LECTURE 1

Introduction to the course, ENH100, Urban Forestry

A

I am Jim Harding, jaharding@ucdavis.edu, 193 EH
752 0349, 758 8884

Our TA is Jennifer Tso

The course will also include Greg McPherson, director of the USFS Center for Urban Forest Research and some guest speakers. Elena is a graduate student with Greg. The course is very much a collaboration between the Plant Sciences department of UC and the USFS which is part of the US Department of Agriculture.

B. Schedule

We meet on Tuesday from 9 to 11 and Thursday from 9 to 12. We will often have a walking lab or field trip on Thursday.

Some of you are also enrolled in

ENH 101 Trees of the Urban Forest
2 unit Course designed to see some of the important trees of the CITY/CAMPUS/ARBORETUM

Which meets Monday afternoon, 1 to 4 or 5
C. The text for ENH100 is:

Robert W. Miller  Urban Forestry: Planning and Managing Urban Greenspaces. There will be copies in the Teaching Lab, room 193, if you want to read the assignments there.

There will be references, that will allow you to supplement Miller, especially in areas in which you have special interest. These will also be available for reading in room 193.

D. Web Page is at www.plan sciences.ucdavis.edu/courses/enh100/

I will put my lecture notes, the mid terms from last year to study, pictures, links, etc.

E. Format

1: Tuesdays, two hrs, there will either be a lecture followed by a break and a discussion or sometimes another lecture,

2: Thursdays, three hrs, will either be an outdoor lab, or field trip, or may have a lecture followed by a shorter lab, demonstration or discussion.

3: There will be reading assignments for most lectures, and I will expect you to have questions or suggestions from your reading.
F. There will be several Guest Lectures, including:

Joe McBride, UC Berkeley, diversity of Urban Forests throughout the World
Paula Peper, USFS, Tree Growth and Management throughout the US
Ellen Zagory, from the UC Davis Arboretum,
Skip Mezger, Grounds at UC Davis, History and Management

G. Grading

There will be 2 Mid Term Exams and 1/2 of your grade will result from the average of the Mid Terms. The Mid terms will have short discussion questions that will focus on material from lectures but will also require you to relate what was presented in lecture to ideas from the readings. For example, “Explain why the pruning cycles are different in Santa Monica and Modesto”. There will also be questions about your observations in the Field Trips. For example, you may be asked to contrast two Parks, or Greenbelts we visited.

Some BS is allowed; this is not ENH105!

There will be an optional take home final and it will replace the midterm average, if you choose to take it. Basically, if you are not satisfied with your midterm grades you can take this final and it will replace the midterms.
There will be a Project, which will be discussed a lot over the next two weeks. It will account for the other 1/2 of your grade, 1/4 for Presentations and Discussions, and 1/4 for the Written Paper. Each Team will have been formed and will have chosen their study site by Oct 11, and on Nov 8 each team will present a brief progress report to the class. So you can see, we are taking the project very seriously and you must get started early in the quarter.

H. Prerequisite: BIS1C or PLS2 is the only prerequisite listed in the catalog, yet many of you have not had it and others have had much more. I will attempt to use examples of plants you will know to some extent, but this is not an identification course like ENH6 or ENH105. I will never ask you to identify a specific species on the exams although you will need to identify plants in your study site. You may get all the help you need for plant ID.

Questions ????
I. Now, I would like to begin the course by showing you some slides of Urban Forests and “not-so Urban” Forests where people live around the world. My purpose here is to begin our discussions about what the Urban Forest really is and how it is related to other fields such as Landscape Architecture, Arboriculture, etc. In his lecture Joe McBride will examine different Urban Forests in detail; this presentation is a “Preview.”

What I would like you to see in the slides is

A. How many people are required to be “Urban”

B. How the “People” in different UFs differ

C. How the “Trees” in different UFs differ

SLIDES
EVOLUTION OF CITIES, Chapter 1

A. **Urbanization** has caused many problems that have shifted some of the research and management of Traditional Forests, such as the Tahoe National Forest, towards that of Urban Forests, such as the Urban Forest of Sacramento. An important problem of urbanization has been the development of an interface between Urban and Rural which often has become the focus of many planning and management problems. We will talk a lot about this Interface.

With the increase in urbanization, we have come to realize the importance of the conservation of rural areas, both agricultural and natural. Hence, the improved management of Interfaces with these areas has become a focus as we try to preserve a high quality habitat in which we and plants and animals can live, as well as retain important agricultural production.

And finally, we have become aware of the deterioration of vegetation within many urban areas. This has led to increased study of how to better manage urban vegetation, i.e. a higher quality habitat for urban plants.

B. **History of Urbanization**

Although not the focus of this course, we need to be aware of historical achievements and mistakes. Miller presents a brief history of urbanization that I suspect you mostly already know, but I will mention a few things about each era.
Agricultural Revolution: Urbanization, that is living in permanent settlements, was made possible by growing crops. This began, we think, about 15,000 years ago, or some 25,000 years after the first appearance of Homo sapiens. This occurred along rich alluvial plains in Egypt and in the Middle East.

Therefore, in a sense, our environment shaped us up to 25,000 years, after which, we ceased to be nomadic and began to shape our environment, for better or for worse by living in permanent settlements.

Food excesses resulted from farmers producing more food than they needed for their families, and thus, everyone did not need to grow their own food. This resulted in the formation of classes of merchants and craftsmen who traded with farmers, and often, competition was replaced by cooperation. Cities were the result, but they were often needed to be walled for their protection, suggesting that competition did still exist from other less cooperative folks.

Some more slides will show some of what we know about the historical developments of the UFs that have been associated with history of cities in Western and Eastern cultures.

SLIDES

BREAK
WHAT IS URBAN FORESTRY? and ARBORICULTURE? 
and URBAN HORTICULTURE?

Urban Forestry has been variously defined, but, anywhere, Urban Forestry is a merging of talents from traditional Forestry, moving its focus from non-urban areas to more urban areas, Arboriculture, that branch of Urban Horticulture that deals with the planting and management of individual urban trees, and Landscape Architecture that deals with the design, and often redesign, of the Urban Plantings.

Arboriculture had its origin in the National Shade Tree Conference organized in 1924. Dick Harris, a retired professor here at UC Davis, has been a leader in this discipline for more than 50 years. His text, Arboriculture, will be available in room 193; in the original 1983 edition he defined

Arboriculture as the Cultivation of Woody Plants, particularly Trees, and

Urban Forestry as the management of trees in urban areas on larger than an individual basis.

Hence, Harris defines Arboriculture as the study of individual trees and Urban Forestry as the study of populations and communities of trees and other plants, both in a more or less urban setting.
Traditional Forestry, without the “urban”, has a much longer history than urban forestry or arboriculture. Modern Forestry has its roots in European Silviculture and arrived in the US near the beginning of the 20th century, more than 100 years ago. Forestry passed through three major periods during the 20th century and into the present, viz.

a. The Classical Period began with the arrival of European methods of Silviculture around 1900. Forest reserves, especially on public land were treated as timber reserves and it was the function of Forestry to oversee these reserves. During this period, Theodore Roosevelt won a Nobel Peace Prize for his establishment of the National Park System. His Secretary of Forestry (not yet a Cabinet position) was Gifford Pinchot; we will come back to him in this lecture.

Timber harvesting was done mostly on Private Lands.

The Classical Period ended with WWII.

b. During WWII, there was such a great demand for lumber to support the war effort that private forests were essentially denuded, and attention was shifted to harvesting public lands. This began the Economic Period in which Economics and Silviculture were combined to maximize the harvest from public lands. They were not treated as reserves during the economic period, and conservation took a back seat. This continued well after WWII, mostly to support the housing boom following the war, bedrooms for Baby Boomers.
c. **The Resource Management Period** began in the late 1960's and was a response to strong criticism of the forest practices of the Economic Period by various conservation and environmental groups. This period added considerations for *aesthetics, wildlife habitat, watershed and soil protection and recreation*.

This was the history of “Forestry” when “Urban Forestry” originated.

Urban Forestry evolved very naturally from this approach for two reasons:

1. The urban forest has always been more involved with **management** than with economic **production** of forest products.

2. Many social developments in the urbanization of the US led to a serious deterioration of the urban environment by this time period.

This in turn, led to the development of what was briefly called

**Environment Forestry** and then ⇒ **Urban Forestry**

Thus, in the early 1970's, U.F. began its development. Much as we have defined Environmental Horticulture as that branch of Horticulture that deals with the Human Environment, Environmental Forestry was seen as that branch of Forestry that deals with the Human Environment.
In 1970, the U.S. Forest Service created the **Pinchot Institute for Environmental Forestry Studies** which authorized the USFS to deal with vegetation in and around metropolitan areas. It is named after Gifford Pinchot, who together with Theodore Roosevelt, initiated our National Park System in order to preserve our natural resources. It is thought that Gifford Pinchot, a very wealthy man, felt guilty that his family wealth had been gained cutting down trees in the country’s best forests, and thus his commitment to forest preservation.

But Roosevelt was the one who won the Nobel Prize. Gifford Pinchot began his interest in Forest Management as the Forest Manager for George Vanderbilt’s Biltmore Estate in North Carolina. George was the grandson of the tycoon Cornelius Vanderbilt, of steam powered transportation fame; but George was reclusive, single and had a mother with malaria. Hence, they moved to the healthy air of Ashville, North Carolina. Vanderbilt built the largest private residence in the country, and also hired Frederick Law Olmsted to design the forest landscape for the more than 100,000 acres. Nothing but the best!

Meanwhile, Pinchot became the rising star of forest conservation and joined Teddy Roosevelt’s administration. Many years after his death his wealthy heirs managed to get his name engraved into posterity by endowing the Pinchot Institute. More on that later....

And, in 1972, the **Sikes Bill** was passed by Congress in which assistance from the USFS was provided to states with their Urban Forests. The federal government had recognized the need to improve our urban vegetation.
Also in 1972, the professional Society of American Foresters created the **Urban Forestry Working Group** which provided, I think, the first official definition of Urban Forestry. It is too long to write on the board; it is **p. 34 (or 30) of Miller**, having been developed by a large committee. There are several other definitions in Miller, all of which appear in the forestry literature about 5 to 10 year before Harris defined it in the Arboriculture literature.
THE URBAN FOREST (Chapter 3)

A. Nature of the Urban Forest

Miller defines the U.F. as “the sum of all woody and associated vegetation in and around dense human settlements, ranging from small communities in rural settings to metropolitan regions.” I think this is as good a definition as we can put forward, but it does have a couple of gray areas in it. At least, it will do no harm to pick at it a bit.

1. “Associated vegetation” sounds like he means herbaceous plants that might have an influence on humans and on the ecosystem. But, is it correct to emphasis woody plants so much? In Plant Community Ecology, Botanists often refer to a community with the name of the dominant woody plants, usually trees, e.g. the Yellow Pine Forest of the Sierra Nevada, named for the Jeffrey and Ponderosa pines that form the Over-structure, or Dominants of the community. They do this because these plants have so much control over all of the rest, i.e. they dominate. An understory species could be lost and the community will not change very much. However, if a dominant is lost, the entire community might evolve into something very different. So, maybe the emphasis on trees in Urban Forestry may be very reasonable.
2. In addition, there are many other physical and biotic factors such as soil organisms that have a significant influence on the woody plants. These seem left out of the definition. But, if everything is included, we may end up with another paragraph long, by committee, type of definition that is not very useful, as a definition. However, later in the Quarter, I will argue for the importance of animals in the Urban Forest, even cats and dogs, and I will also argue for the importance of Art, but,,, also later,,,

3. How small is a small community? Some may consist of a single buildings we saw in the slides from Alaska. Furthermore, there are seasonal communities where people live once the snow has melted, or where there is only one human manning a fire lookout, and only for part of the year. My point only is that these boundaries in this definition must be arbitrary. Therefore, you may place them where you like. Just be prepared to explain your point of view.

**Urban Ecology**

When we do add the physical factors, humans and animals we have a complete ecosystem and its study has been called Urban Ecology. To some then, Urban Forestry is part of Urban Ecology.

One of the aspects of the ecosystem is its size, both in terms of geographic area and in terms of tree number. For area, Miller refers to Clegg’s estimate of 69 million acres in 1982. This estimate includes trees lining streets, parks and schools, parking lots, cemeteries and freeway interchanges.
A survey of the number of municipal trees in 1988, suggests that cities own 60 million trees in the US but there are empty spaces for 60 million more. Later we will discuss models for Full Stocking. The numbers seem to suggest we are at about 50% stocking at the national level.

These estimates do not include privately owned trees, as in your yard. The trees along your street may actually belong to the city, if planted in an easement, even if you planted them. However, McPherson, Nowak and Rowntree estimated that 76% of the tree cover (leaf area) in Chicago was private, so estimates of the importance of our Urban Forest made in terms of acres or numbers of trees may be substantial underestimates.

In addition, the Urban Forests of most cities will include areas such as nature areas, greenbelts and wetlands, depending on the part of the country. In chapter 3, where Miller reviews several definitions of Urban Ecology he emphasizes geographic differences in these ecosystems.

In the east, the climate is continental with summer rainfall and high humidity. Forests were often dense with many deciduous trees, such as oaks, Liriodendron and maples. With development, much of the forest canopy has been retained, and in some cases, human activities are largely unseen from the view from an airplane flying over them.

However, many communities in the drier parts of the west with Mediterranean Climates were devoid of large forest trees, and most trees were introduced species that must be irrigated, at least when young. When these urban forests are viewed from an airplane, as in the Los Angeles or San Diego areas, all one can see is buildings and freeways.
Native and Introduced Species

Students in ENH101, will find as we go out to identify important trees that most “Landmark” trees of the City of Davis are introduced, not native. Important exceptions are the Valley Oak, *Quercus lobata*, the N. California Black Walnut, *Juglans hindsii* and the Fremont Poplar, *Populus fremontii*. Therefore the Davis Urban Forest is basically introduced.

Certainly Urban Forests will vary from community to community due to land use planning, design and climate. And they will vary within a community from section to section of the city. Generally:

**Old Urban:** In the oldest parts of most cities are found businesses, older factories, and high density residential. Here, there are usually fewer trees but they are the older, sometimes landmark trees. These trees in many cases are in the worst condition due to a stressful environment of concrete and asphalt.

**Suburban:** In the suburban zone, humans and residences are less dense, businesses tend to be located in more open shopping centers, newer industries located in more open industrial parks, and there may be greenbelts and parks. Trees here tend to be newer, although there may be older trees in eastern areas, and these tend to be in better health than their more urban counterparts.

**Interface:** between these urban areas and rural areas, although lacking walls and moats, have in common a very diverse and often neglected character. Zoning allows projects not permitted in urban or suburban communities, and some land is owned by speculators who are waiting for appreciation and hoped for future development and may care little for the
current condition of the property. These interfaces vary with climate in east and west. In the east these areas are generally wooded and visually more appealing. In the west there is little vegetation and the urban sprawl is more apparent.

B. Managing the Urban Forest

Now, that we have defined the U.F., we will start to deal with its Management, and this will dominate the rest of the Quarter. When cities are large, such as Chicago, the acres of land being managed is so large as to present real challenges. The street trees of Chicago are managed by one agency and the parks by another. The parks includes more than 7,000 acres. This in complicated by the fact that most of the land in any U.F. we have seen is in private ownership where management falls on thousands of individuals.

Rural and Urban Forestry

Although we formulate a continuum, or categories, for urban vrs. rural, Caldwell (1971) points out that “The first concern of ecology oriented citizens with the forests is their place in the biosphere, their place in the economy is an important but secondary consideration”. Consequently, in an urban, democratic society, the rural forester must be aware of urban values and needs and be aware that they go much beyond wood production. Hopefully, the distinction then between urban and rural will be diminished as time goes on. Miller has a bit more to say that you can read for yourself.