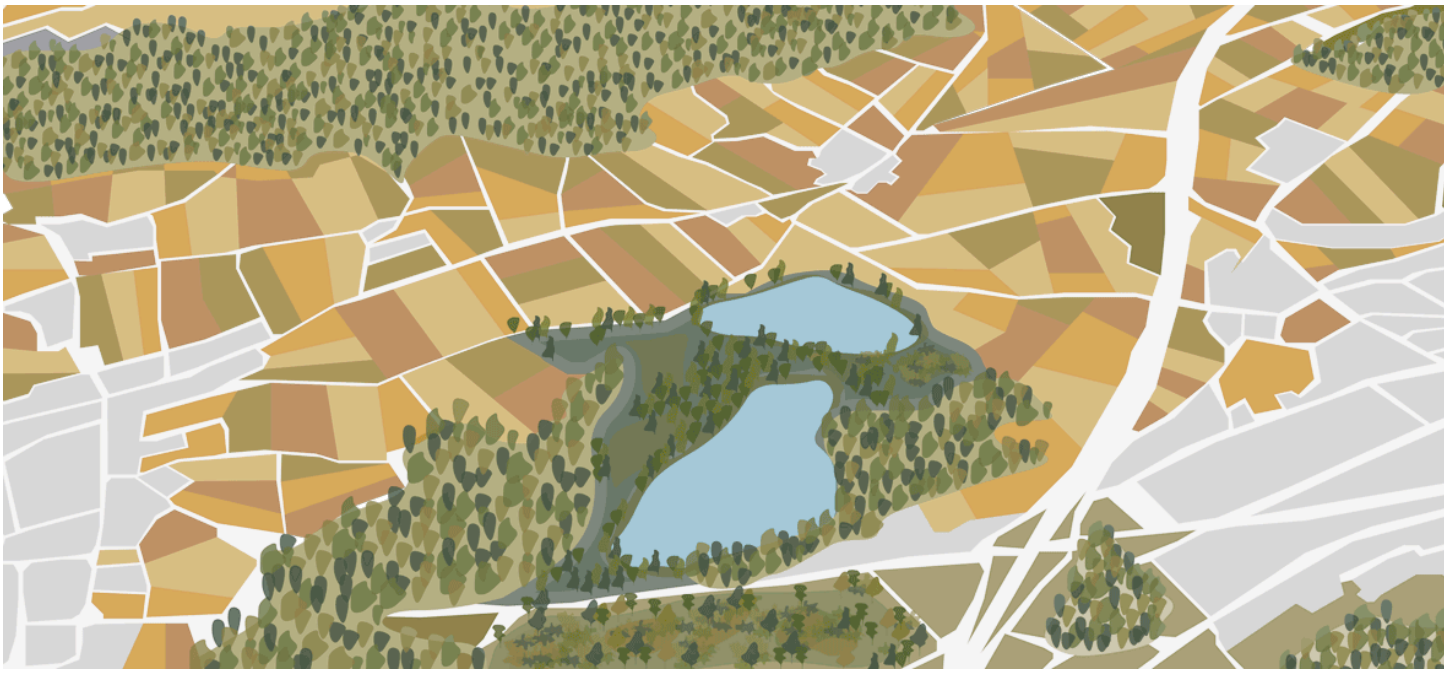
ETH Zurich Department of Architecture
ARCHITECTURE OF TERRITORY
Chair of Architecture
and Territorial Planning
Professor Milica Topalović

Agritopia
Fall 2023

Cohabitopia

Interwoven Landscapes

Tobias Hefti, Nico Bohren, Belma Ahmetovic, Moritz Stoll, and Lisa Tognola



In Zurich, like many other urbanised areas, the expansion of agriculture has significantly contributed to the loss of biodiversity. As the city developed and agricultural practices intensified, natural habitats such as forests, wetlands, and meadows were converted into farmland or urban infrastructure. This transformation led to the fragmentation and destruction of ecosystems, displacing numerous plant and animal species that once thrived in these areas. Additionally, the use of pesticides, herbicides, and intensive farming methods has further exacerbated the decline of biodiversity in Zurich, impacting both local and migratory species. Efforts are underway in Zurich and surrounding areas to implement sustainable agricultural practices and preserve remaining natural habitats to mitigate the ongoing loss of biodiversity.

By introducing hedgerows, buffer strips, and creating wildlife corridors actively, the project will promote habitats for diverse species in Agritopia.

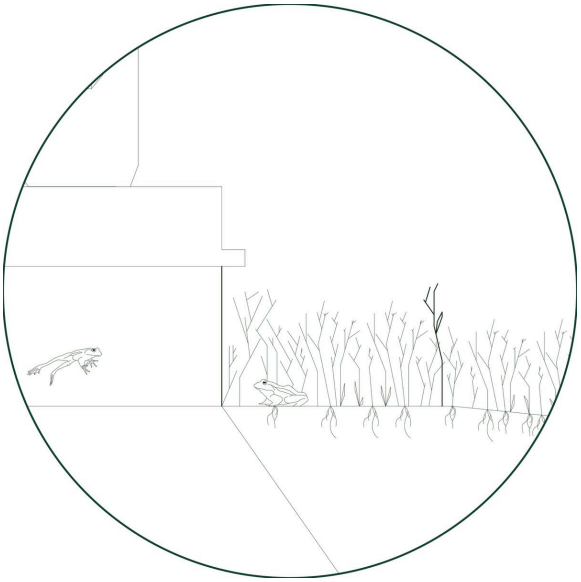
Biodiversity in Anthroprogenic Landscapes



The landscape around the Katzensee area is unique and is identified as an “emerald area.” Our aim was to better understand the character of the landscape and this uniqueness. Four indicators helped us to understand the area.

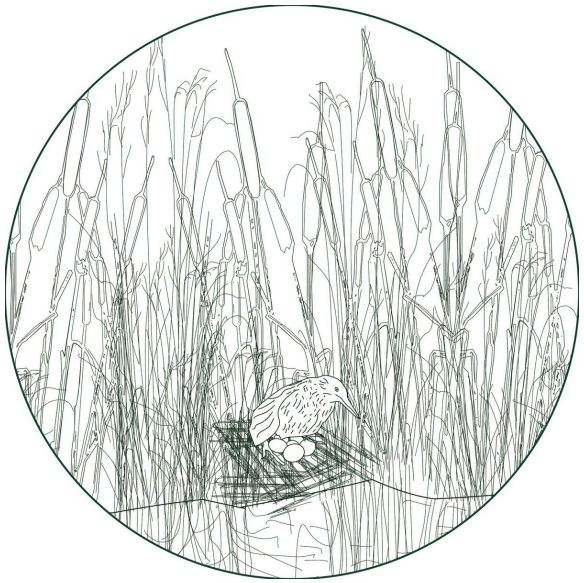
The first of these was the bee, which brought us closer to the perspective of insects. To understand the world of amphibians and the lost connectivity of their habitats, the frog guided us through the area. Another endangered inhabitant of the marshes is the bittern. Through its gaze, we understood the complexity and importance of the marshlands. Finally, one of the largest inhabitants is the red deer. It has revealed the barriers created by human hands.



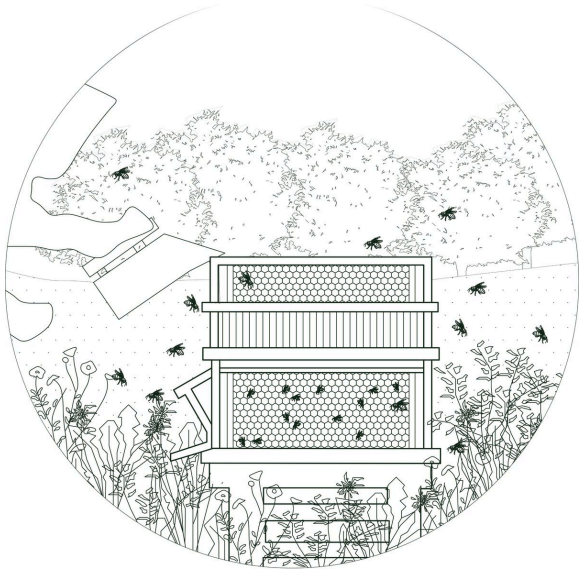




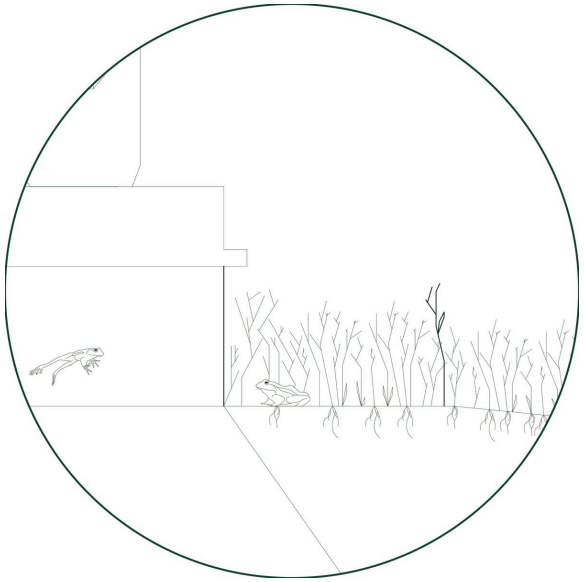














The common frog, hiding places.

The common frog, spawning grounds.



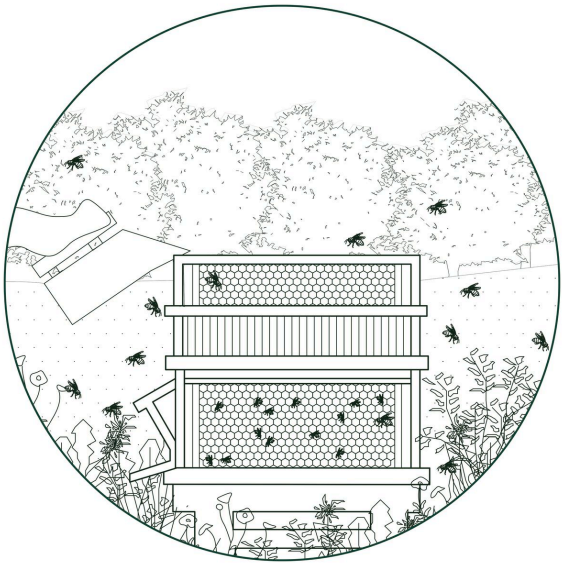
The Eurasian Bittern, on a food hunt.



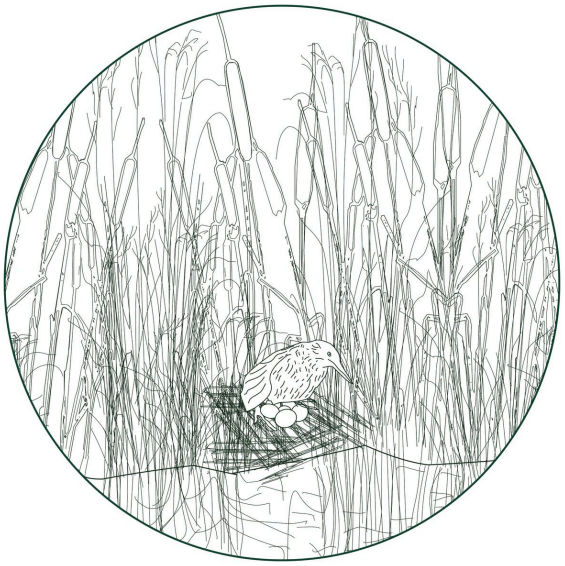
The red deer, barriers and
negative impact on habitats.



The red deer, natural behavior in the habitat.



The honeybee, man-made hive
for pollination as well as honey.

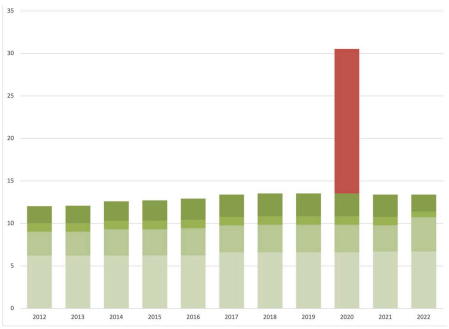


The Eurasian Bittern, nesting places.



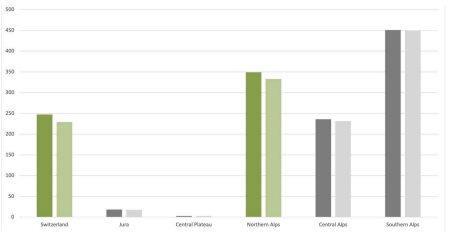
The wild bee, nesting sites in small structures.

The biodiversity of the Katzensee region in Zurich reflects a rich tapestry of interconnected ecosystems. This area showcases a complex web of life, encompassing diverse habitats such as wetlands, meadows, and woodlands. Within this intricate landscape, numerous plant and animal species coexist, each playing a unique role in the ecosystem. The delicate balance between these elements contributes to the region's biodiversity, offering a glimpse into the intricate relationships and dependencies that shape this natural haven. Efforts to understand and preserve this complexity are crucial for sustaining the diverse array of life within the Katzensee region in Zurich.



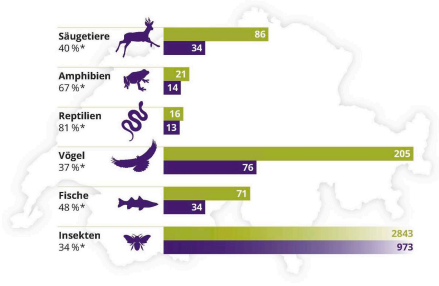
Areas designated for biodiversity.

- Target 2020
- Other areas designated for biodiversity protection and promotion
- Protected areas of international importance
- Cantonal, regional and local protected areas
- National protected areas



Fragmentation of landscapes.

- 2014
- 2020



Ratio of the number of different species in Switzerland and the number on the red list.

- Number of species in Switzerland
- Number of species on the red list

The landscape around Katzensee boasts serene beauty, with its idyllic meadows, shimmering lake, and verdant woodlands offering a picturesque escape. However, the encroachment of agriculture has left visible scars, fragmenting natural habitats and disrupting the seamless harmony of the ecosystem. The juxtaposition of beauty and agricultural impact reflects a delicate balance, urging a need for sustainable practices to preserve the region's allure while mitigating the adverse effects on its biodiversity.



The habitat of wildbee's: Stonepiles and flowers. Tobias Hefti 2023.



The habitat of the Red Deer: Large open fields with tree's for fallen fruit. Nico Bohren 2023.



The habitat of the Amphibians: Small water streams. Nico Bohren 2023.



The habitat of the Waterbirds: Wetlands with nesting sites. Nico Bohren 2023.





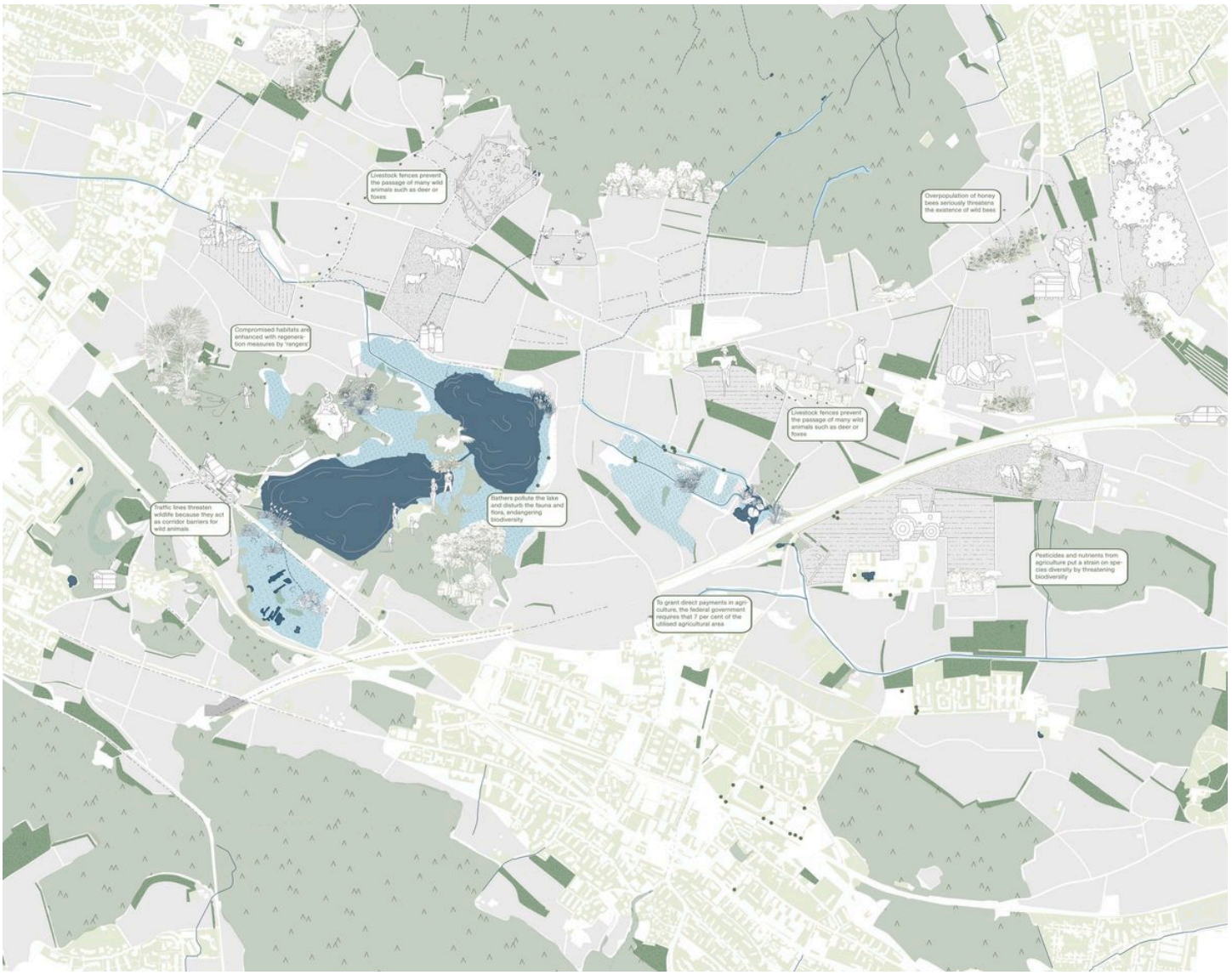






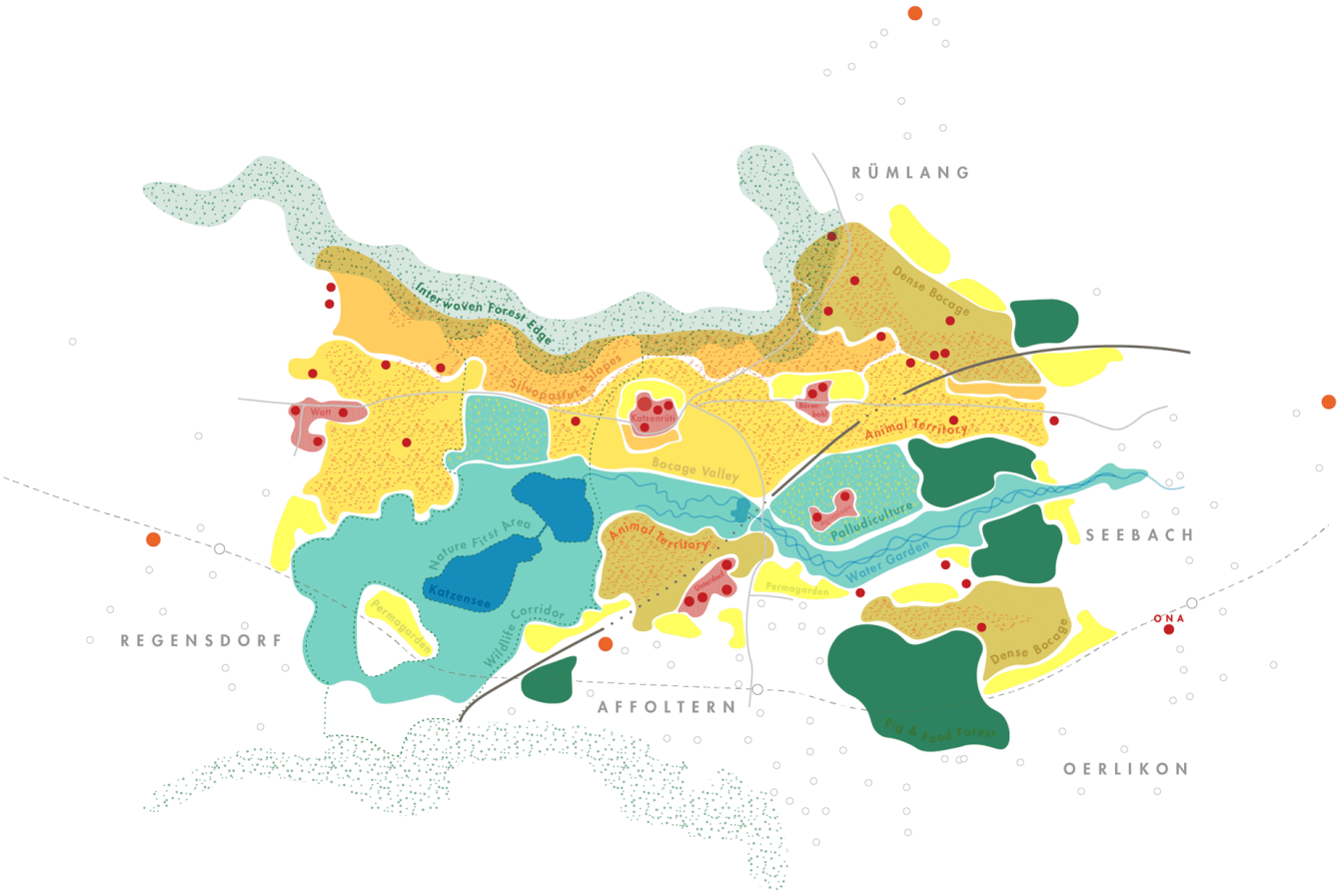




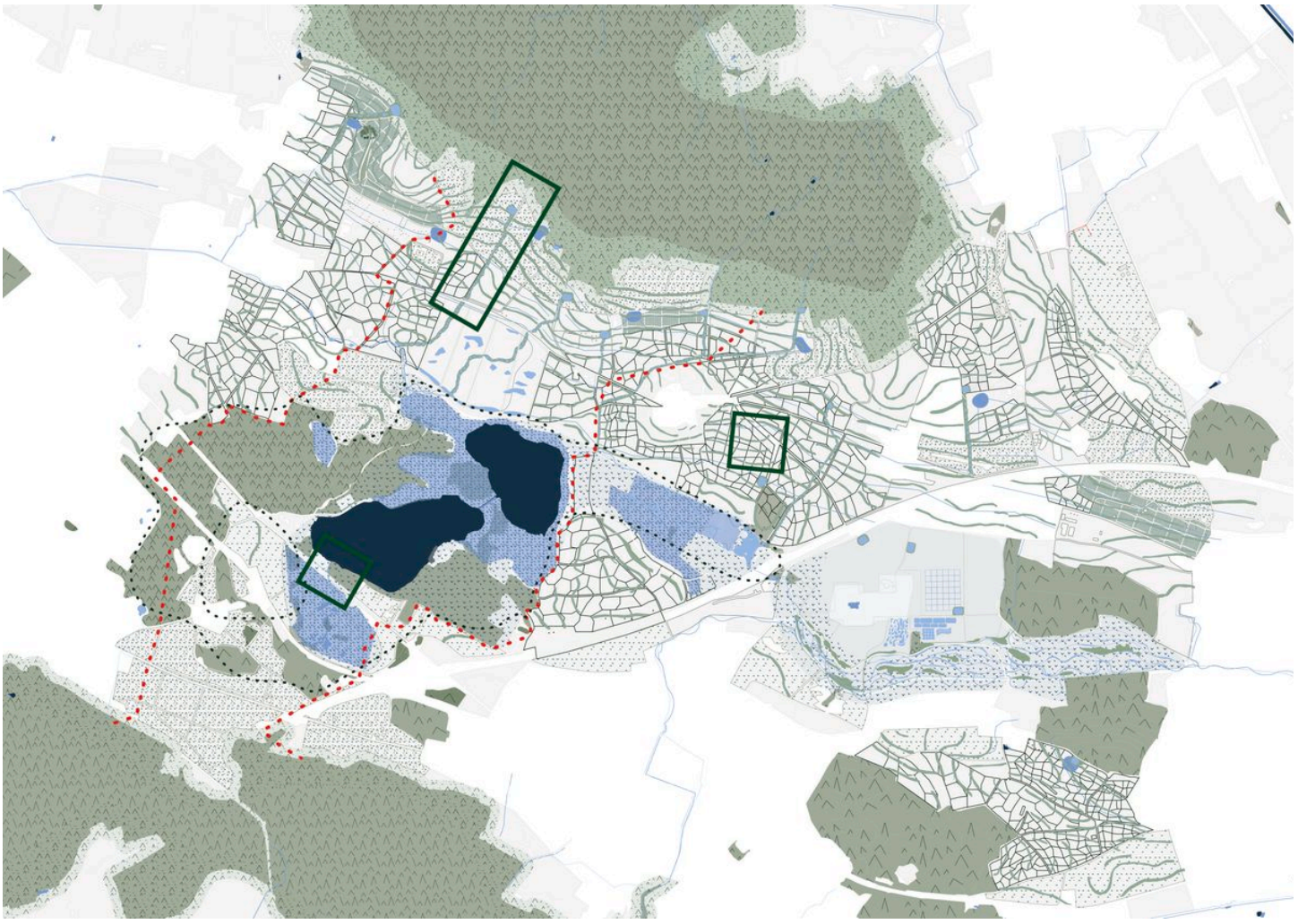
Narrative Cartography Map.

Harmony Between Habitats and Agriculture: Creating Sanctuaries for Wildlife

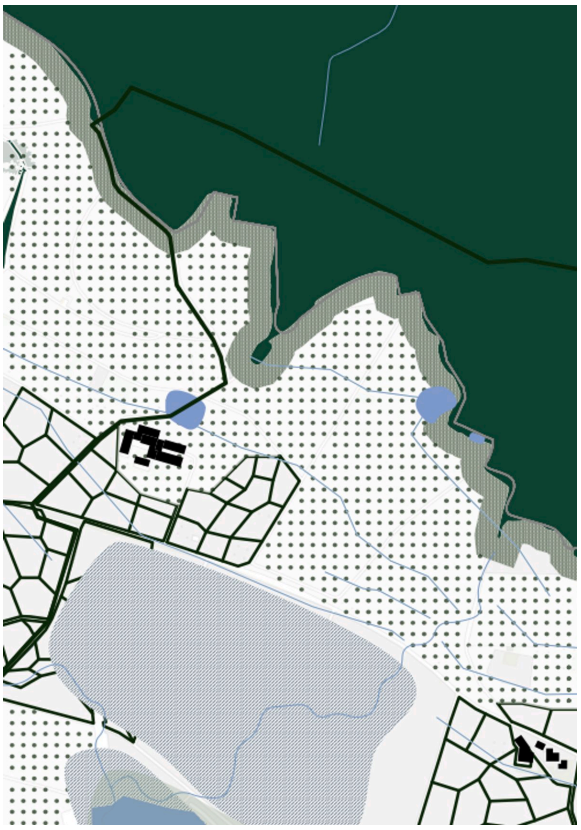


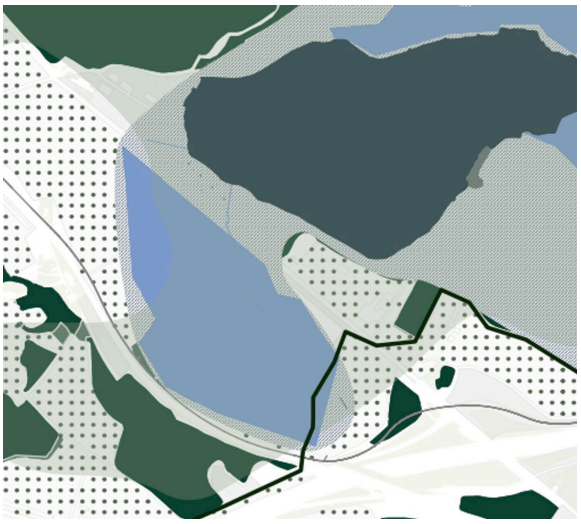
For Agritopia, we propose a landscape in which humans, flora and fauna will cohabit, focusing on three areas: The Katzensee region, biodiversity in agriculture and the renaturation of the forest edge.

The collaboration between human endeavors like farming and the generation of biodiversity and habitats is an active synergy driving sustainable ecosystems. Farmers actively cultivate diverse crops, implement habitat-friendly practices, and create designated wildlife sanctuaries within agricultural landscapes. This deliberate effort not only sustains food production but actively nurtures habitats for various species. The interplay between human stewardship and natural biodiversity actively fosters resilient ecosystems, showcasing how intentional human actions can harmonise with nature's intricate web of life.

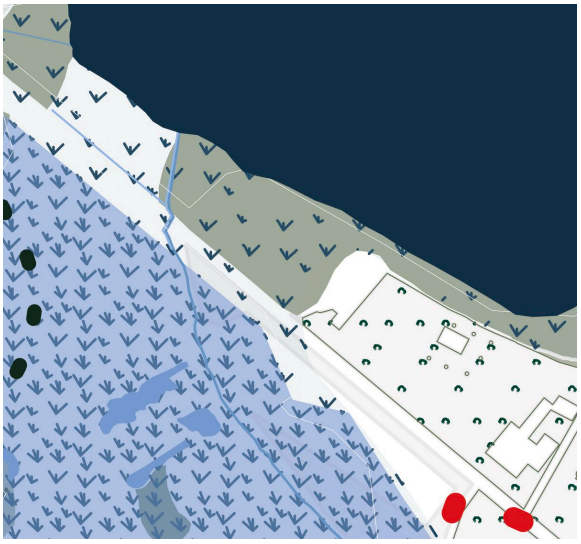


Our project focuses on three areas:
The Katzensee region, biodiversity in agriculture and the renaturation of the forest edge. Based on these three locations, a concept is generated for the entire landscape in Zurich Nord in order not only to maintain biodiversity and habitats, but also to improve them.









Katzensee region.

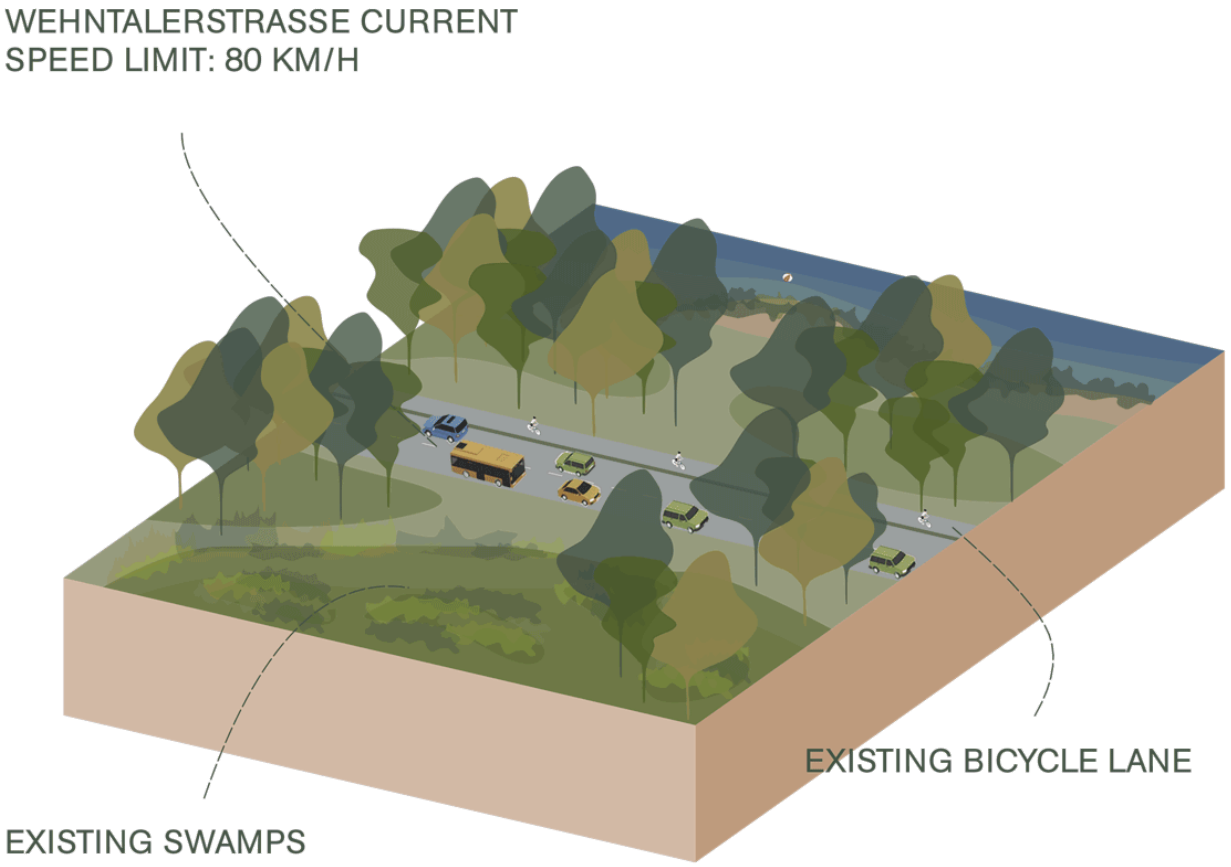


Biodiversity in agriculture.



Forest edge.

Preserving the Rich Biodiversity of the Emerald: A Conservation Endeavor

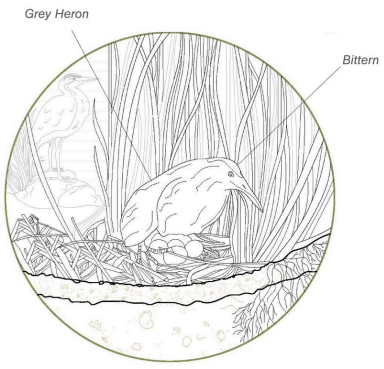


Protecting the Katzensee in Zurich is crucial to safeguard its rich biodiversity, preserving a delicate ecosystem teeming with diverse plant and animal life. This pristine natural habitat serves as a vital sanctuary for migratory birds, offering crucial resting and nesting grounds along their journeys. Additionally, the Katzensee's conservation ensures the preservation of essential ecological functions, such as water purification and maintaining a balanced local ecosystem.

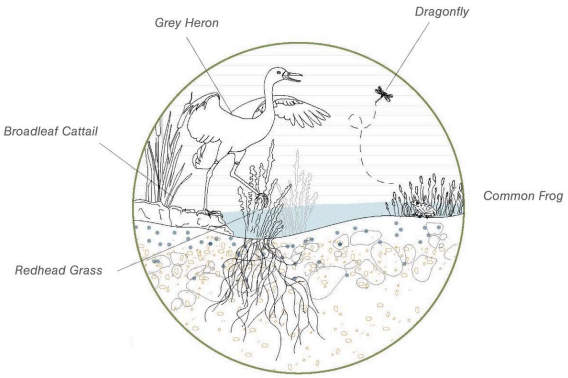
Preserving nature in the Katzensee region is an active imperative, driven by the urgent need to safeguard its rich biodiversity. This area teems with interconnected ecosystems, from vibrant wetlands to diverse woodlands, harboring a myriad of plant and animal species. Protecting these natural habitats actively ensures the continuation of crucial ecological functions, such as water purification and wildlife preservation. By actively conserving the Katzensee region, we actively secure a haven for biodiversity, enabling future generations to thrive amidst this treasure trove of nature's wonders.



Protecting the existing landscapes: fluid and interconnected habitats can be generated



Eurasian Bittern nesting place.

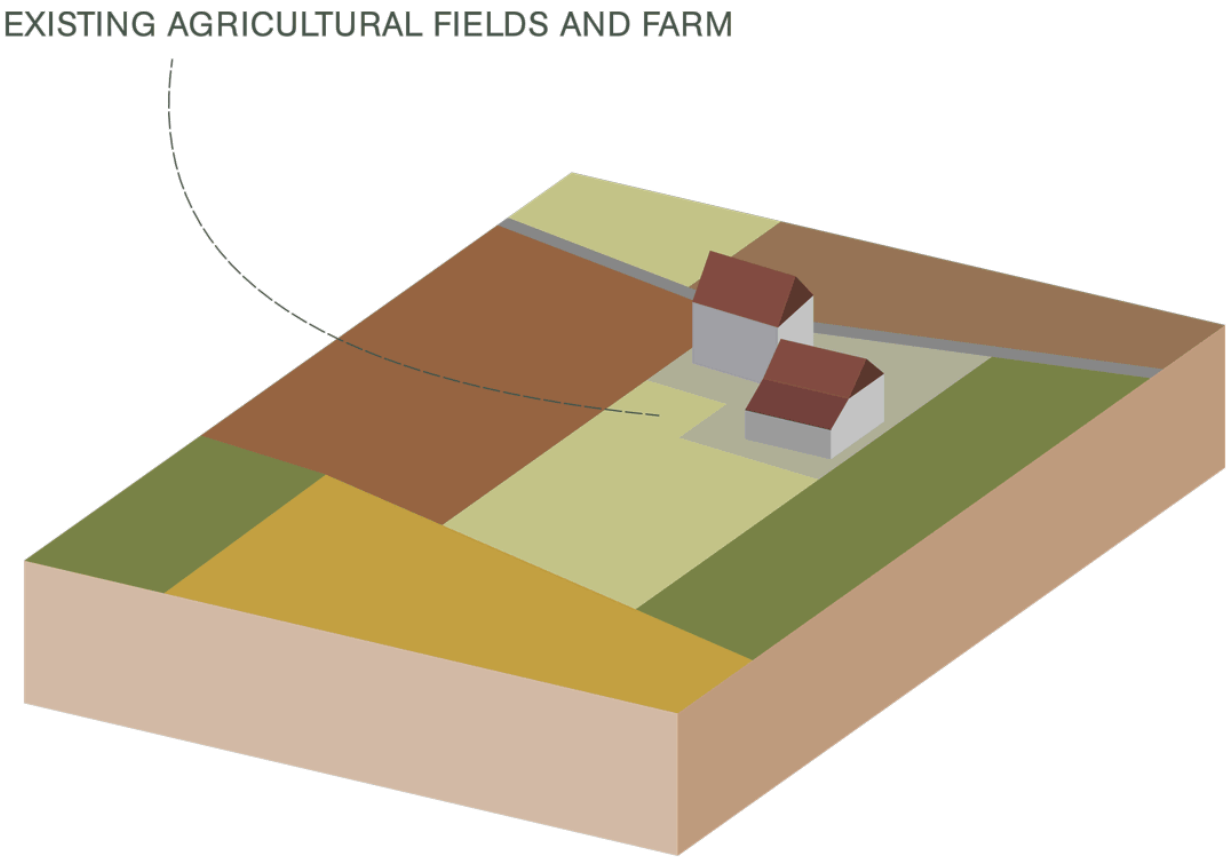


Biodiversity at the shore of Katzensee.





Redefining Agriculture: Cultivating Biodiversity in Transformed Landscapes

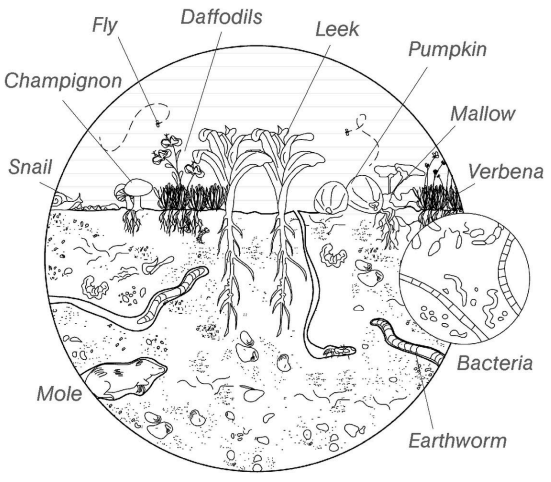


Strategically planning to reintroduce native flora, creating wildlife corridors, and implementing diverse cropping systems actively fosters habitats for diverse species, from pollinators to beneficial insects, thereby promoting a healthier ecosystem during the transformation of agricultural fields into biodiverse landscapes.

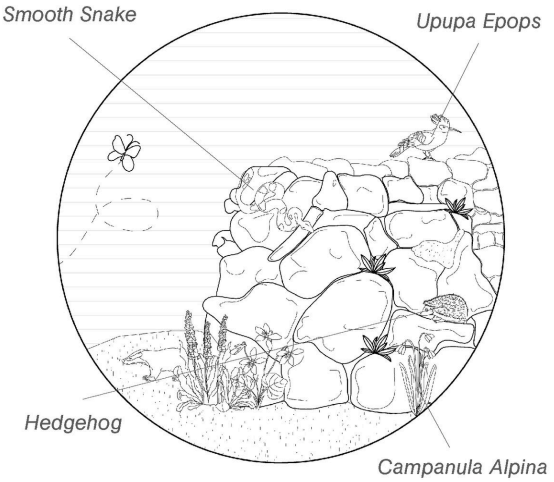
Biodiversity in agriculture has been a prominent subject in switzerland for some time now. Despite the regulation of a percentage as compensation areas, it is not only the quantity that is questionable, but also the quality of the individual areas. Agritopia not only promotes biodiversity, but also ensures a high level of connectivity.



Drawing the new areas: smaller fields enable greater diversity in agriculture

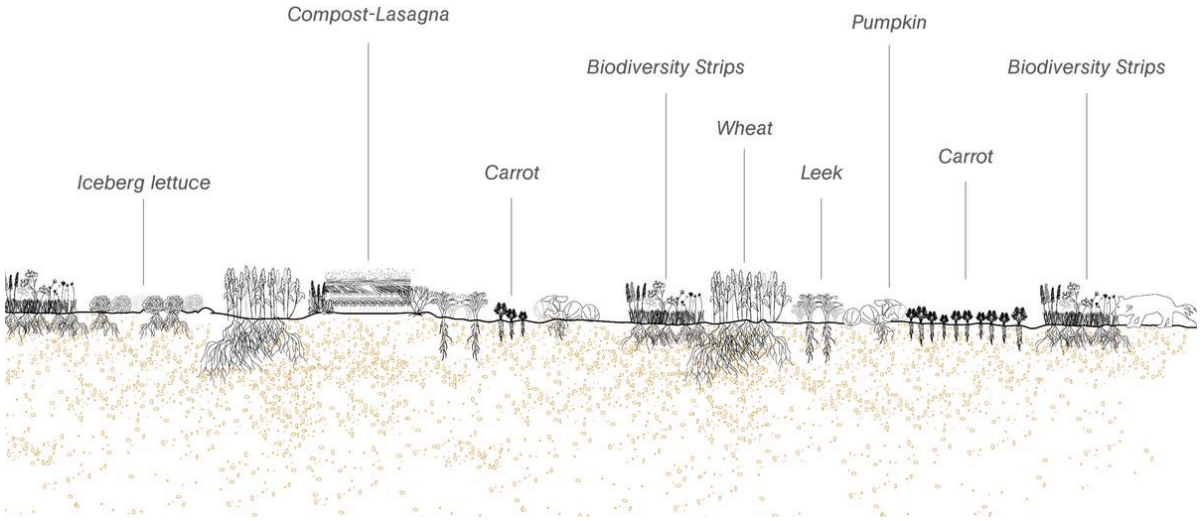


Soil structure with a high degree of species diversity.

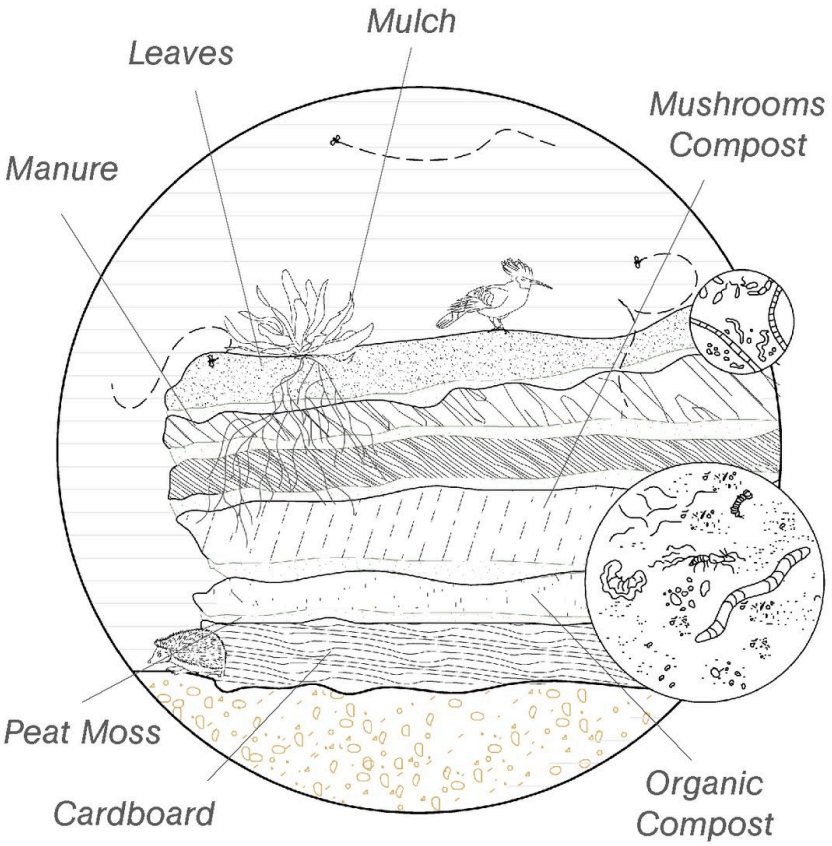


Stone piles on marginal areas to enable high species diversity and different habitats.

The role of biodiversity and the creation of networked habitats is made possible in agriculture through the planting of different species. The fields are embraced by the various “tools” and networked with each other. The result is a membrane that runs through the entire area and links the habitats of the individual organisms with each other. At the same time, the biodiverse strips ensure a repertoire of beneficial organisms that can protect and stabilize the yields of the agricultural crop.



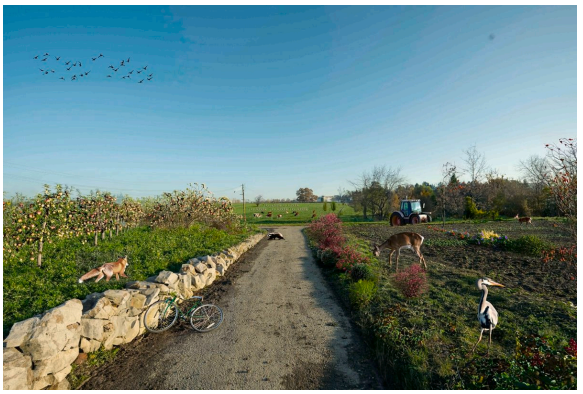
Sectional view of the newly designed agricultural areas with an increase in biodiversity areas.



Composition of a "soil lasagna".



Drawing the new areas: existing landscape in agriculture



Drawing the new areas: new networks and habitats are generated

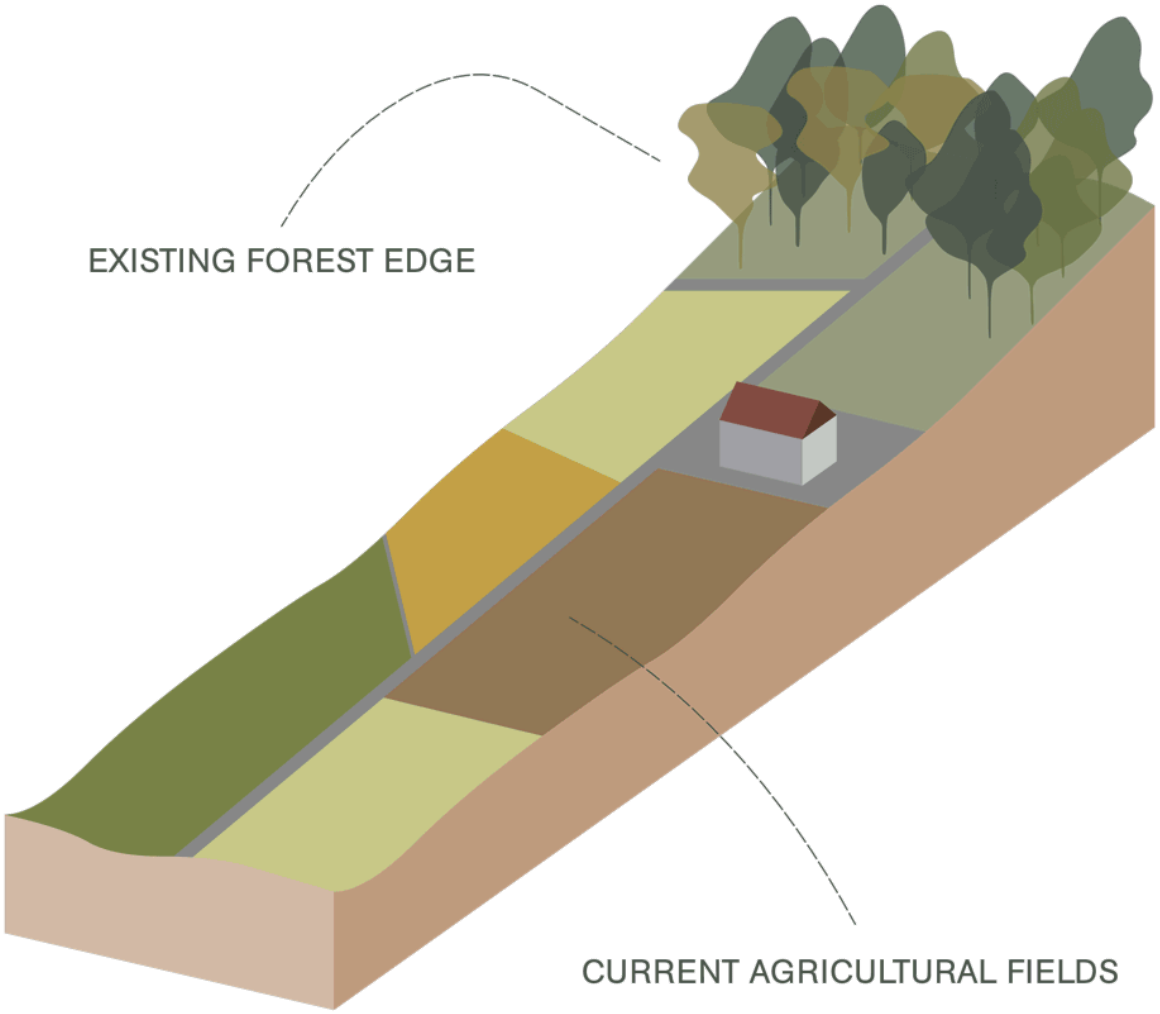


Drawing the new areas: existing landscape in agriculture. Nico Bohren 2023.



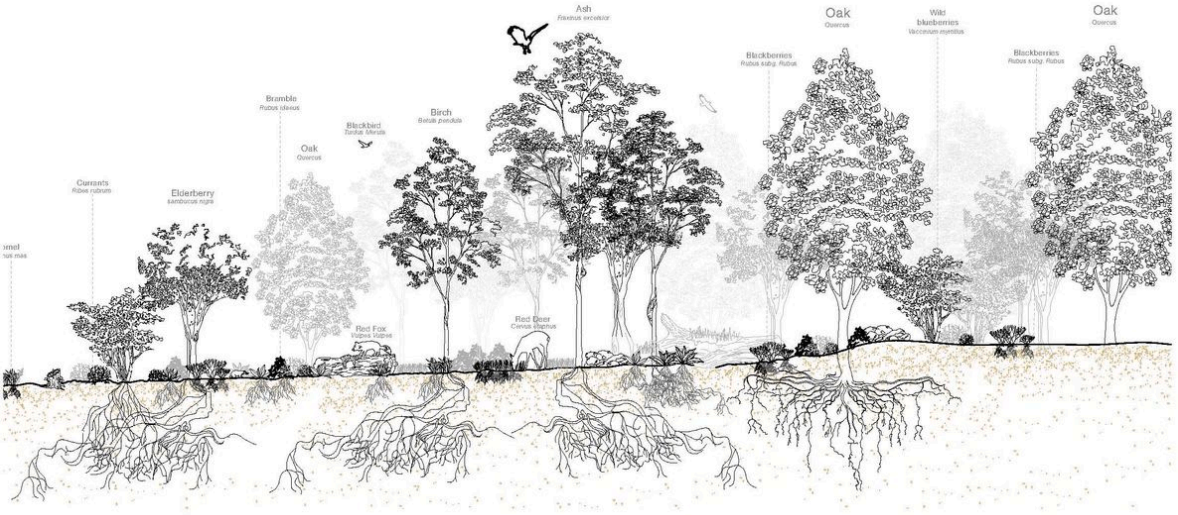
Drawing the new areas: new networks and habitats are generated.

Expanding Forest Edges: Enhancing Biodiversity Along Borders

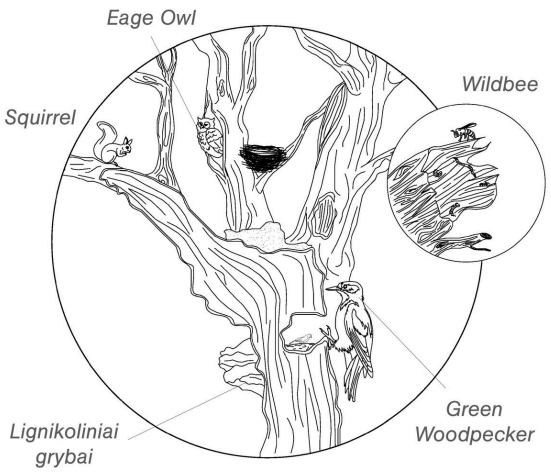


Deliberately extending forest edges amplifies biodiversity by introducing transitional habitats that bridge woodland and open landscapes, fostering a diverse array of species adapted to varied environments. These expanded edges actively serve as crucial corridors, enabling wildlife movement and facilitating interactions between different ecosystems, thereby enhancing overall biodiversity.

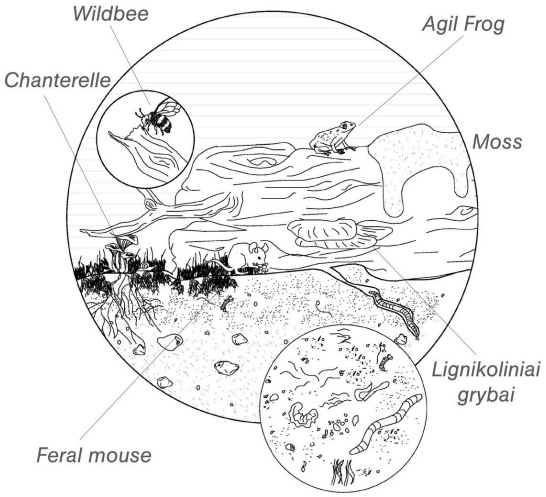
Richly structured forest edges not only lead to a high level of biodiversity, but also provide an important habitat for numerous animal and plant species. Over time, humans' strict sense of order has meant that the boundaries between forests and agricultural fields have to be drawn ever more clearly. By breaking down the boundaries and reweaving the landscapes, the lost habitats are restored and a new perspective on the relationship between nature and agriculture is made as a result.



Breaking down boundaries: the immediate edge of the forest

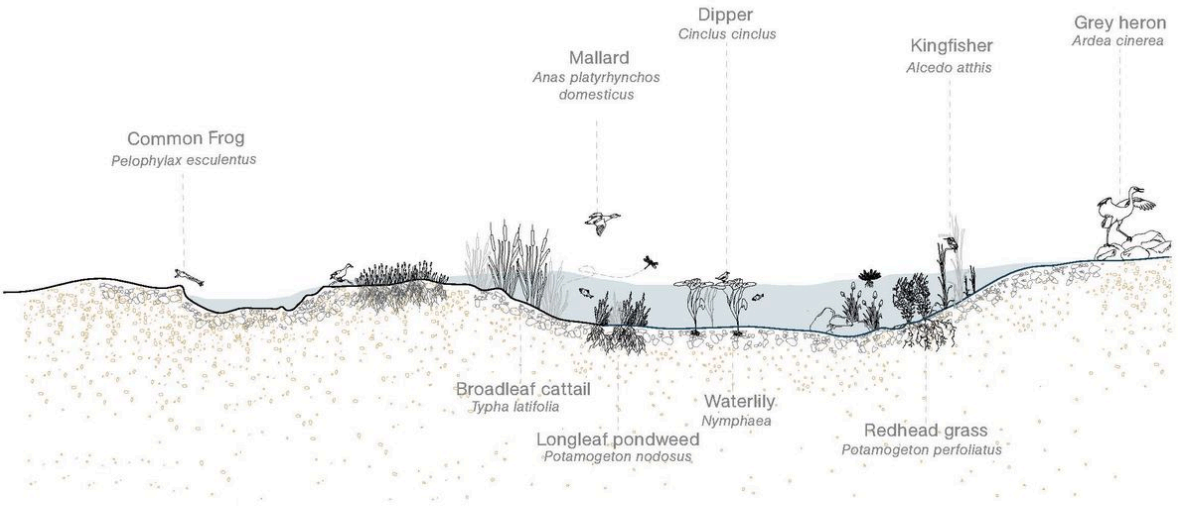


Habitat tree: enables living spaces for microhabitats.

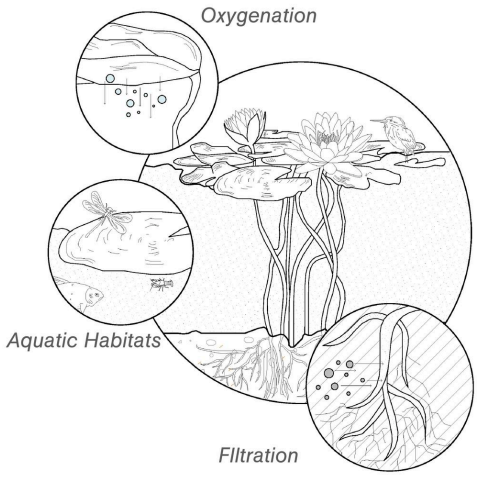


Deadwood and other biowaste from species in the forest generate a high level of biodiversity.

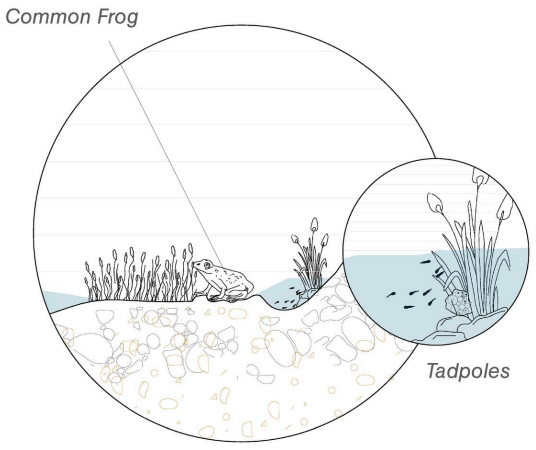
The immediate border at the edge of the forest is broken up by the planting of native species. The herbaceous border forms the lowest layer and spreads over the ground. Young trees and shrubs form the shrub layer which then slowly flows into the forest mantle. Deadwood and habitat trees form microhabitats for smaller organisms such as wild bees and other insects.



Breaking down boundaries: water is reintroduced

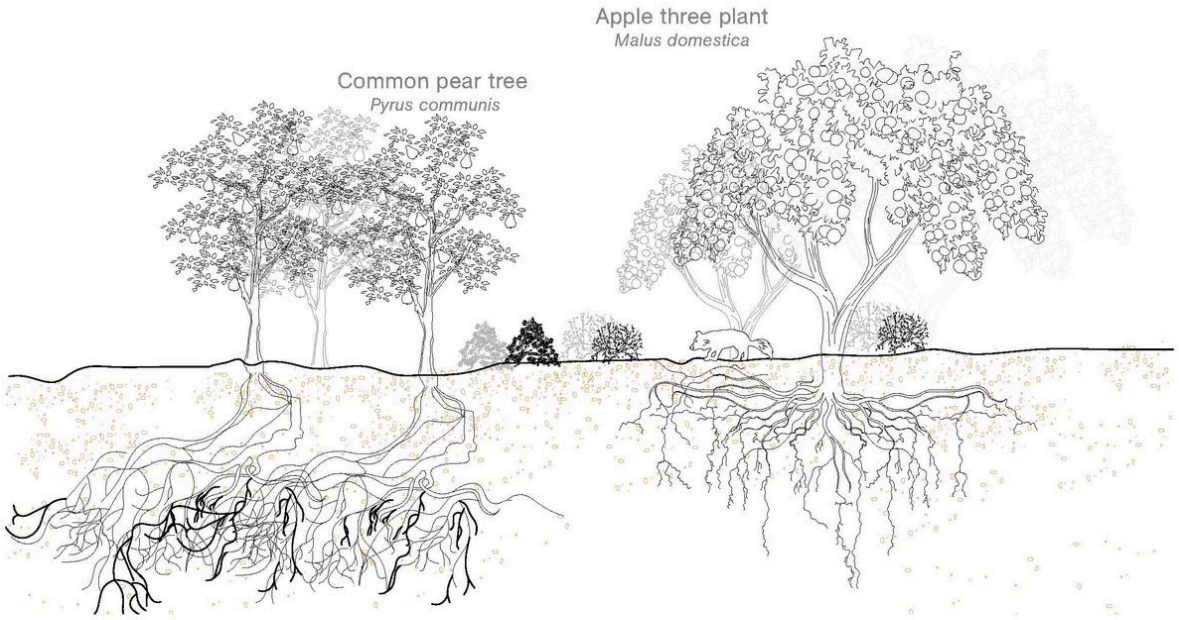


Processes caused by hydrophilic plant species in water bodies.

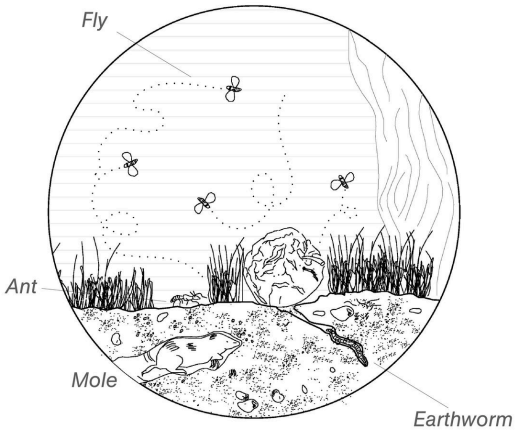


Retention areas providing nesting and breeding sites for various species.

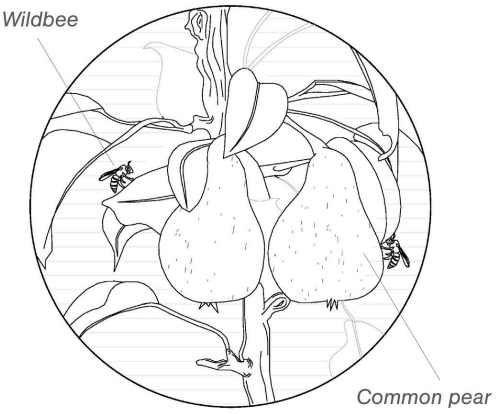
Water is embedded in the forest edge through smaller streams along the slope, the retention areas and water terraces. Alternately moist plant species such as lichens and mosses form another type of habitat. The habitat of amphibians is thus once again more interconnected and spawning areas are promoted. In addition, the “ponds” also provide water for agriculture, which can relieve the groundwater table.



Breaking down boundaries: agriculture as added value and not a boundary



Windfall fruit provides micro-habitats, nutrients for soil and animals.



Promoting wild bees has a positive effect on the Pollination of orchard's.

The forest edge can also be used in a natural way in agriculture: the various nut and fruit trees are used by both humans and animals. The open design also ensures permeability at the same time. the fallen fruit of the trees not only generates food for wild animals, but microhabitats can also be created here.



Existing forest edge



Newly created habitat

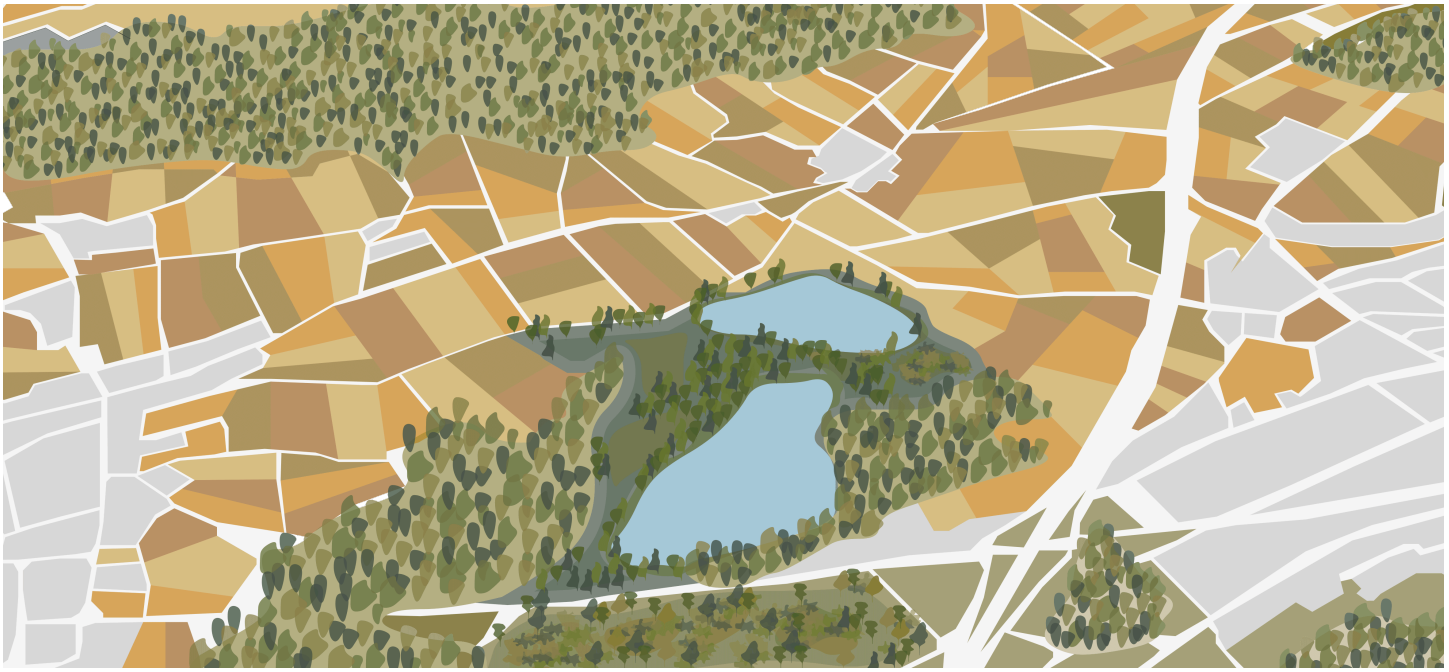








Evolutionary Shifts: Necessity of a Common Constitution



Collaborating groups actively exchange ideas and expertise for a comprehensive territorial plan, ensuring inclusive decision-making among governmental bodies, communities, and organizations with varied needs.

As agriculture embraces greater biodiversity, the landscape undergoes a transformative shift. Fields once dominated by monocultures now host a tapestry of diverse crops interwoven with native plants. Hedgerows and wildflower strips bordering fields attract a flurry of pollinators, while ponds and wetlands nestled within farmland teem with life. The soil, enriched by diverse root systems and reduced tillage, becomes a thriving habitat for a multitude of microorganisms. Birdsong fills the air as avian species find refuge in the trees and shrubs dotting the fields.

This newfound diversity doesn't just enrich the scenery; it fosters resilience. Pest control becomes a balanced interplay, with natural predators thriving amidst varied habitats. Water retention and purification improve, benefiting both the land and nearby waterways. Farmers witness increased yields and healthier crops, while biodiversity flourishes within and beyond agricultural boundaries.

Ultimately, the landscape evolves into a harmonious mosaic, where agriculture and nature coexist, intertwine, and thrive together.










SOURCES

- “Amphibienlaichgebiete.” Bundesamt für Umwelt. Accessed 31 October 2023. https://www.bafu.admin.ch/bafu/de/home/themen/biodiversitaet/fachinformationen/oekologische-infrastruktur/biotope-von-nationaler-bedeutung/amphibienlaichgebiete.html
- “Amphibienschutz” Naturschutzverein Regensdorf https://nvregensdorf.ch/programm/projekte/amphibienschutz
- Bayerische Landesamt für Umwelt, “Rohrdommel (Botaurus stellaris)”, Accessed 17. October 2023. https://www.lfu.bayern.de/natur/sap/arteninformationen/steckbrief/zeige?stbname=Botaurus+stellaris
- Bea Maas, “Vielfalt, Schönheit, Freiheit: Vögel”, Universität Wien, 12. November 2019, https://medienportal.univie.ac.at/uniview/wissenschaft-gesellschaft/detailansicht/artikel/vielfalt-schoenheit-freiheit-voegel/
- “Bedeutung für Mensch und Umwelt” Bienenfachstelle Kanton Zürich. 16 June 2017. https://www.bienenfachstelle-zh.ch/infopool/bedeutung-mensch-umwelt/?seq_no=2
- “BFS” (https://www.bfs.admin.ch/bfs/de/home/statistiken/raum-umwelt/umweltindikatoren/alle-indikatoren/umweltzustand/gefaehrdete-tiere-und-pflanzen.assetdetail.27965547\.html)
- “Bienen” Stadt Zürich Tiefbau- und Entsorgungsdepartement https://www.stadt-zuerich.ch/ted/de/index/gsz/beratung-und-wissen/tier-und-mensch/Bienen.html
- “Biodiversität: Vielfalt des Lebens” (https://missionb.ch/de/biodiversitat)
- “Bundesinventar der Amphibienlaichgebiete von nationaler Bedeutung – Ortsfeste Objekte,” Bundesamt für Umwelt. Accessed 12 October 2023. https://www.geocat.ch/geonetwork/srv/ger/catalog.search#/metadata/1b48774e-1047-4e8f-b743-
- “Chancen für die Biodiversität im Kanton Zürich” Baudirektion Kanton Zürich. October 2010. https://www.zh.ch/content/dam/zhweb/bilder-dokumente/themen/umwelt-tiere/umweltschutz/zuercher-umweltpraxis-zup/2010/62/ZUP062_2010_T0023_ganz.pdf
- Elisa Schmit, “Was wäre, wenn es keine Vögel mehr gäbe?”, Welt.de, 07. February 2011, https://www.welt.de/wissenschaft/umwelt/article12469935/Was-waere-wenn-es-keine-Voegel-mehr-gaebe.html
- “ÖkoArtCervus” Deutsch Wildtier Stiftung. June 2016. https://www.rothirsch.org/wp-content/uploads/2019/03/broschuere_a4_6seiter_rotwild_0616_druckbogen_klein.pdf
- “Naturkalender” (https://www.naturkalender.at/arten/straeucher)
- “Naturschutzgebiet Katzensee” (https://nvregensdorf.ch/wp-content/uploads/2015/10/Naturschutzgebiet-Katzensee-2017\.pdf)
- “Plantillustrations” (http://botanicalillustrations.org/taxa.php?id_taxon=7191&taxon=Pyrus&higher_taxon=Rosaceae&code_category_higher_taxon=3&genus=Pyrus&SID=mhlgh24ucmom0dncu5t03tftmb&mobile=0&uhd=0&size=0&query_broad_or_restrictedbroad&query_type=genus&thumbnails_selectable=0)
- Prof. Dr. Katrin Böhning-Gaese, “Vögel in Ökosystemen”, Senckenberg World of Biodiversty, Accessed 17. October 2023. https://www.senckenberg.de/de/ueber-uns/organisation/themen/tag-des-vogels/#:~:text=Welche%20Rolle%20spielen%20V%C3%B6gel%20in,%2C%20Samentransporteure%20oder%20%E2%80%9EM%C3%BCllpolizei%E2%80%9C
- “Rothirsch” Wikipedia. https://de.wikipedia.org/wiki/Rothirsch#Nahrung
- “Rotwildkonzept Kanton Zürich” Amt für Landschaft und Natur Kanton Zürich. October 2017. https://www.zh.ch/content/dam/zhweb/bilder-dokumente/themen/umwelt-tiere/tiere/fischerei-und-jagd/jagd/artenschutz_artenfoerderung/rotwildkonzept_kanton_zuerich.pdf
- “Verschollene Pflanze wiederentdeckt” (https://www.zuonline.ch/verschollene-pflanze-wieder-entdeckt-497063483705)
- Vogelwarte Schwiez, “Rohrdommel Botaurus stellaris”, Accessed 17. October 2023. https://www.vogelwarte.ch/de/voegel-der-schweiz/rohrdommel/
- “Waldrand” (https://www.waldwissen.net/de/lebensraum-wald/naturschutz/artenschutz/waldrand-lebensraum-voller-ueberraschungen#:~:text=Der%20Waldmantel%20ist%20meist%20reich,finden%20am%20Waldrand%20günstige%20Existenzmöglichkeiten.)

This work by Tobias Hefti, Nico Bohren, Belma Ahmetovic, Moritz Stoll, and Lisa Tognola was created as part of the design studio Agritopia at ETH Zurich in Fall 2023. The PDF is intended for educational purposes only. Its commercial distribution is strictly forbidden.

© 2025, Architecture of Territory

Architecture of Territory
Professor Milica Topalović

TEACHING TEAM
Dorothee Hahn
Milica Topalović
Jakob Walter
Jan Westerheide

Prof. Milica Topalović
ETH Zurich
ONA G41
Neunbrunnenstrasse 50
8093 Zurich
Switzerland
+41 (0)44 633 86 88
www.topalovic.arch.ethz.ch