

Exam Review

WFS 340: Wetlands Ecology and Management

Definition of a Wetland

- 1) Know the 3 USACE criteria that are necessary for an area to be classified as a jurisdictional wetland.
- 2) Know low-water depth that defines the beginning of the aquatic deepwater system.
- 3) Know the 5 USACE plant classifications, which are related to flood tolerance.
- 4) Know which 3 of the USACE plant classifications (in #3) are considered hydrophytes.
- 5) Know the % horizontal coverage of hydrophytes that is necessary to meet USACE jurisdictional wetland criteria.
- 6) Know the 3 types of histosols, and what makes them different with respect to identifiable plant fibers.
- 7) Know percent composition of organic C required to be classified as an Organic soil, and how clay may influence this percentage.
- 8) Know 3 of the 5 hydric soil indicators commonly used in the field.
- 9) Know the hydric soil chroma criteria for Munsell charts.
- 10) Know the gas responsible for the “rotten egg” smell in wetlands that have been inundated for long durations.
- 11) Know the USACE criterion for inundation that indicates wetland hydrology.
- 12) Know the 6 USACE hydrologic zones, and how they differ with respect to growing season flooding duration.
- 13) Know 4 of the 7 wetland hydrology indicators commonly used in the field.
- 14) Know the function of aerenchyma and what can happen if excessive oxygen flows out of the roots into flooded anaerobic soils.

Wetland Hydrology

- 1) Be able to explain the hydrologic influence model as well as give examples of possible biological feedbacks.
- 2) Know the definition of wetland hydroperiod and what is a hydrograph.
- 3) Know the 3 components of wetland hydroperiod
- 4) Understand the importance of pulsing water events.
- 5) Know the primary ways water can flow into and out of wetlands.
- 6) Be able to calculate a wetland water budget ($\Delta V/\Delta t$) given values for precipitation, inflows, and outflows.
- 7) Understand the relationship between residence time and wetland productivity, and possible reasons why this relationship may occur.
- 8) Be able to define throughfall, stemflow, and interception.
- 9) Be able to define overland flow (a.k.a. sheet flow).
- 10) Understand the differences between the hydrologic response coefficient and the rational runoff coefficient.
- 11) Be able to define streamflow and know what is bankfull discharge.
- 12) Be able to calculate overflow probability given the recurrence interval for a river.
- 13) Be able to define groundwater.
- 14) Know the difference between recharge and discharge wetlands.
- 15) Be able to define evaporation and transpiration.
- 16) Know the different types of tides with respect to frequency and magnitude of inundation.
- 17) Understand the vertical and horizontal stratification of salinity associated with a saltwater wedge.

Nutrient Cycling

- 1) Be able to define oxidation, reduction and redox potential.
- 2) Know how quickly soils can become anaerobic after flooding.
- 3) Understand the relationship between redox potential and oxygen content.
- 4) Be able to recall the oxidized and reduced forms of nitrogen, manganese, iron, sulfur, and carbon.
- 5) Know the order in which the above chemicals are reduced.
- 6) Know the 3 common processes that nitrogen is reduced.
- 7) Know the 2 common processes that carbon is reduced, and the electron acceptors and byproducts of each process.
- 8) Recall what percentage of atmospheric methane is produced by wetlands.

Wetland Losses and Human Impacts

- 1) Know the pre-European settlement and current acreage of wetlands in the lower 48 states.
- 2) Know the most common wetland type in the United States and what State influences this percentage most.
- 3) Know the most common wetland type in the lower 48 and Southeast.
- 4) Know where most of the coastal wetlands are located.
- 5) Know the primary legislation responsible for wetland loss in the United States.
- 6) Know which 3 states have lost the most acreage of wetlands, and what percent of Tennessee wetlands have been lost.
- 7) Know the percent of hardwood bottomlands that have been deforested in the MAV.
- 8) Know the Act in Tennessee that helps conserve, restore, and manage wetlands in the State.
- 9) Know how many hectares of wetlands are currently lost each year.
- 10) Know what is the #1 anthropogenic cause for wetland loss and how most wetlands have been destroyed.
- 11) Be able to list and describe 4 of the 6 ways that humans can negatively affect wetlands.
- 12) Know the 2 primary reasons that rivers are channelized and leveed.
- 13) Know the 2 primary uses of peat worldwide, and how use differs between the western and eastern hemispheres.
- 14) Be able to explain the primary causes of Louisiana coastal erosion.

Hardwood Bottomland Sedimentation

- 1) Be able to define geomorphology.
- 2) Know the difference between point-bar deposition and vertical accretion (slide 8).
- 3) Know where sediment deposition commonly occurs in the floodplain (slide 9).
- 4) Know the 3 changes to a stream channel that can result from channelization (slide 13).
- 5) Know at least 3 possible hydrologic impacts of river channelization (slide 14 & others).
- 6) Know at least 3 possible geomorphic impacts of river channelization (slide 15 & others).
- 7) Know the primary “roots to the bottomland sedimentation problem” in west Tennessee (slide 22)
- 8) Know the 2 major types of erosion (slides 23 and 24).
- 9) Be able to describe bed load transport (slide 26).
- 10) Be able to define valley plugs, understand their formation process, and be able to describe how they may alter hydrology of a floodplain (slides 28, 29, and many others).

Wetland Values

- 1) Know the 3 general categories of wetland values.
- 2) Be able to recall 6 of the 11 wetland values discussed in class.

- 3) Know approximately what percentage of breeding birds in North America use wetlands at some time during their life cycle.
- 4) Know that approximately 3.5% of the world's surface is wetlands and 40% of the world's species depend on them.
- 5) Know that approximately 50% of threatened or endangered species in the United States use wetlands.
- 6) Be able to describe how wetlands help slow discharge into a stream or lake after a rain event.
- 7) Understand the importance of streamside vegetation and coastal wetlands in bank stabilization.
- 8) Know the name of the wetlands that are important in groundwater recharging the Ogallala Aquifer.
- 9) Be able to describe how wetlands can improve water quality.
- 10) Know the #1 mammal harvested from wetlands for fur.
- 11) Know the approximate profit value of bottomland hardwood timber.
- 12) Be able to list some recreational uses of wetlands.
- 13) Be able to recall the estimated total global worth of natural systems, and what percentage is attributed to wetlands.

Moist-soil Management

- 1) Be able to describe how the diet of many waterfowl species differs through the annual cycle, and what life cycle events are driving these changes.
- 2) Know the 5 components of the waterfowl habitat management complex.
- 3) Know approximately what percentage of a management area should be refuge.
- 4) Know the specific definition of a moist-soil wetland, and which subclass we attempt to maintain through management.
- 5) Understand all aspects of hydrologic management in wetlands (slide 10).
- 6) Know the 3 primary foods available for waterfowl in flooded moist-soil wetlands.
- 7) Know the 3 common types of water control structures, and which is most preferred.
- 8) Be able to describe 3 methods that can be used to move water among moist-soil impoundments, and which is cheapest.
- 9) Know the 3 primary reasons why managers in the Southeast may forego mechanical manipulations until autumn.
- 10) Know which mechanical manipulation generally is best at setting back succession.
- 11) Be familiar with our results on autumn mechanical manipulations (slide 22).
- 12) Be able to describe the hemi-marsh concept and how it can influence waterbird abundance and diversity.
- 13) Be able to explain when burning or grazing might be used in managing moist-soil wetlands.
- 14) Know the 2 reasons why agricultural plots ideally should be placed in close proximity to natural wetlands.
- 15) Understand the decomposition differences between agricultural and moist-soil seed.

Greentree Reservoir Management

- 1) Know the specific definition of a hardwood bottomland.
- 2) Know the species of bottomland red oaks that we attempt to encourage in the Southeast.
- 3) Know the 2 species of waterfowl that use hardwood bottomlands all year in Tennessee.
- 4) Know the primary 4 reasons that waterfowl use hardwood bottomlands in fall and winter.
- 5) Know the 3 primary waterfowl foods in hardwood bottomlands.
- 6) Be able to provide the definition of a greentree reservoir (GTR).
- 7) Know the 2 primary objectives of GTR management.
- 8) Be able to describe the difference in hydrology between a natural hardwood bottomland and typical historic flooding in a GTR.
- 9) Know at least 3 of the negative effects of historic GTR flooding.

- 10) If hydroperiod is extended substantially, be able to provide some tree species that could begin to become dominant (i.e., overcup oak, water tupelo, baldcypress).
- 11) Know that timber value of typical red oaks in hardwood bottomlands is about 2X greater than water-tolerant white oak species, such as overcup and swamp chestnut oaks.
- 12) Be able to explain why waterfowl seem to prefer smaller red oak acorns.
- 13) Given a certain number of GTRs on a management area, be able to conceive a possible rotational flooding scheme. In particular, address flooding duration, depth and timing.
- 14) Describe some of the possible functions of managed forest openings in GTRs. NOTE: Dr. Kaminski recommends 0.5-1 acre in size.

Wetland Impoundment Construction

- 1) Know the ideal slope for the sides of a levee.
- 2) Know that contour levees are preferred over rectangular units that cross multiple contours.
- 3) Know the maximum number of 0.3-m contours that should be flooded in a moist-soil impoundment, and why this maximum is recommended.
- 4) Know the resolution that is necessary for a topographic survey in order to draw engineering plans based on 0.3-m contours---Answer is 1 ft or 0.3 meters---Your contour size.
- 5) Know the 2 types of dropboard (also call flashboard) water control structures with respect to structure position in the levee.
- 6) Know the name of the protected portion of a levee that is designed lower in height and exactly at 2 contours so water can flow out if high water occurs.
- 7) Know which direction the receiving end of concrete pipe should face with respect to water flow through the manhole structure and pipes.
- 8) Know the 2 methods used to create a watertight seal between inflow and outflow pipes and the manhole structure.
- 9) Know why use of PVC water control structures should be avoided.

Wetland Regulation and Conservation Programs

- 1) Know the legislative act responsible for the protection and regulation of wetlands.
- 2) Know the primary federal agency (and 2 secondary agencies in certain circumstances) responsible for wetland regulation in the United States.
- 3) Know the 3 primary wetland conservation programs available to landowners in Tennessee.

Waterfowl Carrying Capacity

- 1) Know the 4 waterfowl flyways.
- 2) Know the primary goal of the North American Waterfowl Management Plan.
- 3) Know the 2 Joint Ventures that include west and middle Tennessee (i.e., Lower MS Valley and Central Hardwoods, respectively).
- 4) Be able to define duck-use days (DUD).
- 5) Know the 3 primary reasons why waterfowl managers calculate DUD.
- 6) Know the 3 primary techniques used to calculate DUD.
- 7) Be able to explain why there is less residual agricultural seed nowadays compared to the 80s.
- 8) Be able to describe the advantages and disadvantages of the 3 techniques used to calculate DUD (opinions are welcomed!).
- 9) Be able to describe the steps you would take to calculate DUD using the dot method.