## Sierra Valley GSP Groundwater Dependent Ecosystems

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## Potential GDEs (Draft)

- There are 17,355 acres of likely GDEs in Sierra Valley
- Most of the GDEs include the wetlands in the eastern half of the basin
- GDE mapping is limited by relatively low- quality vegetation mapping



## **Potential GDEs**

- Most of the GDEs include the wetlands in the eastern half of the basin
- GDE mapping is limited by relatively lowquality vegetation mapping
- Information not sufficient to assess rooting depth



## Part 2: Sensitive Species: Methods

- 1. Query species data sources within the basin plus a 1-mile buffer. Data sources include:
- California Natural Diversity Database (CNDDB);
- California Native Plant Society Manual of California Vegetation;
- eBird ;
- TNC freshwater species lists generated from the California Freshwater Species Database); and
- USFWS's Information for Planning and Consultation (IPaC) portal (USFWS 2021).
- 2. Assess likelihood of groundwater dependence in Sierra Valley based on available literature



Braudrick et al., 2018 (figure by K. Rodriguez and A. Merrill)

# Who are the likely special-status users of GDEs?



Туре	Number of species
Plants	6
Sensitive Natural Communities	1
Amphibians	1
Birds	10
Mammals	7

Photo by Andrew Wright/Lighthawkphoto

#### What Groundwater Dependent Special Status Species are Present? (Draft)

Plants (6)		Birds (10)		Mammals (7)	
Lemmon's milk-vetch	Astragalus lemmonii	American white pelican	Pelecanus erythrorhynchos	American badger	Taxidea taxus
		Bald eagle	Haliaeetus leucocephalus	Fringed myotis	Myotis thysanodes
Scalloped moonwort	Botrychium crenulatum	Bank swallow	Riparia riparia	long-eared myotis	Myotis volans
		Black tern	Chlidonias niger	Pallid bat	Antrozous pallidus
Mingan moonwort	Botrychium minganense	Canvasback	Aythya valisineria	Sierra marten	Martes caurina
		Greater sandhill crane	Antigone canadensis tabida		sierrae
Watershield	Brasenia schreberi	Redhead	Aythya americana	Spotted bat	Euderma maculatum
		Swainson's hawk	Buteo swainsoni	Yuma myotis	Myotis yumanensis
Plumas ivesia	Ivesia sericoleuca	Willow flycatcher	Empidonax traillii	Amphibians (1)	
		Yellow-headed blackbird	Xanthocephalus		Ambystoma
Santa Lucia	Juncus luciensis		xanthocephalus	Southern long-toed salamander	macrodactylum
					sigillatum
uwarrrusii					



Montane Freshwater Marsh



Photo by Andrew Wright/Lighthawkphoto



#### The GDEs in the Sierra Valley Groundwater Basin have a high ecological value

Due to the large number of special-status groundwater dependent species and the sensitive natural community directly tied to GDEs the GDEs in the Sierra Valley Groundwater Basin have a high ecological value. The Audubon Society has designated Sierra Valley as an Important Bird Area.



### **Tracking GDE Health**

#### NDVI

- Normalized Differential Vegetation Index How green are the plants?
- Increases in NDVI correspond to higher plant density and leaf area







Source: https://www.agricolus.com/en/indici-vegetazione-ndvi-ndmi-istruzioni-luso/

# Tracking GDE health: NDVI change from 2011-2020

- Summer (July-September) NDVI from Landsat imagery
- 30-m resolution
- Data Processed in Google Earth Engine

SIERRA VALLEY GROUNDWATER SUSTAINABILITY PLAN <sup>O</sup>Lake Davis Porto Rock Creek NDVI Slope within Potential GDEs Map Sources: Map Location Groundwater basin: DWR GDEs: CalVeg, NWI, and DWR Slope of NDVI change (2000 to 2020) Groundwater Basin NDVI: Landsat 5/7/8 Hillshade: USGS 0.04 Potential GDEs Sacrament Stillwater Science

## Mean NDVI of mapped GDEs is relatively steady through time



#### Summer NDVI generally higher during wet years



- Vegetation map quality is not sufficient to assess rooting depths and the degree to which GDEs are connected to groundwater
- A subsequent map was begun by CDFW, but is currently on hold.
- Incomplete understanding of the connection to groundwater and interconnected surface water beneath GDEs

