

PRIMARY and SECONDARY PRODUCTION

Primary production is the production of new organic matter, or biomass, by autotrophs in an ecosystem per unit area or volume during some period of time.

Gross primary production is the total primary production by all primary producers in the ecosystem.

Net primary production is gross primary production minus respiration by primary producers; it is the amount of energy in the form of biomass available to the consumers in an ecosystem.

Secondary production is the production of biomass by heterotrophic consumer organisms feeding on plants, animals, microbes, fungi, or detritus during some period of time, for example, per hour or per year. Secondary production, which is analogous to net primary production, includes consumer growth, reproduction, and, at the population level, mortality.

Terrestrial primary production is generally limited by temperature, moisture, and nutrients.

Actual Evapotranspiration and Terrestrial Primary Production

The ecosystems showing the highest levels of primary production are those that are warm and receive large amounts of precipitation.

Soil Fertility and Terrestrial Primary Production

“Liebig’s Law of the Minimum.”

Patterns of Aquatic Primary Production

Aquatic primary production is generally limited by nutrient availability.

Global Patterns of Marine Primary Production

The highest rates of primary production are concentrated along the margins of continents over continental shelves and in areas of upwelling.

Primary Producer Diversity

Primary producer diversity contributes to higher primary production.

Terrestrial Plant Diversity and Primary Production

A plant functional group consists of plants with similar physiological and anatomical characteristics that influence their seasonality, resource requirements, and life histories (Tilman et al. 2001).

Consumer Influences

Consumers can influence rates of primary production in aquatic and terrestrial ecosystems through trophic cascades.

bottom- up controls

top-down controls.

A trophic cascade involves effects of predators on prey that alter abundance, biomass, or productivity of a population, community, or trophic level across more than one link in the food web.

Secondary Production

Ecosystems with greater primary production generally support higher levels of secondary production.