WETLAND BIRDS (Water birds)

- large group; about 800 species world-wide; 260 species in North America
- defined by the habitat use
- taxonomically diverse

Wetlands provide food, nesting and resting places, protection from predators.

Adaptations to wetland and aquatic environment.

Interactions between birds and other wetland components.

Endangered wetland birds

Phalacrocorax brasilianus– Neotropical cormorant

Birds - bipedal vertebrates with feathers

- feathers distinguish birds from all other vertebrates
- evolved from the small reptilian dinosaur *Archeopteryx lithographica*

Feathers - essential for flight

- insulation
- modified feathers aid in swimming and water repellence (preen glands)

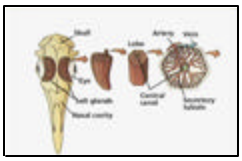
Flight - central avian adaptation

- lightweight bones
- strong flight muscles
- some wetland birds lost ability to fly

ADAPTATIONS

(1) Feet

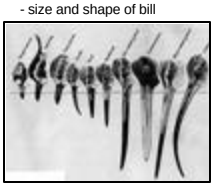
- webbed and lobbed toes
- long legs for wading



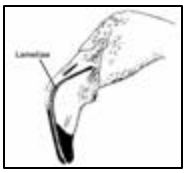
(3) Salt glands - large structures located in depressions in the skull above the eyes

(2) Feeding adaptation

- size and shape of bill
- filter feeding



flamingo bill consists of large lower mandible with a powerful tongue that creates suction when it pumps back and forth; lamellae sort food items from debris in water



MIGRATIONS

- allow for year round activity, exploitation of feeding opportunities
- physiological adjustment, endurance

The Atlantic Flyway– important for waterfowl (Canvasbacks, Redheads) that winter on the waters and marshes south of Delaware Bay.

The oceanic and coastal route of the Atlantic Flyway has its northern origin in the eastern Arctic islands and the coast of Greenland (Arctic Tern, auks, guillemots)

The Mississippi Flyway - It's northern terminus is on the Arctic coast of Alaska and its southern end in Patagonia (the longest in the Western Hemisphere). Several species of shorebirds that breed north to Yukon and Alaska. Shorebirds traverse the full length of this migration route twice each year. (no mountains for > 3000 miles)

The Pacific Flyway- Alaska Peninsula, the Gulf of Alaska and along the coast line of British Columbia, Washington, Oregon and California; passage of gulls, ducks and other water birds.

WATERFOWL

Members of family Anatidae - geese, swans and ducks (143 species)

- Webbed feet with elevated hind toe
- Duck (flattened blunt-tipped) bill
- Strong wings, dense coat of waterproof feathers, long neck

Successfully established in nearly any aquatic habitat on Earth; feed primarily on aquatic vegetation

Swans: the largest members of Anatidae;

Geese: (Canada goose, snow goose); the role in nitrogen cycling

Ducks: dubbling ducks (mallards, pintails, teals, shovelers, wigeons)

Shallow water, water shores, mudflats

GEESE

Brent goose *Branta bernicla*

Breeding - Arctic tundra with shallow pools, usually near to the sea.

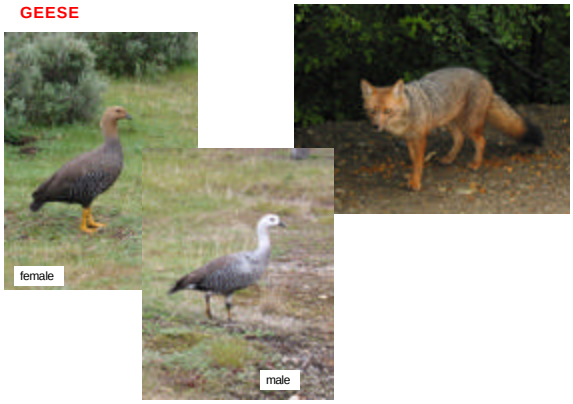
Wintering - Estuaries and shallow coasts with mudflats. Also grazes on fields near the coast.

Canada goose *Branta canadensis*

Breeding – Canada from Yucon to Newfoundland

Wintering – some in British Columbia, majority in the US, even northern Mexico

GEESE



Chloephaga picta, Magellan goose, caiquen

GEESE

Chloephaga policephala, canquen, ashy headed goose

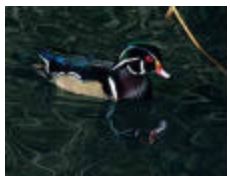
DUCKS

Mallard duck - *Anas platyrhynchos*

"dabbling duck"; omnivore

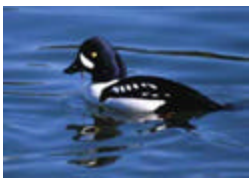
North and northern Central America

Wood Duck - *Axis sponsa*



Distinctly North American species; primarily herbivore, but also insects and invertebrates

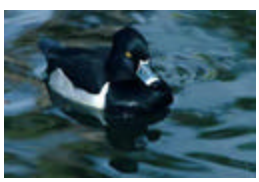
DUCKS



Barrow's Goldeneye - *Bucephala islandica*

"diving duck"; mollusks, insect larvae, seeds

North America



Ring-necked Duck - *Aythya collaris*

North America

OPEN WATER BIRDS

Grebes(20 species) and loons (5 species)

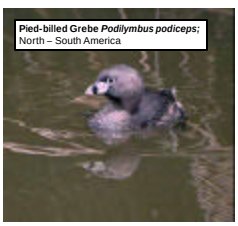
Swim underwater to gather food (small fish & Crustacean)

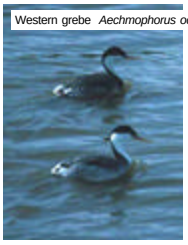
Legs positioned very far on their bodies - adapted to diving

Some migrate long distances; tropical grebes do not migrate

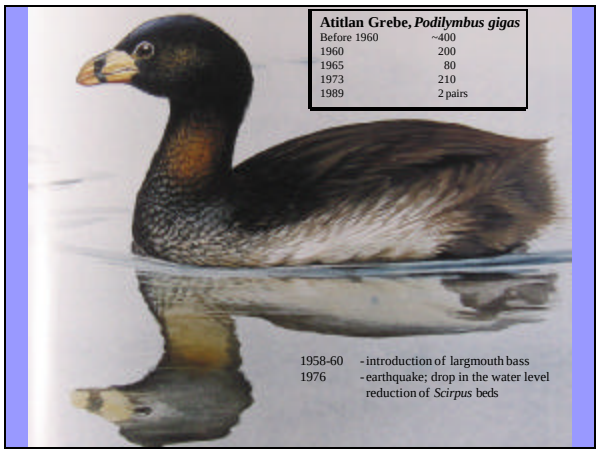
GREBES Podicipedidae 20 spp

ancient family going back 80 million years, well-represented in the fossil record, and not closely related to any other birds





Clear Lake; DDT !



Junin Grebe - *Podiceps taczanowskii*

Lake Junin, Andes of Peru

Population of grebes became trapped in the lake during a glaciation, about 100,000 to 10,000 years ago.

Evolved into flightless birds.

Mining operations, high levels of lead, copper, zinc, and iron oxide.

Water diversion (hydroelectric dams) – destruction of wetland habitat seasons

Only about 300 birds left.

LOONS *Gaviidae*

5 spp (restricted to Northern Hemisphere)

small and ancient group of birds

specialized fish eaters with dagger-like bills

spend most of their time in water

lobed feet set far back on the body

clumsy on land

migratory, winter in coastal harbors and bays

negative impacts of motor boats on breeding populations

Common loon - *Gavia immer*

WADERS

Predators of shallow waters (135 species in 5 families)

Long legs, long necks and long bills

Herons - half of all waders; long necks that fold in flight; nest in stick structures on trees or ground

Storks - fly with their necks forward; feed by slowly wading in shallow waters (can also feed in agricultural fields or on dead animals - marabou stork)

Ibises & Spoonbills - ibises - downcurved bills; feed in shallow mud; spoonbills - modified bills, flattened with a spoon-like tip

Flamingos - feed by filtering small organisms through their bills; can survive in salt lakes and alkali wetlands; nest in large colonies (over 106 pairs)

Cranes - feeding upland and in water; some species came close to extinction (Japanese crane)

HERONS *Ardeidae*

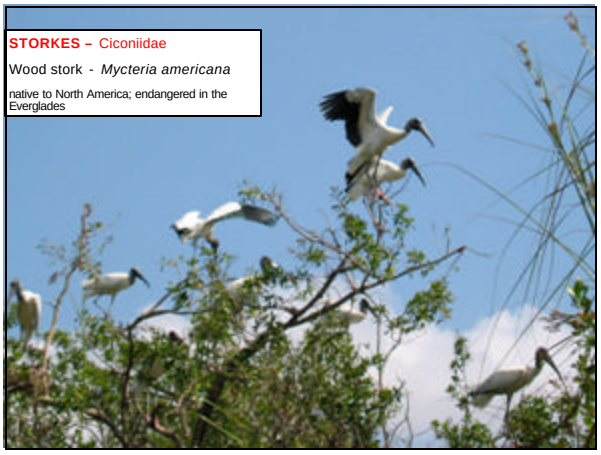
65 spp

Ancient family, origins in Lower Eocene some 55 million years ago

Preying on fish, frogs, and snails

Bare-throated Tiger-Heron - *Tigrisoma mexicanum*

Central America lowlands and mangrove swamps



STORKES – Ciconiidae

Wood stork - *Mycteria americana*

native to North America; endangered in the Everglades

STORKS

Jabiru stork - *Jabiru mycteria*

Southern Mexico to northern Argentina

IBISES

Scarlet ibis - *Eudocimus ruber*

South America (mainly Suriname)

Tidal lagoons and mangrove swamps

Feed on crabs

Migrate to Pantanal (Brazil)

FLAMINGOS

Long necks; webbed feet; unique bills

Large colonies in alkaline or saline habitats (coastal lagoons; interior soda lakes – danger of salt incrustation)

Pink plumage is the result of carotenoid pigments in the diet

Greater flamingo – crustacean, mollusks, small fish; Lesser flamingo - algae

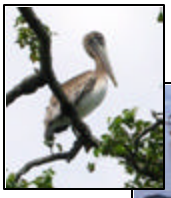
PELICANS *Pelecanidae*

8 spp

Fossils of pelicans go back 40 million years

Two basic types of feeding strategies: plunge-diving (Brown Pelican) and group fishing (various white pelicans)

Pouch of bare skin between the branches of lower mandible used as dipnet for fish capture



Brown pelican - *Pelecanus occidentalis*

The Brown Pelican was heavily impacted by DDT in the 1950s and '60s, and breeding populations along the Pacific coast of California declined. They have made a great comeback throughout their range since DDT was banned

Shoebill (Whale-headed Stork)- *Balaeniceps rex*

(special family related to pelicans)

The Shoebill lives in extensive papyrus swamps in the interior of central and East Africa

Primary prey — lungfish (major hook at the tip of the beak)

RALLIDS

Secretive marsh dwelling birds

Do not swim very often (sora, clapper rail, black rail)

In the early 1800s, California clapper rails (*Rallus longirostris obsoletus*) were abundant in the tidal marshes of San Francisco Bay and smaller populations were present in coastal marshes from Humboldt Bay to Morro Bay.

Hunting between 1850 and 1915 decimated rail populations leading to the extinction of many local populations.

Destruction of tidal marsh habitat for urban use and salt production accelerated in the 1920s and proceeded at a rapid pace the mid-1960s.

Restoration projects

LIMPKIN *Aramidae* *Aramus guarauna*

Limpkin is a strange marsh bird of the New World tropics

It looks superficially like an ibis, has the general anatomy of a crane, and shares many behavioral traits with rails. Recent DNA evidence places it close to the sungrebes

Long bill designed to deal with apple snails (*Pomacea)* on which the Limpkin depends. The upper tip is sharpened against the lower tip to create a "knife-tip" point to cut the snail's attaching muscles.

BIRDS OF PRAY

Peregrines, fish-eating hawks, ospreys, kites

Snail kite - *Rostrhamus sociabilis*

operculum

Apple snail - (*Pomacea flagellata*)

Impact of snail kites on formation of marsh patchiness

SHOREBIRDS

about 200 species

Mudflats, marshes, beaches, coastal rocks

Many share the same habitat - different ways of feeding

Sandpipers - long bills

Plovers - short bills

Main shorebird nursery - arctic tundra (June, July); long migration routes

Some tropical – jacanas (elongated toes and claws) – "lily hoppers"

Jacana nest

PLOVERS *Charadriidae*

66 spp.

Occur throughout the world, from high arctic tundra to tropical sandbars.

Arctic-breeding species are highly migratory (migratory mistakes)

Golden plovers fly from the Arctic tundra over the Atlantic Ocean to wintering grounds in South America (pampas of Argentina); come back across NW South America, then the Mississippi flyway (young birds don't use the oceanic route)

Grey Plover - *Pluvialis squatarola*

SANDPIPERS *Scolopacidae*

87 spp.
Shores and in wetlands around the globe
Many are highly migratory with distinctive breeding and winter plumages

Dunlin - *Calidris alpina*

lowland and highland marshes, tundra, tarns, small ponds

circumpolar breeding in Arctic and northern temperate areas (Norway, Svalbard

territorial on breeding grounds

nests in grass tussocks; 4 eggs

Feed on inverts;

LARIDS

Gulls and terns

long winged, web-footed

often in marine environments

nesting on cliffs or small islands without predators;;

Laughing gull – *Larus atricilla*

Arctic tern; *Sterna paradisea*

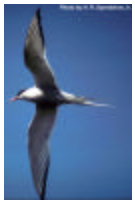
Breeding the Arctic; wintering in SA, as far as Antarctica

Feeds on fish & crustacean

35 years (1)

Direct attacks

Arctic fox



ALCIDS *Alcidae*

Auks and relatives

23 spp
Alcids (or auks) fill a similar ecological niche in the northern hemisphere as penguins do in the southern hemisphere, except alcids can fly

In the north Pacific, a diverse set of species pursue krill and bait fish in cold waters throughout the day, coming ashore only during the short breeding season to nest in crevices or offshore islets protected from predators.

Some small species only fly to their burrows after dark, so as to avoid predation by gulls. niches.

Puffins – highly modified bill
ranges from Alaska to California. The southernmost permanent colony is on the Farallone Islands.

Tufted Puffin - *Fratercula cirrhata*

Little auk - *Alle Alle*

Arctic fox - *Alopex lagopus*

Smallest of the European auks, cliffs, Arctic region, West Greenland, Svalbard, Frans Josef Land (breeding);

SW Greenland – wintering grounds

Single egg

Adults collect small crustacean and bring it to the young in a gular pouch

Fertilize the tundra!!!

A colony of 50,000 breeding birds supplies the area in the nearby tundra with 100 t of excrements

PASSERINES

Blackbirds, wrens, sparrows

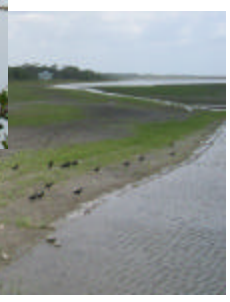
The number of passerines breeding in different types of wetlands depends on the structural complexity of macrophytes and foraging opportunities they provide

Size of marshes important

Tropical king bird – *Tyrannus melancholicus*

VULTURES – Cathartidae

Carrion eaters



Clack vulture – *Coragyps atratus*

Central US to central Chile

Smooth billed Anni - *Crotophaga ani*