Oil Spills in Water

Cleanup Alternatives & Restoration

In ecology, there is no such thing
as a free lunch…everything is connected…

Why this Presentation?

A few reasons, but the overall goal is to help conserve fish and wildlife.

Fish and wildlife in the Midwest is under assault. Wetland loss, modifications to hydrology, nutrient loading, fish kills, energy projects, losses at wintering and breeding grounds all reduce fish and wildlife populations.

Oil Pollution Act

➢ We in this room through the application of OPA help sustain our Nation's natural resources.

➢ Establishes liability for removal costs and damages with the discharge of oil into navigable waters.

➢ Provides for the restoration of injured natural resources along with the liability for lost ecological services.

http://www.oilpollutionlaw.com/overview.htm

Disclaimer

We continue to recommend early notification and frequent coordination with natural resource trustees and site natural resource managers.
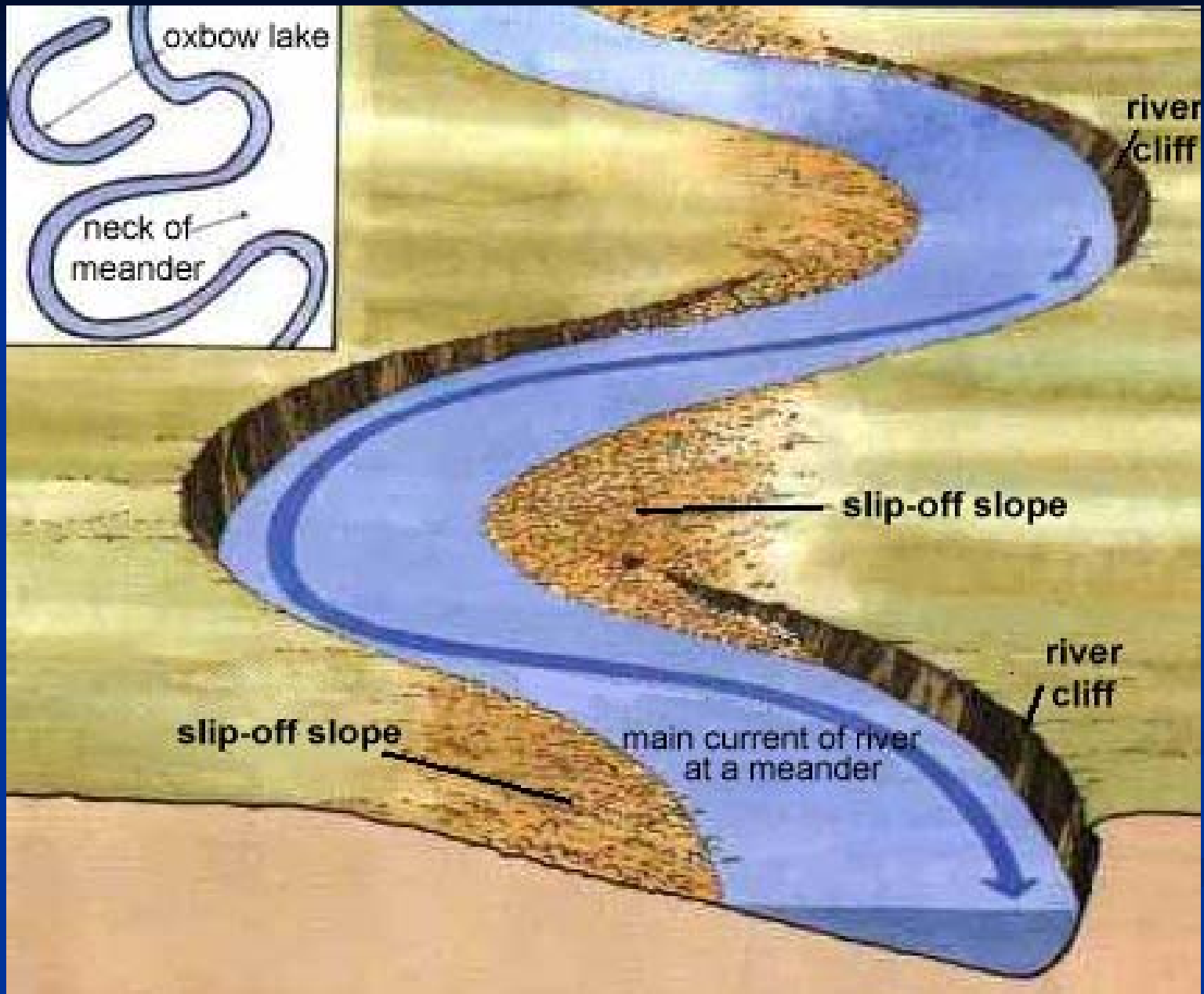
➢ What we do for the response has a lot to do with our ability and feasibility to restore the injured or lost natural resources.

➢ We have already lost over half of aquatic and wetland resources in the lower States. Some States have lost over 90%.

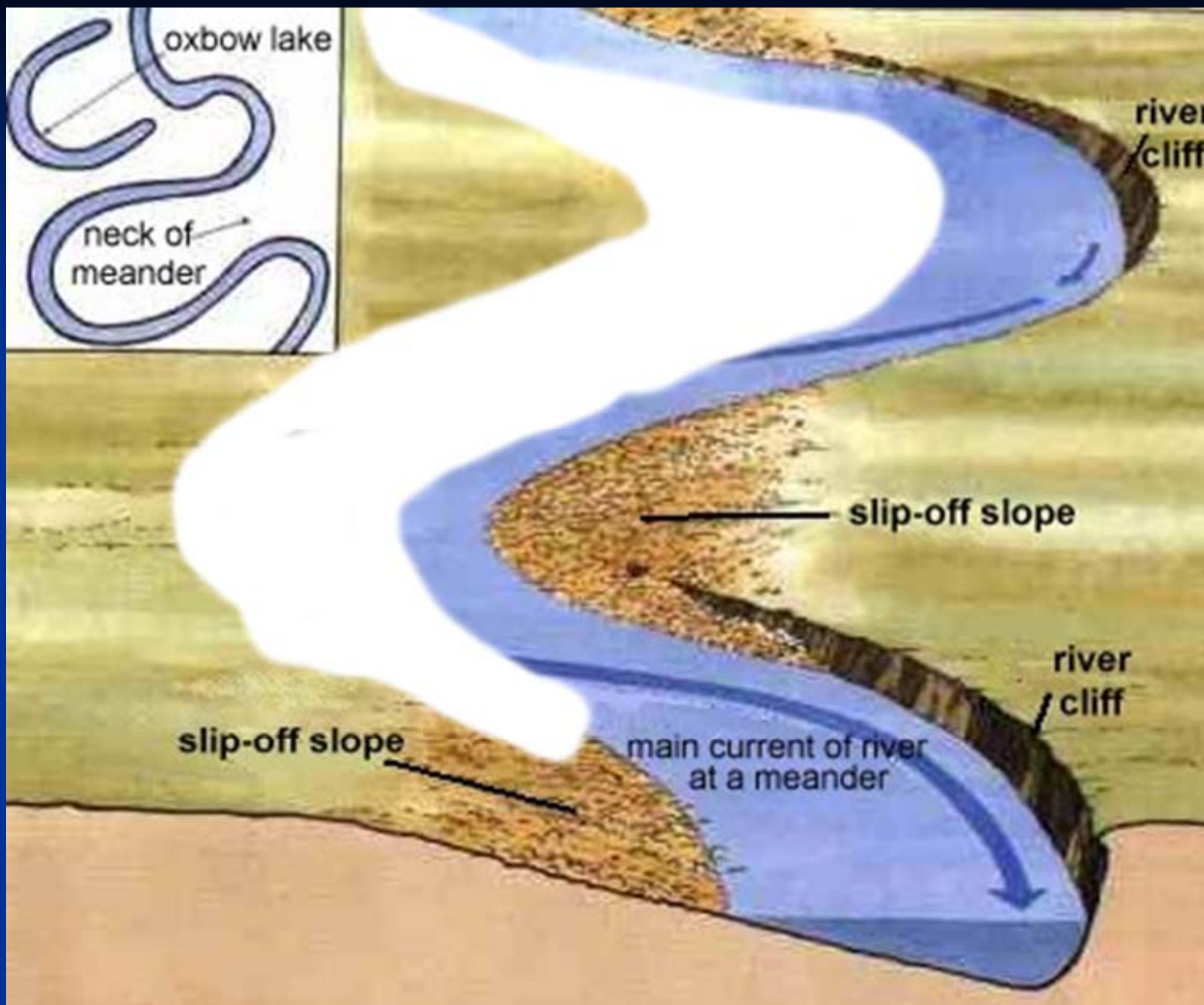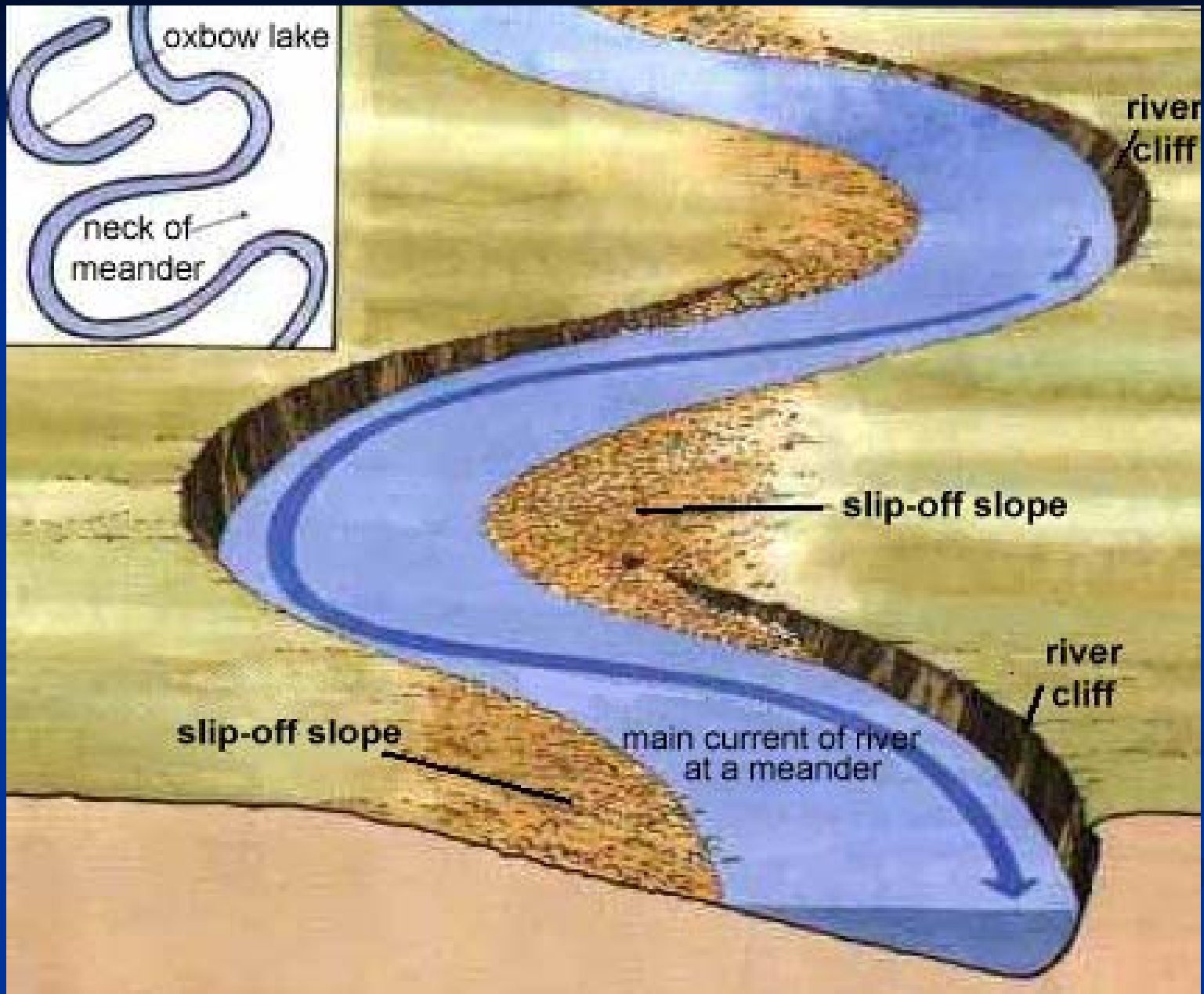http://www.npwrc.usgs.gov/resource/wetlands/wetloss/summary.htm

➢ So, what are our response options and how do these alternatives influence the restoration?

- Let's set aside any oiled wildlife or species problems and focus on the habitat for our discussion.

- There is a structure to riverine and floodplain wetland habitats of our navigable waters.

- The structure relates to the arrangement of three key ingredients: water, soil, and vegetation.

➢ We can check the literature or do field surveys to determine the kinds and quantities of the key ingredients for the purpose of restoring the site back to the condition that existed prior to the spill.

➢ We may be able to acquire suitable soil and vegetation (seeds or young plants) locally or outside of the spill site. How water gets to and leaves the site is another key question to answer.
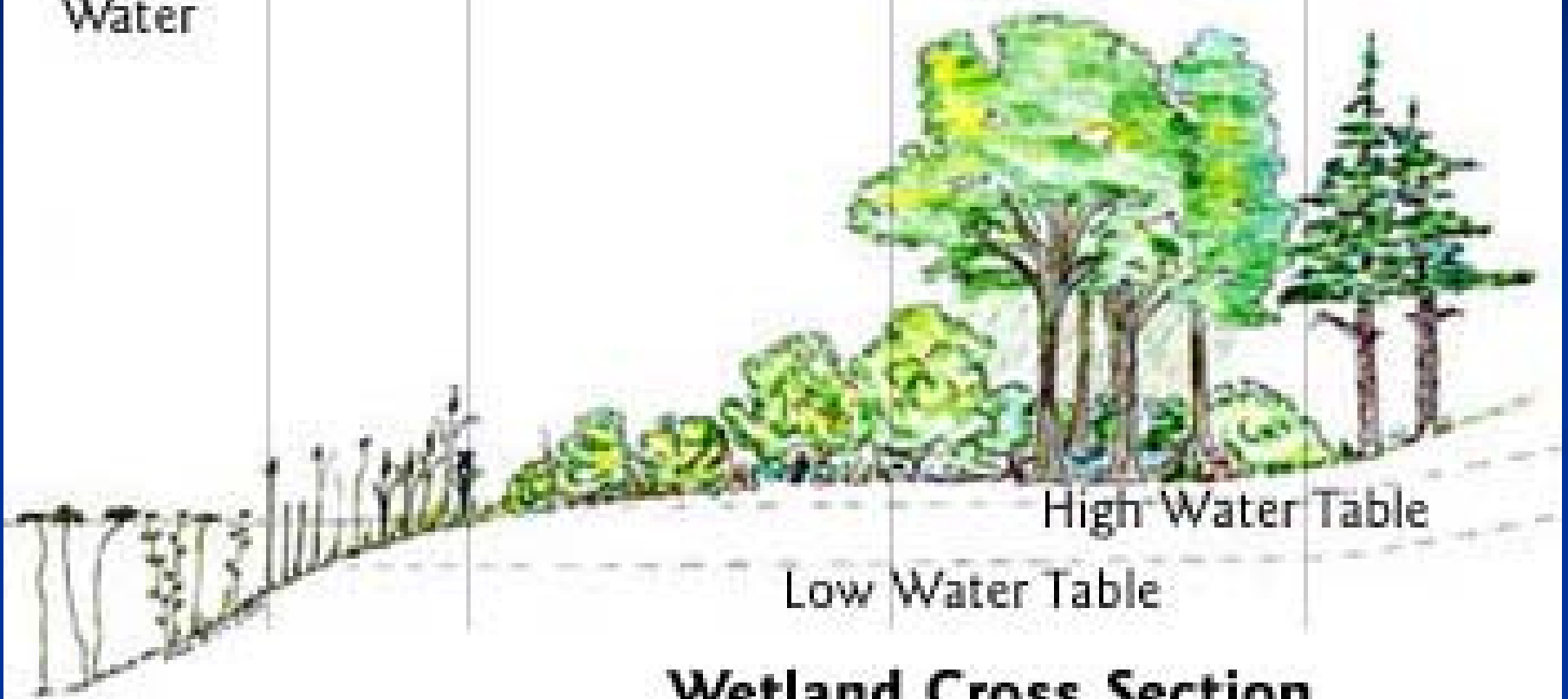
oxbow lake

neck of meander

river cliff

slip-off slope

river cliff

slip-off slope

main current of river at a meander
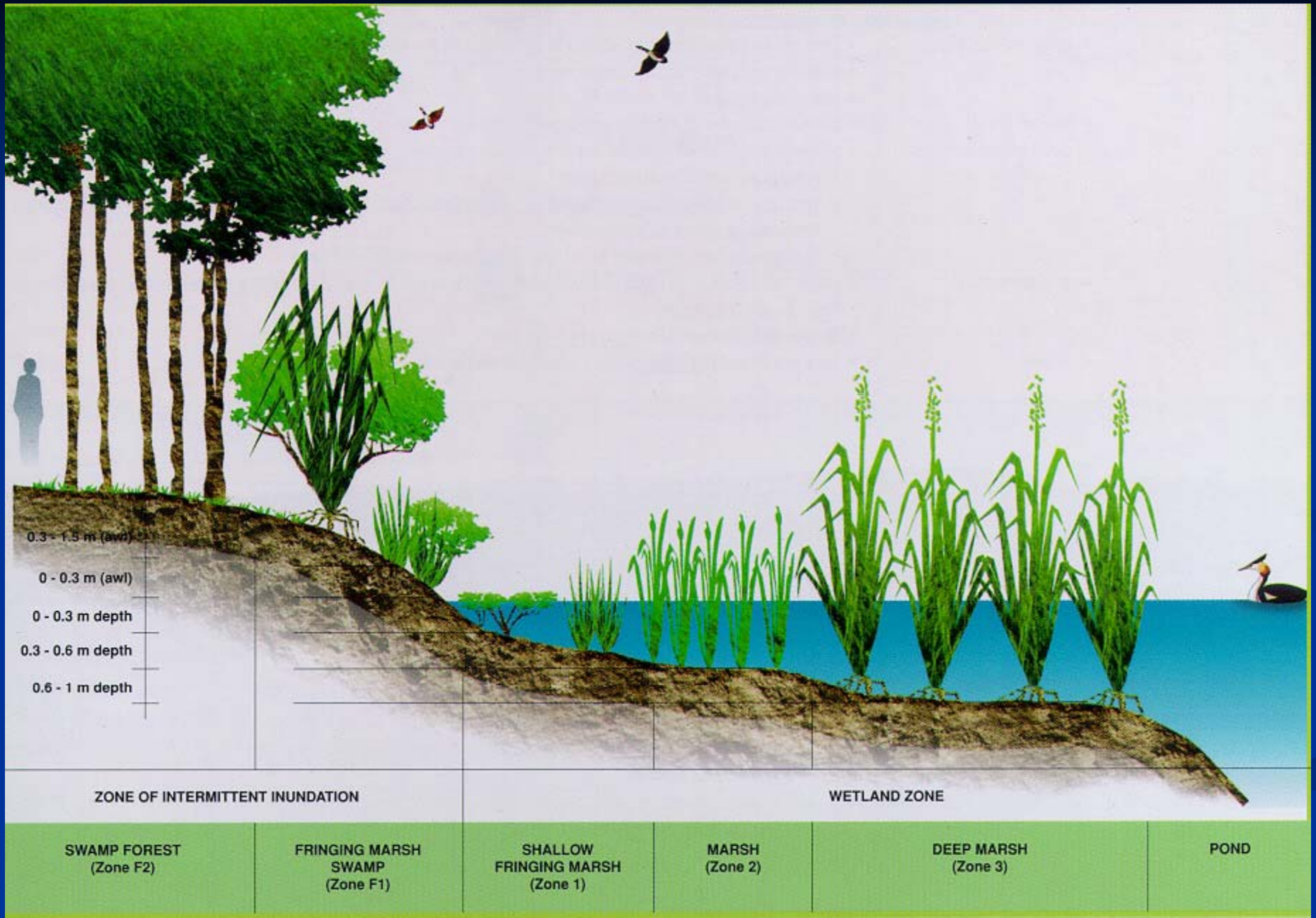
Open Water | Marsh | Shrub Swamp | Wooded Swamp | Upland

High Water Table

Low Water Table

Wetland Cross Section

0.3 - 1.5 m (awl)
0 - 0.3 m (awl)
0 - 0.3 m depth
0.3 - 0.6 m depth
0.6 - 1 m depth

ZONE OF INTERMITTENT INUNDATION

WETLAND ZONE

SWAMP FOREST
(Zone F2)

FRINGING MARSH
SWAMP
(Zone F1)

SHALLOW
FRINGING MARSH
(Zone 1)

MARSH
(Zone 2)

DEEP MARSH
(Zone 3)

POND

0.3 - 1.5 m (awl)

0 - 0.3 m (awl)

0 - 0.3 m depth

0.3 - 0.6 m depth

0.6 - 1 m depth

ZONE OF INTERMITTENT INUNDATION

WETLAND ZONE

| SWAMP FOREST (Zone F2) | FRINGING MARSH SWAMP (Zone F1) | SHALLOW FRINGING MARSH (Zone 1) | MARSH (Zone 2) | DEEP MARSH (Zone 3) | POND |

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ZONE OF INTERMITTENT INUNDATION

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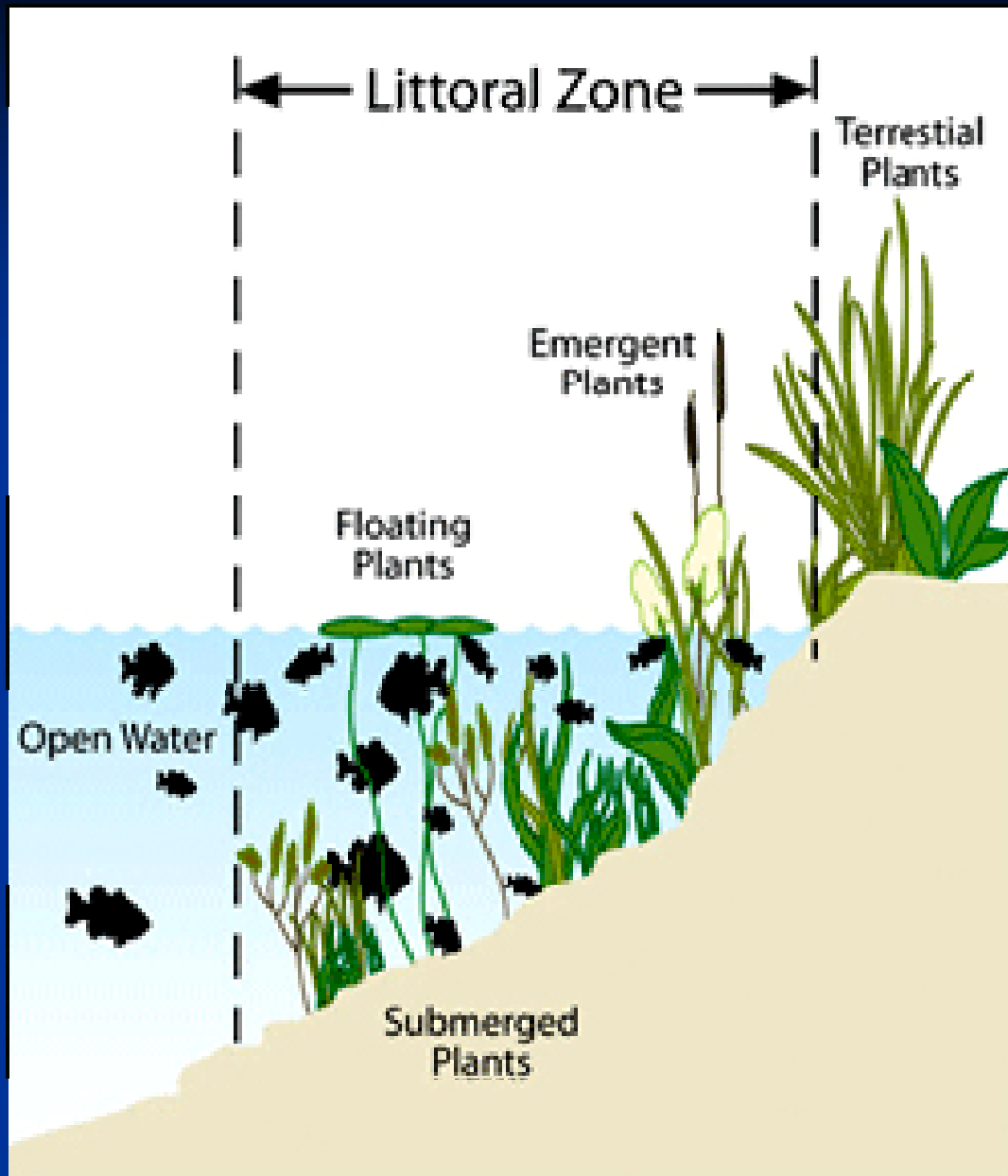| SWAMP FOREST (Zone F2) | FRINGING MARSH SWAMP (Zone F1) | SHALLOW FRINGING MARSH (Zone 1) | MARSH (Zone 2) | DEEP MARSH (Zone 3) | POND |

Water depth and substrate regulates the type of plants in the littoral zone and in the floodplain.

The type of plants attracts different kinds of aquatic invertebrates and fishes.

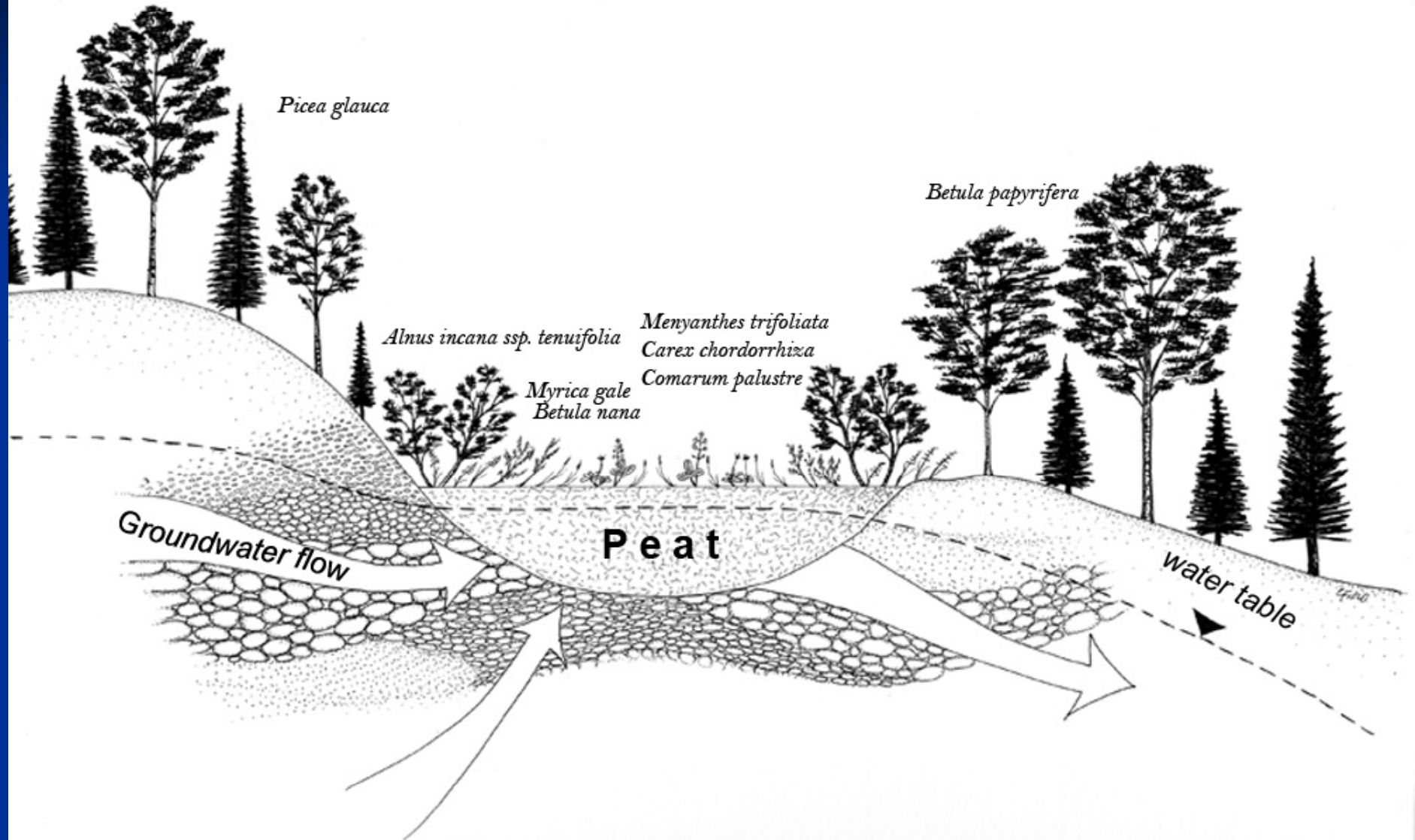In turn, the assemblage of aquatic life attract specific kinds of wildlife.

These plant and animal communities make up the ecosystem its ecological services and human uses.

These specific ecological services and human uses are what we are trying to restore.

➢ Sometimes the ingredients are difficult to find for on-site rehabilitation.

➢ Yes there is then the option to replace the injured or lost habitat off-site or elsewhere.

➢ It may be irreplaceable in the region or costs far exceed the on-site rehabilitation costs.

➢ It may truly be a phenomena of landscape geography so it cannot be created somewhere else.

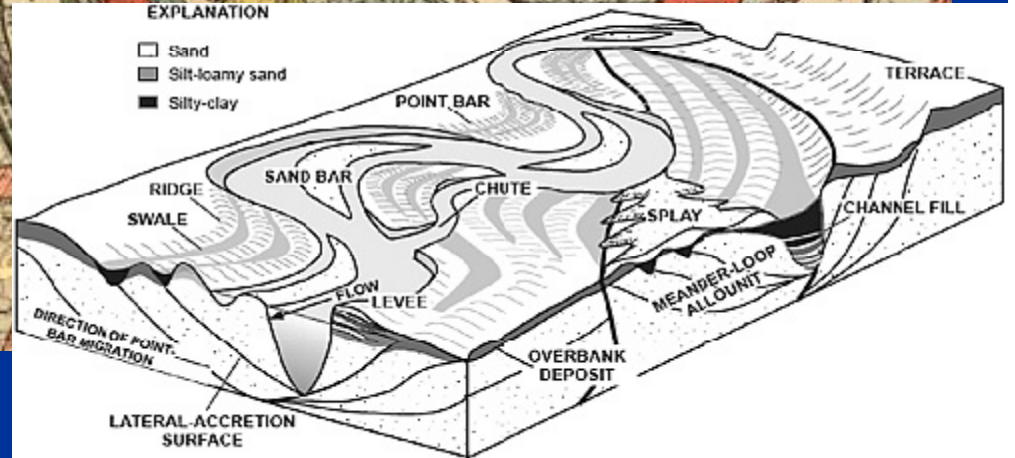# Spring Fen Ecosystem

Picea glauca

Betula papyrifera

Alnus incana ssp. tenuifolia

Menyanthes trifoliata
Carex chordorrhiza
Comarum palustre

Myrica gale
Betula nana

Groundwater flow

P e a t

water table

Artwork by Conrad Field

EXPLANATION

☐ Sand
▨ Silt-loamy sand
■ Silty-clay

TERRACE
POINT BAR
RIDGE
SAND BAR
CHUTE
SPLAY
SWALE
CHANNEL FILL
FLOW LEVEE
MEANDER-LOOP ALLUINT
DIRECTION OF POINT-BAR MIGRATION
OVERBANK DEPOSIT
LATERAL-ACCRETION SURFACE

Additional items for thought:

Some soils have unique assemblage of microorganisms and chemical conditions as part of the habitat that can't always be replaced, or that we do not know how to replace. The soil and plants may be able to survive some degree of oiling, but will not exist if dug our or scraped away.

Phytoremediation as a follow-on to removal - control sheen (several aquatic plants are good oil digesters, duckweed, arrowhead).

➢ So, are there alternatives to removal that may leave much of the structure in place for these situations allowing for the rehabilitation of the site back to the previous condition?

➢ How do we become familiar and comfortable in using the alternatives?

➢ How do we develop Administrative Orders that accommodate the response alternatives? Can sheens persist?

➢ What are your ideas for the response?

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Low Water Table

Wetland Cross Section