

GEOMORPHOLOGY (GEOL 317) REVISED; 4 Credits

Fall 2019
Exploratory Hall 1005

Prerequisites: GEOL 101 and 102 or 6 credits of geography including GEOG 102; air photo interpretation (GEOG 412) is strongly recommended

Lecture: Tuesdays 10:30 am to 1:15 pm (Exploratory 1005)
Professor: Dr. Randy McBride
Office: 3417 Exploratory Hall
Office Hours: Tuesdays, 4:30-5:30 pm or by appointment
rmcbride@gmu.edu

Lab: Thursdays 10:30 am to 1:15 pm (Exploratory 1005)
Instructor: Joao Silveira Meyers
Office: 3418 Exploratory Hall
Office Hours: Thursdays 1:30-3:30 pm or by appointment
jsilveir@gmu.edu

Isabella Lupini
Learning Assistant (LA)
Office Hours: TBA or by appointment
ilupini@gmu.edu

REQUIRED TEXTS: Ritter, D.F., Kochel, R.C., & Miller, J.R., 2011. Process Geomorphology, 5th ed. Waveland Press, 652 p.

Hess, D., 2017. Physical Geography Laboratory Manual, Pearson Press, 12th edition, 364 p.

Wanless, H.R., 1998. Aerial stereograms: an introduction to geology, geography, conservation, forestry, & surveying using stereo photographs. Hubbard Scientific, Chippewa Falls, WI, 92 p.

Additional readings may be posted on Blackboard.

COURSE DESCRIPTION: Analysis of surficial processes and resulting landforms (geomorphic features) that occur on Earth and other planets. Labs stress the recognition and evaluation of landforms using maps, aerial photography, and videos. Attendance in class, lab, or for any other course activities is required.

GOAL: Provide a detailed examination of terrestrial & extraterrestrial landforms and the processes that form them so that geomorphic landscapes can be interpreted at different spatial scales.

COURSE REQUIREMENTS: Attendance at lectures/labs/field trips, completion of lab exercises, reading of textbook chapters/hand outs, participation in class, completion of written exams, preparation of a written term paper, and an oral presentation of term paper. This is a ***writing-intensive*** course.

METHOD OF INSTRUCTION: Lectures given by instructor/guest speaker during class times and during any field trips, reading of textbook chapters and hand-outs outside of class, and an oral presentation by each student regarding their term paper. Portions of this class will emphasize the technique of ***active learning***. In other words, ***student-centered learning*** instead of teacher-centered learning.

TECHNOLOGY: Students are required to communicate via e-mail and conduct web-based research. All GMU students are allocated a GMU e-mail account. If you do not know your e-mail address, please see www.gmu.edu/email. You should check your e-mail regularly (e.g., once a day) at numerous locations around campus

TENTATIVE SCHEDULE (Subject to change): Lectures are indicated by non-italicized text, lab activities are italicized

Date	Topic	Readings (R) = Ritter (W) = Wanless (lab) (P) = Pearson (lab)
PART I ENDOGENIC PROCESSES AND LANDFORMS		
AUG 27	Lecture 1: Intro and plate tectonics	Ch. 1 & 2 (R); review Geol 101 textbook
AUG 29	<i>Lab 1: Contour lines, topographic maps & profiles</i>	Exercises 28-30 (P)
SEP 3	Lecture 2: Volcanic processes & landforms	Posted reading
SEP 5	<i>Lab 2: Aerial Photographs and Volcanoes</i>	<i>Introduction, Plates 50-56(W); Exercises 34 & 35 (P)</i>
SEP 10	Lecture 3: Topographic expression of folded strata	Posted reading: pp. 226-247, 248-272
SEP 12	<i>Lab 3: Topographic expression of folded strata</i>	<i>Plates 62, 64, 67, 70-73, 74 (W); stereo pairs</i>

Outline, references, & primary figures (include last name as part of filename) must be uploaded by 11 pm, upload digital copy (.doc or .docx file) to Drop Box (specific web address will be provided). NOTE: Perform a comprehensive spell check as last task before submittal.

PART II EXOGENIC PROCESSES AND LANDFORMS

SEP 17 Lecture 4: Weathering - chemical Ch. 3 (R)

SEP 19 *Lab 4: Weathering lab or possible field trip (e.g., SKYLINE CAVERNS south of Front Royal, VA)
If field trip, then meet vans at loading dock of Exploratory Hall at 10:20 am with bag lunch & drink.
Bring a notebook and pencil to take notes for lab.*

Revised outline, references, & primary figures (add v2 to filename) must be uploaded by 11 pm, upload digital copy (.docx or .doc file) to Dropbox (specific web address will be provided).

SEP 24 Lecture 5: Physical Weathering & Mass Movement Ch. 4 (R)

SEP 26 *Lab 5: Mass wasting Exercise 38 (P); Plates 6, 7, & 8 (W); stereo pairs*

OCT 1 EXAM 1; Lecture 6: Drainage Basins & Patterns Ch. 5 (R)

OCT 3 *Lab 6: Drainage Basins & Patterns Exercises 39 & 41 (P); Plates, 39-45, (W); stereo pairs*

OCT 8 Lecture 7: Fluvial Processes Ch. 6 (R)

OCT 10 Lecture 8: Fluvial Landforms Ch. 7 (R)

OCT 15 NO CLASS (Columbus Holiday); Mon classes meet on Tues

OCT 17 *Lab 7: Fluvial Landforms Exercise 40 (P); Plates 34–38 (W); stereo pairs*

Upload complete papers by 9 am and submit hard-copies in class at 10:30 am (1st version, submit 1 hard copy & upload 1 digital copy) with a SafeAssign score of <20%. NOTE: Perform a comprehensive spell check as last task before submittal. Classmate assigned for peer review; LA reviews papers too.

NOTE: Upload digital complete paper (.docx or .doc file) with last name and paperV1 as part of filename to Dropbox.

OCT 22 Lecture 9: Karst processes & landforms Ch. 12 (R)

OCT 24 *Lab 8: Karst topography Exercise 44 (P); Plates 4 & 5 (W); stereo pairs*

Classmate returns hard-copy peer review to professor & professor passes review to author; LA uploads his/her reviews to Dropbox.

OCT 29 Exam 2; Lecture 10: Glacial processes Ch. 9 (R)

OCT 31 Lecture 11: Glacial landforms Ch. 10 (R)

NOV 5 *Lab 9: Continental & Alpine Glaciation Exercises 47 & 48 (P); Plates 9, 10, 11, 17, & 21 (W)*

Author uploads fully-revised digital paper by 9 am and submits hard-copy paper to professor at 10:30 am (2nd version, 1 hard copy & 1 digital copy in Word as .docx or .doc file) with a SafeAssign score of <15%. NOTE: Perform a comprehensive spellcheck as last task before submittal. LA reviews papers too.

NOTE: Upload revised digital paper (last name filename plus add paperV2) to Dropbox.

NOV 7 Lecture 13: Aeolian processes & landforms Ch. 8 (R)

NOV 12 *Lab 10: Aeolian processes and landforms Exercise 45 & 46 (P); Plates 1 – 3 (W)*

PART III EXTRATERRESTRIAL LANDFORMS

NOV 14	Lecture 14: Planetary geomorphology (meteorites, craters, & Moon)	Posted reading
NOV 19	Lecture 15: Planetary geomorphology	Posted reading
NOV 21	<i>Lab 11: Terrestrial Planets</i>	<i>Handout; Plate 58 (W)</i>

Author uploads final, fully revised, clean digital paper (3rd final version) by 9 am with SafeAssign score of <15%. NOTE: Perform a comprehensive spell check as last task before submittal.

NOTE: Upload final, fully-revised, clean digital paper (last name plus add paperV3 to filename) to Dropbox.

NOV 26	NO Class	
NOV 28	NO LAB (Thanksgiving Holiday)	
DEC 3	<i>Lab 12: Paper presentations (see details below)</i>	<i>Students presentations</i>
DEC 5	<i>Lab 13: Paper presentations (see details below)</i>	<i>Student presentations</i>
DEC 10	NO CLASS, READING DAY	
DEC 17	FINAL EXAM (10:30 am to 1:15 pm), No exceptions!	Comprehensive but will emphasize last third of course

IMPORTANT DATES:

- Sep 12** Outline, references, & primary figures uploaded by 11 pm
- Sep 19** Revised outline, refs, & primary figures uploaded by 11 pm
- OCT 1** EXAM 1
- Oct 17** Upload complete papers by 9 am and submit hard copy at 10:30 am (1st version; 1 hard & 1 uploaded copy); LA reviews paper too.
- Oct 24** Classmate returns hard-copy peer reviews to professor; LA uploads his/her reviews too
- OCT 29** EXAM 2
- Nov 5** Author uploads fully-revised, digital paper by 9 am and submits hard copy to professor at 10:30 am (2nd version, 1 uploaded copy in Word & 1 hard copy) with a SafeAssign score of <15%
- Nov 21** Upload final revised papers by 9 am (3rd version; 1 uploaded copy)
- Dec 3 & 5** Oral presentations presented in lab
- DEC 17** FINAL EXAM (10:30 am to 1:15 pm), REQUIRED AS SCHEDULED, NO EXCEPTIONS

GRADING:	Exams 1 & 2	10% each
	Final Exam	25% (comprehensive including labs)
	Labs	22% (~1.7% per lab or field trip; lowest lab grade dropped, except for any field trip labs. Field trip labs cannot be dropped.)
	Paper	18% total <ul style="list-style-type: none">• Paper Outline, Figures, & References (3%);• 1st version of Paper (classmate peer review; satisfactory or unsatisfactory [up to 10% deducted on 2nd draft grade for reviewer & author]) with a SafeAssign score of <20%• 2nd version of paper (10%) with a SafeAssign score of <15%• 3rd Final, revised paper (5%) with a SafeAssign score of <15%
	Oral presentation	10%

NOTE: Completion of all five components of the paper is required to earn a passing grade in the course.

Participation/quizzes	<u>5%</u> 100%
EXTRA CREDIT	0.33% for each GeoClub meeting attended (sign attendance sheet); other potential opportunities may exist for class-wide extra credit.

Exams may cover lectures, textbooks readings, slides, overheads, videos, handouts, labs, and field trip/museum

information. All exams must be taken as scheduled. **Makeups will not be given**, unless for exceptional circumstances and only if scheduled **PRIOR** to the exam date with a legitimate excuse (e.g., signed doctors' excuse). Make-up exams will be all essay. Otherwise, any missed exams will be scored a **zero**. Missed labs or lab field trips also will be scored a **zero**.

GRADE SCALE:

A+ = 97 - 100%
A = 93 - 96%
A- = 90 - 92%
B+ = 87 - 89%
B = 83 - 86%
B- = 80 - 82%
C+ = 77 - 79%
C = 73 - 76%
C- = 70-72%
D = 60 - 69%
F = 0 - 59%

Extra Credit: 1) Attend GeoClub meetings (0.33% for each meeting attended if on official attendance sheet and stay for entire meeting) and 2) Participate in possible miscellaneous extra field trips. More details later.

LAB: Labs/field trips are required. Please take lab seriously, which means attending lab and thoughtfully completing the entire lab exercise each week. Labs may require several hours of effort outside the formal lab meeting. **EACH LAB IS DUE AT THE END OF THE LAB PERIOD FOR WHICH IT IS ASSIGNED UNLESS STATED OTHERWISE. Ten points will be subtracted for each day the particular lab is late, up to three days. Labs four or more days late will not be accepted... NO EXCEPTIONS.** NOTE: The lowest lab grade will be dropped except field trip labs (i.e., Skyline Caverns). Lab makeups will only be permitted if the lab instructor is notified beforehand with an official excuse (e.g., signed doctor's excuse on official letterhead).

TERM PAPER: This course is designated as "Writing Intensive" and all students are required to complete this aspect of the class. The paper should be 10 pages in length, not including title page, illustrations, or references. There are seven *REQUIRED* stages to the "writing intensive" process and each stage is worth a certain percentage of your grade: 1) detailed paper outline, references, and primary figures & figure captions, 2) revised paper outline, references, and primary figures & captions, 3) submit complete 1st version, 4) peer review of your paper by a classmate, 5) submit fully revised 2nd version, 6) instructor review of 2nd draft, and 7) submit final, fully revised copy (3rd version). Grading of the paper will be based on adherence to the guidelines below and overall scholarly quality. Specific information regarding the references, papers, and oral presentations is found in subsequent pages. The papers will be presented in lab during the last weeks of class. Each person will prepare a 15- or 20-minute oral presentation (10% of grade) with graphics (e.g., PowerPoint slides, video clips, multimedia, etc.). **Ten points will be subtracted for each day the above-mentioned items are late.**

DISABILITIES: Students with disabilities or medical conditions that affect classroom performance should contact GMU Disability Support Services immediately at 993-2474. NOTE: Students will not receive any disability accommodations unless official GMU paperwork from Disability Resource Office is provided to and signed by Dr. Randy McBride.

HONOR CODE: Adherence to the GMU honor code is expected of all students. Lab exercises are expected to be individual efforts, unless teams are specifically assigned. Students are encouraged to discuss the concepts and procedures among themselves, but each student is expected to complete the lab assignment individually using their own words (e.g., **Copying someone's lab is a violation of the GMU honor code and will be treated as such...not only for the person who copied, but also for the person who allowed the copying**).

EXPECTATIONS:

I expect you to:

- 1) attend class, labs, and field trips
- 2) participate in class activities by asking questions and showing a genuine interest
- 3) get notes from a classmate (not from me) if you have to miss a class
- 4) read the appropriate material in the textbook **before** class and be prepared to discuss it in class
- 5) arrive on time for all exams (late arrivals will simply give you less time to complete the exam)
- 6) contact me via e-mail or visit me during my office hours if you do not understand something
- 7) be respectful of your classmates and of me at all times

You can expect me to:

- 1) present material in as clear a fashion as I can
- 2) assume you are familiar with the appropriate readings **before** we discuss it in class
- 3) welcome short questions at any time if you do not understand something (if I do not answer your question satisfactorily in class, we can discuss it after class or during office hours)
- 4) return your respect in kind

GUIDELINES FOR GEOMORPHOLOGY TERM PAPER (GEOL 317)

Outline, references, & primary figures due: uploaded by 11 pm (must include 5 or more full references in correct bibliographic format)

Scientific Paper

A. **Purpose:** Learn to write in scientific style

The scientific writing style is concise, factual, non-verbose, and non-fiction. It should not contain jargon and should be presented in a logical fashion so that facts build upon facts that lead to rational interpretations, discussion, and conclusions. Scientific writing is no place for fanciful leaps of faith or implied truths. Fact and hypotheses rule!

B. **Audience:** Assume the reader has your working knowledge of geology, physical geography, and geomorphology.

C. **Outline, References, & Primary Figures**

The reference section must contain at least **5 references** from the following specific sources: journal articles, books, book chapters, government documents, theses/dissertations, and published field guides (NOTE: Do not use professional abstracts). Use online bibliographic databases through Fenwick Library such as GeoRef, GeoBase, ScienceDirect, Jstor, Science Citation Index Expanded, etc. Information from the World Wide Web and other sources (e.g., National Geographic) are acceptable but must be in addition to the 5 references mentioned above. Newspaper and magazine articles are unacceptable sources of information. Each reference must be in the correct format as described below under "references."

D. **1st Complete Version of Paper** (*Upload digital papers by 9am and submit hard copies to professor at 10:30 am [1 hard & 1 uploaded copy] with a SafeAssign score of <20%; classmate assigned for peer review*)

The first complete copy of your research paper should follow the guidelines outlined below and include all the appropriate components and headings. **You should consider this 1st version a completely finished manuscript.** Your 1st version will be reviewed by a classmate and returned so you can make revisions/corrections/additions for the 2nd version.

1. Paper should be no more than 10 typed pages in length (excluding title page, illustrations, tables, references, and appendices), double-spaced, 1" margins on all four sides, a simple 10 or 11-point font (e.g., Helvetica, times roman), and fully justified.
2. Each page should be numbered sequentially (this means that every page handed in should have a page number including the references, all figures and tables, and appendices).
3. Spelling errors are unacceptable (use your spell-checker and proofread your text before submittal).

4. **SIX EXTRA CREDIT POINTS** on term paper if you visit GMU Writing Center and attend 50-min. tutoring session (NOTE: Must provide dated and signed official documentation from GMU Writing Center with your name on it).
5. Your paper should follow an outline of a scientific paper with primary headings as indicated below:

Title Page

paper title, course information, student's name, and date (all centered)

Abstract (½ page)

extremely concise overview of paper (250 words or less)

address main points of results, discussion, and conclusions (What are the primary geomorphic features and processes that create them?)

Introduction (1 page; one or two paragraphs each)

general introductory statement

literature review (very brief synthesis of *most* important articles regarding your area (Smith, 2003; Hill, 1991)

scope of paper (e.g., all volcanoes in your field locality [e.g., National Park] or a selected group)

specific scientific objectives of paper

Regional Setting (1 page)

location map (**REQUIRED!!**)

briefly describe regional geology, tectonic setting, & climate (e.g., average & extreme temperatures, arid or humid)

Results and Interpretations (~4 pages)

Describe primary modern and/or ancient geomorphic features and interpret processes responsible for creating features; geomorphic evolution of features or landscape **must include topographic map** (1:24,000, 1:64,000, 1:250,000, etc.) with interpretations. **Construct several topographic profiles of primary geomorphic features using topographic map above.** Mark profile locations on topographic map and label profiles (X and Y axes labeled, horizontal & vertical scale, compass direction).

Discussion (~1 page)

NOTE: Discuss the DRIVING/RESISTING FORCES, PROCESSES, TIME, & GEOMORPHIC FEATURES and summarize into a table (**TABLE IS REQUIRED!**).

Conclusions (~½ page)

What do you conclude from all of the above? What are the primary geomorphic features and processes? What are the primary points that need reiterating?

References

All material cited in the text (e.g., George, 1998; Abston et al., 1987; McBride and Moslow, 1991) must be listed alphabetically in the reference section. Follow a specific bibliographic format as shown below. **All ideas not your own must be cited otherwise you have plagiarized. Some paragraphs might include a citation for every sentence (e.g., Regional Setting).**

Book

Dawson, A.G., 1992. Ice Age Earth - Late Quaternary geology and climate. Routledge Publishers, London, 293 p.

Journal article

McBride, R.A. and Moslow, T.F., 1991. Origin, evolution, and distribution of shoreface sand ridges, Atlantic inner shelf, USA. Marine Geology, v. 97, pp. 57-85.

Paper or chapter in edited book or proceedings volume

Abston, J.R., Dinnel, S.P., Schroeder, W.W, Shultz, A.W., and Wiseman, W.J, Jr., 1987. Coastal sediment plume morphology and its relationship to environmental forcing. Main Pass, Mobile Bay, Alabama. In: Kraus, N. (editor), Coastal Sediments '87, v. 2, pp. 1989-2005.

Government Report

Folger, D.W., 1972. Characteristics of Estuarine Sediments of the United States. U.S. Geological Survey Professional Paper 742, U.S. Government Printing Office, Washington, D.C., 94 p.

Theses and dissertations

George, S.M., 1988. Sedimentology and mineralogy of the Pensacola Bay system. M.S. thesis, University of Southern Mississippi, 93 p.

Figures

All figures must be clear and readable (if you cannot read it, do not include it!!!)

Each figure must be numbered sequentially starting with #1 and have a typed figure caption that describes the figure. A citation should occur at the end of the figure caption indicating the source of the figure. For example: *Figure 1. Shoreline changes of Parramore Island, VA from 1871 to 1999 (Vidal and McBride, 1999).*

Topographic maps should be given a figure number and referenced in the text.

Tables

All tables must be numbered sequentially starting with #1 and have a typed table caption. A citation should occur at the end of the table caption indicating the source of the table (Note: use same format as above for figure caption except replace Figure 1 with Table 1).

E. 2nd Version of Paper

Author uploads fully-revised digital copy by 9 am and submits hard copy to professor at 10:30 am (1 digital copy in Word & 1 hard copy) with a SafeAssign score of <15% (submit digital copy on Blackboard). The format follows the above-mentioned guidelines under "1st Complete Version of Paper."

F. Final 3rd Version of Paper

Author uploads final, fully-revised, digital papers (3rd final version) by 9 am with SafeAssign score of <15%. The format follows the above-mentioned guidelines under "1st Complete Version of Paper."

TERM PAPER TOPICS IN GEOMORPHOLOGY (National Parks in USA and elsewhere)

Stromboli, Italy	Geomorphology of Mercury	Mt. Shasta, CA	
Mount Etna, Italy	Galeras volcano, Colombia	Geomorphology of Io	Volcanoes of the Galapagos
Volcanoes of the Azores	Wrangell-St. Elias, AK (g)	Mt. Rainier, WA	Gosses Bluff Crater, Australia
Mt. Hood, OR (v)	Kenai Fjords, AK (g)	Fluvial features of Mars	Devils Tower
Monument Valley, UT	Nevados del Ruiz, Colombia (v)	Aeolian features of Mars	
Katmai, AK (v)	Enchanted Rock State Park, TX	Glacial features of Mars	
Glacier Bay, AK	Mt. Etna, Italy	Mass wasting features of Mars	
Waterton-Glacier, MT, Canada (g)	Karst features of Slovenia	Volcanic features of Mars	
Great Sand Dunes, CO (a)	Lake Clarke, AK (v)	Mars impact craters	

GUIDELINES FOR ORAL PRESENTATION

Purpose: Convey scientific results (geomorphic features & processes) in a clear, professional manner

Time Allotment:

Each student will be given a total of 15 minutes to present results (4 minute warning and 1 minute warning). Part of your grade will be based on time (ended early, just right, truncated) and the pace of your presentation (e.g., slow, relaxed but good pace, rushed). Practice your talk. Write down an outline of what you are going to say for each graphic or component of talk. Know your graphics and the order in which they will be presented. As an overall guide, you should include no more than 10 PowerPoint slides for your entire talk. **When in doubt, cut it out.**

Graphics

Graphics for your talk should be dominated by maps, satellite images, air photos, video clips, etc. that show actual geomorphic features and processes. Geomorphology is visually oriented. In other words, **SHOW YOUR PRIMARY GEOMORPHIC FEATURES DURING YOUR TALK!!** Use as little text as possible.

Content of Presentation:

1. Title slide (20 seconds)
Title of presentation and name only
one PowerPoint slide
2. Objectives slide (30 seconds)
Primary objectives
one PowerPoint slide
3. Location diagram (1 minute max.)
Do not assume anyone knows where your site is located. Therefore, indicate any major reference points.
one PowerPoint slide
4. Regional setting (2 minutes)
Tectonic setting
one PowerPoint slide
5. Results & Discussion: Geomorphic features & processes (8 minutes)
Most important geomorphic features and processes (do not try to explain everything in your paper, you must pick or synthesize most important ones) for each geomorphic feature mentioned, discuss driving force, process(es), time, & geomorphic feature. Make sure to include topographic profiles and a table synthesizing Driving Forces, Processes, Time,

and Geomorphic Features
6 to 8 PowerPoint slides that may include short video clips.

6. Conclusions (1 to 2 minutes)
Briefly state most important conclusion(s)
one slide
7. Questions

GRADING

Components of talk (as listed above)
Organization and quality of talk
Comfort level with material
Quality of graphics
 present clear, easy to read PowerPoints
 use 16 point font (must be readable from back of room!)
 do not present something of poor quality (dark slide, numerous numbers, etc.)

Time
Pace of presentation
Enthusiasm & audience rapport (e.g., good eye contact)

Grading Scale:

- 1) **poor**
- 2) **underachieved**
- 3) **achieved**
- 4) **good** (exceeded expectations in some categories)
- 5) **excellent** (exceeded expectations in all categories)

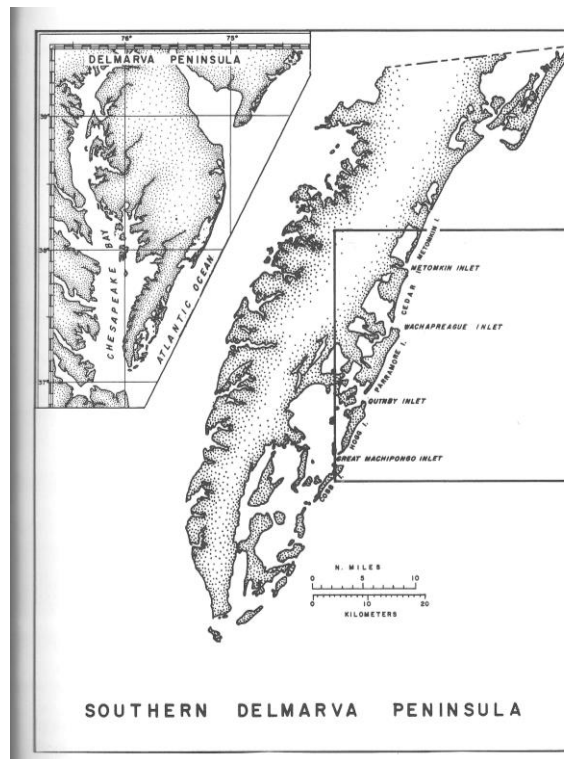


Figure 1. The southern Delmarva Peninsula showing the location of Wachapreague, VA (from Goldsmith et al. 1975).