



Biomimicry: **Innovation in Landscape Design**

By Wynton Wizinowich and Micah Barker

How can we achieve that beautiful landscape desired by our clients while also reducing water consumption, pollution, and the ever-increasing cost of maintenance? Over the last 7 years while working for Bio-Scape Hawaii LLC, we have developed sustainable alternatives to conventional landscape practices. Through careful observation of natural ecosystems, we apply innovative design in built urban and residential environments. We couple our unconventional approach with high-end, naturally beautiful landscapes personalized for the client while also reducing water and labor by up to 75%. We achieve this through biomimicry, the learning from and then emulating nature's forms, processes, and ecosystems to create more sus-

tainable designs. There are countless ways to apply biomimicry, and if you study it closely, you will find many natural secrets to give you the edge in your projects. In this article, however, we strive to just share our key methods, the logic behind them and their benefits.

Soil is far more complicated than even the leading experts can fully grasp; different types alone can lead to countless variations and that doesn't even begin to address soil organisms. However, from observing simple patterns of climate and soil interactions, it's possible to make some accurate assumptions about soil health. The most basic being it is hot and sunny in Hawaii; this means that very fast growth is possible, but water evaporates very quickly and nutrients can be lost to runoff and leaching. You can literally watch plants do

their part to mitigate these problems simply by covering the soil as much as possible and recycling their leaves to feed it. The first way we can use this information is mulching. Many people find mulch messy and although nothing beats a good hardwood wood-chip mulch, there are many ways to cover the soil via cinders or even a gravel. Keeping the soil covered can reduce watering costs and improve plant health. In sustainable ecosystems, it also allows water to penetrate more deeply, where it is almost stored for plants. We advocate installing unconventionally deep soils to encourage this further (18" minimum and up to 3 ft). Deep soil will also give more sustainable nutrition for your plants long-term; meaning reduced fertilizing and dramatically less pest problems. In turn, this reduces pollution.



Conservation Landscape at Kuki'o in Kona
Photo by Micah Barker

Without water, there is no life. The amount of water obviously has a determining effect on a landscape. But even the way that water moves and interacts in an environment will greatly influence all other qualities. In nature, it's why a desert is a desert, and forest is a forest and a swamp is a swamp. On a landscape, we can actually improve the long-term health of plants and soil by changing the way we water and even reduce the amount. Generally speaking, plants put roots where there is water. This means light, frequent watering leads to stunted and shallow root growth, whereas deeper soaks with more time in between, encourages deep root growth. The more expansive a plant's root system, the better it will survive and thrive with less watering. Additionally, the deeper wa-



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ter lies in soil, the less evaporation occurs. Although, it's a simple concept, it becomes more complicated in the field for 2 reasons: Soil type/depth, and the watering type output rate. If the soil is too porous or too shallow, large amounts of water will leach out of the soil decreasing fertility and polluting water ways, aquifers and reefs. If water is emitted too quickly on to a soil surface, it will runoff, taking nutrients with it and again polluting the surrounding water environments. Deeper soils will allow for deeper watering and encourage deeper root growth; this will save on water long term and improve plant vitality. To reduce runoff, we recommend watering slowly via either drip or more efficient nozzles such as Hunter Industries' MP Rotator or Toro's Precision Spray Nozzle.

Finally, plant selection can make a big difference, not only for water needs but also because a healthier plant needs less attention. There are many "tropical" looking plants that can handle drought conditions and even grow avidly on their own in the right circumstances. Wax ficus, tiare gardenia, el dorado, ixora, singapore plumeria are a few examples. With experience, it's easy to identify the "winners" of the area. Sometimes a mix of dryland and tropical can create a beautiful oasis look that clients love; especially in the dry lava fields of the Big Island. Moreover, lowering the

planting density and focusing on feature plants will save water, reduce fertilization and pruning needs as the plants will not be competing for space. Allowing for plants to grow into their natural size and form will result in a dramatic reduction in labor and cost down the road.

There are many applications of biomimicry that can help us develop more sustainable landscapes. Through careful observation and trial and error, we have come up with our own methods of biomimicry: 1. mulching; 2. installing deeper soils that retain water; 3. watering slowly, deep and less frequent; 4. planting less and more selectively. With this information, it's possible to lower maintenance costs, conserve energy/water and reduce pollution. All the while, we can still achieve that beautiful landscape desired by our clients. There are even more lessons to be learned from natural systems and with innovative application in our industry, these advances in technique will lead to more and more sustainable landscapes for Hawai'i and beyond.

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