



*Pristine Alpine Lake in the Sierra Nevada Mountains*

## Geography and Planning of Water Resources

*“When the well’s dry we know the worth of water.” - B. Franklin*

We have acted as if water were like air – free, so omnipresent as to exist beyond our conscious thought; so unquestionably necessary to life on this planet that it would be foolish to spend any time or energy thinking about it. - F. Powledge

**Course:** GEOG 305 Spring 2010 MWF 11:00-11:50 am, SCHU 311  
**Instructor:** Dr. Tracy H. Allen, Department of Geography Chair and Associate Professor of Geography and the Environmental Sciences Program  
**Office:** 317B Milne Library, Department of Geography  
**Office Hours:** M 3:00-4:00pm & T 10:00-11:00am or by appointment, or if my door is open, come in. If you need to see me I will be available. Office hours are for you!  
**Phone:** Office - 436-3152; Department of Geography: 436-3459  
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**Course Website:** <http://employees.oneonta.edu/allenth/>

### ***Required text and additional readings:***

Cech, Thomas. 2005. Principles of Water Resources: History, Development, Management, and Policy, 2<sup>nd</sup> Edition. Hoboken, New Jersey: John Wiley and Sons, Inc.

Additional readings will be posted to the course web site, copied and passed out during class, or will be placed on reserve at Milne Library (See “Readings” in the Course Outline and Schedule Section of this syllabus).



### ***Course Description and Purpose:***

Water sustains all life. It is the most distinctive and abundant substance found on Earth; yet, it remains naturally scarce by location. Increasingly, human activities are creating shortages of this most abundant resource as we overuse, misuse, and pollute – “water, water everywhere but not a drop to drink”. This course is an analysis of the geographic distribution/redistribution, quantity, and quality of water resources, with an emphasis on the roles of science, planning, and policy, in the United States. Major case studies or applied water resources (including the Colorado River, New York City water supply, the Columbia River Riparian zone, and New Island Upper Susquehanna River) illustrate the interplay between science and policy in water planning. Major topical areas to be covered are: 1) importance of water 2) physical characteristics of riparian, lacustrine, and groundwater

systems; 3) water management; 4) water quality; and, 5) water use and control. While lacustrine and groundwater water resources are important, much of the focus of this class will be on riparian systems - their morphology, flooding, multiple uses, and misuses will be discussed.

Students will be expected to conduct, write, and present original research in this class. Class participation is necessary for a successful class. Two all day class field trips are mandatory. Prerequisite: Junior standing, Geography 100, and another 3 s.h. Geography course.

Work Completed	Possible Points	Grading Scale
<b>Participation:</b> Daily Class Involvement, Class Discussion Topics; In-class Fieldtrip; Participation in Two Mandatory Fieldtrips and Completed Field Exercises ( <b>grade based on completion of assigned work, attendance, preparation, and participation</b> )	40	200 - 185 points = A 184 - 180 points = A- 179 - 175 points = B+ 174 - 165 points = B 164 - 160 points = B- 159 - 155 points = C+ 154 - 145 points = C 144 - 140 points = C- 139 - 135 points = D+ 134 - 125 points = D 124 - 120 points = D- 119 - 0 points = F
<b>Water Resources Project/Paper and Presentation</b> (Project/Paper - 50 points and Presentation - 10 points)	60	
<b>First Exam</b>	30	
<b>Second Exam</b>	30	
<b>Third Exam</b>	40	
200 Total Possible Points		
Extra Credit: Water Resource Essay	Maximum 5 points	

**Policies:**

*Exams and Quizzes:* If you miss an exam or quiz, I will not allow you to make up the work unless you have written proof that adequately validates your absence. Only under "dire" circumstances (as to what "dire" constitutes, this will be decided by the instructor on an individual basis) will exams or quizzes be accepted after the assigned date. **If you do not talk directly with me, call, or leave a voice mail prior to missing an exam or quiz, I will not allow you, under any circumstance, to make up the work.** Call ahead and be responsible.

*Plagiarism and Cheating Policy:* Know the college policies regarding plagiarism and cheating. With the Internet it is so easy to simply copy and paste other people’s work into your own assignment. Refrain from doing this. It is stealing and is unethical. When I read something that appears out of sync with your writing style, I do check for plagiarism. By simply typing the phrase in question into Google or other search engines, it is very easy to find the source. I detest cheating of any kind. Students that feel they must stoop to this level of misrepresentation will earn a failing grade in the class.

*Exercises:* All assignments must be **completed**. If you hand in an assignment late and after the said assignment has already been graded and passed back to the class, **I will not accept it**. If you miss a lab/recitation that requires in-class group discussion, the best grade that you can receive on the assignment is 80%. Make arrangements with me **early** if you anticipate missing an important class activity. **All assignments that need to be picked up late will require you to come to my office.** I will not bring extra copies to class the following class period. Generally, extra copies can be found in a box attached to my office door.

*Return Policy:* Because I expect you to take exams, quizzes, and assignments on time, I hold myself to the same standards. I will always return your work promptly.

*Classroom Policy:* I expect general rules of etiquette and respectful behavior to be followed. Be respectful to me and your fellow students. If you plan to talk during lecture, mumble so that no one can hear you. If I can hear your

conversation, I will stop class and ask you to speak such that the entire class can hear - after all the conversation “must be” important. No full course meals or smoking in the classroom.

*E-mail Policy:* I will respond to your emails as quickly as I can however, if you have an issue that you need to discuss, make the effort to meet with me in person either before or after class, during office hours, or anytime that the door to my office is open. **I will only discuss grades in person**, NOT via e-mail or phone. This is college policy. I will not give you your final grade - the college will notify you.

*Cell Phone Policy:* I am sorry that I have to make this policy, but there are too many phones in the classroom creating many interruptions and distractions. You may carry your phone into the class; however, keep it out of sight or permanently fixed to your person or bag while in class. Do not talk, send text messages, play games, check your email, take pictures, play music, electrify your professor, or otherwise use your phone in any manner while in class. In the event that you should receive a call in class, be certain to have the ringer set to off and do not answer the call. Feel free to call your friend back later and tell him/her how great class was today. While these rules are hard and fast, they are doubly hard and fast during exam periods.

*Headphone Policy:* Do not wear headphones in my class. Disconnect the headphones and put them in your bag.

*Laptop Computer Policy:* Use your laptop only to take notes. Do not use it to play games or travel the World Wide Web while in class. If you violate this policy, I will ask you to leave class and not to bring the laptop again.



#### ***Participation - Mandatory Fieldtrips and Field Exercises:***

You will attend three mandatory field trips. Two trips will be held on Saturday and one during class. We leave from Behind the library at 10:00 and will return at 3:00pm. The first fieldtrip will focus on water quality on New Island Greenway on the Susquehanna. The second fieldtrip will follow Silver Creek from headwaters to mouth and focus on issues such as water use, flooding, and urban stream bank stability. I will cancel four classes to compensate for time spent in the field. If you fail to attend a field trip you will lose 10 participation points – so plan ahead. If under dire circumstances you miss a fieldtrip (I will decide what is dire), and you have

**spoken to me in advance**, I will allow you to makeup the trip on your own with deductions for being late. You must satisfactorily complete the assigned fieldwork exercises or points will be deducted. Questions from the field assignment will be on the exam. Be prepared for cold weather. You will be in the water (with neoprene waders). No whining unless you begin to feel frostbite. One short on campus fieldtrip to Silver Creek will be held during the class period. We will be gathering macroinvertebrates. Be prepared for bad weather and a rushed class. Be on time or you will be left, as we will need a full hour. The in-class field trip is mandatory and worth 5 participation points. You must complete the accompanying field assignment.

#### ***Participation - Class Discussions and Recitations:***

You will be expected to participate in each and every class – ask questions and be attentive. There will be times when I ask you to read an article for discussion or prepare a class debate on a specific topic. Discussions will allow you to deeper explore lecture topics. I will let you know which discussions require preparation. The discussions will be in both small group and class-wide formats and designed to put you in touch or give you a hands-on application of materials covered in class. I believe the best way to learn is by doing. Points awarded for the discussion will be based on completion of assigned work, attendance, preparation, and participation. It is in your interest to come to class. If you miss an assigned discussion you can't make up the points allotted to the in-class portion of the exercise. I am trying to make the class somewhat seminar style and more like a graduate class. I firmly believe that you will learn more by engaging yourself in the subject rather than just listening to me lecture.

### ***Water Resources Project/Paper and Presentation***

You will complete a major water resources research project/paper and presentation in this class pertaining to New Island along the Susquehanna River in Oneonta or any other local water resources project that is approved by me. The paper must be 10 pages of text with at least two pages of supplemental charts, maps, and photos. I have numerous projects that have real significance to the local region (such as the Coal Tar Pollution in Groundwater Project, Eurasian Milfoil Project, Hunt Union Water Quality Project and the Citywide Initiative on Pollution Free Streams). This class is not just theory, it has genuine applications. Students will have the opportunity to work on a real water resources project and conduct actual original research where you will be collecting some of your own data. If you decide to write a paper concerning the water resource of New Island, you will be participating in an ongoing EPA grant. The New Island Greenway Environmental Education Project will provide students with hands-on riparian environmental experience, enabling them to understand issues related to water resources, greenway development, and ecosystem conservation in an increasingly fragmented Susquehanna River riparian zone. Industrial perturbations of the past have fallen into disuse, allowing the site to become an isolated, fully functional ecosystem island in a sea of longstanding riverside urbanization. Students will evaluate an ideal route for a multi-use nature trail and identify plant species, animal species, soil types, and landform change along the trail. Numerous way-stations/observation points, referred to as Eco-stations, will be established based upon varying habitat types. Student-based teams will design environmentally descriptive Eco-stations and determine the linkages between stations. The data will be uploaded to the Internet, where a virtual tour of the environmental resources of New Island can be accessed. Other potential local water resources research projects include: Damming the Upper Susquehanna River, Susquehanna River water resources, Silver Creek or Oneonta Creek macroinvertebrate water quality analyses; Oneonta creeks project; water quality of any local body of water...The final portion of the research paper grade will be a concise presentation. Students will be expected to deliver their presentation by using PowerPoint, the Internet, or some other digital presentation method. More information on the research project and presentation will be made available on the Water Resources Homepage. Because this project comprises 30% of your entire grade for the class, I must approve your topic and make certain that you are on the correct path to success. I have very high expectations for the project.

### ***Exams:***

There are three exams in this course. Exams will cover information discussed in class, fieldtrips, and text material. If you do not come to class, you will not do well on the exams. You may not miss an exam without prior permission.

### ***Extra Credit – Water Resources Essay***

Identify, examine, and offer possible solutions to a pressing or potential water resources related problem. The following are example topics to give you an idea of what is meant by a water resources related problem: Flooding along the lower Mississippi River, Municipal sewage in the Ganges, Coal tar threat in Oneonta groundwater, Hypoxia in the Gulf of Mexico, Mercury poisoning in Minamata Bay, Onondaga Lake: the most polluted lake in America... The issue must be current, specific to some location, and not discussed in class. It should consist of three distinct parts: identify the problem, insightfully examine the problem, and offer possible solutions. The essay must be at a minimum two pages, typed, and double-spaced (not including pictures, charts or the bibliography). The point size can't exceed 12. Include at least three cited sources. The bibliographic information from the sources must be included. A well-written essay may receive the maximum of five points added to the final grade for the course; for example, a final grade of 174 points may become 180, which would equate to an "A-" grade in the class. Failure to follow these instructions will result in no points awarded.

### ***Attendance, Participation and Tardiness:***

Regular attendance is expected and necessary. My lectures come from a variety of sources. If you do not come to class, it will be impossible to do well on the exams. Do not catch up on your sleep in my class. I work hard to bring you the best lecture possible. Sleeping during lecture is extremely rude and results in deducted participation points. You should keep up with the lectures and the reading, as the materials will be strongly cumulative. To make this a better class, your individual insight, feedback, and participation are necessary. Throughout the term, I reward students who come to class with bonus points or hints on potential exam questions. Please let me know if you are having any problems with the material. Always arrive on time or let me know if you plan to make class late. Late arrivals disrupt class. Being tardy multiple times will result in expulsion from the class. Do not leave class in mid-lecture unless you really have to (with prior permission). It is very bad-mannered and disruptive to walk out of class.

Never put your notebook and texts away before you are dismissed. I always end class on time. I look forward to meeting with you and having an enjoyable term.

**Course Outline and Schedule:** I will try to keep to this schedule, but some changes are inevitable.

Week	Topic	Readings
Week 1 1/18	<b><u>Part I: Importance of Water – Water a Global Crisis</u></b> Introduction to Water Resources course – cover course syllabus Do you know...facts about water The problem with water – Too much and too little <b>Case Study:</b> Aral Sea desiccation	“An overview: World population and water”- Simon – Water Resources Homepage
Week 2 1/25	The problem with water – quantity and quality and water conflict <b>Case Study:</b> Water quantity, quality: Yellow River China – “The River of China’s Sorrow” Case Study: Water Use and Development – the Colorado River	Text: Chapter 14  Managing Across Boundaries: The Case of the Colorado River Delta – Electronic Reserve
Week 3 2/1	Quality: Combined sewage overflows <b>Case Study:</b> Water Quality -The Stink at Flushing Bay Water resources: what makes it different? Unique physical properties Cadillac Desert Series Film	Water Conflict Chronology - Peter H. - Gleick -- Water Resources Homepage  Text: Chapter 6
Week 4 2/8	<b><u>Part II: Physical Aspects of Water</u></b> The hydrologic cycle. Physical characteristics of subsurface water Consequences of groundwater withdrawal: depleting and poisoning <b>Case Study:</b> Ogallala Aquifer and depleting groundwater Student presentations on assigned water topics (preparation is required)	Text: Chapter 2
Week 5 2/15	Overusing groundwater Subsurface water terms, characteristics, & human interactions <b>Case Study:</b> Mass arsenic poisoning in Bangladesh  <b><u>Exam One: Friday, 2-19-10</u></b>	Text: Chapter 4
Week 6 2/22	<b>Yahoo! Winter Break.</b> College is closed for the week. Build a snowman.	Break
Week 7 1/1	Physical characteristics of fluvial processes; Riparian surface runoff; basic lacustrine characteristics Stream order, flow, valley widening and floodplains <b>Case Study:</b> Surface water and Niagara Falls	Text: Chapter 3
Week 8 3/8	<b><u>Part III: Management of Water - Legal and Political</u></b> Case Study: Klamath Basin Water allocation law. Video	Text: Chapter 8 Handouts
Week 9 3/15	Water planning policy: U.S. Federal Water agencies & legislation Riparian Doctrine and Prior Appropriation Class-wide question, discussion, interpretation activities on water law	Text: Chapter 9  “New Island Greenway (Susquehanna River)” – Allen - World Wide Web Reading
Week 10 3/22	<b><u>Part IV: Water Pollution</u></b> How to measure water quality Analyzing specific types of water pollution: alkalinity, BOD, conductivity, hardness, nitrate, nitrite, odor, dissolved oxygen, pH, Phosphate, salinity, temperature, turbidity – most of these water quality parameters will be covered on the New Island fieldtrip  <b><u>Exam Two: Wednesday, 3-24-10</u></b>  <b>Saturday Fieldtrip 3-27-10</b> - New Island Greenway water resources fieldtrip; This is a mandatory fieldtrip – we leave at 10:00am and return at 3:00pm; be prepared for bad weather!	Text: Chapter 5

Week	Topic	Readings
Week 11 3/29	<p>Benthic Macroinvertebrates as Water Quality Indicators in Streams of the South Central Adirondacks</p> <p>Benthic macroinvertebrates and water quality in silver creek (class to be held outside in the water. Be prepared for cold and bad weather.</p>	Allen - Benthic Macroinvertebrates as Water Quality Indicators in Streams of the South Central Adirondacks – Water Resources Homepage (if I finish the article)
Week 12 4/5	<b>Spring Break.</b> No classes! College Closed. Go swimming in clean water.	Break
Week 13 4/12	<p><b><u>Part V: Water Uses and Control</u></b></p> <p>If my paper is accepted, I will be gone this week to a conference in Washington DC. thus Wednesday and Friday classes may be canceled. The fieldtrips compensate for the missed classes.</p> <p>Municipal/Domestic Water Use</p> <p><b>Case Study:</b> Safe Drinking Water Through Watershed Management – New York City</p>	Text: Chapter 11
Week 14 4/19	<p>How clean is your drinking water? Case Study in Not Providing Safe Drinking Water: Sewage &amp; Salvation in the Ganges</p> <p><b>Saturday Fieldtrip 4-24-10</b> - Silver Creek fieldtrip: Stream Use, Flooding, and Channel Stability in an Urban Environment. This is a mandatory fieldtrip – we leave at 10:00am and return at 3:00pm; be prepared for bad weather!</p>	Allen - Riparian Zone Classification Systems: Landuse/landcover and Wetland
Week 15 4/26	<p>Applied Study: Wetlands and dams on the Lower Columbia River Dams debate (preparation required before class)</p> <p>Wednesday class canceled. The fieldtrips compensate for the missed class. Work on your paper.</p> <p><b>Student presentation begins on Friday 4-30-10</b></p> <p><b>Backup Fieldtrip 5-2-10.</b> We will leave at 12:15. In the event that we experienced very severe weather during one of the scheduled fieldtrips and the class was canceled, this date will be the backup.</p>	Text Chapter: 7
Week 16 5/3	Student Presentations	Allen – Chapter VIII – Water Resources Homepage
Week 17 5/10	<p>Student Presentations</p> <p>Finish wetlands and dams on the Columbia.</p> <p>Review day for the final exam.</p> <p><b>The research paper/project is due on: Monday 5-10-10</b></p>	Text: Chapter 12
<b>Third EXAM -- Date: Monday 5-17-10 Time: 2:00 pm to 4:30 pm</b>		