Stockholm Resilience Centre

# Annual report 2015

*"Transformative research for biosphere stewardship"*


Stockholm Resilience Centre
Sustainability Science for Biosphere Stewardship

Stockholm University

A PARTNER WITH
The Beijer Institute of Ecological Economics
Kungl. Vetenskaps-Akademien
The Royal Swedish Academy of Sciences

FUNDED BY
MISTRA
The Swedish Foundation for Strategic Environmental Research

*Stockholm Resilience Centre Annual Report 2015*
**PRINTED BY** TMG Tabergs AB, 2016
**EDITED BY** Sturle Hauge Simonsen
**FRONTPAGE BY** O. Henriksson/Azote
**GRAPHIC DESIGN BY** Blomquist & Co
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# **Stockholm Resilience Centre** Annual Report 2015

# Chair's preface

"Stockholm Resilience Centre has developed a unique, team based culture and a student and research group that is ever more agile and skilled at connecting methodologies and epistemologies," says Frances Westley

PHOTO: COURTESY OF UNI. OF WATERLOO

**Frances Westley**,
Chair of the Board

**THE ACADEMIC SYSTEM** must be responsive to a changing world. Whereas in the past the traditional disciplines have made huge strides in understanding the earth and its social and biophysical systems, we now urgently require new approaches consistent with the complexity of the challenges facing us as a species. Humans have had a profound impact on the biophysical systems of the planet, and these are in turn driving new patterns of social and political behaviour. Rates of environmental crises are increasing as are instances of environmental violence and worldwide migration of refugees. If the academy is to play an important role in understanding these emerging dynamics and contributing to a sustainable future, new integrations of disciplinary knowledge are constantly required.

Since its launch nearly ten years ago, the Stockholm Resilience Centre (SRC) has taken this challenge to heart, seeking to approach problems in an interdisciplinary way. It has succeeded in the goal set by the Mistra foundation for a "large-scale, interdisciplinary and internationally competitive academic research centre addressing sustainable governance and management of linked ecological and social systems." The effort and dedication that this has involved should not be minimised. Interdisciplinary work is not the norm, even in sustainability science, and has demanded patience and creativity. The SRC of today has both. Under the able leadership of Carl Folke and Johan Rockström, a vibrant and highly productive interdisciplinary research group has formed and has become a global leader in producing scientific breakthroughs in sustainability science. Beginning with a core of system ecologists, SRC now boasts social scientists, from economists to political scientists to sociologists and anthropologists.

The Resilience Research School is an ever-evolving experiment in attracting and training a new generation of deeply interdisciplinary researchers. Most importantly, SRC has developed a unique, team based culture and a student and research group that is ever more agile and skilled at connecting methodologies and epistemologies. That is one reason why SRC is a beacon, attracting visiting researchers from all over the world interested in transformations toward sustainability, not only in theory but in practice.

This year SRC has taken on a bold new Sida funded project, GRAID (Guidance for Resilience in the Anthropocene: Investments for Development), which will bring the challenges of development into the heart of resilience studies. This is a logical next step for an interdisciplinary organization committed to solving global sustainability problems. I am both optimistic and confident in this new initiative, founded as it is on the ever growing interdisciplinary and transdisciplinary competence of SRC. I look forward to more exciting breakthroughs in resilience science, associated with GRAID, in the year ahead.

## Vision & Mission

The *vision* of the Stockholm Resilience Centre is a world where social-ecological systems are understood, governed and managed, to enhance human well-being and the capacity to deal with complexity and change, for the sustainable co-evolution of human civilizations with the biosphere.

The *mission* of Stockholm Resilience Centre is to advance research for governance and management of social-ecological systems to secure ecosystem services for human well-being and resilience for long-term sustainability. We apply and further develop the scientific advancements of this research within practice, policy and academic training.

# *Directors' view*

A major strength of the centre is the collaborative mode of pursuing our research agenda for deep understanding, and complementing it with strategic science, policy and practice activities

**SOCIAL-ECOLOGICAL SYSTEMS** are embedded in the biosphere. Since the beginning, our research on human development and poverty alleviation has been based on the biosphere as the biophysical foundation for human well-being, through critically important ecosystem services. The wellbeing of individuals, communities, and societies is tightly coupled to the capacity of the biosphere to sustain it. This is an obvious fact in a situation when the scale, connectivity, and speed of human actions shape the dynamics of the biosphere and the earth system as a whole.

Resilience is about cultivating the capacity to sustain development in the face of unexpected and surprising changes. It is about how periods of gradual change interact with abrupt changes, and the capacity of people, communities, societies, and cultures to adapt or even transform into new development pathways in the face of dynamic change. It is about the capacity to secure favourable outcomes (material, symbolic and emotional) under new circumstances, and when necessary, by new means, even when this entails significant modifications to behaviour or the social frameworks that structure and give meaning to behaviour. Sustainable development requires the management and governance of social-ecological systems. This translates to stewardship of social systems and ecosystems, landscapes and seascapes, in tune with the living planet as a whole.

To achieve development on a planet where humans and the environment are truly intertwined – whether for poverty alleviation, reduced inequality, or economic progress – this development has to be embedded in the biosphere if sustainability is to be taken seriously. There is great interest in the interplay between resilience, development and global change, and major actors like development agencies are now engaging deeply in resilience and development. The development agenda is confronted with the new situation of the Anthropocene, involving new interactions of people and planet, reshaping and expanding the development challenge. Addressing resilience, from local communities to the Earth system as a whole, as well as interactions and feedbacks between them, is now a core for attaining the Sustainable Development Goals on global development. Stockholm Resilience Centre (SRC) has with great excitement become deeply engaged in this challenge, and the new GRAID programme (Guidance for Resilience in the Anthropocene: Investments for Development) has been set in motion, supported by Sida and connected to the Global Resilience Partnership spearheaded by the Rockefeller Foundation, USAID and Sida. GRAID will be a collaborative platform for using resilience both as a lens and as a process in development. New recruitments and transdisciplinary collaborations are emerging for advancing this significant challenge towards sustainability. GRAID is nicely in tune with the vision and mission of the SRC, and synergies of GRAID with our research agenda and science, practice, policy, and communication are plentiful.

A major strength of the SRC is the collaborative mode of pursuing our research agenda for deep understanding, and complementing it with strategic science, policy and practice activities for magnifying this understanding for action. More explicitly, complementing it with the hope of transforming human actions to become in tune with biosphere dynamics for wellbeing and sustainability. We are deeply appreciative to our colleagues and collaborators for a never ending curiosity and for contributing with such high quality work in such a professional, cooperative and collective manner, and to our funders and supporters for making the work we do possible.

**Johan Rockström,**
Executive Director

**Carl Folke,**
Science Director

**Line Gordon,**
Deputy Director &
Deputy Science Director

**Olof Olsson,**
Managing Director

# *Madame Evergreen*

## The making of a water hero

Mrs Water. The Trailblazer. An icon. We attribute many names to the ones we admire and Malin Falkenmark is no exception. At the age of 90 few researchers have gained as much respect and admiration as her

**THROUGH A CAREER** that spans over 60 years she has contributed to more than 400 publications and some 20 books. But she will not stop working. Not yet, there is still too much to do. Her dream, she says, is to see a more genuine acknowledgement of water's essential roles in the life support system "before age seriously kicks in". Such a statement is a testament of her formidable energy and determination.

### Green, blue and Johan Rockström

Falkenmark remains frustrated over what she calls "water blindness" or narrow-minded views on the role of water for all life on earth. Somehow many fundamental roles of water still tend to escape attention. Good thing then she is blessed with the gift of turning complex concepts into easily understandable ones. Her description of water being "the bloodstream of the entire biosphere" is well-known and the terms "green" and "blue" water to differentiate between the below-surface water, which makes food and plants grow (green), and the water we see flowing in rivers (blue), are equally impressive. These terms reduce complex hydrology science to the elementary school level without compromising the intellectual work behind them. How fitting then that they were developed together with another master of scientific clarity, centre director Johan Rockström.

Over the last 25 years Falkenmark and Rockström have sought to explain to the world why green and blue water must be better managed. Interestingly enough, their collaboration is down to a spur-of-the-moment decision by Johan Rockström. As a young agronomy student in 1989, he decided at the last minute to attend a lecture by Falkenmark. Afterwards he was so fascinated by her work he asked her to be his supervisor for his Master's study. The rest is history, as they say: Johan Rockström is today one of the world's most prominent researchers on water management and global sustainability issues in general. For Falkenmark, it remains her most worthwhile professional achievement to have inspired Rockström to pursue his scientific career.

### An inspiration for women

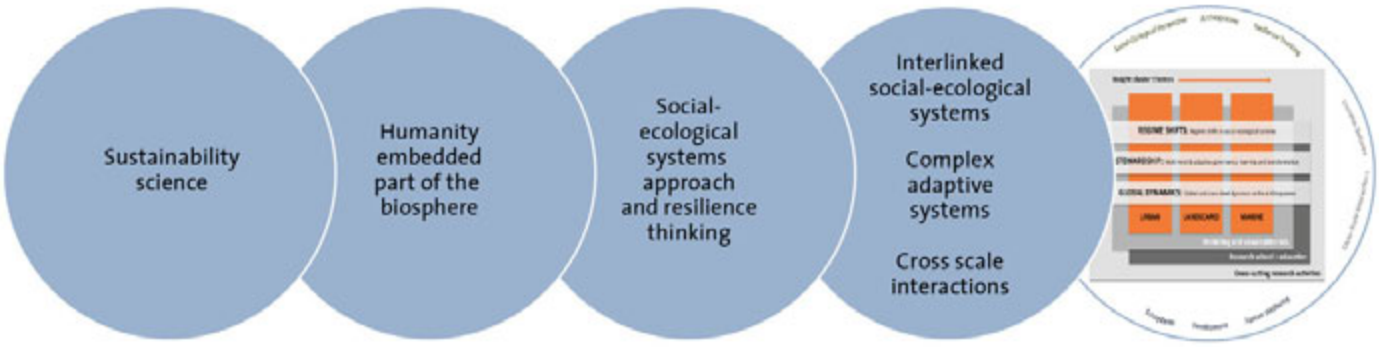
In the the male-dominated world that is science academia, Falkenmark also remains an inspiration for numerous women. Our own deputy science director Line Gordon describes her as "a great source of inspiration" who has taught Gordon everything she knows about water. "She is a fabulous systems thinker and a great listener with a tremendous capacity to synthesize information in new ways," Gordon says.

When the participants of the 1977 UN Water Conference in Mar del Plata discovered that the selected Rapporteur General was a woman, they welcomed Falkenmark to the podium with never-ending applause. "I will never forget that moment. It was an applause of astonishment," says Falkenmark, who herself has never been particularly concerned about working in a male dominated environment. "That's not a problem," she says, "In my early career just being tall was quite helpful." Malin Falkenmark is 184 centimetres tall. But for her own academic development, Falkenmark owes some credit to her first boyfriend, the late Mats Olsson. They spent much time together during the period 1941-45, a period Falkenmark describes as her "formative years".

Her parents had her embarked on a career within linguistics but her boyfriend's interest in science appealed to her. "I got an A in math and the question arose whether subjects like statistics or physics would suit me better. My relationship with Mats, with his books and perspectives, helped shape my decision to ultimately pursue studies within science," she says. Falkenmark took the scientific world by storm, establishing herself as a reference point within ice physics, water exchange, and international hydrology. Her career has taken her to a variety of places but her cabin in Trosa outside Stockholm remains her favourite place. That is where she finds peace and quiet, spending time with her family but also reflecting on the future and how we can manage precious water resources in an increasingly populated world. Planet Earth has put its best woman on the job.

# Research overview

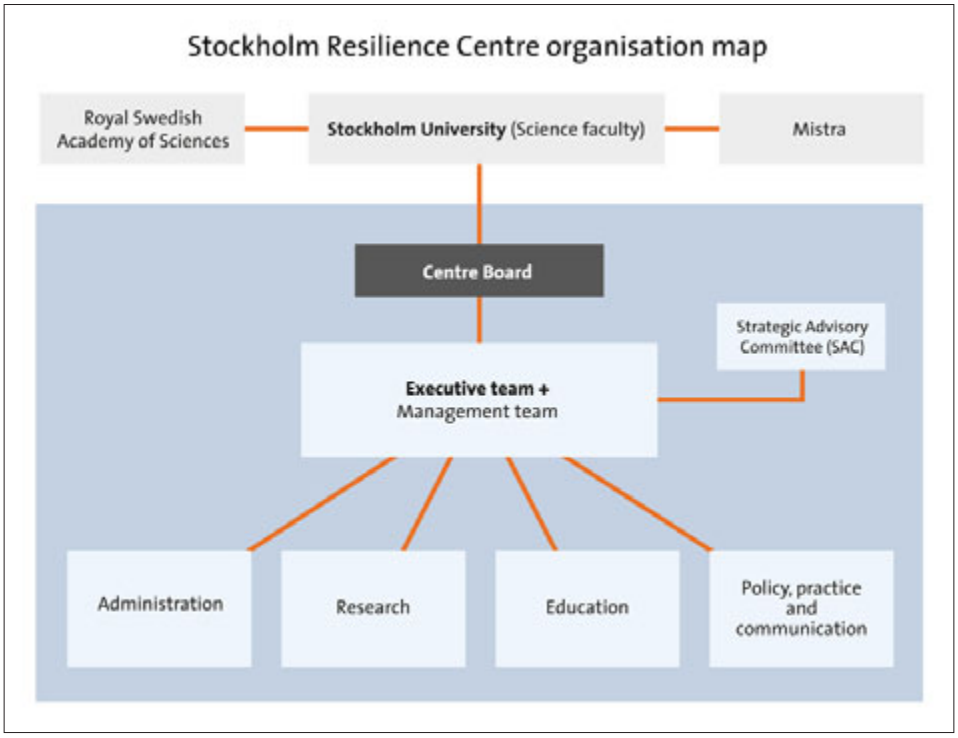
## The Stockholm Resilience Centre research framework




**SUSTAINABILITY SCIENCE** is a broad interdisciplinary and transdisciplinary field defined by the problems it addresses rather than by the disciplines it employs. The research focus of the Stockholm Resilience Centre (SRC) is sustainability science for biosphere stewardship in the Anthropocene, underlining that sustainability cannot just concern the social, economic and cultural spheres, but that human development and progress rests on a resilient biosphere. Hence, the environment is not viewed as a mere input among many others for human wellbeing but serves as a foundation for social and economic development. The research framework of the SRC emphasizes that people are embedded parts of the biosphere, shaping it from local to global scales, and at the same time fundamentally dependent on the collective work of the Earth's ecosystems, the biosphere.

Development issues in our work are approached from within this framework. The framework makes clear the challenges and opportunities that emerge for humans to become stewards of the biosphere and sustain development for current and future generations; environmental issues are about our own future on Earth. We use the social-ecological approach that aims at understanding intertwined social-ecological systems and the cross-scale dynamics of the Anthropocene.

We use resilience thinking as one lens to ask new questions and analyze complex systems and particularly complex adaptive social-ecological systems. Capturing the interplay between periods of slow and rapid change, and how to adapt and persist and even transform new development pathways in the face of dynamic change, is a research frontier – which includes our interactions with policy, practice, and the arts. Within the SRC framework, centre researchers are using a diversity of theories, approaches, methods and perspectives, including co-production of knowledge together with practitioners and other stakeholders. The research of the centre requires in-depth collaboration, not only among the researchers in Stockholm, but also with our international networks of collaborators and stakeholders.



# *Reflections on PECS*

In 2005 The Millennium Ecosystem Assessment (MA) called for a better understanding of how social-ecological systems evolve over time. The result was the Programme on Ecosystem Change and Society (PECS), which is hosted by the Stockholm Resilience Centre

**ALBERT NORSTRÖM**, executive director of PECS, gives an overview of the importance of PECS and what it will deliver.

## First of all, what is PECS and why is it important?

PECS is an international research programme that focuses on how we can transform systemic linkages between humans and nature into more sustainable ones. PECS is important because it boosts research in areas where progress is urgently needed.

## How can it make a difference?

I think our work can make a difference in many ways. For example, our projects and case studies all have high levels of engagement and collaboration with people from outside academia. We also put a strong emphasis on transformation and how desired futures might be reached. Finally, rather than downscaling from a global scope, projects within PECS build up from the local and place-based perspectives.

## How do you work and who do you work with?

PECS's research follows two broad approaches. The first approach concerns comparisons of place-based case studies from around the world. To date we have endorsed 21 projects that together encompass 42 really interesting case studies. By comparing these case studies we hope to reveal general behaviours and dynamics of these systems.

Furthermore, these case studies use different methods because of specific contexts and histories. One ambition is to build a central database of the many methods employed in the case studies to create a basis for offering training workshops on making different methods meet.

Our second approach is the development of a set of "fast-track" research activities that often build on, but are not limited to, the endorsed PECS place-based case studies. One example is the "Seeds of a Good Anthropocene" project, which focuses on collecting visions of futures that are socially and ecologically desirable, just, and sustainable.

## Looking back, what is PECS's most significant achievement so far?

I would say the first PECS conference, which was held in South Africa in 2015. That was a great milestone.


We gathered 250 researchers and stakeholders from within and beyond the PECS network to share cutting-edge research. We are really proud of that event.

## What can we expect from PECS in the near future?

The near future will also see the continuous growth of PECS with more projects being endorsed and new working groups established. We will continue to play an important part of global research platforms such as Future Earth. What is exciting about Future Earth is that it is, in essence, a network of networks that wants to intensify the impact of research and accelerate sustainable development on all levels. Finally, I also have to mention, as a small teaser, that the next PECS conference will be held in Oaxaca, Mexico, in 2017. I look forward to another two years of fascinating PECS activities, which will culminate in that event.

# Publications

Centre research continues to be attractive to top ranked scientific journals. In 2015 alone fifteen articles were published in Nature, Science, and Proceedings of the National Academy of Sciences, USA (PNAS)

**ALL IN ALL OVER 150 SCIENTIFIC** articles were published by centre researchers in 2015. Some 40 of them appeared in journals with an impact factor at or above 4 such as The Lancet, Trends in Ecology and Evolution, Nature Climate Change, Nature Communication, Global Change Biology, Frontiers in Ecology and the Environment, Philosophical Transactions of the Royal Society B, Proceedings of the Royal Society B and Global Environmental Change.

Some 50 articles were published in the interdisciplinary journals Ambio, Current Opinion in Environmental Sustainability, Ecological Economics, Ecology and Society, Global Environmental Change, Marine Policy, Plos One, and Sustainability. About a third of the 2015 publications (48 articles) appeared in journals that were new to the publication list of Stockholm Resilience Centre (SRC) researchers. These included Advances in Ecological Research, Ecosystem Services, Science of the Total Environment, Climate of the Past, the Anthropocene Review, Agricultural Systems, Urban Studies, Aquaculture Research, Water Resources and Rural Development, Frontiers in Environmental Science, Journal of Environmental Planning and Management, Journal of Environmental Practice, and Conservation and Society.

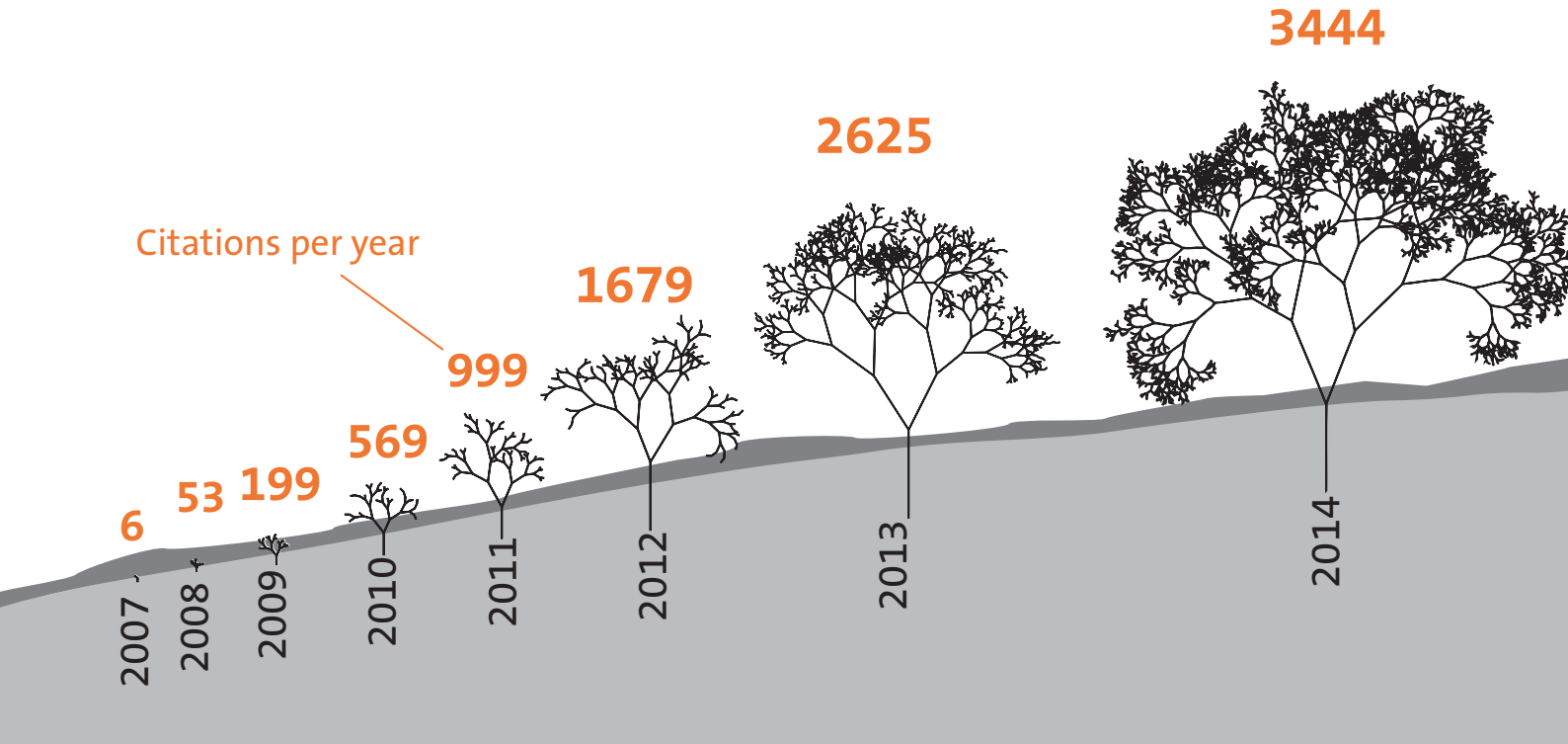
Several of these new journals have their roots in the social sciences and humanities like Annual Review of Anthropology, Environmental Humanities, Nature and Culture, Frontiers in Psychology, Geoforum, International Review of Environmental and Resource Economics, Review of International Organizations, The Journal of Corporate Citizenship, European Union Politics, Policy Sciences, and the International Journal of the Commons. There are also publications among the new journals with explicit focus on sustainability like Environment Development and Sustainability, Ecosystem Health and Sustainability, Agroecology and Sustainable Food Systems, International Journal of Social Ecology and Sustainable Development, and International Journal of Sustainability in Higher Education.

Centre researchers have also been engaged with editing several special issues.

*A framework for analyzing, comparing, and diagnosing social-ecological systems* edited by Pieter Bots, Maja Schlüter, Jan Sendzimir. Ecology and Society. December 2015 (four SRC papers).

*Advancing the frontier of urban ecosystem services research: Lessons and future challenges* edited by Erik Andersson, Thomas Elmqvist, Peleg Kremer, Timon McPhearson. Ecosystem Services. April 2015 (five SRC papers).

*Advancing the understanding of behavior in social-ecological systems: Results from lab and field experiments* edited by Marco Janssen, Therese Lindahl, Jim Murphy. 2015. Ecology and Society December 2015 (two SRC papers).



*Applied research for enhancing human well-being and environmental stewardship: using complexity thinking in Southern Africa* edited by Carolyn Palmer, Oonsie Biggs, Graeme Cumming. Ecology and Society. March 2015 (four SRC papers).

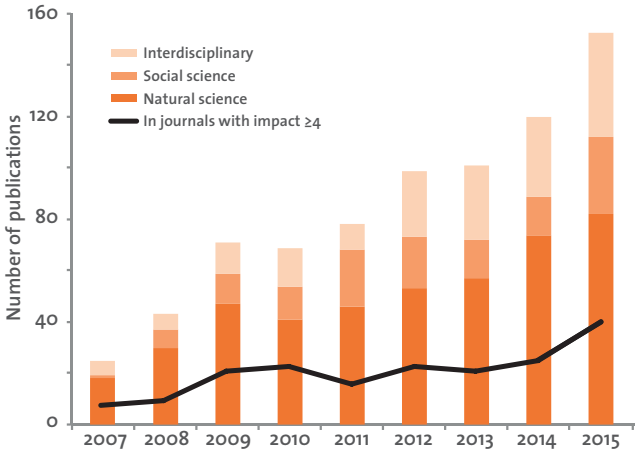
*Baltic Sea ecosystem-based management under climate change* edited by Erik Bonsdorff, Agneta Andersson, Ragnar Elmgren, Terry Bidleman, Thorsten Blenckner, Elena Gorokhova, Catherine Legrand, Johan Wikner. Ambio 44(3). June 2015 (three SRC paper).

*Cooperation, local communities, and marine social-ecological systems: New findings from Latin America* edited by Sebastian Villasante, Henrik Österblom. Ecology and Society. March 2015 (one SRC paper).

*Governing for urban resilience* edited by Cathy Wilkinson, Sue Parnell, Ruth Beilin. Urban Studies 52(7). May 2015 (three SRC papers).

*Marine regime shifts around the globe: Theory, drivers, and impacts* edited by Alessandra Conversi, Christian Möllmann, Carl Folke, Martin Edwards. Philosophical Transactions of the Royal Society London, Biological Sciences 270, issue 1659, 2015. January 2015 (six SRC papers).

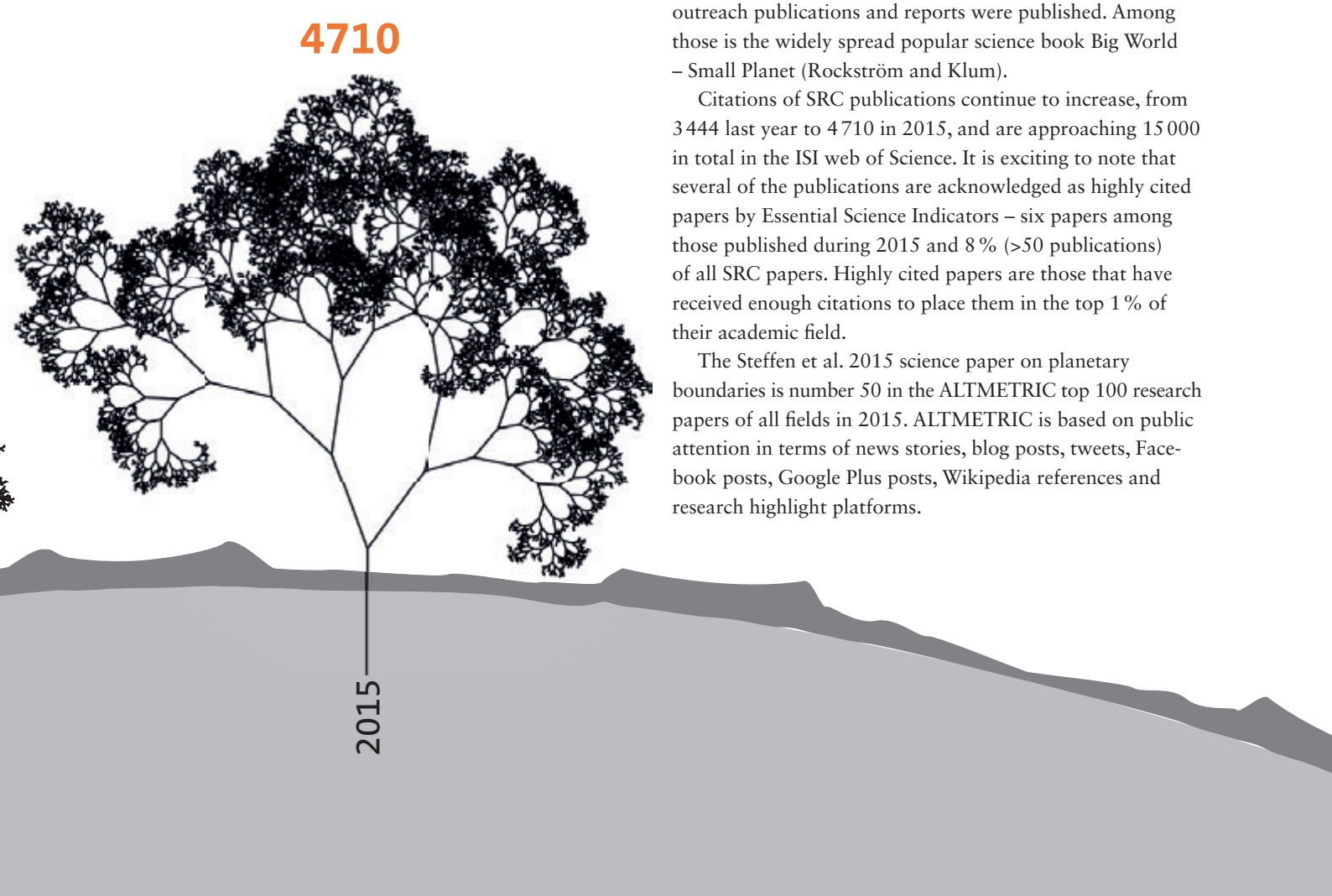
## Publications per discipline & publications in high impact journals




Centre researchers also contributed papers to the 100th Anniversary Special Feature of PNAS on Nature as Capital as part of a collaboration with Stanford, as well as the Ambio special issues Climate and land-use change effects on landscape processes, biodiversity, ecosystem services and governance as part of the Ekoklim project at Stockholm University. In addition, 28 journal articles with official publication dates in 2016 appeared online in 2015. Two science books, one with Cambridge University Press and one with LM Publishers were released in 2015. Also 20 book chapters and some 50 science, policy, practice and outreach publications and reports were published. Among those is the widely spread popular science book Big World – Small Planet (Rockström and Klum).

Citations of SRC publications continue to increase, from 3 444 last year to 4 710 in 2015, and are approaching 15 000 in total in the ISI web of Science. It is exciting to note that several of the publications are acknowledged as highly cited papers by Essential Science Indicators – six papers among those published during 2015 and 8 % (>50 publications) of all SRC papers. Highly cited papers are those that have received enough citations to place them in the top 1 % of their academic field.

The Steffen et al. 2015 science paper on planetary boundaries is number 50 in the ALTMETRIC top 100 research papers of all fields in 2015. ALTMETRIC is based on public attention in terms of news stories, blog posts, tweets, Facebook posts, Google Plus posts, Wikipedia references and research highlight platforms.



# Research highlights

## ESA: Centre publications among most influential

To celebrate its 100th anniversary, the Ecological Society of America (ESA) highlighted 100 of the journal's most influential papers. Among them were articles by centre researchers, including "Response diversity, ecosystem change, and resilience" co-authored by Thomas Elmqvist, Carl Folke, Magnus Nyström, Garry Peterson, Brian Walker and Jon Norberg. Another influential article with centre involvement was "Rediscovery of traditional ecological knowledge as adaptive management" co-authored by Johan Colding and Carl Folke.

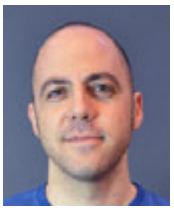
## Highlighting local initiatives in regional development

The ARTS project (Accelerating and Rescaling Transitions to Sustainability) is an EU-funded project that seeks to understand the role and potential impact of local sustainability initiatives in five city-regions across Europe: Brighton, Budapest, Dresden, Flanders and Stockholm. The work in Stockholm is led by centre researcher Sara Borgström. ARTS Stockholm has applied an interactive research process which includes a number of dialogues between local initiatives, regional and municipal officials and politicians, policy makers, researchers and artists. Together they are working towards a roadmap that will identify and formulate strategies for how to better integrate the innovative power of local initiatives in the Stockholm region. ARTS Stockholm was during 2015 an active partner in Experiment Stockholm at Färgfabriken, a project and exhibition that experimented with new strategies for dealing with a rapidly urbanizing Stockholm region. The ARTS project has been acknowledged by the European Union as a Policy Excellence Project used as a role model for international research exchange.

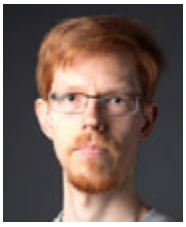
## Funding boost for researchers

**MAJA SCHLÜTER** received a consolidator grant from the European Research Council for the project MuSES – Towards middle-range theories of the co-evolutionary dynamics of multi-level social-ecological systems (five years, 18.5 MSEK). The project will develop a mechanism-based understanding of change in social-ecological systems by developing dynamic models of SES at an intermediate level of complexity across a set of empirical cases of marine and terrestrial food production systems.

The ambitious project will advance sustainability science by developing approaches to identify critical social-ecological interactions across local to global scales and integrate human adaptive responses into models of SES.



**ALBERT NORSTRÖM** received nearly 3 million SEK from Formas to carry out an ambitious, empirical assessment of global coral reef regimes, relying on an extensive global dataset across gradients of natural and anthropogenic conditions. The results from the project will aid practitioners to move toward practical implementation of ecosystem-based management.



**SARA BORGSTRÖM AND ERIK ANDERSSON** received nearly 3 million SEK from Formas to investigate the potential of nature protected areas to support biodiversity and ecosystem services benefits on a landscape scale. Part of the project includes formulating guidelines for how to better connect protected areas to their surroundings by interventions in the transition zones and wider landscape.

**MARIA TENGÖ** received 3.6 million SEK from the Swedish Research Council (VR) to implement and analyze the Multiple Evidence Base, an innovative approach for connecting local, indigenous and scientific knowledge systems. Together with a team of researchers and experts of local and indigenous knowledge she will study how such an approach can transform the way knowledge is generated and used. The project grows out of on-going science-policy practice dialogues at the Stockholm Resilience Centre, in collaboration with the centre hosted practice and policy interface Swedbio.

## The important support from the Ebba and Sven Schwartz Foundation

The Ebba and Sven Schwartz Foundation has since 2011 helped the researchers Ann-Sophie Crépin, Line Gordon and Lisen Schultz to excel academically and build their careers in a resilient fashion. The overall focus of the Schwartz grant is to find ways to allow people to account for biosphere support and ecosystem services in decision making. Everything from the climate resilience of Arctic ecosystems to the value of tropical mangrove forests for storm protection has been investigated by the three Schwartz-funded researchers, not to mention the management and governance of cultural landscapes in Kristianstad, Sweden, and water and poverty in the Sahel. The five years of the Schwartz-funded research have now been summarised in a report, which can be downloaded from the centre's website.

Line Gordon

Ann-Sophie Crépin

Lisen Schultz

## Revealing the good and bad sides of Stockholm

What is experienced as "good" or "bad" among ordinary people often goes unarticulated in urban planning. Instead, solutions are often based on temporary aesthetic trends, economic beliefs and the priorities of planners, politicians or architects. Centre researchers Stephan Barthel and Matteo Giusti have designed the website www.varardittstockholm.se to visualise the daily experiences of people living in Stockholm. On "Var är ditt Stockholm?" (Where is your Stockholm?) inhabitants of Stockholm can map places in the city that are associated with both positive and negative experiences. By the end of 2015, the site had received more than 2100 locations and the project has caught the interest of City of Stockholm and may expand to suburban municipalities such as Huddinge, Haninge and Botkyrka. Just like the ARTS Stockholm project (see separate text), "Var är ditt Stockholm?" was in 2015 an active partner of Experiment Stockholm at Färgfabriken, a project and exhibition that experimented with new strategies for dealing with a rapidly urbanizing Stockholm region.

**Matteo Giusti**

**Stephan Barthel**

## Collecting seeds of sustainable futures

**Oonsie Biggs**

**Garry Peterson**

**Albert Norström**

While there is no shortage of stories that document human inequality and the unsustainable stewardship of our planet, efforts to envision a more positive future seldom receive the same attention. To counter this, centre researchers Garry Peterson, Oonsie Biggs and Albert Norström, together with an international team of researchers, have launched Seeds of a good Anthropocene, a project that will gather examples of a thriving sustainable social-ecological future. The examples are collected and presented on the website www.goodanthropocenes.net.

## Research focus in Latin America

In 2015, the centre's Latin America contact group was established. It aims to strengthen the Latin America-focused research at SRC as well as work in the science, law and policy interface. The group has also made external connections with other institutions in Sweden and in Latin America, and has been instrumental in setting up a Memorandum of Understanding with Universidad Autónoma Metropolitana, Mexico, and Universidade Federal do Ceará, Brazil. The group has also hosted two visiting researchers from Mexico.

## Towards a low carbon society – the role of Sweden

The EU Project COMPLEX is designed to support the transition to a low carbon society by 2050. The project has 17 European partners, and Stockholm Resilience Centre is part of the Swedish contingent that will look at the Stockholm-Mälar region of Sweden and its possible paths towards a significantly less carbon-intense region. With support from centre researchers Uno Svedin, Sara Borgström and Stephan Barthel, the aim is to analyze strategic societal choices and their consequences. The project runs between October 2012 and September 2016.

## Contributing to Lancet commission on health and climate change

The Lancet Commission on Health and Climate Change maps out the impacts of climate change, and the necessary policy responses, to ensure the highest attainable standards of health for populations worldwide. Centre researchers Victor Galaz and My Svensdotter were members of the commission. One interesting way forward is so-called ecosystem-based adaptation, says Victor Galaz: "Ecosystems and their services contribute to human health in multiple ways and they can act as buffers, increasing the resilience of social-ecological system to climate-induced hazards and disasters."

**Victor Galaz**

**My Svensdotter**

## The World in 2050: Pathways towards a sustainable future

The International Institute for Applied Systems Analysis (IIASA), the Stockholm Resilience Centre, the Earth Institute at Columbia University, the Sustainable Development Solutions Network (SDSN), and the Alpbach-Laxenburg Group have launched a new initiative to help achieve sustainable development and attain the Sustainable Development Goals. "The World in 2050" project brings together leading modelling teams to perform an integrated assessment that addresses the full spectrum of sustainable development challenges. The project is jointly led by IIASA Director General & CEO Professor Dr Pavel Kabat, Stockholm Resilience Centre Director Professor Johan Rockström, and Professor Jeffrey Sachs, Director of Earth Institute at Columbia University.

## New management tool to assess the health of the Baltic Sea

**Thorsten Blenckner**

Amid a range of initiatives and programmes to improve the state of the Baltic Sea, few have been successful in incorporating the social, ecological and financial factors into a new tool for decision-makers in the region. This new tool, called the Baltic Health Index, will focus on the ability to continue to produce the ecosystem services and products that humans depend on. The index is a regional study under the global Ocean Health Index framework, the first comprehensive ocean assessment that also includes humans as a part of the marine ecosystems. Led by centre researcher Thorsten Blenckner, the project is a joint initiative between Stockholm Resilience Centre and Baltic Eye at the Baltic Sea Centre, both at Stockholm University, together with the Ocean Health Index team.

## Analyzing interactions and change in social-ecological systems

The SES-LINK team continued modelling and analyzing the co-evolutionary dynamics of social-ecological systems to identify key interactions for change. Projects include the role of social processes in the cod collapse of the Baltic Sea, the robustness of collective action in relation to resource variability, the evolution of self-governance in small-scale fisheries and syntheses of poverty traps and frameworks of policy change.

The group also engaged in developing new methods for SES modelling. PhD students Jamila Haider and Kirill Orach defended their licentiate and extended research proposal, respectively. Several members of SES-LINK were also involved in a SESYNC project on alternative models of human behaviour in SES models and collaborated with Therese Lindahl and Caroline Schill from the Beijer intsitute for ecological economics to explore mechanisms of sustainable cooperative use of natural resources. The SES-LINK project is funded by a starting grant from the European Research Council (ERC) to centre researcher Maja Schlüter under the 7th European Union Framework Programme, and a core grant to the Stockholm Resilience Centre by Mistra.

# Global Economic Dynamics and the Biosphere programme

The Global Economic Dynamics and the Biosphere programme (GEDB) was established as a five-year research programme at the Royal Swedish Academy of Sciences in 2013. It is funded by the Family Erling-Persson Foundation to address the economic dynamics of global change and its implications for a sustainable future. The programme consists of a number of SRC staff including science director Carl Folke, deputy science director Victor Galaz and researchers Beatrice Crona, Jean-Baptiste Jouffray and Max Troell. Since its inception, the programme has spearheaded several exciting research projects on the effects of globalised trade within, for instance, seafood:

PHOTO: E.WISNIEWSKA/AZOTE

## *The invisible collapse*

Global seafood trade leave consumers unaware of over-exploited marine ecosystems.

*Crona, B., T. Daw, W. Swartz, A. Norström, M. Nyström, M. Thyresson, C. Folke, J. Sundberg H. Österblom, L. Deutsch, and M. Troell. DOI: 10.1111/faf.12109. Masked, diluted, drowned out: Global seafood trade weakens signals from marine ecosystems. Fish and Fisheries*

## *Keystone actors shape marine ecosystems*

13 corporations control up to 40 per cent of world's most valuable fisheries.

*Österblom H., Jouffray J.-B., Folke C., Crona B., Troell M., Merrie A., Rockström, J. 2015. Transnational corporations as 'keystone actors' in marine ecosystems. PLOS ONE 10(5): e0127533e*

PHOTO: H. ERIKSSON

## *A contagious tendency*

Global marine resource exploitation can spread in similar patterns to disease epidemics.

*Eriksson H., Österblom H., Crona B., Troell M., Andrew N., Wilen J., Folke C. 2015. Contagious exploitation of marine resources. Frontiers in Ecology and the Environment 13: 435–440*

PHOTO: A. MASLENNIKOV/AZOTE

## *Banking for ecologists*

Hidden ecological effects of algorithmic trade and new financial instruments described in new study.

*Galaz V., Gars J., Moberg F., Nykvist B., Repinski C. 2015. Why ecologists should care about financial markets. Trends in Ecology & Evolution 30: 571–580*

PHOTO: A. MASLENNIKOV/AZOTE

# Scientific achievements and awards

Centre researcher **INGO FETZER** received an F1000Prime recommendation for his article in the Proceedings of the National Academy of Sciences (PNAS) entitled "The extent of functional redundancy changes as species' roles shift in different environments". The article was written together with colleagues from the Helmholtz Centre for Environmental Research (UFZ) in Germany. The F1000Prime identifies and recommends important articles in biology and medical research publications, which are selected by some of the world's leading scientists and clinicians.

PHOTO: R. STEVENS/KU LEUVEN

Science director **CARL FOLKE** was recognised by Belgian university KU Leuven for "adding a new dimension" to sustainability thinking. The university describes Carl Folke's research as exceptional and novel. His research on the resilience of ecosystems is considered particularly pertinent for policy frameworks aimed at addressing climate change. Carl Folke was also recognized 2015 as a Highly Cited Researcher by Thompson Reuters. He is listed in two areas, environment/ecology and social sciences general. Folke has been cited in well over 25 000 journal articles (Web of Science) with citations exceeding 75 000 in Google Scholar Citations.

PHOTO: JEXPO '90 FOUNDATION

Centre director **JOHAN ROCKSTRÖM** was awarded the prestigious German Environmental Award 2015 and the Japanese International Cosmos Prize for his research and outreach on sustainable development. The German Environmental Award described Rockström as "one of the great thinkers and communicators in the field of sustainable development". The International Cosmos Prize is an annual award presented by the Expo'90 Foundation to acknowledge research that has contributed to a "significant understanding of the relationships among living organisms, the interdependence of life and the global environment."

Centre researcher **REINETTE (OONSIE) BIGGS** was awarded a Research Chair in "Social-Ecological Systems and Resilience" as part of the South African Research Chair Initiative (SARChI). The initiative aims to attract and retain excellent and innovative researchers at South African public universities.

# Selected scientific publications

PHOTO: J. LOKRANTZ/AZOTE

## Every species counts

The value of biodiversity particularly high in poor environmental conditions

*Fetzer I., Johst K., Schäwe R., Banitz T., Harms H., Chatzinotas H. 2015. The extent of functional redundancy changes as species' roles shift in different env ironments. Proceedings of the National Academy of Sciences, USA 112: 14888–14893*

PHOTO: T. DAHLIN/AZOTE

## A new landscape of global crises

Recent crises are increasingly global and follow new kinds of patterns

*Homer-Dixon T., Walker B., Biggs R., Crépin A.-S., Folke C., Lambin E.F., Peterson G.D., Rockström J., Scheffer M., Steffen W., Troell M. 2015. Synchronous failure: The emerging causal architecture of global crisis. Ecology and Society 20(3): 6*

PHOTO: FEDERAL EMERGENCY MANAGEMENT AGENCY/WIKIPEDIA

## Don't fence me in

Managing ecosystems for predictable outcomes may backfire

*Carpenter S.R., Brock W.A., Folke C., van Nes E.H., Scheffer, M. 2015. Allowing variance may enlarge the safe operating space for exploited ecosystems. Proceedings of the National Academy of Sciences, USA 112:14384–14389*

PHOTO: S-E ARNDT/AZOTE

## Connecting the seas of Norden

Nordic marine researchers push for increased collaboration across disciplines

*Paasche Ø., Österblom H., Neuenfeldt S., Bonsdorff E., Brander K., Conley D.J., Duran J.M., Eikeset A.M., Goksøyr A., Jónsson S., Kjesbu S.O., Kuparinen A., Stenseth N.C. 2015. Connecting the Seas of Norden. Nature Climate Change 5: 89–92*

PHOTO: M. HAMANN

## Living in a loop

Use of ecosystem services more determined by income, gender and land tenure than physical access

*Hamann M., Biggs R., Reyers B. 2015. Mapping social-ecological systems: Identifying 'green-loop' and 'red-loop' dynamics based on characteristic bundles of ecosystem service use. Global Environmental Change 34: 218–226*

PHOTO: N DESAGHER/AZOTE

## Don't stop talking

Communication between resource users reduces over-exploitation, but significantly only in early periods

*Lindahl T., Bodin Ö., Tengö M. 2015. Governing complex commons: The role of communication for experimental learning and coordinated management. Ecological Economics 111: 111–120*

PHOTO: M ALMQVIST/AZOTE

## Quite a lot of that human touch

How humans matter for ecological regime shifts

*Lade S.J., Niiranen S., Hentati-Sundberg J., Blenckner T., Boonstra W.J., Orach K., Quaas M.F., Österblom H., Schlüter M. 2015. An empirical model of the Baltic Sea reveals the importance of social dynamics for ecological regime shifts. Proceedings of the National Academy of Sciences, USA 112: 11120–11125*

PHOTO: J. LOKRANTZ/AZOTE

## A social-ecological lens for the future

How research can catch up with rapid environmental change

*Fischer J., Gardner T., Bennett E.M., Balvanera P, Biggs R., Carpenter S.R., Daw T., Folke C., Hill R., Hughes T.P., Luthe T., Maass M., Meacham, M., Norström A., Peterson G.D., Queiroz C., Seppelt R., Spierenburg M., Tenhunen J. 2015. Advancing sustainability through mainstreaming a social–ecological systems perspective. Current Opinion in Environmental Sustainability 14: 144–149*

PHOTO: O. HENRIKSSON/AZOTE

## Uncomfortable truths

Ecosystem management that ignores "taboo tradeoffs" is likely to fail

*Daw T., Coulthard S., Cheung W.W.L., Brown K., Abunge C., Galafassi D., Peterson G.D., McClanahan T.R., Omukoto J.O., Munyi L. 2015. Evaluating taboo trade-offs in ecosystems services and human well-being. Proceedings of the National Academy of Sciences USA 112: 6949–6954*

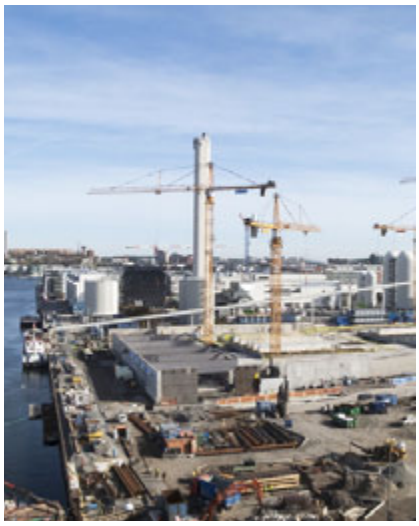


PHOTO: G ANEER/AZOTE

## Build, but build with nature

Increased green infrastructure is likely to provide substantial further benefits from ecosystem services

*Queiroz C., Meacham M., Richter K., Norström A.V., Andersson E., Norberg J., Peterson G. 2015. Mapping bundles of ecosystem services reveals distinct types of multifunctionality within a Swedish landscape. Ambio 44: S89–S101*

PHOTO: J. RUSSELL/FLICKR

## Learning for resilience in the court room

Practices of the European Court of Human Rights support adaptive governance

*West S.P., Schultz L. 2015. Learning for resilience in the European Court of Human Rights: Adjudication as an adaptive governance practice. Ecology and Society 20(1): 31*

PHOTO: M. ALMQVIST/AZOTE

## Command-but-too-much-in-control

Rigid regulations, not market dynamics or fish stocks, leave fishers more specialised and inflexible

*Hentati-Sundberg J., Hjelm J., Boonstra W.J., Österblom H. 2015. Management forcing increased specialization in a fishery system. Ecosystems 18: 45–61*

PHOTO: L. WIKLUND

## Learning to apply resilience

First in-depth analysis of a resilience assessment put into practice

*Sellberg M.M., Wilkinson C., Peterson G.D. 2015. Resilience assessment: A useful approach to navigate urban sustainability challenges. Ecology and Society 20(1): 43*

PHOTO: N DESAGHER/AZOTE

## Global icons, local threats

Think global, act local or risk losing the world's iconic natural treasures

*Scheffer M., Barrett S., Carpenter S.R., Folke C., Green A.J., Holmgren M., Hughes T.P., Kosten S., van de Leemput I.A., Nepstad D.C., van Nes E. H., Peeters E.T.H.M., Walker B. 2015. Creating a safe operating space for the world's iconic ecosystems. Science 347: 1317–1319*

PHOTO: M. ALMQVIST/AZOTE

## Look beyond the cod

Changes in Baltic Sea ecosystems will cause financial losses up to 120 million euros per year

*Blenckner T., Llope M, Möllmann C, Voss R, Quaas MF, Casini M, Lindegren M, Folke C, Stenseth N.C. 2015 Climate and fishing steer ecosystem regeneration to uncertain economic futures. Proceedings of the Royal Society B. 282: 20142809.*

PHOTO: R. KAUTSKY/AZOTE

## Missing a great opportunity

Meeting global food needs requires increased rainwater harvesting in Africa

*Rockström J., Falkenmark M. 2015. Increase water harvesting in Africa. Nature 519: 283–285*

PHOTO: J. LOKRANTZ/AZOTE

## Fit to work

Management of fragmented urban landscapes is challenging; network analysis can help improve it

*Bergsten A., Galafassi D., Bodin Ö. 2014. The problem of spatial fit in social-ecological systems: Detecting mismatches between ecological connectivity and land management in an urban region. Ecology and Society 19(4): 6.*

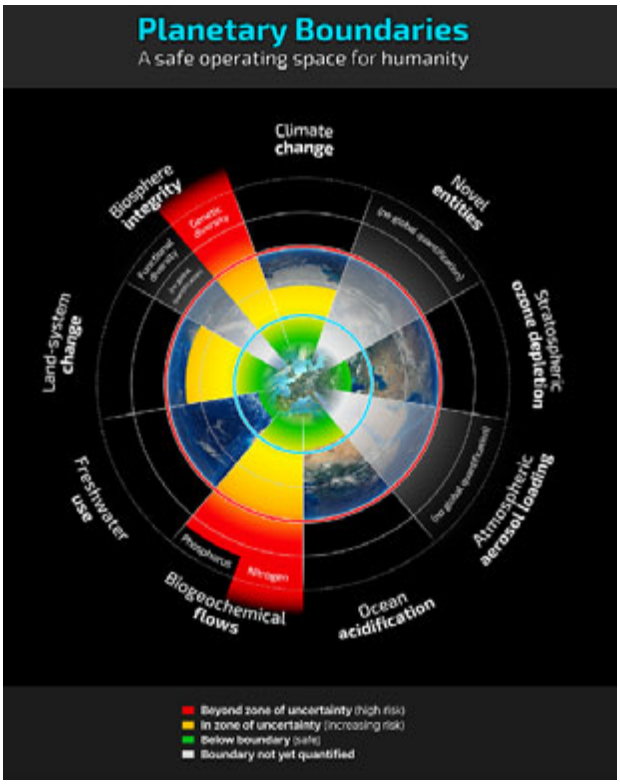



ILLUSTRATION: F. PHARAND-DESCHÊNES/GLOBAÏA

## Planetary Boundaries 2.0 – new and improved

Science publishes the updated research, four of nine planetary boundaries have been crossed

*Steffen W., Richardson, R., Rockström, J., Cornell, S.E et al. 2015. Planetary Boundaries: Guiding human development on a changing planet. Science 347: 736, 1259855 1–10*

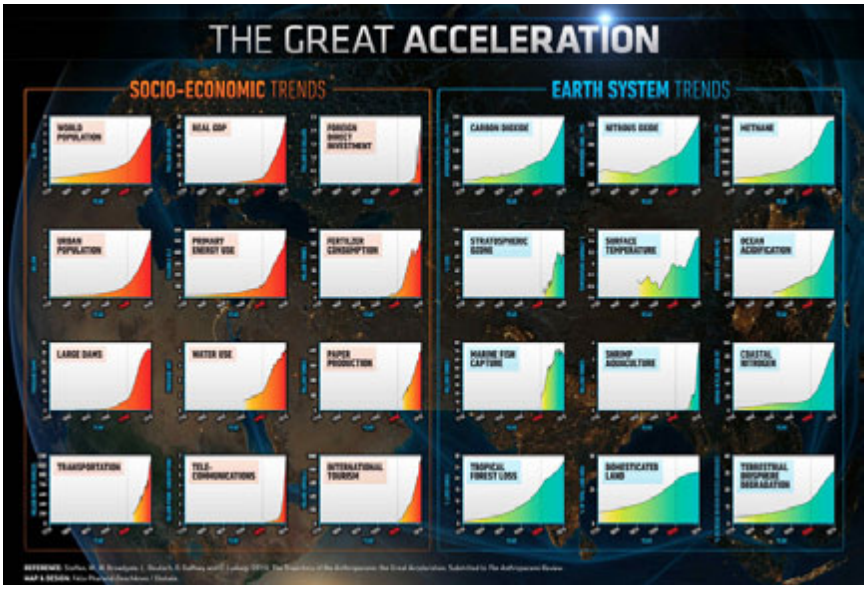



ILLUSTRATION: STEFFEN ET AL. 2015 AND F. PHARAND-DESCHÊNES/GLOBAÏA

## New planetary dashboard shows increasing human impact

Centre researchers have updated classic "Great Acceleration" graphs

*Steffen W., Broadgate W., Deutsch L., Gaffney O., Ludwig C. 2015. The trajectory of the Anthropocene: the Great Acceleration. The Anthropocene Review 2: 81–98*

PHOTO: M. TROELL/AZOTE

## How to make China's aquaculture more sustainable

Centre researchers in Science: "China's aquaculture can tip the balance in world fish supplies"

*Ling Cao L., Naylor R., Henriksson P., Leadbitter D., Metian M., Troell M., Zhang W. 2015. China's aquaculture and the world's wild fisheries. Science 347: 133–135*

PHOTO: F. WILDE/AZOTE

## Urban sustainability – a child's play?

Children who spend more time in nature show a better understanding of both natural resources and environmental degradation

*Giusti M., Barthel S., Marcus L. 2015. Nature routines and affinity with the biosphere: A case study of preschool children in Stockholm. Children, Youth and Environments 24: 16–42*

PHOTO: R. KAUTSKY/AZOTE

## Untangling ecological collapse

First Regime Shift Database helps researchers assess main global-level drivers of unwanted ecological transitions

*Rocha J.-C., Peterson G.D., Biggs R. 2015. Regime shifts in the Anthropocene: Drivers, risks, and resilience. PLOS ONE 10(8): e0134639.*

PHOTO: J. LOKRANTZ/AZOTE

## Syndromes of change

How international seafood trade impacts small-scale fisheries

*Crona B.I., Van Holt T., Petersson M., Daw T.M., Buchary E. 2015. Using social–ecological syndromes to understand impacts of international seafood trade on small-scale fisheries. Global Environmental Change 35: 162–175.*

PHOTO: B. CHRISTENSEN

## Some like it hot

Some species may have a greater tolerance to warming oceans. This can lead to a redistribution of species across the globe

*Stuart-Smith R.D., Edgar G.J., Barrett N.S., Kininmonth S.J., Bates A.E. 2015. Thermal biases and vulnerability to warming in the world's marine fauna. Nature 528: 88–92*

PHOTO: J. ÖSTLUND/AZOTE

## The young, the migrants and the left behind

New study identifies the most vulnerable segments among Kenyan fishing communities when it comes to preparing for and adapting to change

*Cinner J.E., Huchery C., Hicks C.C., Daw T.M., Marshall N., Wamukota A., Allison E.H. 2015. Changes in adaptive capacity of Kenyan fishing communities. Nature Climate Change 5: 872–876*

PHOTO: A. MASLENNIKOV/AZOTE

## No regrets

Lancet commission on health and climate change presents opportunities and solutions amid serious climate change

*Watts N., Adger W.N., Agnolucci P., Blackstock A., Byass P., Cai W.J., Chaytor S., Colbourn T., Collins M., Cooper A., Cox P.M., Depledge J., Drummond P., Ekins P., Galaz V., et al. 2015. Health and climate change: Policy responses to protect public health. The Lancet 386: 1861–1914*

PHOTO: J. CINNER/AZOTE

## Getting rid of the misfits

Study maps cross-country institutional linkages in the Indo-West Pacific. The results can improve marine management

*Treml E.A., Fidelman P.I.J., Kininmonth S., Ekstrom J.A., Bodin Ö. 2015. Analyzing the (mis)fit between the institutional and ecological networks of the Indo-West Pacific. Global Environmental Change 31: 263–271*

PHOTO: N. RYRHOLM/AZOTE

## Adaptive governance of the Baltic Sea – lessons from elsewhere

How the Baltic Marine Environment Protection Commission could improve its prospects for working with the ecosystem approach

*Valman M., Österblom H., Olsson P. 2015. Adaptive governance of the Baltic Sea: Lessons from elsewhere. International Journal of the Commons 9: 440–465*

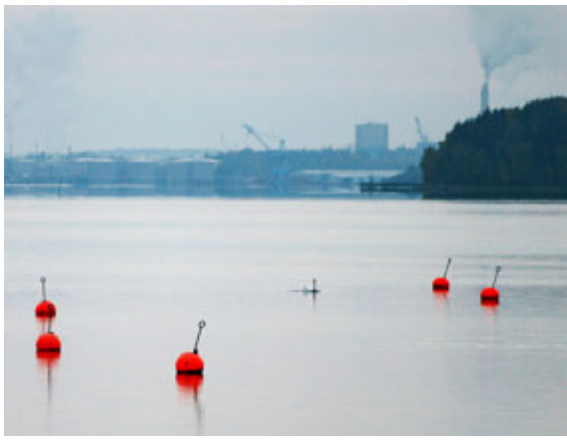


PHOTO: K. JOHNSSON/AZOTE

## Just the right balance

Public network governance is a careful negotiation between central goals and local solutions

*Sandström A., Bodin Ö., Crona B. 2015. Network governance from the top: The case of ecosystem-based coastal and marine management. Marine Policy 55: 57–63*

PHOTO: J. CASTELL/FLICKR

## Unlocking Romania's poverty traps

Barriers to rural development are multiple and interacting, that is why one-sided interventions on poverty traps will fail

*Mikulcak F., Haider J.L., Abson D.J., Newig J., Fischer J. 2015. Applying a capitals approach to understand rural development traps: A case study from post-socialist Romania. 2015. Land Use Policy 43: 248–258*

PHOTO: HAPPY HORIZONS/FLICKR

## Finding Earth's sore spots

New method identifies regions acting as sources for global perturbations

*Runge J., Petoukhov V., Donges J.F., Hlinka J., Jajcay N., Vejmelka M., Hartman D., Marwan N., Palus M., Kurths J. 2015. Identifying causal gateways and mediators in complex spatio-temporal systems. Nature Communications 6: 8502*

PHOTO: NATIONAL OCEAN SERVICE/FLICKR

## Hawaiian reefs through the resilience lens

Algae-eating fish key to avoiding regime shifts among Hawaiian coral reefs

*Jouffray J.-B., Nyström M., Norström A.V., Williams I.D., Wedding L.M., Kittinger J.N., Williams G.J. 2015. Identifying multiple coral reef regimes and their drivers across the Hawaiian archipelago. Philosophical Transactions of the Royal Society London B 370: 20130268.*

PHOTO: J. LOKRANTZ

## Urban gardens key in times of crisis

The role played by urban gardens during historical collapses in urban food supply lines

*Barthel S., Parker J., Ernstsson H. 2015. Food and green space in cities: A resilience lens on gardens and urban environmental movements. Urban Studies 52: 1321–1338*

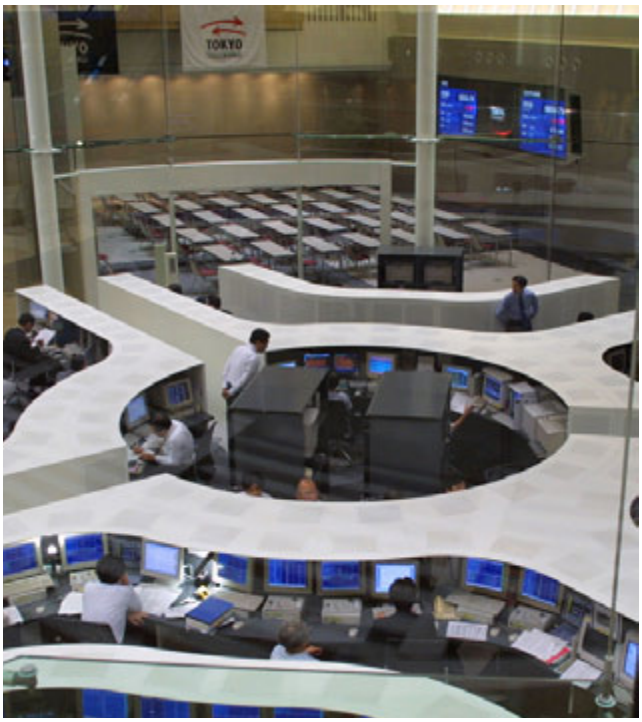
PHOTO: O. HENRIKSSON/AZOTE

## Joining forces before it's too late

The higher the risk for a regime shift, the higher the probability for collaboration to avoid it

*Schill C., Lindahl T., Crépin A.-S. 2015. Collective action and the risk of ecosystem regime shifts: Insights from a laboratory experiment. Ecology and Society 20(1): 48*

PHOTO: A. MASLENNIKOV/AZOTE




## Banking for ecologists

Hidden ecological effects of algorithmic trade and new financial instruments described in new study

*Galaz V., Gars J., Moberg F., Nykvist B., Repinski C. 2015. Why ecologists should care about financial markets. Trends in Ecology & Evolution 30: 571–580*

PHOTO: A. MASLENNIKOV/AZOTE

## Keystone actors shape marine ecosystems

13 corporations control up to 40 per cent of world's most valuable fisheries

*Österblom H., Jouffray J.-B., Folke C., Crona B., Troell M., Merrie A., Rockström, J. 2015. Transnational corporations as 'keystone actors' in marine ecosystems. PLOS ONE 10(5): e0127533e*

PHOTO: S. ZEFF/AZOTE

## Green streets of gold

Amid climate change, restoring ecosystem services in urban areas is not only environmentally sound and good for health but may also be financially smart

*Elmqvist T., Setälä H., Handel S.N., van der Ploeg S., Aronson J., Blignaut J.N., Gomez-Baggethun E., Nowak D.J., Kronenberg J., de Groot R. 2015. Benefits of restoring ecosystem services in urban areas. Current Opinion in Environmental Sustainability, 14:101–108*

PHOTO: HOANG THE NHIEM

## Damned if they do, damned if they don't

Adaptation to environmental change is not straightforward, struggling fishing communities in Vietnam show why

*Boonstra W.J., Tong Thi Hai Hanh. 2015. Adaptation to climate change as social-ecological trap: A case study of fishing and aquaculture in the Tam Giang Lagoon, Vietnam. Environment, Development and Sustainability 17: 1527–1544*

PHOTO: H. ERIKSSON

## A contagious tendency

Global marine resource exploitation can spread in similar patterns to disease epidemics

*Eriksson H., Österblom H., Crona B., Troell M., Andrew N., Wilen J., Folke C. 2015. Contagious exploitation of marine resources. Frontiers in Ecology and the Environment 13: 435–440*

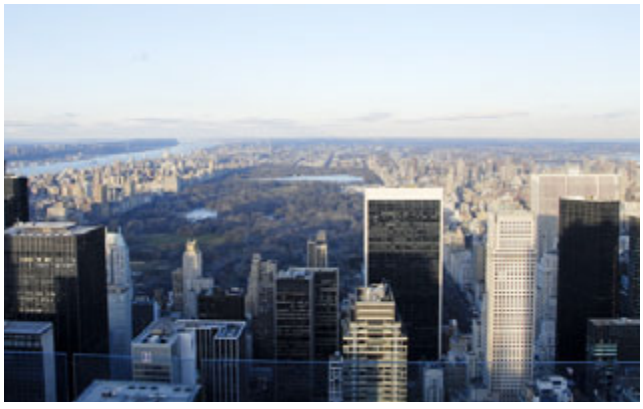


PHOTO: E. WISNIEWSKA/AZOTE

## Fruits of the urban jungle

The social importance of ecosystem services in urban areas

*McPhearson T., Andersson E., Elmqvist T., Frantzeskaki N. 2015. Resilience of and through urban ecosystem services. Ecosystem Services 12: 152*

PHOTO: АРКАДИЙ ЗАРУБИН CC BY-SA 3.0

## An empire of fisheries

How the rise and fall of the Soviet Union contributed to marine regime shifts and a transition in governance

*Österblom H., Folke C. 2015. Globalization, marine regime shifts and the Soviet Union. Philosophical Transactions of the Royal Society London B. 370: 20130278*

# Books

## "*Principles for Building Resilience*: Sustaining Ecosystem Services in Social-Ecological Systems"


**TEN CENTRE RESEARCHERS** contributed to a new Cambridge University Press book about resilience and ecosystem services. The book presents seven principles that are considered crucial for building and applying resilience in social-ecological systems. The seven principles are 1) maintain diversity and redundancy, 2) manage connectivity, 3) manage slow variables and feedbacks, 4) foster complex adaptive systems thinking, 5) encourage learning, 6) broaden participation, and 7) promote polycentric governance systems.

The book is edited by centre researchers Maja Schlüter and Oonsie Biggs together with Michael Schoon of Arizona State University.

## "*Big World Small Planet*: Abundance within Planetary Boundaries"

**CENTRE DIRECTOR JOHAN** Rockström and National Geographic photographer Mattias Klum have launched a sequel to their 2012 book "The Human Quest: Prospering Within Planetary Boundaries".

In this new book, the authors describe a world full of possibilities – provided a new narrative is created: "By describing boundaries for resources, ecosystems, and the climate, we can trigger a new wave of sustainable technological inventions thanks to an abundance of ideas and solutions for human prosperity and planetary stability," they say.


## "*With our own hands*: A celebration of food and life in the Pamir Mountains of Afghanistan and Tajikistan"


**IN THIS BOOK**, centre PhD student Jamila Haider and Frederik van Oudenhoven blend beautiful pictures with essays on food and life in the Pamir mountains of Afghanistan and Tajikistan. The book began as a simple recipe book, to fulfil a promise to a grandmother and to document the rich unwritten knowledge about the unique agricultural biodiversity in the Pamirs. Over the course of five years, nearly 700 pages describe and visualize the lives, struggles and celebrations of the people in the Pamirs.

# *Policy, practice and outreach*

## Introducing GRAID

New extensive funding from Sida will strengthen connections between resilience thinking and development

**THERE IS A RISING** recognition of the need to integrate resilience as a core strategy for meeting development needs in an increasingly globalised world of social and environmental turbulence.

In recognition of this need, the Swedish International Development Cooperation Agency (Sida) granted Stockholm Resilience Centre (SRC) 107 million SEK to strengthen the centre's efforts to integrate resilience into international development practice and policy. The money will be allocated under "GRAID – Guidance for Resilience in the Anthropocene: Investments for development" for an initial four-year period.

Belinda Reyers, a long-time affiliate of the Stockholm Resilience Centre (SRC) and an extraordinary Professor at Stellenbosch University, South Africa, has taken on the role as director of the GRAID programme. She believes the programme will take resilience science in a new direction. "GRAID provides us with the opportunity to connect, innovate and synthesise scientific insights on development challenges such as inequality, migration, biodiversity loss and emerging diseases."

### Part of the Global Resilience Partnership

GRAID is based on place-based research around the world, building on the SRC-hosted Programme on Ecosystem Change and Society (PECS). It uses competencies at the SRC including models, data, resilience methods, and synthesis to conduct cross-case and cross-scale comparisons. Sida sees

PHOTO O. HENRIKSSON/AZOTE

GRAID as a knowledge partner for the newly inaugurated Global Resilience Partnership (GRP) established by Sida, the Rockefeller Foundation and USAID.

GRAID is a collaboration between the SRC and Stellenbosch University and the Council for Scientific and Industrial Research in South Africa, and will build on the SRC's existing networks, including the Resilience Alliance.

The GRP and GRAID will focus on priority regions in the Sahel, Horn of Africa, and South and Southeast Asia. Reyers believes we are witnessing a reframing of development from a narrow focus on developing countries to a global focus on prosperity, equity and sustainability. This new perspective on development is clearly signalled by the Sustainable Development Goals, which set out a universal agenda for a more equitable and sustainable development for people and planet. But this new perspective needs a new kind of science – able to develop understanding, evidence and tools for implementing development in this light. "This is where resilience research has a key role to play," she says. "Areas such as social-ecological systems and feedbacks, cross-scale dynamics and linkages, non-linear change, and transformations can all contribute to a better understanding of the dynamics and patterns of the Anthropocene and how to transform towards sustainability."

**Belinda Reyers**

# SwedBio

As an acknowledgement of its work, Sida will continue to fund SwedBio for the period 2016–2019. This will deepen and broaden its work on biodiversity and ecosystems and its relation to poverty alleviation and sustainable livelihoods. Below are some of their main contributions in 2015

**SWEDBIO AND PARTNERS** organised a Dialogue Workshop on Assessment of Collective Action in Biodiversity Conservation in Panajachel, Lake Atitlán, Guatemala in June 2015. The Conveners were the Government of Guatemala, through CONAP, and the Secretariat to the Convention on Biological Diversity (CBD). The dialogue gathered Indigenous peoples and local communities, academics and government representatives from more than 30 countries. A main topic was how the value of collective action and its contribution to conservation, and the sustainable use of biological diversity, can be visualised and accounted for in reports like the CBD Financial Reporting Framework and National Biodiversity Strategy and Action Plans (NBSAPs). Participants suggested that collective action's contribution to biodiversity conservation should be addressed and visualized under all Aichi Biodiversity targets adopted under the CBD, including under Target 20 for resource mobilization.

## Resilience Dialogue in Addis Ababa

With resilience being increasingly used in development policies and capacity building, SwedBio, UNDP and MELCA-Ethiopia in Addis Ababa organised in November 2015 a Multi-actor Resilience Dialogue (pictured). Taking place in Addis Ababa, Ethiopia, the dialogue gathered some 50 participants from 17 different countries, representing governments, international development organizations, practitioners, scientists, communities and farmers. The dialogue offered an opportunity to analyze various approaches to addressing, assessing, measuring and mainstreaming resilience by focusing on how resilience is understood and managed in a variety of contexts. It was emphasized that these opportunities should continue with representation from developing countries, organizations and institutions from village level to national and international scale.

## Contributions to the Sustainable Development Goals

SwedBio has actively informed and contributed to the Sustainable Development Goals (SDGs), which were signed by all UN member states in September 2015. SwedBio worked behind the scenes and in the corridors of the UN headquarters in New York since the announcement of the SDGs at Rio+20 in 2012. They also influenced the process indirectly through supporting collaborating partner organizations' work by following and informing the negotiations. One of the most important channels in influencing the final outcome has been the Sustainable Development Solutions Network (SDSN). SwedBio has contributed to SDSN's proposals and together with researchers at the Stockholm Resilience Centre analyzed and formally commented on various drafts produced by the UN Open Working Group on SDGs. SwedBio has also organised several dialogues with partner organisations and countries to discuss the 2030 Agenda.

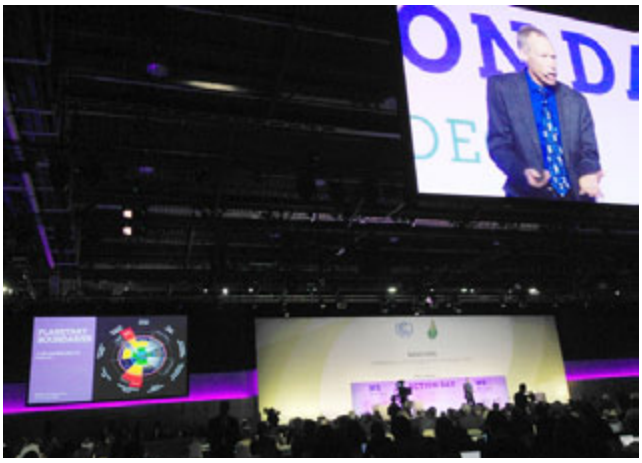
## Urban Natural Assets for Africa

With Africa becoming rapidly urbanized, SwedBio collaborates with ICLEI's Cities Biodiversity Center in the SwedBio funded programme Urban Natural Assets for Africa (UNA Africa) to improve urban human well-being, strengthen local sustainability and improve climate resilience. This is done by mainstreaming biodiversity and ecosystem services into land-use planning and city decision-making processes. The programme targets the urban poor as the main beneficiaries, taking into consideration gender and equality, and provides tangible solutions to contribute to poverty alleviation. Four Sub-Saharan cities participated in the programme during 2015: Dar es Salaam in Tanzania; Lilongwe in Malawi; Addis Ababa in Ethiopia; and Cape Town in South Africa. SwedBio will fund the UNA Africa programme for another four years enabling concrete projects on different levels to be launched.

# COP21: How science was heard

## The Paris climate summit was not only historic from a global perspective, it was also a meeting where Stockholm Resilience Centre had considerable impact

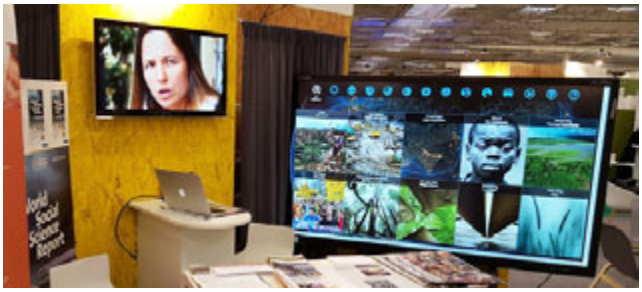
**LEADING UP TO** the summit, centre director Johan Rockström led the work on writing The Earth Statement, a list of eight essential elements the international climate agreement should include. Over 100 political, faith and business leaders such as Paul Polman, Richard Branson, Winnie Byanyima, Mary Robinson, Arianna Huffington, Desmond Tutu and Russell Brand signed the statement. The centre also launched a global social media campaign to sign the statement that was featured in two almost-full-page adverts and a wrap-around cover for the International New York Times.



At the summit, on 5 December, the major climate event "Action Day" opened with a keynote speech by Rockström to 1200 delegates, including France's minister for Ecology, Sustainable Development and Energy, Ségolène Royal, and Al Gore. The speech contextualized climate change within planetary boundaries.

However, the most significant impact during the summit was down to a spontaneous press conference on 11 December, the final scheduled day of the summit. The draft COP21 agreement presented on the previous day was such a significant departure from the science and commitments made in previous drafts that the SRC and Future Earth proposed holding a press conference for scientists to express their concern. The press conference was co-organised by the Earth League (which includes SRC), Future Earth and the International Council for Science (ICSU) with the Tyndall Centre and Potsdam Institute for Climate Impact Research. Speakers at the press conference were Kevin Anderson (Tyndall Centre for Climate Research), Steffen Kallbekken (CICERO), Johan Rockström, Joeri Rogelj (IIASA), Hans Joachim Schellnhuber (Potsdam Institute PIK) and Denise Young (Moderator) (ICSU).

The press conference had a big impact and contributed to shaping the media narrative of the summit, making headlines in, for example, the Washington Post, Reuters, New York Times, New Scientist, the Wall Street Journal and BBC. The final agreement, published on Saturday 12 December, improved somewhat on the penultimate draft.



The centre was also involved in a series of side events and had a booth at the main summit site Le Bourget where it showcased resilience research. Research was also presented at the Swedish Institute in central Paris.

Centre staff also helped run a virtual reality hackathon with ICSU and Future Earth on 5 December. It brought together scientists, journalists, filmmakers and developers to brainstorm ways virtual reality could be used to explore concepts such as the Anthropocene, and global issues like climate and biodiversity loss.

# Centre invited back to the World Economic Forum

For the World Economic Forum's annual meeting in Davos centre director Johan Rockström was invited to present the latest findings on planetary boundaries. He also introduced his new book "Big World, Small Planet" together with co-author Mattias Klum. This was the second year in a row the Stockholm Resilience Centre was prominent at the World Economic Forum.

PHOTO M. BUCHOLZER/WORLD ECONOMIC FORUM

PHOTO STURLE H. SIMONSEN


## *Policy dialogue: Creating a good Anthropocene in southern Africa*

In conjunction with the first international conference by the Programme on Ecosystem Change and Society (PECS) (see page 9), a science-policy-practice dialogue took place in Cape Town 1–2 November 2015. Entitled "Opportunities for creating a Good Anthropocene in southern Africa", the dialogue stimulated thinking and action around positive futures for the region. It engaged 60 participants from science, policy, business and civil society. Dr Reinette (Oonsie) Biggs (Stockholm Resilience Centre) Prof Bob Scholes (University of the Witwatersrand), Dr Desta Mebratu (United Nations Environment Program (UNEP) and Prof Lorenzo Fioramonti (Centre for Governance Innovation, University of Pretoria) provided a set of provocative perspectives on the challenges and opportunities for change in the southern African region. The event was co-hosted by the Southern African Program on Ecosystem Change and Society (SAPECS) with sponsorship from SwedBio.

# New visions for the European Union

In 2015 centre researchers Lisen Schultz and Thomas Elmqvist together with Head of External Relations Henrik Pompeius collaborated with The High Level Group on Innovation Policy Management (HLGI). The HLGI is a unique public-private partnership, comprising top-level representatives from EU Member States, the European Commission, the European Council, Business and Academia. Together with HLGI, Lisen Schultz and her colleagues organized three round-table meetings in Brussels and Stockholm to promote new visions for innovation and sustainable development within the EU. The aim of the collaboration is to come up with new models of achieving sustainability, based on resilience thinking and management.

PHOTO H. POMPEIUS

PHOTO F. MOBERG

# Crown Princess Victoria receives update on sustainability science

As part of her active engagement in environmental issues, H.R.H Crown Princess Victoria of Sweden joined centre researcher Sara Borgström and Fredrik Moberg on a field trip to the Royal National City Park in Stockholm.

During the trip, the Crown Princess learned more about the importance of urban green spaces for human well-being. The Crown Princess took a special interest in the relation between children's well-being and the design of urban environments.

As part of the day, the Crown Princess was also given an update on research concerning the Baltic Sea, with centre researcher Thorsten Blenckner presenting the Baltic Health Index, a new tool that will help decision-makers make better decisions about the Baltic Sea region. This is the second time the Crown Princess spent an entire day at the centre to learn more about sustainability.

In 2013 she was given an introduction to research on water management, the role of ecosystem services, network theory and the biosphere. In 2011 she also opened the Nobel Laureate Symposium on Global Sustainability, which took place at the Royal Swedish Academy of Sciences.

# *An informal dialogue on Sweden and sustainability*

In August 2015 the centre invited top-level representatives from business and politics to an informal dialogue about Sweden's role in global sustainable development. Participants were Foreign Minister Margot Wallström and Helene Hellmark-Knutsson, Minister for Research and Higher Education, as well as business leaders Leif Johansson (Chair AstraZeneca and Ericsson), Hans Enocson (CEO GE Nordic) and Johan Eliasch (CEO HEAD). Anki Bystedt, head of external relations and communications at Stockholm University was also present. Centre director Johan Rockström, science director Carl Folke and deputy science director Line Gordon represented the centre.

PHOTO H. POMPEIUS

# Seminars and events





## PECS 2015 – Social-ecological dynamics in the Anthropocene

Between 3 and 5 November 2015, the first international conference hosted by the Programme on Ecosystem Change and Society (PECS) took place in Stellenbosch, South Africa

The conference, which gathered some 230 scientists from various disciplines within and beyond the PECS network, became an excellent arena for cutting-edge insights on sustainable development. It highlighted PECS's achievements and ambitions so far (see page 9 for an introduction to PECS) and provided a basis for new initiatives. Key note speakers were Steve Carpenter, director of the Center for Limnology at the University of Wisconsin-Madison; Eduardo S. Brondizio, co-director of the Anthropological Center for Training and Research on Global Environmental Change (ACT) Garry Peterson, researcher at the Stockholm Resilience Centre; Debra Roberts, head of the Environmental Planning and Climate Protection Department of eThekwini Municipality (Durban, South Africa); Belinda Reyers, Director of the GRAID programme at the Stockholm Resilience Centre; and Cheikh Mbow, Senior Scientist on climate change and development at the World Agroforestry Centre (ICRAF). At the PECS 2015 conference, scholars from the South African branch of PECS, SAPECS, also convened a session with early career scholars to reflect on their identity as social-ecological researchers and how they work. The discussions also focused on challenges of working across different disciplines, and ethical dilemmas of doing place-based, participatory research.

The next international PECS conference will take place in Oaxaca, Mexico, in 2017.

# Transformations2015 – people and the planet in the Anthropocene

The Transformations2015 conference, held in Stockholm 5–7 October 2015, focused on how to create good living conditions while strengthening the Earth's life support system


PHOTO: M. AXELSSON/AZOTE

The conference, which followed up from the first Transformations conference in Oslo in 2013, gathered some 250 participants from various disciplines around the world to share cutting-edge research on transformations to global sustainability. Participants were invited to critically examine whether current technological and social innovations and sustainability initiatives contribute to the large-scale transformations that humanity needs, or whether they reinforce current unsustainable pathways.

Key note speakers included Frances Westley, head of the Waterloo Institute for Social Innovation and Resilience; Victor Galaz, deputy science director at the Stockholm Resilience Centre; Marcella D'Souza, executive director of the Watershed Organisation Trust; Elin Enfors Kautsky, theme leader for the Landscapes theme at Stockholm Resilience Centre; David Christian, director of Macquarie University's Big History Institute; J. Stephen Lansing, director of the Complexity Institute at Nanyang Technological University, Singapore; and Johan Rockström, executive director of the Stockholm Resilience Centre.

The next conference will take place in Dundee, Scotland, 30 August–1 September 2017.

PHOTO J. LYCKELL/EAT 2015

# EAT Stockholm Food Forum 2015

For the second consecutive year, the EAT Initiative, in collaboration with Stockholm Resilience Centre, hosted the EAT Stockholm Food Forum on how to provide a growing global population a healthy and nutritious diet within safe environmental boundaries. Speakers included Swedish Prime Minister Stefan Löfven, Norway's Prime Minister Erna Solberg and Lee Howell, Managing Director of the World Economic Forum. The forum was hosted by the international journalist Femi Oke (pictured).

The next forum will take place in Stockholm 13–14 June 2016.

**Stefan Löfven**

**Lee Howell**

**Erna Solberg**

# *Stockholm Summit on Natural Capital*

As part of a five-year research exchange with Stanford University, the centre and its partners at the Beijer Institute and the Global Economic Dynamics and the Biosphere programme had the privilege of hosting Professor Gretchen Daily from Stanford University. One of her first efforts was to establish a Stockholm Summit on Natural Capital as a platform for long-term collaboration. During two days in May 2015, some 50 business executives and scientists convened under Chatham House rules to discuss ways to better acknowledge the importance of natural resources in modern economies. At the summit, successful examples were presented by such diverse institutions as the InterAmerican Development Bank, the Council on Ethics for the Norwegian Government Pension Fund, IUCN, Unilever and the Government of China. A joint action plan was agreed to scale up efforts and pave the way for new projects.

PHOTO A. EMMELIN


PHOTO ANNA EMMELIN

## *Nordic Centre for Research on Marine Ecosystems and Resources under Climate Change (NorMER)*

Several Centre researchers took part in the fifth NorMer conference in Stockholm 2015. NorMER is a Nordforsk-sponsored Centre of Excellence that brings together research groups from all Nordic countries and several North American institutions.

The purpose is to implement a new research strategy to explore the management consequences of global climate change on fisheries resources. The conclusion from the conference was clear: scientists need to get better at working across scientific disciplines and together with stakeholders. One significant step forward has been the funding of 18 interdisciplinary trained PhD students.

## Financial systems and the Biosphere

As part of a collaboration with the Changing Planet initiative, and with funding from the Global Economic Dynamics and Biosphere programme (GEDB) at the Royal Academy, the Stockholm Resilience Centre supported a series of talks and seminars about financial systems and their role in shaping the biosphere. While much of current discussion about the financial sector and sustainability centre on the role of fossil fuels, "stranded assets" and divestment, this series explored a wider set of issues linking additional dimensions that are associated with commodities, new financial technologies, and possible wider ecosystem impacts.

**11 FEBRUARY**, 2015. Royal Swedish Academy of Sciences. Bitcoins, financial "hacking" and the new digital economy – should we really care? Brett Scott (journalist), Robin Teigland, Associate Professor, Stockholm School of Economics.

**11 MARCH**, 2015. Stockholm Resilience Centre, Sustainable Investment and Divestment: Trends, Surprises and the Future. John Howchin, Secretary General, the Ethical Council, Sweden, Sara Nordbrand, Head of Corporate Engagement, Church of Sweden

**23 APRIL**, 2015, Stockholm School of Economics. Price volatility and financial markets – current debates and implications. Christopher Gilbert, Adjunct Professor, SAIS Bologna Center, Italy, Naomi Hossain, Research Fellow, Institute for Development Studies, UK.

# *New collaboration with the Swedish Royal Dramatic Theatre*

PHOTO ROGER STENBERG

The centre once again collaborated with the Swedish Royal Dramatic Theatre to blend science with the performing arts. The project ”Människans Scen” brought together researchers from the centre, Stockholm Environment Institute and Stockholm University with directors and playwrites to express the challenges and solutions of the Anthropocene. Three short plays were produced, one modern Greek drama about run-away climate change, one comedy about human short-comings in being the dominant species on the planet, and one philosophical reflection on water in the Anthropocene. Miriam Huitric, Emily Boyd, Fredrik Moberg and Johan Rockström participated from the centre.

# Stockholm Seminars 2015

## The Stockholm Seminars feature prominent experts on global sustainability

The seminars are hosted by Albaeco, Stockholm Resilience Centre, the Beijer Institute of Ecological Economics, the International Biosphere-Geosphere Programme, Stockholm Environment Institute and the Swedish Secretariat for Environmental Earth System Sciences.

**13 JANUARY**
Stuart Scott
*Rethinking economics in the age of abrupt climate change*

**30 JANUARY**
Terry Hartig
*Urban densification, contact with nature, and psychological restoration: Issues of conflict and compensation*

**21 MAY**
Jianguo Liu
*Promises and perils of telecouplings for global sustainability*

**4 JUNE**
Kazuhiko Takeuchi
*Science and innovation for a sustainable future*

**17 JUNE**
Katherine Richardson & Jorgen Randers
*Are we likely to hit planetary boundaries before 2050?*

**15 SEPTEMBER**
Steve Carpenter
*Regional scenarios: emergence of fragility in safe operating spaces*

**5 OCTOBER**
David Christian
*Big History: an origin story for the Anthropocene*

**17 DECEMBER**
Trevor A. Branch
*Fishing impacts on food webs: Multiple working hypotheses*


PHOTO SVENSK TENN

*Welcome to the banquet by Stina Wirsén*

# *Patterns of the Biosphere:* Exhibition on resilience research

The exhibition "Patterns of the Biosphere" was a joint production by centre partner the Beijer Institute of Ecological Economics and the classical Swedish interior design company Svenskt Tenn. The exhibition featured the artwork of four Swedish illustrators, Eric Ericson, Liselotte Watkins, Stina Wirsén and Jesper Waldersten. They interpreted key concepts and insights from the transdisciplinary research done at the Beijer Institute often together with the Stockholm Resilience Centre. The exhibition took place between April and June 2015 in Svenskt Tenn's store on Strandvägen 5 in Stockholm.

Jointly with the "Patterns of the Biosphere" exhibition, an outdoor exhibition called "Reflections on People and the Biosphere" was opened at the Raoul Wallenberg Square by Nybroplan, Stockholm. It displayed pictures and quotes from the book by the same name authored by Stockholm Resilience Centre science director Carl Folke and Lars Hall, one of Sweden's most prominent art directors.

PHOTO ULF JACOBSSON

*Anders Wall, head of the Beijer Foundation and SRC Science director Carl Folke opened the exhibition*

PHOTO CARL FOLKE

*The exhibition Reflections on People and the Biosphere shown in central Stockholm*

PHOTO SVENSK TENN

*A classic cabinet by Svenskt Tenn's head designer Josef Frank (1885–1967) was transformed into a spectacular interpretation of resilience*

# Education

2015 has been a successful year, albeit marked by world events; it saw the successful defence of six PhDs, four licentiate and sixteen Master's theses

**IN 2015 WE SAW** further progress in the development of the centre's PhD programme in Sustainability Science, both in developing the framework to nest students' research in the centre's work and in developing their research skills through the two PhD courses "A primer in quantitative methods for studying, complex social-ecological systems" and "Advanced systems analysis".

Almost 3000 students enrolled in the centre's MOOC "Planetary Boundaries and Human Opportunities", which ran again in 2015, and 500 completed the course. This year more women enrolled (52%), there were students from 91 countries (mostly Sweden, USA, UK, Brazil, Canada, Mexico, and India) and 60% were under the age of 40.

The popular first-level course Världens eko (Sustainable Perspectives on Development) continues to attract students from all backgrounds to our impressive line-up of lecturers including Carl Folke, Johan Rockström, Hans Rosling and Mattias Klum. This year we focused on the process and significance of global commitments such as the Sustainable Development Goals and the COP21 summit in Paris.

We successfully launched our first Stockholm University online course "Introduction to Sustainability Science". The course aims to provide students insight into emerging sustainability challenges as well as inspire solutions that can be applied in work and life.

The independent Master's course Urban Social-Ecological Systems continued to develop in exciting ways by partnering with the Swedish art gallery Färgfabriken. Students contributed to the exhibit "Experiment Stockholm" as a part of their classwork.

While the Master's programme continued to run smoothly, 2015's world events impacted our students' work. These events included the coup d'état in Burkina Faso and terrorist activity in Kenya (see separate student stories). World events also brought opportunities. For example, as a result of her work in Ecuador with indigenous communities, our student Carmen Séco Perez was asked to take part in organizing and participating in the COP 21 side-event "International Rights of Nature Tribunal".

# STORIES FROM **OUR STUDENTS**

PHOTO: D DONALDSON/FLIRK

## Fieldwork amid a political coup

When Master's students Katja Malmborg and Elinor Holén went on a two-month field trip to the Ouahigouya area in Burkina Faso in October 2014, they ended up being witnesses to a political coup. Attempts by the long-time president Blaise Compaoré to extend his 27-year presidency caused anger and led to military interventions and closed borders. The students were ordered to stay indoors. Eventually Compaoré resigned. After four days of waiting, Malmborg and Holén were allowed back in the field, finishing their studies successfully. In November 2015, Roch Marc Kabore, the former prime minister of Burkina Faso, was named the winner of the first democratic election in three decades.

PHOTO: D DONALDSON/FLIRK

PHOTO: NEW ZEALAND CONSULATE

## Master's student awarded Global Swede 2015

Master's student Kate Williman (pictured) received the prestigious 2015 Global Swede award. The award goes to foreign students who have excelled in studies related to innovation. It was handed over by the Swedish Minister for Enterprise and Innovation, Mikael Damberg (pictured) and Annika Rembe, Director-General of the Swedish Institute.

## From the Ecuadorian Amazon to mock ecocide tribunals in Paris

It has been an exciting year for master's student Carmen Seco Pérez. Her active involvement and subsequent field work among indigenous peoples in the Ecuadorian Amazon led her to become a research associate at Universidad Andina Simón Bolívar in Ecuador. There she became part of a project that aims to understand Sumak Kawsay, or harmony with nature, a new notion for welfare that was informed by indigenous wisdom and was included in the Ecuadorian Constitution in 2008. Carmen's work was to analyze Sumak Kawsay from the Amazonian Indigenous peoples' perspective. This project and her collaboration with a local NGO in the Northern Amazon in September 2014 led her to be part of the Earth Rights Tribunal, a side-event during COP21 Paris 2015.

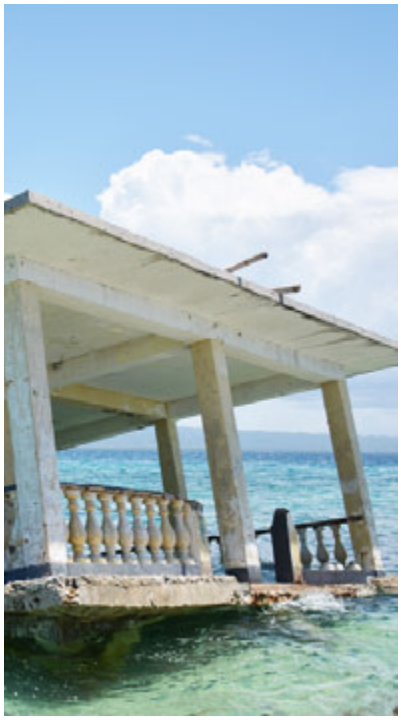
The Tribunal heard cases of environmental and human rights violations behaving as if the Rights of Mother Earth and the crime of Ecocide existed in International Law. Pérez was part of the tribunal's organization, and mostly prepared the Ecocide cases from the Ecuadorian Amazon that were presented to the Tribunal as well as help construct the statements for the cases. She also helped by acting as an "improvised" translator for the Indigenous peoples that were participating in the Tribunal as witnesses of the cases.

**Carmen Seco Pérez**

## From terrorist attacks in Kenya to earthquakes in the Philippines

Crammed shoulder to shoulder with seven others in a habal-habal, a Filipino motorcycle taxi built for four, was not what Master's student Ashley Perl had in mind for her field project. In fact, ending up with Bohol, Philippines as a field site was a complete surprise. She was originally scheduled to go to Kenya and work with the NGO Wildlife Conservation Society, but attacks from militant terrorist group Al-Shabab were happening close to the coastal villages where she had been planning to compare the effectiveness of different community-based Marine Protected Areas' (MPA) management strategies. Going there was too risky and alternative project arrangements had to be made. Ashley Perl instead ended up in the Philippines where she successfully worked for the Philippine branch of the Zoological Society of London to study how a 7.2-magnitude earthquake affected MPA management. While the road to Bohol was winding and required patience and sacrifices, it turned out to be a welcomed surprise.


Ashley Perl



## Hurricane Katrina revealed deep social differences in New Orleans



Joshua Lewis

PHOTO: P. BATTY/FLICKR

In his recently published doctoral thesis, PhD student Joshua Lewis presented one of the first social-ecological studies of urban vegetation dynamics following a major flood disturbance. Examining the effects of Hurricane Katrina in 2005, the thesis shows that neighborhoods in New Orleans experience highly differentiated outcomes both in terms of human population and vegetative conditions. Poor and working class African-American areas have been particularly affected, not only by the hurricane, but also from inconsistent recovery and rebuilding. "The communities most exposed to the devastating effects of Hurricane Katrina are the same communities still struggling to regain residents and control emergent, often invasive, vegetation," Lewis says.

PHOTO NEW A. MASLENNIKOV/AZOTE

## Nudging consumer behaviour

Linda Lindström

Linda Lindström, a second year Master's student, is specializing in "nudging", a way to influence consumer behaviour. In her study Lindström works with a chain of grocery stores in Sweden on how to nudge customers to make more sustainable choices such as buying less meat. "Most of us want to live sustainably, but we often make choices that counteract this desire simply because they seem easier to do. Facilitating more sustainable choices without infringing on people's free choice has great potential in making a difference," she says.

Jonas Hentati-Sundberg

## Watching the Baltic Sea change

In December 2015 Jonas Hentati-Sundberg defended his PhD-thesis, entitled Sea Change. Hentati-Sundberg has looked at long-term changes in the Baltic Sea with regard to ecological dynamics, fishers' behaviour and fisheries policy. Together with colleague Wijnand Boonstra, he was interested in combining quantitative data on fish catches with more qualitative data concerning what motivates and drives fishers to fish what, where and the way they do. Hentati-Sundberg's work reveals a trend towards increased specialization in the fishery, which is an unintended and previously disregarded effect of fisheries management. At the same time, there are big uncertainties around what is being fished and how much fish there is in the sea. "Bigger flexibility in the fishery is a way to build resilience for unexpected changes in the ecosystem and the economy," Hentati-Sundberg concludes.

## Master theses 2015

### Social-ecological Resilience for Sustainable Development programme (SERSD)

*Hanna Ahlström*, Institutional structures and actor collaborations for the governance of global nitrogen and phosphorous cycles: investigating polycentric order

*Lara D. Mateos*, Aquatic food production and resource management: Freshwater use in Chinese aquaculture

*Katja Malmborg*, Identifying ecotopes on a regional scale in Burkina Faso

*Viveca Mellegård*, Making craftsmanship visible as a source of social-ecological resilience: From the Swedish Arctic to the Stockholm Archipelago: Sami duodji and Baltic small scale fishing

*Roweena Patel*, Identifying Spatial Distribution of Fishing Effort of Artisanal Fishers in Coastal Kenya

*Fernando Remolina,* Role of local stakeholders in reaching, developing and sustaining collaborative management: case study of urban wetlands of Bogotá, Colombia

*Philipp Siegel*, Structural and Functional Changes in a Lake Bacterial Community Exposed to Multiple Stress Regimes

*Jessica Spijkers*, Exploring Misfit: A case study of the northeast Atlantic mackerel

*Kate Williman*, Soybean trade telecouplings and land use change in Uruguay: connecting the provincial to the global

*Elinor Holén,* Using soil properties to indicate regulating ecosystem services in a Sudano-Sahelian agro-ecological landscape

*Hanna Griffiths*, Learning to Adapt: A Swedish case study on adaptation of biodiversity management within Svenska Cellulosa Aktiebolaget (SCA)

*Matilda Lenell*, Decrease in traditional ecological knowledge through modernisation: Perspectives on culturally protected village fengshui forests in Southeast China

*Linda Lindström*, Nudging towards sustainable meat consumption: a natural field experiment

*Ashley Perl*, Post-disaster recovery trajectories and community-based management: A case of community-based marine protected areas and their recovery from an earthquake in Bohol, Philippines

*Carmen Seco Perez*, Sumak Kawsay: Listening to the voices of the Living Forest -Resilience and Identity for Indigenous peoples in the Ecuadorian Amazon

### Ecosystems, Resilience and Governance programme (ERG)

*Ulrika Lyckman Alnered*, What facilitates or hinders the introduction of Adaptive Governance approaches into water quality management on a local level?: A case of Swedish municipalities

### Independent MSc thesis

*Laura Elsler*, Venice Ventures: Modeling social-ecological co-evolution for resilience

## PhD theses

*Marnie Graham:* Postcolonial Nature Conservation and Collaboration in Urban Protected Areas: Everyday relations at Macassar Dunes/Wolfgat reserves, Cape Town, South Africa

*Jonas Hentati-Sundberg:* Sea Change: Social-ecological co-evolution in Baltic Sea fisheries

*Johannes Langemeyer:* Urban Ecosystem Services: The Value of Green Spaces in Cities

*Joshua Lewis:* Deltaic Dilemmas: Ecologies of Infrastructure in New Orleans

*Andrés Marín:* Adaptive capacity for social and environmental change: The role of networks in Chile's small-scale fisheries

*Juan Carlos Rocha:* Regime Shifts in the Anthropocene

## Licentiate theses

*Johan Enqvist*: Urban environmental stewardship: Roles and reasons for civic engagements in governance of social-ecological systems

*Jamila Haider:* Understanding poverty traps in biocultural landscapes

*Patrick Keys:* Probing the Precipitationshed: A quantification of the biophysical dimensions of terrestrial moisture recycling

*Caroline Schill:* Making complex commons work: Identifying social-ecological factors and mechanisms for sustainable ecosystem management

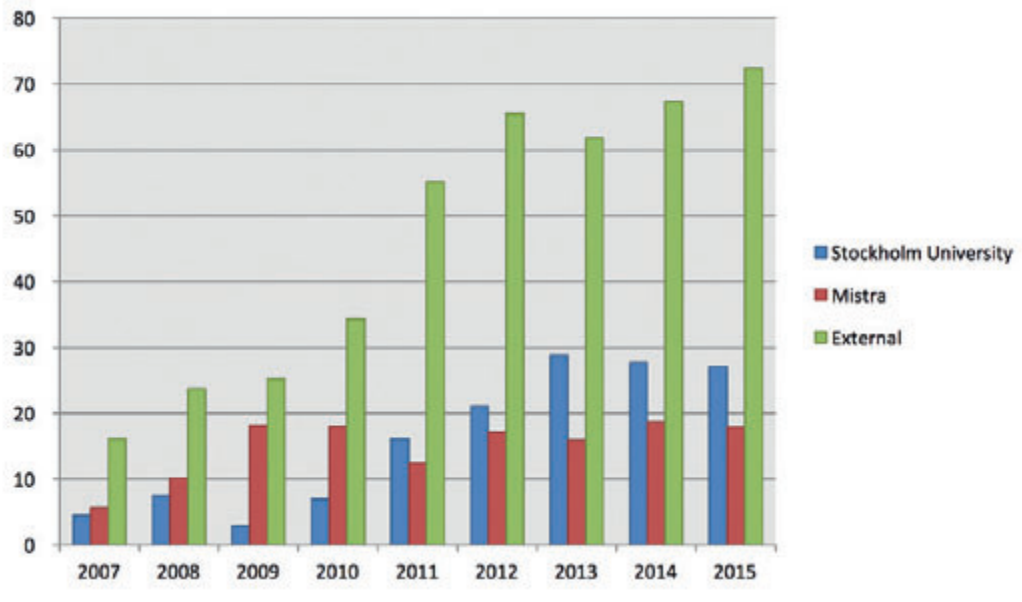
*Simon West:* Negotiating social-ecological fit through knowledge practice

# *Appendix:*

## Finances

| 2015 Total | 117,4 | MSEK |
|---|---|---|
| ***Stockholm University*** | **27,1** | **MSEK** |
| Allocated fund from Stockholm University | 18,9 | MSEK |
| Allocated External Formas funding via faculty | 8,2 | MSEK |
| **MISTRA core grant*** | **17,9** | **MSEK** |
| ***External grant total*** | **72,4** | **MSEK** |
| The Swedish Research Council | 5,4 | MSEK |
| Formas | 9,8 | MSEK |
| Swedish Environmental Protection Agency | 3,1 | MSEK |
| SIDA (GRAID) | 4,4 | MSEK |
| SIDA (Swedbio) | 21,4 | MSEK |
| Futura | 1,7 | MSEK |
| Schwartz | 1,4 | MSEK |
| Nippon Foundation | 1,2 | MSEK |
| Global Challenges Foundation | 1,2 | MSEK |
| EU | 5,0 | MSEK |
| Stordalen Foundation | 1,0 | MSEK |
| NERC | 4,7 | MSEK |
| NordForsk | 2,3 | MSEK |
| Other | 9,8 | MSEK |

**Allocated grant from Mistra 17,5 MSEK plus accumulated surplus 0,4 MSEK*



# Centre publications

### Books

Biggs, R., M. Schlüter, M.L. Schoon (Eds.). 2015. Principles for building resilience: *Sustaining ecosystem services in social-ecological systems. Cambridge University Press, Cambridge.*

van Oudenhoven, F., J. Haider. 2015. With our own hands: *A celebration of food and life in the Pamir Mountains of Afghanistan and Tajikistan. LM Publishers, Arnhem, Netherlands.*

### Journal articles

Abernethy, K.E., Ö. Bodin, P. Olsson, Z. Hilly, Agné, H., L.M. Dellmuth, J. Tallberg. 2015. Does stakeholder involvement foster democratic legitimacy in international organizations? An empirical assessment of a normative theory. *Review of International Organizations* 10: 465–488.

Andersson, E., B. Nykvist, R. Malinga, F. Jaramillo, R. Lindborg. 2015. A social-ecological analysis of ecosystem services in two different farming systems. *Ambio* 44: 102–112.

Andersson, E., M. Tengö, T. McPhearson, P. Kremer. 2015. Cultural ecosystem services as a gateway for improving urban sustainability. *Ecosystem Services* 12: 165–168.

Andersson, E., T. McPhearson, P. Kremer, E. Gomez-Baggethun, D. Haase, M. Tuvendal, D. Wurster. 2015. Scale and context dependence of ecosystem service providing units. *Ecosystem Services* 12: 157–164.

Andringa, T.C., K.A.-M. Van Den Bosch, N. Wijermans. 2015. Cognition from life: The two modes of cognition that underlie moral behavior. *Frontiers in Psychology* 6: 362.

Anthony, K.R.N., P.A. Marshall, A. Abdulla, R. Beeden, C. Bergh, R. Black, C.M. Eakin, E.T. Game, M. Gooch, N.A.J. Graham, A. Green, S.F. Heron, R. van Hooidonk, C. Knowland, S. Mangubhai, N. Marshall, J.A. Maynard, P. McGinnity, E. McLeod, P.J. Mumby, M. Nyström, D. Obura, J. Oliver, H.P. Possingham, R.L. Pressey, G.P. Rowlands, J. Tamelander, D. Wachenfeld, S. Wear. 2015. Operationalizing resilience for adaptive coral reef management under global environmental change. *Global Change Biology* 21: 48–61.

Armitage, D., R.C. de Loë, M. Morris, T.W.D. Edwards, A.K. Gerlak, R.I. Hall, D. Huitema, R. Ison, D. Livingstone, G. MacDonald, N. Mirumachi, R. Plummer, B.B. Wolfe. 2015. Science-policy processes for transboundary water governance. *Ambio* 44: 353–366.

Baird, J., R. Plummer, D. Dupont, B. Carter. 2015. Can context help to understand the perceptions of water quality in First Nation communities? *Nature and Culture* 10: 225–249.

Ban, N.C., E. Boyd, M. Cox, C.L. Meek, M. Schoon, S. Villamayor-Tomas. 2015. Linking classroom learning and research to advance ideas about social-ecological resilience. *Ecology and Society* 20(3): 35.

Barthel, S., J. Parker, H. Ernstson. 2015. Food and green space in cities: A resilience lens on gardens and urban environmental movements. *Urban Studies* 52: 1321–1338.

Beaugrand, G., A. Conversi, S. Chiba, M. Edwards, S. Fonda-Umani, C. Greene, N. Mantua, S.A. Otto, P.C. Reid, M.M. Stachura, L. Stemmann, H. Sugisaki. 2015. Synchronous marine pelagic regime shifts in the Northern Hemisphere. *Philosophical Transactions of the Royal Society B: Biological Sciences* 370: 20130272.

Beilin, R., C. Wilkinson. 2015. Introduction: Governing for urban resilience. *Urban Studies* 52: 1205–1217.

Bennett, E.M., W. Cramer, A. Begossi, G. Cundill, S. Díaz, B.N. Egoh, I.R. Geijzendorffer, C.B. Krug, S. Lavorel, E. Lazos, L. Lebel, B. Martín-López, P. Meyfroidt, H.A. Mooney, J.L. Nel, U. Pascual, K. Payet, N.P. Harguindeguy, G.D. Peterson, A.-H. Prieur-Richard, B. Reyers, P. Roebeling, R. Seppelt, M. Solan, P. Tschakert, T. Tscharntke, B.L. Turner, P.H. Verburg, E.F. Viglizzo, P.C.L. White, G. Woodward. 2015. Linking biodiversity, ecosystem services, and human well-being: Three challenges for designing research for sustainability. *Current Opinion in Environmental Sustainability* 14: 76–85.

Biggs, R.O., C. Rhode, S. Archibald, L.M. Kunene, S.S. Mutanga, N. Nkuna, P.O. Ocholla, L.J. Phadima. 2015. Strategies for managing complex social-ecological systems in the face of uncertainty: Examples from South Africa and beyond. *Ecology and Society* 20(1): 52.

Birnbaum, S., Ö. Bodin, A. Sandström. 2015. Tracing the sources of legitimacy: The impact of deliberation in participatory natural resource management. *Policy Sciences* 48: 443 – 461.

Blenckner, T., A. Kannen, A. Barausse, C. Fischer, J.J. Heymans, T. Luisetti, V. Todorova, M. Valman, L. Mee. 2015. Past and future challenges in managing European seas. *Ecology and Society* 20(1): 40.

Blenckner, T., H. Österblom, P. Larsson, A. Andersson, R. Elmgren. 2015. Baltic Sea ecosystem-based management under climate change: Synthesis and future challenges. *Ambio* 44: 507–515.

Blenckner, T., M. Llope, C. Möllmann, R. Voss, M.F. Quaas, M. Casini, M. Lindegren, C. Folke, N.C. Stenseth. 2015. Climate and fishing steer ecosystem regeneration to uncertain economic futures. Proceedings of the Royal Society B: *Biological Sciences* 282(1803): 20142809.

Boonstra, W.J., K.M. Ottosen, A.S.A. Ferreira, A. Richter, L.A. Rogers, M.W. Pedersen, A. Kokkalis, H. Bardarson, S. Bonanomi, W. Butler, F.K. Diekert, N. Fouzai, M. Holma, R.E. Holt, K. Kvile, E. Malanski, J.I. Macdonald, E. Nieminen, G. Romagnoni, M. Snickars, B. Weigel, P. Woods, J. Yletyinen, J.D. Whittington. 2015. What are the major global threats and impacts in marine environments? Investigating the contours of a shared perception among marine scientists from the bottom-up. *Marine Policy* 60: 197– 201.

Boonstra, W.J., T.T.H. Hanh. 2015. Adaptation to climate change as social-ecological trap: A case study of fishing and aquaculture in the Tam Giang Lagoon, Vietnam. *Environment Development and Sustainability* 17(6): 1527–1544.

Borgström, S., Ö. Bodin, A. Sandström, B. Crona. 2015. Developing an analytical framework for assessing progress toward ecosystem-based management. *Ambio* 44: 357–369.

Bots, P.W.G., M. Schlüter, J. Sendzimir. 2015. A framework for analyzing, comparing, and diagnosing social-ecological systems. *Ecology and Society* 20(4): 18.

Boyd, E., B. Nykvist, S. Borgström, I.A. Stacewicz. 2015. Anticipatory governance for social-ecological resilience. *Ambio* 44: 149–161.

Bratman, G.N., J.P. Hamilton, K.S. Hahn, G.C. Daily, J.J. Gross. 2015. Nature experience reduces rumination and subgenual prefrontal cortex activation. *Proceedings of the National Academy of Sciences, USA* 112: 8567–8572.

Campennì, M., A. Manciocco, A. Vitale, G. Schino. 2015. Exchanging grooming, but not tolerance and aggression in common marmosets (Callithrix jacchus). *American Journal of Primatology* 77: 222–228.

Cao, L., R. Naylor, P. Henriksson, D. Leadbitter, M. Metian, M. Troell, W. Zhang. 2015. China's aquaculture and the world's wild fisheries. *Science* 347: 133–135.

Carpenter, S.R., W.A. Brock, C. Folke, E.H. Van Nes, M. Scheffer, S. Polasky. 2015. Allowing variance may enlarge the safe operating space for exploited ecosystems. *Proceedings of the National Academy of Sciences, USA* 112: 14384–14389.

Chaigneau, T., T.M. Daw. 2015. Individual and village-level effects on community support for Marine Protected Areas (MPAs) in the Philippines. *Marine Policy* 51: 499–506.

Chalmers, A.W., L.M. Dellmuth. 2015. Fiscal redistribution and public support for European integration. European Union Politics 16: 386–407.

Cinner, J.E., C. Huchery, C.C. Hicks, T.M. Daw, N. Marshall, A. Wamukota, E.H. Allison. 2015. Changes in adaptive capacity of Kenyan fishing communities. *Nature Climate Change* 5: 872–876.

Conversi, A., V. Dakos, A. Gårdmark, S. Ling, C. Folke, P.J. Mumby, C. Greene, M. Edwards, T. Blenckner, M. Casini, A. Pershing, C. Möllmann. 2015. A holistic view of marine regime shifts. *Philosophical Transactions of the Royal Society B: Biological Sciences* 370: 20130279

Cornell, S. 2015. The approaching Great Transformation: Toward a liveable post carbon economy. *Journal of Critical Realism* 14: 439–440.

Crépin, A.-S., C. Folke. 2015. The economy, the biosphere and planetary boundaries: Towards biosphere economics. *International Review of Environmental and Resource Economics* 8: 57–100.

Crona, B.I., T. Van Holt, M. Petersson, T.M. Daw, E. Buchary. 2015. Using social-ecological syndromes to understand impacts of international seafood trade on small-scale fisheries. *Global Environmental Change* 35: 162–175.

Da, C.T., L.H. Phuoc, H.N. Duc, M. Troell, H. Berg. 2015. Use of wastewater from striped catfish (Pangasianodon hypophthalmus) pond culture for integrated rice–fish–vegetable farming systems in the Mekong Delta, Vietnam. *Agroecology and Sustainable Food Systems* 39: 580–597.

Daw, T.M. 2015. Saving global fisheries: Reducing fishing capacity to promote sustainability. *Review of Policy Research* 32: 622–624.

Daw, T.M., S. Coulthard, W.W.L. Cheung, K. Brown, C. Abunge, D. Galafassi, G.D. Peterson, T.R. McClanahan, J.O. Omukoto, L. Munyi. 2015. Evaluating taboo trade-offs in ecosystems services and human well-being. *Proceedings of the National Academy of Sciences, USA* 112: 6949–6954.

de Bruin, A., R. Pateman, J. Barron, M. Balima, I. Ouedraogo, E. Da Dapola, M. Fosu, F.O. Annor, M. Magombeyi, J.-M. Kileshye Onema. 2015. Setting up agricultural water management interventions: Learning from successful case studies in the Volta and Limpopo river basins. *Water Resources and Rural Development* 6: 12–23.

de Grosbois, D., R. Plummer. 2015. Problematizing water vulnerability indices at a local level: A critical review and proposed solution. *Water Resources Management* 29: 5015–5035.

Díaz, S., S. Demissew, J. Carabias, C. Joly, M. Lonsdale, N. Ash, A. Larigauderie, J.R. Adhikari, S. Arico, A. Báldi, A. Bartuska, I.A. Baste, A. Bilgin, E. Brondizio, K.M.A. Chan, V.E. Figueroa, A. Duraiappah, M. Fischer, R. Hill, T. Koetz, P. Leadley, P. Lyver, G.M. Mace, B. Martin-Lopez, M. Okumura, D. Pacheco, U. Pascual, E.S. Pérez, B. Reyers, E. Roth, O. Saito, R.J. Scholes, N. Sharma, H. Tallis, R. Thaman, R. Watson, T. Yahara, Z.A. Hamid, C. Akosim, Y. Al-Hafedh, R. Allahverdiyev, E. Amankwah, T.S. Asah, Z. Asfaw, G. Bartus, A.L. Brooks, J. Caillaux, G. Dalle, D. Darnaedi, A. Driver, G. Erpul, P. Escobar-Eyzaguirre, P. Failler, A.M.M. Fouda, B. Fu, H. Gundimeda, S. Hashimoto, F. Homer, S. Lavorel, G. Lichtenstein, W.A. Mala, W. Mandivenyi, P. Matczak, C. Mbizvo, M. Mehrdadi, J.P. Metzger, J.B. Mikissa, H. Moller, H.A. Mooney, P. Mumby, H. Nagendra, C. Nesshover, A.A. Oteng-Yeboah, G. Pataki, M. Roué, J. Rubis, M. Schultz, P. Smith, R. Sumaila, K. Takeuchi, S. Thomas, M. Verma, Y. Yeo-Chang, D. Zlatanova. 2015. The IPBES conceptual framework: Connecting nature and people. *Current Opinion in Environmental Sustainability* 14: 1–16.

Donges, J.F., I. Petrova, A. Loew, N. Marwan, J. Kurths. 2015. How complex climate networks complement eigen techniques for the statistical analysis of climatological data. *Climate Dynamics* 45: 2407–2424.

Donges, J.F., J. Heitzig, B. Beronov, M. Wiedermann, J. Runge, Q.Y. Feng, L. Tupikina, V. Stolbova, R.V. Donner, N. Marwan, H.A. Dijkstra, Kurths. 2015. Unified functional network and nonlinear time series analysis for complex systems science: The pyunicorn package. *Chaos* 25(11): 113101.

Donges, J.F., R.V. Donner, N. Marwan, S.F.M. Breitenbach, K. Rehfeld, J. Kurths, F. Viehberg. 2015. Non-linear regime shifts in Holocene Asian monsoon variability: Potential impacts on cultural change and migratory patterns. *Climate of the Past* 11: 709–741.

Dyck, T., R. Plummer, D. Armitage. 2015. Examining First Nations' approach to protecting water resources using a multi-barrier approach to safe drinking water. *Canadian Water Resources Journal* 40: 204–223.

Elmgren, R., T. Blenckner, A. Andersson. 2015. Baltic Sea management: Successes and failures. *Ambio* 44: 335–344.

Elmhagen, B., G. Destouni, A. Angerbjörn, S. Borgström, E. Boyd, S.A.O. Cousins, L. Dalén, J. Ehrlén, M. Ermold, P.A. Hambäck, J. Hedlund, K. Hylander, F. Jaramillo, V.K. Lagerholm, S.W. Lyon, H. Moor, B. Nykvist, M. Pasanen-Mortensen, J. Plue, C. Prieto, Y. van der Velde, R. Lindborg. 2015. Interacting effects of change in climate, human population, land use, and water use on biodiversity and ecosystem services. *Ecology and Society* 20(1): 23.

Elmqvist, T., H. Setälä, S.N. Handel, S. van der Ploeg, J. Aronson, J.N. Blignaut, E. Gómez-Baggethun, D.J. Nowak, J. Kronenberg, R. de Groot. 2015. Benefits of restoring ecosystem services in urban areas. *Current Opinion in Environmental Sustainability* 14: 101–108.

Enquist, B.J., J. Norberg, S.P. Bonser, C. Violle, C.T. Webb, A. Henderson, L.L. Sloat, V.M. Savage. 2015. Scaling from traits to ecosystems: Developing a general trait driver theory via integrating trait-based and metabolic scaling theories. *Advances in Ecological Research* 52: 249–318.

Eriksson, H., H. Österblom, B. Crona, M. Troell, N. Andrew, J. Wilen, C. Folke. 2015. Contagious exploitation of marine resources. *Frontiers in Ecology and the Environment* 13: 435–440.

Eriksson, H., M. de la Torre-Castro, S.W. Purcell, P. Olsson. 2015. Lessons for resource conservation from two contrasting small-scale fisheries. *Ambio* 44: 204–213.

Feldhoff, J.H., S. Lange, J. Volkholz, J.F. Donges, J. Kurths, F.-W. Gerstengarbe. 2015. Complex networks for climate model evaluation with application to statistical versus dynamical modeling of South American climate. *Climate Dynamics* 44: 1567–1581.

Fetzer, I., K. Johst, R. Schawea, T. Banitz, H. Harms, A. Chatzinotas. 2015. The extent of functional redundancy changes as species' roles shift in different environments. *Proceedings of the National Academy of Sciences, USA* 112: 14888–14893.

Fischer, J., T.A. Gardner, E.M. Bennett, P. Balvanera, R. Biggs, S. Carpenter, T. Daw, C. Folke, R. Hill, T.P. Hughes, T. Luthe, M. Maass, M. Meacham, A.V. Norström, G. Peterson, C. Queiroz, R. Seppelt, M. Spierenburg, J. Tenhunen. 2015. Advancing sustainability through mainstreaming a social-ecological systems perspective. *Current Opinion in Environmental Sustainability* 14: 144–149.

Galaz, V., J. Gars, F. Moberg, B. Nykvist, C. Repinski. 2015. Why ecologists should care about financial markets. *Trends in Ecology and Evolution* 30: 571–580.

Glaser, K., A. Kuppardt, J. Boenigk, H. Harms, I. Fetzer, A. Chatzinotas. 2015. The influence of environmental factors on protistan microorganisms in grassland soils along a land-use gradient. *Science of the Total Environment* 537: 33–42.

Gotham, K.F., J.A. Lewis. 2015. Green tourism and the ambiguities of sustainability discourse: The case of New Orleans's Lower Ninth Ward. *International Journal of Social Ecology and Sustainable Development* 6: 57–73.

Graham, M. 2015. Everyday human (in)securities in protected urban nature: Collaborative conservation at Macassar/Wolfgat dunes nature reserves, Cape Town, South Africa. *Geoforum* 64: 25–36.

Green, T.L. 2015. Lecturers' perspectives on how introductory economic courses address sustainability. *International Journal of Sustainability in Higher Education* 16: 44–56.


**Publications according to subject area 2015**


Guerrero, A.M., Ö. Bodin, R.R.J. McAllister, K.A. Wilson. 2015. Achieving social-ecological fit through bottom-up collaborative governance: An empirical investigation. *Ecology and Society* 20(4): 41.

Guerry, A.D., S. Polasky, J. Lubchenco, R. Chaplin-Kramer, G.C. Daily, R. Griffin, M. Ruckelshaus, I.J. Bateman, A. Duraiappah, T. Elmqvist, M.W. Feldman, C. Folke, J. Hoekstra, P.M. Kareiva, B.L. Keeler, S. Li, E. McKenzie, Z. Ouyang, B. Reyers, T.H. Ricketts, J. Rockström, H. Tallis, B. Vira. 2015. Natural capital and ecosystem services informing decisions: From promise to practice. *Proceedings of the National Academy of Sciences, USA* 112: 7348–7355.

Hahn, T., C. McDermott, C. Ituarte-Lima, M. Schultz, T. Green, M. Tuvendal. 2015. Purposes and degrees of commodification: Economic instruments for biodiversity and ecosystem services need not rely on markets or monetary valuation. *Ecosystem Services* 16: 74–82.

Hajer, M., M. Nilsson, K. Raworth, P. Bakker, F. Berkhout, Y. de Boer, J. Rockström, K. Ludwig, M. Kok. 2015. Beyond cockpit-ism: Four insights to enhance the transformative potential of the sustainable development goals. *Sustainability* 7: 1651–1660.

Hamann, M., R. Biggs, B. Reyers. 2015. Mapping social-ecological systems: Identifying 'green-loop' and 'red-loop' dynamics based on characteristic bundles of ecosystem service use. *Global Environmental Change* 34: 218–226.

Häyhä, T., P.P. Franzese, A. Paletto, B.D. Fath. 2015. Assessing, valuing, and mapping ecosystem services in Alpine forests. *Ecosystem Services* 14: 12–23.

Henriksson, P.J.G., A. Rico, W. Zhang, S. Ahmad-Al-Nahid, R. Newton, L.T. Phan, Z. Zhang, J. Jaithiang, H.M. Dao, T.M. Phu, D.C. Little, F.J. Murray, K. Satapornvanit, L. Liu, Q. Liu, M.M. Haque, F. Kruijssen, G.R. De Snoo, R. Heijungs, P.M. Van Bodegom, J.B. Guinée. 2015. Comparison of Asian aquaculture products by use of statistically supported life cycle assessment. *Environment, Science and Technology* 49: 14176–14183.

Hentati-Sundberg, J., J. Hjelm, W.J. Boonstra, H. Österblom. 2015. Management forcing increased specialization in a fishery system. *Ecosystems* 18: 45–61.

Hertz, T., M. Schlüter. 2015. The SES-Framework as boundary object to address theory orientation in social-ecological system research: The SES-The-Or approach. *Ecological Economics* 116: 12– 24.

Hinkel, J., M.E. Cox, M. Schlüter, C.R. Binder, T. Falk. 2015. A diagnostic procedure for applying the social-ecological systems framework in diverse cases. *Ecology and Society* 20(1): 32.

Homer-Dixon, T., B. Walker, R. Biggs, A.-S. Crépin, C. Folke, E.F. Lambin, G.D. Peterson, J. Rockström, M. Scheffer, W. Steffen, M. Troell. 2015. Synchronous failure: The emerging causal architecture of global crisis. *Ecology and Society* 20(3): 6.

Janssen, A.B.G., G.B. Arhonditsis, A. Beusen, K. Bolding, L. Bruce, J. Bruggeman, R.-M. Couture, A.S. Downing, J. Alex Elliott, M.A. Frassl, G. Gal, D.J. Gerla, M.R. Hipsey, F. Hu, S.C. Ives, J.H. Janse, E. Jeppesen, K.D. Jöhnk, D. Kneis, X. Kong, J.J. Kuiper, M.K. Lehmann, C. Lemmen, D. Özkundakci, T. Petzoldt, K. Rinke, B.J. Robson, R. Sachse, S.A. Schep, M. Schmid, H. Scholten, S. Teurlincx, D. Trolle, T.A. Troost, A.A. Van Dam, L.P.A. Van Gerven, M. Weijerman, S.A. Wells, W.M. Mooij. 2015. Exploring, exploiting and evolving diversity of aquatic ecosystem models: A community perspective. *Aquatic Ecology* 49: 513–548.

Janssen, M. T. Lindahl, J. Murphy. 2015. Advancing the understanding of behavior in social-ecological systems: Results from lab and field experiments. *Ecology and Society* 20(4): 34.

Jouffray, J.-B., M. Nyström, A.V. Norström, I.D. Williams, L.M. Wedding, J.N. Kittinger, G.J. Williams. 2015. Identifying multiple coral reef regimes and their drivers across the Hawaiian archipelago. *Philosophical Transactions of the Royal Society B: Biological Sciences* 370(1659): 20130268.

Kaiser, B.A., S. Bakanev, R.G. Bertelsen, M. Carson, A. Eide, L. Fernandez, P. Halpin, S. Izmalkov, L.A. Kyhn, H. Österblom, M. Punt, L. Ravn-Jonsen, J. Sanchirico, K. Sokolov, J.H. Sundet, G.G. Thorarinsdóttir, N. Vestergaard. 2015. Spatial issues in Arctic marine resource governance workshop summary and comment. *Marine Policy* 58: 1–5.

Karlberg, L., K.K. Garg, J. Barron, S.P. Wani. 2015. Impacts of agricultural water interventions on farm income: An example from the Kothapally watershed, India. *Agricultural Systems* 136: 30–38.

Karp, D.S., C.D. Mendenhall, E. Callaway, L.O. Frishkoff, P.M. Kareiva, P.R. Ehrlich, G.C. Daily. 2015. Confronting and resolving competing values behind conservation objectives. *Proceedings of the National Academy of Sciences, USA* 112: 11132–11137.

Selkoe, K.A., T. Blenckner, M.R. Caldwell, L.B. Crowder, A.L. Erickson, T.E. Essington, J.A. Estes, R.M. Fujita, B.S. Halpern, M.E. Hunsicker, C.V. Kappel, R.P. Kelly, J.N. Kittinger, P.S. Levin, J.M. Lynham, M.E. Mach, R.G. Martone, L.A. Mease, A.K. Salomon, J.F. Samhouri, C. Scarborough, A.C. Stier, C.White, J. Zedler. 2015. Principles for managing marine ecosystems prone to tipping points. *Ecosystem Health and Sustainability* 1(5): 1–18.

Kininmonth, S., A. Bergsten, Ö. Bodin. 2015. Closing the collaborative gap: Aligning social and ecological connectivity for better management of interconnected wetlands. *Ambio* 44: 138–148.

Krause, G., C. Brugere, A. Diedrich, M.W. Ebeling, S.C.A. Ferse, E. Mikkelsen, J.A. Pérez Agúndez, S.M. Stead, N. Stybel, M. Troell. 2015. A revolution without people? Closing the people-policy gap in aquaculture development. *Aquaculture* 447: 44–55.

Kremer, P., E. Andersson, T. McPhearson, T. Elmqvist. 2015. Advancing the frontier of urban ecosystem services research. *Ecosystem Services* 12: 149–151.

Lade, S.J., M. Coelho, I.M. Tolić, T. Gross. 2015. Fusion leads to effective segregation of damage during cell division: An analytical treatment. *Journal of Theoretical Biology* 378: 47–55.

Lade, S.J., S. Niiranen, J. Hentati-Sundberg, T. Blenckner, W.J. Boonstra, K. Orach, M.F. Quaas, H. Österblom, M. Schlüter. 2015. An empirical model of the Baltic Sea reveals the importance of social dynamics for ecological regime shifts. *Proceedings of the National Academy of Sciences, USA* 112: 11120–11125.

Lange, S., J.F. Donges, J. Volkholz, J. Kurths. 2015. Local difference measures between complex networks for dynamical system model evaluation. *PLoS ONE* 10(4): e0118088

Langemeyer, J., F. Baró, P. Roebeling, E. Gómez-Baggethun. 2015. Contrasting values of cultural ecosystem services in urban areas: The case of park Montjuïc in Barcelona. *Ecosystem Services* 12: 178–186.

Leenhardt, P., L. Teneva, S. Kininmonth, E. Darling, S. Cooley, J. Claudet. 2015. Challenges, insights and perspectives associated with using social-ecological science for marine conservation. *Ocean and Coastal Managemen*t 115: 49–60.

Li, C., H. Zheng, S. Li, X. Chen, J. Li, W. Zeng, Y. Liang, S. Polasky, M.W. Feldman, M. Ruckelshaus, Z. Ouyang, G.C. Daily. 2015. Impacts of conservation and human development policy across stakeholders and scales. *Proceedings of the National Academy of Sciences, USA* 112: 7396–7401.

Lidström, S., S. West, T. Katzschner, M.I. Pérez-Ramos, H. Twidle. 2015. Invasive narratives and the inverse of slow violence: Alien species in science and society. *Environmental Humanities* 7: 1–40.

Lindahl, T., Ö. Bodin, M. Tengö. 2015. Governing complex commons: The role of communication for experimental learning and coordinated management. *Ecological Economics* 111: 111–120.

Lucas, R., A. Kuchenbuch, I. Fetzer, H. Harms, S. Kleinsteuber. 2015. Long-term monitoring reveals stable and remarkably similar microbial communities in parallel full-scale biogas reactors digesting energy crops. *FEMS Microbiology Ecology 91(3) DOI*: 10.1093/femsec/fiv004

Malinga, R., L.J. Gordon, G. Jewitt, R. Lindborg. 2015. Mapping ecosystem services across scales and continents: A review. *Ecosystem Services* 13: 57–63.

Marín, A., Ö. Bodin, S. Gelcich, B. Crona. 2015. Social capital in post-disaster recovery trajectories: Insights from a longitudinal study of tsunami-impacted small-scale fisher organizations in Chile. *Global Environmental Change* 35: 450–462.

Martin, R., M. Schlüter. 2015. Combining system dynamics and agent-based modeling to analyze social-ecological interactions; An example from modeling restoration of a shallow lake. *Frontiers in Environmental Science 3:66. doi:* 10.3389/fenvs.2015.00066

McPhearson, T., E. Andersson, T. Elmqvist, N. Frantzeskaki. 2015. Resilience of and through urban ecosystem services. *Ecosystem Services* 12: 152–156.

Mikulcak, F., J.L. Haider, D.J. Abson, J. Newig, J. Fischer. 2015. Applying a capitals approach to understand rural development traps: A case study from post-socialist Romania. *Land Use Policy* 43: 248–258.

Möllmann, C., C. Folke, M. Edwards, A. Conversi. 2015. Marine regime shifts around the globe: Theory, drivers and impacts. *Philosophical Transactions of the Royal Society B: Biological Sciences* 370(1659): 20130260.

Moksnes, P.-O., D.O. Mirera, E. Björkvik, M.I. Hamad, H.M. Mahudi, D. Nyqvist, N. Jiddawi, M. Troell. 2015. Stepwise function of natural growth for Scylla serrata in East Africa: A valuable tool for assessing growth of mud crabs in aquaculture. *Aquaculture Research* 46: 2938–2953.

Moor, H., K. Hylander, J. Norberg. 2015. Predicting climate change effects on wetland ecosystem services using species distribution modeling and plant functional traits. *Ambio* 44: 113–126.

Nauber. N, A. Paulsch (Eds.), F. Daguitan, V. Figueroa, C. Goerg, P. Hardison, K. Heubach, S. Lehmann, H. Magata, P. Malmer, O. Masardule, S. Mitambo, D. Pacheco, C. Paulsch, U. Payyappallimana, E. Perez, J. Rubis, M. Tengoe, P. Trakansuphakon, H. Wittmer. 2015. International Workshop on diverse Knowledge Systems in IPBES. Gustav-Stresemann-Institute Bonn, Germany January 18th–20th, 2015. *BfN-Skripten* 415 2015. Bonn, Germany.

Nocke, T., S. Buschmann, J.F. Donges, N. Marwan, H.-J. Schulz, C. Tominski. 2015. Review: Visual analytics of climate networks. *Nonlinear Processes in Geophysics* 22: 545–570.

Orr, Y., J.S. Lansing, M.R. Dove. 2015. Environmental Anthropology: Systemic perspectives. *Annual Review of Anthropology* 44: 153–168.

Österblom, H., C. Folke. 2015. Globalization, marine regime shifts and the Soviet Union. Philosophical Transactions of the Royal Society B: *Biological Sciences* 370: 20130278.

Österblom, H., J.-B. Jouffray, C. Folke, B. Crona, M. Troell, A. Merrie, J. Rockström. 2015. Transnational corporations as 'keystone actors' in marine ecosystems. *PLoS ONE* 10(5): e0127533.

Österblom, H., M. Scheffer, F.R. Westley, M.L. van Esso, J. Miller, J. Bascompte. 2015. A message from magic to science: Seeing how the brain can be tricked may strengthen our thinking. *Ecology and Society* 20(4): 16.

Österblom, H., Ö. Bodin, U.R. Sumaila, A.J. Press. 2015. Reducing illegal fishing in the Southern Ocean: A global effort. *Solutions* 4(5): 72–79.

Oteros-Rozas, E., B. Martín-López, T.M. Daw, E.L. Bohensky, J.R.A. Butler, R. Hill, J. Martin-Ortega, A. Quinlan, F. Ravera, I. Ruiz-Mallén, M. Thyresson, J. Mistry, I. Palomo, G.D. Peterson, T. Plieninger, K.A. Waylen, D.M. Beach, I.C. Bohnet, M. Hamann, J. Hanspach, K. Hubacek, S. Lavorel, S.P. Vilardy. 2015. Participatory scenario planning in place-based social-ecological research: Insights and experiences from 23 case studies. *Ecology and Society* 20(4): 32.

Paasche, Ø., H. Österblom, S. Neuenfeldt, E. Bonsdorff, K. Brander, D.J. Conley, J.M. Durant, A.M. Eikeset, A. Goksøyr, S. Jónsson, O.S. Kjesbu, A. Kuparinen, N.C. Stenseth. 2015. Connecting the seas of Norden. *Nature Climate Change* 5: 89–92.

Palmer, C.G., R. Biggs, G.S. Cumming. 2015. Applied research for enhancing human well-being and environmental stewardship: Using complexity thinking in Southern Africa. *Ecology and Society* 20(1): 53.

Pickering, K., R. Plummer, T. Shaw, G. Pickering. 2015. Assessing the adaptive capacity of the Ontario wine industry for climate change adaptation. *International Journal of Wine Research* 7: 13–27.

Queiroz, C., M. Meacham, K. Richter, A.V. Norström, E. Andersson, J. Norberg, G. Peterson. 2015. Mapping bundles of ecosystem services reveals distinct types of multifunctionality within a Swedish landscape. *Ambio* 44: 89–101.

Rammig, A., M. Wiedermann, J.F. Donges, F. Babst, W. Von Bloh, D. Frank, K. Thonicke, M.D. Mahecha. 2015. Coincidences of climate extremes and anomalous vegetation responses: Comparing tree ring patterns to simulated productivity. *Biogeosciences* 12: 373–385.

Reyers, B., J.L. Nel, P.J. O'Farrell, N. Sitas, D.C. Nel. 2015. Navigating complexity through knowledge coproduction: Mainstreaming ecosystem services into disaster risk reduction. *Proceedings of the National Academy of Sciences, USA* 112: 7362–7368.

Richter, S., I. Fetzer, M. Thullner, F. Centler, P. Dittrich. 2015. Towards rule-based metabolic databases: A requirement analysis based on KEGG. I*nternational Journal of Data Mining and Bioinformatics* 13: 289–319.

Rocha, J., J. Yletyinen, R. Biggs, T. Blenckner, G. Peterson. 2015. Marine regime shifts: Drivers and impacts on ecosystems services. *Philosophical Transactions of the Royal Society B: Biological Sciences* 370(1659): 20130273

Rocha, J.C., G.D. Peterson, R. Biggs. 2015. Regime shifts in the Anthropocene: Drivers, risks, and resilience. *PLoS ONE* 10(8): e0134639.

Rockström, J., M. Falkenmark. 2015. Agriculture: Increase water harvesting in Africa. *Nature* 519: 283–285.

Rubio, L., Ö. Bodin, L. Brotons, S. Saura. 2015. Connectivity conservation priorities for individual patches evaluated in the present landscape: How durable and effective are they in the long term? *Ecography* 38: 782–791.

Runge, J., V. Petoukhov, J.F. Donges, J. Hlinka, N. Jajcay, M. Vejmelka, D. Hartman, N. Marwan, M. Paluš, J. Kurths. 2015. Identifying causal gateways and mediators in complex spatio-temporal systems. *Nature Communications* 6: 8502.

Sandström, A., T. Bodin, B. Crona. 2015. Network governance from the top: The case of ecosystem-based coastal and marine management. *Marine Policy* 55: 57–63.

Scheffer, M., J. Bascompte, T.K. Bjordam, S.R. Carpenter, L.B. Clarke, C. Folke, P. Marquet, N. Mazzeo, M. Meerhoff, O. Sala, F.R. Westley. 2015. Dual thinking for scientists. *Ecology and Society* 20(2): 3.

Scheffer, M., S. Barrett, S.R. Carpenter, C. Folke, A.J. Green, M. Holmgren, T.P. Hughes, S. Kosten, I.A. van de Leemput, D.C. Nepstad, E.H. van Nes, E.T.H.M. Peeters, B. Walker. 2015. Creating a safe operating space for iconic ecosystems. *Science* 347: 1317–1319.

Schill, C., T. Lindahl, A.-S. Crépin. 2015. Collective action and the risk of ecosystem regime shifts: Insights from a laboratory experiment. *Ecology and Society* 20(1): 48.

Schleussner, C.-F., D.V. Divine, J.F. Donges, A. Miettinen, R.V. Donner. 2015. Indications for a North Atlantic Ocean circulation regime shift at the onset of the Little Ice Age. *Climate Dynamics* 45: 3623–3633.

Schultz, L., C. Folke, H. Österblom, P. Olsson. 2015. Adaptive governance, ecosystem management, and natural capital. *Proceedings of the National Academy of Sciences USA* 112: 7369–7374.

Schulze, J., R. Martin, A. Finger, C. Henzen, M. Lindner, K. Pietzsch, A. Werntze, U. Zander, R. Seppelt. 2015. Design, implementation and test of a serious online game for exploring complex relationships of sustainable land management and human well-being. *Environmental Modelling and Software* 65: 58–66.

Sellberg, M.M., C. Wilkinson, G.D. Peterson. 2015. Resilience assessment: A useful approach to navigate urban sustainability challenges. *Ecology and Society* 20(1): 43.

Selomane, O., B. Reyers, R. Biggs, H. Tallis, S. Polasky. 2015. Towards integrated social-ecological sustainability indicators: Exploring the contribution and gaps in existing global data. *Ecological Economics* 118: 140–146.

Siegmund, J.F., R.V. Donner, M. Wiedermann, J.F. Donges. 2015. Impact of climate extremes on wildlife plant flowering over Germany. *Biogeosciences Discussions* 12: 18389–18423.

Sinare, H., L.J. Gordon. 2015. Ecosystem services from woody vegetation on agricultural lands in Sudano-Sahelian West Africa. *Agriculture, Ecosystems & Environment* 200: 186–199.

Soler, G.A., G.J. Edgar, R.J. Thomson, S. Kininmonth, S.J. Campbell, T.P. Dawson, N.S. Barrett, A.T.F. Bernard, D.E. Galvan, T.J. Willis, T.J. Alexander, R.D. Stuart-Smith. 2015. Reef fishes at all trophic levels respond positively to effective marine protected areas. *PLoS One* 10(10): e0140270.

Steffen, W., K. Richardson, J. Rockström, S.E. Cornell, I. Fetzer, E.M. Bennett, R. Biggs, S.R. Carpenter, W. De Vries, C.A. De Wit, C. Folke, D. Gerten, J. Heinke, G.M. Mace, L.M. Persson, V. Ramanathan, B. Reyers, S. Sörlin. 2015. Planetary boundaries: Guiding human development on a changing planet. *Science* 347: 736, 1259855.

Steffen, W., W. Broadgate, L. Deutsch, O. Gaffney, C. Ludwig. 2015. The trajectory of the Anthropocene: The great acceleration. *The Anthropocene Review* 2: 81–98.

Stuart-Smith, R.D., A.E. Bates, J.S. Lefcheck, J. Emmett Duffy, S.C. Baker, R.J. Thomson, J.F. Stuart-Smith, N.A. Hill, S.J. Kininmonth, L. Airoldi, M.A. Becerro, S.J. Campbell, T.P. Dawson, S.A. Navarrete, G. Soler, E.M.A. Strain, T.J. Willis, G.J. Edgar. 2015. The potential of trait-based approaches to contribute to marine conservation. *Marine Policy* 51: 148–150.

Stuart-Smith, R.D., G.J. Edgar, N.S. Barrett, S.J. Kininmonth, A.E. Bates. 2015. Thermal biases and vulnerability to warming in the world's marine fauna. *Nature* 528(7580): 88+.

Subramaniyam, N.P., J. Hyttinen, J.F. Donges. 2015. Signatures of chaotic and stochastic dynamics uncovered with ε-recurrence networks. Proceedings of the Royal Society A: *Mathematical, Physical and Engineering Science* 471: 20150349.

Sun, A.Y., J. Chen, J. Donges. 2015. Global terrestrial water storage connectivity revealed using complex climate network analyses. *Nonlinear Processes in Geophysics* 22: 433–446.

Sutherland, W.J., M. Clout, M. Depledge, L.V. Dicks, J. Dinsdale, A.C. Entwistle, E. Fleishman, D.W. Gibbons, B. Keim, F.A. Lickorish, K.A. Monk, N. Ockendon, L.S. Peck, J. Pretty, J. Rockström, M.D. Spalding, F.H. Tonneijck, B.C. Wintle. 2015. A horizon scan of global conservation issues for 2015. *Trends in Ecology and Evolution* 30: 17–24.

Treml, E.A., P.I.J. Fidelman, S. Kininmonth, J.A. Ekstrom, Ö. Bodin. 2015. Analyzing the (mis)fit between the institutional and ecological networks of the Indo-West Pacific. *Global Environmental Change* 31: 263–271.

Tuvendal, M., J. Elmberg. 2015. A handshake between markets and hierarchies: Geese as an example of successful collaborative management of ecosystem services. *Sustainability* 7: 15937–15954.

Ulmanen, J., Å. Gerger Swartling, O. Wallgren. 2015. Climate adaptation in Swedish forestry: Exploring the debate and policy process, 1990–2012. *Forests* 6: 708–733.

Valman, M., H. Österblom, P. Olsson. 2015. Adaptive governance of the Baltic Sea: Lessons from elsewhere. *International Journal of the Commons* 9: 440–465.

van den Bergh, J., C. Folke, S. Polasky, M. Scheffer, W. Steffen. 2015. What if solar energy becomes really cheap? A thought experiment on environmental problem shifting. *Current Opinion in Environmental Sustainability* 14: 170–179.

Villasante, S., H. Österblom. 2015. The role of cooperation for improved stewardship of marine social-ecological systems in Latin America. *Ecology and Society* 20(1): 8.

van Tol Smit, E., R. de Loë, R. Plummer. 2015. How knowledge is used in collaborative environmental governance: water classification in New Brunswick, Canada. *Journal of Environmental Planning and Management* 58: 423–444.

van Vuuren, D.P., P.L. Lucas, T. Häyhä, S.E. Cornell, M. Stafford-Smith. 2015. Horses for courses: Analytical tools to explore planetary boundaries. *Earth System Dynamics Discussions* 6: 1711–1741.

von der Porten, S., R.C. de Loë, R. Plummer. 2015. Collaborative environmental governance and indigenous peoples: Recommendations for practice. *Journal of Environmental Practice* 17: 134–144.

von Heland, F., J. Clifton. 2015. Whose threat counts? Conservation narratives in the Wakatobi National Park, Indonesia. *Conservation and Society* 13: 154–165.

Vulturius, G., Å. Gerger Swartling. 2015. Overcoming social barriers to learning and engagement with climate change adaptation: Experiences with Swedish forestry stakeholders. *Scandinavian Journal of Forest Research* 30: 217–225.

Waddell, S., S. Waddock, S. Cornell, D. Dentoni, M. McLachlan, G. Meszoely. 2015. Large systems change: An emerging field of transformation and transitions. *The Journal of Corporate Citizenship* 58: 5–30.

Wagenaar, H., C. Wilkinson. 2015. Enacting resilience: A performative account of governing for urban resilience. *Urban Studies* 52: 1265–1284.

Wallner-Hahn, S., M. de la Torre-Castro, J.S. Eklöf, M. Gullström, N.A. Muthiga, J. Uku. 2015. Cascade effects and sea-urchin overgrazing: An analysis of drivers behind the exploitation of sea urchin predators for management improvement. *Ocean and Coastal Management* 107: 16–27.

Wamukota, A.W., B. Crona, K. Osuka, T.M. Daw. 2015. The importance of selected individual characteristics in determining market prices for fishers and traders in Kenyan small-scale fisheries. *Society & Natural Resources* 28: 959–974.

Watts, N., W.N. Adger, P. Agnolucci, J. Blackstock, P. Byass, W. Cai, S. Chaytor, T. Colbourn, M. Collins, A. Cooper, P.M. Cox, J. Depledge, P. Drummond, P. Ekins, V. Galaz, D. Grace, H. Graham, M. Grubb, A. Haines, I. Hamilton, A. Hunter, X. Jiang, M. Li, I. Kelman, L. Liang, M. Lott, R. Lowe, Y. Luo, G. Mace, M. Maslin, M. Nilsson, T. Oreszczyn, S. Pye, T. Quinn, M. Svensdotter, S. Venevsky, K. Warner, B. Xu, J. Yang, Y. Yin, C. Yu, Q. Zhang, P. Gong, H. Montgomery, A. Costello. 2015. Health and climate change: Policy responses to protect public health. *The Lancet* 386: 1861–1914.

Weigel, B., H.C. Andersson, H.E.M. Meier, T. Blenckner, M. Snickars, E. Bonsdorff. 2015. Long-term progression and drivers of coastal zoobenthos in a changing system. *Marine Ecology Progress Series* 528: 141–159.

West, S.P., L. Schultz. 2015. Learning for resilience in the European court of human rights: Adjudication as an adaptive governance practice. *Ecology and Society* 20(1): 31.

Wiedermann, M., J.F. Donges, J. Heitzig, W. Lucht, J. Kurths. 2015. Macroscopic description of complex adaptive networks coevolving with dynamic node states. *Physical Review E – Statistical, Nonlinear, and Soft Matter Physics* 91: 052801.

### Journal articles online 2015 official publication year 2016

Angeler, D.G., C.R. Allen, C. Barichievy, T. Eason, A.S. Garmestani, N.A.J. Graham, D. Granholm, L.H. Gunderson, M. Knutson, K.L. Nash, R.J. Nelson, M. Nyström, T.L. Spanbauer, C.A. Stow, S.M. Sundstrom. Management applications of discontinuity theory. *Journal of Applied Ecology* DOI: 10.1111/1365-2664.12494.

Bai, X., S. van der Leeuw, K. O'Brien, F. Berkhout, F. Biermann, E.S. Brondizio, C. Cudennec, J. Dearing, A. Duraiappah, M. Glaser, A. Revkin, W. Steffen, J. Syvitski. Plausible and desirable futures in the Anthropocene: A new research agenda. G*lobal Environmental Change* doi:10.1016/j.gloenvcha.2015.09.017.

Baird, J., M. Jollineau, R. Plummer, J. Valenti. Exploring agricultural advice networks, beneficial management practices and water quality on the landscape: A geospatial social-ecological systems analysis. L*and Use Policy* doi:10.1016/j.landusepol.2015.11.017.

Baird, J., R. Plummer, Ö. Bodin. Collaborative governance for climate change adaptation in Canada: Experimenting with adaptive co-management. *Regional Environmental Change* doi:10.1007/s10113-015-0790-5.

Béné, C., R. Arthur, H. Norbury, E.H. Allison, M. Beveridge, S. Bush, L. Campling, W. Leschen, D. Little, D. Squires, S.H. Thilsted, M. Troell, M. Williams. Contribution of fisheries and aquaculture to food security and poverty reduction: Assessing the current evidence. *World Development* doi:10.1016/j.worlddev.2015.11.007.

Birnbaum, S. Environmental co-governance, legitimacy, and the quest for compliance: When and why is stakeholder participation desirable? *Journal of Environmental Policy & Planning* DOI:10.1080/1523908X.2015.107744.

Bull, J.W., N. Jobstvogt, A. Böhnke-Henrichs, A. Mascarenhas, N. Sitas, C. Baulcomb, C.K. Lambini, M. Rawlins, H. Baral, J. Zähringer, E. Carter-Silk, M.V. Balzan, J.O. Kenter, T. Häyhä, K. Petz, R. Koss. Strengths, weaknesses, opportunities and threats: A SWOT analysis of the ecosystem services framework. *Ecosystem Services* doi:10.1016/j.ecoser.2015.11.012.

Crona, B.I., X. Basurto, D. Squires, S. Gelcich, T.M. Daw, A. Khan, E. Havice, V. Chomo, M. Troell, E.A. Buchary, E.H. Allison. Towards a typology of interactions between small-scale fisheries and global seafood trade. *Marine Policy* doi:10.1016/j.marpol.2015.11.016.

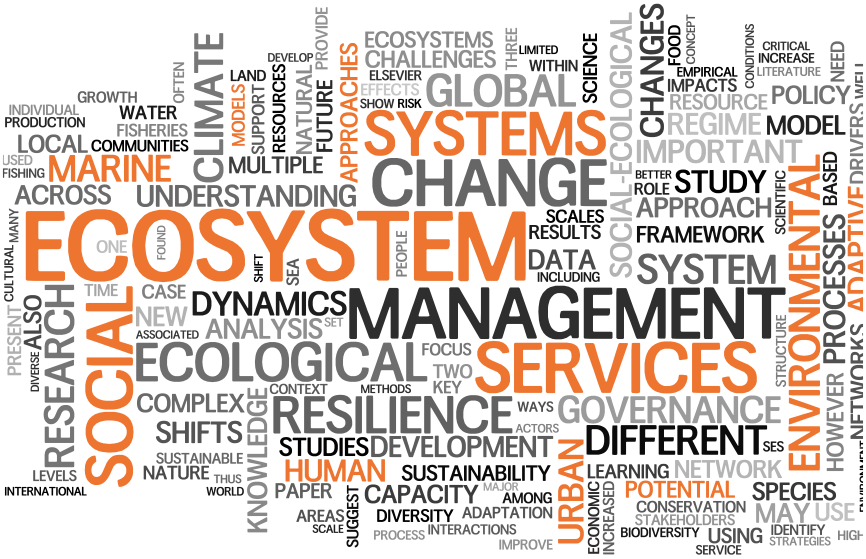
Crona, B.I., T.M. Daw, W. Swartz, A.V. Norström, M. Nyström, M. Thyresson, C. Folke, J. Hentati-Sundberg, H. Österblom, L. Deutsch, M. Troell. 2015. Masked, diluted and drowned out: How global seafood trade weakens signals from marine ecosystems. *Fish and Fisheries* DOI: 10.1111/faf.12109

Defeo, O., M. Castrejón, R. Pérez-Castañeda, J.-C. Castilla, N.L. Gutiérrez, T. Essington, C. Folke. Co-management in Latin American small-scale shellfisheries: Assessment from long-term case studies. *Fish and Fisheries* DOI: 10.1111/faf.12101.

de Loë, R.C., N. Melnychuk, D. Murray, R. Plummer. Advancing the state of policy delphi practice: A systematic review evaluating methodological evolution, innovation, and opportunities. *Technological Forecasting and Social Change* doi:10.1016/j.techfore.2015.12.009.

Dile, Y.T., L. Karlberg, P. Daggupati, R. Srinivasan, D. Wiberg, J. Rockström. Assessing the implications of water harvesting intensification on upstream-downstream ecosystem services: A case study in the Lake Tana basin. *Science of the Total Environmen*t doi:10.1016/j.scitotenv.2015.10.065

Edgar, G.J., A.E. Bates, T.J. Bird, A.H. Jones, S. Kininmonth, R.D. Stuart-Smith, T.J. Webb. New approaches to marine conservation through the scaling up of ecological data. *Annual Review of Marine Science* DOI: 10.1146/annurev-marine-122414-033921.




**Word cloud from abstracts 2015**

Eriksson, H., D.S. Adhuri, L. Adrianto, N.L. Andrew, T. Apriliani, T. Daw, L. Evans, L. Garces, E. Kamanyi, R. Mwaipopo, A.H. Purnomo, R.J. Sulu, D.J. Beare. An ecosystem approach to small-scale fisheries through participatory diagnosis in four tropical countries. *Global Environmental Change* doi:10.1016/j.gloenvcha.2015.11.005.

Griffiths, J.R., S. Hajdu, A.S. Downing, O. Hjerne, U. Larsson, M. Winder. Phytoplankton community interactions and environmental sensitivity in coastal and offshore habitats. *Oikos* DOI: 10.1111/oik.02405.

Kadin, M., O. Olsson, J. Hentati-Sundberg, E. Willerström Ehrning, T. Blenckner. Common Guillemot Uria aalge parents adjust provisioning rates to compensate for low food quality. *Ibis* DOI: 10.1111/ibi.12335

Ouedraogo, I., J. Barron, S.D. Tumbo, F.C. Kahimba. Land cover transition in northern Tanzania. *Land Degradation and Development* DOI: 10.1002/ldr.2461.

Oyanedel, R., A. Marín, J.C. Castilla, S. Gelcich. 2015. Establishing marine protected areas through bottom-up processes: Insights from two contrasting initiatives in Chile. *Aquatic Conservation: Marine and Freshwater Ecosystems* DOI: 10.1002/aqc.2546.

Pedersen, M.W., A. Kokkalis, H. Bardarson, S. Bonanomi, W.J. Boonstra, W.E. Butler, F.K. Diekert, N. Fouzai, M. Holma, R.E. Holt, K.Ø. Kvile, E. Nieminen, K.M. Ottosen, A. Richter, L.A. Rogers, G. Romagnoni, M. Snickars, A. Törnroos, B. Weigel, J.D. Whittington, P. Woods, J. Yletyinen, A.S.A. Ferreira. Trends in marine climate change research in the Nordic region since the first IPCC report. *Climatic Change* doi:10.1007/s10584-015-1536-6.

Polhill, J.G., T. Filatova, M. Schlüter, A. Voinov. Modelling systemic change in coupled socio-environmental systems. *Environmental Modelling and Software* doi:10.1016/j.envsoft.2015.10.017.

Quinlan, A.E., M. Berbés-Blázquez, L.J. Haider, G.D. Peterson. 2015. Measuring and assessing resilience: Broadening understanding through multiple disciplinary perspectives. *Journal of Applied Ecology* DOI: 10.1111/1365-2664.12550.

Schlüter, M., S. Levin, A. Tavoni. The robustness of norm-driven cooperation in the commons. *Proceedings of the Royal Society B*. DOI: 10.1098/rspb.2015.2431

Soy-Massoni, E., J. Langemeyer, D. Varga, M. Sáez, J. Pintó. The importance of ecosystem services in coastal agricultural landscapes: Case study from the Costa Brava, Catalonia. *Ecosystem Services.* doi:10.1016/j.ecoser.2015.11.004.

Takeuchi, K., K. Ichikawa, T. Elmqvist. Satoyama landscape as social–ecological system: historical changes and future perspective. *Current Opinion in Environmental Sustainability* doi:10.1016/j.cosust.2015.11.001.

Tallberg, J., L.M. Dellmuth, H. Agné, A. Duit. 2015. NGO influence in international organizations: Information, access and exchange. *British Journal of Political Science* doi.org/10.1017/S000712341500037X.

Uusitalo, L., S. Korpinen, J.H. Andersen, S. Niiranen, S. Valanko, A.-S. Heiskanen, M. Dickey-Collas. 2015. Exploring methods for predicting multiple pressures on ecosystem recovery: A case study on marine eutrophication and fisheries. *Continental Shelf Research* doi:10.1016/j.csr.2015.11.002

Verburg, P.H., J.A. Dearing, J.G. Dyke, S.V.D. Leeuw, S. Seitzinger, W. Steffen, J. Syvitski. 2015. Methods and approaches to modelling the Anthropocene. *Global Environmental Change* doi:10.1016/j.gloenvcha.2015.08.007

Weigel, B., T. Blenckner, E. Bonsdorff. Maintained functional diversity in benthic communities in spite of diverging functional identities. *Oikos* DOI: 10.1111/oik.02894

**Book chapters**

Biggs, R. (Oonsie), L.J. Gordon, C. Raudsepp-Hearne, M. Schlüter, B. Walker. 2015. Principle 3 Manage slow variables and feedbacks. In: Biggs, R., M. Schlüter, M.L. Schoon (Eds.), Principles for Building Resilience: Sustaining Ecosystem Services in Social-Ecological Systems. *Cambridge University Press,* Cambridge, UK pp. 105–141.

Biggs, R., M. Schlüter, M.L. Schoon. 2015. An introduction to the resilience approach and principles to sustain ecosystem services in social-ecological systems. In: Biggs, R., M. Schlüter, M.L. Schoon (Eds.), Principles for Building Resilience: Sustaining Ecosystem Services in Social-Ecological Systems. *Cambridge University Press,* Cambridge, UK pp. 1–31.

Schlüter, M., R. Biggs, M.L. Schoon, M.D. Robards, J.M. Anderies. 2015. Reflections on building resilience: Interactions among principles and implications for governance. In: Biggs, R. (Oonsie), M. Schlüter, M.L. Schoon (Eds.), Principles for Building Resilience: Sustaining Ecosystem Services in Social-Ecological Systems. *Cambridge University Press,* Cambridge, UK pp. 251–282.

Bohensky, E.L., L.S. Evans, J.M. Anderies, D. Biggs, C. Fabricius. 2015. Principle 4 Foster complex adaptive systems thinking. In: Biggs, R. (Oonsie), M. Schlüter, M.L. Schoon (Eds.), Principles for Building Resilience: Sustaining Ecosystem Services in Social-Ecological Systems. *Cambridge University Press,* Cambridge, UK pp. 142–173.

Cundill, G., A.M. Leitch, D. Armitage, G.D. Peterson. 2015. Principle 5 Encourage learning. In: Biggs, R., M. Schlüter, M.L. Schoon (Eds.), Principles for Building Resilience: Sustaining Ecosystem Services in Social-Ecological Systems. *Cambridge University Press,* Cambridge, UK pp. 174–200.

Dakos, V., A.E. Quinlan, A.B. Jacopo, E.M. Bennett, Ö. Bodin, S. Burnsilver. 2015. Principle 2 Manage connectivity. In: Biggs, R., M. Schlüter, M.L. Schoon (Eds.), Principles for Building Resilience: Sustaining Ecosystem Services in Social-Ecological Systems. *Cambridge University Press,* Cambridge, UK pp. 80–104.

Donner, R.V., J.F. Donges, Y. Zou, J.H. Feldhoff. 2015. Complex network analysis of recurrences. In: Webber, Jr. C., N. Marwan (Eds): Recurrence Quantification Analysis: Theory and Best Practices. *Springer International Publishing,* Berlin, Germany pp. 101–163 (2015).

Elmqvist, T., E. Gómez-Baggethun, J Langemeyer. 2015. Ecosystem services from green infrastructure in cities. In: Potschin, M., R. Haines-Young, R. Fish, R.K. Turner (Eds.), *Routledge Handbook of Ecosystem Services,* Routledge, Oxford, UK pp. 452–468.

Falkenmark, M., J. Rockström. 2015. Chapter 13: Double water blindness: Delaying Sub-Saharan green revolution. In: Clausen, A., T.J. Holmgren, K. Lexen (Eds.), Water for Development: *Charting a Water Wise Path*. SIWI, Stockholm, Sweden Vol. 35 pp. 64–69.

Galaz, V. 2015. Anthropocene and planetary boundaries. In: Pattberg, P.H. (Ed.), Encyclopedia of Global Environmental Governance and Politics. *Edward Elgar Pub,* Northampton, MA, USA pp. 3–8.

Gerger Swartling, Å., O. Wallgren, Richard J. T. Klein, J. Ulmanen, M. Dahlin. 2015. Participation and learning for climate change adaptation: A case study of the Swedish forestry sector. In: O'Brien, K.L., E. Selboe (Eds.), The Adaptive Challenge of Climate Change. *Cambridge University Press,* New York, NY pp 252–270.

Haider, L.J., B. Strassburg, A. Iribarrem, T. Gardner, A. Latawiec, H. Alves-Pinto. 2015. Understanding indicators and monitoring for sustainability in the context of complex social-ecological systems. In: Latawiec, A.E., D. Agol (Eds.), Sustainability Indicators in Practice. *De Gruyter,* Boston, MA, USA pp. 23–36.

Humborg, C., H.E. Andersen, T. Blenckner, M. Gadegast, R. Giesler, J. Hartmann, G. Hugelius, J. Hürdler, P. Kortelainen, G. Blicher-Mathiesen, M. Venohr, G. Weyhenmeyer. 2015. Environmental impacts: Freshwater biogeochemistry. In: The BACC II Author Team (Eds.), Second Assessment of Climate Change for the Baltic Sea Basin. *Springer International Publishing,* Berlin, Germany pp 307–336.

Kotschy, K., R. Biggs, T.M. Daw, C. Folke, P.C. West. 2015. Principle 1 Maintain diversity and redundancy. In: Biggs, R., M. Schlüter, M.L. Schoon (Eds.), Principles for Building Resilience: Sustaining Ecosystem Services in Social-Ecological Systems. *Cambridge University Press,* Cambridge, UK pp. 50–79.

Kurpiers, L.A., B. Schulte-Herbrüggen, I. Ejotre, D.M. Reeder. 2015. Bushmeat and emerging infectious diseases: Lessons from Africa. In: Angelici, F.A. (Ed.), Problematic Wildlife: A Cross-Disciplinary Approach. *Springer International Publishing,* New York, USA pp. 507– 551.

Leitch, A.M., G. Cundill, L. Schultz, C.L. Meek. 2015. Principle 6 Broaden participation. In: Biggs, R., M. Schlüter, M.L. Schoon (Eds.), Principles for Building Resilience: Sustaining Ecosystem Services in Social-Ecological Systems. *Cambridge University Press,* Cambridge, UK pp. 201– 225.

Odom Green, O., L. Schultz, M. Nekoro, A.S. Garmestani. 2015. The role of bridging organizations in enhancing ecosystem services and facilitating adaptive management of social-ecological systems. In: Allen, C.R., A.S. Garmestani (Eds.), Adaptive Management of Social-Ecological Systems. *Springer Netherlands, Dordrecht,* Netherlands pp. 107–122.

Österblom, H., Ö. Bodin, A.J. Press, U.R. Sumaila. 2015. The high seas and IUU (Illegal, Unregulated, Unreported) fishing. In: Smith, H.D., J.L. Suárez de Vivero, T.S. Agardy (Eds), Routledge Handbook of Ocean Resources and Management. *Routledge, Abingdon, Oxon,* UK pp 232–240.

Schoon, M.L., M.D. Robards, K. Brown, N. Engle, C.L. Meek, R. Biggs. 2015. Politics and the resilience of ecosystem services. In: Biggs, R. (Oonsie), M. Schlüter, M.L. Schoon (Eds.), Principles for Building Resilience: Sustaining Ecosystem Services in Social-Ecological Systems. *Cambridge University Press,* Cambridge, UK pp. 32–49.

Schoon, M.L., M.D. Robards, C.L. Meek, V. Galaz. 2015. Principle 7 Promote polycentric governance systems. In: Biggs, R., M. Schlüter, M.L. Schoon (Eds.), Principles for Building Resilience: Sustaining Ecosystem Services in Social-Ecological Systems. Cambridge University Press, Cambridge, UK pp. 226–250.

Svedin, U. 2015. Challenges for planetary stewardship at the entry of the period of the Anthropocene. In: W. Leal Filho, W., A. Ubelis, D. Berzina (Eds.), Sustainable Development, Knowledge Society and Smart Future Manufacturing Technologies, World Sustainability Series, *Springer International Publishing,* Zurich, Switzerland pp 3–18.

Svedin U. 2015. Urban development and the environmental challenges: "Green" systems considerations for the EU. In: W. Leal Filho, W., A. Ubelis, D. Berzina (Eds.), Sustainable Development, Knowledge Society and Smart Future Manufacturing Technologies, World Sustainability Series, *Springer International Publishing,* Zurich, Switzerland pp. 81–112.

Viitasalo, M. T. Blenckner, A. Gårdmark, H. Kaartokallio, L. Kautsky, H. Kuosa, M. Lindegren, A. Norkko, K. Olli, J. Wikner J. 2015. Environmental impacts: Marine ecosystems. In: The BACC II Author Team (Eds.), Second Assessment of Climate Change for the Baltic Sea Basin. *Springer International Publishing,* Berlin, Germany pp 363–380.

**Policy, Practice, Commentaries and Outreach publications**

Andersson, E., C. Adams, J. Kronenberg, D. Haase. 2015. Cash flows generated by urban green spaces – Methods for identifying indirect values of UGI. *Green Surge Deliverable* 4.2.

Andersson, E., C. Adams, J. Kronenberg, R. Cvejic. 2015. Integrating green infrastructure ecosystem services into real economies. *Green Surge Deliverable* 4.1.

Baptiste, B., J. Carabias, S. Hatfield-Dodds, C. Ituarte-Lima, U. Pascual, I. Ring (coordinating authors) J. Ram Adhikari, M. Andriamahefazafy, S. Arora, G. Erpul, M. Mokhtar Ali Fouda, M. George, H. Hendriks, T. Kluvankova, C. Maretti, E. Munyeneh, R. Oliva, R. Ongugo, G. Pataki, A. Tezer, C.I. Zambrana-Flores. 2015. Definition and typology of policy support tools and methodologies in the context of IPBES. In: Progress report on the catalogue of policy support tools and methodologies (deliverable 4(c)), *Information Document IPBES/4/INF/14 for the 4th session of the Plenary of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services,* Kuala Lumpur.

Berg, C., (ordf. Axel Johnson), T. Puusepp (koncernchef Elekta), H. Vestberg (koncernchef Ericsson), G. Mårder (vd Företagarna), K.-J. Persson (koncernchef H&M Group), P. Strömberg (vd ICA Gruppen), S. Gunolf (vd Indiska), L. Appelqvist (vd Löfbergs), S. Campbell (vd Ratos), P. Hallberg (koncernchef Scania), A. Falkengren (koncernchef SEB), S. Hansén (vd SPP), A. Ryott (vd Swedfund), M. Gerger (koncernchef Systembolaget), A. Kirkby (vd Tele2 Group), N. Gustafsson (Chief Sustainability Officer Volvo Group), C. Petri Gornitzka (Generaldirektör Sida), J. Kuylenstierna (Executive Director Stockholm Environment Institute), T. Holmgren (Executive Director Stockholm International Water Institute), J. Rockström (Director Stockholm Resilience Centre). 2015. Vi lovar göra miljön till kärnverksamhet. *Dagens Industri Debatt.* 2015-10-14.

Bjereld, U., H. Flam, B. Frank, P. Holmgren A. Jackelén, J. Kuylenstierna, A. Lindbeck, J. Rockström, A. Wijkman. 2015. Löfven måste ta ställning mot start av nya kolgruvor. *Dagens Nyheter Debatt.* 2015-11-24.

Colding, J. 2015. Stärkt hållbarhet, sid 25–32 in Sju perspektiv på hållbar utveckling. Arbetsmaterial 2015:1, Uppdragsbeskrivning för forskar- och expertinsats i delprojekt Stärkt hållbarhet, programarbete för en ny RUFS. *Tillväxt- och regionalplaneförvaltningen, Stockholms Läns Landsting.*

Crona, B. 2015. Have the oceans reached a tipping point? *World Economic Forum.* 2015-09-22.

Demaio, A.R., J. Rockström. 2015. Human and planetary health: Towards a common language. *The Lancet* 386(10007): e36 – e37.

Falkenmark, M. 2015. Blind spots delay sub-Saharan struggle for water security. WaterFront 2015, nr 3, *Stockholm International Water Institute,* Stockholm.

Folke, C. 2015. Om biosfären, människan, och konsten. S*apir Magazine.* 2014-04-16.

Gaffney, O. 2015. Twenty-four charts every leader should see. *World Economic Forum.* 2015-01-22.

Gaffney, O., D. Young. 2015. How can we make people care about sustainability? *World Economic Forum.* 2015-03-09.

Gaffney, O. 2015. Walking the Anthropocene. *Out of Eden Walk.* 2015-03-16.

Gaffney, O. 2015. Is equality a foundation for global sustainability? *Huffington Post.* 2015-06-29.

Gaffney, O. 2015. Go large: The power of exponential thinking. *Huffington Post.* 2015-07-31.

Gaffney, O. 2015. Ten facts about the Sustainable Development Goals. *World Economic Forum.* 2015-09-16.

Gaffney, O. 2015. Rebels with a cause. *Huffington Post.* 2015-12-03.

Gaffney, O. 2015. Earth to Paris. *Huffington Post.* 2015-12-10.

Galaz, V. 2015. Preparing for zoonotic surprise. *Lancet Global Health.* 2015-03-31.

Galaz, V. 2015. Vi kan ännu väcka dom goda klimatjättarna. Svenska Dagbladet, Under Strecket, *Kultur.* 2015-11-29.

Galaz, V. 2015. A manifesto for algorithms in the environment. *The Guardian.* 2015-10-05.

Gerten, D., J. Rockström, J. Heinke, W. Steffen, K. Richardson, S. Cornell. 2015. Response to comment on 'Planetary boundaries: Guiding human development on a changing planet'. *Science* 348(6240): 1217–d.

Gordon, L., L. Wang-Erlandsson, P. Keys. 2015. Six invisible global water issues. *World Economic Forum.* 2015-09-18.

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**Staff enjoying some time off during the annual retreat at Stora Karlsö**


Haider, L.J., F. van Oudenhoven. 2015. Seeds and Ideas: Food as a method in development practice. T*hought for Food Hivos & Oxfam Novib*.

Henriksson, P.J.G., M. Troell, A. Rico. 2015. Antimicrobial use in aquaculture: Some complementing facts. *Proceedings of the National Academy of Sciences* USA 112: E3317.

Kapoor, R., J. Rockström, K. Sall, F. Sijbesma. 2015. The long march to Paris. *Project Syndicate*. 2015-11-30.

Karp, D.S., C.D. Mendenhall, E. Callaway, L.O. Frishkoff, P.M. Kareivab, P.R. Ehrlich, G.C. Daily. 2015. Reply to Kirchhoff: Homogenous and mutually exclusive conservation typologies are neither possible nor desirable. *Proceedings of the National Academy of Sciences* USA 112: E5906.

Kuylenstierna, J., J. Rockström. 2015. FN's mål är universella. Svenska Dagbladet Debatt, *Replik*. 2015-08-24.

Lindahl, T. 2015. Beteendevetenskap och miljöekonomi. Kapitel i boken Nationalekonomi för miljöintresserade (red Ulrika Stavlöt), *Ivrig förlag*.

Lindahl, T., B. Stikvoort. 2015. Nudging: The new black in environmental policy. *Fores Study* 2015:3. Stockholm, Sweden.

Norström, A. 2015. This goal is key to the whole development agenda. *World Economic Forum*. 2015-09-25.

Rockström, J. 2015. Nine ways to pull our planet back from the brink. *World Economic Forum*. 2015-01-19.

Rockström, J. 2015. New hope to avert catastrophe. *World Economic Forum*. 2015-01-22.

Rockström, J. 2015. An American plate that is palatable for human and planetary health. *Huffington Post*. 2015-03-26.

Rockström, J. 2015. We have three chances to change the world for the better in 2015. *Guardian*. 2015-04-14.

Rockström, J. 2015. Pushing Earth beyond its natural limits: In pictures. *Guardian*. 2015-04-14.

Rockström, J. 2015. An Earth Year. *Project Syndicate*. 2015-04-22.

Rockström, J. 2015. Planetary boundaries and human prosperity. *Project Syndicate*. 2015-04-28.

Rockström, J. 2015. The catastrophe narratives for humanity are wrong: Here's why. *Huffington Post*. 2015-05-13.

Rockström, J. 2015. The climate Pope. *Project Syndicate*. 2015-06-19.

Rockström, J. 2015. Can the climate Pope save the planet? *Huffington Post*. 2015-06-22.

Rockström, J. 2015. Arctic tipping points can ripple around the world. *Huffington Post*. 2015-09-14.

Rockström, J. 2015. Leaving our children nothing. *Project Syndicate*. 2015-09-11.

Rockström, J. 2015. Will some countries be 100% renewable by 2030? W*orld Economic Forum*. 2015-09-25.

Rockström, J. 2015. A 'perfect' agreement in Paris is not essential. *Nature* 527: 411.

Rockström, J. 2015. The planet's future is in the balance. *Guardian*. 2015-11-14.

Rockström, J. 2015. Mötet är vår sista chans. *Aftonbladet. Debatt*, 2015-11-30.

Rockström, J. 2015. Vi har ett ansvar mot omvärlden att ställa om. *Expressen*. 2015-11-30.

Rockström, J. 2015. The carbon budget for the rest of humanity's time on Earth. *Huffington Post*. 2015-12-04.

Rockström, J. 2015. Nästa år går vi från ord till handling. *Dagens Nyheter, Kultur*. 2015-12-12.

Rockström, J., P. Bakker. 2015. We have a plan for our planet. *Huffington Post*. 2015-10-03.

Rockström, J., M. Klum. 2015. Big World, Small Planet: Abundance within Planetary Boundaries. *Bokförlaget Max Ström*, Stockholm.

Rockström, J., P.O. Sjöö, P. Stoltz, A. Wijkman. 2015. Omställningen måste ses som en investering. *Dagens Nyheter Debatt*. 2015-07-02.

Rockström, J., T. Sterner, L. Zetterberg, M. Wråke. 2015. Sveriges koldioxiddebatt är en förebild. *Svenska Dagbladet Debatt*. 2015-12-29.

Selvin Pérez, E., M. Schultz. 2015. Co-chairs summary Dialogue Workshop on Assessment of Collective Action in Biodiversity Conservation, Panajachel, Guatemala 11-13 June 2015. *Secretariat of the Convention on Biological Diversity*, Montreal, Canada.

Steffen, W. 2015. Climate change may be worse than we think. *World Economic Forum*. 2015-09-22.

Steffen, W. 2015. Michael Raupach (1950-2015). *Nature Climate Change* 5: 296–296.

Sundin, A., C. Folke, F. Moberg, A. Wall. 2015. Patterns of the Biosphere (Biosfärens mönster). Exhibition catalogue. S*venskt Tenn and the Beijer Institute*, Stockholm.

**Erratum:**
Anderies, J.M., S.R. Carpenter, W. Steffen, J. Rockström. 2015. The topology of non-linear global carbon dynamics: from tipping points to planetary boundaries (vol 8, 044048, 2013). *Environmental Research Letters* 10(6): 069501.

# Centre staff

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Carl Folke, *Science director*
Olof Olsson, *Managing director*
Victor Galaz, *Deputy science director*
Line Gordon, *Deputy director and Deputy science director*
Henrik Österblom, *Deputy science director*

**Administration**
Astrid Auraldsson, *Coordinator to executive director*
Bengt Hall, *IT-support*
Gunnar Jacobsson, *IT-support*
Therese La Monde, *Office & financial administrator*
Christina Leijonhuvud, *Affiliated administrator*
Cecilia Linder, *Human resources*
Tanja Litvinova, *Financial & HR officer*
Emina Muratspahic, *Head of administration*
Henrik Pompeius, *Fundraiser*
Maria Schewenius, *Project coordinator*
Wenche Starck-Wistrand, *Project controller*
Agneta Sundin, *Affiliated administrator*

**Practice, Policy and Communication**
Anna Emmelin, *Communication strategist*
Owen Gaffney, *Director international media and strategy*
Marika Haeggman, *Communication officer*
Sturle Hauge Simonsen, *Head of communication*
Louise Hård af Segerstad, *Communication strategist*
Helene Karlsson, *Communication officer*
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Fredrik Moberg, *Senior strategic advisor*
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Örjan Bodin, *Senior lecturer*

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Pernilla Malmer, *Senior advisor*
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Maria Schultz, *Director*
Hanna Wetterstrand, *Advisor*

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Siv Ericsdotter, *Head of secretariat*

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Miriam Huitric, *Programme director*
Cornelia Ludwig, *Education coordinator*

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**Landscapes**
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Malin Falkenmark, *Affiliated senior researcher*
Line Gordon, *Senior researcher (Deputy science director)*
Anna Helgeson, *PhD student*
Louise Karlberg, *Affiliated researcher*
Patrick Keys, *PhD student*
Steven Lade, *Postdoc*
Emelie Lindqvist, *PhD student*
Rebecka Malinga, *PhD student*
Katja Malmborg, *Research assistant*
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Kirill Orach, *Project assistant*
Cibele Queiroz, *Postdoc*
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Gustav Engström, *Researcher*
Matteo Giusti, *PhD student*
Julie Goodness, *PhD student*
Marnie Graham, *PhD student*
Åsa Green, *Affiliated researcher*
Joshua Lewis, *PhD student*
Nikolina Orescovic, *Research assistant*
Jeff Ranara, *PhD student*
Magnus Tuvendal, *Research assistant*

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Beatrice Crona, *Senior researcher*
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Lisa Dellmuth, *Researcher*
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Jonas Hentati Sundberg, *PhD student*
Patrik Henriksson, *Postdoc*
Jean-Baptiste Jouffray, *PhD student*
Martina Kadin, *Postdoc*
Andres Marin, *PhD student*
Andrew Merrie, *PhD student*
Susa Niiranen, *Postdoc*
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Matilda Thyresson, *Postdoc*
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Matilda Valman, *PhD student*
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Henrik Österblom, *Senior lecturer (Deputy science director)*

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Maike Hamann, *PhD student*
Daniel Ospina, *PhD student*
Garry Peterson, *Professor*
Juan Carlos Rocha Gordo, *PhD student*

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Stephan Daume, *Project assistant*
Andrea Downing, *Researcher*
Ingo Fetzer, *Researcher*
Tiina Häyhä, *Postdoc*
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My Svensdotter, *Project assistant*
Sverker Sörlin, *Affiliated senior researcher*
Brian Walker, *Affiliated senior researcher*
Claudia Ituarte Lima, *Researcher*

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Diego Galafassi, *PhD student*
Thomas Hahn, *Researcher*
Stuart Kininmonth, *Postdoc*
Cecilia Lundholm, *Affiliated senior researcher*
Maria Mancilla, *Postdoc*
Vanessa Masterson, *PhD student*
Helen Moor, *PhD student*
Björn Nyqvist, *Postdoc*
Jon Norberg, *Professor*
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Åsa Gerger Swartling
Tracy van Holt

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Johanna Yletyinen, *PhD student (SRC staff)*
Supervisor: Thorsten Blenckner

## *PhD profile: Juan Carlos Rocha*

**CENTRE PHD STUDENT JUAN CARLOS ROCHA** looks at the main drivers of regime shifts, or abrupt and persistent reconfiguration of ecosystem's structure and function. While scientist believe that such phenomena could become more common and severe in the near future, little is known about the patterns of regime shifts' causes and consequences for human well-being. Juan's work aims to assess global patterns of such regime shifts. A framework for comparing regime shifts has been developed as well as a public forum for discussing knowledge about regime shifts, namely the regime shift database. Juan hopes his results offer useful guidance for managers and policy makers on how to prioritize drivers or impacts of regime shifts. That means bringing back multi-causality to the scientific debate:

"One take home message is that well-understood variables are not necessary the ones where most managerial efforts need to be taken. When doing theoretical or empirical work, our methods tend to ignore the multi-causal nature of regime shifts," he says.

# Visiting reseachers

### Amelie Dupraz-Ardiot
Scientific Officer, Swiss Federal Office for the Environment, Switzerland
November 2014–February 2015

### Joung Hun Lee
Assistant professor, Kyushu University, Japan
16–23 January

### Catrin Ciemer
PhD student, Potsdam Institue for Climate Impact Research (PIK), Germany
29 Jan–6 February

### Delphine Zemp
PhD fellowship, Potsdam Institute for Climate Impact Research (PIK), Germany & Brazilian National Institute for Space Research (INPE) and the University of São Paulo (USP), Brazil
29 Jan–6 February

### Laura Elsler
Master's student, University of Graz, Austria
1 February–5 March

### Brent Loken
Founder, Integrated Conservation
2 March–31 October

### Christopher Ives
Postdoc, Leuphana University, Germany.
20 April–9 October

### Jonathan F. Donges
Joint Post-Doc, Stordalen Scholar and EarthDoc, Potsdam-Institute for Climate Impact Research (PIK) Germany and Stockholm Resilience Centre.
10 May–13 June

### Angela Cristina Lomba
Post- Doc Research Center In Biodiversity and Genetic Resources (CIBIO.), Portugal
17 May–21 May

### Ralf Seppelt
Professor, Helmholtz-Centre for Environmental Research. Germany
27 May–31 May

### Pascal Thoya
Researcher, Kenya Marine and Fisheries Research Institute, Kenya
15 June–14 July

### Jesse Lambrecht
Voluntary researcher, Centre for Environmental and Energy Law, Ghent University, Belgium
6 July–29 August

### Kensuke Fukushi
Professor, Integrated Research System for Sustainability Science (IR3S), The University of Tokyo, Japan
8 August–24 August

### Cristina Quintas Soriano
PhD student, University of Almería, Andalusian Center for the Assessment and Monitoring of Global Change, Spain
15 August–15 November

### Monica Suskevics
Post-Doc, Stockholm Resilience Centre, funded by the Swedish Institute.
1 September–31 August 2016

### Antoine Libert Amico
PhD student, Universidad Autónoma Metropolitana (UAM) Xochimilco, Mexico
15 September–15 December

### Joshua Stoll
PhD student, School of Marine Sciences at the University of Maine, United States
2 October–22 October

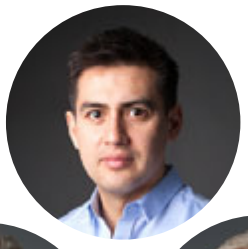
### Luis-Bernardo Varquez
Researcher, Colegio de la Frontera Sur (ECOSUR), Mexico
15 November–26 November

### Ancia Cornelius
Master's student. North-West University, South Africa
11 November–31 December

### Deborah Goffner
Research director, French National Centre for Scientific Research (CNRS), France
2013–2016

# Reinforcements to SRC leadership

**IN 2015, VICTOR GALAZ**, Associate Professor and Senior Lecturer in political science, joined Line Gordon and Henrik Österblom as deputy science directors. Galaz will help with strategic leadership and support for researchers and the communications team. This new position is part of a bigger re-organisation of the centre leadership group. The three deputy science directors will from 2016 take on a more extensive responsibility for the research staff of the organisation. They will become the focal point for all researchers and help create a more dynamic and closer connection between the centre leadership, researchers, the administration team and the communications team. The new deputy science directors will also look at ways to improve the current research theme organization and internal communication.



Victor Galaz

Line Gordon

Henrik Österblom


# SRC in brief

Get a quick and easy overview of who we are and what we do or watch the video on our website.