Interdisciplinary Environmental and Sustainability Education and Research: Institutes and Centers at U.S. Research Universities

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Abstract

Interdisciplinary environmental and sustainability focused institutes and centers (IESICs) serve a crucial role in bridging the knowledge needs of society and the knowledge production capabilities of universities. They facilitate research, administer 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 research institutes and centers and none have investigated IESICs specifically. This chapter describes the results of the first empirical study of IESICs in the United States. The data were obtained from a census of IESICs at research universities and a survey completed by a representative sample of 340 directors. The results reveal that IESICs comprise approximately 8 % of all U.S. research institutes and centers and fall into seven distinct categories, each exhibiting distinctive characteristics. Findings discussed include the types of IESICs, their primary

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goals, their funding sources, and how these attributes are related to their operational and administrative structures.

Keywords
Research institutes and centers · Interdisciplinary research · Transdisciplinary research · Environmental education · Sustainability education

1 Introduction

Research institutes and centers (ICs) play an increasingly important role in higher education in the U.S. 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 (Stahler and Tash 1994). Today, ICs occupy a pivotal and expanding role as boundary spanning organizations that provide the organizational context for interdisciplinary, transdisciplinary and applied university research that directly addresses pressing societal needs (Geiger 1990).

In the U.S., the growth in the number of ICs over the last three decades has been extraordinary. This rapid expansion has made ICs a common feature in higher education; they often outnumber departments at research universities (Jacobs and Frickel 2009). The most recent *Research Center Directory* lists over 15,000 research centers in the U.S., most based at research universities (Gale Research 2011). This is in contrast to the approximately 1,500 identified in a census conducted in 1980 (Friedman and Friedman 1986). Increasing recognition of the importance of sustainability-oriented problem solving centered on understanding and managing complex linked environmental, social and economic challenges, is leading to a steady stream of new or restructured ICs involved in interdisciplinary environmental and sustainability research and education (IESICs).

Only a few studies have examined the roles and functions of institutes and centers. No studies have focused specifically on IESICs and how their operational and administrative structure influences integrative sustainability research and education. To investigate this question, the Council of Environmental Deans and Directors and the National Council for Science and the Environment designed an initial study to establish a baseline dataset and understanding that will be used to facilitate further research.

2 Methodology

Our study was designed to provide foundational information about the number, structure, activities and resources of IESICs in the United States. We first conducted a census to identify all institutes and centers focused on the environment and/or

sustainability at research universities in the U.S., followed by an online survey of directors. Analysis of the data from the census and the survey allowed us to characterize the population and explore relationships between various attributes.

Census. The Carnegie Classification of Institutions of Higher Education is widely used in higher education research in the U.S. 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 classified as doctorate-granting universities—institutions that award at least 20 doctorate degrees per year. A search of these 297 universities' websites and catalogs was conducted during the spring of 2013 to identify IESICs located at each university. Although we strove to identify all IESICs, we may have missed some 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.

Survey Sample. A survey of U.S. IESIC directors was conducted May–July 2013. All 1,122 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 %. 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 ±5 %. The survey included questions addressing three sets of characteristics: operational structure, activities and resources (see Appendix A 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 U.S. census division (region of the United States), and IESIC type (seven categories—see the typology discussion in the next section). The sample was representative on all four parameters.

Relationships. Two nonparametric statistical tests ($\alpha = 0.05$) were used to explore relationships among the types of IESICs and their attributes (answers to the survey questions): 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.

3 Results and Discussion

3.1 IESIC Typology

During the census we discovered that IESICs at research universities can be classified into seven main types and twenty-six subtypes based on their primary focus (Table 1). Broad environmental and sustainability IESICs are those with a comprehensive focus on coupled human-natural environmental systems and/or

Table 1 IESIC categories

Institute/center category	Number	Proportion of total (%)
Broad environmental and sustainability focus		
Environment	93	13
Sustainability	30	
Place/region/biome	37	
Category total	160	
Energy and climate change focus		
Energy technology	236	24
Climate/climate change	57	
Category total	293	
Natural systems focus		
Freshwater aquatic systems/watersheds	64	22
Marine/coastal systems	72	
Forests	15	
Earth systems/geosciences	48	
Ecology/conservation	48	
Natural resources/lands management	24	
Category total	271	
Human wellbeing focus		
Human heath, risk assessment and management	85	13
Security	13	
Population studies	4	
Agriculture and food	38	
Education and outreach	19	
Category total	159	
Societal systems focus		
Policy and economics	32	10
Law	27	
Society and behavior	25	
Business and finance	35	
Category total	119	
Technology and informatics focus		
Engineering and technology	75	10
Modeling and informatics	20	
Geospatial technology and remote sensing	21	
Category total	116	

(continued)

Table 1 (continued)

Institute/center category	Number	Proportion of total (%)
Built environment focus		
Built environment	56	8
Sustainable cities/communities	38	
Land use/landscape design	9	
Category total	103	
Total	1,221	100

sustainability, including those targeting a particular place, region, or biome. The other six categories are IESICs with a more narrow focus: (1) energy and climate change, (2) natural systems such as aquatic systems or forests, (3) human wellbeing such as risk assessment or sustainable agriculture, (4) societal systems such as environmental policy or law, (5) environmental and sustainability research technology and informatics, and (6) sustainable built environments/communities. IESICs focused on energy and climate change are the largest group, followed by those focused on natural systems.

Our classification system is based on our census observations and is imperfect—many individual IESICs could be classified into more than one category. As a result, caution is required in interpreting the survey findings regarding the seven categories. We hope to gather additional data in the future that will allow us to classify IESICs using an improved empirically-derived schema.

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 (using the Mann Whitney t test or the KWANOVA test) with the other categories (results not included here). Distinguishing characteristics were found in all three broad sets of parameters: structure, activities and resources (Vincent et al. 2014).

3.2 Differences Between Institutes, Centers and Similar Units with Other Names

One of the key differences among the seven categories of IESICs is the proportion of institutes and centers in each category. The majority of U.S. IESICs are named ‘center,’ about a third are named ‘institute,’ 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 or network. These entities are similar in structure and function to centers and institutes and therefore are included in the collective term IESICs used in this article.

Our survey sample included 218 centers, 99 institutes and 23 units with other names; a ratio representative of the total population. Most institutes are found in three categories: broad environmental and sustainability, energy and climate

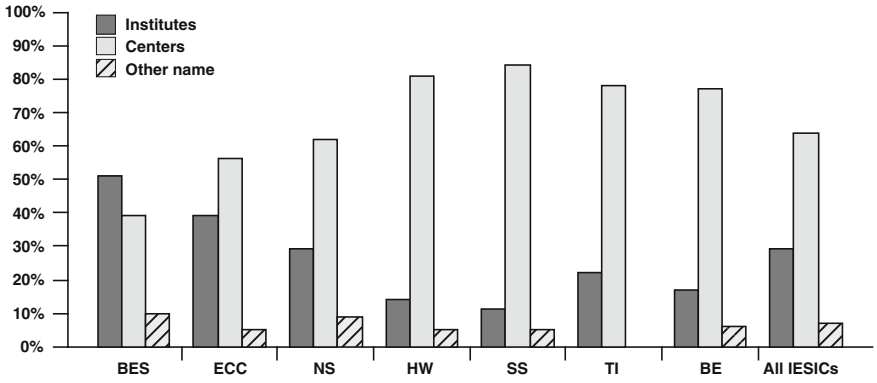

Fig. 1 IESIC categories and name types *BES* Broad Environmental and Sustainability, *ECC* Energy and Climate Change, *NS* Natural Systems, *HW* Human Wellbeing, *SS* Societal Systems, *TI* Technology and Informatics, *BE* Built Environment

change, and natural systems. These three categories have a broader research focus, indicating that institutes tend to have a more expansive research mandate than centers (Fig. 1).

The broader research focus of institutes is also reflected in significantly higher numbers of affiliated faculty. The average number of formally affiliated faculty for institutes is 59, compared with 22 for centers and 24 for entities with other names.

Institutes are also significantly more likely than centers to be administratively located at the primary university level with a director that reports to upper administration (president/chancellor, chief academic officer or chief research officer). Centers are more often located within a secondary or tertiary level—within a college or shared by colleges with directors that report to one or more college deans, or within a department with directors that report to the department chair/head. Institutes are also more likely to be housed within their own building or suite of offices than centers.

Institutes and centers are similar in their allocation of resources; they both focus about half of their activities on research and about a quarter on education of students. The IESIC units with names other than institute or center are distinctive—they focus their activities more on education and less on research compared with either institutes or centers.

3.3 IESIC Roles in Sustainability Education and Research

IESICs facilitate integrated research that address coupled human-nature systems research, support collaborative sustainability problem-solving efforts with a wide range of partners, and advance campus and community sustainability initiatives (Krizek et al. 2011). We found that the majority of IESICs devote most of their resources and activities to three goals—research, education and community

Table 2 IESIC category and mission/goals

IESIC category	Mission/goals									
	Research		Education		Outreach/ continuing education		Campus sustainability		Other[a]	
	% = 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

[a]Economic development; provision of services and goods; partnership coordination; policy analysis and advising; publishing

outreach/continuing education—but missions vary for different categories of IESICs (Table 2). For example, societal systems IESICs place less emphasis on research and more on education, outreach and policy advising.

IESICs are at the forefront of interdisciplinary education. Degree programs administered by IESICs are a growing trend; the number offering IES degree programs increased 6 % from 2008 to 2012 (Vincent et al. 2012). While only a third of IESICs operate formal academic programs, student education is a primary goal for the majority.

A third of IESICs administer some type of academic program; the proportion ranges from a high of 44 % of broad environmental and sustainability IESICs to a low of 26 % of energy and climate change 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 (Fig. 2).

Community outreach and post-graduate continuing education is also a widely held goal for IESICs; between 77 and 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; however, it is a goal for over half of the broad environmental and sustainability IESICs and about a third of the IESICs focused on the built environment and human wellbeing. The average level of resources/activities devoted to campus sustainability is low, averaging 12 % or less.

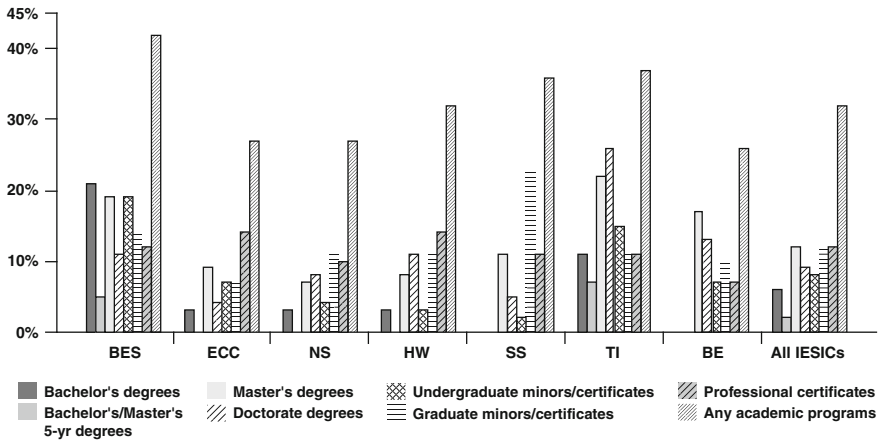

Fig. 2 IESIC category and academic programs *BES* Broad Environmental and Sustainability, *ECC* Energy and Climate Change, *NS* Natural Systems, *HW* Human Wellbeing, *SS* Societal Systems, *TI* Technology and Informatics, *BE* Built Environment

3.4 IESIC Funding

Bozeman and Boardman (2013) classified ICs into four types based on their primary source of fiscal support: university ICs, National Science Foundation (NSF) and other federal agency ICs, state ICs, and other ICs. 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, foundations, and industry funds. NSF and other federal agency ICs make up about a quarter of all ICs and are created and funded by the 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.

Funding for ICs and IESICs has transitioned over time. The earliest ICs, established in the 1900s, were primarily funded by philanthropic foundations and donors, although some of the engineering centers developed flourishing contract research relationships with industry. A relationship between ICs and the U.S. federal government developed during World War II when the government contracted universities to perform war-related research. By the end of the war, this partnership was viewed as essential for national security and economic competiveness.

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 NSF and the National Institutes of Health and was targeted toward more basic departmental-based research. Both ICs and departmental research thrived due to the greatly increased funding, but the balance of university research shifted 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 (Press 2013).

For IESICs there appears to be a growing trend of foundations and other philanthropic donors providing substantial support—recent examples include a $25 million challenge grant from the James F. and Marion L. Miller Foundation to

support the Institute for Sustainable Solutions at Portland State University, a $20 million gift from an anonymous donor to establish the Environmental Initiative at Georgetown University, and a $27.5 million grant from the Rob and Melani Walton Fund of the Walton Family Foundation to support the Global Institute of Sustainability at Arizona State University.

Funding sources are directly tied to the missions and goals of IESICs. On average, IESICs spend 54 % of their resources and activities on research (Table 2). The other half of their resources and activities are devoted to other goals—education, community outreach/continuing education, campus sustainability, and provision of services.

About a third of the IESICs in our survey reported they received most or all of their funding from short-term grant or contract funding. These IESICs focus more of their resources and efforts on research and were likely created as the result of a single grant or contract. A small proportion, 12 %, reported they currently had no funding. These were also likely created from a single award and have been unable to find additional support after their grant or contract expired.

The remaining IESICs rely on diverse funding sources, including institutional appropriations, endowments and other long-term directed sources, gifts from donors, and fees for products and services (Table 3). Research grants and contracts are still the most commonly reported sources of funding; this funding also makes up the largest average proportion of all IESICs' budgets.

Different categories of IESICs have different funding source patterns. The broad environmental and sustainability IESICs and the natural systems focused IESICs are more likely than the other types to receive funding from institutional appropriations; this funding supplies over half of overall funding—53 % on average—for the broad environmental and sustainability group. This group is also more likely to receive funding from endowments and donor gifts.

We also noted a relationship between funding sources and the location of the IESIC (Table 4). IESICs at the primary university level with directors that report to the president/chancellor, chief academic officer, or chief research officer are more likely to receive support from direct appropriations, potentially reflecting a relationship between institutional funding and the importance that high-level administrators assign to interdisciplinary environmental and sustainability research and education at their institutions.

IESICs with higher average proportions of funding from short-term grants and contracts most often report either directly to faculty (department chairs) or to the chief research officer, indicating a relationship between these IESICs and the importance of individual investigator grant funding and/or enhanced institutional grant writing support.

Table 3 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[a]	
	% = 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

Table 4 IESIC budget sources by reporting office

Director reports to	Budget source									
	Institutional appropriations		Endowments and other long-term funding		Short-term contracts and grants		Donor gifts		Other[a]	
	% = proportion having as a budget source | μ = mean proportion of budget from source									
	%	μ (%)	%	μ (%)	%	μ (%)	%	μ (%)	%	μ (%)
President/Chancellor *n* = 6	67	36	33	50	75	59	42	9	17	18
Chief Academic Officer *n* = 20	75	50	33	27	75	51	26	16	11	56
Chief Research Officer *n* = 19	83	39	24	10	81	65	36	10	7	38
Dean of a College *n* = 138	62	40	30	32	82	59	38	19	12	36
Deans of 2 + Colleges *n* = 21	48	45	24	53	62	56	29	24	24	63
Department Chair/Head *n* = 41	20	45	10	60	66	82	17	10	2	100
2 + Dept. Chairs/Heads *n* = 2	50	10	50	1	100	88	50	14	0	–
Steering Committee *n* = 5	40	65	0	–	60	57	0	–	0	–
Other[b] *n* = 22	46	40	18	14	64	58	27	7	23	85
All IESICs *n* = 340	60	42	26	31	77	61	32	16	12	50

[a]Fees for goods or services; federal or state funding other than grants and contracts; other unspecified sources
[b]Board of directors, advisory board, multiple administrators, other administrator

4 Conclusion

Our study reveals a set of findings that provide a foundation for further research into IESICs. As a group, IESICs share similarities, but on an individual level they may differ markedly from each other. They can be categorized into seven main types based on their scope and focus; some are broadly focused on sustainability while others have a more targeted focus related to specific aspects of sustainability. Although not discussed here, each type has its own set of defining characteristics (Vincent et al. 2014).

IESICs typically fulfill several roles in their universities, facilitating interdisciplinary research, providing interdisciplinary education for students and career professionals, engaging with a variety of partners on applied sustainability projects and transdisciplinary research, and supporting campus sustainability initiatives. A growing number of IESICs serve as the administrative home of interedisciplinary environmental and sustainability degree programs. Undergraduate students, graduate students, faculty, university staff, external partners and career professionals all benefit from the educational and research opportunities provided by IESICs.

There are differences in goals and funding sources for different types of IESICs and for IESICs located at different levels within the university. IESICs located at the primary level with directors that report to top administration have more institutional, endowment and donor support, which may make them more stable incubators for research and teaching on complex coupled human-natural systems. IESICs located within colleges or departments rely more on short-term funding from grants and contracts. Since federal grant funding is declining in the U.S., these IESICs may be more vulnerable to funding issues.

Broad environmental and sustainability IESICs are especially likely to offer academic programs and have a broader reach across the campus with more affiliated faculty from more diverse fields, which make these IESICs especially well-suited to preparing students for careers at the science-policy, science-management, and policy-management interfaces.

IESICs provide advantages for both students and faculty. Many university research-faculty split their time between ICs and departments. IC-affiliated researchers are motivated to participate by the prospect of doing research that is more intellectually interesting and important and believe that their participation positively influences their own research (Rhoten 2005, Bozeman and Boardman 2013). IC-affiliated faculty have also been shown to provide more fiscal support for undergraduate and graduate students, and they have greater involvement with teaching undergraduates than their non-affiliated peers, thus strengthening both the research and teaching missions of universities (Bozeman and Boardman 2013).

However, there are downsides to researchers when participating in IESICs —"role strain" faced by affiliated researchers caused by the tensions and limitations inherent in current universities' structures and reward systems (Boardman and Bozeman 2007). These constraints are of special concern for IES researchers and can negatively impact the effectiveness of interdisciplinary research (Pfirman 2011).

A recent study of IC effectiveness concluded the main impediment to effective integrative research is the lack of systematic implementation of university structures that explicitly support interdisciplinary work (Rhoten 2005). The study found both extrinsic attention (funding agencies, leadership) and intrinsic motivation (faculty, students) are sufficient to support research that is more heterogeneous, interdisciplinary, fluid, and horizontal. The key constraints are academic research communities that do not adequately accommodate interdisciplinary work in their institutional structures and systems of professional standing for faculty researchers. The consequence is that many ICs have a "tendency to become a nexus of loosely connected individuals searching for intersections, as opposed to cohesive groups tackling well-defined problems" (Rhoten 2005:9).

We identified two common models for IESICs: (1) broadly interdisciplinary institutes located at the primary administrative level, with strong institutional financial support and a broad mandate to tackle complex coupled human-natural systems problems; (2) more narrowly defined centers managed at the college or department level that rely more on short-term grants and contracts. More research is needed to understand how the operational and administrative structures of each of these predominant models impacts IESIC effectiveness in achieving various goals, developing sustainable fiscal support, supporting faculty participation and collaborative integrative research, and educating students and post-graduates.

5 Appendix A—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 in 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.

- 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 3 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):

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Dr. Antje Danielson has been a researcher, consultant, entrepreneur, lecturer, and student mentor in environmental geosciences and sustainability since 1993. She is an Assistant Professor and currently leads the Tufts Institute of the Environment. She is also the President of the Council for Environmental Deans and Directors at the National Council for Science and the Environment. She received her PhD in geochemistry in 1989 from the Freie Universität in Berlin, Germany. Between 1991 and 2005 she worked at Harvard University in the Department of Earth and Planetary Sciences, the Center on the Environment, and the Green Campus Initiative on teaching and research related to greenhouse gas emissions reductions from energy consumption in the U.S. From 2005 until 2008 she was the Deputy Director for Sustainability at the Centre for Research into Earth Energy Systems at Durham University in the UK, working on carbon capture and sequestration and creating a campus sustainability program, which was awarded the Green Gown Award in 2008. She joined Tufts University in 2008. She is currently interested in the mechanisms that underpin interdisciplinary research and collaboration. In 1999/2000 she also co-founded the car-sharing company Zipcar.

Rica Santos serves as a Research Assistant in the Center for Environmental Education Research at the National Council for Science and the Environment. She is a recent graduate of Santa Clara University in California, where she earned a BS in political science and environmental studies. She has worked as a research assistant for projects in education research and sustainable development agriculture and policy.