Final Report

Sustainability at Oregon State University

Prepared by
The Institute for Natural Resources
Oregon State University

June 2009

Institute for Natural Resources

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The Institute for Natural Resources

Created by the Oregon Legislature through the 2001 Oregon Sustainability Act, the Institute for Natural Resources' mission is to provide Oregonians with ready access to current, relevant, science-based information, methods, and tools for better understanding natural resource management challenges and developing solutions.

The Institute for Natural Resources is an Oregon University System institute.

Institute for Natural Resources
Oregon State University
210 Strand Agricultural Hall
Corvallis, Oregon 97331

http://inr.oregonstate.edu/

Executive Summary

In spring 2008 the Institute for Natural Resources was asked to conduct an inventory of OSU's sustainability capabilities. The general approach to this *OSU Sustainability Inventory* is modeled after the 2006 *Coastal and Ocean Sciences at Oregon University* assessment conducted by Oregon Sea Grant. To produce this inventory, the Institute for Natural Resources used a variety of sources of information, including the OSU on-line course catalogue, the OSU website, documents from units, and the Research Office's grants and contracts data. Since the term "sustainability" lacks a precise definition and is interpreted differently by different audiences, whether or not a particular activity should be included as contributing to "sustainability" is not exact. Every effort was made to be consistent and conservative in our determinations; however, the content of this inventory, similar to that of coastal and oceans sciences inventory, was influenced by many individual, subjective decisions.

In the process of conducting the *OSU Sustainability Inventory*, the Inventory Team followed a written protocol. The draft protocol included a sustainability framework around which to categorize OSU's sustainability efforts, details about the search strategy, and details for cataloguing information. In the context of OSU, sustainability activities focus on campus operations, and focus on providing the content and context in which students, faculty, and staff can develop sustainability knowledge, skills, and values.

The university is a natural laboratory for society to test new ideas. OSU, Oregon's Land Grant, Space Grant, Sea Grant, and Sun Grant University, provides the space and opportunity to further knowledge about sustainability and sustainable practices, develop new technologies that decrease costs while increasing community and environmental benefits, and transfer results to the citizens of Oregon. This report is a snapshot of the depth and breadth of research, education, outreach, and operations activities as they relate to sustainability at Oregon State University. Most of the work at OSU contributes to one or more of the dimensions of sustainability but trying to balance and link these dimensions challenges how we think and do our teaching and scholarship. As such, particular emphasis was given to: (1) activities that identify their intent or self-describe "sustainability"; (2) the areas in which OSU sustainability activities appear to link the four dimensions of sustainability—environmental, economic, institutional, and social; and (3) the identification and categorization of OSU sustainability strengths.

This report is intended to be an internal document for Provost Sabah Randhawa.

Summary of Findings

Institutional Structure

OSU sustainability activities span the university – in some cases the university administration has taken a leadership role and in others colleges, departments, and faculty have taken the lead.

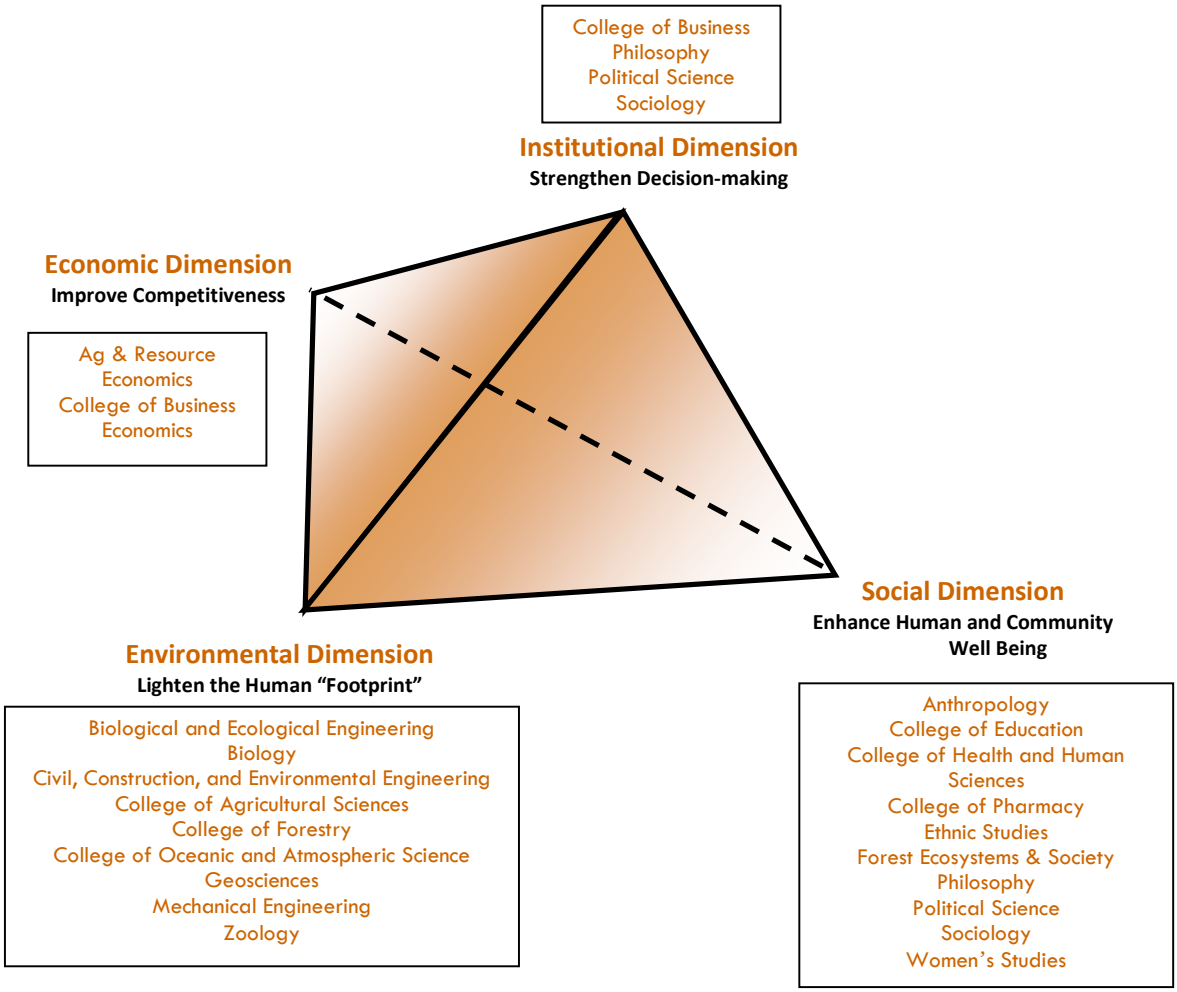
In 2004, OSU identified five multidisciplinary thematic areas within its strategic plan, and six strategic initiatives for investment, all of which apply to sustainability. In a review of the executive summaries of each of the initiatives, only the Sustainable Rural Communities Initiative appeared to intentionally link the dimensions of sustainability. Through this initiative, with a $1.5 million investment over five years, OSU seeks to "build capacity in rural communities to achieve economic and environmental sustainability and social and cultural well-being…" The other five initiatives are sustainability activities but, based on their executive summaries on the OSU Strategic Plan website, they do not appear to link any of the dimensions of sustainability. Rather they appear to be located either within the environmental dimension of sustainability (water and watersheds, computational and genome biology, ecosystem informatics, and subsurface biosphere education and research) and within the social dimension (the Center for Healthy Aging). If these initiatives are also included, OSU has strategically invested a total of $9 million in sustainability research and education.

In a review of the Ecampus, OSU Cascades, OSU Extension, and the 11 OSU Colleges strategic plans, we found different levels of reference to sustainability, ranging from no mention of sustainability to it being a foundational part of their education, research, and outreach missions.

In addition to the 2004 OSU Faculty Senate approval of an OSU commitment to sustainability, other university-level sustainability efforts include:

- Chartering of the OUS Institute for Natural Resources, which was created by the Oregon Sustainability Act in 2001;
- Creating the Provost Sustainability Council in 2004 to help promote OSU's sustainability agenda and encourage myriad of grass-root sustainability activities; and,
- Signing the American College & University Presidents Climate Commitment.

Based on a review of documents that describe each college's and departments' purpose and focus, we created an "OSU Prism of Sustainability" to illustrate the breadth of OSU's sustainability activities and where on the "OSU Prism of Sustainability" colleges and departments are more generally placed.



OSU's Prism of Sustainability
Colleges and Departments

As would be expected, our sustainability expertise—as represented by our colleges and departments—mostly lies within the environmental dimension. Three colleges and six departments contribute to OSU's environmental expertise, three colleges and five departments contribute to OSU's social expertise, and one college and three departments contribute to each of OSU's economic and institutional expertise.

Of the examined university-level centers, institutes, and programs (CIPs), nine link two or more dimensions of sustainability – predominantly bridging the environmental-economic and the environmental-social dimensions. Of the 82 examined college-based CIPs, 13 (16 percent) appear to link two or more dimensions of sustainability.

Education

To get a better sense of how courses offered at OSU apply to sustainability, we reviewed the descriptions of 7,713 courses listed in OSU's on-line course catalogue. Our

examination resulted in 47 course listings that specifically mention "sustainability" or "sustainable" in their description. Upon further review of all of the course descriptions, our examination also yielded more than 365 course listings that appear to link (or have as relevant included topics of discussion) the environmental, economic, social, and/or institutional dimensions of sustainability.

We also found that eight OSU educational programs that specifically mention sustainability in their descriptions. Those degrees include: the Graduate Certificate Program in Sustainable Natural Resources; the sustainability option within the Bioresource Research undergraduate degree; the undergraduate and graduate degrees in Biological and Ecological Engineering; the Masters in Business Administration; and, the Community and Landscape Horticultural Systems and Sustainable Crop Production graduate degree options and the Sustainable and Ecological Horticultural Production and Environmental Landscape undergraduate options offered by the Department of Horticulture. Numerous other graduate and undergraduate programs appear to address or link more than one dimension of sustainability in their core curricula.

Research

OSU researchers are leaders in understanding earth systems, both natural and man-made, and are working to apply their knowledge to developing new sustainable, resilient technologies, and cultural understandings. Based on a review of the OSU college- and department-based research focus areas, OSU sustainability strengths fall into six categories: alternative energy and energy sources; blue sustainability; climate; green sustainability; materials, practices, and technologies; and rural communities.

OSU Sustainability-related Strengths					
Alternative Energy and Energy Sources	**Blue Sustainability**	**Climate**	**Green Sustainability**	**Materials, Practices, & Technologies**	**Rural Communities**
• Bio-based energy • Passive nuclear • Solar • Wave • Wind	• Coastal & ocean sciences • Fisheries • Water & watersheds	• Adaptation • Human dimensions • Impacts • Mitigation • Processes	• Agriculture • Ecosystems & habitats • Forests • Landscapes • Soils	• Bio-based materials • Bio-remediation • Environmental toxicology • Green technologies	• Agricultural & resource economics • Rural studies

In a review of the 1,973 grants and contracts awarded in FY07, we found that faculty received $5,242,954 for alternative energy and energy sources; $54,646,393 for blue sustainability; $20,239,141 in climate-related research; $46,275,998 for green sustainability; $21,424,186 for research related to materials, practices, and technologies; and, $5,634,617 for rural communities efforts. Though many of the awarded projects address more than one of the sustainability strengths, we were conservative in our

allocation of projects to multiple strengths. Nonetheless, many projects are accounted for in more than one of the strengths.

Outreach and Engagement

OSU had the first Extension position in the U.S. focusing on sustainable living education. And, like the sustainability newspaper insert introducing many Oregonians to ideas of sustainability suggest, OSU has been finding innovative ways to connect with interested citizens across the state through established outreach programs like Master Gardner; and innovative programs like the Sustainable Living Program, and OSU's Spring Creek Project for Ideas, Nature, and the Written Word which has a national reputation as an innovative outreach program that brings together environmental science, philosophy, and creative writing to re-imagine how we might live sustainably and responsibly. An ongoing project between Extension and Ecampus has been to bring established programs online and has already resulted in the Master Gardener program reaching a new online audience.

While most OSU colleges, departments, and CIPs have outreach as part of their mission, OSU Extension, OSU Extended Campus, and Oregon Sea Grant Extension lead OSU's outreach mission by engaging with Oregon's people and communities "to have positive impacts on community livability, economic vitality, natural resources sustainability, and the health and well-being of people."

Students also remain active in their engagement in sustainability issues as is exemplified by the number of activities they are involved in. Most notably are the Student Sustainability Initiative and a Student Sustainability Center. OSU students 2007 voted to increase student fees by $8.50 per student per term to fund 100% renewable energy for the university, and this initiative was instrumental in OSU being presented the 2008 Green Power Leadership Award at the National Renewable Energy Marketing Conference.

Campus Operations

OSU Facility Services has taken an active and coordinated lead in promoting and practicing sustainability within campus operations. With the establishment of a Sustainability Coordinator for campus operations, OSU has been able to propel its sustainability efforts and has received several high-profile recognitions and awards, including:

- Earning a place in the Kaplan College Guide 2009's list of America's top 25 "green" colleges.
- Being recognized by the U.S. EPA for our commitment to green power with a 2008 Green Power Leadership Award to be presented as part of the National Renewable Energy Marketing Conference.
- Being rank by the U.S. EPA as one of the nation's top five higher education users of "green power" and the best in the Pac 10
- Being listed among the nation's top 25 campuses on the Sustainable Endowment Institute's 2008 College Sustainability Report Card.

Overall, campus operation's sustainability efforts can be categorized into six primary areas: buildings, climate and energy, food service, natural features and landscaping, recycling and waste management, and transportation.

Conclusions & Recommendations

Based on this preliminary inventory, the written comments to the draft of this document, the numerous conversations with OSU faculty about sustainability, and a review of documents from the Sustainability Council, what is evident is the need and the desire to capture, enhance, and present the synergistic sustainability activities that are and will continue to happen throughout the OSU community. Similar to the recommendations written in the 2005 Sustainability Council report, we recommend:

- Endorsing a university-wide campaign to increase the visibility of OSU's sustainability activities both on- and off-campus in conjunction with implementation of the revised strategic plan and the integrated marketing plan.
- Reconstituting and remobilizing the Provost's Sustainability Council. The Sustainability Council would be made up of up to 20 faculty, staff, students, Vice Presidents and Administrators of the University. The Council would provide direction and oversight to coordinate OSU sustainability-related activities, and recommend sustainability-related policy to the OSU President and Provost. In addition to representatives of the groups named above and each of the colleges, we'd also recommend representatives specific to the humanities, the basic sciences, OSU operations, Extension, Extended Campus, and OSU off-campus faculty.
- Creating a full-time Assistant to the Provost for Sustainability Initiatives. Responsibilities might include, but not be limited to: developing and implementing sustainability initiatives and projects as directed by the Provost's Sustainability Council; managing the operations of the Council and its programs; developing, obtaining and administering grants to support the Sustainability Council's initiatives; tracking and reporting on sustainability-related research and educational activities at OSU; serving as a liaison to connect faculty, researchers and students with local community organizations; coordinating and collaborating with other OUS institutions on sustainability-related activities; and conducting annual evaluations of progress to be published in an annual report.
- Funding an OSU faculty member at .25 to .30 FTE to staff the Provost's Sustainability Council, barring the ability to hire a full-time Assistant to the Provost for Sustainability Initiative.

This report is should be viewed as a living document to be deliberated, improved, and expanded in the pursuit of a coordinated effort to showcase OSU's contribution to sustainability.

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Introduction

Background

Universities are natural laboratories for society to test new ideas. Oregon State University—Oregon's Land Grant, Space Grant, Sea Grant, and Sun Grant University—provides the space and opportunity to further knowledge about sustainability and sustainable practices and technologies that decrease costs while increasing community and environmental benefits, and transfer results to the citizens of Oregon.

Sustainability at OSU crosses all aspects of the university. As early as October 2001, OSU Extension introduced Oregon citizens to a new way of thinking with an *Oregonian* insert — *Looking for Oregon's Future: What is Sustainability?* The level of OSU student and faculty engagement for sustainability is exemplified by numerous multi-disciplinary centers, programs, initiatives, and research efforts that have sustainability and sustainable practices as part of their focus. Though most of the work at OSU contributes to one or more of the dimensions of sustainability, we face some challenges:

- OSU's sustainability activities, as a whole, are not well known outside of OSU;
- Balancing and linking the dimensions of sustainability challenges how we think and do our teaching and scholarship;
- Sustainability, like other interdisciplinary efforts, is limited by a lack of coordination and collaboration across the multiple units, projects, relationships, and partnerships (See Appendix A: OSU Sustainability Council, June 2005).

Project Purpose

In spring 2008 the Institute for Natural Resources was asked to conduct an inventory of OSU's sustainability capabilities. More specifically, INR was asked to document OSU's sustainability activities as they pertain to OSU's mission of research, education, and outreach.

Purpose of this Report

Based on an extensive review of OSU on-line sources and other unit documents, including documents requested by Provost Sabah Randhawa in spring 2008 regarding OSU Colleges' sustainability activities, this report is a snapshot of current sustainability activities and expertise at OSU. We do not attempt to characterize the entire university nor do we attempt to assess the quality of any of the sustainability activities that are happening at OSU. While the basic sciences and humanities are a valuable part of researching, learning about, and understanding sustainability, we did not attempt to capture the entire suite of social and biophysical foundations that support sustainability. We recognize that though this inventory is extensive, we may have accidentally missed numerous activities that are relevant to sustainability on campus. Any omission is the fault of the authors, and

is not a reflection of the quality of the sustainability work being done at OSU (See Appendix B for the comments regarding this report and other subsequently submitted sustainability-related information).

This report is intended to be an internal document for Provost Sabah Randhawa.

Project Approach

The general approach to this *OSU Sustainability Inventory* is modeled after the 2006 *Coastal and Ocean Sciences at Oregon University* assessment conducted by Oregon Sea Grant. To conduct the inventory, INR used a variety of sources of information, including the OSU on-line course catalogue, the OSU website, documents from units, and the Research Office's grants and contracts data.

In the context of OSU, sustainability activities focus on: (1) providing the content and context in which students, faculty, and staff can develop sustainability knowledge, skills, and values; (2) campus operations; and (3) the translation and use of sustainability knowledge in decision-making. Since the term "sustainability" lacks a precise definition and is interpreted differently by different audiences, whether or not a particular activity should be included as contributing to "sustainability" is not exact. Every effort was made to be consistent and conservative in our determination for inclusion; however, the content of this inventory, similar to that of coastal and oceans sciences inventory, was influenced by many individual, subjective decisions.

Inventory Framework and Process

Since the 1987 Brundtland Report's articulation of the concept of sustainability on the world stage, many have tried to define it and Oregon is no exception. The 2001 Oregon Sustainability Act defines sustainability as follows:

> *"Sustainability" means using, developing and protecting resources in a manner that enables people to meet current needs and provides that future generations can also meet future needs, from the joint perspective of environmental, economic and community objectives.*
>
> ***Oregon Sustainability Act***
>
> *[2001 c.918 §1; 2001 c.918 §16]*

As a framework for categorizing OSU's sustainability efforts, we utilized Anke Valentin and Joachim Spangenberg's (1999) "Prism of Sustainability" model, which consists of four, instead of three, dimensions of sustainability: environmental, economic, social, and institutional. As such the *environmental dimension* refers to earth's physical environment and ecosystems; the *economic dimension* refers to the systems of production and consumption, and finance and also to the market-based and unpaid economy; the *institutional dimension* refers to societal processes, and in particular governance; and, the *social dimension* refers to the enhancement of human and community well-being. The model also takes into the consideration the linkages between the dimensions (Figure 1). Though Valentin and Spangenberg defined these linkages, for purposes of our inventory we chose not to, thus allowing for broader interpretations of the relationships between the dimensions.

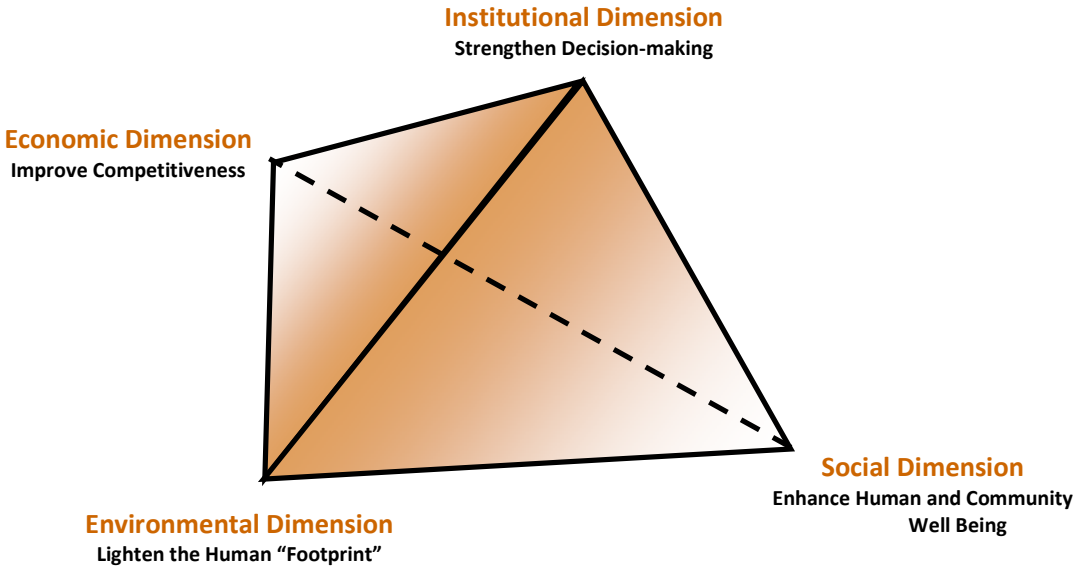

Figure 1. The Prism of Sustainability
Source: Adapted from Joachim Spangenberg, SERI as sited in http://www.foeeurope.org/sustainability/sustain/t-content-prism.htm

To conduct the inventory, the research team developed a protocol to filter and review documents. As a first step we identified activities that self-described "sustainability" or "sustainable" in their descriptions. Second we reviewed activities with regard to linking the four dimensions of sustainability—environmental, economic, institutional, and social. And, third, we identified OSU sustainability strengths and categorized activities accordingly. The first two steps were followed for information gathering for university-level and college-based CIPs, courses and degrees, and college- and department-based research focus areas. At various times during the process, issues were discussed with individuals outside of the project team in order to obtain their perspectives and guidance.

Institutional Structure for Sustainability

As mentioned earlier, OSU sustainability activities span the university – in some cases the university administration has taken a leadership role and in others colleges, departments, and faculty have taken the lead. To document the institutional structure of sustainability at OSU, we reviewed the OSU Strategic Plan (Phase I); the strategic plans of the Cascades Campus, Ecampus, and OSU Extension; the Colleges' strategic plans, and Facility Services' sustainability strategic plan, among other documents.

In 2004, OSU identified five multidisciplinary thematic areas within its strategic plan, all of which apply to sustainability:

- Advancing the arts and sciences as the foundation for scientific discovery, social and cultural enhancement, and progress in the applied professions.
- Understanding the origin, dynamics, and sustainability of the Earth and its resources.
- Optimizing enterprise, innovation, and economic development.
- Realizing fundamental contributions in the life sciences and optimizing the health and well-being of the public.
- Managing natural resources that contribute to Oregon's quality of life, and growing and sustaining natural resources-based industries.

In the strategic plan, OSU also identified six strategic initiatives for investment, the intent being to bring new centers for research and outreach, additional faculty, and undergraduate and graduate student scholarships, internships and educational opportunities to OSU. In a review of the executive summaries of each of the initiatives, only the Sustainable Rural Communities Initiative appeared to intentionally link the dimensions of sustainability. Through this initiative, with a $1.5 million investment over five years, OSU seeks to "build capacity in rural communities to achieve economic and environmental sustainability and social and cultural well-being…" The initiative states that "the *overall goal* of the Sustainable Rural Communities Initiative is to *improve environmental, economic, social and cultural well-being in Oregon's rural communities.*"

The other five initiatives are sustainability activities but, based on their executive summaries on the OSU Strategic Plan website, they do not appear to link any of the dimensions of sustainability. Rather they appear to be located either within the environmental dimension of sustainability (water and watersheds, computational and genome biology, ecosystem informatics, and subsurface biosphere education and research) and within the social dimension (the Center for Healthy Aging). If all of these initiatives are also included, as part of phase I of the strategic plan OSU has strategically invested a total of $9 million in sustainability research and education in the last five years.

Phase II of OSU's Strategic Plan (2009-2013) focused efforts from the 2004 Plan on three Signature Areas of Distinction: *Advancing the Science of Sustainable Earth Ecosystems; Improving Human Health and Wellness;* and, *Promoting Economic Growth and Social Progress.* These Areas essentially define sustainability.

Though the OSU strategic plan does not directly pertain to campus operations, in 2005, the OSU Sustainable Facilities Committee prepared the Sustainability Plan Part 1: Strategies and Goals to guide operations in its sustainability efforts. Goals include:

> Goal 1: Attain University-wide zero net environmental impact.
> *This means zero OSU-induced degradation of air, water and soil quality; toxic emissions from campus and; reliance upon non-renewable material and energy. (Natural Step System Conditions 1, 2, and 3)*
>
> Goal 2: Enhance Human Well-being.
> *This means that employees, students and visitors can access comfortable healthy and productive workplaces, learning and meeting space. (Natural Step System Condition 4)*
>
> Goal 3: Provide long-term cost reductions.
> *Oregon taxpayer investments are protected by reducing OSU's operating costs through strategic expenditures and long term cost avoidance.*
>
> Goal 4: Foster a culture of sustainability.
> *Faculty, staff and students are aware of their impact on OSU's sustainability performance and why it is critical to the success of OSU. Their passion and enthusiasm changes the culture.*
>
> Goal 5: Drive and support innovation.
> *Tap into OSU's strong innovation, research and development capabilities to establish new thresholds for sustainability performance, new technologies and better application of existing technologies.*

In a review of the Ecampus, OSU Cascades, and OSU Extension strategic plans, we found different levels of reference to sustainability. The Ecampus Strategic Plan (June 2004) indirectly references sustainability by "extend[ing] OSU's academic programs of excellence by providing courses and programs in each area of the five multidisciplinary themes of the university to non-traditional and non-resident learners". One of the goals of Strategic Area #1 (Building Academic Programs) of the OSU Cascade's Strategic Plan (2008) is to "increase program offerings to support enrollment growth and contribute to regional social and economic vitality. One of the targets is to launch a program in sustainability (bachelor's degree) in fall 2011." OSU Extension states in its OSU Extension Strategic Plan (September 2004, updated December 2005) that a the lead in OSU's outreach mission OSU Extension engages " with Oregon's people and communities to have positive impacts on community livability, economic vitality, natural resources sustainability, and the health and well-being of people." Extension's thematic focus areas include strengthening communities and economies, sustaining natural resources, and promoting healthy families and individuals.

In addition to efforts to address sustainability in the abovementioned strategic plans, in 2004 the OSU Faculty Senate approved the following commitment to sustainability:

> *Oregon State University (OSU) honors the commitments made by the Governor of the State of Oregon, state agencies, and many of Oregon's*

companies and communities to develop sustainable solutions that balance economic, environmental, and community needs while building opportunities for future generations to meet their own needs. As the state's land, sea, and space-grant university, OSU is ready to support and lead both public and private sector organizations to find sustainable approaches, educate future leaders and citizens who understand and practice sustainability, and demonstrate sustainable practices in the University's day-to-day operations. OSU is committed to incorporating sustainability in its education, research, outreach, and operations as a critical component to its goal of becoming a top-ten land grant university.

Other university-level sustainability efforts include:

- Being a founding member in 2001 of the Education for Sustainability Western Network, now known as the Association for the Advancement of Sustainability in Higher Education (AASHE);
- Chartering and providing start up funds for the OUS Institute for Natural Resources, which was created by the Oregon Sustainability Act in 2001;
- Creating the Provost's Sustainability Council in 2004 to help promote OSU's sustainability agenda and encourage myriad of grass-root sustainability activities; and,
- Signing the American College & University Presidents Climate Commitment.

College and Departments

Information for this section was collected through a review of the 11 Colleges' strategic plans. Our review revealed that five of the 11 colleges refer to sustainability in their plans – Agricultural Sciences, Business, Engineering, Forestry, and Oceanic and Atmospheric Sciences. While the colleges of Agricultural Sciences, Business, and Forestry refer to sustainability free of, or in addition to, the context of OSU's strategic plan, the colleges of Engineering, and Oceanic and Atmospheric Sciences more generally refer to having activities that are aligned with the OSU themes of "Advancing the arts and sciences as the foundation for scientific discovery …," "Understanding the origin, dynamics, and sustainability of the Earth and its resources," and "Managing natural resources that contribute to Oregon's quality of life and growing and sustaining natural resources-based industries." Figure 2 highlights the statements in which these units refer to sustainability.

College of Agricultural Sciences (2004)

- The Oregon Agricultural Experiment Station plans and carries out its work in the agricultural, biological, social, and environmental sciences. Its director is also the dean of the College of Agricultural Sciences. Research is targeted to improve Oregon's economic, social, and environmental well-being and sustainability…
- As part of its Vision. The Oregon State University College of Agricultural Sciences is a responsive force for: fostering economic growth and sustainability…

College of Business Strategic Plan (February 2007)

- Strategic Initiative – Entrepreneurship and Innovation. Provide expertise and knowledge in developing sustainable business practices and new products, processes and organizational forms.
- Desired Capabilities – Education Programs. We offer high quality business education integrating information technology, ethics, sustainability, the global economy, and the entrepreneurial process.
- Scholarship Objectives and Actions – Measures to assess progress in meeting required capabilities for "Scholarship". Faculty publication and productivity especially in family business, sustainability, and entrepreneurship and innovation.
- Infrastructure Objectives and Actions -- Objective: Maintain the physical facilities and implement sustainable practices. Establish baseline to measure sustainable practices in the building and implement and implement best practices.

College of Forestry Strategic Plan (Spring 2002)

- Three overarching themes that encompass our goals: …Broaden and diversify interests and scope of programs…Become the world leader in interdisciplinary approaches to achieving sustainability of forest resources.
- Seven major factors that will influence the College's future. The world and the workplace require professionals who possess and are comfortable with diverse ideas, perspectives, and cultures. The College aims to produce a diverse community of graduates who will enrich society, solve complex problems, and help achieve sustainability.
- Goals of the College of Forestry – Develop collaborative and interdisciplinary approaches to address complex issues through teaching, research, and extended education. Expand activities of the Sustainable Forestry Partnership.

College of Oceanic and Atmospheric Sciences Strategic Plan (Executive Summary, 2008)

The COAS scientific focus has long been on integrative Earth System Science with emphasis on the impacts of global scale processes on the Pacific Northwest. This focus directly supports the College's goal to ensure the long-term ecological and economic sustainability of our region through fundamental research, technology development, and the creation of meaningful partnerships within the University, with government agencies at all levels, and with the private sector.

Figure 2. Highlighted "Sustainability" Statements in OSU College Strategic Plans

Based on the "Prism of Sustainability" framework and a review of documents that describe each colleges' and departments' purpose and focus, we have created an "OSU Prism of Sustainability" in which we illustrate the breadth of OSU's sustainability activities

and where on the prism relevant colleges, departments, and CIPs generally function (Figure 3). As would be expected, our sustainability expertise—as represented by our colleges and departments—mostly lies within the environmental dimension. Three colleges and six departments contribute to OSU's environmental expertise, three colleges and five departments contribute to OSU's social expertise, and one college and two departments contribute to each of OSU's economic and institutional expertise.

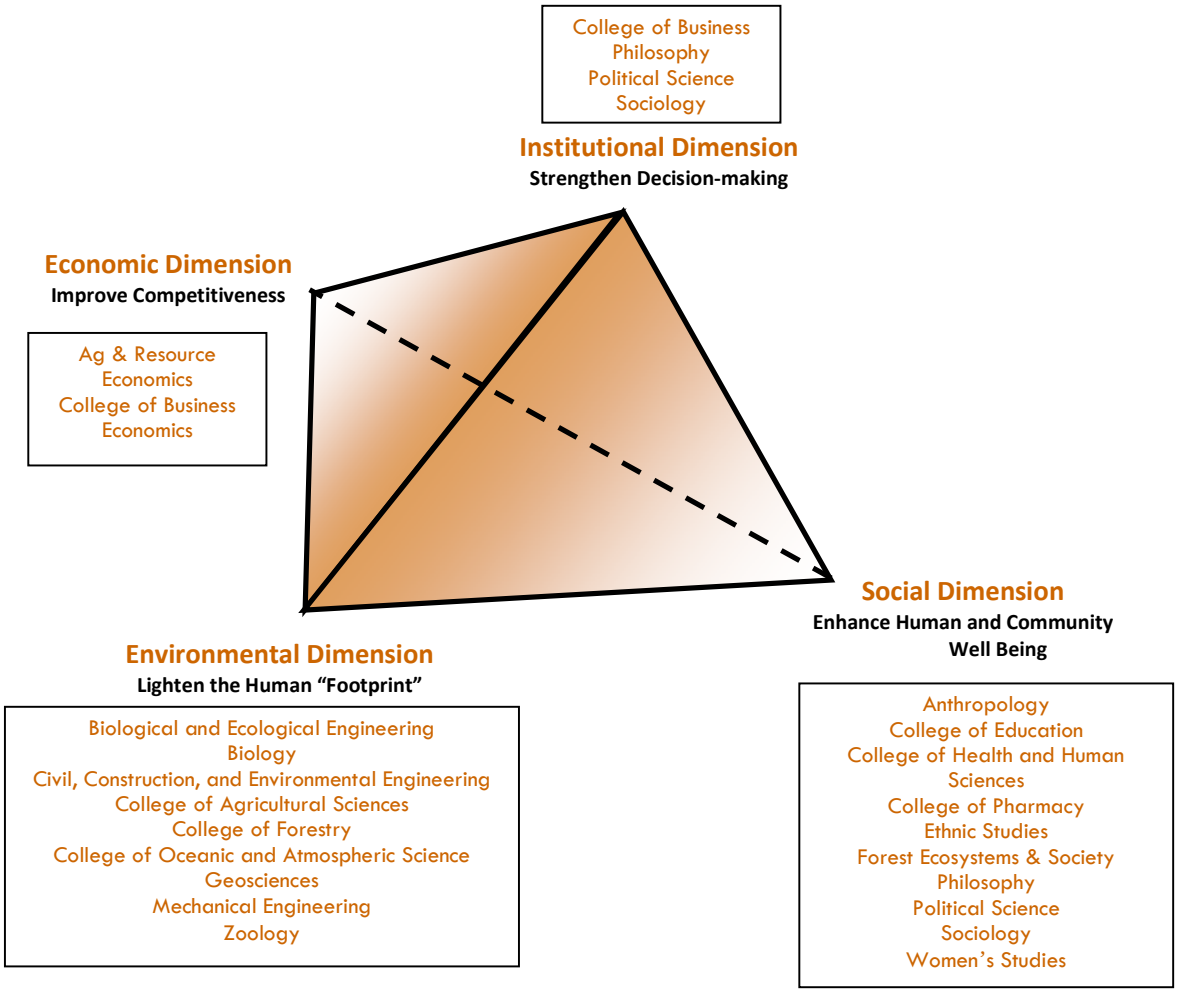

Figure 3. OSU's Prism of Sustainability
Colleges and Departments

Centers, Institutes, and Programs

OSU Centers, Institutes, and Programs (CIPs) span a range of specializations. While some report to OSU's Vice President for Research, while others report to the colleges. As noted in the Coastal and Ocean Sciences Assessment, there are not standard definitions, nomenclature, or policies associated with CIPs, and a degree of uncertainty exists about what constitutes, for example, a center as opposed to a program or an institute (Sea

Grant, 2006). While university level CIPs report to the Vice President of Research, colleges throughout OSU refer to different aspects of their units as centers, institutes, and programs. For this section we also gathered information based on significant documents that described each CIPs purpose and/or focus.

University-level CIPs and Initiatives

University-level Centers, Institutes, and Programs (CIPs) can also be shown on OSU's Prism of Sustainability. As most of the university-level CIPs are interdisciplinary, they tend to link the sustainability dimensions (Figure 4). As with the college and department prism, CIPs can be shown more than once in the figure, depending if they contribute to linking more than one dimension. Of the examined university-level CIPs, nine link two or more dimensions of sustainability – predominantly bridging the environmental-economic and the environmental-social dimensions.

College-based CIPs and Initiatives

As shown in Figure 3, most of OSU's colleges or departments fall within at least one of the sustainability dimensions. To provide information for this section, we reviewed college-based CIPs as they were listed on a College's website. After that review we turned to those CIPs that were listed under departments. Our efforts focused on the college- or department-based CIPs and initiatives that appeared to link the dimensions (Table 1). Of the 82 examined college-based CIPs, 13 (16 percent) link two or more dimensions of sustainability.

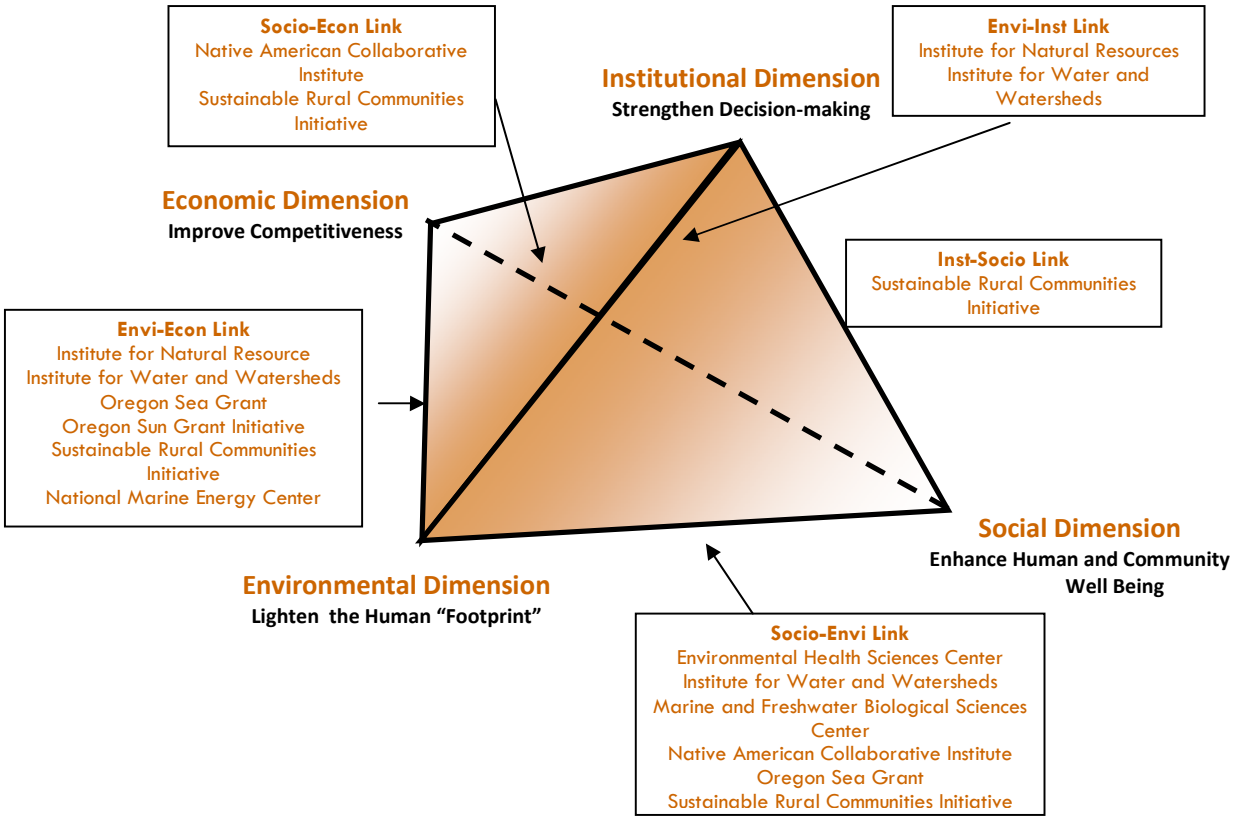

Figure 4. OSU's Prism of Sustainability
University-level CIPs and Initiatives that Link Sustainability Dimensions

Table 1. Examples of College-based CIPs and Initiatives as they pertain to "OSU's Prism of Sustainability"

College-based CIPs and Initiatives	Sustainability Imperatives				Linkages					
	Envi	Econ	Inst	Socio	Envi-Econ	Econ-Inst	Inst-Socio	Socio-Envi	Socio-Econ	Envi-Inst
Advanced Thermal Hydraulics Research Center	●									
Agricultural Research Experiment Stations					●			●		
Applegate River Watershed Forest Simulation	●									
Aquaculture Collaborative Research Support Program					●			●		
Art about Agriculture								●		
Aspen Project, The	●									
Astoria Seafood Laboratory					●					
Austin Entrepreneurship Program		●								
Bates Family Study Center				●						
Biodeterioration, Wood Protection, and Product Durability	●									
Cascade Center for Ecosystem Management, The	●									
Center for Advanced Materials Research	●									
Center for Healthy Aging and Research				●						
Center for Intensive Planted-forest Silviculture	●									
Center for Microtechnology-Based Energy and Chemical Systems	●									
Center of Wood Utilization Research	●									
Child Development Center				●						
Coastal Landscape Analysis and Modeling Study	●									
Coastal Oregon Marine Experiment Station					●			●		
Composite Materials		●								
Cooperative Chemical Analytical Laboratory	●									
Cooperative Forest Ecosystem Research	●									
Cooperative Institute for Oceanographic Satellite Studies	●									
Energy Resources Research Laboratory	●									
Environmental Remote Sensing Applications Lab	●									

Table 1 (continued)

College-based CIPs	Sustainability Imperatives				Linkages					
	Envi	Econ	Inst	Socio	Envi-Econ	Econ-Inst	Inst-Socio	Socio-Envi	Socio-Econ	Envi-Inst
Family Policy Program							●			
Fish and Wildlife Habitat in Managed Forests Research Program	●									
Food Innovation Center					●					
Forest Biogeochemistry	●									
Forest Photogrammetry Research Lab	●									
FRESC – Forest and Rangeland Ecosystem Science Center	●									
Geotechnical Testing Laboratory	●									
H.J. Andrews Experimental Forest	●									
Hallie Ford Center for Healthy Children and Families				●						
Hardwood Silviculture Cooperative	●									
Highway Materials Laboratory	●									
Integrative Analysis of Longitudinal Studies on Aging				●						
Industrial Assessment Center	●									
Innovation in Oregon High Schools				●						
Integrated Plant Protection Center								●		
Kiewit Center for Infrastructure and Transportation	●									
Laboratory for Applications of Remote Sensing in Ecology	●									
Large Scale Structural Strong-Wall Facility	●									
Long-term Ecological Research	●									
Long-Term Ecosystem Productivity Program	●									
Marine Mammal Institute	●									
Microproducts Breakthrough Institute	●									
National Biological Service	●									
National Center for Accessible Transportation										●
National Marine Energy Research Center	●									

Table 1 (continued)

College-based CIPs	Sustainability Imperatives				Linkages					
	Envi	Econ	Inst	Socio	Envi-Econ	Econ-Inst	Inst-Socio	Socio-Envi	Socio-Econ	Envi-Inst
National Pesticide Information Center								●		
Northern Coast Range Adaptive Management Areas	●									
Northwest Tree Improvement Cooperative	●									
Nursery Technology Cooperative	●									
O.H. Hinsdale Wave Research Laboratory	●									
Oak Creek	●									
Oregon Child Care Research Partnership				●						
Oregon Climate Change Research Institute	●									
Oregon Invests!					●			●		●
Oregon Metals Initiative	●									
Oregon Wood Innovation Center	●									
ORGANON Growth Model	●									
OSU Wind Research Cooperative	●									
Pacific Northwest Tree Improvement Research Cooperative	●									
Partnership for the Interdisciplinary Study of Coastal Ocean	●									
Range Contraction Project	●									
Science and Math Investigative Learning Experiences				●						
Science Education Partnerships Program				●						
Silviculture Group	●									
Spring Creek Project, The					●			●		●
Sun Grant	●									
Supercritical Fluid Treatment Research Cooperative	●									

Table 1 (continued)

College-based CIPs	Sustainability Imperatives				Linkages					
	Envi	Econ	Inst	Socio	Envi-Econ	Econ-Inst	Inst-Socio	Socio-Envi	Socio-Econ	Envi-Inst
Sustainable Business Initiative					●				●	
Sustainable Forestry Partnership					●					●
Swiss Needle Cast Cooperative	●									
Terrestrial Ecosystem Research and Regional Analysis group	●									
Tree Biosafety and Genomics Research Cooperative	●									
Utility Pole Research Cooperative	●									
Vegetation Management Research Cooperative	●									
Wallace Energy Systems and Renewable Energy Facility	●									
Western Regional Hazardous Substances Research Center									●	
Wind Research Cooperative	●									
Young Stand Management	●									

OSU Sustainability: Education

Courses

To get a better sense of how courses offered at OSU apply to sustainability, we reviewed the descriptions of 7,713 courses listed in OSU's on-line course catalogue. Courses labeled "special topics", "research and scholarship", "thesis", "reading and conference", "projects", "seminar", etc. were not reviewed as their course descriptions are limited and the focus of such courses can vary.

Our examination resulted in 47 course listings that mention "sustainability" or "sustainable" in their description (Table 2). Of these course listings, all 47 are available to students attending the OSU main campus, 16 are available to those at the OSU Cascades campus, 13 on Ecampus (with the majority of the classes associated with the Sustainable Natural Resources Graduate Certificate Program), and none being offered at the Hatfield Marine Science Center.

For students interested in studying abroad, courses in Iceland and Greece focus on sustainability. The Kefalonia program of the Overseas Study Center in Greece focuses on sustainable community development and "would appeal to students interested in sustainable economic development, agriculture and natural resource development, urban planning, landscape design and architecture, social anthropology and environmental sciences." While in Iceland, students will study environmental science, Icelandic history and culture, land use management and other sustainability-related subjects in a field-based study abroad program

When we account for the one course that is cross-listed in two departments, the three undergraduate courses that are also listed as Honors College courses, and the overseas study courses to Iceland and Greece that combined are listed under 9 course numbers, the number of undergraduate, graduate, and combined under-/graduate courses that self-describe "sustainability" changes to 33.

Upon further review of the 7,713 course descriptions, our examination also yielded more than 365 course listings that appear to link (or have as relevant included topics of discussion) the environmental, economic, social, and/or institutional dimensions of sustainability. These courses reach more broadly into various departments around campus—agricultural and resource economics, forest ecosystems and society, teacher and counselor education, sociology, political science, philosophy, human development and family science, and marine resource management, to name a few—and are offered at the OSU main campus, Ecampus, the Cascade campus, and one at the Marine Hatfield Science Center. We expect that were there to be an examination of the more detailed syllabi of each class, many more classes would be added to this list. Also there would be changes to the list were instructors to change their online descriptions.

Table 2. Listed Courses with Titles or Course Descriptions Mentioning "Sustainability" or "Sustainable"

College	No. of Listings	Course Listing
Agricultural Sciences	11	AREC 550 – Environmental Economics CSS 199 – Special Studies: Issues in Sustainable Agriculture CSS 205 – Soils: Sustainable Ecosystems RNG 477/577 – Agroforestry HORT 260 – Organic Farming and Gardening HORT 318 Applied Ecology of Managed Ecosystems HORT 350 Urban Forestry HORT 380 Advanced Landscape Design Studio FW 350 – Endangered Species, Society, and Sustainability FW 620 – Ecological Policy
Business	1	BA 466 – Integrative Strategic Experience
Education	-	
Engineering	4	BEE 321 - Fundamentals of Ecological Engineering ENGR 350 – Sustainable Engineering ENVE 456/556 – Sustainable Water Resources Development
Forestry	4	FOR 365 – Issues in Natural Resources Conservation FS 432/532 – Planning Agroforestry Projects FS 547 – Nutrient Cycling
Health and Human Sciences	1	DHE 288 – Environmental Building Systems
Liberal Arts	2	PS 452/552 – Alternative International Futures
Oceanic and Atmospheric Sciences	2	MRM 530 – Principles and Practice of Marine Resource Management MRM 535X – Rights-based fisheries management
Pharmacy	-	
Science	2	BOT 547 - Nutrient Cycling GEO 300 - Environmental Conservation and Sustainability
University Honors College	3	CSS 199H - Special Studies: Issues in Sustainable Agriculture ENGR 350H - Sustainable Engineering GEO 300H - Environmental Conservation and Sustainability
Veterinary Medicine	-	
Sustainable Natural Resources Graduate Certificate	8	SNR 506X – Independent Project in Natural Resource Sustainability SNR 511X – Sustainable Natural Resources Development SNR 520X – Socially Sustainable Natural Resources SNR 521X – Economics of Sustainable Natural Resources SNR 522X – Basic Beliefs and Ethics in Natural Resources SNR 530X - Ecological Principles of Sustainable Natural Resources SNR 531X – Sustainable Silviculture SNR 535X - Sustainable Management of Aquatic and Riparian Resources
Overseas Study	9	OICE 188/288/488/588 - OVERSEAS STUDIES/ICELAND OKEF 188/288/388/488/588 - OVERSEAS STUDY CENTER IN GREECE

Degrees

In our search we found eight OSU educational programs that specifically mention sustainability in their descriptions. Those degrees include: the Graduate Certificate Program in Sustainable Natural Resources; the sustainability option within the Bioresource Research undergraduate degree; the undergraduate and graduate degrees in Biological and Ecological Engineering; the Masters in Business Administration; and, the Community and Landscape Horticultural Systems and Sustainable Crop Production graduate degree options and the Sustainable and Ecological Horticultural Production and Environmental Landscape undergraduate options offered by the Department of Horticulture.

OSU MBA Program Ranked Among Top 100 by Aspen Institute

CORVALLIS, Ore. – Oregon State University's Master of Business Administration program is among the top 100 in the world, according to the Aspen Institute's 2007–2008 edition of "Beyond Grey Pinstripes," which ranks business schools based on proven integration of social and environmental issues into the curriculum.

The Aspen Institute Center for Business Education, a program of The Aspen Institute Business and Society Program, compiled "Beyond Grey Pinstripes," its survey and alternative ranking of business schools, looking at how well social and environmental issues are incorporated into the training of future business leaders.

OSU's College of Business's MBA program was singled out for its key focus areas of sustainability and entrepreneurship. Its classes on corporate responsibility and ethics, as well as legal courses on e-commerce were highlighted as benefits for students.

For more on this story go to: OSU News and Communications. Media Release. October 10, 2007.

Currently, a new Conservation and Sustainability Option is being developed in the undergraduate Environmental Sciences degree program. The Option has core courses in the science of conservation as well as in sociology, anthropology, and economics. The Option was designed to be offered online through Ecampus as well as on campus.

The College of Business, through its Sustainable Business Initiative provides a distinctive educational and research program focused on sustainability so that students entering the business world understand that a sustainable business meets economic, social and environmental needs without compromising the future of any of them. The concepts of sustainability are integrated throughout the curriculum. The program's mission is to accumulate and disseminate information about the relationship between business, the environment and society with an aim of helping students and members of the business community answer the following questions:

- Is it possible for an organization to simultaneously have superior performance on economic, environmental and societal indicators?
- If so, how is this superior performance achieved?
- If not, what are the trade-offs?

Examples of other educational programs, though not specifically mentioning sustainability, imply linking or addressing more than one of the sustainability dimensions in their core curriculum (Table 3).

Table 3. Examples of OSU Educational Programs that Link or Address More than One Sustainability Dimension

Educational Program	Degree Type	Sustainability Dimensions			
		Envi	Econ	Inst	Socio
Primary Sustainability Dimension: Environmental					
Biological and Ecological Engineering*	Graduate and undergraduate	●	●	●	●
Bioresource Research – Sustainability Option*	Undergraduate	●	●	●	●
Environmental Sciences	Graduate and undergraduate	●	●	●	●
Fisheries and Wildlife	Graduate, graduate certificate, and undergraduate	●	❍	❍	●
Forest Management	Undergraduate	●	●	●	●
Forest Resources	Graduate and undergraduate	●	●	●	❍
Horticulture	Graduate and undergraduate	●	●		●
Geosciences – Resource Geography	Graduate	●			●
Marine Resource Management	Graduate and graduate certificate	●	●	●	●
Natural Resources Interdisciplinary Program	Undergraduate	●	●	●	●
Rangeland Ecology & Management	Graduate and undergraduate	●	●	●	●
Sustainable Natural Resources*	Graduate certificate	●	●	●	●
Water Conflict Resolution	Graduate certificate	●	●	●	●
Water Resources Policy and Management	Graduate	●	●	●	●

* = self-describes "sustainability" in its description; ● = applies to the sustainability dimension; ❍ = applies depending on the concentration or option

Table 3 (continued)

Educational Program	Degree Type	Sustainability Dimensions			
		Envi	Econ	Inst	Socio
Primary Sustainability Dimension: Economic					
Agricultural and Resource Economics	Graduate and undergraduate	●	●	●	❍
Masters in Business Administration*	Graduate	●	●	●	●
Primary Sustainability Dimension: Institutional					
Public Policy – Environmental Policy Option	Graduate	●	●	●	●
Public Policy – International Policy Option	Graduate	❍	●	●	●
Public Policy – Social Policy Option	Graduate		●	●	●
Public Policy – Rural Policy Option	Graduate		●	●	●
Primary Sustainability Dimension: Social					
Applied Anthropology – Natural resources and communities, indigenous knowledge and environment	Graduate	●			●
Human Development and Family Studies	Graduate and undergraduate		❍	●	●
Public Health	Graduate and undergraduate	❍	❍	❍	❍
Sociology	Undergraduate	❍		●	●

* = self-describes "sustainability" in its description; ● = applies to the sustainability dimension; ❍ = applies depending on the concentration or option

Fellowships, Scholarships, and Internships

In an on-line search of the Fellowship Programs Administered by the Graduate School, College-Based OSU Fellowships, and Other On Campus Fellowships, sustainability was not a self-described intent of any of the fellowships or scholarships being administered by or based out of OSU. However in 2008, the Department of Fish and Wildlife instituted the *Charles E. Warren Award for Ecology and Sustainable Societies*. Preference for this scholarship is given to students whose research integrates ecology, political economy, and environmental justice in the quest for sustainable relationships between communities and their natural resources.

OSU Sustainability: Research

Sustainability-related Research Strengths

OSU researchers are leaders in understanding earth systems, both natural and man-made, and are working to apply their knowledge to developing new sustainable, resilient technologies. Based on a review of the OSU college- and department-based research focus areas, OSU sustainability strengths fall into six categories: alternative energy and energy sources; blue sustainability; climate; green sustainability; materials, practices, and technologies; and rural communities (Table 4).

Table 4. OSU Sustainability-related Research Strengths

Alternative Energy and Energy Sources	Blue Sustainability	Climate	Green Sustainability	Materials, Practices, & Technologies	Rural Communities
• Bio-based energy • Passive nuclear • Solar • Wave • Wind	• Coastal & ocean sciences • Fisheries • Water & watersheds	• Adaptation • Human dimensions • Impacts • Mitigation • Processes	• Agriculture • Ecosystems & habitats • Forests • Landscapes • Soils	• Bio-based materials • Bio-remediation • Environmental toxicology • Green technologies	• Agricultural & resource economics • Rural studies

Grants and Contracts

To determine how OSU self-identified its research in terms sustainability, the INR project team engaged in two activities. First the team conducted a word search of 4 years FY03 – FY07 of research grants as maintained in a Research Office database of newly award grants, and a review of the FY07 database. Second, we conducted an on-line search of research programs on the OSU website. The on-line search consisted of examining the research program's mission and/or objectives, and a word-search for "sustainable" and "sustainability".

Through a project title word search of 8,426 listings in the Research Office's database of new grants awarded each year (FY03 – FY07), in only 35 instances did the principal investigator (PI) include the term "sustainable" or "sustainability" in the project title. This does not imply that other PIs did not have projects that related to sustainability or that sustainability was not part of the intent of the project; rather it only indicates the number of instances in which those terms were part of the project title.

We then turned to reviewing the 1,973 grants and contracts awarded in FY07. In terms of their application to OSU's six sustainability strengths, many of these awarded grants can apply to multiple OSU's sustainability strengths. We were conservative in our decisions to categorize awarded projects in more than one of the OSU sustainability strengths. For instance, because of the knowledge that INR has about IGERT and LTER, funds awarded to these projects show up in more than one OSU sustainability strength category. In cases where we were not able to determine the possible categorization of the grant or contract, they were omitted from the list.

During FY07 (Table 5), projects within OSU's six sustainability strengths, were overwhelmingly funded by federal agencies, with the exception of rural communities, in which funds primarily came from state agency sources of funding.

Table 5. FY07 Funding for grants and contracts based on Sustainability Strength

Sustainability Research Strengths	**Funding Amount**
Alternative Energy and Energy Sources	$ 5,242,954
Blue Sustainability	$ 54,646,393
Climate	$ 20,239,141
Green Sustainability	$ 46,275,998
Materials, Practices, and Technologies	$ 21,424,186
Rural Communities	$ 5,634,617
Total	$153,463,289

Although this is only one year of research funding, it suggests that almost three-quarters of OSU's research relates to sustainability.

Examples of research projects with each of the OSU sustainability strengths include:

Alternative Energy and Energy Systems

Researchers throughout the university are exploring a range of alternative energy sources including wind, wave, solar, biofuels, and passive nuclear. And others are seeking ways to shift from hydrocarbon based products to those based on biological processes.

- **Wave Energy.** Scientists across OSU are working to sustainably capture the power of the ocean, from work on a cutting edge new wave generator in the College of Engineering (*Annette VonJouanne*), to research by the Marine Mammal Institute on potential impacts on whale migration (*Bruce Mate*), to Sea Grant extension agents working with affected communities to assure compatibility with existing ocean users (*Flaxen Conway*). This research on technology, ecological effects and human dimensions of wave energy is attracting scholars and graduate students to OSU where they know they can help develop sustainable energy solutions for the future.

- **Sun Grant.** The Sun Grant Initiative is a national program established to create new solutions for America's energy needs and to revitalize rural communities by working with land-grant universities and their federal and state laboratory partners on research, education, and extension programs. Oregon has been conducting further R&D into biomass production and conversion (especially in the areas of agricultural and timber residues, which represent major feedstock opportunities in the Western states), biogas from animal and urban wastes, and transportation fuels, in conjunction with power generation and co-product development. Examples of valuable co-products under investigation are industrial proteins and enzymes, pharmaceuticals and nutraceuticals, "natural" crop control chemicals, and structural materials that could be obtained from each state's unique crops and plants. Oregon investigators are also conducting R&D in processing technology that includes microbial and solar driven hydrogen fuel cells, micro processing of biodiesel production, and processing biosensors. In the area of bioremediation, scientists at Oregon State University's Klamath Experiment Station have been investigating the possibility of using fast-growing hybrid poplars and other crops to treat sewage effluent

- **Solar Energy.** Working together, OSU chemists and engineers, like *Doug Keszler*, are developing novel compounds that could give new life to the solar energy industry. These advanced solar-cell compounds absorb more light, produce higher voltage, and work more efficiently, which is why they could lead to an exponential expansion of sun-based power generation. With funding from the National Renewable Energy Laboratory, OSU researchers are investigating oxides as the optimal materials to replace yesterday's solar cell mainstays—silicon, cadmium telluride, and copper indium diselenide.

Blue Sustainability (water-based resources)

- **Watersheds Research Cooperative.** The Watersheds Research Cooperative (WRC) is a long-term research and demonstration program to fill gaps in scientific knowledge identified through the Oregon Plan for Salmon and Watersheds. Directed by Forest Engineering faculty member *Arne Skaugset*, it is a cooperative and collaborative public-private program of research and outreach to evaluate the cumulative environmental effects of contemporary forestry practices on water quality, native fish, amphibians, and aquatic insects at the watershed scale. Three major studies are underway in the Hinkle Creek, Trask River, and Alsea River watersheds in western Oregon.

- **Western Water Basins at Risk**. This project utilizes historical records of water driven conflict and cooperation to identify key geographic indicators associated with both sides of the water relations spectrum.

- **Oak Creek Center for Urban Horticulture.** Researchers are experimenting with green roof systems to reduce and manage urban stormwater. They are developing the science behind creating successful green roofs, a brand new landscape where nothing is truly native.

- **Toxic Algae and Red Tides.** *Pete Strutton* from COAS is leading the way to forecasting when harmful plankton blooms are coming to the coast through new ocean observatories. Strutton and other researchers have discovered "hotspots" where algal blooms start and spread out from. They include Heceta Bank off central Oregon and a big eddy at the mouth of the Strait of Juan de Fuca off the northwest tip of Washington State. He is working on biological and chemical sensors needed to provide relevant data for helping to predict the toxicity of the blooms.

Climate

- **Oregon Climate Change Research Institute.** Established by the state Legislature in 2007, OCCRI works to facilitate climate change research and provide information to Oregon decision-makers.

- In June 2007 Oregon State University conducted a Climate Research Initiative Workshop. The workshop, which attracted close to 100 OSU faculty, was the first step in a larger effort to define a Climate Change "Initiative" at OSU. The overall goals of the Initiative include:

    - Develop a formal organization to foster climate research on campus and to serve as a magnet for external funding
    - Promote stronger collaboration across units to generate greater internal funding, increase potential for interdisciplinary research initiatives, and provide a means for OSU researchers to connect with colleagues
    - Enhance infrastructure support, where infrastructure includes building, laboratory and major equipment
    - Develop graduate and undergraduate programs in climate studies
    - Provide outreach vis-à-vis climate change research and implications

    Based on the white papers submitted by the OSU community of climate change researchers, the first working groups of the workshop were based on four themes:

    - Understanding processes causing climate change
    - Understanding impacts physical environment and ecosystems
    - Understanding impacts on populations and community structures
    - Understanding the human dimension of climate change

- **Haze, Clouds, and Climate Change.** The effect of haze on climate is the largest source of uncertainty in determining how humans are affecting the climate. A COAS research group studies the properties of clouds and haze around the world using observations of reflected sunlight and emitted infrared radiation obtained from NASA and weather satellites.

Green Sustainability (land-based resources)

- **Fish and Wildlife Habitat in Managed Forests Research Program.** The Oregon Forest Research Laboratory invests about $375,000 of Harvest Tax receipts in a collaborative program to provide new information about sustaining fish and wildlife habitats and native species diversity within Oregon's actively managed forests through research, technology transfer, and service activities. Projects focus on enhancing the scientific information base that informs state regulations under the Oregon Forest Practices Act and also Oregon's actively managed federal forestlands. The goals are to provide the information needed by forest managers to guide responsible stewardship of fish and wildlife habitat resources consistent with land management objectives, and by policy makers to establish and evaluate informed forest policy and regulations.

- **Sustainable Wine Research.** Utilization of new cropping systems (like canopy and water stress management, and rootstocks) will improve profitability from higher quality fruit and wine composition, and improved pest management. • Use of new technologies will help develop fruit and wine noted for unique qualities that are used in specialty markets or higher value products. Environmental quality will be improved with soil health, improved canopy management to achieve grape quality, rootstock evaluation, pest management, and organic production systems.

- **Sustainable and Ecological Production Systems**
  Oregon Invests! There are many sustainability-related research and outreach activities being done by College of Agriculture and its associated county extension and branch experiment stations faculty. Some of this work has been done for decades. In 2000 Oregon Invests!, the College of Agricultural Sciences' accountability database, was put online to offer information on the College's agricultural research. Each project or program in the database is rated on a scale of -3 to +3 on how the project impacts each of three sustainability dimensions (economic, environmental, and social). This database documents 258 extension and research activities that have a social consequence to the work being carried out, 295 records of activities that have an economic consequence, and 271 records of activities that have an environmental consequence.

  Food Systems. Researchers in the College of Agriculture have secured $139,000 in funding and are conducting organic cropping systems. Areas of investigation include organic potato production, weed control in organic forage systems, nitrogen supply from cover crops in cropping systems, organic wheat production, biological pest management, and organic vegetable seed production.

  The Integrated Fruit Production strategy has reduced organophosphate applications to the pear and apple crops by 75%, and resulted measurable changes in the Hood River Watershed sweet cherry production. More efficient water delivery systems, reduced rates of water use, and on farm irrigation

efficiency upgrades in the Milton-Freewater apple production area have contributed to summer streamflows in the Walla Walla River. The river ran all summer in 2001 for the first time in over one hundred years. Endangered aquatic species are now making use of the improved passage and habitat in the river.

Materials, Practices, and Technologies

- **Green Building and Construction Products from Renewable Materials.** Researchers in the College of Forestry have developed composites using formaldehyde-free adhesives, higher value products from modified plantation-grown poplar, low-toxicity preservatives for protecting doors and window systems from biodeterioration, wood-plastic composites for sustainable highway perimeter products and new methods for removing volatile organic compounds from dry kiln emissions.

- **New Packaging.** A thin Saran Wrap-like film has been developed by scientists (*Yanyun Zhao*, *Mark Daeschel,* and *Su-il Park*) in OSU's Department of Food Science and Technology. Not only does it prevent food from spoiling, it can be eaten along with the food that it wraps. It can even be fortified with vitamins and minerals so the food and the film together make for a more nutritious lunch.

- **Green Roofs.** As part of Portland's efforts to promote sustainable development, city leaders are encouraging the use of green roofs as a lightweight, low maintenance, vegetated alternative to conventional rooftop materials on both residential and commercial buildings. To help explore this new frontier, OSU joined into a partnership with the city of Portland to study the green roof on top of the Portland Building in the heart of the city's downtown area.

- **Environmental Landscapes.** Current work is underway in water quality credit trading.

- **Non-Toxic Adhesives.** *Kaichang Li* has invented ways to convert bark and rotted wood to effective, environmentally friendly wood glues. Even though rotting wood may seem to be everywhere as you walk through a forest, harvesting enough from natural sources to allow commercial production of adhesives is too expensive and time-consuming. Li's team now is trying to find ways to produce rotted wood on a large scale. The formaldehyde-free wood glues are good for replacing the resins used in exterior wood composites, but the dark glue lines that they produce are undesirable for interior finishes. To replace the resins used in interior wood composites, Li has developed another formaldehyde-free wood glue based on soy flour. The glue lines are light, and the glue is water-resistant and safe.

- **Oregon Wood Innovation Center** evaluation of new products and business practices. Other new product development: environmentally-friendly adhesives for a variety of applications, cellulose-reinforced biopolymers to

replace petroleum-based plastics. Life-cycle analysis and inventory to rationally identify the environmental burdens associated with building materials and methods to determine carbon budget, global warming potential and other factors for various residential and light industrial/commercial constructions.

- **Bioremediation.** Working with OSU botanists, microbiologists, and plant pathologists, environmental engineering professor *Lew Semprini*, who directs the Western Region Hazardous Substance Research Center at OSU, is using microorganisms to transform highly toxic chlorinated solvents like Trichloroethylene (TCE) into inert components. Widely used as an industrial degreaser and dry cleaning agent, TCE now contaminates vast areas of soil where it was carelessly dumped. In collaboration with Stanford University, Semprini and environmental engineering professor *Mark Dolan* have successfully engineered ways to inject contaminated soils with microbes and then use DNA testing to track how the organisms do the cleanup.

Rural Communities

- **Sustainable Rural Communities Initiative.** Director *Bruce Weber* works with colleagues within OSU and across OUS to coordinate teaching, research, and outreach focused on the environmental and economic sustainability of rural communities and their social and cultural well-being. Approaches include generating new knowledge, preparing the next generation of citizens, expanding citizen and policy-maker understanding, and empowering communities to develop appropriate strategies.

In addition to these activities, OSU faculty researchers are engaged in four Oregon University System (OUS) multi-institutional, interdisciplinary research institutes related to sustainability. These research institutes include the *Oregon Built Environment & Sustainable Technologies (Oregon BEST) Center*, the *Institute for Natural Resources (INR)*, the *Oregon Transportation Research and Education Consortium*, and the *Oregon Climate Change Research Institute (OCCRI)*.

OSU Sustainability Strengths: OSU College- and Department-based Research Focus Areas and CIP Focus Areas

Several OSU colleges and departments have articulated their overall research focus areas on the OSU website. Tables 6 and 7 categorize these focus areas within OSU's sustainability strengths. Thirty-four departmental research focus areas cross two or more of the OSU's sustainability research strength. Thirteen CIPs appear to cross two or more sustainability strength areas.

Table 6. OSU College- and Department-based Research Focus Areas that are Part of OSU's Sustainability Strengths

Research Focus Areas	OSU Sustainability Research Strengths					
	Alternative Energy & Energy Sources	Blue Sustainability	Climate	Green Sustainability	Materials, Practices, & Technologies	Rural Communities
College of Agricultural Sciences						
Agricultural and Resource Economics		●	●	●		●
Animal Sciences						
Dairy, cattle, poultry, swine, equine, and sheep				●	●	
Biological and Ecological Engineering						
Biofuels development	●				●	❍
Bioprocessing					●	
Ecological engineering					●	
High value bioproduct engineering					●	
Water resources engineering		●				
Botany and Plant Pathology (see COS)						
Crop and Soil Science						
Crops		●		●		
Entomology				●		
Soils		●		●		
Environmental and Molecular Toxicology						
Environmental chemistry and ecotoxicology		●		●		
Mechanistic toxicology		●		●		
Molecular and cellular toxicology		●		●		
Neurotoxicology		●		●		
Fisheries and Wildlife						
Fisheries research		●	●			
Wildlife research			●	●		
Food Science and Technology					●	

● = applies to the sustainability strength; ❍ = can apply depending on the focus

Table 6 (continued)

Research Focus Areas	OSU Sustainability Research Strengths					
	Alternative Energy & Energy Sources	Blue Sustainability	Climate	Green Sustainability	Materials, Practices, & Technologies	Rural Communities
Horticulture						
Ecological landscapes		●		●		
Resilient farm and food systems		●		●		
Microbiology						
Microbes as pathogens						
Microbes in the environment and their contributions to ecosystems		●		●		
Molecular mechanisms of microbial action		●		●		
Physiology, ecology and environmental microbiology		●		●		
Rangeland Ecology and Management						
Water quality		●				
Riparian ecology and management		●				
Restoration ecology and management				●		
Sagebrush steppe ecology and management				●		
Juniper ecology and management				●		
Invasive species ecology and management				●		
College of Business						
College of Education						
College of Engineering						
Energy systems	●				●	
Biological and ecological systems	●				●	
Kiewit Center for Infrastructure and Sustainability					●	
ONAMI					●	

● = applies to the sustainability strength; ❍ = can apply depending on the focus

Table 6 (continued)

Research Focus Areas	OSU Sustainability Research Strengths					
	Alternative Energy & Energy Sources	Blue Sustainability	Climate	Green Sustainability	Materials, Practices, & Technologies	Rural Communities
College of Forestry						
Forest Engineering, Resources, & Mgmt.						
Forest operations research				●		
Forest sector market modeling					●	
Forest soils and water quality		●		●		
GIS and spatial analysis resources				●		
Hillslope and watershed hydrology		●				
Forest Ecosystems and Society						
Forest ecosystem processes				●		
Forest genetics				●		
Forest health				●		
Forest landscape ecology				●		
Tree physiology				●		
Wood Science and Engineering						
Biodeterioration, wood protection, and product durability					●	
Composite materials					●	
Forest products business and marketing					●	
Timber engineering and structural design					●	
Wood anatomy and quality					●	
Wood chemistry					●	
Wood products processing and manufacturing					●	

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Table 6 (continued)

Research Focus Areas	OSU Sustainability Research Strengths					
	Alternative Energy & Energy Sources	**Blue Sustainability**	**Climate**	**Green Sustainability**	**Materials, Practices, & Technologies**	**Rural Communities**
College of Health and Human Sciences						
Design and the Human Environment						
Human Development & Family Sciences						
Developmental and family research methods						❍
Risk and resilience across the life span						❍
Transitions across the life course						❍
Nutrition and Exercise Sciences						
Applied nutrition and dietetics						
Bionutrition						
Biomechanics						
Exercise physiology						
Movement studies in disabilities						
Physical education teacher education						
Physical activity and health						
Sport and exercise psychology						
Sports medicine						
Public Health						
Aging						❍
Chronic and infectious disease prevention						❍
Environmental protection		●		●		❍
Health informatics						❍
Health services						❍
Mental health						❍
Smoking cessation interventions						❍

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Table 6 (continued)

Research Focus Areas	OSU Sustainability Research Strengths					
	Alternative Energy & Energy Sources	**Blue Sustainability**	**Climate**	**Green Sustainability**	**Materials, Practices, & Technologies**	**Rural Communities**
College of Liberal Arts						
Anthropology				❍		❍
Ethnic Studies						❍
Political Science		❍	❍	❍		❍
Sociology		❍	❍	❍		❍
Women's Studies						
College of Oceanic & Atmospheric Sciences						
Atmospheric sciences		●	●			
Biological oceanography		●				
Chemical oceanography		●				
Marine geology and geophysics		●				
Marine resource management		●				●
Physical oceanography		●	●			
College of Pharmacy						
Medicinal chemistry and natural products		❍		❍	❍	
Pharmacology						❍
Pharmaceutics and pharmacokinetics						
College of Science						
Botany and Plant Pathology						
Plant ecology				●		
Plant molecular, cellular, and genomic biology				●		
Plant pathology				●		
Plant systematics				●		
Geosciences						
Active tectonics and earthquake geology				●		
Climatology and climate change			●			

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Table 6 (continued)

Research Focus Areas	OSU Sustainability Research Strengths					
	Alternative Energy & Energy Sources	**Blue Sustainability**	**Climate**	**Green Sustainability**	**Materials, Practices, & Technologies**	**Rural Communities**
Ecosystem informatics		●		●		
Geographic information science		●		●		
Resource geography		●		●		
Volcanology, igneous petrology and economic geology						
Water resource science and policy		●	●	●		
Zoology						
Development and cell biology		●		●		
Ecology and evolutionary biology		●		●		
Physiology and behavior		●		●		
College of Veterinary Medicine						

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Table 7: OSU College-based CIPs and Initiatives that Pertain to OSU's Sustainability Research Strengths

College-based CIPs	OSU Sustainability Research Strengths					
	Alternative Energy & Energy Sources	Blue Sustainability	Climate	Green Sustainability	Practices, Materials, & Technologies	Rural Communities
Advanced Thermal Hydraulics Research Center					●	
Agricultural Research Experiment Stations		●		●		
Applegate River Watershed Forest Simulation		●		●		
Aquaculture Collaborative Research Support Program		●				
Aspen Project, The				●		
Astoria Seafood Laboratory		●				
Austin Entrepreneurship Program					●	
Bates Family Study Center						❍
Biodeterioration, Wood Protection, and Product Durability					●	
Cascade Center for Ecosystem Management, The				●		
Center for Advanced Materials Research					●	
Center for Healthy Aging and Research						❍
Center for Intensive Planted-forest Silviculture				●		
Center for Microtechnology-Based Energy and Chemical Systems	●					
Center of Wood Utilization Research					●	
Child Development Center						❍
Coastal Landscape Analysis and Modeling Study		●				
Coastal Oregon Marine Experiment Station		●				
Composite Materials					●	
Cooperative Chemical Analytical Laboratory						
Cooperative Forest Ecosystem Research				●		

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Table 7 (continued)

College-based CIPs	OSU Sustainability Research Strengths					
	Alternative Energy & Energy Sources	Blue Sustainability	Climate	Green Sustainability	Practices, Materials, & Technologies	Rural Communities
Cooperative Institute for Oceanographic Satellite Studies		●	●			
Energy Resources Research Laboratory	●					
Environmental Remote Sensing Applications Lab		●		●		
Family Policy Program						❍
Fish and Wildlife Habitat in Managed Forests Research Program		●		●		
Food Innovation Center				●	●	
Forest Biogeochemistry				●		
Forest Photogrammetry Research Lab				●		
Forest and Rangeland Ecosystem Science Center		●		●		
Geotechnical Testing Laboratory				●		
H.J. Andrews Experimental Forest		●	●	●		
Hallie Ford Center for Healthy Children and Families						❍
Hardwood Silviculture Cooperative					●	
Highway Materials Laboratory					●	
Integrative Analysis of Longitudinal Studies on Aging						❍
Industrial Assessment Center					●	
Innovation in Oregon High Schools						❍
Integrated Plant Protection Center				●		
Kiewit Center for Infrastructure and Transportation					●	
Laboratory for Applications of Remote Sensing in Ecology				●		
Large Scale Structural Strong-Wall Facility					●	

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Table 7 (continued)

College-based CIPs	OSU Sustainability Research Strengths					
	Alternative Energy & Energy Sources	Blue Sustainability	Climate	Green Sustainability	Practices, Materials, & Technologies	Rural Communities
Long-term Ecological Research		●	●	●		
Long-Term Ecosystem Productivity Program		●		●		
Marine Mammal Institute		●				
Microproducts Breakthrough Institute					●	
National Biological Service		●		●		
National Center for Accessible Transportation					●	
National Marine Energy Research Center	●					
National Pesticide Information Center				●		
Northern Coast Range Adaptive Management Areas				●		
Northwest Tree Improvement Cooperative				●		
Nursery Technology Cooperative				●	●	
O.H. Hinsdale Wave Research Laboratory		●				
Oak Creek		●		●		
Oregon Child Care Research Partnership						❍
Oregon Climate Change Research Institute			●			
Oregon Metals Initiative					●	
Oregon Wood Innovation Center					●	
ORGANON Growth Model				●		
OSU Wind Research Cooperative	●					
Pacific Northwest Tree Improvement Research Cooperative				●		
Partnership for the Interdisciplinary Study of Coastal Ocean		●				

● = applies to the sustainability strength; ❍ = can apply depending on the focus

Table 7 (continued)

College-based CIPs	OSU Sustainability Research Strengths					
	Alternative Energy & Energy Sources	Blue Sustainability	Climate	Green Sustainability	Practices, Materials, & Technologies	Rural Communities
Range Contraction Project				●		
Science and Math Investigative Learning Experiences						❍
Science Education Partnerships Program						❍
Silviculture Group				●		
Spring Creek Project, The		●		●		
Sun Grant						
Supercritical Fluid Treatment Research Cooperative					●	
Sustainable Business Initiative					●	
Sustainable Forestry Partnership		●	●	●	●	
Swiss Needle Cast Cooperative				●		
Terrestrial Ecosystem Research and Regional Analysis group				●		
Tree Biosafety and Genomics Research Cooperative				●		
Utility Pole Research Cooperative				●		
Vegetation Management Research Cooperative				●		
Wallace Energy Systems and Renewable Energy Facility	●					
Western Regional Hazardous Substances Research Center					●	
Wind Research Cooperative	●					
Young Stand Management				●		

● = applies to the sustainability strength; ❍ = can apply depending on the focus

OSU Sustainability: Outreach and Engagement

OSU had the first Extension position in the U.S. focusing on sustainable living education. And, as the sustainability newspaper insert introducing many Oregonians to ideas of sustainability suggests, OSU has been finding innovative ways to connect with interested citizens across the state through established outreach programs such as Master Gardner Program and innovative programs like the Sustainable Living Program.

While most OSU colleges, departments, and CIPs have outreach as part of their mission, OSU Extension and Oregon Sea Grant Extension lead OSU's outreach mission by engaging with Oregon's people and communities "to have positive impacts on community livability, economic vitality, natural resources sustainability, and the health and well-being of people."

Students also remain active in their engagement in sustainability issues as is exemplified by the number of activities they are involved in. Most notably are the Student Sustainability Initiative and a Student Sustainability Center. OSU students 2007 voted to increase student fees by $8.50 per student per term to fund 100% renewable energy for the university, and this initiative was instrumental in OSU being presented the 2008 Green Power Leadership Award at the National Renewable Energy Marketing Conference.

OSU is also involved in the local community, which is committed to sustainability. OSU is a member of the Corvallis Sustainability Coalition, a leader in the Corvallis Energy Challenge, and has been instrumental in the Corvallis and Benton County Economic Vitality Partnership—a consortium of fifteen economic development, government and social service organizations working together to keep Benton County a vibrant place to live and work.

This section highlights only some of many OSU's sustainability outreach and engagement activities taking place around the state.

Green and Blue Sustainability

- The **Sustainable Living Education Program** has had 7,500 people participate in sustainable living workshops, receiving research-based information to help them make intelligent consumer decisions. More than 698,000 browsers have also explored the program website. *Viviane Simon-Brown* also directs the National Network for Sustainable Living Education (NNSLE)—a network of more than 50 Extension faculty from 24 land-grant universities working collaboratively on sustainable living programming. The network also has a database of sustainable living education programs and is developing green guidelines for adult and youth camps.

- **Spring Creek Project for Ideas, Nature, and the Written Word**. *Kathleen Dean Moore* directs a variety of sustainability projects that link the sciences and the humanities. These include the USDA Forest Service-funded Long-Term Ecological Reflections Project, designed to map for 200 years the creative and moral response of writers to the Andrews Experimental Forest. In campus, community, and national gatherings, Spring Creek encourages scientist - humanist collaborations that generate new ideas for living sustainably and responsibly.

- **OSU Extension**
  Sustaining agricultural practices. Sustainable agriculture is a signature of Oregon production and organic production is growing rapidly. Oregon is the nation's third largest producer of organic dairy products. The organic industry is helped by OSU researchers developing new varieties and practices that meet the certification requirements of this rapidly growing sector.

  Sustaining crops through integrated pest management. As honey bees decline, OSU Extension is helping growers use native pollinators to sustain their crops. In addition, IPPC is working with farmers to develop habitat within their fields to shelter predatory beetles that help keep pests in check.

  Sustaining water where water is scarce. OSU researchers along the Columbia River and in central Oregon are helping growers thrive on land that receives less than 10 inches of annual precipitation. In addition, they are demonstrating that by thinning invading junipers they can recharge groundwater and rejuvenate wells.

  Sustaining water through re-use. OSU Extension is partnering with food producers and packagers to develop ways to re-use industrial water for crop irrigation. The result from one example alone has been to recycle millions of gallons of water and nearly a million pounds of nitrogen back to agricultural fields, reducing the need to pump clean water and additional fertilizer onto the land.

  Sustaining water quantity through increased irrigation efficiency. New methods of irrigation conserve water and prevent groundwater contamination with new low-pressure technologies that allow spoon-fed accuracy of water and fertilizer to crops. Using arrays of soil and air temperature and moisture sensors, growers can calculate the minimum required input with pinpoint accuracy.

  Sustaining water quality by managing pesticide use. Unlike point-source pollution that can be traced to a pipe or a mine, non-point pollution enters waterways from anonymous sources across the landscape. OSU researchers working with orchardists on the flanks of Mount Hood have helped to greatly reduce the flow of organophosphates into the region's waterways by careful monitoring, reduce use of pesticides, and increased awareness of the unseen consequences of their practices.

  Sustaining natural communities. Invasive species threaten Oregon ecosystems and economies. Work by OSU Extension is helping to halt the progress of these silent invaders—from rangeland weeds to aquatic invasives— and halt the loss of billions of dollars from lost productive capacity of our land and waterways.

Sustaining communities. OSU Watershed Stewardship program provides the skills and knowledge necessary for people to effectively restore and sustain the watersheds in which they live. Nearly 400 people have completed the rigorous 80 hours of classroom training and provided their communities with 40 hours of on-the-ground project work.

Sustaining future generations. Last year the OSU's 4-H Program reached 30,862 youth across the state of Oregon with educational programs related to sustainable living. Programs included Equipo Verde (green team), 4-H Wildlife Stewards, Junior Climate Masters, resident and day camping, and energy education. The 4-H Wildlife Stewardship program, which trains adult volunteers to connect schoolchildren with natural resource education and local restoration projects, has grown from six Portland-area schools to more than 45 schools throughout the state where children are becoming involved in the sustainability of their watersheds. A new 4-H wind energy curriculum and 40 wind turbine kits have just been distributed statewide.

eOrganic. eOrganic is a webcommunity where farmers, researchers, and educators can exchange objective, research and experience based information about organic agriculture. Oregon State University Extension faculty continue to provide leadership in this area.

MG Report, Waterwise gardening, certified home landscapes. When the Master Gardener program began in the mid-1970's, its focus was primarily directed at diagnosing plant problems and offering solutions. While still a major focus, Extension faculty and volunteers working in the Master Gardener Program also develop and deliver a variety of educational programs that address critical issues in the community. These programs include: least toxic and integrated pest management, water quality protection, yard waste management and composting, sustainable landscaping, organic gardening, waterwise and fire resistant gardens and adaptive gardening. Sustainable Gardening and Local and Backyard Food Production are the "flagship" programs for the Home Horticulture program at this time. OSU Certified Sustainable Landscapes, Waterwise Plants, Gardensmart Oregon, and the Willamette Valley Green Industry Seminar are all examples of Sustainable Gardening projects, while *Local and Backyard Food Production* is expressed through such projects as the Organic Gardening Certificate Program, Garden Enhanced Nutrition Education, and Extension supported demonstration, community and school gardens at fairgrounds, city parks, extension offices, and experiment stations.

Sustainable Stormwater Solutions. A group of Extension faculty has been working on education programs related to sustainable/green/low impact development practices. These practices aim to reduce land use development impacts on stormwater and water quality and rely on reducing the amount of runoff (skinny streets, green streets, green roofs, urban forest cover), protecting natural areas (wetlands, riparian areas, forest cover, streams, etc.), and using a variety of distributed stormwater facilities that capture, infiltrate and clean runoff (bioswales, rain gardens, permeable pavement, etc.).

- **Oregon Explorer**. Citizens, government officials, and scientists all call for more changes in natural resources policy, management, business practices, and research to

achieve sustainability goals. The Oregon Explorer uses the power of today's cutting edge information technology to create a state-of-the-art web-accessible natural resources digital library building on, accessing, and integrating data from state and federal agencies, local governments, university scientists and citizens to support informed decisions and actions by people concerned with Oregon's natural resources and environment.

- **Partnership for Interdisciplinary Studies for Coastal Oceans (PISCO)**. The partnership is a large-scale marine research program that focuses on understanding the nearshore ecosystems of the U.S. West Coast. An interdisciplinary collaboration of scientists from four universities, PISCO integrates long-term monitoring of ecological and oceanographic processes at dozens of coastal sites with experimental work in the lab and field. The partnership explores how individual organisms, populations, and ecological communities vary over space and time. PISCO's findings are applied to issues of ocean conservation and management, and are shared through our public outreach and student training programs.

- **Organic Agriculture's New National Resource for Farmers and Ranchers**. This resource, created by the eOrganic Community of Practice, is for farmers, ranchers, agricultural professionals, certifiers, researchers and educators seeking reliable information on organic agriculture, published research results, farmer experiences, and certification. Their current content is focused on general organic agriculture, dairy production, and vegetable production. The content is collaboratively authored and reviewed by their community of university researchers and Extension personnel, agricultural professionals, farmers, and certifiers with experience and expertise in organic agriculture.

Alternative Energy and Energy Systems

- The Extension Service's **Renewable Energy Working Group** addresses increasing number of questions about renewable energy that now go unanswered because of insufficient translational material, lack of knowledge of where to refer questions, and/or lack of time to deal with individual contacts.
- The **Oregon Wood Innovation Center's** Mobile Demonstration Solar Kiln. The trailer-mounted solar kiln was built in 1995 as a demonstration unit to provide first-hand experience drying a variety of wood species in different parts of Oregon - from the high desert to coastal rainforests.

Rural Communities

- **Walk Our Talk**. The new Walk Our Talk program for Extension faculty and staff is about assessing current sustainability practices in self-selected county offices, doing sustainable living education for self-selected Extension faculty and staff with ongoing coaching, and conducting pre-and post-evaluations to identify behavior change. It will be tested in fall 2009 and is spearheaded by the National Network for Sustainable Living Education (NNSLE).

- **Living Sustainably online.** This online course uses OSU Extension's and NNSLE's publication Living Sustainably: It's Your Choice and is designed to train Extension faculty to teach sustainable living practices.

- **Tough Times: Lessons from Grandma**. This neighborhood-based program is a multi-week workshop designed to support small, cohesive neighborhood or workplace groups wanting to explore life choices during difficult economic and environmental times. It will be piloted in Metro in fall 2009.

- **The Oregon Community Indicators Project.** The Rural Studies Program has created an online resource of Community Indicators for each of the 36 counties in Oregon. Users will be able to retrieve in one location demographic, economic, social, and housing information that provide an overall picture of community well-being.

- **Sustainable Communities Project in Marion County.** The Sustainable Communities Project is designed to assist community-based groups, coalitions, organizations and smaller local governments in building their civic leadership capacity, communication and outreach skills, and human and fiscal resources through fostering dialogue and improving access to training and education materials. Program emphasis is on quality-of-life issues such as healthy, resilient youth, active watershed education, economic diversification, and rural community capacity building.

New OSU Web Site Provides Data on Oregon's Rural Communities

CORVALLIS, Ore. – Oregon State University has created a Web site that compiles statistics, maps and scholarly works to help people understand and shape the future of Oregon's rural communities.

Called the Rural Communities Explorer, the Web site (http://oregonexplorer.info/Rural/) is intended as a source of information for policymakers, nonprofits, local leaders and concerned citizens.

"The Rural Communities Explorer provides them with a one-stop shop to get information they need to advocate for their community, apply for grants, and be more informed about where their community is with respect to environmental, economic, social and demographic issues," said Lena Etuk, a social demographer with the OSU Extension Service and one of the developers of the Web site. "Until now, that information hasn't been easily accessible."

The site combines data from sources that include the U.S. Census Bureau, the OSU Extension Service, OSU's Rural Studies Program, and state agencies like the departments of Education, Environmental Quality, Forestry, Human Services and Revenue.

Data are provided for common demographics like population, age, family structure, education, income, employment, migration, ethnicity, mortality, crime and housing. But there also are some less typical countywide statistics, like the value of deposits in commercial banks and the number of bowling alleys.

The Web site, which includes data on large and small towns too, allows users to compare these demographics for specific places in a side-by-side, easy-to-read tabular format.

For more on this story got to: OSU News and Communications. Media Release. October 14, 2008.

Practices, Materials, and Technologies

- **Industrial Assessment Center** (IAC). The OSU-IAC is one of 26 centers supported by the U.S. Department of Energy (DOE) at universities across the country and provides no cost energy, waste and productivity assessments to small and medium-

sized manufacturers primarily in WA, OR and ID. The OSU-IAC has been commended by the DOE for its work, and has also contributed to a national award for Environmental Sustainability presented to DOE by Renew America, Inc. IAC teams have visited more than 500 Northwest manufacturers, and have made recommendations totaling more than $86 million in annual savings.

Climate

- **OSU Global Environmental Change Organization**. A group of students at Oregon State University, the Global Environmental Change Organization (GECO), with an interest in issues involving global climate change, started as an interdisciplinary network for graduate students at OSU. This group discusses diverse aspects of global change including physical processes, modeling, policy, mitigation efforts, ethics, economics, and social implications.
- **Climate Masters.** The Climate Masters Program is a cooperative partnership between University of Oregon Climate Leadership Initiative and OSU Extension. It is a new 11-week course for 'citizen consultants' to learn about reducing GHG emissions and to conduct home carbon audits in their neighborhoods. Topics include climate change science, home energy, waste reduction, transportation, consumption habits, low impact yards, and carbon footprints. The Program is in the middle of the first course for Benton and Linn counties with 25 adult students. After this pilot program, OSU Extension is planning to offer other Climate Master programs around the state.

OSU Sustainability: Campus Operations

OSU Main Campus

OSU Facility Services has taken an active and coordinated lead in promoting and practicing sustainability within campus operations. In November 2004 OSU Facilities Services established the (OSU) Sustainable Facilities Committee (SFC) to develop guiding principles, policies, and procedures that move campus infrastructure and operations toward sustainability. The SFC's task was to collaboratively create the strategic and goal setting first part of a two part plan. Development of the second part has begun, and is comprised of more detailed implementation and guidance documents, including a campus-wide Environmental Management System. Goals include:

> GOAL 1: Attain University-wide zero net environmental impact.
> *This means zero OSU-induced degradation of air, water and soil quality; toxic emissions from campus and; reliance upon non-renewable material and energy. (Natural Step System Conditions 1, 2, and 3)*
>
> GOAL 2: Enhance Human Well-being.
> *This means that employees, students and visitors can access comfortable healthy and productive workplaces, learning and meeting space. (Natural Step System Condition 4)*
>
> GOAL 3: Provide long-term cost reductions.
> *Oregon taxpayer investments are protected by reducing OSU's operating costs through strategic expenditures and long term cost avoidance.*
>
> GOAL 4: Foster a culture of sustainability.
> *Faculty, staff and students are aware of their impact on OSU's sustainability performance and why it is critical to the success of OSU. Their passion and enthusiasm changes the culture.*
>
> GOAL 5: Drive and support innovation.
> *Tap into OSU's strong innovation, research and development capabilities to establish new thresholds for sustainability performance, new technologies and better application of existing technologies.*

In 2005, the OSU Sustainable Facilities Committee prepared the *Sustainability Plan Part 1: Strategies and Goals* for campus operations. Campus Operations includes all of the business functions that support OSU's education, research and public outreach mission. Campus physical development, purchasing and disposal of goods, and managing OSU's budget are all operational activities. The four main operation departments, categorized under one of the Facilities Services Units umbrella at OSU are: Custodial, Key Shop, Landscape and Maintenance.

Oregon State University's leadership in environmentally responsible practices has lead to several high-profile recognitions, including:

- Earning a place in the Kaplan College Guide 2009's list of America's top 25 "green colleges.
- Being recognized by the U.S. EPA for our commitment to green power with a 2008 Green Power Leadership Award to be presented tonight as part of the National Renewable Energy Marketing Conference.
- Being rank by the U.S. EPA as one of the nation's top five higher education users of "green power" and the best in the Pac 10
- Being listed among the nation's top 25 campuses on the Sustainable Endowment Institute's 2008 College Sustainability Report Card.

Operation's sustainability efforts can be categorized into six primary areas: buildings, climate and energy, food service, natural features and landscaping, recycling and waste management, and transportation.

This section highlights some of the activities.

Buildings

OSU has a 124-page *Design Criteria* document that is used to support "OSU policies related to facilities' design and maintenance, and the Campus Master Plan. It specifically identifies OSU standard equipment, materials and maintenance practices. It provides guidelines and standards for design consultants to use in developing campus construction contract documents." Of special interest to OSU sustainability the documents policy that "items different from the Design Criteria will be reviewed by OSU for life cycle cost, environmental impact and future flexibility (of occupants needs)." Within the Design Criteria, eco-efficient choices are sometimes noted. For instance, when choosing floor covering materials, Marmoleum is mentioned as the preferred type of linoleum and that carpet tiles should be used where carpet is required or requested. Marmoleum is recognized in the industry as a sustainable material and the use of carpet tile allows for replacing much smaller areas than is possible with rolls of carpeting.

- **Green Building**. OSU has two LEED certified buildings including Kelley Engineering (Gold) and the renovated historic Weatherford Hall (Certified). OSU has committed to all new construction and major remodels being certified at least as LEED Silver. A new Energy Center will cut OSU's greenhouse gas emissions by about 38% and is designed to be certified as LEED Platinum.

Climate and Energy

- **Climate.** OSU is a Charter Signatory of the American College and University Presidents Climate Commitment. The commitment requires OSU to launch a two-year planning process to outline its path toward becoming climate neutral. In addition to planning for climate neutrality, the Commitment requires OSU to conduct a greenhouse gas inventory and take specified interim steps to reduce its greenhouse gas emissions. The inventory was completed in Spring 2008.
- **Energy.** In 2003, OSU became the first public university in Oregon to direct a portion of its 3% public purpose charge to go to the Bonneville Environmental Foundation's (BEF) Green Tags program. In turn, BEF directs these funds to support

the production of five million kilowatt hours of renewable wind and other energy resources in the Pacific Northwest. OSU currently offsets 75% of campus electrical use with a green tags purchase funded by students.

- **Carbon Footprint.** The greenhouse gas (GHG) inventory for the 2007 fiscal year shows that OSU's total emissions increased 9.4 percent since a similar survey was done in 2004, for a total of 151,287 metric tons of carbon dioxide equivalent. Purchased electricity was the single greatest source of greenhouse gas emissions, accounting for more than 61 percent. The inventory counted emissions resulting from electricity use and steam production, student and employee commuting, air travel, solid waste and several other sources.
- **Large Solar Electric Systems.** Working under guidance and a master agreement from OUS, we are far along in working with solar consultants to install large solar electric systems. These systems will be installed summer 2008 and owned and operated for about 10 years by a third party who can utilize tax credits and other incentives that OSU, as a non-profit (public agency), cannot utilize. Systems will be several hundred thousand watts in size and located on buildings accessible to researchers, party visible to the public, and will offset some of the campus electrical needs with fully renewable, clean energy.
- **Utility Data Online.** The campus community will be able to access electrical, steam, natural gas, and water consumption figures for OSU properties beginning spring 2008. A new set of tools will allow viewers to create trends from historical meter data, troubleshoot building system issues, and understand the financial and environmental costs associated with OSU infrastructure. Eventually, up-to-the-minute consumption data will be available through this system.

OSU named 'Green Power Leader' by U.S. Environmental Protection Agency

DENVER, Colorado – Officials with the U.S. Environmental Protection Agency recognized Oregon State University's commitment to "green power" with a 2008 Green Power Leadership Award to be presented tonight as part of the National Renewable Energy Marketing Conference.

…Thanks to a "green energy" fee passed by an overwhelming vote of the student body in 2007, OSU is purchasing nearly 67 million kilowatt-hours of green power annually -- enough to meet about 75 percent of its purchased electricity use. OSU buys renewable energy certificates from Bonneville Environmental Foundation.

According to the EPA, OSU's green power purchase is equivalent to avoiding the carbon dioxide emissions of more than 9,000 passenger vehicles per year, or is the equivalent amount of electricity needed to power more than 6,000 average American homes annually.

We're particularly proud of this award, because it reflects a level of responsibility that our students demonstrated in passing the green energy fee," said Brandon Trelstad, OSU sustainability coordinator. "Not only are they taking important steps on behalf of the environment while they are students, they are modeling values that they'll take with them into the workplace upon graduation. Recognition of their efforts proves that this is grassroots activism that is making a difference."

Source: OSU News and Communications. Media Release. October 20, 2008

Food Service

- **Food and Recycling.** OSU Housing and Dining Services spend 40% of their food expenditures on local, organic, or otherwise environmentally preferable food and offer a variety of vegetarian options at the three campus dining centers. They estimate over 20% of their meals are vegetarian-compatible.

Natural Features and Landscaping

- **Natural Features and Landscaping.** The OSU landscape crew takes many steps to reduce their operation's impact on the environment including: use of Maxi-com computerized irrigation system with weather-based watering; on-campus handling and chipping of woody debris and compostable material; application as groundcover of mulch and wood chips to reduce watering and weeding needs; and planting native and drought tolerant species

  Oak Creek has been identified by the City of Corvallis as a significant natural feature. OSU land holdings comprise much of the Oak Creek watershed, and the lower reaches of the creek pass through the main campus. Recent activity to protect the creek includes removal of invasive species (namely Himalayan blackberry and English ivy), planting of native species, cleaning of storm water that is discharged to the creek with bioswales, and curtailing development immediately adjacent to the riparian corridor.

Recycling and Waste Management

Allied Waste of Corvallis, OSU Campus Recycling and Linn and Benton Counties will again sponsor a Master Recycler Class in 2009, an eight-week program that covers all aspects of waste reduction. Discussions are underway to offer the Master Recycler program online. Topics in the past have included:

- Recycling and Waste Diversion
- Waste Reduction and Reuse
- Sustainability, Green Building, Closing the Loop
- Composting and Vermicomposting
- Household Hazardous Waste & Water Conservation
- Outreach Techniques

Transportation

- **Transportation.** As of March 2008, OSU has partnered with UO to gain access to an *Electronic Rideshare System*, a powerful online ride-matching service. The system will be introduced in April, after it has been tailored to meet OSU's needs. OSU's main campus was designated by the US EPA as one of the *Best Workplaces for Commuters*, recognizing efforts to provide alternatives to single occupancy vehicles. OSU has agreements with four local transit systems that allow students, faculty, and staff to ride free.

Hatfield Marine Science Center

At the Hatfield Marine Science Center (HMSC), planning for sustainability is not a new concept. Since 2003, the HMSC Facilities department has looked for opportunities to reduce waste and improve the efficiency of energy and water resource uses on the 49-acre site. A campus-wide sustainability committee was formed in 2006 to promote, through education demonstration, sustainable practices and technologies at HMSC and in the surrounding community. Increasingly, daily operations and planning are being considered in this new light. Fleet vehicle replacements are moving from diesel to electric and hybrid, and even bicycles are being used to get around HMSC for certain maintenance calls, further reducing our carbon footprint.

In 2003, the HMSC embarked on the first official Oregon University System (OUS) sanctioned Energy Savings Performance Contract (ESPC), which is a method of partnering with a mechanical contracting firm to identify energy conservation projects and pay for the improvements with the energy savings. (Since then, ESPCs have been successfully completed at other OUS institutions.) Upgrades completed during this project included a remodel of the entire lighting system to energy-efficient electronic ballasts and T-8 fluorescent technology, new, safer heating units, and "smart" energy controls for the heating/ventilation system. In addition to reducing energy costs, this project also eliminated a considerable amount of maintenance to the aging lighting system.

Another major system overhaul targeted at reducing energy consumption at the HMSC was completed in 2007. The heating system for the Guin Library was upgraded by removing an antiquated heat pump and installing a high efficiency gas boiler and modern high efficiency heat pump in its place. As a result of the heating system upgrade and earlier improvements to the lighting and ventilation systems, annual kilowatt hour usage totals for the library have been reduced by nearly 30% from FY 2003 to FY 2007.

Looking at other types of resource consumption, the HMSC Facilities department switched to paper products made from 100% post-consumer recycled content and cleaning supplies purchased almost entirely from EPA's list of certified green products. Waterless urinals and motion-activated faucets were installed in restrooms to reduce water use. An examination of solid waste disposal practices has led to improved recycling compliance through various measures to keep many tons of recyclables out of the waste stream.

As a popular destination on the Oregon coast for school field trips and the general public, the Hatfield Marine Science Center offers a unique opportunity to educate people about sustainability issues. In 2006, the Visitor Center installed an interactive wave energy exhibit designed by students in OSU's College of Engineering, highlighting a technology that may one day provide a source of clean, renewable energy harnessed from the ocean.

A second renewable energy display, developed in partnership with the Bonneville Environmental Foundation (BEF) and installed in front of the Visitor Center in 2007, features a 1.1 kW solar power panel containing six 170-watt photovoltaic modules. It is connected to an interactive kiosk display inside, where visitors can monitor the amount of energy being generated, even on a rainy day, to better understand the potential of solar

power and distributed energy to reduce the nation's reliance on fossil fuels. Current data from the display is linked to a webpage highlighting other locations with BEF-funded solar panels, offering a larger picture of solar power opportunities in region.

The HMSC has hosted lectures by scientific experts from OSU and other institutions whose research on topics such as ocean acidification, rising sea levels, and other climate-related impacts help increase public understanding of emerging scientific evidence. The sustainability committee also organizes a monthly brown bag lunch speaker series and engages the local community through co-sponsorship of events like the National Teach-In on Global Warming Solutions.

In 2009, the HMSC will undertake an energy audit to be performed by the OSU Engineering Department to find more efficient ways of heating, cooling, and pumping seawater and fresh water utilized by various labs for research. Funded through a grant from the Bonneville Power Administration, the objective of the analysis is to recover wasted heat energy from chillers and identify ways to optimize the system.

Recommendations

The faculty, staff, and students of Oregon State University are involved in sustainability-related activities both on-campus and around the state. Capturing all of these efforts proves to be difficult due to (1) the vast number of sustainability-related activities that OSU is engaged in; and, (2) the lack of a coordinated effort to make visible—both internally and externally—what OSU is doing in terms of sustainability research, education, and outreach. At the outset of this project, there was no pretense of being able to fully recognize and document all of the sustainability-related at Oregon State University. Instead, the intent of this report was to exemplify the breadth and depth of these efforts.

Based on this preliminary inventory, the written comments to the draft of this document, the numerous conversations with OSU faculty about sustainability, and a review of documents from the Sustainability Council, what is evident is the need and the desire to capture, enhance, and present the synergistic sustainability activities that are and will continue to happen throughout OSU. Similar to the recommendations written in the 2005 Sustainability Council report, we recommend:

- Endorsing a university-wide campaign to increase the visibility of OSU's sustainability activities both on- and off-campus in conjunction with implementation of the revised strategic plan and the integrated marketing plan.
- Reconstituting and remobilizing the Provost's Sustainability Council. The Sustainability Council would be made up of up to 20 faculty, staff, students, Vice Presidents and Administrators of the University. The Council would provide direction and oversight to coordinate OSU sustainability-related activities, and recommend sustainability-related policy to the OSU President and Provost. In addition to representatives of the groups named above and each of the colleges, we'd also recommend representatives specific to the humanities, the basic sciences, OSU operations, Extension, Extended Campus, and OSU off-campus faculty.
- Creating a full-time Assistant to the Provost for Sustainability Initiatives. Responsibilities might include, but not be limited to: developing and implementing sustainability initiatives and projects as directed by the Provost's Sustainability Council; managing the operations of the Council and its programs; developing, obtaining and administering grants to support the Sustainability Council's initiatives; tracking and reporting on sustainability-related research and educational activities at OSU; serving as a liaison to connect faculty, researchers and students with local community organizations; coordinating and collaborating with other OUS institutions on sustainability-related activities; and conducting annual evaluations of progress to be published in an annual report.
- Funding an OSU faculty member at .25 to .30 FTE to staff the Provost's Sustainability Council, barring the ability to hire a full-time Assistant to the Provost for Sustainability Initiative.

This report is should be viewed as a living document to be deliberated, improved, and expanded in the pursuit of a coordinated effort to showcase OSU's contribution to sustainability.

References

Oregon Sea Grant. 2006. *Coastal and Ocean Sciences at Oregon State University*. Oregon State University. Corvallis, Oregon. October.

OSU Sustainability Council. 2005. *Sustainability at OSU: A Report to the Provost from the Sustainability Council*. Oregon State University. Corvallis, Oregon. June.

Appendix A: A Report to the Provost from the Sustainability Council (June 2005)

(This document does not contain Appendices B (success stories) or C (OSU sustainability framework) that were contained in the original submission of the report.)

Executive Summary

The OSU Sustainability Council was appointed by the Provost in November 2004 and consists of representatives from all Colleges, Operations, and the student body. The Council collected data about the current status of sustainability at OSU from a wide variety of people both on and off campus and makes the following recommendations to the Provost. Detailed information is provided in the main body of the attached report.

The Sustainability Council is impressed with the breadth and, in some cases, the depth of sustainability activities in which members of the OSU community are currently involved. Sustainability is addressed in curriculum around campus, research projects in multiple units, outreach efforts around the state, and the way we conduct our day-to-day business. Many people in the OSU Community have engaged sustainability to a considerable degree. Specific opportunities to increase our involvement include:

A. Consolidating excellence of existing classes, on-going projects, and learning opportunities into a transparent package that students, employers, and community members can recognize as a mastery of sustainability practices.
B. Strengthening the core of OSU expertise, experience, and facilities focused on alternative energy and energy systems to engage with public and private partners in developing and implementing new technology.
C. Capitalizing on traditional reputation and partnerships to build expertise in sustainable management practices for production agriculture, fisheries, and forestry.
D. Encouraging continued transformation of OSU operations toward sustainable design and practices and taking advantage of appropriate partnerships that can link operations, academic programs, and students and staff.

The increasing array of sustainability efforts at OSU are hampered by limitations seen in most new initiatives including shortage of resources, strategy, and organizational structure. Sustainability, like other interdisciplinary efforts, also suffers from a lack of coordination and collaboration across the multiple units, projects, relationships, and partnerships. As OSU becomes more involved in sustainability activities, this weakness is likely to limit the full potential of faculty, staff, and students to engage in funded efforts.

To that end, the Sustainability Council recommends that the Provost create a full time Sustainability Coordinator position that is co-funded by Facilities and Operations and the Provost's Office in order to capture the synergy of mission and operations activities that will be the hallmark of successful institutionalization of sustainability on campus. The Sustainability Council would act as the Advisory Board to the Sustainability Coordinator, who would report to the Provost or his appointee. The Sustainability Coordinator would be responsible for formulating a strategic plan and organizational structure, including a fiscally prudent budget for implementing specific projects, and collecting and charting

information about progress. The Coordinator would also be responsible for increasing the visibility of sustainability at OSU.

I. Introduction

The university is a natural laboratory for society to test new ideas and provides the opportunity to further knowledge about sustainability and sustainable practices, develop new technology that decreases costs while increasing community and environmental benefits, and transfer results to the citizens of Oregon. The Provost and the Provost's Council have made a commitment to institutionalizing sustainability at OSU through its traditional land grant missions of education, research, and outreach, and in its day to day operations and practices. OSU currently has considerable expertise and experience in sustainability across many colleges and one challenge is to organize that excellence to make it visible. The other challenge is to ensure that the university is nimble enough to work with a wide array of partners – both traditional and non-traditional – in this quickly emerging and changing field.

The OSU Sustainability Council was convened in November 2004 with directions from the Provost to help OSU develop strategic directions for sustainability that will position OSU as a leader in this area. A list of Sustainability Council members is attached as Appendix A to this report. The Council proposed to complete two main activities this year: **(1) Identify opportunities to create a competitive advantage for OSU; and (2) to track and promote sustainability at OSU.** In addition to completing the analysis for this report, the Sustainability Council also provided "success stories" about sustainability at OSU to the Governor's Office (attached as Appendix B), developed a framework for collecting information about sustainability (attached as Appendix C), and prepared this report with recommendations for the Provost.

II. Identifying Opportunities

Sustainability efforts at OSU can best be implemented if they reflect the strengths of the university, honor its history and diversity, and recognize both global and local challenges. We must be able to count on our traditional constituents as well as seek new partners as we move forward into this arena. We must also recognize that sustainability is a consideration that may lead people and institutions to choices not necessarily indicated by internal or economic concerns alone.

In order to gather information about current sustainability activities and opportunities a SWOT analysis was conducted looking at OSU's Strengths, Weaknesses, Opportunities, and Threats relative to sustainability. The Council convened four groups of interested and engaged people including about 15 faculty, staff, and students at each meeting to gather information about OSU's strengths and challenges regarding sustainability. After a brief description of the Sustainability Council and the purposes of the analysis, participants were asked to provide specific examples of sustainability activities currently underway, barriers and challenges to existing and new activities, and opportunities that will allow OSU to capitalize on our strengths and current programs and practices.

The data from the sessions were compiled and reviewed by members of the Sustainability Council and a few major efforts were identified that could move OSU forward in its Strategic Plan and sustainability goals. The strategic areas are specifically designed to

bring new ideas and resources into the university. These are described in some detail below.

A. Sustainability Curriculum - Summary

The most obvious opportunity for OSU right now is to consolidate existing excellence in classes, on-going projects, and learning opportunities into a transparent package that students and community members can recognize as sustainability. Currently, there are efforts in multiple colleges and departments including individual classes, certificate programs, "master" training programs, and short course training sessions. There are potential opportunities to link university operations (e.g., green building, energy systems, eco-roofs, etc.) with interested students, classes, and research projects. However, there is no up-to-date comprehensive list of courses across multiple colleges, introductory course on sustainability, or transcript-visible program.

Industry needs and student employability have driven changes in the Colleges of Business, Engineering, Forestry, and Health and Human Sciences - all sectors outside the university which have undertaken substantial sustainability efforts. The College of Agricultural Sciences is also responding to existing and new constituents to ensure that graduates understand sustainable agricultural practices. Programs at other universities and colleges that focus on sustainability have seen enrollment increase as students look for those programs that will help them find jobs in these changing fields. Some of OSU's traditional constituents are not totally convinced yet that sustainable practices aren't code words for "increased environmental regulation," so care is encouraged in how we go about implementing sustainability in the curriculum. There are opportunities for OSU to secure funding from agencies such as NSF and USDA, both with programs aimed at increasing sustainability knowledge and awareness. These resources could enhance an already impressive array of classes that can be re-packaged as a sustainability curriculum.

Potential Projects

- Create case studies of early efforts at the college level (e.g., College of Business) and at the department/classroom level (e.g., geosciences, plant science, environmental health and occupational safety management, design, and forest science) that can be used by others as models for how to integrate sustainability into curriculum. These case studies can include examples of ways to integrate sustainability into strategic plans, syllabi for sustainability courses, and links to more information.
- Develop a graduate minor in sustainability that provides opportunity for graduate students to create a transcript-visible core of expertise in the topic.
- Create sustainability courses that can meet graduation requirements.
- Develop sustainability courses that provide students with opportunities to conduct original, interdisciplinary research on sustainability and/or participate in internships to learn more about sustainability practices.
- Find ways to link university operations with classroom instruction; in particular, work closely with Facilities and Operations during activities such as new buildings, remodels, new energy system development, and landscaping.

B. Alternative Energy and Energy Systems - Summary

A core of expertise, experience, and facilities to study and implement alternative energy and energy systems is quickly developing at OSU. Researchers in the Colleges of Agricultural Sciences, Engineering, Forestry, and Oceanic and Atmospheric Sciences are exploring a range of alternative energy sources including bio, wind, wave, and solar. A few examples can describe the breadth of activities underway. A group of undergraduate students has been involved in developing expertise in biofuels for the past several years and recently participated in an EPA-sponsored program to develop new technology. Researchers in plant science are examining ways to replace oil-based energy and other products with cell-based equivalents. OSU was named a Sun Grant university in recognition of its ability to bring many participants together to focus on bio-based energy and sustainable agricultural production. The university is proposing an innovative co-generator that will optimally supply not only the whole campus with energy but also provide "nega-watts," or excess energy that can be sold to other users. Researchers in Engineering have worked with external partners to create a successful wave energy program, developing technologies to take advantage of wave power.

Like other emerging areas, however, energy researchers at OSU are spread across multiple colleges and departments with little coordination and communication; this is starting to change. There is yet no unified message that alternative energy initiatives are a campus-wide priority. And, while student interest in alternative energy is high, we have few classes where students can learn more about, or get experience with, alternative energy systems. This is a topic of strong interest at both the state and national level and OSU has only begun to tap into potential partners in both the public and private sectors. It is also an area that can provide development and patenting of new technologies that will change energy production and use. There is considerable competition in this area, however, and we will need to formulate strategies quickly to take advantage of our currently state-of-the-art knowledge before the field moves on to newer ideas.

Potential Projects

- Create Center for Renewable Energy as described by Research Office to leverage existing excellence. While ONAMI may be an appropriate model for this effort, we suggest that reconnaissance be conducted to develop the business case for partners. This will include determining the appropriate organizational structure for coordinating expertise across OSU and partners.
- Conduct an inventory and assessment of research and education capabilities in energy systems and alternative energy. This information should also be made available on the OSU web site. Some of this preparatory work may have been done for the OUS AEED process and should be completed at the earliest possible date.
- Convene one or more cross-disciplinary groups comprised of college representatives who are knowledgeable of efforts in their units. These groups can act as the bridge to other interested parties in the private and public sectors as well as with community members.

C. Sustainable Natural Resources - Summary

OSU is widely recognized for its commitment to natural resources and has a long history of supporting research and education managing agricultural, forestry, and fishing production systems. It is recognized that these systems are critical to the economy and

culture of the state. OSU also has a more recent commitment to research, education, and outreach that focuses on sustainable management of the same systems. A graduate certificate program in Sustainable Natural Resources, for example, has been created. A student-run organic farm is supported by an increased number of courses in sustainable agriculture. Finding uses for renewable plant systems for everything from medicine to remediation provide the impetus for the SPROUT program. And, while these programs are also spread across campus and the state, there is more coordination and communication of efforts between the two primary colleges (Agricultural Sciences and Forestry) that are working to integrate curriculum, research, and outreach activities on several topics.

However, to date, the expertise and experience of faculty and students in Colleges of Business and Engineering have not been fully engaged to help think about building the business case for sustainability or engineering sustainable solutions to resource problems. A large opportunity exists for OSU to develop new knowledge and technology for creating sustainable natural resource production systems. These may include, for example, innovative "closed loop" systems in agriculture and forestry as well as more traditional efforts that mitigate or restore impacts from current practices. Increased funding for research and training about sustainable resource practices include the Sun Grant Initiative, the 2002 Farm Bill Energy Title, various specialty crop programs, and others. Several of the Provost's Initiatives including the Institute for Water and Watersheds and the Rural Community Initiative will provide internal development resources.

The threats to these opportunities include historic constituents who may perceive that attention to new practices will eliminate support they need. Given financial resource shortages in the state, this concern is recognized as serious. Another threat to improving our capacity for developing sustainable natural resource production systems is the declining commitment to research in several resource agencies including the USDA (Agriculture and Forestry), USDOI (USGS and Park Service), and Commerce (NOAA Fisheries). While we have been successful to date with these agencies given our current strengths, the decline in total budgets combined with emerging areas that may not be our strengths, requires us to move quickly to fashion transparent expertise in sustainable resource practices.

Potential Projects

- Develop demonstration projects that focus on sustainable production forestry, agriculture, and fishing to show how to reduce economic, environmental and social costs while increasing benefits.
- Work with Colleges of Business and Engineering to create "business effective" sustainable production practices.
- Use existing funds, resources, and relationships in the Colleges of Agricultural Sciences and Forestry to re-orient (both internally and externally) thinking about natural resource production.
- Focus Research Office funds on developing expertise in "green" infrastructure, transportation, and building as well as in sustainable agriculture and forestry. This may include faculty and department incentives to develop new courses, write interdisciplinary proposals, or form cross-disciplinary development teams.

- Make sure that existing and emerging expertise at OSU regarding sustainable natural resource production is visible to constituents, funders, and students. Oregon Invests! serves as an example of one way to compile information about sustainability expertise.

D. Sustainable Operations - Summary

Commitment to sustainability – at both the individual and organizational level – is increasing throughout the various operations organizations at OSU. Campus planning addresses sprawl and growth patterns, the fleet of hybrid and flex-fuel vehicles in the Motor Pool is growing, new construction and large remodel projects now meet or exceed environmental standards, and a proposed heat plant will in part use methane generated on campus to power and heat campus. Improvements to existing infrastructure are also being made. Shop workers are exploring less expensive and polluting paint and painting systems, grounds keepers are installing lower impact landscaping, biodiesel is run in two major campus vehicles, and safety is ensured through well-run ergonomics and asbestos programs. Outreach and services to campus have also improved. Recycled paper is now standard at Printing and Mailing, which sells recycled paper to other campus units for the same price as cheap non-recycled paper. In addition, the Recycling Program, working with student leadership, has created a post-consumer food waste composting program.

While State government is supportive of the concept of sustainable practices, sometimes State regulations can be obstacles to implementing new practices. Occupant changes to state buildings, distributed decision-making, and decentralized purchasing, shipping and receiving all limit the ability of operations groups to ensure choices that make OSU more sustainable. Other concerns include market fluctuation, product availability, pricing, product information and quality of building materials. Although belief that sustainable actions are the most expensive choices is slowly changing, it is still prevalent and often routes decision making toward the status quo. Although we strive to be a leader in sustainable practices, it's important to acknowledge that competition from outsourcing (e.g., hiring off-campus paint contractors) can be a factor if internal limits are too aggressive.

There are some unique opportunities for OSU operations to pursue in creating a sustainable campus including partnerships with academic programs and student groups. The lack of resources for updating the aging and diverse campus plant may be offset by working with students and instructors who can provide appropriate expertise and/or learning opportunities that can lead to an increase in resources from foundations and individual or corporate donors. For example, with the new roofing project at the Memorial Union, a grant could be pursued to build an "eco-roof" that the student-led Organic Grower's Club could use to provide vegetables to Pangea restaurant, another student operated initiative. Students would gain experience in multiple disciplines while the university can make its needed improvements.

Potential Projects

- Energy reduction is an area where OSU can use the campus intellectual and physical infrastructure as an example of how to improve sustainable practices. This process would engage students, courses, and faculty in the establishment of energy efficiency targets, a plan of action, and a monitoring strategy that will be conducive to innovation and accountability. This applied process should be integrated with the ongoing research in this area with a goal of making OSU

energy-sustainable within a targeted number of years (e.g., 25). Energy-sustainable means OSU will have aligned usage and supply so that campus activity does not contribute to global warming or depletion of finite resources.

- While recently completed projects embody best practices, there may still be innovation potential in our standard operating procedures. To move forward, it will be critical to document what works and what doesn't at OSU as future improvements are planned. Pre-design processes, for example, should incorporate wide-ranging consideration of environmental and social impacts along with sustainable design. In order to increase our expertise, sustainable design of OSU facilities should be closely coupled with research and teaching to provide not just sustainable buildings but to equip future generations with knowledge of sustainable practices.
- Pursue development of a "green purchasing consortia" with the Oregon University System to address some aspects of purchasing and inventory control. This could include green building materials, verification of any sustainability criteria attached to specific products, and support for local suppliers and growers.
- Each area where OSU desires sustainable practices must have a process for the evaluation and commitment of resources required to satisfy this outcome. Key provisions could include financial budgeting with >20 yr horizons; regular energy audits and targets for efficiency; coordination of units sharing responsibility for core mission elements (teaching, research, extension) to identify connections and procedures for the maintenance of institutional capabilities; and human environment audits to assure healthy environments upon which will follow a healthy institution. Setting objectives and tracking progress towards sustainability goals will help OSU create a targeted message about sustainability on campus.

III. Tracking and promoting sustainability

During the SWOT meetings we heard about many sustainability efforts, activities, and practices across campus. Most of us are impressed with how much is actually going on, although we also heard that it is difficult to find information about sustainability activities at OSU. Currently, there are multiple individuals and organizations – both official and *ad hoc* - tracking and promoting sustainability at the institutional level. There are also specific sustainability efforts that are promoted at the unit level (e.g., Colleges of Agricultural Sciences, Business, Engineering, Forestry, and Health and Human Sciences) and project level (e.g., biofuels, Sustainable Communities, Sustainable Natural Resources Graduate Certificate Program). However, there is no single, comprehensive way to easily find information about sustainability at OSU. Currently sustainability information is provided through six different organizations described below.

A. Center for Water and Environmental Sustainability (CWESt)

Web page: contains basic information about sustainability at OSU, numerous links to on and off campus efforts, a sustainability calendar updated regularly, and a nascent inventory of activities started by a now defunct faculty sustainability group. For more information:
http://cwest.oregonstate.edu/sustain/index.htm

Newsletter: regular newsletter highlighting sustainability efforts by OSU campus community. For more information:
http://cwest.oregonstate.edu/OSUstainability/newsletter/index.htm

B. Institute for Natural Resources (INR)

Created by the Oregon Legislature in the Sustainability Act of 2001, the INR Director works with the Oregon University System and the Chancellor's Office to represent OSU in the development of state-wide sustainability efforts. For more information:
http://inr.oregonstate.edu/index.html

B. OSU Operations

Sustainability Coordinator: Part time (.25 FTE) position funded by Director of Facilities to assist in sustainability project implementation.
Web page: Compiled by Sustainability Coordinator, focus on sustainable operations although information does overlap with information on CWESt web page. For more information: http://oregonstate.edu/sustainability/index.html

C. Sustainability Group

Coordinated by Linda Hunn on her own time, the Sustainability Group meets regularly to talk about on and off-campus sustainability projects. In addition, Linda prepares a regular *newsletter* describing sustainability efforts both on and off campus that may be of interest to OSU community. Calendar over-lap with CWESt web page and newsletter.

D. Sustainability Council

The Council was created by the Provost in late 2004 to develop strategic directions for sustainability at OSU. Currently, the Council is developing recommendations for future activities.

E. Oregon University System Sustainability Plan

The OUS Plan provides a limited framework in which to coordinate with other campuses. An OUS sustainability coordinators network for sharing general information and best practices will soon be initialized. The OUS sustainability coordinator has contracted with Good Company of Eugene to provide reports on campus sustainability governance structures and campus emissions. The Plan also serves as a checkpoint for the Oregon Sustainability Board.
http://www.sustainableoregon.net/oregon/index.cfm

As described in Table 1 below, there is considerable overlap in the multiple functions served by these various efforts. All groups consider communicating and raising visibility for sustainability at OSU as part of their mission. CWESt, INR, and Operations have all devoted resources (people and money) to making the communication happen. While it is critical that raising visibility be the responsibility of many parties, it should not be difficult for someone to find a point of entry for information about sustainability at OSU.

	CWESt[1]	**INR**	**Facilities & Operations**	**Sustainability Group**	**Sustainability Council**
Compiling	X		X		X

[1] CWESt will be transitioning to the Institute for Water and Watersheds (IWW) during the next six months. Most of its sustainability responsibilities will be transferred to the Institute for Natural Resources, including the web site and newsletter.

Information					
Internal Communication	X	X	X	X	X
External Communication	X	X			
Contact with OUS		X			
Prioritizing and Recommending Projects		X	X[2]		X
Raising Visibility	X	X	X	X	X

Table 1: Responsibility for Tracking and Promoting Sustainability at OSU

In an analysis of "sustainability star" institutions[3] conducted during spring 2004, OSU graduate students found that these universities had several practices in common: they all have a standing committee like the Sustainability Council, a sustainability strategic plan with objectives and performance measures, and a sustainability center located in its own green building. In sum, these universities have a coordinated and visible presence on their campuses. As shown in Table 1, there is no single organization at OSU responsible for setting sustainability goals, compiling information, making recommendations for improvements, or reporting on a regular basis. Resources are currently not available to ensure that these efforts are completed on a comprehensive or timely basis.

Many institutions find a sustainability coordinator position valuable in organizing and expanding sustainability-related activities and as a single, initial point of contact for external requests and internal communication. This decreases response time and minimizes workload for Sustainability Council members.

Recommendation:
Based on our findings of the myriad sustainability activities currently pursued by OSU students, faculty, and staff, the lack of coordination, and the duplication of effort in making sustainability visible, the Sustainability Council recommends that a full time Sustainability Coordinator position be created. This position would be co-funded by Facilities and Operations and the Provost's Office in order to capture the synergy of mission and operations activities that will be the hallmark of successful implementation of sustainability activities on campus. The Sustainability Council would act as the Advisory Board to the Sustainability Council, who would report to the Provost or his appointee. The Sustainability Coordinator would be responsible for developing a Sustainability Plan that includes specific goals and objective, implementing specific projects like those identified in this report, and collecting information about progress towards goals. The Coordinator would also be responsible for increasing the visibility of sustainability at OSU, maintaining the web page and publishing a periodic newsletter, and serving as the point of contact for both internal and external questions about sustainability at OSU.

In addition, the Sustainability Council recommends creating two annual Provost's Sustainability Awards to recognize the services and innovation of (1) faculty and staff and (2) students.

[2] Responsible for making decisions about facilities and operations at OSU.
[3] Star institutions included Ball State University, Oberlin College, Pennsylvania State University, and the University of South Carolina.

Appendix A:
OSU Sustainability Council Members

Gail Achterman, Institute of Natural Resources
Carol Caughey, Design/Human Environment
Robert Collier, COAS
Steve Cook, Geosciences (resigned)
Kristen Downey, ASOSU
Jesse Ford, Fisheries and Wildlife
Denise Lach, Sociology (Co-Chair)
Jim Lloyd, Facilities Services
Bill Lunch, Political Science
Mark Pagell, Management
Steve Radosevich, Forest Science
John Selker, Bioengineering
Brandon Trelstad, Government Relations
Anthony Veltri, Public Health
Ken Williamson, Civil, Construction, and Environmental Engineering (Co-Chair)

Appendix B: Comments on the Draft 2009 OSU Sustainability Inventory

This list of comments includes only some of the substantive comments that were received in writing.

Comments from Denise Lach

Lisa – congratulations on getting this report out the door…looks good! There are a couple of institutional commitments that I don't see mentioned anywhere in the report (and maybe they shouldn't be): OSU was a charter/founding member of the Education for Sustainability Western Network, created in 2001; this is the organization that morphed into the AAHSE in 2006. We paid dues for EFS for several years, but discontinued after CWESt went away. We've also had a Provost's Sustainability council almost as long…

Comments from Paul Doescher

Hi Lisa—what a great report! Wonderful job!

A few suggestions—the NR Undergraduate Degree would qualify as having all "boxes" filled in with a solid circle—the curriculum does embrace all concepts of sustainability.

Also, the NR 201 course –"Managing Natural Resources for the Future" has sustainability introduced in the first lecture and maintains it as a common thread throughout the term.

Let me know if I can help with anything on the report.

Paul

Comments from Department of Philosophy (Jonathan Kaplan)

Response to Jonathan Kaplan

Jonathan -

Thank you for your comments. We will include your input and I do acknowledge the lack of attention in the document to the humanities' contribution to sustainability. As a quick response to one of your comments, we have the below listed classes a part of the 365 courses "that appear to link (or have as relevant included topics of discussion) the environmental, economic, social, and/or institutional dimensions of sustainability (See Appendix X for the courses)". The unfortunate part of the draft that was distributed is that this list was not included. The

PHL PHL 439 - PHILOSOPHY OF NATURE

PHL PHL 440 - ENVIRONMENTAL ETHICS
PHL PHL 440H - ENVIRONMENTAL ETHICS
PHL PHL 443 - *WORLD VIEWS AND ENVIRONMENTAL VALUES
PHL PHL 443H - *WORLD VIEWS AND ENVIRONMENTAL VALUES
PHL PHL 539 - PHILOSOPHY OF NATURE
PHL PHL 540 - ENVIRONMENTAL ETHICS
PHL PHL 543 - WORLD VIEWS AND ENVIRONMENTAL VALUES
PHL PHL 340 - *SCIENCE, POLICY, AND SOCIETY

We will also look at the additional courses that you mention in your comments.

If you are interested, I would like to speak with you more in-depth about your comments and how we can go about incorporating your input into the document for Provost Randhawa. Though the intent of the document is for the Provost's internal use only, I do hope that however the final version is shaped, that it ends up being a stepping stone for re-mobilizing the Provost's Sustainability Council and it's efforts to define, coordinate, and promote OSU's sustainability efforts.

All the best,

Lisa

Response to meeting with Department of Philosophy

Dear Lisa, Thank you for last week's very productive meeting. I promised to send you some information about for the OSU sustainability study. Here they are:

1. An example of a student project: CAMPUS CARBON CHALLENGE. For her interdisciplinary M.A. degree (Philosophy, Sociology, Anthropology), Carly Johnson created the Campus Carbon Challenge. More than six hundred students and faculty participated, each pledging to make five changes in their lives to lessen their carbon footprint, choosing from a list of fifty possible actions. By studying the choices of the participants and their degrees of success in keeping their pledges, Carly gained useful information about the factors involved in positive change.

2. An example of a humanities faculty research project: FOR ALL TIME. Scientists have been increasingly successful in establishing a global scientific consensus about climate de-stabilization: is it real, it is dangerous, it is upon us. Together with a colleague from Michigan State University, Philosophy professor Kathleen Dean Moore is setting out to establish the corresponding global moral consensus: We have a moral responsibility to the future to take steps to leave a world as rich in possibilities as the world we inherited. Together, but not alone, the scientific information and the affirmation of moral responsibility can lead to a necessary conclusion: we must take immediate steps to slow or reduce climate destabilization. For a book, FOR ALL TIME, Moore and her colleague have asked one hundred moral and intellectual leaders from around the world to write short essays that affirm our obligation to the future.

3. An example of a Spring Creek Project program: THE COLUMBIA RIVER QUORUM. The rate of increase in climate-change gases is far greater than the rate of human response --

this despite the best efforts of experts in many fields, most working in disciplinary isolation. In a field symposium designed to find ways that experts can work together to increase and hasten the human response to climate de-stabilization, the Spring Creek Project brought together scientists, communication experts, environmental writers, and environmental ethicists in a search for synergies. They are issuing a series of papers suggesting how science can join forces with the expressive arts to craft new, more effective messages, more efficiently delivered.

Thanks, Lisa. I hope these help.

Kathleen Dean Moore
Philosophy

Comments from Mark Abbott

I have read through your draft as requested by Sabah, and I have a fundamental concern with the underlying approach. Although the prism is useful in some areas, I don't think it is really capturing the essence of sustainability. That is, the approach focuses on short-term strategies to reduce impacts on the environment, and the tactic of looking for "sustainability" gives distorted view of what is going on at OSU. I recognize that it is extremely difficult not to lump everything into sustainability, but I think the report's approach greatly undervalues the role of the basic sciences and the need to link this knowledge with decisions.

As Roger Pielke Jr. noted last week, these are "wicked problems," or rather dilemmas with strategies in the face of long-term and spatially-complex uncertainties. When I go through the report, I see an over-reporting of the traditional resource-based approach of fish/farms/forests driving our vision of sustainability. I think the more interesting and challenging issue is how to develop flexible and resilient strategies to confront global-scale processes that are manifested on regional and decadal scales, as opposed to short-term solutions to specific problems.

A modern view of sustainability refers to meeting human needs and sustaining the Earth system today and in the future. This implies a more global view and a more interconnected view. The present draft really just takes the traditional resource development and exploitation view and adds a lower impact to the environment (natural products vs. petrochemical, new logging practices, etc.) While these are fine and should be in the report, there is not much mention to the emergence of Earth system science (and not just the physical component) in line with the modern view of sustainability.

The net result is that colleges like COAS and COS play a much smaller role in the OSU sustainability effort than the traditional natural resources colleges.

Response to comments from the Graduate School (Sally Francis)

Sally et al.,

Thank you for the editorial and substantive comments. The final report is intended as an internal document for Provost Sabah Randhawa so that he would have an overview of the sustainability efforts on campus -- institutional (the strategic plan, etc), research and education, outreach and engagement, and campus operations. We understood, as we mentioned in the document, the difficulty in capturing all of the sustainability efforts on campus, so input such as yours is needed.

To quickly answer some of your questions:

Comment A1: What are blue sustainability, green sustainability?

> These are general terms that refer to land-based sustainability efforts (green sustainability) and water-based efforts (blue sustainability) and are more explicit in the table following the comment.

Comment A4: It would be very helpful to offer a definition here. Does this report accept the 2001 Oregon definition below?

> We intentionally did not define sustainability and only made mention of the State's definition. We discussed this with several people on the Provost's Sustainability Council and other faculty members, and it was recommended that not defining sustainability in the report was a good idea.

Comment A5: See page 5 for additional programs. Note that the environmental science and water resources programs are in the Graduate School, not a specific college

> We only focused on colleges and departments, and not interdisciplinary programs in Figure 3. We will make adjustments accordingly.

Comment A6: Total is 44 but text says 43. Total with graduate enrollment is 17.

> Acknowledged

Comment A7: This table seems to be a mix of departments, graduate degree programs, and areas of concentration within degree programs. The list is surprisingly short.

> As indicated in the title of Table 3, the list is only on of examples. It is not comprehensive.

Comment A8: Why is this included? Is the intent to list fellowship programs that are sustainable? Or fellowship programs designed to support students in academic programs that explore topics of sustainability? In contrast, there is no list of all of the instructional programs or CIPs that do not address sustainability, so why include financial support programs? This seems to suggest that this is a problem—is it?

> This section only notes that fellowships don't self-describe "sustainability" as an explicit intent. Of those who have submitted comments to me, only in one case did a

department mention that they have a scholarship award that self-describes sustainability as the award's intent. The latest version of the report has been changed to reflect that. If you know of more, please do let me know. You are right about what we did with the CIPs, I will speak with Provost Randhawa to see if he would like to have a similar breakdown for the financial support programs.

Comment A9: This section names people in some areas, but not all; dollar investment is given in only one area. For consistency, either include or delete such detail.

Acknowledged. As these were submitted by Colleges, and are highlighted as examples, they will probably not be modified.

Comment A10: This table is understood to reflect RESEARCH areas and not instructional programs. If it is intended to include instructional programs, then several interdisciplinary programs are missing. Same comment re table #7.

As indicated in the title of table 6, the intent was only department- and college-based research areas. In the case of the College of Liberal Arts, the departments did not specify departmental research focus areas, as other colleges and departments did. Instead we turned to looking at the research focus areas of faculty members for an indication of sustainability-related research. We did look at the Water Resources Graduate Program, the Environmental Sciences Program, etc. Similarly explicit research areas were not indicated. We also considered looking at the research areas of individual faculty, but those appeared to be captured in the college and department-based research areas. If you have a suggestion of how this should be handled, please let me know. Table 7 reflects the College-based research CIPs as indicated on the colleges' websites. If there are more you think we should include, please let me know.

Please do feel free to provide me with specific examples of Graduate School efforts so that we can more accurately reflect them. We will incorporate your input in the final report.

Thanks again and all the best,

Lisa

Response from the Graduate School

Lisa,

I did not expect to receive a personal response to the comments we offered. Thanks for taking the time. I hope these comments are helpful to you in revising the report to be accessible to a general audience.

Sally

Comments from the College of Agriculture

Comment from Daniel Edge

Lisa,

Nice job on the sustainability report. I offer the following additions/suggestions from a Fisheries and Wildlife perspective for your consideration.

Table 3--you could add "undergraduate" to Fisheries and Wildlife degree types.
Table 6--We have several grants in the climate area for both fisheries research and wildlife research.
Table 7--The Forest Range and Ecosystem Science center does work that fits under the "blue sustainability" heading, and HJ Andrews has research under the "climate" heading.

Finally, under scholarships, we have a graduate scholarship that is new in 2008 that fits...here is a description.

Charles E. Warren Award for Ecology and Sustainable Societies, preference given to students whose research integrates ecology, political economy, and environmental justice in the quest for sustainable relationships between communities and their natural resources.

Thanks for your efforts.

Comment from Peter Shearer

Hi Lisa,

It looks like your efforts with this report are pretty thorough. My qualifier deals with what I perceive as minimal attention to agriculture as a means to measure and/or achieve sustainability. My focus, as are the efforts from faculty and staff at MCAREC (OSU Mid-Columbia Agricultural Research and Extension Center), is on agriculture and keeping/making ag sustainable. I suspect that there is a lot of this going on at OSU. Our mission statement at MCAREC indicates: The MCAREC themes fall under the University's premise of managing natural resources that contribute to Oregon's quality of life and growing and sustaining natural resources-based industries. Additionally, the themes recognize the College of Agriculture Sciences' research emphasis to work toward preeminence in food, nutrition, and health, as well as in water and watersheds. While there is mention of agricultural sustainability in the report, it seems minimal. Maybe I missed something in your report, or, as I am new here, missed the intent of the report. Regardless, I think one could promote OSU and sustainable agriculture and all its benefits a bit more than is currently presented in this report.

Thanks for your efforts with this.
Peter

Comment from Beth Emshoff

Bill et.al.,

You are absolutely correct about Ag not being adequately represented. Nor are the rest of our programs, metro or statewide for that matter. My intent was to "stir the pot" internally. I believe that we are doing much more engaged work in sustainability across the state that is not communicated internally or externally. The metro sustainability working group will be looking at mapping who else (agencies, schools, government, NGO's, etc) is doing sustainability education in our region, but we don't even have a good handle on who within OSU is doing work here in the metro much less state wide that is engaged or outreach scholarship.

I have started wading through SOARS reports and found lots of info but it has to be "edited" down to put into some kind of manageable report.

This is a much bigger project than just metro. If anyone has ideas or comments please chime in.

Beth

Comment from Bill Braunworth

Scott and Deb: There are many sustainability efforts in CAS (teaching, research and Extension) all over the state that are not yet included in addition to campus-based activities. I wonder if one approach would be to have the authors further connect with station superintendents, staff chairs and department heads. I am unclear as to how much detail should be provided for these other numerous programs. Beth has a number of others in the metro area mentioned below, but we have so much more all through the state. I am not clear about the best way to provide input to this process, but I can say that Extension (all programs) and the College of Agricultural Sciences, all missions, is not adequately represented.

Bill Braunworth

Comment from Beth Emshoff

Bill et.al.,

After reviewing this draft, I called Lisa Gaines (the faculty at INR who is compiling this report) and indicated that quite a bit of what is happening in the metro on sustainability with Extension is not included. We have three themes that will be focusing on based on the metro summit; Food Systems, Rural Urban Connections and SUSTAINABILITY.

She did say that Roger had gotten back to her on 4H programming, so thanks Roger.
All of the work that Weston has done at the learning gardens on sustainability education, the organic master gardener course, Derek Goodwin's efforts to create a storm water research collaborative that is moving along with multiple agencies and NGO's, Sam Chan and the horticulture faculty's work on invasive species with OPB, the rural urban interdependence efforts, nutrition education with low income families is sustainability focused, etc. This list goes on.

I am going to submit an annotated list to Lisa, with websites and impact data that I have. I will include work that we have invested in that does not yet have impact data, like the climate master program but is evidence of our commitment to this effort.

I will copy all of you with what I submit.
Beth

Comment from Clinton Shock

Comment #1

Lisa,

This is a good document. The public knowledge of OSU efforts to build sustainable production systems is very important. It is also essential that OSU itself become more aware what other members of our university are doing,

I believe that the "Sustainability at OSU" report could be strengthened with the suggested edits as attached.

Kind regards,

Clint
Clinton C. Shock, Superintendent and Professor
Oregon State University Malheur Experiment Station

Comment #2 (as stated within the reviewed document)

It is essential that the document reflect the richness of sustainability efforts being made all across the state and by many departments. To avoid the focus from being too parochial around the campus, it is essential to pick additional key examples for the "OSU Sustainability: Outreach and Engagement" section that are representative of the breadth and penetration of our work and accomplishments. Add 3-4 pages of representative short highlights on topics like

- Reduced tillage
- Sustainable crop production
- Breeding for sustainability
- Efficient irrigation
- Drip irrigation system development
- Erosion control
- Management of invasive weeds in rangeland
- Management of invasive weeds in cropland
- Groundwater protection
- Surface water protection
- Riparian protection in rangeland
- Sustainable grazing management

- Organic meat and milk production
- Protection of fish stocks
- Sustainable forestry practices
- Partnerships with watershed councils and soil and water conservation districts
- Programs with 4H
- Etc.

Comment from Russ Karrow

Lisa,

Clint had asked me to work with him on edits to this document but other responsibilities requiring immediate participation or reply have prevented me from doing so.

I do agree with Clint's general tenant that there are many activities being done by OSU's county extension and branch experiment stations faculty that are directly related to sustainability. Some of this work has been done for decades. There are few references to this work in the document and the picture of OSU sustainability efforts would be more robust with such inclusion. The web site Oregon Invests would be a ready source of such information.

Thanks for your work on this project.

Russ Karow, Head
Crop and Soil Science

Comment from Roger Rennekamp

Comment #1

Hi Lisa,

Here is some information that you may want to add to your report on Sustainability at OSU.

Last year, the **OSU's 4-H Program** reached 30,862 youth across the state of Oregon with educational programs related to sustainable living. Programs included **Equipo Verde** (green team), **4-H Wildlife Stewards,** Junior Climate Masters, resident and day camping, and energy education. A new 4-H wind energy curriculum and 40 wind turbine kits have just been distributed statewide.

You may also want to take a look at the recent article in the Oregonian about OSU's work in the Portland Metro area focusing on youth sustainable living education through the OSU 4-H program.

http://www.oregonlive.com/environment/index.ssf/2009/01/girl_scouts_4h_stress_conserva.html

The OSU 4-H Program is operated by the College of Education for the OSU Extension Service.

Roger

Comment #2

Hi Lisa,

Sounds good...your report is great and really pulls together a lot of great work happening at OSU!

Roger Rennekamp, Ph.D.

Comments from the College of Forestry (Vivian Simon-Brown)

Comment #1

Thanks Hal for forwarding this draft to me. I can add a couple new Extension programs, and update some numbers. It's impressive to see the aggregate of OSU's sustainability efforts. It must have been a bear to pull together.

Lisa, here are some additional programs within the Outreach and Engagement section. Let me know what else you need to know.

1. Climate Masters at Home is a cooperative partnership between University of Oregon Climate Leadership Initiative and OSU Extension. It is a new 11-week course for 'citizen consultants' to learn about reducing GHG emissions and to conduct home carbon audits in their neighborhoods. Topics include climate change science, home energy, waste reduction, transportation, consumption habits, low impact yards, and carbon footprints. We are in the middle of the first course for Benton and Linn counties with 25 adult students. After this pilot program, OSU Extension is planning to offer other CM programs around the state.

2. We also have a new Walk Our Talk program for Extension faculty and staff. The National Network for Sustainable Living Education (NNSLE) is spearheading it, so it will be national as well as in Oregon. It's about assessing current sustainability practices in self-selected county offices, doing sustainable living education for self-selected Extension faculty and staff with ongoing coaching, and conducting pre-and post-evaluations to identify behavior change. It's being tested in Fall 2009.

3. And, we have an online Living Sustainably course which uses OSU Extension's and NNSLE's publication Living Sustainably: It's Your Choice. It's designed to train Extension faculty to teach sustainable living practices.

4. And finally, we are developing a Tough Times: Lessons from Grandma neighborhood-based program. It's a multi-week workshop designed to support small, cohesive neighborhood or workplace groups wanting to explore life choices during difficult economic and environmental times. It will be piloted in Metro in Fall 2009.

5. NNSLE now has 63 faculty from 27 land-grant institutions.

Viviane Simon-Brown

Comment #2

This will be very useful. I had a student from Apparel and Design or something like that, call me last week asking about what sustainability efforts were on campus. She said the dept head wanted to know and thought it would be a good project for her.... vsb