

Lincoln County, Missouri

The Midwest Floods

The Midwest floods in the summer of 1993 inundated 75 towns and more than 20 million acres of land in nine states. The flood damaged or destroyed an estimated 50,000 homes and ruined household belongings in thousands of other homes that were flooded. One rural county that borders the Mississippi River, Lincoln County, Missouri, developed a successful debris management program with a significant recycling component.

Collection and recycling

Lincoln County initiated separate debris cleanup programs for three types of debris:

❧ **Mud and sand deposited on roads**

Crews cleared mud and sand from roads and moved it into roadside drainage ditches. Later the ditches were cleared of the dirt and sand to restore drainage. Crews delivered the dirt to farmers, who used it for topsoil.

❧ **Household debris**

Soon after the flood waters began receding, county officials placed containers for household flood debris at one site in each of the county's four towns along the river. The county contracted with a private waste management firm to haul approximately 700 containers of debris, ranging in capacity from 40 to 90 tons, to a landfill.

Initially, staff operated the collection sites 10 hours per day. Officials soon increased operating time to 24 hours per day because residents dropped off more debris at night than during the day. County residents brought household flood debris to the collection sites and left it on the ground. The county used a hi-lift, a tractor with a bucket on the front, to lift heavy items into large containers. Site staff were responsible for sorting materials for recycling, as well as separating out hazardous waste. The waste management contractor provided guidance on the types of hazardous waste sorters

were likely to encounter. Staff separated about 25 percent of the debris, including appliances, wood, shingles, insulation, tires, materials containing asbestos, and household hazardous waste. Scrap dealers picked up the appliances; individuals salvaged wood. Missouri's recycling policy prohibiting landfilling of compostable materials (leaves and yard waste) was temporarily lifted after the flood.

Substantial household hazardous waste accumulated at the collection sites. If sorters were unsure whether particular materials were hazardous (e.g., shingles and insulation), they set them aside as special debris. The waste hauler then determined whether these materials should be taken to a hazardous or nonhazardous waste landfill. The hauler placed leaking hazardous waste containers into sealed containers. No hazardous materials leaked onto the ground, so no soil remediation was needed at the collection sites.

❧ **Building demolition debris**

Approximately 300 houses in Lincoln County sustained damage amounting to more than 50 percent of the value of the house. Most of these homeowners chose to sell their properties to the county in a buy-out and demolition program. FEMA and the state Community Development Block Grant program, which is connected with a Department of Housing and Urban Development program, funded the program.

Once the county purchased the houses slated for demolition, county crews worked to remove and separate salvageable or non-burnable items from the homes. Crews removed vinyl siding, windows, asphalt shingles, insulation, cabinets, appliances, furniture, electrical cables, piping, rafters, studs, and decks. The demolition contractor then had the option to sell or give away as much of these materials as possible before disposing of what remained. The

contractor then could easily demolish the shell of each house, which consisted almost entirely of wood.

An air curtain burner combusted the demolition debris and unsalvaged items from the houses. Other debris was landfilled.

Communication

A mass mailing of over 1,000 letters was sent to residents in the Lincoln County floodplain. Information also was distributed through a local newspaper. The county's communication strategy differed for each of the three types of debris generated.

Through phone calls and advertisements in local newspapers, the county found farmers interested in taking the soil debris piled by the roadside. County crews removing soil from ditches delivered some of the soil to their farms.

The county publicized the household debris collection program through public meetings, newspapers, and radio, but ultimately word of mouth was the most effective communication mechanism. Signs on the road identified each

collection site. The county informed residents 30 days prior to the closing of the collection sites.

A series of public meetings was held throughout the county to inform residents of the home buyout program. County staff responsible for assessing flood damage to houses met daily for breakfast from 6 to 7 a.m. at a centrally located restaurant in the flood area and welcomed homeowners to meet with them and learn about the buyout program. The county also notified residents of the program with posters at the same restaurant and at a resort community at the northern end of the flood area. As of July 1995, Lincoln County had completed over 250 buyouts, had demolished and recycled over 200 homes, and was expecting to purchase and remove an additional 150 homes from the flood plain.

Outside assistance

The Boonslick Regional Planning Commission, a local government group, recruited staff for the collection sites and the pre-demolition salvage crews. U.S. Department of Labor funds paid for these services through the Jobs Training Partnership Act program.

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Metro-Dade County, Florida

Hurricane Andrew

Hurricane Andrew, which struck the Florida coast on August 24, 1992, left an estimated 6 million tons of debris in Metro-Dade County (Greater Miami). This included downed trees and debris from 150,000 houses that were severely damaged or completely destroyed. Because of the extent of the destruction, Miami received help in collecting hurricane debris from USACE through FEMA.

Since the hurricane, to streamline the administration of hauling contracts in the event of future disasters, Metro-Dade County has issued an RFP for a contingency contract for various waste management activities. The RFP calls for two types of bids: one bid for a disposal site plus waste hauling services and one bid for a disposal site without waste hauling services.

Collection and recycling

Metro-Dade County instituted a hurricane plan prior to the disaster and followed the plan's emergency debris collection guidelines. In accordance with the plan, the county initially focused on both collection of garbage, because garbage can pose the greatest health risk, and clearing of the county's highways.

In the three weeks after the hurricane, the amount of garbage set out by residents was double the pre-disaster amount as people in houses without electricity cleaned out spoiled food from refrigerators and freezers. County garbage collection crews worked seven days a week, 18 hours per day to collect garbage and clear debris from the streets.

A small number of county solid waste management employees initially could not report to work because they needed to make emergency repairs to their homes, obtain food for their families, or provide care to children or elderly dependents. In these cases, other county employees offered assistance, thereby reducing the amount of time county employees were unable to perform their waste management duties.

Initially, the hurricane debris consisted mostly of downed trees. As citizens began their

cleanup efforts, more household debris was collected (e.g., rain-damaged furniture). And as repairs began, the debris contained more C&D wastes (e.g., drywall and roofing tiles).

The county asked residents to bring wood and yard waste, appliances, and metal to any of the county's 18 existing trash and recycling dropoff centers. Wood and yard waste was chipped for mulch. Scrap dealers took appliances and metal. County officials asked residents to place other hurricane debris at the curb and to separate nonburnable waste from burnable waste.

Soon the trash and recycling centers were overwhelmed with debris. The county then opened neighborhood staging areas in parks and similar locations where residents could bring their wood waste. Approximately 500,000 tons of wood waste from the hurricane were mulched and distributed to agricultural areas, parks, and residential sites.

The county and USACE hired debris haulers to move debris from the curbs to staging areas. At each of the staging areas, personnel separated and inspected incoming loads and removed any hazardous waste. In the northern part of the county, the county government established 16 zones and assigned county resources to four zones, contracting out the work in the remaining 12 zones to qualified local contractors. The county divided up the number of contracts equally to firms owned by Whites, African Americans, and Hispanics. USACE contracted debris removal work in 13 zones to six out-of-state contractors. Metro-Dade County contracted with a private firm to haul debris from all of the staging areas to the private firm's landfills.

The Florida Department of Environmental Regulation allowed debris to be burned under an emergency 30-day order. USACE used air-curtain burners that met all federal and state requirements. Some other local burn sites, however, did not use state-of-the-art technology. Burning at these sites led to many public complaints and