Sustainability **- Operating principles and approaches at Portland State University**

Portland State University has a longstanding commitment of the integrated concept of sustainability. This commitment is articulated as a party of our institutional vision and values (http://www.pdx.edu/mission.html) and is explicitly stated in a declaration endorsed by a large number of students, faculty and administrators and formally by the faculty Senate (http://www.pdx.edu/sustainability/). More recently, through a priority setting process, sustainability has been identified for academic program investment as the initial area of focus to expand innovative research activities that address important regional issues and that are also of global significance (http://www.pdx.edu/media/o/a/oaa_overviewpriorities.doc).

Sustainability at Portland State University

Our approach to addressing sustainability is based on the principles of integration and connectivity that underlie sustainability as a basic concept. The three concepts that form the basis of our approach are the integrated nature of sustainability, our fundamental commitment to engagement as the way in which we approach both education and research, and our unique geographic and intellectual strengths.

The integrated concept of sustainability. We seek to address the dimensions of sustainability – environmental, social and economic – not as separate issues but in an integrated manner, recognizing that developing sustainable systems requires this type of analysis and understanding. We also see technology (understood broadly as the development of improved processes and practices) as a catalyst for developing sustainable systems and as a means to ensure better understanding of problems and possible solutions in an integrated way. Thus, to address the complex nature of truly sustainable solutions, we are working to bring together the broad array of disciplines to work in a more integrated fashion.

Engagement. At Portland State University, we have committed to engagement as our fundamental approach to both educational and research activities. As a result, we seek collaborations in both defining important issues, identifying solutions to problems, and evaluating whether those solutions are working. We have a long history of internal collaboration through multi- and interdisciplinary programs and research, with other educational institutions in the metropolitan region and within OUS, and with partners in our local and international community. Such a strategy of engagement leads us to align our priorities - in this case, building our academic sustainability program – with those activities that allow us to leverage our resources. Specific targets for alignment include the BEST Signature Research Center in terms of specific research and technology transfer activities, ETIC programs for the development of technology education and research, and the priorities of the local metropolitan region (both public and private sectors) in terms of both regional and economic development activities.

Building on our strengths and advantages. Sustainability is a broad topic and to make a significant impact, we will focus in those areas where there is an intersection with our existing academic and intellectual strengths and issues of local relevance and national (and international) significance. One of our important strengths and advantages is our physical location in the Portland metropolitan region.

Consistent with our commitment to engagement with the community, we will continue to expand our approach of using community-based activities - with a particular focus on our own campus - as a "living laboratory" for our educational and research programs, benefiting both our students and the community.

The unique contributions of the University to sustainability

While developing sustainable systems will require the combined efforts of all of the organizations in the public and private sectors and of all of our citizens, the University can play a unique role through its instructional and research activities. There are three important contributions that we hope to achieve: educating citizens to live in a more sustainable world through their actions and individual choices, educating professionals to contribute directly to developing sustainable systems and developing an improved understanding of the effectiveness of current practice, and innovating to advance improved future practices through research and technology transfer (broadly understood). It is our goal to distinguish Portland State University by preparing students and creating knowledge that will contribute significantly to developing sustainable processes and practices.

Instructional programs and student learning. We are working toward an integrated understanding of sustainability as a unique learning outcome for all Portland State students - particularly at the undergraduate level. We are approaching sustainability not as a new and separate topic but as way of living and working and thus we are integrating the concepts into both our majors and general education. Sustainability concepts are being more deeply integrated into the undergraduate general education core curriculum so that it is a part of each undergraduate student's academic program. In addition, a focus on sustainability is being integrated into many of the disciplinary majors so that the graduates of these programs will approach their work with a set of principles and tools that will allow them to integrate sustainability considerations into their work in an appropriate fashion. To assist with the process of integration, we have developed two undergraduate minors and are seeking final approval for a graduate certificate to assist in developing a brad understanding of the underlying concepts and complement work done in the disciplines.

Discovery, integration and application of sustainable practice. To build on our strengths and make contributions to significant issues in sustainability, we have identified four major areas of focus where we will aggressively develop our scholarly work, whether basic or applied. These areas build on and are supported by a strong foundation of disciplinary research and represent an effort to integrate that research in ways that address significant issues in sustainability. Our expertise is concentrated in two main, inter-connected areas – the relationships between human and natural systems, and sustainability in urban and urbanizing communities. We also have particular strengths in two cross-cutting topical areas – metrics and evaluation, and mechanisms that effect change and foster engagement at the individual, organizational, societal and ecosystem levels. (See addendum for more details on this framework.) Some examples of specific activities in these four broad areas include:

- **Coupling human and natural systems**. Our programs in aquatic invasive species, climate change research, mitigation and response and understanding and valuing ecosystem services are

among the research programs that address broad issues related to the interactions of human and natural systems. These topics ore global in scale and significance.

- **Sustainable urban communities**. PSU has a long history of contributing to "livability" in urban environments, and we are expanding this notion to encompass sustainable urban systems. Examples of our work includes assessment of the effects of green building practices, in particular eco-roofs, on building energy use and storm water management, the mitigation of urban heat islands, innovative multi-modal urban transportation systems, assessing the social impacts of development finance in urban environments, and urban ecosystem management.

- **Developing sustainability: Mechanisms for change**. Developing a better understanding of how to enhance public and private awareness and engagement related to the challenges facing the planet must be central to any long term sustainable solutions to climate change, social inequities, landscape degradation and other issues. PSU has a unique concentration of programs focused on change at the individual, family, organizational and institutional levels. Research underway encompasses understanding how choices are made with respect to energy resources as multiple levels, developing programs that incorporate sustainability education into K-12 school systems, and developing, measuring and capturing the motivations that lead businesses to adopt sustainable practices.

- **Making sustainability credible: Measurement, Valuation and Evaluation**. To determine whether the activities we undertake actually lead to more sustainable systems, we need a rigorous evaluation process and, in some cases, we need to develop a process for valuing the outcomes. PSU, being located in the major metropolitan region of the state, is in a unique position to perform such assessments, whether for environmental, social or economic systems. A strong set of academic programs provides the credible resources for this activity. Current examples include the aforementioned assessment of eco-roof performance on building energy and stormwater management, assessments of green building practices on workplace productivity, and our work on the impacts of smart urban transportation systems, including pedestrian and bike transportation.

Campus operations

It is also incumbent on us to "walk the talk" and to move our campus operations toward more sustainable practices whether through new construction, energy use and purchasing, transportation systems, maintenance of campus or grounds office practices. PSU is strongly committed to moving all of its operations toward more sustainable practices and we have been recognized for many of these efforts. A few of the initiatives include:

- LEED certification (two silver and one gold) on our last three new building, as well as of our greenhouses, and the intention to apply for LEED gold certification on our three significant remodeling projects.
- A commitment to purchase 100% renewable energy for the campus
- An integrated transportation system for students, faculty and staff. Working with TriMet and the

City of Portland, we participate in the development of the streetcar and the extension of the MAX light to and through campus. We also provide a transit pass program to encourage the use of mass transit and encourage bicycle commuting. Our transportation program has received a BEST award from the City of Portland Office of Sustainable Development.

- Our campus is certified Salmon Safe – the first in the country to be so classified – based on our sustainable practices.

Addendum: A framework for addressing sustainability at Portland State University

Coupling of Human and Natural Systems

The unsustainable practices and policies that threaten the health of ecosystems and communities of all types reflect a "disconnect" between natural and human systems. Sustainable solutions seek to integrate the environmental, social and economic spheres in ways which support the integrity, health and restoration of both of these systems. However, achieving this integration requires new ways of thinking across disciplines and new ways of translating academic research into practice. PSU already has significant expertise in research related to the interface between biophysical systems (e.g. streams, lakes, watersheds, coastal margins, flora and fauna, ecosystem services, etc) and human communities (e.g. individual's mental, physical and economic well-being, sustainable practices, planning, food systems, etc.).

Sustainable Urban Communities

PSU is already known nationally and internationally for its expertise in urban systems and in the rural-urban interface - expertise that encompasses ecosystem management, planning, governance, ecology, infrastructure, social sustainability, and community health. W have the opportunity to create a more integrated program that brings together these areas of expertise within a framework that addresses the social, economic and environmental elements of healthy and resilient urban communities (both biophysical communities and social communities). This program integrates PSU's growing understanding of ecosystem functions and services within the more human oriented sciences such as economics and sociology. As an urban university situated at the center of a progressive metropolitan area, PSU has the opportunity to establish long-term research projects that monitor the ecological and socio-economic conditions of this urban area and that reach beyond the built environment to incorporate the larger watershed context.

Developing sustainability: Mechanisms for Change

Developing a better understanding of how to enhance public awareness and engagement related to the challenges facing the planet must be central to any long term sustainable solutions to climate change, social inequities, landscape degradation and other issues. This realm encompasses issues of human development, consumer choice, lifestyle and behavior change at multiple levels.

PSU has a unique concentration of degree programs, certificates, schools, etc. with research focused on change at the individual, family, organizational and institutional levels. By linking existing faculty and integrating new faculty into a programmatic focus on these aspects of change, PSU has the opportunity to develop a program that would have impacts at the national and international levels. For example, one area of focus within such a program could be the human dimensions of climate change - how the consumer choices, business behaviors, and government regulations affect this issue both positively and negatively. Another example of focus within such a program could be the management of invasive species, which similarly constitutes a global threat with direct local implications. Such a program encompasses social investments, technology development, population growth and migration,

cultural contexts, economic institutions, governance systems, the human impacts of a changing environment, human perceptions and valuations of ecosystem services, environmental justice, disaster management and mitigation, consumption patterns, systems of provision, supply chains, interactions of markets and policies, development of new business models, etc.

This focal area provide an overarching cross-disciplinary framework to bridge the work being done across PSU's campus on the multiple mechanism and strategies for effecting change at the individual, organizational and societal levels. By integrating these efforts, PSU can offer a unique analytical framework and understanding of what actions need to happen at all scales to realize truly sustainable development.

D: Making Sustainability Credible: Measurement, Valuation, and Evaluation

As public and private sector players seek to develop and implement long term solutions to issues ranging from climate change to ecosystem degradation to public health, there is a significant need for more empirical and theoretically-grounded methods of impact assessment (health impact assessment, triple bottom line impact assessment, long term/intergenerational impact assessment) and for improved tools and strategies to inform public discussions, business decisions and public policy-making. These systems are essential to understand whether policies and programs are working, and to provide the feedback loops needed to refine and adapt decisions based on their impacts on the ground. Such information systems can improve the abilities of public and private actors to weigh the relative effects of their current actions and the impacts of choices made about future actions (that may produce either "more" or "less" "sustainable" results). What criteria are relevant? What kind of "metrics" are needed? How difficult are they to develop? How can they best be created, reported, and interpreted? How can they be best implemented?

In addition, the development of new and innovative valuation methodologies is needed to ensure that social and economic forces better reflect the value of natural systems (i.e. ecosystem services) to take into account long term and less easily quantifiable costs and benefits.

PSU offers the ideal platform to develop and test new and innovative decision-support systems to inform local, state, regional policy and market choices, and to help in conceiving, measuring, and communicating about socio-environmental change processes at the regional scale. Topical areas for sustainability include regional genuine progress indicators, salmon recovery models, flood prediction models, landslide models, climate change models, "evidence based" prescriptive models in medicine, criminal justice, etc. and social and economic well being models.

This focal area should be promoted as a core area that provides the underlying rigor and guidance that enhance the value and effectiveness of all the other areas of focus. It could serve both to guide research efforts as well as a sort of continuous "auditing/evaluation" center to gauge the effectiveness of research findings after implementation. The number of research projects that would be generated either by teams or individuals would be impressive as well as of tremendous value to a wider audience of practitioners.