

# How to Navigate Fisheries Education and Employment

**Andrew K. Carlson**

South Dakota State University, Department of Natural Resource Management, NPBL 138, Box 2140B, Brookings, SD 57007. E-mail: andrew.carlson@sdstate.edu

**Karen M. Dunmall**

University of Manitoba, Department of Biological Sciences, Winnipeg, MB, Canada

**Ross E. Boucek**

Florida International University, Department of Biology, Miami, FL

**Nicholas W. Cole**

University of Nebraska, School of Natural Resources, Fisheries and Wildlife Cooperative Research Unit, Lincoln, NE

**Janice A. Kerns**

Wisconsin Cooperative Fishery Research Unit, College of Natural Resources, University of Wisconsin–Stevens Point, Stevens Point, WI

**Rebecca M. Krogman**

Iowa Department of Natural Resources, Chariton, IA

**M. Clint Lloyd**

Mississippi State University, Department of Wildlife, Fisheries & Aquaculture, Mississippi State, MS

**Vivian M. Nguyen**

Carleton University, Ottawa, ON, Canada

**Tracy R. Wendt**

University of Montana, Department of Ecosystem & Conservation Science, Missoula, MT

**Shannon L. White**

Department of Ecosystem Science Management, The Pennsylvania State University, University Park, PA

**Kyle L. Wilson**

University of Calgary, Department of Biological Sciences, Calgary, AB, Canada

All authors are current or former members of the AFS Student Subsection of the Education Section Executive Committee. Authorship is alphabetical after the second author.

## INTRODUCTION

The old joke is true: fish are smart because they travel in schools. Taking a cue from fish themselves, a group of American Fisheries Society (AFS) students and young professionals from the Student Subsection of the Education Section schooled together to create a series of “How to ...” documents to help our cohorts navigate the many steps of professional development in fisheries. The complete series is available online at [students.fisheries.org](http://students.fisheries.org).

## HOW TO CONDUCT UNDERGRADUATE RESEARCH

Undergraduate research in fisheries can take many forms. For example, a student may assist a conservation agency in sampling sport fish 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. This “How to ...” document:

1. Describes the process of undergraduate research and emphasizes the importance of scientific experience for graduate school; and
2. Teaches undergraduate students how to brainstorm research ideas, develop questions and hypotheses, plan for research, collect data, and complete additional steps of the scientific method in the context of a fisheries investigation. In the end, students are encouraged to reflect on their research experiences to celebrate personal growth, identify areas for improvement, and apply acquired skills in new situations.

## HOW TO PREPARE FOR GRADUATE SCHOOL

Graduate school is an increasingly important component of fisheries education. A master’s of science (M.S.) degree is now the norm for agency biologist positions, making graduate school critical for attaining employment in a fisheries-related discipline. This “How to ...” document:

1. Reviews and differentiates the processes of preparing for M.S. and Ph.D. research, offering valuable insights for success;
2. Explains the importance of developing a strong undergraduate record to prepare for graduate school;
3. Offers undergraduate students a roadmap for the next destination in their educational path (e.g., identifying research interests, taking the GRE, locating M.S. positions, contacting faculty, and scheduling visits); and
4. Gives important insights for doctoral success, including strategies for streamlining the project search, securing independent funding, and refining written and oral communication skills.

## HOW TO WRITE EFFECTIVE SCHOLARSHIP APPLICATIONS

Writing effective scholarship applications is an art. This “How to ...” document:

1. Describes the process by condensing scholarship applications into comprehensible steps;
2. Teaches readers how to locate scholarships that highlight their strengths and future promise and thus establish their credibility as worthy awardees;
3. Discusses the importance of having personalized reference letters;
4. Describes how to write effective research proposals and personal statements that highlight achievements within key categories often reviewed by scholarship committees; and
5. Empowers students to effectively advertise their skills and abilities as they craft high-quality scholarship applications.

## HOW TO ANALYZE YOUR DATA

Data analysis is the formal process of deriving scientific conclusions from quantitative and/or qualitative information collected during a study. In fisheries, proper data analysis is critical for reliable research, high-quality publications, and science-based management. Students are often exposed to analytical procedures in courses (e.g., statistics, biometrics, quantitative fisheries science, and fisheries population analysis) that prepare them for graduate research, for which statistical acumen is indispensable. This “How to ...” document:

1. Reviews the steps of data analysis and offers tips for success; and
2. Introduces readers to database management, statistical software packages (e.g., R, SAS, and SPSS), types and assumptions of analytical procedures, and options for data interpretation and visualization.

---

### HOW TO WRITE AND DEFEND YOUR THESIS

Writing and defending your thesis helps authenticate your research findings and establish yourself as an expert in your field. This “How to ...” document:

1. Demystifies thesis writing and defense, providing valuable insights for success during each stage of the process;
2. Shows students how to select an organizational structure and separate chapters as individual manuscripts for publication;
3. Encourages students to write early and often in graduate school, using their best writing from scholarship applications, thesis proposals, or literature reviews in their final theses;
4. Offers tips for avoiding writer’s block (e.g., changing environments, brainstorming with colleagues, spending time away); and
5. Teaches students how to prepare for their thesis defense by attending defenses of other students and researching the expertise of committee members to anticipate questions they may ask.

Overall, this document describes valuable, applicable skills for succeeding at two of the greatest challenges of graduate school.

---

### HOW TO PUBLISH IN GRADUATE SCHOOL

Publications are the currency of the sciences and one of the best ways to increase your marketability for graduate assistantships, scholarships, and jobs. Research suggests that the best predictor of employment in biological sciences is the number of publications a person produces before he or she finishes graduate school. Thus, publishing as a student may be one of the best career investments you can make. However, publishing research is challenging. From writing to submitting a manuscript, the publishing process can seem somewhat daunting at first, especially when considering the demands of other simultaneous academic obligations, such as teaching and assistantship assignments, studying for comprehensive exams, and writing proposals. This “How to ...” document:

1. Provides a quick primer for publishing in graduate school that will smooth the process for young students;
2. Includes strategies, insights, and example documents to highlight the steps leading to an accepted publication; and
3. Describes how to write manuscript sections, select journals, write cover letters, and respond to reviewers.

---

### HOW TO WRITE A RÉSUMÉ/CV

The first step in looking for a job or applying to graduate school is developing marketing materials. You need to sell potential employers and advisors on who you are. A strong résumé or curriculum vitae (CV), paired with a cover letter tailored to the opportunity at hand, is the key document that will get their attention. This “How to ...” edition:

1. Describes differences between a résumé and a curriculum vitae, along with strategies for creating both types of documents; and
2. Shows how to format and write sections of résumés and

CVs and craft cover letters that strategically highlight achievements relevant to specific jobs.

This document is beneficial for undergraduate and graduate students alike as they prepare and apply for careers in fisheries science.

---

### HOW TO GET A JOB

Finding a job is not always an easy task, especially in the fisheries field where employment can be limited. During each step of the process, you must stand out among many (and oftentimes very competitive) candidates. This “How to ...” document:

1. Introduces a variety of job search tools available for aspiring fisheries professionals to locate the position of their dreams;
2. Helps students tailor a cover letter and résumé/CV to fit specific jobs; and
3. Describes strategies for crafting applications, conquering interviews, and following up appropriately.

Written by AFS members who have had recent success securing employment, this document is a must-read for aspiring fisheries professionals.

---

### HOW TO BE A YOUNG PROFESSIONAL

Transitions can be exciting, scary, and rewarding. Becoming a young professional (YP) is no different. This “How to ...” document:

1. Explains the changes that occur during the progression from student to full-fledged fisheries professional;
2. Details what it means to be a YP member in AFS; and
3. Describes financial benefits (e.g., lower cost of membership and meeting registration) and professional enrichment opportunities (e.g., awards, exchange programs, and new leadership and mentoring options) associated with being a YP.

Many students who were AFS members during their formal education find themselves overwhelmed and underfunded when they enter the professional world. Young professional membership was developed by AFS to acknowledge the unique values recent graduates offer the Society and to help support them during this demanding time period.

---

### CONCLUSION

There is safety in numbers, especially during risky times. Thus, schooling behavior helps fish and those studying fish, both during school and beyond. This “How to ...” series was crafted to clarify and explain the steps of fisheries education. It is a “living” document online and thus can be updated with new topics and information as necessary. The collaborative, international nature of its development is indicative of the broad opportunities available for students and professionals in AFS. The AFS Student Subsection of the Education Section (Subsection) facilitates interactions among students and professionals, making education less confusing and creating opportunities for networking and personal and professional growth. Students and young professionals automatically become members of the Subsection with membership in AFS. We encourage students to get involved in the Subsection by visiting our website (students.fisheries.org), attending the Subsection Business Meeting (held annually at the AFS Annual Meeting), and emailing Subsection officers with questions and ideas, including volunteering to write new topics for the “How to ...” series. As AFS students swim in their educational and professional directions, new perspectives broaden the stream. Welcome to the school.

