

ARKANSAS GEOLOGICAL SURVEY

FY 2018 – FY 2019 STRATEGIC PLAN

MISSION:

The Arkansas Geological Survey (AGS) is a non-regulatory agency that is responsible for the collection and dissemination of unbiased and sound geologic data and information pertaining to the State of Arkansas for the public, private industry, academia, and government agencies as well as local, municipal, county, state, and federal officials, regulators, and decision makers for over 160 years.

VISION:

The AGS's vision is to educate the citizens of Arkansas about the importance of geology and how it affects their everyday lives by providing accurate geological information by cost-effective methods to promote the development and effective management of the state's rock, mineral, fossil fuel, and water resources while protecting the environment; all in a transparent manner.

CORE VALUES:

In order to achieve the AGS's mission and vision statements of serving the geologic needs of the citizens of Arkansas, the AGS's geologic staff and support personnel prescribe to the following core values:

- **Results:** research and provide our customers with geological information pertaining to the State's groundwater, mineral, and energy resources in an efficient and responsive manner;
- **Education:** educate and provide geological expertise to the public, private industry and government agencies, identify rocks, minerals and fossils for the public, give educational and outreach presentations;
- **Efficiency:** provide in the most efficient and cost effective manner to the public and private industry information on economic minerals and other mineral occurrences in the State to create jobs and grow Arkansas's economy;
- **Integrity:** provide sound geohazard-related expertise, geohazard maps, and conduct education/outreach presentations to various groups, operate a statewide broadband seismic network to detect earthquakes, work as a subject matter expert on earthquake disaster preparedness to protect the public's safety;
- **Accountability:** register and regulate the professional geologists operating within the State of Arkansas to protect the public's safety and promote quality of life; and
- **Transparency:** conduct geological research and mapping projects, publish technical reports and maps on geology of Arkansas that are accessible to public in a transparent manner; to provide open and free access to the AGS's well drilling core/cuttings library to the public and private industry to conduct research in the State.

GOAL 1: GEOLOGIC RESEARCH

Continue to improve in excellence and efficiency in geologic research and distribution of data concerning the state's geologic materials (rocks, minerals, fossil fuels, surface and groundwater), structures (faults, folds), and active processes (earthquakes, landslides, sinkhole formation, and ground subsidence).

AGS's Goal 1 aligns with State of Arkansas Goals to grow the economy and protect public safety of Arkansas by understanding, characterization and prudent development of Arkansas's natural resources are vital to the economy and quality of life to the residents of Arkansas. Below are objectives to meet this goal:

OBJECTIVE 1: Provide reliable, focused, and research-based geologic information for economic development in the State. The AGS will continue to strengthen our relationship (see Objective 7 – Strategy 3) with the economic planning districts to provide them with geologic data and information for economic planning and development. In 2015, over \$991 million in industrial (nonfuel) minerals were produced in the State.

Strategy: Establishment of collaborative partnerships with Arkansas' eight Economic Planning and Development Districts, resulting in various geologic reports tailored to the needs of each planning district. Each district will have different geologic needs based on the geology of their region. We are planning to meet with other districts in fall of 2017 to determine their geologic needs. Our goal is to develop, assemble, and disseminate geologic data focused on the needs of each of the economic planning and development districts in the State. We will evaluate their needs and develop guidelines for the geologic reports and maps that are produced.

Performance Measures: Prioritize the reports that are most vital to the economic development of the State. Require internal and external peer review of project. Conduct weekly leadership meetings to review progress of the project.

Benchmark: Complete guidelines for geologic reports specific for the Economic Planning and Development District by the end of FY 2018.

OBJECTIVE 2: Continue to improve in excellence and efficiency in geologic research and distribution of data concerning the State's natural resources. Produce county water well completion report maps.

Strategy: Synthesize the collected water well completion reports into a database and create county water well maps to be used as a groundwater depth and yield screening tools by the public.

Performance Measures: Require internal and external peer review of project. Conduct weekly leadership meetings to review progress of the project.

Benchmark: Produce hydrogeology maps for the counties comprising one of the districts comprising the Economic Planning and Development project by end of FY 2019. These maps will be available online and print.

OBJECTIVE 3: Continue to improve in excellence and efficiency in geologic research and distribution of data concerning the State's natural resources. In a modern society, Rare Earth Elements (REE) are extremely important (critical elements) in “cutting-edge” electronic devices such as cell phones, solar panels, and etc.

Strategy: Research Rare Earth Elements (REE) characterization and occurrence in phosphate deposits in Arkansas. Collect, characterize and interpret geologic data pertaining to rare earth elements (REE) concentrations in phosphate deposits in north-central Arkansas.

Performance Measure: Require internal and external peer review of project. Conduct weekly leadership meetings to review progress of the project.

Benchmark: Publish as AGS Information Circular by end of FY 2019. This publication will be available online and print.

OBJECTIVE 4: Provide a reliable, focused, and research-based source of geologic information for the development of the State's fossil fuels (hydrocarbons). Geologic data, information, and concepts will be critical in the continued development the oil and gas resources of the state. In 2016, over \$2.7 billion in gross value of fossil fuels was produced in the state.

- **Strategy:** Research the hydrocarbon potential and reservoir characteristics of the Mississippi Embayment in eastern Arkansas. Collect, characterize and synthesize geologic data pertaining to hydrocarbon potential and reservoir characteristics of the Mississippi Embayment in eastern Arkansas.

Performance Measure: Require internal and external peer review of project. Conduct weekly leadership meetings to review progress of the project.

Benchmark: Publish as AGS Information Circular by end of FY 2019. This publication will be available both online and print.

- **Strategy:** Federally-funded research grant on hydrocarbon potential and reservoir characteristics of the Smackover Formation in southern Arkansas. Collect, characterize and synthesize geologic data pertaining to hydrocarbon potential and reservoir characteristics of

the Smackover Formation. Create an oil wells database in the southern Arkansas which includes stratigraphic tops of key formations and digitized electronic well logs.

Performance Measure: Stipulate that all grants requirements are to be met on-time and under budget. Require internal and external peer review of project. Conduct weekly leadership meetings to review progress of the project.

Benchmark: Publish as AGS Information Circular 45 by end of FY 2019. This publication will be available online and print. The oil wells database will be available online.

OBJECTIVE 5: Provide a reliable, focused, and research-based source of geologic information for the wise use of the state’s natural resources for tourism and recreation. Tourism is an economic “powerhouse” in the state with \$7.6 billion in total travel expenditures generating \$393 million in state taxes, \$145 million in local taxes. Many of our state parks are so designated because of their natural assets (scenic qualities – geologic uniqueness) for example: Crater of Diamonds, Petit Jean, Crowley’s Ridge, Mammoth Springs, and etc. Note that several of these assets are made more enjoyable and educational for the public because of geologic reports and maps previously prepared by AGS.

Strategy: AGS has recently started a new series of publications directed to “geology-based tourism” – the Geologic Road Guide Series of reports featuring Scenic Highways of the State (as designated by the Arkansas State Highway Department). The AGS is also currently working on Hobbs State Park as part of the State Park Series publications (see Objective 6 – Strategy 2). Collect, characterize and synthesize geologic data for the Geologic Road Guide Series and the State Park Series publications.

Performance Measure: Require internal and external peer review of project. Conduct weekly leadership meetings to review progress of the project.

Benchmark: Publish the *Highway 10 Geologic Road Guide* and a new geologic report in our State Park Series: *Geology of Hobbs State Park #4* by FY 2019. Both will be available online and print.

OBJECTIVE 6: Apply the knowledge, research and analytical skills of professionally-educated geologists in the collection of data and to conduct detail geologic mapping of the State.

- **Strategy 1:** Submit grant proposals to the USGS STATEMAP Geologic Mapping Program (50/50 match of State and Federal Funding). The AGS was awarded a grant of \$59,943 for FY 2018 to map the Japton and Witter quadrangles in northwest Arkansas (*A quadrangle covers approximately 63 square miles*). The AGS will submit a grant proposal to map the Weathers, Boston, Fallsville, and Swain 7.5-minute quadrangles in FY 2019. Two mapping geologists will spend approximately 24-30 weeks in the field area to collect over 900 data points using a Trimble data collector with ArcPad software. The geologists will draw the geologic map and

cross-sections. The GIS personnel will digitize the maps and cross-sections using ArcGIS. The final map layouts will be produced by the geologists in Adobe Illustrator after a staff review.

Performance Measure: Require internal and external peer review of project. Conduct weekly leadership meetings to review progress of the project. Finish the geologic maps for FY 2018 and submit to the USGS by the end of the grant period, June 30, 2018 to fulfill our grant requirements. Receive new award amount for FY 2019 by June 2018 and begin mapping for new grant in July, 2018. Finish the geologic maps for FY 2019 (using the same strategy as outlined above) and submit to the USGS by the end of the grant period, June 30, 2019.

Benchmark: We will continue to improve upon the standards we have in place for creating and producing geologic maps. Publish, in color, standardized, geologic maps of the Japton and Witter 7.5-minute quadrangles on the AGS website by end of FY 2018. The maps will also be available in print form. Publish, in color, standardized, geologic maps of two to three quadrangles by end of FY 2019.

- **Strategy 2:** Conduct geologic mapping of State Parks for the State Park Series. Our current focus is Hobbs State Park. We will finish the geologic map of the War Eagle quadrangle which contains a large portion of the park, as well as a small area on the adjacent quadrangle. Geologists will spend approximately 15 weeks in the field collecting data points using a Trimble data collector with ArcPad software. The War Eagle quadrangle has been digitized by GIS staff and the layout will be created by the geologist. After the map is completed, a geologic report of Hobbs State Park will be written with corresponding trail maps and points of interest based on the geology.

Performance Measure: Require internal and external peer review of project. Conduct weekly leadership meetings to review progress of the project. Produce geologic map of the War Eagle 7.5-minute quadrangle by the end of FY 2018.

Benchmark: We will continue to improve upon the standards we have in place for creating and producing geologic maps. Publish, in color, standardized, geologic map of War Eagle 7.5-minute quadrangle on the AGS website by December 2018. The map will also be available in print form.

OBJECTIVE 7: Identify/study, monitor, and advise the public and officials about active or potentially active hazardous geologic processes (earthquakes, landslides, and ground subsidence) in Arkansas.

- **Strategy 1:** Monitor statewide earthquake activity in Arkansas with the six broadband seismometers comprising the Arkansas Seismic Network (AG). Provide real-time earthquake monitoring 24/7/365, provide seismic data and information to the public and officials. Secure additional funding to add three more broadband seismometers to the AG network.

Performance Measure: Secure the funding to increase the number of broadband seismometers comprising the Arkansas Seismic Network (AG) from six (6) to nine (9) by end FY 2019.

Benchmark: The Arkansas Seismic Network (AG) will be comprised of nine (9) broadband seismometers by end FY 2019.

- **Strategy 2:** Develop/analyze geohazard (for select soil, liquefaction and landslide) susceptibility information and urban geohazard maps for the Little Rock Metropolitan Area. Collect new (using agency owned drill rig and staffing) and existing geotechnical data (from collaborative partnership) from the Little Rock Metropolitan Area.

Performance Measure: Require internal and external peer review of project. Conduct weekly leadership meetings to review progress of the project.

Benchmark: Synthesize the collected geotechnical data and develop a database to use for the future production of urban geohazard maps for the Little Rock Metropolitan Area by end of FY 2019.

- **Strategy 3:** Develop/analyze geohazard landslide susceptibility information and maps for regions in Lake Fort Smith area in Crawford County (Western Economic Planning District) and the Greers Ferry Lake area in Cleburne and Van Buren Counties. Collect/add landslide/slope instability locations to geodatabase through continued collaboration with partners and geologic field mapping activities by end of FY 2019.

Performance Measure: Require internal and external peer review of project. Conduct weekly leadership meetings to review progress of the project.

Benchmark: Completion of landslide susceptibility report, maps for Lake Fort Smith area in Crawford County by end of FY 2018.

- **Strategy 4:** Geohazard study findings may be used to support analysis, decision making and risk reduction including: 1) Improve understanding of geohazard/seismic risk in Arkansas (New Madrid Seismic Zone and other areas), 2) Promote geohazard risk awareness and mitigation of high-risk communities, 3) Support awareness of seismic building code provisions, 4) Support disaster response and recovery planning. 5) Coordinate, update plans for earthquake preparedness and participate in all geohazards training/exercises locally, statewide and regionally. 6) Develop HAZUS software proficiency in coordination with the Arkansas Department of Emergency Management (ADEM). The software, (Hazards U.S.), a PC-based standardized tool that uses a uniform engineering-based approach to measure damages, casualties and economic losses from earthquakes *Based on a FEMA 2017 HAZUS run for a significant earthquake scenario, Arkansas is ranked 14th in the nation by Annualized Earthquake Loss (AEL) and projected to experience \$51M in losses from this natural disaster.*

Performance Measure: Require internal and external peer review of project. Conduct weekly leadership meetings to review progress of the project.

Benchmark: Completion/submittal of After Action Report/Improvement Plans and follow-up meetings for earthquake exercises. Demonstrate HAZUS software proficiency through simulated natural disaster; present findings to officials by 2019.

GOAL 2: GEOLOGIC EDUCATION AND OUTREACH

Continue providing geologic-related information and educational resources efficient and responsive manner through printed media, web-based formats, access to databases, personal one-on-one contact, and guided field trips to higher education institutions, K-12 school classes, home-school classes, and the citizens of Arkansas free of charge, via printed media, web-based formats, personal one-on-one contact, and guided field trips to support life-long learning for Arkansans.

ASG's Goal 2 aligns with State of Arkansas goals to educate the citizens of Arkansas on the geology of the State through education and outreach programs designed for life-long learning. Below are objectives to meet this goal:

OBJECTIVE 1: Apply the knowledge and research skills of professionally-educated geologists in providing educational services and resources to higher education instructors, K-12 teachers and home school educators. According to the activity reports for 2016, the AGS education and outreach section directly served 143 school/civic groups consisting of 9,204 students/citizens and offered over 245 geologic presentations throughout the state.

Strategy: Visit schools, provide educational presentations, conduct field trips, produce educational guidebooks and provide rock and mineral samples as teaching aids to classrooms. Offer educational workshops to Educational Cooperatives and STEM Centers throughout the State. The AGS will hire a Teacher through the Arkansas STRIVE (Supporting Teachers Research Involvement for Vital Education) Program to work for the summers of 2018 and 2019.

Performance Measure: Respond to all requests for educational services and resources to higher education instructors, K-12 teachers, and home school educators.

Benchmark: Goal – 100% response to all requests.

OBJECTIVE 2: Apply the knowledge and research skills of professionally-educated geologists in providing geological expertise and presentations to the public and other state and federal agencies. The AGS served a total of 22,947 customers in 2016 which included office visitors, map/publication sales, offsite contacts, and rock packet giveaways.

Strategy: Identify rocks, minerals and fossils for the public. Provide geologic presentations to civic groups. Review and comment on environmental studies and geologic maps for other state and federal agencies. Conduct town-hall meetings as needed on geologic-related topics (example: Fayetteville Shale Play during its initial development).

Performance Measure: Respond to all requests for providing geological expertise and presentations to the public and other state and federal agencies.

Benchmark: Goal – 100% response to all requests.

GOAL 3: GEOLOGIC SERVICES AND DATA

Continue providing geologic services and data in an efficient and responsive manner through printed media, web-based formats, access to databases, personal one-on-one contact, and guided field trips to the citizens of Arkansas, State agencies tasked with economic development, higher education institutions and K-12 school classes, and private companies.

ASG's Goal 3 aligns with State of Arkansas Goals to provide geologic information pertaining to the geology of Arkansas in an efficient and responsive manner to improve the quality of life for its residents. Below are objectives to meet this goal:

OBJECTIVE 1: Continue to maintain and improve the availability of geologic data through our website, print-on-demand, and direct access to AGS databases.

Strategy: Providing information, reports, data, and maps by electronic means is growing significantly and is now outstripping demand for paper or hard copies. Because of this the AGS is placing a growing emphasis on delivering its services, information, and products online. As the agency moves forward, its goal is to ensure that sufficient funding and resources are dedicated toward these efforts. In 2016, the AGS website had a total of 338,902 page views by 103,859 visitors of which 77.9% were new and 22.1% were returning visitors. Total number of AGS publications (PDF downloads) from the website were 19,851. The top-10 of these downloads had an assessed value of \$38,999.60 that was provided to the citizens/taxpayers of Arkansas for free.

Performance Measure:

- Build new and expand existing geologic-related databases. These are stored on in-house servers and an off-site webserver containing electric-logs, drillers' reports, water well construction reports, field collection databases, geologic maps, topographic maps, and geologic publications published since the 1800's (most available online for free download).
- Continue to scan the AGS print library of 35,000 technical references, including books dating back to 1857 and add them to the AGS *on-line* data set of topographic and geologic maps, reports, tutorials, and news of geologic events.
- Continue adding to the AGS oil and gas well core/cuttings and mineral exploration borehole cores library – *a collection of physical materials from approximately 5,000 wells and boreholes (13 million feet of drilled-hole cuttings and one million feet of cored rock samples).*

Benchmark: Increase in the overall number of entries in the AGS geologic-related databases. The number of AGS website products and databases used or downloaded will be equal to or greater than the preceding year through FY 2019.

APPENDIX: AGENCY PROFILE AND ORGANIZATIONAL CHART

- **Primary services:**

The AGS serves our state in a significant role by publishing geologic data and maps, reports and 3-D models that are utilized by the decision makers in public, private industry, academia and government agencies as well as local, municipal, county, state, and federal officials and regulators. Geologic information provided by state geological surveys are vitally important to the economy of each state and to the nation.

The geologic information is used by other state agencies, by consultants, private industry, developers, and the public in general as critical input in local and regional economic development plans, resulting in an economic advantage to the state. This information is utilized by industrial minerals (non-fossil fuels) industry that contributes ½ to 1 billion dollars annually to the state's economy.

The information is essential for the responsible and sustainable development of a state's mineral, energy, and water resources, safe development and modernization of infrastructure, protecting the public from losses due to geologic and natural hazards or anthropogenic hazards, the wise use of the state's natural resources for tourism and recreation. The AGS protects the state from practice by unqualified geologists through the Board of Registration for professional geologists.

- **Key customers and stakeholders:**

Key customers include the public, private industry, academia, and local, county and federal government agencies: Arkansas State Highway and Transportation Department (AHTD), Arkansas Department of Emergency Management (ADEM), Arkansas Natural Resource Commission (ANRC), Arkansas Department of Environmental Quality (ADEQ), Arkansas Department of Health (ADH), Arkansas Game and Fish Commission (AGFC), Arkansas Forestry Commission, Central United States Earthquake Consortium (CUSEC), United States Forest Service and numerous other state and federal agencies, University of Arkansas at Fayetteville, University of Arkansas at Little Rock, Arkansas Tech University and professional geologists.

Key stakeholder groups include the State of Arkansas, U.S. Geological Survey (USGS), Department of Energy (DOE), National Parks Service (NPS), Arkansas Oil and Gas Commission (AOGC), and University of Memphis – Center for Earthquake Information (CERI), Arkansas State Parks, and State Farm Insurance Corporation.

○ **Profile of the workforce:**

The AGS workforce is divided into three major areas: 1) Technical Services, 2) Information Services, and 3) Administrative Services. The Technical Services is divided into six major sections:

- Fossil Fuels (oil & gas, lignite & coal)
- Geohazards (earthquakes, landslides, and karst)
- Geologic Mapping (surface, subsurface)
- Hydrogeology (water)
- Minerals (industrial, metallic, non-metallic)
- Public Outreach & Education

The Information Services (GIS, Website and IT), and Administrative Services (Accounting, HR and administrative support) support the Technical Services area.

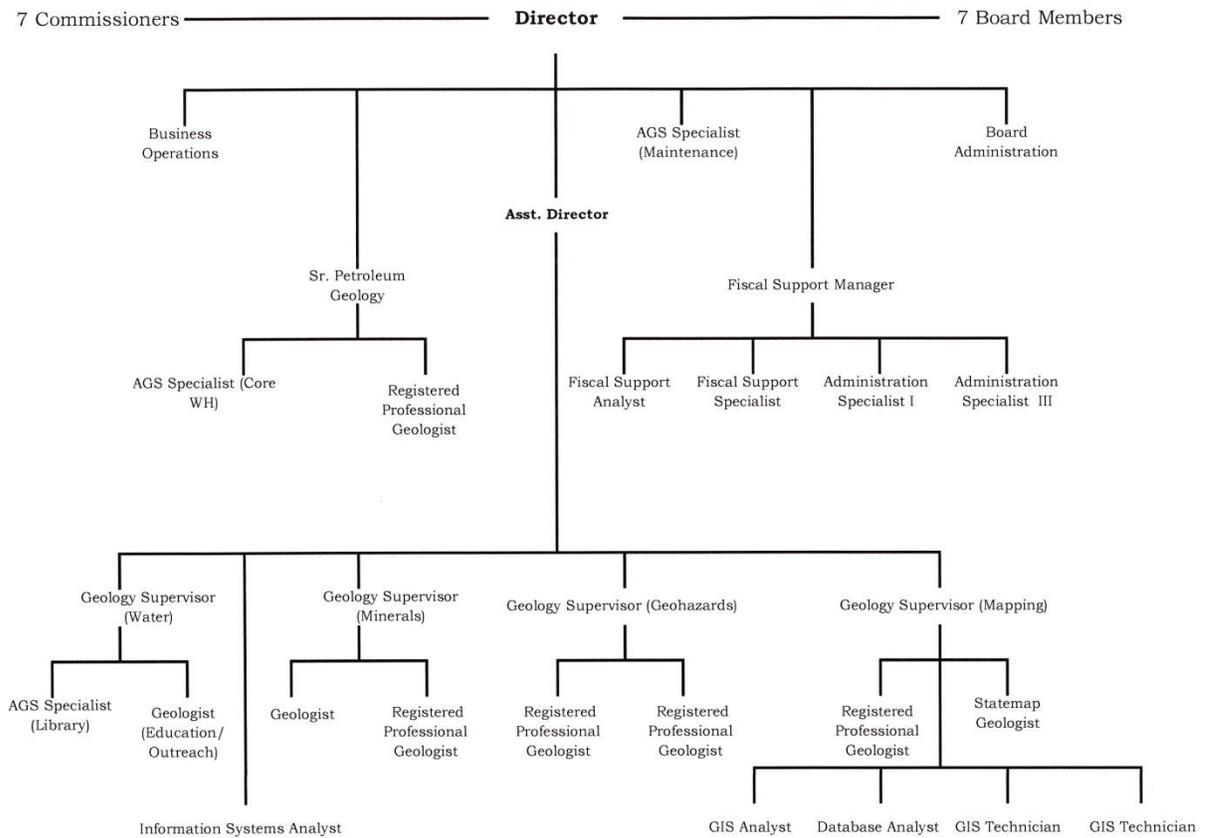
○ **Strategic challenges:**

- Securing sustainable funding to continue the gathering and dissemination of geologic information.
- Finding and retaining an educated and well-trained staff of Geologists, GIS and IT staff, to continue the mission;
- Keeping up with the ever-increasing rate of changes in technology that directly impacts in the gathering and dissemination of geologic information;
- An aging and deteriorating main building and warehouse with limited space and ever increasing maintenance costs;
- Acquiring and maintaining a suitable fleet of field-worthy vehicles to conduct geologic mapping in remote areas of the state; and
- Securing additional funds to make up for budget cuts and decrease in funding of federal grants that allow us to perform geologic mapping and other research.

○ **Strategic advantages:**

- Remaining a non-regulatory agency helps ensure unbiased research collection and dissemination of unbiased and sound geologic data and information pertaining to the state of Arkansas;
- Providing information on mineral resources to assist industry to develop and grow the economy of the State of Arkansas.

ORGANIZATIONAL CHART:



FY 18

30 Positions

ADDITIONAL PLAN INFORMATION:

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