

Natural Resources Management

With increasing human pressure and a growing need to balance competing demands, our world needs new and better ways to manage society's impacts on the environment. The Natural Resources Management program prepares students for challenging careers requiring the sustainability perspective and global social perspective necessary for examining and solving complex natural resources management problems. Our goal is the highest and best societal uses of natural resources while maintaining the integrity of life-sustaining socio-ecological systems. Career opportunities abound in federal, state and local government, the private sector, non-profit conservation and environmental organizations, as well as higher education and research.

An interdisciplinary major in NRM leads to a Bachelor of Science (B.S.) degree. Students benefit from faculty engagement from the various colleges across the university in the coordination of the program, classroom teaching and advising.

During the first four semesters of the NRM program, students complete a broad foundation of core courses in the social, biological, and physical sciences. The second half of the program offers students the opportunity to focus on a specific area of interest (emphasis). NRM offers six emphasis areas, each allowing students the flexibility to select courses for specialized career preparation.

- **Biotic Resources Science:** deals with basic scientific principles that govern the interrelationship between biotic (e.g., plants, animals) and abiotic factors (e.g., climate, soils) in major ecosystems and the use of these principles for environmentally sound management of both natural and agro-ecosystems.
- **Environmental Communication:** is designed for environmentally oriented students preparing for careers in communication fields such as journalism, public relations, broadcast media and the internet.
- **Natural Resources Economics:** prepares students for management, administrative, regulatory, and policy positions that require a broad understanding of natural resources management and allocation.
- **Physical/Earth Resources Science:** leads to an understanding of the physical and chemical aspects of ecosystems. Topics of study include hydrology, water management and quality, waste management, soil properties, energy resources and land-use management.
- **Pollution Control:** focuses on the principles and practices of managing natural resources for pollution control. Topics include the technical aspects of pollution as they relate to water, air/solids, earth/soils, and the impact of environmental pollution on biotic factors. Students interested in this emphasis are strongly urged to complete College Algebra before entering the NRM program.
- **Social Sciences:** concentrates on human factors (social, political, anthropological) in environmental management and environmental disaster management, while recognizing constraints and opportunities presented by physical and biological factors.
- **Sustainability and Resiliency:** focuses on how to build capacity to deal with change; prepares students through system, strategic, and anticipatory thinking.

Major Requirements

Major: Natural Resources Management

Degree Type: B.S.

Minimum Degree Credits to Graduate: 128

General Education Requirements for Baccalaureate Degree

- A list of approved general education courses is available here (<http://bulletin.ndsu.edu/past-bulletin-archive/2017-18/academic-policies/undergraduate-policies/general-education/#genedcoursestext>).
- General education courses may be used to satisfy requirements for both general education and the major, minor, and program emphases, where applicable. Students should carefully review the major, minor, and program emphases requirements for minimum grade restrictions, should they apply.

Code	Title	Credits
Communication (C)		12
ENGL 110	College Composition I	
ENGL 120	College Composition II	
COMM 110	Fundamentals of Public Speaking	
Upper Division Writing [†]		
Quantitative Reasoning (R) [†]		3
Science and Technology (S) [†]		10
Humanities and Fine Arts (A) [†]		6
Social and Behavioral Sciences (B) [†]		6
Wellness (W) [†]		2

Cultural Diversity (D) ^{*†}**Global Perspectives (G) ^{*†}**

Total Credits	39
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* May be satisfied by completing courses in another General Education category.

† May be satisfied with courses required in the major. Review major requirements to determine if a specific upper division writing course is required.

Major Requirements

Code	Title	Credits
Required Core Courses for Natural Resources Management:		
AGRI 189	Skills for Academic Success ¹	1
BIOL 150 & 150L	General Biology I and General Biology I Laboratory	4
BIOL 151 & 151L	General Biology II and General Biology II Laboratory	4
BIOL 364	General Ecology	3
CHEM 121 & 121L	General Chemistry I and General Chemistry I Laboratory (May satisfy general education category S)	4
ECON 201	Principles of Microeconomics (May satisfy general education category B and G)	3
ECON 481	Natural Resource Economics	3
GEOL 105	Physical Geology (May satisfy general education category S and G)	3
HIST 434 or HIST 435	Environmental History World Environmental History	3
NRM 150	Natural Resource Management Orientation	1
NRM 225	Natural Resources & Agrosystems (May satisfy general education category S)	3
NRM/SOIL 264	Natural Resource Management Systems	3
NRM 431	National Environmental Policy Act & Environmental Impact Assessment	3
NRM 462	Natural Resource and Rangeland Planning	3
POLS 115 or POLS 215	American Government Problems and Policies In American Government	3
RNG 452 or GEOG 455	Geographic Information Systems in Range Survey Introduction to Geographic Information Systems	3
SOIL 210	Introduction to Soil Science	3
STAT 330	Introductory Statistics (May satisfy general education category R)	3
Select one of the following: (May satisfy general education category B)		3
POLS 110	Introduction to Political Science	
SOC 110	Introduction to Sociology	
EMGT 101	Emergencies, Disasters, and Catastrophes	
ANTH 111	Introduction to Anthropology	
Select one of the following:		3
SOC 431	Environmental Sociology	
POLS 360	Principles of Public Administration	
POLS 422	State and Local Politics	
POLS 442	Global Policy Issues	
ANTH 462	Anthropology and the Environment	
EMGT 261	Disaster Preparedness	
EMGT 262	Disaster Mitigation	
EMGT 263	Disaster Response	
EMGT 264	Disaster Recovery	
NRM Emphasis Area: Students must select one of the six NRM emphasis areas to complete the major. See below.		38
Total Credits		97

- ¹ AGRI189 is only required for first-time, first-year students—A first-time, first-year student is defined as a student who has not yet completed a college course as a college student. Students that are not first-time, first-year students that either transfer into the university or change their major are not required to take AGRI 189.

Natural Resources Management Emphasis Areas

- Select and complete one emphasis area as part of the Natural Resources Management major.
- Declaring an Emphasis- Students should formally declare an emphasis area with the Office of Registration & Records (<https://www.ndsu.edu/registrar>) by the beginning of their junior year. The emphasis area is recorded on the academic transcript with the degree.

Biotic Resources Science

Code	Title	Credits
Required. Select two of the following:		6
CHEM 122	General Chemistry II	
CHEM 240	Survey of Organic Chemistry	
RNG 136	Introduction to Range Management	
RNG/NRM 453	Rangeland Resources Watershed Management	
Select a minimum of 32 credits from the approved electives list below for Biotic Resources:		32
BOT 414	Plant Systematics	
RNG 456	Range Habitat Management	
SOIL 217	Introduction to Meteorology & Climatology	
NRM 401	Urban-Ecosystem Management	
NRM 420	Sustainable Scenarios in Natural Resources Management	
PLSC 219	Introduction to Prairie & Community Forestry	
ZOO 470	Limnology	
ZOO 476	Wildlife Ecology and Management	
PLSC/BOT/ZOO 315	Genetics	
PLSC/BOT/ZOO 315L	Genetics Laboratory	
RNG/NRM 454	Wetland Resources Management	
BOT/RNG 460	Plant Ecology	
MICR 202	Introductory Microbiology	
ZOO 450	Invertebrate Zoology	
ZOO 454	Herpetology	
ZOO 458	Mammalogy	
PLSC 355	Woody Landscape Plants	
RNG/BOT 450	Range Plants	
BOT 380	Plant Physiology	
RNG 458	Grazing Ecology	
MICR 202L	Introductory Microbiology Lab	
NRM 402	River and Stream Resource Management	
NRM 421	Environmental Outreach Methods	
ZOO 462	Physiological Ecology	
ZOO 475	Conservation Biology	
ZOO 477	Wildlife and Fisheries Management Techniques	
ENT 350	General Entomology	
ZOO 360	Animal Behavior	
ZOO 452	Ichthyology	
ZOO 456	Ornithology	
PLSC 323	Principles of Weed Science	
RNG 326	Modeling of Range and Agro-Ecosystems	
Total Credits		38

Sustainability

Code	Title	Credits
Required:		
NRM 420	Sustainable Scenarios in Natural Resources Management	3
NRM 401	Urban-Ecosystem Management	3
Select one:		3
POLS 442	Global Policy Issues	
POLS 453	Environmental Policy and Politics	
SOC 404	Community Assessment	
SOC 431	Environmental Sociology	
Select one:		3
NRM 402	River and Stream Resource Management	
NRM 454	Wetland Resources Management	
SOIL 410	Soils and Land Use	
ZOO 475	Conservation Biology	
Physical/Earth Resources Science - Select a minimum of 26 credits from the approved electives:		26
ANTH 462	Anthropology and the Environment	
ANTH 459	Global Cultural Heritage	
ANTH 464	Disaster and Culture	
BIOL 271	Wildlife Ecology and Conservation: An undergraduate research course	
BIOL 480	Ecotoxicology	
BIOL 481	Wetland Science	
ECON 482	Environmental Economics	
EMGT 101	Emergencies, Disasters, and Catastrophes	
EMGT 261	Disaster Preparedness	
EMGT 262	Disaster Mitigation	
EMGT 263	Disaster Response	
EMGT 264	Disaster Recovery	
ENT 350	General Entomology	
GEOL 300	Environmental Geology	
HIST 435	World Environmental History	
NRM 322	Environmental Law and Policy	
NRM 402	River and Stream Resource Management (If not used above)	
NRM 421	Environmental Outreach Methods	
NRM 453	Rangeland Resource/Watershed Management	
PLSC 110	World Food Crops	
PLSC 219	Introduction to Prairie & Community Forestry	
POLS 442	Global Policy Issues (If not used above)	
POLS 453	Environmental Policy and Politics (If not used above)	
RNG 451	Ecology of Fire-Dependent Ecosystems	
RNG 456	Range Habitat Management	
RNG 458	Grazing Ecology	
RNG 460	Plant Ecology	
SOC 404	Community Assessment (If not used above)	
SOC 405	Community Development	
SOC 235	Cultural Diversity	
SOC 431	Environmental Sociology (If not used above)	
SOC 443	International Disasters	
SOIL 217	Introduction to Meteorology & Climatology	
SOIL 351	Soil Ecology	
SOIL 410	Soils and Land Use (If not used above)	
ZOO 475	Conservation Biology (If not used above)	

ZOO 476	Wildlife Ecology and Management	
Total Credits		38

Physical/earth Resources Science

Code	Title	Credits
Required:		
CHEM 122 & 122L	General Chemistry II and General Chemistry II Laboratory	4
MATH 146 or MATH 165	Applied Calculus I Calculus I	4
GEOG 412 or SOIL 444	Geomorphology Soil Genesis and Survey	3
Select a minimum of 27 credits from the approved electives list below for Physical/Earth Resources Science:		27
ABEN 464	Resource Conservation and Irrigation Engineering	
ASM 354	Electricity and Electronic Applications	
RNG 136	Introduction to Range Management	
GEOL 105L	Physical Geology Lab	
SOIL 444	Soil Genesis and Survey	
GEOG 412	Geomorphology	
NRM 401	Urban-Ecosystem Management	
RNG/NRM 454	Wetland Resources Management	
NRM 420	Sustainable Scenarios in Natural Resources Management	
PHYS 211	College Physics I	
CE 204	Surveying	
SOIL 322	Soil Fertility and Fertilizers	
SOIL 410	Soils and Land Use	
MICR 202	Introductory Microbiology	
SOIL 465	Soil And Plant Analysis	
GEOL/CHEM 428	Geochemistry	
ASM 225	Computer Applications in Agricultural Systems Management	
PHYS 211L	College Physics I Laboratory	
CHEM 240	Survey of Organic Chemistry	
GEOL 300	Environmental Geology	
GEOL 414	Hydrogeology	
MICR 202L	Introductory Microbiology Lab	
NRM 402	River and Stream Resource Management	
NRM 421	Environmental Outreach Methods	
ASM 454	Principles and Application of Precision Agriculture	
SOIL 217	Introduction to Meteorology & Climatology	
SOIL 351	Soil Ecology	
SOIL 433	Soil Physics	
SOIL 447	Microclimatology	
SOIL 480	Soils and Pollution	

Total Credits		38
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Environmental Communication

Code	Title	Credits
Required:		
COMM 112	Understanding Media and Social Change	3
COMM 200	Introduction to Media Writing	3
NRM 421	Environmental Outreach Methods	3
COMM 485	Risk and Crisis Communication	3
Select one of the following:		4

COMM/POLS/CJ 325	Applied Research Methods	
SOC 340 & SOC 341	Social Research Methods and Social Research Methods Laboratory	
Select a minimum of 22 credits from the approved electives list below for Environmental Communication:		22
COMM 245	Principles of Broadcast Production	
COMM 260	Introduction to Web Design	
COMM 301	Rhetorical Traditions	
NRM 420	Sustainable Scenarios in Natural Resources Management	
COMM 433	Legal Communication	
COMM 442	Digital Media and Society	
COMM 445	Advanced Broadcast Production	
COMM 472	Public Relations Campaigns	
COMM 402	Contemporary Rhetoric	
COMM 261	Introduction to Web Development	
COMM 310	Advanced Media Writing	
COMM 362	Principles of Design For Print	
COMM 383	Organizational Communication I	
NRM 421	Environmental Outreach Methods	
COMM 436	Issues in Mass Communications	
COMM 443	Mass Media and Public Opinion	
COMM 450	Issues in Communication	
COMM 431	Communication Ethics and Law	
Total Credits		38

Pollution Control

Code	Title	Credits
Required:		
CE 309	Fluid Mechanics	3
CE 370	Introduction to Environmental Engineering	3
CE 408	Water Resources and Supply	3
CHEM 122 & 122L	General Chemistry II and General Chemistry II Laboratory	4
MATH 165	Calculus I	4
ME 221	Engineering Mechanics I	3
ME 222	Engineering Mechanics II	3
Select a minimum of 15 credits from the approved electives list below for Pollution Control:		15
Air/Solids:		
CE 472	Solid Waste Management	
SOIL 217	Introduction to Meteorology & Climatology	
SOIL 447	Microclimatology	
Biotic:		
ABEN 499	Special Topics	
BOT 380	Plant Physiology	
BOT/RNG 460	Plant Ecology	
MICR 350	General Microbiology	
MICR 350L	General Microbiology Lab	
ZOO 470	Limnology	
ZOO 476	Wildlife Ecology and Management	
ZOO 477	Wildlife and Fisheries Management Techniques	
Earth/Soils:		
CHEM 240	Survey of Organic Chemistry	
GEOL 300	Environmental Geology	
SOIL 322	Soil Fertility and Fertilizers	

SOIL 351	Soil Ecology
SOIL 410	Soils and Land Use
SOIL 433	Soil Physics
SOIL 444	Soil Genesis and Survey
SOIL 447	Microclimatology
SOIL 465	Soil And Plant Analysis
SOIL 480	Soils and Pollution
Water:	
ABEN 464	Resource Conservation and Irrigation Engineering
CE 410	Water and Wastewater Engineering
CE 421	Open Channel Flow
CE 477	Applied Hydrology
CE 478	Water Quality Management
GEOL 414	Hydrogeology
RNG/NRM 453	Rangeland Resources Watershed Management
GEOL/CHEM 428	Geochemistry
Total Credits	

38

Natural Resources Economics

Code	Title	Credits
Required:		
MATH 144	Mathematics for Business	4
ECON 341	Intermediate Microeconomics	3
STAT 331	Regression Analysis	2
Select a minimum of 29 credits from the approved electives list below for Natural Resources Economics:		29
AGEC 339	Quantitative Methods & Decision Making	
AGEC 375	Applied Agricultural Law	
ECON 202	Principles of Macroeconomics	
ECON 343	Intermediate Macroeconomics	
ECON 456	History of Economic Thought	
ECON 470	Public Economics	
ECON 480	Industrial Organization	
GEOG 262	Geography of North America	
NRM 401	Urban-Ecosystem Management	
NRM 420	Sustainable Scenarios in Natural Resources Management	
POLS 220	International Politics	
POLS 442	Global Policy Issues	
POLS 452	Comparative Political Economy	
SOC 403	Sociology of The Great Plains	
SOC 439	Social Change	
AGEC 347	Principles of Real Estate	
AGEC 484	Agricultural Policy	
COMM 315	Small Group Communication	
ECON 324	Money and Banking	
ECON 410	Econometrics	
ECON 461	Economic Development	
ECON 472	International Trade	
HNES 427	Leisure And Society	
NRM 402	River and Stream Resource Management	
NRM 421	Environmental Outreach Methods	
POLS 360	Principles of Public Administration	
POLS 444	International Law	

POLS 453	Environmental Policy and Politics	
SOC 431	Environmental Sociology	
Total Credits		38

Social Sciences

Code	Title	Credits
Required:		
SOC 405	Community Development	3
SOC 340 & SOC 341	Social Research Methods and Social Research Methods Laboratory	4
Select a minimum of 31 credits from the approved electives list below for Social Science:		31
ANTH 204	Archaeology and Prehistory	
ANTH 206	Introduction to Cultural Anthropology: Peoples of the World	
ANTH 446	Latin America & Caribbean: Afro-Latino/as, Gender, Indigeneity	
CJ 201	Introduction to Criminal Justice	
EMGT 261	Disaster Preparedness	
EMGT 263	Disaster Response	
EMGT 414	Spatial Analysis in Emergency Management	
EMGT 461	Business Continuity and Crisis Management	
EMGT 481	Disaster Analysis	
GEOG 262	Geography of North America	
NRM 401	Urban-Ecosystem Management	
NRM 421	Environmental Outreach Methods	
POLS 225	Comparative Politics	
POLS 422	State and Local Politics	
SOC 403	Sociology of The Great Plains	
SOC 422 or ANTH 480	Development Of Social Theory Development of Anthropological Theory	
SOC 418	Social Psychology	
SOC 431	Environmental Sociology	
SOC 443	International Disasters	
ANTH 205	Human Origins	
ANTH 433	Apes and Human Evolution	
ANTH 462	Anthropology and the Environment	
ANTH 481	Qualitative Methods in Cultural Anthropology	
EMGT 101	Emergencies, Disasters, and Catastrophes	
EMGT 262	Disaster Mitigation	
EMGT 264	Disaster Recovery	
EMGT 463	Voluntary Agency Disaster Services	
ENGL 474	Native American Literature	
NRM 420	Sustainable Scenarios in Natural Resources Management	
POLS 215	Problems and Policies In American Government	
POLS 360	Principles of Public Administration	
POLS 453	Environmental Policy and Politics	
SOC 439	Social Change	
SOC 465	Applied Demographics	
Total Credits		38

Degree Notes:

- **Acceptable Substitutions:** The following courses are accepted as electives in all emphasis areas: NRM courses (may not be double-counted with the NRM Core); a maximum of 3 credits of Field Experience (396/496); a maximum of 3 credits of Co-op Ed (397/497). **All other substitutions**

require NRM advisor approval and a substitution form to be completed and submitted to the Office of Registration and Records (<https://www.ndsu.edu/registrar>).

Minor Requirements

Natural Resources Management Minor

Minor Requirements

Required Credits: 19

Code	Title	Credits
Core Courses		
NRM 150	Natural Resource Management Orientation	1
NRM 225	Natural Resources & Agrosystems	3
NRM 431	National Environmental Policy Act & Environmental Impact Assessment	3
Interdisciplinary Courses		
Select four of the following:		12
ASM/NRM/SOIL 264	Natural Resource Management Systems	
BIOL/ZOO 364	General Ecology	
BOT/RNG 460	Plant Ecology	
ECON 481	Natural Resource Economics	
EMGT 261	Disaster Preparedness	
EMGT 262	Disaster Mitigation	
ENT 350	General Entomology	
GEOL 105	Physical Geology	
GEOL 300	Environmental Geology	
HIST 434	Environmental History	
NRM 421	Environmental Outreach Methods	
NRM/RNG 453	Rangeland Resource/Watershed Management	
RNG 336		
SOIL 210	Introduction to Soil Science	
SOIL 217	Introduction to Meteorology & Climatology	
SOC 431	Environmental Sociology	
POLS 453	Environmental Policy and Politics	
RNG 452	Geographic Information Systems in Range Survey (RNG 452 changing to NRM 452 GIS in NRM)	
SOIL 410	Soils and Land Use	
SOC 405	Community Development	
ZOO 476	Wildlife Ecology and Management	

Minor Requirements and Notes:

- Students must earn a 2.00 minimum GPA in the courses used to satisfy the minor requirements.
- A minimum of 8 credits must be taken at NDSU.