# *California:* Restoring Ecosystems in Arid Western States for $8.8 Million an Acre?

*By Craig C. Dremann*

If you had wanted the fastest computer in the world in 1954, you had to get 2,800 radio tubes and build from scratch a 10,000-pound machine that only had 5K of RAM and 64 K of memory, for $30 million dollars. That was the Illiac-1 at the University of Illinois. Once you got the then world's fastest 1954 prototype computer running, it took another 50 years and billions of dollars more of research and development to invent the small, efficient computers that sit on our desks today.

Restoration in general and restoring "non-riparian" arid Western ecosystems in particular is at an identical early stage of development. It's no more advanced then 1950s era computer design and programming. "Non-riparian" means that there isn't any perennial natural water source on the site: no streams, creeks, ponds, or marshes. That's about 99% of the lands of the arid West. That also means restoration projects are at the mercy of the annual rainfall. To add more difficulties, the Western United States, between California and the Rocky Mountains, has been experiencing a five to fifteen-year severe to extreme drought (*Weekly Drought Monitor,* 2004).

Classically, Ecological Restoration means restoring a local self-functioning plant ecosystem, to a high percentage of native plant cover (e.g. 85%-99%), with a high number of native plant species within a short amount of time (for example, about 90 days to two years). And once completed the project requires little or no future human maintenance. This is a very new idea, especially within the industrialized nations. Such a concept of restoration goes 180 degrees against the view of the planet as a never-ending supermarket—that humans can shop until they drop, without ever restocking or even inventorying the planet's ecosystem-shelves.

Further, the idea of restoring locally extinct native animals or restoring indigenous human-ecosystem interactions is usually beyond the scope of most restoration projects.

For the last thirty years, Californians have invested time and money in restoring some of the state's two hundred offically recognized ecosystems, based on the dominant vegetation (See John O. Sawyer and Todd Keeler-Wolf's book *A Manual of California Vegetation* (1995). Since the first Earth Day, volunteers have tried small-scale ecological restoration around the Western States. Have any ecosystems actually been restored?

The Federal government has dwarfed these efforts with its mitigation projects. There's at least $300 million being spent in California by a single agency, CALFED, on ecological restoration for mitigation, mostly riparian repair for endangered species of fish. Additional hundreds of millions are being spent by the U.S. Bureau of Reclamation on the Columbia River Basin watershed for the endangered fish.

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## The Bureau of Reclamation is spending millions on the Salton Sea

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Paradoxically, the Bureau will also start spending millions for restoring the human-created Salton Sea and tens of millions for mitigating the San Joaquin River's Friant dam. A very small portion of all that Federal money is spent annually on upland habitat or non-riparian restoration, with each grant usually ranging from $650,000 to $1,200,000. Smaller amounts of public money are spent on ecological restoration for other purposes, like converting the tall, dry, flammable annual grasses along California's roadsides back to original perennial native vegetation.

Most people who live or visit California and see the "golden" hills in the summer don't realize that all those dry grasses are from Europe. The California perennial bunchgrasses are now so rare that the only reliable place you can see them is on the California flag, underneath the extinct California grizzly bear. Restoring non-riparian roadside native grass is

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# Restoring at $8.8 Million an Acre

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turning out to be every bit as expensive and as primitive as that $30 million dollar computer from 1954. According to University of California cost studies from a Dunnigan Hills project carried out in 2004, it is going to cost about $8.8 million dollars per acre to restore a California perennial bunchgrass prairie from scratch.

This means that as a society, we will probably have to invest at least $10 million dollars per acre of more complex California ecosystems, just to get those first successful prototypes established. If we have 200 different ecosystems in California, we'll have to spend a total of $2 billion just to see a one acre prototype for each ecosystem.

We should start thinking about a "Blue Book" value for an acre of one of these ecosystems. As the Dunnigan Hills project demonstrates, it may be cheaper for developers to protect the examples of California native ecosystems that we have left. At $8.8 million per acre, restoration may be more costly than development, more pricey than what the land with buildings are worth. When the Nature Conservancy or the State Parks want to buy such land, they often consider prime ecosystems as "unimproved" with low real-estate values. Perhaps the best local examples of the remaining California native ecosystems should have an ecosystem-replacement value or an ecosystem "Blue-book" value. This might give private land owners an economic incentive to manage or restore native ecosystems on their lands. They'd be guaranteed that preserving, managing, or restoring pristine ecosystems is at least as economically valuable as grading the property and building some condos on the land.

The most important message that the UC Davis project can teach us is that we need to know how to successfully restore the arid Western ecosystems and how much is it really going to cost to restore an ecosystem. This must be considered before we can allow any development, any Federal land grazing permitees, any new grape vineyards, or any new highway project to destroy the remaining good examples of Western non-riparian ecosystems.○

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# How a Day Passes Revegetating the Dry Tropical Forests in Bahia de Caraquez

*By Peter Berg*

It is tempting to dwell on the difficulties of pioneering dry tropical forest revegetation because the obstacles and challenges are a kind of earth news. Reporting them is a way to spread the whys and hows of carrying out work that is urgently necessary but involves truly arduous effort. There is also a high spirit of creativity that also needs to be told. This *elan* comes from the inventive way a day unfolds as the requisite problems of practicing a craft in a unique way are encountered. From the moment we walk out the door to become engaged with one of the field sites, we begin responding to conditions as they are found, and the process of discovery and spontaneous interaction that comes into play occupies and rewards our consciousness completely.

At the *vivero* (greenhouse) this morning, Renée and I first emptied a twenty-five liter can of organic garbage that we had carried out on

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