



Aquatic Plants: Adaptations and Ecology

Jenifer Parsons

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Aquatic Plants play a vital role in shallow aquatic ecosystems



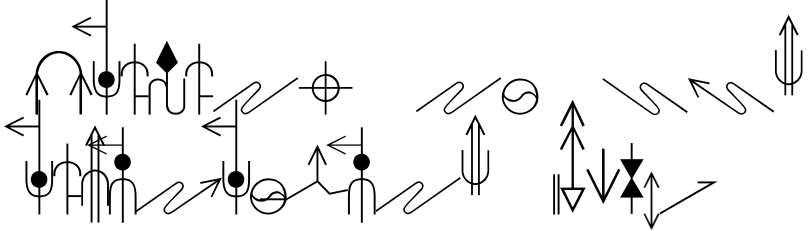
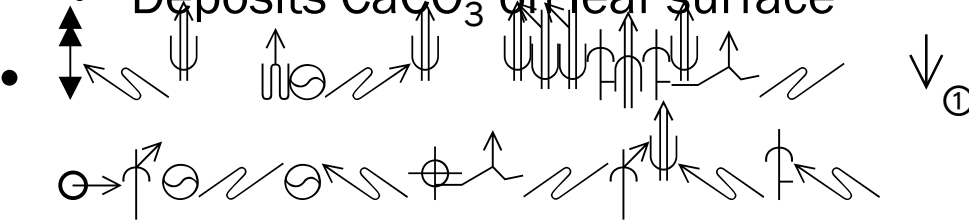
Adaptations to Life in Water



- Plants need –
 - CO₂ & O₂
 - Nutrients
 - Water
 - Light
- Submersed Plants Limited By -
 - Light
 - CO₂



Adaptations to low CO₂

- 
- Either on leaf surface or internally
- Increases with alkalinity
- Deposits CaCO₃ on leaf surface
- 



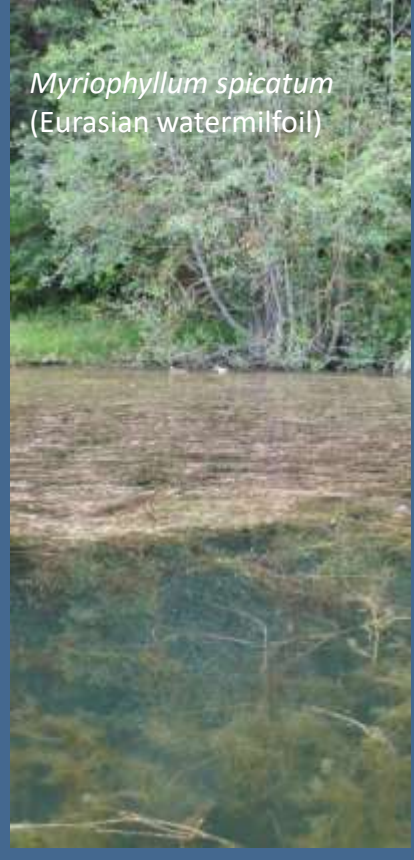
Potamogeton illinoensis (Illinois pondweed)

Adaptations to increase light

- Grow toward the surface
- Create above and below water leaves



P. gramineus
(grass leaf pondweed)



Myriophyllum spicatum
(Eurasian watermilfoil)



P. nodosus
(long leaf pondweed)



M. heterophyllum
(variable leaf watermilfoil)

Other Adaptations

- Thin, air-filled leaves and stems



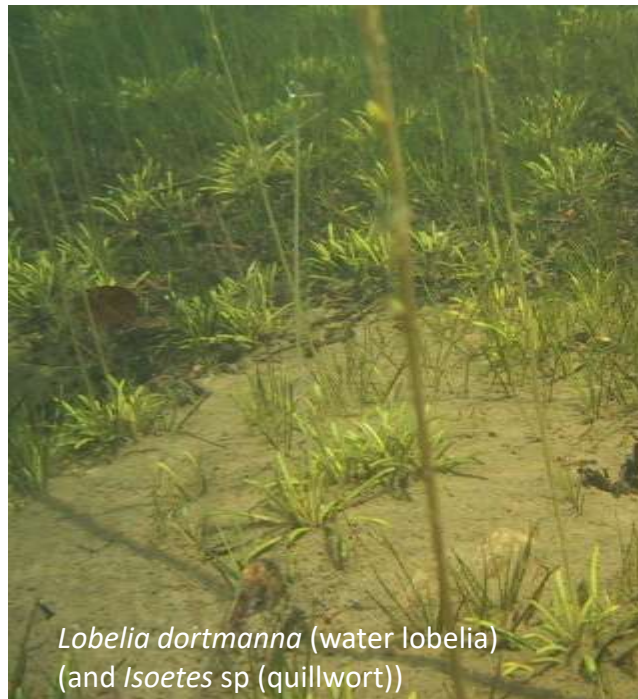
Potamogeton praelongus (white stem pondweed)

Aerenchyma

- Gas transport, buoyancy



Limnobium laevigatum
(South American spongeplant)



Lobelia dortmanna (water lobelia)
(and *Isoetes* sp (quillwort))



Other Adaptations

- Leaf shape



Utricularia vulgaris (common bladderwort)



Cabomba caroliniana (fanwort)



Bidens beckii (water marigold)



Myriophyllum spicatum
(Eurasian watermilfoil)

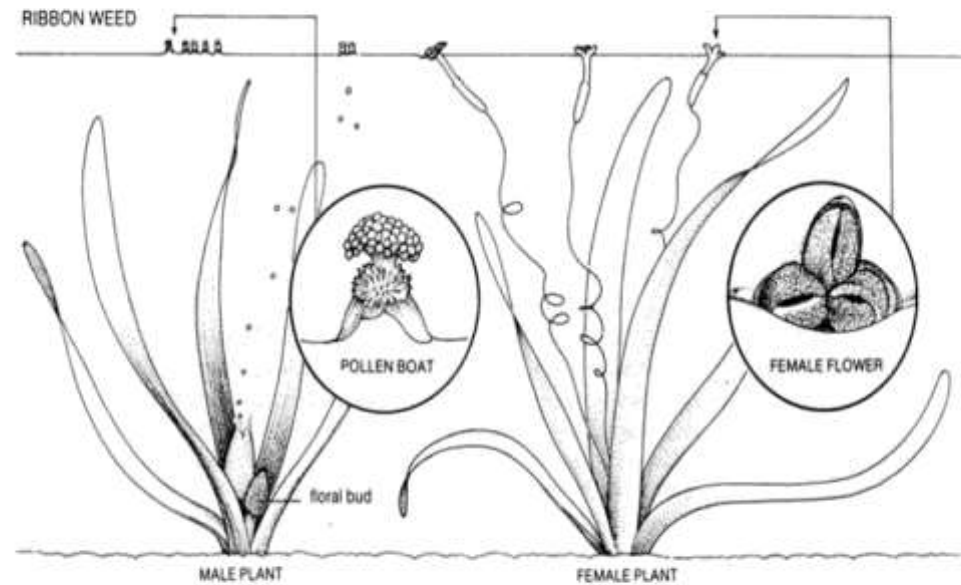
Other Adaptations

- Reproduction

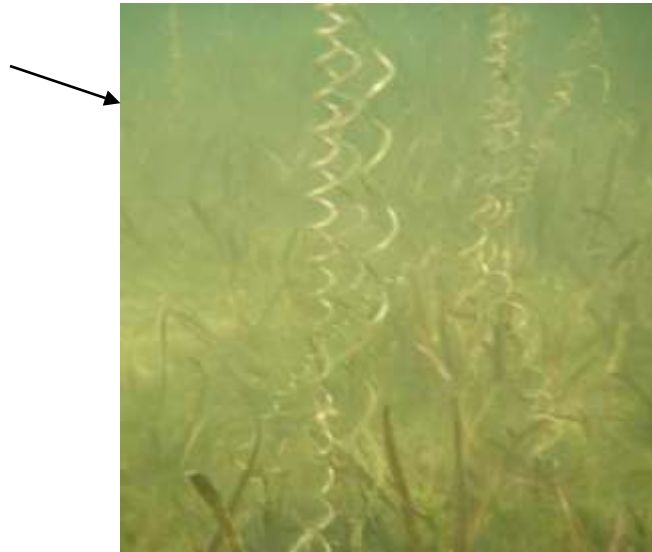


2-dimensional pollination

Water Pollination



- *Vallisneria americana* (tape grass)
- *Elodea canadensis* (Canadian waterweed)



Underwater pollination

- *Zannichellia palustris*
(horned pondweed)
- *Callitriche hermaphroditica*
(autumnal waterstarwort)



*Zannichellia
palustris*



Callitriche hermaphroditica

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Other Adaptations

- Reduced roots



Aquatic Plants and Lake Ecology



Aquatic Plants & Lake Ecology

- Aquatic plants provide
 - Food
 - Habitat



Utricularia intermedia and *Potamogeton amplifolius*



Aquatic Plants & Lake Ecology

- Stabilize bottom sediment and shoreline



Myriophyllum quitense (Andean watermilfoil)



Aquatic Plants & Lake Ecology

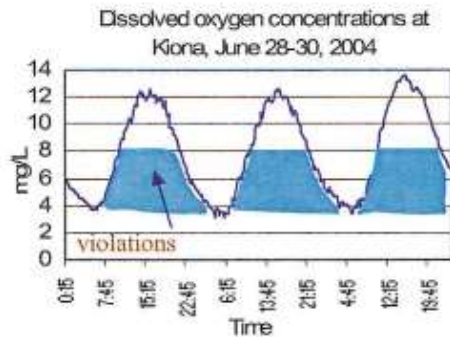
- Dissolved oxygen and pH



Myriophyllum sibiricum (northern watermilfoil)

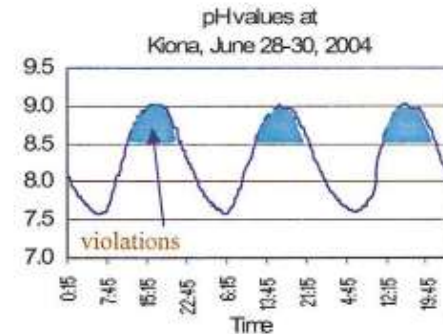
Yakima River

- *Heteranthera dubia*
(water stargrass)



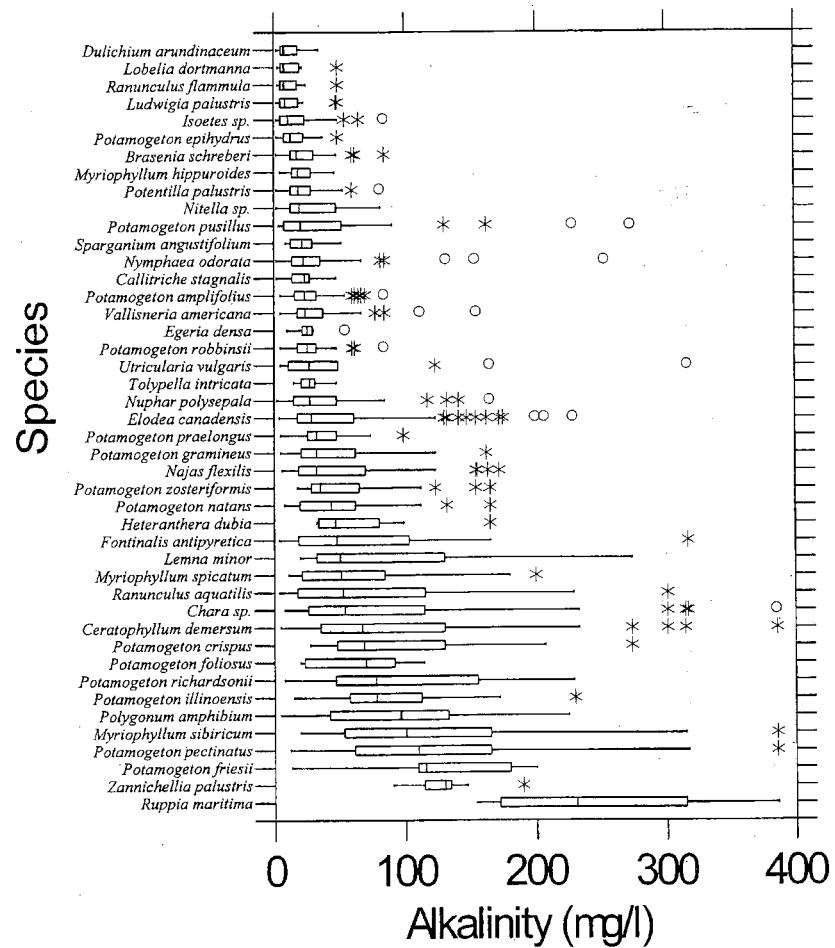
Bacteria, fish, and insects consume O_2 all the time. Algae & plants produce O_2 during the day but consume it at night.

Algae & plants use CO_2 during the day, which raises the pH.



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Alkalinity



Legend:

bar within the box - median

hinges (box edges) - within which 25% to 75% of the values lie

whiskers - include values within 1.5 Hspreads of the hinges (Hspread is the absolute value of the difference between the values of the two hinges).

asterisk - values within 3 Hspreads of the hinges

open circle - values outside 3 Hspreads of the hinges

Figure 9. Box plot of alkalinity ranges for selected macrophytes.

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- Temperature



Nuphar polysepala (spatterdock)



Aquatic Plants & Lake Ecology

- Nutrients



Summary diagram

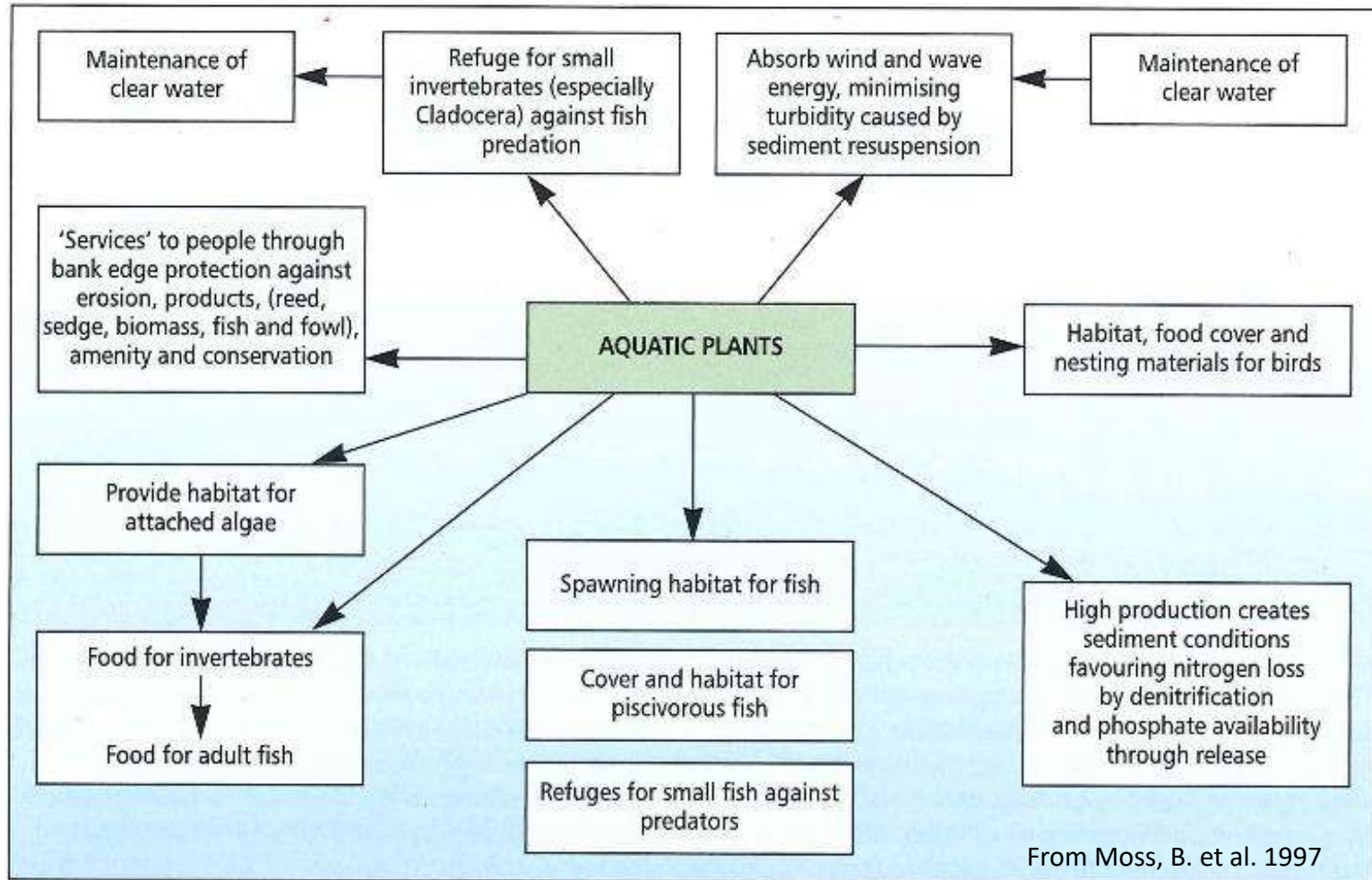


Fig 1.9 Links between aquatic plants and other organisms, including ourselves.



Any questions?

Lakes webpage:
<https://fortress.wa.gov/ecy/coastalatlantools/LakeDetail.aspx>

Phone: 509-457-7136
E-mail: jenp461@ecy.wa.gov

