

## Travis W. Nauman

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### **Background and Research**

Travis Nauman's research examines the role of soils in earth system responses to different drivers of change using geospatial tools, machine learning, modeling, and applied pedology. Dr. Nauman has worked to improve accuracy, resolution, and data structures of soil surveys to meet needs of land management decision makers and modelers. He has also worked with a wide variety of public, private, and academic entities to help better integrate objective science into land management frameworks. His other interests include pedological processes, wind and water erosion, salinity, water security, climate change, dust emissions, and ecosystem potential frameworks.

### **Education**

PhD. Plant and Soil Sciences	West Va. Univ. Morgantown, WV. May 2015
M.S. Soil and Water Science	Univ. of Arizona, Tucson, Arizona. May 2009
Geographic Info. Science Certification	Univ. of Arizona, Tucson, Arizona. Dec. 2008
B.S. Environmental Science	Univ. of Arizona, Tucson, Arizona. May 2006

### **Experience:**

2015 – present	Soil Scientist	U.S. Geological Survey, Moab, UT
2011 – 2015	Soil Science Pathways Intern	USDA-NRCS, Morgantown, WV
2010 – 2011	Natural Resource Specialist	USDA-NRCS, Holbrook, AZ
2008 – 2011	CEO, Soil Scientist	Nauman Geospatial, Tucson, AZ

### **Funding:**

2019	Co-PI. Develop soil-ecohydrologic framework for Colorado Plateau drylands climate change response. NPS FY 2019 Servicewide Comprehensive Call. \$297k.
2018	Co-PI. New tools for evaluation of conservation practice effectiveness. National Cooperative Soil Survey – Soil Survey Collaborative Research Project Call. \$155k
2017	Duniway, M.C. and T.W. Nauman. Developing and mapping ecological sites and sensitive soils on the Colorado Plateau for BLM land managers. US Department of Interior—Bureau of Land Management. Interagency Agreement. \$250k.
2017	Nauman, T.W., and M.C. Duniway. Salinity Risk Mapping for the Utah Colorado River Basin. US Department of Interior—Bureau of Land Management. Interagency Agreement. \$78k.
2014	PI. Mapping Forest Restoration Potential Using Ecological Sites. West Virginia Restoration Venture. USDA-NRCS. One year (2014-2015). \$50k.

### **Publications**

Nauman, T. W., C. P. Ely, M. P. Miller, and M. C. Duniway. In Press. Salinity yield modeling of the Upper Colorado River Basin using 30-meter resolution soil maps and random forests. *Water Resources Research*. <https://doi.org/10.1029/2018WR024054>. [pdf](#).

Chaney, N. W., Minasny, B., Herman, J. D., Nauman, T. W., Brungard, C. W., Morgan, C. L. S., McBratney, A. B., Wood, E. F., and Yimam, Y., 2019, POLARIS Soil Properties: 30-m Probabilistic Maps of Soil Properties Over the Contiguous United States: *Water Resources Research*, <https://doi.org/10.1029/2018WR022797>. [pdf](#).

Nauman, T. W., and Duniway, M. C., 2019, Relative prediction intervals reveal larger uncertainty in 3D approaches to predictive digital soil mapping of soil properties with legacy data: *Geoderma*, v. 347, p. 170-184. [pdf](#).

- Duniway, M. C., Pfennigwerth, A. A., Fick, S. E., **Nauman**, T. W., Belnap, J., and Barger, N. N., 2019, Wind erosion and dust from US drylands: a review of causes, consequences, and solutions in a changing world: *Ecosphere*, v. 10, no. 3, p. e02650. [pdf](#).
- Maynard, J. J., **Nauman** T. W., Salley, S. W., Bestelmeyer, B. T., Duniway Michael, C., Talbot, C. J., and Brown, J. R., 2019, Digital mapping of ecological land units using a nationally scalable modeling framework: *Soil Science Society of America Journal*. [pdf](#).
- Nauman**, T. W., Duniway, M. C., Webb, N. P., and Belnap, J., 2018, Elevated aeolian sediment transport on the Colorado Plateau, USA: The role of grazing, vehicle disturbance, and increasing aridity: *Earth Surface Processes and Landforms*, v. 43, no. 14, p. 2897-2914. [pdf](#).
- Waller, E. K., Villarreal, M. L., Poitras, T. B., **Nauman**, T. W., and Duniway, M. C., 2018, Landsat time series analysis of fractional plant cover changes on abandoned energy development sites: *International Journal of Applied Earth Observation and Geoinformation*, v. 73, p. 407-419. [pdf](#).
- Fan, Z., Wills, S. A., Herrick, J. E., **Nauman**, T. W., Brungard, C. W., Beaudette, D. E., Levi, M. R., and O'Geen, A. T., 2018, Approaches for improving field soil identification: *Soil Science Society of America Journal*. [pdf](#).
- Poitras, T. B., Villarreal, M. L., Waller, E. K., **Nauman**, T. W., Miller, M. E., and Duniway, M. C., 2018, Identifying optimal remotely-sensed variables for ecosystem monitoring in Colorado Plateau drylands: *Journal of Arid Environments*, v. 153, p. 76-87. [pdf](#).
- Nauman**, T. W., Duniway, M. C., Villarreal, M. L., and Poitras, T. B., 2017, Disturbance automated reference toolset (DART): Assessing patterns in ecological recovery from energy development on the Colorado Plateau: *Science of The Total Environment*, v. 584-585, p. 476-488. [pdf](#).
- Ramcharan, A., Hengl, T., **Nauman**, T., Brungard, C., Waltman, S., Wills, S., and Thompson, J., 2018, Soil Property and Class Maps of the Conterminous United States at 100-Meter Spatial Resolution: *Soil Science Society of America Journal*, v. 82, no. 1, p. 186-201. [pdf](#).
- Duniway, M. C., **Nauman**, T. W., Johanson, J. K., Green, S., Miller, M. E., Williamson, J. C., and Bestelmeyer, B. T., 2016, Generalizing Ecological Site Concepts of the Colorado Plateau for Landscape-Level Applications: *Rangelands*, v. 38, no. 6, p. 342-349. [pdf](#).
- Nauman**, T.W., Duniway, M.C., 2016. The Automated Reference Toolset (ART): A soil-geomorphic ecological potential matching algorithm. *Soil Science Society of America Journal*. doi: 10.2136/sssaj2016.05.0151. [pdf](#).
- Chaney, N.W., Wood, E.F., McBratney, A.B., Hempel, J.W., **Nauman**, T.W., Brungard, C.W., & Odgers, N.P. (2016). POLARIS: A 30-meter probabilistic soil series map of the contiguous United States. *Geoderma*, 274, 54-67. [pdf](#).
- Nauman**, T.W., Thompson, J.A., Teets, J., Dilliplane, T., Bell, J.W., Connolly, S.J., Liebermann, H.J., & Yoast, K. (2015). Pedoecological Modeling to Guide Forest Restoration using Ecological Site Descriptions. *Soil Science Society of America Journal*. [pdf](#).
- Nauman**, T.W., J.T. Thompson, J. Teets, T. Dilliplane, J. Bell, S.J. Connolly, H.J. Liebermann, and K. Yoast. 2015. Ghosts of the forest: mapping pedomemory to guide forest restoration. *Geoderma* 147-148. [pdf](#).
- Nauman**, T.W., Thompson, J.A., Rasmussen, C.R. 2014. Semi-Automated Disaggregation of a Conventional Soil Map using Knowledge Driven Data Mining and Random Forests in the Sonoran Desert, USA. *Photogrammetric Engineering and Remote Sensing*. [pdf](#).
- Nauman**, T.W. and Thompson, J.A., 2014. Semi-automated disaggregation of conventional soil maps using knowledge driven data mining and classification trees. *Geoderma*, 213(0): 385-399. [pdf](#).
- Helmick**, J.L., Nauman, T.W. Thompson, J.A. Developing and assessing prediction intervals for soil property maps derived from legacy databases. *GlobalSoilMap Conference to be held in Orleans, France. 7 to 9 October 2013 - Awarded best oral presentation in conference*. [pdf](#).
- Nauman**, T., Thompson, J.A., Odgers, N. and Libohova, Z., 2012. Fuzzy Disaggregation of Conventional Soil Maps using Database Knowledge Extraction to Produce Soil Property Maps. In: B. Minasny, B. Malone and A. McBratney (Editors), *Digital Soil Assessments and Beyond: 5th Global Workshop on Digital Soil Mapping*, Sydney, Australia. [pdf](#).
- Thompson, J.A., **Nauman**, T., Odgers, N., Libohova, Z. and Hempel, J., 2012. Harmonization of Legacy Soil Maps in North America: Status, Trends, and Implications for Digital Soil Mapping Efforts. In: A. McBratney, B. Minasny and B. Malone (Editors), *The 5th Global Workshop on Digital Soil Mapping. Digital Soil Assessments and Beyond*, Sydney, Australia. [pdf](#).