

The Friends of Madera Canyon is an apolitical organization. We are not anti-mining. We recognize the importance of copper to our economy and as a vital resource component for virtually all things electrical. We are dedicated to the environment as proclaimed in our mission:

“To serve as stewards of Madera Canyon and to keep it open for the enjoyment and education of visitors.”

Our goals are to:

- Maintain reasonable public access to the Canyon.*
- Serve as a steward for the Canyon, its animal and plant life, and its overall ecosystem.*
- Offer programs of public education concerning the history and ecology of the Canyon.*

Mining, whether above or below ground will create some disturbance to the nature of land and all things that dwell on it. It is challenging to find a balance and it is often location, location, location that either find compromise or create contention and concern. It is with that thought in mind that when we foresee the potential danger to our biome and mission, we investigate and question the consequences.

The editorial following presents facts worth considering and giving us all the opportunity to take appropriate action.

John Murphy is a retired educator and science administrator. He served on the Board of Directors of the Chicago and Tucson Herpetological Societies

Herpetological Society (positions held include president and publication secretary 1975-1987) and the Tucson Herpetological Society (2018-2019). His experience with biodiversity was and is focused on amphibians and reptiles. John is a Research Associate at the Field Museum (Chicago) in the Zoology Department and has authored books

that can be viewed

at: <https://fieldmuseum.academia.edu/JohhCMurphy>

He is also a member of the International Union for the Conservation of Nature, Snake Specialist Group. John serves as a Board member of the Friends of Madera Canyon.

Education: BS zoology, Southern Illinois University (Carbondale); MS in Environmental Science (animal behavior and ecology) from Governors State University (University Park, IL).

The Santa Rita Mountain Range and Copper World

By John C. Murphy, Board Member

Santa Rita Range has many canyons, Madera Canyon is just one of them. The range is also a biodiversity hot spot. It supports thousands of vascular plant species, unique invertebrates, and spectacular vertebrates. People travel from other countries and states to see the Santa Rita Range and its flora and fauna. Madera Canyon is often the target destination for many naturalists, but there is much more to the Santa Ritas.

The Canadian mining corporation Hudbay Minerals proposed the Rosemont Copper Mine, a large open pit mine project on the east side of the Santa Ritas. However, the Rosemont mine was delayed in 2019 by legal judgments, and the US Army Corps of Engineers suspended its operating permit. In addition, a federal judge overturned environmental permits for the proposed mine, saying the US Fish and Wildlife Service failed to consider the mine's impact on several endangered species in the Santa Rita Mountains. An appeal was filed, and the 2019 ruling was upheld in May 2022.

Hudbay's determination to extract copper, gold and other minerals from the deposit was not deterred. They purchased land on the west side of the Santa Rita's and proposed a series of three open pit mines

collectively called Copper World. In July of 2022, the Pima County Administrator wrote a memo (1) to the Chair and Members of the Pima County Board of Supervisors. The memo, titled "Update on Hudbay Mineral's Copper World Complex," outlines critical facts about the proposed Copper World Complex mine, presently being constructed on the western slope of the Santa Rita Mountains. Unfortunately, these facts have not been made clear to the public until now.

In part, the memo says:

Hudbay plans to heap leach minerals on the west side using sulfuric acid in the old Helvetia mining district. Large quantities of sulfuric acid will be used to process oxide deposits rich in carbonates. The company estimates that approximately 200 million metric tons of acid-leachable resources are present. Sulfuric acid may be brought in by truck, but the company plans to make 1,100 tons of acid per day onsite by burning elemental sulfur.

The memo was based upon Hudbay Mineral's "Preliminary Economic Assessment." This document provides the most detailed look at the planned mine to date. However, the public does not realize that, in addition to blasting into the western slopes of the Santa Rita Mountains to mine copper, a large industrial complex will also be built and constructed about 1000 feet above the Santa Cruz Valley. Hudbay will be manufacturing sulfuric acid. The acid will be used to process the ore, and Hudbay plans to sell the excess inorganic acid. Thus, tanker trucks will carry sulfuric acid out of their property through the surrounding communities. Furthermore, this sulfuric acid plant will result in most of the residents of the Santa Cruz Valley chronically exposed to sulfur fumes, spills, and odors from the inevitable accidents.

Sulfuric acid and sulfur trioxide are highly reactive compounds. Both will react with water to form sulfuric acid droplets when in the air.

During my career as a science educator and administrator, we trained teachers to deal with sulfuric acid spills.

A standard lab demonstration involved a glass beaker filled with sugar and the addition of sulfuric acid. The result was a chemical reaction that reduced the sugar to pure carbon by removing hydrogen and oxygen. Airborne sulfuric acid droplets react the same way with moist membranes in your eyes, nose, and lungs.

But, there is a revision in the second memo (3). The second memo from Pima County Administration Jan Lester is dated September 14, 2022. The revised Hudbay plan is discussed for the Pima County Board of Supervisors. My slightly edited version of Ms. Lester's memo is in the following six paragraphs.

The new plan avoids using federal land for Phase 1, the first 16 years of the mine life, by limiting activities to Hudbay's patented mining claims and other acquired private property. Patenting is the process of converting federal land to private ownership by paying an extremely modest fee. In addition, the 16-year delay provides time for the company to sort out various legal issues related to using federal land and permitting under the Clean Water Act and Endangered Species Act.

The footprint of the proposed mine has expanded from the original Rosemont project on the east side of the Santa Rita Mountains. The revised mine plan includes open pit mine areas, waste rock, tailings, and other facilities along the crest and on the west side of the Santa Rita Mountains. In addition, Hudbay acquired an additional 2,400 acres in this west area specifically for these purposes.

The new plan proposes to excavate the original Rosemont pit (now called the East pit) starting in year 4. Materials from this pit would be hauled over the crest to the west side of the mountains. However, if federal permissions are secured, waste materials would be disposed of in the east-side waste and tailing dumps. In addition, the East pit at Rosemont would be enlarged and deepened onto National Forest land.

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Mine facilities on the west will also include a solvent-extraction and electrowinning facility (where gold, silver, and copper are recovered from a solution using an electrolytic chemical reaction), an operation to produce molybdenum concentrate, and a facility to concentrate silver and gold. These facilities and operations will all be located at Helvetia, near the end of Santa Rita Road. Some facilities may process concentrate brought in from other mines. Copper cathodes, molybdenum concentrate, and a silver-gold mix will be shipped.

Water Use. No revised estimates of total water use are available in the report, but Hudbay notes that they are

authorized to pump 6,000 acre-feet per year at their Sahuarita wellfield. Because the operational life of the mining project doubled to 45 years, the total amount of groundwater used can also be expected to increase at least proportionately. Dewatering requirements (18,000 acre-feet) on the east side would remain the same. Dry-stack tailings would not be used in the first 16 years, so more water will be required to dispose of tailings. More water would be needed to construct and excavate the additional facilities on the mountain crest and west side and to control dust on a greater surface area.

The expanded footprint will have a direct negative impact on the biodiversity of the area and the overall ecological integrity of the Santa Ritas. In addition, the sulfuric acid leaks into the atmosphere, and eventual deposition in the soil will have a negative impact on nearby forests. Acidic rain and acidic soils are relatively well-studied (4). The accumulation of sulfhydryl (sulfur bonded to a hydrogen atom) results in the inactivation of many enzymes in plants by breaking chemical bonds and changing enzyme shapes resulting in reduced protein and enzyme synthesis. Common symptoms caused by SO₂ exposure in plants include excessive hydration, reduced mechanical strength in tissues, impaired functions of the stomates (the ports in leaves and stems that control gas exchange in plants) that increase necrosis and brown spot formation, and other damage to the plants.

Acid deposition on forest ecosystems results in soil leaching from acid rain. Acid rain also contributes to freshwater acidification, adversely affecting sensitive organisms and creating long-term disruptions in ecosystem structure and function.

And, of course, there is the issue of water. Hudbay will take water out of the same aquifer the Santa Cruz Valley residents use. I encourage readers concerned about this to contact the Pima County Department of Environmental Quality and the Arizona Department of Environmental Quality both are responsible for issuing permits for Copper World.

Please do not take Hudbay's press releases at face value. They push the ideas of job creation and American copper with the profits staying in the USA. As we learn more about Hudbay's plan, we will likely find that the costs to local communities will be more than the benefits.

1. Link to Lester Memo

https://webcms.pima.gov/UserFiles/Servers/Server_6/File/Government/Administration/AdminMemosForWeb/2022/July/2022-july-28-update-on-hudbay-mineral-s-copper-world-complex.pdf

2. ATSRD Toxic Substances Port -

<https://wwwn.cdc.gov/TSP/PHS/PHS.aspx?phsid=254&toxid=47>

3. Link to Lester Memo September 14, 2022.

https://webcms.pima.gov/UserFiles/Servers/Server_6/File/Government/Administration/AdminMemosForWeb/2022/September/2022-september-14-copper-world-complex-update.pdf

4. Savita. 2021. Impacts of Air Pollutants on Forest Ecosystem and Role in Ecological Imbalance. Pages 129-140 in Tiwari S, Saxena P, editors. Air Pollution and Its Complications: From the Regional to the Global Scale. Cham: Springer International Publishing.



Copper World site west side Santa Rita Mountains

FoMC Potpourri aka the lightning round (not necessarily in order)

The Baldy-Supertrail hill side restoration project held up pretty well during Monsoon. The plants were watered until the rains came and they could sustain on their own. So far, so good. Many of the plants flowered over the summer and some which had protective fencing are now on their own. The project and video (courtesy of Richard and



Christine Olsenius) received wide acclaim up through the USFS office in Tucson and recognition via a personal visit by USFS Regional from Albuquerque.

Plans are for trial weekend video presentations at the Amphitheater. The USFS has received a grant for stipends to presenters. Of course, the Restoration Project video will be featured. Look for more about this in upcoming eblasts.

Speaking of projects, plans for next year are the long-awaited Amphitheater restroom, Proctor parking expansion and the conversion of two sites at the Bog Springs Campground to ADA compliance.

We and the USFS have been approached by two new groups wishing to volunteer. The first is a mixed group of Scouts, about 13 boys and 8 girls. Dan White is working with the scoutmasters to come up with a plan. The second group is the University of Arizona Fish & Wildlife Society. John Titre and I will be meeting with them soon to explore opportunities. It is really great to see this interest in stewardship by young people.

An eblast was sent out recently announcing FoMC “on the air”. Doug Moore, Education Director and Bob Pitcher, Co-chair of the Protection Initiative will be interviewed on the KGVY Crackerbarrel radio show. Did you happen to catch Arizona Illustrated Sunday evening the 25th? The taping of the show originated from Madera Canyon. Covid willing, we hope to have an in person Annual Meeting in January. Work is underway to schedule the GVR Desert Hills Auditorium. And...all things equal a Volunteer Appreciation Brunch at La Posada is in the planning stages for March. It will be so exciting to see everyone and be together after a three-year hiatus. Oh, and Carole deRivera and her committee are scheduling in Music in the Canyon. Musicians are lined up. Dates and ticket sales will be announced late winter/early spring.

That brings us to the last but not least important topic **HELP WANTED**. We have openings coming up on the **Board of Directors** as members cycle through their terms. The Board meets on the 3rd Friday of each month weather dependent either at the Proctor Ramada or at Friends in Deed except July and August and frequently June if there is no pressing agenda. You do not have to be a full-time resident. There are seasonal participants that typically reside in the area 7 or 8 months that are contributors. Board terms are 3 years. Become an active part of managing this incredible organization and working with an incredible group of dedicated volunteers. Elections are held in December. Want to see how it works? Attend our next Board meeting. If you would like to be considered as a candidate, send a 1-2 paragraph biography to info@friendsofmaderacanyon.org .

Visitor Information Center (VIS). Anita Woodward, Chair could use a few extra hands. The VIS is open Friday and weekends 8-noon or 10-

2pm seasonally. October signals the time change 10-2pm. The shifts are two hours with on the job training.

The **Honor and Memory Wall** is looking for a Co-Chair. This is intermittent work throughout the year as those looking to remember their loved ones apply for inscription on the Wall. Applications are reviewed and voted on by a 4 member committee.

Do you possess **Web skills**? Our current webmaster is winding down and is looking to retire after serving FoMC well. This is not an on-the-job training position, but requires experience.

If any of these opportunities interest you and you want to know more, contact info@friendsofmaderacanyon.org.

OK Friends, that's about it for now. Thank you for your continued support.

Stay healthy and enjoy Fall in Madera Canyon.