

WHAT IS GEOSCIENCE?

Geoscience is the study of the Earth and the complex geologic, marine, atmospheric, and hydrologic processes that sustain life and the economy. Understanding the Earth's surface and subsurface, its resources, history, and hazards allows us to develop solutions to critical economic, environmental, health, and safety challenges.



Satellite image: NASA/USGS Landsat Program. State outline (not to scale): Matt Battison.

WORKFORCE IN TENNESSEE

- 5,302 geoscience employees (excludes self-employed) in 2017¹
- \$73,201: average median geoscience employee salary¹
- 9 academic geoscience departments²

WATER USE IN TENNESSEE

- 430 million gallons/day: total groundwater withdrawal³
- 5.99 billion gallons/day: total surface water withdrawal³
- 850 million gallons/day: public supply water withdrawal³
- 64 million gallons/day: water withdrawal for irrigation³
- 734 million gallons/day: industrial fresh water withdrawal³
- 91% of the population is served by public water supplies³

By the numbers: TENNESSEE

- 5,302 geoscience employees (excludes self-employed)¹
- 430 million gallons/day: total groundwater withdrawal³
- \$1.14 billion: value of nonfuel mineral production in 2017⁴
- 68 total disaster declarations, including 31 severe storm, 17 flood, and 11 fire disasters (1953-2017)⁶
- \$2.22 million: NSF GEO grants awarded in 2017¹⁴

ENERGY AND MINERALS IN TENNESSEE

- \$1.14 billion: value of nonfuel mineral production in 2017⁴
- Stone (crushed), zinc, cement (portland): top three nonfuel minerals in order of value produced in 2017⁴
- 640,000 short tons: coal produced in 2016⁵
- 270,000 barrels: crude oil produced in 2017⁵
- 150,000 megawatt hours: solar produced in 2017⁵
- 7.61 million megawatt hours: hydroelectricity produced in 2017⁵

NATURAL HAZARDS IN TENNESSEE

- 68 total disaster declarations, including 31 severe storm, 17 flood, and 11 fire disasters (1953-2017)⁶
- \$196 million: individual assistance grants (2005-2017)⁶
- \$149 million: mitigation grants (2005-2017)⁶
- \$260 million: preparedness grants (2005-2017)⁶
- \$44 million: public assistance grants (2005-2017)⁶
- 69 weather and/or climate events, each with costs exceeding \$1 billion (inflation adjusted) (1980-2017)⁷

1 U.S. Bureau of Labor Statistics, *Occupational Employment Statistics*, May 2017
2 American Geosciences Institute, *Directory of Geoscience Departments*, 53rd Edition (2018)
3 U.S. Geological Survey, *Estimated Use of Water in the United States in 2015*

4 U.S. Geological Survey, *Mineral Commodity Summaries 2018*
5 U.S. Energy Information Administration
6 FEMA Data Visualization: *Summary of Disaster Declarations and Grants* (accessed May 2, 2018)
7 NOAA National Centers for Environmental Information, *U.S. Billion Dollar Weather and Climate Disasters from 1980 to 2018* (accessed April 6, 2018)

U.S. GEOLOGICAL SURVEY (USGS)

- \$1.15 billion: total USGS budget in FY 2018 (5.8% increase from FY 2017)⁸
- The National Cooperative Geologic Mapping Program funds geologic mapping projects with federal (FEDMAP), state (STATEMAP), and university (EDMAP) partners
- \$1.06 million: Tennessee STATEMAP funding (1993-2016)⁹
- Tennessee Technological University, Vanderbilt University, and University of Tennessee have participated in EDMAP⁹
- USGS streamgages collect real-time or recent streamflow, groundwater, and water-quality data in Tennessee

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION (NASA)

- \$20.7 billion: total NASA budget in FY 2018 (5.5% increase from FY 2017)¹⁰
- \$1.9 billion: total FY 2018 NASA Earth Science budget (0% change from FY 2017)¹⁰
- Gravity Recovery and Climate Experiment (GRACE) satellites measure groundwater changes in Tennessee
- Soil Moisture Active Passive (SMAP) satellite measures soil moisture in Tennessee

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION (NOAA)

- \$5.9 billion: total NOAA budget in FY 2018 (4.1% increase from FY 2017)¹¹
- Next-generation geostationary (GOES) and polar orbiting (JPSS) satellites provide weather forecasting for Tennessee
- Deep Space Climate Observatory (DISCOVER) satellite monitors radiation and air quality over Tennessee
- 9 National Weather Service Automated Surface Observing Systems (ASOS) stations in Tennessee¹²
- 169 National Weather Service Cooperative Observer Program (COOP) sites in Tennessee¹²

NATIONAL SCIENCE FOUNDATION (NSF)

- \$7.8 billion: total NSF budget in FY 2018 (4% increase from FY 2017)¹³
- \$1.4 billion: total NSF Geosciences Directorate (GEO) awards in FY 2017 (7.2% increase from FY 2016)¹⁴
- 13 NSF GEO awards in Tennessee totaling \$2.22 million in 2017¹⁴
- \$849,000: NSF GEO grants awarded to University of Tennessee Knoxville in 2017¹⁴

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)

- \$8.1 billion: total EPA budget in FY 2018 (0% change from FY 2017)¹⁵
- 18 active Superfund sites in Tennessee in 2018¹⁶
- \$8.24 million: Drinking Water State Revolving Fund (DWSRF) grants in Tennessee in 2017¹⁷

FEDERAL FACILITIES IN TENNESSEE

- USGS NOROCK Southern Appalachian Duty Station, Knoxville
- DOE Oak Ridge National Lab, Oak Ridge
- NOAA Air Resources Laboratory, Oak Ridge
- USGS Patuxent Wildlife Research Center, Memphis

YOUR STATE SOURCE FOR GEOSCIENCE INFORMATION

Tennessee Geological Survey

312 Rosa L. Parks Ave

Nashville, TN 37243

<https://www.tn.gov/environment/program-areas/tennessee-geological-survey.html>

615-532-1502

⁸ U.S. Department of the Interior, FY 2019 Budget in Brief

⁹ U.S. Geological Survey, National Cooperative Geologic Mapping Program

¹⁰ National Aeronautics and Space Administration, FY 2019 Budget Estimates

¹¹ National Oceanic and Atmospheric Administration, FY 2019 Bluebook

¹² NOAA In Your State and Territory

¹³ U.S. House of Representatives, FY 2018 Omnibus Spending Bill (Division B) – Commerce, Justice, Science, and Related Agencies Appropriations Act, 2018

¹⁴ National Science Foundation, Budget Information System

¹⁵ U.S. House of Representatives, FY 2018 Omnibus Spending Bill (Division G) – Department of the Interior, Environment, and Related Agencies Appropriations Act, 2018

¹⁶ U.S. Environmental Protection Agency, Superfund Sites

¹⁷ U.S. Environmental Protection Agency, Drinking Water State Revolving Fund National Information Management System Reports

AGI's Geoscience Policy and Critical Issues programs support well-informed public policy and decision making by providing information and facilitating dialogue between the geoscience community and decision makers at all levels.

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<https://www.americangeosciences.org/policy/factsheet/states> | govt@americangeosciences.org