SESYNC Feedbacks

News from the National Socio-Environmental Synthesis Center

RESEARCH SPOTLIGHT | SESYNC Study in *PNAS*

SESYNC Research Shows That Cutting Food Waste in Half Could Benefit Biodiversity As Much As Overhauling Diets

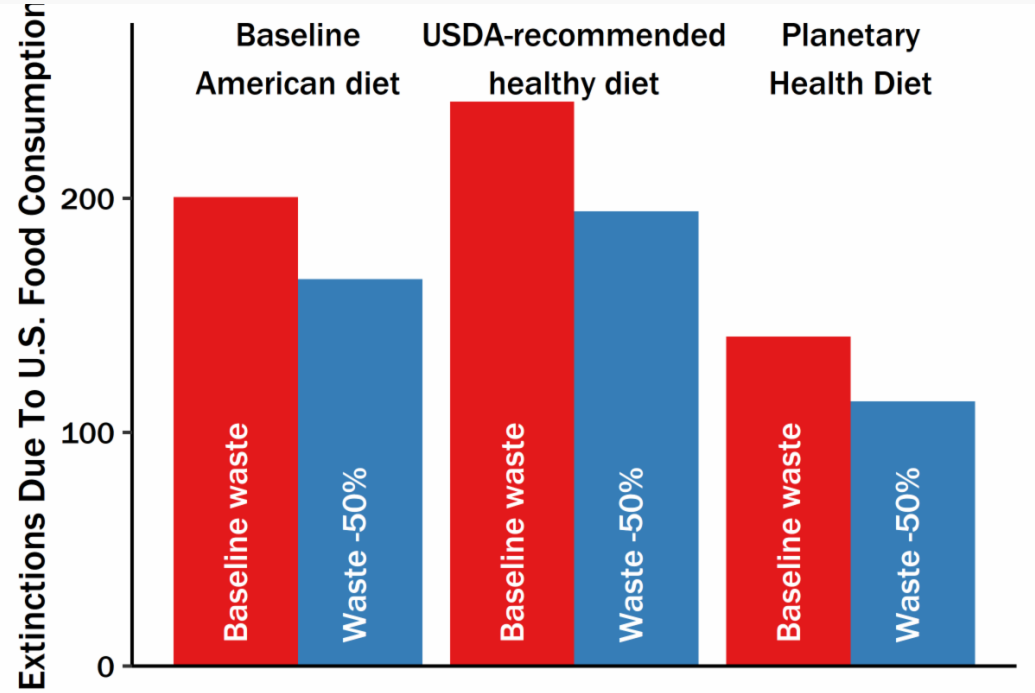
Study finds slashing U.S. food waste could reduce threats to biodiversity by 18%.

ANNAPOLIS, Md — Simply cutting avoidable food waste in the United States by 50% could be almost as beneficial to biodiversity as switching the entire United States' population to a planet-conscious diet, a new study finds. The study, conducted by researchers at the University of Maryland's National Socio-Environmental Synthesis Center (SESYNC), appears in ***Proceedings of the National Academy of Sciences***.

Lead author Quentin Read—a SESYNC computational scientist who is now a statistician at USDA's Agricultural Research Service—says, "Food waste has been a hot topic for a while, but it's time for us to really get serious about reducing it. People working in both the food space and the conservation space can point to our study to make the connection between food waste reduction and preserving biodiversity."

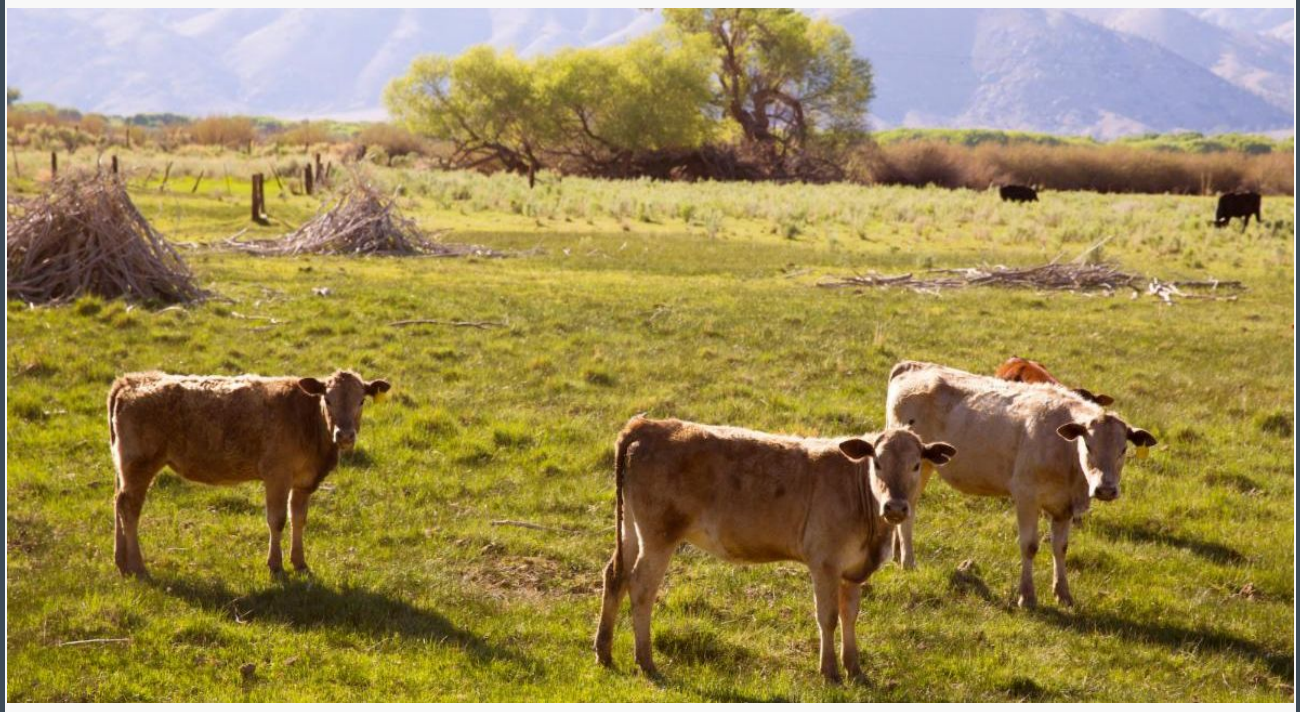
Humans' conversion of much of Earth's most productive land to agricultural land has resulted in some plant and animal species going extinct, while others are in a "death spiral"—their remaining natural habitat is just too small to sustain viable populations. As food production's land and biodiversity footprint expands in the United States and worldwide, the problem is only getting worse. Thus, it's important to assess the potential benefits—and trade-offs—of possible societal actions that could reduce the food system's impact and allow ecosystems and the

threatened species they support to recover. In this study, researchers explored two of the most promising actions: food waste reduction and diet shifts. **Read more**.



Cutting food waste in half would offset the increased threat to biodiversity of switching all Americans to a healthier diet recommended by the USDA—or reduce the threat to biodiversity even further if all Americans shifted to the Planetary Health diet.

RESEARCH SPOTLIGHT | SESYNC Study in *Science*



SESYNC Researchers Find Declining Nitrogen Availability in a Nitrogen-Rich World

Study finds that nitrogen availability for plants is declining, which could have important consequences for the growth of plants and the animals that consume them.

ANNAPOLIS, Md — Since the mid-20th century, research and discussion have focused on the negative effects of excess nitrogen on terrestrial and aquatic ecosystems. However, new evidence indicates that the world is now experiencing a dual trajectory in nitrogen availability with many areas experiencing a hockey-stick shaped decline in the availability of nitrogen. In a new review paper in the journal ***Science***, researchers have described the causes for these

declines and the consequences on how ecosystems function.

“There is both too much nitrogen and too little nitrogen on Earth at the same time,” said Rachel Mason, lead author on the paper and former Postdoctoral Fellow at the University of Maryland's National Socio-Environmental Synthesis Center (SESYNC).

Over the last century, humans have more than doubled the total global supply of reactive nitrogen through industrial and agricultural activities. This nitrogen becomes concentrated in streams, inland lakes, and coastal bodies of water, sometimes resulting in eutrophication, low-oxygen dead-zones, and harmful algal blooms. These negative impacts of excess nitrogen have led scientists to study nitrogen as a pollutant. However, rising carbon dioxide and other global changes have increased demand for nitrogen by plants and microbes. In many areas of the world that are not subject to excessive inputs of nitrogen from people, long-term records demonstrate that nitrogen availability is declining, with important consequences for plant and animal growth. **Read more**.

SEMINAR | Reframing Rangeland Sustainability Science

VIRTUAL SERIES

Seminars are free and open to the public. Registration required.

Join us at 3 p.m. EDT on May 11 for our next virtual SESYNC Seminar!

Dr. Ryan Unks will present "Reframing Rangeland Sustainability Science: Triangulating Ecological Variability, Pastoralist Livelihoods, and Knowledge Systems in Kenya" based on his postdoctoral work at SESYNC.

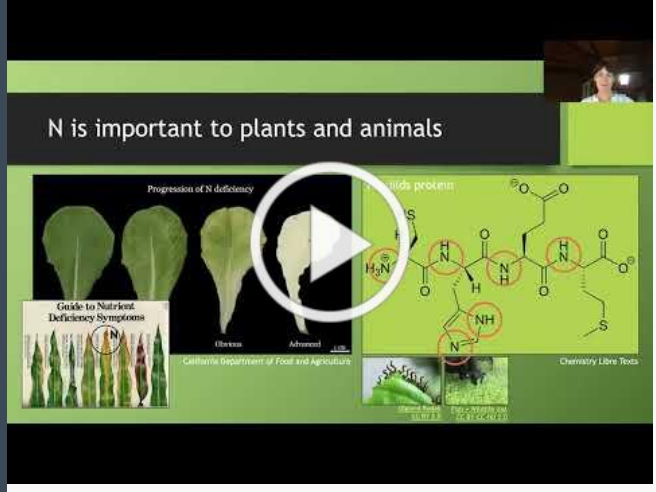
Abstract: A wide range of social science research has shown how the expertise of pastoralists enables them to thrive in highly variable rangeland environments, often modifying their livelihood practices in complex ways in response to new social, political, economic, and biophysical uncertainties. However, due to numerous disciplinary and conceptual divides, these understandings remain largely absent from analyses of landscape ecology in rangelands. In this talk, Dr. Ryan Unks briefly outlines a conceptual framework for integrating research on pastoralist livelihoods into landscape ecology through a focus on differentiated access to ecologically variable resources, processes of control of resource access, and asymmetries in power relations that shape dominant rangeland research paradigms. He then distills findings from ethnographic analysis of livelihood change and access to resources in two contexts in Kenya. **Read more**.

Talks are free and open to the public. Registration is required. **Register here**.

SEMINAR | Recordings of Spring Seminars Available

Is Nitrogen Becoming Less Available in Terrestrial Ecosystems?

Presented by: Dr. Rachel Mason

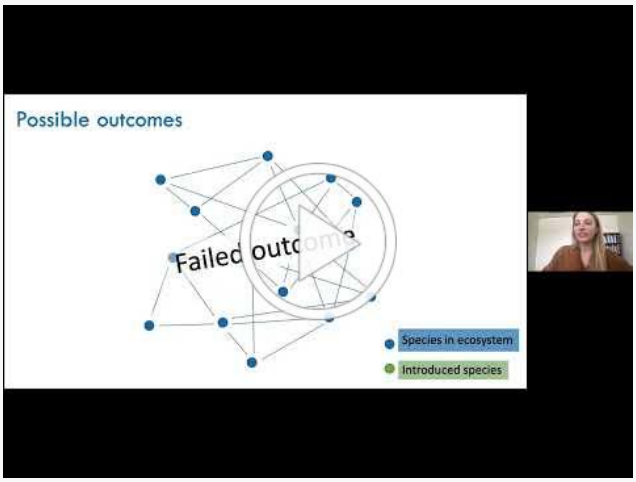


Nitrogen (N) is both necessary for life and potentially harmful to it, so the amount and distribution of reactive forms of nitrogen around the world is an important matter. While N is often viewed as a pollutant (think fertilizer runoff and ocean dead zones), there are reasons to expect that rising atmospheric CO2 and other global changes are rendering N less accessible to plants and microorganisms. This talk begins by summarizing the evidence, from sources ranging from pollen chemistry to spectroscopy of cattle manure, that N is indeed becoming less available in many terrestrial ecosystems. **Read more**.

Ecological Networks and Structured Decision Making for Ecosystem Management

Presented by: Dr. Katie Peterson

Ecological communities are frequently subject to natural and human-induced additions of species, as species shift their ranges under climate change, invasions occur, and species are re-introduced for conservation. Because species interact in complex networks, the outcomes of gaining new species for ecological communities are difficult to predict. In particular, the addition of new species produces novel interactions and has the potential to modify the interactions between extant species. Due to high uncertainty in how these novel or modified interactions within a community will affect the persistence and abundances of species, practitioners need quantitative methods to help predict potential outcomes of changes to communities. **Read more**.



Be sure to **subscribe** to SESYNC's YouTube channel to receive notifications whenever we add new videos!

NEW PUBLICATIONS | SESYNC in the Journals

"Evidence, causes, and consequences of declining nitrogen availability in terrestrial ecosystems." Published in ***Science*** by former SESYNC postdoc Rachel E. Mason, Joseph M. Craine, Nina K. Lany, Mathieu Jonard, Scott V. Ollinger, Peter M. Groffman, Robinson W. Fulweiler, Jay Angerer, former SESYNC postdoc Quentin D. Read, Peter B. Reich, Pamela H. Templer, and SESYNC staff member Andrew J. Elmore. This paper resulted from the SESYNC Pursuit: The ecological consequences of declining nitrogen concentration in plants worldwide.

"News media and fisheries-independent data reveal hidden impacts of hurricanes." Published in ***Ambio*** by Stephen F. Jane, Kayla M. Smith, Dana Baker, Allison Saroni, Emma Cutler, and Paul Carvalho. This paper resulted from the SESYNC Graduate Pursuit: Hurricanes and the social-ecological system: how ecosystem changes, managing institutions, and public perception are interrelated in the Gulf Coast and Southern Atlantic Region.

"Using Bayesian Belief Networks to Investigate Farmer Behavior and Policy Interventions for Improved Nitrogen Management." Published in ***Environmental Management*** by Felix Jäger, Jessica Rudnick, Mark Lubell, Martin Kraus, and Birgit Müller. This paper resulted from the Pursuit: Testing and extending Ostrom's frameworks: quantitative

synthesis and modeling of social-ecological dynamics.

"Biodiversity effects of food system sustainability actions from farm to fork."
Published in ***Proceedings of the National Academy of Sciences*** by former SESYNC postdoc Quentin D. Read, former SESYNC staff member Kelly L. Hondula, and Mary K. Muth.