

# **Environmental Resource Analysis:**

## **Integration of Environmental Resources into Land Use Planning**

2 3 - P L A N - 6 0 3 Spring Quarter, 2008, Tuesday/Thursday 2:00-3:20 pm., # 3410  
School of Planning College of DAAP University Cincinnati

Instructor: Menelaos Triantafillou  
Office hours: by appointment  
menelaos.triantafillou@uc.edu

Teaching Assistant: Tarun Jaiswal, email: jaiswat@uc.edu

---

### **Course Description**

This course focuses on how environmental resources are integrated into the land use planning process, and as a result changes to the environment from development can be predicted and can be avoided through planning, with any potential adverse impacts to be mitigated through effective land use policy, regulations, and design guidelines. This integration is considered within the framework of the American constitution, land use policy, zoning, and other laws and regulations at the state and local government level, operating within a market-driven development process.

This course does not take an advocacy position towards the protection of the environment by promoting the idea that the real problem is caused by developers who do not care about the environment. While this may be true in many cases, the effective integration of the environment into land use necessitate that we must first understand how development takes place and how we can achieve better planning through informed analysis that can constrain and guide private development decisions. The choice as to what course of land use action a local community should take is left to its elected political leaders. Our mission as planners is to offer them clear and legally defensible alternative courses of actions that spell out the consequences and benefits for each over a period of time. The course aims at training planners to become more effective and to do this by expanding their understanding of the land use development process, its interaction with the environment, and the use of sophisticated GIS tools to conduct analyses and to prescribe alternative futures.

The planner as the know-it-all savior on a white horse that demands how a single land use must be followed by all is a fading picture. It is becoming increasingly difficult to arrive at a consensus regarding the land use plan within multi-cultural, socioeconomically diverse communities. The description of alternative future scenarios is becoming the proffered way to approach development and change. The integration of the environment with land use within an alternative scenarios process is gradually gaining ground and frames the perspective of this course.

Increasingly, the integration of environmental resources into the land use planning and design process holds a central place in land use planning, growth management, landscape preservation, and sustainable development. The smart growth movement is increasingly requiring that urban planners prepare ecologically based land use plans, capable of balancing the needs for environmental resource protection and land use and development. Regulations at the Federal, State, and Local government levels are increasingly require that development must adhere to mitigation measures so that development impacts are minimized. Low Impact Development (LID) approaches and regulations are being promoted by planners in watershed planning and storm water runoff management plans.

During the last ten-fifteen years, 'landscape ecology' and 'biodiversity' have been established as the two key areas of research by scientists who are generating knowledge to explain the impacts of land use

development on the landscape and the consequences on species diversity. Parallel to this, landscape ecologists in collaboration with landscape architects and landscape planners have been developing new knowledge on how to bring research findings into the planning practice. This course uses the concepts of 'landscape' and 'landscape ecology' interchangeably with the term 'environmental resources'.

The evolution of GIS-based methods and techniques in resource analysis and landscape planning make it possible to understand highly complex interactions between land use development and its consequences on the environment. Predicting and evaluating alternative urbanization scenarios at the macro as well as at the micro site development level with the use of GIS methods, is making it possible for planners to make recommendations to the local elected officials on the nature and the consequences of change, so that informed decisions can be pursued.

The 'watershed' as a distinct geographic unit in a local government context is used in the course for understanding the development process, and for applying methods and knowledge to integrate the environment with land use planning

### **Course Topics**

The course is structured as a lecture/seminar and requires the engagement of the students in class, gaining knowledge through assigned readings, and through the preparation of a series of GIS-based assignments by two-student teams.

Lectures and reading material are structured into five modules and will be addressed at varying degrees of depth:

1. Land use development and the environment: Understanding the relationship between land use development and environmental consequences.
2. The existing framework for governmental policy and activities to integrate environmental considerations into the land use planning process, including the need for conservation at the federal, regional, state, and local levels.
3. Basic understanding of natural systems and environmental resources that need to be considered in land use planning.
4. Overview of approaches to environmental resources analysis within the field of landscape planning.
5. Suitability analysis and build-out scenario planning: Application to watershed planning at the local government level.

### **Pedagogic Objectives**

- To develop an understanding on how to integrate environmental resource information into the land use planning and design process by ensuring that the methods and the results are legally defensible.
- To provide for an understanding of important approaches and methods for environmental resources analysis at the local government level.

- To familiarize the student with basic information of natural landscape systems, geomorphology, and landscape change of importance to planners.
- To learn how to apply the knowledge gained to a watershed area, to analyze its resources, conduct suitability analyses for land use, and recommend a desired course of action to guide development.

### **Textbook**

The course will use two textbooks, both ordered at the UC Bookstore system:

1. John Randolph . (2004). 'Environmental Land Use Planning'. Island Press
2. Andre Botequilha Leitao, et.al. (006). 'Measuring Landscapes: A Planner's Handbook', Island Press.

In addition, the instructor will place supplementary readings as needed (pdf file format) in the course's folder 'Documents' in DAAP space.

### **Course Structure**

The course is structured on three aspects as follows:

1. A series of lectures in which the theoretical elements and background, natural systems at the watershed level, and methods applicable to environmental land use planning are surveyed. Lectures will be supported by visual information and with case studies whenever necessary, where particular aspects of the method are critical to its success. Reading assignments will be required to provide for additional understanding and in constructing each student's awareness of available literature. The presentations will not follow the exact format of the assigned readings but they will use the readings to provide for a more comprehensive understanding of the topic.
2. Two-student team assignments. The students will be divided into two-student teams to perform assignments through the quarter, to help them understand the application of methods in the inventory, organization, and analysis of spatial data. The assignments will run parallel with the topical developments. Two types of assignments are required:
  - a) Two essays by each team on selected readings. Each student from each team will be responsible for selected readings. Detailed instructions and dates for the submission of the assignments will follow.
  - b) Methods application assignments. A list of the assignments is included in this syllabus. Detailed instructions for each assignment and how to do it will be given at the appropriate time. Both students will be responsible for completing the assignment as a team. The methods application assignments will require basic skills in GIS and the accessing of CAGIS data. Each team should have one member who has familiarity with ArcGIS and CAGIS data. The assignments should be of the highest quality in terms of their process, graphics and content. The final assignment (below) will include all previous assignments into a document.

3. A final assignment incorporated into the final team project, which will include all previous assignments into a cohesive and effective document. Specific instructions on the final assignment will be given in the appropriate time.

The course teaching assistant will be available to assist with the GIS elements of the course.

### **Procedures**

The course is structured as a lecture/seminar course, with frequent slide presentations. The following are stressed as keys to success and for a high student evaluation and final grade:

1. Class attendance and, more importantly, participation in discussions of the various issues and topics. Absence from class should be communicated in advance to the instructor.
2. Reading of all required material and evidence of reading from participation in discussions and in the required written essays.
3. On-time completion of all required assignments from each student team.
4. The completion of the final project and its submission on-line by the deadline. The instructor will be looking for a very effective document, both in written text, charts, and graphics, according to the instructions that will be given later on in the course.

### Basis for Final Grade

- |                                    |     |
|------------------------------------|-----|
| 1. Class attendance, participation | 20% |
| 2. Written essays                  | 20% |
| 3. Application assignments         | 35% |
| 4. Final project assignment        | 25% |