



Applied Remote Sensing Training (ARSET) Program

Invasive Species Monitoring with Remote Sensing

Homework Questions

Question 1

How can remote sensing technology help us in monitoring invasive plants? (select all that apply)

Answers: (bold correct)

- a. Direct mapping of invasive plants
- b. Providing data for predicting distribution of invasive plants
- c. Assessing the impacts of invasive plants
- d. Direct mapping of understory invasive plants
- e. All of the above**

Feedback:

All of the above are potential uses and capabilities of remote sensing technologies with direct impacts on our ability to monitor invasives species and their impacts.

Question 2

What makes remote sensing technology a unique approach for monitoring invasive plants? (select all that apply)

Answers: (bold correct)

- a. Collecting data across large spatial domains
- b. Collecting data with consistent format
- c. Collecting data frequently
- d. Collecting data in remote locations

e. All of the above

Feedback

All of the above are unique benefits of remote sensing for the monitoring of invasive species.

Question 3

One approach to map invasive plants is by taking advantage of their distinct phenological cycles. Which of the following are phenological events that may be used to distinguish between species?

- A. Leaf out/leaf off events
- B. Flowering
- C. Storm activity
- D. Soil moisture

Answers: (bold correct)

- a. B only
- b. B & D
- c. A & B**
- d. A, B, C & D

Feedback:

Phenological events are those events which occur as part of the seasonal cycle of a plant's biology: leaf out/ leaf out events and flowering. Though other indicators may be useful, they are not directly related to phenology.

Question 4

Which of the following are examples of places where you can access freely available remote sensing data?

- A. EarthData
- B. HyMap
- C. NASA DAAC
- D. AISA

Answers: (bold correct)

- a. A only
- b. B & D
- c. A & C**
- d. A, B, C & D

Feedback:

EarthData and the NASA DAAC are both good sources of freely available remote sensing data. The other two (HyMap and AISA) are examples of commercially available data.

Question 5

In another tab, open the [University of Georgia Center for Invasive Species and Ecosystem Health database EDDMapS](#). Click on "Plants" and then select "Aquatic" to view a list of invasive species with links to distribution maps. Which of the following aquatic invasive plants from the list has the greatest number of records? You can click on "Point" or "County" to see the spatial distribution of each invasive plant.

Answers: (bold correct)

- a. Purple Loosestrife**
- b. Common Reed
- c. Starry Stonewort
- d. Common water hyacinth

Feedback:

Purple loosestrife is the most commonly reported plant on that list with more than 57,000 records as of August 2024.

Question 6

In Part 3, we presented a case study on grasslands in XYZ. Which of the following were functional traits that helped the team differentiate *L. cuneata* from other co-occurring species, such as native grasses? (select all that apply)

- A. Total nitrogen
- B. Chlorophyll a+b
- C. Spongy mesophyll
- D. Potassium

E. Magnesium

Answers: (bold correct)

- a. A & B
- b. C, D & E
- c. B, C, D & E**
- d. A, B, D & E

Feedback:

Spongy mesophyll is simply a feature of green plants. All of the remaining traits were explored as functional traits that could be used to distinguish *L. cuneata* from co-occurring native species.

Question 7

Which of the following is an incorrect statement about the features and tradeoffs of remote sensing platforms?

Answers: (bold correct)

- a. Drone-based (UAV/UAS) remote sensing tends to result in higher spatial resolution.
- b. Space-based remote sensing tends to result in coarser spatial resolution.
- c. LiDAR is effective at collecting spectral signatures.**

Feedback:

LiDAR is not capable of collecting spectral information because its active laser emitting component is at a fixed wavelength. Space-based systems can cover a large area but usually at lower spatial resolution due to their relative distance from the ground. Drone-based remote sensing usually covers a smaller area but at a higher spatial resolution.

Question 8

What is the most important quality of data for assessing invasive species based on differences in phenology?

Answers: (bold correct)

- a. Spatial resolution
- b. Temporal resolution**

- c. Spectral resolution
- d. Radiometric resolution

Feedback:

The phenological cycle happens over time which makes temporal resolution the most important factor in determining which datasets capture differences in phenology.

Question 9

Recall the discussion of how spectral signatures, the profile of reflected wavelengths associated with a ground feature, can help to distinguish one feature from another. Which of the following combinations would you expect to have spectral signatures that are most dissimilar?

Answers: (bold correct)

- a. Saltwater & Freshwater
- b. Grasses & Shrubs
- c. Water & Trees**
- d. Sand & Gravel

Feedback:

The spectral signatures of water and trees are most dissimilar, especially in the near infrared where water is a strong absorber and plants are strong reflectors. This is especially true in the near infrared where water is a strong absorber and plants are strong reflectors.

Question 10

Which of the following are examples of impacts that invasive species have on society and the environment? (select all that apply)

Answers: (bold correct)

- a. Ecosystem service disruption
- b. Economic disruption
- c. Loss of native biodiversity
- d. Decreased resilience to climate change
- e. All of the above**

Feedback:

All of these are examples of impacts that invasive species may have on society and the environment. Invasive species disrupt many systems by outcompeting native species, disrupting agriculture, and damaging the natural resources that are critical to avoiding the worst effects of climate change.