Introduction

This inventory of sustainability learning outcomes was developed for Colorado State University's STARS 2.1 submission following the STARS 2.1 credit criteria for AC2: Learning Outcomes.

Methodology

Sustainability Learning Outcomes for undergraduate students at CSU can be defined at the:

- College level (e.g. applying to all graduates from that college)
- Program level (e.g. applying to all graduates in that major or degree program)
- Concentration level (e.g. applying to all graduates within a specific concentration within a major or degree program)
- Certificate level (e.g. applying to all graduates who completed the certificate program)
- At the course level (e.g. applying to all graduates who took a Sustainability Course from AC1 as part of the requirement to complete the program; Courses that Include Sustainability were not counted in this inventory)

Because CSU does not specify learning outcomes at the graduate level, graduate students from sustainability-focused programs cited in AC4 (i.e. college, majors, minors, concentrations, and for-credit certificate programs) as well as identified graduate Sustainability Courses from AC1: Academic Courses were calculated for this credit per the STARS 2.1 Technical Manual (graduate level Courses that Include Sustainability were not counted in this inventory).

In order to complete the most comprehensive assessment possible, CSU examined learning outcomes at a comprehensive level for undergraduate and graduate students who graduated in the 2015-2016 academic year. Institutional Research then cross-listed the CSU student ID numbers to ensure that each student was only counted once. For example, a student graduating in the College of Engineering would be covered by the college's learning outcome but may have also taken several elective or required courses with a sustainability learning outcome and/or may have had a minor with a sustainability learning outcome. Institutional Research cross-listed all student IDs to ensure that each student would only be counted once in the assessment, regardless of how many sustainability learning outcomes may have applied to them during their time at CSU.

CSU has a large number of sustainability-related majors, minors, concentrations, and certificate programs at both the undergraduate and graduate level so a full inventory is attached here (not all are listed out in AC4 but all are available via the websites referenced in AC4). A column has been added to the spreadsheet to indicate major and minors that have been listed by the School of Global Environmental Sustainability

(SoGES). For a complete list of Sustainability Courses, see AC1: Academic Courses (courses that Include Sustainability were not counted in this inventory).

Definitions:

Learning outcome (from STARS 2.1 Technical Manual):

Consistent with the United Nations Educational, Scientific and Cultural Organization (UNESCO), student learning outcomes are defined as:

Statements of what a learner is expected to know, understand, and be able to demonstrate after completion of a process of learning as well as the specific intellectual and practical skills gained and demonstrated by the successful completion of a unit, course, or programme. Learning outcomes, together with assessment criteria, specify the minimum requirements for the award of credit, while grading is based on attainment above or below the minimum requirements for the award of credit. Learning outcomes are distinct from the aims of learning in that they are concerned with the achievements of the learner rather than with the overall intentions of the teacher.

Sustainability learning outcome (from STARS 2.1 Technical Manual):

Sustainability learning outcomes are statements that outline the specific sustainability knowledge and skills that a student is expected to have gained and demonstrated by the successful completion of a unit, course, or program. Learning outcomes do not necessarily have to use the term "sustainability" to count as long as they collectively address sustainability as an integrated concept having social, economic, and environmental dimensions.

Sustainability focused program (from STARS 2.1 Technical Manual):

Sustainability-focused programs are interdisciplinary academic programs that concentrate on sustainability as an integrated concept, including its social, economic, and environmental dimensions. The courses required for the successful completion of the program educate students about how different dimensions of sustainability relate to and support each other in theory and practice. The sustainability focus of such a program should be explicit in the program title or description.

College	College-Level Learning Outcome
College of Business	An understanding of the environmental, social, and economic dimensions of sustainability and how to measure, report, and manage sustainability in organizations
College of Engineering	The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.

MAJOR	COLLEGE	Listed by School of Global Environmental Sustainability	DEGREE	LEARNING OUTCOME
Agricultural Business	Agricultural Sciences	Yes	BS	Students will learn knowledge and skills needed to manage small and medium sized business in agriculture and allied industries. This is true whether the business is directly involved in production, value-adds to raw agricultural products, or provides support services including the distribution, processing, packaging, and marketing of agricultural products.
Agricultural Education	Agricultural Sciences	No	BS	Requires AGED 110, AREC 202, FW 104 (sustainability course from AC1)
Agricultural Extension Education	Agricultural Sciences	No	MAEE	Sustainability-focused program from AC4
Agricultural Sciences	Agricultural Sciences	Yes	MAGR	Sustainability-focused program from AC4
Bioagricultural Sciences	Agricultural Sciences	Yes	MS	Sustainability-focused program from AC4
Bioagricultural Sciences	Agricultural Sciences	Yes	PHD	Sustainability-focused program from AC4
Environmental and Natural Resource Economics	Agricultural Sciences	Yes	BS	Requires AREC 202 (sustainability course from AC1)
Environmental Horticulture	Agricultural Sciences	Yes	BS	Management and leadership skills necessary for a successful career in the green industry. Technical competencies in their understanding of growth and development of horticultural plants and landscapes, including development as influenced by manipulation of horticulture technologies, such as fertility and water management, and integrated pest management for all aspects of landscape horticulture. Skills to assess site issues, provide creative environmentally sound solutions and manage designed, and built landscapes. Analytical and problem solving skills that allow identification of problems related to the management or production of horticultural crops and landscapes, as well as strategies to solve them.
Horticulture	Agricultural Sciences	Yes	MS	Sustainability-focused program from AC4
Horticulture	Agricultural Sciences	Yes	PHD	Sustainability-focused program from AC4
Horticulture	Agricultural Sciences	Yes	BS	Requires HORT 100 (sustainability course from AC1)
Landscape Architecture	Agricultural Sciences	Yes	MLA	Sustainability-focused program from AC4
Landscape Architecture	Agricultural Sciences	Yes	BS	Requires LAND 220 and GEOL 120/122 (sustainability courses from AC1)
Soil and Crop Sciences	Agricultural Sciences	Yes	MS	Students will learn the importance of learning soil and crop science principles in alleviating concerns of rapidly increasing world populations, the demand on land for food supplies, and the demand for environmental quality to enhance human comfort and wellbeing. Special emphasis is placed on improved production efficiency and the conservation of soil, chemicals, energy, plants, and water.

Soil and Crop Sciences	Agricultural Sciences	Yes	PHD	Students will learn the importance of learning soil and crop science principles in alleviating concerns of rapidly increasing world populations, the demand on land for food supplies, and the demand for environmental quality to enhance human comfort and wellbeing. Special emphasis is placed on improved production efficiency and the conservation of soil, chemicals, energy, plants, and water.
Soil and Crop Sciences	Agricultural Sciences	Yes	BS	Students will learn the importance of learning soil and crop science principles in alleviating concerns of rapidly increasing world populations, the demand on land for food supplies, and the demand for environmental quality to enhance human comfort and wellbeing. Special emphasis is placed on improved production efficiency and the conservation of soil, chemicals, energy, plants, and water.
Biomedical Engineering	College of Engineering	Yes	BS	The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.
Environmental Engineering	College of Engineering	Yes	BS	The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.
Systems Engineering	College of Engineering		MS	The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.
Anthropology	College of Liberal Arts	Yes	BS	Students will learn a broad background in geographic thinking with an emphasis on the traditional geographic focus of understanding dynamic interaction between humans and the environment in an era of rapid global change.
Environmental Sociology	College of Liberal Arts	Yes	BS	Students will stand back from commonsense views of the world to understand the structure and processes of a society as a whole, including global societies; translating these tasks into analysis and action around environmental issues.
Construction Management	Health and Human Sciences	Yes	MS	Requires CON 576 (sustainability course from AC1)
Construction Management	Health and Human Sciences	Yes	BS	Students will learn the overall planning, coordination, and control of a project from inception to completion. The CM major addresses issues related to the management of multiple project sites and the applications of resource management, schedule control, cost control, design, and other requirements of the construction process. Design elements concentrate on the relationship between the built environment and the comfort of its inhabitants while safety education emphasizes the health of the individual worker.

INTO Pathways - Civil Engineering - Water Resources	Intra-Programs	Yes	BS	The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.
INTO Pathways - Global Social and Sustainable Enterprise	Intra-Programs	Yes	BS	An understanding of the environmental, social, and economic dimensions of sustainability and how to measure, report, and manage sustainability in organizations
Ecology	Intra-University	Yes	MS	Sustainability-focused program from AC4
Ecology	Intra-University	Yes	PHD	Sustainability-focused program from AC4
Biochemistry	Natural Sciences	Yes	MS	Sustainability-focused program from AC4
Biochemistry	Natural Sciences	Yes	PHD	Sustainability-focused program from AC4
Biochemistry	Natural Sciences	Yes	BS	Students will learn the structure and behavior of the complex molecules found in biological materials and the ways these molecules interact to form cells, tissues, and whole organisms. Biochemistry provides the basis for advances in human and veterinary medicine, agriculture, and biotechnology. Biochemists may participate in interdisciplinary research and development projects alongside chemical engineers, biologists, microbiologists, agronomists, physicians, and other professionals. They investigate the molecular mechanisms of such diseases as AIDS, diabetes, cancer, heart disease and stroke, and develop solutions to environmental problems through biotechnology.
Biological Science	Natural Sciences	Yes	BS	Students will learn the structure and function of cells, organ systems and tissues in animals and plants, ecology (the relationship between living things and their environment), and evolution. They learn about physiology, behavior, genetics and heredity, aquatic toxicology, microscopic organisms such as bacteria, and laboratory techniques for diverse areas ranging from field research to biotechnology. This major provides a solid foundation of understanding in the basic biological sciences.
Botany	Natural Sciences	Yes	MS	Sustainability-focused program from AC4
Botany	Natural Sciences	Yes	PHD	Sustainability-focused program from AC4
Chemistry	Natural Sciences	Yes	MS	Sustainability-focused program from AC4
Chemistry	Natural Sciences	Yes	PHD	Sustainability-focused program from AC4

Chemistry	Natural Sciences	Yes	BS	From the liberal arts chemistry course (chem 103) on up chemistry courses develop chemistry concepts and techniques and apply them to a range of chemical problems including water issues, health, and energy issues. Five sections of the second semester of general chemistry (chem 113) utilize the water tragedy in Flint Michigan as a foundation for discussing acid-base chemistry, redox chemistry, and ionic equilibria. Students then learn to quantitatively measure and mathematically discuss these environmental concepts in Quantitative analysis (chem 335), a required second year course. The use of modern instrumental techniques for carrying out these measurements is learned in Instrumental Analysis (chem 431), a required senior level course.
Natural Sciences	Natural Sciences	Yes	BS	Requires LIFE 220 (sustainability course from AC1)
Zoology	Natural Sciences	Yes	MS	Sustainability-focused program from AC4
Zoology	Natural Sciences	Yes	PHD	Sustainability-focused program from AC4
Environmental Health	Veterinary Med and Biomed Sci	Yes	MS	Effectively communicate the health consequences of actions, behaviors, or environmental degradation to the public, political community, legal experts, or the media. Demonstrate critical thinking and problem solving abilities for environmental issues as an individual and as a member of a problem-solving team. Integrate knowledge in social, physical, and biological sciences to evaluate environmental issues. Apply knowledge of scientific methods to evaluate compliance with environmental health standards and assess risks to workers and the public.
Environmental Health	Veterinary Med and Biomed Sci	Yes	PHD	Effectively communicate the health consequences of actions, behaviors, or environmental degradation to the public, political community, legal experts, or the media. Demonstrate critical thinking and problem solving abilities for environmental issues as an individual and as a member of a problem-solving team. Integrate knowledge in social, physical, and biological sciences to evaluate environmental issues. Apply knowledge of scientific methods to evaluate compliance with environmental health standards and assess risks to workers and the public.
Environmental Health	Veterinary Med and Biomed Sci	Yes	BS	Effectively communicate the health consequences of actions, behaviors, or environmental degradation to the public, political community, legal experts, or the media. Demonstrate critical thinking and problem solving abilities for environmental issues as an individual and as a member of a problem-solving team. Integrate knowledge in social, physical, and biological sciences to evaluate environmental issues. Apply knowledge of scientific methods to evaluate compliance with environmental health standards and assess risks to workers and the public.

Conservation Leadership	Warner Coll of Natural Resrces	Yes	MS	Requires NR 540, NR 541, NR 542 (sustainability courses from AC1)
Earth Sciences	Warner Coll of Natural Resrces	Yes	PHD	Sustainability-focused program from AC4
Ecosystem Science and Sustainability	Warner Coll of Natural Resrces	Yes	BS	Students in the major are learning: How to help people use natural resources in a sustainable way; About environmental change at local and global scales; How they can identify ways people can adapt to change and improve their lives; The amazing connections between different earth system components; How to conduct field work in a variety of settings addressing questions important to sustainability.
Fish, Wildlife, and Conservation Biology	Warner Coll of Natural Resrces	Yes	MFWC	Requires FW 104 (sustainability course from AC1)
Fish, Wildlife, and Conservation Biology	Warner Coll of Natural Resrces	Yes	MS	Requires FW 104 (sustainability course from AC1)
Fish, Wildlife, and Conservation Biology	Warner Coll of Natural Resrces	Yes	PHD	Requires FW 104 (sustainability course from AC1)
Fish, Wildlife, and Conservation Biology	Warner Coll of Natural Resrces	Yes	BS	Requires FW 104 (sustainability course from AC1)
Fishery and Wildlife Biology	Warner Coll of Natural Resrces	Yes	PHD	Demonstrate a mastery of ecological concepts and fundamental principles and techniques to manage and conserve fish and wildlife populations, and how they apply to current natural resource management issues. Demonstrate mathematical, statistical, and study design knowledge and skills required for careers in fishery, wildlife, and conservation biology. Become effective in oral and written communication about issues related to the environment and natural resources, including as members of multi-disciplinary teams. Learn approaches to solving complex natural resource management issues, including planning, organizing, creating, and presenting group projects.
Fishery Biology	Warner Coll of Natural Resrces	Yes	BS	Demonstrate a mastery of ecological concepts and fundamental principles and techniques to manage and conserve fish and wildlife populations, and how they apply to current natural resource management issues. Demonstrate mathematical, statistical, and study design knowledge and skills required for careers in fishery, wildlife, and conservation biology. Become effective in oral and written communication about issues related to the environment and natural resources, including as members of multi-disciplinary teams. Learn approaches to solving complex natural resource management issues, including planning, organizing, creating, and presenting group projects.

Forest Sciences	Warner Coll of Natural Resrces	Yes	MS	Effectively communicate knowledge of forestry and natural resources, both verbally and in writing. Demonstrate proficiency in subject areas outside their major study focus, including principles/issues in wildlife, water, recreation, wilderness, soil, range, and fishery resources. Demonstrate comprehensive knowledge of subject areas relevant to the major fields of study in forest sciences, including forest ecology and forest management, and apply this knowledge in a complex, problem-solving environment.
Forest Sciences	Warner Coll of Natural Resrces	Yes	PHD	Effectively communicate knowledge of forestry and natural resources, both verbally and in writing. Demonstrate proficiency in subject areas outside their major study focus, including principles/issues in wildlife, water, recreation, wilderness, soil, range, and fishery resources. Demonstrate comprehensive knowledge of subject areas relevant to the major fields of study in forest sciences, including forest ecology and forest management, and apply this knowledge in a complex, problem-solving environment.
Forest and Rangeland Stewardship	Warner Coll of Natural Resrces	Yes	BS	Sustainability-focused program from AC4
Geosciences	Warner Coll of Natural Resrces	Yes	MS	A solid foundation in the physical sciences and broad understanding of geological processes. Application of scientific reasoning skills to data analysis and problem solving in the geosciences, both individually and in teams. An awareness of sociopolitical and economic factors and ethical practices and standards that apply to careers in geosciences.
Greenhouse Gas Management and Accounting	Warner Coll of Natural Resrces	Yes	MGMA	Requires ESS 524 & ESS 501 (sustainability courses from AC1)
Human Dimensions of Natural Resources	Warner Coll of Natural Resrces	Yes	MS	Understand collaborative tools for contributing to conservation solutions. Apply social science concepts and techniques to understand and address conservation problems. Attain a breadth of understanding of how different social science disciplines can contribute to conservation. Describe the linkages between conservation and human livelihoods, ecosystem services and human well-being. Practice and use adaptive and effective planning and environmental communication techniques. Practice and use core principles of protected area management. Become adept at conservation problem solving and linking knowledge understanding and practice.

Human Dimensions of Natural Resources	Warner Coll of Natural Resrces	Yes	PHD	Understand collaborative tools for contributing to conservation solutions. Apply social science concepts and techniques to understand and address conservation problems. Attain a breadth of understanding of how different social science disciplines can contribute to conservation. Describe the linkages between conservation and human livelihoods, ecosystem services and human well-being. Practice and use adaptive and effective planning and environmental communication techniques. Practice and use core principles of protected area management. Become adept at conservation problem solving and linking knowledge understanding and practice.
Human Dimensions of Natural Resources	Warner Coll of Natural Resrces	Yes	BS	Understand collaborative tools for contributing to conservation solutions. Apply social science concepts and techniques to understand and address conservation problems. Attain a breadth of understanding of how different social science disciplines can contribute to conservation. Describe the linkages between conservation and human livelihoods, ecosystem services and human well-being. Practice and use adaptive and effective planning and environmental communication techniques. Practice and use core principles of protected area management. Become adept at conservation problem solving and linking knowledge understanding and practice.
Master of Tourism Management	Warner Coll of Natural Resrces	Yes	MTM	Sustainability-focused program from AC4
Natural Resorces Management	Warner Coll of Natural Resrces	Yes	BS	Requires NR 120 (sustainability course from AC1)
Natural Resources Stewardship	Warner Coll of Natural Resrces	Yes	MNRS	Sustainability-focused program from AC4
Rangeland Ecosystem Science	Warner Coll of Natural Resrces	Yes	MS	Sustainability-focused program from AC4
Rangeland Ecosystem Science	Warner Coll of Natural Resrces	Yes	PHD	Sustainability-focused program from AC4
Watershed Science	Warner Coll of Natural Resrces	Yes	MS	Sustainability-focused program from AC4
Watershed Science	Warner Coll of Natural Resrces	Yes	BS	Sustainability-focused program from AC4

Wildlife Biology	Warner Coll of Natural Resrces	Yes	BS	Demonstrate a mastery of ecological concepts and fundamental principles and techniques to manage and conserve fish and wildlife populations, and how they apply to current natural resource management issues. Demonstrate mathematical, statistical, and study design knowledge and skills required for careers in fishery, wildlife, and conservation biology. Become effective in oral and written communication about issues related to the environment and natural resources, including as members of multi-disciplinary teams. Learn approaches to solving complex natural resource management issues, including planning, organizing, creating, and presenting group projects.

Minor	College/Program of Study Description	Listed by School of Global Environmental Sustainability	Learning Outcome
Global Environmental Sustainability	Interdisciplinary	Yes	Requires GES 101 (sustainability course from AC1)
Agricultural and Resource Economics	College of Agricultural Sciences	Yes	Requires AREC 202 (sustainability course from AC1)
Agricultural Literacy	College of Agricultural Sciences		Requires AGED 110 (sustainability course from AC1)
Applied Environmental Policy	College of Liberal Arts		At the end of the minor students will be able to recall and explain the basic rationales for public policies; be able to apply rigorous research methods for evaluating policy; and be able to integrate the elements of theory, methods, problem structuring, ethics, analysis and argumentation to generate reports useable in government and nonprofit management.
Anthropology	College of Liberal Arts	Yes	Requires ANTH 200 (sustainability course from AC1)
Botany and Zoology	College of Natural Sciences	Yes	Students will learn the study of plants and plant-like organisms from microscopic algae to giant redwoods, from mushrooming fungi to flowering angiosperms. Plant anatomy, how plants grow and develop, and how they survive and interrelate within their environments.
Chemistry	College of Natural Sciences	Yes	From the liberal arts chemistry course (chem 103) on up chemistry courses develop chemistry concepts and techniques and apply them to a range of chemical problems including water issues, health, and energy issues. Five sections of the second semester of general chemistry (chem 113) utilize the water tragedy in Flint Michigan as a foundation for discussing acid-base chemistry, redox chemistry, and ionic equilibria. Students then learn to quantitatively measure and mathematically discuss these environmental concepts in Quantitative analysis (chem 335), a required second year course. The use of modern instrumental techniques for carrying out these measurements is learned in Instrumental Analysis (chem 431), a required senior level course.
Conservation Biology	College of Natural Sciences	Yes	Students learn about the molecules of life in general chemistry (chem 103, 107, and 111) and how they are impacted by the environment and follow this up with a more detailed development in organic chemistry (chem 341), a required second year course.
Ecological Restoration	Ecological Restoration	Yes	The foundational concept of energy is discussed in general chemistry and developed in Physical Chemistry (chem 474 and chem 475).

Energy Engineering	Interdisciplinary		Students in Engineering and the sciences will learn an understanding of renewable and non-renewable energy systems; clean energy technologies; basic principles of operation of energy extraction, conversion, storage, and transmission systems; and depth in current and new energy methods and applications (e.g., PV, batteries, biofuels, etc.).
Environmental Affairs	College of Liberal Arts	Yes	Student will address domestic and international issues of concern with both current and historical perspectives, and with a well-rounded program of study with environmental courses from 6 colleges.
Environmental Engineering	College of Engineering	Yes	The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.
Environmental Health	Organic Agriculture Interdisciplinary	Yes	Requires AREC 202 (sustainability course from AC1)
Environmental Horticulture	College of Agricultural Sciences		Requires HORT 100 (sustainability course from AC1)
Food Science and Safety	Interdisciplinary		Provide students with the interdisciplinary background necessary for understanding the roles and responsibilities of growers, producers, processors, retailers, consumers, and others working within the food system to ensure that food is safe and healthful.
Forestry	Warner College of Natural Resources		Effectively communicate knowledge of forestry and natural resources, both verbally and in writing. Demonstrate proficiency in subject areas outside their major study focus, including principles/issues in wildlife, water, recreation, wilderness, soil, range, and fishery resources. Demonstrate comprehensive knowledge of subject areas relevant to the major fields of study in forest sciences, including forest ecology and forest management, and apply this knowledge in a complex, problem-solving environment.
Geography	Anthropology	Yes	Students will learn the critical interactions among space, place, people and the built and natural environment to interpret the spatial and temporal distribution of features and processes, applying spatial techniques and information technologies such as Geographic Information Systems (GIS) and remote sensing.
Geology	Geosciences	Yes	Requires either GEOL 120, GEOL 122 or GEOL 124 (sustainability courses from AC1)
Horticulture	College of Agricultural Sciences	Yes	Requires HORT 101 (sustainability course from AC1)
Integrated Resource Management	Interdisciplinary		Requires LAND 220 (sustainability course from AC1)
International Development	Interdisciplinary		Introduce students to international development through a variety of approaches and practices. Students will facilitate critical thinking about issues such as poverty, ethics, and global interdependence.

Organic Agriculture	Environmental Health	Yes	Requires AREC 202 (sustainability course from AC1)
Organic Agriculture	Interdisciplinary	Yes	Requires AREC 202 (sustainability course from AC1)
International Peace and Reconciliantion	Interdisciplinary	Yes	Students will learn more about the ideas that underlie nonviolent conflict resolution, effective communication, cooperation, and mediation within cross-cultural contexts and will help students evaluate how peace and reconciliation can impact their beliefs, choices, and actions.
Sustainable Peace and Reconcilitation Studies	Interdisciplinary		Students will learn more about the ideas that underlie nonviolent conflict resolution, effective communication, cooperation, and mediation within cross-cultural contexts and will help students evaluate how peace and reconciliation can impact their beliefs, choices, and actions.
Plant Health	College of Agricultural Sciences		Students explore ecology, tree health, horticulture, and understanding living systems
Range Ecology	Warner College of Natural Resources		Provides an academic background for students interested in wildlife habitat, integrated land management, ranch management, applied ecology, and international development of arid lands.
Soil Restoration and Conservation	Soil Resources & Conservation	Yes	Students will learn the importance of learning soil and crop science principles in alleviating concerns of rapidly increasing world populations, the demand on land for food supplies, and the demand for environmental quality to enhance human comfort and wellbeing. Special emphasis is placed on improved production efficiency and the conservation of soil, chemicals, energy, plants, and water.
Soil Science	College of Agricultural Sciences	Yes	Students will learn the importance of learning soil and crop science principles in alleviating concerns of rapidly increasing world populations, the demand on land for food supplies, and the demand for environmental quality to enhance human comfort and wellbeing. Special emphasis is placed on improved production efficiency and the conservation of soil, chemicals, energy, plants, and water.
Sustainable Water	Interdisciplinary	Yes	Requires AREC 240 (sustainability course from AC1)
Watershed Science	Warner College of Natural Resources		Provide students with an experiential learning opportunity in the watershed practicum field course with additional coursework that emphasizes physical, bio-chemical, and societal aspects of water.

Concentration	Major	College	Learning Outcome
Agricultural Economics	Agricultural and Resource Economics	College of Agricultural Sciences	Sustainability-focused program from AC4
Agricultural Literacy	Agricultural and Resource Economics	College of Agricultural Sciences	Sustainability-focused program from AC4
Botany	Biological Science	Natural Sciences	Students will learn the study of plants and plant-like organisms from microscopic algae to giant redwoods, from mushrooming fungi to flowering angiosperms. Plant anatomy, how plants grow and develop, and how they survive and interrelate within their environments.
Conservation and Management	Rangeland Ecology	Warner College of Natural Resources	Accurately and effectively communicate their understanding of rangeland ecology both verbally and in written form. Demonstrate learning of subject areas outside their major study focus, including (but not restricted to) principles/issues in wildlife, water, recreation, wilderness, soil, range, and fishery resources; students will also demonstrate knowledge of social science analytic techniques. Demonstrate comprehensive knowledge of subject areas relevant to the major fields of study in range ecology and management, including plant/animal interactions, grazing methods, range improvements, animal nutrition, plant ecology, and soil science, and apply this knowledge in a complex, problem-solving environment.
Conservation Biology	Fish, Wildlife and Conservation Biology	Warner College of Natural Resources	Students will address contemporary environmental issues that deal with biological diversity and program will prepare students to play an active role in the maintenance of biological diversity.
Conservation Biology	Natural Resource Stewardship	Warner College of Natural Resources	Students will address contemporary environmental issues that deal with biological diversity and program will prepare students to play an active role in the maintenance of biological diversity.
Earth Science	Geosciences	Warner College of Natural Resources	Sustainability-focused program from AC4
Ecological Engineering	Environmntal Engineering	College of Engineering	The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.
Ecological Restoration	Natural Resource Stewardship	Warner College of Natural Resources	Sustainability-focused program from AC4

Ecosystem Science and Sustainability	Ecosystem Science and Sustainability	Warner College of Natural Resources	Students in the major are learning: How to help people use natural resources in a sustainable way. About environmental change at local and global scales. How they can identify ways people can adapt to change and improve their lives. The amazing connections between different earth system components. How to conduct field work in a variety of settings addressing questions important to sustainability.
Environmental Communication	Human Dimensions of Natural Resources	Warner College of Natural Resources	Develops expertise in communicating with and educating the public in order to enhance enjoyment of natural resources and facilitate informed public participation in the decision making process.
Environmental Communication	Natural Resource Recreation Tourism	Warner College of Natural Resources	Develop expertise in communicating with and educating the public in order to enhance enjoyment of natural resources and facilitate informed public participation in the decision making process.
Environmental Geology	Geology	College of Engineering	Students develop expertise in surface and shallow-subsurface processes that shape the Earth and provide important soil and water resources and services for human and natural use. Graduates will be prepared for employment opportunities that address environmental implications of geological process and human activities on Earth.
Environmental Politics and Policy	Political Science	College of Liberal Arts	Students will develop the knowledge and skills to analyze the connections between politics and the natural world to pursue careers in environmental politics and policy-making. Students will learn about how political forces contribute to environmental degradation, the process for developing environmental policies, strategies to assess the strengths and weaknesses of different policy approaches, and how political forces can be harnessed to develop effective responses to problems such as climate change, water and air pollution, food security, and energy provision. Students will explore these issues from both domestic and global perspectives.

Environmental Sociology	Sociology	College of Liberal Arts	Stand back from commonsense views of the world and understand the structure and processes of a society as a whole, including global societies, and translate these tasks into analysis and action around environmental issues. Students will find the concentration helpful in preparing them for a growing number of jobs that have a focus in environmentally related matters.
Environmental Soil Science	Soil and Crop Sciences	College of Agricultural Sciences	Students will learn the importance of learning soil and crop science principles in alleviating concerns of rapidly increasing world populations, the demand on land for food supplies, and the demand for environmental quality to enhance human comfort and wellbeing. Special emphasis is placed on improved production efficiency and the conservation of soil, chemicals, energy, plants, and water.
Farm and Ranch Management	Agricultural and Resource Economics	College of Agricultural Sciences	Sustainability-focused program from AC4
Fisheries & Aquatic Sciences	Fish, Wildlife and Conservation Biology	Warner College of Natural Resources	Students will address contemporary environmental issues that deal with biological diversity and program will prepare students to play an active role in the maintenance of biological diversity.
Floriculture	Horticulture & Landscape Archt	College of Agricultural Sciences	Students learn propagation, production, utilization, and improvement techniques of plants, and are prepared to grow quality greenhouse products.
Food Safety and Nutrition	Nutrition and Food Science	College of Agricultural Sciences	Students will be prepared for employment in the food industry or in government in such areas as quality assurance, product development, research, food inspection, sensory evaluation, and consumer education. The concentration also provides an excellent background for a graduate program. Students in the concentration are encouraged to participate in the interdisciplinary minor in Food Science/Safety to further their understanding of the continuum of responsibility shared through the food system in ensuring that food is safe and healthful.
Forest Biology	Forestry	Warner College of Natural Resources	Students learn about forest ecology and tree biology; prepares students for graduate studies in forest biological sciences and eventual careers in teaching or research.

Forest Fire Science	Forestry	Warner College of Natural Resources	Students learn how to control wildfires and how prescribed fires can enhance habitat, prepare seedbeds, control forest insects and disease, and reduce fuel hazards.
Forest Management	Forestry	Warner College of Natural Resources	Students learn about forest productivity, economics, policy, conservation, and the latest in computer-based management tools.
Forest Sciences	Natural Resource Stewardship	Warner College of Natural Resources	Sustainability-focused program from AC4
Foresty	Forest and Rangeland Stewardship	Warner College of Natural Resources	Effectively communicate knowledge of forestry and natural resources, both verbally and in writing. Demonstrate proficiency in subject areas outside their major study focus, including principles/issues in wildlife, water, recreation, wilderness, soil, range, and fishery resources. Demonstrate comprehensive knowledge of subject areas relevant to the major fields of study in forest sciences, including forest ecology and forest management, and apply this knowledge in a complex, problem-solving environment.
Global Social and Sustainable Enterprise	Business Administration	College of Business	An understanding of the environmental, social, and economic dimensions of sustainability and how to measure, report, and manage sustainability in organizations
Global Tourism	Human Dimensions of Natural Resources	Warner College of Natural Resources	Understand collaborative tools for contributing to conservation solutions. Apply social science concepts and techniques to understand and address conservation problems. Attain a breadth of understanding of how different social science disciplines can contribute to conservation. Describe the linkages between conservation and human livelihoods, ecosystem services and human well-being. Practice and use adaptive and effective planning and environmental communication techniques. Practice and use core principles of protected area management. Become adept at conservation problem solving and linking knowledge understanding and practice.
Horticultural Food Crops	Horticulture & Landscape Archt	College of Agricultural Sciences	Sustainability-focused program from AC4
Horticultural Science	Horticulture & Landscape Archt	College of Agricultural Sciences	Sustainability-focused program from AC4
Horticultural Therapy	Horticulture & Landscape Archt	College of Agricultural Sciences	Sustainability-focused program from AC4
Human Environment Interactions	Ecology	Warner College of Natural Resources	Sustainability-focused program from AC4
Hydrogeology	Geosciences	Warner College of Natural Resources	Sustainability-focused program from AC4
Hydrology	Geosciences	Warner College of Natural Resources	Sustainability-focused program from AC4

International Soil and Crop Sciences	Soil and Crop Sciences	College of Agricultural Sciences	Students will learn the importance of learning soil and crop science principles in alleviating concerns of rapidly increasing world populations, the demand on land for food supplies, and the demand for environmental quality to enhance human comfort and wellbeing. Special emphasis is placed on improved production efficiency and the conservation of soil, chemicals, energy, plants, and water.
Natural Resouces Management	Forest and Rangeland Stewardship	Warner College of Natural Resources	Students will: Demonstrate knowledge of a wide range of natural resource topics spanning ecological, social and physical aspects of wildland ecosystems; Demonstrate proficiency in an area of specialization through completion of a minor in an area complementary to natural resource management. Some minors that students find well-suited to develop a proficiency are Global Environmental Sustainability, Forestry, Rangeland Ecology, Ecological Restoration, Watershed Science, Conservation Biology, or Environmental Affairs, though there are many additional options; Be able to apply their broad natural resources knowledge to create sustainable solutions at local, national, and global scales; Accurately communicate their knowledge of natural resources, both verbally and in written form
Natural Resource Economics	Agricultural and Resource Economics	College of Agricultural Sciences	Sustainability-focused program from AC4
Natural Resource Tourism	Natural Resource Recreation Tourism	Warner College of Natural Resources	Develop appropriate skills for work in sustainable recreation and tourism enterprises; students will gain cross-cultural experience by learning a second language, studying at a university abroad, and participating in an international internship.
Organic Agriculture	Soil and Crop Sciences	College of Agricultural Sciences	Students will learn the importance of learning soil and crop science principles in alleviating concerns of rapidly increasing world populations, the demand on land for food supplies, and the demand for environmental quality to enhance human comfort and wellbeing. Special emphasis is placed on improved production efficiency and the conservation of soil, chemicals, energy, plants, and water.

Parks and Protected Areas Management	Human Dimensions of Natural Resources	Warner College of Natural Resources	Understand collaborative tools for contributing to conservation solutions. Apply social science concepts and techniques to understand and address conservation problems. Attain a breadth of understanding of how different social science disciplines can contribute to conservation. Describe the linkages between conservation and human livelihoods, ecosystem services and human well-being. Practice and use adaptive and effective planning and environmental communication techniques. Practice and use core principles of protected area management. Become adept at conservation problem solving and linking knowledge understanding and practice.
Plant Biotechnology	Soil and Crop Sciences	College of Agricultural Sciences	Students will learn the importance of learning soil and crop science principles in alleviating concerns of rapidly increasing world populations, the demand on land for food supplies, and the demand for environmental quality to enhance human comfort and wellbeing. Special emphasis is placed on improved production efficiency and the conservation of soil, chemicals, energy, plants, and water.
Rangeland Ecology	Forest and Rangeland Stewardship	Warner College of Natural Resources	Students will: Demonstrate knowledge of a wide range of natural resource topics spanning ecological, social and physical aspects of wildland ecosystems; Demonstrate proficiency in an area of specialization through completion of a minor in an area complementary to natural resource management. Some minors that students find well-suited to develop a proficiency are Global Environmental Sustainability, Forestry, Rangeland Ecology, Ecological Restoration, Watershed Science, Conservation Biology, or Environmental Affairs, though there are many additional options; Be able to apply their broad natural resources knowledge to create sustainable solutions at local, national, and global scales; Accurately communicate their knowledge of natural resources, both verbally and in written form
Rangeland Ecosystems	Natural Resource Stewardship	Warner College of Natural Resources	Sustainability-focused program from AC4

Restoration Ecology	Rangeland Ecology	Warner College of Natural Resources	Provides students with skills important to restoration and rehabilitation of damaged rangeland ecosystems.
Soil Ecology	Soil and Crop Sciences	College of Agricultural Sciences	Students will learn the importance of learning soil and crop science principles in alleviating concerns of rapidly increasing world populations, the demand on land for food supplies, and the demand for environmental quality to enhance human comfort and wellbeing. Special emphasis is placed on improved production efficiency and the conservation of soil, chemicals, energy, plants, and water.
Soil Restoration and Conservation	Soil and Crop Sciences	College of Agricultural Sciences	Students will learn the importance of learning soil and crop science principles in alleviating concerns of rapidly increasing world populations, the demand on land for food supplies, and the demand for environmental quality to enhance human comfort and wellbeing. Special emphasis is placed on improved production efficiency and the conservation of soil, chemicals, energy, plants, and water.
Soil, Land Uses and Climate Change	Soil and Crop Sciences	College of Agricultural Sciences	Students will learn the importance of learning soil and crop science principles in alleviating concerns of rapidly increasing world populations, the demand on land for food supplies, and the demand for environmental quality to enhance human comfort and wellbeing. Special emphasis is placed on improved production efficiency and the conservation of soil, chemicals, energy, plants, and water.
Sustainable Military Lands	Natural Resource Stewardship	Warner College of Natural Resources	Sustainability-focused program from AC4
Teacher Development	Agricultural Education	College of Agricultural Sciences	Requires AREC 202 (sustainability course from AC1)
Viticulture and Enology	Horticulture & Landscape Archt	College of Agricultural Sciences	Sustainability-focused program from AC4
Watershed Science	Ecosystem Science and Sustainability	Warner College of Natural Resources	Students in the major are learning: How to help people use natural resources in a sustainable way. About environmental change at local and global scales. How they can identify ways people can adapt to change and improve their lives. The amazing connections between different earth system components. How to conduct field work in a variety of settings addressing questions important to sustainability.
Watershed Science	Natural Resource Stewardship	Warner College of Natural Resources	Sustainability-focused program from AC4

Watershed Science	Geosciences	Warner College of Natural Resources	Sustainability-focused program from AC4
Wildlife Biology	Fish, Wildlife and Conservation Biology	Warner College of Natural Resources	Students will address contemporary environmental issues that deal with biological diversity and program will prepare students to play an active role in the maintenance of biological diversity.

Credit Certificate Name	Description	College	Department	Credits
Seed Technology Training	Seed analysis and seed biology	College of Agricultural Sciences	Agricultural Sciences	9
Theory and Applications of Regression Models	Online statistics certificate focused on natural resources, climate and weather studies, wild animal population tracking, and financial market predictions	College of Natural Sciences	Natural Sciences	10
Systms Engineering Practice	Multi-disciplinary managing projects from a lifecycle lens with focus on electric grid and entire product lifecycle	Engineering	College of Engineering	9
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Power and Energy	Power systems certificate with focus on smart grid; electric vehicles, personal technologies, and renewable energy sources	Engineering	Electrical and Computer Engr	
Power and Energy Distance	Power systems certificate with focus on smart grid; electric vehicles, personal technologies, and renewable energy sources	Engineering	Electrical and Computer Engr	
Computer Systems Engrg	Multi-disciplinary managing projects from a lifecycle lens with focus on electric grid and entire product lifecycle	Engineering	Electrical and Computer Engr	
Computer Systems Engrg	Multi-disciplinary managing projects from a lifecycle lens with focus on electric grid and entire product lifecycle	Engineering	Electrical and Computer Engr	
Applied Global Sustainability: Water Resources	Global environmental sustainability related to water resources planning and management	Intra-University	Schl Glbl Envir Sustnblty-SAU	12
Applied Global Sustainability: Natural Resources	Military lands management, natural resources policy, sustainable infrastructure	Intra-University	Schl Glbl Envir Sustnblty-SAU	12
Applied Global Sustainability: Agriculture	Sustainable agriculture, urban horticulture, animal agriculture, food systems, bioenergy	Intra-University	Schl Glbl Envir Sustnblty-SAU	12
Gender, Power, & Difference	The graduate certificate in Gender, Power, and Difference provides students with a solid foundation in feminist frameworks that address gender power and privilege.	Liberal Arts	Ethnic Studies	
Ski Area Management	Balance priorities and manage ski area operations that are sustainable on every level, conversation of natural resources and protection of alpine environment, positive community relationships	Warner Coll of Natural Resrces	Human Dimensions of Nat Res	12

Ski Area Management Distanc	Balance priorities and manage ski area operations that are sustainable on every level, conversation of natural resources and protection of alpine environment, positive community relationships	Warner Coll of Natural Resrces	Human Dimensions of Nat Res	12