

## **A SYSTEMS-BASED SEMINAR ON SUSTAINABILITY OF THE LONG ISLAND PINE BARRENS**

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In the spring semester of 2007, a new course, "Sustainability of the Long Island Pine Barrens", was initiated at Stony Brook University. The seminar is designed to consider the problem of sustaining the Pine Barrens region from broad perspective, enriched by the juxtaposition of a wide range of disciplines. Reflecting this interdisciplinary perspective, the course is cross-listed among several departments, namely Geosciences, Ecology and Evolution, Materials Science and Engineering, and Economics. Enrollment includes undergraduate and graduate students.

The ecologically diverse Long Island Pine Barrens region provides a habitat for a large number of rare and endangered species, but faces challenges associated with protection of a natural ecosystem that lies in close proximity to an economically vibrant urban area that exerts intense development pressure. Therefore, the course considers the interactions of the ecological, developmental and economic factors that impact the Pine Barrens and the effectiveness of decision support systems in promoting sustainability of the Pine Barrens.

For example, the presence of particular species of plants in the Long Island Pine Barrens at the current time needs to be understood in the context of the climate, the underlying geology, and the impact of past and present human activity. Preservation of the Pine Barrens must consider the complex issue of what ought to be preserved, the various human-caused and natural threats to sustainability of the Pine Barrens, how market phenomena encourage development, and how the market might be used to facilitate preservation.

The following challenges to sustainability of the Long Island Pine Barrens serve as a basis for the content of the course:

- Acid Rain
- Ground Level Ozone
- Global Warming
- Habitat Fragmentation
- Development
- ATV use
- Loss of Top Predators
- Loss of Migratory Birds
- Fire and Fire Suppression
- Changes in Water Table Level
- Nutrient Enrichment
- Invasive Species
- Biodiversity Loss
- Recreation
- Hunting and Trapping
- Groundwater Contamination

The students who have enrolled in the course bring together a variety of majors. Undergraduate students are required to work in groups to give a PowerPoint presentation focused on selected challenges to Pine Barrens sustainability. Each group specializes in one of the challenges listed above. Graduate students also give PowerPoint presentations with their workgroups, and must submit a research paper consistent with their workgroup's topic. The research paper is optional for undergraduate students. In addition, the course offers a range of other optional activities, each of which contributes to the students' grades for the

course. These include 1) two field trips, 2) an introductory Geographic Information Systems (GIS) workshop in which students work with data on Pine Barrens vegetation, fires, zoning, and infrastructure, 3) quizzes, and 4) exams. The field trips address ecological variability within the Pine Barrens by visiting the Dwarf Pine Plains, the Calverton Ponds, Cranberry Bog County Park, Hubbard County Park, and Sears-Bellows County Park. Students who attend the GIS workshop and the field trips are required to apply their acquired knowledge and understanding by writing reports. When Ray Corwin gave a presentation on the Central Pine Barrens Commission, many of the students, prompted by a question he asked, indicated that they had never been to the Pine Barrens. The field trips provide them with an opportunity to appreciate, first-hand, the ecology, geology, and aesthetics of the Pine Barrens environment. The quizzes help promote students' understanding of the complex issues addressed in each lecture by requiring them to work both individually and in groups.

The presentations by guest lecturers and students are designed to encourage discussion. As the semester has progressed, along with the students' knowledge and conceptual base regarding the Pine Barrens region, the degree of class discussion has increased. In addition, discussion has been stimulated by an ongoing role-playing exercise focused on development and related issues, and a game based on transfers of development rights, a mechanism that has been used to preserve some land within the Pine Barrens Core Area. Some of the lectures stimulated discussion by challenging common notions of how the Pine Barrens have come into existence, what needs to be preserved in the region, and how it should be preserved.

For the spring, 2007 semester, the course has included the following topics and presenters:

- Introduction to Pine Barrens on Long Island and Elsewhere - Glenn Richard
- The Natural System: Geology and Soil - Gil Hanson
- The Natural System: Environmental Threats and Climate - Brian Colle and Gil Hanson
- The Natural System: Present Ecology - Jessica Gurevitch
- Humans in the Natural System: Glacial Retreat to Pre-Columbian - David Bernstein
- Central Pine Barrens Commission - Ray Corwin
- Establishing Protection of Central Pine Barrens - Dick Amper
- Fire Ecology - Marilyn Jordan
- Protection by Non-Governmental Organizations - Tim Green
- Protection by Governmental - Steve Englebright
- Transfer of Development Rights and Economic Forces - Warren Sanderson
- Effects of Forestry and Farming - John Black
- Effects of Fire - Natural and Human - Jessica Gurevitch
- "Green" Manufacturing and Pollution Prevention - Gary Halada
- Computer Based Modeling, Monitoring, Decision Support System, Soil/Ground Water Remediation Technologies - Gary Halada
- Wrap-Up Discussion - Everyone

The course has been designed and initiated at a time when plans are being made and implemented for Stony Brook University's new College at Southampton for which the plans are to emphasize on environmental studies and sustainability. In the future, the course may be offered as part of this program.