ARIZONA
WATER RESOURCE

No. 4 June 1998

El Niño News

El Niño Brings Mixed Fire Season Blessings

Increased precipitation from El Niño ensures more abundant vegetative growth, which in turn raises concern about increased fire hazards, especially during Arizona's summer fire season. Whatever fire hazards are due this year to El Niño are not being experienced evenly throughout the state, however, with some areas actually having less fires. And, in some cases, El Niño's legacy may not be apparent this season, but instead be evident by fires in future years.

El Niño brought cooler and wetter than normal weather to the state. The added precipitation caused new growth in trees and plants throughout Arizona.

This cooler, wetter weather bodes well for fire fighters in northern Arizona. Only 36 fires have been reported so far this year in the Coconino National Forest, about 60 fewer than expected for this time of year. Reduced fire activity is attributed to moist vegetation from above normal spring precipitation and cooler temperatures, says Raquel Poturalski, Public Affairs Officer for the Coconino National Forest.

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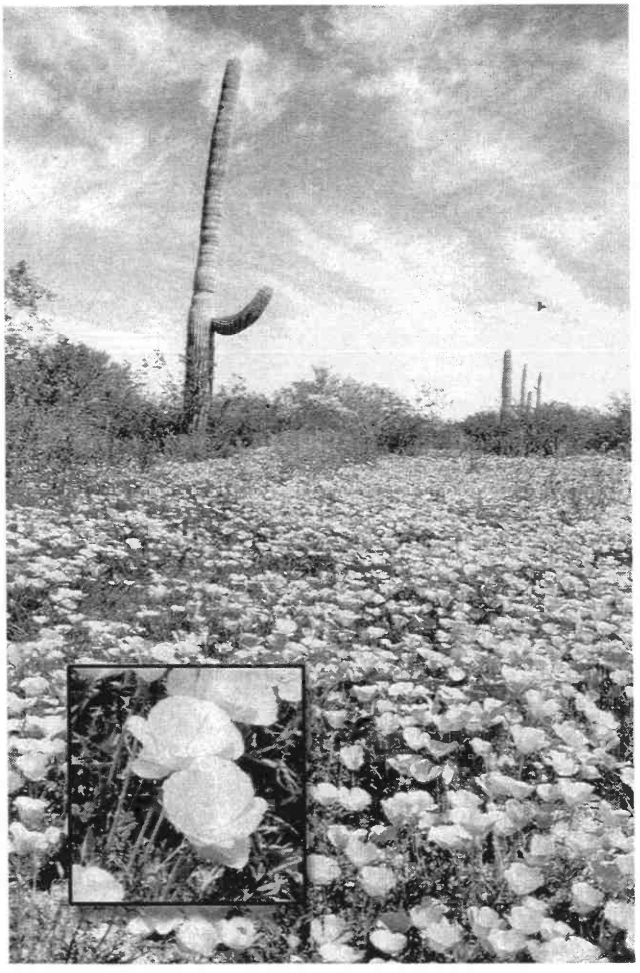

Abundant El Niño rains brought forth a plethora of spring wild flowers in Southern Arizona. Word of the extraordinary floral display–some say it was the best in this century–ranged far and wide, with the "New York Times" devoting a full page of colored photos to it. The blooming of the desert actually began in mid-November in the lower elevations but hit its dramatic peak in March. Shown above is a field of Californian poppies at Organ Pipe National Park. (Photo: B. Tellman)

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Will Conditions Flip Flop, El Niño to La Niña?

As El Niño conditions wane scientists look for signs of a companion climatological condition known as La Niña, an atmospheric event that often follows El Niños. The two events are climatologically related, with one scientist describing La Niña as a "rebound effect of El Niño." La Niñas' appearance after El Niños also has been described as "a pendulum swinging back and forth." Signals, however, are mixed as to whether La Niña will, in fact, follow the present El Niño this year.

In some ways, La Niña is the opposite of El Niño. El Niño is characterized by the pooling of a vast expanse of unusually warm water in the eastern Pacific Ocean, off the coast of South America. The increased moisture and energy pumped into the the atmosphere sets off a chain of global weather changes, from drought in Southeast Asia to increased precipitation in the U.S. Southwest

La Niña represents a reverse scenario. With La Niña, water several degrees cooler than normal collects in the eastern Pacific and triggers global weather changes that

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are the opposite of El Niño's. Instead of El Niño's topsy-turvy weather effects, with the wetting of dry areas and the drying of wet areas, La Niña tends to accentuate normal weather patterns. Wet areas become wetter, and dry areas drier. For example, Southeast Asia might expect increased rains, with the U.S. Southwest experiencing dry conditions. What both El Niño and La Niña have in common is the power to alter global weather patterns.

El Niños and La Niñas tend to alternate about every two years, although the time from one event to the next can vary from one to ten years. El Niños tend to be more frequent than La Niñas since not all El Niños engender strong cold events. Like El Niños, La Niñas vary in strength. The most recent La Niña occurred during the fall and winter of 1995/96. At that time, the Southwest experienced severe drought conditions. (The graph below shows recent occurrences of El Niños and La Niñas according to the Multivariate ENSO Index.)

A review of the El Niños and La Niñas that have occurred in the Southwest during the last 65 years shows that only about three-quarters of the El Niños brought above-normal precipitation to the area. The link between El Niño and rainfall in the area therefore is probabilistic, not certain. In contrast, during almost every cold event or episode in the tropical Pacific—i.e. a La Niña occurrence—below normal rainfall was reported in the area. La Niña more accurately predicts future climatological conditions than El Niño. The question, however, is whether La Niña will occur this year. The question has prompted differences of opinion.

Even computer models are sending mixed signals, with some predicting a cold weather event could begin as soon as mid July to September, while other models predict a return to normal weather. A scientist relying on the Multivariate ENSO Index reports that a strong La Niña this year is "not likely, to say the least." A recent National Centers for Environmental Prediction (NCEP) forecast states that near normal conditions in the Pacific will return in two to five months. NCEP's coupled model indicates that these normal conditions will continue through the end of 1998.

Tim Barnett of the Scripps Institution of Oceanography disagrees. The institute's Hybrid Coupled Model forecasts that El Niño will fade by mid-1998, to be followed by a cold event or La Niña in the second half of 1998.

Barnett says, "The surface water on the equator is already starting to turn cold, with some places now up to two degrees centigrade colder than long-term normal. A side view shows that there is a huge amount of cold water beneath the surface, and this cold glob is starting to break the surface now. By the end of the summer, a very strong La Niña will be in place."

Barnett says that most climate models are set to determine El Niño activities and are less accurate in forecasting La Niñas. "Our model is tuned to the whole record. In fact, it seems to do La Niñas more faithfully than El Niños."

Researchers acknowledge difficulties in accurately predicting La Niña. Whatever skills or confidence they gained from successfully tracking El Niño activities are not necessarily applicable when predicting La Niña events. Part of the reason is that La Niña is much less studied than El Niño.

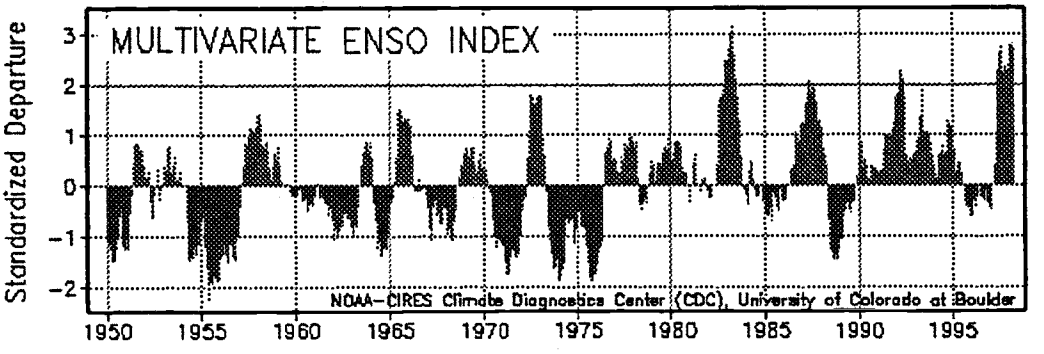
Barnett says, "La Niñas are suppose to be the opposite side of the climate coin, but there is clearly some different physics involved with La Niñas than with El Niños."

La Niña literally means The Little Girl and is also referred to as El Viejo, anti-El Niño, or "a cold event" or "a cold episode." Journalists have coined more colorful terms referring to La Niña as El Niño's little sister, and both of them as "children of the tropics."

Lewis and Clark and La Niña

The Shoshone woman Sacajawea may not have been the only female influence on Lewis and Clark's long journey. La Niña also might have held the two explores in her sway. Terry Nathan, professor in atmospheric science at the University of California, Davis, finds evidence in their journal that the winter of 1805 was a La Niña year. He noted that of the 107 days Lewis and Clark spent in Oregon, from Dec. 7, 1805 to Mar. 23, 1806, they recorded only 12 days without rain. Such abundant rainfall in Oregon during that time of year is consistent with a La Niña event.

MEI Record of El Niños and La Niñas, 1950-1998



The above figure shows the Multivariate ENSO Index for 1950 to March/April 1998. Positive values of the MEI represent the warm, or El Niño phase of the ENSO cycle, while negative values represent the cold, or La Niña phase. The figure shows the alternating nature of the El Niño and La Niña phases of the ENSO cycle, with a predominance of warm events since 1976 and a predominance of cold events before 1976.

Military Checks Out El Niño Effects

Researchers have pondered the effects of El Niño from diverse and varied perspectives: climatological, economic, agricultural, public health, etc. Not to be outdone, military researchers also have investigated the topic from their unique perspective.

In a paper titled, "El Niño-Its Far-Reaching Environmental Effects on Army Tactical Decision Aids," John Neander of the U.S. Army Topographic Engineering Center notes that El Niño's disruption of global oceanographic and atmospheric patterns "can produce short-turn weather differences that impact vested interests of the United States on the world's political and military arenas." An awareness of El Niño's exact climatic parameters would enable "strategic and logistic planners to decide what type of weapons and support material will work best in the various world theaters."

Neander is little concerned with the initial El Niño build-up in the southwest North Pacific because, "There is little immediate economic, political or strategic (military) value in these waters." Concern increases, however, as El Niño expands globally. Neander's main focus is on the Korean Peninsula because economic and agricultural problems in the area might lead to social and political conflict. If El Niño's effects in the area are not considered, "tactical decision aids for either strategic or humanitarian situations can be in error."

Neander stresses that advanced knowledge of El Niño "will allow strategic and logistical planners to be better prepared in their efforts to diffuse chaos in the world's political and military areas of tomorrow."

Good Fish'n Thanks to El Niño

Fish in some Arizona lakes are reaping a rich harvest from El Niño, and their numbers are expected to increase as a result, to the delight of Arizona anglers. Fisherman are expecting better spawning and bigger and healthier adult fish.

El Niño runoff carries added nutrients to lakes that boosts the food chain. Microorganisms such as zooplankton feed upon the nutrients, and the zooplankton in turn are fed upon by shad and minnows as well as the newly spawned game fish. The process continues as adult and juvenile game fish feed on the abundant forage fish.

A good fish spawn has long-term effects. Anglers will be reaping this year's benefits in future years as they reel in fish spawned during the present excellent conditions.

Fish (and anglers) also are benefitting from El Niño runoff in other ways. Some Arizona lakes are experiencing a "new lake syndrome." The water level of these lakes has been low for so long that vegetation grew up along the low water mark. Runoff raised the water level to flood this vegetation. The vegetation then decomposes providing more nutrient loading, thus increasing the fertility and productivity of the lake.

Lake Mead came up 13 feet last years, flooding brush and trees along the shoreline. Roosevelt Lake also is expected to fill beyond the previous high lake level, flooding established vegetation. Arivaca also is experiencing a "new lake phenomenon."

Along with supplying nutrients, flooded vegetation also provides additional cover for newly hatched fish. Their survival rate then increases.

Mixed Fire Season Blessings...continued from page 1

In the Coronado National Forest in southern Arizona, some prescribed burns scheduled for May and early June were postponed because the fuels were wet and would not burn, according to Sherry Tune, Southeastern Zone Coordinator for the U.S. Forest Service in Arizona. With fewer than normal fires reported, the Southwest Region of U.S. Forest Service became benefactor to areas much more threatened by fires. The region loaned fire crews and advisors to work at this year's hot spots, in Mexico, Canada, and recently in Florida which is experiencing a later than normal fire season. "That is the biggest effect from El Niño that I've seen in Arizona," says Tune. "Normally the Southwest is competing for resources with other regions at this time of year." Tune warns, however, that one year of above normal precipitation does not make up for several years of accumulated fuel moisture deficit.

In addition, the monsoons, which can usually be counted on to provide fire relief, may not be as reliable this year as in previous years. Some research indicates that a wet El Niño winter may mean a delayed or weaker monsoon season. This could mean less moisture this summer and an extended fire season.

Lower elevation areas are more threatened by fire danger. In the Tonto National Forest in central Arizona, El Niño rains caused an unusual buildup of grass and herbaceous fuels. Spring winds dried the fuel, and the fire danger is now rated extreme. Cool weather, however, has helped keep the number of fires in the area about normal for this time of year. Along with maintaining fuel moisture, the cool temperatures also discouraged visitors to the forest. "Cooler weather has kept people at home, and visitor numbers are down, especially at the lakes," says Tim Boss of the Tonto National Forest. This means less chance for fires to start, because about half of the fires every year are person-caused.

Vegetative growth in the Tucson area is raising fire concerns. Because of ample rains, weed and shrub growth is one to two feet above normal for this time of year in the Tucson area. Local fire agencies are alerting property owners, especially those near wildlands, of the increased fire danger.

The most serious El Niño fire danger may not occur this summer, but during following years. Researchers Thomas Swetnam of the University of Arizona's Laboratory of Tree-Ring Research, and Julio Betancourt of the Desert Laboratory, U.S. Geological Survey, show that the greatest fire danger occurs in years after an El Niño event, often during the following summer. If a La Niña event follows an El Niño, which is often the case, dry conditions likely would prevail in the Southwest, further increasing the probability of increased future fire activity.

Recent reports that the ocean is in fact cooling has prompted forecasts of a strong La Niña, possibly occurring as early as the fall. Swetnam says that given the large build up of fuel loads, if forecasts for a strong La Niña event prove correct, there is a real danger of an early and severe fire season next summer. He emphasizes the need for heightened public awareness of that possibility.

El Niños Boost Riparian Vegetation

By increasing precipitation El Niños benefit Arizona's native riparian vegetation, with actual benefits depending upon whether an El Niño causes flooding or moderate-to-heavy stream flows. The flooding of previous El Niños established new riparian growth, while the recent event helped ensure the survival of this formerly established plant life.

El Niño floods allow new generations of cottonwoods and willows to grow by clearing away competing vegetation and exposing bare alluvium. These conditions favor the germination of cottonwood and willow seedlings, in need of freshly deposited or reworked alluvium that retains moisture until seedling roots reach the watertable. Stands of cottonwood-willow forests along the Salt and Colorado rivers can be traced back to reservoir releases during the El Niño flood year of 1993.

Julie Stromberg of the Department of Plant Biology at Arizona State University explains, "By flushing salts and providing extra moisture–and supplying that moisture during spring when cottonwoods and willows are releasing their seeds–El Niño years help restore some native species in areas formerly dominated by salt cedar thickets."

Characterized by heavy stream flows, but with little or no flooding, the recent El Niño did not likely establish willow and cottonwood seedlings in river areas. Instead, by recharging aquifers and maintaining shallow groundwater levels, this event helped ensure the survival and growth of species that previous El Niños established.

Stromberg says, "By recharging the watertable the high stream flows of this El Niño further tipped the balance toward the natives and made them more competitive."

El Niños' contribution to reestablishing native riparian plant species is especially evident along the San Pedro River. According to Stromberg, "Salt cedar took root along the middle reaches of the San Pedro in the 60s and tended to dominate areas of the river during the 60s and 70s. Now, in the 90s, cottonwoods and willows are more abundant along some areas of the flood plain than salt cedar. A recovery is going on." Along with El Niño precipitation, Stromberg also credits the removal of livestock as contributing to the recovery.

The greater frequency of El Niño events of varied intensities that have occurred recently generally coincides with this new growth of riparian vegetation along the San Pedro. Stromberg's research found that prior to about 1960 summer monsoons provided most of the heavy flows to the San Pedro, with scarce winter floods occurring. After about 1960, the summer monsoon floods have been of smaller magnitude, with a greater frequency of flooding during El Niño years.

(El Niño occurrences have followed an unusual pattern during the last 20 years. Not only did more El Niño events occur during this time period than were typical during earlier periods, but one of the biggest El Niños on record, 1982-83, occurred during this time.)

Special El Niño editions of the **Arizona Water Resource** newsletter will be published during the 1997-98 El Niño season. The University of Arizona's Water Resources Research Center publishes the newsletter, with financial support from the **U.S. Geological Survey, Water Resources Division, AZ District.**

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