

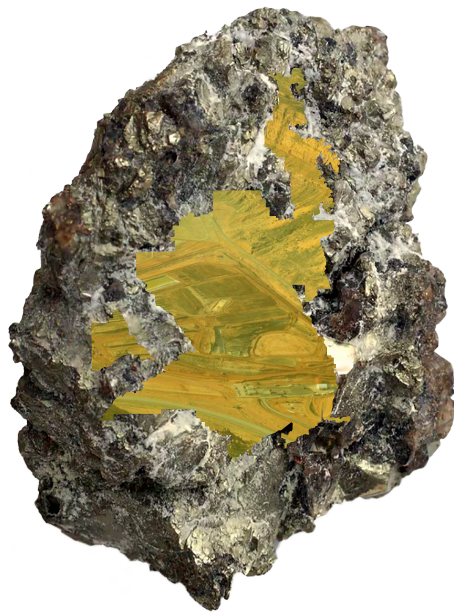
Contaminant



*A speculative exploration into the future
of uranium mining in and around Bears
Ears National Monument*

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of uranium mining in and around Bears
Ears National Monument.*



A project by Kevin Howard
In Partnership with The Bureau of Land Management
Multi-Disciplinary Design, University of Utah
DES 3520-001 Design Product Studio 2
Professor Elpitha Tsoutsounakis
Salt Lake City, Utah
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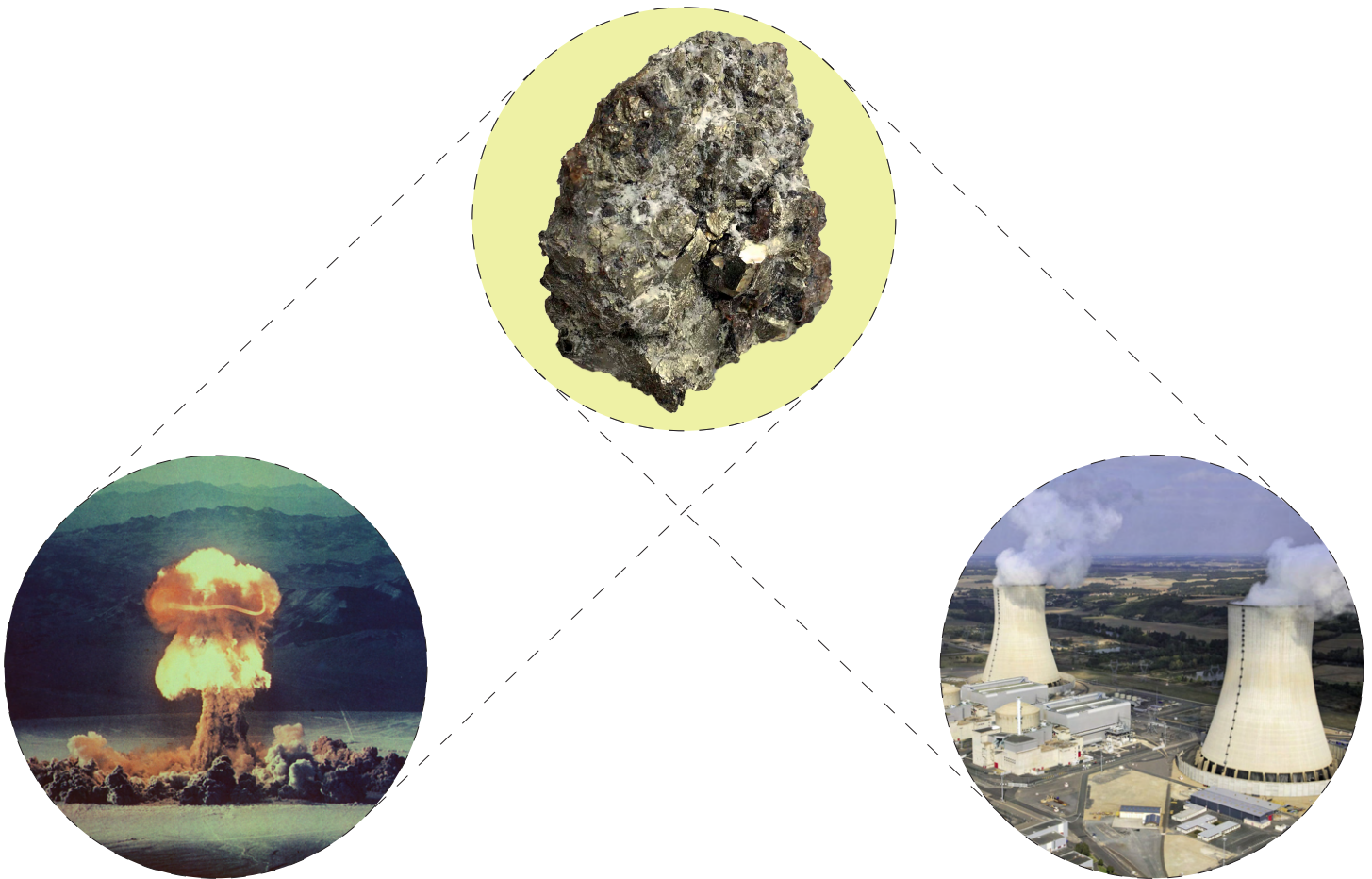
CONTEXT

A Radioactive Mineral

Uranium is a radioactive, metallic chemical element that was first discovered in the 18th century. It is the main material used for the development of nuclear technologies; the most prominent of which are nuclear energy and nuclear weaponry. Uranium is also used as a building material for military shielding, planes, and helicopters.

Uranium is naturally occurring in small amounts in nearly all soils, rocks, and waters. In order for uranium to be used for nuclear development, it must be extracted from the earth in large quantities through the process of uranium mining. This process produces radioactive waste in the form of leftover rock, or tailings, that are much more radioactive than the uranium ore in its natural state because it has now been exposed and concentrated.

These radioactive tailings break down into dust, which can be easily spread throughout the environment by wind and water, causing radioactive contaminants to disseminate throughout the landscape.

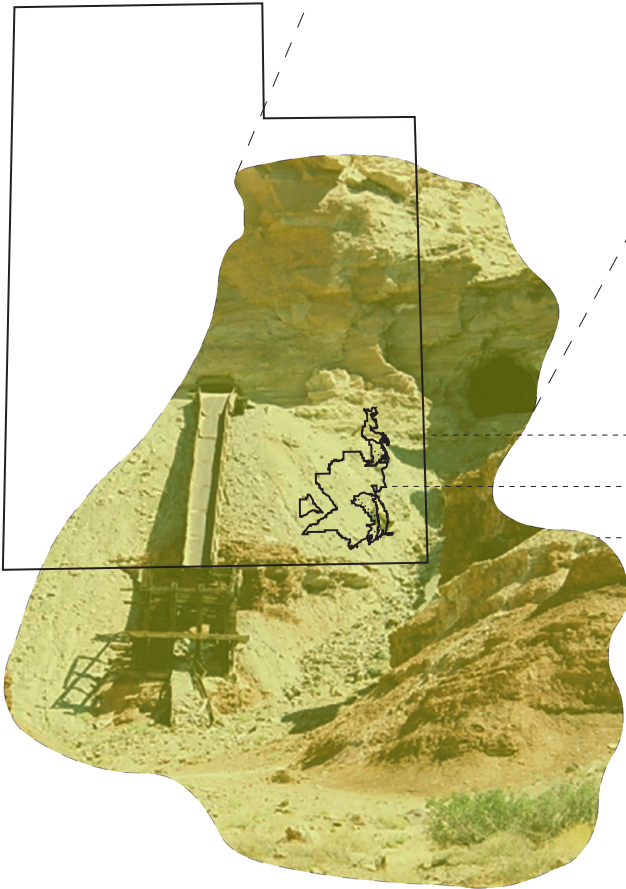
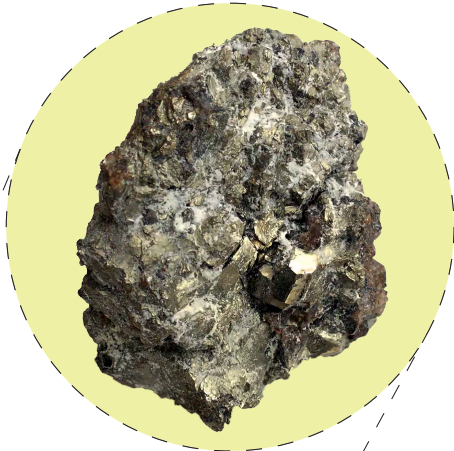


The Uranium Boom in the West

Uranium mining in Southern Utah dates back to the year 1898. Although, it gained the most traction at the end of World War II, when uranium was in high demand as the United States began to develop nuclear weaponry. This sparked a uranium boom in the American West.

During this uranium boom, a geologist named Charles Steen discovered that there was a significant amount of uranium ore in the Colorado Plateau. Much of Southern Utah and all of Bears Ears National Monument lay on the Colorado Plateau, making them prime areas for uranium prospecting.

Steen's discovery inspired uranium prospectors to flood into Southern Utah and the surrounding areas. By 1955, there were approximately 800 uranium mines on the Colorado Plateau.



Kevin Howard

A Toxic Legacy

"We felt the full brunt of uranium contamination."

- Amber Kanazbah Crotty, Navajo Nation Council Delegate, 2017

The uranium boom in the American West left a toxic legacy in Southern Utah and the surrounding areas.

Uranium mining contaminated the landscape by releasing radioactive byproducts into the soils and water supplies of the area. Indigenous communities were, and are currently, subject to drinking contaminated water and frequenting contaminated lands.

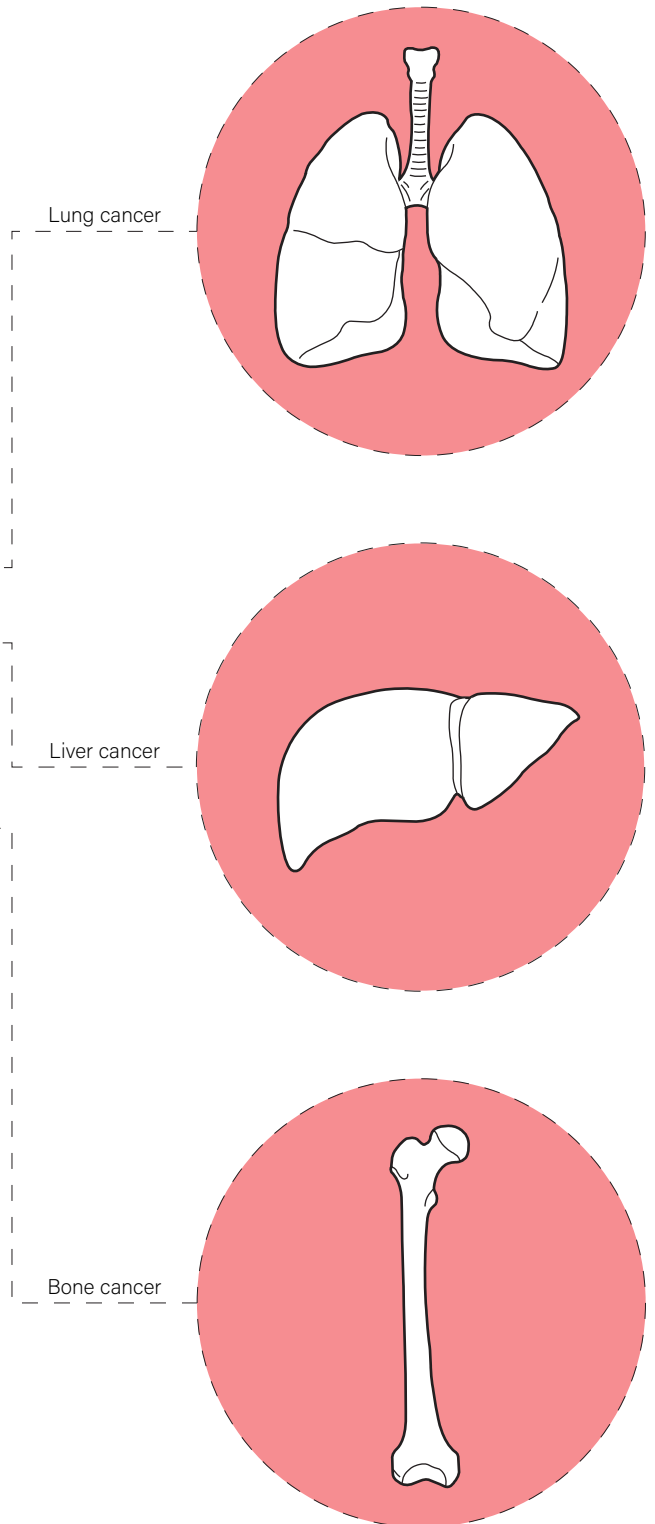
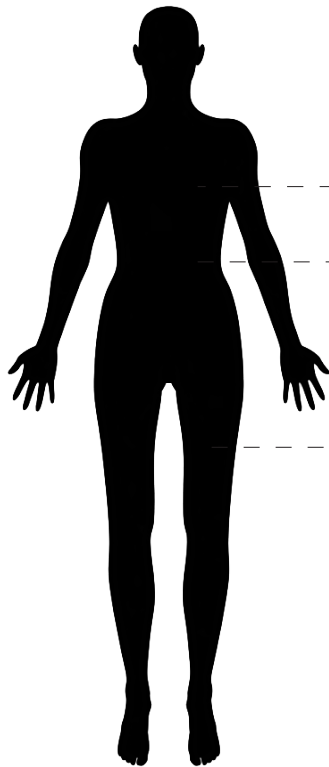
The Navajo Nation has been greatly affected by this, as there are approximately 500 abandoned uranium mines on their land that continue to contaminate their drinking water supplies.



Exposure to Radiation

Exposure to uranium radiation can result in lung, liver, and bone cancer.

Lung cancer results from the inhalation of uranium particles into the lungs. Liver and bone cancer can occur when uranium radiation is ingested through contaminated water or absorbed through an open cut or wound.



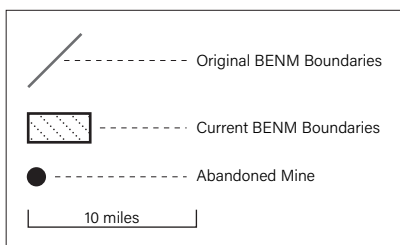
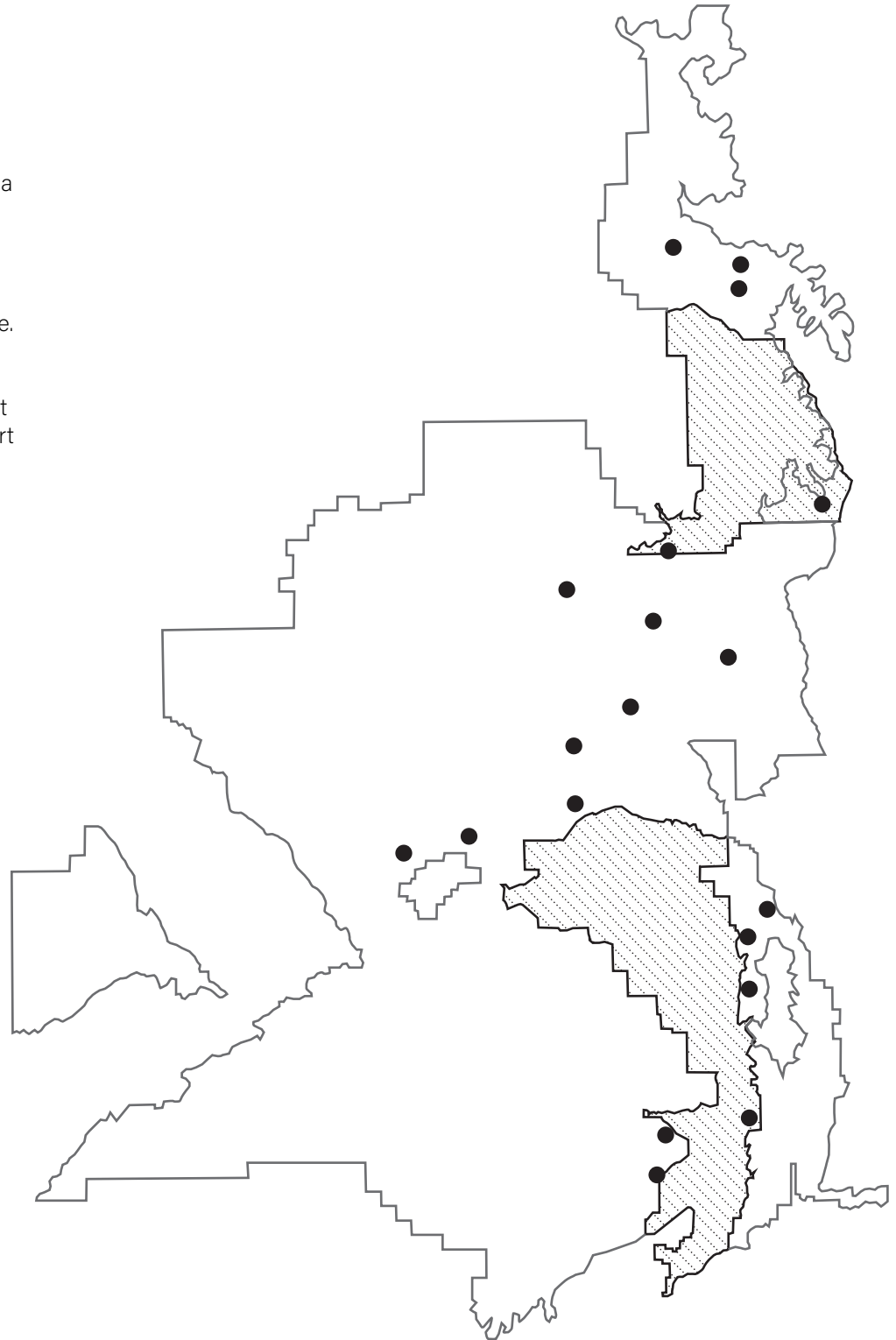
Abandoned Mines

This map shows all of the abandoned uranium mines still on record within and around the boundaries of Bears Ears National Monument.

These abandoned mines scar the landscape of Bears Ears and serve as a constant reminder of the toxic legacy that the uranium mining industry has created in the area. Many of these mines have yet to be cleaned up, and continue to contaminate the landscape.

Although these mines aren't currently being used, some energy development companies see them as promising start points for future uranium mining operations.

The most recent example of this is the Daneros uranium mine, located just outside the original boundaries of Bears Ears.

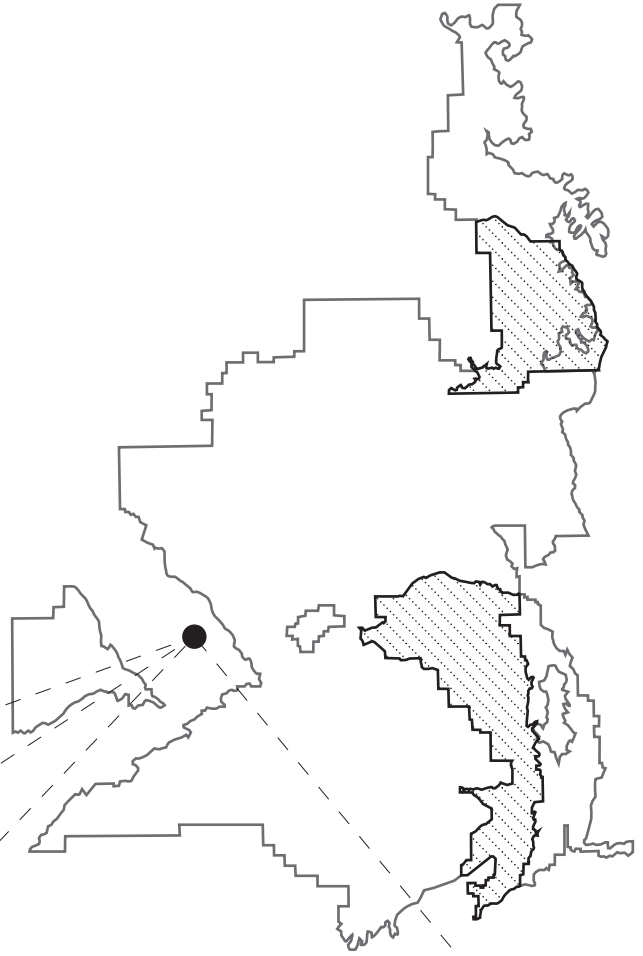


The Daneros Mine

The Daneros uranium mine is located just three miles from the original boundaries of Bears Ears. The Daneros mine operated from 2009 to 2012 when the operation was halted due to a decrease in the demand for uranium.

Regardless of this decreased demand, Energy Fuels Resources, the mines owner, submitted a final proposal to the Bureau of Land Management in June of 2016 to expand the mine from 4.5 acres to 46.3 acres.

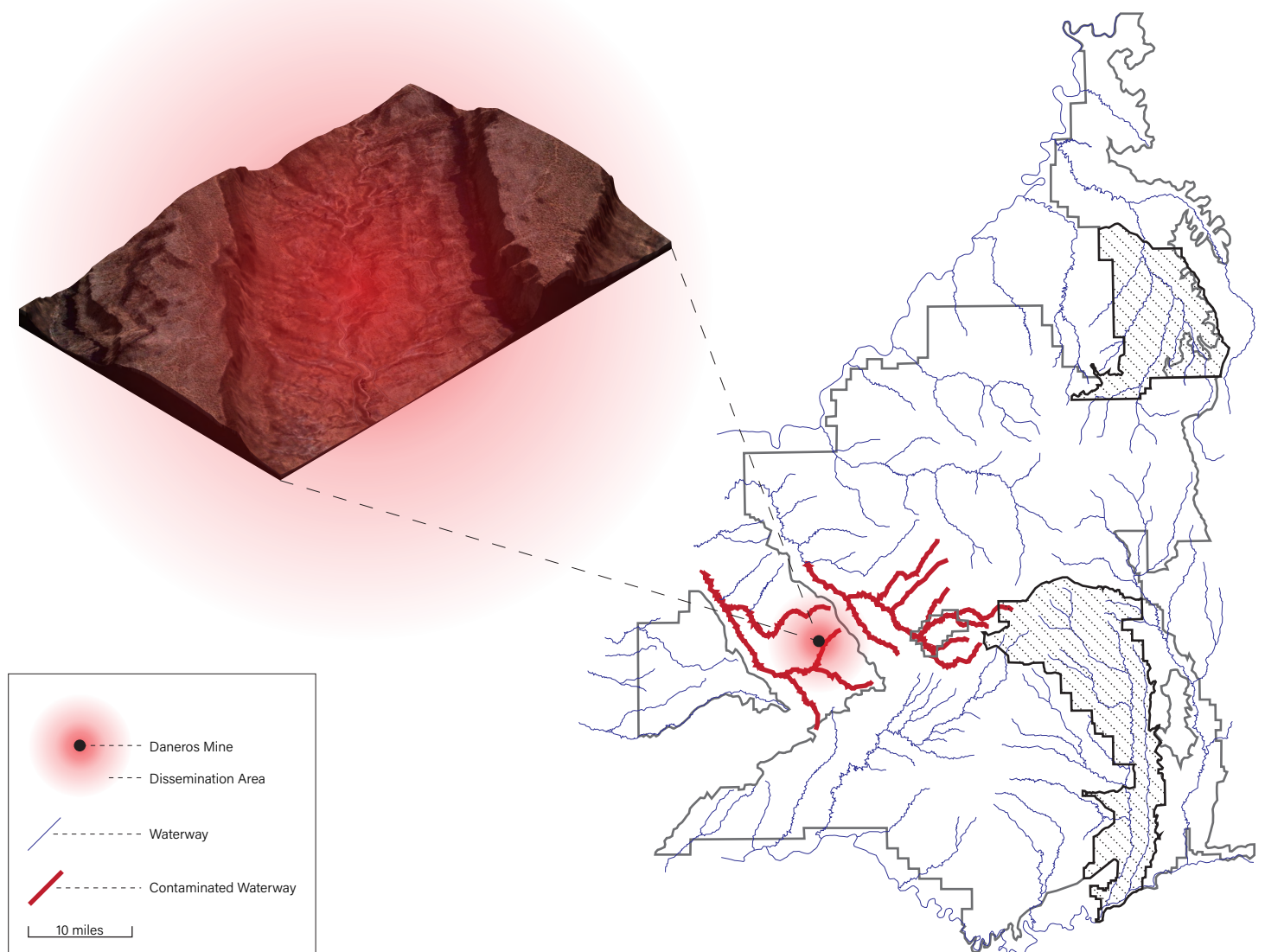
Also included in this proposal was the plan to reconstruct the Bullseye Canyon Uranium mine, which is a historically abandoned mine that hasn't been operational in nearly 50 years.



Radioactive Dissemination

The expansion and reconstruction of the Daneros mine will have damaging effects throughout the landscape because of the dissemination of radioactive dust that is produced as a byproduct of uranium extraction.

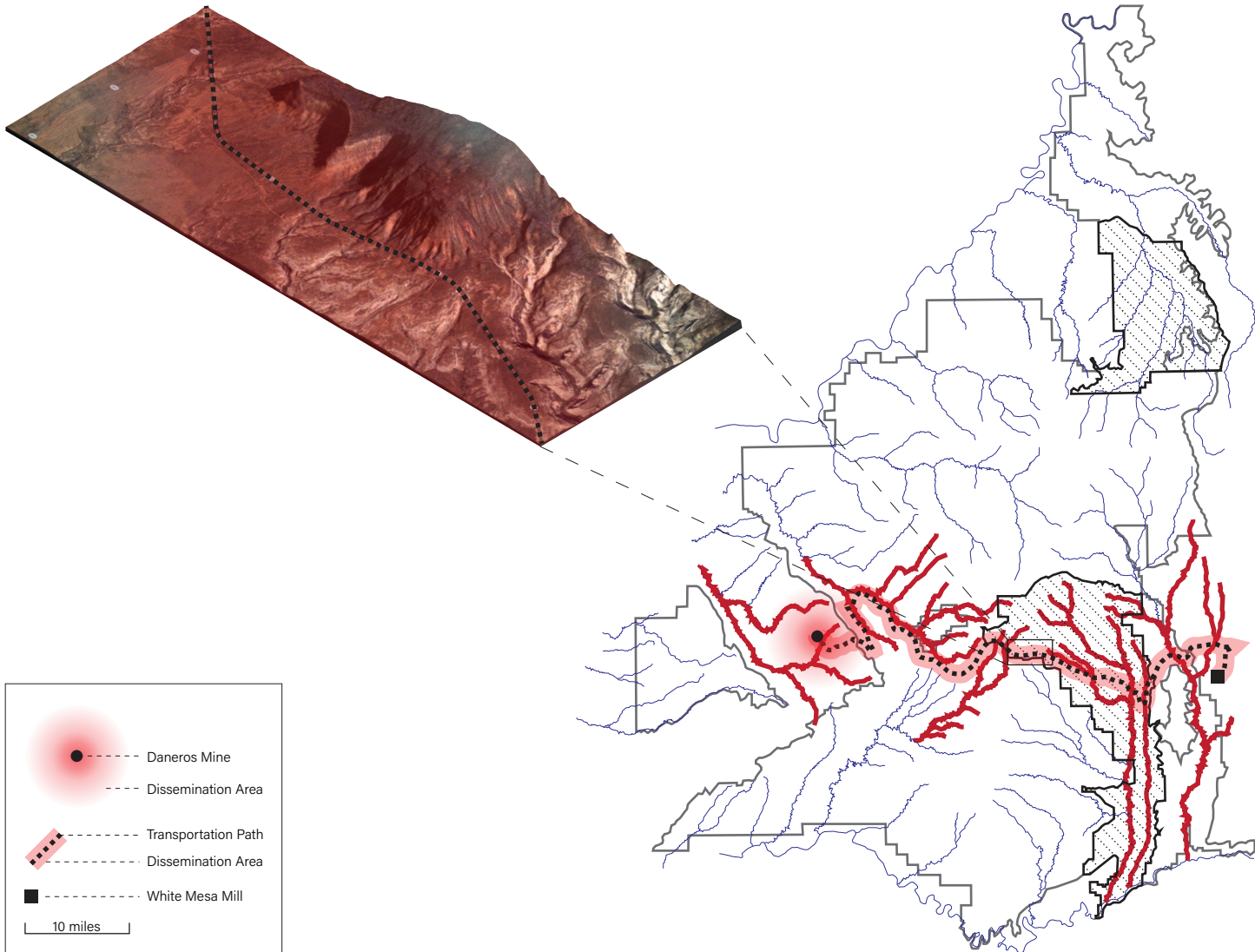
When uranium is taken out of the ground and exposed, it becomes much more radioactive than it is in its natural state. It then breaks down into dust particles which can be carried by the wind for miles before settling into soils and waterbeds, where they are then spread further throughout the landscape.



Radioactive Transportation

The spread of contamination throughout Bears Ears increases when we take into account the transportation of the extracted uranium. All of the uranium extracted at the Daneros mine complex must be transported to the White Mesa Uranium Mill, just east of the monument. Much of this transportation occurs on Utah State Highway 95, which cuts directly through the current boundaries of Bears Ears.

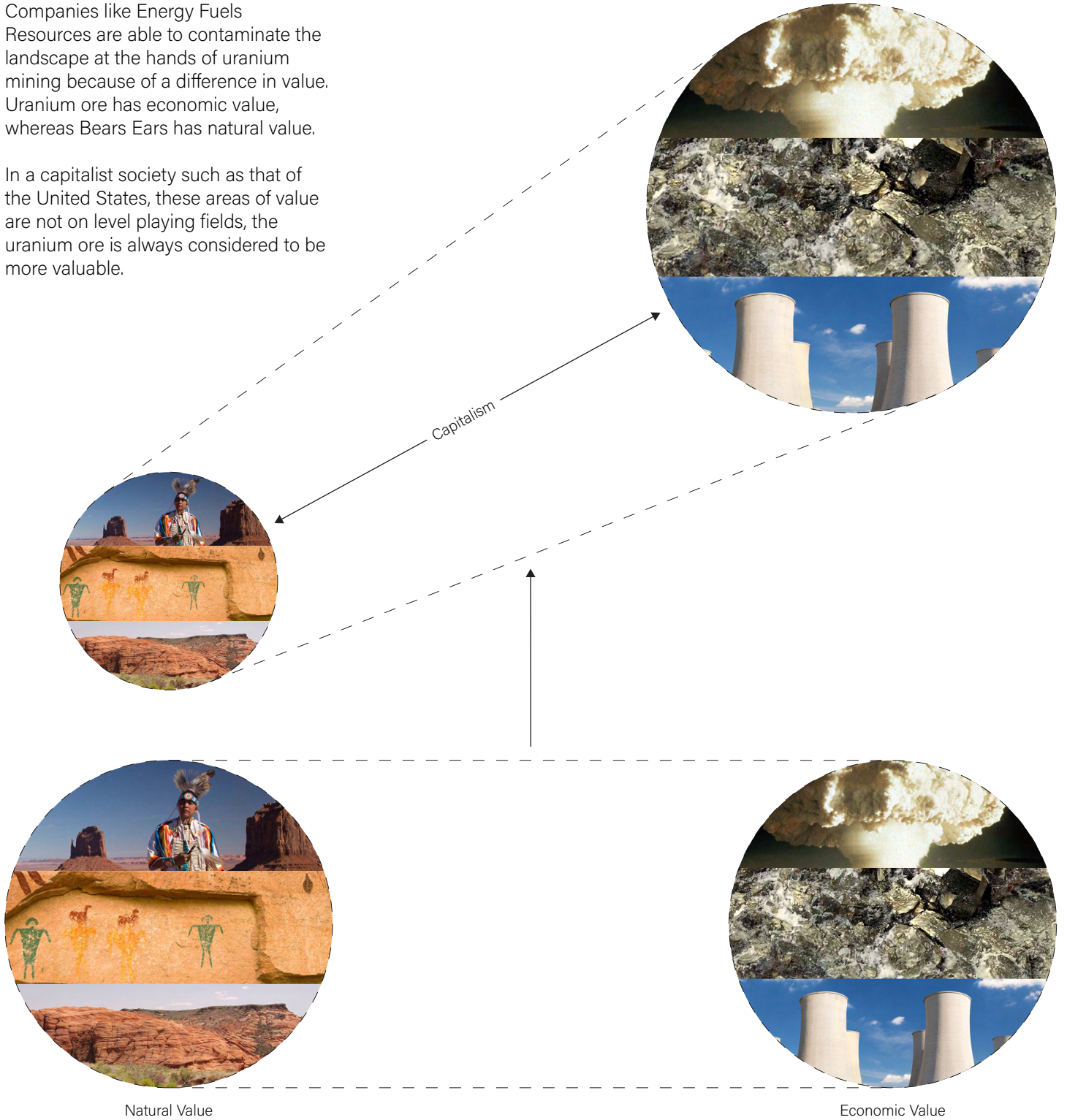
Energy Fuels resources states that the uranium would be transported in open bed trucks covered with tarps up to 15 times a day.



A Difference in Value

Companies like Energy Fuels Resources are able to contaminate the landscape at the hands of uranium mining because of a difference in value. Uranium ore has economic value, whereas Bears Ears has natural value.

In a capitalist society such as that of the United States, these areas of value are not on level playing fields, the uranium ore is always considered to be more valuable.



Natural Value

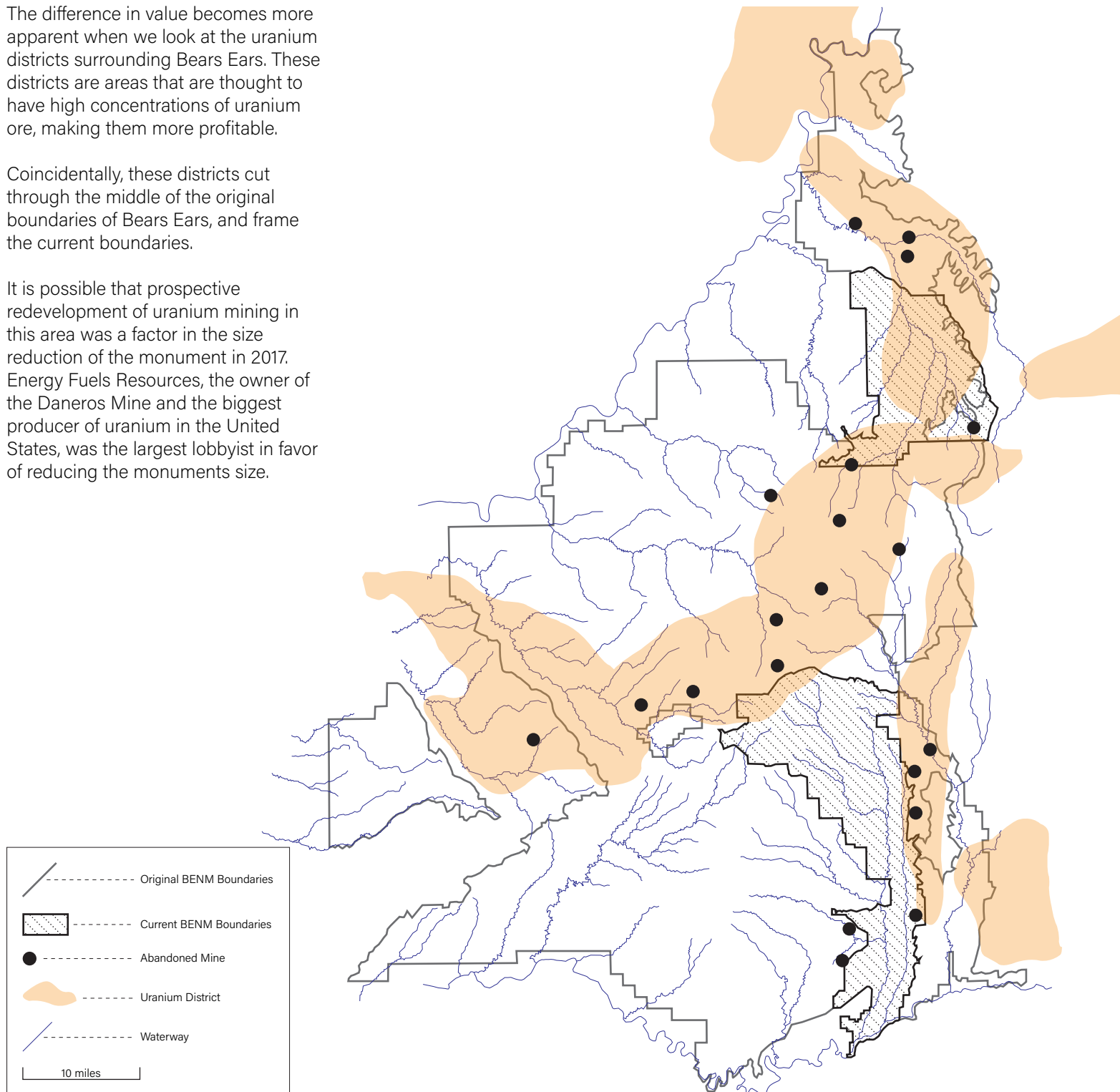
Economic Value

Uranium Districts

The difference in value becomes more apparent when we look at the uranium districts surrounding Bears Ears. These districts are areas that are thought to have high concentrations of uranium ore, making them more profitable.

Coincidentally, these districts cut through the middle of the original boundaries of Bears Ears, and frame the current boundaries.

It is possible that prospective redevelopment of uranium mining in this area was a factor in the size reduction of the monument in 2017. Energy Fuels Resources, the owner of the Daneros Mine and the biggest producer of uranium in the United States, was the largest lobbyist in favor of reducing the monuments size.



Uranium Districts

*“Energy Fuels Resources (USA) Inc. urged the Trump administration to limit the monument to the smallest size needed to protect key objects and areas, such as archeological sites, **to make it easier to access the radioactive ore.**”*

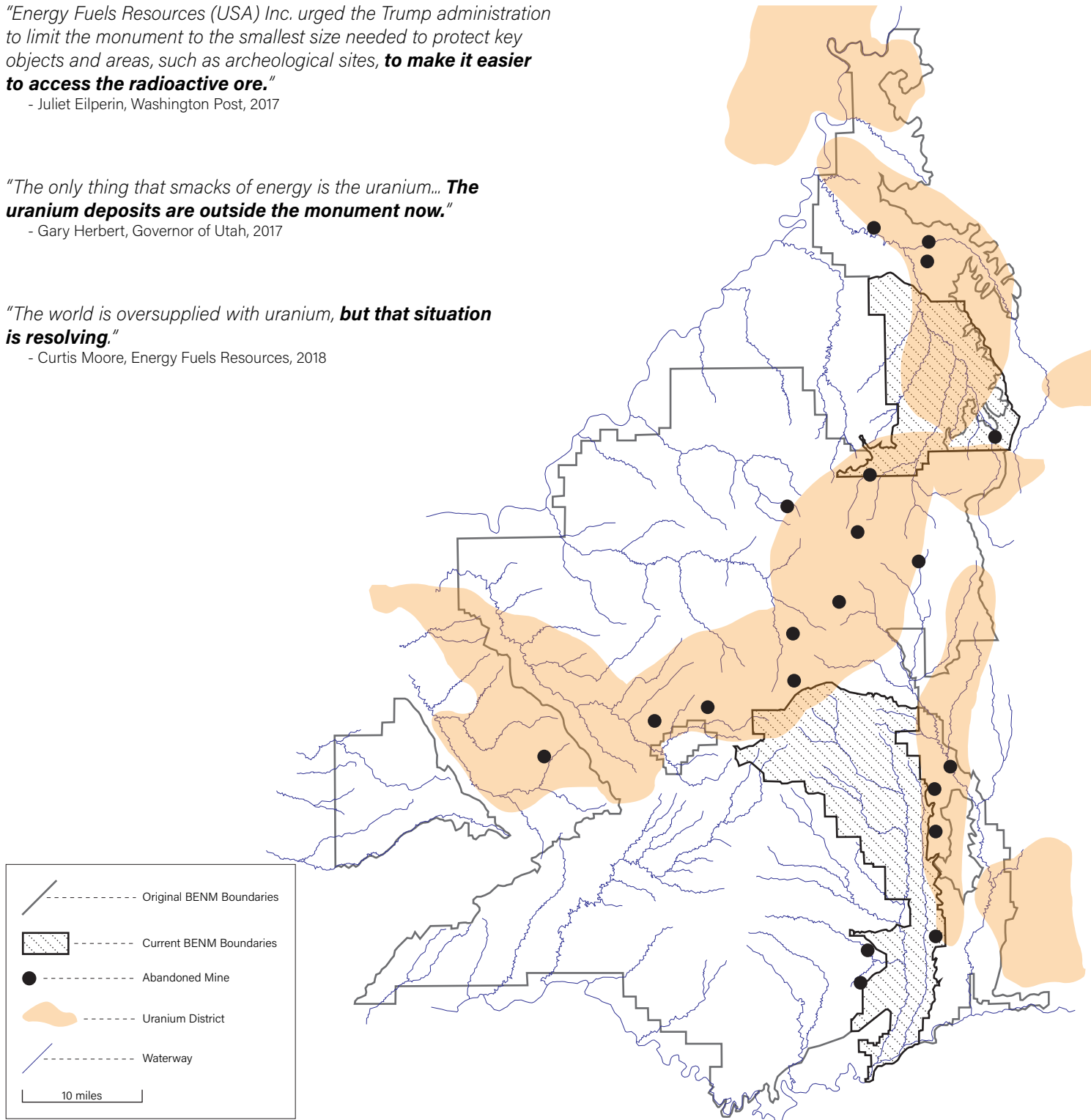
- Juliet Eilperin, Washington Post, 2017

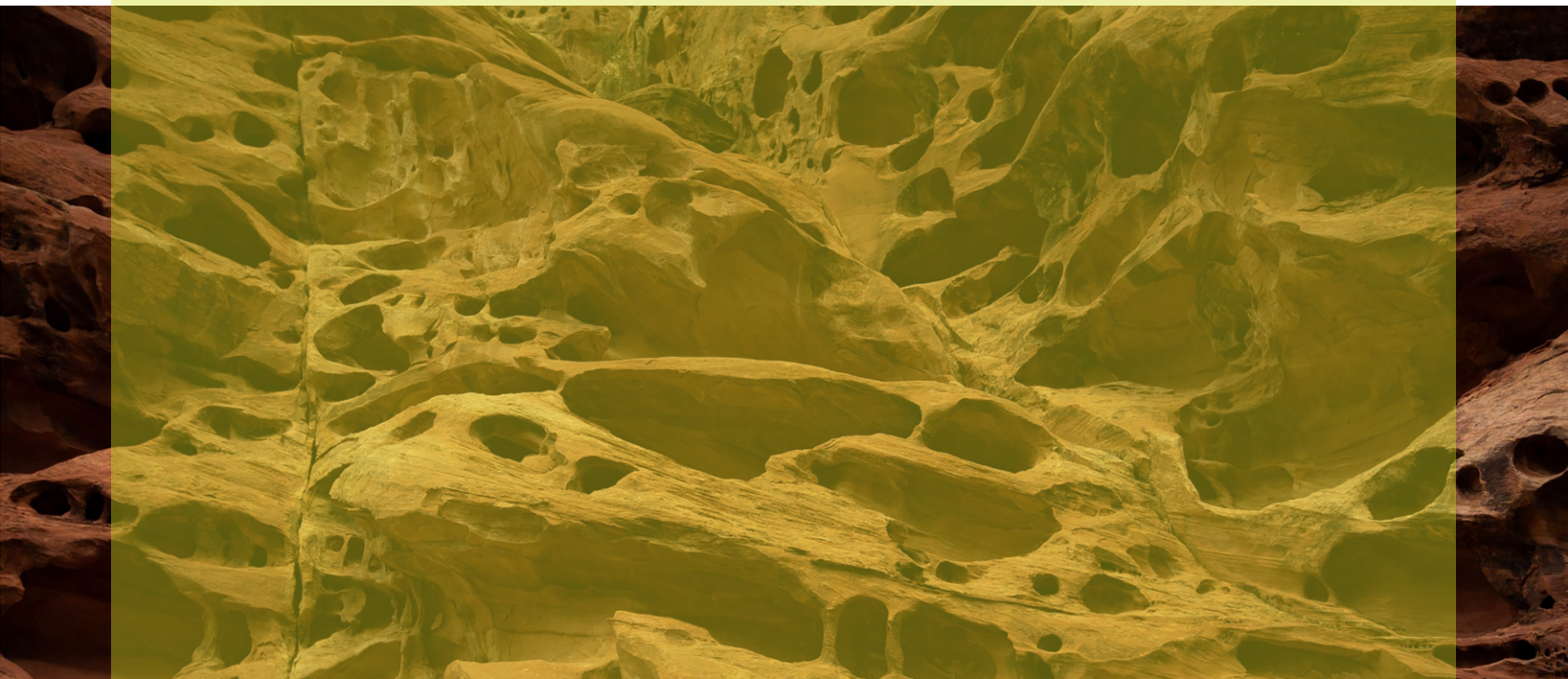
*“The only thing that smacks of energy is the uranium... **The uranium deposits are outside the monument now.**”*

- Gary Herbert, Governor of Utah, 2017

*“The world is oversupplied with uranium, **but that situation is resolving.**”*

- Curtis Moore, Energy Fuels Resources, 2018





16-22

SPECULATION

A Future Expansion

If the demand for uranium increases in the future, will other mining companies follow in the footsteps of Energy Fuels Resources and reconstruct abandoned uranium mines in the areas surrounding Bears Ears National Monument?



Given the rich history of uranium mining in Southern Utah and the recent proposal to expand the Daneros uranium mine regardless of currently stagnant uranium prices, a future expansion of the industry is entirely possible. The actions and words of Energy Fuels Resources suggest that the demand for uranium could increase in the near future, raising the question:

If the demand for uranium increases in the future, will other mining companies follow in the footsteps of Energy Fuels Resources and reconstruct abandoned uranium mines in the areas surrounding Bears Ears National Monument?

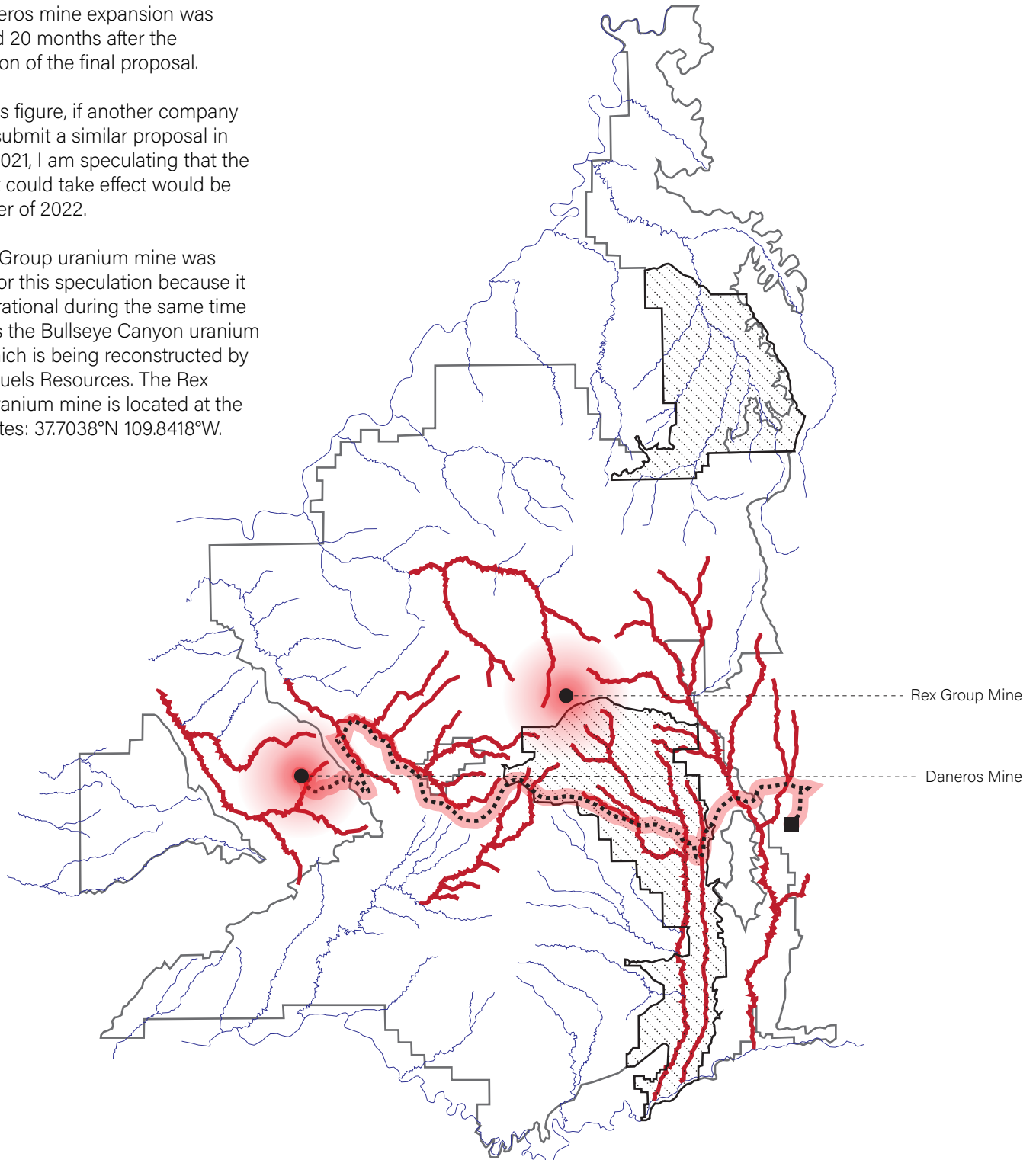
In order to explore this possibility, I am speculating for a future expansion of the uranium mining industry in and around Bears Ears National Monument.

December 2022

The Daneros mine expansion was approved 20 months after the submission of the final proposal.

Given this figure, if another company were to submit a similar proposal in April of 2021, I am speculating that the earliest it could take effect would be December of 2022.

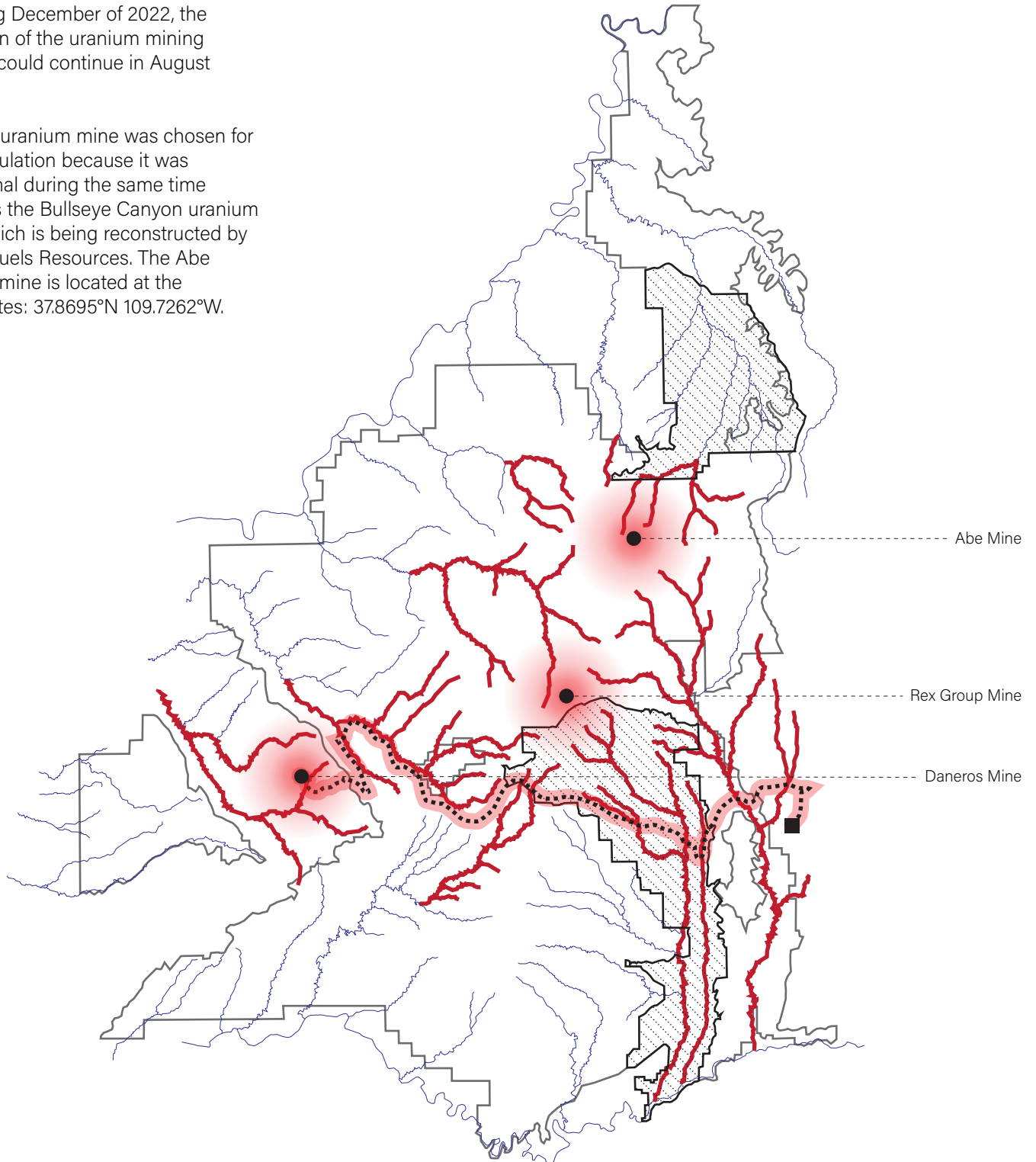
The Rex Group uranium mine was chosen for this speculation because it was operational during the same time period as the Bullseye Canyon uranium mine, which is being reconstructed by Energy Fuels Resources. The Rex Group uranium mine is located at the coordinates: 37.7038°N 109.8418°W.



August 2024

Following December of 2022, the expansion of the uranium mining industry could continue in August of 2024.

The Abe uranium mine was chosen for this speculation because it was operational during the same time period as the Bullseye Canyon uranium mine, which is being reconstructed by Energy Fuels Resources. The Abe uranium mine is located at the coordinates: 37.8695°N 109.7262°W.

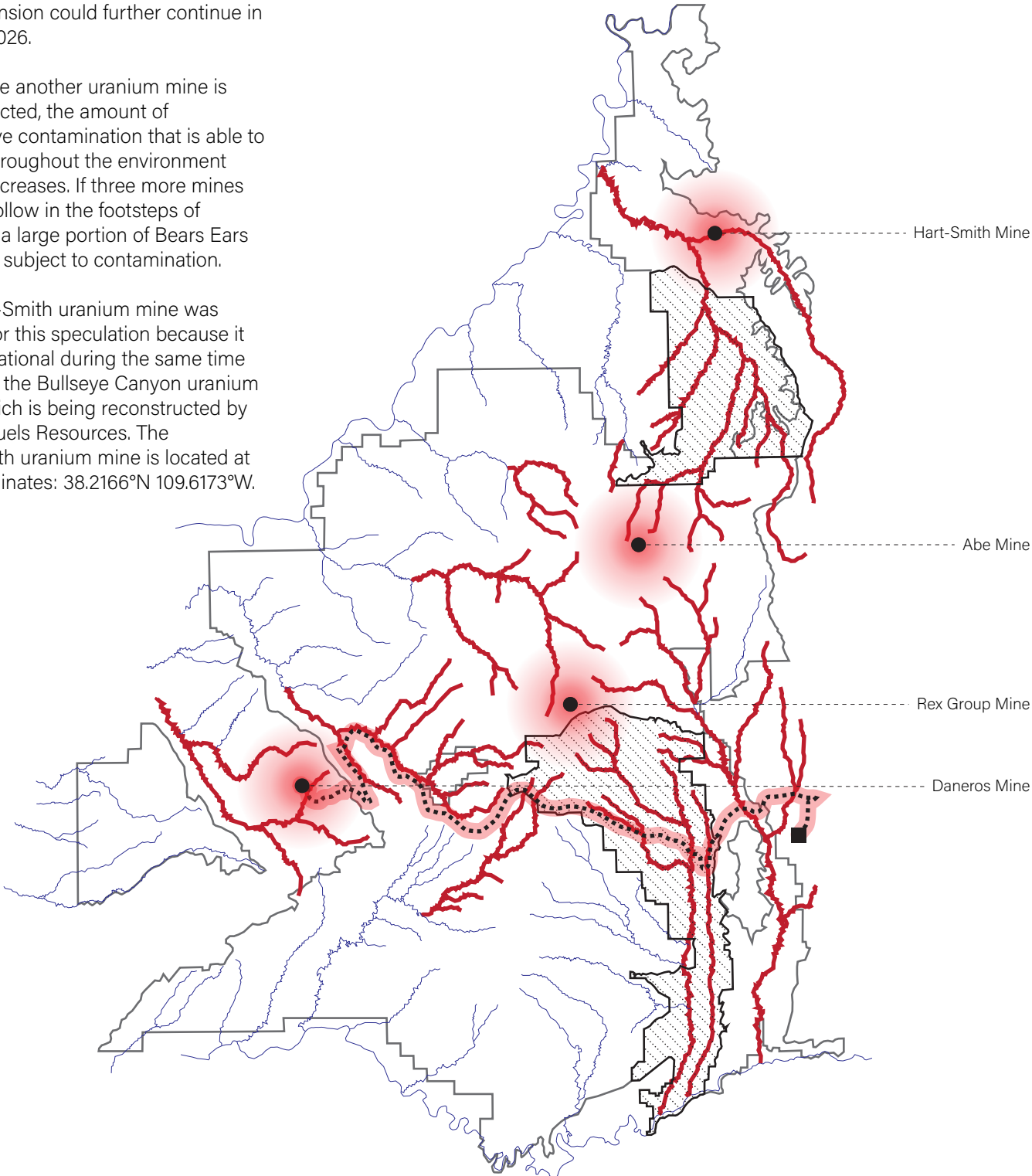


April 2026

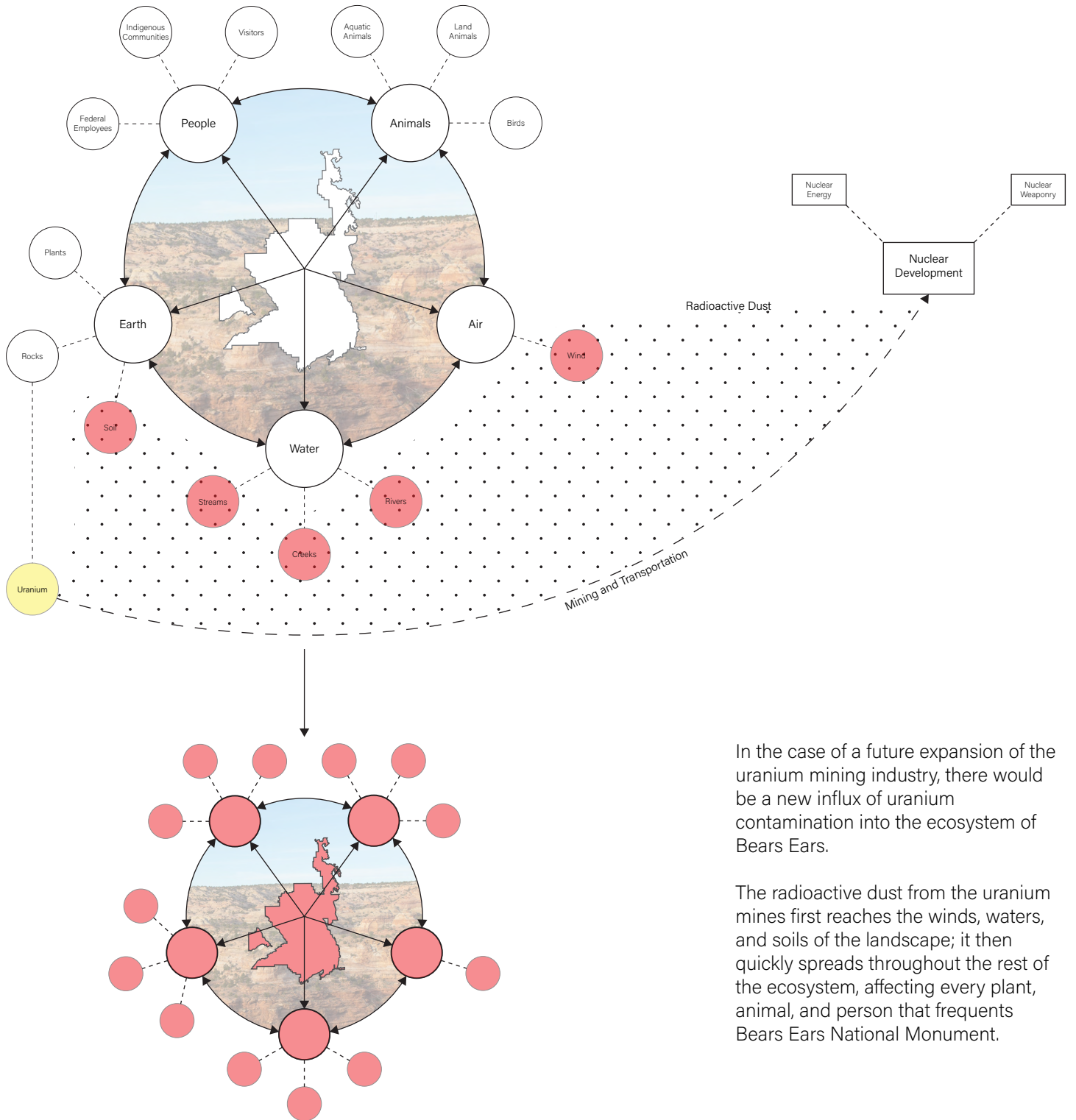
The expansion could further continue in April of 2026.

Every time another uranium mine is reconstructed, the amount of radioactive contamination that is able to spread throughout the environment quickly increases. If three more mines were to follow in the footsteps of Daneros, a large portion of Bears Ears would be subject to contamination.

The Hart-Smith uranium mine was chosen for this speculation because it was operational during the same time period as the Bullseye Canyon uranium mine, which is being reconstructed by Energy Fuels Resources. The Hart-Smith uranium mine is located at the coordinates: 38.2166°N 109.6173°W.



Contaminated Ecosystem



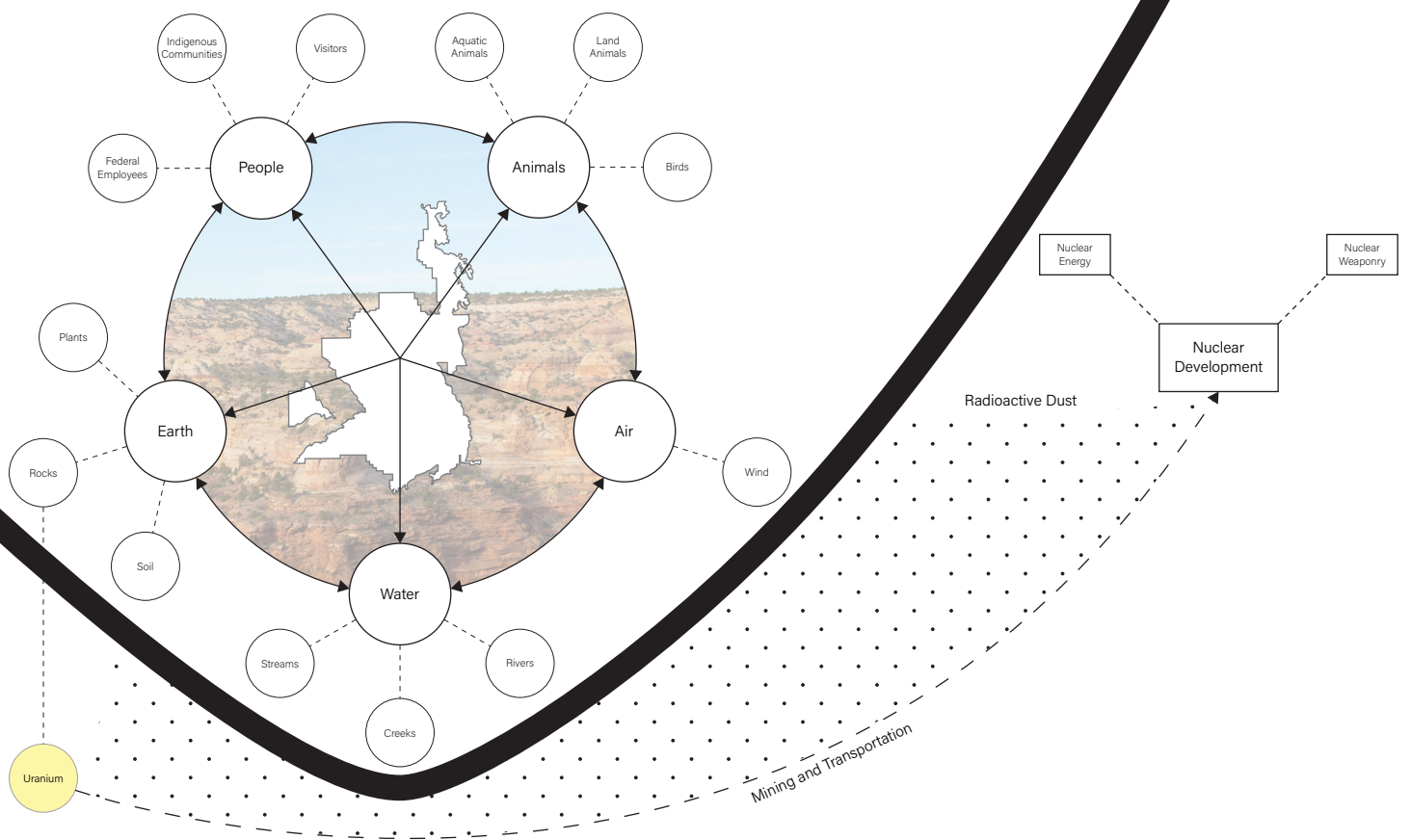
In the case of a future expansion of the uranium mining industry, there would be a new influx of uranium contamination into the ecosystem of Bears Ears.

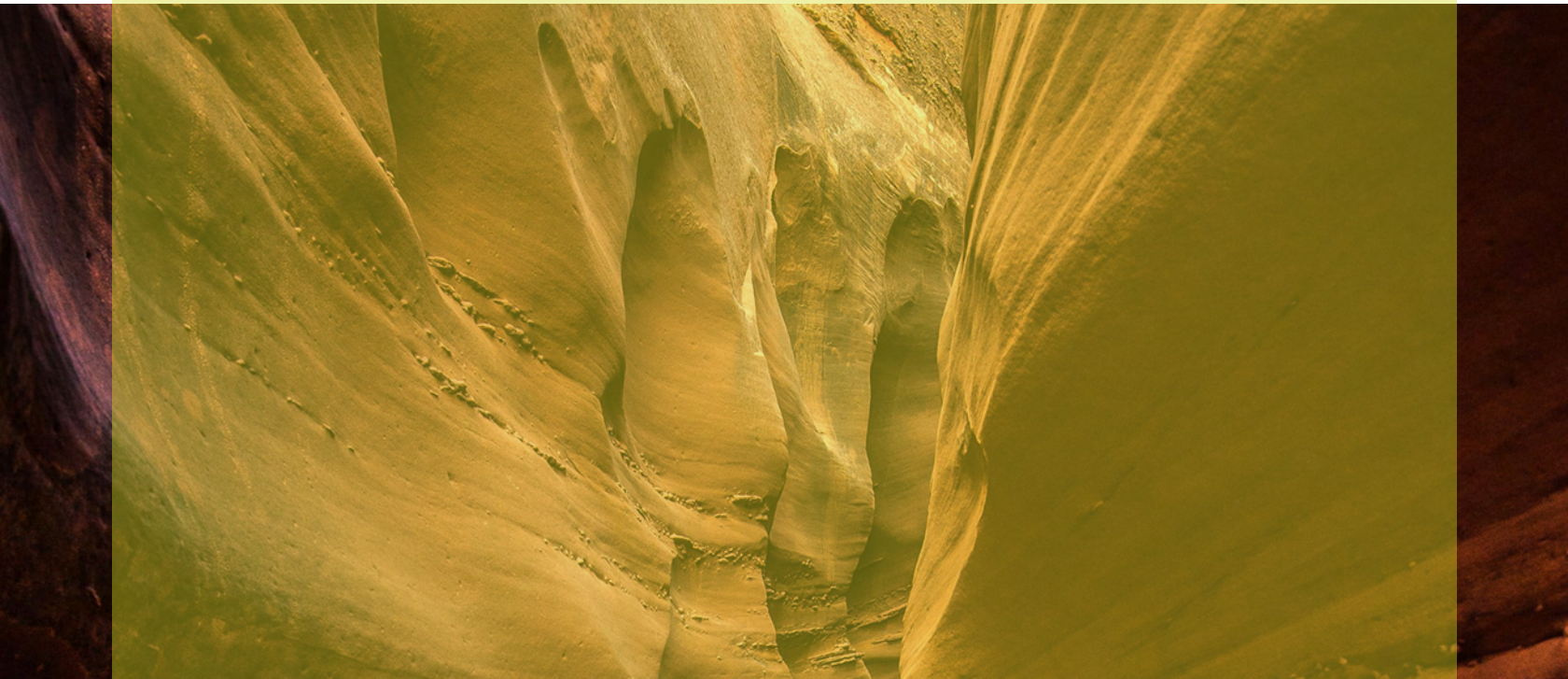
The radioactive dust from the uranium mines first reaches the winds, waters, and soils of the landscape; it then quickly spreads throughout the rest of the ecosystem, affecting every plant, animal, and person that frequents Bears Ears National Monument.

A Reactionary Effort

In order to protect Bears Ears from this influx of uranium contamination, the reactionary effort of blocking the contamination from entering the ecosystem will need to be taken.

Uranium mining is still governed by the Mining Act of 1872, which was heavily influenced by heads of the mining industry at the time of its passage. Thus, the prevention of uranium mining in and around Bears Ears is not likely. In a future expansion of the uranium mining industry, all that will stand between Bears Ears and mass radioactive contamination will be reactionary, last chance efforts.





23-29

RESPONSE

A New Contaminant

*If uranium mining companies continue to be granted permission to contaminate Bears Ears in the future, **we will have to resort to the reactionary measure of creating barriers between the contaminants and the ecosystem.***



Being that there are no current policies that would prevent mining companies from contaminating the landscape, I am speculating that in the future we will have to resort to the reactionary measure of creating barriers between the contaminants and the ecosystem.

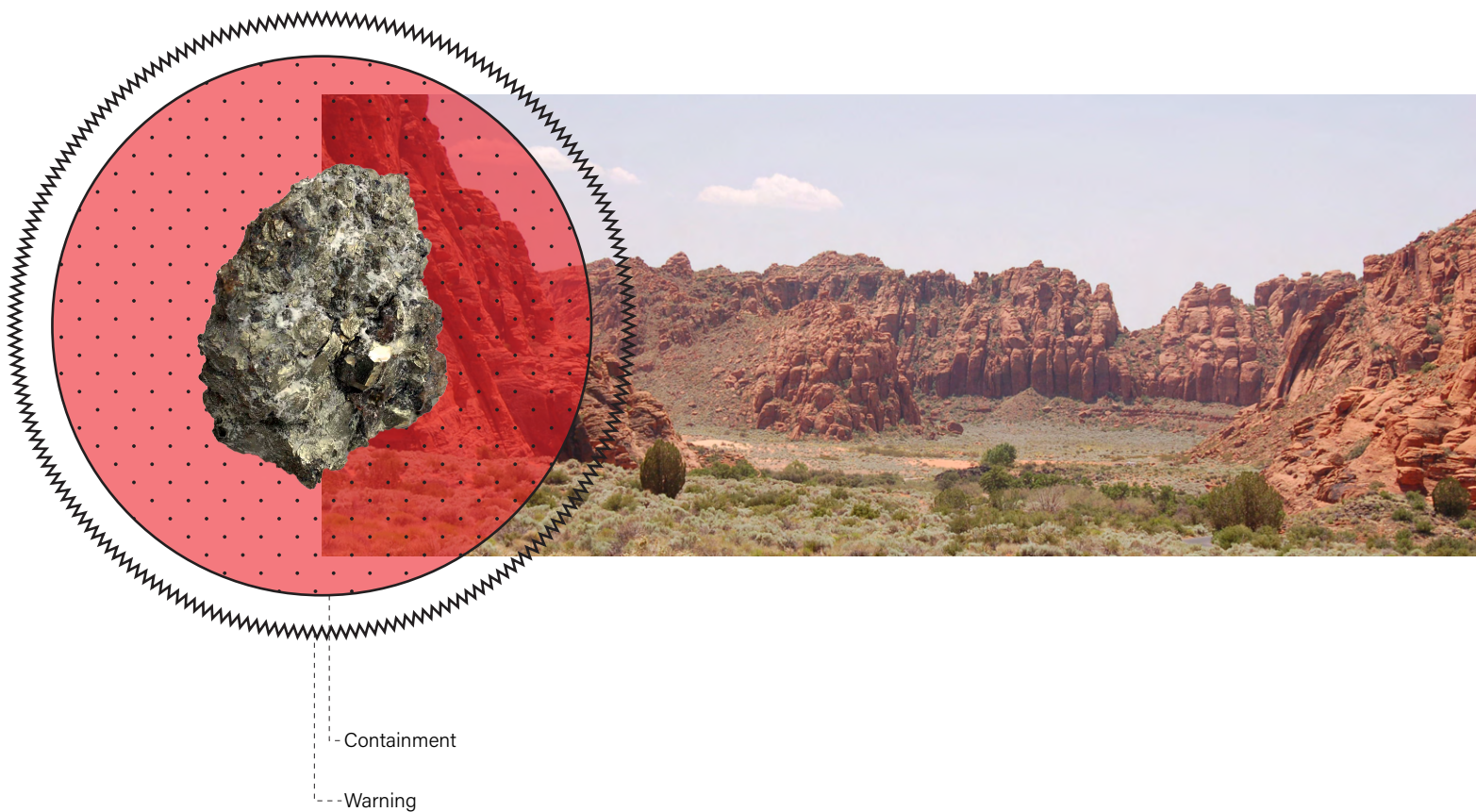
The Barriers are structures that stop radioactive contamination from spreading into the environment of Bears Ears. They will not stop uranium mining from happening, but rather create a layer of separation between the contaminants it produces and Bears Ears National Monument.

Although the Barriers work to stop the spread of radioactive contaminants, they themselves take the form of a new contaminant within the landscape.

Purpose

The Barriers serve two primary purposes: to stop radioactive contamination from entering the environment of Bears Ears, and to act as a warning sign of the dangerous and unethical actions occurring at the uranium mining complexes.

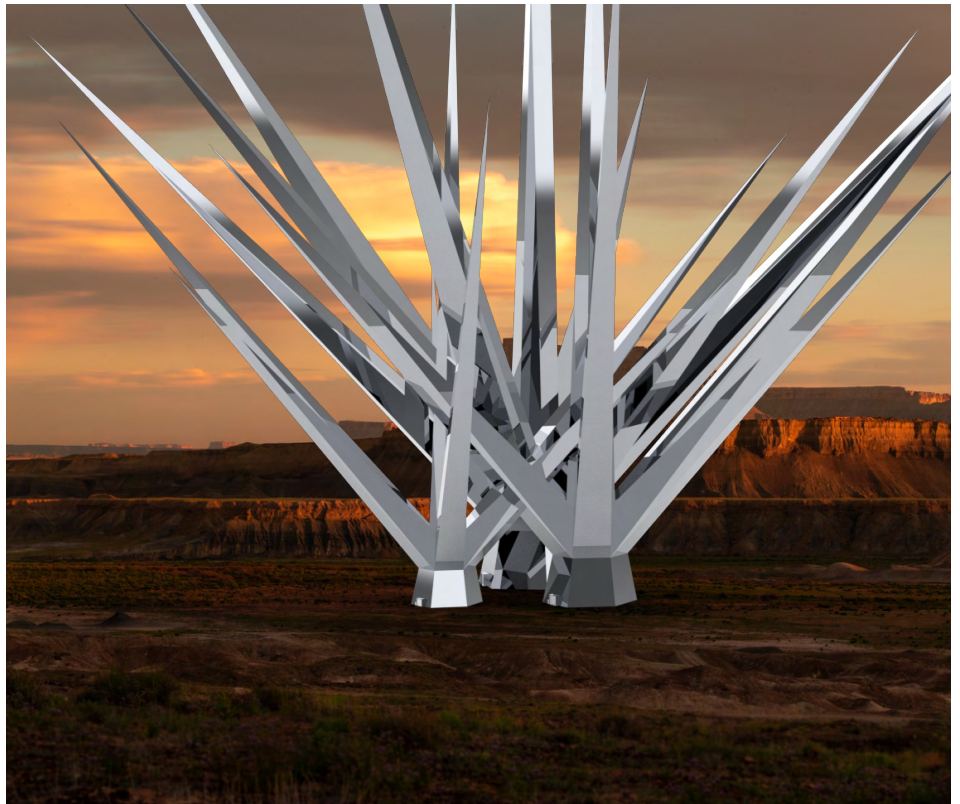
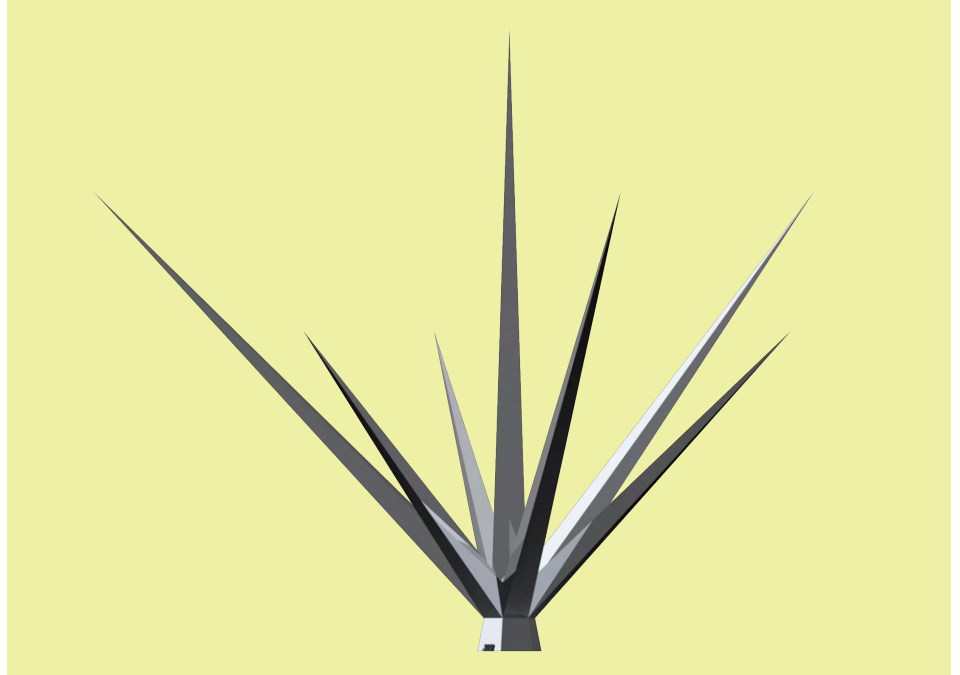
Uranium mines are landmarks of exploitation, which is not conducive to an ethical relationship with the land. Visitors of Bears Ears need to know that these areas are not safe, thus it is necessary for the Barriers to serve as a warning as well as a layer of protection.



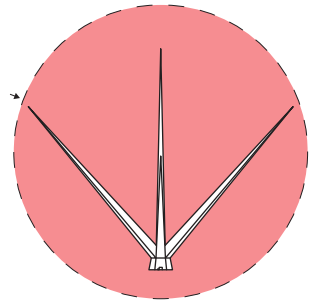
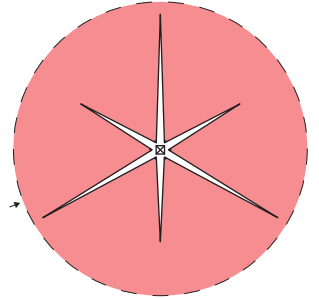
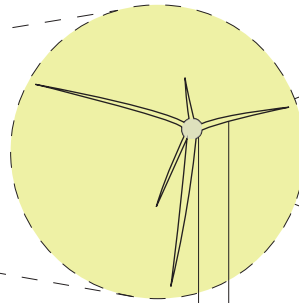
The Barriers

The Barriers are large structures that enclose different areas of a uranium mining complex.

The base of each barrier contains any contaminants produced in the mining process, while their aggressive form and steel exterior contrast the landscape of Bears Ears National Monument and warn any people to stay away from the mining area.



Form



Spine

Areole

The form of the Barrier was derived from the tulip prickly pear cactus, a species native to the Bears Ears region.

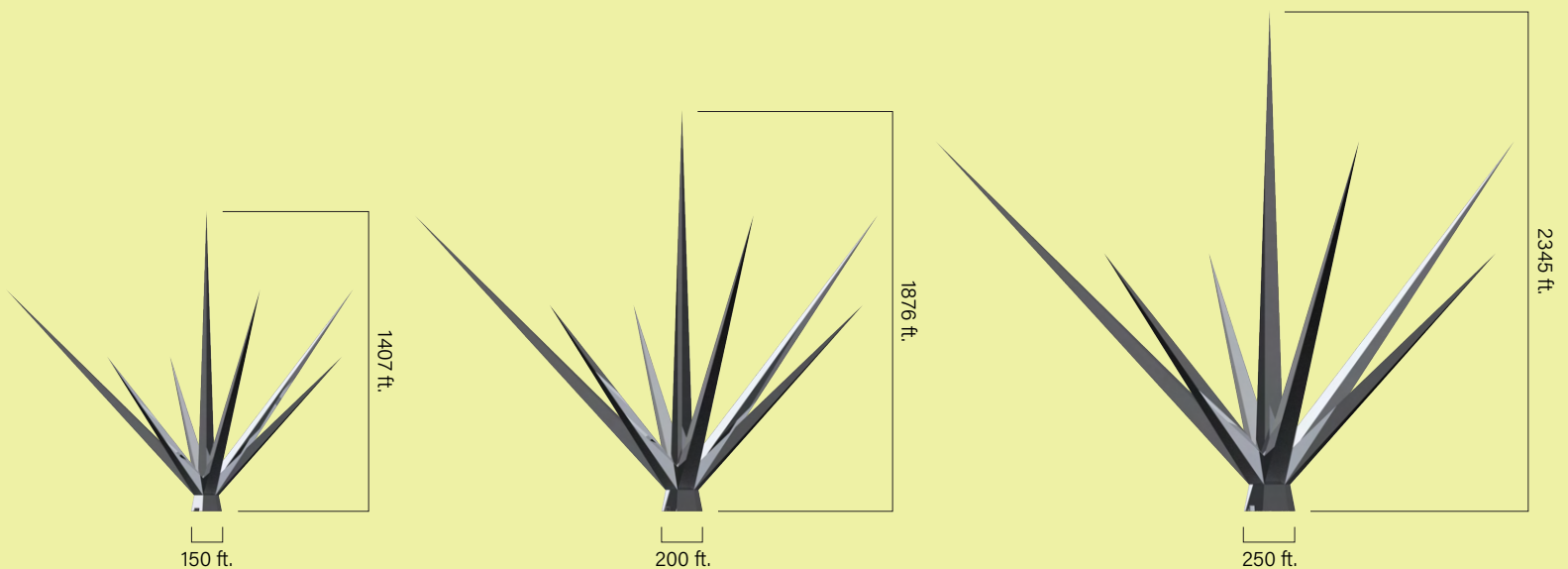
These cacti have aggressive spines that warn other organisms to stay away from them, which inspired the spikes projecting from the barrier. The base of the barrier was inspired by the areole, the part of the cactus that connects the spines to the stem.



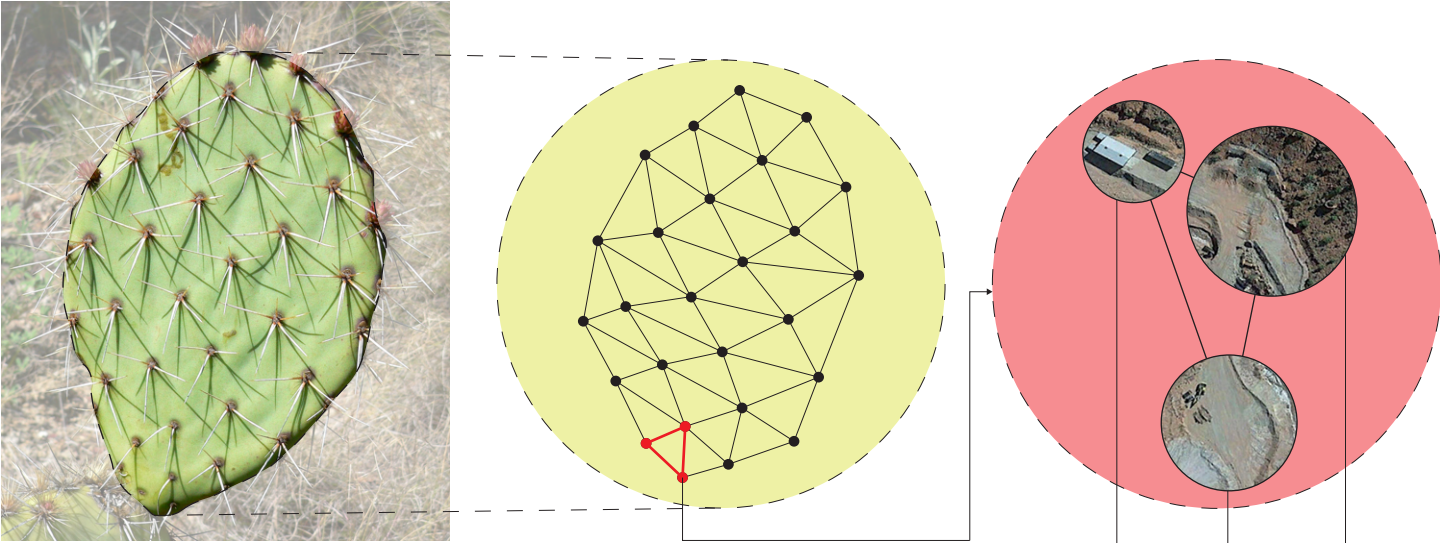
Scale

The sizes of the Barriers range between 150 feet at the base and 1407 feet tall, to 250 feet at the base and 2345 feet tall. The middle size, being 200 feet at the base and 1876 feet tall, was designed to be 100 feet taller than the tallest building in the United States, the One World Trade Center building in New York City. This ensures that the Barriers will be visible from nearly everywhere in Bears Ears National Monument.

The widths of the bases were derived from the various structures at the Daneros mining complex. The largest Barrier was designed to cover the portal area of the mine, as it is the largest and most heavily trafficked area while also producing the most contaminants of anywhere in complex. The two smaller sizes were designed to cover any additionally infrastructure at a mining complex, such as employee buildings and equipment storage areas.



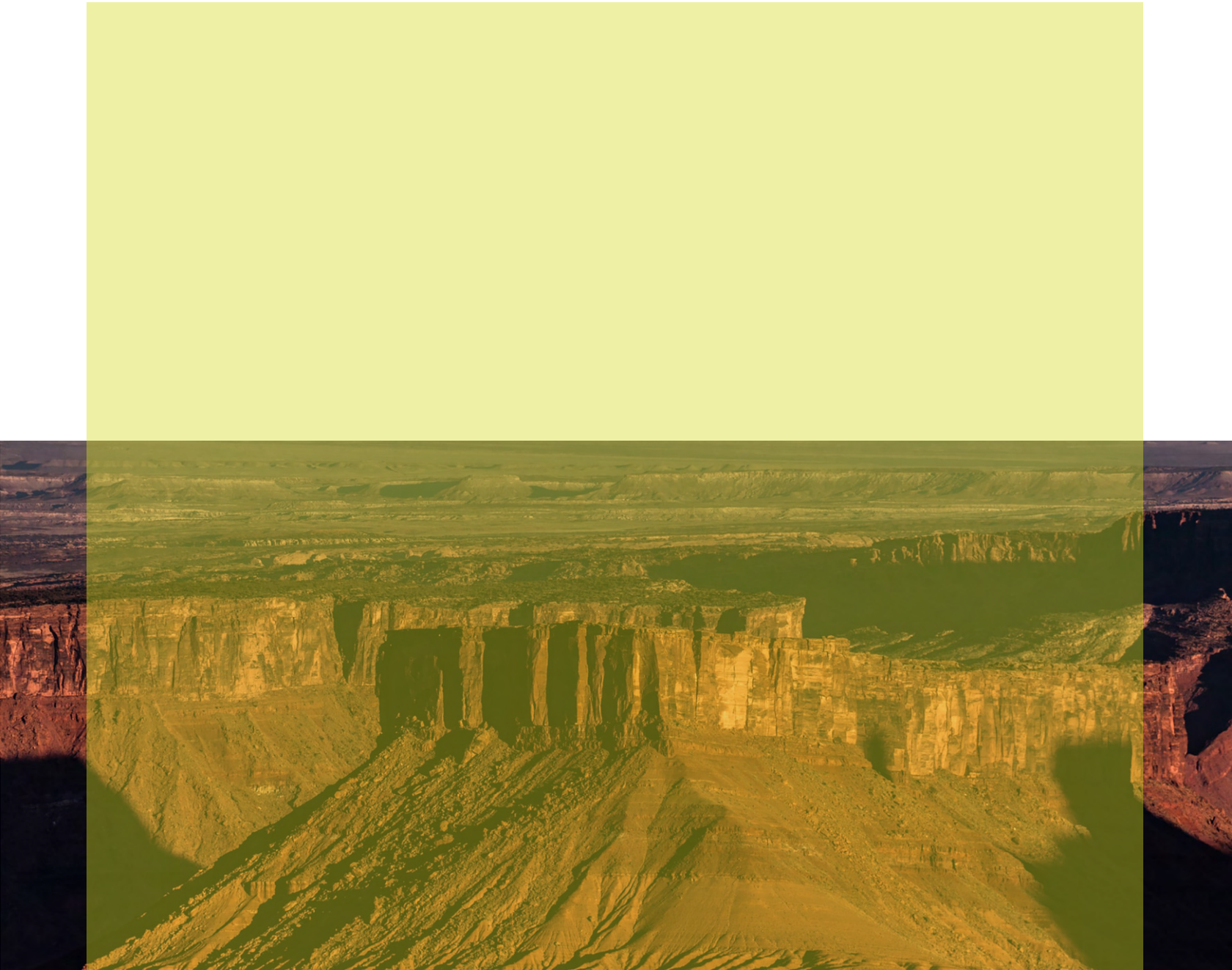
Layout



- Employee structure
- Equipment area
- Portal area

The layout of the Barriers was also derived from the prickly pear, as the spines grow on a loose isometric grid that mimics the layout of uranium mining complexes, such as the Daneros mine pictured here.

The largest Barrier is containing the portal area, where the uranium ore is extracted from the ground. The equipment parking area is contained by the medium sized Barrier; and the employee structure is contained by the smallest Barrier.



30-35

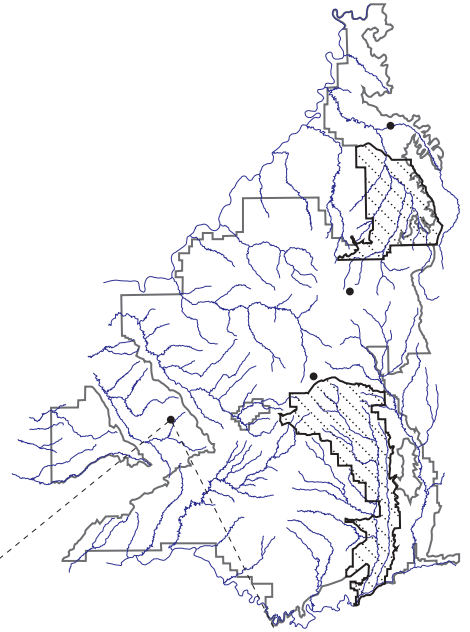
IMPACT

Altered Landscape: Daneros Mine

If we apply the Barriers to the current Daneros uranium mining complex, we can begin to see how they manifest within the landscape. Their form, size, and materiality contrast the area around them.

While the Barriers are containing the mining complex and stopping uranium contamination from entering the ecosystem, they themselves are disrupting the landscape.

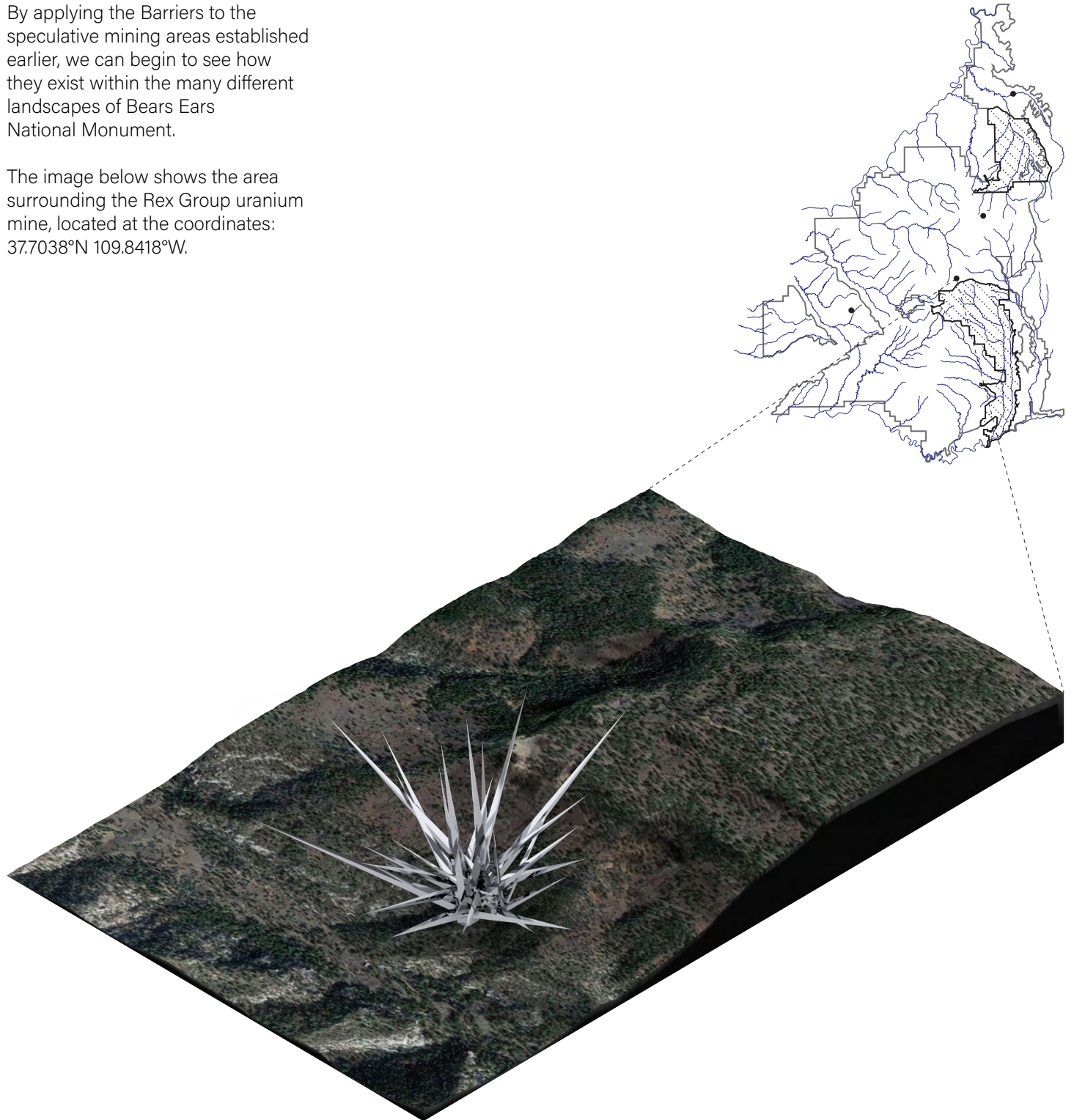
The contaminants from uranium mining are not allowed to spread, but the environment is now subject to a new form of contaminant.



Altered Landscape: 2022

By applying the Barriers to the speculative mining areas established earlier, we can begin to see how they exist within the many different landscapes of Bears Ears National Monument.

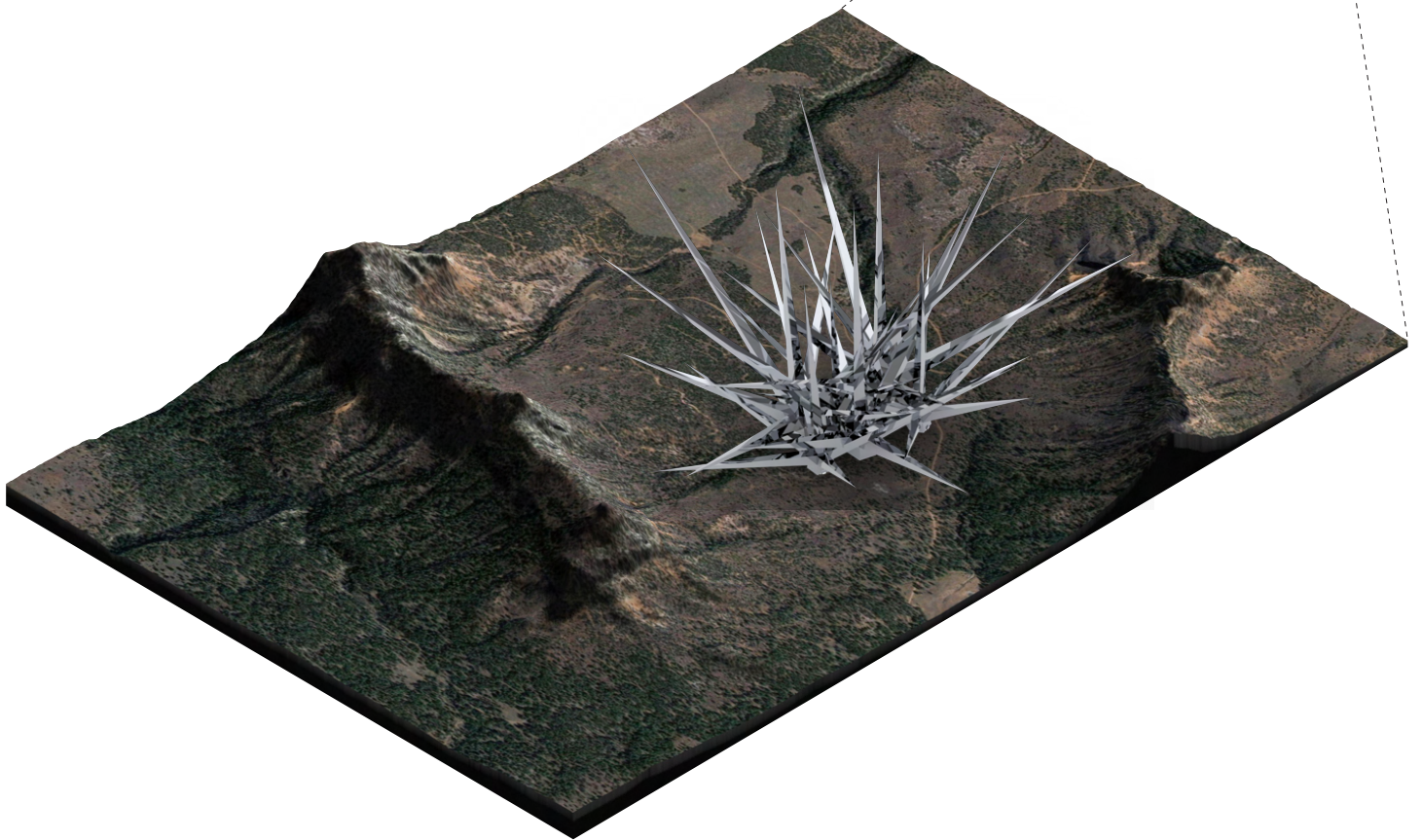
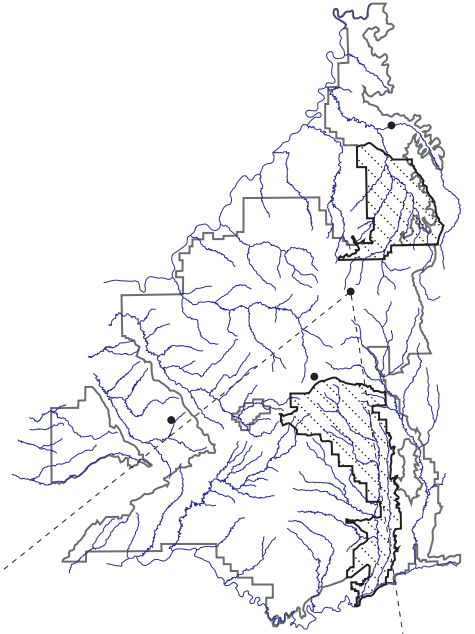
The image below shows the area surrounding the Rex Group uranium mine, located at the coordinates: 37.7038°N 109.8418°W.



Altered Landscape: 2024

Regardless of variations in the landscape, the Barriers simultaneously protect and disrupt.

The image below shows the area surrounding the Abe uranium mine, located at the coordinates: 37.8695°N 109.7262°W.

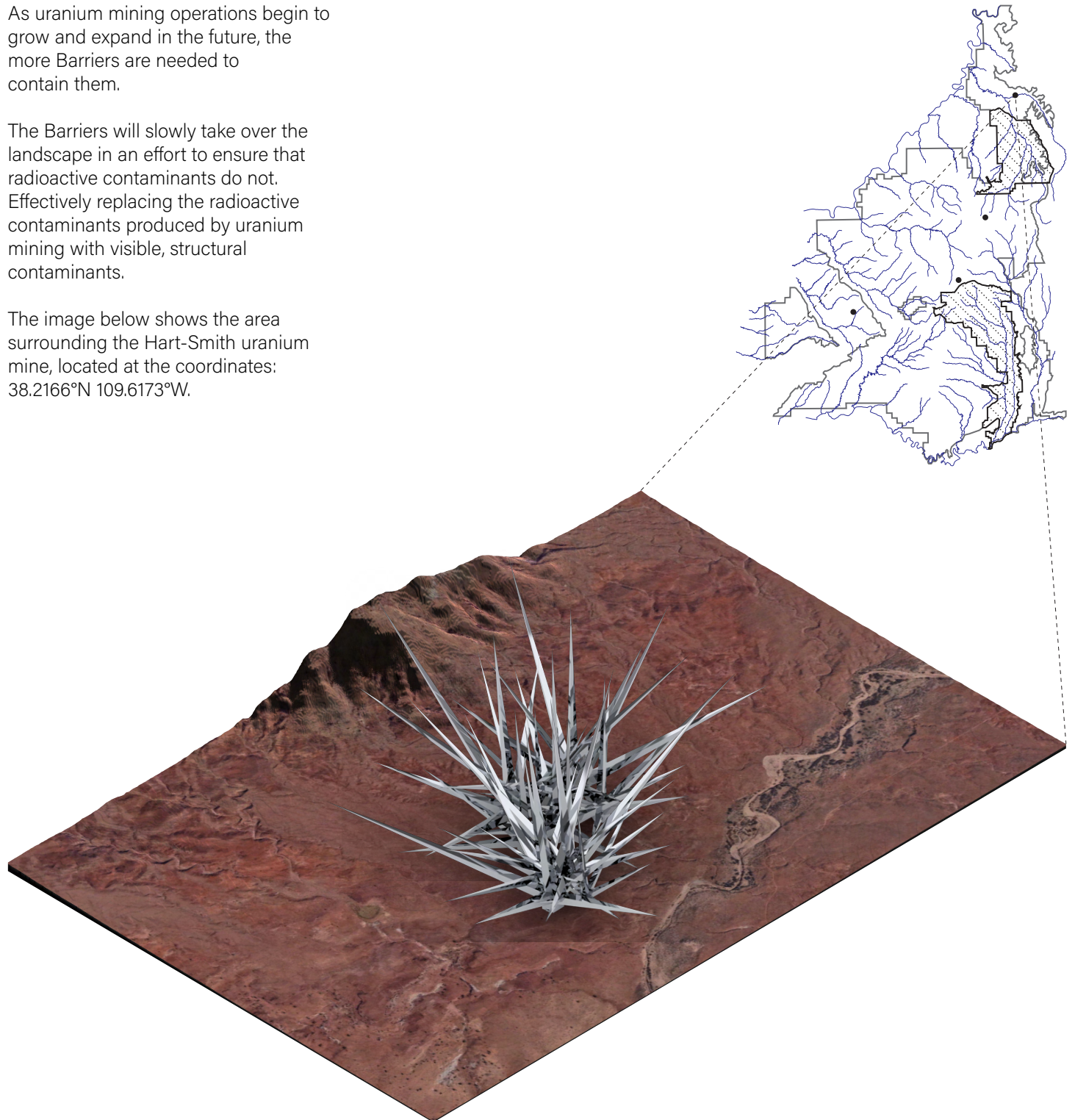


Altered Landscape: 2026

As uranium mining operations begin to grow and expand in the future, the more Barriers are needed to contain them.

The Barriers will slowly take over the landscape in an effort to ensure that radioactive contaminants do not. Effectively replacing the radioactive contaminants produced by uranium mining with visible, structural contaminants.

The image below shows the area surrounding the Hart-Smith uranium mine, located at the coordinates: 38.2166°N 109.6173°W.



Summary

The Barriers are a reactionary effort to protect Bears Ears National Monument from increased exposure to radioactive contamination as uranium mining continues to be redeveloped in the future.

Historical precedents of uranium mining in the areas surrounding Bears Ears suggest that a future expansion of the industry is entirely possible. This possibility is given urgency when considering the recent actions and statements of Energy Fuels Resources.

If measures are not taken to prevent a future expansion before it can have damaging effects on Bears Ears National Monument, reactionary efforts will need to be taken to stop radioactive contamination from entering the ecosystem. However, these efforts may result in the introduction of a new form of contaminant.



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