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Climate change, water and wetlands – managing for change



Draft Resolution X.24 Climate change and wetlands



Document 25

Additional information on climate change and wetland issues

Key messages



1. **Global climate change is occurring more rapidly than in the past**
2. **Climate variability is natural and projected to increase under global climate change**
3. **Many wetlands and species are already under immense pressure – high level of loss and degradation globally**



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« Healthy wetlands, healthy people »

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4. Climate change/variability will increase these pressuresexpected further loss

5. Data/information for assessing responses is often inadequate or not available

6. Risk and vulnerability analyses are useful for assessing priorities for action/data



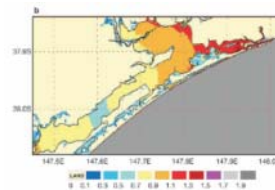
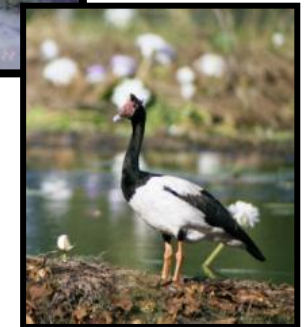
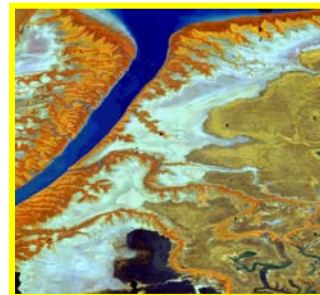
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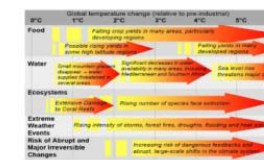
« Healthy wetlands, healthy people »

Discussion

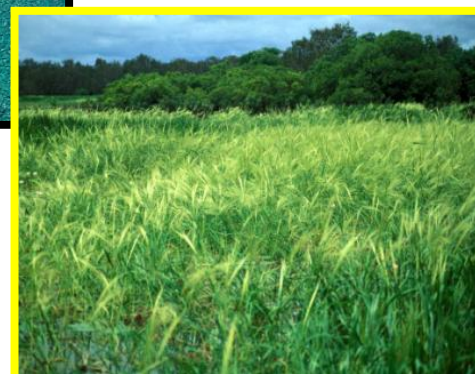
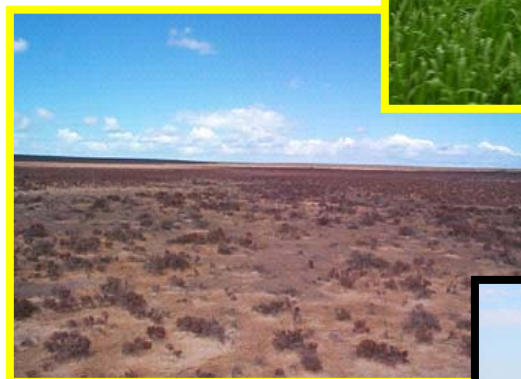
- Wetland types
- Climate change and sea level rise
- Vulnerability
- Responses...



Projected impacts of climate change



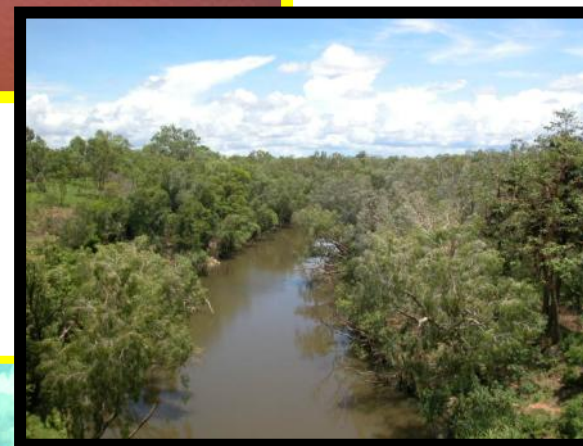
Swamps, marshes, lakes



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« Healthy wetlands, healthy people »

Rivers & flood plains



« Healthy wetlands, healthy people »

Salt flats & mangroves



« Healthy wetlands, healthy people »

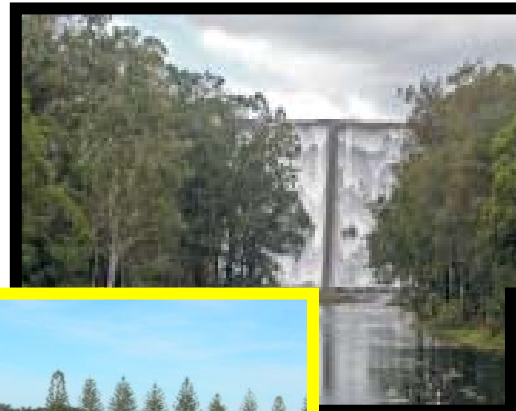
Reef systems



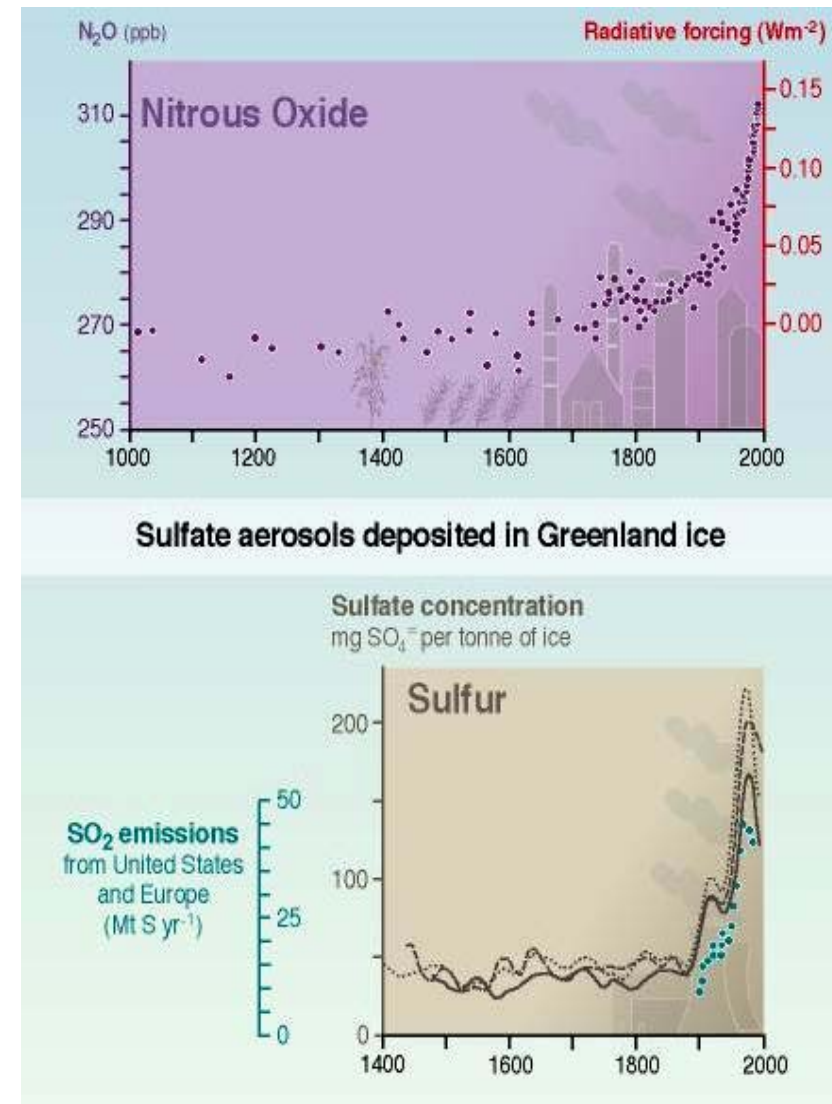
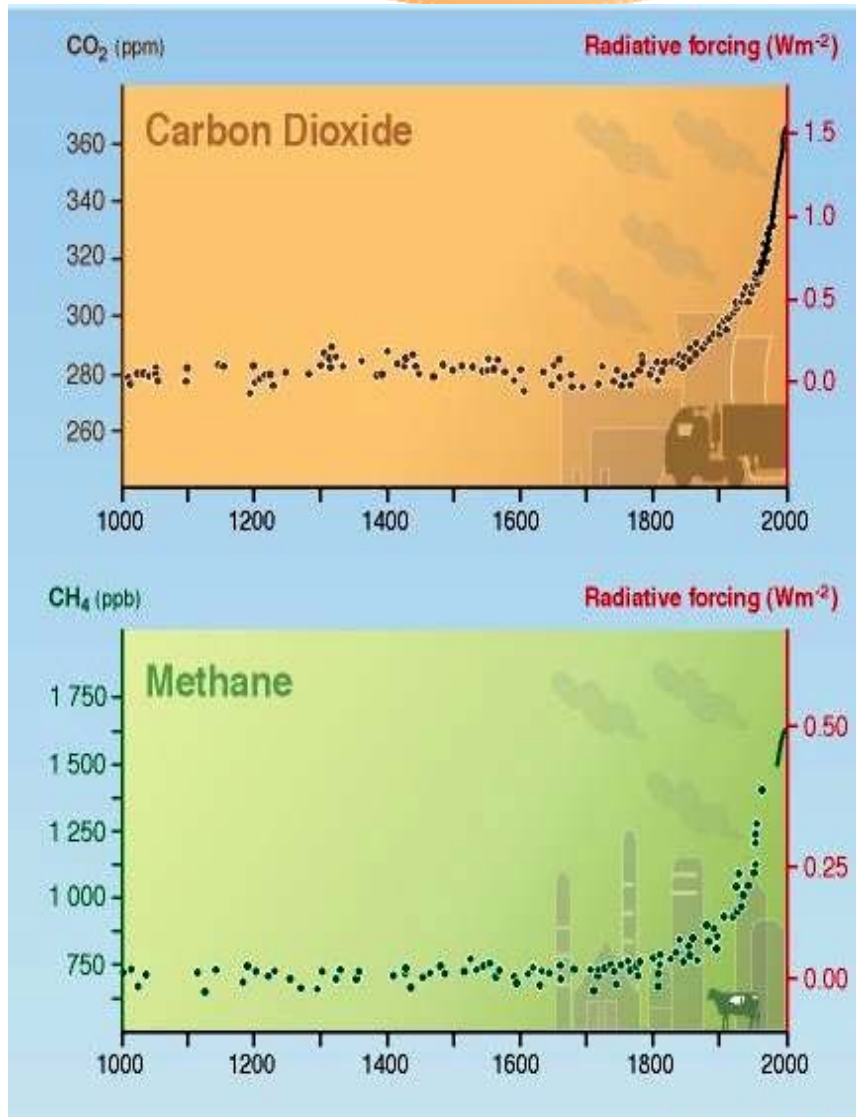
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« Healthy wetlands, healthy people »

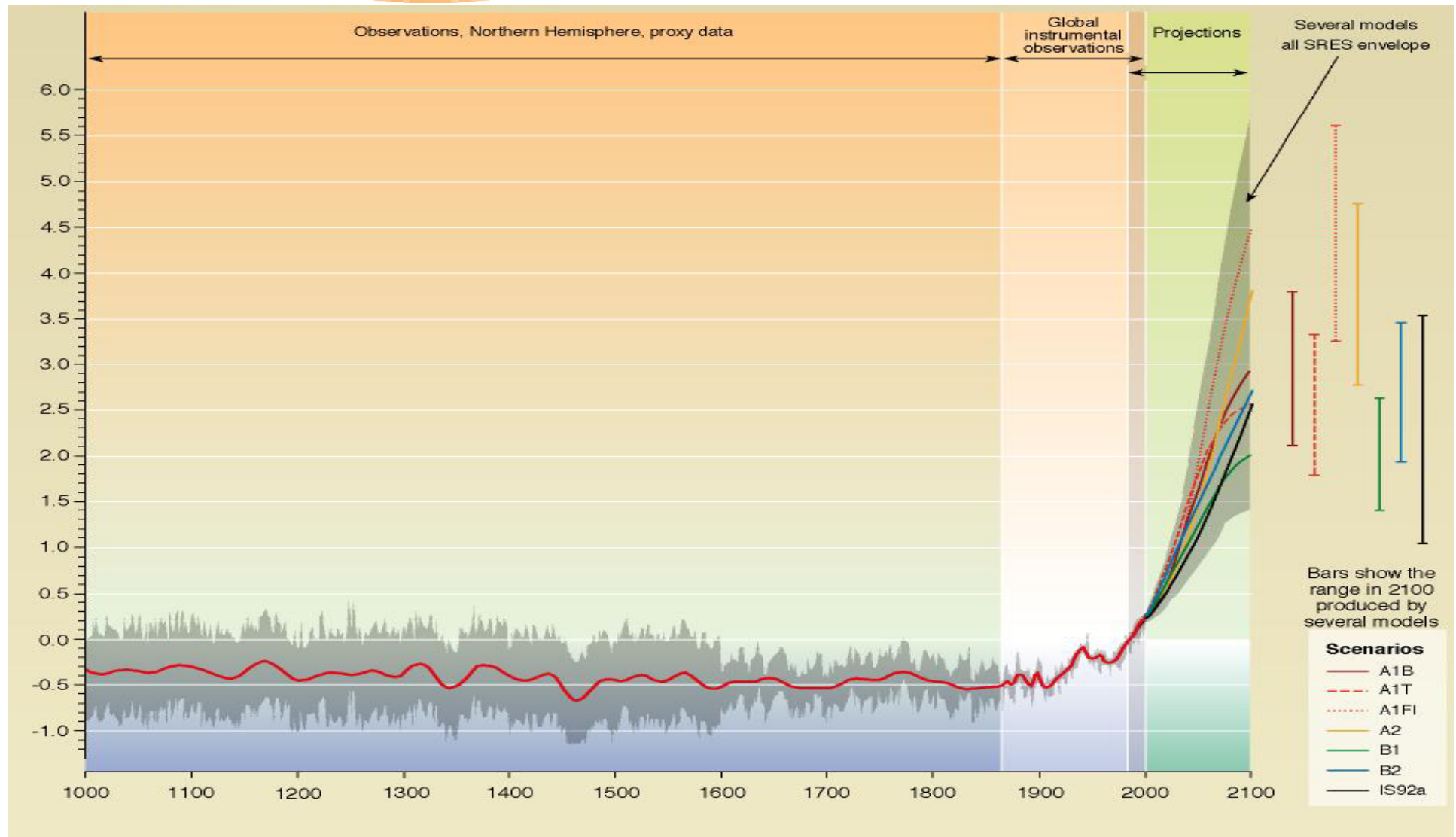
Artificial wetlands



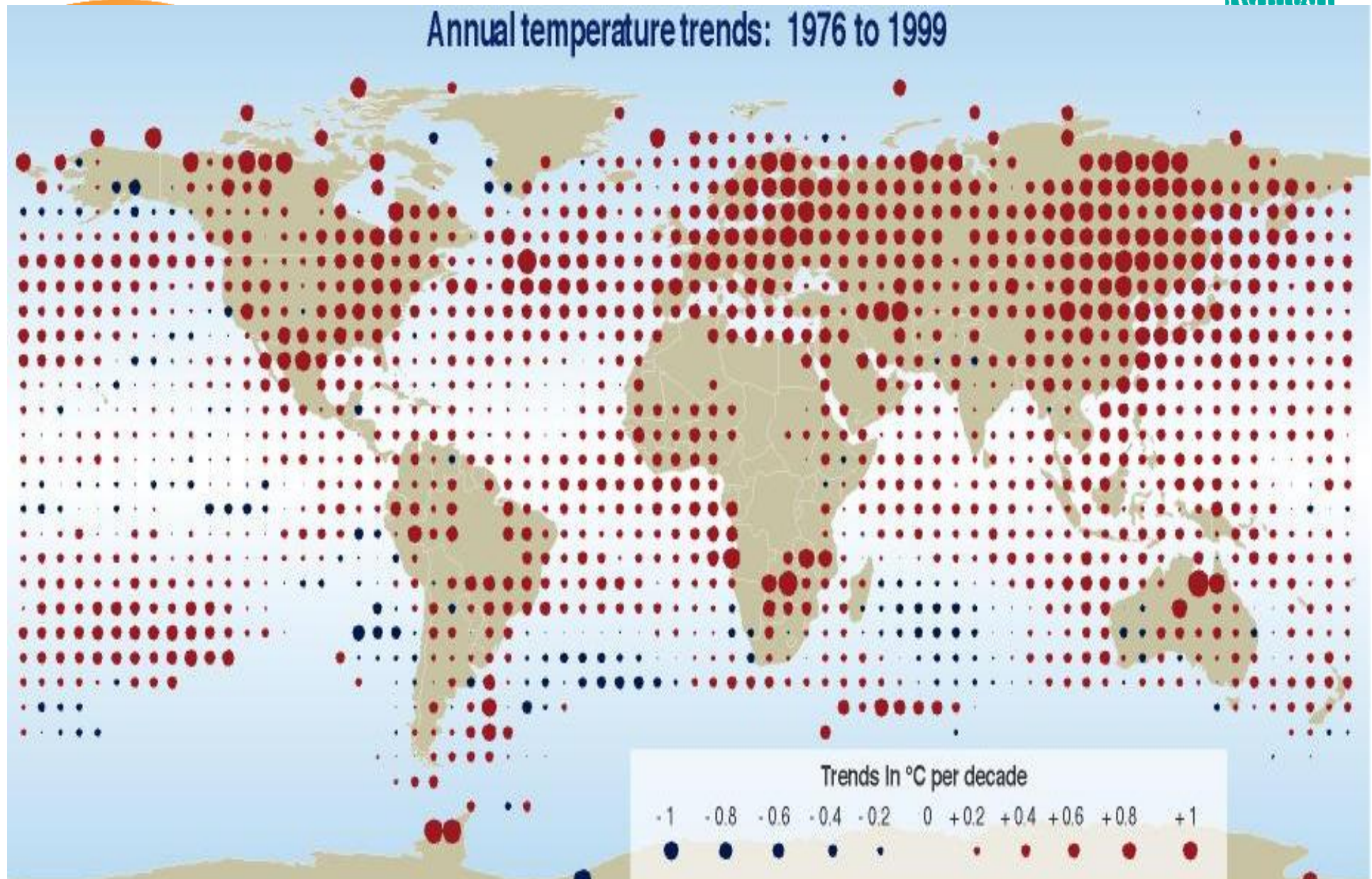
Human activities have changed the composition of the atmosphere since the pre-industrial era



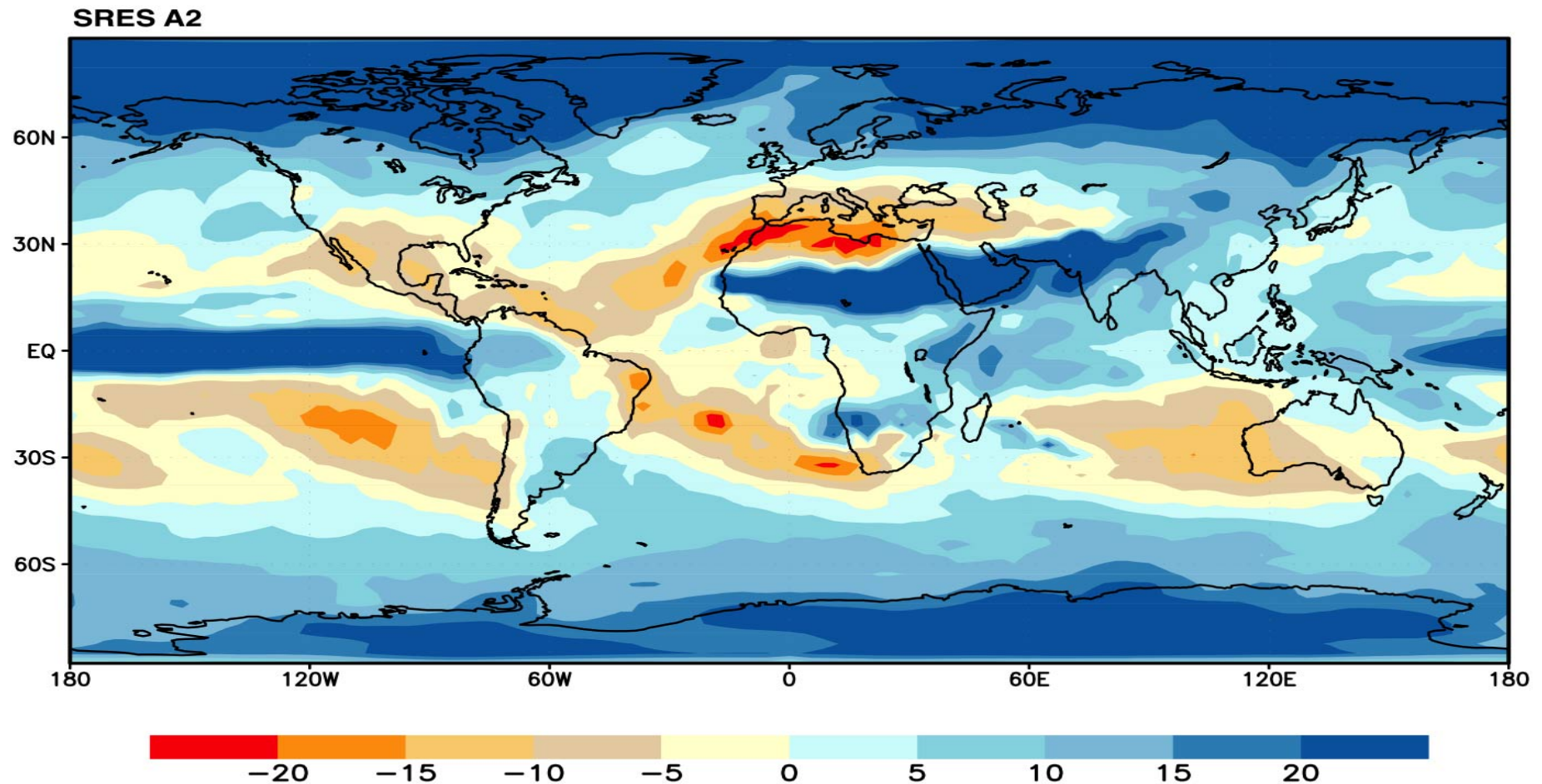
Projected temperatures during 21st C are much higher than at any time during the last 1000 years



The land and oceans have warmed 0.4 - 0.8 °C



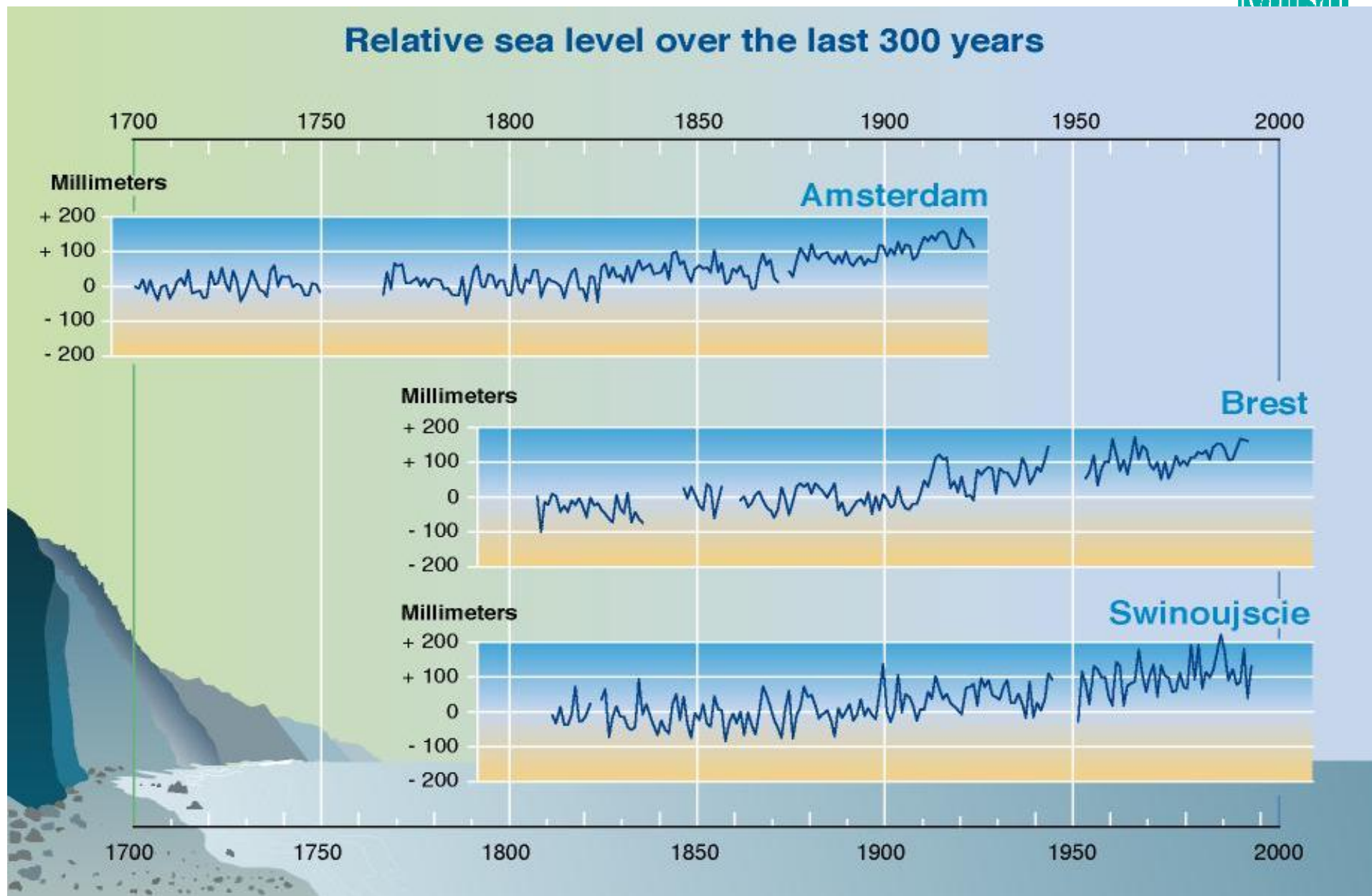
Some areas projected to become wetter, others drier



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Between 1900-2000 sea levels rose by 10-20 cm



Sea level rise

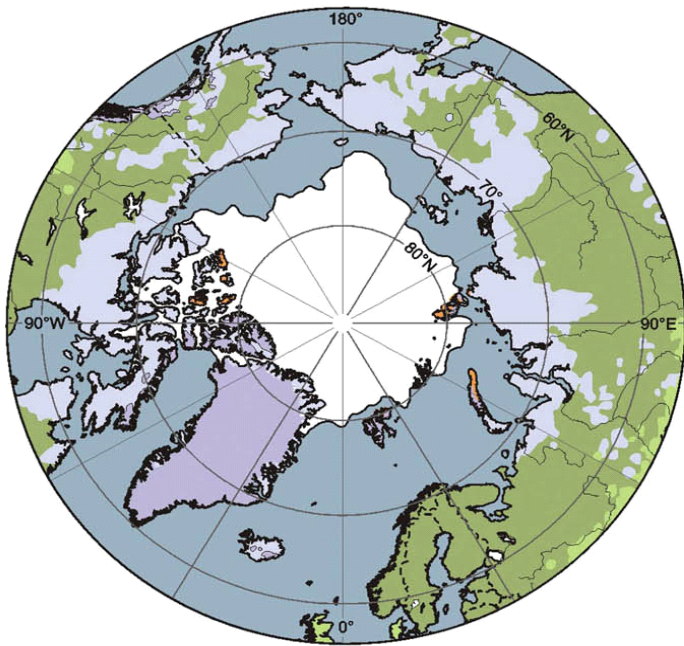


- **Major change to wetland water regimes – flooding/drying**
- **Sea level rise inundates coastal wetlands – tidal & storm surge**
- **Further salinisation - loss of freshwater wetlands**
- **Loss/change of habitat e.g. migratory birds – intertidal and inland habitats**
- **Loss of ecosystem services and livelihoods** « Healthy wetlands, healthy people »

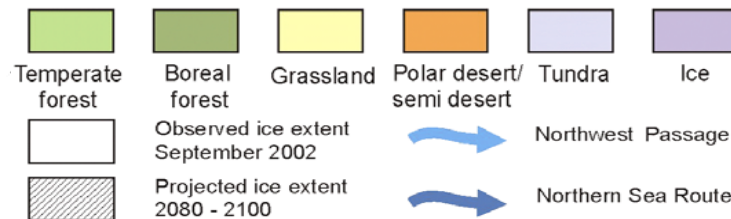
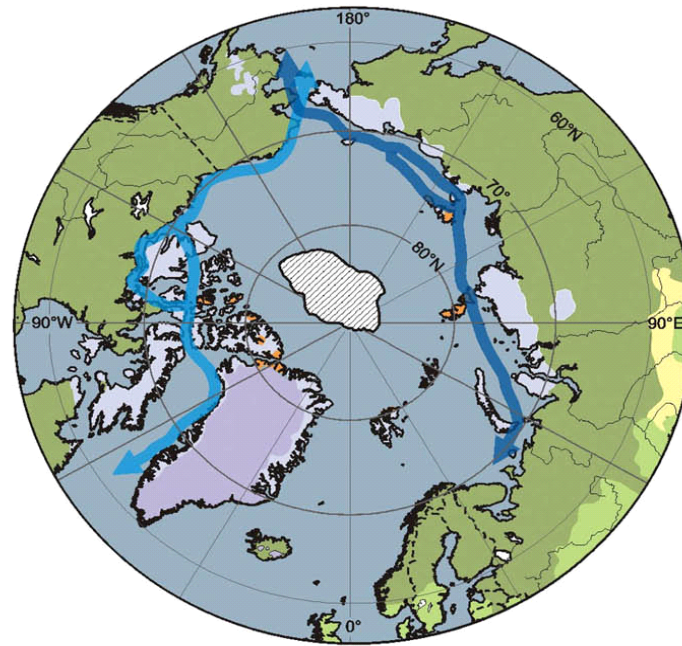
Expecting further changes in response to atmospheric emissions



Current Arctic Conditions



Projected Arctic Conditions



Vegetation of the Arctic: current conditions and projected changes under the IS92a scenario for 2090-2100

Storm surge & large events

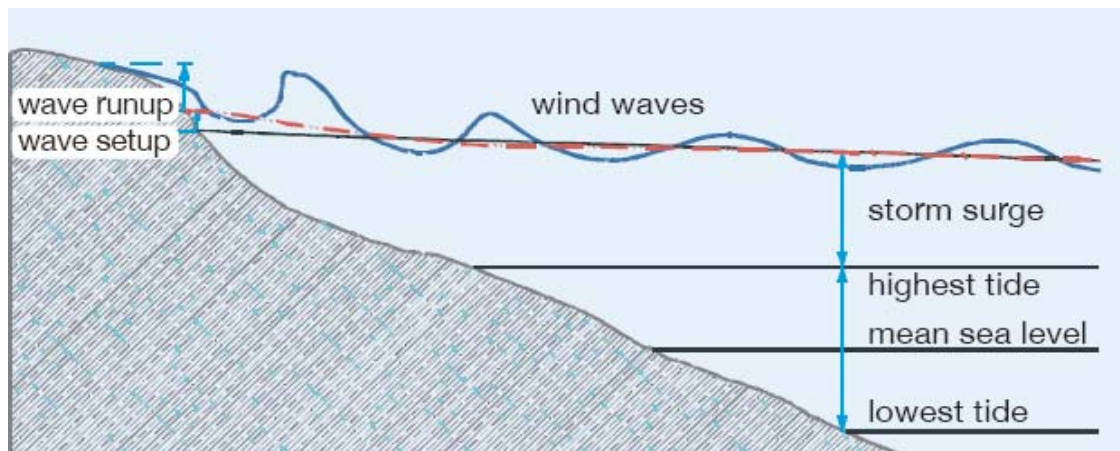


Storm surges occurring on higher mean sea levels will enable inundation and damaging waves to penetrate further inland.

This would increase flooding, erosion and damage to built infrastructure and natural ecosystems.

Changes to wind speed will also affect storm surge height.

Extreme events such as large storms also likely to increase.



Healthy wetlands, healthy people »

Drought & Fire

- **Droughts are projected to increase in some areas.**
- **A substantial increase in fire risk is likely.**
- **Increased wetland degradation and release of carbon gases.**



Overall projected impacts



- Climate change will affect wetlands and their species e.g. through biological responses to changes in temperature, rainfall, water regimes, salinity ...
- Wetlands play important roles in the global cycling of water, and the storage and cycling of carbon gases – these cycles will be affected by climate change

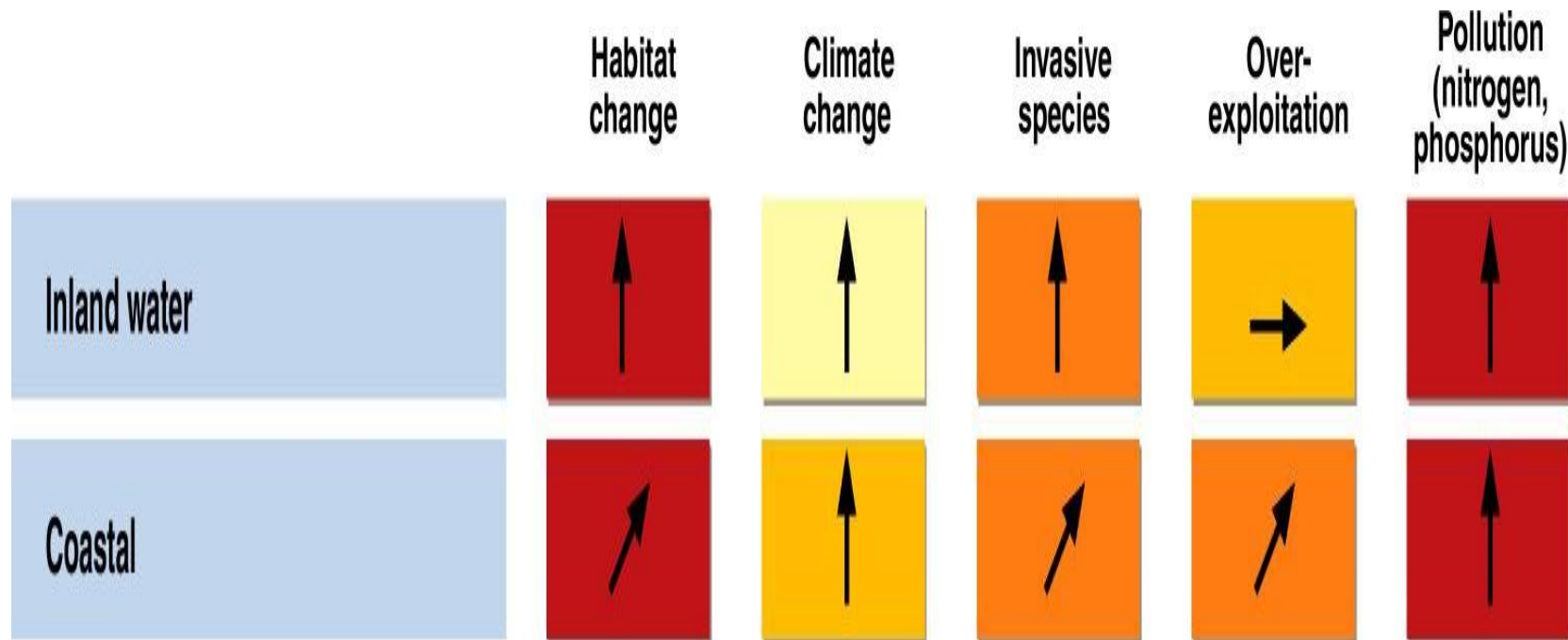


Changes in climate have already begun to affect wetland biodiversity

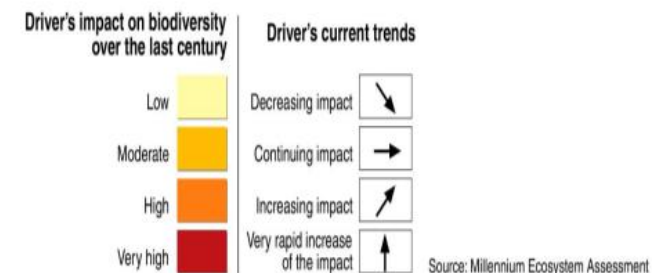


- Frequency and impacts of disturbances (fires, storms, droughts etc)....
- Timing of growing season, migrations, reproduction
- Changes in pest/disease outbreaks/vectors
- Affects noted in high latitude and high altitude systems
- Increased coral bleaching; bird movements

Climate changes will exacerbate existing pressure on wetlands – integrated responses are necessary



Responses to climate change impacts could improve overall wetland condition – support restoration measures

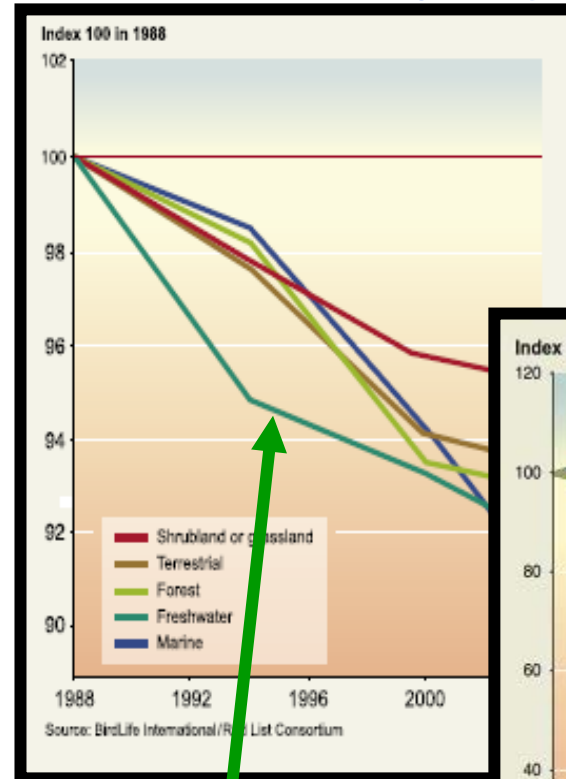
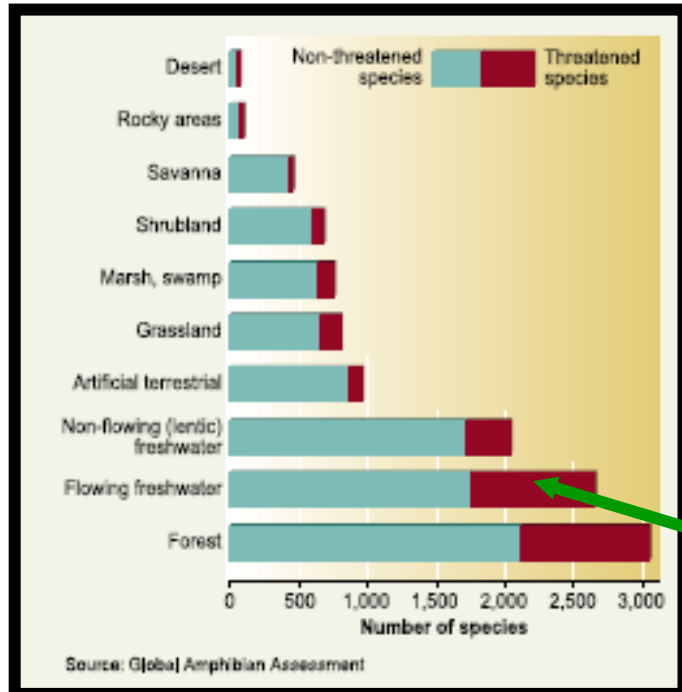


Condition of freshwater species

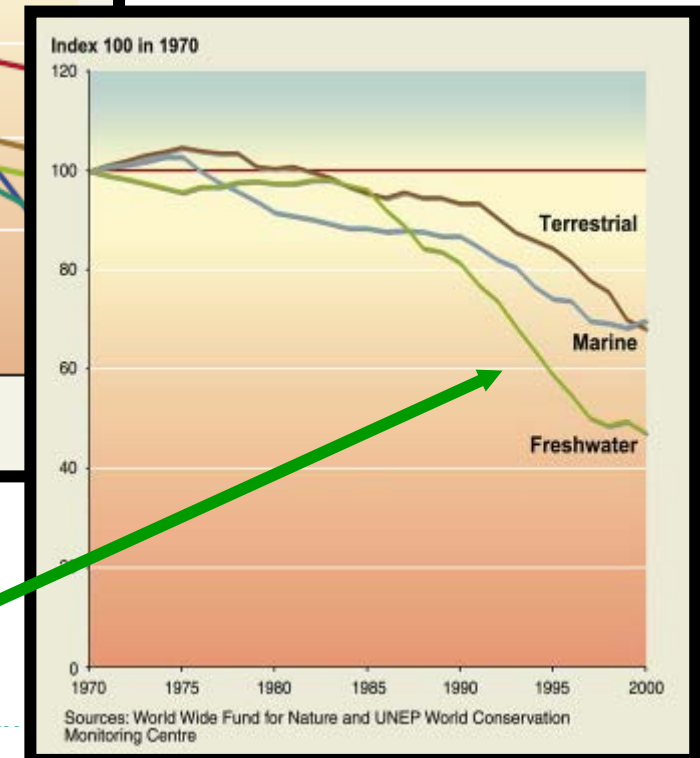


Red List for birds in different ecosystems

Number of threatened amphibians



Living planet index



Freshwater ecosystems

Wetland-dependent species / population status



- Waterbirds – 20% extinct or threatened
- Mammals – 30% decline (dolphins, manatees, porpoises)
- Fish (freshwater) – 20% threatened or extinct
- Amphibians – 30% threatened (not all are aquatic)
- Turtles – 50% threatened
- Crocodiles – 45% threatened

Extent of loss and degradation of wetlands



- More than 50% of wetlands in parts of Europe, North America, Australia & New Zealand – no evidence that 50% of wetlands globally have been lost, but.....
- Increased pressure on wetlands in Asia, Africa and southern America, and small islands
- Wetlands/rivers are in faster decline than rainforests and savanna grasslands (Millennium Ecosystem Assess)



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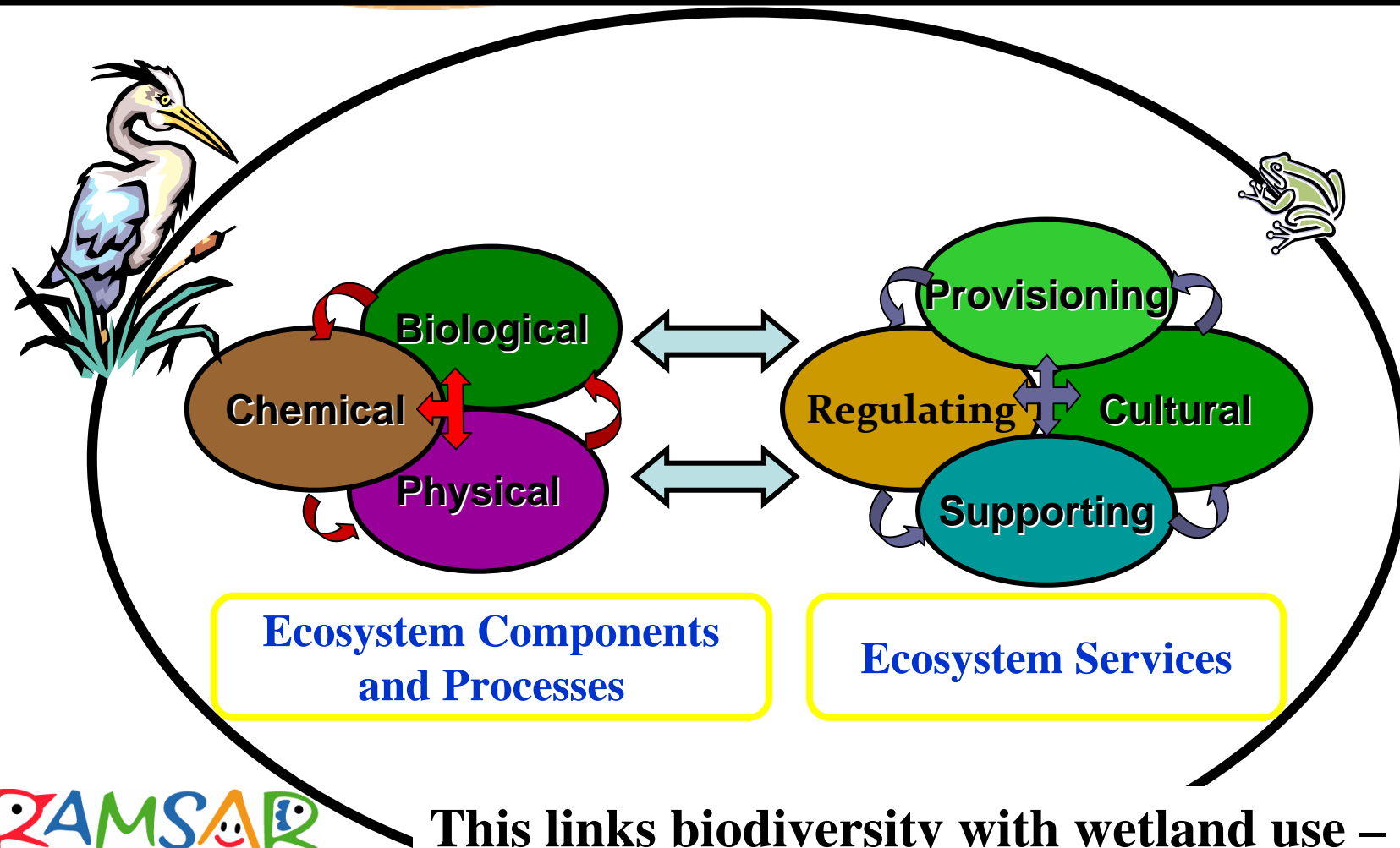
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Scientific gaps - wetlands



- **Knowledge of the extent and ecological condition of wetlands and their ecosystem services**
- **Development of regional level data and models for the geographical distribution of species and their response to climate change**
- **Development of models, that include human land- and water-use patterns to provide a realistic projection of the future state & vulnerability of wetlands**
- **Indicators to measure the effectiveness of adaptation measures**
- **Measure of the importance of all wetland types in carbon cycles**

Ecological character is the combination of the ecological components, processes and ecosystem services that characterize the wetland



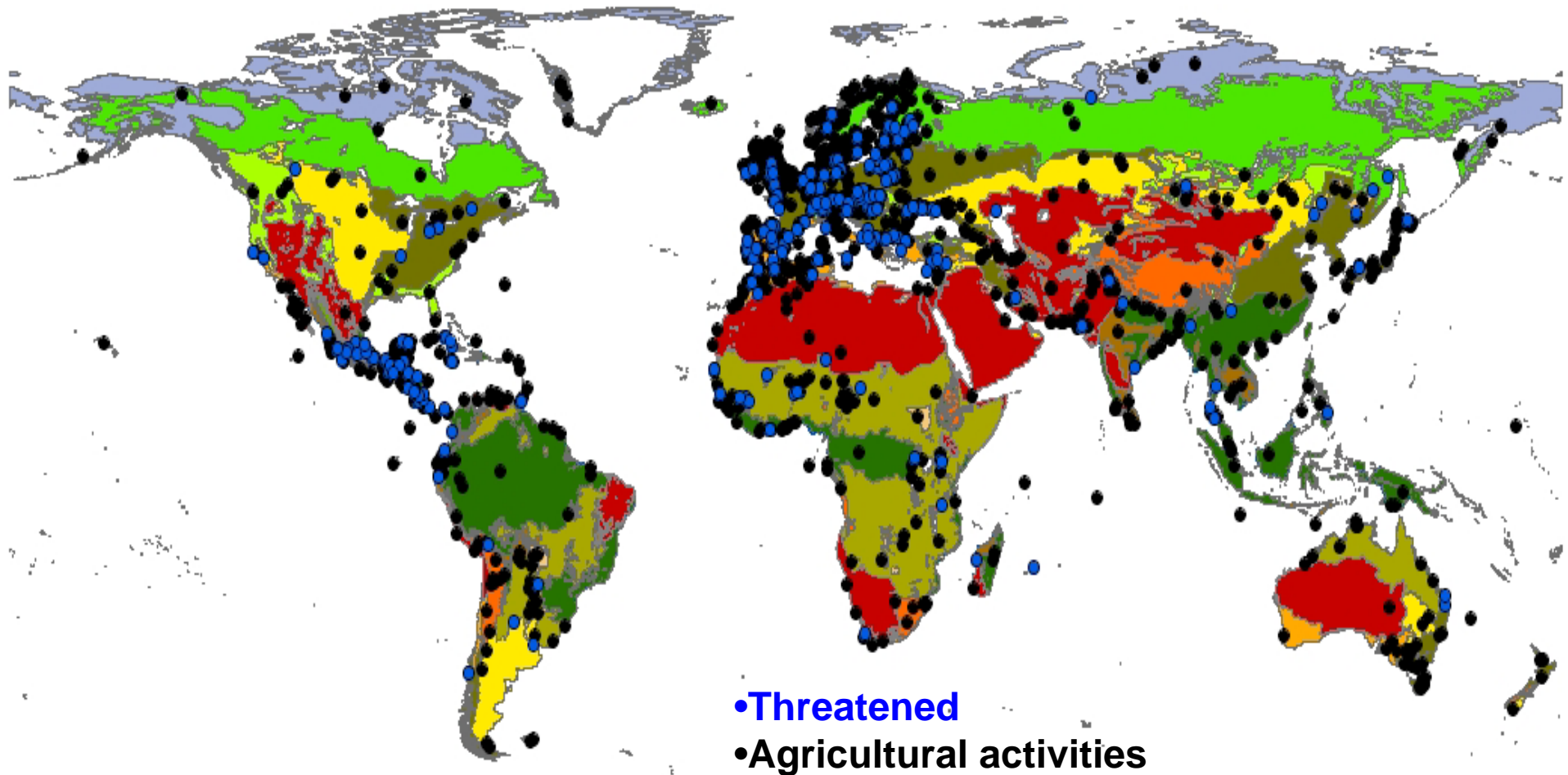
Agriculture – Food Production



- By 2025 there will be about 2 billion more people.
- How much more water do we need to feed more people?
- Where does it come from, what are the environmental consequences?



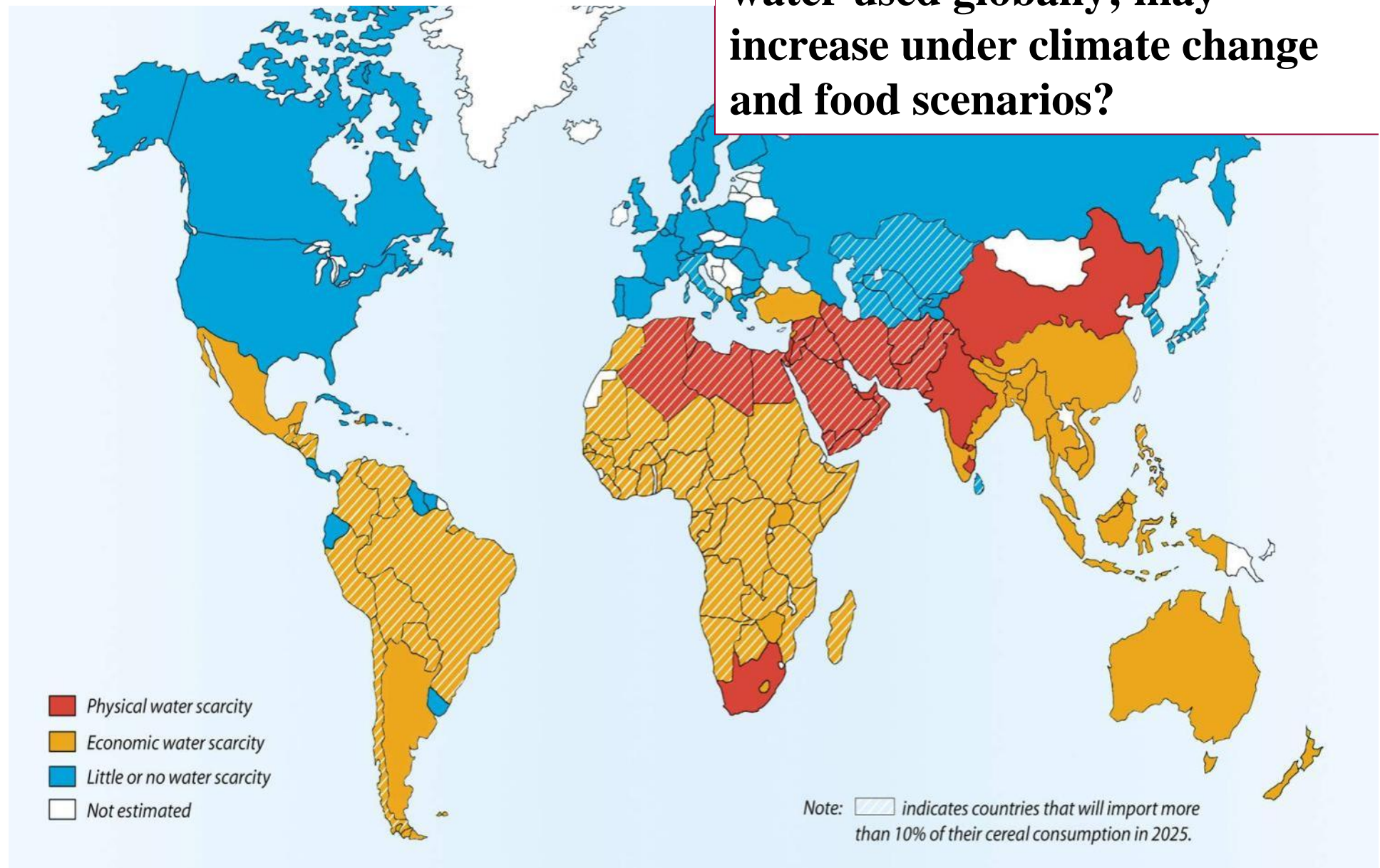
Ramsar sites with agriculture and those threatened by agriculture (across WWF Biomes)



80% of Ramsar sites contain some form of agriculture, and 65% of these are threatened by agriculture

Projected water scarcity in 2025

**Water is important for wetlands!
Irrigation comprises 70% of
water used globally; may
increase under climate change
and food scenarios?**



Vulnerability Assessment - Method

1. Risk Assessment – based on present status and recent trends

Excellent

Good

Poor

2. Risk Perception – based on sensitivity and adaptive capacity

Sensitivity

Low

Moderate

High



Adaptive capacity

High

Moderate to Low

Risk Minimization/Management – develop *responses* to minimize risk

Involve stakeholders - develop scenarios for drivers of change

No responses

Develop responses

Underpinned by adaptive management - monitoring & learning

Risks assessment



Risk Assessment:

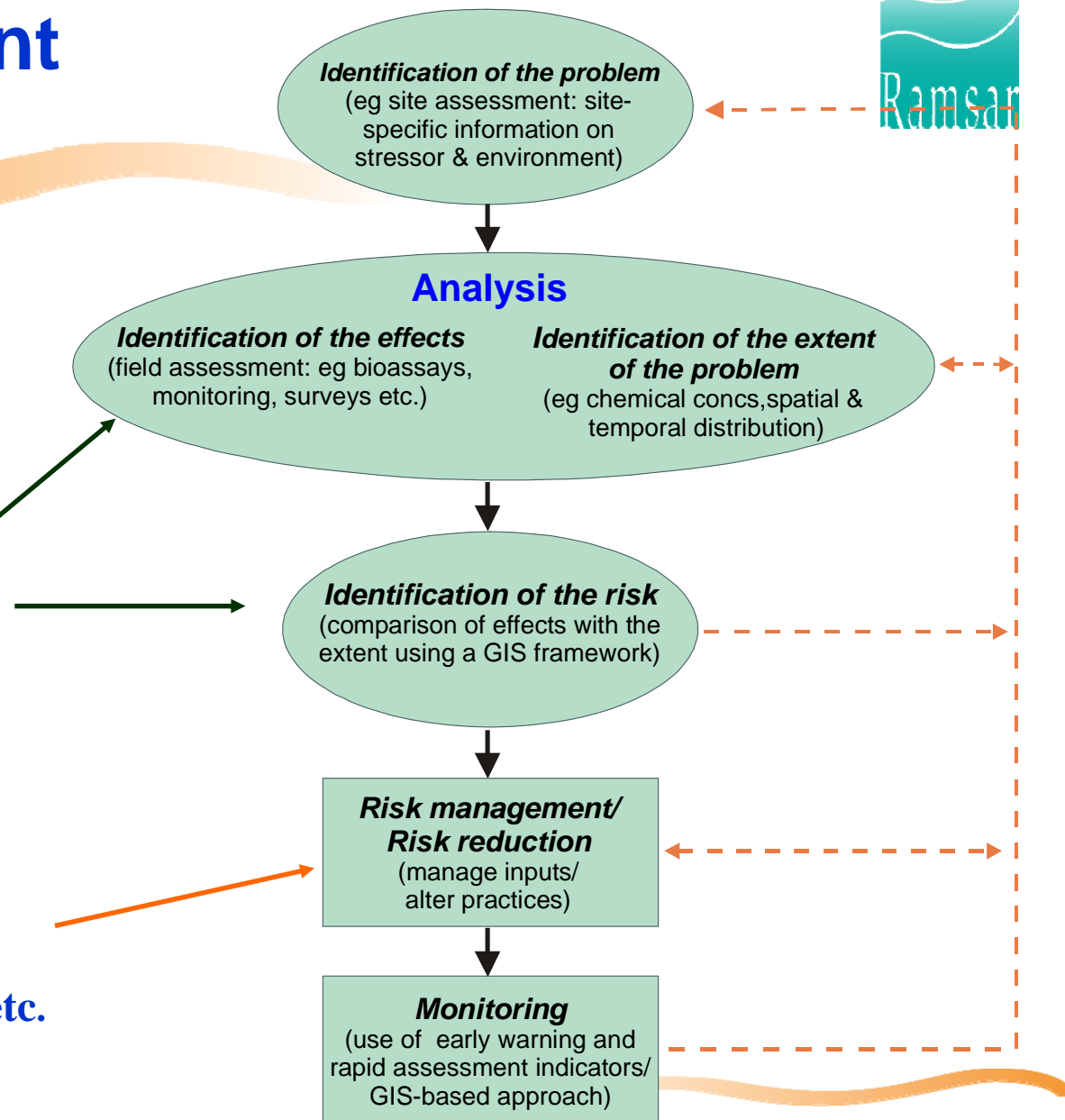
- Analysing/quantifying extent and effects of the activity and estimating risks to the wetland
- Identifying information gaps

Prioritisation of Wetlands:

- Prioritising wetlands based on pre-agreed criteria that relate to risks of threats, risks of alternatives, services/values, etc.



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Draft Resolution 24



- **Places climate change in biodiversity, water, land management context – emphasises value of restoration and wise use of wetlands**
- **Refers to impacts on wetlands and role of wetlands in climate change**
- **Introduces scientific gaps and roles for STRP in collaboration with others**



Thank-you



The low levels of understanding and appreciation of the findings and conclusion represented in the DR represent a serious and real threat to wetlands.