

Grazing in Vernal Pools: Restoration Management Decisions

by

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The Situation*

The U.S. Fish and Wildlife Service has recently acquired 200 acres of open land in the Central Valley of California. This land once supported vernal pools that were home to many endemic and endangered flora and fauna. Unfortunately, over the last decade human activities such as off-road driving have significantly degraded the landscape. Because of this degradation invasive species have taken over both the uplands and the pool basins.

The acquired site has been approved for an active restoration plan that seeks to create vernal pools that are able to sustain the same biodiversity that was once observed in both its flora and fauna. The restoration management plan and its implementation are determined by a panel of individuals who will decide how the vernal pools are restored at this site. The panel members all have a unique vested interest in how the restoration project is completed. While all are amenable to following the vernal pool mitigation guidelines as put forth by the state of California, the panel members also bring their own personal biases to the decisions being made. After going through multiple iterations of the restoration plan so far, the general specifics have been determined (e.g., vernal pool density and seeding treatments). However, a big decision that is currently under debate is whether grazing should occur within the restoration site.

It is your responsibility to help this panel decide whether grazing should be excluded or allowed at this site. You, as the expert on grazing effects, will consider the main ecological consequences of grazing as presented in the assigned papers (Marty 2005 and Croel and Kneitel 2011) and from these considerations will present your rationale to the panel of experts. However, your grazing proposal submitted to the panel is a competitive proposal as others will be proposing alternatives to your grazing plan. It is imperative you use sound ecological, and potentially, economical, reasons to explain your stance on grazing within the restoration site. After hearing all of the proposals stating the merits and downfalls of grazing the panel will make a decision on whether grazing should be allowed at the site and to what degree.

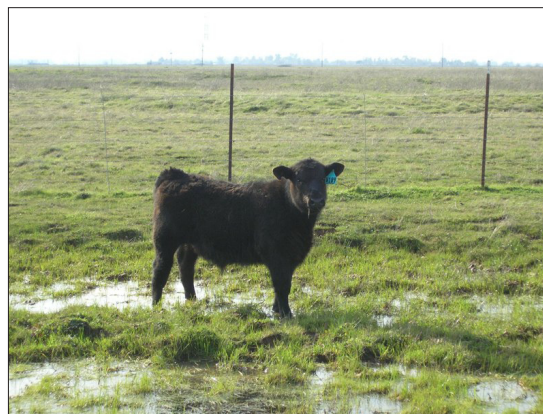


Figure 1. Cow grazing in a vernal pool during the wet season. Credit: J.M. Kneitel, used with permission.

Learning Goals

1. Use evidence to construct an argument.
2. Compare and contrast ecological studies in a similar system with a similar question.
3. Use vernal pool ecological relationships to help make land management decisions.
4. Identify and work through biases to reach a management decision.

* Although based in fact, the situation described in this case study is a work of fiction.

Task 1 – Interpreting Graphs

Write one or two sentences explaining the two graphs below. Then discuss with the members of your group how these graphs complement and/or contradict each other.

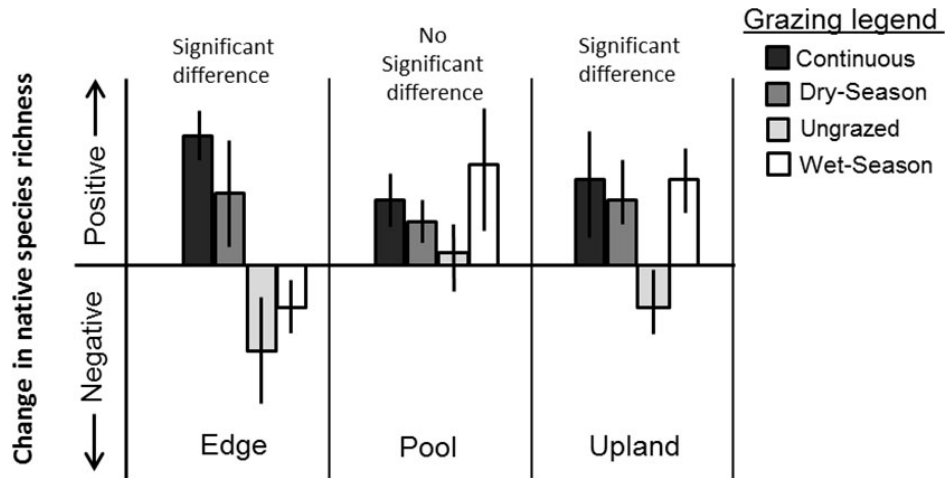


Figure 2. Adaptation of Figure 3 in Marty (2005). For actual results refer directly to article.

Explanation:

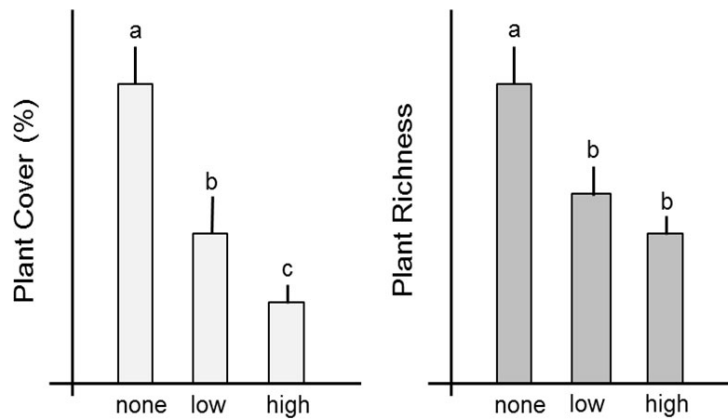


Figure 3. Adapted from Figure 2 panels “c” and “d” in Croel and Kneitel (2011). For actual results refer directly to paper.

Explanation:

Task 2 – Ecological Consequences of Grazing

What was your grazing assignment? Please circle: **Grazing** or **No grazing**

Assuming your grazing assignment, consolidate your arguments supporting your stance. Work together as a group to write at least one ecological argument (approximately 1–3 sentences) for each of the categories applicable to your grazing regime to address when presenting your management plan (~20 min). *Hint!* Use details from the two assigned papers to provide concrete findings to help support your argument.

Use the space below to explain what might be altered with your proposed grazing plan.

How grazing (or lack of) alters the biology of vernal pools:

1. Vascular and non-vascular (algae) plants

2. Invertebrates

3. Vertebrates

How grazing (or lack of) alters the abiotic side of vernal pools:

1. Hydrology

2. Soil

3. Nutrients

Anything else you might need to consider from an ecological perspective?

Task 3 – Know Your Audience

Your group has now identified the general ecological components of your management plan. Did you consider how you would phrase these arguments? Does it matter who the panel members are? When writing a competitive argument you must know your audience.

Take ~10 minutes (~2 min/panel member) to discuss/write down key points on how your presentation may change for each of the five panel members described below.

1. *Land developer* who is actually funding a big portion of this restoration plan as they were required by section 404 of the clean water act to replace the vernal pools their land development may be degrading. (*Note:* California laws currently state that if one acre of vernal pools are lost then two acres need to be restored in a similar habitat.)
2. *Cattle rancher* who doesn't own the land but is the owner of the cattle that will be used if grazing is approved. (*Note:* The average profit of lands under cattle grazing is around \$20/acre/year.)
3. *Fish and Wildlife Service representative* who has no known vested interest in grazing at the site, but will be responsible for overseeing the project to its completion and long term monitoring.
4. *California Native Plant Society member* who is only concerned with maintaining a high native biodiversity regardless of the effort or funding needed.
5. *Restoration ecologist* who has been pulled on as an expert in vernal pool ecology and is up to date on current ecological knowledge and literature.

Task 4 – Prepare Your Presentation

By now you should have a good framework on the biological and abiotic factors altered by grazing and how to frame your argument. Take this time in your group (~10 min) to prepare for your presentation to the panel.

1. Decide who will present to the panel (choose one representative from each group to be a panel member).
2. Provide at least two quantitative points to support your argument. One graph from the paper and one statistic in support of your argument. Remember that details are very important here; broad, general statements will likely not have as much impact on the panel.
3. Formulate a minimum of two ecological reasons (from Task 2), with at least one biological and one abiotic, to support your position.
4. You can also use this time to practice your argument with your group.

Task 5 – Present Your Findings

Each group will send one representative up to argue their case to the panel (2–4 minutes per case). Remember, be concise and to the point; you are convincing the panel your perspective is the best for grazing.

Task 6 – Decision!

Panel members: 3–5 minutes to make management decision.

Non-panel members: While the panel is deliberating write down any potential biases you observed and whether they were rooted in science or went outside of science.

Wrap-up

In the real world the decision a panel makes can easily go one way or the other. As a wrap-up, we will discuss alternatives to grazing and general concerns that restoration practitioners face when attempting to restore vernal pools.

References

- Croel, R.C., and J.M. Kneitel. 2011. Cattle waste reduces plant diversity in vernal pool mesocosms. *Aquatic Botany* 95:140–145.
- Marty, J.T. 2005. Effects of cattle grazing on diversity in ephemeral wetlands. *Conservation Biology* 19:1626–1632.