

Ten Natural Principles to Guide Your Landscaping Practices

(excerpt from Integrated Landscaping: Following Nature's Lead by Lauren Chase Rowell and Mary Tebo-Davis, et al.)

Integrated Landscaping relies on research in horticulture and other sciences, as well as on the everyday experience of landscape practitioners. It uses local ecosystems as models, studying and applying the natural, fundamental processes of nature and applying them to the landscapes we create around our homes, workplaces, and public spaces. The following principles inherent in natural systems serve as both a framework and a justification for mimicking nature in our Integrated Landscaping practices. We gleaned them from the works of great ecological thinkers such as Sir Albert Howard, Aldo Leopold and Janine Benyus, among others, as well as from the practical experience of local landscapers.

1. Diverse forms of life live and work together interdependently.

In natural systems plants are always found with animals, living together. Plants growing in conditions that suit them well respond by producing abundant flowers, fruit, and dense vegetative growth. Pollen and nectar-feeders, birds, and other animals, driven by a desire to eat, or looking for nesting and shelter, are attracted to such resources, finding their niches within the multiple layers of vegetation and soils provided by the natural ecosystem. In turn, flowers are pollinated, seeds are dispersed, and genes passed on. In the process, occasional feathers, hairs, and scat fall to the ground and decompose, contributing to soil fertility.

2. Soils are covered and protected from the impacts of excessive wind, sun and rain.

In natural systems, soils are typically covered and protected, with layers of vegetation serving as the first line of defense, beginning with the tallest canopy or overstory trees, followed by shrubs, herbs, and groundcovers. Canopy layers influence the amount of hot, drying sun reaching the ground level. They also break falling rain into smaller and smaller droplets. Plant litter—leaves, twigs, fruit husks and nut hulls—derived from the above vegetative layers, slowly decomposes on the landscape floor. The organic matter gets gradually consumed, while humus - the long-lasting remnants of decaying organic material - remains in the soil layer. Drying winds and air currents are slowed and sometimes humidified as they pass through layers of vegetation and litter. The canopy, litter layer and humus all protect the underlying soil from wind, sun and hard rain.

3. Rainfall is filtered, conserved, and available when needed.

Natural systems allow rainwater, already reduced to fine sprays by multiple-canopy layers, to sink slowly into the ground. After being transformed into thin films of water by the litter layers, water moves through the humus in the topsoil. Humus absorbs moisture and helps form an elaborate crumb structure of aggregated soil particles. These aggregates are full of aeration and drainage channels, accentuated by a network of pathways created by earthworms, invertebrates and burrowing animals.

Healthy amounts of continuously decomposing roots also create underground channels for water and air. Rainwater is full of oxygen, essential for plant growth, microbial processes, and all other chemical processes requiring oxidation. All these interdependent factors and actions make a porous, well-developed soil that retains water, making it available to the multitude of simultaneous processes when needed.

Porous soils within natural systems allow water to be held internally. Thin films of water adhere and are stored in the spaces and voids between aggregated particles. Humus assures abundant and direct absorption. Drought stress is less frequent because rainfall is retained.

4. Soil organisms are fed by the cycling and recycling of nutrients.

In natural systems, a great variety of decomposing organisms consume organic matter as a food source, leaving behind humus, the stable and long lasting remnant (due to its chemical composition and chemical bonds) of decaying organic material. Sources of organic material come from plant litter: fallen leaves, twigs, spent flowers and fruit. Another way of understanding this may be simply to say that what comes out of the earth—leaves, stems, flowers, fruits, bark, all made with solar energy captured from sunlight through photosynthesis—returns to the earth to nourish another generation of plants.

Organic matter improves the soil by allowing microorganisms to multiply. Larger organisms enter the picture. They all eat, grow, reproduce and die, cycling and recycling nutrients into the developing food web. Natural ecosystems produce no waste; the waste products and dead bodies of one organism provide nourishment for other forms of life. Through these and other complex processes, organic matter is converted to simple inorganic forms that can be taken up by plants.

5. Humus holds fertility reserves within the upper layers of soil.

In the Northeast, plant litter doesn't accumulate but decomposes quickly with the help of numerous decomposers. The end product of organic-matter decay—humus—acts as a reservoir of plant nutrients, held in the soil until needed.

6. Diversity builds over time, keeping plant pests and diseases in check.

Natural systems sustain themselves as organisms live, grow, die, and decay together. Plant diseases that attack the plants in that system may appear, but rarely with enough strength to cause a species to weaken and die.

Healthy natural systems invite enough diversity to ensure that populations of beneficial insects, birds, and mammals keep damaging pest species in check even healthy systems often can't accommodate invasives without being overtaken and transformed utterly.

7. Plants supply fresh air above and below the ground, as well as cool shade.

Both fresh air and cool, moist soil promote growth of root systems and populations of microorganisms. Healthy root systems take in nutrients that enhance plant growth, increasing the amount and size of plants leaves (biomass). The leaves manufacture food, giving plants energy to increase the overall size of root systems. This cyclical action supplies fresh air and shade, which in turn promotes continuous functioning of the natural processes described above.

The growth and decay of plant roots creates passageways through the soil, improving both air and water drainage. Nutrients, carried by rainfall and pulled by gravity, travel through this intricate network. In a loose, permeable soil, gas exchange occurs readily, while nutrients travel deeper into the soil, building soil fertility reserves.

In natural systems, dense layers of vegetation from the canopy to the litter layers covering soils, provide fresh air and shade to the landscape. Water that infiltrates the soil is absorbed by roots and

released through the leaves as water vapor (transpiration). Additional cooling occurs when water evaporates from soil, litter, and leaf surfaces.

8. The subsoil provides inorganic compounds required for living and nonliving processes.

In undisturbed natural systems, subsoil (C horizon) lies below the upper layers of soil (O, A, and B horizons). Formed by the weathering of parent material, the subsoil provides inorganic compounds (mineral matter) to the soils and plants above.

Systems with diverse plants and animals contribute to the upward movement of the subsoil's mineral riches. For example, the large mound of soil at the entrance of a woodchuck hole and the much smaller mounds of ant hills are both examples of subsoil being brought to the surface where over time they are incorporated into the litter layer and become part of the nutrient cycle.

9. Natural systems are dynamic and will change over time.

Natural systems undergo succession, the progressive change from one ecosystem type to another. For example, naturally disturbed soil gets colonized by lichens, followed by grasses. An old field becomes a forest. Both plants and animals co-evolve as a system, and both modify and are modified, by their environment.

Plants and animals change over time in natural systems. For example, as the canopy of a young tree expands, the branch density provides safety for a nesting bird. Shade-tolerant plants such as ferns may flourish beneath and as the tree begins to flower pollinating insects arrive, fruit forms, and the fruit matures to feed wildlife. Sun-loving plants find their way to the outside edge of the canopy's spread, where they find plenty of light. All the while, soils keep developing and improving.

10. Humans experience sensory, intellectual, emotional and spiritual stimulation, opportunities for learning, and insights into the wonder of complex natural processes.

Natural systems engage all our human senses:

- We hear the crunch of acorns and leaves rustling beneath our feet, water dripping, insects chirping, birds singing, and winds whistling through grasses.
- We feel the textures of bark and leaves, softness of a flower petal, coolness of shade or a warm pocket of sunshine, and feel of soil in our hands.
- We see colors, patterns of light and shadow, shapes, depth, density, movement, and a myriad of plants and animals.
- We taste edible fruits, stalks, leaves and flowers, the sour tang of a sorrel leaf.
- We smell the fragrance of mayflower and summersweet, of wet earth, of ripening fruit.

Nature stimulates our intuitive sense by providing places to reflect, relax, imagine, inspire, hope, create, be still, be part of the great unknown and fathom the mysteries of life. They also provide innumerable learning opportunities. Natural spaces serve as classrooms where people can study geology, botany, entomology, ecology, hydrology and more. In all these ways, we reconnect with nature and begin to understand our place in the natural scheme. Our natural landscapes remind us that we humans depend on the natural world for our own health and wellbeing.