Edwards Air Force Base
Environmental Management

Intelligent Planning for Renewable Energy Projects

Fall 2012

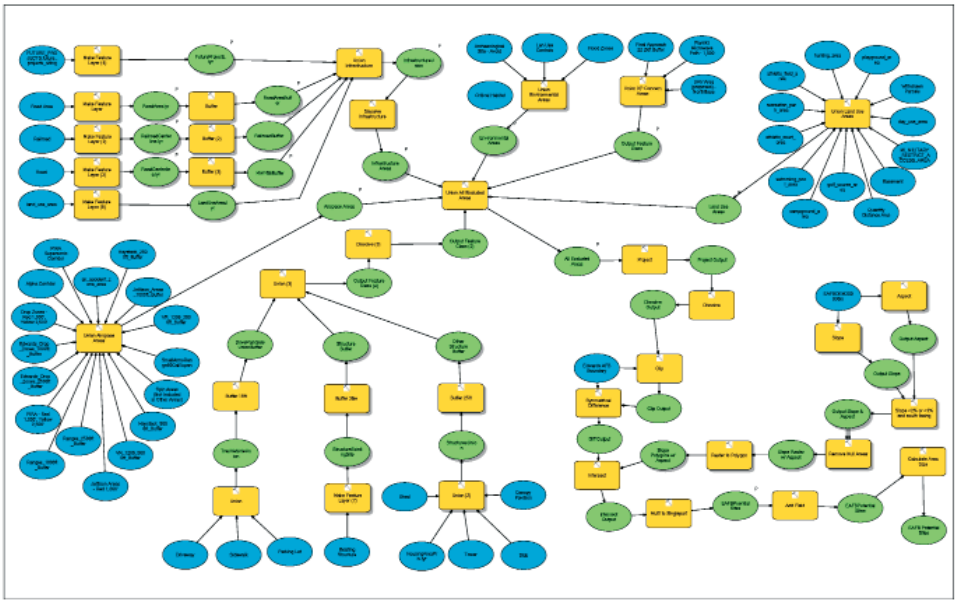
PROTECTING THE TORTOISE — A construction worker stops work to string caution tape around a desert tortoise and burrow near another base project.

An enhanced use lease, or EUL, is an opportunity for the Air Force to capitalize on non-excess assets, including land, by leasing them to private entities.

The Air Force is facing unexpected demands on its resources including budget shortfalls, rising fuel prices, the costs of fighting the global war on terror and restrictions on retiring weapon systems. In response to these issues, the Air Force is seeking ways it can continue to accomplish its mission. One of these ways is to use innovative business practices such as the EUL to return value to the American warfighter.

Edwards Air Force Base officials started planning for EUL opportunities in the mid-2000s. Using the extensive knowledge of the 412th Test Wing Civil Engineering and Environmental Management personnel at the base, a team looked at possibilities for EUL projects. Due to the base's remoteness and climate, renewable energy topped the list.

The almost constant sunshine and wind resources of the western Mojave Desert make



MODELLING SUCCESS — Edwards officials built a complicated model to identify the most ideal location for a renewable energy enhanced use lease.

the areas around Edwards attractive to renewable energy developers. Most of the base is in Kern County where more than 12 commercial wind and 11 solar projects north and west of the base have been approved since 2005. In fact, the largest wind power installation in the United States is currently under construction near the community of Mojave, northwest of the base.

Protecting Environmental and Mission Priorities

The team working on initial planning for EUL projects started out by completing a comprehensive review of underutilized land. At 481 square miles, Edwards' sheer size made this a challenge.

One critical tool in this process was the Edwards Geographic Information System. This system, one of the most robust in the Air Force, allows planners to combine layers of information, including access to utilities, environmental concerns, national security concerns, mission areas, buffers, and other aspects for a particular area.

In this instance, the EUL team built a model for the GIS to find suitable areas. This model winnowed out locations that would not be appropriate, including, but not limited to, critical habitat for desert tortoise and other sensitive species, hazardous waste sites, the bombing range, major lakebeds or clay playas, mission critical areas and steep slopes.

This model led to the initial selection of an area in the northwest part of the base. The site is bordered by the base boundary on the north and west sides, southeast of the intersection of Lone Butte Road and Trotter Avenue in Mojave.

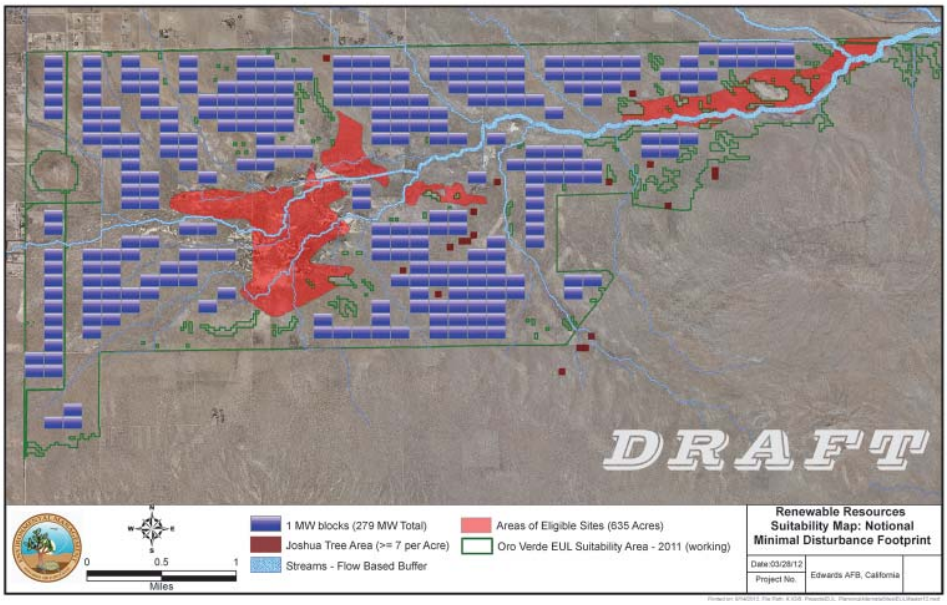
The initial site was roughly a 3,000-acre rectangle when the EUL was first put out for competitive solicitation as a renewable energy generating site in 2009. Since that time, the site has expanded to 6,000 acres to allow flexibility in avoiding sensitive habitat, drainage and cultural areas the Air Force most wants to protect.

Better Environmental Stewardship Through Smarter Planning

Site visits by Environmental Management staff, the beginning of the *National Environmental Policy Act/ California Environmental Quality Act* analyses and lessons learned at large, off-site commercial renewable energy projects have led the Air Force to focus planning efforts to ensure the environment in the EUL project area is well protected.

Edwards officials recognize that renewable energy projects should be thoughtfully planned to minimize impacts to the environment. The Air Force wants to avoid impacts to sensitive species and habitat to the maximum extent possible.

LEAVING NATIVE PLANTS IN PLACE — Native prairie grass grows below solar photovoltaic units at a renewable energy site in Texas. One idea with the soft footprint concept is to trim existing desert plants before construction, rather than clearing the land, to reduce dust and support wildlife.



MAPPING THE POSSIBILITIES — Edwards officials use their Geographic Information System to create different scenarios for the site.

The Air Force's new idea is called the soft footprint concept.

The soft footprint would involve:

- Siting renewable energy apparatus outside important environmental areas of concern, including sensitive habitat for plant and animal species, cultural resources and seasonal streams and drainage.
- Continuing Edwards' practice of detailed desert tortoise avoidance training for construction workers.
- Keeping ground disturbance to the minimum extent possible.
- Removing and returning sensitive animal species immediately after construction is completed in each small area.
- Monitoring all aspects of the projects full time.
- Using native plants and biotic crust as a natural dust suppressant; not allowing brine or salt to be used.
- Gathering data on how desert tortoises, Mohave ground squirrels and other animals adapt to the panels. The panels will provide shade, changes in moisture and wind, and help animals hide from predatory birds.

At the same time, the Air Force is investigating other soft footprint ideas that would engage the EUL site in the history and spirit of testing at Edwards. These include:

- Trimming desert plants to different heights to determine if there is a threshold level that supports wildlife best.
- Researching use of different densities or heights for renewable energy equipment to learn about the effects of the structures on wildlife and plants.
- Providing habitat strips for use as migration corridors.
- Reestablishing the existing long-term habitat quality analysis monitoring sites in the EUL area.

The soft footprint approach means the boundaries of the renewable energy EUL site would be reshaped.

Learning from the Wisdom of Others

Edwards officials know the base can learn a lot from others, especially those with recent experience in renewable energy projects throughout the southwest. The Air Force is inviting early involvement of the environmental and Native American communities so that Edwards will better understand potential issues before they become critical.

SITE VISIT — Members of the San Fernando Band of Mission Indians visited the base, including the EUL site, in August 2012.

In addition, the Air Force is asking other government agencies and non-governmental organizations in the Mojave Desert to partner with the base; to share their experience and ideas on how to minimize the environmental impact of renewable

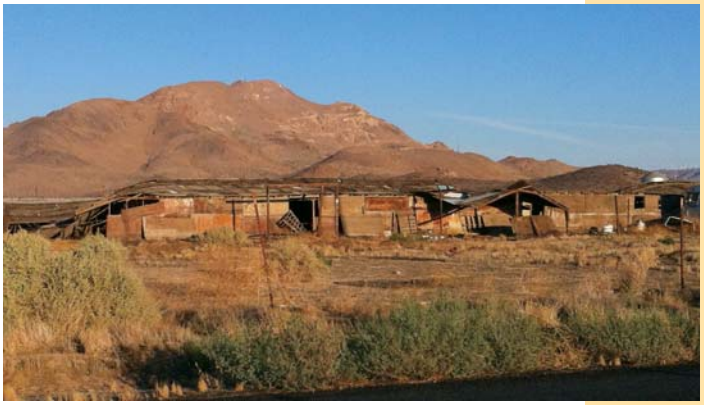
energy projects, maximize benefits, and understand the inevitable changes to the ecosystem.

Public Participation and Environmental Planning

A Notice of Intent is expected to be published in the *Federal Register* in 2013.

Public scoping meetings are tentatively planned in Mojave, Lancaster and Sacramento, Calif. At those meetings, members of the public may ask questions and enter comments into the public record for this project.

The Air Force currently anticipates delivery of a draft environmental impact report by the end of 2013.



YESTERDAY AND TODAY — Left, the remains of a poultry barn west of the project site. Right, a Marine helicopter hovers above the ground surface during training exercises at the project site.

Oro Verde Enhanced Use Lease Site History

- **10,000 to 12,000 years ago –** Base archaeologists have evidence of Native Americans living in the Bissell Basin, the valley in which the project area lies. Lake Thompson, stretching from present day Lancaster to Boron through the Edwards area, was to the south and east.
- **10,000 to 7,000 years ago –** Over time, Lake Thompson shrank into the dry lakes we see today.
- **7,000 to 5,000 years ago –** The change to a drier climate drove Native Americans away from the area, except for seasonal visits. Prehistoric people were still drawn to springs, seeps and the water that filled up the playas during rains. It was wetter than it is today due to a higher water table.
- **5,000 to 1,500 years ago –** Archaeologists have found evidence of trade with coastal peoples, including shell artifacts, on the base from this period.
- **1,500 to 300 years ago –** Periods of drought interspersed with wetter conditions forced people to migrate throughout the Mojave Desert in search of food. Native Americans in the project area probably hunted birds that had come to the playas in search of freshwater shrimp to eat. In addition to the birds, they hunted rabbits, and other small animals and gathered more than 200 native plants such as Indian rice grasses.
- **Late 1700s –** Spanish traveled through the area.
- **1843 –** Explorer John C. Fremont mapped the area.
- **1850s –** Anglo-Americans started moving to the area. The town of Mohave (now Mojave), to the northwest of the site, was established in 1858.
- **1876 –** The Southern Pacific railroad came to Mohave. The current tracks run about 1/2 mile west and two miles north of the base boundary near the project area.
- **1890s – 1940s –** Homesteaders moved into the Bissell Basin area. According to archaeologists, the area is rich with historic remains. Ranching, poultry and alfalfa farms were popular.
  In 1894, gold was discovered on Standard Hill northwest of the area, northeast of Soledad Mountain. Many other mines in the area were active until World War II began.
- **1933 –** The Army Air Corps began operations at Muroc Field on the east shore of Rogers Dry Lake to the east.
- **1942 –** The Marine Corps established the Marine Corps Auxiliary Air Station, Mojave at a county airport just east of the town. Just south of the project area, aerial photographs reveal an emergency landing strip built during the war.
  Army Air Corps flight training and flight testing missions began in earnest on the western edge of Rogers Dry Lake.
- **1954 to 1955 –** The Air Force bought out all the Bissell Basin landowners within the present boundaries of the base.
- **1959 –** The Marine Corps Auxiliary Air Station, Mojave closes.
- **2000s –** Marine Corps helicopters assigned to Edwards AFB use the Bissell Basin area for their exercises.

Environmental Management
5 East Popson Avenue, Building 2650A • Edwards AFB California 93524-8060
(661) 277-8707