PENN STATE CONSERVATION GIS COURSE SYLLABI 2021

Instructor

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Course Overview

GEOG 587: CONSERVATION GIS. Conservation GIS applies geospatial problem solving to ecological research and resource management issues to enhance conservation planning.
Prerequisites - GEOG 487 or equivalent.
Conservation GIS strives to document Earth's biological diversity, investigate how human activities influence natural systems and work for the conservation of natural and cultural resources by applying appropriate geospatial technologies and methods. Designing, implementing, and evaluating conservation action requires interdisciplinary approaches that blend spatial and temporal information on physical, biological, and socio-economic factors as a basis to establish current conditions, monitor change, and predict possible futures. Practitioners work in support of government natural resource management agencies, non-profit conservation organizations, and environmental consulting companies to address projects from local to global scales. They combine geospatial capability with core concepts from conservation biology, landscape ecology, biodiversity monitoring, environmental impact analysis, watershed assessment, and wildlife management (among others) to address specific conservation challenges.

GEOG 587 provides students the opportunity to expand on the GIS concepts introduced in GEOG 487: "Environmental Applications of GIS" while emphasizing the foundational knowledge that is expected of conservation professionals and is often required in order to be successful in the scientific and highly interdisciplinary conservation arena. Complimenting the excellent technical software training that students receive in the MGIS program; the course takes a knowledge-building and problem-based approach by guiding students through readings and conceptual frameworks for thinking about conservation problems and asking them to write about their understanding of how and why conservation works and does not work. Rather than teaching a few geospatial tools and techniques that may or may not be applicable to each student's professional setting; the goal of a problem-based approach is to provide students with the understanding and expertise to select and

communicate the justification for selecting specific geospatial tools and datasets in their future work. Unlike in the past, today we are fortunate that there is a geospatial tool or algorithm to do just about any spatial operation -- the challenge is in selecting one and communicating with others how and why it works. In completing a final project students are given the opportunity to select a specific geospatial dataset, software, tool or method to learn (along with the instructor's support) that is most applicable to their current and/or future career goals. The student's ability to synthesize information and use the written word to describe their reasoning and decision process will in large part dictate their success in this course.

Course Objectives Overview

Students who successfully complete this course will be prepared to:

- define and describe Conservation GIS and the interdisciplinary process of identifying conservation targets
- discuss the history and evolution of contemporary global strategies for environmental/biodiversity conservation
- understand and apply the theoretical scientific concepts that inform conservation action today
- describe and contribute a spatial perspective to natural resource planning and management
- understand and use technical terminology correctly related to conservation, climate change and human dimensions of natural resources
- design and complete a geospatial conservation project from question/objective development to the communication of results in the form of effective technical writing and the generation of supporting figures and graphics

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Required Course Materials

To take this course, you need to have the required course materials listed below. All (other) materials needed for this course are presented online through our course website and in Canvas. To access the online materials, you need to have an active Penn State Access Account user ID and password (used to access the on-line course resources). If you have any questions about obtaining or activating your Penn State Access Account, please contact the Outreach Helpdesk. They can be reached at 1-800-252-3592 in the US or internationally at 814-865-5403 (country code 001). You may reach them by e-mail at psuwd@psu.edu(link sends e-mail) (link sends e-mail).

Currently, there are no required textbooks for this course. For each lesson, you will be directed to a set of required readings that are on library reserve.

A number of software packages will be used for hands-on activities throughout the course. Please refer to the Program Technical Requirements(link is external) to verify that your computer meets the minimum specifications.

ESRI software (#1 below) is available to all Penn State affiliates including online students. You may choose to identify and download additional software packages for your work in the course based on personal interest. If you are a desktop ESRI ArcGIS Desktop user I encourage you to take this opportunity to begin a transition to using ArcPro as this is the software that will be supported by ESRI into the future.

Be sure to install and/or **test** your ESRI (or other software if you already have others in mind for your final project) software during the orientation or first week. The same goes for datasets if you already have a dataset in mind with which you would like to work.

For some general ideas of datasets to use see here(link is external), and here(link is external). Some other more conservation oriented datasets include:

1. USGS Protected Area Database(link is external)
2. USFS LANDFIRE(link is external)
3. The Nature Conservancy Conservation Gateway(link is external)
4. ESRI Living Atlas(link is external)
5. eBird(link is external)
6. eMammal(link is external)
7. NatureServe(link is external)
8. World Wildlife Fund(link is external)
9. US Fiash and Wildlife Service(link is external)
10. And many more -- if you know of great conservation gis datasets please post them to the course discussion page for everyone's benefit.

Trouble-shooting software installtions and data access constraints can take time and you will need your software and data to function without issue later in the course.

1. **ESRI, ArcPro Student Edition**: For complete ordering information, see the GIS Program FAQ(link is external).
2. Additional software packages might include:
    0. FRAGSTATS(link is external)
    1. ArcGIS Online(link is external)
    2. QGIS(link is external)
    3. R-Statistical(link is external)
    4. OSGEO4W(link is external) suite of open source tools
    5. etc.