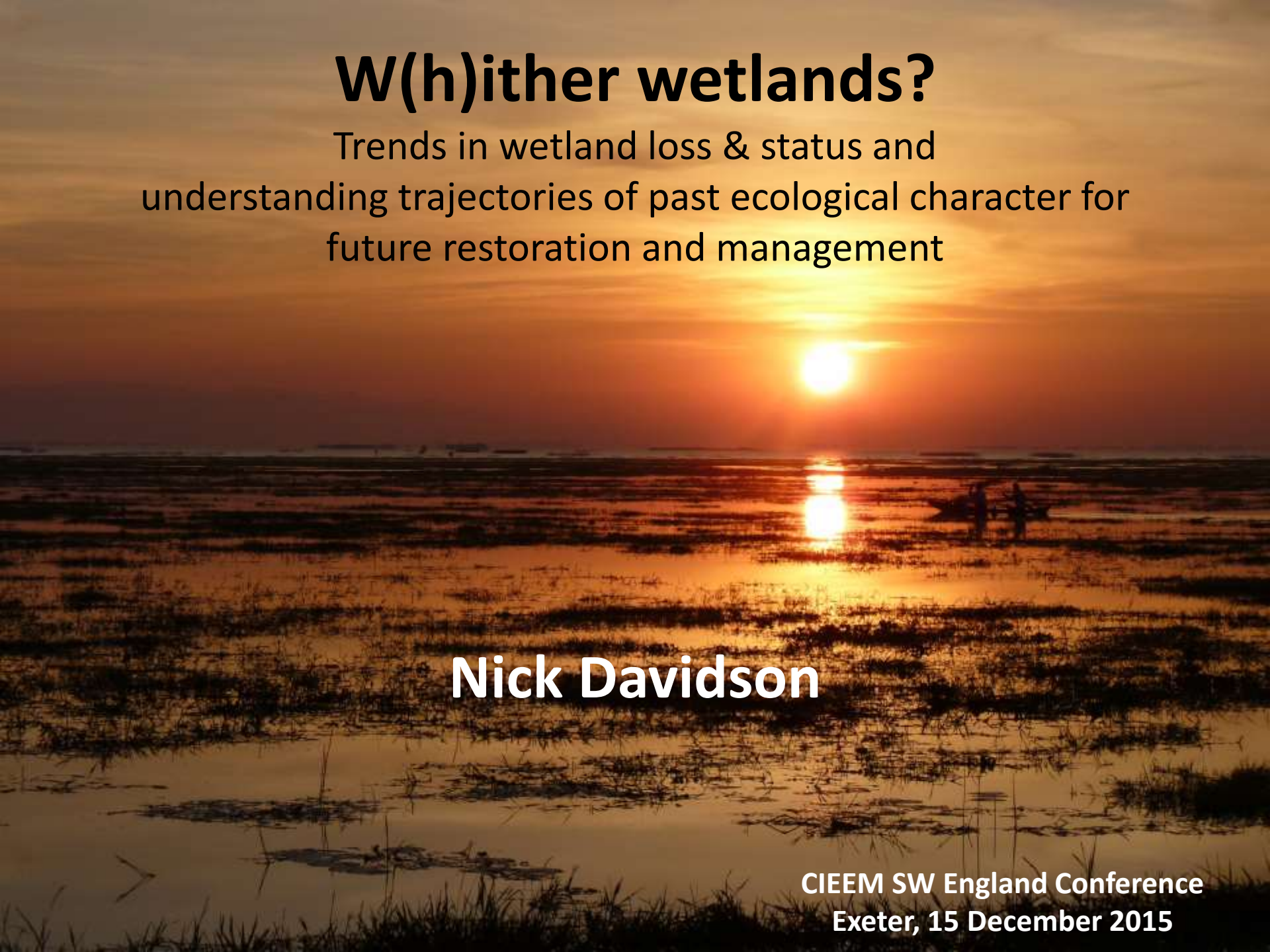


W(h)ither wetlands?

Trends in wetland loss & status and
understanding trajectories of past ecological character for
future restoration and management

Nick Davidson

CIEEM SW England Conference
Exeter, 15 December 2015

1971: The Ramsar Convention's text

"***Desiring to stem* the progressive encroachment on and loss of wetlands now and in the future***"

* to "restrain or stop"

So have we achieved that desire of 45 years ago?

USSR A. FIROUZ (chair) S-AFRICA M.F.MÖRZER BRUIJNS G.MATTHEWS E. CARP

“50% of the world’s wetlands have been lost”

or

“50% of the world’s wetlands have been lost since 1900”

True or false?

False …

- Origins in two 1950s papers citing losses in small parts of USA
- Restated as a global figure by Winkler & DeWitt (1985)
- Frequently re-quoted/mis-quoted since – without audit trail to sources

What extent of losses more realistic?

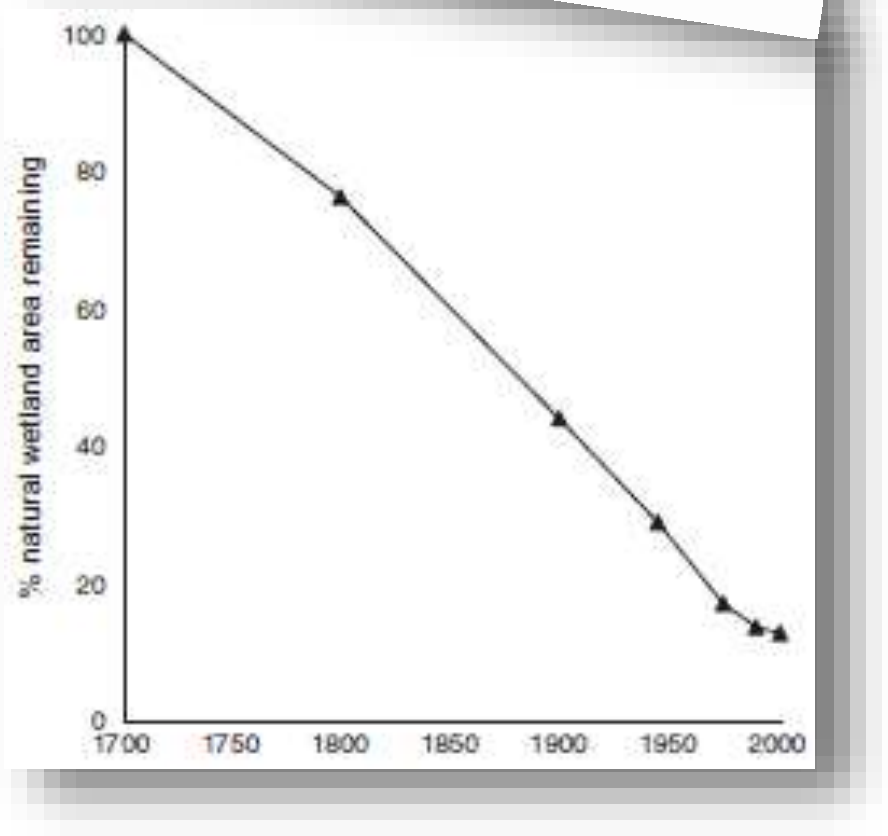
- 2 new papers: Davidson (2014) & Dixon et al (2015)

How much ‘natural’ wetland has the world lost?

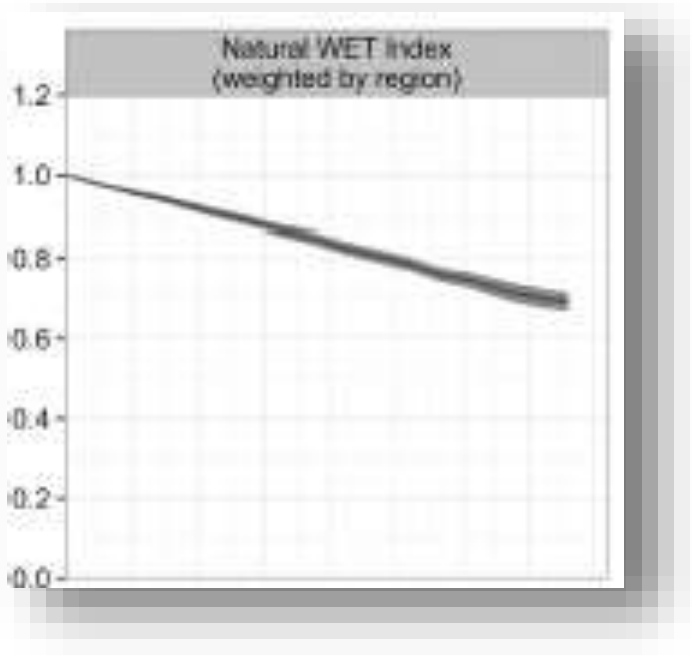
Meta-analysis of 189 cases

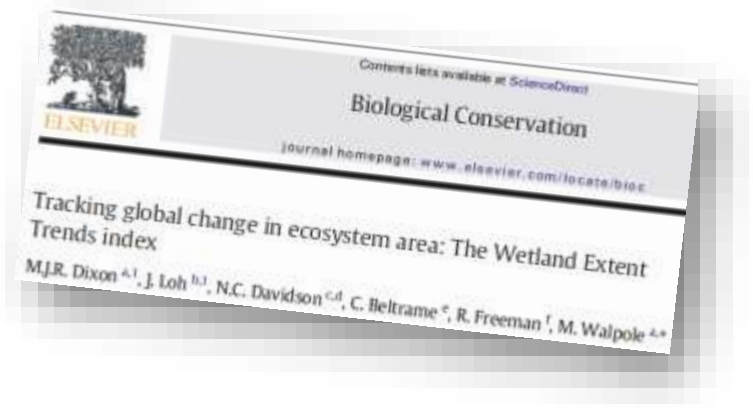
Long-term & 20th Century losses:

- **87%** since 1700 AD
- **64-71%** since 1900 AD
- **20thCentury: 3.7x faster** than historical
- **Losses greatest in Asia & Europe**



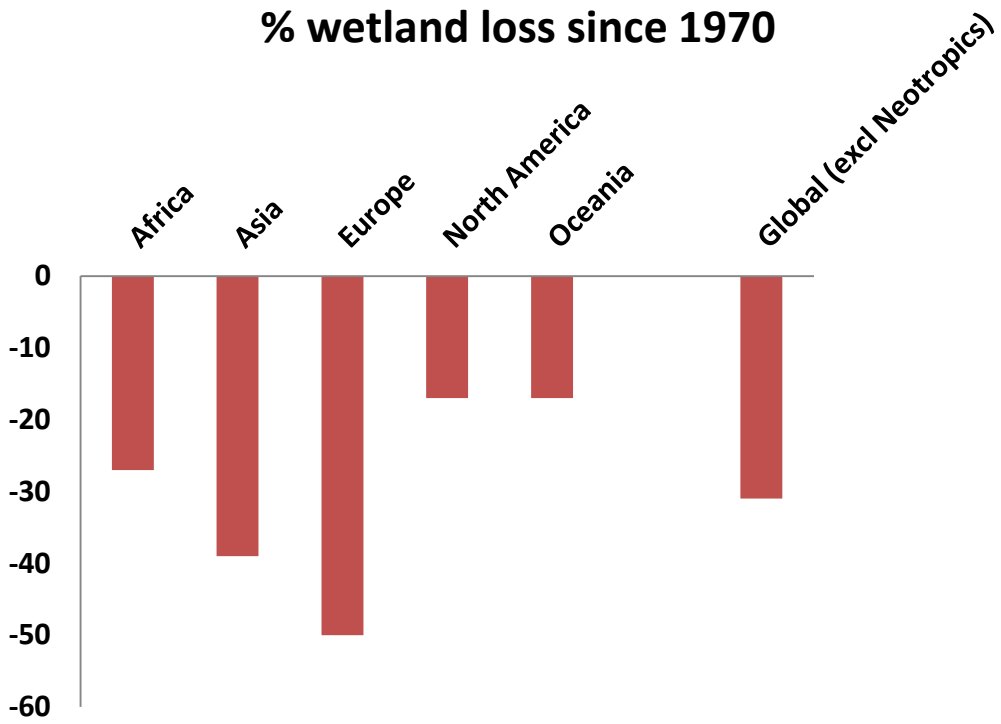
Wetland Extent Trends (WET) Index




Contents lists available at ScienceDirect
Biological Conservation
journal homepage: www.elsevier.com/locate/bioc
ELSEVIER

Tracking global change in ecosystem area: The Wetland Extent Trends index

M.J.R. Dixon [a,1], J. Loh [b,1], N.C. Davidson [c,d], C. Beltrame [e], R. Freeman [f], M. Walpole [d,*]



31% natural wetland loss since 1970

Europe: 50%; Asia 39%

Paper free to download

(to 8 Jan 2016):

http://authors.elsevier.com/a/1S3XR1R~d-O9a

We know where the problem lies …

- Wetlands as “waste-lands”
- Demands of economic & population growth still over-riding maintenance of wetlands and their benefits (services) to people
- Drivers: ecosystem degradation; water regulation; agriculture

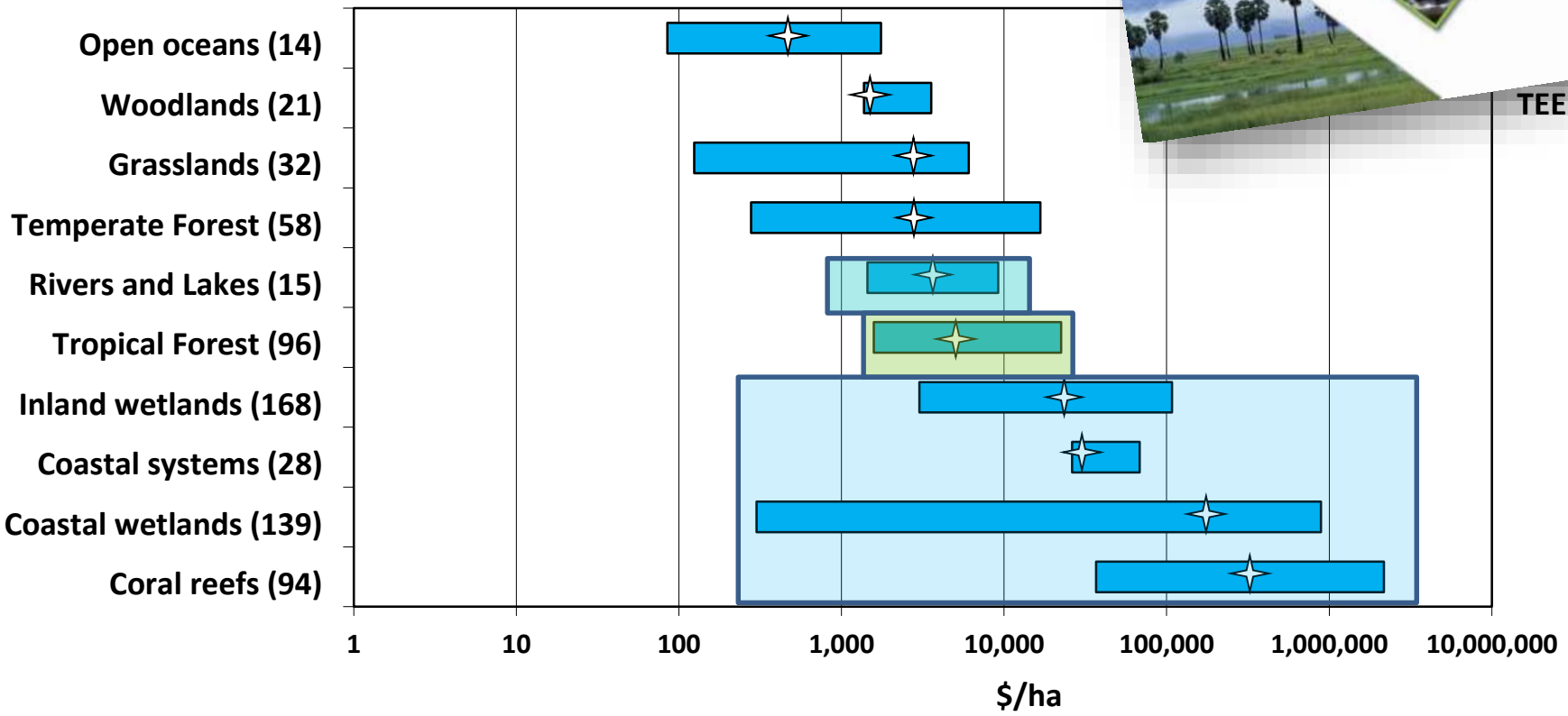
- **So just how valuable are wetland services?**

What is the most important/valuable ecosystem in the world?

Natural wetlands give us huge value ...

and often even more than other ecosystems such as forests

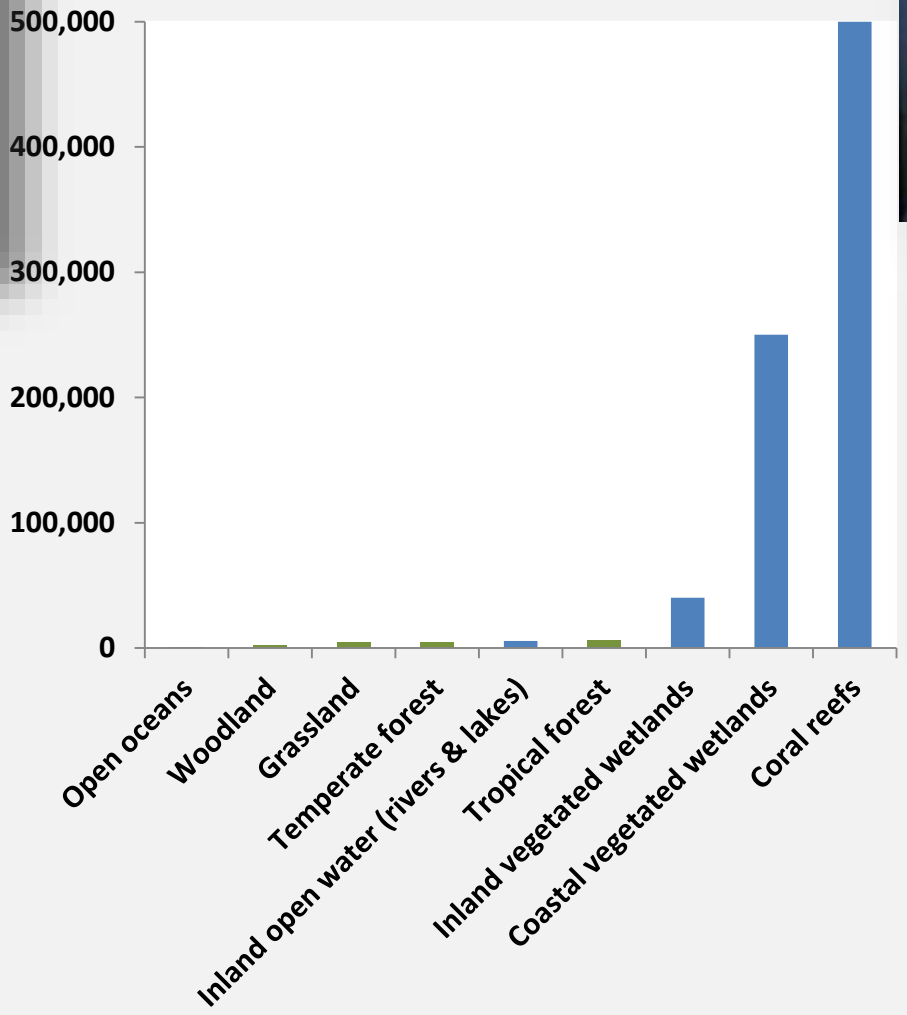
TEEB 2013



Natural wetlands give us huge value ...

Total value (average $/ha) of wetlands & other ecosystems

(derived from de Groot *et al.* 2012)

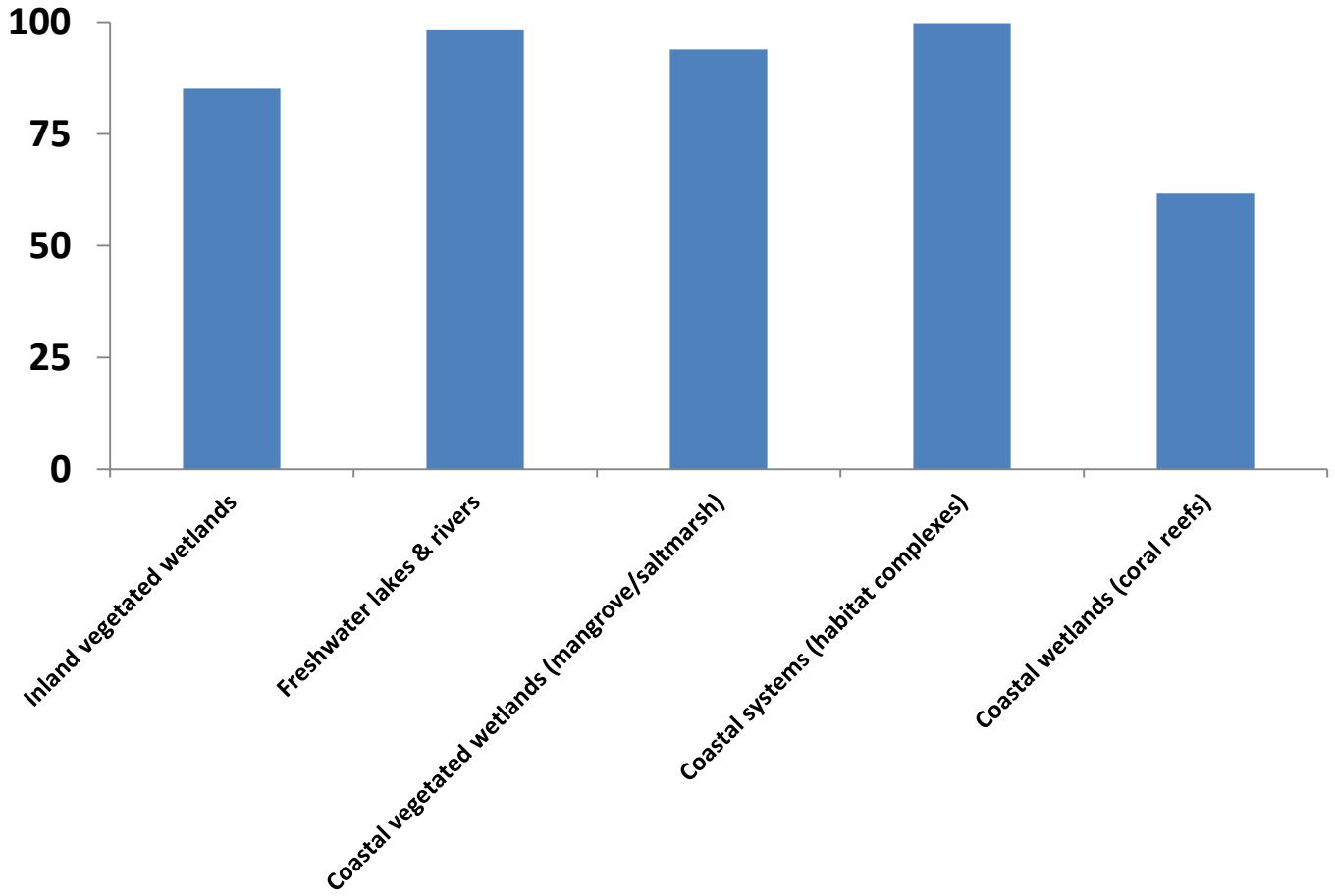


Value of wetlands' services

Hugely "water-related": 85-95% of total values

Water-related service values as
% of total provisioning & regulating services

Services included: freshwater supply, moderation of extreme events, regulation of water flows, waste treatment/water purification, nutrient cycling.



With major losses but very high values, are we maintaining our remaining wetlands?

Still big gap in the Ramsar guidance and reporting on wetland status

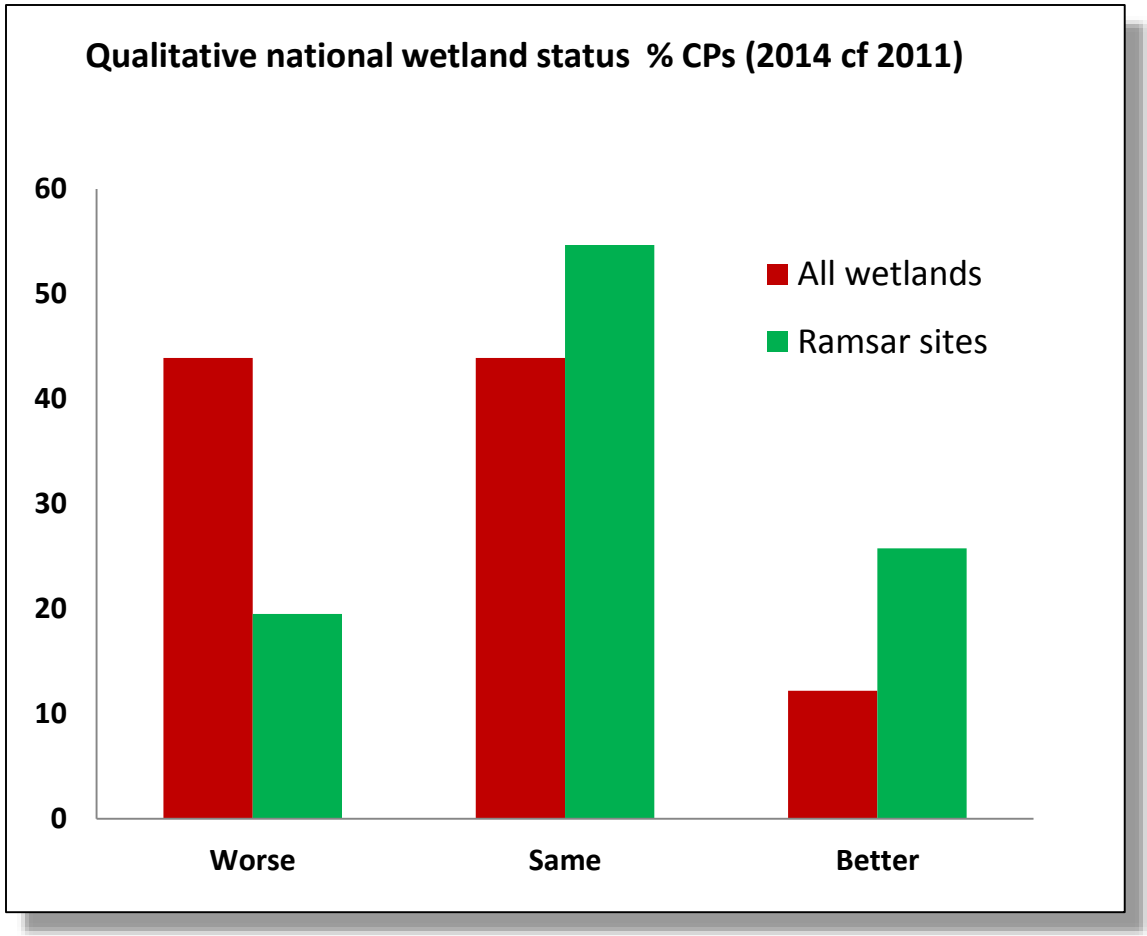
- whether a described wetland ecological character is “good” or “bad”; “favourable” or “unfavourable”

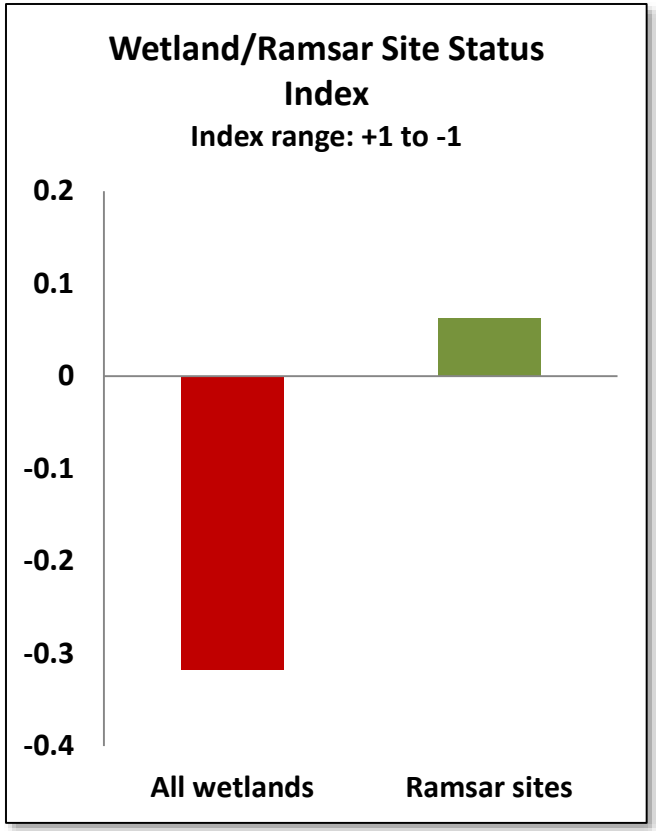
Ramsar Contracting Parties provide some qualitative information in triennial National Reports

What do they tell us?

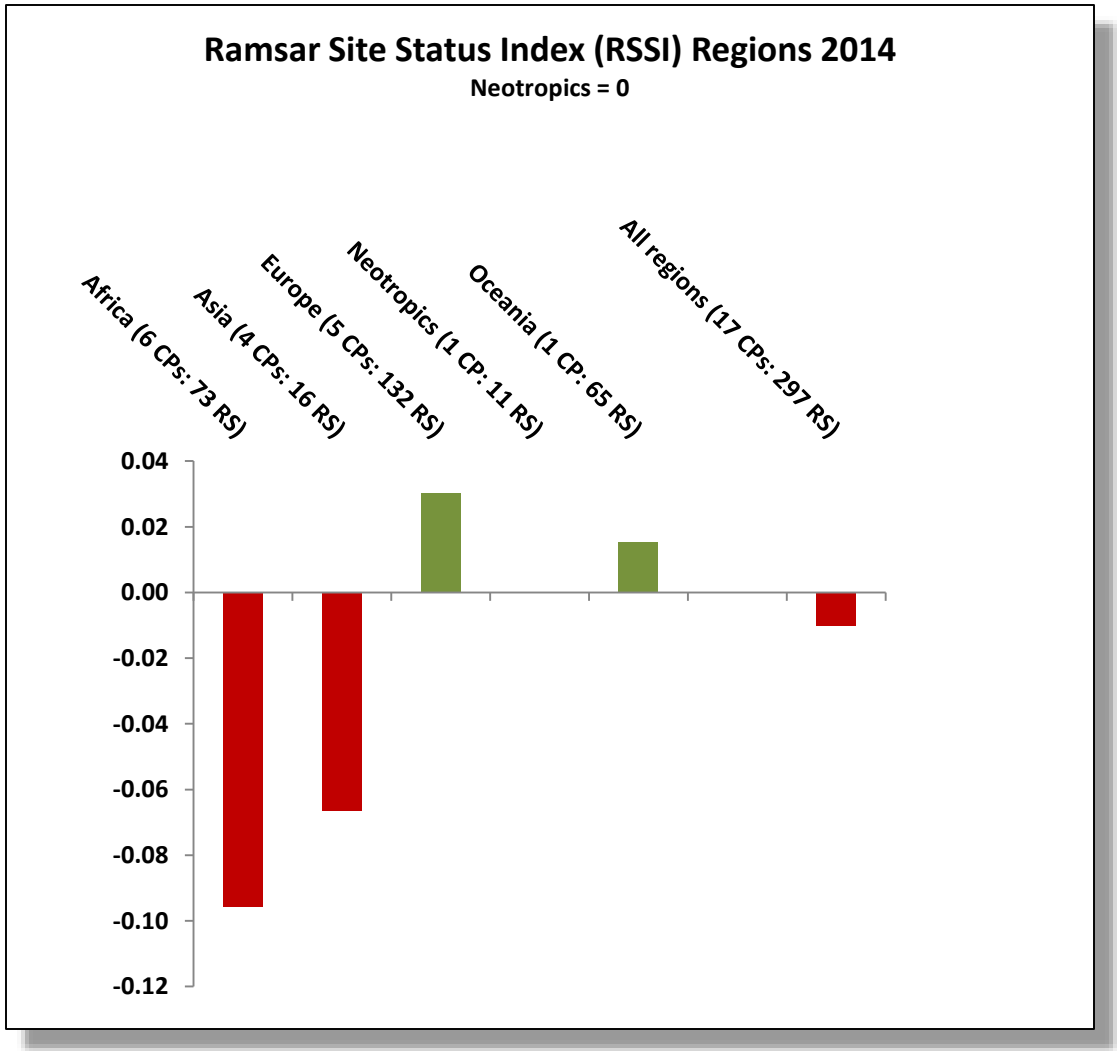
Ecological character status of wetlands & Ramsar Sites

- All wetlands in worsening condition
- Ramsar Sites better condition than all wetlands
- But even Ramsar Sites in worsening condition in almost 20% of countries





Status of individual Ramsar Sites



Only 13% of Ramsar Sites reported so far

- 297 Ramsar Sites

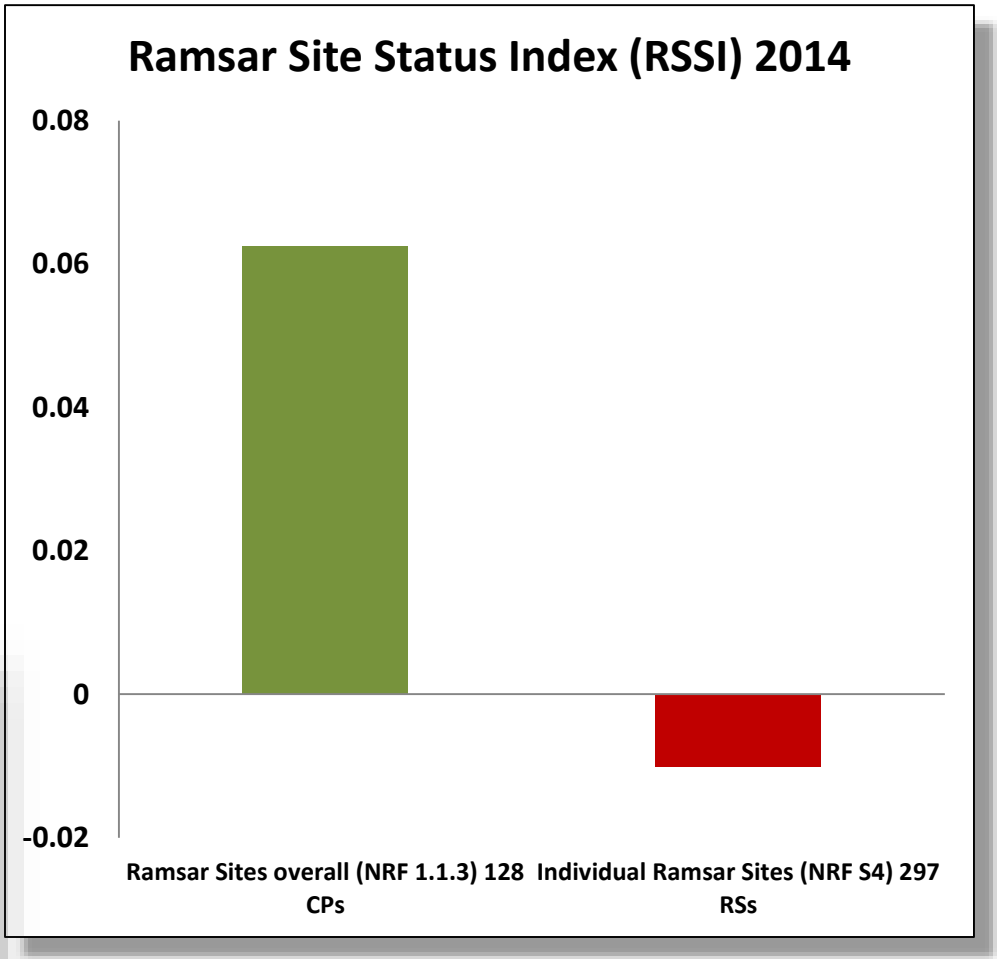
Regional differences:

- Europe, Oceania better status
- Africa, Asia worse status


Urban wetland, Bangkok

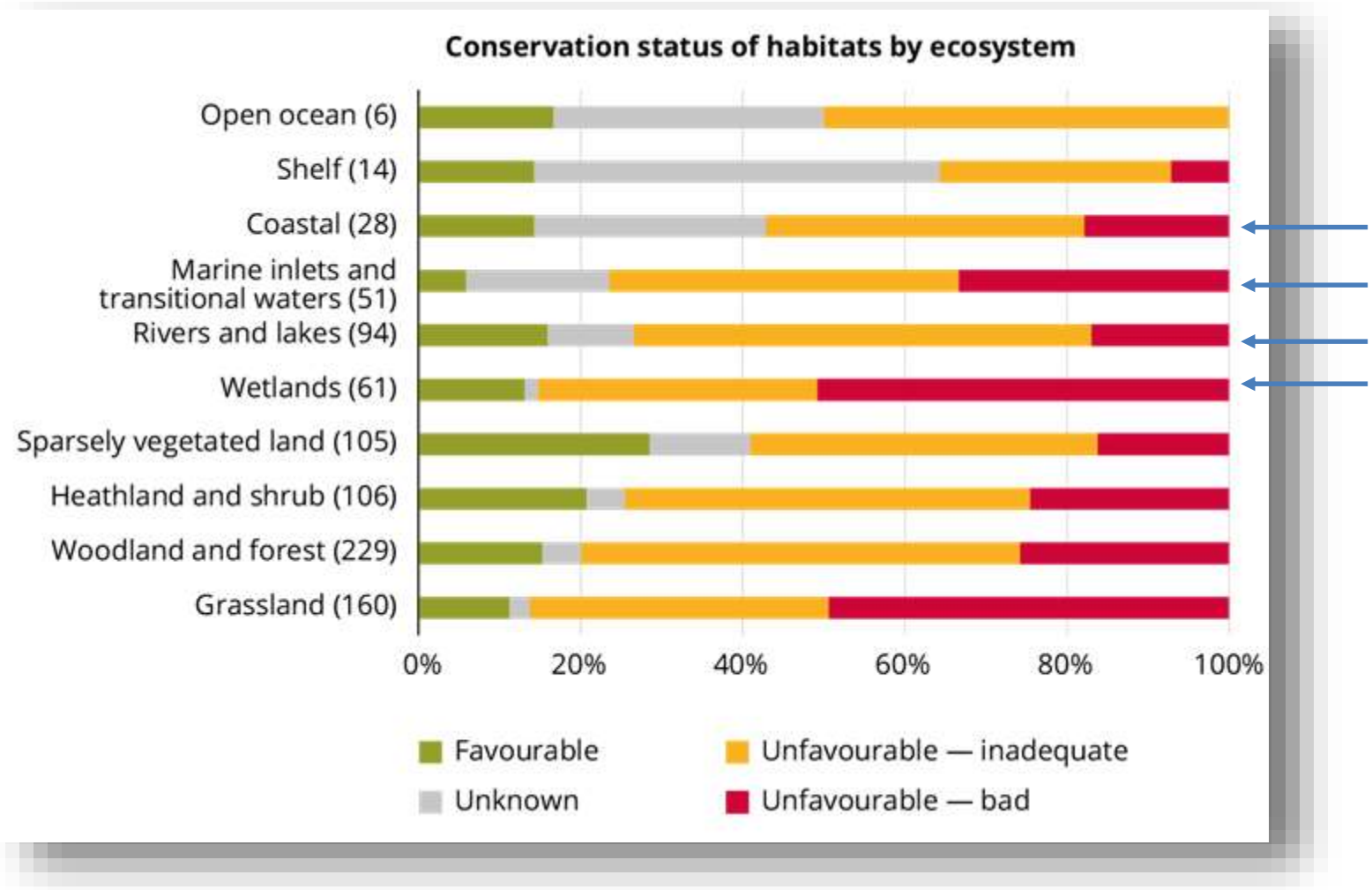
Ramsar Site status:
Overall status vs individual Ramsar Sites

- Contracting Parties seem more 'optimistic' in their general reporting of Ramsar Site status
  - than from the status of individual Ramsar Sites




Moeyungyi Ramsar Site, Myanmar

EEA State of Europe's Environment 2015



Is wetland restoration the answer?

Potentially - if well planned and executed


STRP
Scientific and Technical Review Panel

Briefing Note

Number 4, May 2012

Ramsar Convention on Wetlands

Purpose of this BN

The benefits of wetland restoration

But …

"[Wetland] restoration performance is limited:

- *current restoration practice fails to recover original levels of wetland ecosystem functions,*
- *even after many decades*."

"If restoration as currently practiced is used to justify further degradation,

- *global loss of wetland ecosystem function and structure will spread*."

Why?

Moreno-Mateos *et al.* 2012, PLoS Biology (621 restored wetlands)


Structural and Functional Loss in Restored Wetland Ecosystems

David Moreno-Mateos[1,2]*, Mary E. Power[1], Francisco A. Comín[3], Roxana Yockteng[4]

Is wetland restoration the answer?

Many reasons for restoration failure:

- need to better recognise
  - "*holistic wetland restoration benefits*"
    - Restore wetland functions and processes, not for e.g. conditions for a particular species
  - *Full suite of restoration benefits*
    - Cultural and socio-economic, not just environmental
  - *Baselines/reference conditions for restoration*
    - With changing climate, restoring to a prior condition increasingly unlikely to be successful

Is wetland restoration the answer?

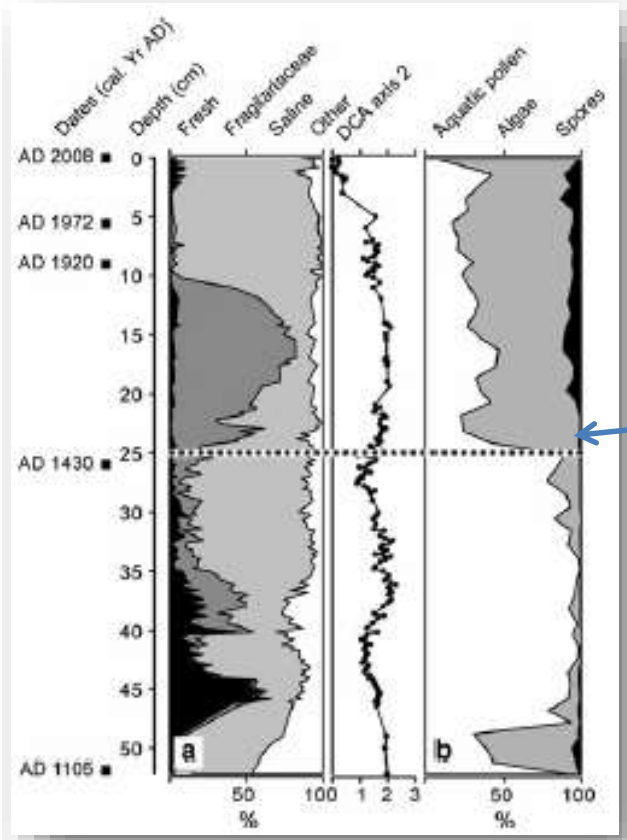
Baselines?

- What baseline to choose a matter of societal choice:
  - "what do you want it to be like"
- "Generational amnesia"
  - Little memory of what wetland was like in our parents' or grandparents' time (or before that)
  - Tendency to want to restore back to our first memory of the place
  - But that state may be very different from its 'natural' state, or potential future state

Past trajectories, not baselines:
importance of palaeo-ecology

Digging further back into the past:

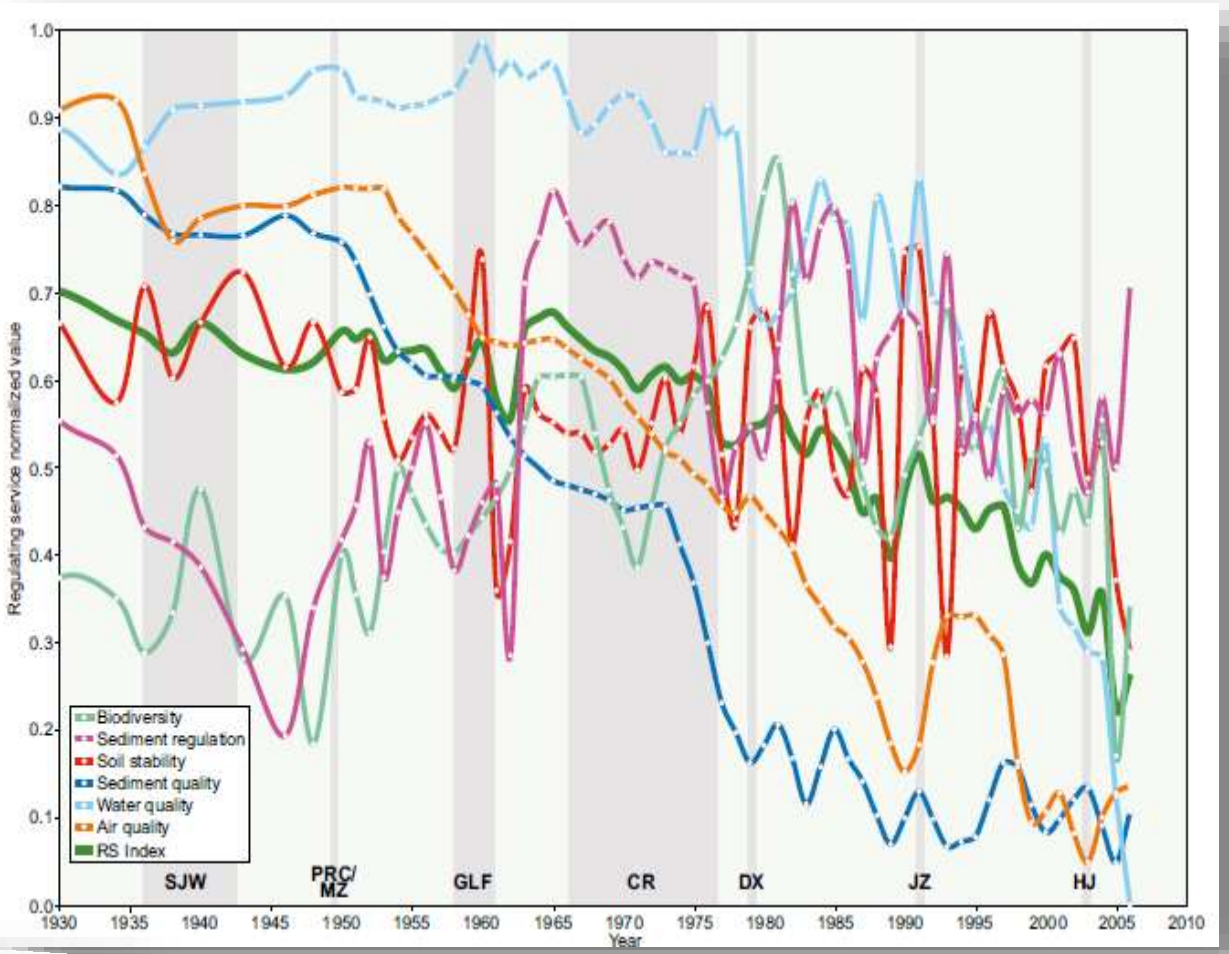
- reminds us that all wetlands change naturally over time
- tells us how the wetland has changed over time
  - Naturally and through human intervention
- helps predict how it may change in the future
- ***Can give some big surprises…***



- 1000-year trajectory
- Major shift from macrophyte-dominated to algal-dominated
- c. AD 1430
- Australia, so long before European settlement interventions
- More likely climate-related

Importance of palaeo-ecology: long-term ecosystem service trends

- Palaeo-record as proxies for services
- Regulating Services trends since 1930
- Yangtse Basin, China
- Dearing *et al.* 2012 *PNAS*



Extending the timescale and range of ecosystem services through paleoenvironmental analyses, exemplified in the lower Yangtze basin

John A. Dearing[a,1], Xiangdong Yang[b], Xuhui Dong[b], Enlou Zhang[b], Xu Chen[b], Peter G. Langdon[a], Ke Zhang[a], Weiguo Zhang[c], and Terence P. Dawson[a]

Knowing palaeo-ecology trajectories

E.g. Norfolk Broads:

- Palaeo-ecology has helped:
  - confirm origin as medieval peat diggings, not natural
  - managers understand causes and mechanisms of change in ecological character
  - determine restoration options and trajectories

England's Wetland Landscape: A 50-year vision for wetlands

- Admirable aims and goals: "*restoration of freshwater wetlands for people*"
  - but only part of the wetland resource: what about restoring coastal wetlands?
  - Need to ensure that Vision delivery:
    - addresses the wholesale restoration of the former wetland extents
      - to optimise the benefits/services they can provide
    - rather than focus only on management/restoration of just the small remaining pockets of wetlands for biodiversity/species conservation

England's Wetland Landscape:
A local vision for Wigmore Lake, Herefordshire

- Former glacial lake
- River Teme floodplain
- Drained: used to winter flood, to 1990s
- Much is Grade 4 (poor) agricultural land
- Little infrastructure/ buildings
- 1 small (<9 ha) wetland nature reserve remaining
- ***Landscapes for Living*** (West Midlands Biodiversity Partnership):
  - Rivers & floodplains: will be "***linked and enhanced with particular emphasis on restoring […] floodplain systems to alleviate flooding***"