

# **Exam Review**

## **WFS 340: Wetlands Ecology and Management**

### **What is a Jurisdictional 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 deepwater (aquatic) system.
- 3) Know the 5 USACE plant classifications, which are related to flood tolerance.
- 4) Know which USACE plant classifications (in #3) are considered hydrophytes.
- 5) Know the % horizontal coverage of hydrophytes that is necessary to meet USACE jurisdictional wetland criteria, and how to calculate percent dominance using the 50/20 dominance rule.
- 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. Also, know which zones qualify as “wetland hydrology.”
- 13) Know 4 of the 7 wetland hydrology indicators commonly used in the field.
- 14) Understand the function of aerenchyma.

### **Wetland Regulation**

- 1) Know the Federal legislative act that prevents the filling of jurisdictional wetlands.
- 2) Know the provision of the Food Security Act that penalizes farmers for cultivating wetlands.
- 3) Understand what constitutes a jurisdictional wetland as per federal law.
- 4) Know the effects of the SWANCC decision and overturn of the Tulloch Rule on the definition of a jurisdictional wetland.
- 5) Know the difference between a Nationwide 27 and 30 permit.
- 6) Know what constitutes an isolated wetland in Tennessee according to state law.
- 7) Be able to define “water” and “pollution” as they relate to regulating wetlands in Tennessee.
- 8) Know the state legislative act that helps protect wetlands in Tennessee and the state agency that is in charge of wetland regulation.
- 9) Know the name of the state permit that is required for any activity that results in pollution of state waters.

### **Global Amphibian Declines & Amphibian Disease Program at UT**

- 1) Be able to describe why amphibians are especially susceptible to human disturbance.
- 2) Be able to describe how most amphibian populations are structured on a landscape in temperate regions and why periodic interaction of populations is important.
- 3) Know the 4 ways humans can directly affect amphibian populations.
- 4) Know the difference between point-source and non-point source pollution.
- 5) Know some primary predators and competitors of amphibians.
- 6) Know the 4 ways that humans can indirectly affect amphibian populations.

- 7) Be able to describe how global warming may affect amphibians.
- 8) Know what amphibians are most susceptible to UV-B radiation.
- 9) Know the possible effects of acid precipitation on amphibians, and why this is or is not a likely cause of declines.
- 10) Know the 4 pathogens that have been linked to amphibian die-offs, and how they affect amphibians.
- 11) Be able to describe the FV3 results that we documented for Cumberland Plateau amphibians.
- 12) Be able to describe (draw) the trematode life cycle, and how (and likely why) it causes malformations in amphibians.

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

### **Hardwood Bottomland Sedimentation**

- 1) Be able to define hydroperiod and describe the 3 components of wetland hydroperiods.
- 2) Know the difference between point-bar deposition and vertical accretion.
- 3) Know where sediment deposition commonly occurs in the floodplain, and the usual annual rate of deposition.
- 4) Know the 3 changes to a stream channel that can result from channelization.
- 5) Know at least 3 possible hydrologic impacts of river channelization.
- 6) Know at least 3 possible geomorphic impacts of river channelization.
- 7) Know the primary “roots to the bottomland sedimentation problem” in west Tennessee.
- 8) Know the 2 major types of erosion.
- 9) Be able to describe bed load transport.
- 10) Be able to define valley plugs, understand their formation process, and be able to describe how they may alter hydrology of a floodplain.
- 11) Know the difference in mean annual deposition between valley plug sites and shoal and unchannelized sites.
- 12) Know the difference in composition of sediment between valley plug sites and shoal and unchannelized sites.
- 13) Be able to describe the difference in spatial trends in deposition between valley plug and unchannelized sites.
- 14) Be able to describe the differences in duration and depth of flooding between valley plug and unchannelized sites.

- 15) Be able to describe the difference in vegetation composition between valley plug and unchannelized sites, and how this relates to the dendrogeomorphic results of Aaron Pierce.

### **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 4% 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 the major life cycle events of North American dabbling ducks throughout the annual cycle, and how these events influence seasonal diet composition of females, males and ducklings.
- 2) Be able to describe (or draw a timeline) when we focus on management of amphibians, shorebirds, breeding wood ducks, and migratory waterfowl in Tennessee.
- 3) Be able to describe how you would manage the hydrology and vegetation using water control structures and natural and mechanical manipulations for a complex of moist-soil units to meet the needs of all communities in #2.
- 4) Know the 5 components of a waterfowl management complex.
- 5) Know approximately what percentage of a management area should be refuge.
- 6) Understand the Cowardin definition of moist-soil wetlands and how it relates management.
- 7) Understand the effects of hydrologic management in wetlands.
- 8) Know the 3 primary foods available for waterfowl in flooded moist-soil wetlands.
- 9) Know the 3 common types of water control structures, and which is most preferred.
- 10) Be able to describe 3 methods that can be used to move water among moist-soil impoundments, and which is cheapest.
- 11) Know the 3 primary reasons why managers in the Southeast may forego mechanical manipulations until autumn.
- 12) Know which mechanical manipulation generally is best at setting back succession.
- 13) Be familiar with our results on autumn mechanical manipulations.
- 14) Be able to describe the hemi-marsh concept and how it can influence waterbird species richness and waterbird and food resource abundance.
- 15) Be able to explain when burning or grazing might be used in managing moist-soil wetlands, and know the influences of these techniques on vegetation and aquatic invertebrate responses.
- 16) Know which herbicides are best for controlling broad-leaved emergent plants that are non-desirable, and which are used for total vegetative kill.

- 17) Know the 2 reasons why agricultural plots ideally should be placed in close proximity to natural wetlands.
- 18) Be able to describe how you would incorporate agriculture (including crop type) into managing for waterfowl, reflecting on differences in seed decomposition and TME.
- 19) Be able to provide several biological reasons for providing natural wetlands for waterfowl (not solely agriculture).

### **Greentree Reservoir Management**

- 1) Understand the Cowardin definition of hardwood bottomlands and how it relates hydrology.
- 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) Be able to describe goals of GTRs, and how these goals are achieved through 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) Be able to describe forest opening management in GTRs.

### **Waterfowl Carrying Capacity**

- 1) Know the 4 waterfowl flyways.
- 2) Be able to describe the history and goals of the North American Waterfowl Management Plan, and how it is implemented. Especially understand how duck-use days are used in implementation.
- 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) Be able to describe in detail the concept of duck-use days, relating it to the DUD formula.
- 6) Know the 3 primary reasons why waterfowl managers calculate DUD.
- 7) Know the 3 common methods for estimating food resources in wetlands, and be able to compare and contrast the advantages and disadvantages of each.
- 8) Understand the results from recent research on the availability of waste rice grain in harvested fields for waterfowl.
- 9) Be able to describe the steps you would take to calculate DUD using the dot method.
- 10) Be able to describe some future research needs for duck-use day calculations.

### **Wetland Impoundment Construction**

- 1) Know the ideal slope for the sides of a levee, and how to calculate levee dimensions and the width of site-prep disked areas.
- 2) Know why 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.