



Mining debris at Flintere (6519) mine, Utah

DRUM PROGRAM ANNUAL PROGRESS REPORT

Jan. 1-Dec. 31

2022



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Purpose

This 2022 annual report for the U.S. Department of Energy (DOE) Office of Legacy Management (LM) Defense-Related Uranium Mines (DRUM) program provides details on 2022 program activities and accomplishments and project plans for 2023. Additional information on the program is available in other documents and through the contact information provided at the end. The information presented in this report is stored in a continually updated database and represents data that were queried on Jan. 3, 2023.

Open Subsidence at Bell Hill (4077) mine, Utah Statewide FOP

Background

The 2014 Defense-Related Uranium Mines Report to Congress (DOE 2014) (Report to Congress) identified 4,225 uranium purchase records in 19 states, revealing an unknown degree of liability from a unique set of abandoned uranium mines (AUMs) in the United States. These mines provided uranium ore to the U.S. Atomic Energy Commission (AEC) for defense-related activities from 1947 to 1970. Using the 2014 Report's list of 4,225 mines as a starting point, mine reconciliation efforts correlated each mine with a specific geographic location and production size. Subsequent evaluation resulted in a reduction of the total number of reconciled mines to 3,472. This reduction was based on many factors but was primarily due to resolution of duplicate mine records. In response to the Report to Congress, LM initiated DRUM Program Campaign 1 in 2017 to conduct verification and validation (V&V) activities using existing mine information and collect screening level site-specific data at about 2,500 legacy mines on public land, administered by federal and state agencies. Field V&V work for Campaign 2 began in fiscal year (FY) 2022, which kicked off the assessment of DRUM sites on tribal land. Campaign 3, which will address DRUM sites on private property, is scheduled to begin field V&V work in FY 2024.

Program Mission, Objectives, Scope, and Methods

The overall DRUM program mission is to identify DRUM sites that pose potentially unacceptable risks to human health and the environment and improve strategies for the allocation of government resources to address these risks. More specifically, the DRUM program mission is to: (1) correlate individual mines with ore production and location information, (2) inventory mine features and complete screening level sampling of mine sites, (3) provide risk screening information to help prioritize any potential future actions, and (4) identify potential environmental concerns

The DRUM program supports LM's strategic goal of "Protect human health and the environment" (Goal 1) and its strategic objective to "address the environmental legacy of defense-related uranium mining and milling sites" (DOE 2020a).

In support of its mission and goals, the objectives of the DRUM program are to:

1. Share existing information and collect site-specific data at each mine to identify physical safety hazards or human health and environmental risks.
2. Perform program-specific risk scoring and ranking of these mine hazards.
3. Improve the data quality and content of the DRUM program database and partner agency databases.
4. Exchange program results and information with federal, tribal, and state governments.
5. Quantify the resources necessary to mitigate the physical hazards posed by these sites and work with partner agencies to leverage resources to address mines with priority physical safety hazards.

The V&V process has three sequential steps: (1) reconciliation, (2) field inventory and environmental sampling, and (3) technical report preparation. These comprise the scope and methods utilized for the V&V process to achieve program objectives.

During the reconciliation step, DRUM personnel review available data to assess the location, ownership, and land management status of the mines. This includes reviewing AEC ore purchase records, company records, available mine maps, and federal and private libraries and collections.

Typical challenges encountered during reconciliation include inaccurate location information, duplicate records, multiple mines listed under one record, and missing records. In some cases, mine locations remain in an unknown status until DRUM personnel can find additional data.

The reconciliation process ensures that the most accurate location data are available to field teams before they conduct field V&V activities. As mines in designated geographic areas are reconciled, they are compiled into project areas used by land management agencies and field teams to coordinate field activities.

In the field inventory and environmental sampling step, field teams locate each mine site and map the existing features (e.g., adits, shafts, structures, waste rock piles). These activities include describing physical mine conditions, identifying mining-related features, assessing the physical hazards posed by each feature, evaluating ecological and environmental hazards, and assessing the ease of public access to the mine and signs of recent recreational use. Field teams collect environmental samples to determine the presence of selected radionuclides and chemicals in waste rock, soil, sediment shed areas, and surface water (when present). In addition, environmental sampling includes performing a gamma radiation survey of the mechanically disturbed area of the mine. Field data and observations are used to perform risk rankings for each mine. Field teams collect and record data electronically and conduct a rigorous quality-assurance/quality-control process before uploading to the DRUM program database.

In the report-preparation step, DRUM personnel develop V&V reports for each mine. Each report summarizes the V&V efforts that: (1) confirmed the current conditions and location of the mine; (2) recorded information associated with mine features, such as adits, shafts, and waste rock piles; and (3) provided the primary hazard rankings for physical hazards and potential risks to human health and the environment. Each V&V report also includes additional factors that influence risk rankings, such as current ecology and ease of public access. Risk screening is a systematic approach to evaluating risks associated with the mines. The DRUM team conveys risk-screening information to partner agencies via risk roll-up reports. An outgrowth of these activities is safeguarding physical mine hazards identified during V&V operations and evaluated and documented during risk roll-up reporting.

After completing the V&V steps, LM and its partner agencies collaborate as a cohesive team to safeguard physical hazards posed by remnant mining-related features at DRUM sites. Safeguarding involves the construction of barricades designed to prohibit public access to hazardous adits, shafts, subsidences, hazardous highwalls, and other excavated mine features. It may also remove or secure dilapidated structures. The scope and relative degree of the hazard presented by each feature are documented in risk roll-up reports prepared by the DRUM program for use by land management agencies.

V&V Summary

This section presents a summary of 2022 V&V activities and accomplishments. DRUM teams completed field visits at 333 mine locations in 2022. In addition, three records were removed from the DRUM program database during the reconciliation process because they were redundant records of the same mine (i.e., duplicate records). Table 1 presents a summary of mine reconciliations and field V&V activities.

Table 1. Summary of V&V Activities

	Duplicates Removed ^a		Field V&V Visits Completed ^b		Total V&V Completed ^c	
State	CY 2022 ^d	Project to Date	CY 2022	Project to Date	CY 2022	Project to Date
Colorado	4	435	98	967	102	1402
Utah	1	452	137	928	138	1380
Arizona	0	83	13	13	13	96
Wyoming	0	78	5	43	5	121
New Mexico	0	46	3	62	3	108
South Dakota	3	29	71	96	74	125
Texas	0	7	0	0	0	7
California	0	5	0	0	0	5
Nevada	0	2	0	0	0	2
Montana	0	4	4	11	4	15
Missouri	0	1	0	0	0	1
North Dakota	0	8	2	2	2	10
New York	0	2	0	0	0	2
Total	8	1152	333	2122	341	3274

Notes:

^a Removal of duplicates is the process of eliminating redundant (duplicate) records from the DRUM program database when more than one record references the same mine. In addition, non-DRUM sites and 26 unconventional sites are included in the count of duplicate records once they are removed from the database.

^b This is the number of mine V&V site visits accomplished.

^c This is the number of field V&V site visits completed added to the number of duplicate mines eliminated from the database.

^d Due to the “merge in place” process carried out in CY 2022, duplicate counts “recount” some previously merged mines.

Abbreviation: CY = Calendar Year

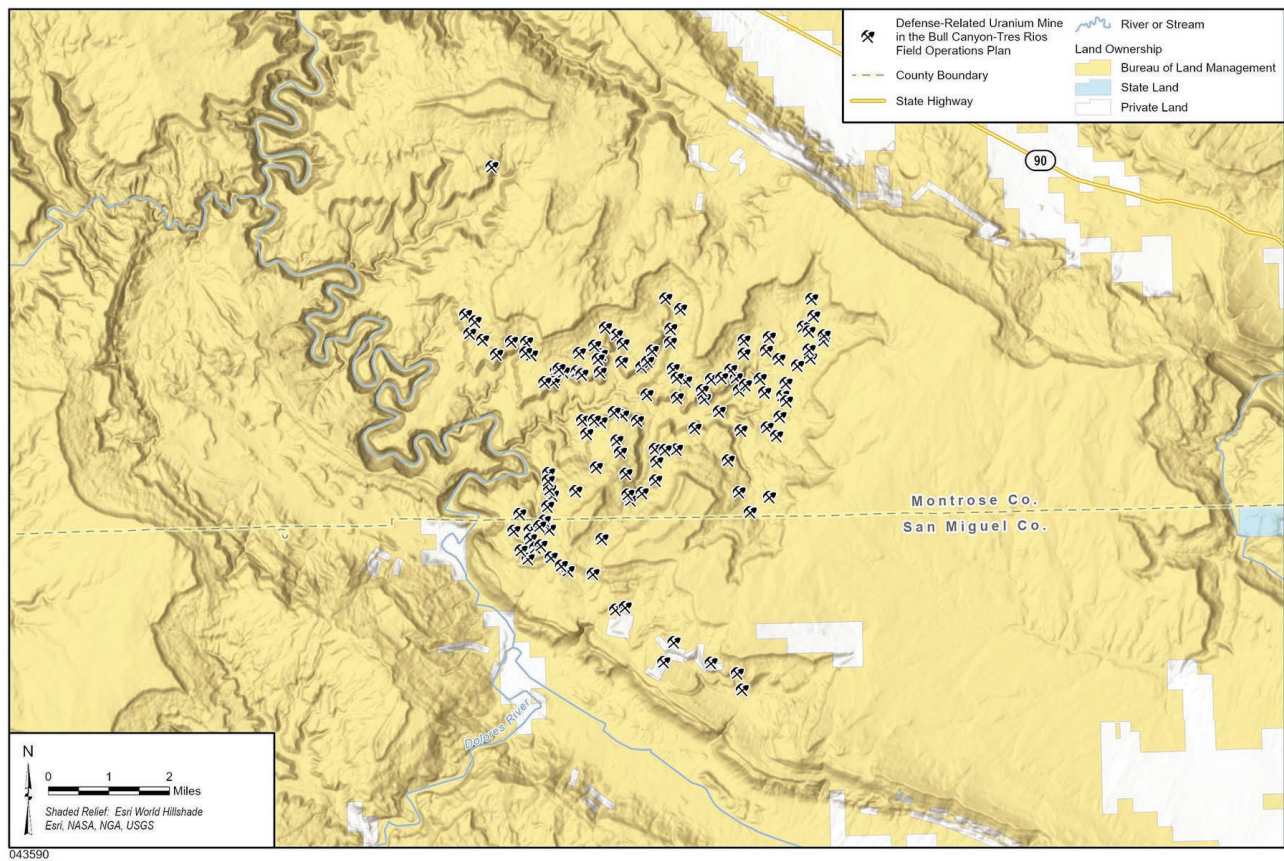
Lessons learned from the 2021 field season led to improvements in the 2022 field inventory methodology and refinements to mine V&V protocols to ensure consistency in application of program data-collection standards. The Defense-Related Uranium Mines Verification and Validation Work Plan (DOE 2022jj) (Campaign 1 V&V Work Plan) was updated to incorporate these changes. As described above, individual V&V mine reports capture this information.

DRUM personnel completed 325 V&V reports in 2022 and 1,992 V&V reports since the program’s inception. The DRUM Program Midyear Progress Report, January 1–June 30, 2022 (DOE 2022mm) presented additional analysis on the project’s status and its progress.

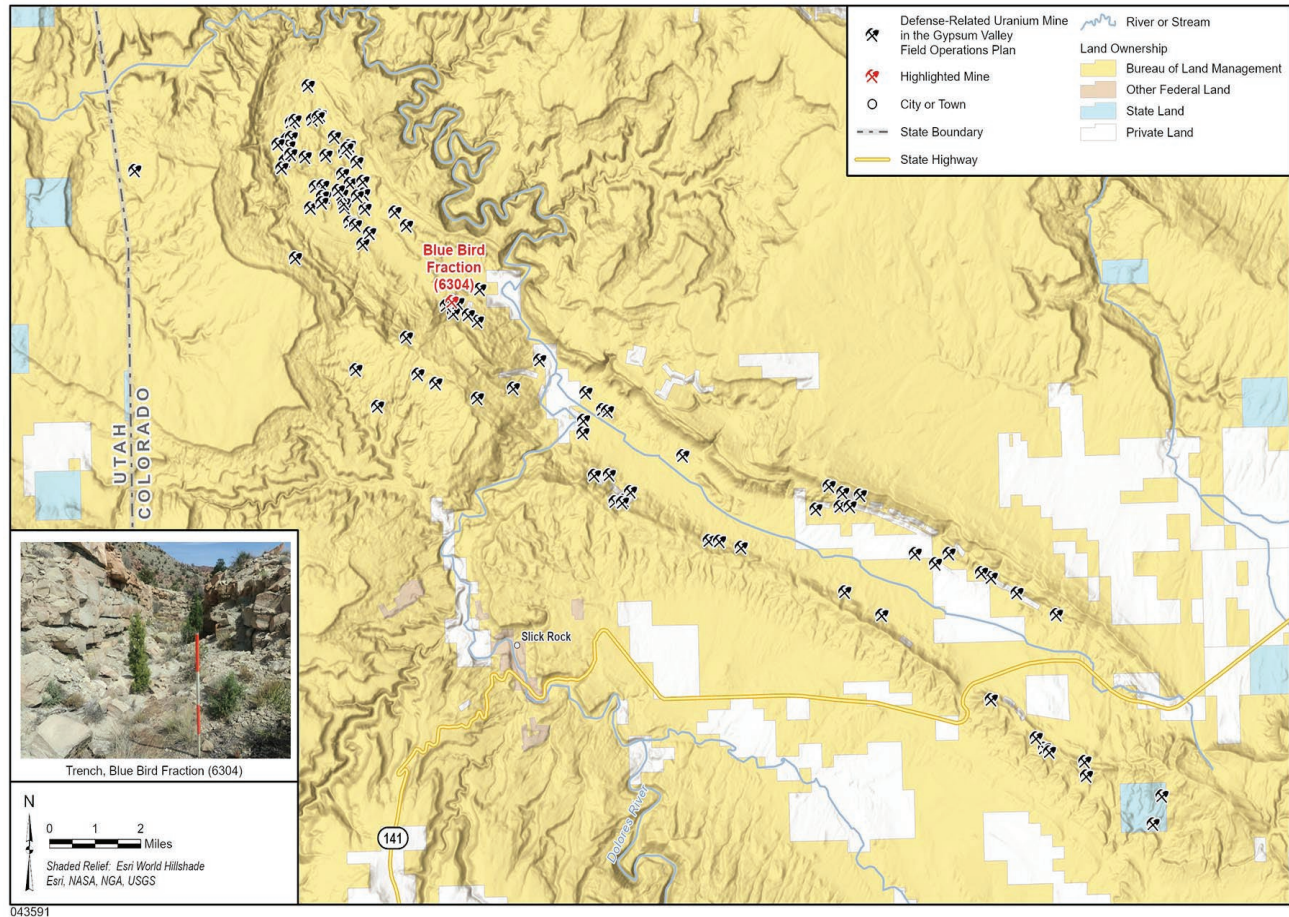
Field V&V operations are organized into logical project areas referred to as Field Operations Plans (FOPs) for ease of reference. The following is a summary of the field activities conducted within each FOP, including those FOPs where activities have been completed in or before 2022. These summaries are organized by state or campaign.

Colorado

- **Bull Canyon — Tres Rios FOP:** This project area includes Montrose and San Miguel counties in southwestern Colorado. The 124 mines in this FOP are on land administered by the U.S. Bureau of Land Management (BLM) and mixed-ownership land (i.e., BLM-administered land and private property). DRUM field teams conducted V&V activities at 123 mines in 2021 and at the final mine in 2022 to close out the FOP.
- **Bull Canyon — Uncompahgre Field Office (UFO) FOP:** This project area is located primarily in southwestern Colorado and includes 44 mines. There are 29 mines on BLM-administered land and 15 mines on mixed-ownership land (i.e., BLM-administered land and private property; BLM-administered land, Uranium Leasing Program [ULP] lease tracts, and private property; or BLM-administered land and ULP lease tracts). DRUM field teams conducted V&V activities at eight mines on public land in 2022 to complete work in this FOP.

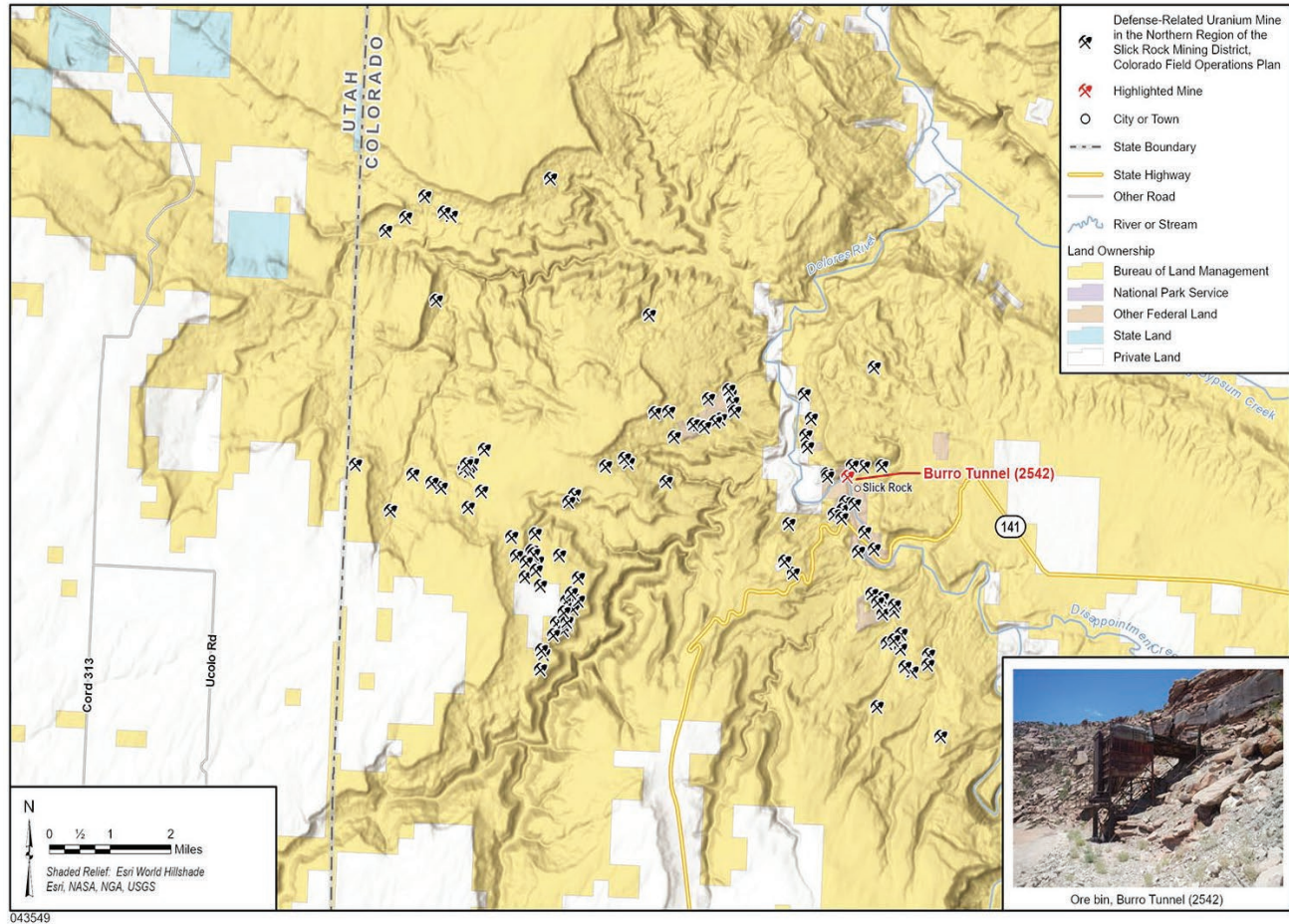


- Gypsum Valley FOP:** This project area covers San Miguel and Montrose Counties in southwestern Colorado. Of the 97 mines in this FOP, there are 83 mines on BLM-administered land, two mines on public land managed by the State of Colorado, and 12 mines on mixed-ownership land (i.e., BLM-administered land and private property). DRUM field teams conducted V&V activities at 88 mines in 2021 and seven mines in 2022; the remaining two mines have active mining permits and will not be visited.

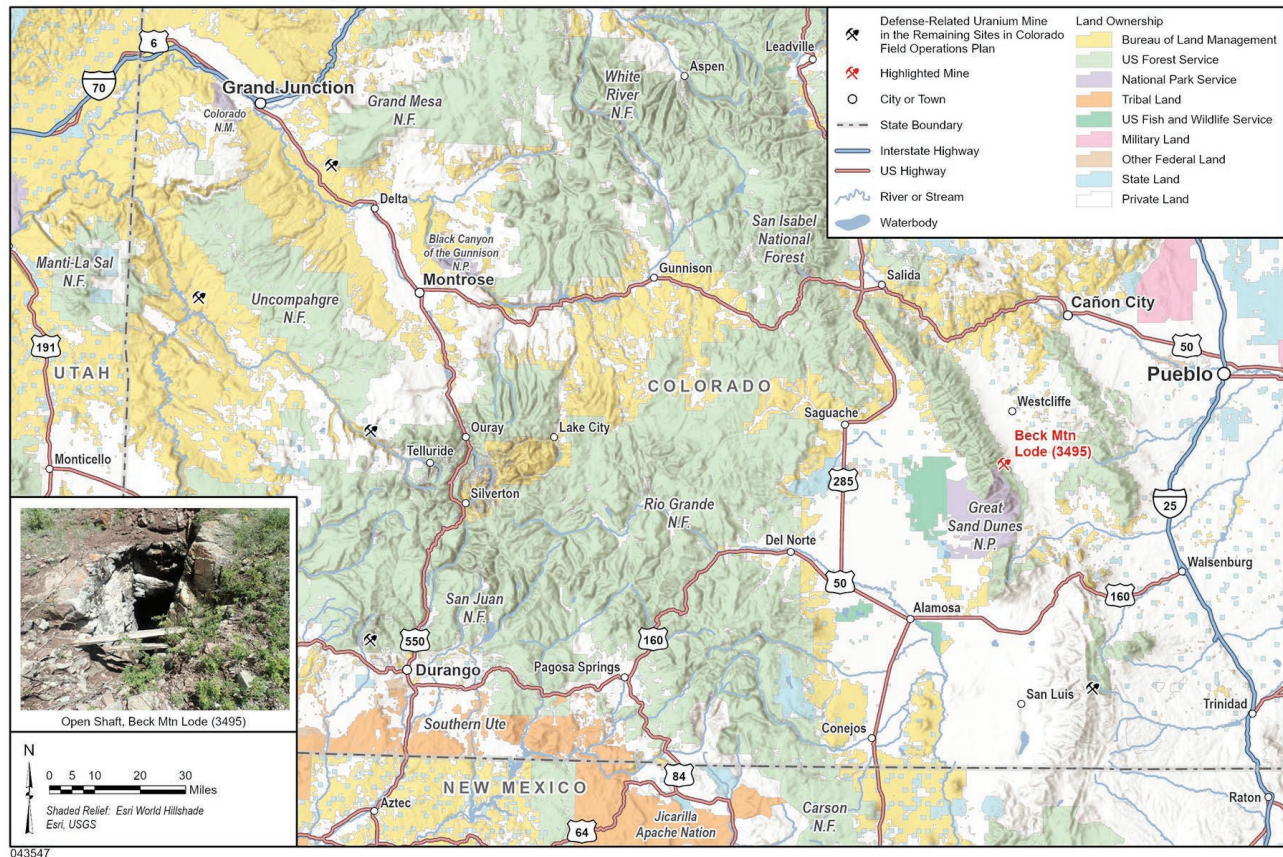


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- North Slick Rock FOP:** This project area includes a portion of west-central Colorado. There are 63 mines on BLM-administered land and 40 mines on mixed-ownership land (i.e., four on BLM-administered land, ULP lease tracts, and private property; 35 on BLM-administered land and ULP lease tracts; and one on BLM-administered land and private property). One mine in this FOP is on an active mining permit and will not be visited. DRUM field teams conducted V&V activities at 93 mines in 2021 and visited the remaining nine mines in 2022 to close out the FOP.

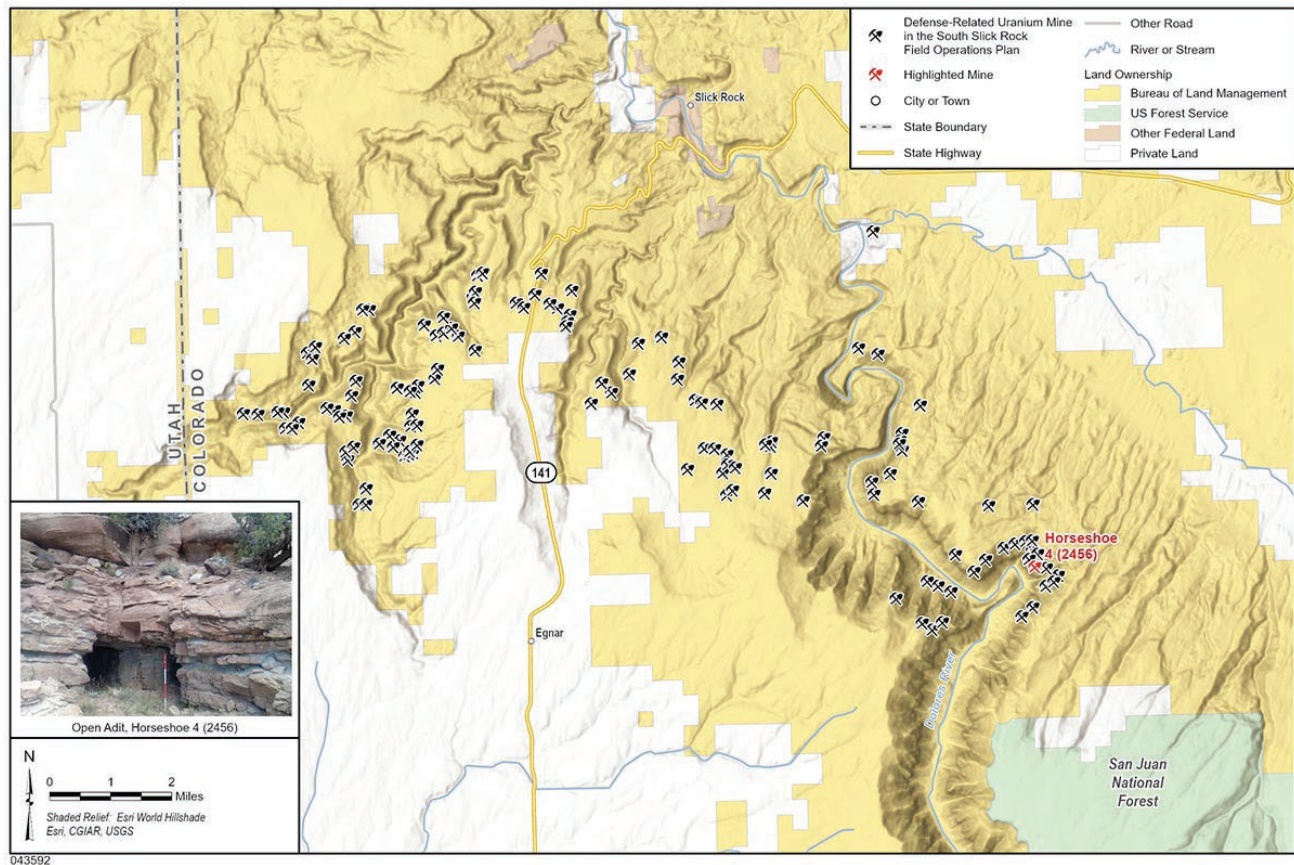


- Remaining Sites in Colorado FOP:** This project area covers southern Colorado. Although V&V work was thought to be completed in this area previously, the sites included in this FOP were not identified at the time the initial work was performed. The project areas include a total of three mines on BLM-administered land and three mines on land administered by the U.S. Forest Service (USFS). DRUM field teams conducted V&V activities at five of the six mines in 2022 and will visit the remaining mine in 2023.



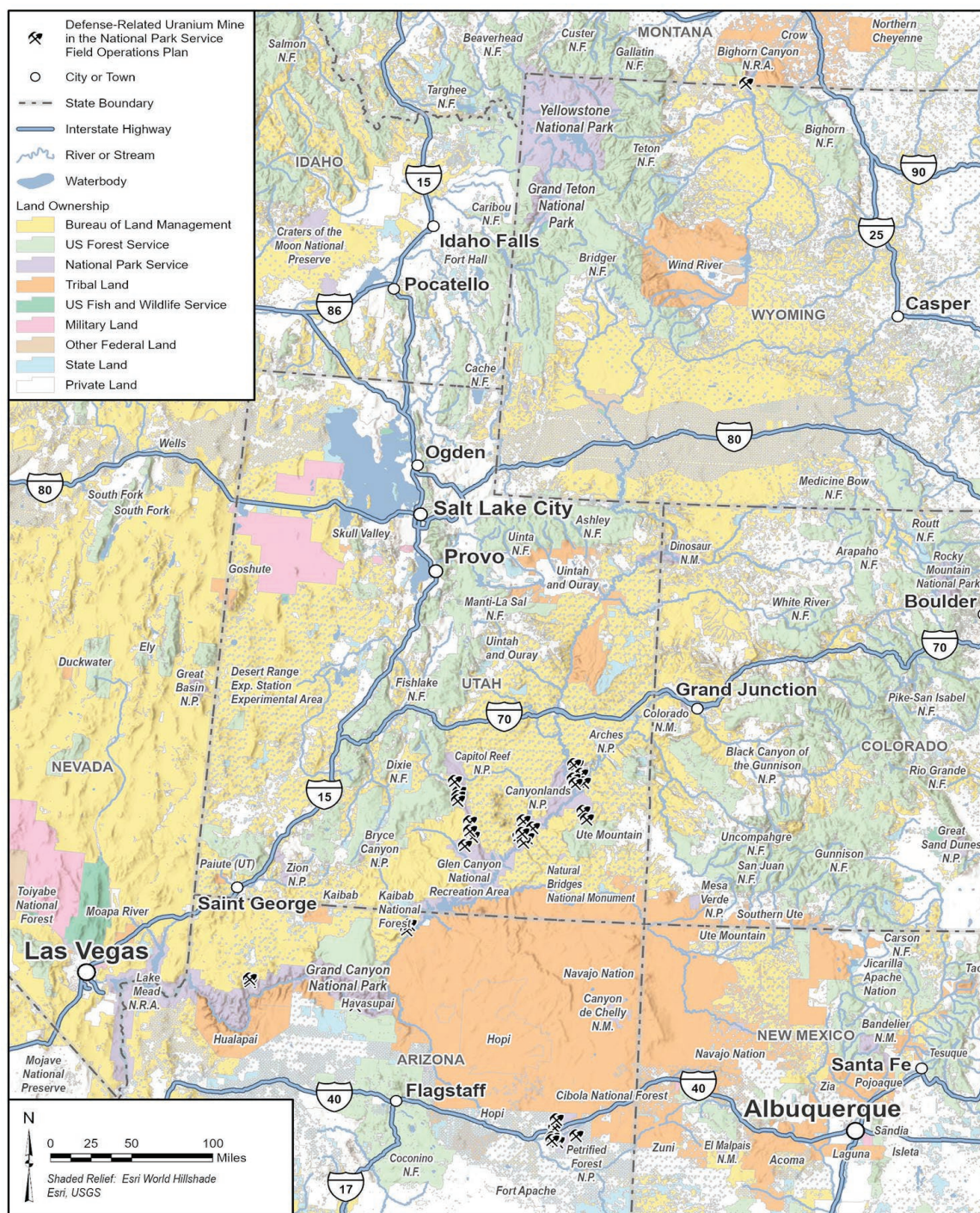
Abbreviations: NF = national forest, NM = national monument, NP = national park

- South Slick Rock FOP:** This project area covers 133 mines in southwestern Colorado. The FOP comprises 79 mines on BLM-administered and 54 mines on mixed-ownership land (i.e., BLM-administered land/ULP lease tracts and BLM-administered land/private property). DRUM field teams conducted V&V activities at 69 mines in 2021 and 62 mines in 2022. DRUM field teams will visit the remaining two mines in 2023.



National Park Service (NPS)

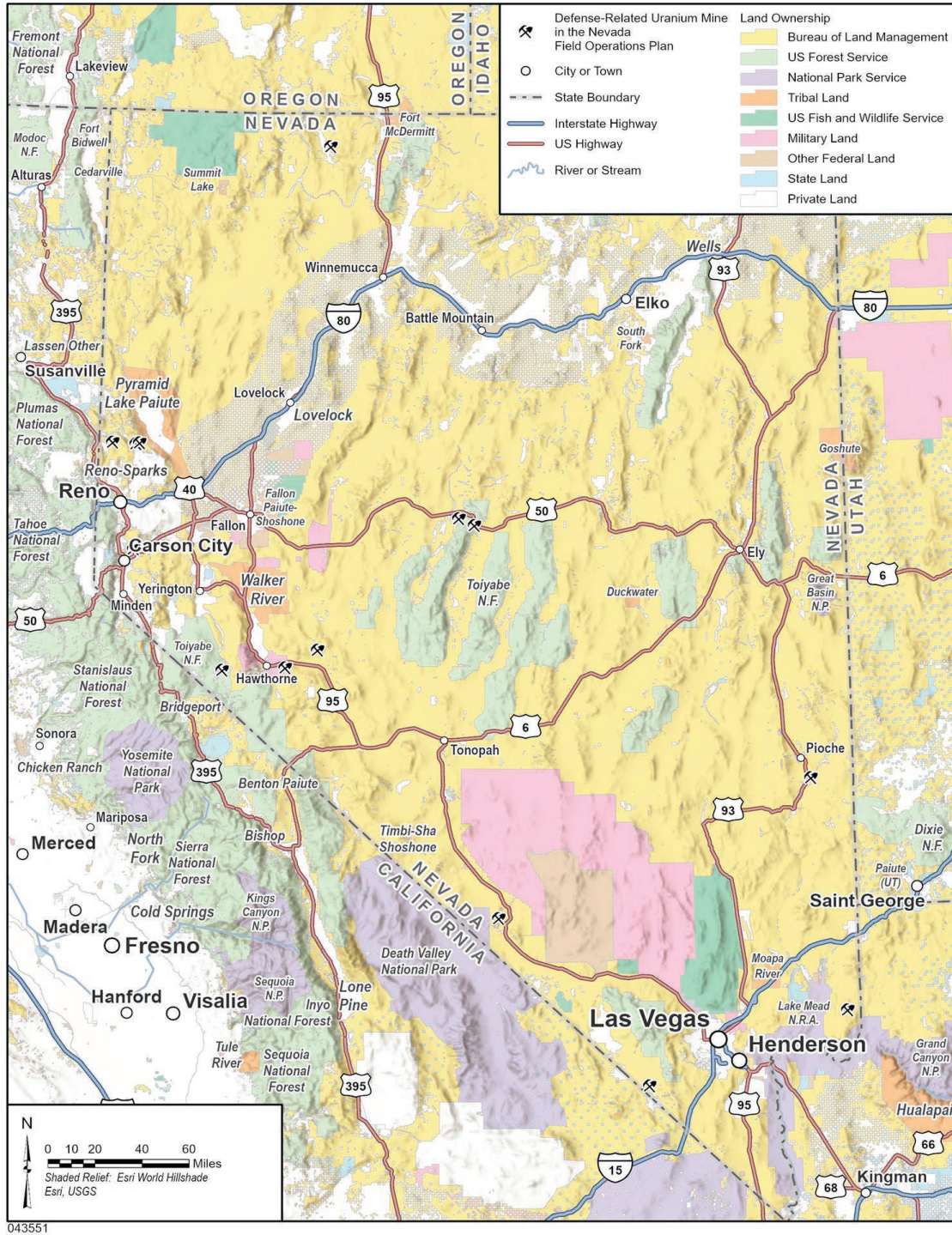
- NPS sites FOP:** This project area covers mines in Arizona, Montana, and Utah and includes 44 mines in national park units and other NPS-managed lands. DRUM field teams conducted V&V activities at seven mines in 2022. NPS has requested that three mines be removed from further consideration by the DRUM program. DRUM field teams will visit the remaining 32 mines on public land in 2023 and address the two mines on private property during Campaign 3.



Abbreviations: NF = national forest, NM = national monument, NP = national park, NRA = national recreation area

Nevada

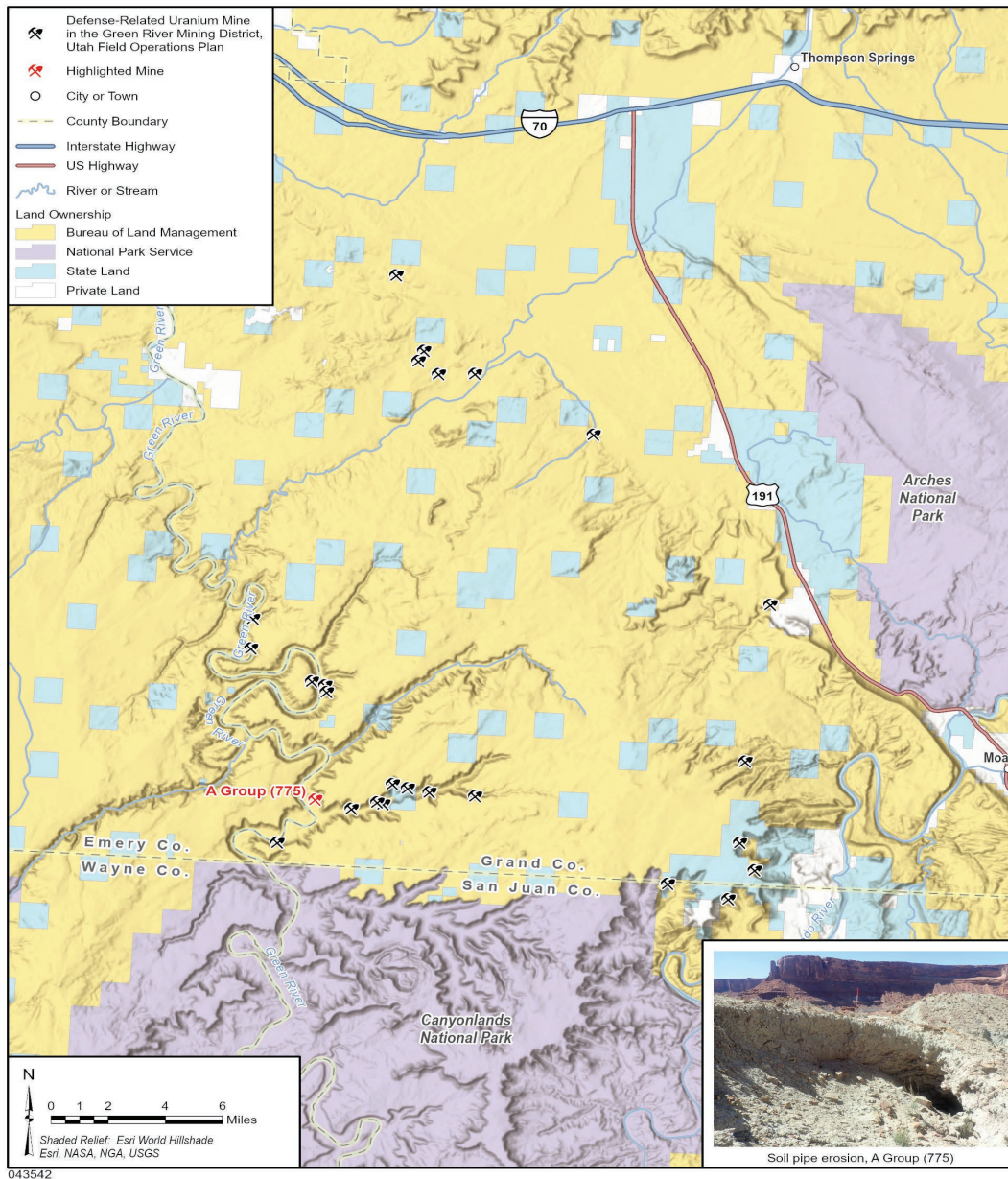
- Nevada FOP:** This project area covers 19 mines across Nevada, within the California, Reno, and Salt Lake mining districts. There are six mines on USFS-administered land and 13 mines on BLM-administered land. DRUM field teams will begin V&V activities at these mines in 2023.



Abbreviations: NF = national forest, NP = national park, NRA = national recreation area, UT = Utah

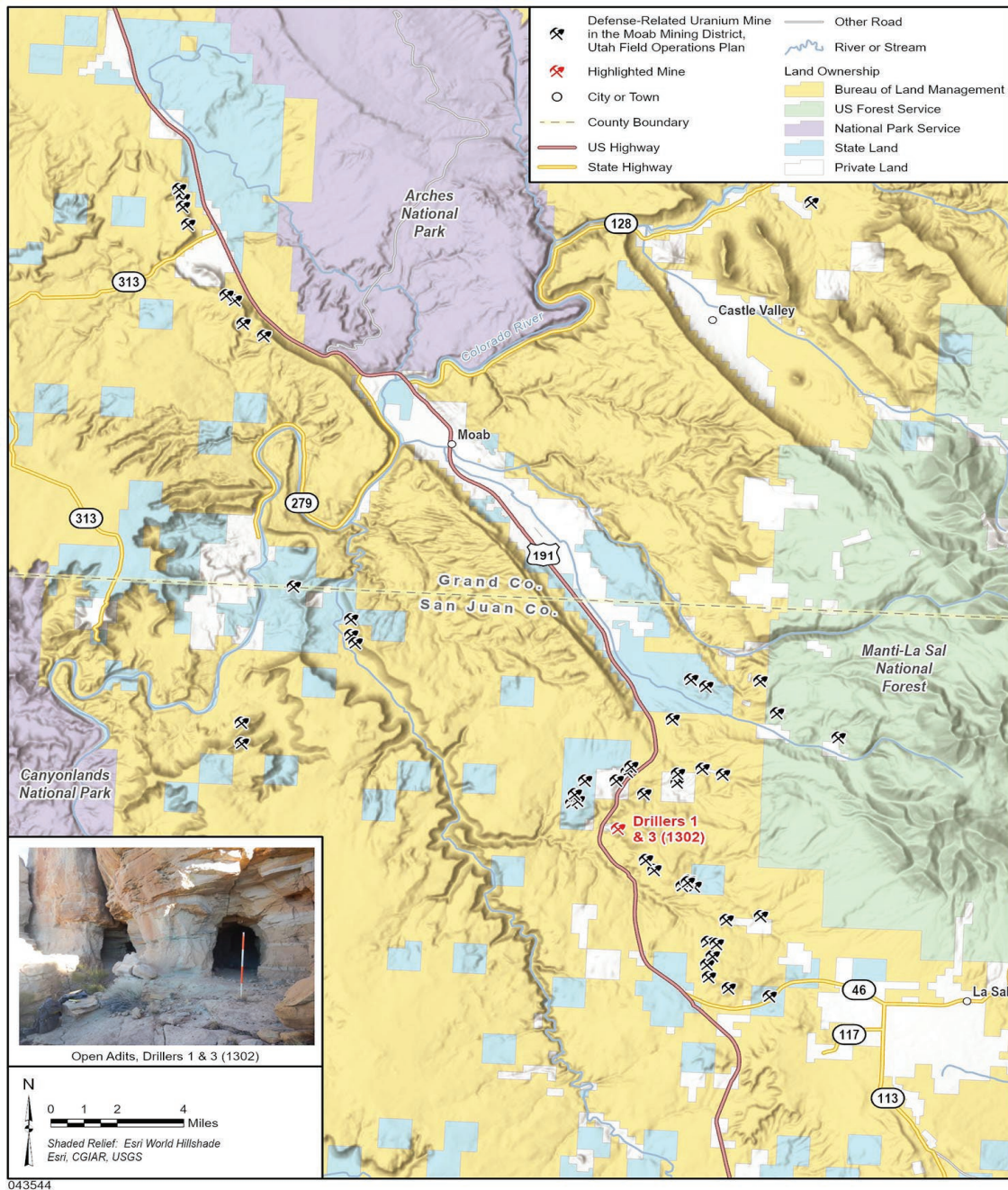
Utah

- Green River FOP:** This project area is primarily in Grand County in west-central Utah. It includes 26 mines on BLM-administered land, land administered by the State of Utah School and Institutional Trust Lands Administration (SITLA), and mixed-ownership land (i.e., BLM-administered and SITLA-administered land). DRUM field teams conducted V&V activities at 11 mines in 2021 and visited the remaining 15 mines in 2022 to close out the FOP.

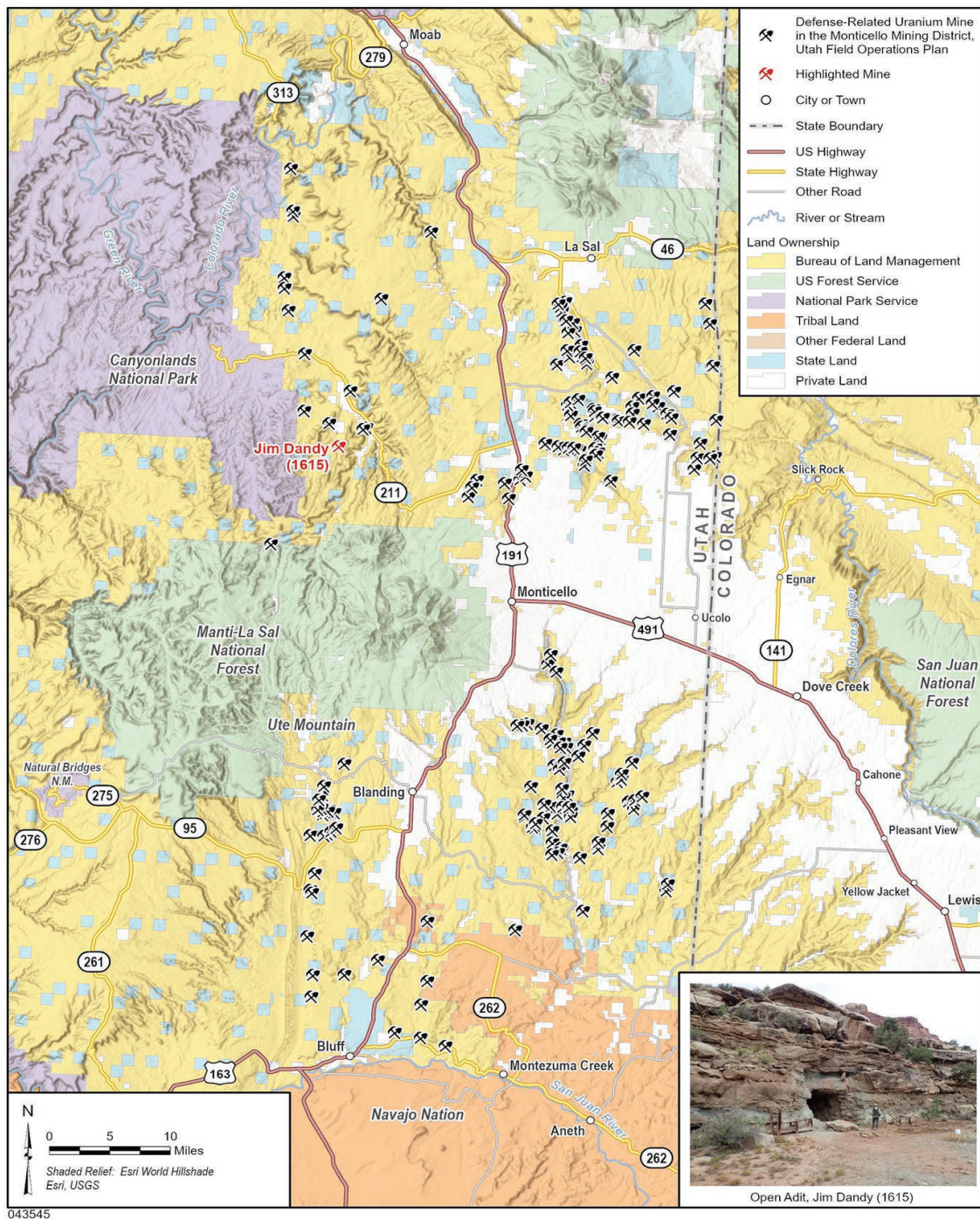


- Henry Mountains FOP:** This project area covers 125 mines in south-central Utah. It includes 109 mines on BLM-administered land, five mines on USFS-administered land, eight mines on SITLA-administered land, and three mines on mixed-ownership land (i.e., BLM-administered and SITLA-administered land). DRUM field teams conducted V&V activities at 89 mines in 2020, 33 mines in 2021, and one mine in 2022 to close out the FOP. The remaining two mines have active mining permits and will not be visited.

- Moab FOP:** This project area includes 49 mines in east-central Utah. It comprises 29 mines on BLM-administered land, eight mines on SITLA-administered land, five mines on mixed-ownership land (i.e., three on BLM-administered land and SITLA-administered land, one on BLM-administered land and private property, and one on SITLA-administered land and private property), and seven mines on private property. DRUM field teams conducted V&V activities at 39 mines between 2019 and 2021 and visited the remaining three mines on public lands in 2022. DRUM field teams will visit the final seven mines on private property during Campaign 3.

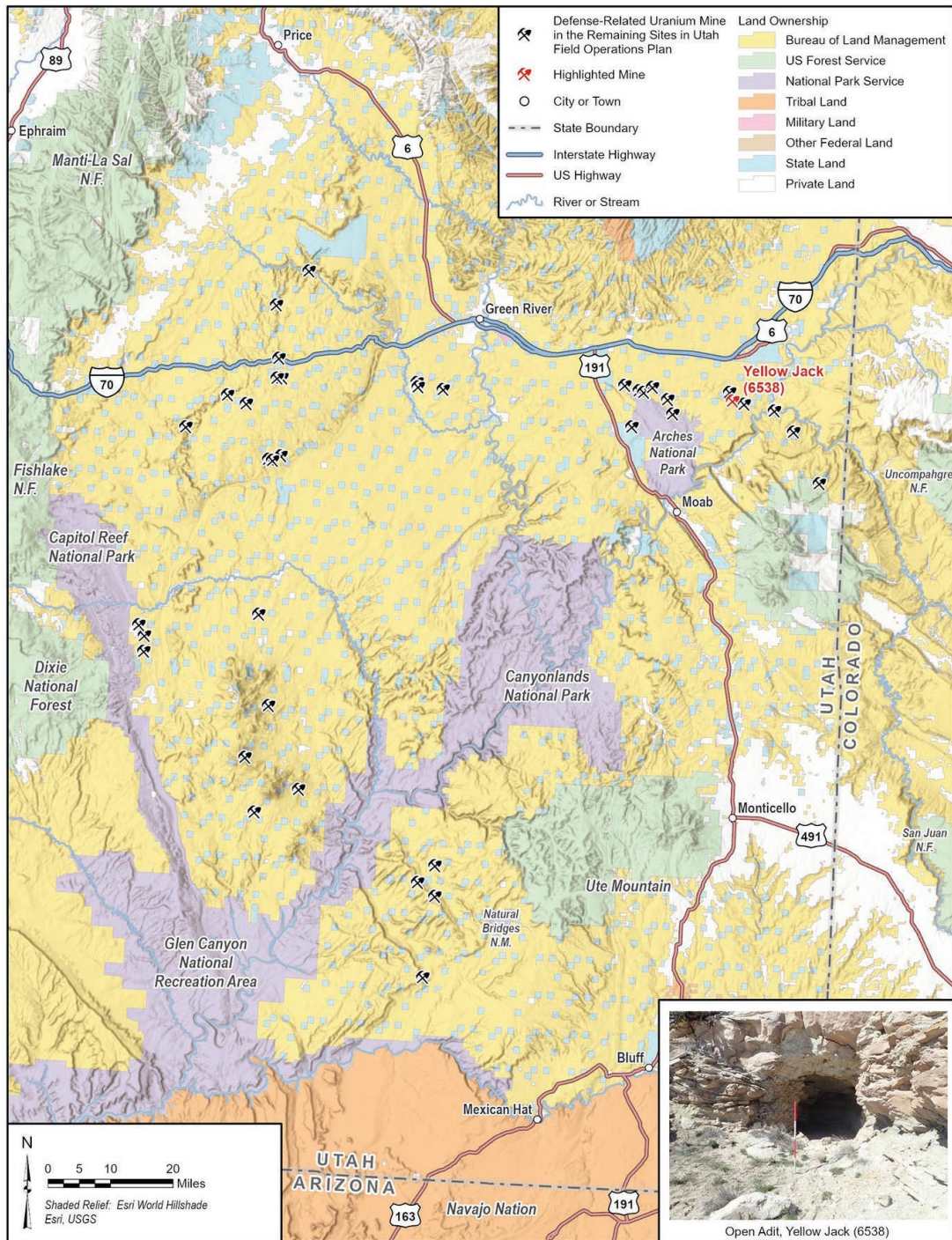


- **Monticello FOP:** This project area covers 208 mines in southeastern Utah. There are 186 mines on BLM-administered land, nine mines on SITLA-administered land, one mine on USFS-administered land, and 12 mines on mixed-ownership land (i.e., seven mines on BLM-administered land and private property, four mines on BLM-administered land and SITLA-administered land, and one mine on SITLA-administered land and private property). In 2020 and 2021, DRUM field teams conducted V&V activities at 170 mines and 28 mines in 2022. There are eight mines that have active mining permits and will not be visited, and DRUM field teams will visit the remaining two mines in 2023 to close out the FOP.



Abbreviations: NM = National Monument

- Remaining Sites in Utah FOP:** This project area covers 42 mines in the Thompson, White Canyon, San Rafael, and Henry Mountains mining districts in southeast Utah. Although V&V work had been thought to be completed in this area previously, the sites included in this FOP were not identified at the time the initial work was performed. The project area includes mines on BLM-administered, SITLA-administered, and USFS-administered land. DRUM field teams conducted V&V activities at all 42 mines in 2022 to close out the FOP.



Abbreviations: NF = National Forest, NM = National Monument

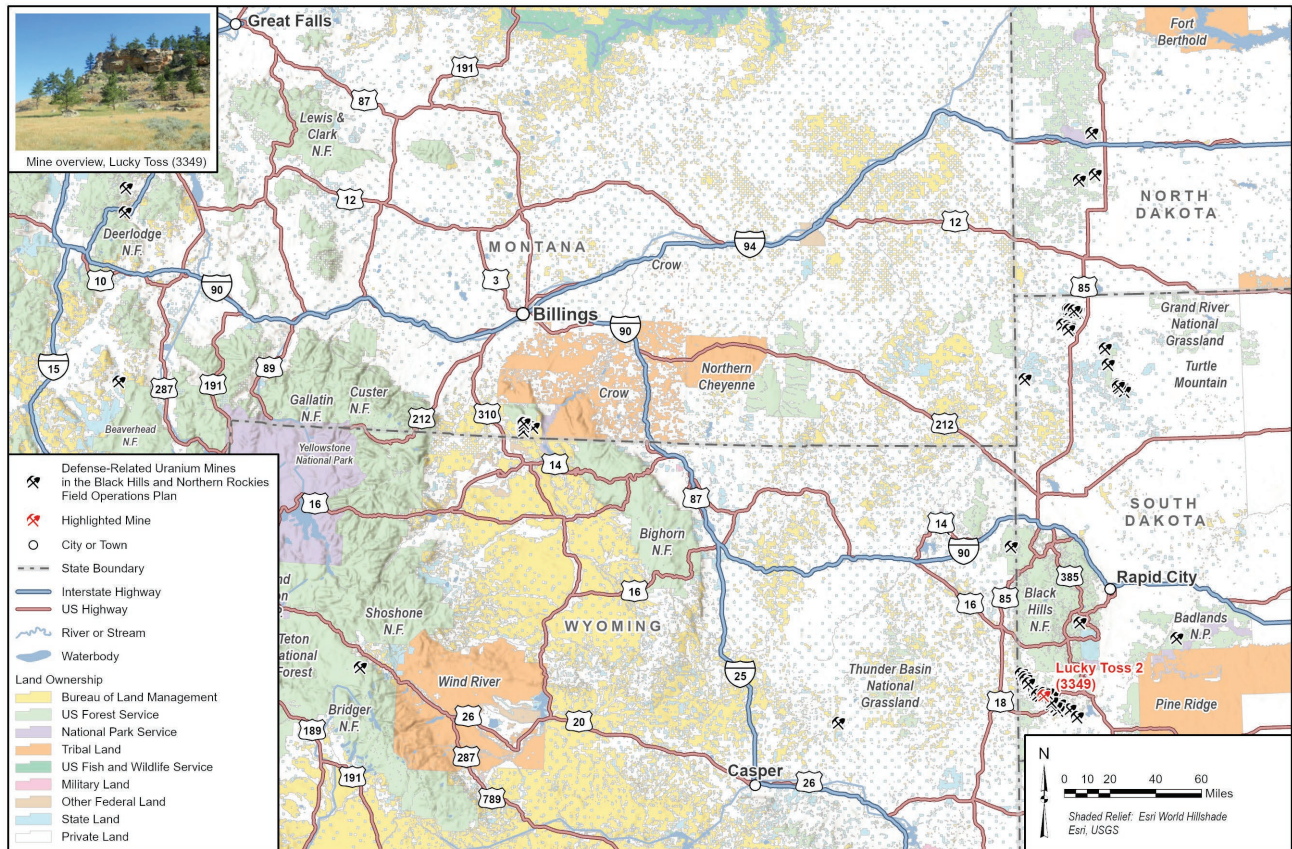
- Utah Statewide Mining Districts FOP:** This project area covers 44 mines in the Salt Lake, Uintah, Thomas Range, and Last Chance Desert mining districts throughout Utah. It includes 31 mines on BLM-administered land, nine mines on USFS-administered land, two mines on SITLA-administered land, and two mines on mixed-ownership land (i.e., BLM-administered and SITLA-administered land). In 2022, DRUM field teams conducted V&V activities at 24 mines in the Salt Lake Mining District, 15 mines in the Uintah Mining District, one mine in the Last Chance Mining District, and two mines in the Thomas Range Mining District. DRUM field teams will visit the remaining two mines (one mine in the Salt Lake Mining District and one mine in the Thomas Range Mining District) in 2023.



Abbreviations: NF = National Forest, NM = National Monument, NP = National Park, UT = Utah

South Dakota

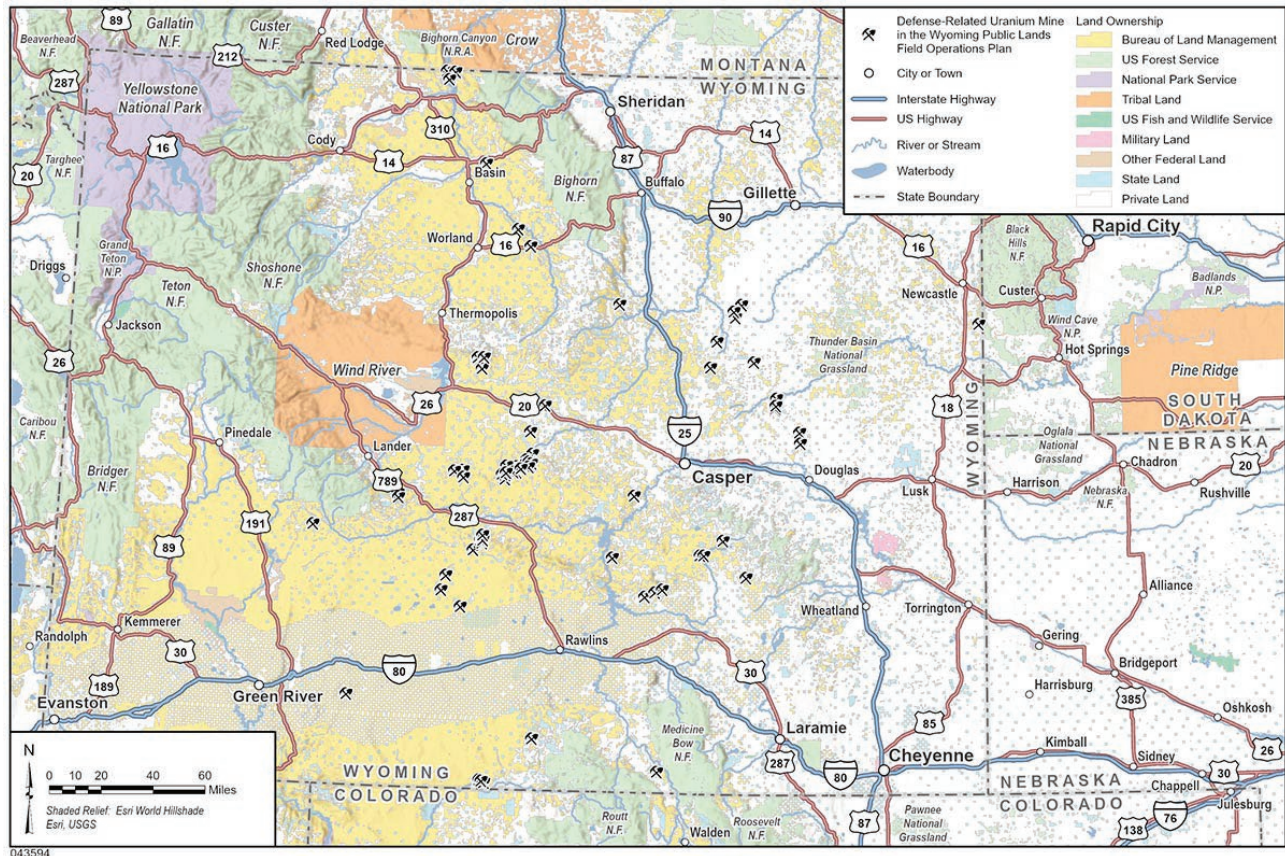
- Black Hills and Northern Rockies Region FOP:** This project area covers portions of South Dakota, North Dakota, Montana, and Wyoming. It includes 122 mines on USFS-administered land, BLM-administered land, public land managed by the state of North Dakota, private property, and mixed-ownership land (i.e., private property/USFS-administered land and private property/BLM-administered land). In 2022, DRUM field teams conducted V&V activities at 71 mines in South Dakota, four mines in Montana, and two mines in North Dakota. DRUM field teams visited 25 mines in 2019 and seven mines in 2021 and will visit the remaining 12 mines on public land (spread across the four states) in 2023. There is one mine on private property that will be visited during Campaign 3.



Abbreviations: NR = National Forest, NP = National Park

Wyoming

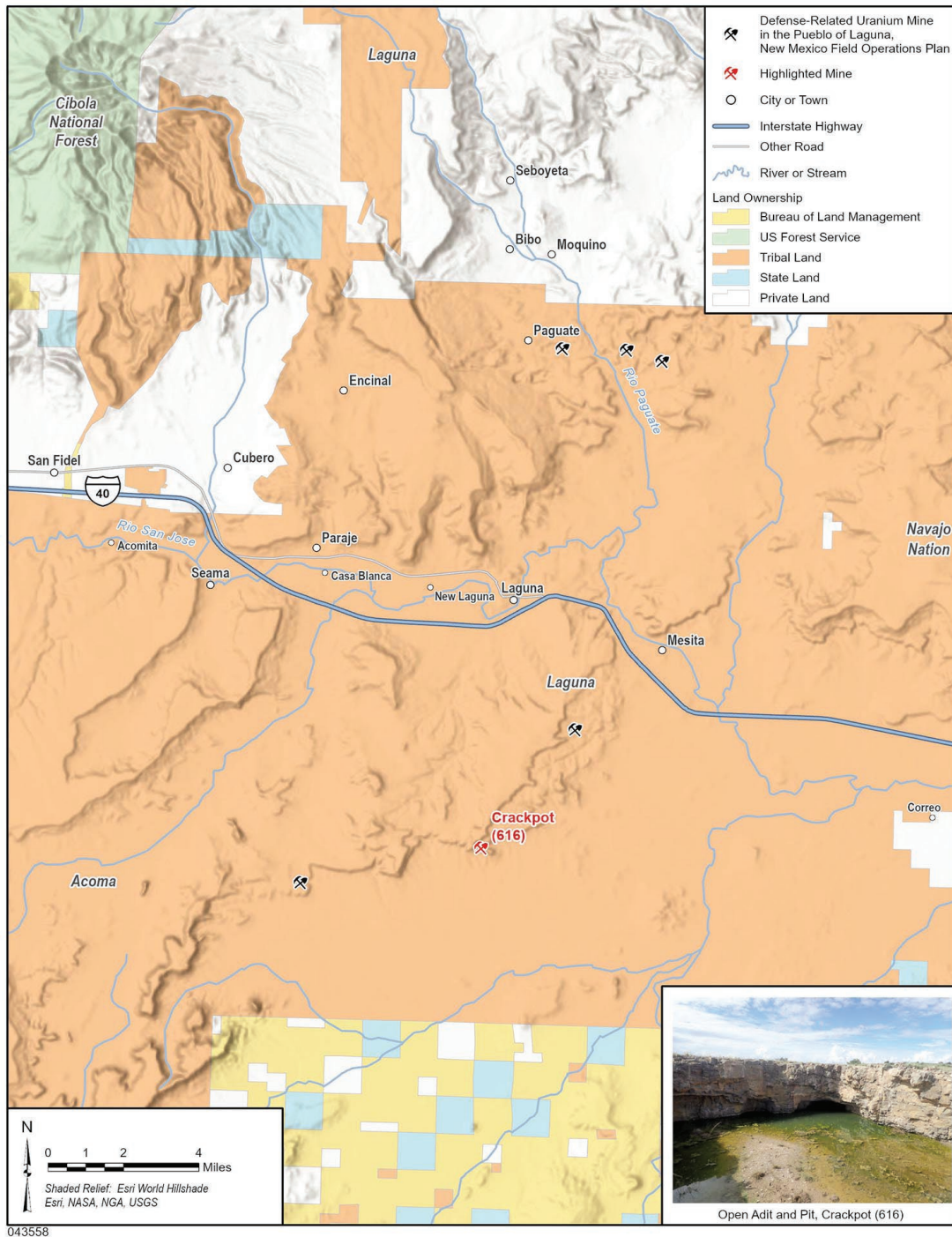
- Wyoming Public Lands FOP:** This project area covers 118 mines across the state. There are 80 mines on BLM-administered land, 15 mines on state land, 16 mines on mixed-ownership land (i.e., 10 mines on BLM-administered land and private property; two mines on BLM-administered and NPS-administered land; two mines on BLM-administered and state-administered land; one mine on BLM-administered land, state-administered land, and private property; and one mine on state-administered land and private property), and seven mines that could not be located during the reconciliation process. DRUM field teams conducted V&V activities at 38 mines in 2019 and seven mines in 2022. DRUM field teams will visit the remaining 73 mines in 2023 to close out the FOP.



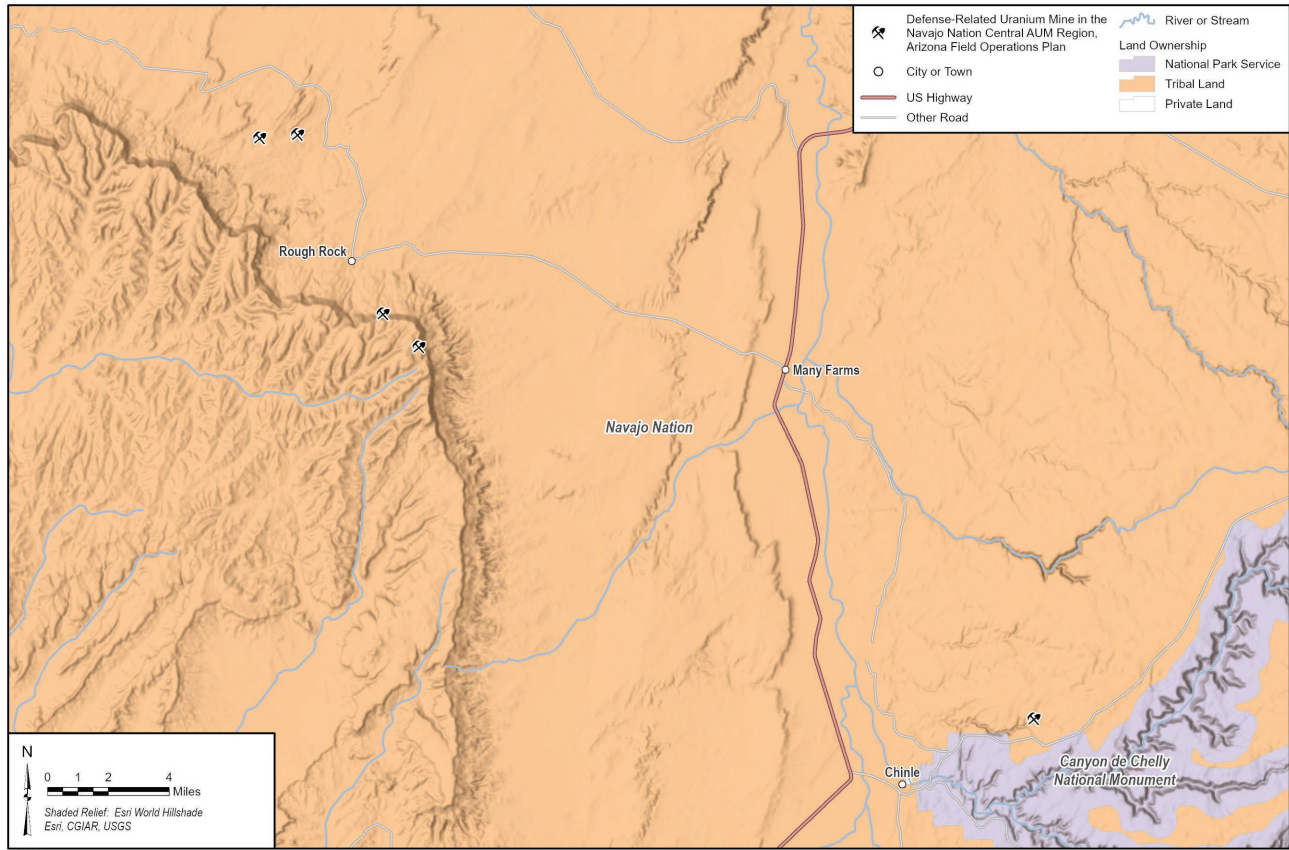
Abbreviations: NR = National Forest, NP = National Park, NRA = National Recreation Area

Campaign 2

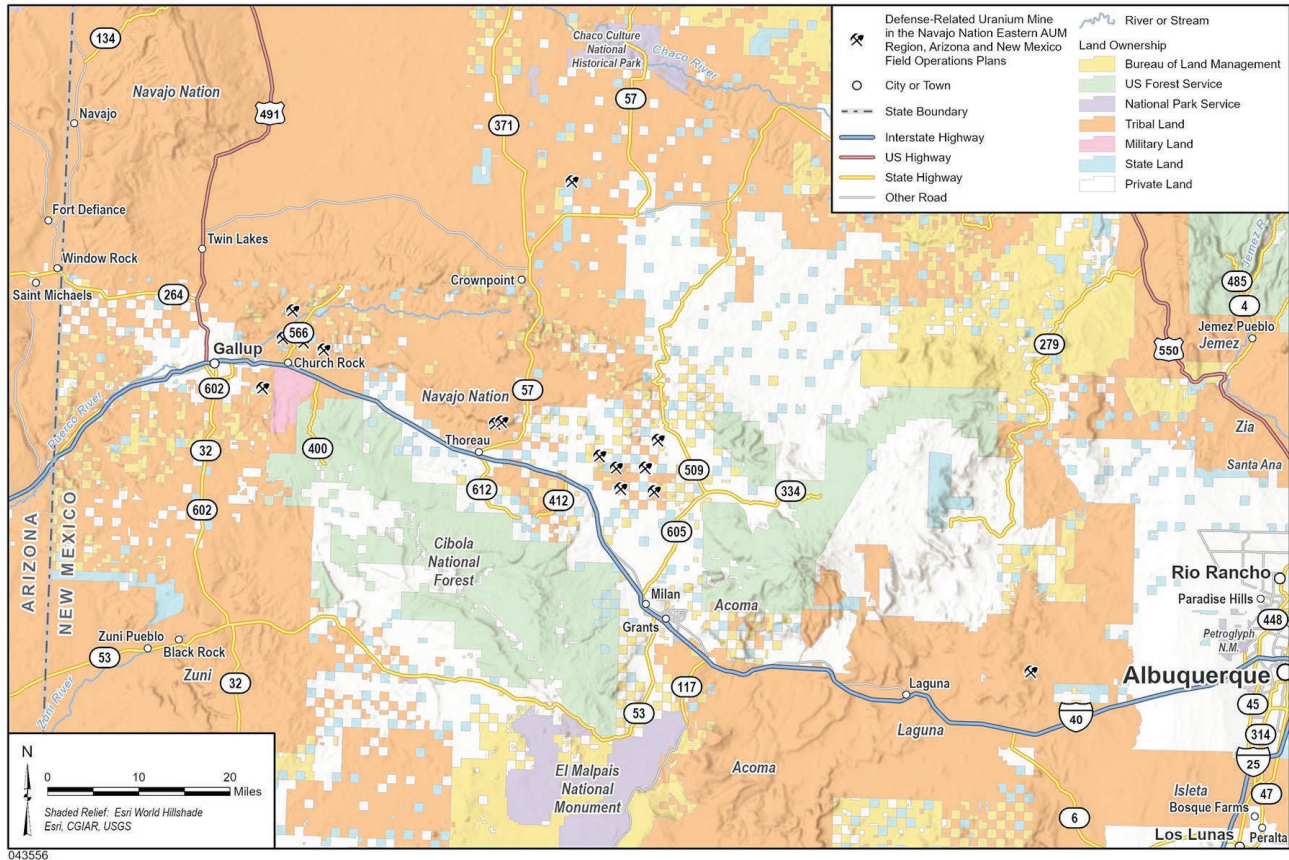
- Pueblo of Laguna Sites, New Mexico FOP:** This project area covers six mines in the eastern portion of the Grants Mining District in New Mexico, on Pueblo of Laguna-administered land. Three of the six mines are on the National Priority List for Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) cleanup and will not be visited. DRUM field teams conducted V&V activities at the remaining three sites in 2022.



- Central AUM Region, Navajo Nation FOP:** The five mines within this project area are in the central portion of the Navajo Nation and include four mines in the Black Mesa Mining District and one mine in the Chinle Mining District. All five mines are on Navajo Nation-administered land, and DRUM field teams will visit these mines in the future.

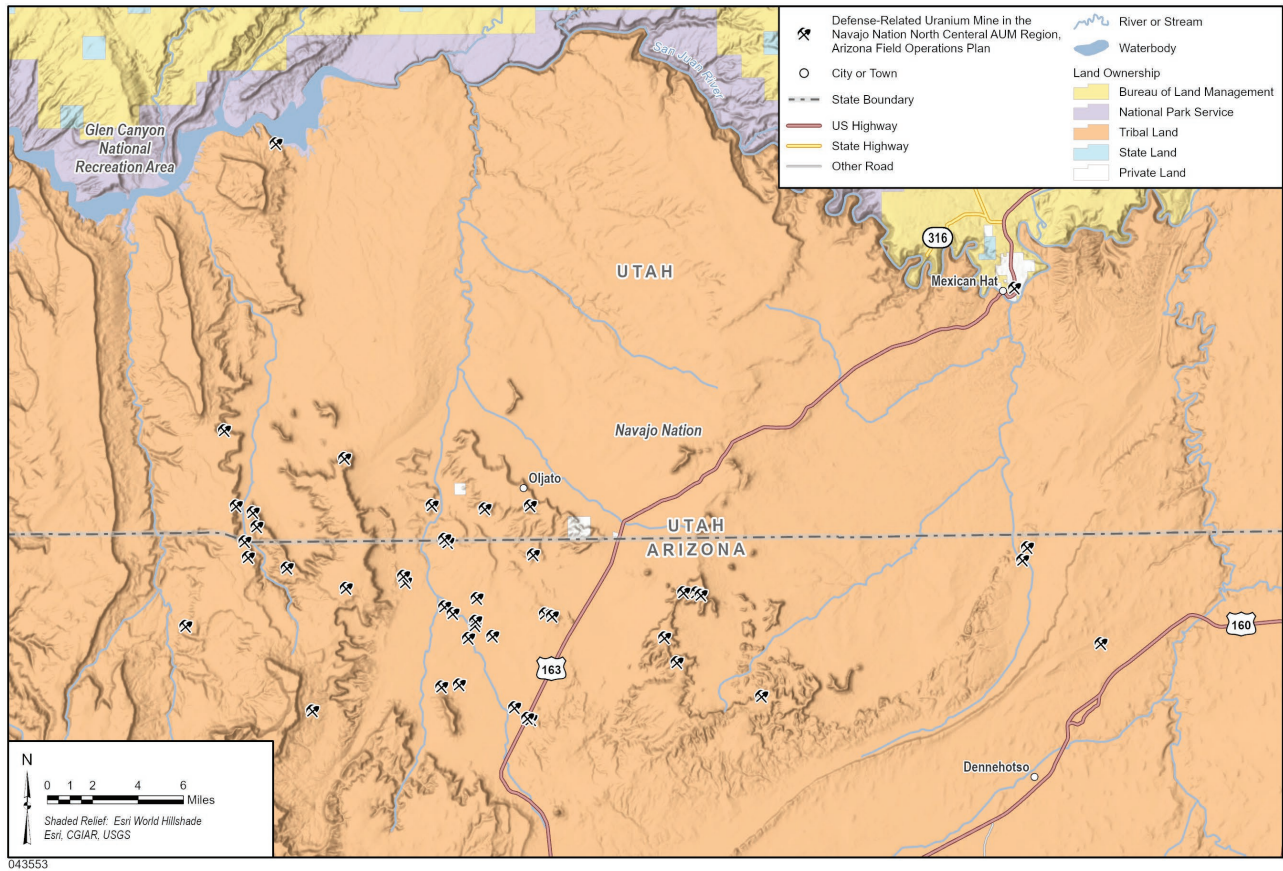


- Eastern AUM Region, Navajo Nation FOP:** This project area covers 17 mines in the Grants Mining District in the eastern portion of the Navajo Nation. It includes 15 mines on Navajo Nation-administered land, one mine on mixed-ownership land (i.e., Navajo Nation and state of New Mexico land), and one mine on private property on the Navajo Nation. DRUM field teams have not begun V&V activities within this FOP.

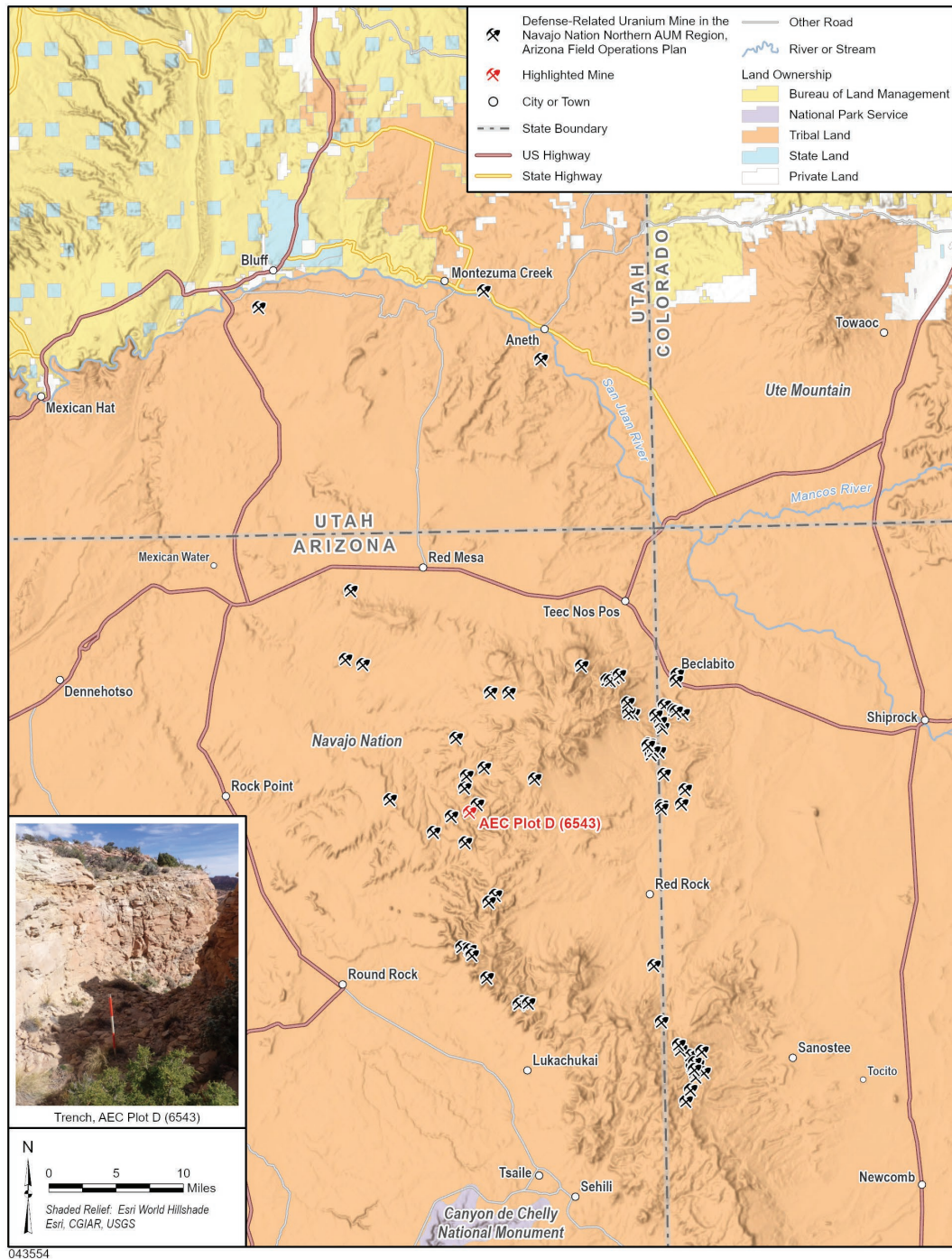


Abbreviation: NM = National Monument

- North Central AUM Region, Navajo Nation FOP:** This project area covers 44 mines which shares geography with parts of Arizona and Utah. It includes 43 mines on Navajo Nation-administered land and one mine on mixed-ownership land (i.e., BLM-administered land and private property). DRUM field teams have not begun V&V activities within this FOP.

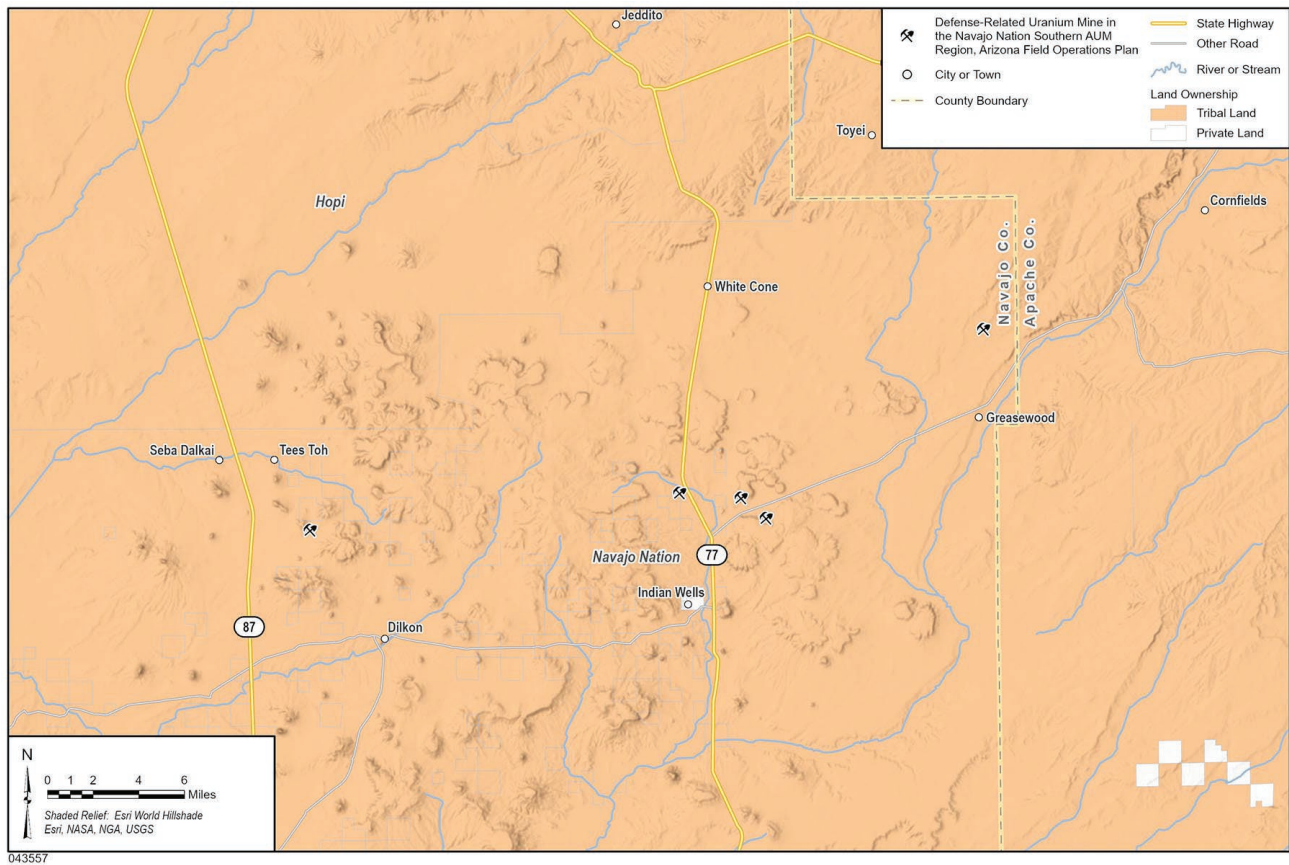


- Northern AUM Region, Navajo Nation, Arizona, New Mexico, and Utah:**
 This project area comprises 71 mines in the northern portion of the Navajo Nation, which shares geography with parts of Arizona, New Mexico, and Utah. There are 70 mines on Navajo Nation-administered land and one mine on mixed-ownership land (i.e., BLM-administered and Navajo Nation-administered land). DRUM field teams conducted V&V activities at 13 mines in the Shiprock Mining District in Arizona and will visit the remaining 58 mines in the future.

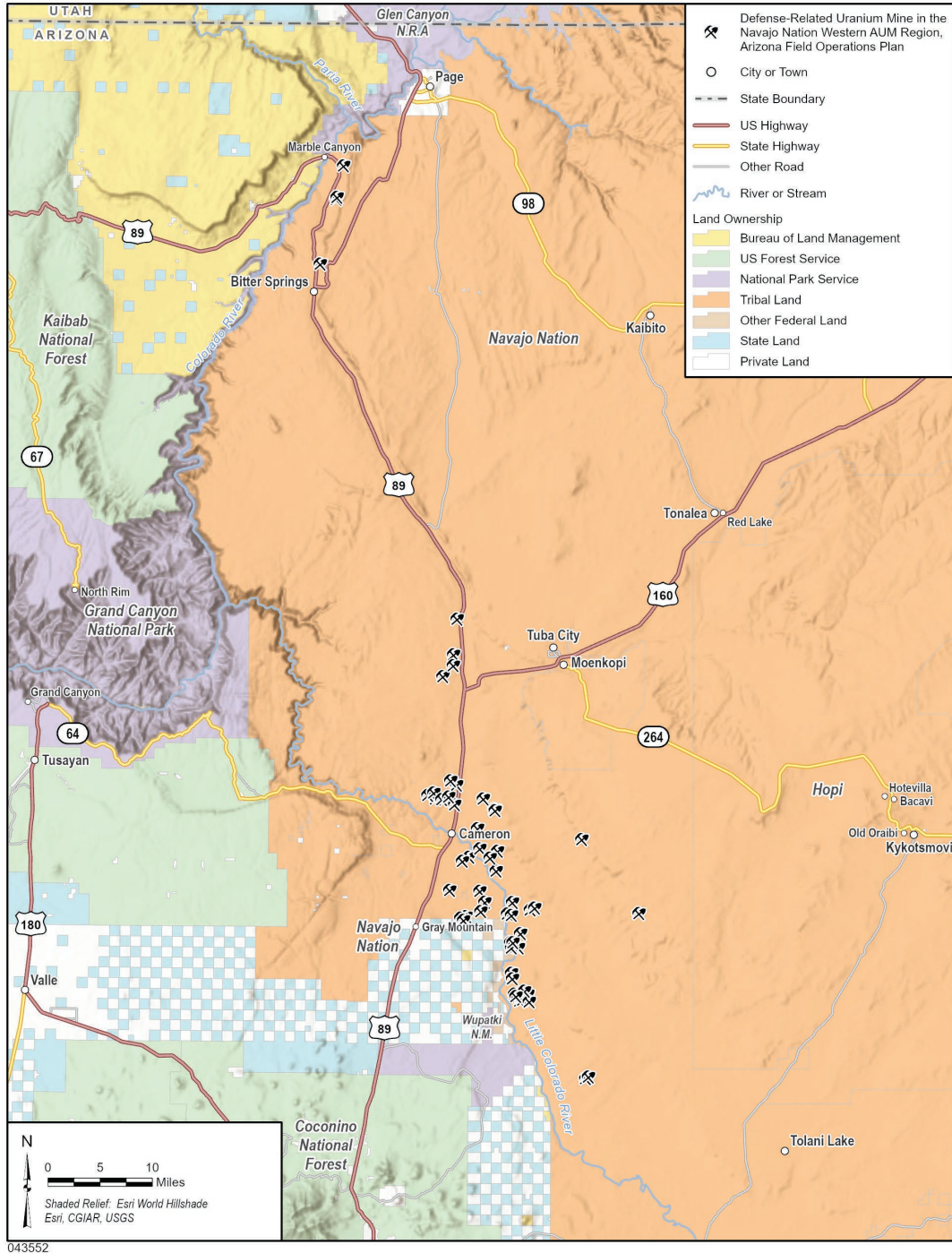


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- Southern AUM Region, Navajo Nation FOP:** This project area covers five mines in the southern portion of the Navajo Nation in the Little Colorado Mining District. The mines in this FOP are on Navajo Nation-administered land. DRUM field teams have not begun V&V activities within this FOP.



- Western AUM Region, Navajo Nation FOP:** This project area is primarily in the western portion of the Navajo Nation, which shares geography with Arizona. It includes 57 mines in the Cameron, Lees Ferry, and Vermilion Cliffs mining localities; 56 mines on Navajo Nation-administered land; and one mine on private property on the Navajo Nation. DRUM field teams have not begun V&V activities within this FOP.



Abbreviations: NM = National Monument, NRA = National Recreation Area

Programmatic Accomplishments

The DRUM program had a very successful year while still following DOE and other federal workplace protocols to protect program staff during the COVID-19 pandemic. Every facet of the program — including management, reconciliation, field and report staff, data and records management, environmental compliance, safety and health, quality assurance, stakeholder engagement, business services (e.g., technical editing), and project services (e.g., analytical laboratory) — contributed to its success. With the DRUM Program, LM has created a “center of excellence” providing thoughtful leadership; best practices and expertise; strategic partnerships; and meaningful engagement, research, support, and training for the inventory, assessment, and safeguarding of abandoned defense-related uranium mines.

On January 18, 2023, LM was notified that the DRUM Program received the Secretary of Energy Achievement Award for work completed in 2022. According to the notice, “These awards are among the highest forms of internal, non-monetary recognition DOE Federal and contractor employees can receive.” This is the first time an LM program or project has ever received this award.

The DRUM program accomplished the following programmatic activities in calendar year 2022:

January 2022

- Met with NPS, including Capitol Reef National Park and Canyonlands National Park, to begin planning for 2022 fieldwork on NPS land.
- Met with representatives of the Navajo Nation to present the DRUM V&V fieldwork process.
- Received data from the completed New Mexico Grants Mining District safeguarding project and successfully uploaded the data to the DRUM program database.
- Uploaded spatial data collected for all DRUM sites visited during the 2021 field season on BLM-managed lands in Colorado, New Mexico, Utah, and Montana to the BLM Colorado electronic file transfer (EFT) site for distribution to local field offices.
- Conducted “spring training” in preparation for the upcoming field season. Training topics included the Integrated Work Control Process, a DRUM program overview, the DRUM program database, DRUM mine features, and Wilderness First Responder training.
- Met with Freeport-McMoRan and ULP to coordinate 2022 safeguarding efforts for projects planned in western and southwestern Colorado and eastern Utah.

February 2022

- Updated the DRUM Campaign 1 V&V Work Plan to incorporate operational experiences and deviation requests from the 2021 field season and streamline field processes for the 2022 field season.
- Received data from the completed Buckmaster Draw Phase 2 and Red Canyon Mining District safeguarding projects and successfully uploaded the data to the DRUM program database.
- Produced a map of Navajo Nation AUM region boundaries and the DRUM sites thereon and a list of DRUM sites provided by the Navajo Abandoned Mine Lands Reclamation Department (NAMLRD).
- Published the DRUM program’s annual report for calendar year 2021 (DOE 2022a), providing details on 2021 program activities and accomplishments, project planning for 2022, and an updated program timeline.

- Conducted additional spring training in preparation for the upcoming field season. Training topics included DRUM V&V and risk roll-up report production, field photography, uranium geochemistry, and Wilderness First Responder training.
- Completed the FOPs for the Remaining Sites in Utah (DOE 2022k), the Remaining Sites in Colorado (DOE 2022j), and the Utah Statewide Mining Districts in Utah (DOE 2022l).
- Prepared a risk roll-up report for the mines in the Mexico Group Locality (seven mines) in western Colorado on BLM-administered land and mixed-ownership land (i.e., BLM-administered land and private property) (DOE 2022dd).
- Conducted a job safety analysis (JSA) briefing with DRUM staff to review the DRUM fieldwork JSA.
- Completed the Defense-Related Uranium Mines Quality Assurance Program Plan (LMS/DRM/S15867) (QAPP).

March 2022

- Conducted additional spring training in preparation for the upcoming field season. Training topics included field training, DRUM lessons learned, training wrap-up and summary, and DRUM readiness review.
- Started the sixth year of conducting V&V field visits of mines on public land on March 14 in the Yellow Cat and San Rafael Swell areas in Utah.
- Completed all V&V reports for the 2021 field season, which included 507 reports in total.
- Received data on completed safeguarding projects in the Bald Eagle, Long Park, Klondike, and Martin Mesa mining localities and successfully uploaded the data to the DRUM program database.
- Met with Freeport-McMoRan to discuss and coordinate upcoming safeguarding projects in 2022.
- Revised the FOP for mines in the Green River area in Utah (DOE 2021).
- Prepared risk roll-up reports for the mines in:
 1. Circle Cliffs Locality (19 mines) in central Utah on BLM-administered land (DOE 2022n).
 2. Circle Cliffs Locality (five mines) in central Utah on USFS-administered land (DOE 2022o).
 3. Gypsum Gap Locality (six mines) in western Colorado on BLM-administered land (DOE 2022u).
 4. South Deerneck Mesa — Dry Valley Locality (11 mines) in eastern Utah on BLM-administered land (DOE 2022ff).
 5. Little Rockies Locality (19 mines) in central Utah on BLM-administered land (DOE 2022aa).
 6. Spud Patch Group Locality (25 mines) in western Colorado on BLM-administered land and mixed-ownership land (i.e., BLM-administered land and ULP lease tracts) (DOE 2022gg).
 7. Wild Steer Locality (eight mines) in western Colorado on BLM-administered land (DOE 2022ii).

8. North San Rafael Locality (14 mines) in central Utah on BLM-administered land and mixed-ownership land (i.e., BLM-administered and SITLA-administered land) (DOE 2022ee).
 9. Legin Group Locality – Bishop Canyon in western Colorado on BLM-administered and mixed-ownership land (i.e., BLM-administered land and ULP lease tracts) (DOE 2022w).
- In preparation for beginning work on Campaign 2, program personnel:
 1. Provided maps of mine sites on Navajo Nation land.
 2. Participated in meetings with the Navajo Nation and the Navajo Nation DRUM working group to draft sections of the Defense-Related Uranium Mines Verification and Validation Work Plan, Campaign 2 — Navajo Nation (DOE 2022kk) (Navajo Nation V&V Work Plan) and to prepare National Environmental Policy Act (NEPA) documentation and access agreements.

April 2022

- Compiled all V&V reports completed during the 2021 field season on mines in Colorado, Utah, and Wyoming on BLM-managed lands (271 reports in total) and submitted them to BLM.
- Revised and completed the FOP for mines on NPS land (DOE 2020c).
- Revised the FOPs for the Monticello District (DOE 2020b), the Remaining Sites in Utah (DOE 2022k), the Moab District (DOE 2019a), the Black Hills and Northern Rockies areas (DOE 2019b), the Remaining Sites in Colorado (DOE 2022j), and USFS Region 2 (DOE 2018).
- Prepared risk roll-up reports for the mines in:
 1. Upper Group Locality (17 mines) in western Colorado on BLM-administered land and mixed-ownership land (i.e., BLM-administered land and ULP lease tracts) (DOE 2022hh).
 2. Manti-La Sal National Forest — Moab Ranger District (30 mines) in eastern Utah on USFS-administered land (DOE 2022cc).
 3. Carpenter Ridge Locality (four mines) in western Colorado on USFS-administered land (DOE 2022m).
 4. Henry Mountains and San Rafael Swell districts (14 mines) in central Utah on SITLA-administered land (DOE 2022v).
 5. Lower Group Locality (13 mines) in western Colorado on BLM-administered land and mixed-ownership land (i.e., BLM-administered land and ULP lease tracts) (DOE 2022bb).
 6. Empire Group Locality (eight mines) in western Colorado on BLM-administered land (DOE 2022r).
- In preparation for beginning work on Campaign 2, program personnel:
 1. Received written concurrence from the Navajo Nation to perform DRUM V&V work at 205 mines.
 2. Participated in meetings with the Navajo Nation DRUM working group.
 3. Coordinated a group V&V site field visit.

May 2022

- Developed the FOPs for the Western AUM Region, Navajo Nation, Arizona (DOE 2022g); the North Central AUM Region, Navajo Nation, Arizona (DOE 2022d); the Northern AUM Region, Navajo Nation, Arizona, New Mexico, and Utah (DOE 2022e); the Central AUM Region, Navajo Nation, Arizona (DOE 2022b); the Eastern AUM Region, Navajo Nation, New Mexico (DOE 2022c); and the Southern AUM Region, Navajo Nation, Arizona (DOE 2022f).
- Prepared risk roll-up reports for the mines in:
 1. Elk Ridge Locality (36 mines) in eastern Utah on USFS-administered land (DOE 2022q).
 2. Grand and San Juan counties (30 mines) in eastern Utah on SITLA-administered land and mixed-ownership land (i.e., BLM-administered and SITLA-administered land) (DOE 2022t).
 3. Little Gyp Locality Central (25 mines) in western Colorado on BLM-administered land (DOE 2022x).
 4. Cottonwood Wash Locality (21 mines) in southeastern Utah on BLM-administered land (DOE 2022p).
- In preparation for beginning work on Campaign 2, program personnel:
 1. Participated in meetings with the Navajo Nation DRUM working group to draft sections of the Navajo Nation V&V Work Plan.
 2. Conducted a V&V demonstration at the Moqui Jug mine (LM ID 2621) for the Navajo Nation DRUM working group.
 3. Toured three DRUM and three CERCLA mine sites on Navajo Nation land.
 4. Completed a debrief of the field activities.
- Presented on aerial gamma radiation surveys of DRUM mines in Wyoming for the International Atomic Energy Agency, covering the Wyoming sites surveyed in 2021 and the analysis of the results completed in 2022.

June 2022

- Completed a spatial evaluation and submitted a table comparing Freeport-McMoRan mine features to DRUM mine features in Colorado, along with a plan for safeguarding projects in 2022.
- Prepared risk roll-up reports for the mines in:
 1. Little Gyp Locality South (23 mines) in western Colorado on BLM-administered land (DOE 2022z).
 2. Little Gyp Locality North (eight mines) in western Colorado on BLM-administered land (DOE 2022y).
- In preparation for Campaign 2, program personnel:
 1. Provided a Spokane Tribe of Indians representative with a requested record of DRUM sites and maps of all DRUM mines on tribal lands.
 2. Assessed two DRUM mines on the Spokane Indian Reservation to understand future resource needs and to make recommendations for future V&V activities.

3. Developed the FOP for mines on Pueblo of Laguna land (DOE 2022i).
 4. Attended a meeting with the Pueblo of Laguna to plan for and prepare the Defense-Related Uranium Mines Verification and Validation Work Plan, Campaign 2 — Pueblo of Laguna (DOE 2022II) (Pueblo of Laguna V&V Work Plan).
 5. Met with NAMLRD and the U.S. Bureau of Indian Affairs (BIA) to discuss proposed V&V work on Navajo Nation and allotment lands.
- Met with USFS to discuss the DRUM program, safeguarding projects, and interagency agreements.
 - Hosted a KZMU-FM radio station reporter to observe inventory and sampling activities at a nearby mine in Moab, Utah.

July 2022

- Completed the FOPs for mines in the Central AUM Region, Navajo Nation, Arizona (DOE 2022b); the Eastern AUM Region, Navajo Nation, New Mexico (DOE 2022c); the North Central AUM Region, Navajo Nation, Arizona (DOE 2022d); the Southern AUM Region, Navajo Nation, Arizona (DOE 2022f); and the Western AUM Region, Navajo Nation, Arizona (DOE 2022g).
- Completed a spatial data comparison of Freeport-McMoRan's 2022 safeguarding projects with DRUM V&V features to correlate DRUM features and closure work.
- Met with LM, BLM, and Freeport-McMoRan to discuss the potential to develop a mine feature data sharing application.
- In preparation for Campaign 2, program personnel:
 1. Developed the Pueblo of Laguna V&V Work Plan.
 2. Met with the Navajo Nation DRUM working group to continue developing the Navajo Nation V&V Work Plan, NEPA documents, access agreements, FOPs, and the Defense-Related Uranium Mines Community Involvement Plan for the Navajo Nation (LMS/DRM/S33638).
 3. Issued the Environmental Review Form (ERF) and Categorical Exclusion Evaluation (CXE) for V&V work on the Navajo Nation.

August 2022

- Submitted ERF and CXE for the NEPA amendment to form LM 11-21 for the Jamestown and Sullivan's Travels safeguarding program in Colorado.
- Developed the NPS V&V report template.
- Uploaded seven risk roll-up reports about mines on BLM land to the BLM EFT site.
- Completed the FOP for the Pueblo of Laguna sites in Grants Mining District, Cibola County, New Mexico (DOE 2022i); and completed the Pueblo of Laguna V&V Work Plan (DOE 2022II).
- Carried out V&V field work on Pueblo of Laguna mines, officially beginning Campaign 2 V&V work.
- The DRUM team was accompanied by the Pueblo of Laguna's acting director of the Environmental and Natural Resources Department, the Tribal Historic Preservation Officer, and an approved archeologist during V&V activities to monitor fieldwork and prevent the disturbance of cultural resources.

- In preparation for Campaign 2 on Navajo Nation land, program personnel:
 1. Attended the quarterly Navajo Nation/Hopi Tribe meeting in Gallup, New Mexico.
 2. Developed the Defense-Related Uranium Mines Program Outreach Communications Plan, Campaign 2, Navajo Nation (LMS/DRM/41438) (Outreach Communications Plan) and attended the first Navajo Nation Chapter House meeting.
 3. Participated in an impromptu meeting with NAML RD, discussing the list and map of DRUM sites scheduled for upcoming work.
 4. Submitted the information sheet for DRUM fieldwork on the Navajo Nation for field personnel to hand out in response to inquiries during field work.
 5. Reduced the total number of mine sites to be inventoried from 205 to 199 as a result of U.S. Environmental Protection Agency (EPA) Region 9's revision of the status of six mines, which changed them to funded CERCLA sites.

September 2022

- Submitted the amended CXE form (LM 05a-19) for DRUM program V&V visits in South Dakota.
- Completed the revised Defense-Related Uranium Mines Safety Plan (LMS/DRM/S15804) (Safety Plan), including updates to the incident investigations, ionizing radiation, biological hazards (ticks), and heat- and cold-stress sections.
- Submitted the Defense-Related Uranium Mines Personnel Qualification Plan (LMS/DRM/S14578).
- Bat Conservation International (BCI) performed biological and cultural surveys in the Yellow Cat Locality, Utah, in preparation for safeguarding 94 hazardous mine features.
- Met virtually with the Pueblo of Laguna's new director of the Environmental and Natural Resources Department to review digital inventory and sampling data collected in August at three DRUM sites on Pueblo of Laguna land.
- In preparation for Campaign 2 on Navajo Nation land, program personnel:
 1. Identified the first 21 DRUM mines on the Navajo Nation for V&V.
 2. Submitted the final DRUM Navajo Nation information sheet.
 3. Finalized the Navajo Nation V&V Work Plan (DOE 2022kk) and submitted it to the Navajo Nation DRUM working group.
 4. Published a Navajo Nation press release, an LM article, a notification letter, and a flyer.
 5. Initiated Navajo Nation community outreach, in collaboration with NAML RD, by presenting at the Round Rock Chapter House monthly meeting. DRUM program participants described the V&V schedules and composition of the V&V field team, so community members could recognize DOE's presence and activities.
 6. Completed the Outreach Communications Plan.
 7. Submitted the Navajo Nation Chapter House notification letter.

October 2022

- Participated in and presented at the 43rd Annual National Association of Abandoned Mine Land Programs Conference in Grand Junction, Colorado. The presentation included the following:
 1. “Defense-Related Uranium Mines Environmental Data & Evaluation” poster.
 2. DRUM program physical features presentation.
- Published the DRUM Program Midyear Progress Report, January 1–June 30, 2022 (DOE 2022mm) on the DRUM website.
- Met with USFS to plan for future V&V work on USFS-managed land in outlying states.
- Prepared a risk roll-up report for the mines in the Fawn Springs Locality in (29 mines) in western Colorado on BLM-administered land (DOE 2022s).
- Began V&V work on the Navajo Nation in the Northern AUM Region.

November 2022

- Supported the Voluntary Protection Program application process by providing detail about additional steps used by the DRUM program to keep team members safe.
- Submitted the 2023 DRUM program field season schedule.
- Completed the FOP for the Northern AUM Region, Navajo Nation, Arizona, New Mexico, and Utah (DOE 2022e).
- Submitted maps for upcoming fieldwork on Navajo Nation land.

December 2022

- Received the Secretary of Energy Achievement Award.
- Developed and submitted the Draft Approach for Utilizing Aerial Gamma Radiation Survey Data description.
- Submitted the amended CXE form (LM 31a-19) for DRUM program V&V visits in Arizona.
- Completed the FOP for Nevada (DOE 2022h) and revised the FOP for Grants, New Mexico (DOE 2017).
- Hosted the quarterly Abandoned Uranium Mines Working Group virtual meeting to update annual stakeholder reports and reconfirm communication and strategic plans.
- Hosted a safeguarding project status meeting with BLM Utah and BCI to discuss the Yellow Cat Locality and Manti-La Sal National Forest safeguarding projects.
- Joined the Utah Abandoned Mine Reclamation Program (AMRP) and the BLM state office program lead in Moab, Utah, for a field visit to the Kane Creek Safeguarding Project, where closure work was observed.
- Completed the 2022 field season for Campaigns 1 and 2.

Risk Screening

To date, program results indicate that physical hazards (e.g., open shafts and adits) at the mines pose the greatest risk to the public, with roughly 28% of the mines ranked “high” for physical hazards. This suggests the need for future safeguarding to mitigate the risk presented by these features. More than 48% of the mines ranked “low” or “none” for physical risk. These estimates reflect mining-related physical hazards associated with uranium ore- extraction operations. Other hazardous features, such as structures previously included in evaluations of physical risks, were not considered. However, LM will address the handling of structures individually with each land management agency because each agency tends to address structures differently, if at all.

The DRUM team prepared V&V reports for each mine and risk roll-up reports for groups of mines in the same area (e.g., mining district, national forest) so land management agencies can set priorities for that region and develop potential physical hazard safeguarding projects.

Safeguarding

The DRUM program assisted land management agencies with safeguarding physical hazards posed by some mine features at eight different project areas in western Colorado, eastern Utah, and southern Montana. These hazards were primarily open adits, shafts, and subsidence features.

Table 2 summarizes the 2022 safeguarding projects and lists the cooperating land management agencies and state abandoned mine lands (AML) offices. These safeguarding projects demonstrate the collaborative relationships between the DRUM program and cooperating state AML offices and land management agencies.

Table 2. 2022 Safeguarding Projects

State	Project Area	Features Safeguarded	Cooperating AML Office	Cooperating Land Management Agency
Colorado	Atkinson Mesa, Carpenter Flats, and Carpenter Ridge	35	Colorado DRMS	BLM-UFO
Colorado	Spud Patch and Bishop Canyon	107	Colorado DRMS	BLM-TRES Rios Field Office
Colorado	Jamestown and Sullivan’s Travels	3	Colorado DRMS	Private property owner(s)
Colorado	Lady Bug Mine	2	Colorado DRMS	USFS
Colorado	Western Colorado	28	Colorado DRMS	Freeport-McMoRan, BLM-Tres Rios Field Office, and BLM-UFO
Montana	Pryor Mountains	4	BLM Montana	BLM-Billings Field Office
Utah	Yellow Cat	24	Utah AMRP	BLM-Moab Field Office
Utah	Kane Creek and Brumley Ridge	80	Utah AMRP	BLM-Moab Field Office
Total Safeguards Installed		283		

Abbreviation: DRMS = Division of Reclamation, Mining, and Safety

Strategic Partnerships

LM strives to maintain and encourage collaborative partnerships with BLM, USFS, NPS, and the states of Colorado, Montana, New Mexico, South Dakota, Utah, and Wyoming. LM also collaborates with EPA Regions 6 and 9 on program V&V assessment and risk-screening methods on tribal lands. LM continues to revise partnership agreements among various federal, state, and nonprofit entities to not only accomplish the V&V work but also safeguard physical safety hazards at these AUMs. Most notably, DOE has a cooperative agreement with BCI that provides long-term access to the spectrum of project development, environmental review (including NEPA documentation), and design and construction services needed to safeguard mines on public land.

Collaboration with a multitude of federal and state entities on the DRUM program supports a one-government approach with financial agreements. This provides access to agency expertise, involving managing abandoned mines on public land and critical input into work plans, schedules, data reviews, conclusions, and safeguarding projects. State AML programs in Colorado and Utah have been used to inventory private property intermixed with public land, providing valuable planning information needed to support the DRUM program.

In 2022, the DRUM program began V&V work on its tribal land campaign. The DRUM team developed a cooperative agreement with the Pueblo of Laguna in New Mexico to support and plan for V&V work. DRUM personnel conducted and completed V&V work at mines on Pueblo of Laguna land in August. The DRUM team developed an additional cooperative agreement with the Navajo Nation for their assistance with public outreach, operational planning, V&V work, and future safeguarding tasks. After many months of planning and collaborating with the Navajo Nation and other agency counterparts, LM began V&V work at mines on the Navajo Nation in October. In June, LM completed the work to assess the future resource needs and to make recommendations for future V&V activities on Spokane Tribe of Indians land.

2023 Planned Activities

LM completed V&V work at nearly 90% of the mines in Campaign 1 at the end of 2022, and this effort will continue in 2023. LM reconciled all DRUM locations at the end of 2021 and will continue into 2023 as the program crosswalks mine lists with EPA and tribal AML programs. LM will continue to expand its partnerships with states and agencies for field activities scheduled through 2023. Included in the implementation of Campaign 1 is LM's plan to leverage resources to assist partner agencies in addressing priority physical hazards identified by the program. Through a process of collaboration and concurrence, with hazards defined during V&V activities, LM and partner agencies determine priorities and optimize available resources for safeguarding physical hazards. This process, initiated in 2020, will continue at an accelerated pace in 2023.

V&V Field Operations

The field teams will visit several locations during the 2023 field season, which lasts from March through December. The teams are scheduled to conduct inventory and environmental sampling at DRUM sites in:

- Northern AUM Region, Navajo Nation, Arizona, New Mexico, and Utah.
- Little Colorado, Central Arizona, Northern Arizona, Southeastern Arizona, and Western Arizona mining districts, Arizona.
- Uintah and Last Chance Desert mining districts, Utah.

- Monticello Mining District, Utah.
- Slick Rock Mining District, Colorado.
- San Juan, Marshall Pass, Wet Mountains, Tallahassee Creek, Cochetopa, and Maybell mining districts, Colorado.
- Canyonlands National Park, Capitol Reef National Park, and Glen Canyon National Recreation Area, Utah.
- Bighorn Canyon National Recreation Area, Montana.
- Petrified Forest National Park, Arizona.
- Black Hills, Wind River Basin, Laramie, Powder River Basin, Washakie Basin, Butte, and Shirley Basin mining districts, Wyoming.
- Williston Basin and Black Hills mining districts, South Dakota.
- Dakota Plains Mining District, North Dakota.
- Butte Mining District, Montana.
- Basin and Range, Mojave Desert, Sierra Nevada, Temblor Range, and Reno mining districts, California.
- Stanhope Mining District, New Jersey.
- Northwest Mining District, Washington.
- Northwest and Lakeview mining districts, Oregon.
- Northwest and Stanley mining districts, Idaho.
- Nacimiento Jemez, North-Central New Mexico, Tucumcari, San Jose, Datil, Elk Mountain, Cuchillo Negro, Sabinoso, and Grants mining districts, New Mexico.
- California, Reno, and Salt Lake mining districts, Nevada.

The field teams are poised to complete V&V activities at approximately 250 mines on public land in calendar year 2023. For each project, a FOP will provide coordination instructions to the teams for the inventory and environmental sampling activities so that fieldwork is conducted efficiently. FOPs convey to LM and partner agencies information pertinent to the V&V activities at the specific project area. Also, contingencies are in place to ensure that field teams always have a DRUM site to inventory and assess. Although weather (e.g., late seasonal snow) or a natural disaster (e.g., smoke from a wildland fire) may affect field teams, they will have other options, allowing them to safely continue fieldwork.

Campaign 2

V&V work on Campaign 2, which addresses DRUM sites on tribal land, started in 2022. This will continue with plans to complete V&V activities at approximately 48 Navajo Nation mines in 2023 and 2024.

Safeguarding Program

In 2023, the DRUM program will increase the number of safeguarded features, with additional projects in Colorado and Utah. In Colorado, the DRUM program will safeguard an estimated 149 hazardous mine features on land managed by BLM's Grand Junction and Tres Rios field offices. The DRUM program plans to expand safeguarding work to the Calamity Creek, Outlaw Mesa, Wedding Bell, Bachelor Draw, Rimrock Blues, Starlight, and Fawn Springs areas. In Utah, the DRUM program has planned safeguarding projects at Manti-La Sal National Forest, where 48 hazardous features will be safeguarded; in the Yellow Cat Area near Moab, where 94 hazardous features will be safeguarded; and in the Kane Creek and Brumley Ridge Areas, where 147 hazardous features will be safeguarded. In total, the DRUM program is planning to safeguard 438 hazardous mine features in 2023.

Safeguarding projects are initiated as a follow-up to the DRUM program's risk roll-up reports, which document physical hazards presented by individual features at mines. LM works with affected land management agencies as they concur with the need to safeguard specific mine features in specific geographic areas. Land management agencies, state AML offices, LM, and BCI will collaborate to complete environmental reviews, develop designs and construction specifications, and contract and manage safeguard construction.

Program Plans

The activities performed by the DRUM program are represented in numerous documents that provide specific guidance and direction for successful completion of tasks or project activities. These documents are:

- Defense-Related Uranium Mines Program Management Plan (LM-Plan-3-23-1.0, LMS/POL/S15809) (Program Management Plan).
- V&V Work Plans.
- QAPP.
- DRUM Safety Plan.
- FOPs.
- Defense-Related Uranium Mines Data Management Plan (LMS/DRM/S19467) (Data Management Plan).
- Defense-Related Uranium Mines (DRUM) Mine Safeguarding Program Management Plan (LMS/DRM/S33217) (Safeguarding Program Management Plan).

A summary of each plan is provided below.

Program Management Plan

The Program Management Plan defines how LM will execute the DRUM program, set goals, and effectively communicate program strategies and objectives to the partner agencies. It is the primary guiding document of the program. LM issued a revised Program Management Plan in May 2022. The revised plan addresses V&V activities for the three DRUM campaigns, including safeguarding of physical safety hazards. It describes how LM, the LM Strategic Partner (LMSP) contractor, and partner agencies will work as a cohesive team to execute the DRUM program. The next revision to the plan is scheduled for March 2024.

V&V Work Plans

The V&V Work Plans provide data objectives, direction, and methodologies regarding how LM and partner agencies will collect, store, and report information gathered during V&V activities at mines on public and tribal lands. This includes inventorying mining-related features by using digital technology, radiological data collection, soil and water sampling (if required), photo documentation of mining-related features, in-field and office-based data quality assurance procedures, and reporting. LM developed separate V&V Work Plans for Campaign 2 for the Navajo Nation and the Pueblo of Laguna. LM will also develop a separate V&V Work Plan for mines that fall under Campaign 3. LM updates and reviews each V&V Work Plan annually.

QAPP

QAPP describes the procedure for ensuring that environmental data collected during V&V activities at a mine will be of sufficient quantitative and qualitative value for use in determining whether data-quality objectives are being met. The data provided to partner agencies will be used to supplement existing documentation of mine conditions. The next revision to this plan is scheduled for March 2024.

Safety Plan

The Safety Plan defines the requirements of the LMSP Worker Safety and Health Program and the Integrated Safety Management System. These high-level programs establish the parameters for how the LMSP contractor safely performs program activities. The DRUM Safety Plan replaced the previous Defense-Related Uranium Mines Health and Safety Plan in spring 2020 and is updated as necessary.

FOPs

FOPs detail activities to be performed on lands administered by partner agencies within discrete operational areas. Each FOP provides contact information for the relevant personnel from LM, the LMSP contractor, and partner agencies; identifies the mines where DRUM personnel will perform V&V activities; provides information pertinent to mine access; describes special circumstances and restrictions that need to be addressed before, during, or after V&V activities; and includes emergency contacts and locations of medical facilities near planned V&V activities. Each FOP is updated as necessary.

Data Management Plan

The Data Management Plan describes the tasks, processes, and procedures for managing DRUM program data. This plan identifies responsibilities, outlines data sources and locations, and provides insight on the quality control checks, capabilities, and queries that can be done related to the DRUM program database.

Safeguarding Program Management Plan

LM issued the Safeguarding Program Management Plan in 2021. This plan addresses how LM — in collaboration with land management agencies, state and tribal AML offices, the LMSP contractor, and BCI — implements safeguarding and follow-up monitoring and maintenance activities. The next revision to this plan is scheduled for May 2023.

Abbreviations List

AEC	U.S. Atomic Energy Commission
AML	Abandoned mine lands
AMRP	Abandoned Mine Reclamation Program
AUM	Abandoned Uranium Mine
BCI	Bat Conservation International
BIA	U.S. Bureau of Indian Affairs
BLM	U.S. Bureau of Land Management
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CXE	Categorical Exclusion Evaluation
DOE	U.S. Department of Energy
DRUM	Defense-Related Uranium Mines
EFT	Electronic file transfer
EPA	U.S. Environmental Protection Agency
ERF	Environmental Review Form
FOP	Field Operations Plan
FY	Fiscal year
JSA	Job safety analysis
LM	Office of Legacy Management
LMSP	Legacy Management Strategic Partner
NAMLRD	Navajo Abandoned Mine Lands Reclamation Department
NEPA	National Environmental Policy Act
QAPP	Quality Assurance Program Plan
SITLA	School and Institutional Trust Lands Administration
UFO	Uncompahgre Field Office
ULP	Uranium Leasing Program
USFS	U.S. Forest Service
V&V	Verification and Validation

Additional Information

Additional information about the DRUM program, including the 2014 Report to Congress, other program documents, ongoing projects, and updates, is available at the following DOE website: <https://www.energy.gov/lm/defense-related-uranium-mines-program>.

For more information about the DRUM program, please contact:

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