INTRODUCTION:

Wetlands have become a major conservation interest since the mid 1970's. Before 1970's they were considered a source of diseases (mosquitos) and water damage due to flooding. Better understanding of their ecological role has led to a major change in view. It is now recognized that wetlands are important wildlife refuges, nursery's and improve water quality and reduce flooding. Wetlands in the US, are currently managed by the 50% rule, which states that the vegetation must be 50% hydrophytic in an area for it to be called a wetland. The 50% rule has caused a lot of controversy in defining wetlands. There are lots of sub category descriptions. Hydrophytic vegetation can be obligate hydrophytic, facultative hydrophytic, facultative mesaphytic, or a facultative upland plant (this includes emergent and is the cause of the most controversy.)

Wetlands have been described as**Kidneys** and **Biological Supermarkets** The kidney function analogy is: wetlands filter impurities from water as it passes through. They especially remove nitrogen and phosphorous and several organic and inorganic pollutants. They also reduce sediment and suspended solids from the water column. It's role as a Biological Supermarket is as a support bases for food chains and for the large assortment of plants and animals that are drawn to them as permanent or season habitat. Early civilizations all developed in wetlands (Nile, Euphrates, Jordan River, Yellow and Pearl Rivers in China, etc. Also, Lake Texcoco in Aztec in Mexico and Head waters of the Amazon in Peru for Inca culture. Even today most of the major cities of the world are on river deltas. Most civilizations used the food and fiber and wood products from wetlands and riparian zones.

In this class we will look at aquatic plants, also called aquatic macrophytes, or wetland plants. Aquatic plants are broadly defined as plants that normally grow in water, in soil covered with water, or soil normally saturated with water.

Definition of aquatic plants for this class = Vascular Hydrophytes (vascular = conductive tissue in higher plants, hydro = water, phytes = plants)

One EPA definition of a wetland is an ecosystem that needs constant or recurrent shallow saturation of substrate. Diagnostic features are hydrophytic plants, standing water, and hydric soils.

The EPA has put out a Hydrophyte List, which currently lists 6,728 species found only in the United States. This includes 18 regional lists. This list was started by the US Fisheries and Wildlife in the mid- 1970's and has been supplemented by Reed's "National List of Plant Species that Occur in Wetlands" in 1988.
　　　Reed's List is organized into three growth factors.

1. **Obligate Plants** = require a specific wetland environment to grow. These plants require saturated soils.

Example: Cattails (genus *Typha*) in Southern AZ *Typha domingensis*. In Northern AZ *Typha latifolia.*

2. **Facultative** = adapted equally to either wet or dry conditions. Vegetation adapted for growing in saturated soils or upland soils. Example: Cottonwood trees

3. **Occasional** = usually found out of wetland environment, but can tolerate wetlands.

EPA Hydrophytes List (morphological types):

A) Plants rooted in the substrate

- Emergent plants example: Cattail *Typha domingensis*. Plant production takes place mostly above the water with its roots   buried in aggressive shallow water. No other vegetation can grow around these plants.

- Plants with floating leafs

1. <u>Rhizomatous</u> - those with long petioles. Example: Water Lily (genus *Nuphar*) This plant has a stem under the soil and the petiole lifts the leaf up to the waters surface
2. <u>Stoloniferous </u>- having a long stem. Example: Pondweed and *Potamogeton natans.* Pondweed has an erect stem leading to the surface with leaves growing along the stem and at the surface.

B) Submerged plants

- Stem type - leaves on the stem. Example: *Hydrilla* (also called Waterweed)
- Rosette type - leaves all from a subterranean root or stock. Example: *Vallisneria*
- Thalloid type - reduced body without leaves. Example: *Podostemmum* (this plant attaches to rocks in streams and waterfalls)

C) Free floating hydrophytes - found in still waters.
   Examples: Water Hyacinth (*Eichornia crassipes*), Duckweed (*Lemna*), Water Fern (*Azolla*)

Origin of Aquatic Plants:
Many angiosperm aquatic plants are secondarily adapted to the water. (algae - mosses - ferns - gymnosperms - angiosperms). The flower portion of the plant is above water where it is able to transport sugar from the atmosphere down into the water while water is transported up to the flower portion of the plant.

Ferns have 5 families with many aquatic plants, with 200 known species. Azolla is an aquatic fern

1% of higher plants could be described as aquatic plants 250 + families of angiosperms with 300,000 species.   Angiosperms divide into monocot and dicot families. There are

18 monocot families; all seagrasses are monocots. Common monocots are *Zoestra, Potamogeton, and Ruppia*. Some freshwater monocots examples are *Lemna, Typha,* and *Naja.* The Water Lily, mangroves and *Ceratophyllum* are examples of aquatic dicots.

Families that have many hydrophytes:

- *Graminae* - grasses including reeds, *Spartina* and *S. spartinae* and *Phragmites*
- *Cyperaceae* - sedges including *Cyperus*, *Carex*, and *Scirpus*.
- *Juncus* - rushes, have a hollow stem.

There are different zonation patterns for fresh and saltwater plants. Freshwater zones have deep rooted plants, shallow rooted plants, emergent vegetation, floating attached plants, submerged plants, and floating plants. Saltwater zones have halophytes in the sand dune areas, mangroves, emergent grasses, and sea grasses. In saltwater zones, plants must adapt to high and low tides.