

Fisheries, Wildlife, and Conservation Biology (BS): Fisheries Science Concentration

Fisheries, Wildlife and Conservation Biology (FWCB) major prepares students to manage and conserve populations of fish and wildlife in their natural habitats. This STEM (Science, Technology, Engineering and Mathematics) major gives students the skills they need to observe, research, monitor and assess the impact of environmental change, human behavior and public policy on wild populations of animals. Using a combination of lab work, technology and field study, students develop conservation strategies that ensure the long-term health of fish and wildlife populations.

After sophomore year, students spend six weeks in summer field courses. During “summer camp” experience, students learn hands-on fish and wildlife management techniques in locations across the state. From plant and animal identification and bird mist netting to camera-trapping and radio telemetry, students gain experiences that prepare them for careers after graduation. FWCB students have the option to substitute the summer field course with approved internships or study abroad courses.

The Fisheries concentration meets the qualifications for certification by the American Fisheries Society. The fisheries concentration includes required courses in chemistry, aquatic ecology, and biology of fish that are not required in the other FWCB concentrations.

Contact

Dr. Nicole Mihnovets
 anmihnov@ncsu.edu
 FWCB Undergraduate Coordinator

Department of Forestry and Environmental Resources
 Box 8008
 North Carolina State University
 Raleigh, North Carolina 27695-8008

Plan Requirements

First Year		Hours
ENV 100	Student Success in Environmental First Year	1
ENV 101	Exploring the Environment	2
MA 131	Calculus for Life and Management Sciences A	3
BIO 181	Introductory Biology: Ecology, Evolution, and Biodiversity	4
BIO 183	Introductory Biology: Cellular and Molecular Biology	4
CH 101 & CH 102	Chemistry - A Molecular Science and General Chemistry Laboratory	4
COM 110 or COM 112	Public Speaking or Interpersonal Communication	3

Acad Writing Research (p. 2) ¹		4
Hours		25
Second Year		
FOR 172	Forest System Mapping and Mensuration I	2
FW 221	Conservation of Natural Resources	3
PY 131	Conceptual Physics	4
CH 201 & CH 202	Chemistry - A Quantitative Science and Quantitative Chemistry Laboratory	4
Select one of the following:		4
CH 220	Introductory Organic Chemistry	
CH 221	Organic Chemistry I	
CH 222	Organic Chemistry I Lab	
AEC 360 or PB 360	Ecology or Ecology	4
Communication Elective (p. 2)		3
Select one of the following:		3
ARE 201	Introduction to Agricultural & Resource Economics	
ARE 201A	Introduction to Agricultural & Resource Economics	
EC 201	Principles of Microeconomics	
EC 205	Fundamentals of Economics	
Hours		27
Summer		
FW 311	Piedmont Wildlife Ecology and Management	3
FW 312	Fisheries Techniques and Management	1
FW 313	Mountain Wildlife Ecology and Management	1
FW 314	Coastal Ecology and Management	1
Hours		6
Third Year		
FW 353	Wildlife Management	3
FW 373	Vertebrate Natural History	3
FW 411	Human Dimensions of Wildlife and Fisheries	3
AEC 420	Introduction to Fisheries Science	3
GN 301 or GN 311	Genetics in Human Affairs or Principles of Genetics	3
ST 311	Introduction to Statistics	3
ENG 333	Communication for Science and Research	3
GIS 280	Introduction to GIS	3
ENT 201	Insects and People	3
Hours		27
Fourth Year		
FW 415	Professional Development in Fisheries, Wildlife, and Conservation Biology	1
AEC 441	Biology of Fishes	3
Quantitative Elective (p. 2)		3
Policy Elective (p. 2)		3
Aquatic Elective (p. 2)		3
Physical Science Elective (p. 3)		3
Biology Elective (p. 3)		3

Technical Elective (p. 3)	3
Technical Elective (p. 3)	2
Hours	24
Total Hours	109

¹ A grade of C- or better is required.

Code	Title	Hours	Counts towards
GEP Courses			
	GEP Humanities (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/)	6	
	GEP Health and Exercise Studies (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/)	2	
	GEP Elective (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/)	3	
	GEP Global Knowledge (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-global-knowledge/) (Verify Requirements)		
	World Language Proficiency (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/world-language-proficiency/) (Verify Requirements)		
Total Hours		11	

Acad Writing Research

Code	Title	Hours	Counts towards
Acad Writing Research			
ENG 101	Academic Writing and Research	4	
FLE 101	Academic Writing and Research	4	

Transfer Sequence

ENG 202	Disciplinary Perspectives in Writing	3	
ENG 1GEP		3	

Communication Electives

Code	Title	Hours	Counts towards
COM 201	Introduction to Persuasion Theory	3	
COM 211	Argumentation and Advocacy	3	
COM 226	Introduction to Public Relations	3	

COM 301	Presentational Speaking	3	
ENG 214	Introduction to Editing	3	
ENG 216	Technologies for Texts	3	
ENG 316	Introduction to News and Article Writing	3	

Quantitative Electives

Code	Title	Hours	Counts towards
CSC 200		3	
MA 231	Calculus for Life and Management Sciences B	3	
MA 241	Calculus II	4	
ST 312	Introduction to Statistics II	3	

Policy Electives

Code	Title	Hours	Counts towards
ARE 309	Environmental Law & Economic Policy	3	
FOR 472	Forest Soils	4	
NR 460	Renewable Natural Resource Management and Policy	3	
NR 560	Renewable Natural Resource Management and Policy	3	
PS 320	U.S. Environmental Law and Politics	3	
PS 336	Global Environmental Politics	3	

Aquatic Electives

Code	Title	Hours	Counts towards
AEC 380	Water Resources: Global Issues in Ecology, Policy, Management, and Advocacy	3	
AEC 419	Freshwater Ecology	4	
AEC 519	Freshwater Ecology	4	
MEA 200	Introduction to Oceanography	3	
MEA 220	Marine Biology	3	

Physical Science Electives

Code	Title	Hours	Counts towards
CH 201	Chemistry - A Quantitative Science	3	
CH 202	Quantitative Chemistry Laboratory	1	
CH 223	Organic Chemistry II	3	
MEA 100	Earth System Science: Exploring the Connections	4	
MEA 130	Introduction to Weather and Climate	3	
MEA 200	Introduction to Oceanography	3	
MEA 210	Oceanography Lab	1	
MEA 220	Marine Biology	3	
MEA 250	Introduction to Coastal Environments	3	
MEA 323	Geochemistry of Natural Waters	3	
PY 212	College Physics II	4	

Biology Electives

Code	Title	Hours	Counts towards
ENT 425	General Entomology	3	
ZO 250	Animal Anatomy and Physiology	4	
ZO 402	Invertebrate Biology	4	
ZO 410	Introduction to Animal Behavior	3	

Technical Electives

Code	Title	Hours	Counts towards
AEC 515	Fish Physiology	3	
AEC 586		3	
AEC 587		1	
FOR 252	Introduction to Forest Science	3	
FOR 304	Theory of Silviculture	4	
FOR 420	Watershed and Wetlands Hydrology	4	
FOR 520	Watershed and Wetlands Hydrology	4	

FW 404	Wildlife Habitat Management	3
FW 453	Principles of Wildlife Science	4
FW 515	Fish Physiology	3
FW 586		3
FW 587		1
MEA 200	Introduction to Oceanography	3
MEA 210	Oceanography Lab	1
MEA 220	Marine Biology	3
MEA 250	Introduction to Coastal Environments	3
MEA 251	Introduction to Coastal Environments Laboratory	1
MEA 449	Principles of Biological Oceanography	3
MEA 549	Principles of Biological Oceanography	3
NR 420	Watershed and Wetlands Hydrology	4
NR 520	Watershed and Wetlands Hydrology	4
PB 200	Plant Life	4

Semester Sequence

This is a sample.

First Year

Fall Semester	Hours
ENV 100 & ENV 101	Student Success in Environmental First Year and Exploring the Environment 3
ENG 101	Academic Writing and Research ¹ 4
MA 131	Calculus for Life and Management Sciences A 3
BIO 181	Introductory Biology: Ecology, Evolution, and Biodiversity 4
GEP Health and Exercise Studies (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/)	1

Hours 15

Spring Semester

CH 101	Chemistry - A Molecular Science	3
CH 102	General Chemistry Laboratory	1
BIO 183	Introductory Biology: Cellular and Molecular Biology	4

COM 110 or COM 112	Public Speaking or Interpersonal Communication	3
GEP Humanities (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/)		3
GEP Health and Exercise Studies (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/)		1
Hours		15

Second Year**Fall Semester**

Select one of the following:		4
CH 220 & CH 222	Introductory Organic Chemistry and Organic Chemistry I Lab	
CH 221 & CH 222	Organic Chemistry I and Organic Chemistry I Lab	
FW 221	Conservation of Natural Resources (CP)	3
Communication Elective (p. 1)		3
FOR 172	Forest System Mapping and Mensuration I	2
Hours		12

Spring Semester

Economics Elective (p. 1)		3
AEC 360 or PB 360	Ecology (CP) or Ecology	4
PY 131	Conceptual Physics	4
CH 201 & CH 202	Chemistry - A Quantitative Science and Quantitative Chemistry Laboratory	4
Hours		15

Summer

Summer Camp courses may be substituted by a combination of two approved FWCB internship² or FWCB study abroad experiences.

FW 311	Piedmont Wildlife Ecology and Management	3
FW 312	Fisheries Techniques and Management	1
FW 313	Mountain Wildlife Ecology and Management	1
FW 314	Coastal Ecology and Management	1
Hours		6

Third Year**Fall Semester**

GEP Humanities (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/)		3
FW 353	Wildlife Management (CP)	3
GN 301 or GN 311	Genetics in Human Affairs or Principles of Genetics	3-4
ST 311	Introduction to Statistics	3
ENG 333	Communication for Science and Research (CP)	3
Hours		15

Spring Semester

AEC 420	Introduction to Fisheries Science (CP)	3
FW 373	Vertebrate Natural History (CP)	3
FW 411	Human Dimensions of Wildlife and Fisheries	3

GIS 280	Introduction to GIS	3
ENT 201	Insects and People (GEP Interdisciplinary Perspectives (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-interdisciplinary-perspectives/))	3

Hours **15**

Fourth Year**Fall Semester**

Quantitative Elective (p. 2)		3
GEP Interdisciplinary Perspectives (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-interdisciplinary-perspectives/)		2-3
Policy Elective (p. 2)		3
Aquatic Elective (CP) (p. 2)		3
FW 415	Professional Development in Fisheries, Wildlife, and Conservation Biology	1

Hours **12**

Spring Semester

AEC 441	Biology of Fishes (CP)	3
BIO Elective (p. 3)		3
Physical Science Elective (p. 3)		3
Technical Elective (CP) (p. 3)		3
GEP Elective (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/)		3

Hours **15**

Total Hours **120**

¹ A grade of C- or better is required.

² FW 492 External Learning Experience

Career Opportunities

Graduates are prepared for graduate school and entry-level professional positions in state and federal government agencies, non-profit organizations and private industry. Upon graduation, students are qualified to seek certification from The Wildlife Society or the American Fisheries Society.

Career Titles

Learn More About Careers

NCcareers.org (<https://nccareers.org/>)

Explore North Carolina's central online resource for students, parents, educators, job seekers and career counselors looking for high quality job and career information.

Occupational Outlook Handbook (<https://www.bls.gov/ooh/>)

Browse the Occupational Outlook Handbook published by the Bureau of Labor Statistics to view state and area employment and wage statistics. You can also identify and compare similar occupations based on your interests.

Career One Stop Videos (<https://www.careeronestop.org/>)

View videos that provide career details and information on wages, employment trends, skills needed, and more for any occupation. Sponsored by the U.S. Department of Labor.

Focus 2 Career Assessment (<https://careers.dasa.ncsu.edu/explore-careers/career-assessments/>) (NC State student email address required)

This career, major and education planning system is available to current NC State students to learn about how your values, interests, competencies, and personality fit into the NC State majors and your future career. An NC State email address is required to create an account. Make an appointment with your career counselor (<https://careers.dasa.ncsu.edu/about/hours-appointments/>) to discuss the results.

Focus 2 Apply Assessment (<https://www.focus2career.com/Portal/Register.cfm?SID=1929>) (Available to prospective students)

A career assessment tool designed to support prospective students in exploring and choosing the right major and career path based on your unique personality, interests, skills and values. Get started with Focus 2 Apply and see how it can guide your journey at NC State.

North Carolina Chapter of the Wildlife Society (<http://nctws.org/wordpress/>)

North Carolina Chapter of the American Fisheries Society (<https://nc.fisheries.org/>)