

Interdisciplinary Environmental and Sustainability Education and Research:

Institutes and Centers at Research Universities

*A study conducted by The National Council for Science and the Environment
for the Council of Environmental Deans and Directors*



Shirley Vincent, Rica Santos, and Louise Cabral

Foreword by Antje Danielson and David Blockstein

March 2014



National Council for Science and the Environment
Improving the scientific basis for environmental decisionmaking



Council of
Environmental
Deans and
Directors

National Council for Science and the Environment

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- Strengthening Education and Careers;
- Communicating Science to the Public;
- Hosting the annual National Conference on Science, Policy and the Environment;
- Science Solutions to Specific Environmental Challenges; and
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The Council of Environmental Deans and Directors (CEDD) is the leadership group for members of the NCSE University Affiliate Program (listed at back of report). CEDD brings together environmental and sustainability leaders from members of the NCSE University Affiliate Program to improve the quality, stature and effectiveness of academic environmental programs at U.S. universities and colleges. CEDD represents academic environmental programs of all sizes and types. CEDD holds regular meetings that facilitate networking and collaborations. Among its many activities, CEDD supports projects and committees on

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- Campus-wide subscriptions to online environmental and energy news services;
- Sabbatical opportunities; and
- Special reports and studies.

This report is a product of NCSE's ongoing academic program research and is distributed as a service to members of the NCSE University Affiliate Program.

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Foreword

The Council for Environmental Deans and Directors (CEDD) consists of the leaders of academic environmental and sustainability programs from 173 U.S. colleges and universities affiliated with the National Council for Science and the Environment (NCSE). The CEDD representatives more often than not have no direct peers in their home institutions. CEDD provides this peer group and a forum for exchange and discussion. CEDD members meet twice a year; the meetings provide a forum for new ideas, exchange, and reporting in a think-tank-like atmosphere.

One theme has become a recurring topic of discussion at CEDD meetings, and that is the question *whether the administrative structure of a program has specific advantages or disadvantages for the success of a program*. Interdisciplinary environmental and sustainability programs come in many shapes and forms. In order to facilitate interaction among faculty from many academic disciplines and departments, many colleges and universities have created centers, institutes and other cross-departmental structures. The CEDD members have discussed the pros and cons of those different structures extensively. At the 2011 summer meeting in Vermont, the differences among administrative types became acutely apparent when many representatives reported a turnover in their respective university leadership teams. They queried each other on how to manage through these times of transition and realized that they had only anecdotal evidence for certain assumptions but very few real data points. In the summer of 2012 even more members were experiencing leadership changes with the additional pressure of a changing perspective on the content of their programs. We then decided to survey the community in order to tease out some answers to the structural questions we were asking.

After the summer 2012 meeting, NCSE Director of Education Research Shirley Vincent met with CEDD President-elect Antje Danielson. At this meeting a preliminary set of survey questions based on the preceding CEDD member meetings was created. They decided on a subset of universities to include in the survey and on a preliminary classification of the centers and institutes in those universities. This was the beginning of this report.

The results of the survey and the cases detailed in this report are intriguing and provide a lot of information. There are definite predictors. With trust in our peers we should assume that we can use the predictors to improve our programs. This is one outcome from the report. However, new paradigms arise from unusual out-of-the-box approaches, and we sincerely hope that the information contained in this report will also enable some of our colleagues to create paradigm shifts and allow for us to discover our own niche. After all, wouldn't it be awful if we all did the same thing.

“War is ninety percent information.” In the spirit of Napoleon Bonaparte we very much hope that this report will help you improve your programs, advocate for your approaches, benchmark your efforts, help you create a new institute or center, and in general make your programs more sustainable.

Antje Danielson, CEDD President 2014-2015,
Director, Tufts Institute of the Environment

David Blockstein, CEDD Executive Secretary,
National Council for Science and the Environment

Executive Summary

Interdisciplinary environmental and sustainability (IES) academic and research programs have an important and unique role in higher education. IES programs study the interfaces and interactions of coupled social-nature systems using interdisciplinary knowledge and insights gained from systems approaches and different epistemological perspectives. Linking science, policy and management has been identified by many experts as one of the critical unmet needs of society; IES programs address this need by conducting research and preparing students for careers at the science-policy, science-management, and policy-management interfaces. IES programs have a distinctive goal: preparing sustainability-oriented problem solvers through interdisciplinary scholarship, research, practice and informed citizenship.

IES institutes and centers (IESICs) serve a crucial role in bridging the knowledge needs of society and the knowledge production capabilities of universities. They facilitate interdisciplinary and trans-disciplinary research, administer interdisciplinary academic programs, support campus sustainability initiatives, and engage in collaborative problem-solving with internal and external partners including students, faculty, staff, public and private sector organizations, citizen scientists, other colleges and universities, and governmental institutions from local to global.

Few studies have examined the roles and structures of institutes and centers and none have investigated IESICs.¹ This report describes the results of the first empirical study of IESICs in the United States and includes 28 individual profiles that illustrate the diversity of IESICs. The data for this report were obtained from a census of IESICs at research universities in the U.S. and a survey completed by a representative sample of 340 directors of IESICs at research universities across the U.S. The survey included questions addressing operational structure, activities and resources.

IESICs comprise about 8% of all research institutes and centers at universities in the United States. There are seven distinct categories of IESICs based on their names, which indicate their primary focus: [1] broad environmental and sustainability; [2] energy and climate change; [3] natural systems, such as aquatic systems or forests; [4] human wellbeing, including security, risk assessment and sustainable agriculture; [5] societal systems, such as economics, policy and law; [6] technology and informatics; and [7] sustainable built environments. Each category has its own set of characteristics, as discussed in the overview chapter and described in summaries for each category and in profiles of individual IESICs.

The broad environmental and sustainability group is the most distinctive. IESICs in this group are more likely to be titled institutes, have their own building, administer academic programs, support campus sustainability initiatives, engage with a wider diversity of partners, receive funding from institutional appropriations and endowments, and support full-time directors and other administrative staff when compared with IESICs in the other six categories.

1. Two studies have compiled limited sets of IESIC profiles. The Aspen Institute (2008). *A closer look at applied sustainability centers*. Washington, DC; Banas, S. (2007). *A survey of university-based sustainability science centers: supplement for the forum for sustainability science programs roundtable*. American Association for the Advancement of Science: Washington, DC.

Other key findings from the survey of IESICs include:

- About a third of IESICs are administratively located at the primary university level (report to top administrators and are not located within another unit such as a college); half are located administratively within a college or are shared by two or more colleges; a sixth are located within departments or are shared by two or more departments; and the remainder are administratively located in other units, are operated as non-profits affiliated with the university, or are subunits of larger institutes or centers.
- About of third of IESICs are titled institute and most others are titled center. A small proportion (<10%) use another name such as collaborative or initiative.
- IESICs with the title institute are more likely to be administratively located at the primary university level with directors reporting to top university administrators, while centers are most often located within colleges with directors reporting to one or more deans.
- Institutes on average have a broader focus on the environment, sustainability, energy and climate change, or natural systems, and are more likely to have their own physical space—a building or suite of offices. They are also more likely to have formal relationships with a larger number and diversity of affiliated faculty members.
- IESICs with names other than institute or center typically place less emphasis on research and more on education compared with institutes and centers.
- About two-thirds of IESICs occupy their own building (16%) or office suite (47%), while the other third either have space within another office (15%) or no dedicated space (22%).
- About 2% of IESICs are very large, supporting up to 250 full-time staff members, 150 part-time staff members, 27 core faculty positions, 60 joint faculty positions, and formal affiliations with up to 500 faculty members across the university. The vast majority of IESICs are much smaller. About two-thirds support 5 or fewer full-time staff and/or faculty positions. About 8% operate “virtually” without a designated physical space or current budget.
- Most IESICs focus most of their resources and activities on three goals: research, education and outreach, but individual missions and goals vary widely. About a quarter identify supporting campus sustainability initiatives as a primary goal. A few do not include research in their activities, but instead focus on technology commercialization and entrepreneurship, policy advising, or providing services and technical assistance.
- Over half of all IESICs partner with other colleges and universities, governmental agencies and administrations, and private or public sector organizations. Most also include faculty and other experts from a variety of disciplines, including the humanities and professional fields, as well as the applied, natural and social sciences. Experts in environmental science(s) and studies, engineering and other applied sciences, and natural resources management and agriculture are the most common partners participating in collaborative IESIC projects overall.
- A third of all IESICs administer some type of academic program. Graduate degrees, minors and certificates and continuing education certificates are most prevalent, but baccalaureate degrees and undergraduate minors and certificates are also housed in IESICs.
- IESICs rely on diverse sources for their funding, including institutional appropriations, endowments, grants and contracts, donor gifts, and fees for products and services.

Background – the NCSE Research Program on Environmental and Sustainability Higher Education

NCSE initiated its extensive research program on IES higher education in 2003. The first study sought to understand the nature and number of academic leaders' perspectives on ideal curriculum design for baccalaureate and graduate IES degree programs.

One of the most important findings from this initial study was a consensus on the identity of the IES field: it is focused on the interfaces and interactions of coupled human-nature systems with the goal of preparing students to be sustainability-oriented problem solvers. Key learning outcomes include disciplinary synthesis abilities, systems-thinking cognitive skills, knowledge of the sociopolitical and natural aspects of environmental problems, understanding of the limits of science and technology, and recognition of the importance of acknowledging and reporting uncertainty.²

IES programs have a distinctive role in higher education in preparing students to understand problems and devise solutions using insights gained from interdisciplinary knowledge and different epistemological viewpoints and a systems approach rather than a traditional reductionist approach.

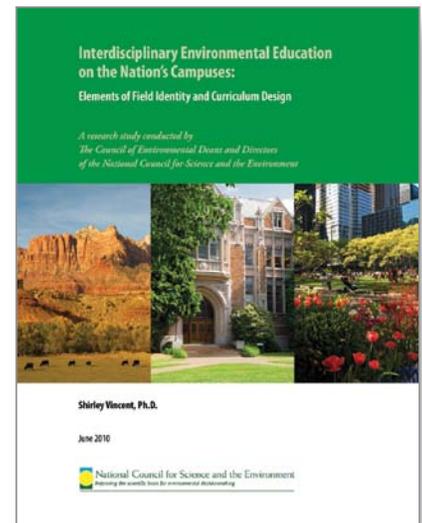
In 2008, NCSE conducted a census to identify all baccalaureate and graduate IES degree programs offered by universities and colleges in the U.S. The census served to define and characterize the population for ongoing research.

The census was followed by an extensive national survey of IES program leaders. The three related research tasks together comprised the first comprehensive empirical study that sought to identify the defining characteristics of the field and describe the diversity of programs' administrative and curricular structures at U.S. higher education institutions.

The national survey of IES academic program administrators elucidated the characteristics that collectively describe the diversity of programs, including:

- Ideal core interdisciplinary knowledge and integrated skills competencies
- Ideal models for curriculum design
- A framework for understanding the diversity of programs
- Different types of administrative structures for programs

The findings of these studies are summarized in the 2010 NCSE report *Interdisciplinary Environ-*



2. For more information on the study see: Vincent, S. and W. Focht (2010). U.S. higher education environmental program managers' perspectives on curriculum design and core competencies: implications for sustainability as a guiding framework. *International Journal of Sustainability in Higher Education* 10(2): 164-183. For a more thorough discussion on sustainability and its relationship to the consensus view of IES program identity see: Vincent, S. and W. Focht (2010). In search of common ground: exploring identity and the possibility of core competencies for interdisciplinary environmental programs. *Environmental Practice* 12(1):76-86.

mental Education on the Nation's Campuses: Elements of Field Identity and Curriculum Design, available on the NCSE website at www.NCSEonline.org.

The 2012-13 Census and Surveys

The census of IES programs was updated and extended in 2012. A total of 1,562 public and not-for-profit and 76 for-profit schools were reviewed. The new census identified baccalaureate and graduate academic programs with an explicit interdisciplinary approach as well as academic programs in disciplines and professional fields with formal specializations in environment and sustainability; minors and certificate programs; and centers and institutes focused on the environment and/or sustainability. A series of three reports from NCSE illustrates the rapid growth in the IES field overall—especially in sustainability academic programs—and the emergence of new types of interdisciplinary energy programs:

- *Interdisciplinary Environmental and Sustainability Education: Results from the 2012 Census of U.S. Four-Year Colleges and Universities.*
- *Sustainability Education: Results from the 2012 Census of U.S. Four-Year Colleges and Universities.*
- *Non-traditional and Broad Energy Education: Results from the 2012 Census of U.S. Four-Year Colleges and Universities.*

A survey of the leaders of IES academic programs was completed in spring 2013. The survey instrument was developed with numerous experts and included questions on degree program attributes and curriculum design, program leadership and faculty, administrative structure and resources, internal and external partnerships, and influences on programs' success. A series of reports will be released throughout 2013-14 combining findings from the survey with case studies and relevant information from other published journal articles and reports. The first report was released in August 2013:

- *Interdisciplinary Environmental and Sustainability Education on the Nation's Campuses 2012: Curriculum Design*

A separate survey of the directors of IES institutes and centers at research universities was completed in summer 2013. This survey included questions on the institutes' and centers' mission and goals, administrative structure, personnel, and resources. The census identified a total of 1,121 IESICs at 236 universities. The directors of these IESICs were invited to participate in the survey. Completed survey responses were received from the directors of 340 IESICs for a response rate of 28%. This report describes the findings from this survey.

Rapid Growth in Environmental and Sustainability Higher Education

The number of IES programs continues to expand dramatically. The 2012 census identified 1,151 academic units/programs offering 1,859 IES baccalaureate and graduate degrees located at 838 colleges and universities. In the four years following the 2008 census, the number of schools offering IES programs increased by 29%, the number of academic units by 37%, and the number of degree programs by 57%.

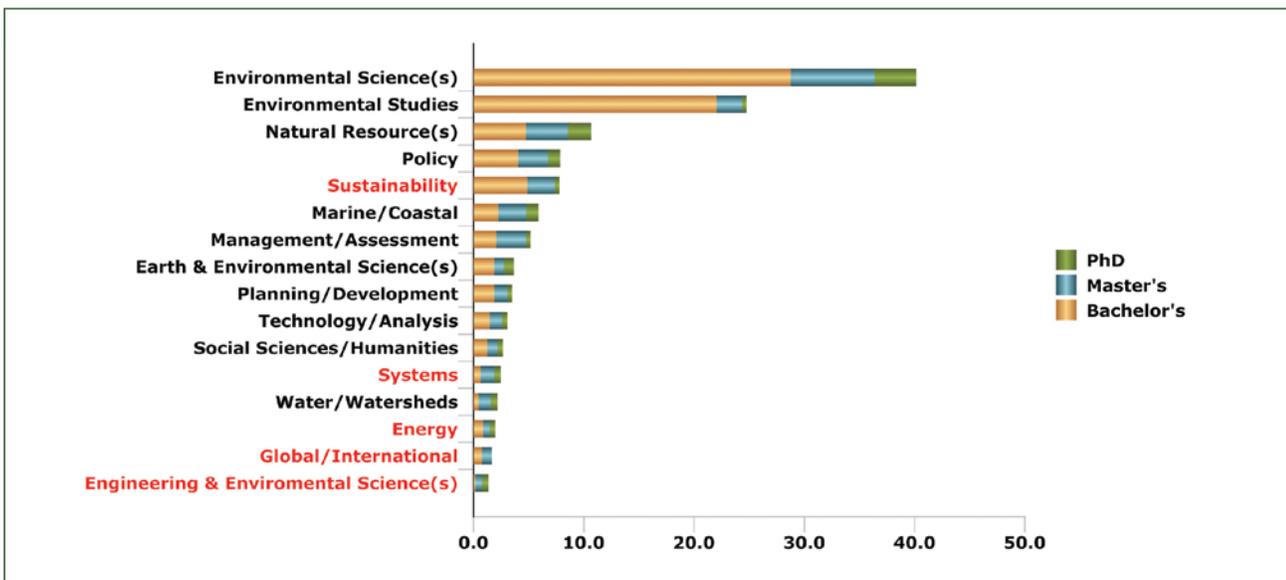
Matriculation in IES programs also increased; 64% of baccalaureate programs reported positive growth trends, as did 30% of master's programs, and 23% of doctoral programs. The average number of students enrolled in IES programs increased by 49% for undergraduate programs and 15% for master's programs; the average number of students enrolled in doctoral programs remained steady.

The census findings reveal several trends:

- The last few years have seen an expansion of IES institutes and centers administering academic programs; the proportion of IES degree programs offered by IES institutes, centers, colleges and schools increased by 6%.
- More degree programs focused on specific themes or problem-solving domains. The numbers of all types of IES degree programs increased, but the proportion of the total named environmental science(s) or environmental studies declined, while programs with other names such as Community, Environment and Development; Environmental Dynamics; or Coastal and Watershed Science and Policy increased.
- Tremendous growth in the number of sustainability degree programs—from 13 in 2008 to 141 in 2012.
- The emergence of new types of IES programs: interdisciplinary energy programs, environmental/sustainability systems programs, programs that combine engineering and environmental science, and programs with an international or global focus.
- More master’s programs. The number of master’s degrees increased by 68%, compared with 57% for baccalaureate degrees and 35% for doctoral degrees. A number of the new master’s programs—37—have received a Professional Science Master’s™ designation (www.NPSMA.org).

One of the defining characteristics of IES programs is their diversity; both in the types of programs offered and in their administrative structures. The largest proportion of IES degree program names, 40%, includes the term environmental science or sciences (Figure 1). Another 25% include the term environmental studies. Program names that include natural resource(s) comprise 11%. The growth in sustainability programs brings this category to 8%, tied with the proportion that includes policy in their names.

Figure 1. IES degree program types (titles in red indicate new types of programs)



IES degrees are offered in a variety of administrative locations, including degree programs within a traditional disciplinary department or school; IES departments, schools, and colleges; IES centers

and institutes; programs that span multiple departments, one or more colleges, or an entire institution; and degree programs operated by a consortium of campuses or institutions. The administrative homes for the majority of IES degrees are interdisciplinary academic units or programs. Many (41%) are located in interdisciplinary academic units—a department, school, college, or a center or institute. Another 37% are offered through interdisciplinary programs that span units. Only 22% are located in traditional academic departments or schools.

Institutes and Centers Overview

Research institutes and centers (ICs), often referred to in the literature as “organized research units,” play an increasingly important role in higher education. ICs have traditionally served to support research focused on the needs of external sponsors or research that did not fit into departmental structures because of its interdisciplinary/transdisciplinary nature, the magnitude of the research task, the cost, and/or the need for continuity that did not fit well with traditional academic cycles.³ Today, ICs occupy a pivotal and expanding role in driving a higher education transformation toward increasing engagement in research and partnerships responsive to pressing societal needs.

ICs involved in interdisciplinary environmental and sustainability research and education (IESICs) are at the vanguard of this transformation. IESICs facilitate integrated research that addresses the complex and urgent problems of sustainability, enable collaborative problem-solving partnerships with a wide range of external partners—governments, private and public sector organizations, and communities—and help advance campus and community sustainability initiatives.⁴ IESICs are also at the forefront of interdisciplinary education; about a third serve as the administrative home for interdisciplinary environmental and sustainability education programs, particularly for graduate degrees.⁵

ICs are a common feature in higher education. Many researchers split their time between ICs and departments; one study found that ICs often outnumber departments at research universities.⁶ ICs serve an important role as boundary spanning organizations within universities by providing an organizational context for interdisciplinary and applied research, although they vary in their effectiveness in supporting truly integrative interdisciplinary collaboration. Observers point out that many have a “tendency to become a nexus of loosely connected individuals searching for intersections, as opposed to cohesive groups tackling well-defined problems.”⁷ Other studies focus on the “role strain” faced by IC-affiliated researchers and highlight the tensions and limitations inherent in current university structure and reward systems.⁸ In spite of these limitations and constraints, most IC-affiliated researchers reported that their relationships with other IC participants have positively influenced their own research programs and that they are motivated to participate in ICs by the prospect of doing research that is more intellectually interesting and important. Another study found IC-affiliated faculty are more likely to provide support for undergraduate and graduate students and have greater involvement

3. Stahler, G.J. and W.R. Tash (1994). Centers and institutes in the research university. *The Journal of Higher Education* 65(5):540-554.

4. Krizek, K.J. et al. (2011). Higher education’s sustainability imperative: how to practically respond? *International Journal of Sustainability in Higher Education* 13(1):19-33.

5. Vincent S., Bunn S. and L. Sloane (2012). *Interdisciplinary Environmental and Sustainability Education: Results from the 2012 Census of U.S. Four-Year Colleges and Universities*. National Council for Science and the Environment: Washington, DC.

6. Jacobs, J.A. and S. Frickel (2009). Interdisciplinarity: a critical assessment. *Annual Review of Sociology* 35:43-65.

7. Rhoten, D. (2005). Interdisciplinary research: trend or transition. *Items Issues* 5:6-11.

8. Boardman, C. and B. Bozeman (2007). Role strain in university research centers. *The Journal of Higher Education* 78(4):430-463.

with teaching undergraduates than their non-IC affiliated peers, strengthening rather than detracting from universities' teaching missions.⁹

Geiger provides a history of the development and growth of ICs in the United States.¹⁰ The earliest ICs were established in the nineteenth century and include observatories, museums and the agricultural experimental stations at land grant universities created by the Hatch Act of 1887. The number and types of ICs expanded during the early twentieth century to include organizations such as the Scripps Institution of Oceanography, engineering focused centers such as the Research Lab in Applied Chemistry at the Massachusetts Institute of Technology, and medical science centers such as the Phipps Institute for the Study, Treatment and Prevention of Tuberculosis at the University of Pennsylvania. These early ICs were primarily funded by philanthropic foundations and donors, although some of the engineering centers developed flourishing contract research relationships with industry.

A new relationship between ICs and the federal government occurred during World War II when, rather than induct scientists into the services and base them at federal laboratories (as in World War I), the government opted to contract with universities to perform war research. By the end of the war this partnership was viewed as essential for national security and economic competitiveness. Initially, most of the federal funds available for universities were intended for war-related applied research to further the particular aims of the sponsoring federal agency. The predominance of this “programmatic” research funding in the postwar economy created conditions that drove the initial proliferation of research centers and institutes.

Following the Soviet launch of the Sputnik satellite in 1957, the federal government initiated massive investments in basic scientific research and education. This abundance of funding was channeled primarily through the National Science Foundation (NSF) and the Institutes of Health and again altered the nature of the research partnership between the federal government and universities. Both ICs and departmental research thrived due to the greatly increased funding, but the balance of university research shifted toward more basic departmental-based research and away from sponsored IC research. The federal research funding boom reached its peak in the 1960s and has been declining as a proportion of GDP. As federal funding has waned, public and private sector-sponsored support has picked up. Support for scientific research in the United States has kept pace with the size of the U.S. economy, comprising from 2.2% to 2.8% of GDP, but the proportions have reversed from two-thirds of total support from the federal government and one-third from the public and private sectors, to two-thirds from public and private sectors and one-third from the federal government.¹¹

In 1998, Jane Lubchenco, writing on behalf of the board of the American Association for the Advancement of Science, challenged all scientists to rethink the way all science is deployed to meet the challenges of the future:

“The concept of what constitutes “the environment” is changing rapidly. Urgent and unprecedented environmental and social changes challenge scientists to define a new social contract....

9. Bozeman, B. and C. Boardman (2013). Academic faculty in research centers: neither capitalism's slaves nor teaching fugitives. *The Journal of Higher Education* 84(1):88-120.

10. Geiger, R.L. (1990). Organized research units—their role in the development of university research. *The Journal of Higher Education* 61(1):1-19.

11. Press (2013). What's so special about science (and how much we spend on it?). *Science* 342:817:822.

The new and unmet needs of society include more comprehensive understanding and technologies for society to move toward a more sustainable biosphere—one which is ecologically sound, economically feasible and socially just.”¹²

In response, the federal government, institutions of higher education, non-profit and for-profit organizations, and thousands of individual scientists have realigned research priorities, instituted new funding programs, and designed new interdisciplinary structures to facilitate interdisciplinary coupled human-nature systems research, assist in the development of new sustainability policies, and support action aimed at solving pressing environmental problems.

In 2000, the National Science Board released a report titled *Environmental Science and Engineering for the 21st Century*. The report urged the NSF to expand its efforts and create an organizational focus on environmental research and education and recommended the establishment of an external advisory board. This board, the NSF Advisory Committee on Environmental Research and Education (NSF AC-ERE), issued a report in 2003 titled *Complex Environmental Systems: Synthesis for Earth, Life and Society in the 21st Century*. This influential report identified the critical need for additional national capacity in “environmental synthesis to frame integrated interdisciplinary research questions and activities and to merge data, approaches and idea across spatial, temporal and societal scales.”¹³ The 2009 NSF AC-ERE report titled *Transitions and Tipping Points in Complex Environmental Systems* urged a shift toward societal needs-driven education and research exemplified by the emerging field of sustainability science.¹⁴ This report emphasizes the need for environmental education and research to “strengthen our understanding of the links between human behavior and natural processes” by integrating the behavioral sciences, life sciences, earth and atmospheric sciences, social sciences, mathematics, physical sciences, engineering and information sciences.

The federal government formally shifted its environmental focus to sustainability in the 2007 national *Sustainability Research Strategy*.¹⁵ In December 2010 then USEPA Administrator Lisa Jackson announced that sustainability is the goal for agency reforms and in 2011 the National Academy of Sciences report, *Sustainability and the U.S. EPA*, made recommendations on how to make sustainability operational throughout the agency. A 2013 report by the National Academies of Sciences titled *Sustainability for the Nation: Resource Connections and Government Linkages* addresses how the federal government can best address sustainability issues across all agencies and offices.

Public and private sector funders of scientific research and development have also recognized the value of interdisciplinary research in pushing fields forward and accelerating scientific discovery. Increased recognition of the importance of IES research and education coupled with increased funding opportunities has driven the creation of new IESICs and the evolution of established older IESICs.

12. Lubchenco, J. (1998). Entering the century of the environment: a new social contract for science. *Science* 279:491-496. Quote is on page 491.

13. Pfirman, S. and the NSF AC-ERE (2003). *Complex environmental systems: synthesis for earth, life, and society in the 21st Century*. National Science Foundation, Washington, DC. Quote from page 1.

14. National Science Foundation AC-ERE. 2009. *Transitions and Tipping Points in Complex Environmental Systems*. Washington, DC: National Science Foundation.

15. United States Environmental Protection Agency Office of Research and Development. 2007. *Sustainability Research Strategy*. http://www.epa.gov/Sustainability/pdfs/EPA-12057_SRS_R4-1.pdf.

The majority of IESICs are named centers, about a third are titled institutes, and a small proportion do not include either institute or center in their name but instead use titles such as academy, agency, collaborative, consortium, initiative, laboratory, office, partnership, program, project or network.

The number of IESICs per research university also varies by state and ranges from a low of 1 for Missouri and Tennessee to a high of 22 for Washington. Four states average 10 or more IESICs per research university—Colorado, Connecticut, Washington and Wyoming. The remaining states are relatively evenly divided between states with 5-9 IESICs per university and states with 1-4 (Table 1). The overall average for the U.S. is 4.

Table 1. U.S. research universities with IESICs by state

State	Number of research universities	IESICs per university	State	Number of research universities	IESICs per university
Alabama	5	1.8	Montana	2	5.0
Alaska	1	8.0	North Carolina	8	6.8
Arizona	3	6.0	North Dakota	2	1.5
Arkansas	2	1.5	Nebraska	2	3.0
California	23	5.9	New Hampshire	2	7.0
Colorado	6	10.2	New Jersey	6	2.5
Connecticut	2	9.5	New Mexico	2	3.5
District of Columbia	5	2.2	Nevada	2	4.0
Delaware	2	9.0	New York	24	4.4
Florida	13	4.2	Ohio	15	1.7
Georgia	6	3.2	Oklahoma	3	3.7
Hawaii	1	8.0	Oregon	3	5.3
Iowa	2	8.5	Pennsylvania	11	5.1
Idaho	2	4.5	Rhode Island	2	2.0
Illinois	13	2.2	South Carolina	3	2.7
Indiana	6	5.2	South Dakota	2	2.0
Kansas	3	3.7	Tennessee	7	1.4
Kentucky	3	4.7	Texas	21	4.0
Louisiana	5	4.0	Utah	3	5.0
Massachusetts	12	3.9	Virginia	7	6.1
Maryland	5	2.2	Vermont	1	8.0
Maine	1	5.0	Washington	2	22.0
Michigan	8	4.0	Wisconsin	5	3.6
Minnesota	4	6.3	West Virginia	1	8.0
Missouri	7	1.4	Wyoming	1	11.0
Mississippi	4	2.8	Total	281	4.3

The NCSE census also discovered that IESICs at research universities fall into 7 broad types and 26 subtypes based on their name/primary focus (Table 2). Broad environmental and sustainability IESICs are those whose names indicate a broad focus on environment or sustainability, including those target-

ing a particular place, region, or biome. The other six categories are IESICs whose names indicate a more narrow focus on energy and climate change, natural systems such as aquatic systems or forests, issues related to human wellbeing such as risk assessment or sustainable agriculture, societal systems such as environmental policy or law, technology and informatics, or sustainable built environments. IESICs focused on energy and climate change are the largest group, followed by those focused on natural systems. This report includes a chapter highlighting the key characteristics of the each of the 7 categories. Profiles representing IESICs from the different sub-types illustrate the diversity of IESICs in the U.S.

Table 2. IESIC categories

Institute/center category	Number	Proportion of total
Broad environmental and sustainability focus		
Environment	93	
Sustainability	30	
Place/region/biome	37	
Category total	160	13%
Energy and climate change focus		
Energy technology	237	
Climate/climate change	57	
Category total	294	24%
Natural systems focus		
Freshwater aquatic systems/watersheds	64	
Marine/coastal systems	72	
Forests	15	
Earth systems/geosciences	48	
Ecology/conservation	48	
Natural resources/lands management	24	
Category total	271	22%
Human wellbeing focus		
Human health, risk assessment and management	85	
Security	13	
Population studies	4	
Agriculture and food	38	
Education and outreach	19	
Category total	159	13%
Societal systems focus		
Policy and economics	32	
Law	27	
Society and behavior	25	
Business and finance	35	
Category total	119	10%
Technology and informatics focus		
Engineering and technology	75	
Modeling and informatics	20	

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Geospatial and remote sensing	21	
Category total	116	10%
Built environment focus		
Built environment	56	
Sustainable cities/communities	38	
Land use/landscape design	9	
Category total	103	8%
Total	1,222	100%

The classification system is based on our census observations and is imperfect—individual IESICs can be classified into more than one category. In addition, although our survey sample is representative based on this classification system and institutional attributes and large enough for robust statistical validity, it is nevertheless small in terms of each of the 7 categories. There is also wide variability in the characteristics of the IESICs within each group. As a result, caution is required in interpreting the survey findings regarding the 7 categories. We hope to gather additional data in the future that will allow us to classify IESICs using an improved empirically derived schema.

Bozeman and Boardman classify institutes and centers into four types: university ICs, National Science Foundation (NSF) and other federal agency ICs, state ICs, and other ICs.¹⁹ They found that university ICs are by far the most common, comprising about three-fifths of all ICs. These ICs are created by universities and sustained by a combination of university resources and individual investigator grants, foundation, and industry funds. NSF and other federal agency ICs make up about a quarter of all ICs and are created and funded by NSF and other federal agencies under their various programs. State ICs include about a tenth of all ICs and are created by special state programs and supported by state appropriations. Most state-funded ICs are focused on technology-based regional economic development. The remaining few ICs are those that do not fall into one of the other three groups, such as non-profit organizations formally affiliated with universities. Although we did not categorize IESICs according to this typology, only 2% of the survey respondents reported that half or more of their budget was from state or federal funding (not counting short-term grants and contracts), indicating a smaller proportion of IESICs are government-sponsored compared with all ICs.

Geiger describes a continuum of types of ICs based on the aims of sponsored research with departmental ICs at one end and federal contract ICs at the other.²⁰ In this model, departmental IC research is conducted within the context of a department or related departments and is less concerned with sponsor interests, while federal agency research is focused entirely on the aims of the agency program (what Geiger terms research for academic motives versus research with sponsor interest in the results). He describes two other points in the continuum as “centers” and “institutes,” with centers facilitating largely academic basic research outside of departments, and institutes conducting applied research oriented more toward the needs of sponsors. Our analysis found significant differences between insti-

19. Bozeman, B. and C. Boardman (2013). Academic faculty in research centers: neither capitalism's slaves nor teaching fugitives. *The Journal of Higher Education* 84(1):88-120.

20. Geiger, R. L. (1990). Organized research units—their role in the development of university research. *The Journal of Higher Education* 61(1):1-19.

tutes and centers that appear to be generally consistent with Geiger's assertion. IES institutes tend to be more autonomous (not located within a college or department) and have a broader focus and more participating faculty than IES centers.

We conclude our overview with a summary of attributes that have been identified as important for IC success.²¹ An NSF-funded study of interdisciplinary ICs concluded that the main impediment to effective integrative research is the systematic implementation of university structures that explicitly support interdisciplinary work. The study found that the extrinsic attention (funding agencies, leadership) and the intrinsic motivation (faculty, students) were sufficient to support a transformation to academic research that is more heterogeneous, interdisciplinary, fluid, and horizontal. The constraint is academic research communities that do not adequately accommodate interdisciplinary work and "networks of practice" in their institutional structures and systems of professional standing for faculty researchers.

The study also identifies several other attributes important for effective ICs:

- ICs should be well-funded, with an independent physical location and an intellectual direction distinct from traditional departments.
- ICs should have clearly articulated organizing principles—problems, projects or products—around which research collaborations are designed.
- ICs need continuity in leadership and management, but flexible intermittent appointments are preferable for participating researchers. Coalitions of researchers should be chosen to participate in specific projects based on their technical, methodological, or topical contributions as well as their commitment to and interest in the targeted endeavors.
- Face-to-face communication is important for working across disciplines; technologically-mediated communication is a good complement, but not a substitute for face-to-face communication.
- Larger numbers of faculty affiliates do not result in greater interdisciplinarity; smaller groups are more effective in generating meaningful interdisciplinary connections. Bounded networks based on specific projects are recommended for larger ICs.

21. Rhoten, D. (2005). Interdisciplinary research: trend or transition. *Items and Issues*. 5:6-11.

IESICs Survey Results Overview

The NCSE survey of IESICs at research universities included questions addressing three sets of characteristics:²²

- Operational structure: administrative location within the university, reporting structure, physical space
- Activities: goals, partners, academic programs administered
- Resources: personnel, associated faculty, budget sources

Analyses of the survey results reveal a number of interesting findings, including differences between groups of IESICs based on their name (institute, center or other) and category (the seven groups based on name/primary focus).

How are institutes different from centers?

Most IESICs are centers, about a third are institutes, and a small proportion (<10%) have other names such as academy, collaborative, consortium, initiative, partnership, program, project or network. We began our analysis with an investigation of whether institutes are significantly different from centers and whether the units with other names are more similar to institutes or centers or make up a third unique category.²³ We found a few significant differences between the three name-type groups, primarily in IESIC structure.²⁴

Institutes are significantly more likely to be administratively located at the primary university level (not within another unit such as a college) with a director that reports to upper administration (president, chief academic officer or chief research officer). They are more likely to be housed in their own building, tend to have a broader focus, and engage with a wider number and diversity of affiliated faculty partners.

We also discovered that the IESICs with other names are more focused on education and less focused on research compared with centers or institutes.

We found no significant differences between institutes, centers and other IESICs in the types of partners included in projects, whether they administer any academic programs, or in the level of engagement with community partners via outreach, continuing education, or providing services. We also did not find any significant differences in budget sources or staffing levels.

Institutes tend to have a broader focus—on environment, sustainability, energy or natural systems.

Table 3 illustrates that almost all of the institutes (79%) and the units with other names (73%) are in the first three IESIC categories—broad environmental and sustainability, energy and climate change,

22. See Appendix C for the survey questionnaire.

23. Mann Whitney tests were used to test for differences between groups, Kruskal Wallis analysis of variance (KWANOVA) tests were used to test for differences in population averages; α was set to .05 for both tests.

24. It is important to note that there is high variability within each name type such that any individual unit that falls into one name type may be very similar to another in another name type.

and natural systems. Centers are more widely distributed across all IESIC categories with only 49% in the first three groups.

Table 3. IESIC name type and category

IESIC category	Institutes n=99	Centers n=218	Other n=23	All IESICs n=340
Broad environmental and sustainability n=57	30%	10%	26%	17%
Energy and climate change n=72	28%	18%	17%	21%
Natural systems n=73	21%	21%	30%	21%
Human wellbeing n=37	5%	14%	9%	11%
Societal systems n=44	5%	17%	9%	13%
Technology and informatics n=27	6%	9%	-	8%
Built environment n=30	5%	11%	9%	9%

Institutes are more often administratively located at the primary university level—outside colleges and departments.

Institutes are twice as likely as centers or other IESICs to be primary level units, with directors that report to the president or chancellor, chief academic officer (provost or equivalent), or the chief research officer (vice president for research or equivalent; Table 4). Altogether, about a third of IESICs are primary level units and half are administratively located within colleges. Only a small number are administratively housed within departments or other locations.

Table 4. IESIC name type and administrative location

Location within university	Institutes n=99	Centers n=218	Other n=23	All IESICs n=340
Primary level – not within a college or department n=100	51%	21%	22%	30%
Secondary level – within a college or shared by colleges n=174	37%	57%	56%	51%
Tertiary level – within a department or shared by departments n=55	10%	19%	13%	16%
Other* n=11	2%	3%	9%	3%

*Operated by a consortium of universities; not-for-profit organization formally affiliated with the university; unit within a larger institute/center; unit within an agricultural experimental station

Institutes are more likely to have their own building(s).

Institutes are also more than twice as likely to be housed within their own building(s) as centers or IESICs with other names (Table 5). A majority of IESICs are housed within their own building or suite of offices and a small number have office(s) within another suite, such as an office in a college dean’s suite. About a fifth operate without a dedicated physical space.

Table 5. IESIC name type and physical space

Physical space	Institutes n=99	Centers n=218	Other n=23	All IESICs n=340
Own building(s) n=54	26%	12%	9%	16%
Own suite with distinct entrance n=161	44%	49%	48%	47%
Own office within another suite n=52	14%	16%	17%	15%
No distinct space n=73	16%	23%	26%	22%

Institutes engage with more faculty than centers or units with other names.

All IESICs have similar average numbers of full-time and part-time staff, and institutes and centers have similar average numbers of core and joint faculty. However, institutes have significantly higher average numbers of formally affiliated faculty (Table 6). IESICs with other names have significantly lower average numbers of core and joint faculty.

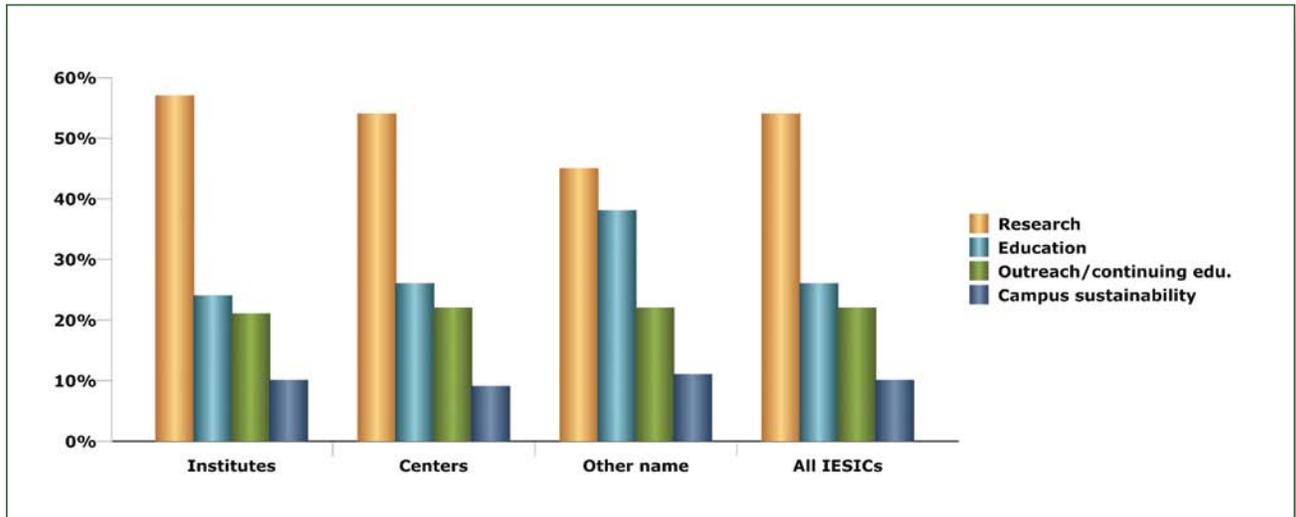
Table 6. IESIC name type and personnel

Unit personnel	Institutes n=99	Centers n=218	Other n=23	All IESICs n=340
	Mean number of personnel			
Full-time staff	10	8	8	9
Part-time staff	5	5	3	5
Core faculty	5	4	2	4
Joint faculty	8	7	2	7
Affiliated faculty	59	22	24	34

IESICs with other names place more emphasis on education and less on research.

Although almost all IESICs emphasize research in their activities, IESICs with names other than institute or center focus significantly more of their resources and efforts on education and less on research compared with institutes and centers (Figure 3).

Figure 3. IESIC name type and average proportion of resources/activities devoted to primary goals



How are the seven categories of IESICs different from each other?

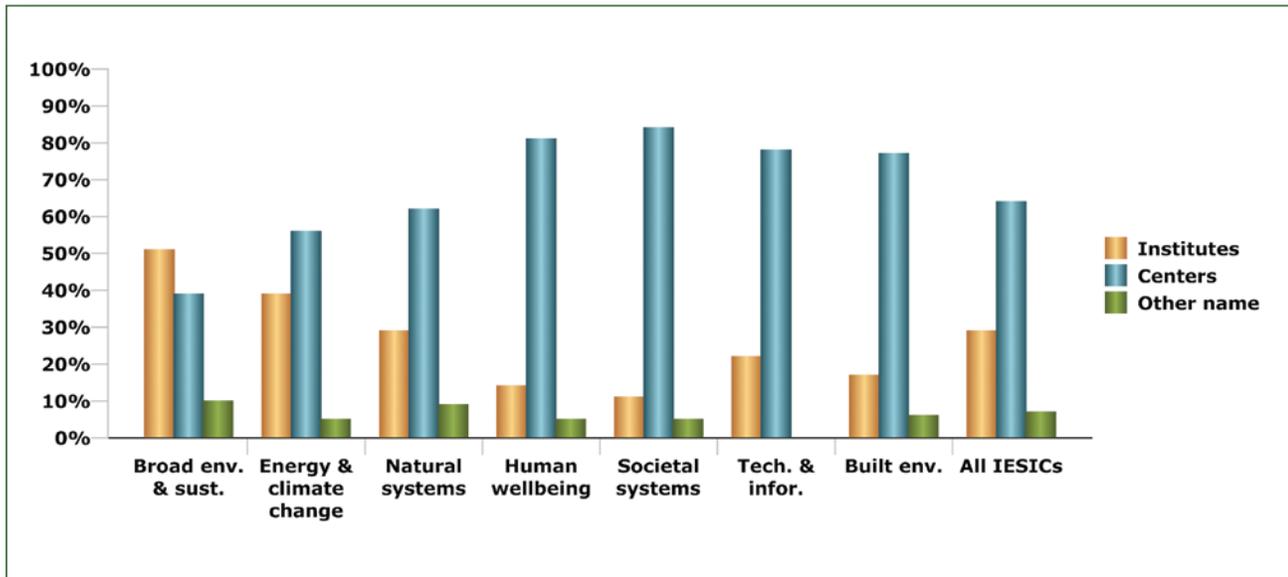
We also investigated whether there are significant differences between the 7 different categories of IESICs noted during the census.²⁵ Statistical tests reveal that each category has its own unique set of characteristics, each exhibiting from 13 to 36 statistically significant differences when compared pairwise with the other categories. Distinguishing characteristics were found in all three broad sets of characteristics: structure, activities and resources. Two categories stand out as being dissimilar from the others—the broad environmental and sustainability and the societal systems categories.

Operational structure: administrative location, reporting structure, and physical space

One of the key differences among the seven groups is the proportion of institutes and centers in each category, which is closely tied to administrative location, reporting structure and physical space as discussed above. Figure 4 illustrates that the broad environmental and sustainability category has a greater proportion of institutes and units with other names than the other six categories, which have higher proportions of centers.

25. Mann Whitney tests were used to test for differences between groups, Kruskal Wallis analysis of variance (KWANOVA) tests were used to test for differences in population averages; α was set to .05 for both tests.

Figure 4. IESIC category and name type



Because institutes are more often located administratively at the primary university level, the broad environmental and sustainability IESICs are also more likely to be located at the primary university level (Table 7). IESICs in the other categories are more likely to be located administratively within a college or department.

Table 7. IESIC category and unit administrative location

IESIC category	Administrative location			
	Primary level: university level	Secondary level: within college(s)	Tertiary level: within department(s)	Other location*
Broad environment and sustainability n=57	58%	33%	7%	2%
Energy and climate change n=72	35%	53%	12%	0%
Natural systems n=73	28%	52%	19%	1%
Human wellbeing n=37	11%	59%	19%	11%
Societal systems n=44	9%	64%	18%	9%
Technology and informatics n=27	33%	41%	22%	4%
Built environment n=30	17%	60%	23%	0%
All IESICs n=340	30%	51%	16%	3%

*Office of international affairs; agricultural experimental station; business operations unit; consortium of institutions/organizations; independent not-for-profit affiliated with university; state or federal sponsored institute/center affiliated with university; unit within an institute/center

Reporting structure is closely related to administrative location; most primary level IESIC directors report to the office of the president/chancellor, the chief academic officer, or the chief research officer (Table 8). Most secondary and tertiary level IESICs report to one or more deans or department chairs/heads.

Table 8. Unit administrative location and reporting structure

Administrative location	Reporting office						
	President/ chancellor n=12	Chief academic officer n=57	Chief research officer n=42	College/ school/divi- sion dean(s) n=159	Department chair(s)/ head(s) n=43	Steering committee n=5	Other* n=22
Primary level	11%	36%	33%	13%	1%	1%	5%
Secondary level	1%	10%	4%	75%	5%	1%	4%
Tertiary level	0%	2%	3%	22%	60%	4%	9%
Other location	0%	18%	9%	27%	0%	0%	46%
All IESICs n=340	4%	17%	12%	47%	13%	1%	6%

*Board of directors; advisory board; independent laboratory; lead faculty member in specialty area (no departments); associate VP for engagement, outreach and international affairs; director of continuing education and academic outreach; three VPs for research at different campuses and dean; VP for research and executive dean of arts and sciences; dean and steering committee; institute/center director; school director; two deans and provost; dean and institute director

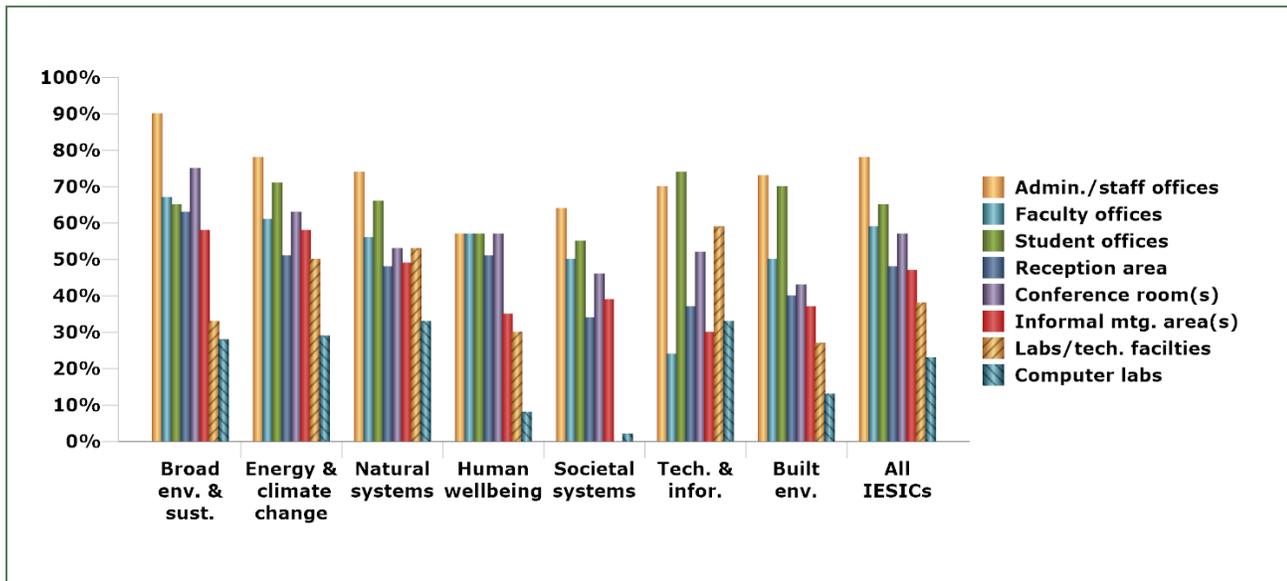
Most IESICs are housed in their own building or office suite, but almost 4 in 10 only have space within another office or do not have a distinct space (Table 9). Broad environmental and sustainability IESICs are more likely to have their own building(s), and are most likely, along with the human well-being IESICs, to have their own building or office suite. Societal systems and technology and informatics IESICs are least likely to have their own dedicated space.

The types of office and other spaces available to IESICs also differ by category (Figure 5), reflecting differing activities and goals for each type. For example, IESICs with a wider focus—the broad environmental and sustainability and the energy and climate change IESICs—are more likely to have informal gathering areas and conference rooms. Technology and informatics and natural systems focused IESICs are more likely to have laboratories and other technical facilities. On average most IESICs’ facilities include conference rooms and office space for administrators, staff, faculty and students. Between 40-50% include reception areas, informal meeting areas, and technical and laboratory facilities. Less than a quarter have computer laboratories.

Table 9. IESIC category and unit physical space

IESIC category	Physical space			
	Own building(s)	Own suite with separate entrance	Own space within another office	Virtual - no distinct space
Broad environment and sustainability n=57	25%	51%	7%	17%
Energy and climate change n=72	18%	42%	17%	24%
Natural systems n=73	14%	49%	13%	23%
Human wellbeing n=37	11%	62%	16%	11%
Societal systems n=44	7%	43%	20%	30%
Technology and informatics n=27	19%	33%	30%	18%
Built environment n=30	17%	50%	10%	23%
All IESICs n=340	16%	47%	15%	22%

Figure 5. IESIC category and types of facilities



Activities: goals, partners, and academic programs

The majority of IESICs devote most of their resources and activities to three goals: research, education and outreach, but missions vary for different categories of IESICs (Table 10). For example, societal systems IESICs place less emphasis on research and more on education, outreach and policy advising. Broad environmental and sustainability IESICs are more likely than the other groups to include facilitating campus sustainability as a primary goal.

Missions also vary widely for individual IESICs. For example, economic development is the primary goal for the Institute for Energy and Sustainability at Worcester Polytechnic University; technology commercialization and entrepreneurship is the main goal for the Oregon Built Environment and Sustainable Technologies Center at Oregon State University; policy advising is the chief goal for the Pace Center for Environmental Legal Studies at Pace University; promoting dialogue about environmental issues is the premier goal for the Center for Environmental Policy at American University; providing technical assistance to a wide range of organizations is the principal goal for the Great Lakes Environmental Finance Center at Cleveland State University; and providing energy audits is the major goal for the Center for Agricultural Energy at Colorado State University.

Almost all IESICs have research as a primary goal, but there are a few exceptions (Table 9). About 2% of the IESICs included in the survey sample do not include research as a goal. These include the Center for Green Industries and Sustainable Business Growth at Duquesne University, the Center for Environmental Education at Middle Tennessee State University, the Pace Center for Environmental Legal Studies at Pace University, the Rocky Mountain Land Use Institute at the University of Denver, the Center for Invasive Species and Ecosystem Health at the University of Georgia, the Energy Institute of the Americas at the University of Oklahoma, and the Virginia Natural Resources Leadership Institute at the University of Virginia. These IESICs are exclusively focused on education, outreach and continuing education, policy analysis and advising, and/or providing community services.

The average proportion of resources and activities spent on research varies by IESIC category and

ranges from a low of 42% for societal systems focused IESICs to a high of 62% for IESICs focused on technology and informatics.

Education of students is a goal for the majority of IESICs, although the proportion varies by category from a low of 67% of IESICs with a focus on the built environment to a high of 90% for broad environmental and sustainability IESICs. Education comprises an average of a quarter to a third of total resources and activities.

Outreach and continuing education is also a widely held goal for IESICs; between 77-92% are engaged in these activities. For most IESICs outreach and continuing education involves a smaller proportion of their activities, ranging from an average of 15% for energy and climate change focused IESICs to 30% for societal systems focused IESICs.

Campus sustainability is not widely held as a primary goal for most IESICs, although it is a goal for over half of the broad environmental and sustainability IESICs and a third of the IESICs focused on the built environment. The average level of resources/activities devoted to campus sustainability is 12% or less.

A number of IESICs listed other primary goals, including economic development, technology transfer, providing goods and services, partnerships coordination, policy analysis and advising, and journal publishing. Providing goods and services, such as applied research and development, was listed most often as an additional primary goal. Energy and climate change and technology and informatics IESICs often include economic development and transfer. The most common other goal for broad environmental and sustainability IESICs is partnership coordination.

Table 10. IESIC category and mission/goals

IESIC category	Mission/goals									
	Research		Education		Outreach/ continuing education		Campus sustainability		Other*	
	% = proportion with goal μ = mean proportion of resources/activities devoted to goal									
	%	μ	%	μ	%	μ	%	μ	%	μ
Broad environmental and sustainability n=57	98%	52%	90%	29%	88%	19%	53%	10%	16%	12%
Energy and climate change n=72	97%	59%	82%	25%	88%	15%	24%	12%	19%	33%
Natural systems n=73	97%	58%	89%	23%	82%	25%	12%	8%	8%	28%
Human wellbeing n=37	97%	48%	84%	30%	92%	24%	27%	9%	16%	23%
Societal systems n=44	96%	42%	80%	33%	82%	30%	18%	10%	18%	44%
Technology and informatics n=27	100%	62%	85%	23%	78%	16%	19%	12%	11%	32%
Built environment n=30	100%	53%	67%	25%	77%	28%	33%	8%	23%	27%
All IESICs n=340	98%	54%	84%	26%	84%	22%	26%	10%	16%	28%

*Economic development; provision of services and goods; partnership coordination; policy analysis and advising; publishing

IESICs’ research and other activities are often highly collaborative both within and outside the university. More than half typically include external partners—governmental organizations, public and

private sector organizations, and other universities—in their ventures (Table 11). Most also include a diversity of expertise from different disciplines and professional fields with experts from more interdisciplinary and applied fields—environmental science(s) and studies, engineering and applied sciences, natural resources and agriculture—most often serving as partners. The humanities and professional fields such as law, business, and public administration are least often included.

The different categories of IESICs tend to include different types of partners. For example, the energy and climate change group and the technology and informatics group are more likely to include engineers in their projects; the societal systems group is more likely to include lawyers, policy analysts and other professionals in their work; and the human wellbeing group is more likely to include life scientists.

The broad environmental and sustainability and the natural systems IESICs are most likely to include a wider range of partners; more than half of these IESICs include all three types of external partners and more academic fields. The broad environmental and sustainability IESICs also have the highest levels of inclusion for the humanities and second highest level for professional fields.

Table 11. IESIC category and partners

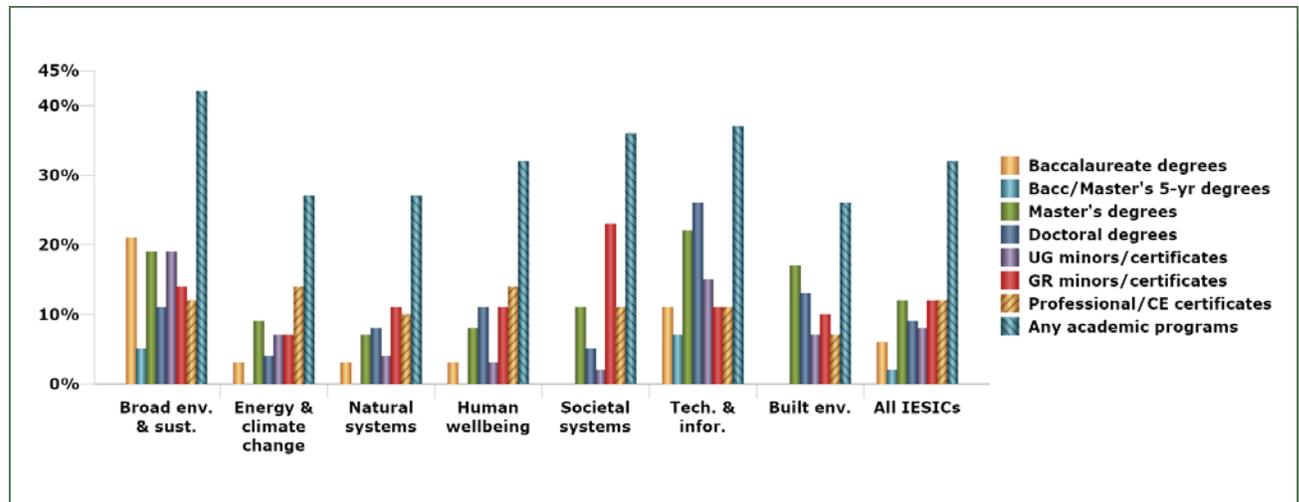
Typical project partners	IESIC category							All IESICs n=340
	Broad environmental and sustainability n=57	Energy and climate change n=72	Natural systems n=73	Human wellbeing n=37	Societal systems n=44	Technology and informatics n=27	Built environment n=30	
Environmental science(s) and studies	93%	67%	90%	87%	75%	93%	83%	83%
Engineering and applied sciences	68%	85%	60%	51%	48%	93%	73%	68%
Natural resources and agriculture	72%	44%	85%	54%	61%	48%	70%	64%
Social sciences	74%	53%	55%	49%	59%	37%	73%	58%
Physical sciences	63%	68%	58%	32%	27%	78%	47%	55%
Life sciences	67%	36%	62%	78%	32%	56%	33%	52%
Professional fields	49%	33%	25%	30%	80%	15%	40%	39%
Humanities	42%	14%	8%	16%	25%	15%	27%	20%
Governmental organizations	63%	51%	66%	62%	66%	48%	67%	61%
Public and private sector organizations	65%	53%	62%	62%	64%	52%	60%	60%
Other higher education institutions	54%	43%	56%	49%	46%	48%	40%	49%

Overall, a third of IESICs administer some type of academic program, but the proportion ranges from a high of 42% for broad environmental and sustainability IESICs to a low of 26% of built environment IESICs. Broad environment and sustainability and technology and informatics IESICs are the most likely to offer undergraduate programs and master’s degree programs, and they are the only

two groups that offer all types of programs—undergraduate and graduate degrees, undergraduate and graduate certificates and minors, and professional/continuing education certificates (Figure 5). Technology and informatics IESICs are most likely to administer doctoral degree programs.

Figure 6 illustrates the proportions of IESICs in each of the seven categories that offer various types of academic programs.

Figure 6. IESIC category and academic programs



The types of master’s degrees offered also differ by IESIC category (Table 12). Overall, the number of MA/MS degrees is equivalent to the number of other types of master’s degrees (Professional Science Masters™ other “Master of” degrees, and executive degrees designed for working professionals); 9% of IESICs offer MA/MS degrees and 8% offer other types of master’s degrees. The proportion varies by IESIC type with two categories offering equivalent numbers of both types (broad environment and sustainability, societal systems), four skewed toward more traditional MA/MS degrees (energy and climate change, natural systems, technology and informatics, built environment), and one skewed toward more applied, typically non-thesis, master’s degrees (human wellbeing).

Table 12. IESIC category and master’s degree types

IESIC category	Offer master’s degrees*	MA or MS	PSM™	Other	Executive
Broad environmental and sustainability n=57	19%	12%	4%	7%	2%
Energy and climate change n=72	8%	6%	3%	-	-
Natural systems n=73	7%	6%	1%	1%	-
Human wellbeing n=37	8%	5%	3%	5%	-
Societal systems n=44	11%	9%	2%	7%	2%
Technology and informatics n=27	22%	22%	4%	4%	-
Built environment n=30	17%	13%	3%	3%	3%
All IESICs n=340	12%	9%	3%	4%	1%

*Proportion of IESICs that offer one or more master’s degrees

Resources: personnel, affiliated faculty, and budget sources

Most IESICs do not provide funding support for full-time leadership positions. Two-fifths include funding for full-time directors; two-fifths support part-time directors; and the remaining one-fifth operate with volunteer directors (Table 13).

Broad environmental and sustainability IESICs are most likely to support full-time directors and other administrative positions—half fund full-time directors, a quarter full-time associate or assistant directors, and half other administrative positions. About a quarter of all IESICs support full-time associate or assistant directors, and about a third fund other full-time administrative personnel such as program coordinators or managers.

Overall, less than 10% of all IESICs support all three full-time leadership positions: a director, associate or assistant director, and one or more other administrative positions.

Table 13. IESIC category and leadership positions

IESIC category	IESIC-funded leadership positions					
	Director or executive director		Associate or assistant director		Other administrative position	
	Any FTE	Full-time FTE	Any FTE	Full-time FTE	Any FTE	Full-time FTE
Broad environmental and sustainability n=57	92%	53%	44%	26%	70%	47%
Energy and climate change n=72	82%	26%	47%	14%	72%	46%
Natural systems n=73	77%	34%	33%	18%	45%	27%
Human wellbeing n=37	87%	30%	33%	19%	46%	24%
Societal systems n=44	85%	46%	48%	34%	44%	21%
Technology and informatics n=27	71%	41%	49%	30%	29%	22%
Built environment n=30	73%	33%	50%	33%	37%	27%
All IESICs n=340	81%	37%	42%	23%	53%	33%

IESICs exhibit wide variability in personnel and affiliated faculty—both in the proportions of IESICs that have staff and associated faculty and in the average number of positions (Table 14). Most IESICs have either full-time or part-time employees or both, but the proportions vary by category from 64-81% for full-time staff and from 48-81% for part-time staff. The average number of positions also varies by category from 3-15 for full-time positions and from 2-8 for part-time positions. The broad environmental and sustainability group and the technology and informatics group are most likely to have full-time staff positions; the energy and climate change group is most likely to have the highest number of positions overall.

Fewer IESICs have faculty FTEs for core full-time faculty or joint part-time faculty shared with other units. Core and joint faculty may or may not support education goals; less than half of the IESICs that employ core and/or joint faculty also administer academic programs. The proportion varies by category from 24-44% for core faculty and 23-51% for joint faculty, and the average number of positions also varies from 2-7 for core faculty and 2-10 for joint faculty. The natural systems category and the broad environmental and sustainability category are most likely to have core faculty; the technology and informatics group has the highest average number of positions. The broad environmental

and sustainability category and the technology and informatics groups are the most likely to have joint faculty positions, while the broad group and the energy and climate change IESICs have higher average numbers of joint faculty positions.

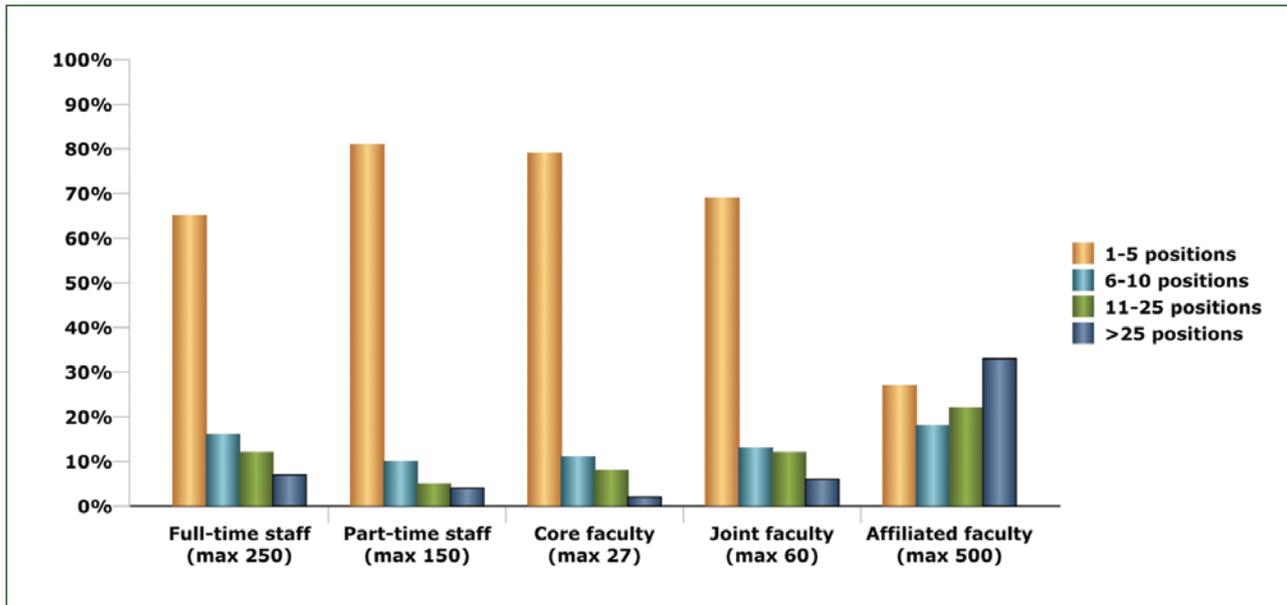
Three-fifths of all IESICs have formal relationships with faculty across the university; the average number ranges from 11-57. The broad environmental and sustainability and technology and informatics IESICs have the highest average number of affiliated faculty, and societal systems IESICs the lowest.

A third or more of IESICs in all 7 categories support no staff, core or joint faculty positions (Figure 7). Almost 40% have no formally affiliated faculty. Figure 6 illustrates that of the IESICs that do support personnel, most have 5 or fewer staff, core faculty or joint faculty positions. About half have 10 or fewer affiliated faculty. A few IESICs are very large and support up to 250 full-time staff members, 150 part-time staff members, 27 core faculty, 60 joint faculty and 500 affiliated faculty positions. Most of these larger IESICs are in the broad environmental and sustainability, natural systems, and energy and climate change categories. The proportions of IESICs with larger numbers of staff and faculty positions vary by category. Societal systems IESICs have fewer positions overall. On average, natural systems IESICs support more core faculty positions; broad environmental and sustainability and technology and informatics IESICs support more joint faculty positions.

Table 14. IESIC category and personnel

IESIC category	Full-time staff		Part-time staff		Core faculty full-time FTE		Joint faculty part-time FTE		Formally affiliated faculty	
	% = proportion with any positions μ = mean number of positions									
	%	μ	%	μ	%	μ	%	μ	%	μ
Broad environmental and sustainability n=57	81%	9	61%	5	42%	3	51%	10	70%	57
Energy and climate change n=72	67%	15	58%	8	26%	4	40%	10	65%	39
Natural systems n=73	74%	10	60%	5	44%	5	23%	8	55%	21
Human wellbeing n=37	68%	7	81%	4	24%	6	41%	3	68%	16
Societal systems n=44	64%	3	52%	2	39%	2	34%	2	57%	11
Technology and informatics n=27	81%	8	48%	2	37%	7	52%	9	56%	55
Built environment n=30	70%	4	53%	4	33%	3	27%	2	60%	37
All IESICs n=340	72%	9	60%	5	36%	4	37%	7	62%	34

Figure 7. Proportions of IESICs with different levels of personnel



IESICs rely on diverse sources for their funding, including institutional appropriations, endowments and other long-term sources, short-term grants and contracts, gifts from donors, and fees for products and services (Table 15). Grants and contracts are the most commonly reported sources of funding; this funding also makes up the largest average proportion of IESICs' budgets (Table 15). The second most common source of funding is institutional support; more than half of all IESICs receive support from this source, which comprises from 34-53% of their budgets on average. About a quarter of IESICs receive funding from endowments and a third from donor gifts; endowments average about a third of the total budget and gifts a sixth.

Broad environmental and sustainability IESICs are most likely to have institutional support, which provides about half of their budgets on average. This group is also most likely to receive funding from endowments, which averages almost a third of their overall funding. The types of funding sources and the average budget proportion that each comprises vary for each IESIC category.

Table 15. IESIC category and budget sources

IESIC category	Budget source									
	Institutional appropriations		Endowments and other long-term funding		Short-term contracts and grants		Donor gifts		Other*	
	% = proportion having as a budget source μ = mean proportion of budget from source									
	%	μ	%	μ	%	μ	%	μ	%	μ
Broad environmental and sustainability n=57	74%	53%	39%	29%	74%	43%	42%	13%	12%	59%
Energy and climate change n=72	54%	41%	22%	15%	76%	72%	28%	16%	7%	51%
Natural systems n=73	70%	34%	27%	28%	80%	65%	30%	13%	12%	40%
Human wellbeing n=37	41%	41%	22%	23%	87%	59%	35%	26%	22%	46%
Societal systems n=44	61%	42%	34%	51%	68%	47%	39%	16%	11%	64%
Technology and informatics n=27	48%	44%	15%	50%	82%	75%	15%	19%	4%	5%
Built environment n=30	57%	44%	13%	31%	77%	62%	27%	13%	13%	54%
All IESICs n=340	60%	42%	26%	31%	77%	61%	32%	16%	12%	50%

*Fees for goods or services; federal or state funding other than grants and contracts; other unspecified sources

Note: 12% of all IESICs currently do not have a designated budget



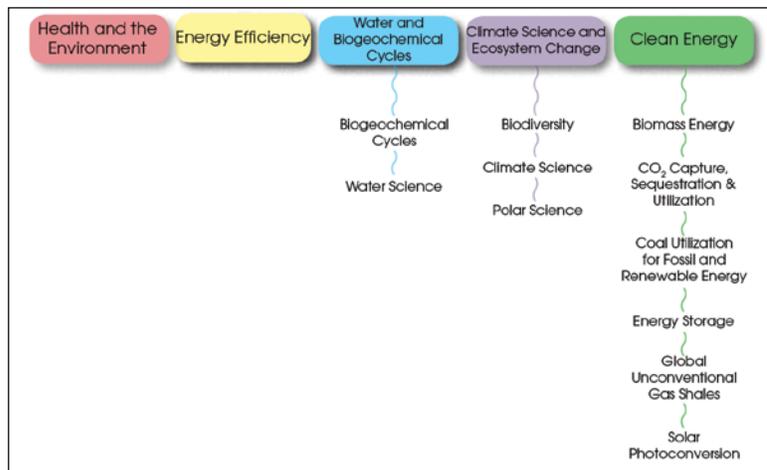
Penn State Institutes of Energy and the Environment

The Pennsylvania State University
University Park, Pennsylvania • www.psiee.psu.edu

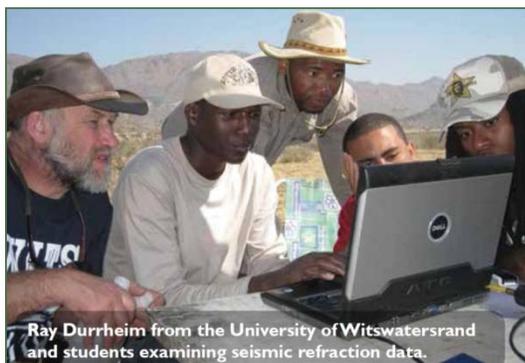
Penn State Institutes of Energy and the Environment at The Pennsylvania State University (PSIEE), a consortium of five institutes related to energy and environment, acts as a “central coordinating structure for energy and environmental research, education and outreach at Penn State” whose mission is “to expand Penn State’s capacity to pursue the newest frontiers in energy and environmental research by encouraging cooperation across disciplines and engaging the participation of local, state, federal, and international stakeholders.”

- Organized under the Office of the Vice President for Research, PSIEE is led by a director, an associate director, and one assistant director each for water resources, outreach, and environment. This team of five directors is further assisted by a Coordinating Council, consisting of 22 faculty members from diverse departments, an Executive Committee, including deans and vice presidents; and an Advisory Board representing external stakeholders.
- Links more than 500 faculty members representing most of the colleges at Penn State University including the Commonwealth Campuses. Approximately 60 of these faculty members are co-funded by PSIEE to encourage departmental hires in strategic areas. The research is categorized into 5 interdisciplinary themes of global significance that support 13 targeted initiatives.
- PSIEE’s numerous partnerships provide all energy and environmental researchers throughout Penn State access to shared facilities, particularly labs with specialized equipment and technology. PSIEE supports a Laboratory for Isotopes and Metals in the Environment, a Water Quality Laboratory, a Shared Fermentation Lab, a Center for Quantitative X-ray Imaging, and a Stopped Flow Spectroscopy Lab. The Institute provides facilities oversight of the Land and Water building and the Materials Research Laboratory both of which are on the University Park campus.
- The operating budget for PSIEE to fund faculty and their research is composed mostly of University appropriations. Additional funding can come from donor gifts and endowments.
- PSIEE also serves as a resource for faculty when seeking funding opportunities and preparing grant proposals. For the 2012-2013 fiscal year PSIEE co-funded faculty members were awarded over \$61 million in grant funding. Out of the \$676 million in awards for Penn State during that fiscal year, \$97 million were categorized as Energy and Environment research. PSIEE’s combination of secure funding from its home institution and highly successful grant proposals demonstrate the importance of establishing centers and institutes with internal resources in order to attract external engagement.

PSIEE targets its strategic themes to reflect areas of significant challenge and societal interest, that cross traditional disciplinary boundaries, and where Penn State aspires to global leadership. Internal activities assist Penn State toward achieving institutional goals, while external activities, especially leading research and outreach in relevant energy and environmental issues for investing organizations, increase Penn State's visibility and stature. PSIEE serves Penn State's internal community as an overarching management structure that engages all of the major colleges involved in energy and environmental research and teaching. PSIEE is either involved in or responsible for new faculty hires, grants and funding development, facilities and equipment management, and collaborative intellectual discourse that affect interdisciplinary research and teaching. These activities are done in collaboration with PSIEE's five college-level institutes organized around energy, environment and ethics, as well as other university-wide institutes focused on sustainability, life sciences, materials research, cyberscience, and social science research.



Beyond the Penn State campuses, PSIEE provides research support to public and private sector partners and facilitates communication among these stakeholders. Examples of the external projects PSIEE supports include AfricaArray - a collaboration between Penn State, the University of Witwatersrand



and a range of industry, government and university partners; the Northeast Woody/Warm-season Biomass Consortium (NEWBio), which investigates the social, economic and ecological drivers for a sustainable regional rural renaissance; the Susquehanna Shale Hills Critical Zone Observatory, which was the first of six CZOs funded by NSF; the DOE's Energy Efficient Buildings HUB, GridStar, and the Clean Energy Applications Center, all based at the Philadelphia Navy Yard; and Sustainable Climate Risk Management (SCRiM), one of NSF's first two sustainable research networks.

Global Institute of Sustainability

Arizona State University
Tempe, Arizona • sustainability.asu.edu

At Arizona State University, sustainability is a fundamental principle that underlies ASU's learning and research, as well as its daily business operations. The Global Institute of Sustainability (provides leadership and support for ASU's sustainability initiatives, coordinating and supporting the university's commitment to sustainability education, sustainability research, and global partnerships.

Organization

Established in 2004 with a \$15 million gift from investor Julie A. Wrigley, the Institute is a pan-university infrastructure that reports to ASU President Michael M. Crow. The ASU Board of Directors for Sustainability at ASU is co-chaired by ASU President Michael Crow, Julie Wrigley, and Wal-Mart Stores, Inc. Chairman Rob Walton. The Institute also reports to this Board.

The Institute is structured "horizontally," empowered by ASU's president to work with every university academic department and business unit unlike traditional "vertical" units that concentrate on their own important mission.

Mission

The primary missions of the Institute are to:

- Articulate and exemplify ASU's university-wide commitment to sustainability
- Support and encourage ASU units and their partners in teaching, learning, and discovery of sustainability
- Promote, extend, and share ASU's sustainable practices
- Build bridges that connect scientists, engineers, policymakers, and business leaders.

Sustainability Education

ASU's School of Sustainability (schoolofsustainability.asu.edu), an essential part of the Global Institute of Sustainability, is a flagship—the first U.S. comprehensive degree-granting program in sustainability. It is an ASU crucible for transdisciplinary activity and focuses on understanding real-world solutions to environmental, economic, and social challenges. More than 70 faculty members from across ASU teach in the School of Sustainability, including 28 with appointments specifically in the School of Sustainability.

Enrolling students since fall 2008, the School currently has approximately 450 undergraduate majors and 80 graduate students. Approximately 1,400 students are engaged in sustainability studies at ASU in degrees, minors, and concentrations throughout various departments. There are approximately

150 graduate-level and 350 undergraduate-level courses across all colleges that feature sustainability principles at ASU. In 2012, these courses enrolled a total of 66,000 students.

The School of Sustainability educates students who decide to focus their careers on sustainability. It also works closely with other ASU schools and colleges to help them infuse principles of sustainability and sustainability science into their curricula, in support of the university's fundamental commitment to sustainability. The faculty and students of the School of Sustainability study and research sustainability locally and throughout the world.

Sustainability Research

ASU's university-wide community of approximately 280 sustainability scientists and scholars is comprised of researchers who conduct important work on and/or teach sustainability topics. The community integrates the spectrum of disciplines in the natural and social sciences, medicine, engineering, mathematics, humanities and the arts, accelerating the pace of discovery and training the next generation of sustainability leaders, practitioners, and entrepreneurs.

ASU's sustainability scientists and scholars are engaged in hundreds of research projects funded by external awards exceeding \$70 million of annual expenditures. The Global Institute of Sustainability supports these efforts by offering technical and event support, proposal development assistance, strategic marketing and communications, and seed funding for its sustainability scientists and scholars. The Institute also provides access to state-of-the-art meeting, videoconferencing, and office space within the Institute's headquarters building, Wrigley Hall at ASU's Tempe campus.

ASU's Global Institute of Sustainability collaborates on numerous notable, externally funded research projects. Examples include:

- Rob and Melani Walton Sustainability Solutions Initiatives (sustainabilitysolutions.asu.edu)
- Central Arizona-Phoenix Long Term Ecological Research (caplter.asu.edu)
- Decision Center for a Desert City (dcdc.asu.edu)
- Energize Phoenix (energize.asu.edu)
- The Sustainability Consortium (sustainabilityconsortium.com)
- LightWorks (asulightworks.com)

Global Partnerships

At ASU, local solutions have global impact and vice versa. Sustainability partnerships and innovative outreach projects connect the university with diverse communities and nations around the world to help them find real-world solutions to environmental, economic, and social challenges.

The Global Institute of Sustainability's programs reach out to the greater community locally, nationally, and globally.

- Sustainable Cities Network (sustainablecities.asu.edu)
- Urbanization and Global Environmental Change (uhec.org)
- Sustainability Science for Sustainable Schools (sustainableschools.asu.edu)
- Stardust Center for Affordable Homes and the Family (stardust.asu.edu)
- Global Sustainability Solutions Centers (sustainabilitysolutions.asu.edu)

Center on Globalization and Sustainable Development

Columbia University
New York, New York • <http://cgsd.columbia.edu/>

The Center on Globalization and Sustainable Development (CGSD) “mobilizes the scientific expertise of the Earth Institute to create tools and research that shape new solutions to the challenges of sustainable development, and to provide policy support – as requested by governments and development organizations – to address these challenges in the context of a global society.” One of CGSD’s grounding principles is “science + policy = impact” to produce sustainable development solutions that “focus on the spread of social and economic opportunities for all people, while both responding to and protecting the earth’s environment.”

CGSD partners with the governments of the countries where it works, the United Nations (UN) and other international agencies, and independent research organizations “to advise on national, regional and local public policy and implementation strategies.” These projects are informed by the technical expertise of a range of specialists – engineers, scientists, lawyers, social workers and medical practitioners – to impact the social, environmental and economic spheres, or “the triple-bottom line.”

- CGSD is one of over 30 research units within Columbia’s multidisciplinary Earth Institute. Its approximately full-time staff of 60 is led by a single director and includes specialists assigned to specific program areas and initiatives. The director of CGSD reports to the director of the Earth Institute, Professor Jeffrey D. Sachs.
- Focusing on international and collaborative efforts more than internal research, CGSD does not maintain extensive physical facilities, but does have a reception area; offices for administrators, faculty and staff; student workspaces; and a conference room.



- The majority (70 percent) of CGSD’s funding comes from short-term directed funds such as grants or contracts, while non-directed institutional appropriations and donor gifts comprise 10 percent each. The fact that CGSD receives relatively minimal funding from Columbia reflects the center’s financial independence and robust external activities and partnerships.

CGSD’s primary focus is to lead policy advising programs with national, regional and local governments in the areas of agriculture, climate, data and analytics, economic development, education, health,

nutrition, and capacity building. These programs are supported by multisectoral applied research, education and outreach to advance the UN Millennium Development Goals, which include the reduction of levels of environmental degradation.

CGSD's operates in multiple capacities both on and off Columbia's campus. The Earth Institute's diverse research units collaborate often and produce annually several publications, reports and white papers authored by research teams representing various academic departments, centers and institutes.

CGSD is closely connected to the Global Association of Master's in Development Practice program as well as Columbia's Master's of Public Administration in Development Practice program. CGSD integrates the program curriculum and summer field placements with its programs by extending graduate students with practical educational opportunities throughout the world. In return, CGSD's partner organizations benefit from an additional network of support "to help process data, analyze intervention initiatives and provide strategic recommendations" to researchers.

CGSD works with partners around the world to find and implement solutions in currently 10 developing countries. Through the UN Sustainable Development Solutions Network, CGSD senior researchers and other Earth Institute collaborators "work with stakeholders including business, civil society, UN agencies and other international organizations to identify and share the best pathways to achieve sustainable development."



Broad Environmental and Sustainability IESICs (57 in survey sample)

Broad environmental and sustainability IESICs have a comprehensive focus on environmental or sustainability issues. There are three subgroups in this category: broad environmental, broad sustainability, and broad environmental and/or sustainability targeted to a specific place, region or biome. This group includes some of the largest IESICs including the Institutes for Energy and the Environment at Pennsylvania State University, the Global Institute for Sustainability at Arizona State University, and the Mitchell Center and Maine Sustainability Solutions Initiative at the University of Maine.

Profiles for IESICs in this group include:

- *Broad environmental*: Institutes for Energy and the Environment at Pennsylvania State University, and the Institute of the Environment at Tufts University
- *Broad sustainability*: Global Institute for Sustainability at Arizona State University, the Earth Institute Center on Globalization and Sustainable Development at Columbia University, and the Sustainability Solutions Institute at the University of California at San Diego
- *Broad place/region/biome*: Lake Erie Center at the University of Toledo

Organizational Structure

This is the only category with more institutes than centers. It also includes more IESICs with other names. Just over half of the IESICs in this group are institutes, 39% are centers and 10% have other names, such as the Sustainability, Energy and the Environment Initiative at the University of Dayton; the Academy for Applied Environmental Studies at Pace University; the Integrated Program in the Environment at Indiana University at Bloomington; and the Environmental Change Initiative at Brown University.

IESICs in this category are more than twice as likely as those in the other categories to be located at the primary level of their university and report to top administrators. Most IESICs in this group are administratively located at the primary level of the university with directors that most often report to the chief academic officer (Table 16). About a third of these IESICs are administratively located within a college or shared by two or more colleges with directors who most often report to a dean. The remaining few are located within departments, but only one director reports to the department chair. The directors of the other department based IESICs report to other university administrators.

Table 16. Broad environmental and sustainability IESICs’ administrative location and reporting structure

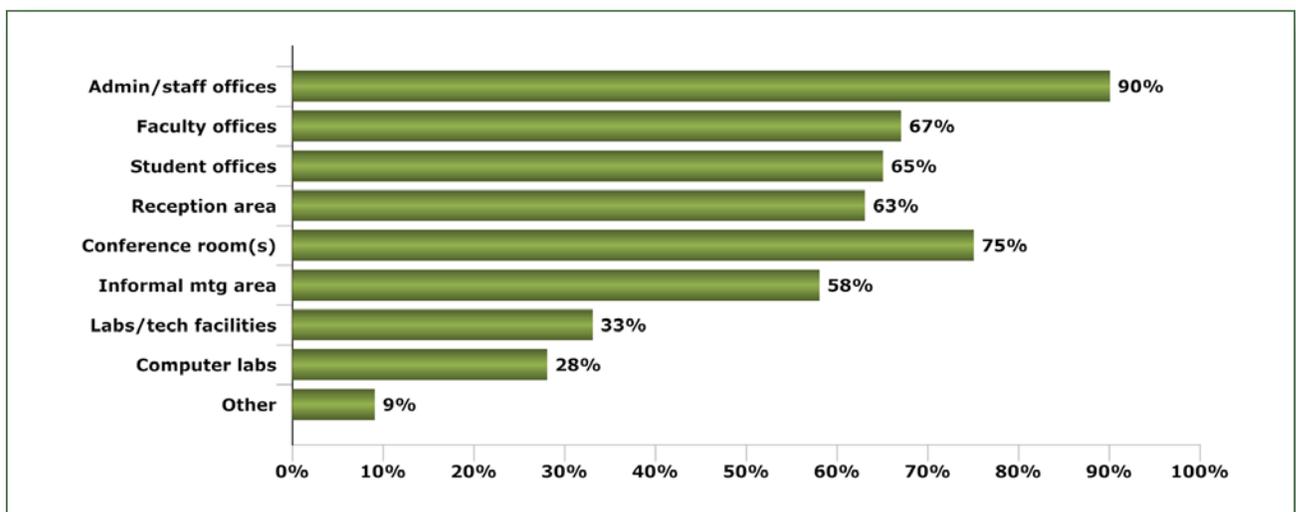
	Primary level n=33	College level n=19	Department level n=4	Other* n=1
President/chancellor	6%	-	-	-
Chief academic officer/provost	46%	5%	25%	100%
Chief research officer/VP for research	30%	-	-	-
College/school/division dean	12%	64%	25%	-
Multiple college/school/division deans	3%	21%	-	-
Department chair/head	-	5%	25%	-
Multiple department chairs/heads	-	-	-	-
Steering/advisory committee	-	-	-	-
Other**	3%	5%	25%	-

*Other location: office of international affairs

**Other reporting: president, provost, vice president for research, and steering committee; associate vice president for engagement, outreach and international affairs; vice president for research and executive dean

IESICs in this category are more likely to have their own building or suite. Three-quarters of the IESICs in this category are housed within their own building (25%) or have a suite of offices (51%). The remaining quarter either have space within another suite of offices or do not have a designated physical space. Over half have offices for administrators and staff, faculty and students, a reception area, conference room(s), and informal meeting area(s); about a third have technical and/or computer laboratories (Figure 8). Other facilities include field stations and sites and housing for visiting scholars.

Figure 8. Broad environmental and sustainability IESICs’ facilities



Activities

IESICs in this category are more likely to include education and campus sustainability as a primary goal. Over half of the IESICs in this group include campus sustainability as a primary goal compared with 12-33% of the other six groups (Table 17). This group also has the highest proportion of IESICs that include education as a primary goal; a pursuit that averages about a third of overall activities. Research comprises the largest proportion of activities for this group, as it does for all IESICs on average. Other goals include policy development and advising, partnership coordination, economic development and providing services. Examples include the Steinbrenner Institute for Environmental Education and Research at Carnegie Mellon University which includes internal promotion of interdisciplinary research and education as a primary goal, and the Center on Globalization and Sustainable Development at the Earth Institute at Columbia University which includes policy advising as a primary goal.

Table 17. Broad environmental and sustainability IESICs' primary goals

	Research	Education	Outreach/ continuing education	Campus sustainability	Other*
Is a primary goal	98%	90%	88%	53%	16%
Mean proportion of resources/activities	52%	29%	19%	10%	12%
Mode – most common proportion	60%**	20%	10%	5%	NA

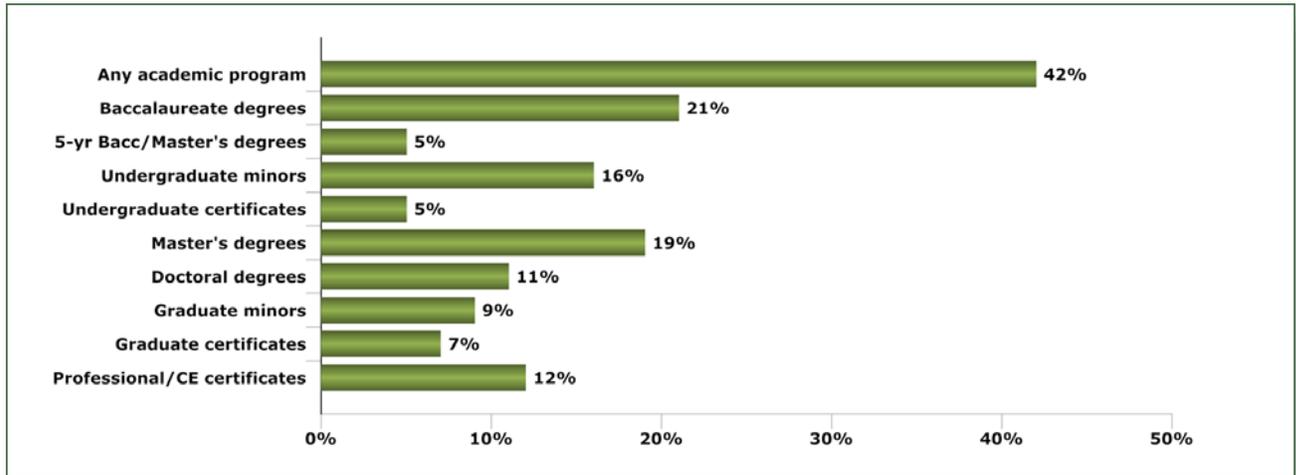
*Policy advising; partnership coordination; economic development; provision of services

**Multiple modes – smallest value shown

This category has the highest number of IESICs that administer undergraduate programs and academic programs overall. Education is a primary goal for 90% of the IESICs in this group, the highest proportion compared with other IESICs. Broad environmental and sustainability IESICs offer more baccalaureate and master's degrees than IESICs in the other categories (Figure 9). Academic programs administratively housed within broad environmental and sustainability IESICs are a growing trend noted in NCSE's national survey of interdisciplinary environmental and sustainability degree programs.²⁶ Examples include the Nelson Institute for Environmental Studies at the University of Wisconsin at Madison which offers baccalaureate, master's and doctoral degrees as well as undergraduate and graduate certificates, and the Institute for the Environment and Sustainability at Miami University (Ohio) which offers baccalaureate and master's degrees including an accelerated five-year baccalaureate/master's degree.

26. Vincent S., Bunn S. and L. Sloane (2012). *Interdisciplinary Environmental and Sustainability Education: Results from the 2012 Census of U.S. Four-Year Colleges and Universities*. National Council for Science and the Environment: Washington, DC.

Figure 9. Broad environmental and sustainability IESICs' academic programs



This group engages with a broader range of partners on average than other IESICs and is more likely to include the humanities and social sciences. Broad environmental and sustainability IESICs have equal or higher than average proportions than other IESIC groups for partnering on projects with all academic fields and external partners and are twice as likely to include the humanities compared with IESICs overall (Table 18).

Table 18. Broad environmental and sustainability IESICs' partners

Partner fields of study and organizations	Proportion of BES IESICs	Average proportion for all IESICs
Environmental science(s) and studies	93%	83%
Engineering and applied sciences	68%	68%
Natural resources and agriculture	72%	64%
Social sciences	74%	58%
Physical sciences	63%	55%
Life sciences	67%	52%
Professional fields	49%	39%
Humanities	42%	20%
Governmental organizations	63%	61%
Public and private sector organizations	65%	60%
Other higher education institutions	54%	49%

Resources

The IESICs in this category are more likely to support full-time leadership positions. This group of IESICs has higher than average proportions of IESICs that support directors, associate or assistant directors, and other administrators. This group has the highest proportion that supports director positions, and about half support full-time directors and other administrator positions (Table 19).

Table 19. Broad environmental and sustainability IESICs' leadership positions

	Director	Associate or assistant director	Other administrators
Support position	92%	44%	70%
Full-time FTE	53%	26%	47%

Most of these IESICs support full-time and/or part-time staff positions. The average number of positions is similar to those for all IESICs, but the proportion supporting positions is higher, especially for full-time positions (Table 20).

Table 20. Broad environmental and sustainability IESICs' staff positions

	Full-time staff	Part-time staff
Support staff positions	81%	61%
Mean number of positions	9	5
Mode – most common number of positions	2	1

This group is more likely to have formal relationships with affiliated faculty and support joint faculty positions. Broad environmental and sustainability IESICs are the most likely group to have formal relationships with affiliated faculty and have the highest average number of these relationships (Table 21). They are also more likely to support joint faculty appointments than most IESICs.

Table 21. Broad environmental and sustainability IESICs' faculty positions

	Core faculty	Joint faculty	Affiliated faculty
Support faculty positions	42%	51%	70%
Mean number of positions	3	10	57
Mode – most common number of positions	1	1	25

IESICs in this category are most likely to receive funding from institutional appropriations and endowments; on average, institutional appropriations comprise the highest proportion of their budgets. Like other IESICs, broad environmental IESICs rely mostly on institutional appropriations and short-term grants and contracts for their funding, but more rely on endowments than other IESICs, with endowments making up an average of a third of the budget for IESICs with this source of funding (Table 22). Other sources of funding are also important for a few of these IESICs.

Three IESICs in this group indicated that 100% of their budget comes from other sources. For example, the Catawba Sustainability Center at Virginia Polytechnic Institute and State University, which receives 100% of its funding from Roanoke County and the Roanoke Center; and the Environmental Institute at Clemson University, which receives 100% of its funding from 10% of the facilities and administrative expenses (F&A) generated by its affiliated research projects.

Table 22. Broad environmental and sustainability IESICs' budget sources

	Institutional ap- propriations	Endowments and other long-term funding	Short-term grants and contracts	Donor gifts	Other*
Is a source	74%	39%	74%	42%	12%
Mean proportion from source	53%	29%	43%	13%	59%
Mode – most common proportion from source	20%**	10%**	10%	10%	100%

*Fees for services; county government and center; overhead for research projects

**Multiple modes – smallest value shown



Tufts Institute of the Environment

Tufts University

Medford, Massachusetts • environment.tufts.edu

The Tufts Institute of the Environment (TIE) describes itself as “an interdisciplinary university-wide institute that initiates, facilitates, supports, and connects environmental education, research and outreach toward a sustainable future.” TIE serves as the University’s environmental innovation incubator by fostering an on-campus environmental community through providing grants, space and programmatic support. TIE houses Ph.D. students, faculty, guest researchers, and interns of various interdisciplinary environmental partner programs and provides the necessary infrastructure for collaboration and creative exchange.

- Early among higher education institutions to introduce environmental initiatives, Tufts created TIE in 1998 to unify its existing environmental programs and to replace a precursor organization, the Center for Environmental Management, created with an EPA grant in 1984. TIE has since evolved into “the hub for environmental research, teaching and leadership at Tufts.”
- TIE is a primary level administrative unit under the Office of the Provost and Senior Vice President, which was central in TIE’s governance restructuring in 2007. Initially led by a director and a large steering group of staff and faculty, today TIE’s governance structure comprises a full-time administrative director who serves as the chief executive officer and four specialized faculty co-directors.
- TIE’s interest in broad interdisciplinary collaboration is reflected in over 20 external partnerships, of which 7 are student organizations and 10 are internal Tufts organizations.
- In addition to 3 full-time staff members and 10 part-time staff members, TIE’s personnel include 6 joint partly compensated faculty members from several of Tufts’ schools and diverse academic departments. TIE also has 86 affiliated faculty who are connected to TIE through researcher, as student advisors, through course development and teaching, as program directors, and as programmatic advisors.
- TIE’s on-campus suite has undergone major renovations in recent years and has grown roughly 100% since 2008. Current facilities include a reception area; offices for administrators, interns, faculty, research fellows, and Ph.D. students; informal meeting spaces and lounges; conference rooms; and a kitchen. TIE-affiliated researchers may utilize the laboratories and other technical facilities of internal university partners, such as the digital media lab and the Tufts GIS Center, for which TIE supported a significant funding grant.
- TIE receives significant financial support from Tufts, with 90 percent of its budget coming from

non-directed institutional appropriations. TIE reports that the remaining 10 percent is sourced equally from donor gifts and short-term directed funds, such as grants and contracts.

- TIE itself provides funding to students for interdisciplinary environmental research, through several TIE programs: TIE Fellowships, Travel Grants, Summer Scholars and the Tisch Library Undergraduate Research Award. Affiliated faculty members receive guidance in applying for external research grants.

TIE's activities prioritize scholarly research and academic education, while lesser priorities include partnership coordination, communication, and the facilitation of the link between campus sustainability and scholarly research. One of its main goals is to support faculty collaboration for interdisciplinary environmental research in Tufts' thematic areas of strength: water, energy and climate, health and the environment, sustainable cities, and civic engagement.

TIE hosts and organizes committees and co-sponsors many on-campus lectures, workshops and symposiums to further collaborative efforts and "maintain and enhance Tufts' leadership role in environmental affairs."

TIE's signature programs include: the Water: Systems, Science & Society (WSSS) Symposium and the Tufts Environmental Literacy Institute. The former is an interdisciplinary graduate student certificate program and the latter a multi-day faculty development workshop; TIE also supports the Tufts Water Diplomacy program, an NSF-funded IGERT.

TIE involves external collaborators by both inviting interested parties to its on-campus and sponsoring affiliated researchers' attendance at relevant interdisciplinary environmental forums. TIE hosted a side event with Tufts panelists at Rio+20, organized a symposium and workshop at the National Council for Science and the Environment's conference in 2013, and presented at a Dow Sustainability Innovation Student Challenge collaboration event in 2012. The TIE affiliated Tufts Environmental Alumni group, TEA, is the most active special interest group of Tufts' Alumni Association and provides alumni and students with networks, information sharing and educational and service opportunities.





Sustainability Solutions Institute

University of California San Diego
San Diego, California • ssi.ucsd.edu

The University of California San Diego's Sustainability Solutions Institute (SSI) was created to facilitate interdisciplinary research, education, and community service in environmental sustainability. In its first few years SSI has brought in over \$4M in grants, contracts and gifts, contributed to annual savings of millions of dollars of energy and resource use on campus, fostered numerous interdisciplinary research opportunities for faculty and students, and served the interests of local, regional and international stakeholders by information and technology transfer. These activities have been supported by over 150 participating faculty and staff members from 36 departments and programs from across the campus. These include faculty from the Jacobs School of Engineering, Scripps Institution of Oceanography, Rady School of Management, such Divisions, Departments, and Centers as biology, economics, communication, urban planning and public health, the Superfund Research Center, the Qualcomm Institute, and California Institute for Telecommunications and Information Technology. SSI has organized activities with a long list of government agencies, corporations, foundations, NGOs, and academic institutions. Recent achievements are described in a report available on SSI's website and include:

- *Fostering basic research* that might otherwise not get started, as it requires inter-Divisional, inter-Departmental, interdisciplinary efforts. SSI's Venice Lagoon sustainability project and the commercial building natural ventilation retrofit project are examples. Together, they provided about \$3M of extramural support for collaborating faculty, staff and students from numerous departments across the campus. Similarly, SSI's leadership of the Association of Pacific Rim Universities' Sustainability and Climate Change program has brought direct benefit to several coastal cities.



Greenovation Forums

- *Serving societal needs of regional and global communities.* With support from the Scripps Foundation for Science and the Environment, SSI has organized 20 Greenovation Forums linking university researchers to the regional business sector. The Rady School of Management's clean technology program built on this outreach. SSI has also played a role in preparing the influential *San Diego 2050 Report*, and in bringing prominent speakers like Al Gore to the campus. In 2013, SSI launched the first university-based Terrestrial Carbon Accounting Certificate course with students from 19 countries.

- *Serving the needs of its students and campus.* SSI prepared much of the documentation that contributed to the campus' rising to the top-tier on three national environmental rankings. Together with the campus' Sustainability Program Office SSI provides students in more than 40 environmental clubs with guidance, introductions to faculty members, and numerous research opportunities. Today, over 1,200 undergraduates are enrolled in 14 different educational programs related to environmental sustainability and the college catalog lists over 270 courses that touch on sustainability. Student activism, faculty interests and an unusually strong relationship with the campus operations staff have led to energy consumption savings of 20%, and the installation of on-campus electric and biodiesel fueling stations, building-topped solar panels, fuel cells, a natural gas cogeneration plant, smart building microgrids, green transportation, and other cost-saving technologies. UC San Diego is a national leader in the use of the campus as a test bed.



Keeling Apartments, the first LEED Platinum residential building among all University of California campuses

- *Positioning UC San Diego's interdisciplinary contributions on the world stage.* As in most disciplines there is a real need for translational work to link scholars to policy makers. SSI's leadership in the Regional Adaptation and Climate Change program of the annual Kyoto Science and Technology for Society (STS) forum enables SSI to showcase the university's discoveries before an audience of global leaders. At recent STS fora SSI highlighted new findings on future water supplies in Africa and the Himalayas that resulted from their consortium with University of Cambridge scholars, presented the results of their international sea level rise workshop (a year before IPCC5), and made recommendations for the organization of Knowledge Action Networks linking academics to policy makers.

These highlights show that SSI's campus-wide platform has fostered valuable interdisciplinary research and training opportunities in the broad field of environmental sustainability. It is quite remarkable that SSI has achieved these results without core funding from the university. SSI is not comparable to the sustainability institutions typically found in other major universities; SSI has a part-time director, a very small staff, and is funded entirely by extramural grants and gifts. SSI's orphan status among the highly competitive Schools and Divisions is a serious impediment to interdisciplinary program development and is currently under administrative review. Nevertheless, the university's leadership is strongly committed to sustainability and recognizes that the big breakthroughs will come as a result of interdisciplinary efforts. SSI remains confident therefore, that with some administrative re-organization, UC San Diego will demonstrate that sustainability is a major priority for the foreseeable future.



Lake Erie Center

The University of Toledo
Toledo, Ohio • utoledo.edu/nsm/lec

The Lake Erie Center (LEC) serves as a center for interdisciplinary research and student and public education on the Great Lakes at the University of Toledo, aiming “to improve the environmental condition, ecosystems services, natural resources and sustainability of Lake Erie and its watersheds.” The listed goals in its mission statement include: implementing long-term research of “the linkages among land use, aquatic resources, water quality, sustainable living and human health; providing “a state-of-the-art research and education facility for sponsored research and collaborations;” facilitating “hands-on cutting-edge” research and education experiences for students; and conducting outreach programs to “engage secondary school students, teachers and the public.”

The LEC’s work is focused on “the land-water interface and bay-lake exchanges in the Great Lakes” but is aimed at solving environmental problems in aquatic ecosystems throughout the world. Established in 1999, the LEC studies the Maumee River and Bay and the western Lake Erie Basin “as a model for Great Lakes ecosystems and aquatic ecosystems worldwide.” The LEC operates a variety of research projects that incorporate university and external experts, as well as unique and interactive education programs that attract students and the general public.

- Located within the College of Natural Sciences and Mathematics, the LEC is led by full-time director Dr. Carol Stepien and supported by a small staff of two part-time and two full-time members. Five faculty members have joint appointments (Dr. Daryl Dwyer, Dr. Christine Mayer, Dr. Jonathan Bossenbroek, Dr. Thomas Bridgeman, and Dr. Kevin Czajkowski), and twenty more from various departments and colleges are formally affiliated with the LEC.
- Additionally, the LEC employs 4 laboratory and research technicians and 13 graduate students with specialized research projects. There are five advisory boards: Internal and External Science Advisory Boards, Internal and External Education and Outreach Advisory Boards (includes GK-12 school administrators), and an Internal Graduate Student Advisory Board.
- The LEC has 30,000 square feet of core facilities, including 12 laboratories assigned to individual researchers, offices for faculty and students, classroom, a library, a public lobby and support facilities.” Its facilities are outfitted with recycled materials for energy efficiency and landscaped with native vegetation and a constructed wetland. The LEC also owns boats and other vehicles to enable research and education experiences.

- The majority (80 percent) of the LEC’s budget comes from non-directed funds, giving the LEC relative operational freedom. Short-term directed funds, the overhead recovery from the several million dollars received in federal grants annually, contribute the remaining 20 percent.
- The LEC also gains in membership fees from Friends of the Lake Erie Center (FOLEC), which opens exclusive activities and opportunities to its members in return for their support.

The LEC concentrates its integrated research and education programs in the following focus areas: “Aquatic and Terrestrial Ecology; Aquatic Resources and Fisheries; Environmental Restoration Ecology; Geography and Land Use Planning; Hydrologic and Landscape Modeling; Plant Science and Bio-remediation; Public Policy and Risk Management; Remote Sensing and Monitoring; Soil and Water Chemistry; and Water Pollution, Air Pollution, and Human Health.” Smaller but significant efforts are directed toward public outreach and campus sustainability.

The LEC hosts weekly guided tours and monthly public lectures, raising awareness about environmental problems and increasing the reach of projects conducted by LEC-affiliated faculty, government scientists and visiting researchers. Undergraduate students have the opportunity to get involved with LEC’s work through the Research and Mentoring Fellowship Program funded by a 5-year \$600,000 NSF grant. During the summer, the LEC also offers one-week intensive courses and summer science camp for 4th and 5th graders.



Summer science camp for local 4th and 5th grade students

LEC also manages the robust environmental education GK-12 program, also funded by the NSF and supported by federal, state and local environmental agencies. Graduate students in STEM disciplines partner with high school teachers and students “to build an Environmental Science Learning Community at the land-lake ecosystem interface.” GK-12 aims to get students interested in STEM careers, improve STEM teaching and communication, and “develop hands-on solutions to environmental problems along school-yard stream ecosystems feeding the Great Lakes.”

PHOTO COURTESY DON KEMP



Recent achievements at LEC include numerous grants, such as the NSF Field Stations and Marine Laboratories grant to build an environmental sensor network in the Great Lakes and a university-funded Women and Philanthropy grant to install interactive displays in the LEC lobby. LEC-affiliated faculty are frequently published and awarded grants, including two EPA Great Lakes Restoration Grants in 2012.

Energy and Climate Change IESICs (72 in survey sample)

Energy and climate change IESICs focus on energy technology, climate and climate change. There are two subgroups in this category: energy technology and climate/climate change. This group also includes some of the largest IESICs, including the Great Lakes Bioenergy Research Center at University of Wisconsin at Madison, the Center for Applied Energy Research at the University of Kentucky, and the International Pacific Research Center at the University of Hawaii at Manoa.

Profiles for IESICs in this group include:

- *Energy technology*: Precourt Institute for Energy at Stanford University
- *Climate/Climate change*: North Carolina Institute for Climate Studies at North Carolina State University at Raleigh

Operational Structure

This category has the second highest proportion of institutes. Institutes make up 39% of this group, 57% are centers, and 6% have other names such as the Virginia Coastal Energy Research Consortium at Old Dominion University, the Global Climate and Energy Project at Stanford University, and the Program on Climate Change at the University of Washington at Seattle.

About a third of the IESICs in this category are administratively housed at the primary university level. This group has the second highest proportion—over a third—of IESICs administratively located at the primary level of the university with most directors reporting to the chief research officer (Table 23). This group of IESICs is also the most likely to have directors that report to the office of the university president, but the number is still very small. Slightly over half are located within a college or shared by two or more colleges with directors that most often report to a dean. The remaining few are located within departments, with most reporting to the department chair.

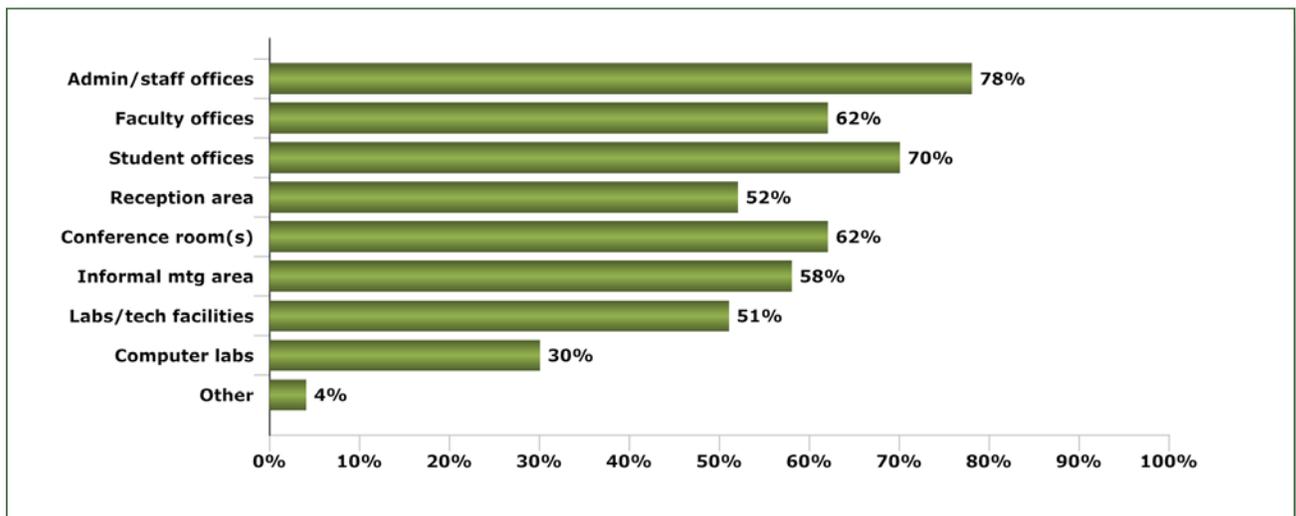
Table 23. Energy and climate change IESICs' administrative location and reporting structure

	Primary level n=25	College level n=38	Department level n=9
President/chancellor	16%	3%	-
Chief academic officer/provost	24%	8%	-
Chief research officer/VP for research	40%	8%	11%
College/school/division dean	8%	60%	11%
Multiple college/school/division deans	-	8%	11%
Department chair/head	4%	5%	67%
Multiple department chairs/heads	-	3%	-
Steering/advisory committee	4%	-	-
Other*	4%	5%	-

*Multi-institution institute reports to three chief research officers and a dean; board of directors made up of senior administrators; independent laboratory

Over half of the IESICs in this category are housed in their own building or suite. A small proportion (18%) has a dedicated building including the Center for Applied Energy Research at University of Kentucky which is housed on its own research campus with eleven buildings. Most (42%) are housed within their own suite. The remaining energy and climate change IESICs either have space within another suite of offices (17%) or do not have a designated physical space (23%). For example, the Solar Energy Center at Oregon State University is a consortium of researchers who have their own spaces but share equipment and expertise. Most energy and climate change IESICs have offices for administrators and staff, faculty and students, a reception area, conference room(s), and informal meeting area(s); about a have third technical and/or computer laboratories (Figure 10). Other facilities include field and demonstration sites.

Figure 10. Energy and climate change IESICs' facilities



Activities

IESICs in this category focus on research, education and outreach. Research comprises the largest proportion of activities for this group, as it does for most IESICs (Table 24). The majority of the IESICs in this category also include higher education as a primary goal, dedicating about a quarter of their resources and activities to this purpose on average. Many in this group are involved in outreach which includes economic development activities and technology demonstration projects. This goal comprises 10-15% of activities on average. About a quarter also include campus sustainability as a goal which constitutes about 10% of their activities on average.

Other goals include providing services and policy development. Examples include the Center for Agricultural Energy at Colorado State University which focuses primarily on providing energy audit services, and the Energy Institute at the University of Southern California which devotes a third of its activities to energy policy studies.

Table 24. Energy and climate change IESICs’ primary goals

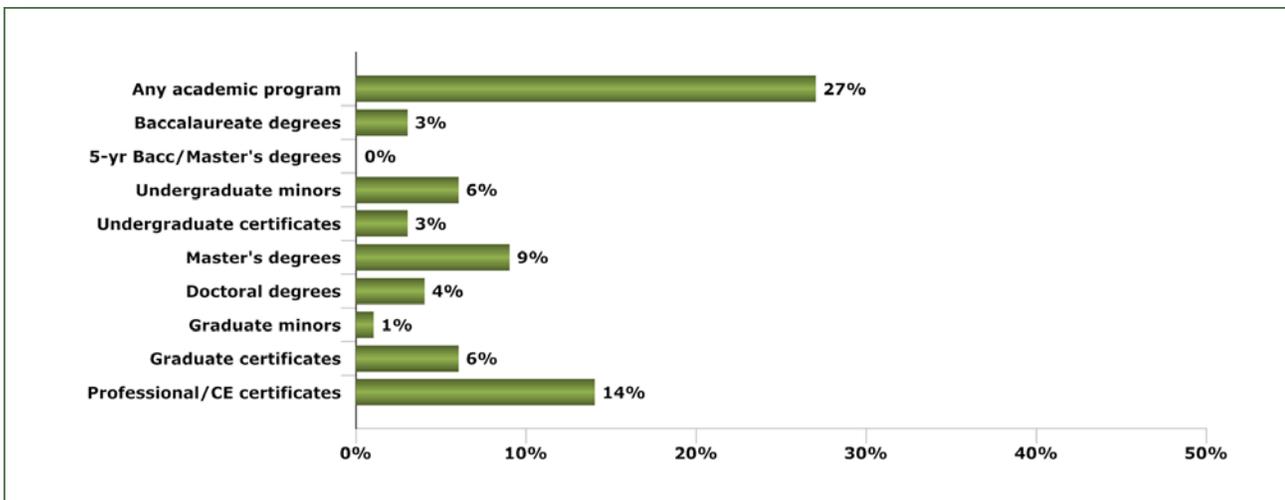
	Research	Education	Outreach/ continuing education	Campus sustainability	Other*
Is a primary goal	97%	82%	88%	24%	19%
Mean proportion of resources/activities	59%	25%	15%	12%	33%
Mode –most common proportion	60%	20%	10%	10%	NA

*Economic development; applied research/testing; provision of services; policy development and advising; partnership coordination; infrastructure development

These IESICs are most likely to administer professional and continuing education programs. Education is a primary goal for 82% of the IESICs in this group, but only a quarter administer any type of academic program (Figure 11). Most of the academic programs administered by these IESICs are minors and certificate programs including professional continuing education certificates.

Only two administer baccalaureate degrees: the Center for Renewable Energy at Illinois State University, and the National Wind Institute at Texas Tech University which also offers a doctoral degree. The Center for Carbon-free Power Integration at the University of Delaware offers master’s and doctoral degrees. The Solar Fuels Energy Frontier Research Center at the University of North Carolina at Chapel Hill administers a doctoral degree. Other IESICs that administer master’s degrees include the Future Renewable Electric Energy Delivery and Management Systems Center at North Carolina State University at Raleigh, the Great Lakes Energy Institute at Case Western Reserve University, the Colorado Energy Research Institute at the Colorado School of Mines, the Energy Systems Engineering Institute at Lehigh University, and the Climate Change Institute at the University of Maine.

Figure 11. Energy and climate change IESICs’ academic programs



Project partners for this group most often include engineering and applied sciences, physical sciences, environmental science(s) and studies and social sciences. Energy and climate change IESICs are less collaborative than IESICs overall with proportions lower than average for partnering on

projects with all academic fields and external partners, except for engineering and applied sciences and physical sciences (Table 25).

Table 25. Energy and climate change IESICs' partners

Partner fields of study and organizations	Proportion of ECC IESICs	Average proportion for all IESICs
Environmental science(s) and studies	67%	83%
Engineering and applied sciences	85%	68%
Natural resources and agriculture	44%	64%
Social sciences	53%	58%
Physical sciences	68%	55%
Life sciences	36%	52%
Professional fields	33%	39%
Humanities	14%	20%
Governmental organizations	51%	61%
Public and private sector organizations	53%	60%
Other higher education institutions	43%	49%

Resources

The IESICs in this category are less likely to support full-time leadership positions. This group of IESICs has lower than average proportions of IECICs that support directors, associate or assistant directors, and other administrators (Table 26). The majority of IESICs support directors and other administrators, but most leadership positions have part-time FTEs.

Table 26. Energy and climate change IESICs' leadership positions

	Director	Associate or assistant director	Other administrators
Support position	82%	47%	72%
Full-time FTE	26%	14%	46%

About two-thirds of these IESICs support full-time and/or part-time staff positions. The average number of positions is higher compared to those for all IESICs; but the proportion with positions is lower, especially for full-time positions (Table 27).

Table 27. Energy and climate change IESICs' staff positions

	Full-time staff	Part-time staff
Support faculty positions	67%	58%
Mean number of positions	15	8
Mode – most common number of positions	3	1

This group is less likely to have core faculty positions. The energy and climate change group and the human wellbeing group are least likely to have core faculty positions (Table 28). The proportions that have joint faculty positions and affiliated faculty are roughly equal to the averages for all IESICs. For IESICs that do have faculty positions, the mean numbers of core faculty positions is average, joint faculty positions are higher than average, and the number of affiliated faculty are slightly higher than average.

Table 28. Energy and climate change IESICs' faculty positions

	Core faculty	Joint faculty	Affiliated faculty
Support faculty positions	26%	40%	65%
Mean number of positions	4	10	39
Mode – most common number of positions	1	3	10*

*Multiple modes – smallest value shown

IESICs in this category receive most of their funding from grants and contracts. Like other IESICs, energy and climate change IESICs rely mostly on institutional appropriations and short-term grants and contracts (Table 29). About a quarter also receive part of their funding from endowments and donor gifts. Other sources of funding include fees for services, sponsorships and federal and state programs.

Examples include the Center for Applied Energy Research at the University of Kentucky which receives about a fifth of its budget from client services, the Climate Energy Decision Making Center at Carnegie Mellon University which is 100% funded by the National Science Foundation, the Institute for Energy and Sustainability at Worcester Polytechnic Institute which is partially funded by state appropriations, and the Crisman Institute for Petroleum Research at Texas A&M University which is funded largely by corporate sponsorships.

Table 29. Energy and climate change IESICs' budget sources

	Institutional appropriations	Endowments and other long-term funding	Short-term grants and contracts	Donor gifts	Other*
Is a source	54%	22%	76%	28%	7%
Mean proportion from source	41%	15%	72%	16%	51%
Mode – most common proportion from source	10%**	5%**	100%	10%	NA

*Fees for services; federal and state funding other than short-term grants and contracts; corporate sponsorships

**Multiple modes – smallest value shown

Precourt Institute for Energy

Stanford University
Stanford, California • energy.stanford.edu

The mission of Stanford University's Precourt Institute for Energy (PIE), established in 2009, includes to serve "as the hub of energy research and education" at Stanford, "to transform energy by supporting cutting-edge research and facilitating collaboration," and "to develop energy-literate leaders and communities through educational programs and the dissemination of research results."

- PIE maintains affiliations and coordinates programs with 25 academic departments located throughout the university's seven schools, plus dozens of energy-oriented labs and research programs. As a research program independent of any one school, PIE's director reports to the vice provost and dean of research, currently Ann Arvin. The institute is supported by an executive committee of nine and an advisory council comprising 19 members representing the private, public and academic sectors.
- Within its broad network, PIE's activities involve 215 participating faculty members. The director leads a staff of ten.
- Though PIE's facilities do not include laboratories or computer labs, access to technical facilities is provided through the numerous affiliated energy-oriented labs, centers and institutes.
- PIE and two of its centers, the TomKat Center for Sustainable Energy and the Precourt Energy Efficiency Center, provide faculty research awards through their seed grant programs. The 44 grants since 2010 have gone to a total of 63 Stanford faculty members, plus their graduate research assistants. These faculty members are in various science, engineering and social science departments, as well as the Stanford Graduate School of Education and Stanford's Graduate School of Business.

PIE's goals broadly encompass the vision of abundant, secure, environmentally benign and affordable energy services for all of humankind, as well as educating students and the public to achieve that future. While many Stanford research programs work on energy, PIE works most closely with the following programs, all of which are dedicated to building sustainable, reliable and cost-effective energy systems: the Bay Area Photovoltaic Consortium, the Center for Advanced Molecular Photovoltaics, the Center on Nanostructuring for Efficient Energy Conversions, the Energy Modeling Forum, the Global Climate & Energy Project, the Precourt Energy Efficiency Center, the Program on Energy and Sustainable Development, the Shultz-Stephenson Task Force on Energy Policy, the Stanford Environmental & Energy Policy Analysis Center, the Stanford Institute for Materials & Energy Science, the Steyer-Taylor Center for Energy Policy & Finance, the SUNCAT Center for Interface Science & Catalysis, and the TomKat Center for Sustainable Energy.

Aside from research, PIE coordinates various internal and external education and outreach events,

bringing perspectives on energy and environment issues from the field to the Stanford community, as well as augmenting and encouraging collaboration within the Stanford energy network.

On the Stanford campus, PIE organizes the weekly Energy Seminar, both a for-credit course and free public event, which features speakers “from Stanford and other leading research institutions, energy companies, government and other organizations.” PIE’s week-long summer conference “Energy@Stanford&SLAC” showcases the university’s latest energy research for incoming graduate students interested in studying some aspect of energy. The conference also provides an opportunity for students, invited from all of Stanford’s schools, to network with each other and faculty. Additionally, PIE liaises with departments and schools regarding new energy-related scholars, curriculum and faculty appointments and assists the student-led groups such as the Stanford Energy Club, the Stanford Solar Car Project and the Stanford Solar Decathlon Team.

Externally, PIE also carries out essential aggregation and dissemination of Stanford energy research results to the media, government and the energy industry. The Energy & Environment Affiliates Program is a forum where Stanford researchers benefit from the real-world perspective of representatives from member industrial firms to identify areas of opportunity for energy research and solutions. Its objectives are symbiotic, such as to “provide financial support for research and education,” “exchange best practices and pursue out-of-the-box ideas,” and “foster more rapid commercialization of working solutions.”

A recent large-scale event exemplary of PIE’s progress toward its goals was hosting the U.S. west coast launch of the Global Energy Assessment, “the first ever fully integrated energy assessment that analyzes energy challenges, opportunities and strategies for developing industrialized and emerging economies... supported by government and NGOs, the United Nations Systems, and the private sector.”



North Carolina Institute for Climate Studies

North Carolina State University
Asheville, North Carolina • www.cicsnc.org

Background

In 2009, The Cooperative Institute for Climate and Satellites (CICS) was formed through a national consortium of academic, non-profit and community organizations, with leadership from the University of Maryland College Park (UMCP) and North Carolina State University (NCSU) with principal locations in College Park, Maryland and Asheville, North Carolina. CICS is administered as part of the NOAA/NESDIS/STAR Cooperative Research Program Institutes which is an effort by NOAA and academic institutions to engage a geographically dispersed, diverse set of more than 20 partner institutions across the United States to address environmental change, their prediction, and potential impacts. CICS-NC is also an Inter-Institutional Research Center (IRC) of the University of North Carolina (UNC) System, where it is known as the North Carolina Institute for Climate Studies (NCICS). It is administrated by NCSU and affiliated with all the UNC academic institutions as well as a number of other academic and community partners across the state and nationally. CICS-NC is co-located with NOAA's National Climatic Data Center (NCDC) in Asheville, NC.

Vision

- CICS-NC inspires cutting-edge research and collaboration
- CICS-NC advances NOAA's mission to understand and communicate the current and future state of the climate
- CICS-NC engages with business, industry, academia, and the public to enhance decision-making

Mission

- Focus primarily on the collaborative research into the use of in situ and remotely sensed observations in climate research and applications that is led by NCDC.
- Innovate new products and creates new methods to understand the state and evolution of the full Earth system with cutting-edge research
- Prepare the next generation of the workforce needed to address climate science and its applications
 - o CICS-NC support graduate education and professional scientific training
 - o CICS-NC provides opportunities for students to interact with NOAA scientists
- Engage with corporate leaders to develop climate-literate citizens and a climate-adaptive society
- Facilitate regional economic development through its Engagement activities

Objectives

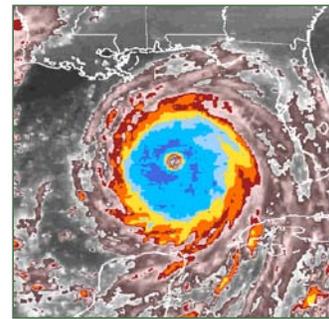
CICS-NC objectives are “to promote the discovery of new knowledge about global, regional, and local climate variability and its impacts; and to provide information that is critical for determining trends and validating climate forecasts at all of these spatial scales.” CICS communicates these findings and their contexts and implications to the scientific community, business and industry communities, K-12 and higher education communities, policymakers and the general public.

Structure

CICS-NC activities support NOAA’s National Climatic Data Center (NCDC) and enterprise climate services. Main collaborative activities are currently organized into 7 streams:

- Climate Data Records
- Climate Literacy and Engagement
- Surface Observing Networks
- National Climate Assessments
- Workforce Development
- Consortium Projects
- Administrative Support

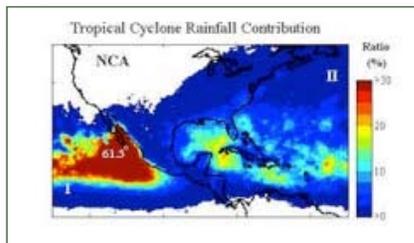
These streams are supported by the different divisions in NCDC, NOAA Line Offices such as the National Environmental Satellite, Data and Information Service (NESDIS), Oceanic and Atmospheric Research (OAR), and the National Weather Service (NWS), the US Global Change Research Program (USGCRP), and North Carolina State University. CICS-NC is structured thematically by these streams.



Satellite image of Hurricane Katrina (2005), recently highlighted on Cyclone Center

Opportunities

There are a broad array of potential collaboration opportunities at CICS-NC and its NOAA NCDC partner. At a very high level the Center’s needs span the range from basic and applied natural science research, social science research, policy research and development and outreach to the public.



Tropical Cyclone Rainfall Contribution for 1998-2009

There are three science-driven units at the National Climatic Data Center: the Global Climate Applications Division, the Remote Sensing & Applications Division and the Climate Services and Monitoring Division. Their respective foci are:

1. Surface observing systems and observations including historical and paleo proxies,
2. Remotely sensed observing systems and observations, space and surface-based, and
3. Product development and delivery for national, regional and local uses, and engagement of stakeholders in defining their needs.

Natural Systems IESICs (73 in survey sample)

Natural systems IESICs focus on earth systems. There are six subgroups in this category: freshwater aquatic systems/watersheds, marine/coastal systems, forests, earth systems/geosciences, ecology/conservation, and natural resources/land management.

Profiles for IESICs in this group include:

- *Freshwater aquatic systems/watersheds*: Oklahoma Water Resources Center at Oklahoma State University
- *Marine/coastal systems*: Coastal Studies Institute and Coastal Sustainability Studio at Louisiana State University
- *Forests*: Global Institute of Sustainable Forestry at Yale University
- *Earth systems/geosciences*: Institute for the Study of Earth, Oceans, and Space at the University of New Hampshire
- *Ecology/conservation*: Colorado Plateau Biodiversity Center at Northern Arizona University
- *Natural resources/land management*: Institute for Natural Resources at Oregon State University

Operational Structure

This category has the third highest proportion of institutes. Institutes make up 29% of this group; 62% are centers; and 9% have other names, such as the Great Lakes Research Consortium at SUNY College Environmental Science and Forestry, the Great Lakes Program at the University of Buffalo, the Water Resources Agency at the University of Delaware, and the Powell River Project at Virginia Polytechnic Institute and State University. This group has the second highest proportion of IESICs with other names, second only to the broad environmental and sustainability category.

About a quarter of the IESICs in this category are administratively housed at the primary university level. This group has a little over a quarter of IESICs administratively located at the primary level of the university with most directors reporting to the chief research officer (Table 30). Slightly over half are located within a college or shared by two or more colleges with directors that most often report to a dean. The remaining fifth are located within departments, with most reporting to the department chair, but several reporting to other administrators.

Table 30. Natural systems IESICs’ administrative location and reporting structure

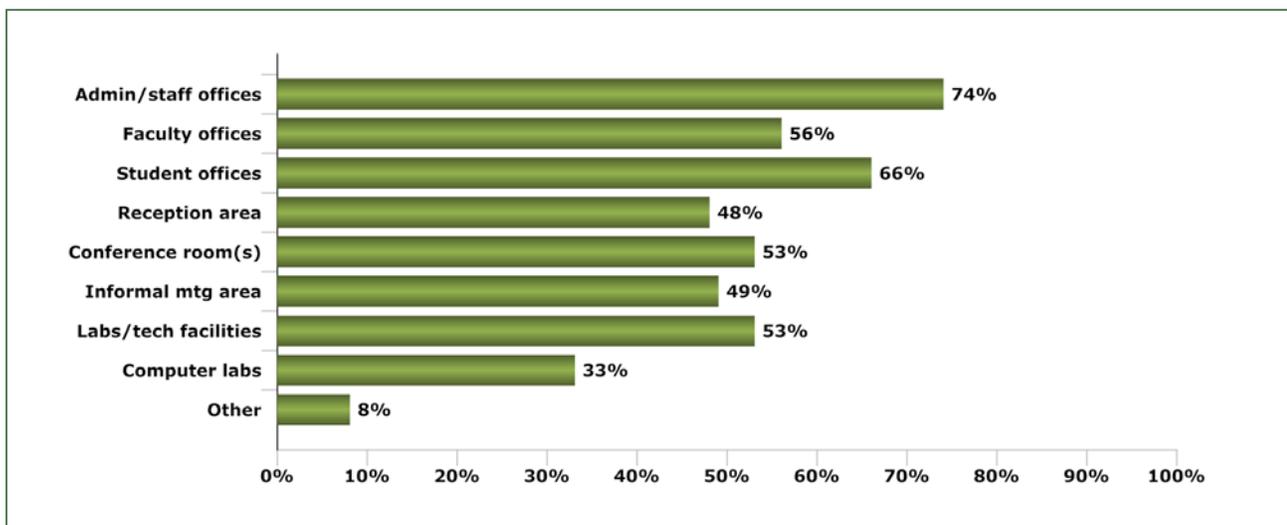
	Primary level n=20	College level n=38	Department level n=14	Other* n=1
President/chancellor	15%	-	-	-
Chief academic officer/provost	30%	13%	-	-
Chief research officer/VP for research	40%	5%	-	-
College/school/division dean	5%	63%	14%	-
Multiple college/school/division deans	-	11%	-	100%
Department chair/head	-	-	57%	-
Multiple department chairs/heads	-	-	-	-
Steering/advisory committee	-	5%	7%	-
Other**	10%	3%	22%	-

*Other location: agricultural experiment station

**Other reporting: institute director, center director, institute director and dean, dean and steering committee

Most of the IESICs in this category are housed in their own building or suite. A small proportion have a dedicated building (14%) and half (49%) are housed within their own suite of offices. The remaining IESICs either have space within another suite of offices (14%) or do not have a designated physical space (23%). Most natural systems IESICs have offices for administrators and staff, faculty and students, a reception area, conference room(s), and informal meeting area(s); over half have technical laboratories and over a third computer laboratories (Figure 12). This group of IESICs and the technology and informatics group are the most likely to have laboratories or other technical facilities. Other facilities include field stations, hatcheries, science collections, marine operations, equipment storage and specialized classrooms.

Figure 12. Natural systems IESICs’ facilities



Activities

IESICs in this category focus on research, education and community outreach. Research comprises the largest proportion of activities for this group, comprising over 50% of activities on average (Table 31). A large majority of this group also include education as a primary goal, dedicating an average of about a quarter of their resources and activities to this purpose. Many in this group are involved in outreach, which also comprises about a quarter of activities on average. Only about a tenth of the IESICs in this group include campus sustainability as a goal which constitutes less than 10% of their activities on average.

About 10% of the IESICs in this group have other primary goals. The Center for International Earth Science Information Network (CIESIN), part of The Earth Institute at Columbia University, focuses on and policy and decision support activities and data and cyber-infrastructure development, integration, and dissemination. The Oklahoma Water Resources Center at Oklahoma State University devotes half of its resources and activities to supporting cooperative extension services. The Center for Conservation Biology at the University of Washington at Seattle allocates a fifth of its resource and activities to supporting forensic science investigations with law enforcement agencies and the National Aquatic Monitoring Center at Utah State University spends a third of its resources and activities running a macro-invertebrate sample processing laboratory for state and federal agencies.

Table 31. Natural systems IESICs' primary goals

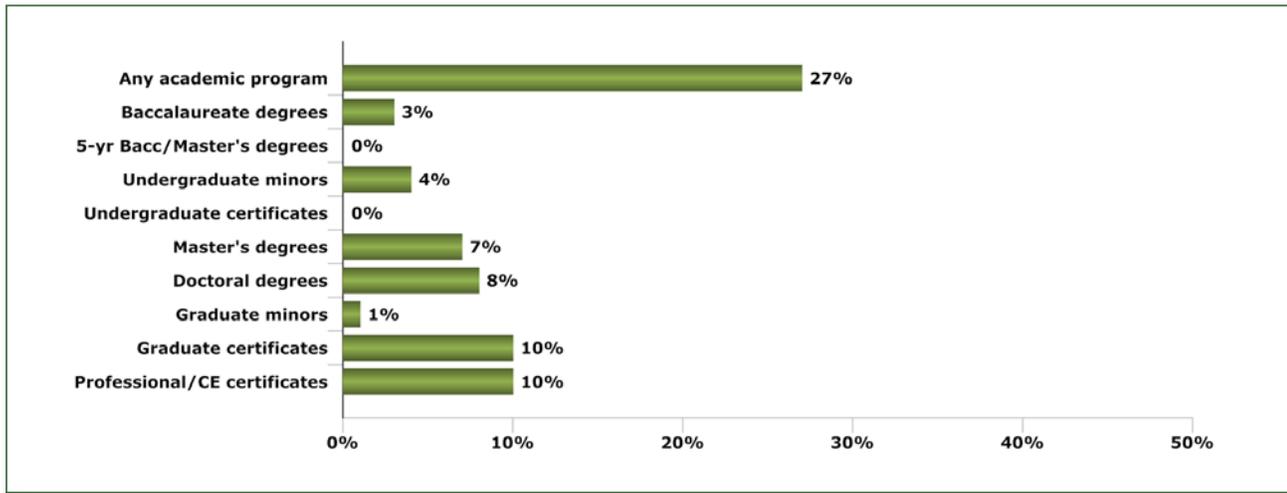
	Research	Education	Outreach/ continuing education	Campus sustainability	Other*
Is a primary goal	97%	89%	82%	12%	8%
Mean proportion of resources/activities	58%	23%	25%	8%	28%
Mode – most common proportion	50%	10%	10%	5%	NA

*Applied research; provision of services; partnership coordination

This group is less likely to administer academic programs. Education is a primary goal for the majority of the IESICs in this group, but only about a quarter administer any type of academic program (Figure 13). Most of the programs administered by this group are graduate programs, but less than 10% of IESICs in this category offer these programs, and this category has the lowest proportion of all seven categories in administering master's degrees.

Only two administer baccalaureate degrees: the Environment and Natural Resources Institute at Pennsylvania State University and the Water Resources Agency at the University of Delaware which also administers a master's degree. Only five offer master's degrees including the Kansas Cooperative Fish and Wildlife Research Unit at Kansas State University, the Baruch Institute of Coastal Ecology and Forest Science at Clemson University, the Center for Ecohydraulics Research at Idaho State University, and the Center for Marine Biodiversity and Conservation at the University of California at San Diego, all of which also offer doctoral degrees. The Center for Conservation Biology at the University of Washington at Seattle and the Institute for Coastal Science and Policy at Eastern Carolina University also administer doctoral degrees.

Figure 13. Natural systems IESICs' academic programs



More natural systems IESICs partner with other higher education institutions and governmental, public and private sector organizations. The natural systems category has the highest proportion of IESICs that typically work with other universities, and has proportions higher than the average for all IESICs that participate with other external partners. Project partners for this group most often include environmental science(s) and studies, natural resources and agriculture, life sciences, and physical sciences (Table 32). This group is the least likely to include the humanities and the most likely to include natural resources compared with the other six categories.

Table 32. Natural systems IESICs' partners

Partner fields of study and organizations	Proportion of NS IESICs	Average proportion for all IESICs
Environmental science(s) and studies	90%	83%
Engineering and applied sciences	60%	68%
Natural resources and agriculture	85%	64%
Social sciences	55%	58%
Physical sciences	58%	55%
Life sciences	62%	52%
Professional fields	25%	39%
Humanities	8%	20%
Governmental organizations	66%	61%
Public and private sector organizations	62%	60%
Other higher education institutions	56%	49%

Resources

A third of the IESICs in this group support full-time directors. This group of IESICs has lower than average proportions of IESICs that support FTEs for directors, associate or assistant directors, and other administrators (Table 33). The majority support FTEs for directors, but most are part-time.

Table 33. Natural systems IESICs' leadership positions

	Director	Associate or assistant director	Other administrators
Support position	77%	33%	45%
Full-time FTE	34%	18%	27%

About three-quarters of the IESICs in this category support full-time staff positions. The proportion supporting full-time positions and the average number of positions are higher than the averages for all IESICs; the proportion supporting part-time positions and the number of part-time positions are equivalent to the overall averages (Table 34).

Table 34. Natural systems IESICs' staff positions

	Full-time staff	Part-time staff
Support faculty positions	74%	60%
Mean number of positions	10	5
Mode – most common number of positions	5	1

Natural systems IESICs are most likely to support core faculty positions. This group has the highest proportion that supports core faculty positions and the average number of positions is slightly above average (Table 35). The proportions that have affiliated faculty are roughly equal to the averages for all IESICs. The average number of joint faculty positions is higher than average, and the number of affiliated faculty is slightly higher than average.

Table 35. Natural systems IESICs' faculty positions

	Core faculty	Joint faculty	Affiliated faculty
Support faculty positions	44%	23%	55%
Mean number of positions	5	8	21
Mode – most common number of positions	1	1	5

IESICs in this category receive most of their funding from grants and contracts. Like other IESICs, natural systems IESICs rely mostly on institutional appropriations and short-term grants and contracts (Table 36). About a third of these IESICs also receive part of their funding from endowments and donor gifts. Other sources include fees for services and products and federal and state funding other than grants and contracts.

Examples include the Arkansas Water Resources Program at Arkansas State University which receives half of its budget from the United States Geological Survey, the Center for Sustainable Forestry at Pack Forest at Washington State University at Seattle receives funding from timber sales and cell phone tower leases, and the Virginia Natural Resources Leadership Institute at the University of Virginia receives funds from program fees.

Table 36. Natural systems IESICs' budget sources

	Institutional appropriations	Endowments and other long-term funding	Short-term grants and contracts	Donor gifts	Other*
Is a source	70%	27%	80%	30%	12%
Mean proportion from source	34%	28%	65%	13%	40%
Mode – most common proportion from source	10%	5%	90%	5%	NA

*Fees for goods and services; federal and state funding other than short-term grants and contracts



Oklahoma Water Resources Center

Oklahoma State University
Stillwater, Oklahoma • water.okstate.edu

Helping secure Oklahoma's water future through research and transferring science-based information, the Oklahoma Water Resources Center acts as the center of water-related research and extension activities in Oklahoma. As one of 54 institutes in the US and a member of the National Institutes for Water Resources, the Center provides funding for research on Oklahoma's water resources and their management, education for water specialists and professionals, and outreach and information transfer to the Oklahoma water resource community. Over the past 10 years, the Center has funded over 30 research projects and trained approximately 150 students.

- The Water Center is administered by the Division of Agricultural Sciences and Natural Resources. The Division also operates 18 outlying research stations featuring diverse climates and land uses that provide field laboratories for water research and demonstrations. A statewide Cooperative Extension staff supports the Center's mission of delivering research-based information to the state's citizens.
- The Center includes over 80 faculty members from all nine academic departments in the Division, select Area Extension Specialists and County Educators, District Extension Directors, and appropriate department and unit leaders.
- The Water Center is guided by the Water Research Advisory Board, which consists of 22 state regulators, policymakers, and other water resource professionals and meets bi-annually to assist the Center in developing research priorities.
- The Center is located in its own distinct suite, containing a reception area, offices for administrators, and an informal meeting space.



The Center also coordinates with the Division's departments and other university programs to support water research and Extension programs. Affiliated graduate programs are available in the departments of Agricultural Economics, Biosystems and Agricultural Engineering, Entomology and Plant Pathology, Natural Resource Ecology and Management, Plant and Soil Sciences, and the Environmental Science Graduate Program.

The annual Water Research Symposium brings together students studying water issues in the region with researchers and professionals in a mutually beneficial exchange. The Center has held its Sympo-

sium since 2003 and partnered with the Oklahoma Water Resources Board's Oklahoma Governor's Water Conference since 2007, allowing participants to interact with a more diverse audience.

The Center conducts research and related services through the Oklahoma Agricultural Experiment Station and the Oklahoma Cooperative Extension Service. Annually, the Center supports research projects throughout the state related to water quality, water conservation, weather and climate, aquatic and terrestrial ecosystems, water issues in industry, and economics and policy. Projects involve faculty, staff, and students and reach wide audiences due to their outreach and extension components. These services are provided in the form of factsheets, media presentations, workshops, and one-on-one consulting.



The Center's online resources include quarterly newsletters, a monthly publication of topical articles, and a YouTube channel (youtube.com/OkstateWaterCenter), featuring advice videos such as "Restocking Cattle after a Drought." The Center hosts presentations by water professionals as part of the Thomas E. Berry Professorship Seminar Series.

The Center's range of community education, Extension, and outreach activities are intended to empower Oklahomans to make better land and water resource decisions. Learn more about the work the Oklahoma Water Resources Center does at water.okstate.edu.



Coastal Studies Institute and Coastal Sustainability Studio

Louisiana State University
Baton Rouge, Louisiana • www.csi.lsu.edu and www.css.lsu.edu

The purpose of the Coastal Studies Institute (CSI) is, “to facilitate the development and integration of knowledge in coastal science and engineering for sustainable deltaic coastlines; to inform policies promoting environmental and economic sustainability of the Mississippi River Delta, and of deltaic coasts around the world; and to enhance LSU research and education efforts in coastal regions and shelf seas around the world.” The mission of the Coastal Sustainability Studio (CSS) is, “to support resilient and adaptive communities in the dynamic Gulf of Mexico environment.” We work across disciplines connecting scientists, engineers, and designers to envision and design sustainable systems that reduce vulnerability to increased storm strength, coastal hazards, habitat degradation, and global environmental change.

Both CSI and CSS are interdisciplinary organizations that engage faculty, staff and students throughout the university. CSI and CSS are complementary partner organizations, yet differ in their primary disciplines –CSI researches natural ecosystems such as coastal geology and sedimentary environments, CSS focuses on the design of adaptive habitable structures and resilient coastal communities. Both CSI and CSS serve the needs of government agencies, industry, and community interests. CSI develops “scientific knowledge, engineering principles and planning



tools,” while CSS works to advance the community resilience and principles of adaptation through projects that, “aim to reduce economic losses and protect assets, use the natural and built environment to promote sustainable coastal communities, provide suitable habitats to support an array of commercial and recreational activities, and sustain state’s unique coastal heritage.”

Founded in 1952, CSI was established with funding from the Geography Programs of the Office of Naval Research to perform in-

terdisciplinary and field-oriented research for the US Navy. CSI continues to conduct coastal research for federal and state agencies and industrial partners. CSS was founded in 2009 to address contemporary problems facing the Louisiana coast. Its innovative and trans-disciplinary solutions to these issues are meant to, “serve as a national and worldwide model for addressing coastal sustainability.” In 2012, the LSU Office of Research and Economic Development supported CSI’s expansion and restructuring into a central organization and point of contact to facilitate collaborative coastal science and engineering and to promote all coastal activities at the university, therefore increasing cooperation between CSI and CSS.

- CSI and CSS are both supported by large teams of faculty, research staff, support staff, field support staff, and graduate students, all led by a part-time directors who report to the deans of LSU’s partner academic units. These include the School of the Coast and Environment, the School of Renewable Natural Resources, the College of Science, the College of Humanities and Social Sciences, and the College of Engineering, while CSS reports to the College of Art + Design. CSI’s director sits on CSS’s advisory board and vice versa, as do other leaders from LSU, industry, design firms, nonprofits, and other organizations.
- CSI occupies a distinct suite on the LSU campus and maintains coastal research facilities to collect and stream information. These are the Earth Scan Laboratory, which is also used for education and emergency response, and the CSI Field Support Building, which houses laboratories, fabrication and machine shops, and equipment storage areas. CSS is housed in a large open space in the Design Building where faculty, staff, and students work on a variety of projects ranging from design research to community engagement to developing new courses of trans-disciplinary study using “design thinking” as a base.
- CSI receives research funding through a range of competitive grants and contracts, making up most of its budget. A smaller fixed amount of funding comes from non-directed institutional appropriations. CSS operations and projects are fully supported by a mix of internal and external grants and contracts through industry, government agencies, and foundations.

Activities at CSI and CSS are innovative with real-world impact, representing “LSU’s commitment to the Coast.” They are also intended to “leave behind a workable, replicable framework” to be applied to delta regions worldwide.

CSI’s areas of research are marine geology and geophysics; coastal morphology; hydrodynamics; marine meteorology; physical oceanography and numerical modeling; and oceanographic and atmospheric remote sensing. CSI performs ongoing field work and operations to model, monitor and analyze the coast. The Wave-Current Information System provides real-time meteorological conditions, and the Earth Scan Laboratory streams satellite image data. These enable CSI to generate “real-time atmospheric products consisting of different regions of interest to Louisiana,” such as tracking oil during the Deepwater Horizon spill.



CSS conducts experimental design research projects, awards 2 to 4 project grants to LSU faculty annually, and oversees larger externally funded projects such as the Louisiana Resiliency Assistance Program (LRAP), created by CSS and the Disaster Recovery Unit of the Office of Community Development with funding from the U.S. Department of Housing and Urban Development (HUD). LRAP, “is being developed to collect, develop, house and disseminate current planning efforts, resources and local best practices to promote, assist and build networks around resiliency planning in Louisiana.” In its pilot phase it assists 30 Louisiana communities with their design, planning, and sustainability issues, and there are plans to expand the program to municipalities across the state.

Although a fairly new organization, CSS work has been recognized nationally and internationally including selection by the Environmental Design Research Association (EDRA) to administer the 2014 EDRA National Conference in New Orleans; 2013 Gulf of Mexico Community Climate of Practice – 2013 Spirit of Community Award for Associate Director Dr. Lynne Carter; selection by the National Endowment for the Arts and American Architectural Foundation to present the Winter 2013 Southern Regional Mayors’ Institute on City Design; Association of Collegiate Schools of Architecture (ACSA) 2012-13 Collaborative Practice Award; National Park Service 2012 Peterson Prize for the CSS-funded project “Fort Proctor;” EDRA 2011 Place Research Award for the CSS internal project “Measured Change: Tracking Transformations Along Bayou Lafourche;” and selection by the U.S. Department of State to represent the U.S. at the 2010 Venice Biennale, the world’s premier architecture exhibition, through the collaborative project “In the Mississippi Delta: Constructing with Water” with a team from Princeton University and Guy Nordenson and Associates.



Global Institute of Sustainable Forestry

Yale University

New Haven, Connecticut • environment.yale.edu/gisf

Established in 2000 by the Dean and a group of faculty at the Yale School of Forestry and Environmental Studies (FES), the Global Institute of Sustainable Forestry’s mission is to integrate, strengthen, and focus the School’s forestry research, education, and outreach to address the needs of the 21st century and a globalized environment. The Institute continues the tradition of leadership with FES faculty-led programs and research projects domestically and worldwide. Other Yale centers and external institutions are highly involved in the Institute’s activities.

The Institute publishes three academic report series, operates ten distinct research and education programs, and supports forestry management training and restoration projects in more than a dozen countries around the world. It is also at the forefront of testing new tools and methods of research, such as modeling and remote sensing. A unique advantage of the Institute is FES’s 10,880 acres of forestland in Connecticut, New Hampshire and Vermont that serve as laboratories for faculty and students, teaching areas for professional and community organizations, and working forests that produce timber and non-timber forest products.

- The Institute’s full-time Director reports to the Institute’s Faculty Director and to the FES Dean and relies on an External Advisory Board of international forestry conservation leaders, connecting the Institute’s work to “more practical aspects” of forestry protection, management, and restoration.
- An additional 15 associated personnel include program directors and managers, research coordinators and scientists, and participating faculty members.
- The Institute is housed in historic Marsh Hall, the first facility of FES. The building provides offices for administrators and workspaces for students. FES’s forests remain the Institute’s primary facility for research, education, and outreach.
- Like many large institutes with global research, the Institute’s budget consists mostly of short-term directed funds (70 percent) with relatively minimal institutional appropriations (20 percent). The remaining 10 percent of the budget comes from donor gifts.



Field trip in Kenya led by Wangari Maathai.

and interesting speakers on the topic about forestry, from the molecular to the global, from the industrial end to the government to leaders in environmental movements. The Institute's student involvement is focused in student assistantships and internships and in the Yale student chapters of the Society of American Foresters and the International Society of Tropical Foresters. The Institute also offers mid-career courses for working professionals of different levels – for those with no forestry background, those with some forestry background, and a Forest Stand Dynamics course for forestry practitioners.

The Institute's extensive international work is varied according to the project and to each location's specific economic and environmental conditions. The Mexico, Central America and South America programs largely feature ecosystem restoration, payments for environmental services, and agroforestry in rural communities. The Institute works with the National University of Life and Environmental Science in Kiev, Ukraine to mitigate the wildfire potential of the irradiated forests around Chernobyl. A program in Africa offers capacity building for local institutions. The South Pacific and Asia programs are also institution-focused. They include the Indian Forest Service Mid-Career Training Program, as part of a partnership between the Institute, The Energy and Resources Institute in India, and the Indira Gandhi National Forest Academy, acting under the auspices of the Indian Ministry of Environment and Forests, as well as cooperation with Beijing Normal University on Amur tiger habitat development and advising on the forest inventory of the forests of Bhutan. Partnerships with academic institutions in Europe and Eurasia enable student exchanges and innovative research projects, such as testing LiDAR for assessment of change in forest biomass over time in Norway.



Students preparing for a prescribed burn in one of Yale's managed forests.



Institute for the Study of Earth, Oceans, and Space

University of New Hampshire
Durham, New Hampshire • www.eos.unh.edu

The Institute for the Study of Earth, Oceans, and Space (EOS) provides opportunities for collaborative and interdisciplinary high-level research projects at the University of New Hampshire (UNH). EOS is uniquely structured to unify and facilitate cooperation between three research centers and an academic school. As UNH's clearinghouse for the majority of Earth systems, space physics, and geoscience research, EOS supports projects of all scales from local to international scopes.

Involving more than 275 affiliated students, faculty and staff, the Institute's three research centers are the Earth Systems Research Center, the Ocean Process Analysis Laboratory, and Space Science Center. Each of these centers supports both research and graduate education that cross traditional academic boundaries, a characteristic that is reflected in their affiliations with academic departments and degree programs. Newly established within EOS, the School of Marine Science and Ocean Engineering is UNH's first interdisciplinary school offering graduate courses, certificates and degrees collaboratively with partner colleges and draws upon faculty expertise from many colleges within the university.

- EOS is a primary level administrative unit, itself housing three research centers and a school. The director reports to UNH's chief academic officer.
- EOS's leadership consists of a full-time director and part-time associate director, who are supported by a large staff. EOS has approximately 23 tenure-track and 33 research faculty members. They contribute expertise from the fields of space science, solar terrestrial theory, engineering, atmospheric chemistry, ocean dynamics and chemistry, biogeochemistry, climate change, paleoclimatology, forest and wetland ecology, hydrology, marine science, and remote sensing of terrestrial and ocean ecosystems.
- EOS operates out of Morse Hall, which includes a reception area; offices for administrators, faculty and staff; student workspaces; informal meeting spaces; conference rooms; and technical and computer laboratories, including clean rooms and vacuum chambers for building and testing flight hardware for satellite missions. Other facilities include the Business Service Center from which business operations are conducted, as well as offsite research facilities. The observatories are used for a range of research and educational opportunities in marine, terrestrial, atmospheric and biological sciences, as well as green technology. These observatories contain a combined 300 acres of fields, forests, streams, wetlands and marine areas.

- UNH's largest research enterprise, EOS is funded primarily by institutional appropriations from federal, state, and other awards (95%), with the remainder provided for by long-term directed funds. EOS's funding includes over \$41 million a year in research support from NASA, NOAA, NSF and other federal agencies.

EOS research covers processes on the Sun, solar influences on Earth and its magnetosphere, the



Forest Watch educational research program

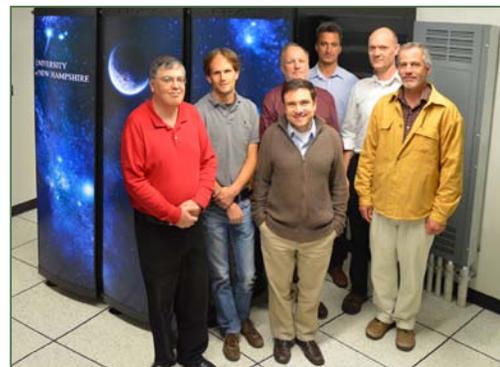
chemistry and dynamics of the atmosphere, changing climate, and large-scale ecosystems in terrestrial and marine environments. All projects emphasize impacts on and by human activities. EOS's significant funding and resources allow for investigation of important yet inaccessible places through the use of satellites, aircraft and ships.

Current collaborations with NASA involve designing, building and operating major instruments on NASA satellites to study solar-

terrestrial physics and phenomena at the edge of the solar system. EOS researchers are participating in a multi-institutional scientific team analyzing data from NASA's Earth Observing System. EOS also represents UNH as one of nine New Hampshire affiliate institutions in the New Hampshire Space Grant Consortium, funded by NASA, which "brings together NH's educational and scientific communities to foster public interest in science education, scholarship and research."

Internal activities at EOS include an online quarterly newsletter and several seminar series and colloquia, serving to inform the UNH community on developments in EOS's various focus areas and disciplines. EOS also supports graduate students in several capacities, including a graduate certificate program in geospatial science. Numerous academic programs and courses are supported by EOS faculty from each research area. Graduate students conduct their research under the auspices of EOS but earn degrees in the traditional academic programs of Physics, Earth Sciences, Natural Resources, Oceanography or Zoology.

EOS's efforts in community outreach and education include its collaboration with the UNH Forest Watch program. Established over 20 years ago, Forest Watch is a K-12, inquiry-based science program that trains students from 28 local schools to conduct research on forest health and present their results through forums organized by EOS.



Cray supercomputer

A notable recent achievement is EOS's acquisition of a Cray supercomputer, roughly 1000 times more powerful than a typical desktop computer and the only of its kind in New Hampshire, which will enable cutting-edge research in modern physics. The Cray was funded by a \$534,977 Major Research Instrumentation award from the National Science Foundation.

Colorado Plateau Biodiversity Center

Northern Arizona University
Flagstaff, Arizona • <http://www.mpcer.nau.edu/cpbc>

The Colorado Plateau Biodiversity Center (CPBC) promotes biodiversity research, education and public outreach. The CPBC provides an overarching framework to increase communication and collaboration among various life sciences collections, comprising more than a half million specimens at NAU. These individual collections benefit from center-wide projects to improve resources, data storage and website development. The CPBC's specific objectives are listed as to "collect and document species of the Colorado Plateau and comparative species from other regions; interpret the natural world through education, research, and public programs; promote understanding of the evolution and diversity of the Colorado Plateau; and inspire a respect for biodiversity and the environment in all people."

Northern Arizona University (NAU) and the Arizona Board of Regents, with the support of the Merriam-Powell Center for Environmental Research, established the CPBC in 2008 "to focus on biodiversity teaching and research" and maintain the university's growing life sciences collections. These collections were started in the 1920s as a result of teaching and research activities within and donations to the School of Forestry and the Departments of Biological Sciences, Geology and Environmental Sciences. The CPBC represents NAU's "commitment to sustaining these collections for research and teaching [and its] deep connection to the Colorado Plateau."

- Officially, the CPBC is within the College of Engineering, Forestry, and Natural Sciences, and the CPBC's director reports to the College's dean. The CPBC operates mostly autonomously, however, under the leadership of the part-time director and 16 faculty curators overseeing the CPBC's 7 divisions: Quaternary Paleoecology; Botany; Marine Invertebrates and Molluscs; Arthropods; Vertebrates; Fungi; and Environmental Genomics and Genetics.
- The CPBC's operations are supported by a large team of 3 full-time and over 50 part-time staff, as well as over 30 joint and affiliated faculty members.
- The CPBC's offices for administrators, faculty and staff; student workspaces; informal meeting places; computer labs; and other basic facilities are shared with other services of the Merriam-Powell Center for Environmental Research. Its main facilities are the museums and laboratories that house the CPBC's collections, including the Quaternary Science Program Lab of Paleoecology, the Deaber Herbarium, the Museum of Marine Invertebrates and Molluscs, the Colorado Plateau Museum of Arthropod Biodiversity, and the Environmental Genomics and Genetics Laboratory.

- The CPBC's Digital Imaging Facility serves the entire university community and features the BK Plus Lab System. Nearby universities also utilize this state-of-the-art imaging system, facilitating regional collaboration. CPBC staff members teach an undergraduate course in digital imaging techniques, after which students may use the Imaging Facility unsupervised.
- Short-term directed funds such as grants and contracts account for 90 percent of the CPBC's budget. Non-directed funds make up the remaining 10 percent.

Research and education are equal priorities for the CPBC. Its collections are important resources for researchers and students. “The CPBC’s whole specimens, genetic material, digital archives, and related data support bioinformatics and biodiversity research at regional, national and international levels... [and] also are used as teaching tools in almost 30 NAU courses, to advance undergraduate and graduate student research, and to create curatorial opportunities for students.”



Students working in the CPBC's facilities produce deliverables that both demonstrate their skills development and benefit their academic community. After the Digital Imaging Techniques course, students create video guides “related to the creation of high-end digital images of specimens for scientific research,” covering 8 topics from software proficiency to specimen preparation.



The Imaging Facility enables digital imaging projects to help catalogue regional specimens for research, education and public outreach. The creation of online image libraries help park visitors identify wildlife, as well as facilitate sharing among taxonomic specialists “to obtain species-level identifications where this information is missing or uncertain.” Currently, the Colorado Plateau Museum of Arthropod Biodiversity is collaborating with the Navajo Nation’s Diné College and Harvard University to conduct the Navajo Ant Project, using GIS technology and field collection techniques “to study the role of native ants in the ecology and conservation of biodiversity.”

The CPBC’s goals for the future are motivated by “the need to make the specimens and information housed in its collections more accessible to biologists, policy makers, and the general public... [and] increase its ability to address scientific questions across a variety of disciplines.” Its current projects work to inform conservation by integrating information and creating searchable online databases about species distribution and biological changes in the face of climate change, invasive species, and other threats to biodiversity.



Institute for Natural Resources

Oregon State University
Corvallis, Oregon • oregonstate.edu/inr

A collaboration among the institutions of the Oregon University System, the Institute for Natural Resources (INR) seeks “to provide access to integrated knowledge and information to inform natural resource decision making and develop solutions in the context of sustainability.” Specifically, INR’s activities build “synergy and connections between research and practice,” resulting in better informed and interdisciplinary natural resource management solutions.

Through the 2001 Oregon Sustainability Act, the Oregon Legislature created INR as “a cooperative enterprise bringing the scientific knowledge and expertise of the Oregon University System and other higher education institutions to bear on natural resource decision making.” Designated to lead the administration of INR, Oregon State University (OSU) established INR as a research institute within OSU’s Corvallis campus. Since 2001, INR has facilitated collaborative efforts to “address Oregon natural resource issues in the local, regional, national and international context.”

- INR is a primary level administrative unit on the OSU campus. Its partners represent the Oregon University System, with interdisciplinary and environmental institutes at Portland State University (PSU) and the University of Oregon (UO); all levels of government, including the Governor’s Natural Resource Cabinet agencies; and independent organizations such as the Oregon Business Council, Defenders of Wildlife, and The Nature Conservancy.

- INR is led by a full-time director, who reports to the OSU Vice President of Research, supported by a staff of about 20, based in the INR administrative office, in both the Corvallis and Portland campuses, and in the field. The INR’s advisory board members represent the Oregon University System and the public and private sectors and include administrators from OSU, PSU, and UO.

- INR operates out of a distinct campus suite, with a reception area, offices for administrators, student workspaces, and conference rooms. Outside of this administrative space, INR’s activities mostly take place in the field and at partner organizations.



PHOTO: MILES HEMSTROM (INR)

- A large majority (80 percent) of INR’s work – “including the development and continual refinement of our services and products – is funded by grants and contracts.” Non-directed funds provide for the remaining 20 percent of the budget.

Research is INR’s focus, though some of its activities are outreach-oriented. INR describes its primary services to be “information and data development, management and access; research-practice (science-policy) integration; research coordination and project management; and experiential learning and leadership development.” Its specific activities are guided by Oregon’s evolving and emerging natural resource-related areas of interest, but these are founded in its core programs: the Science-Policy Research Program, the Oregon Biodiversity Information Center, the Oregon Explorer digital library, the Landscape Assessment and Mapping Program, the Oregon Natural Areas Program, and the Cooperative Ecosystem Studies Unit.

INR integrates and provides web access to data from government offices and agencies, university researchers, and individual citizens in the Oregon Explorer digital library, the INR Publications Database, and the OSU Library’s Scholar Archive. INR publishes many other resources to support informed decisions and actions regarding Oregon’s natural resources and environment. INR’s evidence-based and impartial science reviews “determine whether scientific information or analysis that informs a particular natural resource management decision has suitable scientific applicability, content and rigor” and include a description of the uncertainties surrounding the decision. The Policy Research Program similarly offers independent analyses of environmental and natural resource issues to public sector clients such as the Governor’s office and board and commission members. INR functions “as the crucial bridge between academic researchers, whose work is important to developing solutions to Oregon’s policy issues, and policymakers, who depend on timely access to and synthesis of information.”

In its spring 2013 e-newsletter, available online, INR announced its recently completed 2013-2017 strategic plan, formed after individual meetings “with Oregon’s state and federal natural resource agency directors to discuss how university research can be more useful and impactful to management and policy.” Its updated strategic goals involve improved capacity building, knowledge and information access, and product relevance and delivery. The newsletter also highlighted INR’s achievements over the past 5 years in terms of its previous strategic plan. These included “publishing Oregon’s first Natural Areas Plan in conjunction with the State Land Board and the Natural Heritage Advisory Council,” creating the Ecosystem Commons online platform, and “facilitating the establishment of the Oregon Coastal and Marine Data Network.” INR’s activities involved 60 student interns and assistants, 48 citizen volunteers, as well as 6 AmeriCorps volunteers.

Over the next two to five years, INR’s activities will focus on the following areas: conservation and biodiversity, integrated landscape assessments, natural hazards, and (in partnership with its sister institute, the OSU Institute for Water and Watersheds) water.



Human Wellbeing IESICs (37 in survey sample)

Human wellbeing IESICs focus on human health and security. There are five subgroups in this category: human health, risk assessment and management; disasters and security; population studies; agriculture and food security; and education and outreach.

Profiles for IESICs in this group include:

- *Human health, risk assessment and management*: Interdisciplinary Waste Management Institute at North Carolina A&T University
- *Disasters and security*: Center for Disaster and Risk Analysis at Colorado State University
- *Agriculture and food*: Kansas Center for Agricultural Resources and the Environment at Kansas State University
- *Education and outreach*: Wallerstein Collaborative for Urban Environmental Education at New York University

Operational Structure

Most IESICs in this group are centers. Centers make up 81% of this group, 14% are institutes, and 5% have other names, including the Wallerstein Collaborative for Urban Environmental Education at New York University, and the Yale Sustainable Food Project at Yale University.

Most of the IESICs in this group are administratively housed at the college level. Over half of the IESICs in this group are administratively located within a college with most directors reporting to the dean (Table 37). About a fifth are located within departments with directors who report most often to the department chair or head. The remaining few are located at the primary university level, are a statewide center housed at the university, are part of the university business operations, or are independent organizations partnering with the host university. Examples include the Center for Disaster and Risk Analysis at Colorado State University which is located at the university level reporting to the provost, and the Nautilus Institute for Security and Sustainability at the University of San Francisco which is an independent not-for-profit organization affiliated with the university and other higher education institutions in Australia and South Korea.

Table 37. Human wellbeing IESICs’ administrative location and reporting structure

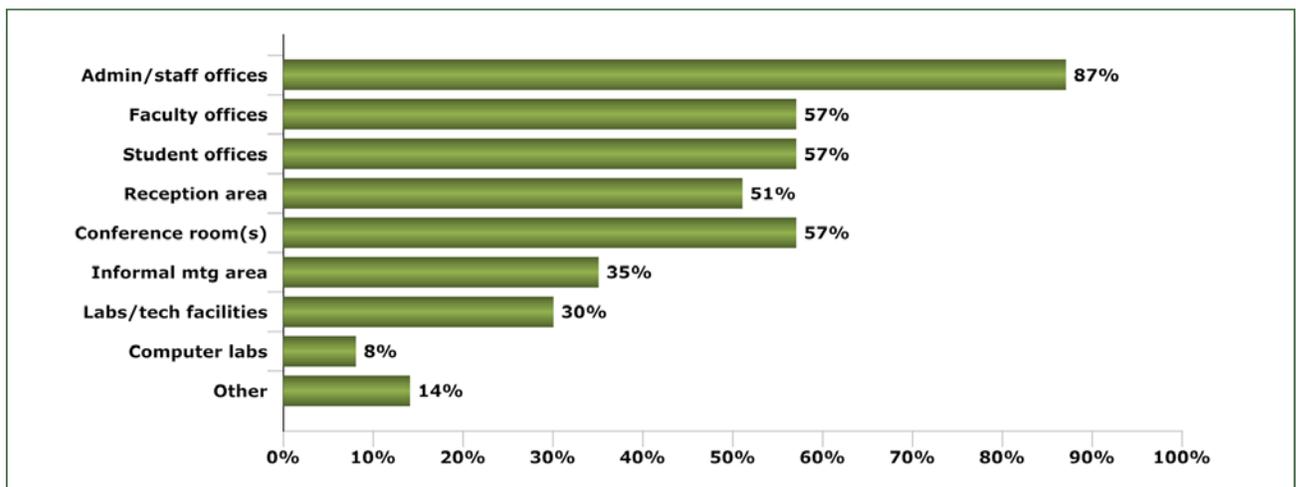
	Primary level n=4	College level n=22	Department level n=7	Other* n=4
President/chancellor	-	-	-	-
Chief academic officer/provost	50%	9%	-	-
Chief research officer/VP for research	50%	5%	14%	25%
College/school/division dean	-	68%	-	25%
Multiple college/school/division deans	-	-	-	-
Department chair/head	-	9%	86%	-
Multiple department chairs/heads	-	5%	-	-
Steering/advisory committee	-	-	-	-
Other**	-	4%	-	50%

*Other location: statewide center established by the Florida legislature; partnership with Marianist Province church; independent not-for-profit organization formally affiliated with university; business operations

**Other reporting: director of continuing education and academic outreach; board of directors; advisory board

Two-thirds of the IESICs in this category are housed in their own building or suite. A small proportion have a dedicated building (11%) and over half (62%) are housed within their own suite of offices. Shaver’s Creek Environmental Center at the University of Pennsylvania manages several buildings and 700 acres of park land. The remaining IESICs either have space within another suite of offices (16%) or do not have a designated physical space (11%). This group is the most likely to have a dedicated space, with the smallest proportion without their own office. Over half of the human wellbeing IESICs have offices for administrators and staff, faculty and students, and conference room(s); fewer have reception and informal meeting areas (Figure 14). About a third have technical laboratories; only a few have computer laboratories. Other facilities include managed lands and demonstration sites, as well as equipment storage buildings and classrooms. Examples include the Marianist Environmental Education Center at the University of Dayton; which manages 100 acres of land that includes labyrinth, earthworks, a nursery, and demonstration areas; and the Center for Agroecology and Sustainable Food Systems at the University of California at Santa Cruz; which includes research, teaching and production fields.

Figure 14. Human wellbeing IESICs’ physical spaces



Activities

IESICs in this category focus on research, education and outreach. This group has the largest proportion of IESICs engaged in outreach, which comprises about a quarter of their activities on average (Table 38). Like other IESICs, research is the main focus for this group, making up about half of their activities on average. A large majority of this group also include higher education as a primary goal, dedicating an average of about a third of their resources and activities to this purpose. About a third include campus sustainability as a goal which constitutes about less than 10% of their activities on average.

A number of the IESICs in this group also reported other primary goals including assisting with sustainability initiatives at K-12 schools, policy development and advocacy, supporting diplomatic missions, restoring land to its natural state, and facilitating the development of trans-national networks.

Table 38. Human wellbeing IESICs’ primary goals

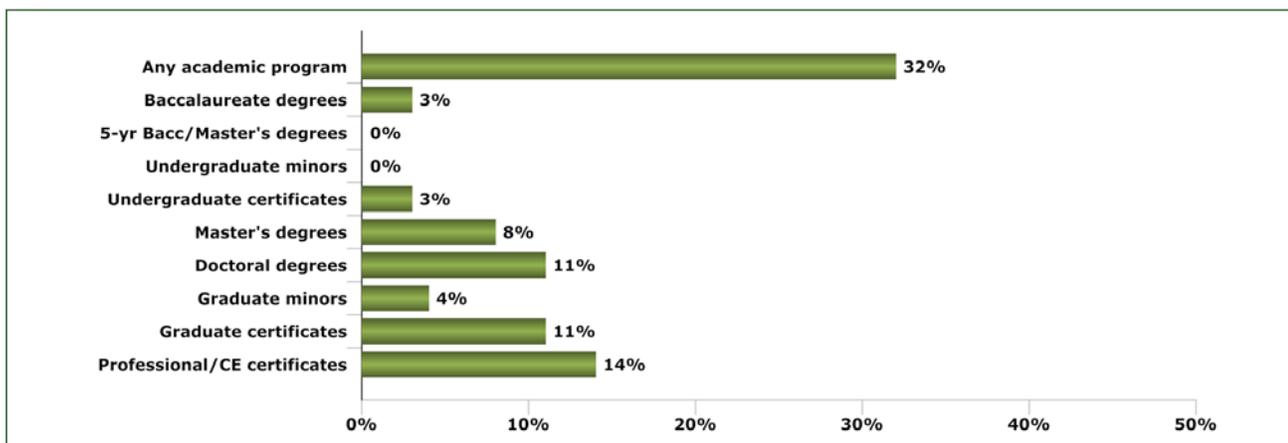
	Research	Education	Outreach/continuing education	Campus sustainability	Other*
Is a primary goal	97%	84%	92%	27%	16%
Mean proportion of resources/activities	48%	30%	24%	9%	23%
Mode – most common proportion	70%	10%	10%	10%	NA

*K-12 schools sustainability; policy development and advocacy; supporting diplomatic missions; land restoration; trans-national network development

A third of these IESICs administer academic programs, mostly graduate and continuing education programs. Education is a primary goal for the majority of the IESICs in this group, and about a third administer one or more academic programs; almost all graduate and continuing education programs (Figure 15).

Only one administers a baccalaureate degree—the Agricultural Sustainability Institute at the University of California at Davis. Three offer master’s degrees and doctoral degrees: the Center for Global Environmental and Occupational Health at the University of Illinois at Chicago, the Center for Environmental Health Sciences at the University of Montana, and the Maryland Institute for Applied Environmental Health at the University of Maryland at College Park. The Center for Environmental and Human Toxicology at the University of Florida also offers a doctoral degree.

Figure 15. Human wellbeing IESICs’ academic programs



Human wellbeing IESICs projects most often include environmental science(s) and studies and life sciences. The human wellbeing category has below average proportions of IESICs that partner with all the disciplines and professional field except for environmental science(s) and studies and life sciences (Table 39). They have average proportions that work with external partners—other universities, government and public and private sector organizations.

Table 39. Human wellbeing IESICs' partners

Partner fields of study and organizations	Proportion of HW IESICs	Average proportion for all IESICs
Environmental science(s) and studies	87%	83%
Engineering and applied sciences	51%	68%
Natural resources and agriculture	54%	64%
Social sciences	49%	58%
Physical sciences	32%	55%
Life sciences	78%	52%
Professional fields	30%	39%
Humanities	16%	20%
Governmental organizations	62%	61%
Public and private sector organizations	62%	60%
Other higher education institutions	49%	49%

Resources

A third of human wellbeing IESICs supports full-time directors. This group of IESICs has slightly higher than average proportions of IECISs that support FTEs for directors, but lower than average proportions that support associate or assistant directors and other administrators (Table 40). The majority support FTEs for directors, but only a third are full-time FTEs.

Table 40. Human wellbeing IESICs' leadership positions

	Director	Associate or assistant director	Other administrators
Support position	87%	33%	46%
Full-time FTE	30%	19%	24%

Two-thirds of human wellbeing IESICs support full-time staff positions. The proportion supporting full-time positions and the average number of positions are lower than the averages for all IESICs; the proportion supporting part-time positions is higher than the average for all IESICs, but the mean number is lower (Table 41).

Table 41. Human wellbeing IESICs' staff positions

	Full-time staff	Part-time staff
Support faculty positions	68%	81%
Mean number of positions	7	4
Mode – most common number of positions	3	2

Human wellbeing IESICs are least likely to support core faculty positions. This group has the lowest proportion that support core faculty positions, although the mean average number of core faculty positions is higher than average (Table 42). The proportions with affiliated of faculty are slightly over average, but the mean number of affiliated faculty is the second lowest compared to the other categories. Only the societal systems group has lower mean numbers of affiliated faculty. The average number of joint faculty positions is lower than average, although the proportion that support joint faculty positions is slightly above average.

Table 42. Human wellbeing IESICs' faculty positions

	Core faculty	Joint faculty	Affiliated faculty
Support faculty positions	24%	41%	68%
Mean number of positions	6	3	16
Mode – most common number of positions	1	1	3*

*Multiple modes – smallest value shown

IESICs in this category rely on several budget sources. Like other IESICs, most human wellbeing IESICs rely on short-term grants and contracts for the majority of their budgets; less than half receive funding from institutional appropriations, endowments, donor gifts or other sources (Table 43). Other sources of funding include fees for services, sponsorships and federal and state governments. For example, the Pine Jog Environmental Education Center at Florida State University receives funding from fees from its afterschool and summer camp programs; the Center for Agroecology and Sustainable Food Systems at the University of California at Santa Cruz receives funding from produce sales; the Kansas Center for Sustainable Agriculture and Alternative Crops at Kansas State University was created by state statute and receives state appropriations; and most of the funding for the Hinkley Center for Solid and Hazardous Waste Management at the University of Florida at comes from an annual appropriation from the Florida state legislature.

Table 43. Human wellbeing IESICs' budget sources

	Institutional appropriations	Endowments and other long-term funding	Short-term grants and contracts	Donor gifts	Other*
Is a source	41%	22%	87%	35%	22%
Mean proportion from source	41%	23%	59%	26%	46%
Mode – most common proportion from source	10%**	6%	100%	10%	NA

*Fees for services; produce sales; state appropriations

**Multiple modes – smallest value shown

Interdisciplinary Waste Management Institute

North Carolina Agricultural and Technical State University
Greensboro, North Carolina • www.ncat.edu/divisions/academic-affairs/wmi

Founded on the belief that waste management is “the key to innovation, creativity and productivity,” the Interdisciplinary Waste Management Institute (WMI) is responsible for “coordination of environmental and waste management instruction, research, outreach, internship, faculty development, and student development” within various departments at North Carolina Agricultural and Technical State University (NC A&T State). WMI also implements two certificate programs in Waste Management, advise students interested in environmental and waste management careers, and serves as the university’s clearinghouse for environmental and waste management activities. The WMI certificate programs add value to degree programs.

- WMI is an interdisciplinary academic support unit within the School of Agriculture and Environmental Sciences that performs research and public service “to mobilize academic resources and capabilities for developing solutions.” WMI reports to the university’s chief academic officer through the office of the Dean and an interdisciplinary advisory committee of about 58 members.
- A full-time faculty director leads WMI’s small staff of about 4, as well as contributing interdisciplinary faculty members IPA staff. WMI’s on-campus suite contains offices for these faculty members.
- Non-directed institutional appropriations account for 60 percent of WMI’s budget. Another 30 percent comes from short-term directed funds and the remaining 10 percent from donor gifts.

WMI’s activities prioritize education and student success, and additional goals are outreach, research and campus sustainability. In addition to its certificate programs for undergraduates and graduate students, WMI works with academic departments to tailor capstone seminars and other courses to follow an interdisciplinary waste management curriculum. These courses cover topics such as recycling, environmental ethics and philosophy, environmental justice, and hazmat training. WMI’s yearly publication *Environews* incorporates contributions from the Departments of Architectural Engineering, Business Management, Construction Management and Safety, His-



tory, Journalism and Mass Communications, Nursing, Political Science, Psychology, and Sociology and Social Work.

Recent significant research projects affiliated with WMI include a study on climate change, environmental justice, fate and transport of contaminants, food bio-processing, innovative technologies, sustainable energy and waste management remediation, fate and transport of hazardous chemicals through more than \$3 million academic partnership grant from the Department of Energy and an academic partnership program in environmental restoration and waste management through more than \$50,000 from industrial partners. The WMI hosted a national conference on “advances in environmental science and technology on September 12, 2013. More than 150 people attended the conference. Over 60 technical papers were presented.



WMI conducts community outreach in environmental and waste management, as well as environmental technology transfer and information services. Activities include a pre-college workshop and a summer science intensive for selected K-12 students from North Carolina public schools. WMI also provides consulting services and partnership opportunities to improve technology transfer, information management, and health and safety training within industry, small businesses and government agencies. Recently, WMI partnered with the Hazmat Team of the city of Greensboro to provide the Hazmat Training Session for Waste Management Scholars at NC A&T.



Center for Disaster and Risk Analysis

Colorado State University
Fort Collins, Colorado • disaster.colostate.edu

The Center for Disaster and Risk Analysis (CDRA) at Colorado State University (CSU) “is dedicated to reducing the harm and losses caused by natural, technological, and human-caused disasters” by engaging in interdisciplinary research, education, and outreach activities. CDRA focuses its efforts on learning “how social inequality impacts the ability of marginalized groups to prepare for, respond to, and recover from disaster” and increasing their capacity to do so. Its activities are guided by four guiding goals: (1) to minimize harm and suffering by focusing on social vulnerability and human impacts; (2) to emerge as a center of scholarly research in the social impacts of disasters; (3) to train future hazards and disasters researchers and professionals; and (4) to become a clearinghouse for disaster-related information and resources.

In 2010, with financial support from CSU, two faculty members (one in the Department of Sociology, the other now in the Department of Economics) established CDRA as an interdisciplinary research center dedicated to analyzing and mitigating the human impacts of disaster. CDRA builds on the work of the Hazard Assessment Laboratory (HAL), founded in 1984, which trained hazards and disaster researchers and contributed to the public understanding of risk and disaster management.

- CDRA is one of 12 Centers, Institutes, or Other Special Units (CIOSUs) in the College of Liberal Arts at CSU recognized by the Office of the Vice President for Research. CIOSUs are designed to extend beyond the boundaries of a single academic department.
- Led by its 2 founders and co-directors, CDRA brings together 16 CSU and 6 international faculty affiliates, 9 graduate research assistants, and 5 undergraduate research assistants.
- CDRA is located in a shared space on the CSU campus, including 2 offices for graduate students and a shared conference room. Its faculty members have offices in their respective academic departments.
- CDRA received \$300,000 in start-up funds from CSU but does not currently have a dedicated budget. Its faculty relies on their regular faculty lines, and graduate students and undergraduates are paid through research grants secured by CDRA faculty or the students themselves. Sponsors include the National Insti-



tute of Environmental Health Sciences, National Science Foundation, the Gates Foundation, the National Park Service, the Ford Foundation, The Nature Conservancy, National Oceanic and Atmospheric Administration, Federal Emergency Management Agency, and the Environmental Defense Fund.

CDRA primarily conducts research on hazard risk and disaster impacts, as well engages in various education and outreach activities. Projects involve qualitative, quantitative, and mixed methods research, using sophisticated methodological tools to best assess the full scope and range of disaster effects experienced by individuals and communities.

Just a few recent projects include evaluating disability preparedness in disasters for children and adults; conducting a three-year study of risk perception and evacuation behavior among U.S. Gulf and Atlantic Coast residents; assessing the potential physical and mental health impacts of the BP oil spill on children; measuring levels of toxic chemicals in the soil in New Orleans playgrounds; surveying Colorado childcare providers regarding disaster planning and preparedness levels; studying displaced children's long-term recovery in the aftermath of Hurricane Katrina. Disasters studied by CDRA faculty and students include Hurricane Andrew (1992), Hurricane Katrina (2005), Hurricane Sandy (2012), the September 11, 2001, attacks, the 2010 Haitian earthquake, the 2010 BP/Deepwater Horizon Oil Spill, the 2011 Christchurch earthquake, the 2011 Slave Lake wildfires, the 2011 Joplin tornado, the



2012 Colorado wildfires, and 2013 Colorado floods. CDRA faculty also study more chronic or slow-onset hazards such as drought and technological hazards such as hydraulic fracturing. Many CDRA faculty and students work with those living in disaster-affected communities to engage and empower them in post-disaster recovery and pre-event planning processes. This allows the CDRA teams to translate their research to action.

For example, the SHOREline (Skills, Hope, Opportunities, Recovery, Engagement) project is a youth empowerment and disaster recovery program, supported by the Baton Rouge Area Foundation, being implemented by 5 pioneering chapters at high schools in the Gulf Coast. This program involves over 60 students and 6 teacher sponsors in Alabama, Mississippi, and Louisiana. CDRA is partnering with the National Center for Disaster Preparedness at Columbia University to guide students and teachers in building tools that will help their communities recover from disasters. Students will have opportunities to engage with local and national leaders and innovators and will travel to 2 Gulf Coast university campuses for regional summit meetings.

CDRA also engages CSU students through university courses, thesis and dissertation advising, and graduate and undergraduate research mentoring and assistantships. CDRA connects students with internship opportunities at partner organizations working in hazards, disasters, and/or emergency management that have indicated an interest in working with CSU Sociology undergraduates and those students from other disciplines. A number of organizations have worked with CSU students, includ-

ing, for example, the American Red Cross, local Emergency Management offices in Fort Collins and Loveland, FEMA Corps, and school district offices.

CDRA faculty and students regularly participate in public outreach through hosting guest lectures and seminars; giving lectures at university and community events; serving on local, regional, national, and international advisory boards; and working with groups dedicated to reducing disasters losses. CDRA faculty have advised regional and national leaders on a number of topics. Overall, they are constantly striving toward their goal of using research and scholarship to reduce disaster losses and improve the quality of life for all those living in hazard prone areas.



Kansas Center for Agricultural Resources and the Environment

Kansas State University
Manhattan, Kansas • www.kcare.ksu.edu

Kansas Center for Agricultural Resources and the Environment (KCARE) was established to coordinate and enhance research, extension and teaching activities pertaining to environmental issues related to agriculture.” Its mission is to “develop and deliver knowledge that helps Kansans balance ‘utilization’ and ‘protection’ of natural resources today and into the future.”

- KCARE employs a 5-person staff, including a full-time director. An additional 5 watershed specialists each represent a different watershed location in which KCARE specializes.
- These administrators have offices on the Kansas State University (KSU) campus, though KCARE does not have its own distinct facilities.
- Short-term directed funds provide for 80 percent of KCARE’s budget, and the remaining 20 percent comes from non-directed institutional appropriations.

KCARE conducts basic and applied research relevant to Kansan communities in the following areas of emphasis: air quality, water quality, waste management, soil conservation quality, water conservation and use, and sustainable agriculture. KCARE’s numerous outreach activities include key water programs to improve water quality throughout the state, such as developing watershed restoration and protection strategies with community input and assisting livestock producers in implementing their own water management plans.

The KCARE website and YouTube channel feature a number of resources to assist Kansan farmers, such as videos on controlling wind erosion, economics reports with crop and livestock information, news about water access and emergency relief, relevant literature, and links to government disaster resources. KCARE also hosts Field Days and other public events to educate the community at large about current and relevant research.



Along with the Kansas Water Office, K-Start Research and Extension, and the Kansas Water Resources Institute, KCARE is a co-host for the Governor’s Conference on the Future of Water in Kansas, held in Manhattan. KCARE researchers participate as both attendees and guest speakers.



Wallerstein Collaborative for Urban Environmental Education

New York University
New York, New York • steinhardt.nyu.edu/wallerstein

The goal of the Wallerstein Collaborative for Urban Environmental education “is to provide a year-round program which stimulates public school teachers in the metropolitan New York City region to incorporate environmental education in their classrooms,” as well as to create “increased environmental education opportunities for pre-service teachers through direct experience in the urban environment.” Through strong partnerships with science institutions, environmental organizations, government agencies and New York City schools, the Collaborative introduces educators to resources, materials and strategies for environmental education across all grade levels and curriculum areas.

Established in 2000, the Collaborative offers environmental education and services to the community at large, including courses, internships, seminars, conferences, workshops, curriculum design and professional development for classroom teachers. Examples of collaborators include but are not limited to the American Museum of Natural History, National Park Service, the New York Botanical Garden, the Queens College Center for Environmental Teaching and Research, the Wildlife Conservation Society, the Black Rock Forest Consortium and many others.

- The Collaborative is administratively located within the Department of Teaching and Learning under New York University’s (NYU) Steinhardt School of Culture, Education and Human Development. It is affiliated with the graduate Program for Environmental Conservation Education.
- The Collaborative is administered by a director, a program coordinator and several graduate students from the Environmental Conservation Education Program.



- In a shared campus space, the Collaborative’s facilities include offices for administrators, faculty and staff; student workspaces. . The Collaborative also has access to NYU’s city campus facilities and meeting spaces and is now part of the newly developed Jhumki Basu STEME Center promoting scientific literacy in STEM and the Environment.

- Donor gifts account for 90 percent of the Collaborative’s budget, and the remaining 10 percent

comes from a variety of grants. Major support is provided by the Johanette Wallerstein Institute. Additional funding has come from the City Parks Foundation/Mellon Foundation, ExxonMobil, NOAA, the National Parks Foundation, NSF, the New York City Environmental Education Fund/Hudson River Foundation, and the EPA.

The Collaborative has launched numerous environmental education programs throughout New York City for students in grades K-12, working with both public and private schools. The recent **Jane Wallerstein Children and Nature Project** aims to provide outdoor educational experiences and nature-based curricula for K-6 students. Each school participates in a three-part program which includes a pre-trip visit to introduce students to environmental topics, a field trip to an outdoor setting such as a garden or farm, and a documented follow-up project for students to complete in their school or community. For high school students, the NSF funded GreenTECH initiative works with 4 local high schools to introduce green technologies and green career options. GreenTECH offers a searchable career database, guest speakers from various green technology sectors, field trips and tours of green sites and buildings, as well as internship opportunities.

Examples of the Collaborative's teacher training programs include the Hudson River Teacher Education Program which was funded by the New York City Environmental Fund, was developed as a 3-week intensive experience during the summer. The TEEP initiative established in 1999 with GrowNYC and the Environmental Education Advisory Council, is a network of environmental professionals and university faculty – including professors from the City College of New York, Columbia, Cornell, Pace, Queens College, SUNY and Syracuse – dedicated to increasing opportunities for environmental education in pre-service teacher education. This network is working to include environmental education as part of teacher preparation throughout the state. The Collaborative is also working with New York State Outdoor Education Association in the creation of a New York State Environmental Literacy Plan.



More recently the Collaborative has launched a citizen science program to help teachers and students monitor the Hudson River Estuary. This initiative combines NYU graduate students with NYC teachers and their students in actively participating in data collection through hands-on field experiences along the Hudson. Data is stored and shared with all citizen science participants through a web-based portal.

The Collaborative serves a bridge between academic endeavors and community based work.

Societal Systems IESICs (44 in survey sample)

Societal systems IESICs focus on social aspects of understanding and systems for addressing environmental and sustainability issues. There are four subgroups in this category: policy and economics, law, society and behavior, and business and finance.

Profiles for IESICs in this group include:

- *Policy and economics*: Center for the New Energy Economy at Colorado State University
- *Law*: Pace Center for Environmental Legal Studies at Pace University
- *Society and behavior*: Center for Science, Technology and Public Policy at the University of Minnesota at Twin Cities
- *Business and finance*: Erb Institute for Global Sustainable Enterprise at the University of Michigan at Ann Arbor

Operational Structure

Most of the IESICs in this group are centers. Centers make up 84% of this group, 11% are institutes, and the remaining proportion use names other than center or institute such as the Sustainable Enterprise Partnership at the State University of New York at Syracuse and the NorthStar Initiative for Sustainable Enterprise at the University of Minnesota at Twin Cities.

IESICs in this group are more likely to be administratively located within a college or are shared by two or more colleges. Two-thirds of societal systems IESICs are located at the college level with directors that most often report to the dean of a college (Table 44). About a fifth is located at the department level with directors reporting to the department chair or head.

Table 44. Societal systems IESICs' administrative location and reporting structure

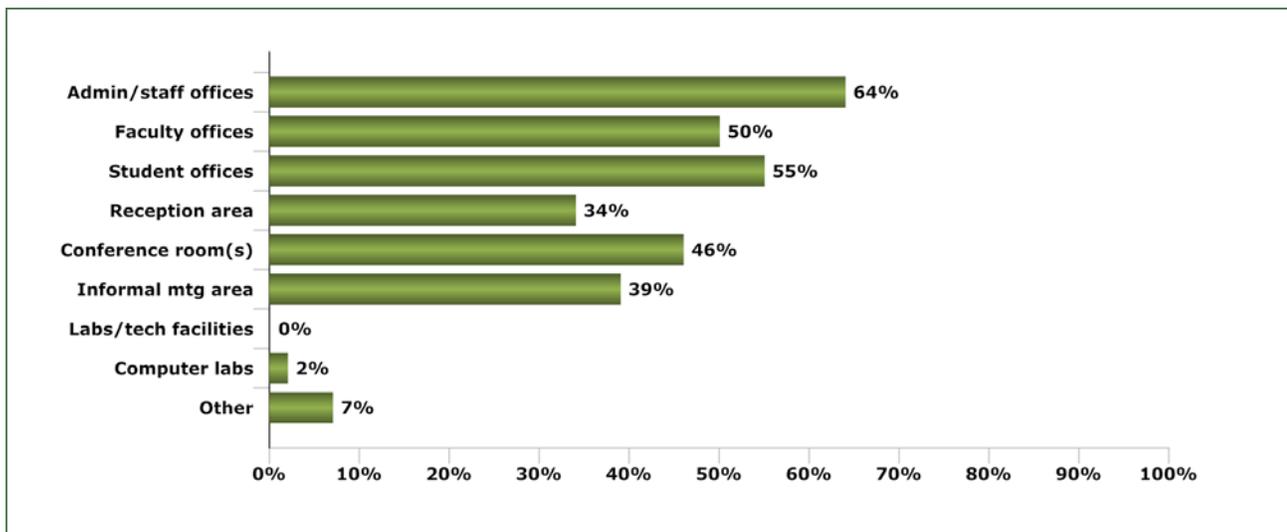
	Primary level n=4	College level n=28	Department level n=8	Other* n=4
President/chancellor	-	-	-	-
Chief academic officer/provost	25%	14%	-	-
Chief research officer/VP for research	-	-	-	-
College/school/division dean	75%	68%	13%	-
Multiple college/school/division deans	-	7%	-	25%
Department chair/head	-	4%	75%	-
Multiple department chairs/heads	-	-	-	-
Steering/advisory committee	-	-	-	-
Other**	-	7%	12%	75%

*Other location: international office; collaboration among multiple universities; located within joint NOAA-sponsored institute; not-for-profit organization

**Other reporting: two deans and provost; independent/no direct reporting beyond director; institute director; board of directors; lead faculty member in specialty area; school director

IESICs in this category are the least likely of all IESICs to have their own building. Only 7% of societal systems IESICs are housed in their own building and 43% are housed in their own suite of offices. The remaining 50% either have space within another suite of offices (20%) or do not have a designated physical space (30%). This group of IESICs is the most likely to not have their own designated space. Most have offices for administrators and staff, faculty and students; informal meeting space(s); and conference room(s). This group has the lowest proportion of IESICs with technical or computer laboratories (Figure 16).

Figure 16. Societal systems IESICs' facilities



Activities

Societal systems IESICs devote more resources and activities to education and outreach. Research is a primary goal for almost all of these IESICs, but it comprises a smaller proportion of their activities on average compared with other IESICs (Table 45). This group also devotes the highest average proportions of resources and activities to education and outreach. Supporting campus sustainability is a primary goal for about a fifth, which on average comprises about 10% of the activities for IESICs who share this goal. Other goals include economic development, partnership coordination, technical assistance and policy development and advising. Examples include the Buerk Center for Entrepreneurship at the University of Washington at Seattle which serves as an accelerator for startup companies; the Center for Legal Studies at Pace University which is a voting member of the International Union for the Conservation of Nature and working on developing international policy; the Great Lakes Environmental Finance Center at Cleveland State University which provides technical assistance and applied research services to federal agencies, state and local governments; and the Center for Environmental Philosophy at the University of North Texas which publishes an environmental philosophy academic journal.

Table 45. Societal systems IESICs’ primary goals

	Research	Education	Outreach/ continuing education	Campus sustainability	Other*
Is a primary goal	96%	80%	82%	18%	18%
Mean proportion of resources/activities	42%	33%	30%	10%	44%
Mode – most common proportion	20%**	40%	20%	10%	NA

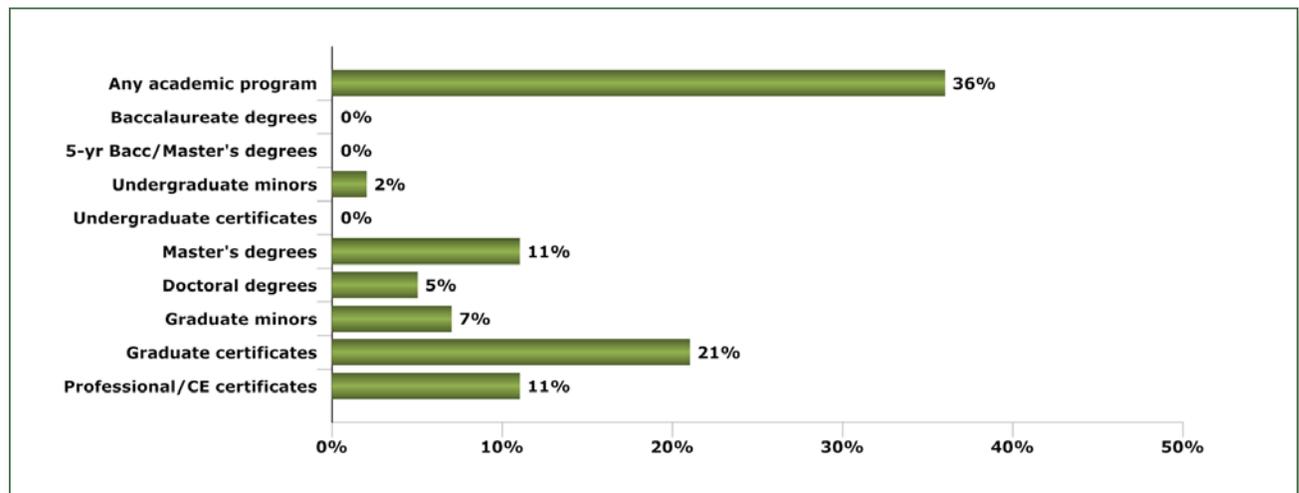
*Economic development; provision of services; policy development and advising; partnership coordination; publishing

**Multiple modes – smallest value shown

This group has the highest proportion of IESICs that administer graduate minors and certificates. Over a third of the IESICs in this group administer academic programs (Figure 17). Only one administers an undergraduate minor; the remaining academic programs are either graduate programs or continuing education programs.

Two IESICs in this group administer doctoral degrees; the Land Use Law Center at Pace University and the Fowler Center for Sustainable Value at Case Western Reserve University, which also administers a master’s degree. Four other IESICs offer master’s degrees; the Center for Sustainable Tourism at East Carolina University, the Erb Institute for Global Sustainable Enterprise at the University of Michigan at Ann Arbor, the Center for Science, Technology and Public Policy at the University of Minnesota at Twin Cities.

Figure 17. Societal systems IESICs’ academic programs



This group has the highest proportion of IESICs that include professional fields and the second highest proportions of IESICs that partner with governmental organizations and public and private sector organizations. Although this group often partners with governmental, private and public sector organizations, they are less collaborative than most IESICs overall. The proportions that typically partner with various disciplines are below average except for professional fields and social sciences

(Table 46). This group is twice as likely to include experts in the professional fields and least likely to include the physical or life sciences in their projects.

Table 46. Societal systems IESICs' partners

Partner fields of study and organizations	Proportion of SS IESICs	Average proportion for all IESICs
Environmental science(s) and studies	75%	83%
Engineering and applied sciences	48%	68%
Natural resources and agriculture	61%	64%
Social sciences	59%	58%
Physical sciences	27%	55%
Life sciences	32%	52%
Professional fields	80%	39%
Humanities	25%	20%
Governmental organizations	66%	61%
Public and private sector organizations	64%	60%
Other higher education institutions	46%	49%

Resources

About half of IESICs in this group support full-time leadership positions. Most IESICs in this group support directors; half of these positions are full-time which is higher than the average for all IESICs (Table 47). About half also support associate or assistant directors, about a third of these positions are full-time; which is also above average compared with all IESICs. A fifth support other full-time program managers or other administrators.

Table 47. Societal systems IESICs' leadership positions

	Director	Associate or assistant director	Other administrators
Support position	85%	48%	44%
Full-time FTE	46%	34%	21%

Over half of these IESICs support full-time and or part-time staff positions. However, this group is below the averages for all IESICs in the proportions that fund staff positions (Table 48).

Table 48. Societal systems IESICs' staff positions

	Full-time staff	Part-time staff
Support staff positions	64%	52%
Mean number of positions	3	2
Mode – most common number of positions	1	1*

*Multiple modes – smallest value shown

This group has the lowest average numbers of all types of faculty positions, including affiliated faculty. IESICs in this group on average support fewer core, joint and affiliated faculty positions than all IESICs (Table 49).

Table 49. Societal systems IESICs’ faculty positions

	Core faculty	Joint faculty	Affiliated faculty
Support faculty positions	39%	34%	57%
Mean number of positions	2	2	11
Mode – most common number of positions	1	1	3*

*Multiple modes – smallest value shown

This group rely more on endowments. Societal systems IESICs rely less on short term grants and contracts and more on endowments than other IESICs (Table 50). Although most receive funding from institutional appropriations and short term grants and contracts, about a third also receive substantial funding from endowments. Other sources of funding are important for a few of these IESICs and include fees for services, events and programs, and federal funding such as annual core funding from the U.S. Environmental Protection Agency’s Center for Environmental Finance.

Table 50. Societal systems IESICs’ budget sources

	Institutional appropriations	Endowments and other long-term funding	Short-term grants and contracts	Donor gifts	Other*
Is a source	61%	34%	68%	39%	11%
Mean proportion from source	42%	51%	47%	16%	64%
Mode – most common proportion from source	10%	30%	10%**	10%	NA

*Fees for services; events and programs; federal funding other than short-term grants and contracts

**Multiple modes – smallest value shown



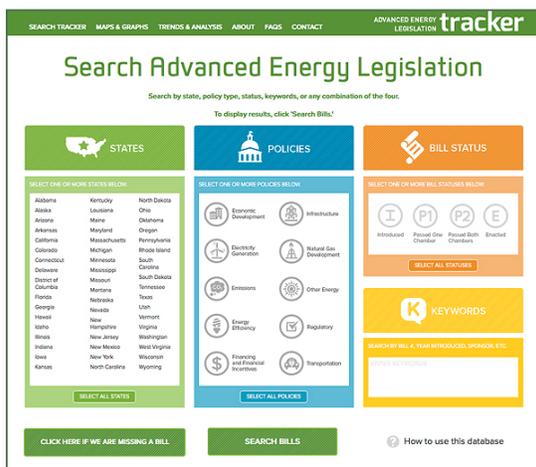
Center for the New Energy Economy

Colorado State University at Fort Collins
Fort Collins, Colorado • cnee.colostate.edu

The mission of the Center for the New Energy Economy (CNEE) is to “incorporate best practices from around the nation and world to accelerate the development of a new energy economy,” defined as an economy that creates and keeps American jobs, develops and uses clean and affordable domestic energy, protects the environment and climate, and maintains America’s global competitiveness. CNEE provides technical assistance to policymakers, regulators and other decision makers “to help them create the policies and practices that will facilitate America’s transition to a clean energy economy.”

Founded in February 2011 by former Colorado governor Bill Ritter, CNEE leverages its political connections to influence energy policy and frames the issue to motivate numerous audiences. Its collaborative partners include the Powerhouse Energy Institute, Advanced Energy Economy, and the Energy Foundation, as well as the Department of Energy’s Joint Institute for Strategic Energy Analysis, the National Center for Atmospheric Research, and the Colorado Energy Research Collaboratory (a research consortium of Colorado State University, the University of Colorado at Boulder, Colorado School of Mines and the National Renewable Energy Laboratory). CNEE works with these entities and their industry and public agency partners “to accelerate the commercialization of renewable energy, energy efficiency and energy management technologies.”

- CNEE is organized under the Powerhouse Energy Institute (PEI), which brings together energy research labs, policy centers, superclusters and start-ups. Over 130 faculty members representing all 8 colleges are affiliated. CNEE employs a full-time director and assistant director, 2 senior policy advisors, an executive assistant and a part-time student research team. CNEE also contracts subject-matter experts in public policy, administration and regulation as needed when providing customized technical assistance to state governments.
- CNEE is currently housed in a distinct suite containing a reception, offices for administrators, student workspaces, an informal meeting space and a conference room. In January 2014, CNEE will relocate to a 65,000-square foot addition to PEI’s facilities.
- CNEE is funded entirely by private support, directed through the Colorado State University Foundation. Principal donors include the Rockefeller Brothers Fund, the San Francisco-based Energy



Foundation, the Fort Collins-based Bohemian Foundation, the Argosy Foundation and Advanced Energy Economy.

CNEE primarily conducts outreach and continuing education activities for groups and individuals who directly impact energy policy. CNEE’s energy policy areas of focus are renewable energy, energy efficiency, electric grids, natural gas and energy financing. These areas coincide with topics of energy research both by external partners and at CSU, encompassing biofuels, carbon, economics and policy, efficiency, solar and wind.

CNEE’s technical assistance “is tailored to the opportunities, needs and conditions in each client state” and are free of charge. Its services entail “assistance in developing legislative, regulatory and programmatic plans for clean energy development... direct engagement with the governor and staff, state energy office director and staff, legislators, regulators, and opinion leaders, to advise on policy best practices and how to implement them... [and] coordination with local industry and policy stakeholders.”

CNEE also co-sponsors the annual Natural Gas Symposium, hosted adjacent to the CSU campus. This initiative brings together stakeholders to explore solutions for natural gas in “a collaborative effort aimed at forging relationships between industry, researchers and environmentalists to explore solutions to energy development in Colorado.”



The CNEE website is updated with resources on energy policy, including current energy bills organized in the comprehensive and easy-to-use Advanced Energy Legislation TRACKER database, produced in partnership with Advanced Energy Economy. CNEE’s website also features links to energy research developments, reports and white papers, and resource pages prepared specifically for policymakers, industry professionals, residential consumers and energy researchers.

Following up on President Obama’s meeting with 14 experts, including Bill Ritter, CNEE released a report with 200 recommendations on ways for the President to use executive authority to advance his Climate Action Plan in five energy-related action areas. The Cabinet, White House staff and other federal officials were briefed on the report at the National Press Club prior to its January 21 release.

PACE LAW

TURNING PASSION INTO PRACTICE

Center for Environmental Legal Studies

Pace University School of Law
New York, New York • law.pace.edu/center-environmental-legal-studies-cels

The Center for Environmental Legal Studies (CELS) oversees Pace Law School's extensive environmental curriculum, projects, and research centers, including the Environmental Litigation Clinic, the Energy and Climate Center, the Land Use Law Center, and the Kheel Center for the Resolution of Environmental Interest Disputes. CELS anchors projects addressing important environmental issues, including energy conservation, international environmental law, and sustainable development. CELS is operated by a small staff, including two faculty co-directors (Nicholas Robinson

and Richard Ottinger) and the director and administrative staff of the Pace Environmental Law Programs. Staff are housed in a suite of offices in the law school's administrative building. Pace's other Centers' faculty and staff are housed in separate buildings on campus.



Since its inception in 1982, CELS has provided opportunities for JD, LLM and SJD candidates to work directly with Pace Law professors on advanced environmental law research and reform. Law students actively participate in CELS projects, researching, editing and drafting research publications, and participating in hands-on experiential learning opportunities. As the only law school body that is a voting member of the International Union for the Conservation of Nature (IUCN), CELS is closely involved

with the work of international environmental organizations, and many CELS projects are international or comparative in scope.

To support its primary goal of policy advising, CELS provides global environmental research and education and holds national and international symposia and conferences with the assistance of Pace students. Recent symposia and conference topics have included "Giving Force to Conservation Laws: Environmental Adjudication" (IUCN World Conservation Congress); "Places for People: Strategies and Funding for Sustainable Communities;" "A Clean Fuel Sector for the Northeast and Mid-Atlantic: Policy Options and Immediate Actions to Reduce Transportation Emissions;" "Turning Local Organic Wastes into Vehicle Fuel;" and "Capturing the Benefits of Microgrids and District Energy Systems for Communities."



Brazil-American Institute for Law and Environment

students and faculty at each university worked together over two years to create a dictionary of environmental legal terms in English with Mandarin and Pinyin translations; work on a Mandarin to English companion is currently underway.

Experiential programs of note include the UN Environmental Diplomacy Practicum, which places students with Permanent Missions to the UN to address environmental matters of small island nations; the Environmental Litigation Clinic, in which students represent non-profits in pollution cases; and the China Program, where students and faculty collaborate with peers and other scholars at Chinese universities. A notable ongoing collaboration between CELS and Shanghai Jiao Tong University is the Dictionary of Environmental and Climate Change Law (Edward Elgar 2013). To aid negotiators and policymakers working on environmental issues between China and English-speaking nations, teams of

The Frederick A. and Barbara M. Erb Institute for Global Sustainable Enterprise

University of Michigan at Ann Arbor
Ann Arbor, Michigan • erb.umich.edu

The Erb Institute is committed to creating a socially and environmentally sustainable society through the power of business.” The Institute conducts its research, teaching and direct engagement activities according to the following set of guidelines: the prioritization of enterprise- and market-based solutions, quantifiable goals and measurable outcomes to create scalable solutions, innovation and experimentation, leadership qualities, collaboration across disciplines and sectors, transparency and inclusion, scholarships as incentives, and change as a means of growth.

The Institute was founded in 1996 with an endowment gift of \$5 million from Michigan alumnus Frederick A. Erb and his wife, Barbara. The total endowment is now \$40 million, comprising \$20 million from the Erb family and an additional \$20 million from Dow, Holcim and Max McGraw. Over the past two decades, the Institute has become a leading source of knowledge on the role of business in adapting to environmental change and has grown a global network of students and alumni in the public, private and nonprofit sectors.

- The Institute is a partnership between the School of Natural Resources and Environment and the Stephen M. Ross School of Business at the University of Michigan. Two boards, made up of industry, government and nonprofit leaders help to keep the Institute abreast of current trends and challenges: the External Advisory Board provides the Institute with educational advice and students mentoring and job opportunities, and the Strategic Advisory Council advises the Institute about market and societal trends and works to increase its global presence and impact among organizations and leaders pursuing a sustainable future.
- The Institute’s personnel include a faculty director, full-time managing director, 5 full-time administrative staff, 3 core faculty members (one of which is the faculty director), and about 40 affiliated faculty members. The Institute’s facilities include only offices for these administrators and staff.
- Endowments from the Erbs and other supporters provide for 80 percent of the Institute’s budget. The remaining portion comes from donor gifts (10 percent), short-term directed funds (8 percent) and non-directed funds (2 percent).

The Institute prioritizes education and research that integrate the natural and social sciences to address issues relevant to sustainable enterprise. Though the Institute’s research areas change with global developments, research is currently focused in 5 primary areas: energy and climate, social enterprise, the built environment, management innovation, greening markets, and sustainable mobility.

The Institute serves to cultivate University of Michigan students' interest in business and sustainability. The interdisciplinary three-year MBA/MS program, which grants degrees from the School of



Natural Resources and Environment and the Stephen M. Ross School of Business, emphasizes “harmonizing economic, environmental and social interests.” For undergraduates, the Institute offers a course on Global Enterprise and Sustainable Development and is actively developing new curriculum, learning experiences and student support opportunities.

The Institute offers fellowships funded by Dow Chemical Company and IBM, as well as the Erb Post-Doctoral Fellowship. PhD students in any discipline conducting relevant research and being advised by an Institute faculty member may join the PhD Affiliates

Community, through which many PhD students receive research funding. The Institute’s global network enables students to develop and apply their business and critical thinking skills worldwide, such as building sustainability community systems in Africa and developing ecotourism in South America.

Other on-campus initiatives include the Colloquium Brown Bag, a monthly informal research seminar featuring University of Michigan and outside faculty from various disciplines speaking on recent developments in sustainable enterprise. The Institute also publishes a wide selection of teaching materials on its website, including case studies on sustainability challenges.



A recent collaboration among the Institute and several University of Michigan institutes and academic departments, including the Colleges of Engineering and Architecture, is the REFRESCH (Researching Fresh Solutions to the Energy/Water/Food Challenge in Resource-Constrained Environments) project. The project seeks sustainable technology solutions for communities without access to a reliable electric grid, clean water and sufficient food. Graduate students have been involved through research assistant appointments and case-study development fellowships.

Center for Science, Technology, and Public Policy

University of Minnesota - Twin Cities
Minneapolis, Minnesota • hhh.umn.edu/centers/stpp

The mission of the Center for Science, Technology, and Public Policy (CSTPP) is “to improve people’s lives by advancing the application of science and technology to solve public problems.” CSTPP’s strategies are to “educate students in effective ways to apply science and technology to policy problems; explore best practices for applying science and technology to solve public policy problems and engaging citizens in science policy issues; and engage in outreach to improve public understanding of science and the public’s ability to make decisions on issues that involve science and technology.” Kenneth Keller, a former President of the University of Minnesota, created CSTPP in 1996 with an interdisciplinary faculty, including both members with strong science backgrounds and those with considerable public policy experience. The establishing agreement, approved by the Dean of the Humphrey School of Public Affairs and the sitting University President, emphasized that CSTPP should aid in developing policies that support “research and development and the implementation of science- and technology-informed recommendations at all levels of governance” locally, regionally, nationally and internationally.

- CSTPP is administratively located in the Humphrey School of Public Affairs, but collaborating faculty members represent various disciplines, including the Departments of Applied Economics, Fisheries and Wildlife, Mechanical Engineering, and Chemistry.
- The CSTPP team is made up of 10 center members, led by a full-time director, and 9 collaborating faculty members.
- CSTPP’s facilities are in a shared on-campus space and include faculty offices, student workspaces, an informal meeting space and a conference room.
- CSTPP’s budget is provided for equally by endowments and short-term directed fund. The Denny Chair, provided for by a gift from Charles M. Denny, Jr., a former CEO of ADC Telecommunications, ensures CSTPP’s longevity.

The Humphrey School prepares individuals with natural or engineering science backgrounds or interests to assume roles in public policy development and implementation in the areas of science, technology, and the environment, particularly in their relation to economic growth, energy, water, health,



environment, and education. The programs take a hands-on approach with faculty and students actively working with communities, private sector, government and nonprofit sectors to translate science to action for the public good.

These responsibilities are divided among five research groups: Innovation Policy, Energy Policy, Environmental Policy, Emerging Technology Policy, and STEM Education/Student Projects. CSTPP also studies public perception of emerging technologies, chemical risk management, Great Lakes environmental planning and management, and regulatory and legal analysis of emerging technologies. The bi-weekly seminar STEP FAR (Science Technology and Environmental Policy Feedback and Research) provides an informal setting for students, staff, faculty and fellows to share their projects and opportunities.

CSTPP also conducts outreach to the general public, government decision makers, practitioners, and internal and external faculty members. The Minnesota STEM Network connects leaders in education, business, government, nonprofit organizations and communities to articulate and align strategies to improve the state's STEM education. The Civic Science Initiatives aim to publicize university research to the general public through seminars, lectures and continuing education classes related to science issues. Another unique initiative is the use of art and culture to communicate scientific concepts to the non-science oriented public. Café Scientifique and Big Bang Book Club “take science out into the community” and facilitate a dialogue among organizations, educators, researchers and community leaders.

The “Sustainable Infrastructure, Sustainable Cities: India” summer education program is a current collaboration among American, Chinese and Indian universities, funded by an NSF Partnership in International Research and Education (PIRE) grant. The University of Minnesota is leading the grant-funded effort “to develop a transformative international research, education and outreach program to assist in the development of low-carbon, resource-efficient and healthy cities in the US, China and India.” An interdisciplinary team – including researchers from the University of Minnesota, Georgia Tech, the National Center for Atmospheric Research, the University of Colorado at Denver, Yale, and partner Indian universities and organizations – is working to monitor sustainability indicators in six Indian cities and identify policy, technology and urban planning solutions to improve these indicators. The PIRE project will extend to China in the summer of 2014.



Technology and Informatics IESICs (27 in survey sample)

Technology and informatics IESICs focus on developing and providing tools that aid in environmental and sustainability problem-solving. There are three subgroups in this category: engineering and technology, modeling and informatics, and geospatial and remote sensing.

Profiles for IESICs in this group include:

- *Engineering and technology*: Center for Environmental Sciences and Engineering at the University of Connecticut
- *Modeling and informatics*: Earth Data Analysis Center at the University of New Mexico
- *Geospatial and remote sensing*: Conrad Blucher Institute for Surveying and Science at Texas A&M University at Corpus Christi

Operational Structure

Most of the IESICs in this group are centers. Centers make up 78% of this group and the remaining 22% are institutes.

IESICs in this group are administratively located at the primary, college and department level. A third of these IESICs are located at the primary university level with directors that most often report to the chief academic officer (Table 51). Another 40% are located at the college level with directors that most often report to a dean. A quarter of these IESICs are located at the department level with directors that are split between reporting to department chairs and college deans.

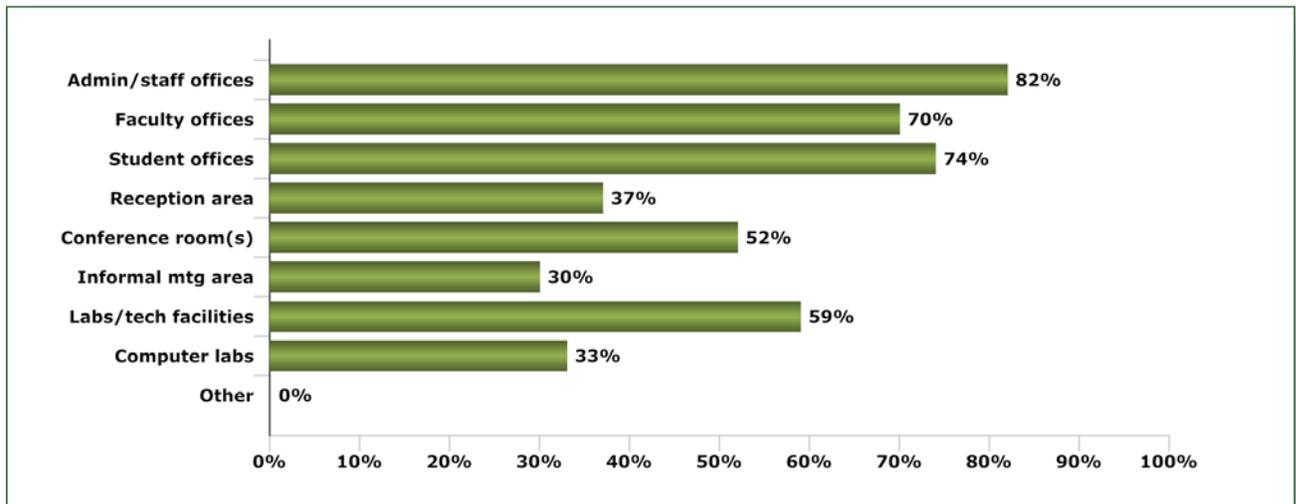
Table 51. Technology and informatics IESICs' administrative location and reporting structure

	Primary level n=10	College level n=11	Department level n=6	Other* n=1
President/chancellor	11%	-	-	-
Chief academic officer/provost	44%	9%	-	100%
Chief research officer/VP for research	22%	-	-	-
College/school/division dean	22%	64%	50%	-
Multiple college/school/division deans	-	18%	-	-
Department chair/head	-	9%	50%	-
Multiple department chairs/heads	-	-	-	-
Steering/advisory committee	-	-	-	-
Other	-	-	-	-

*Unit within an institute

IESICs in this category are most often located within their own suite or have an office within another units' space. Two-thirds of the IESICs in this group are located in within the own suite or within another suite of offices. The remainder is evenly split between IESICs located in their own buildings or those that do not have their own dedicated space. Most have technical laboratories and offices for administrators, staff, faculty and students (Figure 18). Fewer have reception areas, conference room(s), informal meeting areas, and computer laboratories.

Figure 18. Technology and informatics IESICs' facilities



Activities

Technology and Informatics IESICs devote most of their resources and activities to research. All of the IESICs in this group include research as a goal, which comprises about two-thirds of their efforts on average, the highest of any of the IESIC categories (Table 52). Education is a goal for most of these IESICs, making up about a quarter of their missions. This group has lower proportions of IESICs that include outreach or campus sustainability as goals. A few have other primary goals, including the Center for Remote Data Analysis and Visualization at the University of Tennessee at Knoxville that supports the production and deployment of high-performance computing systems, the Delaware Biotechnology Institute at the University of Delaware that supports local companies, and the Institute for Green Science at Carnegie Mellon University that facilitates a global network of sustainability leaders in multiple fields.

Table 52. Technology and informatics IESICs' primary goals

	Research	Education	Outreach/continuing education	Campus sustainability	Other*
Is a primary goal	100%	85%	78%	19%	11%
Mean proportion of resources/activities	62%	23%	16%	12%	32%
Mode – most common proportion	60%	10%**	10%	10%**	NA

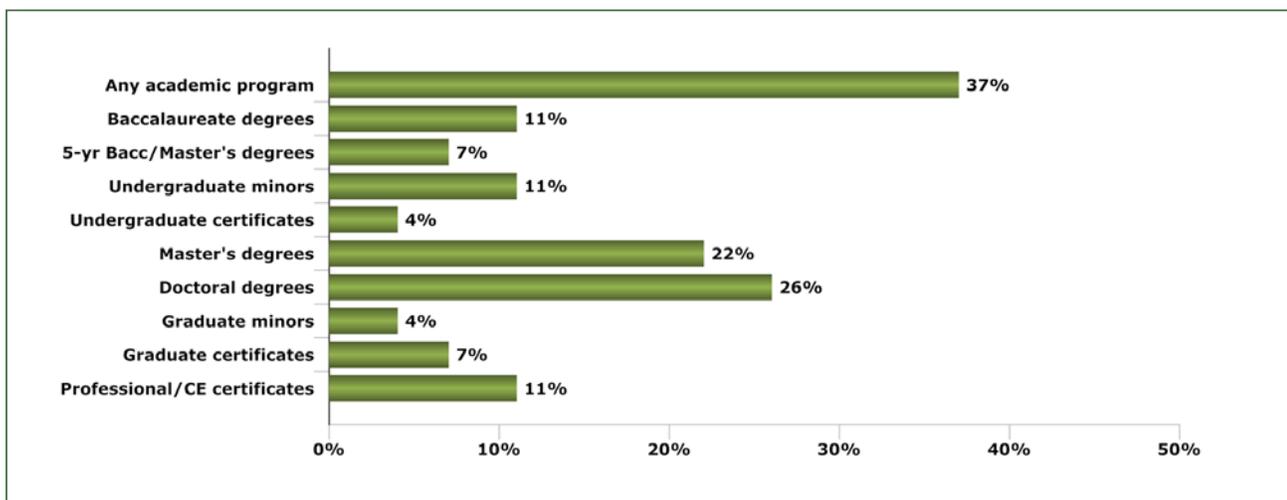
*Provision of services; partnership coordination

**Multiple modes – smallest value shown

IESICs in this group are the most likely to offer graduate degrees. This group is twice as likely to administer doctoral degrees as the other IESIC categories; it also has the highest proportion that offers master's degrees (Figure 19). This group and the broad environmental and sustainability group are also the only two groups that include IESICs that offer all types of academic programs—baccalaureate degrees, undergraduate minors and certificates, master's degrees, doctoral degrees, graduate minors and certificates and continuing education certificates.

Three offer baccalaureate, master's and doctoral degrees: the York Center for Engineering and Environmental Science at the New Jersey Institute of Technology, the Center for Advanced Sensors and Environmental Systems at State University of New York at Binghamton, and the Conrad Blucher Institute for Surveying and Science at Texas A&M University at Corpus Christi. Three offer master's and doctoral degrees: the Catalysis Center for Energy Innovation at Delaware State University, the NOAA-CU Center for Environmental Technology at the University of Colorado at Boulder, and the Earth Engineering Center at the University of Columbia. Two others administer doctoral degrees: the Institute for Critical Technology and Applied Science at Virginia Polytechnic Institute and State University, and the Bredesen Center for Interdisciplinary Research and Graduate Education at the University of Tennessee at Knoxville.

Figure 19. Technology and informatics IESICs' academic programs



This group has the highest proportion of IESICs with environmental science(s) and studies working in partnership with engineers and applied and physical scientists. They are more likely to include life scientists but less likely to include social sciences, professional fields or the humanities (Table 53). This group is least likely to partner with governmental or public and private sector organizations.

Table 53. Technology and informatics IESICs' partners

Partner fields of study and organizations	Proportion of TI IESICs	Average proportion for all IESICs
Environmental science(s) and studies	93%	83%
Engineering and applied sciences	93%	68%
Natural resources and agriculture	48%	64%
Social sciences	37%	58%
Physical sciences	78%	55%
Life sciences	56%	52%
Professional fields	15%	39%
Humanities	15%	20%
Governmental organizations	48%	61%
Public and private sector organizations	52%	60%
Other higher education institutions	48%	49%

Resources

IESICs in this group are most likely to have volunteer directors. Although most of the IESICs in this group do support director positions, they have the lowest proportion compared with the other groups (Table 54). Only 40% support full-time director positions, and about half support assistant or associate director positions; about a third of these positions are full-time. This group also has the lowest proportion of IESICs with other administrative positions.

Table 54. Technology and informatics IESICs' leadership positions

	Director	Associate or assistant director	Other administrators
Support position	71%	49%	29%
Full-time FTE	41%	30%	22%

Technology and information IESICs are more likely to support staff positions. Most of the IESICs in this group have full-time staff positions and about half have part-time staff positions (Table 55). This group has a mean average number of full-time positions similar to IESICs overall, but a higher mode. Fewer have part-time staff compared with IESICs overall.

Table 55. Technology and informatics IESICs' staff positions

	Full-time staff	Part-time staff
Support staff positions	81%	48%
Mean number of positions	8	2
Mode – most common number of positions	6	1

This group has higher numbers of core, joint and affiliated faculty. IESICs in this group and the broad environmental and sustainability group have the highest proportions of IESICs with joint and

affiliated faculty positions; they also have the highest mean numbers of positions (Table 56). Technology and informatics IESICs also have the highest mean number of core faculty positions, although the proportion of IESICs with core faculty is about the same as the average for all IESICs.

Table 56. Technology and informatics IESICs' faculty positions

	Core faculty	Joint faculty	Affiliated faculty
Support faculty positions	37%	52%	56%
Mean number of positions	7	9	55
Mode – most common number of positions	1	2	30

IESICs in this group reply more on short-term grants and contracts. On average, three-quarters of the budgets for these IESICs are from grants and contracts (Table 57). About half also receive institutional funding which accounts for 44% of their budgets on average. Fewer receive funds from endowments and donor gifts, but some of those that do receive substantial funding from these sources.

Table 57. Technology and informatics IESICs' budget sources

	Institutional appropriations	Endowments and other long-term funding	Short-term grants and contracts	Donor gifts	Other*
Is a source	48%	15%	82%	15%	4%
Mean proportion from source	44%	50%	75%	19%	5%
Mode – most common proportion from source	20%**	1%**	100%	1%**	NA

*Unspecified

**Multiple modes – smallest value shown



Center for Environmental Sciences and Engineering

University of Connecticut
Storrs, Connecticut • cese.uconn.edu

The Center for Environmental Sciences and Engineering (CESE) “leads and promotes multidisciplinary research, education and outreach in environmental sciences, engineering, policy and sustainability” at the University of Connecticut (UConn), both a land-grant and sea-grant institution. CESE serves the multi-campus community “as a collaboratory and synthesis center for multidisciplinary research and graduate education.” CESE’s Analytical Laboratories and Business Office provide infrastructural support to faculty members, and its Graduate Fellowship and Summer Research Awards support graduate education.

- Led by a full-time director who has held the position since 2005, CESE is a primary administrative unit at UConn. The administrative staff consists of about 10 employees. Faculty members are associated with CESE in four capacities: the Executive Committee, Advisory Committee, Center Faculty, or Affiliated Faculty. The 10 Center Faculty members, all scientists and engineers, receive direct salary support from CESE, while the diverse Affiliated Faculty members participate in many CESE activities.
- CESE has its own building on the Storrs Campus, with a reception area; offices for administrators, faculty members and staff; student workspaces; informal meeting places; conference rooms; and computer labs; and faculty laboratories. CESE also operates 5 state-of-the-art laboratories (Metals, Nutrients, Sampling, Biofuels and Organics) that “provide a full range of services in the development of analytical methods and analytical testing to support research by faculty, government and industry.”
- CESE’s laboratory services are “physical and chemical analyses for persistent and nontraditional environmental pollutants in ambient air, atmospheric deposition, biological tissue, surface water (both saline and fresh), ground water, sediment, soil and hazardous waste.”
- Most of CESE’s budget is provided by institutional appropriations (84 percent), and the remainder is from short-term directed funds such as grants and contracts (15 percent) and long-term directed funds such as endowments (1 percent).

Representing over 20 academic departments, programs, institutes and centers at UConn, CESE faculty members and students conduct research in a range of disciplines. Projects address problems in terrestrial, freshwater and marine environments at local to global scales. CESE coordinates exchanges among environmental researchers by helping to announce relevant activities to the UConn community,

including seminars at the College of Liberal Arts and Sciences, School of Engineering, College of Agriculture and Natural Resources, School of Pharmacy and School of Law.

CESE's Business Office greatly benefits UConn research by managing environmental grants for researchers from all academic departments. The Business Office Staff provides assistance at all stages of the grant process, from the submission of the proposal to the end of the granting period. CESE also maintains the Environmental Research Searchable Database, which comprises approximately 85 faculty and staff members in 28 administrative units, who are searchable by many criteria, including departmental affiliation and description of areas of expertise.

CESE scientists, in partnership with University faculty members and the Connecticut Department of Energy and Environmental Protection (CT DEEP), are undertaking a comprehensive study to determine if mosquito control pesticides are continuing to cause the decline in the lobster population of Long Island Sound. Collaborators are conducting a sound-wide assessment of lobsters to obtain a better understanding of why this species -- and an industry it has historically supported -- are now in danger of collapse. This comple-



Many CESE faculty members and their students investigate the structure and functioning of threatened forests, such as those in the tropical Amazon.

leaders and local citizens to discuss climate strategies and, with the support of the university president, reaffirmed UConn's commitment to its comprehensive Climate Action Plan; among the first to include a climate adaptation component. CIMA is now an annual event at the university.

Supported by the Sheldon and Samantha Kasowitz Environmental Education and Research Fund, CESE's planned activities for the near future include a student sustainability competition; a university-wide sustainability blog; an oral record documenting UConn's changing perspectives on sustainability; and a transdisciplinary environmental sciences textbook lead by the Director and in collaboration with faculty members in the College of Agriculture and Natural Resources, the College of Liberal Arts and Sciences, and the School of Engineering.



ments the Centers continuing analytical and technical support of state and regional long-term water quality monitoring and assessment programs. These projects include the CT DEEP's Long Island Sound and Ambient Water Quality Surveys, as well as assessments of mercury and organic pollutants in fish tissue.

With considerable funding over the past 25 years from NSF, CESE faculty members and students collaborate with an internationally renowned network of environmental scholars in long-term ecological research in the only tropical national forest in the U.S., the Luquillo Experimental Forest of Puerto Rico.

CESE is connected to environmental projects globally, including (1) forests, rights and insurgency in South Asia; (2) socio-ecological understanding of tropical reforestation; (3) ecology of tropical montane cloud forests; and (4) water resource sustainability issues in Africa. In spring 2012, the Climate Impacts, Mitigation and Adaptation (CIMA) event brought together a grassroots committee of UConn



Earth Data Analysis Center

University of New Mexico
Albuquerque, New Mexico • edac.unm.edu

The Earth Data Analysis Center (EDAC) is a center of expertise in the geospatial information sciences (GI-sciences) for the University of New Mexico (UNM), the State of New Mexico, the US and internationally. Its mission is to employ GI-science and technologies to serve the needs of Federal agencies; state, local and tribal governments; professional societies and organizations; individual researchers and research teams; and advisory bodies nationally and internationally. EDAC stimulates collaborations among these communities and UNM and strengthens graduate education to improve resource management and decision-making.

EDAC was established in 1964 to transfer NASA space-based technology to the private and public sectors. EDAC has since expanded its services to include a library clearinghouse in 1968, remote sensing in 1973, image processing in 1979, Geographic Information Systems (GIS) in 1983, the New Mexico Resource Geographic Information System (NM RGIS, rgis.unm.edu) geospatial data clearinghouse in 1988, Global Positioning Systems (GPS – discontinued as a specific program) in 1990 and information technologies and applications development in 1999.

- EDAC employs a staff of 17, a small number of students and is led by a part-time director and full-time associate director. Coming from a variety of academic disciplines, the staff shares an interdisciplinary focus and is experienced in working across disciplinary boundaries with a variety of project partners and end-user communities.
- EDAC's five areas of applied GI-science – GIS, Image Archive and Data Services, Image Processing and Remote Sensing, Information Technology, and the RGIS Data Clearinghouse – are each managed by a designated staff member.
- EDAC's on-campus facilities are within a shared space, including offices for administrators, faculty and staff; student workspaces; a conference room; and laboratories.
- EDAC's budget comes entirely from short-term directed funds such as grants and contracts.

Maintaining a diverse network of collaborators has allowed EDAC to develop projects in a range of domains: public health; atmospheric modeling; hydrologic modeling; transportation infrastructure; floodplain management; border dispute resolution; ecological modeling and habitat analysis; resource management; demographic analysis; range management; econometric modeling and analysis; and civil



society capacity building. The common theme for all of these project activities is EDAC's active partnering with domain experts in the definition of the specific problem(s) to be solved and identifying the data and geospatial analysis, modeling and visualization technologies that may be developed and deployed to solve those problems.

EDAC's services include customized GIS products and consulting services for a variety of clients, such as government partners in the RGIS Program. As the New Mexico photography repository for many federal agencies, EDAC maintains an extensive archive of aerial photography of NM and the Southwest, space shuttle imagery, satellite imagery, and topographic maps. EDAC also processes remotely acquired data for various applications such as crop inventory, natural resource management and border conflict resolution.

All of EDAC's geospatial data are managed within a custom-built system upon which RGIS Data Clearinghouse and other project-specific applications are built. Created in 1988 by the New Mexico legislature to be developed and maintained by EDAC and the Bureau of Business and Economic Research at UNM, RGIS was designated as New Mexico's Geospatial Data Clearinghouse by the New Mexico Legislature in 2013. An integral part of interagency and intergovernmental coordination in New Mexico's geospatial community, the RGIS program supports public service programs, policy development and implementation, resource and assets management, and strategic planning within New Mexico.



Conrad Blucher Institute for Surveying and Science

Texas A&M University-Corpus Christi
Corpus Christi, Texas • www.cbi.tamucc.edu

The Conrad Blucher Institute for Surveying and Science (CBI) “conducts innovative research and encourages scientists and professional engineers to develop and apply technology solutions relevant to surveying, scientific measurements, and to the issues in the Gulf of Mexico region.” CBI serves state and national agencies and private organizations as a resource for geospatial datasets relevant to the coastal environment.

Dedicated in May 1987, CBI is named after Conrad Meuley Blucher (1885-1977), Registered Professional Land Surveyor. Conrad Blucher was the first President of the Nueces County Chapter of the Texas Society of Professional Engineers, Founding Director of the Texas Surveying Association, Surveyor of the Year in 1967, and Engineer of the Year in 1974. Conrad and his wife Zula Blucher transferred their estate to the university to foster surveying education and to establish the Blucher Chair of Surveying. CBI has since achieved and maintains a national reputation for its innovative research and data collection.

- CBI is led by a full-time director and part-time associate director, who are supported by a large full-time staff of nearly 20. About 10 affiliated faculty members represent various disciplines across the physical and environmental sciences, as well as computing sciences and mathematics. Undergraduate and graduate students are involved as research assistants and technicians.
- The CBI facilities are located in a separate building, which includes offices for faculty, staff and administrators; student workspaces; a conference room; and laboratories. CBI operates dozens of tide gauges with meteorological sensors supporting real-time environmental data and monitoring



stations throughout the Texas coast. Texas A&M's Bell Library holds the Conrad Blucher Plat and map Collection, the largest depository of private surveying historical records in south Texas.

- Short-term directed funds such as grants and contracts account for 90 percent of CBI's funding, and the remaining 10 percent comes from long-term directed endowment funds. CBI's many sponsors include USDA, the National Weather Service, US Fish and Wildlife Service, NOAA's National Geodetic Survey, US Army Corps of Engineers, the National Geospatial-Intelligence Agency, Texas General Land Office, Texas Water Development Board, and the Texas Department of Transportation.

CBI focuses its resources on research projects, which consist of coastal monitoring, mapping shorelines for beach erosion studies, oceanic/atmospheric predictions, coastal habitat restoration and other related research. CBI manages much of these data in a public online database. CBI offers continuing education and research GIS and Geomatics programs through Texas A&M Corpus Christi, including a bachelor's degree in Geographic Information Science and a master's degree in Geospatial Surveying Engineering. CBI also conducts public outreach in these program areas: Coastal Habitat Restoration GIS (CHRGIS), Hurricane Awareness, Surf Conditions and Rip Currents, and GIS Day. CBI's initiatives

are intended to educate the public about its research and promote awareness about coastal processes. Staff frequently present at local schools to encourage education in CBI's research fields.

A significant achievement is CBI's implementation of the Texas Coastal Ocean Observation Network (TCOON), a network of scientific data collection platforms used to amass wind and water data that are critical to people living and working

near the Gulf coast. TCOON is of great benefit to commercial interests, recreation, research, and environmental and public safety. Part of the Texas Integrated Ocean Observing System, TCOON was achieved through a collaboration of academic institutions and federal, state and local government entities. Sponsors include the Texas General Land Office, the Texas Water Development Board, the US Department of the Interior, the Army Corps of Engineers, and the US Fish and Wildlife Service.

Other notable projects include the Transit Time mobile phone app, developed in collaboration with NOAA, which makes NOAA's hydrodynamic model predictions for the Houston-Galveston ship channel more easily accessible for barge navigation and large ship pilots. The Packery Channel Monitoring Program was initiated by CBI in 2003 in anticipation of construction activities. Since the City of Corpus Christi assumed sponsorship of the project in 2008, monitoring has continued at seasonal intervals in support of research-based management. The Texas Spatial Reference Center (TSRC) was funded by NOAA and the National Geodetic Survey in 2005 to implement the National Height Modernization Program of Texas. TSRC enables the integration of research and cooperation among geospatial scientists, professional engineers, and professional land surveyors to re-establish accurate elevations throughout Texas.

JEFF JENKO



Built Environment IESICs (30 in survey sample)

Built environment IESICs focus on land use, sustainable communities, and the design of the built environment. There are three subgroups in this category: built environment, sustainable cities/communities, and land use/landscape design.

Profiles for IESICs in this group include:

- *Built environment*: Urban Harbors Institute at the University of Massachusetts at Boston
- *Sustainable cities/communities*: Institute for Community Sustainability at Indiana State University
- *Land use/landscape design*: Center for Land Use and Environmental Responsibility at the University of Louisville

Operational Structure

Most of the IESICs in this group are centers. Centers make up 77%, 17% are institutes, and the remaining few use names other than center or institute such as the Landscape-based Environmental System Analysis and Modeling Laboratory at the University of Buffalo, and the Green Futures Research and Design Laboratory at the University of Washington at Seattle.

Most IESICs in this group are administratively located at college or department level. A small number (17%) of these IESICs are located at the primary university level with directors that most often report to the chief academic officer (Table 58). Most (60%) are located at the college level with directors that most often report to a dean. A quarter is located at the department level with directors that are split between reporting to department chairs and college deans; one director reports to a steering committee.

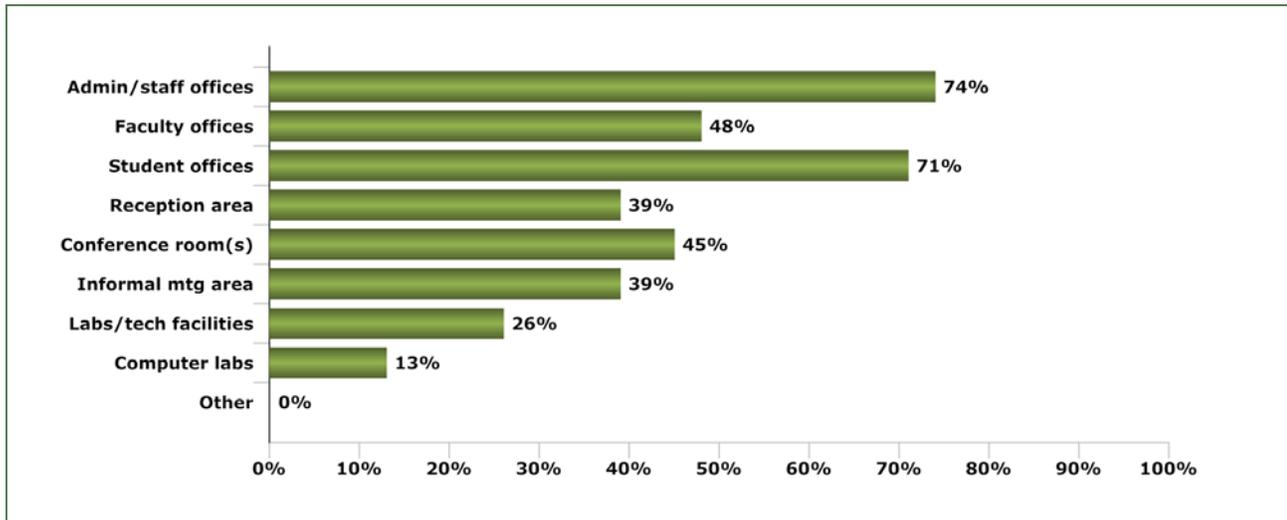
Table 58. Built environment IESICs' administrative location and reporting structure

	Primary level n=5	College level n=18	Department level n=7
President/chancellor	20%	-	-
Chief academic officer/provost	40%	11%	-
Chief research officer/VP for research	20%	-	-
College/school/division dean	-	78%	43%
Multiple college/school/division deans	-	11%	-
Department chair/head	-	-	43%
Multiple department chairs/heads	-	-	-
Steering/advisory committee	-	-	14%
Other*	20%	-	-

*Independent laboratory; board of directors

Most of the IESICs in this group are located within their own suite. Half are located in their own suite and 17% in their own building. A tenth have offices in other spaces and the remaining quarter do not have a designated physical space. Most have offices for administrators and staff and students; half include faculty offices. Less than half have reception or informal meeting areas, conference rooms, and technical or computer laboratories (Figure 20).

Figure 20. Built environment IESICs' facilities



Activities

Research and outreach are the primary goals for most of these IESICs. Research is a primary goal for all built environment IESICs, and outreach is a goal for over two-thirds (Table 59). Together, these goals comprise 81% of their activities on average. This group has the smallest proportion for which education is a goal; for those that do include education it comprises about 20-25% of their activities. A third of this group includes campus sustainability as a goal; this group and the broad environmental and sustainability IESICs are most likely to include this as a primary goal. About a quarter included other goals such as economic development, providing services, policy development and advising and partnership coordination.

Examples include the Oregon Built Environment and Sustainable Technologies Center at Oregon State University which supports with technology commercialization and entrepreneurship, and the Institute for Community Sustainability at Indiana State University which works with community members to find sustainable solutions for local businesses and residences.

Table 59. Built environment IESICs' primary goals

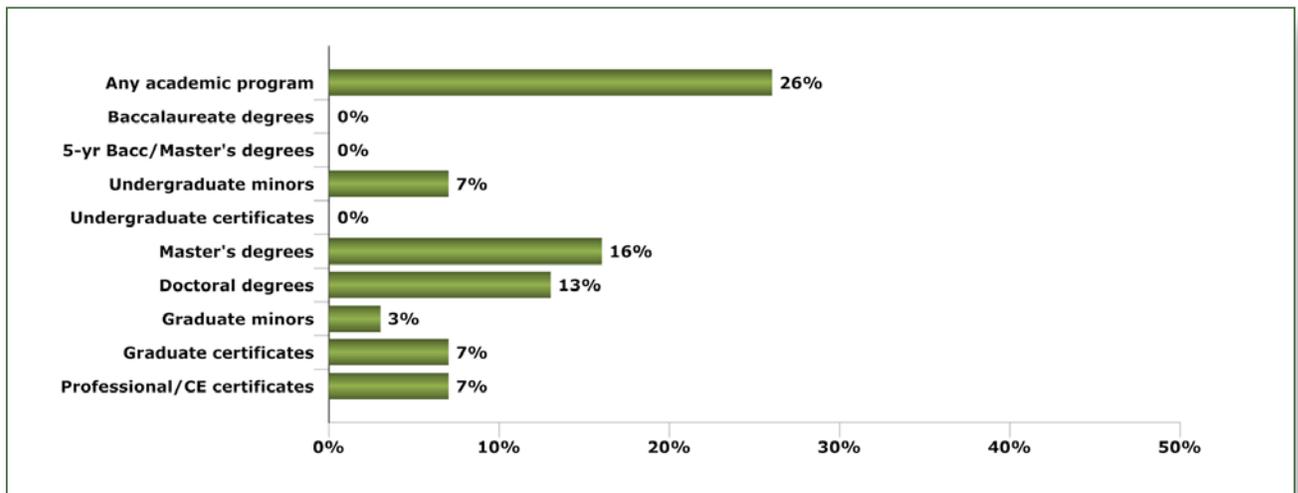
	Research	Education	Outreach/ continuing education	Campus sustainability	Other*
Is a primary goal	100%	67%	77%	33%	23%
Mean proportion of resources/activities	53%	25%	28%	8%	27%
Mode – most common proportion	50%	20%	10%	10%	NA

*Economic development; provision of services; policy development and advising; partnership coordination

This group is more likely to administer graduate degrees. Built environment IESICs have higher than average proportions that offer graduate degrees, but lower proportions than IESICs overall for administering other types of academic programs (Figure 21).

The Metropolitan Design Center at the University of Minnesota at Twin Cities administers master’s degrees. The Center for Architecture Science and Ecology at Rensselaer Polytechnic Institute, the the Institute of Transportation Studies at the University of California at Davis, and the Water Resources Center at the University of Minnesota at Twin Cities administer both master’s and doctoral degrees.

Figure 21. Built environment IESICs’ academic programs



IESICs in this group engage a wide variety of partners. This group has the highest proportion of IESICs that partner with governmental organizations and the lowest proportion that partner with other universities (Table 60). They are more likely to include environmental science(s) and studies, engineering and applied sciences, natural resources and agriculture, social sciences, professional fields, and humanities, and they are less likely to include physical and life sciences in their projects compared with all IESICs.

Table 60. Built environment IESICs’ partners

Partner fields of study and organizations	Proportion of BE IESICs	Average proportion for all IESICs
Environmental science(s) and studies	83%	83%
Engineering and applied sciences	73%	68%
Natural resources and agriculture	70%	64%
Social sciences	73%	58%
Physical sciences	47%	55%
Life sciences	33%	52%
Professional fields	40%	39%
Humanities	27%	20%
Governmental organizations	67%	61%
Public and private sector organizations	60%	60%
Other higher education institutions	40%	49%

Resources

Only a third of the IESICs in this group support full-time director positions. About three-quarters of the IESICs in the group fund director positions; about a third of these are full-time positions (Table 61). About half support associate or assistant directors; about a third of these are also full-time. Over a third fund other administrative positions.

Table 61. Built environment IESICs' leadership positions

	Director	Associate or assistant director	Other administrators
Support position	73%	50%	37%
Full-time FTE	33%	33%	27%

Many of these IESICs support staff positions. Built environment IESICs have slightly below average proportions that support staff positions and below average mean numbers of positions for both full and part-time staff members (Table 62).

Table 62. Built environment IESICs' staff positions

	Full-time staff	Part-time staff
Support staff positions	70%	53%
Mean number of positions	4	4
Mode – most common number of positions	1	1

This group has lower proportions of IESICs that support core and joint faculty positions. They also have lower mean numbers of positions (Table 63). They have average proportions of IESICs with formally affiliated faculty and average mean numbers of affiliated faculty.

Table 63. Built environment IESICs' faculty positions

	Core faculty	Joint faculty	Affiliated faculty
Support faculty positions	33%	27%	60%
Mean number of positions	3	2	37
Mode – most common number of positions	1	1	8

IESICs in this group rely more on short-term grants and contracts. On average, three-quarters of the budgets for these IESICs are from short-term grants and contracts (Table 64). About half also receive institutional funding which accounts for 44% of their budgets on average. Fewer receive funds from endowments and donor gifts. A few rely on other sources of income including fees for services, and federal or state funding other than short-term grants and contracts. Examples include the Oregon Built Environment and Sustainable Technologies Center at Oregon State University which receives state funding for economic development, and the Green Futures Research and Design Laboratory at the University of Washington at Seattle which receives fees for community engagement and municipal planning services.

Table 64. Built environment IESICs' budget sources

	Institutional appropriations	Endowments and other long-term funding	Short-term grants and contracts	Donor gifts	Other*
Is a source	57%	13%	77%	27%	13%
Mean proportion from source	44%	31%	62%	13%	54%
Mode – most common proportion from source	80%	2%**	100%	5%	NA

*Fees for services; federal and state funding other than short-term grants and contracts

**Multiple modes – smallest value shown

Urban Harbors Institute

University of Massachusetts at Boston
Boston, Massachusetts • www.uhi.umb.edu

Since 1990, the Urban Harbors Institute (UHI) has drawn on the expertise of the University of Massachusetts at Boston (UMass Boston) community “to bring a well-rounded and academic approach to providing expert advice on environmental problems and issues,” specifically urban marine and watershed issues in New England. Beyond its regional focus, UHI has also worked with governments, independent organizations and marine industry representatives throughout the world.

“UHI offers technical assistance and advisory services in fields such as urban planning, coastal and harbor planning, natural resource management, marine industry master planning, water transportation and geographical information systems” and organizes meetings, conferences and workshops related to marine and coastal management and problem-solving.

- UHI is led by a full-time director, who reports to the Office of the Provost, and supported by a small staff and associated UMass Boston faculty members.
- UHI is housed in a suite within an on-campus library and contains a reception, offices for administrators, student workspaces, and spaces for both informal meetings and conferences.
- The UHI budget is sourced from non-directed funds (46 percent) and short-term directed funds such as grants and contracts (54 percent).

UHI’s strategic priorities are research and related policy advising, but its varied activities are also in service of campus sustainability, applied research, and internal and external networking. UHI’s projects serve and involve public and private sector stakeholders in several areas of expertise: harbor and port planning and management, integrated coastal management, natural resource protection, public education and participation, and water transportation.

UHI’s interdisciplinary approach to managing port, harbor and coastal issues informs management plans that “balance the needs of commerce, tourism and the environment” and “integrate economic, environmental and regulatory frameworks.” These plans include environmental impact assessments and consider the sustainable use and protection of natural resources. UHI has provided its advising services to government agencies and harbor constituencies locally, regionally, and internationally, such as assisting the Bulgarian government with a coastal management program for its Black Sea coast.



Acting as a forum for public debates and activities related to environmental issues, UHI extends its research and services to the general public. Annual initiatives include the annual COASTSWEEP coastal clean-up, part of an international effort coordinated by The Nature Conservancy. UHI also maintains a national ferry database and produces reports on marine transportation issues such as alternative fuels and community impacts of ferry systems.

Significant collaborative projects in recent years include the Nantucket Shellfish Management Plan in collaboration with the Nantucket Shellfish



Association and other academic institutions, the Digital Coastal Habit Atlas for Boston Harbor funded by the Massachusetts Environmental Trust, and the Outer Continental Shelf Renewable Energy Space Use Conflicts and Potential Mitigation Measures on behalf of the Department of the Interior and in collaboration with several Sea Grant institutions. In 2010, UHI collaborated with the Massachusetts Ocean Partnership and multiple UMass Boston organizations to conduct the Massachusetts Recreational Boater Survey, ensuring the consideration of boaters' preferred routes and destinations during management decisions regarding Massachusetts' ocean waters.



INDIANA STATE UNIVERSITY
**Institute for
Community
Sustainability**

Institute for Community Sustainability

Indiana State University
Terre Haute, Indiana • unboundedpossibilities.com/ICS

The mission of the Institute for Community Sustainability (ICS) is “to improve the environment and increase quality of life in the Wabash Valley through education, collaborative projects and research.” ICS maintains a strong campus presence and highly engages the greater community “as a living laboratory to find economically viable sustainable solutions for local organizations and individuals.” Though Indiana State University (ISU) has pursued campus sustainability since 1989, ISU created ICS in February 2012 to link and generate sustainability initiatives on the ISU campus and throughout the Wabash Valley. ICS received a quick and positive response from campus and community leaders and has continued to support and communicate these sustainability efforts.

- One of ISU’s Unbounded Possibilities programs of distinction, ICS is maintained by a small staff comprising a part-time director, full-time associate director, a full-time administrative assistant, and a graduate assistant. Approximately 40 faculty members are affiliated with ICS as Sustainability Fellows. The President’s Council on Sustainability, composed of about a dozen administrators, provides additional support to ICS initiatives.
- ICS’s office space was once an abandoned home; it was renovated by ICS staff working alongside ISU’s Facilities department. Sustainable solutions were used to create an office that doubles as a sustainable model home renovated to LEED standards. Notable sustainability features are bamboo floors, recycled and repurposed fixtures, and locally made and sourced cabinetry. An outdoor deck space, more than double the square footage of the house, encircles the building and serves as an outdoor classroom.
- ICS is primarily funded by institutional appropriations (70 percent), signifying ISU’s commitment to developing a green campus. The remainder 30 percent comes from grants and donor gifts). ICS aims to diversify its income stream to include research grants, philanthropic giving, service contracts, speaker fees, conference fees, intellectual property, and patents related to sustainability in order to fund ICS’s work in the community.

ICS focuses on research in service of increasing campus sustainability and finding sustainable solutions for local businesses and residences. ICS’s internal activities aim to make ISU a model sustainable university community and to provide practical sustainability education opportunities. Externally, as “a community leader on transitioning to a more sustainable industrial society,” ICS engages public schools and the Wabash Valley community in its growing “living laboratory for research and implementation

of sustainable practices.” ISU also serves as a resource concerning sustainable solutions by enhancing technology transfer and information dissemination.

ICS’s primary campus initiatives are organized into 10 themes: Built Environment, Earth Day, Energy, Food, Grounds, the ISU Sustainability Map (which shows wind and solar data in relation to green technologies), Social Justice, Transportation, Waste, and the Wind Turbine. The social justice initiative demonstrates ICS’s recognition of sustainability as a broad concept with human impacts. ICS partners with ISU’s Social Justice Committee to host panel discussions on religious diversity, violence against women and oppression. ICS also coordinates the promotion of Fair Trade chocolates on Halloween.



Earth Day at ISU

ISU’s waste management programs are another example of an integrated sustainability solution that results in both social and environmental benefits. Local partner charities and businesses facilitate the recycling and reuse of old furniture and other items from across the ISU campus. Excess food is donated to the local organization Catholic Charities. Campus food services coordinates with Facilities Management and Resident Dining to gather food waste for compost and purchases 10 percent of its ingredients from local and organic sources.

ISU’s community initiatives include the Community Garden, Greenhouse, Lead Testing, the Sustainability Map, and a Community Action Plan for Sustainability in the Wabash Valley. The greenhouse project will involve seven sister greenhouses – one existing at ISU and six others to be built at preK-12 schools and community centers around the county – to “represent multidisciplinary learning, encompassing green construction, science education and nutrition.” For the Wabash Valley Action Plan, ICS has partnered with a nonprofit called Our Green Valley Alliance to develop a sustainability survey to initiate a community dialogue about successes and needed improvements.



Since February 2012, ICS’s achievements include receiving \$71,750 in external grants, coaching 800 student research experiences, giving 14 sustainability presentations of which 4 were international, generating over 150 media pieces, contributing over \$20,000 in-kind donations to community sustainability efforts, and hosting 12 major events open to the public. Numerous projects are underway to add and expand sustainability initiatives, such as seeking designation as a Bicycle Friendly University, growing the Community Garden and the Greenhouse Project, and adopting a sustainability undergraduate minor.

Center for Land Use and Environmental Responsibility

University of Louisville
Louisville, Kentucky • louisville.edu/landuse

The Center for Land Use and Environmental Responsibility is an interdisciplinary research and public service center that “seeks to identify principles, methods and processes that promote environmentally responsible land uses.” It is one of eight centers that compose the Kentucky Institute for the Environment and Sustainable Development (KIESD). The Center serves to organize and support academic research, public service and educational programs regarding land use and environmental problems for the benefit of the public, government agencies, community groups, professional organizations and the campus community.

- In addition to its organization under KIESD, the Center is administratively located in the School of Law. It is physically housed in the Department of Urban and Public Affairs, with which it is informally affiliated.
- The Center is directed by a full-time tenured faculty member who holds an endowed chair in land use and dual appointments in law and urban planning. He devotes about 40% of his time to directing the Center and conducting related research. The Center also has a 50 percent research associate, who is a full-time term faculty member in psychology, urban and public affairs, and law. Two graduate research assistants each have 25 percent appointments in the Center. Several from about a dozen disciplines are affiliated with the Center.
- The Center’s suite includes student workspaces and a single office for the director and researchers, though participating faculty members have separate offices in their academic units.
- Long-term directed funds such as endowments provide for 65 percent of the Center’s budget, and short-term directed funds such as grants and contracts are 30 percent. The remaining funds come from non-directed institutional appropriations (4 percent) and donor gifts (1 percent).



The Center focuses on basic and applied research, including outreach, to promote better understanding of and ideas about the relationships between land use and human and natural environments. Its work is organized around two initiatives: the Fair and Healthy Land Use Initiative and the Healthy Watershed Land Use Initiative. These include grant projects; panels, symposia and other speakers; and research and publications. Most of the Center’s current work is focused on watershed governance institutions, including their participatory methods,

their evolution, and their promotion of resilience among both natural ecosystems and human communities (i.e., social-ecological resilience).

A highlighted project of the Fair and Healthy Land Use Initiative is “The Community Land Use Assessment for Fair and Healthy Neighborhoods: An Educational-Community Partnership in West Louisville.” Funded by a “civic capacity enhancement mini-grant” from the Louisville Metro Center for Health Equity, the environmental justice project trained local high school students in researching and presenting the results of a community survey. The purpose was to understand residents’ views on their community conditions, including housing, health equity and community assets, in neighborhoods that are predominantly black, low-income and experiencing inequitable distribution of land uses. Student representatives presented the report to Habitat for Humanity of Metro Louisville to identify methods of engaging local residents in housing construction, housing rehabilitation and community revitalization. Another project of this initiative is the Green City Partnership Project, which the Center has assisted by providing research and administrative support to the Louisville Metro Climate Change Task Force and the Committee on Land Use, Transportation and Urban Forestry.

As part of the Healthy Watershed Land Use Initiative, the Center co-hosted the Kentucky Growth Readiness Workshops, part of the Commonwealth Water Education Project, funded by an EPA grant to the Commonwealth of Kentucky Division of Water and the University of Louisville’s Department of Geography. The workshops were meant to facilitate community-based, multi-stakeholder workshops across jurisdictions on mechanisms to adapt land development regulations and planning to protect water quality by bringing together local officials, community leaders, land development and environmental professionals, civic groups and other water and land use organizations. The Center has also produced publications now available online -- the “Kentucky Wet Growth Tools for Sustainable Development: A Handbook on Land Use” and the “Water for Kentucky Communities and the Darby Creek Land Use Planning and Law Report,” prepared by an interdisciplinary group of law, planning, and public administration students. Current work on building and sustaining adaptive watershed governance institutions includes doing case-study research on 52 watersheds in 11 states, field and laboratory research on participatory governance methods, working with government officials and environmental conservation experts on watershed planning in the Green River basin, and meeting with basin coordinators statewide to develop adaptive watershed planning methods.



Internal activities include the Boehl Distinguished Lecture Series in Land Use Policy, established with funds from the Kentucky Research Challenge Trust Fund and the estate of a law school alumnus, and the 2010 publication *Sustain: Environmentally Responsible Land Use*, a multidisciplinary volume of 12 scholarly works on land use and the environment, available on the Center’s website. Also posted online is a “Top 20” list of relevant websites, as well as the blog “Mapping the Landscape” which features abstracts of and links to recent publications.

Appendix A – Methodology

Acknowledgements

NCSE's research relies on the time and efforts of the environmental, sustainability, energy and related program leaders who participate in our surveys. Their contributions are greatly appreciated.

Methodology

This study was designed to provide foundational information about the number, structure, activities and resources of IESICs in the United States. We initially conducted a census to identify all institutes and centers focused on the environment and/or sustainability at research universities in the United States, followed by a survey of directors and analysis of the data collected to characterize the population and explore relationships.

Census. The Carnegie Classification of Institutes of Higher Education is widely used in higher education research in the United States. The Carnegie Classification system categorizes institutions primarily based on the highest degree conferred, the number of degrees conferred, and the level of research activity. The census included all academic institutions in the U.S. classified as doctoral-granting universities; institutions that award at least 20 doctoral degrees per year. These universities are further divided into three sub-groups based on their level of research activity: very high research activity (108 institutions), high research activity (99 institutions), and doctoral/research universities (90 institutions). A search of these 297 universities' websites and catalogs was conducted during the spring of 2013. Although we strove to identify all IESICs we may have missed one or more if their focus wasn't sufficiently clear based on the materials we examined. We limited our current study to research universities because the vast majority of IESICs are located at these institutions. We identified a total of 1,122 IESICs.

Survey Sample. A survey of U.S. IESIC directors was conducted May-July 2013. All 1,222 IESIC directors identified during the census were invited to participate. Completed survey responses were received from the directors of 340 IESICs; a response rate of 28% (see the list of participating institutions and institutes/centers in Appendix B). The sample size was sufficient to measure correlations between attributes with a power of 0.90 to detect a 0.20 effect (small-moderate) size at $\alpha=0.05$; statistical frequencies have a margin of error of $\pm 5\%$. The survey included questions addressing three sets of characteristics: operational structure, activities and resources (see Appendix C for the questionnaire).

The representativeness of the sample was assessed by comparing four defining program attributes between the sample and target population at $\alpha=0.05$: institution basic Carnegie class, institution control (public or private-not-for-profit), institution census division, and institute/center types (seven categories). The sample was representative on all parameters.

Relationships. Two nonparametric statistical tests ($\alpha=.05$) were used to explore relationships among the types (name type and category) of IESICs and their attributes: the Wilcoxon (Mann Whitney t test and Kruskal-Wallis one-way analysis of variance by ranks (KWANOVA)). The Mann Whitney test is used to test for differences between two independent groups. Kruskal-Wallis is a non-parametric test of the difference in the shape or location (central tendency) of populations underlying two or more groups.

Appendix B - List of Participating Institutions, Institutes and Centers

Note: the institutes or centers in bold type are profiled in this report

University	City	State	Institute or Center
American University	Washington	DC	Center for Environmental Policy
Arizona State University	Phoenix	AZ	Global Institute of Sustainability
Auburn University	Auburn	AL	Forest Policy Center
Ball State University	Muncie	IN	Center for Energy Research, Education, and Service
Ball State University	Muncie	IN	Field Station and Environmental Education Center
Barry University	Miami	FL	Center for Earth Jurisprudence
Brown University	Providence	RI	Center for Environmental Health and Technology
Brown University	Providence	RI	Center for Environmental Studies
Brown University	Providence	RI	Environmental Change Initiative
California Institute of Technology	Pasadena	CA	Resnick Sustainability Institute
Carnegie Mellon University	Pittsburgh	PA	Center for the Environmental Implications of Nanotechnology
Carnegie Mellon University	Pittsburgh	PA	Climate Energy Decision Making Center
Carnegie Mellon University	Pittsburgh	PA	Institute for Green Science
Carnegie Mellon University	Pittsburgh	PA	Steinbrenner Institute for Environmental Education and Research
Case Western Reserve University	Cleveland	OH	Fowler Center for Sustainable Value
Case Western Reserve University	Cleveland	OH	Great Lakes Energy Institute
Central Michigan University	Mount Pleasant	MI	Institute for Great Lakes Research
Clarkson University	Potsdam	NY	Institute for a Sustainable Environment
Clemson University	Clemson	SC	Baruch Institute of Coastal Ecology and Forest Science
Clemson University	Clemson	SC	Clemson Environmental Institute
Cleveland State University	Cleveland	OH	Great Lakes Environmental Finance Center
College of William and Mary	Gloucester Point	VA	Virginia Institute of Marine Science: Aquaculture Genetics and Breeding Technology Center
College of William and Mary	Gloucester Point	VA	Virginia Institute of Marine Science: Marine Advisory Services
Colorado School of Mines	Golden	CO	Center for Experimental Study of Subsurface Environmental Processes
Colorado School of Mines	Golden	CO	Colorado Energy Research Institute
Colorado School of Mines	Golden	CO	Renewable Energy Materials Research Science and Engineering Center
Colorado State University	Fort Collins	CO	Center for Agricultural Energy
Colorado State University	Fort Collins	CO	Center for Disaster and Risk Analysis
Colorado State University	Fort Collins	CO	Center for Protected Area Management and Training
Colorado State University	Fort Collins	CO	Center for the New Energy Economy
Colorado State University	Fort Collins	CO	Colorado Center for Sustainable Integrated Pest Management
Colorado State University	Fort Collins	CO	Colorado Forest Restoration Institute
Colorado State University	Fort Collins	CO	Energy Institute

CONTINUED ►

Interdisciplinary Environmental and Sustainability Education and Research: Institutes and Centers

University	City	State	Institute or Center
Colorado State University	Fort Collins	CO	Institute for the Built Environment
Columbia University	New York	NY	Center for Climate Change Law
Columbia University	New York	NY	Center for Environmental Health in Northern Manhattan
Columbia University	New York	NY	Center for International Earth Science Information Network (CIESIN), The Earth Institute
Columbia University	New York	NY	Columbia Water Center
Columbia University	New York	NY	Earth Engineering Center
Columbia University	New York	NY	Earth Institute: Center for Environmental Sustainability
Columbia University	New York	NY	Earth Institute: Center on Globalization and Sustainable Development
Cornell University	Ithaca	NY	Center for Sustainable Global Enterprise
Cornell University	Ithaca	NY	New York State Water Resources Institute
CUNY Graduate School and University Center	New York	NY	Center for Human Environments
Duke University	Durham	NC	Center for Energy, Development, and the Global Environment (EDGE)
Duke University	Durham	NC	Center for the Environmental Implications of NanoTechnology (CEINT)
Duke University	Durham	NC	Duke University Wetland Center
Duke University	Durham	NC	Gendell Center for Engineering, Energy and the Environment
Duquesne University	Pittsburg	PA	Center for Environmental Research and Education
Duquesne University	Pittsburg	PA	Center for Green Industries and Sustainable Business Growth
East Carolina University	Greenville	NC	Center for Natural Hazards Research
East Carolina University	Greenville	NC	Center for Sustainable Tourism
East Carolina University	Greenville	NC	Institute for Coastal Science and Policy
Florida Atlantic University	Tallahassee	FL	Pine Jog Environmental Education Center
Florida Institute of Technology	Boca Raton	FL	Institute for Research on Global Climate Change
Florida International University	Melbourne	FL	Southeast Environmental Research Center
Florida State University	Miami	FL	Institute for Energy, Economics and Sustainability (IESES)
George Mason University	Fairfax	VA	Center for Climate Change Communication
George Mason University	Fairfax	VA	Global Environment and Natural Resource Institute
George Mason University	Fairfax	VA	Potomac Environmental Research and Education Center
Georgetown University	Washington	DC	Center for the Environment
Georgia Institute of Technology	Atlanta	GA	Brook Byers Institute for Sustainable Systems
Georgia Institute of Technology	Atlanta	GA	Strategic Energy Institute
Illinois Institute of Technology	Chicago	IL	Center for Sustainable Enterprise
Illinois Institute of Technology	Chicago	IL	Wanger Institute for Sustainable Energy Research (WISER)
Illinois State University	Normal	IL	Center for Renewable Energy
Indiana State University	Terre Haute	IN	Institute for Community Sustainability
Indiana University-Bloomington	Bloomington	IN	Integrated Program in the Environment
Iowa State University	Ames	IA	Iowa Water Center
Jackson State University	Jackson	MS	Coastal Hazards Center-Education
Jackson State University	Jackson	MS	Trent Lott Geospatial and Visualization Research Center

CONTINUED ►

Interdisciplinary Environmental and Sustainability Education and Research: Institutes and Centers

University	City	State	Institute or Center
Johns Hopkins University	Baltimore	MD	Center for a Livable Future
Kansas State University	Manhattan	KS	Center for Hazardous Substance Research
Kansas State University	Manhattan	KS	Center for Sustainable Energy
Kansas State University	Manhattan	KS	Kansas Center for Agricultural Resources and the Environment
Kansas State University	Manhattan	KS	Kansas Center for Sustainable Agriculture and Alternative Crops
Kansas State University	Manhattan	KS	Kansas Cooperative Fish and Wildlife Research Unit
Lehigh University	Bethlehem	PA	Energy Research Center
Lehigh University	Bethlehem	PA	Energy Systems Engineering Institute
Louisiana State University	Baton Rouge	LA	Coastal Studies Institute and Coastal Sustainability Studio
Miami University-Oxford	Oxford	OH	Institute for the Environment and Sustainability
Michigan State University	East Lansing	MI	Center for Global Change and Earth Observations
Michigan State University	East Lansing	MI	Center for Systems Integration and Sustainability
Michigan State University	East Lansing	MI	Center for Water Sciences
Michigan Technological University	Houghton	MI	Advanced Power Systems Research Center
Michigan Technological University	Houghton	MI	Michigan Tech Center for Water and Society
Michigan Technological University	Houghton	MI	Power and Energy Research Center
Middle Tennessee State University	Murfreesboro	TN	Middle Tennessee State University Center for Environmental Education
Mississippi State University	Mississippi State	MS	Center for Environmental Health Sciences
Mississippi State University	Mississippi State	MS	Forest and Wildlife Research Center
Montana State University	Bozeman	MT	Center for Bio-Inspired Nanomaterials
New Jersey Institute of Technology	Newark	NJ	York Center for Engineering and Environmental Science
New York University	New York	NY	Wallerstein Collaborative for Urban Environmental Education
North Carolina A&T State University	Greensboro	NC	Interdisciplinary Waste Management Institute
North Carolina State University-Raleigh	Raleigh	NC	Center for Environmental and Resource Economic Policy
North Carolina State University-Raleigh	Raleigh	NC	Center for Human Health and the Environment
North Carolina State University-Raleigh	Raleigh	NC	Center for Transportation and the Environment
North Carolina State University-Raleigh	Raleigh	NC	Future Renewable Electric Energy Delivery and Management Systems Center
North Carolina State University-Raleigh	Raleigh	NC	North Carolina Institute for Climate Studies
North Carolina State University-Raleigh	Raleigh	NC	State Climate Office
Northern Arizona University	Flagstaff	AZ	Colorado Plateau Biodiversity Center
Northern Illinois University	Dekalb	IL	Fuel Cell Center Research Center
Northern Illinois University	Dekalb	IL	Institute for the Study of the Environment, Sustainability, and Energy
Ohio State University	Columbus	OH	Byrd Polar Research Center
Ohio State University	Columbus	OH	Environmental Sciences Network
Ohio State University	Columbus	OH	Institute for Energy and the Environment
Ohio University	Athens	OH	Institute for Sustainable Energy and the Environment

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Interdisciplinary Environmental and Sustainability Education and Research: Institutes and Centers

University	City	State	Institute or Center
Oklahoma State University	Stillwater	OK	Biobased Products and Energy Center
Oklahoma State University	Stillwater	OK	Oklahoma Water Resources Center
Old Dominion University	Norfolk	VA	Virginia Coastal Energy Research Consortium
Oregon State University	Corvallis	OR	Cooperative Institute for Marine Resources Studies
Oregon State University	Corvallis	OR	Institute for Natural Resources
Oregon State University	Corvallis	OR	Institute for Water and Watersheds
Oregon State University	Corvallis	OR	Northwest National Marine Renewable Energy Center
Oregon State University	Corvallis	OR	Oregon Built Environment and Sustainable Technologies Center (Oregon BEST)
Oregon State University	Corvallis	OR	Oregon Climate Change Research Institute
Pace University	New York	NY	Brazil-American Institute for Law and Environment (BAILE)
Pace University	New York	NY	Land Use Law Center
Pace University	New York	NY	Pace Academy for Applied Environmental Studies
Pace University	New York	NY	Pace Center for Environmental Legal Studies
Pace University	New York	NY	Pace Energy and Climate Center
Pennsylvania State University	University Park	PA	Center for Environmental Informatics
Pennsylvania State University	University Park	PA	Environment and Natural Resources Institute
Pennsylvania State University	University Park	PA	Penn State Institutes of Energy and the Environment
Pennsylvania State University	University Park	PA	Pennsylvania Water Resources Research Center
Pennsylvania State University	University Park	PA	Riparia Center
Pennsylvania State University	University Park	PA	Rock Ethics Institute
Pennsylvania State University	University Park	PA	Shaver's Creek Environmental Center
Purdue University	West Lafayette	IN	Center for the Environment
Purdue University	West Lafayette	IN	Indiana Water Resources Research Center
Purdue University	West Lafayette	IN	Purdue Climate Change Research Center
Rensselaer Polytechnic Institute	Troy	NY	Center for Architecture Science and Ecology
Rensselaer Polytechnic Institute	Troy	NY	Center for Infrastructure, Transportation, and the Environment // VREF's Center for Sustainable Urban Freight Transport
Rutgers University-New Brunswick	New Brunswick	NJ	Center for Energy, Economic and Environmental Policy
Stanford University	Stanford	CA	Global Climate and Energy Project
Stanford University	Stanford	CA	Precourt Institute for Energy
SUNY-Binghamton	Binghamton	NY	Center for Advance Sensors and Environmental Systems (CASE)
SUNY-Binghamton	Binghamton	NY	Center for Autonomous Solar Power
SUNY-Binghamton	Binghamton	NY	Center for Integrated Watershed Studies
SUNY-Syracuse (College of Environmental Science and Forestry)	Syracuse	NY	Great Lakes Research Consortium
SUNY-Syracuse (College of Environmental Science and Forestry)	Syracuse	NY	Randolph G. Pack Environmental Institute
SUNY-Syracuse (College of Environmental Science and Forestry)	Syracuse	NY	Sustainable Enterprise Partnership
Temple University	Philadelphia	PA	Center for Sustainable Communities
Texas A&M University	College Station	TX	Crisman Institute for Petroleum Research

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Interdisciplinary Environmental and Sustainability Education and Research: Institutes and Centers

University	City	State	Institute or Center
Texas A&M University	College Station	TX	Texas Sea Grant College Program
Texas A&M University-Corpus Christi	Corpus Christi	TX	Conrad Blucher Institute for Surveying and Science
Texas Christian University	Fort Worth	TX	TCU Energy Institute
Texas Tech University	Lubbock	TX	Center for Environmental Radiation Studies
Texas Tech University	Lubbock	TX	Climate Science Center
Texas Tech University	Lubbock	TX	International Center for Arid and Semiarid Land Studies (ICASALS)
Texas Tech University	Lubbock	TX	National Wind Institute
Texas Tech University	Lubbock	TX	Water Resources Center
Tufts University	Medford	MA	Tufts Institute of the Environment
Tulane University	New Orleans	LA	Tulane / Xavier Center for Bioenvironmental Research (Gulf Coast)
Tulane University	New Orleans	LA	Tulane Institute on Water Resources Law and Policy
University at Buffalo	Buffalo	NY	Great Lakes Program
University at Buffalo	Buffalo	NY	Landscape-based Environmental System Analysis and Modeling (LESAM) Laboratory
University of Alabama	Tuscaloosa	AL	Environmental Institute
University of Alaska-Fairbanks	Fairbanks	AK	Water and Environmental Research Center
University of Arizona	Tucson	AZ	Institute of the Environment
University of Arizona	Tucson	AZ	Water Resources Research Center
University of Arkansas	Fayetteville	AR	Arkansas Water Resources Center
University of California-Berkeley	Berkeley	CA	Berkeley Water Center
University of California-Berkeley	Berkeley	CA	Energy Biosciences Institute
University of California-Davis	Davis	CA	Agricultural Sustainability Institute
University of California-Davis	Davis	CA	Center for Environmental Policy and Behavior
University of California-Davis	Davis	CA	Center for Watershed Sciences
University of California-Davis	Davis	CA	Energy Efficiency Center
University of California-Davis	Davis	CA	Institute of Transportation Studies
University of California-Davis	Davis	CA	UC Davis Energy Institute
University of California-Davis	Davis	CA	Western Cooling Efficiency Center
University of California-Irvine	Irvine	CA	Center for Environmental Biology
University of California-Irvine	Irvine	CA	Center for Learning in the Arts, Sciences and Sustainability
University of California-Irvine	Irvine	CA	Newkirk Center for Science and Society
University of California-Irvine	Irvine	CA	UCI Law Center for Land, Environment, and Natural Resources
University of California-Los Angeles	Los Angeles	CA	California Center for Sustainable Communities
University of California-Los Angeles	Los Angeles	CA	Emmett Center on Climate Change and the Environment
University of California-Los Angeles	Los Angeles	CA	Lewis Center for Regional Policy Studies
University of California-Los Angeles	Los Angeles	CA	UCLA Center for Corporate Environmental Performance
University of California-Merced	Merced	CA	Sierra Nevada Research Institute
University of California-Riverside	Riverside	CA	Center for Conservation Biology
University of California-Riverside	Riverside	CA	Center for Sustainable Suburban Development
University of California-San Diego	La Jolla	CA	Center for Environmental Economics
University of California-San Diego	La Jolla	CA	Center for Marine Biodiversity and Conservation

CONTINUED ►

Interdisciplinary Environmental and Sustainability Education and Research: Institutes and Centers

University	City	State	Institute or Center
University of California-San Diego	La Jolla	CA	Institute on Global Conflict and Cooperation
University of California-San Diego	La Jolla	CA	Sustainability Solutions Institute
University of California-Santa Barbara	Santa Barbara	CA	Institute for Energy Efficiency
University of California-Santa Barbara	Santa Barbara	CA	UC Center for Environmental Implications of Nanotechnology
University of California-Santa Cruz	Santa Cruz	CA	Center for Agroecology and Sustainable Food Systems
University of California-Santa Cruz	Santa Cruz	CA	Center for Integrated Water Research
University of California-Santa Cruz	Santa Cruz	CA	Center for Sustainable Energy and Power Systems
University of California-Santa Cruz	Santa Cruz	CA	Institute of Marine Sciences
University of Colorado-Boulder	Boulder	CO	Center for Science and Technology Policy Research
University of Colorado-Boulder	Boulder	CO	NOAA-CU Center for Environmental Technology (CET)
University of Connecticut	Storrs	CT	Center for Environmental Sciences and Engineering
University of Connecticut	Storrs	CT	Center for Land Use Education and Research (CLEAR)
University of Connecticut	Storrs	CT	Wildlife and Fisheries Conservation Center
University of Dayton	Dayton	OH	Building Energy Center
University of Dayton	Dayton	OH	Marianist Environmental Education Center (MEEC)
University of Dayton	Dayton	OH	Sustainability, Energy and the Environment
University of Delaware	Newark	DE	Catalysis Center for Energy Innovation
University of Delaware	Newark	DE	Center for Carbon-free Power Integration
University of Delaware	Newark	DE	Center for Environmental Genomics
University of Delaware	Newark	DE	Delaware Biotechnology Institute
University of Delaware	Newark	DE	Delaware Environmental Institute
University of Delaware	Newark	DE	Institute of Energy Conversion
University of Delaware	Newark	DE	Water Resources Agency
University of Denver	Denver	CO	Rocky Mountain Land Use Institute
University of Florida	Gainesville	FL	Bill Hinkley Center for Solid and Hazardous Waste Management
University of Florida	Gainesville	FL	Center for Environmental and Human Toxicology
University of Florida	Gainesville	FL	Florida Institute for Sustainable Energy
University of Florida	Gainesville	FL	UF/IFAS Center for Aquatic and Invasive Plants
University of Florida	Gainesville	FL	Water Institute
University of Georgia	Athens	GA	Center for Invasive Species and Ecosystem Health
University of Georgia	Athens	GA	River Basin Center
University of Georgia	Athens	GA	Savannah River Ecology Laboratory
University of Georgia	Athens	GA	UGA Marine Institute
University of Hawaii-Manoa	Honolulu	HI	Center for Conservation Research and Training
University of Hawaii-Manoa	Honolulu	HI	International Pacific Research Center
University of Hawaii-Manoa	Honolulu	HI	Water Resources Research Center
University of Houston	Houston	TX	Environment, Energy and Natural Resource Center
University of Houston	Houston	TX	Environmental Institute of Houston
University of Idaho	Moscow	ID	Center for Ecohydraulics Research
University of Illinois-Chicago	Chicago	IL	Environmental and Occupational Health Sciences
University of Illinois-Chicago	Chicago	IL	Institute for Environmental Science and Policy

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Interdisciplinary Environmental and Sustainability Education and Research: Institutes and Centers

University	City	State	Institute or Center
University of Illinois-Urbana-Champaign	Champaign	IL	Center for Water as a Complex Environmental System (2-3)
University of Iowa	Iowa City	IA	Center for Health Effects of Environmental Contamination
University of Kentucky	Lexington	KY	Center for Applied Energy Research
University of Kentucky	Lexington	KY	Tracy Farmer Institute for Sustainability and the Environment
University of Louisiana-Lafayette	Lafayette	LA	Center for Ecology and Environmental Technology
University of Louisville	Louisville	KY	Center for Environmental Genomics and Integrative Biology
University of Louisville	Louisville	KY	Center for Environmental Policy and Management
University of Louisville	Louisville	KY	Center for Land Use and Environmental Responsibility
University of Louisville	Louisville	KY	Kentucky Institute for the Environment and Sustainable Development
University of Maine	Orono	ME	Climate Change Institute
University of Maine	Orono	ME	Senator George J. Mitchell Center for Sustainability Solutions
University of Maryland-College Park	College Park	MD	Maryland Institute for Applied Environmental Health
University of Massachusetts-Amherst	Amherst	MA	Climate System Research Center
University of Massachusetts-Amherst	Amherst	MA	Wind Energy Center
University of Massachusetts-Boston	Boston	MA	Center for Governance and Sustainability
University of Massachusetts-Boston	Boston	MA	Center for Rebuilding Sustainable Communities after Disasters
University of Massachusetts-Boston	Boston	MA	Urban Harbors Institute
University of Massachusetts-Lowell	Lowell	MA	Lowell Center for Sustainable Production
University of Miami	Coral Gables	FL	National Center for Coral Reef Research (NCORE)
University of Michigan-Ann Arbor	Ann Arbor	MI	Erb Institute for Global Sustainable Enterprise
University of Michigan-Ann Arbor	Ann Arbor	MI	Graham Sustainability Institute
University of Michigan-Ann Arbor	Ann Arbor	MI	University of Michigan Energy Institute
University of Minnesota-Twin Cities	Minneapolis	MN	Center for Environment and Natural Resource Policy
University of Minnesota-Twin Cities	Minneapolis	MN	Center for Integrated Natural Resources and Agricultural Management
University of Minnesota-Twin Cities	Minneapolis	MN	Center for Science, Technology and Public Policy
University of Minnesota-Twin Cities	Minneapolis	MN	CUES Center for Urban Sustainability
University of Minnesota-Twin Cities	Minneapolis	MN	Forest Products Management Development Institute
University of Minnesota-Twin Cities	Minneapolis	MN	Metropolitan Design Center
University of Minnesota-Twin Cities	Minneapolis	MN	NorthStar Initiative for Sustainable Enterprise
University of Minnesota-Twin Cities	Minneapolis	MN	Regional Sustainable Development Partnerships
University of Minnesota-Twin Cities	Minneapolis	MN	Water Resources Center
University of Missouri-Columbia	Columbia	MO	Geographic Resources Center
University of Montana	Missoula	MT	Center for Environmental Health Sciences
University of Montana	Missoula	MT	O'Connor Center for the Rocky Mountain West
University of Nebraska-Lincoln	Lincoln	NE	Center for Environmental Health and Toxicology
University of Nevada-Las Vegas	Las Vegas	NV	Center for Urban Horticulture and Water Conservation
University of Nevada-Reno	Reno	NV	Academy for the Environment
University of New Hampshire	Durham	NH	Center for Freshwater Biology
University of New Hampshire	Durham	NH	Institute for the Study of Earth, Oceans, and Space
University of New Mexico	Albuquerque	NM	Earth Data Analysis Center

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Interdisciplinary Environmental and Sustainability Education and Research: Institutes and Centers

University	City	State	Institute or Center
University of New Orleans	New Orleans	LA	Energy Conversion and Conservation Center
University of New Orleans	New Orleans	LA	Maritime Environmental Resources and Information Center (MERIC)
University of North Carolina-Chapel Hill	Chapel Hill	NC	Center for Law Environment Adaptation and Resources (CLEAR)
University of North Carolina-Chapel Hill	Chapel Hill	NC	Environmental Finance Center
University of North Carolina-Chapel Hill	Chapel Hill	NC	Institute for the Environment
University of North Carolina-Chapel Hill	Chapel Hill	NC	North Carolina Coastal Resources Law, Planning, and Policy Center
University of North Carolina-Chapel Hill	Chapel Hill	NC	Solar Fuels Energy Frontier Research Center
University of North Carolina-Chapel Hill	Chapel Hill	NC	UNC Coastal Studies Institute
University of North Carolina-Chapel Hill	Chapel Hill	NC	Water Institute
University of North Carolina-Charlotte	Charlotte	NC	Infrastructure, Design, Environment and Sustainability Center
University of North Texas	Denton	TX	Center for Environmental Philosophy
University of North Texas	Denton	TX	Center for the Study of Interdisciplinarity
University of Notre Dame	South Bend	IN	University of Notre Dame Environmental Research Center (UNDERC)
University of Oklahoma	Norman	OK	Center for Restoration of Ecosystems and Watersheds
University of Oklahoma	Norman	OK	Energy Institute of the Americas
University of Oklahoma	Norman	OK	Institute for Energy and the Environment
University of Oregon	Eugene	OR	Environmental and Natural Resources Law Center
University of Oregon	Eugene	OR	Institute for a Sustainable Environment
University of Oregon	Eugene	OR	Solar Energy Center
University of Pittsburgh	Pittsburgh	PA	Center for Energy
University of Pittsburgh	Pittsburgh	PA	Mascaro Center for Sustainable Innovation
University of Rochester	Rochester	NY	Environmental Health Sciences Center
University of San Francisco	San Francisco	CA	Nautilus Institute for Security and Sustainability
University of South Carolina	Columbia	SC	Baruch Institute for Marine and Coastal Sciences
University of Southern California	Los Angeles	CA	Energy Institute
University of Southern California	Los Angeles	CA	Wrigley Institute for Environmental Studies
University of Tennessee-Knoxville	Knoxville	TN	Bredesen Center for Interdisciplinary Research and Graduate Education
University of Tennessee-Knoxville	Knoxville	TN	Institute for Environmental Modeling (TIEM) (6-23)
University of Tennessee-Knoxville	Knoxville	TN	Tennessee Water Resources Research Center
University of Tennessee-Knoxville	Knoxville	TN	UT Center for Remote Data Analysis and Visualization (6-27)
University of Texas-Arlington	Arlington	TX	Energy Systems Research Center
University of Texas-Austin	Austin	TX	Center for Sustainable Development
University of Texas-El Paso	El Paso	TX	Center for Environmental Resource Management
University of Texas-El Paso	El Paso	TX	Center for Inland Desalination Systems
University of Texas-San Antonio	San Antonio	TX	Center for Cultural Sustainability
University of Toledo	Toledo	OH	Lake Erie Center
University of Utah	Salt Lake City	UT	Institute for Clean and Secure Energy
University of Utah	Salt Lake City	UT	Wallace Stegner Center for Land, Resources and the Environment at the S.J. Quinney College of Law

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Interdisciplinary Environmental and Sustainability Education and Research: Institutes and Centers

University	City	State	Institute or Center
University of Vermont	Burlington	VT	Center for Sustainable Agriculture
University of Vermont	Burlington	VT	Gund Institute for Ecological Economic
University of Virginia	Charlottesville	VA	Virginia Natural Resources Leadership Institute
University of Washington-Seattle	Seattle	WA	Buerk Center for Entrepreneurship
University of Washington-Seattle	Seattle	WA	Center for Clean Air Research
University of Washington-Seattle	Seattle	WA	Center for Conservation Biology
University of Washington-Seattle	Seattle	WA	Center for Sustainable Forestry at Pack Forest
University of Washington-Seattle	Seattle	WA	Green Futures Research and Design Lab
University of Washington-Seattle	Seattle	WA	Program on Climate Change
University of Washington-Seattle	Seattle	WA	Quaternary Research Center
University of West Florida	Pensacola	FL	Center for Environmental Diagnostics and Bioremediation
University of Wisconsin-Madison	Madison	WI	Aquatic Sciences Center
University of Wisconsin-Madison	Madison	WI	Center for Climatic Research
University of Wisconsin-Madison	Madison	WI	Great Lakes Bioenergy
University of Wisconsin-Madison	Madison	WI	Nelson Institute for Environmental Studies
University of Wisconsin-Madison	Madison	WI	Wisconsin Energy Institute
University of Wisconsin-Milwaukee	Milwaukee	WI	Water Equipment and Policy I/UCRC
University of Wyoming	Laramie	WY	Center for Energy Economics and Public Policy
University of Wyoming	Laramie	WY	Center for Photoconversion and Catalysis
University of Wyoming	Laramie	WY	Ruckleshaus Institute of Environment and Natural Resources
University of Wyoming	Laramie	WY	Wind Energy Research Center
University of Wyoming	Laramie	WY	Wyoming Reclamation and Restoration Center
Utah State University	Logan	UT	National Aquatic Monitoring Center
Utah State University	Logan	UT	Western Rural Development Center
Virginia Commonwealth University	Richmond	VA	Rice Center for Environmental Sciences
Virginia Polytechnic Institute and State University	Blacksburg	VA	Catawba Sustainability Center
Virginia Polytechnic Institute and State University	Blacksburg	VA	Conservation Management Institute
Virginia Polytechnic Institute and State University	Blacksburg	VA	Institute for Critical Technology and Applied Science
Virginia Polytechnic Institute and State University	Blacksburg	VA	Powell River Project
Virginia Polytechnic Institute and State University	Blacksburg	VA	Virginia Water Resources Research Center
Wake Forest University	Winston Salem	NC	Center for Energy, Environment, and Sustainability
Washington State University	Pullham	WA	Institute for Sustainable Design
West Virginia University	Morgantown	WV	Environmental Research Center
West Virginia University	Morgantown	WV	Natural Resource Analysis Center
Worcester Polytechnic Institute	Worcester	MA	Institute for Energy and Sustainability
Yale University	New Haven	CT	Global Institute of Sustainable Forestry
Yale University	New Haven	CT	Yale Institute for Biospheric Studies
Yale University	New Haven	CT	Yale Sustainable Food Project

APPENDIX C – Survey Questionnaire

Center/institute name:

University:

Director name:

Director email address:

1. Where is the center/institute located in the administrative hierarchy of your institution?
 - Primary level – the center/institute is a primary level administrative unit.
 - Secondary level – the center/institute is located administratively within one college (school/division) or shared by two or more colleges (schools/divisions).
 - Tertiary level – the center/institute is located administratively within a department or shared by two or more departments.

Other (explain):

2. Which disciplines, professional fields and external groups are typically involved in the center's/institute's projects?
 - Environmental science and studies
 - Life sciences
 - Physical sciences
 - Applied sciences/engineering
 - Natural resources management/agriculture
 - Social sciences
 - Humanities
 - Professional fields (e.g. law, business, public administration)
 - Governmental agencies or organizations
 - External public or private organizations
 - Other higher education institutions

3. To whom does the center/institute director report?
 - President or chancellor (administrator in the office of the president or chancellor)
 - Chief academic officer (administrator in the office of the provost or vice-chancellor)
 - Vice president for research or similar position
 - Dean of one college/division/school
 - Deans of two or more colleges/divisions/schools
 - Chair/head of one department
 - Chairs/heads of two or more departments
 - Steering committee

Other (explain):

4. What are the primary goals of the center/institute? Please indicate the proportion of the center's/institute's activities/resources devoted to each area. Proportions should add to 100%.

Research ____%

Education ____%

Outreach/continuing education ____%

Campus sustainability ____%

Other (explain):

5. Does the center/institute administer any academic programs? Check all that apply.

- Baccalaureate degree(s)
- Accelerated 5-year baccalaureate/master's degree(s)
- Master's degree(s) – MS/MA
- Master's degree(s) – Other/professional (e.g. Master of Environmental Management)
- Master's degree(s) – Professional Science Master's™
- Master's degrees specifically designed for working professionals (e.g. executive master)
- Doctoral degrees(s)
- Undergraduate minor(s)
- Graduate minor(s)
- Undergraduate certificate(s)
- Graduate certificate(s)
- Professional/continuing education certificate(s)

6. Does the center/institute have its own physical space?

- The center/institute is located in its own building
- The center/institute is located in its own distinct space (suite with a separate entrance)
- The center/institute is located within another space (e.g. college dean's office)
- The center/institute does not have its own distinct/dedicated space

The center/institute space includes the following (check all that apply).

- Reception area
- Offices for administrators/staff
- Offices for faculty
- Workspace/offices for students
- Informal meeting place/lounge
- Conference room(s)
- Laboratories or other technical facilities
- Computer labs
- Other (explain):

7. Please indicate if the center/institute supports the following administrators/faculty and staff. Check or complete all that apply. (302)

- Director/executive director (Full-time FTE in the center/institute)
- Director/executive director (Part-time FTE in the center/institute)
- Associate/assistant director (Full-time FTE in the center/institute)
- Associate/assistant director (Part-time FTE in the center/institute)
- Other administrator(s) (Full-time FTE in the center/institute)
- Other administrator(s) (Part-time FTE in the center/institute)

___ Number of full-time staff

___ Number of part-time staff

___ Number of core faculty (Full-time FTE in the center/institute)

___ Number of joint faculty (Part-time FTE in the center/institute or temporary release from unit)

___ Number of participating faculty (formally affiliated with the center/institute)

8. Identify the proportion of the center's/institute's budget that comes from the following sources (average over last three years). Proportions should add to 100%.

- The center/institute does not have its own budget

Non-directed funds (institutional appropriations) _____%

Long-term directed funds (e.g. endowments) _____%

Short-term directed funds (e.g. grants, contracts) _____%

Donor gifts _____%

Other (explain):

NCSE University Affiliate members

Alabama A&M University	Lehigh University	University of Alaska, Anchorage
Alabama State University	Lewis & Clark College	University of California, Berkeley
Allegheny College	Lewis University	University of California, Davis
Antioch University New England	Louisiana State University	University of California, Irvine
Arizona State University	Loyola Marymount University	University of California, Merced
Arkansas State University	Macalester College	University of California, San Diego
Ball State University	Manhattan College	University of California, Santa Barbara
Bard College	Maryville College	University of Central Florida
Barnard College	Marywood University	University of Cincinnati
Bellarmino University	Michigan State University	University of Colorado, Boulder
Bentley University	Middlebury College	University of Connecticut
Boston College	Monmouth University	University of Dayton
Boston University	Moravian College	University of Delaware
Brandeis University	Morgan State University	University of the District of Columbia
Bryn Mawr College	Mount Holyoke College	University of Georgia
California Polytechnic State University- San Luis Obispo	New College of Florida	University of Idaho
Chatham University	North Carolina A&T State University	University of La Verne
Clarkson University	North Carolina State University	University of Louisville
Clemson University	Northeastern University	University of Maryland-Center for Environmental Science
Colby College	Northern Arizona University	University of Maryland-College Park
Colgate University	Northern Illinois University	University of Massachusetts, Boston
Collegiate of Charleston	Ohio State University, The	University of Michigan
College of Menominee Nation	Old Dominion University	University of Minnesota, Twin Cities
College of Saint Benedict/St. John's University	Oregon State University	University of Montana, Missoula
Colleges of the Fenway	Pace University	University of Nebraska-Lincoln
Colorado College	Pennsylvania State University	University of Nevada, Reno
Colorado State University	Pomona College	University of North Florida
Columbia University	Portland State University	University of North Texas
Cornell University	Purdue University	University of Pennsylvania
Dartmouth College	Reed College	University of Pittsburgh
Dickinson College	Robert Morris University	University of Redlands
Doane College	Rutgers-The State University of New Jersey	University of Rhode Island
Drexel University	Sacred Heart University	University of Rochester
Duquesne University	Salisbury University	University of South Alabama
Evergreen State College, The	Salish Kootenai College	University of South Carolina
Florida A&M University	Salem College	University of South Florida
Florida Atlantic University	Sewanee, The University of the South	University of Tennessee
Florida International University	Siena College	University of Toledo
Franklin & Marshall College	Smith College	University of Tulsa
Frostburg State University	Southern New Hampshire University	University of Utah
George Mason University	Stanford University	University of Vermont
George Washington University	Stetson University	University of Wisconsin-Extension
Georgia State University	Suffolk University	University of Wisconsin-Whitewater
Goshen College	SUNY-College of Environmental Science and Forestry	University of Wyoming
Guilford College	Swarthmore College	Vassar College
Haverford College	Syracuse University	Vermont Law School
Hendrix College	Temple University	Villanova University
Heritage University	Texas A&M University	Warren Wilson College
Illinois Institute of Technology	Texas Southern University	Wayne State University
Indiana University at Bloomington	Towson University	Wesleyan University
Jackson State University	Tufts University	Western Washington University
James Madison University	Unity College	West Virginia University
Johns Hopkins University	University of Alabama	Winthrop University
Kentucky State University	University of Arizona	Worcester Polytechnic Institute
Keystone College	University of Arkansas, Fayetteville	Yale University



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