BIODIVERSITY CONVENTION

From Science to Implementation

26.06.2023 - 29.06.2023
Monte Verità, Ascona,
Switzerland

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SCHEDULE

Sunday 25.06			
Registration and Check in			**from 15:00**

Monday 26.06			
Breakfast			**7:00**
Registrations			**11:00**
Lunch break - Sala Luce dining hall			**12:00**
Welcome	Irene Schmidli	*CSF & Monte Verità welcome address*	**13:00**
Opening statement	Prof. Dr. Florian Altermatt		**13:15**
Nature/Culture panel - Auditorium		**Chairs: Dr. Mollie Chapman, Kilian Perrelet**	
Plenary	Prof. Dr. Christopher Schell	*Biodiversity for the people: Conserving species through collective action and justice*	**13:30**
Presentations	Prof. Dr. Gladman Thondhlana	*Re-imagining culture-nature relations for biodiversity conservation: evidence and challenges*	**14:15**
Global Q&A			**14:25**
Presentations	Felicia Lamanuzzi	*VIVAI DIFFUSI*	**14:40**
	Dr. Annina Helena Michel	*Exploring the role of memories in nature's meanings*	**14:50**
	Dr. Mollie Chapman	*Caring for nature but not like a conservationist*	**15:00**
Global Q&A			**15:10**
Coffee break - Spazio Roccia and Balint Room's terrace			**15:30**
Discussions/Science café (in parallel)	Dr. Janine Bolliger	*Implementing blue-green infrastructure to enhance biodiversity using social- ecological networks (SEN): potential and challenges* - **Eranos room**	**16:00**
	Prof. Dr. Meredith Christine Schuman	*"Genes from Space" - leveraging earth observation technologies to monitor essential genetic diversity* - **Von der Heydt room**	**16:00**
	Kilian Perrelet	*A framework to study blue-green linkages: from process ecology and conservation to interdisciplinarity and challenges* (Part 1) - **Mandala room**	**16:00**
	Dr. Ian McFadden	*Building mechanistic models to forecast and protect biodiversity dynamics in terrestrial and freshwater ecosystems* (Part 1) - **Pioda room**	**16:00**
Ice-breaker, Speed science			**18:00**
Dinner - Sala Luce dining hall			**19:00**

SCHEDULE

Tuesday 27.06			
Breakfast			7:00
Science/Policy panel - Auditorium		**Chairs: Dr. Roger Keller, Dr. Annina Michel**	
Plenary	Dr. Raffael Ayé	*Relevancy of science for biodiversity policy*	8:30
Presentations	Dr. Giulia Donati	*Social-ecological networks to enhance blue-green biodiversity in human dominated landscapes*	9:15
	Dr. Roger Keller	*Science-policy-interface: Experiences from the ongoing ValPar.CH-project on Ecological Infrastructures in Switzerland*	9:25
	Dr. Sierra Deutsch	*Transdisciplinary transformative change: An analysis of some best practices and barriers, and the potential of critical social science in getting us there*	9:35
	Dr. Jean-Yves Humbert	*The conservation of farmland biodiversity - from science to implementation*	9:45
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Coffee break - Spazio Roccia and Balint Room's terrace			10:20
Presentations	Dr. Johan Früh	*Planning for the minimization of conflict between biodiversity conservation and local recreation*	10:50
	Dr. Eva Spehn	*Communicating Science in Factsheets and Policy Briefs*	11:00
	Gregor Lichtenthäler	*Biodiversity conservation policy in Switzerland: Minimizing trade-offs with energy production considering legal frameworks*	11:10
	Dr. Helena Bergallo	*The Program for Biodiversity Research (PPBio): The Brazilian strategy to expand knowledge on biodiversity*	11:15
Global Q&A			11:25
Lunch break - Sala Luce dining hall			12:00

SCHEDULE

Tuesday 27.06			
Lunch break			12:00
Global change/Mitigation panel - Auditorium		**Chairs: Dr. Maarten Eppinga, Valentin Moser**	
Plenary	Prof. Dr. Aliny Pires	*Integrating biodiversity and climate change agendas toward a sustainable future*	13:00
Presentations	Dr. Shyamolina Ghosh	*Temperature change and biodiversity influence community stability differently in birds and fishes*	13:45
	Dr. Sofia van Moorsel	*Intraspecific trait and genetic variation of beech seedlings (Fagus sylvatica) in a common garden experiment*	13:55
	Dr. Alizée Le Moigne	*Methanotrophy in Arctic shallow ponds*	14:00
	Susanna Hempel	*Combined effects of land use change and climate change on alpine plant-invertebrate communities*	14:05
	Dr. Yasuhiro Sato	*Genome-wide neighbor effects predict genotype pairs reducing herbivory in mixed planting*	14:10
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Coffee break - Spazio Roccia and Balint Room's terrace			14:45
Indigenous/Western Knowledge Systems panel - Auditorium		**Chairs: Dr. Mollie Chapman, Dr. Sierra Deutsch**	
Plenary	Dr. Tania Martinez Cruz	*TBA*	15:15
Presentation	Vigilant Woforodo	*Ethno-ornithological Knowledge, Perception and Uses of Necrosyrtes monacus (Hooded Vulture), in Port Harcourt City Local Government Area (PHALGA), Rivers State.*	16:00
Short discussion	Dr. Mollie Chapman	*Weaving Indigenous Peoples' Knowledge and scientific knowledge for diversified solutions.*	16:10
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Discussions/Science café (in parallel)	Dr. Roger Keller	*Challenges and barriers for the science-policy-practice interface: How can we overcome them?* **- Eranos room**	16:50
	Heng Zhang	*Aquatic biodiversity monitoring and modelling for practical conservation* **- Von der Heydt room**	16:50
	Kilian Perrelet	*A framework to study blue-green linkages: from process ecology and conservation to interdisciplinarity and challenges* (Part 2) **- Mandala room**	16:50
	Dr. Ian McFadden	*Building mechanistic models to forecast and protect biodiversity dynamics in terrestrial and freshwater ecosystems* (Part 2) **- Pioda room**	16:50
Dinner - Sala Luce dining hall			19:00
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Wednesday 28.06			
Breakfast			7:00
Ecosystem interfaces/Functioning panel - Auditorium		**Chairs: Dr. Rosetta Blackman, Heng Zhang**	
Plenary	Prof. Dr. Ralf Schäfer	*Crossing boundaries - Stressors at the aquatic-terrestrial interface*	8:30
Sub-panel I. Environmental DNA in ecology		**Chairs: Dr. Rosetta Blackman, Heng Zhang**	
Presentations	Kilian Perrelet	*Environmental DNA uncovers aquatic and terrestrial arthropod community structure in the urban environment*	9:15
	Dr. Luca Carraro	*Coupled biological and hydrological processes shape spatial food-web structures in riverine metacommunities*	9:25
	Heng Zhang	*A spatial fingerprint of land-water linkage of biodiversity uncovered by remote sensing and environmental DNA*	9:35
	Yan Zhang	*Global Meta-analysis of riverine fish eDNA and Associations with drainage characteristics*	9:45
	Dr. Rosetta Blackman	*Microbial diversity and function in river networks*	9:55
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Sub-panel II. Litter decomposition and breakdown		**Chairs: Dr. Sofia van Moorsel, Bastiaan Drost**	
Presentations	Rebecca Oester	*Trophic interactions in streams are linked to riparian forests*	10:40
	Dr. Paula Munhoz de Omena	*Upstream and downstream buffer capacity of riparian vegetation*	10:50
	Dr. Larissa Corteletti da Costa	*An overview of the role of freshwater crabs and shrimp on leaf decomposition in Atlantic Forest streams (SE, Brazil)*	11:00
	Bastiaan Drost	*The effects of macro- and microclimate and forest management on leaf litter decomposition in blue-green habitats*	11:05
	Dr. Maja Ilić	*Leaf litter decomposition in tree holes depends on water availability and macroclimate*	11:15
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Sub-panel III. Theoretical ecology and Ecosystem engineering		**Chairs: Dr. Sofia van Moorsel, Bastiaan Drost**	
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	Dr. Ian McFadden	*Linking human impacts to community processes in terrestrial and freshwater ecosystems*	11:40
	Dr. Tural Aliyev	*Urban Transition in Baku: Analysis for possible Introduction of Large-scale Blue-Green Territorial Planning Project*	11:50
	Valentin Moser	*Species interactions in beaver engineered habitats link land-water ecosystem processes*	12:00
	Grégoire Saboret	*The diversity of species functionality: case study with arctic char in Greenland*	12:10
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Lunch break - Sala Luce dining hall			12:30

SCHEDULE

Wednesday 28.06			
Lunch			12:30
Sub-panel IV. Monitoring and Management		**Chairs: Dr. Maja Ilić, Mara Knüsel**	
Presentations	Dr. Nyimale Grace Alawa	*Blue-Green Biodiversity and the circular Economy*	13:30
	Nargiz Safaraliyeva	*Estimating Biomass in Alpine Grasslands using Multi-Year Imaging Spectroscopy Data*	13:40
	Mara Knüsel	*Using citizen science data to model the distribution and diversity of groundwater amphipods*	13:50
	Dr. Leonardo Capitani	*The role of habitat to mitigate fish weight reduction in a tropical impounded river*	14:00
	Georges Alex Agonvonon	*Tree communities conservation in forest patches of Benin, West Africa*	14:05
	Nicole Manser	*Benchmarking lidar and image based close-range remote sensing to estimate forest structure parameters in a temperate forest*	14:15
Global Q&A			14:25
Coffee break - Spazio Roccia and Balint Room's terrace			14:40
Natural processes/Human management panel - Auditorium		**Chairs: Dr. Maja Ilić, Kilian Perrelet**	
Plenary	Prof. Dr. Clara Zemp	*Restoring tropical agroecosystems for people and nature*	15:10
Presentations	Dr. Perpetra Akite	*Spatial and matrix influences on the long-term persistence of insect fauna in forest fragments in central Uganda*	15:55
	Dr. Madlen Stange	*Stocking of Phoxinus spp. in North-Rhine Westphalia*	16:05
	Daniella Schweizer	*Evaluation of smartphone apps technology for monitoring forest restoration*	16:15
	Marius Fankhauser	*Local acceptance of river restorations - what is the source?*	16:20
	Giulia Casciano	*Urban green areas and biodiversity in cities. A structural typology and a multi-species approach.*	16:30
	Dr. Katrin Pakizer	*Greening the city: Analyzing the social networks behind urban green area management in Switzerland*	16:40
	Dr. Maarten Eppinga	*Biodiversity dynamics as a driver of social-ecological system transitions*	16:45
Global Q&A			16:50
Closing remarks	Prof. Dr. Maria J. Santos		17:15
Dinner - Sala Luce dining hall			19:00
Outreach event - Auditorium	Round table	*Co-abitazione uomo e natura - Sviluppo sostenibile del territorio: Illusione o obiettivo realista?*	20:30

Thursday 29.06			
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Excursion		*The renaturation of the Ticino River*	08:30 - 12:00

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Agonvonon, Georges Alex

Collaborator: Chinwe Ifejika Speranza

Affiliation: University of Bern, Institute of Geography, Bern, Switzerland

Panel: Ecosystem interfaces/functioning

Tree communities conservation in forest patches of Benin, West Africa (10min presentation)

The conservation of tree communities in forest ecosystems across the world is challenged by various anthropogenic pressures such as deforestation and fragmentation. In many areas in West Africa, fragmentation has reduced the original continuous forest ecosystems to small and isolated forest patches, mostly managed by local communities. While the importance of such small patches in biodiversity conservation is recognized in literature, evidence from tropical forest ecosystems and plant-based studies are still limited. In our study, we (i) assessed the contribution of small, unprotected forest patches to tree species conservation; (ii) determined the variation of seed dispersal syndromes in tree stands between a continuous forest and small forest patches; and (iii) identified the drivers of tree species colonization among forest patches. We sampled 69 plots in a continuous forest and surrounding small isolated forest patches within 20-km radius. Trees and natural regenerations were recorded as well as their functional traits including dispersal syndrome, seed weight and maximum height. We used Generalized Linear Models to identify the determinants of immigrant regeneration densities in isolated forest patches. In total, 103 woody species were recorded and the species richness was higher in the forest patches than in the continuous forest. Tree assemblages differed between the continuous forest and the forest patches and tree density was higher in the continuous forest than in small forest patches. Defaunation somewhat affected the regeneration of disturbed forest patches as germination and seedling were dominated by abiotic-dispersed species and local species. Taller or heavier seed species were more likely to colonize forest patches and the density of tree species in a forest patch increased with abundance of immigrant regeneration in the nearest neighbor. We recommend the implementation of sustainable management in form of participative restoration of forest remnants where ecosystem functions were impaired, which remain important for biodiversity conservation.

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Dr. Akite Perpetra

Affiliation: Makere University, Zoology, entomology and Fisheries science, Uganda

Panel: Natural processes/Human management

Spatial and matrix influences on the long-term persistence of insect fauna in forest fragments in central Uganda (10min presentation)

How best to manage forest patches, mitigate the consequences of forest fragmentation, and enable landscape permeability are key questions facing conservation scientists and managers. As tropical forests become increasingly fragmented, there is a reduction in interior forest habitats, increase in edge habitats, and reduction in connectivity. Consequently, it has become increasingly apparent that understanding how species are affected by fragmentation requires information on their responses to all components of the landscape, i.e. forest patches, remaining continuous forest, and the intervening matrix. However, very little is known of how faunal communities and in particular insect assemblages utilize resources within the patch-matrix landscape. The subsequent impact of forest fragmentation on species turnover across spatial and temporal scales also remains largely unclear. We assessed patterns of diversity of three insect taxa and their relation to habitat heterogeneity, disturbance gradient and how anthropogenic impacts may be altering these patterns. A combination of butterflies, moths and grasshoppers were studied as model indicators to describe patterns of diversity and distribution across the temporal, vertical and spatial scales in three forest reserves; Mabira (largely stable and recovering from past encroachment, albeit with minor illegal logging, but disturbed at the edges), Zika and Mpanga (relatively undisturbed and unchanged internally, but with substantially altered matrix), all in central. Overall, there was a marked decline in richness and abundance of species over time, even within relatively stable forests. The temporal decline was most drastic for forest-dependent species, while generalist species mostly showed the reverse trend. This change was more evident in the smallest Zika forest. This study also recorded a general decline in richness and abundance of species along a land-use gradient from mature forest to home gardens, with forest specialist species showing severe declines, and several species only restricted to the mature forests. The patterns were consistent across the different ecologically-distinct insect taxanomic groups. These findings together with similar patterns reported for other taxa in similar habitat settings indicate a worrying reduction in the capacity of protected forests to main biodiversity. Since protected forests are ecologically linked to their surrounding habitats, failure to stem broad-scale loss and degradation of these habitats will consequently increase the likelihood of serious biodiversity declines and subsequent extinction.

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Dr. Alawa Nyimale Grace

Collaborators: Eniang E. A., Yohanna C. T., Joel Y. H., Adejo R., Okweche S. I., Akani, G.C.

Affiliation: Rivers State University, Animal and Environmental Biology, Nigeria

Panel: Ecosystem interfaces/Functioning

Blue-Green Biodiversity and the circular Economy (10min presentation)

Nigeria has not benefitted from the circular economic approach in its economic and developmental drive. The blue-green strategic direction has not been fully harnessed in agroecological and conservation fronts especially in the mangrove-dominated Niger delta region of the Country. Extensive baseline surveys using multistage random sampling combined with broad sweep surveys, spot checks, contact visits and site-assessments were carried out from 2020-2022 to evaluate mangrove ecosystems in three (3) states of Southern Nigeria; Akwa Ibom, Cross river and Rivers states. The results reveal that the Nigerian mangrove ecosystem is experiencing multi-dimensional crisis such as: anthropogenic disturbances- overharvesting, mangrove wood banking, land-use changes, pollution, deliberate bushfires, subsistence agriculture and its bush fallow practices, urbanization, invasive species, coastal erosion that negatively affect the environment, population and biodiversity.

A multi-sectoral and multi-stakeholder conservation approach must be established to promote the blue-green global concept towards achieving sustainability. Creation of marine protected areas in the region, education of the populace to control lifestyle patterns of excessive utilization, monitoring and evaluation, policy reviews and law enforcement and rigorous land-use reforms which would lead to better livelihood options and biodiversity conservation needs to be implemented.

Regulating the use of natural resources, restoration by planting and protection of the mangroves can adapt the circular economy model.

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Dr. Aliyev, Tural

Affiliation: Eawag, ESS, Dübendorf, Switzerland

Panel: Ecosystem interfaces/functioning

Urban Transition in Baku: Analysis for possible Introduction of Large-scale Blue-Green Territorial Planning Project (10min presentation)

The metropolitan region of Baku is facing the challenge of a triple transition: post-Sovietism, post-industrialism, and post-oil economy. In this particular context, the regeneration of this large territory (some 5,500 hectares), which centrally includes industries inherited from Soviet planning, critical infrastructures as well as ill-suited and also modern housing, offers a unique opportunity to present the methods and tools of a large-scale ecological urban planning project.

This doctoral thesis presentation will focus on the elements of the territory in question as well as their interconnectedness by means of “active description” (Corboz, 2001). Active description concentrates on ongoing description making it possible to explore other ways of development than those which are presented by the various current territorial and urban strategies.

To this end, this presentation introduces different theoretical currents (landscape ecological urbanism, landscape approach, territorialism) from a position that is firmly inspired by the inversion of the site-program relation. From this theoretical base, the thesis approaches Baku’s territory from its inception as a city, in an exercise that illustrates urban history as much as the history of urban planning and typo-morphological reading. The objective is to rise the persistent invariant questions (relation to the sea, relations to natural resources, international openness) and other more temporal ones (urban dynamics, functioning of the city, emerging phenomena, etc.) which have given shape to the metropolitan area.

This thesis presentation also clarifies the different qualities of the territory in question, to set out potential axes of development. It redefines Baku’s territory in its contemporary challenges by targeting the period that began with independence from USSR. The thesis presentation aims to illustrate the opportunities and constraints of this territory by taking a particular interest in the stakeholder’s reasons behind their planning choices. In doing so, it draws up a rational inventory of the various resources at their disposal (regulatory, land, financial, institutional resources, etc.) which are used to transform space.

It uses a SWOT analysis to identify the quality of practice in Baku’s territorial development while facing the current political, energetic, and developmental transitions. Ultimately, this research outlines the fundamental elements contributing to Baku’s various stakeholders and their development of the territorial fabric and space.

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Dr. Aye Raffael

Affiliation: Birdlife Switzerland

Panel: Science/policy

Relevancy of science for biodiversity policy (45min keynote)

Using examples like the 30% protected area target, ecosystems restoration and others, the uptake of scientific evidence in politics will be discussed. There are examples of conservation issues that were taken up rather enthusiastically by authorities and politicians, especially action plans for usually large and attractive species. Other conservation issues have been blocked for years if not decades in many countries (agriculture policy reform; functional protected area systems; ecosystem restoration). Factors for success or failure will be discussed. Differences in scientific communication and political dialogue will also be touched upon. Finally, possible enabling factors and success strategies will be proposed and discussed.

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Dr. Bergallo Helena

Affiliation: Rio de Janeiro State University (UERJ), Department of Ecology/Institute of Biology, Brazil

Panel: Science/Policy

The Program for Biodiversity Research (PPBio): The Brazilian strategy to expand knowledge on biodiversity (10min presentation)

How is Brazil expanding the knowledge on biodiversity?

In 2004 the Brazilian Ministry of Science, Technology and Innovation created the Program for Biodiversity Research (PPBio) that aims to expand and disseminate knowledge of Brazilian biodiversity and its processes.

How does PPBio work?

The program covers the entire country and its biomes and thus is designed to fill knowledge gaps, especially in regions with difficult access and thus historic deficits in terms of biodiversity knowledge. PPBio is based on a network with regional and local hubs that involve researchers, managers and the local community interested in biodiversity.

How to allow comparisons in space and time on biodiversity and ecosystem processes, necessary for decision-making?

Most of the PPBio sampling sites use the standardized RAPELD methodology, which allows studies with different organisms and abiotic factors on the same spatial scale, allowing comparisons over time and among different sites, biomes, and continents. RAPELD attempts to meet the need for rapid surveys while providing the infrastructure necessary for long-term research.

How to integrate RAPELD research and to make it attractive to researchers?

The integration of researchers in a monitoring system on the same spatial scale also occurs through the sharing of data and metadata. Data sharing is one of PPBio's main lines of action, and researchers are encouraged and trained to deposit their field data and metadata in publicly available repositories.

Abstract

The Program for Biodiversity Research (PPBio) created in 2004, aims to expand and disseminate knowledge of Brazilian biodiversity and its processes, integrating all biodiversity research stakeholders. It has installed long-term ecological research sites throughout Brazil and in some other southern-hemisphere countries. The program supports all aspects of research necessary to understand biodiversity and the processes that affect it. Most of the 161 sampling sites use the standardized RAPELD methodology, which allows studies with different organisms and abiotic factors on the same spatial scale, allowing comparisons between biomes and over time. The program has a data policy, and metadata is available on DataOne so that it can be used by other researchers or decision makers. PPBio promotes training courses, lectures, workshops to transfer and share knowledge with local communities. The main challenge of the program is maintaining the long-term funding, which has consequences for scientific research, biodiversity knowledge and for conservation.

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Dr. Blackman, Rosetta

Collaborator: Florian Altermatt

Affiliation: University of Zurich, Department of Evolutionary Biology and Environmental Studies, Dübendorf, Switzerland

Panel: Ecosystem interfaces/functioning

Microbial diversity and function in river networks (5min presentation)

Assessing biodiversity and the associated ecosystem function within a habitat is a crucial step towards sustainable management and identifying ecosystem degradation. Due to the vulnerability of freshwater ecosystems to anthropogenic pressures, such as climate change, pollution and invasive species, there has been a rapid increase in the decline of biodiversity and its associated function, it is therefore essential that we carry out further exploration of community changes and the implications this may have on ecosystem function. Riverine ecology often focuses on indicator groups with an emphasis on easily collected or recognisable groups, such as macroinvertebrates and fish. However, this focus lacks detail of ecosystem processes, such as energy flow and nutrient cycling which are fundamental to understand the state of an ecosystem. The rapid development of molecular tools, such as environmental DNA (eDNA), was hailed as a “game changer” in the way we can interpret changes in freshwater ecosystems, yet the application of these tools to delve further than the traditional taxonomic groups and into ecosystem dynamics remains unrealised. Here, we assessed the spatial and temporal changes in microbial diversity over a large river network. We explore microbial communities and the ecosystem function they provide, as foundations of these ecosystems. Our data demonstrates the effect of anthropogenic pressures on microbial diversity and identifies key indicator taxa derived from eDNA samples to establish ways to assess the ecosystem function of these vulnerable ecosystems.

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Dr. Bolliger Janine

Collaborator: Manuel Fischer

Affiliation: WSL, Landscape Dynamics, Switzerland

Implementing blue-green infrastructure to enhance biodiversity using social- ecological networks (SEN): potential and challenges (Science café)

Growing concerns about global biodiversity loss call for a more active role for cities to promote and ensure the long-term persistence of biodiversity. Urban green spaces (UGA) provide functional green infrastructure supporting both, ecological habitat and human needs for safe, resilient and sustainable cities. However, interacting social, ecological, cultural and economic factors make the management and governance of UGA difficult. The challenge of cities is therefore to go beyond the mere provision of amenities and offer synergistic and ecologically functional habitat that maintain biodiversity while meeting human needs for livable cities. Social-ecological networks (SEN) combine the ecological and social networks relevant to the management and governance of ecological issues, such as biodiversity. We discuss the potential and challenges of SEN to mitigate and implement blue-green infrastructure in the context of biodiversity.

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Dr. Capitani, Leonardo

Collaborators: Ronaldo Angelini, Tommaso Giarrizzo

Affiliation: WSL and Eawag, Community ecology, Birmensdorf, Switzerland

Panel: Ecosystem interfaces/functioning

The role of habitat to mitigate fish weight reduction in a tropical impounded river (5min presentation)

The transformation of the lotic environment into lentic environment, habitat fragmentation and the introduction of non-native species are the predominant mechanisms that render fish assemblages susceptible to impacts from dams. In the Xingu River, a major tributary of the lower Amazon River, the Belo Monte hydropower dam has been indicated as the cause of reductions in fish abundance (<4%) and richness (12-16%). What is still unclear is how much fish weight and length have changed before and after the Belo Monte operation stage. And how much variation in weight is explained by the habitat in which the fish reproduce and feed. Using 10-year dataset of fish individuals, sampled twice each year from the Xingu River reduced flow sector, we developed a multilevel Bayesian distributional model to describe how fish weight changes as a function of fish length, time, trophic level (TL) and river habitat. We hypothesized that 1) the average fish weight decreases over time because reduced resource availability due to loss of longitudinal and lateral hydrologic connectivity to floodplains 2) the effect of time on fish weight is modulated by the habitat type because each fish trophic guild is associated to specific physiologic requirements.

We found that there is a 65% probability that fish weights have decreased by an average of 3% since the first year of dam operation stage. In addition, environments with greater connectivity to flooded forest have a 26% probability of no decrease in fish weight. These results highlight the dependence of tropical fish communities on floodplain ecosystems. Therefore, to mitigate the impacts of hydroelectric power dams, it is necessary to consider the relationship between the amount of flooded forest, river land connectivity and the productivity of fish stocks.

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Dr. Carraro, Luca

Collaborators: Florian Altermatt, Hsi-Cheng Ho

Affiliation: University of Zurich, Department of Evolutionary Biology and Environmental Studies, Zürich, Switzerland

Panel: Ecosystem interfaces/functioning

Coupled biological and hydrological processes shape spatial food-web structures in riverine metacommunities (10min presentation)

For conservation purposes it is key to understand species' spatial distributions and their interactions. These result from coupled local trophic dynamics, dispersal processes, resource availability, and abiotic factors ruled by the landscape matrix, which also determines the spatial connectivity for dispersal and resource fluxes. This is particularly the case for river networks, which exhibit universal spatial structures that are linked to species and metacommunity processes. Here, using a mechanistic model of spatially connected food webs integrating biological and hydrological aspects, we investigate how food-web properties vary in space. We then contrast our predictions with several null models, where spatial structure or trophic interactions of the spatial food-web model are relaxed. We find that species richness is highest in areas where local nutrient load is maximal. Species richness is positively associated with link density, modularity and omnivory, and negatively with connectance, nestedness and niche overlap. However, for connectance and omnivory, stochasticity of trophic interactions is a stronger predictor than spatial variables. Relationships between species richness and food-web metrics do not hold in null models, and are hence the outcome of river-specific coupled biological and hydrological processes. Our model generates realistic patterns of species richness and food-web properties, shows that no universal food-web patterns emerge from the riverine landscape structure, and paves the way for future applications investigating riverine metacommunity dynamics.

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Casciano, Giulia

Collaborators: Janine Bolliger, Achilleas Psomas

Affiliation: WSL, Land Change Science, Zurich, Switzerland

Panel: Natural processes/Human management

Urban green areas and biodiversity in cities. A structural typology and a multi-species approach. (10min presentation)

The last 30 years have seen a sharp increase in the rate of urbanization across the world, with more than half of the world's population living currently in urban areas.

The urbanization process has caused radical changes in the landscape within and surrounding the urban area, leading to several negative consequences for public health, global and local climate, and nature.

In this scenario, green areas within cities represent important elements for the urban environment, improving human well-being and acting as fundamental stepping stones for the local biodiversity. Species living inside cities suffer from the fragmentation of the landscape, and therefore rely on the habitats that the urban green areas can provide.

Urban green areas (UGA) are highly dynamic and heterogeneous at both spatial and temporal scales. They can differ in relation to their size, shape, persistence in time, vertical complexity, and to the characteristics of the surrounding impervious surfaces.

Within the "GreenCityNet" project a comprehensive structural typology of the UGA is being developed. The classification relies on standard land use data, enriched with high resolution environmental and structural vegetation data derived from remote sensing.

This typology of the UGA is evaluated in association with multi-species assessments derived from species distribution models of selected taxa. The approach is important for biological conservation and enhancement of urban biodiversity, as it helps to better understand how the spatially dynamic structure of the UGA is related to biodiversity within cities.

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Dr. Chapman, Mollie

Collaborator: Anna Deplazes

Affiliation: University of Zurich, URPP GCB, Rombach, Switzerland

Panel: Nature/Culture

Caring for nature but not like a conservationist (10min presentation)

The relationships between people and nature and the values derived from these relationships have recently garnered renewed attention as potential leverage points for sustainability transformations. Often such discussions implicitly or explicitly call for a transformation of values towards nature. Yet what might this mean in practice? We conducted interviews with 32 farmers in the Swiss Alps to better understand their relationships to nature and relational values. We found a diversity of relationships to nature among respondents and in many cases within one respondent. Most common was the idea of a partnership with nature, which embodied a bidirectional relationship between farmers and nature. We discuss these relationships to nature in light of our previous work on these farmers' relational values and the ways that these two concepts intersect. Finally, we conclude with implications of a better understanding of farmers' relationships with nature for designing effective biodiversity policy.

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Dr. Chapman, Mollie

Collaborators: Dr. Sierra Deutsch, Dr. Tania Martinez Cruz

Affiliation: University of Zurich, URPP GCB, Rombach, Switzerland

Panel: Indigenous/Western Knowledge Systems

Weaving Indigenous Peoples' Knowledge and scientific knowledge for diversified solutions. (30min discussion)

What is "Indigenous Peoples' knowledge"? What characterizes them and how do they differ from scientific knowledge? How are they similar? What methodologies can help us to honor and respect multiple knowledge systems when working on solutions to socio-ecological crises together? These are some questions we will explore during this short discussion session. Come to share ideas, ask questions, or just learn.

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Dr. Costa, Larissa

Collaborators: Paula M. de Omena, Walace P. Kiffer Jr, Pamela Barbosa, Marcelo S. Moretti

Affiliation: Universidade Vila Velha (UVV),Department of Ecosystem Ecology, Brazil

Panel: Ecosystem interfaces/functioning

An overview of the role of freshwater crabs and shrimp on leaf decomposition in Atlantic Forest streams (SE, Brazil) (5min presentation)

Freshwater macroconsumers, such as crabs and shrimp, feed on several trophic levels, although basal resources can be an important food resource. Because of their generalist feeding behavior, these organisms can affect leaf decomposition in different ways. For instance, they can either 1) enhance leaf processing by consuming allochthonous detritus or 2) reduce leaf processing by preying on insect shredders, such as caddisflies. Herein, we examined the role of macroconsumers in leaf processing and their interaction with caddisfly shredders that build cases with different organic materials (leaf pieces and. wood sticks). Our findings suggest that crabs could promote leaf processing by consuming tough leaves that are avoided by insect shredders. Conversely, shrimp do not process significant amounts of leaf material. Both macroconsumers could only prey on caddisflies that build cases with leaf pieces. These results underscore the importance of macroconsumers in detritus-based food webs in tropical streams.

Key Words: Macroconsumers; freshwater decapds; insect shredders, leaf processing; tropical streams.

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ABSTRACTS

Dr. Deutsch, Sierra

Collaborators: Roger Keller, Cornelia Krug, Annina Michel

Affiliation: University of Zürich, Department of Geography, Zürich, Switzerland

Panel: Science/policy

Transdisciplinary transformative change: An analysis of some best practices and barriers, and the potential of critical social science in getting us there (10min presentation)

Biodiversity experts now widely acknowledge that transformative change is best supported through transdisciplinary collaborations. Yet, such collaborations rarely successfully occur in major biodiversity research institutions and those that do rarely achieve the paradigmatic effects they aim to deliver. To gain some insight into this global phenomenon, we surveyed Swiss-based researchers and non-academic stakeholders addressing global change and biodiversity. In this article, we connect our findings to global patterns in transdisciplinary transformative change initiatives (TTCIs) and heuristically divide collaboration barriers into two categories: lack of resources and lack of vital functional elements. Two of the major themes that emerged from this research were the continued difficulties with (1) establishing a common 'language', understanding, and goals, and (2) meaningful pluralization of knowledge in transdisciplinary collaborations aimed at addressing global change and biodiversity loss. The former is widely cited in the literature as contributing to the failure of TTCIs in the form of incoherent problem-framing, while the latter is often identified as contributing to the lack of structural transformative change (e.g., paradigmatic shifts) in completed initiatives. Another major theme reflected in TTCI literature was limited time. Moreover, based on our own extensive inter- and transdisciplinary experience, we agree with other experts that there is a persistent lack of understanding of the potential contributions of critical social science (CSS) to TTCIs. We thus argue that enhancing resource availability for TTCIs, especially tools for improving CSS literacy, could save time and support both problem-framing alignment and delivery of the structural/paradigmatic changes we aspire to.

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Dr. Donati, Giulia

Collaborators: Francine van den Brandeler, Francesc Molné, Peter M. Bach, Noemi Schenk, Mirjam Grünholz, Janine Bolliger, Manuel Fischer

Affiliation: Eawag, Environmental Social Sciences, Dübendorf, Switzerland

Panel: Science/policy

Social-ecological networks to enhance blue-green biodiversity in human dominated landscapes (10min presentation)

Blue-Green Infrastructures (BGIs) provide multiple benefits to cities and their inhabitants –human and non-human. The potential of these measures to address issues such as flooding, extreme heat, air and water quality, and well-being, received growing recognition in recent years. Their potential to support biodiversity has received less attention. While urban areas often lead to the degradation and fragmentation of natural habitats, interventions such as multifunctional BGIs can be spatially planned and designed to enhance both local and broader landscape biodiversity. For such interventions to be effective, it is crucial to identify optimal implementation spaces based on ecological approaches. Yet, they also require supportive collaborative governance arrangements that span across the urban area and beyond, integrating actors across multiple sectors and levels. Little is known on the interactions between the social and ecological dimensions of BGIs, especially when these are spanning across heterogenous landscapes. Focusing on case studies across a rural-urban gradient in Switzerland, we use social-ecological network concepts and methods to examine the governance implications of planning, designing, and implementing BGIs for blue-green biodiversity enhancement, and how actors and actor interactions shape these interventions. We use an integrated framework combining ensemble models of species distributions, connectivity analyses and social-ecological networks to identify, quantify and evaluate the complex social-ecological network structures of BGI with aim to identify transformation pathways for more sustainable ecosystem governance in human dominated landscapes.

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ABSTRACTS

Drost, Bastiaan

Collaborators: Maja Ilić, Carsten Schubert, Martin Gossner

Affiliation: WSL, Forest Entomology, Birmensdorf, Switzerland

Panel: Ecosystem interfaces/functioning

The effects of macro- and microclimate and forest management on leaf litter decomposition in blue-green habitats (10min presentation)

Ecosystem functioning is strongly altered by anthropogenic factors, such as climate change and land use. Leaf litter decomposition is one important ecosystem process in forests that is crucial for nutrient cycling and soil fertility. However, our understanding of how forest management, (historical) macroclimate and local, short-term microclimate affect leaf litter decomposition in blue-green habitats is still limited. To address this question, we installed mesocosms in aquatic (streams), interconnected (stream banks) and terrestrial (forest floor) habitats in paired managed and unmanaged beech forests with similar environmental conditions along a climatic gradient in Switzerland. We measured leaf litter decomposition by invertebrates and micro-organisms using coarse and fine mesh bags filled with beech leaf litter after 3 months. Additionally, we measured temperature and humidity (microclimate) throughout the entire experiment and analyzed weather data from the past 20 years to describe the macroclimate for each site. Daily maximum temperature (microclimate) negatively influenced the decomposition rate of both invertebrates and microorganisms which is mainly driven by a negative effect in aquatic habitats. This is in contrast with literature, where often a positive relationship between decomposition and temperature was found. This experiment was carried out during an unusually warm summer, during which temperatures may have been above the optimal temperature for decomposers. Moreover, there was a significant interaction effect between management and habitat for the decomposition rate of invertebrates, meaning that the decomposition rate is lower in aquatic habitats in managed forests compared to aquatic habitats in unmanaged forests. Overall, decomposition in aquatic habitats is less resistant to changes in microclimate and management, compared to interconnected and terrestrial habitats.

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ABSTRACTS

Dr. Eppinga, Maarten

Collaborators: Martin O. Reader & Maria J. Santos

Affiliation: University of Zurich, Geography, Zurich, Switzerland

Panel: Natural processes/Human management

Biodiversity dynamics as a driver of social-ecological system transitions (5min presentation)

Sustainable management of social-ecological systems requires an understanding of how anthropogenic climate- and land use change may disrupt interactions between human societies and the ecosystem services they depend on. Within the ecological subsystem, responses to global environmental change may depend on the level of biodiversity present (i.e. remaining). Within the sociological subsystem, responses may be mediated by economic processes that alter the dependency of locally generated ecosystems services. Recent theoretical frameworks have identified how socio-economic processes can create alternative development pathways for social-ecological systems subject to environmental change. Incorporating potentially mediating effects of biodiversity within these frameworks is challenging, however, in part due to the time lags and associated legacy effects of past human activities on the current state of biodiversity. Here we examine how the role of biodiversity may be reflected in current social-ecological system dynamics, and the implications of these impacts for system responses to anticipated environmental changes. Using a mathematical modelling framework, we systematically compare biodiversity effects involving a range of time lags between anthropogenic impacts and ecological responses. In these analyses, we pay particular attention to the probability of these effects initiating critical transitions in social-ecological system states. We also demonstrate how these model predictions can be tested with historical land use data and ecosystem service provisioning data from Caribbean island states.

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ABSTRACTS

Fankhauser, Marius

Collaborator: Matthias Buchecker

Affiliation: WSL, Social Landscape Science, Rombach, Switzerland

Panel: Natural processes/Human management

Local acceptance of river restorations - what is the source? (10min presentation)

River restoration is an important measure for the promotion of biodiversity. According to recent research, the Swiss population is largely in favour of such measures. Nevertheless, concrete projects often meet with resistance during implementation. Evidence suggests that lay people's limited understanding of the importance of natural watercourses for enhancing local biodiversity may be an important cause of resistance. Research on social learning suggests that interactive participation could improve participants' shared understanding of the ecosystem. It is assumed that such changes increase locals' support for river restoration. We test these assumptions in a study using a quasi-experimental panel analysis design. The study takes place in several case regions of Switzerland where river restoration projects are planned. Between two repetitive quantitative surveys, groups of participants are assigned to different interventions (e.g., workshops, etc.) related to river restoration planning. As qualitative interviews within the Mental Model approach used for this research have shown, biodiversity is perceived by the population as something complex and important for humans. However, the importance of near-natural water bodies for local biodiversity is greatly underestimated. In addition, the ecological quality of local watercourses tends to be overestimated. In the presentation, we will share findings from the baseline survey on local residents' understanding of biodiversity and on the perception of the importance of local watercourses. We will also show, how these aspects are related to respondents' acceptance of local river restoration measures, their willingness to accept restrictions and their will to support the implementation of watercourse restoration in their region.

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ABSTRACTS

Dr. Früh, Johan

Collaborators: Matthias Buchecker and Sabine Fink

Affiliation: WSL, Wirtschafts- und Sozialwissenschaften, Widen, Switzerland

Panel: Science/Policy

Planning for the minimization of conflict between biodiversity conservation and local recreation. (10min presentation)

It has become increasingly urgent to prevent biodiversity loss and many areas that could strongly benefit from protective measures are close to urban areas. At the same time, nature-based local recreation has increased in popularity, particularly during the Covid-19 pandemic, and its impact on mental health and well being is increasingly recognized. Consequently, landscape and infra-structure planning need to respond to both local recreation needs and biodiversity preservation requirements. However, it is currently challenging to fully integrate both factors when planning for urban development.

We wished to investigate how access to an easy-to-use planning tool that incorporates scientific advances in both social and ecological sciences could help Swiss practitioners minimize conflict between local recreation and the biodiversity conservation. To help answer this question, we are developing a web-based visitor management tool. This tool will provide the means to simultaneously highlight the most sensitive areas regarding biodiversity by flexibly combining species distribution maps, while accurately simulating the pressure brought by local nature-based recreation using agent-based models. Furthermore, the tool will allow planners to virtually modify existing infra-structure and green spaces, conferring the ability to foresee resulting pressure on sensitive wildlife before any costly modifications are made.

In this talk, I will first elaborate on the current need for such an easy-to-use visitor management tool, before going through the methods behind its development and presenting a working version of the tool. I will then present the next steps in the project (i.e. case studies and evaluations). I will conclude with future perspectives for such an intuitive tool (ex: integrating climate change) and their potential in helping integrate advances from social and biological sciences into policy and decision making.

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Dr. Ghosh, Shyamolina

Collaborators: Blake Matthews, Owen Petchey

Affiliation: University of Zurich, Department of Evolutionary Biology and Environmental Studies, Zurich, Switzerland

Panel: Global Change/Mitigation

Temperature change and biodiversity influence community stability differently in birds and fishes (10min presentation)

To understand the maintenance of biodiversity in the face of global warming, it is crucial to focus on the factors that affect community stability and the mechanistic pathways by which they operate. We disentangled the relationships among various components of temperature change (TC) and various properties of 1235 birds and 572 fish communities in North America and Europe, with the general goal to find integrated explanations of variation in community stability. TC was related to stability either directly or indirectly via at least one community property (richness, evenness, overall synchrony, and synchrony at the extremes). Furthermore, we found evidence of interactions between temperature and richness, but a contrasting impact on bird vs fish communities. To understand how TC could affect the community-level response, we explored two mechanistic hypotheses (H1, H2). Increasing trait variation among species decreased overall community synchrony (H1), in particular, for fish. On the other hand, increasing extreme temperature led to more variability among species' thermal tolerance limits which reduced interspecific synchrony at the extremes (H2) for birds. Considering different components of TC in addition to its synergistic effects with richness in terrestrial vs aquatic communities will improve the mechanistic understanding of biodiversity change to global climatic stressors.

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Hempel, Susanna

Affiliation: Agroscope Reckenholz, Agricultural Landscape and Biodiversity, Dübendorf, Switzerland

Panel: Global Change/Mitigation

Combined effects of land use change and climate change on alpine plant-invertebrate communities (5min presentation)

Plant-invertebrate communities of semi-natural grasslands that have evolved during long-term traditional management (i.e., extensive mowing and grazing regimes) belong to the most species rich habitats in Europe. However, they currently face multiple pressures including land use intensification, land use abandonment and global warming, with so far largely unknown consequences for overall biodiversity and ecosystem functioning. As part of the European Horizon 2020 project SHOWCASE and in collaboration with European research partners, we aim to analyse how these global change drivers modify biodiversity in semi-natural grasslands. First, we will conduct a systematic literature review establishing the benefits and values of biodiversity rich grasslands in marginal agricultural areas. We aim to answer how the biodiversity of these marginal grasslands is affected by abandonment, and conversely what is the impact of conservation efforts and restoration practices. Second, we will analyze how land abandonment and the following bush encroachment affects the diversity of species rich marginal grasslands. To do so, we will combine large datasets of plant diversity of marginal grasslands with contrasting history of abandonment, sampled across Europe. Further, focus group discussions with relevant stakeholders and structured interviews with farmers in the different regions will help to identify the drivers of abandonment. Together with the review, this will shed light on the current state and threat of the species rich marginal grasslands, which will help to design appropriate mitigation actions.

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ABSTRACTS

Dr. Humbert, Jean-Yves

Affiliation: University of Bern, Biology, Bern, Switzerland

Panel: Science/policy

The conservation of farmland biodiversity - from science to implementation (10min presentation)

Semi-natural grasslands such as traditionally managed meadows are among the most threatened ecosystems in Europe. In addition to their high nature value, they play important eco-functional roles within farmland landscapes. Conserving and restoring them is thus a top priority but remains a challenge, especially regarding the insect communities that have shown dramatic declines in the last decades. In this context, we experimentally assessed meadowland management measures that effectively mitigate negative impact of common harvesting practices on invertebrate communities. The experiment was carried out at the field scale (i.e. one management measure was assigned to the entire area of a meadow), it was replicated twelve times at different locations on the Swiss lowland Plateau and lasted more than seven years. A clear advantage of a large-scale, controlled experiment carried out in real farming conditions is that the actual costs and logistic constraints faced by the farmers are embedded in the whole study from the onset. In addition, findings about best practices can directly translate into policy measures. Indeed, some of these measures, such as delaying the first annual cut by one month or maintaining a 10% uncut grass refuge when mowing, have now been implemented in most Swiss cantons as a voluntary measure, and shall be endorsed in the next Swiss Agricultural Policy. The research project was developed from the start in concert with a group of stakeholders that included all relevant actors. An asset of this participative approach is that it naturally bridges the traditional wide research-to-action gap, thus increasing the acceptance and implementation of novel measures for the conservation of biodiversity.

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Dr. Ilić, Maja

Collaborators: Bastiaan J. W. Drost, Carsten J. Schubert, Martin M. Gossner

Affiliation: WSL, Forest Health and biotic Interactions, Bern, Switzerland

Panel: Ecosystem interfaces/functioning

Leaf litter decomposition in tree holes depends on water availability and macroclimate (5min presentation)

Tree cavities such as water-filled tree holes (WTH) and dry cavities (DTH) are important tree-related microhabitats in forests, where insect larvae are abundant - both contribute to forest biodiversity and provide additional water and/or food sources for terrestrial animals, such as birds or small mammals. Although it has been shown that forest management has direct and indirect effects on tree hole communities, not much is known about the joint impact of forest management and climate on leaf litter decomposition in tree holes, especially in the absence of water. We hypothesized that leaf litter decomposition and arthropod abundance will be higher in WTH and DTH in unmanaged forest, and that both macro- and microclimate will affect the decomposition of leaf litter in both microhabitats. To address these hypotheses, we installed artificial WTH and DTH (microcosms, 1 L plastic cups) with standardised leaf litter on 140 trees along a climatic gradient across Switzerland, in paired managed and unmanaged beech dominated forests. We used coarse and fine mesh bags filled with beech leaf litter to measure the leaf litter decomposition by invertebrates and micro-organisms after three months. We analyzed temperature and precipitation data from the past 20 years to describe the macroclimate for each site, and measured temperature and humidity in a subset of microcosms to access the local microclimate. Leaf litter decomposition was in general higher in WTH compared to DTH and was negatively related to the long-term mean temperature. These effects on leaf litter decomposition are most likely mediated by a change in the invertebrate communities. Both local microclimate and forest management had only minor to no effect on the leaf litter decomposition. In conclusion, these results show that water availability in the tree holes plays a crucial role for the decomposition of leaf litter and ensures the habitat provision for numerous invertebrate larvae and suggest that expected increase of drying-out events due to climate change will most likely slow down leaf litter decomposition in these systems.

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Dr. Keller, Roger

Collaborator: Johann Dupuis

Affiliation: University of Zurich, Geographisches Institut, Zürich, Switzerland

Panel: Science/policy

Science-policy-interface: Experiences from the ongoing ValPar.CH-project on Ecological Infrastructures in Switzerland (10min presentation)

ValPar.CH is an interdisciplinary research project funded through the Action plan of Swiss Biodiversity Strategy of the Swiss Government. ValPar.CH aims at analysing the values of the Ecological Infrastructure (EI) from a social, economic and ecological perspective. When valuing the EI, the different perspectives of the stakeholders concerned, such as farmers and foresters, the general population, the municipal, cantonal and federal authorities or the environmental protection organisations, play a decisive role. Within ValPar.CH, those perspectives and interests are integrated through participatory methods in the different research regions.

Within ValPar.CH we distinguish between three different kinds of outputs:

- “classical research outputs” like contributions in peer-reviewed journals, presentations at scientific conferences.
- “outputs for science-policy-dialogue” like ‘working papers’ and technical-methodological reports
- “outputs for science-policy-practice dialogue” like newsletters, main messages and recommendations

In our presentation we want to combine the viewpoints from the institution that issued the research mandate (represented by the Swiss Federal Office for the Environment) on one hand and the research consortium (represented by the University of Zurich) on the other hand.

We will focus on some specific challenges and opportunities of such science-policy-interfaces and discuss, what is needed to “apply” research results into policy actions.

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ABSTRACTS

Dr. Keller, Roger

Collaborators: Sierra Deutsch, Annina Michel, Cornelia Krug

Affiliation: University of Zurich, Geographisches Institut, Zürich, Switzerland

Transdisciplinary transformative change: Best practices and barriers (Group discussion)

Biodiversity experts now widely acknowledge that transformative change is best supported through transdisciplinary collaborations. Yet, such collaborations rarely successfully occur in major biodiversity research institutions and those that do rarely achieve the paradigmatic effects they aim to deliver. Two of the major themes that emerged from our research were the continued difficulties with 1) establishing a common 'language', understanding, and goals, and 2) meaningful pluralization of knowledge in transdisciplinary collaborations aimed at addressing global change and biodiversity loss.

In this discussion group, we would like to further explore this issue, based on a case study in 2022, focussing on URPP GCB and ValPar.CH.

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Knüsel, Mara

Collaborators: Roman Alther, Nicole Bongni, Nadine Locher, Angela Studer, Florian Altermatt

Affiliation: Eawag, Department of Aquatic Ecology, Dübendorf, Switzerland

Panel: Ecosystem interfaces/functioning

Using citizen science data to model the distribution and diversity of groundwater amphipods (10min presentation)

Groundwater ecosystems harbor a broad and highly adapted biodiversity. However, this biodiversity is still poorly studied, mainly due to difficulties in groundwater accessibility. To better understand and protect groundwater ecosystems, basic knowledge on the distribution and diversity of groundwater organisms is essential. We established a citizen science approach across Switzerland and integrated water providers in the process of data collection. We received samples from 905 sites representatively covering all of Switzerland. The samples included over 2,000 groundwater amphipods, which enabled us to build one of the most extensive datasets on groundwater macroinvertebrates in Europe. We then modeled the distribution of 12 groundwater amphipod species using a spatial factor multi-species occupancy model. The model indicated distinct species distribution ranges across Switzerland and the overall highest biodiversity was predicted for the Jura region and northeastern Switzerland (Töss catchment). We conclude that implementing a systematic and countrywide citizen science approach can be efficient for studying biodiversity in underexplored and difficult-to-access aquatic ecosystems such as groundwater.

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Lamanuzzi, Felicia

Collaborator: Spazzi Matteo

Affiliation: Atelier d'Architettura Felicia Lamanuzzi, Atelier d'Architettura Felicia Lamanuzzi, San Pietro, Switzerland

Panel: Nature/Culture

VIVAI DIFFUSI (10min presentation)

VIVAI DIFFUSI is a project that promotes urban greenery as a tool of urban renewal. The initiative is inspired by the examples of tactical urbanism and land art as means to raise awareness and uses installations of temporarily potted trees firstly to improve the overall quality of life, secondly to try limiting the effect of global warming but also to start restoring the relationship between artificial spaces and natural ones, interrupted by human intervention.

The project's name exactly means "widespread plant nurseries" and derives directly from the initiative concept: temporarily potted trees, that like in a plant nursery "wait" provisionally before being definitely placed. In the same way, thanks to VIVAI DIFFUSI, you'll find trees installations spread across the most fragile urban areas in terms of livability, presence of urban greenery and heat islands.

VIVAI DIFFUSI is directly inspired by the recent cantonal guidelines that aim to spread the so-called "qualitative development of settlements". The project's goal is to raise awareness of the importance of urban greenery and its power to confer quality and identity to bare and anonymous areas. VIVAI DIFFUSI helps citizens to imagine the renewal of these spaces through a provisory, cheap and fast installation of potted trees that will turn empty concrete fields into more livable and attractive spaces.

The vision of urban greenery promoted by VIVAI DIFFUSI leaves behind the purely decorative role and promotes the development of urban greenery as a true infrastructure, that will be able to create a green net in order to encourage slow mobility and urban biodiversity, making a step closer to the 15 minute-city model.

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Dr. Le Moigne, Alizée

Collaborators: Jakob Pernthaler, Gabriela Schaepman-Strub, Maciej Bartosiewicz

Affiliation: University of Zurich, Limnological Institute (IPMB), Zurich, Switzerland

Panel: Global Change/Mitigation

Methanotrophy in Arctic shallow ponds (5min presentation)

The most prevalent water bodies of the northern tundra are small thermokarst ponds with a depth <2 m. Such aquatic systems account for two-third of the total emissions of the potent greenhouse gas methane in regions above 50°N latitude. A fraction of the newly produced methane in aquatic environments is removed by the activity of aerobic and anaerobic methanotrophic microbes, thereby diminishing its flux to the atmosphere. The thawing of the permafrost mobilizes an important stock of labile organic carbon and increases methane emissions from Arctic ponds and it is unclear if and to which extent methanotrophs might mitigate this development. In general, global change affect these ponds in an antithetical way: on the one hand, ponds are expected to expand due to permafrost thawing and the enhanced levels of precipitation predicted in summer. On the other hand, permafrost thawing can also enhance drainage and temperature increase intensifies evaporation, leading to the shrinkage or even drying up of such shallow ponds. Thermokarst ponds are, therefore, not only biogeochemical hotspots but also sentinels of global change in the Arctic landscape. Our research in north-eastern Siberia has identified at least 2 distinct categories of shallow ponds that differ in their genesis, in landscape-related aspects, and water chemistry. Here, we investigated the biodiversity of methanotrophic communities in 20 ponds of both types and their relationship to the concentrations of dissolved methane . In addition, we assessed the distribution of methanotrophs within different habitat compartments (water, sediment, biofilms).

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Lichtenthäler, Gregor

Collaborators: Gabriela Schaepman-Strub, Cornelia Krug

Affiliation: University of Zurich, IEU, Zürich, Switzerland

Panel: Science/Policy

Biodiversity conservation policy in Switzerland: Minimizing trade-offs with energy production considering legal frameworks (5min presentation)

The push for renewable energy is causing tensions with ongoing efforts of Switzerland`s Biodiversity Strategy. From a legal point of view, the rule of law has been weakened and the possibility of a weighing of public interests between biodiversity protection and energy policy was settled in favor of advancing renewable energy production.

In this study, we will examine the question: How can trade-offs be minimized in an integrative approach to Switzerland's biodiversity conservation strategy, considering the interests of renewable energy production?

This question has different facets:

- What are the different scenarios of renewable energy expansion with maximum efficiency and minimal impacts on biodiversity?

- Who are the stakeholders, what are their interests, where are the blocking points and where can synergies be identified?

- What are the necessary steps to develop mechanisms that consider biodiversity in all administrative, legislative and juridical decisions?

The goal is to create transformation knowledge towards sustainable biodiversity governance in Switzerland with inclusive policy actions in the energy sector. In this study, we analyze the legislative activities in the energy sector and possible scenarios of renewable energy production (wind, solar, water) from an ecological and legal point of view.

For this purpose, we review existing studies on renewable energy production and its impact on biodiversity and will also consider the spatial ecology of selected taxa. The methods of jurisprudence include the analysis of the current legislative processes in the field of biodiversity and renewable energy, a review of literature on spatial planning and environmental protection, as well as the case law in these areas. In addition, we consider a survey to capture stakeholder views, which are analyzed using game theory.

Depending on the legislative outcomes, there will be some preferred scenarios, which could be supported with a forward-looking strategy and incentives. Achieving this transformation would likely need better collaboration between all stakeholders to minimize trade-off`s.

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Dr. Martinez Cruz, Tania

Affiliation: Université libre de Bruxelles, Laboratoires d'anthropologies de mondes contemporains, Belgium

Panel: Indigenous/Western Knowledge Systems

TBA (45min keynote)

TBA.

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Manser, Nicole

Collaborators: Daniel Kükenbrink, Aline Bornand, Meredith P. Schuman, and Felix Morsdorf

Affiliation: University of Zurich, Department of Geography, Switzerland

Panel: Ecosystem interfaces/functioning

Benchmarking lidar and image based close-range remote sensing to estimate forest structure parameters in a temperate forest (10min presentation)

Forest stand characteristics influence species composition and trophic relationships. However, the understanding of this dependence is still limited. Recent advances in the field of 3D remote sensing allow a detailed characterization of complex forest structures. In conjunction with optical technologies, the assessment of the relative contribution of remotely sensed structural and physiological forest parameters to biodiversity composition and functioning could be achieved. This study aims to evaluate the use of different close-range remote sensing platforms for the estimation of forest parameters, primarily focusing on structural parameters.

The measurements are conducted on three neighboring patches of 15x15m on the Zürichberg, Switzerland; one dominated by conifer trees, a mixed, and a deciduous patch. For each patch, terrestrial and UAV-based data is acquired under leaf-off and leaf-on condition. The terrestrial sensors are a handheld mobile laser scanner and a terrestrial laser scanner (TLS), UAV-based sensors are an optical camera and a lidar. A combination of the TLS and the lidar acquisition is defined as the reference dataset as it represents the 3D forest structure the best. Other acquisitions and combinations are evaluated regarding their completeness against this reference dataset. It is further evaluated how the completeness may affect forest structure parameters.

Preliminary results show that a combination of the TLS and the structure from motion point cloud extracted from the optical UAV provide a good representation of the 3D forest structure. In a next step, the best sensor or sensor combination as found in this study will be analyzed regarding their suitability for above-ground-biomass estimation and the potential to derive light availability within the canopy. This study sets a basis for a bigger biodiversity-ecosystem functioning study on the Lägern, Switzerland, where effects of structural and physiological forest attributes on biodiversity, multi-trophic interactions and ecosystem functions across vertical forest layers will be investigated.

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Dr. McFadden, Ian

Collaborator: Anita Narwani

Affiliation: University of Amsterdam, Institute for Biodiversity and Ecosystem Dynamics, Amsterdam, Netherlands

Panel: Ecosystem interfaces/functioning

Linking human impacts to community processes in terrestrial and freshwater ecosystems (10min presentation)

Human impacts such as habitat loss, climate change and biological invasions are radically altering biodiversity, with greater effects projected into the future. Evidence suggests human impacts may differ substantially between terrestrial and freshwater ecosystems, but the reasons for these differences are poorly understood. We propose an integrative approach to explain these differences by linking impacts to four fundamental processes that structure communities: dispersal, speciation, species-level selection and ecological drift. Our goal is to provide process-based insights into why human impacts, and responses to impacts, may differ across ecosystem types using a mechanistic, eco-evolutionary comparative framework. To enable these insights, we review and synthesise (i) how the four processes influence diversity and dynamics in terrestrial versus freshwater communities, specifically whether the relative importance of each process differs among ecosystems, and (ii) the pathways by which human impacts can produce divergent responses across ecosystems, due to differences in the strength of processes among ecosystems we identify. Finally, we highlight research gaps and next steps, and discuss how this approach can provide new insights for conservation. By focusing on the processes that shape diversity in communities, we aim to mechanistically link human impacts to ongoing and future changes in ecosystems.

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ABSTRACTS

Dr. McFadden, Ian

Collaborators: Anita Narwani, Florian Altermatt, Catherine Graham, Conor Waldock

Affiliation: University of Amsterdam, Institute for Biodiversity and Ecosystem Dynamics, Amsterdam, Netherlands

Building mechanistic models to forecast and protect biodiversity dynamics in terrestrial and freshwater ecosystems (Group discussion)

Human impacts such as habitat loss, climate change and biological invasions are radically altering biodiversity, with greater effects projected into the future. Evidence suggests human impacts may differ substantially between terrestrial and freshwater ecosystems, but the reasons for these differences are poorly understood. Building on a recent Blue-Green Biodiversity Initiative conceptual synthesis (McFadden et al. 2022b Ecology Letters), we propose a discussion group with the goal of exploring how to create mechanistic models that link human impacts, fundamental community processes (sensu Vellend 2010) and community / ecosystem responses. Such models could allow researchers to make predictions about how dynamics may be altered in terrestrial or aquatic communities given one (or more) human impacts. This work could leverage recent process-based simulation models that have been used to infer the mechanisms shaping diversity through deep time and across spatial scales (Hagen et al. 2021, Hagen et al., 2021). When parametrized with or fitted to data, process-impact-response models have the potential to be a useful tool for exploring potential scenarios of biodiversity change in the face of human impacts. These models could also inform future studies of the strength and function of single or multiple processes in both terrestrial and freshwater ecosystems, especially the understudied processes of speciation and ecological drift.

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ABSTRACTS

Dr. Michel, Annina Helena

Affiliation: University of Zurich, Department of Georgraphy, Zürich, Switzerland

Panel: Nature/Culture

Exploring the role of memories in nature's meanings (10min presentation)

How do people experience and value 'nature' in their everyday lives? This presentation follows this question and explores people's nature experiences in four rural regions in Switzerland. The research is embedded in the political process of installing an 'ecological infrastructure' – a network of near-natural landscapes providing society with ecosystem services. To grasp the societal values of these landscapes, go-along interviews, focus group discussions, and participatory mapping exercises were conducted with local stakeholders. Based on this qualitative mixed-methods approach, I explore how emotional encounters and embodied practices in rural landscapes trigger memories and create meanings in everyday lives that influence how certain near-natural landscape elements are valued. In particular, I discuss the role of memories and the lived past in constructing meanings attached to what people call 'nature'. Acknowledging the central role of temporalities in human-nature relationships shifts the focus from assessing collective sociocultural nature conceptions to understanding individual everyday encounters with nature in the present and past. This exploration facilitates the assessment of the richness of individual perceptions of rural landscapes and how these perceptions give meaning to 'nature'. Moreover, this leads to a critical reflection on dominant assessment frameworks of societal values of nature and biodiversity, which are mostly built on a strong 'presentism'. This reflection opens the ground to push for more integrated approaches to landscape and biodiversity protection, which will ensure social justice and account for value pluralism.

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ABSTRACTS

Moser, Valentin

Collaborators: Anita C. Risch, Francesco Pomati, Aline Frossard, Steffen Boch, Chris Robinson, Christof Angst, Silvan Minnig

Affiliation: WSL and Eawag, Community Ecology / Aquatic Ecology, Birmensdorf, Switzerland

Panel: Ecosystem interfaces/functioning

Species interactions in beaver engineered habitats link land-water ecosystem processes (10min presentation)

Conservation action for freshwater biodiversity is needed due to losses in habitat area and quality. Restoration of freshwater habitat is challenging because it is resource intensive to recreate natural dynamics. Ecosystem engineering by beavers could support these restoration efforts. Construction and foraging activities of beavers create mosaic-like habitats, which often have been documented to increase local species richness and abundance. However, while knowledge on some community aspects related to beaver activities are well known, links between different species communities and the land-water boundary are poorly understood. Our research is designed to explore the potential of beavers as conservation agents, especially at the land-water boundary. We hypothesise that beaver activities strengthen links between aquatic and terrestrial habitats and increase overall landscape diversity while providing resource hotspots for other organisms. First results suggest that the beaver affects different communities and ecosystem in varying ways. While some communities such as bats seem to show higher aboundance and species richness in beaver systems, other communities such as arthropods had a more complex response. Further analysis are necessary to help understand the potential of using beaver activities as tools to restore biodiversity and strengthen ecosystem functions. The results of this study will provide a baseline for future evidence-based aquatic ecosystem conservation and appropriate beaver management policies.

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ABSTRACTS

Prof. Dr. Niklaus, Pascal

Collaborators: Sarah Mayor, Florian Altermatt, Michael Schaepman, Bernhard Schmid

Affiliation: University of Zurich, Department of Evolutionary Biology and Environmental Studies, Zurich, Switzerland

Panel: Ecosystem interfaces/functioning

Diversity–functioning relationships across hierarchies of biological organization (10min presentation)

Biodiversity–ecosystem functioning (BEF) experiments have shown that plant community productivity typically increases with species diversity. Interestingly, phenomenologically similar “effect patterns” have recently been found at the landscape level where landscapes composed of more different ecosystem types tend to be more productive. At the other end of the organizational scale, within organisms, the phenomenon of heterosis also bears remarkable similarity in that the performance of hybrids often increases with intra-individual genetic diversity. In this presentation, we discuss the similarities of these phenomena and outline how community ecological concepts such as niche complementarity, selection probability effects, traits etc. could possibly be generalized across multiple scales of ecological organization. We discuss the merits if such a general framework of diversity effects across organization scales and the challenges that occur on this path. Ultimately, we argue that diversity effects in complex, real-world systems can only be fully understood when considering all these effects and their interplay simultaneously.

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Oester, Rebecca

Collaborators: Paula M. de Omena, Paula C. dos Reis Oliveira, Marcelo S. Moretti, Florian Altermatt, Andreas Bruder

Affiliation: SUPSI and Eawag, Microbiology, Aquatic Ecology, Mendrisio, Switzerland

Panel: Ecosystem interfaces/functioning

Trophic interactions in streams are linked to riparian forests (10min presentation)

Detritus-based food webs in streams rely on terrestrial resource inputs. From microbial saprotrophs to macroinvertebrate shredders, a range of organisms depends on the nutrient and carbon sources that leaf litter from the riparian vegetation provides to the base of aquatic food webs. The trophic interactions between terrestrial resources and aquatic consumers, therefore, depend on the presence of the riparian forests. Here, we studied how absence and presence of riparian forest affect the community composition and trophic relationships of leaf-associated macroinvertebrate assemblages in leaf litter bags exposed in streams. Our results showed that abundance, diversity, and biomass of both EPT and shredders were often higher in the forested stream sections. Consequently, macroinvertebrate-mediated leaf litter breakdown rates were also higher. Our results highlight the cascading effects of terrestrial ecosystem structure on aquatic food webs, and that a food-web perspective is needed to fully understand aquatic-terrestrial linkages.

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Dr. Omena, Paula

Collaborators: Paula C R Oliveira, Larissa C da Costa, Rebecca Oester, Andreas Bruder, Marcelo S Moretti

Affiliation: Universidade Vila Velha (UVV), Department of Ecosystem Ecology, Brazil

Panel: Ecosystem interfaces/functioning

Upstream and downstream buffer capacity of riparian vegetation (10min presentation)

Riparian vegetation acts as a buffer, regulating human impacts on streams, such as agriculture, nutrient enrichment, and sedimentation. However, more is needed to know about the capacity of upstream forest riparian zones to mitigate deforestation impacts on downstream areas. Here, we investigated whether forest riparian zones could buffer the impacts of deforestation on stream abiotic characteristics, biodiversity, and functioning in both upstream and downstream areas. To this end, we conducted leaf decomposition experiments in eight streams located at agricultural catchments: four running from a forest area into a deforested area, and four running from a deforested area into a forest area. Our findings indicate that forest upstream areas could reduce electrical conductivity, redox potential, and the daily water temperature range in downstream deforested areas. Moreover, forest upstream areas also increased macroinvertebrate diversity. In addition, leaf mass loss was higher in forest stream reaches regardless of the presence of upstream deforested areas. These results indicate that the buffering capacity of forest riparian zones can extend to downstream areas, emphasizing the importance of preserving forest patches in modified landscapes.

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Dr. Pakizer, Katrin

Affiliation: Eawag, Environmental Social Sciences (ESS), Dübendorf, Switzerland

Panel: Natural processes/Human management

Greening the city: Analyzing the social networks behind urban green area management in Switzerland (5min presentation)

Urban green areas (UGAs) are crucial for urban biodiversity and the development of resilient and sustainable cities. However, in addition to providing important ecological habitat, UGAs often serve multiple functions and provide various ecosystem services across different sectors (e.g., leisure, climate mitigation, infrastructure, land use planning, etc.). Due to this complexity, managing UGAs with the aim of maintaining and enhancing biodiversity is a major challenge, especially in the context of rapid environmental change and increasing urbanization.

Effective UGA management requires a comprehensive understanding of the social network involved in UGA and biodiversity governance, including stakeholders, such as individuals, organizations, and public administrations, and the connections between them (e.g., through collaboration or knowledge exchange). Different structures of governance networks can influence policy change, governance innovation dynamics, democratic legitimacy, and improved environmental problem solving. Therefore, innovative forms of collaborative governance are necessary to address the challenges of ecosystem governance.

However, several questions related to social and specifically social networks remain under-addressed in the literature. For example, cross-sectoral and integrated governance across multiple issues or ecosystem services has only recently been studied. Comparative analysis of several networks is also scarce, and it is unclear how different types of instruments and institutions affect networks and how they can be steered in an innovative direction. Finally, governance networks have only recently been analyzed together with the underlying problem structure of ecological challenges that they are supposed to address.

The short presentation will introduce a post-doc project that aims to tackle these research gaps by analyzing and comparing the social networks and governance arrangement involved in managing UGA in Swiss cities (e.g., Zurich, Geneva), identifying factors that enable or hinder the development of a dynamic and sustainable UGA management.

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ABSTRACTS

Perrelet, Kilian

Collaborators: Lauren Cook, Florian Altermatt, Marco Moretti

Affiliation: Eawag, WSL, University of Zürich, SWW, Dübendorf, Switzerland

Panel: Ecosystem interfaces/functioning

Environmental DNA uncovers aquatic and terrestrial arthropod community structure in the urban environment (10min presentation)

As a result of their life cycle requirements or low-mobility, aquatic and ground-dwelling organisms are particularly threatened by urbanization and the resulting destruction and fragmentation of their habitat. However, cities also offer particular opportunities to protect habitats and conserve biodiversity through appropriate design of blue-green infrastructure (BGI), such as ponds and parks. Yet, little is known about how to best conserve aquatic and ground-dwelling (i.e., terrestrial) arthropods simultaneously through the improvement of local (e.g., vegetation structure) and landscape (e.g., connectivity) BGI conditions. In this study, we used environmental DNA (eDNA) metabarcoding to monitor arthropods in 54 paired aquatic and terrestrial sites in the city of Zürich, Switzerland. We characterized the diversity and distribution of each community and their respective sensitivities to local and landscape factors. We hypothesized that the distribution of aquatic and terrestrial communities would not be congruent and that local factors would be the most important drivers of aquatic species diversity, whereas landscape factors would be more prominent for terrestrial species. Preliminary results indicate that newly developed arthropod-specific primers increase eDNA metabacoding efficiency. Future work will challenge our expectations and highlight the common and distinct drivers of each community at the local and landscape scales. We will identify the functional traits (e.g., foraging strategy, degree of mobility) driving the incongruities in community distributions and their respective sensitivities to local and landscape filters. To our knowledge, this is the first documented use of eDNA metabarcoding to survey aquatic and terrestrial communities simultaneously in cities, with important implications for BGI design and management.

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ABSTRACTS

Perrelet, Kilian

Collaborators: Valentin Moser, Bastiaan Drost, Rebecca Oester, Florian Altermatt

Affiliation: Eawag, WSL, University of Zürich, SWW, Switzerland

A framework to study blue-green linkages: from process ecology and conservation to interdisciplinarity and challenges (Group discussion)

The aquatic-terrestrial (i.e. blue-green) interface, where aquatic and terrestrial habitats intersect, is a hotspot for species interactions and energy fluxes. However, the consequences of biodiversity decline and climate change on this interface are poorly understood. On the one hand, blue-green linkages can be especially sensitive to environmental pressures and disturbances such as climate and land use changes, due to their reliance on both aquatic and terrestrial realms. On the other hand, the stability of aquatic and terrestrial ecosystems is dependent on interactions not only within but also across ecosystems. To address the challenges and unique properties of the blue-green interface, we identified four key topics.

The first topic will be centered around identifying ecological processes and energy fluxes where aquatic and terrestrial ecosystems are linked, both from an abiotic and biotic perspective. We will identify the most crucial pathways in both systems respectively, but more importantly, the linkages across the blue-green interface.

These linkages will then help us understand how to use this blue-green knowledge to face future challenges, such as global change in biodiversity and climate. Disentangling the role of blue-green restoration as a tool or a target of restoration is crucial for implementation and requires high levels of trans- and interdisciplinary collaboration.

However, these holistic approaches often involve different methods and types of analysis across fields, which may hinder collaboration. We will therefore interdisciplinarily discuss different methods and tools that can help bridge disciplines and be used to collectively measure biodiversity, ecosystem services and properties

Finally, we will conclude the discussion by identifying the current scientific and institutional barriers to blue-green linkages research. We will then formulate a framework to overcome these challenges in future research and upcoming implementation.

Through this interdisciplinary discussion, we aim to bridge disciplines and evaluate knowledge gaps, which will enhance collaboration and determine the role of blue-green research in mitigating biodiversity and climate crisis.

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ABSTRACTS

Prof. Dr. Pires, Aliny

Affiliation: Rio de Janeiro State University, Brazil

Panel: Global Change/Mitigation

Integrating biodiversity and climate change agendas toward a sustainable future (45min keynote)

Biodiversity loss and climate change are major crises compromising human well-being today and in the future. In this talk, Aliny Pires will explore key questions on the potential and challenges in integrating biodiversity and climate change agendas to establish a safe future for all. How climate mitigation can contribute to dealing with other biodiversity threats? How can climate change efforts compromise biodiversity and vice-versa? How important are cross-cutting issues to implement integrated strategies? Do we have a single answer to these questions? Aliny Pires will bring her experiences and reflections from Brazil to try to explore these and other questions in this talk.

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Saboret, Grégoire

Collaborators: C. Delarue, B. Matthews, J. Brodersen and C.J. Schubert

Affiliation: ETH Zurich, EAWAG, Kastanienbaum, Switzerland

Panel: Ecosystem interfaces/functioning

The diversity of species functionality: case study with arctic char in Greenland (10min presentation)

Biodiversity encompasses not only species richness, but also functional diversity. The same species can play various roles in ecosystems, transfer different energy channels up food webs, and carry nutrients across ecotones to provide valuable ecosystem services.

However, studying functional diversity in a natural habitat can be challenging since it is often not easily observable. Using stable isotopes of amino acids help to better understand ecosystems in revealing the sources of primary productivity through carbon fingerprinting and the modalities of trophic transfer via nitrogen isotopes in different amino acids.

We applied these methods to the glacier-river-fjord interface in southwest Greenland, a pristine region particularly affected by global warming. Our study focused on a single species, arctic char, which exhibits highly flexible life histories. We found that migratory forms of arctic char transfer marine subsidies to freshwater ecosystems, sustaining unique populations of resident fish that depend entirely on ecosystem connectivity. Glacier melt plays a significant role in shaping the ecological niche of freshwater resident chars and affecting production in the fjord. Trophic cascades within river fish populations can potentially determine the density of migratory forms, which in turn affects the amount of marine subsidies.

Overall, we emphasize that biodiversity is not limited to phenotype and genetics, but also encompasses the role of species in ecosystems. Changes in one ecosystem, whether fjord, glacier, or river, can ultimately cascade to all others, resulting in the potential loss of functional diversity.

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Safaraliyeva, Nargiz

Collaborators: Anna K. Schweiger, Christian Rossi, Andreas Hueni, Mathias Kneubuehler, Maria J. Santos

Affiliation: University of Zurich, Geography, Zürich, Switzerland

Panel: Ecosystem interfaces/functioning

Estimating Biomass in Alpine Grasslands using Multi-Year Imaging Spectroscopy Data (10min presentation)

Recent advances in remote sensing, especially Imaging spectroscopy (IS), show great advantages of high spectral, spatial, and temporal resolution for ecosystem monitoring, resulting in reliable and reproducible estimates of changes and processes. Nonetheless, these changes, including changes in biodiversity as for instance measured by changes in plant traits, are seldomly explored on a multi-temporal scale.

In this study, we used three different processing approaches of multi-year IS data over Alpine grasslands of the Swiss National Park (SNP) to assess (i) the differences in IS data processing, and (ii) the effects of processing approaches on multi-year biomass prediction.

IS data were acquired with the APEX (Airborne Prism Experiment) imaging spectrometer once a year during the peak of the growing season. Pre-processing of the APEX IS data included radiometric and atmospheric corrections. Here, we compare the effects of different atmospheric and geometric correction methods, i.e., (i) standard ATCOR processing, (ii) the Minnaert, and (iii) the Modified Minnaert method applied processing.

First, we performed reflectance differences analyses using three years and three different processing settings of IS data to gain an understanding of variations in grassland reflectance spectra due to data processing settings. The reflectance differences among distinct processing approaches varied between 3 – 15% per wavelength per year. Second, we built a Partial Least Squares Regression (PLSR) model per year and processing approach to predict above ground wet biomass in high Alpine grasslands. The variation in biomass explained by each PLSR model ranged between 70% and 8%. These results emphasise the need of consistent and advanced IS data processing over single and multiple years to achieve accurate plant trait predictions.

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Dr. Sato, Yasuhiro

Collaborators: Rie Shimizu-Inatsugi, Kazuya Takeda, Atsushi J. Nagano, Kentaro K. Shimizu

Affiliation: University of Zurich, IEU, Zürich, Switzerland

Panel: Global Change/Mitigation

Genome-wide neighbor effects predict genotype pairs reducing herbivory in mixed planting (10min presentation)

Genetically diverse vegetation is believed to increase plant resistance to natural enemies. Yet, beneficial genotype pairs remain elusive due to the mixed occurrence of positive and negative effects of mixed planting on plant resistance. We used genome-wide polymorphisms of the plant species Arabidopsis thaliana to predict potential effects of genotype pairs on anti-herbivore resistance in the field. By quantifying neighbor interactions among 199 genotypes grown in a randomized block design, we first anticipated that 4.2% out of possible 19,701 pairs could reduce herbivory. We then planted prospect pairs under mixture and monoculture conditions, and indeed found significant reduction in herbivore damage in the mixture compared with monocultures. Our study discovered key pairs out of diverse genotypes that could reduce herbivory through mixed planting, showing a way to identify positive contributors for intraspecific biodiversity effects on ecologically important traits.

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Prof. Dr. Schäfer, Ralf

Affiliation: iES - Institute for Environmental Sciences, Natural Sciences, Germany

Panel: Ecosystem interfaces/functioning

Crossing boundaries – stressors at the aquatic-terrestrial interfaces (45min keynote)

Aquatic and terrestrial ecosystems are functionally linked through reciprocal flows of resources (subsidies). While terrestrial ecosystems export leaf litter to aquatic ecosystems and thereby provide an important energy source, aquatic ecosystems export nutrients through flooding and emergent aquatic insects as prey for riparian terrestrial predators. Both the quantity and quality of subsidies can alter the dynamics of the recipient ecosystem. Most previous studies have focussed on subsidy flows from terrestrial to aquatic systems and on subsidy quantity. I provide an overview on the multi-faceted role of subsidy quantity and quality in recipient ecosystems with a particular emphasis on subsidy quality based on insights from theoretical ecological models and empirical studies. Both the quantity and quality of subsidy flows can be affected by anthropogenic stressor and I also present different case studies that highlight how stressors can alter the quantity and quality of subsidy flows and the consequences for the recipient ecosystem. Based on these findings I reflect on management measures that account for aquatic-terrestrial linkages.

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ABSTRACTS

Prof. Dr. Schell, Christopher

Affiliation: University of California Berkeley, Environmental Science, Policy, and Management, USA

Panel: Nature/Culture

Biodiversity for the people: Conserving species through collective action and justice (45min keynote)

Imagining our global future is an extraordinary challenge. Due to our escalating climate crisis, it is uncertain how recognizable our environmental landscape will be 100-150 years from the present. Inarguably, the increased frequencies of once-in-a-lifetime storms, heat waves, droughts, and wildfires already suggest that our current context is ominous. Building solutions that minimize impending catastrophe is therefore a particularly urgent endeavor, one that will require transdisciplinary, agile, and resilient tools that leverage collective forms of knowledge. The development of those tools will need to leverage all peoples' experience and knowledge, emphasizing the need for environmental justice, equity, and access. Such efforts will also compel us to radically reimagine conservation strategies as decrees of collective action and community cohesion, while simultaneously challenging how the commodification of nature and capitalism have generated the issues we face today. In this plenary session, Dr. Chris Schell will discuss how built environments provide a rubric for ushering in a new conservation era that spotlights what will be required of us to collectively build ecological resilience through biodiversity conservation. In so doing, Professor Schell will help elucidate the links among biodiversity, climate change, resilience, and justice.

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Prof. Dr. Schuman, Meredith Christine

Collaborators: Michael E. Schaepman, Claudia Röösli

Affiliation: University of Zurich, Department of Geography, Department of Chemistry, Switzerland

"Genes from Space" - leveraging earth observation technologies to monitor essential genetic diversity (Group discussion)

Earth's biodiversity is declining into a sixth mass extinction (e.g. McCallum (2015), Cowie et al. (2022)). International monitoring efforts attempt to quantify this decline and facilitate accountability measures for mitigation. A growing set of essential biodiversity variables (EBVs, Pereira et al. (2013)) enables comparable, interpretable and actionable monitoring data, but monitoring remains limited by observation and sampling effort (e.g. Kissling et al (2017), Hoban et al. (2022)). Earth observation (EO) can lift that limit by providing repeated, potentially global observations independently of, or extrapolating from in situ sampling (e.g. O'Connor et al. (2015), Skidmore et al. (2021)). Sampling effort is especially limiting for EBVs on genetic diversity, which support assessments of species' potential to adapt to global change based on genetic sequence variation, and are important for preventing extinctions and designing effective conservation measures. Current development of genetic EBVs focuses on targeted and effective use of genetic sequence data, supported by proxies of sequence diversity which can be more rapidly and frequently monitored, and may be more directly translated into policy (e.g. Geijzendorffer et al. (2015), Hoban et al. (2022)). Now is the time to incorporate extensive proxies of genetic diversity which could be obtained with EO. We recently proposed an international team to develop and demonstrate both immediately applicable, and potential future workflows to integrate EO data into genetic EBVs, and the inferences they support about biodiversity and conservation, in time for the development of a global biodiversity monitoring system (Leadley et al. (2022)). We will present our proposal to the Biodiversity Convention discussion group, and work together to produce a conference paper outlining key resources, considerations, and targets for upcoming international team activities. These efforts could foster a step change in biodiversity monitoring, and the policy and actions it supports.

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ABSTRACTS

Schweizer, Daniella

Collaborators: Rebecca J. Cole, Leland K. Werden, Gerald Quirós Cedeño, Kassandra Navarro, Jose Marcel Esquivel, David Rodriguez, Simeon Max, Fidel Chiriboga, Rakan A. Zahawi, Karen D. Holl and Thomas W. Crowther

Affiliation: Cifor/Icraf

Panel: Natural processes/Human management

Evaluation of smartphone apps technology for monitoring forest restoration (5min presentation)

1. With increased support for forest restoration as a natural solution to climate change and biodiversity loss, comes an urgent need to provide transparency using accurate, scalable, cost-effective monitoring tools. The ubiquity of smartphones has led to a surge in the development of apps that facilitate data entry and estimate forest monitoring indicators useful for restoration. We conducted an extensive review of these types of apps using web-searches and through conversations with 32 restoration practitioners around the world.

2. We identified 42 apps that facilitate data entry or automatically monitor indicators via onboard sensors and built-in analytical software. Data entry apps support the tracking of seedling survival and field data recording. Automated indicator apps estimate values like plant diameter and height, canopy openness and bird diversity. We selected five we considered promising for monitoring and compared them to standard field techniques. We gathered feedback from 16 collaborator organizations who evaluated these and four additional apps in active restoration projects.

3. Our field tests show tree diameters collected with smartphone apps correlated well with standard tape-based diameter measurements (r = 0.91, 0.95). Whereas, canopy openness and ground cover apps showed weaker correlations to standard densiometer and quadrat cover measurements (r = 0.67, 0.68). Inaccuracies in app-estimated tree diameters and canopy openness are caused by varying light conditions, epiphytes, complicated tree architecture, steep slopes, and/or dense vegetation. Biodiversity detection apps (e.g., birds) are promising and work well in Europe and North America, but need additional development for tropical locations. The apps tested did not improve efficiency in field data collection compared to standard methods but do preclude the requirement to purchase specialized field equipment.

4. Rapid evolution of machine learning algorithms, increased quality of training datasets, and improved smartphone sensors (e.g., cameras) can facilitate and scale standardized monitoring in the near future. However, additional development of these tools along with practical field validations are still needed. We conclude with calls to further estimate and publish costs for app development and maintenance and statistics on user uptake to inform cost-effective development. We recommend the development of a restoration monitoring app that can effectively speed-up and standardize data collection.

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ABSTRACTS

Dr. Spehn, Eva

Collaborator: Sascha Ismail

Affiliation: SCNAT, Forum Biodiversität Schweiz, Basel, Switzerland

Panel: Science/policy

Communicating Science in Factsheets and Policy Briefs (10min presentation)

The Swiss Biodiversity Forum is the scientific competence center for biodiversity and ecosystem services in Switzerland. It is a think tank at the interface between science and policy. Based on best available scientific expertise, the Forum makes a significant contribution to the conservation, promotion and sustainable use of biodiversity and ecosystem services. In order to provide the scientific basis for effective policy strategies and measures, and to integrate the issue of biodiversity within and between sectors and into new areas, communication and compilation of scientific facts for political decision-makers and the interested public is key. For these tasks, factsheets and policy briefs are an important communication tool. In this talk we will give insights into the publication and dissemination of three different policy briefs on biodiversity in the "Swiss academies Factsheets" series published in recent years. We will highlight important considerations to take into account during the whole process, as well as accompanying activities and other success factors to maximise impact and to provide impetus for the necessary transformational change in society.

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ABSTRACTS

Dr. Stange, Madlen

Collaborator: Nils Sternberg

Affiliation: Leibniz Institute for the Analysis of Biodiversity Change, Centre for Molecular Biodiversity Research, Bonn, Germany

Panel: Natural processes/Human management

Stocking of *Phoxinus* spp. in North-Rhine Westphalia (10min presentation)

Recent research on the taxonomy of the genus *Phoxinus* evidenced that the Eurasian minnow or P. *phoxinus* (lineage 10 sensu Palandačić et.al. 2020) is not spread all over Europe, which previously resulted in its conservation status 'LC', but is in fact restricted the lower Rhine area, reducing its previously assumed population size and geographic distribution.

In the 1960s and 1970s, several fish kills caused by pollution from industrial wastewater and runoff threatened local minnow populations. This was also observed in the Sieg River in North Rhine-Westphalia, Germany. As minnows are considered important bait for angling as well as prey for economic and conservation target species such as trout and salmon, this prompted local fisheries and nature conservation associations to implement large-scale stocking programmes. Active and unwanted stocking with putative *P. phoxinus* from other drainages, especially from Danube populations, led to the introduction of allochthonous *Phoxinus* species, which now threaten the autochthonous *P. phoxinus* populations in the Sieg and its tributaries.

We interviewed members and traced the stocking books of regional angling and conservation associations at the rivers Sieg, Agger, Sülz, Ferndorf and Nister that often used commercial suppliers with specimens of non-local origin for their stocking programs.

Preliminary results from COI-barcoding show a gradient of hybrid populations along the Sieg; the Agger - the type locality - shows the least impact of allochthonous species. Stocking of *P. phoxinus* specimens originating from the Dill and stocked in the Littfe seems to slowly reinstate stronger *P. phoxinus* signatures in the upper Sieg.

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ABSTRACTS

Prof. Dr Thondhlana Gladman

Affiliation: Rhodes University, Department of Environmental Science, South Africa

Panel: Nature/Culture

Re-imagining culture-nature relations for biodiversity conservation: evidence and challenges (10min presentation)

Around the world, culture-nature links are at the centre of biodiversity conservation efforts by local and indigenous communities. Yet cultural values tend to be glanced over in many biodiversity conservation policy discourse and practice. Based on a synthesis of decade-long research work in the Global South, I argue that understanding culture-nature links is vital for biodiversity conservation efforts and discuss changing cultural contexts and their implications for biodiversity conservation. Three proposals through which culture can be integrated into biodiversity conservation are identified: (1) incorporating the plural meanings of culture; (2) the uptake of cultural values language and action in conservation policy discourse and (3) strengthening the agency and voice of local communities.

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ABSTRACTS

Dr. van Moorsel, Sofia

Affiliation: University of Zurich, Geography, Zürich, Switzerland

Panel: Global Change/Mitigation

Intraspecific trait and genetic variation of beech seedlings (*Fagus sylvatica*) in a common garden experiment (5min presentation)

Intraspecific diversity is the basis for adaptation to new environmental conditions. However, the interactions between genotypic contribution to intraspecific trait diversity and plasticity are still largely unknown. Beech (*Fagus sylvatica*) is common in Europe and commercially and culturally important. However, climate change, including droughts and heatwaves, is likely to change the distribution of beech in Europe and lead to local population declines. For beech to persist, it relies on intraspecific phenotypic and genetic diversity.

We conducted a common garden experiment with 200 beech seedlings from 16 European beech populations with known population genetic structure. Once placed in the common environment, we determined intraspecific trait variation that remained and its association with genetic variation. We found strong signals of beech tree origin and climatic variables assosciated with those sites on the plant phenotype for plant height, stem diameter, growth rates and phenology. For example, the length of the growing season decreased with increasing altitude of the source site but increased with increasing temperature. Other traits, such as leaf spectra and leaf traits derived from those spectra, were also highly variable and showed origin-specific signals. The intraspecific trait variation will be assessed over several years to find out if trait variation decreases or increases with tree age as the genetic variation remains unchanged. Our study aims to provide a window into the mechanisms underlying the link between intraspecific genetic diversity and trait variation to support efforts to help Beech persist.

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ABSTRACTS

Woforodo, Vigilant

Affiliation: University of Port Harcourt, Nigeria

Collaborator: G.N. Alawa

Panel: Indigenous/Western Knowledge Systems

Ethno-ornithological Knowledge, Perception and Uses of *Necrosyrtes monachus* (Hooded Vulture), in Port Harcourt City Local Government Area (PHALGA), Rivers State. (10min presentation)

The Hooded Vulture (*Necrosyrtes monachus*) is among the species listed as critically endangered due to significant population declines; poisoning and habitat degradation. Despite the alarming decline in populations of vulture species across the globe, in Rivers State, the Hooded Vulture is still considered the most hunted of all wildlife however, there is still little known about the ethno-cultural significance and the local people's perception of this species in Rivers State, therefore, the objective of this study is to assess the local people's knowledge, perceptions and uses of *N. monachus* in PHALGA, which is dominated by the Ikwerre ethic group. Oral interview was conducted between April and September, 2022; to collect data on the subject matter. 50 respondents [(male= 31 (62%) and female= 19 (38%)] were randomly selected from the study area and analyzed on a Likert scale. Findings from the study revealed that the people are well knowledgeable about *N. monachus*, and that the species is highly significant culturally and used in diverse ways. They are used as a symbol of ancestors in Ikwerre tradition, they are believed to be agents of the gods, spirit and ancestors that must gather and eat the ritual meals offered by the chief priest and can be very predictive. Vultures are not eaten as they are venerated as spiritual bird, however, their body parts were perceived to be useful ingredients by herbalists in the preparation of concoctions for curing diverse diseases.

Key words: Ethno-ornithological, *Necrosyrtes monacus*, gods, agents, spirit, ancestors.

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ABSTRACTS

Prof. Dr. Zemp, Clara

Affiliation: University of Neuchâtel, Institute of Biology, Switzerland

Panel: Natural processes/Human management

Restoring tropical agroecosystems for people and nature (45min keynote)

In the UN Decade on Ecosystem Restoration, large knowledge gaps persist on how to increase biodiversity and ecosystem functioning in cash crop-dominated landscapes. I will present key findings from a large-scale, five-year ecosystem restoration experiment in an oil palm landscape in Indonesia that was enriched with 52 tree islands of varying area and planted diversity. I will provide evidences that tree islands increase multi-taxa biodiversity and ecosystem multifunctionality at the local and landscape scales, without comprising agricultural productivity. Furthermore, I will show that biodiversity and ecosystem functioning within the tree islands are driven by vegetation structural complexity and by landscape patterns. Overall, results demonstrate that enriching tree islands in cash crop landscapes is a promising ecological restoration strategy, yet should not replace the protection of remaining tropical forests.

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ABSTRACTS

Zhang, Heng

Collaborators: Elvira Mächler, Felix Morsdorf, Pascal A. Niklaus, Michael E. Schaepman, Florian Altermatt

Affiliation: University of Zurich and Eawag, Department IEU, Dübendorf, Switzerland

Panel: Ecosystem interfaces/functioning

A spatial fingerprint of land-water linkage of biodiversity uncovered by remote sensing and environmental DNA (10min presentation)

Aquatic and terrestrial ecosystems are tightly connected via spatial flows of organisms and resources. Such land-water linkages integrate biodiversity across ecosystems and suggest a spatial association of aquatic and terrestrial biodiversity. However, knowledge about the extent of this spatial association is limited. By combining satellite remote sensing (RS) and environmental DNA (eDNA) extraction from river water across a 740-km2 mountainous catchment, we identify a characteristic spatial land-water fingerprint. Specifically, we find a spatial association of riverine eDNA diversity with RS spectral diversity of terrestrial ecosystems upstream, peaking at a 400 m distance yet still detectable up to a 2.0 km radius. We also discover that the land-water linkage of biodiversity includes contributions of both aquatic and terrestrial origins but cannot be attributed to direct effects like organismal movement from land to water. Our findings show that biodiversity patterns in rivers can be linked to the functional diversity of surrounding terrestrial ecosystems and provide a dominant scale at which these linkages are strongest. Such spatially explicit information is necessary for a functional understanding of land-water linkages and provides a reference spatial scale for adequate conservation and landscape management decisions.

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ABSTRACTS

Zhang, Heng

Collaborators: Luca Carraro, Yan Zhang, Florian Altermatt

Affiliation: University of Zurich and Eawag, Department IEU, Switzerland

Aquatic biodiversity monitoring and modeling for practical conservation (Group discussion)

Biodiversity is alarmingly declining at the global scale, with a notably higher magnitude in freshwater ecosystems. Nowadays, biodiversity monitoring approaches, like environmental DNA (eDNA) metabarcoding and remote sensing (RS), accumulate a spectacular amount of data; however, a proper integration of these data types across spatiotemporal scales is still lagging behind. In this discussion, we will bring about the concept of data and model across multiple scales to uncover a better view of biodiversity, aiming for practical tools for aquatic biodiversity conservation. We will kick off the discussion with some examples from our research. First, a massive sampling across the Yangtze River, one of the longest rivers in the world, reveals remarkable heterogeneity in biodiversity distributions. Second, a model of integrating eDNA transport and hydrology allows for space-filling biodiversity predictions at a catchment scale. Third, a model integrating land use and land cover effects on fish diversity provides unprecedented opportunities to project the change of biodiversity patterns in rivers. A unifying theme across these examples is that of spatiotemporal scales, which affects the accuracy and confidence of biodiversity predictions and thus conservation strategies. In this discussion, we welcome people that have broad interests in biodiversity monitoring and modeling, and are enthusiastic about data- and model-driven methods to tackle the pressing biodiversity crisis. People with expertise in eDNA, RS, and modeling are especially welcome to participate in this discussion. We expect an in-depth exchange of ideas and creative brainstorming.

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ABSTRACTS

Zhang, Yan

Collaborators: Heng Zhang, Loïc Pellissier, Xiaowei Zhang, Florian Altermatt

Affiliation: Eawag, Eco, Dübendorf, Switzerland

Panel: Ecosystem interfaces/functioning

Global Meta-analysis of riverine fish eDNA and Associations with drainage characteristics (10min presentation)

Despite their enormous biodiversity and essential ecosystem functions and services, rivers are among the most threatened ecosystems worldwide, with escalating biodiversity losses and changes in the biogeographic distribution of fishes. Rivers are organized into hierarchical dendritic networks embedded in the land matrix, shaping unique biodiversity patterns closely related to their drainage characteristics. Understanding fish distribution patterns in global river networks is critical for decision-making in biodiversity conservation, yet it remains largely unexplored. Here, we conducted a global meta-analysis of fish eDNA in rivers, aiming to 1) delineate the distribution of fish diversity in the global river network based on existing published and unpublished datasets; 2) analyze the impact of drainage characteristics, including hydrological and terrestrial-related factors, on the spatial distribution of global riverine biodiversity; 3) conduct spatial modeling and predict the future riverine biodiversity distribution under different scenarios. We extracted fish eDNA data of 42 rivers distributed across most continents. The preliminary results showed that fish diversities possessed clear but distinct up-downstream patterns and were highly associated with drainage areas. This work will reveal unifying patterns of distribution and diversity of fish in global riverine networks, thereby guiding the development of policy and restoration measures to maintain sustainable river biodiversity.

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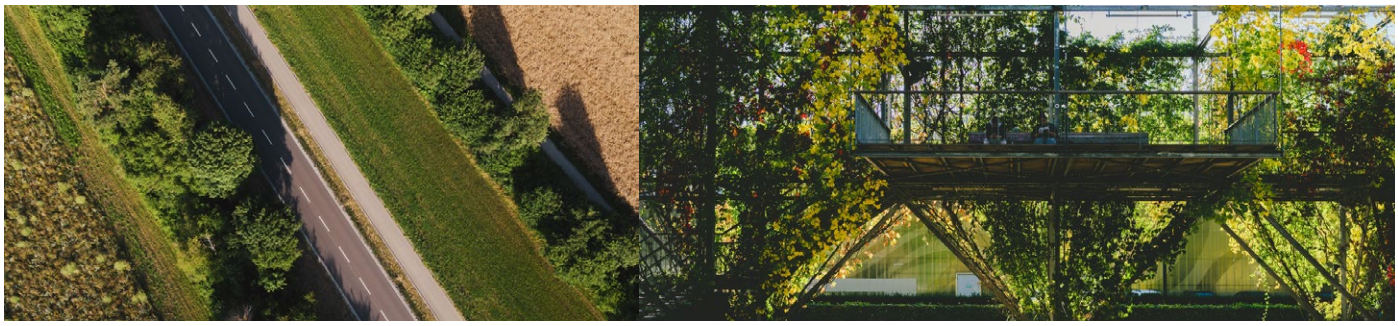
OUTREACH EVENT

Congressi Stefano Franscini

University of Zurich[UZH]

WSL Istituto federale di ricerca per la foresta, la neve e il paesaggio WSL

eawag aquatic research



CO-ABITAZIONE UOMO E NATURA

SVILUPPO SOSTENIBILE DEL TERRITORIO: ILLUSIONE O OBIETTIVO REALISTA? CLARA CAVERZASIO IN DIALOGO CON LA RICERCA

L'Uomo e le sue attività hanno trasformato il territorio e gli ecosistemi in molteplici modi, con gravi conseguenze sulle dinamiche naturali, sulla biodiversità e sui servizi che essa fornisce a tutti noi. La serata inizierà con una breve sintesi dalla ricerca scientifica, con particolare attenzione a concetti emergenti per la salvaguardia della biodiversità. Parleremo per esempio di “soluzioni basate sulla natura”. Seguirà una discussione sulle opportunità e sulle sfide inerenti la co-abitazione tra Uomo e Natura in contesti urbani e rurali.

L'evento sarà moderato dalla giornalista e divulgatrice scientifica **Clara Caverzasio** con la partecipazione di ricercatori e ricercatrici presso istituti Svizzeri e internazionali, quali **Marco Moretti** (Istituto federale di ricerca WSL), **Cristian Scapozza** (SUPSI), **Chiara Catalano** (ZHAW Zurigo e CNR-IRET, Italia) e **Giulia Donati** (Eawag Aquatic Research). Ampio spazio sarà dedicato allo scambio d’idee tra ricercatori, pubblico e rappresentanti di gruppi d’interesse.

Mercoledì 28. giugno 2023, ore 20:30
Auditorium, centro congressuale Monte Verità, Ascona
Partecipazione libera, rinfresco a seguire

Scuola universitaria professionale della Svizzera italiana SUPSI

CNR IRET

zhaw

EXCURSION
THE RENATURATION OF THE TICINO RIVER

Bellinzona, Thursday 28.06.2023, 8:30:00 – 12:00

English summary
Official website of the project here
Download the official flyer in Italian here

Speakers

Nicole Selber, TBF+Partner
Function: customer support, representation of the CCFT
Presentation: general aspects of the river project

Paolo Piattini, EcoControl
Function: environmental engineering expert
Presentation: biodiversity in river design (Torretta, ev. Saleggi)

I. Schedule

08:30 Departure from Monte Verità
09:00 arrival at CCFT headquarters (Viale Stefano Franscini 8, Bellinzona)
09:00-10:00 CCFT project presentation
10:00-11:15 excursion with visit to the Torretta Sector
11:45 back to Bellinzona train station

Note: You will have to check out in the morning and take your luggage with you.

II. The importance of watercourse renaturation in Switzerland

Around 15,000 km of watercourses in Switzerland have been altered, dammed, or covered for land reclamation and flood prevention. These interventions have negatively impacted watercourses and disrupted their ecological balance.
A key objective of Switzerland's current water protection policy is to preserve or restore lakeshores, rivers, and streams to their natural state. This involves providing sufficient space and proper runoff, known as renaturation.

This project contributes to and is part of Switzerland's renaturation policy.

Renaturation projects in Switzerland has for goals to contribute to long-term flood protection, create habitats for living organisms and recreational areas and support biodiversity.

EXCURSION

III. The case of the Ticino river preservation: A space for humans and nature

The Ticino River, like every river, has undergone changes over time. In the late 19th century, efforts to modify its watercourse began, aiming to reclaim land and protect against floods.

While these past interventions improved safety and increased agricultural land availability, they also resulted in significant habitat loss for terrestrial and aquatic fauna and reduced river dynamism. The river was confined to narrow and straight channels, leading to erosion.

Today, maintenance and safety works are necessary to ensure the riverbanks' effectiveness and safety, with a focus on countering erosion. Initial works have commenced, and further efforts will continue in the coming years.

The intervention will primarily occur in two areas: Boschetti (Sementina and Gudo) and Saleggi (Bellinzona, Giubiasco, and Monte Carasso). A pilot intervention has already been completed in **the Torretta sector in Bellinzona, which will be visited during the excursion** (download the official flyer for Torretta sector here).

Torretta Sector at Bellinzona. Photo from www.ilmiofiume.ch

Considerable attention must be given to logistics and minimizing inconvenience for the population during the construction phase, accounting for natural variables that may arise.

The intervention requires an estimated investment of CHF 80 million, primarily funded by the Canton and the Confederation.

Goals of this intervention:

- Ensuring bank stability and territorial safety.
- Revitalizing the river ecosystem, benefiting aquatic and terrestrial environments.
- Enhancing accessibility of the river for the local population.

Acknowledgments

We are deeply grateful to speakers Nicole Selber and Paolo Piattini for planning and guiding the excursion and we extend our sincere appreciation to the Consorzio Correzione Fiume Ticino. We address our warmest thanks to Dr. Giulia Donati for supporting us for the organization of this event.

SHUTTLES

From Locarno train station to Monte Verità

The shuttle can take a maximum of 8 people/run.

Sunday 25th	17:00 18:00
Monday 26th	10:20 11:00 11:40 12:20
Thursday 29th	several shuttles after breakfast (to be announced during the conference)

Nota bene: If you are participating to the excursion, please check out and take your luggage with you in the morning. We will end the tour at Bellinzona train station.

A conference organized by
URPP Global Change and Biodiversity (UZH) and
Blue-Green Biodiversity Research Initiative (WSL & Eawag, ETH)

Conference leaders
Prof. Dr. Florian Altermatt (BGB)
Prof. Dr. Owen Petchey (URPP GCB)
Prof. Dr. Maria J. Santos (URPP GCB)

Conference coordinators
Dr. Morgane Brosse (BGB)
Dr. Cornelia Krug (URPP GCB)

Scientific steering committee
Dr. Mollie Chapman (UZH)
Dr. Giulia Donati (Eawag)
Dr. Maja Ilić (WSL)
Dr. Sofia van Moorsel (UZH)
Dr. Francesca Pittino (WSL)

Outreach event committee
Dr. Giulia Donati (Eawag)
Prof. Marco Moretti (WSL)

Venue managers
Liliana Cantoreggi (Monte Verità)
Dr. Therese Egli (CSF)

Photo courtesy of Fondazione Monte Verità.