Groundwater Recharge to Address Integrated Groundwater and Surface Waters: The ESPA Recharge Program, Eastern Snake Plain, Idaho

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ABSTRACT The Eastern Snake Plain Aquifer (ESPA) Recharge Program aims to recharge an average of 250,000 AFY to mitigate the effects of groundwater pumping on surface water resources and, in doing so, to reduce conflicts between surface and groundwater users. The Idaho Water Resources Board (IWRB) partners with canal and irrigation companies to use IWRB's surface water rights to conduct aquifer recharge through in- and off-canal seepage and direct injection wells. The canal and irrigation companies are paid by IWRB to use their canals and property for recharge sites. From 2014 to 2019, the program achieved 249,028 AFY of average recharge per year. The ESPA Recharge Program serves as a good example of a statewide recharge program that addresses challenges in managing highly connected groundwater and surface water. Moreover, it illustrates the incentives that can emerge for joint management of groundwater and surface water based on legal regimes that integrate the two. The ESPA Recharge Program particularly benefited from its centralized structure, with one state agency, IWRB, given sole control of implementing the recharge program. Nevertheless, the program faces some future obstacles, namely, in securing long-term funding, building out conveyance capacity to transport water to recharge sites during wet years, and modeling groundwater resources adequately. **KEYWORDS** groundwater, managed aquifer recharge, governance, institutions

Overview	
Location	Eastern Snake Plain, Idaho
Groundwater challenges	Depletion of interconnected surface and groundwater
Managed aquifer recharge (MAR) motivating factors	Conflict between groundwater and surface water users due to interconnected water sources
MAR project goal	Recharge 250,000 AFY on average; since 2014, the project has recharged an average of 249,028 AFY
Recharge method	Infiltration in unlined canals or off-canal spreading basins, with some direct injection by injection wells
Water source	Snake River, Big Wood River, and Little Wood River
Key actor(s)	Idaho Water Resources Board (IWRB), Idaho Department of Water Resources, canal companies, and irrigation districts

(continued)

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Challenges	**Technical**—Building sufficient physical capacity to deliver and recharge all available water during wet years; tracking and monitoring recharge flows to understand how recharge affects the aquifer and surface water resources **Institutional**—Building cooperative relationships between the Idaho Water Resources Board and local canal companies and irrigation districts **Funding**—Securing a source of long-term funding from the state and financial contributions from water users **Regulatory**—Obtaining surface water permits to divert water to recharge sites and addressing protests by stakeholders in the permit application process
Milestones	2009—The ESPA Comprehensive Management Plan passed by the Idaho Legislature; IWRB begins piloting recharge projects in the Snake Plains Aquifer 2014—The ESPA Recharge Program fully implemented 2015—Settlement agreement reached between the Surface Water Coalition and the Idaho Ground Water Appropriators 2016—ESPA Recharge Program first exceeds annual recharge goal
Current status	Fully operational; in expansion phase as of this writing
Cost	US$20–25/AF

INTRODUCTION

The Eastern Snake Plain Aquifer (ESPA) Recharge Program is a large-scale program undertaken by the Idaho Water Resources Board (IWRB) to increase recharge in the region in collaboration with canal companies and irrigation districts [1]. The program aims to add 250,000 AFY on average to the aquifer through managed aquifer recharge (MAR) by diverting and infiltrating surface water to the aquifer at multiple recharge sites spread across the basin. It is an ambitious regional effort to address the impacts of groundwater pumping on surface water resources and minimize conflict between groundwater and surface water users. The ESPA Recharge Program is an example of a centrally coordinated model for conducting large-scale recharge across multiple sites and partners, particularly for basins with highly interconnected surface and ground water. Idaho's legal system provides a crucial motivating factor. Because water rights for surface water and groundwater are administered under the same system, water users have greater incentive to work together to improve the health of the basin. The IWRB plays a central role in obtaining water rights, overseeing and contracting recharge projects, and channeling state funding to the program. Water agencies and private canal companies participate in the distributed recharge efforts, incentivized by state funding to cover their costs. Overall, the ESPA Recharge Program provides useful insights for other regions experiencing increasing competition for seasonally constrained resources.

CASE EXAMINATION

Methods

This case study forms part of the journal's special collection entitled "Institutional Dimensions of Groundwater Recharge." The collection examines empirical examples of MAR from across the United States to provide insights on the institutional structures and motivations of MAR implementation. An in-depth description of the special collection and its objectives along with a discussion of the wider context of groundwater management concerns that MAR aims to address is included in Miller et al [2]. Each of the case studies in the collection examines a different physical and institutional design for MAR. Case studies were developed through an analysis of documents and expert interviews. Documents reviewed include reports from governmental agencies implementing the MAR projects, permits and reports from regulatory agencies, state laws and regulations, academic literature and technical reports, and news articles. Interviews were conducted with key individuals involved in the development of each project including government officials, regulators, and project implementors.

Background

The ESPA underlies the eastern portion of the Snake River Plain basin in Southeastern Idaho (figure 1). The Snake River runs east to west along the southern border of the aquifer and is highly hydrologically connected to the aquifer [3]. The predominantly agricultural region

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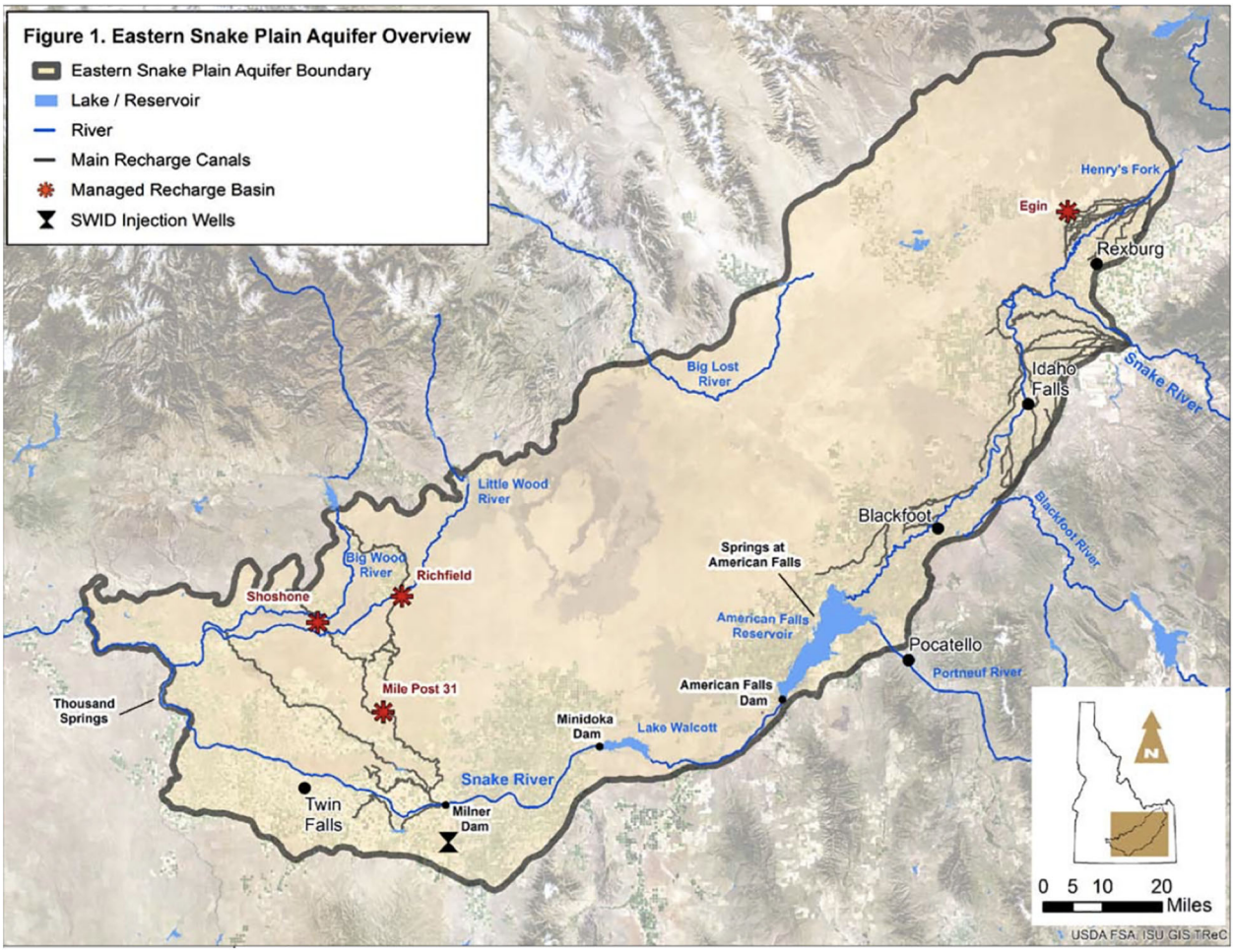

FIGURE 1. Eastern Snake Plain Aquifer and recharge sites. Source: Stewart-Maddox et al. (2018).

includes 2.1 million acres of irrigated lands. Beginning in the 1950s, increasingly efficient irrigation methods reduced the amount of incidental recharge occurring in ESPA, while groundwater pumping for agricultural use increased. Storage in the aquifer declined at a rate of 200,000 AFY, leading to a depletion of surface water flows [3]. These changes ignited protracted, decades-long conflicts between surface and ground water users [4]. Idaho water rights are administered according to prior appropriation, where water rights are determined by priority of beneficial use.[1] The first person to use water or divert water for a beneficial use or purpose can acquire individual rights to the water. In ESPA, surface water users generally have senior priority rights over more junior groundwater users.

At issue was the impact of groundwater pumping on surface flows and how shortages would be addressed. Under Idaho's doctrine of prior appropriation, when a senior priority water right does not have access to the full quantity of water they are entitled to divert due to usage by a junior priority water rights holder, the senior rights holder can ask the state to intervene. To do so, senior water users request that the Idaho Department of Water Resources (IDWR), the state agency that oversees water rights, make a "delivery call" [5]. Given such a request, the Director of IDWR must determine what actions, if any, must be taken to ensure the senior water user receives their designated share of water [5]. Generally,

1. Idaho's prior appropriation system supports conjunctive management of groundwater and surface water resources. The Idaho Department of Water Resources (IDWR) administers surface water and groundwater rights conjunctively; surface water in the Snake River and groundwater in Eastern Snake Plain Aquifer (ESPA) are effectively administered by the state as a single resource. The state's legal water rights management framework reflects the physical interconnection between groundwater and surface water. Idaho Department of Water Resources (2015). A Water User's Information Guide: Idaho Water Rights a Primer. Available: https://idwr.idaho.gov/files/water-rights/water-rights-brochure.pdf.

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such actions entail curtailment of water diversions by junior water users. In the ESPA system, senior surface water users were positioned to make delivery calls that curtailed the water available to groundwater users with junior water rights.

Despite some early efforts by the state to ameliorate the problem, in the 1990s, surface water users began to make delivery calls along the eastern portion of the Snake River [6]. By 2008, the situation was so severe that IDWR issued an order curtailing junior groundwater pumpers. The curtailment order spurred litigation, which had the potential to severely disrupt the economy of the Eastern Snake Plain region [7]. This litigation had two outcomes: The first was the state legislature's creation of the ESPA Comprehensive Aquifer Management Plan (CAMP) in 2009. CAMP was designed to alleviate stress on the entire water system, in the hope of reducing conflicts between water rights holders [7]. The second outcome was a 2015 Settlement Agreement between groundwater and surface water users, in which groundwater users agreed to decrease their net water consumption by 240,000 AFY. The settlement was in part possible due to expectations of recharge from CAMP, and as described below, CAMP's successor, the ESPA Recharge Program.

THE ESPA RECHARGE PROGRAM

As conceived by the Idaho state legislature, the ESPA CAMP aimed to improve the ESPA water budget by 600,000 AFY by 2030 [8]. CAMP proposed a number of concurrent policy options for achieving this goal, one of which entailed increasing MAR in the basin.

Between 2009 and 2014, IWRB, which is the state agency responsible for water planning, financing of water projects, and operation of many water programs throughout the state, collaborated with irrigation districts to implement several MAR projects. Insufficient funding, a lack of broad institutional support, and lack of participation by some key stakeholders meant that the amount of MAR achieved by these early projects was inadequate to entirely meet CAMP goals for recharge [9]. Recognizing that greater state involvement would be necessary to achieve the CAMP recharge goals, state agencies and the state legislature began to contemplate a new, more robust MAR program under the CAMP framework. In 2014, the legislature allocated funding for this more robust and specific MAR program, called the ESPA Recharge Program (or, hereafter, the program), with a target of adding 250,000 AFY on average to the aquifer. This is the program that exists as of this writing.

Under the program, IWRB has an enhanced role. IWRB partners with local water agencies to conduct MAR [10]. Water managers from irrigation districts, groundwater districts, or nonprofit canal companies[2] [11] propose recharge projects to the IWRB.[3] Some partners convey water to the recharge sites, while others actively operate recharge sites in combination with conveyance services. The costs of conveying water and conducting recharge can be significant. If not used for recharge, conveyance infrastructure is largely shut down during the winter months. When the canal companies conduct recharge under the program, they incur the costs of personnel to manage the system, repairs (especially during freezing conditions), complying with reporting requirements, and wear and tear from additional use.[4] IWRB pays partners a conveyance fee for delivering the water to the recharge sites. This fee also covers the costs of infrastructure improvements and other expenses incurred as a result of running a project to recharge water that contributes to the goals of the program.[4]

While the IWRB makes all final decisions regarding the ESPA Recharge Program's operations, stakeholders—including groundwater and surface water users in ESPA, along with environmental interests—are highly engaged in the program. Formally, stakeholders share input through various IWRB committee meetings. These committees provide an opportunity for representatives of municipalities, land developers, surface water users, groundwater users, spring water users, hydropower, and environmental interests to provide input into the administration of the program.[5]

2. Canal companies are private, nonprofit 501(c)3 irrigation organizations that hold rights to surface water. They own and maintain canals to deliver water to fee-paying shareholders.

3. IDWR determines the 5-year retention rate by using its ESPA groundwater flow model to determine what percentage of the water recharged in a certain area would still be in the aquifer 5 years from the time of recharge. Idaho Water Resources Board (IWRB) generally will not approve proposed projects if the calculated 5-year retention rate of the aquifer is less than 15%. Phone correspondence with Wesley Hipke, Recharge Program Manager at Idaho Department of Water Resources (August 9, 2019).

4. Email correspondence with Wesley Hipke, Recharge Program Manager at Idaho Department of Water Resources (September 11, 2020).

5. Committees include IWRB's Aquifer Stabilization and Upper Snake River Advisory Committees and an Environmental Resources and Technical Working Group. *See* Idaho Department of Water Resources. Eastern Snake River Plain Aquifer (ESPA) Plan—Implementation Committee

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Securing water rights for source water through the program has required extensive negotiations between IWRB and other stakeholders. IWRB obtained two of its water rights to the Snake River through a long application process with IDWR. In March 1998, IWRB filed 19 applications with IDWR requesting two more water rights for recharge with points of diversion throughout ESPA.[6] Eleven parties filed protests on the applications [12],[7] including the Idaho Department of Fish and Game, U.S. Fish and Wildlife Service, the U.S. Department of Interior, and Trout Unlimited. The protests cited concerns about the potential impacts of the proposed diversions on existing water rights and the environment.[8] In 2013, IWRB resubmitted eight consolidated applications. IDWR approved two of these applications, totaling 6,569 cfs, after the protesting agencies and the IWRB reached an agreement.[8] After IWRB received its first recharge rights, the agency continued to aggressively expand its recharge rights, even in the face of intense public opposition.

The ESPA Recharge Program has been much more focused than CAMP and has met its goal of recharging 250,000 AFY into the ESPA. Between 2009 and 2012, the program recharged a yearly average of 117,111 AF [13]. Between 2012 and 2016, the state made significant improvements to MAR infrastructure. Subsequently, during the 2016/2017 recharge season, 317,000 AF were recharged, and during the 2017/2018, season over 545,000 AF were recharged [3]. Recognizing the inherently high variability of water supply, the program has achieved on average 249,028 AF of recharge per year since it began, almost exactly its target of 250,000 AFY.

Funding for the program has been fraught since its inception, illustrating a broader theme of state-initiated MAR projects. Originally, water users agreed to fund 60% of the program [8]. But by 2013, water users had only funded 13% of that 60% goal [13]. The legislature attempted to bridge the gap by assessing a fee, but this was abandoned in the face of strong protest in 2010.[9] Instead, to sustain the program, the legislature offered up US$4 million from the state's general fund[10] and US$5 million from state cigarette taxes.[11] These funding sources constitute the basis for the ESPA Recharge Program's budget today.

The Recharge Process

Availability of water for the program depends on seasonal flows and the demands of other water users. The IWRB currently holds surface water diversion rights for recharge. However, these rights are not senior, and thus, water is only available and in priority in wet years or during the winter months, when demands for water from other water users are low.[12]

Water recharged in ESPA under the program is diverted from the Snake River or Big Wood and Little Wood Rivers using existing irrigation canal infrastructure. Diverted water is recharged during its transport in unlined canals, in off-canal spreading basins, or via injection wells. Off-canal recharge can occur whenever water is available for recharge and the canal transporting that water has sufficient conveyance capacity.

Conveyance capacity also is subject to constraints, as canals and infrastructure are often at capacity during the growing season. Most off-canal recharge occurs during the

Contact List. Available: https://idwr.idaho.gov/files/iwrb/2010/2010-ESPA-CAMP-Implementation-Committee.pdf.

6. Idaho Office of the Attorney General. In the Matter of Applications for Permit Nos. 01-7142 and 01-10609 in the Name of Idaho Water Resources Board (April 14, 2017). On file with authors.

7. Parties may protest water rights applications with IDWR. Parties are then given an opportunity to negotiate privately. If negotiations fail, IDWR schedules a formal hearing. "After the hearing, the IDWR hearing officer reviews all evidence and testimony, and then issues a recommended order which is a document detailing the recommended decision in the case. The record is also reviewed by the IDWR director who issues a final order which sets out the formal IDWR decision. Depending on the specific application, the technical complexities involved, the number of protests, administrative appeals, court challenges, and so forth, the process can take months or even years to complete."

8. Idaho Office of the Attorney General. In the Matter of Applications for Permit Nos. 01-7142 and 01-10609 in the Name of Idaho Water Resources Board (April 14, 2017). On file with authors.

9. Senate Bill 1407. 60th Legislature, Second Regular Session 2010. Available: https://legislature.idaho.gov/sessioninfo/2010/legislation/S1407/.

10. Idaho House Bill 479. 62nd Legislature, Second Regular Session 2014. Available: https://legislature.idaho.gov/sessioninfo/billbookmark/?yr=2014&bn=H0479.

11. Statement of Purpose, Idaho House Bill 547. 62nd Legislature, Second Regular Session 2014. Available: https://legislature.idaho.gov/wp-content/uploads/sessioninfo/2014/legislation/H0547SOP.pdf.

12. For example, the U.S. Bureau of Reclamation's water right for generating hydroelectric power at Minidoka Dam limits when managed recharge can occur above Minidoka in winter months to about half of all years. Downstream of Minidoka, water is available almost every day during the winter months. During the irrigation season, less water is available for recharge as irrigation rights are in priority. In about two-thirds of years, managed recharge can occur during a 30-day window in early summer. Per IWRB policy, recharge operations also may not impact storage in the reservoir system on the Snake River. See Refs. [3, 9].

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winter months, when infrastructure is not being used to convey water for agriculture.

Water quality is not a predominant concern for the program. This is because water recharged through the program would generally flow through the river, infiltrating to the connected aquifer irrespective of the program, albeit to a much lesser degree. Nonetheless, steps are taken to ensure water quality. Protection measures vary with the mechanism for recharge. The Idaho Department of Environmental Quality requires a monitoring plan for each recharge site that utilizes spreading basins. These plans must show that the recharge will not pollute groundwater, based on the site's specific geology, hydrology, and soil characteristics [3, p. 7]. IDWR is responsible for permitting and overseeing groundwater quality when managed recharge is performed via injection wells. To date, there have been no reports of problems or concerns related to water quality associated with the program [3, p. 7].

Accounting

Recharge is tracked at multiple stages throughout the process. Only recharge that occurs through managed recharge operations and specifically for the purpose of meeting the CAMP recharge goal is counted toward the annual 250,000 AFY program goal. Recharge that occurs through seepage from unlined canals during the irrigation season (April through October) is not counted [3]. Each entity that conducts recharge for the program has a monitoring plan that measures the water diverted for recharge. Diverted water includes water that leaves the aquifer system by returning to the river, water diverted to another canal system, and water diverted to off-canal sites. Actual infiltration is not measured, and there is no exact accounting for water once it is recharged to the aquifer.

In addition to monitoring diversions for recharge, IDWR operates a monitoring program of 460 wells across ESPA. This monitoring program tracks progress toward CAMPs aquifer stabilization benchmarks [3]. Under the terms of the 2015 Settlement Agreement, groundwater users agreed to metering of groundwater wells in ESPA, an agreement later formalized by an IDWR order.[13] Water district watermasters collect and annually report groundwater metering data to IDWR.[13]

While monitoring diversions for recharge and water levels provides some insights on the effect of recharge activities on water levels and river flows, additional information is needed to fully understand the aquifer and river dynamics. To address this shortcoming, IWRB is working to develop a groundwater model that can assist identifying and tracking flows that occur as a result of recharge as of 2020. IWRB is also in the process of establishing a detailed monitoring plan for the region. This monitoring will collect data in key recharge areas and will include localized groundwater transducer networks, dye-testing, and water chemistry analysis.[14]

Costs and Financing

Between 2014 and 2019, the IWRB spent over US$20 million on the ESPA Recharge Program [14]. The major expenditures are fees paid to partner irrigation districts and canal companies for conducting recharge. As described above, those entities propose projects to IWRB. If IWRB approves a project, it enters into a contract with the partner agency that agrees to recharge IWRB water for 20 years in exchange for payments based on the costs of conveyance and infrastructure improvements. These arrangements have generally been seen as win-win. Partner agencies gain funding for infrastructure that they need to operate during the growing season, and IDWR avoids the need to build and operate its own infrastructure. Ultimately, recharged water increases groundwater levels, making more water available for appropriation during the growing season.

SUCCESS FACTORS AND CHALLENGES

The ESPA Recharge Program has achieved greater success than prior MAR efforts in the region, including CAMP. At least three reasons explain the improvement: (1) extensive state agency management and financing; (2) voluntary partnerships between state agencies, canal companies, and irrigation districts; and (3) buy-in from private and public stakeholders, which stems in part from laws that conjunctively manage surface and groundwater in the state.

One of the most important reasons for the ESPA Recharge Program's success is the state's strong role in leading the recharge effort, securing and administering water rights to supply the recharge sites, overseeing recharge

13. Exceptions exist for domestic and stockwater users and small irrigators. Idaho Department of Water Resources (June 2016). Final Order Requiring Measuring Devices for Ground Water Diversions in the Portions of Water Districts Nos. 31, 34, 100, 110, 120, 130, and 140 Overlying the Eastern Snake Plain Aquifer. https://idwr.idaho.gov/files/legal/orders/2016/20160615-Final-Order-Requiring-Measurement-Devices-ESPA.pdf.

14. Phone correspondence with Wesley Hipke, Recharge Program Manager at Idaho Department of Water Resources (August 9, 2019).

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financing, and monitoring. The state's initial impetus for taking a more active role in groundwater management in the ESPA region was to help reduce the conflicts between groundwater and surface water users, as these conflicts had become a real economic threat to the region. Under CAMP, the state and stakeholders expected water users would conduct recharge on their own, but emergent efforts by water users failed to meet MAR goals established by CAMP. Consequently, the state legislature saw the need for even more intensive state management. It thus created the ESPA Recharge Program and designated IWRB as the state agency to oversee and administer it.

IWRB's role in securing water rights for recharge has also been essential to the success of the program. These water rights enable a designated source of water for recharge, making use of flows that had otherwise gone unappropriated during nongrowing seasons. Consequently, recharge is not contingent on other water users foregoing their water rights, nor on individual rechargers navigating the water rights process. Without this centralized role, these administrative hurdles to large-scale recharge would be immense.

Finally, voluntary, cooperative partnerships between the state and canal companies and irrigation districts have proved essential to accomplishing the state's recharge goals. These partnerships make it possible to take advantage of existing infrastructure to conduct the recharge.

While the program has been successful to date, its long-term effectiveness will be contingent on navigating a variety of future stresses. The primary challenges include sustained funding and infrastructure capacity. Continued financing for the program remains a concern. Currently, the program relies heavily on funding from the state legislature. Water users have occasionally contributed to the recharge program through infrastructure improvements and contributions of water for recharge, but collectively they have continually fallen short of their initially expected financial contribution to the program. The longevity of the program thus depends either on its ability to remain a political priority for the state legislature or the development of alternative funding mechanisms. How to elicit greater willingness to contribute by water users remains an unanswered question. Even though water users directly benefit from the increased availability of water, conflicts between who should pay have not been resolved.

Access to water conveyance infrastructure is another critical concern. The ESPA Recharge Program is a public program that conducts recharge for the benefit of the entire region. However, other recharge projects are also being developed within the region. Under Idaho Law and as part of the CAMP program, groundwater users are allowed to offset their pumping by conducting recharge outside of the auspices of the program. Thus, during wet years, when surplus water is available for recharge, there is competition for the use of conveyance infrastructure. To date, the IWRB has managed this conflict through its long-term contracts with partnering canal companies and irrigation districts. Under those contracts, when water is available for IWRB to recharge, both agree to recharge IWRB's water. However, IWRB's ability to expand recharge is constrained, as potential partners may choose instead to conduct recharge for their own purposes or for other private entities, rather than enter into contracts with IWRB.

CONCLUSION

The ESPA Recharge Program is geared to address decades of water management challenges in Idaho's Eastern Snake Plain resulting from long-standing mismanagement of regional groundwater resources. Developing a large-scale solution to protracted conflicts between groundwater and surface water users rested on Idaho's legal treatment of groundwater and surface water as legally interconnected. This unified legal doctrine enabled a combination of leverage and uncertainty that lead the parties to seek alternative solutions. Illustrating a highly centralized, large-scale model for recharge, the program has achieved significant success in meeting its ambitious goal to improve streamflow and basin conditions by recharging 250,000 AFY.

In part because of the centralized nature of the program, strong state leadership has been essential to its success. In particular, the strong leadership role of state agencies has been instrumental. These agencies, in particular IWRB, have engaged substantively in the design of recharge mechanisms using existing infrastructure, stewarded a consistent technical approach, motivated tangible legislative support, and developed entitlements to water for use in recharge. The result has been a programmatically streamlined but physically distributed recharge network which has produced clear benefits for a range of individual stakeholders and the regional aquifer system, as well as depressurizing a long-standing conflict between classes of water rights holders.

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While state entities have been critical to the operation of the program, the state naturally does not operate in a vacuum. Buy-in and cooperation from a range of partnering entities has been important to the success of this program. Water users, organized as irrigation districts or canal companies, carry out many of the recharge actions. These groups have performed recharge or enabled the repurposing of existing infrastructure in support of recharge for the program. This collaborative aspect has made the program more efficient and allowed it to expand faster than it would have if the state alone was responsible for managing individual recharge projects, and the distributed nature of these partnerships further emphasizes the importance of a centralized entity with the capacity to negotiate and manage multiple relationships with a single broader goal. Water users are generally supportive of recharge projects in ESPA but have been unable or unwilling to pay for it. Thus far, the state has stepped in to support the project with funding from other sources, rather than see it languish.

While physical, funding, and political challenges to the program's continued success remain, other states considering large-scale programs can learn from the program's structure and can consider whether empowering state agencies for large-scale recharge might enable creative use of existing resources to increase recharge.

KEY TERMS AND ACRONYMS

(AF) *Acre-feet*—A volume of water that would cover one acre at a height of one foot. Equivalent to 325,851 gallons or 1,233 cubic meters.

(CAMP) *ESPA Comprehensive Management Plan*—Idaho's plan for managing the Eastern Snake Plain Aquifer, implemented in 2009. CAMP aims to add 600,000 AFY to the ESPA water budget by 2030.

(ESPA) *Eastern Snake Plain Aquifer*—An aquifer covering 10,800 square miles in Southeastern Idaho, comprising the eastern portion of the Snake River Plain basin.

(ESPA Recharge Program or program) *Eastern Snake Plain Aquifer Recharge Program*—A Program designed to alleviate conflicts between groundwater and surface water users of the aquifer, by contributing at least 250,000 AFY to recharge.

(IDWR) *Idaho Department of Water Resources*—The state agency that administers water rights and issues delivery calls.

(IWRB) *Idaho Water Resources Board*—The state agency primarily responsible for administering CAMP and implementing the ESPA Recharge Program.

(MAR) *Managed Aquifer Recharge*—Intentionally inducing water to flow into an aquifer, typically through a project that utilizes specific infrastructure.

(Program) *see* ESPA Recharge Program.

AUTHOR CONTRIBUTIONS

K.M. researched and wrote the original draft. P.G., K.F., and J.T. contributed to research and writing. M.K. and A.M. reviewed and edited the article, and conceptualized, secured funding for, and managed the project.

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COMPETING INTERESTS

The authors have declared that no competing interests exist.

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