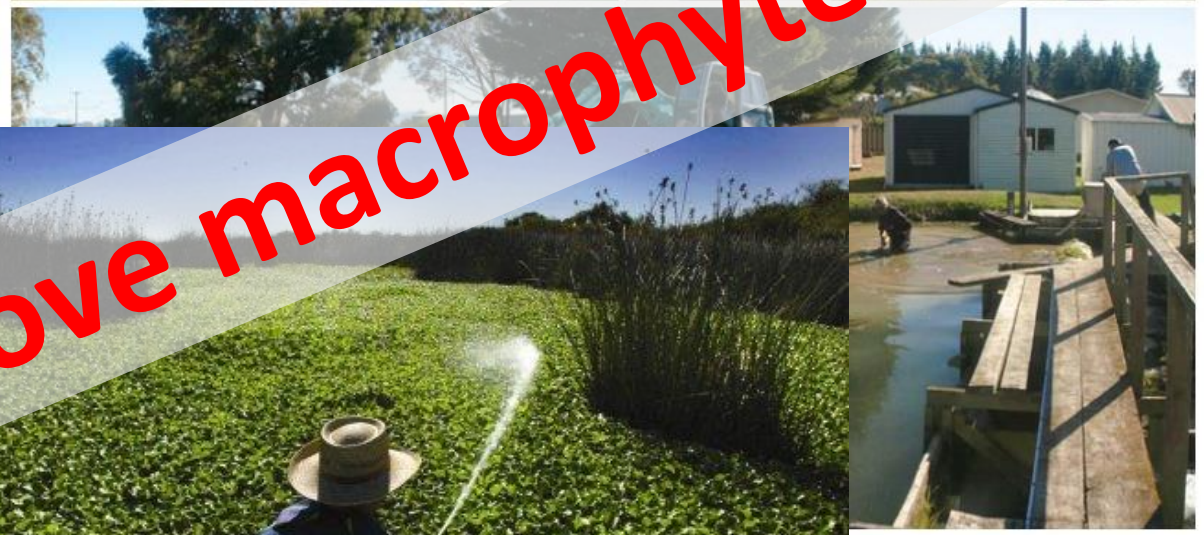

Mass development of aquatic macrophytes - causes and consequences of macrophyte removal for ecosystem structure, function, and services
- MadMacs -

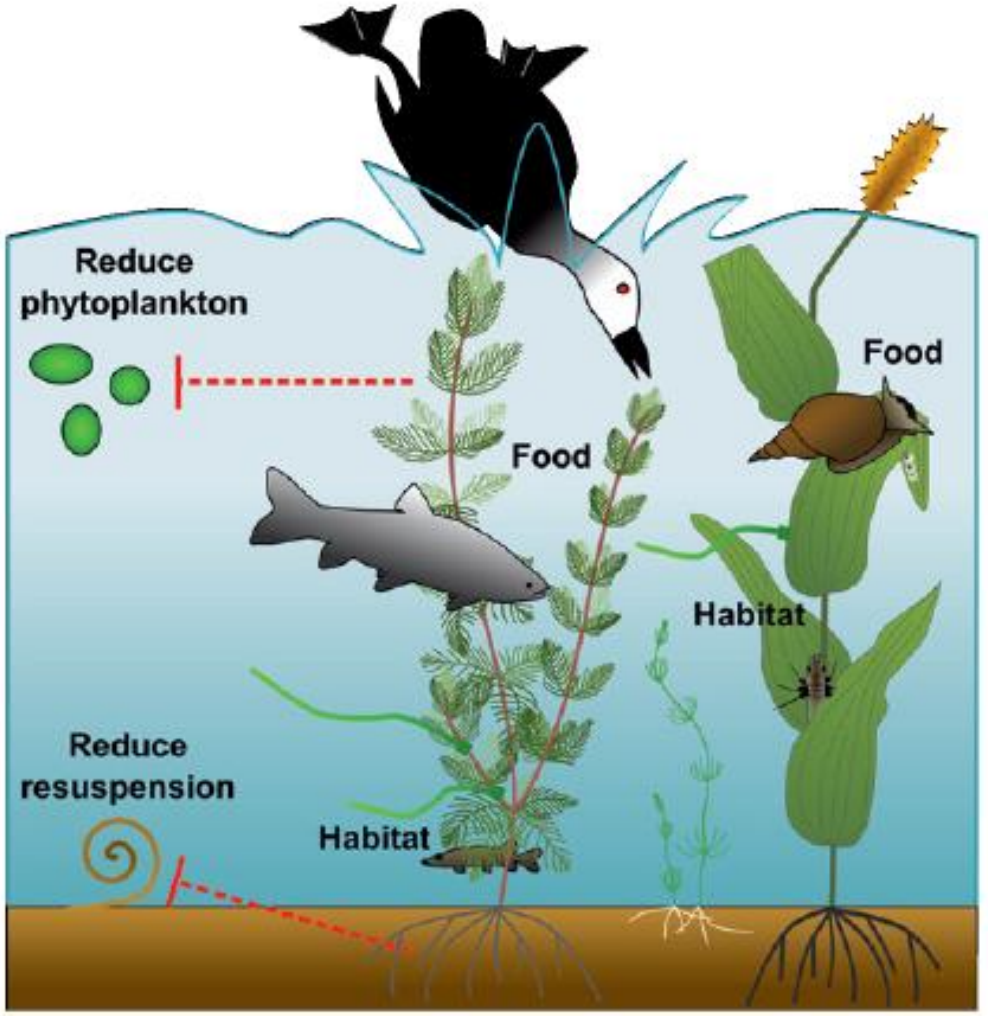
- mass development of aquatic macrophytes occurs worldwide
- nobody has ever quantified how much money annually is spent worldwide for removal, but the amount must be enormous
- the macrophytes either quickly grow back, or cause other problems to surface



Why do we remove macrophytes?

there are obvious negative consequences …

some ecosystem services provided by aquatic plants



there are “winners and loosers” of macrophyte mass development

- people have a strong voice and generally want to remove the macrophytes
- in MadMacs, we want to also “ask the swan”

1. Which combination of natural conditions and pressures leads to undesired mass development of macrophytes?

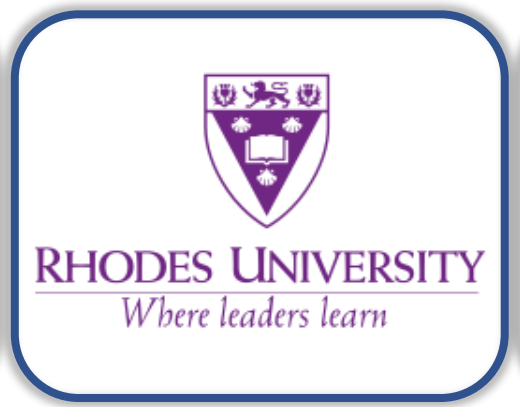
2. What are the direct and indirect consequences of macrophyte removal for ecosystem functions and services? Which consequences of macrophyte removal are site-specific, and which are general?

Consistent BACI large scale “real world experiments” at 6 sites in 5 countries to quantify the effect of macrophyte presence/removal on

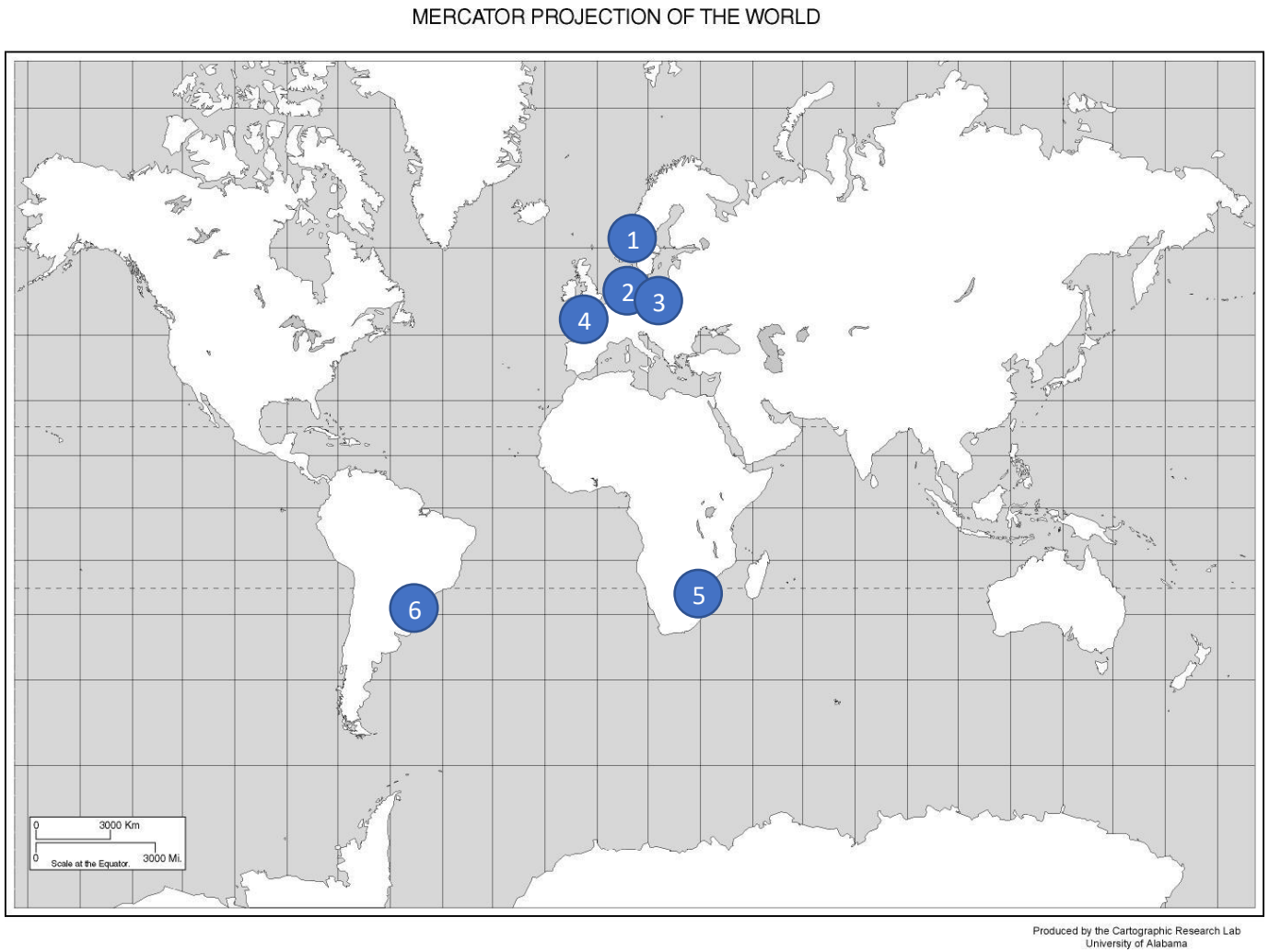
- ✓ structural and functional diversity of aquatic biota (**biodiversity**)
- ✓ nutrient and carbon retention (**water purification**, incl. greenhouse gas emissions)
- ✓ hydraulic effects on adjacent land (**erosion, impounding**)
- ✓ **human perception** / use
- ✓ summarize everything under an **ecosystem services** framework

⇨ **What are the consequences of macrophyte removal for the ecosystem?**

Norway | Germany | France | South Africa | Brazil

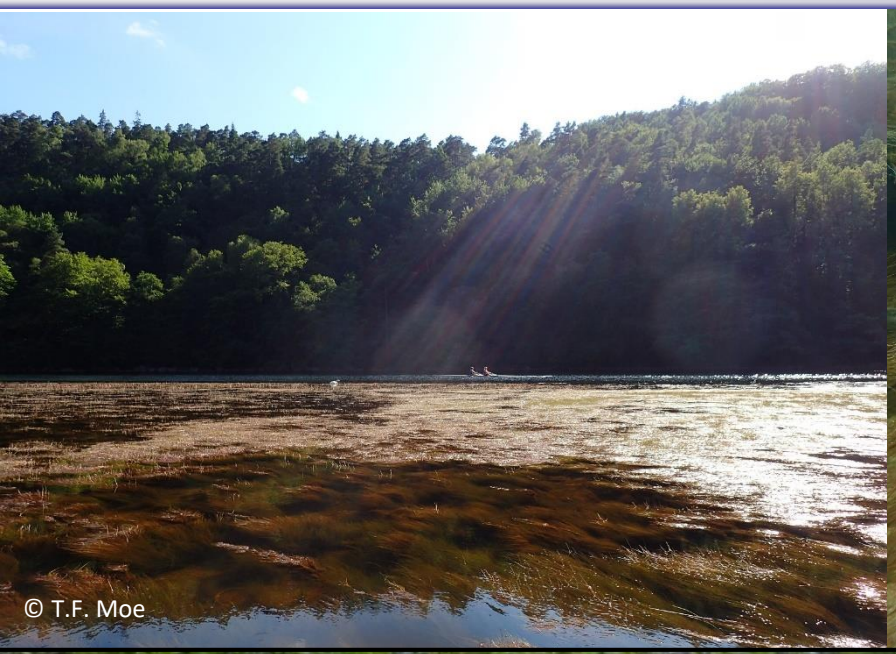


- to set up a model to forecast the consequences of macrophyte removal on aquatic ecosystems
- to set up a model to analyse which combinations of natural conditions and stressors can cause mass development of macrophytes
- ⇨ “cookbook” for water management



1. *Norway*
   ***Juncus bulbosus* in the River Otra**
2. *Germany*
   ***Elodea nuttallii* in Lake Müggelsee**
3. *Germany*
   ***Native macrophytes* in the lower River Spree**
4. *France*
   ***Ludwigia* sp. in Lake Grand-Lieu**
5. *South Africa*
   ***Eichhornia crassipes* in Hartebeespoort Dam**
6. *Brazil*
   ***Urochloa arrecta* in the River Guaraguaçu**

Juncus bulbosus in the river Otra (Norway)



Elodea nuttallii in Lake Müggelsee (Germany)

native macrophytes in the lower River Spree (Germany)

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Ludwigia sp. in Lake Grand-Lieu (France)


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Ludwigia: Etang Scamandre (Camargue)
© S. Dandelot

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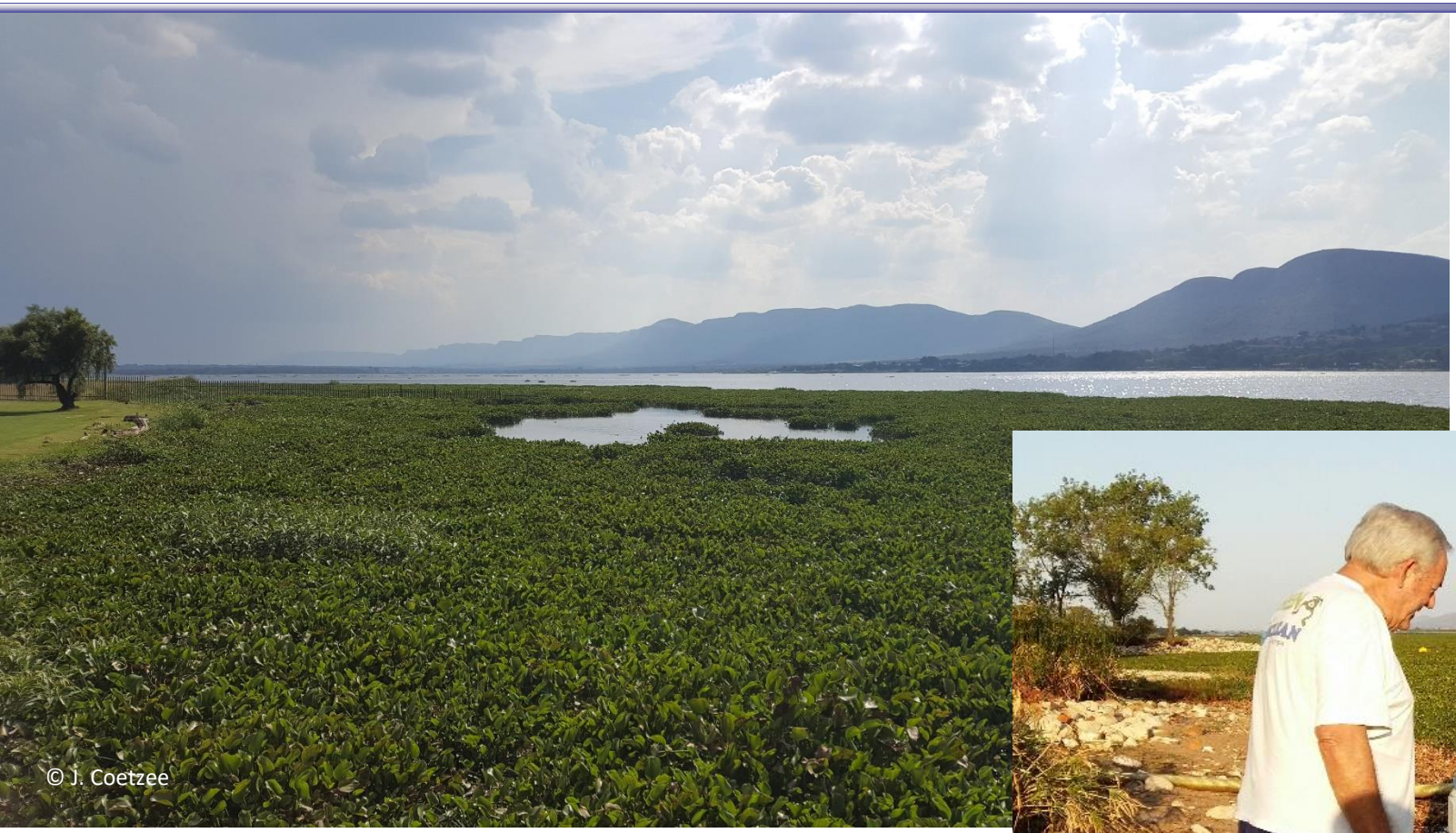
Eichhornia crassipes in Hartebeespoort Dam (South Africa)



Urochloa arrecta in the River Guaraguaçu (Brazil)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⇨ wish us good luck