Section 1.1: Accounting of ecosystems and ES (physical and biodiversity indicators)	
Elena Bukvareva (BCC, Moscow)	Biodiversity Indicators in the Experimental Ecosystem Accounting in Russia: Experience of the TEEB-Russia 2 Project
Tatiana Sviridova (BCC, IPEE RAS, Moscow), Michail Kalyakin (MSU, Moscow) Olga Voltzit (MSU, Moscow)	Atlas of Breeding Birds of European part of Russia and testing of its data for the development of bird diversity indicators (TEEB-Russia 2)
Andrey Scherbakov, Nadezhda Lyubeznova (BCC, MSU, Moscow)	Vascular plants plants diversity as indicator of ecosystems quality in TEEB-Russia 2
Angela Lausch (UFZ, Leipzig)	Monitoring bio- geodiversity and ecosystem health by traits, remote sensing and data science approaches
Sergey Ostroumov (MSU, BCC, Moscow)	Scientific issues connected with aquatic ecosystem services and their valuation

Indicators of Ecosystem Assets in the Experimental Ecosystem Accounting in Russia: Experience of the TEEB-Russia 2 Project

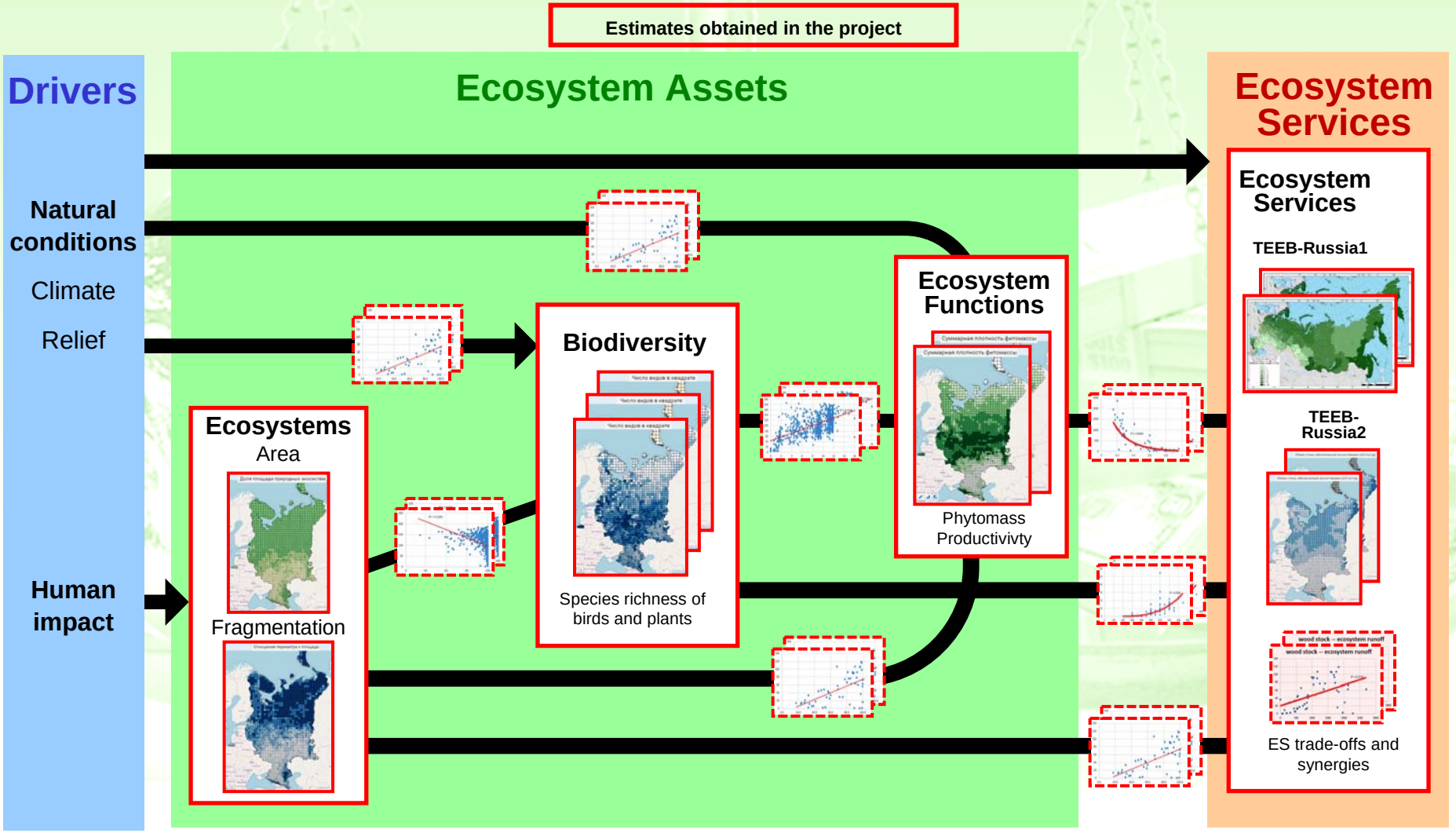
Elena Bukvareva
bukvareva@gmail.com

Biodiversity Conservation Center

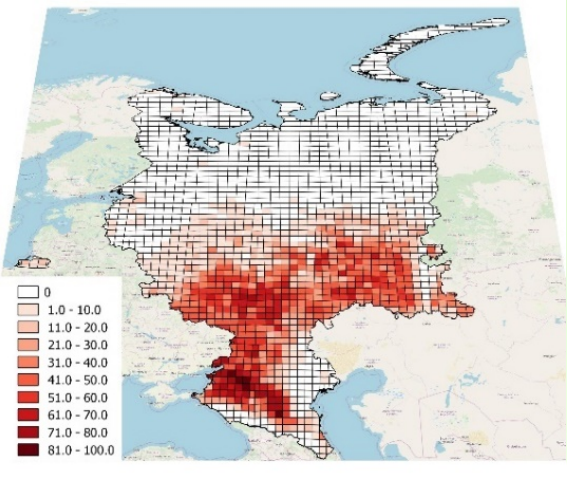
TEEB-Russia 2 (2018 - 2019)

Implementation of the System of Environmental-Economic Accounting Experimental Ecosystem Accounting (SEEA-EEA) in Russia

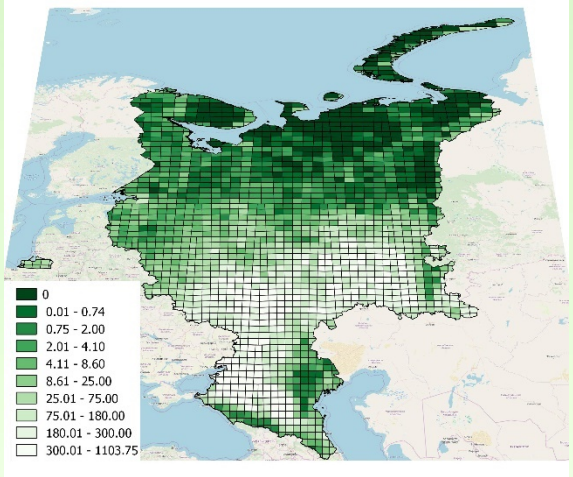
The analytical part of the project TEEB-Russia 2



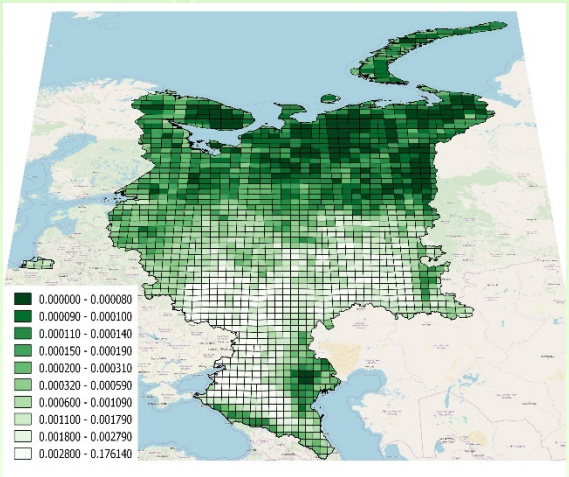
1. Area of ecosystems - Fragmentation



Proportion of area of transformed ecosystems (%)

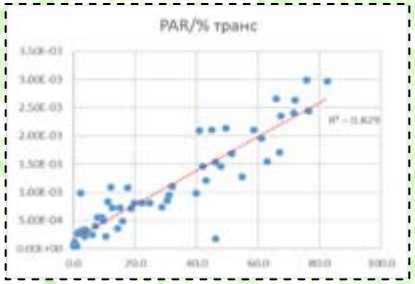


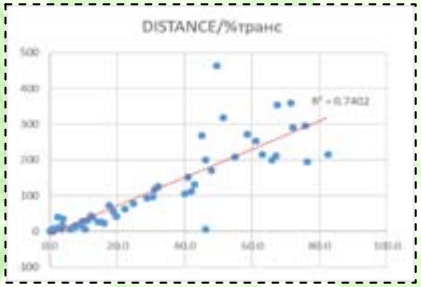
DISTANCE

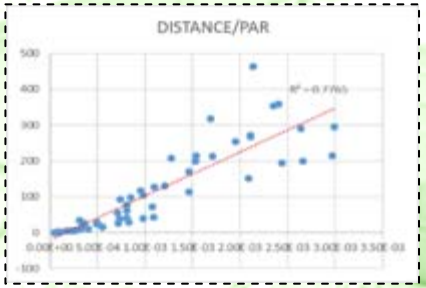


PAR

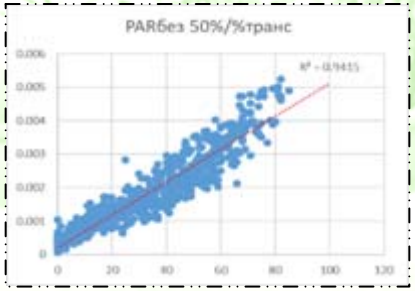
Subjects of Russia

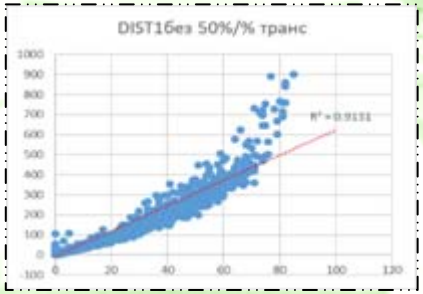


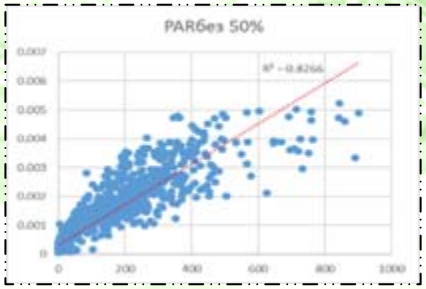




50-rm squares





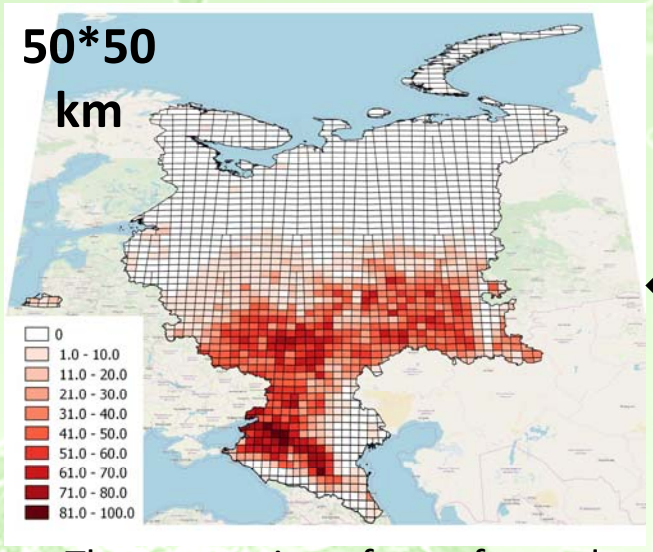


Proportion of area of transformed ecosystems (%)

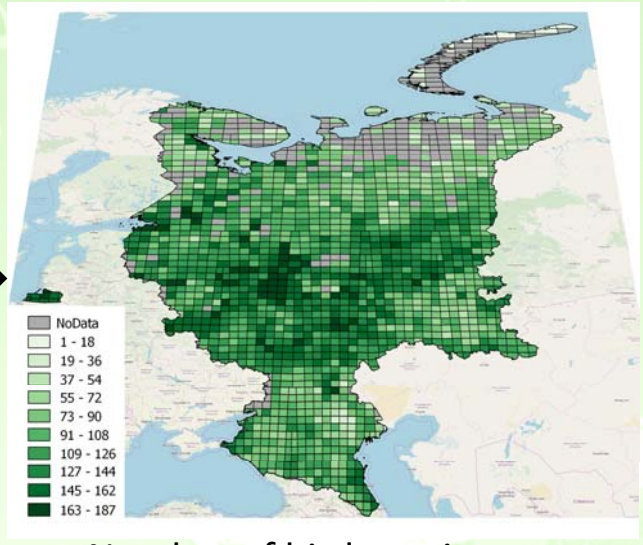
Proportion of area of transformed ecosystems (%)

PAR

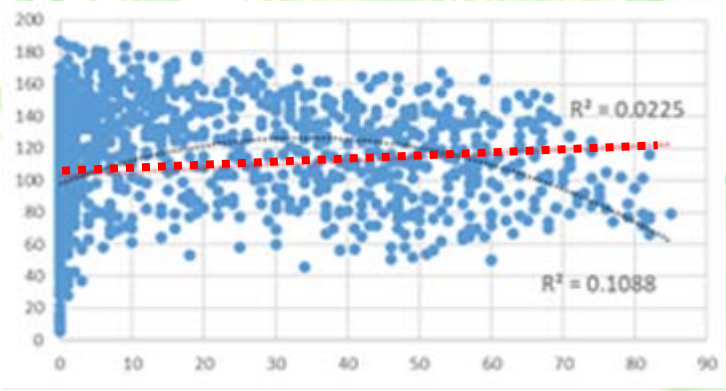
2. Transformation of ecosystems - Biodiversity



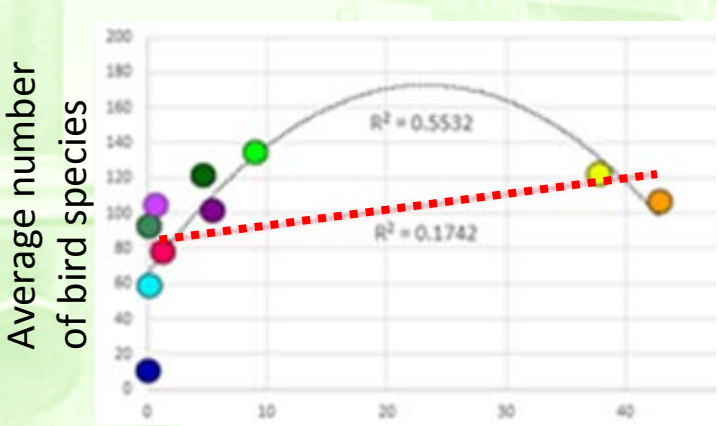
The proportion of transformed ecosystems per square (% of area)

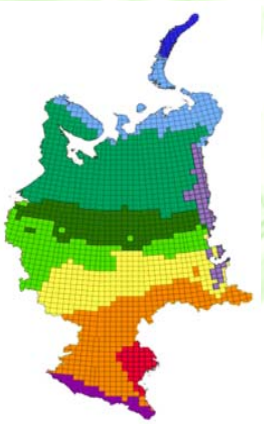


Number of bird species per square



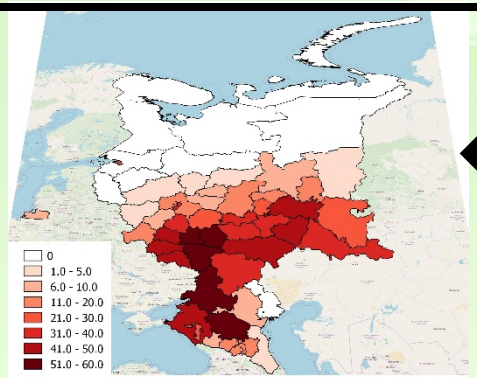
The proportion of transformed ecosystems per square



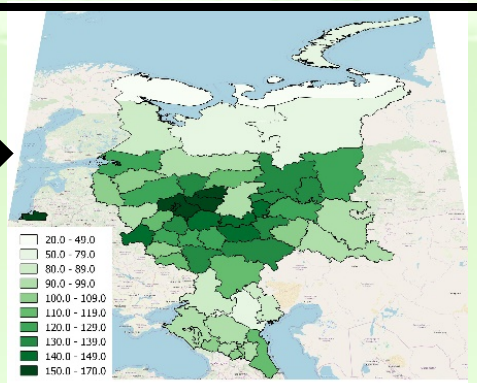


The average proportion of transformed ecosystems in ecoregions

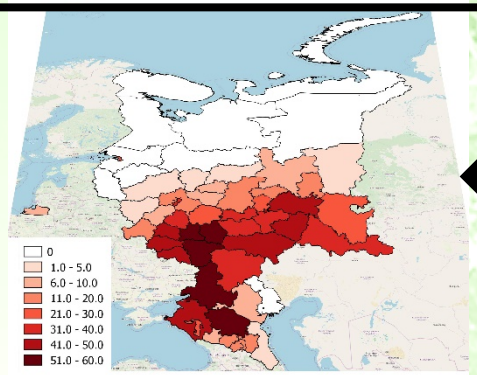
2. Transformation of ecosystems - Biodiversity



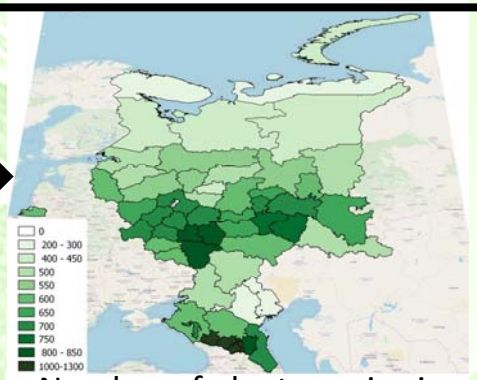
The proportion of transformed ecosystems (% of area)



Average number of bird species per square



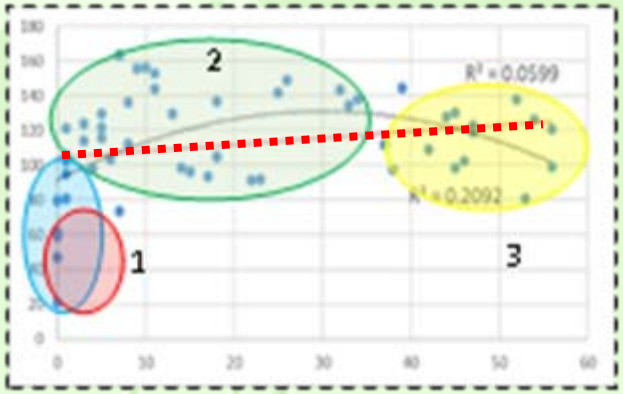
The proportion of transformed ecosystems (% of area)

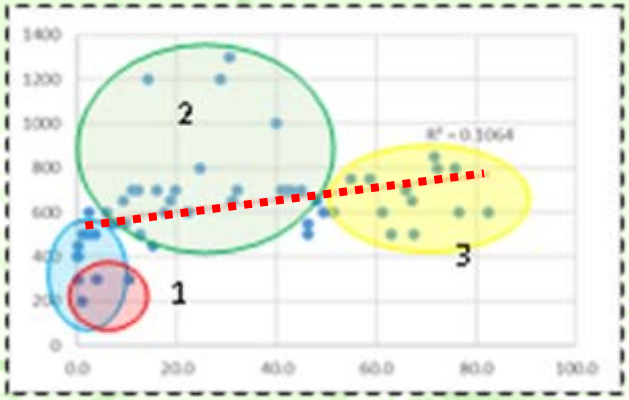


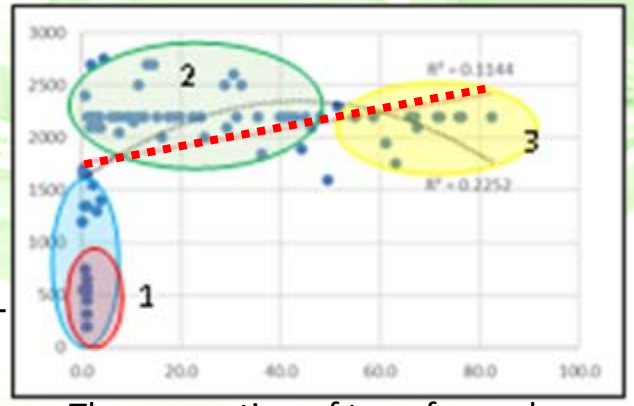
Number of plant species in local floras

The proportion of natural ecosystems (% of area)

Number of plant species per 100 000 km^2







The proportion of transformed ecosystems (% of area)

2. Transformation of ecosystems - Biodiversity

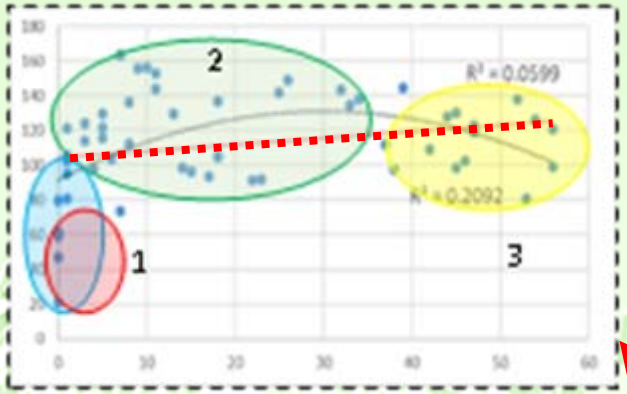
What does positive correlation mean for management:

Does transformation of ecosystems increase biodiversity?

Should we increase ecosystem transformation to support biodiversity?

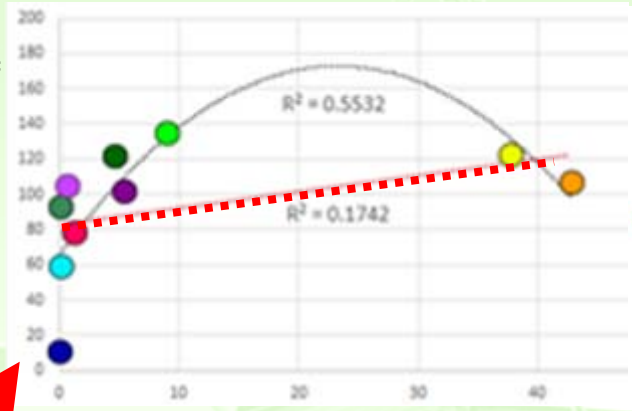
NO

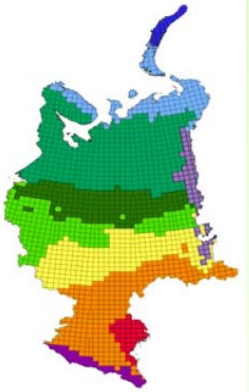
Average number of bird species



The proportion of transformed ecosystems (% of area)

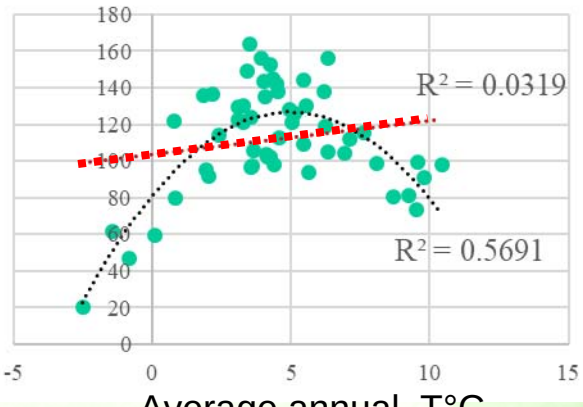
Average number of bird species





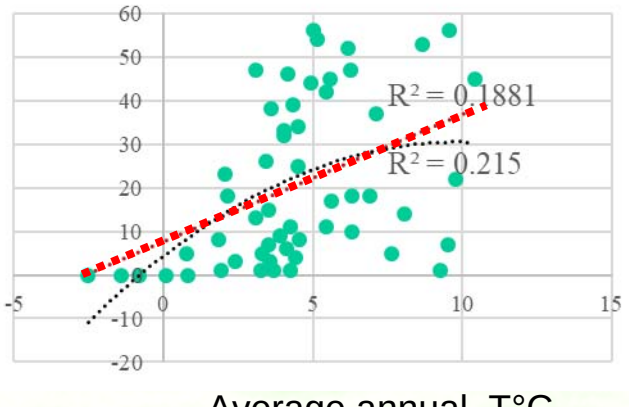
The average proportion of transformed ecosystems in ecoregions (% of area)

Average number of bird species per square



Average annual T°C

The proportion of transformed ecosystems (% of area)

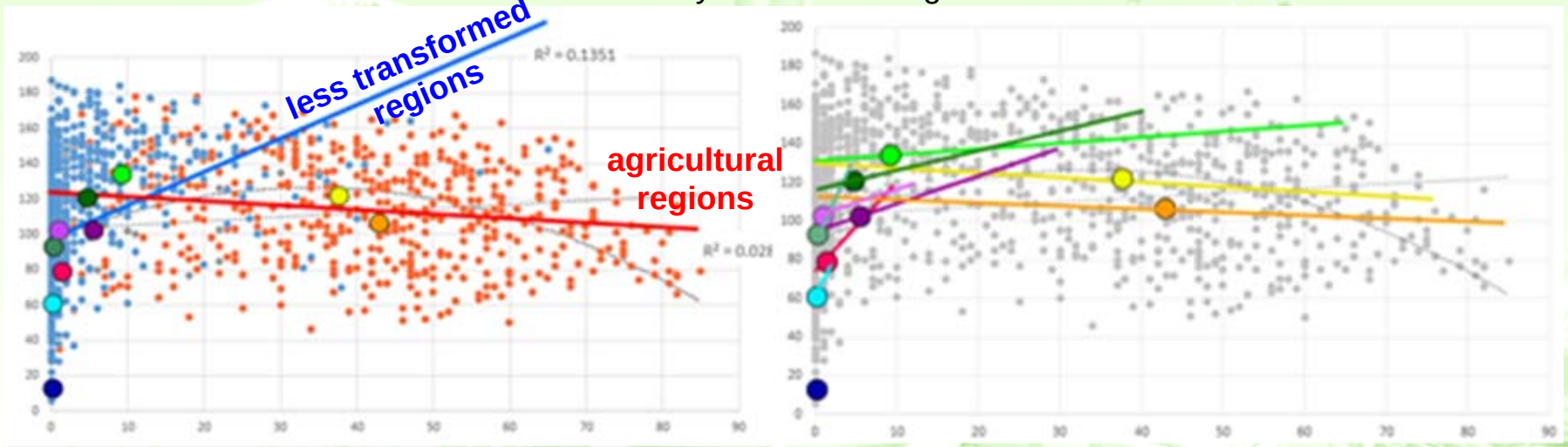


Average annual T°C

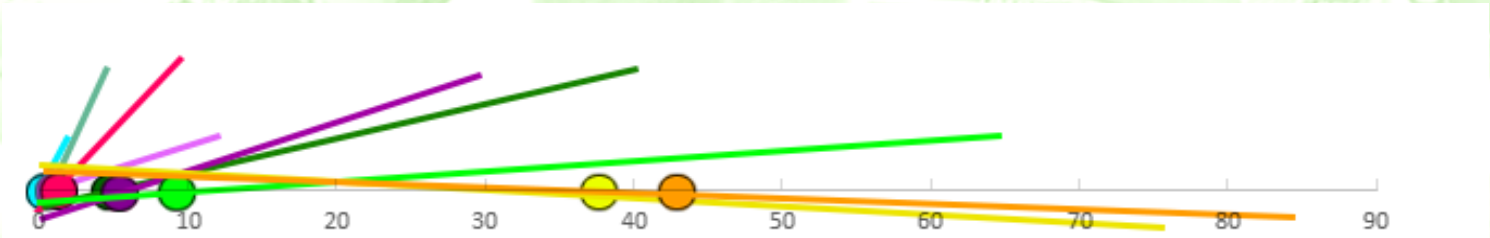
2. Transformation of ecosystems - Biodiversity

The average proportion of transformed ecosystems in ecoregions

Number of bird species

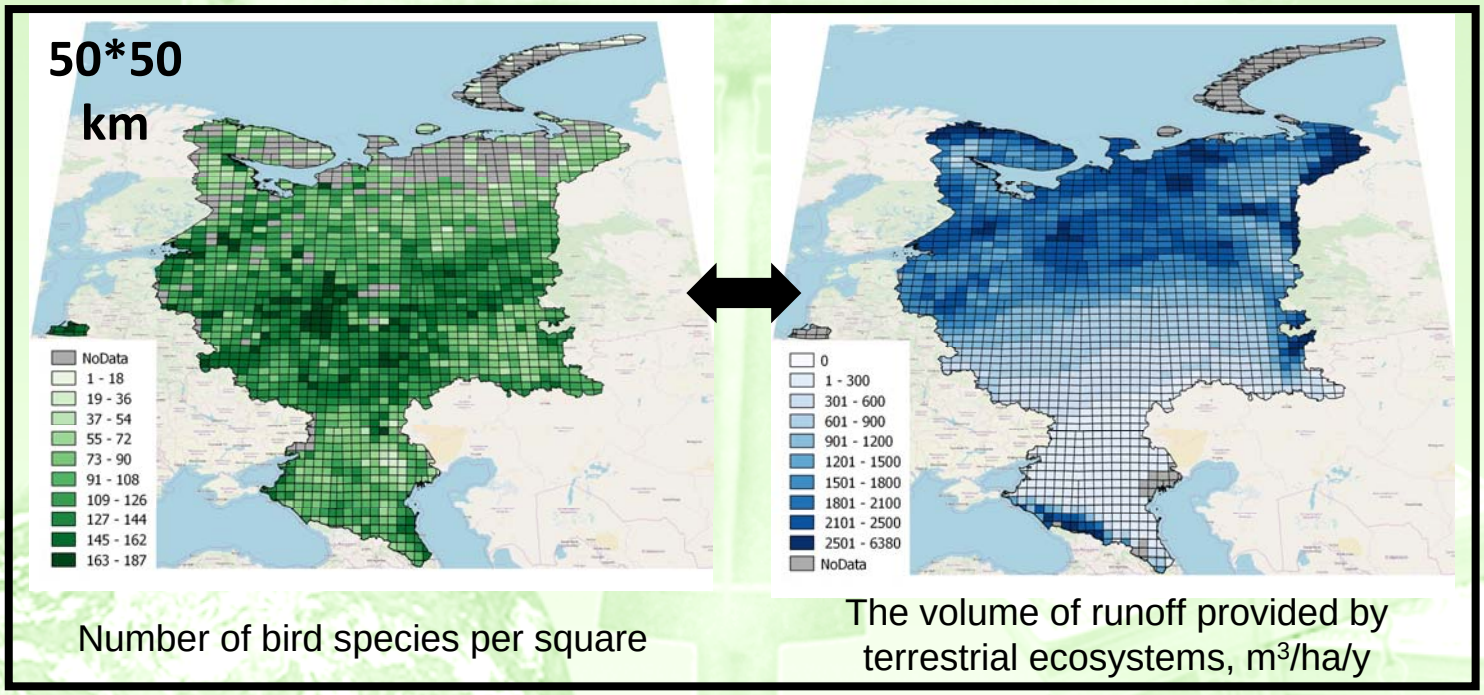


The proportion of transformed ecosystems per square



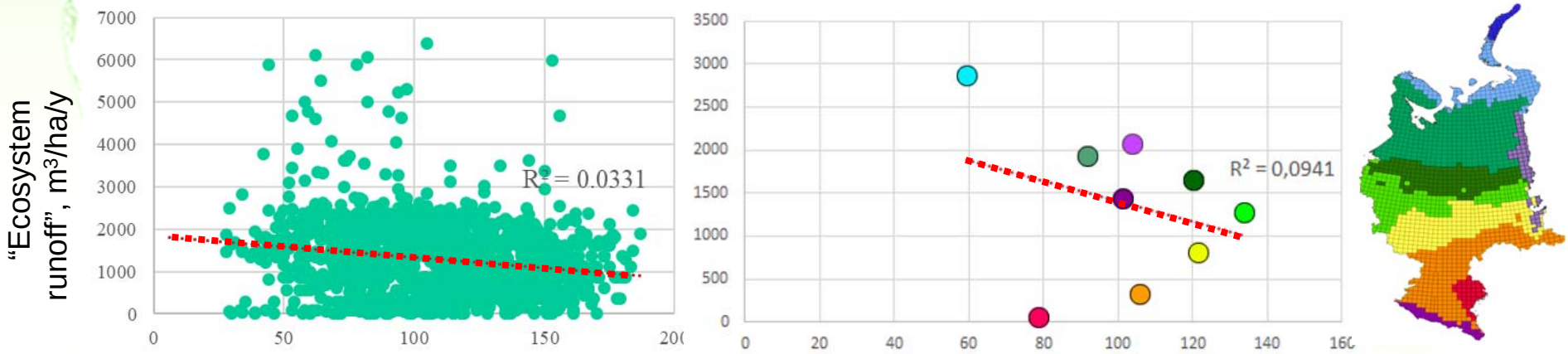
The proportion of transformed ecosystems per square

3. Biodiversity – ES (water-related)



Number of bird species per square

The volume of runoff provided by terrestrial ecosystems, $m^3/ha/y$



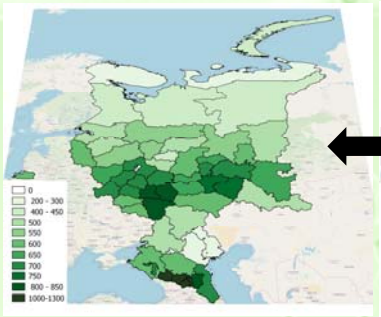
Number of bird species per square

Average number of bird species per square

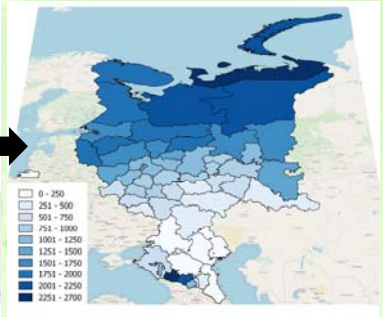
3. Biodiversity – ES (water-related)

Mean number of plant species per 100,000 km^2

"Ecosystem runoff" m^3/ha/y



Species richness of local flora

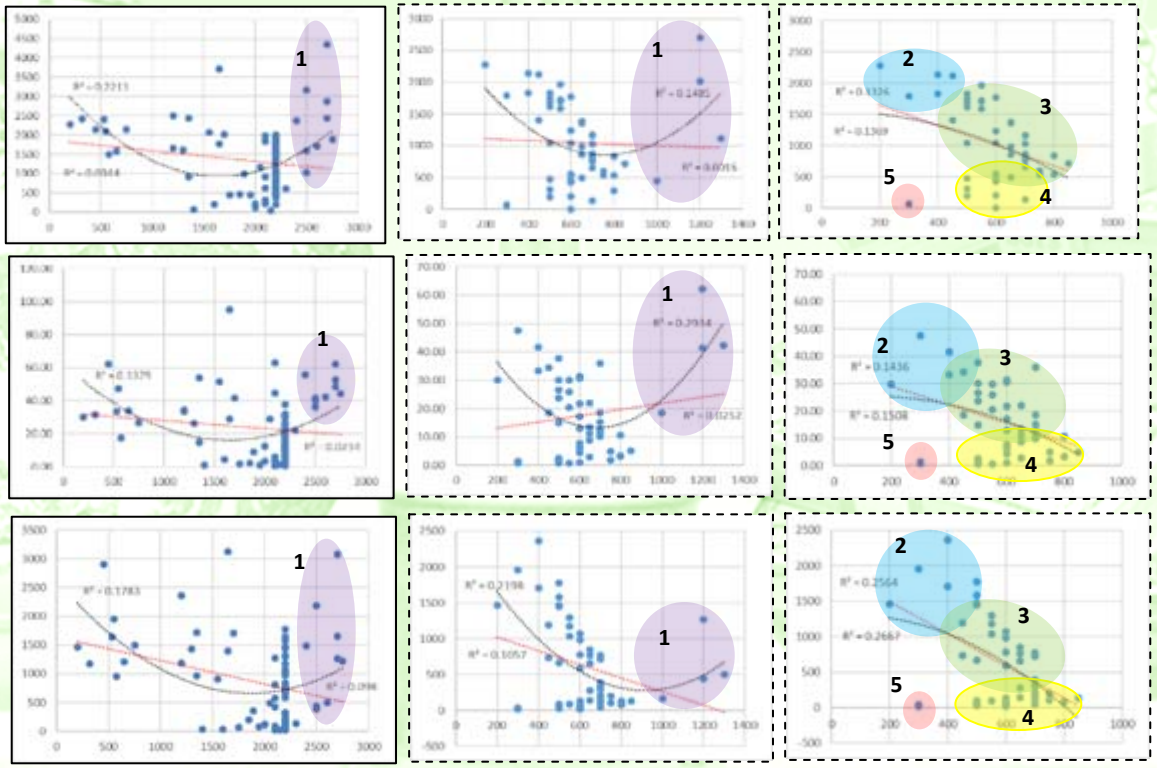


"Ecosystem runoff" m^3/ha/y

"Ecosystem runoff", m^3/ha/y

Wastewater purification by freshwater ecosystems, m^3/ha/y

Ensuring the quality of runoff by terrestrial ecosystems, m^3/ha/y



Mean number of plant species per 100,000 km^2

Species richness of local flora

Species richness of local flora

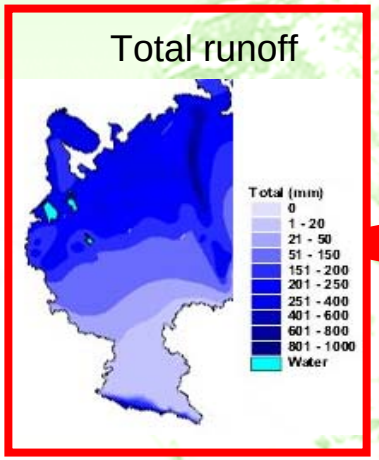
3. Biodiversity – ES (water-related)

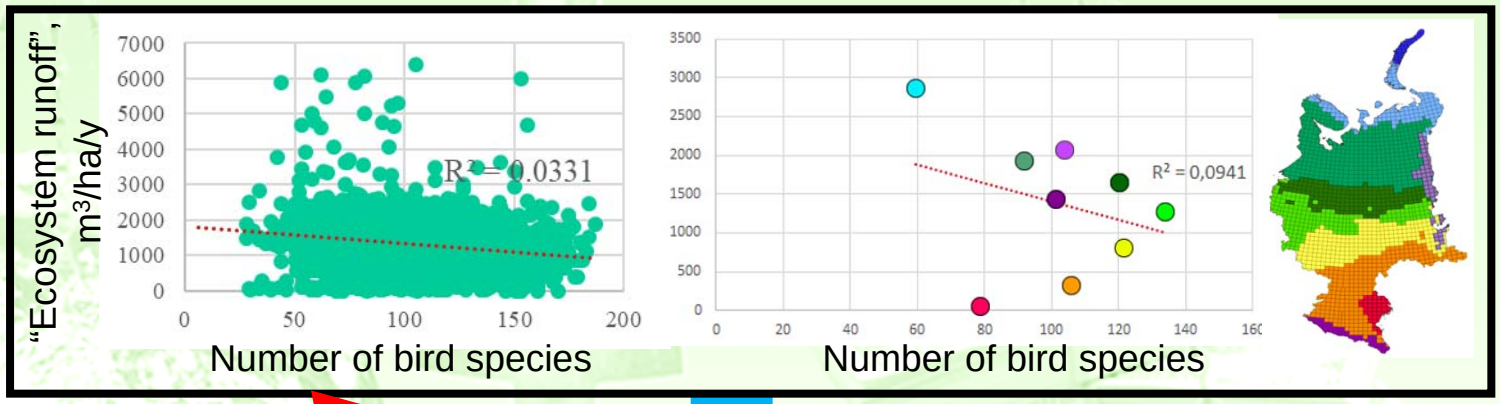
What does negative correlation mean for management:

Does biodiversity decrease water regulating ES?

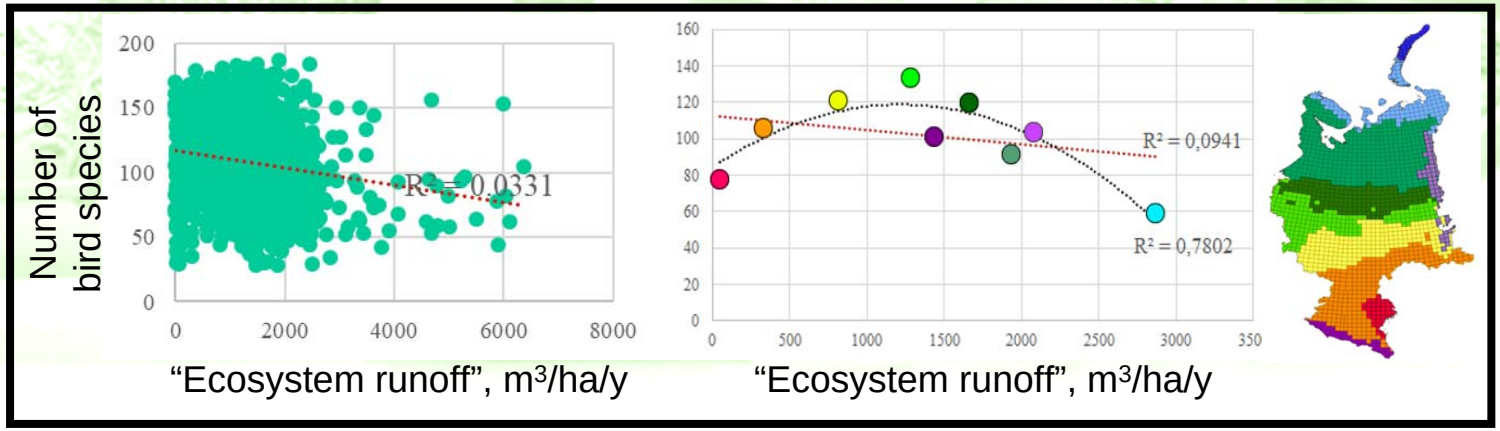
Should we decrease biodiversity to support water regulating ES?

NO

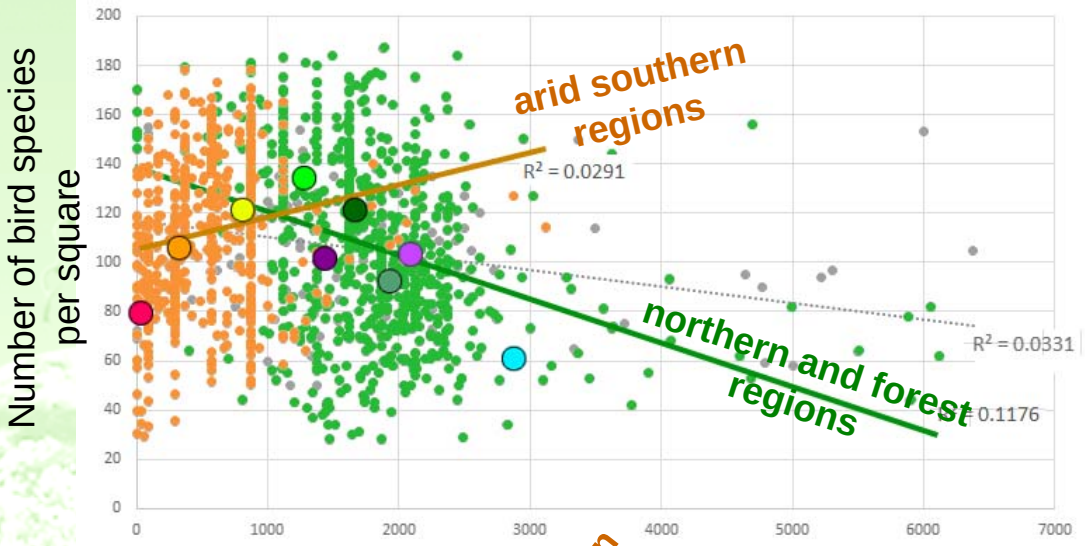


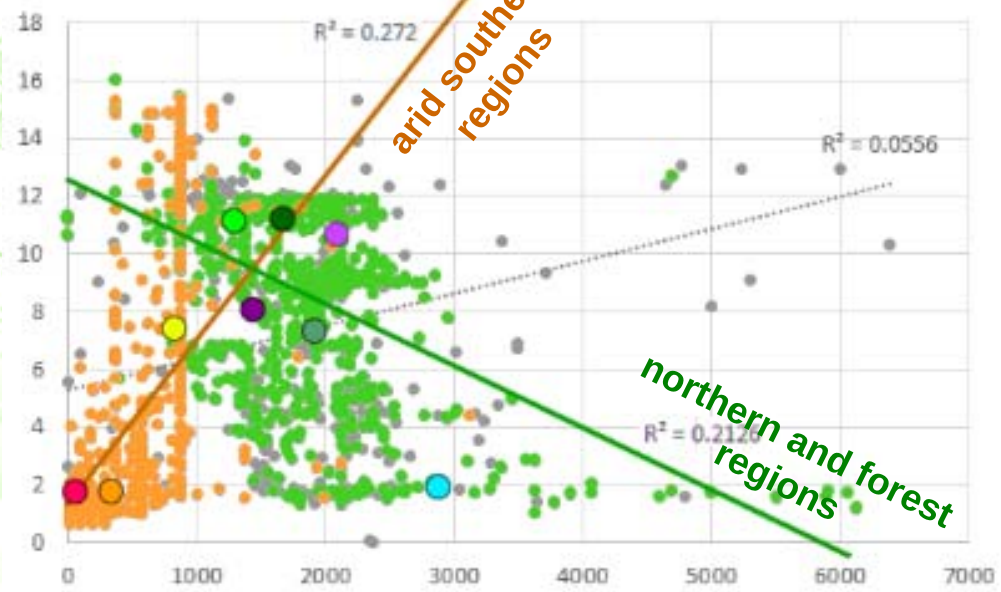


Change axes



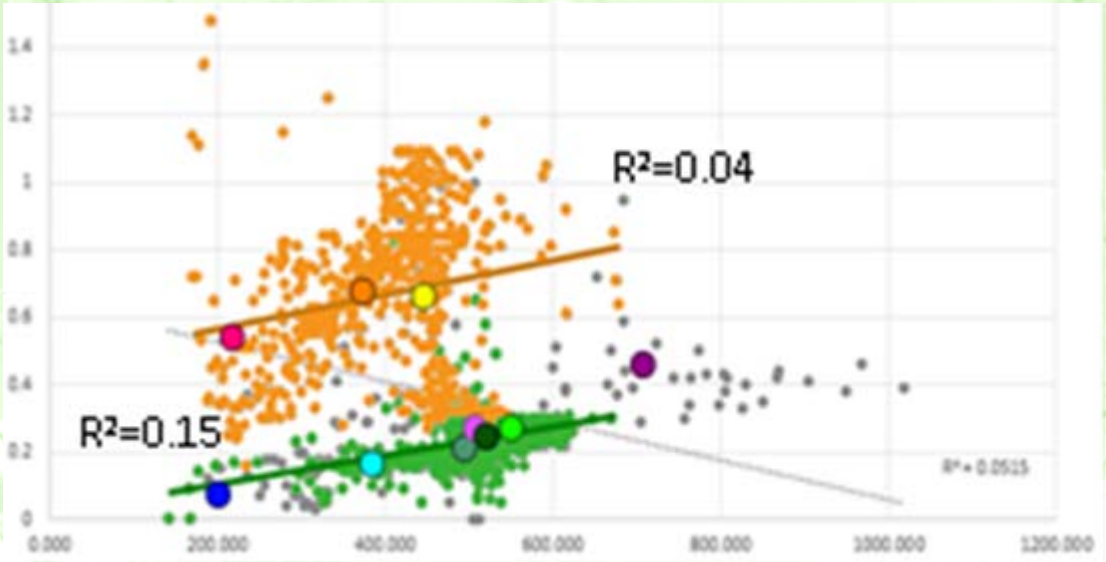
3. Biodiversity – ES (water-related)
4. Ecosystem Functioning – ES (water-related)

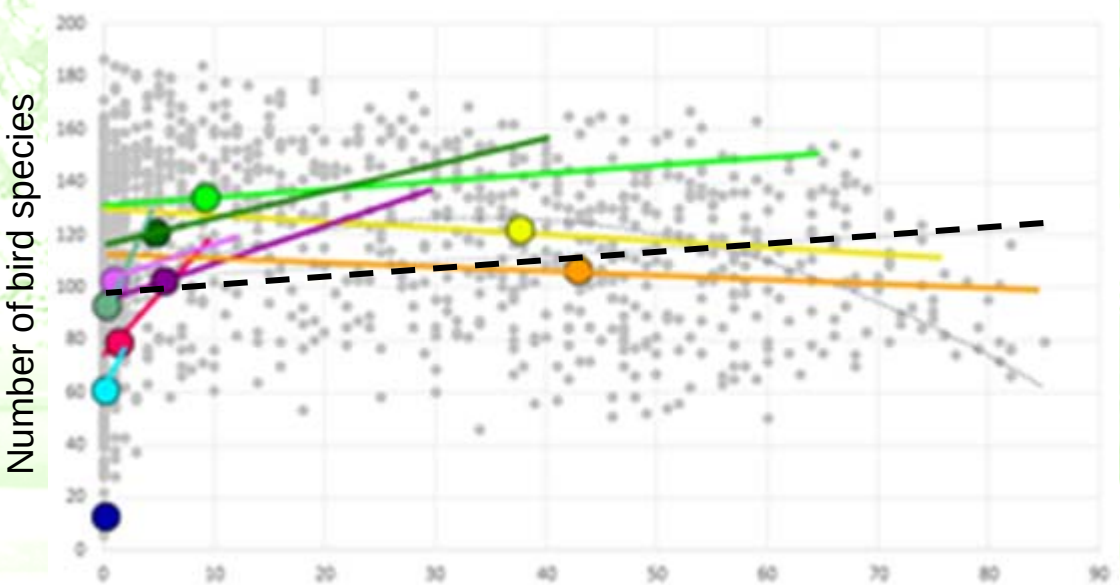




"Ecosystem runoff", m³/ha/y

5. Different Scales

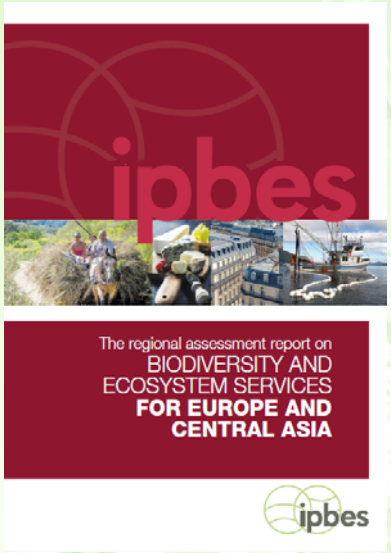


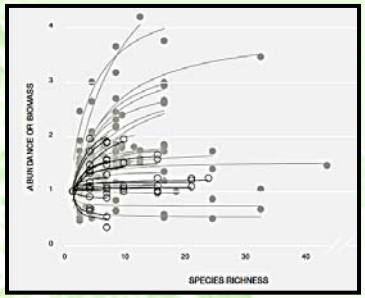


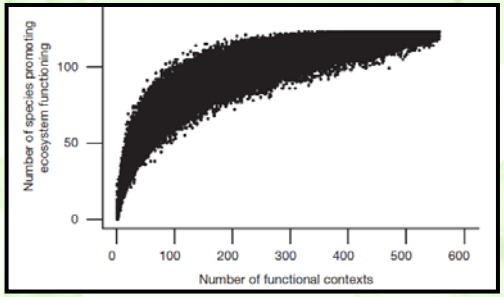
5. Biodiversity – a key indicator at the local/regional level

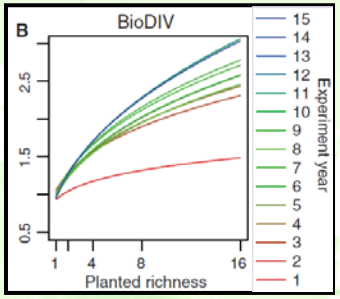
Causal relationships between biodiversity and EF work at the level of individual ecosystems, habitats and landscapes

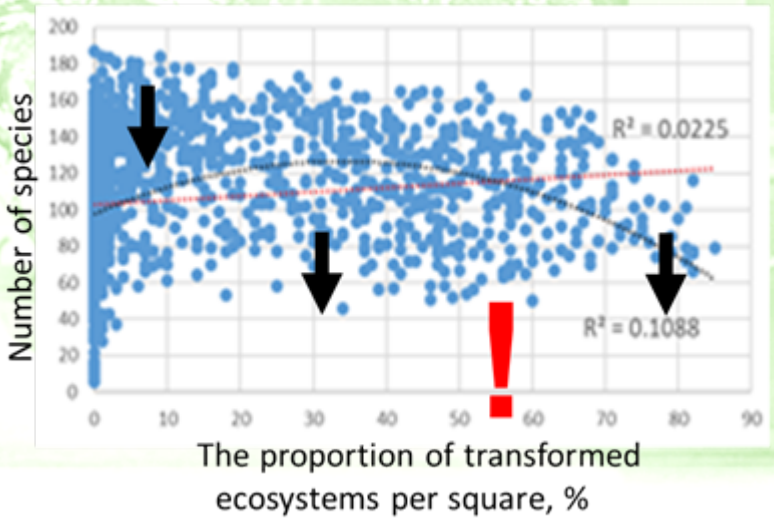
Biodiversity indicators are highly important because local biodiversity reduction indicates degradation of ES in corresponding locations

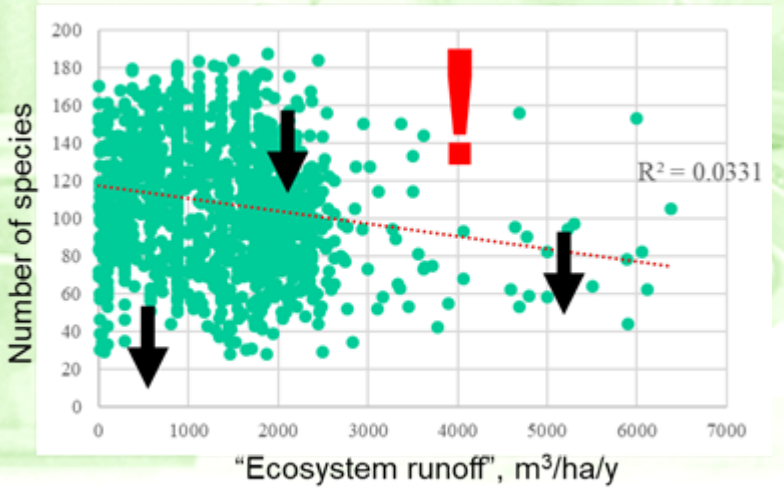












Indicators of Ecosystem Assets in the EEA in Russia:

main findings of TEEB-Russia 2 project

EEA in Russia should be regionally differentiated and take into account differences both in natural conditions and the degree of anthropogenic transformation

There are different interrelations between indicators of EA and ES in different conditions and ecoregions: **northern -southern; mountain – flat; natural - agricultural; humid – arid, etc.**

Low biodiversity in poor and harsh northern or arid regions is not less important as high biodiversity in more productive "middle-zone" regions

Regional biodiversity levels which are typical for undisturbed ecosystems are adaptations for natural (climatic) conditions. They provide the best performance of ES in a given conditions.

Biodiversity indicators are highly important because negative dynamics of local/regional biodiversity reduction indicates degradation of EA and ES

Causal relationships between biodiversity and EF work at the level of individual ecosystems, habitats and landscapes

Correlations identified at the national scale cannot be a direct basis for decision making, but they are important for the interpretation of indicators' values

Positive/negative correlations between biodiversity and other indicators at the national/subnational scale are not causal relationships but are the result of their parallel changes in different natural conditions.

Decisions developed at one scale (e.g. national) cannot be automatically transferred to other scales (e.g. local or regional)

Interconnections between EA and ES indicators are different at different scales

Thanks for your attention

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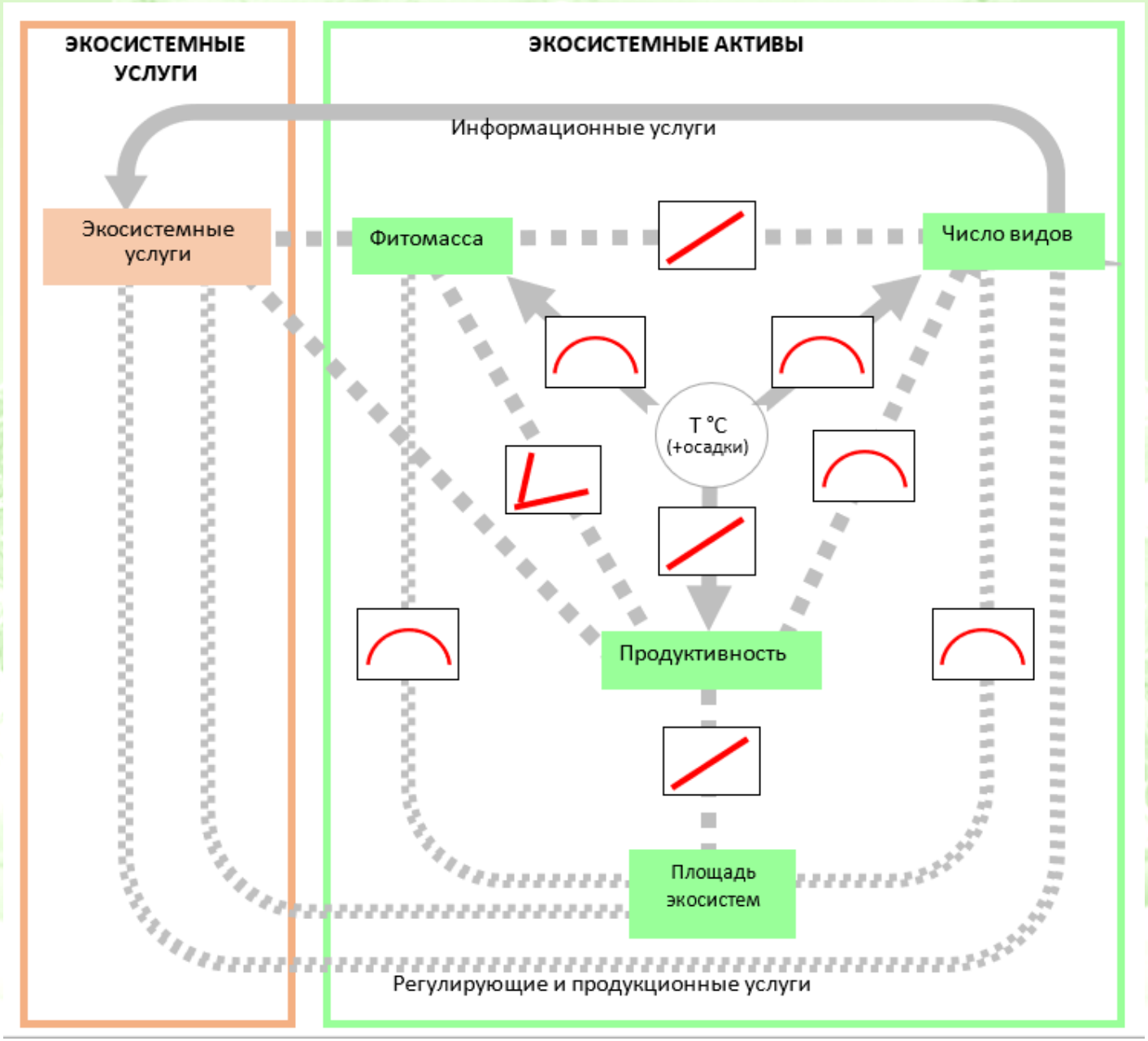
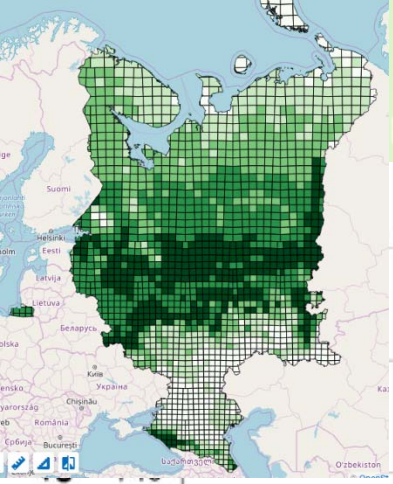
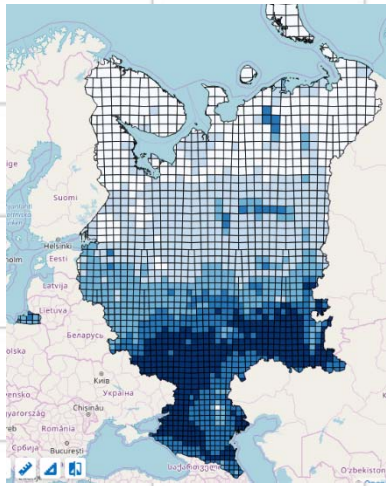

ЭКОСИСТЕМНЫЕ УСЛУГИ
ЭКОСИСТЕМНЫЕ АКТИВЫ
Информационные услуги
Экосистемные услуги
Фитомасса
Число видов
T °C (+осадки)
Продуктивность
Площадь экосистем
Регулирующие и продукционные услуги

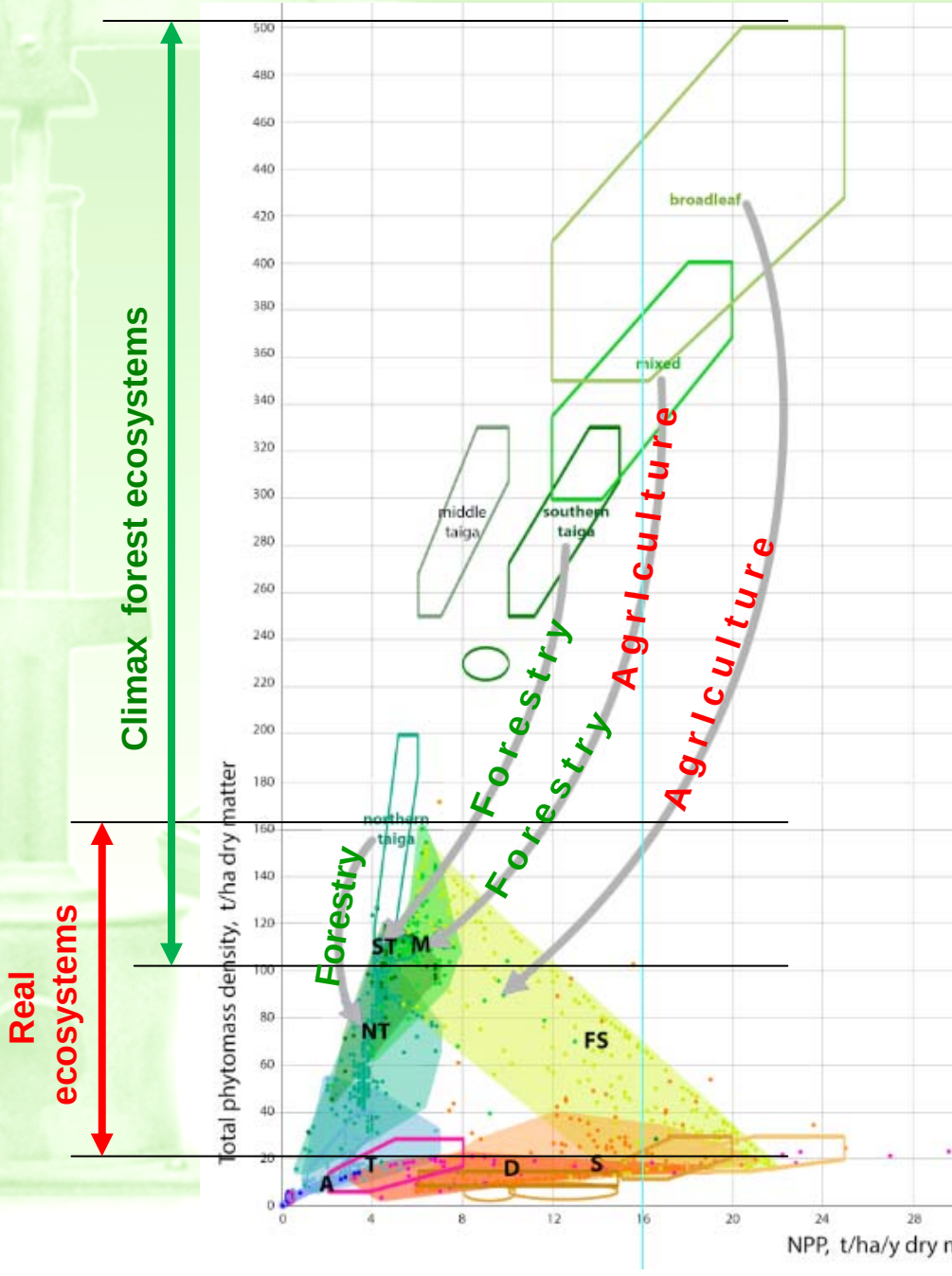
Phytomass - NPP





Phytomass - NPP

Decrease in phytomass because of forestry (ES use) and agriculture (land use)

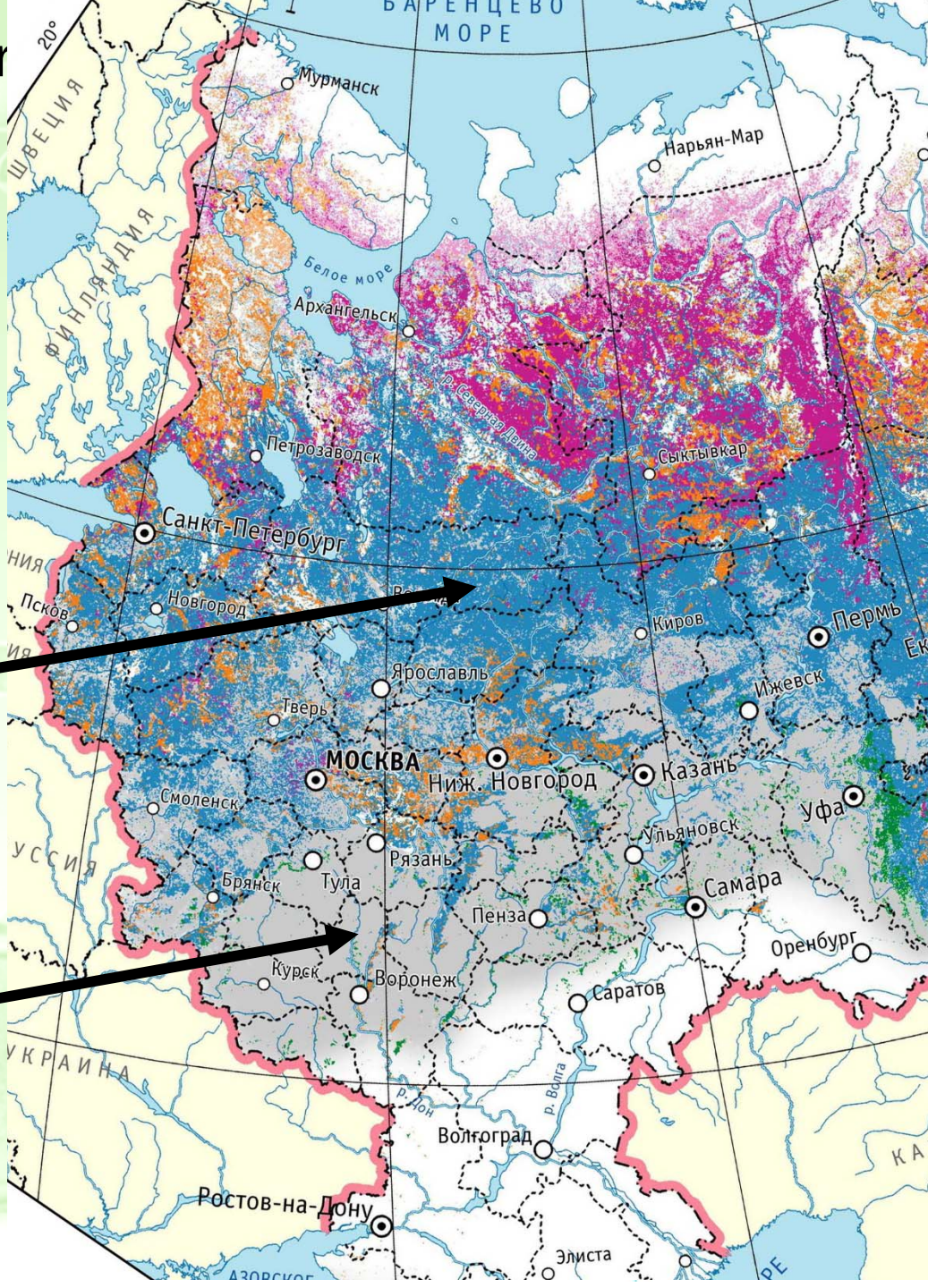


Phytor

Decrease in phytomass because of forestry (ES use) and agriculture (land use)

Blue: - secondary birch forests

Gray - agricultural fields at the site of the former forests



Phytomass - NPP

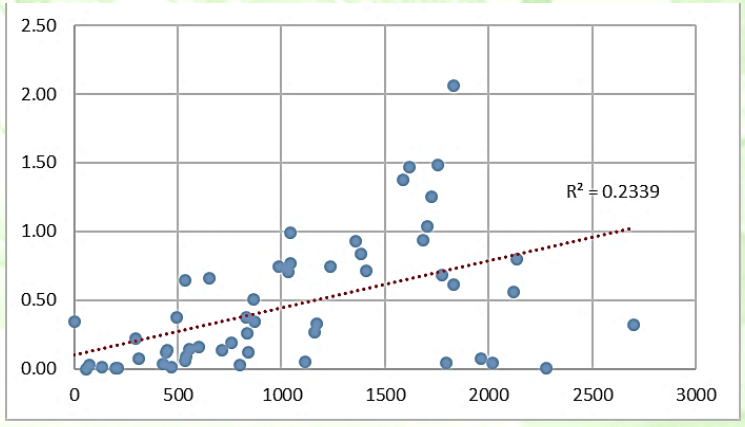
Trade-offs:

ES of wood production – other ES

Agriculture (land use) – ES

Not all tradeoffs can be identified by currently correlations

Wood production, AAC



Runoff provided by terrestrial ecosystems