

With a Road Log of Junctions, Miles, and GPS Coordinates

November 2016
East to West Edition

In all, four hundred persons are said to have perished of thirst between Altar and Yuma in eight years, and this scarcely seems an exaggeration, for the writer counted sixty-five graves in a single-day's ride of a little over thirty miles. So fearful was the death toll, that...travel along this route soon ceased, and at the time of this survey [in 1895] the road had not been traveled...in sixteen years. Locally it is known as 'El Camino del Diablo' (the road of the devil) and few names are more appropriate.

David D. Gaillard, US Corps of Engineers, 1896

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Map by Lara Mitchell.

Sponsored by Friends of the Sonoran Desert, an educational non-profit citizens' conservation group.

Further Information

A visit to the Ajo Museum can answer many of your history questions, as can the Pima County Library in Ajo, Cabeza Prieta NWR visitor center, and Organ Pipe Cactus NM visitor center. For information on Native Americans, visit the Tohono O'odham Cultural Center and Museum in Topawa south of Sells. The Yuma Public Library and Arizona Historical Society at Yuma offer information and exhibits, as does the Wellton Museum.

Primary Sources:

- Bill Broyles, Gayle H. Hartmann, Thomas E. Sheridan, Gary P. Nabhan, & Mary Charlotte Thurtle, *Last Water on the Devil's Highway* (University of Arizona Press, 2012).
- Mark A. Dimmitt, Patricia Comus, & Linda Brewer, eds., *A Natural History of the Sonoran Desert* (Arizona-Sonora Desert Museum, 2015).
- Richard S. Felger & Bill Broyles, *Dry Borders: Great Natural Reserves of the Sonoran Desert* (University of Utah Press, 2007).
For the Camino region, this book features 1) a gazetteer of place names; 2) a full list of birds with descriptions by David Griffin, 3) a thorough list of reptiles, amphibians, and tortoises with discussions by Phil Rosen, 4) a grand list of mammals and descriptions by Bob Henry, and 5) an authoritative list and descriptions of plants by Richard Felger and others. The plant list is also available free at www.Phytoneuron under R.S. Felger and S. Rutman. "Ajo Peak to Tinajas Altas: A Flora of Southwestern Arizona," or at <http://cals.arizona.edu/herbarium/content/flora-sw-arizona>
- William K. Hartmann, *Desert Heart* (Fisher Books, 1989).

Other good reading:

Edward Abbey, *Cactus Country* (Time-Life, 1973).
John Annerino, *Dead in Their Tracks* (Four Walls Eight Windows Press, 1999).
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Charles Bowden, *Blue Desert* (University of Arizona Press, 1986).
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Mark Klett, *El Camino del Diablo* (Radius Books, 2016).
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Luis Urrea, *The Devil's Highway* (Little, Brown & Co. 2004).
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A Visitors Guide for El Camino del Diablo

El Camino del Diablo – the Devil's Highway – links our past to our present to our future. It connects a region's history, its ecology, its enduring places and its diverse people. In simplest terms it runs from Sonoyta, Sonora, to Yuma, Arizona, but it is far more than a road.

Before history was written in words, the road – actually more of a route – was a network of Native American foot trails going to water, fields, villages, hunting grounds, and sacred places. American Indians, primarily Tohono and Hia-ced O'odham, guided the first European explorers, padres, and soldiers across the vast and perilous desert. Padre Eusebio Kino made some of the region's first maps, applying long-used Indian names and newly minted Spanish labels to villages, mountains, and rivers. Famous among those early travelers were Kino, Jacob Sedelmayr, and Juan Bautista de Anza.

Beginning in the late 1840s streams of prospectors, lured by gold fever, traversed the region seeking their fortunes in California. In 1854, the US purchased a vast tract of land south of the Gila River from Mexico (the Gadsden Purchase), and waves of surveyors, scientists, and adventurers came to see what the "new" land was all about. The original Camino was a foot trail. Horses came in the late 17th century and wagons or oxcarts followed in the late 18th century. A motorcar first crossed the route in 1915.

Today you can drive much of the route, or walk if you prefer. In stretches, the current roadway is the same as then; in others, it parallels the old trail, or at least what was first mapped as the Camino in 1920 by the US Army Corps of Engineers. Although the drive can be made in a day, you may wish to allow 3 to 4 days for the trip and prefer the company of a second vehicle. October through April may be the most comfortable and photogenic months to visit. During summer months, the heat will limit activities by even well-acclimated visitors.

Enjoy your trip! ¡Bien viaje!

Be a safe traveler:

You must obtain a permit and register for this trip. At the same time you can learn current road and travel conditions, as well as where the flowers are blooming. Tell friends or family your plans and when you will return. Even small mishaps – a wrong turn, a dead battery, a spilled canteen, a sprained ankle, a broken spring, a missed rendezvous, a lost key – may cascade into dire consequences.

Take sufficient water, fuel, food, and shelter for warmth or shade. There are no services between Ajo/Why/Lukeville and Yuma. A person requires two gallons of drinking water per day in warm weather. Places labeled as a desert waterhole or “wildlife water” should NEVER be relied upon for water. Hundreds of people have died here thinking they could find water – do not let this happen to you.

The weather and road are unpredictable: flashfloods, mud, soft sand, jagged rocks, crippling heat, windstorms, and washouts top the list. Vehicles may fail.

Stay with your vehicle if it breaks down or gets stuck. Agents, rangers, and wardens will find you. If stranded, find shade, raise your car’s hood, use mirrors and the car’s horn to attract help. No one is stronger than the sun – people can die of thirst and heat within hours, especially children or the elderly. So can pets. By sitting calmly in shade and drinking ample water, you will survive even the hottest day.

Obey all signs, rules, and regulations. They protect you and your public lands.

In essence the Camino is a one-lane road with two-way traffic. Drive prudently. The speed limit is 25 mph and posted. In many places sensible drivers will proceed at a slower pace due to tire-puncturing rocks and stobs, spring-busting chuckholes, and deep sands or mud holes that swallow tires and axles. The route requires special caution with its many blind curves and hills – an unseen ATV or giant 6x6 water truck may be speeding toward you. Medical help is many hours away. Caution is the best policy on this road. After all, you’re here to enjoy the scenery safely.

Smuggling and illegal immigration may be encountered in this area. Avoid suspicious groups. Very, very few visitors have had any problems at all, but a potential for trouble exists.

Emergency numbers: 9-1-1.

Border Patrol: 1-877-872-7435

Interagency Dispatch: 1-800-637-9152

Operation Game Thief (Arizona Game and Fish Dept.): 1-800-352-0700

Cell phone service is spotty, unreliable, or nonexistent between Ajo and Yuma.

Epilogue

When he looked back on his own summertime trip across the route in 1861, Raphael Pumpelly delivered a grim report, cheered only by his surviving the journey alive.

In a few days we approached the worst part of the desert; the watering places became more separated and the supply smaller. Our route lay over broad gravelly plains, bearing only cacti, with here and there the leafless paloverde tree, and the never failing greasewood bush. In the distance, on either side, arise high granite mountains, to which the eye turns in vain for relief; they are barren and dazzling masses of rock. Night brought only parching winds, while during the day we sought in vain for shelter from the fierce sun-rays. The thermometer ranged by day between 118 and 126 degrees in the shade, rising to 160 degrees in the sun.

On these vast deserts the sluggish rattlesnake meets the traveler at every turn; the most powerful inhabitant, his sway is undisputed by the scorpions and lizards, on which he feeds. The routes over these wastes are marked by countless skeletons of cattle, horses, and sheep, and the traveler passes thousands of carcasses of these animals wholly preserved in the intensely dry air. Many of them dead, perhaps, for years, had been placed upright on their feet by previous travelers. As we wound, in places, through groups of these mummies, they seemed sentinels guarding the valley of death.

Yet when he returned to make the trip in 1915 with his children, three daughters and a son, he waxed nostalgic for his former days in the desert, and told readers,

The mood of the desert is never sad. It is either entrancingly smiling or terrifyingly grand; radiant in its ephemeral garb of flowers and in the golden silence of its bare plains and tinted mountains; awful at night when hell is let loose, storm rages on the heights, the cloud is alive with forked lightning and the heavens re-echo incessant thunder.... It is in the great wildernesses, on lofty heights and on desolate deserts, that one feels the greatness of Nature’s mysteries.

How was *your* trip?

among other items, abalone shell eventually used by Hohokam jewelers in south-central Arizona. Gabrieleños of the Los Angeles basin and Channel Islands traded sea shells, steatite, and other items as far east as central Arizona, generally by way of middlemen. The Kitanemuk of the western Mojave Desert traded with the Quechan along the lower Colorado River. The Cahuilla, who lived northwest of the Salton Sea, were specialized traders who visited as far east as the Gila River to obtain goods.

The first Europeans to visit Yuma Crossing arrived in 1540, when Hernando de Alarcón led a small band of sailors up the Colorado River in support of Francisco Vásquez de Coronado's expedition into the Southwest. They were surprised to learn that the local Indians already knew about Coronado's concurrent expedition in northeastern Arizona, were familiar with the Zuni, used Hopi cotton textiles, and possessed buffalo-skin robes from far away.

A parade of padres, soldiers, and settlers followed en route to explore and settle in California. Over the next five centuries, significant events at Yuma Crossing influenced the development of Arizona, the Southwest, and the nation. The crossing and the Camino del Diablo are time-honored legacies in the histories of America, Mexico, and native nations.

The Yuma Crossing National Heritage Area boasts two state historic parks, one National Historic Landmark (Yuma Crossing and Associated Sites), the Anza trail, two new riverfront parks connected by a multi-use path, 350 acres of restored wetlands, and an interpretive plaza that tells the many stories of the Yuma Crossing.

Amenities and services are available for the perfect conclusion to your drive through history. Activities include dining, hotels, pubs and night life, canoe trips, bicycle and walking trails, bird watching, river tubing, nature trails, farmer's market, and tours of the historic Army Quartermaster Depot and Yuma Territorial Prison.

Using this traveler's road log and guide:

This road log gives mileages (000.0), GPS coordinates (NAD 1983), and key junctions.

"As you go..." gives information between waypoints.

Begin from either the Cabeza Prieta National Wildlife Refuge visitor center in Ajo or the Organ Pipe Cactus National Monument visitor center north of Lukeville. Reset your trip odometer.

The trip ends at Yuma, Wellton, or Tacna, and the route in this guidebook is divided into legs:

Leg 1a: Ajo to junction of Darby Well Road and Highway 85, p. 6.

Leg 1b: Organ Pipe to junction of Darby Well Road and Highway 85, p. 7.

Leg 2: Darby Well Road to Tule Well to Tinajas Altas, p.12.

Leg 3a: Tinajas Altas to Wellton, p. 50.

Leg 3b: Tinajas Altas to Fortuna, p. 56.

Leg 4: Tule Well to Tacna, p. 68.

Leg 1a: Ajo to junction of Darby Well Road and Highway 85.

Start 0.0 miles. 32°23'09"N, 112°52'21"W. Highway 85 milepost 40.8. Cabeza Prieta National Wildlife Refuge office and visitor center on west side of highway (1611 North Second Ave., aka Gila Bend Highway). The refuge is managed by US Fish and Wildlife Service.

The office offers permits and information, and has a nature walk and small visitor center auditorium with displays and information. When built in 1980, the office was a model of energy efficiency: low sun-facing walls, special windows, efficient heating and cooling. The 30-acre parcel of open state-land next to the office was once part of the refuge and should be obtained for more visitor services, including a handicap-friendly walkway through a demonstration desert botanical garden. An expanded facility would greatly enhance the refuge's ability to offer programs and exhibits for area schools, residents, and tourists.

To the northwest is Childs Mountain, named for Ajo pioneers Thomas Childs, Jr. and Sr. Periodically the refuge offers tours to the top of the mountain and its scenic vista. The Tohono O'odham called the mountain Kavaḍ Mehidad, meaning "remains of a burnt shield," as if a burnt or blackened war-shield is lying face up.

Turn right (south) from the refuge parking lot onto Highway 85. Ajo offers your last services – gas, food, lodging – until Yuma, about 130 miles away. Always start with a full tank of gas and plenty of drinking water.

Stay on the main road – Highway 85 – as the road curves eastward at the Shell station and then bends to the south as you near the Plaza.

Mile 1.4. 32°22'21"N, 112°51'45"W. Plaza and Ajo's only stop light.

The iconic plaza is to your left, and the majestic old churches and Curley School are to the right. Ajo was founded in 1854 as a mining camp and boasted 7,000 residents in its heyday. Today the mine has closed but the community of about 3,500 people includes retirees, civil servants, and business workers. Curley School is an active, creative arts community. North of town at the end of Well Road are a country club, golf course, roping arena, shooting range, and several picnic grounds. The unincorporated town is served by the Pima County Sheriff Department, the Ajo-Gibson Volunteer Fire Department, a utility company, the *Ajo Copper News*, and many businesses. The name "Ajo" generally includes former settlements of Gibson, Clarkston, Rowood, Mexican Town, Ajo Indian Village (Indian Town), and Old Ajo.

Small amounts of copper from Ajo were used by Native Americans for pigment or ceremonies, and O'odham showed these minerals to an 1847 American expedition that included Tom Childs, Sr., who reported rediscovering



As you go.... Mile 41.7: A second leg of the Colfred landing field triangle. On right is a remnant of a once vigorous jojoba field, an oil-rich bean grown in 1980s-1990s for cosmetics and special industrial oils. The demand did not meet expectations. As you've probably already noticed, the largest jojobas are roadside. Rainfall in this area is about 3 to 4 inches a year.

As you go.... Miles 42.0 to 42.5: Notice that creosotes are slowly reclaiming a fallow jojoba field, but it will take many years for the ground to become natural desert again.

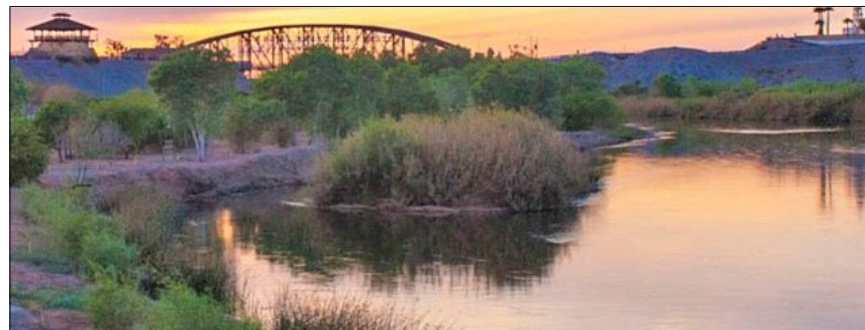
Mile 45.5. 32°41'30"N, 113°57'11"W. Tacna interchange: County Road 40E and Interstate 8 (also Highway 80). Paved road 40E is 40 miles east of Yuma. The town of Tacna north of the interstate and railroad offers fuel, food, and lodging. Turn east on I-8 for Gila Bend, Phoenix, Tucson. Turn west for Yuma, El Centro, San Diego, and Los Angeles.

For the first time in our lives, perhaps, we had spent five almost noiseless days, viewed miles of uninterrupted scenery, untouched, uninhabited, unwanted because of one thing, the lack of life-sustaining water.

Dorothy Childs Hogner, *Westward, High, Low and Dry*

Special note:

Yuma Crossing National Heritage Area (32°43'43"N, 114°36'56"W. 201 North Fourth Ave, Yuma).



Regardless of whether you return by way of Tacna, Wellton, or Fortuna, you may wish to complete your trip with a visit to Yuma Crossing, where early travelers crossed the unpredictable Colorado River and modern travelers enjoy water sports, historical buildings, dining and hotel accommodations.

Because of a favorable place to cross the Colorado River and raise crops, this area – homeland of the Quechan – was a hub of Native American activity and trade. Abalone shell was brought from the Pacific coast to people living in what are now Phoenix and Tucson, and other goods flowed back and forth. The Colorado River tribes traded with Pacific coast and inland tribes, receiving,



received the 2015 Director's Wes Henry National Wilderness Stewardship Awards for group and individual work.

Cooperative projects include establishment of a regional weather network with remote, self-reporting stations providing temperatures, wind speeds and directions, soil moisture, and precipitation in real-time. Sonoran pronghorn are being restored back to viable herds by captive breeding and releases beyond their current range – this noble effort includes agencies in Mexico. Researchers also are seeking ways to reduce the spread of invasive species, to understand ancient peoples, to monitor water quality at game waters, and to understand landscape changes, including those generated by military training, Border Patrol operations, and illegal border crossings.



Mile 39.6. 32°41'38"N, 113°51'00"W. KEY JUNCTION. Turn west (left) to reach Wellton and I-8. Be cautious cresting hills – oncoming traffic is blind.

This intersection is locally known as Buster's Pole, for Border Patrol agent Walter "Buster" Hummel, who successfully apprehended a group of smugglers here at night, despite high-centering his blacked-out vehicle on a well-casing pole that once stood bumper-high in the center of the roadway. The pipe was later cut to ground level, with a section being mounted onto a plaque for Buster.

As you go.... Miles 39.7, 40.1, or 40.6: The road crosses dunes that can be enjoyed by children of all ages. On a windy day you can watch ripple waves form and feel the power of wind-driven sand, though the dune as a whole is relatively stationery.

To the northeast you may notice a knob-like peak called Mohawk Peak. Its O'odham Indian name, Kuswa Toob Do'ag, means "twisted neck mountain" for its resemblance to a headless chicken or bird.

As you go.... Mile 40.3: A "forest" of crucifixion thorn trees (*Castela emoryi*).

In many places this road has become a de facto riparian zone with larger, denser vegetation and more habitat for birds and other animals.

Mile 41.3. 32°41'38"N, 113°52'46.1W. Note large open area of Colfred runway along both sides of the road, one leg of a triangle-shaped airfield built for training military pilots in WWII. A number of these auxiliary fields dot the Southwest. This one is now private property. The name comes from a nearby railroad siding named for Colonel Fred Crocker, treasurer of Southern Pacific Railroad in 1881.

ore here, and later his son Tom Jr. was instrumental in opening larger mining operations. Big-time open-pit copper mining began with the arrival of John C. Greenway in 1911, but ended in 1985. Copper production totaled 6.3 billion pounds from low-grade ore (average 0.8%). The Ajo mill and smelter, including its landmark smokestack, were dismantled in 1995-1996.

Ajo's name probably comes from the O'odham word for the desert onion (*Allium macropetalum*, a small, native onion with a garlic-like flavor), although some believe it is for the Ajo lily (*Hesperocallis undulata*) or the O'odham term o'ohon (or, au'auho) for the red oxides and green carbonates used as mineral dyes.

A Hia-ced O'odham village southwest of town was called Moik Vavhia (soft well). The Hia-ced O'odham are western cousins of the Tohono O'odham (The Desert People) – if you came from Tucson you have just traveled through the Tohono O'odham Nation. The name "Hia-ced O'odham" means "The Sand People" because these people lived in the dry, sandy region of southwestern Arizona and northwestern Sonora, including the region along the Camino del Diablo.

Mile 2.9. 32°21'58"N, 112°50'21"W. Continue on highway.

A side road goes eastward to Burro Gap, aka Pipeline Road. A natural gas pipeline from Casa Grande to Ajo was laid along this route in 1936 to fuel the smelter and town. Mountains on the eastern horizon include the Pozo Redondo Mountains, Sikort Chuapo Mountains (also spelled Sikortjüupo, meaning "round tank"), and the Saucedo Mountains, including the distinctive Coffee Pot Mountain.

Mile 3.9. 32° 21'21.5"N, 112° 49'37.5"W. KEY JUNCTION: Darby Well Road and Highway 85. Highway milepost 44.6.

Turn right (southwest) onto unpaved Darby Well Road (aka Bates Well Road or Scenic Loop). The wide roadside is a good place to pause and reset your odometer.

Paved Highway 85 continues to Why, Organ Pipe, and Lukeville, and Highway 86 goes to Sells and Tucson. Turn to page 12.

Leg 1b: Organ Pipe to junction of Darby Well Road and Highway 85.



Start: Mile 0.0. 32°57'13.8"N, 112°48'00"W. Organ Pipe Cactus National Monument visitor center. Milepost 75.2.

Re-set odometer to 0.0. Restrooms and drinking water are available at the visitors center, along with information, publications, and displays. Permits for the Cabeza Prieta and Goldwater Range are

not available here, but can be obtained in Ajo at the Cabeza Prieta office, 1611 North Second Avenue.

Your last gas, food, lodging, or reliable cellular service from here to Yuma are at Lukeville, Why, or Ajo. Head back to Highway 85.

Mile 0.1. 31°57'14"N, 112°48'00"W. Junction with Highway 85. Turn north (left).

The National Park Service (NPS) manages 84 million acres of federal land in order "to conserve the scenery and the natural and historic objects and wildlife therein, and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations." NPS administers more than 400 sites, including national parks, monuments, historical sites, memorials, battlefields, wild and scenic rivers, seashores, preserves, trails, recreation areas, and a dozen other designations.

Mile 2.8. Tillotson Peak wayside overlook and parking on east side of highway. The peak is the summit of the Diablo Mountains (3,374 feet) and named for Minor R. Tillotson, a National Park Service regional director during 1940s and 1950s. The Diablo Mountains, the small but spectacular and rugged range immediately west of the Ajo Mountains, were formed when a massive block of rhyolite faulted off of the main Ajo Range. It can be argued that the Tillotson segment merits its own name, or that both are really just part of the Ajo Mountains.

As you go.... Miles 3 to 8: Organ Pipe radio 1610 AM provides information on camping and activities in the park. In 2016 the National Park Service celebrated its 100th anniversary.

Twenty-two miles of Highway 85 through the park have been designated a Scenic Roadway by the Arizona Department of Transportation because of its visual, historic, and cultural significance, as well as providing a memorable visual impression, being free of visual encroachment, and forming a harmonious composite of visual patterns. Much of the Sonoran Desert ecosystem can be seen from the road itself and has been set aside for preservation. The geology seen from the road features splendid rock formations in the Ajo Mountains, Diablo Mountains, Puerto Blanco Mountains, and Bates Mountains. Looking north you can see the Little Ajo, Pozo Redondo, and Growler mountains.

State Route 85 itself is also a historic road, and has been recognized as part of the Historic State Highway System. The roadside displays a multitude of desert plants including saguaro, creosote, mesquite, ocotillo, brittlebush, cholla, prickly pear, and, of course, organ pipe cactus. After a wet winter, you may see a riot of color: gold poppies, blue lupines, pink owl clover, and yellow brittlebush. In late spring, yellow, white or orange cactus flowers offer their own spectacle.

This scenic roadway does have a Camino del Diablo connection, for it roughly parallels a route taken by some miners traveling between Ajo and Yuma beginning in 1854 when Andrew B. Gray and Peter Brady surveyed a railroad route from Texas to the Pacific Ocean. Along the way, the survey party



partnership of several dozen agencies that meet at least three times a year to discuss common issues and shared projects. Members include state and federal agencies, municipalities, and tribes, as well as Customs & Border Protection and the Arizona Game & Fish Department. Other groups such as Friends of the Sonoran Desert, Defenders of Wildlife, Sierra Club, Humane Borders, and Arizona Desert Bighorn Sheep Society regularly attend, and the public is always invited. The Goldwater Range plays a crucial role in national defense and the state's economy, and its use of the land is authorized by Congress, with renewal of the "lease" coming up for approval again in 2025. More information will be forthcoming on the Range website.

The Goldwater is America's third largest military reservation, and one of the most complicated to manage. It sits on the border of a foreign country with migrants from around the globe trying to cross the border illegally,



sometimes smuggling drugs or contraband. The region's population is booming, and citizens press for recreation on the Range. Endangered species must be protected. The military flies a wide range of missions here from bases near and far, complicating coordination of the airspace. And, the climate is changing, affecting everything from the plants and animals to the flying operations. There seem to be a million moving parts and concerns.

However, the military operation here is highly successful, in large part due to cooperation and help from its neighboring agencies, such as National Park Service, US Fish and Wildlife Service, Bureau of Land Management, Border Patrol, and Arizona Game and Fish Department. The Range is a model of collaboration and efficiency. In fact, in the most recent recognition of these



partnerships the Goldwater Range was awarded the 2016 US Fish and Wildlife Service Military Conservation Partner Award for working closely with its range partners to "provide exemplary landscape-level stewardship for diverse and rare natural resources including three federally protected species: Sonoran pronghorn, lesser long-nosed bat and acuña cactus." The National Park Service at Organ Pipe



A study by researchers Richard Felger and Dale Turner identified 122 species of seed plants, representing 95 genera and 35 families in the 19,000-acre Mohawk Dune Field and its immediate surroundings. The dunes (including interdune swales) support 78 species. The adjacent non-dune habitats (sand flats and playa) support 109 species, of which 43 were not found on the dunes. Of these

dune annuals, 53 species (84%) develop during the cool season. While no plant taxon is endemic to the Mohawk region, there are 8 sand-adapted dune endemics: dune cryptantha (*Cryptantha ganderi*), dune spectacle-pod (*Dimorphocarpa pinnatifida*), bugseed (*Dicoria canescens*), saw-toothed ditaxis or Yuma ditaxis (*Ditaxis serrata*), big galleta (*Hilaria rigida*), Emory's indigo-bush (*Psoralea emoryi*), Schott's wire-lettuce (*Stephanomeria schottii*, for Arthur Schott, artist on the Emory boundary survey of 1854-1858), and fanleaf crinklemat (*Tiquilia plicata*). Two non-native species in the dunes, Sahara mustard (*Brassica tournefortii*) and Arabian grass (*Schismus arabicus*), pose serious threats to the dune ecosystem.

If the day is warm or you have small children, you may choose to wait until Miles 39.7, 40.1, or 40.6 for a much easier chance to stand atop a dune – you will drive over them.

Mile 37.4. 32°40'04.1N, 113°49'48.4"W. Unusual tree right next to the road. Meet



Castela emoryi, one of three aridland species commonly called crucifixion thorn. The spines are exceptionally stout and the tree is drought resistant. The seeds do not fall far from the parent tree, so these trees grow in clusters miles from others of their species. From a distance they resemble "strange" paloverdes. Look for shrikes posted on top branches. Named for William H. Emory, who led the American team that surveyed the US-Mexico border beginning in 1854.

Mile 38.4. 32°40'46"N, 113°50'27.6"W. Goldwater Range northern boundary. The military has your safety in mind. Obey all warning signs.



You may have seen few or no other people on your visit across the Camino, but many people, agencies, and organizations pay close attention to it. Foremost is the Goldwater Range Interagency Executive Council, a

collected mineral specimens from Ajo with hopes of developing a mine there. The Arizona Mining and Trading Company was formed, and some of its employees as well as supplies for the mine came by horseback on the Camino from Yuma to Sonoyta, then north to Ajo, using tinajas at Wild Horse Tank and Alamo Canyon that are east of Highway 85. George Kippen, a special messenger for the company during 1855-1859, took this route several times, and in his diary reported frequent trips by wagon or pack mule from Sonoyta to Ajo carrying food, especially flour, and driving cattle for beef. Eventually the company decided that the Camino was too dry and dangerous, so it elected to transport supplies and ore along Jaeger's Wagon Road from Ajo to the Gila River near Stanwyx, and then to Yuma.

Mile 9.7. 32°05'29"N, 112°46'29"W. Alamo Wash and road. Continue straight to reach El Camino. Turn east (right) for Alamo Canyon and campground.

Take a look at Alamo Wash. It looks peaceful enough, but during the summer monsoon of 2012 monument employees and visitors witnessed two major flood events in larger canyons of the Ajo Range. The first occurred on August 16 when 2.3 inches fell in early afternoon west of Tillotson Peak, joined by 2.8 inches in Alamo Canyon in mid-late afternoon. During the second and larger event that peaked on September 10, flood waters at both the culvert at mile 66.5 and the bridge at Alamo Wash overtopped Highway 85, leaving several sections of backcountry road impassable. This flood was the culmination of six continuous days of rain in the Ajo Range, which began on September 6 and lasted until September 11.

Flood waters in Alamo Wash scoured a large expanse of the adjacent floodplain and uplands, removing large trees and saguaro cacti that were hundreds of years old. A substantial portion of the flow overtopped the Alamo Wash floodplain and flowed through a pass in Tillotson Ridge and into the wash at mile 66.5 on Highway 85. Arizona Geological Survey and US Geological Survey researchers calculated the total discharge at 17,600 cubic feet per second. For the Alamo Wash basin, there is a 0.2% probability that this would occur in any given year (also known, somewhat misleadingly, as a 500-year flood; however, this does not mean this type of flood occurs at regular 500-year intervals, just that it is a relatively rare event on human time scales).

Imagine the wash briefly turning into a river the size of the Colorado River flowing through the Grand Canyon! Can you imagine a string of river rafts or dories coming down Alamo Wash? Desert flooding can be almost unimaginable when looking at a dry arroyo, but evidence of past flash-flooding is everywhere around us. Flash floods usually subside within hours, so if the road is blocked by running water, your best bet is to park on high ground and enjoy the show.

Mile 12.3. Ajo Mountain wayside overlook and parking on west side of highway. No facilities. The large Valley of the Ajo, extending to the north and west, is bounded by fault block mountains and filled to an unmeasured depth by sediments from the surrounding mountains.

The Ajo Mountains feature high peaks and deeply cut canyons sculpted from rhyolite, andesite lava flows, and tuffs at least 2,000 feet thick. These

block-faulted volcanics formed in the mid-Tertiary orogeny, 36 to 17 million years ago. The higher elevations support many "sky island" relict plants that were more wide-spread in cooler, wetter Pleistocene times, before the advent of the Sonoran Desert beginning about 10,000 years ago. These include roseberry juniper (*Juniperus coahuilensis*), littleleaf mulberry (*Morus microphylla*), scrub oak (*Quercus turbinella*), and Sonoran Desert rosewood (*Vaqueria californica* var. *sonorensis*). Here the Hia-ced O'odham collected wild tepary beans (*Phaseolus acutifolius*) and hot peppers called *chilitipines* (*Capsicum annuum* var. *aviculare*). These and other native foods can be tasted at Desert Rain Café in Sells, Arizona.

The knob-headed Montezuma Peak, a sacred place for the Tohono O'odham, who call it Monchisum (Montezuma) or 'Oks Dak ("place where a woman is sitting"), can be seen to the northeast.

Mile 17.1. 32°12'02"N, 112°45'34.4"W. Organ Pipe northern boundary. Entering BLM lands.

Mile 17.3. Border Patrol check-point. Agents intercept people and contraband that cannot legally enter the US. The Customs and Border Protection agency combines the roles of the Border Patrol and Customs departments to enforce laws involving immigration and importation. In the 1930s agents like Jeff Milton and Ed Ketchum literally camped with their bedrolls beside the road and flagged cars down.



Mile 19.8. Bridge over Gunsight Wash. Picnic area with tables. Camping west of the highway on BLM land, but no facilities.

Three-quarters of a century ago the Border Patrol office was shaded by the ironwood tree at the bridge. And in 1915, during the throes of the Mexican Revolution, Venustiano Carranza emerged as the political leader of Mexico, forcing Pancho Villa and his rebels to retreat. "As a result of that victory...", writes Kirk Bryan, "450 Villistas crossed the boundary near Ajo. Charles Puffer, as justice of the peace, with the help of Messrs. [Ruben] Daniels and [John] Cameron, arrested the whole 450 as disturbers of the peace and menace to the peace and safety of the town of Ajo. They were held until on the arrival of immigration inspectors, they could be duly admitted to the United States." Bryan undoubtedly heard this story first-hand, for Charles Puffer was his assistant on the survey of water resources in southwestern Arizona.

Mile 21.7. 32°15'56"N, 112°44'23"W. Community of Why. Also called Rocky Point Junction.

Gas and food are available, with camping at Coyote Howls Campground and RV Park. At junction of Highway 85 with Highway 86 to Tucson, go straight

we got there. They were El Salvadorans. Before they got to the dunes we found a woman and two kids. And then we found another woman in the dunes later on. It was an all-day thing, and we worked into the night and then into the following day before we found her. I don't remember now if it was three or if it was just two women, but it was too many."

And Border Patrol has rescued many people here. In the words of Joe McCraw, who was raised in Wellton and retired as head of Wellton Station, "I loved the Patrol. Best job I ever had. Some people said I was working too hard out here, but I was just having fun. The thrill is tracking 'em up before they die. It's a rough ol' way to go -- run outta water in this desert." His story and those of other agents from the Tacna-Wellton Station are featured in the book *Desert Duty: On the Line with the U.S. Border Patrol* (University of Texas, 2010).

As you go: Miles 25.7 to 26.5: Note changes in the look of the creosote flats: smaller bushes mixed with more ratany, bursage, cholla, big galleta...and rodent burrows. If you're seeing rodent tracks with a tail line behind the feet, the best guess is a kangaroo rat. And if you're seeing rodent tracks, you may spot the distinctive S-loops of the sidewinder rattlesnake.

As you go: Miles 26.5 to 27: Note fewer creosotes in the flats, and many more big galleta and bursages. And some barrel cactus have appeared. What changed?

Mile 29.2. 32°34'23"N, 113°44'32"W. Mohawk Dunes. A cool-weather hike east to the edge of the nearest dune is about ¼ mile and another 1 mile to the crest. Rodents here include round-tailed ground squirrels and kangaroo rats, plus a variety of birds, snakes, and lizards, including, a sand-loving lizard, the Yuman



Desert fringe-toed lizard (*Uma rufopunctata*), which dives into soft sand and "swims" underneath to hide from predators or escape heat. Its body is streamlined and it has large feet and "fringed toes" that allow it to run on its hind feet across the sands up to 15 mph. Researcher Dale Turner found that the lizards' diet included 65 taxa of arthropods

(ants, beetles, spiders) from 39 families, along with the leaves, seeds, and buds of 13 plant species. The lizards live among creosotebushes, white bursages, big galleta, and other dune plants. Its name derives from Fort Yuma, from where natural history specimens were shipped in the 1880s, and *rufopunctata* for its pattern of rust-colored dots.

Mile 32.0. 32°36'19.9"N, 113°46'24.6"W. Rescue beacon and a good place to park for walking ½ mile east to the dunes and another ¾ mile to the crest (distances are one-way). Get acquainted with specialized dune flowers like primroses, sand verbena, Ajo lily, and sand loco weed (*Astragalus insularis*). Sand for the dunes comes from the Gila River.

As you go.... Miles 18.5 to 19.5: Watch for black-tailed jackrabbits (*Lepus californicus*). Jacks are hares, precocial mammals, that are born furred and seeing, plus they can hop within a few hours of birth. The other rabbit you've seen on your trip is the desert cottontail (*Sylvilagus audubonii*), a true rabbit, born blind, naked, and helpless. Jacks prefer open terrain and rely on their amazing speed and leaping ability to escape predators, while cottontails are quick but prefer dense brush for cover.

As you go.... Miles 19.5 to 20.5. Cryptobiotic crusts act as a living skin for the desert. Dark patches between creosotebushes on both sides of road are communities of algae, moss, tiny invertebrates, cyanobacteria, and fungi. Together they help retain moisture in the soil, add nutrients for plants, and reduce erosion. A free USGS book on cryptobiotic soils is available on the web if you search "A Field Guide to Biological Soil Crusts of Western U.S. Drylands" by R. Rosentreter, M. Bowker, and J. Belnap.

Solitary trees growing among these creosote flats look conspicuous. In warm seasons watch for desert iguanas (*Dipsosaurus dorsalis*), a lizard that eats plants including creosote leaves and flowers as well as insects and carrion. Both triangle leaf and white bursage mingle along the road.

As you go: Mile 20.6. Mohawk Mountains stand straight ahead (north). As you drive north you can start to see the tan line of sand dunes along the mountain base.

Mile 22.3. 32°29'31.5"N, 113°40'50.3"W. Mohawk junction. A Border Patrol drag road running east and west is used to track tire and foot prints of smugglers and border crossers; rescue beacon. A provisional campsite, especially if arriving in the area at night.

As you go.... Miles 24.5 to 25: The broad area to the west, nicknamed The Punch Bowl, is a large plain rimmed by mountains where military pilots have trained since 1940. Pilot Barry M. Goldwater, who helped lay out the Range in 1940, later became a US senator, and the Range was renamed for him in 1986.

Many border-crossing migrants have died in the flats where shade is scarce and their last drink of water may have been days ago. Agents remember the chases but take the fatalities personally, as did agent and retired station chief Glen Payne, who recalled, "The worst was when we found women and little children, about five and seven years old. That's probably the worst day of my life right there. It was on a Sunday, and we had cut their tracks across the Big Pass Drag. They were headed for Mohawk Pass on the interstate. Whenever we saw those little bitty tracks, we knew that we had something of urgency here and that we had to find them. It worked out that they were deceased by the time



ahead (north) toward Ajo, unless you wish to try your luck at the Tohono O'odham Nation casino a short distance southeast of the junction.

The name reportedly arose from a common question fielded by local businesswoman Peggy Cater: "Why live here?" as well as a pun on highway "why" or "Y." "Why" has been used since about 1965. Anthropologist Henry Dobyns notes that the O'odham word for deer is the homonym "huawi," and desert mule deer do inhabit this area. Coyote Howls is the English equivalent of the O'odham name Ban Hi:nk. Why is also home of a famous laundromat: "Why Wash," leading to existential questions like the "Why Senior Citizens" highway marker and the "Why Not" store.

Mile 22.4. US Border Patrol's Ajo Station. Built in 2012, it sits on 30 acres and provides nearly 54,000 square feet of administrative and detention space for 500 agents as well as parking, equipment, repair stations and a helipad. 850 North Highway 85, Why, AZ 85321-9634. Phone: (520) 387-7002. The station's area of responsibility encompasses over 64 miles along the international border and nearly 7,000 square miles of land – roughly the size of Connecticut and Rhode Island combined. In contrast to today's operation, the 1987 station consisted of 25 agents and in the 1930s the Ajo office had only two agents covering the same area.

Much of the Ajo Station's operational area lies within environmentally sensitive or protected lands including the Organ Pipe Cactus National Monument, Cabeza Prieta National Wildlife Refuge, Bureau of Land Management, Barry M. Goldwater Range, and Tohono O'odham Nation. The building was designed and constructed with energy savings in mind. Solar panels supply roughly half of the station's electrical needs during daylight hours, due in large part to natural lighting that greatly reduces the need for daytime lighting. A highly efficient lighting and air-conditioning system also reduces operating costs, demonstrating Border Patrol's commitment to being good stewards of the environment. Ajo Station's advanced technologies has earned it a "Gold Certification" from the United States Green Building Council, under the Leadership in Energy and Environmental Design (LEED) program. The Station was constructed at a cost of \$28.5 million.

Illegal border crossers commit to several days of foot-travel in a rugged, inhospitable, and perilous desert. Because of the remoteness, a large portion of the area must be patrolled on foot, by horse patrol, ATVs, motorcycles, aircraft, and drones. Agents combine age-old arts of sign-cutting and tracking with modern ground sensors and night vision equipment. Through a combination of



personnel, technology, and infrastructure, the Ajo Border Patrol Station continues to apprehend smugglers and undocumented immigrants. Agents rescue many migrants from heat and thirst.

Because migrants or agents may suffer injuries, heat stress, and illnesses, Border Patrol created a special unit of agents trained as Emergency Medical Technicians

(EMT) who are skilled in rescue techniques. Called BORSTAR – for Border Patrol Search, Trauma, and Rescue – these agents are posted in the field and can respond to remote locations much sooner than urban ambulances or paramedics. BORSTAR agents have even delivered babies.

Miles 23.2, 25.0, and 27.0. Memorial crosses along the highway. These usually indicate the site of a highway fatality and are tended by family and friends especially on All Souls Day (Day of the Dead, or Día de los Muertos), November 2 of each year. Sites may include crosses, mementoes, shrines, and candles. The Spanish term is “*cruz de memoria*,” and they can be found throughout the Southwest. In his book *Beliefs and Holy Places*, historian Jim Griffith points out that the tradition was brought from Spain by Catholic padres more than three centuries ago.

Mile 23.5. Note several crucifixion thorn trees (*Castela emoryi*) along the highway. They resemble paloverde trees with super-stout spines and clusters of seeds that remain on the plant for several seasons before falling to the ground.

As you go.... Miles 24 to 29: Unlike what some newcomers expect, the desert here is neither monotonous nor barren. Sections of nearly pure creosote stand along the road, but in a mile or two become mixed with mesquite trees or threaded with washes lined by trees and shrubs.

Mile 29.8. 32° 21'21.5"N, 112° 49'37.5"W. KEY JUNCTION: Darby Well Road and Highway 85. Highway milepost 44.6.

Turn left (southwest) onto unpaved Darby Well Road (aka Bates Well Road or Scenic Loop). The wide roadside is a good place to pause and reset your odometer. Check your gas gauge for the 130 miles of jeep trail ahead.

Paved Highway 85 continues northwest to Ajo (gas, food, lodging) and Gila Bend.

Leg 2: Junction of Darby Well Road and Highway 85 to Tinajas Altas.

You can't see anything from a car; you've got to get out of the ... contraption and walk, better yet crawl, on hands and knees, over sandstone and through the thornbush and cactus. When traces of blood begin to mark your trail you'll see something, maybe.

Ed Abbey, *Desert Solitaire*

Mile 0.0. 32° 21'21.5"N, 112° 49'37.5"W. KEY JUNCTION. Darby Well Road to Bates Well and Yuma.

Take a moment here to double check that your gas gauge reads “full,” your tires have air, and the ice chest is stowed for a bumpy ride. No services from

Mile 17.1. 32°25'06.3"N, 113°40'12.8"W. Northern boundary of the Cabeza Prieta National Wildlife Refuge. Northbound travelers are entering the Goldwater Range, and southbound travelers must check-in at the Cabeza Prieta kiosk. You may find a reasonable campsite here, especially after dark. Structures on the hill to the east belong to the US Marine Corps.

Examine creosotes carefully. You may see the creosotebush grasshopper (*Boottettix argentatus*), the desert clicker (a grasshopper with the name *Ligurotettix coquillei*), the creosotebush katydid (*Insara covilleae*), a creosote bush walkingstick (*Diapheromera covilleae*), and a green jumping spider – all of them cryptic, green-colored, and living primarily within creosotebushes. Oh, and you may spot a green-colored praying mantis. Green coloration helps them hide among the leaves, but they also find moisture and food and can reproduce there.

You may already “know” the desert clicker, though you may not have been sure what kind of “bug” it was. The desert clicker is conspicuous because of the loud, seemingly incessant clicking sound it makes, plus when seen, it quickly slips around to the other side of a branch, playing hide-and-seek with you. Other common desert grasshoppers include the pallid-winged grasshopper (*Trimerotropis pallidipennis*) and horse lubber (*Taeniopoda eques*). And in the sands below a creosotebush you may find solpugids, scorpions, geckos, and a variety of insects.



Following rains you may see the sand come alive with vivid “red velvet mites” (family *Trombididae*), about the size of a pea. Because they live underground and appear as if by magic, they are known regionally as “sand babies.” They are harmless and beautiful. Too, on your trip you may have noticed fuzzy red, orange, white, or yellow-colored “ants” scurrying across the ground. They avoid people but are attractive. Some jokester may encourage you to pick one up and hear its faint “squeak,” but these are not ants –

they are wingless wasps (family *Mutillidae*) that pack an eye-opening sting. Foremost on the pain scale is the large “tarantula wasp” (genus *Pepsis*), orange and black hunters that feed on other insects, particularly caterpillars, and on the nectar of milkweeds. They lay their eggs in tarantulas paralyzed by their sting. One insect expert, Justin Schmidt in his book *The Sting of the Wild* (2016), rates the pain of the tarantula wasp’s sting at the top of the scale, alongside the bullet ant of the South American jungle, but fortunately tarantula wasps ignore people unless pestered.

Mile 17.4. 32°25'23N, 113°40'07W. Point of the Pintas. Campsites north and south of hill west of the road. A traditional spot to watch the sunset.

An administrative Border Patrol trail running eastward is closed to public vehicles.

Mile 11.3. 32°20'03.8"N, 113°39'39.5"W. One of the largest ironwood trees on the refuge stands close by the road.

Several species of hard to identify "little brown birds" use the roadway habitat during the year. They seem to conspire against identification, though the suspects are many, including: black-tailed gnatcatchers, Bewick's wrens, house wrens, and the challenging sparrows such as Cassin's, white-crowned, chipping, Brewer's, black-throated, sage, and vesper, and house finches, all flying ahead of our cars to further confuse us. And to make matters worse, in winter they may all flock together. Valleys in this region are home to a large portion of the US population of Le Conte's thrashers, and you may spot cactus wrens, horned larks, and an occasional greater roadrunner. Near rocky terrain and trees you may spot an ash-throated flycatcher, Say's phoebe, loggerhead shrike, or verdin.

The Le Conte's thrasher may be new to you. These birds have a long, strongly-curved beak that they use to 'thrash' the soil and ground litter as they search for arthropods to eat. Good field marks for this species are its long beak, long tail and overall pale color. If the bird fleeing from you has a long tail, is nearly the color of the desert sand, and appears as if it would rather run than fly, then it may be a Le Conte's Thrasher. Scientists and conservationists are concerned about the future of Le Conte's Thrasher, which is only found in the arid deserts of Arizona, Nevada, California and Mexico. Human development has decreased the distribution of the species, particularly in southern Arizona and southern California. Climate change may push the birds toward the limits of their physiological tolerance. Currently, the wide, sparsely-vegetated valleys traversed by the Camino contain some of the densest and most viable populations of this species in the United States. Please do your part in helping to conserve this unique bird by treading lightly across its habitat.

Mile 13.0. 32°21'32"N, 113°39'57"W. Administrative trail to North Pinta Tank, a water tank constructed in 1951 for desert bighorn. It is a 1.9-mile (one-way) stroll to the tank. Red-tailed hawks hunt here, and keen-eyed observers may see an occasional golden eagle soaring above any of the region's mountain ridges. Northern harriers cruise low over the creosote flats, while Cooper's hawks and sharp-shinned hawks hunt the canyons and wooded arroyos. Prairie falcons prefer cliffs and canyons.

As you go.... Miles 13.4 to 15: Notice differences in size between creosotes next to the road/wash and those beyond. Along the wash we find more and larger creosotes and a fuller variety of smaller plants due to the extra runoff. In turn, a wash provides a richer habitat that can support more species of wildlife due to more forage, shade, and protection, especially in the paloverdes, mesquites, and catclaws.

Mile 15.1. 32°23'20.9"N, 113°40'10.9W. One of the largest blue paloverdes on the refuge stands beside the road. The past decade has been drier and warmer in this region, killing or stressing a number of large trees.

here to Yuma; 130 miles of bad road lie ahead. Reset odometer. Make sure that you have your Cabeza Prieta range permit and that you check in by phone with Goldwater-West to give them your permit number. The Goldwater number is on the back of your permit, but Darby Well Road may be your last reliable phone connection.



Black Mountain (3,008 feet), standing to left of the road ahead, is an eroded remnant of a basaltic volcano that once covered a much larger area. The horizontal banding is due to differences in hardness between the basalt flows and softer tuffs that have been tilted and faulted. The brown-black color tinged with

red is typical oxidation and weathering for such rocks. Also called Darby Mountain and Ko'okomadmam, which is O'odham for "belonging to blue paloverde" that grow abundantly along the arroyos around the mountain.

The New Cornelia Mine's rock dump to the right is its own mountain, made of rock that once sat atop the ore deposits. In fact, three mountains were leveled to dig the pit, a hole that now is 1,100 feet deep and varies from 1¼ to 1½ mile in diameter. East of Ajo, tailings from the crushed and processed ore were pumped as slurry across the highway and settled in ponds on top of the enormous pile, now made even taller by a cap of mine rock "paving" the top to prevent the dust from blowing away.

WWI ace Frank Luke, Jr., worked a few summers at the Ajo mine before enlisting as a pilot in the Army. He flew a Spad XIII and became America's second-ranked ace with 18 air victories – 14 balloons and 4 aircraft – to his credit before being killed in battle in 1918. Known as "The Balloon Buster" for his prowess at downing observation balloons, a more difficult target because they were heavily defended by anti-aircraft fire, he was awarded the Medal of Honor. Luke Air Force Base, which manages the Goldwater Range-East, was named for him, but the border community of Lukeville was named for the related Charles Luke family who bought 67 acres here in 1920 and later sold it in 1960.

Mile 1.8. 32° 20'22"N, 112° 50'58"W. KEY JUNCTION. Darby Well Road and Scenic Loop Road. Bear straight ahead. Road to right continues the Scenic Loop around the mine and returns to Ajo.

At one time a community of Hia-ced O'odham lived around the wells. Respect private properties and fences along the road.

As you go.... Miles 2.2 to 12.2: Land from here to Organ Pipe is administered by the US Bureau of Land Management (BLM) for multiple use, including recreation. BLM allows camping on these lands and no permit is required, although all vehicles must stay on designated roads and trails. Driving in washes is prohibited. BLM also provides an RV camping area near Gunsight Wash at Highway 85. BLM's phone number is inside the front cover of this guide. The nearest BLM office is in Phoenix.

The BLM manages 247 million acres of federal land in order “to conserve, protect, and enhance fish, wildlife, plants and their habitats for the continuing benefit of the American people.” This means managing land for multiple uses, including grazing, mining, coal and oil leases, timber harvesting, and a wide variety of recreational activities. BLM also administers the National Landscape Conservation System, that features 873 special areas and approximately 32 million acres of national conservation areas, wilderness areas, wild and scenic rivers, national scenic and historic trails, and national monuments such as Sonoran Desert National Monument near Gila Bend. The agency also administers 700 million acres of subsurface mineral rights across America.



Mile 2.6. 32°19'48"N, 112°51'29.6"W.

Locomotive Rock and photo point directly ahead. Distinctive fanglomerate rock-formation whose silhouette from certain directions resembles a small, old-time railroad locomotive with flared smokestack.

As you go.... Miles 3 to 12.2: These desert lands were once ranched by the John W. Cameron family that came to

Arizona in 1880. John and his sons drilled wells in the Ajo area (including Valentine, Lower, Adobe, and Bandeja wells). About 2005 they amicably retired their grazing allotment, taking cattle off the range, and today Jeff Cameron maintains wells for wildlife water, especially the imperiled Sonoran pronghorn. Fences have been removed in coordination with the National Park Service and the US Fish and Wildlife Service. At one time the Cameron's leased allotment included land and wells within the Cabeza Prieta refuge as well as BLM land. Historically the allotment totaled about 144 sections (144 square miles), and the ranch headquarters was in Ajo, where the family continues to live.

Mile 9.1. 32°14'24.7"N, 112°52'53.3"W. KEY JUNCTION. Large reverse Y junction. Bear left (south). Road to right (southwest) goes to Bandeja Well and Lime Hill.

Note many small washes supporting paloverde trees (both *Parkinsonia florida*, blue paloverde, and *P. microphylla*, foothills paloverde), wolfberries (*Lycium* spp.), and other shrubs, with creosotebushes, ocotillos (*Fouquieria splendens*), and ironwood trees (*Olneya tesota*) on the ridges. In spring these washes are abuzz with native bees and other pollinators.



Creosote is sometimes called greasewood, though that name also applies to other shrubs in the West, including chamise, desert broom, spiny greasebush, snakeweed, and seepwood. Creosote is not the source of the wood preservative creosote, which is a petroleum byproduct. Creosotes range



Mile 6.4. 32°16'38.2"N, 113°41'38.9"W.

Christmas Pass. Narrow spot in the roadway – use caution. Route rough-hewn out of bedrock by Dan Drift for his re-supply trips to Wellton and he finished on Christmas day.



Mile 6.5. 36°16'39"N, 113°41'33"W.

Christmas Pass campground. No facilities, but sizeable parking and beautiful vista, especially at sunset when distant mountains glow orange and red. Scramble on rocks or investigate plants on the slopes.

Sierra Pinta is to the east. Its mid-range contact line between lighter colored granite to the north and darker gneiss to the south is obvious.

Mile 8.7. 32°17'45.4"N, 113°40'01.4"W. Junction. Go straight ahead (north). Rescue beacon and administrative trail to Heart Tank.

Note soil layers, root systems, and abandoned rodent burrows in erosion banks along roadway. Heart Tank is a natural perennial tinaja on the west slope of Sierra Pinta, 0.7 mi northwest of the range's summit (BM Pinta, 2,950 ft). Heart was named for its heart shape when full, and it was Padre Kino's Aguaje de la Luna (Water Trough of the Moon – he arrived at night), which he visited and gratefully used in 1699.

As you go.... Miles 8.8 to 9.6: The road parallels and at times merges with Mohawk Wash. Big galleta grass (*Hilaria rigida*) thrives along wash, taking



advantage of extra moisture in road soil, and to both sides of the roadway are nearly pure stands of creosote and bursage. A favorite hunting ground for kestrels. The Indians of this region seldom used horses when they became available, because horses or other livestock require feed and water, both in short supply out here. Early padres, soldiers, travelers, and surveyors commented on the lack of feed and rejoiced when they found patches of

big galleta, seasonal grasses, or paloverde and mesquite beans. Those of us longing for the good old days should remember what it was like catching and saddling horses each morning, hitching the wagon, or packing our worldly belongings on mules, all on top of finding food and water for them. Little of this valuable grass grows in the flats above the road.

Mile 4.5. 32°15'15.0"N, 113°40'58.7"W. Closed administrative trail to Senita Tank, now suitable for walking.



The wildlife water built for bighorn sheep in 1957 is at **32°15'24"N, 113°40'35"W**. A lone senita cactus (*Lophocereus schottii*) was reported east of the Drift Hills and is namesake for the game tank. In Organ Pipe Cactus National Monument senitas prosper in a basin near the border, but few others are found in the park or in the refuge, though they are common south of the border. The senita vaguely resembles an organ pipe cactus, but it has fewer flutes (ribs), thicker stems, and mature individuals have hoary gray bristles near the branch tips.

Smoke trees (*Psoralea spinosa*), blue paloverdes, mesquites, and others trees and shrubs line the wash creating photogenic and rich habitat. Distance from junction to wash is about ¼ mile one-way, then walk up or down wash to your heart's content. The tank is about ½ mile one-way – follow old trail east and then north into the canyon.

Olga Smith, who once lived in a ramshackle camp northwest of here, wrote of her own arroyo,

*I walked in the garden often these last days, preferably alone,
and looked lovingly at my clumps of brittleweed, my fine beds
of desert holly, my borders of paper daisies and desert
marigolds. Fresh, after the autumn rains, the plants seemed
to be putting forth their best efforts, now that I would be
walking among them no more. Here, tended by unseen
hands, grew plants equal to any in a botanical garden. They
seemed to flourish for me alone, just as the birds seem to
sing for me alone. There was no one else to see them, just as
there was no one else to hear the birds sing.*

Mile 4.7. 32°15'23.0N, 113°40'58.7"W. Site of Dan Drift's camp, dating to 1940s. Little remains. The Drift Hills are east and north of road. Dan was one of many WWI veterans who found solace and peace in the desert – some might call him a hermit, but he also lived in the Wellton area, prospected, did odd jobs, raised a family, and mentored a Boy Scout troop. We're reminded of world-traveler Raphael Pumpelly, who having a special affinity for this desert, wrote,

*Few can resist the spell of the desert or willingly neglect its
call in the stress of ills of body or of soul. The geologist [WJ]
McGee, in the extremity of nervous breakdown, sought and
found new life on the Old Yuma Trail.*

And we believe that Dan Drift did too.

from the Great Basin Desert of Nevada to southern Argentina; and they are common to all four North American Deserts: Sonoran, Chihuahuan, Mojave, and Great Basin. The species here is *Larrea tridentata*. Norwegian ethnographer Carl Lumholtz learned to love creosote, writing,

*To me the greasewood is a symbol for health and an example
of cheerful existence under adverse circumstances.... It may
be compared to a person radiant with health and good cheer,
for which he is liked, though he may not be handsome. Were
I a poet, I should sing the praise of the modest greasewood of
sterling qualities.*

And naturalist Gary Nabhan wrote a book called *The Desert Smells Like Rain*, honoring the bush's sublime and unforgettable fragrance, particularly following rain showers. Creosote is a keystone species, one on which many other species depend.

Mile 12.2. 32° 12'01"N, 112° 54'20"W. Organ Pipe Cactus National Monument boundary.

Its headquarters is five miles north of Lukeville and the Mexican border. Camping is available near the visitor center, with primitive camping at Alamo Canyon. Managed by the National Park Service, the monument was established in 1937 and embraces 330,687 acres, with 95% of that being federally designated Wilderness Area.

The monument is a member of the UNESCO biosphere reserve system, placing it alongside internationally renowned biological, geologic, and historical wonders of the world such as Yellowstone, Grand Canyon, Denali, Big Bend, Rocky Mountain, and 41 other U.S. national parks. The designation highlights a park's natural and cultural resources as well as the people and communities around the park, so that the park can be managed in a wider context and be a good neighbor. Problems such as air pollution, threatened species, and even climate change affect the park and communities alike. The program, sanctioned by the United Nations Educational, Scientific, and Cultural Organization (UNESCO) and run by the US Man and the Biosphere Program (MAB), has proven successful over the past 40 years. Each nation retains sovereignty and jurisdiction over its own sites. Biosphere reserves highlight three very different, but equal, aims: conservation of genetic resources, species, and ecosystems; scientific research and monitoring; and promotion of sustainable development in communities of the surrounding region.

Also, Organ Pipe is a sister park for El Pinacate and El Gran Desierto de Altar Biosphere Reserve immediately south of Organ Pipe. Their staffs work together to increase and share information, and to conserve resources, such as protecting Sonoran pronghorn and fighting invasive weeds. A model for sister parks is Waterton-Glacier International Peace Park that has worked successfully since 1936 on the US-Canada border.

As you go.... Miles 12.6 to 13.3: In the distance to the southeast you may see traffic on Highway 85. In the terrain between here and there, 13 migrants from El Salvador died from thirst and heat in July 1980 and another 32 children,

women, and men were rescued by Border Patrol agents and park rangers after a frantic search. The event is recounted in the book *Escape!* by Aron Spilken, who presumed that “People who did such work must be harsh and insensitive.... What I found instead were public-spirited people with a difficult job.... Certainly the desperate energy that [the agents and officers] invested in saving the Salvadorans’ lives could only have come from a certain nobility of spirit.” Imagine being an agent searching this landscape to find men, women, or children who do not want to be found or who are totally exhausted by heat and lying immobile under a bush. Their death may be only hours away. Can you find them in time?

Mile 14.5. 32°10’55”N, 112° 55’38”W. Growler Pass. At times the road is rough and rocky, showing bedrock. In the hills to the north are nearly a dozen prospect holes where old-time miners tried to find their fortunes but found nothing of commercial value. The pass separates the Growler Mountains to the north and Bates Mountains to the south.

As you go.... Miles 14.6 to 15.2: Cholla forest with several species of cholla, including many chain-fruit cholla (*Cylindropuntia fulgida*), whose hanging fruits are a staple food of Sonoran pronghorn. Native peoples have used the buds of several species of cholla as a nutritious food for a very long time. Wendy Hodgson answers many of your questions in her book *Food Plants of the Sonoran Desert* (2001).

Mile 15.1. 32°10’56.8”N, 112°56’40.8”W. Rescue beacon. These beacons allow migrants and persons lost in the desert to summon help from Border Patrol. In some places civilian humanitarian groups, such as Humane Borders, provide water stations where migrants will find a blue barrel of emergency water.

In spring, this is a favorite area for kestrels and phainopeplas, especially in ironwood and palo verde trees.

As you go.... Mile 15.3 to 16.0: Scarface Mountain to the north. In the southern Growler Mountains to the west are several mine adits and caves that provide shelter for bats, including the fruit- and nectar-eating lesser long-nosed bat (*Leptonycteris curasoae yerbabuenae*) that may fly as many as 60 miles a night in search of food, especially flowers and fruit of saguaro and organ pipe cactus. Along this stretch you may also notice a number of places where abandoned trails or off-roading incidents are being restored by NPS to replicate the natural habitat.



As you go.... Miles 16.1 to 19.1: Growler Mountains to the north. These rugged basaltic mountains extend about 25 miles to the north-northwest. Their distinctive western escarpment contrasts with their more gently sloping eastern side, and makes for dramatic photographs.

Las Playas and the Gila River north of Tacna. Sometimes called the Cabeza Prieta route, it left Las Playas and headed north across the Pinta Sands to Heart Tank. From there it went west to Cabeza Prieta Tanks, a set of tinajas secluded in a side canyon northeast of Cabeza Prieta Peak. Then travelers pushed north to Baker Tanks, known on old maps as La Tinaja or La Tinaxa, south of Baker Peaks. Their final push was north to the Gila River, which promised not only water but forage for their horses. Kino took this route several times, as did others, for it was a safer route with shorter distances between reliable waterholes. The gold-fevered 49ers preferred the more direct but riskier route from Tule Well to Tinajas Altas and on to Yuma.

Mile 0.0. 32°13’35”N, 113°44’59”W. Tule Well. Take road northeast.

Emergency water may be available at Tule Well from a spigot at the storage tank fence, but it is not approved for drinking, and even when boiled its saltiness makes poor coffee.

Mile 0.2. Big washes like this one are important habitat for a variety of wildlife, as well as home to a variety of trees and shrubs. The wash provides values for wildlife, such as a travel corridor and bird nesting habitat; it functions as shade, food, and a hospitable microclimate with cooler temperatures and higher humidity, perhaps even providing water in short-lived pools.

As you go.... Miles 0.6 to 1.8: cinder flats with occasional desert pavement populated by ocotillo, creosote, saltbush, saguaro, palo verdes, and seasonal desert sunflowers, and devil’s spineflower. A stroll across the flat will reveal many more seasonal flowers, including purplemat (*Nama demissum*) and Mojave desertstar (*Monoptilon bellioides*).



Mile 2.1. 32°14’23.2”N, 113 °43’06.0”W. Picturesque smooth peaks to right (east) of road. The basalt flows, tuffs, and agglomerates in this area are Miocene age. These graceful rocks deserve an official name.

As you go.... Mile 3.0: Distinctive mountain of tilted rock layers straight ahead (east).

As you go.... Miles 3.5 to 4.4: colored hills and old mining claims marked by cairns and test holes. The claims in the next few miles include the Halo Group, Last Chance, High Grade, Gold Johnny, Leona, Mary, and finally Dan Drift’s Mine (that’s its name) and his Dart & Kart (aka Tillie Pat). Imagine a campfire where we could ask these old-timers about their diggings and dreams. What an evening that would be! Most of these claims gathered enough ore to file a claim, but not enough to file a production report.

through the sandy habitat of the flat-tail horned lizard (*Phrynosoma mcallii*), an endangered species. The Marine Corps is very protective of this little lizard, and unless you're asking to do KP or 50 pushups, you should be too. The lizard, named for Col. George A. McCall (U.S. Army) who collected the type specimen in the 1850s, has a small home-range in the Sonoran Desert. Although well adapted to heat and sands, it is threatened by off-roading, cities, and farms overrunning its habitat.

It is specially camouflaged from predators with side fringes that eliminate shadows in the open desert – it is kind of a stealth lizard, like the F-35 that “conceals” itself from radar. Too, different populations can match their bodies to local soil or rock using a combination of color-creating cells, including black melanophores and red chromatophores in the upper layer, scattered over a layer of reflective white iridophores. For food, they prefer ants, which they catch with a flick of their tongue and swallow without chewing. Apparently they are immune to the stings of ants, but they coat each ant with a protective mucus as they swallow them. Too, they eat other small insects and they drink dew or rainwater, though they excrete semisolid uric acid and do not urinate. Horned lizard motifs appear in the pottery, baskets, and rock art of many Southwest Indian tribes.

Mile 6.3: Drive north 6.9 miles to Goldwater Range boundary at sign A (32° 37'35.7"N, 114°24'35.3"W). This is the intersection of Foothills Blvd. and 56th Street.

Mile 10.5: From boundary, drive north 2.7 miles on paved road to Interstate 8.

Congratulations! You have survived El Camino del Diablo. Yuma or Bust! You're almost there.

Leg 4: Tule Well to Tacna

Reset odometer at Tule Well.

The winter sun was bathing the desert in its golden warmth the day we left and the brittlebush by the cave camp was a mass of yellow bloom. Everything was saturated in that dry, radiant warmth – a warmth that only the desert knows. As we heaped the last of our belongings in the truck, as we climbed in our usual places, I beside Dad on the seat, Cap behind on the canvas-covered load – as the truck carried us down the trail and we turned our backs to the brush shade, to the battered tent, to the friendly boulders that had sheltered us so long, I knew that I was leaving my real home. And I knew just as surely, that some day not too far away, I was coming back.

Olga Wright Smith, *Gold on the Desert*.

This leg loosely approximates the popular route used a century or more ago when travelers afoot or horseback connected three major waterholes between

Mile 16.2. 32° 10'11.8"N, 112° 57'06.1"W. T-junction. Gate to Bates Well and ranch. Turn left to visit the ranch or turn right to continue your trip.



The first of several wells here was dug about 1880, and different families ranched here over the years, with the Robert L. Gray family running cattle in the monument from about 1919 to 1978. The buildings are fine examples of pragmatic desert ranch architecture. Be cautious of honeybees in and around the buildings.

On seasonally pleasant hikes along Growler Wash and into Growler Canyon, watch for mule deer and javelina. A few mountain lions roam from north of Ajo to the border, using the Growler, Bates, and Puerto Blanco Mountains as home. The Bates Mountains are volcanic, consisting of layered and eroded basalts.

The O'odham name for Bates Well is Juñi Kaachk (“place of ripe saguaro fruit”) indicating a favorite area to harvest the nutritious fruit that was also used in ceremonial drinks.

Mile 16.9. 32°10'17.6N, 112°57'49.6"W. Viewpoint of Kino Peak to the south.



Named for Jesuit padre Eusebio Kino who in the late seventeenth and early eighteenth centuries traveled the route now called Camino del Diablo. Believe it or not, there is a “secret” hiking route to the summit (strenuous all-day hiking plus some scrambling), but if you reach the summit, you'll enjoy a grand view and likely see desert bighorn sheep or at least their fresh tracks and scat.

Mile 17.0. 32°10'19"N, 112°57'58". Growler Mine site. Only photos remain.

Optimistic miners once worked the hills here digging shafts trying to find gold, silver, or copper. Little or no profit was reported but many stocks were sold to distant investors. Ore from the mine ran 20% to 40% copper, with its silver going 100 oz. to the ton, or so investors were told. The Growler site included about



73 acres and four claims: the Copper Hill, Yellow Hammer, Copper Flat, and Daisy. Growler at one time featured a boarding house, three boilers, an Ingersol-Rand air compressor, and two steam hoists.

First worked by Frederick Wall who named the mine after his friend, John Growler, the mine consisted of several claims and workings, primarily the Growler and Yellow Hammer. By 1916 the mine reached peak population and production under leadership of George H. Morrill, but by 1917 production ceased. Until the claims were sold to the National Park Service in 1957, a series of miners – including Bert Long, Charles Greer, and John Cameron – tried to restart operations, but they were thwarted by high costs, rising groundwater in the shafts, and low market prices for ore. The Arizona Bureau of Mines estimates all years of production from the Growler claims totaled 12,000 pounds of copper, 2 ounces of gold, and 200 ounces of silver with a sum value of \$2,000.

Water was available at the nearby Bates Well, but a heavy flow of water in the mine – about 300 gallons a minute – was encountered at 117 feet, leading to flooding and the perpetually expensive problem of pumping it out. At one time a crew of 25 men used the mine shaft water as their only water source, but its taste and potability were dubious. A mining engineer who appraised the claims in 1956 wrote, "Certainly the purity of the water from the old mine workings would be questionable. It probably has a small copper content which might be mildly poisonous, as well as the essence of rotting mine timbers and perhaps the bodies of a few smugglers and bootleggers who have long used such mountain fastnesses along the Mexican border."



Bert Long's mine, 268 feet deep, produced a respectable amount of copper. The Yellow Hammer, 250 feet deep, seems to have been the richest copper shaft with a mineralized fault vein, one to five feet wide. Long claims 43 tons of 50% copper ore were shipped in 1917. Long had about three or four tons of high grade ore and about 50 tons of low grade ore on the dump. The Daisy claim was little more than disturbed ground with no production. The Copper Flat was no mine at all, but was the plot where Long sometimes lived in his 24 feet x 55 feet, three-room adobe home with a sheet-metal roof.

Mile 43.3. Fortuna Boulevard and Interstate 8 interchange. Many stores and services. Add air to your tires if needed.

Congratulations! You have survived El Camino del Diablo.

Alternate route to the west

Mile 0.0. 32°31'25.3"N, 114°20'52"W. KEY JUNCTION. At A-6 take road to left (west) that goes to Foothills Blvd. and Yuma. This is an easier but less scenic alternative to the route via Fortuna Mine (for Fortuna Mine, continue straight north at sign A-6).

At A-6 turn west (left). Drive 3.6 miles to A-4, and turn north (right) on dirt road that becomes Foothills Boulevard. Junction A-4 is at **32°31'25.5"N, 114°23'34.5W**. Route passes over small gravel hills and minor dunes, and past patches of desert club cholla, creosote flats with many ocotillos, and several closed trails to active do-not-enter military sites. The gravel hills may indicate river bars in the ancient Colorado or Gila rivers. The road parallels a power line except for a brief 1.2-mile stretch when its wires mysteriously go underground.



This alternate route crosses landscape more like what early travelers would have faced – it is unlikely they would have gone by way of Fortuna Mine because there is no water that way and the road can be quite rocky. Early maps of the area show El Camino del Diablo Oeste (West) angling northwest from here roughly in a bee-line to Yuma Crossing, where parties could ford the river or board ferries for a fee. Make a point to visit the historic district and riverfront of Yuma.

Speed limit is 25 mph – use caution for horned lizards and other desert critters. This may not look like home to us, but it's all they've got. This road is



Mile 30.8. Sign B-4. Junction. Take the road to north (straight ahead). Road to west (left) angles to Foothills Boulevard.

Mile 31.1. Sign B-3 and trail to northwest. Continue north.

Mile 31.4. Sign B-2 and trail to the east. Continue north.

Mile 32.6. Sign B-1. Continue north.



Mile 33.6. 32°37'35.9"N, 114°22'31.2"W. Goldwater Range northern boundary. Corner of 56th Street and South Ave 15E. Sign post B. Take paved road north to the highway.

Mile 34.8. Golf course and ponds.

Mile 35.8. 32°39'37.3"N, 114°22'31.3"W. South Frontage Road and South Avenue 15E. Go west (left) to Foothills Boulevard and Interstate 8 interchange.

Mile 37.2. 32°40'02.1N, 114°23'55.4"W. Fortuna Wash and bridge. Many early travelers probably followed Fortuna Wash to the Gila River.

Mile 37.6. 32°40'02.9"N, 114°24'21.5"W. Historical marker and city street named El Camino del Diablo. Marker reads:



El Camino del Diablo (The Devil's Highway). Early day route from Sonora to California over the path taken by Father Eusebio Kino in 1700 when he sought to discover if California was part of the American mainland. The parched desert along this route has claimed hundreds of lives, particularly during the California Gold Rush of 1849.

Mile 37.9. Foothills Boulevard and Interstate 8 interchange. Few services. Continue straight (west) on frontage road or Interstate for Fortuna Boulevard and services.

Eventually the water pumps proved too expensive to run, and operations ceased. A watchman named Ziegler was hired to guard the Growler. His diet consisted almost entirely of oatmeal mush and canned milk, and he made periodic trips to buy supplies in Ajo by walking there and back again while pushing a wheelbarrow. He refused rides from passing cars.

It's a pleasant walk to the top of the hill with a rewarding vista. Along the way you'll meet an array of chain-fruit cholla, saguaro, and ocotillo.

Mile 20.0. 32°09'42.6"N, 113°00'44.4"W. An example of head-cutting erosion; as the road bed erodes, land on uphill side also erodes, submitting to running water. Kino Peak is to the southeast.

As you go.... Miles 20.1 to 22.1: This is Sonoran pronghorn country.



These fleet-footed animals prefer open spaces and a variety of foods including chain-fruit cholla buds and spring forbs. An international task force of agencies and dedicated biologists has teamed in a heroic effort to help this endangered subspecies rebound from 21 animals in the US in the year 2002 to nearly 400 hundred today. Pronghorn resemble antelope, but are classified as a unique family (Antilocapridae) within the order

Artiodactyla (even-toed ungulate mammals). These are *Antilocapra americana sonoriensis*.

Turnaround or stopping points are available every mile or two for your driving convenience. Watch out for approaching traffic, including heavy trucks and road graders, along this single lane roadway.

Mile 20.9. 32°09'22.4", 113°01'36.0"W. Growler Wash may look insignificant, but it can flow or flashflood several times a year, usually during summer thunderstorms. It is fed by Cherioni Wash (with headwaters in the Diablo Mtns), Alamo Wash (from Ajo Mtns), Cuerda de Leña Wash (from Pozo Redondo & Little Ajo mtns), and Kuakatch Wash (from Ajo Mtns & Gunsight Hills).

Excellent place to closely view blue paloverdes (*Parkinsonia florida*), velvet mesquites (*Prosopis velutina*), desert willows (*Chilopsis linearis*), desert broom (*Baccharis sarothroides*), catclaw acacia (*Senegalia greggii*, formerly *Acacia greggii*), California threefold (*Trixis californica*), and various vines, plus a variety of birds, as well as find shade for yourself and bathe in desert fragrances.

As you go.... Miles 21.3 to 22.0: The road is being eroded by traffic and running water, creating a ditch. You can help reduce erosion by keeping your vehicle on the road. Resist driving on the berm unless necessary. When turning around, utilize one of the pullouts available along the way, or make a three-point or T-turn as if you are pulling into or backing into a parking lot stall and then returning the way you came.

And you will come upon freshly smoothed stretches of road. This is the handiwork of a Border Patrol agent diligently “dragging” the road so that agents can “read” the road for foot or tire prints of smugglers or migrants crossing the road. The dragging may benefit you by smoothing out the road’s washboard corrugations, but its real-life-and-death purpose is to rescue migrants and catch criminals. Agents request that when possible, drive the ruts, not the smooth “chalkboard” or the berms. Dragging is done at 3 to 5 mph, and requires hours of work.



Note the exposed root systems of various plants. Most desert plants stand in shallow soil atop rock or in deep but relatively dry soils. Even the mighty saguaro’s roots are shallow, spreading widely but seldom deeper than 4 inches so that they can benefit from even light rain. Saguaro’s do have short taproots about 2 feet deep that help anchor them, but they may be toppled by high winds, especially if

the soil is moist. Rainfall from an average rain may percolate only a few inches into older or caliche-layered soils, favoring plants with shallow roots such as bursages and chollas. Rain infiltrates deeper into younger or sandy-gravelly soils, allowing creosote to extend its roots deeper, though its shallow roots allow it to persist in drier soils, too. Woody desert plants may survive by dropping their leaves when stressed (drought dormancy), while cactus rely on moisture stored in their pulp to carry them through dry times between rains.



Mile 22.1. 32°08'47.3"N, 113°02'31.8"W. This dense plant community includes ratany (*Krameria* spp.), which is semi-parasitic on the triangleleaf bursage (*Ambrosia deltoidea*). You may also find several queen-of-the-night cactus (*Peniocereus greggii*) and an assortment of shy springtime flowers, such as desert chicory (*Rafinesquia neomexicana*) and desert pincushion (*Chaenactis stevoides*).

Mile 22.2. 32°08'43.8"N, 113°02'38.8"W. KEY JUNCTION. Intersection with Pozo Nuevo Well road and route to Tinajas Altas. Go straight (southwest) for your Tinajas Altas adventure. Road to left (southeast) goes to Pozo Nuevo, Quitobaquito, and Lukeville.

Attentive visitors have seen Sonoran pronghorn in the creosote flats of this area.

Mountains ring this broad Growler Valley: Agua Dulce Mountains to the south-southwest, Granite Mountains to the northwest, Growler Mountains to the north, and Bates Mountains and Kino Peak to the east.

is now withdrawn from all mining. For further information on the mine and its geology, try “Geology of the Fortuna Mine, Yuma County, Arizona,” a 1999 open file report (97-16) by the Arizona Geological Survey. The site is eligible for listing in the National Register of Historic Places.

Continue north at B-7 for Yuma.

Mile 27.4. Sign B-6. Campsites to the west on overlook.



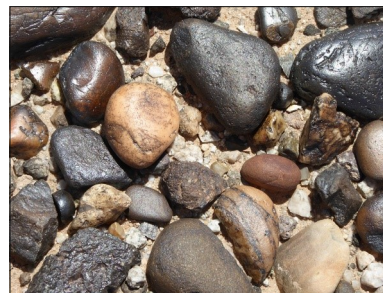
Mile 28.3. Two fascinating desert phenomena are obvious along the road. One is desert varnish, a natural process where a thin, shiny coating is formed on exposed rock surfaces by an interaction of microbes with clay, oxidized manganese, and oxidized iron over many millennia. The second is desert pavement, a natural flat stony surface that may be many tens of thousands of years old.

Mile 29.3. Out of the mountains and into washes. Though it is difficult to believe while standing in the heat on parched ground, these rocks have been eroded, rounded, and moved by running water over several million years in floods, debris flows, and at times live streams. Note road-cuts that show layers of similar-sized rocks several feet deep.

Mile 29.4. 32°34'23.6"N, 114°21'59.3"W. Sign B-5 and trail to the west. Continue straight.

Mile 30.0. Big wash with big trees.

Mile 30.4. Flats of “varnished” rocks, chemically darkened over time with a natural patina. Many of the smaller rocks have been tumbled and rounded by running water or wave action, and are not sharp edged. How could that be? The Gila Mountains, once much larger, are block-faulted and are typical of mountains in the Basin and Range Province.



Within the past 5.5 to 4.5 million years, rifting and subsidence created the proto-Gulf of California and Salton Basin as well as a shallow inland sea that reached as far

as modern Phoenix, Arizona, and Las Vegas, Nevada. It surrounded the Tinajas Altas and Gila mountains, which have since risen relative to sea level. So “way back when,” you could have camped along the western flank of these mountains and enjoyed a sunset at the beach.

Mile 26.8. 32°33'11.0"N, 114°20'04.2"W. Center of Fortuna Mine complex. Sign B-7. Site of mining company's general store, which also housed offices. A two-mile interpretive trail invites you to explore a unique gold mining town, brought to life through informative signs with historical photos.



The Fortuna gold mine in the northwestern Gila Mountains operated intermittently from 1893 to 1926, employing 80-100 workers during its peak. Workings consisted of two inclined shafts, one 1,100 feet deep, the other 359 feet deep, with lateral work at various levels. The lode's quartz vein ran through Pre-Cambrian schist and gneiss intruded by granite, amphibolites, and numerous dikes

of pegmatite and aplite, all of which have been heavily faulted. The original production shaft was located on a low hill – called Mill Hill – about 250 feet southwest of the main vein outcrop and was inclined 60° to N034E (degrees clockwise from north). The fence around the shaft was placed there a few years ago to protect visitors from falling in and to keep vehicles from being pushed in for insurance claims or because they had been stolen. They were hard to get out!



Charles D. Lane, principal developer of the mine, bought it in 1896 when he was also a major stockholder in the Harquahala (or Bonanza) Mine near Salome, Arizona, which was running out of ore at the time. Most of the mining crew at Harquahala was transferred to the new mine at Fortuna, where the company built the mill and laid a four-inch water pipeline more than 12 miles to a well on the Gila River's flood plain near Blaisdell. Living conditions were primitive and temporary; it was a mining camp, not a mining town with amenities, schools, and churches.

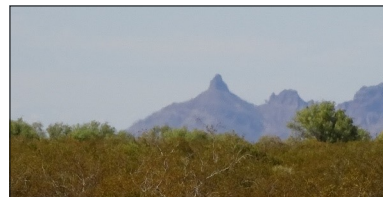
Turn east (right) at B-7 to see more of the Fortuna site. On the slope to the east stood a 20-stamp mill operated by steam-power, and a 100-ton cyanide plant treated the tailings. Native wood, especially ironwood trees from Woodcutters

Canyon, was burned for fuel. Total production amounted to \$2.6 million, or 124,239 ounces, with almost all of that occurring between 1896 and 1904. One novel feature at the mine was the use of three water catchments – cisterns,



really – that harvested rain runoff, stored it in sumps in abandoned drifts, let it purify by putrefaction over several months, and then served it for use. The largest "water catch" held 15,000 gallons when full.

The depleted mine workings partly filled with groundwater and in 1929 the shafts were caved at the surface. The land



The cone-shaped Sheep Peak stands far to the north, just west of the main Growler Mountains escarpment. It has been used as a guide post for travelers walking to Charlie Bell Well, and it can be seen from Interstate 8.

Mile 22.8. 32°08'30.4"N, 113°03'15.9"W. Rescue beacon. Although migrants may have walked a day or two from the Mexican border to reach this spot, others have walked much farther. One woman walked all the way from Honduras, an eight month trek. In summer, people on foot can die within a few hours in the open desert, even if their canteen is not empty. Heat exhaustion and heat stroke are very real threats here. From 1981 through May of 2016 the Pima County Medical Examiner's office confirmed 334 migrant deaths in this region. That breaks down to 153 in Organ Pipe, 77 in Cabeza Prieta, 38 in Goldwater-West, 10 in Goldwater-East, and 56 on BLM lands in the Ajo area. A running tally and additional information is at <http://www.humaneborders.info/>.

As you go.... Miles 23.3 to 24.3: The nearly pure stands of creosote may appear monotonous, but seasonally these flats throb with a variety of colorful flowers, especially in nutritious soil around the bushes. What is there without creosote?

Mile 24.8. 32°07'50"N, 113°05'08"W. Cabeza Prieta National Wildlife Refuge



boundary and Boundary Camp, a Border Patrol forward operating base. Visitors must obtain a permit beforehand and then sign in at the kiosk, which is about 100 yards west of the tall tower. Permits are available at the Cabeza Prieta visitor center in Ajo, the US Air Force Auxiliary Field south of Gila Bend, the Marine Corps Air Station in Yuma, and at BLM offices in Phoenix. The permits are free and allow access to both the Cabeza Prieta National

Wildlife Refuge and parts of the Goldwater Range. Visitors must notify the Goldwater Range before each visit there; contact numbers are on the back of the permit. Permits are required because of special hazards and regulations on the refuge and range. Do not touch, handle, or disturb unexploded military ordnance or any other military equipment or items, including shell casings.

Created in 1939, the refuge covers 860,010 acres with about 93% being Wilderness. It is administered by the US Fish and Wildlife Service. In 2014 the Cabeza Prieta celebrated its 75th anniversary. The US Fish and Wildlife Service manages 150 million acres of federal land "to conserve, protect, and enhance fish, wildlife, plants and their habitats for the continuing benefit of the American people." This mission includes managing 560 wildlife refuges, managing

migratory birds – especially waterfowl, restoring fisheries and wetlands, and protecting endangered species.

The refuge endorses the Leave No Trace ethic, with its seven point creed: 1) plan ahead and prepare, 2) travel and camp on durable surfaces, 3) dispose of waste properly, 4) leave what you find, 5) minimize campfire impacts, 6) respect wildlife, and 7) be considerate of other visitors.

Be careful with campfires, for the refuge has suffered wildfires in the past, particularly 2005. In most years there is not enough dry plant fuel between shrubs, cactus, and trees to carry a fire very far. But in exceptionally wet years, open spaces may fill with new plants, and when they dry out, a fire can sweep many miles. Cactus and most desert plants are not adapted to fire, which is of grave concern because invasive plants like buffelgrass are adapted, resprouting vigorously after fire and providing heavy stocks of fuel for future fires. Another invasive, Sahara mustard, reseeds easily, sprouts early, and suppresses native winter annuals by dominating light, water, and soil nutrients, and it too can carry fire. Native annual plants have declined where this mustard is thriving.

The designated Wilderness Area begins 100 feet from the centerline of the roadway. Public vehicles are required to stay within 50 feet of the centerline; law enforcement vehicles may enter the Wilderness in special or emergency circumstances. The refuge has some administrative trails in the Wilderness, but these are for official use only; no public vehicles are allowed and even official traffic is monitored. An administrative trail for law enforcement officers can be seen heading north into the Growler Valley, and an administrative trail goes south to Agua Dulce Pass.

Boundary Camp, so called because it is on the boundary of Organ Pipe and



Cabeza Prieta, operates around the clock. Since construction of this base and Camp Grip, as well as the vehicle barrier along the border, the number of vehicles used for smuggling has been greatly reduced. The tall

tower provides electronic observation of the border area as well as communications, and it is part of Border Patrol's network of stationary and mobile observation devices, including drones.

As you go.... Miles 25.0 to 30.0: Pilot training.

Since 1941 the Growler Valley has been a flight corridor for student military pilots on the Barry M. Goldwater Range, which has long been one of the nation's most important training ranges because of its extensive size, year-round-flying weather, few operational limitations, and close proximity to military air bases. Some specified areas of the Goldwater Range are open to the public by permit; all other areas are off-limits due to safety risks. On old maps the range may appear as Williams or Luke gunnery range. Barry M. Goldwater was an Army Air Corps officer who helped set the range's boundaries in 1941 and

Mile 22.4. Raptor nest in saguaro west of road.

Mile 23.1. **32°30'22.8"N, 114°20'23.9"W.** Junction A-7. Continue straight ahead. Side trail goes east to a rescue beacon.

Miles 23.4 to 23.6. Gravel flats here are fairly bare, with ironwood and palo verde trees in small runnels.

Mile 24.2. Administrative trail west to "Bootleg." No public access.

Mile 24.4. **32°31'25.3"N, 114°20'52.0"W.** MAJOR JUNCTION. Sign A-6. Sign shows Camino del Diablo going west (left). Continue straight (north) for Fortuna Mine. Or for a smoother but less scenic trip to Yuma, take road to west as described in Alternate Route below (see page 67). Fortuna road is rocky and rough.



Mile 24.6. Road narrows and becomes rocky, giving it the feeling of a real backcountry road. Bare rocky slopes add scenic look when contrasted with lush growth along washes.

Mile 25.4. **32°32'11.1"N, 114°20'47.7"W.** Sign A-6-A. Tricky turn: go left at tip of rock ridge – do not go east (right) into open area.

Note distinctively bedded rocks. The Gila Mountains have a very complex geology, beginning with the many faults and intrusions into the Mesozoic gneiss



and schist in the north and granite in the south. One of the wildlife waters in the area is named Geology Divide Tank in recognition of the geologic distinction.

Drainage bottoms (washes, arroyos) are rocky here, but note the driftwood and flotsam in trees. Despite infrequent rain storms, the runoff can be high, swift, and powerful, and a vehicle is no match for running water.

Miles 26.3 to 27.1: Danger! Open mine pits and shafts. You are entering the Fortuna mining district.

The message in English and Spanish reads:

ATTENTION! YOU CANNOT WALK TO SAFETY FROM THIS POINT!
 YOU ARE IN DANGER OF DYING IF YOU DO NOT SUMMON HELP!
 ¡ATENCIÓN! ¡SI CONTINUAS MAS LEJOS DE ESTE PUNTO, NO
 PODRA LLEGAR A UN LUGAR SEGURO! ¡SI NO LLAMA POR
 AYUDA, ESTA EN PELIGRO DE MORIR!

Agents take these calls seriously and check the beacon regularly.

As you go... Miles 16.5 to 16.8: Possible campsites, with interesting plants on slopes. *NO* hiking west of road due to laser hazard area. Those signs about unexploded ordnance and lasers in use? What they're really saying is, "Survivors will be taken to jail." One author is sketching the plot to a novel about a desert hiker who crosses that line and is blinded by a laser beam, so he must wander alone through the sands, feeling his way through the cactus forest and.... The story does not have a happy ending.

Mile 19.8. 32°28'15.3"N, 114°18'03.9"W. Information marker for Yodaville, a simulated urban combat village (Urban Target Complex) used for training pilots and aircrews in urban tactics. The village can be seen to the west. Yodaville is a live-fire area. Observe all warning signs. All of them. "Closed to the public" and "Danger" mean what they say.



Yodaville is constructed from shipping containers to replicate a town, complete with painted doors and windows, vehicles, and mock infrastructure. Built in 1999, its nearly 200 buildings are made of surplus cluster-bomb containers (stacked like legos), steel shipping containers, and lumber, with faux trees, roads and powerlines, vehicles, and even a fake soccer field. Designed to simulate close ground support of troops by Marine Corps aircraft, it is a highly dangerous live-fire area, with hazards from bullets, practice bombs, unexploded



ordnance, and lasers. Named for USMC Major Floyd Usry, who proposed the concept after serving in the 1993 hostilities in Somalia. His pilot call-sign was Yoda, presumably after the *Star Wars* character. Aircraft you may see include the V-22 Osprey, UH-1Y Venom helicopter, AH-1W Super Cobra, FA-18 Hornet, AV-8B Harrier II, and F-35B Lightning II. Ooh Rah.

Mile 20.1. 32°28'26.1"N, 114°18'14.0"W. Trail to Spook Canyon. Sign A-8 set in pyramid of rocks. The Goldwater Range-West range management office (RMO) handles environmental and public issues, and in its early days range managers Ron Pearce and Don Little (call-sign "Big") made range signs in their home garages on weekends. Today the office has a dozen employees, including range wardens who patrol the 2,800 square kilometers of desert.

later became a prominent Arizona senator and presidential candidate. In 2016 the Goldwater Range celebrated its 75th anniversary.



F-16 Fighting Falcon

The Range is divided into Goldwater East (managed by the US Air Force) and Goldwater West (managed by the US Marine Corps). Its airspace overlies much of the Camino from the ground to 80,000 feet. By agreement, the military does not operate below 1,500 feet above ground level over the Cabeza Prieta unless on a designated low level route or in the performance of certain weapons and tactics instructor course scenarios.

Unrestricted supersonic flights are authorized down to 5,000 feet. Visitors along the Camino within the refuge are much more likely to hear aircraft than see them, but you may be able to identify the A-10 Thunderbolt (aka Warthog), F-16 Fighting Falcon, and F-35 Lightning II, as well as multi-duty versions of the propeller-driven C-130 Hercules.



F-16 above, F-35 Lightning below.

A low-level over-flight or sonic boom may be disruptive for a few seconds, but studies have not shown any adverse effects of aircraft noise on pronghorn or bighorn. All considered, the range, refuge, and monument are among the quietest lands on Earth. When observing wildlife at an isolated Cabeza Prieta waterhole, author Charles Bowden was put on alert by a loud, mysterious thumping sound, only to find that he was hearing the beating of his own heart.

You may see strange shiny objects standing in the distance, particularly in the Growler and San Cristobal valleys north of you. These are military tow darts



A-10 Thunderbolt

used for gunnery target-practice by student pilots training at the Goldwater Range from 1941 into the Cold War era. The darts were unreeled behind the towing aircraft on 1,500 feet of 11/64-inch cable. Student pilots would then practice shooting at the dart. The darts could not be reeled back-in, so they were either jettisoned over the range or, preferably, along Dart Drop Road near Gila Bend Air Force Auxiliary Field south of Gila Bend. The darts littering the

refuge were either shot off the cable or jettisoned when they became unstable. The darts hit the ground nose first and resemble foil-covered paper airplanes stuck tip-first in the dirt. Ravaged by time, many of them have now fallen over, but on hikes you may find cables and wings lying on the ground. At one time the

refuge and military proposed to remove the darts, but the task was cumbersome, expensive, dangerous, and damaging to the land. Several trial runs by refuge staff and volunteers working on foot determined that the darts were too heavy and too numerous to feasibly pack out of the Wilderness.

Mile 27.5. 32°06'44.8"N, 113°07'39.9"W. San Cristobal Wash.

This dense swale of mesquite trees, vines, grasses, and coyote gourds is a



good place to poke around and find an assortment of seasonal wildflowers. A variety of small mammals, birds, snakes, lizards, and toads also live here. Some of the loudest residents – Couch's spadefoot (*Scaphiopus couchii*) and giant desert toads (*Bufo alvarius*, once called Colorado River toads) – are active and heard only in the summer rainy season. Signs announce rehabilitation of an old road detour around a treacherous mud hole now crossed by a

causeway.

When filled by extreme thunderstorms, this wash runs from near Dripping Springs in the Puerto Blanco Mountains to silt flats a few miles south of Dateland on Interstate 8, though its channel reaches the Gila River. So flat are the valley bottoms that sometimes a channel of San Cristobal Wash takes an alternative route, looping through the Antelope Hills and eventually finding its way to Las Playas.

As you go... Miles 28.4 to 28.6, and 29.5 to 29.7: Portions of the roadway are lined with metal landing mats to reduce erosion and provide footing for vehicles across what was at times a dust bowl. We're reminded of the pioneer Plank Road through the Algodones Dunes west of Yuma. However, this stretch of road requires frequent maintenance because the mats shift from side to side on the soft ground, leaving drivers to straddle mats like a sailor with one foot on the boat and one on the dock – sometimes the vehicle "falls in" and gets stuck.

Notice that the terrain slopes to the north as shown by erosion of the south (left) bank. The Agua Dulce Mountains to the southwest are named for a short stretch of the Sonoyta River where historically the water was fresh, not salty.



Mile 29.0. 32°06'20.5"N, 113°08'56.3"W. Photo stop. Classic nurse tree south of road. An adult saguaro grew from seed underneath this older ironwood that shaded it from excessive sun, provided richer soil, and hid the seedling from herbivores in its leaf litter.

For a short time in the 1970s, 80,000 acres of land surrounding Tinajas Altas was part of the Cabeza Prieta National Wildlife Refuge, extending the refuge nearly to the Butler Mountains. Botanist Richard S. Felger and co-authors have published a "flora" (a detailed and thorough plant list) for the area. You may find it on-line under the title "Flora of Tinajas Altas, Arizona – A Century of Botanical Forays and Forty Thousand Years of Neotoma Chronicles," *Journal of Botanical Research Institute of Texas*, 2012.

Another "flora" for the entire Camino del Diablo is available on-line at Felger, R.S. and S. Rutman. "Ajo Peak to Tinajas Altas: A flora of southwestern Arizona," in the on-line journal *Phytoneuron*, or at: <http://cals.arizona.edu/herbarium/content/flora-sw-arizona>

Mile 10.1. 32°22'48.4"N, 114°10'19.3"W. Sign A-11. Go straight (northwest). Cross trails are closed to the public.

The Butler Mountains lie to the west in a restricted area. They are a small, very arid, granitic range with their slopes partially buried by drifting sands. The range was named by geologist Eldred D. Wilson for Gurdon Montague Butler, dean of College of Mines at the University of Arizona (1915-1940) and director of Arizona Bureau of Mines (1918-1940). An important packrat fossil-midden study in the Butler and Tinajas Altas mountains by ecologist Thomas Van Devender found that prior to 11,000 years ago these hills sported Joshua trees (*Yucca brevifolia*), single-leaf pine (*Pinus microphylla*), California juniper (*Juniperus californica*), Mojave sage (*Salvia mohavensis*), and other cooler climate plants. The summit benchmark is at 1,169 ft.



Ahead you can see the jagged ridgeline for Vopoki Ridge, part of the Gila Mountains. Vopoki is an O'odham word for "lightning," though it was named by Wilson.

Mile 11.4. 32°23'37.1"N, 114°11'16.7"W. Junction A-10. Continue straight (northwest). Road to right (northeast) goes through Cipriano Pass and to Wellton, and may entice you for a future visit. Signs say "Cipriano Pass" and "Tinajas Altas. Fortuna Mine."



The pass separates the Tinajas Altas Mountains from the Gila Mountains, which lie to the north, though early maps lumped them into one little-known range.

Mile 16.5. GPS. 32°26'14.0"N, 114°15'34.7"W. Southern tip of Vopoki Ridge. Continue straight (northwest) at sign A-9. Rescue beacon for border-crossers and migrants who may be suffering thirst or heat exhaustion...the next phase is death.



Mile 7.1. Campsites beside mountain, with open desert to the west and short walks along base of the ridge or into the flatlands. At sunset it is easy to imagine oneself on the shore of a western sand sea. Or a West Coast beach.

As you go.... Miles 7.2 to 7.4: Stressed, dying, or dead plants. How can you have a drought in a desert, which is already dry

and hot? Desert plants are accustomed to scant and unpredictable rains, but they still need water. When they are forced to contend with warmer and drier times year after year, they fail. Although many of the elephant trees are still standing, they are brown and brittle. Wood may decay slowly in the dry desert – even termites require moisture to make their tubes and digest cellulose.

By some accounts, an ironwood may live 300 to 600 years, but accurate dating is difficult because their growth rings indicate rain cycles, not annual seasons, and may be missing or incomplete. Their dead heartwood spars may endure many hundreds of years – one was dated to have stood 1,600 years after it died. The wood is quite dense and will not float in water. The ironwood tree may reach a height of 45 feet, and many species of birds are known to nest among its branches. In the nitrogen-rich soil beneath the tree – a nitrogen fixing legume – researchers such as Gary Nabhan have documented more than 250 species of desert plants growing from seed. The Spanish name is *palo fierro*, meaning iron wood. Ironwood Forest National Monument, northwest of Tucson, is another place you may wish to visit.

As you go.... Miles 8.6 to 9.8: An unusual community of ocotillo, creosote, brittlebush, white bursage, some chollas, but no trees.



An ambitious research project is underway to map plant communities from Ajo to Yuma, including along the Camino. When finished, the database can provide information on plant relationships and associations; indicate places where certain species of birds, mammals, reptiles, or invertebrates may be found; act as a baseline for landscape changes; and supply information for land managers. It

also provides a large archive of GPS-located photographs for future comparisons. For desert lovers, the project provides insight into the complexity and beauty of desert ecology. We can see plants with new eyes, so to speak. Sponsored by the Marine Corps, Air Force, Fish and Wildlife Service, and National Park Service, and conducted by botanist Jim Malusa and ecologist Peter Sundt (both from the University of Arizona), the project is slated for completion in 2019. Google “Goldwater vegetation report” or “Malusa ResearchGate.”

Mile 29.9. 32°06'11.7"N, 113°09'59.6"W. KEY JUNCTION. Y-road junction. Route to the right (northwest) goes to Papago Well. Take it.

Administrative trail to the left is closed to public vehicles and goes to wildlife water catchments. Sheep Mountain (distinct from Sheep Peak, 21 miles to the north) stands west-northwest 3 miles away, while Papago Mountain is west-southwest and 5 miles from here. (There also is a Sheep Mountain in the Gila Mountains, but that is getting ahead of ourselves. As you can tell, bighorn have long fascinated visitors to this region.)



Mile 30.7. 32°06'34.4"N, 113°10'40.7"W. Photogenic saguaros, with big galleta grass (*Hilaria rigida*), chainfruit cholla, and other perennial plants as well as seasonal wildflowers and nesting birds. The saguaro is classified as *Carnegiea gigantea*, with the genus honoring Andrew Carnegie, magnate and philanthropist, who in 1902 funded the Carnegie Desert Laboratory on Tumamoc Hill in Tucson as well as public libraries across America. Gigantea? You've guessed it.

Mile 30.9. 32°06'39.6"N, 113°10'53"W. Cholla Pass. Aptly named for stands of teddy bear and other chollas. For propagation, chollas rely more on fallen stems taking root than on seeds being dispersed. Species with the widest ranges seem to also have joints that most easily snag passing animals, including us. A pocket comb is the weapon of choice in removing a cluster of spines. For single, large spines you may prefer needle-nosed pliers; for those devilishly small glochid spines, try tweezers.



In describing the throes of extreme thirst of a prospector who ran out of water along the Camino in 1905 and for five days walked, stumbled, and crawled back to Tinajas Altas, WJ McGee placed cholla in a special hell for someone hallucinating about a drink of water, writing, “The forbidding cholla, spiniest of the cruelly spined cacti, is vaguely seen as a huge carafe surrounding by crystal goblets, and the flesh-piercing joints are greedily

grasped and pressed against the face to cling like beggarticks to woolen garments; with the spines penetrating cheeks and perhaps tapping arteries.”

Photographers like Jack Dykinga see cholla as picture-perfect subjects for backlit *Arizona Highways* photos, and birds – especially thrashers, doves, and cactus wrens – build nests in cholla, and packrats stack cholla joints to make walls and roofs for their dens.

Mile 32.2. 32°07'25"N, 113°11'50"W. Chinaman Flat. The name reportedly came from Chinese immigrants who wished to farm here sometime in the first half of the twentieth century, though another version says they were smuggled across the border and then murdered here.

Trees and grasses along the band of dry runnels provide an interesting place to walk south along the Deer Hollow drainage, perhaps as far as Antelope Tank (about 3 miles one-way). Sonoran pronghorn have been seen here as well as mule deer and roosting turkey vultures.

Mile 33.0. 32°07'47"N, 113°12'29"W. Vista of the Granite Mountains to the north, as well as Sheep Peak in the Growler Mountains to the northeast.

Mile 34.5. 32°07'48.8"N, 113°13'57"W. Pull-out. From the slopes of the small hill north of the road you can look north toward the Granite Mountains where 14 immigrants died in May 2001 after being abandoned by their smugglers and then becoming hopelessly lost west of the mountains. Border Patrol agents raced to find them and rescued 12 others in the group from certain death in the summer's torrid heat. Those events are chronicled in Luis Urrea's book *The Devil's Highway*, a book he dedicated "For the dead, and for those who rescue the living." Ironically, the summit of this hill (32°07'54"N, 113°13'59"W) has been used as a lookout post by smugglers to spy on Border Patrol.



As you go... Mile 36.3: Reminder: the Camino's speed limit is 25 or below. This route is a single-lane jeep trail with two-way traffic.

Mile 38.2. 32°05'57.7"N, 113°16'59.8"W. Y junction. Camino goes west; administrative trail coming in from southeast is closed to public vehicles.

Mile 38.3. 32°05'57"N, 113°17'03"W. Papago Well primitive campground. It has picnic tables, but no ramadas, water, latrines, or trash pickup.

Hikers may find an old eastbound trail to the Papago Mine diggings at the base of Papago Mountain. And birdwatchers can always find a variety of birds along the wash and in the flats, such as vireos, gnatcatchers, and hummingbirds, with several owl species calling at night.



Mile 38.4. 32°05'57"N, 113°17'13"W. Papago Well. No camping is allowed near the well or wildlife guzzler. Along the washes you can find canyon ragweed (*Ambrosia ambrosioides*), white burrobush or cheesebush (*Ambrosia salsola*, formerly *Hymenoclea salsola*), desert starvine (*Brandegea bigelovii*), and pigweed or

seaport). One of Yuma's most interesting citizen's ran camel pack-trains to mines near Dome. Nicknamed Hi Jolly, he brought camels to the U.S. from Turkey as part of Lt. Beale's experiment to use "the ships of the desert" in the American Southwest to carry military supplies. His Arabic name was Hadj Ali. And if you began your trip in Ajo or Organ Pipe, you may have seen references to Kalilville (the name for Lukeville at one time) or signs for Alley Road or Tom Alley Courthouse. The Syde Kalil family – Ajo stalwarts – hailed from Syria about 1900, and the Judge Tom Alley's grandfather was Turkish and originally named Muhammad Ali – while passing through England on his way to America he changed it to Alley. Gary Nabhan's book *Arab / American: Landscape, Culture, and Cuisine in Two Great Deserts* tells us more. And if you return home through Dateland, Arizona, stop in for a date shake made from *medjools*.

Mile 5.4. Campsite at end of a ridge and next to a wash. At any of your camps, you might take a close look at the dark soil crust. If you examine a



teaspoon scoop of it, you may notice that the grains of sand are held together by sheaths of cyanobacteria, and that the grains may be tinged with green algae. If you wet a saucer-sized area of the crust, you may actually see it turn greener within hours, a miracle of rejuvenation. Biological soil crusts are a complex mosaic of living organisms – cyanobacteria (formerly called blue-green algae), green algae, lichens, mosses, liverworts, bacteria, and fungi –

that weave throughout the top few millimeters of the soil surface.

If you had a microscope in your *trique* bag, you could see a circus of small invertebrates such as protists (e.g., amoebae, ciliates, and flagellates), nematodes and microarthropods (e.g., mites, tardigrades, isopods), macroarthropods (e.g., tenebrionid beetles, termites, and ants), and bacteria and fungi, all relying on the crust for food and shelter. Grazing by protozoas stimulates cyanobacterial nitrogen fixation. You can see why ecologist Jayne Belnap calls the crust BOB, for Bio-Organic Buddies. Don't crush Bob!

A Border Patrol road runs east-west about 50 yards north of here.

Mile 5.6. 32°20'19.1"N, 114°06'42.3"W. Sign A-13 for a trail that goes eastward. Gardenesque: large limberbushes (*Jatropha cuneata*), creosote, some velvet mallows (*Horsfordia* spp.), ocotillos, ironwoods... and dozens of trees and cactus that have died between 2005 and 2015 for lack of moisture. Keep going north.

Mile 6.0. Sign A-12. Keep straight on main road.

Mile 6.4. Campsites.

eons brought sand and silt downstream, leaving us the Glamis Dunes, Algodones Dunes, Yuma Dunes, Gran Desierto, Colorado River Delta, and the exceptionally rich soil of the Imperial Valley and Yuma Valley. Major tributary rivers bringing the sand and silt are the Green, San Juan, Little Colorado, Virgin, Bill Williams, and Gila rivers.

Mile 2.6. 32°18'45.7"N, 114°05'16.0"W. KEY JUNCTION. Y junction. Turn northwest (right) at sign A-14. This road trends northwest for many miles, roughly parallel to the mountain spine. A "Camino del Diablo – Fortuna Mine" sign may point this way. The other road, closed to the public, goes south to the border fence.

Before you lies a "different" desert, one with more sand, flatter ground, and plants growing farther apart, relying on less precipitation. Visually it lacks the nearby mountains and peaks, and the light and colors appear different, perhaps from humidity of the river valley or smoke drifting from field burning. Nearby are creosotes, limberbush (*Jatropha cuneata*), ocotillo, a few saguaros, and spacious open flats. The Spanish name for limberbush is *sangrengado*, a contraction for *sangre del drago* – dragon's blood, because it "bleeds" reddish sap when injured. It is a member of the large spurge family, and its stems have been used by Native Americans for basketry.

Mile 2.9. 32°18'38.7"N, 114°05'33.6"W. A rescue beacon. Continue around the tip of the mountain and go northwest.

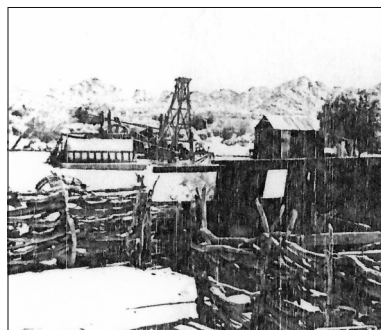
Mile 3.9. Campsite, surveyor's benchmark, and rocks. Surveying in the desert can be challenging in unusual ways, including the effects of heat on the men, and shimmering heat or mirages distorting accurate readings with their sextants. As Lt. N. Michler, boundary surveyor in 1855 reported, "The heat had become so great as to compel us to operate entirely with signal-fires by night."

As you go.... Miles 4.8 to 5.0. Campsites. Large bare flats at edge of mountain and next to sandy washes.

As you go.... Miles 5.3 to 5.4: Fine examples of teddybear cholla and cryptobiotic crusts. The crust helps hold the thin soil and scant moisture for the cactus. Many of the dust storms experienced in Arizona originate from unplanted farmlands or construction sites, not the open desert, which is largely held in place by this biotic crust. Interestingly, the weathercaster word *haboob* is Arabic (*habūb*, gale wind), one of many we borrowed into English. Others include monsoon (*mawsim*, for season), adobe (*at-tūba*, brick), alkali (*al-kahli*, alkaline), caravan (*qarawān*, a convoy), candy (*qandī*, sugared), cotton (*qutun*), and coffee (*qahwa*, coffee, with *mocha* coming from the name of a Yemen



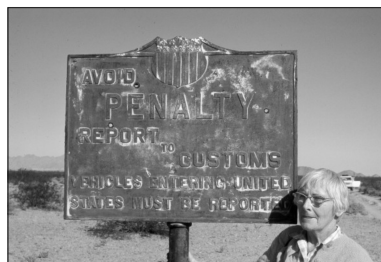
careless weed (*Amaranthus palmeri*) as well as paloverde trees. The large saguaro near the wildlife guzzler is a favorite hangout for turkey vultures and other birds.



The well provided water to Papago Mine in the 1890s and early 1900s, but the mine was a bust. In the late 1930s Jim Havins and his family established a ranch here with a two-room cabin, corrals, stock tanks, and windmill. His son Hank Havins ran cattle in the area until the late 1970s, but nothing remains of the ranch. Refuge manager Gale Monson bragged that Jim and Mary Havins baked the best buttermilk biscuits he ever tasted.

And as you effortlessly unscrew the cap on your water bottle, you might recall Kirk Bryan's description of getting a drink here in 1920. "There was...a tripod and pulley erected over the well. Water was obtained by means of a steel cable drawn through a pulley and attached to a sand pump, the sand pump being lowered to water at a depth of 235 feet, filled through a valve at the bottom, and pulled out by attaching the cable to an automobile. A single horse or two men could pull out the sand pump when full, but it is doubtful that a man alone could obtain water."

Mile 38.5. 32°06'00.7"N, 113°17'16.2"W. Camino bends west (left). An administrative trail runs north (right) to several distant wildlife waters but is closed to public vehicles. The stout sign post on south side of the road once held a US Customs sign telling border crossers to check in at nearest Customs office. Until the late 1970s border travelers who were US citizens could cross the international line into the US where they wished and were required to report for inspection only if importing goods from abroad. Famous agents who patrolled this portion of the border and rode the line horseback from Sonoyta to Yuma include Jeff Milton and Ed Ketchum. Milton was lionized in J. Evetts Haley's book *Jeff Milton: A Good Man with a Gun* and featured in William T. Hornaday's *Camp-fires on Desert and Lava*.



As you go.... Mile 40.9: A tall wooden post south of the road marks a control point for the US Army Map Service's mapping project of the early 1960s. Its tag reads "31." Termites, wind, and erosion have toppled most of the posts throughout the region, but for several decades these numbered posts served as road and junction markers. Many regional survey benchmarks and place-names date from this period. For example, benchmarks were named for refuge managers Gale Monson and Norman Simmons, who assisted the surveyors,

and this period is when places such as the Sierra Arida, Hummingbird Canyon, and Bean Pass were formally named. The 1960-era maps have been subsequently updated using GPS and laser technology.

As you go... Mile 40.5 to 41.2: Mexico's Sierra Pinacate looms to the south. It



is a shield volcano and the summit (3,957 feet) of the Pinacate Lava Field, now included within the Pinacate World Heritage Site and Reserva de la Biosfera El Pinacate y El Gran Desierto de Altar, a 1.7 million-acre Mexican biosphere reserve. The western peak is called Pinacate Peak and is the summit of Volcán Santa Clara. On October 9, 1698, the intrepid Jesuit padre Eusebio Kino and his party were the first Europeans to ascend

this peak, and in November 5, 1706, Kino again climbed a peak in the area and reported, "We saw very plainly the connection of this our land with that of the west," fueling his claim that Baja California is a peninsula and not an island. Cartographers had forgotten that Spanish sea captain Hernando de Alarcón proved this in 1540. The eastern peak is sometimes called Carnegie Peak, figuring in a desert travel book *Camp-Fires on Desert and Lava* by William T. Hornaday.

The name Pinacate is derived from a Nahuatl term, *Pinacatl*, meaning beetle; in northwestern Sonora the term Pinacate is used for large black stink-beetles in the genus *Eleodes* (e.g. *E. armata*). When threatened, the desert stink beetle may stand on its head and spray predators with a foul fluid from its abdomen. O'odham call the mountain S-cuk Do'ag (sometimes spelled Schuk Toak), meaning "black mountain."

Mile 41.8. 32°05'52.1"N, 113°20'34.0"W. Camp Grip, a Border Patrol forward



operating base and *de facto* rescue station with blinking red beacon atop communications mast. The camp was established in 2002 as a response to the 14 migrant deaths near the Granite Mountains in May 2001 and the terrorist attacks of September 11, 2001. It allows agents to work close to the international

line and respond immediately to callouts and emergencies. Agents are the nation's border police and frequently work in areas where no other agency is able to respond to violations, crimes, or rescues. Technically Camp Grip is a mobile base, meaning that it could be disassembled and moved in a few days. The name comes from the slogan "Get a grip" on a problem.

On the south side of the road, a grave and cross pay tribute to Pete, an off-course pelican that landed here and died before an animal rescue specialist could arrive. And ravens frequent the camp, showing a fondness for tearing

shown on the Goldwater Range Map and it simplifies your trip.) Early travelers used this western route to reach Yuma more directly.

The road north goes to Wellton. The leg to Fortuna and Yuma is dipper, sandier, rockier, and more wash-boarded than the route to Wellton, but it also feels more like the "old" Camino del Diablo, wilder and with less traffic.

Mile 0.2. 32°19'29.6"N, 114°03'13.8"W. Junction A-15. Take the better road west (left), heading through the mountain.

As you go.... Miles 0.6 to 0.9: Tinajas Altas Pass. Heading west, the foothill



paloverdes on the hillsides are probably the last you'll see en route to Yuma; mainly the blue paloverde survives in the hyperarid desert ahead, both along drainages and on the slopes. This is unexpected and not typical in most of the Sonoran Desert, where blue paloverde flourishes along water courses and in deeper soils while foothills paloverde prefers drier hillsides and bajadas. Apparently the crest of the Tinajas Altas range creates a summer rain shadow, disfavoring the west side.

Similarly, triangle-leaf bursage has given up – westward, you'll find only white bursage, because triangle-leaf requires summer rains as well as winter rains, but white bursage does not. The desert west

of the Gila and Tinajas Altas Mountains receives an average of only 2 to 3 inches a year, most of it in winter.

Rocks and granite slopes to climb and play on. Campsites. In the evening, even in cooler weather, your camp may be visited by any of several species of insect eating bats that roost in crevices, caves, and old mines. These may include pallid bats, big brown bats, leaf-noised bats, California myotis, and western pipistrelle, the most common species in this region. Too, lesser nighthawks fly at dusk hunting insects. The presence of bats is a sign of a healthy ecosystem.

As you go.... Miles 1.1 to 1.6: Look for bighorn tracks in sandy washes and roadway where they cross from one mountain to another or feed on plants along the washes. What is here for them to eat? Among their favorite foods are leaves, twigs, and flowers of ironwood, paloverde, catclaw, fairy duster, Mormon tea, burrobrush, ditaxis, and ocotillo; cactus, such as fishhooks and barrels; a variety of grasses; and forbs such as mallow, Indian wheat, and filaree. Their diet consists of roughly 1/3 grasses, 1/3 browse, and 1/3 forbs as seasonally available. Most of these are available in the valleys or mountains around you.

Mile 2.3. View ahead of distant Gran Desierto and its sand fields. The Colorado River begins its journey in the Rocky Mountains of Colorado and for

Because of the naturally salty soils, fertilizers, and high temperatures, the fields watered by these canals build up salts and must be periodically flooded to leach away the salts. That water is pumped by wells, from an average depth of about 100 feet, and that highly saline water is returned by gravity to the Colorado River main channel, near Yuma. La Ciénega de Santa Clara, a 40,000-acre wetland in the Colorado Delta, depends upon this water to support a rich wildlife and bird sanctuary.

Mile 1.6: Road passes under Interstate 8.

Mile 2.3. 32°39'35"N, 114°12'37"W. Highway 80 at Avenue 25E (25E for 25 miles east of Yuma). Turn left (west) for Dome and Yuma, or right (east) for Wellton.

Railroad crossing is just before the highway stop sign. The trans-Arizona railroad reached here, Adonde, late in 1878 following years of corporate and political intrigue portrayed in David Devine's book *Slavery, Scandal, and Steel Rails* (iUniverse, 2004). One newspaper reported that the trip from Yuma to Adonde would take two hours and cost \$3. The facilities at Adonde included a "temporary platform for delivery of freight, barber shop, two saloons, one hotel, telegraph with lady operator, Chinese wash house, railroad office, and one butcher shop." The hotel was actually a railcar with rooms and, as you may realize, the name Adonde is Spanish (¿Adónde? or ¿A dónde?) for "Where?" as in a disbelieving "Where in the world is that?" As the tracks were laid eastward, reaching Wellton on February 1, 1879, Wellton soon became the hub of local activity and a water stop for the steam engines.

As we shook off the sands of Lechuguilla on the main highway, we thought, the clocks of history have done little ticking on El Camino del Diablo since Padre Kino's time.

Dorothy Childs Hogner, *Westward, High, Low and Dry*

Leg 3b: Tinajas Altas to Fortuna

Reset odometer.

The sierra is easily crossed by a circuitous route a little farther north which finally takes one through a natural pass. Coming out on the western side, that which appears most striking is a picturesque sierra rising boldly from among the great sand dunes to the south. It looked deep blue in the hazy and calm afternoon as we began to leave [Tinajas Altas] behind.... The next morning...I saw sunshine by refraction.... The sun shone into my tent...for at least twenty-three minutes before it rose, and the moon was bright at the same time for five minutes.

Carl Lumholtz, *New Trails in Mexico*.

Mile 0.0. 32°19'33.4"N, 114°02'59"W. KEY JUNCTION for Tinajas Altas Pass. From sign A-16, go southwest through the pass. (If you just came from Tinajas Altas, this may seem like you're retracing your steps for 50 yards, but this is the route

rubber wiper blades off of the patrol trucks – who knows why. Savvy agents remove the blades while working here.

Mile 42.5. 32°05'50.2"N, 113°21'15.2"W. O'Neill's grave and O'Neill Pass. Final resting place of Dave O'Neill, a prospector who died of exposure after his burros wandered away, perhaps in 1916. By one report, the two men who buried O'Neill were friends of his, prospectors by trade, and rugged, practical frontiersmen. They divvied up O'Neill's valuables and then covered him with dirt and rocks. A couple weeks later they ran out of tobacco and remembered that they had buried O'Neill's tobacco with him. They returned to the grave and retrieved the tobacco pouch,

one reporting that it "chewed just as good as if it had been in my pocket all them two weeks." The gravesite has been plundered at least three more times since then, without reward.

R.I.P.Descanse en paz.

Mile 43.5. A Border Patrol road. No public traffic allowed.

Mile 44.3. Following good rains, these flats are ablaze with the colors of globemallow and other spring flowers.



As you go.... Mile 44.4: Sand hills, visible around the base of Sierra Pinta to the northwest, provide a forest of chain-fruit cholla and other edible plants that draw Sonoran pronghorn here. This antelope-like sub-species is smaller and lighter in color than its northern relatives, and adapted for survival in desert conditions.

Pronghorn are slightly smaller than a white-tailed deer with a shoulder-height of about three feet. The bucks weigh up to 130 pounds, and does up to 110 pounds. Both sexes have horns, with the females' being short and the males' being black and about 10-12 inches long. Their horns have a small tine that gives the species its name: pronghorn. The horns have an outer sheath of

fused, modified hair that covers a permanent, bony core. Pronghorns shed the hollow outer sheath each year in fall and grow a new set by summer. Both have extra-long white hair on their hind section that stands up when they are frightened. This can be seen from a distance and serves as a visual locator – the bold, white markings help pronghorn find each other from long distances on the large, open range. It can also be used as an alarm to let other pronghorn know that danger is nearby. Pronghorn can reach speeds of up to 60 miles per hour on short distances and can maintain a speed of 35 mph for longer distances. If you see pronghorn, please pause to let them pass.



Pronghorn have keen vision, and they can spot movement several miles away. They are extremely shy and easily spooked. Their wariness, along with their good eyesight and speed, is very important to their survival. They are also well adapted to the desert conditions and during extreme heat are able to raise patches of their stiff hair to release heat.

These same hollow hairs serve as insulation during the winter.

Pronghorn can have twins when food is abundant but most does deliver one fawn that weighs between five and seven pounds. Though typically able to stand a day after being born, fawns will lie very still throughout the day waiting for their mother to come back and feed them, which is typically twice a day. At about six months of age, the young pronghorn will be independent of its mother.

The Sonoran pronghorn has a four-part stomach similar to cows, allowing them to digest the succulent desert vegetation that makes up most of their diet. As desert vegetation dries with the onset of summer, water availability becomes increasingly important for digestive purposes, and pronghorn rely on the fruit of the chainfruit cholla as a source of moisture when water is otherwise unavailable.

As you go.... Miles 44.5 to 47.3: To the south you may notice highway traffic on Mexico Highway 2, a major highway that parallels the borderline and connects mainland Mexico with the Baja California peninsula. Peter Matthiessen's short story "The Wolves of Aguila" is set south of here, on a lonely stretch of road near the Los Vidrios truck stop, though there are no wolves known in the area today.

In the 1920s and 1930s before Highway 2 was even graded, let alone paved, enterprising Mexican drivers braved the fearsome sands from Sonoyta to San Luís Río Colorado in beefed-up cars carrying passengers and cargo. Some died and all had misadventures, as newspaperman Valdemar Barrios-Matrecitos chronicled in his book *Por las Rutas del Desierto*, but these "choferes del desierto" and their taxis were the only way to get there. You also may wish to read Guillermo Munro's novel *El Camino del Diablo* to imagine what that trip was like.

services. The road crosses over east-flowing Wellton Canal just south of the interstate overpass.

Congratulations. You have survived the Devil's Highway. And if you wish to "finish" your quest for the now usually dry Gila River, you can reach it by driving straight north on Ave 29E.

To Yuma:

Mile 0.0. From the intersection at Goldwater Range boundary, sign C, go north (straight ahead).

As you go.... Mile 0.1: Date palms and Gila Ranch subdivision on west (left).

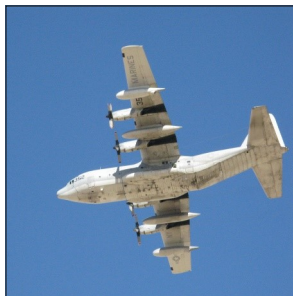
As you go.... Miles 0.4 to 0.5: Smoke trees (*Psoralea argophylla*). They bloom in May or June, meaning that winter visitors may not understand the joy felt by residents who luxuriate in their indigo blooms and mystical, diaphanous form.

Mile 0.7. 32°37'12"N, 114°12'41"W. This is the Mohawk branch of the Wellton-Mohawk canal, carrying irrigation water as far as the Mohawk Mountains and feeding another canal that attends Texas Hill. Exercise caution and do not exceed 15 mph. Road makes hairpin turn to the east, then veers left and up to top of the flood control levee, from where you have a grand view of Gila River Valley. Then the road goes north.

Water in this canal flows eastward from the Colorado River and is pumped uphill at several pumping stations. This vast irrigation project began operation in 1952 and involves about 65,000 acres of farmland. According to the Bureau of Reclamation, the 18.5-mile Wellton-Mohawk Canal diverts Colorado River water from the Gila Gravity Main Canal about 15 miles below Imperial Dam. Its branches, the Wellton Canal and the Mohawk Canal, are 19.9 and 46.8 miles long respectively. The Wellton Canal has a diversion capacity of 300 cubic feet per second and the Mohawk Canal has a diversion capacity of 900 cubic feet per second. Three large pumping plants along the Wellton-Mohawk Canal lift the water a total of 170 feet. Thirteen small pumping plants are scattered throughout the Wellton-Mohawk Division on 227 laterals. There are also branches for a Texas Hill Canal and Dome Canal. The canals can be dangerous for people or wildlife, with steep slippery sides, siphons, and unpredictable currents leading to death by drowning.

Mile 1.4: Pavement.

Mile 1.5: This smaller canal is the Wellton branch of the Wellton-Mohawk Canal, delivering irrigation water as far east as Antelope Hill.



Occasionally this is a bustling intersection as various Marine Corps units deploy to the field and their heavy equipment is delivered by commercial trucks. The training exercises vary from deployment of remote communications units to large field camps to combat units complete with defensive "missiles" and electronic or laser countermeasures and locators. Pilots of various aircraft train in close coordination with ground troops and observers.



Rugged Gila Mountains to the west meant that westbound travelers had to go around them by way of Dome and the Gila River valley, or find one of the very few passes through the range (Cipriano Pass), or skirt them by going far south to Tinajas Altas Pass. In modern times the highway over Telegraph Pass has solved this problem.

From here there are two easy routes home, one directly to Wellton and the other directly to Yuma. Re-set odometer.

To Wellton:

Mile 0.0. Sign C. Turn east (right) at the intersection onto County 14th St.

Mile 1.9. Pavement. Continue straight.

Mile 3.9. 32°37'12.6"N, 114°08'31.12W. Turn north (left) from County 14th Street onto Ave 29E. Ave 29E is 29 miles east of Yuma.

Coyote Wash runs northward in braided channels about a mile east of this junction. Early Europeans such as Juan Bautista de Anza (1776) and Pedro Fages (1781 and 1782) came along Coyote Wash to or from the Gila River instead of by way of Tinajas Altas. They paused for water and horse forage at Pozo de San Miguel, an area east of the Wellton Hills where seasonal water might be found. Native Americans may have dry farmed in the flats along the wash, growing corn, melons, beans, or other crops.

Mile 5.0. The road passes over the eastbound Mohawk Canal.

Mile 6.3. 32°39'25.3"N, 114°08'32.8"W. Entrance to Coyote Wash commercial park with gas and food. Interstate 8 interchange with Ave 29E is 0.1 mile north. Called "Exit 30." Go east for Tucson and Phoenix; west for Yuma. Going straight north over the interchange will take you to the town of Wellton and

Mile 45.6. 32°05'28.8"N, 113°24'15.1"W. Junction. Go straight ahead (west). A trail created by smugglers and illegal immigrants is now used by Border Patrol to travel south to the border near a now-abandoned truck stop at Los Vidrios on Highway 2, and to travel north to the Growler Valley. Smugglers first carved these wildcat roads, frequently in the dead of night, and Border Patrol followed. Construction of the border vehicle barrier in 2007-2008 has greatly diminished the number of vehicles crossing the border illegally, as well as the scores of smuggling vehicles that were abandoned, sometimes far from any road. As you have noticed, any tire tracks straying off the road may last for many years. Even tracks from the passage of a single vehicle may linger a lifetime, harming the land in subtle but unkind ways.

As you go.... Miles 46.7 to 48.7: You can now say that you are on the Camino del Diablo, also known as the Yuma Trail or Sonora Trail. The road you have been on from Darby Well dates to the 1890s.

The Camino del Diablo was a route from Sonoyta, Sonora, to Yuma, Arizona. From Sonoyta it followed the Sonoyta River until the river turned south. The route then headed northwest and came through the westernmost O'Neill Hills, thereby skirting the jagged flank of the Pinacate lava flows. It possibly passed close by Ortega's Represa, a rock dam just south of Border Monument 179, or perhaps through a low, easy pass north of the monument. It probably passed just north of Las Playas and climbed the Pinta Sands onto the lava flow, going westward approximately where the modern road is. An alternate route to Yuma from Tucson was the Gila Trail that followed the lower Gila River.

El Camino del Diablo was an informal, backcountry route, unlike several other famous royal roads (highways, really) sanctioned by the Spanish crown in the 17th century. In the Southwest these include El Camino Real de Tierra Adentro (connecting Mexico City with Santa Fe, New Mexico, including El Jornada del Muerto), the Camino Real de California (connecting the Spanish missions from Loreto, Baja California Sur, to Sonoma, California, just north of San Francisco), and El Camino Real de los Tejas (connecting Mexico City with eastern Texas and Louisiana). Camino Real means the "royal road" or "king's highway."

As you go.... Mile 46.8: The road slices through stunted mesquite thickets that provide good birding.

Decades ago a low-flying Marine Corps Harrier jet crashed in the playa when it hit a red-tailed hawk, and several years later a Border Patrol helicopter crashed in the area. Both pilots walked away.

Mile 47.3. 32°05'35"N, 113°26'02"W. Las Playas. ("Playas" is Spanish for dry lakes or beaches.) This stretch of road is a confusion of braided ruts, so your best bet is to follow the most recent tracks on the widest lane. It's smart to engage four-wheel drive before starting.

This dry, dusty depression may become an impassible mud bog following rains. As the mud dries, a mosaic of deep cracks forms. The Pinacate lava field now blocks arroyos that once flowed southward, creating this internally drained

basin and intermittently dry lake. Other nearby dry lakes include Pinta Playa and Dos Playas in the refuge, and Díaz Playa in Mexico 13 miles southeast.



Perennial plants frequently found near playas include alkali mallow (*Malvella leprosa*), arrowleaf alkali mallow (*Malvella sagittifolia*), and hairy ground cherry (*Physallis lobata*). Kirk Bryan reported in 1925 that “a few small mesquites are found around the border of the clay flat, but the center is without vegetation and is broken by deep cracks, so that it makes a rough roadbed.” He noted that tributaries on the western and southern edges of the

playas leave numerous depressions where water remains for considerable periods after a rain, and “All the ancient routes from Sonoyta to Yuma came through Las Playas, because there was a good possibility of finding water there and because of the presence of horse feed.”

In September of 1861 Raphael Pumpelly survived an Apache attack south of Tucson and fled to California. Along the way he dodged bandits, heat, and thirst. When he and his small band camped at Las Playas they were dog-tired, out of water, and still had a 30-hour ride ahead of them before reaching Yuma. He feared that their horses would not survive and, in turn, he would die. “But during the night the sky was overcast with black clouds, and there came the first rain that had fallen on this desert for more than two years. Never was a storm more welcome; both we and our horses enjoyed heartily its drenching torrent.... A broad sheet of water, only a few inches deep, covered the playa for miles before us, and banished from our minds all fear of suffering.”

Mile 48.2. 32°05'38.0"N, 113°26'53.5"W. Cool-weather hike of 1 or 2 miles north to the taller dunes amid seasonal dune flowers – dune evening primrose (*Oenothera deltoides*), dune sunflowers (*Geraea canescens*), sand verbena (*Abronia villosa*), Ajo lily (*Hesperocallis undulata*), rare Emory's indigo-bush (*Psoralea emoryi*) – and fascinating tracks of rodents, kit foxes, snakes, and insects.

From here Padre Kino and others of his time usually headed northwest across the uncharted sands to reach Heart Tank, guided by Native Americans who lived in the region. Prehistorically there were a number of camps around the playa and dunes, and even in historic times the Hia-ced O'odham for parts of the year had camps at Cabeza Prieta Tanks, Quitobaquito, and south of the Sierra Pinta.



Mile 48.4. 32°05'38.0"N, 113°27'03.8"W. Eastern edge of the windblown Pinta Sands. Photo stops next ½ mile. Following wet summers, the sands may bloom with

a drag-harrow of old tires pulled behind a vehicle at slow speed, leaving a *tabula rasa* where agents can “read” subsequent tracks made by people or vehicles. Tracking is an old art, taking years to master, and out here it has saved many migrant lives.

Continue straight.

Mile 13.9. Junction C-8 and trail west to S-52. Do Not Enter laser hazard area. Continue straight.

Mile 14.1. Area S-51. Continue straight.

Mile 14.5. Junctions C-6 to west and C-7 to east. Continue straight.

Mile 15.0. 32°31'41.3"N, 114°08'49.4W. Junction C-5. Road west goes toward mountains and various campsites. Continue straight.

Mile 15.0. This hulk of an armored personnel carrier has become a local landmark.

Mile 15.1. Junction C-4. Continue straight.

Mile 16.2. 32°32'24.9"N, 114°09'26.9"W. Roadside patch of hollyleaf bursage (*Ambrosia ilicifolia*), defined by holly shaped leaves and large size. Plants survive here by many means: spines or stickers for protection, foul taste, drought tolerance, and this plant uses them all, plus its seeds have “hooks” that attach to animal fur and are dispersed far and wide. Its leaves can be green following rainy seasons, though this region receives only 3 to 4” of rain a year. Hollyleaf bursage is different than desert holly (*Atriplex hymenelytra*), a beautiful yet hardy plant found on the western side of the Gila Mountains.

Mile 17.2. 32°36'24.6"N, 114°09'59.3"W. Junction C-2. A power line and road head north. Continue straight north-northwest on main road.

Note that ocotillos here are the dominant tall plant, with only an occasional ironwood tree that is growing more like a shrub than a tree. Shorter shrubs



include white bursage, brittlebush, cheesebush, and creosote, with an occasional cholla or saguaro. Cryptobiotic soil crust holds the soil and keeps it from blowing away.

Mile 21.4. Large encampment area for military training. Sign S-50. Two wooden temporary buildings stand in stark contrast to the bare ground.

Mile 22.3. 32°37'11.1"N, 114°12'38.1W. KEY JUNCTION “C” and Goldwater Range northern boundary.

Mile 7.5. 32°25'49.4", 114°05'13.0"W. Junction C-14 and a trail to Raven Butte, a distinctive mound of Miocene basalt. It was probably named for its raven-black color, though one source who never saw it said it was named for ravens living in the area.

Mile 9.4. Signpost C13 and trail to southwest. Continue straight.

Mile 10.0. 32°27'52"N, 114°06'17.5"W. Cipriano Pass junction and signpost C-12. Continue straight (northwest). Road to southwest takes you to Cipriano Pass. Also sign S-56 for a military bivouac site.

Pass may be named for Cipriano Ortega, head of a family hacienda near Santo Domingo along the Sonoyta River in Sonora, but it is not to be confused with Cipriano Pass or Cipriano Hills in Organ Pipe Cactus National Monument. The Ortega family sometimes drove cattle from Sonoyta to Mexicali, Mexico, and freight wagons to Yuma.

Mile 10.7. Military bivouac site S-55. Continue straight.

As you go.... Miles 10.7 to 11.3: Note grass, mallow, white bursage, and white-stem milkweed (*Asclepias albicans*), plus diamond cholla (*Cylindropuntia ramosissima*) growing in runoff runnels. Even ironwood trees and other large plants grow along them. The runnels flow across the roadway, but road grading blocks or re-channels them, leaving plants on the downstream side of the road with less water and affecting their growth. If you walk along a runnel, you'll find animals seeking shade and food. The functions and values of runnels are analogous to riparian habitat. Runnels also nourish cryptobiotic soils, and their growth patterns on the ground may reveal where rainwater runs or pools.

Mile 11.3. Road widens a bit.

Mile 11.5. Junction C-11 and military staging area S-54. Heed laser warning signs from here to C-8. Do not hike or drive west of the road.

Mile 12.5. Military bivouac area S-53 to the west. Continue straight. At certain times of the year, large contingents of Marines camp along this road in military training exercises such as the Weapons and Tactics Instructor course (WTI), an advanced tactical aviation exercise designed to train weapons and tactics instructors.



Mile 13.0 . 32°30'11.9"N, 114°07'45.5"W. Junction C-10 and the eastbound Hobbs Drag Road, a Border Patrol sign-cutting trail named for agent Kenneth Hobbs who hailed from Sonora, Texas, and pioneered the road in 1967-1968. Agents regularly sweep the trail smooth with

many flowers, including summer California caltrop (*Kallstroemia grandiflora*). Following wet winters, visitors may see uncommon displays of blue sand lily (*Tritileopsis palmeri*), as well as sand verbena, Ajo lilies, desert club cholla, big galleta, primroses, and other plants that prefer or tolerate sandy soil.

Mile 49.2. 32°05'50.9"N, 113°27'53.4"W. Eastern edge of the Pinacate Lava Flow. You may spot Sonoran pronghorn, hawks, and burrowing owls. Patient visitors with good binoculars or 'scopes may be rewarded by observing wildlife and their behavior.

As you go.... Visitors may be surprised to see non-desert birds almost



anywhere along the Camino. Egrets, herons, and grebes have been seen perched or standing in unlikely places along your route. Their preferred habitats are waters like Quitobaquito and shores on the Gulf of California, about 60 miles to the south, but they sometimes feed far from water, may be blown off course, or may alight to rest while flying across open desert. Bird expert Gale Monson reported seeing a flock of 51 white pelicans flying

over Heart Tank in Sierra Pinta, the arid mountain range north of here, presumably going from the Sonoyta River to the Colorado or Gila rivers. His essay "The Arizona Desert" in Olin Pettingill's *The Bird Watcher's America* may be the finest account of birds along the Camino.

And along the Camino somewhere west of Las Playas, members of the 1890s boundary survey were astonished to find "the skeleton of a camel, which, the Mexican guide stated with much relish, had been brought for use on the deserts in northern Sonora and had perished here of thirst." The unfortunate animal probably had escaped or descended from Lt. Edward F. Beale's Camel Corps 1857-1859 experiment using camels for the US Army in the arid Southwest.

Mile 50.0. 32°06'01.2N, 113°28'38.0"W. A friendly place to camp.

Mile 50.2. 32°06'07.4"N, 113°28'50.1"W. Viewpoint. Looking north from here, you can see the two-tone contact line between the northern light-colored granite and southern dark-colored gneiss of Sierra Pinta that gives the range its "pinta" ("speckled" or "painted") name. The sierra represents classic horst-and-graben geology – one block up (the horst, German for "raised ground"), one block down (the graben, German for "ditch" or "trench") – of the Basin and Range Province. Most non-



volcanic mountain ranges and valleys in Arizona, New Mexico, Nevada, and eastern California trend parallel in one direction: north-south or northwest-southeast. They are being pulled apart by the underlying tectonic plates stretching the land (think faults and earthquakes). The valleys and mountains are linear and slender. Geologist Clarence Dutton famously compared the many narrow, parallel mountain ranges that distinguish the unique topography of the Basin and Range to an "army of caterpillars marching toward Mexico." The summit of Sierra Pinta is BM Pinta at 2,950 feet.

Also find here a seasonal flower show ranging in size from tall prickly poppy or "cowboy's fried eggs" (*Argemone gracilentia*) to the diminutive devil's spineflower (*Chorizanthe rigida*, a buckwheat) and other "belly" flowers like Mojave desertstar (*Monoptilon bellioides*).

Mile 50.1. 32°06'05N, 113° 28'46"W. Parking for walk to Díaz Crater, a shallow sand-filled mystery ring less than a mile north of the Camino. It may be a basalt-rimmed crater and the northernmost of the Pinacate craters, but further research is needed. William K. Hartmann, Dale Cruikshank, and others at the University of Arizona's Lunar and Planetary Laboratory in Tucson identified it from high-altitude photographs and named it for explorer Melchior Díaz, whose expedition passed near Sierra Pinacate in 1540. The feature is at **32°06'33"N, 113°28'42"W**.

Mile 50.5. 32°06'11.1N, 113°29'3.3"W. Nice place to stop and walk out into the lava, with a good view south of Pinacate Peak, a large shield volcano now included in Mexico's renowned Pinacate Biosphere and World Heritage Site.

A Mexican microwave tower stands atop a hill to the southwest. Black lava-capped buttes resemble miniature Cabeza Prieta peaks. Swales of big galleta grass (*Hilaria rigida*) and bursage are home to rodents and cottontail rabbits, as can be seen in the many trailways running between bushes or holes. With practice and help from books like Pinau Merlin's *A Field Guide to Desert Holes*, you can figure out who lives in the dozens of different kinds of holes, depressions, and burrows. Many desert species spend most of their lives underground, especially in the heat of the day. Gila monsters, for example, spend about 95% of their lives in subterranean seclusion.

Mile 51.5. Campspot with view of Sierra Pinta to the north.



Mile 51.6. 32°06'33.4"N, 113°30'09.5"W. Nameer's grave or marker along south side of road. To date no one has unlocked the mystery of who is commemorated here or why, but the marker predates 1930. Let us know if you solve the case.

As you go.... Miles 1.2 to 1.9: Cholla forest, highlighting teddy bear cholla, diamond cholla, and others. A wash at Mile 2.3 features ironwood trees, occasional mesquites, horsfordia and desert lavender.

Mile 3.4: Junction C-17. A dead-end spur. Continue straight.

As you go.... Miles 4.3 to 5.9: From road to apartment house. Piles of sand removed from the road by a maintenance crew have been colonized by a variety of rodents and plants.

Mile 4.5: Junction C-16. A dead-end spur. Continue straight.

Mile 5.9: Junction C-15. A dead-end spur. Continue straight.

Mile 6.6. 32°25'06.1N, 114°04'51.8"W. Historical footnote: the concrete pad and posts along the west side of the road once marked the inclusion of Tinajas Altas within Cabeza Prieta National Wildlife Refuge. For a short period in the 1970s, 80,000 acres were added to the Cabeza Prieta National Wildlife Refuge as part of a BLM land swap, later reversed by Congress. At that time BLM managed the natural and cultural resources of the Range, as the Marine Corps now does. The annex ran from here to the international border, and westward nearly to the Butler Mountains.

Mile 7.1. 32°25'31.2"N, 114°05'03.7"W. El Camino del Diablo historical information sign. It reads:



"The Road of the Devil" is a rough, unpaved route which begins in Altar and Caborca Mexico and crosses southwestern Arizona, ending in Yuma. Prehistoric peoples used the route to transport shells and salt from the Gulf of California. Spanish soldiers led by Melchior Diaz in 1540 were the first Europeans to travel this route.

More than 150 years later, the Jesuit priest, Father Kino, traveled the region while exploring for routes to California. After the discovery of gold in California in 1849, thousands traveled the Camino in search of gold and new lives. Historians estimate more than 400 people died of thirst on the Camino during the 1850s. At one time, at least 50 graves could be identified along the route. Today the area (part of which is listed on the National Register of Historic Places) is under restoration. Please stay on the road and help us protect this historic resource.

the road splits into several routes. Generally go straight, which usually is the best route.

Note the signs encouraging restoration of natural ground. A proliferation of unneeded wildcat roads was confusing drivers and destroying the landscape so the Marine Corps and Bureau of Land Management marked accepted routes. Driving off the road churns living soil into "moon dust," creating places no one wants to camp.

Continue to sign A-16, though you may be tempted by side roads.

Mile 88.7. 32°19'33.4"N, 114°02'59"W. KEY JUNCTION. A-16. Road north (straight ahead) goes to Wellton. Road to the southwest (left) goes to Fortuna Mine and Yuma (turn to page 56). Road to the southeast (right) returns to Coyote Wash and distant Ajo, the way you came.

Reset odometer.

Leg 3a: Tinajas Altas to Wellton

Reset odometer.

This is my last night here [Tinajas Altas]. Tomorrow, Win comes with the horses and I shall go home as quickly as possible. But I will not forget these mystical nights, sitting alone here in camp in the moonlit desert. The calm, the silence, the radiance of the mountains, the softness of the light and the mystery pervading the scene. My trip has been completely successful.... The sunsets have been wonderful, especially tonight, with the lighted clouds changing from golden to crimson to pink, all seen through the vistas of the craggy mountain masses. As I look out on the desert by moonlight, it seems so soft and hospitable. The sense of its death-dealing aridity is lost. I shall hunt for an hour at daylight and that will be my last. Then all my thoughts will be centered on home.

Charles Sheldon, *The Wilderness of Desert Bighorns and Seri Indians*

Mile 0.0. 32°19'31.1"N, 114°02'59"W. KEY JUNCTION at sign A-16. Go north (straight). Road to southwest (left, and back nearly the way you just came) goes to Fortuna.

Mile 0.3. 32°19'49.8"N, 114°03'00.3"W. Junction: go north. Faded BLM sign announcing Tinajas Altas. Also sign C-19. Other, wider road goes southeast and is a bypass for vehicles not wanting to visit Tinajas Altas.

Mile 1.1. 32°20'30.3"N, 114°02'59.5"W. Sign C-18. Side road northwest to the mountain. Not closed to the public. Good camping sites can be found along the route.

As you go.... Miles 51.7 to 51.9: Stay right as the road goes through swale



of mesquite, bursages, and big galleta that includes desert fleabane (*Erigeron lobatus*), fermina (*Janusia gracilis*), mallows (*Sphaeralcea* spp.) and other interesting plants. Black-tailed jackrabbits thrive here. They "freeze" until approached too closely, and then they hop and leap away with amazing speed, frequently making a wide zig-zag loop back to the same bush.

Mile 52.2. 32°06'42.5"N, 113°30'41.1"W. Looking northward you can see the light/dark Sierra Pinta contact. Southward you can see black lava-capped buttes. Try a cool-weather hike of about ¼ mile to nearest butte north of road, or about ¾ mile to Monument Bluff south of the road.



From the road, Monument Bluff looks like a flat-topped hill, but if you make the hike and climb up to the rim, the interior

crater is impressive and well worth the effort. If you hike about a half-mile farther south from the crater, you'll reach the U.S.-Mexico border and will see



Boundary Monument 181 at 32°05'43.6"N, 113°30'48.8"W. A total of 258 of these monuments were placed along the international boundary by a joint US-Mexico commission between 1892 and 1895, beginning at El Paso, Texas, and ending at the Pacific Ocean south of San Diego, California. Most of the monuments were iron obelisks like this one, but some were made from brick and mortar. The line of the boundary passes through the apex of the obelisk, so half of the monument is in the U.S., and half is in Mexico. They were placed at regular intervals in locations where the next one along the line could be observed using surveying instruments. Many are located on flats or low hills like this one, #190, but some atop mountain peaks are very

difficult to reach, as seen in David Taylor's book *Monuments* (Radius Books, 2016).

The workers encountered great hardship placing the monuments along the section of border between Sonoyta, Mexico and the Colorado River, owing to the long distances and the lack of water. Everything needed was transported in wagons, including barrels of water, cement, the monuments themselves, and all provisions. In some places, the monuments and building materials had to be pulled up cliff faces by rope. It took about 400 pounds of Portland cement for each monument base, plus additional local gravel and sand, all mixed together

with about 30 gallons of water. The iron monuments themselves weighed 710 pounds. All work was by hand. The work party along this stretch consisted of 29 men. Transportation included 4 baggage wagons, 2 water tank wagons, 2 spring wagons, 6 pack animals and 5 riding animals – in all, 41 animals.

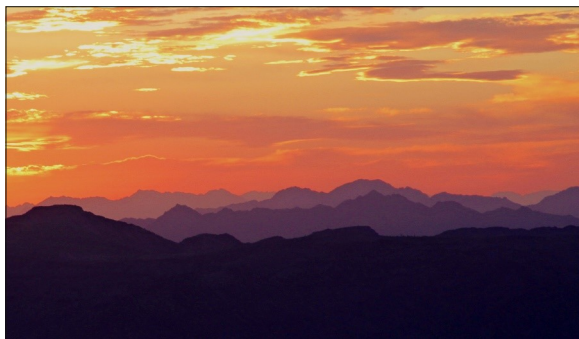
The vehicle barrier that now runs along the border in this section was completed in 2008. Previous to that time there was only a seven-stranded barbed-wire fence here, erected around 1950 to keep cattle from wandering into the U.S. from Mexico. Many miles of the border west of here had no fence at all until the present barriers were erected.

Mile 52.5. 32°06'49.9"N, 113°31'00.6"W. Three rock crosses lie beside the road on the south side. These may have been made recently. Few rock crosses along the Camino date to the nineteenth century. Like memorial crosses along Southwest and Mexican highways today, crosses may commemorate someone's death here instead of being an actual grave.

Mile 53.1. 32°06'59.7"N, 113°31'36.8"W. Speed limit enforcement zone reminder: stay alive below 25.

Cinder flats, probably ash and stones expelled from one of the craters to the south. Most sand and loess soil on this lava flow has been blown in by wind. The lava flow you have been traveling across stands 10-25 feet above the surrounding area.

Mile 54.4. 32°07'28.3"N, 113°32'50.0"W. Campsite on south side of road. Good



view of peaks to the north and west foreshadow a rocky stretch of road ahead.

Somewhere along this stretch of road Raphael Pumpelly and his family camped in 1915. He wrote,

This camp in the lava field was one of the most attractive of the expedition. There were none of the desert trees – leafless palo verdes and palo fierro [ironwoods] – but there were great masses of flowering plants and some beautiful white lilies. And there was, scattered here and there, the strange ocotillo with its many slender, branchless stems, nearly ten feet high, radiating from one root, each stem bearing one scarlet blossom floating like a pennant at the top. Eastward beyond the lava field and its cones, and far away over the desert plain, crumbing mountains shone red in the sunset glow.

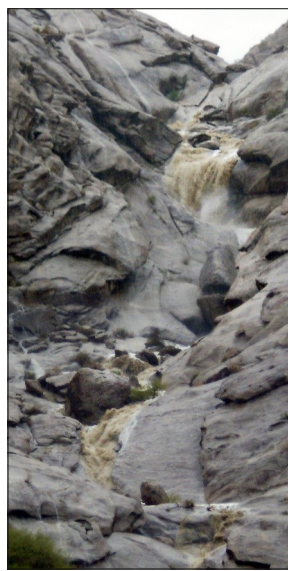
where their bodies were found a few days later, the fingers worn to the bone in their dying efforts to reach the water, which was found in abundance in the tank which they had tried so hard to reach."

Nine intermittent and perennial pools hold at least 22,000 gallons when full. Permanent water made these large tinajas "renowned in the pioneer history of the district," according to Norwegian ethnographer Carl Lumholtz, but he was displeased in January 1910 to find "pieces of cast-off clothing, rusty tin cans, and other cheerless marks of human occupancy."

An arroyo from a hanging valley in these granitic mountains downcuts steeply through joint fractures to pluck and scour a staircase of pools. Long a prehistoric campsite, Mesa of the Dead was a name applied in honor of the many graves and rock crosses once found there.

Tinajas Altas is the setting of Robinson Jeffers' poem "The Dead Men's Child," which includes lines "his life / Ran smooth because he had nothing future about him. / Men do not stumble on bones mostly but on seeds...."

An array of interesting plants thrive among the granite cliffs and slopes. Large woody shrubs called desert sumac (*Rhus kearneyi*) can be found in shaded north-facing canyons. Visitors will see splendid desert tree-beargrass (*Nolina bigelovii*) that from a distance looks like yucca, and they may be surprised to see ferns such as Parry's lip fern (*Cheilanthes parryi*) and desert spike-moss (*Selaginella eremophila*), and to find on cliff ledges Arizona liveforever (*Dudleya arizonica*), which botanist Jim Malusa describes as withstanding drought "by withering until it looks like a Fritos corn chip, then springing back to life with the rains." The "caves" that can be seen on the steep slopes are natural geological features called tafoni.



The pools are replenished by runoff during occasional rains, though rarely producing waterfalls such as this one seen by Scott Fischer in September 2013. The pools are carved out by falling, churning water, giving a sense of water's power over millennia even in a desert.

The O'odham name for this place is 'U'uwuak (also, Oo'oowac, or "place where the arrows fell") and the Cocopah name for the mountain range is Xamilkwilau ("lofty water"). These pools have been important to humans for thousands of years. Prehistoric trails led here and more than a dozen Native American tribes, including O'odham, Quechan, and Cocopah, claim Tinajas Altas as part of their culture. As you walk into the canyon, watch for several large boulders featuring deep round holes or small, shallow depressions used by Native people for grinding bean pods and seeds into edible meal.

Mile 87.9. 32°18'47.9"N, 114°02'52.2"W. From the north end of the mesa, the road drops into a sandy wash and then up onto solid ground. From 88.0 to 88.5

Mile 87.3. Continue straight at junction A-16-A. Another trail turns south.

Thirty yards farther, the better of two trails jogs to the north for about 100 yards and then back westward as the Camino winds through broken gullies. Interesting plants include many-headed barrels, limberbush (*Jatropha cuneata*), and patches of desert agave (*Agave deserti* var. *simplex*). Botany is a lively science, with fresh techniques solving mysteries and showing new relationships. For example, this agave was long thought to be variety of *Agave deserti*, but new analysis indicates it may be more closely related to *Agave mckelveyana*, or it may merit its own niche as *Agave simplex*. It reproduces by seeds or by producing “pups” that are clones.

Mile 87.8. 32°18'44.2"N, 114°02'51.9"W. Tinajas Altas and Mesa of the Dead. In



the vee of the cove in front of you lie the most significant tinajas in the region. Parking is allowed on the mesa, but camping is regulated. Stopping to “glass” the slopes with binoculars may reveal desert bighorn on the granite cliffs. Birds seen here range from golden eagles to lesser goldfinches, red-tailed hawks to mourning doves, turkey vultures to assorted hummingbirds.

A short walk of about 1,000 feet west into the canyon will take you to the lowest tinaja. If you had been an early traveler you would be wondering: “Is there water today? Will we live or ...?” One 19th century surveyor, David Gaillard, reported that many of the early travelers and gold seekers “made the journey in safety, but others, unused to desert traveling, their insufficient supply of water exhausted, realized their peril, and pushed toward Tinajas Altas. Some perished of thirst by the way; some wandered from the road and never found the water they craved; some reached the tanks, finding the water all gone and too weak to go further, lay down and died; others reached the longed-for spot, but in such a state of exhaustion that, unless water was found in the lower tank, they were too feeble to climb to the next and perished miserably, their horrors aggravated by the thought that water, for want of which they were perishing,



was but a few yards off, had they but the strength to reach it.... Three prospectors, who exhausted for want of water, reached the lower tank only to find that some travelers, who had preceded them but a day or two, had emptied this tank. Feeling sure that there was water in the next tank above, they made strenuous efforts to climb to it, but were too weak to succeed, and perished at the foot of the almost vertical slope leading to the second tank,

Mile 54.6. 32°07'30.8"N, 113°33'01.6"W. Western edge of the Pinacate Lava Flow and the beginning of more Pinta Sands, which wrap around the lava flow like a horseshoe. Here the sands are less “duney” than the east side.

As you go.... Miles 54.6 to 57.0: The road here is far below the level of the



surrounding land. With the passing of vehicles and occasional roadwork, desert roads channel water. A summer thunderstorm of over six inches of rain here about 1991 flash-flooded and eroded several feet of soil, creating a ditch and scour holes up to seven feet deep. The deepest holes have since filled in, but at one time the banks stood taller than the refuge patrol truck.

At mile 55.8 and other places note the root systems and abandoned rodent burrows in the wall of the bank, plus flowers that flourish here, and the layers of soil.

Mile 54.8. 32°07'36.6"N, 113°33'17.0"W. Close encounter with Sahara mustard (*Brassica tournefortii*), an invasive cool-season annual that threatens to crowd out native plants, including some of our showiest flowers and richest foods for wildlife. In contrast to this stand of mustard, 0.6 miles to the west you may find open spaces with stands of Spanish needles (*Palafoxia arida*), primroses (*Oenothera* spp.), wooly desert marigold (*Baileya pleniradiata*), dune sunflower (*Helianthus niveus*), and button encelia (*Encelia frutescens*). But next year you may find this flower patch bare or overloaded by Sahara mustard. Seeds of most annual wildflowers may remain viable of years. Desert iguanas and round-tailed ground squirrels are seasonally active.

Mile 57.0. 32°08'28"N, 113°35'21.7"W. Approximate western extent of the Pinta Sands.

Mile 59.8. 32°09'26.9"N, 113°37'33.3"W. Note changes in vegetation along



roadway: mallows, including pink velvet-mallow (*Horsfordia alata*), desert club cholla (*Grusonia wrightiana*), and white bursage (*Ambrosia dumosa*), which is better adapted to a hotter and drier climate than triangle-leaf bursage. Roadrunners like these areas, too, finding lizards, snakes, beetles, and grasshoppers to eat.

As you go.... Mile 62.3: Large ironwood nurse trees for saguaros and other cactus. Blue paloverdes along dry washes, and plentiful teddybear chollas (*Cylindropuntia bigelovii*). Do you see any saguaros 1 to 4 feet tall?

Saguaros are emblematic of the Sonoran Desert and world famous, but hard to spell. Even world-famous botanist Daniel T. MacDougal goofed when he first came to the Southwest in 1905. He spelled it “suwarro,” but was gently corrected by Yuma hotel proprietor Herbert Brown, who told him the proper Spanish is “saguaro,” or he could make it English with “sahuaro,” if he liked. But, “we [Arizonans] will hate SUWARRO as we hate the Devil.”

As you go.... Mile 63.8. Keep an eye open for desert bighorn sheep crossing from one mountain to another or feeding on fresh leaves on trees along the washes, grasses, forbs, or even barrel cactus. Bighorn may feed a mile or more into the flats, but they prefer steep slopes for bedding and raising lambs. These desert bighorn are *Ovis canadensis mexicana*, a distinct subspecies.

Mile 63.8. 32°10'52.3"N, 113°41'08.7"W. Dry-weather campsites in the sandy washes. Interesting stands of desert hummingbird bush (*Justicia californica*) along banks, and fermina or slender janusia vines (*Janusia gracilis*) can be found entwined with other plants, including desert lavender, brittlebush, velvet mallow, catclaw, and mistletoe, a favored food of phainopeplas.

Mile 64.3. 32°10'58.3"N, 113°41'26.0"W. Good sites for camping and hills to climb. Park here for hike to Salazaria Canyon to the south, and a good place to see bladder sage (*Salazaria mexicana*), named for one of the Mexican civil engineers who helped survey the US-Mexico boundary in 1854.

Mile 64.5. 32°10'59.7"N, 113°41'47.3"W. A veritable desert garden and good place to see elephant trees (*Bursera microphylla*), desert agave (*Agave deserti*), ironwood and paloverde trees, brittlebush (*Encelia farinosa*), ratany (*Krameria* spp.), ocotillo, a teddybear cholla forest, and other attractive or interesting desert plants.

The marvelous stands of elephant trees (*Bursera microphylla*) along the western Camino provide fruit for Gray Vireos (*Vireo vicinor*), which otherwise eat insects most of the year. The vireo's range overlaps the elephant tree's, suggesting a mutual dependence: the bird relies on the tree for fruit during winter, and the bird distributes the tree's seeds.



As you go.... Mile 64.9: 32°11'01.3"N, 113°42'12.5"W. Note showy flowers of Parish goldeneye (*Viguera deltoidea*) and parasitic desert mistletoe (*Phoradendron californicum*) in trees.

Imagine you are a 49er driving an oxcart or walking on foot to California – how far have you come, and how far must you go?

Mile 65.3. 32°11'08.4"N, 113°42'29.6"W. Two roadside rock crosses on the ground south of road; possibly associated with the 49ers. WJ

covers the ground between the creosotebushes, mesquites, wolfberries (*Lycium macrodon* and *L. parishii*), desert saltbushes (*Atriplex polycarpa*), white



bursages (*Ambrosia dumosa*), canyon ragweeds, brittlebushes, and button encelia (*Encelia frutescens*). Half-grown sphinx-moth caterpillars graze on *Boerhavia* plants and there is a constant buzz of insects. The soil is glistening mud made solid by biological soil crust. Some of the annual desert daturas (*Datura discolor*) are shrub-like about one meter tall."

As you go.... Miles 83.6 to 85.8: A long sandy stretch of road. Use prudence; four-wheel drive is preferred. Getting stuck is easy; digging out is hard.

As you go.... Miles 83.7 to 84.6: Broad patches of cryptobiotic soil stretch between the creosote bushes, especially along south side of the road. It may look like barren desert, but every square inch is alive.

Mile 84.4. 32°17'36.3"N, 113°59'36.5"W. Junction C-22. A restricted official-use-only trail runs to the border.

As you go.... Mile 85.9: The countryside opens up with ocotillo, brittlebush, diamond cholla, and creosotes. Looking back along the road to east, you can see Tordillo Mountain to left (north) of the road and Cabeza Prieta Peak even farther left.

Mile 86.0. 32°18'09.1"N, 114°01'13.5"W. KEY JUNCTION at sign C-21. The devil's parking lot. Go straight, taking narrower road directly toward the mountain and canyon. A small sign reading "Road – Trail" may mark this road.



Three other options may confuse you here. The wide, main road goes right (northwest) and bypasses Tinajas Altas. A trail heads southeast toward the border. And a thinner trail goes southwest to the mountain. This large cleared area served as a staging ground for materials and

equipment during the 2007-2008 construction of the border security fence.

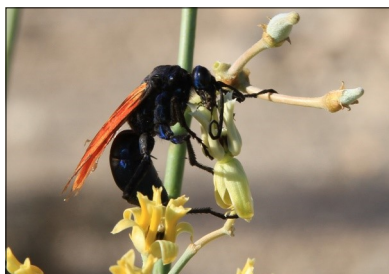
As you go.... Miles 86.9 to 87.3: A desert garden of ironwood trees (*Olneya tesota*), desert lavender (*Condea albida*), pink velvet mallow (*Horsfordia alata*), wolfberries (*Lycium* spp.), several species of cholla, saguaros and other interesting plants are watered by runoff from the mountain.

cactus, not a cluster of individuals. Another cactus of this species at Mile 82.0 has 62 heads, and one in the area is reported have over 150 heads.

As you go.... Miles 79 to 81: The mountains south (left) of the road are Sierra Lechuguilla, that straddle the international borderline.

Mile 82.4. 32°16'55.7"N, 113°57'41.3"W. Western entrance to CPNWR. Visitor kiosk and Border Patrol turnaround. Camp if you wish – the site is roomy.

Note perennial giant sand milkweeds (*Asclepias erosa*) along the roadway; when in bloom they attract many pollinators, including *Pepsis* wasps. Too, you



may spot dragonflies in the open desert many miles from the nearest standing water. For example, the rainpool gliders (a type of dragonfly) are a strong, wide-ranging genus (*Pantala*) that not only find distant pools in which to lay their eggs, but they may accompany humid weather-fronts and storms to lay eggs in ephemeral pools left by the newly fallen rain.

When you exit the refuge and drive west from here, you are in the Barry Mr. Goldwater Range-West controlled and administered by the US Marine Corps at Yuma. Just as Organ Pipe and the Cabeza Prieta have patrol rangers, the Goldwater Range has wardens assigned to protect the resources and assist the public. A current range permit and check-in are required for each visit.

Each road junction on the Goldwater Range is marked with a wooden 4 x 4 post bearing a letter and number. This is the name of that junction – for example, A-4 – and not the name of the road. (The Marines can provide a fine map showing each junction and road; pick it up with your permit if you're starting from Yuma.) If you see a spur road, but not a wooden post at the junction, that spur road is closed and should not be driven. This prohibition includes spur roads marked by small metal signs bearing the letter 'S' and a number (e.g., S55); these are military staging areas, not roads for public use.

Mile 83.6. 32°17'19.5"N, 113°58'49"W. Head of Coyote Wash. Lush vegetation; the road may be impassible when flooded. The wash is hardly discernible, for runoff here is unchannelized sheet flow. Not far south from this point is a watershed divide with La Jolla Wash. Coyote Wash runs north to the Gila River, and La Jolla Wash runs south and soaks into the Gran Desierto sands.



Botanist Richard Felger fondly remembers this place: "It is humid and warm and an aromatic yellow carpet of desert chinchweed (*Pectis papposa*) and other summer annuals almost completely

McGee, who traveled the Camino in 1901, observed "Its course was marked by the pitiful milestones of solitary graves, each with its cruciform heap of pebbles."

Mile 65.6. 32°11'21.9"N, 113°42'41.7"W. Dry-weather camp in wash. Note desert lavender (*Condea albida*, formerly *Hyptis emoryi*), a favorite for a variety of native bees and Africanized honeybees. Too, you'll probably see a jackrabbit here. With luck, you may see Sonoran Silverbush (*Argythamnia brandegeei*) growing on hot, south-facing slopes.

On a cool day, peakbaggers might enjoy a very steep and rough hike from here to the unnamed high point of the Tule Mountains, easily seen about 1.3 miles to the southwest as the buzzard flies, but probably closer to 2 miles on foot. Take a map and a good supply of water and follow the wash that crosses the road here southwards to the mouth of a canyon. Stay in the bottom of the drainage and follow the canyon all the way to the top. You won't need ropes, but it is very rugged with 1,150 feet of elevation gain. Only recommended for hikers that are experienced and highly-motivated. The summit is at **32°10'28.3"N, 113°43'17.9"W** (2,307 feet). Benchmark (BM) Tule is here. You might notice some discarded lumber and wire lying around, left by the original surveyors in 1920. They erected poles with flags and beacons to make the points easier to see when viewed from similar control stations far in the distance. Only a handful of high peaks were used as primary control points during the 1920 survey. All of the other survey markers you might come across in this region date from the 1960s.

As you go.... Mile 65.7: Black-capped Cabeza Prieta Peak is on horizon to the northwest (roughly straight ahead).

Mile 66.0. Another favored dry-weather camping spot.

Mile 66.8. 32°11'58.2"N, 113°43'41.3"W. Administrative trail to the southeast; no public vehicles allowed. Around 1900 a wooden signboard near here instructed travelers, "Go back and fill your canteen" at Tule Well. This is a nice spot to picnic and admire elephant trees on the hillside.

Mile 68.0. 32°12'46.6"N, 113°44'25.6"W. Administrative trail south to Tuseral Tank, a wildlife waterhole constructed in 1948. It is a pleasant cool-season walk of about 2 miles one way.

Dry-weather campsite in wash at mile 68.1.

Mile 68.7. 32°13'22.2N, 113°44'48.4"W. Interesting mixes of plants along road, especially near rocky outcrops. Seasonally find stickleaf (*Mentzelia* spp.), desert sunflower (*Geraea canescens*), odora (*Porophyllum gracile*), desert spineflower (*Chorizanthe rigida*), and desert trumpet (*Eriogonum inflatum*). As you have seen in many places along the Camino, ratany is found close to other plants, especially bursage, because ratany is semi-parasitic and needs a host

plant. Two ratanys occur in this region: range ratany (*Krameria erecta*) and white ratany (*Krameria bicolor*, formerly *K. grayi*). Tiny barbs on the range ratany fruit *range* the length of the shaft, whereas white ratany fruit spines are barbed only at the tip, like a harpoon for Ahab's great *white* whale. Another parasite that you may see along the Camino in cooler weather is desert broomrape (*Orobanche cooperi*) – it looks like brown or purple asparagus with pretty purple and yellow flowers.

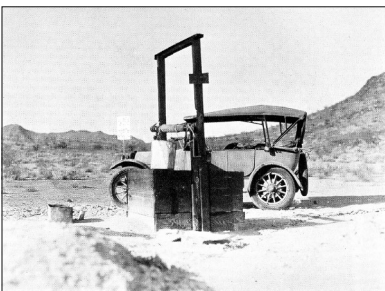
Mile 69.0. 32°13'35"N, 113°44'59"W. Tule Well. A cabin, well, large water tank, and picnic tables. For Tinajas Altas head west (left) from the junction. The Christmas Pass road goes north (right) to Wellton (See page 68).



The current cabin was built in 1989 by the US Air Force's 832nd Civil Engineering Squadron to help celebrate the refuge's 50th anniversary, and it replaced an earlier cabin built in 1949 for refuge staff, livestock line-riders, and border agents.

Traces of the old well are visible. The campground has several picnic tables. The flagpole and Boy Scout monument northwest of the cabin were built for the refuge's dedication in March 1941 and enhanced in 1989. The original plan was to place a life-sized statue of a bighorn sheep on the monument's base. The scouts were instrumental in a political campaign to establish the refuge.

The original hand-dug well was not there at the time of the Gadsden



Purchase and subsequent boundary survey of 1854, nor did Pumpelly mention a well when he passed this way in 1861. But the boundary surveyors of 1891-1896 reported, "During the 'early sixties' [1860s] there was a large influx in Mexicans from Sonora to the gold diggings on the Colorado River, and an enterprising Mexican dug two wells near the road, in the purpose of selling water to travelers.

But the deaths from thirst along this route became so frequent that the road was soon abandoned and for over twenty years had remained unused." By another account, perhaps apocryphal, the enterprising Mexican who dug the wells was killed by someone who refused to pay for water.

The 1890s surveyors hired a party of workers from Sonoyta to clean out the wells, which had nearly filled with dirt, and the wells then "yielded a supply of about 500 gallons per day. The water is beautifully clean, but owing to the presence of minerals has a vile taste and is very unwholesome. Near the wells stand the ruins of the old adobe house, the only building between Quitobaquito and the Colorado River." The wells first appeared on an 1894 General Land Office map.

Leading a survey team in 1855, Lt. N. Michler recalled, "Imagination cannot picture a more dreary, sterile country, and we named it the 'Mal Pais'." Bad country.

Mile 77.5. You are now atop a hill and can see the long, straight trail to Tinajas Altas. One witness, Lt. N. Michler in 1855, reported somberly, "All traces of the road are sometimes erased by the high winds sweeping the unstable soil before them, but death has strewn a continuous line of bleached bones and withered carcasses of horses and cattle, as monuments to mark the way."

In addition to obvious brittlebush and creosote, look for beavertail cactus (*Opuntia basilaris*) and many-headed barrel cactus (*Echinocactus polycephalus*), both preferring very hot and dry homes. If you've seen the many-headed barrel in bloom, you've been here in the heat of June.



Mile 77.9. 32°15'24"N, 113°53'21"W.

Parking for an easy walk of about ½ mile south to the Grave of Eight. The spot is also about 8 miles from Tinajas Altas and slightly more than 8 miles back to Tule Tank.

In 1896 surveyor and soldier David D. Gaillard reported that "an entire Mexican family of six or eight persons" had the calamity of its glass demijohn of water breaking about eight miles east of Tinajas

Altas; all perished and the site is now commonly known as the Grave of Eight. "The wagon tracks made when the [unfortunate] Mexican drove his exhausted team to one side of the road, were plainly visible thirty years afterward...."

Gaillard reminded his readers, "Nor are these horrible experiences confined to the past alone. The desert still claims its victims, and not a month passes but that some inexperienced prospector yields up his life in the search for the fabled mines of the desert-sirens which have lured scores of victims to their deaths. On two different occasions prospectors were rescued by our own [survey] parties when death seemed to them to be inevitable."

But disregarding the desert's perils, Gaillard fell in love with it. "In spite of all that has been said, there is an unexplainable fascination about the desert – a charm which, after a while, everyone feels, and which causes one to look with longing for the time when once more his eyes may rest upon the well-

remembered scenes, and once more he may stand amid that weird, appalling – but now to him soothing – silence."



Mile 78.9. 32°15'43.9"N, 113°54'17.1"W. A many-headed barrel cactus (*Echinocactus polycephalus*) north of road. This one has 27 heads, which are really stems of one

Mile 76.1. 32°14'52.0"N, 113°52'03.1"W. These slopes are like gardens. Note desert tree-beargrass (*Nolina bigelovii*), desert agave (*Agave deserti* var. *simplex*), and elephant trees (*Bursera microphylla*) on the slope, where you'll also probably find ragged rock-flower (*Crossosoma bigelovii*), twinberry (*Menodora scabra*), arrow-leaf (*Pleurocoronis pluriseta*) and other uncommon desert plants. In Spanish the *Agave deserti* is called lechuguilla, giving its name to the Lechuguilla Valley just ahead.

Mile 76.6. 32°14'49.4"N, 113°52'58.9"W. You are leaving the granite mountains to cross the Lechuguilla Valley, but may find a suitable campsite here.

The Tinajas Altas Mountains appear low on the western horizon, almost like a mirage. If you are a thirsty traveler on your way to the gold fields of California, can you find the next waterhole? Can you walk that far? You've still got about 12 miles to go across the Lechuguilla Desert before you can get water at Tinajas Altas – if you can find them, and if there's any water left. If you found water a few miles back at Tule Tank you're probably feeling confident. If you didn't, you've now come across more than 50 miles of waterless desert and could very well be at the edge of your endurance.

Earliest travelers didn't have the information we do today. There were no guidebooks, no road signs, no GPS, and no satellite imagery. At best they might have a very crude map (though we know of no surviving examples), and they were probably finding their way based on verbal directions provided by someone who may or may not have actually done the trip. One survivor of the Camino, Raphael Pumpelly, got his directions in a saloon from a bandit who intended to waylay him. A typical set of directions might have told you to ride west for a day to a white pass, then up a canyon to find water, then ride another day to a broad valley, then veer north, and so on. What's amazing is that many more people didn't die, and it says a lot for the hardiness and determination of the many people who have passed through here.

Mile 77.1. 32°15'06.9"N, 113°52'35.4"W. Tordillo Mountain (2,170 ft.) to your north provides an interesting hike and scramble. Tordillo means "dappled" or "gray." Tordillo and Cabeza Prieta Peak are on the eastern side of a large granite batholith that includes the southern Copper and Gila mountains, plus all of the Butler and Tinajas Altas mountains. The rock, intruded in Cretaceous or Paleocene times, is called Gunnery Range granite in a salute to the Goldwater Range. The basalt caps on Tordillo, Cabeza Prieta Peak, and Raven Butte came later (16 to 10 million years ago).



As you go.... Miles 77.2 to 77.5: A rough stretch of road across the lava from the Tule Mountains reminds us why the old Camino del Diablo was primarily a foot or horse trail.

The well or wells were about 35 feet deep and relied on a bucket and windlass to bring up water. Raphael Pumpelly traveled along the Camino del Diablo with his family in 1915, and the well left a lasting impression on them. He wrote,

We camped at the abandoned Tule well. Its water was both brackish and offensive, but facing thirst on the desert one can't be squeamish. Several months later a friend who had been over that route on a survey asked: "How did you like the Tule well water?" "Not much," I answered. "Naturally," he said, "for we found and left a man in it two years ago."

Later a windmill raised water. Now it is a covered well with a solar pump and large storage tank.

White salts on the soil indicate ground water close to surface, as do salt-tolerant plants such as seepweed (*Suaeda nigra*) and desert saltbush (*Atriplex polycarpa*). This is one of the few places along the Camino where these plants grow.

Mile 70.7. 32°13'11.7"N, 113°46'32.7"W. Note differences in color of sands in this small wash: blond from granite west of the wash, and black from basalts east of the wash. Also this is a favorite place to stop and touch the granite and wander among the small outcrops, especially for youngsters.

The first wash to the west has stands of sweetbush (*Bebbia juncea*), a prolific producer of food favored by butterflies and chuckwallas, hence its other common names butterfly bush or chuckwalla delight. You may see chuckwallas (large herbivorous lizards) later at Tinajas Altas or along the route to Fortuna. The wash also features canyon ragweed (*Ambrosia ambrosioides*) and narrowleaf climbing milkweed (*Funastrum hartwegii*).

Mile 70.8. 32°13'12"N, 113°46'40"W. Administrative trail to north goes to Buckhorn Tank, a pleasant 2 ½ mile walk one-way. From the tank you may wish to walk to the low pass west of the tank and circle south around the mountain back to your vehicle. If flowers are blooming anywhere on the refuge, they usually are blooming along this route, plus you may see bighorn, butterflies, and other amazing creatures along the way.

Buckhorn Tank was an intermittent tinaja used by Native people, and then enlarged by the refuge as a waterhole for wildlife in 1948. Named by refuge patrolman John "Ace" Kempton for horns and skeletons of desert bighorn sheep he found in the area. After a week's stay in an observation blind at the tank, naturalist Ann Zwinger wrote, "Easy landscapes stifle me.... I prefer the absences and big empties.... I prefer the raw edges and the unfinished hems of the desert landscape."

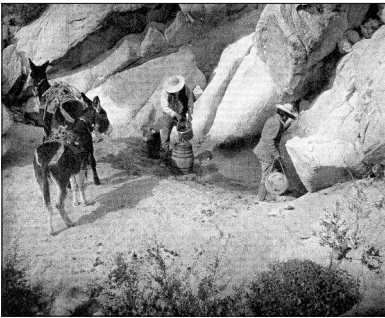
Also, you have a good view of Cabeza Prieta Peak from this road junction. Many people looking to climb the peak start their trek from here. It's a full day venture, about 6 miles each way, much of it across rough ground. The vistas are stunning.

Mile 70.9. 32°13'12.0"N, 113°46'49.9"W. Border Patrol roads to the south and north are closed to the public.

As you go.... Miles 71.0 to 73.8: Good examples of dark cryptobiotic soil crusts carpeting ground between creosotes. Following summer rains, these carpets may erupt with hundreds of millipedes that live underground most of their lives but graze on the living crust, primarily at night.

Tire tracks across the soil may be decades old and are harmful to the soil because tires kill the crust, compact the ground and reduce moisture, create erosion, and encourage other misguided drivers to follow off-road. Driving off-road also attracts the attention of police who may assume the driver is a smuggler.

Mile 71.6. 32°13'12"N, 113°47'34.8"W. Tule Tank. This famous tinaja about ½ mile north of the road was a crucial water stop on El Camino del Diablo. In 1925 hydrologist Kirk Bryan reported, it can be found "1,600 feet...up a narrow canyon. It consists of a rock basin about 6 ft. in diameter at base of dry falls and is usually full of sand. Water is found in the sand for some time after rains. Not permanent."

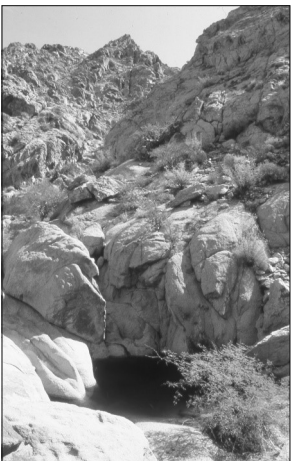


Rock basins such as this were extremely important sources of water for Native people and early European explorers. They are called "tinajas" in

Spanish. Carl Lumholtz, an intrepid Norwegian ethnographer who traveled the Camino in the early 1900s, writes the following about Tule Tank, "At Tinaja del Tule...we watered our animals and filled our barrels." He goes on to comment that he was surprised at the small volume of the water hole, but then says, "Still, as it is in sand, it contains somewhat more water than is apparent, and it would

cover a horse standing in it." Kirk Bryan reported that a sand-filled tinaja may hold about 25% water in the spaces between sand grains, and you may see holes where wildlife, especially coyotes, digs for water. Evaporation from open water surfaces may reach 1 inch per day, with Yuma running about 120 inches per year.

Tule is Spanish for "cattail" (*Typha domingensis*) and its O'odham name 'Uduvhag ('Uduvak) means "where cattails grow." No cattails grow here today, but the canyon is a pleasant place to meet hollyleaf bursage (*Ambrosia ilicifolia*) and to see grinding holes used by Native Americans. The presence of grinding holes (known as mortar holes to archaeologists), provides a glimpse into the life of



the Native people who lived in the region. With heavy stone pestles, they ground mesquite pods into meal in these holes, which are found near virtually all tinajas.

Along the wash you may be caught by the thorny catclaw acacia (now *Senegalia greggii*), a fragrant blooming tree that attracts numerous native bees. The range of this tree is a bit unusual, for it grows in a belt across the US-Mexico border states and Nevada from the Gulf of Mexico nearly to the Pacific Ocean. A very small butterfly may be encountered at the flowers, the Marine Blue (*Leptotes marina*). The tinaja is at **32°13'35"N, 113°47'47"W**.

As you go.... Miles 72.3 to 72.7: Rocks to scamper on! Look for unusual plants among the rocks, such as ragged rock-flower (*Crossosoma bigelovii*), turpentine broom (*Thamnosma montana*), California otat (*Fagonia californica*), and desert-fir (*Peucephyllum schottii*), as well as bighorn tracks, scat, and beds.

Mile 74.0. 32°14'14.8"N, 113°49'36.4"W. This is a pleasant spot to rest and take flower photos, and a good starting point for those wishing to hike to



Cabeza Prieta Peak, about 3½ miles one way. The summit, one of highest in the refuge, offers a stunning panoramic view of the refuge and beyond. The peak's Spanish name means "dark head," and in O'odham it is S-Chuk Mo'o ("black head"). The seldom visited Tule Mountains stand to the south.

Many of the surrounding mountains are light-colored granite covered by a layer of dark basalt, but most of the basalt has been eroded away.

As you go.... Miles 75.5 to 77.1: Watch for bighorn tracks crossing road from one mountain to another, or feeding on new growth of trees along the washes. Seasonal devil's claw (*Proboscidea altheifolia*) and globemallows (*Sphaeralcea* spp.) flower here.

Leaf-cutter ants (*Acromyrmex*) may leave trails of leaves and petals across the roadway as they take them to their nests marked by entrances shaped like miniature volcanoes. In their underground vaults, the ants actively farm fungus on the organic matter, and that is their food. Individual colonies may be many decades old and even use the same entrance; these nests may extend 10 to 12 feet below ground. You may see harvester ants (such as *Pogonomyrmex*, *Messor*, or *Aphaenogaster*) that gather seeds, bring them back to the nest, and crush them with powerful jaws. Harvester ant nests are characterized by denuded ground around the entrance and piles of chaff. Ants and termites are major agents in aerating the soil and recycling organic nutrients. Some experts estimate that the biomass of ants and termites exceeds the living weights of all other animals in the desert combined. They do the work done by earthworms in moister climates.