



### **Crookston Campus**

## **Natural Resources B.S.**

*Agriculture and Natural Resources*

### **Academic Affairs**

- Program Type: Baccalaureate
- Requirements for this program are current for Fall 2017
- Required credits to graduate with this degree: 120
- Required credits within the major: 42 to 79
- This program requires summer terms.
- Degree: Bachelor of Science

Managing natural resources is increasingly important, with increasing human populations and limited natural resources and habitats. Natural resource managers help balance the needs of people with the ability of ecosystems to sustainably support soil, water, forests, wildlife, fish, and recreational resources.

UMC's bachelor of science in natural resources provides an integrated approach to soil and water conservation, wildlife and fisheries management, forestry, and recreation. This combination enables graduates to work with a variety of resources and people and to build a career tailored to their interests. Students select one of the following emphases:

Ecological restoration  
Natural resources aviation  
Natural resources law enforcement  
Natural resources management  
Park management  
Water resource management  
Wildlife management

#### **Program outcomes:**

Apply an integrated approach to resource management that incorporates environmental, economic, and social considerations  
Demonstrate appropriate technical knowledge and practical applications necessary for employment in the natural resources field  
Perform group problem solving, decision-making, and conflict management to be effective in resource management  
Demonstrate oral and written communication skills appropriate for a beginning natural resource professional  
Be aware of the necessity of continuing education and professional development to be successful in a changing natural resources workplace

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

## **Admission Requirements**

For information about University of Minnesota admission requirements, visit the [Office of Admissions website](#).

## **General Requirements**

All students are required to complete general University and college requirements. For more information, see the [graduation requirements](#).

## **Program Requirements**

Students must complete 40 upper division credits.

A maximum of two D grades are allowed for core courses required in the program, subplan/emphasis, and technology requirements. This includes grades earned at UMC or transferred in from another institution.

### **Program Requirements**

Required Courses - 24 credits

[MGMT 3210](#) - Supervision and Leadership (3.0 cr)

[NATR 1233](#) - Introduction to Natural Resources (3.0 cr)

[NATR 1244](#) - Elements of Forestry (4.0 cr)

[NATR 2630](#) - Introduction to Geographic Information Systems (3.0 cr)

[NATR 3374](#) - Ecology [BIOL SCI] (4.0 cr)



NATR 3899 - Pre-Internship Seminar (0.5 cr)  
NATR 3900 - Internship (0.5 - 4.0 cr)  
NATR 3901 - Post-Internship Seminar (0.5 cr)  
NATR 4652 - Seminar (1.0 cr)  
WRIT 3303 - Writing in Your Profession (3.0 cr)

### Liberal Education Requirements

A minimum of 40 liberal education credits required. Students must complete the 10 goal areas of the Minnesota Transfer Curriculum with the following specific liberal education courses required.

BIOL 1009 - General Biology [BIOL SCI, PEOPLE/ENV] (4.0 cr)  
CHEM 1001 - Introductory Chemistry [PHYS SCI] (4.0 cr)  
COMP 1011 - Composition I [COMMUNICAT] (3.0 cr)  
COMP 1013 - Composition II [COMMUNICAT] (3.0 cr)  
PHYS 1012 - Introductory Physics [PHYS SCI, PEOPLE/ENV] (4.0 cr)  
COMM 1101 - Public Speaking [COMMUNICAT] (3.0 cr)

### Technology Requirements

Take any 3 credits from the following courses. (If applicable, the course taken from below may be used to satisfy both the program and technology requirements.)

CA 1020 - Spreadsheet Applications (3.0 cr)  
or NATR 3635 - Geographic Information Systems Applications (3.0 cr)

## Program Sub-plans

Students are required to complete one of the following sub-plans.

### Ecological Restoration

Ecological restoration is the processes of repairing ecosystems that have been damaged due to human or natural influences. Courses in this emphasis provide an interdisciplinary background that encompasses restoration and management of terrestrial and wetland ecosystems, invasive species management, conservation biology, ecology, and remediation of severely disturbed lands. The emphasis prepares students for a career as restoration practitioners and land managers with non-profit, private, or governmental agencies and for graduate school in natural resource management.

Program outcomes:

Assess causes of land degradation and plan restoration actions that promote ecosystem health  
Understand the interactions between management practices and social factors that lead to successful project implementation

### Ecological Restoration Emphasis Requirements

Required Courses - 43 credits

ASM 3009 - Surveying (4.0 cr)  
BIOL 2022 - General Botany [BIOL SCI, PEOPLE/ENV] (3.0 cr)  
ENSC 3124 - Environmental Science and Remediation Techniques (3.0 cr)  
NATR 3344 - Land Use Planning (3.0 cr)  
NATR 3364 - Plant Taxonomy (3.0 cr)  
NATR 3480 - Ecological Restoration (3.0 cr)  
NATR 3486 - Conservation Biology (3.0 cr)  
NATR 3488 - Invasive Species Ecology and Management (3.0 cr)  
NATR 3580 - Advanced Ecological Restoration (2.0 cr)  
NATR 3635 - Geographic Information Systems Applications (3.0 cr)  
NATR 4699 - Integrated Resource Management (3.0 cr)  
SOIL 1293 - Soil Science (3.0 cr)  
SWM 3224 - Soil and Water Conservation (4.0 cr)  
SWM 3225 - Watershed Management (3.0 cr)

### Required Electives

Choose one of the following:

Take exactly 1 course(s) from the following:

- HORT 3036 - Plant Propagation (4.0 cr)
- NATR 3376 - Wetland and Riparian Ecology and Management (3.0 cr)
- NATR 3660 - Prairie and Range Ecology and Management (3.0 cr)
- NATR 3468 - Wildlife Habitat Management Techniques (3.0 cr)
- SOIL 3414 - Soil Fertility and Plant Nutrition (4.0 cr)
- SWM 3009 - Hydrology and Water Quality (4.0 cr)

### Electives

Students must take enough electives to satisfy the 120 credit graduation requirement. Number needed will depend on how the student selects their liberal education courses to satisfy the Minnesota Transfer Curriculum.



### Natural Resources Aviation

This emphasis leads to careers as natural resource pilots employed by state/federal agencies, such as the National Park Service, US Fish and Wildlife Service, US Forest Service, and state departments of natural resources.

Program outcomes:

Demonstrate competency in aeronautics

Apply an integrated approach to resource management that incorporates environmental, economic, and social considerations

Perform group problem solving, decision making, and conflict management to be effective in resource management

Understand ecological management principles that apply to wildlife, fish, forest, soil, water, and recreation resources

### Natural Resources Aviation Emphasis Requirements

Required Courses - 49 to 51 credits

AVIA 1103 *{Inactive}* (4.0 cr)

AVIA 1104 *{Inactive}* (1.0 cr)

AVIA 1396 *{Inactive}* (1.0 cr)

AVIA 2220 *{Inactive}* (2.0 cr)

AVIA 2221 *{Inactive}* (1.0 cr)

AVIA 2222 *{Inactive}* (2.0 cr)

AVIA 2223 *{Inactive}* (1.0 cr)

AVIA 3320 *{Inactive}* (2.0 cr)

AVIA 3321 *{Inactive}* (1.0 cr)

AVIA 3324 *{Inactive}* (3.0 cr)

AVIA 3396 *{Inactive}* (1.0 cr)

AVIA 3602 *{Inactive}* (2.0 cr)

BIOL 2022 - General Botany [BIOL SCI, PEOPLE/ENV] (3.0 cr)

NATR 3203 - Park and Recreation Management (3.0 cr)

NATR 3344 - Land Use Planning (3.0 cr)

NATR 3364 - Plant Taxonomy (3.0 cr)

NATR 4654 - Wildlife Ecology and Management (4.0 cr)

NATR 4699 - Integrated Resource Management (3.0 cr)

Choose one of the following:

AGRO 1183 - Field Crops: Production Principles (3.0 cr)

or BIOL 2012 - General Zoology (4.0 cr)

or HORT 1010 - Introduction to Horticulture (3.0 cr)

Choose one of the following:

NATR 3464 - Mammalogy (3.0 cr)

or SWM 3224 - Soil and Water Conservation (4.0 cr)

Choose one of the following:

NATR 3466 - Ornithology (3.0 cr)

or SOIL 1293 - Soil Science (3.0 cr)

### Liberal Education Requirement

Will count towards the 40 credits required in liberal education.

MATH 1031 - College Algebra [MATH THINK] (3.0 cr)

### Open Electives

Students must take enough electives to satisfy the 120 credit graduation requirement. Number needed will depend on how the student selects their liberal education courses to satisfy the Minnesota Transfer Curriculum.

### Natural Resources Law Enforcement

This emphasis provides integrated instruction in natural resources management and law enforcement. General classes in natural resources, wildlife and fisheries management, forestry recreation, and land use planning are combined with criminal justice/law enforcement classes. After completing coursework and training in first aid and traffic law, students may attend a skills session and take the Minnesota Peace Officer Standards and Training (POST) certification examination.

Program outcomes:

Understand the role of education and law enforcement in natural resource management

Be qualified to attend the peace officer's skills training academy

### Natural Resources Law Enforcement Emphasis Requirements

Required Courses - 54 to 55 credits

CRJS 1500 - Introduction to Criminal Justice [HI/BEH/SSC, ETH/CIV RE] (4.0 cr)

CRJS 2500 - Introduction to Policing (3.0 cr)

CRJS 2550 - Traffic Law (2.0 cr)

CRJS 2560 - Emergency Medical Responder (3.0 cr)

CRJS 3505 - Judicial Process (3.0 cr)

CRJS 3525 - Juvenile Justice and Delinquency (3.0 cr)



CRJS 3530 - Criminal Justice Diversity (3.0 cr)  
CRJS 3550 - Criminal Investigation (3.0 cr)  
CRJS 3575 - Critical Issues in Policing (3.0 cr)  
CRJS 4510 - Victimology (3.0 cr)  
CRJS 4540 - Criminal Law (4.0 cr)  
CRJS 4550 - Criminal Procedure (4.0 cr)  
SOIL 1293 - Soil Science (3.0 cr)  
NATR 3203 - Park and Recreation Management (3.0 cr)  
NATR 4654 - Wildlife Ecology and Management (4.0 cr)  
Choose one of the following:  
BIOL 2012 - General Zoology (4.0 cr)  
or BIOL 2022 - General Botany [BIOL SCI, PEOPLE/ENV] (3.0 cr)  
Choose one of the following:  
CRJS 3520 - Natural Resource Law Enforcement Techniques (3.0 cr)  
or NATR 3520 - Natural Resource Law Enforcement Techniques (3.0 cr)

#### **Liberal Education Requirements**

Will count towards the 40 credits required in liberal education.

MATH 1031 - College Algebra [MATH THINK] (3.0 cr)  
or MATH 1150 - Introduction to Statistics [MATH THINK] (3.0 cr)

#### **Open Electives**

Students must take enough electives to satisfy the 120 credit graduation requirement. Number needed will depend on how the student selects their liberal education courses to satisfy the Minnesota Transfer Curriculum.

#### **Natural Resources Management**

This emphasis provides an integrated approach to land use and the conservation of wildlife, fish, forest, and recreation resources. This major is especially appropriate for students seeking a broad understanding of resource management principles and environmental issues. A combination of coursework in natural resources, agriculture, and liberal education prepares students for land management positions in which a balance between environmental, economic, and social concerns is sought.

Program outcome:

Understand ecological management principles that apply to wildlife, fish, forest, soil, water, and recreation resources

#### **Natural Resources Management Emphasis Requirements**

Required Courses - 35 credits

ASM 3009 - Surveying (4.0 cr)  
BIOL 2022 - General Botany [BIOL SCI, PEOPLE/ENV] (3.0 cr)  
NATR 3203 - Park and Recreation Management (3.0 cr)  
NATR 3344 - Land Use Planning (3.0 cr)  
NATR 3364 - Plant Taxonomy (3.0 cr)  
NATR 4654 - Wildlife Ecology and Management (4.0 cr)  
NATR 3660 - Prairie and Range Ecology and Management (3.0 cr)  
NATR 4699 - Integrated Resource Management (3.0 cr)  
SOIL 1293 - Soil Science (3.0 cr)  
SWM 3224 - Soil and Water Conservation (4.0 cr)

Choose one of the following:

AGRO 1183 - Field Crops: Production Principles (3.0 cr)  
or HORT 1010 - Introduction to Horticulture (3.0 cr)

#### **Liberal Education Requirements**

Will count towards the 40 credits required in liberal education.

MATH 1031 - College Algebra [MATH THINK] (3.0 cr)  
or MATH 1150 - Introduction to Statistics [MATH THINK] (3.0 cr)

#### **Agriculture/Natural Resources Electives**

Students must take 9 credits selected in consultation with an advisor.

#### **Open Electives**

Students must take enough electives to satisfy the 120 credit graduation requirement. Number needed will depend on how the student selects their liberal education courses to satisfy the Minnesota Transfer Curriculum.

#### **Park Management**

This emphasis provides an integrated approach to park and recreation area management. A combination of natural resources, horticulture, and management courses prepare students for park and resource management positions, typically with federal/state/county/city recreation agencies. Flexibility in the choice of major electives allows students to build a customized program that meets their specific career goals.

Program outcome:

Understand the interrelatedness of and techniques used to manage both visitor use and recreational resources



### **Park Management Emphasis Requirements**

Required Courses - 18 credits

[BIOL 2022](#) - General Botany [BIOL SCI, PEOPLE/ENV] (3.0 cr)

[NATR 3203](#) - Park and Recreation Management (3.0 cr)

[NATR 3344](#) - Land Use Planning (3.0 cr)

[NATR 3364](#) - Plant Taxonomy (3.0 cr)

[NATR 4699](#) - Integrated Resource Management (3.0 cr)

[SOIL 1293](#) - Soil Science (3.0 cr)

### **Liberal Education Requirements**

Will count towards the 40 credits required in liberal education.

[MATH 1031](#) - College Algebra [MATH THINK] (3.0 cr)

or [MATH 1150](#) - Introduction to Statistics [MATH THINK] (3.0 cr)

### **Agriculture/Natural Resources Electives**

Students must take 15 credits.

#### **Horticulture Electives**

Students must take 7 credits.

#### **Management Electives**

Students must take 3 credits.

#### **Open Electives**

Students must take enough electives to satisfy the 120 credit graduation requirement. Number needed will depend on how the student selects their liberal education courses to satisfy the Minnesota Transfer Curriculum.

### **Water Resource Management**

Courses in natural resources along with agriculture, geology, soils, fisheries management, water quality, and land use planning provide a background focused on water resources. Watersheds are studied by land cover and mapping technologies in relationship to field monitoring of lakes and streams.

#### **Program outcomes:**

Understand methods of assessing land management practices at the watershed scale and how they affect water quality

Measure and use appropriate water quality parameters to assess the health of land and aquatic systems

Recommend appropriate land/water management practices to achieve soil conservation and water quality goals

### **Water Resource Management Emphasis Requirements**

Required Courses - 45 credits

[AGRO 1183](#) - Field Crops: Production Principles (3.0 cr)

[ASM 3009](#) - Surveying (4.0 cr)

[BIOL 2022](#) - General Botany [BIOL SCI, PEOPLE/ENV] (3.0 cr)

[BIOL 3722](#) - Limnology (3.0 cr)

[GEOL 1001](#) - Introductory Geology [PHYS SCI, PEOPLE/ENV] (4.0 cr)

[NATR 1663](#) - Principles of Fisheries Management (3.0 cr)

[NATR 3344](#) - Land Use Planning (3.0 cr)

[NATR 3364](#) - Plant Taxonomy (3.0 cr)

[NATR 3376](#) - Wetland and Riparian Ecology and Management (3.0 cr)

[NATR 4699](#) - Integrated Resource Management (3.0 cr)

[SOIL 1293](#) - Soil Science (3.0 cr)

[SWM 3009](#) - Hydrology and Water Quality (4.0 cr)

[SWM 3224](#) - Soil and Water Conservation (4.0 cr)

[SWM 3225](#) - Watershed Management (3.0 cr)

### **Liberal Education Requirements**

Will count towards the 40 credits required in liberal education.

[MATH 1031](#) - College Algebra [MATH THINK] (3.0 cr)

or [MATH 1150](#) - Introduction to Statistics [MATH THINK] (3.0 cr)

#### **Open Electives**

Students must take enough electives to satisfy the 120 credit graduation requirement. Number needed will depend on how the student selects their liberal education courses to satisfy the Minnesota Transfer Curriculum.

### **Wildlife Management**

This emphasis concentrates on wildlife and habitats. The major focuses on land and wetland habitats and their animal associates with some emphasis on fisheries management. Graduates fulfill the educational requirements for certification as an Associate Wildlife Biologist by The Wildlife Society. Professional relationships and student development are enhanced by a student chapter of The Wildlife Society.

#### **Program outcomes:**

Understand the interrelatedness and techniques used to manage vertebrate populations and their habitat

Understand the dynamics of wildlife populations, habitats, and appropriate monitoring techniques



A minimum GPA of 3.00 is required for graduation.

### **Wildlife Management Emphasis Requirements**

Required Courses - 49 credits

[AGRO 3030](#) - Statistical Analyses and Research Techniques in Agriculture and Natural Resources (3.0 cr)

[ANSC 3203](#) - Animal Anatomy and Physiology (4.0 cr)

[ASM 1034](#) - Facility Maintenance and Safety (4.0 cr)

[ASM 3009](#) - Surveying (4.0 cr)

[BIOL 2012](#) - General Zoology (4.0 cr)

[BIOL 2022](#) - General Botany [BIOL SCI, PEOPLE/ENV] (3.0 cr)

[NATR 3344](#) - Land Use Planning (3.0 cr)

[NATR 3364](#) - Plant Taxonomy (3.0 cr)

[NATR 3464](#) - Mammalogy (3.0 cr)

[NATR 3466](#) - Ornithology (3.0 cr)

[NATR 3468](#) - Wildlife Habitat Management Techniques (3.0 cr)

[NATR 4654](#) - Wildlife Ecology and Management (4.0 cr)

[NATR 3660](#) - Prairie and Range Ecology and Management (3.0 cr)

[NATR 4699](#) - Integrated Resource Management (3.0 cr)

[SOIL 1293](#) - Soil Science (3.0 cr)

### **Liberal Education Requirements**

Will count towards the 40 credits required in liberal education.

[MATH 1031](#) - College Algebra [MATH THINK] (3.0 cr)

[MATH 1150](#) - Introduction to Statistics [MATH THINK] (3.0 cr)

### **Open Electives**

Students must take enough electives to satisfy the 120 credit graduation requirement. Number needed will depend on how the student selects their liberal education courses to satisfy the Minnesota Transfer Curriculum.