

Rana Creek Restoration Ecology

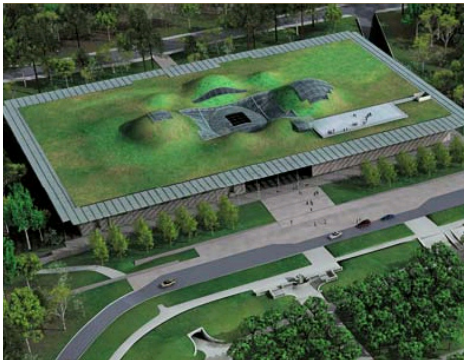
Customer Success Story

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A Butterfly's Best Friend

3D design enables Rana Creek Restoration Ecology to restore butterflies and healthy ecosystems to the landscape — faster, better, and cheaper



California Academy of Sciences

Butterfly populations all over the world are on the decline as their food sources and habitat are lost to development. Why should you care? Because butterflies and other less attractive invertebrates are pollinators. Without pollinators, the number and array of plant species begins to decline, and biodiversity suffers. (Biodiversity refers to the variety of forms among all living things: plant, animal, and microorganism.) And why should you care about that?

Biodiversity stabilizes and strengthens ecosystems, which is good for the planet's health. On a more personal level, biodiversity gives the human race more options for survival. Since we've come to rely on just a handful of plants and animals to provide us with the food, medicine, and materials we need to survive, we're at risk if any of those species fail. If more frequent floods or rising temperatures wipe out our staple crops, we'll need to find other species that can thrive under changing climate conditions. So, if we accidentally wipe out the butterfly that pollinates the grasses that could replace wheat and corn as our top nutritional sources, we limit our alternatives. And since we don't know what might happen in the future, it's prudent to keep our options open, the species diverse, and the butterflies fluttering.

The 42 biologists, ecologists, designers, builders, and landscapers at Rana Creek Restoration Ecology are dedicated to restoring butterflies, biodiversity, and healthy ecosystems to the landscape. Wise in the ways of both science and nature, they assess, design, build, and monitor the living systems they create in both urban and wilderness settings. Each step is critical to creating a sustainable ecosystem where flora, fauna, soil, and water are balanced so life thrives and then evolves without further human involvement.

The firm is perhaps best-known for their elaborate green roofs on west coast buildings like the Gap, Inc. headquarters in San Bruno, California, the Vancouver Convention Center, and the still-in-progress California Academy of Sciences in San Francisco. In each case, Executive Director Paul Kephart and his team have carefully aligned ecological and architectural objectives to create buildings that welcome nature and benefit from doing so.

Case in point: The Gap's gently undulating, 69,000 square foot rooftop, designed by famed green architect William McDonough, offers critical habitat for the endangered San Francisco mission blue and the San Bruno elfin butterfly, along with

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Gap, Inc. Headquarters



Vancouver Convention Center Expansion Project

numerous other local and migratory species. It's an important component of a wildlife corridor stretching between the Pacific Ocean, the San Francisco Bay, and the Sierra Nevada mountains. Completed in 1997, the native grasses, wildflowers, birds, bugs, and butterflies are flourishing without human interference in a healthy ecosystem. (The Gap mows the roof annually just to keep it from looking scraggly.)

Humans do pretty well from this arrangement, too. The roof's thick vegetated layer provides superior sound and thermal insulation for the building. The energy savings are three times greater than with an ordinary roof membrane, enabling a payback period of less than six years. The plants absorb air pollution (up to five pounds of particulate a year in 20 square feet) and gallons of rainwater during each storm, which keeps water pollutants out of storm sewers. And, oh yes, the building occupants and visitors love to look out at the serene landscape.

At the time the Gap's roof was installed, "Most of these concepts were unheard of. We didn't have metrics to know if it worked," says Kephart. "Why did we do it? It felt right—we were creating habitats and structures and ecological systems within the built environment that perform and give long-term benefit," he explains.

With the economic and environmental benefits of green roofs now established and catching on nationwide, Kephart's clients are ready to incorporate even more sustainable systems into their projects. A new apartment building in San Jose, California, will absorb 100 percent of the rainwater that falls onsite with the help of a living roof, living walls, a bioswale, and retention basin. The six-and-a-half acre Vancouver Convention Center roof will capture, store, and treat its rainwater for use in irrigation and flushing toilets, for a gain of 3 million gallons a year. And Rana Creek is working with the city of San Francisco to devise an effective zero-discharge strategy that would manage rainwater where it falls rather than sending it to old and overtaxed storm water sewer lines.

These complex systems are an artful blend of ecology and engineering. Their designer must understand how nature operates in order to create an environment that will sustain life. He or she also needs tools that simplify the analyses and calculations needed to actually build it.

For smaller residential projects, Rana Creek civil engineer Ben Jordan uses standard AutoCAD. "It's powerful. There's a tremendous amount of data manipulation possible. You can do 95 percent of the design work for smaller projects," he said.

For bigger commercial projects, though, Rana Creek relies on specialized technicians and powerful 3D applications like Autodesk Civil 3D. "These tools are great for roof storm water runoff calculations as well as designing water and sewer systems," says Jordan. When a project requires significant grading and drainage, the software makes it easy to manage the cut and fill (where excess soil is used on site as much as possible, to avoid the high energy costs associated with transporting dirt). "It saves tremendous time," he says.

The visual impact of the 3D drawings is another benefit. "With pictures, you can describe the future scene and lay out the roadmap to get there," Jordan explains. "The more explicit the drawings are, the higher the likelihood of a successful project. When the plans are clearer to the contractor, they understand what they are bidding on. It's cheaper to do and the project goes faster," he adds.

Faster, better, cheaper, and butterfly-friendly. That's a prospect we can all love.

To learn more about how Autodesk Civil 3D is helping organizations around the world complete projects faster and more cost effectively, visit www.autodesk.com/civil3d.

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