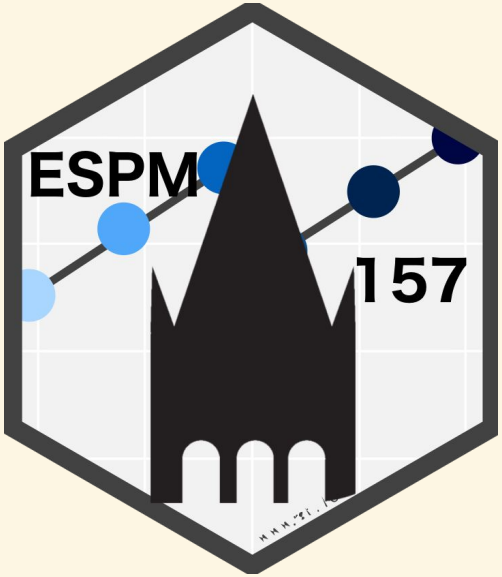
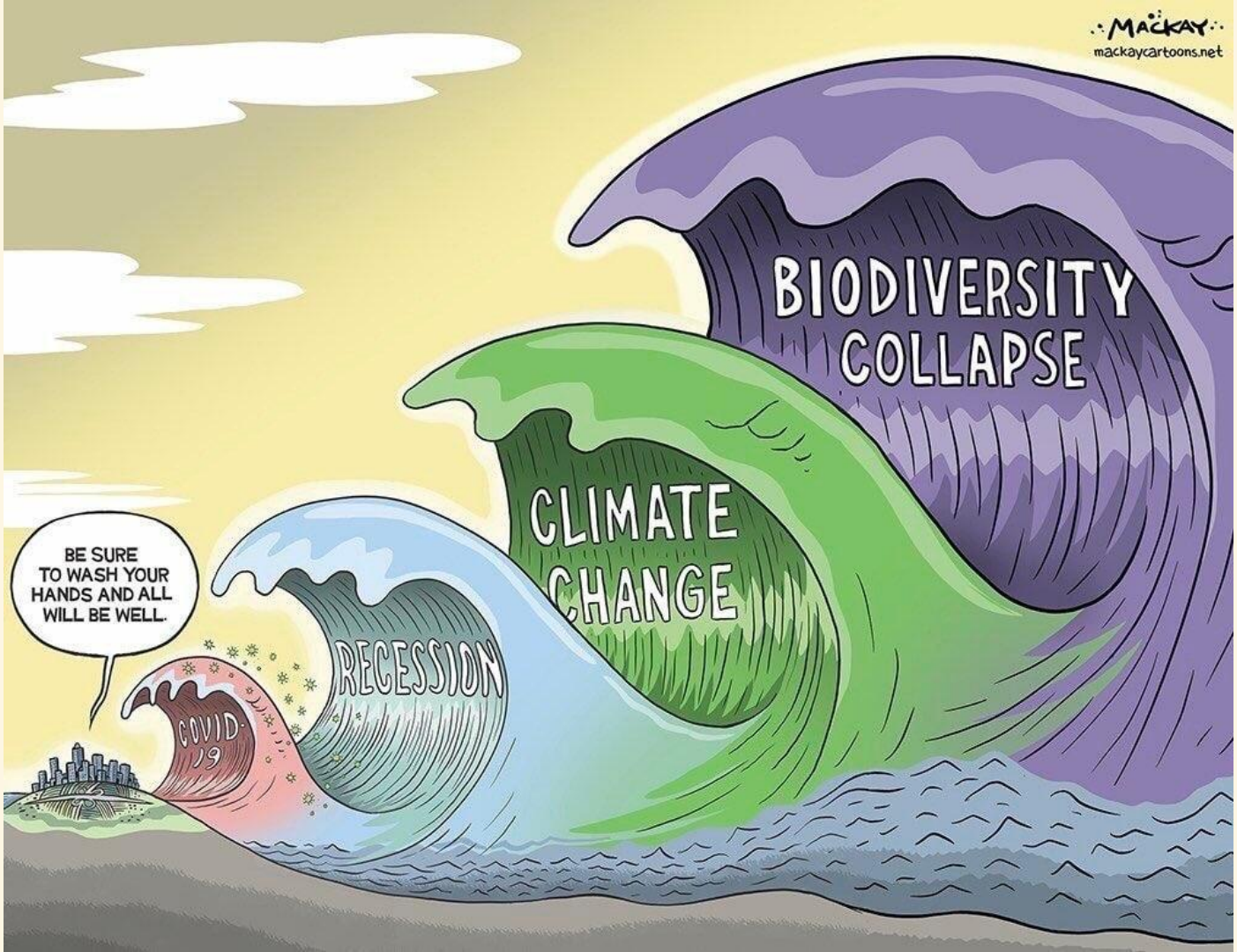
ESPM-157: Data Science for Global Change Ecology

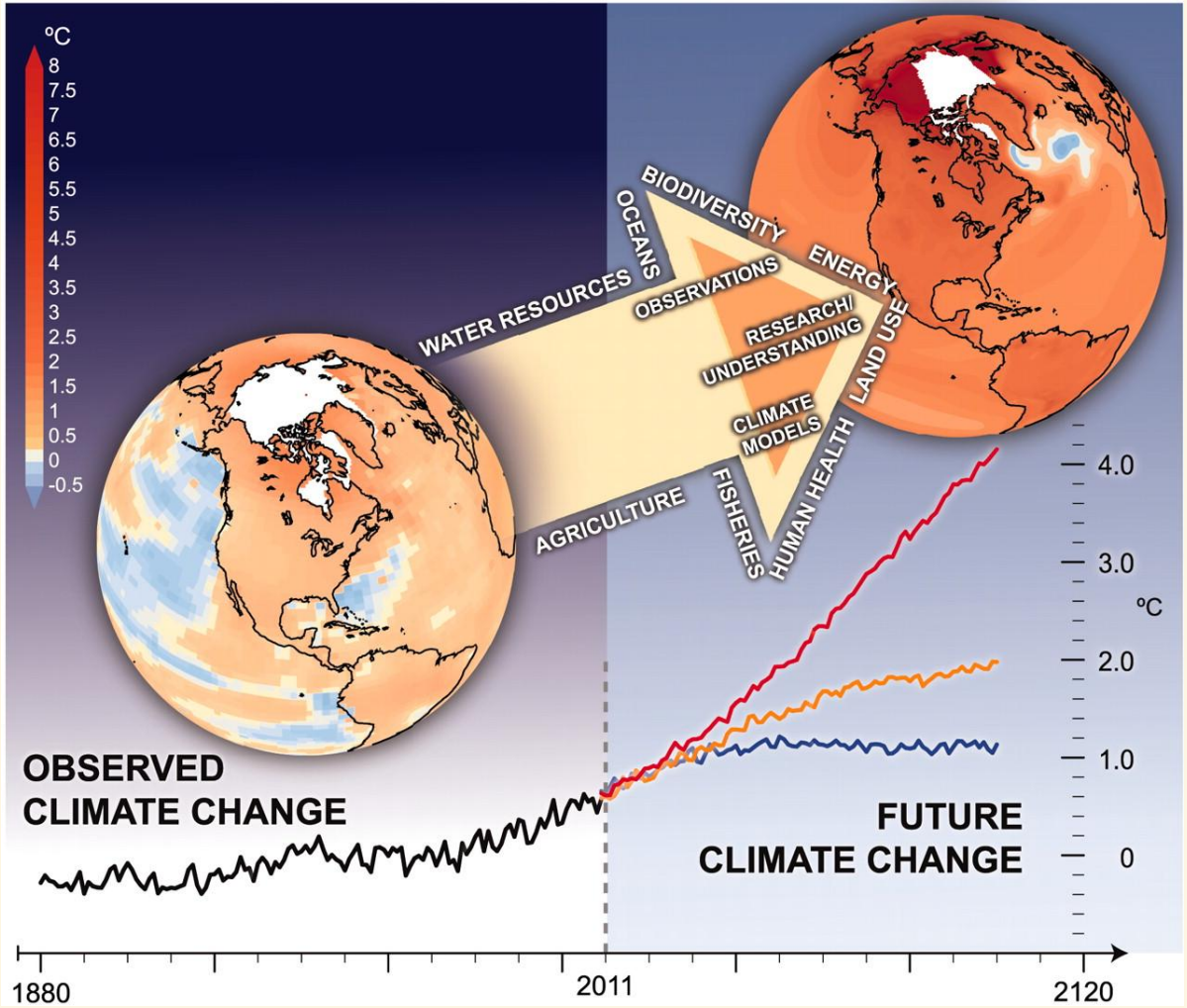


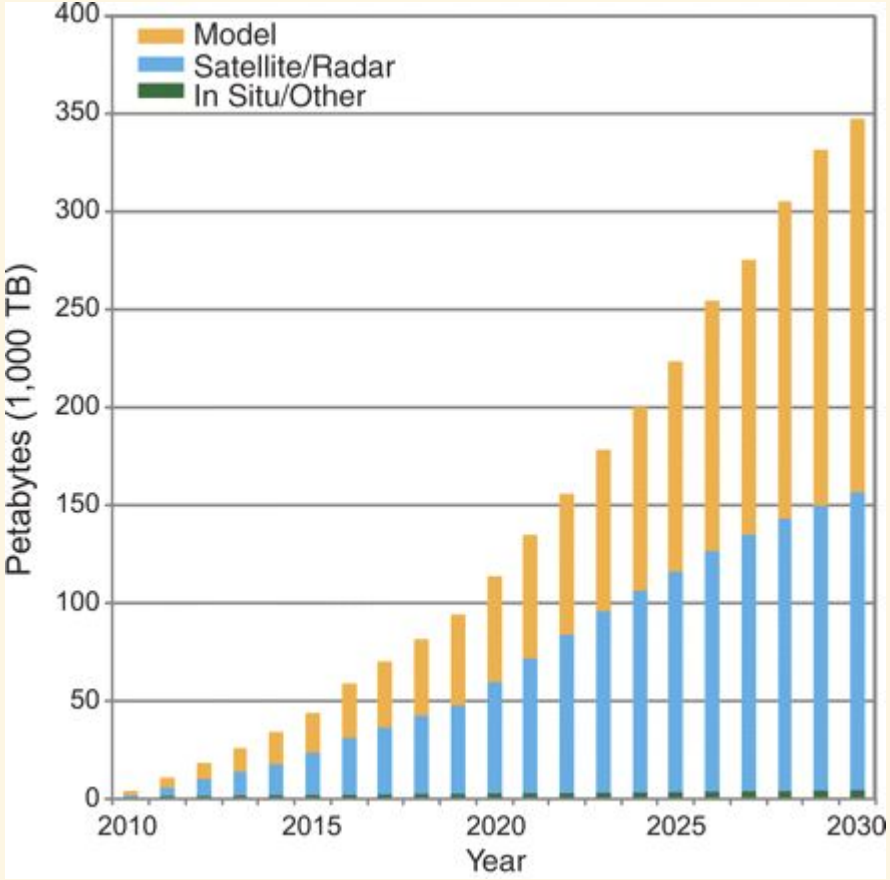
Carl Boettiger


MACKAY
mackaycartoons.net
BIODIVERSITY COLLAPSE
CLIMATE CHANGE
RECESSION
COVID-19
BE SURE TO WASH YOUR HANDS AND ALL WILL BE WELL.

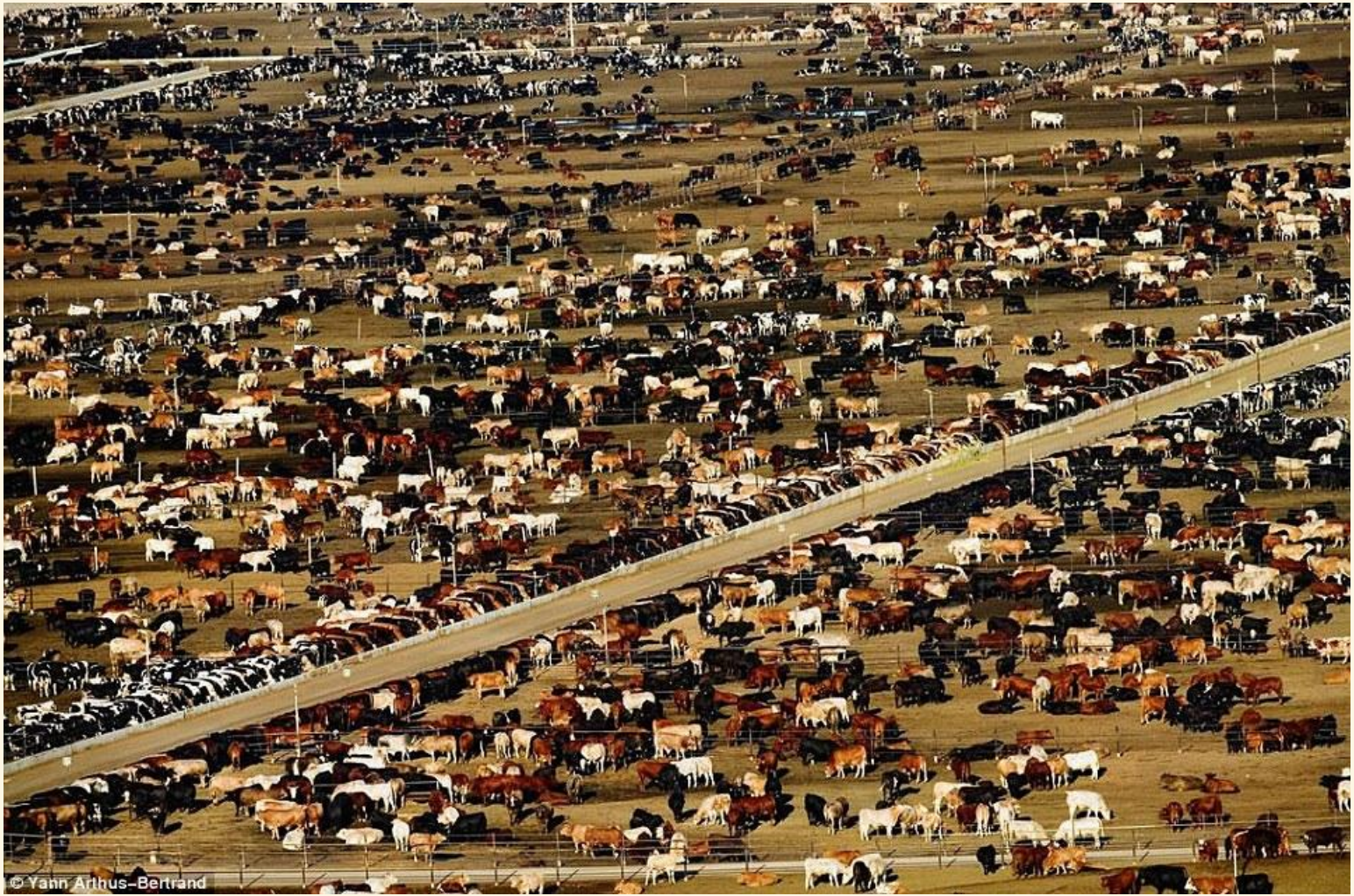
Great Challenges, Great Opportunity

ECLIPSE ce Drill


°C
8
7.5
7
6.5
6
5.5
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
-0.5
OCEANS
BIODIVERSITY
ENERGY
LAND USE
HUMAN HEALTH
FISHERIES
AGRICULTURE
WATER RESOURCES
OBSERVATIONS
RESEARCH/
UNDERSTANDING
CLIMATE
MODELS
OBSERVED
CLIMATE CHANGE
FUTURE
CLIMATE CHANGE
4.0
3.0
°C
2.0
1.0
0
1880
2011
2120


Model
Satellite/Radar
In Situ/Other
Petabytes (1,000 TB)
400
350
300
250
200
150
100
50
0
2010
2015
2020
2025
2030
Year

PHYSICAL WORLD
Sensor
Processing
Communication
Storage
0101
1010
0110
INFORMATION
PHYSICAL WORLD
Sensor
Sensor
Sensor
Sensor
Processing
Communication
Storage
0101
1010
0110
INFORMATION


© Yann Arthus-Bertrand

of the time he was around (but none with tail raised like the one I saw & drew on Feb. 21, p. 47). We certainly gave an R from an St. partridge like the one I drew on Feb. 22, p. 50. Once he went into an even more extreme St, without call of any sort. Course ca.

Definitely hanging on the bent legs.

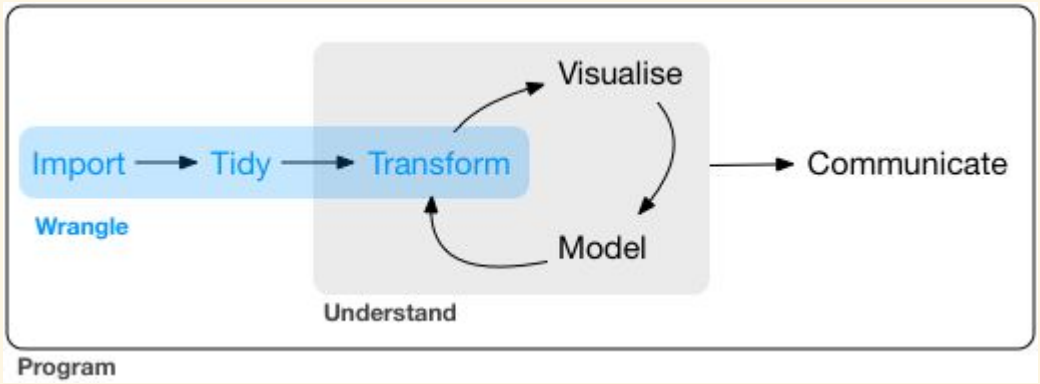
I couldn't see what caused this, or what response, if any, it induced.

Cyanerpes, I — February 25, 1958 — Bruno Colombo

The youngest of the 2 immature Blue ♂'s has been singing a lot this morning. Most (but not all) of his WS's were introduced by 1 or (more frequently 2) notes which seem to be indistinguishable from ordinary HCN's, and a few of the phrases ended with a single similar note. This would seem to indicate that the motivation of the WS contains a hostile component.

I have once seen this immature make a supplanting attack on the nest ♀ immediately after a WS, but this is the only case of the sort I ever remember observing. So the WS cannot possibly contain a relatively very strong aggressive element.

I have seen quite a number of long & violent disputes between adult Blue ♂'s (in full nuptial plumage) yesterday and


Import
Tidy
Transform
Visualise
Model
Communicate
Wrangle
Understand
Program

Tabular Data

Geospatial Data

Relational Databases

Non-rectangular Data

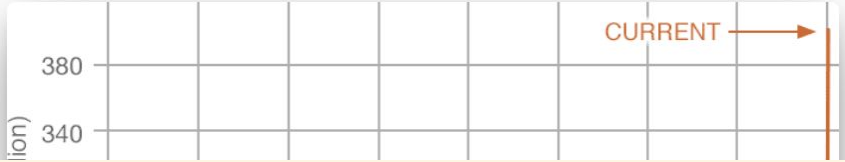
Modules

ESPM 157 HOME MODULES TUTORIALS SYLLABUS POLICIES

and communication are central elements to each module. All work should appear in professional and well documented format using RMarkdown notebooks in the project GitHub repository and pass all automated checks on Travis-CI.

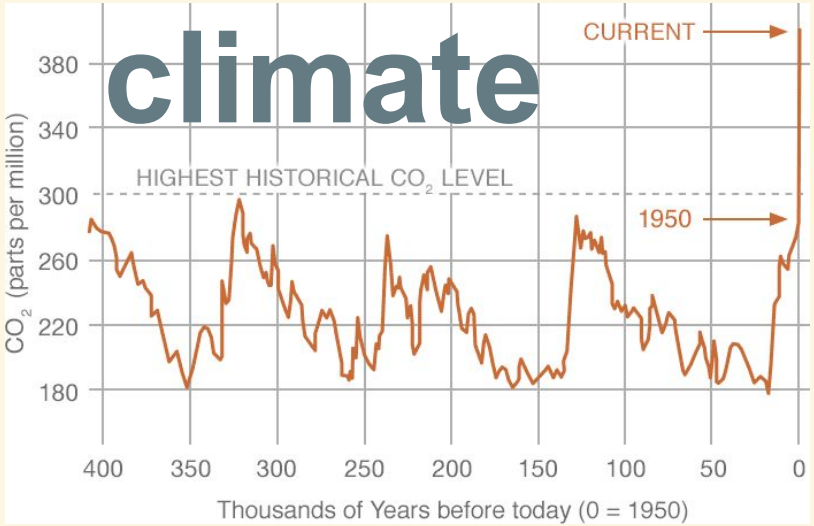
CLIMATE CHANGE OVERFISHING GEOSPATIAL MASS EXTINCTIONS

Climate Change

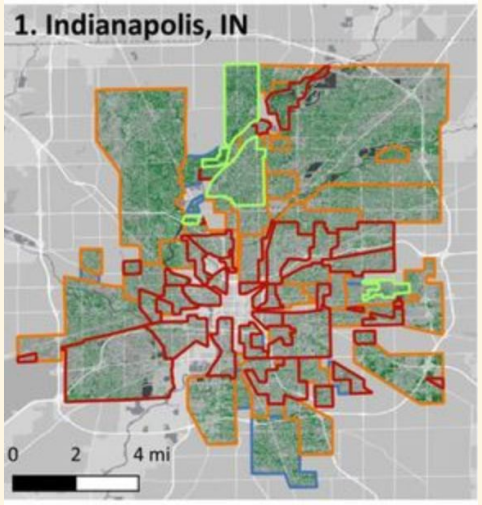


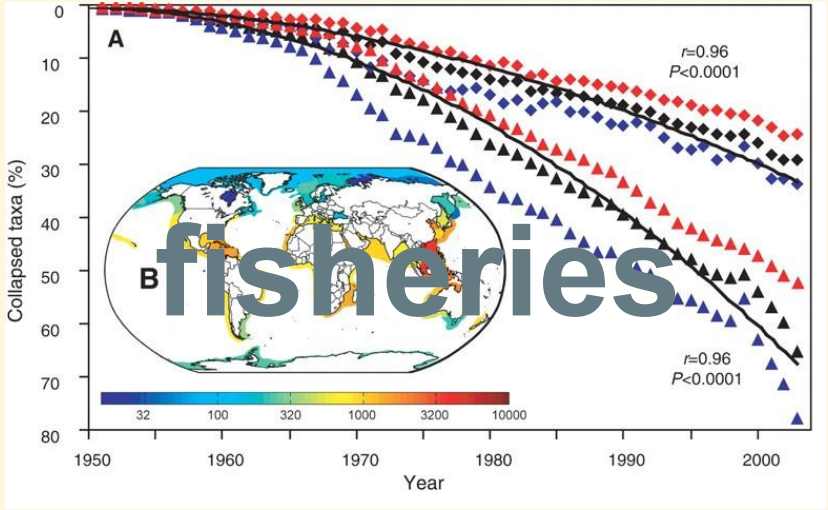
Tabular data

What is the evidence for a changing climate? In this unit, we will examine some of the most important indicators of global climate change: including CO2 concentration, global



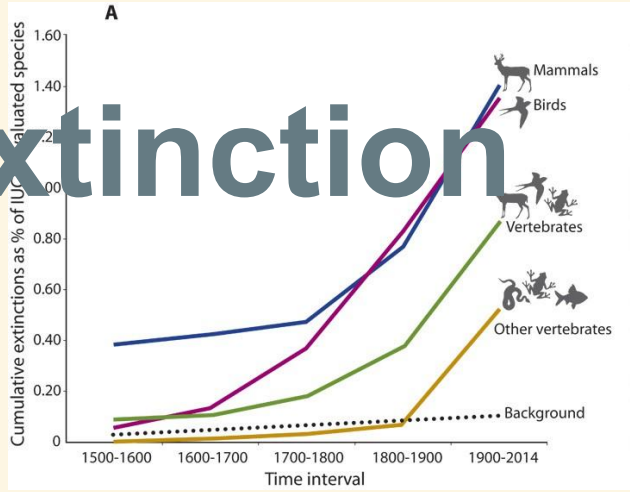
env justice



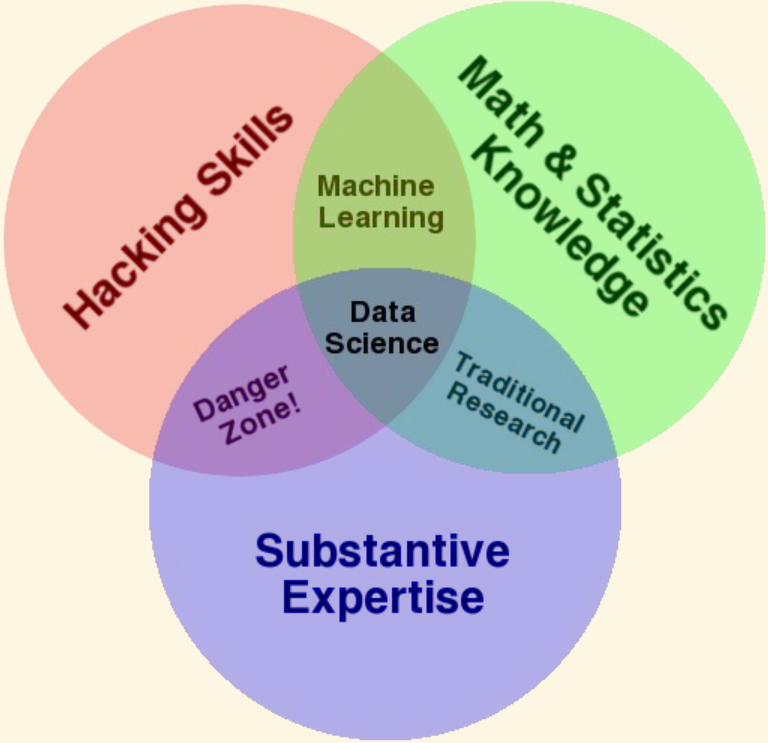


fisheries

extinction



Data Science



Imposter Syndrome

Pedagogy

- No Curves
- No prerequisites
- No purchased materials

Content

- Environmental Justice
- Works of BIPOC scholars

Pedagogy

1. Learning is an **active process** of engaging and manipulating objects, experiences, and conversations in order to build mental models of the world (Dewey, 1938; Piaget, 1964; Vygotsky, 1986).

2. Learning builds on **prior knowledge** (eg Alexander, 1996).

Pedagogy

3. It is necessary to think of learning as a **social activity** (Bransford, et al., 2006; Rogoff, 1998)

4. Learning should be situated in an **authentic context** (Greeno, 2006; Kolodner, 2006).

Pedagogy

Pedagogy

Active Learning

Authentic Context

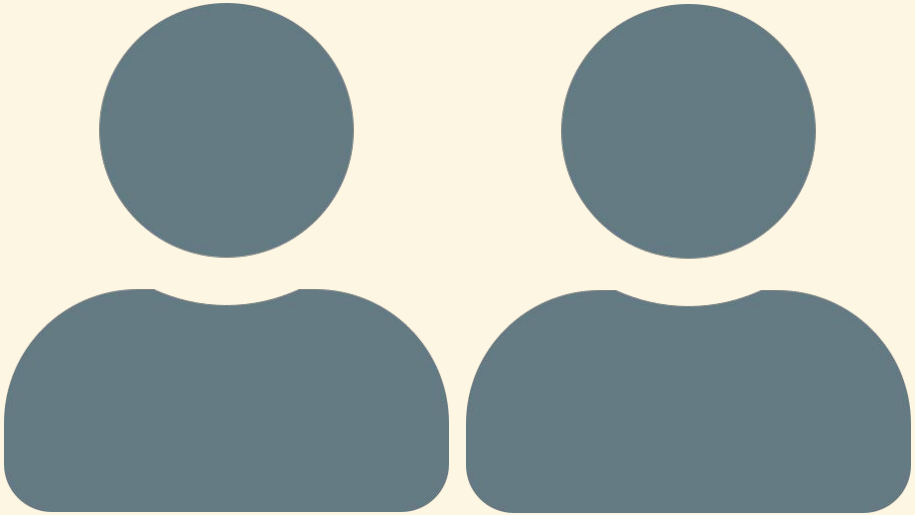
Social Context

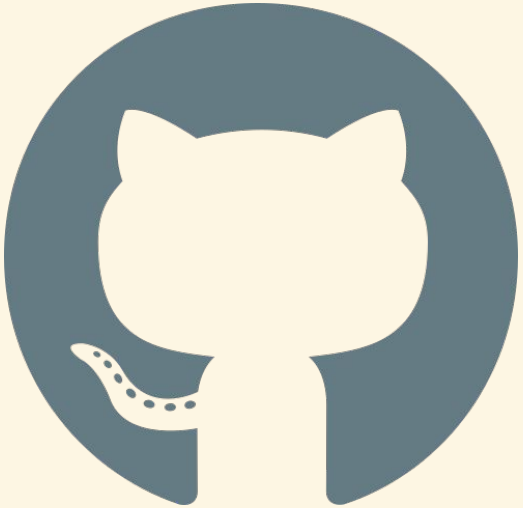
Introductions

https://espm157-fall2021.slack.com

https://espm-157.carlboettiger.info

Pair Coding





(Solarized colors reference)

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Base02: #073642
Base01: #586e75
Base00: #657b83
Base0: #839496
Base1: #93a1a1
Base2: #eee8d5
Base3: #fdf6e3

Yellow: #b58900
Orange: #cb4b16
Red: #dc322f
Magenta: #d33682
Violet: #6c71c4
Blue: #268bd2
Cyan: #2aa198
Green: #859900