

***A Proposal for Curriculum Transformation to the Faculty of the
College of Forest Resources from the Ad Hoc Committee on
Curriculum Transformation (CTRAN)***

May 15, 2002

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Background

The creation of the CTRAN committee by Dean B. Bruce Bare followed a CFR faculty vote (November 7, 2001) to:

- Consolidate CFR's seven existing undergraduate curricula into two:
 1. Environmental Science, Design, and Management
 2. Paper Science and Engineering (PSE)
- Designate a representative faculty group to develop a detailed curriculum proposal for consideration and adoption by the faculty. The curriculum proposal will include "core" requirements and "context" pathways, options, or interest areas.
- Deliberations should also include the exploration of further consolidation, focusing on the level and nature of integration between PSE curriculum and the new Environmental Science, Design, and Management curriculum.

Following the above guidelines, CTRAN was charged to develop a detailed undergraduate curriculum proposal for consideration and adoption by the faculty.

Why Transform?

The faculty of CFR recognized that the College's current curricular structure of seven undergraduate majors:

- Increases division among faculty and students
- Fails to fully integrate the diverse views of natural resource management in the College
- Produces inefficiency in teaching by overemphasizing small class size
- Facilitates redundancy among classes
- Includes some majors with few students
- Is unattractive to the vast majority of UW students

In response to these concerns and to recommendations from the UW President's "Charting New Directions for the CFR Committee" chaired by Dr. Sue Hegyvary, CTRAN crafted a curriculum proposal that builds on CFR's areas of excellence, including:

- A small college with a wide range of expertise in natural resource fields
- A window-box to wildland perspective with both interdisciplinary and strong professional orientations
- An ability to deliver excellent field experiences and an outdoor laboratory from Puget Sound to the Cascades and Olympic Mountains

Transformation Objectives

CTRAN's transformation objectives were to:

- Increase undergraduate enrollment and maintain (or increase) student credit hours
- Increase teaching efficiency by:
 - Increasing class size
 - Increasing the number of majors
 - Recognizing the cost of capstone courses and integrative, interdisciplinary teaching
- Increase student integrated and interdisciplinary learning via:
 - A senior capstone experience
 - Integrated, experiential learning
 - Interdisciplinary teaching
- Maintain rigor in disciplinary education by developing specialized, optional courses of study that build on CFR's strong current programs and anticipate emerging fields of interest to students at UW
- Provide for ease in future adaptive curriculum change.

The Proposal

The vision of the CTRAN committee is to provide a flexible structure for curriculum change. The proposal presented here is a *starting point* down the path of transformation from a disciplinary and often divisive curriculum of seven majors to a unifying curriculum in which all CFR undergraduate majors share some common classes and all faculty perspectives are provided to these students. During its deliberations, the committee often wrestled with how best to balance disciplinary depth with interdisciplinary breadth. We saw interdisciplinarity as glue that could bind the College together, but recognized that disciplinaryity was a necessary component of applied programs within CFR. We balanced these two goals by reformulating strong majors and linking them with an interdisciplinary common core of classes to be taken by all undergraduates in these majors.

The committee first considered merging existing CFR majors (with the exception of PSE) into a single major with disciplinary options. However, after discussions and input from faculty groups and other stakeholders, we were convinced that this structure could impact the visibility and disciplinary identity important to each current major. CTRAN's current proposal maintains disciplinary programs as true majors, but requires all students to participate in a common core designed specifically to build a College community, focus learning around the concept of sustainability, and ensure that a common base of knowledge is imparted to all of our graduates. That is, *we built a curricular structure that allows disciplinary identity and maintains functional*

interdisciplinary. This approach also provides for a substantial degree of integration between PSE and other College programs (this has historically not been the case). The proposal envisions PSE restructuring required classes so that PSE majors participate in at least 3 of 5 core classes (see below).

We recognize that a potential downside to maintaining distinct majors within CFR is reinforced division of faculty and students along disciplinary lines. An important objective of the CTRAN proposal—to "fully integrate the diverse views of natural resource management in the College"—can be accomplished in two ways. First, we urge CFR faculty to resist formal divisional structures organized around majors. We suggest that working groups manage each major and that the existing formal divisional structure be carefully reconsidered in light of its role in perceived and real divisiveness. Second, we propose a change in name for the College of Forest Resources. The committee, while responding to a desire for disciplinary identity at the level of majors, feels strongly that a college name that better reflects the varied programs we administer, clearly signals to UW students and other potential applicants our expertise in environmental and resource management issues, and stakes our position within the UW as leaders in environmental science and natural resource management curricula is essential.

Proposal Summary and ACTION ITEMS—CTRAN's full proposal for faculty consideration can be summarized as:

1. *Revise current majors in wildlife science (renamed wildlife ecology), forest management, environmental horticulture and urban forestry, and paper science and engineering*
2. *Delete current majors in forest engineering, sustainable resource science, and conservation of wildland resources*
3. *Create a new major in environmental science*
4. *Require all majors to participate in an interdisciplinary core of classes emphasizing the concept of sustainability*
5. *Require all classes and majors to accomplish specific learning outcomes*
6. *Investigate College structures that encourage faculty to participate across majors rather than within them*
7. *Begin deliberations to rename the "College of Forest Resources" to something like the "College of Environmental Science and Resource Management," thus allowing for*
8. *Changing the degree offered by the College from a Bachelor of Science in "Forest Resources" to a Bachelor of Science in "Environmental Science and Resource Management."*

Essential Features—Essential features of the proposal include:

1. *An interdisciplinary, unifying, balanced field- and case study-based experiential core, or "hub", of classes that emphasize an urban to wildland perspective.* This hub consists of three courses (5 credits each) to be taken at the sophomore level, one course (3 credits) at the junior level and a 7-10 credit capstone experience at the senior level. These courses address fundamental knowledge areas valuable to all majors including:

- ecological principles along an urban to wildland gradient
- human interactions with the environment in urban to wildland settings
- aspects of measuring and monitoring environmental dimensions
- professional ethics
- conflict management
- group process
- information acquisition and presentation in written and verbal form

A central tenet of the core is ecological and social sustainability. Students taking the entire core will be exposed to environmental issues from ecological and human perspectives. They will gain knowledge of, and respect for, divergent views and disciplines by actively participating in discussions of ideas, collection of data, and interpretation of results in their own and their peers' disciplines.

2. *Recognition of PSE integration with other CFR majors as an ultimate objective, but that rigid PSE disciplinary requirements preclude full integration at this time.* However, PSE students will participate in essential features of the core that facilitate learning about and practicing sustainable resource use. This includes full participation in capstone offerings, the professional ethics junior class, and at least one of the sophomore core classes. The committee feels strongly that PSE majors should take ALL College core classes and encourages the PSE faculty to restructure their curriculum accordingly.
3. *A flexible set of basic UW science requirements that allows transfer students to easily integrate into the College core and enables specialized majors to direct students to advanced, entry-level classes where needed.*
4. *Disciplinary majors that build on current CFR strengths and anticipate important and emerging fields of interest to UW students and emerging needs in natural resource science and management in Washington State and the region.* Initially included in the proposal are five majors (Environmental Horticulture and Urban Forestry, Environmental Science, Forest Management, Paper Science and Engineering, and Wildlife Ecology) that require 30-60 credits of specialized coursework. Most students in these majors will have nearly 1/3 of credits required to graduate (45-65) as unspecified electives and therefore available for personal interests, diversification, *OR FURTHER SPECIALIZATION* within their field of study.

5. *Attractive minors for non-CFR majors.* The proposal includes minors that will be available in the College's majors (with the exception of PSE), as well as continuing CFR's currently existing minors in international forestry and streamside studies.
6. *Adaptively managed optional courses of study for CFR majors.* As student and faculty interests change and expand, new program areas can be initially offered as (1) options within existing majors or (2) as minors. Minors require only Department, College (usually College Curriculum Committee and Dean), and University (Faculty Council on Academic Standards (FACS), Dean of Undergraduate Education) approval. The current faculty has submitted proposals for the following programs that may be appropriate for development into minors:
 - Urban Ecology
 - Ecological Engineering
 - Environmental Monitoring and Modeling
 - Business and Economics
 - Soils and the Environment

CTRAN proposes that minors and options serve as test-beds for new program areas. If sufficient student appeal and faculty sustainability can be demonstrated for a minor, then it can be offered as an official option after approval at the Department, College (usually College Curriculum Committee and Dean), University (FCAS, Provost, President), and State (simple notification to Higher Education Coordinating Board). At present, CTRAN does not propose minors that are designed specifically for majors within CFR. The task of implementing the transformations we propose should be completed before further curricular complexity is attempted.

7. *Appeal to top students at UW.* Students recognized at the UW for their academic excellence are admitted into the University-wide honors program (UW GPA > 3.5). CTRAN proposes a CFR honors track that will allow the College to recruit these academically excellent students. Freshmen honors students interested in natural resource issues can join the core senior capstone classes to immediately begin their immersion in experiential learning. Advanced seminars would be designed for sophomore and junior honors students. As seniors, honors students would have the option of selecting an individual thesis project experience, in addition to or instead of the core capstone requirement, that would expose them to a typical graduate research experience.
8. *A new name for the College that accurately reflects the diversity of its programs and is attractive to UW and other potential students.* The proposed reformulated and integrated majors will serve a broad range of environmental and resource management interests. Therefore, CTRAN proposes that "College of Forest Resources" be changed to something like "College of Environmental Science and Resource Management." A clear emphasis on the two major features of the college (Environmental Science and Resource Management) should attract a wide range of

UW and other potential students. The appeal of the transformed curricula proposed by CTRAN cannot be adequately tested without such a change. In fact, UW administration may view the College's curriculum transformation project as a test of its ability to manage a variety of environmental and resource management programs within a unified College.

9. *A new name for the Bachelor of Science Degree offered by the College.* To reflect the new College name and the diversity of its majors, to increase the appeal to potential majors from the UW and elsewhere and to employers recruiting our graduates, CTRAN proposes that the Bachelor of Science in "Forest Resources" currently offered by CFR should be changed to a Bachelor of Science in "Environmental Science and Resource Management."

Learning Objectives—CTRAN proposes that each class offered in the College be designed to address one of the following learning objectives and that each formal major meet *all* of the following learning objectives.

KNOWLEDGE SETS:

- Understand social, ecological, and economic theory, concepts, and processes at multiple scales.
- Understand biological, physical, and chemical processes.
- Understand professional and environmental ethics.
- Understand application of ecosystem concepts at multiple scales along the urban to wildland gradient.
- Understand the processes of science, design, and management; the process models used to describe and communicate them; and their role in contemporary environmental issues.

SKILL SETS:

- Effectively work in interdisciplinary teams.
- Effectively communicate to a diversity of audiences using written, oral, and graphic methods.
- Effectively access, evaluate, and use information and information tools.
- Recognize research methods used by the social, natural, and design sciences.
- Effectively apply analytical skills, including basic measurement/monitoring skills.
- Effectively and appropriately use computers.
- Effectively be able to do at least one of: devise and conduct a scientifically sound inquiry; design an environmental system or a component of an environmental system; or devise a rational management plan, including plans for its implementation.

DEVELOPING COMPREHENSION, INTEGRATION AND MEANING:

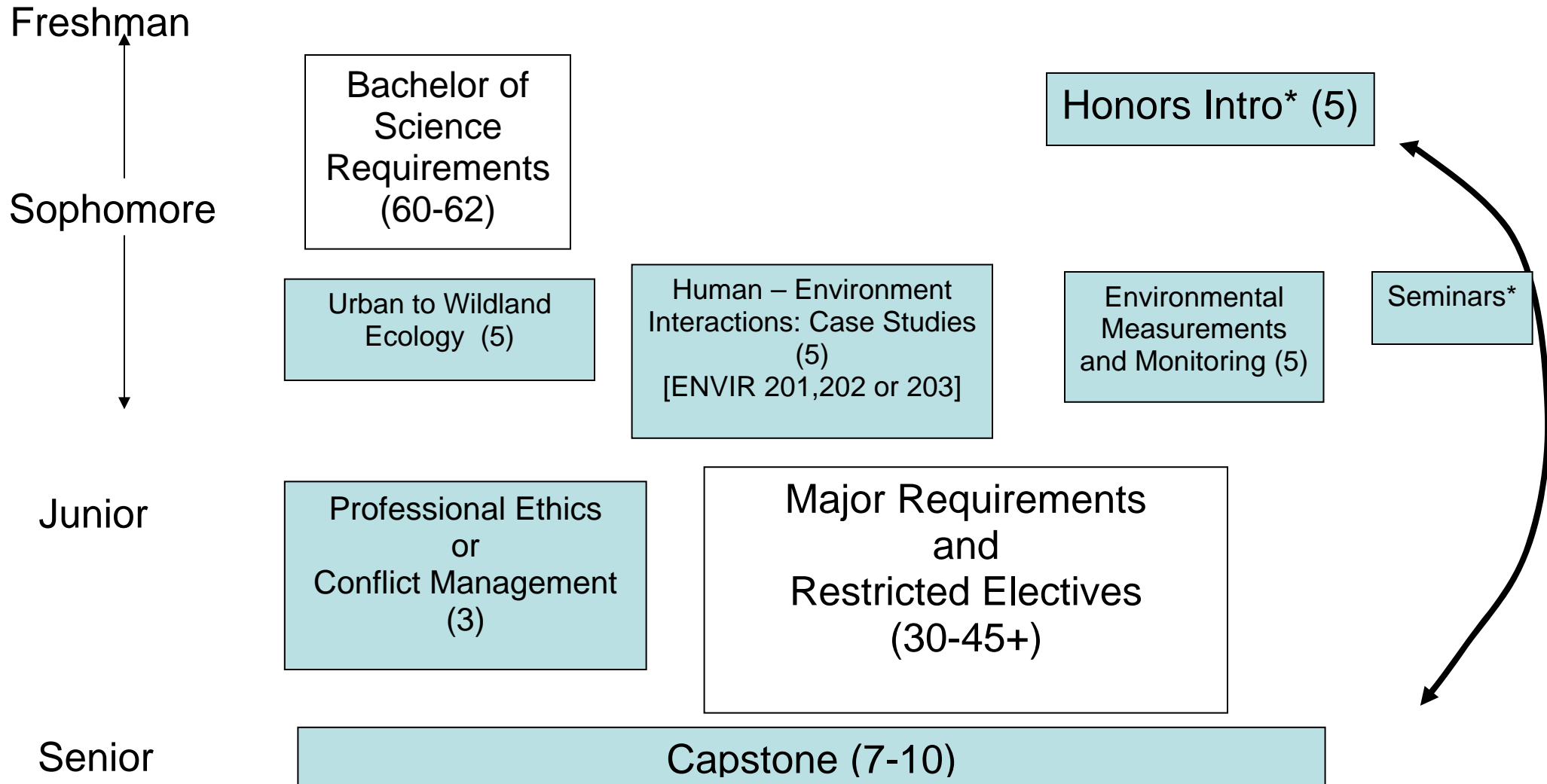
- Understand interactions among plant, animal, and abiotic features of ecosystems.
- Understand business, ecological, and social tradeoffs inherent in natural resource management and use.
- Understand and evaluate policy in context with cultural and historical heritage.
- Understand the expected consequences of implementing a research, design, or management plan and be able to explain them.

Details of Curricular Structure, Requirements, and Classes—The following charts and descriptions describe the core and major approach proposed by CTRAN.

1. Overview Graphic

The following figure shows how the proposal fits into a typical student's four-year experience. General UW requirements are taken by freshman and sophomores. Core CFR classes are taken by sophomores, juniors, and seniors. Juniors and seniors also take classes in their chosen majors to develop disciplinary depth. A detailed description of each component of this proposal follows the graphic.

Diagram of General Requirements, Core Classes (shaded boxes), and Interface with Disciplinary Major Requirements



*These specialty classes will only be developed for honors students

2. General Preparatory UW Requirements for College Majors (not including PSE)

Oral & Written Communication (22)

- (5) English Composition Course (English 131 or equivalent)
- (3) TC 231 Technical Communication (Writing)
- (4) TC 333 *or* Capstone writing component? (Writing)
- (5) COM 220 Intro to Public Speaking (old SpCmu 220) (VLPA)
- (5) Free VLPA

UW requires 5 credits comp, 7 credits of writing, 10 of VLPA

Biological Sciences (13-15)

(10) Biology 101, 102 (or 180, 200 for honors)

Plus one of:

- (4) ESC 210 Soils
- (3) ESC 311 Soils & Land Use
- (5) ESC 110 Environmental Science
- (4) CEE 366 (*Note: long series of prerequisite courses*)

Physical & Chemical Sciences (10)

(5) Chem 120 (or 142) Inorganic Chemistry

Plus one of:

- (5) Chem 220 Organic Chemistry
- (5) Geog 205 or Geol 205
- (5) Physics 121 (*Math 124 prerequisite*)

Mathematics & Statistics (15)

- (5) QSci 101 and (5) QSci 292 or CFR 250 and (5) QSci 381 *or*
- (5) QSci 291 and (5) QSci 292 or CFR 250 and (5) QSci 381 *or*
- (5) Math 124 and (5) Math 125 or CFR 250 and (5) QSci 381 *or*
- (5) Math 144 and (5) Math 145 or CFR 250 and (5) QSci 381

Total required credits: 60-62

3. Descriptions of Core Courses

Urban to Wildland Ecology *Sophomore Core Course*

Assumed Baseline Understanding:

- Plant growth, structure and function
- Plant reproduction
- Population genetics and natural variation
- Evolution
- Basic concepts of population, community, ecosystem, landscape ecology
- Biogeochemical cycles

Goal:

Apply basic earth-science and biological principles to understand controls of PNW natural and human-impacted environments

Emphasis:

- Biotic and physical environment of urban to wildland gradient
- Comparisons and contrasts between human-altered variables and natural biophysical variables
- Key management issues along the gradient

Example Gradient:

- Urban to suburban landscapes: Seattle/Woodinville
- Suburban to resource-managed landscapes: Eatonville/Leavenworth
- Wild landscapes (minimal human impact): Mt. Rainier/Enchantments

Course Prerequisites:

- Biology 101 (develop web exercises to review info in 101 directly linked to CFR 200)
- ESC 110 or earth science

Principles (themes that crosscut the course topics):

- Biotic fluxes: establishment growth, death, reproduction/dispersal (individuals to landscapes)
- Material cycling (nutrients, water, pollutants)
- Energy fluxes: carbon fixation to trophic pyramids
- Change and stability
 - ✓ Perturbations (disturbances, including human)
 - ✓ Feedbacks
 - ✓ Bottom-up versus top-down controls
- Management principles (goals, conflicts)

Course Topics:

1. Physical gradient
 - a. Conditions and causes of gradient (micro to macro):
 - i. Climate
 - ii. Hydrology
 - iii. Soils
 - iv. Human impacts
2. Biotic Consequences
 - a. Compare and contrast biotic-abiotic system across gradient
 - i. Conditions
 - ii. Causes
 - iii. Management issues
 - iv. Feedbacks (biotic-abiotic-human)
 - b. Key issues (i.e., pertain to applied problems) compared across gradient:
 - i. Species patterns, controls (individuals to landscapes):
 1. Establishment
 2. Growth
 3. Death
 4. Reproduction/dispersal
 - ii. System characteristics, controls
 1. Nutrient cycling
 2. Hydrologic regime
 3. Pollutants
 4. Carbon fluxes
 - iii. Change and stability
 1. Perturbations (disturbances, including human)
 2. Feedbacks
 3. Bottom-up versus top-down controls
 - iv. Management principles (goals, conflicts)

Human – Environment Interactions: Case Studies
Sophomore Core Course

To satisfy this requirement, students can take one of the following.

ENVIR 201 Environmental Case Studies: Ecology and Conservation

Credits: 5, max. 10, **Offered:** A

Instructors: Parrish, Smith

Exploration of case studies from natural science, historical, socioeconomic, legal, political, and ethical perspectives. Students gather information, analyze data, apply mathematical and statistical reasoning and decision-making schemes, evaluate conflicting views based on cultural and philosophical frames of reference, and develop communications and research skills. Focus on ecological and conservation case studies and issues.

ENVIR 202 Environmental Case Studies: Population and Health

Credits: 5, max. 10, **Offered:** W

Instructors: Sara Tjossem, Chuck Treser, and Doug Mercer.

Exploration of population health issues from natural science, historical, socioeconomic, legal, political, and ethical perspectives. Students gather information, analyze data, apply mathematical and statistical reasoning and decision-making schemes, evaluate conflicting views based on cultural and philosophical frames of reference, and develop communications and research skills.

ENVIR 203 Environmental Case Studies: Resources

Credits: 5, max. 10, **Offered:** Sp

Exploration of resource issues from natural science, historical, socioeconomic, legal, political, and ethical perspectives. Students gather information, analyze data, apply mathematical and statistical reasoning and decision-making schemes, evaluate conflicting views based on cultural and philosophical frames of reference, and develop communications and research skills.

CFR faculty could teach one of these classes and use it to emphasize:

- Societal beliefs, values and knowledge
- Resources, scarcity, abundance
- Human valuation of resources
- Human interactions (individual, group, communities, institutions, etc)
- Human organizations/institutions (science, politics, education, religion, etc)
- Decision making processes and outcomes
- Tradeoff analysis – evaluation of tradeoffs between options
- Role of values in resource allocation/use decisions
- Organizational learning and adaptive management

Environmental Measurements and Monitoring
Sophomore Core Course

Assumed Previous Learning:

- Basic biology, physics, chemistry and math, ESC 110, etc
- May take in any order with the other proposed sophomore required courses
- Limited concepts of scientific method
- Little/no exposure to scientific method, hypothesis testing, experimental design, monitoring procedures, etc.
- Little/no measurements experience

Objective:

- Introduce basic concepts of scientific method, hypothesis testing, experimental design, monitoring.
- Exploratory research approaches
- Introduction to basic field methods
- Applications across a variety of natural resources disciplines and scales
- Understanding of role of valid quantitative analysis and motivate students toward more specialized and advanced courses.

Emphasis:

- What do we measure and monitor and why?
- How is this accomplished in a credible, unbiased fashion?
- How can you tell if something has changed?
- How is the information analyzed, interpreted, and used?

Example:

- Similarities & differences in monitoring a soil characteristic (e.g. compaction), a stream characteristic (e.g. water temperature), a tree characteristic (e.g. knottiness), forest health (e.g. risk of fire), etc.

Principles (cut across topics):

- Experimentation
- Measuring a process (state)
- Monitoring a process (change of state)
- Basic analysis methods (simple statistics)
- Life-cycle Analysis: shifts and tradeoffs between stages

Course Topics:

1. Basic Concepts and Principles
 - a. An introduction to the principles (listed on previous page)
2. Physical Environment
 - a. Soil, water, atmosphere, physiography
 - b. How are characteristics sampled, measured and monitored at different scales (remote sensing to ground based)

- c. Ex: pollution
 - d. Field study example exercises
3. Organisms
- a. Plants and animals
 - b. How are characteristics sampled, measured, and monitored at different scales (remote sensing to ground based)
 - c. Ex: Individuals, populations, structures, diversity, ...
 - d. Field study example exercises
4. Humans Perceptions, Values, and Interactions
- a. How are perceptions, values and impacts sampled, measured and monitored
 - b. How are characteristics sampled, measured, and monitored at different scales (individual people, communities, organizations, institutions)
 - c. Ex: Esthetics, visualization
 - d. Field study example exercises

Course Structure

5 credits

3 hours lecture

1 field lab

1 analysis, interpretation, discussion lab

Conflict Management
Junior Core Course
(Either Conflict Management or Professional Ethics is taken)

COURSE OBJECTIVES

Conflict appears to be a pervasive element of our culture and hence our daily lives. Often we are able to resolve, or at least manage, the conflicts that we are faced with each day. However, conflicts involving natural resource and environmental issues appear to be especially thorny and difficult, if not impossible, to manage and resolve. This course is designed to give students an introduction to the causes, dynamics, and consequences of natural resource and environmental conflicts, as well as an understanding of the range of possible intervention tools that can be used to manage conflict. We will examine a variety of procedures (regulation, litigation, etc.) that have been traditionally used to manage disputes, and analyze why these mechanisms frequently fail when applied to natural resource and environmental disputes. The search for alternative means to resolve these conflicts has resulted in increased interest in and use of alternative dispute resolution procedures. Specific local and national cases of actual environmental conflicts and dispute resolution procedures will be examined using a mixture of readings, cases, discussion, negotiation simulation exercises (role plays), lecture, and guest speakers to illustrate key points and themes.

The course will help students identify the range of skills necessary to effectively manage environmental conflicts, and strengthen their understanding of the possibilities offered by alternative means of dispute resolution methods, as well as some of the constraints on the use of the process. By applying concepts to actual cases, students will build a framework for analyzing, managing, and participating in environmental and natural resource conflicts, as well as begin to develop skills in negotiating and facilitating disputes.

REQUIRED READINGS

1. A required **Course Reading Pack** is available for purchase at Professional Copy N' Print, 4200 University Way, N.E. (***Referred to as "CP" in syllabus***)
2. Julia M. Wondolleck and Steven L. Yaffee. 2000. Making Collaboration Work: Lessons from Innovation in Natural Resource Management, Island Press. (***Referred to as "Wondolleck" in syllabus***) Available at the University Bookstore.
3. Gerald M. Cormick et al. 1996. Building Consensus for a Sustainable Future: Putting Principles into Practice, National Round Table on the Environment and the Economy. (***Referred to as "Cormick" in syllabus***) Available at the University Bookstore.

WEEKLY READING ASSIGNMENTS AND CLASS DISCUSSION TOPICS

- Week 1** **Intro, The Nature of Environmental & Natural Resource Conflicts**
Why conflict? Interests and Positions
- Week 2** **Theoretical Perspectives on Conflict**
Purposes of conflict, Why consensus?
- Week 3** **Analyzing Environmental and Natural Resource Disputes**
Participation in Consensus Processes
Analyzing Conflict situations
- Week 4** **Designing a Consensus Process**
Incentives, participation, procedural issues
- Week 5** **Science and Technical Issues in Negotiation**
Joint Fact Finding and the Use of Technical Experts
Consensus-Based Approaches to Handling Science
- Week 6** **Compliance and Implementation**
- Week 7** **Mediation/Multiparty Negotiations**
The Role of the Mediator
Designing Multiparty Negotiations
- Week 8** **Critiques and Cultural Issues in Consensus Processes**
Critiques of Consensus Processes
International /Cultural Issues
- Week 9** **Institutionalizing Dispute Resolution Processes**
Organizational Structures and Capacity
- Week 10** **Summary and Conclusion**

Professional Ethics
Junior Core Course
(Either Conflict Management or Professional Ethics is taken)

Course description: No matter what you study or what job you take, you will be faced with decisions that consist of difficult choices. What's good for my career? What's good for my profession? What's good for society? What's good for the environment? What's legal? What's the right thing to do?

Scientists, engineers and other natural resources professionals operate in a social, political, and regulatory context. This class will discuss a variety of topics including: professional and environmental ethics, the regulatory environment and public responsibility.

Emphasis is on discussion of scenarios and methods of ethical decision making. It counts as **I&S credit** and is open to all interested participants, not just engineers and natural resource students. Participation by students with diverse backgrounds is encouraged in order to bring a wide range of opinions into scenario discussions.

Course Objectives: Provide the student with a background that allows them to identify ethical (professional, societal and environmental) issues in the workplace and understand methods of addressing such issues.

TOPICS

I. PROFESSIONAL ETHICS

- a. distinctions between personal and professional ethics
- b. codes of ethics for professional societies
- c. codes may change as role changes (parent, child, citizen employee, etc.)

II. PREVENTIVE ETHICS

- a. must think ahead-anticipate consequences of their actions as professionals
- b. think effectively about those consequences and decide what is ethically and professionally right
- c. learning preventive ethics
 1. stimulate the moral imagination- What if exercises?
 2. recognize ethical issues
 3. Analytical skills
 4. Sense of responsibility
 5. Tolerating disagreement and ambiguity

III. FRAMEWORK FOR RESPONSIBILITY

- a. standards of responsibility
- b. three basic legal definitions of harm
 1. intentional
 2. negligent
 3. reckless

- c. models of professional responsibility
 1. Malpractice Model
 2. Reasonable Care Model
- d. impediments to responsibility
 1. self interest
 2. self deception
 3. weakness of will
 4. ignorance
 5. egocentric thinking
 6. microscopic vision
 7. acceptance of authority
 8. groupthink

IV. INTRODUCTION TO MORAL THINKING

- a. distinctions among common, personal and professional morality
- b. tools for solving ethical problems
 1. identify factual issues
 2. identify conceptual issues
 3. identify application issues

V.METHODS FOR MORAL PROBLEM SOLVING

- a. line-drawing problems
 1. method of casuistry- case studies and analogies
- b. conflict problems
 1. easy choices
 2. creative middle ways
 3. hard choices
- c. respect for person's basis: individual rights
 1. Golden rule
 2. Self-defeating test
 3. Rights test
- d. utilitarianism basis: maximizing human well-being
 1. The act test
 2. The cost/benefit test
 3. The rule test

VII. ENVIRONMENTAL ETHICS

- a. Basis for environmental ethics
 1. human role in environment
 2. Classic readings
 - e.g. tragedy of the commons; should trees have standing?; Leopold
- b. Issues in restoration

Senior Interdisciplinary Capstone Experience

Expectations:

1. Integrated team solutions to real world situations/ problems.
2. Students from diverse backgrounds work "for" a client on a problem using an integrated team approach.

Key experiences to be derived from the capstone might include and would not be limited to the following:

Critical thinking, evaluation and critiquing

- Proposal development and presentation
- Working in a team of individuals with different backgrounds and expertise
- Executing multiple phases of a real project with an external client
- Developing educational aspects of project
- Coordinating team, client-team, volunteers and other stakeholder and non-stakeholder groups
- Securing appropriate permits and legal procedures
- Implementing project, developing long-term sustainability (e.g., maintenance, monitoring) aspects of project, training client as necessary
- Presenting project and materials in an all-College Fair and as an internet website

Nature of: should be a two to three quarter sequence containing three parts:

1. Critical examination of the successes and challenges of previous projects (learn about the process), client presentations of problems or issues, team formation and team work process training, identification of projects for potential proposal development
2. Proposal preparation, presentation, modification and acceptance by client, securing necessary funding or volunteer help
3. Proposal implementation

4. Majors (not including PSE)

Wildlife Ecology		Forest Mgmt.		Environ. Hort & Urban Forestry		Environmental Science	
CFR 3XX (5)	Basic Principles of WE	CFR 3XX (5)	Silviculture	BOT 371 (3)	Plant Physiology	CFR 4XX (5)	Ecosphere
CFR 3XX (5)	Population Survey Methods	CFR 3XX (5)	Business & Econ	CFR 3XX/ BOT 113 (3-5)	Plant ID	CFR 4XX (5)	Geosphere
CFR 4XX (5)	Advanced Principles	CFR 3XX (5)	Measurements	CFR 4XX (3)	Plant Propagation	CFR 4XX (5)	Sociosphere
CFR XXX (3)	Wildlife Habitat/Silviculture	CFR 4XX (5)	Soc/Policy/Planning	CFR 4XX (5)	Urban Plant Protection	TOTAL REQUIRED = 15	
CFR XXX (2)	Seminar	CFR 3XX (5)	Soils	CFR 4XX (5)	Ecological Restoration		
REQUIRED COURSES=20		TOTAL REQUIRED=25		CFR 4XX (3)	Hort Stress Physiology	At least 15 (10 at 300-400 level) credits of:	
				CFR 4XX (5)	Landscape Plants	Ecosphere	
		At least 20 credits:		CFR 4XX (3)	Invasive Plants	ESC/EHUF or	
At least 15 credits of:		Measurements (Choose 2)*		TOTAL REQUIRED=30-32		Botany or	
CFR 2XX (5)	GIS	CFR 4XX (4)	Applied Sampling ES			Zoology or	
CFR 4XX (5)	Landscape Ecology	CFR 4XX (4)	Applied Principles Biometry	Any two courses of:		Fish or	
CFR 4XX (5)	Biol Cons of Birds	GEOG 460 (4)	Applied Principles GIS	Environmental Hort. Track		CEE (bio/eco)	
CFR 4XX (5)	Field Ornithology	CFR 4XX (4)	Aerial Photos/Remote Sens	BIOL 476 (5)	Conservation Biology	Geosphere	
CFR 4XX (5)	Mammology	CFR 4XX (4)	Forest Surveying/Roads	BIOL 454 (4)	Evolutionary Mechanisms	ESC soils or	
CFR 4XX (5)	Mammology Lab	CFR 4XX (4)	Wood Prop/ID			Geology or	
CFR 4XX (5)	Wildlife Toxicology	Policy/Admin. (Choose 1)*		Urban Forestry Track		Ocean or	
CFR 4XX (5)	Mgmt of Endangered Spcs	CFR 4XX (4)	Nat Res Policy Proc	CFR 4XX (5)	Urban Forest Landscapes	Earth/Space Science or	
CFR 4XX (5)	Wildlife Conservation in NW	CFR 4XX (3)	Appl Principles Conflict Mgmt	CFR 4XX (3)	Urban Forest Mgmt.	CEE (hydrology)	
FISH 311 (3/5)	Biology of Fishes	ENVIR 201/203/FM 271(5) Env Case St				Sociosphere	
FISH 323 (3)	Fisheries Mgmt & Conserv	Forest Ecology & Biology (Choose 2)*		Public Horticulture Track		CFR/FME policy planning or	
FISH 475 (3/5)	Marine Mammology	CFR 2XX (4)	Forest Soils	URBDP 300 (5)	Intro to Urban Plnng.	History or	
ZOOL 301 (3)	Into Physiol	CFR 2XX (4)	Dendrology	LARCH 341 (3)	Site Planning	Political Science or	
ZOOL 408 (4)	Mech Animal Behavior	CFR 3XX (4)	Appl Principles Wild Biology	LARCH 352 (3)	Hist of Landscape Arch	Env. Hlth (policy/culture) pr	
ZOOL 409 (5)	Sociobiology	CFR 4XX (4)	Appl Principles Forest Pathol	CFR 4XX (3)	Curation and Education	Larch (Environ. Psychology)	
ZOOL 410 (4)	Ethology & Ecol Lab	CFR 4XX (4)	Appl Principles Forest Entom	MUSEUM 480 (3)	Intro to Museology		
ZOOL 451 (5)	Vert Zoology	CFR 4XX (4)	Appl Principles Water/Hydrol	Material in the following will be delivered in core capstone course:			
ZOOL 464 (5)	Nat Hist of Birds	CFR 4XX (4)	Appl Princ For Landscape	CFR 481/482 (2)	Practicum		
	(Instead of ESC 451-452)	Mgmt of Forest Resources (Choose 1)*		CFR 495 (5)	Internship/Sr. Project		
ZOOL 492 (3)	Animal Migration	CFR 3XX (4)	Appl Principles Forest-Fish				
QSCI 477 (5)	Quant Wildlife Assessment	CFR 3XX (4)	Appl Principles Timber Harv				
QSCI 480 (3)	Sampling Theory/Biol	CFR 4XX (3)	Appl Principles Economics				
QSCI 482 (5)	Statistical Inference	CFR 4XX (3)	Mgmt Wildlands Recreat				
QSCI 483 (5)	Statistical Inference	CFR 4XX (4)	Appl Principles Mktg For Prod				
QSCI 486 (3)	Experimental Design	CFR 4XX (4)	Appl Principles of Conservat				
		CFR 4XX (4)	Stand Management				
OPTION REQUIRES 35 CREDITS MIN		OPTION REQUIRES 47 CREDITS MIN		OPTION REQUIRES 36 CREDITS MIN		OPTION REQUIRES 30 CREDITS MIN	
FREE ELECTIVES = 55-60 CREDITS		FREE ELECTIVES = 43-48 CREDITS		FREE ELECTIVES = 52-59 CREDITS		FREE ELECTIVES = 60-65 CREDITS	

5. Minors Available for non-Majors in the College

Wildlife Ecology	Forest Management	Env. Horticulture & Urban Forestry	Environmental Science
30 credits to include: 2 CFR sophomore core courses 15-credit wildlife core plus 5 credits of CFR 3XX/4XX courses	30 credits to include: 2 CFR sophomore core courses plus 20 credits forestry science core	30 credits to include: 2 CFR sophomore core courses 16-credit EHUF core plus 4 credits of CFR 3XX/4XX courses	30 credits to include: 2 CFR sophomore core courses or two of ENVIR 201/202/203 plus 20 credits of CFR 3XX/4XX courses

Implementation Issues Requiring Further Attention

Transition from the current to the proposed curriculum structure will require a concerted, College-wide effort. Issues we recognize as needing attention during this time include:

1. Tasking each professor and each faculty group responsible for a major and/or core, required, or restricted elective class to review class syllabi and submit in writing how each class addresses some of the learning objectives set forth by CTRAN and how each option satisfies *all* of the learning objectives.
2. Tasking each faculty group responsible for a major to review all classes currently listed as required (core required, plus restricted electives) to develop those not currently in existence and determine if any current listing should be merged or deleted because of redundancy, lack of enrollment, or lack of teaching faculty.
3. Develop guidelines for class size requirements.
4. Task the Office of Student Services to develop an approach to monitor student/faculty/employer satisfaction with, and meeting of, learning objectives.
5. Develop a comprehensive, state-of-the-art web-based system to advise students of major requirements, certification needs, and career/goal-based suggestions for use of free electives.
6. To facilitate integrated teaching and learning within the College, CTRAN suggests that the faculty consider two additional cultural changes: (1) the structure of College divisions should be reappraised in light of the CTRAN proposal; (2) the faculty should consider alternative names for the College that better reflect the diversity of curricular and research endeavors and better advertise the unique identities of undergraduate options. We urge the faculty to consider both of these topics during the 2002-03 academic year so that transition of culture and curriculum can proceed in tandem.

Committee Activity/Process

CTRAN met frequently from late December 2001 through May 2002 to develop a new undergraduate curriculum for consideration by the faculty. All meeting minutes are on line and available at <http://www.cfr.washington.edu/Internal/Organization/committees/comteUndCurricTrans form.htm>.

During this time, the committee sought advice from faculty, other stakeholders, peers, and colleagues openly and often. It consulted reports completed within the College and by external groups, including CFR's FASAC, Synthesis, and Futures Committee reports, the input from faculty, students, alumni, and employers gained at the Camp Long curriculum workshop, and the 2000 Pinchot Institute Report. Specific dates in this process are listed below.

11/30/01: Dean Bruce appointed the committee and charged CTRAN to

1. Consolidate CFR's seven existing undergraduate curricula into two: Environmental Science, Design, and Management; and Paper Science and Engineering.
2. Develop a detailed curriculum proposal for consideration and adoption by the faculty, to include "core" requirements and "context" pathways, options, or interest areas; and the exploration of further consolidation, focusing on the level and nature of integration between PSE and the new Environmental Science, Design, and Management curriculum.

12/13/01-5/1/02: Fourteen CTRAN meetings to develop proposal structure

1/24/02: Call to faculty for options; incorporate input into revised proposal

2/1/02: Meet with faculty for feedback; incorporate feedback into revised proposal

2/15/02: Meet with stakeholders (attendance by students/alums/DNR/Simpson Timber/CFR Advisory Board member) for feedback; incorporate feedback into revised proposal

3/8/02: Meet with UW colleagues (Bridges, Conquest, Nicotri, Palka, ZumBrunnen) for feedback; incorporate feedback into revised proposal

4/5/02: Meet with faculty for feedback; incorporate feedback into revised proposal

4/17/02-4/26/02: Two meetings with alternative curriculum group to craft compromise; incorporate feedback into revised proposal

4/26/02: Meet with faculty for feedback; incorporate feedback into revised proposal

5/3/02: Hear further presentation of alternative proposal

5/8/02: CTRAN meeting to compile final proposal

5/15/02: Present final proposal to faculty delivered to Dean Bare