1. Integrated economic assessment of the costs and benefits of improving water quality in the Upper Mississippi River Basin.

Despite increasing impacts on water quality and other ecosystem services, adoption of best-management practices (BMPs) in row crop agriculture in the UMRB remains low primarily because of the mismatch between who bears the costs and who stands to benefit from BMP implementation. This project would integrate agro-economic and ecosystem services valuation data into an optimization framework that will highlight strategies to reduce nutrients and meet additional ecosystem services objectives cost-effectively.

TNC participants: Kris Johnson (kjohnson@TNC.ORG); Joe Fargione (jfargione@TNC.ORG); Timm Kroeger (tkroeger@TNC.ORG)
Cornell participants: Catherine Kling (ckling@iastate.edu)

2. Refining Hydropower Planning Protocols

New hydropower dams are being built around the world, potentially causing ecological and economic impacts that are poorly accounted for in current assessment protocols. Building on the hydropower advisory experience of TNC and Cornell, this project will use team expertise and a workshop to identify an important set of considerations and associated data sources for systematic hydropower planning at the watershed scale and beyond.

TNC contact: Jorge Gastelumendi (jgastelumendi@yahoo.com)
Cornell contact: Pete McIntyre (pbm3@cornell.edu)

3. Evaluation of the role of farmer input in designing effective sustainable agriculture interventions

The sustainable agriculture literature finds that farmers report a wide range of barriers to adopting sustainable practices, and that overcoming reported barriers does not always lead to successful adoption. Building on the strength of new data on farmer-reported barriers, we will empirically test whether or not matching interventions to what farmers report makes a significant difference in adoption.

TNC contact: Jon Fisher (jon_fisher@tnc.org)
Cornell contact: Shannan Sweet (sks289@cornell.edu)

4. Demonstrating the next generation of Natural Climate Solutions science: from global solutions to state policies and local actions throughout New York State.

The Nature Conservancy and Cornell University, in partnership with other institutions, have developed a global and national framework for Natural Climate Solutions (NCS): 20 pathways for mitigating climate change through improved land stewardship. We propose to use New York State as a pilot project to demonstrate how to use the NCS framework to develop a science-based portfolio of regionally explicit actions and strategies to catalyze policy and financial investments in climate change mitigation and to demonstrate to other states and countries how to use the global NCS framework to drive regional change.

TNC co-leads: Bronson Griscom (bgriscom@TNC.ORG); Rebecca Benner (rbenner@tnc.org)
Cornell lead: Peter Woodbury (peterwoodbury@cornell.edu)

5. Adaptive Planning Responses to Climate-Change Displacement in Coastal and Riparian Communities in New York State.

We propose to undertake a joint study to 1) develop reliable projections of sea-level and river rise, coastal and riparian flooding, and extreme-weather event incidence affecting coastal and riparian communities in New York State, 2) forecast--on the basis of rigorous, empirically based modeling--social, economic, and environmental impacts of climate-change-related effects, and 3) examine response strategies that are effective in the short run but which put communities on the 'right path' in the long run to transition to settlement systems that are both resilient and equitable.

TNC: Rebecca Benner (rbenner@tnc.org); Andrew Peck; NY Flood Smart Communities Program
Cornell: Katherine Bunting-Howarth (keb264@cornell.edu); Josh Cerra (jfc299@cornell.edu); Kieran Donaghy (kpd23@cornell.edu); Brian Rahm (bgr4@cornell.edu)

6. Enabling institutions and policies for creating natural infrastructure for urban areas.

There is growing evidence that natural infrastructure can be a cost-effective way to increase urban resilience, manage risks, and increase human well-being, but many urban areas struggle to build and maintain natural infrastructure. This proposal researches the enabling conditions, institutional coordination, and policies that can overcome barriers, including institutional siloing, high transaction costs, and misaligned policy and finance incentives.

TNC: Rob McDonald (rob_mcdonald@TNC.ORG)
Cornell: Katherine Bunting-Howarth (keb264@cornell.edu)

7. Bioacoustics Monitoring for Conservation

We will develop and apply a spatial partial identity model for density estimation using bioacoustics data from gibbons in Borneo, Indonesia and migratory waterbirds in the Central Valley of California, USA as case studies. We will record vocalizations and signal strength at multiple sensors simultaneously and develop models of sound attenuation and individual space use, allowing us to: a) probabilistically aggregate vocalizations lacking direct information about individual identity to the individuals that produced them using spatial information and b) provide an estimate of the number of individuals in the population with appropriate measures of uncertainty.

TNC: Eddie Game (egame@tnc.org); Mark Reynolds (mreynolds@TNC.ORG)
Cornell: Angela Fuller (angela.fuller@cornell.edu); Johannes Lehmann (cl273@cornell.edu); Ben Augustine; J. Andrew Royle (Patuxent Wildlife Research Center); Cornell Lab of Ornithology – Bioacoustics group

8. Actions on natural climate solutions and potential outcomes in developing countries: a case study for Zambia.

This project will aim to inform the Zambian government on appropriate actionable natural climate solutions (NCS) as defined by Griscom et al. (2017) for meeting their nationally determined contributions (NDC) to the Paris agreement. We will provide analysis leveraging new vegetation and soil survey data for Zambia to explore a set of land-based mitigation actions and their potential outcomes, in order to contribute orienting country-level implementation of NCS in developing countries with strongly agrarian economies.

TNC: Deborah Bossio (deborah.bossio@tnc.org)
Cornell: Johanne Pelletier (jp2443@cornell.edu); Johannes Lehmann (cl273@cornell.edu)

9. Identifying Enabling Conditions to Scale Private Investment in Conservation.

The goal of the research project would be to identify the enabling condition to allow for a significant increase in private investment in conservation. Existing conservation investment processes take the policy and financial environment as a given and look for cash flows that can be used to backstop investment vehicles. This research project would look at the range of policy innovations (taxes, fees, regulatory structures, institutions, etc.) from a variety of other sectors that can be adapted to the conservation space in order to create the conditions for new and additional cash flows that can drive substantially greater investment in conservation.

TNC: Lynn Scarlett (lscarlett@TNC.ORG); Andrew Deutz (adeutz@tnc.org)
Cornell: John Tobin (john.tobin@cornell.edu); Amanda Rodewald (arodewald@cornell.edu); David Ng (dtn4@cornell.edu)

For the following proposal ideas, please contact proposal leads for more information:

10. **Solar energy;** model for community engagement; how to site solar; promote solar growth; maintain agricultural production; maintain biodiversity; NY and NC

     TNC: Rebecca Benner (rbenner@tnc.org); Liz Kalies (elizabeth.kalies@TNC.ORG)
     Cornell: Amanda Rodewald (arodewald@cornell.edu); Max Zhang (KZ33@cornell.edu); Lindsay Anderson (cla28@cornell.edu); Angela Fuller (akf34@cornell.edu); Kieran Donaghy (kpd23@cornell.edu)

11. **Hydrologic restoration of peatlands**; sequester carbon; soil carbon model

     TNC: Liz Kalies (elizabeth.kalies@TNC.ORG)
     Cornell: Johannes Lehmann (cl273@cornell.edu);

12. **Better forecasting for wind energy integration**; RPS; Renewal Portfolio Standards

     TNC: Joe Fargione (jfargione@TNC.ORG)
     Cornell: Lindsay Anderson (cla28@cornell.edu)