

STRATEGY 9

Increase awareness of the value of GDEs and the need to protect and reduce impacts to them

Why this strategy is needed

Even though half of Nevada's counties received over 80% of their water supplies from groundwater in 2015 (Dieter et al. 2018), groundwater is a hidden resource that is underground with complex spatial and temporal dynamics (Saito et al. 2021; United Nations 2022), so many people may not be aware of groundwater issues or how they may affect their lives and ecosystems they care about. Increased public awareness of groundwater at all levels (i.e., K-12, university, citizens, stakeholders, and decision-makers) enables informed action on water issues (Cherry 2023) and knowledge democratization (Cherry 2020), but a study of media coverage on California's Sustainable Groundwater Management Act between 2014 and 2019 found that gaps in representation of stakeholders (especially disadvantaged communities), and lack of knowledge about GDEs and solutions could contribute to low levels of engagement by the public in groundwater planning (Bernacchi et al. 2020). A recent study of threats to rare plants in Nevada, some of which are GDEs, found that a majority of Nevada's rare plants occur on BLM land and the largest observed threats were due to recreation (McClinton et al. 2022), so educating people accessing GDEs for recreation may help reduce impacts. Resources such as [The Groundwater Project](#) and the [Nevada Indicators of Groundwater Dependent Ecosystems story map](#) can be useful for educating people about groundwater and GDEs.

Examples of actions associated with this strategy

- Partner with networks and local groups to learn about management options and share knowledge of GDEs
- Build and use accessible K-12 and higher education curricula about groundwater and GDEs (see [The Groundwater Project](#) for some examples)
- Involve K-12 and higher education students in monitoring and reporting about GDEs
- Educate legislators and judges about groundwater and GDEs to enable informed decision-making on issues that can affect GDEs
- Educate and involve disadvantaged communities to empower them to take action and participate in sustainable planning for GDEs and groundwater
- Educate recreational users about GDEs, their value, and how to reduce impacts

Challenges and considerations

Increasing awareness of GDEs is a long-term strategy that involves a social shift and may be slow to influence change and can be difficult to measure. It will also require funding and capacity to develop curricula and public resources, which might also involve using public relations specialists to develop a campaign to truly reach a broad base that will translate under-

standing to action. This strategy will be more effective if done in conjunction with Strategy 1 to fill knowledge gaps about GDEs, and it is unlikely to make substantial impacts unless other strategies are in place or developed from the increased awareness (e.g., Management Strategies). However, none of the stressors and threats can be reduced without education; when people are more educated about a topic, they can be more conscientious about it, choose direct action to reduce the stressor or threat, or reduce a stressor or threat by participating in the decision-making process in their communities.

Qualitative assessment of the effectiveness of Strategy 9's ability to reduce the impacts of each GDE stressor and threat.

STRESSOR RISK	EFFECTIVENESS
S1: Groundwater pumping status	<i>Somewhat Likely</i>
S2: Declining groundwater level trends	<i>Somewhat Likely</i>
S3: Current climate	
S4: Ungulate impacts	
S5: Non-native species presence	<i>Somewhat Likely</i>
S6: Surface diversions	<i>Somewhat Likely</i>
S7: Urbanization	
THREAT RISK	EFFECTIVENESS
T1: Appropriation status	<i>Somewhat Likely</i>
T2: Potential withdrawal proximity to GDEs	<i>Somewhat Likely</i>
T3: Future climate	<i>Somewhat Likely</i>
T4: Non-native species spread	
T5: Future urbanization	<i>Somewhat Likely</i>

