

# Polishing Your Writing Skills for State Government Agency Careers - Perspectives from Actual State Agencies

---

DAVID SPEARS, STATE GEOLOGIST

VIRGINIA DEPARTMENT OF MINES, MINERALS AND ENERGY



# Outline

---

- I. Geoscience jobs in state agencies
- II. Types of writing needed in state agencies
- III. Results of informal survey of state geological surveys

# What types of state agencies employ geoscientists?

---

- State geological surveys
  - Geologic mapping
  - Mineral resource studies
  - Groundwater/hydrogeology
  - Geologic hazards
  - Publications
  - Outreach

# What types of state agencies employ geoscientists?

---

- Highway departments
- Regulatory agencies
  - Mining (coal, aggregate, minerals)
  - Oil and gas
  - Groundwater
  - Solid waste

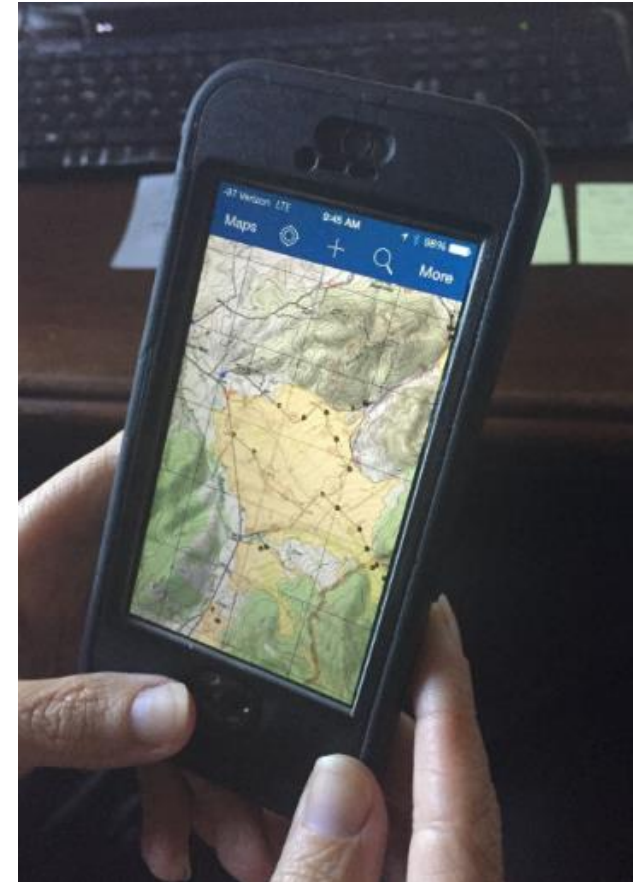
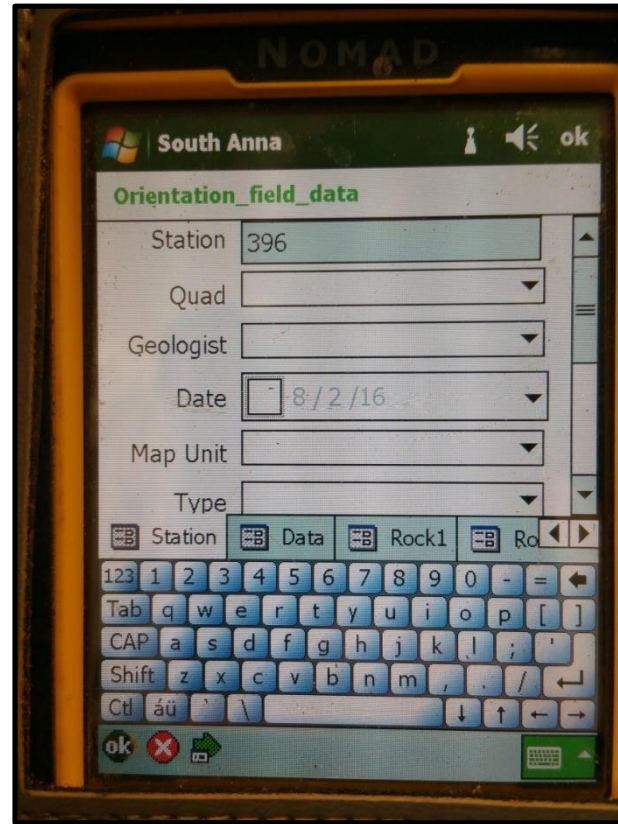
# Types of writing needed in state government – Part I, *Technical*

---

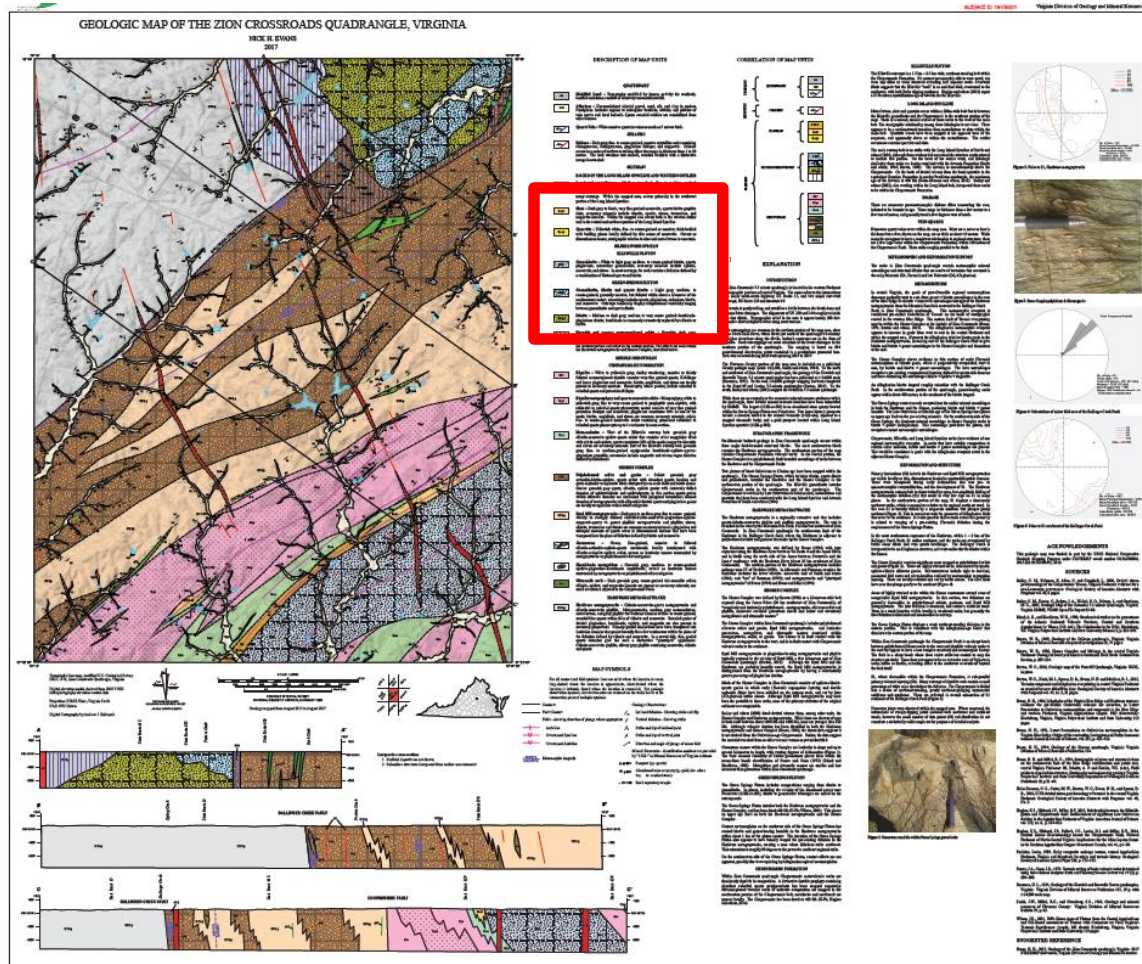
- Field notes
- Maps (with text)
- Reports
- Abstracts
- Grant proposals

# Technical writing – Field notes

---



# Technical writing – Maps



## SILURIAN

### ROCKS OF THE LONG ISLAND SYNCLINE AND WESTERN OUTLIER

Soms

**Laminated metasilstone** – Medium gray fresh, fine- to medium- grained muscovite, chlorite, biotite, quartz phyllitic metasilstone; zircon, tourmaline, and graphite are common accessory minerals; graded laminations are visible in many outcrops. Within the mapped area, occurs primarily in the southwest portion of the Long Island Syncline.

Sosl

**Slate** – Dark gray to black, very fine-grained muscovite, quartz-biotite-graphite slate; accessory minerals include titanite, apatite, zircon, tourmaline, and magnetite-ilmenite. Within the mapped area occurs both in the western outlier and in the central and northeast portion of the Long Island Syncline.

Soqz

**Quartzite** – Yellowish white, fine- to coarse-grained or massive; thick-bedded with bedding planes locally defined by thin seams of muscovite. Occurs as discontinuous lenses; stratigraphic relation to slate and metasilstone is uncertain.

## SILURIAN/ORDOVICIAN

### ELLISVILLE PLUTON

SOe

**Granodiorite** – White to light gray, medium- to coarse-grained biotite, quartz, plagioclase, microcline granodiorite; accessory minerals include epidote, muscovite, and zircon. In most outcrops, the rock contains a foliation defined by a combination of flattened quartz and biotite.

### GREEN SPRINGS PLUTON

SOgg

**Granodiorite, diorite and quartz diorite** – Light gray, medium- to coarse-grained, generally massive, but foliated within about a kilometer of the southeastern contact; mineralogy includes quartz, plagioclase, orthoclase, biotite, and muscovite. Outcrops commonly display compositional variability ranging between granodiorite and quartz diorite.

# Technical writing – Reports



New Jersey Geological and Water Survey  
Open-File Report 16-1



## Hydrogeologic Framework and Computer Simulation of Groundwater Flow in the Valley-Fill and Fractured-Rock Aquifers of the Germany Flats Area of Sussex County, New Jersey



New Jersey Department of Environmental Protection

erosional unconformity is the Cambrian-age Hardyston Quartzite. This basal unit grades into carbonate rock of the overlying Kittatinny Supergroup. The stratigraphic thickness of the Hardyston Quartzite is variable in New Jersey, ranging from about 2 feet to 200 feet (Drake and others, 1995). The formation is less than 50 feet thick in the study area.

The Kittatinny Supergroup consists of Cambrian to Ordovician-age carbonate rock of the Leithsville Formation, Allentown Dolomite, Beekmantown Group and Jacksonburg Limestone. The rock is primarily dolomite, with some limestone, dolomitic sandstone, siltstone and shale. The total stratigraphic thickness of the Kittatinny Supergroup in New Jersey is approximately 4000 feet (Herman and Monteverde, 1989). Within the study area, the sedimentary rocks generally strike northeast-southwest, following the trend of the valley, and dip at an angle of approximately  $56^{\circ}$  to  $65^{\circ}$  to the northwest.

The Ordovician Martinsburg Formation is the youngest rock unit, and consists of slate, graywacke and siltstone (Drake and others, 1995). The stratigraphic thickness is at least 3000 feet (Kummel, 1940). The resistant slate of the Martinsburg Formation forms a bedrock ridge on the northwestern side of the valley.

Structural deformation of rocks in the area resulted from at least two orogenic events and includes folding and faulting of the Paleozoic

retreated northward. The glacial sediments vary in thickness, but can be several hundred feet where valley-fill overlies carbonate bedrock at lower elevations. Till is thickest on northwest-facing bedrock slopes (Witte, 1992).

## HYDROGEOLOGY

### Bedrock aquifers

For the purposes of this report, the bedrock units are grouped into four aquifers 1) the igneous and metamorphic fractured-rock aquifer, 2) the Franklin Marble, 3) the carbonate fractured-rock aquifer, and 4) slate of the Martinsburg Formation. The igneous and metamorphic fractured-rock aquifer includes undifferentiated Precambrian gneiss and granitoid rock, a narrow band of the Wildcat Marble and Franklin Marble, and the Hardyston Quartzite. The stratigraphically-thin layer of Hardyston Quartzite was grouped with the underlying crystalline rock rather than the carbonate rocks because the hydraulic properties of the quartzite were thought to more closely match that of the granite and gneiss. The Franklin Marble is distinguished as a separate unit only in the area of Limecrest Quarry. The carbonate-rock aquifer consists of rocks of the Kittatinny Supergroup and Jacksonburg Limestone. The Martinsburg aquifer includes all rocks of the Martinsburg Formation. Hydrologic properties of the bedrock aquifers are summarized in table 1.



# Technical writing – Abstracts

## **LANDFORMS AND SEQUENCE STRATIGRAPHY: USE OF COMPREHENSIVE LANDSCAPE ANALYSIS TO CREATE MAPS OF SURFICIAL DEPOSITS AND THEIR HYDROLOGIC ATTRIBUTES, COASTAL PLAIN SECTOR, NEUSE RIVER BASIN, NORTH CAROLINA, USA**

[FARRELL, Kathleen M.](#), North Carolina Geological Survey, MSC 1620, Raleigh, NC 27699-1620, [Kathleen.Farrell@ncmail.net](mailto:Kathleen.Farrell@ncmail.net)

The Atlantic Coastal Plain of eastern North Carolina is an area where relict Plio-Pleistocene topography reflects a falling stage systems tract (after Plint and Nummedal, 2000). This landscape, including the Neuse River Basin, is characterized by a series of progressively younger (highstand and falling stage) paleoshorelines and intervening terraces that step down in elevation and age towards the coast and into drainages. Each highstand shoreline was abandoned during a subsequent regression, or fall in relative sea level.

This paper explains how to subdivide this type of relict landscape into a series of progressively younger depositional systems and their landform elements, using Brierley's constructivist approach. A stratigraphically complex terrain is simplified through an iterative process that defines the relationship between relict landforms, stratigraphy, soils, and the shallow aquifer system. Assumptions for the geomorphic analysis are based on widely circulating concepts (e.g.: Oaks et al, 1974; Johnson, 1976; Soller, 1988; Mixon et al, 1989; Owens, 1989), and some new ideas. Data shown was acquired from the Little Contentnea Creek Watershed, including a 3D subsurface analysis at the Lizzie Research Station (km<sup>2</sup>). Map units were defined from electronic databases (digital elevation models, lidar, 7.5 minute digital raster graphics, and soils and wetland coverages).

A set of rules or assumptions for defining the geomorphic elements of a relict falling stage systems tract (FSST) is proposed. Systematic application of these rules subdivides and redefines the landscape in the context of a geologic conceptual model that explains the relative age, position, and geometry of each landform. Facies and significant bounding surfaces identified at detailed study sites such as Lizzie provide bases for defining unconformity bounded units that are regionally extrapolated using geomorphology. Within each sequence, 3D facies geometries such as those observed at Lizzie provide a template for understanding groundwater pathways in shallow aquifers systems. Integrating the results of this geomorphic analysis with the landscape units defined by Mew (2003, this meeting) from soils coverages, will enable assignment of attribute data such as recharge, to surficial geologic map units.

# Technical writing – Grant proposals

## Attachment A

### FY 2018 NGGDPP Proposal Information Summary

**Name of the State Geological Survey:** Michigan Geological Survey

**Project Title:** Michigan Geological Survey 2018 Data Preservation program:  
Preserving unique historical collection of drill cuttings and generating inventories together with metadata for them

**Principal Investigator:** William B. Harrison, III  
Michigan Geological Survey  
Department of Geosciences  
Western Michigan University  
1903 W. Michigan Avenue  
Kalamazoo, MI 49008-5241  
Telephone: (269) 387-8691 Email: [harrison@wmich.edu](mailto:harrison@wmich.edu)

**Authorized Institutional Representative:** Western Michigan University  
Michigan Geological Survey  
Attn: Sherine Obare  
1903 W. Michigan Avenue  
Kalamazoo, MI 49008-5456

<b>Amount Requested:</b>	FY 2018 FEDERAL BUDGET	FY 2018 STATE BUDGET
	Salaries - \$24,970	Salaries - \$24,971
	Fringe Benefits - \$7,591	Fringe Benefits - \$7,594
	Other Direct Costs - \$150	Other Direct Costs - \$150
	Indirect Costs - \$16,683	Indirect Costs - \$16,685
	Grand Total - \$49,394	Grand Total - \$49,400

**Proposed Start Date:** September 1, 2018

**Proposed Duration:** Twelve months from proposed start date

## PROJECT SUMMARY

The Michigan Geologic Survey (MGS), through its repository, the Michigan Geological Repository for Research and Education (MGRRE), part of the Department of Geosciences at Western Michigan University (WMU), preserves geological samples and data, making them readily accessible. For this project, the Survey will preserve, inventory and generate metadata for a large collection of historical drill cuttings recently given to the MGS by another university. The MGS will also submit that information in required format to the National Digital Catalog (NDC). This project meets FY 2018 NGGDPP priorities of preserving geological material and submitting inventories and metadata to the NDC.

These drill cuttings are small rock samples from the great majority sedimentary formations throughout Michigan's Lower Peninsula. They were acquired through early oil and gas exploration from the late 1920's-1950's, carried out by one primary company in partnership with several smaller operators. Based on our initial examination of the collection, we expect these are likely the only remaining physical samples for most of these early bore holes.

All the samples are contained in fragile glass vials placed loosely on cardboard trays stacked in large paper boxes. The boxes have sustained water damage and deterioration from poor storage conditions. Initially vials were organized on trays from shallower to deeper samples. Because the boxes have been moved several times, many of the vials have rolled out of the trays and there is little remaining order. Often the paper labels on vials, identifying the well and sample footage, have come loose but are still wrapped around the vials. Some of the vials are cracked and a few have broken. Even so, most of the sample material remains in the vials.

# Types of writing needed in state government – Part II, *Nontechnical*

---

- Website content
- Outreach materials – fact sheets, brochures
- Social media
- Letters to citizens

# Nontechnical writing – Website content

## MBMG Earthquake Studies Office —ESO

The Earthquake Studies Office, located in Butte, Montana on the [Montana Tech](#) campus, is on the third floor of the Natural Resources Building (NRB) which is on the north side of Granite/Park Street at the west end of campus.

Financial support for the operation and maintenance of MRSN is provided by the [State of Montana](#), and the [Confederated Salish and Kootenai Tribes](#).



The Bridger Canyon seismic station (BCMT) is owned and operated by [DAQ Systems, LLC](#) of Bozeman, MT. They provide this station free of charge to the MRSN via a [continuous data feed](#).



The ESO operates the [Montana Regional Seismic Network \(MRSN\)](#), a network of 35 permanent seismic stations located throughout western Montana. The data acquisition equipment includes: radio telemetry units, eight analog seismograph drum recorders, eight computers (*two digital acquisition machines, one database computer, three seismic analysis computers, one outside research computer, and one general purpose machine*), and Helicorder and Seismic data archives.

### Mission

Western Montana has a history of large damaging earthquakes, and remains seismically active. Many of these earthquakes occur along faults that do not extend to the Earth's surface, and are thus unmapped and unknown. Seismic hazards associated with earthquakes along these "blind" faults cannot be evaluated with traditional geologic studies and can only be studied by evaluations of data from a permanent network of seismograph stations. Accordingly, our mission is to monitor, analyze, and report on Montana earthquakes and make this data available to the public.



# Nontechnical writing – Outreach materials

## EARTHQUAKES NEAR THE COAST



**DROP!** **COVER!** **HOLD ON!**  
Protect Yourself During Earthquakes



**GO TO HIGH GROUND OR INLAND!**  
The Shaking is Your Tsunami Warning



**STAY THERE!**  
Tsunami Waves May Arrive for Hours

**PROTECT Yourself During the Earthquake**

- If indoors, DROP under a sturdy table or object, COVER your head and neck and HOLD ON
- If outdoors, move to a clear area if you can safely do so – away from trees, beach cliffs, signs and other hazards – DROP to the ground, COVER your head and neck and HOLD ON
- If you are unable to DROP to the ground, COVER your head and neck and HOLD ON

**MOVE to High Ground**

- As soon as it is safe to move, go to higher ground. DO NOT WAIT for an official tsunami warning
- Avoid downed power lines and weakened overpasses
- If you are not in a Tsunami Hazard Zone, stay where you are

**STAY There**

- Remain on high ground. Waves from a tsunami may arrive for 8 hours or longer
- Return to the coast only when officials have announced that it is safe.

## TSUNAMI INFORMATION

- Tsunami – Series of waves commonly caused by an earthquake beneath the sea floor
- Water “Draw Down” – Unusual lowering of ocean water, exposing the sea floor. Water will strongly surge back toward land
- Tsunami surge on land is usually less than one (1) mile. Beaches, lagoons, bays, estuaries, tidal flats, and river mouths are dangerous places to be during a tsunami
- Tsunami waves are not like coastal waves. Tsunamis are more like a debris-filled flooded river
- Tsunamis cannot be surfed. There is no face to the tsunami waves
- Large tsunamis may be over fifty (50) feet high in some coastal areas. The first tsunami wave is not usually the highest.
- A tsunami may occur anywhere along the California coast. Millions of dollars in damage has occurred along the California coastline during past tsunami incidents. The 2011 Tohoku (Japan) tsunami caused over \$100 million in damage to California coastal communities.

## RESOURCES

California Governor’s Office of Emergency Services  
Earthquake, Tsunami and Volcano Program  
<http://www.caloes.ca.gov/tsunami>

Know Your Hazards  
<http://www.myhazards.caloes.ca.gov/>

California Geological Survey  
<http://www.tsunami.ca.gov>

Tsunami Preparedness Information/Registration  
<http://www.tsunamizone.org/>

National Oceanic and Atmospheric Administration/  
National Weather Service  
National Tsunami Warning Center  
<http://www.tsunami.gov/>  
<http://wcatwc.arh.noaa.gov/>

Great California ShakeOut  
<http://www.shakeout.org/>

Earthquake Country Alliance  
<http://www.earthquakecountry.org/>

# How to Survive a Tsunami

- Protect yourself during the earthquake
- Move to highground or inland as soon as you can
- Stay there



**Cal OES**  
GOVERNOR'S OFFICE  
OF EMERGENCY SERVICES

# Nontechnical writing – Social media

Tweets

Tweets & replies

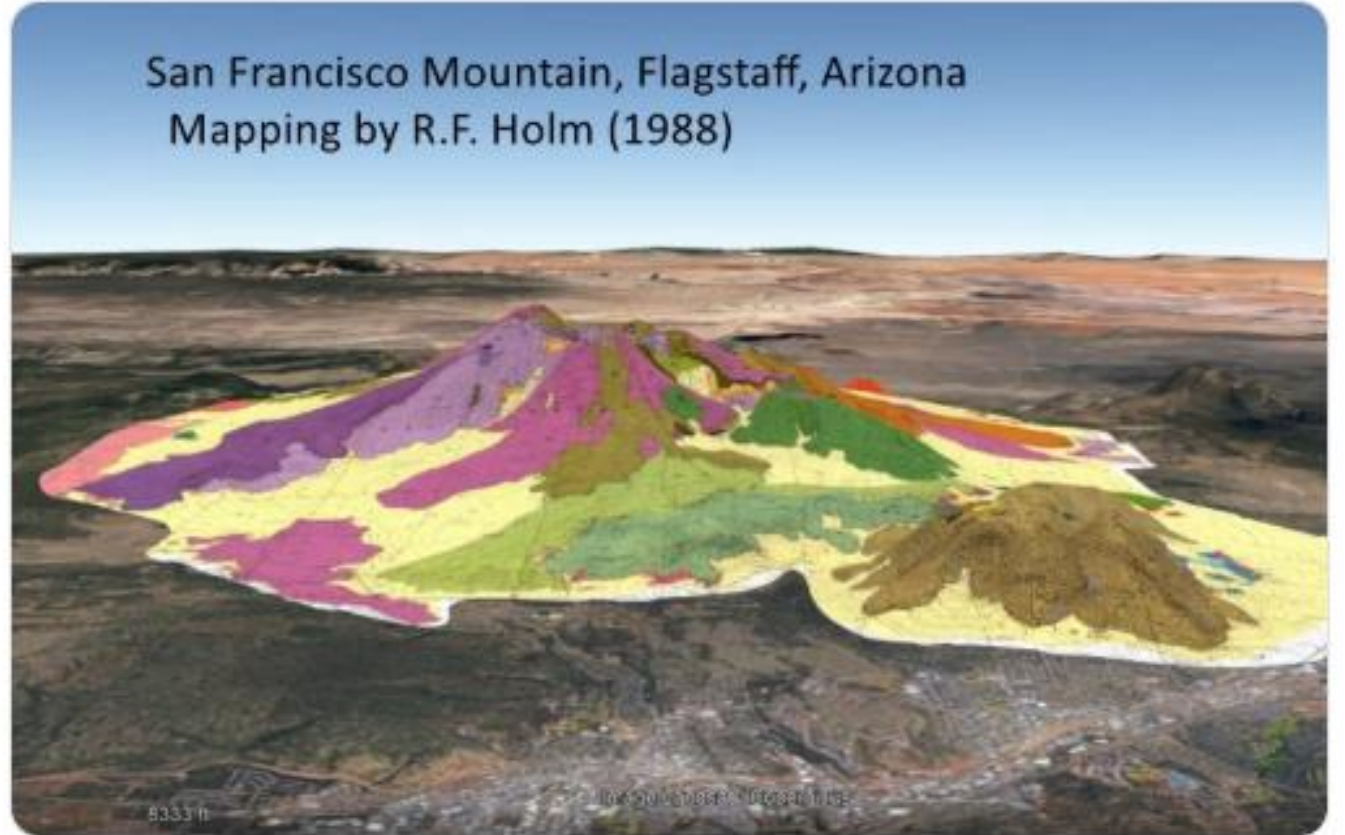
Media



**AZ Geological Survey** @AZGeology · 6h

A 360-degree, 2.5-minute video tour of the geology of San Francisco Mountain, a Pleistocene composite #volcano. [youtu.be/n6T-Bpr4pcY](https://youtu.be/n6T-Bpr4pcY)

San Francisco Mountain, Flagstaff, Arizona  
Mapping by R.F. Holm (1988)



↻ 10

♡ 20

# Nontechnical writing – Letters to citizens



DIVISIONS  
ENERGY  
GAS AND OIL  
GEOLOGY AND MINERAL RESOURCES  
MINED LAND RECLAMATION  
MINERAL MINING  
MINES  
ADMINISTRATION

## COMMONWEALTH OF VIRGINIA

*Department of Mines, Minerals and Energy*

Washington Building / 8<sup>th</sup> Floor  
1100 Bank Street  
Richmond, Virginia 23219-3638  
(804) 692-3200 FAX (804) 692-3237  
[www.dmme.virginia.gov](http://www.dmme.virginia.gov)

June 18, 2018

[REDACTED]  
Charlottesville, Virginia 22904

Dear [REDACTED]

Thank you for writing to Governor Northam with your concerns about offshore oil and gas drilling off Virginia's coast. The Governor has asked me to reply on his behalf.

The Virginia waters of Chesapeake Bay and its tributaries are fully protected from oil and gas exploration by Section 62.1-195.1 of the Code of Virginia, which states, "*Notwithstanding any other law, a person shall not drill for oil or gas in the waters of the Chesapeake Bay or any of its tributaries.*" This provision of state law ensures that no oil or natural gas drilling will ever take place in the Bay. You can find the complete text of this code section online at <http://law.lis.virginia.gov/vacode/title62.1/chapter20/section62.1-195.1/>.

The U.S. Department of the Interior through the Bureau of Ocean Energy Management (BOEM) controls oil and gas resources beneath the offshore waters of the Atlantic Ocean, beyond the three-mile limit of state waters. BOEM offers the rights to develop offshore petroleum resources through its Five Year Outer Continental Shelf Oil and Gas Leasing Program. The current Five-Year Program (2017-2022) does not include any offshore oil and gas leasing in the Atlantic. The current administration reopened the planning process and BOEM has initiated a process to develop a new National OCS Program for 2019-2014. You can read about the planning process and offer your comments to BOEM through their website at <https://www.boem.gov/Five-Year-Program/>.

# Results from an informal survey of state geological surveys...

---

**Question 1. Does your agency offer any training to its employees in the area of technical writing?**

**Question 2. What advice would you offer a student in preparing their writing skills for a future job at your survey?**



# Question 1. Does your agency offer any training to its employees in the area of technical writing?

---

- Not a single state reported offering any formal technical writing training.
- New hires are expected to be able to write on the day they start work.
- Informal training is available in the form of peer review and editor feedback.
- In some states, university classes are available for those who need them.

# Q1. Quotes from state geological surveys

---

“We expect applicants to come in with technical writing skills.” – Idaho

“I assume that when I hire an individual at the Ph.D. or M.S. level that they come with writing skills.” – Nebraska

“We expect our staff to have that skill when they start with us.” – Wisconsin

“We have an expectation for our research staff to have writing skills at the outset.” – Indiana

“We expect clear, organized writing from day one.” – Wyoming

“We just hire them and expect them to know.” – Delaware

## Question 2. What advice would you offer a student in preparing their writing skills for a future job at your survey?

---

“Take additional writing classes even if you think you don’t need them.”  
– Illinois

“Participate in professional societies that provide student opportunities to submit abstracts and posters.” – Florida

“For undergraduates, write a senior thesis, if that is an option.”  
– Maine

“Learn a foreign language. German is good because it has a more rigid grammar and it forces one to re-learn English grammar.” – Nebraska

Question 2 (continued). What advice would you offer a student in preparing their writing skills for a future job at your survey?

---

“Practice, practice, practice.” – Idaho

“Realize that the practice of good writing is a lifelong endeavor and embrace that reality.” – Nebraska

“Read a lot of journal articles.” – Pennsylvania

“Get something published.” – Maine

Question 2 (continued). What advice would you offer a student in preparing their writing skills for a future job at your survey?

---

“Learn how to take critical reviews... Take the advice you are given and make it part of your writing in the future.” – Pennsylvania

“Peer review is one of the best ways to see what makes good writing and where to find ways to improve.” – Indiana

“Find someone to critique and constructively edit your writing.”  
– Wisconsin

“Be willing to accept, and ultimately be unafraid of, criticism.”  
– Nebraska

# Trends and Observations

---

“I’m finding that the writing skills of scientists is deteriorating in general.” – Illinois

“Technical writing ability has declined in entry level people.”  
– Kentucky

“Unfortunately, many of today’s new graduates seem to be deficient in this subject.” – Florida

“Society as a whole has gone rather soft on communication skills.”  
– Nebraska

# Review

---

- I. Geoscience jobs in state agencies
- II. Types of writing needed in state agencies
- III. Results of informal survey of state geological surveys

# Resources

---

- U.S. Geological Survey Suggestions to Authors...
  - <https://doi.org/10.3133/7000088>
- Purdue OWL (Online Writing Lab)
  - [https://owl.purdue.edu/owl/purdue\\_owl.html](https://owl.purdue.edu/owl/purdue_owl.html)
- Society for Technical Communication
  - <https://www.stc.org/>
- The Dutch PhD Coach
  - <https://www.thedutchphdcoach.com/about/>
- Association of American State Geologists
  - <http://www.stategeologists.org/>