



**Oregon State**  
**University**

ENVIRONMENTAL SCIENCES  
GRADUATE PROGRAM (ESGP) AREA  
OF CONCENTRATION IN  
NATURAL RESOURCES

PURPOSE

Natural Resources is the scientific discipline that concerns the relationship between natural and managed population systems, human systems and the environment they all share. The Area of Concentration in Natural Resources is developed to integrate the sciences of biology, ecology and management with the study of human systems: sociology, economics, policy, ethics and communication. Program goals are to stimulate multidisciplinary research among the disciplines, and to promote responsible application of information toward resolution of natural resource problems. These relationships include studies at the species, sub- species, biological and human community, and ecosystem levels of scale. It also includes interactions of organisms and the human systems of production and economics, as well as the consequences of use.

The Natural Resources track is intended for students with strong natural sciences, management, or social sciences backgrounds and who wish to integrate their study to inform natural resource/environmental problems. Students must have the necessary course work in biology, statistics, social science, physical science, and mathematics to enroll in graduate courses that constitute the Area of Concentration in Natural Resources.

PROGRAM OF STUDY

Course work is divided into 5 categories, including ESGP Core courses, Methods and Numerical Skills courses, Natural Resources courses, Elective courses, and Thesis or Project. Total credits required are a minimum of 45 Cr for the M.S. and M.A. degrees and 108 Cr for the Ph.D. degree. Typical Programs of Study will include minimum credits as follow:

Subject Area	M.S. & M.A. Degrees	Ph.D. Degree
ENSC Core Courses	6 Cr	6 Cr
Methods and Numerical Skills	6-8 Cr	9-10 Cr
Science Focal Area Courses	15 Cr min.	30 Cr min.
Electives	11 Cr max.	26 Cr max.
Thesis or Project	6 Cr	36 Cr
Total	45 Cr	108 Cr

### ESGP CORE COURSES

ENSC 515 Environmental Perspectives and Methods (3) (Fall term)  
 ENSC 520 Environmental Analysis (3) (Winter term)

### ETHICS

CITI Responsible Conduct for Research (free training through OSU) or equivalent (0 Cr).  
 Instructions are found at this link: <https://gradschool.oregonstate.edu/environmental-sciences/student-handbook-environmental-science-graduate-program>

### METHODS AND NUMERICAL SKILLS

**6-8 Cr** for the M.S. and M.A. degrees and **9 Cr minimum** for the Ph.D. degree. These courses are to ensure students have sufficient skills in research methods including mathematics, statistics, and computer science. Courses are to be selected by the student, advisor, and advising committee from the list below and from other offerings. **The courses below are a suggested partial listing and are to be selected by consensus of the graduate advisor, advising committee, and student.**

Additional online courses may be included in the program of study that are not listed below. Search the Schedule of Classes by keyword or prefix for additional course options:

[https://classes.oregonstate.edu/?keyword=ensc&srcdb=999999&coursetype=coursetype\\_o2&camp=DB,DI](https://classes.oregonstate.edu/?keyword=ensc&srcdb=999999&coursetype=coursetype_o2&camp=DB,DI)

ENSC 511 Global Environmental Change: Using Data to Inform Decisions (3)
BOT 540 Field Methods in Plant Ecology (4)
BOT 570 Community Structure and Analysis (5)
CROP 590 Experimental Design in Agriculture (4)
FES 522 Research Methods Social Science (4)
FES 523 Quantitative Analysis in Social Science (4)
FES 524 Natural Resources Data Analysis (4)
FW 533 Population Dynamics for Conservation (4)
GEOG 552 Environmental Assessment (3)

GEOG 580 Remote Sensing I: Principles and Applications (4)
GEOG 560, 561, 562 GISCIENCE I, II, III: Geographic Information Science (4)
GEOG 581 Satellite Image Analysis (4)
GEOG 565 Spatio-Temporal Variation in Ecology and Earth Science (4)
GEOG 566 Advanced Spatial Statistics (4)
PPOL 522 Quantitative Methods for Public Policy Analysis (4)
PPOL 523 Qualitative Research Methods (4)
ST 511, 512, 513 Methods of Data Analysis (4 each)
ST 515 Design and Analysis of Planned Experiments (3)
ST 531 Sampling Methods (3)

### SCIENCE FOCAL AREA COURSES

**15 Cr Minimum** for the M.S. and M.A. degree and **30 Cr Minimum** for the Ph.D. degree. Focal area Courses are intended to develop basic knowledge in Natural Resources in the area of Biology, Ecology, Sustainability, and Management or Sociology, Policy, Ethics, and Communications. The courses below are a suggested partial listing and are to be selected by consensus of the graduate advisor, advising committee, and student. Additional online courses may be included in the program of study that are not listed below.

### BIOLOGY, ECOLOGY AND MANAGEMENT

BOT 570 Community Analysis and Structure (4)
BOT 561 Mycology (5)
BOT 588 Environmental Physiology of Plants (3)
BOT 668 Plant Disease Dynamics (4)
FES 540 Wildland Fire Ecology (3)
FES 545 Ecological Restoration (4)
FES 586 Public Lands Policy and Management (3)
FES 550 Trophic Cascades (2)
FOR 536 Wildland Fire Science and Management (4)
FOR 543 Silvicultural Practices (5)
FOR 550 Sustainable Forest Practices (3)
FW 535 Wildlife in Agricultural Ecosystems (3)
FW 554 Fishery Biology (4)
FW 556 Freshwater Ecology and Conservation (5)
FW 558 Mammal Conservation and Management (4)
FW 564 Marine Conservation Biology (3)
FW 573 Fish Ecology and Conservation (4)
FW 580 Stream Ecology (3)
RNG 521 Rangeland Restoration and Management (4)

RNG 555 Riparian Ecohydrology and Management (4)
RNG 557 Habitat Analysis I: Habitat Use and Movement (3)
SOIL 545 Environmental Soil Chemistry (3)
SOIL 555 Biology of Soil Ecosystems (4)
IB 523 Environmental Physiology (3)
IB 581 Biogeography (3)
IB 583 Population Biology (3)
IB 594 Community Ecology (5)

#### SOCIOLOGY, ECONOMICS, POLICY, ETHICS AND COMMUNICATION

AEC 532 Environmental Law (4)
AEC 550 Environmental and Natural Resource Economics (4)
AEC 651 Advanced Natural Resource Economics (4)
AEC 653 Empirical Environmental and Resource Economics (3)
ANTH 581 Natural Resources and Community Values (4)
COMM 540 Theories of Conflict and Conflict Management (3)
GEOG 512 Social-Ecological Systems (3)
GEOG 551 Planning Principles and Practices for Resilient Communities (4)
GEOG 553 Effective Communication of Environmental Change Science (3)
TRAL 593 Environmental Interpretation (4)
PHL 543 World Views and Environmental Values (3)
PPOL 544 Collaborative Governance (4)
PPOL 546 The Politics and Law of United States Coastal Governance (4)
PS 575 Environmental Politics and Policy (4)
PS 577 International Environmental Politics and Policy (4)
SOC 580 Environmental Sociology (4)
SOC 581 Society and Natural Resources (4)

#### ELECTIVE COURSES

**11 Cr maximum** for the M.S. and M.A. degrees and **26 Cr maximum** for the Ph.D. degree. Students will work with their graduate advisor and committee to select elective courses to develop necessary background, and to add breadth and depth to the student's Program of Study. Search the Schedule of Classes by keyword or prefix for additional course options: [https://classes.oregonstate.edu/?keyword=ensc&srcdb=999999&coursetype=coursetype\\_02&camp=DB,DI](https://classes.oregonstate.edu/?keyword=ensc&srcdb=999999&coursetype=coursetype_02&camp=DB,DI)

#### THESIS

**6 Cr** for the M.S. and M.A. degrees and **36 Cr** for the Ph.D. degree.