American Fisheries Society
Student Subsection of the Education Section

How To Conduct Undergraduate Research

Overview

Undergraduate research is, quite simply, a scientific investigation conducted by an undergraduate student. Fisheries research can take many forms. For example, an undergraduate student may assist a conservation agency in sampling sportfish in inland lakes, help a graduate student identify small-bodied native fishes from prairie streams, or design an angler survey instrument with a faculty member. Undergraduate students commonly conduct research for course credit, graduation with honors, professional experience, and/or intellectual enrichment. Research prepares undergraduate students for graduate school and future employment and is a valuable way to contribute to fisheries science early in one’s career.

Conducting undergraduate research

1. Brainstorm research ideas
   a. Identify your research interest area(s).
   b. Email and/or meet with a faculty member to discuss possible research ideas, especially those related to your interests.
   c. Consult with graduate students who need research assistants for projects they are completing.

2. Develop research questions, objectives, hypotheses
   a. Outline the question or questions that need to be answered.
   b. Conduct a literature review exploring previous studies in areas related to your research.
   c. Identify knowledge gaps in the literature.
   d. Outline objectives that will fill knowledge gaps.
   e. Predict research results based on your literature review and prior knowledge.
3. Make a plan
   a. Forecast logistical details of the research project (e.g., how much you will work, when you will work).
   b. Estimate required expenses.
   c. Obtain necessary supplies and personnel.
   d. Identify deliverables necessary for project completion.

4. Apply for funding
   a. Work with your faculty advisor to identify possible grants and funding sources.
   b. Complete and submit funding applications.

5. Collect data
   a. Perform fieldwork, conduct laboratory experiments, and perform other tasks as required to fulfill your objectives.
   b. Arrange for research equipment and data to be safely and securely stored.

6. Analyze data
   a. Consult with a faculty member, graduate student, and/or statistician about appropriate statistical tests to perform.
   b. Select an appropriate statistical program (e.g., R, SAS, SPSS).
   c. Save statistical outputs.
   d. *See “How To Analyze Your Data” document.

7. Organize and interpret results
   a. Identify important results.
   b. Elucidate results by conducting a literature review.

8. Write a manuscript or report
   a. Organize all background information, results, interpretations, and conclusions in the form of a scientific manuscript or report.
   b. Send drafts to advisors for review.

9. Revise and submit
   a. Make changes to initial drafts according to edits from advisors.
   b. Write a final copy and submit it for peer-reviewed and/or university publication.

10. Present and reflect
    a. If possible, communicate your results in the form of an oral or poster presentation at a scientific conference.
    b. Reflect on your research experience, highlighting personal growth, areas for improvement, and ideas for future research.
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