

Module 2.3

Multiple Choice

1. The field that addresses how a given ecosystem is structured and how the species living in it interact is known as:

- a. population ecology.
- b. community ecology.
- c. nutrient cycles.
- d. ecosystem services.
- e. resilience ecology.

ANSWER: b

2. What is a characteristic of a niche specialist?

- a. will eat almost anything
- b. requires a specific habitat
- c. can live almost anywhere
- d. cannot out compete other organisms
- e. can switch food resources if one declines

ANSWER: b

3. Humans drained the Everglades in the early 20th century because:

- a. they were seen as having no utility to humans.
- b. people wanted to develop cities and towns in the region.
- c. people thought it would prevent flooding.
- d. All of the answer choices are correct.

ANSWER: d

4. Which group can undergo photosynthesis to generate energy?

- a. secondary consumers
- b. primary consumers
- c. producers
- d. both secondary consumers and primary consumers
- e. both primary consumers and producers

ANSWER: c

5. The sensitivity of a species to changes in the environment is often what makes it a useful _____ for the management of an ecosystem.

- a. keystone species
- b. consumer species
- c. indicator species
- d. apex predator
- e. edge species

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ANSWER: c

6. The difference between a food chain and a food web is that:

- a. a food web includes only a single line of species consuming other organisms among trophic levels.
- b. a food chain always shows how much energy is passed from one organism to the next.
- c. producers are the first species in a food web, while secondary consumers begin a food chain.
- d. a food web shows interactions between all the species of a community, instead of just a single line of energy transfer among trophic levels.
- e. There is no difference between a food chain and a food web.

ANSWER: d

7. In the Everglades, what organism is an example of a consumer?

- a. periphyton
- b. sawgrass
- c. applesnail
- d. Bladderwort
- e. All of these organisms are consumers.

ANSWER: c

8. Phytoplankton live on the ocean surface, capturing sunlight and converting it to energy. Tiny shrimp eat the phytoplankton as a food source. Small fish eat the shrimp as food. The interaction between the phytoplankton, shrimp, and fish is a good example of:

- a. a food web.
- b. a food chain.
- c. trophic levels.
- d. both a food web and a food chain.
- e. both a food chain and trophic levels.

ANSWER: d

9. Which group feeds on all of the other groups?

- a. decomposers
- b. producers
- c. primary consumers
- d. secondary consumers
- e. tertiary consumers

ANSWER: a

10. The concept of the trophic pyramid reflects:

- a. the fact that each transfer of energy as you move up the food web results in a loss of about 90%.
- b. the fact that each transfer of energy as you move up the food web results in a loss of about 10%.
- c. the fact that biomass increases as you move up the food web.

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d. the number of decomposers found in a system.

ANSWER: a

11. Organisms that eat dead organic matter are known as:

- a. producers.
- b. decomposers.
- c. detritivores.
- d. consumers.
- e. both detritivores and consumers.

ANSWER: e

12. Organisms living in an ecosystem that are particularly sensitive to changes in that ecosystem are known as:

- a. keystone species.
- b. indicator species.
- c. consumers.
- d. producers.
- e. None of these answer choices is correct.

ANSWER: b

13. In a study comparing the trophic interactions in two streams, you discover that a Florida stream has 12 different fish species at the secondary consumer level, while an Ohio stream has only six. Compared with the Ohio stream, you hypothesize that the Florida stream shows:

- a. greater resilience.
- b. greater ecological complexity.
- c. greater connectivity in the food web.
- d. a higher number of trophic levels.
- e. All of these answer choices are correct.

ANSWER: e

14. In the Everglades food chain below, which organism is a secondary consumer?

sawgrass → insect → frog → raccoon → alligator

- a. sawgrass
- b. insect
- c. frog
- d. raccoon
- e. alligator

ANSWER: c

15. A study examined the bird community composition of four different mangrove forests. Which forest community would you conclude shows a high species diversity in birds?

- a. high richness, high evenness

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- b. high richness, low evenness
- c. low richness, high evenness
- d. low richness, low evenness

ANSWER: a

16. Species diversity is measured in which two ways?

- a. species richness and niche availability
- b. number of producers and consumers
- c. species richness and species evenness
- d. species evenness and resilience
- e. species richness and number of trophic levels

ANSWER: c

17. Which option includes two of the other options?

- a. species evenness
- b. edge effects
- c. core species
- d. species diversity
- e. species richness

ANSWER: d

18. Regions of distinctly different physical areas that serve as boundaries between different communities are called:

- a. ecotones.
- b. ecological zones.
- c. buffers.
- d. core habitat.

ANSWER: a

19. Human alterations of the Everglades system resulted in:

- a. a reduction in the sheet flow of water.
- b. changes in food webs.
- c. reductions in wading bird populations.
- d. All of these answer choices are correct.
- e. None of these answer choices is correct.

ANSWER: d

20. A chemical leaks into a pond that selectively kills off the phytoplankton (a producer). Many of the other organisms in the pond die over a short period of weeks, and the overall species diversity declines. The phytoplankton in this pond could be considered a good example of a(n) _____ species.

- a. keystone

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- b. edge
- c. indicator
- d. core

ANSWER: a

21. A comparison of the diets of two snake species, a native species and a newly introduced species, yields the following data:

Prey species	Percentage of Diet for Each Species	
	Native species	Introduced species
House mouse	12	14
Rice rat	20	19
Cotton rat	62	61
Juvenile fox squirrel	6	6

The introduced species is aggressive and the superior competitor. What is your prediction for the long-term future of this interaction?

- a. local extirpation of the native species
- b. a shift in the diet composition of the native species
- c. dispersal from the community by the native species
- d. All of these choices are possible outcomes of the interaction over time.
- e. None of these choices is a possible outcome of the interaction over time.

ANSWER: d

22. The cowbird is a nest parasite that lays its eggs in the nests of other species in the trees along the boundaries of forests and meadows. Nest parasitism (the number of nests with cowbird eggs) declines dramatically as you move deeper into the forest. Cowbirds would be considered a(n) _____ species.

- a. core
- b. keystone
- c. edge
- d. indicator
- e. ecological zone

ANSWER: c

23. Owls hunt for field mice in a field at night. Foxes hunt for field mice in the same field during the day. The term that BEST describes the interaction between the owls and the foxes is:

- a. mutualism.
- b. commensalism.
- c. parasitism.
- d. resource partitioning.
- e. predation.

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ANSWER: d

24. One example of commensal interaction could be:

- a. snail kites and apple snails.
- b. gray squirrels and humans.
- c. bees and daffodils.
- d. leeches and alligators.
- e. gray squirrels and fox squirrels.

ANSWER: b

25. A tick attaches itself to a human to feed but harms the human in the process. The tick and human have a _____ relationship.

- a. parasitic
- b. mutualistic
- c. commensal
- d. competitive
- e. symbiotic

ANSWER: a

26. In mutualism, one organism is _____, and the other organism is _____.

- a. harmed; harmed
- b. harmed; benefited
- c. benefited; benefited
- d. benefited; harmed
- e. neither benefited nor harmed; neither benefited nor harmed

ANSWER: c

27. Gray squirrels and fox squirrels competing for the same resources are an example of:

- a. predation.
- b. intraspecific competition.
- c. interspecific competition.
- d. commensalism.
- e. symbiosis.

ANSWER: c

28. The American alligator is considered a keystone species in the Everglades system because its presence leads to an increase in the:

- a. availability of aquatic habitat.
- b. abundance and diversity of fish.
- c. abundance and diversity of wading birds.
- d. All of these answer choices are correct.

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- e. None of these answer choices is correct.

ANSWER: d

29. What is it called when two species use different parts of a resource instead of competing directly for that resource?

- a. predation partitioning
- b. habitat partitioning
- c. resource sharing
- d. resource symbiosis
- e. resource partitioning

ANSWER: e

30. A survey of morphological diversity among three weasel species in Minnesota showed some interesting patterns in skull size, with the length of skulls ranging from 25 to 55 mm and little to no overlap between species. The assumption in the study was that skull size is related to the size of prey a weasel can handle (primarily small rodents). This appears to be a good example of:

- a. resilience.
- b. trophic pyramids.
- c. niche differentiation.
- d. edge effects.

ANSWER: c

31. Which indicator species gave ecologists an early warning the Everglades ecosystem was suffering from drastic changes caused by human impact?

- a. alligator
- b. wood stork
- c. raccoon
- d. applesnail
- e. sawgrass

ANSWER: b

32. Professionals involved in a restoration ecology project would probably NOT include a(n):

- a. psychologist.
- b. engineer.
- c. politician.
- d. biologist.
- e. ecologist.

ANSWER: a

33. What was the purpose of the Comprehensive Everglades Restoration Plan?

- a. to introduce new species to the area for increased biodiversity
- b. to give scientists a place to test the impacts of disturbances in ecosystems

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- c. to restore the flow of water back to the wetlands and raise water levels
- d. to silence environmentalists by vowing to no longer interfere with the Everglades
- e. to take over the U.S. sugar industry

ANSWER: c

34. To effectively plan restoration projects, scientists and engineers must be:
- a. innovative.
 - b. flexible.
 - c. adaptive.
 - d. innovative, flexible, and adaptive.
 - e. innovative and flexible.

ANSWER: d

35. The number of wood stork nests in the Everglades suggests that the population is:
- a. declining.
 - b. increasing.
 - c. stable.
 - d. crashing.

ANSWER: c

36. A key goal of the Everglades restoration is to increase the amount of water flowing through the Everglades. This should lead to the restoration of the wood stork population, in part through the increase in the availability of nesting trees due to restoring the _____ relationship between alligators and storks.
- a. predator–prey
 - b. mutualistic
 - c. parasitic
 - d. commensal
 - e. competitive

ANSWER: d

37. _____ ecology is the science that deals with the repair of damage or disturbed ecosystems.
- a. Restoration
 - b. Remediation
 - c. Adaptive
 - d. Landscape
 - e. Corrective

ANSWER: a

38. In 2000, Congress enacted the _____, the most comprehensive ecological repair project to restore some of the natural flow of water through the Everglades.
- a. Complete Everglades Restoration Plan

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- b. Complete Everglades Restoration Project
- c. Comprehensive Everglades Restoration Plan
- d. Healthy Everglades Remediation Project
- e. Developing Everglades Resources Project

ANSWER: c

39. Human impact has reduced the original Everglades by approximately ____%.
- a. 10
 - b. 25
 - c. 50
 - d. 75
 - e. 90

ANSWER: c

40. Human activities in the Everglades have:
- a. reduced species richness.
 - b. reduced species evenness.
 - c. fragmented habitats.
 - d. polluted natural water sources.
 - e. All of these answer choices are correct.

ANSWER: e

41. After decades of human-caused disturbance in the Everglades, the species diversity is ____ it was before human involvement.
- a. higher than
 - b. lower than
 - c. the same as

ANSWER: b

42. The historic flow of water in South Florida was from Lake Okeechobee, with the main flow moving:
- a. south through the Everglades and into Florida Bay.
 - b. east–west across Florida.
 - c. southeast through the Everglades to Miami and the Atlantic Ocean.
 - d. north to Orlando.
 - e. east through West Palm Beach and into the Atlantic Ocean.

ANSWER: a

43. Which types of plants would you often find in areas of primary succession?
- a. grasses
 - b. shrubs
 - c. moss

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- d. trees
- e. herbs

ANSWER: c

44. Species that move into areas at later stages of ecological succession are called _____ species.
- a. edge
 - b. climax
 - c. pioneer
 - d. colonizing
 - e. indicator

ANSWER: b

45. The process by which one community replaces another is known as:
- a. species regression.
 - b. ecological succession.
 - c. successive diversification.
 - d. pioneer colonization.
 - e. ecological replacement.

ANSWER: b

46. The difference between primary succession and secondary succession is:
- a. primary succession occurs when a species moves into an area that starts as bare rock.
 - b. secondary succession begins with the entrance of a pioneer species.
 - c. primary succession involves repopulating a previously damaged ecosystem.
 - d. secondary succession occurs when a species moves into an area that starts as bare rock.

ANSWER: a

47. An example of secondary succession is:
- a. an old agricultural field that has been abandoned.
 - b. the extirpation of mangrove forests.
 - c. a tropical rainforest being cleared and replanted with non-native grasses for cattle grazing.
 - d. coastal erosion due to lost wetland.
 - e. succession on a recent volcanic lava flow.

ANSWER: a

48. Some species, like trees that thrive in the shade, can survive as long as their environment remains unchanged. A climax species:
- a. will survive until a disturbance causes a new ecosystem to move in.
 - b. will survive any ecosystem disturbances.
 - c. will decline after reaching the climax stage.
 - d. will be the first things to grow in that area after a disturbance.

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e. is an *r*-adapted species.

ANSWER: a

49. The Hawaiian Islands are a chain formed by volcanic activity about 1–3 million years ago. Which pattern of ecological succession would have occurred soon after the formation of the Big Island, Hawaii?

- a. late stage
- b. secondary
- c. primary

ANSWER: c

50. Trees whose seeds can grow under low-light conditions would MOST likely be found _____ succession.

- a. early in primary
- b. late in primary
- c. early in secondary
- d. late in secondary

ANSWER: d

51. During ecological succession in the Everglades, _____ will move in as the sediment layer becomes thicker through time, outcompeting the _____.

- a. floating and submerged plants; cypress and willow trees
- b. floating and submerged plants; sawgrass
- c. cypress and willow trees; floating and submerged plants
- d. cypress and willow trees; sawgrass

ANSWER: d

52. Early in primary succession, lichens and mosses colonize bare rock and become the first ecological community. Why are they critical to later stages of succession?

- a. They deplete nutrients.
- b. Decomposing lichen and moss biomass create soil.
- c. They outcompete pioneer species, allowing succession to progress.
- d. They limit the ability of climax species to colonize the area.

ANSWER: b

Use the following scenario and table to answer the question(s) below.

You are performing ecological research in the Chihuahuan Desert in New Mexico. You are examining the species diversity in two areas, site 1, near a freshwater spring, and site 2, out in the desert. You count the number of species you see at each site, and you record the following data:

Species	Site 1	Site 2
Spadefoot toad	5	1
Ladderback woodpecker	7	5
Deer mice	8	4

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Bell's vireo	5	0
Bobcat	3	2
Pronghorn antelope	7	12

53. To measure species diversity in your research sites, you need:

- a. only species evenness.
- b. only species richness.
- c. both species richness and species evenness.

ANSWER: c

54. According to your data, which site has GREATER species richness?

- a. site 1
- b. site 2
- c. They have the same species richness.

ANSWER: a

55. According to your data, which site has GREATER species evenness?

- a. site 1
- b. site 2
- c. They have the same species evenness.

ANSWER: a

56. One food chain seen in site 1 is:

seeds → deer mice → bobcat

On what trophic level would the bobcat be?

- a. producer
- b. primary consumer
- c. secondary consumer
- d. tertiary consumer

ANSWER: c

57. The deer mouse will eat a wide variety of plant and animal matter, including seeds, nuts, flowers, insects, and spiders. They would be considered niche:

- a. specialists.
- b. generalists.

ANSWER: b

Use the following scenario to answer the question(s) below.

You are on a safari in the African savanna. You see an elephant and a giraffe drinking from the same watering

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hole. There are small birds called oxpeckers riding on the backs of some zebras. The safari guide explains they feed on ticks and other insects that bite the zebras. Your guide points out several male lions feeding on an antelope, and several hyenas waiting nearby. The guide says the hyenas will feed on the remains after the lions have left. The lions begin to fight over their prey. There are many herbivorous hooved animals that live on the savanna. The giraffe feeds from the tops of trees while the impala, a small antelope, feeds on grasses and fruits.

58. Which term describes the interaction between the oxpecker and the zebra?

- a. interspecific competition
- b. commensalism
- c. mutualism
- d. predation

ANSWER: c

59. Which example describes commensalism?

- a. several male lions fighting over their prey
- b. an elephant and giraffe drinking from the same watering hole
- c. giraffes and impalas feeding from different areas of vegetation
- d. hyenas feeding on the remains of the lions' prey

ANSWER: d

60. The savanna can support many grazing species of animals that feed on different kinds of vegetation or in different areas, like the giraffe and the impala. This is an example of:

- a. resource partitioning.
- b. predation.
- c. intraspecific competition.
- d. mutualism.

ANSWER: a

61. Interspecific competition can be seen in the:

- a. oxpecker feeding on ticks from the zebra.
- b. lions fighting over their prey.
- c. giraffe and the elephant drinking from the same watering hole.
- d. giraffe feeding on tree leaves and the impala feeding on grasses.

ANSWER: c

Subjective Short Answer

Match each term below to the statement that it best exemplifies.

A. consumers (including worms, insects, crabs) that eat dead organic material

B. a symbiotic relationship between individuals of two species in which one benefits from the presence of the other,
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but the other is unaffected
C. the relative abundance of each species in a community
D. an organism that eats other organisms to gain energy and nutrients; this includes animals, fungi, and most bacteria
E. progressive replacement of plant (and then animal) species in a community over time due to the changing conditions that the plants themselves create (more soil, shade, and so on)
F. the study of all the populations (plants, animals, and other species) living and interacting in an area
G. a symbiotic relationship between individuals of two species in which one benefits and the other is negatively affected
H. feeding levels in a food chain
I. the variety of species in an area; this includes measures of species richness and evenness
J. the role a species plays in its community, including how it gets its energy and nutrients, what habitat requirements it has, and which other species and parts of the ecosystem it interacts with
K. a linkage of all the food chains together that shows the many connections in a community
L. a strategy in which different species use different parts or aspects of a resource rather than competing directly for exactly the same resource
M. a photosynthetic organism that captures solar energy directly and uses it to produce its own food (sugar)
N. the physical environment in which individuals of a particular species can be found
O. species interaction in which individuals are vying for limited resources

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P. the different physical makeup of an ecotone that creates different conditions that either attract or repel certain species (for example, it is drier, warmer, and more open at the edge of a forest and field than it is further in the forest)
Q. the science that deals with the repair of damaged or disturbed ecosystems
R. a simple, linear path starting with a plant (or other photosynthetic organism) that identifies what each organism in the path eats
S. organisms such as bacteria and fungi that break organic matter all the way down to constituent atoms or molecules in a form that plants can take back up
T. regions of distinctly different physical areas that serve as boundaries between different communities
U. the ability of an ecosystem to recover when it is damaged or perturbed
V. a species that is particularly vulnerable to ecosystem perturbations and that, when we monitor it, can give us advanced warning of a problem
W. ecological succession that occurs in an area where no ecosystem existed before (for example, on bare rock with no soil)
X. ecological succession that occurs in an ecosystem that has been disturbed; it occurs more quickly than primary succession because soil is present
Y. plant species that move into an area during early stages of succession; these are often <i>r</i> species and may be annuals (species that live a year, leave behind seeds, and then die)
Z. a species with very specific habitat or resource requirements that restricts where it can live
AA. species interaction in which one individual (the predator) feeds on another (the prey)
BB. the total number of different species

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in a community
CC. a symbiotic relationship between individuals of two species in which both parties benefit
DD. a close biological or ecological relationship between two species
EE. all the organisms in a given area plus the physical environment in which they interact
FF. a species that impacts its community more than its mere abundance would predict, often altering ecosystem structure
GG. a species that occupies a broad niche because it can utilize a wide variety of resources

62. community ecology

ANSWER: F

63. habitat

ANSWER: N

64. ecosystems

ANSWER: EE

65. indicator species

ANSWER: V

66. food chain

ANSWER: R

67. food web

ANSWER: K

68. producer

ANSWER: M

69. consumer

ANSWER: D

70. trophic levels

ANSWER: H

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71. detritivores

ANSWER: A

72. decomposers

ANSWER: S

73. niche generalist

ANSWER: GG

74. niche specialist

ANSWER: Z

75. niche

ANSWER: J

76. resilience

ANSWER: U

77. species diversity

ANSWER: I

78. species richness

ANSWER: BB

79. species evenness

ANSWER: C

80. ecotones

ANSWER: T

81. edge effects

ANSWER: P

82. keystone species

ANSWER: FF

83. predation

ANSWER: AA

84. competition

ANSWER: O

85. resource partitioning

ANSWER: L

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86. symbiosis
ANSWER: DD

87. mutualism
ANSWER: CC

88. commensalism
ANSWER: B

89. parasitism
ANSWER: G

90. restoration ecology
ANSWER: Q

91. ecological succession
ANSWER: E

92. primary succession
ANSWER: W

93. pioneer species
ANSWER: Y

94. secondary succession
ANSWER: X

Essay

95. What is a niche generalist, and what advantage do they have over a niche specialist?

ANSWER: A niche generalist is a species that occupies a broad niche. Their advantage is flexibility; since they can use a wide variety of resources, they have the option to switch to another food source if one food source is depleted. A niche specialist is restricted in where they can live or the food they can eat. If a food resource is diminishing, they have fewer options.

96. What is an indicator species, and why is it easier for scientists to study them as a measure of the health of an ecosystem, rather than an entire ecosystem as a whole?

ANSWER: Indicator species are members of an ecosystem that are particularly vulnerable to changes in that ecosystem. Perturbations may show an effect on indicator species well before other members of the ecosystem, meaning if you were to wait to see an effect in those members, it may be too late to prevent major damage. Thus it is useful to study and monitor the indicator species as a measure of the ecosystem as a whole.

97. In terms of energy transfer, why can't trophic levels be in the shape of an inverted pyramid, that is, more quaternary consumers and fewer producers?

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ANSWER: Trophic levels cannot be in the shape of an inverted pyramid because there would not be enough energy transferred to support the ecosystem as a whole. Since most energy is not transferred between the levels and is instead lost as heat within and out of the organism, it would be impossible for quaternary consumers to produce enough energy to support the rest of the trophic levels. The only energy transfer between levels that is substantial is that from producers to primary consumers. The energy made by producers is what supports and fuels the entire ecosystem, so if they were the least abundant, they would also not produce enough energy for the other trophic levels and the ecosystem would collapse.

98. Why are decomposers and detritivores essential members of any ecosystem?

ANSWER: Decomposers and detritivores are essential members of any ecosystem because they return vital nutrients to the soil, where producers can use them to grow and provide more energy to the other trophic levels. Without them, the producers would not be able to survive, and thus the ecosystem would collapse.

99. Which community do you think would be more resilient to a perturbation: a community with high species richness and low species evenness or one with low species richness and high species evenness? Why?

ANSWER: Although communities with BOTH high species richness and evenness are the most resilient to perturbation, it is likely that a community with high species richness and low species evenness would be somewhat more resilient than one with low species richness and high species evenness. With high species richness and low species evenness, there is a better chance, due to the higher number of species present, that some of those species would be able to survive the perturbation and maintain the ecosystem.

100. Why are invasive species so damaging to ecosystems?

ANSWER: Invasive species are damaging to ecosystems for a variety of reasons. They likely do not have natural predators in the new environment and can thus grow their population unchecked, decreasing the species evenness. Invasive species are also more likely to live in a niche that is already occupied by a member of the original ecosystem and thus will likely outcompete that member for food and shelter and possibly drive it to extinction, decreasing the species richness.

101. Small woodland wetlands can be very diverse, productive communities. In a study comparing the food webs of a wetland in Alabama with one in Michigan, you collect the following data:

Wetland	Species richness	Number of connections in food web
Alabama	20	35
Michigan	10	18

Which wetland would you predict to show the greatest resilience, and why?

ANSWER: In general, resilience increases with increasing ecological complexity. Complexity is determined in part by the overall species' richness in the food web, the number of trophic levels, and the number of connections between species in the food web. Given the data collected, the Alabama wetland shows both higher richness and greater connectivity, so it should show greater ecological resilience than the Michigan wetland.

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102. How does the introduction of an exotic predator species circumvent the natural predator–prey relationship?

ANSWER: Introduced (exotic) species normally have a significant impact on an ecosystem. The organisms that the exotic species prey on have not evolved defense mechanisms to allow them to elude predation. Natural selection is a very gradual process, and there may not be enough time for the prey item to develop a defense mechanism to elude the newly introduced predator before the prey population is decimated.

103. The American honeybee population has been decimated by colony collapse disorder. What impact will the removal of the American honeybee have?

ANSWER: The honeybee is a very efficient pollinator, and many species of plants rely on the honeybee for pollination. Removal of the honeybee will also have an impact on any agriculture crops that need pollinators. Potentially, another pollinator could fill the gap, but that pollinator may not be as efficient or may not be attracted to the plants that need to be pollinated.

104. Why is the lowered species diversity and availability of healthy habitat a problem for the continued survival of the Everglades ecosystem?

ANSWER: Largely due to human involvement, the species diversity and healthy habitat availability have both decreased in the Everglades ecosystem. This is a problem for the continued survival of this ecosystem because, as we know, decreased species diversity, due to whatever reason, makes the ecosystem more vulnerable to disturbances. If the ecosystem is no longer able to recover totally or quickly enough from any number of disturbances, it will likely cease to exist.

105. The United States has some of the strictest laws on the harvesting of timber. Timber companies, however, have realized that even though they are required to replant after harvesting, they can just plant pine trees. What problems does this cause, and how would you change the regulation?

ANSWER: Pine trees are easy for the timber company to plant, but doing so does not re-create the forest that was there before it was harvested. The number of niches and diversity of life that can be supported by the pine trees could be and probably is much less than what was there previously. It is unrealistic and economically impractical to force a timber company to exactly replant the forest as it was, but timber companies should be required to at least replant a ratio of the most common trees that were there to more closely approximate the natural community.

106. The red-cockaded woodpecker is an endangered species with highly specific niche requirements. They prefer longleaf pine forests in the southeast with open understories and few to no deciduous trees. Longleaf pines are a fire-adapted species, and periodic natural wildfires would kill other trees and select for open, longleaf pine forests. How would knowledge of ecological succession help you conserve red-cockaded woodpeckers?

ANSWER: The natural pattern of periodic wildfires has historically maintained these communities at the young forest stage of secondary succession, preventing colonization by late successional, shade-tolerant climax species. Since red-cockaded woodpeckers require the longleaf pine forests, periodic managed burns would mimic natural wildfires and maintain these areas at an earlier successional stage, enhancing the habitat for woodpeckers and allowing for their persistence.

107. Along the southeast coast of the United States, an important part of the Gullah culture (African American descendants of slaves brought through South Carolina and Georgia) has been the weaving of sawgrass and other marsh grass baskets (called sweetgrass baskets). How could you use your knowledge of ecological succession in

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wetland habitats to maintain sawgrass communities as a natural and cultural resource?

ANSWER: Sawgrass marshes occur early in wetland succession as sediments collect and deepen and sawgrass is able to outcompete the early successional floating and submerged vegetation. Without disturbance, the natural pattern would be for the sediment to continue to deepen and allow for the colonization of cypress and willow trees. Sawgrass is a fire-adapted species, and in some areas periodic natural wildfires would prevent the colonization of trees, allowing the sawgrass marsh to persist. Periodic controlled burns of marsh areas would therefore maintain marsh grasses as a resource for both the Gullah community and the natural communities dependent upon the marsh grass ecosystem.