State-wide analysis of suitable areas for Opportunistic Recharge Enhacement on Roads and Hillslopes of Arizona

Ryan E. Lima

Abraham E. Springer

Temuulen Tsagaan Sankey

2024-08-28

Abstract

None

## 1 Literature Reviewed

Source: [Article Notebook](https://Ryan3Lima.github.io/ATUR-Hillslope-Road/index.ipynb.html)

**Uncovering the gaps in manage aquifer recharge for sustainabile groundwater: A focus on hillslopes and mountains** (Meles et al. 2024)

*Key findings:*

1. This paper recommends using mountain/hillslope managed aquifer recharge Hillslope-MAR and water chaptured by roadside channel networks as a potential new source and setting for MAR applications.
2. Suggests that road system-based managed aquifer recharge (Road-MAR) could have high potential for enhancing recharge through things like infiltrations channels.
3. Roads on mountain sides and hillslopes passing through areas with high concentrations of lineaments could be suitable areas

*Keywords:*

Managed Aquifer Recharge (MAR); Attenuation Zone, Groundwater, Lineaments/Faults, Hillslope-MAR, Road-MAR

Source: [Article Notebook](https://Ryan3Lima.github.io/ATUR-Hillslope-Road/index.ipynb.html)

**Mountain-Block Recharge: A Review of Current Understanding** (Markovich et al. 2019)

*Key findings:*

1. Mountain-block recharge confirmed as important source of recharge to basin aquifers in a variety of climatic and geologic settings globally.
2. Recent work advanced the understanding of fundamental controls on mountain-block recharge ans somewhat improved methods for characterization.
3. Future research should aim to acquire subsurface data in mountain blocks and at the mountain front.

*Keywords:*

Mountain Front Recharge (MFR), Mountain Block Recharge (MBR), Aquifer Recharge, Review

Source: [Article Notebook](https://Ryan3Lima.github.io/ATUR-Hillslope-Road/index.ipynb.html)

**Mountain-block hydrology and mountain-front recharge** (Wilson and Guan 2004)

*Key findings:*

1. Explains the general processes at work in Mountain fronts and Mountain blocks
2. Provides practical advice for delineating the mountain front and the mountain block

*Keywords:*

Mountain Front Zone, Mountain Block

Source: [Article Notebook](https://Ryan3Lima.github.io/ATUR-Hillslope-Road/index.ipynb.html)

**Title** [citation]

*Key findings:*

1. text

*Keywords:*

Source: [Article Notebook](https://Ryan3Lima.github.io/ATUR-Hillslope-Road/index.ipynb.html)

## 2 Notes

Menbru Meles suggested including: - Contributing areas for roadside channel segments - slope and slope length to calculate the volume of runoff that passes through these systems

Question:

If we remove overland flow or intercept shallow soil or groundwater flow how will it impact ecosystems downstream? In other words how do we ensure that the water we capture is not supporting some riparian ecosystem downstream that we are sacrificing to increase recharge deeper in the aquifer.

Source: [Article Notebook](https://Ryan3Lima.github.io/ATUR-Hillslope-Road/index.ipynb.html)

## 3 Data & Methods

Source: [Article Notebook](https://Ryan3Lima.github.io/ATUR-Hillslope-Road/index.ipynb.html)

## 4 Conclusion

Source: [Article Notebook](https://Ryan3Lima.github.io/ATUR-Hillslope-Road/index.ipynb.html)

## 5 Works Cited

Source: [Article Notebook](https://Ryan3Lima.github.io/ATUR-Hillslope-Road/index.ipynb.html)

## References

Source: [Article Notebook](https://Ryan3Lima.github.io/ATUR-Hillslope-Road/index.ipynb.html)

Markovich, Katherine H., Andrew H. Manning, Laura E. Condon, and Jennifer C. McIntosh. 2019. “Mountain‐Block Recharge: A Review of Current Understanding.” *Water Resources Research* 55 (11): 8278–8304. <https://doi.org/10.1029/2019WR025676>.

Meles, Menbru B., Scott A. Bradford, Alberto Casillas-Trasvina, Lin Chen, Gordon Osterman, Tyler Hatch, Hoori Ajami, Octavia Crompton, Lucia Levers, and Isaya Kisekka. 2024. “Uncovering the Gaps in Managed Aquifer Recharge for Sustainable Groundwater Management: A Focus on Hillslopes and Mountains.” *Journal of Hydrology* 639: 16. <https://doi.org/10.1016/J.JHYDROL.2024.131615>.

Wilson, John L., and Huade Guan. 2004. “Mountain-Block Hydrology and Mountain-Front Recharge.” In *Water Science and Application*, edited by James F. Hogan, Fred M. Phillips, and Bridget R. Scanlon, 9:113–37. Washington, D. C.: American Geophysical Union. <https://doi.org/10.1029/009WSA08>.