

# Threat management for wetland

Loss of vegetation (introduction of  
invasive species, salinization)

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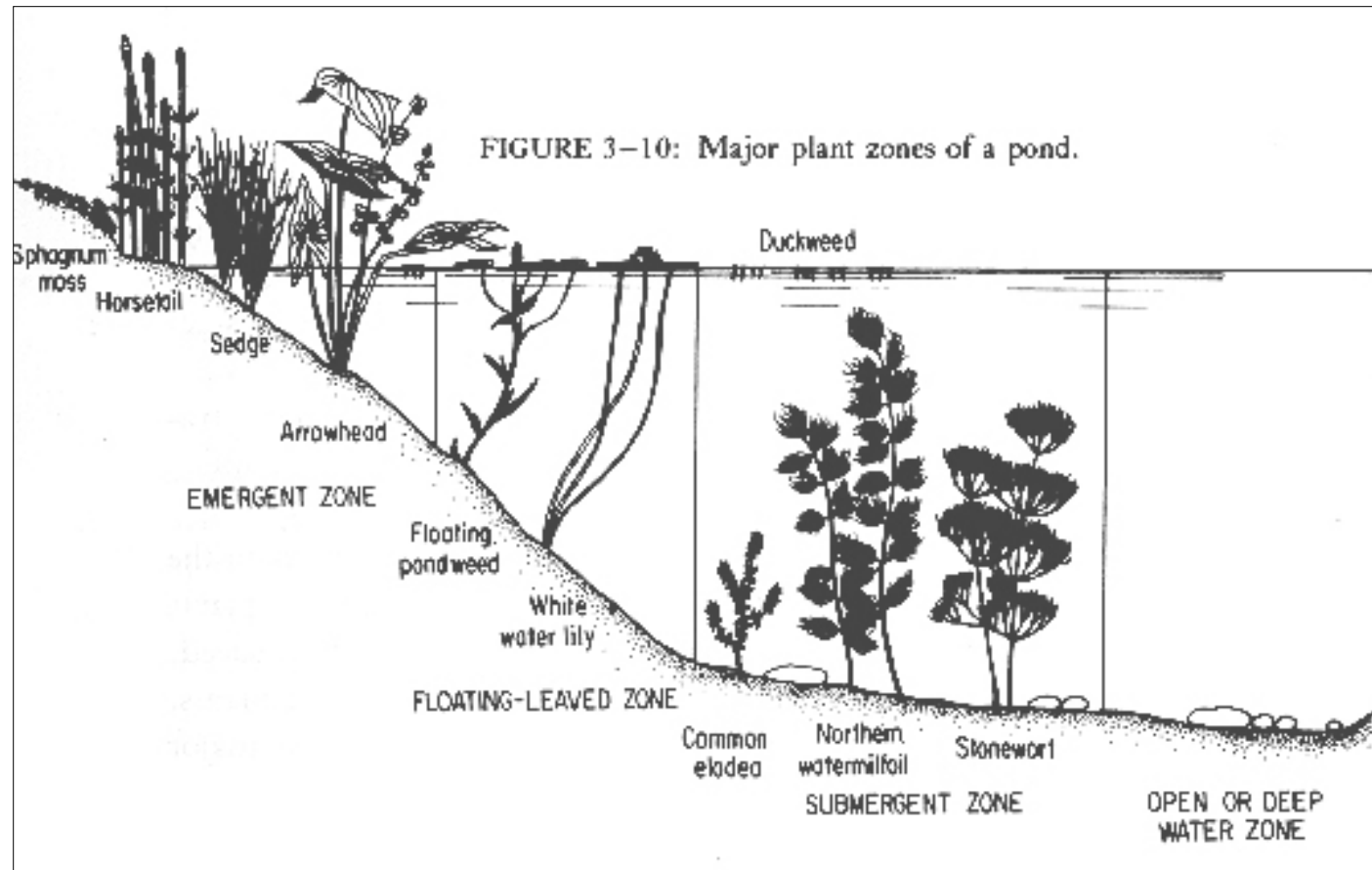
# Content of session

- What is wetland vegetation and vegetation loss
- Functions of wetland vegetation
- Threats to wetland vegetation
  - Invasive species – effects and management measures
  - Salinisation – effects and management measures

# Wetland vegetation

- Aquatic macrophytes – plants that live either completely submerged or small plant parts emerging (*Potamogeton*, *Lemna*)
- Emergent macrophytes – plants always rooted in sediments and protruding over water surface (*Typha*)

# Wetland vegetation



# Wetlands vegetation

- Emergents
- Floating leaf



## Loss of wetland vegetation – loss of functions

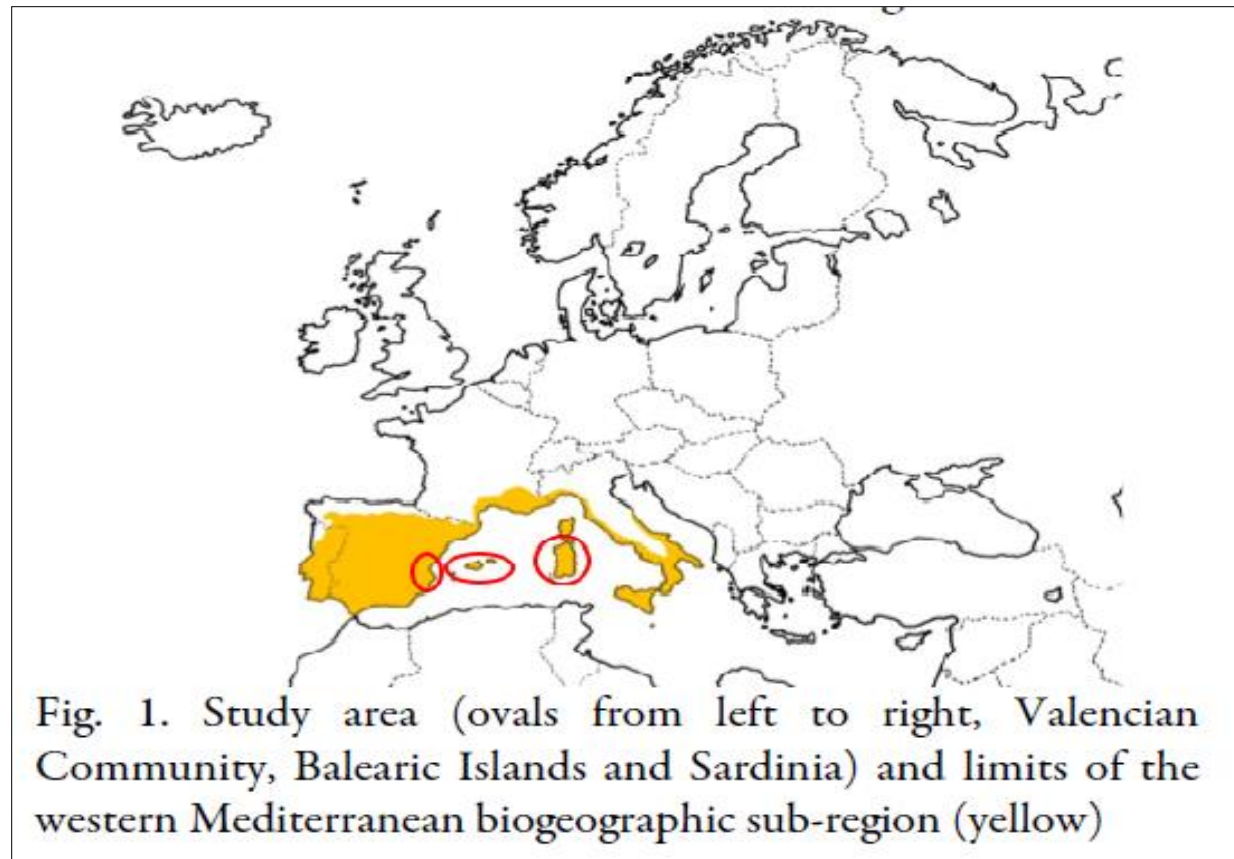
### **Some major functions**

- maintaining water quality by filtering out nutrients and sediments;
- providing food, shelter and breeding habitat for both aquatic and terrestrial fauna;
- preventing erosion;
- Etc.

## Threats to wetland vegetation – invasive species

- Invasion of alien species (invasive species) resulting in increased competition for resources (water, light, nutrient and space)
- Invasion closely linked with clearing, grazing, altered fire regimes, spread of diseases, dieback etc.
- Grazing and overgrazing impacting species diversity, distribution and health, soil compaction, increased nutrient levels, introduction of invasive species, trampling of native plant species etc

## Alien plant diversity in Mediterranean wetlands Mayoral *et al.* 2018



## Alien plant diversity in Mediterranean wetlands Mayoral *et al.* 2018

- 380 alien taxa from 89 families
- Invasive component includes 77 taxa
- 9 (nine) invasive taxa common to the three territories
- 6 (six) taxa considered invasive worldwide

- Tree of heaven (*Ailanthus altissima*)
- Giant reed (*Arundo donax*)



- Castor oil plant (*Ricinus communis*)



- Pampa grass (*Cortaderia selloana*)



## Management of threat – invasion of plant species

- Control of weed species is essential to maintain native plant communities in wetlands.
- Some control methods are:
  - manual removal by either hand weeding, using a knife or trowel, crown cut or digging out the entire plant;
  - mulching in disturbed areas;
  - herbicide spraying or wiping (care must be taken to avoid herbicide drift and not to use chemicals which may leach into the wetland); and
  - stem injection with herbicide or the painting of herbicide on the freshly cut stump to control weed trees or large shrubs.

# Preventative management

The best method of weed control:

- garden rubbish and clippings should never be disposed of in wetlands;
- not planting invasive exotic species in parkland next to wetlands;
- removing problem plants immediately, to prevent them from spreading and taking hold;
- clearing weeds around seedlings for the first two years to dramatically improve growth and survival rates;
- maintaining overstorey native trees that will help to shade out many weeds;
- taking care when spraying for weeds on adjacent land to avoid spray drift into wetland areas; and
- fire management is necessary to prevent the loss of fire sensitive and fire dependent native plant species and to avoid increased weed invasion.
- In conjunction with weed control it is important to rehabilitate native wetland vegetation to prevent further weed invasion, protect wetland water quality and provide habitat for native flora and fauna.

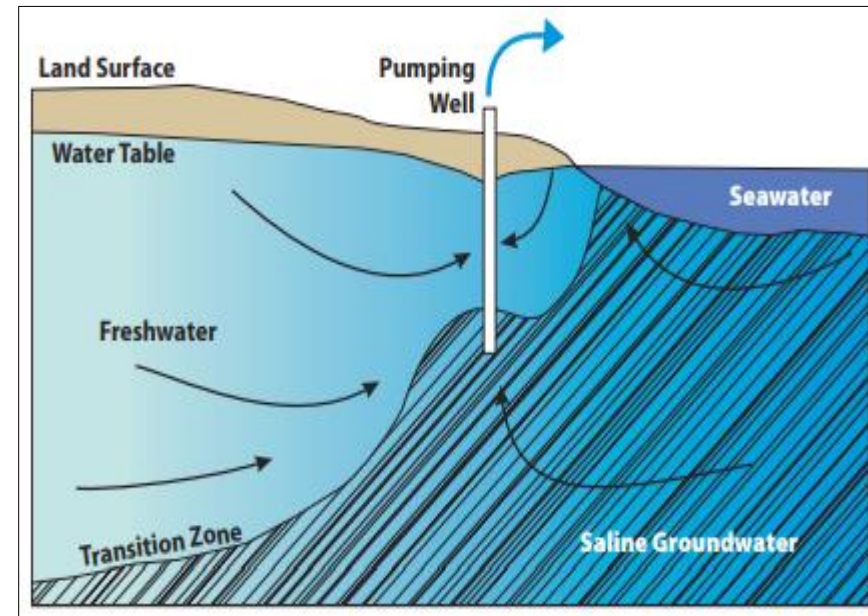
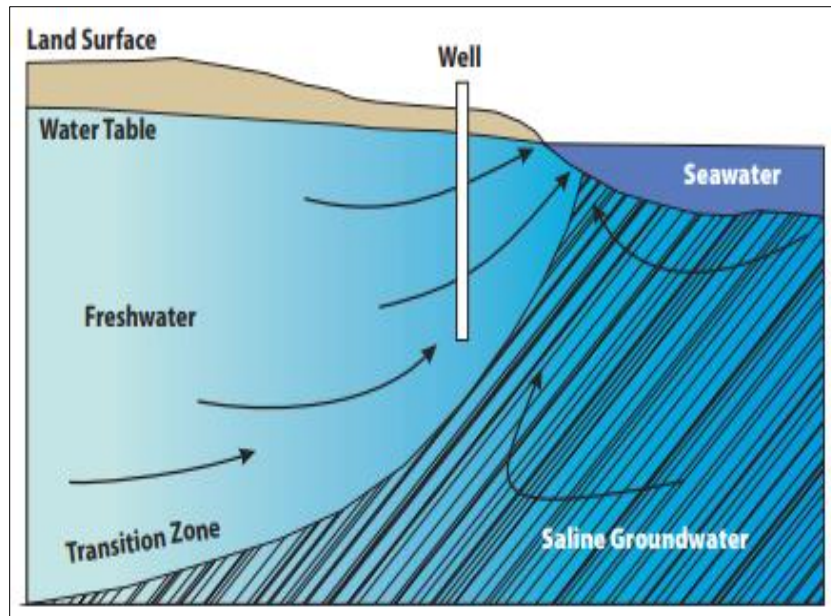
## Threats to wetland vegetation – changes in wetlands hydrology

- Changes in both surface water and ground water or changes in wetland hydrology
- Abstraction of ground water and the construction of drains lowers the water table
- That could result in plants death and changes in species composition and distribution
- Elevated water levels can pose significant threats

## Abstraction of ground water in coastal areas induces salinisation

- The aquifer in coastal areas is linked to the sea;
- An extraction of water from the ground water reservoir is partly balanced by an influx of saline water from the sea, particularly when there is less rainfall;
- Extraction of ground water increased due to ground-water b from the reservoir based irrigation, rapid urbanisation and industrial development;
- Some coastal regions have saltwater trapped in the subsurface sediments from floods in the past, when sea levels were higher;
- Groundwater abstraction at large volumes or at high rates can, therefore, cause a gradual increase in the salt content of the water, due to the higher influx of (trapped) sea-water

# Salinisation



Upcoming or inland movement of the freshwater-saltwater interface can occur due to pumping or other disturbances (e.g. sea level rise, reduced recharge). If a single well is overpumped or multiple wells are pumping, a large area of the aquifer may be impacted by salinity.

# Threat management - salinisation

- Increasing the natural aquifer recharge by adapting land use, or reducing surface runoff.
- Optimised pumping practices and locations
  - Well location – at least 50 m from the coast
  - Well depth – avoid deep wells close to the coast.
  - Special attention needs to be paid if bedrocks are fractured.
  - Monitoring during drilling – using a hand-held meter to measure conductivity and stop drilling if the conductivity changes drastically.
  - Seal the well below a certain depth to prevent salty water from entering.
  - Reduce water use and reduce pump depth
  - Pump less water more frequently
  - Coordinate the pumping in a multi-well system so it is not simultaneous



Thank you for your attention!