Above, drip torch operator ignites non-native grasses. Middle, flames up to 12 feet high rapidly devour dry

Putting the fire back into habi

Photo courtesy of TNC

Santa Rosa Plateau Reserve Natural Resource Manger Carole Bell inspects non-native grasses marked for a future burn project.

For many years now, officials have mounted campaigns against fires that scorch dry wildlands, laying waste to thousands of acres. Yet, as science and understanding have progressed, ecologists, biologists, and wildlife area managers have come to recognize that fire, like so many other natural occurances, has its place in the healthy maintenance of the environment.

By Patrick Moore

And so it was with this understanding that Dee Sudduth of the Department of Fish and Game's (DFG) Eastern Sierra-Inland Deserts Region attended a habitat burn project at the Santa Rosa Plateau Ecological Reserve in June of 2000.

Sudduth gazed over tranquil, unspoiled desert oak and brush land located in Riverside County, a short distance southwest of Murrieta. The Santa Rosa Plateau Ecological Reserve incorporates a little of every type of prime, high-desert habitat: chaparral, grassland, oak woodland, and even riparian. Though administered by the DFG and managed day-to-day by The Nature Conservancy (TNC), the 8,300-acre reserve is cooperatively governed with the County of Riverside and the Metropolitan Water District of Southern California.

In June 2000, the burn subjects were two grassland units, a 40-acre and a 90-acre parcel. The California Department of Forestry and Fire Protection (CDF) provided a 150-member crew, principally CDF firefighters augmented by local fire personnel from surrounding towns and a group of prison inmates, supported by some 50 fire engines.

The operation command center consisted of a large truck parked at a crossroads where project leaders directed the process. The vehicle doubled as a first-aid station and rest area.

"During the first (smaller, 40-acre burn) I stayed at the command center and asked a lot of questions as I watched," said Sudduth. "They pointed out places on the topographical map where little wind-devils, chimneys, and small twisters might come off, and we watched the smoke color and direction to consider possible air quality issues that could arise."

Crew members, dressed in full firefighting regalia and gripping shovels,

desert grasses. Left, grasshopper sparrows' nests receive protective bath moments before flames arrive.

itat recovery and maintenance

were dispersed along a line roughly surrounding the 40-acre burn area, led by fewer than a dozen drip-torch operators.

Resembling a small version of a WWII flame-thrower, but with considerably subdued potency and producing far less ferocious results, a drip-torch consists of a small canister containing a gasoline/diesel fuel mixture, attached to a three- to four foot long expandable tube with a nozzle affixed to the business end. Small globs of red fire can be induced to dribble from the device.

Drip-torch operators ignite the dry vegetation as they march forward, with other crew members, shovels in hand, following closely behind. The entire entourage treks inward from the parameter, similar to herding sheep toward a pen. Those with shovels watch for spot fires — small fires that can flare up behind the moving torch line — that left to burn, could incite an uncontrolled wildfire.

The first burn ended at 10 a.m., one-hour after it had started, burning out at the feet of those at the command center.

A CDF firefighter watches and waits.

An optimal chance to study recovery

Wildlife biologists use the Santa Rosa Plateau Ecological Reserve as a habitat enhancement laboratory where controlled burns and their results can be examined. Projects are studied for weeks following each burn event. Impacts on animals that depend on grasslands are evaluated by checking the contents of herp array traps after each burn.

A herp array trap consists of seven 5-gallon buckets that serve as pitfall traps that use shade cloth drift fences and cloth funnels to capture larger reptiles. As traps are monitored following a burn, wildlife population increases and/or decreases are recorded based on trap contents. Herp trap research provides biologists a method to detect which animals return to the area, and at what point in time following a burn they reappear. Each set of burn study results supplements a statewide data bank, contributing to information that strengthens insight into planning subsequent burn projects.

DFG photos by Carole Bell

No art to it — only science

Long before flame hits the flora, preparations begin, first with public notification. Carole Bell, TNC natural

resource manager at Santa Rosa Plateau ER, must alert local municipalities and schools, conduct public announcement meetings, and post a notice in local newspapers.

Concurrently, with a large map as their guide, burn managers write a prescription for the operation, much as a doctor might for a medical procedure, delineating acceptable burn operational limits that hinge on ambient temperature, wind velocity, and relative humidity figures. If any single weather element refuses to align correctly within a set burn protocol, the entire project is scratched — safety and control are the priority.

"Everything is very precise," Sudduth said. "They go out there for several weeks before the burn to find out what time the winds come up, what directions they come from, so they know what the wind patterns are typically for that time of year. Based on that information, and based on a topo map showing the area geography, they can predict (how the fire is likely to proceed). It's strictly science. There's no art to it."

Based on information obtained beforehand, burn designers can establish the best location for a fire line, in which direction the line will travel, and at what points flames might backtrack over areas already burned — locations where crew members may be threatened as a result.

Burning for native species

Santa Rosa Plateau Ecological Reserve is home for sundry resident and migratory birds, including three vulnerable species: the state listed threatened Swainson's hawk (*Buteo swainsoni*), the federally sensitive and DFG listed species of special concern burrowing owl (*Athene cunicularia*), and a state listed endangered

Burn line from six months earlier. Native bunch grasses emerged within days of the June burn.

Photo by Carole Bell

bird, the willow flycatcher (*Empidonax traillii*).

Burn managers focused on nonnative grasses for the burn, which not only eliminates the invasive species, it also reduces a swelling fuel source that could feed a devastating wildfire. Stretching to slightly more than three feet tall, exotic invaders such as mustard and red brome force out native bunch grasses, lotus weed, and deer grass. Biologists count on habitat burns to slow the exotic grasses' relentless encroachment and thereby reenergize native vegetation.

Timing is critical.

"Burn too late in the season and the seeds are already on the ground," Sudduth said. "Burn too early and the grass is too green to burn. We burn nonnative grass areas in June each year before the seed pods open, because once the pods shatter and seeds are on the ground and in the soil, the fire goes by so fast they don't get burned."

Humidity, too, can spoil burn plans.

"It's hot out and the grass is dry, but in actuality they have problems getting the fire going because the air is so humid," said Sudduth. A hot, fast fire is desired, but what occurs on a humid day is an occasional hot-spot that just sits and smolders.

Among special plants avoided by burn crews are the California Native Plant Society designated rare, Nuttall's scrub oak (*Quercus dumosa*), and the federal and state listed endangered, California orcutt grass (*Orcuttia californica*).

Also protected from the flames are a number of delicate vernal pools that occupy the reserve. The Santa Rosa Plateau vernal pools contain a species of fairy shrimp that is found only every few years. Among the most vulnerable of these are the federally threatened vernal

Middle and right, with non-natives removed, the Santa Rosa Plateau blossoms.

Photos by Carole Bell

pool fairy shrimp (*Branchinecta lynchi*); the riverside fairy shrimp (*Streptocephalus woottini*), indexed on the federal endangered list; Orcutt's brodiaea (*Brodiaea orcuttii*) listed rare by the California Native Plant Society; both state endangered and federally threatened thread-leaved brodiaea (*Brodiaea filifolia*); and San Diego button celery (*Eryngium aristulatum var. parishii*) on both state and federal endangered species lists and designated rare by the California Native Plant Society.

The burning continues

At about 10:30 a.m. following a brief time-out to check weather conditions and to allow the burn crew to prepare for round two, the time arrived for the day's second burn.

"That burn started right there at the command center, and at that point I was handed a shovel and placed on the line," said Sudduth.

"And then I walked along, just two feet behind a guy with a drip-torch. It's set up like a huge pie and everyone except for a few posted observers is distributed around the perimeter of the pie, and (as we walked toward a uncommon point) the pie kind of works down into one piece, and everybody's there. Everything was so well calculated I didn't feel the slightest element of fear or risk — it was exciting, but not fearful at all."

Immediately following the last burn, crew members beamed wide smiles, and participated in a brief celebration honoring the end of a successful, safe burn day.

Patrick Moore is an information officer with the DFG's Region 6. After many years with the DFG, he will retire this summer.

In the absence of the non-native grasses, native plants have the opportunity to thrive and reclaim lost territory.

Photos by Carol Bell