

# DESERT REPORT

BY PATRICK DONNELLY

## Species On The Edge Of Extinction

Conservation of aquatic biodiversity in the Great Basin

The Great Basin is among the driest regions in North America, and yet is blessed with abundant springs which punctuate the landscape's corrugated basin-and-range topography. In particular, the Great Basin has the densest concentration of thermal spring features anywhere on the continent, a vitally important resource since the Great Basin is a cold desert which experiences hard freezes all winter long. Thermal springs provide an essential refuge for biodiversity - the fact that they do not freeze means life is able to persist in places it otherwise could not.

Due to its extreme aridity, unique geology and topography, and the vast distances separating its surface water bodies, the Great Basin has extremely high levels of endemism. Well over 500 taxa of fish, plants, insects, mammals, amphibians, and aquatic invertebrates live in the Great Basin and nowhere else on earth - many inhabiting just a single site. These narrow endemics are frequently clinging to existence at the very limits of their physiological tolerances for extreme environmental conditions, be they water temperature, aridity, heat, salinity, nutrient deficit, or other abiotic factors.

Narrowly endemic aquatic or groundwater dependent organisms (herein aquatic endemics) are the most imperiled class of taxa in the Great Basin. Functionally

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*Dixie Valley Toad. Photo by Patrick Donnelly*

### SPECIAL ISSUE

Continuing a series of focused articles placing our deserts in a broad environmental and social context as we are increasingly faced with a number of *Fundamental Choices*.



BY ROLAND GEYER

# Corporate Sustainability Has Failed Us

## Now what?

This year marks the thirtieth anniversary of the Earth Summit in Rio de Janeiro, the seminal event that propelled environmentalism out of its niche existence and into the global mainstream. The Rio Conference set off an avalanche of governmental, civic, and corporate environmental activities and firmly embedded the notion of sustainability into everyone's language and consciousness. Looking at it from this angle, the Earth Summit was a tremendous success and its anniversary should be cause for celebration.

Unfortunately, the mood among environmental scientists and activists is increasingly dark and desperate rather than celebratory and joyous. Thirty years after the United Nations convened the world's leaders in Rio and urged them to "rethink economic development

and find ways to stop polluting the planet and depleting its natural resources," humanity is still not living any more sustainably. Instead, the three environmental crises of climate change, biodiversity loss, and pollution are still accelerating rather than slowing down. How is this reconcilable with thirty years of governmental and corporate sustainability efforts? Let's take a moment to explore the events that led to the Earth Summit. It will help us understand what went wrong during and after the Summit and find a path forward that might finally reconcile human prosperity and environmental health.

### A brief history of business and the environment

At the beginning of the 20th century, humanity's impact on the environment was still negligible. Only a fraction of the 1.7 billion people on the planet had been industrializing their economies, using inefficient and limiting technologies. Annual global GDP was roughly 3 trillion 2010 dollars and annual fossil CO<sub>2</sub> emissions were around 2 billion metric tons, almost all of which came from coal combustion. Despite the advances of the industrial revolution, planet Earth still seemed vast and the idea that humanity could alter its environment on a global scale seemed preposterous.

The next fifty years not only saw two devastating world wars, but also unimaginable scientific and technological advances. The electrification of factories made assembly lines and thus mass production possible. Mass produced automobiles fueled by leaded gasoline soon replaced horse-drawn carriages. The new ability to mass produce aluminum made commercial aviation possible. The invention of CFCs made compressor-based refrigeration and spray cans affordable and safe for households. Mass production of nitrogen fertilizer and synthetic pesticides, such as DDT, revolutionized and industrialized agriculture. The invention and mass production of synthetic polymers, known as plastics, paved the way to single-use packaging and products.

By mid-century, the environmental consequences of the relentless growth in industrial production and consumption became impossible to ignore. In 1948, smog caused by U.S. Steel's zinc and steel plants in Donora, PA, killed twenty and sickened thousands. At the same time, the exhaust of millions of cars in the LA basin caused ever-worsening photochemical smog, while the Hooker

The series of articles on Fundamental Choices is continuing in this issue with one by Birgitta Jansen (an interview with Ehsan Masood) and another by Roland Geyer (on corporate sustainability). As part of the Fundamental Choices series we're also planning an additional Desert Report for this summer. The focus of this entire issue will be an in depth look at the prospects and problems for obtaining renewable energy from solar sources. The current priority given to deserts of California and Nevada for photovoltaic installations makes this topic especially relevant for readers of this publication. There are no easy answers. – *Editor*

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BY BIRGITTA JANSEN

# The GDP: It's Complicated

An interview with Ehsan Masood

## The GDP today

Science journalist and senior editor at the journal *Nature*, Ehsan Masood, recently wrote a book about a subject worth thinking about: *GDP: The World's Most Powerful Formula and Why it Must Now Change (2021)*. We spoke on the phone January 27, 2022. He was at his home just outside north-west London.

The GDP (Gross Domestic Product) "is the world's principal measure of economic growth."<sup>1</sup> According to one of the most commonly-used measures, it is the sum of the money we spent, for instance, going shopping (C), plus the large sums spent and invested by corporations (I), plus money invested by government (G). Money that is spent on the purchase of goods outside the country (M) is subtracted from the money earned from sales outside the country (X) and that total is then added to the sum of money spent within the country. In short:  $Y = C + I + G + (X - M)$ .<sup>2</sup>

Masood maintains that, since the GDP is now almost universally utilized as a measure of a nation's economic success, it has become the world's most powerful formula. So powerful, that when the GDP goes down, it takes politicians' chances for re-election down with it. Despite its almost global acceptance, even its designers accept that it is a flawed measure because it is based on the singular assumption that: "economic growth is always good." That assumption is now in question. A healthy rise in the GDP can mask many ills such as poverty, pollution, and environmental degradation.

The GDP was designed in the US and the United Kingdom in the 1930s and 1940s, and during that time economic needs and requirements were different. For instance, British economist John Maynard Keynes advocated for government spending to boost countries' economic development with the intention to protect existing jobs and create new jobs by investing in big-capital-intensive projects. The expectation was that this would increase economic growth and GDP.<sup>3</sup> It did. The adoption of these ideas led to a system that stimulated and rewarded large scale industrial and commercial development. But this in turn, led to large scale environmental degradation and other negative unintended consequences.

In many instances, both past and present, it is not the corporations who need to confront these problems

or bear the costs for the clean-up and restoration of the land, but the taxpayer – that is, if the land can be restored. Regardless of who pays, these expenses also boost the GDP. When money moves around, it counts.

But we are now paying the price for accepting without question that "economic growth is always good." Climate change is a good example of that. Masood agrees that politics and economics are closely related, and inextricably intertwined with environmental degradation. In his amiable voice with a slight British accent, he explains that, "The practice of neo-liberal economics has closely followed a politics that supports the idea of small states, low taxes, and which favors developing big industries." He continues, "Although the GDP was developed nearly 94 years ago, governments still organize their countries economic affairs along these lines. The other relationship between politics and economics is that economic research is funded by government grants, which determine priorities. Also big corporations are large donors to political causes. This gives them influence on the political decision making processes. It has always been this way but what is different now is the scale of corporate power."

"In addition, the GDP tends to reward traditional, fossil fuel-powered economic development. Since the fossil fuel industry's infrastructure is mostly in place, it can move forward much more quickly than greener development." In essence GDP incentivizes economic sectors that increase the GDP regardless of environmental degradation.

Masood's example of this is coal fired power. "Countries need power therefore they are still investing in the extraction of coal. The GDP is constructed in such a way that coal fired power plants can quickly increase the GDP. This does not encourage countries to consider alternatives. Good access to electrical power is tied to the GDP."

## The dilemma and the need for change

Now we find ourselves on the horns of a dilemma, a conflict between the continuing need for large scale economic growth and the increasingly urgent need to take care of our biosphere. The biosphere is a closed system which means that nature's resources have limits.

But how do we to make the necessary changes on the scale that is necessary? It would not entirely solve

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BY ROGER FEATHERSTONE

# Mining For Strategic Minerals

## Planning before it's too late

Although conservationists have long known the dangers of climate change, many others have taken far too long to join the bandwagon. And, many, including some decision makers and members of Congress, have not and probably never will recognize the threat. It is a sure sign that climate change has hit the big time when corporate America is jockeying to figure out a way to make big money from the crisis.

The international mining industry is now talking non-stop about the world needing more mining to produce copper, lithium, and other minerals which, they say, will be needed to build renewable energy to replace fossil fuels. Mining companies have crafted a public message that roughly says: "We need to mine our way into a climate neutral future, and you cannot stand in the way of our efforts to save you." It is important to note that most mining companies are foreign based, and it is highly suspicious when a foreign corporation talks freely about providing a large percentage of US

minerals and solving the economic and climate woes of a country other than their own.

In the United States, mining companies are heavily subsidized. Not only do they get tax breaks and other direct subsidies, but the U.S. is the only country in the world that gives hard rock minerals (copper, gold, silver, lithium, etc.) away without charging royalties. This is one of the many out of date provisions of the 1872 General Mining Law (signed into law by President Ulysses S. Grant) that is still the law of the land. State laws, especially in Arizona – owner of the worst state mining laws in the union – also give tremendous financial incentives to mines in the U.S. While state laws are somewhat better in Nevada and even more so in California, nearly all state laws are too weak and out of date in today's brave new world.

While the demand for wind turbines, electric cars, solar panels, batteries, and many other components will require more minerals than we use now, the projections made for new mines by the mining industry and their supporters are wildly inflated. The commodity prices of most minerals have risen sharply in the last couple of years, and mining companies are actively looking for the next big "strike" to take advantage of this new "boom."

In the United States, anyone (including foreign corporations) can claim public land for mining simply by "staking" a mining claim and paying a small annual fee. This gives the claim holder exclusive rights to the minerals under the surface. Almost all the public land open for claiming in southern California, Nevada, and Arizona is already claimed. Even some claims within out-of-bounds land such as Wilderness Areas are still susceptible to mining. Land disrupting activities can happen on these claims long before actual mining takes place. Existing deposits and mines in the Death Valley area show the presence of iron, lithium, tungsten, bismuth, copper, gold, manganese, zinc, silver, lead, uranium, and fluorine (fluorite). Most, if not all, are used for the production of renewable energy infrastructure components.

Mines use an enormous amount of water. A study of seven working copper mines in Arizona, operating from 2004 – 2008, showed an average water consumption of 28.3 gallons per pound of copper. For the proposed Resolution Copper mine which would destroy Oak Flat in Arizona, experts have calculated that the



***Pit lake is the glory hole at the Questa mine in New Mexico. Photo by Roger Featherstone***

mine would use enough water for a city of 180,000 people.

The largest use of water in open pit and block cave mines involves transport and storage of tailings (discarded remains of the mined ore after processing). Tailings usually include toxic mineral such as arsenic, selenium, lead, etc., and many also contain sulfur components which when mixed with water and air reacts with the toxic minerals to release them into the air and water. Usually, tailings leave the processing operations mixed with water in a slurry. These tailings are moved via pipelines to the tailings dump where some of the water is drained and then returned for further use. However, huge amounts (in excess of 47%) of the tailings dump will be water. Not only do tailings dumps sequester huge amounts of water, but this water is normally highly toxic and often migrates from the tailings dump to create long term water pollution.

Deep mines (either open pit or underground) need to be kept dry as mining takes place. This requires dewatering an often large area around the mine. Once mining ceases, water flows back into the mined area. It often takes many hundreds of years for water equilibrium to get back to pre-mining conditions. This flow into the mine after mining ends can permanently deplete water from large areas around the project.

We are experiencing the worst drought the southwest has seen in 1,200 years. In Arizona, this is the 23rd year of continuous drought. In desert climates, water pollution is a problem, but the bigger problem occurs

when mines usurp water from communities and the environment. We are already having trouble providing water for existing users (and wildlife and wildlands are certainly feeling it the worst), and we certainly won't have enough in the future with the added burden of new mines.

Mining also uses a huge amount of energy. Studies show that mining worldwide uses 10% of the world's usable energy supply. Again, looking at the proposed Resolution Copper mine in Arizona, the project could use as much as 22% of the peak power capacity of the Salt River Project (the utility that would provide electricity for the project). This proposed mine could use as much electricity as 1.6 million households. With the power generating capacity of Lake Mead and Lake Powell in serious jeopardy due to our ongoing drought, additional mining activity could seriously impact residential users.

Roads, along with the powerline and water pipeline corridors that accompany mining operations, all create serious impacts to desert ecosystems and are magnets for unfettered development around these "improvements."

### **There are generally three types of mining in the southwest**

Open pit mining is used most often. Here, you remove non-mineral bearing rock from above the deposit to get to the ore body. The excavation leaves a large hole in the ground (although the state of California requires that this pit be backfilled). Since such a large quantity of material needs to be moved, open pits generally have large piles of waste rock (which may or may not be polluting) as well as the tailings dumps we have talked about earlier.

Underground mining is also sometimes used. As most new mines are very large, a procedure called block caving is now more prevalent than the "old fashioned" cut and fill type of mines. Block cave mines are essentially an upside-down open pit. These mines leave a crater due to the ground subsiding where the ore-body has been removed and also have the same large tailings dumps and water usage that open pit mines do.

The third type is in-situ mining with a variety of mining brines. These mines pump water containing dissolved minerals from the ground. For traditional in-situ mines, you drill a well and inject acid into the orebody to leach minerals from the rock. You then drill more wells around the injection well which are supposed to pump at a slightly higher rate than the injection well to recover the mineral laced water. This "pregnant" water is then processed creating toxic waste while also permanently polluting the water table. In a slightly different procedure (one which is used with some lithium deposits), underground brines are pumped to the surface to settle and evaporate in large ponds which may,



***Subsidence at San Manuel Mine. Photo by Bruce Gordon, Ecoflights***

BY MARK R. FAULL

# Preserving History In A Classic Landscape

## Two possible futures for the Old Dutch Cleaner Mine

One of the most endearing aspects of our California deserts is our ability to witness firsthand the raw and brute force of powerful geology at our fingertips. Elsewhere in the state, increased moisture adds layers of life that conceal that raw earth beneath our feet. Unveiled in the deserts is the majesty of rock sculpted over the eons by the interplay of tectonic forces and the limited, but consistent, etching of water (sometimes accompanied by wind).

Red Rock Canyon represents one of the most spectacular and dramatic examples of that interplay. It is a unique theater where the drama of desert adapted lifeforms, many of which are locally endemic, gives way to inspiring and expansive geologic vistas. From massive rock monuments and parapets, towering several hundred feet overhead, down to the very intricate, we marvel in awe at the forces which shape our planet. This exposure of readily accessible raw earth also avails another opportunity – easier access to minerals. And thus, it is not surprising that many of our most prized desert landscapes have in tandem a rich mining history. Such a circumstance is abundantly true at Red Rock Canyon State Park.

Most of the Red Rock mine sites have long ceased production and now lie protected within the park as one more layer of the cultural heritage associated with this landscape. Nevertheless, there do remain a few private inholdings left over from past endeavors where ever-hopeful owners envision riches to come.

The largest modern inholding includes the remains of the Old Dutch Cleanser mine where room and pillar underground mining from 1923 to 1947 excavated 120,000 tons of pumicite (under the tradename of “seismotite”). This fine volcanic ash was used as the abrasive element within the extraordinarily popular and successful scouring powder Old Dutch Cleanser. Since 1947 when the popularity of Old Dutch Cleanser faded, these mines have sat nearly idle. But these juxtaposed societal uses, heritage preservation and mining, remain on a collision course today.

What is historically intriguing is that both the effort to preserve Red Rock Canyon and the creation of the Old Dutch Cleanser Mine occurred in close chronological proximity. This makes the story of the preserving the amazing heritage contained in Red Rock and Last Chance Canyon and the extraction of the minerals for

Old Dutch Cleanser a parallel journey.

The movement to preserve Red Rock Canyon as a State or National Park began in earnest in 1919, predating the Old Dutch Cleanser Mine by nearly four years. That movement was spearheaded by a former City Editor for the *Los Angeles Times*, John Von Blon, who built a coalition of citizens interested in Red Rock Canyon. Using his skills as an author, Von Blon published several pivotal articles about Red Rock Canyon: a multi-page article in his former newspaper (October 12, 1919), an article in the October 4, 1919 issue of *Scientific American*, and a third in the December 1919 issue of the very popular *The Wide World* magazine. In all three, Von Blon praised the attributes of the canyon, called for its formal sequester as a park, and cultivated people’s curiosity when he initiated many fanciful place names for the canyon’s sculpted architecture. Most of those names survive today. Von Blon liberally used photographs that later became early staples of the Red Rock postcard trade.

Only one year after Von Blon’s efforts, another writer joined in singing the praises of Red Rock Canyon.



**Cliff with the Dutch Cleanser Mine. The top would have to be removed for an open pit mine.**

**Photo by Mark Faull**

In 1917, Ruth Thompson became the first schoolteacher hired at Red Rock Elementary School in Cantil immediately south of the proposed park. While living there, she was captured by the beauty of the local desert landscape as well as its inhabitants, and in 1920 she published “*Comrades of the Desert*,” a novel meant to inspire adolescents. The book’s popularity was instantaneous, and in it she introduced young readers nationwide to Red Rock Canyon and the early 20th Century’s rugged life on the ranches near Koehn Dry Lake. Considered by scholars to be an American classic, the novel boasted early photographs of the canyon with chapter five devoted to the awe and reverence that the four young lead characters felt upon entering Red Rock’s rugged ramparts.

These back-to-back publications unveiled the mysteries and beauty of Red Rock Canyon to early 20th Century America. Whereas Ruth Thompson’s prose introduced Red Rock Canyon to readers far and wide who never witnessed the canyon firsthand, Von Blon’s promotion and articles started a movement of people visiting the canyon, touting its attributes and calling for its preservation. Fueled by the “ease” of early automobile travel, artists, adventurers, and even the motion picture industry began to flock to the canyon.

With a public desire to preserve Red Rock Canyon for posterity already under consideration, interest in Last Chance Canyon joined the cascade in 1924 with the discovery of a fascinating Petrified Forest. The local remains of fossilized trees had first been noted by miners in late 1893 and were well known to local, early 20th Century prospectors. Nevertheless, it took two brothers, Charles and Ben Brewer, to turn this Petrified Forest into a paid tourist attraction in 1924, complete with a guided tour. The new daredevil tourists, bouncing along the dusty desert dirt roads of the day, would utilize the new haulage road, created the year before to transport “seismotite” from the Old Dutch Cleanser mine, to access this stone forest which lay only a little over a quarter of a mile away from the mine.

Almost immediately, this stone forest added to the chorus calling for local preservation. By November of 1925, word had leaked that the forest would be preserved as a National Monument, but then the good news evaporated. One overly optimistic headline in the November 24, 1925, edition of the *Bakersfield Californian* read “Kern’s Petrified Forest Declared National Park.”

With federal protection failing, scientists, artists, garden clubs, and adventurers turned their attention towards the embryonic California State Park System of the late 1920s and managed to insert both Red Rock Canyon and neighboring Last Chance Canyon into the first prioritized listing of terrains to be acquired for the public good. A document, prepared by Frederick Law Olmsted, Jr. for the State Park Commission and released in January of 1929, provided a formal recogni-

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# Thank You

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# Species On The Edge Of Extinction

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every aquatic endemic in the region is threatened with extinction due to a combination of factors including groundwater overdraft, declining precipitation and runoff due to climate change, increasing desiccation and evapotranspiration from increased temperatures, direct habitat destruction, groundwater manipulation for energy production, overuse by recreationists, invasive aquatic or terrestrial species, or other factors. If we willingly allow a species to go extinct, we have diminished a world that we don't even begin to understand, and we have thereby diminished ourselves as well.

The Center for Biological Diversity is actively engaged in the conservation of these aquatic endemics, primarily through using the Endangered Species Act (ESA) to obtain protections for these imperiled organisms. In almost all cases, it is only through many years of advocacy and litigation that the US Fish and Wildlife Service (FWS) will list a species. The following are examples for which the Center has actively petitioned.

The Dixie Valley toad (*Anaxyrus williamsi*) is a species of the Western toad complex which lives at a single location in Churchill County, Nevada. The toad's habitat, Dixie Meadows, is a vast wetland ecosystem fed by abundant flow from hot springs at the site. The hot springs are indicative of a geothermal aquifer, and as a result geothermal energy developer Ormat has long coveted the area for energy production. There is an extensive body of peer-reviewed literature documenting that geothermal energy production dries up or significantly alters adjacent surficial thermal water features. In one report, the United States Geological Survey stated such a thing "is the rule, not the exception." The Dixie

Valley toad has persisted for hundreds of thousands of years, and, but for the geothermal power plant proposed next to its habitat, would continue to be a happy little toad into the future. But it now faces an existential risk of extinction due to the proposed geothermal project.

The water in the Great Basin's aquifers have long been coveted by urban areas seeking water to fuel sprawling growth. So it is with the proposed Pine Valley Water Supply Project, the first part of a 70 mile pipeline-and-pumping scheme which would drain groundwater from aquifers in the West Desert of Utah to feed sprawl in Cedar City, Utah. The drawdown could propagate across a huge area of the eastern Great Basin, depleting aquifers as far afield as Spring Valley and Great Basin National Park in Nevada, and northward down-gradient in Utah toward Fish Spring National Wildlife Refuge and the Great Salt Lake itself. As a result of these threats, the Center has petitioned FWS to protect the least chub (*lotichthys phlegethon-tis*), a rare fish which inhabits just a handful of spring systems across the West Desert. The Center previously petitioned the least chub in 2007, but listing was denied in 2014 due to a "candidate conservation agreement" in which parties including the state of Utah implemented various conservation actions to address the reasons the fish is imperiled. All of those conservation actions are for naught, however, if there is no water for the fish to live in.

Nevada is home to no fewer than 75 species of springsnail – tiny mollusks which inhabit spring ponds and brooks in thermal waters across the state. The



**Bishop Springs in Snake Valley, Utah, home to the least chub. Photo by Patrick Donnelly**

sterile basin pyrg (*Pyrgulopsis sterilis*) lives at just two locations in Nye County – one location, whose current status is unknown, is on a privately held ranch actively grazed by cattle, the other is at Sidehill Spring in Stone Cabin Valley. Sidehill Spring is an extremely remote location that is heavily overgrazed by cattle and feral horses. The spring pool and brook have been decimated by ungulate hooves – and yet somehow, against all odds, the sterile basin pyrg persists.

The Long Valley speckled dace (*Rhinichthys osculatus ssp.*) is a subspecies of the more widespread speckled dace which lives only in the Long Valley caldera in Mono County, California. The Long Valley speckled dace used to be widespread in the world-famous thermal waters of the area, but a number of factors including geothermal energy development, surface alterations and diversions, cattle grazing, and invasive species have caused it to be extirpated across the vast majority of its range. They were thought to be extinct in the wild, but recent surveys reveal that they do persist at one location, in the outflow from municipal pools at Whitmore Hot Springs.

The Monte Neva paintbrush (*Castilleja salsuginosa*) is an extremely rare and diminutive cousin of the very common Indian paintbrush wildflower, and lives at just two locations – one on private land in Steptoe Valley, Nevada, and one on public land in Eureka County, Nevada. The paintbrush thrives in alkali soils fed by subsurface flow discharging from hot springs. Little is known about the private land population, but the Eureka County location on public land faces imminent risk of extirpation. Once persisting in complete obscurity, the

hot spring it lives at became developed with a famous heart-shaped pool, and visitation increased dramatically when Travel Nevada posted a photo of the pool on Instagram. Now, on any given day there will be dozens of “van-lifers” coming through the small, vulnerable site – driving on paintbrush habitat, trampling paintbrush plants, degrading the marshland, and altering the flow regime.

Finally – there is a cautionary tale. The Ash Meadows montane vole is (was) a subspecies of rodent which lived in the alkali wetlands of Ash Meadows in Nye County, and has not been observed since 1933. Repeated trapping efforts over several years in the 2000s turned up no voles at Ash Meadows, and the population was believed by the researchers conducting the trapping effort to be extirpated. While the declaration of extinction is a portentous occasion and has not been made official yet, it’s likely that the Ash Meadows montane vole is extinct due to the extensive historical alteration and destruction of alkali wetland habitats at Ash Meadows in the early- to mid-20th century. Its close cousin, the Pahranaagat Valley montane vole, still persists along the White River in eastern Nevada. Will a similar fate await it?

What can we do to stanch the aquatic endemic extinction crisis in the Great Basin? First and foremost is to cease groundwater pumping which exceeds natural recharge. This is the primary cause for aquatic habitat degradation and loss in the Great Basin. Natural recharge is decreasing as climate change takes hold, so basically all groundwater pumping in the Great Basin needs to be carefully scrutinized to determine if it is acceptable given current and future precipitation trends. Secondly, we need to invest in land management agencies to eradicate invasive species, manage recreation, and restore degraded habitat. Finally, we need to curb our carbon emissions, as climate change poses an existential threat to all aquatic endemics.

The Center for Biological Diversity will continue to use the Endangered Species Act to protect aquatic endemics, as it remains the best tool at hand to compel conservation action for biodiversity. But it will take more than just species petitions and litigation to save aquatic endemics in the Great Basin. It will take a change in our relationship with water and the land.

*Patrick Donnelly is Great Basin Director with the Center for Biological Diversity. His passion in life and raison d’etre is the conservation of aquatic endemics in the Great Basin. He fights mining, inappropriate energy development, groundwater pumping, and fossil fuels from a remote desert outpost on the edge of Death Valley.*



**The sterile basin pyrg. Photo by Patrick Donnelly**



# Desert Updates



*Road into Conglomerate Mesa*

## **Yet Another Bad Bill? California A.B. 2696**

California is normally to be commended for its engagement with the Climate Crisis. However, there is a temptation to look for simple solutions without considering side effects and collateral damage. Assembly Bill 2696, now before the State Legislature, exemplifies such a nearsighted impulse.

Existing state law requires the California Energy Commission (CEC) among its other duties, to assess the trends in the consumption of electrical energy and the alternatives available for meeting the demand. Section Two of AB 2696 would additionally require that the CEC (in consultation with several other agencies) review and report on potential lower cost ownership and alternative financing mechanisms for new transmission facilities needed to meet the state's clean energy and climate targets. A study of this sort may be long overdue, but one must ask: why does it focus solely on long-distance transmission and not on local distribution facilities? An enhanced distribution grid would assure that local energy resources ramp up and help avoid building remote, desert-destroying solar projects.

Current law requires that before construction of any electrical transmission line, the California Public Utilities Commission (PUC) must certify that the project is necessary for future public convenience and necessity. Traditionally these decisions are made after extensive review and public comment. If AB 2696 becomes law, the PUC will be required to provide the certification if the project will facilitate the achievement of California's stated renewable energy goals. The bill makes no mention of public convenience, necessity, or of any other consideration beyond production of large-scale renewable energy and the transmission needed to deliver it, whether it is cost effective or not. Environmental damage, social justice, and competing alternatives need not be considered. As written, this bill is hugely problematic.

## **California Border Wall**

Damage caused by construction of the border wall within the Jacumba Wilderness Area has been documented several times. (*Desert Report*, June 2020, and June 2021). Immediately after becoming President, Joseph Biden ordered an end to the construction sub-

ject to constraints of existing law. It has been difficult to evaluate the effectiveness of this order, in part because public access in Wilderness is restricted to non-motorized means and in part because the distinctions between "construction," and "remediation or maintenance" are subjective. The situation is further complicated by the mission of the Border Patrol to control entry into the country at its borders. The uncontested fact is that even within the past year roads have been altered within the Jacumba Wilderness, trenches for (presumed) electrical equipment have been excavated, natural drainages have been altered, and archaeological artifacts have been displaced.

In response to similar complaints all along the U.S./ Mexican Border, the California Wilderness Coalition joined four other plaintiffs in a suit against the Department of Defense, the Department of Homeland Security, and the Treasury Department charging violations of several provisions of the U.S. Constitution and several Federal laws. Before going to trial, a Settlement Agreement between the parties was filed on March 25, 2022.

Among the stipulations was an agreement that the defendants (U.S. Government departments) would provide access to cultural data and to planned demobilization plans for border barrier projects. In the El Centro sector of the border, the defendants agreed to 1) terminate construction that was undertaken using particular funding sources, 2) remove unused construction material and backfill open trenches, and to 3) consult with the Plaintiffs on remediation of damaged vegetation, on repairs to roads and berms, on remediation for blocked drainages, and on the means for allowing wildlife free passage across the border.

It is significant that there are no promises for remediation of damages. The Governmental departments promise only to *consult with the Plaintiffs in the future*. The action to be taken as a result of the consultation is left to the federal departments. The settlement also specifies that any remediation will be dependent upon the availability of sufficient funding. Perhaps the best that can be said of the agreement is that the federal government has acknowledge the nature and extent of damage done by construction of the wall.

Settlement Agreement in the matter of *Rio Grande Int'l Study Center, et al., v. Austin, et al., No. 19-CV-720 (D.D.C)*

## Conglomerate Mesa in the News Once Again

On March 21, 2022, K2 Gold, a Canadian mining company, announced that it was suspending its gold mining project on Conglomerate Mesa. For several years K2 has accessed the area by helicopter and has been drilling prospect cores to assess the value of the ore. More recently, it sought permission to construct a road into the area and to expand their explorations to over forty drill holes. Before granting permission, the Bureau of Land Management (BLM) required that a lengthy Environmental Impact Statement (EIS) be prepared. The appearance was that the probability of economic success was not sufficient for K2 Gold to justify the cost of the EIS and that was responsible for their withdrawal. On May 14, K2 Gold informed the Ridgecrest BLM office that *it has reversed its decision and intends to resubmit its mining proposal and will pursue an EIS*. The future of Conglomerate Mesa remains in limbo.

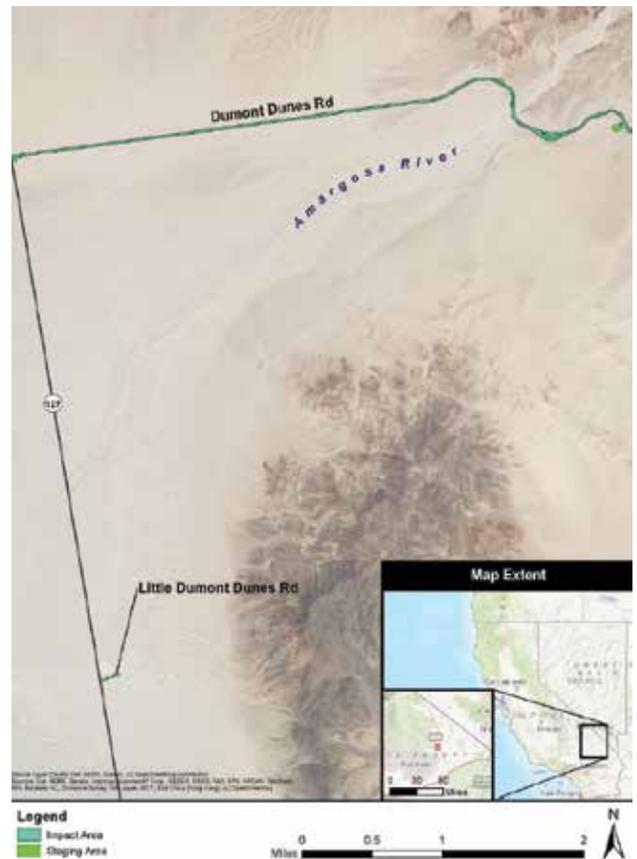
Conglomerate Mesa is entirely roadless, has a rich variety of flora, and is sacred ground for several Native American Tribes. These Tribes, local residents in the nearby Owens Valley, and a number of environmental organizations have long argued that Conglomerate Mesa deserved the same legislative protection that is given to the neighboring Malpais Mesa and Inyo Mountains Wilderness Areas. While Conglomerate Mesa does have some level of protection under BLM protocol, these latter designations are administrative and can be overridden by the 1872 Mining Act and NAFTA treaty obligations.

## Are the Dumont Dunes Exempt from Environmental Review?

North of Baker, California, and south of Shoshone, the Dumont Dunes are a popular destination for off-highway vehicle recreation. On winter weekends there can be many thousands of people who use the area for family camping and for open riding in the spectacular landscape. The dunes are managed by the Bureau Land Management (BLM) which charges a fee for access. Lying three miles east of paved U.S Highway 127, visitors reach the area via a three-mile graded gravel road which may be heavily corrugated and is certain to be dusty.

Plans are currently being finalized to pave this access road with work to begin in early summer 2022. Permits have been obtained from the Federal Highway Administration, and as the road will cross a federally designated Wild and Scenic River, a Biological Assessment has been prepared. These documents acknowledge that the project will in all probability increase the use of the recreation area. The Barstow field office of the BLM has ruled that beyond the right-of way itself, no environmental review is necessary beyond what has already been done. No public hearings have been held, and no formal opportunity for comment has been created.

Twenty or thirty miles away, residents of Shoshone and Tecopa have been miles concerned for some time about



increasing use of off-road vehicles in the area. Dust from the Dunes can travel many miles, and while tourism is encouraged, roadside litter and discarded trash are persistent problems. Common experience suggests that increasing use of permitted riding areas correlates with illegal intrusion into nearby areas that are designated for protection. A fuller evaluation of the environmental consequences of the proposed project would seem to be warranted.

## Fish Slough Caught in the Middle

Fish Slough is a national treasure with fourteen special status species including the endangered Owens Pupfish. A part of Fish Slough is an Area of Critical Environmental Concern (ACEC), and while this affords some protections, the groundwater flowing through Fish Slough is not protected. Its groundwater, coming from the nearby Tri-Valley basin, is being diverted before reaching the Slough.

Who manages that groundwater? The answer to this question is changing. The Owens Valley Groundwater Authority (OVGA) was managing the Tri-Valley basin as part of the larger Owens Valley groundwater basin and had recently submitted a groundwater sustainability plan to the Department of Water Resources. The plan outlined steps needed to address the decline in the water table in the Tri-Valley. The OVGA consists

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# Corporate Sustainability Has Failed Us

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Chemical Company polluted the Love Canal in Niagara Falls, NY, with toxic waste. Rivers, like the Cuyahoga, were so polluted that they kept catching on fire.

In the late 60s, people finally had enough and demanded change. It was the birth of the modern environmental movement. Industry was no longer exclusively seen as the generators of wealth and progress, but also as polluters who killed and sickened people and nature. 1970 saw two landmark events: The first Earth Day and the creation of the Environmental Protection Agency. Many environmental NGOs were founded in the late 60s or early 70s. The growth of the environmental movement is mirrored by the growth in environmental regulation and mandatory pollution control.

This period was characterized by conflict between industry on one hand and environmentalists or environmental regulators on the other. One side's gain is the other one's loss. Environmentalism is a threat to companies' profits or even viability. Companies are unrelenting and unrepentant polluters. Despite some successes of the environmental movement, pollution did not end. By the early 90s, 5.5 billion people were generating a global annual GDP of 39 trillion 2010 dollars and annual fossil CO<sub>2</sub> emissions of 22 billion metric tons. The United Nations became so worried about humankind's trajectory that it organized the Earth Summit in Rio de Janeiro in June 1992.

## The rise of win-win and eco-efficiency

The summit resulted in the Rio Declaration, the Agenda 21, the Forest Principles, and the Conventions of Climate Change and Biodiversity. Something equally momentous, but less apparent also had happened. Business and industry were suddenly no longer the enemy of the environment. Michael Porter, the leading business scholar at the time, started to suggest that "the conflict between environmental protection and economic competitiveness is a false dichotomy" and even went as far as claiming that pollution is simply resource inefficiency. For Stephan Schmidheiny, heir to the asbestos-cement empire Eternit and a key representative of global business at the Earth Summit, this meant that "business is good for sustainable development and sustainable development is good for business." This view is also known as 'win-win' and quickly became the main paradigm of the newly emerging notion of corporate sustainability.

The linchpin that holds the vision of continued economic growth and environmental sustainability together is called 'eco-efficiency.' Eco-efficiency is about reducing the environmental impact per unit of product, like a car, or economic output, such as GDP. Doing so decouples economic output from environmental impact, so that the former can continue to grow while the latter is brought down to a sustainable level. After the Earth Summit, most of the governmental and corpo-

rate sustainability efforts were based on the promise of win-win and eco-efficiency. We now had thirty years of eco-efficiency efforts, and therefore thirty years of data to examine its effectiveness.

Unfortunately, the reality of eco-efficiency looks very different from its promise. Despite the increasing fuel efficiency of the U.S. vehicle fleet, for example, its fuel consumption is still increasing, simply because everyone keeps driving more year over year. Like many industrial processes, aluminum mass production has become much more energy efficient since it was invented around the turn of the last century, but this was no match for the dramatic growth in output. Since the Earth Summit alone, global annual aluminum production has almost tripled. Despite increased efficiency, global aluminum's annual electricity consumption more than doubled since Rio. In fact, in every single industry examined by a seminal study, growth in total production and consumption outstripped efficiency gains. All data shows that our single-minded reliance on win-win and eco-efficiency has been a dismal failure.

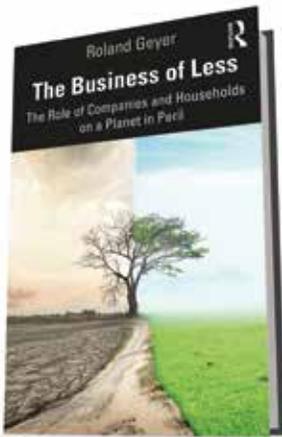
Probably the most fateful letdown of eco-efficiency is climate change. While the global economy doubled in size since Rio to 84 trillion 2010 dollars, its carbon intensity only decreased by 25%. As a result, annual fossil CO<sub>2</sub> emissions grew by over 60% in the last thirty years to 36 billion metric tons, despite the fact that the Intergovernmental Panel on Climate Change urges us to bring them down to net zero as quickly as possible

## What now?

The first task at hand right now is to fully recognize that the tenets of eco-efficiency and win-win have completely failed to deliver sustainability or even just modest environmental impact reductions. They have set us on the wrong course for the last thirty years and thus need to be thrown overboard. Encouragingly, even business scholars who made their name doing win-win research now call for its abandonment.

Next, we need new tools that can finally guide us to a more sustainable future or, at this point, even just help us to increase the likelihood of maintaining a livable planet. I am presenting and discussing such a set of tools in the second half of my book *The Business of Less: The Role of Companies and Households on a Planet in Peril*. The concept that I propose to replace eco-efficiency is called 'net green.' It emphasizes that the purpose of any environmental action is to reduce total environmental impact and not just impact per product.

I then apply the net green concept to the three pollution prevention principles of reuse and recycling, substitution, and source reduction. The net green lens reminds us that the sole purpose of recycling, for example, is to reduce the production and use of virgin materials. In other words, we need to use recycled materials instead of, not in addition to, virgin materials. It is



encouraging to see that businesses, households, and legislators have shifted their attention from mere end-of-life collection and landfill diversion to making, buying, and mandating recycled content. The next step will be to adopt and support business models that entirely move away from selling more stuff year after

year. Apparel rental, repair, and resale businesses offer some glimpses of a possible, dematerialized future.

Net green also tells us that the only point of green products and technologies is the reduced use or even phase out of old, non-sustainable ones. On a global level, the rise of renewable energy has yet to decrease the consumption of fossil fuels. I am heartened, though, by recent actions of the California Government. Senate Bill 100 essentially phases out fossil fuels from California's grid mix, while Governor Newsom's Executive Order N-79-20 calls for the elimination of internal combustion vehicles. Calls are also getting louder for legislation that effectively reduces the production and use of primary materials. This is particularly true for virgin plastic, which not only generates significant amounts of emissions during its production, but has also become a major environmental pollutant itself.

One powerful way to increase the sustainability of our economy is to shift business models and household spending from materials and energy to labor, i.e. people's time and skills. While even green materials and renewable energy are not without significant environmental burden, pure labor has no impacts whatsoever. By increasing the labor share of their value creation and making sure living wages are paid all along their supply chains, businesses can reduce their environmental footprints. By supporting such businesses and overall shifting their spending from stuff to labor, households can reduce theirs. Legislators can support these efforts by shifting taxation from labor to materials and energy. All those actions would concurrently achieve environmental and social goals. Now there is a win-win I can get behind.

I still believe that there can be room for all species on this planet, but it will require that we abandon the empty promises of corporate sustainability and finally change the way we produce and consume. *The Business of Less* is my attempt to make the case for the former and provide a roadmap for the latter.

*Roland Geyer is Professor of Industrial Ecology at the Bren School of Environmental Science Management, University of California, Santa Barbara. He fell in love with California in his mid-twenties and managed to move there ten years later. Learn more about Roland's work on [www.rolandgeyer.com](http://www.rolandgeyer.com).*

## Outings

As a result of the coronavirus outbreak, there are currently no Desert Committee outings scheduled. For updated information visit the Outings section of the Desert Report website at [desertreport.org](http://desertreport.org). You may also want to consult with other groups that conduct recreational and service outings in the desert.

**Desert Survivors:** [desert-survivors.org](http://desert-survivors.org)

**Friends of the Inyo:** [friendsoftheinyo.org](http://friendsoftheinyo.org)

**Friends of NV Wilderness:** [nevadawilderness.org](http://nevadawilderness.org)

## Future Committee Meetings

Unless unexpected circumstances intervene, the next Desert Committee meeting will be in-person in August in the White Mountains. As the date gets closer, details concerning the campground and the agenda will be announced on the Desert Forum, on [desertreport.com](http://desertreport.com), and by email to those who have signed in for meetings in the past.

The November meeting of the Desert Committee will be held via Zoom with details of date, agenda, and instructions on participation to appear later.

## Join Us On The Desert Forum

If you find Desert Report interesting, sign up for the Desert Committee's e-mail Listserv, Desert Forum. Here you'll find open discussions of items interesting to desert lovers. Many articles in this issue of Desert Report were developed through Forum discussions. Electronic subscribers will continue to receive current news on these issues — plus the opportunity to join in the discussions and contribute their own insights. Desert Forum runs on a Sierra Club Listserv system.

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# Joshua Trees

## A tangled past: An uncertain future



Most residents and visitors to the high desert consider themselves familiar with Joshua trees. Ubiquitous in some areas, they are arguably the signature species of the Mojave Desert. It may be surprising then, to review past and present uncertainties surrounding these trees.

The Mojave is the ancestral homeland of several Native American tribes; all were familiar with the species and had names for it. The Serrano of the southwestern Mojave called it *hunuwat chiy'a*, utilized its leaves for fiber, and ate its blossoms. Spanish and American travelers in the region undoubtedly coined many names for it, ultimately bequeathing us its current common name. Explorer John C. Fremont first encountered it near Tehachapi Pass on his second expedition and memorably described it as “the most repulsive tree in the Vegetable Kingdom.”

Fremont was the first (in 1844) to collect and describe the tree scientifically, but the specimens collected were unfortunately damaged during a river crossing on the trip back to the United States. It was not until 1854 that new specimens were collected and formally described. Botanist John Torrey classified the tree as *Yucca draconis* var. *arborescens*, that is, as a new variety of a plant common in southeast coastal areas of North America. Over the next half century, the species was reclassified by several taxonomists, as *Yucca*

***Yucca brevifolia* var. *brevifolia* at JTNP on snowy day. The Western Joshua proposed for listing. Photo by Nelda McCulloch**

*brevifolia*, *Y. arborescens*, *Clistoyucca arborescens*, *C. brevifolia*, and finally back to *Y. brevifolia*.

In 1932, Harvard botanist Susan McKelvey spoke with a Riverside Junior College instructor named Edmund Jaeger, who told her of Joshua trees in the north-eastern Mojave that looked different (were morphologically different) from those in the southwest. Later, Jaeger told her the variety “reaches its greatest density in the vicinity of the New York Mts.” He was referring to the forest on Cima Dome. Encountering the trees northeast of Baker, McKelvey took measurements and collected specimens with shorter leaves and a more shrublike growth habit than the described species. In 1935, in a short account of her findings, she proposed a new variety of Joshua tree, designated as *Y. brevifolia* var. *jaegeriana*. Her view was accepted by other botanists at the time, and Munz’s (1958) *Southern California Flora* listed both vars. *brevifolia* and *jaegeriana*.

In 1977, taxonomist James Reveal, a major contributor to the massive *Intermountain Flora: Vascular Plants of the Intermountain West*, while writing the *Yucca* section in volume 6, took issue with McKelvey’s conclusions, noting that the original specimen in Torrey’s 1854 collection also had short leaves, as did some specimens McKelvey collected outside of her proposed range of var. *jaegeriana*. He concluded, “it seems best to consider all of these elements as representing only one kind of plant, and call them *Y. brevifolia*. Those plants from the mountain ranges surrounding the Mojave Desert do have longer leaves..., and may deserve some formal recognition.” Is this asserting that Jaeger and McKelvey’s short leaved species should properly be called “*Yucca brevifolia*,” and the longer leaved southern and western population possibly recognized as a new variety?

From this point begins a divergence of opinion among taxonomists. The comprehensive *Flora of North America North of Mexico* agreed with Reveal’s determination, as did Kew Gardens’ *World Checklist of Selected Plant Families* (2011), both listing only *Y. brevifolia*, with no varieties. The 2nd edition of *The Jepson Manual* (2012), follows suit, but without explicitly citing Reveal.

Reveal's conclusion was not universally accepted, though. In 2001, Hochstatter proposed that *jaegeriana* be considered a subspecies. Lenz (2007) asserted that *Y. brevifolia* and *Y. jaegeriana* should be considered separate species, based mostly on differences in flower structure, and due to their different species of primary pollinators. More recently, the Joshua Tree Genome Project and others have analyzed genetic data that provide some evidence of differences at the species level.

As of today, both Kew's 2022 database and Jepson's current eFlora list var. *jaegeriana* as a synonym of *Y. brevifolia*, effectively opining that even varietal separation is questionable. On the other hand, correspondence with several desert botanists indicates a growing consensus that the two are different varieties, with disagreements remaining about separation at species level.

### **So what is the difference between a variety and a species?**

The classical, mostly animal-based, Darwinian, definition of *species* is based on the organism's ability to successfully produce offspring when mating occurs. A population of organisms is considered to be of the same species if individuals of appropriate sexes can successfully breed and produce viable offspring ("viable" means the offspring must also be able to breed.) *Subspecies* are recognizably different groups within a species that are geographically isolated from each other. *Varieties* are recognizable groups that are not geographically isolated. (Varieties are only recognized in plants.)

The boundaries between species, subspecies, and varieties are now understood to be a great deal less distinct than the "classical" definitions convey. What happens when two geographically disjunct subspecies are brought together?

First, a slight digression. All evolutionary change is driven by mutations. Organisms within a population constantly collect random genetic mutations. Favorable mutations, including those that increase reproductive success, often spread over time within a population, because individuals carrying those mutations will have more offspring than individuals without. Mutations that decrease reproductive success will (either quickly or eventually) disappear. (Mutations that are neither favorable nor unfavorable can also spread within a population. The slow accumulation of such mutations in separated populations is called *genetic drift*.)

Species differentiation can occur when two populations of the same species are separated (say, by an ocean or a hot desert valley). Over time, each population varies through accumulation of genetic mutations, both from genetic drift and as it responds to the pressures of its environment. Since the environmental pressures and the mutations are different for each population, differences arise between the populations. If the differences are noticeable, (to botanists and possibly to other humans), the two populations may be referred to

as separate *subspecies*.

If the populations then come back together (by removal of the barrier or by migration), hybridization can occur. If hybrids are at any disadvantage in reproductive capacity (that is, if hybrids produce fewer offspring than non-hybrids), then evolutionary pressure will favor the non-hybrids. The mechanics of this differentiation are *reproductive isolating mechanisms*. Structural or behavioral differences (caused by mutations) that make mating difficult or that prevent fertilization will be favored. Varieties with such differences cannot hybridize, and are therefore considered separate species. (Again, this is the Darwinian model.)

This process is still believed to be substantially correct. What has changed is an increased recognition that successful hybridization is far more common than was once believed, especially in plants. Oaks, for example, are known to hybridize extensively. Every oak in a grove is exposed to pollen from all surrounding oak trees, and it is to each tree's reproductive advantage not to be too choosy.

Joshua tree pollination is performed by moths. One of the best arguments that *brevifolia* and *jaegeriana* are separate species is that each has its own species of moth; *brevifolia* is pollinated by *Tegeticula synthetica*, and *jaegeriana* by *T. antithetica*. This would seem to be a perfect example of a reproductive isolating mechanism.

Both *brevifolia* and *jaegeriana* (and their associated moths) occur in the remote Tikaboo Valley in Nevada, so a natural experiment of sorts is taking place there. Will the two types of trees freely hybridize, or will reproductive isolating mechanisms kick in to further separate them into species?

As it turns out, *T. antithetica* (*jaegeriana*'s pollinator) is physically unable to lay eggs in *brevifolia* flowers. This looks very much like it could be an isolating mechanism. However, *T. synthetica* (*brevifolia*'s natural pollinator) can successfully lay eggs in *jaegeriana* flowers, though not as successfully as in its preferred *brevifolia* flowers. So the isolating mechanism (if that's what it is) only operates in one direction. The Joshua Tree Genome Project's data indicate that *brevifolia* and *jaegeriana* do hybridize, though less commonly than if hybridization were unrestricted. So hybrids may be somehow disadvantaged, perhaps by being less attractive to either pollinator.

The "natural experiment" in Tikaboo Valley is, then, not just about the evolution of Joshua trees, but about co-evolution of the trees with their pollinator insects. The moths produce a new generation every year, but Joshua trees may take decades to reach sexual maturity, so observing changes that might resolve the trees' taxonomic status could take many years. Of course, natural experiments, by their very nature, have many variables. One variable in the Tikaboo experiment is climate change. It's unclear how the trees, or their pollinators, will react to warming temperatures. Will earlier

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# Joshua Trees

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spring warmth induce the trees to bloom earlier? If so, will it also cause the moths to emerge earlier? What happens if they don't?

Scientific research, especially in the field, can take a long time, and the results may reveal more new questions than answers. The answers we want can be elusive. Species are considered "rare" based on number of occurrences, and on immediate threats to their survival. For example, the California Native Plant Society generally considers species with less than about 80 occurrences to be "rare." This number is within guidelines used by the California Fish and Game Commission (CFG).

Regardless of whether there are one or two species of Joshua tree, there are many more than 80 occurrences. So it comes down to how we assess "immediate threats," in this case, the existential threat of climate change, includes the increase in destructive fires driven by climate change. It could take 50 years or more for climate change to reach catastrophic levels for Joshua trees. Of course, 50 years was sufficient to wipe out passenger pigeons, and to nearly extirpate the buffalo. But climate change equally threatens a huge number of species; arguably most desert species. Is it ethical to use rare plant legislation to choose one charismatic species for special protection? Is it ethical not to? Should other species that will gain protection from saving Joshua tree habitat also be considered? The answers seem obvious to those who believe catastrophe is coming and who value the particular species. But questions like these, rather than tentative scientific conclusions, are the main criteria CFG will have to use to make their decision. The issues involved are ultimately more complex than the convoluted taxonomy of Joshua trees.

## Acknowledgment

I corresponded with a number of biologists in preparing this article, both to educate me in how evolutionary theory has changed in the nearly 50 years since my college coursework, and to provide details specific to Joshua trees. James Andre, Cameron Barrows (both of University of California, Riverside), Nick Jensen, Aaron Sims (both of California Native Plant Society), and Jeremy Yoder (California State University, Northridge) all patiently shared their time and answered my questions. Any errors in summarizing or synthesizing their views are mine alone.

*Arch McCulloch majored in Biology, but was seduced by the dark side and became a software and data security engineer. Now retired, he ponders life's mysteries from the shade of a mesquite. He is a Director of Morongo Basin Conservation Association, and is rumored to be reviving the Mojave Desert Chapter of California Native Plant Society.*



***Yucca brevifolia* var. *jaegeriana* on Cima Dome.**  
Photo by Nelda McCulloch

## Are Joshua Trees Threatened?

Joshua trees are generally but not universally recognized to have western and eastern varieties. The western trees, such as those at Joshua Tree National Park (JTNP), have been proposed for a California State listing of "Threatened" (which is less serious than "Endangered"). The threat is climate change. Warming temperatures and related effects are believed to be the cause of low reproductive rates of trees in JTNP. Outside of JTNP, most of the western variety are in areas currently unprotected from development.

The western variety was granted provisional protection while the issue is decided. In April, the California Department of Fish and Wildlife recommended against the species receiving Threatened status. Final determination will be made by the California Fish and Game Commission in June. The decision could hinge either on insufficient differences between eastern and western varieties, or (more likely) on the threat not being considered sufficiently imminent.

The eastern variety, such as those in Mojave National Preserve, while believed to be in better shape, are themselves threatened (as are the western trees) by fires driven by invasive grasses. Joshua trees (and many other desert plants) are not adapted to fire. The Dome Fire of August, 2020 destroyed about a quarter of the contiguous Joshua tree woodland (over 40,000 acres) on Cima Dome in the Preserve, killing 1.3 million trees.

# Mining For Strategic Minerals

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or may not be lined. Sometimes the waste is injected back underground.

All three types of mining use large amounts of water and create toxic waste. They all use large amount of energy be it electricity or fossil fuels directly. Any way you look at it, modern mines pose serious risks in the desert southwest. While the mining industry talk about large amounts of money being injected into the economy, the risk to outdoor recreation and other sustainable uses is significant. An economic study done for the proposed Rosemont mine that would be south of Tucson, Arizona, shows that if the proposed mine disrupts only 10% of outdoor recreation, it would offset any economic benefits from the mine.

## The solution?

Instead of creating new mines, the mining industry must responsibly finish mining existing mines. In Arizona, existing mines are not operating even close to full capacity. BHP, the world's largest mining company, abandoned and dismantled the San Manuel mine, a perfectly good working mine with one of the cleanest burning smelters in the US, and with 30 years' worth of copper still underground. In what world is it OK to abandon a mine like that and instead opt to mine a sacred recreational and ecological haven?

Secondly, we should utilize our landfills and recycle our minerals much more aggressively.

Thirdly, as long as it is done right, re-mining of old mines using new technology would recover substantial minerals. There is a large caveat with re-mining – most schemes posed now ask that existing laws be relaxed as an incentive for companies to re-mine. This is not acceptable, and so far, all federal legislation encouraging re-mining falls far short of the mark.

Thankfully the Biden administration is beginning the process of updating both Interior Department and US Forest Service mining regulations. The Interior Department has begun listening to stakeholders (including you) on how to update of mining regulations. The updating of US Forest Service regulations is on a slower track.

On the other hand, the Biden Administration has issued an executive order that could fast-track mining for materials needed for batteries and other renewal energy needs. It remains to be seen what this could mean for permitting new mines, but you can bet that the mining industry is looking at how to take advantage of this executive order.

Finally, there is a move afoot to reform the 1872 mining law on its 150th anniversary. Bills have been introduced in the House of Representatives by Arizona Representative Raul Grijalva and in the Senate by New Mexico Senator Martin Heinrich. Both are called the *Clean Energy Minerals Reform Act*. In a press release issued by the House Natural Resources Committee,

Rep. Grijalva said, "Minerals like copper and lithium are essential for our clean energy future, but that doesn't mean we should sacrifice our environment, health, and sacred or special places just to get them. Our current mining law was put in place before we even knew what a car was, much less an electric one. By keeping this outdated system going, we're telling mining companies it's okay to wreak total havoc on our environment and then leave American taxpayers to foot the cleanup bill. Modernizing this relic of a law isn't extreme or anti-industry—it's just common sense."

These mining law reform bills would go a long way to correct problems we face on the ground, at least on federal land.

## What you can do

Support 1872 mining law reform, upgrading federal hard rock mining regulations, and state laws and regulations (in Arizona and Nevada, a rather tall order!)

The sooner opposition can be mounted for these inappropriate proposals, the better. As most, if not all, of the mining pressure in the desert southwest is perpetrated by foreign mining companies that often have low tolerance for controversy, generating opposition early makes life easier down the line.

There are many non-profit organizations that can help with new mining pressure. However, be aware that organizations that work on mining issues are uniformly understaffed and underfunded!

*Roger Featherstone is Director of the Arizona Mining Reform Coalition and an avid hiker and boater in the desert southwest. To learn more, go to [www.azminingreform.org](http://www.azminingreform.org).*



**An open pit at one of the Carlin trend gold mines in Nevada. Photo by Roger Featherstone**

# The GDP: It's Complicated

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the problem, but addressing the way in which the GDP is calculated could go a long way towards facilitating a much needed transition to a less harmful way to conduct business.

Masood points out that although “the world is driven by the GDP,” it needs to be kept in mind that “the GDP is an artificially created index.” In spite of the fact that there is an economic incentive not to do so, there are now a number of proposals under discussion to make the GDP more inclusive. For example, a proposal that Masood supports is to continue the use of the basic GDP formula but subtracting the costs of externalities. “Going back to the example of coal-fired power stations,” he explains, “they have positives and negatives. Considering both would make for more informed decisions. The value of increased spending on healthcare as a result of water and air pollution, is quantifiable. These costs could be subtracted from the gains.” That would amount to economic growth minus the costs of that growth.

Masood continues: “China very nearly did this about a decade ago. They called it the Green GDP. Unfortunately they received a lot of pushback from the provincial states. But they are seriously thinking along these lines and they are very, very keen. They understand economics as well as the ecological costs.” When I expressed surprise at this because I have never encountered any reporting on this in mainstream media, Masood replies, “You’re right. But it does turn up in more specialized publications. There is a lot of innovation going on in China.”

There are various proposals for what could be changed such as including measures that address factors that matter in our lives: social justice issues, wellbeing, education, living standards, healthcare, and unpaid work. Many, including the majority of environmentalists, support a dashboard of measurements, others prefer a single number.<sup>4</sup> Masood feels that, “The GDP as it is has important strengths that should be preserved. One major strength is that it has been set according to internationally agreed rules. It would be very difficult to obtain agreement again on that level, especially when considering the complexity involved.”

Clearly, pushback to change is going to be an issue. Masood views inertia as a factor in this. “The GDP has been in use longer than 50 years. Whole industries were dependent on this as they continue to be today. Clearly to make changes in this has implications. Even explaining it is complicated. Then it depends a great deal on who is interested. Consider who benefits from the GDP as it exists today: the rich and the corporations. Thus not everyone is interested in changing it. It would be beneficial if the U.S. and China could collaborate on this, because both stand to gain. An added complication is that policy makers rely on academics. And the academic community is not united on this issue either.”

## How to change the GDP

A process exists in which researchers from all UN member states have a voice to propose how the GDP can change. Masood emphasizes that environmentalists need to recognize the dominance of the GDP and also that there is a need for them to “engage with GDP’s processes just as much as they do for climate change.”<sup>5</sup>

However there seems to be little information publicly available on how the GDP can be changed. Who does this and what is the process? Considering that it is, as Masood calls it, the most Powerful Formula in the World, one would think we’d know more about this.

Masood clarifies, “What looks like secrecy, has developed more by default than design. The GDP’s rules are set by a group of academic statisticians through the United Nations Systems of National Accounts (SNA), which is organized by a branch of the United Nations. Until very recently, they were horrified if non-statisticians tried to understand their complicated systems. So the UN never reached out to make this a more open process as they do, for instance, with the climate change process. But that is now changing. There is a new head who is more interested in letting in some light on the process of changing the GDP.”

Discussions on the next revision to the GDP have just begun and are to be finalized in 2025. One change already made is that researchers and delegates from the developing countries are more involved than has been the case in the past. The process now provides a route for all countries, rich and poor, to have an equal stake in deciding how the world’s economies should measure what matters. Change, whether evolutionary or revolutionary, must be inclusive and accountable.

And the biggest change? During this current process the rule setters will consider how the GDP could best take the needs of the natural environment into account. Most importantly, emphasizes Masood, “Today’s industrial development must be weighed against environmental costs.”

*Birgitta Jansen has been an active volunteer in Death Valley National Park. Currently residing in British Columbia, she is a managing editor of the Desert Report, has written previously on a number of environmental topics, and has completed a book about the October 2015 flash floods in Death Valley NP.*

1. Masood, Ehsan, GDP; The World’s Most Powerful Formula and Why it Must Now Change. Icon Books, London (2021), p. 1

2. Ibid. p. 3

3. Ibid. p. x

4. Ibid. p. xxviii; p. 195.

5. Ibid. p. 195.



**Fish Slough.** Photo by Lynn Boulton

of representatives from the larger water districts in the Owens Valley, Inyo County, and Mono County. However, at the request of the Tri-Valley residents, Mono County announced their decision to withdraw from the OVGA, effective July 1. That withdrawal means the OVGA can no longer impose restraints, fees, or requirements on well owners in Mono County. For a while, the Tri-Valley sub-basin will be unmanaged. The intent is to transfer the groundwater management to the Tri-Valley Groundwater Management District in Mono County. When this is done, the fate of Fish Slough will be in their hands.

Fish Slough has been drying up for the past twenty years. One spring/marsh area has already dried up. The largest spring, the Northeast Spring, is expected to have no discharge this summer. Coincidentally, the alfalfa growers in Tri-Valley have been pumping groundwater for years and capturing the surface runoff coming out the White Mountains for decades. There's little recharge in the Tri-Valley, and climate change means even less recharge in the future. Studies show that groundwater flows from Tri-Valley to Fish Slough, so it is likely that the ranchers' heavy water use is impacting Fish Slough. To know how much groundwater the ranchers could take and not affect Fish Slough requires developing a groundwater model and more well data. The Tri-Valley Groundwater Management District is taking the first steps to develop a model and collect data. That will take years of collecting data, preparing a groundwater sustainability plan, and putting in more monitoring wells to know where to point the finger. Meanwhile, Fish Slough will continue to dry up.

*Lynn Boulton, Range of Light Group, Toiyabe Chapter, Sierra Club*

## State Legislation Proposed Concerning Cannabis Growing

(See *Desert Report*, Sept. 2021, for background.)

In a news release on March 17, San Bernardino County has sponsored new state legislation, AB 2728 (Smith) and SB 1426 (Caballero), that would increase fines for illegal cannabis farming and target the illegal pollution of groundwater by illicit cannabis cultivators. The county is also seeking \$10 million in state funding to clean up environmental damage at hundreds of illegal cannabis sites and is strongly backing several related illegal cannabis bills in Sacramento.

"Illegal cannabis farming is devastating the desert communities of San Bernardino County," said Curt Hagman, chairman of the Board of Supervisors. "The county is determined to stop this terrible damage to the environment and to protect the lives and property of our residents from lawless criminals."

San Bernardino County has also sponsored SB 1426, a bill carried by State Senator Anna Caballero of Salinas. SB 1426 amends state law to specifically address problems of illegal cannabis growing. These include the theft or pollution of groundwater, illegal access to water conveyance or storage infrastructure, digging an illegal well, polluting groundwater with illegal pesticides, or the excessive use of rodenticides, herbicides, pesticides, or other hazardous chemicals.

"Illegal cannabis farming is killing wildlife and wreaking environmental damage across the state," Caballero said. "This bill will help stop the pollution of our groundwater supply and the theft of water, which are all the more important during an ongoing multi-year drought."

## Desert Website

**The Desert Report website has been rebuilt to feature material in a more timely manner than the three-month interval between printed issues. The material that appears on the Home page will also be more action oriented than has been customary in the past. The archive of past issues will be largely unchanged. The Index to past issues and References provided in articles can be accessed from the bottom of any page.**

[www.desertreport.org](http://www.desertreport.org)

BY NICK ERVIN

# Crisis In The Coyote Mountains

Trash and vehicles in a wilderness area



Like many readers of *Desert Report*, I have been active in desert conservation for a long time. My activities go back to the late 1970s when I gave testimony at a public hearing for the original Bureau of Land Management (BLM) Desert Plan that was finalized just before President Jimmy Carter left office. In the latter part of the 1980s and early 1990s, I participated heavily in the mammoth effort to pass the California Desert Protection Act of 1994. What followed during succeeding years was a continued drive to push the BLM to enforce the Desert Act provisions even as significant desert acreage moved to the National Park Service.

In the old days of desert conservation work, the issue of climate change was either unknown to us or was viewed widely as a very long-term problem with plenty of time to address it as far as desert lands in California were concerned. Oh how we now know better. Climate change as an issue has now taken center stage with several conservation organizations, including the Sierra Club. Some of us desert rats bemoaned what we saw as a move away from the traditional conservation focus on problems like mining, grazing, off-highway vehicles (OHVs), and urban sprawl. Wilderness creation and protection in general seemed to take a back seat all too often.

We all bitterly realize now how climate change is here to stay and will exert increasing pressure on our

## **Coyote Mountain Wilderness.**

*Photo by Nick Ervin*

desert ecosystems. Meanwhile, we are still faced with vintage challenges including how to keep the BLM and other agencies on the ball protecting designated wilderness and other safeguarded classes of desert land.

The Trump border wall disaster occupied a lot of conservationists' time and mental space for several years, and appropriately so given the dramatic damage inflicted in places like the Jacumba Mountains Wilderness in California's Imperial County. Still, while our attention was diverted to the border and to climate change, gaps in our protective efforts elsewhere crept in. One prime example of this trend occurs in the Coyote Mountains Wilderness in Imperial County.

Long a favorite hiking area due to its justly famous fossil deposits and unusual geological formations, the Coyote mountains make up an 18,000+ acre BLM wilderness that was created by the Desert Act in 1994. A portion of the wilderness borders on the Anza-Borrego Desert State Park to the north, thus increasing the effective size of the protected area. These rugged volcanic peaks, intermingled with sandstone and mudstone hills as well as exotic wind cave formations, constitute a veritable desert wonderland. In the mid-19th century, renowned geologist William Phipps Blake discovered and first reported these vast fossil beds to western science. From the late 19th century forward, many scientific articles were published about the place, and early tourists flocked to see it.

It is also significant that the Coyote mountains sit next to an OHV free play area to the east, and that lands to the south are scarred by a gravel mine, two major power line corridors, and a wind farm. Access to well-known Fossil Canyon (aka Shell or Alverson Canyon) is solely via a marked BLM dirt route passing through a supposedly "Limited Use" zone. Target shooting is permitted in the limited use area, shooting trash and shell casings must be removed, and vehicles are limited to marked roads only. Thus in order for non-consumptive users to gain access to remarkably scenic fossil and geologic treasures they must traverse what amounts to a shooting gallery – especially on weekends. Over the

years I have been to Fossil Canyon and environs at least ten times, and it is an incomparable resource. Despite heavy collecting pressure, one can still find beautiful and intriguing fossils remains of mostly marine invertebrates dating from four to six million years ago when this wilderness was under a shallow sea.

Sadly, uncontrolled camping, shooting, and OHV use have badly damaged the landscape even though it is within a signed, limited use area. Moreover, for years the local BLM office in El Centro has failed to fix a vandalized metal barrier at the wilderness boundary allowing frequent illegal OHV incursions into Fossil Canyon. It is reported that BLM is now near to finally replacing the barrier.

Along the southern periphery of the wilderness and along the access route to Fossil Canyon, I have repeatedly witnessed OHVs violating the wilderness boundary and roaring up canyons replete with fossils and irreplaceable rock formations. Nearby, there are abundant signs of out-of-control OHV abuse in the so-called "Limited Use" area. Parts of this landscape resemble the worst excesses of any designated OHV free play area. This is especially galling because there is indeed a free play area for cross-country travel a convenient distance away. BLM seems unable or unwilling to commit the resources necessary to curb the worst behavior of a portion of the user public.

In addition to damage inflicted by careless vehicle use and large amounts of trash, the access road to Fossil Canyon has become a clear and immediate public safety hazard. The boom of gunfire is omnipresent and can be easily heard within Fossil Canyon itself. I have heard the suspicious sound of semiautomatic weapons discharge more than once and seen large caliber shell casings in profusion. I recently encountered a hiker in Fossil Canyon who reported that he had previously heard bullets reaching into the canyon itself and had avoided it for several years as a result.

The public safety hazard extends into a zone on the western periphery of the wilderness along a dirt access route leading to the popular Domelands/Wind Caves. This is an especially prized place due to its fabulous long distance views, fantastic wind cave formations, and superb fossils. Once again, BLM allows shooting in this region right next to the popular access route and the staging area for hikers and backpackers. I myself have heard the crackle of bullets entering the wilderness proper from shooters. These are blatantly incompatible uses.

What to do?? In light of my observations and experiences there, I offer the following modest proposals. The El Centro BLM Field Office should immediately initiate a public process to amend relevant land use plans in certain respects.

There must be several defined and well-marked zones across the Limited Use Area that allows safe

access to the boundary of the Wilderness. In these designated regions, all shooting should be prohibited and only street legal vehicles allowed to enter. Appropriate signage and increased law enforcement will be required in order to make the necessary changes stick. New signage should also be provided that guides interested members of the public to Fossil Canyon, which can be quite hard to locate in the maze of signed routes. The BLM should also arrange clean-up of trash in the affected area using whatever volunteer labor is available so as to discourage both further deterioration of the landscape and illegal shooting.

While we focus on the detrimental effects of climate change and poorly sited renewable energy projects in the California desert, let us not ignore or forget other pressing needs. The Coyote Mountains Wilderness would be a fine place to start.

*Nick Ervin is a retired counselor and desert rat who has lived in San Diego and explored the local arid lands for over 40 years. From 1995 through 2000 he served on the U. S. Bureau of Land Management's California Desert District Advisory Council.*



**Trash in the "Limited Use" Area.**  
*Photo by Nick Ervin*

# Preserving History In A Classic Landscape

→ PAGE 7

tion of the conflict between heritage preservation and societal consumption.

When the State first sought to purchase the property in 1930, the owner was Rudolf Hagen. Although willing to sell, his exaggerated belief in the canyon's vast mineral wealth (placer gold) led him to demand a prohibitive sum of money. He died in 1937, but a deal could not be accomplished with his heirs until legislation appropriating funds passed the State Legislature in 1968. By 1947, work at the Old Dutch Cleanser Mine had ceased, and in 1948, it was sold to new owners, the Purex Corporation. Unfortunately the Petrified Forest was disappearing into private collections, and without protections, the stone forest would be gone. In fact, it wasn't until late 1994, with the passage of the California Desert Protection Act, that a large majestic Red Rock Canyon State Park finally became a reality. In the wake of this fulfillment, the 240 acres of the Old Dutch Cleanser mine remained as a private inholding surrounded by the newly expanded park.

Although the Old Dutch Cleanser Mine ceased operation in 1947 and faded into an idle state, Matcon Corporation, the current owner of the mine site, would like to reverse that fate and return profitability to this acreage. To do so, Matcon is trying to use language from the Surface Mining and Reclamation Act (SMARA) of 1976 that exempted preexisting mining ventures from many of the new mining regulations, granting these earlier ventures "vested rights." While the original "intent" was obviously not to grant these rights 46 years later, other modern mining ventures have had recent success convincing County Planning Commissions to ignore their staff recommendations and grant such vested rights (see San Bernardino County in particular).

Earlier this year, Matcon nearly convinced the Kern

County Planning Commission to do just this. The Commission fortunately postponed their decision until their May 12th meeting in order to investigate possible legal jeopardy.

In recent years, Kern County has already reviewed Matcon's case in detail and has stated that the mine meets the legal criteria to be considered both "idle" and "abandoned" and has even suggested that "restoration" of the mine should potentially commence. Thus, Matcon wants to accomplish an end run to avoid these determinations, while simultaneously removing certain environmental restrictions which would ease development or potential sale of the property.

The Old Dutch Cleanser Mine is situated atop a spectacularly beautiful 400-foot cliff in the Last Chance Canyon portion of Red Rock Canyon State Park. Whereas, the 24 year operation of the mines in the first half of the Twentieth Century involved subsurface mining that minimally impacted this vista, Matcon's application for modern mining involves open pit access which necessitates taking off the top of this beautiful cliff.

The Kern County Planning Commission will likely render a decision prior to this article's arrival. Ultimately, the only REAL solution to this recurring dilemma is to convince California State Parks and the current Administration to purchase this mine inholding and preserve this magnificent landscape for all time. This could easily be envisioned as a part of the California 30x30 visioning process.

If we cannot achieve the funding necessary to eliminate this perpetually juxtaposed conflict during significant budget surpluses, when can we accomplish protection? Matcon is actually a willing seller to ANYONE, including State Parks. It is time we acted to resolve this issue once and for all.

The vista from the Old Dutch Cleanser Mine is both breathtaking and spectacular. Photographs alone cannot do it justice. It must be experienced, just like the rest of this magical landscape. This duality of scenery and science versus products for society and profit deserves resolution for all parties involved.

Please consider contacting California State Parks directly, or perhaps indirectly through your legislative representative, to express your opinion on this valuable and long overdue acquisition. Let's complete that 1920's vision!

*A native of northern California, Mark Faull moved to the eastern Kern County region in 1984. For 20 years Mark worked at Red Rock Canyon State Park before retiring from California State Parks in 2004. His passion for and understanding of the importance of park values to society continues, as well as his study of the fascinating local human history and its connection to the richness of the desert environment.*



**Chalk white volcanic ash (pumicite) interior of the Old Dutch Cleanser mine workings - room and pillar mining. Photo by Mark Faull**



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