MAJOR IN FISH, WILDLIFE, AND CONSERVATION BIOLOGY, FISHERIES AND AQUATIC SCIENCES CONCENTRATION

The Fisheries and Aquatic Sciences concentration allows students to focus on a strong background in basic fishery ecology, management, and conservation, which includes an understanding of the linkages between land and water.

Students choosing the Fisheries and Aquatic Sciences concentration are also required to complete at least 160 hours of paid or non-paid employment related to fishery and aquatic biology.

Requirements
Effective Fall 2019
A minimum grade of C (2.000) is required in all biological, mathematical/statistical, physical science, fish, wildlife, and conservation biology, and natural resource courses used to meet graduation requirements for the fish, wildlife, and conservation biology major. The minimum applies to courses taken as substitutions for meeting these requirements. Students choosing the Fisheries and Aquatic Sciences concentration are also required to complete at least 80 clock hours in an internship experience related to fishery and aquatic biology.

Freshman

<table>
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<th>Course Code</th>
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<tbody>
<tr>
<td>CO 150</td>
<td>College Composition (GT-CO2)</td>
<td>1A</td>
<td>3</td>
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<tr>
<td>FW 104</td>
<td>Wildlife Ecology and Conservation (GT-SC2)</td>
<td>3A</td>
<td>3</td>
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<tr>
<td>FW 179</td>
<td>New-to-the-Major Seminar</td>
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</table>

Select one group from the following:

**Group A:**
- BZ 110: Principles of Animal Biology (GT-SC2) 3A
- BZ 111: Animal Biology Laboratory (GT-SC1) 3A
- BZ 120: Principles of Plant Biology (GT-SC1) 3A

**Group B:**
- LIFE 102: Attributes of Living Systems (GT-SC1) 3A
- LIFE 103: Biology of Organisms-Animals and Plants

Select one group of chemistry and physics courses from the following:

**Group A:**
- CHEM 107: Fundamentals of Chemistry (GT-SC2) 3A
- CHEM 108: Fundamentals of Chemistry Laboratory (GT-SC1) 3A
- PH 121: General Physics I (GT-SC1) 3A
- PH 122: General Physics II (GT-SC1) 3A

**Group B:**
- CHEM 111: General Chemistry I (GT-SC2) 3A
- CHEM 112: General Chemistry Lab I (GT-SC1) 3A
- CHEM 113: General Chemistry II
- CHEM 114: General Chemistry Lab II
- PH 110: Physics of Everyday Phenomena (GT-SC2) 3A
- PH 111: Physics of Everyday Phenomena Laboratory (GT-SC1) 3A

Arts and Humanities 3B 3

Total Credits 31-33

Sophomore

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<td>CHEM 246</td>
<td>Fundamentals of Organic Chemistry Laboratory</td>
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<td>FW 204</td>
<td>Introduction to Fishery Biology</td>
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<td>FW 260</td>
<td>Principles of Wildlife Management</td>
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<td>LIFE 320</td>
<td>Ecology</td>
<td></td>
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<tr>
<td>MATH 155 or 160: Calculus for Biological Scientists I (GT-MA1)</td>
<td>1B,1B</td>
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Major in Fish, Wildlife, and Conservation Biology, Fisheries and Aquatic Sciences Concentration

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<tr>
<td>STAT 301 or 307</td>
<td>Introduction to Statistical Methods</td>
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<td></td>
<td>Introduction to Biostatistics</td>
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<tr>
<td>Select one course from the following:</td>
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<tr>
<td>BZ 220</td>
<td>Introduction to Evolution</td>
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<tr>
<td>BZ 346&lt;sup&gt;2&lt;/sup&gt;</td>
<td>Population and Evolutionary Genetics</td>
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<tr>
<td>BZ 350</td>
<td>Molecular and General Genetics</td>
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<td>SOCR 330</td>
<td>Principles of Genetics</td>
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<td>Select one course from the following:</td>
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<tr>
<td>HONR 499&lt;sup&gt;3&lt;/sup&gt;</td>
<td>Senior Honors Thesis</td>
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<td>SPCM 200&lt;sup&gt;3&lt;/sup&gt;</td>
<td>Public Speaking</td>
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<td>Social and Behavioral Sciences</td>
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<td>Summer</td>
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<td>NR 220</td>
<td>Natural Resource Ecology and Measurements</td>
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<td>Junior</td>
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<tr>
<td>FW 300</td>
<td>Biology and Diversity of Fishes</td>
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<td>FW 301</td>
<td>Ichthyology Laboratory</td>
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<tr>
<td>FW 370</td>
<td>Design of Fish and Wildlife Projects</td>
<td>4A,4B</td>
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<td>FW 487&lt;sup&gt;4&lt;/sup&gt;</td>
<td>Internship</td>
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<td>Group A:</td>
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<tr>
<td>BSPM 302</td>
<td>Applied and General Entomology</td>
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<tr>
<td>BSPM 303A</td>
<td>Entomology Laboratory: General</td>
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<td>Group B:</td>
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<td>BSPM 445</td>
<td>Aquatic Insects</td>
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<td>Group C:</td>
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<td>BZ 212</td>
<td>Animal Biology-Invertebrates</td>
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<td>Select one course from the following:</td>
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<tr>
<td>BZ 214</td>
<td>Animal Biology-Vertebrates</td>
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<tr>
<td>BZ 329</td>
<td>Herpetology</td>
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<tr>
<td>BZ 330</td>
<td>Mammalogy</td>
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<td>BZ 335</td>
<td>Ornithology</td>
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<td>Select one Plant Biology course from the following:</td>
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<tr>
<td>BZ 223</td>
<td>Plant Identification</td>
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<td>BZ 325</td>
<td>Plant Systematics</td>
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<td>BZ 332</td>
<td>Introductory Phycology</td>
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<tr>
<td>BZ 450</td>
<td>Plant Ecology</td>
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<tr>
<td>F 310/RS 310</td>
<td>Forest and Rangeland Ecogeography</td>
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<tr>
<td>F 311</td>
<td>Forest Ecology</td>
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<tr>
<td>FW 430</td>
<td>Waterfowl Ecology and Management</td>
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<tr>
<td>FW 568/BZ 568</td>
<td>Sustaining River Ecosystems in Changing World</td>
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<tr>
<td>NR 326</td>
<td>Forest Vegetation Management</td>
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<td>Select one course from the following:</td>
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<td>CO 300</td>
<td>Writing Arguments (GT-CO3)</td>
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<td>CO 301A</td>
<td>Writing in the Disciplines: Arts and Humanities (GT-CO3)</td>
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<td>CO 301B</td>
<td>Writing in the Disciplines: Sciences (GT-CO3)</td>
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<td>CO 301C</td>
<td>Writing in the Disciplines: Social Sciences (GT-CO3)</td>
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<td>CO 301D</td>
<td>Writing in the Disciplines: Education (GT-CO3)</td>
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<td>Professional and Technical Communication (GT-CO3)</td>
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<td>Course</td>
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<tr>
<td>GEOL 120</td>
<td>Exploring Earth - Physical Geology (GT-SC2)</td>
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<tr>
<td>GEOL 121</td>
<td>Introductory Geology Laboratory (GT-SC1)</td>
<td>3A</td>
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<tr>
<td>GEOL 122</td>
<td>The Blue Planet - Geology of Our Environment (GT-SC2)</td>
<td>3A</td>
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<tr>
<td>GEOL 124</td>
<td>Geology of Natural Resources (GT-SC2)</td>
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<td>GEOL 150</td>
<td>Physical Geology for Scientists and Engineers</td>
<td>3A</td>
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<tr>
<td>GR 304/WR 304</td>
<td>Sustainable Watersheds</td>
<td>3A</td>
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<tr>
<td>NR 319</td>
<td>Geospatial Applications in Natural Resources</td>
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<tr>
<td>NR 322</td>
<td>Introduction to Geographic Information Systems</td>
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<td>SOC R 240</td>
<td>Introductory Soil Science</td>
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<tr>
<td>Historical Perspectives</td>
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**Senior**

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<tr>
<td>FW 401</td>
<td>Fishery Science</td>
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<td>Select one group not taken elsewhere from the following:</td>
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<td>Group A:</td>
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<tr>
<td>BZ 471</td>
<td>Stream Biology and Ecology</td>
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<td>BZ 472</td>
<td>Stream Biology and Ecology Laboratory</td>
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<td>Group B:</td>
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<td>BZ 474/ESS 474</td>
<td>Limnology</td>
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<td>Group C:</td>
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<td>FW 304</td>
<td>Conservation of Marine Megafauna</td>
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<td>Group D:</td>
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<td>FW 430</td>
<td>Waterfowl Ecology and Management</td>
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<tr>
<td>Group E:</td>
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<tr>
<td>FW 568/BZ 568</td>
<td>Sustaining River Ecosystems in Changing World</td>
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<td>Group F:</td>
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<td>NR 370</td>
<td>Coastal Environmental Ecology</td>
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<td>Select two courses from the following:</td>
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<tr>
<td>FW 400¹</td>
<td>Conservation of Fish in Aquatic Ecosystems</td>
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<td>FW 402</td>
<td>Fish Culture</td>
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<td>FW 405</td>
<td>Fish Physiology</td>
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<td>Select one Human Dimensions course not taken elsewhere from the following:</td>
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<tr>
<td>FW 472</td>
<td>Issues in Animal Conservation and Management</td>
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<tr>
<td>HIST 355²</td>
<td>American Environmental History</td>
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<td>NR 320</td>
<td>Natural Resources History and Policy</td>
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<td>NR 400</td>
<td>Public Communication in Natural Resources</td>
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<td>NRRT 330</td>
<td>Social Aspects of Natural Resource Management</td>
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<td>NRRT 400²</td>
<td>Environmental Governance</td>
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<td>NRRT 440²</td>
<td>Applications in Environmental Communication</td>
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<td>PHIL 320</td>
<td>Ethics of Sustainability</td>
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<td>PHIL 345</td>
<td>Environmental Ethics</td>
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<td>POLS 361</td>
<td>U.S. Environmental Politics and Policy</td>
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<td>SOC 320</td>
<td>Population-Natural Resources and Environment</td>
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<td>SOC 322</td>
<td>Introduction to Environmental Justice</td>
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<td>SOC 460</td>
<td>Society and Environment</td>
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<td>SOC 461</td>
<td>Water, Society, and Environment</td>
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<td>Arts and Humanities</td>
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<tr>
<td>Diversity and Global Awareness</td>
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<td>3E</td>
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<tr>
<td>Guided Electives⁶</td>
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</table>
Students taking this biology selection should choose a botany-related course in the department elective options to meet botany/plant course requirements for certain federal positions related to wildlife, fisheries, and/or conservation biology.

Students will need to obtain a registration override from the appropriate department to take this course.

Students in the Honors Track 1 program must take HONR 499.

Take 1 credit of FW 487 during the semester in which you are completing the 80 h work experience requirement.

Students selecting GR 304/WR 304 only need select three credits. Students selecting one of the geosciences lecture courses (GEOL 120, GEOL 122, GEOL 124) also need to take GEOL 121.

Guided Electives are courses intended to expand a student’s depth and breadth in wildlife biology and include any 300- or 400-level regular course with a BC, BMS, BSPM, CHEM, ESS, F, FW, GES, MATH, MIP, NR, NRRT, PH, RS, SOCR, STAT, or WR subject code (excluding courses ending in -80 to -99); other courses with prior approval by department and advisor. Courses may not double-count as Guided Electives and for other requirements in the major.

Select enough elective credits to bring the program total to 120, of which at least 42 must be upper-division (300- to 400-level).

Major Completion Map

Distinctive Requirements for Degree Program: The curriculum for the Fish, Wildlife and Conservation Biology major – Fisheries and Aquatic Sciences concentration assumes students enter college prepared to take calculus. Students who have not met the prerequisites for calculus, will be required to successfully complete the prerequisites in their first year. A minimum grade of C (2.000) is required in all biological, mathematical/ statistical, physical science, fish, wildlife, and conservation biology, and natural resource courses used to meet graduation requirements for the fish, wildlife, and conservation biology major. The minimum applies to courses taken as substitutions for meeting degree requirements. NR 220 is a summer course in which students reside at CSU’s Mountain Campus. Students must choose ONE of two CHEM + PH paths: (Path A) CHEM 107/CHEM 108 and PH 121/PH 122 OR (Path B) CHEM 111, CHEM 112, CHEM 113, CHEM 114 and PH 110/PH 111. Students must also choose ONE biology group A) BZ 110/BZ 111/BZ 120 or B) LIFE 102/LIFE 103. Students choosing the Fisheries and Aquatic Sciences concentration are also required to complete at least 80 clock hours in an internship experience related to fishery and aquatic biology. Students must sign up for 1 credit of FW 487 during the semester in which they are completing their internship or work experience requirement.
### Sophomore

#### Semester 3

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<tr>
<td>CHEM 245</td>
<td>Fundamentals of Organic Chemistry</td>
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<tr>
<td>CHEM 246</td>
<td>Fundamentals of Organic Chemistry Laboratory</td>
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Select one course from the following:

- BZ 220 Introduction to Evolution
- BZ 346 Population and Evolutionary Genetics
- BZ 350 Molecular and General Genetics
- SOCR 330 Principles of Genetics

Select one course from the following:

- MATH 155 Calculus for Biological Scientists I (GT-MA1) 1B
- MATH 160 Calculus for Physical Scientists I (GT-MA1) 1B

#### Total Credits

15-16

#### Semester 4

<table>
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<tr>
<td>FW 260</td>
<td>Principles of Wildlife Management</td>
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<tr>
<td>LIFE 320</td>
<td>Ecology</td>
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Select one course from the following:

- HONR 499 Senior Honors Thesis
- SPCM 200 Public Speaking

Select one course from the following:

- STAT 301 Introduction to Statistical Methods
- STAT 307 Introduction to Biostatistics

#### Social and Behavioral Sciences

3C

#### Total Credits

15

#### Semester 5

<table>
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<tr>
<td>NR 220</td>
<td>Natural Resource Ecology and Measurements</td>
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#### Total Credits

5

#### Junior

#### Semester 6

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<tr>
<td>FW 487</td>
<td>Internship</td>
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Select four credits from the following:

- GEOL 120 Exploring Earth - Physical Geology (GT-SC2) 3A
- GEOL 121 Introductory Geology Laboratory (GT-SC1) 3A
- GEOL 122 The Blue Planet - Geology of Our Environment (GT-SC2) 3A
- GEOL 124 Geology of Natural Resources (GT-SC2) 3A
- GEOL 150 Physical Geology for Scientists and Engineers 3A
- GR 304/305 Sustainable Watersheds 3A
- WR 304 Geospatial Applications in Natural Resources
- NR 319 Introduction to Geographic Information Systems

#### Total Credits

1
Major in Fish, Wildlife, and Conservation Biology, Fisheries and Aquatic Sciences Concentration

**Semester 6**

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<td>SOCR 240</td>
<td>Introductory Soil Science</td>
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<td>Select one course from the following:</td>
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<td>X 3</td>
<td>CO 300 Writing Arguments (GT-CO3)</td>
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<tr>
<td>X 2</td>
<td>CO 301A Writing in the Disciplines: Arts and Humanities (GT-CO3)</td>
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<tr>
<td>X 2</td>
<td>CO 301B Writing in the Disciplines: Sciences (GT-CO3)</td>
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<tr>
<td>X 2</td>
<td>CO 301C Writing in the Disciplines: Social Sciences (GT-CO3)</td>
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<td>X 2</td>
<td>CO 301D Writing in the Disciplines: Education (GT-CO3)</td>
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<td>X 2</td>
<td>JTC 300 Professional and Technical Communication (GT-CO3)</td>
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<td>Select one group from the following:</td>
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<td>X 4</td>
<td>BSPM 302 Applied and General Entomology</td>
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<td>Group A:</td>
<td>BSPM 303A Entomology Laboratory: General</td>
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<tr>
<td>Group B:</td>
<td>BSPM 445 Aquatic Insects</td>
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<td>Group C:</td>
<td>BZ 212 Animal Biology-Invertebrates</td>
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<td>Plant Biology Elective (See Department List on Concentration Requirements tab)</td>
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<td>STAT 301 or STAT 307, FW 260, and LIFE 320 must be completed by the end of Semester 6.</td>
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**Total Credits** | **15-16**

**Semester 7**

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<td>FW 300 (Spring only)</td>
<td>Biology and Diversity of Fishes</td>
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<td>FW 301</td>
<td>Ichthyology Laboratory</td>
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<td>FW 370</td>
<td>Design of Fish and Wildlife Projects</td>
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<td>Select one course from the following:</td>
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<td>3-4</td>
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<tr>
<td>BZ 214</td>
<td>Animal Biology-Vertebrates</td>
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<tr>
<td>BZ 329</td>
<td>Herpetology</td>
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<td>BZ 330</td>
<td>Mammalogy</td>
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<td>BZ 335</td>
<td>Ornithology</td>
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<tr>
<td>Historical Perspectives</td>
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<td>3D</td>
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</table>

**Total Credits** | **12-13**

**Senior**

**Semester 8**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>FW 401 (Fall only)</td>
<td>Fishery Science</td>
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<tr>
<td>Select one group from the following:</td>
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<tr>
<td>Group A:</td>
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<tr>
<td>BZ 471</td>
<td>Stream Biology and Ecology</td>
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<td>BZ 472</td>
<td>Stream Biology and Ecology Laboratory</td>
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<td>Group B:</td>
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<td>BZ 474/ ESS 474</td>
<td>Limnology</td>
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<td>Group C:</td>
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<tr>
<td>FW 304</td>
<td>Conservation of Marine Megafauna</td>
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<td>Group D:</td>
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<tr>
<td>FW 430</td>
<td>Waterfowl Ecology and Management</td>
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<td>Group E:</td>
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<tr>
<td>FW 568/ BZ 568</td>
<td>Sustaining River Ecosystems in Changing World</td>
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<td>Group F:</td>
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<td>NR 370</td>
<td>Coastal Environmental Ecology</td>
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**Total Credits** | **12-13**
Select one course from the following:

- FW 400  Conservation of Fish in Aquatic Ecosystems
- FW 402  Fish Culture
  (Spring only)
- FW 405  Fish Physiology
  (Spring of odd years only)

Human Dimensions Elective (See Department List on Concentration Requirements tab) 3

BSPM 302 /BSPM 303A, or BSPM 445, or BZ 212 must be completed by the end of Semester 8.

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<th>Total Credits</th>
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**Semester 9**

<table>
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<th>Critical</th>
<th>Recommended</th>
<th>AUCC</th>
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<td>3-4</td>
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<tr>
<td>FW 400 (Fall only) Conservation of Fish in Aquatic Ecosystems</td>
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<td>FW 402 Fish Culture</td>
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<tr>
<td>FW 405 (Odd years only) Fish Physiology</td>
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Arts and Humanities | X | 3B | 3

Diversity and Global Awareness | X | 3E | 3

Guided Elective (See Department List on Concentration Requirements tab.) | X | | 3

Electives | X | | 0-3

The benchmark courses for the 9th semester are the remaining courses in the entire program of study.

<table>
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<tr>
<th>Total Credits</th>
<th>12-15</th>
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Program Total Credits: 120