

## PROJECT SUMMARY

Overview: The main *objectives* of the Scenarios, Services, and Society (S<sup>3</sup>) RCN are to synthesize existing science, catalyze new research, and produce science products to understand and advance sustainable land-use trajectories. The major *activities* of the S<sup>3</sup> RCN are to: (1) generate a suite of qualitative land-use scenarios co-developed by scientists and stakeholders that depict a range of possible future social, economic, and environmental realities for the study region; (2) simulate the land-use scenarios as they interact with multiple environmental stressors using existing modeling frameworks; (3) evaluate the simulated scenarios in terms of bundles of ecosystem services that are defined together with the stakeholders; and (4) share knowledge with broader audiences to advance sustainable land-use trajectories and enhance communities of practice in scenario-based sustainability science. The *methods* to be employed consist primarily of coordination activities and include: (1) Science and Stakeholder Workshops, (2) Open Technical Workshops to promote methods development and model coupling, (3) Synthesis and Writing Meetings, and (4) a Webinar Learning Series to foster knowledge exchange. *S<sup>3</sup> RCN Steering Committee:* David Foster (PI, Harvard University), Shere Abbott (Syracuse University), Mark Borsuk (Dartmouth College), Charles Driscoll (Syracuse University), Kathy Fallon Lambert (Harvard University), Robert Lillieholm (University of Maine), Taylor Ricketts (University of Vermont), Jonathan Thompson (University of Virginia), Angelica Zambrano (Smithsonian Institution, post doc).

Intellectual Merit: The proposed S<sup>3</sup> RCN will bring together scientists from diverse disciplines and across several major research initiatives to better understand the social-ecological drivers and consequences of land use as it interacts with multiple environmental stressors. As the world population approaches ten billion people, demands on Earth's finite land-base are growing and increasingly conflicting. Natural and managed landscapes are called upon to supply food and fiber, support climate change mitigation and adaptation, alleviate poverty, and support human well-being. Expanded knowledge to meet these demands has been hampered by a lack of synthesis and integration across scientific disciplines. The S<sup>3</sup> RCN will engage diverse stakeholders, synthesize existing data, and link existing models to develop and simulate future land-use scenarios and to analyze the consequences for different bundles of ecosystem services. In doing so, four fundamental sustainability science research challenges will be addressed: (1) linking qualitative scenarios with quantitative simulations, (2) evaluating interacting environmental stressors, (3) analyzing different bundles of ecosystem services, and (4) bridging scenarios-to-solutions. The *major expected benefit* of the S<sup>3</sup> RCN is the development of a novel, network-based framework for using participatory scenarios to understand and promote sustainable land-use trajectories in complex social-ecological systems. Importantly, the S<sup>3</sup> RCN activities reflect the co-mingling of research and practical application that is central to sustainability science.

Broader Impacts: The S<sup>3</sup> RCN will integrate broader impacts throughout its five-year duration. By including post-docs and students at all levels of the RCN, S<sup>3</sup> will contribute to STEM workforce development by offering direct experience in managing collaborative, transdisciplinary research networks. All students and post-docs will have the opportunity to lead workshops and working groups and to (co)author papers. The S<sup>3</sup> RCN will also provide training for scientists of all ranks in techniques of stakeholder engagement, linking science with action, and science communication. To increase its societal impact, the S<sup>3</sup> RCN will collaborate with Reos Partners to design workshop sessions for developing stakeholder-defined scenarios and for bridging scenarios to solutions. The S<sup>3</sup> RCN will also be a central activity of the recently established Science Policy Exchange (SPE), which is co-led by several S<sup>3</sup> Steering Committee members. This collaboration will result in policy-relevant communication products such as synoptic reports, case studies of iconic landscapes, and online visualization tools for decision makers. Finally, drawing on the extensive outreach expertise of the Harvard Forest and SPE, the S<sup>3</sup> products will be widely disseminated to journalists and decision makers through editorial board visits, press kits and teleconference(s), policy briefings, and presentations at policy and management conferences. S<sup>3</sup> will also work with collaborators to share lessons with communities of practice worldwide. Together these broader impacts will help deepen the scientific basis for critical land-use decisions for decades to come.