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 Recreation

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 Dunk, Yvonne Everett, Kevin Fingerprint, James Graham, David Gwenzi, Jennifer Katt, 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, Tashina Welliver

The Program
Students completing this program will have demonstrated:
- the ability to apply science to understanding ecosystems and natural resources
- the ability to understand the policy and social implications of environmental issues.
- 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. B7-B8., and “The Master’s Degree” section of the catalog, pp. B3-B4.

Complete all courses in the major with a C- or better.

Core Courses (24 units)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESM 105</td>
<td>(3) Natural Resource Conservation</td>
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<tr>
<td>ESM 111</td>
<td>(1) Environmental Science Seminar</td>
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<tr>
<td>GSP 101</td>
<td>(2) Geospatial Concepts and</td>
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<tr>
<td>GSP 101L</td>
<td>(1) Geospatial Concepts Lab</td>
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<tr>
<td>STAT 109†</td>
<td>(4) Introductory Biostatistics</td>
</tr>
<tr>
<td>ESM 230</td>
<td>(3) Environmental Methods</td>
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<tr>
<td>ESM 303</td>
<td>(4) Applied Natural History &amp; Ecology</td>
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</table>

Select one of the following concentrations:

Ecological Restoration Concentration
Core courses plus:

Lower Division
- BIOL 105 (4) Principles of Biology
- BOT 105 (4) General Botany
- CHEM 107 (4) Fundamentals of Chemistry
- GSP 270 (3) Geographic Information Science (GIS)
- SOIL 260 (3) Intro to Soil Science

Upper Division
- BOT 350 (4) Plant Taxonomy
- ESM 355 (3) Principles of Ecological Restoration
- ESM 425 (3) Environmental Impact Assessment
- ESM 435 (2) Grant Writing
- ESM 455 (4) Applied Ecological Restoration
- FOR 315 (3) Forest Management and
- FOR 431 (3) Forest Restoration, or
- RRS 306 (3) Rangeland Resource Principles and
- RRS 430 (3) Wildland Restoration & Development
- WSHD 310 (4) Hydrology & Watershed Management

Take one upper division course approved by your advisor; from BOT, ESM, FISH, FOR, GEOEL, GSP, RRS, SOIL, WSHD, or WLDF. (Prerequisites may be required for some courses, depending on choice.)

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

Energy & Climate Concentration
Core courses plus:

Lower Division
- BIOL 105 (4) Principles of Biology, or
- BOT 105 (4) General Botany
- CHEM 107 (4) Fundamentals of Chemistry **

† Course requires one or more prerequisites that are not required elsewhere in the major.
Upper Division

**ECON 450** (4) Energy Economics & Climate Policy

**ENGR 305** (3) Appropriate Technology

**ENGR 371** (3) Energy Systems & Technology

**ESM 370** (3) Energy, Technology & Society

**ESM 411** (3) Sustainable Campus

**ESM 425** (3) Environmental Impact Assessment

**Take two climate science courses:**

**CHEM 370** (3) Earth System Chemistry

**OCN 420** (3) Oceans and Climate

**WSHD 458** (3) Climate Change & Land Use

**Take two tools courses:**

**ECON 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

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**Take 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)

**REC 330** (3) Adventure Theory & Practice

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

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**Environmental Education & Interpretation Concentration**

**Core courses plus:**

**BIOL 105** (4) Principles of Biology, or **BOT 105** (4) General Botany

**CHEM 107** (4) General Chemistry

**ECON 423** (3) Environmental & Natural Resource Economics

**ECON 210** (3) Public Land Use Policies & Management

**ECON 215** (3) Natural Resources & Recreation

**ECON 253** (3) Interpretive Computer Graphics

**CD 209** (3) Middle Childhood Development

**ESM 350** (3) Fundamentals of Environmental Education & Interpretation

**ESM 351** (1) Environmental Interpretation Field Trip

**ESM 353** (3) Environmental Education & Interpretation Graphics

**ESM 430** (3) NR Management in Protected Areas

**ESM 450** (3) Applied Environmental Education & Interpretation

**ESM 453** (4) Environmental Education & Interpretation Practicum (capstone)

**ECON 482** (2) Internship, or **ECON 499** (2) Directed Study

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Take 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)

**REC 330** (3) Adventure Theory & Practice

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

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**Environmental Planning & Policy Concentration**

**Core courses plus:**

**BOT 105** (4) General Botany

**CHEM 107** (4) General Chemistry

**ECON 423** (3) Environmental & Natural Resource Economics

**ECON 210** (3) Public Land Use Policies & Management

**GSP 270** (3) Geographic Information Science (GIS)

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**Lower Division**

**BOT 105** (4) General Botany

**CHEM 107** (4) General Chemistry

**ECON 423** (3) Environmental & Natural Resource Economics

**ESM 210** (3) Public Land Use Policies & Management

**GSP 270** (3) Geographic Information Science (GIS)

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**Upper Division**

**ECON 360** (3) Intro to Environmental Planning Methods

**ECON 365** (3) Local Government Planning

**ECON 423** (3) Environmental & Natural Resource Economics

**ECON 210** (3) Public Land Use Policies & Management

**ECON 215** (3) Natural Resources & Recreation

**ECON 253** (3) Interpretive Computer Graphics

**CD 209** (3) Middle Childhood Development

**ESM 350** (3) Fundamentals of Environmental Education & Interpretation

**ESM 351** (1) Environmental Interpretation Field Trip

**ESM 353** (3) Environmental Education & Interpretation Graphics

**ESM 430** (3) NR Management in Protected Areas

**ESM 450** (3) Applied Environmental Education & Interpretation

**ESM 453** (4) Environmental Education & Interpretation Practicum (capstone)

**ECON 482** (2) Internship, or **ECON 499** (2) Directed Study

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Take 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)

**REC 330** (3) Adventure Theory & Practice

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

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**Environmental Science & Management**
Take one ecology & management course:
- ESM 355 (3) Principles of Ecological Restoration
- ESM 370 (3) Energy Technology & Society
- ESM 420 (3) Ecosystem Analysis
- ESM 430 (3) Natural Resource Management in Protected Areas
- FOR 321 (3) Fire Ecology
- FOR 374 (3) Wilderness Area Management
- FISH 476† (3) Ecology of Running Waters
- WLDF 460† (3) Conservation Biology

Take one natural resources depth or course approved by advisor, minimum three units:
- ESM 360 (3) Intro to Environmental Planning Methods
- ESM 430 (3) Natural Resource Mgmt. in Protected Areas
- FISH 220 (3) Water Resources & Conservation
- FISH 260 (3) Fish Conservation & Mgmt.
- FOR 302 (3) Forest Ecosystems & People
- FOR 307 (3) California’s Forests & Woodlands
- BOT 105 (4) General Botany
- GEOL 300‡ (3) Geology of California
- GEOL 303 (3) Earth Resources & Global Change
- GEOL 306‡ (3) General Geomorphology
- GEOL 308 (3) Natural Disasters
- OCN 301 (3) Marine Ecosystems — Human Impact
- OCN 304 (3) Resources of the Sea
- RRS 306 (3) Wildland Resource Principles
- WSHD 310 (4) Hydrology & Watershed Management
- WSHD 333 (3) Wildland Water Quality
- WLDF 301 (3) Principles of Wildlife Management
- WLDF 468 (3) Spatial Wildlife Ecology

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

Geospatial Science Concentration
Core courses plus:
- 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

ESM 410 (3) Environmental Science Practicum (capstone)
ESM 425 (3) Environmental Impact Assessment
ESM 435 (2) Grant Proposal Writing
Take one natural resources depth or course approved by advisor, minimum three units:
- ESM 360 (3) Intro to Environmental Planning Methods
- ESM 430 (3) Natural Resource Mgmt. in Protected Areas
- FISH 220 (3) Water Resources & Conservation
- FISH 260 (3) Fish Conservation & Mgmt.
- FOR 302 (3) Forest Ecosystems & People
- FOR 307 (3) California’s Forests & Woodlands
- GEOL 300‡ (3) Geology of California
- GEOL 303 (3) Earth Resources & Global Change
- GEOL 306‡ (3) General Geomorphology
- GEOL 308 (3) Natural Disasters
- OCN 301 (3) Marine Ecosystems — Human Impact
- OCN 304 (3) Resources of the Sea
- RRS 306 (3) Wildland Resource Principles
- WSHD 310 (4) Hydrology & Watershed Management
- WSHD 333 (3) Wildland Water Quality
- WLDF 301 (3) Principles of Wildlife Management
- WLDF 468 (3) Spatial Wildlife Ecology

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

Requirements for the minors:
Complete all courses in the minor with a C- or better.

Ecological Restoration Minor
- BOT 105 (4) General Botany
- SOIL 260 (3) Intro to Soil Science
- ESM 355 (3) Principles of Ecological Restoration

Plus take either:
- FOR 315 (3) Forest Management and
- FOR 315 (3) Forest Management or
- FOR 431 (3) Forest Restoration
- RRS 306 (3) Rangeland Resource Principles and
- RRS 430 (3) Wildland Restoration & Development

Environmental Education & Interpretation Minor
- ESM 215 (3) Natural Resources & Recreation
- ESM 253 (3) Interpretive Computer Graphics [or equivalent]
- ESM 350/351 (3/1) Fundamentals of Environmental Education & Interpretation, and Field Trip
- ESM 353 (3) Environmental Education & Interpretation Graphics
- ESM 430 (3) NR Management in Protected Areas
- ESM 450 (3) Applied Environmental Education & Interpretation

Environmental & Natural Resources Planning Minor
- GEOG 106 (3) Physical Geography
- ESM 105 (3) Natural Resource Conservation
- ESM 210 (3) Public Land Use Policies & Management
- ESM 360 (3) Intro to Environmental Planning Methods

Plus two courses from the following:
- ESM 325 (3) Environmental Law & Regulation
- ESM 365 (3) Local Government Planning
- ESM 425 (3) Environmental Impact Assessment

Environmental Policy Minor
- ESM 105 (3) Natural Resources Conservation
- ESM 210 (3) Public Land Use Policies & Management
- ESM 325 (3) Environmental Law & Regulation
- ESM 425 (3) Environmental Impact Assessment
- PSCI 306 (3) Environmental Politics

Take 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

1 Course requires one or more prerequisites that are not required in the major.
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<td>BIOL 105 (4) Principles of Biology</td>
<td>ESM 210 (3) Public Land Use Policies &amp; Management</td>
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<td>ESM 105 (3) Natural Resource Conservation</td>
<td>ESM 215 (3) Natural Resources &amp; Recreation</td>
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<td>SOIL 260 (3) Introduction to Soil Science</td>
<td>ESM 305 (3) Environmental Conflict Resolution, or ESM 309B (3) Environmental Communication</td>
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<td>ESM 210 (3) Public Land Use Policies &amp; Management</td>
<td>FOR 374 (3) Wilderness Area Mgmt.</td>
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<td>ESM 215 (3) Natural Resources &amp; Recreation</td>
<td>ESM 415 (3) Recreation &amp; Park Planning, or ESM 440 (2) Managing Recreation Visitors</td>
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<td>ESM 365 (3) Local Government Planning</td>
<td>ESM 430 (3) NR Management in Protected Areas</td>
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<td>FISH 300 (3) Introduction to Fishery Biology</td>
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