Wetland Biogeochemistry

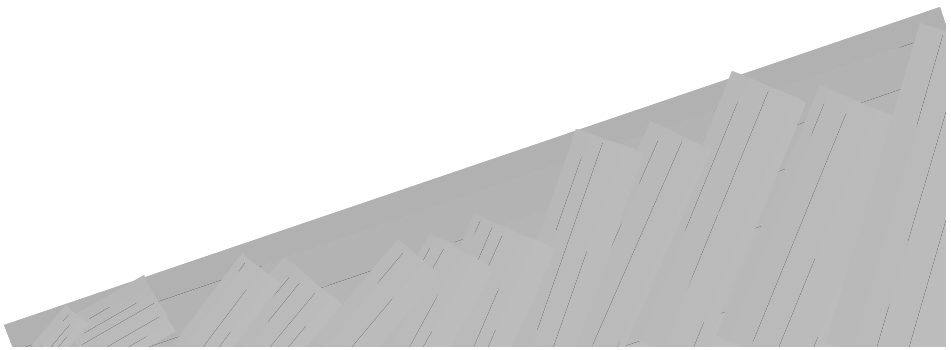


Diagram of Wetland Mass Balance

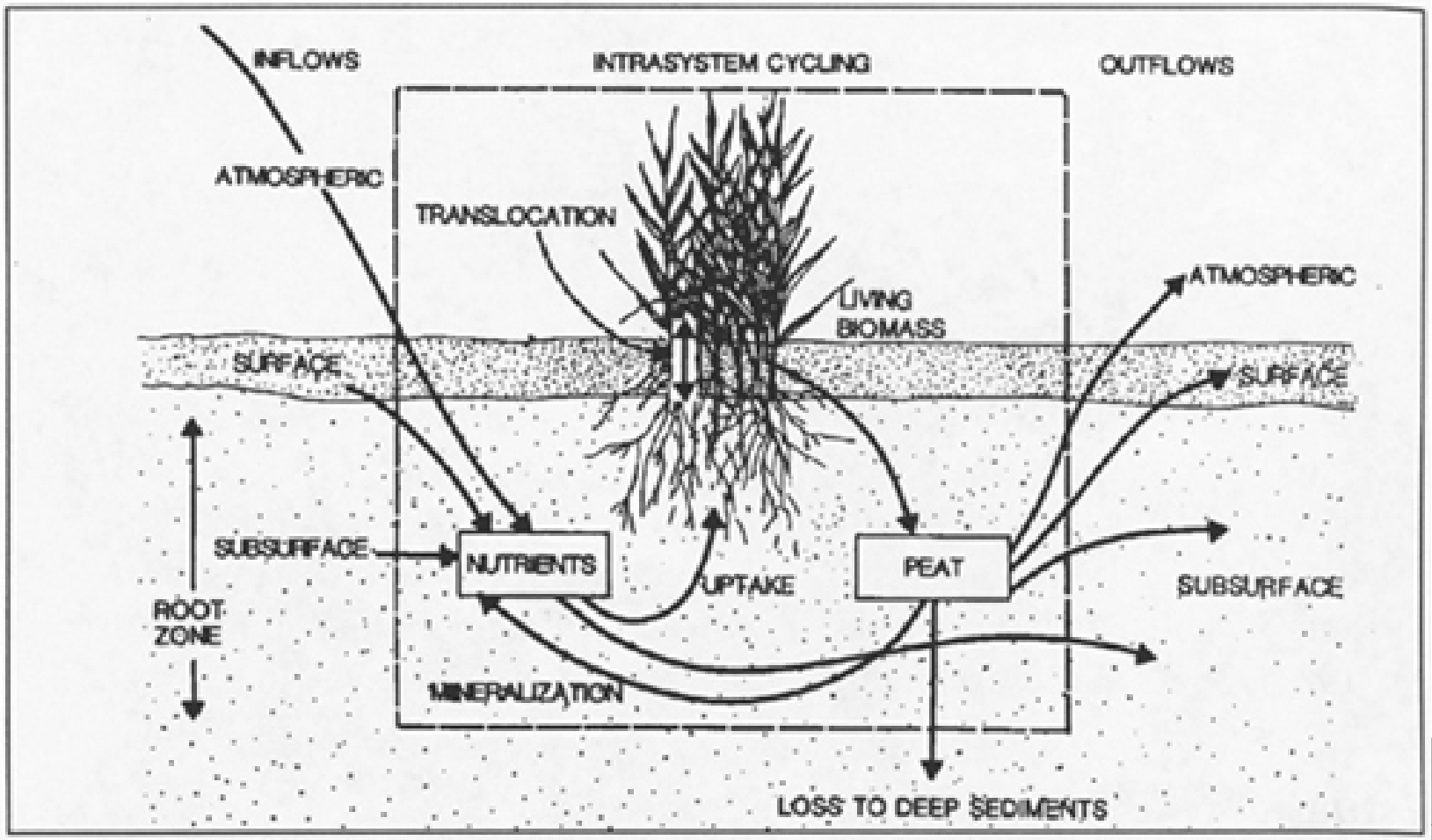
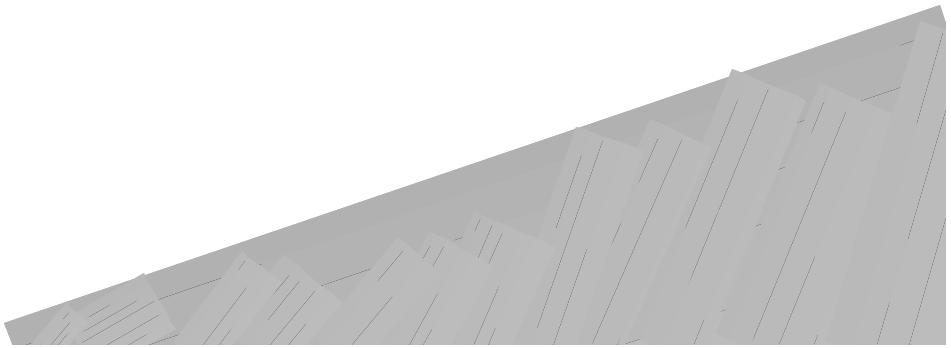


Figure 5–14. Generalized diagram of components of a wetland mass balance, including inflows, outflows, and intrasystem cycling.

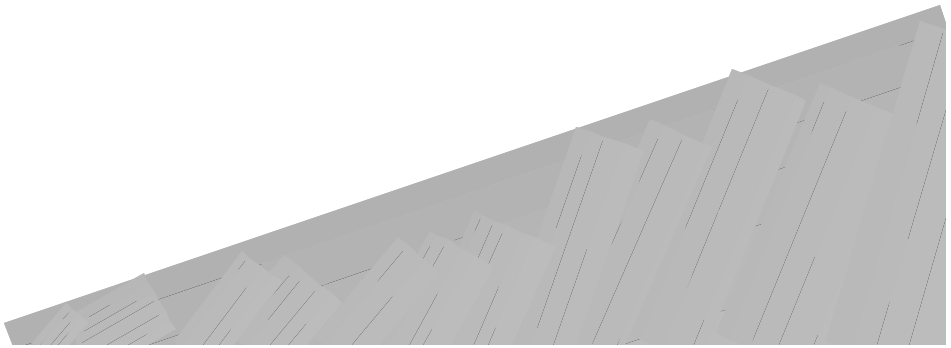
Components of Wetland Balance (Inflow)

- Hydrological
  - Precipitation
  - Surface Water
  - Ground Water
  - Tidal Exchange
- Biological
  - Photosynthesis
  - Nitrogen Fixation
  - Animals
- Intrasystem Cycling
  - Litter Production
  - Remineralization
  - Chemical Transformation
  - Translocation

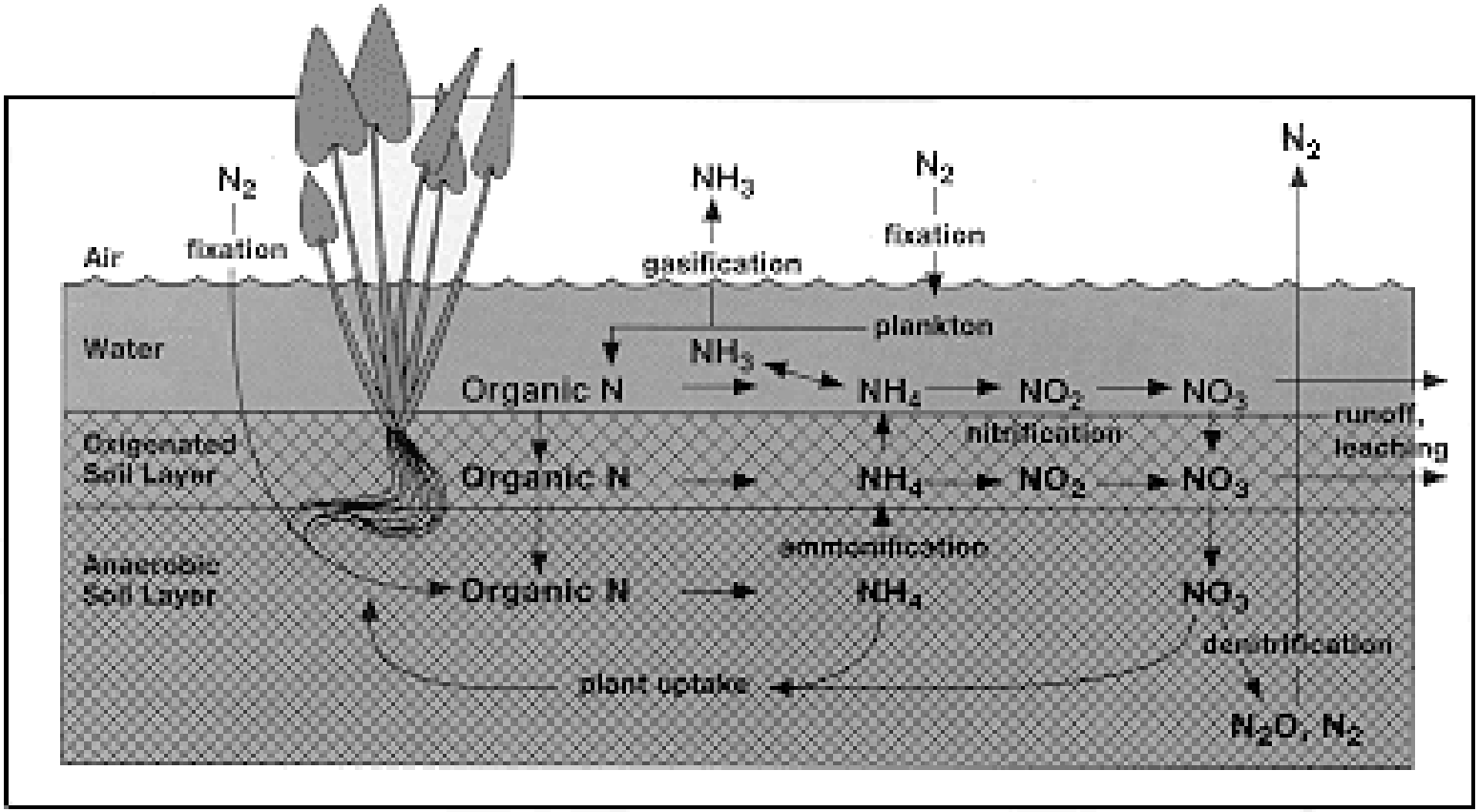


Components of Wetland Balance (Outflow)

- Hydrological
  - Surface Water
  - Ground Water
- Biological
  - Respiration
  - Animals
- Physical
  - Long-Term Burial
  - Denitrification
  - Volatilization of Ammonia
  - Methane
  - HS



Nitrogen Cycle



Nitrogen cycling in wetlands progresses more rapidly where there is a thin oxygenated soil layer present.

After Mitsch & Gosselink 1993

Phosphorus Cycle

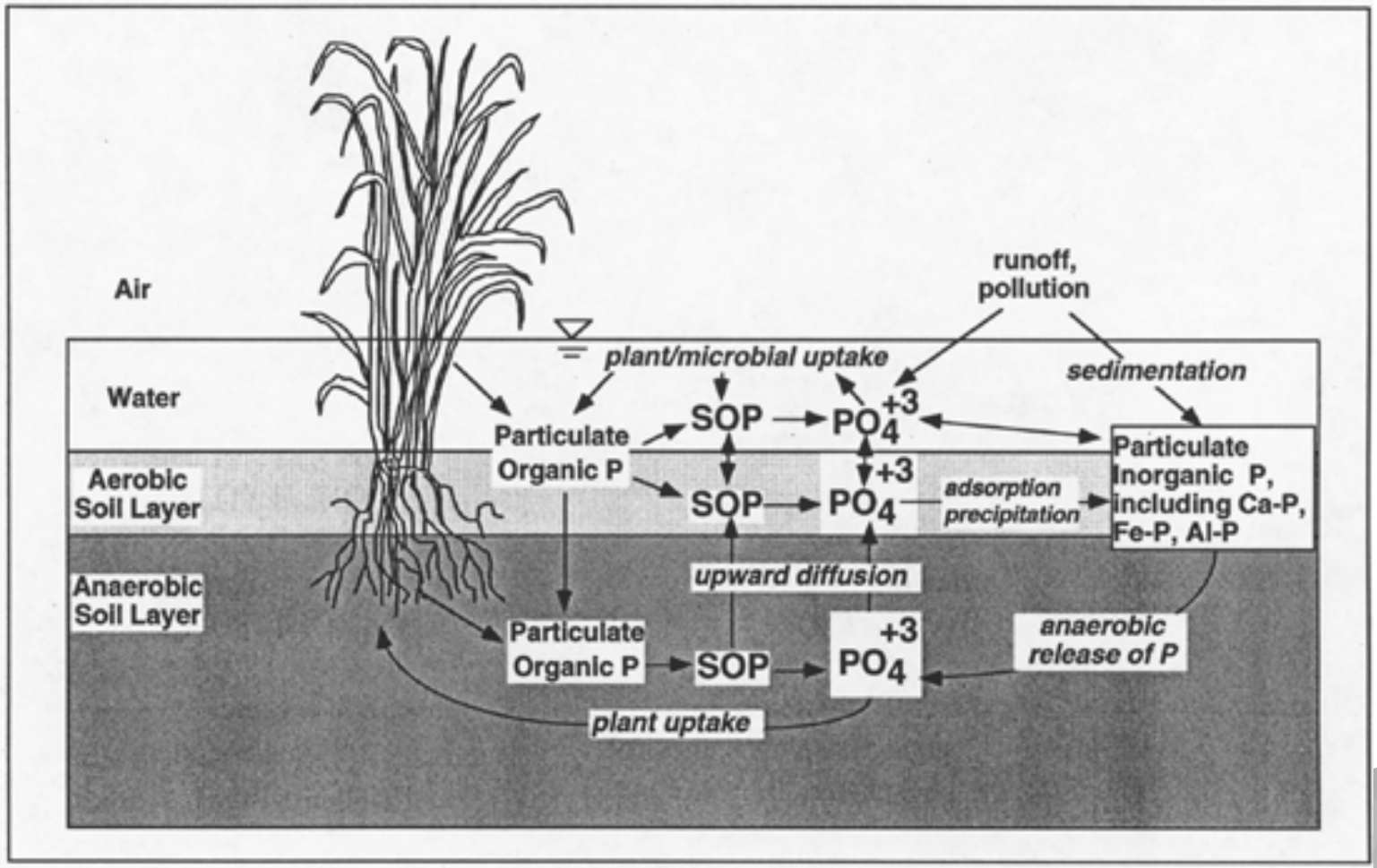


Figure 5–11. Phosphorus transformations in wetlands. SOP indicates soluble organic phosphorus.

Carbon Cycle

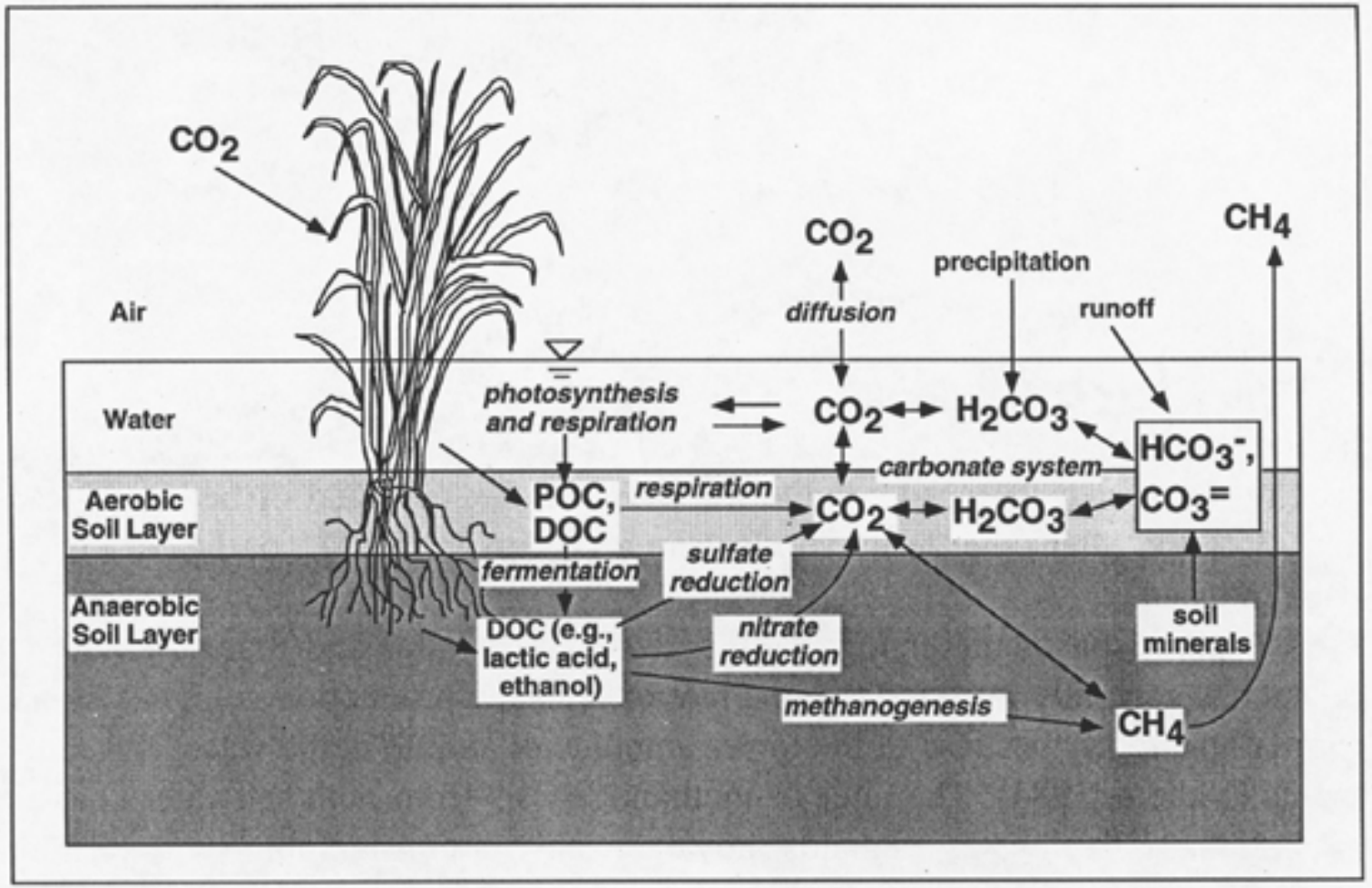
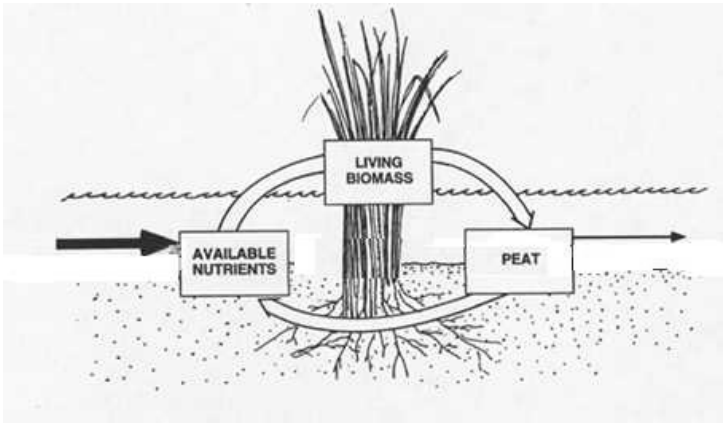
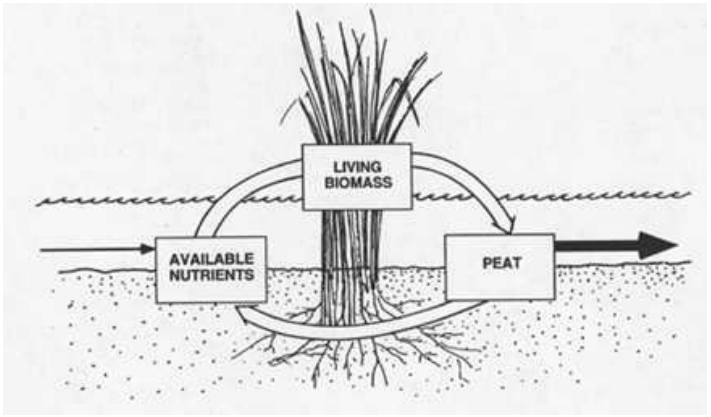


Figure 5–10. Carbon transformations in wetlands. POC indicates particulate organic carbon; DOC indicates dissolved organic carbon.

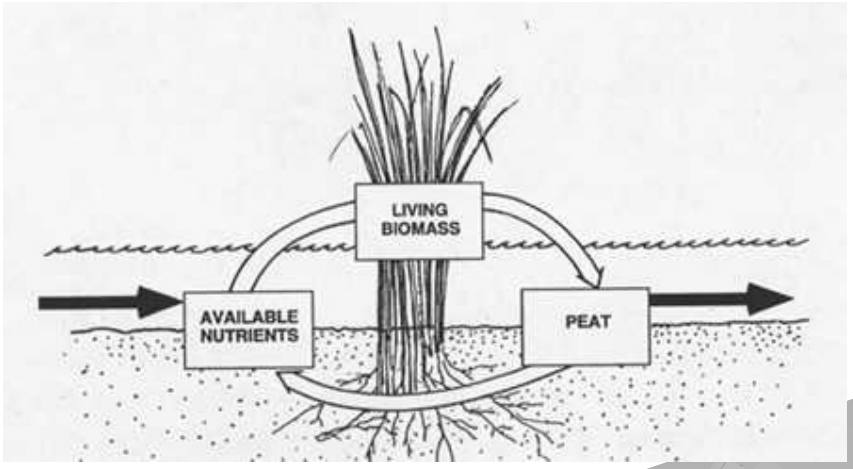
Wetland as Sink / Source / Transformer



Sink



Source



Transformer

Wetland Ecological Process

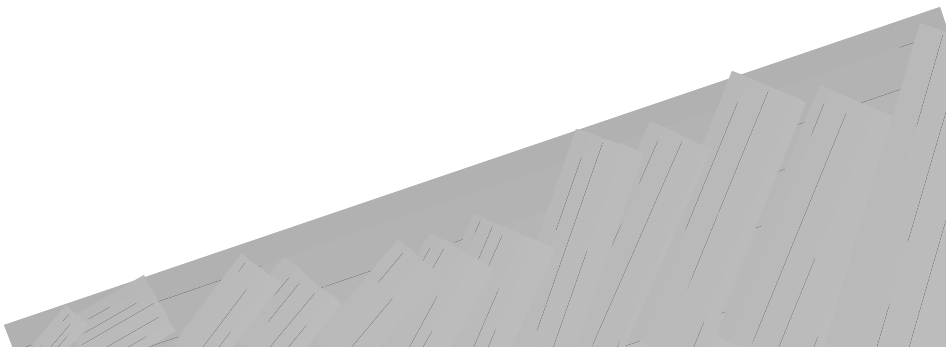


Diagram of Ecosystem Components

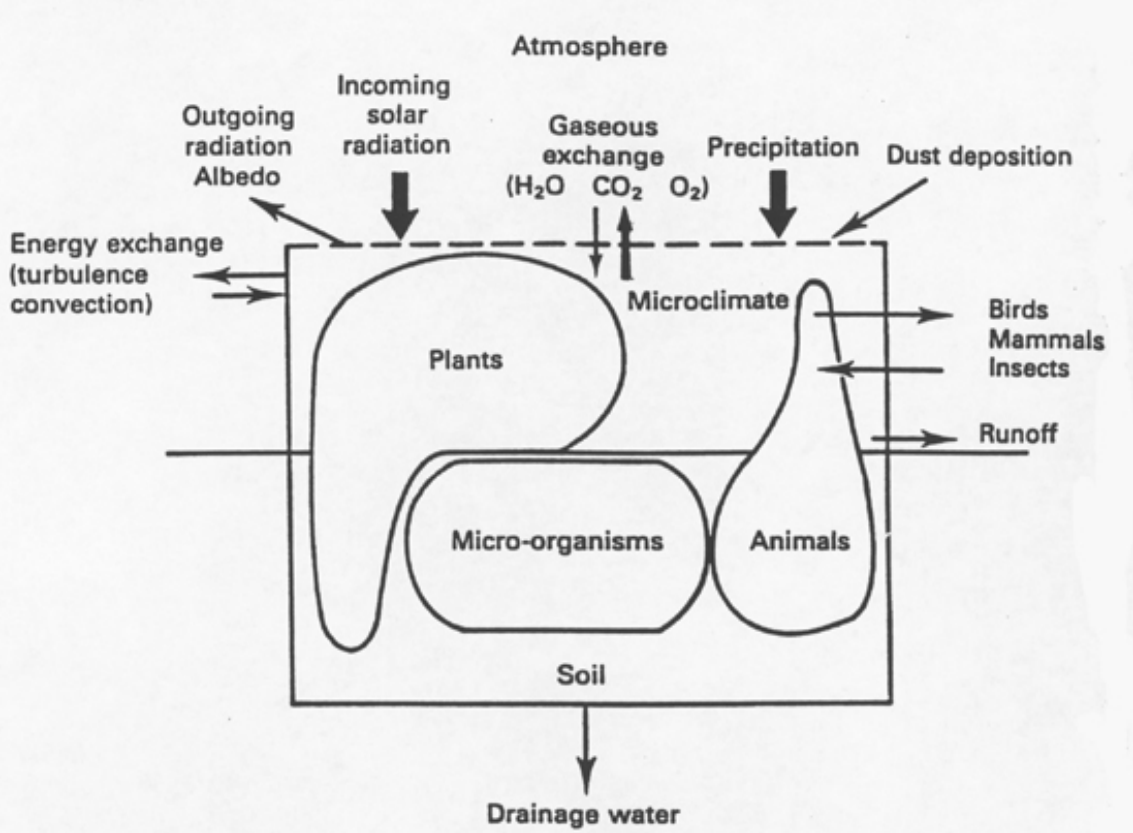
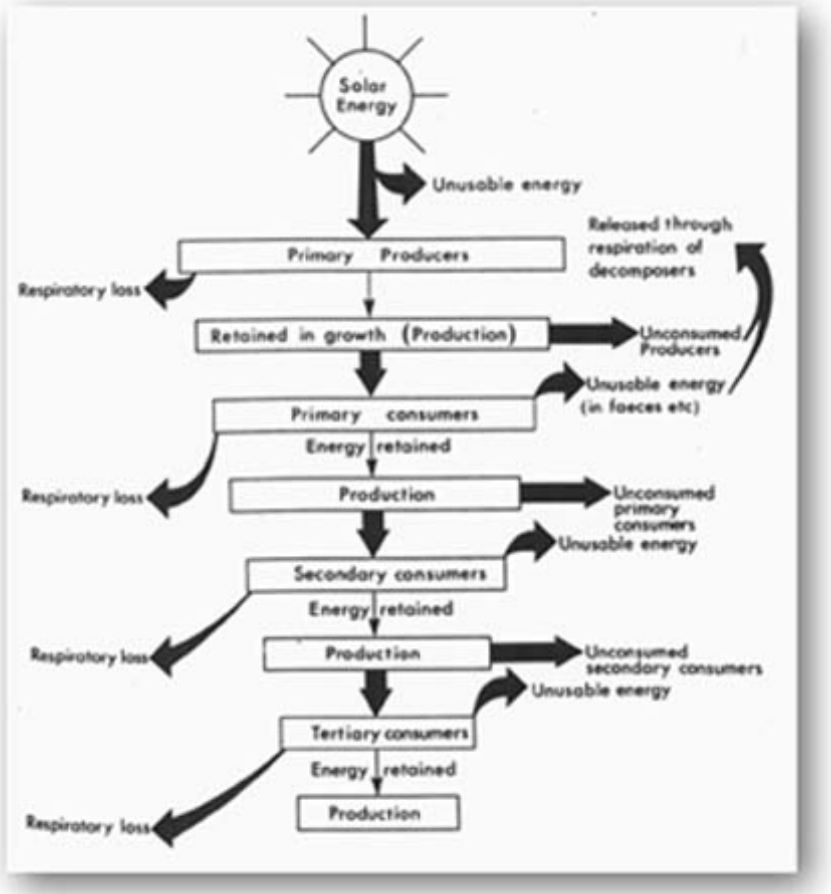


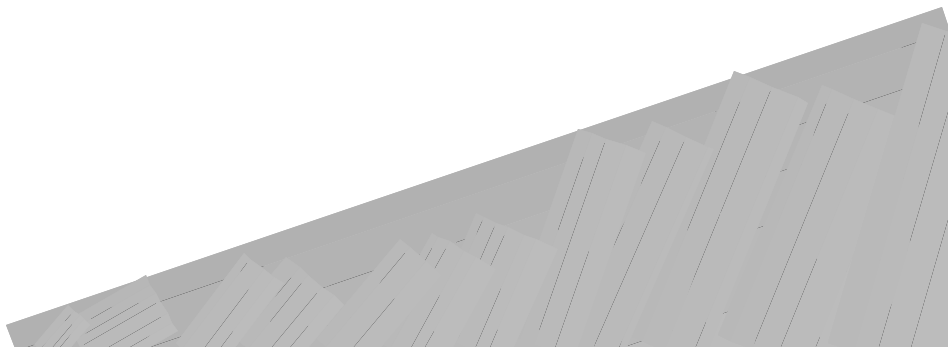
Figure 2.1 Schematic representation of an ecosystem or a biogeocenose (framed) in a state of exchange with the environment. If it is possible to recognize a distinct boundary to the ecosystem, for example, the edge of a woodland, then the area enclosed by the frame would constitute a biogeocenose (Redrawn from Walter (1973); by kind permission of Springer-Verlag, Heidelberg.)

Diagram of Energy Flow



Succession

- Autogenic – community change brought about by the biota
  - Linear
  - Directed
- Allogenic – community change in response to environmental change
  - Continuum



Autogenic Succession

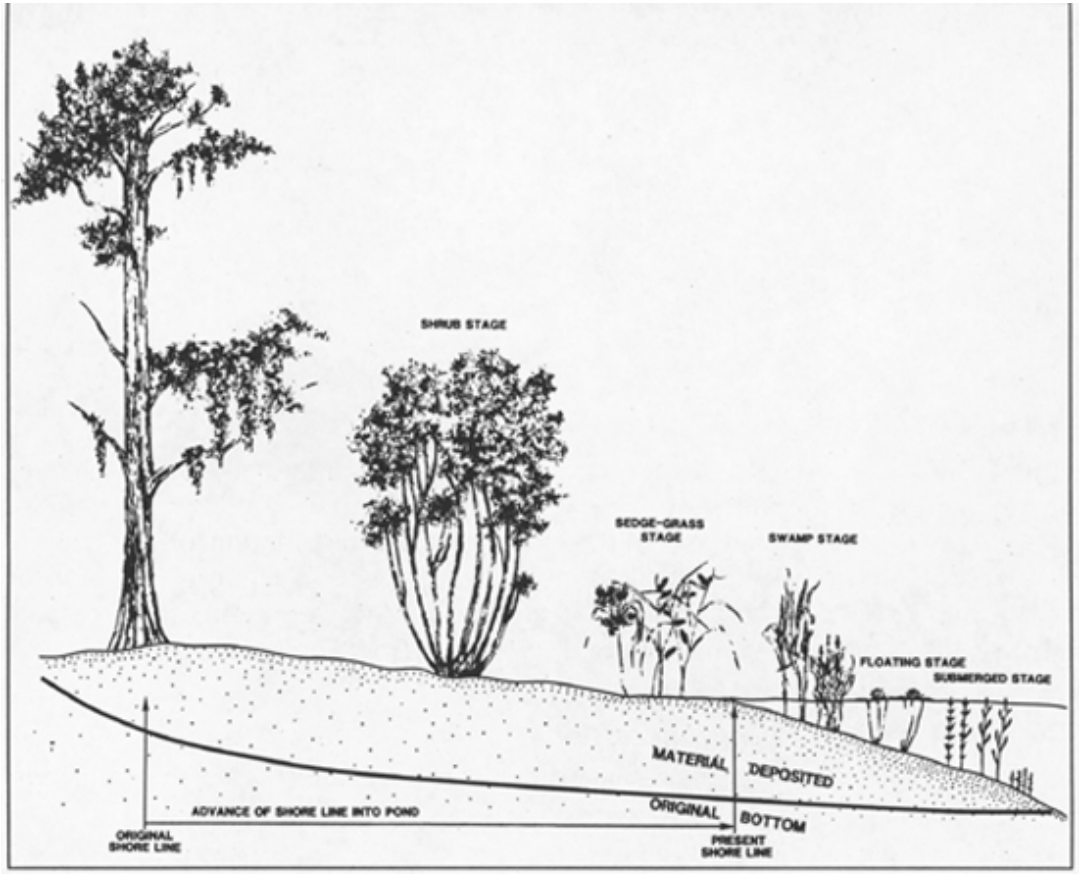


Figure 7–3. Diagram of classical hydrarch succession at the edge of a pond. *(After Wison and Loomis, 1967)*

Plant Zonation