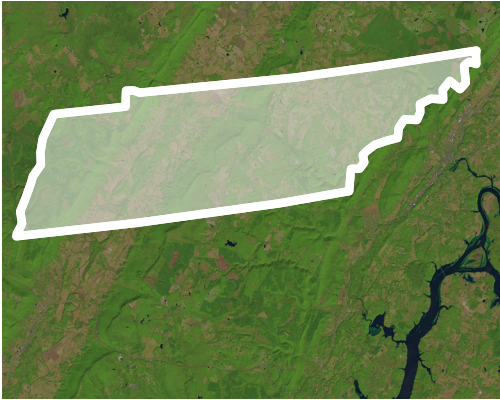


WHAT IS GEOSCIENCE?

Geoscientists study the Earth's systems — the complex geologic, marine, atmospheric, and hydrologic processes that sustain life and the economy. Geoscience expertise enables us to develop solutions to critical economic, environmental, health, and safety challenges.



Satellite image: NASA/USGS Landsat Program. State outline: Matt Battison.

WORKFORCE IN TENNESSEE

- 5,780: **geoscience employees** (non-federal/self-employed) in 2015¹
- \$74,970: average median geoscience employee salary¹
- 3,460: **jobs** in extractive industries in 2015²
- 14: academic geoscience departments³

WATER IN TENNESSEE

- 470 million gallons/day: total groundwater withdrawal⁴
- 7.2 billion gallons/day: total surface water withdrawal⁴
- 920 million gallons/day: public supply water withdrawal⁴
- 72 million gallons/day: water withdrawal for irrigation⁴
- 776 million gallons/day: self-supplied industrial fresh water withdrawal⁴
- 92% of the population is served by public water supplies⁴
- 51 USGS stream gages in **Tennessee**⁵

By the numbers: TENNESSEE

- \$1.2 billion: value of nonfuel mineral production in 2016⁶
- 5,780: **geoscience employees** (non-federal/self-employed)¹
- 3,460: **jobs** in extractive industries in 2015²
- 31 severe storm disaster declarations since 1953⁷
- 11 fire disaster declarations since 1953⁷
- \$80.8 million: NSF grants awarded in Tennessee in 2016¹⁷
- \$2.1 million: NSF GEO grants awarded in Tennessee in 2016¹⁷

ENERGY AND MINERALS PRODUCTION IN TENNESSEE

- \$1.2 billion: value of nonfuel mineral production in 2016⁶
- 300,000 barrels: crude oil produced in 2015²
- 4.3 billion cubic feet: natural gas produced in 2014²
- 900,000 short tons: coal produced in 2014²
- 9.8 million megawatt hours: hydroelectricity produced in 2015²

NATURAL HAZARDS IN TENNESSEE

FEMA statistics for Tennessee

- 31 severe storm disaster declarations since 1953⁷
- 17 flooding disaster declarations since 1953⁷
- 4 tornado disaster declarations since 1953⁷
- 11 fire disaster declarations since 1953⁷
- \$196 million: individual assistance grants since 2005⁷
- \$149 million: mitigation grants since 2005⁷
- \$260 million: preparedness grants since 2005⁷
- \$444 million: public assistance grants since 2005⁷
- 61 weather and/or climate events, each with costs exceeding \$1 billion (inflation adjusted) 1980-2016⁸

¹ Data Derived from Bureau of Labor Statistics Occupational Employment Statistics (2015)

² U.S. DOI Extractive Industries Transparency Initiative

³ American Geosciences Institute Directory of Geoscience Departments (2016)

⁴ USGS Estimated Use of Water in the United States in 2010

⁵ USGS WaterWatch Total Streamgage Stations (March 10, 2017)

⁶ USGS Mineral Commodity Summaries (2017)

⁷ FEMA Summary of Disaster Declarations and Grants (2016)

⁸ NOAA Billion-Dollar Weather and Climate Disasters: Mapping

AGI is a network of 51 member societies, representing more than 250,000 geoscientists.

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U.S. GEOLOGICAL SURVEY (USGS) GEOLOGIC MAPPING

- \$1.06 billion: total FY 2016 USGS budget; 1.6% up from FY 2015⁹
- The USGS National Cooperative Geologic Mapping Program (NCGMP) funds geologic mapping projects by states (STATEMAP) and universities (EDMAP)
- \$1.06 million: **Tennessee** STATEMAP funding (1993-2016)¹⁰
- 25 geologic maps covering 1,750 square miles of **Tennessee** created through STATEMAP (1993-2010)¹⁰
- 4 **Tennessee** universities participated in EDMAP¹⁰

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION (NASA)

- \$5.6 billion: total FY 2016 NASA Science budget; 6.6% up from FY 2015¹¹
- \$1.9 billion: total FY 2016 NASA Earth Science budget; 7.7% up from FY 2015¹²
- GRACE satellites measure groundwater changes in all of **Tennessee**¹³
- SMAP satellite measures soil moisture in all of **Tennessee**¹³

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION (NOAA)

- \$5.8 billion: total FY 2016 NOAA budget; 5.9% up from FY 2015¹⁴
- GOES satellites provide state-of-the-art weather forecasting over **Tennessee**¹⁵
- DISCOVER satellite monitors radiation and air quality over **Tennessee**¹⁵
- 169 National Weather Service Cooperative Observer Program (COOP) sites in **Tennessee**¹⁶

⁹ DOI Budget and Performance

¹⁰ USGS National Cooperative Geologic Mapping Program

¹¹ NASA Budget Documents, Strategic Plans and Performance Reports

¹² American Institute of Physics FY2016 Appropriations

¹³ Gravity Recovery and Climate Experiment (GRACE); Soil Moisture Active Passive (SMAP); Plankton, Aerosol, Cloud, ocean Ecosystem (PACE); Global Precipitation Measurement (GPM)

¹⁴ NOAA Total Budget

¹⁵ Geostationary Operational Environmental Satellite (GOES) & Deep Space Climate Observatory (DISCOVER)

¹⁶ NOAA in Your State

NATIONAL SCIENCE FOUNDATION (NSF)

- \$7.46 billion: total FY 2016 NSF budget; 1.6% up from FY 2015¹⁷
- \$1.28 billion: total FY 2016 NSF Geosciences Directorate (GEO) awards; 1.6% up from FY 2015¹⁷
- 269 NSF grants in **Tennessee** totaling \$80.8 million in 2016¹⁷
- 14 NSF GEO grants in **Tennessee** totaling \$2.1 million in 2016¹⁷
- \$1.4 million: NSF GEO grants to **Vanderbilt University** in 2016¹⁷

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)

- \$8.14 billion: total FY 2016 EPA budget; 0% up from FY 2015¹⁸
- 18 active/proposed superfund sites¹⁹
- \$211 million: federal grants for Drinking Water State Revolving Fund (DWSRF) in **Tennessee** (1997-2016)²⁰
- \$8.3 million: annual value of federal DWSRF grants in **Tennessee** in 2016²⁰

MAJOR FEDERAL FACILITIES IN TENNESSEE

- USGS NOROCK Southern Appalachian Duty Station, Knoxville
- USGS Lower Mississippi-Gulf Water Science Center - Nashville, TN Office, Nashville
- USGS Patuxent Wildlife Research Center - Tennessee, Memphis
- DOE Oak Ridge National Lab, Oak Ridge

YOUR STATE SOURCE FOR GEOSCIENCE INFORMATION

Tennessee Geological Survey

312 Rosa L. Parks Ave

Nashville, TN 37243

<http://tn.gov/environment/section/geo-geology/>

(615) 532-1502

¹⁷ NSF Budget Internet Information System

¹⁸ EPA Budget and Spending

¹⁹ EPA Search for Superfund Sites Where You Live (August 2017)

²⁰ EPA 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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