Environmental Science & Management

Bachelor of Science degree with a major in Environmental Science & Management — with concentrations in:
- Ecological Restoration
- Energy & Climate
- Environmental Education & Interpretation
- Environmental Planning & Policy
- Geospatial Science
- Natural Resources Management

Minors
- Ecological Restoration
- Environmental Education & Interpretation
- Environmental & Natural Resources Planning
- Environmental Policy
- Natural Resources
- Natural Resources Recreation

Certificates of Study
- Environmental Education & Interpretation
- Environmental & Natural Resources Planning
- Geospatial Science
- Natural Resources Policy & Administration

Master of Science degree in Natural Resources — with a concentration in Environmental Science & Management

Department Chair
Steven R. Martin, Ph.D.

Environmental Science & Management
Natural Resources Building 200
707-826-4147
environment.humboldt.edu

Associated Faculty & Advisors
Natalie Arroyo, Gillian Black, Craig Benson, Kerry Byrne, Jeff Dink, Yvonne Everett, Kevin Fingerman, James Graham, David Gwienzi, Jennifer Kalt, Buddhika Madurapperuma, Nick Malloy, Jennifer Marlow, Steven Martin, Judith Mayer, Melanie McCavour, Jack Murphy, Alison O'Dowd, Jennifer Ortega, Laurie Richmond, Amy Rock, Roxann Schroeder, Jennifer Tarton, William Trush, Julie Van Sickle, Casey Vaughn, Tashina Welliver

The Program
Students completing this program will have demonstrated:
- the knowledge and skills to understand, analyze, address and manage the consequences of human actions on the physical, biological, and cultural world.
- the knowledge and skills to seek out the information and resources necessary to understand complex environmental issues.
- the writing, speaking, and electronic communication skills needed to communicate with the public and professionals concerning the environmental sciences.
- the ability to apply critical thinking skills as the basis for decision making and sound value judgments.

Graduates should find work with state, federal, and local governments, nonprofit conservation organizations, private sector consulting firms (particularly those dealing with environmental impact analysis, environmental planning, wetlands delineation, environmental restoration, geospatial applications in natural resources, energy technology and planning, and natural resource management), or go on to professional and graduate schools to study ecology, environmental law, environmental planning, human dimensions of natural resources, outdoor recreation management, geospatial science, natural resources management, wilderness management, public administration, or environmental policy.

Preparation
High school students need strong academic preparation in math, writing, and the sciences.

Requirements for the Major
For a description of degree requirements to be fulfilled in addition to those listed below for the major, please see “The Bachelor’s Degree” section of the catalog, pp. 67-82.

Unit Requirements

Core units: 24
Concentration units: 39-54
Total units in the major: 73-78
Total units required for the degree: 120

Special Grade Requirement
Complete all courses in the major with a grade of C- or better.

Core Courses (24 units)
- ESM 105 [3] Environmental Science
- ESM 111 [1] Environmental Science Seminar

Concentrations
Complete one of the following concentrations to fulfill the requirements of the major:

Ecological Restoration Concentration (47 units)

Lower Division
- SOIL 260 [3] Intro to Soil Science

Upper Division
- BOT 350 [4] Plant Taxonomy
- ESM 435 [2] Grant Writing
- FOR 431 [3] Forest Restoration, or

Complete one upper division course approved by your advisor; from BOT, ESM, FISH, FOR, GSP, RRS, SOIL, WSHD, or WLD. [Prerequisites may be required for some courses, depending on choice.]

Note: 24 units may double-count toward GE requirements.

‡ Course requires one or more prerequisites that are not required elsewhere in the major.
<table>
<thead>
<tr>
<th>Energy &amp; Climate Concentration (54 units)</th>
<th>Lower Division</th>
<th>Upper Division</th>
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<tr>
<td>BIOL 105 (4) Principles of Biology, or</td>
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<td>BOT 105 (4) General Botany</td>
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<tr>
<td>CHEM 107 (4) Fundamentals of Chemistry **</td>
<td>CHEM 109 &amp; CHEM 110 may be substituted for CHEM 107.</td>
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<td>ECDN 104 (3) Contemporary Topics in</td>
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<tr>
<td>MATH 1051 (3) Calculus for the Biological</td>
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<td>Sciences &amp; Natural Resources</td>
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<td>PHYX 106 (4) College Physics: Mechanics &amp;</td>
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<td>Modern Physics</td>
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**Energy & Climate Concentration (54 units)**

**Lower Division**

- BIOL 105 (4) Principles of Biology, or
- BOT 105 (4) General Botany
- CHEM 107 (4) Fundamentals of Chemistry **
- ECDN 104 (3) Contemporary Topics in Economics
- MATH 1051 (3) Calculus for the Biological Sciences & Natural Resources
- PHYX 106 (4) College Physics: Mechanics & Heat
- PHYX 107 (4) College Physics: Electromagnetism & Modern Physics

**Upper Division**

- ECDN 450 (4) Energy Economics & Policy
- ENGR 305 (3) Appropriate Technology
- ENGR 371 (3) Energy Systems & Technology
- ESM 435 (2) Grant Proposal Writing
- GSP 270 (3) Geographic Information Science (GIS)
- GEDG 301 (3) International Environmental Issues & Globalization

Complete two climate science courses:
- CHEM 370 (3) Earth System Chemistry
- OCN 420 (3) Oceans and Climate
- WSHD 458 (3) Climate Change & Land Use

Complete two tools courses:
- ECDN 423 (3) Environmental & Natural Resource Economics
- ESM 309B (3) Environmental Communication
- ESM 435 (2) Grant Proposal Writing
- GSP 270 (3) Geographic Information Science (GIS)
- GEDG 301 (3) International Environmental Issues & Globalization

**NOTE:** 24 units may double-count toward GE requirements.

### Environmental Education & Interpretation Concentration (48 units)

**Lower Division**

- BIOL 105 (4) Principles of Biology, or
- BOT 105 (4) General Botany
- CHEM 107 (4) Fundamentals of Chemistry **
- ESM 210 (3) Public Land Use Policies & Management
- ESM 215 (3) Natural Resources & Recreation
- SOIL 260 (3) Intro to Soil Science
- GSP 270 (3) Geographic Information Science (GIS)
- FOR 374 (3) Wilderness Area Management
- ESM 415 (3) Recreation & Park Planning (alternate years)

**Upper Division**

- ESM 210 (3) Public Land Use Policies & Management
- ESM 215 (3) Natural Resources & Recreation
- SOIL 260 (3) Intro to Soil Science
- GSP 270 (3) Geographic Information Science (GIS)
- FOR 374 (3) Wilderness Area Management
- ESM 415 (3) Recreation & Park Planning (alternate years)

**Environmental Planning & Policy Concentration (45-47 units)**

**Lower Division**

- BOT 105 (4) General Botany
- CHEM 107 (4) Fundamentals of Chemistry **
- ESM 210 (3) Public Land Use Policies & Management
- GSP 270 (3) Geographic Information Science (GIS)

**Upper Division**

- ESM 365 (3) Local Government Planning
- ECON 423 (3) Environmental & Natural Resource Economics
- ESM 425 (3) Environmental Impact Assessment
- ESM 435 (2) Grant Proposal Writing
- ESM 460 (3) Environmental Planning for Public Lands & Rural Communities, or
- ESM 482 (2) Internship, or
- ESM 499 (2) Directed Study

Complete one skills course:
- ART 340 (3) Graphic Design II
- ART 356 (3) Museum & Gallery Practices
- ESM 309B (3) Environmental Communication
- ESM 425 (3) Environmental Impact Assessment
- GSP 270 (3) Geographic Information Science (GIS)

Plus one upper division natural resources management course (3 units), approved by advisor, from FISH, FOR, ESM, RRS, SOIL, WSHD, WLDF.

**NOTE:** 24 units may double-count toward GE requirements.

### Environmental & Natural Resources Recreation Concentration (45 units)

**Lower Division**

- BIOL 105 (4) Principles of Biology, or
- BOT 105 (4) General Botany
- CHEM 107 (4) Fundamentals of Chemistry **
- ESM 210 (3) Public Land Use Policies & Management
- ESM 215 (3) Natural Resources & Recreation
- SOIL 260 (3) Intro to Soil Science
- GSP 270 (3) Geographic Information Science (GIS)
- FOR 374 (3) Wilderness Area Management
- ESM 415 (3) Recreation & Park Planning (alternate years)

**Upper Division**

- ESM 360 (3) Intro to Environmental Planning Methods
- ESM 365 (3) Local Government Planning
- ECON 423 (3) Environmental & Natural Resource Economics
- ESM 425 (3) Environmental Impact Assessment
- ESM 435 (2) Grant Proposal Writing
- ESM 460 (3) Environmental Planning for Public Lands & Rural Communities, or
- ESM 462 (3) Coastal & Marine Planning

‡ Course requires one or more prerequisites that are not required in the major.

* *CHEM 109 & CHEM 110 may be substituted for CHEM 107.*
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GSP 410 (3) Geospatial Capstone
GSP 425 (3) Environmental Impact Assessment
GSP 435 (2) Grant Proposal Writing

Complete one natural resources depth or course approved by advisor; minimum 3 units:

GSP 360 (3) Intro to Environmental Planning Methods
GSP 430 (3) Natural Resource Mgmt. in Protected Areas
FISH 220 (3) Water Resources & Conservation
FISH 260 (3) Fish Conservation & Mgmt.
FISH 300 (3) Intro to Fishery Biology
FOR 302 (3) Forest Ecosystems & People
FOR 307 (3) California’s Forests & Woodlands

Complete two upper division policy and management courses, chosen from a list of approved courses provided by your advisor, from ENGR, FISH, FOR, GEOG, NAS, PHIL, PSCI, RRS, SOIL, WSHD, WLD. (Prerequisites may be required for some courses, depending on choice.)

NOTE: 24 units may double-count toward GE requirements.

Geospatial Science Concentration (39 units)

Lower Division

GEOG 106 (3) Physical Geography
GSP 216 (3) Intro to Remote Sensing
GSP 270 (3) Geographic Information Science (GIS)

Upper Division

GSP 316 (4) Cartography
GSP 318 (3) Geospatial Programming I
GSP 326 (3) Intermediate Remote Sensing
GSP 330 (3) Mobile Mapping
GSP 370 (3) Intermediate GIS
GSP 418 (3) Geospatial Programming II, or
GSP 436 (3) Advanced Remote Sensing, or
GSP 470 (3) Advanced Geospatial Analysis & Modeling

NOTE: 27 units may double-count toward GE requirements.

Environmental Education & Interpretation Minor

Total units required for the minor: 19

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For complete one course from the following:

ECON 423 (3) Environmental & Natural Resource Economics
NAS 332 (3) Environmental Justice
PSCI 317 (4) Public Policy Process
PSCI 352 (4) Water Politics
PSCI 364 (4) Technology & Development
PSCI 373 (4) Politics of Sustainability
PSCI 412 (4) Legal Research
WSHD 430 (3) Water Rights/Water Law

Environmental Policy Minor

Total units required for the minor: 18-19

ECON 423 (3) Environmental & Natural Resource Economics
NAS 332 (3) Environmental Justice
PSCI 317 (4) Public Policy Process
PSCI 352 (4) Water Politics
PSCI 364 (4) Technology & Development
PSCI 373 (4) Politics of Sustainability
PSCI 412 (4) Legal Research
WSHD 430 (3) Water Rights/Water Law
Natural Resources Minor

Total units required for the minor: 19

BIOL 105 (4) Principles of Biology
ESM 105 (3) Natural Resource Conservation
SOIL 260 (3) Introduction to Soil Science

At least three courses from the following (at least 6 units must be 300 or above):

ESM 210 (3) Public Land Use Policies & Management
ESM 215 (3) Natural Resources & Recreation
ESM 305 (3) Local Government Planning
FISH 300 (3) Introduction to Fishery Biology
FOR 315 (3) Forest Management
FOR 374 (3) Wilderness Area Mgmt.
OCN 301 (3) Marine Ecosystems — Human Impact
OCN 304 (3) Resources of the Sea
RRS 306 (3) Wildland Resource Principles
WLDF 301 (3) Principles of Wildlife Management

Natural Resources Recreation Minor

Total units required for the minor: 17-18

ESM 210 (3) Public Land Use Policies & Management
ESM 215 (3) Natural Resources & Recreation
ESM 305 (3) Environmental Conflict Resolution, or
ESM 309B (3) Environmental Communication
FOR 374 (3) Wilderness Area Mgmt.
ESM 415 (3) Recreation & Park Planning, or
ESM 440 (2) Managing Recreation Visitors
ESM 430 (3) NR Management in Protected Areas

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