Course Approval Form

For instructions see:
http://registrar.gmu.edu/facultystaff/catalog-revisions/course/

Action Requested:

[X] Create new course [ ] Inactivate existing course [ ] Reinstate inactive course
[ ] Modify existing course (check all that apply)
[ ] Title [ ] Credits [ ] Repeat Status [ ] Grade Type
[ ] Prereq/coreq [ ] Schedule Type [ ] Restrictions
[ ] Other:

Course Level:

[ ] Undergraduate
[X] Graduate

College/School: College of Science **Department:** AOES
Submitted by: Dr. Randy McBride **Ext:** 3-1642 **Email:** rmcbride@gmu.edu
Subject Code: GEOL **Number:** 563
(Do not list multiple codes or numbers. Each course proposal must have a separate form.)

Effective Term: [ ] Fall [ ] Spring [X] Summer *Year* 2015

Title: Current
Banner (30 characters max w/ spaces)
New Coastal Morphology and Processes

Fulfills Mason Core Req? (undergrad only)
[ ] Currently fulfills requirement
[ ] Submission in progress

Credits: (check one) [4] Fixed [ ] Variable or to

Repeat Status: (check one)
[X] Not Repeatable (NR)
[ ] Repeatable within degree (RD)
[ ] Repeatable within term (RT)
Maximum credits allowed:

Grade Mode: (check one)
[X] Regular (A, B, C, etc.)
[ ] Satisfactory/No Credit
[ ] Special (A, B C, etc. +IP)

Schedule Type: (check one) LEC can include LAB or RCT
[X] Lecture (LEC)
[ ] Lab (LAB)
[ ] Recitation (RCT)
[ ] Internship (INT)
[ ] Independent Study (IND)
[ ] Seminar (SEM)
[ ] Studio (STU)

Prerequisite(s):
Previous courses in geology, oceanography, marine science, earth science, or physical geography; or permission of instructor.

Corequisite(s):

Instructional Mode:
[X] 100% face-to-face
[ ] Hybrid: ≤ 50% electronically delivered
[ ] 100% electronically delivered

Restrictions Enforced by System: Major, College, Degree, Program, etc. Include Code.

Are there equivalent course(s)?
[X] Yes [ ] No
If yes, please list EVPP 563

Catalog Copy for NEW Courses Only (Consult University Catalog for models)

Description (No more than 60 words, use verb phrases and present tense)	**Notes** (List additional information for the course)
Investigates global coastal geomorphology and processes, with emphasis on U.S. Atlantic and Gulf coasts. Topics include plate tectonics; sea-level changes; sediment supply; impacts of waves, tides, storms; and human activities. Lecture and extended weekend field trips to U.S. mid-Atlantic coast.	

Indicate number of contact hours: Hours of Lecture or Seminar per week: 3 Hours of Lab or Studio: 3

When Offered: (check all that apply) [ ] Fall [ ] Summer [X] Spring

Approval Signatures

Department Approval Date

College/School Approval Date

If this course includes subject matter currently dealt with by any other units, the originating department must circulate this proposal for review by those units and obtain the necessary signatures prior to submission. Failure to do so will delay action on this proposal.

Unit Name	Unit Approval Name	Unit Approver's Signature	Date

For Graduate Courses Only

Graduate Council Member Provost Office Graduate Council Approval Date

For Registrar Office's Use Only: Banner_____Catalog_____

revised 10/16/14

Course Proposal Submitted to the Curriculum Committee of the College of Science

1. COURSE NUMBER AND TITLE: GEOL 563

Course Prerequisites: Previous courses in geology, oceanography, marine science, earth science, or physical geography; or permission of instructor.

Catalog Description: Investigates global coastal geomorphology and processes, with emphasis on U.S. Atlantic and Gulf coasts. Topics include plate tectonics; sea-level changes; sediment supply; impacts of waves, tides, storms; and human activities. Lecture and extended weekend field trips to U.S. mid-Atlantic coast.

2. COURSE JUSTIFICATION:

Course Objectives: This course will provide one of the electives for the Earth Systems Science MS.

Course Necessity: AOES currently does not provide any GEOL electives for Earth Systems Science MS.

Course Relationship to Existing Programs: Course is designed to expand elective options for geologically-oriented MS students in support of the Earth Systems Science MS.

Course Relationship to Existing Courses: Course will be cross-listed with EVPP 563. This course was first taught in ESP when the geology faculty resided in that department in the past. EVPP master's students will continue to have access to the course (EVPP 563) but now GEOL graduate students will have access as part of Earth Systems Science MS.

3. APPROVAL HISTORY: Approved by AOES faculty on 21 Nov 2014.

4. SCHEDULING AND PROPOSED INSTRUCTORS:

Semester of Initial Offering: Spring '16

Proposed Instructors: Dr. Randy McBride

5. TENTATIVE SYLLABUS: See below.

COASTAL MORPHOLOGY & PROCESSES (Geol 563)

Thurs. (4:30 to 7:10 p.m.) in Exploratory 1005

Professor: Dr. Randolph A. McBride
Office: 3052 Exploratory Hall
Office hours: after class on most Thursdays or by appointment
e-mail: rmcbride@gmu.edu
webpage: mason.gmu.edu/~rmcbride

REQUIRED TEXTS: Davis, R.A. and Fitzgerald, D., 2004. Beaches and Coasts, Blackwell Publishing, 419 p.

Van Heerden, I. and Bryan, M., 2006. The storm: What went wrong and why during Hurricane Katrina, the inside story from one Louisiana scientist. Viking as part of the Penguin Group, New York, New York, 308 p.

RECOMMENDED: Ward, L.G. et al., 1989. Living with Chesapeake Bay and Virginia's Ocean Shores. Duke University Press, Durham, NC, p. 236.

Note: Additional readings may be assigned.

COURSE DESCRIPTION: This course focuses on global coastal geomorphology, with an emphasis on U.S. Atlantic and Gulf coasts. Primary environments to be discussed include barrier islands, estuaries, deltas, cheniers, and glaciated coasts. Factors affecting coastal morphology will be examined, such as plate tectonics, eustatic and isostatic changes, fluctuations in sediment supply, wave and tidal energy, tsunamis, hurricane impacts, cold-front passages, and human activities. Important environmental issues will also be addressed including sea level rise, shoreline erosion, wetland loss, coastal development and protection, and pollution (e.g., oil spills). A major weekend field trip is an essential element of this class.

GOAL: Examine form/process relationships along different coasts (both in the classroom and in the field) so students will have a familiarity with primary coastal environments worldwide.

PREREQUISITES: Undergraduates- GEOL 101 and GEOL 102 as well as GEOL 317 or GEOL 309 or BIOL 309 or 9 credit hours in geography including GEOG 309; Graduates- Geology or Oceanography course or permission of instructor

COURSE REQUIREMENTS: Attendance at lectures, reading of textbooks and journal articles, participation in class-led discussions & debates, completion of written exams, participation in a major field trip, submittal of handwritten field books, preparation of a four-stage term paper, and an oral presentation in class and in the field for all students (Note: term papers will be compiled into a class field guidebook as individual chapters). ***Participation in 3.5-day field trip is required***.

METHOD OF INSTRUCTION: Lectures given by & discussions led by instructor/guest speakers during class times and during field trips; student-led discussions and debates via internet using email, WebCT, in class, and/or in the field; reading of class textbooks and journal articles outside of class; and an "in-the-field" presentation by each student regarding their term paper locality and topic. 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, use WebCT, and conduct web-based research. All registered GMU students are allocated a GMU e-mail account. If you don't know your e-mail address, go to the Johnson Center, activate it, and check it regularly at numerous locations around campus.

*************TENTATIVE TOPICS: SUBJECT TO CHANGE WITHOUT NOTICE*************

DATE	**TOPIC**	**READINGS** (D = Davis & Fitzgerald; Storm = van Heerden & Bryan)
Jan 27	Introduction; Plate Tectonics	Ch. 1 & 2 (D)
Feb 3	Plate Tectonics, the Seafloor, & coasts	Ch. 2 & 3 (D); Intro & Ch. 1 (Storm)
Feb 10	Relative Sea Level Changes Transgressions & Regressions	Ch. 4 (D); Ch. 2 & 3 (Storm) Curray, 1964
Feb 17	Coastal Processes: Waves	Ch. 6 (D); Ch. 4 & 5 (Storm)
Feb 24	Coastal Processes: Tides ***Paper outline, figures, & references due; $10.00 for field trip***	Ch. 11 (D); Ch. 6 & 7 (Storm)
Mar 3	Storms & Washover Deposits ***Outline of hurricane & tsunami talks due (grads only)***	Ch. 5 (D); Ch. 8 & 9 (Storm)
Mar 10	EXAM	
Mar 17	Spring break	
Mar 24	Guest lecturer ***Papers due (two hard copies)***; ***classmate assigned for peer review (1st complete version)***	
Mar 31	Beach, Nearshore, & Barrier Systems; Dunes ***Classmate returns peer review to author with copy to professor***	Ch. 7, 8, & 9 (D); Ch. 10 (Storm)
Apr 7	Tidal Inlets & Estuaries ***Author submits fully-revised paper to professor (2nd version, 1 digital copy in Word on CD & 1 hard copy)***	Ch. 10, 12, 13, 14, 15 (D); Ch.11 (Storm)
Apr 14	Deltas; Mississippi River Delta & Chenier Plains Grad Student oral presentations (submit CD with PowerPoint talk) ***Professor will return edited paper to author via e-mail attachment by April 17***	Ch. 16 (D); Ch. Afterword (Storm)
Apr 21	Exxon Valdez oil spill, Alaska ***Author submits final, fully revised, camera-ready papers (3rd final version)***	Ch. 17 & 18
Apr 28- May1	Coastal Field Trip (coastal VA & MD) ***Take-home exam handed out at the end of coastal field trip***	Ch. 8, 20 & 21 (D)
May 5	No class, work on Take-home final exam	
May 12	Take-home final exam due (***Submit both a hardcopy of final exam & field note book***)	

IMPORTANT DATES:

Feb 8 (5 p.m.)	Last day to add this class. Please be sure that you are registered for this class by this deadline. If you have been dropped from class role for any reason, it is your responsibility to add back in by this date.
Feb 24	***Detailed paper outline, primary figures w/ captions, & references due for term paper***. Also, cash or personal check for field trip is due ($10.00) to reserve spot; covers tolls, entrance fees to lighthouses & parks, etc. ***but not food.***
Feb 25 (5 p.m.)	Last day to drop classes

Mar 3	Outline for Tsunami/Hurricane oral presentations due (Grad students only)
Mar 10	EXAM
Mar 14-20	Spring Break
Mar 24	***Term paper due (SUBMIT TWO COMPLETE HARD COPIES)- 1st version***
Mar 31	Classmate returns peer review to author with copy to professor
Apr 7	***Revised paper due to professor (SUBMIT ONE DIGITAL [WORD FORMAT ON CD ROM] & ONE HARD COPY)-2nd version***
Apr 17	Professor returns edited papers via e-mail (Word Track Changes)
Apr 14	Oral presentations about Hurricane Impacts and Tsunamis [CD ROM]
Apr 21	***Final, fully-revised, camera-ready copy of term paper due (3rd version)***
Apr 28-May 1	Major class field trip to coastal Virginia and Maryland (meet at 1 pm and depart David King loading dock by 1:30 p.m. on Apr 28 and return Sun evening, May 1). Will involve riding in GMU vans and VIMS boats, all day hiking in primitive conditions and staying at marine lab dormitory in Wachapreague, VA.
May 12	Take-home final exam (comprehensive) due plus field notebook

GRADING:

	Undergraduates	Graduate
Exam	18%	15%
Final Exam	22%	20%
Oral Presentation & Outline	Na	10%
Field Guide Chapter (term project)	35%	30%
Paper Outline, Figures, & References (5%)		
1st draft of Paper (classmate peer review; satisfactory or unsatisfactory [up to 5% deducted])		
2nd draft of Paper (15% undergrad/10% grad)		
Final, Revised, Camera-Ready Copy (5%)		
Field Presentation (10%)		
Field Log for Field Trip	12%	12%
Field Trip Participation	8%	8%
Classroom participation/reading/discussion (The Storm)	5%	5%
	100%	100%

Extra Credit: Attend a GMU Writing Center one-hour session regarding the editing of your research paper and provide signed documentation from Writing Center (5% on paper grade only). More details later.

Exams may cover lectures, mini-lectures, text readings, assigned articles, slides, overheads, videos, field trip information & localities, and any handouts. 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 doctor's excuse). Otherwise, any missed exams 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%

Adherence to The GMU Honor Code is expected of all students.

WEEKLY READING: *THE STORM*

Each student is expected to read the assigned chapters in The Storm each week and be prepared to discuss the contents of the assigned chapters in class. Also, questions about The Storm chapters will

appear on exams*.** When reading each chapter, you should ***compile answers for the following questions in preparation for each class period: 1) What is the overall theme of the chapter?, 2) Identify the three to five primary points of the chapter that the authors are emphasizing, 3) Identify two or three mistakes that were made and the lessons learned, 4) What role does science play in the chapter?, and 5) Compose three questions for class discussion that address science-aspects of Hurricane Katrina's impact on coastal Louisiana and New Orleans (i.e., focus on coastal science questions and avoid political, non-science questions).

ORAL PRESENTATIONS: TSUNAMI AND STORM IMPACTS

Each graduate student will provide a 15- to 20-minute oral presentation on topics regarding tsunami and hurricane impacts. The talks will emphasize the coastal/geologic processes and impacts to shoreline geomorphology associated with each event. Talks should be dominated by images and graphics that show and explain the physical processes and geomorphic response of the shoreline by using actual video clips, photographs, maps, graphs, quantitative data, simulations, etc. Your outline, including primary web pages and some graphics, is due as scheduled above. Presentations will be given in class as scheduled above and should include the following components: ***Title***, ***Intro***, ***Study Area***, ***Brief Methods***, ***Results***, and ***Conclusions***. Also, on the day of your presentation, submit a digital copy of your presentation on CD in PowerPoint format, as well as any video clips.

Topics:

1. Trackline, meteorological characteristics, and surge dynamics of Hurricane Gustav
2. Trackline, meteorological characteristics, and surge dynamics of Hurricane Ike
3. Oceanographic characteristics of seismic sea wave generated by 26 Dec 2004 Sumatra earthquake and the coastal processes & impacts of the tsunami along Indonesian and Indian shorelines

FIELD TRIP

This course involves one required 3.5-day field trip. Transport will be provided using GMU vans connected by CB radios (Note: private vehicles will not be allowed because they cause numerous logistical problems). The field trip will go to coastal VA, MD, and DE and will involve staying at a marine lab dormitory and camping in tents at campground. To reserve a spot, **all students must pay $10.00** (cash or check) by the deadline stated above (important dates), which covers tolls, entrance fees to lighthouses & parks, and unexpected costs ***but not meals***. Meals will be prepared on site by students or obtained at restaurants. ***NOTE: It is suggested that each student bring ~$45.00 as spending money for the field trip.***

FIELD LOG/FIELD BOOK

An organized, legible field log must be kept for the field trip that chronologically ***outlines*** your itinerary (i.e., date, moon phase, time, field location, field conditions [weather, temp., wind direction & speed, wave height/energy, tidal height]) and important notes (e.g., brief field description, lectures, etc.) with simple, labeled field sketches (see example entry below). Field books with waterproof pages are recommended in case it rains or dropped in water. Submit original, handwritten field books (DO NOT RETYPE NOTES) at the end of field trip for grade.

April 25, 2010 (full moon- spring tides)
Oregon Inlet, NC; 70^{o} F w/ clear sunny skies, moderate E winds (15 knots), 1 m waves; spring low tide (-1m)

1230 Lunch on beach

1300 Walking on flood-tidal delta, take 4 pictures on Roll 3(frames 16-19); winds change to NW, seas calm; bars on flood ramp exposed (see simple sketch below). Susan McWilliams gives talk on Oregon Inlet w/ following points:

1400 Heading north along Outer Banks to Jockey's Ridge, NC (large sand dune)

FIELD GUIDE CHAPTER (Term Project):

Each student will be responsible for writing a term paper (8 pages for undergrads; 10-12 pages for graduates) about a certain field locality or specific topic that is directly related to our major field trip in April. A field locality or topic will be assigned to each student from the enclosed prepared list. When completed, the individual papers will be compiled into a field guidebook that we use on our coastal field trip. There are ***four stages*** to the field guide chapter and each stage is worth a certain percentage of your grade: 1) detailed paper outline, primary figures and figure captions, & references, 2) peer review of your paper by a classmate, 3) professor review, and 4) final, fully revised, camera-ready copy. Grading of the field guide chapter will be based on adherence to the guidelines below and overall scholarly quality. **Ten points will be subtracted for each day the particular assignment is late**.

The purpose of the term project is threefold: 1) gain experience writing in the scientific style; 2) experience the difference between writing about something and observing something in the field, and 3) provide a field guidebook. The scientific writing style is concise, factual, non-verbose, and nonfiction. It should not contain jargon and should be presented in a logical fashion so that facts build upon facts. Scientific writing is no place for fanciful leaps of faith or implied truths. Facts rule! In terms of the audience, assume the reader has your working knowledge of geology, physical geography, geomorphology, and environmental science.

Paper Outline, Figures with Captions, & References

Submit a detailed outline of your paper in the correct format as described below including the following: official title, name, affiliation, all primary headings, potential secondary headings, text bullets, primary figures (especially the location diagram) and typed figure captions, and 5 (undergraduate) or 10 (graduate) references. In other words, you should submit a complete skeleton of your paper (framework is there, only the sentences are needed).

The reference section must contain at least 5 bibliographic citations (10 for graduate students) from the following specific sources: journal articles, books, book chapters, government documents, theses/dissertations, and published field guides. Information from the World Wide Web and other sources (e.g., National Geographic) are acceptable but must be in addition to the 5 or 10 citations mentioned above. Newspaper articles are unacceptable sources of information.

Field Guide Chapter

Your term paper should follow the guidelines outlined below and include all the appropriate components and headings. You should consider your paper a completely finished manuscript (1st version). Classmates will peer review (review/edit) your term paper and return it so you can make revisions/corrections/additions for submittal of 2nd version to professor. Professor will return edited paper so the author can further revise paper for final camera-ready version (3rd version). ***A grading rubric and guidelines will be provided to explain the classmate peer-review process (handouts). Furthermore, each peer reviewer will receive either a satisfactory (no points deducted) or unsatisfactory grade with up to 5% points deducted from Field Guide Chapter grade for unsatisfactory work.***

1. Papers should be ***8 (10-12 for graduate students) typed pages in length*** (excluding figures, tables, references, and appendices), double-spaced, 1" margins on all four sides, a simple 11 point font (e.g., Helvetica, times roman), and fully justified.

2. Each page should be numbered sequentially in the upper right-hand corner (this means that every page you hand 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) because points will be subtracted for misspellings.

4. Your paper should follow an outline of a scientific paper with primary headings and format as shown below:

Morphodynamics of Oregon Inlet, Outer Banks of North Carolina

Joe Green
Department of Atmospheric, Oceanic, and Earth Sciences
George Mason University
Fairfax, Virginia 22030

Abstract (½ page)

- Extremely concise overview of field locality or topic (250 words or less)
- Address primary points regarding morphology, processes, and environments
- Address primary human factors in field locality if applicable (e.g., jetties)

Introduction (≤1 page; one or two paragraphs each)

- General introductory statement
- Specific objectives of field guide chapter (i.e., What are you going to do exactly?)
- Scope of paper (e.g., What will be covered in your paper?)
- Literature review (very brief synthesis of most important articles regarding your field locality such as Jones, 1999; Williams et al., 2000)

Regional Setting (~½ page)

- Briefly describe where your locality is using a clear location map (The map may include state boundaries, towns or cities, water bodies, highways and roads, national & state parks)
- Briefly describe physiographic region, local geology, climate if applicable

Detailed Field Locality Description (~4 pages)

- Describe modern and/or ancient geomorphic features and the processes (e.g., tidal range, average wave height, tidal prism, longshore sediment transport volume & net direction) responsible for creating the features; compile a table that quantifies the processes; discuss geomorphic evolution of feature or landscape; discuss shoreline change (include figure)
- If applicable, describe coastal structures (e.g., jetties, seawalls, groins), human infrastructure (e.g., beach houses, hotels, highways) and activities (channel dredging)
- Include the most important figures that summarize field locality
- ***Must include a topographic map*** (scales: 1:24,000 or 1:64,000 or smaller); available at US Geological Survey in Reston (Sunrise Valley Road).
- Specific subheadings may include most or all of the following:
  Geomorphology
  Physical Processes (e.g., tides, tidal prism, currents, winds, waves, net littoral drift)
  Shoreline Changes
  Coastal Structures
  Human Activities and Impacts

Conclusions (~½ page)

- What do you conclude from all of the above? What are the primary geomorphic features, processes, and environments? What are the primary points that need reiterating (e.g., geomorphology, human activities, or policy)? What are the major coastal problems?

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 (all authors must be listed in the reference section). Follow a specific citation method 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, American Society of Civil Engineers, 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, Department of Geology, University of Southern Mississippi, 93 p.

Figures

- All figures must be clear and readable (if you can't read it, don't include it!!!)
- Each figure must be numbered sequentially starting with #1 and has 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).

Final, Fully Revised, Camera-Ready Copy

As per the schedule above, your fully revised field guide chapter is due (i.e., a complete hard-copy, camera-ready version including full-text, references, figures, & tables on plain white bond paper). The format of the paper should follow the same above-mentioned guidelines under "Field Guide Chapter."

TOPICS AND/OR LOCALITIES FOR FIELD GUIDE CHAPTERS

1. Global distribution of barrier-island systems
2. Amphidromic systems of the north Atlantic Ocean and resulting astronomical tides along the outer coasts of VA, MD, and DE
3. Storm surge dynamics and classification systems of storm surge (Sallenger) vs. Saffir-Simpson scale
4. Ridge and runnel systems on beaches: formation, migration, and processes
5. Processes and geomorphology of tide- versus wave-dominated tidal inlets and deposits
6. Processes, geomorphology, sedimentology, and stratigraphic signature of washover fan deposits
7. Processes, geomorphology, sedimentology, and stratigraphic signature of flood-tidal delta deposits
8. Similarities and differences of washover-fan versus flood-tidal delta deposits
9. Geologic history and morphology of Wachapreague Inlet, VA
10. Depositional processes, formation, and types of primary coastal dunes
11. Coastal processes and shoreline response to hurricane impacts along the U.S. mid-Atlantic coast (1938 New England, Gloria, etc.)
12. Trackline, meteorological history and coastal impact of the Ash Wednesday storm, March 1962
13. Barrier island geomorphology, processes, and historical tidal inlets/breaches along Assateague Island, MD
14. Continental shelf sand ridges (shoals): Origin, evolution, & distribution of shoreface-attached sand ridges along the US Atlantic coast, especially offshore Assateague Island, MD
15. Relative and eustatic sea-level changes along the US mid Atlantic bight coast over the past 120,000 years
16. Geomorphic evolution of Chincoteague Island and the recurved spit at Fishing Point, VA (Cape Chincoteague)
17. Geomorphic evolution, coastal processes, and engineering structures at Ocean City inlet, MD and the downdrift impact on northern Assateague Island, MD

Example paper format:

Human-Estuarine Processes Along the Southern Delmarva Peninsula, with Emphasis on the Pocomoke River Basin and *Pfiesteria*-related Outbreaks and Conditions

David A. Greene
United States Geological Survey
Reston, Virginia 20192

Abstract

Recent outbreaks of fish kills, fish lesions, and human health problems in the Pocomoke Sound region of the southern Delmarva Peninsula have been linked to the toxic dinoflagellate *Pfiesteria piscicida*. Certain estuarine water conditions affected by a variety of both natural and human-induced coastal processes appear to trigger drastic responses in this organism. The Pocomoke River watershed of the Southern Delmarva Peninsula contains several environmental characteristics, including relatively high water temperatures, increased salinity, low rates of flushing, elevated acidity, high nutrient levels, and isolated storm events that make it a likely site for *Pfiesteria*-related events. This paper will examine the physical, chemical, biological, and anthropogenic conditions and processes of the Pocomoke watershed, which may be contributing to *Pfiesteria* outbreaks and their resultant effects on living resources.

Introduction

Harmful algal blooms have increased in frequency and severity in many U.S. coastal states and worldwide, causing major fish kills and increased risks to natural resources, environmental quality, and human health (Anderson et al., 1993; Anderson, 1995; Boesch, 1996; Barker, 1997). These increases may be due to increased human activity, cyclic or longer-term variations in climate, other natural processes, or some combination of these factors (Anderson, 1995; Boesch, 1996). Harmful algal blooms are normally characterized by the sudden proliferation of particular species of toxic or harmful algae, resulting from a combination of poorly understood physical, chemical, and biological mechanisms and interactions (Anderson, 1995). Most of these events are attributed to a particular class of marine algae called dinoflagellates, which can stay dormant in an encysted form in bottom sediments for years and then suddenly be triggered into a toxic, free-swimming form under certain environmental conditions (Burkholder et al., 1992; Anderson et al., 1993; Anderson, 1995).

INFO SKIPPED

References Cited

Anderson, D.M., Galloway, S.B., and Joseph, J.D., 1993. Marine Biotoxins and Harmful Algae: A National Plan. Woods Hole Oceanographic Institute Technical Report WHOI-93-02, Woods Hole, MA, 44 p.

Barker, R., 1997. And the Waters Turned to Blood. Simon & Schuster, New York, NY, 346 p.

Biggs, R.B., 1982. Estuaries. In: Schwartz, M.L. (editor), The Encyclopedia of Beaches and Coastal Environments, Encyclopedia of Earth Sciences, Volume XV. Hutchinson Ross Publishing Company, Stroudsburg, PA, pp. 393-397.

Burkholder, J.M., Noga, E.J, Hobbs, C.H., and Glasgow, H.B. Jr., 1992. New 'phantom' dinoflagellate is the causative agent of major estuarine fish kills. Nature, v. 358, pp. 407-410.

Jan 2014
McBride

Field Gear Recommendations & Field Teams for Coastal Field Trip

This list is meant as a guide to help you enjoy your field experience, especially for participants who haven't spent much time in the field. ***In a nutshell, be prepared for a spectrum of weather from cold and rainy weather to warm and sunny weather.***

1. **Waterproof coat or shell** (or warm coat and $3 plastic rain poncho from Wal-Mart) A full suit of rain gear may be purchased at Wal-Mart in the sporting goods area for ~$10 and comes folded in an 8" envelope
2. **Waterproof pants**
3. **Coat liner**: fleece, wool, etc
4. **Waterproof hiking boots or rubber boots**
5. **Long underwear**
6. **Warm gloves or ski mittens** (durable & made for cold, wet weather)
7. **Winter hat** (covers ears)
8. **Baseball cap**
9. Old pair of **tennis shoes (*required to be closed toed for VIMS boats, no sandals, flip-flops, etc. in field*)**
10. Pair of water shoes, booties, or 2nd pair of tennis shoes (***must be closed toed, no sandals, flip-flops, etc. in field***)
11. **Sleeping bag** (if cold natured, then pack an extra warm blanket, rolled with bag)
12. Pillow
13. **Tent** with plastic ground tarp and tent stakes (could be camping in sand &/or wind); borrow one from a friend or buddy up with classmates. You're not expected to buy one for this class unless you want to.
14. Sleeping pads for tent
15. **Day backpack**
16. **Camelback** (water backpack) or hiking water bottles that can be clipped to your day backpack
17. **Bathing suit** for underneath your clothing in case boat can't get to shore (Suggest a 2-piece for females since we will be on undeveloped barrier island with no bathroom facilities)
18. T-shirt (one for each day)
19. Pants (two pair that are loose fitting so long underwear or bathing suit can fit underneath)
20. 4 pairs of white or hiking socks
21. 4 pairs of underwear
22. 1 towel (the smallest one you can fully dry yourself with)
23. Sun glasses with sport strap
24. **Sunscreen or sun block**
25. **Insect repellent**
26. Shower shoes (flip flops, etc.)
27. Small shampoo bottle and deodorant
28. Toothbrush & toothpaste
29. 1 Comb or brush
30. Small bar of soap
31. Put items 23-30 above in a plastic sandwich bag or small overnight bag
32. Quarter or half roll of toilet paper in separate plastic sandwich bag
33. **Personal flash light &/or head lamp** with new batteries and spare batteries (NOTE: If you are going to buy anything for this trip, a good camping headlamp/flashlight is a great investment)
34. A flexible travel bag in which to put your personal items (no hard suitcases)
35. **Trash bags** for your wet and/or dirty items
36. Extra trash bags (~two large heavy duty types)
37. Pocket knife
38. Digital or regular camera with a protective case or plastic freezer bag
39. Small, portable alarm clock
40. **Waterproof field notebook**
41. **Other toiletry items (e.g., female hygiene products)**
42. Medications and medical kit (band aides, Advil, etc.)

43. Sealed medical information (Give to Randy in sealed envelope before trip begins)
44. At **least $45.00** in spending money (snacks, meals on the road, etc.)
45. A **positive, can do attitude** and a willingness to lend a helping hand at anytime!!

Recommendation: Bring your day backpack or fanny pack in the van seat to ride with you. To carry in the field: your field guidebook, waterproof field notebook, pencils/pens, light SNACKS, camera, small pair of binoculars, water, etc.). Snacks that pack well and have a lot of energy are important (e.g., Snickers). You will be using a lot more energy than normal and will get hungry sooner and more often than you expect. Please be aware of your food selection: some foods/snacks don't travel well; moisture and climate may ruin products.

This is a tentative list and subject to change. If you bring the above-mentioned items, you will enjoy yourself, even in the worst weather conditions during a field trip. If you have further suggestions about the field gear, please let me know at rmcbride@gmu.edu.

Field Teams (NOTE: Please volunteer for one or two teams before next class. Many hands make light work. If you don't volunteer, I will assign you a team. Each team will have a team leader or co-team leaders):

1. **Safety Team** (Looking for volunteers who have one or more of the following backgrounds/training: nurse, CPR, lifesaving, EMS, etc.)
2. **Mechanical Team** (Looking for volunteers who are experienced campers/hikers or are mechanically oriented (e.g., like to work on engines) who can take the lead on coordinating coolers for food (need at least 3 coolers), firewood and fire starting materials, jumper cables, tool box, starting an engine in a jam, etc.)
3. **Cooking Team** (Looking for 4 volunteers who like to plan, buy food, and cook for a group)
4. **Clean-up Team** (Looking for volunteers who will take the lead in washing & cleaning up after meals and cleaning up house and campsite upon departure; *I'm on this team!*)
5. **Weather Team** (Looking for 3 volunteers who love to watch and investigate the changing weather conditions on a daily basis. Before we depart, this team will compile a 4-day weather/marine forecast report (e.g., surface weather maps, fronts, air masses, temperatures, wind speeds and wind direction, wave conditions, lunar phases, perigee/apogee dates, etc.) for the eastern United States and field trip area (Eastern Shores of VA & MD, as well as DE).

ACTION ITEM: By next class, please volunteer for ***TWO*** of the above-mentioned field teams so we can finalize details of the field trip and overall organization.