

Anthropogene Gefährdungsfaktoren der Biodiversität auf globaler Ebene



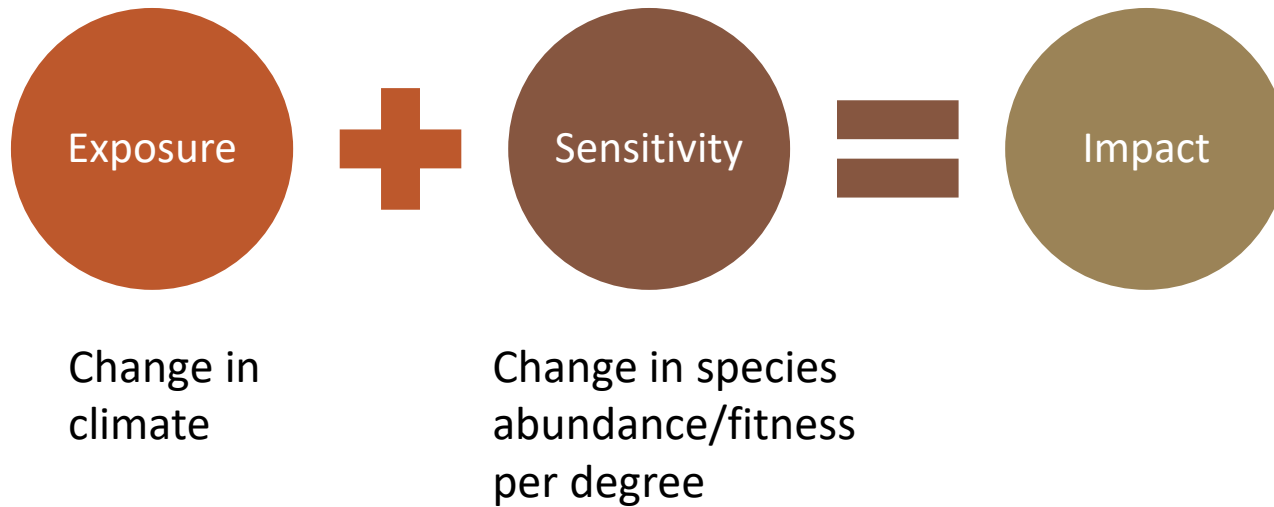
Bowler, D.E., Bjorkman, A.D., Dornelas, M., Myers-Smith, I., Navarro, L.M., Niamir, A., Supp, S.R., Waldock, C., Winter, M., Vellend, M., Blowes, S.A., Böhning-Gaese, K., Bruelheide, H., Elahi, R., Antão, L.H., Hines, J., Isbell, F., Jones, H.P., Magurran, A.E., Cabral, J.S. & A.E. Bates. Mapping human pressures across the planet uncovers anthropogenic threat complexes. In press at *People and Nature*.

Diana Bowler, iDiv
15th January 2020

Impact framework



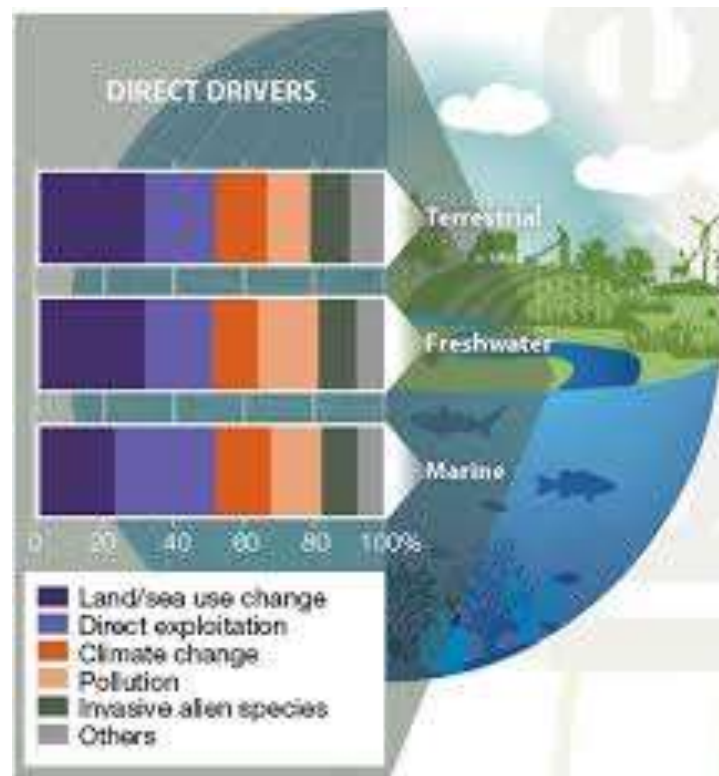
Impact framework



Impact framework



Multiple main drivers



Spatial patterns in drivers

Exposure
to climate
change

Exposure to
land use
change

Spatial patterns in drivers

Exposure
to climate
change

Exposure to
land use
change

Exposure to
land use and
climate
change

Low driver
overlap

Exposure
to climate
change

Exposure to
land use
change

High driver
overlap

Exposure to
land use and
climate
change

Easier to link
cause and effect

High potential for
interactive effects

Exposure
to climate
change

Exposure to
land use
change

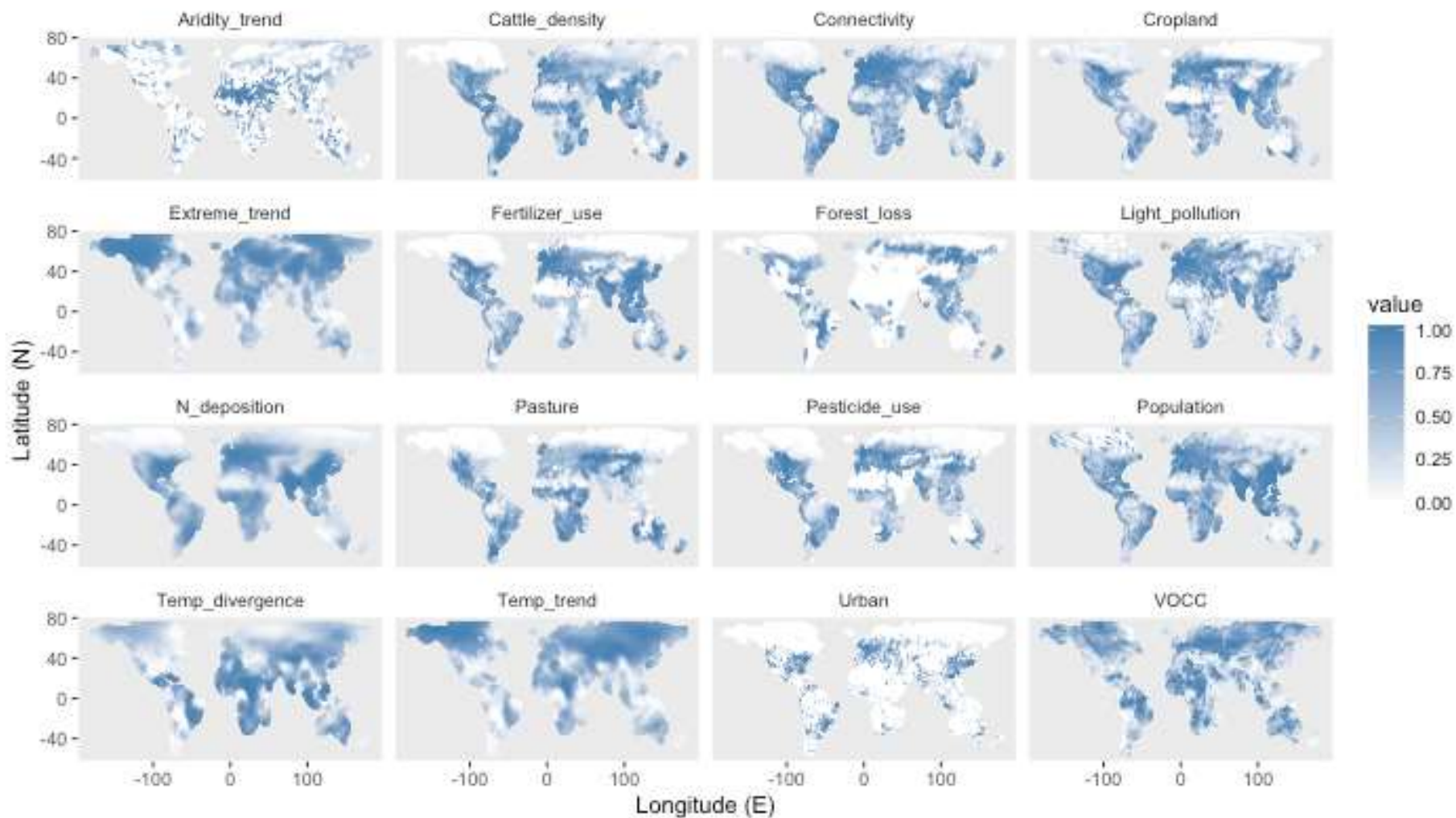
Exposure to
land use and
climate
change

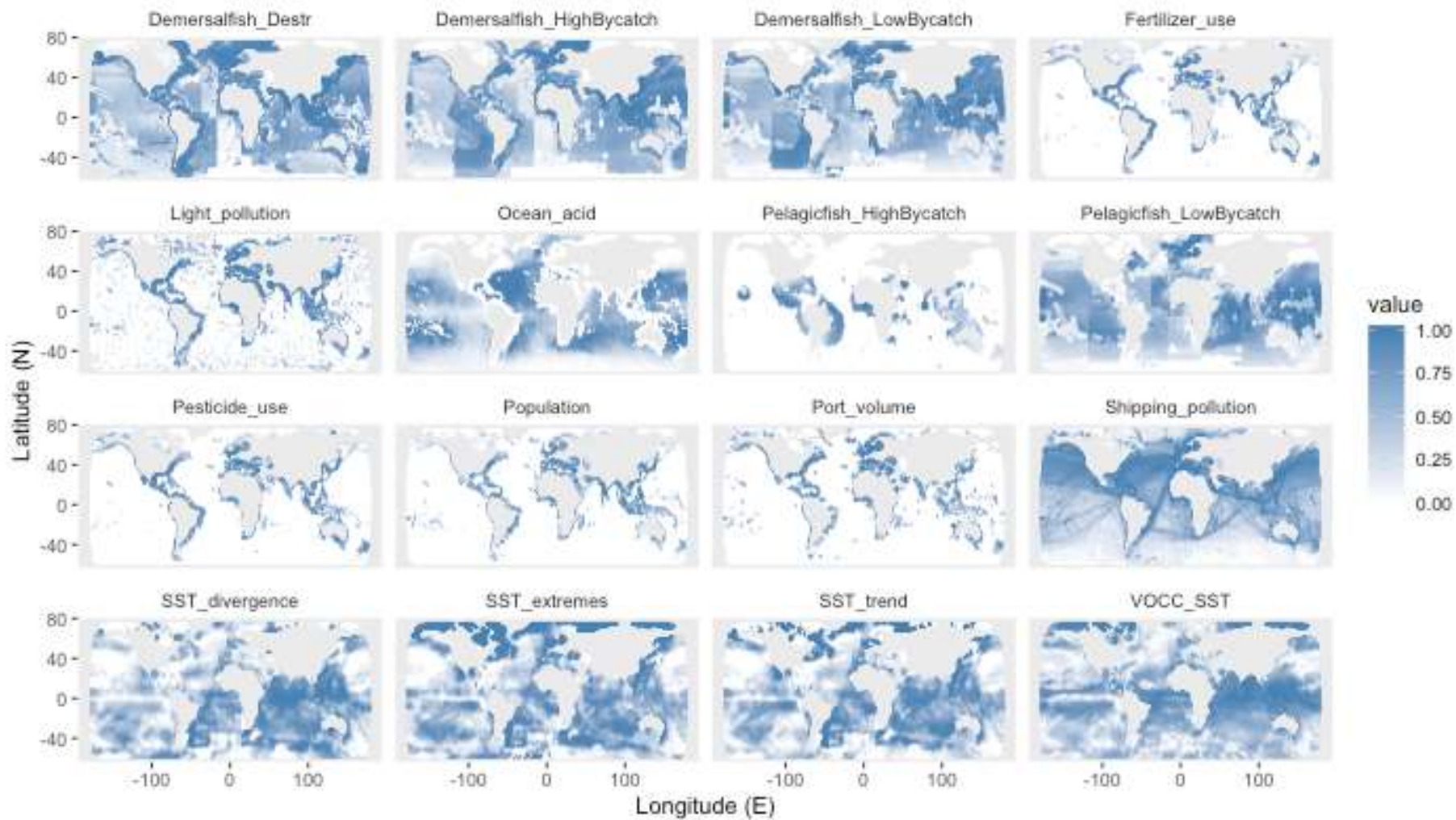
Aim of project

1. Identify which drivers spatially overlap
2. Identify relationships between climate change and other drivers
3. Identify ecoregions most at risk from multiple, overlapping drivers
4. Map regions by the typical patterns of drivers

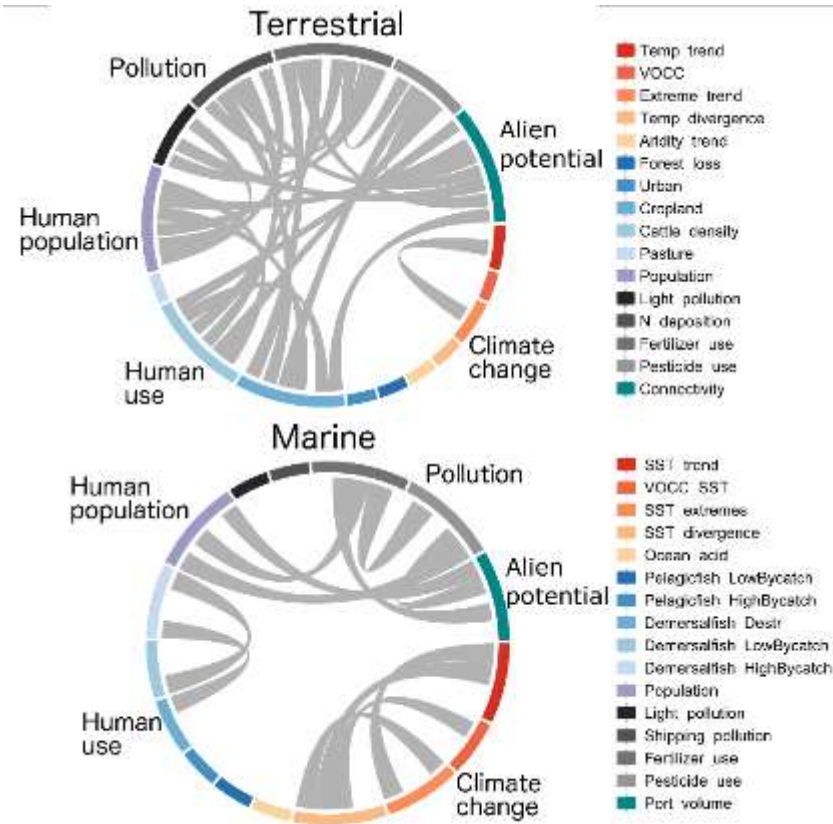
At the global level

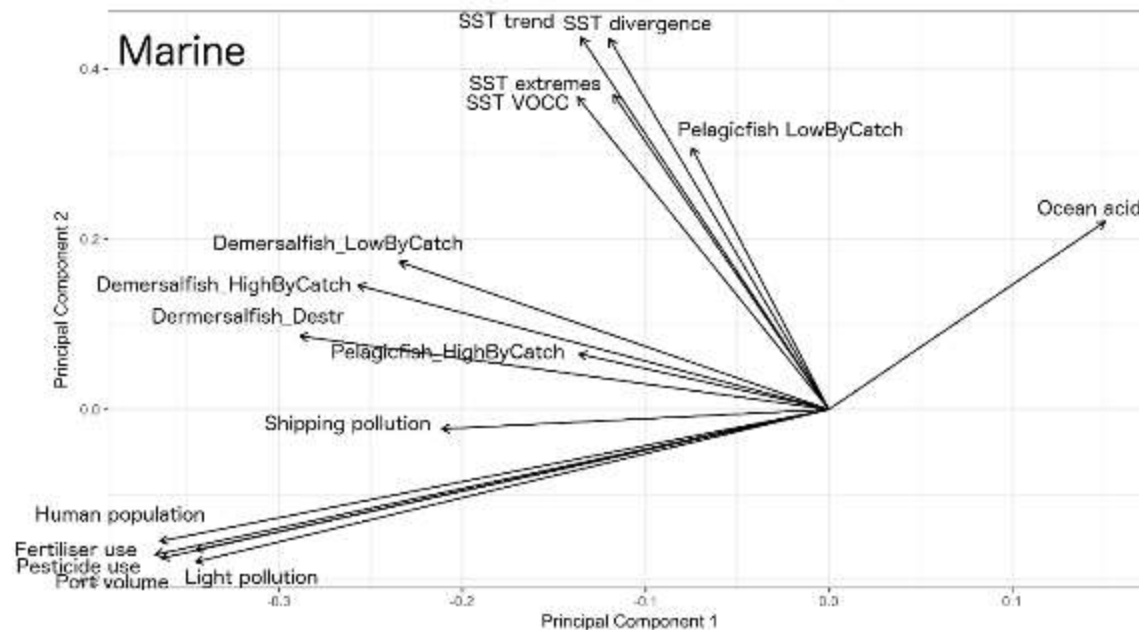
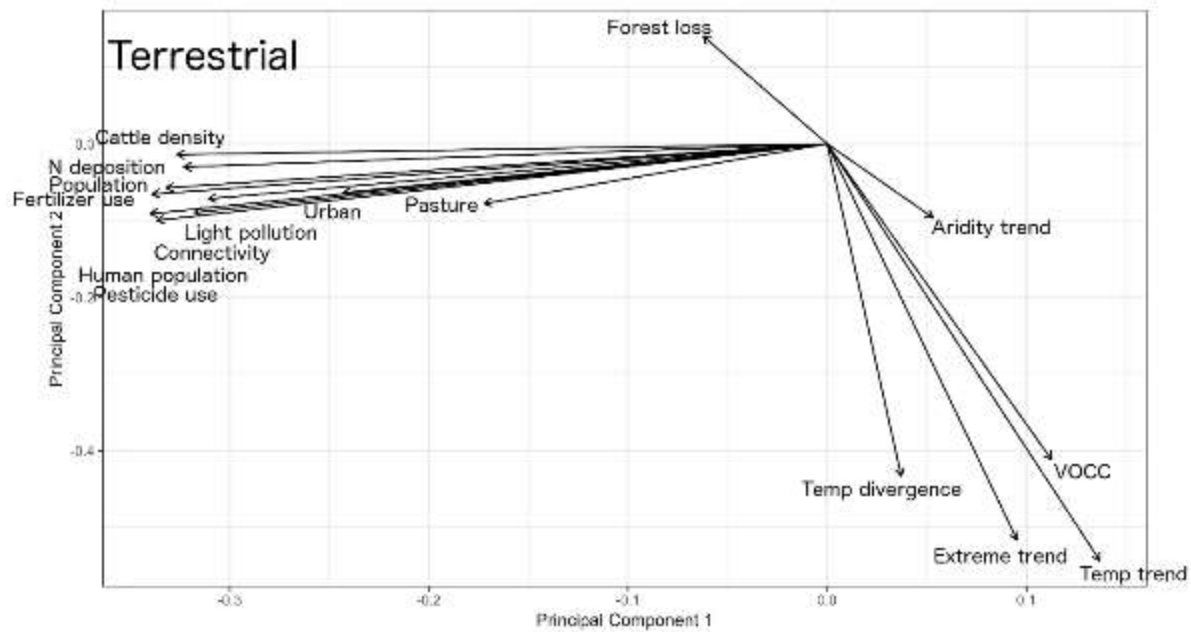
Anthropogenic driver of biodiversity change	Associated variables	
	Terrestrial	Marine
Climate Change	Temperature trend Temperature divergence Change in climate extremes Velocity of climate change Aridity trend	Temperature trend Temperature divergence Change in climate extremes Velocity of climate change Ocean acidification
Human use (land/sea use or change, resource extraction, exploitation)	Crop cover Pasture cover Urban cover Forest loss Livestock density	Destructive demersal fishing Low by-catch demersal fishing High by-catch demersal fishing Low by-catch pelagic fishing High by-catch pelagic fishing
Human population density	Population density	Coastal population density
Pollution	Atmospheric nitrogen deposition Nitrogen fertilizer application Pesticide application Light pollution	Ocean pollution Fertilizer coastal pollution Pesticide coastal pollution Light pollution
Alien potential	Connectivity (transport infrastructure)	Port cargo volume





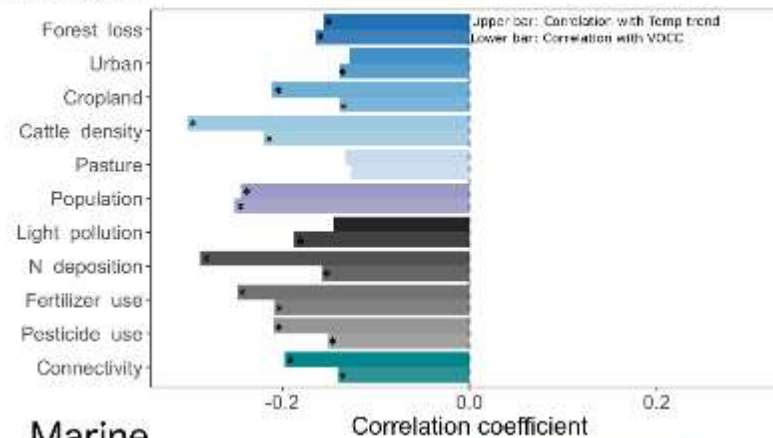
1. Identify which drivers spatially overlap



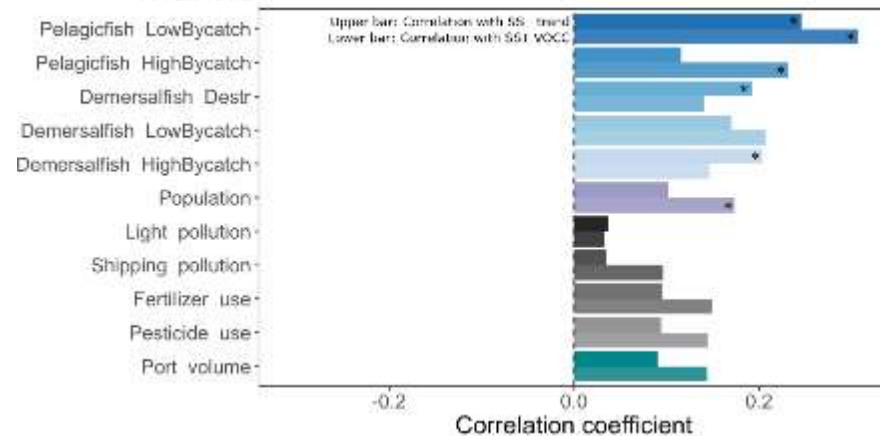


2. Identify relationships between climate change and other drivers

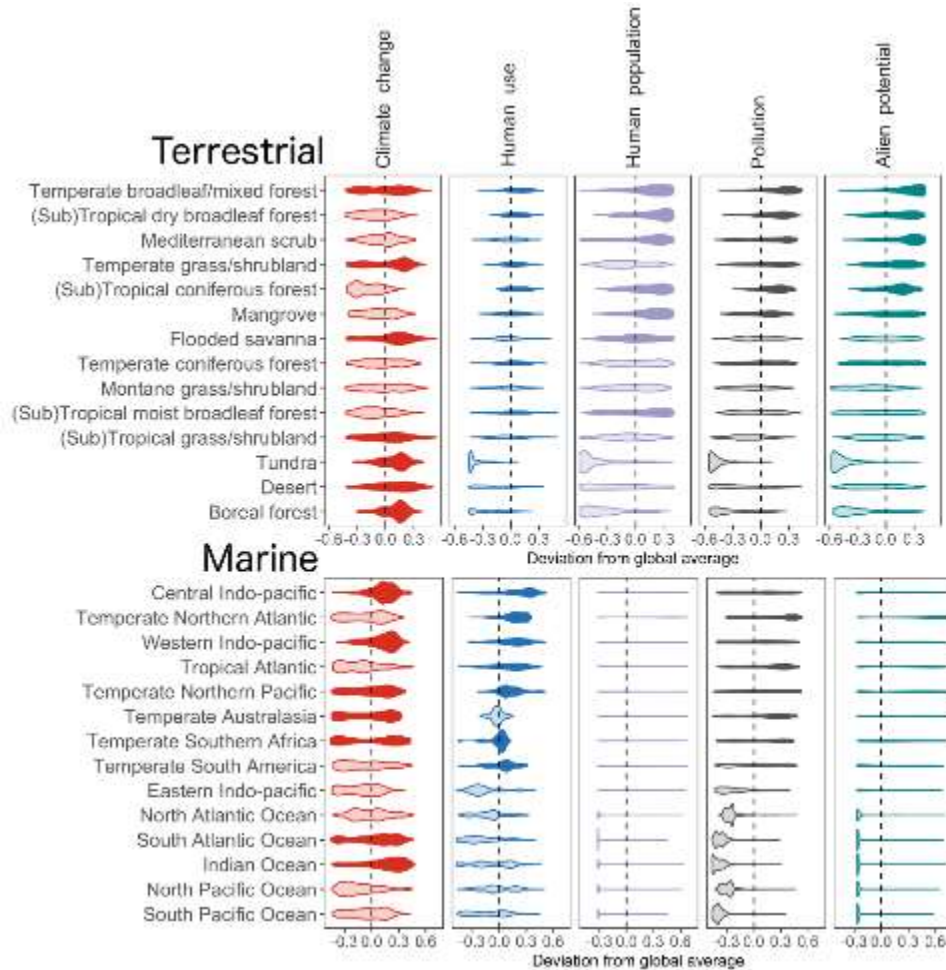
Terrestrial



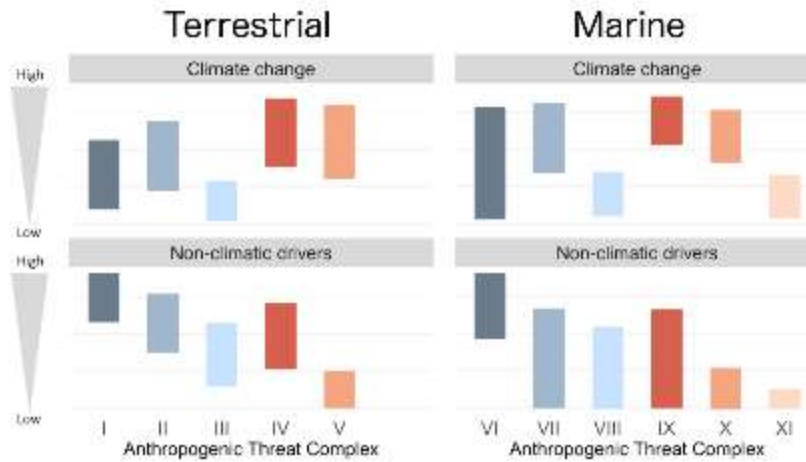
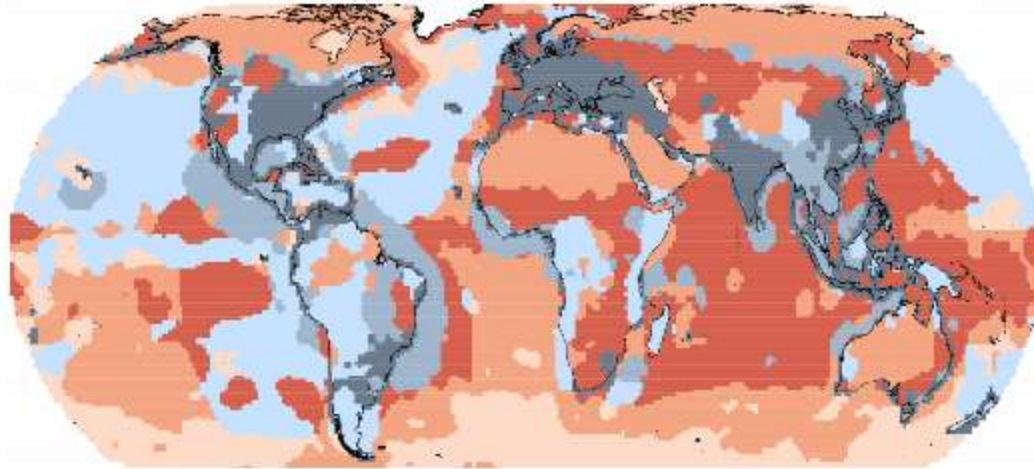
Marine



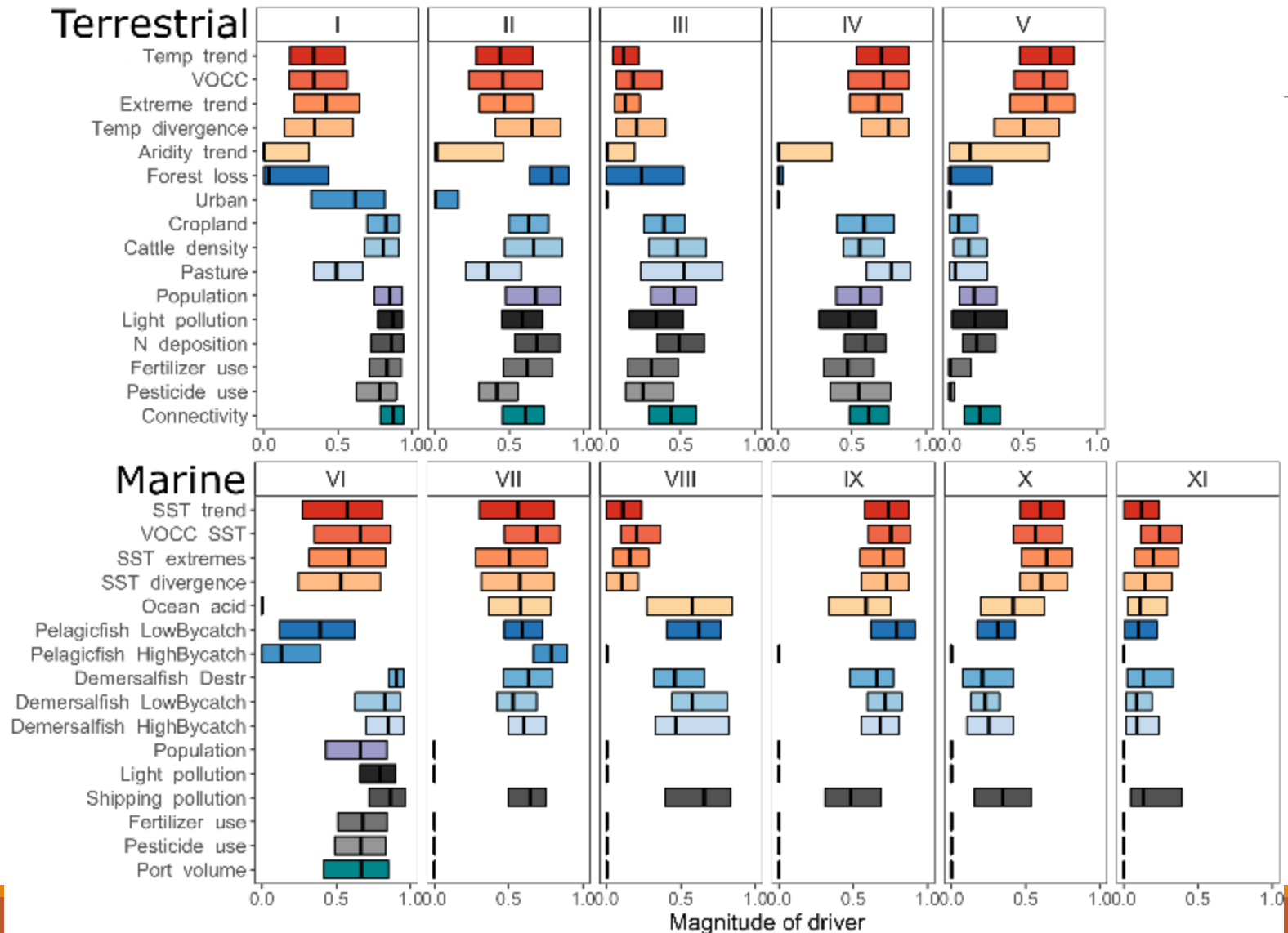
3. Identify ecoregions most at risk from multiple drivers



4. Map regions by the typical patterns of drivers



Anthropogenic threat complex



Could we do this for Germany?

Klimawandel

- Temperature change
- Other metrics

Landnutzung

- Urban cover
- Agricultural cover

Ressourcenausbeutung

- Crop types??

biologische Invasionen

- Alien plant density?

Umweltverschmutzung

- Nitrogen?
- Pesticides?

Possible use:

1. Causal analysis – link with biodiversity data

- Identify regions with one driver to study the unique effects of that driver
- Or regions with multiple drivers to study interactions

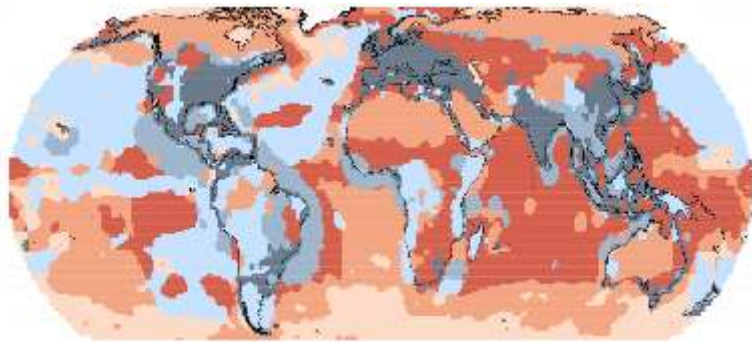
Exposure to
climate
change

Exposure to
land use change

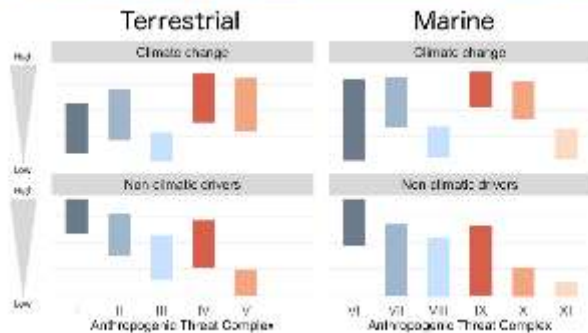
Exposure to
land use and
climate change

Possible use:

2. Monitoring design/Sampling representativeness



Stratify sampling by habitat but also by patterns of disturbance



Are we sufficiently sampling anthropogenic environmental changes?

Could we do this for Germany?

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- Other metrics

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- Urban cover
- Agricultural cover

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