

PROGRAM DESCRIPTION

Department of Natural Resources

HB Section(s): 6.300, 6.305, 6.310, 6.315, 6.320

Missouri Geological Survey

Program is found in the following core budget(s): Missouri Geological Survey

1a. What strategic priority does this program address?

The Missouri Geological Survey Division helps Missouri citizens thrive by managing natural resources to promote a healthy environment and economy by:

- Promoting environmental responsibility and resource stewardship.
- Enhancing services, information, and communication to improve customer experience.
- Modernizing infrastructure, strengthening workforce, and supporting economic development.
- Improving internal processes to better serve our customers.

1b. What does this program do?

The Missouri Geological Survey (MGS) includes the Geological Survey Program, Land Reclamation Program, Dam and Reservoir Safety Program, and Water Resources Center. MGS assists citizens, industry, and government in increasing the knowledge of Missouri's natural resources to achieve economic growth and provide for a healthy environment. MGS leadership provides management, fiscal direction, priority development, and support services. The division coordinates and integrates scientific information and services for efficient state and national distribution of technical information.

Geological Survey Program (GSP): Applies Geoscience for Critical Resource Needs

- Serves the public, industry, academia, and other entities by providing geologic and groundwater information necessary to address environmental concerns and make economic decisions such as siting of landfills and characterizing valuable mineral resources.
- Collects, interprets, and maintains geologic data on Missouri's energy, mineral, and water resources and provides services for professional, technical, and educational use.
- Performs detailed geologic mapping for exploration, identification, development, and understanding Missouri's energy, mineral, and water resources and potential hazards to human health and safety, such as sinkholes and earthquakes. The value of a geologic map is estimated to be 25 to 39 times the cost to produce the map, and developers and engineers save about \$50,000 per project when modern geologic maps are available. As of FY 2020, the program has produced 317 geologic maps with an estimated economic value of \$454 million.
- Provides technical and field assistance to determine potential or existing environmental hazards posed by waste disposal practices and spills of hazardous materials.
- Protects Missouri's valuable fresh groundwater resources by recommending and enforcing standards for the construction and proper plugging of wells and licensing qualified well installation contractors.
- Serves as the official Missouri Mine Map Repository and maintains the McCracken Core Library and Research Center, housing nearly 8 million feet of geologic rock core and cuttings.

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1b. What does this program do? (continued)	
Dam and Reservoir Safety Program (DRSP): Ensures Public Safety Against Dam Failure	
<ul style="list-style-type: none">• Provides public safety for downstream populations and property associated with 710 regulated dams by administering the provisions of the Missouri Dam and Reservoir Safety Law. Dam failures can cause loss of life and serious damage to buildings, critical infrastructure, industries, and local economies.• Regulates nonfederal, nonagricultural dams 35 feet and higher through inspections, and issuance of registration, safety, and construction permits.• Ensures critical dam infrastructure continues to be operated and maintained in accordance with state law.• Performs emergency response to dams in distress and provides engineering evaluation of conditions during natural disasters to protect life and property.• Provides technical assistance to regulated and non-regulated dams.	
Water Resources Program: Defends, Monitors, and Develops Water Resources	
<ul style="list-style-type: none">• Defends Missouri's interests and claims to water in the Missouri and Mississippi Rivers.• Develops, maintains, and periodically updates the Missouri Water Resources Plan to assess current water use in the state and future needs, and water distribution systems.• Monitors surface and groundwater levels by operating and maintaining a network of groundwater observation wells and participating in the stream gage network administered by USGS.• Collects annual water use data from individuals or businesses that have the capacity to withdraw more than 100,000 gallons of water per day, in accordance with the Major Water Users law.• Provides technical expertise for the development or expansion of water distribution systems, water storage capabilities, and water supply sources to help regional water supply projects minimize the impacts of stress on their water systems.• Performs groundwater studies to evaluate the quantity and quality of Missouri's springs and determine safe groundwater yields from the state's aquifers.	
Land Reclamation Program: Ensures Mining Compliance and Reclamation	
<ul style="list-style-type: none">• Permits and inspects industrial mineral mining sites to ensure compliance with The Land Reclamation Act.• Implements the Metallic Minerals Waste Management Act which covers the metallic mineral waste disposal areas to ensure these areas are properly reclaimed.• Utilizes funding provided by Department of Interior Office of Surface Mining to enable the Abandoned Mine Land unit to oversee reclamation of coal mine sites abandoned prior to 1977. Reclamation includes closing dangerous mine shafts, eliminating dangerous high walls, improving severely impacted land, and stabilizing subsiding ground beneath homes and roads.• Permits and inspects active coal sites and oversees reclamation of coal mine land.• Serves as the regulatory authority for coal mine permitting, inspection, enforcement, and maintains certification for blasters at coal mines in compliance with the federal Surface Mining Control and Reclamation Act (SMCRA).	

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1b. What does this program do? (continued)

Multipurpose Water Resource Program PSD: The Multipurpose Water Resource Program fund is intended to support development of public water supply, flood control storage, and treatment and transmission facilities. The Multipurpose Water Resource Act (Sections 256.435 - 256.445, RSMo) authorizes the Department to administer moneys appropriated to the fund through provision of grants or other financial assistance and allows for the state to participate with a sponsor in the development, construction, or renovation of a water resource project providing a long-term solution to water supply needs.

State Water Plan: This appropriation is used for professional services to implement the State Water Plan and advance the Department's efforts and responsibilities to ensure that the availability of water resources supports Missouri's current and future beneficial uses and is not a limiting factor in economic growth. The primary areas of this effort include water supply availability, drought response and watershed feasibility studies, and addressing in terstate water needs.

Oil and Gas Remedial Fund: This appropriation is used to plug abandoned oil and gas wells that have the potential to impact surface and groundwater resources and may pose a threat to human health. The fund is also used to handle emergency situations such as a leaking gas well.

Land Reclamation PSD: Allows the program to contract with surety bond holders, engineering, excavating, and construction companies to reclaim abandoned and bond forfeiture sites. Over 103 eligible Abandoned Mine Land (AML) areas exist consisting of 10,857 acres with public health, safety, and environmental issues and an estimated reclamation cost of \$108.7 million.

The following table shows financial data for the budget units included in this form.	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022
	Actual	Actual	Actual	Current	Gov Rec
Missouri Geological Survey Operations (78510C)	5,257,359	5,772,349	5,675,235	7,576,059	7,576,059
Land Reclamation TRF (78520C)	0	0	145,500	200,000	200,000
Multipurpose Water Resource Program PSD (78525C)	0	869,565	454,677	25,015,042	12,854,030
Multipurpose Water Resource Program TRF (78525C)	750,000	3,000,000	448,988	24,265,042	12,104,030
Stockton Lake Study (one-time authority) (78525C)	0	174,600	0	0	0
Critical Mineral Resource Study (one-time authority) (78525C)	0	0	145,500	0	0
State Water Plan E&E (78525C)	0	0	409,025	924,920	924,920
Oil and Gas Remedial Fund PSD (78526C)	0	0	0	150,000	150,000
Land Reclamation PSD (79465C)	1,962,932	1,921,482	1,279,930	4,083,500	4,083,500
Total	7,970,291	11,737,996	8,558,855	62,214,563	37,892,539

The FY 2021 budget includes \$12.1 million one-time pass-through authority and \$12.1 million one-time transfer authority related to COVID-19 relief.

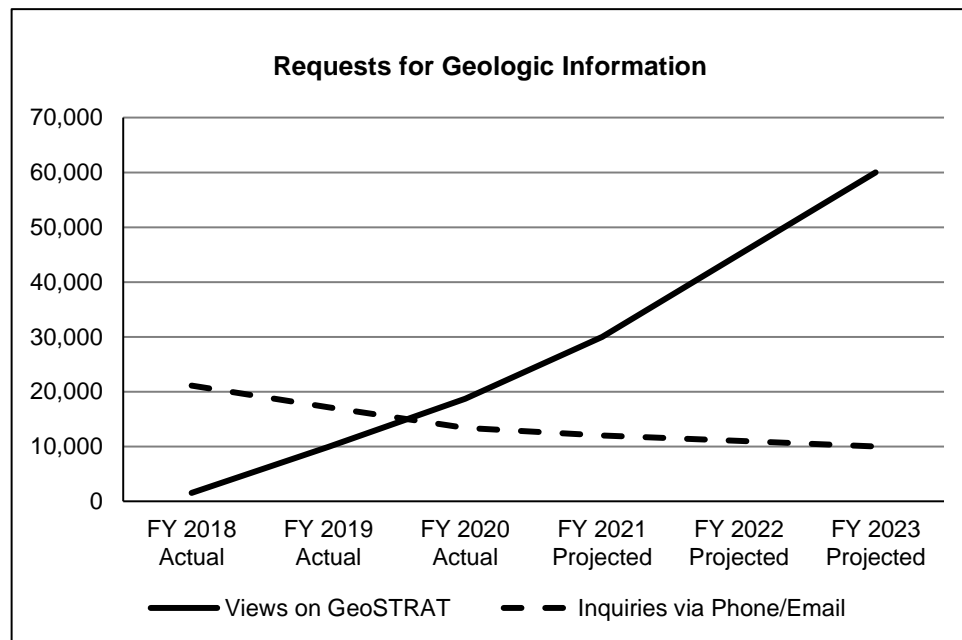
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2a. Provide an activity measure(s) for the program.

- Businesses, farmers, and citizens receive geologic assistance:
- Businesses such as well drillers, oil and gas operators, and mining and quarry operations.
 - Farmers who own land with known or potential geologic resources and/or geologic hazards.
 - Landowners and potential landowners who need geologic information that may include private water wells, oil and gas leases, and potential geologic resources and/or hazards.
 - The general public with inquires on the geologic resources of Missouri.

In FY 2018, the Department's online Geosciences Technical Resource Assessment Tool (GeoSTRAT), received a significant upgrade to a new ArcOnline platform. This web-based, interactive tool now makes geologic and geotechnical data readily available on mobile devices as well as on personal computers. For more than 165 years, the Missouri Geological Survey has produced geologic maps and collected related data. With this new tool, we anticipate that the number of inquiries via phone/email will continue to decrease as GeoSTRAT becomes more widely used for data assessments in disciplines such as hazards assessment, environmental consulting and engineering, local and regional planning, insurance assessment, and others.



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2b. Provide a measure(s) of the program's quality.

Protecting the Missouri River:

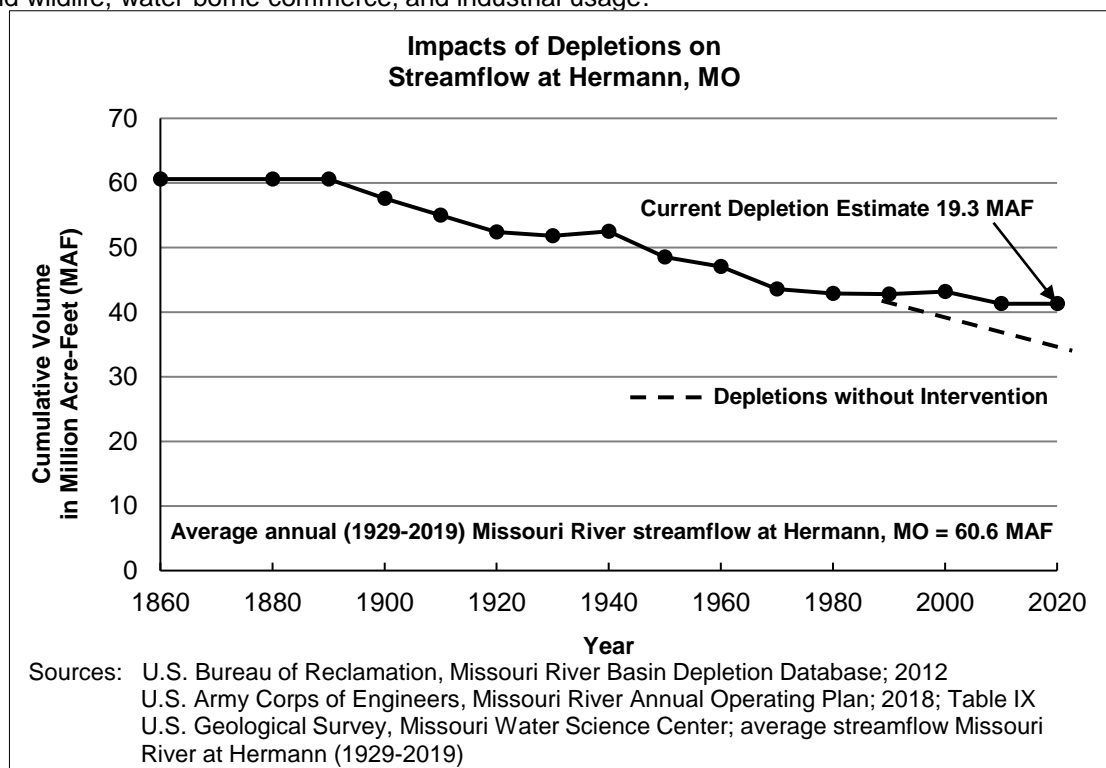
The Department serves Missourians by protecting the quantity of water in the Missouri River for water supply purposes. Approximately 45% of community water systems rely on the Missouri River as a source of drinking water. Other benefits of the program's work include ensuring Missouri River flows are adequate to support recreation, agriculture (irrigation and livestock), flood control, fish and wildlife, water-borne commerce, and industrial usage.

Missourians using Missouri River for drinking water:

FY 2018	FY 2019	FY 2020
2,418,820	2,465,508	2,512,106

Missouri River Water Rights

The Missouri River Master Manual is administered by the U.S. Corps of Engineers and is the primary document governing the operation of the Missouri River mainstem reservoirs. The Department engages with the Corps and other stakeholders to advocate for management outcomes that protect river uses Missourians need. During the Master Manual update and development of the Missouri River Ecosystem Restoration Plan, the Department prevented several proposed river operation changes that would have hampered Missourians' rights to navigate and use the Missouri River and likely would have increased flooding on Missouri property. The Department also successfully worked to establish a consensus-based Missouri River Recovery Implementation Committee (MRRIC) to ensure Missourians have a voice in Missouri River management. These efforts help ensure Missouri's interests in the river (such as drinking water, power generation, river commerce, recreation, and fish and wildlife) are protected and maintained.



The Department is instrumental in providing technical and legal assistance in challenging out-of-basin diversions of Missouri River water. The Department's work has prevented, delayed, or minimized the scope of several proposed diversions.

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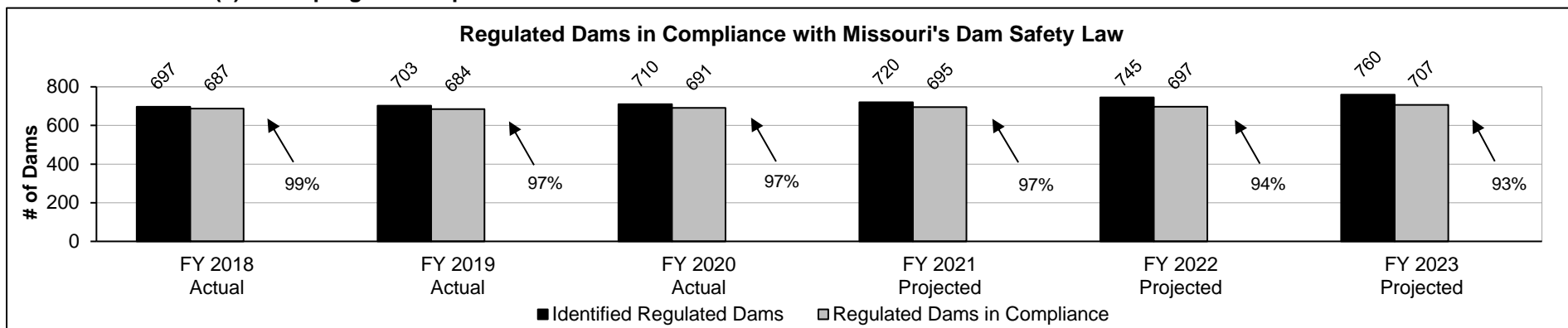
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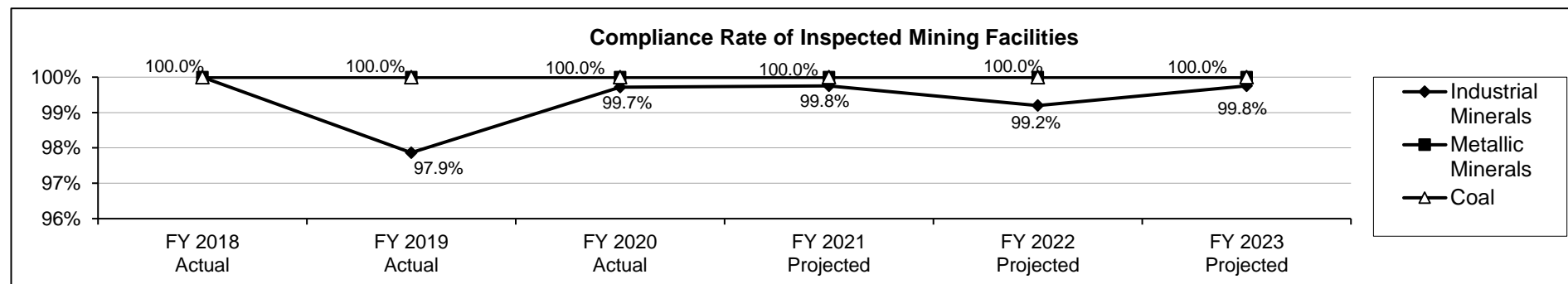
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2c. Provide a measure(s) of the program's impact.



Base Goal: 99% of regulated dams in compliance; Stretch Goal: 100%

The increase in number of regulated dams projected from FY 2019 through FY 2021 is based on the National Inventory of Dams update for Missouri. Construction and operating permits are required for dams 35 feet or higher in height. Missouri dams are aging with many built in the 1960s and '70s. The inspection and permitting process identifies deficiencies requiring repair or maintenance to be undertaken by dam owners to ensure the dam continues to operate as designed.



For 728 Industrial Mineral and 10 Metallic Mineral facilities, the Land Reclamation Program routinely provides compliance assistance to regulated facilities using conference, conciliation, and persuasion (CC&P) to correct issues. There are seven coal facilities in Missouri. Goals for this measure are to maintain the compliance rate for all three categories at 100%. In FY 2019, seven notices of violation were issued to one sand and gravel in-stream operator during an inspection. Since then, the program has provided guidance to correct the violations and the operator has returned to compliance.

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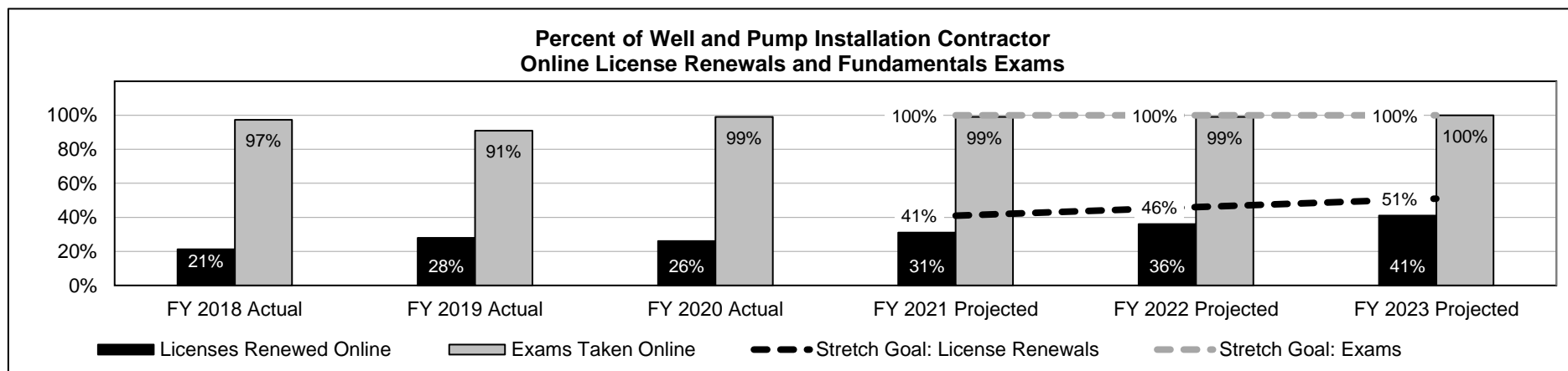
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2c. Provide a measure(s) of the program's impact. (continued)



Base Goal shown as Projected amount.

Beginning in FY 2016, well drillers have had a convenient option to apply for, take, and pay for the fundamentals exam through an online application. Previously, drillers throughout the state were required to drive to Rolla to take an exam which is only offered once a month in person. The automation saves staff time in proctoring and grading exams, processing payments, and mailing letters to notify applicants of their results.

The online application allows permitted well drillers to renew their licenses online, print their own license cards, and receive an automated confirmation of their renewal. We anticipate a significant increase in online permit renewals following implementation of the Well Information Management System - version 2.0 in June of 2021.

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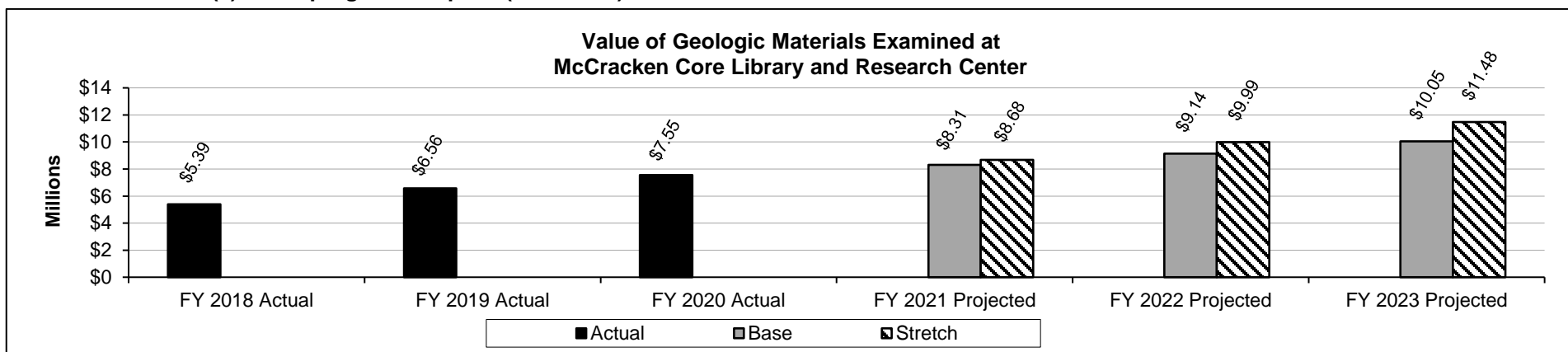
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This performance measure is based on: the amount of core and cuttings accessed by customers; the depth of drilling required to obtain the samples; and by the current estimate of the average cost per foot of drilling. In FY 2020, 14,185 feet of core stored at this facility was examined by our customers. The majority of interest at this time is in core that encompasses Precambrian or “basement” bedrock. Assuming a cost of \$60 per foot to drill, the value of this core is equivalent to approximately \$850,000. When drill cuttings are also considered, the value of these materials to our customers in FY 2020 is approximately \$990,000 for an overall increase of 15% over FY 2019. We attribute much of this to continued interest generated from the McCracken Core Library and Research Center Open House held in April 2019. This event brought in over 150 customers from industry, academia, government, and the public. We held demonstrations and presentations that highlighted the value of core and new ways that geoscience information in Missouri can be accessed. A newly established hand sample archive contains samples from multiple sites now inaccessible, including closed mines. The archive includes samples collected by MGS staff as far back as the 1800s, and is continually being added to.

Of the total feet of geologic materials accessed, more than 8,400 linear feet was used by an exploration company for potential cobalt exploration in Missouri. Cobalt is recognized as a mineral critical to the United States. Data were also collected from multiple hand samples in the collection housed at McCracken. The cost savings for the company were more than \$504,000. A separate company evaluated more than 1,500 linear feet of core to evaluate potash potential in Missouri Precambrian-age rocks. Cost savings to this company were more than \$93,500.

Base Goal: An annual 10% increase in value.

Stretch Goal: An annual 15% increase in value.

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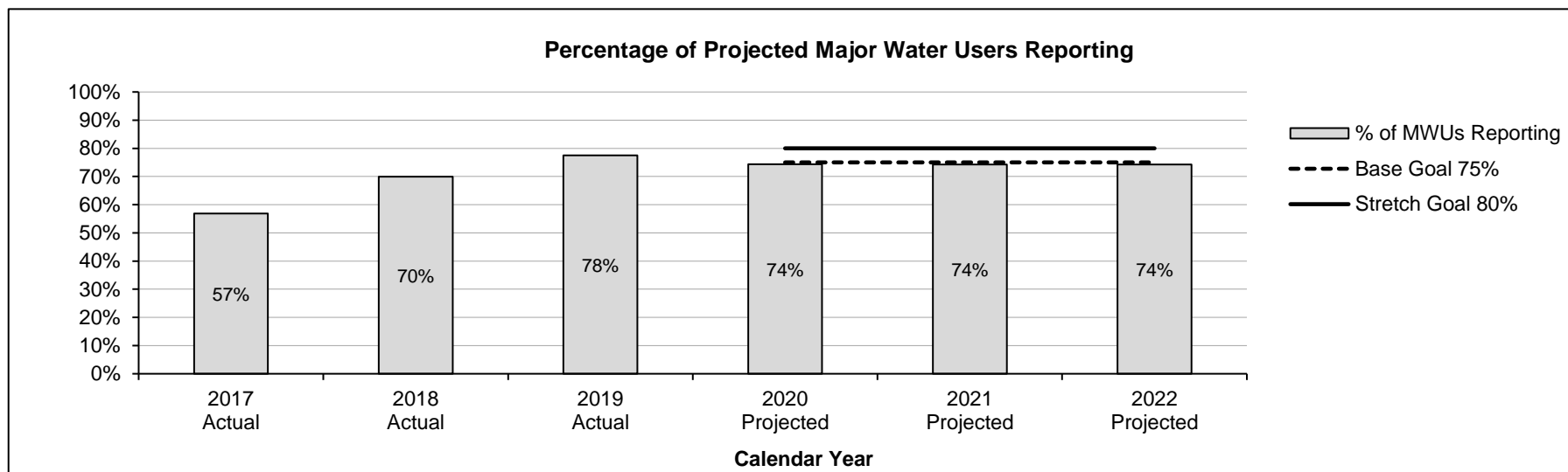
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2d. Provide a measure(s) of the program's efficiency.



Any water user withdrawing 100,000 gallons or more per day from any water source (stream, river, lake, well, spring, or other water source) is considered a major water user in Missouri. All major water users are required by law to register and report water use annually. Reporting water use facilitates the study and understanding of water use trends and patterns over time. Neighboring states that utilize a water rights framework have more data regarding their water use. It is important that Missouri have sufficient data to defend the needs of its users and the use of our water.

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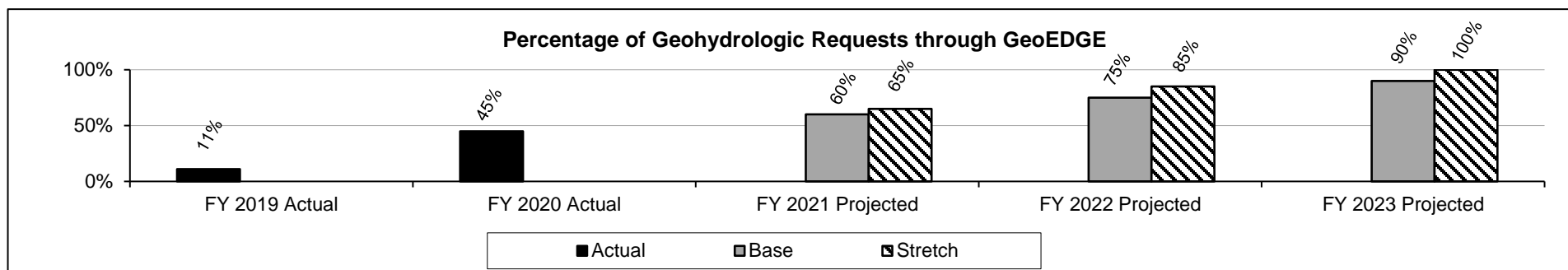
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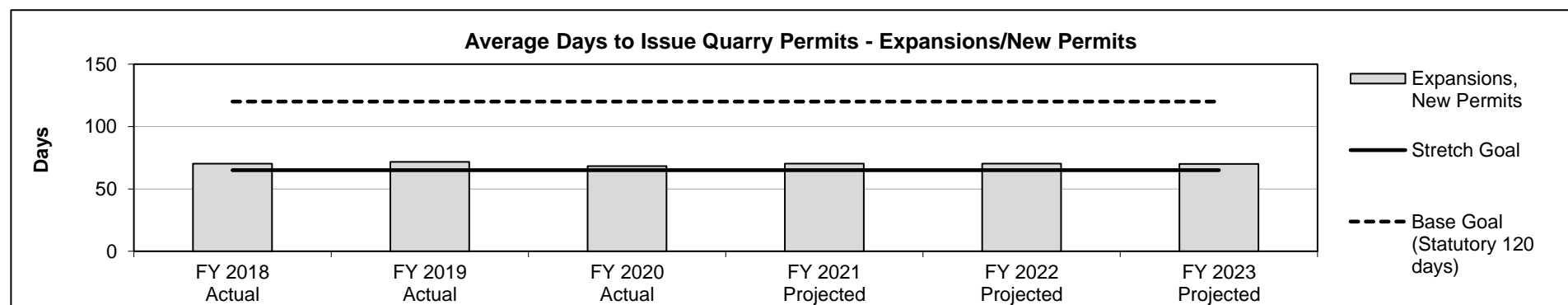
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2d. Provide a measure(s) of the program's efficiency. (continued)



Beginning in FY 2018, the Geologic Evaluation Data Gateway Exchange (GeoEDGE) provides a convenient, paperless option for customers to submit requests for geohydrologic evaluations for liquid waste treatment and residential housing developments. These evaluations provide the requestor, property owner, and the permit writers with site specific information needed to design and install the appropriate waste treatment system. Previously, these requests were submitted via paper requiring staff to input the information into a database. The GeoEDGE web application reduces time the requestor or developer spends on completing and submitting paper forms. It also reduces team member's time entering requests and mailing out reports. Customers are now able to instantly track their requests and receive expedited results through an email.

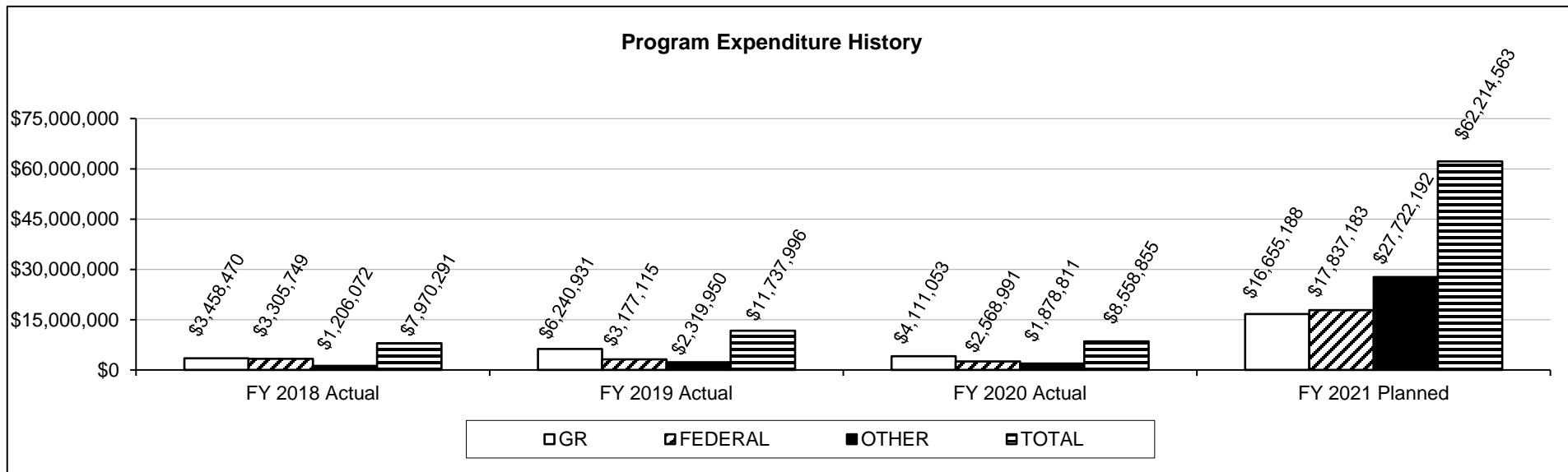


Missouri law allows 120 days to issue a permit, which includes a minimum 45-day comment period for new industrial permits and expansions. When public meetings and hearings are held, however, substantially more than 45 days is needed. The Land Reclamation Program issued 345 industrial minerals permits in FY 2020 covering approximately 750 mining sites.

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3. Provide actual expenditures for the prior three fiscal years and planned expenditures for the current fiscal year. (Note: Amounts do not include fringe benefit costs.)



Financial data includes operating and pass-through appropriations. FY 2021 Planned is shown at full appropriation and includes transfer and pass-through authority for the Multipurpose Water Resource Program, of which \$24.2 million is one-time authority related to COVID-19 relief.

4. What are the sources of the "Other " funds?

DNR Revolving Services Fund (0425); Cost Allocation Fund (0500); Oil and Gas Resources Fund (0543); Coal Combustion Residuals Subaccount (0551); Natural Resources Protection Fund - Damages Subaccount (0555); Natural Resources Protection Fund-Water Pollution Permit Fees (0568); Solid Waste Management Fund (0570); Metallic Minerals Waste Management Fund (0575); Groundwater Protection Fund (0660); Hazardous Waste Fund (0676); Oil and Gas Remedial Fund (0699); Geologic Resources Fund (0801); Multipurpose Water Resource Program Fund (0815); Mined Land Reclamation Fund (0906)

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5. What is the authorization for this program, i.e., federal or state statute, etc.? (Include the federal program number, if applicable.)	
RSMo 256.050	Geologic Assistance, Geologic Information and Maps
RSMo 256.112	Mine Map Repository
RSMo 256.170-256.173	Geologic Hazard Assessment
RSMo 319.200	Ground Shaking Notification
RSMo 256.090	Minerals, Rocks and Fossils
RSMo 578.200-578.225	Cave Resources Act
RSMo 260.925	Dry-Cleaning Facilities
RSMo 256.010-256.080	Provides technical and administrative oversight of all direct program statutory mandates
RSMo 259	Oil and Gas Act
RSMo 256.700-256.710	Geologic Resource Fund and related duties
RSMo 260.205	Solid Waste Management
RSMo 256.600-256.640	The Water Well Drillers' Act
RSMo 256.700 and 444.760-444.790	Industrial Minerals
RSMo 236.400-236.500	Dam, Mills and Electric Power
RSMo 256.060	Survey of water resources of state
RSMo 256.200	Commission to collect and coordinate water data
RSMo 256.400-256.430	Water Usage Law, users to file registration
RSMo 256.435-256.445	Multipurpose Water Resource Act
RSMo 640.400-640.430	Negotiation of interstate compacts, surface and groundwater monitoring, state water resources plan and annual report and special water protection areas
RSMo Chapter 257	Water Conservancy Districts
RSMo 444.350 through 444.380	Metallic Minerals
RSMo 444.500 through 444.755	Strip Mining
RSMo 444.800 through 444.970 and 30 CFR Part 700.01 through 955.17	Coal, Bond Forfeiture and Abandoned Mine Lands

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6. Are there federal matching requirements? If yes, please explain.	
State Geologic Mapping Program Underground Injection Control (UIC) Geodata Preservation Regional Geologic Framework Studies National Dam Safety Assistance Award Drinking Water State Revolving Fund Capitalization Grant Coal Administration and Enforcement Grant Abandoned Mine Land Grant National Groundwater Monitoring Network Water Use and Data Research Missouri Earth Mapping Resources Initiative (Earth MRI) State Geologic Mapping Program Supplemental National Geologic Map Database Geologic Mapping Initiative	50% Federal (USGS) 75% Federal (EPA) 40% Federal (USGS) 50% Federal (USGS) 100% Federal 20% State/Local (EPA) 50% Federal (OSM) 100% Federal (OSM) 63% Federal (USGS) 55% Federal (USGS) 91% Federal (USGS) 49% Federal (USGS) 100% Federal (USGS) 67% Federal (USDA)
7. Is this a federally mandated program? If yes, please explain.	
<p>The Missouri Geological Survey provides the technical geologic expertise for the state's federally-delegated environmental programs. In addition, the EPA has delegated authority to the Department to ensure compliance with the requirements of the Safe Drinking Water Act as it relates to underground injection control.</p> <p>The state has federal delegation to operate the coal regulatory, abandoned mine lands, and coal bond forfeiture programs.</p>	