



## Nevada Water Science Center

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## Southern Amargosa eMbedded Model (SAMM)

The study area for SAMM is in the southern part of the Amargosa Desert, in southern Nevada and eastern California, and is part of the DVRFS. In the DVRFS, natural groundwater discharge at springs and seeps sustains habitat for numerous species, many of which are threatened, endangered, or otherwise considered sensitive. This study will provide information and management tools to make more informed decisions about allocating water resources in the DVRFS and help resolve ongoing conflicts between stakeholders with disparate interests in the region. The DVRFS model was constructed to address regional concerns but lacks sufficient resolution to adequately address local-scale issues; the proposed embedded flow model will have sufficient resolution to simulate groundwater flow on a local scale.

### Research plan

The following general sequence of work has been developed:

- Refinement of the Hydrogeologic Framework,
- Conceptualization of SAMM area,
- Flow model design,
- Calibration of an embedded model of the southern part of the Amargosa Desert, and
- Apply the embedded model.

### Background

The DVRFS is located in the southern Great Basin physiographic province in southern Nevada and eastern California. Because of the arid nature of this region, its increased urbanization, and the presence of potential contamination from the Nevada National Security Site and the Yucca Mountain site, there are many varying and competing interests involving the regional groundwater resources. Some of these competing interests include the preservation of habitat, resource protection, and resource development. The DVRFS groundwater flow model provides stakeholders with a valuable tool for managing scarce water resources in the region and an important tool for addressing complex socio-economic issues.

Federal land-management agencies responsible for land and natural-resource management and Nye County are concerned that increased groundwater pumping of existing wells, as well as from new points of extraction in southern Amargosa Desert and Pahrump Valley, could impact nearby water-dependent ecosystems by reducing the amount of groundwater discharge and lowering shallow water tables. Ground-water discharges at Ash Meadows National Wildlife Refuge, at numerous springs and seeps, and along parts of the Amargosa River. Additionally, groundwater is intersected at Devils Hole, a fissure in a regional carbonate-rock aquifer. These areas typically support habitat for numerous species of plants and animals, including several federally-listed threatened and endangered species.

Federal land-management agencies have been working with stakeholder groups to reach consensus on water-resource development concerns for areas down-gradient of the Nevada National Security Site, particularly in the southern part of Amargosa Desert. Alternatives and options are being evaluated that may protect water-dependent ecosystems within the flow system but also allow for withdrawal of additional groundwater supplies needed to support continued population and economic growth. The U.S. Department of Energy National Nuclear Security Administration is interested in continued support and maintenance of the USGS DVRFS groundwater flow model (Belcher and Sweetkind, eds., 2010).

One approach to evaluate concerns in the southern Amargosa Desert is the application of the regional USGS DVRFS flow model (Belcher and Sweetkind, eds., 2010) to develop a more detailed, embedded flow model of the southern part of the Amargosa Desert. The embedded model will simulate groundwater flow for an area in the southern part of the Amargosa Desert and will provide an adaptive management tool to address water-resource issues for this important sub-region of the DVRFS. The embedded model area includes Ash Meadows, Devils Hole, the Amargosa Farms area, and Stewart Valley. Upgradient of this area are the Spring Mountains, Nevada National Security Site, and Yucca Mountain, and downgradient is Death Valley National park. The model area also contains Stewart Valley, an area of potential hydraulic connection between Amargosa Desert and Pahrump Valley. Pahrump Valley is of importance due to the potential of increased urbanization and associated groundwater pumping. If a hydrologic connection exists, increased pumping in Pahrump Valley may impact water levels in Amargosa Desert.

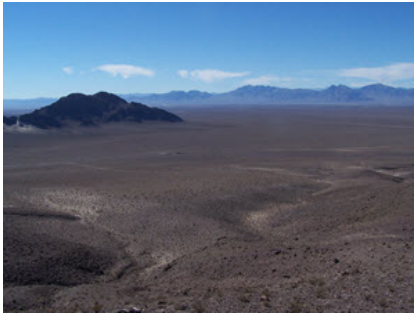
Water-dependent areas and issues of particular concern include effects of groundwater pumping on:

- Health and management of aquatic species or riparian habitat at Ash Meadows National Wildlife Refuge, Devils Hole, and selected reaches of the Amargosa River,
- Health and management of mesquite-woodland habitat,
- Federal water-rights allocations, and
- Flow paths from the NNSS and Yucca Mountain.

Additional issues include the:

- Hydraulic connection between Amargosa Desert and Pahrump Valley through Stewart Valley,

Hydraulic connection between Devils Hole and the Amargosa Farms area, and  
Influence or control of known geologic structures on groundwater flow rates and direction.



### Quick Facts

Location: Southwestern Nevada, Southeastern California

Start Date: 2010

End Date: 2016

Cooperators: [U.S. Fish and Wildlife Service](#), [National Park Service](#), [Bureau of Land Management](#), [Nye County](#), and [U.S. Department of Energy](#)

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### Abbreviations

DVRFS: Death Valley Regional Groundwater Flow System

SAMM: Southern Amargosa Embedded Model

NNSS: Nevada National Security Site

[U.S. Department of the Interior](#) | [U.S. Geological Survey](#)

URL: <http://nevada.usgs.gov/water/studyareas/samm.htm>

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page Last Modified: April 3, 2015