

U.S. Department of Energy

PR



PROGRAM UPDATE

January-March 2021



Birders Flock to Two
Midwestern LM Sites

**An Overview of LM's
Natural Resources
Management Plan**

Observing the Secretive
Inhabitants of LM Sites

Director's Corner



Poet Anne Bradstreet once said, "If we had no winter, the spring would not be so pleasant; if we did not sometimes taste of adversity, prosperity would not be so welcome."

As the days lengthen and the first hints of spring arrive, my thoughts turn to renewal and prosperity. Not just renewal from the cold days of winter, but from all the challenges we've faced over the past year in our nation, our organization, and our personal lives; and I know we will prosper. As we begin to see declining cases of COVID-19 across the country, and with more U.S. Department of Energy (DOE) Office of Legacy Management (LM) and LM Strategic Partner (LMSP) employees receiving the vaccine, there are finally green shoots visible in the long struggle with the pandemic.

So, the normal optimism I feel each spring, as pitchers and catchers report for spring training, is heightened this year with the sense that better days are coming beyond spring, and we will soon be returning to lives that will seem somewhat normal in the "after-times" of the post-pandemic era. And what better way to celebrate the revitalization of spring than with an in-depth look in this *Program Update* issue at the LM Ecology Program, which takes restoration as its guiding mission and sets an example of sustainable management and conservation of LM sites that we can all take pride in.

Ecological restoration of LM sites has been at the center of the LM mission from the early days of the organization, as evidenced by the award-winning beneficial reuse achievements at the Fernald Preserve in Ohio and the Weldon Spring Site in Missouri that were decades in the making. At these sites, restored native ecosystems provide habitat for an ever-growing list of wildlife and plant species that are now celebrated by birders and others (see Page 14).

From "capturing" the surprisingly diverse range of wildlife (and their unique behaviors) at the Monticello, Utah, Disposal Site (see page 6), to supporting cutting-edge research on sustainable livestock grazing practices at the Shirley Basin South site in Wyoming (see page 8), LM and LMSP ecologists are increasing understanding of how our sites serve as refuges for native species and important pieces of the ecological puzzle in their regions.

The Dolores River runs through rugged red-rock canyon country in Colorado and Utah, including a 4-mile section of the river that runs through DOE Uranium Leasing Program tracts in Colorado. LM and LMSP ecologists are working with a diverse set of partners

to control invasive species and restore riverine ecosystems along this wild and scenic-designated river (see page 10), one of the truly special places in the West.

As the climate changes and more sites with diverse ecosystems come into the LM portfolio, the skills and knowledge of our Ecology Program Team will become increasingly important, as we seek to find ways to restore these sites as safe and healthy landscapes for conservation and beneficial reuse.

We also took time this past February to honor Black History Month, which is about telling the story of the often-overlooked contributions of African Americans and their central role in U.S. history. This issue highlights three African American scientists who made essential contributions to the Manhattan Project and science in general, with breakthroughs in research on physics, chemistry, mathematics, and nuclear science (see page 16). I find myself humbled by these stories of great Americans who dedicated themselves to science and knowledge.

I would like to end this quarter's message by stating how proud I am of the response of this organization across the board to the pandemic. Displaying resilience and flexibility, countless individuals have stepped up to keep their colleagues safe while also ensuring the LM mission of protecting human health and the environment remains paramount. And as we enter what is hopefully the final months of a long and challenging time, I want to encourage all of you to maintain vigilance and keep following the practices that have proven effective in the long fight against the pandemic. All that we do is done with an eye to something else.

As always, be safe, take care of each other, and execute the mission.

Warm Regards,

Carmelo

Carmelo Melendez



LM Goals



Goal 1
Protect human health and the environment.



Goal 2
Preserve, protect, and share records and information.



Goal 3
Safeguard former contractor workers' retirement benefits.



Goal 4
Sustainably manage and optimize the use of land and assets.



Goal 5
Sustain management excellence.



Goal 6
Engage the public, governments, and interested parties.

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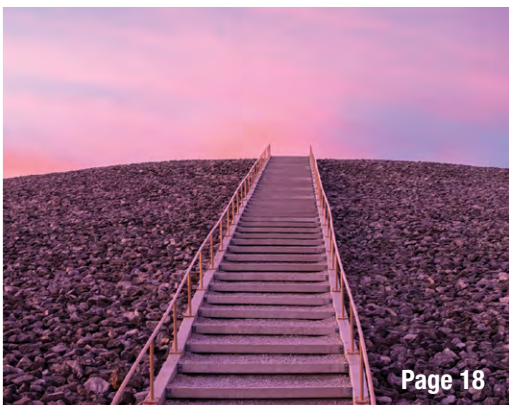
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Cover: Ecological services are any beneficial natural process arising from healthy ecosystems, such as pollination of plants and decomposition of organic waste.



An Overview of LM's Natural Resources Management Plan

Each U.S. Department of Energy Office of Legacy Management (LM) site has unique natural resource management needs. At many sites, LM manages a range of natural resources, including vegetation, wildlife and their habitat, special-status species, invasive species, pollinators, surface and groundwater, wetlands, and resources related to fire ecology. Managing natural resources at LM sites is a complex task. Sites span a large geographic area with differing resources, surrounding landowners, and current and former uses that include ranching, agriculture, mining, oil and gas development, conservation, and recreation.



The state-endangered cave salamander at the Fernald Preserve site in Ohio.

Special-status species are considered sufficiently rare that they require special consideration and/or protection and should be, or have been, listed as rare, threatened or endangered by federal, state, or tribal governments.

Because of the complexity across LM sites, the need for natural resource management is decided on a site-to-site basis. Different types of management include environmental monitoring and/or research, controlling vegetation or wildlife (such as invasive weeds and nuisance wildlife), actively managing natural resources (such as habitat enhancement), and providing education and outreach.

In 2020, LM created a Natural Resources Management Plan (NRMP) to define and guide existing natural resource management efforts across LM sites. The plan's objectives are aligned with LM's mission of ensuring the future protection of human health

and the environment. The plan also supports the Ecosystem Management Team goals of optimizing ecological services and

promoting conservation reuse on LM sites. Other objectives defined in the NRMP include:

- Applying sustainable management practices to: protect and restore native ecological communities, create and enhance habitat for special-status species and pollinators, control damage to natural resources from invasive and nuisance species, and improve habitat and diversity through proactive measures.
- Partnering with other agencies, nonprofit groups, and adjacent landowners.
- Using an adaptive management approach to adjust management decisions based on monitoring, observation, and scientific data, and including ecological baseline characterizations at LM sites pre- and post-transition.

LM works to protect and conserve natural resources at sites spanning diverse ecological systems throughout the United States. In the Southwest, the landscape is characterized by mesas, cliffs, canyons, and valleys, and contains arid grasslands and shrublands along with pinyon-juniper and ponderosa pine forests. An LM survey in 2019 found habitat for monarch butterflies at the Bluewater and Ambrosia Lake sites in New Mexico. The monarch butterfly is a critical pollinator species and a candidate species under the Endangered Species Act. LM is currently promoting best management practices to promote habitat for the insect.

Sites in Wyoming are dominated by high-elevation, arid grasslands and shrublands. Much of the region is used for livestock grazing. The Bear Creek, Spook, and Shirley Basin South sites are grazed by livestock and have established grazing leases under the LM Beneficial Reuse Program. LM works with local ranchers and conducts periodic rangeland health assessments to ensure the land can sustainably support livestock and ecologically stable conditions can be maintained. Rangeland health assessments help LM manage and protect the land while allowing for a multiuse approach at the sites.

The Fernald Preserve, Ohio, Site is one of LM's largest sites and is located within a transitional ecoregion between the Eastern Corn Belt Plains and the Interior Plateau. Over the past centuries, the indigenous forests of this region were cleared or altered for industrial, agricultural, and urban development. Given the site's transitional character and land use history, ecological restoration

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An Overview of LM's Natural Resources Management Plan

projects at Fernald have incorporated a combination of native and nonnative species to establish a unique and varied community of ecosystems within the boundaries of the preserve. The preserve offers habitat for a large variety of plants and wildlife, including special-status species, such as the American burying beetle, the northern long-eared bat, and the cave salamander.

LM is moving toward a land-management approach that optimizes use by placing sites in the most appropriate category of beneficial reuse that is consistent with the tenets of sustainability, good management practices, and mission requirements.

“Conservation efforts and management of our natural resources are essential to long-term stewardship of our LM sites to ensure current and future utilization of our public lands,” said Joyce Chavez, the LM Reuse Asset manager.

The objectives developed in the NRMP help to define responsibilities for managing natural resources. Managers can use these objectives and other information described in the NRMP to plan or expand natural resource management activities at a given site. Training is being created to help familiarize LM staff with the NRMP and to increase knowledge of natural resources and management efforts across LM sites. ❖

Below: LMSP ecologist David Holbrook conducting a rangeland health assessment at the Spook site in Wyoming (native pronghorn in background ensure that he correctly identifies the plant species).



Above: Prescribed burn at the Fernald Preserve site in Ohio.



Observing the Secretive Inhabitants of LM Sites

Landscapes at U.S. Department of Energy Office of Legacy Management (LM) sites are as variable as they are numerous, providing habitat for a wide variety of mammals, birds, reptiles, amphibians, and insects. Some LM sites are even home (or are potentially home) to wildlife species afforded special federal, state, or tribal protections because their populations are deemed at-risk due to low numbers.

Why does wildlife matter at LM sites? For one, LM supports the beneficial reuse of its lands by conserving natural resources and conducting activities that are environmentally sound. Conservation reuse activities, such as ecological revitalization of a site, can encourage recreational activities and economic development. LM sites don't exist in isolation: they are a piece of a larger ecological puzzle. A vital component of this puzzle is the animals that rely on these sites for food, water, refuge, finding mates, or rearing young. As such, natural resources (including plants and animals) may need assessment for a number of reasons, including determination of a site's potential for conservation reuse, as part of a baseline characterization during the transfer of a site to LM or to determine if a protected species occupies or could occupy the site.

How does LM assess these natural resources? In the case of plants, it's straightforward: ecologists conduct a systematic visual survey of the site. This is highly effective because plants can't run or fly, they typically don't hide, and they surely can't migrate when times get tough. Wildlife, on the other hand, may scatter without much warning. This can make boots-on-the-ground visual surveys less effective — a phenomenon known as “imperfect detection” in biostatistician parlance.

Remotely placed, motion-activated cameras (also known as game or trail cameras) have become increasingly popular among biologists for documenting wildlife and their activities. These small, relatively cheap, customizable, weather-resistant cameras can operate continuously for months without maintenance, providing unprecedented insight into the lives of wildlife. Consider the advantages of this technology: day or night, rain or shine, these cameras continue making observations, without substantially disturbing or otherwise altering an animal's behavior.

How can trail cameras benefit LM? To answer this question, four trail cameras were deployed at the Monticello, Utah, Disposal Site, with two primary goals: monitor for presence of the Gunnison

sage-grouse a bird protected as threatened under the Endangered Species Act and document overall biodiversity at the site. Though the sage-grouse has not previously been observed,



A northern harrier patrolling the site.



Two mule deer bucks fighting during the rut.



An elk grazing at night.

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Observing the Secretive Inhabitants of LM Site

the site exists within the sage-grouse's potential range, as designated by the U.S. Fish and Wildlife Service. Over a one-year period, the cameras were strategically located and



A wild turkey passing through the site.



Mule deer sparring.



A mule deer doe leading three fawns through the sagebrush.

periodically moved across the site to maximize the possibility of “capturing” wildlife, especially in the spring when male sage-grouse perform elaborate strutting displays and vocalizations to attract females to their breeding grounds (called leks), thus increasing the probability of observing this species if it was present (even transiently).

Joyce Chavez, the LM Reuse Asset manager, was pleased with the results. “I am so excited to see all of the wildlife activity on the site, as so many of our LM sites in the western United States are ideal for promoting native ecology,” she said.

From October 2019 to October 2020, thousands of pictures of wildlife were captured, including 11 mammal, eight bird, one lizard, and one grasshopper species. Wildlife included mule deer, elk, fox, coyote, northern harrier (hawk), wild turkey, black-tailed jackrabbit, mountain cottontail, striped skunk, numerous rodents, and even a hummingbird. No sage-grouse were documented.

Perhaps more notable were the behaviors of the animals captured: mule deer sparring, elk foraging, a hawk patrolling the grasslands, etc. One thing was evident: animals were not just passing through the site — they were using it.

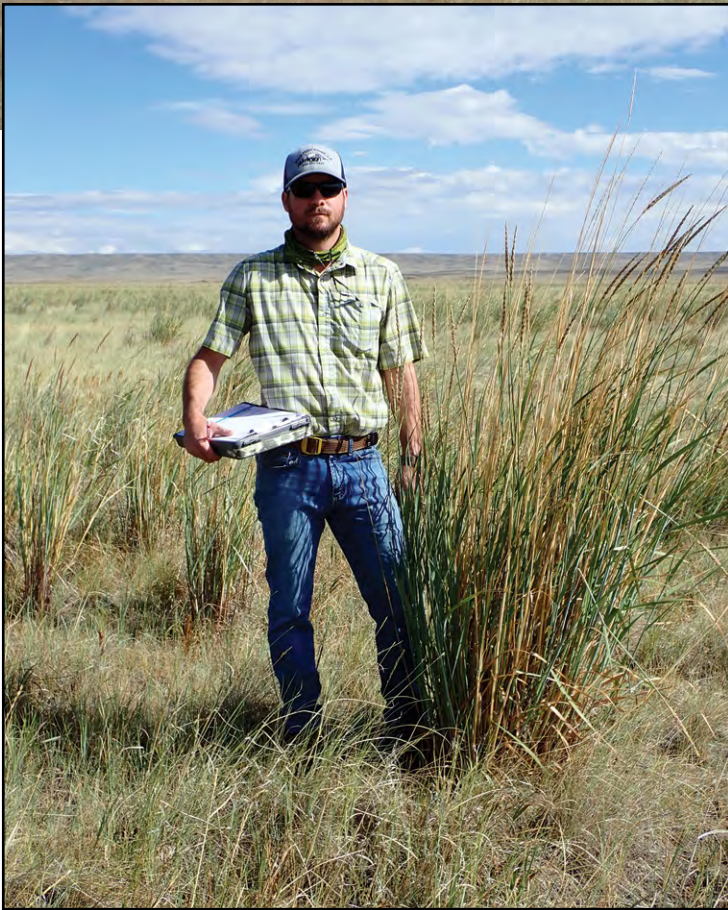
Many species were recorded repeatedly throughout the year, but mule deer were most frequently seen. From rutting (breeding season activities) in the winter to fawning in the spring, seasonal routines were readily on display. This is a promising observation because mule deer have experienced population declines in parts of the West, prompting state and provincial fish and wildlife agency personnel to collectively work together to address long-term declines of this species.

What did we learn?

Trail cameras are an effective, low-cost tool that can be used to passively survey wildlife presence and activity at LM sites. An unanticipated finding of this project was the variability in sizes of animals detected by the cameras, which ranged from adult elk to grasshoppers. The ability to document something as small as a grasshopper expands the potential application of this technology to detect or monitor smaller animals, such as important pollinator species. While these cameras cannot completely replace traditional ground surveys, they are a useful supplement that can allow LM to better understand how sites are functioning as part of the larger ecological puzzle. ❖



Regenerative Grazing Benefits LM Site from the Ground Up



Above: Cattle from the Heward 7E Ranch grazing at the Shirley Basin South site. Left: LMSP's David Holbrook standing next to basin wildrye in one of the regenerative grazing study plots. Below: The team worked with stakeholders to identify potential study plot locations. Pictured below are field notes from the site visit transcribed on a map of the Shirley Basin area.



The sprawling, 1,527-acre Shirley Basin South, Wyoming, Disposal Site sits within rolling grassland and sagebrush steppe, about 60 miles south of Casper. A uranium mill at the Shirley Basin site processed uranium ore from the 1960s to the 1980s, and a disposal cell on the site now safely encapsulates the radioactive tailings produced in the milling process, as well as contaminated soils and building materials from the old mill.

The site, which is owned and managed by the U.S. Department of Energy Office of Legacy Management (LM), has supported a grazing licensee as part of the LM Beneficial Reuse Program,

which aims to “sustainably manage and optimize the use of land and assets.”

The Shirley Basin South site is now taking that commitment to sustainable management a step further by hosting a study designed to explore a holistic livestock grazing approach called “regenerative grazing.”

Site and program managers say the land use history of the site makes it the ideal location for the study of sustainable rangeland practices.

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Regenerative Grazing Benefits LM Site from the Ground Up

“The Shirley Basin area is very unique — there are a lot of things going on with land use, historically and current,” said David Holbrook, the lead ecologist for the LM Strategic Partner (LMSP). “It’s sort of like a checkerboard. Part of it has been mined before, and it’s been revegetated under a legacy management cleanup. Some of it is native rangeland, and all these areas have different levels of plant diversity. Some areas have been grazed for over 100 years, some for the past 10-20 years, and some have never been grazed.”

Holbrook said the unique characteristics of the site will allow a comparison of historic and current land use and livestock practices on plant diversity, soil carbon, and overall rangeland conditions. According to Holbrook, practicing sustainable grazing practices — “the right amount of cows in the right area for the right amount of time” — can promote plant growth and increase the soil’s ability to pull carbon from the atmosphere and store it in the soil. This process is called carbon sequestration.

Carbon sequestration is often promoted as a method of reducing the amount of carbon dioxide in the atmosphere with the goal of reducing global climate change.

LM already conducts rangeland health monitoring at the site, so it wasn’t difficult to take monitoring one step further into the research realm.

At Shirley Basin South, the LM team found a willing partner in the project in the current grazing licensee Todd Heward, who has long been interested in sustainable grazing systems and has partnered with the local conservation district and the University of Wyoming to conduct grazing-related studies. The nearby Heward family 7E Ranch won the 2010 Leopold Conservation Award from the Sand County Foundation, a prestigious nationwide award honoring community leaders and land stewards.

“Heward is all about improving the condition of the land from a sustainability and conservation standpoint,” Holbrook said. “He’s implemented rotational grazing using electrical fences, which allows him to move cattle frequently from pasture to pasture. He makes sure that the landscape remains in good rangeland health and condition.”

Heward put the LM and LMSP Ecology Team in contact with Dr. Anowar Islam, a forage agroecologist in the Plant Sciences Department at the University of Wyoming and a leading researcher of the benefits of regenerative grazing. Islam proposed turning the Shirley Basin South regenerative grazing study into a master’s thesis project. Under LM direction and help, a University of

Wyoming graduate student will conduct the study as the main component of his thesis.

The team is preparing to begin data collection on the three-year project in spring 2021.

Joyce Chavez, the LM Reuse Asset manager and one of the leading proponents of the project, said the regenerative grazing study is a natural fit with LM’s land management and beneficial reuse goals.

“By optimizing grazing practices, LM supports long-term stewardship of land by improving habitats for the local species and promotes resiliency of the site,” Chavez said.

Bernadette Tsosie, the LM site manager for the Shirley Basin South site, is excited about the collaboration with the University of Wyoming and opportunities on the project for graduate student research.

“My career has come full circle since I received funding from DOE to do my graduate work at the Shiprock site in New Mexico,” Tsosie said. “Now that I’m a site manager for LM, I’m always looking for opportunities to support students who are just starting their careers.”

Holbrook echoed Chavez’s and Tsosie’s enthusiasm for the benefits of the project, not just for the Shirley Basin South site but for all LM sites where grazing is a part of the land management approach.

“We take pride in supporting our number one mission, which is supporting the LM mission of protecting human health and environment, but also reusing the site and working with local ranchers, trying to stay on the cutting edge of sustainable rangeland management practices,” Holbrook said. ❖



David Holbrook collecting data for a rangeland health assessment.



LM Battles Invasive Species on the River of Sorrows

The headwaters of the Dolores River can be found in a meadow called Tin Can Basin, high in the rugged San Juan Mountains of southwest Colorado. Originally named “Rio de Nuestra Senora de las Dolores” — or “River of Our Lady of Sorrows” — by Spanish explorers, the Dolores flows 230 miles before joining the Colorado River in the red rock canyon country near Moab, Utah.

The Dolores attracts recreational visitors for its world-class river rafting, excellent fishing, and scenic recreation, but it also supports agriculture and municipal water uses. In addition, the river flows through the Uravan Mineral Belt, a major area for uranium mining during the Cold War.

The Dolores River Restoration Partnership (DRRP) is a coalition of public and private organizations, including federal land management agencies, local governments, landowners, and other interests. The partners are all working to reduce tamarisk and other nonnative vegetation along the river, while restoring native plant species, improving riparian habitat, and creating a healthier ecosystem.

Since 2011, the U.S. Department of Energy (DOE) Office of Legacy Management (LM) has been working as a DRRP partner to address invasive species and restore native riparian habitat on about 4 miles of the Dolores River that runs through DOE uranium lease tracts.

Danika Marshall, an ecologist with the LM Strategic Partner contractor, said the work is paying off.

“We have a lot more native grasses coming up, native shrubs and forbs,” Marshall said. “It’s improving habitat for grazing livestock and for desert bighorn sheep, deer, and bear. So, everything that comes down to the river corridor for water has a lot more forage on-site, rather than the acres of invasive knapweed that was there before.”

Since 2011, LM has partnered with the Southwest Conservation Corps (SCC), a Conservation Legacy program that provides young people with service opportunities through natural resource stewardship projects. SCC crews spend one to two weeks per year at the LM lease tracts applying herbicide and manually removing tamarisk, Russian knapweed, and Canada thistle. They also work to seed native species to replace the removed invasive species.

“This work is important for the health of the river ecosystem as well as for habitat,” Marshall said. “And it’s important that everyone does their part because if we just did our 4-mile

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A view downstream of the Dolores River on ULP lease tract SR-14 in the fall.

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LM Battles Invasive Species on the River of Sorrows

section, and people upriver from us weren't doing anything, then whenever it floods all the noxious weed seeds would come down, and all that work would be for nil."

LM works within the partnership to accomplish vegetation management and restoration activities, and to monitor and measure results against the partnership goals. Other partners upstream and downstream are also working to control invasive species, restore riparian habitat, and promote habitat for wildlife. For example, ranchers who manage a big stretch of riverfront upstream are controlling grazing by alternating pastures to prevent overgrazing that could lead to riverbank erosion.

Debbie Barr, the program manager for the LM Uranium Leasing Program, said it's been rewarding to see that LM's DRRP activities have reduced the abundance of invasive plants in these areas over time.



Southwest Conservation Corps crew treating invasive weeds on a ULP lease tract on the Dolores River.



Russian knapweed is an invasive species that has damaged ecosystems along the Dolores River corridor.

"Restoring native communities along the Colorado River and its tributaries, like the Dolores River, is important," said Barr. "By partnering with such a diverse and extensive number of organizations and individuals, we're able to accomplish so much more together than we could apart."

Joyce Chavez, the LM Reuse Asset manager, said the partnership fits the LM goal of managing land sustainably.

"A major part of invasive species control is working together to be a good neighbor to ensure that unwanted species don't overrun neighboring pastures and fields, which would negatively impact the riverine ecosystem," Chavez said.

LM recently renewed its commitment to DRRP by signing a memorandum of understanding with 28 other signatories. LM is proud to continue partnering with DRRP and SCC in addressing invasive species and restoring native vegetation along the Dolores Rivers as part of a larger effort to improve the health of this wild and scenic river. The work highlights LM's commitment to stewardship and, most importantly, ensures the health of this important riparian corridor. ❖



LM Partners with Bat Conservation International to Safeguard Bat Habitat



Townsend's big-eared bat. (Photo courtesy BCI.)

The U.S. Department of Energy (DOE) Office of Legacy Management [Defense-Related Uranium Mines](#) (DRUM) Program is protecting the environment through a cooperative partnership with Bat Conservation International (BCI).

The DRUM Program partners with organizations, such as BCI, to inventory and screen for risks at the estimated 4,225 abandoned uranium mines that produced uranium ore for the federal government for defense-related activities between 1947 and 1970. BCI is a conservation organization dedicated to ending bat extinctions. Working collaboratively with other organizations, BCI's goal is to redefine global conservation using cutting-edge tools, technology, and training to create a real impact on bat colonies worldwide.

"The BCI partnership with DOE and other partner agencies is integral to the DRUM goal of protecting human health and environment," said DRUM Project Manager Mary Young. "BCI has decades of experience and knowledge in bat conservation in relation to abandoned mine lands and is well respected and trusted within that community."

In fall 2020, BCI undertook bat surveys of DRUM sites in Colorado and New Mexico, encompassing 104 mine openings. The surveys identified bat species and documented telltale signs of their presence, such as guano, insect parts, and roost staining. BCI made recommendations on which mines could be sealed off without disturbing bat habitat and flagged 41 openings as candidates for bat- and wildlife-compatible closures.

BCI team members surveyed exposed mine portals and the interior of the mines that were deemed safe to enter by the highly trained team. A subterranean specialist, suited up with approved personal protective equipment, entered mines to inspect and document bat activity. When faced with potential safety hazards, BCI used light detection and ranging drone technology to map underground mines.

The BCI team determined 14 of the 24 mine features surveyed in New Mexico offered some level of subterranean bat habitat. Four of the features contained evidence of use by bats, in the form of guano and insect parts. None of the features contained live bats at the time of the survey. The BCI team determined bat use of the occupied features primarily represented minor day and night roosting.



Aaron Sidder from Bat Conservation International passes cap and post timbers en route to the mine portal. (Photo by Bill Hatcher/BCI.)

BCI's expertise extends beyond bats. During the surveys, staff documented use of abandoned mine features by other animals, identifying scat and nests. Signs of woodrat and field mouse use were common, and horse and bobcat tracks were also observed. BCI will also perform other required wildlife surveys, such as raptor surveys, to make sure that safeguarding projects do not disturb nesting birds of prey during breeding season. In addition, BCI looks for potential culturally and archaeologically significant items during their surveys. ✨



Hiking, Biking, and Bats: Keeping Humans and Habitats Safe

Enjoying the great outdoors is a wonderful and richly rewarding part of living in the West. Hiking and biking trails are abundant, and the scenery is stunning. However, when taking to the trails, it's important to stay safe when encountering old mines — and there are a lot of old mines in the West. For instance, the U.S. Department of Energy Office of Legacy Management (LM) [Defense-Related Uranium Mines](#) (DRUM) Program has identified approximately 4,225 abandoned uranium mines.

Not only are there safety concerns at abandoned mines but also ecological concerns. Bats are one of many animals that inhabit mines and caves. They also like to hide and rest within rock cracks and ledges, so rock climbers should be careful when finding a handhold.

Although they have received a bad rap due to vampire films, the truth is that bats provide balance to the ecosystem. As pollinators, bats disperse pollen picked up when drinking nectar from flowers. They also eat large amounts of insects, including gnats and mosquitoes.

At the request of the DRUM Team, Bat Conservation International (BCI) recently conducted a survey of several abandoned uranium mines in Colorado and New Mexico and found evidence of suitable bat habitats. Signs of bat activity included bat guano and brush marks left by bat wings as they enter and exit mine openings.

Above: Big brown bats. (Photo by Shawn Thomas/BCI.)

Right: Wooden ore bin in New Mexico. (Photo by Bill Hatcher/BCI.)



BCI provided the DRUM Team with recommendations on how to safely protect bat populations and the public. For instance, thanks to BCI's input, LM partner agencies know which abandoned mines do not show bat activity and can be completely sealed off. Exclusion methods will still be used prior to complete mine closure to ensure no bats are inside. At abandoned mines that do show bat activity, DRUM partners will safeguard with suitable closures, such as bat gates and netting, which have openings to allow bats to enter and exit.

Safeguarding work will also accommodate the bats' lifecycle. Bats hibernate for about 183 days during the winter months and then give birth to live young — or pups — in the spring. Breeding season begins when the temperature is warmer, and food is most abundant. At around three-weeks old, bats begin to learn to fly. By late summer, females and pups leave their nursery sites, as pups no longer need their mother's milk. In the fall, bats are off looking for mates.

When enjoying the outdoors, it's best to keep out of abandoned mines and leave them to the bats. ✨





Birders Flock to Two Midwestern LM Sites



Above: Site interpreter Kevin McCarthy photographed the beautiful winter colors of an American goldfinch at the Weldon Spring Site.

Right: Local photographer Lenny Beck captured a serene sight of three Wilson's snipes and their reflections at Fernald Preserve's wetlands.



A diverse array of feathered friends can be found throughout the seasons at the U.S. Department of Energy Office of Legacy Management's (LM) [Fernald Preserve in Ohio](#) and [Weldon Spring Site in Missouri](#) — and for good reason. These ecologically restored sites provide ample habitat for hundreds of species, as they go about foraging, building nests, or finding mates. Open to the public, these sites have also attracted a growing group of hikers, photographers, and bird-watchers.

While birders, the popular name for bird-watchers, can be found at both the Fernald Preserve and Weldon Spring Site year-round, February is particularly special due to the Great Backyard Bird Count (GBBC), an international citizen scientist event conducted by the Cornell Lab of Ornithology and National Audubon Society. Launched in 1998, GBBC was the first online citizen science project to collect data on wild birds and to display results in near real time. Birders from all over the world provide their bird sighting information to eBird, the Cornell Lab of Ornithology online database, and utilize the resulting data to locate accessible birding locations.

GBBC at the Weldon Spring Site is historically celebrated by the interpretive staff through planned, weekend-long programming.

In the past, the site invited guests to spend the weekend with a pair of binoculars in hand, spotting birds and contributing to the count. This year, due to the COVID-19 pandemic, site staff invited guests to continue the tradition in their own backyards with [STEM with LM's "Be a Clever Birder,"](#) a self-guided introduction to birding.

Birders may catch sight of the song sparrow, one of North America's most widespread birds and a year-round resident at the Weldon Spring Site. In the summer, these sparrows primarily eat insects, but, in the winter, they feed heavily on seeds from grasses and weeds, hopping through Howell Prairie searching for their next meal. American goldfinches congregate in the weedy fields and at feeders, making musical and plaintive calls. These are just two of the many species counted during GBBC at the Weldon Spring Site every year.

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Birders Flock to Two Midwestern LM Sites

While there has never been a Fernald Preserve interpretive staff-supported event scheduled for GBBC, the citizen scientists who visit the rural southwest Ohio site certainly contribute their fair share of data over the course of the year.

Fernald Preserve is one of the many “hotspots” indicated on eBird. Since the preserve opened to the public in 2008, 253 species have been recorded. If a bird appears at the preserve that is unusual for the area, it doesn’t take long for the word to spread, sometimes bringing birders from over 100 miles away.

Hiking on the 7 miles of walking trails or waiting patiently at a wildlife-viewing deck may reveal a least bittern peeking through cattails, a meadowlark perched atop a prairie flower, juvenile pileated woodpeckers eagerly begging from a tree cavity nest, or ring-necked ducks floating on any of the many open water ponds. Winter also brings a diversity of raptors in their down “jackets” hunting the marshes and meadows. Wildlife photographers can capture great action shots of bald eagles, northern harriers, red-tailed hawks, American kestrels, short-eared owls, great-horned owls, and more. Recently, lucky visitors witnessed two adult bald eagles sharing a freshly caught mallard dinner.

The world-class birding at the Fernald Preserve and Weldon Spring Site wouldn’t be possible without the ecologically restored areas at these two sites, designed to provide habitat and green space for local wildlife. LM continues to take proactive measures in a commitment to conservation and [beneficial reuse](#) at these two sites by creating, restoring, protecting, and enhancing habitat. The next time a birder wants to add a few new species to their life list, they should plan a visit to one of these LM sites. ❖



Above: Local photographer Pat Bell captured a once in a lifetime shot of a short-eared owl and a northern harrier sparring over a coveted meadow vole at Fernald Preserve. Right: Site interpreter Kevin McCarthy captured this photo of a song sparrow resting on prairie grass during a snowfall at the Weldon Spring Site.





LM Highlights 3 Accomplished Scientists in Honor of Black History Month

Historian Carter G. Woodson started the first Black History Week in February 1926 through the Association for the Study of African American Life and History (ASALH). Decades later, in 1976, this commemoration of Black history in the United States was expanded by ASALH to Black History Month and President Ford issued the Message on the Observance of Black History Month that same year.

Every year since, it is custom for the president to issue a [Presidential Proclamation](#) to underscore the importance of recognizing the contributions that African Americans have made to American history in their struggles for freedom and equality and to deepen our understanding of our nation's history.

This Black History Month, the U.S. Department of Energy Office of Legacy Management (LM) wants to recognize three of the many Black scientists, physicists, engineers, and technicians who contributed to the success of one of the most significant scientific achievements of the 20th century: the Manhattan Project. Conducted in secrecy to preserve national security, the U.S. Army Corps of Engineers Manhattan Engineer District recruited the nation's greatest minds to develop and build the atomic bomb.

The Manhattan Project began in early 1942, and the project quickly grew into a nationwide network of laboratories and storage and processing facilities. Four sites in particular would emerge as central to the mission: the Oak Ridge Reservation in Tennessee, the Los Alamos Laboratory in New Mexico, the Hanford Reservation in Washington state, and the [Metallurgical Laboratory \(Met Lab\)](#) in Chicago.

The Met Lab, based at the University of Chicago, was under the leadership of Arthur Compton, who recruited and hired 12 African American scientists and technicians to work alongside their white counterparts in efforts to understand the fission process, the science behind the atomic bomb. Two of the 12 were J. Ernest Wilkins Jr. and George Warren Reed.

Wilkins was a prominent mathematician and physicist, whose academic and professional accomplishments began at the age of 13 when he became one of the youngest undergraduates at the University of Chicago. After completing his bachelor's degree in mathematics at age 17, he continued his studies, earning his master's degree the next year and completing his Ph.D. in mathematics in 1942 at the age of 19, becoming the seventh African American to obtain that degree from the University of Chicago.



J. Ernest Wilkins Jr., mathematician and physicist at the Met Lab at the University of Chicago (Image courtesy of Dan Dry/Wikimedia Commons).

Wilkins taught mathematics at the Tuskegee Institute in Alabama before being recruited to the Met Lab in 1944, where he would work in collaboration with Compton and Enrico Fermi. While at the Met Lab, Wilkins researched methods for producing fissionable nuclear materials, focusing primarily on plutonium-239. In the fall 1944, Wilkins's team was scheduled for transfer to Oak Ridge, but Jim Crow laws — state and local laws enforcing racial segregation — prevented him from taking up a scientific post at the east Tennessee site.

Instead, Wilkins was recommended for a position with Eugene Wigner, who was researching the design and development of nuclear reactors that would convert uranium into weapons-grade plutonium. Their research would eventually become the science behind the Wigner-Wilkins approach for estimating the distribution of neutron energies within nuclear reactors.

Wilkins would go on to hold a variety of positions at the Nuclear Development Corporation of America (later the United Nuclear Corporation) and oversee a range of research and development projects with the U.S. Atomic Energy Commission (AEC).

The importance of Wilkins's work in the area of physics, mathematics, and nuclear science would earn him high accolades and honors over the course of his career, including serving as the president of the American Nuclear Society and becoming the second African American to be elected to the National Academy of Engineering, one of the highest honors an engineer can receive. He was also a visiting scientist and Distinguished Fellow at DOE's [Argonne National Laboratory](#). He retired in 2003 and passed away at the age of 87 on May 1, 2011.

Reed was a chemist who also worked at the University of Chicago Met Lab. Reed earned a bachelor's and a master's in chemistry from Howard University prior to being recruited to the Manhattan Project. At the Met Lab, Reed began what would become a major part of his life's work: researching radiation patterns of uranium and plutonium. His research focused on the fission

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LM Highlights 3 Accomplished Scientists in Honor of Black History Month

yields of uranium and thorium to determine their viability for a nuclear chain reaction — work that had an immediate impact on the construction of the atomic bomb.

After the end of the Manhattan Project, Reed completed his Ph.D. at the University of Chicago in 1952 and stayed on to work in the chemistry division of the Argonne National Laboratory, where he continued to research radiation patterns of uranium and plutonium. After World War II, Reed held several positions outside of nuclear chemistry, turning his eyes to the stars. From 1972 to 1980, he was on the lunar sample planning team with the National Aeronautics and Space Administration (NASA). This team of scientists analyzed lunar rock brought back from the recent NASA missions. Reed used a nuclear reactor to determine that the lunar rock contained minerals not found on Earth.



George Warren Reed, chemist at the Met Lab at the University of Chicago. (Image courtesy the George Warren Reed Collection, Atomic Heritage Foundation.)

Over the course of his career, Reed would go on to publish over 120 scientific papers, and for his work on the space program, Reed was the recipient of NASA's Exceptional Scientific Achievement Medal. In 2006, Reed's son, Mark Morrison-

Reed, interviewed him about family life, his work on the Manhattan Project, the riots after the assassination of Martin Luther King Jr., and his position at Argonne National Laboratory. [The interview](#) was graciously donated by Morrison-Reed to the Atomic Heritage Foundation. Reed passed away at the age of 94 on Aug. 31, 2015.

Approximately 300 miles away from Wilkins' and Reed's work at the Met Lab, a research physicist named Carolyn B. Parker was busy at work on the Dayton Project, conducting Manhattan Project work focused on the radioactive element polonium. In 1938, Parker earned her bachelor's from Fisk University, where she later became an assistant professor in physics. After her undergraduate studies, she went on to earn a master's degree in mathematics from University of Michigan in 1941, prior to joining the Dayton Project in Ohio.

Parker was only in her twenties when she was recruited for her mathematical and scientific skills to work as a research physicist. In 1943, Parker's team was tasked with separating

and purifying polonium, the element that was used as the initiator for the fission chain reaction in the atomic bomb and early atomic weapons. The work of Parker's team contributed to the development of the initiator used in the Trinity Test in New Mexico in July 1945 and in the Fat Man device that was dropped on Nagasaki later in 1945.

Parker's research on polonium would continue after the end of World War II at the [AEC Mound Laboratory](#), established to consolidate and to continue the polonium-related work being done at the Dayton Project locations. Parker continued her work as a research physicist for aircraft research and construction at Wright Field in Dayton, Ohio, before taking a position as a professor at her alma mater, Fisk University.



Carolyn B. Parker, research physicist for the Dayton Project.

In 1951, she entered the Massachusetts Institute of Technology (MIT) physics graduate program where she earned a second master's degree in 1953. She is considered the first African American woman known to earn a postgraduate degree in physics, as well as the first African American to earn a postgraduate degree in physics at MIT. During her Ph.D. studies, she was employed by the Air Force Cambridge Research Center in Cambridge, Massachusetts, a leading research laboratory.

Despite finishing the coursework for her Ph.D. in physics, leukemia prevented Parker from completing her doctoral program. In 2008, the National Institute for Occupational Safety and Health determined that leukemia was an occupational risk of working with polonium, the likely cause of Parker's illness. She passed away at the age of 48 on March 3, 1966.

Without the groundbreaking contributions of Wilkins and Reed at the Met Lab and Parker with the Dayton Project, the Manhattan Project would not have achieved success in the timeframe necessary to secure the end of World War II. Without the continued scientific achievements of these individuals, modern nuclear science, space exploration, and aviation would not look the same. This Black History Month, LM honors and celebrates the lives of these extraordinary contributors to the Manhattan Project and beyond. ✨



Superfund Turns 40

On Dec. 11, 1980, Congress enacted the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Commonly known as Superfund, CERCLA authorizes the federal government to respond directly to contamination that may endanger public health or the environment. The U.S. Environmental Protection Agency (EPA) Superfund program works to clean up sites placed on the National Priorities List (NPL) so that they can be safely reused for the benefit of communities.

The U.S. Department of Energy (DOE) Office of Legacy Management (LM) has seven sites managed in accordance with CERCLA regulations. These sites are a testament to Superfund's success in protecting human health and the environment.

LM's Fernald Preserve, Ohio, Site was once the location of the former Feed Materials Production Center, a uranium-processing facility that produced high-purity uranium metal products during the Cold War. Comprehensive environmental remediation of the site was completed (except for ongoing groundwater remediation) in 2006 at a cost of \$4.4 billion. At the time, this cleanup was one of the largest environmental cleanup operations ever undertaken in U.S. history. The 1,050-acre Fernald site has now come full circle, offering a visitors center, a 7-mile network of trails and habitat for over 200 different species of birds. In 2019, EPA awarded the Fernald Preserve with a National Federal Facility Excellence in Site Reuse Award in recognition of its success.

The Weldon Spring Site in Missouri was the location of an ordnance works during World War II and then a uranium feed materials plant during the early Cold War. Remedial activities concluded in 2001 with completion of the site's disposal

cell — a 41-acre engineered structure designed to contain the site's waste that resulted from the cleanup. Visitors can climb to the top of the disposal cell to take in the view of the surrounding 150-acre, native prairie, or they can stay at ground level and enjoy the interpretive center and hiking and biking trails. In 2020, EPA awarded Weldon Spring Site with a National Federal Facility Excellence in Site Reuse Award in recognition of its remarkable transformation.

The Rocky Flats Site in Colorado was once the location of a large industrial plant that manufactured nuclear weapons components during the Cold War. In October 2005, DOE and its contractor completed an accelerated 10-year, \$7 billion cleanup, that included the decommissioning, decontamination, demolishing, and removal of more than 800 structures, including six plutonium-processing and fabrication building complexes. Today, the former security buffer zone of the site is open to the public as the Rocky Flats National Wildlife Refuge.

The Mound, Ohio, Site, which operated from 1948 to 2003 as part of the U.S. Atomic Energy Commission and later under DOE, was built to continue Dayton, Ohio, Manhattan Project work on polonium-beryllium initiators, used in early atomic weapons. The city of Miamisburg chartered the Mound Development Corporation (MDC), formerly the Miamisburg Mound Community Improvement Corporation, to transition the site for beneficial reuse as the Mound Business Park. During site cleanup, DOE supported MDC economic development efforts with grants and early transition of property.

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Remediation at the Fernald Preserve site in Ohio was conducted in accordance with CERCLA regulations.

Superfund Turns 40



Top: The former Rocky Flats Plant in Colorado was added to the National Priorities List in 1989, because site operations released materials defined as hazardous substances, contaminants, and pollutants by CERCLA. Bottom: The Weldon Spring Site in Missouri is one of the seven LM sites managed under CERCLA.

LM's other CERCLA sites each have their own unique stories and accomplishments:

- LM manages project records pertaining to the remediation activities of the Maxey Flats, Kentucky, Disposal Site, which is owned by the commonwealth of Kentucky.
- In 2000, DOE transferred ownership of approximately 380 acres of land at the remediated Monticello, Utah, Processing Site, through the Federal Lands to Parks Program, for permanent use as a public park and recreation area.
- Research activities at the former Laboratory for Energy-Related Health Research, California, Site — located at the University of California, Davis — generated radiological and non-radiological wastes that were disposed of on-site. All buildings have been decontaminated and decommissioned, and a soil management plan is in use to ensure the safe, continued use by the university of their south campus facilities.

Prior to joining LM, Environmental Team 2 Supervisor Gwen Hooten served as an EPA remedial project manager. Hooten was awarded the Bronze Medal and recognized as a member of the Superfund Team of the Year during her tenure with EPA and was an original member of the EPA Remedy Review Board.

"I'm especially proud to see LM's CERCLA sites put to good use," said Hooten. "I've seen how important Superfund has been in keeping communities safe."

Learn more about CERCLA and LM's CERCLA sites at [Legacy Site Programmatic Framework](#). ❖ ❖

Be Environmentally Conscious

LM is continually seeking opportunities to protect the environment and conserve natural resources. One simple step we can take toward improving environmental consciousness is to distribute the *Program Update* newsletter by email instead of sending a printed copy.

Please send your email address and your first and last names to LM-ProgramUpdate@lm.doe.gov so that we can update our database.

Thank you for your assistance.





LM Provides Colorado Mesa University Students with STEM Opportunities

Three environmental science undergraduate students at Colorado Mesa University (CMU) in Grand Junction, Colorado, presented their senior capstone project to U.S. Department of Energy (DOE) Office of Legacy Management (LM) officials in December 2020, including LM Director Carmelo Melendez and Deputy Director Peter O'Konski.

Bill Frazier, site manager of LM's Grand Junction, Colorado, Disposal Site (GJDS), introduced the students — Ben DeNardo, Micah Hightower, and Sara Jurca. The three conducted research throughout their fall semester on the regulatory guidance governing the closure of the GJDS and LM requirements for site closure.

GJDS currently holds 4.5 million cubic yards of contaminated material and has room to hold an additional 230,000 cubic yards under the Uranium Mill Tailings Radiation Control Act (UMTRCA). GJDS was previously approved to remain open until capacity is reached or until 2023, whichever comes first. As part of the 2020 omnibus spending bill, an extension was approved and GJDS is now scheduled for closure in 2031.

"While legislation approved on Dec. 27, 2020, extended the disposal cell closure until 2031, the findings of the research project will remain a relevant and valuable resource as LM continues closure plans focused on the new date," said Frazier.

LM's existing relationship with CMU opened the door for the capstone project, when CMU approached Kirk Roemer, LM Strategic Partner (LMSP) contractor and GJDS site lead, with 2023, LM staff tasked the CMU capstone students with a

complex set of questions: "What is required for closure of the GJDS? Does LM need a closure plan according to U.S. Nuclear Regulatory Commission (NRC) guidance, or are the current LM documents — including the Interim Long-Term Surveillance Plan, Site Completion Report, and Final Design Plan — sufficient?"

Freddy Witarsa, an assistant professor of environmental science and technology at CMU and the advising professor on the capstone project, was excited to see his students begin to utilize all they've learned in his classes.

"The project allowed the students to apply skills that they were taught during their undergraduate careers and allowed them to do so in a way that is impactful," said Witarsa.

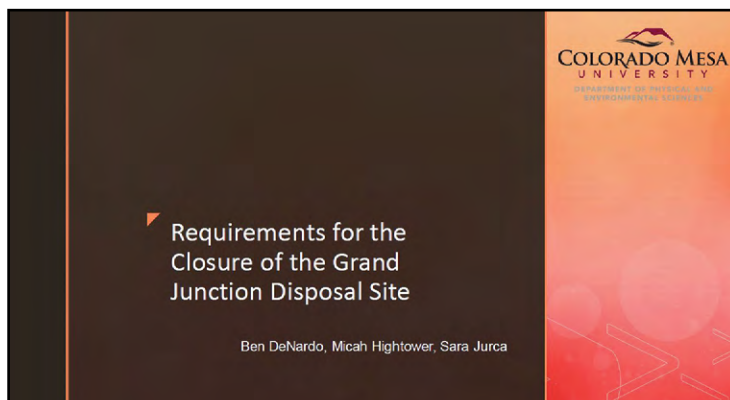
An easing of COVID-19 restrictions in early fall allowed the small group of students to tour the site in-person, while the rest of their research was conducted online. They met with Frazier, Roemer, and LMSP environmental engineer Paul Wetherstein biweekly, as they researched the regulatory guidance and gained valuable insight from the GJDS Team. The students ultimately concluded that a closure plan is not required by NRC. However, they also determined that the plan may be a useful document for internal use and could assist with planning procedures and timelines necessary to meet NRC requirements in the future.

CMU student Ben DeNardo expressed gratitude for the opportunity to engage in practical work with LM.

"It has been a pleasure working with everyone, and we learned a ton about how laws are put into practice and how legal guidance is interpreted," said DeNardo.

This gratitude was reciprocated by Frazier, who emphasized the value added to LM by the work of the CMU students.

"The capstone senior student project was a great opportunity for both DOE and students to engage in solving a real-world problem," Frazier said. "As we all know, solutions to real-world problems are difficult and sometimes uncertain. But these extraordinary students were eager to learn and willing to do the work. Their research and recommendations helped identify the problem for government decisionmakers and stakeholders. They did a wonderful job and I truly believe in their success in the future."



Over the course of the fall 2020 semester, CMU students researched closure guidelines and procedures to provide LM with a recommendation for the GJDS.

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LM Provides Colorado Mesa University Students with STEM Opportunities

The successful completion of the capstone project, which included a well-attended final presentation, is just the latest in many successful collaborations between the LM office in Grand Junction and CMU students.

In the fall 2019, staff from the Atomic Legacy Cabin (ALC) at the Grand Junction office and a group of students in Steven Schulte's public history course at CMU collaborated to create a temporary exhibit for display in the interpretive center. The display, "Atomic Pop Culture," showcases the role of nuclear science and its influence on American culture from the 1950s to the present through interpretive panels and multiple artifacts (e.g., games, comic books, and dinnerware). The exhibit is currently on display at the Tomlinson Library at CMU.

An internship with LMSP brought 2019 CMU graduate Ashton Peterhans' talents to the ALC. Peterhans contributed greatly to the completion of the exhibits in the ALC and its ribbon-cutting ceremony. She has since been rehired as an interpretive specialist for LMSP.

These collaborative CMU and LM success stories are a part of the LM goal of engaging stakeholders in the communities where the office's sites are located. ✨



LM Director Carmelo Melendez, LM Deputy Director Peter O'Konski, LM Site Manager Bill Frazier, and UMRCA Supervisor for LM Paul Kerl listen in as students from Colorado Mesa University present their capstone project.

LM Site Manager Bill Frazier, LM Physical Scientist Sara Woods, and CMU students Sara Jurca and Micah Hightower on-site at the Grand Junction disposal site.





LM's Aviation Program Monitors Sites and Reduces Risk

The U.S. Department of Energy Office of Legacy Management (LM) established its Aviation Program in 2020 to accommodate the growing use of small unmanned aircraft systems for performing long-term surveillance and maintenance at LM sites.

By providing accurate, high-resolution data on site conditions while minimizing risk to field staff, the program supports LM's greater mission of protecting human health and the environment.

"Our site stewardship mission in LM will continue for generations to come," said Deb Steckley, LM Aviation Program manager. "I expect the Aviation Program to prove itself an invaluable tool for providing us with accurate data on site conditions and reducing risk of employee injury, especially in hard-to-access areas and uneven terrain."

The Aviation Program builds on a baseline aerial survey project that LM initiated in 2018, using small unmanned aircraft systems to perform topographic mapping at a handful of Uranium Mill Tailings Radiation Control Act (UMTRCA) disposal sites. The goal of the

project is to establish detailed baseline conditions of the sites, including topography, vegetation, and surface water characteristics. The high-resolution, 3D imagery that resulted is already helping LM enhance long-term surveillance and maintenance activities and remedy potential site issues before they become costly and result in noncompliance.

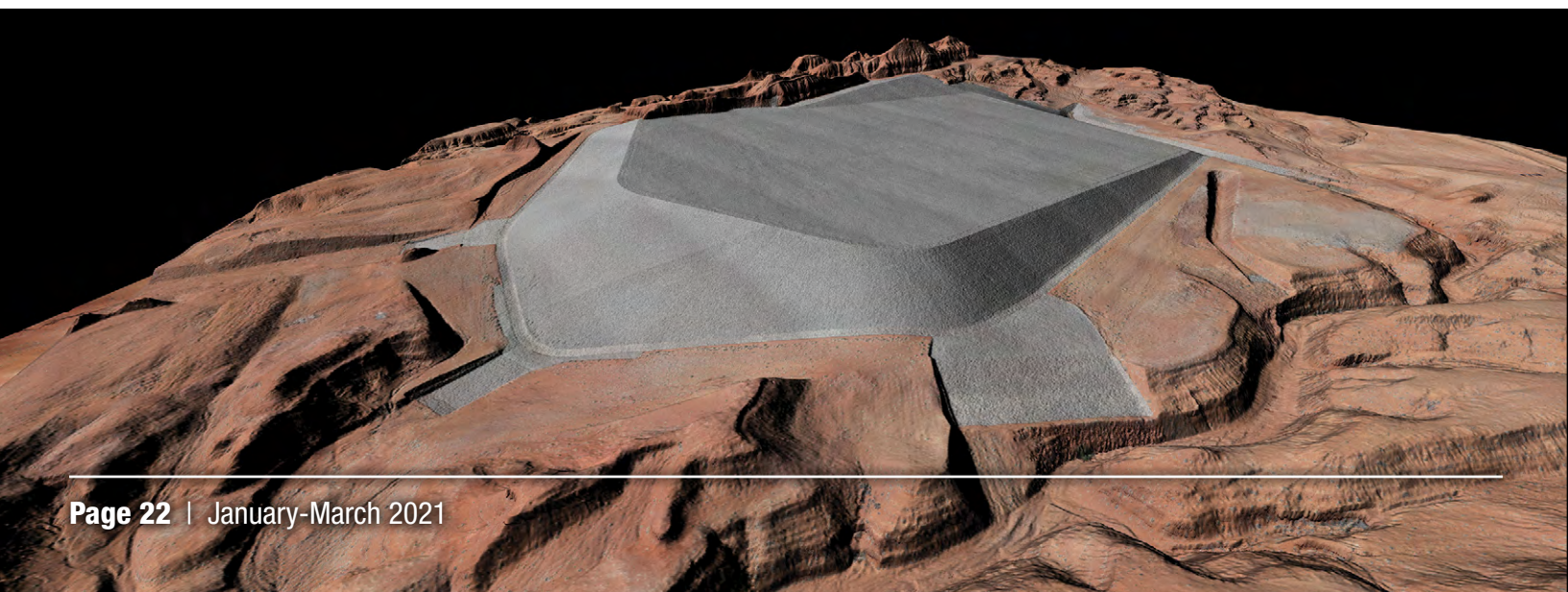
At LM's Mexican Hat, Utah, Disposal Site, the baseline aerial survey helped LM investigate subtle depressions, first identified in 2016, on the northeast side slope of the cell. At the L-Bar, New Mexico, Disposal Site, where erosion surrounding the cell has progressively worsened over time, the survey helped LM develop a 3D model of site conditions and topography to assess the problem. The model was used to brief the U.S. Army Corps of Engineers on the extent of the issue for an upcoming project to repair the erosion and construct additional control structures at L-Bar.

The L-Bar survey also resulted in the development of innovative stakeholder outreach materials, including a physical, 3D site model and a fly-through video. LM has used the model during science, technology, engineering, and math (STEM) events for high school students to demonstrate concepts in environmental science, hydraulics and hydrology, and long-term surveillance and maintenance.

The next steps for LM's Aviation Program are to continue supporting the baseline aerial survey project and collaborate across LM with site managers, GIS specialists, and other technical staff to effectively enhance long-term surveillance and maintenance for generations to come. ✦

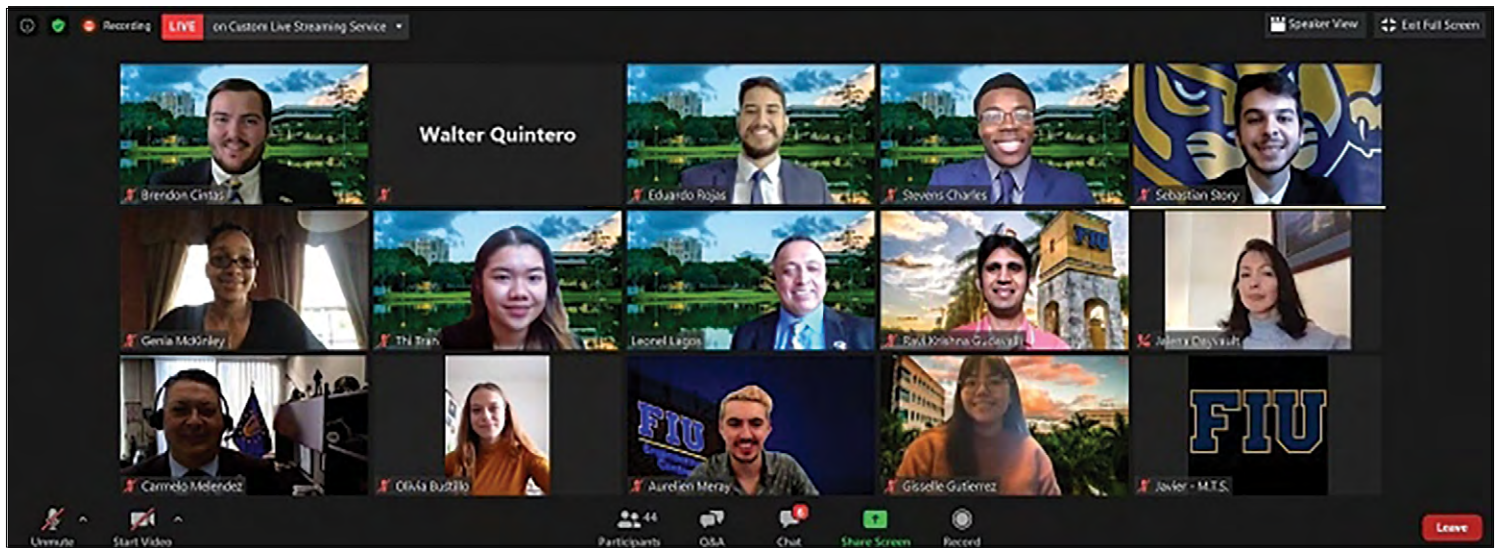


Above: Bill Frazier, site manager for LM's L-Bar, New Mexico, Disposal Site, uses a 3D model of site conditions and topography during a January 2020 briefing with the U.S. Army Corps of Engineers. Below: A digital surface model of LM's Mexican Hat, Utah, Disposal Site combines lidar (laser-based radar) and aerial imagery to generate a 3D surface.





DOE, FIU Welcome New Fellows into Program Shaping Cleanup Workforce



DOE and Florida International University officials recently introduced FIU STEM students as the new DOE Fellows Class of 2020 in a virtual ceremony.

The U.S. Department of Energy (DOE) and Florida International University (FIU) officials recently introduced the DOE Office of Environmental Management (EM) Fellows Class of 2020 — 15 science, technology, engineering, and math (STEM) students inducted into a program intended to shape future candidates for the cleanup workforce.

The FIU students join current fellows in the university's Science & Technology Workforce Development Program, also known as the DOE Fellows program. An additional FIU STEM student was inducted as a DOE Office of Legacy Management (LM) Fellow.

Undergraduate and graduate minority STEM students at FIU are usually welcomed into the program annually in a ceremony hosted at FIU's Modesto Maidique campus. This year, due to health and safety concerns in the wake of the COVID-19 pandemic, the event was held virtually.

The Fellows Program strives to attract, train, and retain the next-generation workforce in nuclear, engineering, science, and construction fields to assist in addressing EM's many long-term scientific and basic research needs and complex cleanup challenges.

Students in the Fellows Program work with DOE scientists and researchers at FIU's Applied Research Center (ARC), which celebrates its 25th anniversary this year, to learn about EM and LM technical areas of need.

In an address during the ceremony, EM Associate Principal Deputy Assistant Secretary for Field Operations Nicole Nelson-Jean reflected

on her experience in a similar mentorship program, which helped steer her on the path to a successful federal government career.

Nelson-Jean stressed the importance of such programs to the environmental missions of EM and LM. She commended the DOE Fellows Program's success stories, highlighting former DOE Fellows hired by DOE and its national laboratories, including EM's Savannah River National Laboratory.

Gisselle Gutierrez-Zuniga, who was inducted into the program last year as an undergraduate student, delivered a message to the new fellows highlighting her personal experience, which she found fulfilling academically and professionally. LM Director Carmelo Melendez delivered the keynote address to the new fellows.

Since its inception in 2007, the Fellows Program has inducted 179 STEM students mentored in research, development, and deployment of new cleanup technologies. Overall, 95% of students who completed the Fellows Program found employment, including three fellows hired by DOE, nine by DOE contractors or national laboratories, 19 hired by other government agencies, and 74 hired by a STEM-related entity.

"FIU continues to train and mentor future leaders," said DOE Fellows Director Dr. Leonel Lagos, the DOE-FIU Cooperative Agreement's principal investigator. "This program provides the opportunity for many first-generation students to complete their degrees at FIU, obtain hands-on research and work experience, and participate in internships across the DOE Complex." ❖



LM Evaluates Site Characteristics to More Efficiently Manage Public Funds

The U.S. Department of Energy Office of Legacy Management (LM) uses a systematic screening process at its 101 sites to help better prioritize resources to ensure management protects human health and the environment, maintains regulatory compliance, addresses stakeholder concerns, and reduces long-term stewardship costs.

LM sites have a wide range of characteristics. Some sites have very low contamination levels, and subsequently low annual stewardship costs. Others have contaminated groundwater that is being actively treated to reduce concentration levels and limit its spread, which have associated maintenance costs. In general, contamination at LM sites is well understood, although there are sites where LM is still investigating sources of remaining contamination. However, some site elements may be less effective or have less certainty than others, which presents different issues or varying levels of concern.

“LM is very good at managing sites on an individual basis,” said Jon Damiano, the LM Quality Assurance program manager. “As we grow, we want to excel as good stewards of taxpayer funding. We decided a systematic analysis would help us more objectively make decisions that optimize use of our resources.”

The decision-making process evaluates key elements that help protect human health, influence how the sites are managed, and directly impact final outcomes. These elements are placed in four categories: 1) potential impacts on human health, 2) stakeholder concerns and input, 3) regulatory impacts and issues, and 4) administrative controls that can help protect human health.

Human Health Impacts – The process screens potential impacts on human health to evaluate whether people could be exposed to unacceptable levels of site-related contamination. This does not mean that people are currently exposed, only that there could be a risk at some time in the future. The ranking for human health also factors in the likelihood that contamination exposures could occur based on site characteristics, probable future site use, and changes in land and water use around LM sites.

Stakeholder Concerns – Stakeholder concerns and input are analyzed to account for the likelihood that the management or cleanup of a given site could be affected or questioned in some way based on input from stakeholders (individuals or organizations). Environmental justice impacts, such as people feeling that issues raised in the past were not addressed, may also increase stakeholder concerns.

“Stakeholder input and education about LM sites are critical to successfully achieving our mission,” Damiano said. “That could include sites where effective communication with stakeholders may require more effort or methods not previously used by LM.”

Regulatory Impacts – Regulatory impacts and issues pertain to final cleanup goals for the site as well as regulatory requirements associated with the site’s long-term surveillance and maintenance. This reflects the likelihood that a site will not attain compliance goals or that compliance will not be maintained into the future. At a few LM sites, there are multiple regulatory authorities involved that may have different regulatory requirements or goals.

Administrative Controls – LM manages numerous sites that contain contaminated materials or media, such as groundwater, that currently exceed a regulatory standard. Administrative controls (also referred to as institutional controls) are the main tool that LM uses to protect human health when unacceptable levels of contamination are found at sites not owned by DOE. The actual or perceived effectiveness of these controls is a factor.

Based on the sites’ characteristics, each of the four categories was assigned a relative rank of very low, low, medium, or high. It is critical to note that these rankings are relative within the LM Program only. Since this is a screening-level evaluation that relies somewhat on judgement and a good understanding of the site conditions, LM developed ranking guidelines to ensure that sites with similar characteristics receive the same rank in each of the four categories. The goal is to sort the sites into similar “bins” to efficiently use the funding available to LM.

After assigning a rank to each of the four categories for each site, LM assigned an overall importance (weighting) to estimate

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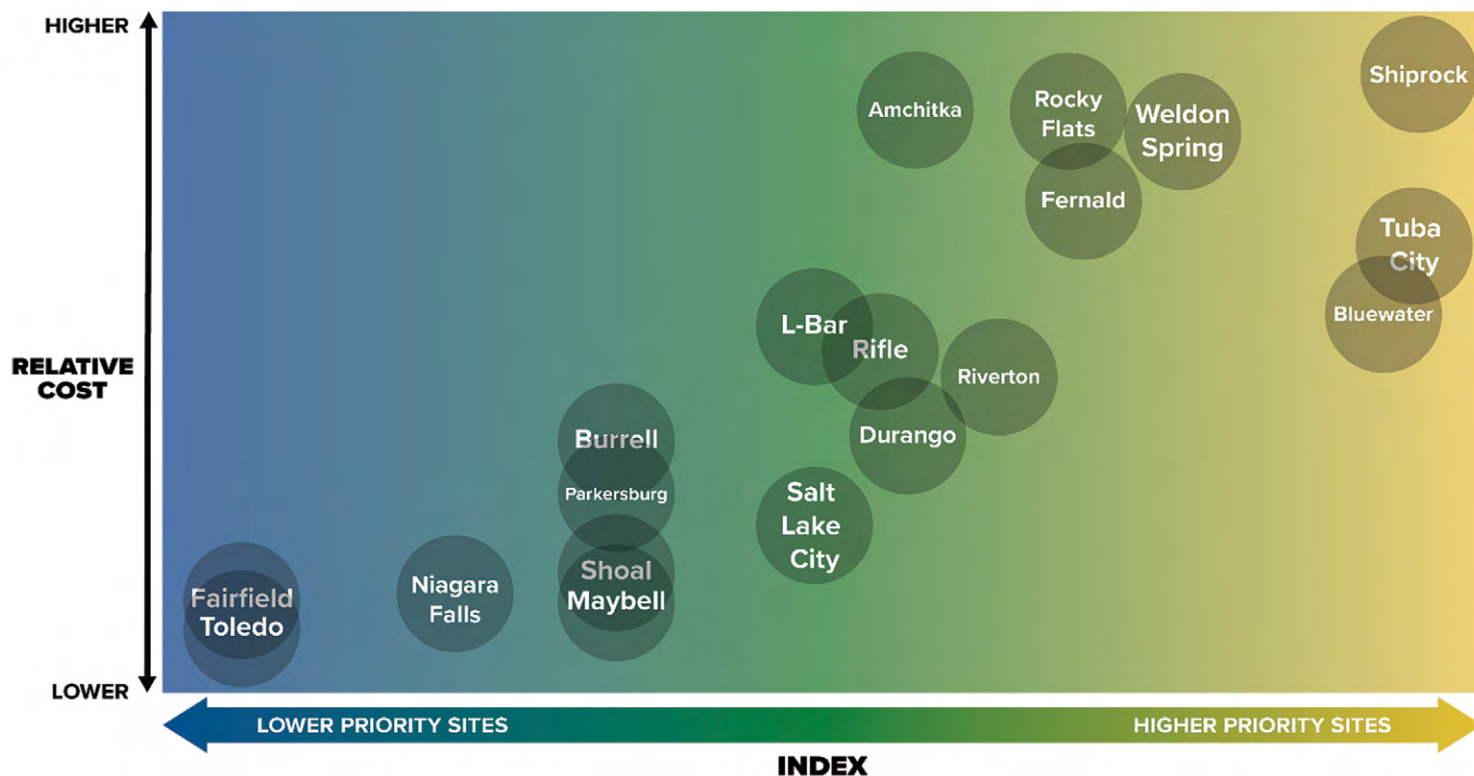
LM Evaluates Site Characteristics to More Efficiently Manage Public Funds

a composite rank for each site. Potential impacts on human health received the highest weight (30%), with the other three categories given a weight of 20%. In addition, a weight of 10% was given to account for the relative complexity of the site, as assigned in the LM Site Management Guide. This composite rank is a major factor in identifying what should clearly be a priority to LM.

This evaluation was completed in 2020, and LM plans to update this information on an annual basis. Overall, LM is effective at protecting human health and managing stakeholder issues and concerns, as well as regulatory impacts and issues and the

use of administrative controls. However, some sites need more attention due to potential issues compared to others, which was the major consideration in this evaluation.

The figure below shows this relative range of LM priorities based on the analysis by only using the composite rank. This is just a starting point for LM, and many other factors can influence how the site is managed and how the funding is used. In addition, more value may be gained by addressing issues at sites with a lower overall composite rank because they may have one or two issues that can be more easily, and cost effectively addressed compared to the more complex sites. ❖



Lower priority sites have simple stewardship requirements and therefore lower relative costs. Higher priority sites are generally much more complex, often requiring groundwater treatment systems and significant maintenance, and relative stewardship costs are generally much higher.



Coming Full Circle: Sue Smiley's 30 Years of Service to DOE

For Sue Smiley, concluding her career with the U.S. Department of Energy (DOE) at the Office of Legacy Management (LM) Fernald Preserve and Mound sites in Ohio is a sign that her work in the field of environmental remediation has come full circle.



Above: Smiley grins from ear to ear with excitement about her upcoming retirement. Below: Smiley and her horse Ginger ready for a ride.



During Smiley's 30 years at DOE, she became an expert on site closure, environmental cleanup design and execution, and long-term surveillance and maintenance (LTS&M) remedies. She holds a master's degree in environmental science, with a concentration in applied ecology, and a bachelor's degree in zoology — both degrees from Miami University. She is also a certified project management professional and a registered environmental manager.

A graduate school internship at the Davis-Besse Nuclear Power Station in Ohio turned into a full-time job. Smiley used the opportunity as a stepping stone to join DOE in 1990 as an environmental compliance specialist at Mound Laboratory during Defense Program operations.

Smiley subsequently followed her supervisor to the DOE Office of Environmental Management (EM), Fernald Field Office, where she supported quality assurance and federal oversight during the early days of the Fernald cleanup. She then returned to Mound as the site transition manager of the Miamisburg Closure Project. Later, she moved to the newly formed Ohio Field Office as lead environmental compliance specialist and the site transition manager for the Fernald, Mound, Columbus, and Ashtabula sites in Ohio.

After cleanup was substantially completed at the Ohio Closure Sites, Smiley moved to the EM Consolidated Business Center in Cincinnati, where she continued to support site transition planning for Ohio and Rocky Flats closure sites, several DOE national laboratories, and EM "small sites," such as Moab, Utah. Her tenure and expertise in site transitions eventually brought her to her final role with DOE in 2016, when she became the site manager for both the Fernald Preserve and Mound sites. In addition, she served as an LM expert on planning for transitioning sites.

To young professionals looking to build a career in environmental remediation, Smiley recommends a well-rounded, team-focused approach.

"Having a strong technical background is only one component of being a competent site manager," Smiley said. "It's also important to understand and recognize the value of work performed by others, often operating behind the scenes on the team."

Smiley's for her fellow team members will remain one of her favorite memories of her time with DOE.

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Coming Full Circle: Sue Smiley's 30 Years of Service to DOE

Colleagues and coworkers from across LM attended Smiley's virtual retirement ceremony in December 2020 with the presentation of a retirement card signed by past and present employees. Smiley received a DOE Distinguished Service Award, the highest of the three retirement award designations for federal employees, in deep appreciation of the competency and technical skills she displayed over the course of her career. Colleagues shared well wishes, fond memories, and congratulations, as Smiley received handmade gifts and mementos of her time spent at the Fernald Preserve and Mound sites.

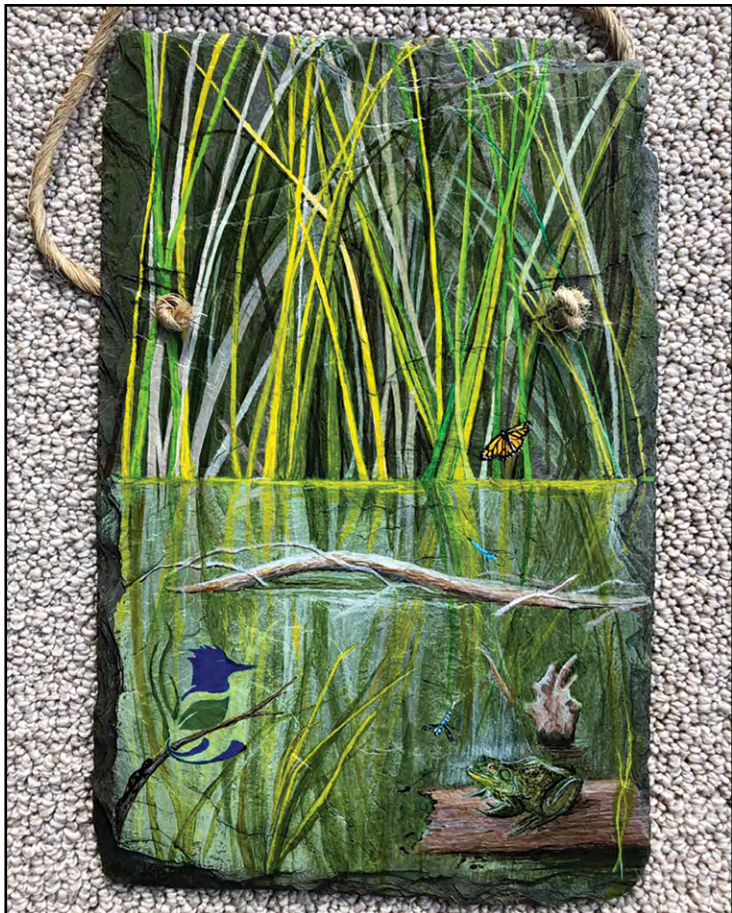
"The focus was always on ensuring the privately owned Mound Business Park continued to flourish and attract new businesses," Smiley said.

Smiley was also instrumental in the design and 2018 startup of the Mound Cold War Discovery Center, an interpretive center at the Mound site designated to maintain the legacy of the former Mound Laboratory and its workers through the production era, environmental cleanup, and present-day LTS&M.

Speaking about her five years spent at the Fernald Preserve, Smiley makes special mention of both the Fernald Residents for



Sue Smiley's Distinguished Service Award from DOE.



A hand-painted slate, gifted to Smiley, depicting a scene from one of Fernald Preserve's award-winning, restored wetland habitats.

Environment, Safety & Health (FRESH) and the Fernald Community Alliance (FCA) stakeholder groups.

"I was amazed at the dedication and enthusiasm those individuals brought to the table — continuing to keep an eye on DOE activities at the Fernald Preserve, but also serving as advocates and educators about the site when questions arose regarding the environmental cleanup or long-term stewardship," Smiley said.

In the absence of managing day-to-day site management tasks, Smiley intends to spend her newfound free time enjoying her many hobbies. Whether she's going for a leisurely horseback ride, getting her hands dirty in the garden, or painting watercolors, Smiley certainly will not find herself with a shortage of enjoyable ways to fill her days. In fact, she has already made plans to return to Fernald Preserve to hike some of the site's 7 miles of nature trails — this time as a nature enthusiast instead of as the DOE site manager. ✨



LM Program Manager Art Kleinrath Celebrates a Long Career at DOE



Kleinrath's colleagues held a socially distanced car parade in his honor at the Grand Junction office site.

When Art Kleinrath retired from the U.S. Department of Energy (DOE) Office of Legacy Management (LM) on Jan. 29, the office bid farewell to one of its original founders.

Kleinrath spent 30 years with DOE, beginning with the former Mound Laboratory (now LM's Mound, Ohio, Site) under the Defense Production Environmental Restoration Program. After his success on the Mound cleanup resulted in a restoration approach applicable to other sites, Kleinrath was asked in 2000 to create a new program from scratch in Grand Junction, Colorado, for managing Uranium Mill Tailings Radiation Control Act (UMTRCA) sites. In 2003, LM was born.

"I've been here since day one," Kleinrath said. "The names and structures change, but the mission has remained the same over the years."

Kleinrath said that he's especially proud of being part of formalizing the transition process for UMTRCA sites as they move from the cleanup phase into LM for long-term stewardship.

"I did a lot of things for which there was no guidance, and I just had to step in and create a process," he said. "The great thing about working here is the trust I've gotten to allow me to work on projects that have no handbook. I've appreciated that trust from my bosses and all the people I've worked with at DOE."

Kleinrath said that he'll miss the people most.

"My biggest pride has been working with our site operations team, helping staff join the group and become excellent managers."

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LM Program Manager Art Kleinrath Celebrates a Long Career at DOE

His advice for his early and mid-career colleagues is to be bold when looking at new information and deciding how to move forward.

“Don’t be scared to step out into new territory,” he said. “It’s okay to have a less-than-perfect plan, but just have a ‘Plan B’ in case it goes wrong.”

In his retirement, Kleinrath looks forward to riding his Suzuki Burgman 400 scooter to visit friends and former colleagues around the country, camping along the way. He also wants to explore yoga and tai chi.

On Jan. 21, Kleinrath’s LM colleagues held a socially distanced car parade in his honor at the Grand Junction office site. ♦



At his retirement party, Site Manager Mark Kautsky presented Art Kleinrath with a framed picture of LM's Grand Junction office signed by Kleinrath's colleagues.



Annual Joint Meeting Strengthens LM and USACE Collaboration

The annual Formerly Utilized Sites Remedial Action Program (FUSRAP) Joint Meeting provides an opportunity for the U.S. Army Corps of Engineers (USACE) and the U.S. Department of Energy Office of Legacy Management (LM) to review accomplishments, discuss the progress of ongoing work, and strategically map out the future of FUSRAP.

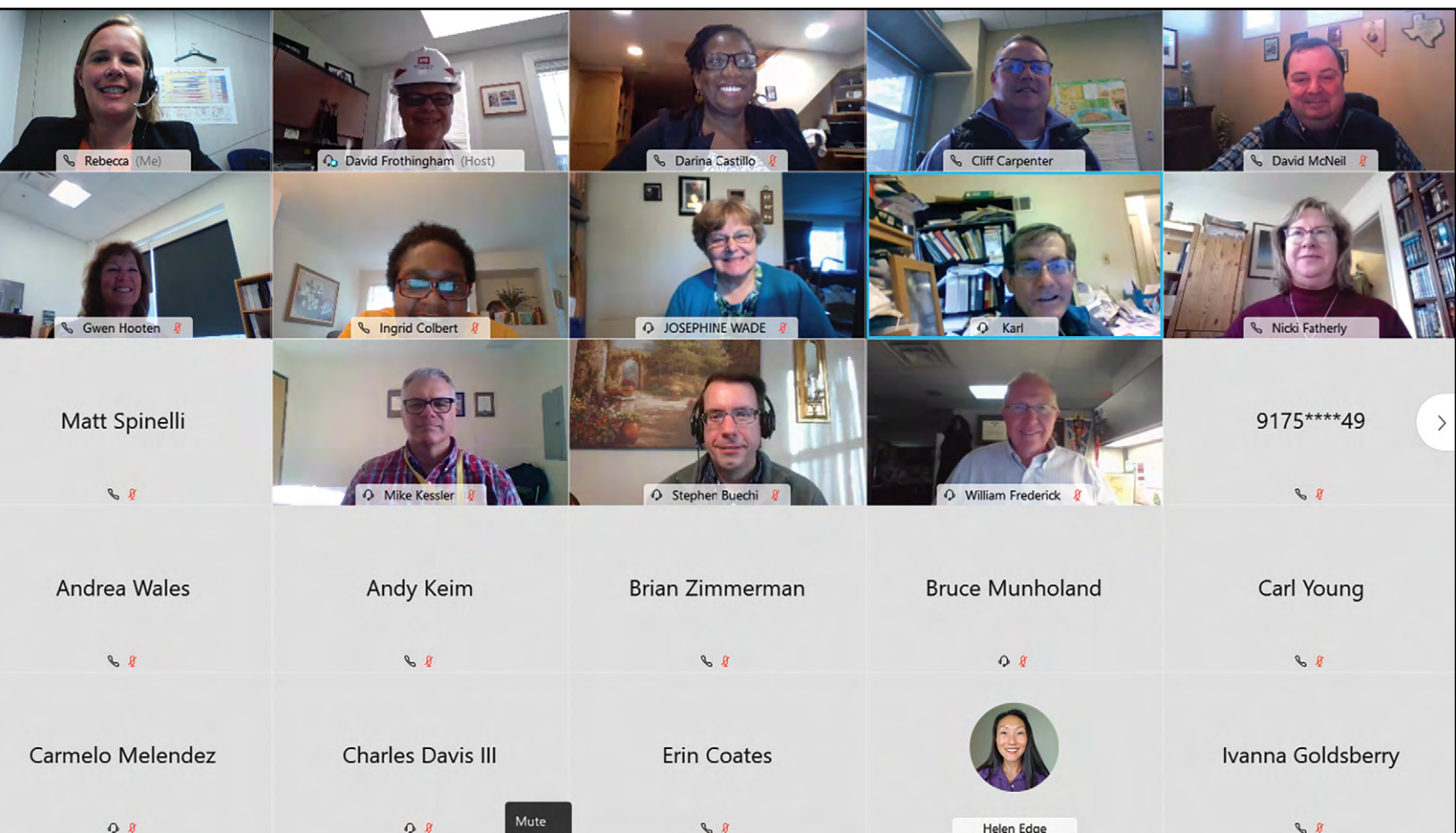
Due to ongoing COVID-19 precautions, USACE and LM virtually hosted the fifth annual FUSRAP Joint Meeting on Nov. 17-18, 2020.

“Meetings like this have proven their value, not only to us but to our stakeholders and to the American taxpayer,” LM Director Carmelo Melendez said. “The annual meetings help streamline the process of transferring sites from USACE to LM for long-term surveillance and maintenance, thereby minimizing transition costs. LM has already seen a 60% reduction in forecasted long-term stewardship environmental liabilities in FUSRAP over the past four years.”

FUSRAP was established in 1974 to identify and clean up sites that supported the Manhattan Project during World War II and the U.S. Atomic Energy Commission during the Cold War. In 1997, Congress transferred management of FUSRAP to USACE, which is responsible for remediating FUSRAP sites before transferring them to LM for long-term stewardship.

USACE FUSRAP National Program Manager Nicki Fatherly presented on USACE personnel and leadership changes as well as budget updates before showcasing the recent successes of the program. She noted the continued progress USACE has been able to make on active sites despite COVID-19. USACE FUSRAP National Program Action Officer Ivanna Goldsberry and USACE project managers provided briefings on sites that are scheduled to transfer to LM within the next five years.

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A virtual group photo from the Fifth Annual USACE and FUSRAP Joint Meeting.

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Annual Joint Meeting Strengthens LM and USACE Collaboration

Meeting participants also discussed interagency working groups, which have proven invaluable in ensuring a common approach in executing FUSRAP. The Records and Data Management Working Group is finalizing its recommendations to streamline the transfer of records and environmental data from USACE to LM, with the aim of improving stakeholder responsiveness and reducing costs.

The newest working group, the Inaccessible Soils Working Group, will be stood up in 2021 and will identify sites that may have quantities of inaccessible soils remaining upon transfer and determine the associated methods of long-term stewardship and maintenance needed by LM.

“USACE and LM have made great progress over the past five years,” said LM Environmental Team 2 Lead Gwen Hooten. “I’m proud of the accomplishments that we have made together, and I’m looking forward to continued successes.”

In the year to come, USACE and LM will continue the close collaboration that has become a hallmark of the success of FUSRAP. Learn more about [the transferred FUSRAP sites in LM’s portfolio](#) and how USACE continues to remediate [active FUSRAP sites](#). ❖



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