IDENTIFICATION OF THE GREEN INFRASTRUCTURE IN SWITZERLAND AND ITS IMPLEMENTATION AT DIFFERENT SCALES

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Introduction

Green Infrastructure (GI) represents a **strategically planned network of natural and semi-natural areas** (EEA, 2014). They are made of **core areas** with high level of biodiversity & supply of ecosystem services, and **links** between them composed of small patches allowing ecological connectivity. Based on the **multifunctional aspect** of the landscape, GI can be used as a tool to provide natural and cost-effective alternatives to human made "grey" infrastructures characterized by a negative impact on nature.

Taking the example of Geneva Canton (Switzerland) and its surrounding, we propose a general **framework** to assess and identify GI at different scales taking into account three main pillars : **biodiversity** of plant species, **ecosystem services** supply and finally **connectivity** & structure of the landscape for a few groups of animals.

1 Dataset and scale

Biodiversity

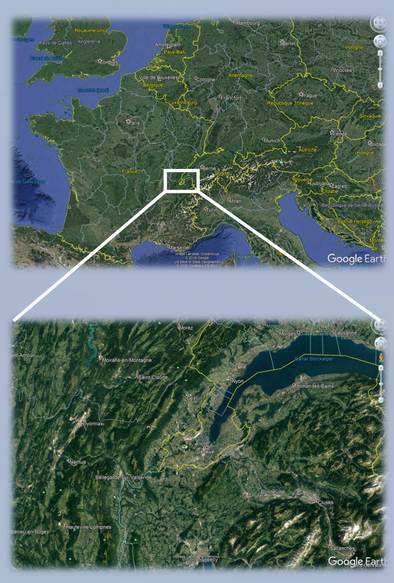
Precise and well distributed occurrences of plant species as well as variables such as temperature, precipitation, soil's pH, altitude, slope, TPI, habitat distribution etc.

Ecosystem services

Land-use land-cover & natural habitat maps.

Connectivity

Land-use land-cover map, animal tracking and expert knowledge.



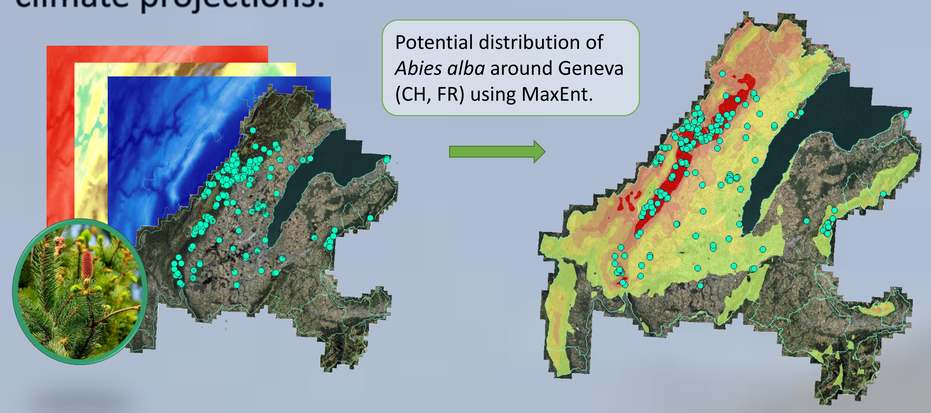
Mean temperature
Maximum temperature
Mean precipitation
Minimum precipitation
Carbon storage
Climate regulation
Large mammals
Birds

Altitude
Solar radiation
TPI
Pollination
Heat protection
Flood protection
Amphibians
Mammals

2 Method and predicted results

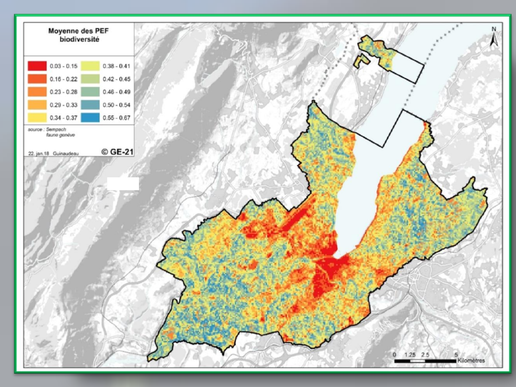
Biodiversity

Using habitat suitability models, we can map potential distribution of plants and identify local biodiversity hotposts. This method is also interesting using variables from future climate projections.



Potential distribution of *Abies alba* around Geneva (CH, FR) using MaxEnt.

Local hotspots of specific richness in Geneva Canton (CH)

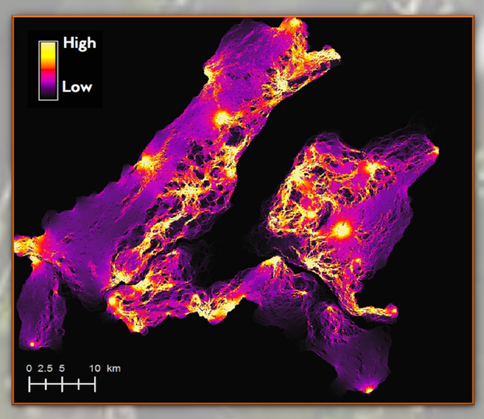


Connectivity

GPS tracking represent the best method to identify daily movements of animals but can't always be applied. Instead, modelling connectivity based on expert knowledge represent an easier alternative (i.e. Circuitscape).

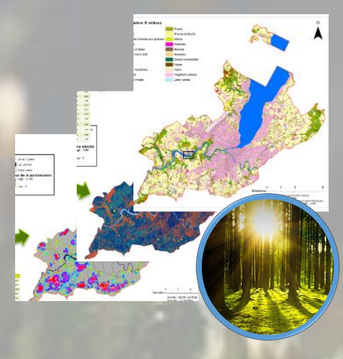
Measuring landscape's fragmentation with Fragstat might also be a good complement for GI.

Connectivity map based on GPS tracked *Cervus elaphus* individus made with CircuitScape. Yellow spots represent known populations and important paths for this animal.

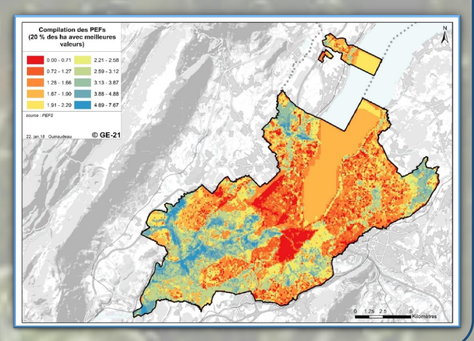


Ecosystem services

Using expert-based valuation of landscape's elements, indicators or models with InvEST, it's possible to map the supply of ecosystem services. Therefore, hotspots of ES supply can be identified and integrated into GI.



Map of ecosystem services supply for the Geneva Canton (CH). Areas in blue are important supplyers and would greatly benefit the local GI.



3 Prioritization process

Spatial Conservation Prioritization (SCP) processes allow to find the best conservation compromise considering the results of the three pillars.

There are many benefits in using SCP softwares such as Marxan or Zonation :

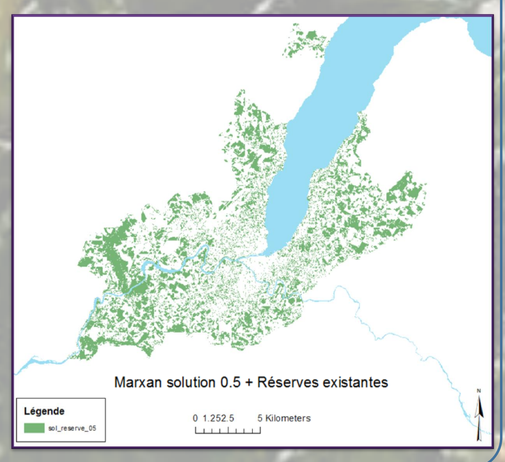
★ Define the desired amount of protected areas and the weight allowed to each pillar.

★ Add the monetary information of each element of the landscape in the model in order to minimize the cost of implementation.

★ Choose alternatives if one element is not compatible with the desired network.

ZONATION

MARXAN conservation solutions



First result using Marxan showing the best 50% areas of the Geneva Canton (CH), taking into account existing protected areas.

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