Succession

1. Howdy and welcome back to Wildlife Habitat Management. In this module we will discuss the definition and concept of succession. We will then go over some of the basic theories of succession and conclude with a discussion on wildlife and succession. The goal of this module is for you to understand the concept of succession and how habitat managers use succession to manage wildlife.

2. If there are only 2 things that you get out of this class this semester make it these 2 points. In order to manage wildlife you need to know your plants and you need to know how to manipulate them. Plants are the foundation of the food web. How can you properly manage wildlife without knowing what they eat or what kind of cover they prefer. Knowing your plants helps to judge plant value from a wildlife habitat perspective. Too often people equate anything green as good but this simply is not true. Different plants have different nutritional values and those values may be on a sliding scale throughout the year. Let me put it this way, a person can survive in the candy isle of the grocery store but one can thrive in the produce isle. Being able to manipulate plants is how we manage wildlife. Knowing that if I disked at this time of year, these plant species will respond favorably is a powerful tool. Knowing that if I burn during this time of year I can control this invasive species and promote these native grasses and forbs is a powerful tool. So in this course, the manipulation of succession will be a large topic.

3. Succession is the predictable, directional change of a plant community over time. At some point in your studies, you have probably seen a graphic like this showing the change of plant communities over time. This is the basic concept of succession but the key component is that this change is predictable. Therefore, by allowing succession to progress we know what plant communities will establish and by setting succession back we can revert a plant community back to a previous one. This is why succession is such an important concept to us as habitat managers.

4. There are 2 types of succession, primary and secondary. Primary succession begins in environments that lack organic matter and have not been altered by living organisms. An example of primary succession would be areas of glacial retreat or newly formed volcanic islands. Secondary succession which is what we will focus on in this course, begins in environments that have already been modified by the occupancy of living organisms. Examples of this are current forests and rangelands.

5. Succession can be viewed in several stages called seral stages. Each seral stage makes up a different type of plant community. These stages if allowed to progress will eventually result in a climax stage. A climax stage is a self-perpetuating community that is relatively stable over several generations of the dominant plant species. An example of a climax stage community might be an Oak-Hickory forest.

6. There are different types of climax stages. A climatic climax is regulated primarily by climate. An Edaphic climax is regulated largely by soil conditions. Some vegetation is vulnerable to catastrophic events and this is called a Catastrophic climax. Chaparral vegetation in California is a good example of this due to its propensity for wildfires. A disclimax community is held in a stable, early successional condition by humans or other animals. In a subclimax community, succession proceeds but is arrested permanently or for a long period of time at the stage preceding the climax stage. A good example of this is a fire climax, longleaf pine forest. If not for period fires the longleaf forest would eventually give way to a hardwood dominated forest.
7. Over time, several theories of succession have been put forth. Let’s discuss 3 of them which include monoclimax, polyclimax, and climax pattern.

8. The monoclimax theory has been around for quite some time. Many people recognized the progression of forests and vegetation particularly after a disturbance occurred but the theory was formulized by Clements in the early 1900s. Clements view the community as a super-organism where species composition and structure is determined by regional macroclimate. Clements viewed succession as deterministic, predictable and unidirectional, ending in 1 possible climax community. This theory is not without its detractors. Gleason refuted Clements views suggesting that succession is not as predictable as Clements’ claimed.

9. The polyclimax theory was developed by Tansley in the 1920s and it suggests that there may be more than 1 type of stable end point or climax community. The theory suggests that local factors such as soil, climate and disturbance greatly impact the composition and structure of the climax community.

10. The climax pattern theory was developed by Whittaker in 1953. This theory viewed the landscape as consisting of environmental gradients and the vegetation that develops will be different at each point along these gradients. Climax vegetation will be a spatial pattern of vegetation that reflects the spatial variation of the physical environment.

11. An important concept within succession that I have already mentioned several times is disturbance and we will refer to disturbance throughout the semester. Disturbance is any event, natural or man-made, that changes the existing condition of a community. Examples of natural disturbances may include tornados, hurricanes, or floods. Examples of man-made disturbances include disking, prescribed fire, or even something as simple as raking just like you would rake leaves in your yard. Typically with man-made disturbances we are trying to mimic natural disturbances but on a smaller scale and with more control of the frequency and intensity of the disturbance. Ultimately, we are trying to affect the soil, organic matter, water and nutrient availability and the amount of sunlight hitting the ground. Disturbance initiates succession.

12. As I mentioned at the beginning of this module, it is important to know your plants and how to manipulate them. When manipulating them, it is important to understand how the timing of disturbance impacts the plant species that respond. Often this is very locally specific so typically you will have to rely on local knowledge and trial and error to determine what time of year a disturbance is required in order for species X, Y, and Z to respond favorably. This calendar shows timing for moist soil management techniques in east Texas. As you can see, in the spring months, moist soil units are slowly drained. Summer months, when the units have sufficiently dried, are typically used to treat undesirable vegetation, plant desirable vegetation or initiate a disturbance like disking to stimulate desirable vegetation. Then in the fall, the units are flooded again.

13. Several factors influence succession. Present and surrounding vegetation are often the first to invade a newly disturbed site. The seed bank or viable seeds in the soil can lay dormant for long periods of time waiting for the right conditions or right disturbance to stimulate their germination and growth. The level of disturbance such as the frequency and/or intensity can influence succession. For example, prescribed fire can be an excellent tool for habitat management but if you burned the same area annually for a long time, you would likely only see response from species that are highly tolerant to that
frequency of burning. And finally, resource availability such as precipitation, light, and soils has a huge impact on succession.

14. So how does our knowledge of succession help us manage for wildlife? By knowing the type of habitat a species prefers we can manipulate succession in order to provide that habitat. We manipulate succession with the use of our available tools such as the axe, cow, plow, fire and gun or leave it alone and let it grow. As you can see from this image some species like white-tailed deer may use all stages of succession at some point however some species like the mourning dove prefer early successional stages. Therefore, if mourning dove is a target species of ours we would want to manage some areas to provide early successional habitat.

15. This ends our lesson on succession and hopefully you recognize the importance of knowing how to identify plant species and how to manipulate them. Succession is an important concept in wildlife habitat management and we will draw on your understanding of it throughout the semester.