**Title:** Strategies for managing and leading fieldwork successfully as a graduate student

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# Abstract:

Ecology and environmental science graduate degrees generally involve fieldwork, often lead by the graduate student. While successfully planning and implementing a data collection field campaign can be fundamental to completing a graduate degree, little formal training and resources exist to support graduate students or their supervisors in preparing for that aspect of the degree. Fieldwork requires leading and managing a team, often in unique circumstances (specialized skillsets, long hours, remote regions, etc.), and thus can be challenging even for those with previous leadership or field experience. Our objectives were to a) collect general advice for graduate students leading fieldwork without prior experience, b) solicit specific suggestions on resources and actions and 3) develop a series of policy recommendations for labs, departments, and universities. We developed a survey to solicit community input and distributed it widely to the ecology community. Here, we present initial results from the survey responses, including a summary of the perceived challenges that face graduate students leading their own fieldwork and suggestions for how to prepare and complete fieldwork successfully.

# Introduction

Successfully planning and implementing a data collection field campaign can be fundamental to completing a graduate degree in ecology or other field sciences. However, programs and labs often provide little formal training in the leadership and management skills required to manage a field team successfully. Many programs and lab PI’s may not have any formal training themselves, so structured graduate student training can be limited. Complicating this is the unique nature of fieldwork, with specialized skillsets, work requirements (e.g., hours of work, conditions), regions and equipment. While some individuals may enter graduate school with prior experience leading a team, the skills required for managing a field crew in various environments, under high stakes and potentially facing physical risks may differ. Furthermore, for those with little specific experience, this can be daunting. While some resources exist, they can often be highly method-specific (i.e., tree climbing, Houle et al. 2004), deal with a specific aspect of risk (e.g., minority identity individuals, Claire Demery et al. 2021 or physical challenges, Daniels and Lavalleee 2014).

Success during a fieldwork season or an academic career may look different to different individuals. Here, we define successful fieldwork as not only collecting the intended data, but maintaining the safety and wellbeing of the field crew.

Here, we provide both suggestions of strategies specifically aimed at a graduate student audience, and recommendations for lab, department, scientific association or institution-level policies and resources that can support graduate fieldwork. Graduate students leading their own field campaign can be in complicated positions of power: they are expected to supervise and lead their field assistants but remain accountable to their advisor and projects. Recent stories of sexual harassment occurring in field research statements in Antarctica and at the Smithsonian Tropical Research Institute highlight the pressing need for resources, policies and training that protect researchers and hold bad actors accountable.

The COVID-19 pandemic disrupted and often prevented conducting ecological fieldwork, particularly in the summer of 2020 (i.e., Tracy et al. 2020). While unprecedented, disruptions to fieldwork can happen at many scales, and can alter research timelines and degree completion for many graduate students who collect data in the field. While the advice here is not specifically geared at dealing with global pandemics, we believe the strategies and advice compiled here will help graduate students be resilient to such turmoil.

We acknowledge that the advice compiled here may often overlap and may not be applicable to every graduate student. For example, individuals conducting fieldwork in remote areas without cell service may need to respond differently to scenarios than those working in urban environments. We acknowledge such particularities where they arise.

To make this piece as applicable as possible, we report the results of the survey in two formats: 1) general advice, 2) specific actions to take at various points of the field season, designed to be more applicable to those leading a field season for the first time, and 3) policy recommendations for labs, departments, and universities. We also include a checklist of questions and actions in the supplemental materials, meant to guide labs in establishing their own lab-specific protocols and policies.

Fieldwork can be particularly trying for student with mental illness and can amplify anxiety (Tucker and Horton 2019)

# Methods

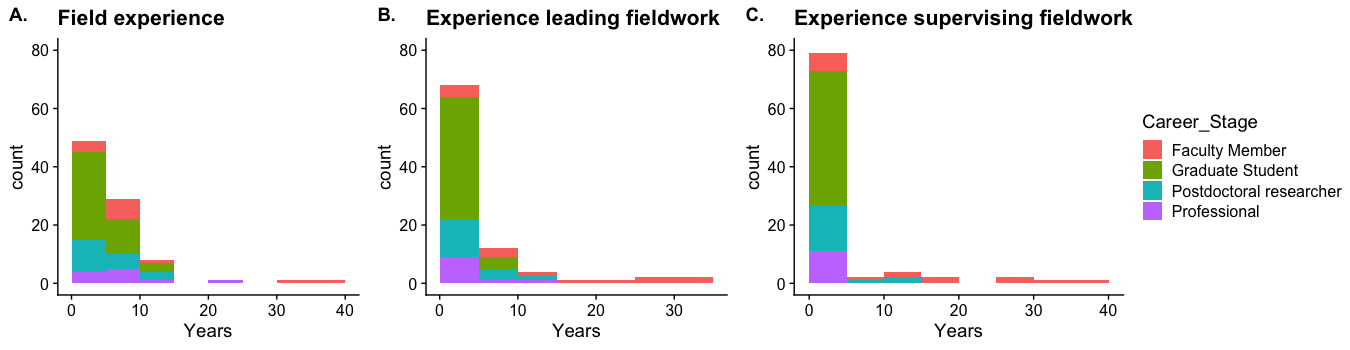
We developed a survey to collect generalized advice for graduate students leading and managing fieldwork. Survey answers were anonymous, and we excluded survey responses that included identifying information (i.e., study site, region, affiliate groups, etc.) from the results. We distributed the survey on 11/22/2021 to the following listservs: Ecolog ([**ECOLOG-L@community.esa.org**](mailto:ECOLOG-L@community.esa.org)**,** Inouye 2018), North American chapter of the International Association of Landscape Ecology (https://www.ialena.org/listserv.html) and the American Geophysical Union Biogeosciences email list (AGUbiogeosciences@ConnectedCommunity.org). We also circulated the survey on twitter and among our personal networks.

# Results

## Survey results

Between 11/22/21 and DATE, 94 individuals completed the survey. 49% of respondents were graduate students (n = 46), 16% were faculty members (n = 15), 20% were postdoctoral researchers (n = 19) and 12% self-identified as 'other' (including research staff, college administrator, and ex-academic).

Respondents had a mix of experiences and backgrounds: 45% of respondents had >5 years conducting fieldwork not as a team lead (n = 43), 24% of respondents had >5 years of experience leading fieldcrews (n = 23), and 14% of respondents had >5 years of experience supervising fieldwork (n = 13) (Fig. 1).



**Figure X. Years of experience of survey respondents. A) Respondent’s years of experience in the field in any capacity. B) Respondent’s years of experience leading fieldwork for at least 3 weeks in the field (cumulative) per year. C) Respondent’s years of experience supervising fieldwork (i.e., supervising a graduate student leading fieldwork) for at least 3 weeks in the field (cumulative) per year.**

57% of respondents typically conducted fieldwork in remote environments (n = 54), 7% described working in urban areas (n = 7), 40% worked in semi-remote regions (i.e., wildlands near cities) (n = 38) and 1% worked in coastal habitats. Some respondents (5%) reported working in a mix of regions.

## Survey resources

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| --- | --- | --- | --- |
| **Table 1. Resources suggested by survey respondents.** | | | |
| Type of Resource | Host | Topic | Link |
| Webinar | IARPC |  |  |
| Cornell |  |  |
| Training | ADVANCEGeo |  |  |
| UC Santa Cruz |  |  |
| FISST |  |  |
| Workshop |  |  |  |
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|  |  |
| --- | --- |
| **Table 2. List of readings suggested by survey respondents.** | |
| Type | Citation |
| Peer-reviewed article | John, C.M. and Khan, S.B., 2018. Mental health in the field. *Nature Geoscience*, *11*(9), pp.618-620. |
| Cooper, K.M., Gin, L.E., Barnes, M.E. and Brownell, S.E., 2020. An exploratory study of students with depression in undergraduate research experiences. *CBE—Life Sciences Education*, *19*(2), p.ar19. |
| Nelson, R.G., Rutherford, J.N., Hinde, K. and Clancy, K.B., 2017. Signaling safety: Characterizing fieldwork experiences and their implications for career trajectories. *American Anthropologist*, *119*(4), pp.710-722. |
| Greene, S.E., Antell, G.S., Atterby, J., Bhatia, R., Dunne, E.M., Giles, S., Groh, S.S., Hanson, E.M., Hilton, J., Knight, H. and Kraftl, P., 2021. Safety and Belonging in the Field: A Checklist for Educators. |
| Demery & Pipkin 2021 - Safe fieldwork strategies for at-risk Individuals, their supervisors and institutions |
| McGill, B.M., Foster, M.J., Pruitt, A.N., Thomas, S.G., Arsenault, E.R., Hanschu, J., Wahwahsuck, K., Cortez, E., Zarek, K., Loecke, T.D. and Burgin, A.J., 2021. You are welcome here: A practical guide to diversity, equity, and inclusion for undergraduates embarking on an ecological research experience. *Ecology and Evolution*, *11*(8), pp.3636-3645 |
| Dyson, K., Ziter, C., Fuentes, T.L. and Patterson, M.S., 2019. Conducting urban ecology research on private property: Advice for new urban ecologists. *Journal of Urban Ecology*, *5*(1), p. juz001 |
| Clancy, K.B., Nelson, R.G., Rutherford, J.N. and Hinde, K., 2014. Survey of academic field experiences (SAFE): Trainees report harassment and assault. *PloS one*, *9*(7), p. e102172. |
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| Website |  |
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| Book | *Fieldwork Ready: An Introductory Guide to Field Research for Agriculture, Environment, and Soil Scientists*, Sara Vero |
| *Personal Narrative of Travels to the Equinoctial Regions of the New Continent, During the years 1799-1804*, Alexander Von Humboldt |

*Section on urban vs rural fieldwork*

*Section on foreign fieldwork*

*Section on what to do when things go wrong*

## General Advice

* **Prepare individuals for risk**

Fieldwork contains risks from a variety of sources: landscape, weather, wildlife, bystanders and occasionally from other team members. Furthermore, not all members of a field crew are faced with the same source or amount of risk: individuals from minority identities (race/ethnicity, sexual orientation, disability, gender identity, religion) may experience greater conflict or violence from sources external (bystanders, local authorities, etc.) or internal (other team members) (Claire Demery et al. 2021). Preparing team members adequately is critical to successfully meeting and managing risks.

The key action required to prepare field assistants fully for potential risks is to talk about them. Acknowledge the risks that exist, and then talk through as a group how the field crew will deal with them if/when they arise. This can feel daunting, particularly in the context of more nebulous sources of risk – it may feel easier for some leads to talk through how to proceed after spotting a bear than how to proceed if a member of the field crew experiences harassment or prejudice, but that makes talking through that risk even more important.

* **Use incentives easily and often**
* **Establish expectations early and often**

## Actionable Advice

[flowchart of before/after/during strategies]

## What to do when things go wrong: Physical

Follow established protocols. Focus on safety first, if necessary. Emergency contacts. Training.

What to do when things go wrong: Interpersonal  
Re-establish communication.

# Conclusions

# Acknowledgements

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# Appendix

## Survey questions

* *Background questions*
  + What stage of your research career are you currently in? [Graduate student, faculty member, postdoc, other]
  + How many years of experience do you have leading a field crew for at least 3 weeks in the field (cumulative) per year?
  + How many years of experience do you have conducting fieldwork not as a team lead?
  + How many years of experience, if any, do you have supervising fieldwork (e.g., as a PI with graduate students who are themselves leading fieldwork)?
  + Where has the majority of your fieldwork experience taken place? [Remote regions, semi-remote (e.g., wildlands near cities), urban areas, a mix of areas]
* *Action Questions*
  + **Before the field season**, what are 2-3 specific actions a successful field crew leader takes to promote physical safety?
  + **Before the field season**, what are 2-3 specific actions a successful field crew leader takes to promote safe and productive interpersonal interactions?
  + **During the field season**, what are 2-3 specific actions a successful field crew leader takes to promote physical safety?
  + **During the field season**, what are 2-3 specific actions a successful field crew leader takes to promote safe and productive interpersonal interactions?
  + **After the field season**, are there any actions a successful field crew leader takes?
  + How, if all, do you change your strategy for leading volunteers vs undergrad/grad students gaining experience vs paid assistants?
* *Reflection Questions*
  + Think about a field season you had that was successful. Without giving identifying details, what leadership traits and/or actions made it successful?
  + Think about a challenging field experience. Without giving identifying details, what made the situation difficult?
  + In general, what advice would you give to incoming graduate students leading a field season for the first time?
* *Exit Questions*
  + Are there specific resources (e.g., online readings, workshops, etc.) you recommend for new field crew leaders?
  + Are there specific resources/policies/processes at the department, lab, or program level that you recommend to help support new or existing graduate field leaders?
  + Are there other strategies to leading fieldwork successfully that you’d like to mention that have not been addressed above?