F3.3.5

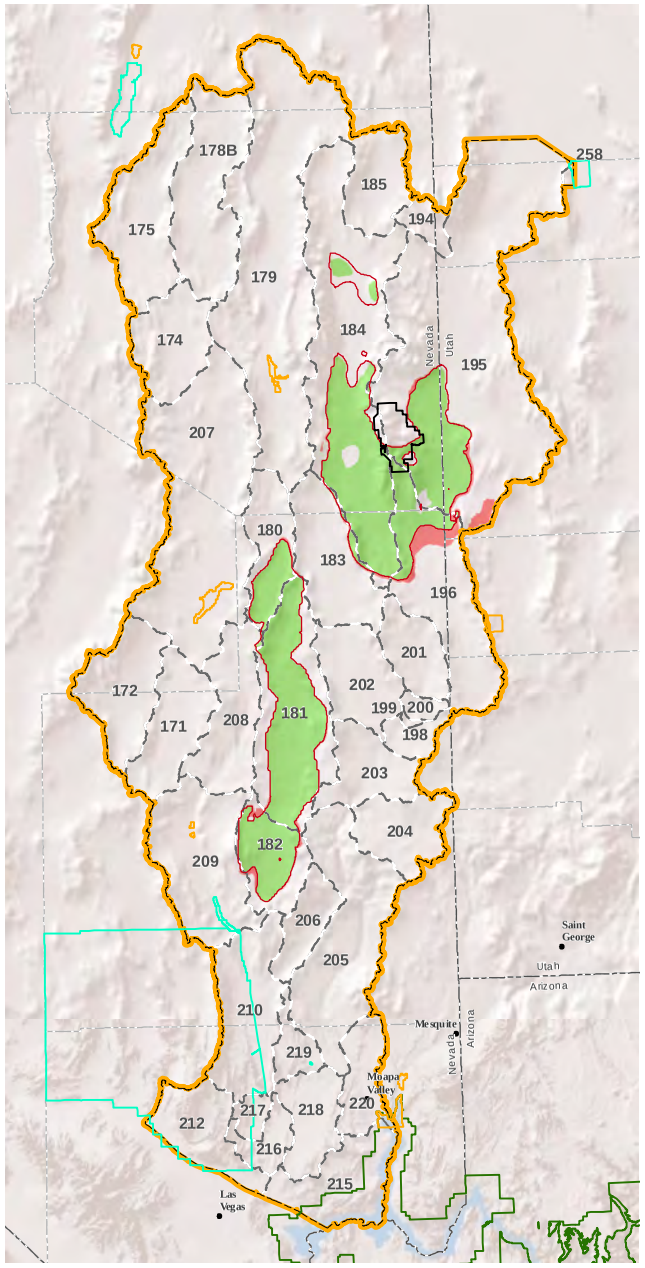
Pumping Cessation-Recovery Analysis

Pumping Cessation – Recovery Analysis

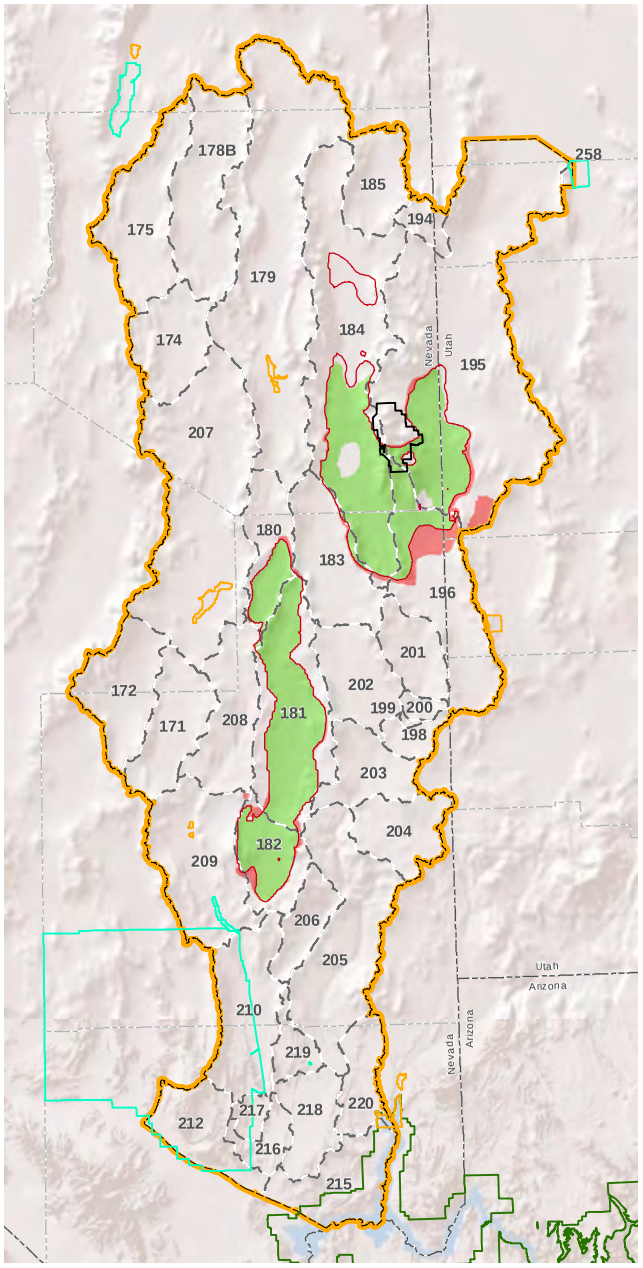
A major issue regarding the concept of adaptive management is the ability of the groundwater system to recover to pre-pumping conditions if pumping were terminated at some point in the future in specific areas. Of particular interest is how quickly the groundwater levels flow would recover if the pumping were terminated. The groundwater flow model was used to evaluate recovery for a hypothetical test case where pumping simulated under the Alternative A pumping scenario was terminated 75 years after full build out as described in the model simulation report (SNWA 2010b). The simulated recoveries of water levels were evaluated at 10, 20, 50 and 125 years after pumping cessation. Comparisons of the drawdown areas (defined as the area affected by 10 feet or more of drawdown) at the point at which pumping is terminated with the residual drawdown areas after 10, 20, 50 and 125 years after cessation of pumping are provided in **Figures F3.3.5-1** and **F3.3.5-2**. The areas defined as "Expanded Drawdown" shown on these figures indicates new areas that would be affected by 10 feet or more of drawdown after pumping cessation. The comparison of the initial drawdown areas with the residual drawdown areas indicates that for this hypothetical test case the residual drawdown area is predicted to persist over most of the initially affected area for at least 50 years. After 125 years of recovery, the drawdown areas in central Spring Valley and in most of Snake Valley and northern Hamlin Valley have recovered. However, residual drawdown is predicted to persist over most of the original drawdown area in southern Spring Valley and in Cave, Dry Lake, and Delamar valleys even after 125 years of recovery. In summary, the results from this hypothetical test case indicate that if an area is affected by drawdown of 10 feet or more, and the pumps are shut down to manage drawdown impacts, it is likely that the residual drawdown area (as defined above) would persist for decades (or longer) in most areas.

The simulated recoveries at six selected observation wells located within the proposed pumping basins are presented in **Figure F3.3.5-3**. The locations of the six observation wells are shown in **Figure 3.3.2-5**. The hydrographs illustrate the predicted rate and magnitude of water level decline and recovery resulting from the pumping and recovery test scenario described above. The model simulation results indicate that the water levels for the wells in Spring and Snake valleys gradually recover to less than 10 feet over the 125-year simulation period; whereas the water levels in Cave, Dry Lake, and Delamar valleys only partially recover over the 125-year recovery period. Moreover, the water levels in Cave and Dry Lake valleys have residual drawdowns of about 40 and 20 feet, respectively, that persist over the entire recovery period.

10 Years After Pumping Cessation



20 Years After Pumping Cessation



Legend

- 10 Ft. Drawdown Contour

10 Ft. Drawdown Polygon

- Residual Drawdown
- Expanded Drawdown
- Region of Study
- Hydrographic Basin
- Great Basin National Park
- Lake Mead National Recreation Area
- National Wildlife Refuge
- State Wildlife Management Area

Basin #	Basin Name	Basin #	Basin Name
171	Coal Valley	202	Patterson Valley
172	Garden Valley	203	Panaca Valley
174	Jakes Valley	204	Clover Valley
175	Long Valley	205	Lower Meadow Valley Wash
178B	Butte Valley (Southern Part)	206	Kane Springs Valley
179	Steptoe Valley	207	White River Valley
180	Cave Valley	208	Pahroc Valley
181	Dry Lake Valley	209	Pahranagat Valley
182	Delamar Valley	210	Coyote Springs Valley
183	Lake Valley	212	Las Vegas Valley
184	Spring Valley	215	Black Mountain Area
185	Tippett Valley	216	Garnet Valley
194	Pleasant Valley	217	Hidden Valley (North)
195	Snake Valley	218	California Wash
196	Hamlin Valley	219	Muddy River Springs Area
198	Dry Valley	220	Lower Moapa Valley
199	Rose Valley	258	Fish Springs Flat
200	Eagle Valley		
201	Spring Valley		

Proposed Clark, Lincoln, and White Pine Counties Groundwater Development Project

Figure F3.3.5-1

Residual Drawdown at 10 and 20 Years After Pumping Ceases

0 5 10 15 20 25 50 75 Miles
0 10 20 30 40 50 100 Kilometers

1:3,000,000

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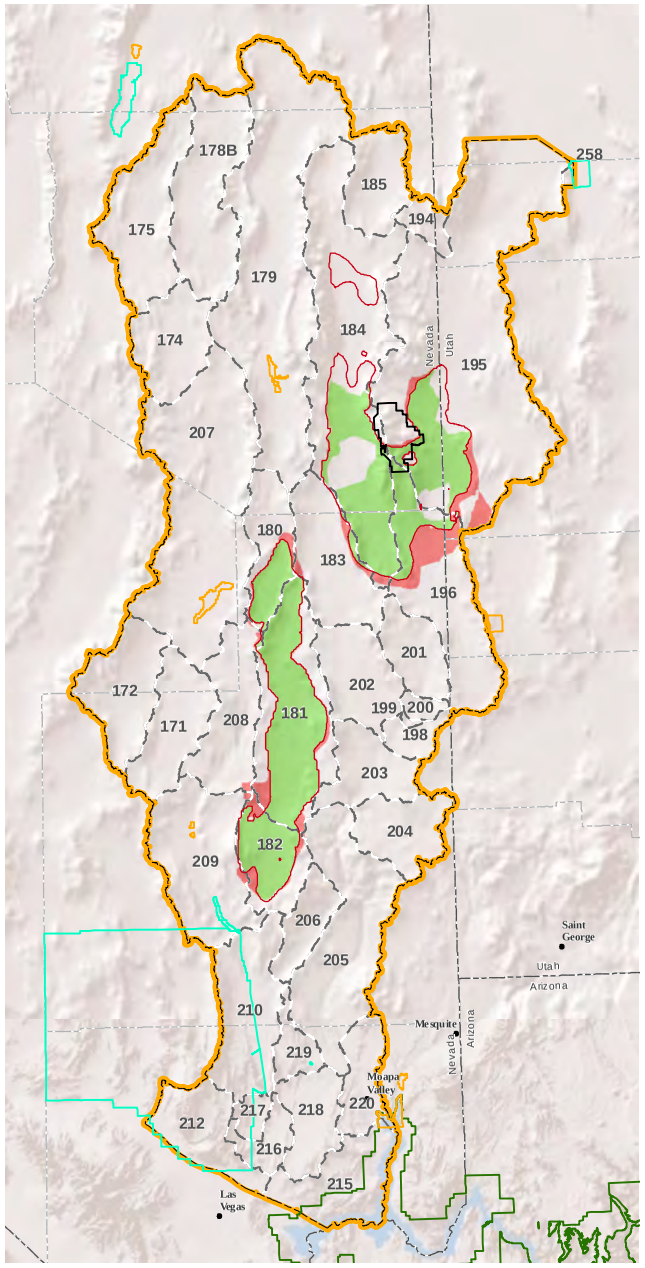
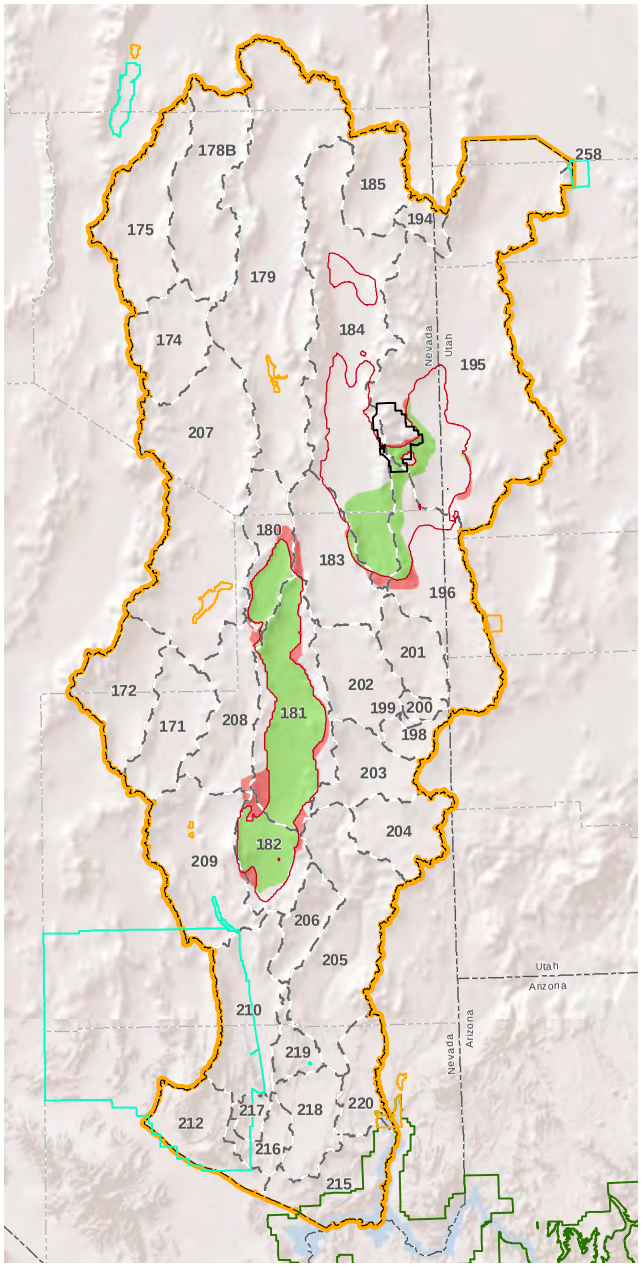
No Warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.

50 Years After Pumping Cessation



125 Years After Pumping Cessation



Legend

- Alternative A 10 Ft. Drawdown Contour 75 Years After Full Build Out

10 Ft. Drawdown Polygon

- Residual Drawdown
- Expanded Drawdown
- Region of Study
- Hydrographic Basin
- Great Basin National Park
- Lake Mead National Recreation Area
- National Wildlife Refuge
- State Wildlife Management Area

Basin #	Basin Name	Basin #	Basin Name
171	Coal Valley	202	Patterson Valley
172	Garden Valley	203	Panaca Valley
174	Jakes Valley	204	Clover Valley
175	Long Valley	205	Lower Meadow Valley Wash
178B	Butte Valley (Southern Part)	206	Kane Springs Valley
179	Steptoe Valley	207	White River Valley
180	Cave Valley	208	Pahroc Valley
181	Dry Lake Valley	209	Pahranagat Valley
182	Delamar Valley	210	Coyote Springs Valley
183	Lake Valley	212	Las Vegas Valley
184	Spring Valley	215	Black Mountain Area
185	Tippett Valley	216	Garnet Valley
194	Pleasant Valley	217	Hidden Valley (North)
195	Snake Valley	218	California Wash
196	Hamlin Valley	219	Muddy River Springs Area
198	Dry Valley	220	Lower Moapa Valley
199	Rose Valley	258	Fish Springs Flat
200	Eagle Valley		
201	Spring Valley		

Proposed Clark, Lincoln, and White Pine Counties Groundwater Development Project

Figure F3.3.5-2

Residual Drawdown at 50 and 125 Years After Pumping Ceases

0 5 10 15 20 25 50 75 Miles
0 10 20 30 40 50 100 Kilometers

1:3,000,000

N

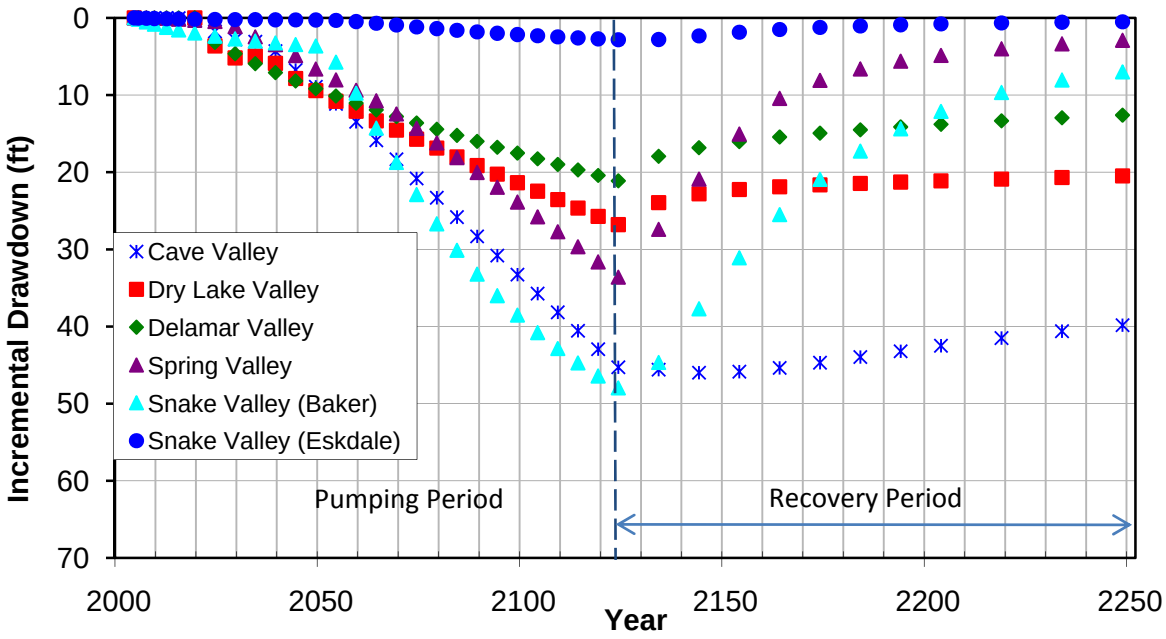


Figure F3.3.5-3 Drawdown Recovery Analysis- Water Level Hydrograph for Sected Locations in Spring, Snake, Cave, Dry Lake, and Delamar Valleys