Environmental Action
UPDATE
Air Force Environmental Activities at McClellan
May 2011

FOCUS ON VERNAL POOLS

The vernal pools at McClellan have been getting a lot of attention lately with the release of the proposed plans for cleanup for the Skeet Range and the Ecological Sites at McClellan. In addition to the vernal pools at those sites, McClellan has a number of other vernal pools scattered all over the west side of the former base (see map on page 3). In the winter, they appear as low-lying areas filled with water; in the spring as fields of flowers; and in the summer and fall as dead grasses. While they are easy to overlook, they in fact, provide critical habitat to a number of endangered species and as such are federally protected habitat.

What are vernal pools and why are they important?

Pools are home to a diverse group of plants and animals

At first glance a vernal pool may not look all that different from any other stretch of landscape. However, a closer look reveals a much more complex environment, home to intricate ecosystems featuring a variety of plants and animals.

Vernal pools are a particular type of seasonal wetland that primarily occurs under the Mediterranean climate conditions of the West Coast. They are covered by shallow water for variable periods from winter to spring, but may be completely dry most of the summer and fall.

These pools range from small puddles to shallow lakes and are usually found in gently sloping grasslands. During a single season, pools may fill and dry several times. In drought years, some may not fill at all.

Vernal pools are distinguished from other seasonal wetlands by the unique and rare plants and animals that not only survive but actually thrive in these harsh conditions. Many of the plants and animals in vernal pools can't live anywhere else. They actually need the extremes of soggy winters and scorching dry summers. They hide out during the dry season as seeds, eggs, or cysts and then grow and reproduce when the ponds are again filled with water.

In addition, birds such as egrets, ducks, and hawks use vernal pools as a seasonal source of food and water.

The key to vernal pools is the bedrock or hard clay layer under the soil that prevents water from draining. Thus, in the wet season, surface depressions over the impermeable layers fill with water to form pools.

A vernal pool near the northwest taxiway in the fall

One of the several vernal pools in the West Nature Area in the spring

Fremont's Tidy-tips (*Layia fremontii*) and Dwarf Sack Clover (*Trifolium depauperatum*)

Vernal pool life cycle

When winter rains fill the pools, freshwater invertebrates such as aquatic beetles, midges, dragonflies, vernal pool fairy shrimp, seed shrimp, and aquatic snails emerge. Amphibians such as pacific tree frogs and western toads lay their eggs. Plants sprout under water, some using special floating leaves and air-filled stems to stay afloat. Some of these plants even flower under water. Birds arrive to feed on the vernal pool plants and animals.

In the spring, wildflowers often bloom in brilliant circles of color that follow the receding shoreline of the pools. Native bees nest in vernal pools and pollinate pool flowers. Insects and crustaceans produce cysts and eggs, and plants produce seeds that are buried in the muddy pool bottom.

By early summer, the water has evaporated, and the clay pools appear brown, barren, and cracked. By late summer, amphibians have dug deep into the soils and gone dormant until the next rainy season. Vernal pools completely dry out and most of the plant and animal species either disappear into the soils or set seed in the mud and die. In this phase, vernal pools are really "banks" full of resting seeds, cysts, and eggs that can survive through desiccating summers, and even extended droughts, until the onset of the rains starts the life cycle all over again.

For additional information, visit:

http://water.epa.gov/type/wetlands/vernal.cfm

http://ceres.ca.gov/wetlands/whats_new/vernal_sjq.html

http://www.vernalpools.org/

Vernal Pools are a protected critical habitat

The unique wet/dry cycle of vernal pools has given rise to a variety of plants and animals that can only survive in that environment. Many of these species, such as the vernal pool fairy shrimp at McClellan, are protected under the federal Endangered Species Act, and thus, the vernal pools are protected habitat. In addition, vernal pools are wetlands protected under the Clean Water Act. Another protection comes from the federal government's "no net loss" policy for wetlands including vernal pools.

With these federal protections in place, any action that would negatively impact a vernal pool is carefully evaluated by the U.S. Fish and Wildlife Service and by the U.S. Army Corp of Engineers, which administer the permit programs under the Endangered Species Act and the Clean Water Act, respectively. Impacts are assessed and if the project is approved, mitigation of the impacts is often required.

A vernal pool near the northwest taxiway in the spring

Canada Geese (*Branta canadensis*) and a Black-necked Stilt (*Himantopus mexicanus*) at a vernal pool in the West Nature Area

Mitigation Questions and Answers

Q: What happens to the vernal pools at McClellan when contaminants are present?

A: Cleanup of environmental contaminants at McClellan falls under the Comprehensive Environmental Response Compensation and Liablility Act (CERCLA), or Superfund program. However, before any cleanup action takes place in a vernal pool area, the relative level of impact to the pool must be determined. Is it more damaging to leave the contaminants in place or to remove the soil and sediment to get the contaminants out, which could cause significant damage to the pool?

If the level of risk from the contaminants is relatively low, then it will probably be less impactful on the species to leave the vernal pool in place with the contaminants that are there. However, if the level is risk relatively high, then a decision may be made to excavate the contaminants.

Q: What is vernal pool mitigation?

A: If a decision is made to excavate the contaminants, then the damage to the pool must be mitigated, either by replacing or restoring the pool onsite, or offsite, depending on the future use of the site. If it will be developed in the future, then it may make more sense to mitigate offsite.

Offsite mitigation involves purchasing credits in a habitat mitigation bank that has already been established and permitted by a regulatory agency as being good habitat. Each bank has a project service area and the mitigation must be as close as possible to where the impact occurred to ensure the presence of similar habitats and species.

In most cases, two types of credits are required to satisfy the requirements under the Endangered Species Act and the Clean Water Act. Typically, to meet the Clean Water Act requirement, a minimum 1-1 (acre-to-acre) restoration or creation credit is required. The Endangered Species Act requires a 1-1 restoration or creation credit plus an additional 2-1 preservation credit.

These ratios are determined in a case-by-case manner. If the impacted habitat is considered to be of particularly good quality or if there is limited similar habitat in that region, then mitigation ratios can be higher. This is done to ensure the continued existence of those species that rely on that specific habitat.

Q: What is the process for determining appropriate mitigation, if any?

A: The first step is consultation with the U.S. Army Corp of Engineers and the U.S. Fish and Wildlife Service. If any state listed species are associated with the habitat of concern then the California Department of Fish and Game is consulted.

The U.S. Army Corps of Engineers requires a permit for wetland fill under Section 404 of the Clean Water Act. The U.S. Fish and Wildlife Service requires a consultation under Section 7 of the Endangered Species Act.

The agencies provide permits and guidance to federal and other entities. The appropriate mitigation for a development project is tailored for each specific vernal pool or wetland being impacted.