INTECOL 2022 Geneva: Excursion on August 31 – Ecological Infrastructure in Swiss Parks

Location: Parc naturel régional Gruyère Pays-d’Enhaut

Program of the day

7:29 am: Departure from Geneva / 10:00 am: Arrival in Château-d’Oex (stop Les Granges).

Walk along the river Sarine within the alluvial area of national importance. Easy walk, about 4.5 km and 1h30 of walking (see the map below).

During the walk, presentations will be given by collaborators of the Park and researchers of the Valpar.CH project.

12:30 Lunch in a local restaurant.

Afternoon: visit of a local biotope and presentations with view on the village.

4:05 pm: Train back to Geneva / 6:31 pm: Arrival in Geneva
1. SWISS PARKS & GRUYÈRE PAYS-D’ENHAUT REGIONAL NATURE PARK
Marie Gallot-Lavallée, Parc naturel régional Gruyère Pays-d’Enhaut

The Swiss Parks preserve their precious natural and cultural resources and highlight their value. They commit to boosting and strengthening their regional economy. They offer visitors real and inspiring experiences, contact with the local community, fascinating stories, and delicious local specialties. The Parks cannot exist without the commitment of their inhabitants. They're the ones who provide the impetus to launch the project. They also form the interest groups that take part in planning the project, in establishing the Park and finally in its management. The Park is mainly supported by its municipalities.

The Gruyère Pays-d'Enhaut Regional Nature Park extends over the cantons of Vaud, Freiburg, and Bern. The region is characterized by an originally rural identity and a diverse landscape. Centuries of human activity have left their mark on the landscape, so that besides steep cliffs, deep valleys and thick forests, there are also many alpine pastures and mountain meadows. A variety of species thrive in remarkable habitats and nature reserves. Agriculture and alpine farming, their architectural heritage, and their products, particularly cheese, still play an important role here today. The Park covers an area of 630 km² and includes seventeen municipalities in four regions.

2. FROM LANDSCAPE STORIES TO BIODIVERSITY TRAJECTORIES
Pierre-Louis Rey & Antoine Adde, University of Lausanne

Climate and land use changes are major biodiversity threats. In Switzerland, urbanization and landscape fragmentation are already impacting biodiversity, including species displacement or replacement. Our talk will be centered on an interactive landscape reading, during which we will illustrate how landscape elements can be used for predicting species distributions. We will show how landscape reading can allow anticipating possible trajectories for biodiversity under the influence of several agents of change.

3. INVASIVE ALIEN PLANT SPECIES
Cindy Ramel, Parc naturel régional Gruyère Pays-d’Enhaut

According to IUCN, invasive neophytes are the second most important cause for the current global species decline, after habitat destruction by humans. In Switzerland, they have also become a threat for biodiversity in the last years. During this presentation, I will explain the situation of the neophytes in the Park territory and how we coordinate actions for control and eradication of target plant species. The priorities for actions defined in a fighting strategy will be presented and we will have the opportunity to explore the alluvial area where some invasive alien plant species have already established.

4. POLICY PERSPECTIVE
Alix d’Agostino, University of Zurich

Swiss regional nature parks serve many purposes, which are listed in policy documents from the three governance levels: federal, cantonal, and park levels. The policy documents, in the form of laws, regulations, park statutes or management plans, list the many policy objectives that the parks should strive for. As we walk through the park, I will describe the patterns that can be found within each governance level, as well as between these levels. Additionally, using data from the parks' budgets and spending, we will understand how the parks’ activities fit within their own objectives, and see where they focus their funds.

5. ECOSYSTEM SERVICES EVALUATION AND MAPPING
Nathan Külling & Audrey Lambiel, University of Geneva

Nature’s contributions to people (NCP) are key factors for the sustenance of our society, as they represent all benefits that humans get from the nature. Thus, understanding their spatial distribution and their interactions is essential to maintain their supply, as well as to promote nature conservation. During our intervention, we will present our research on building spatially explicit models to assess indicators of ecosystem services and analyze the interactions between each other. We will illustrate with some examples of services provided by the landscape during the excursion.
Afternoon presentations: Temple hill

6. ECOLOGICAL INFRASTRUCTURE AND NATURAL BIOTOPES
Maud Fazzari, Parc naturel régional Gruyère Pays-d'Enhaut

In order to improve its ecological infrastructure, the Park supports the creation of wet biotopes, as well as the planting of indigenous bushes and shrubs species in the built-up areas of the Park. It also supports fruit trees plantation. The aim of this project is to create a better network between the gardens and create habitats and food for small fauna in the built environment. At this point of the excursion, we will have the opportunity to see a pond created last year with the support of the Park, as part of a mountain garden rich in plant diversity. This Park project is an example of the concrete actions taken to promote biodiversity and strengthen the ecological infrastructure.

7. AGRICULTURAL LANDSCAPES OF THE GRUYERE PAYS-D'ENHAUT REGIONAL NATURE PARK
Lea Megali, Parc naturel régional Gruyère Pays-d'Enhaut

The landscapes of the Park have an essentially rural and mountainous character. A large part has been shaped by mountain agriculture which is organized around traditional pastoral activities, emblematic of the heritage of the Park. Over the years, the rise of the cheese economy fixed the current components of the landscape with a predominance of cattle breeding and transhumance for the optimal exploitation of grasslands, both in the alpine zone and in the valley. Forests remain on steep and inaccessible slopes or to guarantee the protection of inhabited areas. Even today, the agricultural landscapes of the Park are characterized by the presence of a mosaic of elements: between valleys and mountains, meadows and pastures, villages, forests and various natural environments alternate harmoniously.

Since the 1950s, the intensification of production methods has been characterized simultaneously by the increase in productivity of certain plots and by the abandonment of other less productive ones. This development, made necessary by the increase in the cost of labor and the fall in the selling price of products, is causing a scarcity of semi-natural environments that are precious for biodiversity, gradually closing some landscapes that were once open. Since the 1990s, farmers have played an important role in structuring and maintaining landscapes. In addition to their production of quality meat or milk, transformed into AOP at the village cheese dairy, they actively participate in the maintenance of fragile natural environments and landscape elements by taking part in projects of agroecological networks and landscape quality.

8. ECOLOGICAL INFRASTRUCTURE & NATURE'S CONTRIBUTION TO PEOPLE
Swen-Erik Rabe, ETH Zürich

Ecological infrastructure (EI) is essential for the conservation and enhancement of biodiversity and thus a core element of future species conservation efforts. However, a functioning EI does more than providing connectivity and habitats: it also includes social and economic benefits. Accordingly, what we call "Nature's Contribution to People (NCP)" – here the benefits of the EI to society - are also part of our concept of the EI. Achieving a functioning EI, therefore, also requires that the various stakeholders be able to articulate their desires and ideas that are related to the EI. To collect these wishes, we conducted visioning workshops with stakeholders from different topics of the Park Gruyère-Pays d'Enhaut in the context of the ValPar.CH project. The result is a jointly developed vision of the future that represents the desired development in terms of the EI. In parallel to this normative approach, we elaborated scenarios covering possible pathways of the EI, with one of the scenarios aiming at achieving the vision. The Park is only one actor in achieving the desired state but has the potential to shape development along the possible or targeted development pathways.
9. MAPPING PLANT COMMUNITY COMPOSITION IN MEADOWS AND FORESTS – POTENTIAL OF REMOTE SENSING DATA FOR SPECIES DISTRIBUTION MODELS (SDMS) AND MODELING NATURE’S CONTRIBUTIONS TO PEOPLE (NCPS)

Anna K. Schweiger, RSL, ValPar.CH, University of Zurich

On July 10 2021 the AVIRIS-NG (Airborne Visible InfraRed Imaging Spectrometer - Next Generation) sensor owned by NASA (National Aeronautics and Space Administration) and operated by JPL (Jet Propulsion Laboratory) acquired imaging spectroscopy data across Parc Gruyère Pays-d’Enhaut. This work was part of a joint effort of University of Zurich’s Remote Sensing Laboratories (RSL) and ValPar.CH who managed to fit the flight into the tight schedule of ESA’s (European Space Agency) CHIME mission (Copernicus Hyperspectral Imaging Mission for the Environment). Before the flight, the ValPar.CH team established 65 research plots in alpine meadows. During the summer of 2021, we conducted species inventories in all plots and harvested clip-strips of vegetation to determine plant carbon, nitrogen, non-structural carbohydrate, hemicellulose, cellulose and lignin content in the lab. These data are being used to develop predictive models of plant functional group composition, chemical composition and indicator values across the parc based on spectral image data. Moreover, we will identify tree species across the parc during the summer 2022 to develop predictive models for mapping the most common tree species from spectral image data. The resulting high resolution (2m x 2m) maps of plant community composition will be used as input for SDMs and models for predicting NCPs. Our overall objective is to assess the added value of these high resolution – high detail vegetation maps for assessing the Park’s ecological infrastructure (biodiversity + NCPs). In addition, we will compare the added value of vegetation maps developed from imaging spectroscopy to that of vegetation maps developed from satellite data with lower spatial resolution and information content. In light of the upcoming launches of imaging spectrometers into space, our work will provide important information about how and when remote sensing data can benefit ecological infrastructure assessments.

For more information, please visit https://www.valpar.ch/