Arizona Aquifer Recharge Suitability Analysis

Travis Zalesky[1]

[1]University of Arizona,

Corresponding author: Travis Zalesky, travisz@arizona.edu

Abstract

Aquifer recharge can be either passive or active, and is implemented in a variety of ways. This analysis seeks to identify regions across AZ which are boadly suitable for aquifer recharge projects as a general template for more focuse analysis.

Plain Language Summary

Identifying regions in AZ where surface water can be stored long-term as ground water.

1 Introduction

2 Data & Methods

2.1 Elevation

2.1.1 DEM

Elevation and elevation derivatives from 30-m NASA SRTM. USGS 3-DEM (10m) product not suitable for full study area analysis due to (1) the large area of missing data in Mexico, and (2), the excessively high spatial resolution (massively increasing computational requirements).

SRTM elevation sinks filled prior to calculating slope and aspect.

Should elevation be directly used in the suitability analysis?

2.1.2 Slope

Slope derived from hydrologically conditioned (filled) 30-m SRTM layer using quadratic surface function and a fixed 30-m neighborhood. Slope measured in °.

> Higher slopes are less suitable because thinning is both more expensive and more precipitation will end up as runoff.

Slope classified from 1-10 using a continuous function in ArcPro Suitability Mapper.

2.1.3 Aspect

Aspect calculated as with slope. Aspect reference point at N. Pole.

> Aspect has a large impact on solar radiation. Closer to 0 or 360 is desired, low suitability scores for closeness.

Aspect classified from 1-10 using a continuous function in ArcPro Suitability Mapper.

2.2 Precipitation

Data source?

- **PRISM normals**
  - 800m resolution
  - All months (30-Y)
- **Custom PRISM**
  - 1Km resolution
  - Subset months of interest
  - Custom date range
  - Custom averaging function
  - More granular control over data

Also applies to Temp and other Climactic variables of interest.

45 ## 2.3 Vegetation Characteristics

46 ### *2.3.1 NLCD 2021 Total Canopy Cover*

47 ### *2.3.2 Landfire*

48 ## 2.4 Soil Hydrology

49 AZ_Soil_Hydric_Group data layer

50 **Classification Schema**

Class	Count (pixels)	Text	Value
A	62559472	Group A soils consist of deep, well drained sands or gravelly sands with high infiltration and low runoff rates.	10
B			
C			
D			
A/D			
B/D			
C/D			

51 # 3 Conclusion

52 # References