A WGE analysis of the achievements, potential benefits and damages on health, materials and the environment of Gothenburg Protocol scenarios

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and all WGE's ICPs and TF

INERIS
maîtriser le risque
pour un développement durable

Relevant information from the WGE indicators for the revision of the Gothenburg protocol

In the context of revision of the Gothenburg Protocol,

- What do WGE indicators show
  - ⇨Field observations and modelling
- Which scientific improvements should be encouraged for the future?
- What should be exchanged with the TFIAM (and other groups under the Convention)?
- What should decision-makers know?

Projections available for modelling

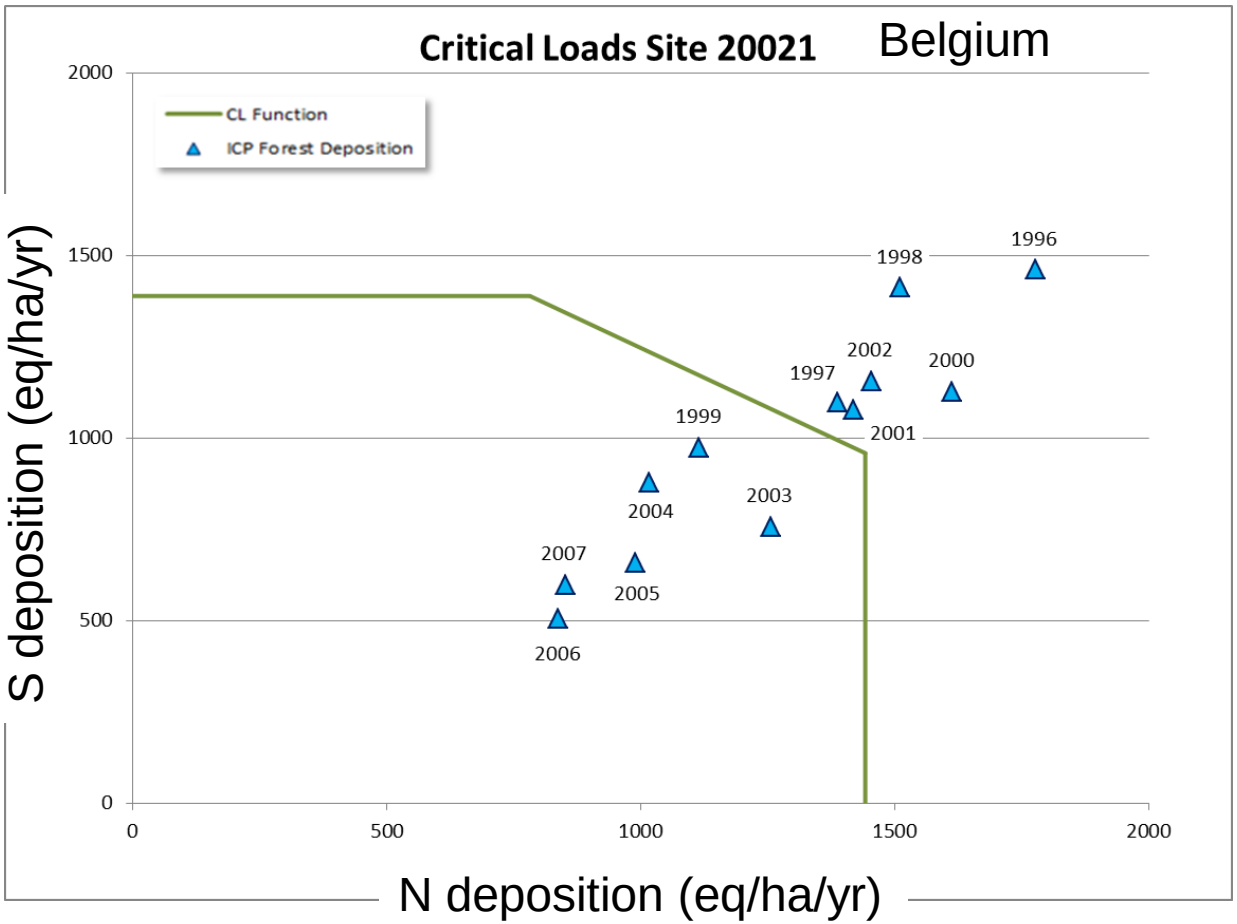
Baseline scenarios

- NAT2000: historic data (partly Eurostat)
- NAT 2020: Projections by Parties for the year 2020
- PRI 2020 and 2030: Projections by PRIMES

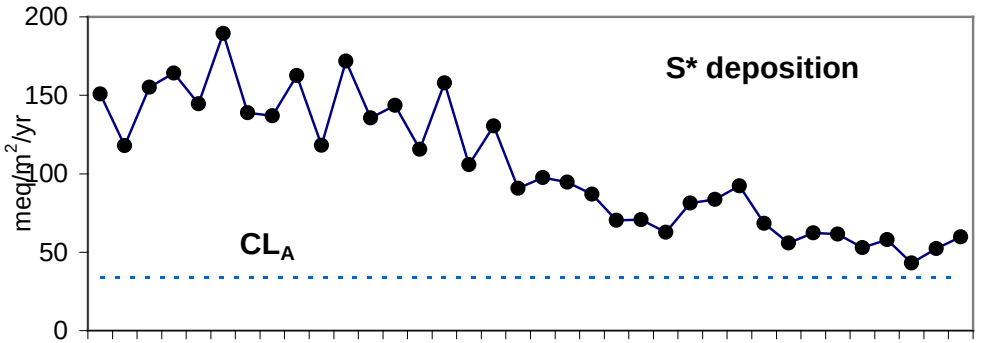
MFR 2020: Maximum (technically) feasible reductions for 2020

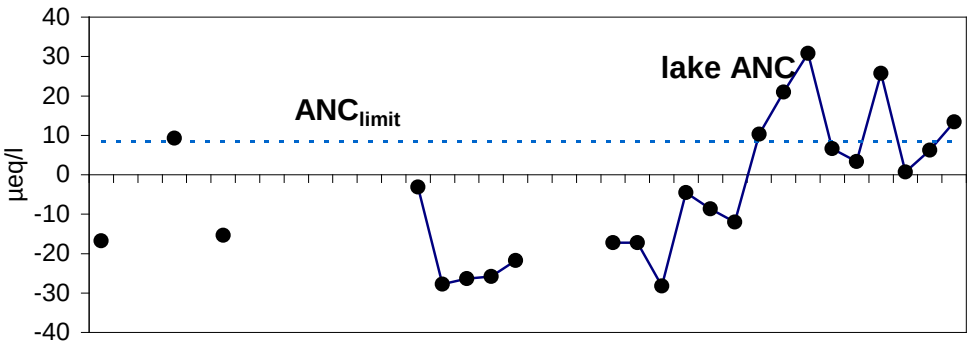
ACIDIFICATION

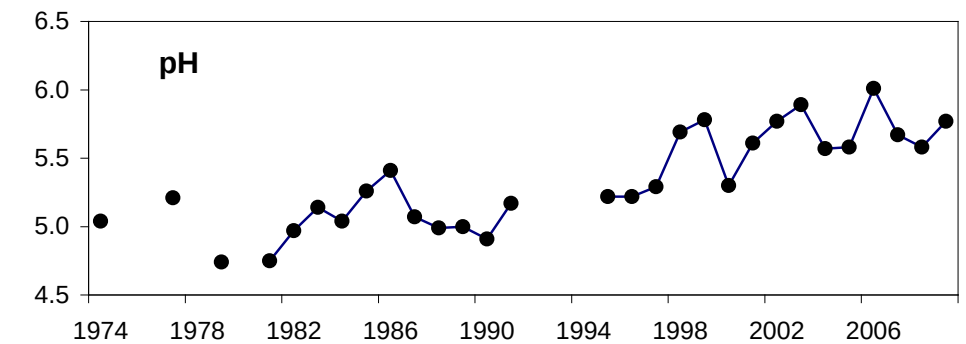
ICP Forests field data: depositions have been decreasing

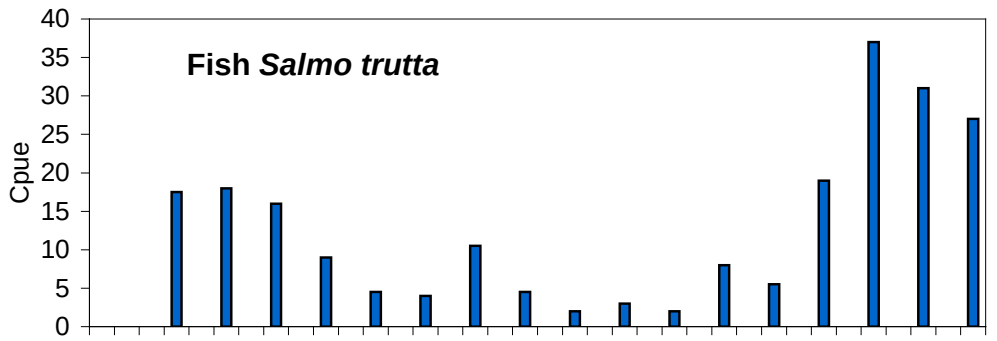


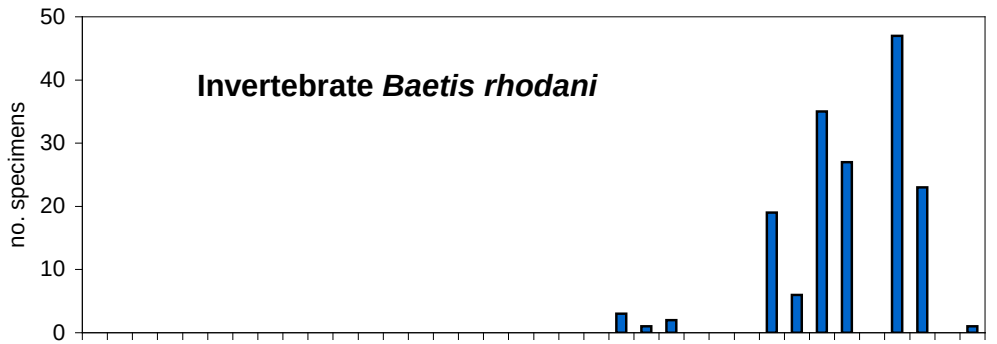
ICP Waters field evidence: Recovery is happening.

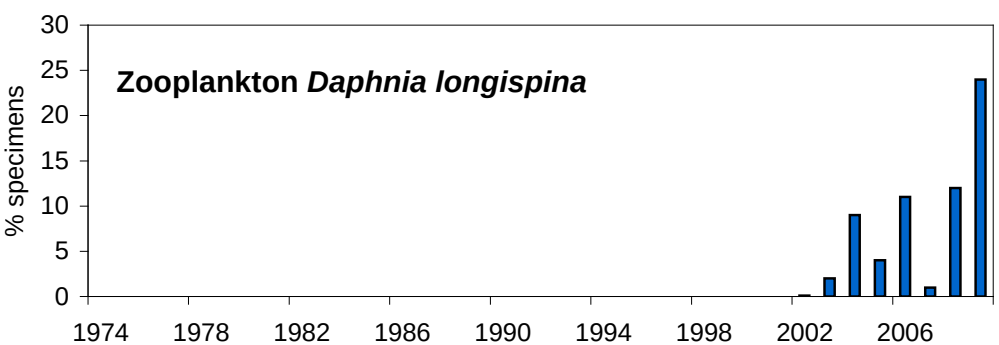






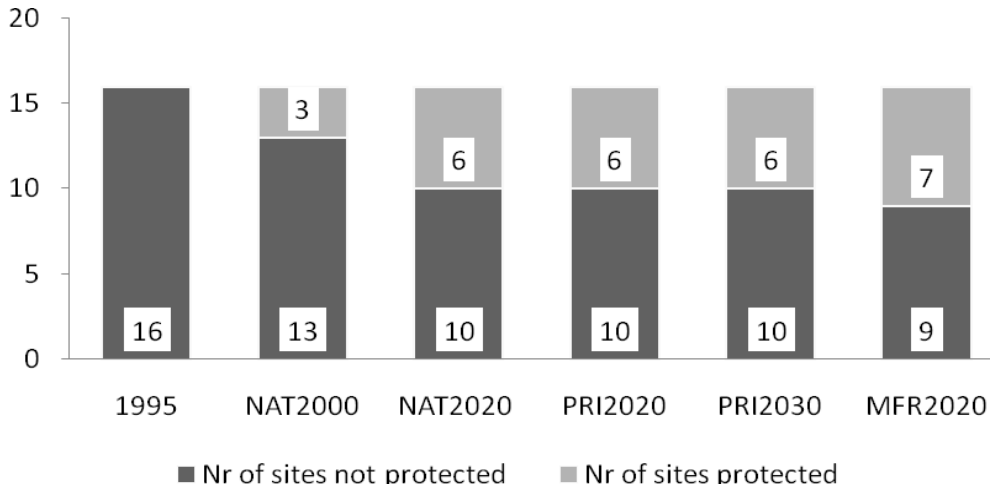






Lake Saudlandsvatn, Norway

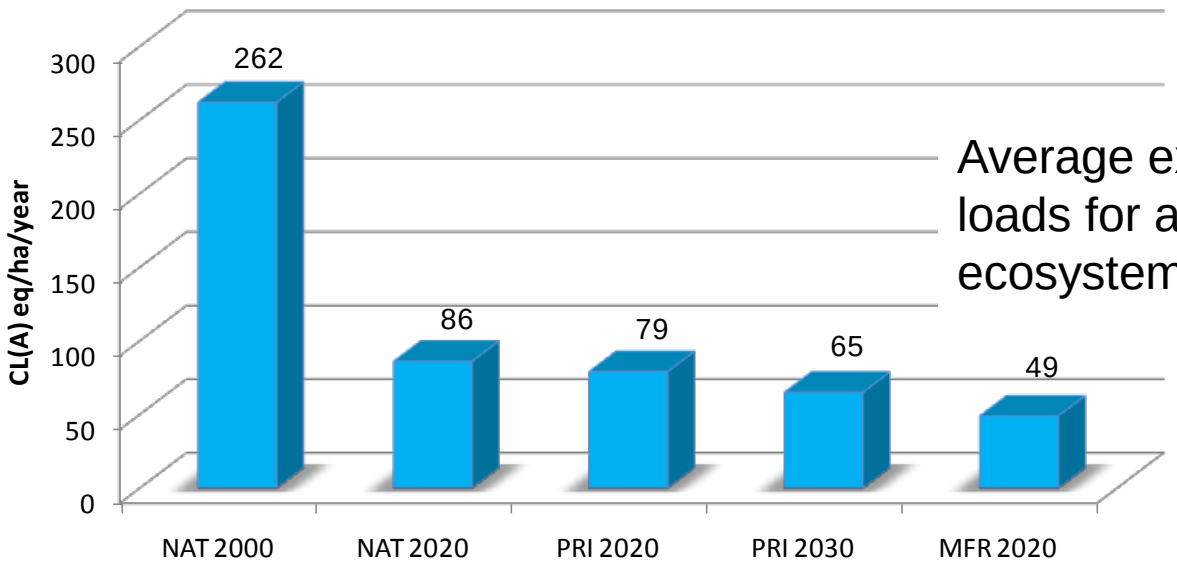
ICP IM: Decrease of impacts is expected at various sites



Number of sites protected /not protected with respect to critical loads for acidification for aquatic ecosystems

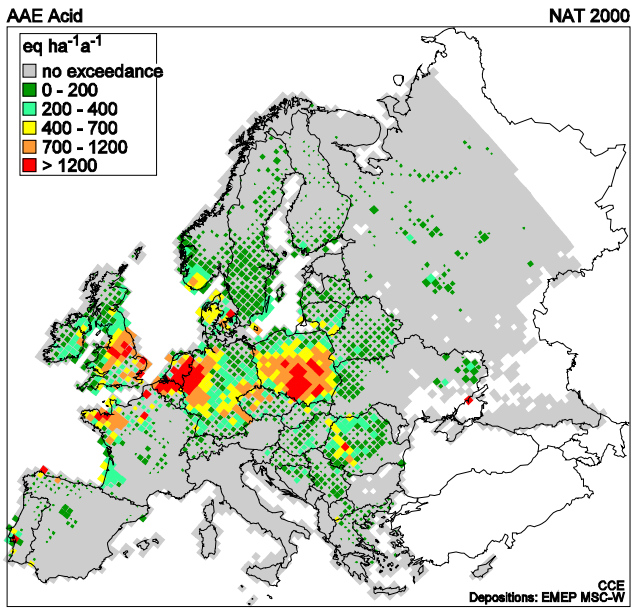
Compared to 2000:

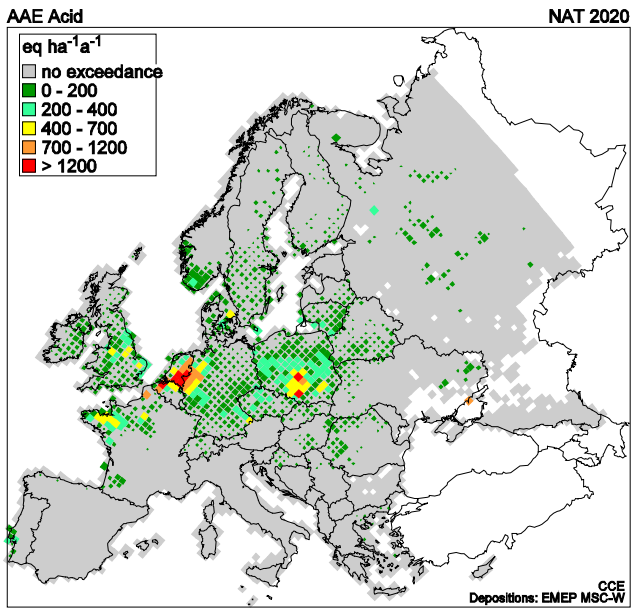
- The number of sites impacted decreases by about 20%
- The magnitude of the impact is reduced by about 70 - 80%

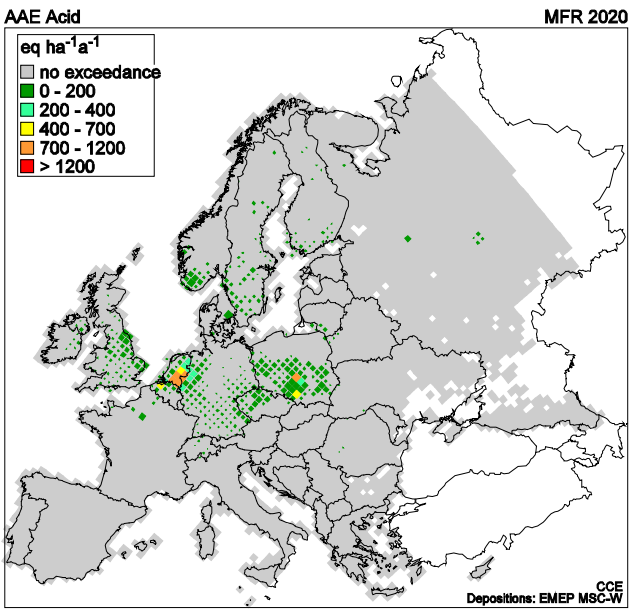


Average exceedance of the critical loads for acidification for aquatic ecosystems

ICP M&M: Modelling confirms the decrease of impacts at European scale





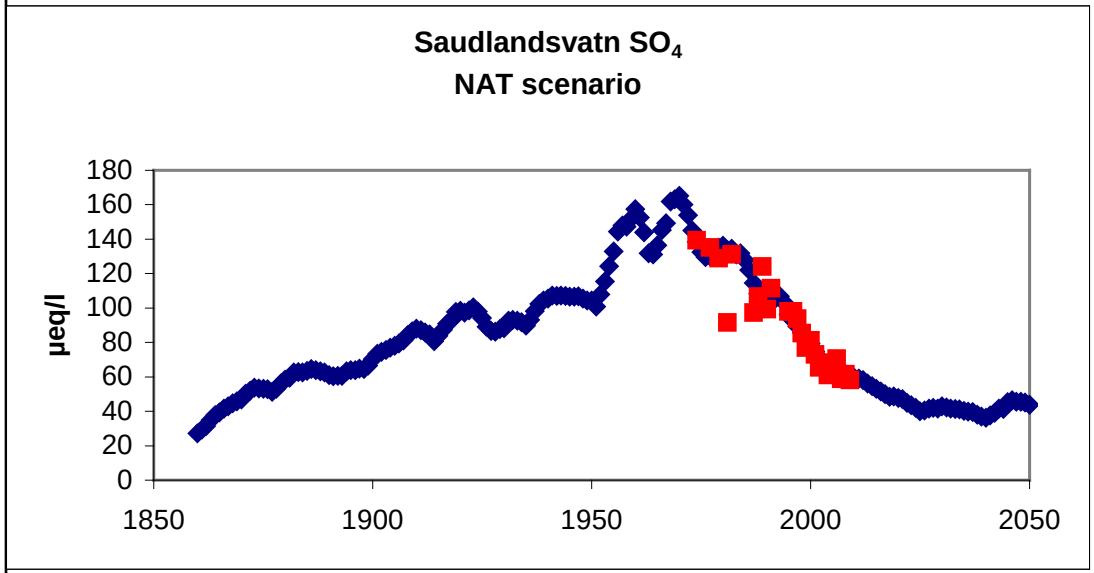


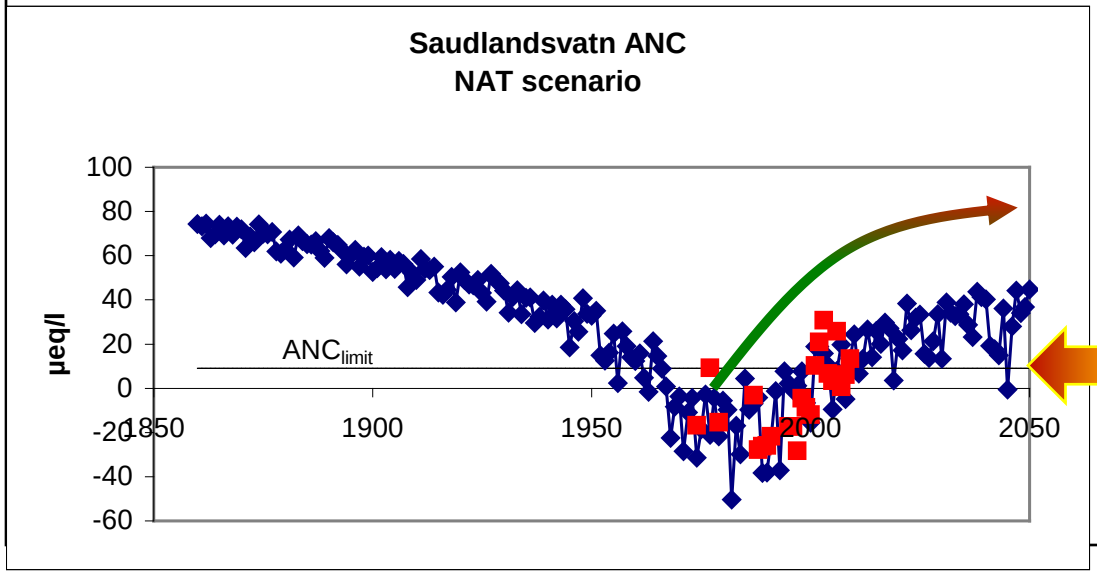
	NAT2000	NAT2020	MFR2020
EU27	19%	4%	2%
All Europe	10%	4%	1%
EU27	108	24	4
All Europe	54	12	2

% areas at risk of acidification ↓

Accumulated Average Exceedance of critical loads for acidification ↓

ICP Waters: dynamic modelling shows recovery… and its limits





Good match of modelled and monitoring data

Conclusion (with NAT2020):

- ANC goes over ANC limit and levels off
- Bad years, acidification may occur
- NAT, PRI and MFR are equivalent as far as water acidification is concerned

Highly sensitive sites will not recover even under MFR.

ACIDIFICATION

Conclusions

Areas impacted are reduced

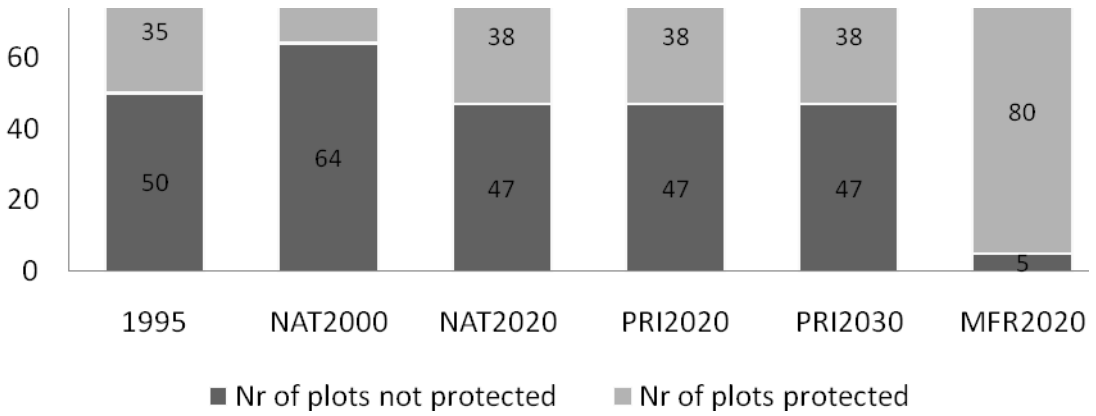
Magnitude of impact decreases

Nitrogen is becoming the main acidifying compound

Recovering is occuring under baseline scenario, it would be better under MFR but highly acidified sites will not recover

EUTROPHICATION

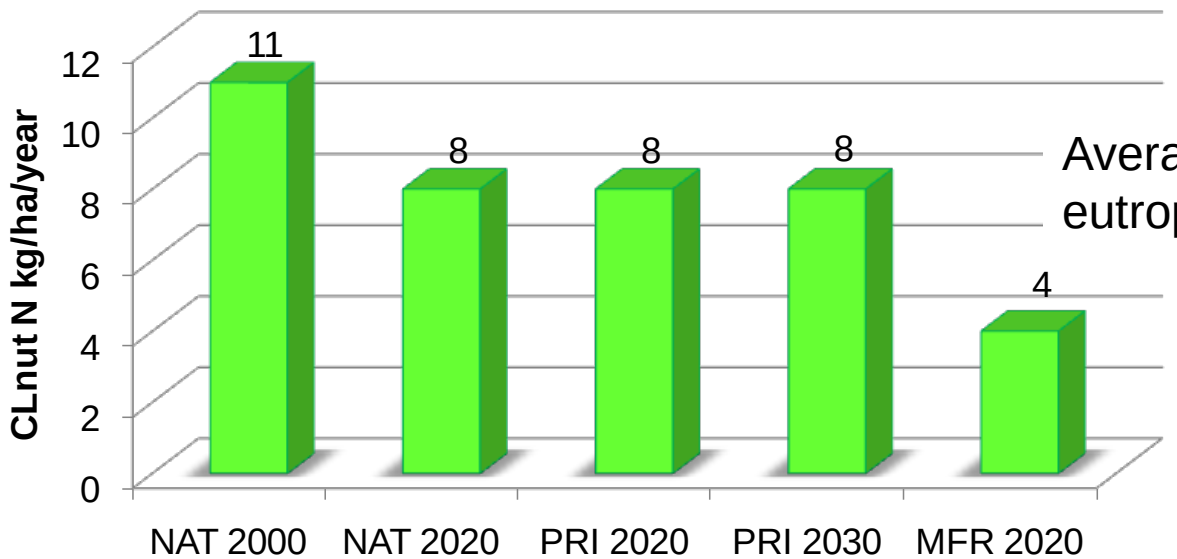
ICP IM: Decrease of impacts is expected at various sites



Number of sites protected /not protected with respect to critical loads for eutrophication for terrestrial ecosystems

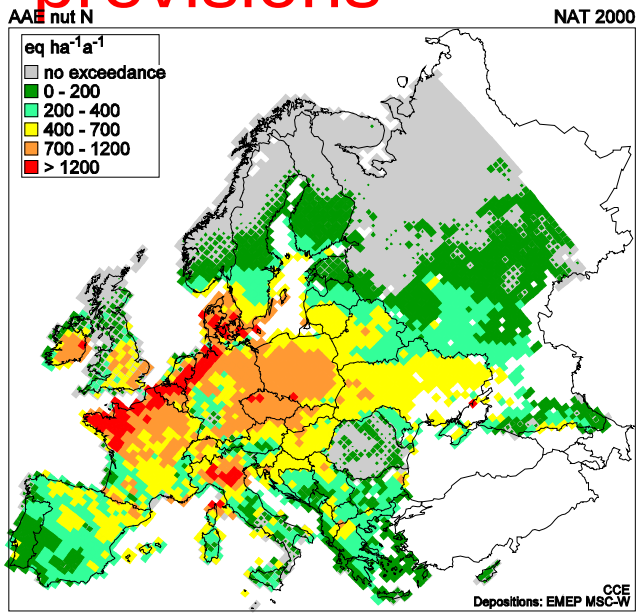
Compared to 2000:

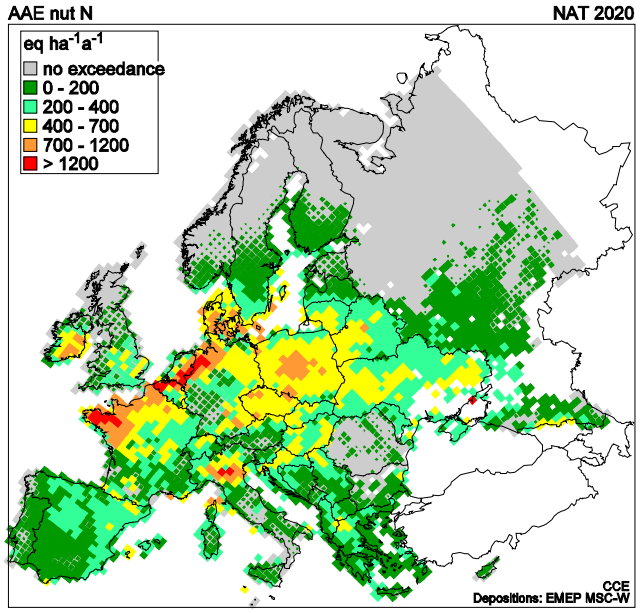
- The number of sites impacted decreases by about 20% with baseline in 2020 (70% with MFR)
- The magnitude of the impact is reduced by about 30% with baseline in 2020 (64% with MFR)

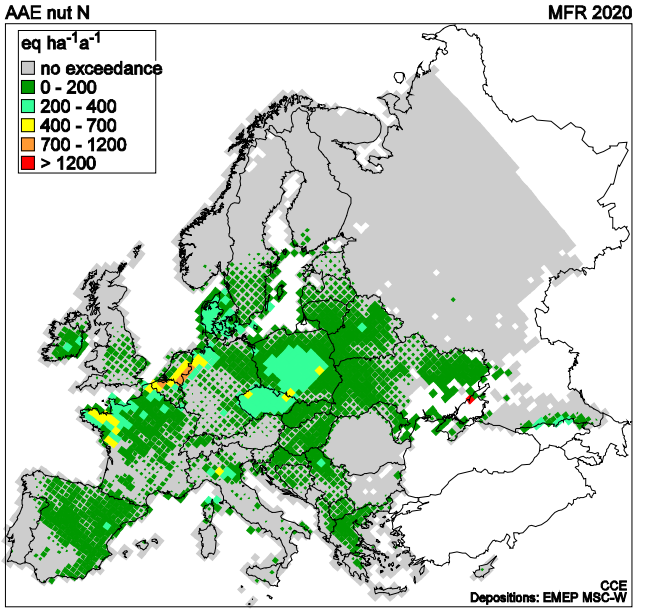


Average exceedance of the critical loads for eutrophication for terrestrial ecosystems

ICP M&M: modelling at european scale confirms sites previsions







CCE Status report

	NAT2000	NAT2020	MFR2020
EU27	74%	61%	24%
All Europe	52%	38%	14%
EU27	333	179	35
All Europe	185	102	18

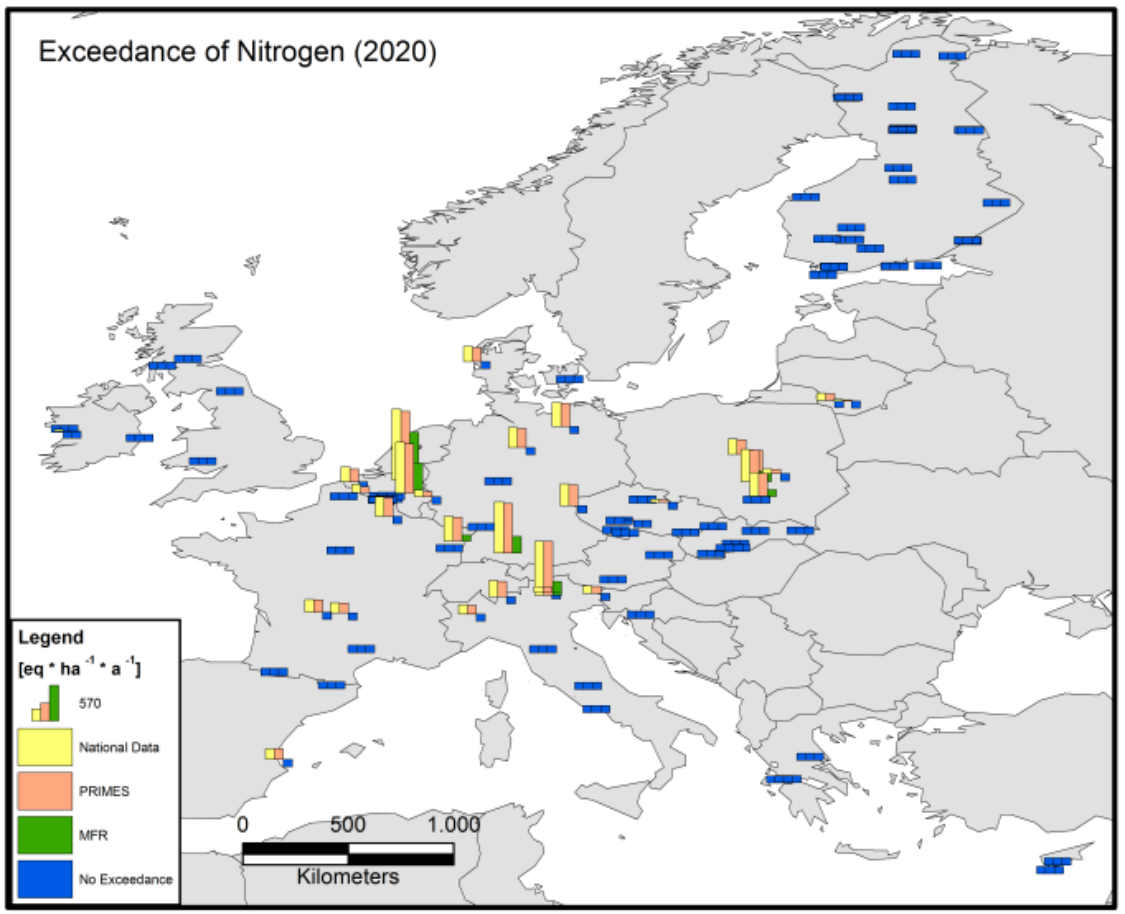
MFR Feb 2011

37% % areas at risk of eutrophication

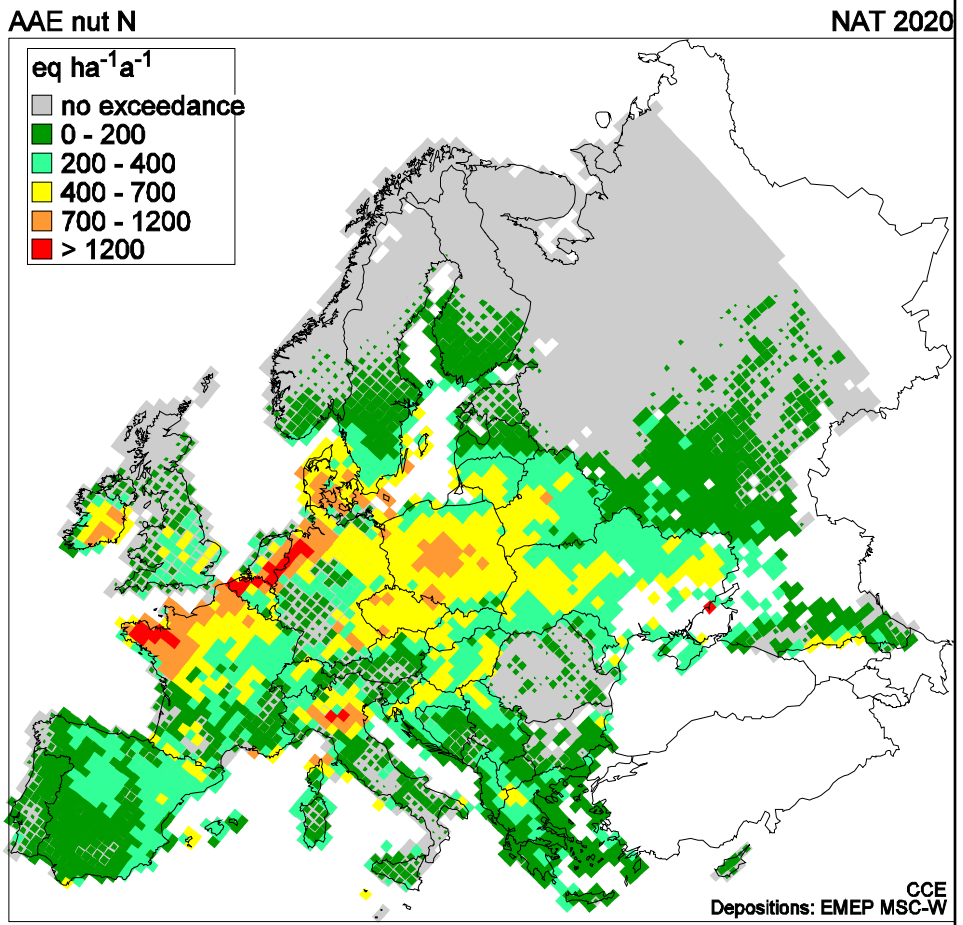
22% Accumulated Average Exceedance of critical loads for eutrophication

Calculations at sites levels and European scale coincide

ICP Forests



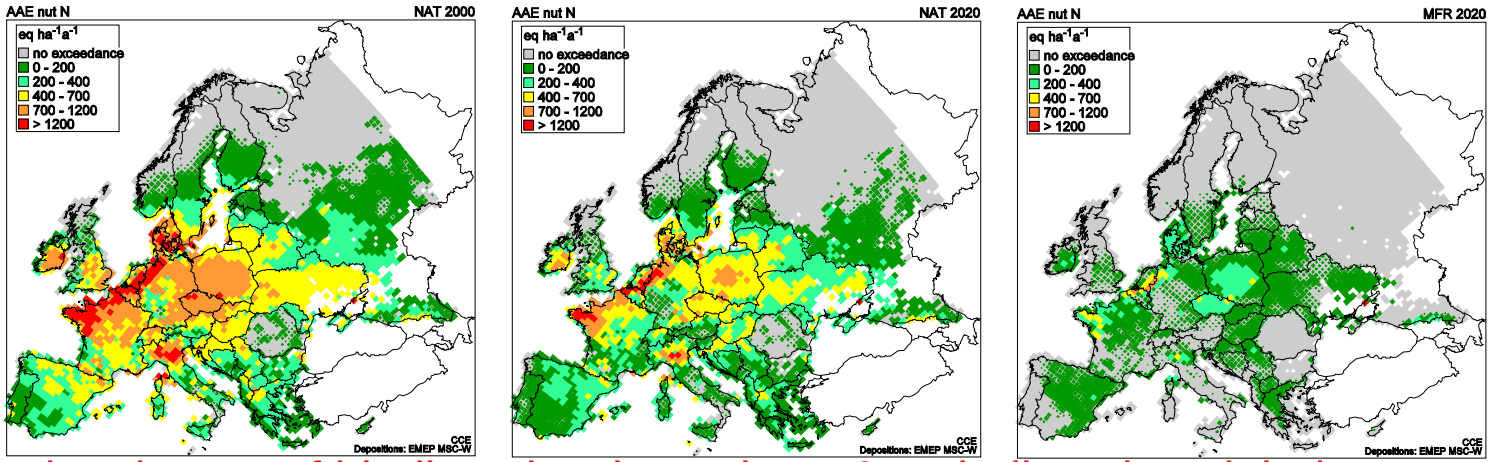
ICP Mapping and modelling



ICP M&M:
Indicators of risk and occurrence tell the same story

Indicator of risk:

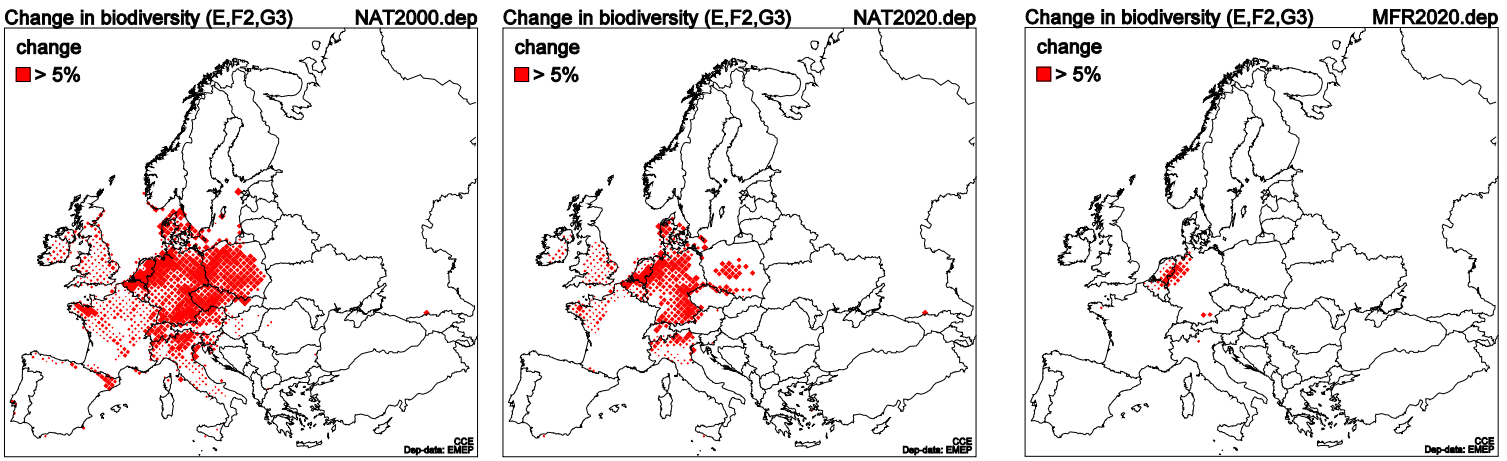
AAE



The change of biodiversity shown is > 5%. Biodiversity might be affected elsewhere as suggested by AAE.

Indicator of occurrence:

loss of biodiversity



EUTROPHICATION

Conclusions:

Areas impacted are reduced

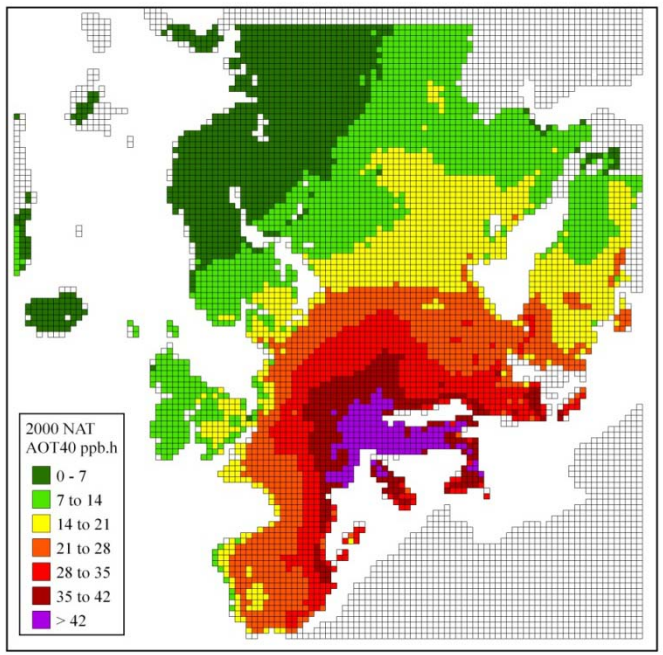
Magnitude of impact decreases

Significant differences between baseline and MFR

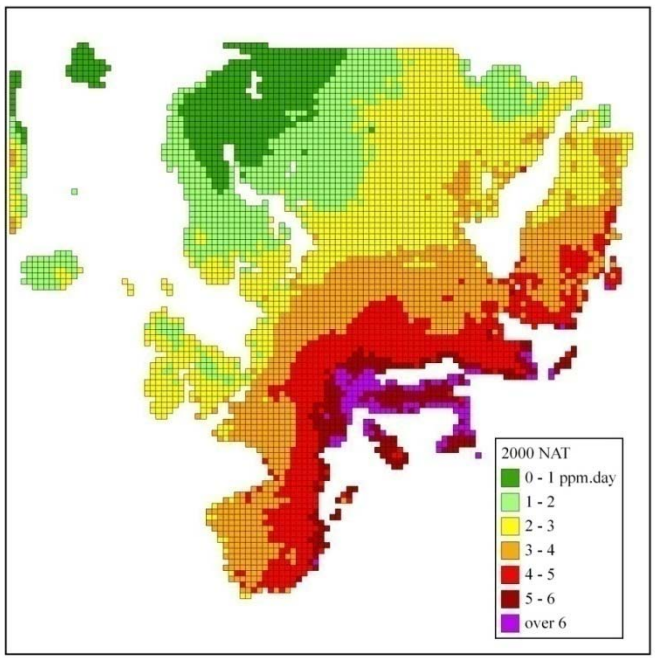
OZONE

ICP Vegetation:
Effects on vegetation are best evaluated with flux indicator

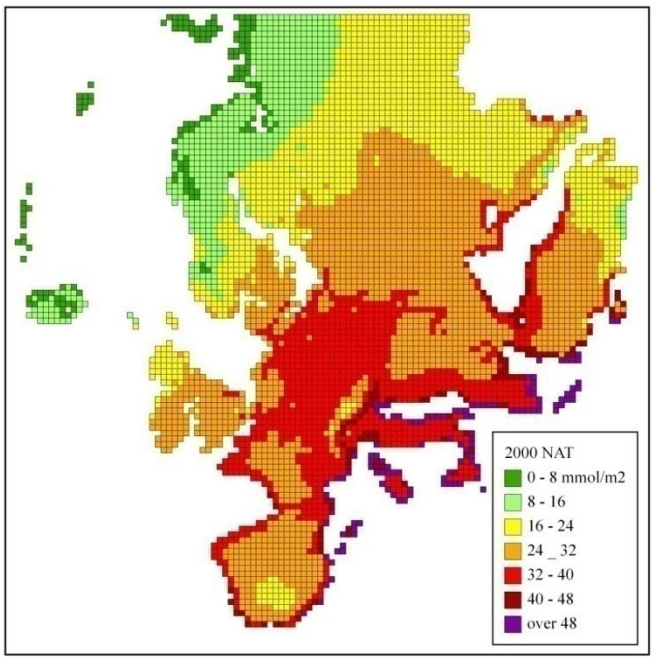
AOT40



SOMO 35



POD_1 (beech)



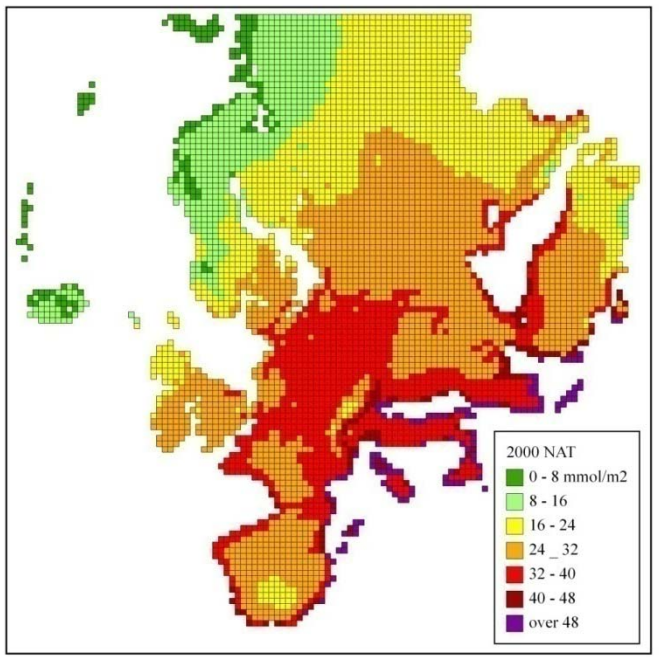
Year 2000

AOT 40 and SOMO 35 do not represent ozone impact on vegetation accurately.

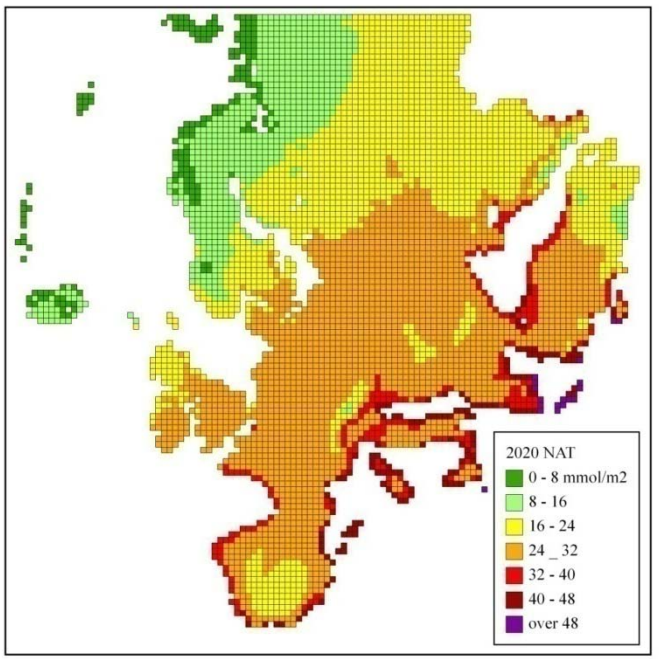
Policies aiming only at health effects would not protect vegetation in large areas of northern and central Europe

ICP Vegetation:
Ozone impacts (POD_1) decrease in time and with MFR

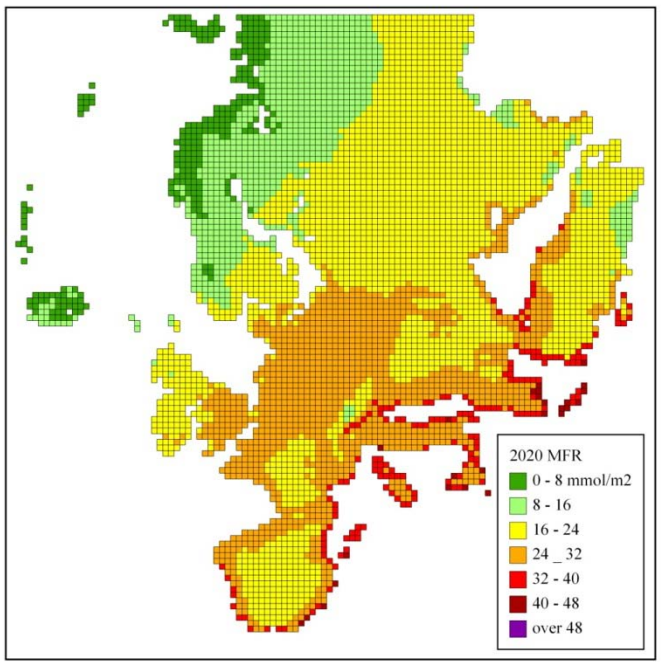
NAT2000



NAT2020



MFR2020



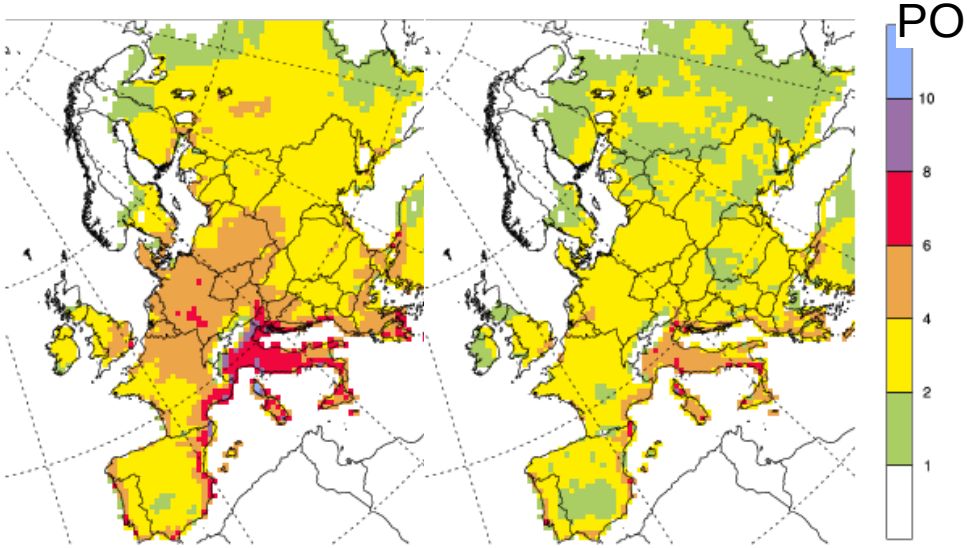
The magnitude of the impact is expected to decrease

The areas (intensely) impacted are reduced

The risk to vegetation continues to be of concern in the future, including northern Europe

ICP Vegetation:
Ozone is of concern for food security

NAT2000 NAT2020



Ozone impact on wheat production

- The magnitude of the impact is reduced
- The areas (intensely) impacted are reduced
- The impact occurs in a large part of Europe

% of grid squares exceeding critical level

	2000	2020
Wheat	69%	56%

Note: provisional data, not scaled by production

OZONE

Conclusion

The areas intensely impacted and the magnitude of impact are reduced.

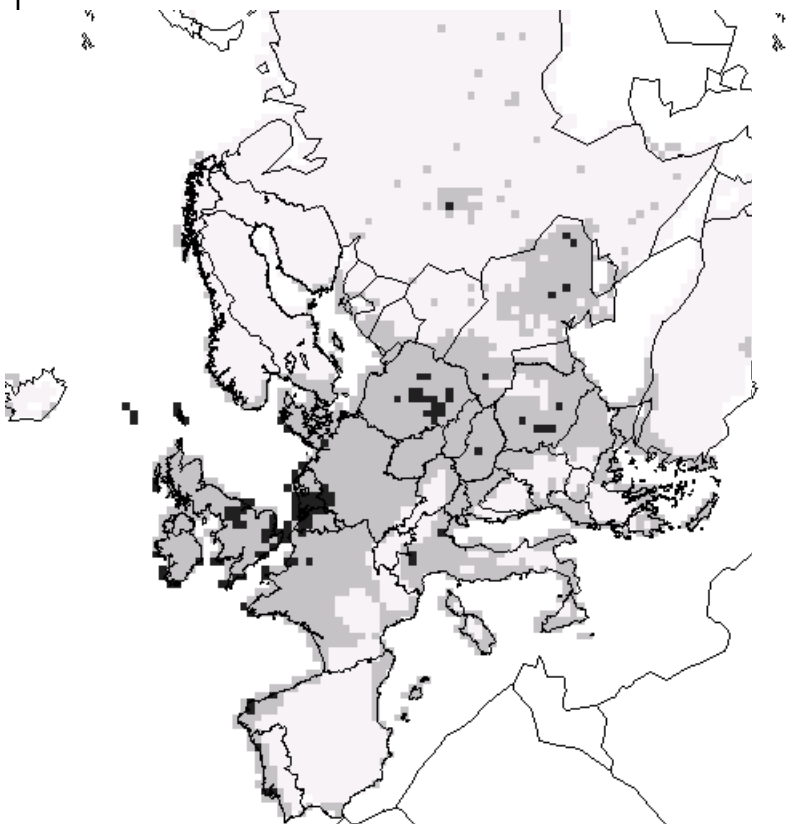
Ozone continues to be of concern, including in northern part of Europe.

MULTI-POLLUTANT

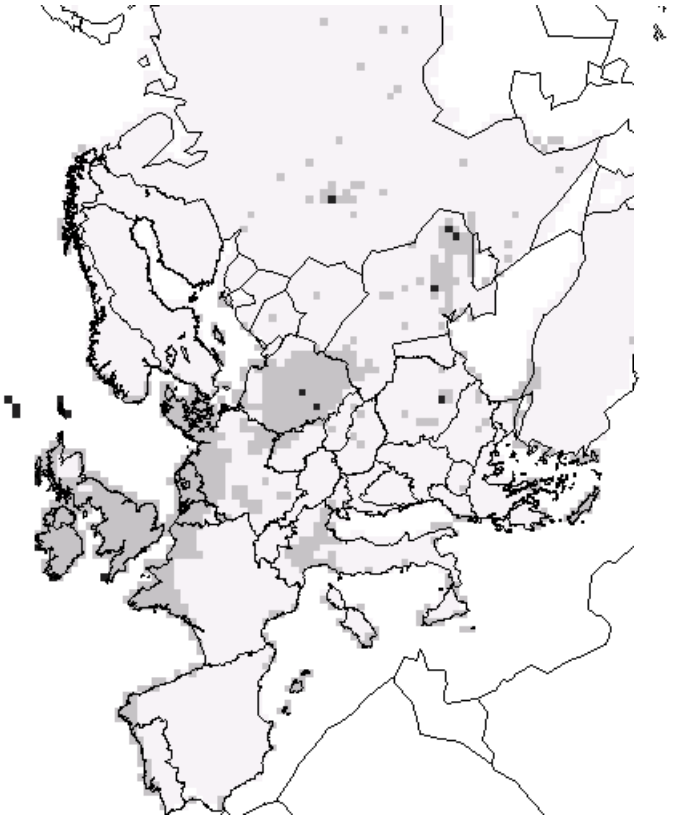
ICP Materials:

Effects on materials will decrease but will not disappear by 2020

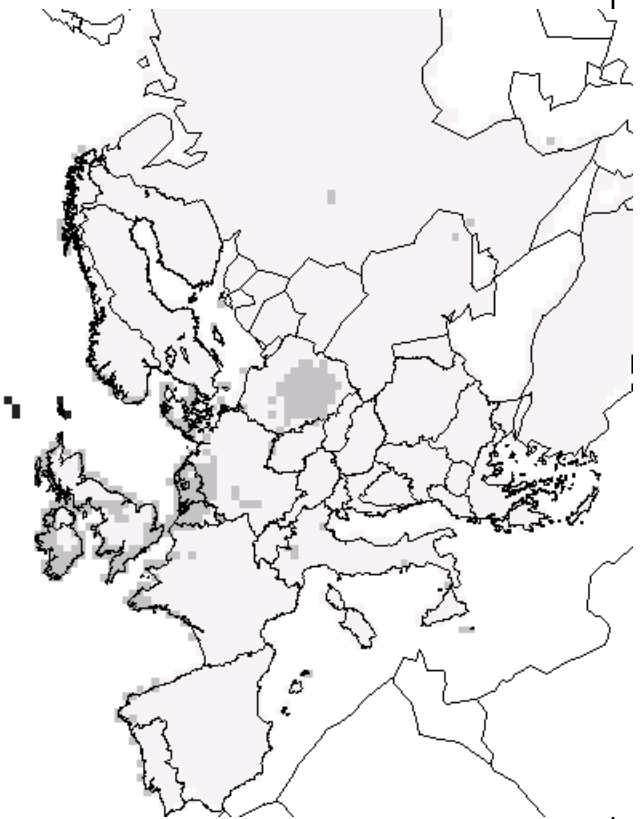
NAT2000



NAT2020



MFR2020



More intense effects are expected in urban areas than shown on maps.

OVERALL CONCLUSIONS

Scientific conclusions

Some observations

- Eutrophication and ozone impacts are widespread in Europe
- Similar conclusions from all groups, for the future:
  - ⇨Area impacted decreases
  - ⇨Magnitude of impact decreases
  - ⇨But large areas still impacted
    - o Eutrophication
    - o Ozone
    - o Multi-pollutants (Material, human health)

Conclusions to TFIAM

Acidification

Changes in historical data make some WGE assessments difficult.

Eutrophication

Which scenarios should be used in next step of the WGE assessment? Should we wait for WGSR decision?

Dynamic models are ready to be used.

Ozone

PODy is a more accurate indicator than AOT40 and is ready to be used

There are new PODy policy relevant indicators available

Multi-pollutant

A better evaluation of urban pollution is needed to calculate impacts on human health and on materials

Specific impacts on health could be used to evaluate uncertainties.

Conclusions for policy makers

Lots of information, mostly giving the same messages:

Most impacts are in western part of Europe.

Acidification

Baseline scenario already providing significant improvement to the condition of the environment. MFR goes further but not enough to provide total protection against acidification for all ecosystems (esp. the most sensitive ecosystems)

Eutrophication

Nitrogen remains a problem although improvements are expected.

Ozone

Effects of ozone on food security, ecosystem services and human health are important.

Multi-pollutant

Effects of air pollution on materials and health probably underestimated in urban areas

Health effects already taken into account in GAINS, further data required to get further information from the assessment.

THANK YOU FOR YOUR ATTENTION