Project Book
ARB301 Thesis
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Advanced Studies in Architecture
and Urban Design

Nomadic Nature(s)

Jheronimus Bosch, *The Garden of Earthly Delights*, detail. 1480–1490.

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Abstract

This project looks at both the role of Gibraltar within the global ecology and the dynamics of the local ecology on the peninsula. It describes how Gibraltar's geomorphology—a mountain surrounded by water, located between two water bodies and two continents—has resulted a unique local ecology that is vital for the global ecosystem. Carried by the winds, migratory birds soar across the Strait; ocean currents and water temperatures determine the spawning locations of marine life migrating through the Strait; human migrants settle on their way to cross the Mediterranean; tourists travel to the peninsula to observe its unique and dynamic biodiversity.

The Rock and its morphology produce local winds and precipitation, which have shaped the Rock into two distinct sides: an urban and cultivated west side, a steep and uncultivated east side, and a Nature Reserve on the Upper Rock. In turn, these sides have framed settlement patterns, from early military settlements between walls and on the Rock, to reclamations and Marinas on the verge of the surrounding waters. Levante clouds and limestone formations provide humidity and alkaline soils for endemic plants; the seeds of which are taken by the wind, insects, birds and Barbary macaques that reside on the Rock; whose residence in turn attracts troops of tourists and their accompanying taxi drivers.

The project explores how both the global and local ecologies affect and are affected by human settlement and design. As humans are part of the same ecosystem as all other species, they shape it, and are shaped by it. Birdwatchers travel to coastal areas to see the journey of the flocks; cruise ships and dolphin tours interact with migrating marine life; urban settlements expand into the sea and onto macaque-territory; Mediterranean woodlands are cultivated and become Maquis-vegetation; behavioural patterns of Barbary macaques are influenced by the tourists coming to see and feed them and the architecture that provides for them; as well as vice versa.

In a context of climate change and population growth, two paintings and a series of models anticipate changes in global and local migratory and settlement patterns and explore the role of design within these ecosystems. As sea-level rise, droughts, changing temperatures, and extreme weather conditions reshape global and regional migration and settlements areas of all species, the projected intervention in Gibraltar is an examination of the role of design in the balancing act of the global ecosystem.

Five propositions

- Gibraltar plays an important role in global and local ecologies.

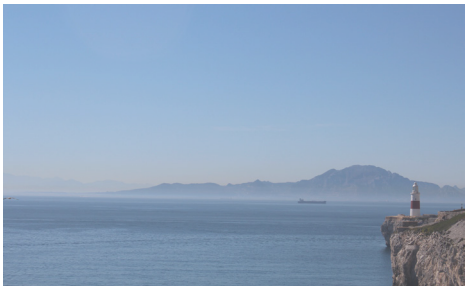
- Climate change influences migratory and settlement patterns of different species.

- Humans affect and are affected by global and local ecologies.

- The "artificial" and the "natural" are poles of a spectrum the built environment exists on this spectrum like all other habitats.

- The position of architecture, a space, or a building, changes on this spectrum over time and in relation to its changing context.

Noortje Weenink (NL)



As Found Propositions

Photographs from authors during fieldtrip in Gibraltar, June 2019

Beyond the Rock

Spatial interventions define and are defined by flux. Fluxes manifest in infrastructure, urban arrangements, buildings, and rooms, guiding, directing, and facilitating our movement. Simultaneously, the practice of movement defines our perception of space. On land we orientate through boundaries, borders, obstructions, and divisions between fields, regions, and states. At sea, our position is determined by intersecting lines of connections through distant objects, creating reference points and networks.

Gibraltar—a small peninsula on the southern tip of Europe—has been one of these reference points for many years. The stable presence of the Rock has been central to many stories, myths, and projects—from the Pillars of Hercules to the dream of Atlantropa. The 421-meter-high limestone formation has been a reference point for sailors, a strategic location for military garrisons, and a crucial stopover for migratory birds and insects. Gibraltar is therefore associated with being a stable, static, and steadfast small town, where one only ends up by virtue of circumstance.

However, Gibraltar is anything but stagnant. Surrounded by water, the territory is part of a global trading network characterized by the movement of cargo, passengers, and migrants. It lies in the midst of the Strait, to which the peninsula lends its name, which defines and unfolds the dynamic, fluctuating, and ever-changing condition of the territory.

As maritime choke points, continental straits determine the rhythm, capacity, and intensity of shipping patterns. Located between two polarities, they pose an inherent condition of tension, conflict, and imbalance. As such, straits channel and catalyze flux.
Where there is difference, there is flux; where there is flux, there is dynamism. The Strait of Gibraltar, too, can be understood in such terms—strategically located between two continents, it separates the Atlantic Ocean from the Mediterranean Sea.
On its edge lies Gibraltar—the entry point to the Mediterranean.

Gibraltar is a relatively unimportant yet historically significant entity; the peninsula is a mere 6.8 sqkm with 33,000 people living almost exclusively on the west side.

Around 250 Barbary macaques and many other species live or stopover in the Upper Rock Nature Reserve, covering 36% of the land. Gibraltar is still crucial in its wider context. Over the course of history, the seemingly insignificant territory has been fought over, conquered, isolated, and reconnected by many. Early Islamic settlers from 711 AD conceived of the city as a fortress; in the sixteenth century the old town started to extend from the Moorish Castle, and the following centuries saw Spanish and Anglo-Dutch troops taking hold of the Rock. Their defenses, moles, batteries, and bastions shaped its surface, while tunnels and excavations shaped the interior of the Rock.

When the end of Great Siege (1779–1783) temporarily stabilized tensions, Genoese, Portuguese, and Moroccan merchants made their way to Gibraltar to make their fortunes at this British trading outpost. In the nineteenth century this multicultural community expanded the city into reclaimed land and onto the Rock, leaving their architectural marks on the city. Today, Gibraltar remains a British Overseas Territory but with separate legal jurisdiction. It is said that as long as the monkeys stay, the British won't leave. But that, soon, might change. Could we reimagine Gibraltar as an autonomous territory?

Independence and Interdependence

Gibraltar is not an island, yet it is prone to isolation. Without any natural resources, the peninsular is highly dependent on its relationship with its surrounding context. This has put tremendous pressure on its border—a 1.2-km-long threshold beneath the Spanish town of La Linea. As Gibraltar is highly dependent on imports and cheap labor from Spain, obstructing this frontier can have a dramatic effect on Gibraltar's economy. As such, it forms an important bargaining tool for its neighbor.

Since the 1713 Treaty of Utrecht officially assigned Gibraltar to the British, Spain has tried to reclaim the strategic outpost by force and persuasion. Gibraltarians, however, want to stay British; in the 1967 sovereignty referendum, a massive majority of 99.6% of Gibraltarians expressed their eagerness to remain under British rule.

As a response, Spanish dictator Francisco Franco restricted all forms of trade and traffic across the border, leaving Gibraltar with no other option but to turn to northern Europe and Africa for for help. For 16 years, until the border fully reopened in 1985, the UK, the Netherlands, Portugal, and Morocco provided the territory with food, water, medical oxygen, and construction materials by sea and air. Franco's actions also forced Gibraltar to look inwards, identify its strengths, and make alliances to overcome its weaknesses.

Following the reopening of the border, the government of Gibraltar actively rebuilt its economy by accentuating its differences from its surrounding context. Over the past four decades, three major industries have emerged—in the 1990s tourism and ship refueling (bunkering) began to account for a significant daily in– and outflow of both people and ships. Financial services then emerged as another major industry after beneficial tax policies implemented in 2009 attracted foreign investors and online gambling enterprises. The boost to employment and general shift towards high-end residential development has brought a significant temporary population increase in recent years, mainly from the UK. These have negated some of Gibraltar's dependencies, but the built environment is still highly dependent on Spain.

Up to 12,000 tourists a month at the cruise terminal, peruse Main Street, and take the cable car for a quick visit on the Rock to illegally feed the monkeys, while 15,000 workers cross the border from the neighboring Spanish town of La Linea every day.

With limited options for urban expansion, the local construction market is highly competitive. Fast-paced developments arise on reclaimed land and former British military grounds, over which the local authorities have little to no control. Often initiated by Spanish contractors and private investors, building culture is characterized by a case-by-case system with little room for architectural innovation. In turn, Spanish urban planning culture restricts Gibraltarian architects to their familiar territory.

How can Gibraltar expand its architectural context and open new doors for its architects?

Five Propositions

1) Geopolitical Shift

While the political situation of the European Union and the United Kingdom are destabilizing, Gibraltar finds itself in an ever-more vulnerable state.
However, opposite the Strait in Morocco and Algeria, solar and biomass energy sectors are rapidly evolving.
They are likely to result in large-scale urban and infrastructural expansion, creating major investment opportunities in northern Africa.
In this projection, Gibraltar aims to monetize these opportunities by shifting its gaze to Northern Africa, plugging into the energy circuit south of the Strait.
As such, Gibraltar's potential, importance, and territory are no longer defined by its administrative borders, but rather in relation to the networks it operates within.
What could be the repercussions on the local building culture of Gibraltar?

2) Infrastructural Connectivity

If Gibraltar wants to gain control over its precarious condition then one thing is inevitable—connection.
As new and improved infrastructural connections create opportunities for investment and expansion in and around Gibraltar,
improved connection to Morocco enhances the capacity of energy, freight, and capital flows across the Strait.
Gibraltar's beneficial tax policies make import through the territory appealing for both Europe and Africa,
accelerating urban expansion and economic growth in nearby cities.
For Gibraltar specifically, the change means that the territory transforms from a geopolitically insignificant peninsula to a crucial node in the intercontinental trading network.
How can Gibraltar exploit this new nodal condition, and how can architecture assist that?

3) Gibraltar as Destination

A transport hub integrated within Gibraltar's urban tissue concentrates all traffic and freight, distributing the flows along and across the territory.
By expanding its context to Africa, economic opportunities attract migration from its surrounding area, creating potential for Gibraltar to become more attractive to investors, tourists, and residents. Additionally, the optimization of ferry routes between Africa and Europe enhances the overseas connection for passengers.
How can spatial strategies accommodate and optimize these new and intensified fluxes?

4) Population Growth & Urban Expansion

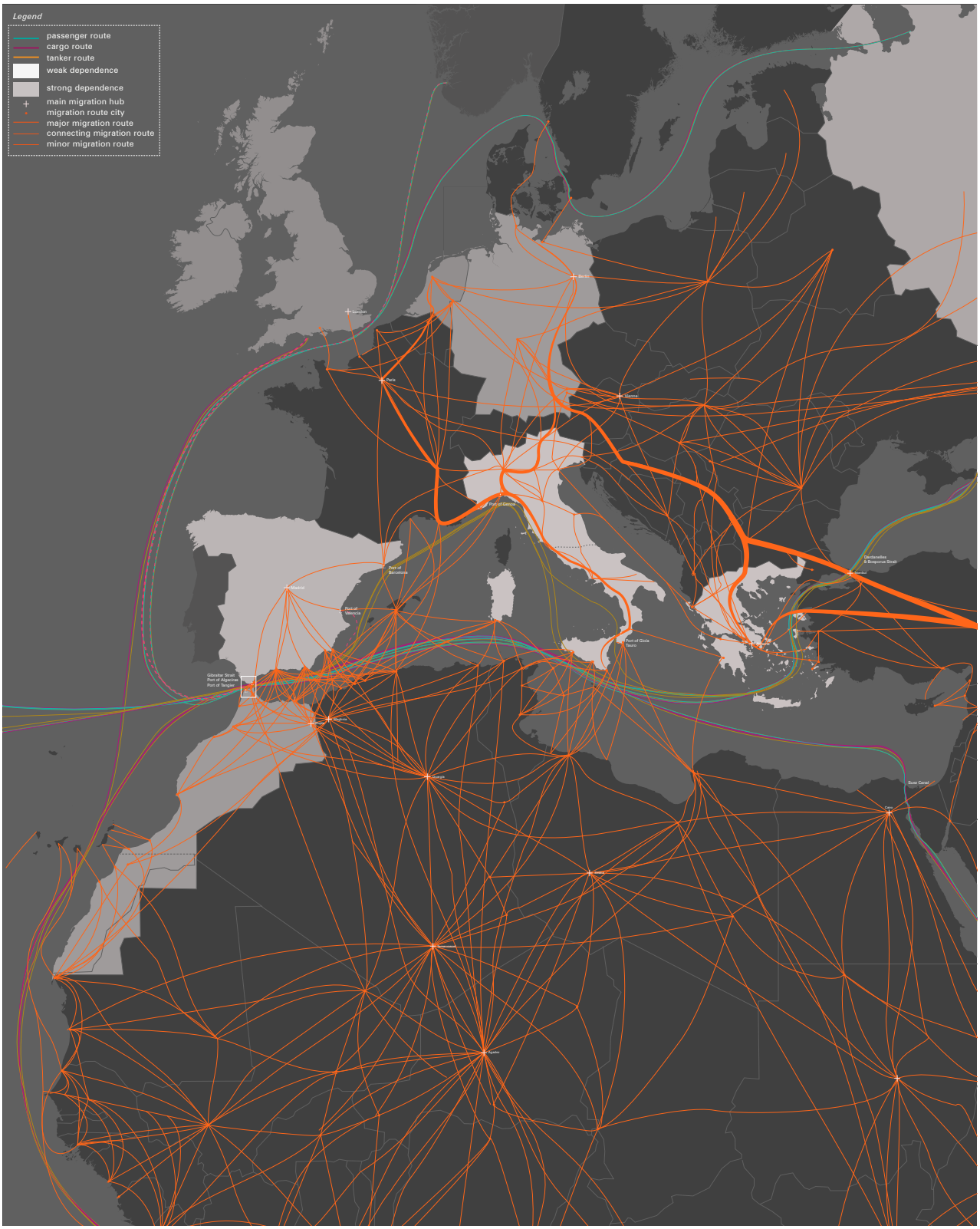
When financial opportunities open up, people from other countries arrive to reap the rewards.
Improved maritime connections and accessibility strengthen the capacity, speed, and frequency of traffic across the Strait, and are thus projected to bring a substantial population increase —laborers from Northern Africa and investors from China are shifting their gaze from Africa up to Gibraltar.
To accommodate this population increase, Gibraltar is projected to expand and densify into the sea as well as on land, following its existing strategies of long-term planning on the west side, and rapid reclamations on the east side.
How could the peninsula deal with the contested changing coast lines, and how would these new communities express themselves in public space?

5) Climate Change

Gibraltar's natural water borders form not just a connection across the Strait, but also a threat to its expansion.
While rising sea levels amplify the spatial pressure on the territory, rising temperatures, extreme weather events, pollution, and overfishing have resulted, and continue to result, in mass extinction and biodiversity loss to which the unique species in Gibraltar are especially vulnerable.
How can we reconsider these crucial thresholds between the city and the water, and the city and the Upper Rock, accommodating both human and non-human populations?

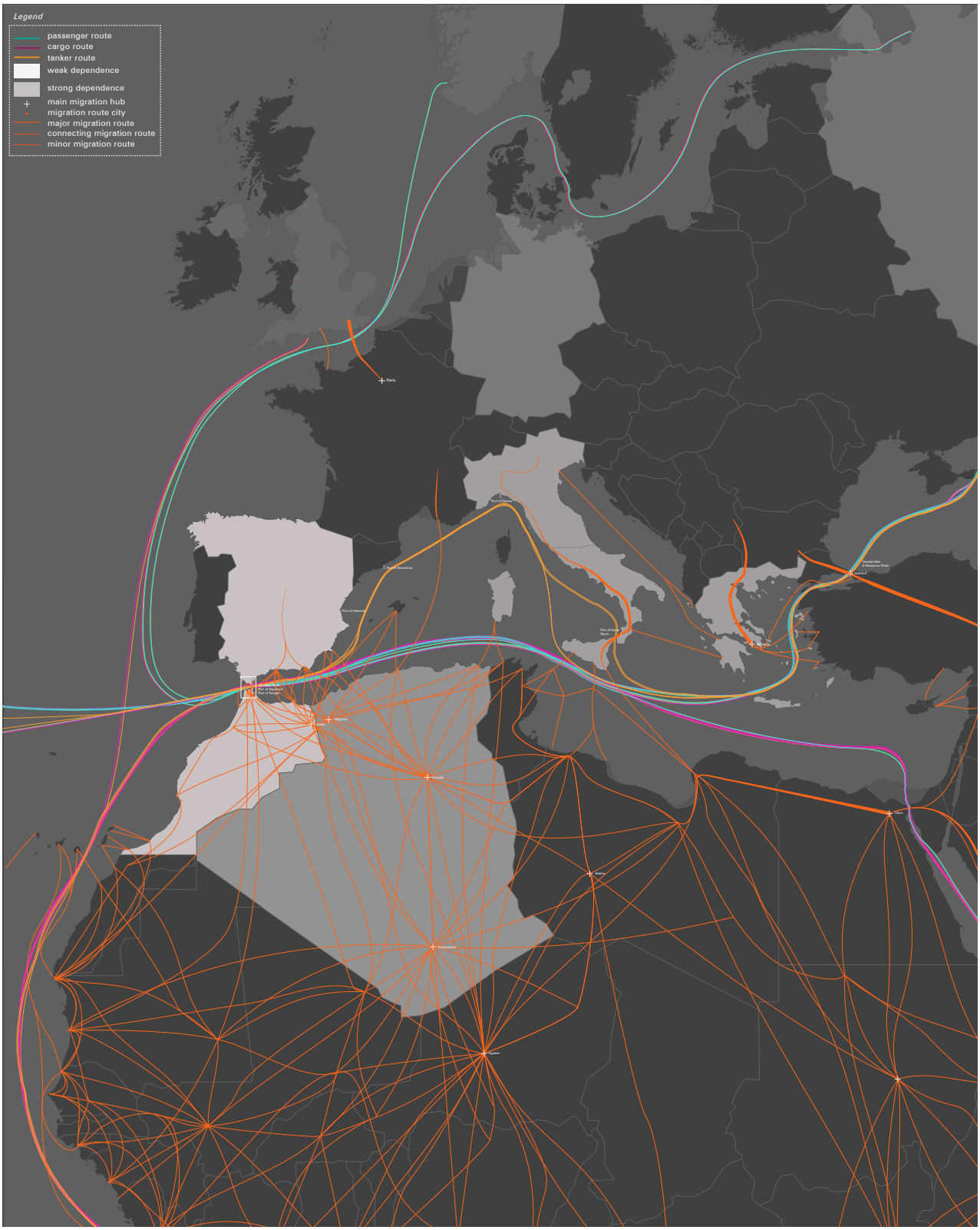
Gibraltar: The Built Environment

Site location of Gibraltar



2020

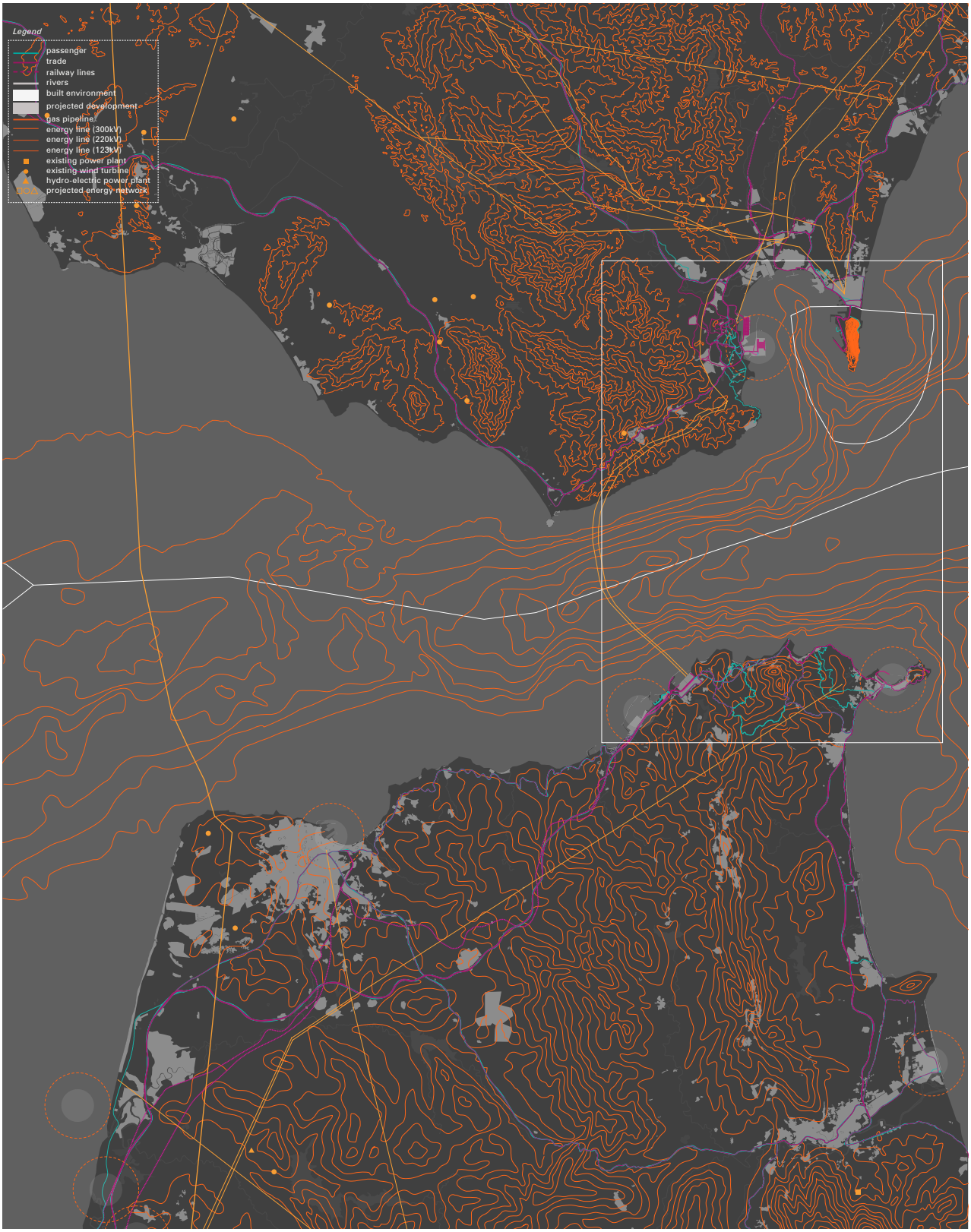
The Territory of Gibraltar: map with present dependecies and migratory routes



2050

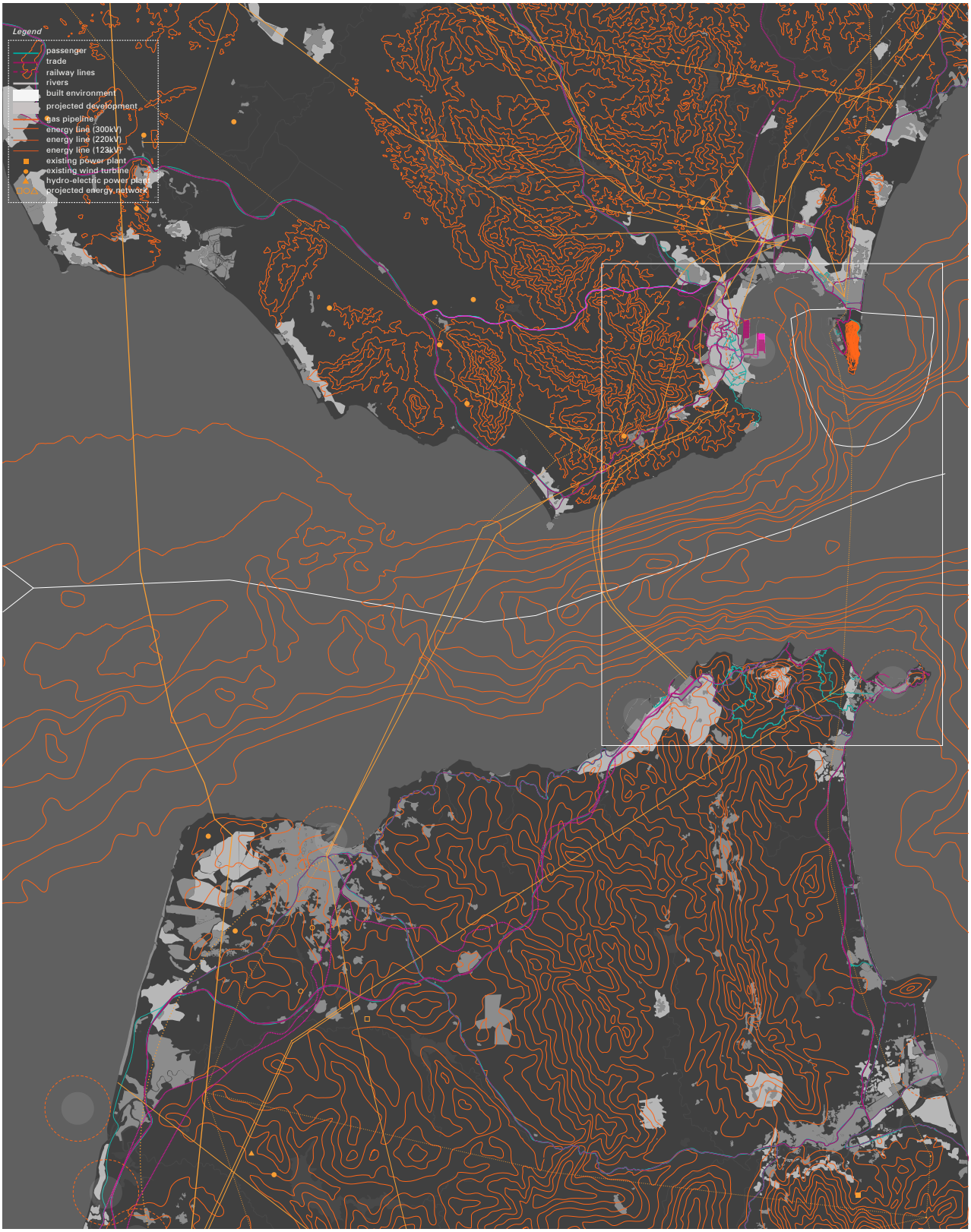
The Territory of Gibraltar: map with future dependecies and the re-orientation towards Africa

2) Infrastructural Connectivity



2020

The Strait of Gibraltar: map with the existing economies and infrastructural developments



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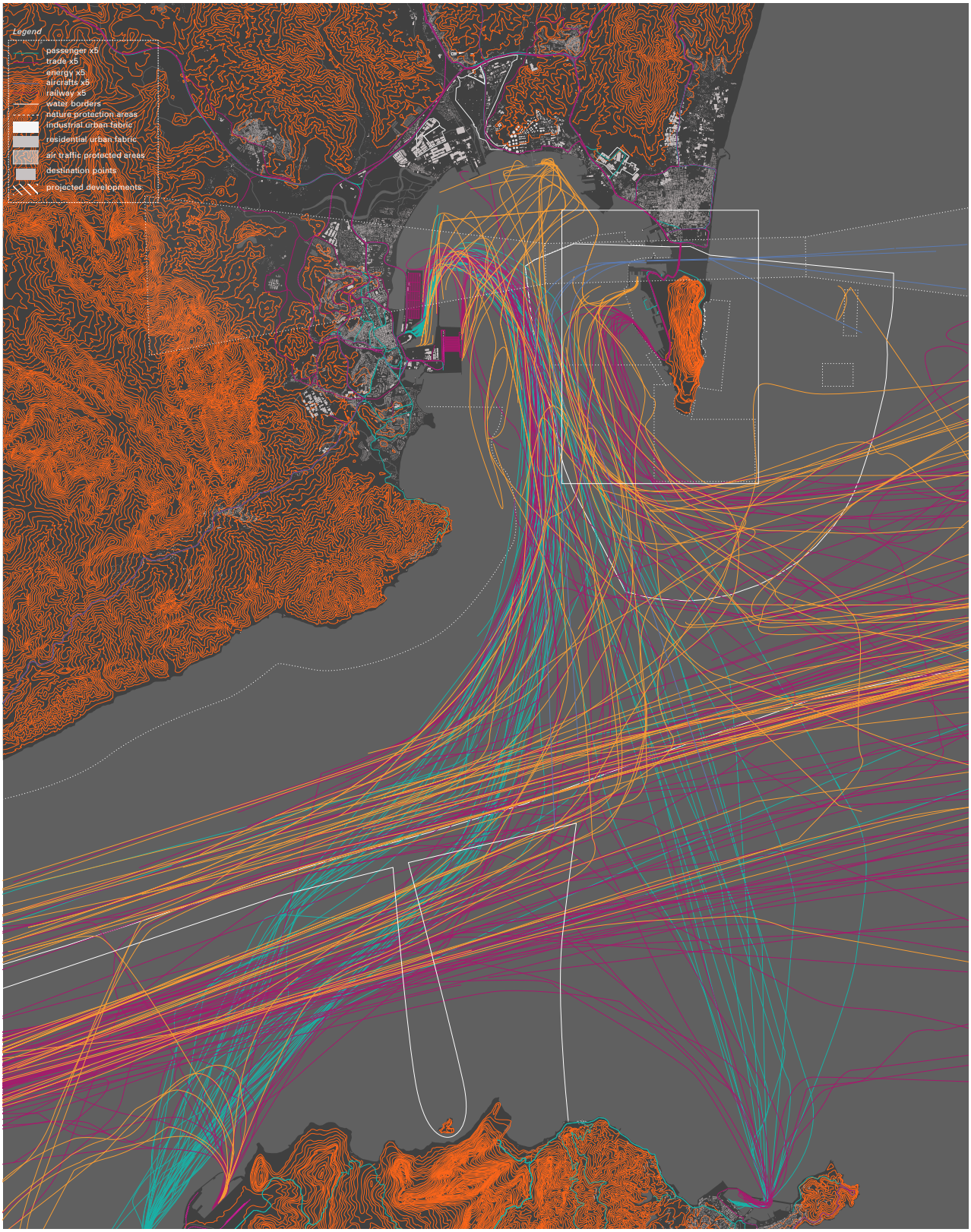
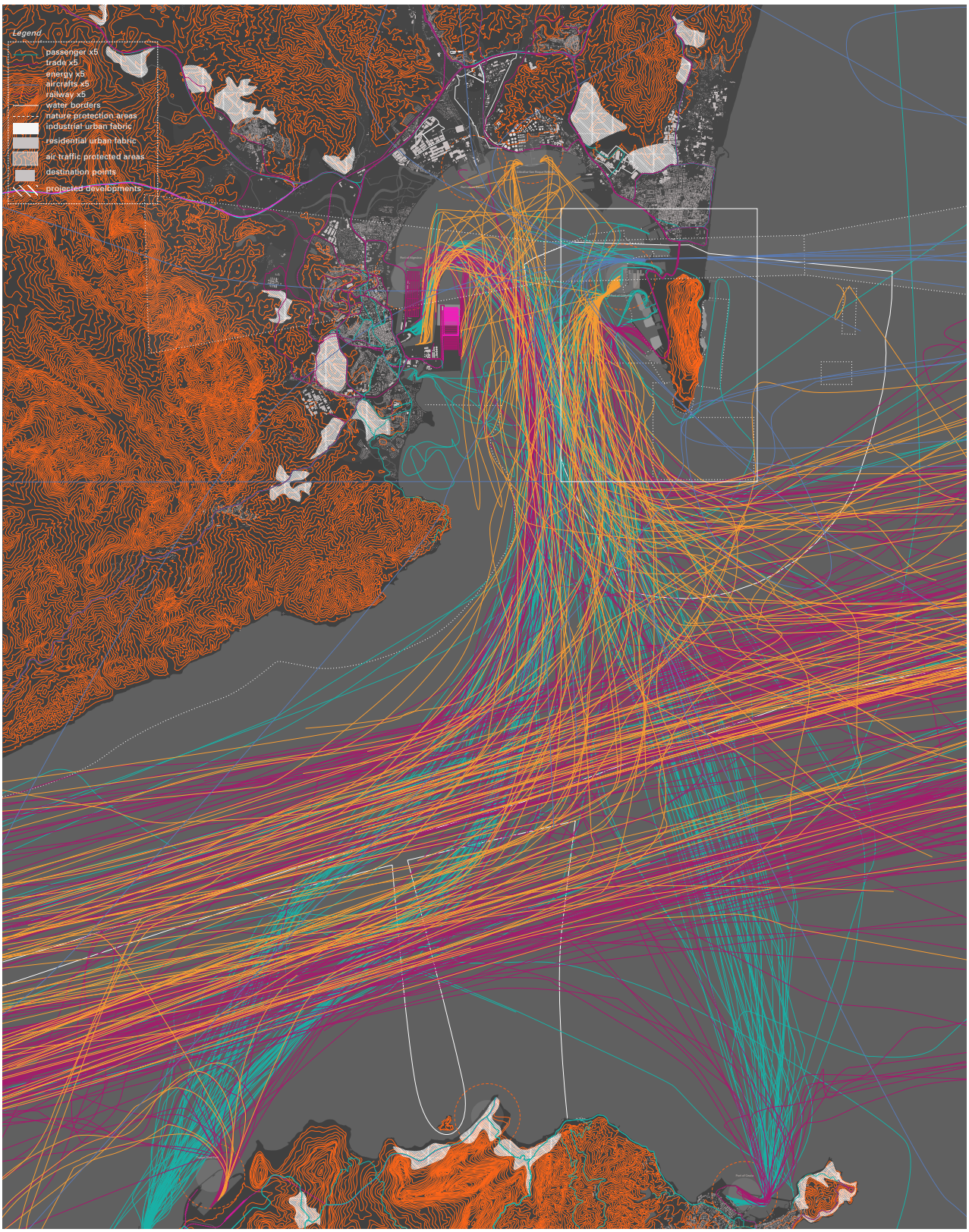
The Strait of Gibraltar: map with the future growing economies and infrastructural developments



2020

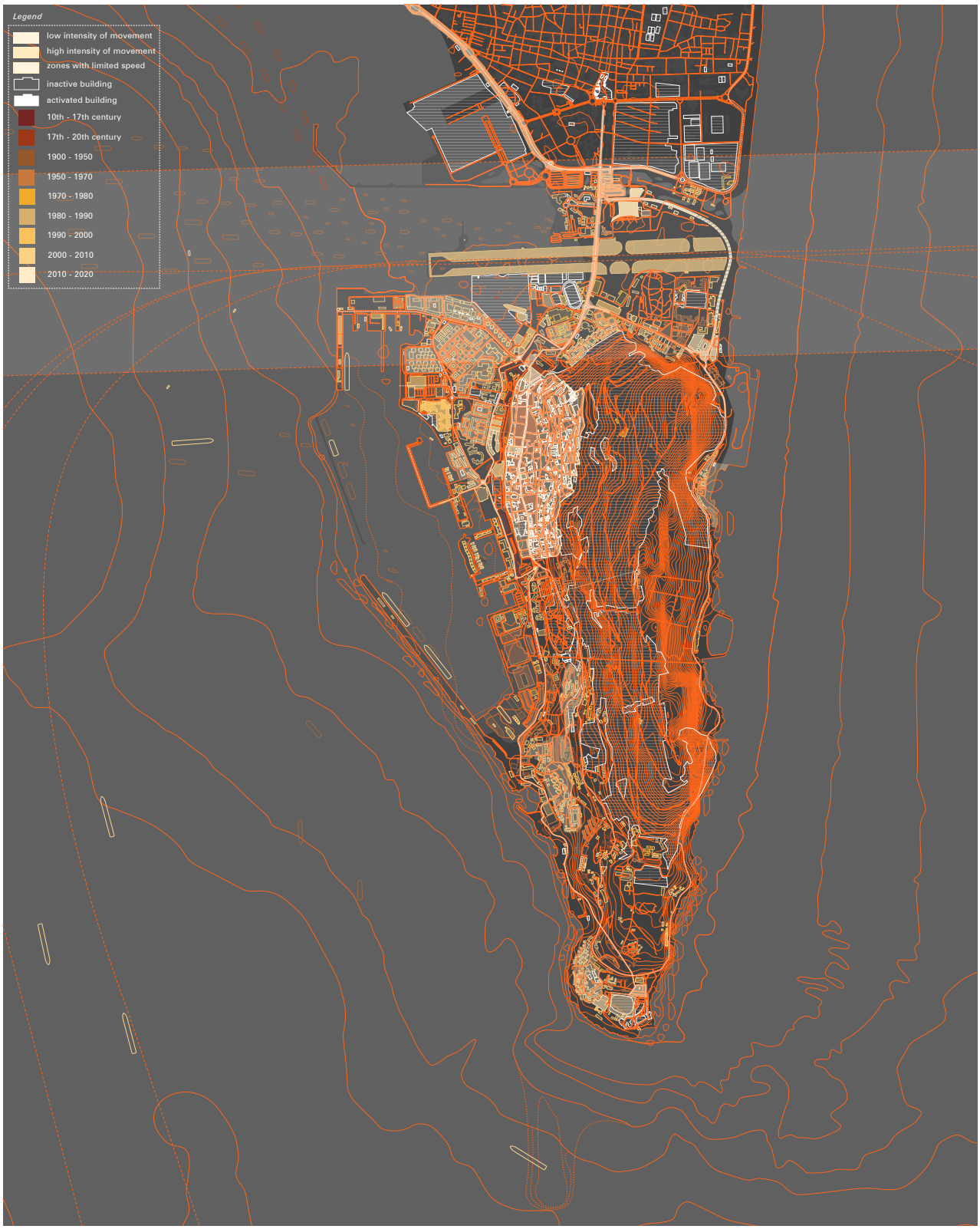
The Bay of Gibraltar: map with the existing weekly traffic through and across the Strait



2050

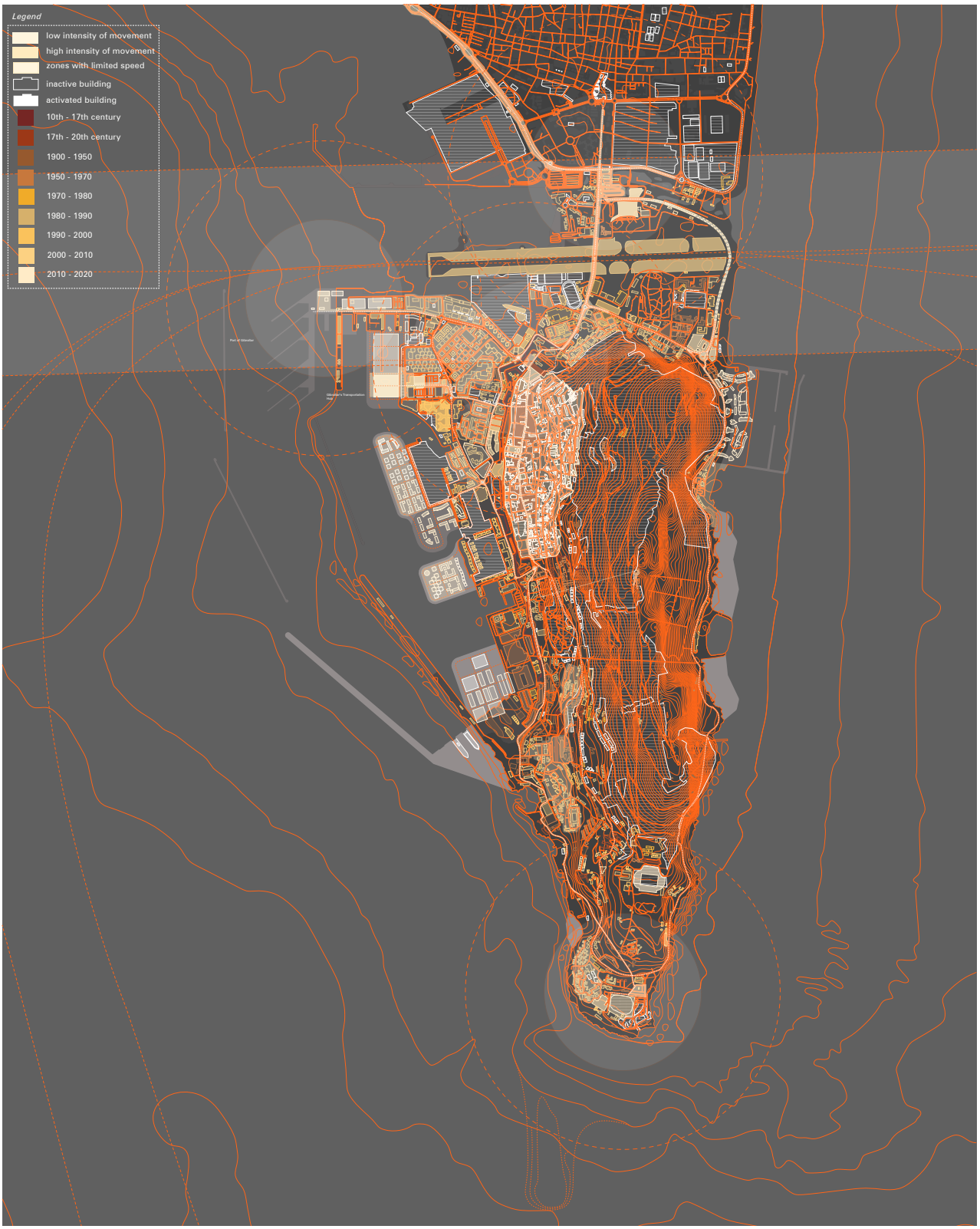
The Bay of Gibraltar: map with the future weekly traffic through and across the Strait

4) Population Growth & Urban Expansion



2020

The Rock of Gibraltar: map with the existing built environment and the peninsula at its current state of flux



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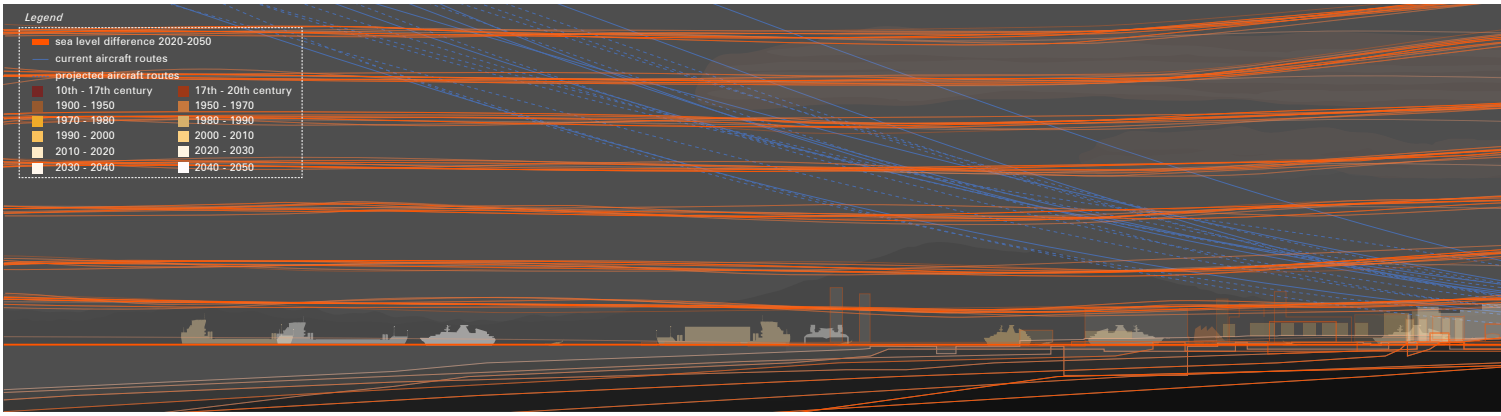
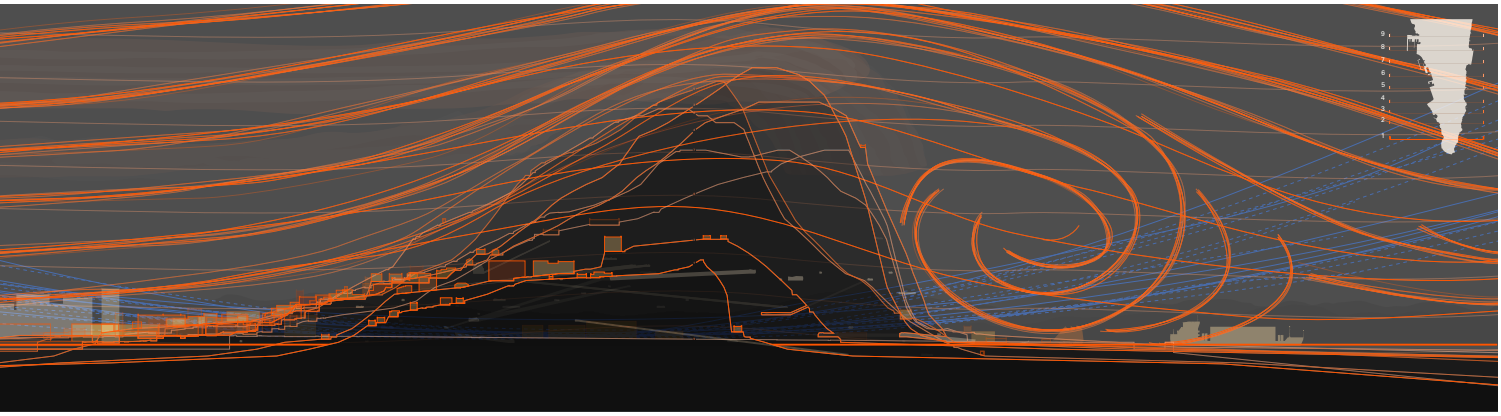
The Rock of Gibraltar: map with the peak areas of the peninsula on the backdrop of future development

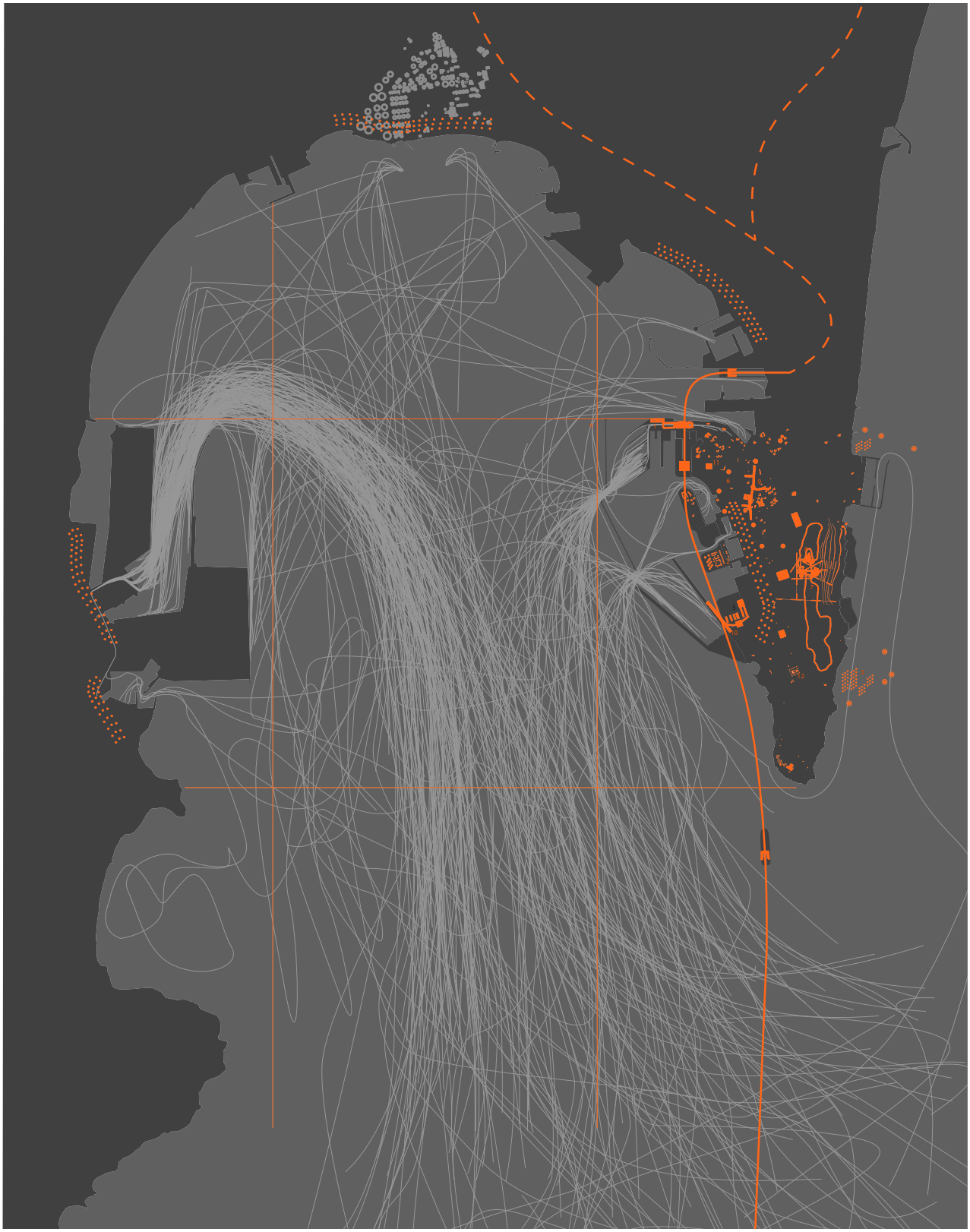
5) Climate Change



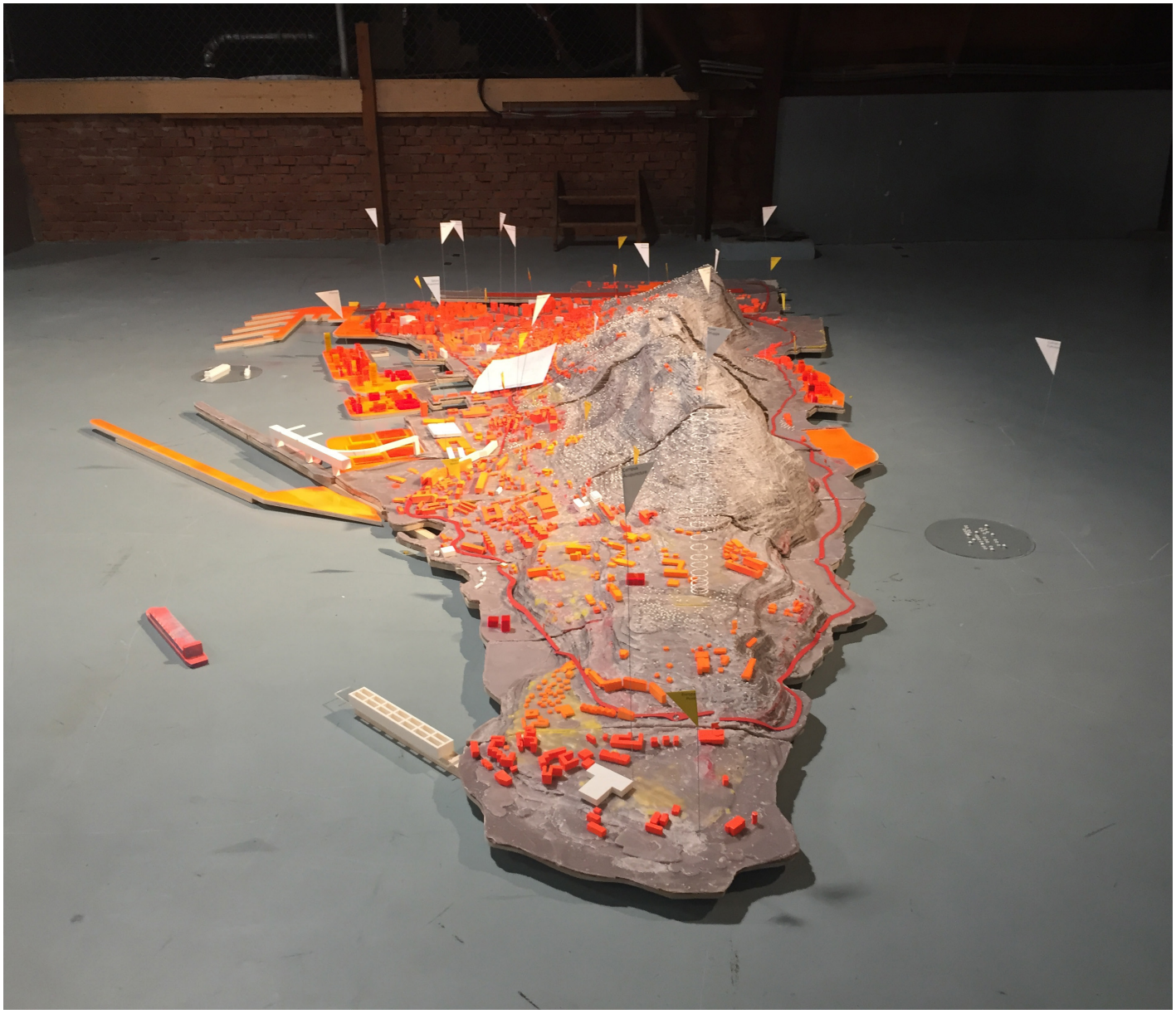


2020, 2050

The Rock of Gibraltar: section with external and climatic conditions



2050 The Twelve Contributions

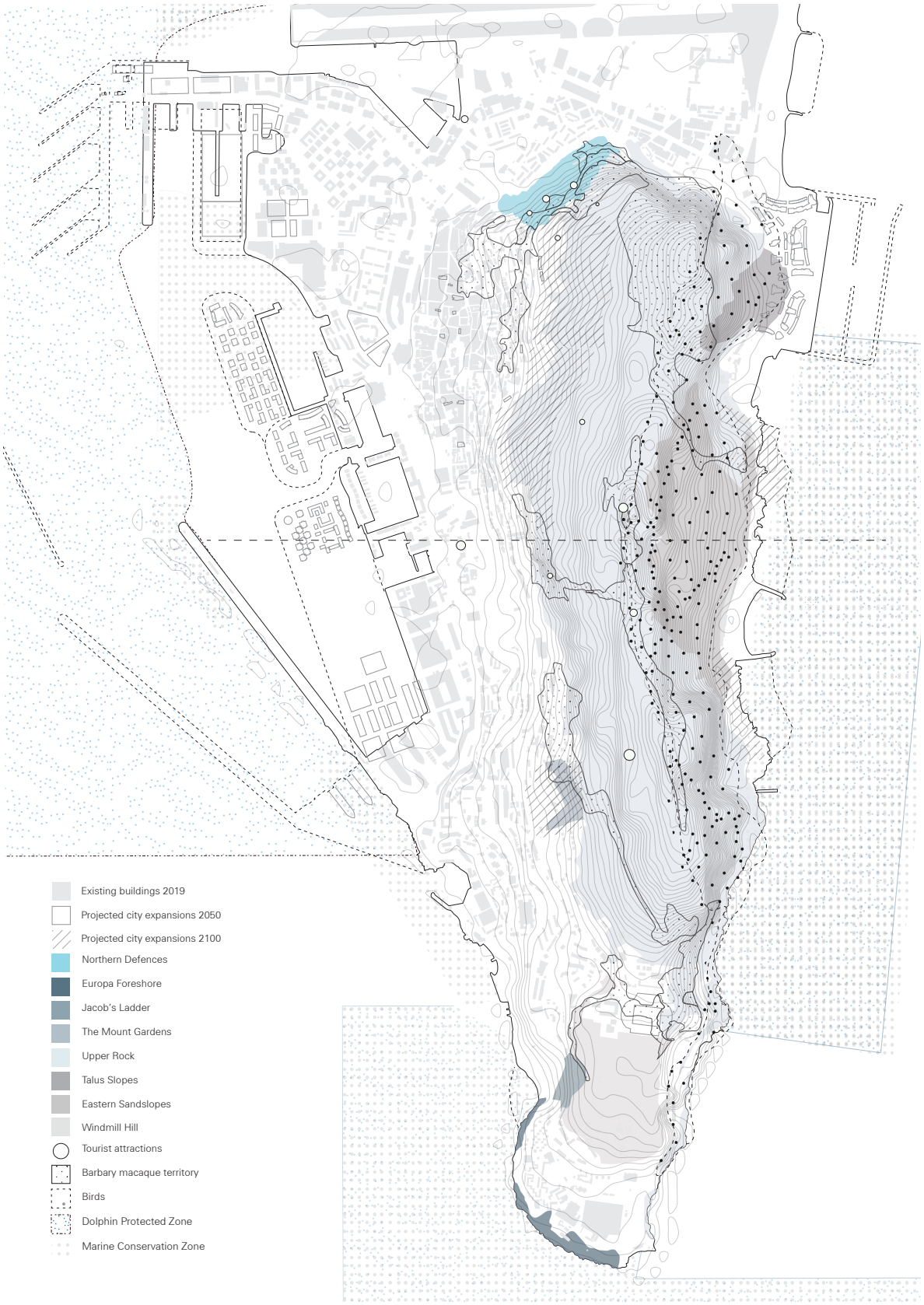


2020, 2050

Beyond The Rock: 1:1000 wax site model

2020, 2050

Beyond The Rock: 1:1000 wax site model



Current protected areas in Upper Rock Nature Reserve, Gibraltar. Barbary macaques avoid open areas such as the Eastern Sandslopes and Windmill Hill.

Birds reside only on the east side of the peninsula. Marine life exists all around the peninsula.

In *Nomadic Nature(s)*, the city of Gibraltar is projected to have expanded into the Nature Reserve by the year 2100. Here, it starts to overlap with and connect the territories of different Barbary macaque troops.

Drawing by Noortje Weenink.

Site Information

The Rock of Gibraltar knows two distinct sides: the east side—'natural' and uncultivated, and the west side, primarily covered by an urban environment. It has historically been one of the most sought after territories on earth. On the west side lies a city, located between the Rock and the surrounding waters. This urban landscape is is neither aquatic nor terrestrial, neither European nor African, neither Mediterranean nor Atlantic. On the east side, limestone cliffs and arid sand slopes dominate the peninsula. It is a landscape that seems unspoilt, but in reality has been altered, transformed, and affected by humans.

The Moorish and Spanish established their "Old Town" on the west side, protected by the Rock. Genoese fishermen found their way via the Mediterranean Sea to Catalan Bay on the east side. British garrisons built batteries on the upper and outer edges of the Rock. The western settlements gradually grew together and expanded into the sea and onto the Rock, while the eastern fishermen's village was limited by the surrounding limestone cliffs.

The Strait of Gibraltar is an important passage for migratory animals. In the center of this junction lies the peninsula of Gibraltar. The location and the unique features of Gibraltar's territory make the limestone Rock a vital stopover. This ecological value is protected and conserved in legislations, attributing 31% of the territory to the Upper Rock Nature Reserve—a landscape that seems unspoilt, but in reality has been altered, transformed, and affected by humans since their early settlements. Millions of years of geological forces, Levanter winds and erosion have shaped the Rock to be asymmetrical, which in turn has determined the establishment and development of human settlements on the territory.

In *Nomadic Nature(s)*, the territory of Gibraltar is considered as a model to explore and complicate the relations between the two distinct east and west side, respectively representing "natural" and "artificial" habitats. The project identifies seven ecologies—each representing a different relation between humans and non-humans.

Discourse

The project aims to redefine the definitions of “artificial” and “natural”. It does so by rethinking the traditional distinction between the two. Rather than treating human and non-human habitats as separate, the (urban) landscape is defined by overlaps and connections—where design for one can mean accommodation for another.
In this, the project complicates and highlights the reciprocal relations between humans and non-humans. The proposed city is one of entanglement, in which no single fact can be considered in isolation.
As such, the project aims to highlight the influence of humans have on the ecology they are part of, and explores the role of the built environment in its balancing act.

Precedent Studies

The field of zoogeography concerns the geographical distribution of animals. It emerged during the Enlightenment period, in the mid 1800s. The distribution made by Philip Lutley Sclater in 1858, edited by Alfred Russel Wallace 18 years later, was only updated in 2012 and still dictates how we look at nature today: divided in regions and boundaries, with species directly relating to their context.

Alexander von Humboldt was one of the first to consider the Earth as one global ecology—a chain of actions and reactions, in which no single fact, human or non-human, can be considered in isolation. His comprehensive atlas, fittingly titled “COSMOS”, embodied multiscalar relations between flora and fauna. Through accompanying drawings, such as *Idealer Durchschnitt eines Theils Der Erdrinde* (Ideal Section from a Part of the Earth’s Crust), the complex networks of the Earth were represented. Oftentimes, the drawings were compositions of elements at different parts of the world. Rather than considering exact attributes and distances, the illustrations thereby focus on the multiscalar relations between different elements—from species of flora and fauna, to soil conditions, elevations, and temperatures, to complete networks—aiming to represent them as part of nature as a whole.

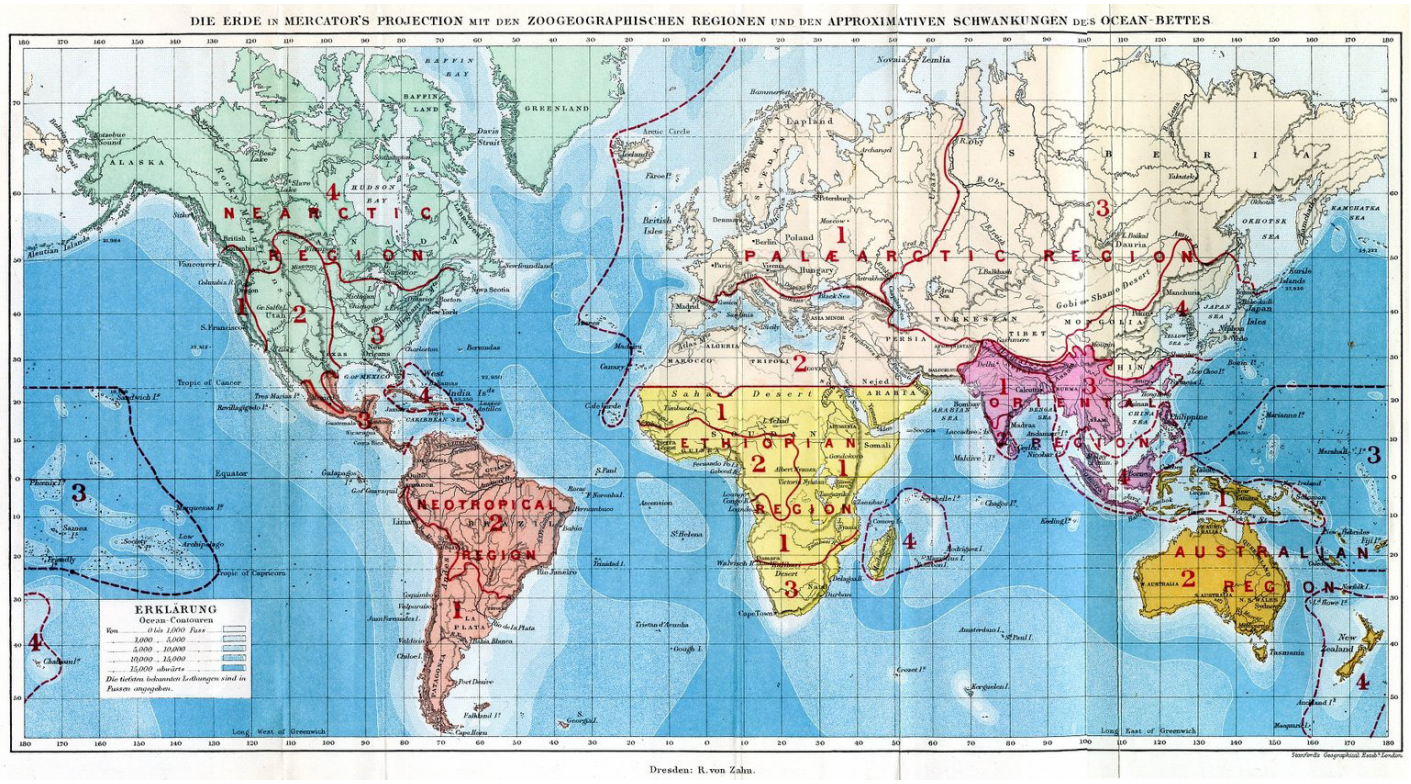
As early as 1832, Von Humboldt was the first to identify three human-induced processes that caused the loss of biodiversity and other changes in the biosphere: deforestation and monocultures, toxic emissions, and irrigation or water management. Today, as we are in a climate emergency, these links are still considered accurate: humans are not just affected, but also directly and indirectly affect the global ecology. And as the only species able to analyze their living environment, humans bear a responsibility towards it.

The *Geological Investigation of the Alluvial Valley of the Lower Mississippi River*, traces the long-term changes of the path of the Mississippi river, demonstrating with color-coding and detailed annotations the relations and overlaps between geography (erosion) and human intervention (plantations, plot divisions).

Landscape architect Gilles Clément also considers the world as one ecology. He rejects ideas of native and invasive species. Instead, he distinguishes the voyager and the wanderer: the voyager as primarily animals, that travel between two points, usually with a goal (food, shelter); the wanderer moving by coincidence, for example plants being distributed over the globe by winds, currents and animals. Rather than controlling nature, humans have the role of managing it with the aim of maximizing biodiversity with minimal intervention.

Dutch landscape architect and self-proclaimed gardener, Piet Oudolf, follows a similar credo. In his landscapes, artificial conglomerations of plants are chosen based on seasonal changes amongst other “uncontrollable” factors. Oudolf acknowledges and understands the limitations of the landscape designer that works with uncontrollable nature, and in doing so accommodates for ‘controlled wilderness’ to arise. He thereby taps into the idea that humans can shape, but not control nature.

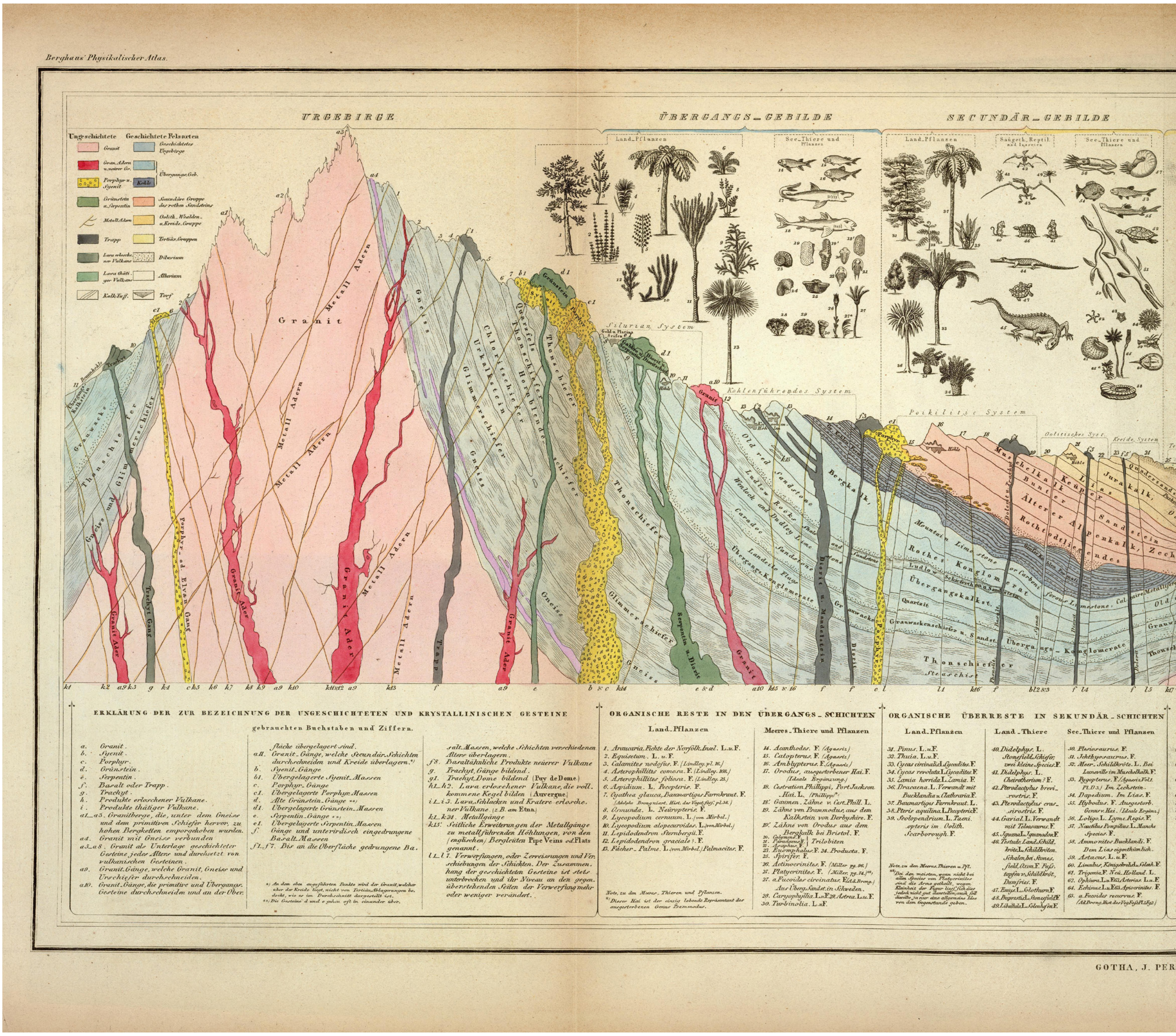
In this interesting overlap between the artificial (design) and natural (wilderness), the traditional distinction between the two dissolves. Rather, artificial and natural are two poles of a spectrum, on which the built environment exists. The position of architecture—a space or a building—changes on this spectrum over time, in relation to its changing context. This means that architecture is part of the balancing act of the ecology. Although buildings and spaces exist for a (relatively) short period of time, they nonetheless carry long-term consequences. Exploring this relation might offer another perspective on the complicated global network of nomadic nature(s), and vice versa.



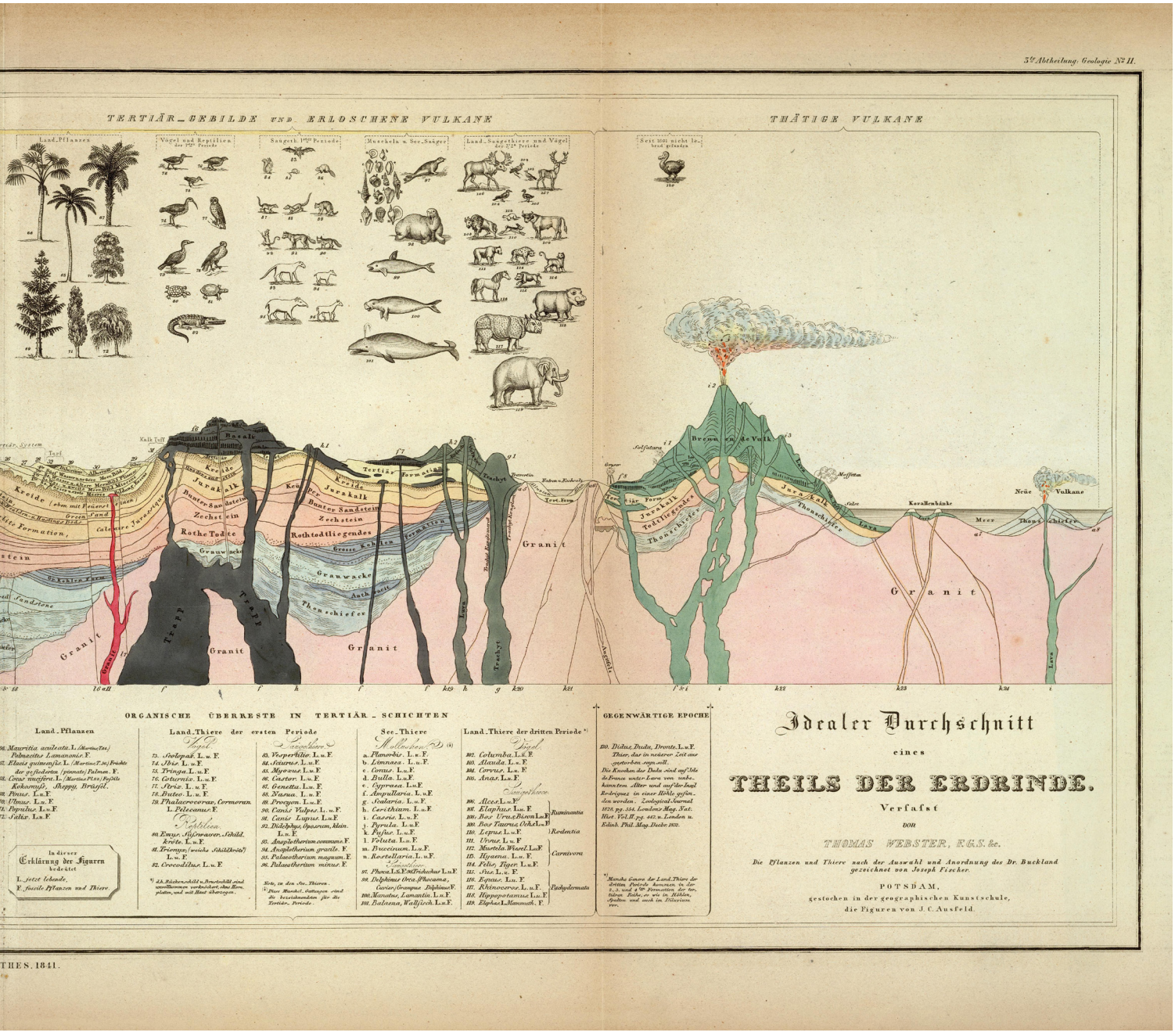
Sclater-Wallace diagram: world map showing the zoogeographical regions as identified by Philip Lutley Sclater in 1858, and edited by Alfred Russel Wallace in 1876.

Meyer, A.B.. *The Geographical Distribution of Animals; with a Study of the Relations of Living and Extinct Faunas as Elucidating the Past Changes of the Earth's Surface*. Authorized German edition by. Dresden: Verlag R. von Zahn, 1876.

Retrieved from: https://en.wikipedia.org/wiki/File:Wallace03.jpg.



Berghaus' Physikalischer Atlas.
URGEBIRGE
ÜBERGANGS-GEBILDE
SECUNDÄR-GEBILDE
Granit
ERKLÄRUNG DER ZUR BEZEICHNUNG DER UNGESCHICHTETEN UND KRYSTALLINISCHEN GESTEINE
gebrauchten Buchstaben und Ziffern.
ORGANISCHE RESTE IN DEN ÜBERGANGS-SCHICHTEN
Land-Pflanzen
Meeres-Thiere und Pflanzen
ORGANISCHE ÜBERRESTE IN SEKUNDÄR-SCHICHTEN
Land-Pflanzen
Land-Thiere
See-Thiere und Pflanzen
GOTHA, J. PER

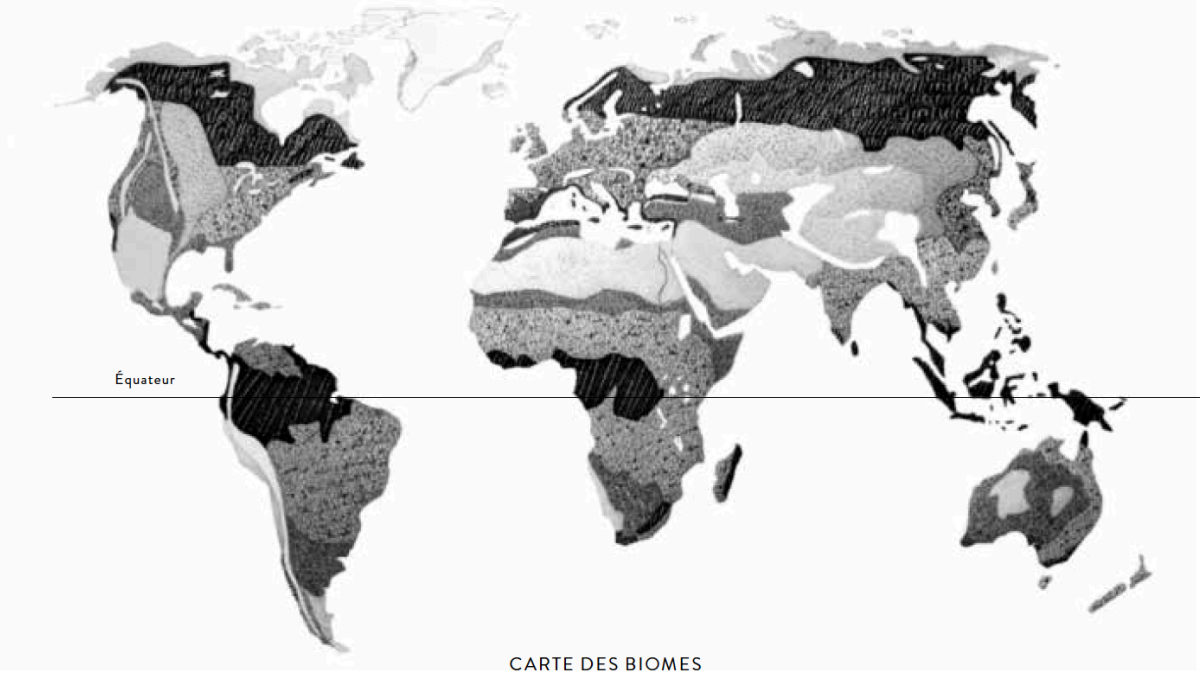


Ideal Section from a Part of the Earth's Crust.

Berghaus, Heinrich. *Idealer Durchschnitt eines Theils Der Erdrinde*. Engraver: Thomas Webster, F.G.S. &c. Plants and animals after the selection and arrangement of Dr. Ing. Buckland drawn by Joseph Fischer. Potsdam, engraved in the geographical art school, the figures of J.C. Ausfeld. 3rd Edition: Geologie, no. 11. Gotha, J. Perthes, 1841. Retrieved from: davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~1516~160054:Idealer-Durchschnitt-eines-Theils-

LE BRASSAGE PLANÉTAIRE

Le brassage planétaire est un mécanisme naturel en fonction depuis l'apparition de la vie sur la planète. Les vents, les courants marins et les animaux sont les acteurs principaux du transport des graines. Ils les distribuent sur tous les continents. Les plantes ainsi déplacées s'installent partout où le sol et le climat leur conviennent. Les animaux agissent de même. Un biome est un ensemble de compatibilité de vie soumis à une zone climatique donnée. Les plantes ne franchissent guère les limites de leur biome. Les animaux s'y risquent. Les humains sont partout. Ils renforcent la dynamique naturelle du brassage planétaire.

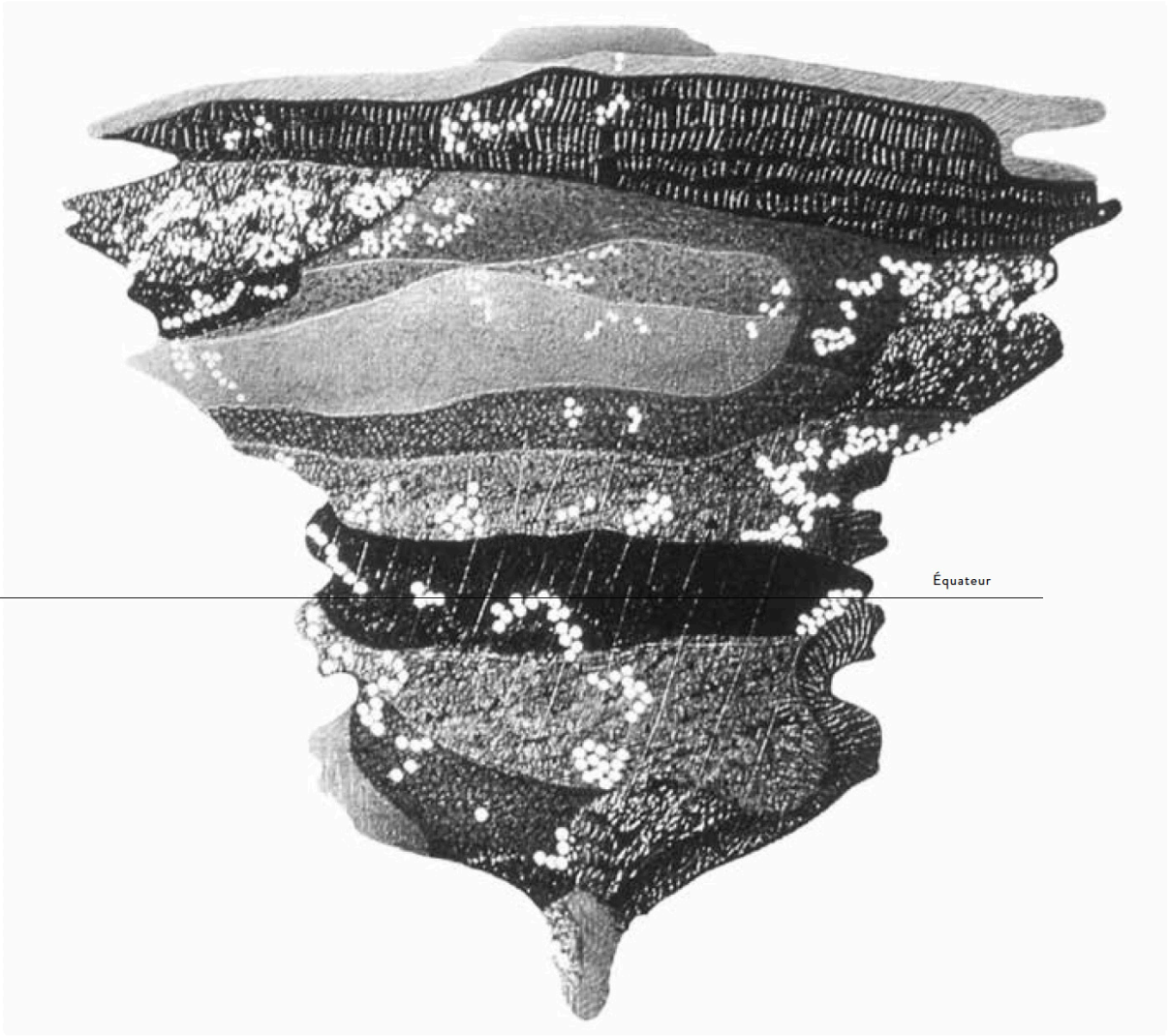


CARTE DES BIOMES

- Forêt némorale de feuillus
- Forêt pluviale tempérée
- Forêt pluviale équatoriale
- Forêt tropophile et savane humide
- Forêt subtropicale
- Forêt boréale de conifères
- Arctique
- Toundra
- Steppe
- Végétation méditerranéenne
- Savane sèche
- Désert

Reference for concept (garden as ecology of the world, plants migrating through animals, wind and humans).

CONTINENT THÉORIQUE : ASSEMBLAGE DES BIOMES

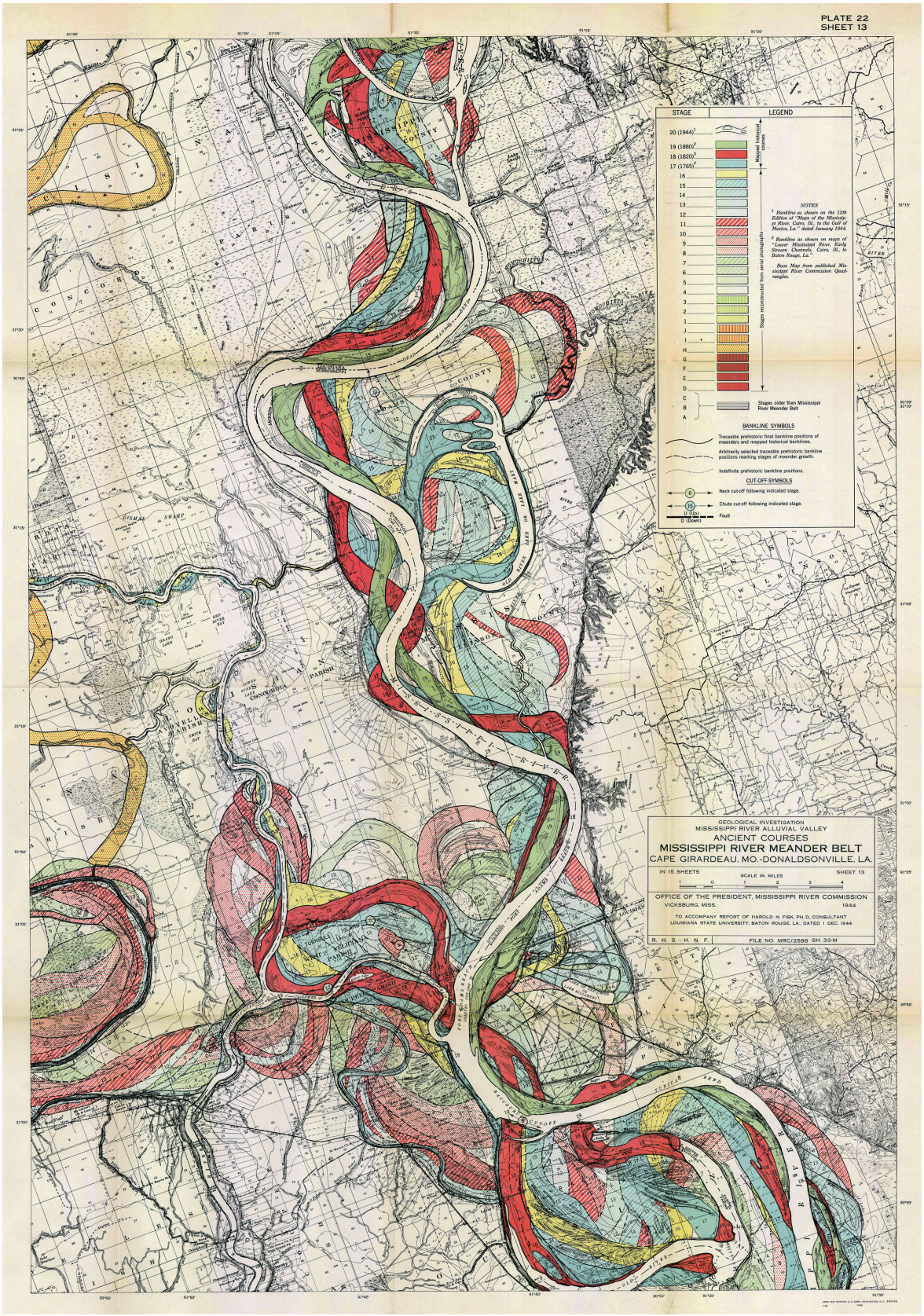


Page de gauche :
Dessin de Franck Neau,
d'après la carte de Carl Troll,
dans *Les végétaux dans la biosphère,*
de Paul Ozenda, 1939
Ci-dessus :
Sculpture, pierre taillée,
69,5 × 69,5 cm.

"Planetary brewing has been a natural mechanism since the beginning of life on the planet. Winds, currents and animals are the main drivers of seed transport. They distribute them on all continents. Plants and insinsidaceae settle wherever the soil and the climate suit them. The animals act the same. Unbiome is a set of life compatibility subject to a given climate zone. Plants hardly cross the limits of their biome. The animals are risking it. Humans are everywhere. They reinforce the natural dynamics of planetary breakdown."

Gilles Clément. "Theoretical Continent: Assembly of Biomes." *Toujours La Vie Invente: Carte Blanche à Un Paysagiste-Jardinier.* Lopérec: Locus solus, 2017, 46–47.

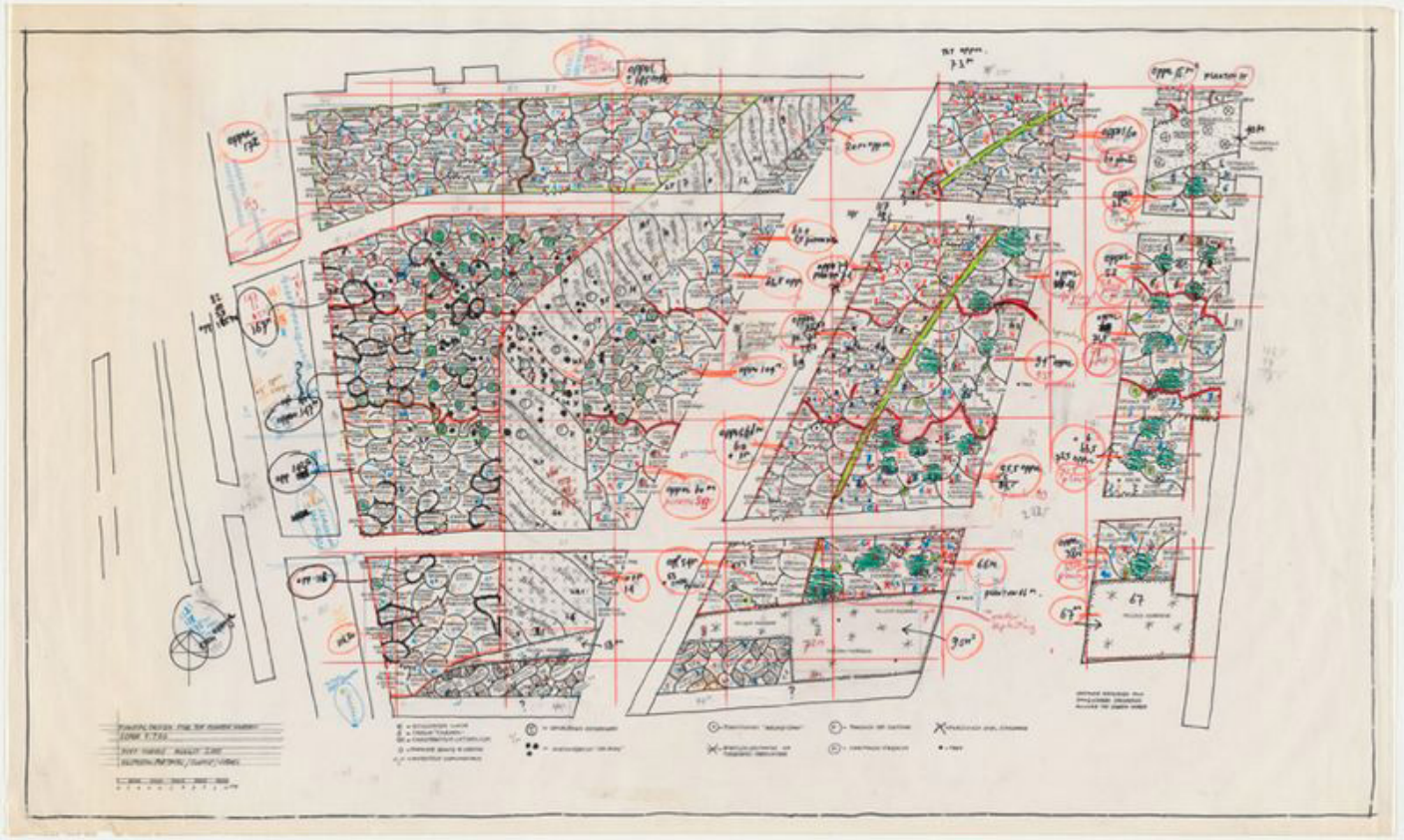
The image on the right is an adjusted image of the original page that did not have annotations.



Geological investigation of the ancient courses of the Mississippi river meander belt.

Reference for drawing technique (showing changes in trajectory).

Harold Fisk. *Geological Investigation of the Alluvial Valley of the Lower Mississippi River*. Made for the U.S. Army Corp of Engineers, 1944.



Piet Oudolf, *Planting Design for the Monroe Garden*. Lurie Garden, Chicago, 2001.

Visualized Evidence

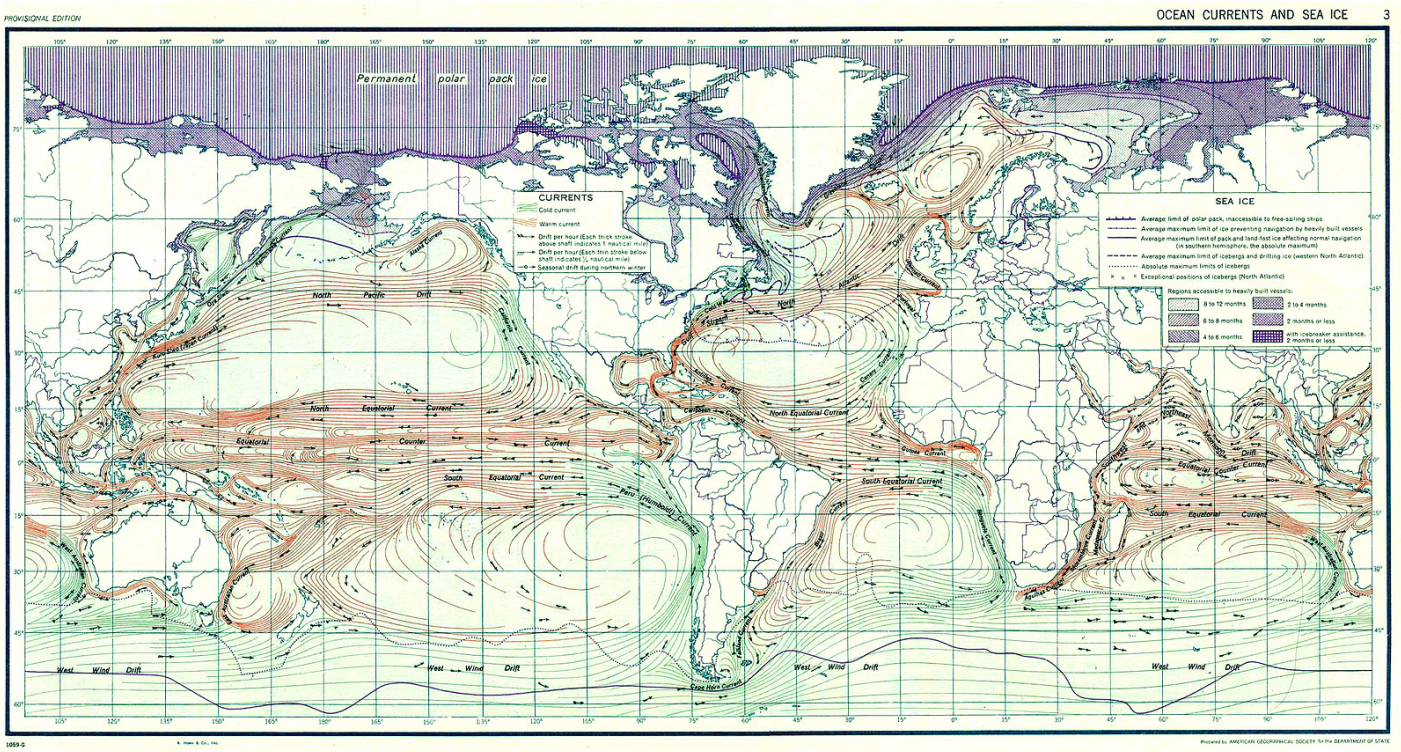
Gibraltar's importance in global and local ecologies is illustrated by the variety of species that pass, live on or temporarily reside on the Rock. To understand how architecture can enrich or sustain Gibraltar's biodiversity, it is important to understand the forces that influence them. Winds, ocean currents, sea and surface temperatures determine global migration trajectories and spawning locations that birders, dolphin watchers and tourists follow.

On a local scale, similar forces affect migratory and settlement patterns: local Levant winds and precipitation have shaped and are shaped by the morphology of the Rock, which in turn has framed settlement patterns of flora and fauna alike.

This chapter provides an overview of the geological forces and predicted consequences of climate change that alter migration and settlement patterns.

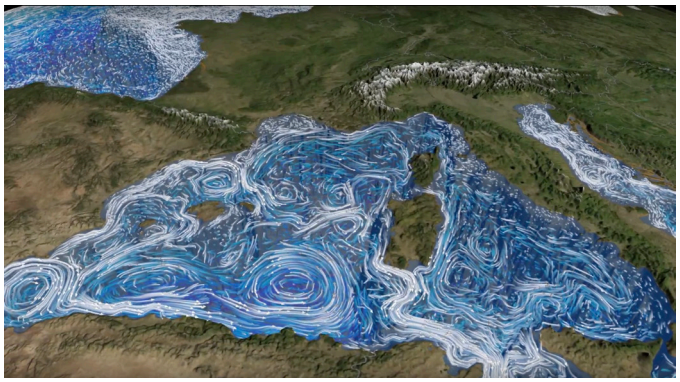
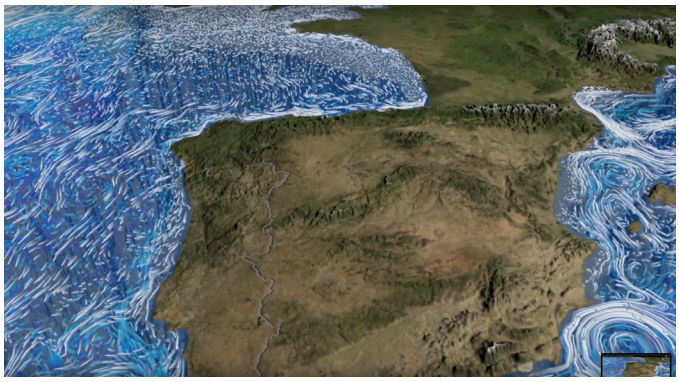
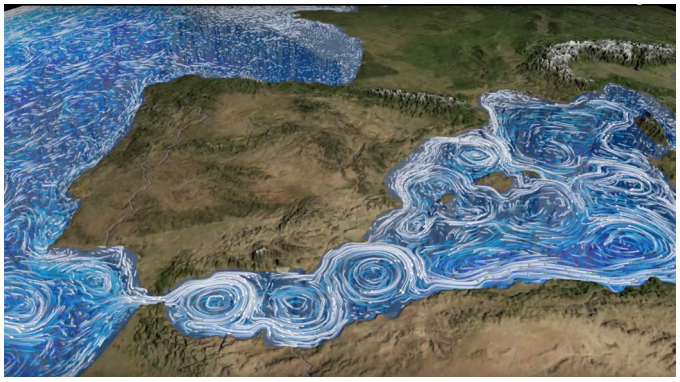
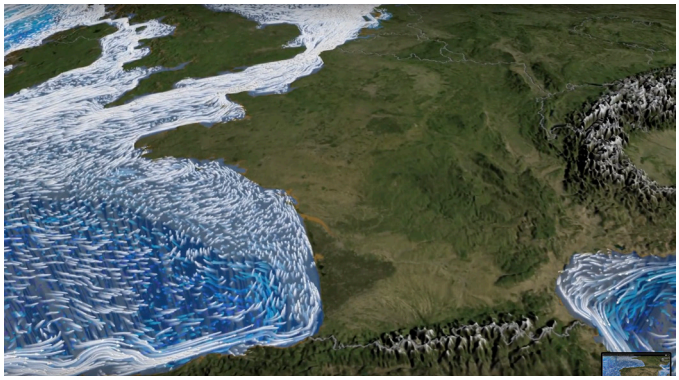
The two scales are represented by two paintings, in which these complex layers of information are overlapped and abstracted to anticipate the changes of migratory and settlement patterns in and around Gibraltar.

Further information on the flora and fauna in and around Gibraltar—their origin, trajectories, vulnerability, et cetera—can be found in the accompanying Visualized Catalogue.



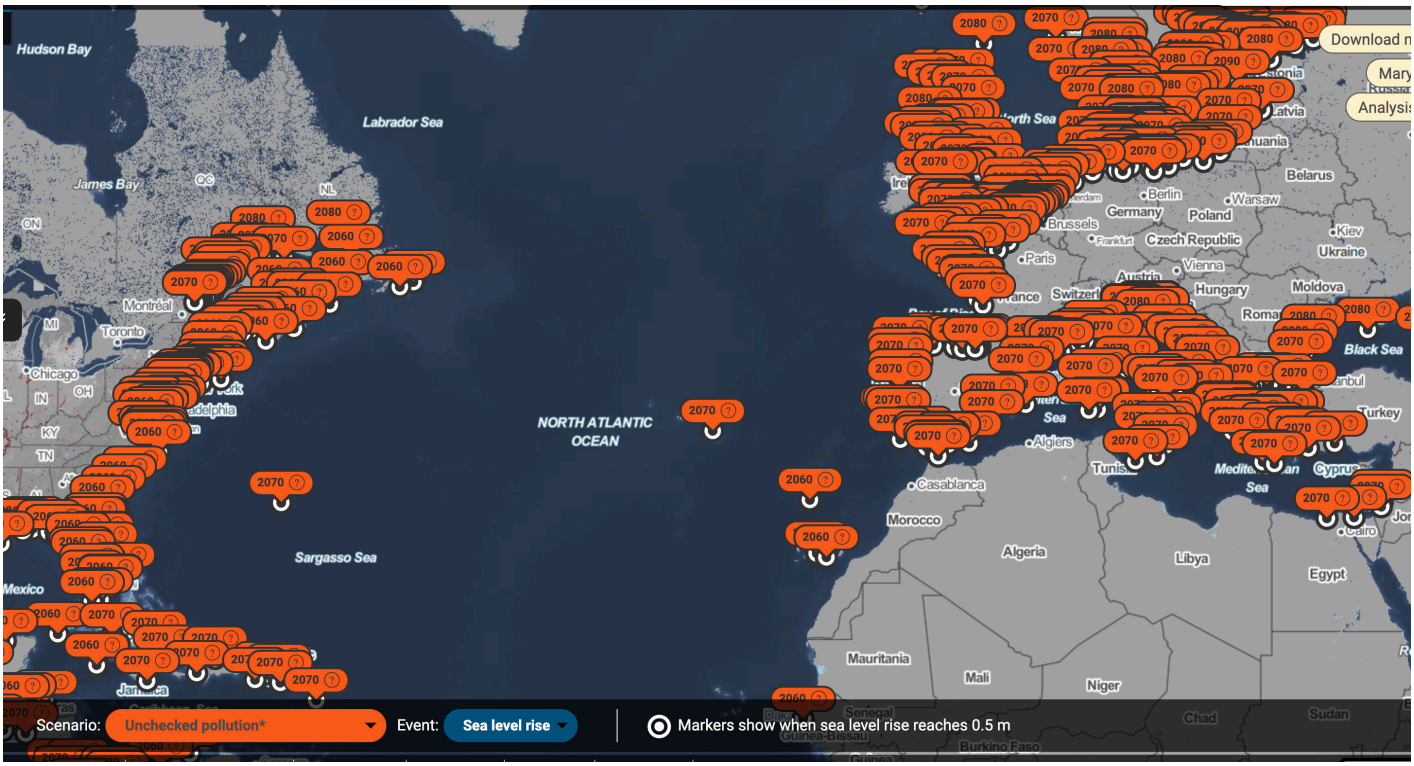
World map showing ocean currents.

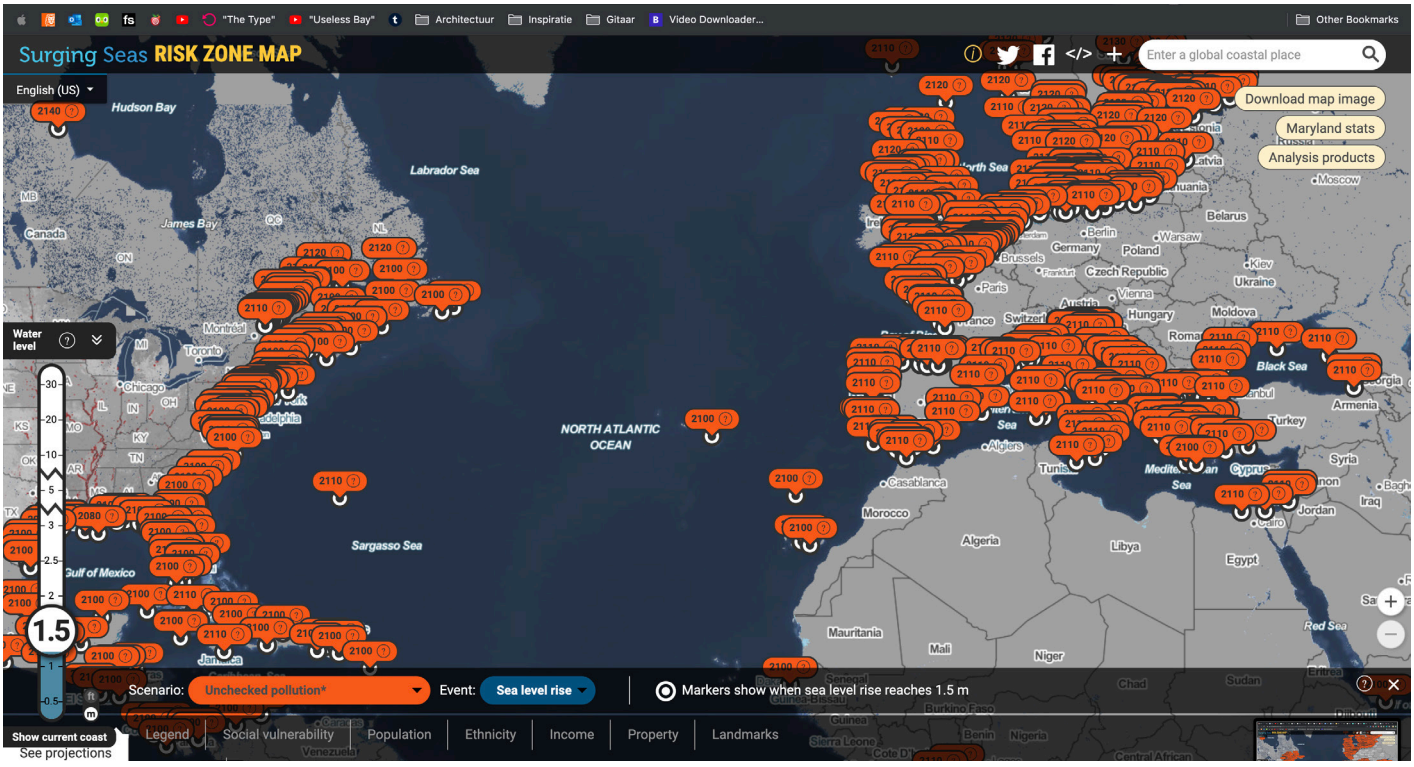
A. Hoen & Co., Inc.. *Ocean Current and Sea Ice 3.* Atlas of World Maps for the Study of Geography in the Army Specialized Training Program. Army Services Forces Manual. M-101. Headquarters, Army Service Forces, 1943. From: davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~%20244308~5513805:Ocean-Current-and-Sea-Ice-3-


Currents in the Mediterranean Sea and Eastern Atlantic.

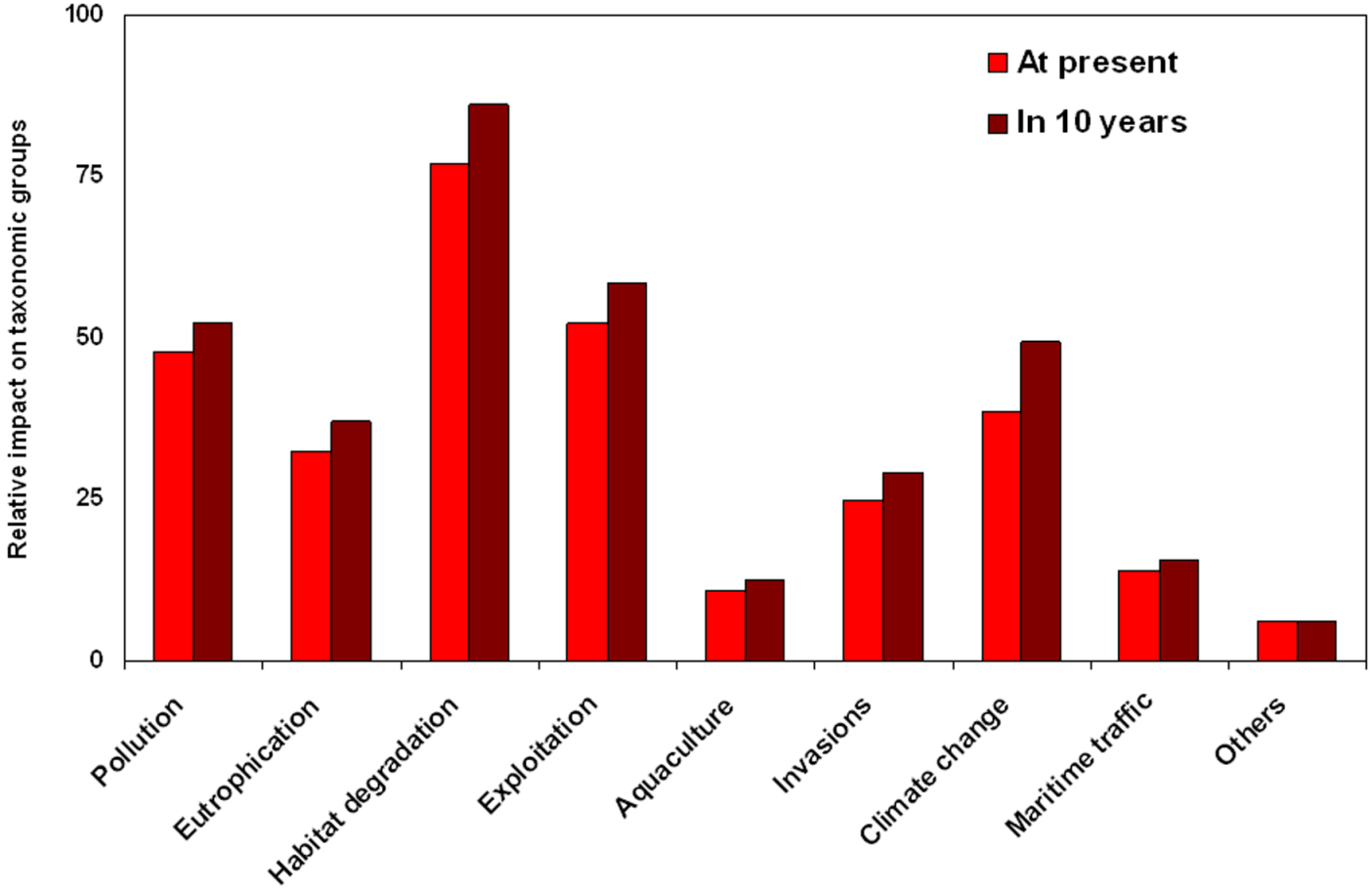
NASA/Goddard Space Flight Center Scientific Visualization Studio. *Ocean Current Flows around the Mediterranean Sea for UNESCO*. 2011. From: http://svs.gsfc.nasa.gov/3820

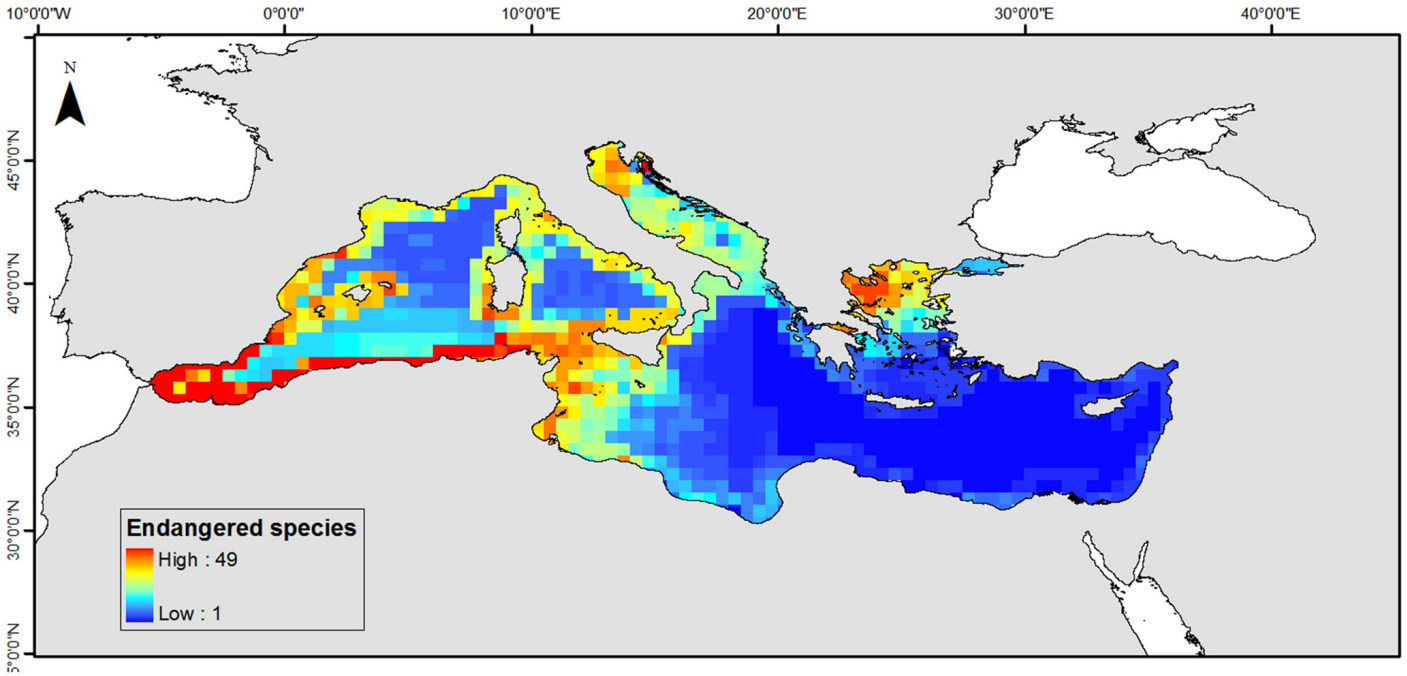




Markers show when sea level rise reaches 0.5m (above) and 1.5m (below) at the indicated points, in the case of unchecked pollution, taking into account the factors used from new Antarctic research.

Screenshots from interactive tool: https://ss2.climatecentral.org/

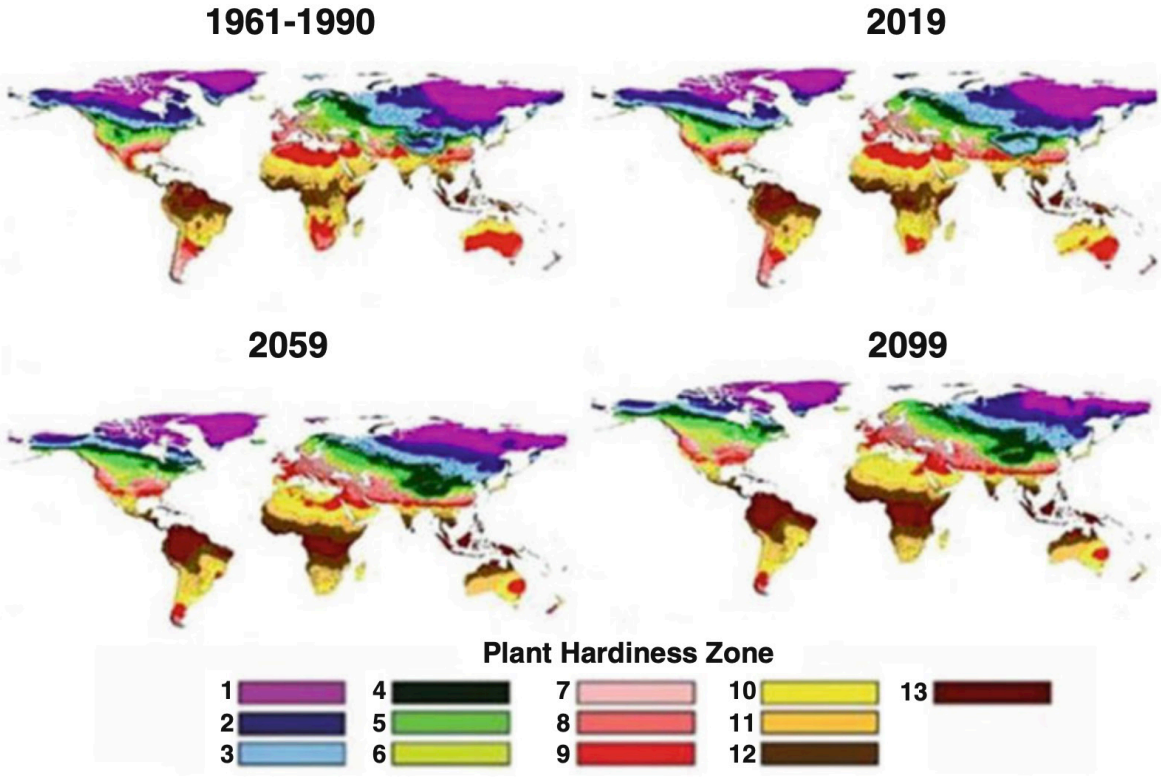




Above: Current and future threats to biodiversity in the Mediterranean Sea

Below: Biodiversity hot spots for Mediterranean vertebrate species of special conservation concern. This figure includes 110 critically endangered, endangered, vulnerable, or near threatened species.

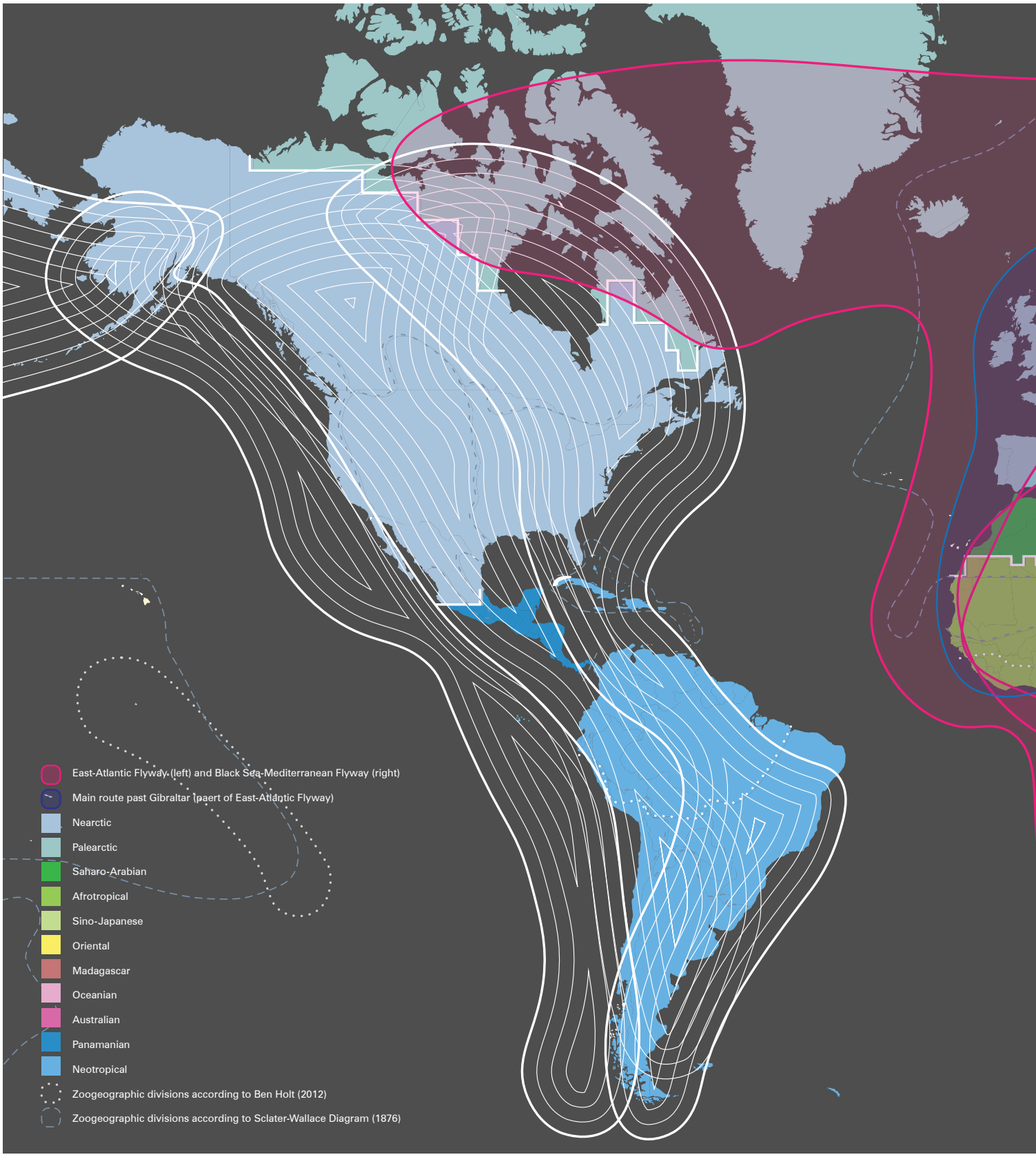
DOI: 10.1371/journal.pone.0011842

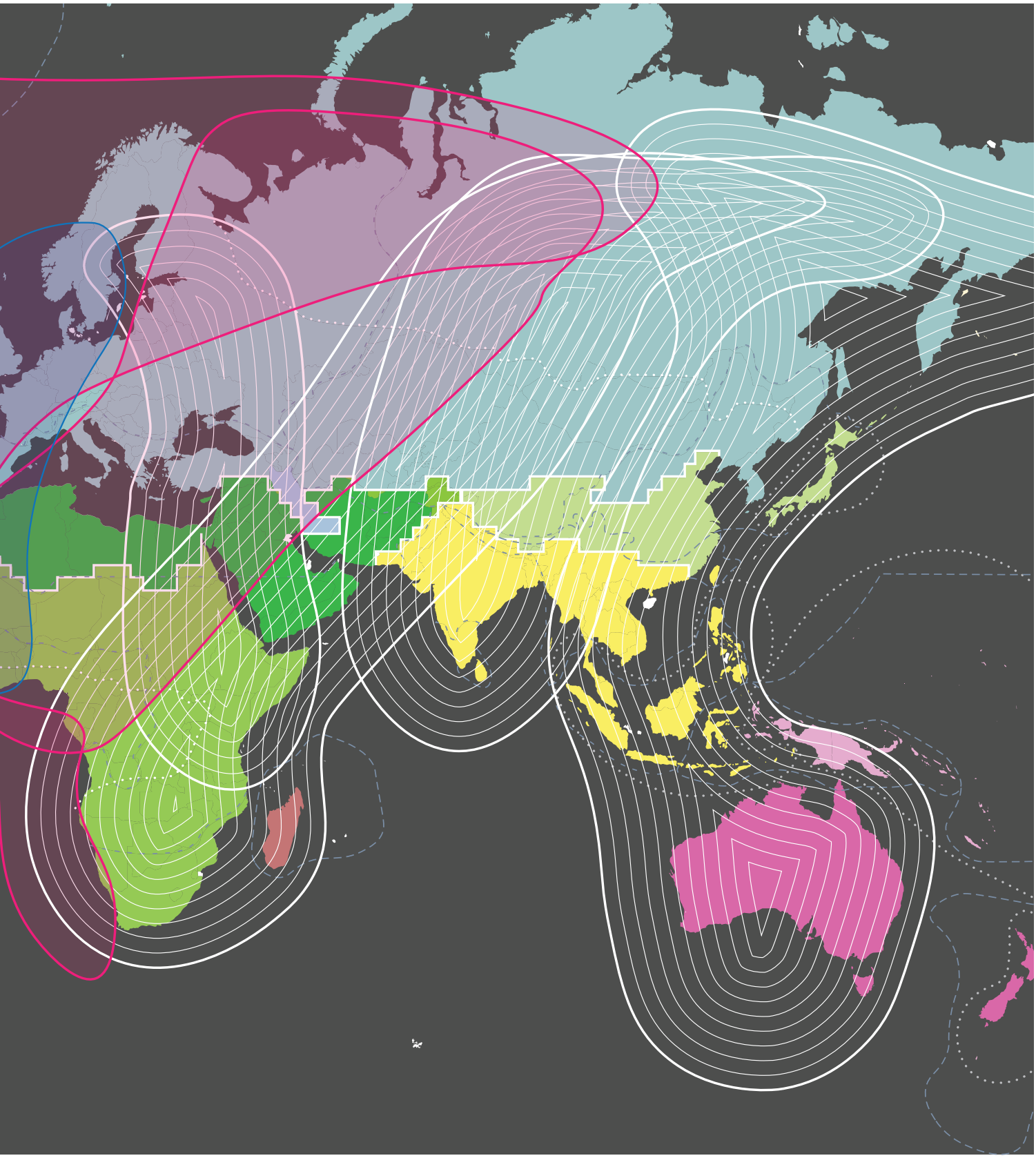


Global plant hardiness zones based on climate change scenario B1 (IPCC, low range emission, +1.8 °C) for 1961-1990, 2019, 2059 and 2099.

Plant hardiness zones (average annual extreme minimum termperatures)
1) –60 to –50 (°F) / –51.1 to –45.6 (°C)
2) –50 to –40 (°F) / –45.6 to –40 (°C)
3) –40 to –30 (°F) / –40 to –34.4 (°C)
4) –30 to –20 (°F) / –34.4 to –28.9 (°C)
5) –20 to –10 (°F) / –28.9 to –23.3 (°C)
6) –10 to 0 (°F) / –23.3 to –17.8 (°C)
7) 0 to 10 (°F) / –17.8 to –12.2 (°C)
8) 10 to 20 (°F) / –12.2 to –6.7 (°C)
9) 20 to 30 (°F) / –6.7 to –1.1 (°C)
10) 30 to 40 (°F) / –1.1 to –4.4 (°C)
11) 40 to 50 (°F) / –4.4 to 10 (°C)
12) 50 to 60 (°F) / 10 to 15.6 (°C)
13) 60 to 70 (°F) / 15.6 to 21.1 (°C)
Plant Hardiness Zone definitions described in Magarey et al. (2008) Climate Change Impacts in book: The Handbook of Plant Biosecurity.

DOI: 10.1007/978-94-007-7365-3_2


East-Atlantic Flyway (left) and Black Sea-Mediterranean Flyway (right)
Main route past Gibraltar (paert of East-Atlantic Flyway)
Nearctic
Palearctic
Saharo-Arabian
Afrotropical
Sino-Japanese
Oriental
Madagascar
Oceanian
Australian
Panamanian
Neotropical
Zoogeographic divisions according to Ben Holt (2012)
Zoogeographic divisions according to Sclater-Wallace Diagram (1876)



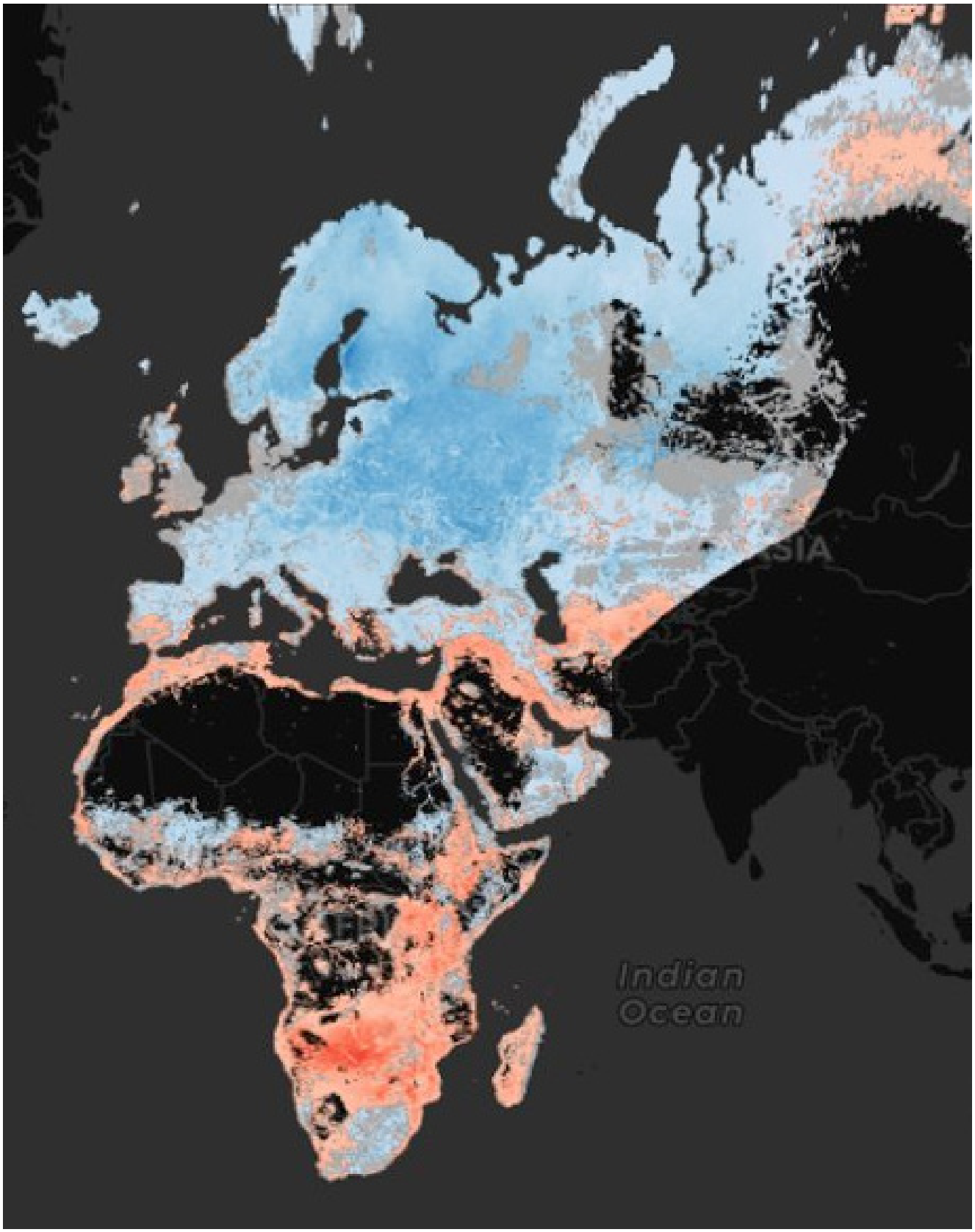
Zoogeographical distribution of the world, based on Ben Holt (2012) with in blue dashed lines the distribution as drawn by Alfred Russell Wallace in the Sclater-Wallace Diagram (1876). Similar colors represent similar characteristics of species.

The map shows Gibraltar on the edge of two biogeographical regions, and as part of two main migration routes for shorebirds and raptors.

Drawing by Noortje Weenink.

Information about specific avian species using Gibraltar as a stop-over. as well as their specific flyways, can be found in the accompanying Species Catalogue.

Source zoogeographic regions: DOI:10.1126/science.1228282.



Change in waterbird population (Blue stands for increase and red for decrease). The study shows that African waterbirds suffer more from climate change than European ones and calls for urgent action to protect important waterbird habitats within the region.

Wetlands.org/news/new-study-predicts-african-waterbirds-will-suffer-climate-change/

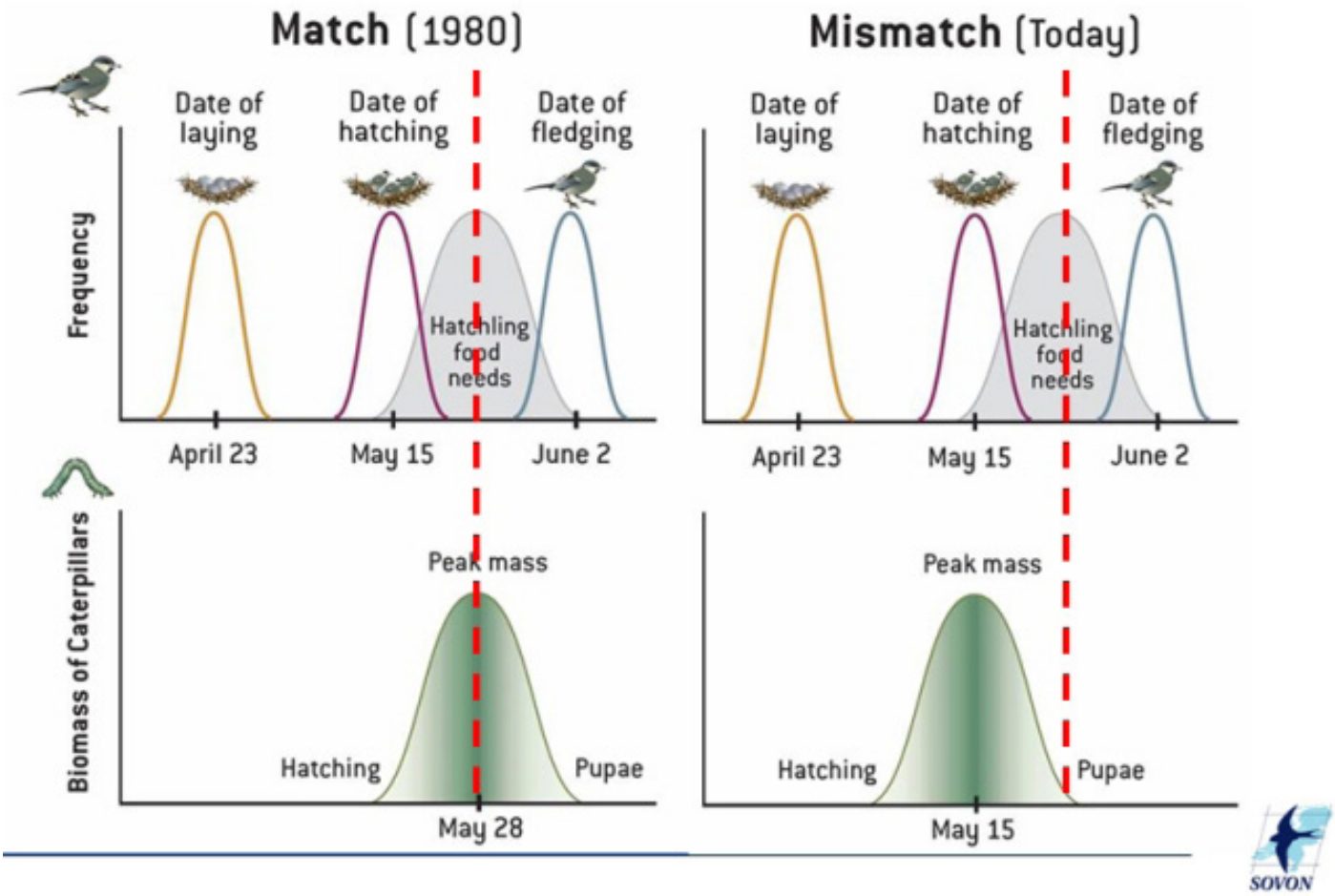
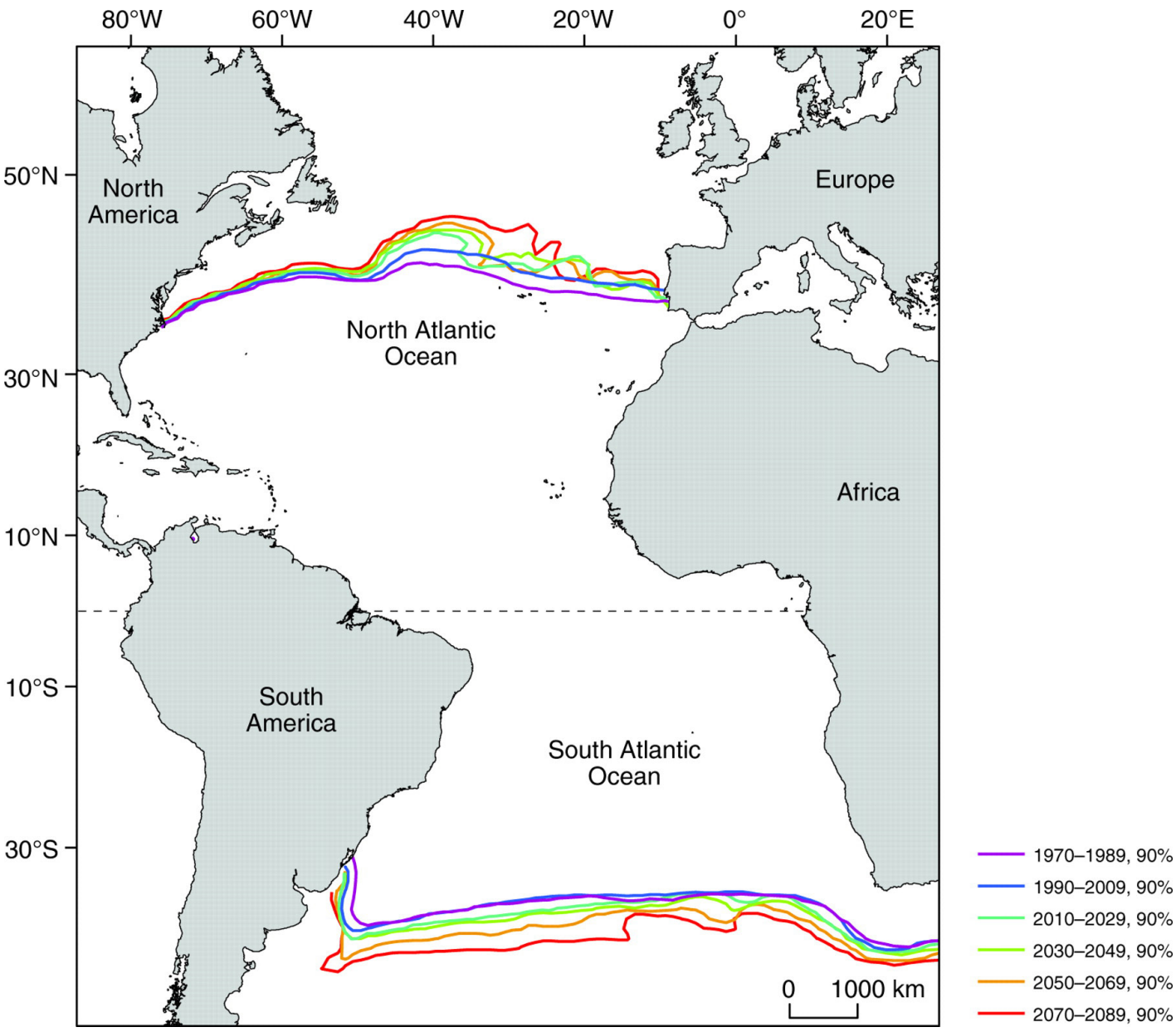
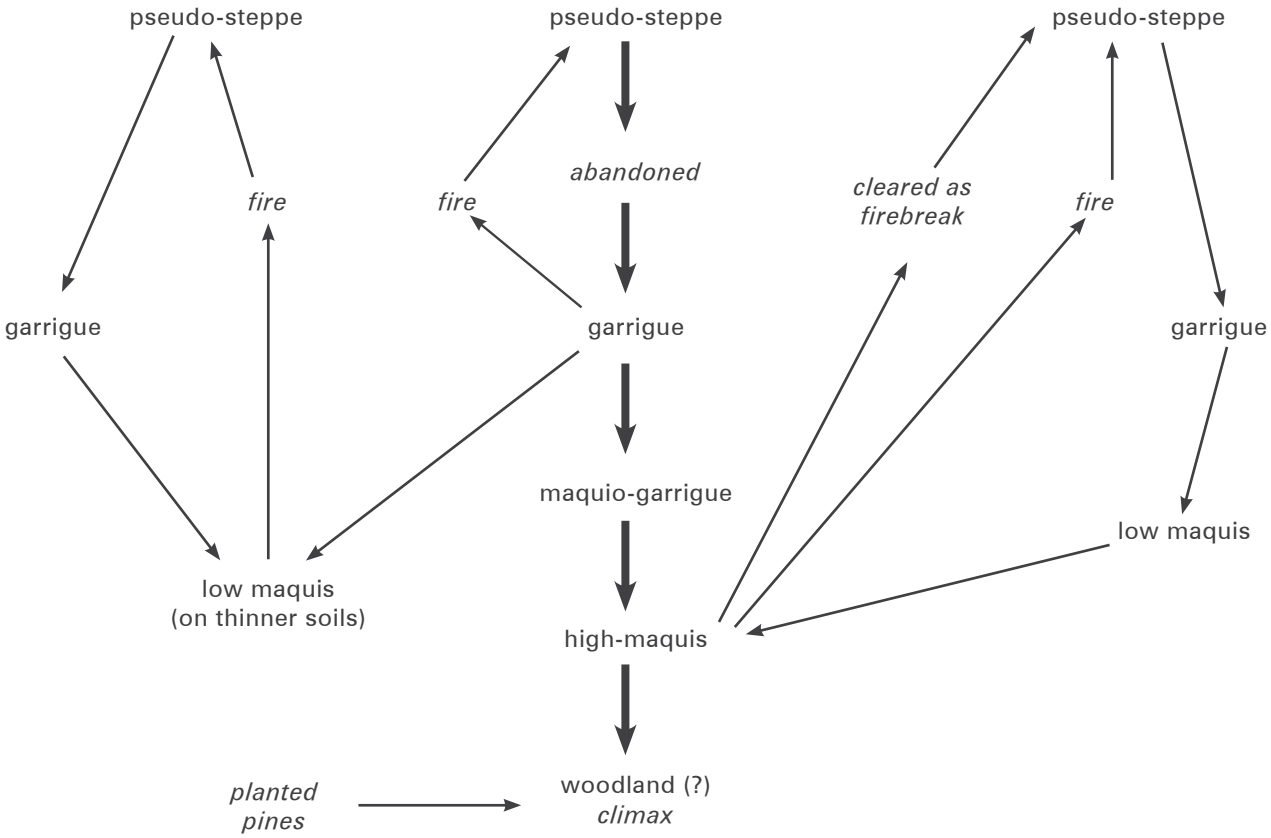


Diagram showing how climate change and the mismatch of migration periods with the available insects is problematic.



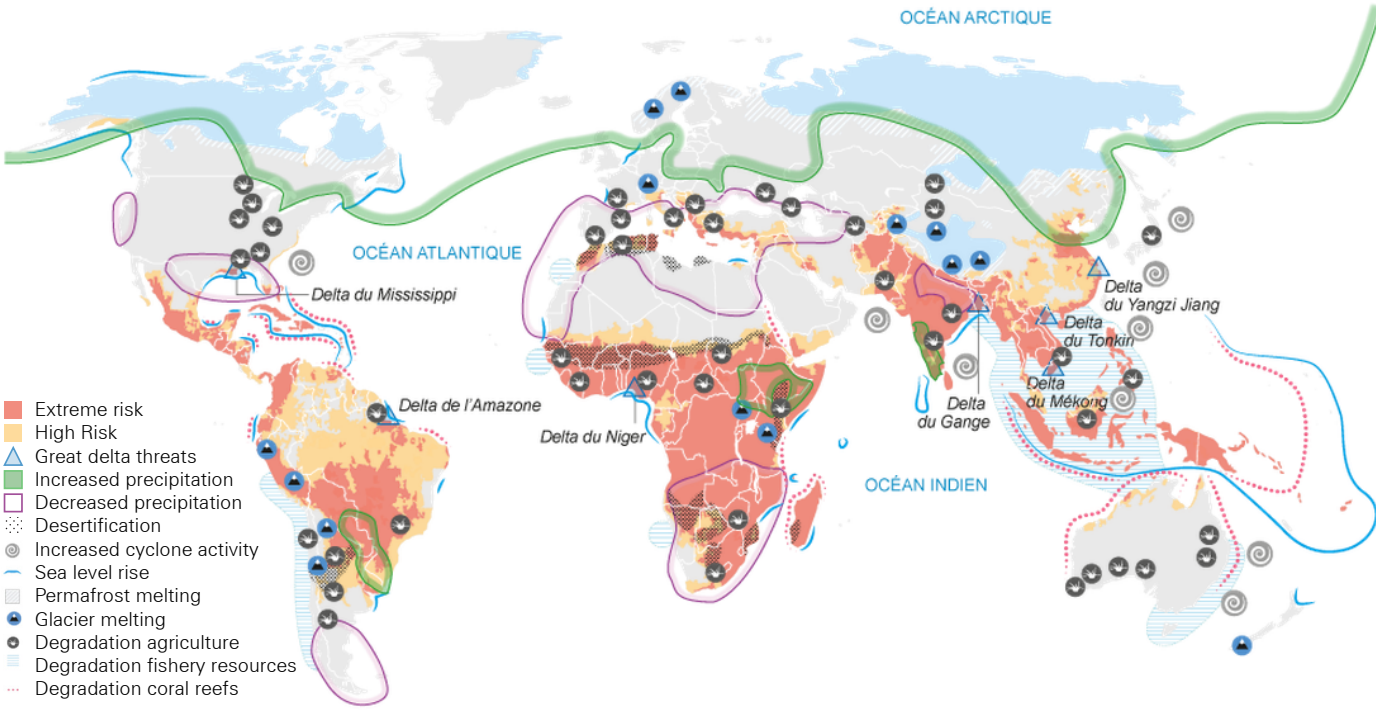
Historic and forecast of Loggerhead Turtle (*Caretta caretta*) habitat suitability in the Atlantic Ocean. This image is chosen to illustrate that migratory species (in this case marine species) move away from the equator in both directions as a result of rising temperatures.

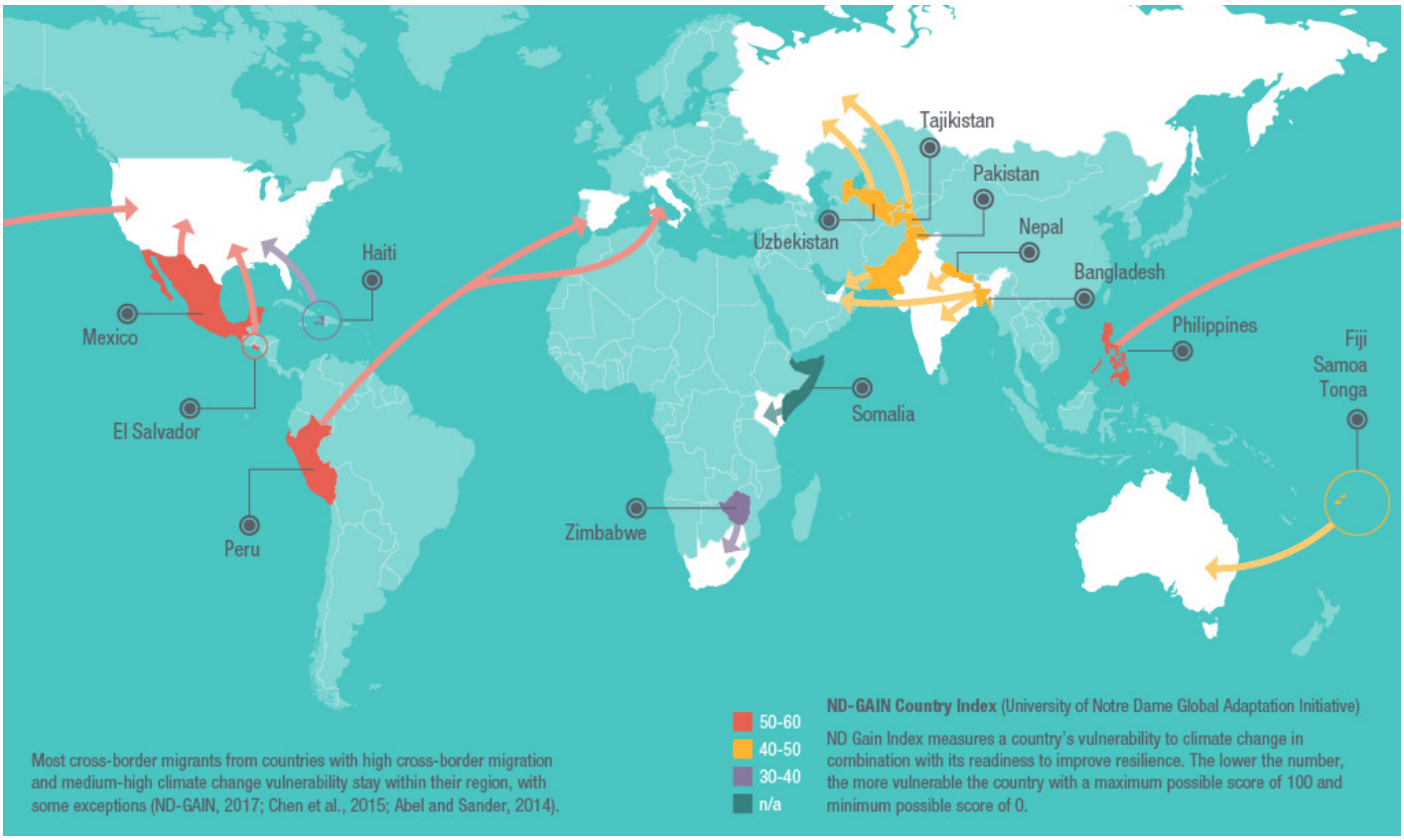
doi: 10.1242/jeb.038133



Vegetation succession as it occurs on the Upper Rock.

Diagram by Noortje Weenink, drawn from: Cortes, 1979, 943.



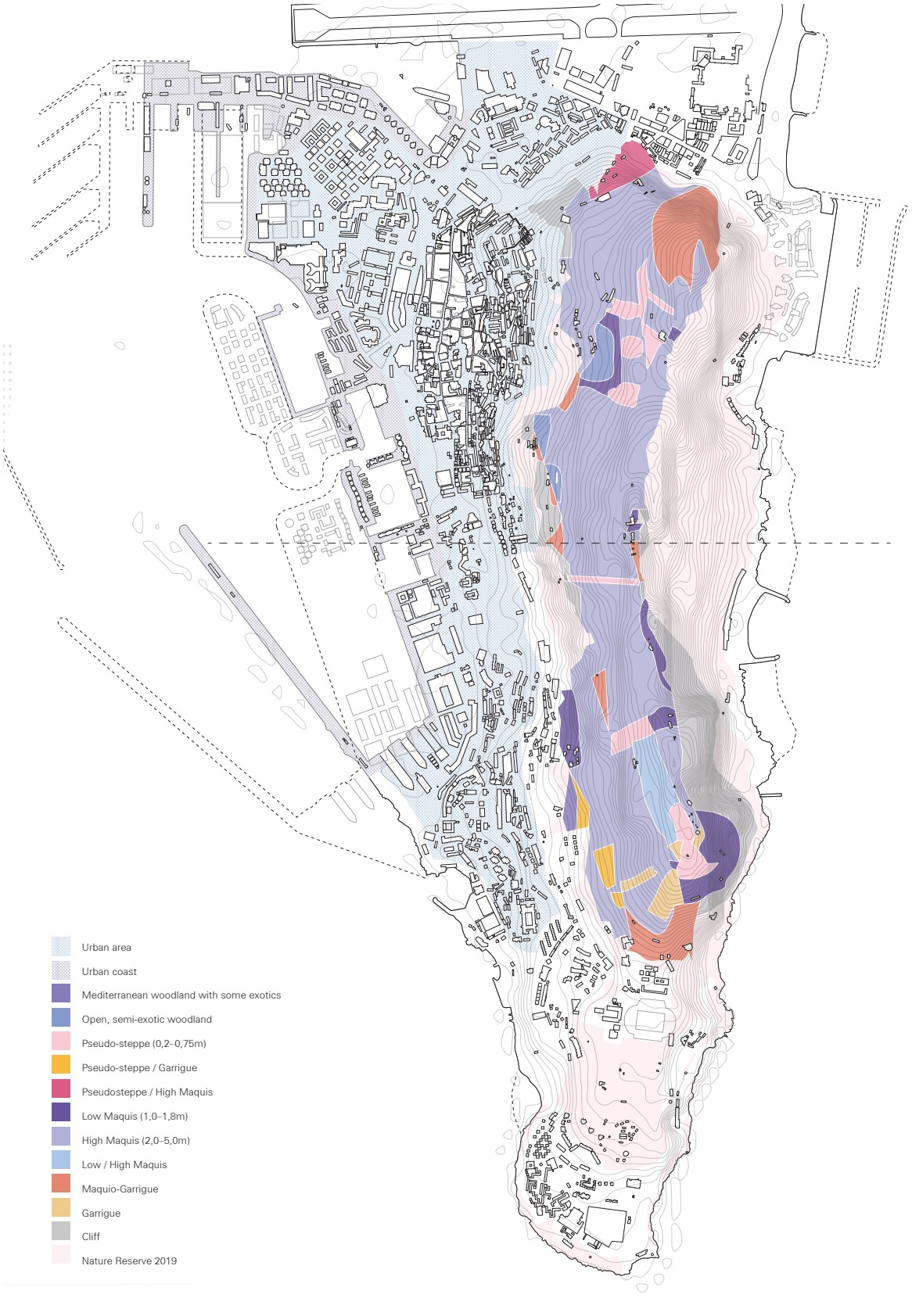


Current and expected human migration patterns induced by climate change.

Above: Atlas du monde de demain, La vie/Le Monde. lejournalinternational.fr/Migrations-environnementales-forcees-l-aspect-oublie-du-changement-climatique_a3488.html

Below: ODI, Overseas Development Institute, UNDP, United Nations Development Programme. *Climate Change, Migration and Displacement: The need for a risk-informed and coherent approach*, 2017 (CC BY-NC 4.0)

Lewis, David. *Despite deaths, crackdown, Sahara migrant trail thrives.* Special Report. Thomson Reuters: 2014. http://graphics.thomsonreuters.com/14/05/EUROPE-IMMIGRATION:NIGER.pdf

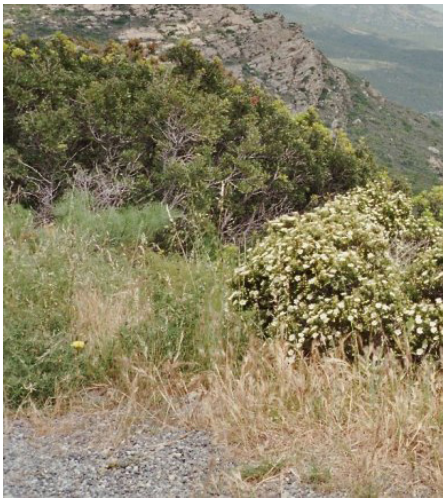


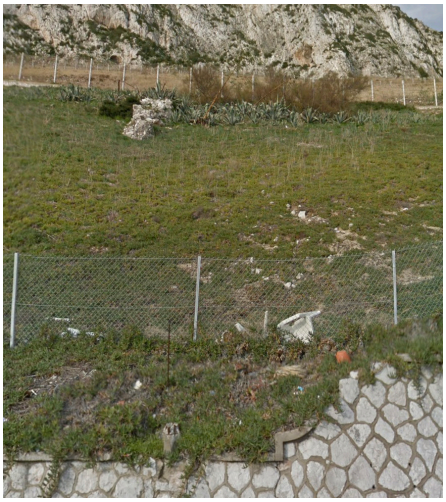
Vegetational ecoregions in Upper Rock Nature Reserve, Gibraltar.

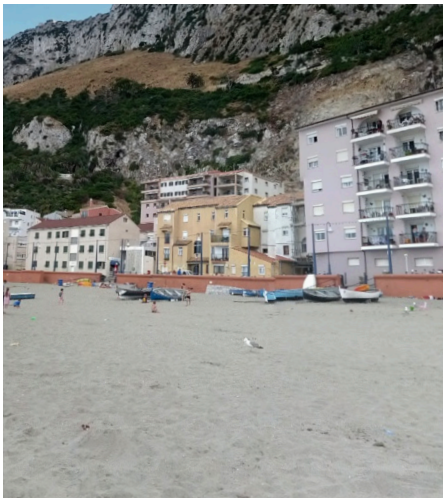
Pseudo-steppes are human-induced firebreaks.

Drawing by Noortje Weenink.

Sources: Gibraltar Museum. "Gibraltar Neanderthal Caves", 944; Charlie Perez. "Sites". Flora of Gibraltar.







The seven ecologies of Gibraltar, as identified by Noortje Weenink.

1. Urban Coast
2. Urban Area / Old Town
3. Upper Rock
4. Pseudo-steppe
5. Cliffs
6. Eastern Sandslopes
7. East Coast

LEGEND

Avian species directly used in project
Aquatic species directly used in project
Terrestrial species directly used in project
Flora directly used in project

Risk

*	Posed for reintroduction
†	Extinct in Gibraltar
1–10.	Domin Value
r.	Rare
rr.	Very rare
vln.	Vulnernable

Range

gar.	Found in Garrigue
high.	Found in High Maquis
low.	Found in Low Maquis
maq.	Found in Maquis
top.	Found only on top of the Rock

FAUNA

Type

R.	Resident species in Gibraltar
M.	Migratory species
Br.	Breeding species in Gibraltar
ins.	Insect

Range

Med.	Mediterranean Sea
Strait.	Strait of Gibraltar
Atl.–Med.	Atlantic Ocean to Mediterranean Sea
Gib.	Gibraltar
E–	East
W–	West
e.g. E–Gib.	East of Gibraltar
e.g. E-Med.	East-Mediterranean Sea.

FLORA

Type

Cl.	Climbing plant
Fl.	Flowering species
Fr.	Fruit-bearing species
Gr.	Grass
H.	Herbal species
Tr.	Tree
W.	Weeds

Range

end.	Endemic to Gibraltar
intr.	Introduced by humans
inv.	Invasive species
x.	Exotic species
oGib.	Grows only in Gibraltar
oEur.	Grows only in Europe
or.	Original species (before human intervention)
rep.	Repopulated species (after human intervention)
la.	Grows in landscaped areas
bu.	Grows on (old) bui

(URBAN) COAST

Aquatic fauna

0. *Argyrops spinifer.* Atl. & Med. Bottom; muddy.
1. *Balaenoptera physalus.* R.W-Med.
2. *Caretta caretta.* R. Med-Coasts.
3. *Delphis delphinus.* R. Med. & E-Gib.
4. *Diplodus annularis.* Bottom; sandy. r.
5. *Diplodus sargus sargus.* Bottom; sandy, near rocks.
6. *Echiichthys vipera.* R.
7. *Globicephala melas.* R.Strait.W-Med.
8. *Lithophaga lithophaga.* R.
9. *Mola mola.* M.Atl.–Med.
10. *Oblada melanura.* Bottom; vegetated. r.
11. *Orcinus orca.* R. Strait;W-Med.
12. *Patella ferruginea.* R.Med.
13. *Physeter macrocephalus.* R.Med.
14. *Pomadasys incisus.* Shallow; sandy & rocky.
15. *Scyliorhinus canicula.* Med. Bottom; sandy.
16. *Solea solea.* R.
17. *Sparus aurata.* Med. Bottom; sandy & rocky.
18. *Sphyraena sphyranea.* R.Med-Coasts.
19. *Stenella coeruleoalba.* R.W-Gib.
20. *Thunnus thynnus.* M. Atl.–Med.
21. *Torpedo marmorata.* R.
22. *Tursiops truncatus.* R.Med.
23. *Uranoscopidae.* R.
24. *Xiphias gladius.* M.Med/-Atl.
25. *Ziphius cavirostris.* R.Med.

Avian fauna

26. *Actitic hypoleucos.* M.
27. *Falco peregrinus.* R.Br.
28. *Larus michahellis.* R.
29. *Streptopelia turtur.* M. & R. Br.
30. *Puffinus mauretanicus.* M.
31. *Columbidae.* R.

Terrestrial fauna

32. *Homo sapiens* var. *laborus.* M.Sp.
33. *Homo sapiens* var. *migrans.* M. & R.
34. *Homo sapiens* var. *residentus.* R.Br.
35. *Homo sapiens* var. *touristus.* M.

Flora

36. *Cistus salvifolius.* lr.
37. *Crithmum maritimum.*
38. *Daucus carota.*
39. *Glaucium flavum.*
40. *Medicago marina.* lr.

Gibraltar's ecoregions and (a selection of) its species, showing that specifically the limestone cliffs have given life to a variety of endemic flora.

In color: the species that are directly considered in the project.

More information can be found in the accompanying Visualized Catalogue.

URBAN AREA

Avian fauna

27. Falco peregrinus. R.Br.
28. Larus michahellis. R.
28. Streptopelia turtur. M. & R. Br.
31. Turdus merula. R.

Terrestrial fauna

34. Homo sapiens var. *residentus* R.Br.
35. Homo sapiens var. *touristus* M.
41. Macaca sylvanus. intr.Afr.

Flora

42. Antirrhinum majus. bu.
43. Ageratina adenophora. x.bu.
44. Campanula mollis. bu.
45. Cyperius rotundus. W.la.
46. Equisetum telmateia. la.
47. Erigeron bonariensis. W.la.
48. Erigeron sumatrensis. W.la.
49. Ficus carica. bu.
50. Helichrysum boissieri. bu.
51. Nicotiana glauca. x.bu.
52. Nothoscordum borbonicum. W.la.
53. Phytolacca americana. W.la.
54. Symphotrichum squamatum. W.la.
55. Trachelium caeruleum. bu.

UPPER ROCK MAQUIS/GARRIGUE

Avian fauna

56. Athene noctua. R.gar.maq.
57. Ciconia ciconia. M.
58. Ciconia nigra. M.
59. Falco naumanni. R.
60. Hieraaetus pennatus. M.
61. Pernis apivorus. M.
62. Scops zorca. R.gar.maq.
63. Torticollis. R.maq.
64. Turdus merula. R.maq.
65. Upupa epops. R.gar.
66. Milvus migrans. M.high.
67. Pandion haliaetus. M.

Terrestrial fauna

35. Homo sapiens. var. *touristus.* M.
41. Macaca sylvanus. intr.Afr.
*68. * Oryctolagus cuniculus.*
69. Atelerix algirus algirus. intr.
70. Erinaceus europeus.
*71. * Vulpes vulpes silacea.* intr.
72. Genetta genetta. intr.Afr. † 1900s.
73. Sas scrofa beaticus. † 1800s.

Flora

74. Acanthus mollis. H.5.
75. Aristolochia baetica. Cl.
76. Calicotome villosa. Fl.2.
77. Chamearops humilis. Tr.3.gar.
78. Clemantis cirrhosa. Cl.
79. Ephedra fragilis. Fl.gar.
80. Euphorbia squamigera. Fl.gar.
81. Genista linifolia. Fl.2.
82. Olea europaea. Fr.5–8.
83. Osyris lanceolata.
84. Osyris quadripartitia. Fr.4.
85. Phillyrea latifolia. top.
86. Pinus pinea. Tr.low.8–9.
87. Pistacia lentiscus. Fr.4–5.
88. Pistacia therebinthus. Tr.low.
89. Rhamnus alaternus. Fr.5.
90. Smilax aspera. Cl.2.
91. Stipa tenacissima. gar.Gr.
92. Tamis communis. Cl.

PSEUDO-STEPPE (FIRE BREAKS)

Avian fauna

93. Aeshna cyanea. M.ins.
94. Vanessa cardui. M.ins.
95. Alectoris barbara. R.oEur. National bird.
96. Circus pygargus. M.
97. Emberiza hortulana. M.

Terrestrial fauna

*68. * Oryctolagus cuniculus.*
98. * *Ammotragus lervia.* †
99. * *Capra pyrenaeica.* † 1980s.
100. Homo sapiens. var. *hortus.*

Flora

101. Bare ground. 5.
102. Ajuga iva. Fl.
103. Aspohdelus aestivus. Fl.3.
104. Asteriscus maritimus. Fl.3.
105. Campanula rapunculus. oGib.
106. Centaurium pulchellum. oGib.
107. Dactylis glomerata. Gr.3.
108. Ephorbia pterococca. oGib.
109. Ferula tingitana. Fl.3.
110. Gladiolus communis. Fl.2.
111. Hypericum perforatum. oGib.
112. Logfia gallica. oGib.
113. Narcisssus payraceus. Fl.3.
114. Nepeta tuerosa. oGib.
115. Pulicaria odora. oGib.
116. Sideritis aborescens ssp. aborescens. oGib.
117. Smyrnium olusatrum. Fl.3.
118. Trifolium glomeratium. oGib.

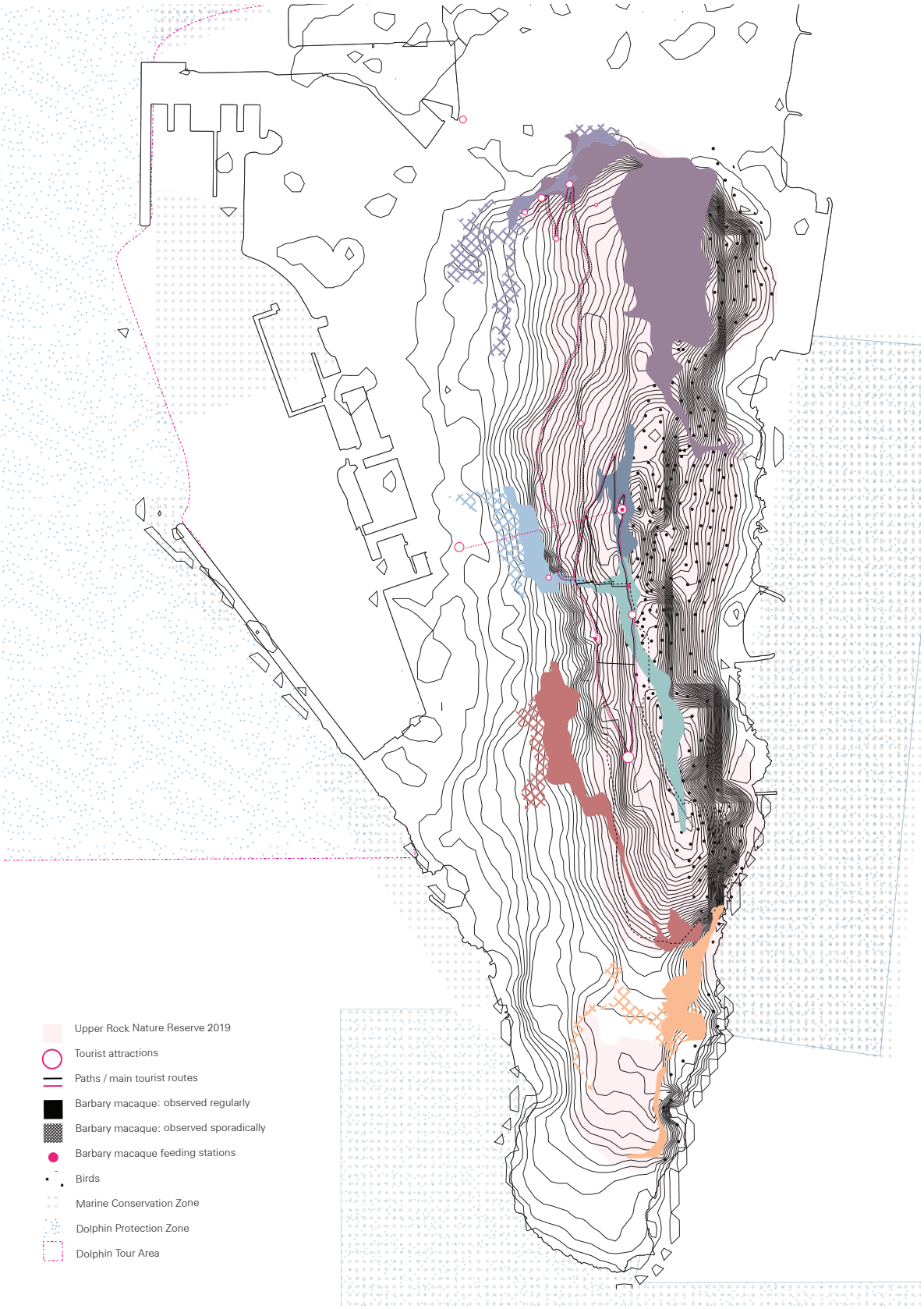
CLIFFS

Avian fauna

119. Circaetus gallicus. M.
120. Neophron percnopterus. M.

Flora

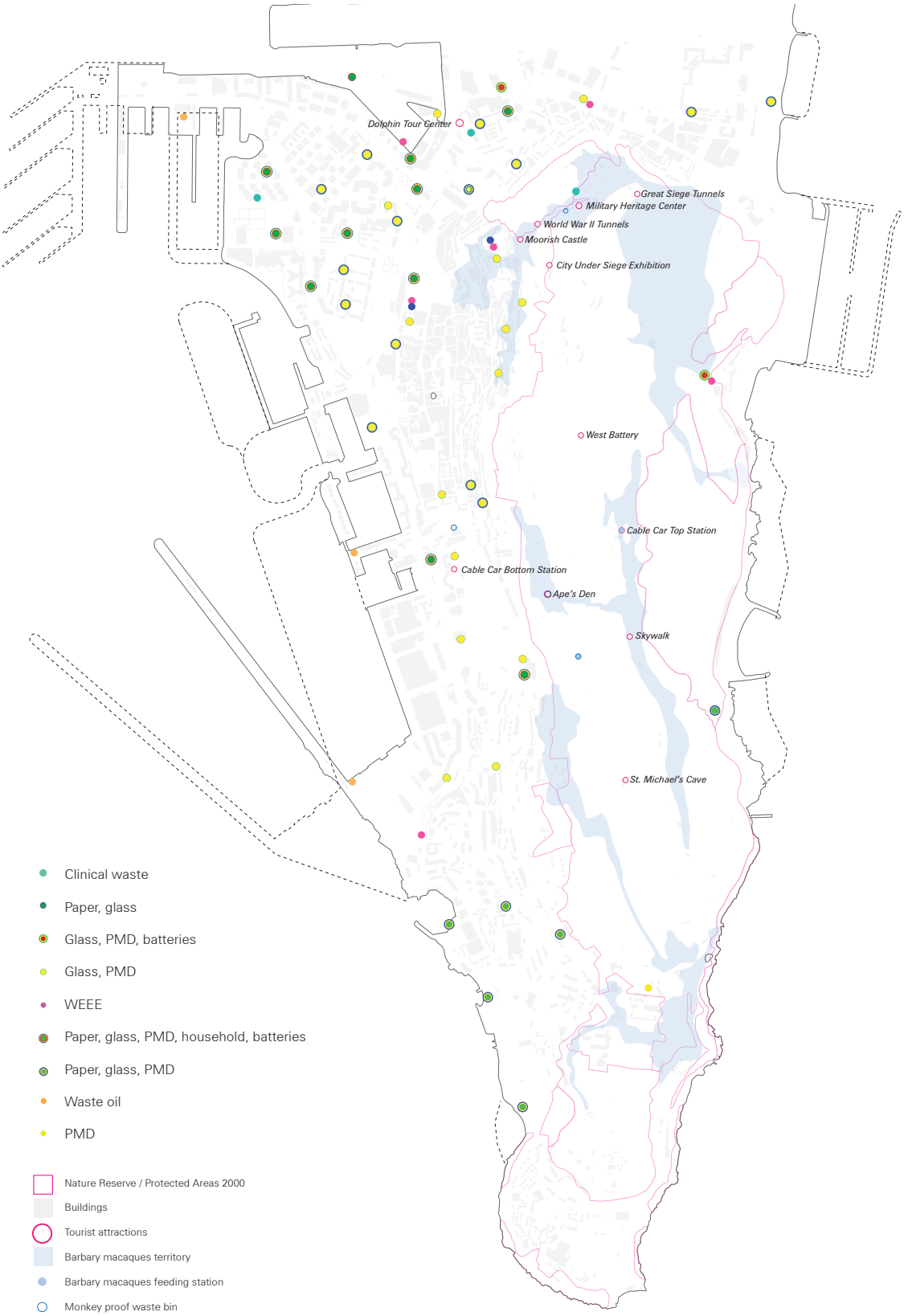
121. Aenomium arboreum. inv.
122. Campanula mollis.
123. Cerastium gibraltaricum. end.Strait.
124. Chaenorrhinum villosum.
125. Dianthus caryophyllus.
126. Helichrysum boissieri.
127. Iberis Gibraltarica. end.N-Afr. National flower.
128. Limonium emarginatum. end.Gib.
129. Opuntia ficus-indica. inv.
130. Petroselinum crispum.
131. Saxifraga globulifera var. *gibraltarica.* end.Gib.
132. Silene tomentosa. Gib.rr.



Heatmap of monkey troops, birds, marine life, and tourists. Different colors refer to different Barbary macaque troops.

Drawing by Noortje Weenink.

Based on observations and drawing by Monkey Talk Gibraltar/Brian Gomila; tourist paths and spots based on tourists maps by HM Government of Gibraltar.



Heatmap of Barbary macaques related to the urban fabric, waste collection sites, and tourist attractions on the Upper Rock.

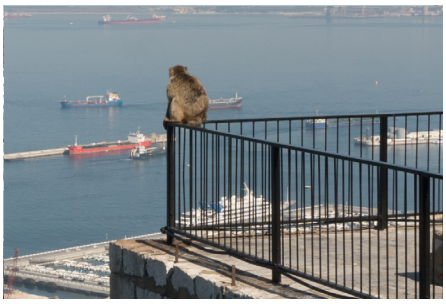
The macaques are often found around PMD collection sites, as well as tourist attractions such as the Cable Car Top Station and the SkyWalk.

Drawing by Noortje Weenink.










Barbary macaques human infrastructures and architecture to move and reside on and around the Rock.

Photographs by Noortje Weenink.

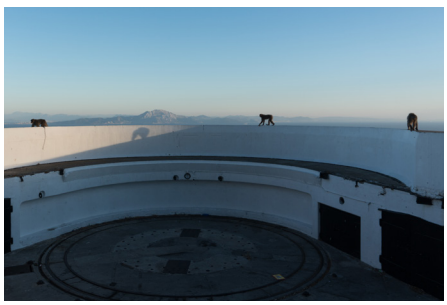










Architecture and objects desigend for humans used by Barbary macaques, and vice versa.

Photographs by Noortje Weenink.

Architecture is an articulation of our understanding of the world we inhabit, and as such of the way we consider our position in the global ecology. This position has indeed been embodied for centuries in architectural form: from collecting and observing exotic animals in menageries, to Pleasure Gardens (*Lusthoven*) idealizing nature with(in) design, to modern zoos mimicking natural conditions. These historic types indicate a separation of humans and nature. Although modern architecture generally has been harmful for biodiversity, but more recently there has been a shift towards a more inclusive approach.

This chapter explores the role of architecture within nature: the position architects take while designing with or for nature, what happens if humans try to design nature, and how nature itself adjusts to design made for humans.

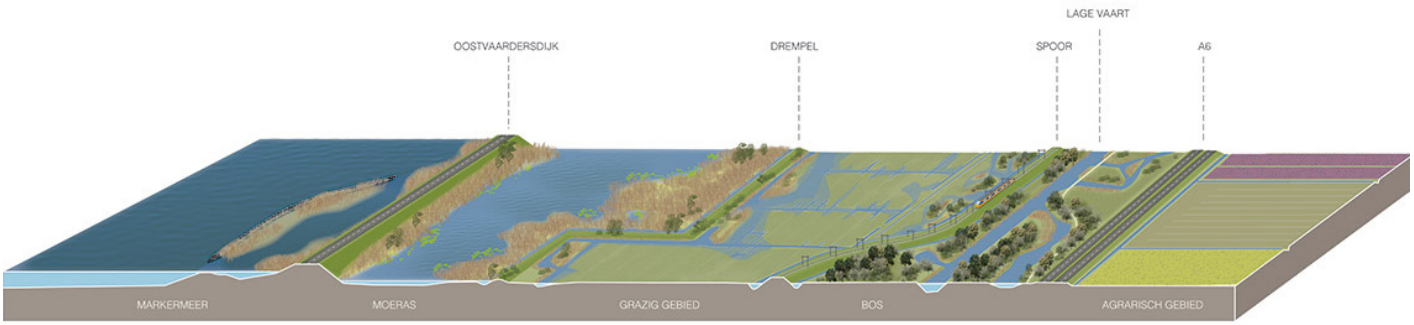
Lusthoven (Pleasure Gardens) as reference for artificial nature.

Paris Zoological Park has aimed the enclosures to create “successive visual frames that enlarge the dimensions and break down distances between humans and animals”. Through the topography, elements and animals are framed or hidden. The aim was to create a type of zoo that is not a singular path leading from enclosure to enclosure, but a single topography that dissolves the paths, tereby forming a ‘natural’ way of interacting with the animals (from a distance). Architectural elements are combined with elements from the animals’ natural habitats, creating an tailored “in between” state of architecture and nature, in which the visitor participates.

Bernard Tschumi Urbanists Architects and Veronique Descharrieres. *Zoological Park*, Paris, 2014. From: ArchDaily.

The Supertree Grove in Singapore consists of 18 artificial trees, between 25 and 50 meters high, which perform a multitude of functions, including planting, shading and working as environmental engines for the gardens.

Grant Associates, Supertree Grove, Gardens by the Bay, Singapore, 2014.



Oostvaardersplassen, the polder that was not completely drained for risks that it posed to surrounding areas. Now it is a nature reserve, managed under the premise of 'rewilding'. Animals are behind a fence and cannot migrate. because of the large reported number of grazers dying by starvation or shot to death, it is a contested experiment.

Above: Carcasses are left in the nature reserve to retain a 'natural' environment, yet people started feedin the animals themselves. Image by Raymond Rutting / de Volkskrant. Below: Section of the design. From left to right: Oostvaarders dike, treshold, train tracks, ditch, highway A6 / Marker lake, wetlands, grazing area, forest, agricultural area.

Satoyama gardens in Japan, where humans and their agricultural interventions in the landscape have become part of and shaped the natural ecologies.

Left: Drylands after reeds have been burned on purpose, providing fertilizer for the vegetation that blossoms in spring.

Right: Humans artificially watering the landscape for rice crops to grow.

Screenshots from:
BBC. *Satoyama II: Japan's Secret Watergarden.* 2004.
Director: Masumi Mizunuma.
Narrator: David Attenborough.

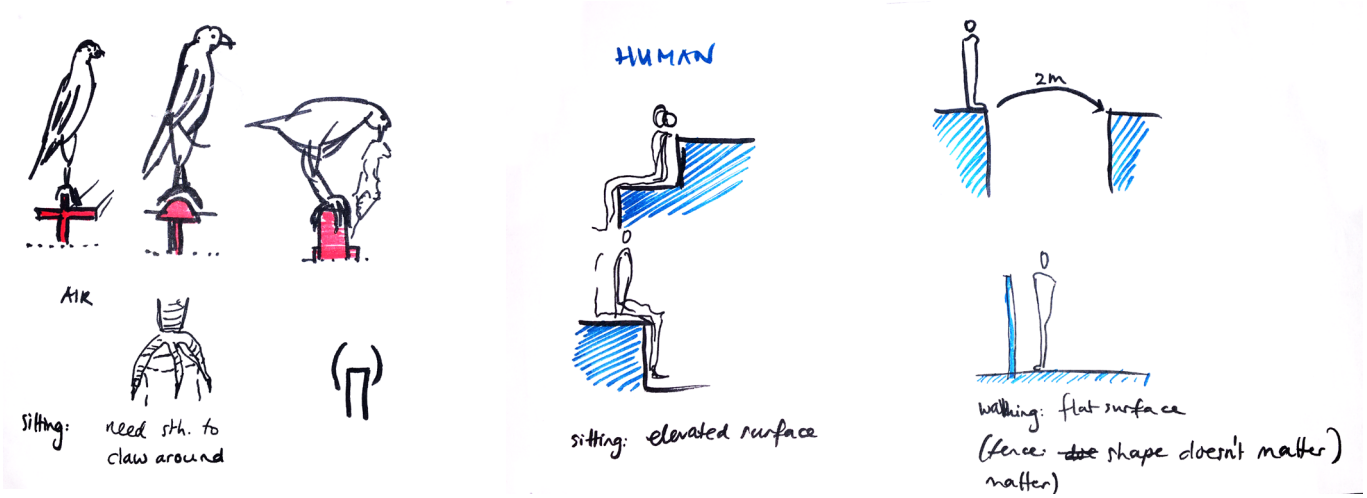


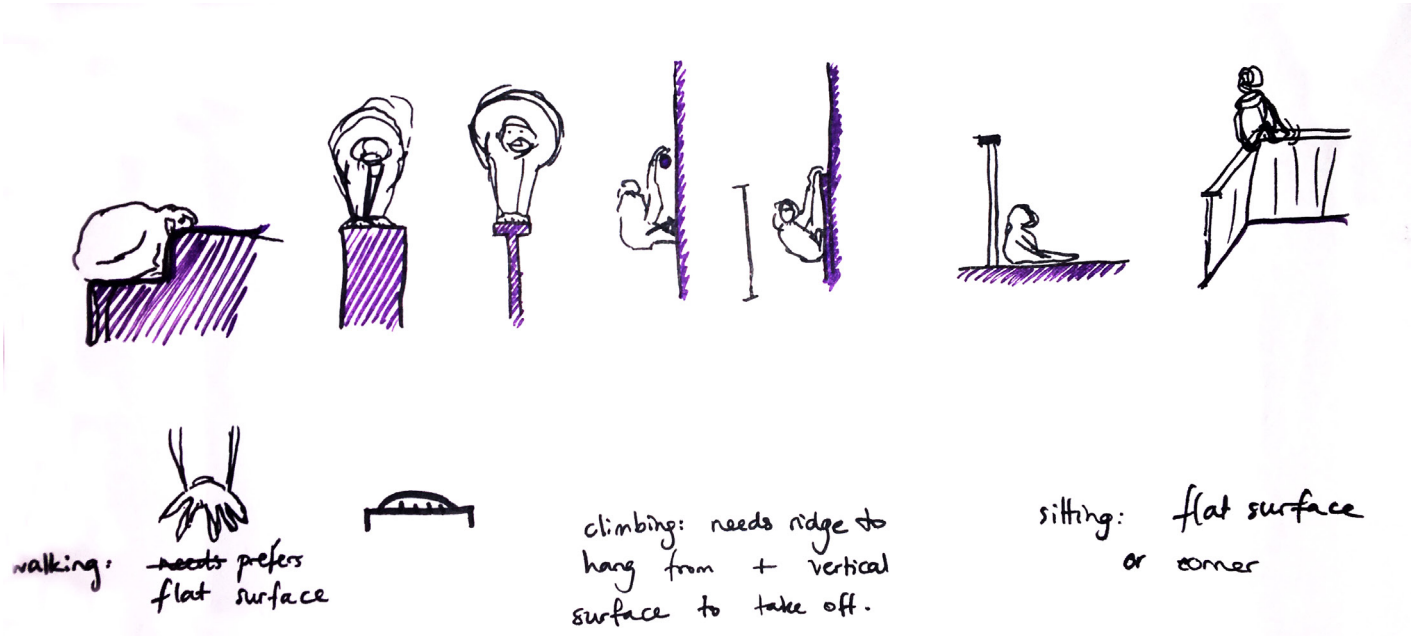






Birds (*Ciconia ciconia, Milvus migrans, Falco peregrinus*) adapting to urban environments.



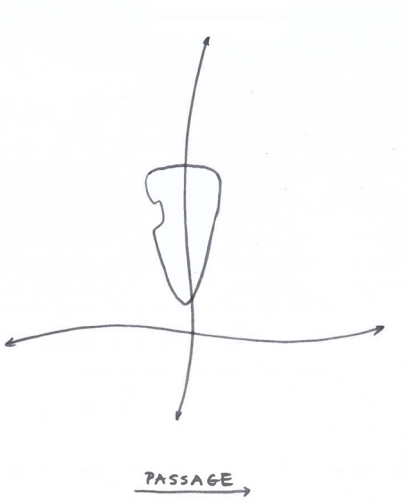


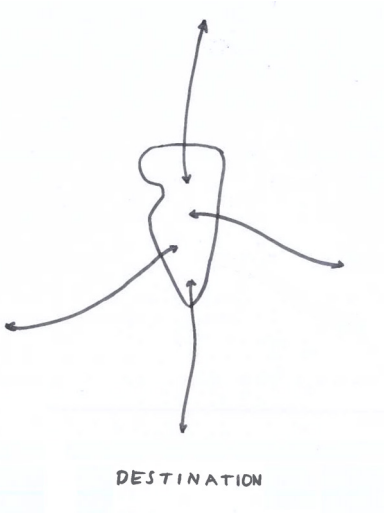
Details of where and how raptors, humans and Barbary macaques move and rest.

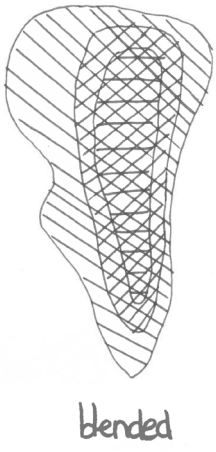
Sketches by Noortje Weenink.

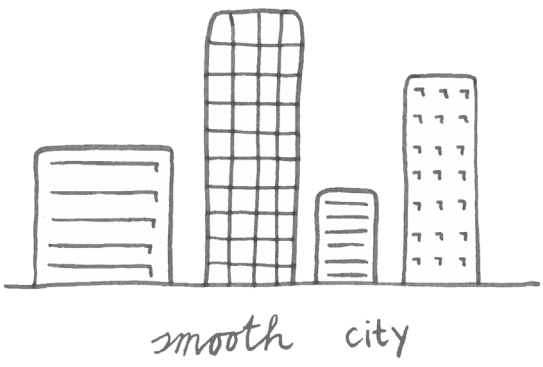
White Storks (Ciconia ciconia) nesting on wooden poles erected by the city of Caceres to compensate for the removal of an old farmhouse supporting a colony of storks.

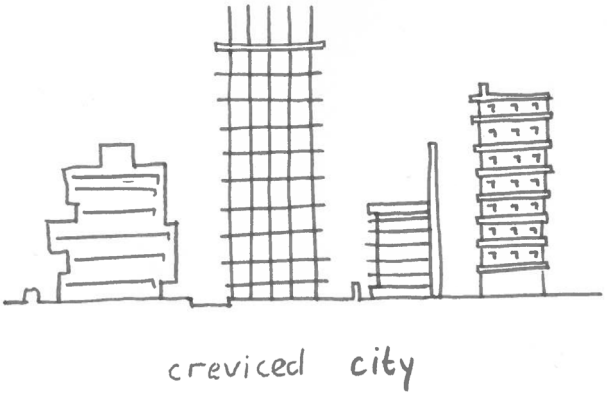
Caceres, Extremadura, Spain.











Before / After: conceptual diagrams by Noortje Weenink (inspired by Leon Krier).

Project Description

"The principal impulse by which I was directed was the earnest endeavor to comprehend...and to represent nature as one great whole, moved and animated by internal forces." [1]

Gibraltar's Ambiguities
In the eighteenth and nineteenth century, British officers collected and documented avian specimens for ordnance surveys and rational recreation. They categorized specimens not by anatomy or classification, but by relationship of animals to environment. Using their natural distribution and migratory patterns, the British determined "the most natural division of the earth's surface",[2] conceptualizing the colonial world as a unified whole, while also allowing for frontiers, peripheries, and uneven development.

The Palearctic region in particular appeared "to belong to Europe zoologically, and not to the continent to which it is physically joined".[3] It validated their imperial conquests gaining control over the Mediterranean region via Gibraltar and Malta.[4] This relationship between region and nature still dictates how we see the world today—but it tells an incomplete story.

The Rock of Gibraltar knows two distinct sides: the east side—'natural' and uncultivated, and the west side, primarily covered by an urban environment. It has historically been one of the most sought-after territories on earth. On the west side lies a city, located between the Rock and the surrounding waters. On the east side, limestone cliffs and arid sandy slopes dominate the peninsula. It is a landscape that seems unspoiled, but in reality, it has been transformed by human hands.

Gibraltar's landscape is neither aquatic nor terrestrial, neither European nor African, neither Mediterranean nor Atlantic.
Many consider the territory a dull Mediterranean oddity, but it is precisely this in-between condition that distinguishes Gibraltar from its surroundings and attracts a unique range of human and non-human species. It is here—in, on and around the Rock—where multiple ecosystems collide, interact, and influence each other.

Nomadic Nature(s) considers the territory of Gibraltar as a model to explore and complicate the relations between the two distinct east and west side, respectively "natural" and "artificial" habitats. The project identifies seven ecologies—each representing a different relation between humans and non-humans. Therefore, the local ecosystems on the Rock is not considered in isolation, but rather as a model of how local conditions influence and are influenced by regional and global ecosystems. In the context of the climate crisis and the projected population growth, the project anticipates the changes of migratory and settlement patterns and explores how humans affect and are affected by these global and local ecosystems.

Gibraltar in the Global Ecology
The Strait of Gibraltar forms the shortest passage for migratory animals between Europe and Africa. In the center of this junction lies the peninsula, characterized by a limestone rock. The location and the unique features of this small territory make it vital for the global ecology.[5]

Twice a year, millions of raptors and shorebirds find the shortest route between Africa and Europe across the Strait. Black Kites (*Milvus migrans*), White storks (*Cicionia cicionia*), Egyptians Vulture (*Neophron percnopterus*), and Booted Eagles (*Hieraaetus pennatus*) are but a few of the species that soar towards their stopover in Gibraltar, where they find temporary residence on and around the Rock.

The increasing surface temperatures of the Earth have forced avian migration away from the equator. Moreover, the insects on which they feed hatch earlier in the season, and due to this lack of timely food, their populations are decreasing. From the Atlantic Ocean, Atlantic Bluefin Tunas (*Thunnus thynnus*) arrive in the Strait. On their way to spawn in the Mediterranean Sea, they have swum thousands of kilometers, spurred by the currents of the Atlantic Ocean.

Gibraltar's Strait is the only passage between the Atlantic and the Mediterranean waters. It houses species from both sides: the colder Ocean waters provides a myriad of small fish and plankton, while species such as the Short-beaked common dolphin (*Delphinus delphis*), Killer whale (*Orcinus orca*), and Common bottlenose dolphin (*Tursiops truncatus*) live in the warmer Mediterranean waters. These predators visit the Strait to indulge on the nutritional feast brought by this mix of different water temperatures and salinities.

Every day, from the coasts of Algeciras, fishermen come to exploit the crowded intersection. Whales, dolphins, and fish often communicate through sound, yet the noisy engines of fishing, tourist, and cargo vessels affect their ability to collaborate for food, to avoid predators, and even find their homes. As sea and ocean waters are warming, ocean currents slow down, causing the acceleration of Earth's surface temperature rises, weather conditions to become more extreme and droughts more frequent. In turn, these conditions have displaced avian species from the equator.

Bird-watchers and dolphin fanatics may find themselves moving northwards too, adapting to the changing migration and settlement patterns of their animal counterparts that, as a consequence of human actions, are displaced and in decline. Illustrating the balance of a variety of ecosystems, Gibraltar forms a model for global and local ecologies, in which nature, as a whole, is in a constant state of flux.

Cities and Ecologies
Cities and nature are always changing. Both humans and non-humans must either cope with these changes or become extinct. The climate crisis exiles humans from vulnerable homes, driving them away from the equator in both directions. Rising sea levels put pressure on the limited land of Gibraltar, and the urban environment can only expand into the busy surrounding waters, or onto the territory of the Barbary macaque (*Macaca sylvanus*): the Upper Rock Nature Reserve. When human environments take over those of their non-human counterparts, the latter, traditionally, must learn to adapt.

Nomadic Nature(s) reverses this trend, instead aiming for the city to adapt and welcome the non-humans it initially ostracizes. Here, the "artificial" and the "natural", are not considered separate, but rather as poles of a spectrum. The built environment exists on this spectrum, like all other

habitats. Many animals already live in cities. Due to the abundance of food and lack of natural predators, doves, pigeons, and seagulls have taken over urban airways.

Gibraltar's Ecologies

Nomadic Nature(s) distinguishes seven ecoregions on the territory of Gibraltar, each illustrating a different type of reciprocity between the human species, flora, and other fauna. It illustrates and complicates their relations through design and non-design, action and inaction—interconnecting and blending the traditionally segregated environments of humans and non-humans.

1. Urban Coast

Gibraltar's rapidly developing urban coast forms the threshold between the human and underwater environment. It is where tourists come onshore via cruise ships and go offshore to see glimpses of the popular predators. Gibraltar's growing city mimics the natural environment of the Peregrine falcon (*Falco peregrinus*). The bird nests on ridges of high-rise buildings. In the pursuit of prey, these offer the perfect lookout. Wind striking the sides of buildings help the falcon gain height, in their flight to prey on their smaller cousins on lower grounds: the European turtle dove (*Streptopelia turtur*) and Yellow-Legged Sea Gull (*Larus michahellis*).[6] These are birds that, due to the abundance of food, also reside in the city, snatching a bite of fish and chips when humans are not paying attention.

2. Old Town / Urban Area

In the old city, cliff-loving flora such as the Snapdragon (*Antirrhinum majus*) cling to the porous walls. They are met by Gibraltar's famous Barbary macaque (*Macaca sylvanus*). Due to a lack of natural predators, Gibraltar's famous Barbary macaque (*Macaca sylvanus*) stays closer to the ground in its natural environment on the Rock. In the old town, window seals, drains, balconies, and balustrades form climbing frames for them, while trash cans, waste collection sites, and careless tourists create their feeding ground.

3. Upper Rock: Low Maquis

More than 250 macaques reside in Gibraltar's Upper Rock Nature Reserve, which covers 36% of the available land. So many live in this small territory because the Gibraltar Ornithological and Natural History Society, and tourists alike, support their daily nutritional needs. Governmental feeding grounds at former military stations aim to reduce interaction between monkeys and humans, feeding them twice every 24 hours.

However, day-trippers bring monkey nuts and other snacks to the Upper Rock Nature Reserve and the macaques have consequently adapted their foraging patterns to peak visitor hours. Once the monkeys are fed up with the pictures and uninvited touching, they sneak off through the fences, balustrades, and barriers that are set up to prevent humans from stepping off the cliffs.

4. Upper Rock: High Maquis

During their military conquest in the eighteenth and nineteenth century, the British significantly altered the Upper Rock, shaping the surface with walls, batteries and bastions, which provided military lookouts and defenses. The Great Siege of 1704 instigated a need for firewood. Garrisons trimmed down the original Mediterranean Woodlands and reduced it to dense maquis shrub vegetation.[7] Resulting from similar procedures, this dense maquis vegetation has become ubiquitous in the Mediterranean region. However, the Rock provides one feature that makes Gibraltar's vegetation stand out from its surrounding countryside: alkaline soil.

Only six hectares of woodland remain in Gibraltar, in the Gibraltar Botanic Gardens that British Governor of Gibraltar, General George Don, commissioned in 1816 to give soldiers a recreational area during leisure time. Similar cultivation procedures were carried out in the rest of the Mediterranean region, where maquis vegetation is now ubiquitous. Fruit-bearing shrubs colonize the Rock, introduced by the droppings avian frugivores in their voyage across the Strait. These shrubs, such as mastic trees (Pistacia lentiscus) and wild olive trees (Olea europaea), provide nutrients for rabbits, bats, and other small mammals and birds living on the periphery of open grounds.

5. Pseudo-steppe / Firebreaks

The lack of light penetration in the dense maquis make human-made firebreaks crucial to Gibraltar's biodiversity. 37% of the Rock's flora—213 species—take root in this artificial pseudo-steppe, attracting phytophagous insects, and in turn bats, reptiles, small mammals such as the Oryctolagus cuniculus (European rabbit), the only European wild population of Gibraltar's national bird, Alectoris barbara (Barbary partridge), and many additional bird species. Human neglect and climate change threaten this fragile ecosystem.

6. Cliffs

On the craggy eastern side, the alkaline soil of the limestone cliffs accommodates the national flower: the Gibraltar candytuft (*Iberis gibraltarica*). It is the only place where this Candytuft species grows in the European wilderness. Native to North Africa, it was likely brought via the droppings of migratory birds that breed on the limestone cliffs of the Rock.[8] The Gibraltar campion (*Silene tomentosa*), and Gibraltar Saxifrage (*Saxifraga globulifera* var. *gibraltarica*) also take root only on Gibraltar's cliffs, withstanding the salty gusts to which the harsh easterly wind exposes them. These winds give rise to the Levante cloud that keeps the west side permanently humid, but due to rising temperatures the cloud might evaporate

7. Eastern Sand Slopes / East Coast

Since prehistoric times, these salt-laden Levante winds have generated an arid sand slope on the east side. Its lower regions hold a rich community of plants, but the cultivation of domestic goats (*Capra aegagrus hircus*) the construction of ten acres of a corrugated iron water catchment in the 20th Century banished many species from the Rock. In 1991, the slopes were given back to nature, but they never fully recovered. The slopes now house Gibraltar's only grassland, dominated by invasive species such as American Aloe (*Agave americana*) and Candelabra aloe (*Aloe arborescens*). The East Coast has acquired a similar fate: while the eastern waters are protected and house a myriad of marine life, over-development on the current East Coast have resulted in a no man's land for flora and fauna other than humans.

Conclusion

Gibraltar is a complex conglomeration of flora and fauna in which internal that has created curious interactions between internal and external

forces—continuously adapting to each other.

In this balancing act of coincidental and purposeful actions, it becomes clear that Gibraltar's local ecosystems work as a model for nature as a whole. It is a layered coexistence, where ecosystems of local and global scale collide, influence, and interact with each other—constantly moving, adjusting, acclimatizing.

Nomadic Nature(s) explores an urban landscape that is not defined by boundaries, subregions, and separations, but is informed by the global ecology; of which the built environment is part.
Architecture is an articulation of our understanding of the world we inhabit, and the way we consider our position in the global ecology. The architecture of the city, constructed chiefly for humans, might be revised for a further complication between the natural and the artificial.

It might be in the way we construct actions and non-actions, designs and non-designs, that we become conscious of our causes and effects, and create an urbanism that does not discriminate between species, regions, and origins, but rather is composed of an architecture of connection: an architecture where design for one also means accommodation for another. As such, the city creates an environment of entanglement, in which no single fact can be considered in isolation, and in the process, we might truly comprehend the complicated and ever-changing network of nomadic natures.

Endnotes

1 Alexander von Humboldt. *COSMOS: A Sketch of the Physical Description of the Universe*. Vol. 1. Translated by E.C. Otter from from the 1858 Harper & Brothers edition (Baltimore and London: The Johns Hopkins University Press, 1997), ePub, 13.

2 Kirsten Greer. "Geopolitics and the Avian Imperial Archive: The Zoogeography of Region-Making in the Nineteenth-Century British Mediterranean." *Annals of the Association of American Geographers*, 103(6), 2013: 1321. DOI: 10.1080/00045608.2013.784095.

3 Ibid., 1322.

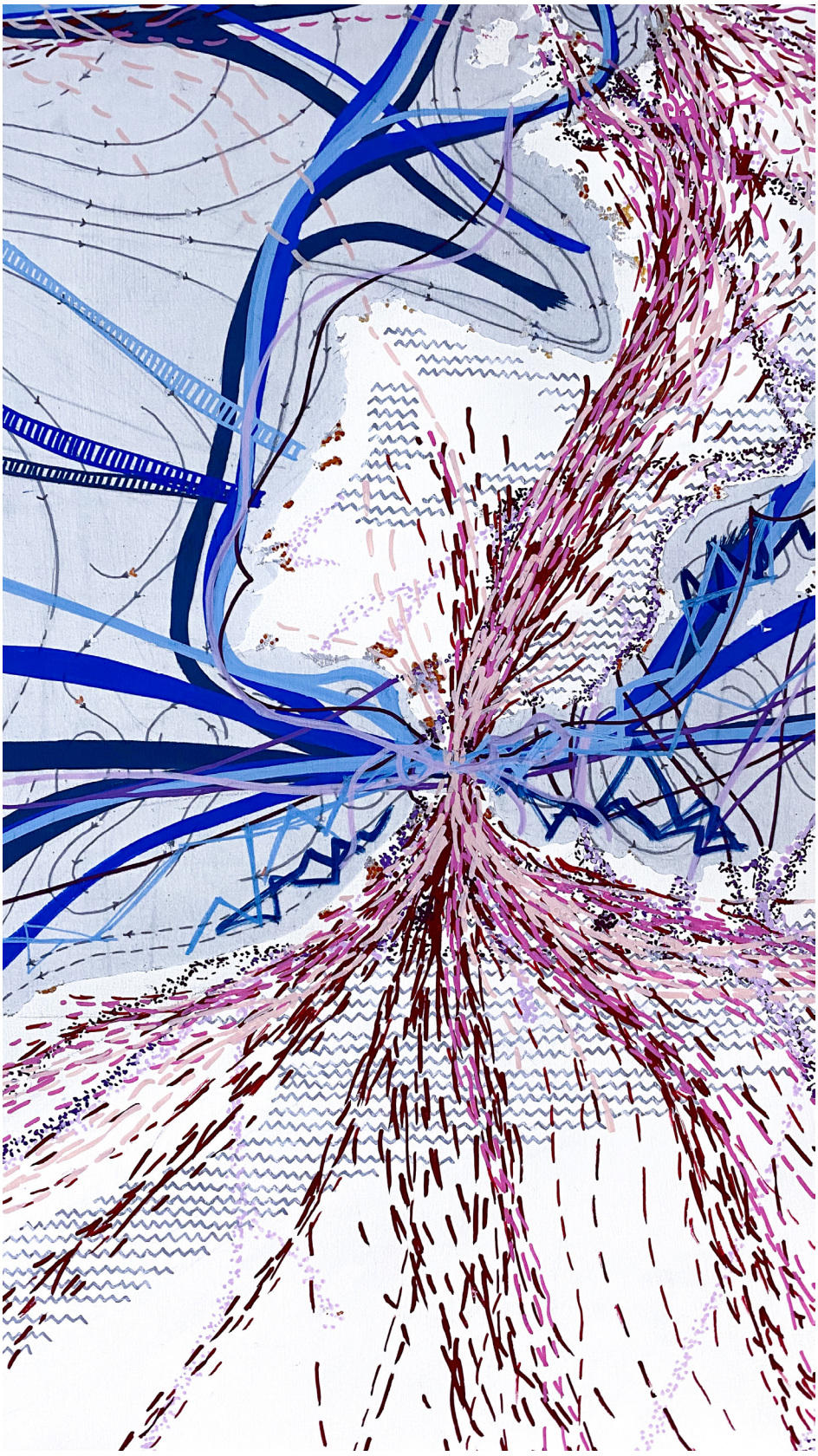
4 Ibid., 1317–1331

5 "Global ecology" is placed in singular to emphasize the interconnectivity of all living beings. It follows the notion of Alexander von Humboldt, who considered nature as "a great chain of causes and effects" in which "no single fact can be considered in isolation." Andrea Wulf. *The Invention of Nature: Alexander von Humboldt's New World* (New York: Vintage Books, 2015), 6.

6 BBC Planet Earth II. "Cities". 6. Produced by Fredi Devas. Presented by David Attenborough (BBC, December 11, 2016).

7 HM Government of Gibraltar. The Gibraltar Museum. Gibraltar Neanderthal Caves and Environments, World Heritage Site Nomination. Nomination Dossier (Vol. 2) (Gibraltar: 2016), 935.

8 Clive Finlayson. *Birds of the Strait of Gibraltar* (London: T.&A.D. Poyser, 1987), 101, 322–453.

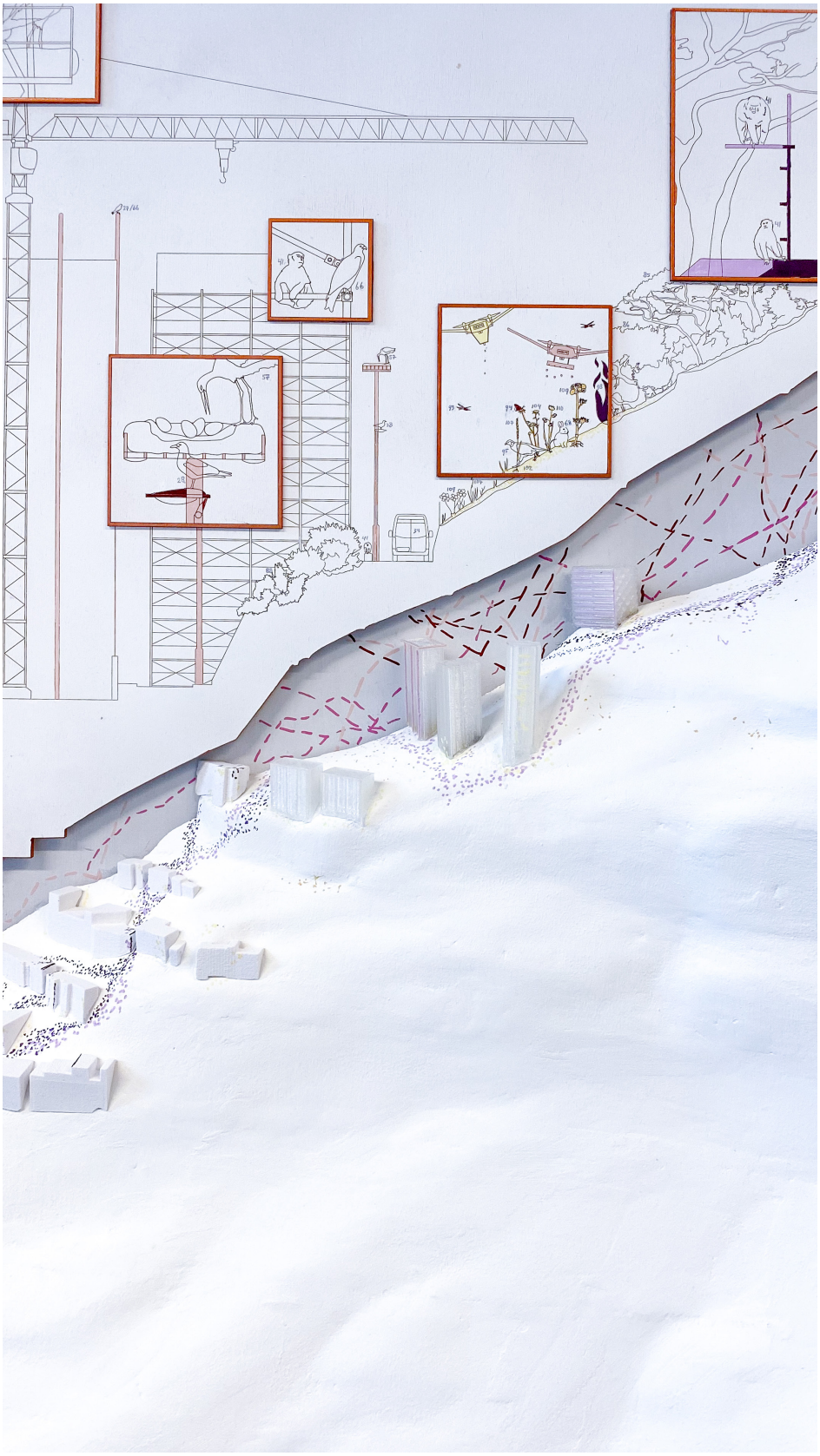


Detail of first triptych showing changes in migrational patterns due to climate change. Gibraltar is central to the global migration routes.

Blue: aquatic fauna.
Purple: terrestrial fauna (humans).
Red/pink: avian fauna.

Darkest colors: 2020.
Brightest colors: 2050.
Lightest colors: 2100.

Photo and painting by Noortje Weenink.



Detail of second triptych showing changes in local movement patterns of different species in and around the city of Gibraltar.

The colored inlets show interventions, while the non-colored inlets show parts of the analysis.

Blue: aquatic fauna.
Purple: terrestrial fauna (humans).
Red/pink: avian fauna.
Yellow: flora.

Darkest colors: 2020.
Brightest colors: 2050.
Lightest colors: 2100.

Photo and artifact by Noortje Weenink.

Expert Conversation #1

Brian Gomila, Gibraltar's only qualified primatologist and organiser of Monkey Talk Gibraltar, an educational "outing" to the Barbary macaques living on the peninsula. Conversation held on visiting the Upper Rock Nature Reserve as the "Monkey Outing" through Monkey Talk Gibraltar, 15 June 2019.

Also present, as my Berlage colleagues: Pavel Bouse (PB), Francesca Giudetti (FG), Elli Papachristopoulou (EP), Panagiotis Rigopoulos (PR), Howie Yu (HY).

[...]
For humans too, it is more common, regardless of what their baby color hair is of the adult, they are more likely to be born with black hair. Normally it wouldn't make sense to make the baby stand out more, it can become a target. Thereform, the babies of most animals are camouflaged: birds, even the cubs of lions—you normally want to hide your baby. After about 2,5 to 3 months, the monkey baby's hair will change to brown.

When you are with a small baby, there is a chance that strangers, who would necessarily be friendly at all, or even talk to you, will socialize with you only because you have a baby. The person or animal who is holding the baby has an advantage, because everyone will be more tolerant towards you. Natural selection has favored the babies of primates to stand out, because if whoever is holding the baby, others will to be polite to him or her, to not injure the baby.

The alpha female decides which way they go—if they go up or down to sleep. The biggest one is the alpha male, but the female decides. In most primate societies, humans included, it is a matriarchal society—although dependent on religion and general culture. Don't you agree?

[EP] How protective are the monkeys of their babies, especially regarding human interaction?
These monkeys are freeliving, habituated monkeys, which are extremely tolerant to people. They cannot become angry or aggressive every time. They know we are just looking, so they are relaxed. However, when I approach to touch the baby, then she will become aggressive. If they feel really threatened, they will vocalize it and the rest of the group will join in to help.

[Pointing towards a group of monkeys with different ages]
Because the baby monkeys are always born around June, they are always exactly one year apart. This year's babies are born in May, so they are about a month old. [That one] is exactly a year older. The one in the shade is exactly a year older than the second one.

[EP] How many monkeys live in Gibraltar?
In total, there are around 250 monkeys. Every time they only carry one baby. Because they form part of the tourist industry, many of the tourists and taxi guides have food—monkey nuts, also known as peanuts.

These are not the tourists, but the management. They have a feeding station—this particular group below on the Rock—, so not only do they eat from foraging, which grows naturally; they snatch food from people and are fed by through an official government programme. Thus, food is not a limiting factor for them, and they are able have a single baby every year.

In North Africa—Morocco—because they are not part of the tourist industry, because they don't get fed, they have a year interval between having babies. Obviously milking offspring is draining on the mother. To be able to conceive again, they have to be in tiptop condition.

[EP] How long do they feed their babies?
The gestation period is 5,5 months. And perhaps that goes on with the next question—how long do they live? As a general rule: the bigger the species, the longer they live.

[We see a two year old monkey jumping on an older one]
The callosities are on the butt, so they can sit on the structures.
The one that mounted is [this one]. Look at his face. The teeth-chattering means he's sucking up to the other one.

Even though [this one] is a one year old baby, they are still vulnerable. If a monkey feels threatened or is not sure how an interaction with another, more dominant monkey will go, they usually come to see the dominant monkey when accompanied by a baby. This is called agonistic buffering—it buffers any potential harm it would have received without the baby.

If the round mouth threat could be translated to English, it would be "No, Go away, don't even think about it, or else... If you continue to come, I will have to bite you." I use the gesture a lot, but when I do, it is a bluff.

Now, why did an adolescent, subordinate male mount a dominant, bigger male? Who do you think benefitted the most from the interaction?

The one that was on top, the younger one, benefitted the most. The crucial thing to keep in mind is that even though if you're on top, it does not mean you're in control. If the younger one was on top, it was because the dominant animal gave the authority/ permission. IThis is like saying to the subordinate monkey: "hey, you're okay!" There is always completion amongst the monkeys; one is always trying to backstab and take advantage of his position to go ahead of another.

[NW] How do they give permission?
First of all; because he didn't take him off. Secondly, they give very subtle body language. Maybe the smaller monkey wanted to do it, but the bigger one authorized it through this subtleties.
Even though there is rivalry in the group, they cannot afford to always be fighting. So once they have proved their point, they say "okay, you don't have to be afraid of me."

[PB, referring to a tattoo at the inner legs] At what age are they marked?
The short answer is "when we're able to catch them", usually between 2 and 3 years old.

I'm still not sure if the monkeys are going up or down. We will go up, because I want to see the alpha female.

[NW] Does she go first and then the others follow?
She doesn't necessarily go first, but the others gamble: they go back and forth a bit and if the alpha female is there. She's the reference point of the group.

[NW] How do you see that she's the alpha female?

Because of the tuck on the head. This is not because she is the alpha female, but it just happens to be the way that I recognizer her.

This is the beta-male; the second in command. What you see now, is that the beta-male threatened the alpha-female. On her own, she couldn't threaten him back. She therefore redirects her aggression to a more subordinate monkey. We do that all the time; if you have a bad day at work you cannot necessarily tell your manager off. Unfortunately, because we are only human, we redirect it towards our wife.

In the male, the callosities are together [like an infinity-sign]. For the female, the callosities are two separate circular shapes. In between are her labia. This one has a more natural, less prominent swelling. The characteristics of her swelling are more in keeping with what they should be during this time of the year. The other one, with the big swelling— the character of the swelling is determined by hormones: testosterone and estrogen. Unfortunately, sometimes a hormonal imbalance derives from the diet that they get here—mainly because of the junk food.

[EP] How do you define junk food for the monkeys?
Anything that is unnatural. Biscuits, chocolate, crisps.

[EP] Similar to the human definition?
No. Maybe call don't call it junk food, but "unnatural food".

[FG] Do the monkeys have medical assistance?
I wouldn't say they have medical assistance. All the vetenary does not care, but all he does is capture them when it is possible and give them a … and give exavations. This has more to do with the coexistence on site—so if they bite someone that person will not get a big disease.

Going back to the baby, and someone said that one of the characteristics was the long arms and big ears… I don't know if you're familiar with this word: ontogeny. If you look at your school pictures from when you were about 4-5 years old. Everyone had huge heads and big ears. In the development from fetus to old age, the head grows "into" the ears. When they are about 2 years old they are in proportion. Then when they are in their adolescent stage, they become long and a bit fat again. This is called ontogeny.

[EP] What happened with his back?
I told you about this barrier structure. The monkeys don't walk randomly: they either walk next to the structure, or on top of the structure. You have to understand not what you are doing, or what you think you are doing, but how the monkey interprets what you are doing.

[NW] [inaudible question]
Since last year, there are ten groups of monkeys. New groups are continuously being formed from existing groups. In group living, there are advantages and disadvantages, the latter for example being competition. When the groups become too big, some monkeys tend to split off, because it eventually becomes counterproductive. Ideal group sizes vary between forty to sixty monkeys.

[NW] What is the optimal size of a troop?
It depends on the terrain, and it depends on the individuals, but approximately 40-50, sometimes sixty. We find that in Gibraltar, they are Which indicates a large intra-group competition. This arises through the fact that people feed them. If they would be left for natural foraging, they would be eating leaves, pick up seeds, flowers… Everything is dispersed. So can you imagine these five monkeys now fighting over this seed here? No! But if you present them with a bar of chocolate, they will fight.
So even if you, as a tourist, give something healthy, the monkeys will still fight over it. Even the mother will fight with her baby. So they are much better left on their own.
[...] I know it is silly, but people ask me if they can touch the monkeys. These two monkeys are touching, they are grooming each other. Now, because they are grooming—which is a special type of touching—would you say they know each other, or that they are strangers?

[NW] That they know each other?
Indeed, you need to have a relationship to touch. It is the same principle as with humans. So I say to people: "They are used to people, but they don't know you. They don't know you're from Greece, or what your favorite food is." You are a stranger to them, and as a stranger you just can't touch them. However, because they are so tolerant, they will tolerate it. This doesn't mean they like it.

Because what they are going to do? Will they bite you, because they touch you? No, only if you touch them in a weird way or if they really don't like it. So they will tolerate it, but that doesn't make it right.

[NW] What is the one reason that people get bitten or attacked?
It is touching, but also feeding. Obviously when you offer them food, the monkey will not politely say thank you. They will snatch it, they can jump on you. They're quite agile. You cannot control how they will react.

Or sometimes they go too close to the baby, because people think it is so cute and they want to get a better picture.
We will stop now between the two white stones. I'm not sure if it will happen, but if we are lucky you will see something interesting.

Hopefully the monkeys will go inside this hole *whistles to the guy*, or they will even go to this side and lick or eat the soil. Why do you think ingest soil? It is called geoagy, the ingestion of soil.

[NW] Minerals?
Yes, minerals; nutrients. When you buy some chips, what do you get on chips? Salt. These monkeys cannot get salt from their natural food, like flowers or the seeds, so this spot acts as a salt lick. There are only a few spots where there is a high concentration of minerals. Now this is limestone.

Maybe it is not minerals per se in the sense of nutrients, but lime has the qualities through alkaline to balance out the sometimes acidic diet.

Now, a group of monkeys is called a "troop". When you see them walking from one place to another, they are quite orderly, it is almost like a single line—a troop, like soldiers. When it is windy, and when the wind rustles, they are feeling a bit unsure of themselves. When they are in this state of mind—I feed of that.

Okay, so they are not going to do it [the salt licking] today. Let's move on.

[inaudible]

Expert Conversation #2

Thomas Weaver is an architectural writer, teacher and editor, and currently senior acquisitions editor for art and architecture for The MIT Press.

Conversation held in the Berlage Studio, June 2019.

I would like to use Robin Evans' method of writing as a means to analyse architecture, or writing as a means to eventually arrive at an architectural design.

Which Evans? Evans the interiors? Evans the dissecting plans and walking through corridors?

The latter: analysing architecture through social perspective. I would want to do it the other way around—write about the social perspective and the interactions between monkey and human, and how that then translates into architecture.

That is also the case with Evans: he was trying to buy a collective house, which suddenly was the idea of everything social, and how you can slightly reimagine or rethink the house through multiple social dynamics. So it had a direct relation to his life.

*Great! What I'm investigating in Gibraltar is the Upper Rock Nature Reserve where all the monkeys live. *Sketches*. Basically this whole part is a reservation. There is a building line around it, with the old town.*

Do they stay within the reservation? They come out when they do not have enough food, or when they are just mischievous.

So you might see them wherever?

Mostly they reside in the upper part of town. I know that they also go to the big trash dump at the East Side. And then on the Rock there are a few food provision stations, where they go. During the day the monkeys reside where the tourists are, or vice versa. The tourists can only go up by small taxi busses, as private cars are forbidden due to congestion. They do not cull them anymore, but they do through prevention.

So it is a managed ecology.

Yes. Because they get fed, food is not a limiting factor in their reproduction; so unlike wild monkeys who give birth every two years, these semi-wild monkeys give birth every year. So the monkey population would grow rapidly if it wasn't for the population management.

It is a classic *Planet of the Apes* scenario. You also have to get familiar with literature, like *Animal Farm*.

Hugo also recommended Great Apes*, by Will Self. And I have a book about a monkey in Gibraltar, it's called Scruffy.*

I'm thinking also of these great, less childish things, but people when they are really using the animal as a different way. There is a writer I love, Roberto Bolaño—he is Chilean. He did a short story about a rat—well, it is about a policeman, who is a private detective and a murder detective. He says: "Hi, my name is Pepe, but my colleagues call me Pepe the Rat. Because I'm a police detective and I'm on the murder team, the other day I had a murder so I went to the sewers and found a body." And only ten pages in you realize that he actually is a rat. It is called Police Rat. It is written in a sort of L.A. Style. And then of course Kafka. I like that literature that is much more than a 101 Dalmatians kind of thing.

Hugo also let me read an excerpt of Great Apes, where someone wakes up in a hospital bed and everything is just slightly bigger than usual. After which he realizes that all the furniture and objects are actually made for chimpanzees. What I'm looking for is this tension between human and monkey; or human and other primates. My initial plan in terms of analysis is to make a Neufert type of drawing—TW: yeah, a Modulor—and placing the monkey in and on human objects. The idea for my final outcome is based on the triptych, specifically Garden of Earthly Delights by Jheronimus Bosch. I will design two extremes—one of the humans taking over, and the other the pure monkey. The actual design intervention will be in the center.

If you can do it in this triptych style, it has to be really big and bold. Another cool thing about Bosch, as a reference, is what's on the other side. All of Jheronomus Bosch's triptychs and cabinets close. There is always something painted on the other side, always in black and white. They are amazing, because they are almost cinematic. This closing is an important aspect.

The idea with the writing is to explore the means in service of architecture. The writing that I have done so far has always been analytical, or essay-like.

If you have a tripartite representational structure, you should try to have a three part structure to the writing too. So in a sense it is a surmon, of good, bad, and something in between. This invites a certain narrative. The tight rope between something that is appealing, like a narrative or a story, but is not some kind of goofy story that loses all the scholarship, needs to be walked with care: you always need some evidence in it. Finding that voice is going to be tricky.

I would look at the three references—Orwell Balaño, and Kafka—and how they work with dialogue. You could take chunks of these dialogues and reappropriate it; so it is quotation from narrative. That could be your motivational bit, and then you can fill in the gaps with analytical.

Another suggestion that I got was to not write fiction, but for example rewrite the Gibraltar Town Planning Design Guide*.*

He's right, you need a rhetorical frame. It all depends on what you are proposing in your project. But I don't think you need a white paper, a planning report, or a management report. I don't think you need to necessarily figure out that frame now: it will become apparent once you start design the limits of that

What do you consider a rhetorical frame?

Something that holds all the writing together. It could be a newspaper; it could equally be a Town Planning Guide.

So you mean the type of writing?

Indeed. Which has to have a structure. And you need to have something meta underneath. If I were you I would explore the idea of the primitive. It has the same etymological root too: primate, which is from a primordial condition—the ape before it comes homo sapiens. The notion of primitive

has a very long relationship with architecture, and art especially—of things coming out of that primitive condition. Picasso has endlessly looked at primitive conditions. Even Le Corbusier has some aspects of looking at some kind of primitivism. 1920s and 1930s Modern Art is very primitive-based. You can start to read art history and art criticism on the idea of the primitive. That will give you a bit more oomph.

Even if you then decide to write in a fictive way about the idea of the primordial. Architecture, with the primitive hut, is almost endlessly valorizing the idea of the primitive. Yours is clever—it has both the primitive and the primate: it gives you the occupant. Instead of some stupid Diana Hunter, or some cherub, some fat kid. You've got the natural primitive, which is the primate. You want it to stand up if you took the monkeys out. You don't need the monkey, and you need people to get that.

I know that I tend to get too vague, hence why I'm now clinging to the monkey.

If it speaks about a bigger, meta-idea of origin, an original condition. You also deal with opposites: primitivism and advancement, wilderness, nature and nurture, nature and culture. The classic distinction between nature and culture is that the monkey eats the greeny-yellow banana because they're hungry, whereas the man lets the banana rot and go a little bit darker, because it makes the flavor richer. Culture is literally allowing something to rot. Your project is right on the edge.

Michiel Riedijk also mentioned Sapiens *and* Homo Deus *by Yuval Noah Harari. In* Sapiens *he explores the history of the homo sapiens, to argue in* Homo Deus *that through technogy we will evolve in a new type, better type of superhuman. Which means that we, in our current state, will be the new monkey.*

That is useful on an evolutionary scale. I would also think about all of those French 18th century studies on faces, by Charles le Brun. They are about proportion, facades, expression, readability of something. A lot of them have animal faces. There are lots of architectural resonances that come off that: it is also the idea of character, type, lexicon. It is the crossover between literature, words and language; and visual things.

You need something abstract and representational—something that has a gesture to the Moorish, given where your project is located. I'm thinking of rugs, tiles, screens… Gibraltar isn't some British shithole at the end of the world, it is actually between a European and an African country.

It is bizarre how beautiful it could have been.

Absorb that! There is also some bad, but interesting racial stuff. Studies of the faces of Moors, as if they are a primate.

That's going to be tricky.
But it has to get in!

Do you have any advice on how to study the three reference that you mentioned, as well as Evans?

I would park Evans for now, he can come in when you have an object. Evans needs an interior, and then he can walk around in it. If you have a floor plan—an internal envelope, he will come along.

Furthermore, do some novelist reading, which is good for your soul. Do some historical analysis of primitivism and type, which is … with surrealism. Brancusi, Picasso, are all playing with primitive shapes. Do a bit of primitive huts, caves. You can read Architecture without Architects by Bernard Rudofsky (1964), which is a really interesting book. It was written during this moment where architects challenged modernism. Rudofsky challenged it by saying "forget about the city, let's look at caves in the Sahara, and tribal communities, as a way of looking at architecture as indigenous, primitive forms." The writing is fantastic—very short one-paragraph bursts along with his visual representation. I would keep that in mind, but don't worry about it now because you don't want it to dominate. I would also keep Jeroen Bosch in mind.

Regarding Jeroen Bosch, it is more about the idea behind it.

I like the idea of tableau drawings that have everything in it, where the student can lead you through a drawing. The object becomes a direct relationship with the presentation.

Do you have any examples of allegorical writing?
The obvious one is the sermon; the priest. That's all allegory. It is quite a nice model. This is also how I would use the story, you don't want it to be "once upon a time…" The way it then forwards is just a parallel narrative. Again, this is where the short stories, Orwell, Kafka and Bolaño.

It looks good. But do find a thing. My fear of a project in Gibraltar would be that it will just be a wall of maps, like a project about cartography. I want to see a house, a school, a square… You know, a typology. There's plenty of them, and it is a useful device. It doesn't have to be the end point of your thesis, it can become the thing that arrives in the middle, but you enter—physically and rhetorically—as a way to go back out again. I wouldn't make it too literal: it's not a zoo, it's not a cage.

That is exactly what I want to stray from. It is where I started, but it immediately blocked all inspiration.

Then everything extrudes off it. It is a monkey project, which becomes a monkey reservation park, with a monkey restaurant, and a monkey waitress… Everything will become monkey, monkey, monkey. You could instead look at the idea of proportion, or the idea primitivism, for example through the idea of the house, or the apartment block—and how that actually works. How do the stairs work when you change proportion systems?

Or even the sociology of it: how do they actually live? Do they need individuality, like we do? You need to be a veterinarian, find out how monkey communities actually work. I would also want to know the exact type of monkey, the genus, where it fits within the primate system—at the evolutionary scale too. I would recommend to read some some Darwin. Darwin was a real devout Christian—so you can be faithful, as well as completely evolutionary.

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Afterword: Reflection of Project in Relation to Discourse

Throughout history, the position of humans in nature has been represented in religious and non-religious painting. The triptych comes with it's own traditions. Originally divided in three pieces for easy transportation, the triptych has become a typical altar piece in Christian churches.

Hieronymus Bosch's *The Garden of Earthly Delights* (1490–1, 510) is thought to be created outside of religious context, not created as an altar-piece, yet representing notions of paradise, Earth, and hell— paradise being linked to a pieceful nature and hell as its opposite, showing architectural and day-to-day objects. The center panel shows humans, innocently indulging in the joys of the Earth.

Nomadic Nature(s) aims to demonstrate that biodiversity in the city can be enhanced by simple interventions in the existing urban fabric and by considering it upfront in the design phase of new constructions. As such, the city and nature become ever-more entangled.

The representation of Gibraltar's importance in global and local ecologies by means of two triptychs is directly linked this the century old issue of the position of the human species in nature. Set-up as one composition rather than separate images, the panels together and represent design as part of the continuously changing spectrum of the artificial and the natural.

Like the center panel of *The Garden of Earthly Delights*, the artificial and nature are represented without placing one as more important than the other. As such, it represents a built environment that might again feed the notion of considering the Earth as a delightful place to be.