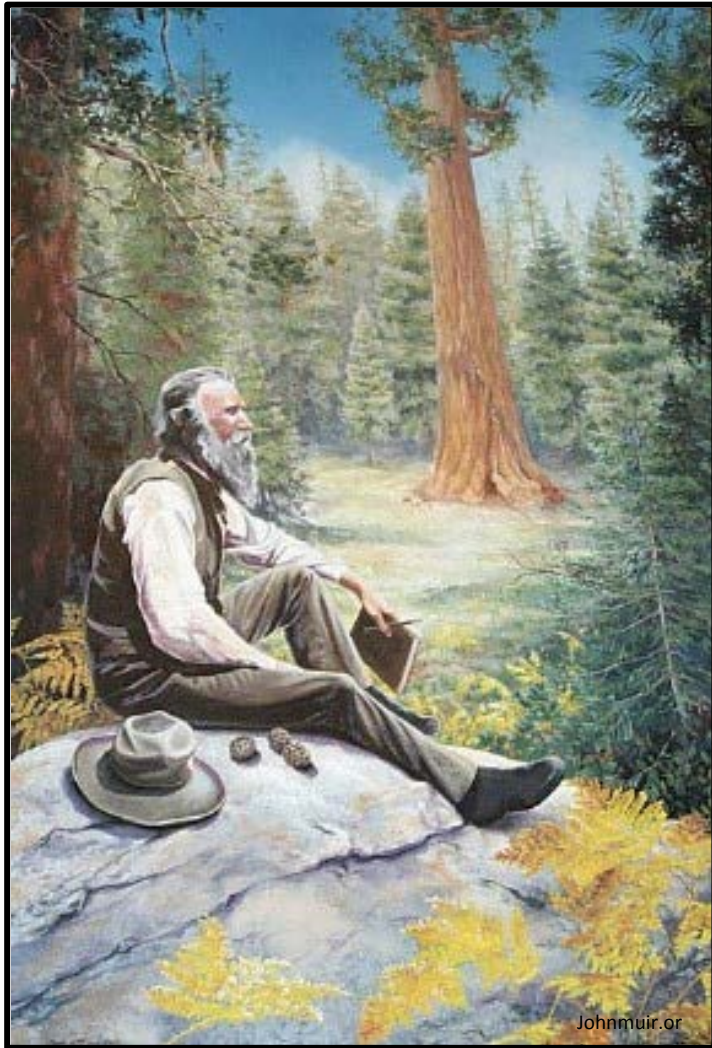


Urban Ecology Muir Web

John Muir

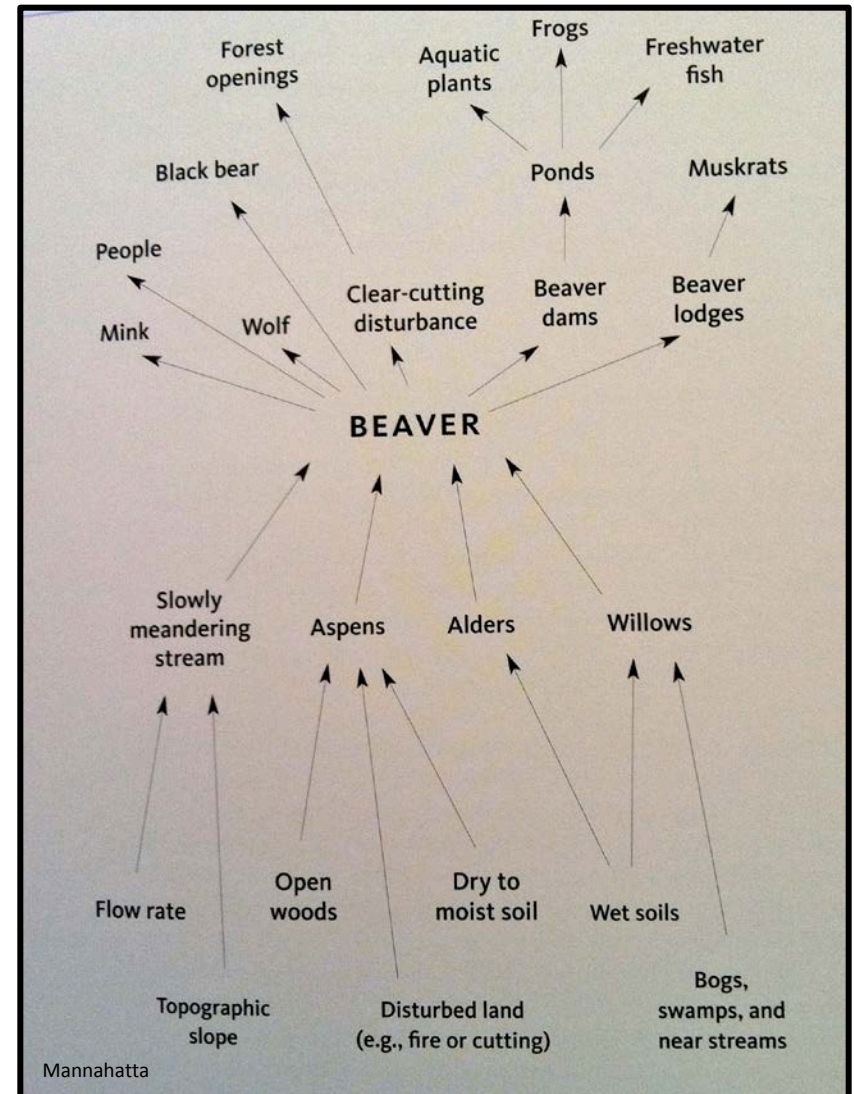
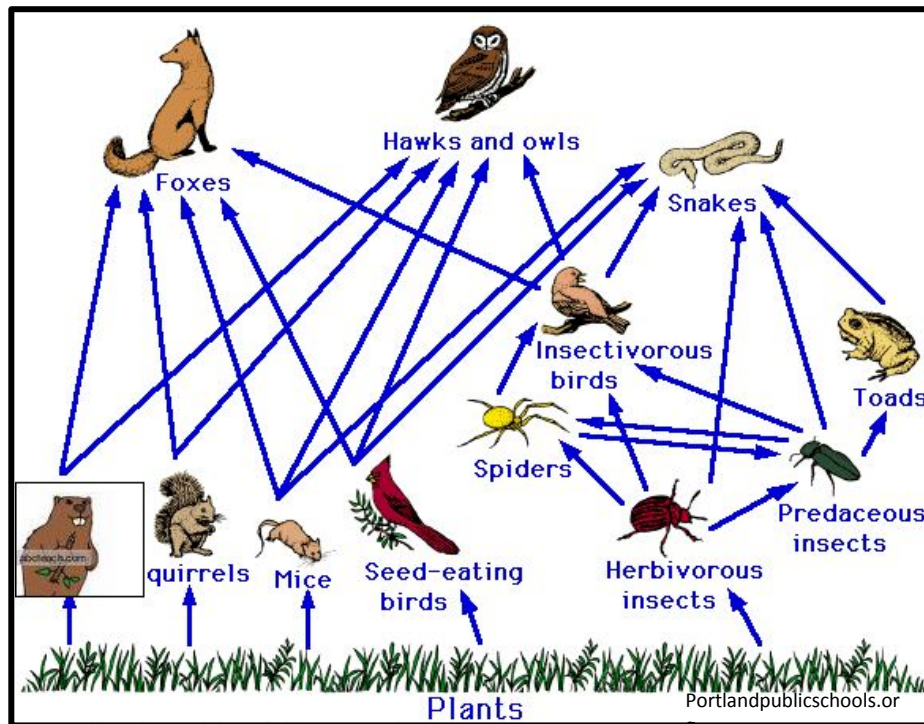


“When we try to pick out anything by itself, we find it attached to everything else in the universe.”

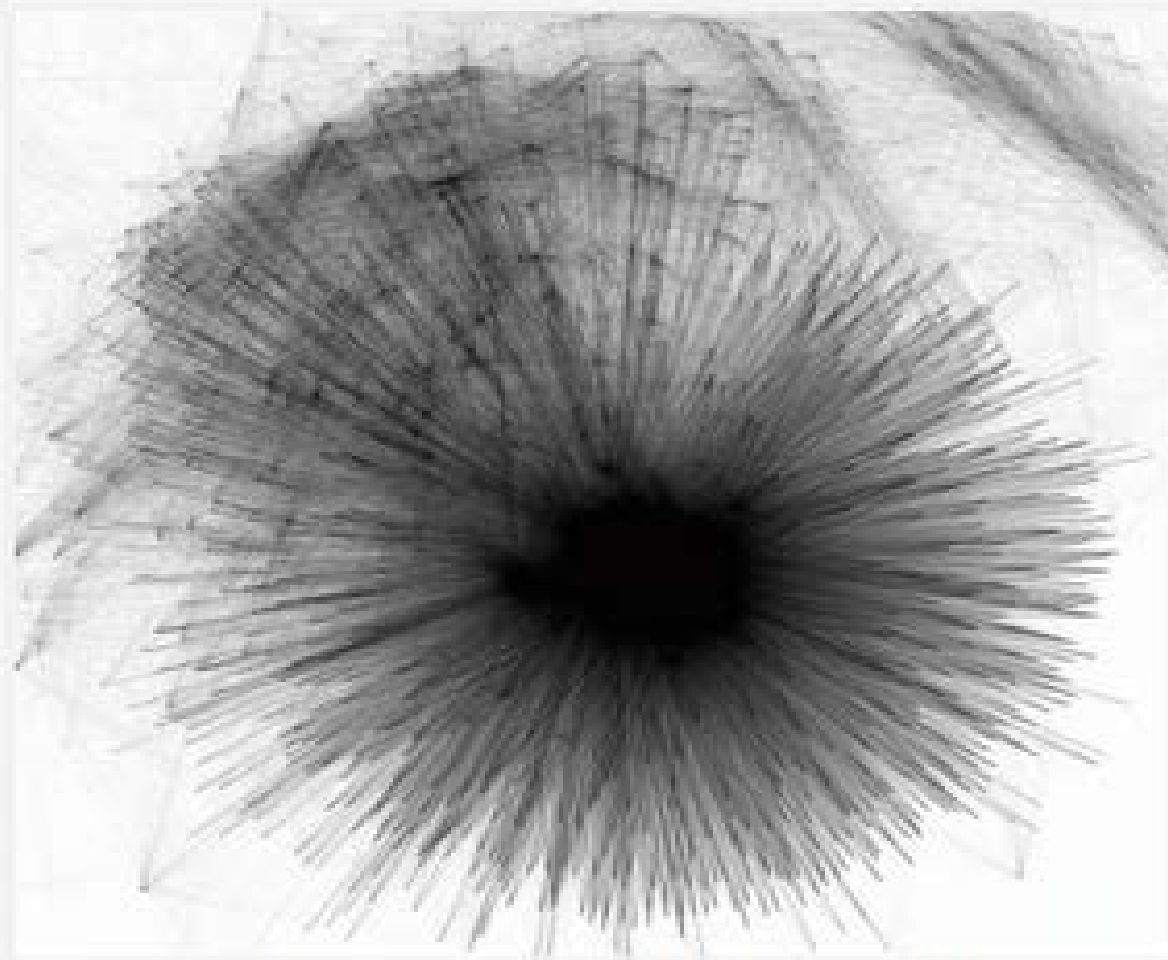
Food Web

VS.

Muir Web



Muir Web of Mannahatta



This Muir Web shows all the habitat relationships for all the species on Mannahatta. Visualization by Chris Harrison of Carnegie-Mellon University. ©WCS

APARTMENT



(habitat)

WHO LIVES HERE?

Humans, Rats, Mice, Bedbugs, Cockroaches

SOIL



(habitat)

WHO LIVES HERE?

Earthworm, Milkweed, Oak Tree

SUBWAY



(habitat)

WHO LIVES HERE?

Rats, Mice, Cockroaches, Squirrels, Pigeons

PARK



(habitat)

WHO LIVES HERE?

**Rats, Mice, Cockroaches, Squirrels, Pigeons,
Hawks, Earthworms, Milkweed, Oak Trees**

STREET



(habitat)

WHO LIVES HERE?

Rats, Mice, Cockroaches, Squirrels, Pigeons

MILKWEED



(food source)

WHO NEEDS ME FOR FOOD?

Monarch Butterflies

WHAT DO I NEED FOR SURVIVAL:

Sun, Soil, Water

OAK TREE



(food source/ habitat)

WHO NEEDS ME FOR FOOD?

Squirrels

WHO NEEDS ME FOR HABITAT?

Squirrels, Pigeons, Hawks

WHAT DO I NEED FOR SURVIVAL:

Sun, Soil, Water

HUMAN



Habitat

We occupy apartments, skyscrapers, subway stations, parks, bridges, streets

We are predators of:

Almost Everything!

COCKROACH



Habitat

These insects can live almost anywhere! In Cities they have even made their way into our homes.

Food

Leaves, trees, sewage, cardboard, wallpaper, cloth, ink (almost anything!)

Predators

Toads, beetles, wasps, fungi

BED BUGS



Habitat

Seams and folds of mattresses, bed covers, and
couches

Food

Blood (human)

Predators

Cockroaches, ants, humans (exterminator)

RATS



Habitat

Subway Stations, Apartments, Large Buildings,
Parks, Streets

Food

Almost anything: Trash, Food Scraps, Soap,
Feces, grains, meat

Predators

Humans (exterminator), Hawk, Falcon, Snake

SQUIRREL



Habitat

Parks, Streets, Trees

Food

Nuts, seeds, fruits, Fungi, leaves, small insects

Predators

Humans (exterminator), Hawk, Falcon, Snake,
Raccoon

MONARCH BUTTERFLY



Habitat

Parks, Trees, Wetlands,

Food

Flower pollen, milkweed

Predators

Birds, Toads, Mice

EARTHWORM



Habitat

soil

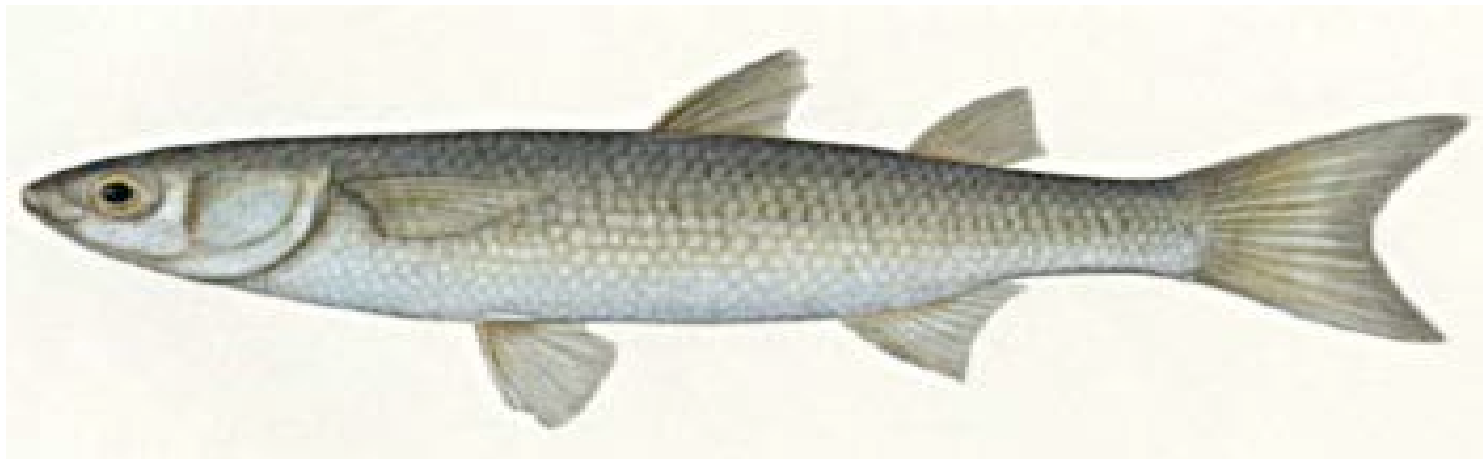
Food

Soil (microbes, organic matter)

Predators

Humans, birds, moles, toads, snakes

GREY MULLET



Habitat

These saltwater fish live in oceans and estuaries

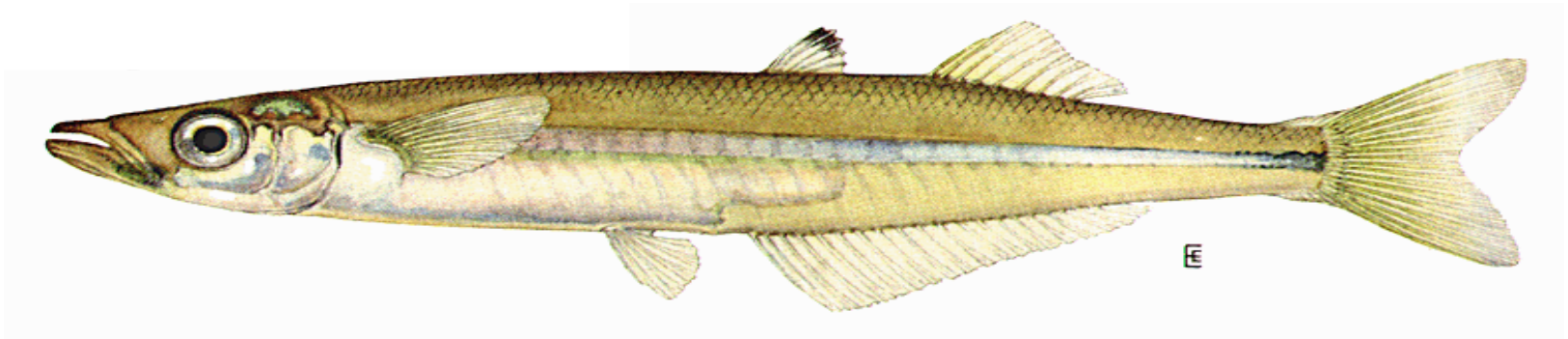
Food

Zooplankton, microalgae

Predators

Harbor seal, osprey

ATLANTIC SILVERSIDE



Habitat

These saltwater fish live in oceans and estuaries

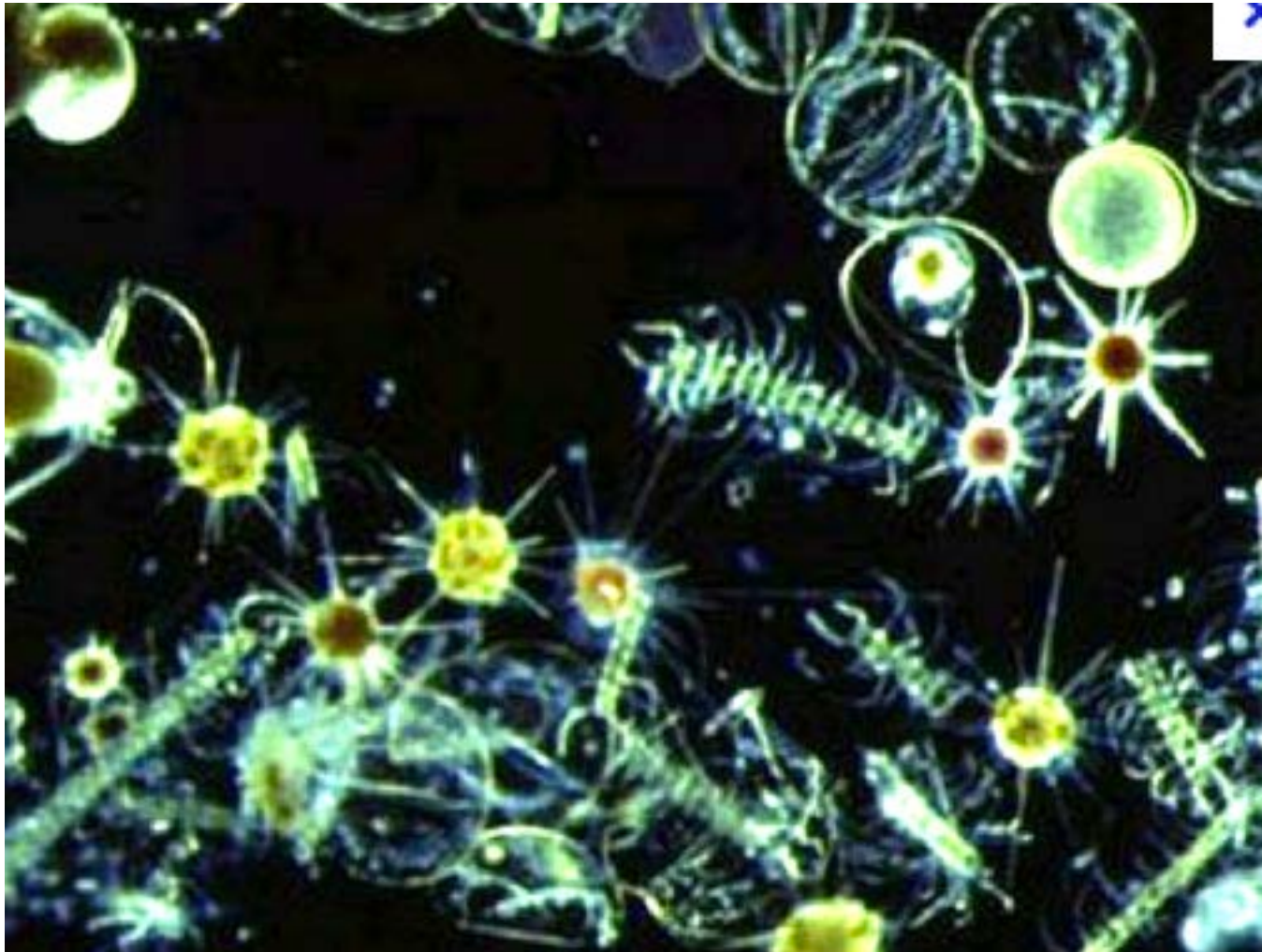
Food

Phytoplankton

Predators

Blue crabs, ospreys, striped bass

PLANKTON



Habitat

These primary producers live in oceans and estuaries

Food

Sunlight, dissolved nutrients

Predators

Atlantic silversides, zooplankton

QUAHOG CLAM



Habitat

They live under the sand and mud of marine coasts in saltwater bays and estuaries and near bridge supports

Food

Plankton

Predators

Crabs, birds

Estuary/River Habitat



(habitat)

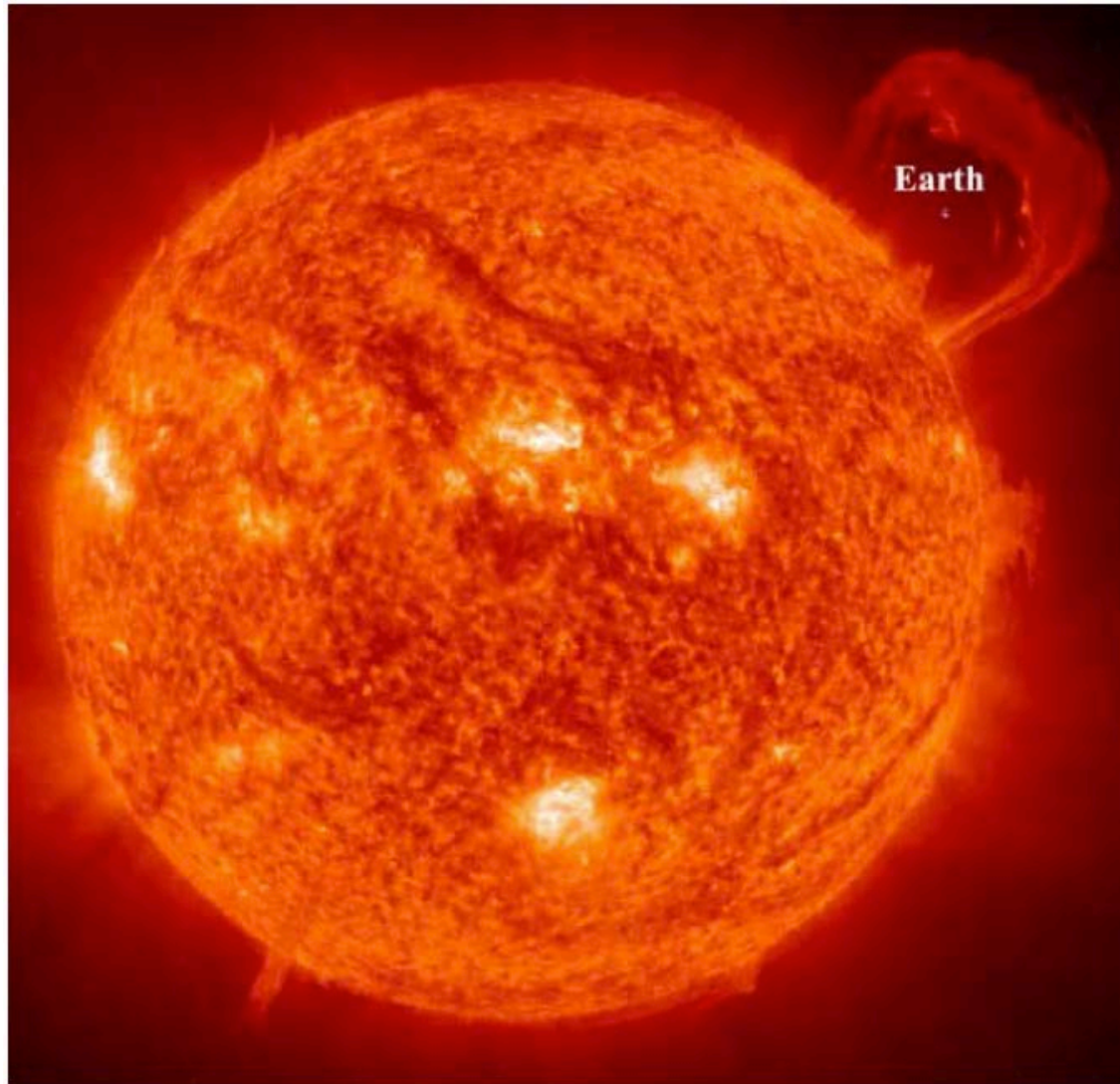
Habitat

An estuary is a brackish body of water where the river meets the ocean

What Lives Here

Osprey, piping plover, sand flea, clams, crabs, fish, plankton

THE SUN



The Sun is the main source of energy for life on Earth

Energy enters the Muir web as plants absorb the ultra violet rays through photosynthesis

The energy is transferred through the Muir web as plants are eaten by herbivores and herbivores are eaten by carnivores

OSPREY



Habitat

Ospreys live along coastlines of rivers and estuaries, they build nests in trees and telephone poles

Food

Fish

Predators

Chicks are eaten by other birds such as hawks and owls

RED-EARED SLIDER TURTLE



Habitat

They live in and around ponds, rivers and marshes

Food

Fish, insects, plants

Predators

Snakes, large birds, large fish

RED-TAILED HAWK



Habitat

They soar in wide circles high over fields and parks to dive after food. They create nests in trees, under bridges, and top of skyscrapers

Food

Mice, squirrels, rats, turtles, fish, earthworms

Predators

Owls, red fox

BRIDGES



(habitat)

Habitat

A bridge connects on piece of land to another
crossing a river or estuary

What Lives Here

Clams, crabs, hawks, pigeon

SKYSCRAPERS



(habitat)

Habitat

These large buildings stand tall to allow for more horizontal space in urban areas

What Lives Here

Humans, hawks, pigeons, rats, mice,
cockroaches

PIGEON



Habitat

They soar in circles high over buildings and dive after food into streets and parks. They create nests on high apartment buildings, atop of skyscrapers, and subways

Food

Grains, human garbage

Predators

Owls, red fox

PIPING PLOVER



Habitat

They are small shorebirds that nests and feeds along sand beaches along the coast and estuary

Food

Plankton, sand flea

Predators

fox, crabs

SAND FLEA



Habitat

The sand flea lives in the inter tidal zone and is capable of burying itself completely in 1.5 seconds

Food

plankton

Predators

birds

MICE



Habitat

Mice live in apartments, street, parks, subways,
skyscrapers

Food

Garbage, grains, food scraps

Predators

hawk, ospreys, racoons,

- Sanderson is calling this web a *Muir web* – named for John Muir, a California naturalist who emphasized the interconnection of all things in nature, and who worked to preserve wilderness in America. A Muir web shows how different species are connected to each other not only in that one may eat the other, but also, for instance, in that one species may provide shelter for another. A Muir web includes not only living species but also abiotic elements, like water, sun, soil and air. Such a web also includes habitats as discrete nodes. Though Sanderson has developed the Muir web model for Mannahatta, a Muir web could be applied to analyze relationships within any other ecosystem.