Development of a Social and Biophysical Sciences Synthesis Center at SUNY-ESF

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1 – Discovery Opportunity: Environmental issues such as biodiversity, water and air quality, climate change, renewable energy, and wildlife conservation are issues of national and international importance. Through an impressive portfolio of research spanning the fields of biology, chemistry, engineering, landscape architecture and design, management, and social sciences, ESF has made significant contributions to these issues. For instance, in research spanning diverse issues such as biodiversity of the Galapagos Islands to the impact of acid rain on northern forests, ESF has made a name for itself as a leading environmental science school. However, for many environmental issues little progress has been made and other environmental issues remain intractable. For instance, harmful algae blooms (HAB) negatively impacting water quality of Lake Erie and Lake Ontario have been studied extensively since the early 70s. Although progress has been made in understanding the biological cause of these HABs, they continue to occur today. Similarly, although it is well accepted that human induced greenhouse gas emissions are a major contributor to climate change, mitigating these emissions and adapting to ensuing changes in our environment remains a major challenge today.

Although the nature of the few environmental issues highlighted above vary, all are complex in nature and require coupled human and natural science solutions. In the Finger Lakes Region of New York for instance, existing watershed management policies and land management practices of farmers and other land owners are diverse and have been linked to declining water quality. Elsewhere, conflicts between livelihood needs and conservation have led to poaching and illegal deforestation in South America and some regions of Africa. Locally, in New York, newly classified wilderness areas in the Adirondack Mountains have led to conflict between the State and local communities relying on Adirondack Forests for resource extraction and economic benefits from tourism. Increasing renewable energy demand also necessitates the expansion of crops such as short rotation willow crops as a bioenergy feedstock. In all cases, humans are both part of the problem and part of the solution, but environmental issues are often addressed from a biophysical science standpoint. Such approaches might highlight solutions such as the need to reduce fertilizer use to improve water quality, the need to protect critical habitat for native plants and wildlife conservation, or the need to incentivize private landowners to grow willow. However, implementing such solutions to environmental problems requires behavior changes from affected stakeholders.

In this context, local stakeholders are therefore essential to understanding how and why current environmental problems exist and how to most effectively address them. Are there alternatives to restricting the use of the land by local populations to preserve critical habitat for wildlife, and how might alternatives offer economic development potentials for local populations ? What are the barriers to BMPs implementation to improve water quality, and what kind of policy or incentives should be developed to improve the odds of success? How can we create policy and market structures that incentivize farmers to grow more bioenergy crops in New York and beyond?

Addressing these complex issues at the human-environment interface certainly requires an in-depth understanding of biophysical systems at play, but also a strong understanding of social forces at play. Biophysical and Social systems are however rarely considered equally on research projects, which strongly limits the potential for success in addressing these complex environmental issues at the human-environment interface.

With this discovery grant, we propose to create a Social and Biophysical Sciences Synthesis Center (SBSSC) at ESF. The purpose of this center will be to foster increased collaboration among social and biophysical scientists to address current environmental issues. The center will propose grant writing support (workshops, retreat, access to a grant writer), marketing opportunities for fund raising (foundations, and advertising of funded projects / success stories), and seed grants for teams of PIs developing proposals addressing complex environmental issues at the human-environment interface.

Although all topics relevant to the mission of the center will be considered for support, teams of PIs will be required to be inter-disciplinary with equal representation of social scientists, and biophysical scientists or engineers.

2 – Graduate Program Impacted and benefits to ESF's students: Should this proposal move forward, all programs at ESF would be positively impacted. The SBSSC will however primarily build on and strengthen many of the areas of study in the Graduate Program in Environmental Science (GPES) that are already interdisciplinary, such as Water and Wetland Systems, Coupled Natural and Human Systems, or Biophysical and Ecological Economics. The SBSSC will support graduate students working on interdisciplinary projects funded by the center. In addition, both undergraduate students and graduate students (regardless of their primary area of specialization) will have the opportunity to gain interdisciplinary research experience either by interning at the center (helping with workshops/retreat organization) or by contributing to center supported research projects. Ultimately, it is expected that these students will be better prepared to be leaders capable of advancing science, practice, and policy together.

3 – List of possible partners: Although the center will be open to all, we intend to seek out external input and partnerships from specific groups or people. If funded, we will immediately seek to create an external advisory board involving non-governmental organization (e.g. the Nature Conservancy, World Wildlife Fund, Conservation International), existing international partners of ESF in central America, Africa, and Asia involved in interdisciplinary research, colleagues working at the interface of human-environmental systems (e.g. Dr. Palmer, Director of the NSF-funded National Socio-Environmental Synthesis Center (SESYNC) at the University of Maryland), and private foundation representatives involved in transdisciplinary environmental research (e.g. Bill and Melinda Gates Foundation, Gordon and Betty Moore Foundation). The advisory board will provide input and feedback on strategic and emerging areas of transdisciplinary research and funding.

4 – How this center will create new partnerships at ESF and beyond: The primary goal of the center is to support the development of new partnerships at ESF and beyond by incentivizing transdisciplinary research. Through seed grants to investigators, workshops, and retreats, new partnerships will develop naturally and help ESF coalesce around social and biophysical projects

to address wicked environmental issues such as climate change, biodiversity, wilderness area conservation, water and air quality and others.

5 – How this center will increase the use of ESF assets especially beyond the Syracuse Campus: One of the biggest assets of ESF is its people (students, faculty, staff). By bringing people together around complex environmental issues, this project will capitalize on the knowledge and energy of this diverse group. In addition, ESF's properties also offer unique opportunities to study novel policy-management-conservation issues related to climate change, wilderness areas, wildlife and water quality just to name a few.

6 – How this center will inform policy decisions, enhance ESF's reputation, and have a global impact: Through the external advisory board, the wide array of NY state and international projects and collaborators expected to benefit from the center, and the focus of the center on research at the interface of social and biophysical systems, we believe that this center with project ESF as a modern forward thinking institution with a global reach. By providing an unprecedented level of understanding of complex environmental issues and showcasing ESF as a modern / think-outside-the-box institution, this work will strongly enhance ESF's reputation both nationally and internationally. Finally, by better understanding how people can be both part of the problem and the solution in the context of complex environmental issues, the center will provide the needed knowledge to develop successful policies to address a wide array of environmental issues.

7 – Description of new investments to move the initiative forward beyond the third-year leading to financial stability by year four

Your success is our success: In order to incentivize faculty engagement in the center, we talked to VP Nomura about 1) a possible funding structure for the long-term financial sustainability of the center, and 2) a strategy to move research dollars toward transdisciplinary research on campus. Although VP Nomura noted that the plan below would require policy changes at the RF, he also encouraged us to move forward with this idea and present this novel strategy to promote transdisciplinary research at ESF. Currently, a 38% indirect cost recovery rate is needed to support on-campus RF operations (VP Nomura, personal communication). For this center, we propose that 50% of indirect costs above the 38% baseline recovery rate would go directly to the PI, and 50% to the center. While this type of funding structure is being used at centers in other universities, it would be novel for ESF and would assure financial sustainability for the center, increase dollars return on research effort to each PI as a way to incentivize PI participation in transdisciplinary projects, and help ESF allocate resources to research projects across disciplines and departments. We propose hiring a part time grant writer and marketing/fundraising person to assist PIs involved with the center to write larger grants for external funding. After 3 years, we expect significant return on investment, which in turn would allow the center to continue offering seed grants. Ultimately, as projects roll through the center, we also intend to use our part time marketing / fundraising person to target donors, including foundations committed to addressing a wide array of environmental issues at the human-environment interface.