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systems and disposal

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HAZARDOUS WASTE
FROM THE BAY TO THE BARGE
LANDFILL MINING IN FLORIDA
and MORE**

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Rural Community Assistance Partnership

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ceo letter

As we continue to look ahead to the future of work for RCAP, we must always take a moment and reflect on our many successes. The ongoing efforts to support rural communities in strengthening their solid waste infrastructure and management systems is only possible because of a small but incredibly dedicated group of TAPs whose passion and mission are grounded in a commitment to environmental stewardship, public health, and long-term community sustainability.

Most recently, we were honored to receive funding from the U.S. Department of Agriculture to expand our solid waste technical assistance programming. This \$914,113.17 award will enable us to continue supporting rural towns throughout the United States. Our Solid Waste program offers direct, on-the-ground assistance to communities seeking to:

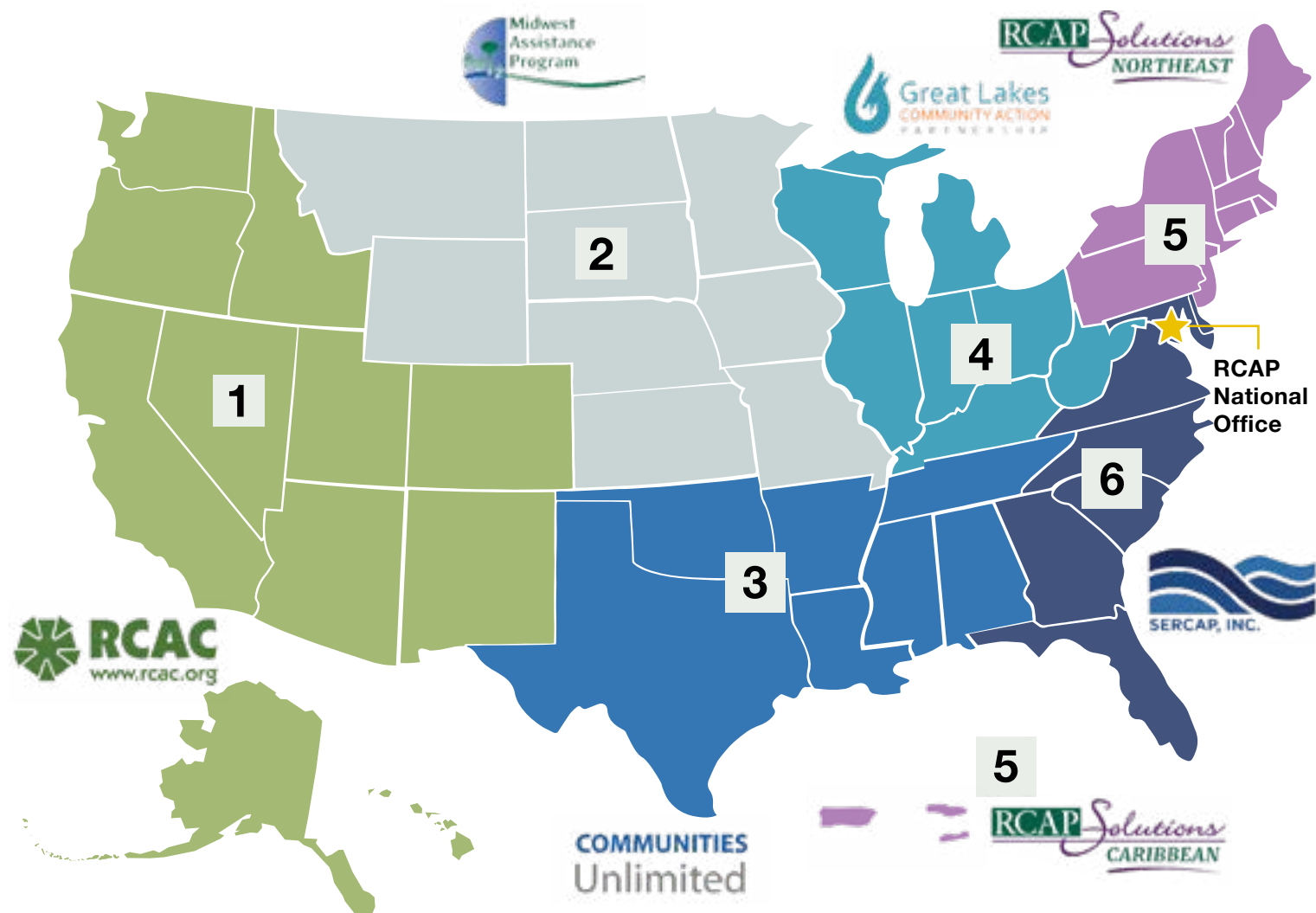
- improve or establish local or regional waste management plans;
- identify cost-effective solutions for waste collection, disposal, and recycling;
- comply with state and federal regulations;
- access additional funding opportunities and partnerships;
- help local agencies support the protection of source waters; and/or
- aid with post-disaster debris management.

With each engagement, we prioritize community-driven solutions tailored to local needs. We work closely with utility boards, municipal leaders, public works staff, and community stakeholders to ensure that proposed improvements are both practical and sustainable.

This work builds on our longstanding mission to deliver high-quality technical, managerial, and financial assistance to underserved rural and Tribal communities across the country. We are grateful for the continued trust placed in us by our partners and funders, and we remain committed to supporting communities in building resilient and environmentally responsible solid waste systems.

Sincerely,

Olga Morales Pate
Chief Executive Officer, RCAP



Rural Community Assistance Partnership

The Rural Community Assistance Partnership (RCAP) is a national network of nonprofit partners with over 350 technical assistance providers across the country. RCAP works to improve the quality of life in rural America starting at the tap.

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**“Thousands have
lived without
love, not one
without water.”**

W. H. Auden

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RURAL ROUND-UP

RCAP has submitted a comment letter in response to USDA's reorganization plan announced in Secretary's Memorandum 1078-015 on July 24, 2025. The plan seeks to consolidate and streamline USDA operations by aligning its workforce with available resources, relocating staff outside of Washington, D.C. into five regional hubs, reducing management layers, and consolidating support functions. USDA states the goals are to enhance efficiency, reduce costs, and bring the Department closer to the communities it serves.

In its letter, RCAP emphasized that while efficiency is important, the success of this effort will be measured by how well USDA continues to serve rural communities. RCAP urged the Department to prioritize maintaining a strong local presence, given that many county offices are already understaffed or operating with minimal personnel. Key recommendations included conducting a comprehensive staffing assessment before relocations or consolidations, committing to backfill vacant positions prior to changes, ensuring continuity of services with clear timelines, and integrating the new hubs in ways that strengthen rather than replace field-level services.

RCAP reiterated its commitment to partnering with USDA throughout the process and stressed that reorganization should ultimately enhance support for rural communities that rely on these essential services.

Training Calendar



RCAP hosts free webinars on topics ranging from capacity building to wastewater treatment. **Sign up for an upcoming webinar here!**



RCAP has a YouTube channel with a variety of microlearning videos. Check them out here!



RECENT WINS and Happenings

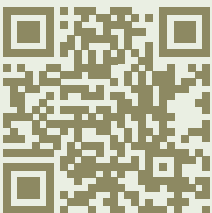
Check out the story
of Alborada,
Puerto Rico



RCAP has been working with RCAP Solutions, Puerto Rico, to finalize our final community video of 2025, which is funded under RCAP's EPA Environmental Finance Center (EFC) grant. This story takes place in the neighborhood community of Alborada, Puerto Rico, which consists of 168 residents. During 2007, there was a large growth in community members, which led to the houses being installed with onsite septic systems. Shortly after the installation, several residents started experiencing issues with wastewater backing up into their homes and yards, which caused some to have to leave their homes. It was determined that the soil in this area could not filter the wastewater. The community has struggled for over 20 years of trying to resolve the issues with its wastewater system. Recently, it was determined that the best option would be to try and connect to a local Puerto Rico Aqueduct and Sewer Authority (PRASA) system, which is a government-owned corporation. This video shows how RCAP is helping them work towards regionalization to eliminate their wastewater issues.



Check out out
RCAP's Annual
Impact Report



rcap.org/our-impact

RCAP has released its Annual Impact Report for Fiscal Year 2024. You can check it out on the website (rcap.org/our-impact), where you can find the link to the StoryMap. Thank you to everyone who contributed to creating this report and to all of the regions that completed the amazing work in FY24!

Some key statistics from the report include:

- more than 3.3 million rural and tribal residents served
- 1,833 communities served
- over \$448 million of infrastructure funds were leveraged by communities with RCAP's assistance
- all 50 states, five territories, and two freely associated states served.





Community Perception vs. Reality

Understanding debris management challenges in Barrio Collores.

Edwin Vazquez-Asencio, Sustainable Materials Management Specialist, RCAP Solutions, Inc., Puerto Rico

This article was funded under RCAP's USDA Solid Waste 24–25 grant.



Several years after RCAP Solutions (RSOL) first worked in Barrio Collores, Juana Díaz, Puerto Rico, community leaders reached out to RSOL with a new concern. During the initial engagement, RSOL supported the community by eliminating illegal dumping sites, providing environmental education, coordinating stakeholder efforts, and acting as a liaison between residents, municipal authorities, and other partners.

Even after the formal project had concluded with the community, RSOL had maintained regular communication with local leaders to support their efforts in keeping the area clean and upholding their knowledge of best practices. RSOL had also assisted during post-disaster cleanup efforts following major events—including hurricanes Irma and María in 2017, subsequent storms, and earthquakes—which all contributed to ongoing waste management challenges. During the COVID-19 pandemic, remote education and webinars through the RSOL online learning platform continued this relationship.

Despite their ongoing efforts, community leaders noticed river flooding events carrying waste downstream. They believed this was due to accumulated debris from recent disasters and an increase in household waste generated during the pandemic. The leaders suspected the problem stemmed from materials in areas not addressed by the Federal Emergency Management Agency (FEMA), often because the debris did not affect public infrastructure or pose immediate danger based on the agency's criteria. As a result, they believed this waste had been left behind during initial disaster response operations.

Empowering Action Through Intergenerational Collaboration

Barrio Collores is located in Juana Díaz, a town located east of Ponce on the southern coast of the island. The RSOL-served community has a population of 613 people, and with a median household income of just \$11,342, over 90% of residents qualify as low-income. The Guayo River plays a critical role in the area as a drinking water source for communities in the highlands of Collores. Two wells near the river also serve neighboring areas. Although there is no indication that the wells are influenced by surface water, their proximity heightened residents' concerns about contamination.

Many Collores residents are elderly, which creates an added challenge for physically demanding community activities such as riverwalk assessments or manual debris removal. These activities are important to identify the composition and source of waste found in the river.

To address this, RSOL enlisted the help of environmental science students from local universities. Their participation not only supported data collection but also fostered connections between future professionals and the community they may one day serve. This collaborative effort provided both practical experience and valuable insight into rural environmental challenges.

Collaborative Assessment and Community-Led Solutions

What caused the problem—and how serious was it? After interviewing community leaders, RSOL conducted

direct outreach to residents along the riverbanks to better understand their perceptions. A sample area between two community bridges was studied, and the materials discovered told a different story from what was expected.

While residents believed the debris had remained since the 2017 hurricanes, a technical assistance provider (TAP) found evidence of ongoing dumping activity. Some of the materials appeared to come from local residents—possibly with the belief they could reuse them as fill for home foundations. This misunderstanding led to informal construction using unprocessed debris, which increases vulnerability to future disasters.

It's a common misconception in small rural communities to equate reuse with recycling. Proper recycling of construction and demolition materials involves processes that ensure uniform size and stability—measures not taken in informal construction. One case involved the use of bulky discarded items to fill a natural depression in the soil, disregarding material safety or suitability.

Community leaders were initially confident that their river had remained free from new waste due to past successes with RSOL-led cleanups. However, during site visits, it became clear that illegal dumping persisted. The TAP shared these findings with leaders through photo documentation and guided tours. Confronted with this new reality, they requested educational materials to help raise awareness among residents and other stakeholders.

RSOL and the team began with a targeted assessment of the river, sharing findings with local leaders. To expand the study, a volunteer group—including students from the University of Puerto Rico–Ponce and the Pontifical Catholic University of Puerto Rico—conducted a more in-depth evaluation. Under RSOL guidance, these volunteers helped clean and document the affected areas, offering much-needed physical assistance due to the limited mobility of many community members.

The data collected confirmed that not all debris was disaster-related. Illegal dumping—some of it based on the misconception that waste materials could be used as construction fill—was still occurring.



Measurable Impact and Long-Term Empowerment

RSOL conducted extensive outreach during this process. Educational materials were provided in Spanish, including brochures about the risks of improper waste disposal and contaminants such as PFAS. These resources were distributed through door-to-door campaigns led by community leaders and RSOL.

Nearly half a ton of debris was removed from the river, with all materials properly disposed of. Community engagement was encouraged through proposed cleanups and environmental restoration activities. The project also successfully reconnected the municipality with community leaders, enabling better coordination for debris collection and transportation.

Environmental science students played a vital role—not only contributing labor and data analysis but also learning from residents' experiences. Community leaders, in turn, gained knowledge about environmental risks and better debris management strategies.



“Community education is vital to overcome this problem. The work and materials provided by RSOL have been fundamental to us in addressing this situation. Also, the hands-on support by the TAP has motivated us to take action! They work with facts and data—a powerful tool in our education as a community.”

— ANA CRISTINA APONTE, COMMUNITY LEADER
BARRIO COLLORES, JUANA DÍAZ, PUERTO RICO



Importantly, the perception that all river waste stemmed from past disasters was corrected through evidence-based outreach.

Testing results from the Puerto Rico Department of Health's Drinking Water Division confirmed that water from the Agustinillo Well and nearby sources contained no regulated contaminants. There were no signs of heavy metals, VOCs, pesticides, nitrates or other contaminants identified under the Safe Drinking Water Act. This was excellent news and a powerful motivator for the community to preserve its local water sources.

The municipality responded positively, assisting with the collection of removed debris and supporting cleanup logistics—proof that local government can be a strong ally when community concerns are clearly presented.

Education, Evidence, and Environmental Stewardship

This case in Barrio Collores illustrates the power of education, collaboration, and continuous support in improving debris management in rural communities. The community now has better tools and greater awareness to face ongoing waste challenges. Perhaps most importantly, residents now understand that reusing construction debris requires more than good intentions; it demands proper handling, knowledge, and oversight to prevent future risks. RSOL remains committed to helping communities like Collores build resilience and protect vital resources, like their clean, safe water supply.



Better Management of Household Hazardous Waste

Rethinking household solid waste in small communities.

Monte Kerchal, Nebraska State Field Manager, Midwest Assistance Program, Inc. (MAP)

This article was funded under RCAP's USDA Solid Waste 24–25 grant.

As we move through our busy lives, “trash,” also known as household waste, is not foremost in our minds. For many of us, it was common when we were growing up to “just throw it in the trash.” Those items thrown out without thought may have been batteries, small electronics, plastics, or old medications along with the typical trash like food discard and plastic wrappers.

The improper disposal of household hazardous waste (HHW) can pose a danger to humans and their surroundings by polluting the environment, harming wastewater treatment systems and septic tanks, and even harming sanitation workers. Improper disposal of HHW can range from pouring waste like oils and cleaners on the ground or down the sink drain or toilet to disposing of the containers in the environment. Dumping of solid waste in the outskirts or in open areas of land has created huge open dump sites that pose serious threats to the environment through air pollution and contamination of ground water. Unfortunately, many small communities lack resources for collecting household waste—they may have little to no collection equipment and infrastructure, an inadequate number of bins and bin capacity, or a lack of manpower and technical skills, as well as a high rate of generated waste from households. This lack of capacity often leads to serious challenges in these communities, where improper disposal of domestic waste is common.

Numerous solid waste safety trainings throughout the United States highlight the harshness of some waste products for the environment and how difficult they are to dispose of safely. The way individuals commonly dispose of “everyday” trash without thought is of great concern, as some of the chemicals can be extremely dangerous and toxic.

Countries around the world are also experiencing an influx of per- and polyfluoroalkyl substances (PFAS) emerging in our ground and surface water from our daily household or domestic waste. PFAS comes from a group of synthetic organochlorine chemical compounds used in various products since the 1950s. They are known for their persistence in the environment. You may have heard these referred to as “forever chemicals” due to their inability to break

down naturally in our environment. Through teaching children and the general population about proper disposal of waste and recycling programs, we can start to mitigate some PFAS emergencies, pollution, and dangers from HHW in our environment.

Household waste encompasses various discarded materials that you may not realize cause environmental and safety concerns, not only in daily traditional disposal but also at solid waste collection points. It may be inconvenient to find a location that accepts some of these discarded materials and, unfortunately, many municipal collection points do not exist in smaller communities.

The answers to these frequently asked questions explain how to dispose of some of these items properly in order to not only keep us safe but mitigate dangers to our environment and our landfill and collection point workers.

How can we manage disposal of larger random household items and used clothing?

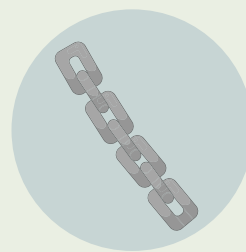
- Check with your city for a fall or spring cleanup week where the sanitation crew can pick up larger household items off your curb.
- Take gently used, clean clothing to a thrift store or have a garage sale.

How can we manage disposal of paper, cardboard, glass, plastic, and metal waste?

- **REUSE** There are so many creative ways to reuse glass, metal, paper scraps, and cardboard.
- **SEPARATE RECYCLING BINS** Use dedicated recycling bins for each type of material to be discarded and ensure they reach the appropriate recycling centers.
- **DROP-OFF CENTERS** If curbside recycling isn't available in your community, search online for a drop-off center or call your city office for your paper, glass, metal, and plastic waste disposal locations. Some grocery stores and chain stores offer plastic bag drop-off bins to discard your unwanted plastic shopping bags. Your state may have a drop-off location resource online.



Waste Paper



Scrap Metal



Waste Glass



Electronic Waste



Waste Plastic



Waste Clothes

Figure 1. Types of household or domestic solid waste.

Examples of common domestic solid waste include

Plastic product packaging waste, cans, toys

Electronics like TVs / computers / toys

Food scraps

Plastics, packing materials

Waste paper, magazines, newspapers, cardboard

Furniture trash, foam, Styrofoam

Batteries

Chemicals such as paint, varnish, oils, and pesticides

Used clothes

Trash from used lamps, lightbulbs, and so on

Medications

Tip!

Try using reusable shopping bags like fabric totes.

Tip!

Most product labels have disposal directions for you to follow.

How do we manage disposal of Hazardous Household Waste (HHW) like paint, cleaners, pesticides, and unused medications?

- **COMMUNITY COLLECTION PROGRAMS** Many larger cities hold HHW collection days for waste products not normally picked up by the regular sanitation crew, allowing residents to safely and responsibly dispose of these items. Call



Figure 2 and Figure 3. Typical controlled disposal of paint, cleaners, pesticides.



Figure 4. Typical controlled disposal of battery sorting and disposal preparation.

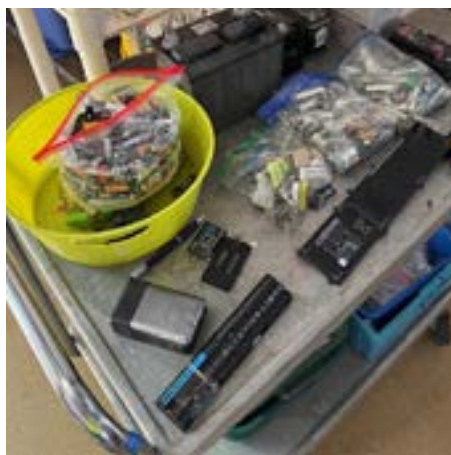


Figure 5. Typical lithium-ion and traditional electronics.

your local city office to see if they have special days like this or check online for neighboring larger towns hosting this.

- **DESIGNATED DISPOSAL SITES** Check with local waste agencies for HHW drop-off sites. Many cities offer this year 'round at the landfill.
- **DRUG TAKE-BACK EVENTS** Most communities have locations where you can dispose of old medications, such as a pharmacy. Many law enforcement agencies will also allow for drop-off old, unused medications.
- **SAFETY TIPS** NEVER dispose of HHW by pouring it down the drain or placing it with regular trash, as it can contaminate water supplies and harm station workers. Do not mix pesticides or chemicals! Some products are not compatible and can cause toxic gases or explosions. Do not flush old medications down the toilet, as they can pollute waterways or end up in your drinking water supply.

How do we manage disposal of electronics or e-waste?

- **IDENTIFY LOCATIONS** Landfills or solid waste collection points will take items such as old phones, computers, appliances, batteries, and other electronics that can be

recycled. Electronics stores will usually accept old cell phones and computers.

- **SAFETY TIPS** NEVER dispose of lithium-ion batteries—these are the batteries in smartphones and many other personal electronic devices—in household trash, as they can cause fire and explosion, toxic gas emissions, and severe chemical exposure. Compared with other types of batteries, lithium-ion batteries have a more volatile fire behavior.

In addition to searching for a community's waste disposal points, there are also resources for communities to pursue solid waste assistance through grants. EPA and USDA Rural Development offer annual grant opportunities for all communities that desire solid waste disposal collection and solutions. You can do your part to make your communities aware of the items that are not recyclable and provide outreach to the community on ways to dispose of said products.

Solid waste planning is not reserved for just large communities that have high volumes of waste. Many states are aggressively trying to manage their municipal solid waste. Most are requiring their communities to create long-term, integrated approaches for collection processing and disposal as well as waste reduction and recycling programs. Rural communities across America are finding the regional approach to solid waste management an attractive option due to federal regulations that make it expensive for small local governments to manage waste independently and responsibly. Regional solid waste systems offer participating communities improved efficiency through economies of scale.

As we move forward, we all need to do our part in protecting our environment and source water supplies. Being mindful of what we throw in the "trash" can make an impact on our future. By connecting our communities to waste disposal opportunities and education, we can make positive changes. Implementing best practices now will benefit future generations and provide more security for our most valuable resources and environment.



From the Bay to the Barge

Backhauling and recycling in rural Alaska.

Jacqueline D. Shirley, MPH, Contract Manager II, Rural Community Assistance Corporation (RCAC)

This article was funded under RCAC's USDA Solid Waste 24–25 grant.



Loading backhaul into
CONEX for barge shipment.

Toksook Bay, Alaska, is a remote traditional Yupik community located 500 miles west of Anchorage on Nelson Island and has no road system.

Reaching it typically requires a small Cessna landing on a gravel strip, the only way in or out for people and most supplies.

The community's Class III landfill is unlined, unmanned, and unfenced. To understand what this means, imagine a dump site without the protective barriers, monitoring systems, or security measures that most Americans take for granted. In the Lower 48, such facilities would be illegal, but in rural Alaska, they are the norm.

Toksook Bay is a member of the Nelson Island Consortium (NIC), a tribal consortium focused on environmental capacity-building and resource protection for member tribes on Nelson Island, Alaska. The consortium helps tribes work together, runs environmental education programs, and tackles issues from subsistence resource protection to solid waste disposal. It also shapes policy and environmental implementation actions related to land, air, and water quality management.

In 2023, the Rural Community Assistance Corporation (RCAC) helped NIC secure a \$1.5 million U.S.

Environmental Protection Agency (EPA) grant to develop a backhaul program for all of the consortia tribes. But what exactly is backhauling, and why does it matter so much to these communities?

The Problem: Geography Meets Environmental Risk

"Backhauling" is a term borrowed from the shipping industry. It means using the return trip of a vessel or aircraft that has delivered supplies to carry waste materials back to proper disposal facilities. For rural Alaska villages, this means loading hazardous waste and recyclables onto the same barges or planes that bring in fuel, food, and other necessities, ensuring these materials reach regulated disposal sites hundreds or thousands of miles away.

Throughout rural Alaska, including Toksook Bay, backhauling household hazardous waste and recyclable waste out of villages via barge or aircraft costs thousands of dollars per shipment, requires multiple permits, and demands specialized knowledge of shipping regulations. Yet it has become the go-to solution for a growing crisis.

Alaska's rural landfills are unlined, and untreated waste burning happens regularly. Alaska's villages are the only communities

in the United States where this type of landfill is still legal. The extreme nature of Alaska's transportation logistics and geography makes building and maintaining a standard landfill impossible to afford or engineer.

Consider the challenges: permafrost that shifts and buckles, temperatures that plunge to minus 60, and the nearest road system hundreds of miles away. Building a lined landfill with leachate collection systems in such conditions would cost millions per village, an impossible burden for communities of a few hundred people.

Hazardous wastes leaching contaminants into waterways or burning toxins released into the air are public health challenges faced by rural Alaska residents daily. Backhauling removes e-waste, batteries, and other hazardous materials that could contaminate the Arctic tundra and waterways, which remain the main food source for these traditional hunter-gatherer communities.

Getting recyclable and shippable waste materials out of villages requires ongoing effort. Local and regional groups must collaborate to make the system work. Meanwhile, extending the maximum lifetime of existing landfills remains critical. Better landfill operations practices and community education are needed to promote improved hazardous waste and recycling habits.

Backhauling in Action

When Toksook Bay requested technical assistance and training to build local staff capacity to prepare for backhaul events and promote increased recycling, RCAC responded with hands-on support.

Currently, Toksook Bay employs landfill operators, backhaul technicians, and environmental protection specialists who collaborated with RCAC to identify critical needs to prepare for barge season; stage and pack materials for shipment; and receive health and safety training when working with hazardous and recyclable materials.

They also needed guidance on community outreach to promote awareness about household hazardous waste management, recycling, and proper disposal at the landfill and backhaul station.

RCAC staff flew to Toksook Bay to evaluate the current setup: how materials were staged for backhaul, landfill conditions, what training staff needed, and how to reach community members with information about the program.

The assessment revealed four urgent needs:

1. **Safety first!**

RCAC trained operators in handling and packing hazardous materials, including selecting and using protective equipment. When dealing with leaking car batteries and electronics containing heavy metals, proper gear saves lives.

2. **Barge preparation proved complex**

With barges arriving only once or twice yearly, technicians must have everything ready: materials sorted, paperwork completed, items properly packaged. Maritime regulations govern these shipments. Barge captains won't accept improperly documented or packed materials. Some villages also ship by aircraft, adding aviation rules to the mix. Missing the barge means waiting another year. Backhauling costs thousands per shipment, so villages can't afford mistakes. When a barge captain refuses a load and corrections cannot be made during the weeklong port call, hazardous waste sits in the village for another 12 months.

3. **Logistics required careful coordination.**

RCAC helped operators create timelines, contact shipping companies, prepare bills of lading and chain-of-custody forms, and secure proper labels. With one annual shot at shipping, every detail counts.

4. **Financial planning for the backhaul event was critical.**

This endeavor is very costly, with expenses ranging from supplies that must be shipped in—like protective equipment, pallets, and shrink wrap—to fees for heavy equipment, barge shipping, recycling vendors, wages, and administration. A single loaded CONEX container can cost up to \$15,000 to ship, with the container itself valued at \$5,000. Because the cost is so high, it is critical that local operators receive adequate training to ensure the first attempt to ship backhaul material is successful. This is why villages and barge companies coordinate to use empty containers from the previous barge year: the shipping companies want their containers back and will often forgo the container cost if the village fills it with backhaul materials.



Getting batteries ready for shipment.

White goods improperly staged. Typical site across rural Alaska.

Importance of On-Site Training and Technical Assistance

Reaching Toksook Bay requires a small Cessna landing on a gravel strip—the only way in or out for people and most supplies. Managing solid waste in such isolation challenges even experienced professionals, especially in tribal communities that have occupied these lands for millennia.

The U.S. Department of Agriculture Rural Development Solid Waste grant allows RCAC staff to reach these remote communities with customized training that addresses their specific situations. In-person, location-specific training makes all the difference. Tribal staff say they can't afford to send whole departments to distant training sessions. When individuals do attend, the training covers urban scenarios—daily truck pickups, nearby recycling centers—that don't apply to villages where the nearest facility sits 1,000 miles away. They return home having to "imagine how to make this work." The grant enables RCAC to deliver meaningful on-site training. Tribes consistently express gratitude for this individual attention to their waste management challenges.

Two half-day workshops were held and were packed with practical skills. Sessions covered safety procedures, backhaul preparation, and specific techniques for properly staging appliances, batteries, and electronics.

Training also focused on how to start a household hazardous waste program and conduct effective community outreach. Getting residents involved proved crucial, so RCAC helped staff write letters explaining the backhaul event.

When everyone knows the schedule, more hazardous waste makes it to the proper staging area instead of being dumped at the landfill. This modern approach was also

strengthened by drawing on traditional ecological knowledge about waste management and environmental protection.

Looking Forward

The Nelson Island Consortium's EPA-funded program will expand these efforts across the region. Each village faces similar challenges but requires site-specific solutions based on geography, barge access, and local capacity.

For communities that have lived on these lands for thousands of years, protecting the tundra and waterways from contamination remains essential for maintaining traditional subsistence practices. The backhaul program addresses environmental and public health needs while navigating the complex logistics that define waste management in remote Alaska—one barge load at a time.



Landfill Mining in Florida

A sustainable solution with special benefits for rural communities.

Rachel Tyler, Senior Technical Assistance Provider, Southeast Rural Community Assistance Project Inc. (SERCAP)

This article was funded under RCAP's USDA Solid Waste 24–25 grant.



Landfill mining, the process of excavating and processing waste from old landfills to recover valuable materials, has emerged as a promising strategy for waste management and environmental remediation. In Florida, a state known for its diverse ecosystems, rapid urbanization, and growing waste management challenges, landfill mining presents a unique opportunity to address both environmental and economic concerns. Understanding landfill mining, its potential benefits and challenges, and its specific implications for rural communities in Florida is of critical value. By focusing on rural areas, where waste

management infrastructure is often limited and economic opportunities are scarce, landfill mining could serve as a transformative tool for sustainable development.

The Concept

Landfill mining involves the systematic excavation of waste from existing landfills to recover recyclable materials such as metals, plastics, and glass as well as to reclaim land for future use. The process typically includes sorting, separating, and processing excavated waste to extract valuable resources while safely disposing of non-recoverable materials. Landfill mining is not a new concept; it has been practiced in various forms for decades. However, recent advancements in waste processing technologies and growing concerns about resource scarcity and environmental degradation have renewed interest in this practice.

In Florida, where landfills are reaching capacity and land availability is increasingly limited, landfill mining offers a sustainable alternative to traditional waste management practices. By recovering materials from old landfills, the state can reduce its reliance on virgin resources, extend the lifespan of existing landfills, and mitigate the environmental impacts of waste disposal.

The Waste Management Challenge in Florida

Florida, with its rapidly growing population, thriving tourism industry, and increased debris removal due to severe storms, generates a significant amount of waste. According to the Florida Department of Environmental Protection (FDEP), the state produces over 40 million tons of municipal solid waste annually (floridadep.gov/waste/waste-reduction). Much of this waste ends up in landfills, which are becoming increasingly crowded. In urban areas where land is at a premium, finding suitable sites for new landfills is a major challenge. In rural areas, where land is more abundant, waste management infrastructure is often underdeveloped, leading to inadequate disposal practices and environmental degradation.

Rural communities in Florida face unique waste management challenges. Limited financial resources, sparse populations, and a lack of access to advanced waste processing technologies often result in inefficient waste disposal practices. Many rural areas rely on small, outdated landfills that are not equipped to handle modern waste streams. These landfills can pose significant environmental risks, including groundwater contamination, soil degradation, and greenhouse gas emissions. Landfill mining offers a potential solution to these challenges by providing a means to remediate old landfills, recover valuable resources, and create economic opportunities in rural areas.

Benefits of Landfill Mining for Rural Communities

ENVIRONMENTAL REMEDIATION

One of the primary benefits of landfill mining is its potential to remediate old and poorly managed landfills. In rural Florida, where many landfills were established decades ago with little regard for environmental protection, landfill mining can help address long-standing environmental issues. By excavating and processing waste, landfill mining can reduce the risk of groundwater contamination, mitigate soil degradation, and decrease greenhouse gas emissions. This is particularly important in rural areas, where agriculture and natural ecosystems are vital to the local economy and way of life.

RESOURCE RECOVERY

Landfill mining can recover valuable materials, such as metals, plastics, and glass, that can be recycled and reused. This not only reduces the demand for virgin resources but also creates a new stream of materials for the recycling industry. In rural communities, where economic opportunities are often limited, the recovery and sale of these materials can provide a much-needed source of income. Additionally, the reclaimed land can be repurposed for agricultural, recreational, or industrial use, further contributing to local economic development.

JOB CREATION

Landfill mining projects require a significant amount of labor, from excavation and sorting to processing and transportation. This creates job opportunities for local residents, which is particularly appealing in rural areas, where unemployment rates are often higher than in urban centers. By providing stable, well-paying jobs, landfill mining can help stimulate economic growth and improve the quality of life in rural communities.

REDUCED RELIANCE ON LANDFILLS

By recovering materials from old landfills, landfill mining can reduce the need for new landfill sites. This is particularly important in Florida, where land availability is limited and the environmental impacts of landfills are a growing concern. In rural areas, where land is often used for agriculture or conservation, reducing the need for new landfills can help preserve valuable natural resources and protect the local environment.

Challenges and Considerations

While landfill mining offers numerous benefits, it also presents several challenges that must be carefully considered, particularly in the context of rural communities.

COST AND FINANCING

Landfill mining can be expensive, requiring significant upfront investment in equipment, labor, and infrastructure. In rural areas, where financial resources are often limited, securing funding for landfill mining projects can be a major challenge. Public-private partnerships, grants, and other forms of financial assistance may be necessary to make landfill mining feasible in these communities.

ENVIRONMENTAL RISKS

While landfill mining can help remediate old landfills, it also carries environmental risks. Excavating and processing waste can release harmful pollutants into the air, water, and soil. Proper environmental safeguards, including dust control, water treatment, and waste containment, are essential to minimize these risks. In rural areas, where environmental monitoring and enforcement may be less stringent, ensuring that landfill mining projects adhere to strict environmental standards is critical.

COMMUNITY ENGAGEMENT

Successful landfill mining projects require the support and participation of local communities. In rural areas, where residents may be skeptical of outside interventions, building trust and fostering collaboration is essential. Community engagement efforts should focus on educating residents about the benefits of landfill mining, addressing concerns about environmental and health risks, and involving local stakeholders in the planning and implementation process.

REGULATORY HURDLES

Landfill mining is subject to a complex web of federal, state, and local regulations. Navigating these regulatory requirements can be challenging, particularly in rural areas where regulatory capacity may be limited. Streamlining the regulatory process and providing technical assistance to rural communities can facilitate the development of landfill mining projects.



Case Studies and Examples

While landfill mining is still a relatively new concept in Florida, there are several examples of successful projects in other parts of the United States and around the world that can serve as models for rural communities in the state. Here are two:

THE LANCASTER COUNTY LANDFILL MINING PROJECT (PENNSYLVANIA)

In the early 1990s, Lancaster County, Pennsylvania, undertook one of the first large-scale landfill mining projects in the United States. The project involved the excavation of over one million tons of waste from a 30-year-old landfill. The recovered materials were sorted and processed, with metals and other recyclables being sold for reuse. The project not only extended the lifespan of the landfill but also created jobs and generated revenue for the local community.

THE LANDFILL MINING PILOT PROJECT (BELGIUM)

In Belgium, a pilot project in the region of Flanders demonstrated the feasibility of landfill mining as a means of resource recovery and environmental remediation. The project involved the excavation of 16,000 tons of waste from a 20-year-old landfill. The recovered materials were sorted and processed, with a significant portion being recycled or reused. The project also included extensive environmental monitoring to ensure that the excavation and processing did not result in harmful emissions or contamination.

These case studies highlight the potential benefits of landfill mining, particularly in terms of resource recovery, environmental remediation, and economic development. They also underscore the importance of careful planning, community engagement, and environmental safeguards in ensuring the success of landfill mining projects.

A Way to a More Sustainable Future

Landfill mining represents a promising solution to Florida's waste management challenges, particularly in rural communities where waste management infrastructure is often inadequate and economic opportunities are limited. By remediating old landfills, recovering valuable resources, and creating jobs, landfill mining can contribute to sustainable development in rural areas. However, realizing the full potential of landfill mining will require addressing significant challenges, including securing financing, minimizing environmental risks, engaging local communities, and navigating regulatory hurdles.

As Florida continues to grapple with the dual challenges of waste management and sustainable development, landfill mining offers a unique opportunity to turn a legacy of waste into a resource for the future. By investing in landfill mining projects and supporting rural communities in their efforts to implement this innovative practice, Florida can pave the way for a more sustainable and prosperous future.



How Waldron Took Control of Its Solid Waste Issues

This small town in Arkansas is taking proactive steps toward a better future with support from Communities Unlimited.

Derek Shore, Staff Writer, and **Michelle Viney**, Area Director of Program Operations, Communities Unlimited

This article was funded under RCAP's USDA Solid Waste 24–25 grant.



Nestled in the Ouachita Mountains near the Oklahoma state line, Waldron, Arkansas, is a small town in Scott County with a population of over 3,300 residents. Waldron serves as the county seat and lies along U.S. Highway 71, a major north-south route that connects the area to Fort Smith and Texarkana. The town is surrounded by rolling hills, dense forests, and waterways, making it a gateway to outdoor recreation in western Arkansas.

Despite its scenic setting, Waldron faces many of the same challenges as other rural towns, including aging infrastructure, a shortage of housing, and the need for economic growth. Instead of waiting for

change, Waldron has actively shaped its future, partnering with Communities Unlimited (CU) since 2020 to address critical challenges. With support from U.S. Department of Agriculture (USDA) programs like the Rural Community Development Initiative (RCDI) and the Solid Waste Management Grant Program, the city has made strides in tackling these issues head-on. Its latest challenge: solid waste management.

For years, the town struggled to keep track of its waste disposal equipment. Dumpsters weren't inventoried. Their condition varied, and some had simply disappeared. Without a clear system for managing solid waste, keeping up with maintenance and replacement needs was an uphill battle. On top of that, dumpster diving had become a growing concern, with scattered waste posing health and safety risks. It wasn't just an inconvenience—it was affecting the community's quality of life.

CU Steps In

The work began in late 2023 when CU secured a Solid Waste grant from USDA to help Waldron address these pressing issues. The first step was conducting a solid waste project assessment to understand the full scope of the city's needs.

In early 2024, CU Area Director of Program Operations Michelle Viney, from the Community Sustainability Team, visited Waldron to lay the groundwork. It quickly

became clear that, before any real improvements could be made, the city needed an inventory system—a way to track its dumpsters, roll-off containers, and other solid waste equipment. Without that, maintaining and upgrading waste management infrastructure would be nearly impossible.

The real work began in August 2024, when Viney returned to Waldron for a full-scale physical inventory of the city's dumpsters. Scattered across town were over 160 dumpsters and roll-off containers, many of which had never been formally labeled or tracked. Working side by side with Waldron's Public Works Department and City Superintendent Brandon Nelson, Viney started cataloging each dumpster. Nelson and Viney marked them with inventory numbers, recorded their conditions, and mapped their locations. It was the first time the city had a comprehensive record of its solid waste assets, and the difference was immediate.

Despite this success, another pressing issue remained. For years, Waldron had dealt with dumpster diving, a problem that had become more than just a nuisance. As people rummaged through waste, trash would spill onto the streets, creating unsanitary conditions. The city had passed an ordinance banning dumpster diving, but without proper enforcement and public awareness, the problem persisted.

CU recognized that littering was becoming a growing concern in Waldron, extending beyond the dumpsters and affecting the broader community. In response, the CU team took a two-pronged approach: they provided educational signage on dumpsters to guide proper waste disposal and supplied the city with a litter event readiness kit. The kit, designed to support local cleanup efforts, included essentials like trash bags, gloves, safety gear, and sanitation supplies. By equipping volunteers with the necessary tools, CU helped make community cleanups more efficient and accessible, empowering residents to take an active role in keeping Waldron clean.

Toward the end of 2024, CU used the data from its inventory work to start developing a comprehensive asset management plan for Waldron's solid waste system. This plan would serve as a roadmap for tracking waste management assets, planning for replacements, and ensuring the long-term sustainability of the city's solid waste operations. By December, the project was at 80% completion, but Waldron wasn't giving up, nor was CU. The work rolled into the following year, with the goal of finalizing the plan and ensuring the city had a structured, long-term approach to managing its waste system.

"This project is helping us bring our system into the 21st century," Nelson says. "Moving everything to a digital format makes tracking and managing our data much easier. We're still finalizing the PDF version, but once that's done, we'll be in good shape."

Waldron's journey with CU highlights what's possible when a rural community takes ownership of its challenges and commits to finding solutions. What started as a simple need for better waste management evolved into a community-wide effort to improve public health, cleanliness, and long-term sustainability. Through hands-on collaboration, Waldron and CU transformed a neglected waste system into a structured, trackable asset, took meaningful action against dumpster diving and littering, and laid the groundwork for a stronger, more resilient community.

"Working with Michelle has been really good," Nelson says. "She's knowledgeable, friendly, and easy to work with. We knew we had familiarity with her from other projects. She's been a good resource to have and knows other resources to bring in when she needs them. It's been a pleasure working with Communities Unlimited, and I hope we can find other projects to work on together."

Beyond Solid Waste

CU has also worked with the City of Waldron on community revitalization, infrastructure improvements, and workforce development. Efforts have included enhancing walkability through sidewalk projects, supporting Main Street redevelopment, and assisting the local Chamber of Commerce in strengthening its presence and impact. Additionally, CU's Geographic Information Systems (GIS) Team has supported Waldron's long-term planning through digital mapping efforts. In 2021, they provided the city with a Community Asset Map, created using public data sources, and conducted training for local leaders to help them utilize the tool for strategic planning and decision-making. In 2022, CU returned to conduct fieldwork, mapping Waldron's water and wastewater systems to support better asset management and infrastructure planning.



Mayor Millard and Michelle Viney

One of the city's most innovative initiatives has been a workforce housing project aimed at addressing the growing need for affordable housing. In partnership with CU, Waldron High School's construction trades program took on the renovation of a donated, older home, turning it into a modernized, livable space while providing students with hands-on experience in the building trades. The project not only helped develop valuable workforce skills but also contributed to the town's efforts to attract and retain essential workers. The success of this initiative has laid the foundation for future housing solutions that blend education, economic development, and community revitalization.

The work isn't finished, but Waldron has set itself apart as a model for rural communities that are looking to take control of their infrastructure challenges and build better futures.

"It's been a pleasure working with Michelle and Communities Unlimited," says David Millard, mayor of Waldron. "She has been instrumental in keeping me excited about the progress in our town. I hope more people recognize the benefits of living in Waldron. I see more businesses moving in, and new residents are on their way. Our town is already beautiful, and it's only getting better. I want to continue attracting more people to be part of our growing community."



Increasing Community Involvement in Solid Waste Programs

There are many practical steps a Technical Assistance Provider can take in a short period of time to get people excited about recycling.

Maggie Neal, Senior Rural Development Specialist, Great Lakes Community Action Partnership (GLCAP)

This article was funded under RCAP's USDA Solid Waste 24–25 grant.

Picture this: It is 2025 in rural America. There is only one recycling center for the entire county, and it has only one cardboard baler, two operators, and six trailers. County officials are unsure if the center will be included in the local government's budget next year. It has become a pet project for the local officials, but it doesn't generate enough money or attention to be a sustainable fixture for the area it serves. The staff don't have the time or resources to promote it, and the few community members who can offer support don't want to lose it. What can you, as a Technical Assistance Provider (TAP), do to help in just one year? Multiple things!

Accepted Items

CORRUGATED CARDBOARD

Pre-flatten boxes.

PLASTICS

#1 PET or PETE and #2 HDPE

ALUMINUM, TIN, BEVERAGE, AND METAL FOOD CONTAINERS

Clean rinsed out cans. No paint cans, aerosol cans or other potentially harmful or hazardous cans.

METALS

We have a metal takeback container ready. All metal is recyclable. No harmful or potentially dangerous materials.

PAPERBOARD

cereal boxes and the like.

Items We Cannot Accept

- Paper
- Glass

Schools

- All have cardboard bins. We are more than happy to come collect it. Please contact us if interested.
- We accept recycling from the entire county!

Ask questions—lots of questions. What do the staff want and hope for? What does management think of this community resource, and do they really support it? Take stock of equipment and whether it is still in use. Find out if they hold take-back or cleanup events and whether they apply for state and/or federal grants. In Kentucky, the state offers state-funded grants covering litter abatement, illegal open dump remediation, waste tire collection, recycling, household hazardous waste collection, composting, and more. Kentucky recycling centers are typically county-operated; there are 120 counties in Kentucky, and there is one Solid Waste Coordinator that serves all communities within each county through one recycling center. If that county isn't applying for and offering these other events, then it is reasonable to think that community education is low—and so is community participation.

Often, a large portion of the public doesn't even know that recycling resources exist within their community. Why? Because, like all important infrastructure, we tend to tuck it away, out of sight, and no one promotes it. The ones who do know it is there are the diehard recyclers. So, how do we as TAPs assist them in building or rebuilding community participation? Community buy-in through grass roots marketing!

First, find out if they market at all and how. Do they have a flyer, social media, a web page, radio ads? Do they attend festivals, hold take-back events? Then get started.

Make a Flyer

Get a list of all of the materials accepted at the recycling center. This can vary significantly from place to place. They might take cardboard, metals, plastics, and glass. They might only accept cardboard, because the price on everything else dropped out and they have had to downsize. Maybe they accept paper and only a little paper/fiber board like cereal and pasta boxes, or even greasy pizza boxes. Finding out exactly what they will accept is an important step in this process. Then, build a basic promotional flyer from that information. You can use design programs to really make it flashy or just make a simple Microsoft

Word document, depending on your skill level. It is always important to remember that having a flyer is better than not having one. A simple flyer is one of the most economical ways to spread the word. List all of the important contact information, ensuring you list the physical address—not a mailing address. Be sure to list days and times open and what websites or social media pages are available. Then, build out the list of materials they will accept. Don't just list "paper, cardboard, cans." Provide examples, with directions. Many people do not have enough information to identify recyclable materials. If they see "plastic" listed, they will include anything that is plastic for recycling, when most small centers can only accept 1s and 2s. Explain the needs of the system: boxes need to be flattened, cans need to be rinsed, no greasy boxes, no clam shells, no aerosol cans, etc. You're not just trying to teach the public which materials you will and won't accept; you want to teach them proper recycling.

Next, dress it up. Ask what the school colors are, or check if the local government has an emblem or seal and what colors are in it. Ask the staff what color choices they would like. If you have a lot of time and they have a lot of information, make it a trifold brochure. Provide information about other events they might hold, like household hazardous waste or tire collections, drug take-back events, or three-bag challenge, road mile, or stream cleanups. It is always great to insert shapes such as the recycling symbol. Anyone who sees the flyer will immediately know it has to do with recycling if they see the three chasing arrows. Have fun with it, get creative, and ALWAYS ask for their final approval before helping them promote it. Remember that the center is a service offered by the local government body.

Now that you have a flyer, what do you do with it? Ask staff if it is OK to post it around town. Find local hot spots and start posting. Find the local feed or hardware store—they usually have a corkboard for postings. The same applies for post offices, city hall, the local police or sheriff's office, and libraries. If they don't have a corkboard, ask if you can tape it in a window. Along the way, you will meet and talk to other local officials and find out more about their histories, and you may even get a chance to educate them that YES, the recycling center is still open. In one community, the county

used to pick up blue bags that the public put their recyclables in curbside and take them to the recycling center, but in-house disagreements had led to the cessation of that service. Many people thought the center had closed, even though customer drop-off was still available. Employees in other county departments were excited to know that the recycling center was still open and began to share information with family members, and that led to a local news story about the recycling center. A huge lead in promoting a community service was gained by simply asking if a flyer could be hung on a cork board.

Create an Online Presence

Many recycling centers have a defunct Facebook account or web page that no one has used for years. Some may have even lost the login credentials, meaning you may be building it from scratch. If this is the case, get approval first. If the solid waste coordinator who runs the recycling center can't approve it, it will go up the ladder. Social media tends to go further than a website. We live in a world of convenience, so the easier it is to find and follow, the more sustained buy-in you have. There are some free website platforms out there and they aren't too difficult to learn, but they are very limited before a paid subscription is needed. Social media is easy because it only takes one click to follow the page, whereas a website requires active participation on the public's side. Again, you need to pay close attention to what the staff/management want and if they have already built something that just needs some attention.

If you build a website or platform from scratch, it will be linked to your personal account. If you are rebuilding one, you can list yourself as an administrator, making it easier to help post information. Find out who should have access to and be co-administrator(s). Is it a city or county clerk, the solid waste coordinator, the mayor or county judge executive, public works director, or all of them? Access should be limited, but not so limited that if one person leaves employment, the whole account is locked. Having multiple people administer the account also provides for more opportunity to post, which is good because it can be difficult for any one person to come up with new ideas or to have time to post. Some individuals are more tech-savvy, too.



It can be much easier to use a legacy account than to build a new one. That legacy account already has a following, even if nothing has been posted in a few years, whereas you will have to work harder to rebuild the audience for a new account. Having multiple accounts also leads to confusion—if the public searches for the center and finds that nothing has been posted, they might think the recycling center has closed. This can also lead to some naming difficulties. If they previously used The City/County of Recycling Center, then you could use City/County Recycling Center—Kentucky. In the About sections of the page, you can list hours of operation and contact information as well as links from web pages that might mention the department or center. Take multiple pictures of the facility for the cover and profile photos. You could also use the city/county seal or build an emblem to use. The quickest way to gain followers and announce the arrival of the page is to like other local government pages and ask them to begin following the recycling center page. It won't take long.

Once it is ready, you can help post regular updates about the facility as well as important related information that people in the recycling world would be interested in. Take pictures of the facility and staff or take short videos of them baling or sorting materials. Build posts about problems they are encountering, remind the public of upcoming events, and post the flyer you made. All of these topics are great ways to educate the public and build buy-in. You can also link to other programs, such as other companies that accept hard-to-recycle products. Post pictures of illegal dumps in the area, educate on the costs of not recycling, and, most importantly, post pictures of volunteers! The key is to post regularly. Posting even just once a month can make a difference, and posting more around the holidays when people have more to recycle is a good idea.

What are some of the hidden benefits of social media? Here's an example. One facility had multiple trailers for recycling collection but pulled them all due to contamination and safety for the staff. Multiple discussions just couldn't change their minds. But once



their social media page went live, citizens began asking staff to bring the trailers back. The page went from zero followers to over 500 in under a month. Not only did the operator and manager gain some validation for the work they do, but they also had a means of communicating with the public at large. In response to multiple public requests, the center began placing the trailers back around town. Staff could answer questions about why certain materials were no longer accepted and even began searching for better material buyers to be able to accept them once again. Today, the facility has just under 700 likes and 800 followers. Its page blew up quickly and has retained interest. Before the social media page began gaining popularity, when asked, many locals thought the recycling center had closed and everything was being taken to another county. Bystanders at a local business, less than a block away from the center, did not know that it was open! If you are an administrator for a social media page, check up on the page and make a post every so often. Once the account is established and you know it is sustainable, you can remove yourself as the primary contact. This leaves the account maintenance fully up to whomever you listed as co-administer(s).

Marketing Through Schools

One of the other big places to market the recycling center is through schools, and it can be highly rewarding. Showing up at a school and asking, in-person, if you can provide an educational event during Earth Week, or any week, is great exposure. There are numerous topics to cover including solid waste, waste diversion, and recycling.

One of the easiest topics to discuss is the 3 R's of waste diversion: Reduce, Reuse, Recycle. Most students of all ages know a little about the Recycling "R" but typically do not have much knowledge of the first two. This is where having hands-on examples of ways to Reduce makes it fun, interesting, and relatable. Examples of ways to Reduce include swapping dryer sheets for wool dryer balls, plastic sandwich bags for silicone sandwich bags, and plastic grocery bags for reusable canvas bags. One popular example is using bamboo toothbrushes over plastic ones or bar shampoo instead of a plastic shampoo bottle. Showing examples of easy switches to Reduce waste goes a long way with kids of all ages—and their teachers!

Many already practice Reusing items and they just don't realize it. Ask how many wear hand-me-down clothes, attend yard sales, have a quilt, ever used a tire swing.

When covering Recycling, show items made from recycled materials, which can be found almost anywhere now, including that big box store that almost everyone either loves or hates. Ask them to check their backpacks and their clothes, and show them examples of clothes you have found. One question that's fun to ask, although it usually causes a little chaos, is if their clothes stretch? If they do, they have plastic in them. If they check the labels, they might just find that it says it is made from 20% recycled materials. The clothes stretching will commence and you will have to rein them back in. You might just gather some interesting facts from the students, such as, "my backpack is made from 16 recycled soda bottles," or from a teacher who says she owns a pair of jeans made from recycled soda bottles.

The students have fun. They learn a lot of new, practical, relatable things and discover valuable resources in their community, and many teachers get involved. One of the most rewarding things is to hear a teacher say that she learned something new today and a student follow that up with "I learned that even adults can still learn." These events are a doorway for teaching valuable lifelong lessons that create community buy-in.

When you're going to do one of these events, ask the recycling center staff if they want to join in and gain more exposure. And remember to provide take-home messages. Give every student and staff member a flyer, at minimum. If you are able to pass out 400 flyers to one school alone, you have the potential to spread that message to two extra people for each person who received the flyer—that means that you have potentially helped educate around 1,200 people with one event! If that flyer has a social media page or website on it, you have also increased steady education and participation with the recycling center. If that recycling center also offers other take-back events or cleanup events, then you have created a chain reaction of community buy-in. That buy-in has the potential to make a small recycling center sustainable, proving to local government that more resources or similar resources are needed for that community, and it can just keep growing. In one 30-minute educational event, you can initiate the butterfly effect for a community and spark lifelong interests in recycling and sustainability.

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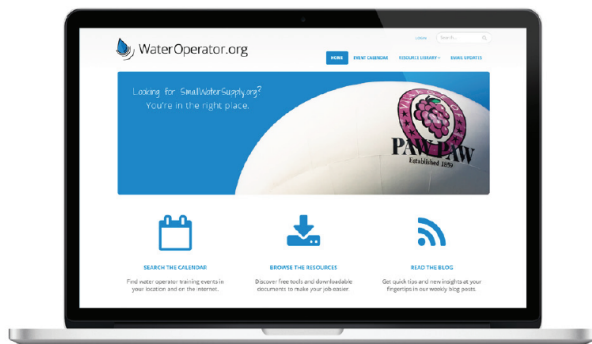
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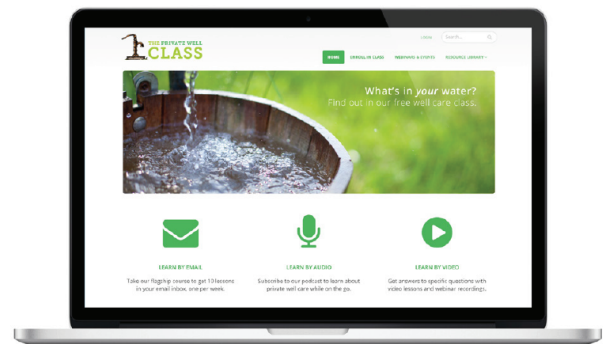
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