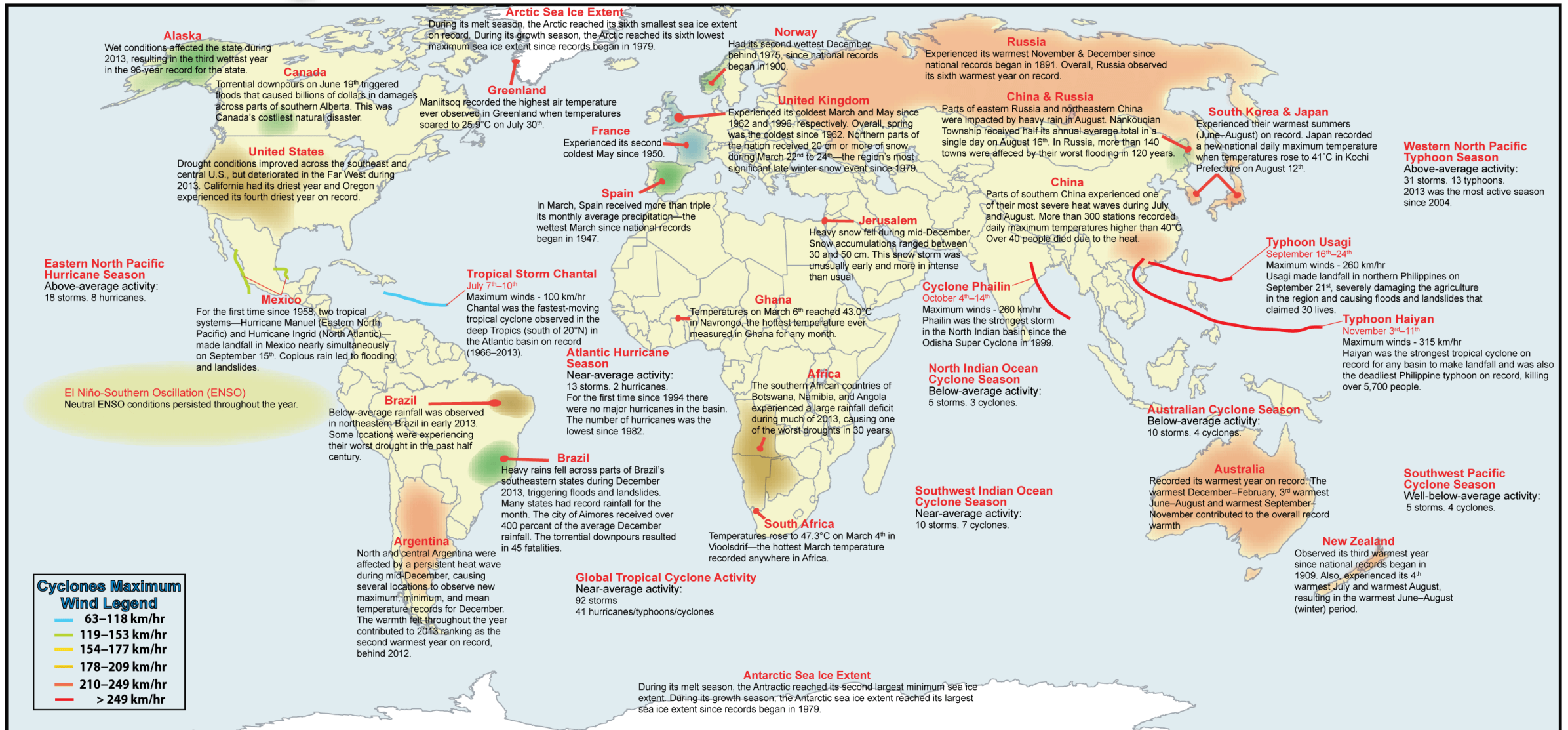


VA approached Europe 23 December 2015

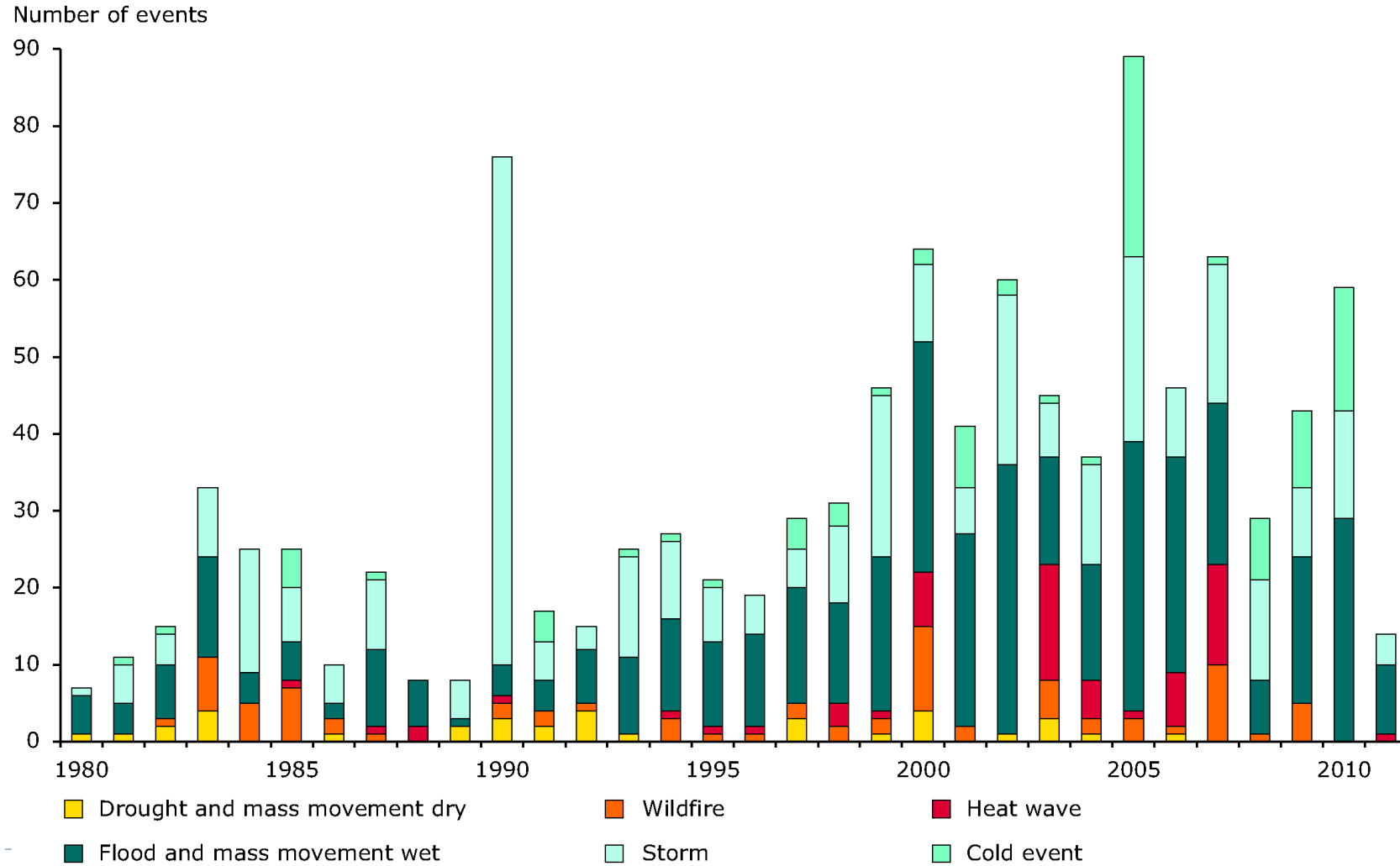
MANTEL

Management of Climatic Extreme Events in Lakes &
Reservoirs
for the Protection of Ecosystem Services

2013 Significant Climate Anomalies and Events

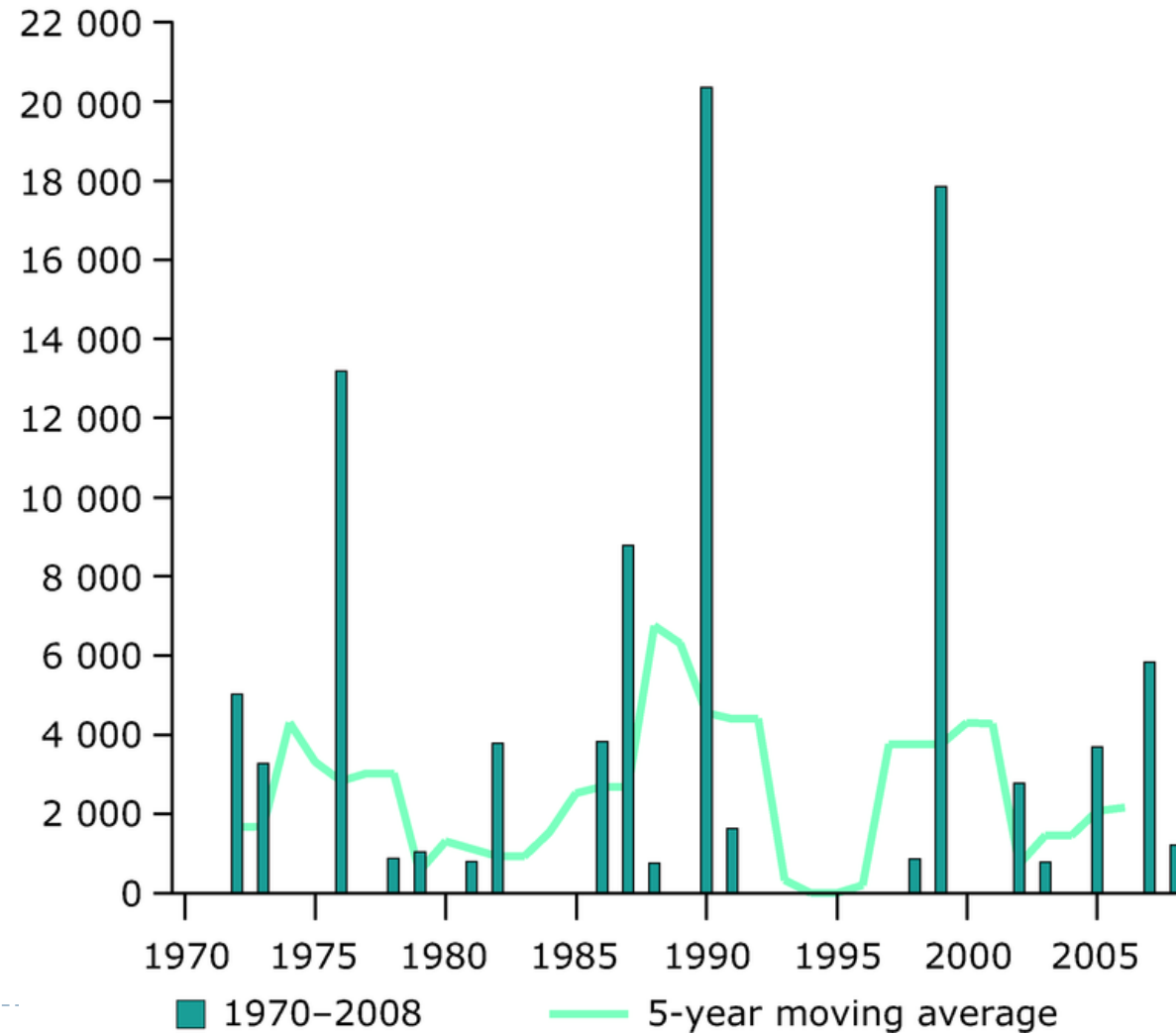


Europe

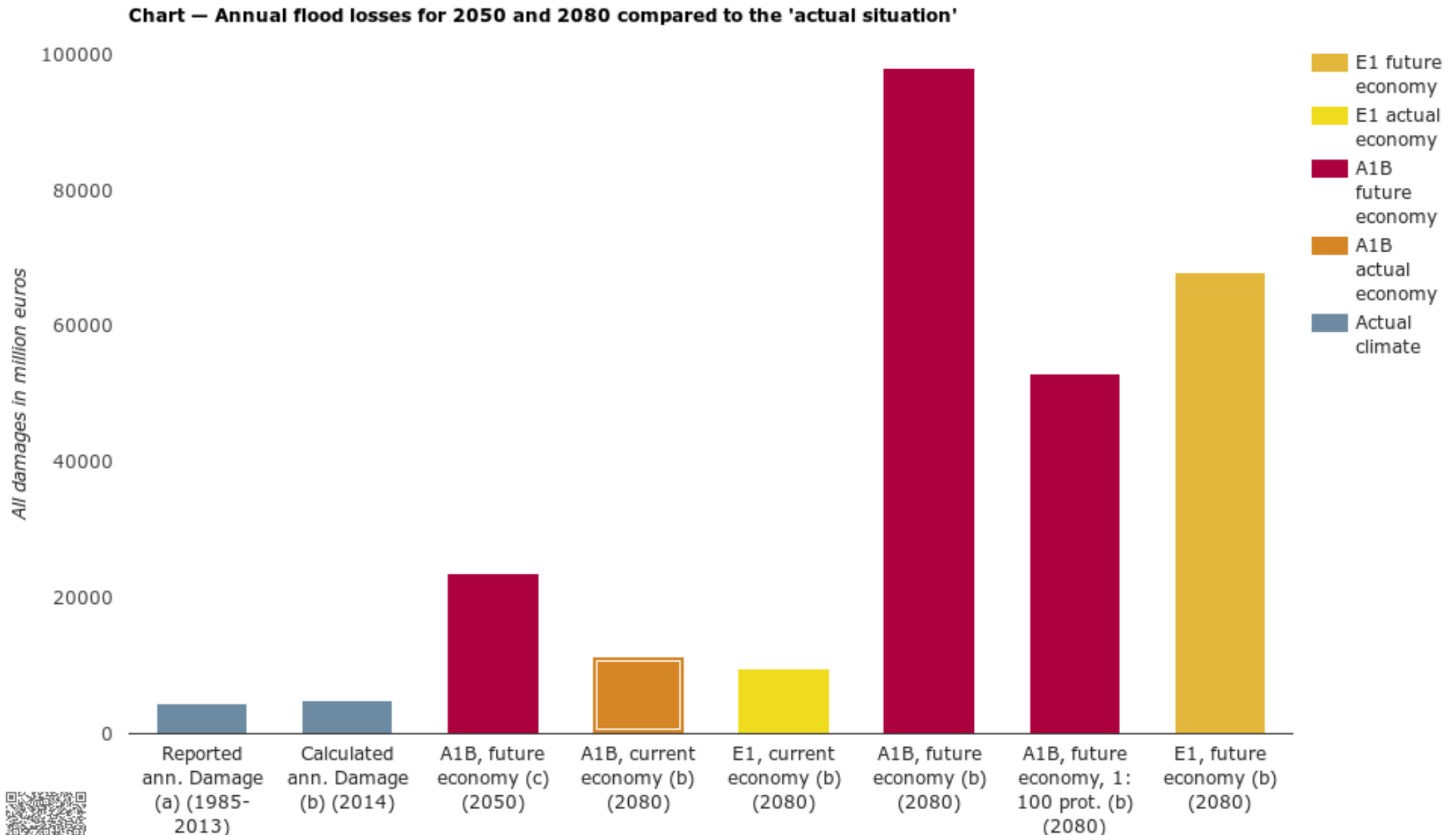


Losses due to storms

Million EUR as of 2008 in PPP



Losses due to floods



12 PhDs divided over 5 workpackages

WP 2 Analysis of HFM data

ESR 1
Impacts of
mixing on lake
physics
DKIT/CEH

ESR 2
Episodic events
and
metabolism
UB/EMU

ESR3
Current and
future effects
on
Phytoplankton
EMU/UB

ESR 4
Episodic events &
C-microbial
dynamics
DKIT/IGB

WP 3 Future Climate Effects

ESR 5
Modelling
future effects
on lake mixing
UU/UG

ESR 6
Exploring future
change in microbial
dynamics
IGB/DKIT

ESR 8
Modelling
future
impacts on
resilience
UG/UU

WP 4 Assessing ecosystem Resilience

ESR 7
Assessing lake
resilience in
data archives
IGB/UG


ESR 9
DOC/DBPs
Current and
future trends
ICRA/NIOO

ESR 12
Resilience
- an exp.
approach
and
informing
managers
UG/IGB

WP 5 Informing Water Industry

ESR 10
Mitigation for
extreme
events
NIOO/ICRA

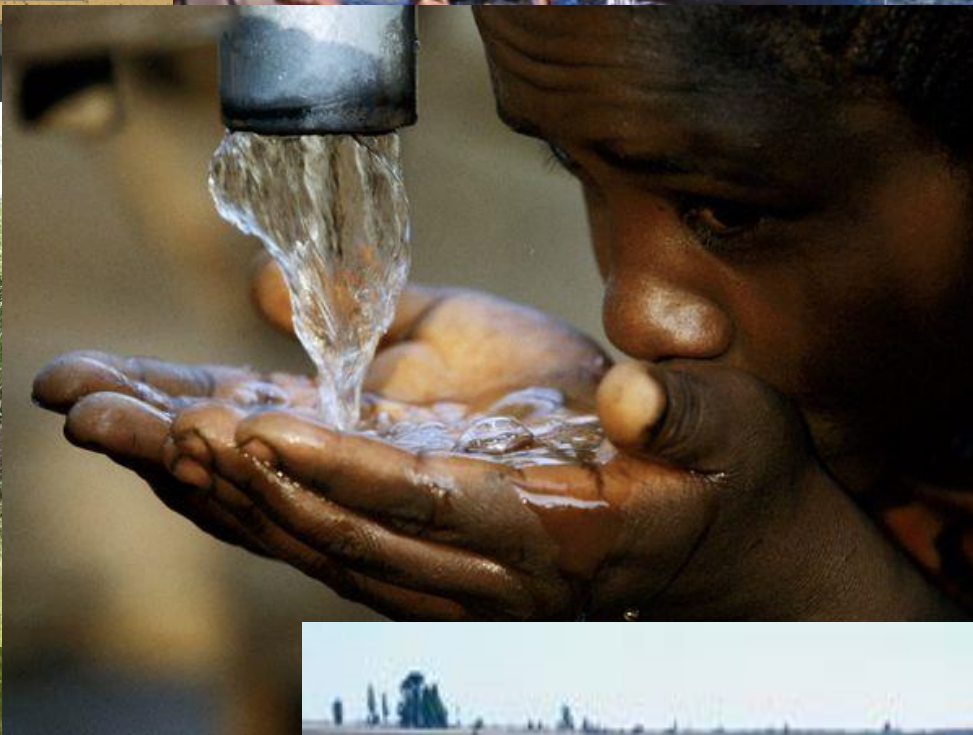
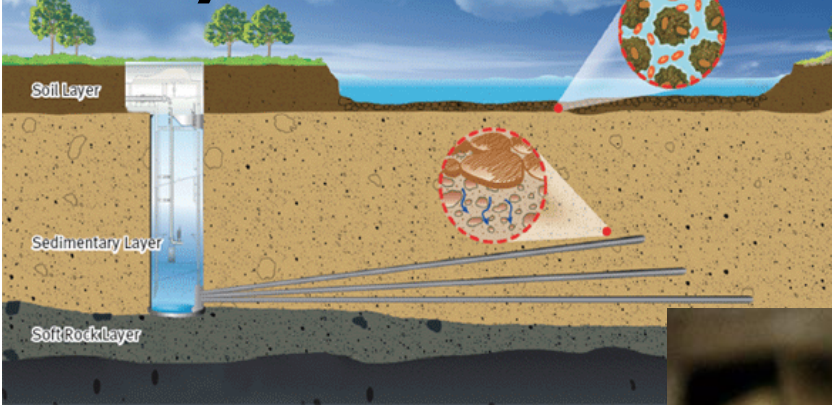
ESR 11
Ecosystems
services – the
Benefit Game
NIOO/ICRA



Human-water interactions: lessons for ecology and management

Riverbed filtration process

Ecosystem services





CLIMATE CHANGE

A TIMELINE

@SEMI-RAD

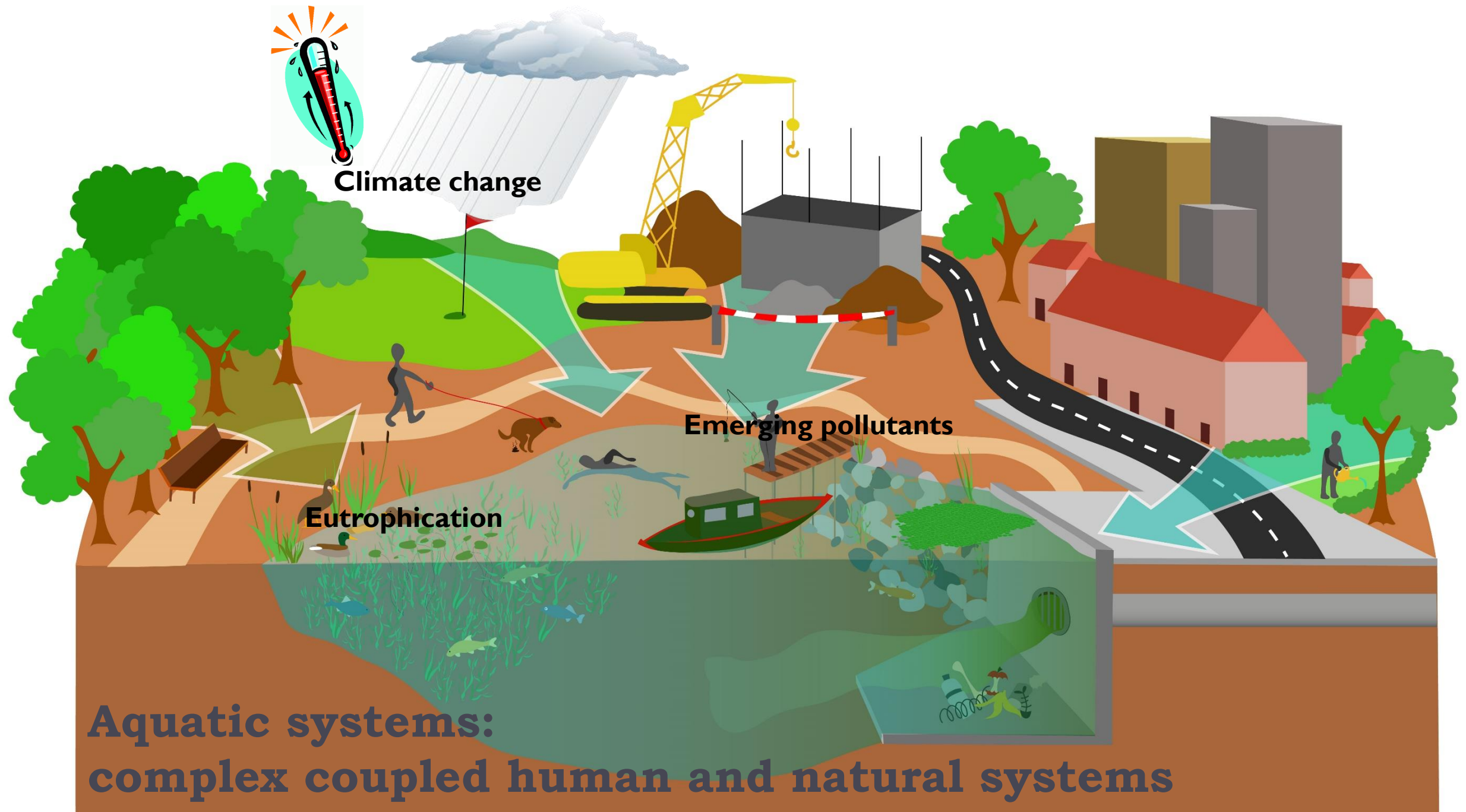
"CLIMATE
CHANGE
ISN'T REAL"

OOPS



OK, CLIMATE CHANGE
IS REAL, WE'RE JUST
NOT CONVINCED IT'S
CAUSED BY HUMANS

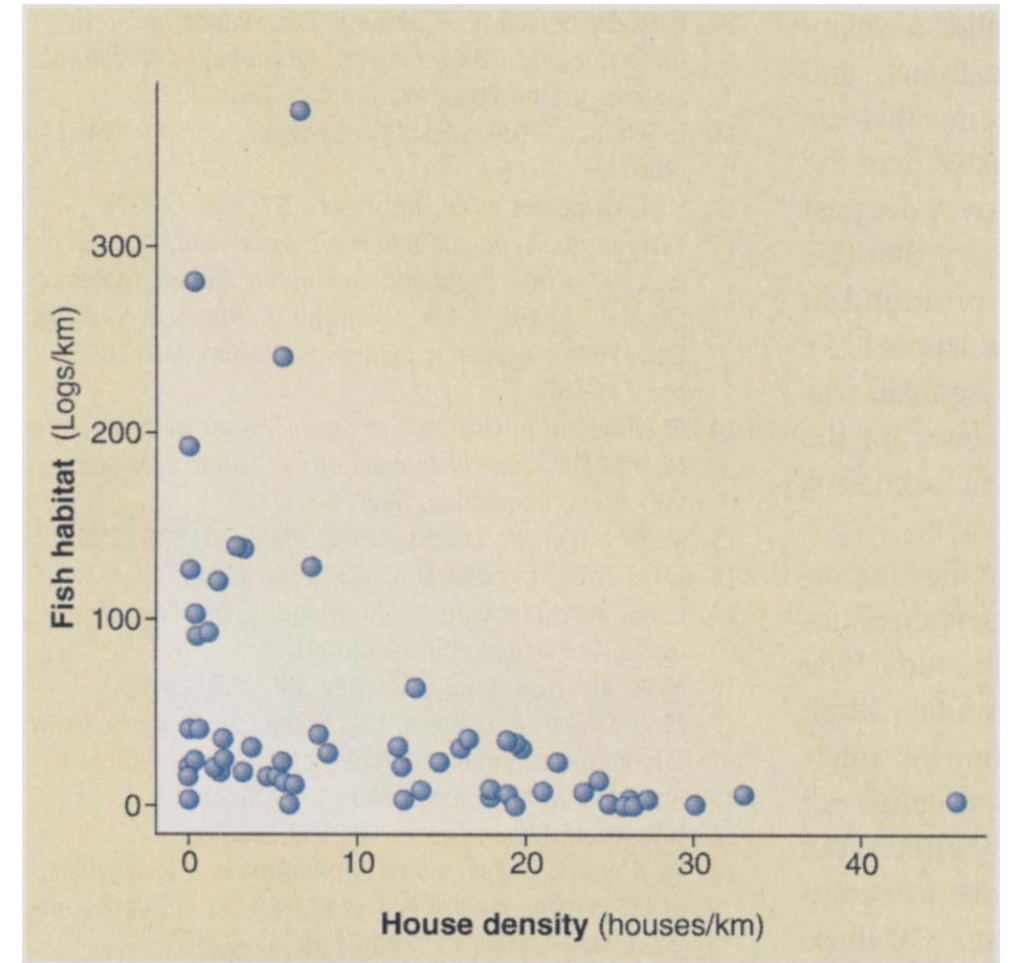




Adapted from Teurlincx et al., COSUST, 2018

Complexity of coupled human-water systems

- ▶ Complex feedback loops
- ▶ Non linearity and thresholds
- ▶ Surprises
- ▶ Legacy effects and time lags
- ▶ Heterogeneity (context dependence)
- ▶ Resilience



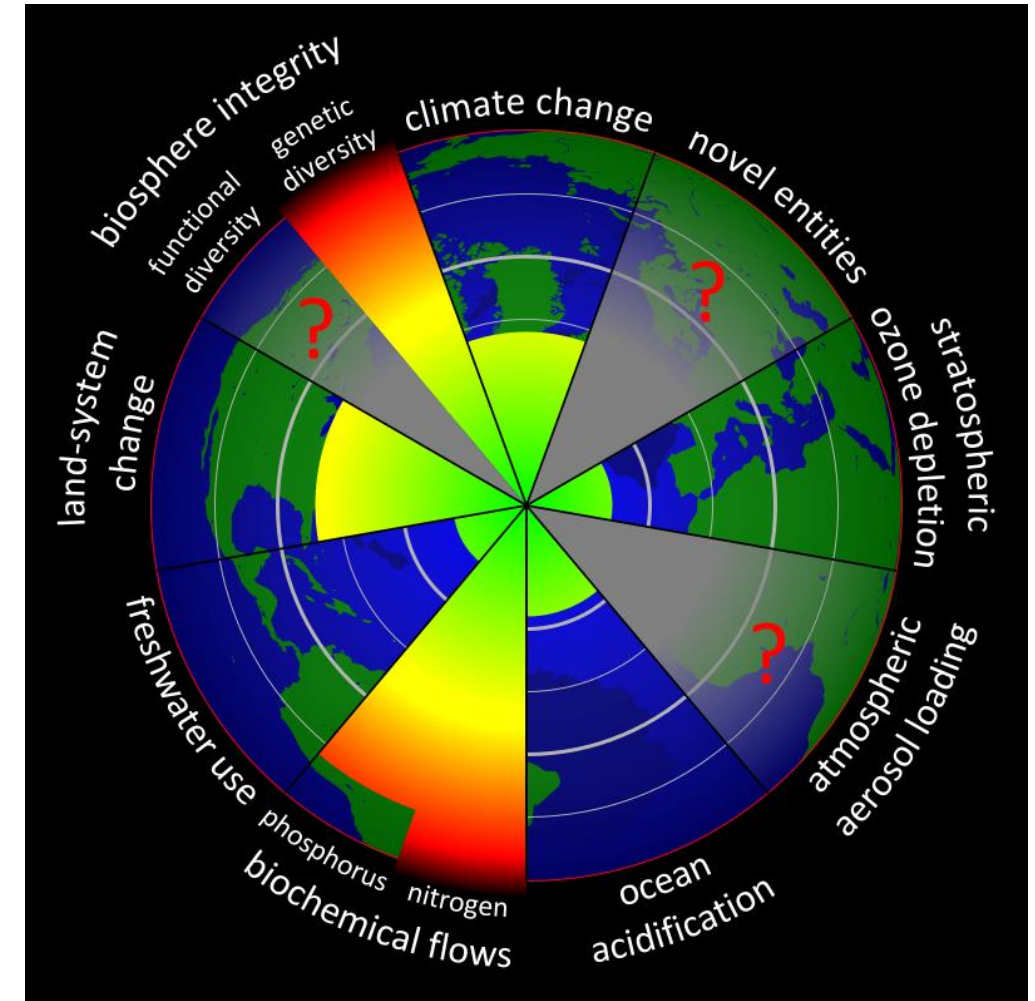
- ▶ Complex feedback loops
- ▶ Non linearity and thresholds
- ▶ Surprises
- ▶ Legacy effects and time lags
- ▶ Heterogeneity (context dependence)
- ▶ Resilience



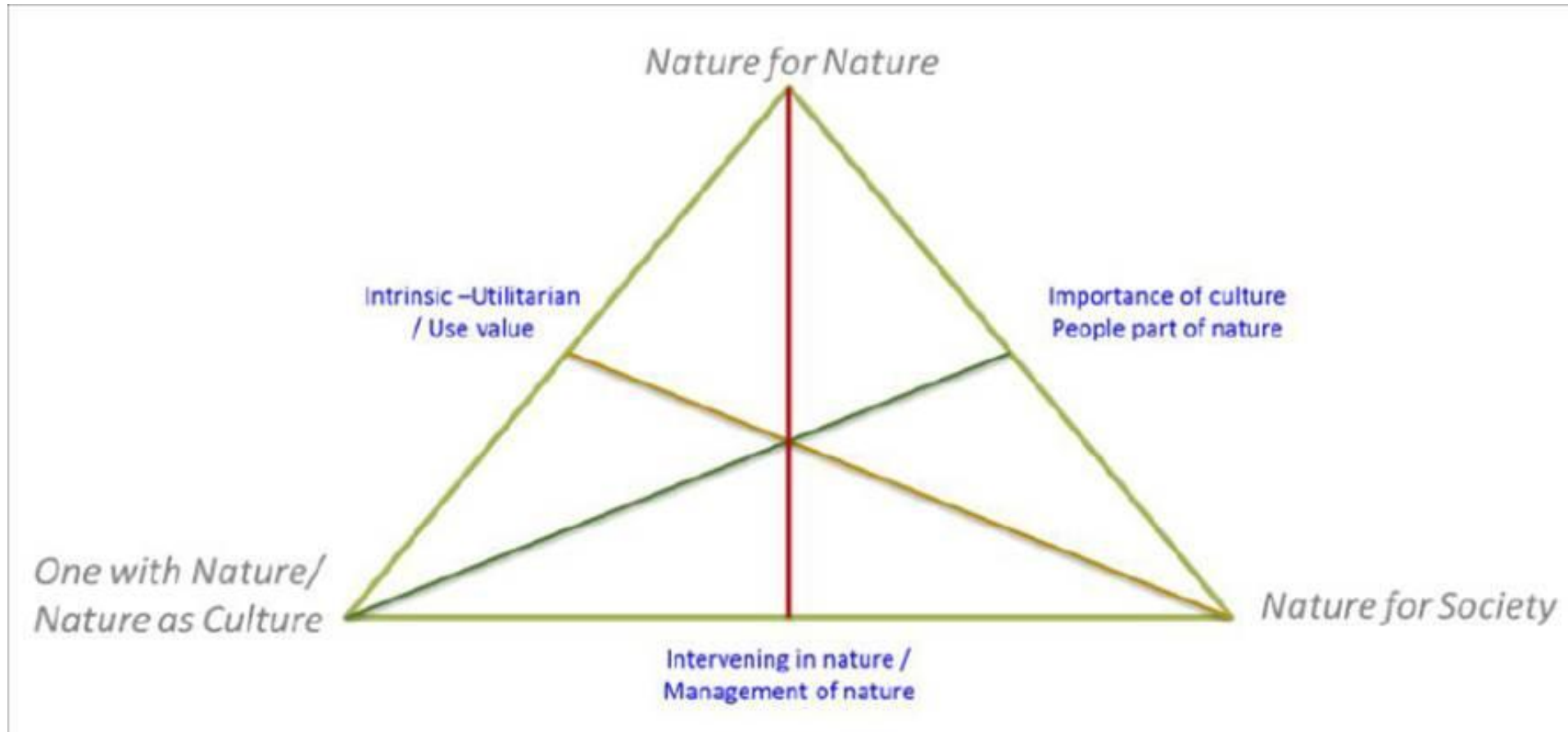
From reaping benefits to recognizing that humans are part of ecosystems



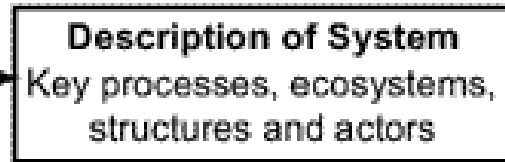
Benefits



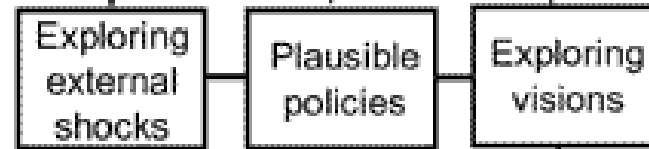
Planetary boundaries



Step 1

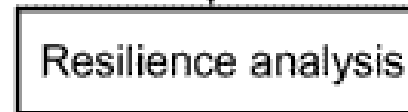


Step 2

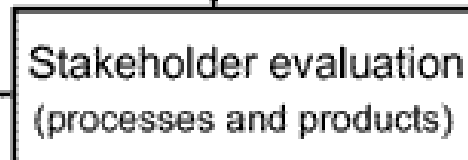


3-5 scenarios

Step 3



Step 4



Better
Integrated
Theories

Policy and
Management
Actions

A conceptual image featuring a large, metallic faucet as the central element. The faucet is positioned over a landscape that is split vertically. The left side of the landscape is a lush, green field with small white flowers, while the right side is a parched, brown, cracked earth. The background is a bright blue sky filled with fluffy white clouds. The faucet's spout is at the bottom, and a small stream of water is visible falling onto the cracked earth. The text is overlaid on a semi-transparent rectangular box in the center of the image.

Water: a finite resource in a fast changing world... how do we better manage these resources?

Program morning

- ▶ 09.30 - 10.00 Opening
- ▶ 10.00 - 10:30 Goals and measures for the Water Framework Directive: how do we make the right choices? (Elisabeth Ruijgrok, Witteveen+Bos)
- ▶ 10.30 - 11.00 Ecosystem services in river basins (Didac Jordà, Catalan Institute for Water Research)
- ▶ 11.00 - 11.30 Coffee break
- ▶ 11.30 - 12.00 Ecological Key factor context: A diagnostic tool for understanding ecosystem services (Alexander van Oudenhoven, Institute of Environmental Sciences of Leiden University)
- ▶ 12.00 - 12.30 Interactive recap of the morning, KAHOOT
- ▶ 12.30 - 13.30 Lunch break with optional tour around the NIOO building



Program afternoon

- ▶ **13:30 - 14:30 Workshop session 1:**
 - ▶ (a) Dutch workshop on usability tools such as key factor Context (Tessa van der Wijngaart (STOWA)
 - ▶ (b) Introduction to the ecological key factor concept (Marloes van der Kamp, Witteveen+Bos/STOWA)
- ▶ **14.30 - 15.00 Break and switch to sessions**
- ▶ **15.00 - 16:00 Workshop session 2:**
 - ▶ (a) The Markermeer (Dutch casus), by Marcel van den Berg, Rijkswaterstaat)
 - ▶ (b) Spanish casus, by Didac Jordà, Catalan Institute for Water Research)
 - ▶ (c) Survey of Maggie Armstrong (PhD student) with practitioners
- ▶ **16.00 - 17.00 Closure and Drinks**

