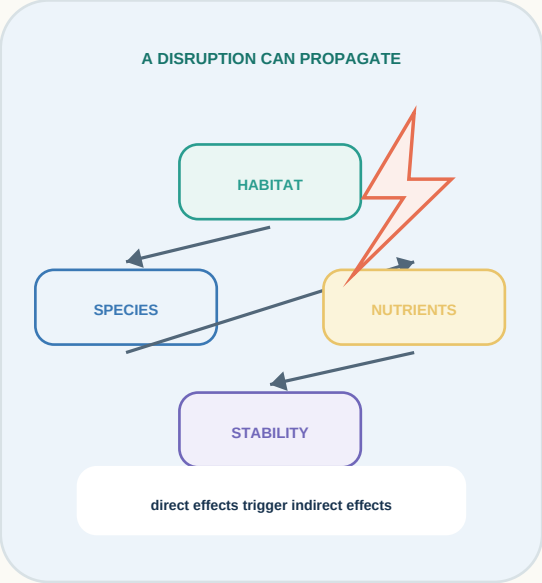
AP BIOLOGY | UNIT 8

TOPIC 8.7

Disruptions in Ecosystems

Natural events and human activities can alter habitats, populations, species interactions, nutrient cycles, and ecosystem stability.



THE DISRUPTION-RESPONSE CHAIN

DRIVER
event or activity

→

DIRECT
first component hit

→

INDIRECT
effects spread

→

OUTCOME
structure shifts

BY THE END, YOU SHOULD BE ABLE TO...

1. Explain how invasive species and human activities disrupt ecosystems.
2. Trace eutrophication and biomagnification through ecological systems.
3. Predict direct and indirect effects of geological or meteorological events.

CENTRAL IDEA

An ecosystem disruption can produce different outcomes depending on its intensity, duration, scale, and the resilience of the ecosystem it affects.

1 Disruptions begin with natural or human-driven change

A disturbance can change population size, species interactions, nutrient cycling, habitat conditions, and geographic distribution.

GEOLOGICAL EVENTS

EXAMPLES

volcanic eruption, earthquake, landslide

POSSIBLE EFFECT

habitat is created, destroyed, or redistributed

METEOROLOGICAL EVENTS

EXAMPLES

hurricane, drought, flood, heat wave

POSSIBLE EFFECT

mortality rises and ranges or resources shift

HUMAN ACTIVITIES

EXAMPLES

land-use change, pollution, overharvest, warming

POSSIBLE EFFECT

local and global change can accelerate extinction

WHY SOME NONNATIVE SPECIES BECOME INVASIVE

1 ARRIVAL

A nonnative species enters a new ecosystem.

2 RELEASE

Predators, parasites, or competitors may be absent.

3 SPREAD

The species exploits resources or an open niche.

4 IMPACT

Native species lose resources, habitat, or survival.

NONNATIVE IS NOT AUTOMATICALLY INVASIVE

An invasive species is nonnative and causes ecological harm. Its impact depends on its traits, the available niche, biotic resistance, resource supply, and interactions with native species.

CLIMATE CHANGE **Long-term shifts in temperature and precipitation can move suitable habitats, alter timing, change species distributions, and reorganize communities.**

BIOGEOGRAPHY

Biogeography examines where organisms occur across space and time. A disruption can shift ranges, fragment populations, or create new contact among species.

2 Pollutants can alter water quality and food webs

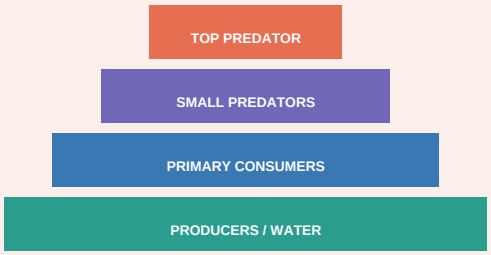
Trace the causal pathway: identify the input, the process it changes, and the organisms most affected.

EUTROPHICATION

NUTRIENTS	fertilizer runoff adds N and P
↓	
ALGAL BLOOM	rapid producer growth
↓	
DECOMPOSITION	microbes consume oxygen
↓	
LOW OXYGEN	aquatic organisms may die

BIOMAGNIFICATION

Persistent toxins become more concentrated at higher trophic levels.



toxin concentration increases upward

COMPARE THE TWO PATHWAYS

EUTROPHICATION	excess nutrients drive algal growth and oxygen loss
BIOMAGNIFICATION	persistent toxins concentrate through trophic transfer

EVENTS CHANGE DISTRIBUTION — **Geological and meteorological events can remove habitat, create new habitat, isolate populations, and shift the geographic distribution of ecosystems.**

PREDICTION RULE

1. Name the disturbance and the first ecosystem component affected.
2. Trace changes in resources, population sizes, or interactions.
3. Extend the chain to food webs, cycles, stability, or distribution.