

**College of Natural Resources
Proposed Catalog Changes
Effective Summer 2020**

Department of Environmental Science

1. Add the Following Courses:

ENVS 444 Water Quality in the Pacific Northwest

3 credits

Cross-listed with SOIL 444. Joint-listed with ENVS 544.

Qualitative aspects of water are covered in this class. Major topics are qualitative aspects of (1): surface water, (2) groundwater, (3) drinking water, (4) water in the oceans, and (5) the human waste stream. Concepts presented are relevant to world-wide water quality issues and concepts; however, however, an emphasis is placed on issues within the four Pacific Northwest states (ID, AK, OR, WA).

Prereq: Three upper-division science courses.

Rationale: This course has been developed to support both the new undergraduate and graduate degrees in the water resources program. This course will also support undergraduate and graduate student degrees in both the soil sciences and environmental sciences program. The instructor developing this class has taught at the University of Idaho for 40 years, has received college and university teaching awards, has completed 43 graduate student programs and has taught more than 15,000 students in his career.

ENVS 544 Water Quality in the Pacific Northwest

3 credits

Cross-listed with SOIL 544. Joint-listed with ENVS 444.

Qualitative aspects of water are covered in this class. Major topics are qualitative aspects of (1): surface water, (2) groundwater, (3) drinking water, (4) water in the oceans, and (5) the human waste stream. Concepts presented are relevant to world-wide water quality issues and concepts; however, however, an emphasis is placed on issues within the four Pacific Northwest states (ID, AK, OR, WA).

Prereq: Three upper-division science courses.

Rationale: This course has been developed to support both the new undergraduate and graduate degrees in the water resources program. This course will also support undergraduate and graduate student degrees in both the soil sciences and environmental sciences program. The instructor developing this class has taught at the University of Idaho for 40 years, has received college and university teaching awards, has completed 43 graduate student programs and has taught more than 15,000 students in his career.

2. Change the following courses:

ENVS 386 ~~Social-Ecological~~ Managing Complex Environmental Systems**3 credits**

Cross-listed with NRS 386.

~~Social-ecological~~ Complex environmental systems are comprised of interconnected social, economic, and environmental components. Explore ~~social-ecological~~ complex environmental systems frameworks and fundamental principles of sustainability in these ~~social-ecological~~ systems by examining theory and practice in case studies. Topics may include natural resource scarcity and human conflict, ecosystem service provision, management, and conservation, and land tenure, rights, and justice relating to human access to natural resources.

Rationale: The new name and description better reflect the content and intent of the course relative to student needs. The changes also better delineate this course from others that address humans, the environment, and natural resources interact as a system.

ENVS ~~446~~ 448 Drinking Water and Human Health**3 credits**

Cross-listed with SOIL 448. Joint-listed with ENVS ~~546~~ 548.

Understand the characterization, testing, and treatment of chemical, microbial and hazardous compounds and their impact on human health. Be familiar with drinking water standards, regulatory aspects and protection of municipal, community, and private well systems. (Spring, Alt/yr)

Distance Availability: Yes

Rationale: Need to cross list courses with water resources and soils programs. Unfortunately, a Soils 446 course already exists – so for successful cross-listing the numbers need to be changed from 446/546 to 448/548.

ENVS ~~446~~ 548 Drinking Water and Human Health**3 credits**

Cross-listed with SOIL 548. Joint-listed with ENVS ~~446~~ 448.

Understand the characterization, testing, and treatment of chemical, microbial and hazardous compounds and their impact on human health. Be familiar with drinking water standards, regulatory aspects and protection of municipal, community, and private well systems. (Spring, Alt/yr)

Distance Availability: Yes

Rationale: Need to cross list courses with water resources and soils programs. Unfortunately, a Soils 446 course already exists – so for successful cross-listing the numbers need to be changed from 446/546 to 448/548.

Department of Fish and Wildlife Sciences

1. Change the following courses:

FISH 503 (s) Workshop

Credit arranged

Selected topics in the conservation and management of ~~natural resources~~ [fish and aquatic systems presented in a workshop format](#). Cooperative: open to WSU degree-seeking students.

~~Prereq: Permission.~~

Rationale: We are just changing description and allowing WSU students to take the course. There is no added workload.

FISH 504 (s) Special Topics

Credit arranged

New selected topics in the conservation and management of fish and aquatic systems presented in a seminar or lecture format. Cooperative: open to WSU degree-seeking students.

Rationale: We are just changing description and allowing WSU students to take the course. There is no added workload.

FISH 510 Advanced ~~Fishery~~ and Wildlife Management

3 credits

Contemporary management of ~~marine and freshwater~~ fish and ~~shellfish~~ [wildlife](#) populations ~~of the world in North America~~. ~~Approaches, factors, and models used to manage commercial, recreational and subsistence fisheries;~~ Guiding principles, relevant laws and policies, social and political aspects, select issues, and the policy interface of biological systems with governmental and social institutions. Cooperative: open to WSU degree-seeking students. (Spring, Alt/yrs)

Distance Availability: Yes.

Rationale: Expanding the Advanced Fishery Management course to also include wildlife and an online option makes the course attractive to more students. Will be co-taught by two faculty in our Fish and Wildlife COOP unit, one was newly hired in 2019 making it possible to expand this course.

WLF 503 (s) Workshop

Credit arranged

Selected topics in the conservation and management of ~~natural resources~~ [wildlife presented in a workshop format](#). Cooperative: open to WSU degree-seeking students.

~~Prereq: Permission.~~

Distance Availability: Yes

Rationale: We are just changing the description and allowing WSU students to take the course. There is no added workload.

WLF 504 (s) Special Topics

Credit arranged.

[New selected topics in the conservation and management of wildlife presented in a seminar or lecture format. Cooperative: open to WSU degree-seeking students.](#)

Distance Availability: Yes

Rationale: We are just changing description and allowing WSU students to take the course. There is no added workload.

2. Make the following changes to the B.S.Wildl.Res in Wildlife Resources:

Wildlife Resources (B.S.Wildl.Res.)

Students pursuing a B.S. in wildlife resources must have received a grade of C or better in each of the following four indicator courses to register in fish- and wildlife-prefixed upper-division courses and to graduate with a B.S. in wildlife resources: BIOL 114 and BIOL 213, STAT 251, and one of FOR 221, WLF 220 or NR 321.

To graduate, a student must receive a grade of C or better in each fish- and wildlife-prefixed upper-division course listed in the requirements for the B.S. in wildlife resources.

Required course work includes the university requirements (see regulation J-3) and:

First and Second Years		
BIOL 114	Organisms and Environments	4
BIOL 115	Cells & the Evolution of Life	3
BIOL 115L	Cells and the Evolution of Life Laboratory	1
BIOL 213	Principles of Biological Structure and Function	4
CHEM 101	Introduction to Chemistry	3
CHEM 101L	Introduction to Chemistry Laboratory	1
CHEM 275 or CHEM 277	Carbon Compounds Organic Chemistry I	3
COMM 101	Fundamentals of Oral Communication	2
ECON 202	Principles of Microeconomics	3
FOR/REM 221/WLF 220	Principles of Ecology	3
FOR 235	Society and Natural Resources	3
MATH 160 or MATH 170	Survey of Calculus Calculus I	4

NR 101	Exploring Natural Resources	2
STAT 251	Statistical Methods	3
WLF 102	The Fish and Wildlife Professions	1
WLF 201	Fish and Wildlife Applications	2
WLF 370	Management and Communication of Scientific Data	2
Select one of the following:		3-4
FOR 220	Forest Biology & Dendrology	
REM 341	Systematic Botany	
REM 252 & REM 253	Wildland Plant Identification and Wildland Plant Identification Field Studies	
Select one of the following:		4
GEOL 101 & 101L	Physical Geology and Physical Geology Lab	
PHYS 100 & 100L	Fundamentals of Physics and Fundamentals of Physics Lab	
PHYS 111 & 111L	General Physics I and General Physics I Lab	
SOIL 205 & SOIL 206	The Soil Ecosystem and The Soil Ecosystem Lab	
Third and Fourth Years		
BIOL 310 or GENE 314	Genetics General Genetics	3
FISH 398 or WLF 398	Renewable Natural Resources Internship Renewable Natural Resources Internship	2
FOR 375	Introduction to Spatial Analysis for Natural Resource Management	3
NRS 383	Natural Resource and Ecosystem Service Economics	3
WLF 314	Ecology of Terrestrial Vertebrates	3
WLF 315	Techniques Laboratory	2
WLF 371	Physiological Ecology of Wildlife	2
WLF 411	Wildland Habitat Ecology and Assessment	2
WLF 440	Conservation Biology	3
WLF 448	Fish and Wildlife Population Ecology	4
WLF 492	Wildlife Management	4
Select one of the following:		2-3
COMM 410	Conflict Management	
FOR 484	Forest Policy and Administration	
NRS 250	Environmental Problem Solving	
NRS 386	Social Ecological Systems	
NRS 387	Environmental Communication Skills	
NRS 462	Natural Resource Policy	
NRS 311	Public Involvement in Natural Resource Management	

SOC 465	Environment, Policy, and Justice	
WLF 205	Wildlife Law Enforcement	
Select two Restricted elective courses from the following (must receive a grade of 'C' or better):		7-8
BIOL 483	Mammalogy	
BIOL 489	Herpetology	
FISH 481	Ichthyology	
WLF 482	Ornithology	
Total Hours		91-94

Courses to total 120 credits for this degree

Rationale: We are adding two new courses to our social political electives bin. There is no added workload for students or faculty

Department of Forest, Rangeland, and Fire Sciences

1. Add the following course:

REM 520 Advanced Vegetation Measurement and Monitoring

3 credits

This course introduces theory and application of quantitative and qualitative methods for measuring and monitoring vegetation in grasslands, shrublands, woodlands, and forests. Students will gain a solid understanding of how to measure and evaluate vegetation attributes and design and implement monitoring programs relative to wildlife habitat, livestock forage, fire fuel characteristics, watershed function, and many other wildland values. Advanced Vegetation Measurements and Monitoring includes a 1-hr weekly discussion of current literature on vegetation measurements and the use of monitoring data for natural resource decision making. Recommended Preparation: A basic understanding of how to use computer spreadsheets such as Excel. Students are encouraged to also enroll in REM 460 for field experience in collecting vegetation data that will be used in this course. (Fall only)

Distance Availability: Yes

Rationale: This course has been taught for two years (Fall 2018, Fall 2019) as a REM 504 section. Consistent interest in the class supports making the course permanent, and will help graduate students (especially in MNR) who normally enroll in 410 to recognize this is the companion graduate class. This course will not result in addition to current workloads.

2. Change the following courses:

REM 410 Principles of Vegetation Monitoring and Measurement**2 credits**

This course introduces theory and application of quantitative and qualitative methods for measuring and monitoring vegetation in grasslands, shrublands, woodlands, and forests. Students will gain a solid understanding of how to measure and evaluate vegetation attributes and design and implement monitoring programs relative to wildlife habitat, livestock forage, fire fuel characteristics, watershed function, and many other wildland values. ~~Class field trip required.~~ Recommended Preparation: A basic understanding of how to use computer spreadsheets such as Excel. ~~Students are encouraged to also enroll in REM 411 which builds on the principles of REM 410 for wildland habitat assessment.~~ [Students are encouraged to also enroll in REM 460 for field experience in collecting vegetation data that will be used in this course.](#) [Graduate students should enroll in REM 520 – Advanced Vegetation Measurements and Monitoring.](#) (Fall only)

Prereq: STAT 251 or permission.

Distance Availability: Yes

Rationale: Change of description to recognize that the field trip component of the class is now in REM 460, and encourage graduate students to enroll in REM 520.

REM 459 Rangeland Ecology**~~2~~ 3 credits**

Application of ecological principles in rangeland management; stressing response and behavior of range ecosystems to various kinds and intensity of disturbance and management practice. Recommended Preparation: courses in general ecology (e.g., REM 221), technical writing (e.g., ENGL 317), and vegetation assessment (e.g., REM 410 or FOR 274) or Permission. ~~(Fall only)~~

Distance Availability: Yes

Rationale: Additional content will be included in the course, thus the need to increase the credit hours. No additional faculty workload because the course is already taught by faculty that teaches REM 460 (corequisite), which will be reduced by 1 credit if approved.

REM 460 Integrating GIS and Field Studies in Rangelands**~~2~~ 1 credit**

~~Topics related to changing knowledge and technology related to GIS and spatial analysis relevant to ecology of grasslands, shrublands and woodlands. Min. six integrated GIS labs; one five-day field trip.~~ [Field experiences in rangeland ecology, vegetation measurements, and habitat assessment. The course consists of preparatory lectures and a four-day field trip to rangelands. The course integrates concepts from Principles of Vegetation Monitoring and Measurement \(REM410\), Wildland Habitat Ecology and Assessment \(REM 411\), and Rangeland Ecology \(REM 459\). Students should take this course concurrently with or before REM 410, REM411 and REM 459.](#) Required for REM majors. (Fall only)

[Prereq: Permission](#)

~~Coreq: REM 459.~~

Distance Availability: Yes

Geographical Availability: Idaho rangelands, online.

Rationale: We currently have three field trips in the REM curriculum related to REM410, REM411, REM459. Combining the field trips in this course will result in a better integrated REM curriculum, reduce travel time, and result in a broader understanding of rangeland ecology, vegetation measurements, and habitat assessments. The current GIS component is removed since a GIS course is already a requirement in the REM curriculum. Some of the existing content will be moved to REM459, which will increase by 1 credit if approved. The course will not impact faculty work load and will increase teaching efficiency.

3. Make the following changes to the **B.S.Fire.Ecol.Mgmt. in Fire Ecology and Management:**

Fire Ecology and Management (B.S.Fire.Ecol.Mgmt.)

Students pursuing a B.S. degree in Fire Ecology and Management must receive a grade of 'C' or better in the following indicator courses to register for upper-division courses in the fire core and to graduate with a B.S.Fire.Ecol.Mgmt.:

Fire Core

MATH 143	College Algebra	3
STAT 251	Statistical Methods	3
REM 144	Wildland Fire Management	3
FOR/REM 221	Principles of Ecology	3
FOR 274	Forest Measurement and Inventory	3

Students must also have a minimum cumulative grade-point average of 2.00 in Forest Resource and Rangeland Ecology and Management courses to qualify for the B.S. degree in Fire Ecology and Management.

Required course work includes the university requirements (see regulation J-3) and:

ECON 202	Principles of Microeconomics	3
ENGL 313 or ENGL 317	Business Writing Technical Writing	3
FOR 221	Principles of Ecology	3
FOR 235	Society and Natural Resources	3
FOR 274	Forest Measurement and Inventory	3
FOR 326	Fire Ecology and Management	3
FOR 375	Introduction to Spatial Analysis for Natural Resource Management	3
FOR 427	Prescribed Burning Lab	3

FOR 433	Fire and Fuel Modeling	2
FOR 435 or REM 429	Remote Sensing of Fire Landscape Ecology	3
FOR 450	Fire Behavior	2
FOR 484	Forest Policy and Administration	2
MATH 143 or MATH 160	College Algebra Survey of Calculus	3-4
NR 101	Exploring Natural Resources	2
NRS 383	Natural Resource and Ecosystem Service Economics	3
PHYS 100	Fundamentals of Physics	3
PHYS 100L	Fundamentals of Physics Lab	1
PLSC 205	General Botany	4
REM 144	Wildland Fire Management	3
REM 407	GIS Application in Fire Ecology and Management	2
REM 459	Rangeland Ecology	2
SOIL 205	The Soil Ecosystem	3
SOIL 206	The Soil Ecosystem Lab	1
STAT 251	Statistical Methods	3
Select one of the following:		3-4
FOR 330	Forest Soil and Canopy Processes	
FOR 424	Silviculture Principles and Practices	
REM 456	Integrated Rangeland Management	
Select one of the following:		4
BIOL 114	Organisms and Environments	
BIOL 115 & 115L	Cells & the Evolution of Life and Cells and the Evolution of Life Laboratory	
Select one of the following:		4
CHEM 101 & 101L	Introduction to Chemistry and Introduction to Chemistry Laboratory	
CHEM 111 & 111L	General Chemistry I and General Chemistry I Laboratory	
Select one of the following:		3
FOR 454	Air Quality, Pollution, and Smoke	
GEOG 301	Meteorology	
GEOG 313	Global Climate Change	
Select one of the following:		3-4
FOR 220	Forest Biology & Dendrology	
REM 252	Wildland Plant Identification	
REM 341	Systematic Botany	
Advisor Approved Electives or Approved Minor		15-21
-Rangeland Ecology and Management		
-Forest Resources		

~~Natural Resource Conservation~~~~Natural Resources Economics~~~~Fishery Resources~~~~Wildlife Resources~~~~Ecology~~~~Forest Operations~~~~Renewable Materials~~**Total Hours**~~95-104~~ 76-79**Courses to total 120 credits for this degree**

Rationale: Requirement of advisor approved electives or academic minor removed to increase student likelihood of completing their degree in four years. Many B.S. Fire Ecology and Management students obtaining degree are transfer students. Advisor approved electives and academic minor results in several these students having to extend education beyond four years to meet degree requirements. Removal of advisor approved electives or academic minor is expected to have no impact on the employability of students and adds flexibility for students to pursue other academic interests.

Change in credit hours for REM 459 consistent with proposed course change.

A detailed assessment plan for the curriculum is available on the university's PLO Assessment Plan and Report System. No elements of the assessment plan are affected by the proposed curriculum changes (e.g., the removal of the advisor approved electives or academic minor) and therefore the plan will remain in place.

4. Make the following changes to the **B.S.Rangeland.Consv. in Rangeland Conservation**:

Rangeland Conservation (B.S.Rangeland.Consv.)

This major prepares students to conserve, restore, and manage the vast landscapes known as rangelands. These ecosystems include deserts, prairies, shrublands, and woodlands. The degree program focuses on the scientific study of rangelands and introduces principles for managing and restoring rangelands for maximum benefit and ecosystem sustainability.

Required course work includes the university requirements (see regulation J-3) and:

First and Second Years		
AVS 109 or AVS 110	The Science of Animals that Serve Humanity Science of Animal Husbandry	3-4
BIOL 114	Organisms and Environments	4
BIOL 213 or PLSC 205	Principles of Biological Structure and Function General Botany	4

COMM 101	Fundamentals of Oral Communication	2
ECON 202	Principles of Microeconomics	3
FOR/ REM 221 / WLF 220 or NR 321	Principles of Ecology Ecology	3
FOR 235	Society and Natural Resources	3
MATH 143 or MATH 160	College Algebra Survey of Calculus	3-4
NR 101	Exploring Natural Resources	2
REM 151	Rangeland Principles	3
SOIL 205	The Soil Ecosystem	3
SOIL 206	The Soil Ecosystem Lab	1
STAT 251	Statistical Methods	3
REM 252	Wildland Plant Identification	2
REM 253	Wildland Plant Identification Field Studies	1
Select one of the following:		4
CHEM 101 & 101L	Introduction to Chemistry and Introduction to Chemistry Laboratory	
CHEM 111 & 111L	General Chemistry I and General Chemistry I Laboratory	
Third and Fourth Years		
ENGL 313 or ENGL 317	Business Writing Technical Writing	3
FISH 430 or FOR 462	Riparian Ecology and Management Watershed Science and Management	3
FOR 375	Introduction to Spatial Analysis for Natural Resource Management	3
NRS 383	Natural Resource and Ecosystem Service Economics	3
REM 341	Systematic Botany	3
REM 410	Principles of Vegetation Monitoring and Measurement	2
REM 411	Wildland Habitat Ecology and Assessment	2
REM 456	Integrated Rangeland Management	3
REM 459	Rangeland Ecology	2 3
REM 460	Integrating GIS and Field Studies in Rangelands	2 1
SOIL 454	Pedology	3
Select one of the following:		3-4
REM 280 & PLSC 419	Introduction to Wildland Restoration and Plant Community Restoration Methods	
REM 440	Restoration Ecology	
Career Tracks with Advisor Input and Approval		15
Total Hours		91-94

Students must also complete 15 credits of advisors approved electives contributing to a specific career track that may include:

RESTORATION ECOLOGY - Millions of acres of rangeland and forests have been disturbed by fire, invasive plants, and overgrazing. Academic advisors in rangeland conservation have developed a set of electives for students interested in a career in wildland restoration. Completing these career track electives will fulfill requirements for the Restoration Ecology Undergraduate Academic Certificate. Careful selection of courses can also highlight expertise in botany and plant materials to qualify for professions as a botanist.

WILDLIFE HABITAT - Many species of wildlife live on rangelands and the management of wildlife habitat is an important and sought after skill. With help from their Academic Advisor, rangeland students can complete a career track that will show expertise in wildlife habitat management and fulfill the requirements for a Minor in Wildlife Resources.

LAND AND LIVESTOCK - This career track is for students interested in “hands-on” management of rangelands. Academic Advisors work with students to select courses that provide the knowledge and skills needed to manage rangelands with grazing and fire to enhance livestock production while sustaining communities of native plants and animals. Completion of these courses can also satisfy the requirements for a Minor in Animal Science or Soil Science.

WILDLAND FIRE - Wildfire is one of the major forces causing change on rangeland ecosystems. Completing a specific set of advisor approved electives, will enable students to show knowledge of land management related to wildland fire and fulfill the requirements for a Minor in Fire Ecology and Management.

INDIVIDUAL INTEREST – Students can work with their advisor to select specific courses to show expertise in a career track of specific interest that may include Watershed or Riparian Ecologist, Natural Resource GIS Specialist, Environmental Consultant, Tribal Land Manager, Resource Economist, or many other interests related to rangelands.

Courses to total 122 credits for this degree

Rationale: Change in credit hours for REM 459 and REM 460 consistent with proposed course changes. Adding in alternatives to FOR 221.

5. Make the following changes to the **Restoration Ecology Undergraduate Certificate**:

Restoration Ecology Undergraduate Academic Certificate

FOR/REM 221/WLF 220 or NR 321	Principles of Ecology Ecology	3
REM 280	Introduction to Wildland Restoration	2
REM 440	Restoration Ecology	3
REM 459	Rangeland Ecology	2
SOIL 205	The Soil Ecosystem	3
Select one of the following:		2-3

FOR 324	Forest Regeneration
FOR 326	Fire Ecology and Management
FOR 426	Global Fire Ecology and Management
FOR 451	Fuels Inventory and Management
LARC 480	The Resilient Landscape
PLSC 338	Weed Control
PLSC 410	Invasive Plant Biology
PLSC 419	Plant Community Restoration Methods
REM 407	GIS Application in Fire Ecology and Management
REM 429	Landscape Ecology
SOIL 438	Pesticides in the Environment
SOIL 454	Pedology
WLF 440	Conservation Biology
Total Hours	15-16

Courses to total 16 credits for this certificate

Distance Availability: Yes

Rationale: Expansion of elective courses related to the certificate will increase flexibility for students wishing to complete the certificate. Additionally, the new elective courses are focused on wildland fire which is an important aspect of restoring disturbed ecosystems. With the planned offering of SOIL 205 online in Spring 2020, these additional courses will allow students to complete the undergraduate academic certificate 100% online.

A detailed assessment plan for the curriculum is available on the university's PLO Assessment Plan and Report System. No elements of the assessment plan are affected by the proposed curriculum changes and therefore the plan will remain in place.

Department of Natural Resources and Society

1. Add the following courses:

NRS 478 Lidar and Optical Remote Sensing Analysis Using Open Source Software

3 credits

Joint-listed with NRS 578.

Lidar and optical remote sensing data play a key role in natural resource and environmental research and management. Students will use open-source software to efficiently and effectively work with optical and lidar remote sensing datasets. Topics include introduction to open-source software for LIDAR and optical remote sensing analysis, acquisition and pre-processing of optical and LIDAR remote sensing data, and remote sensing analysis approaches that allow conversion of remotely sensed data into management/research relevant information. This course focuses on development and application of practical skills through project-based learning. For graduate credit,

primary literature review, discussion, and a class project including evaluation and write-up of unique and advanced datasets is also required.

Prereq: STAT 251 and WLF 370; or STAT 427 and NRS/FOR 472.

Distance Availability: Yes

Rationale: This course has been taught as an experimental NRS 404/504 course over the past two years and has been well received. Employer stakeholders (for example, three large Idaho-based natural resource/environmental consulting and management companies) have specifically mentioned the need for more LIDAR and optical remote sensing practical skills training as this is an emerging technology across many natural resource and environmental applications. This course therefore fills a need in the curriculum for a skills-oriented course focused on analysis of optical and LIDAR remote sensing data. The course will serve as a bridge between introductory data management courses and more advanced discipline specific remote sensing applications courses.

NRS 556 Team Leadership for Environmental Educators

1 credit

This course provides participants with the theoretical understandings and practical tools needed to develop an effective leadership practice. Students will be asked to build upon their life experience and their experience at MOSS to provide context for discussions and practice. Topics to be covered include group dynamics, strengths-based personal development, conflict resolution, and a survey of popular leadership theory. Offered only in McCall, offered only in Fall.

Geographical Area: McCall Field Campus, MOSS

Rationale: The proposed change of splitting the leadership curriculum from one to two semesters provides the students with several opportunities. The first benefit is allowing the students additional time for reflection and dedication to all course work in a more balanced workload over the two semesters. The opportunity to have the leadership courses over two semesters supports the students' experiences as members of a residential cohort and a focus on community leadership theory is directly applicable. No anticipated changes in department workload.

NRS 557 Community Leadership for Environmental Educators

1 credit

This course explores the leadership theories and tools needed to create culture, build trust, and maintain efficiencies within small and large organizations. In particular, it will explore how organizations and teams confront change in order to find success. Students will be asked to build upon their life experience and their experience at MOSS to provide context for discussions and practice. Offered only in McCall, only offered spring.

Geographical Area: McCall Field Campus, MOSS

Rationale: The proposed change of splitting the leadership curriculum from one to two semesters provides the students with several opportunities. The first benefit is allowing the students additional time for reflection and dedication to all course work in a more balanced workload over the two semesters. The opportunity to have the leadership courses over two semesters supports the students' experiences as members of a residential cohort and a focus on community leadership theory is directly applicable. No anticipated changes in department workload.

NRS 576 Environmental Project Management and Decision Making

2 credits

Integrated, interdisciplinary approaches to environmental project and program management and decision making. Emphasis on environmental planning techniques, scenario development, analysis, and application of geospatial tools such as GIS and remote sensing. Direct experience and basic skills for project and program development and evaluation.

Distance Availability: Yes

Rationale: This course has already been offered as an experimental 504 course and was well received. Our enrollment in the online MNR and Environmental Science programs has steadily increased in recent years, and this course was developed in consultation with (and at the request of) several employer stakeholders and the CNR Advisory Board. Online students taking this course are often professionals who are looking to add skillsets in order to advance in their careers and the mix of practical and theoretical skills in this course is designed for these students.

NRS 578 Lidar and Optical Remote Sensing Analysis Using Open Source Software

3 credits

Joint-listed with NRS 478.

Lidar and optical remote sensing data play a key role in natural resource and environmental research and management. Students will use open-source software to efficiently and effectively work with optical and LIDAR remote sensing datasets. Topics include introduction to open-source software for LIDAR and optical remote sensing analysis, acquisition and pre-processing of optical and LIDAR remote sensing data, and remote sensing analysis approaches that allow conversion of remotely sensed data into management/research relevant information. This course focuses on development and application of practical skills through project-based learning. For graduate credit, primary literature review, discussion, and a class project including evaluation and write-up of unique and advanced datasets is also required.

Prereq: STAT 251 and WLF 370; or STAT 427 and NRS/FOR 472.

Distance Availability: Yes

Rationale: This course has been taught as an experimental NRS 404/504 course over the past two years and has been well received. Employer stakeholders (for example, three large Idaho-based natural resource/environmental consulting and management companies) have specifically

mentioned the need for more LIDAR and optical remote sensing practical skills training as this is an emerging technology across many natural resource and environmental applications. This course therefore fills a need in the curriculum for a skills-oriented course focused on analysis of optical and LIDAR remote sensing data. The course will serve as a bridge between introductory data management courses and more advanced discipline specific remote sensing applications courses.

NRS 588 NEPA in Policy and Practices

3 credits

In-depth review of the National Environmental Policy Act (NEPA), its legislative background and history, significant case law, and Council of Environmental Quality (CEQ) Guidelines. Students will review examples of agency Categorical Exclusions, Environmental Assessments, and Environmental Impact Statements. Students will evaluate whether specific documents "meet the intent or spirit" of NEPA, compare state vs. federal NEPA regulations, and review at least one federal agency's NEPA procedures.

Distance Availability: Yes

Rationale: This course has been taught as an experimental NRS 404/504 course two times over the past two years and has been well received. The initial course development occurred in collaboration with external stakeholders in the natural resource and environmental professions. Up to this point the workload has been focused on offering during the summer and we will continue with summer offerings, with possible expansion to regular academic year offerings in future years.

2. Drop the following course:

NRS 385 Conservation Management and Planning - I

4 credits

Theory and practice of decision-making for conservation planning and management, including protected areas, working landscapes, conservation organizations and the challenges facing natural resource managers in the 21st Century. Field trips and a collaborative group community Service-Learning project are required. (Fall only)

Rationale: Course is no longer taught due to evolution of the NRS department and curriculum. For example, a new 4cr course (NRS 476: Environmental Project Management and Decision Making) is now offered as the Senior Experience course in NRS and reflects the evolution of the curriculum that makes discontinuing NRS 385 a necessary yet strategic decision.

3. Change the following courses:

NRS 386 ~~Social-Ecological~~ Managing Complex Environmental Systems**3 credits**

Cross-listed with ENVS 386.

~~Social-ecological~~ Complex environmental systems are comprised of interconnected social, economic, and environmental components. Explore ~~social-ecological~~ complex environmental systems frameworks and fundamental principles of sustainability in these social-ecological systems by examining theory and practice in case studies. Topics may include natural resource scarcity and human conflict, ecosystem service provision, management, and conservation, and land tenure, rights, and justice relating to human access to natural resources.

Rationale: The new name and description better reflect the content and intent of the course relative to student needs. The changes also better delineate this course from others that address humans, the environment, and natural resources interact as a system.

NRS 476 Environmental Project Management and Decision Making**4 credits**

Gen Ed: Senior Experience

Integrated, interdisciplinary approaches to project and program management and decision making. Emphasis on environmental planning techniques, scenario development, analysis, and application of geospatial tools such as GIS and remote sensing. Direct experience and basic skills for project and program development and evaluation.

~~Prereq: NRS 311.~~

Rationale: Course does not build from NRS 311 in a unique way. The relevant course material is now fully covered in this course and eliminating this prerequisite allows broader student enrollment in this Senior Experience Course.

3. Make the following changes to the **B.S.Nat.Resc.Consv. in Natural Resource Conservation**:**Natural Resource Conservation (B.S.Nat.Resc.Consv.)**

Required Course work includes the university requirements (see regulation J-3) and:

ECON 202	Principles of Microeconomics	3
FOR 221	Principles of Ecology	3
FOR 375	Introduction to Spatial Analysis for Natural Resource Management	3
NR 101	Exploring Natural Resources	2
NRS 125	Introduction to Conservation and Natural Resources	3
NRS 235	Society and Natural Resources	3
NRS 310	Social Science Methods	4
NRS 311	Public Involvement in Natural Resource Management	3

NRS 383	Natural Resource and Ecosystem Service Economics	3
NRS 387	Environmental Communication Skills	3
NRS 498	Internship	1-6
STAT 251	Statistical Methods	3
Select one of the following:		3-4
MATH 143	College Algebra	
MATH 160	Survey of Calculus	
MATH 170	Calculus I	
Emphases		
Select one of the following emphases:		50-72
Conservation Planning and Management		
Conservation Science		
Total Hours		87-115

A. Conservation Planning and Management Emphasis

To graduate a student must earn an average GPA 2.30 or higher in all NRS courses.

COMM 101	Fundamentals of Oral Communication (or One semester of a foreign language course)	2-4
ENGL 207 or ENGL 208	Persuasive Writing Personal & Exploratory Writing	3
ENVS 225 or IS 322	International Environmental Issues Seminar International Environmental Organizations	3
NRS 364	Politics of the Environment	3
NRS 462	Natural Resource Policy	3
NRS 475	Local and Regional Environmental Planning	3
NRS 476	Environmental Project Management and Decision Making	4
POLS 101 or POLS 275	American National Government American State and Local Government	3
PSYC 101	Introduction to Psychology	3
SOC 101	Introduction to Sociology	3
Select one of the following:		4
BIOL 102 & 102L	Biology and Society and Biology and Society Lab	
BIOL 115 & 115L	Cells & the Evolution of Life and Cells and the Evolution of Life Laboratory	
Select one of the following:		3
ENGL 313	Business Writing	
ENGL 316	Environmental Writing	
ENGL 317	Technical Writing	
ENGL 322	Studies in Environmental Literature and Culture	
Select one of the following:		3

AGEC 477	Law, Ethics and the Environment	
ENVS 479	Introduction to Environmental Regulations	
NRS 386	Social-Ecological Systems	
Select one of the following:		4
CHEM 101 & 101L	Introduction to Chemistry and Introduction to Chemistry Laboratory	
CHEM 111 & 111L	General Chemistry I and General Chemistry I Laboratory	
GEOL 101 & 101L	Physical Geology and Physical Geology Lab	
Select one of the following:		3-4
NRS/FOR 472	Remote Sensing of the Environment	
FOR 435	Remote Sensing of Fire	
NRS/REM 440	Restoration Ecology	
NRS 478	Lidar and Optical Remote Sensing Analysis Using Open Source Software	
Select one of the following:		3-4
BIOL 314	Ecology and Population Biology	
FOR 326	Fire Ecology and Management	
NRS 450	Global Environmental Change	
REM 429	Landscape Ecology	
REM 340	Ethnobotany	
REM 459 & REM 460	Rangeland Ecology and Integrating GIS and Field Studies in Rangelands	
WLF 370	Management and Communication of Scientific Data	
WLF 440	Conservation Biology	
Contract Courses ¹		12-18
Total Hours		62-72

Courses to total 120 credits for this degree

- ¹ Students must submit a contract for a minimum of 12 credits, completed through prior consultation and approval from the faculty advisor. Courses taken to fulfill major requirements above cannot be double counted for contract courses. All contract courses must be upper division (University of Idaho 3xx, 4xx, or 5xx level courses). Students may fulfill their contract requirement by completing a University approved minor, certificate, or approved study abroad experience. Students are encouraged to make choices that strengthen their expertise and demonstrate proficiency in an area of professional interest. See the University of Idaho General Catalog for a list of approved minors and certificates. (<http://www.uidaho.edu/registrar/classes/catalogs>)

B. Conservation Science Emphasis.

To graduate a student must earn an average GPA of 2.00 or higher in all courses taught in the College of Natural Resources and complete an approved professional work experience in natural resources.

NRS 364 or NRS 462	Politics of the Environment Natural Resource Policy	3
Select one writing course:		3
ENGL 207	Persuasive Writing	
ENGL 208	Personal & Exploratory Writing	
ENGL 313	Business Writing	
ENGL 316	Environmental Writing	
ENGL 317	Technical Writing	
Select one of the following:		3-4
NRS 475	Local and Regional Environmental Planning	
NRS 476	Environmental Project Management and Decision Making	
NRS 490	Wilderness and Protected Area Management	
Select one of the following:		4
CHEM 101 & 101L	Introduction to Chemistry and Introduction to Chemistry Laboratory	
CHEM 111 & 111L	General Chemistry I and General Chemistry I Laboratory	
Select one of the following:		4
BIOL 114	Organisms and Environments	
BIOL 115 & 115L	Cells & the Evolution of Life and Cells and the Evolution of Life Laboratory	
Natural Resource Science Restricted Electives		33
Select 33 credits of Natural Resource Science Restricted electives from the following (at least 15 credits must be at the 400-level):		
<i>Fishery Science</i>		
Select at least 6 credits from the following:		
FISH 314	Fish Ecology	
FISH 315	Fish Ecology Field Techniques and Methods	
FISH 415	Limnology	
FISH 418	Fisheries Management	
FISH 422	Concepts in Aquaculture	
FISH 424	Fish Health Management	
FISH 430	Riparian Ecology and Management	
<i>Fire Ecology and Management</i>		
Select at least 2 credits from the following:		
FOR 326	Fire Ecology and Management	
FOR 433	Fire and Fuel Modeling	

FOR 450	Fire Behavior
FOR 454	Air Quality, Pollution, and Smoke
Forestry and Renewable Materials	
Select at least 9 credits from the following:	
FOR 220	Forest Biology & Dendrology
FOR 275	Forestry Resource Sampling
FOR 324	Forest Regeneration
FOR 330	Forest Soil and Canopy Processes Terrestrial Ecosystem Ecology
FOR 424	Silviculture Principles and Practices
FOR 430	Forest Operations
FOR 431	Low Volume Forest Roads
FOR 436	Cable Systems
FOR 462	Watershed Science and Management
FOR 468	Forest and Plant Pathology
FOR 472	Remote Sensing of the Environment
RMAT 321	Properties of Renewable Materials
RMAT 436	Biocomposites
RMAT 438	Introduction to Lignocellulosic Chemistry
RMAT 444	Primary Products Manufacturing
RMAT 450	Biomaterials Deterioration and Protection
RMAT 491	Biomaterial Product and Process Development Lab
RMAT/MKTG 495	Product Development and Brand Management
Rangeland Ecology and Management	
Select at least 6 credits from the following:	
REM 341	Systematic Botany
REM 410	Principles of Vegetation Monitoring and Measurement
REM 411	Wildland Habitat Ecology and Assessment
REM 429	Landscape Ecology
REM 440	Restoration Ecology
REM 452	Western Wildland Landscapes
REM 456	Integrated Rangeland Management
REM 459	Rangeland Ecology
REM 460	Integrating GIS and Field Studies in Rangelands
Wildlife Science	
Select at least 6 credits from the following:	
WLF 314	Ecology of Terrestrial Vertebrates
WLF 315	Techniques Laboratory
WLF 370	Management and Communication of Scientific Data
WLF 440	Conservation Biology
WLF 448	Fish and Wildlife Population Ecology
WLF 482	Ornithology

WLF 492	Wildlife Management	
Total Hours		50-51

Courses to total 120 credits for this degree

Rationale Emphasis A: Courses in this bin are designed to expose students in this major to biophysical courses in the major taught by NRS faculty. The faculty member that teaches FOR 435 is no longer in NRS, while other NRS faculty will be teaching NRS 478. In addition, WLF 370 is a prerequisite for NRS 478 so we offer that as another biophysical course that can help prepare students for a career in the field where scientific data management is becoming increasingly important.

Rationale Emphasis B: This degree emphasis is designed to provide students a broad scientific context that prepares them for a range of natural resource careers. Each of the courses added to the elective bins offer important skillsets that add to the possible career options for students graduating with this major.

4. Make the following changes to the **Remote Sensing of the Environment Undergraduate Certificate**:

Remote Sensing of the Environment Undergraduate Academic Certificate

Requirement A		
FOR 375	Introduction to Spatial Analysis for Natural Resource Management	3
	Remote Sensing/GIS Integration	
or GEOG 483		
<u>FOR/NRS 472</u>	<u>Remote Sensing of the Environment</u>	<u>4</u>
<u>GEOG 483</u>	<u>Remote Sensing/GIS Integration</u>	<u>3</u>
Requirement B		
FOR 435	Remote Sensing of Fire	3
FOR 472	Remote Sensing of the Environment	4
Requirement C B		
	Select one <u>two</u> of the following:	2-3 <u>6</u>
<u>FOR 375</u>	<u>Introduction to Spatial Analysis for Natural Resource Management</u>	
GEOG 424	Hydrologic Applications of GIS and Remote Sensing	
<u>FOR 435</u>	<u>Remote Sensing of Fire</u>	
<u>NRS 478</u>	<u>Lidar and Optical Remote Sensing Analysis Using Open Source Software</u>	
-LARC 395	GIS Applications in Land Planning 1	
-REM 407	GIS Application in Fire Ecology and Management	
-REM 429	Landscape Ecology	
-REM 460	Integrating GIS and Field Studies in Rangelands	
Total Hours		12-13

Courses to total ~~12~~ 13 credits for this certificate

Rationale: The existing certificate program contains several GIS-only practice and applications courses that address remote sensing only indirectly, and would be a better fit for a GIS certificate rather than this one focused on remote sensing. In addition, several new remote sensing courses are now available on campus and this curriculum better reflects the distribution of fundamental theory/practice of RS (the two required courses in Requirement A) and the various applications of RS (Requirement B).

Faculty who contribute to teaching courses included in this certificate met on October 30, 2018 to address three goals: 1) evaluate the required course sequence and options, 2) identify additional teaching needs and opportunities to expand program options so as to support additional enrollment in the certificate, and 3) discuss program learning outcomes and assessment planning. This was an important meeting because it catalyzed a series of outcomes. First, we learned that courses in the sequence were sporadically offered with a schedule that might prohibit successful program completion by students. Second, we identified several areas of need for expanded course offering to both expand student options and increase the scope and sequence available in each semester (in addition to summer session). Third, we had follow up meetings with additional faculty and secured at least two new courses that will be added to the program offering. Finally, we discussed how we might assess student performance in the certificate when not all students enrolled in these courses are in fact pursuing the certificate program. The upshot of these discussions led us to develop this new course sequence and we affirmed this during a meeting this fall. With recent faculty hires in this area, more courses are likely to be added to this list in future years as they make the transition from experimental to permanent status.