



ESRM 304

Environmental and Resource Assessment

Final Exam Hints & Helps

ESRM 304 Final Exam Hints

- ◆ **The exam will contain up to 9 sections of :**
 - **Short Answers,**
 - **Calculations,**
 - **Definitions,**
 - **Multiple Choice, and/or**
 - **True and False.**
- ◆ **About three dozen Final Exam questions**
- ◆ **Wednesday 16 Dec 2015, 0830-1020, EEB 037**
- ◆ **Closed books/notes; bring pencil/eraser, calculator**

Environmental and Resource Assessment Review

Module: Statistical and Sampling Methods in Nat. Res.

Q. What are covariance and correlation and how do they differ?

A: Covariance and correlation both measure the degree of association between two variables (attributes) of a population. Positive indicates direct relationship, negative an indirect one, and zero indicates little to no relationship. The units of covariance are the product of the units of the variables, whereas correlation is unitless and scaled to be between -1 and +1.

Scientific Method

Q. Explain the difference between a “statistic” and a “parameter.” Give two examples of each and describe potential importance / uses of each.

A: A statistic is a value (number) estimated from a sample. A parameter is a fixed constant referencing a value derived from a population.

Examples (statistic / parameter):

sample mean, \bar{x} / population mean, μ

sample std. deviation, s / population std.dev., σ

Environmental and Resource Assessment Review

Module: Soils and Climate

Q. Knowing the total amount of N in a soil is useful for:

- a) calculating the total amount of carbon
- b) determining microclimatic effects
- c) determining if there is adequate nitrogen in a soil for plant growth
- d) estimating if erosion is likely
- e) estimating if all essential nutrients for plant growth are adequate

Soils and Microclimate

- What are two examples of microclimate information that could be useful when considering land management choices? Explain both choices.

A: Possibilities include:

Wind

Air and/or soil temperature extremes

Incoming solar radiation

Throughfall

Site precipitation

Frost pockets, etc.

All can affect vegetation restoration, growth, etc.

All could influence acceptable vegetation choices for planting,
esp. if native species are involved

Could influence survival of endangered species

Environmental and Resource Assessment Review

Module: Stream Ecology

Q. Name the four dimensions of a stream.

- a) Longitudinal
- b) Lateral
- c) Vertical
- d) Temporal

Stream Ecology

- Describe how you can estimate stream volume if you have only a watch and no fancy equipment.
 - Use the “Float Method” - Find something nearby that floats. Mark a “starting” and “ending” point. Drop buoyant object at starting point noting time; once object passes ending point, note elapsed time. Calculate velocity from these data using adjustment factor for surface to depth correction. Estimate stream cross-sectional area and multiply by velocity.

Environmental and Resource Assessment Review

Module: Ground cover methods

Q. What attributes of CWD are typically recorded when measuring it using the line intersect technique?

- a) Diameter at point it crosses transect
- b) Length of the piece
- c) Species if possible
- d) Decay class

Ground Cover a.k.a. Lower Canopy

- Describe a method used to determine understory vegetation cover.
 - *Point transect* method: Lay out a transect of a certain length, say 100 ft., at pre-determined points along the line, record what is observed, either forest floor or vegetation (by species), being sure to note all layers up to a pre-set maximum distance, say 10 ft.
 - Percent cover is easily derived from such data

Environmental and Resource Assessment Review

Module: Social Environment

Q. What is non-response bias, and why is it important to consider in data collection?

A: One might sample across a population in an effort to be able to generalize findings to that group of people. A low response rate (such as surveys) raises the issue that the respondents may not be an adequate representation of the entire population due to self selection, for instance, they may be more affluent or older than the general population ... etc.

Social Environment

Imagine that a proposal was put forward to use the St. Edward Seminary building for a small conference center and hotel (such as a McMenamins facility). A study is being prepared for market feasibility (in essence, would enough people use the facility to make it pay?).

Question: Of these populations, which would be the least helpful to sample for this study? Explain your choice in a few words.

- a) convention and special events organizers in the King County area
- b) parks and open space managers in the King County area
- c) hotel operators in the King County area
- d) residents living within 5 miles of the park
- e) residents of King County

d) Because the potential user pool for such a facility is a larger geographic area than households proximal to the park. Other choices are *iffy* (particularly b & e). Credit will be received if a tenable explanation is given

Environmental and Resource Assessment Review

Module: Upper canopy vegetation

Q. You are 50 feet away from a tree on flat ground to measure its height. The clinometer reading to the top is 98% and to breast height it is -4%. How tall is the tree?

A: $H = 50 \times [98 - (-4)] / 100 + 4.5 = 55.5$ feet tall

Tree Canopy

- What is the Tree Factor for a 0.25-acre fixed-area, circular plot? If the stand you are sampling is 100 acres in size, what is the statistical population size (N) using the above sampling unit?

A: 0.25 corresponds to $\frac{1}{4}$, so Tree Factor is 4 (four) per acre

$$N = \text{Tree Factor} \times \text{acres} = 4 \times 100 = 400$$

Environmental and Resource Assessment Review

Module: Remote Sensing

Q. True or False? A single aerial photo can be used to extract three dimensional measurements.

A: False.

Remote Sensing

- Why does vegetation appear very bright in infrared photographs or images?

A: Healthy green vegetation is a very strong reflector of infrared radiation. In infrared photography or imagery sometimes called false color imagery, the infrared energy is represented by the red color. The intensity of the red corresponds to the amount of the infrared energy being reflected by the target. Thus the higher the near infrared reflectance the brighter the red color in imagery. Some students might choose to demonstrate this with a spectral reflectance curves such as the graph below.

Environmental and Resource Assessment Review

Module: Wildlife

Q. To be useful, what trait must all CPUE indices share?

A: They must bear a consistent relationship with true abundance

Wildlife Sampling

- When trapping small mammals on a grid of live traps, one accumulates the number of individual animals captured over several trapping periods, and one knows the area of the trapping grid. One can calculate a density from these data. Why is it known as a “naïve” density estimate? What must be done to make it “sophisticated”?

A: Naïve, because it does not account for the possibility that an animal wandered onto the trapping grid from far away.

To sophisticate: A buffer needs to be placed around the trapping grid (size related to the species' home range) to reflect the true area trapped.

Environmental and Resource Assessment Review

Module: Surveying, Mapping, Navigation

Q. On a topographic map, what do contour lines shaped like V's (or U's) pointing uphill indicate?

A: A draw, gully, ravine, stream, etc.

Surveying, Navigation, Mapping

- Define Magnetic Declination

Magnetic declination - the angle between the local magnetic field and geographic (polar) north. The declination is termed “east” when the magnetic north is east of geographic north. Similarly, “west” declination means you are standing on the earth in a spot where magnetic north is west of geographic north.

- What bearing corresponds to an azimuth of 139 degrees?

- a) 221°
- b) N 41° E
- c) S 41° W
- d) S 41° E

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Further example exam questions appear in the Exam Study Guide, posted to the course website

Confer with your colleagues, the TA, module leaders, course lead to make sure you understand the questions there & answers to them