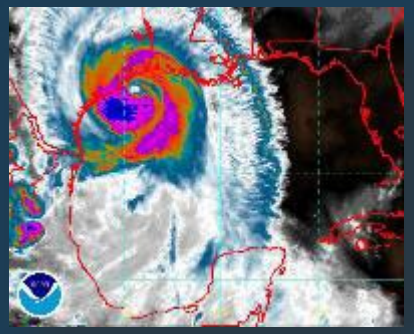
H-GAC 2025 Webinar/Workshop Series






Disaster Debris Workshop

WORKSHOP DATE:

JULY 7, 2025

TIME:

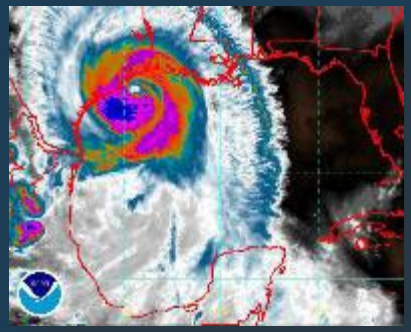
9:00 A.M. TO 12:00 P.M.

Houston-Galveston Area Council

Agenda

1. Recent Incidents and Lessons Learned
2. Private Property Debris Removal
3. Technology and AI in Debris Management Operations
4. Debris Management 101

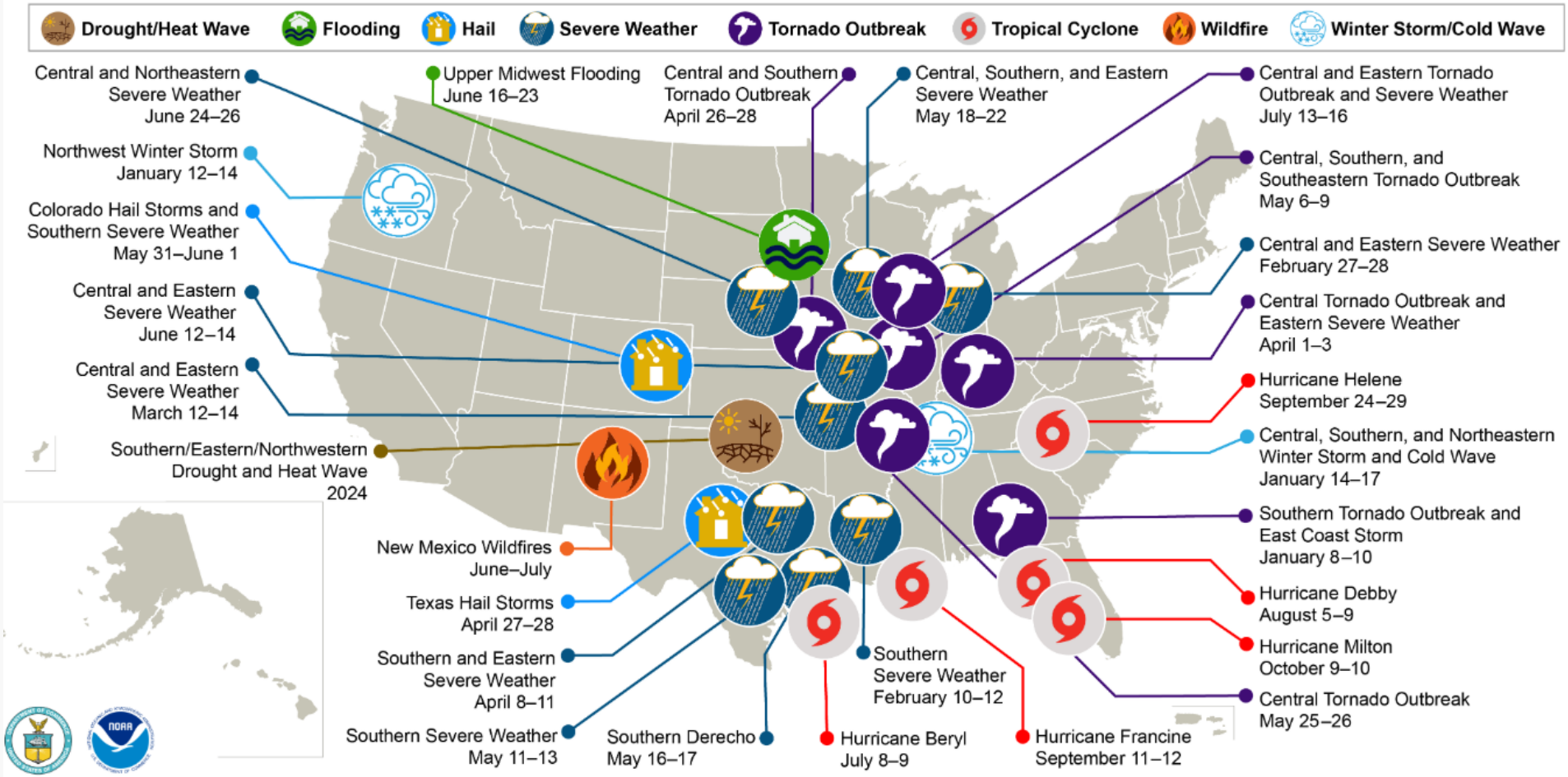





Part 1: Recent Incidents and Lessons Learned

Houston-Galveston Area Council

U.S. 2024 Billion-Dollar Weather and Climate Disasters

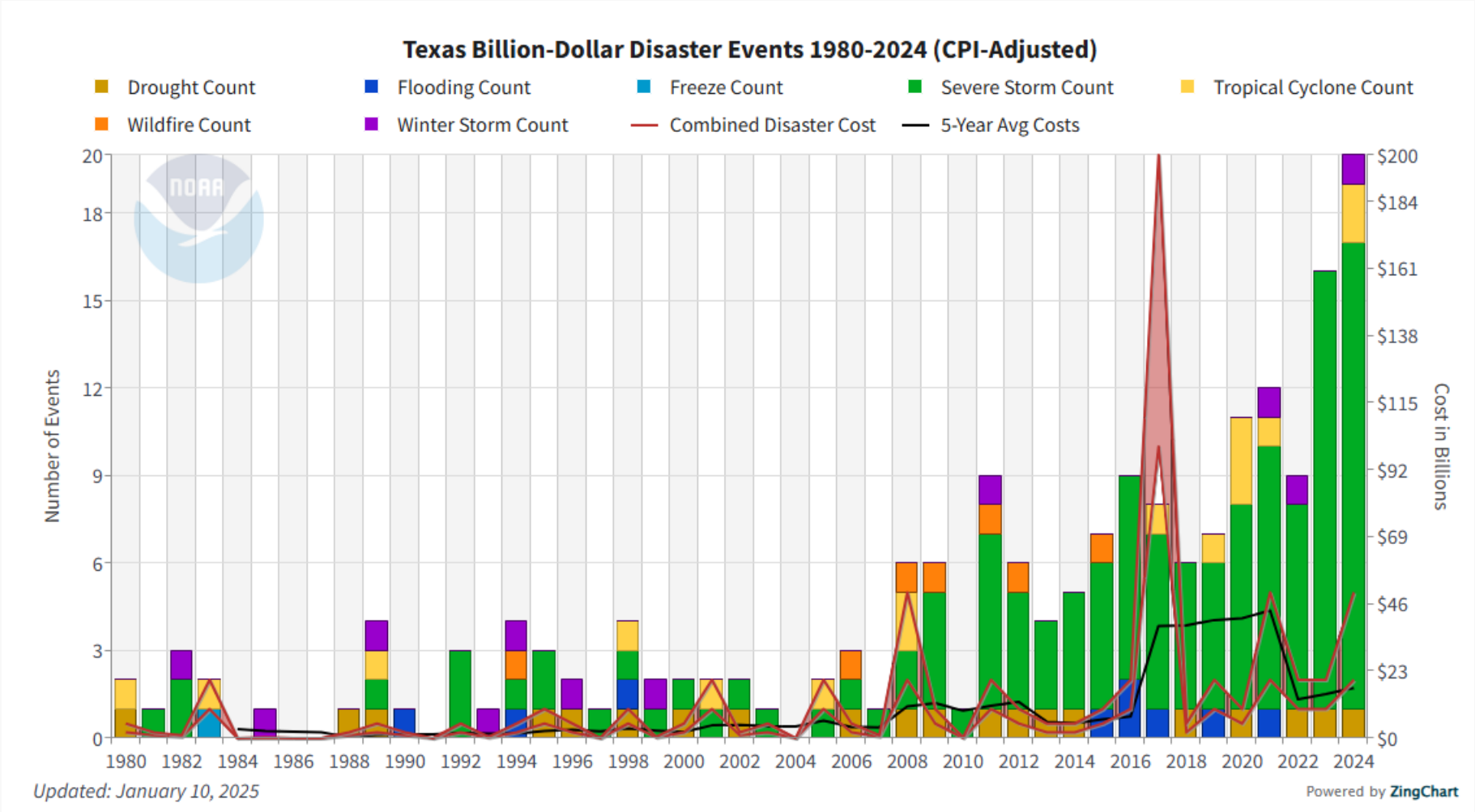


This map denotes the approximate location for each of the ***27 separate billion-dollar weather and climate disasters that impacted the United States in 2024.***

Amount Spent on Debris Removal

- In 2024, $1,484,903,715 was the amount obligated by the federal government for category A (debris removal) across the nation.
- For Texas in 2024, $143,478,277 was the amount obligated by the federal government for category A.

Texas Billion-Dollar Disaster Events 1980 to 2024

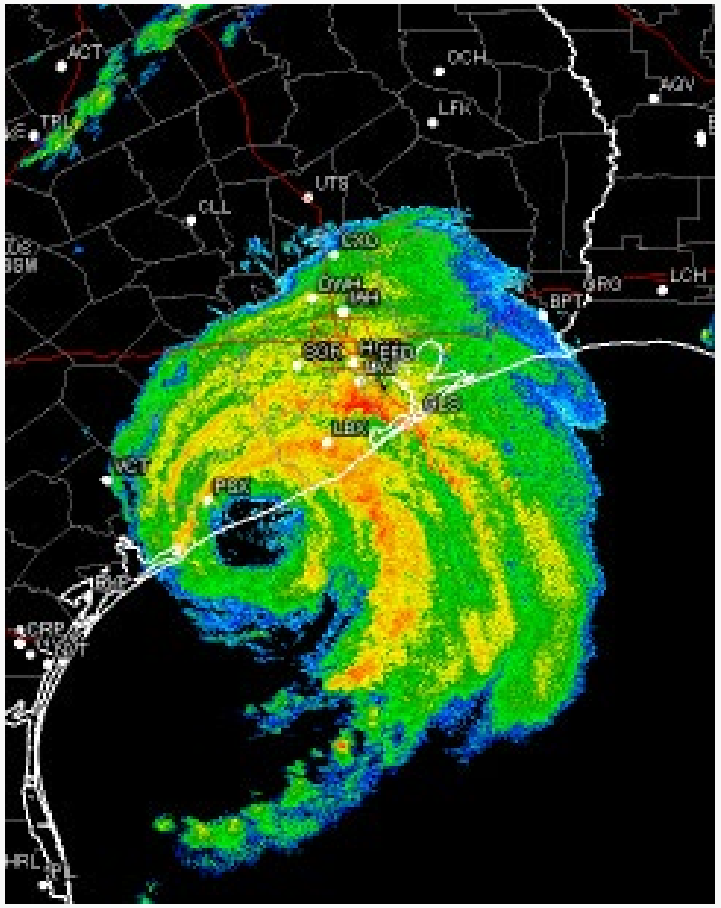


Last Year In Review

- January
  - Flooding
- February and March
  - Smokehouse Creek (North Texas) Fire
- April and May
  - April 10th Storm storm
  - May 4th Severe flooding and high winds
  - May 17th Derecho
  - May 22nd Tornado in Temple, Texas
- July
  - July 8th Hurricane Beryl

Last Year In Review – Hurricane Beryl

- Made landfall near Matagorda, Texas with winds of 90 mph (Category 1 hurricane).
- At one time was a Category 5 hurricane.
- Resulted in:
  - 44 deaths
  - 2.7 households and businesses without power for as long as 11 days. Most power restored within 48 hours.



Last Year In Review – Hurricane Beryl

- Debris removal for Hurricane Beryl started as clean up from the derecho was still underway in some areas.

City of Houston unveils drafted disaster recovery action plan for Hurricane Beryl, Derecho

FILE - HOUSTON, TEXAS - JULY 11: Fallen power lines are seen in the East End neighborhood of Houston, days after Hurricane Beryl made landfall, on Thursday, July 11, 2024 in Houston. (Raquel Natalicchio/Houston Chronicle via Getty Images) (Houston Chronicle/Hearst Newspap, © 2024 Raquel Natalicchio / Houston Chronicle)

Last Year In Review – Hurricane Beryl

- There was a sense of urgency to clean up from the derecho and Hurricane Beryl before we moved into what is typically the most active hurricane months.

Houston's cleanup of Hurricane Beryl debris estimated to cost $100 million, Solid Waste Management says

There are 10 temporary debris collection sites and more than 350 subcontractors that are on hand to pick up debris from Hurricane Beryl and the Derecho.

Author: khou.com

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Beryl blows into Houston: Hurricane makes landfall as category one; three deaths reported

Three people died due to trees falling on homes while a third died while driving to their job at Houston PD. CenterPoint has yet to announce a timeline for restoring power to 2.2 million customers.

Sarah Grunau / Adam Zuvanich / HPM Staff | July 8, 2024, 5:07 AM (Last Updated: July 9, 2024, 9:30 AM)

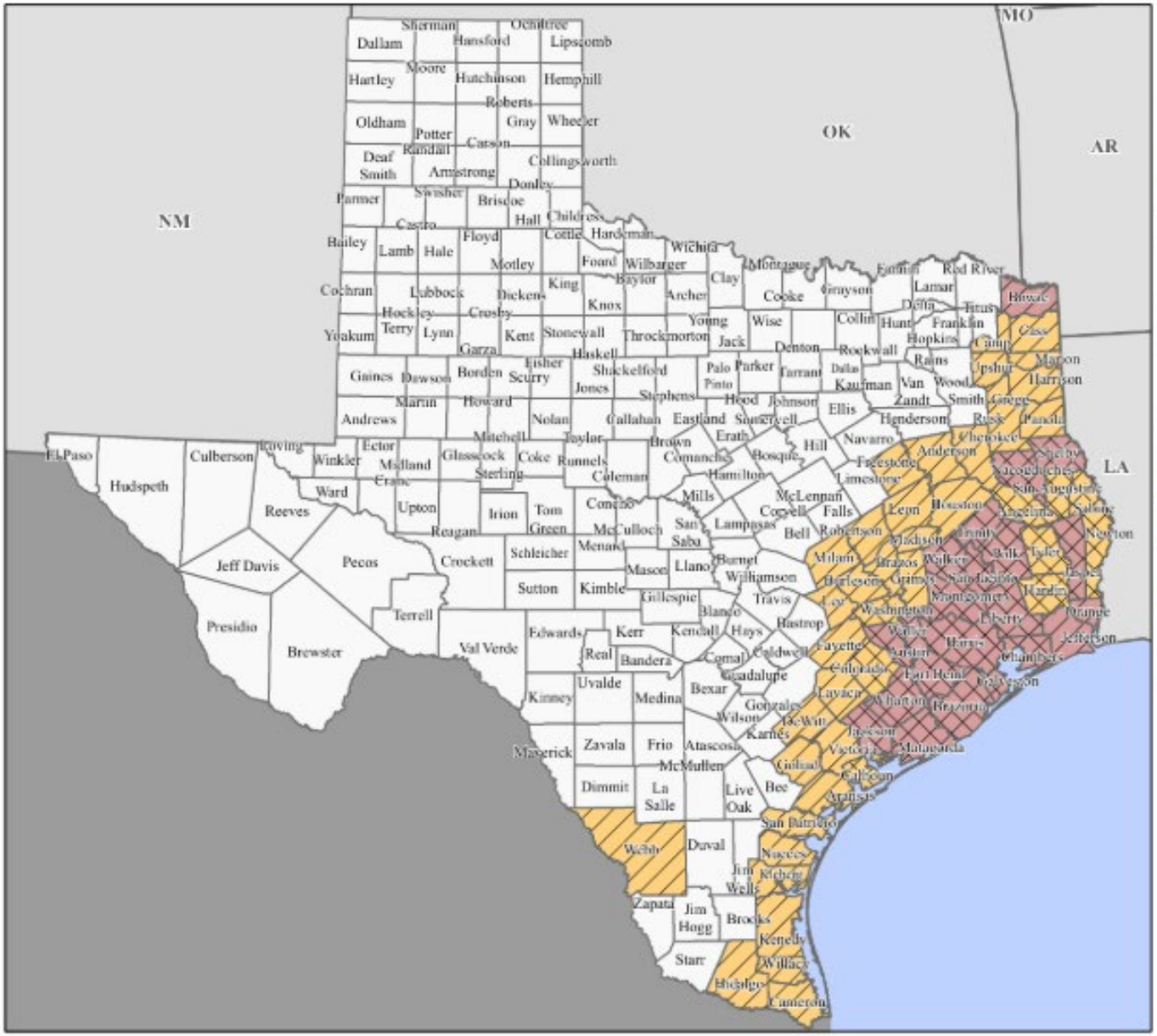
David Smith

High water in Buffalo Bayou after Hurricane Beryl. The view is looking from the Shepherd Drive overpass over Allen Parkway.

Hurricane Beryl

- DR-4798
- Incident Period: July 5, 2024 – July 9, 2024
- Declaration Date: July 9, 2024
- 26 Texas counties were eligible for Public Assistance Category A for debris removal

FEMA-4798-DR, Texas Disaster Declaration as of 09/16/2024



FEMA

Data Layer/Map Description:
The types of assistance that have been designated for selected areas in the State of Texas.

All areas in the State of Texas are eligible to apply for assistance under the Hazard Mitigation Grant Program.

Designated Counties

- No Designation
- Public Assistance (Categories A and B)
- Public Assistance (Categories A - G)
- Individual Assistance and Public Assistance (Categories A and B)
- Individual Assistance and Public Assistance (Categories A - G)

N
W
E
S

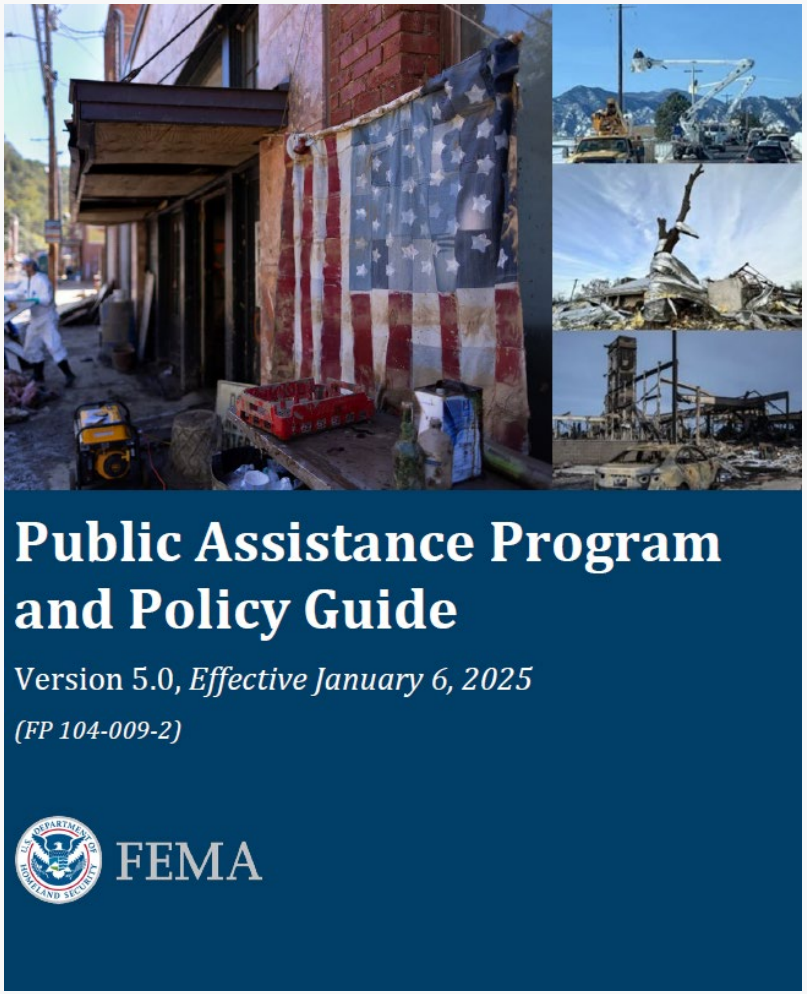
0 40 80 120 160
Miles

Data Sources:
FEMA, ESRI;
Initial Declaration: 07/09/2024
Disaster Federal Registry Notice:
Amendment #6: 09/16/2024
Datum: North American 1983
Projection: Lambert Conformal Conic

MapID 3daa7a429940917240945twhqprod

New Public Assistance Program and Policy Guide

- New PAPPG version 5.0
- Effective January 6, 2025
- Substantially same
- Simplified language, reduced duplication of topics

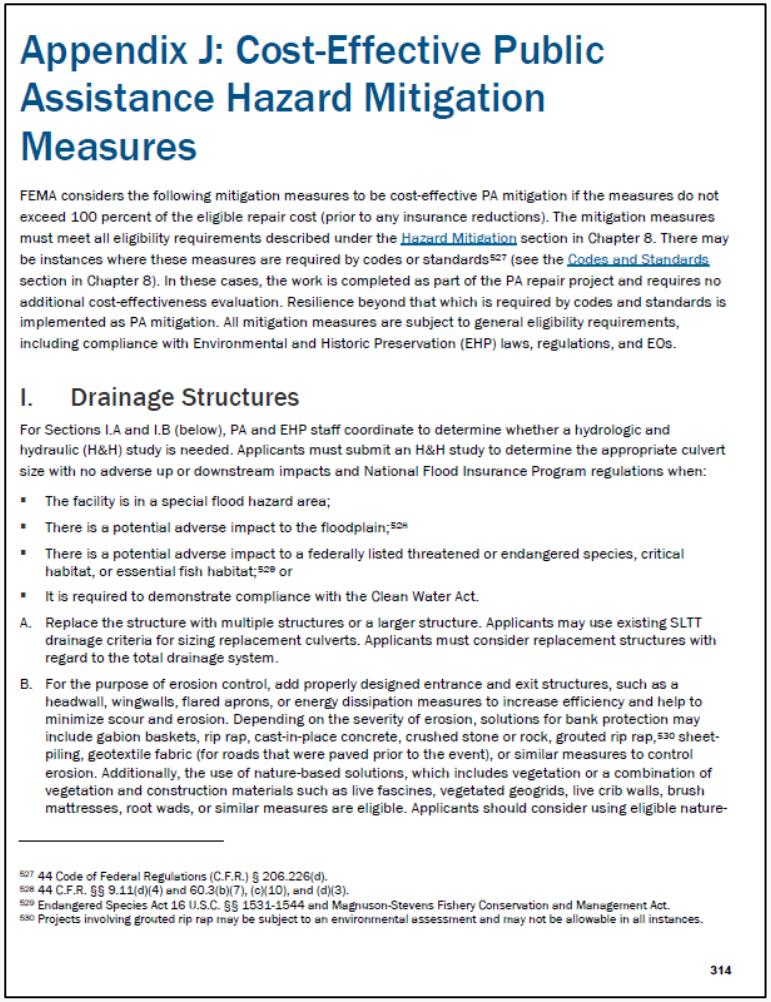


PAPPG – New Category of Work (Category I)

- Building Code and Floodplain Management Administration and Enforcement Activities Grouping (Category I)
- Coincides with FEMA's DRRA 1206 Policy allowing Building Code and Floodplain Management Administration and Enforcement Activities to be captured. Work must be completed within 180 days of the event and only OT is eligible for budgeted employees.

PAPPG - Mitigation

- Can be retroactively applied to older events.
- Expanded Appendix J to include additional measures, with 2 focused on wildfires.



Appendix J: Cost-Effective Public Assistance Hazard Mitigation Measures

FEMA considers the following mitigation measures to be cost-effective PA mitigation if the measures do not exceed 100 percent of the eligible repair cost (prior to any insurance reductions). The mitigation measures must meet all eligibility requirements described under the Hazard Mitigation section in Chapter 8. There may be instances where these measures are required by codes or standards[527] (see the Codes and Standards section in Chapter 8). In these cases, the work is completed as part of the PA repair project and requires no additional cost-effectiveness evaluation. Resilience beyond that which is required by codes and standards is implemented as PA mitigation. All mitigation measures are subject to general eligibility requirements, including compliance with Environmental and Historic Preservation (EHP) laws, regulations, and EOs.

I. Drainage Structures

For Sections I.A and I.B (below), PA and EHP staff coordinate to determine whether a hydrologic and hydraulic (H&H) study is needed. Applicants must submit an H&H study to determine the appropriate culvert size with no adverse up or downstream impacts and National Flood Insurance Program regulations when:

- The facility is in a special flood hazard area;
- There is a potential adverse impact to the floodplain;[528]
- There is a potential adverse impact to a federally listed threatened or endangered species, critical habitat, or essential fish habitat;[529] or
- It is required to demonstrate compliance with the Clean Water Act.

A. Replace the structure with multiple structures or a larger structure. Applicants may use existing SLTT drainage criteria for sizing replacement culverts. Applicants must consider replacement structures with regard to the total drainage system.

B. For the purpose of erosion control, add properly designed entrance and exit structures, such as a headwall, wingwalls, flared aprons, or energy dissipation measures to increase efficiency and help to minimize scour and erosion. Depending on the severity of erosion, solutions for bank protection may include gabion baskets, rip rap, cast-in-place concrete, crushed stone or rock, grouted rip rap,[530] sheet-piling, geotextile fabric (for roads that were paved prior to the event), or similar measures to control erosion. Additionally, the use of nature-based solutions, which includes vegetation or a combination of vegetation and construction materials such as live fascines, vegetated geogrids, live crib walls, brush mattresses, root wads, or similar measures are eligible. Applicants should consider using eligible nature-

[527] 44 Code of Federal Regulations (C.F.R.) § 206.226(d).
[528] 44 C.F.R. §§ 9.11(d)(4) and 60.3(b)(7), (c)(10), and (d)(3).
[529] Endangered Species Act 16 U.S.C. §§ 1531-1544 and Magnuson-Stevens Fishery Conservation and Management Act.
[530] Projects involving grouted rip rap may be subject to an environmental assessment and may not be allowable in all instances.

314

PAPPG – Documentation and Requirements

- Clarified for large vs. small projects and incorporates the Simplified Procedures Policy

PAPPG – Private Property Debris Removal

- Removed requirement for pre-approval and includes privately owned roads and property (commercial and non-commercial)
- Added terminology box defining “orphan roads.”
- Added language clarifying FEMA’s authority to determine whether debris removal from restricted or private roads is in the public interest.
- Still need to notify FEMA, and FEMA still recommends preapproval!

PAPPG – Hazardous Limbs, Trees, and Stumps

- Updated requirements to align with Stafford Act, Section 422, and FEMA's Simplifying the Public Assistance Program Memo (i.e., added language indicating that FEMA encourages applicants work with qualified individuals to perform hazard tree assessments to determine those trees that can be saved by bracing).
- Removed condition that bracing a tree is eligible "only when doing so is less costly than removal and disposal."

PAPPG – Environmental and Historic Preservation (EHP)

- Clarified documentation requirements and provided examples of projects with potential impacts
- Provided considerations by category of work
- Provided examples of project types that may have impacts to natural/cultural resources

PAPPG – Project Closeout

- If the work is 100% complete at the time a project is obligated, the following compliance reviews do not need to be repeated at closeout:
  - Determining whether the subrecipient completed the work within the approved deadline
  - Procurement and contracting
  - Reasonableness of the costs
  - Code & standard requirements
  - EHP Requirements

PAPPG - Sheltering

- Removed pre-approval for non-congregate sheltering in traditional settings (i.e. hotels/motels, dormitories).
- Removed childcare services as a standalone emergency protective measure (now only eligible when associated w/sheltering).
- Expanded sheltering to include pets, service animals, and assistance animals and removed the requirement to shelter owners and animals together.
- For non-congregate sheltering, only a daily rate is eligible.
- FEMA will only cover damages caused by survivors if it's the applicant's legal responsibility based on the facility use agreement/lodging contract.

Lessons Learned
Lithium-Ion Batteries

- Due to issues with ignitability and reactivity, lithium-ion batteries require special care in disposal.

Lessons Learned Lithium-Ion Batteries

United States Environmental Protection Agency

2023 Maui Wildfires
Damaged Lithium-Ion Battery Management Guide for Electric Vehicles & Mobility Devices

Version: November 27, 2023

1. OBJECTIVE

The handling of damaged lithium-ion batteries inherently presents significant hazards to response personnel. This Guide, along with complementary Standard Operating Procedures, has been established as a set of general guidelines for the proper handling of lithium-ion batteries to protect all response personnel. The purpose of this procedure is to outline the minimum requirements for safe handling, transportation, and the disposal process considerations for fire damaged lithium-ion batteries through a process of hazard identification and exposure control practices resulting in risk mitigation (Hazard x Exposure = Risk). This Guide is geared towards the following categories of lithium-ion batteries: Battery Energy Storage Systems (BESS), electric and hybrid vehicles (EVs), micromobility devices (e-bikes and scooters), and small batteries (vaping devices, power tools, computers, cell phones, etc.).

2. HAZARDS

Thermally insulted, burned or partially damaged lithium-ion batteries are susceptible to thermal runaway. This chemical reaction produces self-sustaining high temperatures that can result in the release of toxic and flammable/explosive vapors with the potential for fire (Figure 1). In addition to combustion products, the vapor produced during thermal runaway and fire can include the following hazardous and toxic and flammable/explosive vapors.:

- Hydrogen (30%-50%)
- Carbon monoxide (CO)
- Hydrogen fluoride (HF)
- Hydrogen chloride (HCl)
- Hydrogen cyanide (HCN)
- Phosphoryl fluoride (POF_3)
- Organic solvent droplets
- Ethane, methane, and other hydrocarbons

Figure 1: Diagram depicting a cascading thermal runaway event.

Burned or damaged batteries are unpredictable and cannot be considered fully discharged or free of hazards. Reignition from propagation or thermal insult to other cells within a battery is common and can occur 30 to 90 days from an initial thermal runaway event. During transportation, extreme temperatures and mechanical damage (such as puncturing or jostling) can trigger additional thermal runaway events. Batteries, groups of cells, or individual cells that have suffered significant fire damage may be present as a mass of melted or consumed material that

- The EPA shared the processes they used in coordination with their contractors, to collect, render safe, and dispose of lithium batteries as part of the clean up and recovery from the 2023 Maui wildfires.

Lessons Learned Lithium-Ion Batteries

- Locate the batteries
- Ensure they are not energized
- De-energize the batteries in a brine solution
- Shred or crush the batteries rendering them safe for transport and disposal.

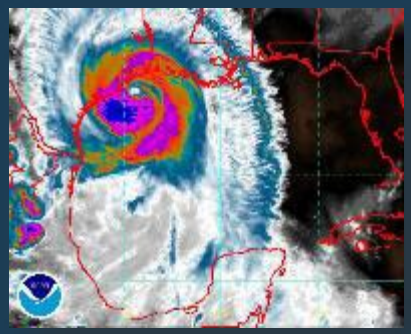
2025 Atlantic Hurricane Season Outlook

- Weather forecasters are predicting an active hurricane season this year though not a busy as last year.
  - 13 to 195 total named storms
  - 6 to 10 are forecast to become hurricanes
  - 3 to 5 major hurricanes

NOAA predicts 2025 Atlantic hurricane season will be 'above normal'

Warmer ocean temperatures, forecasts for weak wind shear and a more active West African Monsoon are expected to contribute to an above-normal season, according to the National Oceanic and Atmospheric Administration.



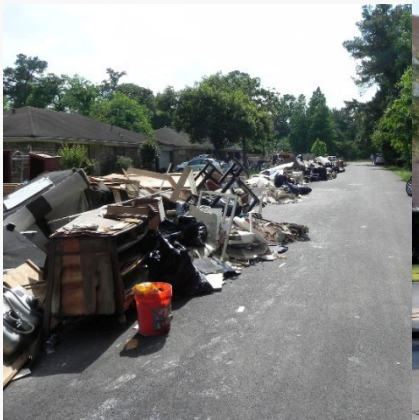



Part 2: Private Property Debris Removal

Houston-Galveston Area Council

Private Property Debris Removal

- Under the latest Public Assistance Program and Policy Guide (January 2025) PAPPG PPDR can include:
  - Privately-owned roads with unrestricted access
  - Privately-owned roads with restricted access
  - Privately-owned non-commercial property
  - Commercial property

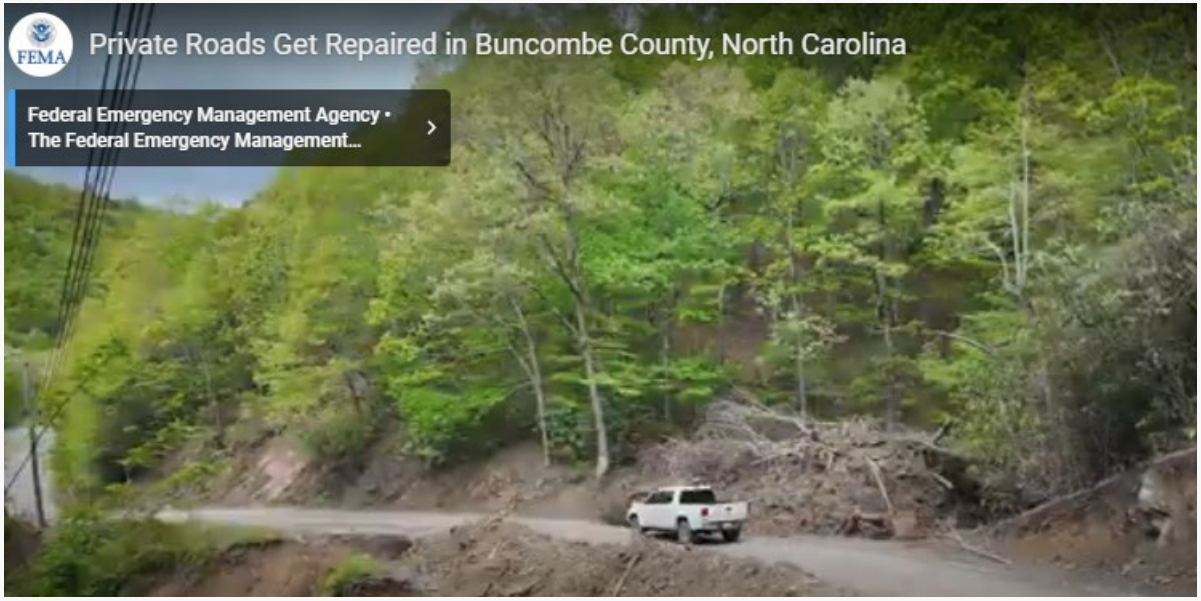




Ungated Private Roads	Gated Communities and HOAs	Non-Commercial Private Property	Commercial ROW
• Typically, does not require ROE • Does not require a separate approval • Document proof that removal is in the interest of public health and safety	• Requires an ROE • Does not require a separate approval (but FEMA recommends prior approval) • Must be "**widespread**" • **Must prove removal is in the interest of public health and safety** • Address duplication of benefits	• Requires an ROE, Indemnification, and proof of legal authority • Requires **prior** approval • Must be "**widespread**" • **Must prove removal is in the interest of public health and safety** • Address duplication of benefits	• Does not require ROE • Requires **prior** approval • **Must prove removal is in the interest of public health and safety**

Privately-Owned Roads

- Private roads are those that are not owned by, or operated by, or otherwise the legal responsibility of a public entity, such as orphan roads, roads in gated communities, or homeowners' association roads.



Privately-Owned Roads But With Public Access

- If the public has unrestricted access (e.g., no locks, gates, or guards) and frequently uses the private road, then removal and disposal of the debris is demonstrably in the public interest.

Privately-Owned Roads But With Public Access

- This work includes debris placed at the curbside by residents. The applicant is generally not required to submit additional documentation demonstrating the debris removal is in the public interest.

Privately-Owned Roads With Restricted Access

- If the public has restricted road access (e.g., behind locks, gates, or guards) or the private roads are unrestricted but rarely used by the public, then the applicant must demonstrate that such debris removal is in the public interest. FEMA has the authority to determine whether such debris removal is eligible.

Private / Gated Streets

- Follow FEMA Guidance, Evaluate hazards.

Privately-Owned Non-Commercial Property

- Debris removal from private-owned non-commercial property (private residential property) is usually not in the public interest.
- However, if is so widespread or of such magnitude that it creates an immediate threat to public health and safety, debris removal may be in the public interest.

Privately-Owned Non-Commercial Property

- To determine if removal of debris from private residential property is in the public interest, FEMA evaluates the public health determination, and will consider:
  - Whether the debris is located in open areas accessible to the public
  - Volume of debris;
  - Height of debris;
  - Number of houses and blocks with large volumes of debris; and,
  - Amount of the public population affected

Private Commercial Property

- Debris removal from commercial property is typically ineligible, as commercial businesses are expected to have insurance covering this.
- Applicants are advised to obtain written pre-approval from FEMA for any debris removal from commercial properties before starting work.

Private Commercial Property

- In rare and exceptional cases, such as when critical facilities are involved, restoration costs for damaged infrastructure in a small area are exceptionally high, or debris is heavily concentrated, the FEMA Regional Administrator may grant an exception.

Private Commercial Property

- Commercial property owners are not allowed to move or place debris from their properties onto public rights-of-way. Debris on public rights-of-way from the incident itself is eligible for removal, but debris deliberately moved there from commercial properties is not eligible.

Duplication of Benefits in Private Property Debris Removal

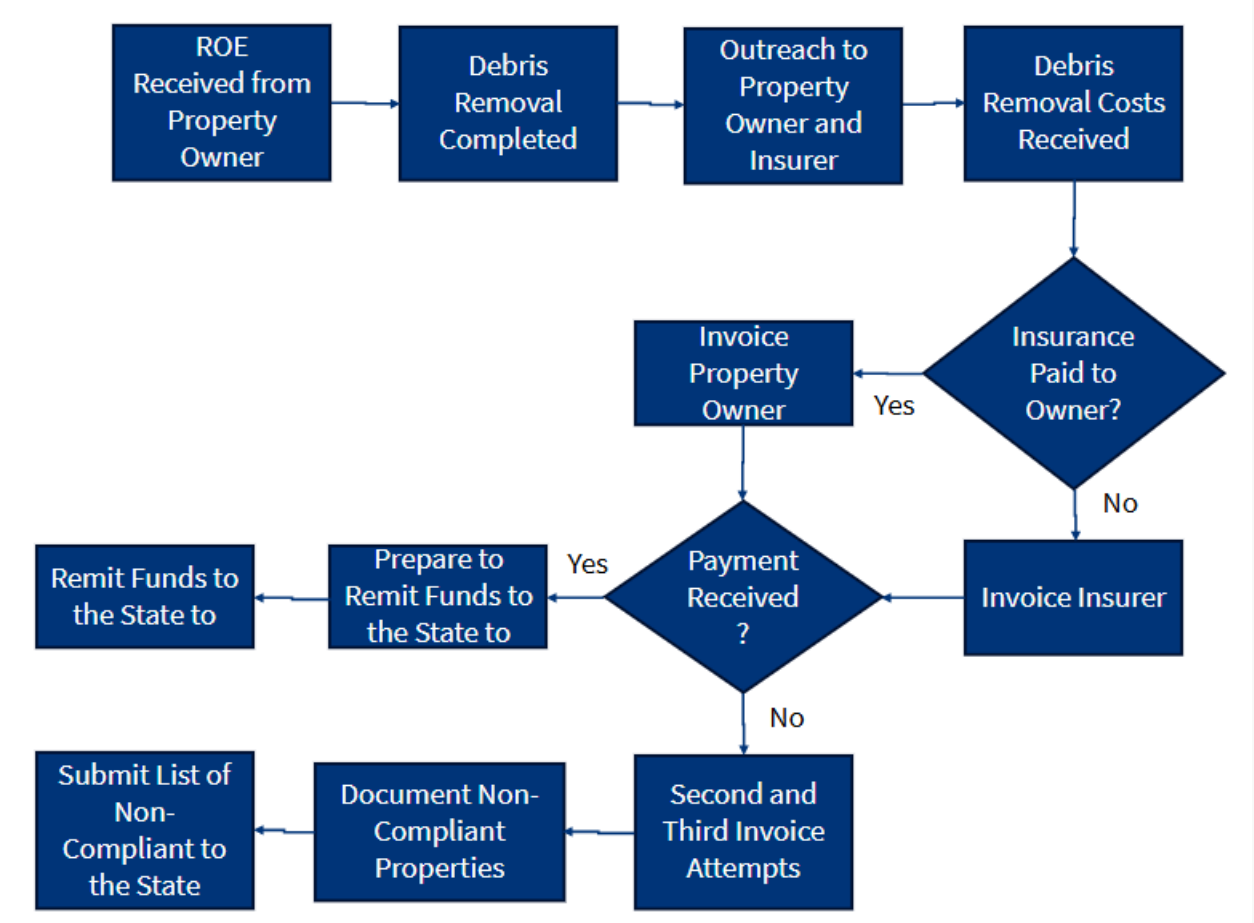
- Applicants must work with private property owners to pursue and recover insurance proceeds and credit FEMA the federal share of any insurance proceeds received.

If I have homeowner's insurance, can I still participate in the debris removal program?

- When you submit an ROE, you must submit a copy of your homeowner's insurance policy.
- To avoid a duplication of benefits, your insurance company may be required to provide payment from your policy designated for debris removal or demolition to the county.
- If you have already received a benefits payment from your insurance company for work you are requesting from the county, you may be requested to reimburse the county for that portion to eliminate any duplication of benefits that may arise after final costs of the project are assessed and your statement of loss is reviewed.

Insurance Review Process Flow

- The process flow diagram shows the steps involved for one project in collecting information, verifying coverage, and collecting insurance proceeds.



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PPDR – Public Information Strategies

- Communicate the requirements of the PPDR program.
  - Completion of ROE
  - Provide insurance information
  - Hold harmless of local, state, and federal entities and their contractors.
  - Disclose the location of septic tanks.
- Communicate the timeline of PPDR activities.
- Communicate requirements of property owners who opt to not participate in the program.

Asbestos and Other Environmental Considerations

- Asbestos and other hazardous materials, must be accurately identified, safely collected, and properly disposed of using qualified personnel or contractors.

Documentation Requirements for PPDR

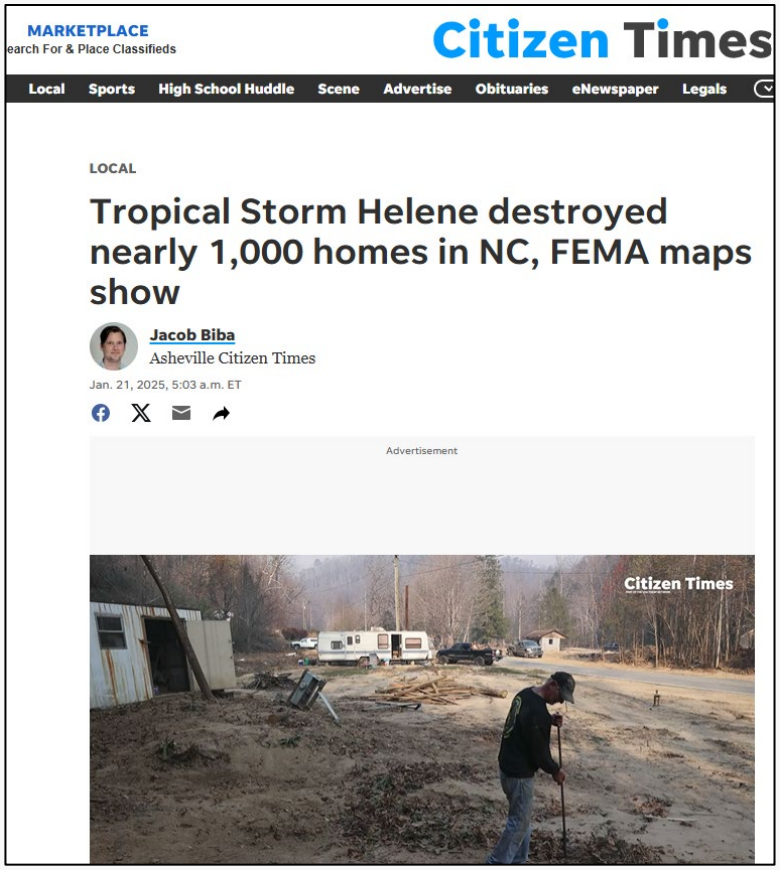
- Written documentation identifying the specific properties or areas of properties where PPDR occurred;
- A written statement from an authorized applicant official that:
  - Certifies the applicant has legal authority and responsibility to remove debris from private property;
  - Cites all applicable sources of authority (law, ordinance, code, contract, etc.); and,
  - Indemnifies the federal government for any claim arising from the debris removal.
- Documentation to show the work is eligible for PA funding.

Documentation Requirements for PPDR

- Applicants must demonstrate that the PPDR was in the public interest.
- The assertion must be made by jurisdiction's public health authority or other public entity that has legal authority to assert that disaster-generated debris on private property constitutes an immediate threat to:
  - Life
  - Public health, or safety, or to the
  - Economic recovery of the community at large.

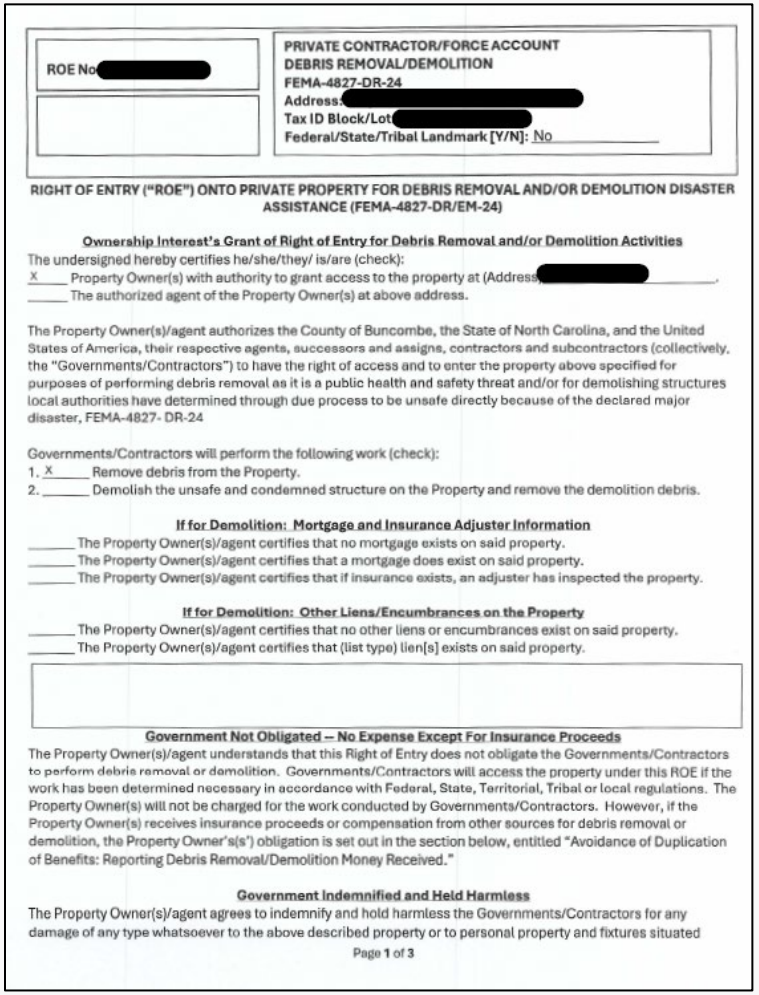
PPDR Case Study
Buncombe County, North Carolina

- Experienced extensive damage from Hurricane Helene



PPDR Case Study
Buncombe County, North Carolina

- Received 6,074 ROE applications.
- For each, ownership of the property had to be verified.
- Signature on the ROE had to match title and trustee documents.



ROE No [redacted]

PRIVATE CONTRACTOR/FORCE ACCOUNT
DEBRIS REMOVAL/DEMOLITION
FEMA-4827-DR-24
Address [redacted]
Tax ID Block/Lot [redacted]
Federal/State/Tribal Landmark [Y/N]: No

RIGHT OF ENTRY ("ROE") ONTO PRIVATE PROPERTY FOR DEBRIS REMOVAL AND/OR DEMOLITION DISASTER ASSISTANCE (FEMA-4827-DR/EM-24)

Ownership Interest's Grant of Right of Entry for Debris Removal and/or Demolition Activities

The undersigned hereby certifies he/she/they/ is/are (check):
X Property Owner(s) with authority to grant access to the property at (Address [redacted].
____ The authorized agent of the Property Owner(s) at above address.

The Property Owner(s)/agent authorizes the County of Buncombe, the State of North Carolina, and the United States of America, their respective agents, successors and assigns, contractors and subcontractors (collectively, the "Governments/Contractors") to have the right of access and to enter the property above specified for purposes of performing debris removal as it is a public health and safety threat and/or for demolishing structures local authorities have determined through due process to be unsafe directly because of the declared major disaster, FEMA-4827- DR-24

Governments/Contractors will perform the following work (check):
1. X Remove debris from the Property.
2. ____ Demolish the unsafe and condemned structure on the Property and remove the demolition debris.

If for Demolition: Mortgage and Insurance Adjuster Information

____ The Property Owner(s)/agent certifies that no mortgage exists on said property.
____ The Property Owner(s)/agent certifies that a mortgage does exist on said property.
____ The Property Owner(s)/agent certifies that if insurance exists, an adjuster has inspected the property.

If for Demolition: Other Liens/Encumbrances on the Property

____ The Property Owner(s)/agent certifies that no other liens or encumbrances exist on said property.
____ The Property Owner(s)/agent certifies that (list type) lien[s] exists on said property.

Government Not Obligated – No Expense Except For Insurance Proceeds

The Property Owner(s)/agent understands that this Right of Entry does not obligate the Governments/Contractors to perform debris removal or demolition. Governments/Contractors will access the property under this ROE if the work has been determined necessary in accordance with Federal, State, Territorial, Tribal or local regulations. The Property Owner(s) will not be charged for the work conducted by Governments/Contractors. However, if the Property Owner(s) receives insurance proceeds or compensation from other sources for debris removal or demolition, the Property Owner's(s') obligation is set out in the section below, entitled "Avoidance of Duplication of Benefits: Reporting Debris Removal/Demolition Money Received."

Government Indemnified and Held Harmless

The Property Owner(s)/agent agrees to indemnify and hold harmless the Governments/Contractors for any damage of any type whatsoever to the above described property or to personal property and fixtures situated

Page 1 of 3

PPDR Case Study
Buncombe County, North Carolina

- Under the program, small businesses were also able to participate.
- The eligibility to participate in the small business program had to be verified.

PPDR Case Study
Buncombe County, North Carolina

- Public Information Efforts:
  - Staff put up flyers all over Buncombe County.
  - Stacks of flyers and FAQs were dropped off at business that would it.
  - Door hangers with FAQs and fact sheets promoting the PPDR the program were hung on doors all over the county

PPDR Case Study
Buncombe County, North Carolina

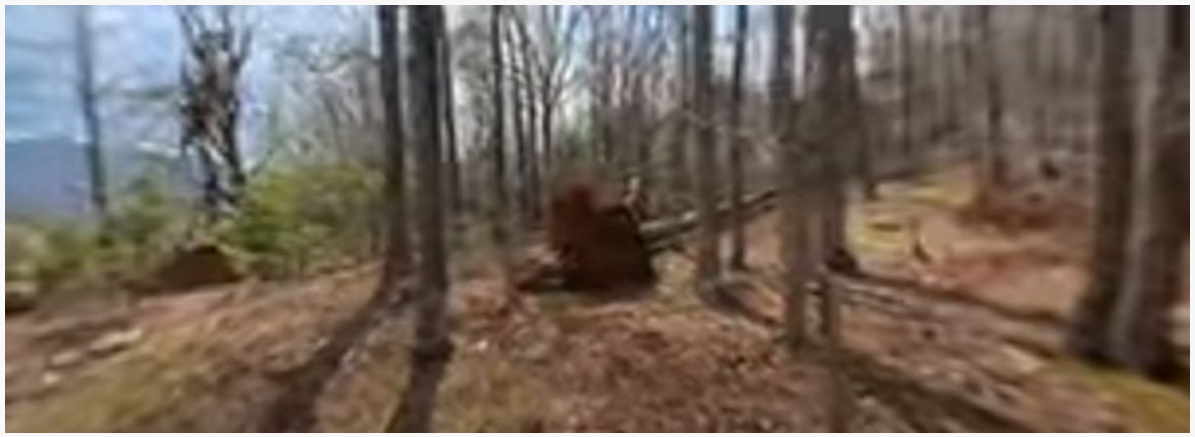
- Public Information Efforts (continued):
  - Developed a comprehensive communications strategy.
  - Managed social media platforms and cross posted instructional messages to increase reach.
  - Used paid radio spots to communicate messages.
  - Conducted community public meetings to answer questions and foster engagement.

PPDR Case Study
Buncombe County, North Carolina

- Some challenges in verifying ROEs:
  - Verifying ownership.
  - In some cases, owners had died so the will executor had to be contacted.
  - For HOAs, finding who had signature authority (staff combed through HOA meeting minutes to find who was given the authority).
  - Two witnesses had to sign the ROE for it to be valid. In some case witnesses were not notified the owner designated them as witnesses.
  - If unreadable documents were sent in staff had to reach out to collect valid documents.
  - Verification of insurance coverage.

PPDR Case Study
Buncombe County, North Carolina

- Documenting the properties:
  - Each property was inspected prior to PPDR.
  - 360 cameras were used to document the condition of the properties.
  - Took pictures of hazards and categorized them.
  - Documented the demolition process.



PPDR Case Study
Buncombe County, North Carolina

- Best Practices:
  - Were able to utilize GIS and local and state resources to verify the ROEs.
  - The 360 cameras were very helpful to allow the contractors to get a good idea of what resources would be needed at a particular site for debris removal.
  - A PPDR dashboard was maintained to provide updates to the County on the progress of operations.
  - Each step was meticulously documented using photographs, and GIS linked recovery software.

PPDR Case Study
Los Angeles County, California

- There were 9,980 participating property owners in the PPDR program resulting from the devastating wildfires in January 2025.

From the Impact Of 2025 Los Angeles Wildfires And Comparative Study Report by the Institute For Applied Economics

PPDR Case Study
Los Angeles County, California

- Only property owners with completely destroyed or severely destroyed properties could participate in the PPDR program.
- There was some flexibility for those who owned condominium properties and mobile home parks.

PPDR Case Study
Los Angeles County, California

- Review of ROEs began on February 3th.
- Debris removal did not start until Mid-March.
- The flow of ROEs can somewhat dictate the scheduling of debris removal as you want to have several in place in an area before dispatching debris removal crews.

PPDR Case Study
Los Angeles County, California

- Foundation removal:
  - In the event of a fire, the intense heat generated can compromise the structural integrity of footings and foundations, resulting in weakened concrete and reinforcement bars.
  - In addition, plumbing and electrical conduit embedded in the concrete is also usually destroyed or heavily damaged.

PPDR Case Study
Los Angeles County, California

- Foundation removal:
  - For these reasons existing footings and slabs in fire damaged buildings and structures are removed as part of the Government-Sponsored PPDR Program and would require testing to be permitted for reuse for individuals not participating in the program.

PPDR Case Study
Los Angeles County, California

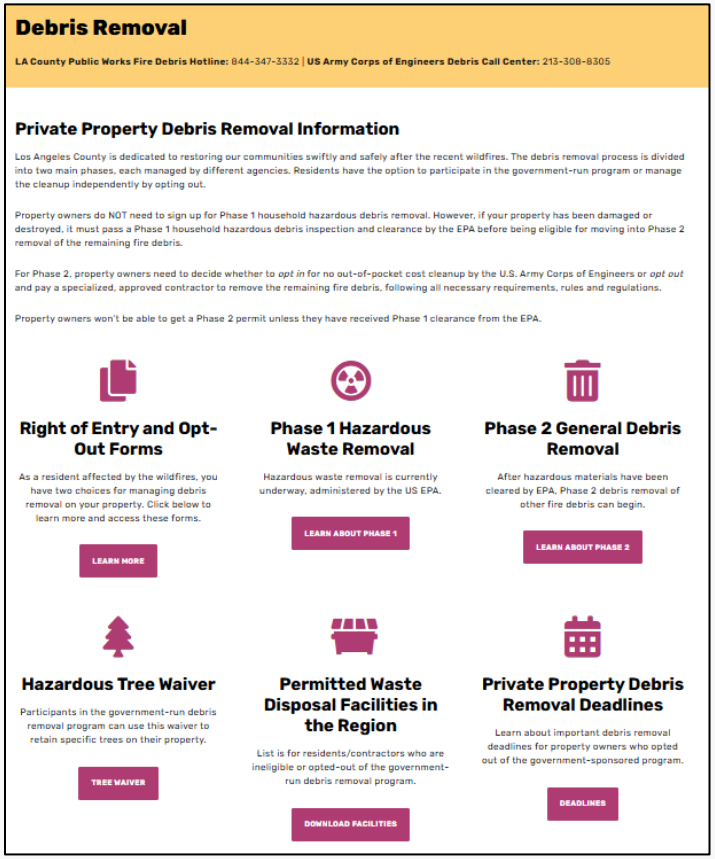
- Some challenges:
  - Lead based paint and asbestos in the debris/ash meant that special precautions had to be taken in collection and disposal.
  - Had to get everyone on the same page regarding the priorities for debris removal.
  - Disaster recovery centers were overwhelmed with individuals not only seeking assistance with PPDR but also housing, food, income and transportation needs.

PPDR Case Study
Los Angeles County, California

- Best practices:
  - Bring in an experienced team to get operations up and running.
  - Need a strong data management system to maintain, share and receive data from partners in response.
  - People who communicate with the public must be empathetic and compassionate to their situation.

PPDR Case Study
Los Angeles County, California

- Best practices:
  - Must have good coordination with elected leaders and contractors to balance priorities.
  - Public information is key. Must provide regular and realistic updates to the public.



Debris Removal

LA County Public Works Fire Debris Hotline: 844-347-3332 | **US Army Corps of Engineers Debris Call Center:** 213-308-8305

Private Property Debris Removal Information

Los Angeles County is dedicated to restoring our communities swiftly and safely after the recent wildfires. The debris removal process is divided into two main phases, each managed by different agencies. Residents have the option to participate in the government-run program or manage the cleanup independently by opting out.

Property owners do NOT need to sign up for Phase 1 household hazardous debris removal. However, if your property has been damaged or destroyed, it must pass a Phase 1 household hazardous debris inspection and clearance by the EPA before being eligible for moving into Phase 2 removal of the remaining fire debris.

For Phase 2, property owners need to decide whether to *opt in* for no out-of-pocket cost cleanup by the U.S. Army Corps of Engineers or *opt out* and pay a specialized, approved contractor to remove the remaining fire debris, following all necessary requirements, rules and regulations.

Property owners won't be able to get a Phase 2 permit unless they have received Phase 1 clearance from the EPA.

Right of Entry and Opt-Out Forms

As a resident affected by the wildfires, you have two choices for managing debris removal on your property. Click below to learn more and access these forms.

LEARN MORE

Phase 1 Hazardous Waste Removal

Hazardous waste removal is currently underway, administered by the US EPA.

LEARN ABOUT PHASE 1

Phase 2 General Debris Removal

After hazardous materials have been cleared by EPA, Phase 2 debris removal of other fire debris can begin.

LEARN ABOUT PHASE 2

Hazardous Tree Waiver

Participants in the government-run debris removal program can use this waiver to retain specific trees on their property.

TREE WAIVER

Permitted Waste Disposal Facilities in the Region

List is for residents/contractors who are ineligible or opted-out of the government-run debris removal program.

DOWNLOAD FACILITIES

Private Property Debris Removal Deadlines

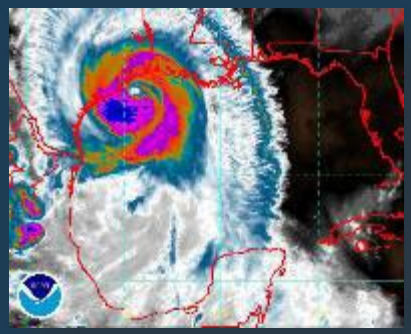
Learn about important debris removal deadlines for property owners who opted out of the government-sponsored program.

DEADLINES

PPDR Case Study
Los Angeles County, California

- Best practices:
  - Provide information to help the public through the recovery process.






Part 3: Technology and AI in Debris Management Operations

Houston-Galveston Area Council

Technology in Debris Operations

- A number of technologies have been introduced that can aid jurisdictions in the management of disaster debris.
  - Drones
  - Automated Debris Management Systems
  - Asset Tracking
  - Road verification
  - 360 Cameras
  - Load scanning systems
  - Artificial Intelligence (AI)

Drones or Unmanned Aircraft Systems

Capabilities:

- Expedited damage assessments
- Ability to survey inaccessible areas
- Progress tracking
- Before and after comparisons

Drones

Case Study:
Camp Fire – Paradise, CA

- Identified critical traffic issues for the purpose of truck routing
- Provided a system-wide view of traffic flow and vehicle progression
- Drone footage captured at key locations during peak travel time

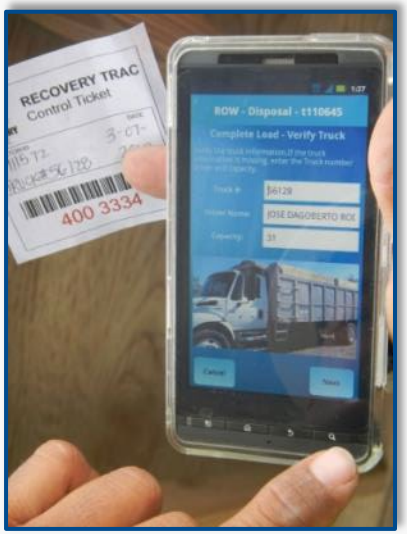
Drones

Case Study:
Camp Fire – Paradise, CA

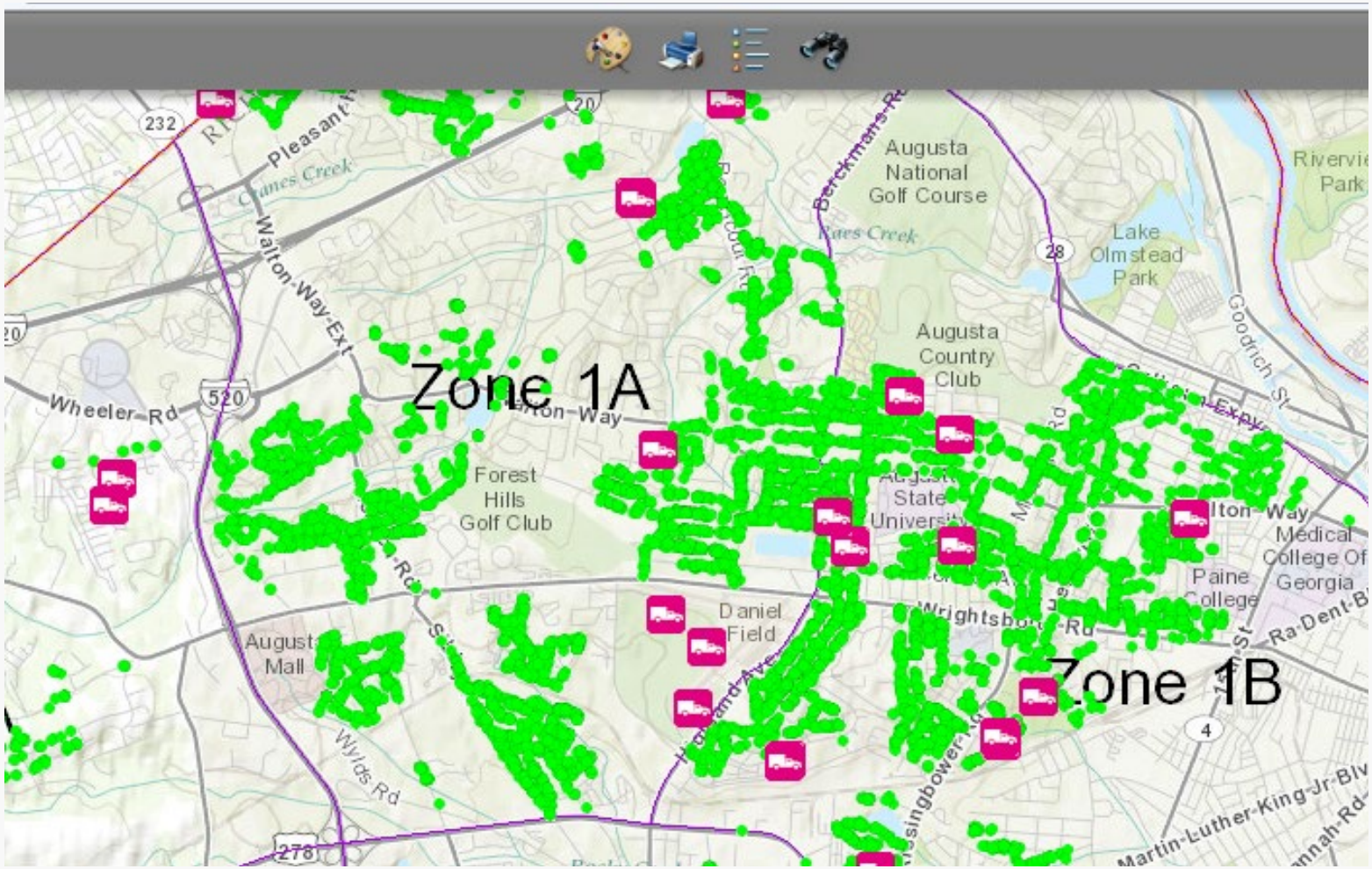
- Drones used for site assessment and pre-planning for debris removal crews on properties with unreachable owners or access issues

Automated Debris Monitoring Systems

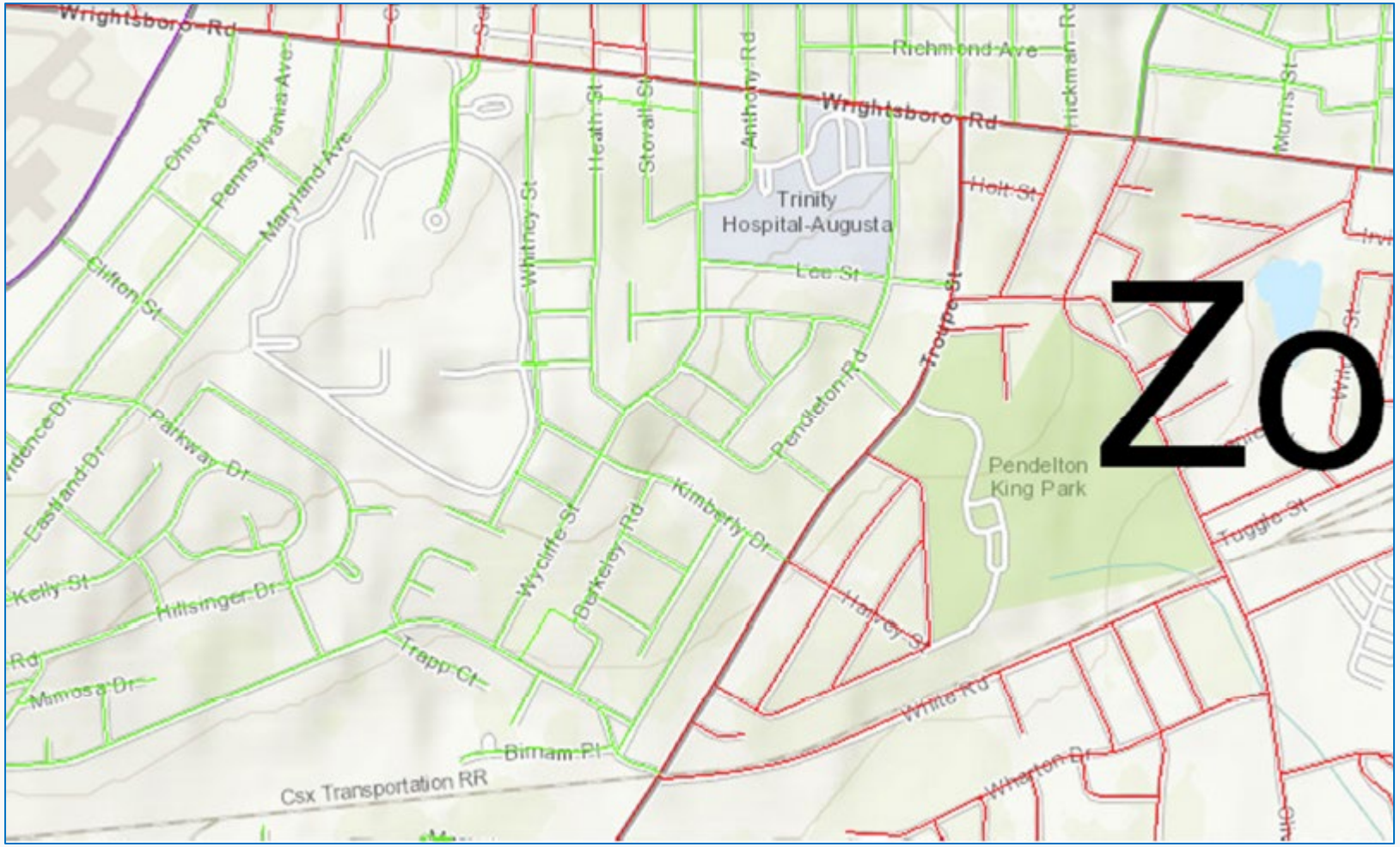
- An Automated Debris Monitoring System (ADMS), is a system used by a monitor to record crucial information so that a load ticket (and other documentation) can be generated.
- ADMS units increase field efficiency and eliminate most errors



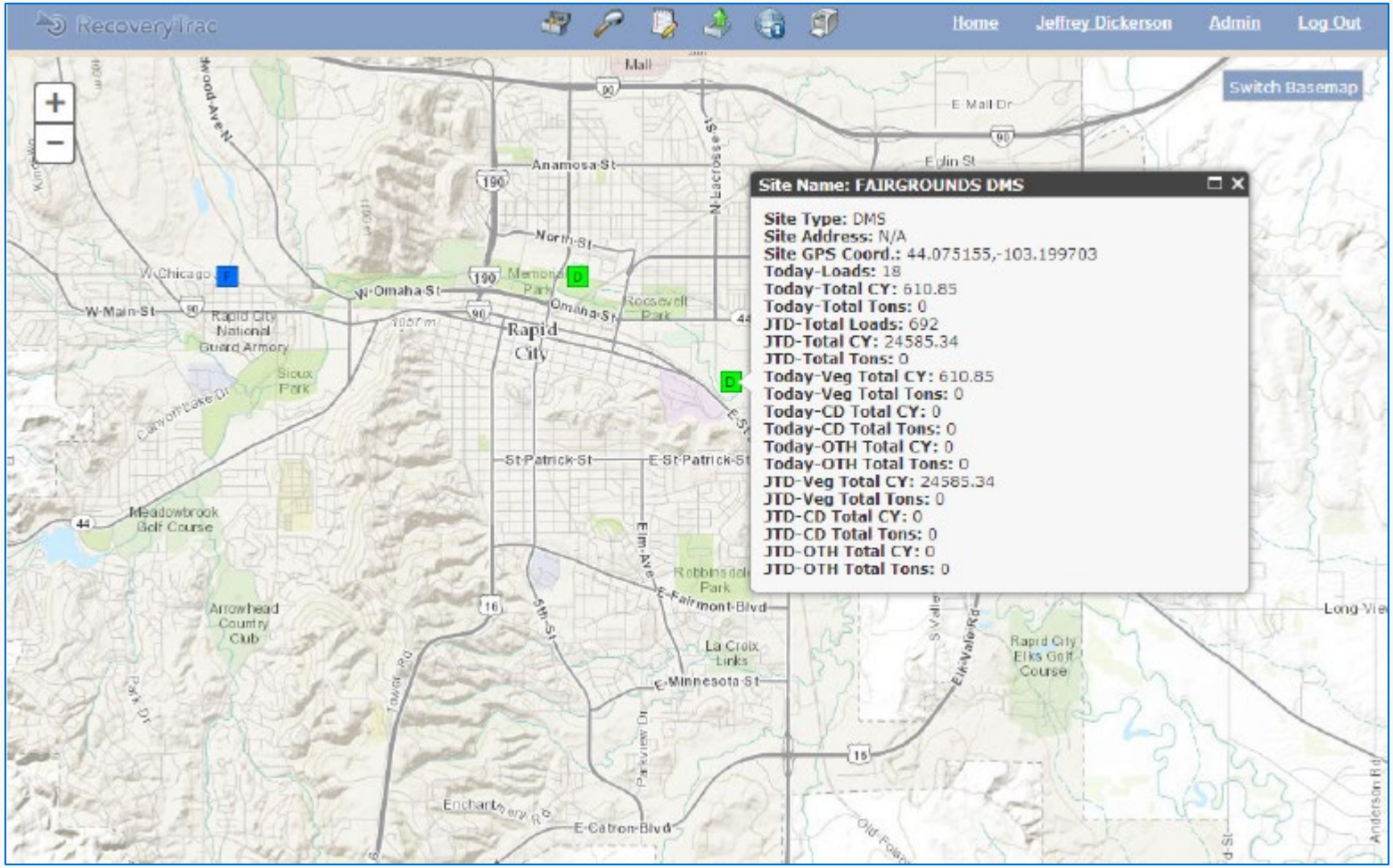
ADMS Real Time Collection Monitoring Locations



ADMS Pass Completion Status



ADMS Disposal Site Locations and Statistics



ADMS Hazardous Tree Removal In-Progress Audit Report

Total Ticket Count: 79

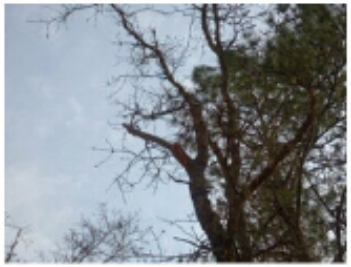
	Ticket No.	Monitor	Date	GPS-Lat	GPS-Lng	Address	Service Code	Unit Count	Meas	Zone	Photo Count
⊞	111470414	ANGELA MARTIN (B214262)	03/23/2014 9:39 AM	33.324213	-81.306739	2-22 CRICKET LN	1A	1.00	3.12	20(GIS: 20)	4
⊞	111470415	ANGELA MARTIN (B214262)	03/23/2014 9:40 AM	33.324226	-81.306741	2-22 CRICKET LN	1A	1.00	2.38	20(GIS: 20)	4
⊞	111470416	ANGELA MARTIN (B214262)	03/23/2014 9:40 AM	33.324217	-81.306724	2-22 CRICKET LN	1A	1.00	2.50	20(GIS: 20)	4
⊞	111470417	ANGELA MARTIN (B214262)	03/23/2014 9:41 AM	33.324196	-81.306678	2-22 CRICKET LN	1A	2.00	2.75	20(GIS: 20)	4
⊞	111470418	ANGELA MARTIN (B214262)	03/23/2014 9:41 AM	33.324203	-81.306732	2-22 CRICKET LN	1A	2.00	3.25	20(GIS: 20)	4
⊟	111470419	ANGELA MARTIN (B214262)	03/23/2014 9:42 AM	33.324248	-81.306773	2-22 CRICKET LN	1A	1.00	3.50	20(GIS: 20)	4

Crew Photo

Pre-Work Photo

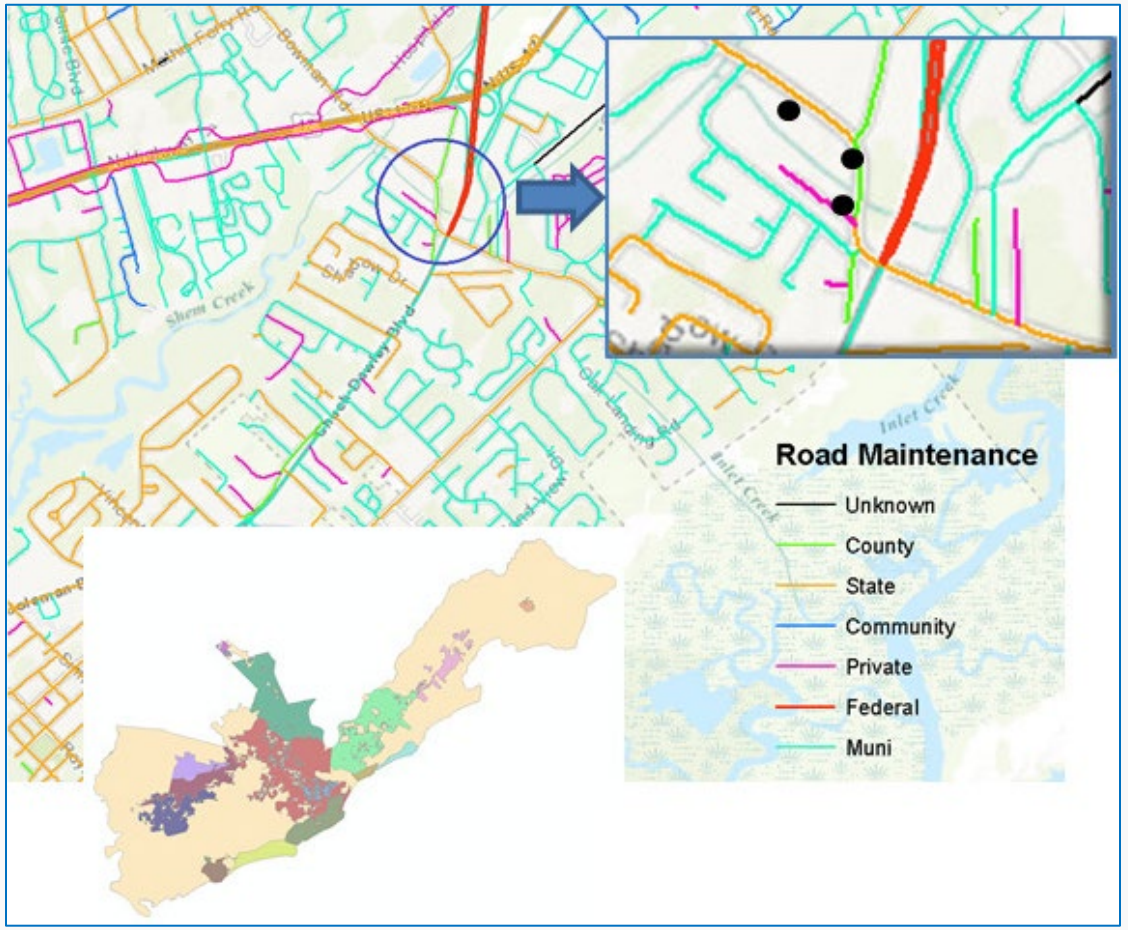
Measurement Photo

Post-Work Photo

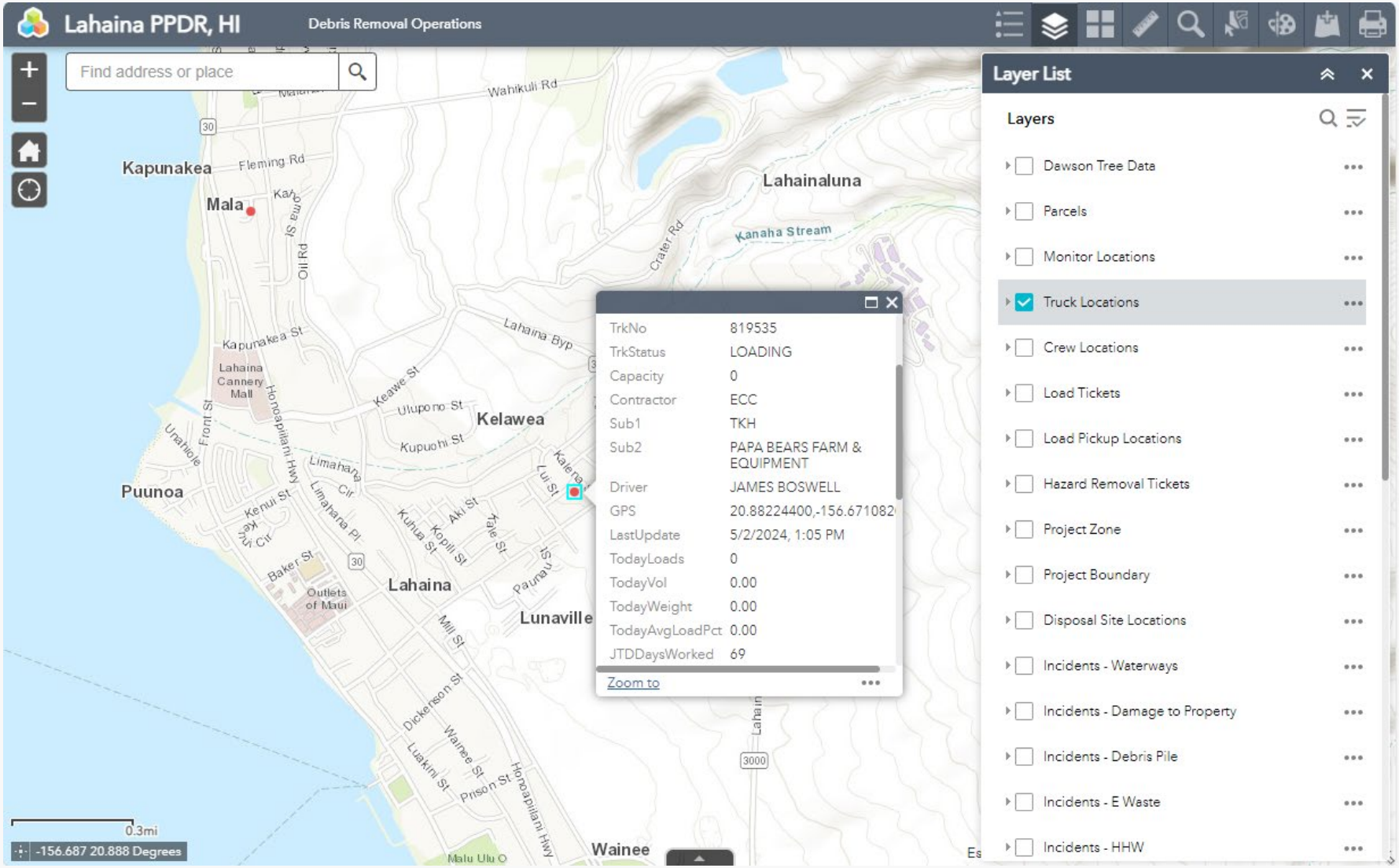


⊞	111470420	ANGELA MARTIN (B214262)	03/23/2014 9:42 AM	33.324402	-81.306778	1-21 CRICKET LN	1A	1.00	3.88	20(GIS: 20)	4
⊞	111470421	ANGELA MARTIN (B214262)	03/23/2014 9:43 AM	33.324396	-81.306802	1-21 CRICKET LN	1A	1.00	3.12	20(GIS: 20)	4
⊞	111470422	ANGELA MARTIN (B214262)	03/23/2014 9:43 AM	33.324412	-81.306757	1-21 CRICKET LN	1A	1.00	3.25	20(GIS: 20)	4
⊞	111470423	ANGELA MARTIN (B214262)	03/23/2014 9:44 AM	33.324437	-81.306777	1-21 CRICKET LN	1A	1.00	3.88	20(GIS: 20)	4
⊞	111470424	ANGELA MARTIN (B214262)	03/23/2014 10:06 AM	33.324274	-81.306813	2-22 CRICKET LN	1A	1.00	4.50	20(GIS: 20)	4
⊞	111470425	ANGELA MARTIN (B214262)	03/23/2014 10:06 AM	33.324190	-81.306692	16116 S CAROLINA 3	1A	1.00	2.62	20(GIS: 20)	4
⊞	111470426	ANGELA MARTIN (B214262)	03/23/2014 10:07 AM	33.324161	-81.306564	1-21 CRICKET LN	1A	1.00	2.75	20(GIS: 20)	4
⊞	111470427	ANGELA MARTIN (B214262)	03/23/2014 10:18 AM	33.324207	-81.306708	2-22 CRICKET LN	1A	2.00	3.12	20(GIS: 20)	4
⊞	111470428	ANGELA MARTIN (B214262)	03/23/2014 10:19 AM	33.324115	-81.306631	2-22 CRICKET LN	1A	2.00	4.75	20(GIS: 20)	4

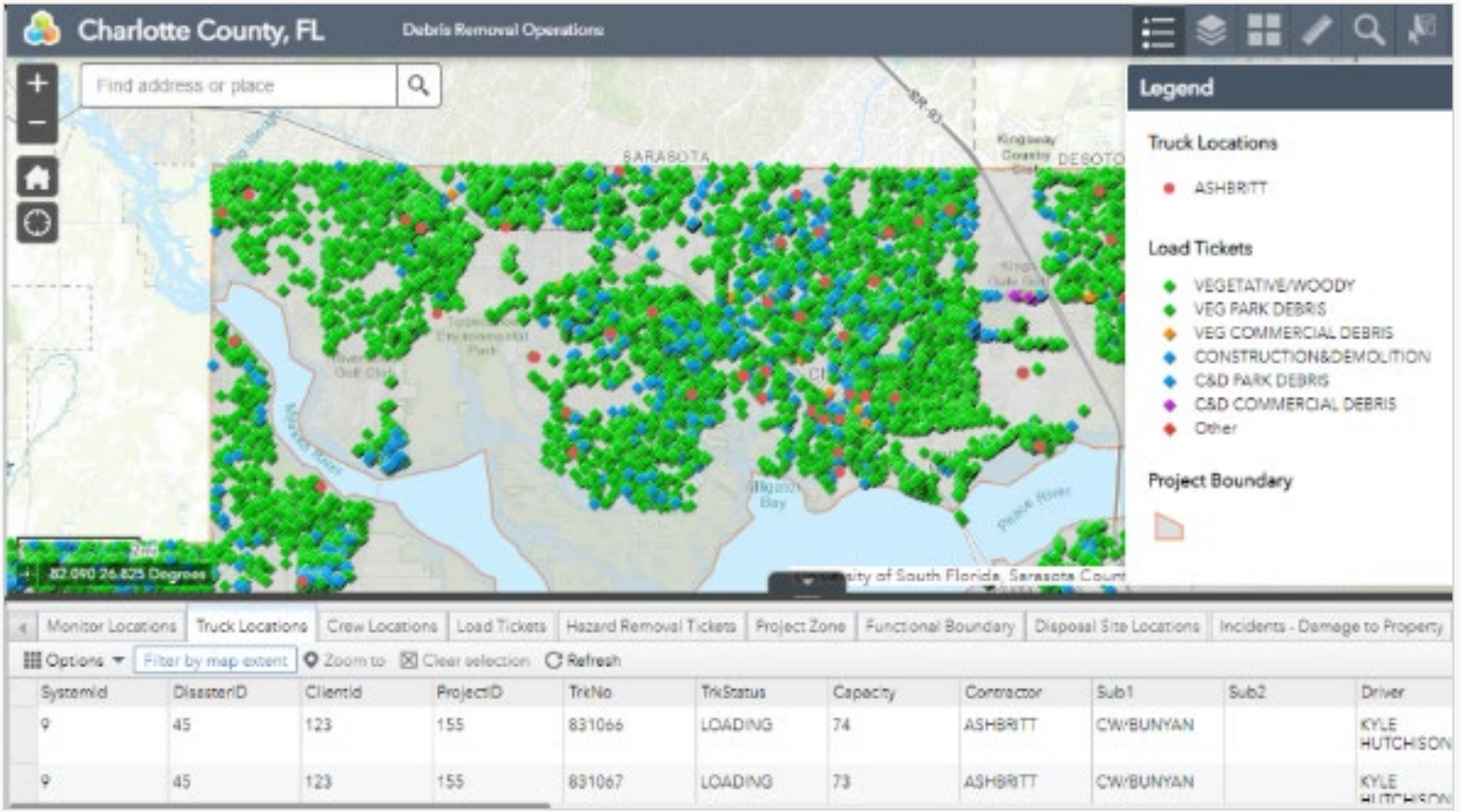
ADMS City Boundaries and Road Centerline Data



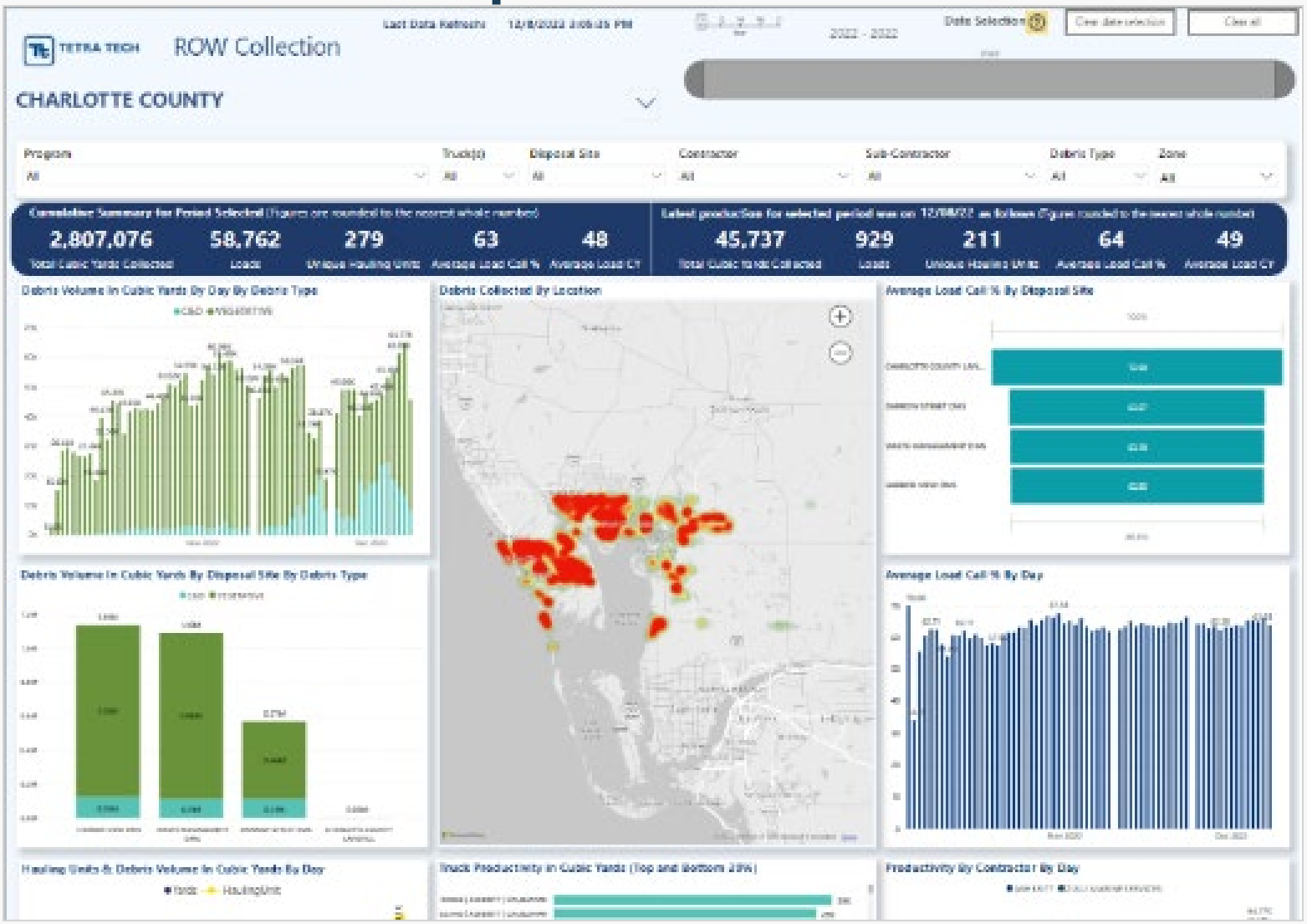
ADMS Truck Locations



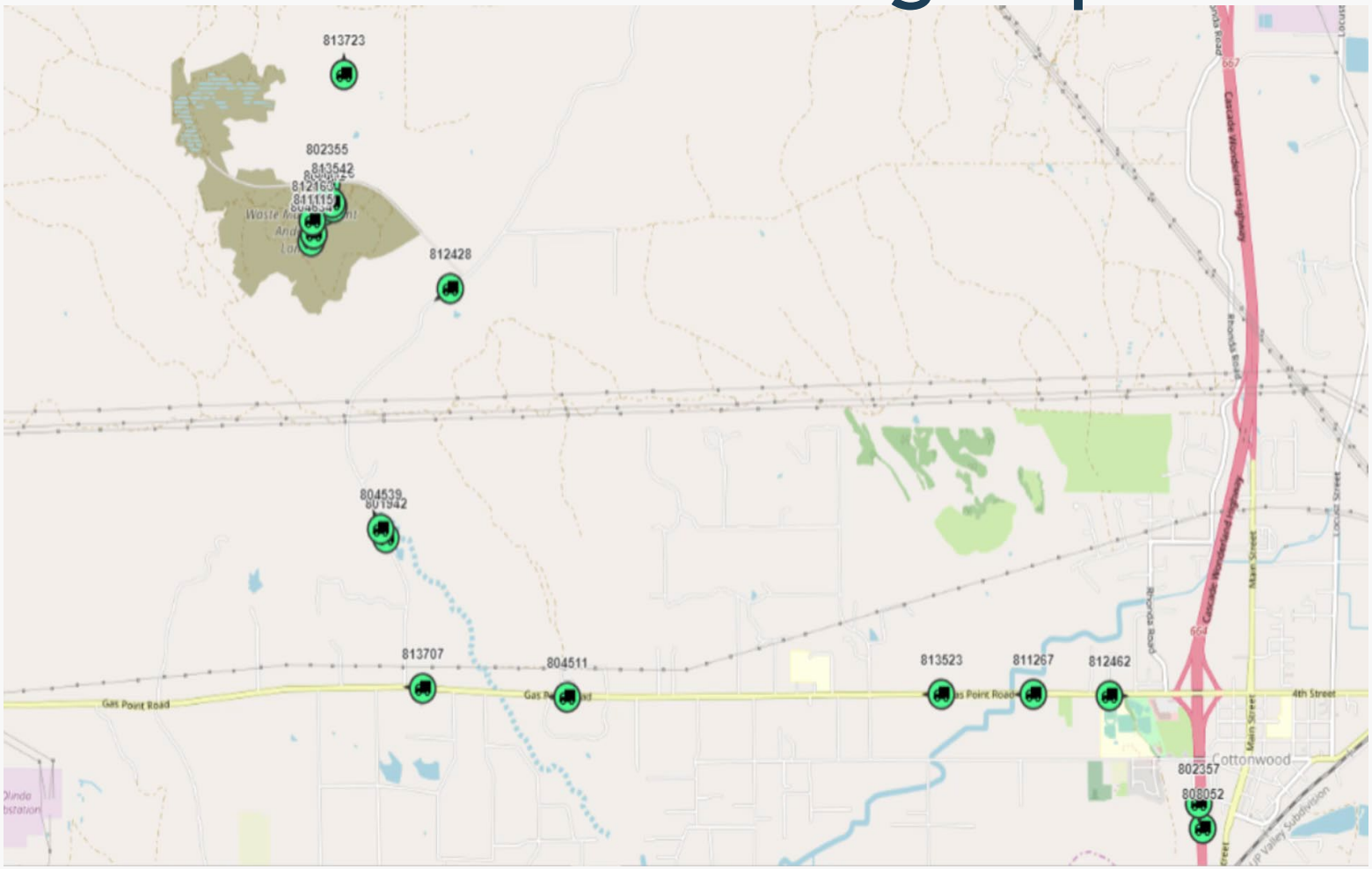
ADMS Customized Reporting



ADMS Geoportal Debris Tracking



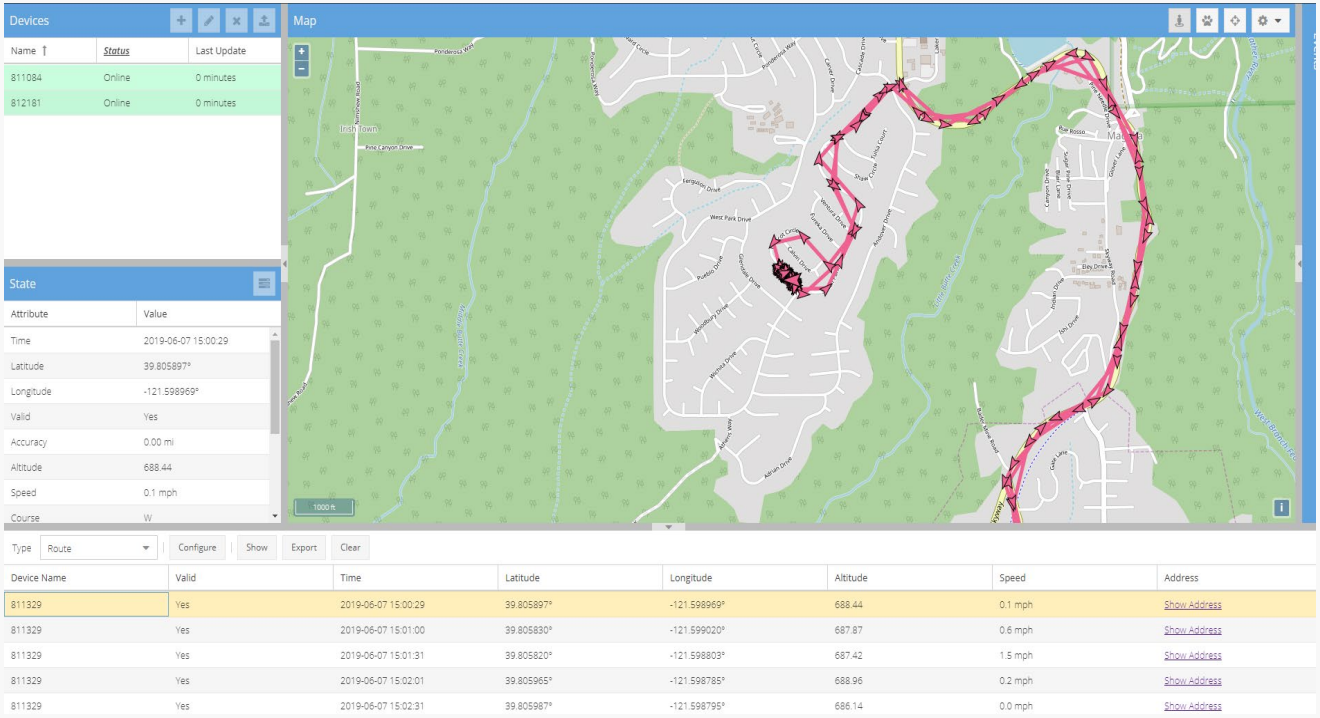
Asset Tracking
Fleet Tracking Capabilities



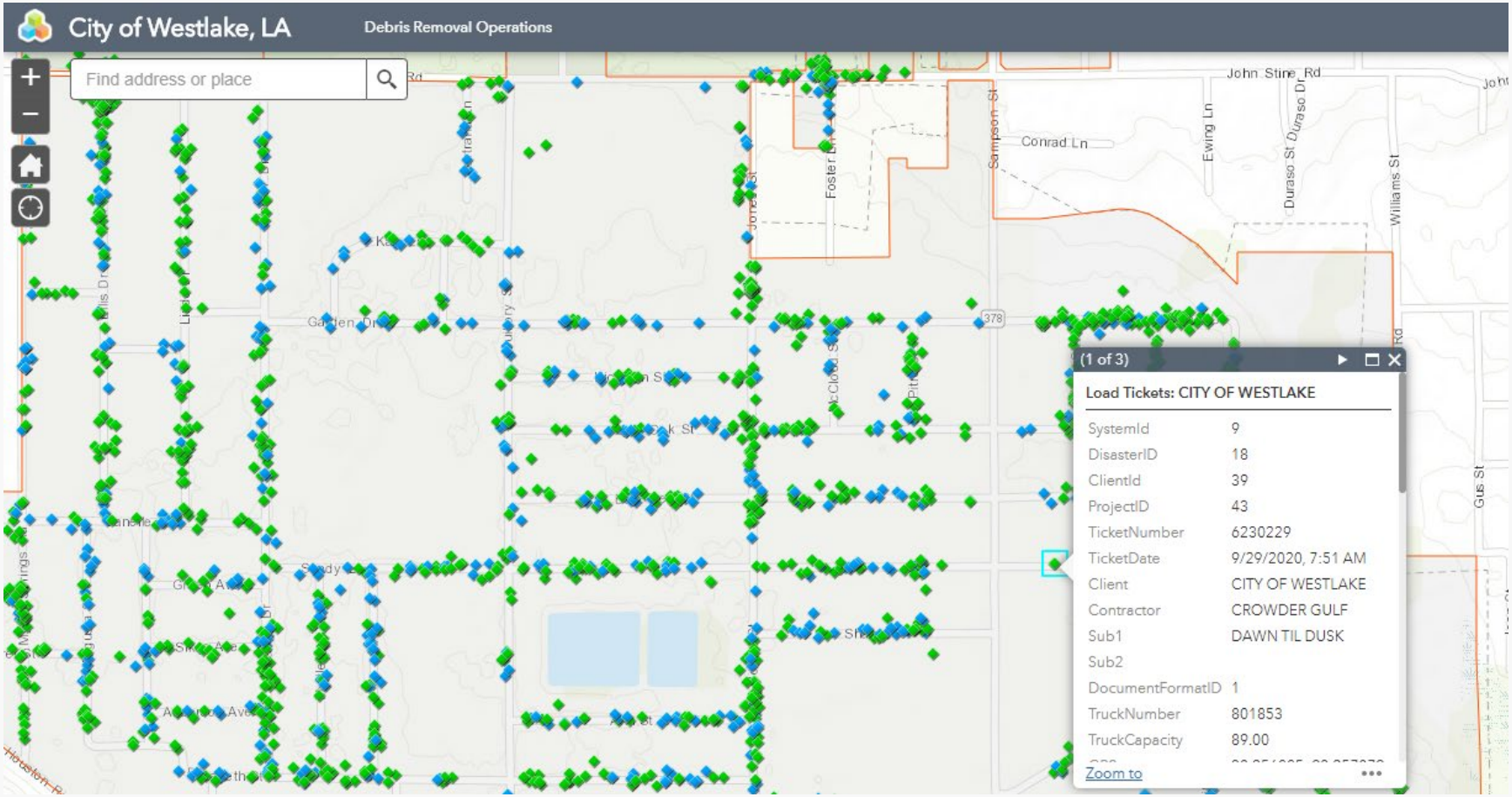
Fleet Tracking Capabilities

Captures:

- Speed
- Location
- Time
- Truck number
- Subcontractor number
- Active/not active
- Return times
- Directional location



ADMS in Road Verification



Verify ADMS Capacity with Monitoring Vendors

- What capacity do you have to deploy ADMS?
- What measures are taken to secure the data?
- Can we integrate the information on our website?
- Who owns the data?
- Is the system easy to deploy?
- What contingency plans are in place if the system or cell towers are down?

360 Cameras

- 360 cameras capture a complete, panoramic view of damaged areas and debris, ensuring that all details are documented, including those that might be missed in traditional photos.


360 Cameras

- 360 images can be easily shared with stakeholders, providing a clear and objective view of the situation and facilitating better communication and decision-making.

@mosaic360cameras

Example of 360 Camera Use

- https://www.youtube.com/watch?v=EdZczD0Grmc

Qualities to Look for in 360 Cameras

- **Image quality:** Consider the resolution of photos and videos to ensure sufficient detail for documentation.
- **Ease of use:** Look for user-friendly designs and straightforward operation.
- **Durability and weather resistance:** Choose cameras that can withstand the conditions of disaster recovery operations and outdoor environments.
- **Software compatibility:** Ensure the camera is compatible with reality capture software or other project management tools you may be using.
- **LiDAR technology:** While some smartphones and scanners offer LiDAR, dedicated 360 cameras are generally preferred for their accuracy and precision in challenging conditions, especially when precise measurements are needed for estimates.

AI in Disaster Recovery Operations

- Fraud detection
- Document analysis
- Photograph analysis
- Chatbot
- Environmental analysis
- Hurricane tracking
- Flood modeling
- Disaster scenarios for exercises

LiDAR Cameras

- LiDAR cameras can be used to help certify trucks by accurately measuring their hauling capacity.
- The US Army Corp of Engineers (USACE) has been using these tools to expedite truck certifications.
- Cost ~30K ea ($1K/mo leased)

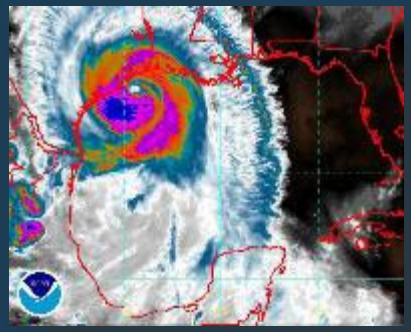
Faro Industries ZEB Horizon RT pictured

Automated Load Scanning Systems

- Can scan truck loads to provide an accurate measurement of loads prior to dumping.
- Can be used on a portable or fixed pole.
- Cost ~50K/ea (unknown if leasing is available)
- Proposed to run side-by-side with human load calls.

Loadscan system pictured

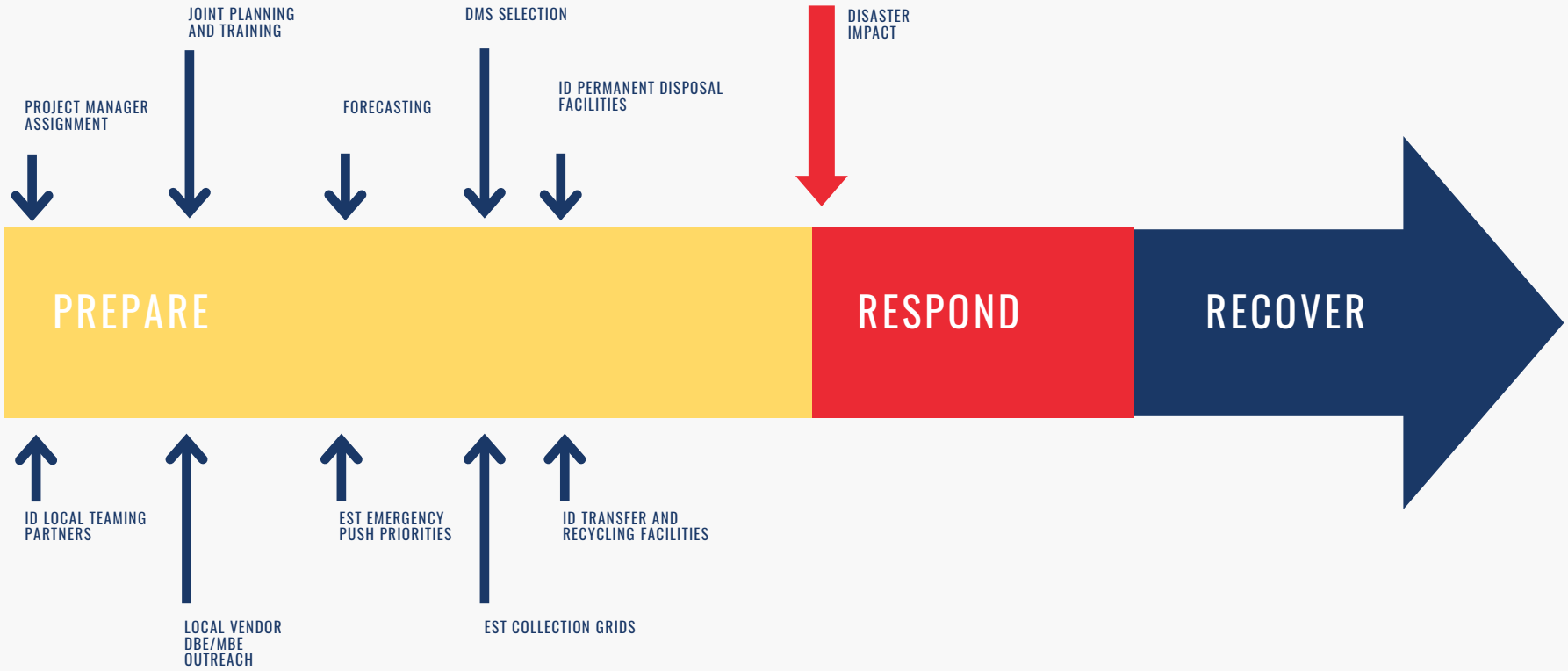





Part 4: Debris Management 101

Houston-Galveston Area Council

TIMELINE OF ACTIVATION



Preparedness

* If the storm is forecast to dissipate within 3 days, the "Full Forecast" and "3 day" graphic will be identical

Click Here for a 5-day Cone Printer Friendly Graphic

Debris Management Planning

The Value of an Up-To-Date Disaster Debris Management Plan…

- Establish clear roles and responsibilities in a debris-generating incident.
- Identify resources that can be used in response.
  - Possible debris management sites
  - Disposal and recycling options
  - Equipment and contractors available to assist
- Provide debris estimates to aid in planning.
- Identify priorities and strategies for debris clearing and collection.
- Identify applicable regulations that must be adhered to in conducting debris operations.
- Provide public information strategies and templates for use in developing public information messages.
- **Failure to follow federal guidance and regulations can result in not being reimbursed for expenses.**

Debris Removal & Monitoring Contracts

- Do you have Disaster Debris Contracts in place?
- Who in your organization would handle this operation?

Annual Training & Coordination

- Check Contracts, Renewals, etc.
- Refresh Points of Contact
- Review any changes
- Review DMS sites
- Training for new staff
- Keep in Touch!

DMS Site Identification

- What is a DMS Site?
  - Temporary Location
  - Used to Manage, Store, & Reduce storm Debris
  - It is not a Final Disposal Location.
  - It Must be Permitted.
- Why do we use them?
  - Storm debris volumes can overwhelm local collection capability.
  - Debris streams often need to be reduced
  - Landfill capacity & requirements can be an issue
  - Public (resident drop off location)
  - Efficiency of the operation
  - Reduce hauling distances and travel time
  - Huge Benefit in Urban Areas
  - **Number and Location of DMS is the #1 Factor in Driving the Speed and Efficiency of Debris Removal**

Identify Road Clearance Priorities

- Certain roads will require priority for emergency road clearance operations.
- Priority roads are deemed as such based on many considerations including size, proximity to adjacent citizen populations,

Identify Road Clearance Priorities

- Critical roads with access to:
  - Fire stations
  - Police stations
  - Hospitals
  - Nursing facilities
  - Pump stations
  - Utilities

95

Emergency Push

- Emergency Clearance
- FEMA Category B
- Contracting - Time and materials
- Windshield assessments
- Aerial assessments
- Estimated quantity of debris
- Acceptable duration of pick-up
- Estimate volume of trucks

Debris Clearance is the clearance of debris to allow passage only. It does not include hauling or disposing of the debris. Debris clearance is often referred to as "cut and toss" or "push". (FEMA PAPPG)

Activation Timeline

+48 Hours

- Develop debris cost estimate required for presidential disaster declaration
- Develop operational plan for disaster-specific issues
- Refine health and safety plan for disaster-specific issues
- Issue Public Information Statement

+72 Hours

- Begin hauling truck certification
- Install ADMS tower monitor infrastructure
- Continue to train monitors on policies, ADMS, and safety
- Open public drop-off sites as requested

Damage Assessments

- Assessing Storm Damage
- How Fast can you do it?
- Windshield Assessments vs Substantial Damage
- Estimating Debris
- Quality of Data
- Becoming more and more important.

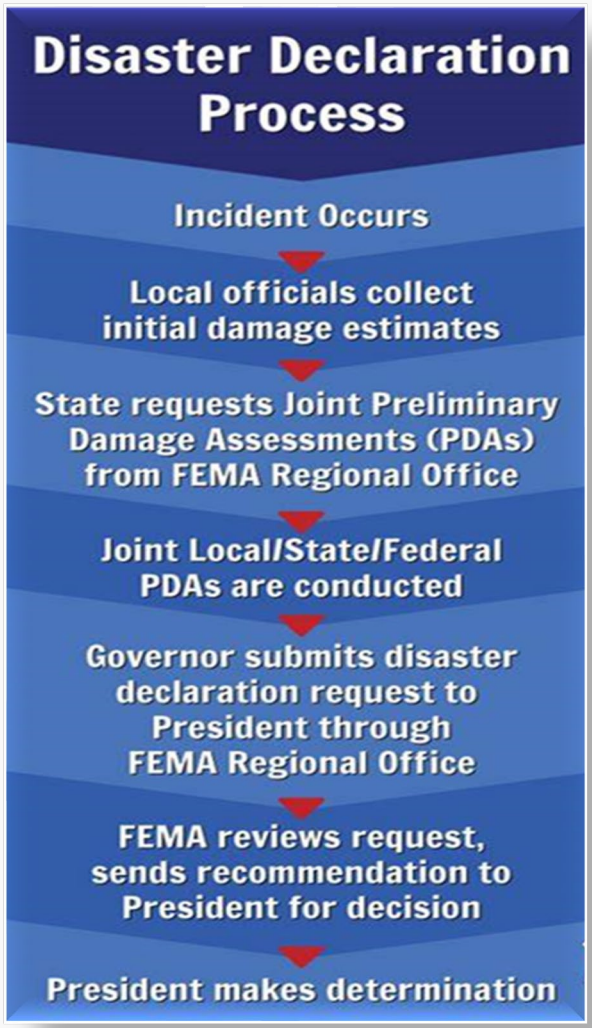
Presidential Declaration

Federal Disaster Declaration Thresholds:
State = $1.89 County = $4.72

State of Texas ~ $60M

**Based on 2020 Census and 2025 FEMA threshold multiplier*

FEMA



Deploying Resources

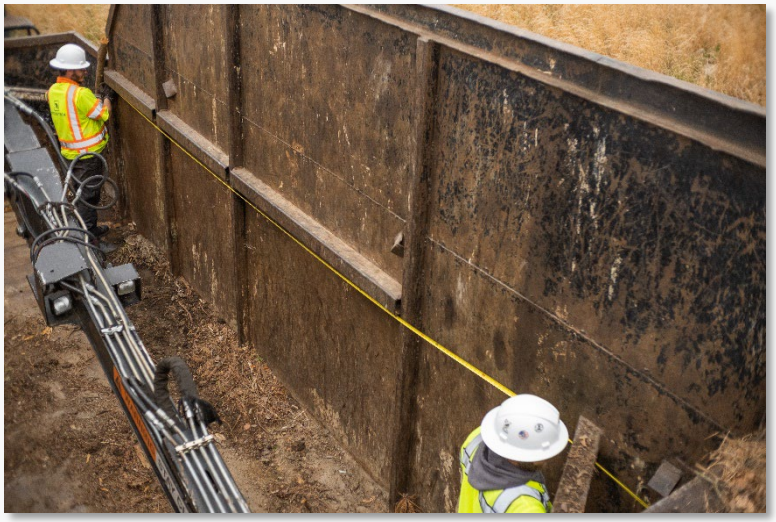
- Staging / Stockpiling Areas
- Resident Collection / Public Dropoff

DMS & Methods of Reduction

- Grinding / Chipping
- Burning
- Compaction/Crushing

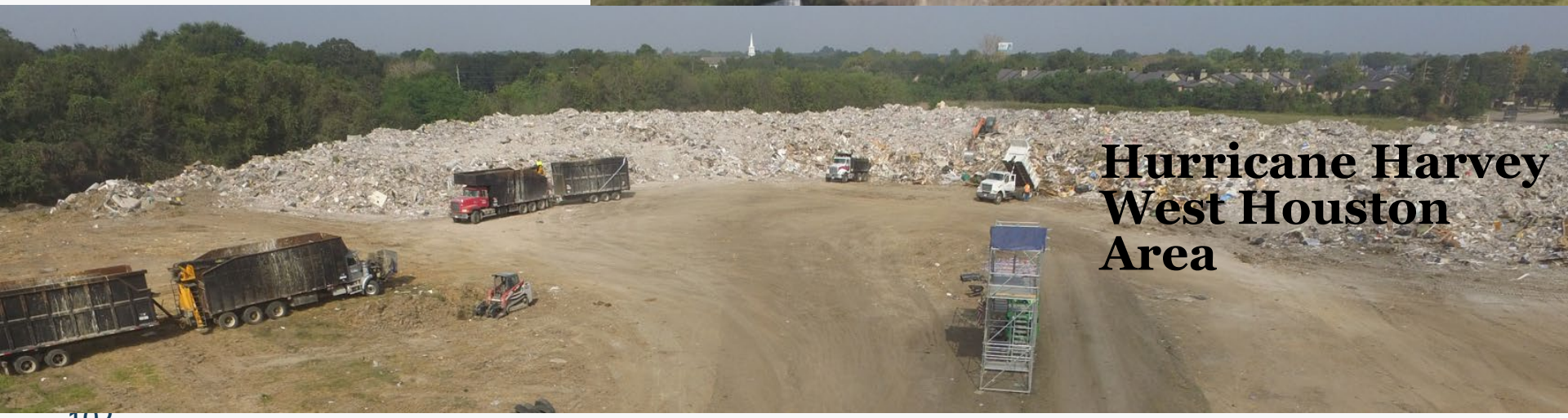
Truck Certification

- Truck certification is the first step in debris removal operations.
- Truck certification should include both county-owned assets and contract hauler vehicles.
- To be eligible for reimbursement, all vehicles used in debris removal have to be certified!



DMS Site Locations

- Temporary Location
- Used to Manage, Store, & Reduce
- Not a Final Disposal Location.
- Must be Permitted.



Hurricane Harvey West Houston Area

Debris Management Sites

TDMS – Temporary Debris Management Sites

- Pre-Authorized ?
- Temporary Staging Site Prior To Final Disposal

Methods of Reduction

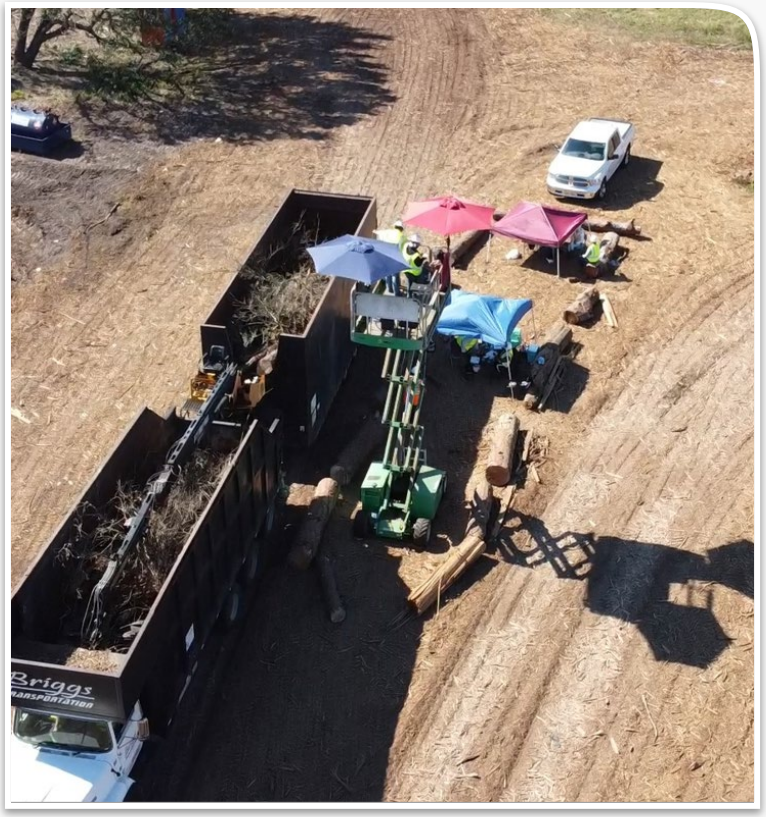
- Grinding, Burning, Chipping, Compaction/Crushing
- Number and Location of TDMS is the #1 Factor in Driving the Speed and Efficiency of Debris Removal

DMS Placement Analysis

- Drive time – One way and Roundtrip
- Relationship to Flood Plain – Will it be accessible or not?
- Environmental concerns
- Historical Review

Best Attributes of a DMS site

- Close to the impacted areas
- Convenient Access / Exit
- Minimum of 5 acres +/-
- Previously cleared / no significant environmental issue
- Away from sensitive receptors (schools, residential areas, etc.)
- Efficient layout



- **Number and Location of TDMS is the #1 Factor in Driving the Speed and Efficiency of Debris Removal**

Bad DMS location

- Small
- Far away
- Traffic nightmare
- Within permit guidelines but close to a neighborhood
- Adjacent to a vulnerable or disadvantaged community
- Difficult to secure or prevent illegal dumping

Manage the Site for Continued Operation

Piles During Extended Use

- Coordinate with local Fire Marshall
- Determine local mulch facility requirements
- Work towards moving debris to final disposal as operation continues
- Monitor pile temperatures as needed.

DMS Fires – Be Prepared

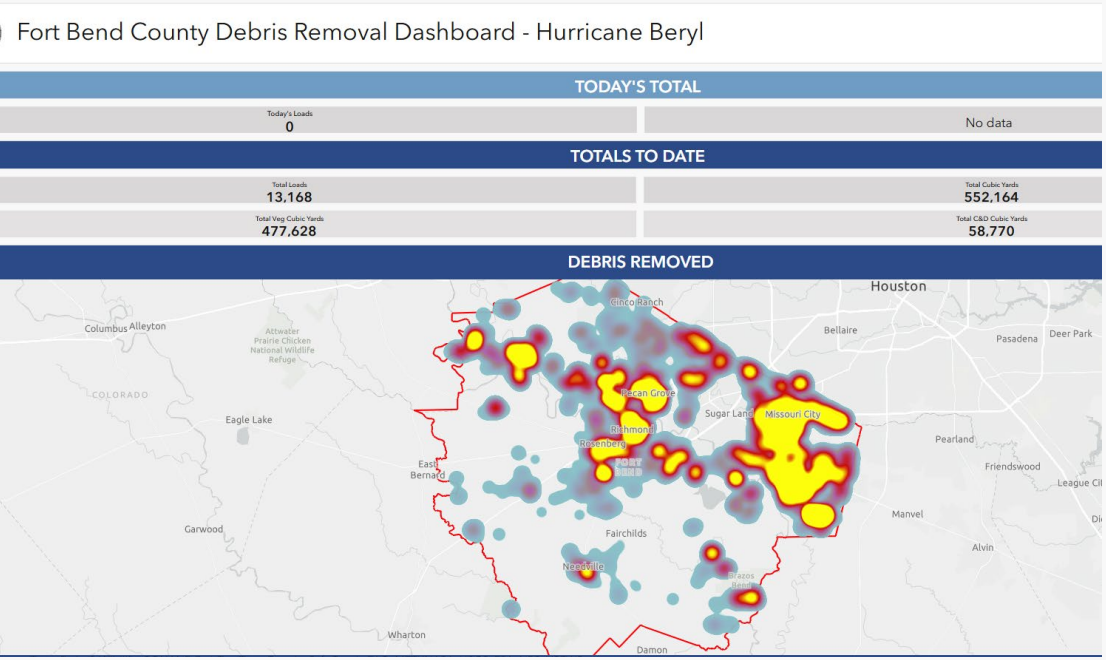
Public Messaging

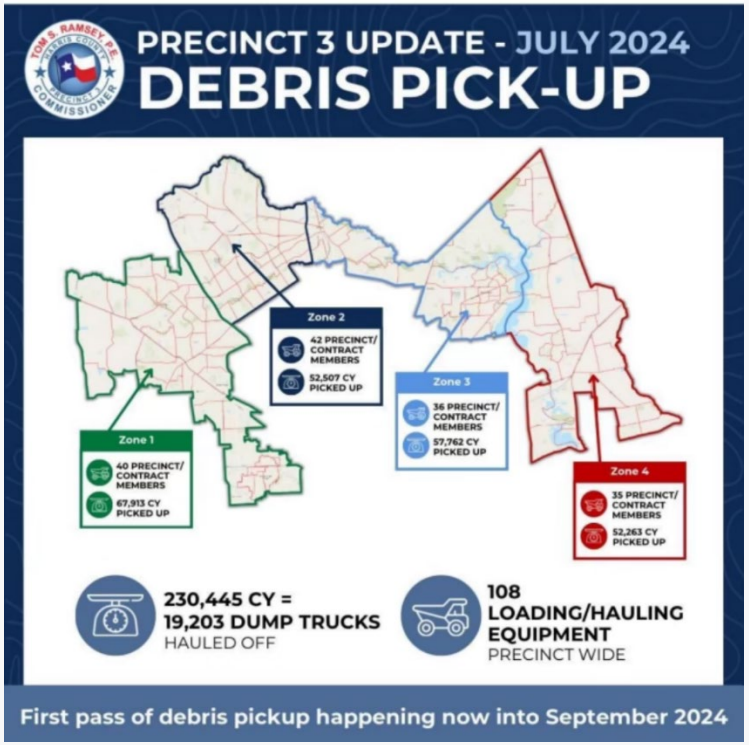
- Public Messaging
  - Debris Separation
- Why do we do this?
- What is the reality?

Sometimes the Reality…

Public Information – Debris Updates

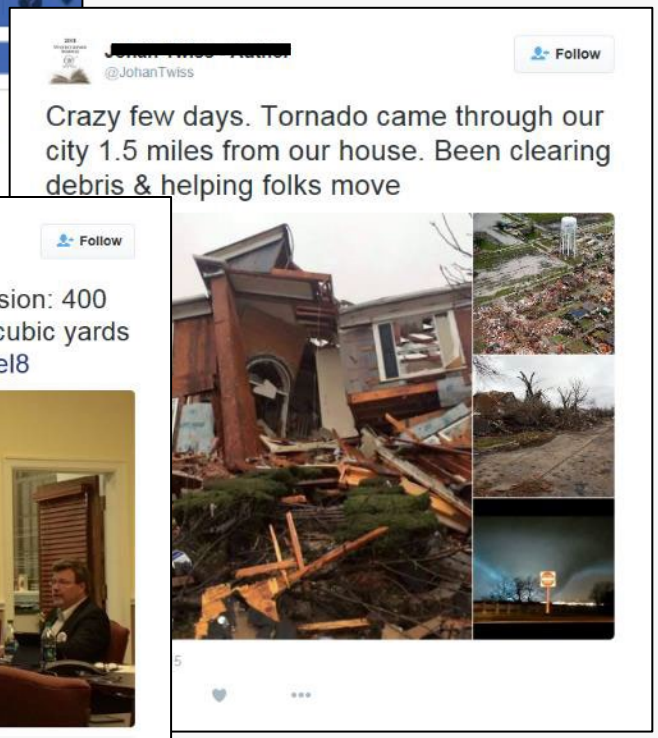
Good Examples



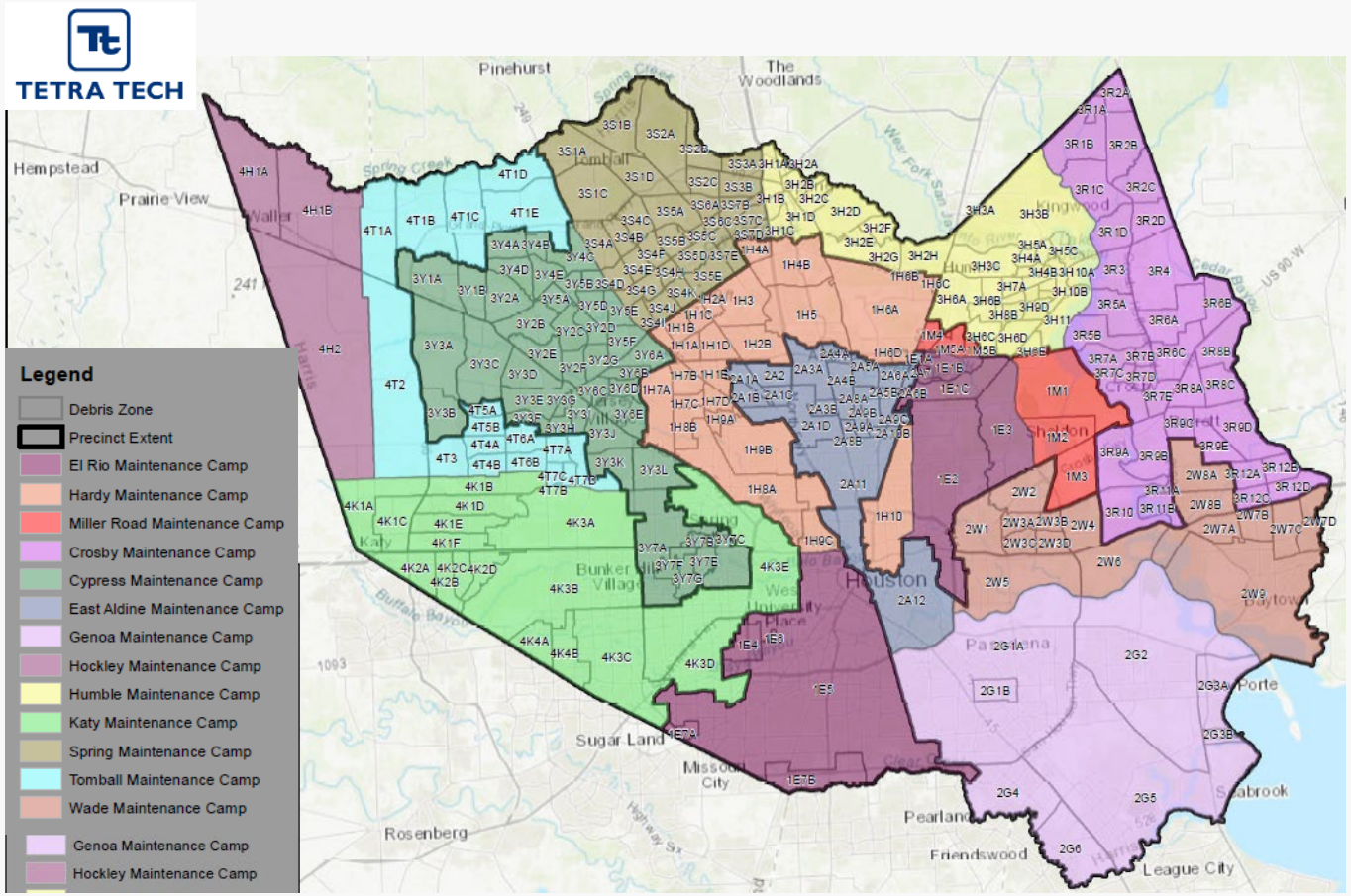


Social Media

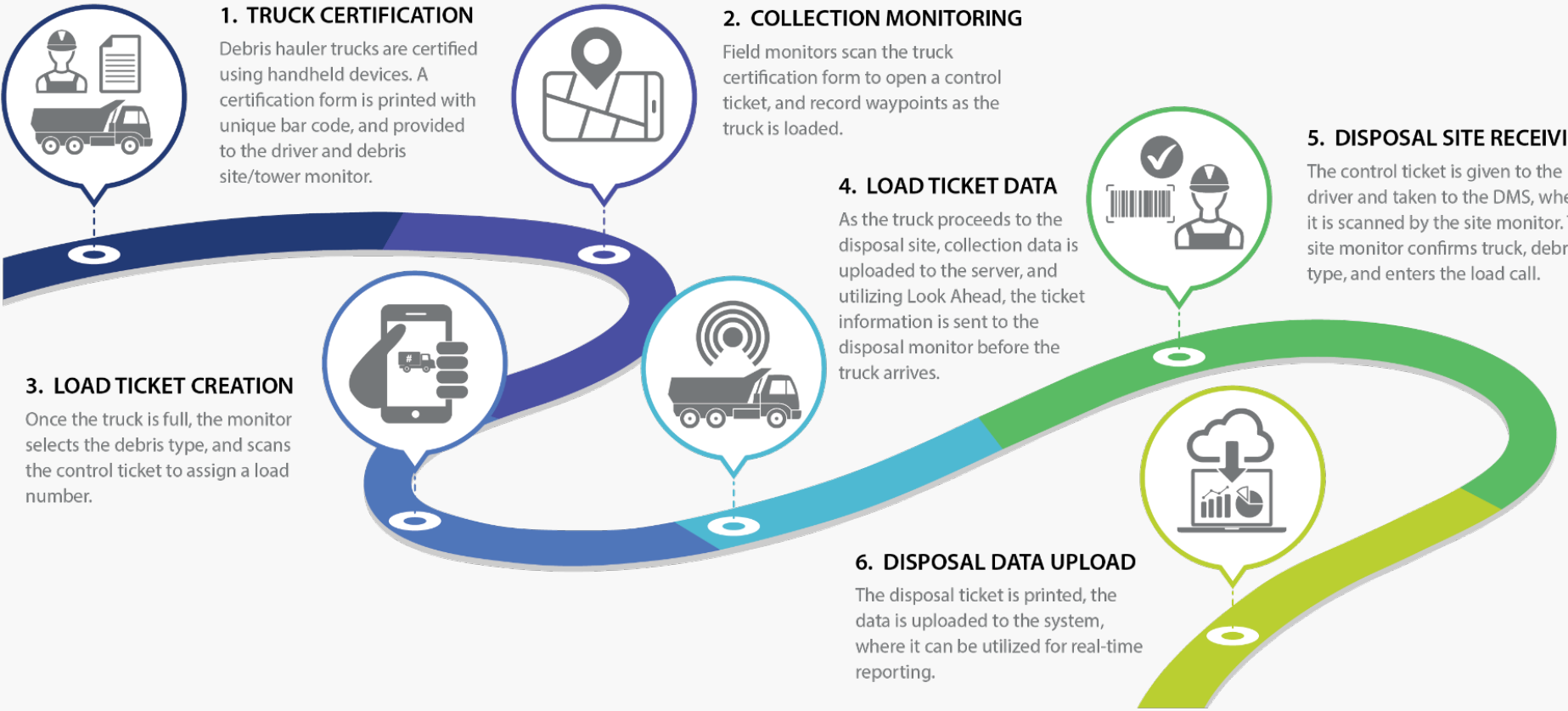
- Watch for rumors and misinformation.
- Provide instructions and regular updates on debris operations.



DEBRIS COLLECTION ZONES



Debris Monitoring **Process**



1. TRUCK CERTIFICATION

Debris hauler trucks are certified using handheld devices. A certification form is printed with unique bar code, and provided to the driver and debris site/tower monitor.

2. COLLECTION MONITORING

Field monitors scan the truck certification form to open a control ticket, and record waypoints as the truck is loaded.

3. LOAD TICKET CREATION

Once the truck is full, the monitor selects the debris type, and scans the control ticket to assign a load number.

4. LOAD TICKET DATA

As the truck proceeds to the disposal site, collection data is uploaded to the server, and utilizing Look Ahead, the ticket information is sent to the disposal monitor before the truck arrives.

5. DISPOSAL SITE RECEIVING

The control ticket is given to the driver and taken to the DMS, where it is scanned by the site monitor. The site monitor confirms truck, debris type, and enters the load call.

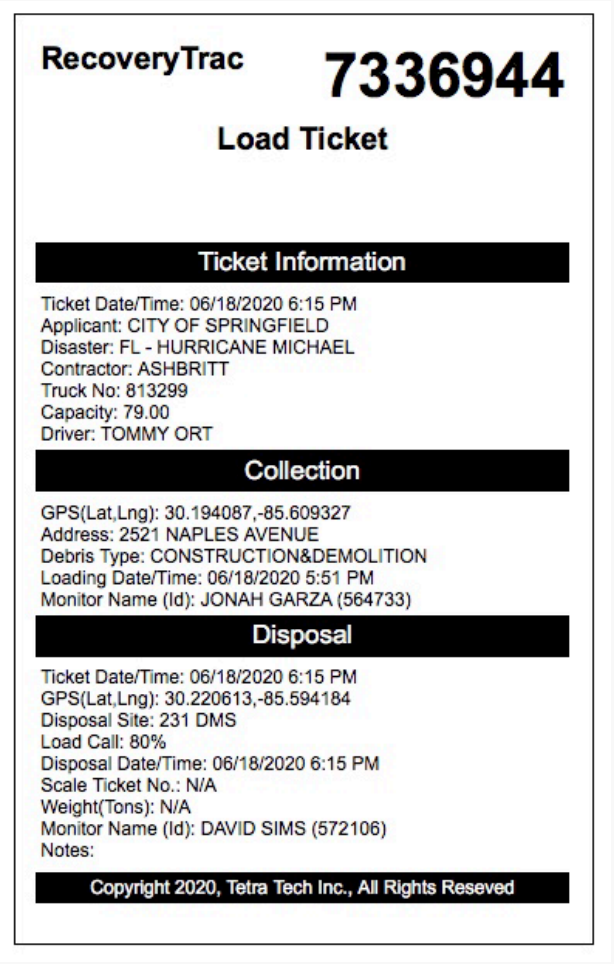
6. DISPOSAL DATA UPLOAD

The disposal ticket is printed, the data is uploaded to the system, where it can be utilized for real-time reporting.

Right of Way Debris Removal

A debris load ticket must contain specific information that FEMA requires:

- GPS Coordinates
- Address
- Debris Type
- Disposal location
- Load Call
- Dates and Times
- Truck #/Driver Name
- Applicant



RecoveryTrac **7336944**

Load Ticket

Ticket Information

Ticket Date/Time: 06/18/2020 6:15 PM
Applicant: CITY OF SPRINGFIELD
Disaster: FL - HURRICANE MICHAEL
Contractor: ASHBRITT
Truck No: 813299
Capacity: 79.00
Driver: TOMMY ORT

Collection

GPS(Lat,Lng): 30.194087,-85.609327
Address: 2521 NAPLES AVENUE
Debris Type: CONSTRUCTION&DEMOLITION
Loading Date/Time: 06/18/2020 5:51 PM
Monitor Name (Id): JONAH GARZA (564733)

Disposal

Ticket Date/Time: 06/18/2020 6:15 PM
GPS(Lat,Lng): 30.220613,-85.594184
Disposal Site: 231 DMS
Load Call: 80%
Disposal Date/Time: 06/18/2020 6:15 PM
Scale Ticket No.: N/A
Weight(Tons): N/A
Monitor Name (Id): DAVID SIMS (572106)
Notes:

Disposal Site Operations

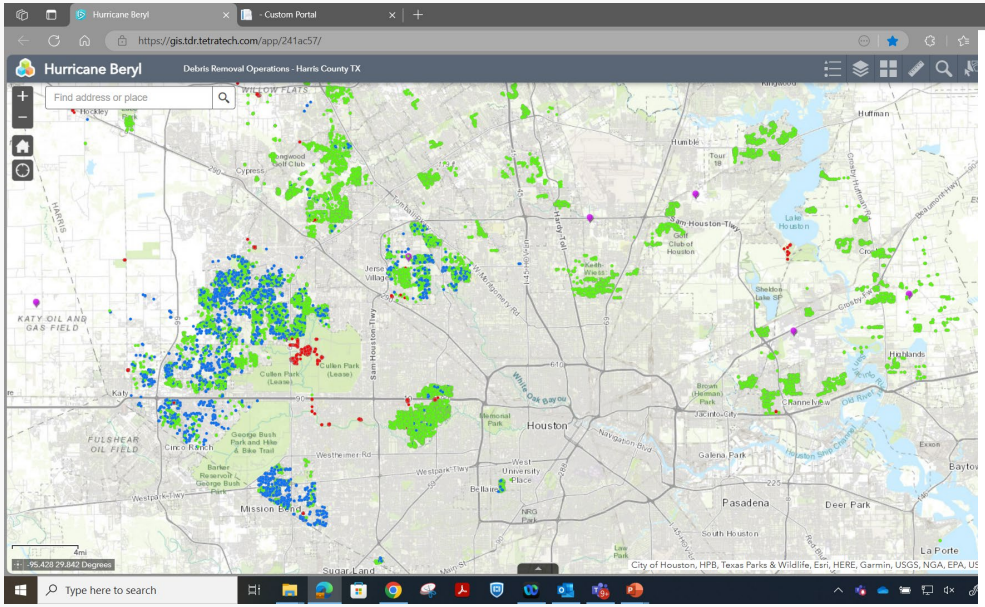
- DMS capacity analysis
- Fraud controls
- Load calls
- It is critical that plans and contingencies for final disposal of vegetative and mixed debris are established.
- Final disposal sites must be properly permitted.
- Debris must be properly disposed/applied at final disposal site.

Closeout of DMS

- Monitor and track all final disposal to authorized facilities.
- Demobilize equipment
- Prepare closeout reports and documentation
- Complete soil sampling as needed
- Return site to existing condition, re-vegetate site as needed.
- Owner Approval
- Conduct close-out inspections.

Debris Tracking

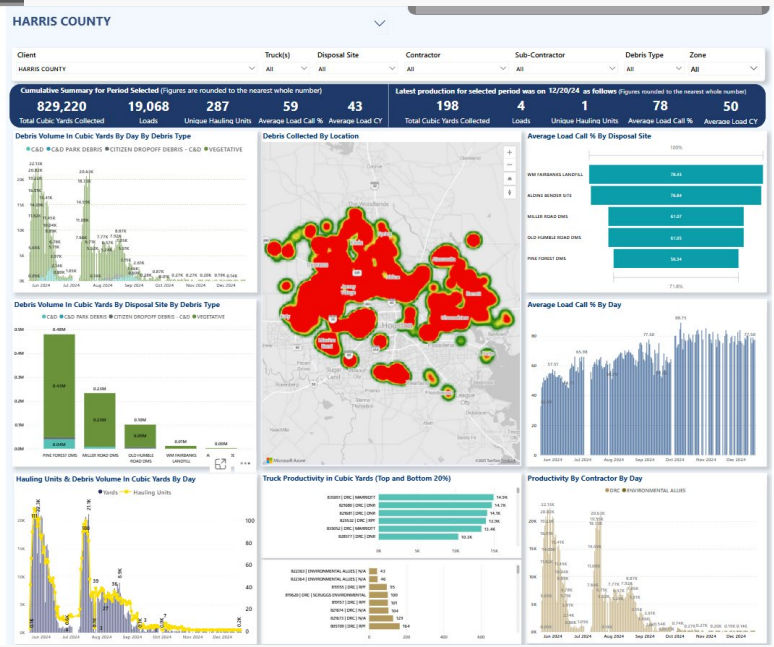
Geoportal Debris Tracking



Try Me!

Sample public-facing dashboard

Custom Reporting



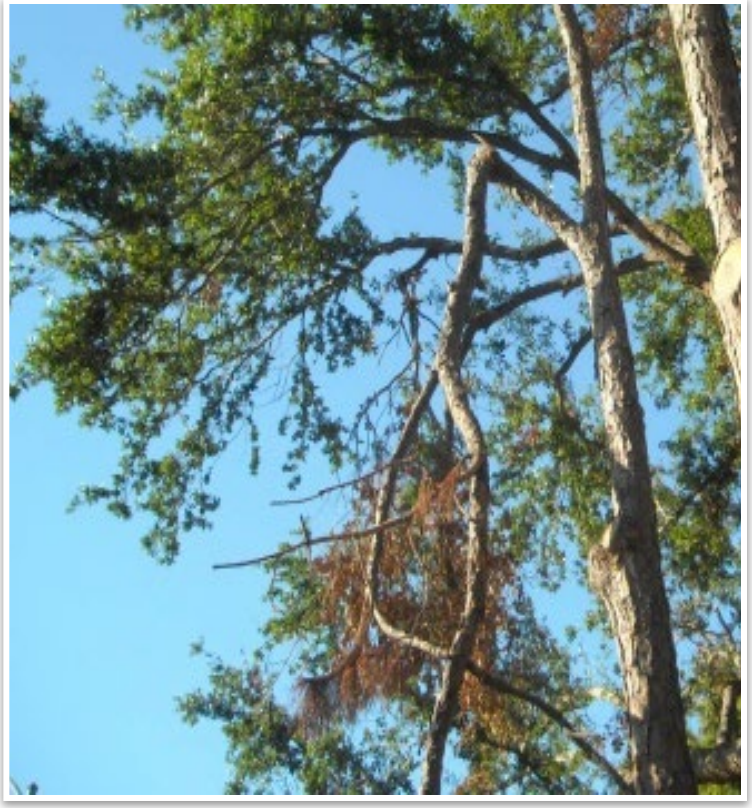
Household Hazardous Waste

Approach is storm dependent:

- Small neighborhood collection events.
- Regional collection events.
- Door to door collection by contractor.
- Utilize permanent HHW Collection Facility.

Hazardous Tree Removal Program

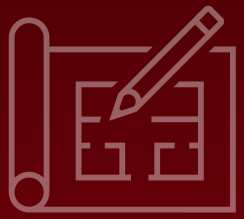
- FEMA has removed minimum size requirements for Hazardous Trees, Limbs & Stumps



Hazardous Tree Removal Program

- However, there is increased scrutiny regarding eligibility.
- It must be documented that the dangerous tree, limb or stump, poses a threat to the public.
- Photos are needed to show the threat to the public.

In Conclusion



Preparation is Key

- Federally compliant procurement/contract
- Understanding FEMA PA
- Permitted DMS locations and capacity
- Proper documentation

New Areas of Emphasis

- Hazardous limbs/trees/stumps
- PPDR
- FEMA timeline consideration
- Pending FEMA Changes

Questions?

Thank You!