Rain Forests and the Water Cycle

What is a Watershed?
A watershed is an area of land, such as a mountain or a valley, that collects and delivers water. Topography influences whether rainfall moves toward the sea via rivers and streams or via underground movement.

What is a Rain Forest?
A rainforest is a forest ecosystem in which rainfall is abundant throughout the year. It is characterized by high humidity and high diversity. Rain forests are important because they are home to a large number of species and play a crucial role in the water cycle.

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The Hawaiian Rain Forest is the Ultimate Watershed Cover

Emergent Trees
These trees are the first to intercept heavy rainfall, absorbing the energy of their fall. Tree leaves pull moisture from airspace via condensation (fog drip). Water runs from leaves, down branches, to plants at lower levels.

Canopy Trees
These trees catch the majority of raindrops and, via evaporation of fog drip on upper foliage, keep the air near the ground water-saturated, slowing the rate of flow.

Subcanopy Trees & Shrubs
These trees and shrubs add additional moisture to plants with as well as energy of dripping water.

Understory Plants
These ferns and shrubs absorb additional water from higher plants as well as moisture from dripping water.

Ground Cover
These plants form a porous absorption layer just above the soil. They filter or evaporate moisture from the ground and prevent soil erosion.

The Watershed is Our Collection Basin
Rainfall is only one part of the water cycle equation. O‘ahu also interacts with the skies to funnel water from the atmosphere back to land. The island’s topography, augmented by a healthy, balanced natural ecosystem, catches, collects, and stores water.

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O‘ahu has two main watershed he’s native forests have evolved over millions of years to produce clouds and precipitation.

Glossary of Basic Hydrology Terms
Aquifer: an underground bed or layer of earth, gravel, or porous stone that yields water.
Aquifer well: a well drilled through an aquifer in order to yield water.
Barometer: an instrument to detect changes in atmospheric pressure.
Boiling point: the temperature at which water vapor which condenses on solid surfaces that have cooled below the dew point and temperature at which water vapor condenses into cloud droplets.
Dew: small water droplets that form on objects that have cooled below the dew point.
Dew point: the temperature at which water vapor condenses into cloud droplets.
Evaporation: the conversion of liquid water through heat energy into water vapor.
Fog drip: water vapor which condenses on cooler surfaces such as rocks and plants without falling to earth as rain.
Hydrologic: concerning water on the earth’s surface, in the soil and underground.
Intermittent stream: a stream that is not flowing continuously or only after a heavy storm.
Precipitation: rain, snow, dew, frost, sleet.
Perennial stream: a stream that remains underground source to feed streams, rivers, springs, or lakes.
Potable: drinkable water of excellent quality, conforms to state and federal requirements.
Pond: a body of water with a definite surface that does not exceed 2 acres.
Rain forest: a forest ecosystem in which rainfall is abundant throughout the year.
Rain shadow: an area sheltered from prevailing winds and rain by adjacent higher ground or mountains and hence an area of less rainfall.
Precipitation: rain, snow, dew, frost, sleet.
Riparian: underlain with impermeable strata to reach water.
Runoff: the passage of water over the earth’s surface; or a region of any water beneath the surface water that is not filtered down to the earth below.
Transpiration: evaporation of water from the plant surface.
Water table: the level of the earth’s surface, such as streams, rivers, lakes. that stores water. This evoked, barren trust used to be a healthy native rain forest. The thriving vegetation now offers few layers to intercept rainfall and the remaining root systems are insufficient to hold the soil, so erosion is- The Hawai‘i-Great resilience of native and non-native rain forest, one rain forest is now less permeable. Water runs off impermeable surfaces rather than filtering down to replenish the aquifer. Streams that emanate from deforested mountains flow during heavy storms. When the rains stop, these streams run dry. The loss of stabilizing tree and plant roots results in landslides. Deforestation can cause streams to rise up in coastal zones, causing erosion of reed and biological habitats. When a native forest is eroded and damaged, opportunistic foreign species invade. While these new plants can stabilize bare ground, the watershed cover they create is not as effective as that of the native forest.