chris zheng

columbia
gsapp
msaud
select-
ed works
2019 – 20

contents

urban study and design

spatial research

theory

turn the leaf
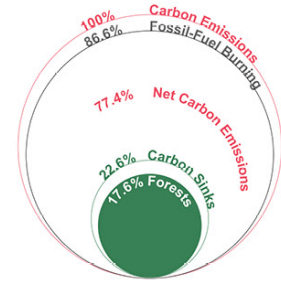## hudson valley region, ny

chris zheng

gsapp, fall 2020
forest system study
kaja kühl, anna dietzsch, david smiley

The Green New Deal's opening statement states how the main cause of climate change is human activity over the past century. Simple fact is we need our forests in order to have a healthy ecosystem. Forests and carbon sinks will turn over the climate crisis. One only needs to plant one trees as a start. One thing that was clear is that the Hudson Valley region and New York state is doing quite well when it comes to reforestation from the heavy destruction that begun in the 1600s. We also learn that forests need proper management in order for them to provide the healthy ecosystem that is the basis for clean air, clean water, clean environment as forests habitat and the other habitats that are in and around forests create a unique environment that is a symbiotic relationship for the human species to survive.
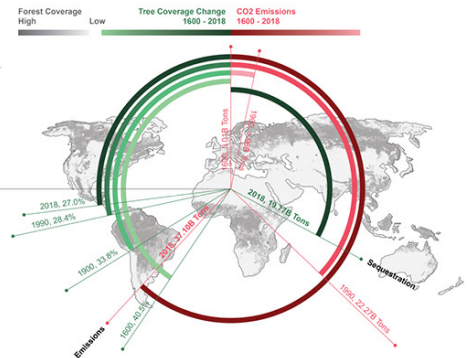

Carbon Contribution

100% Carbon Emissions
86.6% Fossil-Fuel Burning
77.4% Net Carbon Emissions
22.6% Carbon Sinks
17.6% Forests

Global

Tree Coverage	27%
CO2 Absorbtion	19.77B
CO2 Emissions	37.10B
Net C Footprint	17.33B
Carbon Offset	x 3000

USA

Tree Coverage	36%
CO2 Absorbtion	1.76B
CO2 Emissions	5.27B
Net C Footprint	2.99B
Carbon Offset	x 500
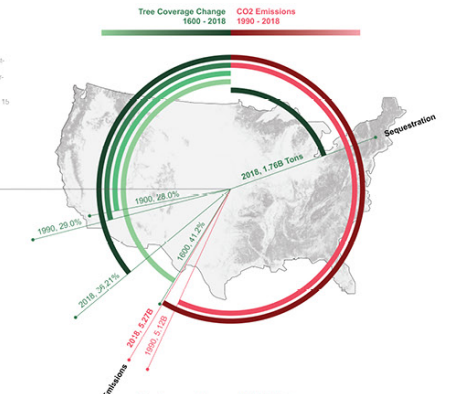
New York State

Tree Coverage	63%
CO2 Absorbtion	38M
CO2 Emissions	206M
Net C Footprint	168M
Carbon Offset	x 28
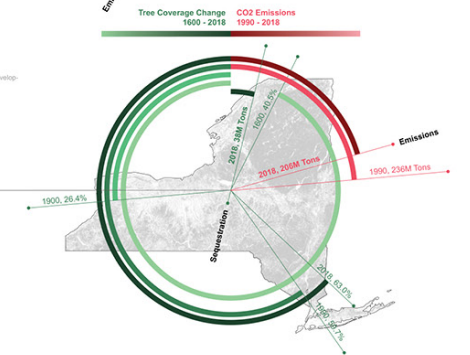
Hudson Valley Region

Tree Coverage	65%
CO2 Absorbtion	6M
CO2 Emissions	29.6M
Net C Footprint	23.6M
Carbon Offset	x 8

Carbon Emissions
- Developed, Open Space
- Developed (Low Intensity)
- Developed (High Intensity)

Carbon Sinks
- Cultivated Crops
- Shrubs/Grasslands/Pasture
- Deciduous Forests
- Evergreen Forests
- Mixed Forests

Carbon Neutral
- Open Water
- Linkage Zones

Hudson Valley Region Land Sources of Carbon Sinks/Emissions

0   20 Miles
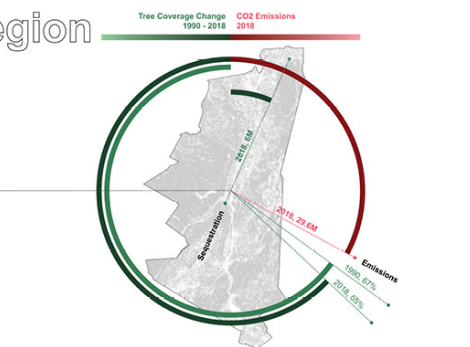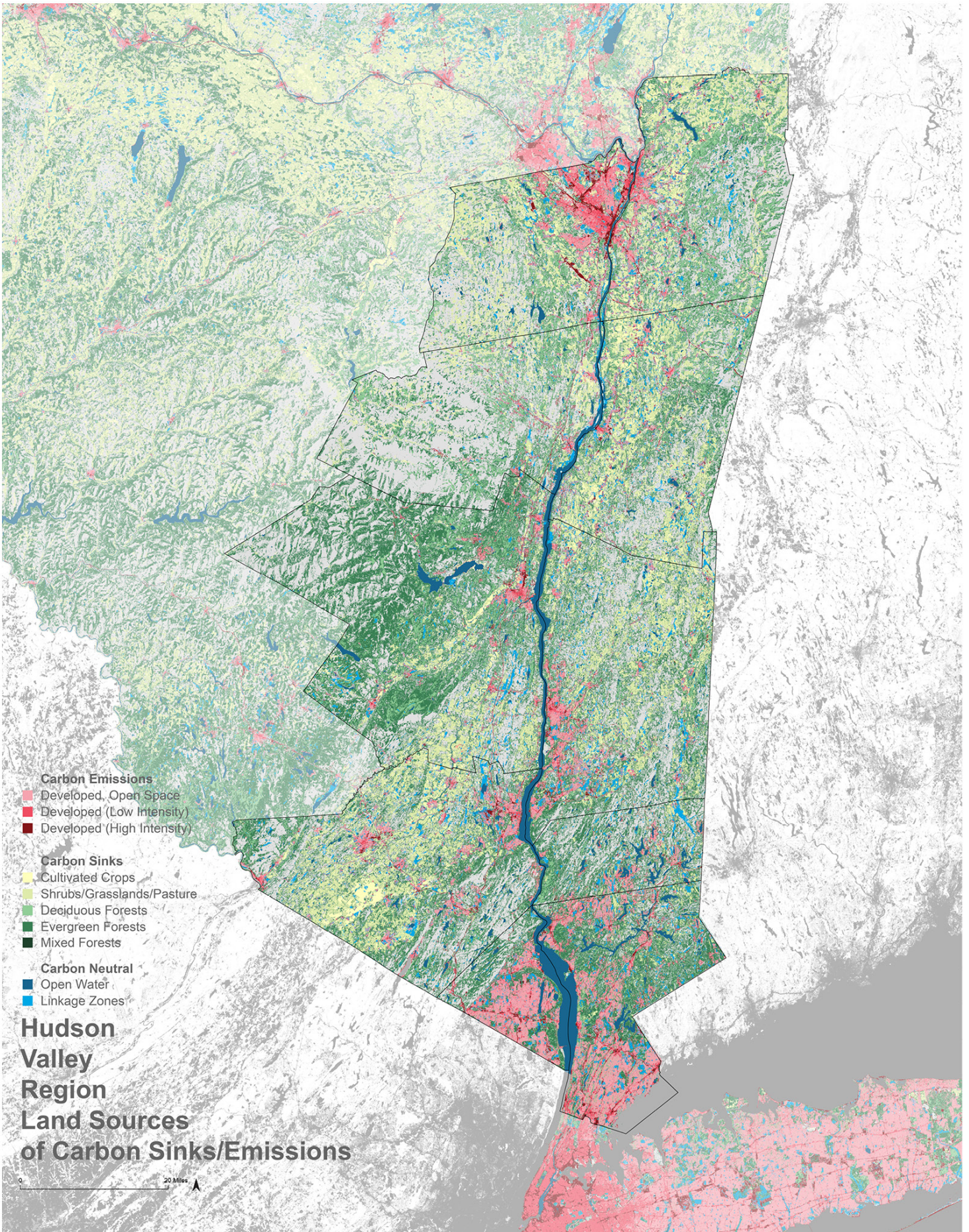
post retail scape
kingston, ny

chris zheng, hatem alkhathlan, einat lubliner, sushmita sheker

gsapp, fall 2020
the climate crisis - imagining a green new deal in hudson valley
kaja kühl, anna dietzsch, david smiley, dragana zoric

This project proposes a sustainable and sys-temetic infrastructural landscape for the city of Kingston, against the backdrop of 'retail apocolypse', and under the umbrella of the Green New Deal.

The main street and big-boxes are largely empty. With the leftover infrastructures, we define a new retail module that spurs from a bottom-up ap-proach by providing experiential and collaborative platform for small businesses, through which space, energy, resources, waste management and storage services are collectively owned and managed.

'the retail apocoplyse'
& a new way out

45%
24%
18%
12%

Retail Percentage of
all employments

+ Amazon Data Centers

✕ Closed major malls in the past decade

● E-commerce distribution center (Amazon & Walmart)

0   500 Miles

The Old Model:
Individual Retail Stores

The New Model:
Cooperative Making Spaces + Integrated Active Spaces

Sharing   Collaborating   Interaction   Experiences

Business

Makers Space
Meeting/office

Indoor   Outdoor

Renewable Energy System

'the retail apocoplyse' & a new way out

The uptown, midtown and downtown of Kingston are currently disconnected. To improve connectivity, we propose an electric light rail system. The clusters of the co-op are positioned depending on the existing context like the social spaces like churches, mosques, art centers and public buildings. This will be connected to the carbon-efficient collective logistic system. The abandoned rail line will carry waste and packaged goods to the distribution and recycling centers.

This collaborative system aims to reuse the existing infrastructure rather than to build new ones. Collaborative shipping, bulk merchandise and shared machinery reduce carbon footprint. It also lowers the cost of small businesses, fosters the exchange of ideas and knowledge, and improves social interaction customer experience.

0   0.1   0.5 Miles
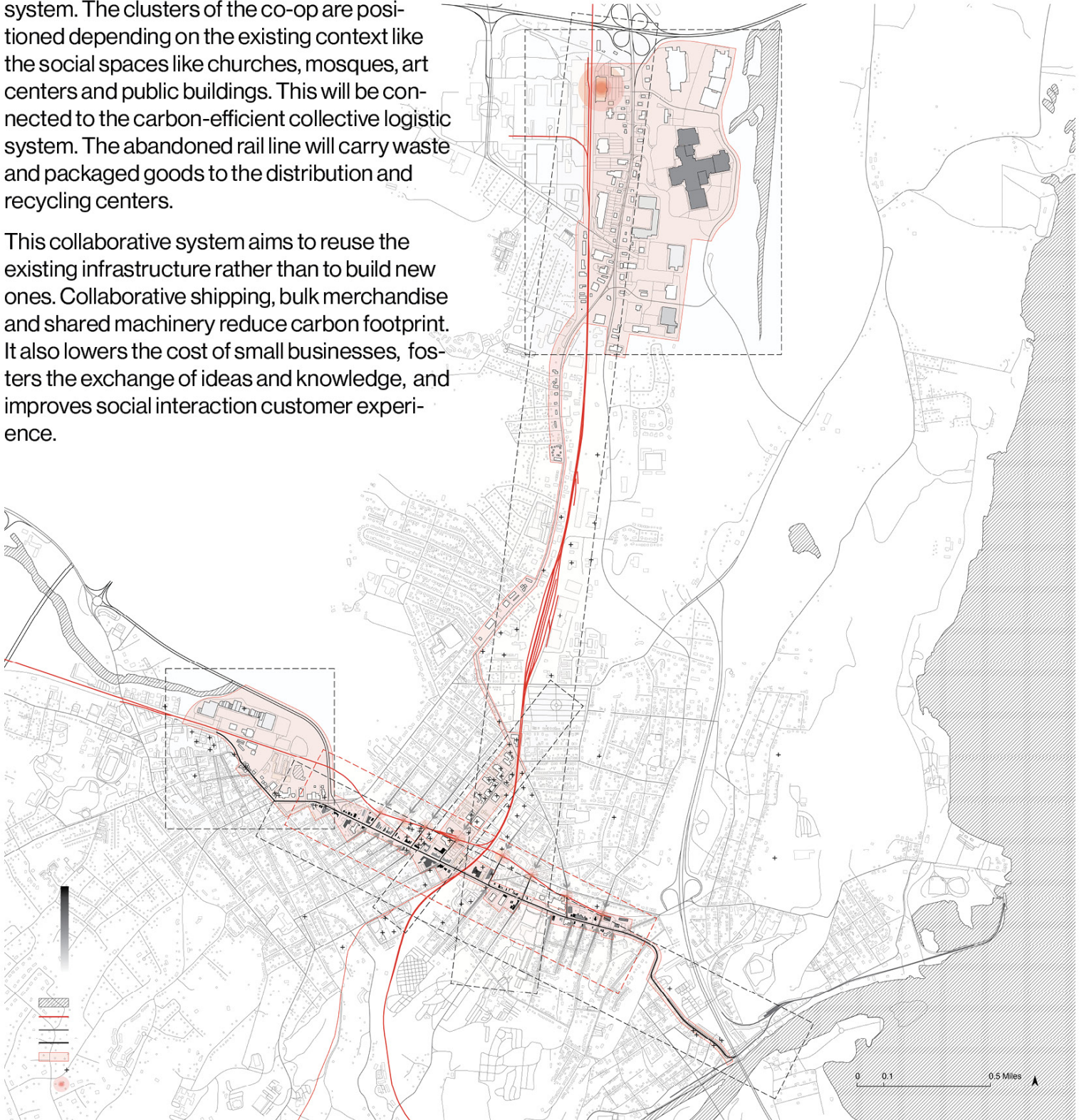
‣ Strategies

Shared space
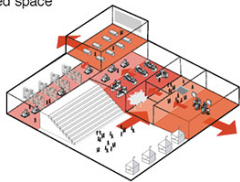
Renewable energy
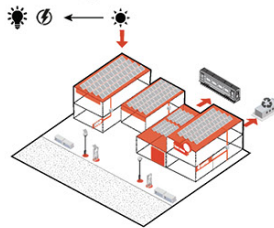
Street extension
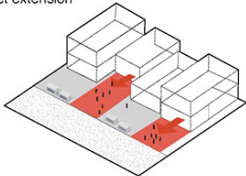
Experiential space

Retail Street I Broadway

Public Service

Media Center

Art Gallery

Mosque

Art Center

Church

Bakery

Data center

Solar farm

Energy storage
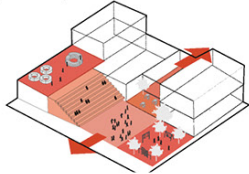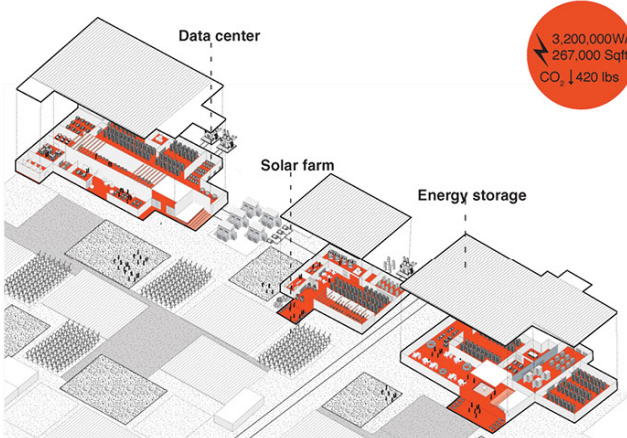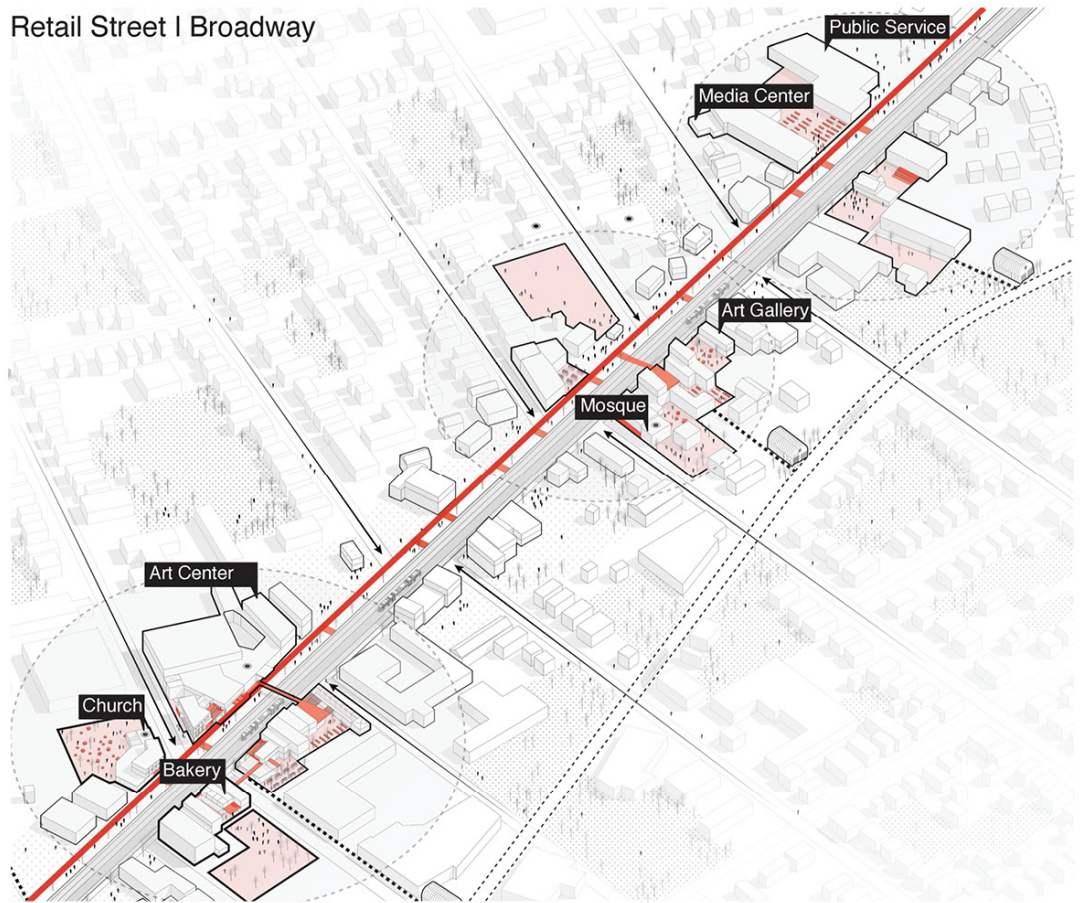
3,200,000W/
267,000 Sqft
$CO_2 \downarrow$ 420 lbs

Recycling Center

Waste to Energy Plant

Recycling
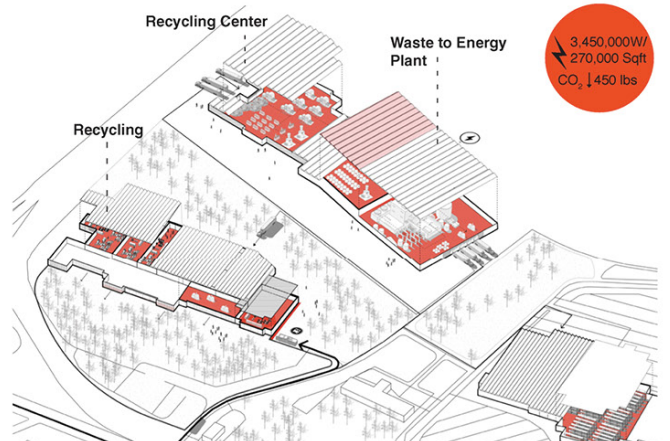
3,450,000W/
270,000 Sqft
$CO_2 \downarrow$ 450 lbs

zheng, alkhathlan, lubliner, sheker

a green new broadway: experiential streetlife

The process starts when 4-5 businesses come together to form a retail collaborative. The blighted properties of the main street are strategically chosen and bought out by the land trust to develop into a retail co-op. The state and federal governments provide incentives to revive the street. A collaborative infrastructure with experiential elements, renewable energy, and waste platform and shared facilities reduces carbon footprint. This spurs the future growth of businesses.

25,600 W/ 2500 Sqft
$CO_2 \downarrow$ 60 lbs

Renewable Energy System

Shared Working

Art Park

Street Extension

Repair Park

Education Space

Playground

Shared Production

Park

Market Square

Shared Makers

Amphitheater

Meeting booth

Light Rail

Shared Space

Waste

Bicycle Lane

01 02 03 04 05

06 07 08 09 10
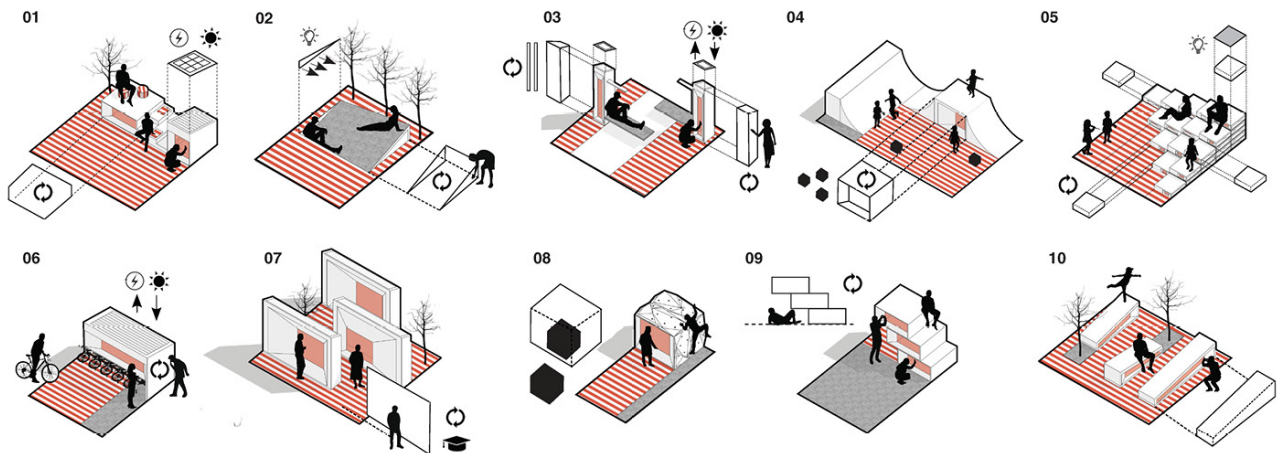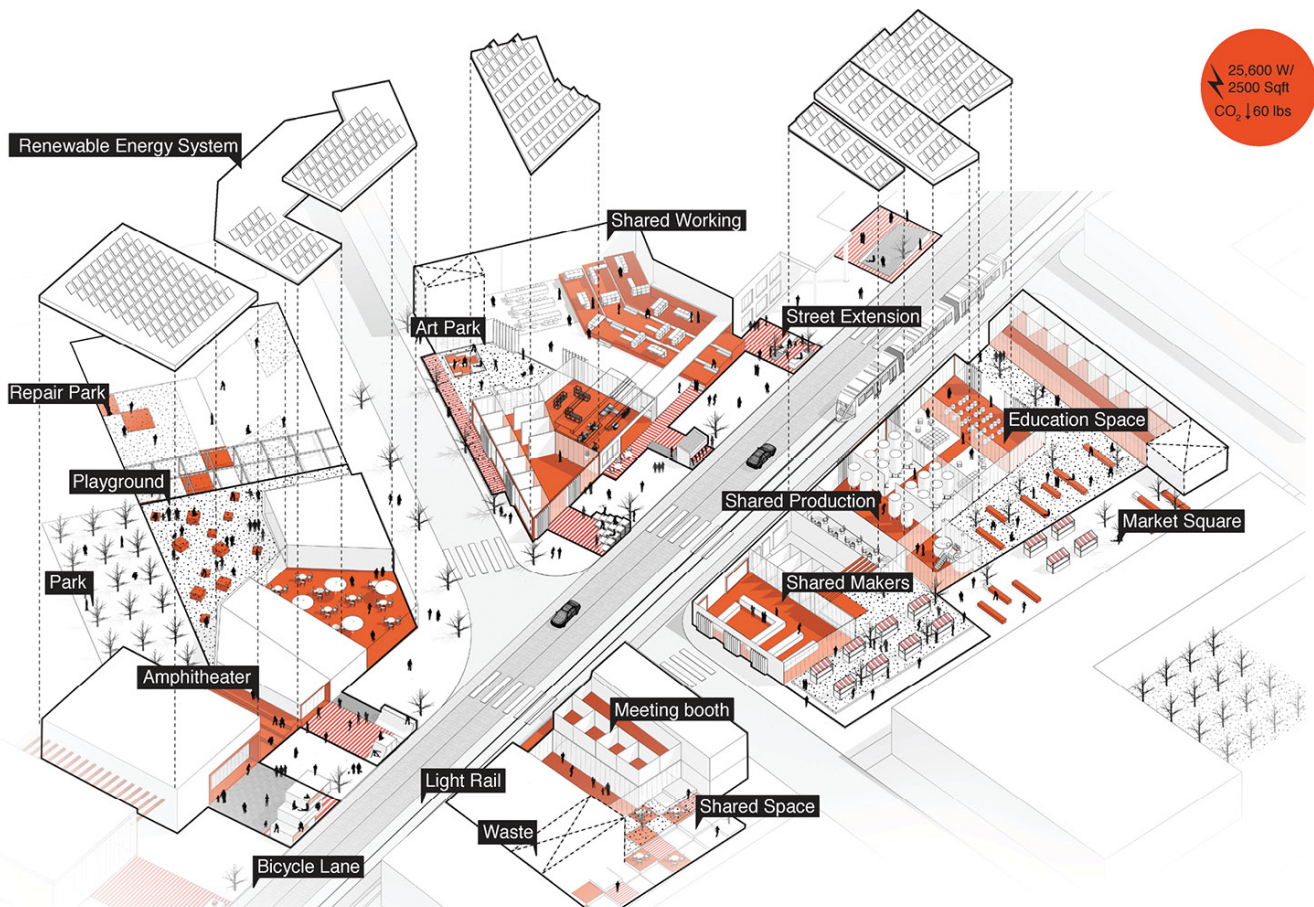
sharing green economy
water urbanism in beira, mozambique

chris zheng, annie wu, ritchie ju, mansoo han, yi zhang

gsapp, spring 2020
urban design studio iii
kate orff, thaddeus pawlowski, dilip da cunha, julia watson

The port of Beira is a major economic asset for Mozambique. As a link between the global shipping and the interior of Sub-Saharan Africa,-the port benefits from Beira's strategic location. This project is imagining how the port could do more to benefit the people of Beira, empowering the local economy, ecology and community.

What if the port could be redesigned to build long-term economic resilience for future generations by

- promoting diversified and regenerative local industries;

- providing more better jobs and training opportunities for people of Beira;

- balancing port infrastructure with thriving, adaptive ecosystems.
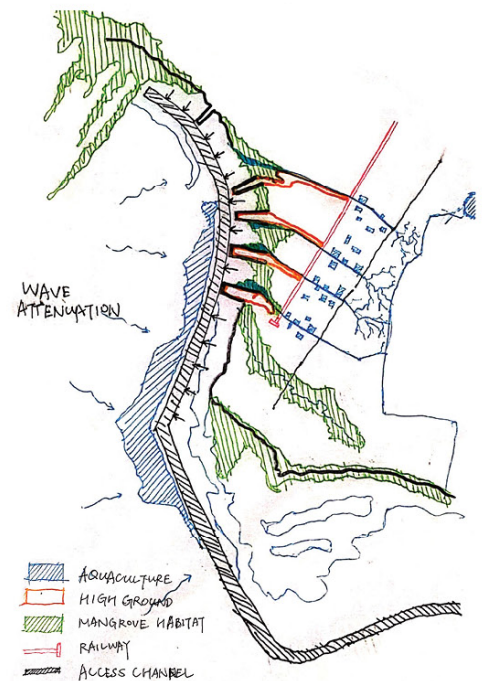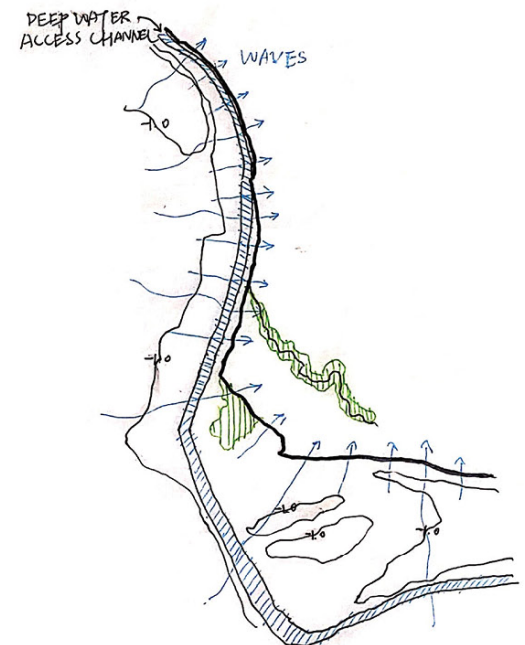
ORIGINAL PORT
a monolithic territory
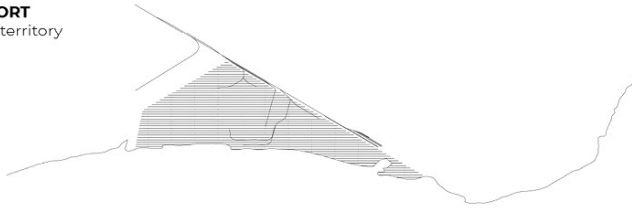
PORT REDEVELOPMENT - CUT & FILL
optimize function and exlarge capacity
create space for local production and education

waste-to-energy port | fishery & ferry terminal | general cargo terminal | commercial fishery
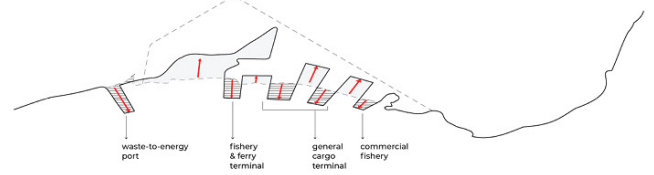
ELEVATED RAILWAY
allow connections + free up intermidiate space
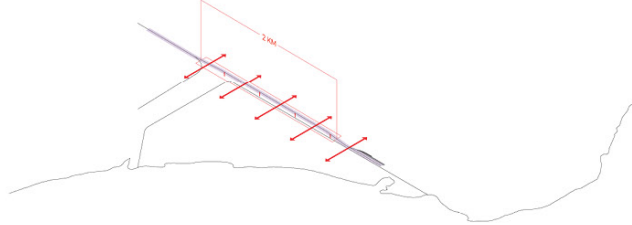
MANGROVE CULTIVATION
ecology restoration
benefits local fishery
storm protection and wave attenuation

CANALS
improve connectivity
promote water-based industries
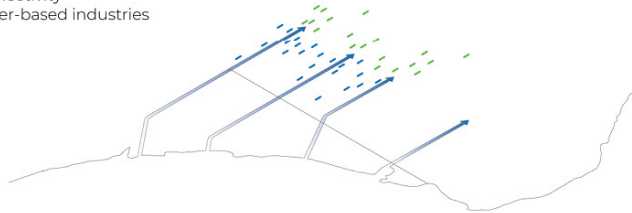
JOB GENERATION
job training programs
employment of diversified industries

MANGROVE HABITAT
- Deforestation due to the expansion of human settlements
- Less protection of Coastline
- Destroyed Ecosystem

DUMP SITE
- Extremely polluted, even toxic
- Unregulated
- Insustainable

COAL & OIL TERMINALS
- Invested and run by FDI
- Lack of jobs for the locals
- Take up large space
- Insustainable

CONTAINER PORT
- Invested and run by FDI
- Lack of jobs for the locals
- disconnected with the city

RAILWAY
- A physical barrier seperates the port from the city

INDUSTRIAL ZONE
- Highly damaged by cyclone
- Highly underutilized
- Limited job provision

HARD EDGE
- Limited protection for shoreline
- High cost in construction and maintenance

LOCALS

Planned Expansion

Mangrove Habitat

Waste

Oil

Coal

Containers

Industrial Zone

DEEP WATER ACEESS CHANNEL

FDI — rent → MUNICIPALITY — LOCALS

job

port

IMPORT/EXPORT

In the long term, Beira's waterfront would transform from a unified hard edge into a fluctuating, growing and hard-and-soft edge that interweaves the land and the sea.

In this vision, different parts of the site are connected with water and are capable of adapting to various water scenarios. During clear weather, the canals provide alternative transportation for the city; while during flooded scenarios, they serve as evacuation routes. The port itself is being raised among the development, and along with the mangrove shoreline it brings much more resiliency to the city.

stakeholders

Operated by a Dutch conglomerate, it provides limited job and training opportunities for the locals. The jobs offered are limited to extractive industries and consumer imports. These jobs are vulnerable to natural disasters and other disruptions of the global economy especially in the age of climate change.

Physically the port blocks Beirans from access to the Pungwe River. The railway also acts as an invisible wall in between the port and the industrial zone. The seawalls create an ecological barrier between land and water while doing little to protect against future storm surge.

In addition, the site is facing the other challenges, such as the deforestation of mangrove; the unsanitized dumping site and the unsustainable development of coal and gas terminals.

We imagine the Port can be expanded and improved by a new locally governed, non-profit Port Authority - the Beira Co-op. It would be an agency composed of representatives from three sectors - the municipality, the private companies (which are the major funders), and the local Beirans (including small business owners and other citizens). The co-op would seek to balance corporate interests with a clear public mission to improve ecological health and provide local job and training opportunities for locals.
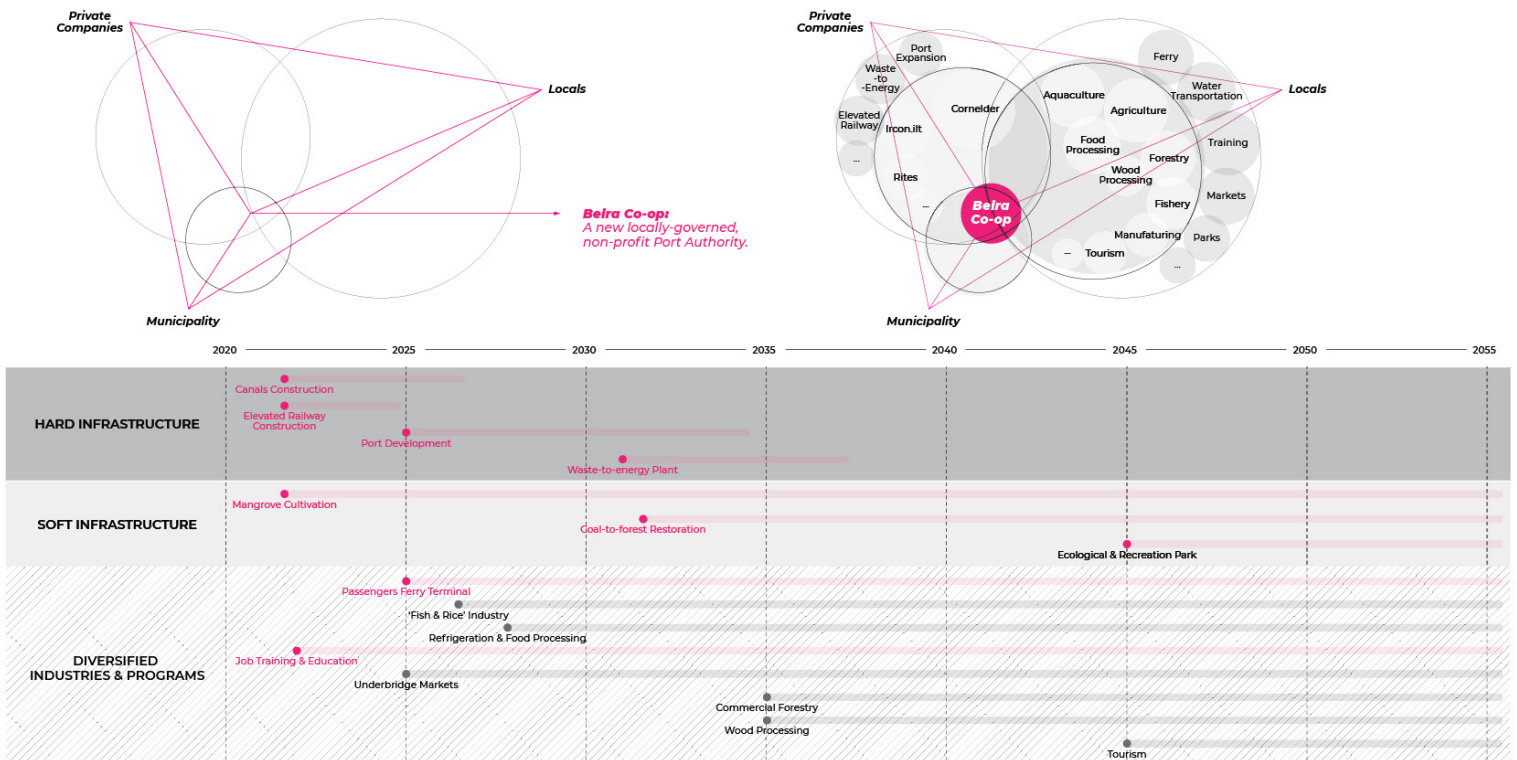
moments
1. a hard & soft edge
2. water-led industries

global light pollution
on protected area
from human activities

chris zheng, annie wu

gsapp, fall 2019
geographic information system
leah meisterlin, carsten rodin

How many of us are still able to enjoy a starry night? According to the International Dark Sky Association (IDA) , more than eighty percent of the world's population lives under 1 sky glow. In the United States, ninety-nine percent of the public cannot experience a natural night.

The increasing use of electric or artificial lights leads people to a highly efficient and convenient individual life. However, as illumination increases, related adverse impact are becoming harder to ignore, which results in disrupting the ecosystem and wildlife, harming human health, affecting crime and safety and increasing energy consumption.

Research Questions

a. Which part of Protected Areas is affected by light pollution?

b. Other than cities, what are the other human activities that generate strong light pollution that affect protected area?

Hypothesis

Light pollution is actually affecting the Protected Areas, defined by WDPA, even though human activities are not "physically" interrupting those areas.

dmsp/ols
nighttime lights
time series

Digital Number (DN)

64

0

0   1000   5000KM
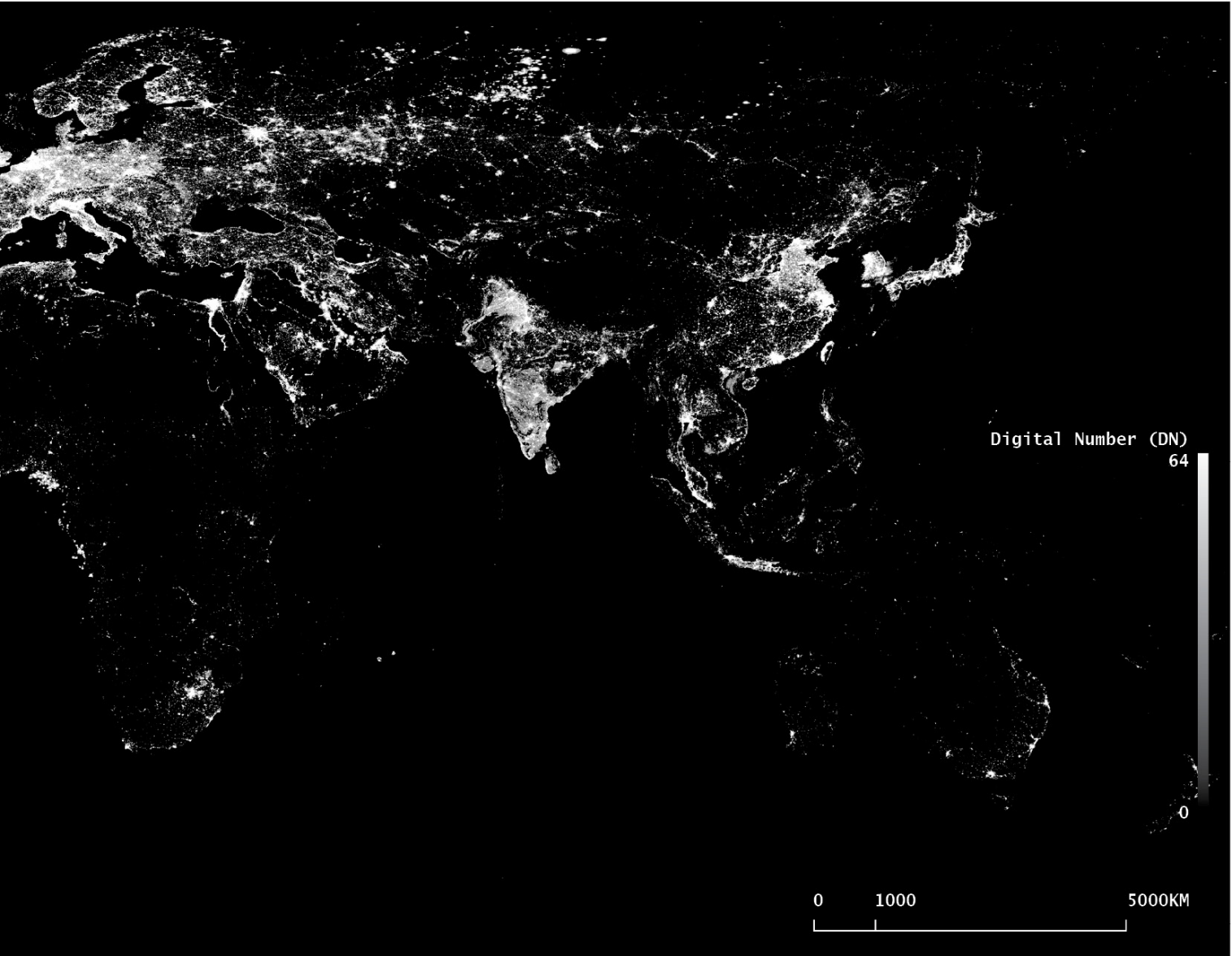
Dataset	Average Digital Number, F18 (2013)
	Version 4 DMSP-OLS Nighttime Lights Time Series
Source	National Geophysical Data Center (NOAA)
Data Type	Raster
Resolution	30 arc second (1KM)
Extent	Lon (East/West) coverage -180° to 180°
	Lat (North/South) coverage -65° to 75°

methodology

The key operation of our methodology is the intersection and filtration of multiple data-sets: protected areas (WDPA), night light map (DMSP/OLS) and global population (GHS_POP). Given the heaviness and the difference in types of the datasets, we also adopt other operations such as reclassification, conversion of raster/polygon, and selection by attributes or locations.

In order to answer the research questions, we propose certain spatial (i.e., protected areas boundary) and numerical (i.e., Digital Number value) limitations. We then translate them into parameters for geoprocessing, mostly, for filtration.

In our study, the vectorized DMSP/OLS night light layer serves as the primary dataset for selection. The final output marks a collection of non-city locations that generate strong level of light pollution (DN>30) and directly over pose within one or more protected areas. This allows us to zoom in to specific locations to learn more about the typologies of not just the affected 'protected' environment, but also the causing human activities other than condensed settlements.
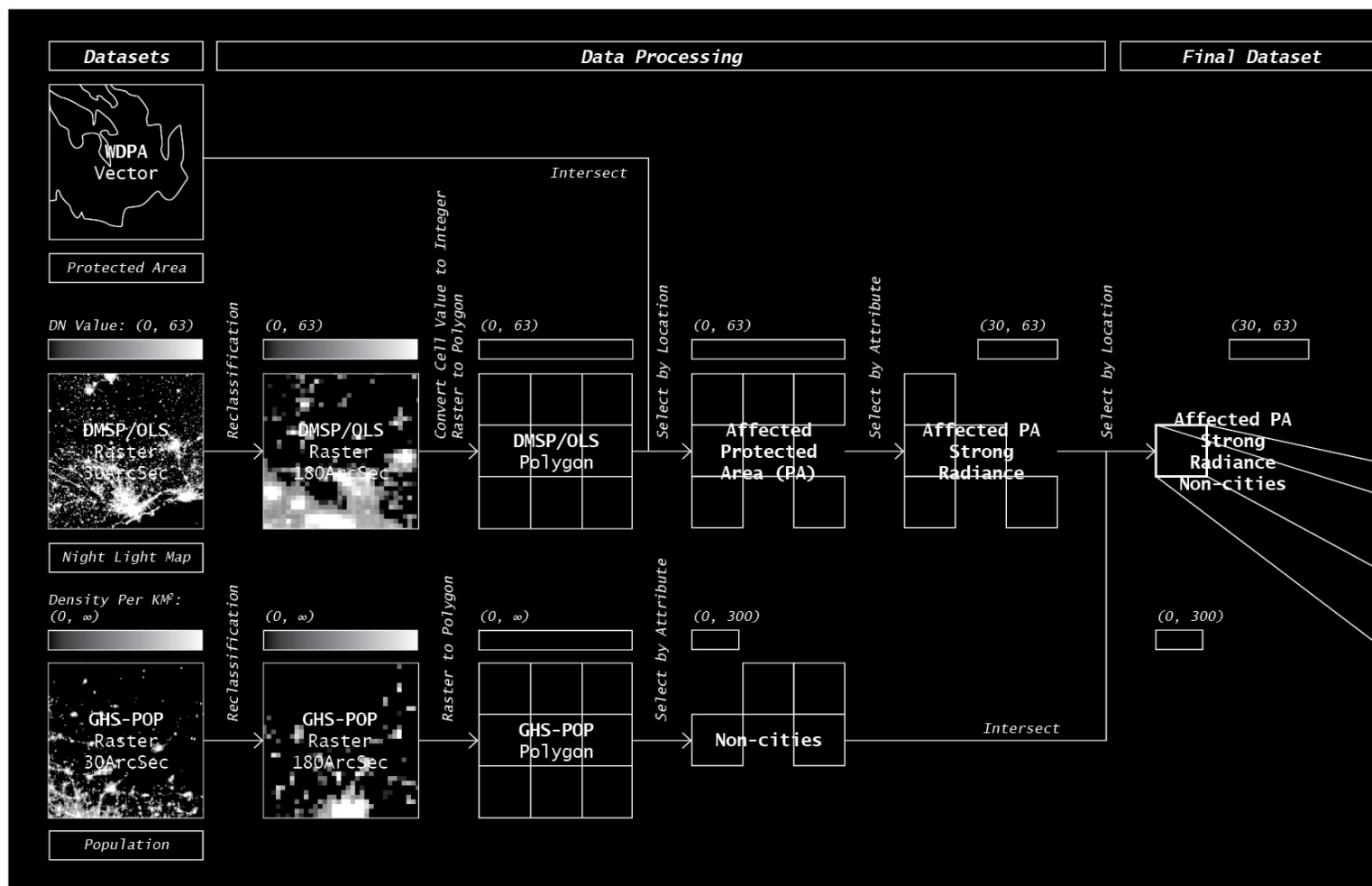
assumptions
& limitations

The data-processing and methodology design in this study are based on several following assumptions:

[1] All enlightened part (DN>0) on the DMSP/OSL map stands for artificial lighting at night.

[2] Any enlightened part (DN>0) on the DMSP/OSL map is considered as light pollution if intersect with one or more Protected Areas, since there is originally no artificial lighting in a natural environment.

[3] Cities, or any other forms of dense human settlements, are the major contributors of brightness across the night light map. It is meaningful to look at places other than that - with high level of brightness and low population density.

Limitations with the datasets:

[1] The night light information on the DMSP/OSL map is influenced by the natural sky glow. Even in its pristine state, the night is not completely dark.

[2] For DMSP/OSL map, there is a large overlap between cells during the data acquisition process. Light observed in one location has the chance to be recorded in more than one pixel.

[3] Both the DMSP/OLS and GHS-POP datasets have a resolution of 30 arc second, which is around 1 kilometer at the equator, but becomes smaller when approaching both poles. This means cells at different latitudes represent areas with different geographic dimensions.

[4] The cells in DMSP/OLS and GHS-POP are not aligned with each other, bringing more ambiguity in defining of the areal units (Fig 1).

Limitations with data-processing:

[1] The reclassification of DMSP/OSL and GHS-POP raster datasets allows the process of a huge geographic scope, but also gives up some granularity. For some certain typologies of human activities, 180 arcsec is too large to give a precise guide for us to identify city and non-city by definition of GHSL. For example, a part of Brooklyn, New York is marked as non-city (Fig 2) because the residential areas are dissolved with large monuments and industrial campus where nobody lives.

[2] The conversion from raster to polygon in GIS software requires an integer value for each cell. That leads to the conversion of cell value from float to integer by truncation, which reduces brightness of the light map to varying degrees. But this loss is rather minor considering the full scale of DN.
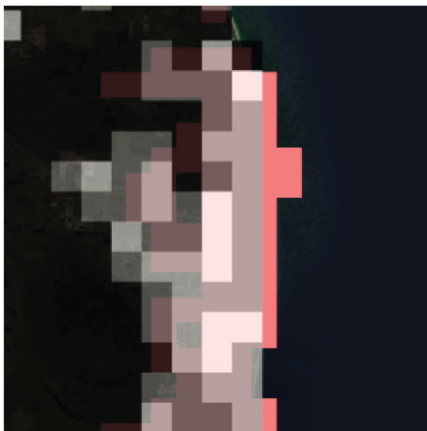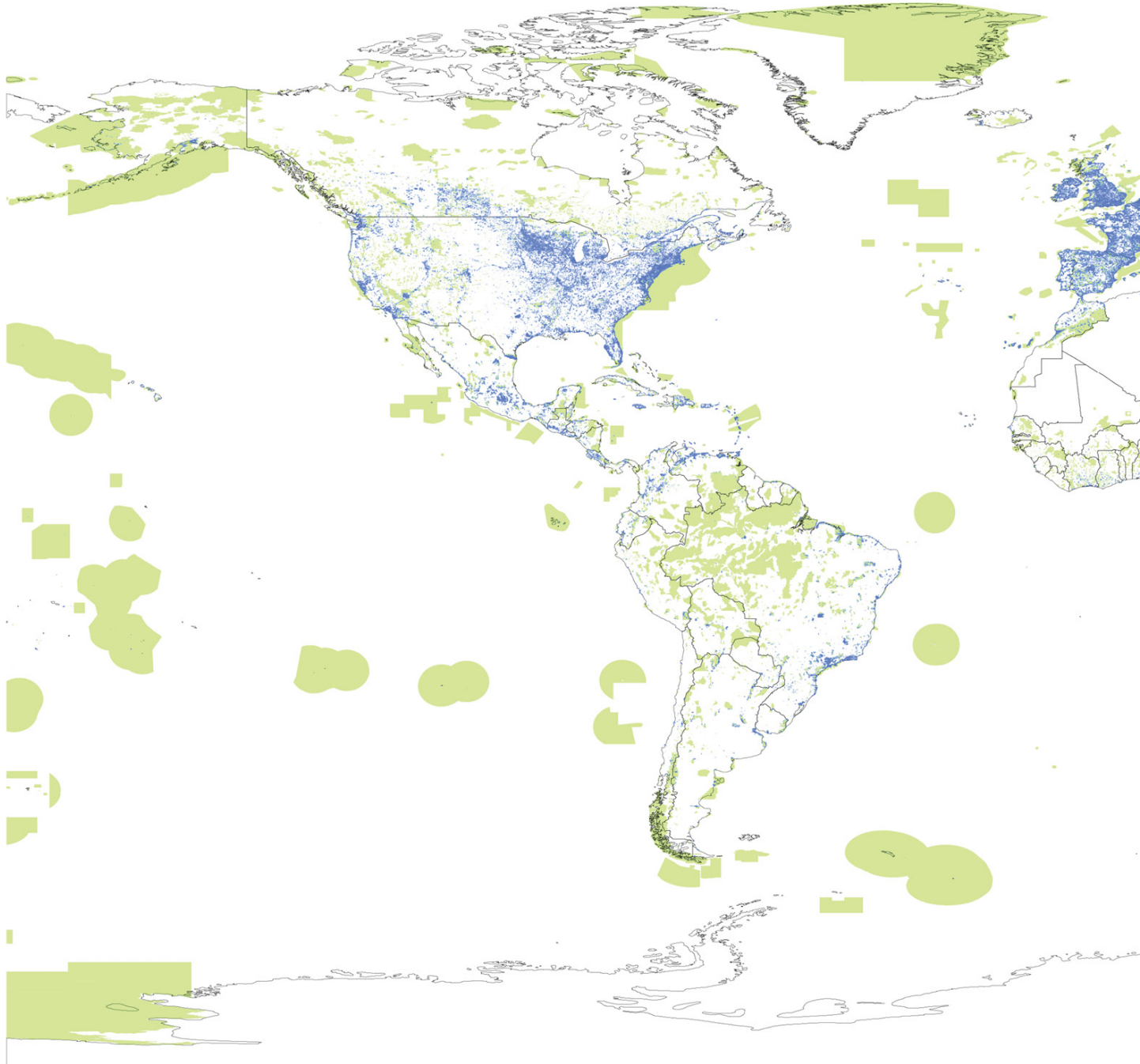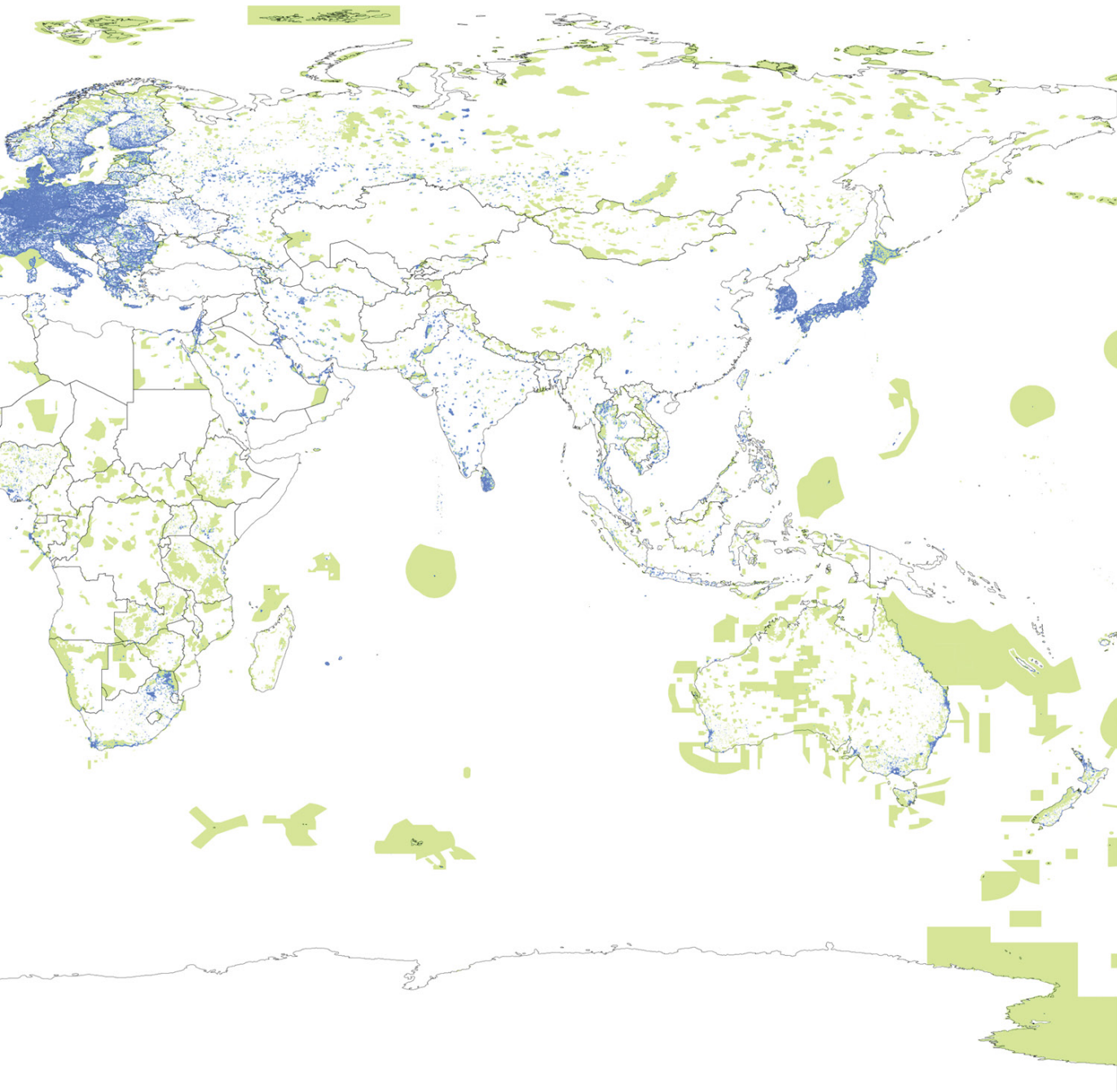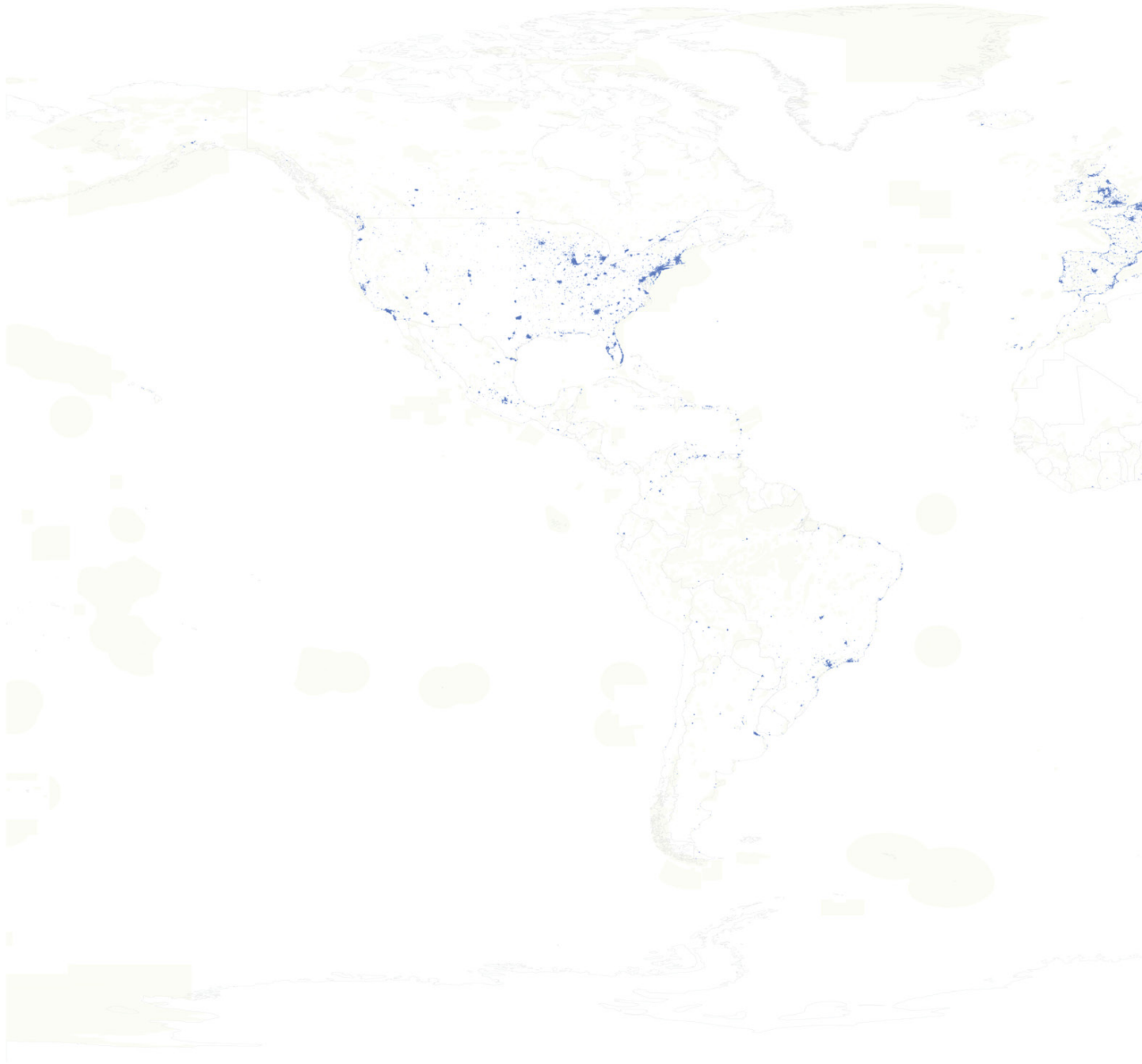
Zoom-in Analysis

Fig 1. Misidentification of non-city area.

Fig 2. Misalignment of population layer and night light layer.

protected area affected
by light pollution

0   1000   5000KM

protected area affected
by strong light pollution

0   1000   5000KM

Oil Gas Field, Canada ☐

Fulfillment Center, USA ☐

Clean Water, USA ☐

Zoo, Mexico ☐

Bo...

Mining, Brazil ☐
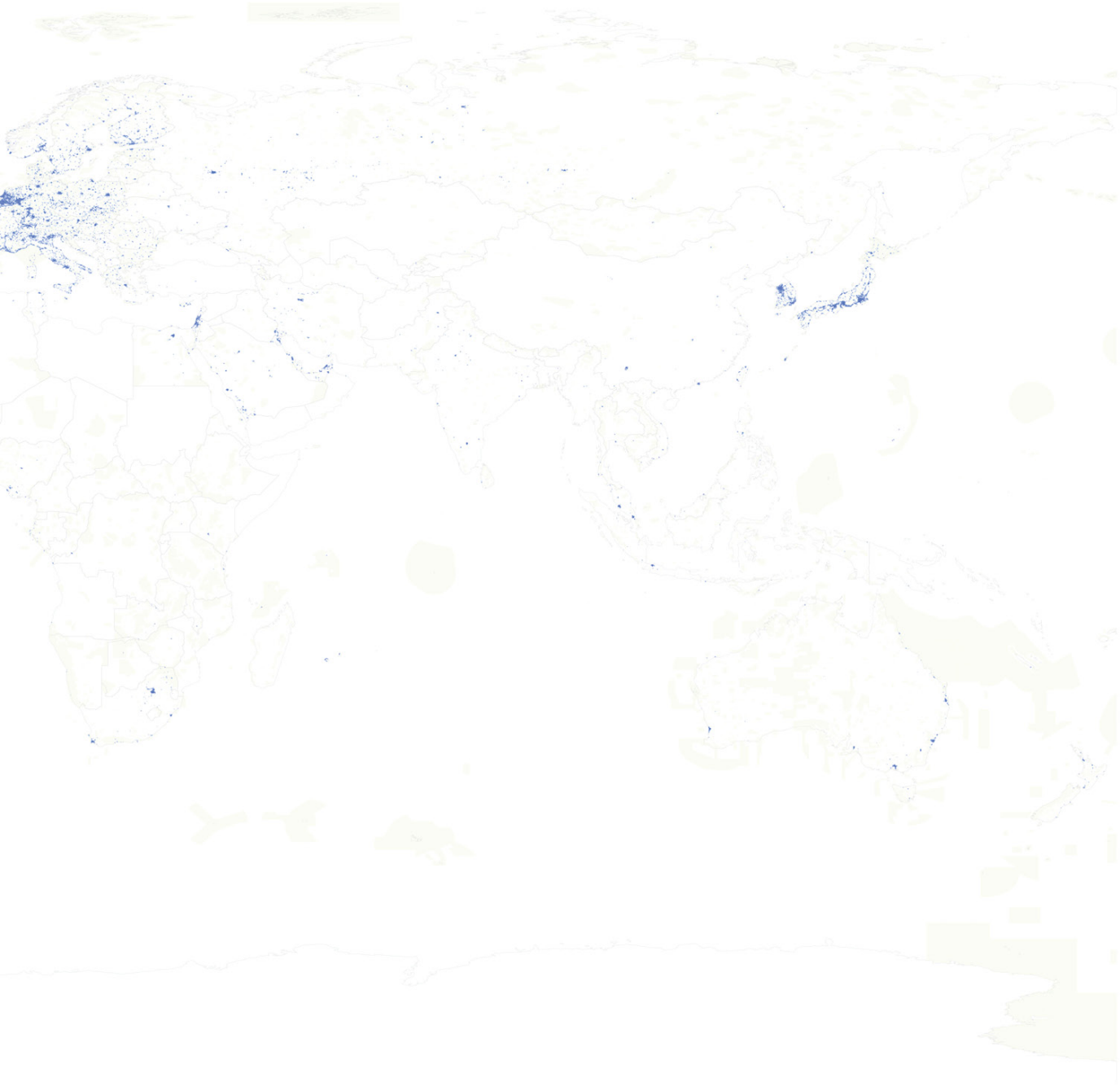
protected area affected
by strong light pollution
in nonurban area

Diamond Extraction, Russia □

Snow Park, Japan □

Tourist Site, South Korea □

rder Station, Saudi Arabia □

Private Properties, UAE □

Cement/Oil Refinery, Australia □

Industrial Site, New Zealand □

0   1000   5000KM

Other than cities, there are other types of human settlements that generate great level of light pollution despite there is very few population living in it:

resorts, reservoir, military bases, industrial sites, transportation hubs, borders and border stations, fulfillment centers, private properties, power plants, ...and the list goes on.

On the other side, a lot of these lighting sources do not directly accommodate any people, but are still constructed for the need of a larger population, either living nearby or thousands of miles away. Although these constructions are 'invisible' to the sight of a majority of people, their negative affections to the natural are real and constant.

ZOO
location: Mexico
population:0
DN:47
26°53'27.0"N.
101°22'52.4"W

SKI FACILITY
location: Canada
population:0
DN:34
49°23'44.3"N
123°12'15.7"W

AMAZON FULFILLMENT CENTER
location: WA,USA
population:0
DN:58
47°06'45.0"N
122°38'01.2"W

FARMLAND/W
location
popula
DN:
47°30'
120°17'

KEYSTONE RESORT
location: CO,USA
population:0
DN:37
39°36'31.6"N
105°56'34.0"W

OTL GAS FIELD
location: CA,USA
population:0
DN:33

SEWAGE TREATMENT
location: Mexico
population:0
DN:33
60°48'57.8"N
20°46'09.9"N

NOVA LIM
location
popula
DN:
20°10'
43°55'

GOLF COURSE
location: South Korea
population:0
DN:38
37°55'36.8"N
127°19'16.8"E

TOURTIST SITE
location: South Korea
population:0
DN:34
35°01'42.1"N
128°48'56.9"E

SNOW PARK
location: Japan
population:0
DN:34
35°59'52.9"N
136°52'39.8"E

SKATE
location
popula
DN:
36°45'
139°5

nonurban sources
of strong light pollution,
enumerated

WAREHOUSES
: WA,USA
tion:0
30
14.4"N
58.3"W

RESERVOIR

location: NV,USA
population:0
DN:32
39°36'29.8"N
119°10'33.9"W

SILICON VALLEY
CLEAN WATER
location:CA,USA
population:0
DN:35
37°32'40.7"N
122°13'43.5"W

SEWER DISTRICT

location: UT,USA
population:0
DN:33
41°05'02.4"N
112°06'35.5"W

A/MINING
: Brazil
tion:0
35
31.3"S
22.8"W

AIRPORT

location: Iraq
population:0
DN:47
30°33'06.7"N
47°40'03.0"E

BOARDER STATION

location: Saudi Arabia
population:0
DN:54
31°31'00.2"N
37°06'40.4"E

PORT

location: China
population:0
DN:43
33°15'22.3"N
120°44'15.2"E

CENTER
: Japan
tion:0
34
7.6"N
37.3"E

DIAMOND EXTRACTION

location: Russia
population:0
DN:41-56
62°31'46.7"N
113°59'21.6"E

INDUSTRIES

location: Australia
population:0
DN:42
22°58'48.2"S
148°35'46.5"E

OIL REFINERY/CEMENT

location: Australia
population:0
DN:41-46
23°48'37.9"S
151°08'54.8"E

The Protected Areas defined by WDPA, which is a collection of the most delicate natural and environmental resources, is actually not well 'protected'. Large region of PA are under light pollution generated by human activities every night.

ZOO

location: Mexico
population:0
DN:47
26°53'27.0"N 101°22'52.4"W

AMAZON FULFILLMENT CENTER

location: WA,USA
population:0
DN:58
47°0...5.0"N 122°38'...12"W

SILICON VALLEY CLEAN WATER

location:CA,USA
population:0
DN:35
37°32'40.7"N 122°13'43.5"W

Cuenca Alimentadora del Distrito
Nacional de Riego 004 Don Martín

WDPA ID: 107621
Reported Area: 15193.85 km²
location: Mexico

Designation: Natural Resources
Protection
IUCN Management Category: VI
Management: National Commission
of Natural Protected Areas

Nisqually Reach

WDPA ID: 555586834
Reported Area: 59.61 km²
location: USA

Designation: Aquatic Reserve
IUCN Management Category: IV
Management: National State Department of
Natural Resources

Don Edwards San Francisco Bay

WDPA ID: 2941
Reported Area: 207.64 km²
location: USA

Designation: National Wildlife
Refuge
IUCN Management Category: IV
Management: U.S. Fish & Wildlife
Service

protected area affected by different sources of human activities

NOVA LIMA/MINING

location: Brazil
population:0
DN:35
20°10'31.3"S 43°55'22.8"W

BOARDER STATION

location: Saudi Arabia
population:0
DN:54
31°31'00.2"N 37°06'40.4"E

TOURIST SITE

location: South Korea
population:0
DN:34
35°01'42.1"N 128°48'56.9"E
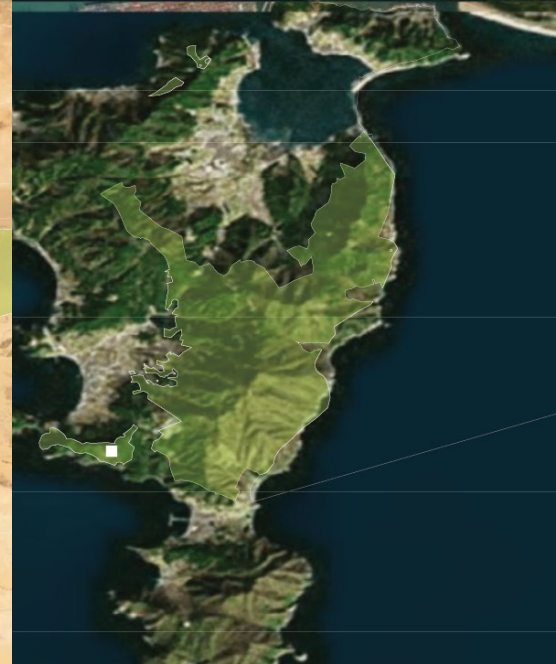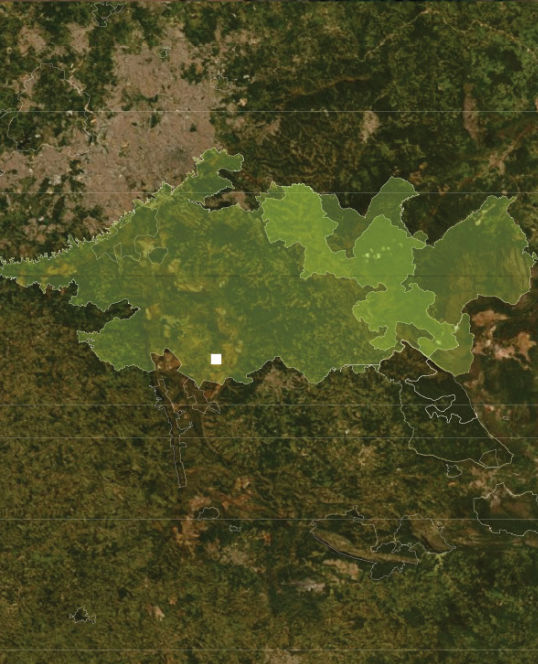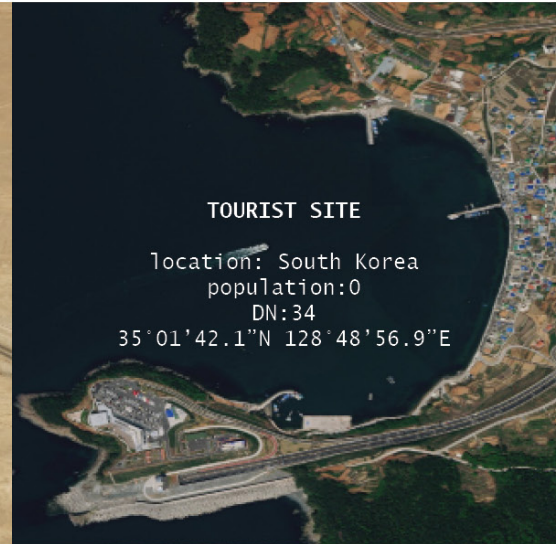
Área De Proteção Ambiental Sul-Rmbh

WDPA ID: 555576219
Reported Area: 1633.16 km²
location: Brazil

Designation: Environmental Protection Area
IUCN Management Category: Null
Management: Instituto Estadual de Florestas de Minas Gerais

Dahek Nature Reserve

WDPA ID: 555643078
Reported Area: 265.42 km²
location: Saudi Arabia

Designation: Nature Reserve
IUCN Management Category: Null
Management: The Royal Society for the Conservation of Nature (RSCN)

Gadeokdo

WDPA ID: 555558252
Reported Area: 5.57 km²
location: Republic of Korea

Designation: Forest Genetic Resources Reserve
IUCN Management Category: IV
Management: Korea Forest Service

bike campaign nyc

chris zheng, ting zhang, zixuan zhang

gsapp, fall 2019
urban informatics i
anthony vanky

The City of New York in a parallel universe is starting a campaign to take all automobiles off the roads. It kicks off with bicycles taking over certain streets and avenues in Manhattan at a certain time of the day, and eventually every street in the whole city, 24/7. While most New Yorkers are embracing this more equal and healthy future, they also wonder what are the next steps to take in the coming days.

To learn from the trend of bicycles, especially shared bicycles' growth in New York City, we will look into the data of Citi Bike, a privately owned public bicycle sharing system serving the city since 2008, and to come up with suggestive proposals for its development.

By analyzing Citibike data in 2018, the number for usage, station location, traveling time, etc. are visualized which contributes to forecasting where the next bicycle lane will be built in the near future. If we are going to launch a campaign which could be participated as many people as possible, what time is the perfect time?

http://www.columbia.edu/~tz2436/BikeCampaign.html

user trend analysis

Seasons

Fri   Mon   Sat   Sun   Thur   Tue   Wed
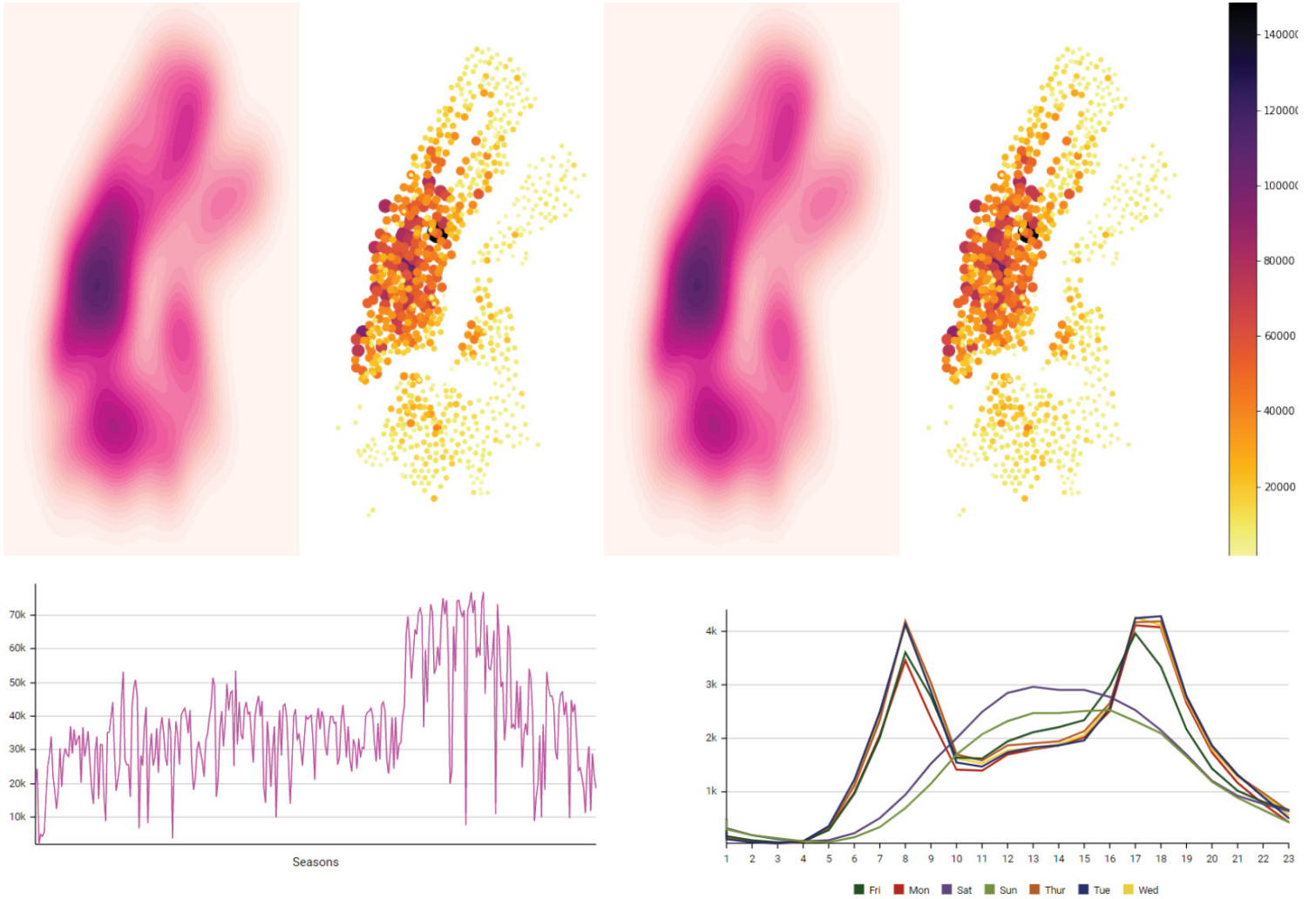
1	2
3	4

1. pick-up spot heatmap
2. drop-off spot heatmap
3. seasonal usage frequency
4. daily usage frequency

extractive urbanism:
social & territorial fragmentation
in mozambique's energy extraction landscape

chris zheng, ting zhang, annie wu, zhou wu

gsapp, spring 2020
conflict urbanism
laura kurgan

Mozambique's booming extractive industries have spurred the country's making of modernity in the post civil war era. Through the lens of urbanism - urban development, foreign investments, infrastructure construction, settlements and resettlements, etc. - this project looks at how the extractive boom is building the country's economy while characterizing it with spatial and socio economic fragmentation across the national territory.

Africa's urban population will triple in the nexy 35 years, with more than 1.3 billion Africans living in cities by 2050. Among these surge of urban expansion, a great number of cities are rising from the ground up powered by FDI. Mozambique is one of the shining stars. The country's economy has taken off with the drive of foriegn capitals which later turned into a controlling power over the extraction and export of Mozambique's natural resources.

Nearly 70% of capital flows in exports come from the mining and its supporting industries - logistics, energy producing, etc. Tete, Palma, Cuamba, Montepuez, Mulevala, Manica and Chibuto, etc, are all those names that are spatially aligned with the large mining and mining serving companies. But for these companies, only less than 40% of them are owned by Mozambicans.

Large Mining Companies
- Mining
- Logistics

Net profits of Large Mining Companies Mining Serving Companies
- $0
- $1,000
- $1,000,000
- $1,000,000,000

Australia, Brazil, China, France, Germany, India, Ireland, Malaysia, Mozambique, Norway, Portugal, South Africa, Switzerland, UK, United Arab Emirates, USA, Zimbabwe

mining, moatize, tete
resettlements
land acquisition conflicts

60% of the Tete Province land is licensed to mining companies
[Including pending licenses]

approved mining licenses
proposed mining licenses
reserved areas

0   25   50 KM

MOATIZE

Moatize

NACALA CORRIDOR

MALABWE

CATEME

MWALADZI

CITY MOATIZE

BAGAMOYO

CAPANGA

RIO TINTO
"BENGA" MINE

VALE
"MOATIZE" MINE

BENGA

CHIPANGA

NHAMBALUALU

MITHETE

Changara

Original Location of Villages
Resettled Location of Villages
Coal Mining Operation

0   0.25   0.5 KM

AFUNGI LNG PLANT
Special Zone

Onshore · Area 1 · Area 4 ·

Area 2 · Area 5 ·

Area 3 · Area 6 ·

LNG AREAS
PROVINCE BOUNDARY

0   30   60 KM

AREA

Onshore
Area1
Area4
Area2
Area5
Area3
Area6

COMPANY

Wentworth Resources
Anadarko
Mitsui E&P Mozambique Area 1
Beas Rovuma Energy Mozambique
BPRL Ventures Mozambique
ONGC Videsh
PTTEP Mozambique Area 1
Eni
ExxonMobil
China National Petroleum Corporation (CNPC)
Galp Energia
Korea Gas Corporation (KOGAS)
Statoil
Tullow
Petronas
Total
Empresa Nacional de Hidrocarbonetos (ENH)

COUNTRY

UK
USA
Japan
India
Thailand
Italy
China
Portugal
Korea
Norway
Malaysia
France
Mozambique

554 households are expected to be physically resettled

952 are expected to lose access to their economic resource

REPLACEMENT VILLAGE

HOUSING

AGRICULTURAL LAND

PIPELINES

Physically Displaced Settlement
Economically Displaced Settlement
Replacement Village
Project Industrial Zone   LNG Special Zone Boundary
Livelihood Development Zone   Planed Pipelines
1,500 m Marine Security Zone   Province Boundary
Marine Facilities   Roads

0   2   4 KM

liquefied natural gas, cabo delgado
extraction entitlements, resettlements, armed conflict, insurgency

Number of the Violent Events in Cabo Delgado By Year

AFUNGI LNG PLANT
Special Zone

Jun 5th 2017
30 armed men associated to an Islamist fundamentalist group attacked three police stations in the Mocimboa da Praia. 8 police officers were killed and around 30 were injured. Eight civilians were killed. 1 or 2 of the armed men were captured. Reports of civilians killed also erupted, but with unconfirmed numbers. The attack lasted two days.

Feb 21st 2019
At least two coordinated raids by suspected ASWJ militia on core members of the Anadarko Petroleum Corp on the road between Mocimboa da Praia and the Afungi peninsula (the company's liquified natural gas construction site). In one incient at least one Anadarko worker was beheaded (coded as Nassoro prec2). In another where a convoy was attacked, six were injured (coded at Afungi prec). Villages were also attacked close to the highway.

May 10th 2019
In Cabo Afungi, a man working on Andarko's project was killed while working towards the LNG site to restart work after a two-month hut down by an armed group allegedly belonging to ASWJ.

Nov 13th 2019
On Nov 13 2019, ASWJ insurgents attacked the village of Nsemo under Cabo Afungi area (Palma, Cabo Delgado). The village is located a few km from natural gas plants. Several people were shot dead. Unknown number of fatalities.

Apr 15th 2020
A bus, which was taking workers to the Cabo Afungi (Palma Cabo Delgado), was fired on by Mozambique military forces. The attack occurred after the bus overtook an armored vehicle. No fatalities were reported.

Event Number

Event Locations
LNG Special Zone Boundary
Province Boundary
District Boundary
City / Town Boundary

0   30   60 KM

51% of displaced households reporting at least one member primarily engaged in FISHING

Physically Displaced Settlement
Economically Displaced Settlement
Fishing - Vessel Acitivity Points
Fishing Locations and Home Ports
Fishing - Intertidal Gathering Points
Intertidal Users and Their Base Villages

1,500 m Marine Security Zone
Marine Facilities
Planed Pipelines
LNG Special Zone Boundary
Province Boundary
Roads

0   2   4 KM

domestic power access

Despite the outsized energy generation, there's a huge gap between the demand and the distribution. Extraction and export segments are among the top priorities of power supply while the whole system is struggling with the existing highly subsidized tariffs. There are 4.1 million households with no power access in Mozambique. The current access rate for residence is 29%. This number is 57% in urban areas and 15% in rural areas, yet only 36.5% of the country's people live in a city.

Population of a large area without power access.

Nighttime Lights Time Series (Enhanced)
Resolution: 1 arcsec (approx. 50m at the equator)
Digital Number

63
1
0

0   100   200 KM

Population Distribution
Estimated total number of people per grid-cell
Resolution: 3 arc (approx. 100m at the equator)

>= 15
3 - 15
1 - 3
<= 0

0   100   200 KM
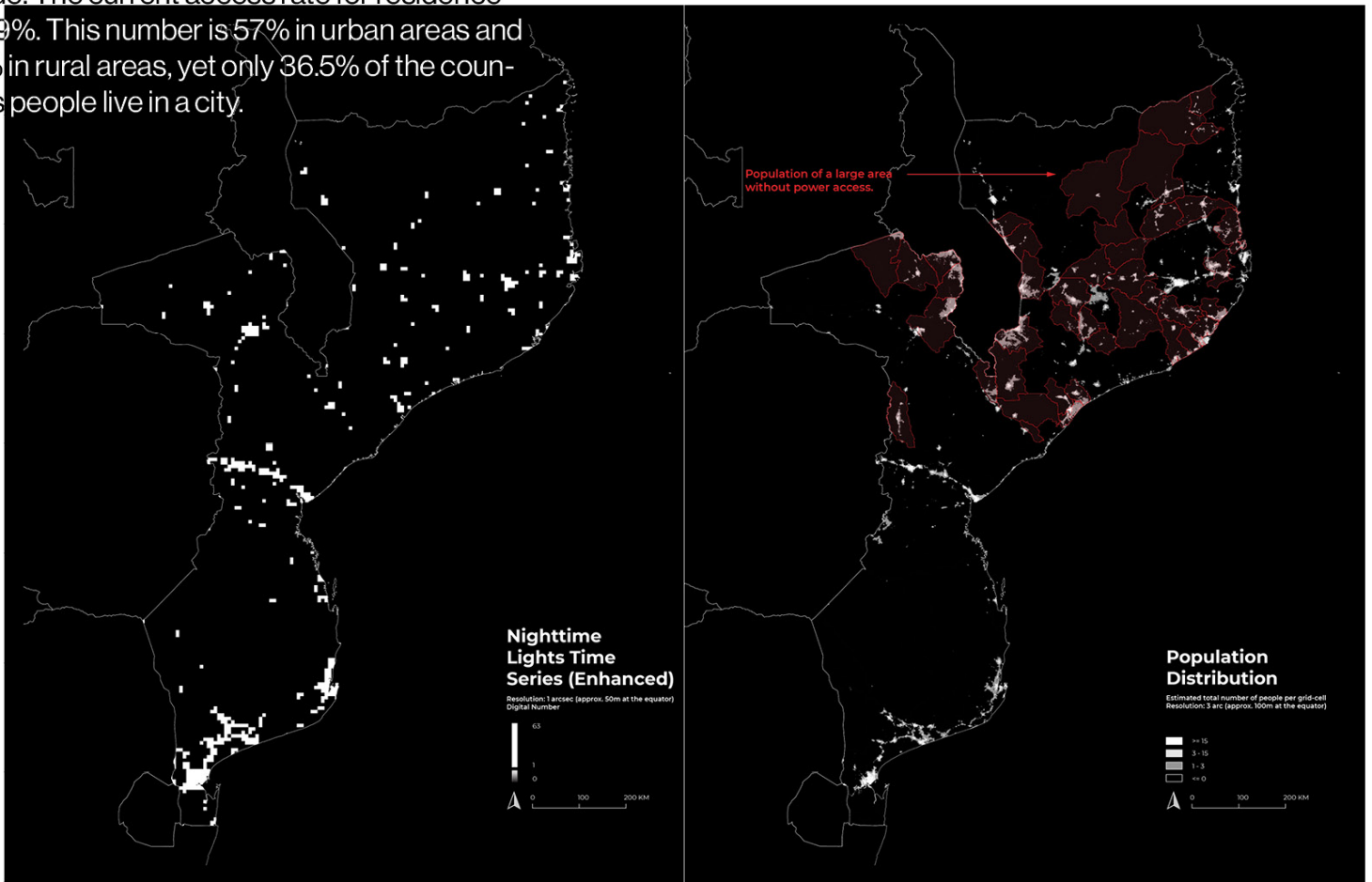
unbalanced
energy distribution

Mozambique is a major exporter of hydropower, coal and natural gas, with the aim of becoming southern Africa's energy hub. At the heart of Mozambique's energy system is Cahora Bassa, the giant hydroelectric dam on the Zambezi River in Tete province, opened in 1977. As a colonial legacy, this project is financed by foreign investors and the guaranteed sale of electricity to South Africa at below-market prices, in exchange for its support in the colonial war. In the post civil war era, Cahora Bassa was taken over by the Mozambique government and rendered as a symbol of national identity - 'o orgulho de Moçambique (the pride of Mozambique)'. But as a major source of revenue income, annually 70% of the dam's output has been committed to South Africa's Eskom utility under a long-term agreement through 2029. A large portion of that is later reimported to Mozambique to serve large extraction industries owned by foreign
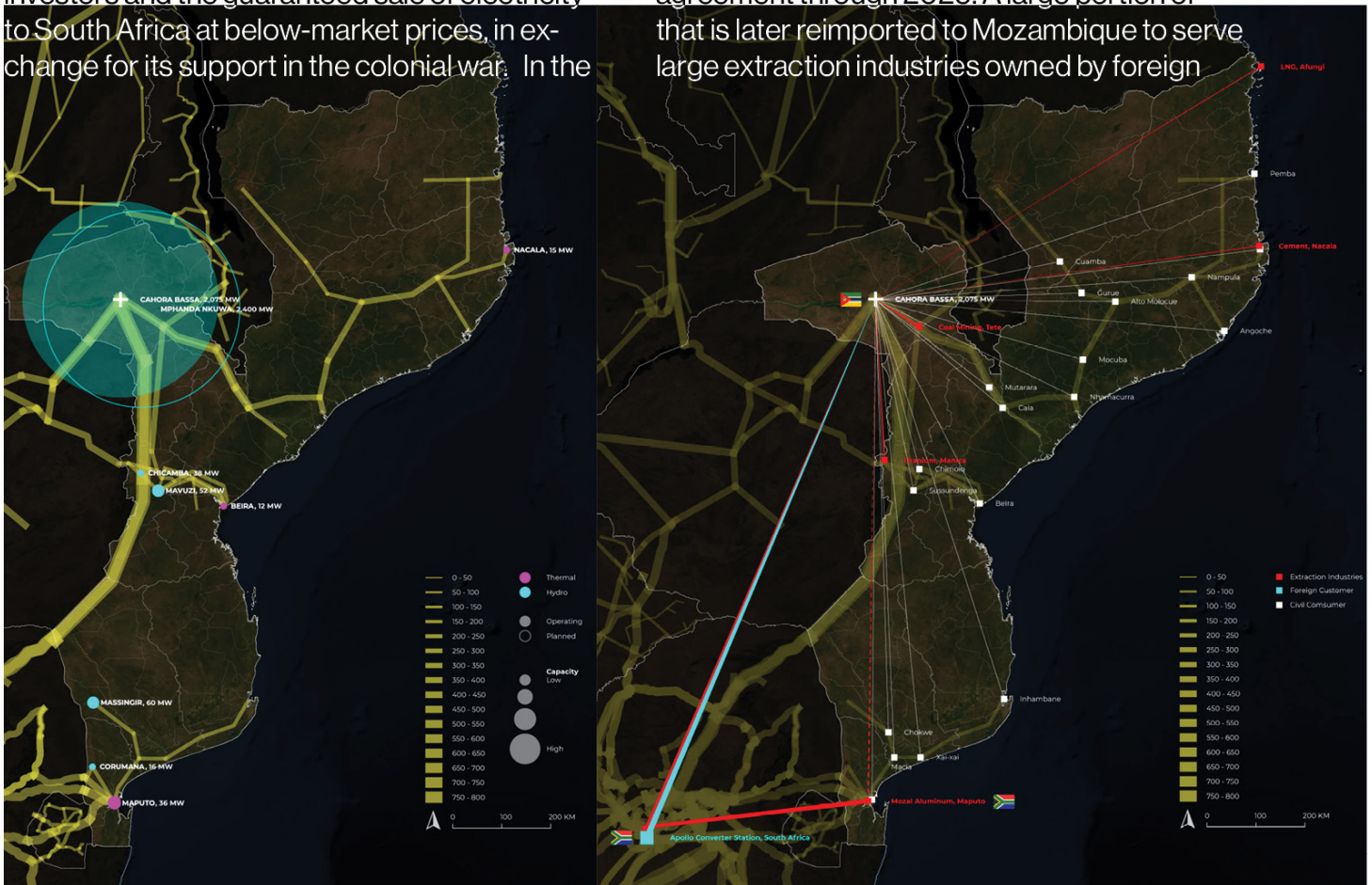
shareholders. Beyond that, the country plans to expand sales to Malawi, Zambia and Tanzania. This all happens with a majority of the domestic population still having no access to electricity.

a case study proposal
for heterotopia:
kowloon walled city, hong kong

chris zheng

gsapp, fall 2019
theory of city form
vishaan chakrabarti, skylar bisom-rapp

Fig 1. An aerial view of Kowloon Walled City, 1989. Wikipedia

Kowloon Walled City in Hong Kong is proposed here as a substitutional case study in this discussion of heterotopia and the larger discourse of postmodernism it introduces.

The connections between these two terminologies – heterotopia and postmodernism – and the case of the Kowloon Walled City are not too obvious at first glance. This famous, once-existed urban settlement has long been seen as a symbol of anarchy, informality, spontaneity, chaos and resistance. Its imageries have constantly being recalled and appreciated to have an unique aesthetics, often referred as 'cyberpunk' in the era of streaming media. At its most romanticized presentation, Kowloon Walled City is the perfect representative for a dystopia or a utopia, one for the modern lifestyle in cities and one for the vice. While heterotopia and postmodernism discussions are scrutinizing the absurdity in modern social norms, such an out-of-place example of the Kowloon Walled City seems too bizarre to be in the context.

But there might be a possibility that heterotopia covers more than just the specific typologies mostly talked. There are, 'in every culture, in every civilization, real places – places that do exist and that are formed in the very founding of society... Places of this kind are outside of all places (Foucault 1967).' Simply put, heterotopia can be a universal reflection over different contexts.

Despite the statement of universality, there might be certain typologies that Foucault was linking to through his talking. The examples offered were largely based on the Western or 'mainstream' trajectory of modern social and urban formation, where modernism gradually emerged into dominance in every aspect with the help of industrialization. It is doubtful whether did Foucault realize how would this concept be applied to a much alien cultural environment, i.e., a colonial or post-colonial one, which the larger part of the world consists of.

In the case of the Kowloon Walled City, there are many interesting characteristics that worth discussing from the heterotopia perspective. These characteristics are either about the community itself or about a cultural spectacle that it stands for. A closer look at the several principles given in Foucault's 1967 speech surprisingly draw some literal connections between the Kowloon Walled City and a heterotopia:

'Its first principle is that there is probably not a single culture in the world that fails to constitute heterotopias' (Foucault 1967). That is, again, stressing the universality of the concept.

Fig 2. A playground at the edge of the city. Wikipedia

'The second principle… for each heterotopia has a precise and determined function within a society and the same heterotopia can, according to the synchrony of the culture in which it occurs, have one function or another' (Foucault 1967). What is meaningful about Greg Girard's 1993 photographic record publication City of Darkness: Life in Kowloon Walled City is that by walking down the alleys inside the concrete behemoth, he was able to reveal a society with clearly defined functions just like the one beyond its walls. Before this record, the Walled City was a space 'of other' for many onlookers. However, the fact was that the same enforcement of social disciplines worked just as well in here. There were kindergartens, libraries, and prisons, no matter who was running them. Even some types of space that were not considered as normal space in other societies, such as brothels, were systematically regulated here. The Walled City certainly was not as regulated as a 'real' city by appearance, but the space and lives here didn't get away from the control of a variety of heterotopias.

A more interesting heterotopia feature in this case is the Kowloon Walled City's legendary mystique and its projections in other part of the world. This prodigious urban village was torn down in 1994 and has been mourned and casted back by many of its residents and others ever since. But nostalgia began even before the city was erased. There was something quintessential exotic about the city, about its orientality, serendipities, and lawlessness. There are countless creations inspired by or directly built their stages in the Walled City, including movies, art works, games, and more. Bloodsport (1988) is a typical example of the foreign eyes' looking at the Walled City. This American martial film was produced before Mixed martial arts (MMA) was prevailing on television. Battles in this movie were staged in the confines of this fortress, introduced by a one-minute handheld shot walking down the narrow, dark aisle with the voiceover talking about the city: '… No joke man. It's a run-down piece of no-man's land in the middle of a tourist paradise… Once you step out of the sunlight into the narrow corridors, it's time to protect your nuts, guys.' But peculiar enough, other than the spooky audio and cramped space, there is nothing unpleasant about this scene. There are babies crying, people chatting, and children with backpacks walking home after school – in other words, everyday life. But the cameras came in with the belief that it is the everyday life in this very place that would render an uncanny and exclusive vibe. Where else can these very brutal, lawless fights take place other than the Kowloon Walled City?
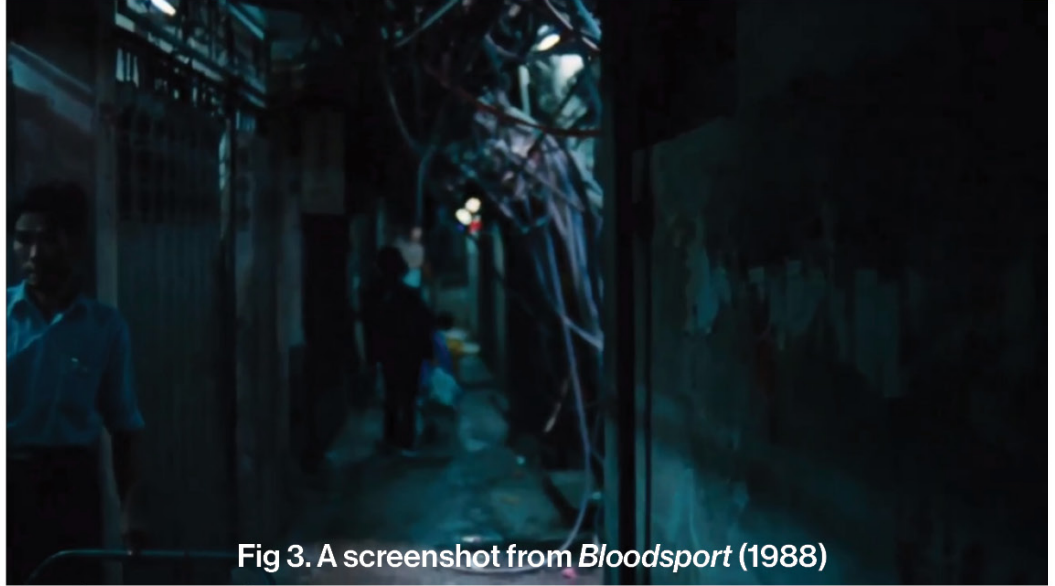
Fig 3. A screenshot from *Bloodsport* **(1988)**

But Bloodsport is already one of the two films that had actually stepped in the city (City of Darkness Revisited). Most fascination in the Walled City celebrates only the extraordinary and sensational part of the story. Several years after its demolishment, a smaller version of the Kowloon Walled City was replicated in Kawasaki, Japan. In a five-story gaming facility with a rusty worn-down façade, the designer modeled the interior by mimicking the look of slimy walls, dripping sewage and neon signage in the by-gone Walled City (Zhang 2019). Even garbage was imported from Hong Kong to scatter on the tin roofs. Going back to Foucault's talk, the obsession and recreation of the Walled City serve exactly an example of making heterotopia. The theme park in Kawasaki is just like the Polynesian villages on the outskirts of cities that offer a compact experience 'not oriented toward the eternal', but 'absolutely temporal' (Foucault 1967).

Another point worth noticing is that the emergent of cyberworld makes space-making much more flexible and at the same time ambiguous. The virtual space is not only dedicating to approach the sense of real in every human sensation, but also in turn enhancing the disciplines in the physical world. In this sense, there are more worlds constructed under the shadow of the Kowloon Walled City: Los Angeles in Blade Runner, Niihama in Ghost in the Shell, Gotham City in Batman Begins, and there might be more. How technology and surrealism can one day wipe off the line between the real and the virtual is not clear. But considering the capability of 'juxtaposing in a single place several places, several sites that are in themselves incompatible' (Foucault 1967), it's not hard to say that heterotopias might be not at all 'hetero', but the new norm in the near future.

Foucault, Michel. Of Other Spaces: Utopias and Heterotopias. From: Architecture /Mouvement/ Continuité. 1984. ("Des Espace Autres," March 1967 Translated from the French by Jay Miskowiec).

Hung, Matthew. Kowloon Walled City Heterotopia in a Space of Disappearance. Mas Context. http://www.mascontext.com/issues/19-trace-fall-13/kowloon-walled-city-heterotopia-in-a-space-of-disappearance/

Girard, Greg. City of Darkness: Life in Kowloon Walled City. (Chiddingfold: Watermark, 1993).

City of Darkness Revisited. https://cityofdarkness.co.uk/

urban structure coding via speculative design: a plan for tokyo, 1960

chris zheng

gsapp, summer 2019
urban theory + design in post industrial age
noah chasin, amy zhang

"A Plan for Tokyo, 1960" was a design proposal by Kenzo Tange, produced against the backdrop of Japan's soaring economic development and Tokyo's sprawling urban scale after World War II. This project was widely considered as closely related with Metabolism, a post-war Japanese movement. Tange himself was not a member, but a tutor of many of the major founders.

This proposal was originated from Tange's belief that the current radial structure of development would only lead the city into worse chaos and congestion. Instead, Tange sought a new linear urban system that is tailored for the highly automobile-oriented society which he expected to come, as "a direction along which redevelopment should proceed". The design plan was an 18-kilometer megastructure across the Tokyo Bay, linking on the north end the city of Tokyo, and on the south end Boso Peninsula. It created a vast, linear reclamation land and identified a new "civic axis", which Tange believed would house 2-2.5 million of residents and a daily cyclical transportation of 6 million people. The core component of the plan was a complicated transportation system consisted of a set of highways designed for different speed and scale of mobility. The spatial order of the plan was fundamentally shaped by almost the transportation system alone, appeared "an innovation of architectural form and a new ur-
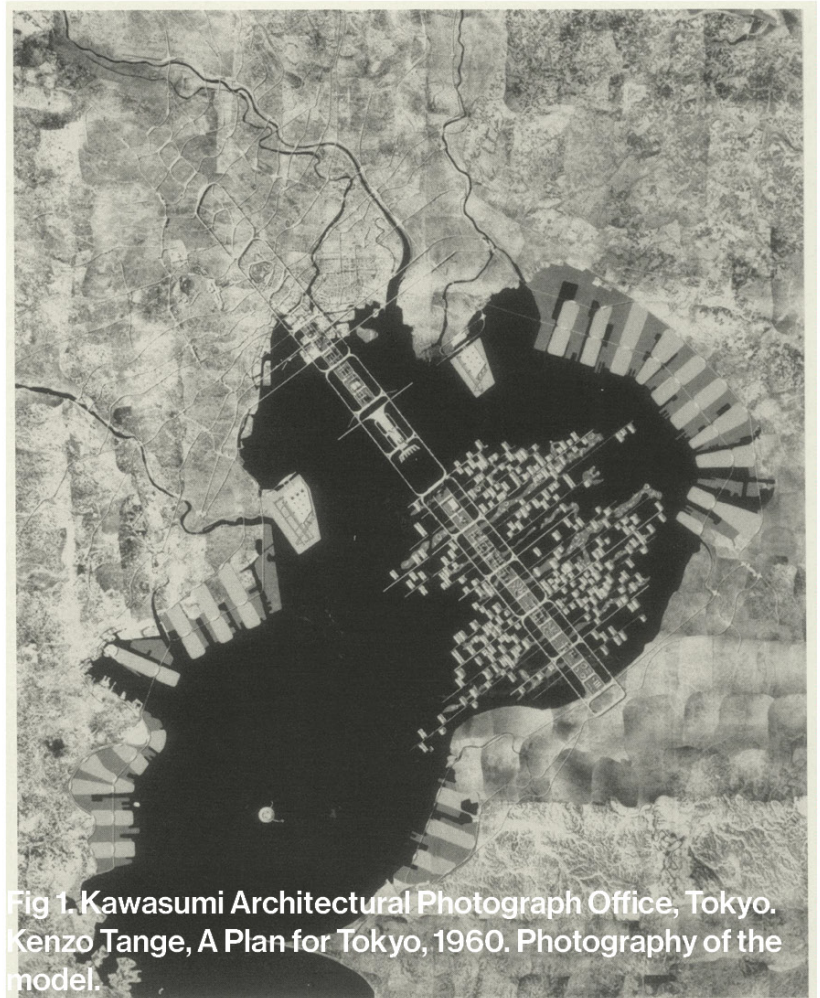

Fig 1. Kawasumi Architectural Photograph Office, Tokyo. Kenzo Tange, A Plan for Tokyo, 1960. Photography of the model.

ban imagery that is distinguished from the past."

In terms of urban planning in this project, Tange claimed he was intentionally shifting from functionalism to a structural methodology despite his close connection with CIAM and European

Modernism. Functionalism was a major design principle in the Modern Movement of architecture and urbanism. By "structural methodology", Tange referred to an integration of different urban programs, contrasting to the prior Modernism which saw city as a composition of 4 individual functions: dwelling, work, recreation and transportation. The proposal demonstrated this structural methodology by proposing to build a network which "bring the city structure, the transportation system, and architecture into organic unity". Much like the Metabolists, he addressed a biological metaphor for the city's evolution, comparing it to the more sophisticated vertebrates rather than amoeba.

Tange's structural methodology generated certain paradoxes. Although Tange noted his insights of a flow of movement and information in the city, there's vagueness in how that flowing motion would be applied in a huge and fixed structure. Compared with the missing of humans in the proposal, as well as the extremely abstracted human activities such as living and moving, the megastructure appeared to be firm and unchangeable. Fumihiko Maki doubted the designer's assumption that which of the functions would be dealt with long or short life span, and remarked the danger that a megastructure might also quickly become obsolete given the uncertainty in urban development.

It is also suspicious to validate the urban form using a biology analogy. Tange argued that the linear system is a more mature and suitable way for city, since "the process whereby a vertebrate body hatches from an egg illustrates the possibility of gradual development on the part of a linear system." There was little solid elaboration in the context of urbanism of how the centripetal radial pattern failed to control the enlargement of city (even assuming it is negative, which is another questionable argument), and how the linear pattern would function to prevent that growth. This assumption was also largely related to motorization or the use of vehicles, which was a prevalent mode of city expansion in the U.S. It is not surprising that Tange was applying this mode of development on the future of Tokyo. Right before the 1960 Tokyo Plan, Tange led a seminar of 'New Community on the Sea: 25,000 Habitants on the Boston Bay', which was also a floating megastructure centered on a high-speed automobile system. But there were great concerns about posing that model of growing in a such hilly and condensed country as Japan. Uzo Nishiyama, a left-leaning architect and urbanist, harshly criticized the plan as "a highly inefficient and unequal tendency that only served the capitalist economic system".

Nonetheless, Tange narrated in a beautiful way, managing to make decent presentation with

graphics and models. But those great techniques only added on its domestic and international reputation as a design scheme; barely impacted Tokyo's city-making in a substantial way. It is worth mentioning that there was a shift of guiding theories and participants in urbanism in the 1960s after the economy started to flourish around mid-1950s in Japan. Functionalism shifted to what Hamaguchi calls 'aesthetic consciousness', and architects started to take part in a broader discussion on cities and urbanities. In this sense, Tange and his plan astood out as representatives. The 1960 plan for Tokyo was an aesthetically pleasing masterpiece, while Kenzo Tange was a big name as architect who pioneered in urban planning.

Meanwhile, it is very hard to ignore the iconic, heroic, and even "megalomaniac" impression of the grand structure. Given the struggles that the plan encountered as mentioned above, it seems that Tange was skipping the urban planning methodology and applying directly his architectural toolset to a wrong, massive scale. The context of the city and every element inside were extremely simplified as sheer figures and the canvas was blank. The utopian city emerged on a vacant site considering barely any existing fabric, even if the designer claimed that it was not rejecting the existing Tokyo and building an entirely new city. The model of development was an imitation and appropria-
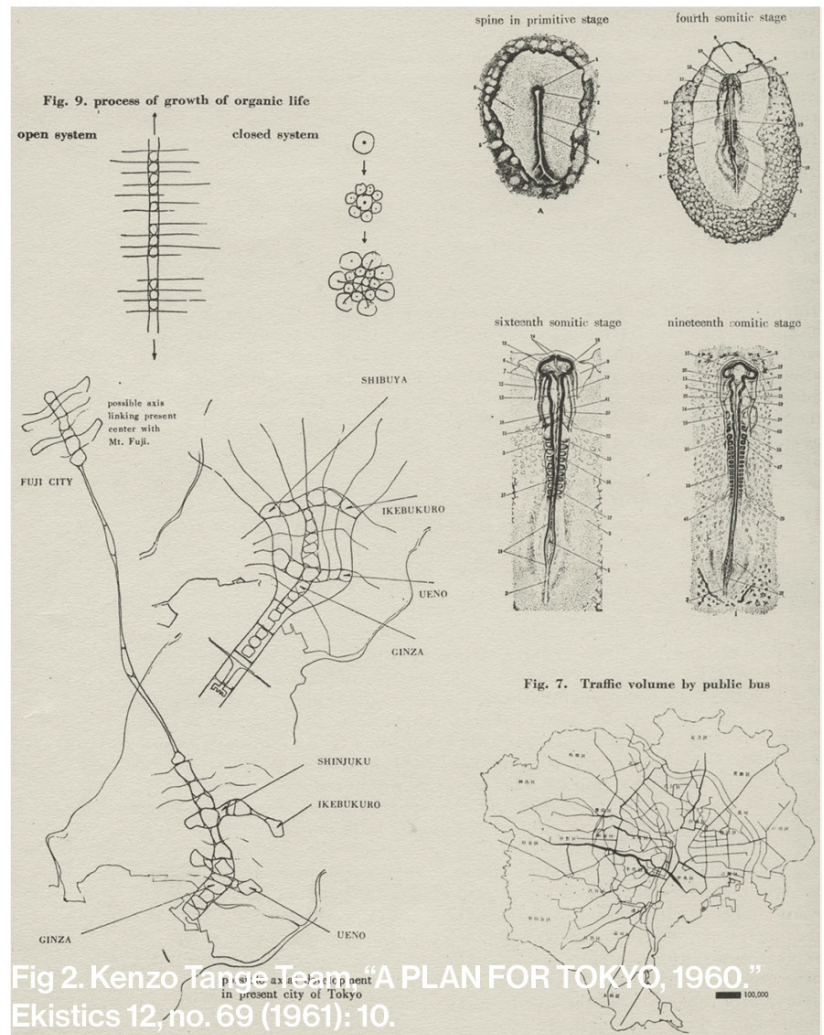

Fig 2. Kenzo Tange Team. "A PLAN FOR TOKYO, 1960." Ekistics 12, no. 69 (1961): 10.

tion of an existing, yet not universally applicable precedent somewhere else.

On the other hand, it is also arrogant to denounce the plan from a pragmatic point of view. City designers, whether architects or urbanists,

have been constantly categorizing endless urban functions into manageable parameters so that the sophisticated systems of city can be modelled and coded by hands. Given a certain scope of technologies in building and transporting, the way people utilize and interact with the space is possible to be specified to some extent. With a passionate faith in mobile system, Tange showed us one end of the urban structure's evolution with every other aspect closely organized around the trunk of transportation. Even almost 60 years after the plan was proposed, the 18-km span over the Tokyo Bay still appears to be a long travel for daily-based movement in city, and requires better solutions to cover.

Kenzo Tange Team. "A PLAN FOR TOKYO, 1960." Ekistics 12, no. 69 (1961): 10.

Lin, Zhongjie. "Urban structure for the expanding metropolis: Kenzo Tange's 1960 plan for Tokyo." Journal of architectural and planning research 24(2), (2007).

Cho, Hyunjung. "Kenzō Tange's A Plan for Tokyo, 1960: a plan for urban mobility." Architectural Research Quarterly 22(2):1-12, (2018).

Banham, Reyner. Megastructure: Urban Futures of the Recent past. New York: Harper and Row, 1976.

Schalk, Meike. "The Architecture of Metabolism. Inventing a Culture of Resilience." Arts 3, no. 2 (2014): 279-97.

CIAM, "Athens Charter". Programs and Manifestoes on 20th Century Architecture (Cambridge: MIT Press, 1971)