

Ecology

Master Gardener Volunteer Training
January 13, 2024

Cornell Cooperative Extension
Orange County



Overview

- **What is Ecology?**
- **Ecological Hierarchy**
- **Ecology of Orange County
New York**
- **Why Ecology?**



What do you think of when you hear the word Ecology? For multiple word answers, using a tilde "~" or underscore "_" between your words.

interrelationships
how organisms interact with their environment
systems
environment study
community
cycles
amazing nature together
interrelationships organisms safety
enviroment working interactions
interaction enviromental saving

What is Ecology?



Think
Tap your brain and **think** quietly about how you will answer the question.

Pair
Pair up with a partner. Take turns sharing your thoughts and listening to each other.

Share
Share your ideas with the whole class.

What is Ecology?

- **Ecology is..**

the study of the relationships between living organisms, including humans, and their physical environment. It seeks to understand the vital connections between plants and animals and the world around them. Ecology also provides information about the benefits of ecosystems and how we can use Earth's resources in ways that leave the environment healthy for future generations.



Ecological Hierarchy

- **Biosphere**



Ecological Hierarchy

- **Biosphere** – global ecological system; living beings in relation to the physical world, including:
 - lithosphere (rocks)
 - hydrosphere (water)
 - atmosphere (air)

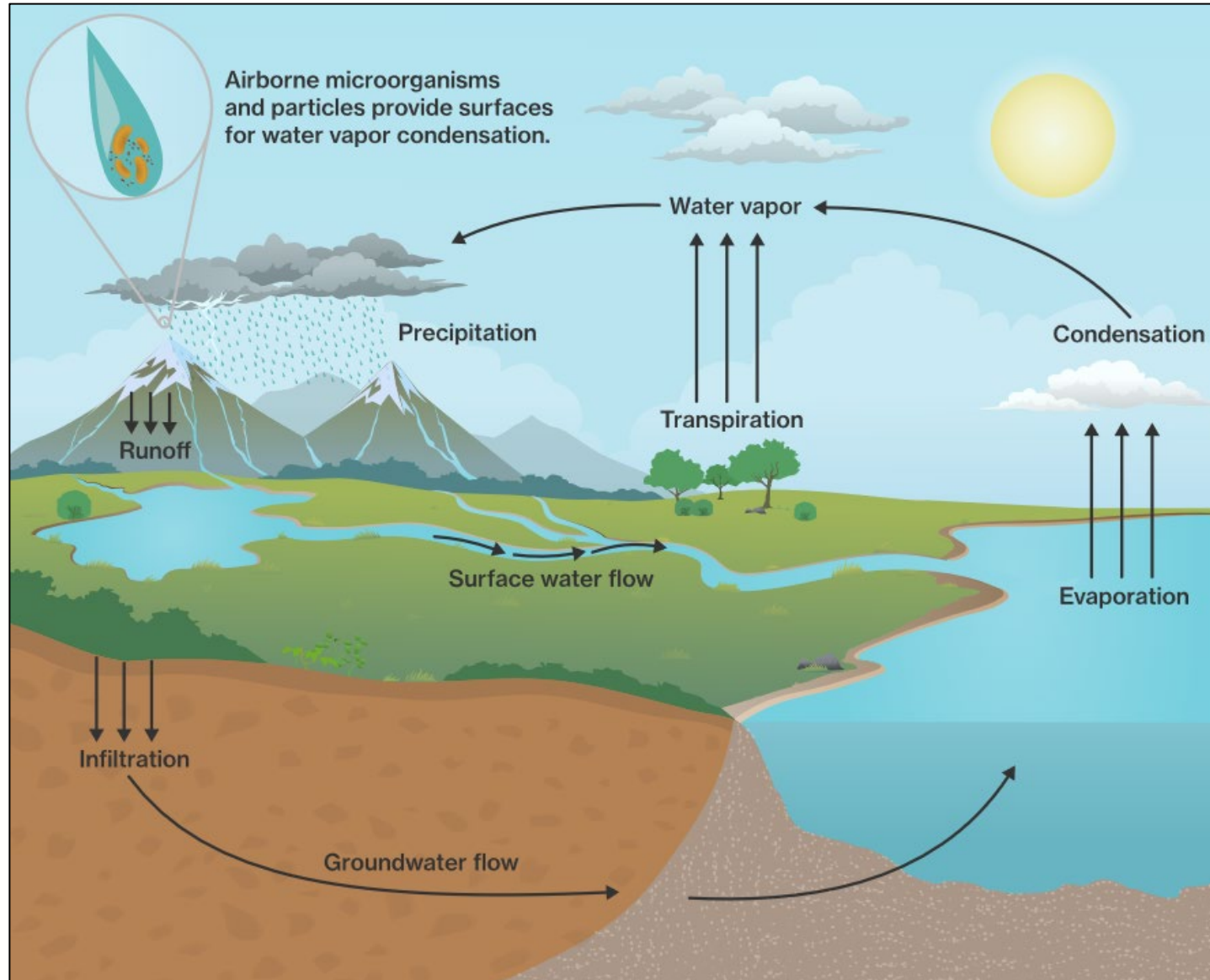


Ecological Hierarchy

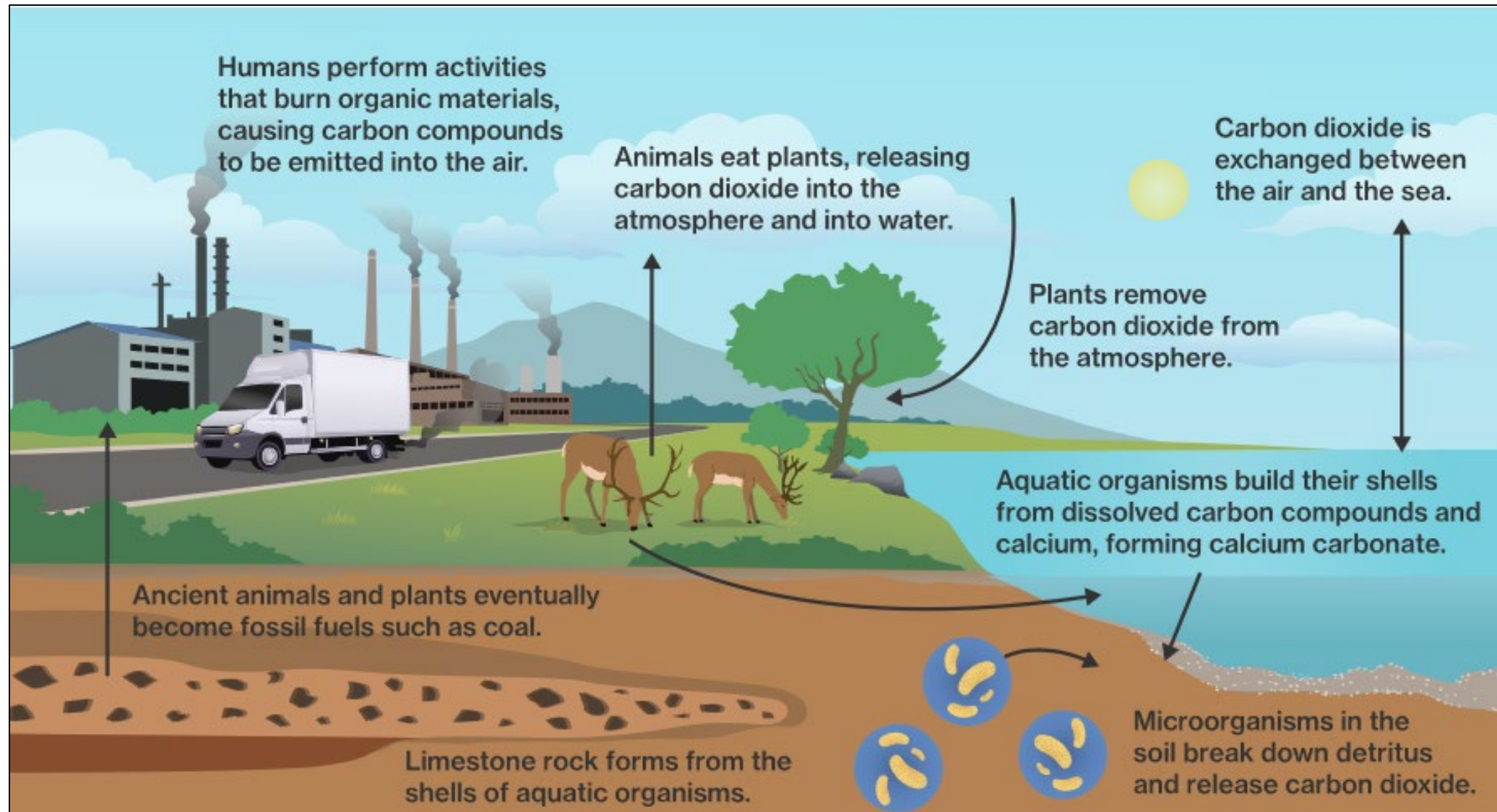
- **Biosphere** – global ecological system; living beings in relation to the physical world.
- **Biogeochemical Cycles**
 - Water
 - Carbon
 - Nitrogen
 - Phosphorus



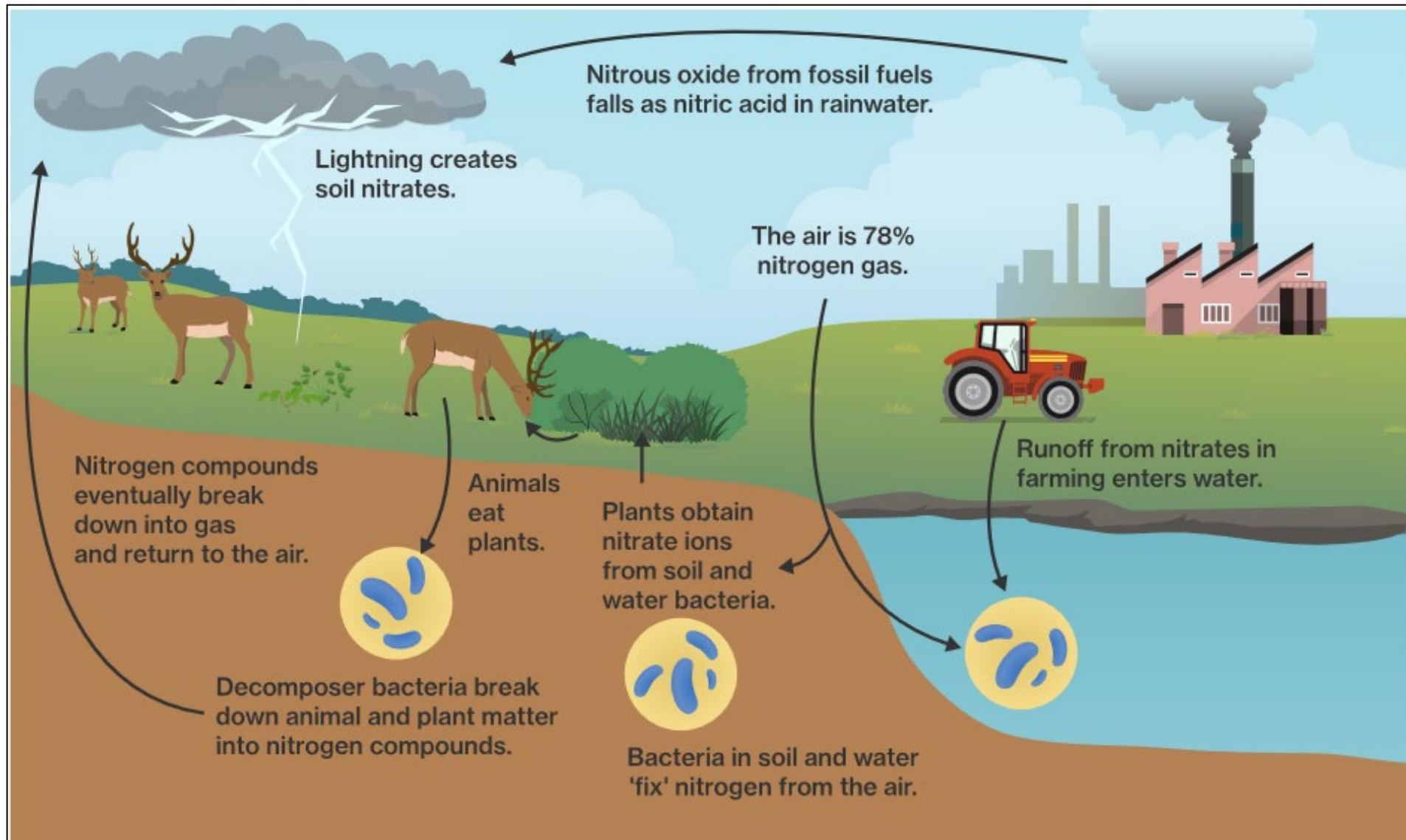
Water Cycle



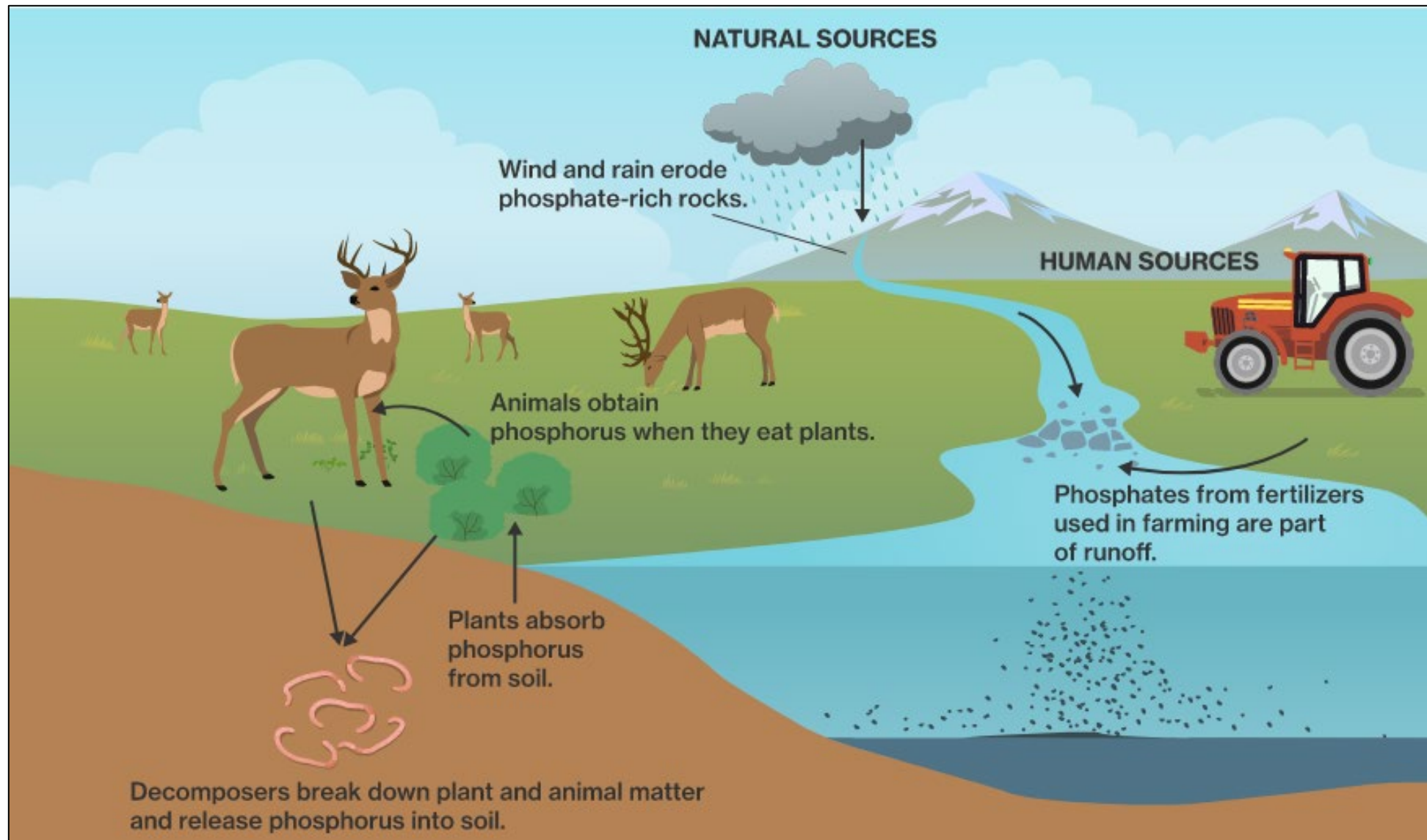
The Carbon Cycle



The Nitrogen Cycle



The Phosphorus Cycle



Ecological Hierarchy

- **Biosphere**
- **Biome**

Ecological Hierarchy

- **Biome** – community of flora and fauna, classified according to the predominant vegetation



Desert



Grassland



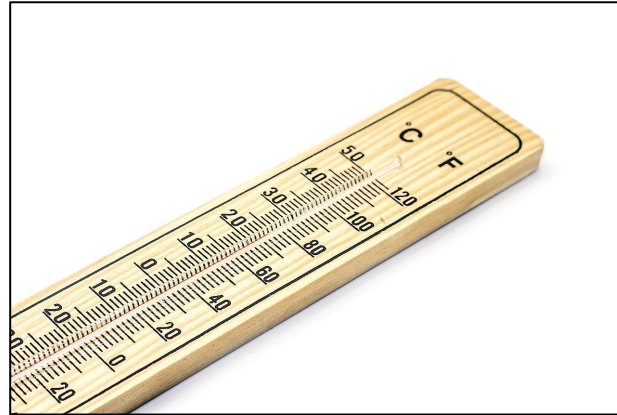
Rain Forest

Ecological Hierarchy

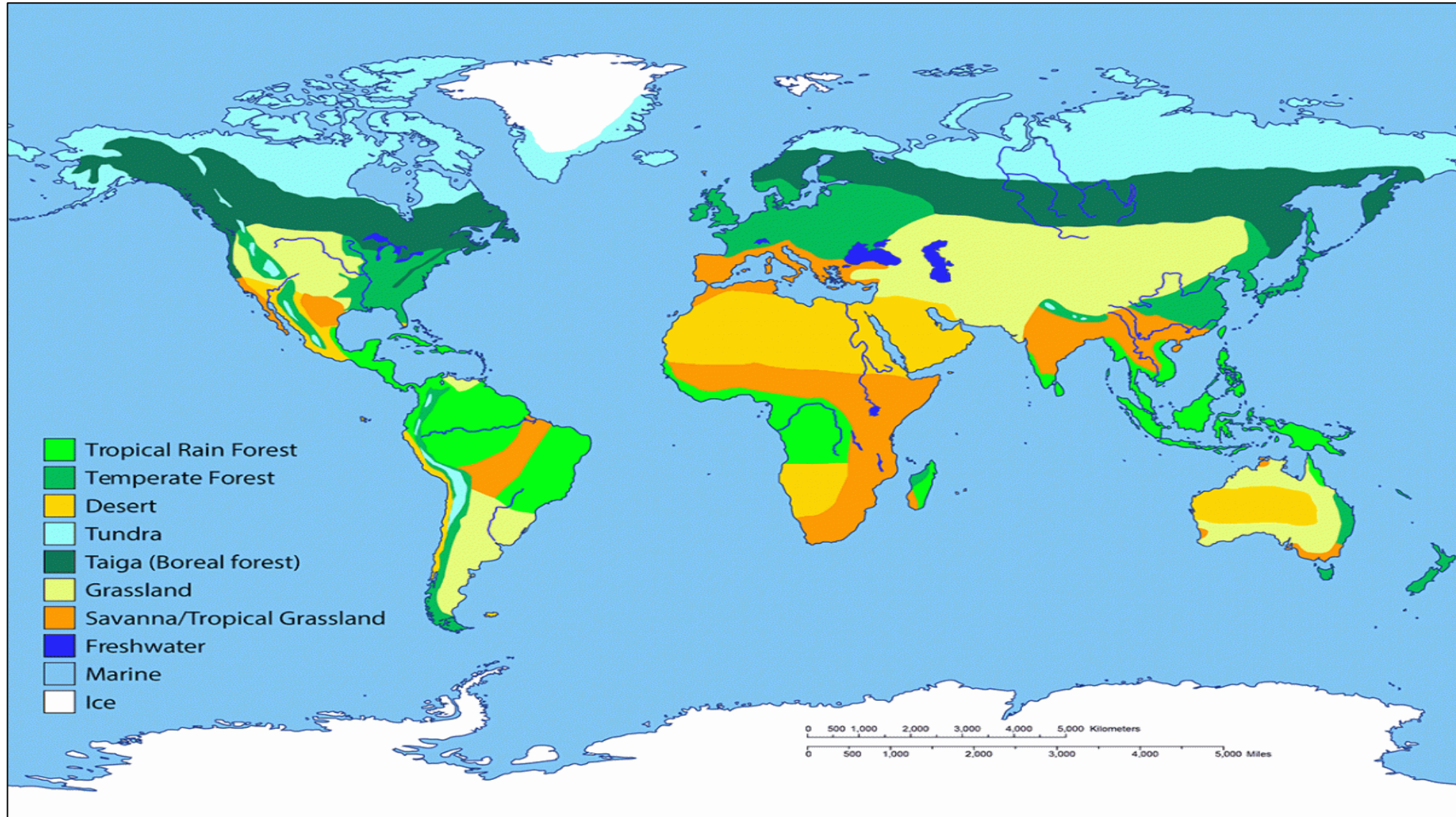
- **Biome** – community of flora and fauna, classified according to the predominant vegetation

- **Temperature**

- **Water**



The Biomes of the World



Ecological Hierarchy

- **Biosphere**
- **Biome**
- **Ecosystem**

Ecological Hierarchy

- **Ecosystem** – a biological community of interacting organisms and their physical environment
- **Biotic** – living organisms
- **Abiotic** – physical environment
 - Temperature
 - Moisture
 - Elevation
 - Soil



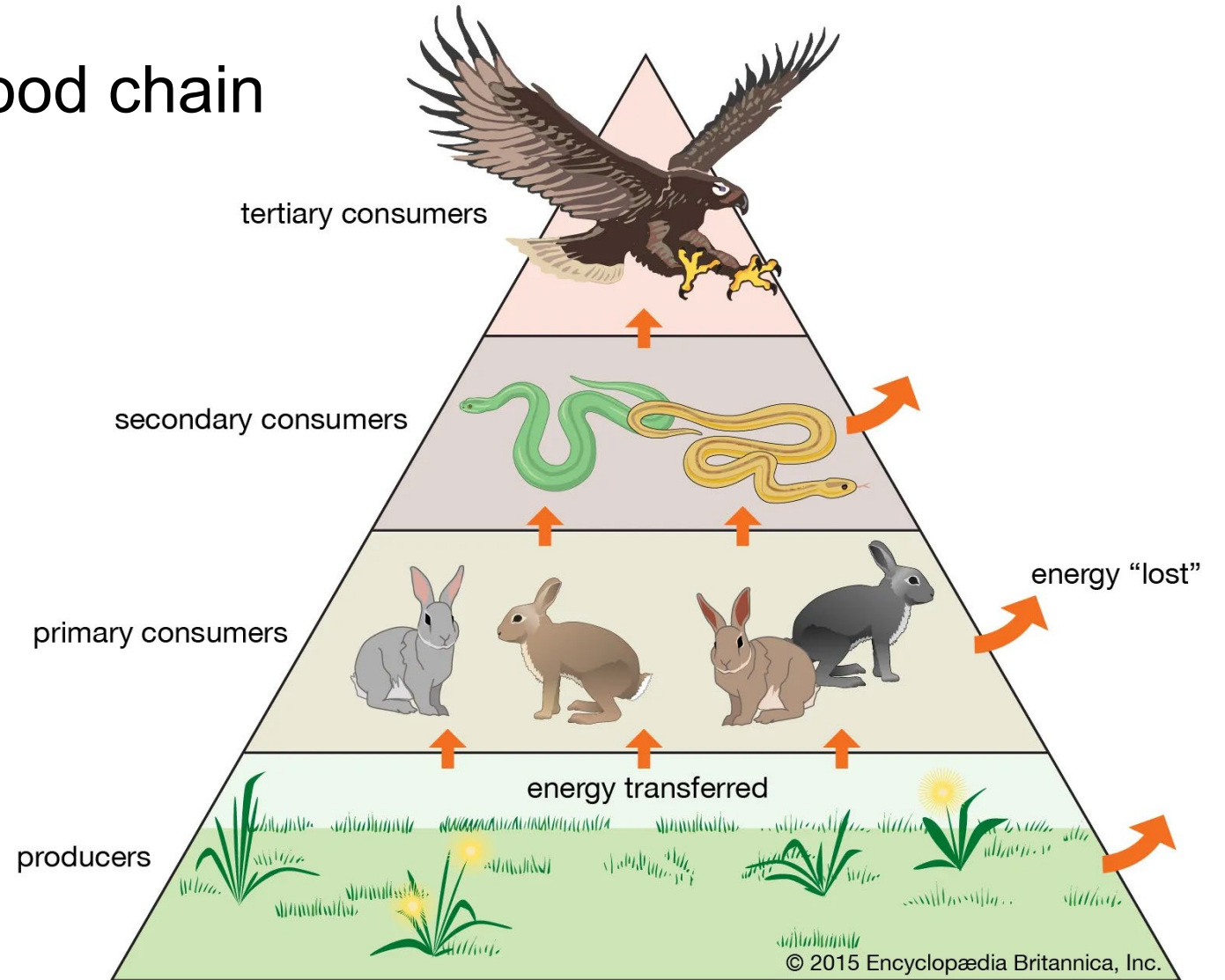
Trophic Levels

- **Autotrophs (Producers)**
- **Heterotrophs (Consumers)**
 - Herbivores (1° Consumers)
 - Omnivores (2° Consumers)
 - Carnivores (3° / 4° Consumers)
 - Detritivores



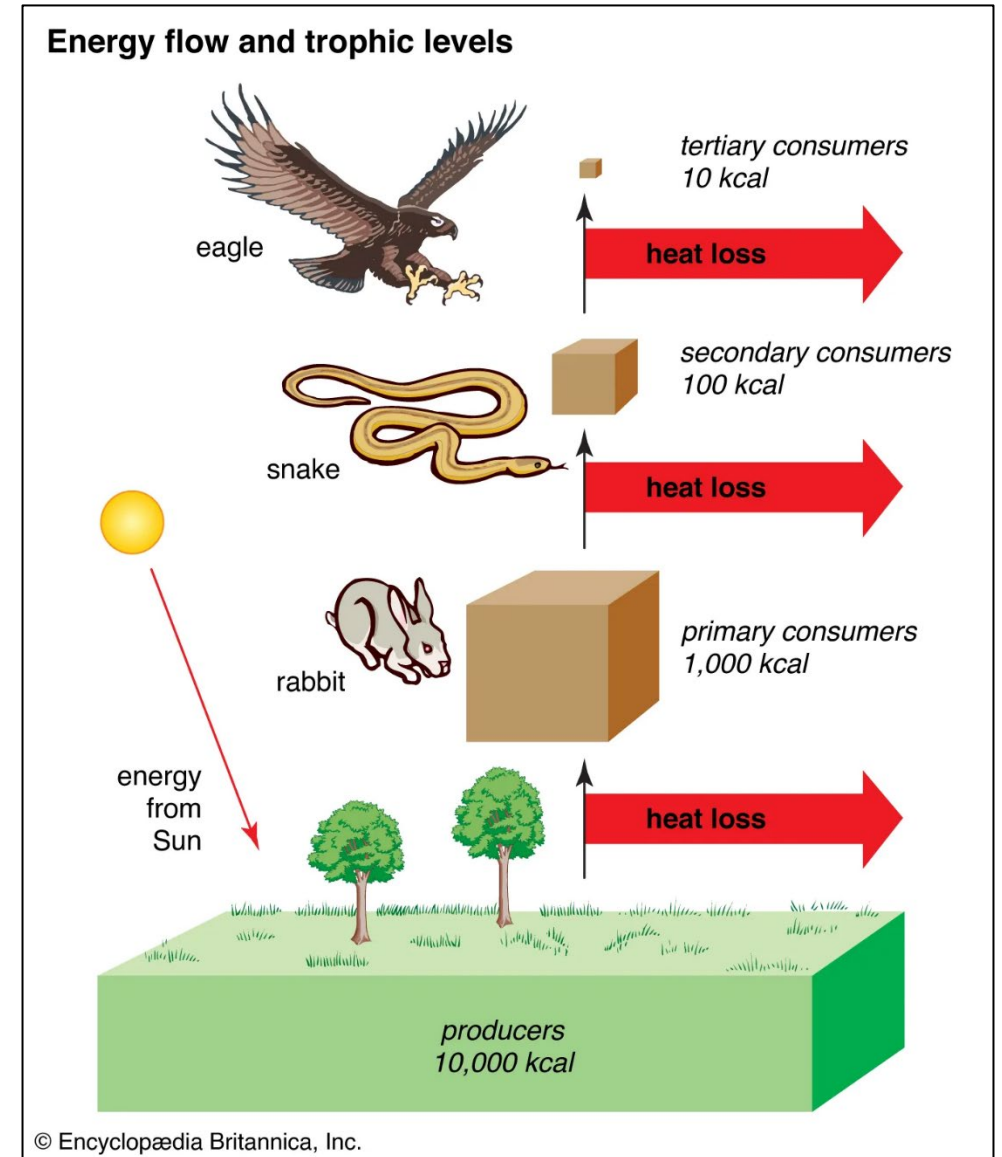
Trophic Levels

- Energy is passed up the food chain
 - 90% of energy used
 - metabolic processes
 - given off as heat
 - 10% of energy passed to the next level



Trophic Levels

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Ecological Hierarchy

- **Biosphere**
- **Biome**
- **Ecosystem**
- **Community**

Ecological Hierarchy

- **Community** – a group of populations of two or more species occupying the same geographic area in a particular time



Ecological Hierarchy

- **Biosphere**
- **Biome**
- **Ecosystem**
- **Community**
- **Population**

Ecological Hierarchy

- **Population** – a group of individuals of one species that interact regularly



Ecological Hierarchy

- **Biosphere**
- **Biome**
- **Ecosystem**
- **Community**
- **Population**
- **Organism**

Ecological Hierarchy

- **Organism** – an individual plant, animal, fungus or single-celled life form



Ecology of Orange County New York



Ecology of Orange County New York

***Biome:* Temperate Deciduous Forest**

- **Temperature Range:** -22°F to 86°F
- **Average Temperature:** 50°F
- **Precipitation:** 29.5 to 60 inches



Ecology of Orange County New York

- **Flora:** broadleaf trees, shrubs, perennial herbs, mosses, etc.



Ecology of Orange County New York

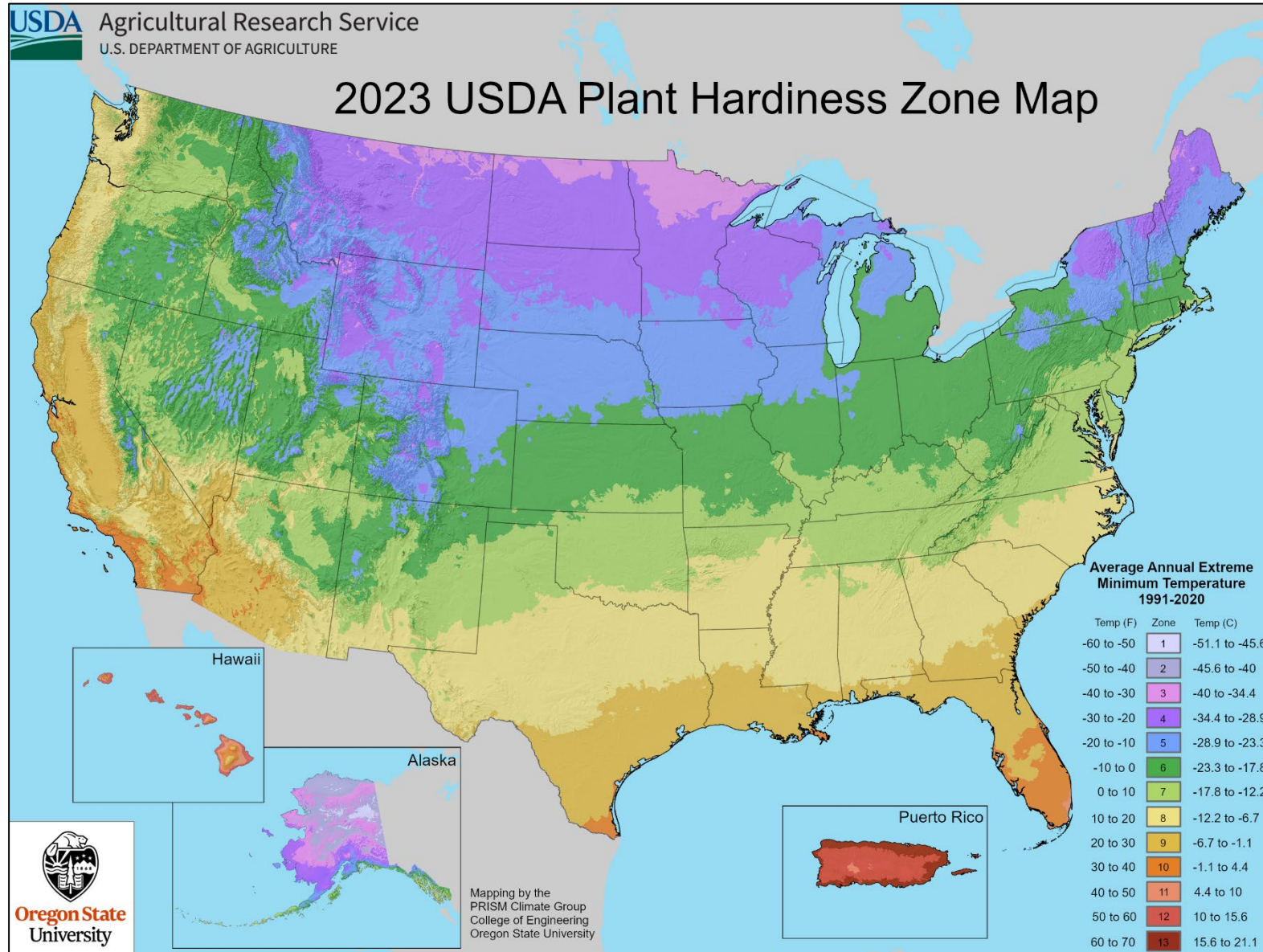
- **Fauna:** mammals, birds, reptiles, amphibians, fish, insects, etc.



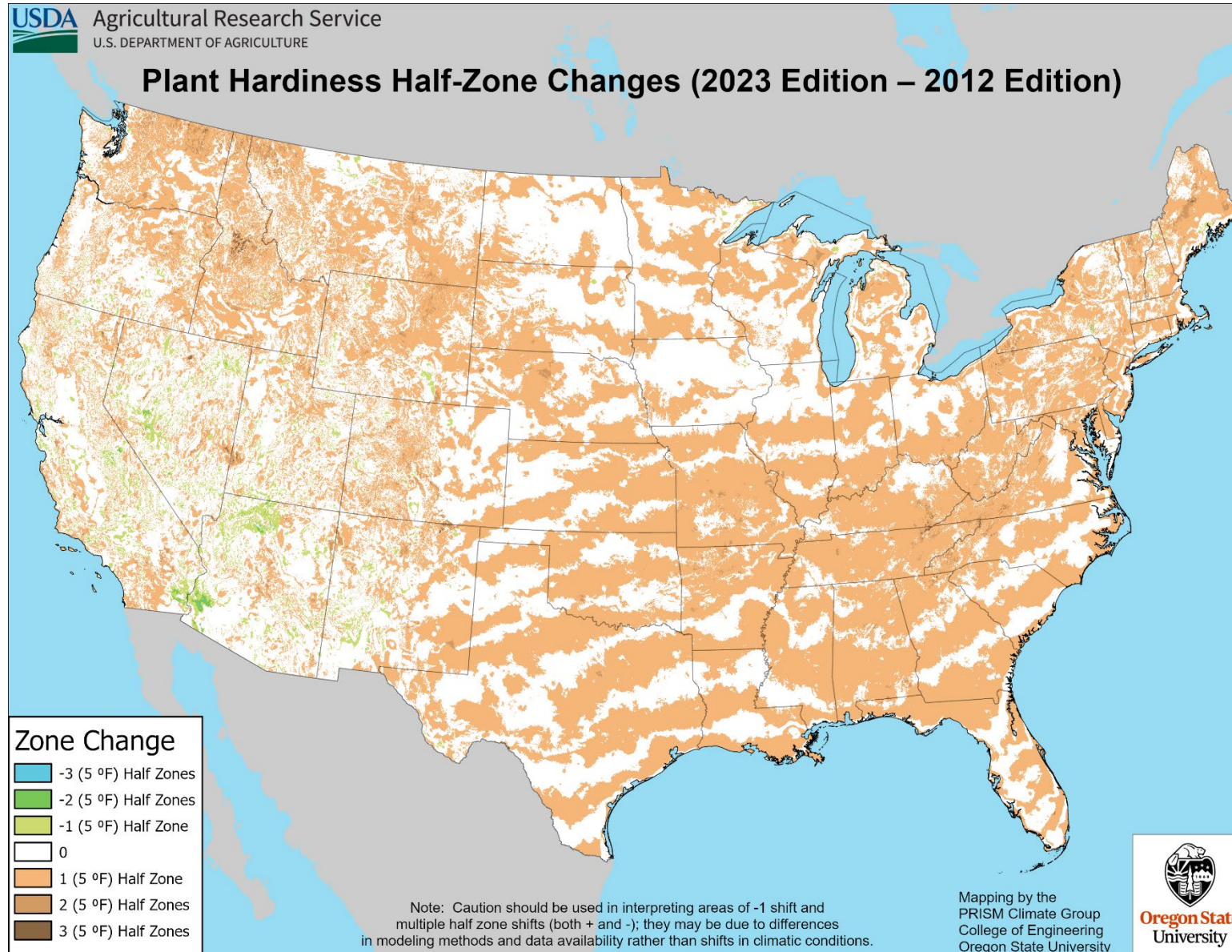
Ecology of Orange County New York

- **Hardiness Zone:** average annual extreme minimum temperature

Ecology of Orange County New York

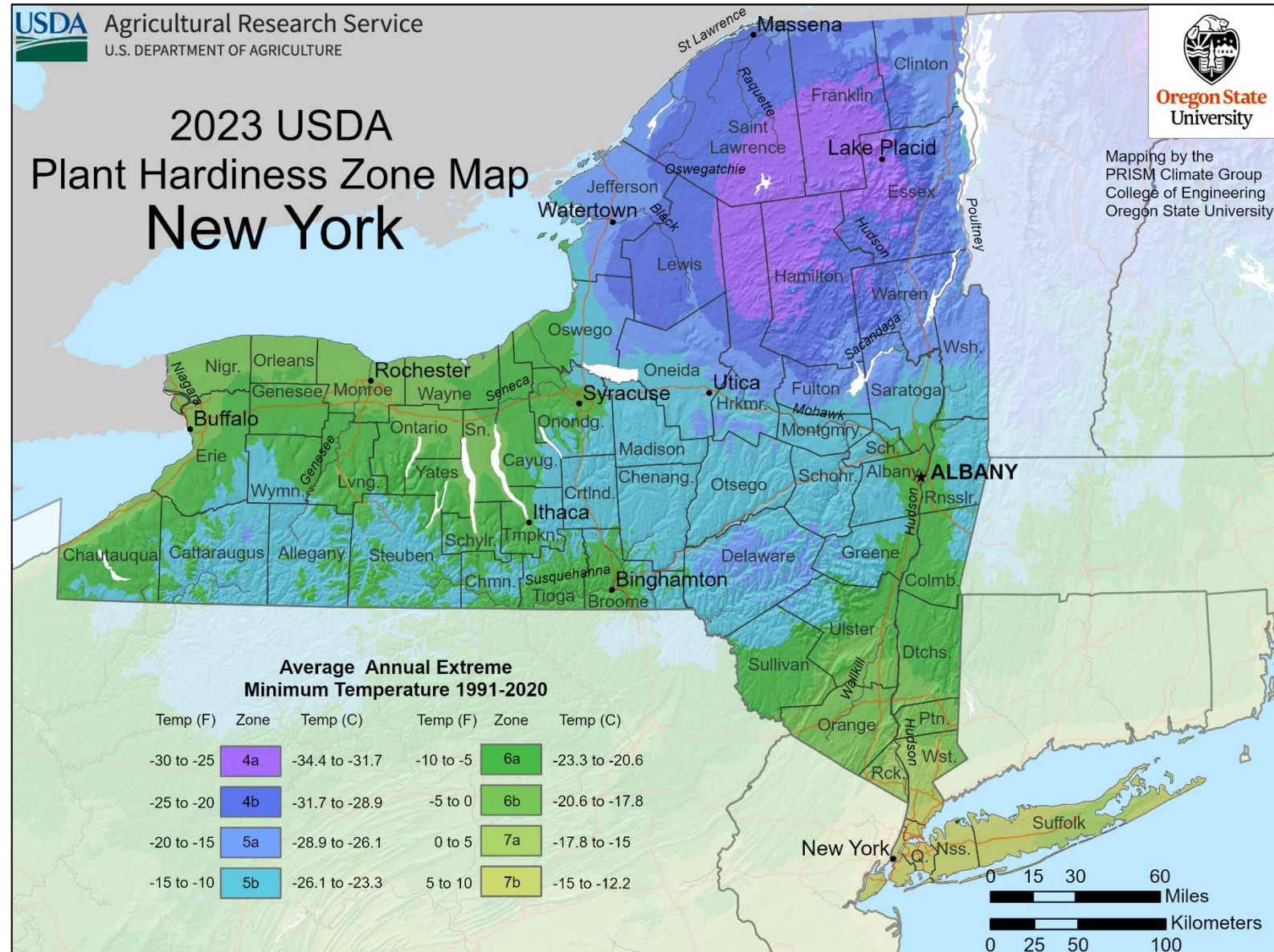


Ecology of Orange County New York



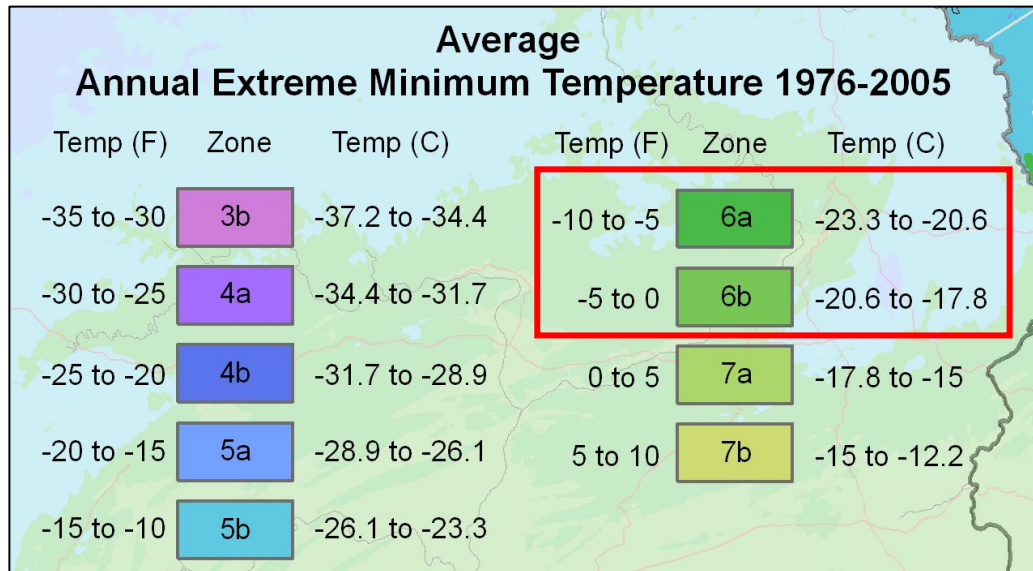
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- **Hardiness Zones**



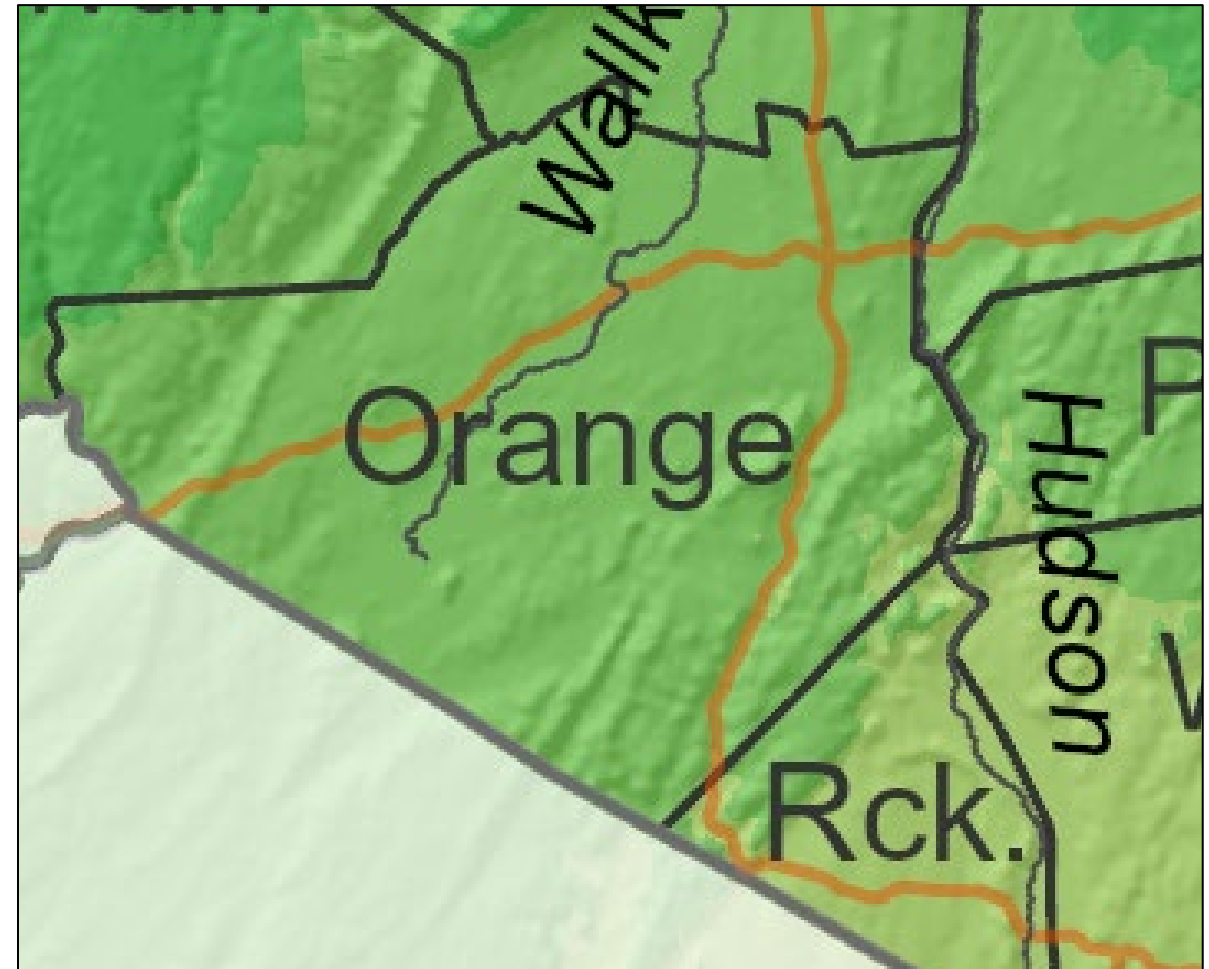
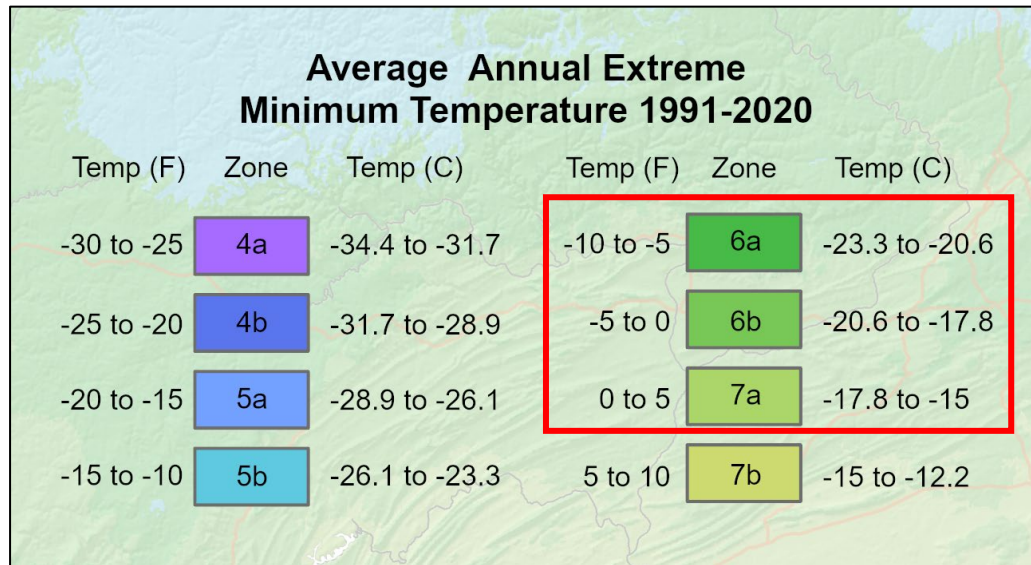
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- **Hardiness Zones - 2012**



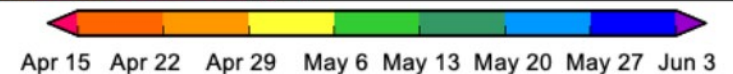
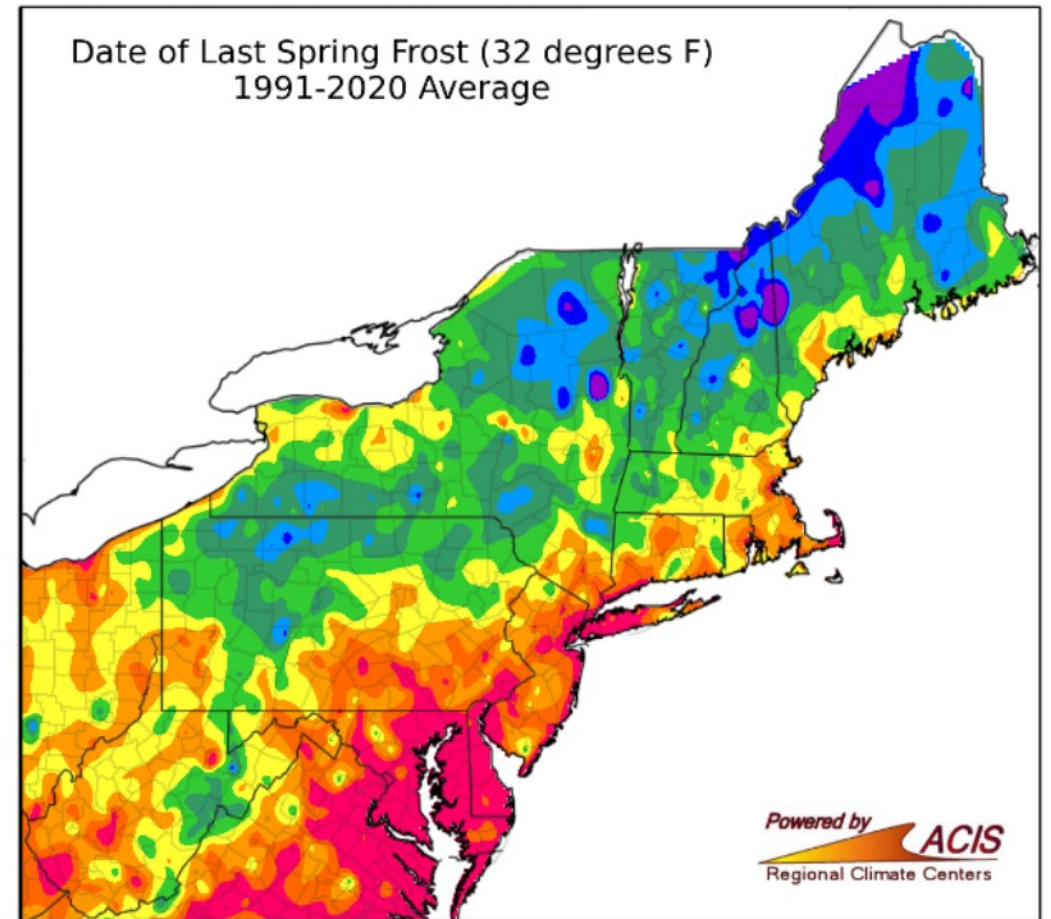
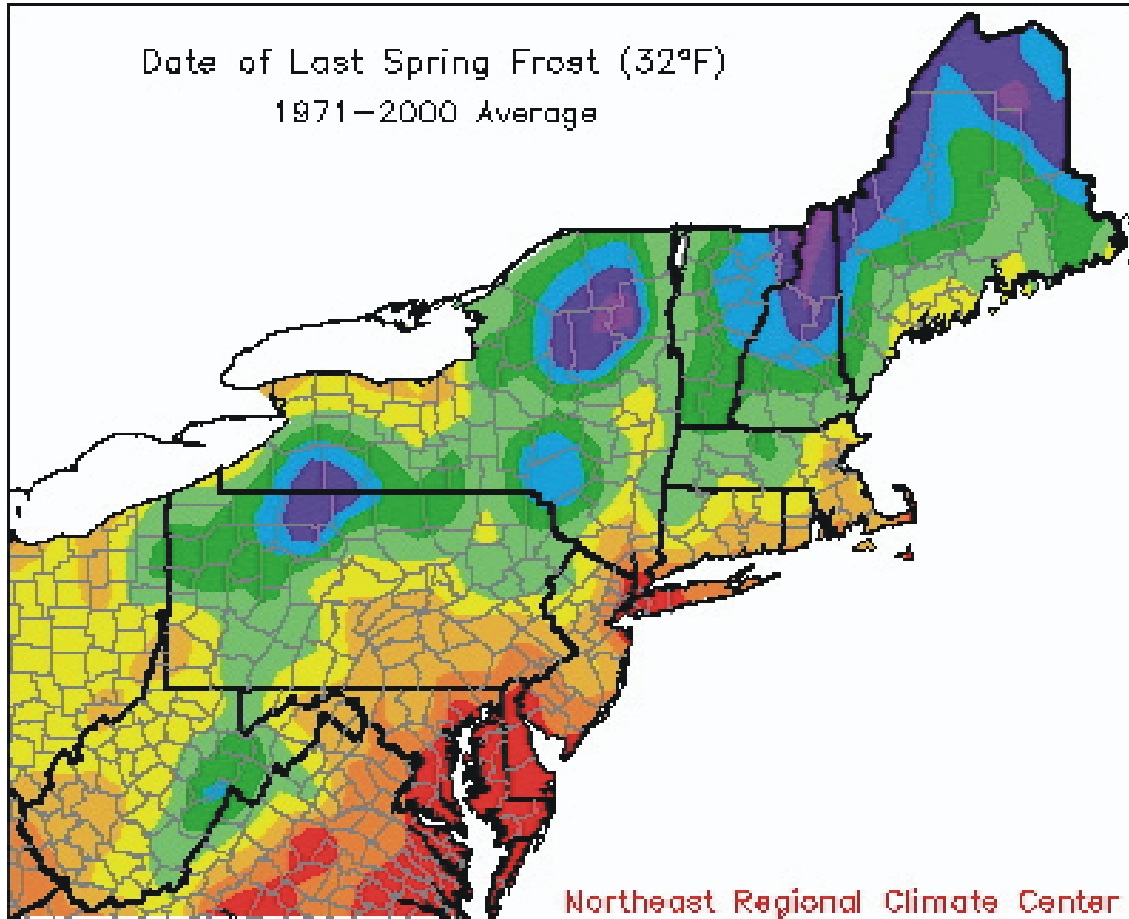
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- **Hardiness Zones - 2023**



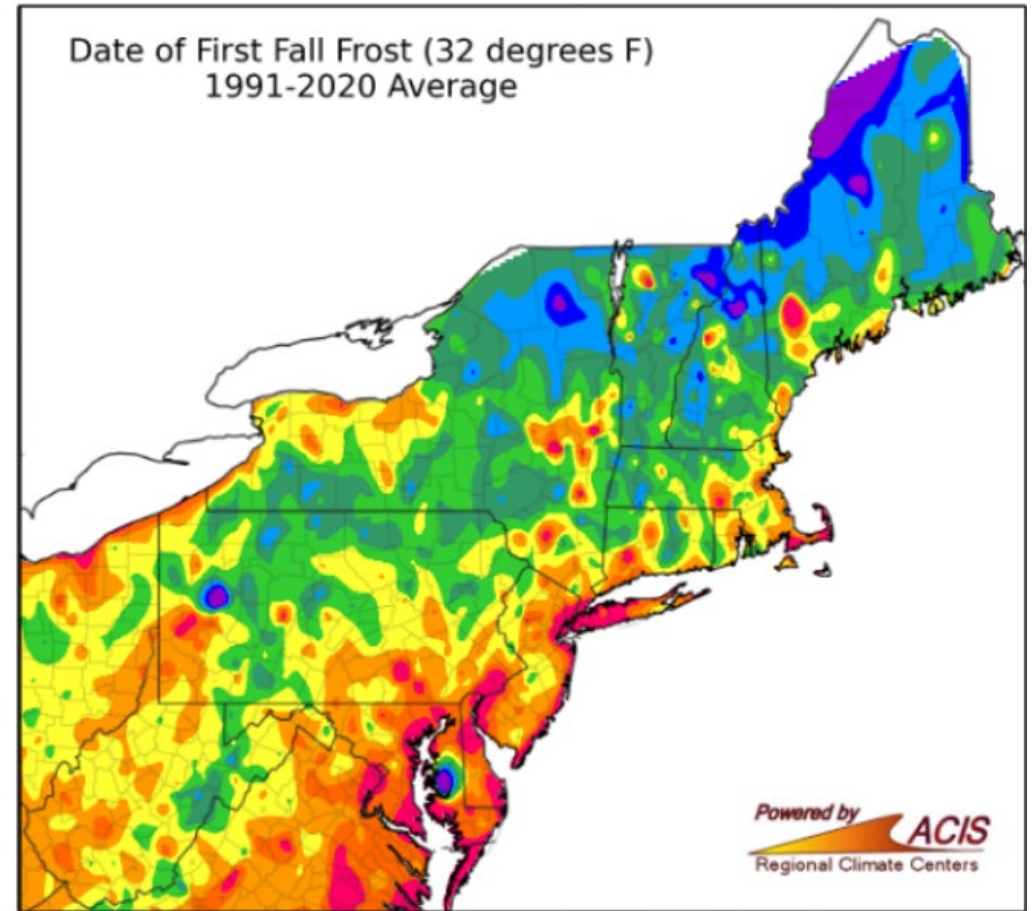
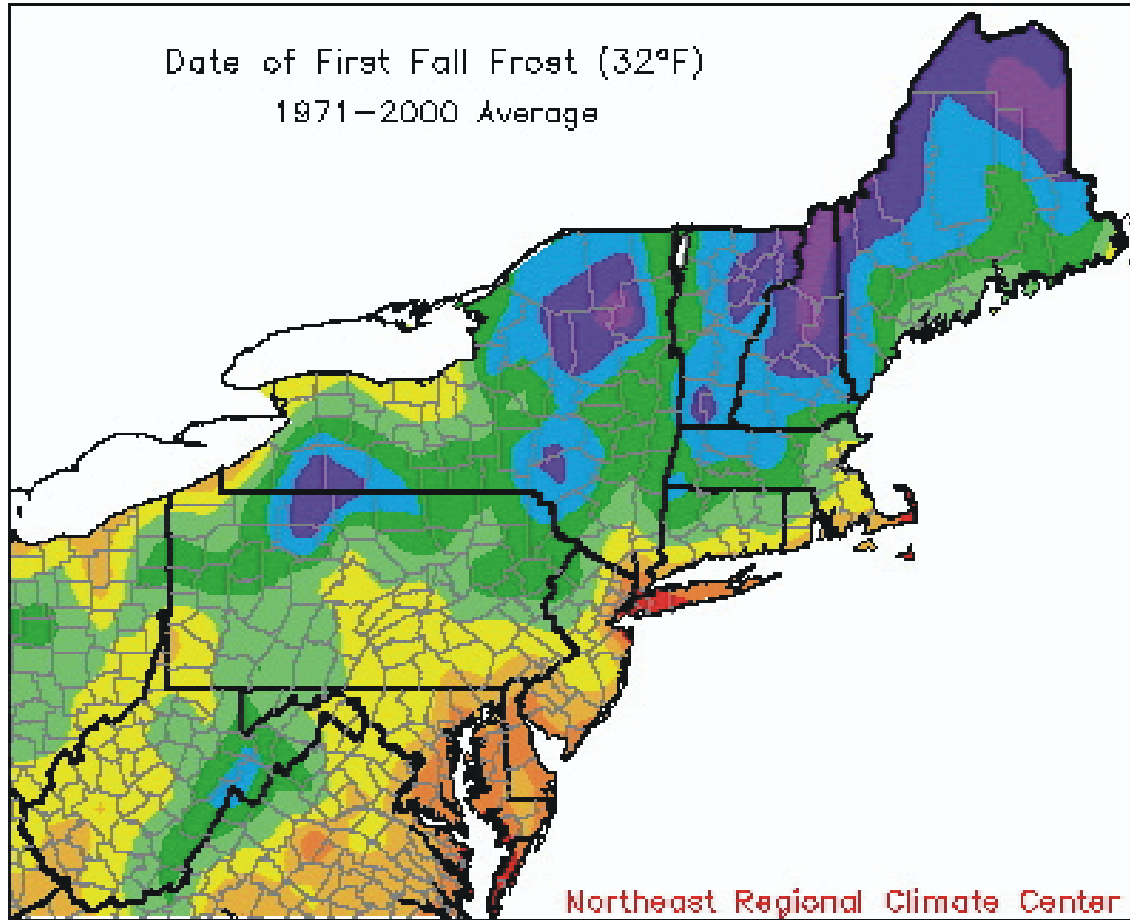
Ecology of Orange County New York

- Average Last Spring Frost Date



Ecology of Orange County New York

- Average First Fall Frost Date



Why Ecology?

How does ecology relate to gardening?



Why Ecology?

- Plant Selection



TICKSEED
Coreopsis
Satin and Lace™ 'Red Chiffon'

PPAF

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TICKSEED

Vibrant flowers start yellow with red eye, then turn mostly red. Bushy habit. Mildew resistant.

 Sun to part shade

 Moist

 Well-draining soil

 18-22"

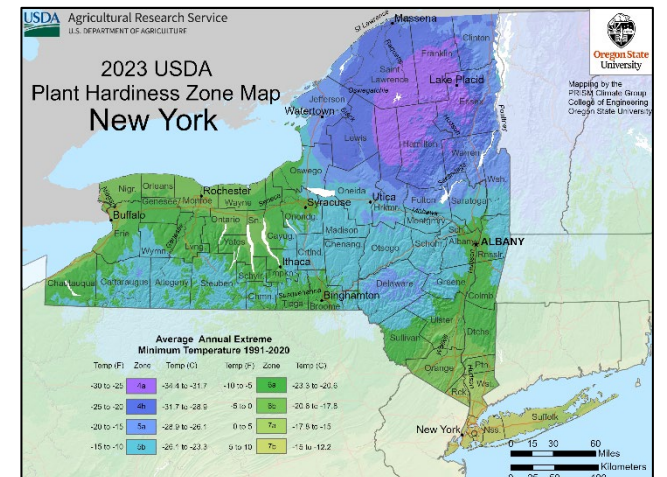
 Hardiness Zones 4-9

Propagation Prohibited

Printed in Canada

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Why Ecology?

- Plant Selection
- **Plant Care**



Why Ecology?

- Plant Selection
- Plant Care
- **Pest Management**



Robert L. Anderson, USDA Forest Service, Bugwood.org

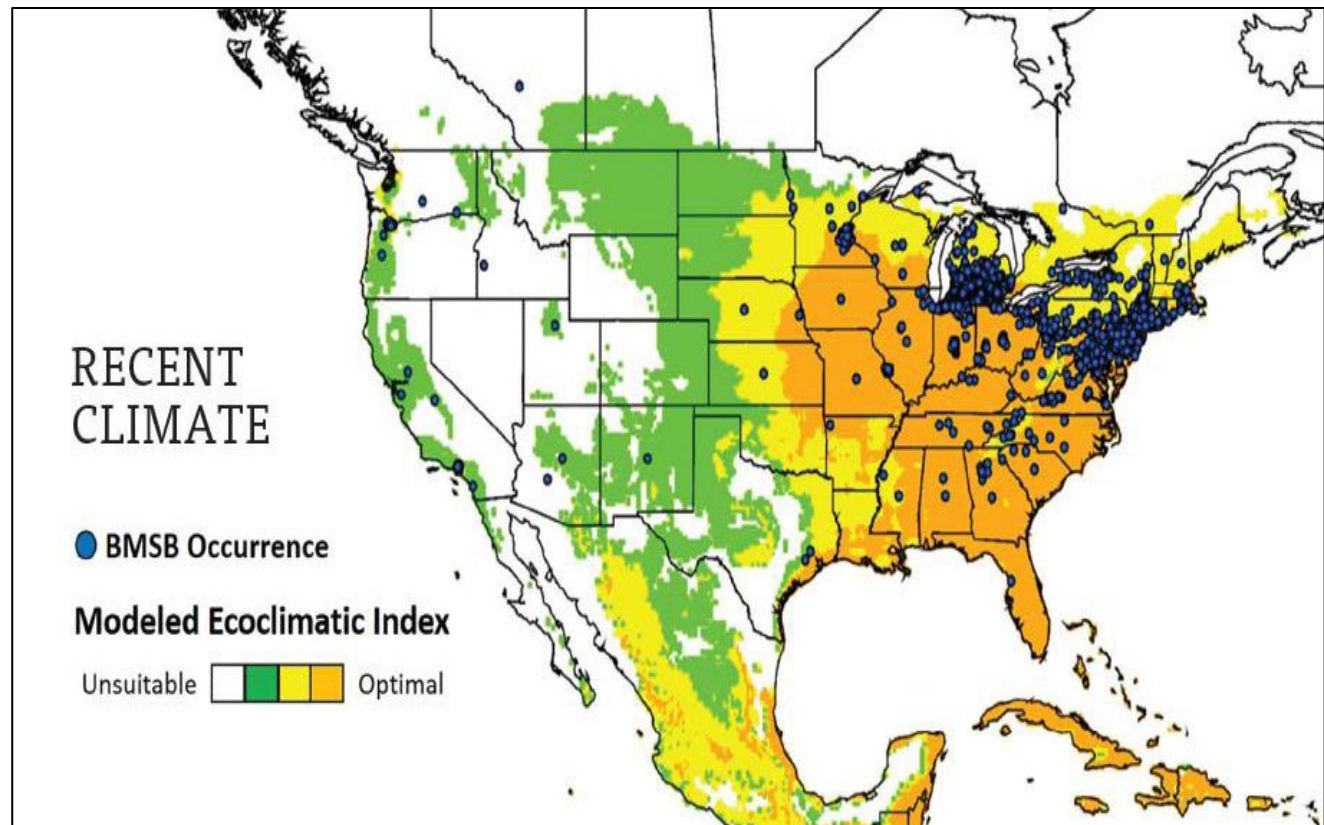


Whitney Cranshaw, Colorado State University, Bugwood.org

Why Ecology?



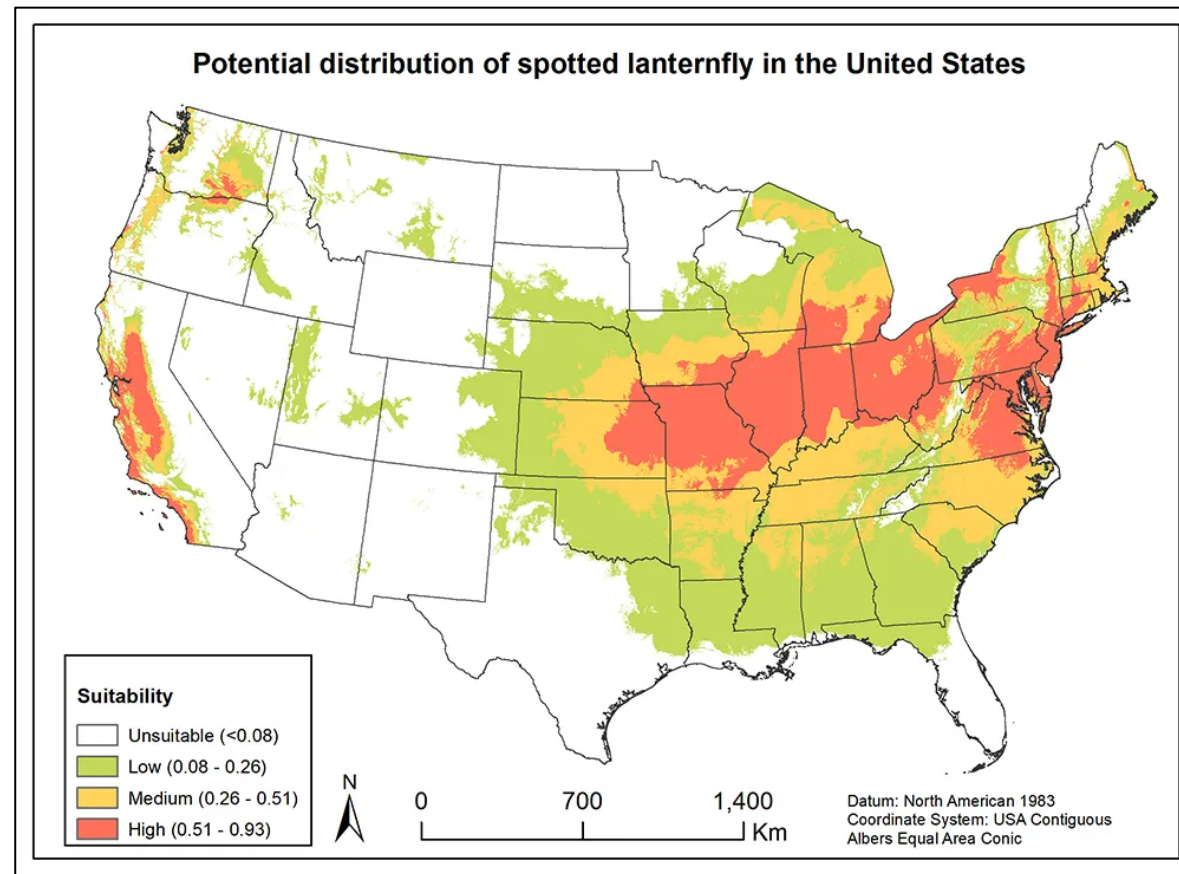
- Plant Selection
- Plant Care
- Pest Management
- **Invasion Biology**



Why Ecology?



- Plant Selection
- Plant Care
- Pest Management
- **Invasion Biology**



Review

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New York**
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Questions?