National Center for Ecological Analysis and Synthesis
Director: Ben Halpern
Annual Report
Fiscal Year 2017-2018
University of California, Santa Barbara
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Mission Statement

NCEAS’ mission is to accelerate scientific discoveries that will enhance our understanding of the world and benefit people and nature, as well as to transform the scientific culture to be more open, efficient, and collaborative.

Overview

The National Center for Ecological Analysis and Synthesis (NCEAS) is an independent research center of UC Santa Barbara with a global network and impact. We conduct transformational science focused on informing solutions that will allow people and nature to thrive. Established in 1995, NCEAS has pioneered the movement toward scientific collaboration, openness, and synthesis in ecology and environmental science and has helped build a community of scientists around it.

Our mission is to accelerate scientific discoveries that will enhance our understanding of the world and benefit people and nature, as well as to transform the scientific culture to be more open, efficient, and collaborative. We do this by:

- Enabling collaborations between the brightest minds in the environmental sciences
- Conducting breakthrough science that is grounded in big-picture thinking
- Improving analyses through computing innovations that increase the usability of data
- Partnering with agencies and organizations that can help put the science to action
- Training and inspiring generations of scientists to practice synthesis and open science

Our approach to science is solutions oriented and enables discoveries at bigger scales and faster speeds, making them well positioned to inform environmental policy and management. The approach focuses on synthesis, leverages collaboration, and embraces and practices open science.

Environmental challenges are complex and their solutions require diverse perspectives and sets of expertise. In recognition of this, we convene multidisciplinary teams of academic and non-academic researchers from all over the world into working groups who, over the course of one to two years, tackle “wicked” questions collaboratively, an approach NCEAS first innovated and institutions around the world now emulate. These teams do not collect new data, but synthesize and analyze existing data from many sources to uncover new and often big-picture insights that can inform policy and management. Given that data must be accessible and
reproducible to be useful and effective for solutions-oriented science, we strive to advance discovery and scientific culture in the direction of open science.

Another aspect of our approach is building **partnerships** with other research institutions, nonprofits, and government agencies, which can expand scientific capacity and help apply the science to solutions. For example, one of our major partnership initiatives is the Science for Nature and People Partnership (SNAPP), a collaboration with The Nature Conservancy and Wildlife Conservation Society that brings together working groups to address challenges that lie at the intersection of nature conservation, sustainability development, and human well-being. We also operate the US Long-Term Ecological Research (LTER) Network’s Communication Office, a partnership with the National Science Foundation.

This approach informs the three pillars of our work: research, data science, and training. We lead synthesis and analytical research initiatives and projects that tackle big questions that would be difficult to answer with other scientific approaches. The following are current examples of our research:

- We co-lead the State of Alaskan Salmon and People (SASAP) project with Nautilus Impact Investing, which has convened eight working groups to attain a comprehensive understanding of ecological and social conditions for salmon to inform decision-making.
- We are leading two working groups producing first-of-their-kind global analyses of the environmental impacts of food systems to help expand the understanding of how to feed a global population sustainably.
- We lead the Conservation Aquaculture Research Team (CART) to continue research started by a SNAPP working group focused on understanding the potential for sustainable offshore aquaculture. CART conducts the science necessary to meet conservation goals while also supporting sustainable aquatic farming, which will be an important part of the future global food system.

We also create innovative solutions for managing and analyzing environmental data, such as the following:

- Our Data Task Force, which is supporting SASAP, is a team focused solely on sourcing often-inaccessible data and building usable databases with them, thereby enabling greater efficiency and productivity.
- We are a founding partner and co-coordinator of the NSF-funded DataONE network, a federation of environmental data centers and repositories with a mission of making data more accessible to researchers around the world.
- In partnership with DataONE and NOAA’s National Center for Environmental Information, we run the Arctic Data Center to make available all data, software, and other research products associated with NSF-funded science in the Arctic for the sake of reproducibility.

Finally, we train early career and established researchers from around the world in best practices for open science and data management, especially with an application to synthesis research. Examples of this work include the following:
• Our Open Science for Synthesis workshop is an intensive, hands-on training in scientific computing and software for conducting reproducible science.
• We serve as a host institution for postdoctoral researchers, which typically support working groups, giving them experience coordinating research teams and designing their own synthesis research projects.
• Our Data Science Fellowship gives researchers hands-on experience and mentorship in data science best practices.

NCEAS operates in downtown Santa Barbara in a facility that provides visiting researchers the physical and mental space for creativity and collaboration – important ingredients that foster the level of scientific output for which NCEAS is known. At the same time, NCEAS maintains strong ties to campus. Many working groups include UCSB faculty or researchers, and we employ and train a large cadre of UCSB graduate students in data management, scientific programming, and science communications.

In addition, the Center supports a community of resident researchers that concentrate on synthesis science or the development of computational approaches and tools to support synthesis science. NCEAS staff provides logistical and technical support, training, and outreach services to increase the productivity and impact of our researchers and working groups.
Executive Summary

At NCEAS, we are always looking for new scientific challenges to tackle and innovative ways to improve the pace and scope of discovery. We use our collaborative, big-picture approach to address many of the most pressing global environmental challenges. We continue to support and host a wide range of transformative science. One of the most exciting things about the past year is a set of new endeavors that promise to enhance the creativity and impact of synthesis science. I believe these initiatives reflect our persistence in pushing the frontier on how science can help build a world in which people and nature thrive.

One of the most pressing global challenges is how to feed the billions – and growing number – of people living on the planet sustainably. With funding from the Zegar Family Foundation, we launched two new initiatives to help answer this multidisciplinary question. One will explore how climate change could impact marine aquaculture production, building on previous work at NCEAS assessing the constraints and opportunities for marine aquaculture to provide protein to people sustainably. This work is being led by our Conservation Aquaculture Research Team (CART), which grew out of a Science for Nature and People Partnership (SNAPP) working group.

The second initiative pairs two separately funded projects – one supported by Zegar Family Foundation and one through a partnership with World Wildlife Fund – to conduct a of the environmental footprints of all major global food production systems and explore the implications of these food footprints for human health. These new initiatives will add to our existing portfolio of projects helping to inform solutions to food security and environmental sustainability, such as one improving science-based soil management, another seeking solutions to eradicate a livestock-killing disease in Mongolia, and previous work that revealed the global importance of pollinators for crop production.

Multidisciplinary science, exemplified in these initiatives, is premised on the idea that scientific discovery sometimes requires new ways of thinking about a problem. Yet, rarely do scientists look outside the walls of academia for such inspiration. NCEAS is working to facilitate this out-of-the-box thinking with the launch of an artist-in-residence program. The program aims to engage scientists and artists in shared dialogue. It will provide scientists access to different perspectives and modes of thinking about science and environmental problems, and it will inspire artists to express scientific ideas in creative ways. We already have an exciting lineup of artists for this year – a photographer, a composer, and a poet – and others are queued up for next year.

In addition to these new endeavors, over the past year NCEAS working groups have published influential papers spanning a range of topics. One group used risk assessment models from the insurance industry to put a dollar amount on how much loss wetlands prevented during Hurricane Sandy – $625 Million – providing tangible evidence of nature’s value in preventing
natural disaster damage (Narayan et al, *Nature Scientific Reports, August 2017*). Another showed that meeting future protein demands with more seafood from aquaculture could reduce one of the biggest environmental impacts of meat production: land use (Froehlich et al, *PNAS, April 2018*). The first published paper from the State of Alaska’s Salmon and People project showed that a record-setting abundance of pink salmon may be having negative impacts on other salmon species, findings that received a good amount of regional media attention. And our two working groups that were part of the TomKat UC Carbon Neutrality Project, an effort to help identify strategies for the UC’s Carbon Neutrality Initiative, published their reports – one identifies a three-step strategy for phasing out natural gas (Meier et al, 2018) and the other identifies ways to increase engagement in the initiative among the UC community (Bales et al, 2018).

NCEAS has a robust and diverse set of existing and expanding projects, many in collaboration with practitioner and academic partners:

- The Science for Nature and People Partnership (SNAPP) has entered its fifth year of activity. A partnership with The Nature Conservancy and Wildlife Conservation Society, SNAPP currently has 16 active working groups, with 4 to 5 more launching in 2019. SNAPP’s impacts and outcomes are described in the summary magazine, SNAPPshot.
- The NSF-funded Long Term Ecological Research (LTER) Network Communications Office (NCO) is operated by NCEAS, capitalizing on NCEAS’ deep experience in synthesis, collaboration, and data science. Major activities in 2018 included supporting six LTER synthesis projects, launching a new Network website, co-hosting with NSF a successful symposium on ocean connections, and organizing the triennial LTER All Scientists’ Meeting, a four-day gathering of over 600 LTER scientists from its 28 research sites across the country.
- NCEAS continues to contribute as a significant partner of DataONE, a network for Earth and environmental data. In the last year, we have delivered citation and usage metrics for data objects as part of the Make Data Count project and exposed provenance information associated with published data. DataONE continues to grow, with over 1.1M data files in the system, and recent repository partners include PANGAEA, the Organization of Tropical Studies, and Research Workspace.
- The NSF-funded Arctic Data Center, a repository for Arctic scientific data and research documents, launched a new, easier-to-use metadata editor, surpassed 5,000 dataset submissions, and made strides in resource sharing within the Arctic research community by hosting data workshops and presenting at a number of major meetings (Polar 2018 Open Science Conference, 2018 Ecological Society of America, Polar Data Summit, International Arctic Workshop).
- The State of Alaska’s Salmon and People Project (SASAP) is nearing its completion, with the publication of its first two academic papers and the start of work on a legacy website that will serve as a public portal to the eight working groups’ major findings. This website will provide valuable and accessible resources to aid local decision-making for the sustainability of Alaska’s salmon and salmon-dependent communities. NCEAS has also started a partnership with the International Year of the Salmon to build on this work and apply similar synthesis approaches to understanding salmon globally.
- The last year marked the sixth annual global Ocean Health Index assessment and the release of a regional assessment for Hawaii. The global scores are informing global sustainability
governance, namely the United Nation’s Sustainable Development Goals. This was also the inaugural year of a new fellowship program, which provides emerging scientists training in data science to produce a global ocean health assessment. The intent for this program is not only to prepare the next generation of ocean scientists with data science skills but also to create an efficient way to continue annual OHI assessments, as the annual assessment is the fellows’ main deliverable.

- Our Conservation Aquaculture Research Team had a productive first year, publishing four papers in high-impact journals that provided several “first looks” into how to produce farmed seafood sustainably, including the spatial requirements for sustainable marine aquaculture and the ecological limits of using forage fish as feed.

**Five-Year Projection Update**

Our overall five-year plan has not changed, and I am excited to offer a few benchmarks that showcase our progress:

- We are maintaining our target number of working groups per year, with 31 that are currently active.
- Our establishment of two working groups focused on global food system sustainability demonstrates progress in our objective to create new nodes for synthesis research.
- We have established two new significant partnerships: one with the World Wildlife Fund to conduct one of the aforementioned working groups in food system sustainability and another with Future Earth and Colorado State University’s Global Biodiversity Center to support four working groups focused on ocean sustainability – the review of proposals for these groups is currently underway. Our strong partnership with The Nature Conversancy and Wildlife Conservation Society through SNAPP continues.
- This past year we supported two cohorts of Data Science Fellows, our new program to provide hands-on experience in environmental data science training to emerging researchers. Separate but related to our Ocean Health Index Global Fellowship, these eleven fellows supported the Arctic Data Center and the State of Alaska’s Salmon and People project. This fellowship is part of our objective to strengthen our position as a go-to place for environmental data science training.
- We have officially launched our artist-in-residence program and are hosting three artists this year – a composer, a photographer, and a poet/essayist – one of the three residency programs we are developing to expand ways of thinking about and solving environmental challenges. The composer, James Stephenson, will be composing a piece based on his week-long residency with us, to be debut next summer and in partnership with the Music Academy of the West. The photographer, Nicole Berry, has been developing an exhibit of scientist portraits; and the poet, Emily Vizzo, will use her experience with NCEAS to inspire her current writing projects.
- We have recruited four founding members for our Director’s Council, which will serve to help NCEAS with high-impact development and fundraising efforts, and potentially contribute to our strategic direction. The Council’s first meeting will be scheduled for this winter, and we aim to grow the Council next year to include two to four new members.

Now two years into my role as Director, I continue to be excited about the diversity and impact of projects we are leading and supporting. I want to thank the Gordon and Betty Moore
Foundation, the National Science Foundation, our partners at The Nature Conservancy and the Wildlife Conservation Society, and our many other sponsors for their generous support. I also want to acknowledge and thank the State of California and the leadership of UC Santa Barbara for their continued support of and commitment to NCEAS.

Figure 1: The centerpiece image of the mural by artist Elkpen, called The Butterfly Effect, created at the start of the fiscal year and commissioned by NCEAS to help communicate our work through art. It is on permanent display in our central lounge and reflects our new initiative to bring together artists and environmental scientists in dialogue.
People of NCEAS

Organization Chart

NCEAS Organization Chart August 2018

Resident Scientists
- Project Scientists: 2
- Postdoctoral Fellows: 7
- Researchers: 3
- Specialists: 1
- Senior Fellows: 5

Administrative Staff
- Deborah Donahue, Contract and Grant Analyst
- Ginger Gillquist, Event Coordinator / Director’s Assistant
- Michelle Morris, Financial Analyst
- Julia Niessen, Business Officer
- Ana Peters, Travel Coordinator

Technical Staff
- Julien Brun, Scientific Programmer
- Rachel Carlson, Data Science Fellow
- Steven Chong, Projects Data Technician
- Melanie Frazier, Scientific Programmer
• Stephanie Freund, Data Science Fellow
• Thomas Hetmank, Programmer/Analyst
• Chris Jones, Software Engineer
• Jared Kibele, Scientific Programmer
• Mitchell Maier, Data Science Fellow
• Bryce Mecum, Science Software Engineer
• Dominic Mullen, Data Science Fellow
• Rushiraj Nenuji, Software Engineer
• Emily O'Dean, Data Science Fellow
• Casey O'Hara, Staff Research Associate
• Erin O'Reilly, Communications Coordinator
• Nicholas Outin, Systems Administrator
• Mark Schildhauer, Center Associate
• Peter Slaughter, Software Engineer
• Irene Steves, Data Science Fellow
• Jing Tao, Software Engineer
• Thomas Thelen, Software Engineer
• Lauren Walker, Software Designer
Publications

Journal Articles

Bagstad, Kenneth; Cohen, Erika; Ancona, Zachary H.; McNulty, Steven; Sun, Ge. 2018. The sensitivity of ecosystem service models to choices of input data and spatial resolution. *Applied Geography*. 10.1016/j.apgeog.2018.02.005.

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Kendy, Eloise; Aylward, Bruce; Ziemen, Laura; Richter, Brian; Colby, Bonnie; Grantham, Ted; Sanchez, Leslie; Dicharry, Will B; Powell, Emily; Martin, Season; Culp, Peter; Szeptycki, Leon; Kappel, Carrie V. 2018. Water Transactions for Streamflow Restoration, Water Supply Reliability, and Rural Economic Vitality in the Western United States. *Journal of the American Water Resources Association*. 10.1111/1752-1688.12619.


Lester, Sarah E.; Stevens, J M; Gentry, Rebecca; Kappel, Carrie V.; Bell, Thomas; Costello, Christopher; Gaines, Steven D.; Kiefer, Dale; Maue, CC; Rensel, Jack; Simons, Rachel; Washburn, Libe; White, Crow. 2018. Marine spatial planning makes room for offshore aquaculture in crowded coastal waters. *Nature Communications*. 10.1038/s41467-018-03249-1.


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Wood, Sylvia; Jones, Sarah; Johnson, Justin; Brauman, Kate; Chaplin Kramer, Rebecca; Premier, Alexander; Girvetz, Evan H.; Gordon, Line; Kappel, Carrie V.; Mandle, Lisa A; Mulligan, Mark; O'Farrell, Patrick; Smith, William Kolby; Willemen, Louise; Zhang, Wei; DeClerck, Fabrice. 2017. Distilling the role of ecosystem services in the Sustainable Development Goals. *Ecosystem Services*. 10.1016/j.ecoser.2017.10.010.

Wyborn, Carina; Louder, Elena; Harrison, Jerry; Montambault, Jensen; Montana, Jasper; Ryan, Melanie; Bednarek, Angela; Nesshoever, Carsten; Pullin, Andrew S.; Reed, Mark; Dellecker, Emilie; Kramer, Johnathan; Boyd, James; Dellecker, Adrian; Hutton, Johnathan. 2018. Understanding the Impacts of Research Synthesis. *Environmental Science & Policy*. 10.1016/j.envsci.2018.04.013.
Reports and White Papers


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### Statistical Summary

1. **Academic personnel engaged in research:**
   - Faculty: 4
   - Professional Researchers (including Visiting): 6
   - Project Scientists: 2
   - Specialists: 5
   - Postdoctoral Scholars: 8
   - Postgraduate Researchers: 17
   - **TOTAL:** 25

2. **Graduate Students:**
   - Employed on contracts and grants: 17
   - Employed on other sources of funds
   - Participating through assistantships
   - Participating through traineeships
   - Other (specify)
   - **TOTAL:** 17

3. **Undergraduate Students:**
   - Employed on contracts and grants: 19
   - Employed on other funds: 1
   - Number of volunteers, & unpaid interns
   - **TOTAL:** 20

4. **Participation from outside UCSB:** (optional)
   - Academics (without Salary Academic Visitors)
   - Other (specify)

5. **Staff (Univ. & Non-Univ. Funds):**
   - Technical: 23
   - Administrative/Clerical: 5

6. **Seminars, symposia, workshops sponsored:** 59
7. **Proposals submitted:** 19
8. **Number of different awarding agencies dealt with***
   - 17
9. **Number of extramural awards administered:** 32
10. **Dollar value of extramural awards administered during year**
    - $26,102,203
11. **Number of Principal Investigators*****
    - 17
12. **Dollar value of other project awards****
    - 0
13. **Number of other projects administered**
    - 0
14. **Total base budget for the year (as of June 30, 2017)**
    - $641,527
15. **Dollar value of intramural support**
    - $89,889
16. **Total assigned square footage in ORU**
    - 13369
17. **Dollar value of awards for year (08 Total)**
    - $4,529,698

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* Count each agency only once (include agencies to which proposals have been submitted).
** If the award was open during the year, even if for only one month, please include in total.
*** Number of PIs, Co-PIs and Proposed PIs (count each person only once.)
**** Other projects - such as donation, presidential awards, fellowships, anything that isn't core budget, extramural, or intramural.
## Principal Investigators

<table>
<thead>
<tr>
<th>Name</th>
<th>Role</th>
<th>Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amber Budden</td>
<td>Center Associate</td>
<td>National Center for Ecological Analysis and Synthesis</td>
</tr>
<tr>
<td>Jennifer Caselle</td>
<td>Researcher</td>
<td>UCSB Marine Science Institute</td>
</tr>
<tr>
<td>Frank Davis</td>
<td>Professor</td>
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## Arctic Data Center Training

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William Fraser  Polar Oceans Research Group  
Evelyn Gaiser  Florida International University  
Peter Groffman  City University of New York (CUNY)  
Douglas Levey  National Science Foundation  
Susanne Menden-Deuer  University of Rhode Island  
Colette St. Mary  University of Florida  

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Katherine Barbeau  University of San Diego  
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Max Castorani  University of Virginia  
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Rose Cory  University of Michigan  
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David Foster  Harvard University  
Evelyn Gaiser  Florida International University  
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<td>Russell Hopcroft</td>
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## LTER: SOM Synthesis

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## LTER: Stream Elemental Cycling

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<td>Lei Zhao</td>
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**NSF Site Visit**

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**Ocean Tipping Points**

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<td>British Columbia Government</td>
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**Open Science Training GRP**

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<td>Marcus Beck</td>
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<td>Brittany Blomberg</td>
<td>Dauphin Island Sea Laboratory</td>
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<tr>
<td>Kim de Mutsert</td>
<td>George Mason University</td>
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<td>Andrea Dell'Apa</td>
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<td>Kirsten Dorans</td>
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<td>Brad Erisman</td>
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<td>Kaitlin Frasier</td>
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<td>Cassandra Glaspie</td>
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Jessica Henkel  
Alexander Ilich  
Kathryn Ireland  
Alexander Kolker  
Christopher Lortie  
Paula Moreno  
Sunil Nepal  
Uyen Nguyen  
Courtney Page  
Alexander Sacco  
Samendra Sherchan  
Edward Sherwood  
Tingting Tang  
Tracy Teal  
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Leah Wasser  
Haorui Wu  
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**Packard Planning Meeting**

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<th>Name</th>
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<tr>
<td>Elizabeth</td>
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<td>Jensen</td>
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<tr>
<td>Jason</td>
<td>Patlis</td>
<td>Wildlife Conservation Society</td>
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<tr>
<td>Hugh</td>
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| Joel       | Reynolds    | National Park Service             |

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Paul Schuette  
Tobias Schwoerer  
Kyle Shedd  
Jennifer Shriver  
Miles Spathelf  
Tiffany Stephens  
Sarah Thompson  
Trang Tran  
Gaeuman William  
Lorna Wilson  
Molly Zaleski  
Xinxian Zhang  
Jennifer Schriver  
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Raymond-Yakoubian
Julie Ringer  University of Alaska, Fairbanks
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January Scott  University of Alaska, Anchorage
Benjamin Stevens  Tanana Chiefs Conference
Carrie Stevens  University of Alaska, Fairbanks
William Voinot-Baron  University of Wisconsin, Madison
Michael Williams  Akiak Native Community

**Session 1: Data Science for Coral Reefs: Data Rescue**
Brian Beck  National Oceanic and Atmospheric Administration (NOAA)
Stephan Bitterwolf  University of California, Santa Cruz
Phil Dustan College of Charleston
Clinton Edwards University of California, San Diego
Cristiana Falvo US Geological Survey (USGS)
Kenneth Johnson Natural History Museum, London
Ingrid Knapp University of Hawaii, Manoa
Krishna Makineni George Mason University
Ouida Meier University of Hawaii
Sarah O'Connor University of Maryland
James Porter University of Georgia
Yuko Stender University of Hawaii, Manoa
Jan Vicente University of Hawaii

Session 2: Advanced Tools and Data Integration for Coral Reef Research
Catherine Alves University of North Carolina, Chapel Hill
Gregory Asner Carnegie Institution
Ross Cunning University of Miami
Mary Donovan University of Hawaii, Manoa
Crawford Drury Hawaii Institute of Marine Biology
Robert Dunn San Diego State University
Ruth Gates University of Hawaii
Gretchen Goodbody-Gringley Bermuda Institute of Ocean Sciences (BIOS)
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Carolyn Gray Wildlife Conservation Society
Jensen Montambault The Nature Conservancy
Hugh Possingham University of Queensland
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<tr>
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<tr>
<td>John Robinson</td>
<td>Wildlife Conservation Society</td>
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**SNAPP Management Team**

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<td>Kyle Burford</td>
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<td>Craig Groves</td>
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<td>Matthew Miller</td>
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**SNAPP: Appalachian Coal Fields**

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<td>Mark Anderson</td>
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<td>Danna Baxley</td>
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<tr>
<td>Joshua Bills</td>
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<td>Brandon Dennison</td>
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<td>Cliff Drouet</td>
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**SNAPP: Assessing Biocultural Indicators of Community Resilience**

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<tr>
<td>Joe McCarter</td>
<td>American Museum of Natural History</td>
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<tr>
<td>Manuel Mejia</td>
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Edward Ellis  Universidad Veracruzana
Bronson Griscom  The Nature Conservancy
Sara Leavitt  The Nature Conservancy
Delon Marthinus  The Nature Conservancy
Daniela Miteva  Ohio State University
Sebastian Palmas Perez  University of Florida
Hugh Possingham  University of Queensland
Sébastien Proust  The Nature Conservancy
Francis Putz  University of Florida
Claudia Romero  University of Florida
Rebecca Ruslandi  University of Queensland
Rebecca Runting  University of Queensland
Ruslandi  University of Florida
Erin Sills  North Carolina State University
Oscar Venter  University of Northern British Columbia
Dawn Ward  University of Florida

**SNAPP: Habitat Restoration Assessment**

Katie Arkema  Stanford University
Rick Bennett  US Fish and Wildlife Service (FWS)
Kelly Burks-Copes  US Army Engineer Research and Development Center
Anthony Chatwin  National Fish and Wildlife Foundation
Allison Colden  Chesapeake Bay Foundation
Alyssa Dausman  The Water Institute of the Gulf
Bryan DeAngelis  The Nature Conservancy
Rachel Gittman  Northeastern University Marine Science Institute
Jonathan Grabowski  Northeastern University
Jessica Henkel  Gulf Coast Ecosystem Restoration Council
A. (Anne) Randall Hughes  Northeastern University
Steven Scyphers  Northeastern University
Tisa Shostik  National Oceanic and Atmospheric Administration (NOAA)
Ariana Sutton-Grier  University of Maryland, College Park

**SNAPP: Land Use Change Orinoquia**

Paola Agostini  World Bank
Eduardo Arias  World Bank

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Silvia Alvarez  Wildlife Conservation Society 
Mayesse Da Silva  International Center for Tropical Agriculture (CIAT) 
Glenn Hyman  International Center for Tropical Agriculture (CIAT) 
Carlos Rogelis  The Nature Conservancy 
Tomas Walschburger  The Nature Conservancy 

**SNAPP: Levers for Health**

Giulio De Leo  Stanford University 
Andrew Dobson  Princeton University 
Isabel Jones  Stanford University 
Christopher LeBoa  Stanford University 
Andrea Lund  Stanford University 
Andrew MacDonald  Stanford University 
Nicole Nova  Stanford University 
Sarah Olson  Wildlife Conservation Society 
Susanne Sokolow  Stanford University 
Chelsea Wood  University of Washington 

**SNAPP: Management Team**

Benita Hussain  Wildlife Conservation Society 
Matthew Miller  The Nature Conservancy 
Jensen Montambault  The Nature Conservancy 

**SNAPP: Managing Soil Carbon**

Chelsea Carey  Point Blue Conservation Science 
Emma Fuller  Granular 
Sasha Gennett  The Nature Conservancy 
Kelly Gravuer  The Nature Conservancy 
Daniel Kane  Yale University 
Elsa Ordway  Stanford University 
Joe Rudek  Environmental Defense Fund 
Stephen Wood  The Nature Conservancy 

**SNAPP: Sanitation for and by Nature**

Robert Bastian  US Environmental Protection Agency (EPA) 
Florent Chazarenc  RSTEA 
Joaquim Comas  Catalan Institute for Water Research (ICRA) 
Lluis Corominas  Catalan Institute for Water Research (ICRA) 
Katharine Cross  International Water Association Bangkok Office 
Rose Kaggwa  National Water and Sewerage Corporation (NWSC) 
Nathan Karres  The Nature Conservancy
SNAPP: Science Advisory Council

- Fabrice DeClerck, Bioversity International
- Craig Groves, The Nature Conservancy
- Wendy Harrell, The Nature Conservancy
- Jane Carter Ingram, Wildlife Conservation Society
- Yuta Masuda, The Nature Conservancy
- Jensen Montambault, The Nature Conservancy
- Dilsy Roe, International Institute for Environment and Development
- Brian Stenquist, Meeting Challenges
- David Wilkie, International Institute for Environment and Development

SNAPP: Steppe Health

- Philippe Chardonnet, International Foundation for the Conservation of Wildlife
- Veronique Chevalier, French Agricultural Research Centre for International Development
- Andrew Dobson, Princeton University
- Amanda Fine, Wildlife Conservation Society
- Richard Kock, University of London
- Jeffrey Mariner, Tufts University
- Felix Njeumi, Food and Agricultural Organization (FAO)
- Mathieu Pruvot, Wildlife Conservation Society
- Enkhtuvshin Shiiledgamba, Wildlife Conservation Society

TomKat: Communication for Mitigation

- Roger Bales, University of California, Merced
- Jon Christensen, University of California, Los Angeles
- Alexander Heeren, University of California, Merced
National Center for Ecological Analysis and Synthesis is located in downtown Santa Barbara, approximately 8.5 miles from the main UC Santa Barbara campus.

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