

DEBRIS MANAGEMENT LESSONS LEARNED



**US Army Corps
of Engineers®**

Agenda

- I. Introduction
- II. Potential Debris Waste Streams
- III. Multi-Agency Planning & Coordination
- IV. Waste Segregation
- V. Debris Disposal Management
- VI. Sample Contracts



Debris Waste Streams Hurricanes Katrina



August 29, 2005



September 23, 2005



Hurricane Destruction



Massive Quantities of Debris



Massive Quantities of Debris



Fallen Structures and Damaged Autos



Debris and Autos



Widespread Flooding



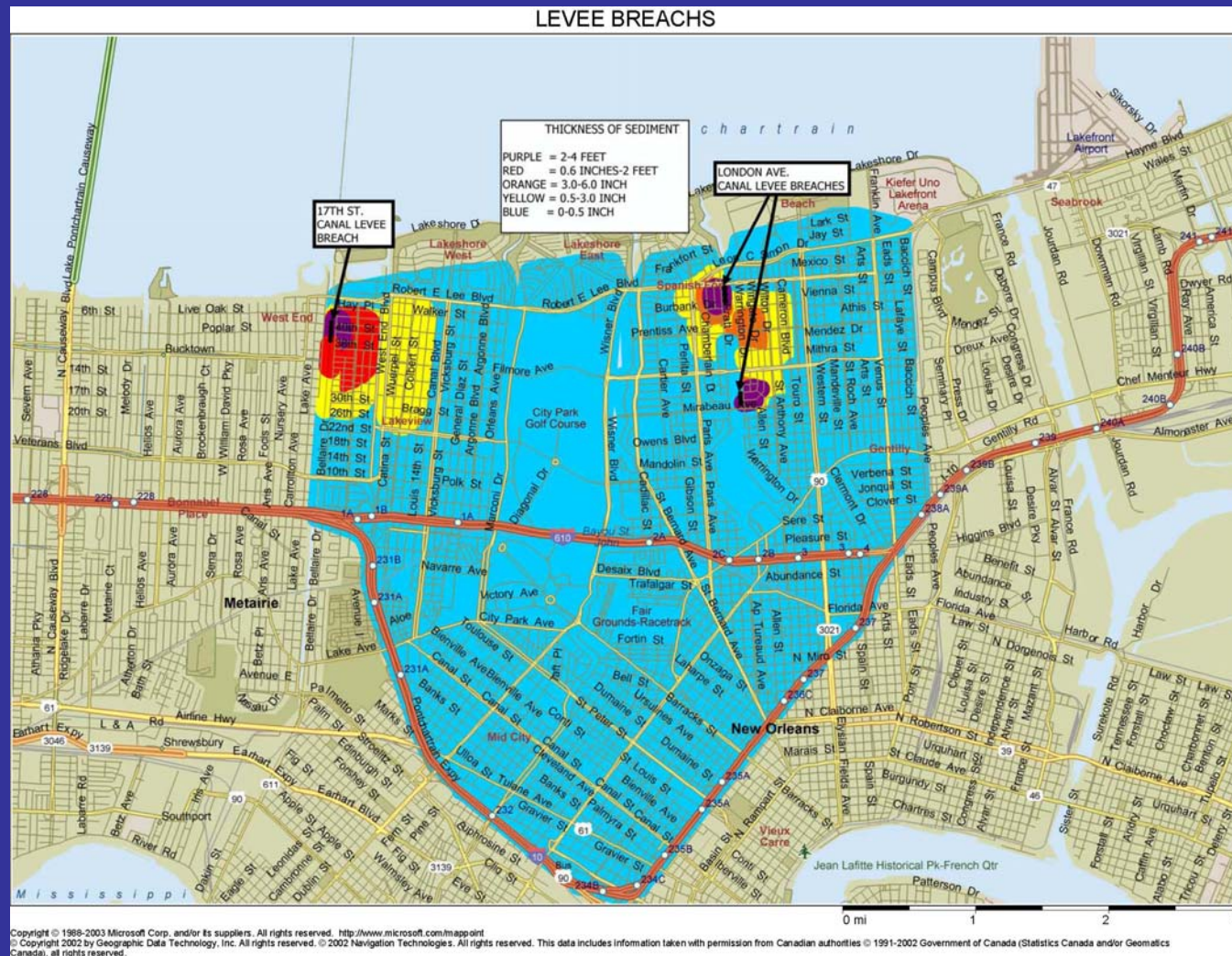
Widespread Flooding



Widespread Flooding



Residual Solid Deposits to 4 Feet Thick



Residual Solids from Levee Breaks



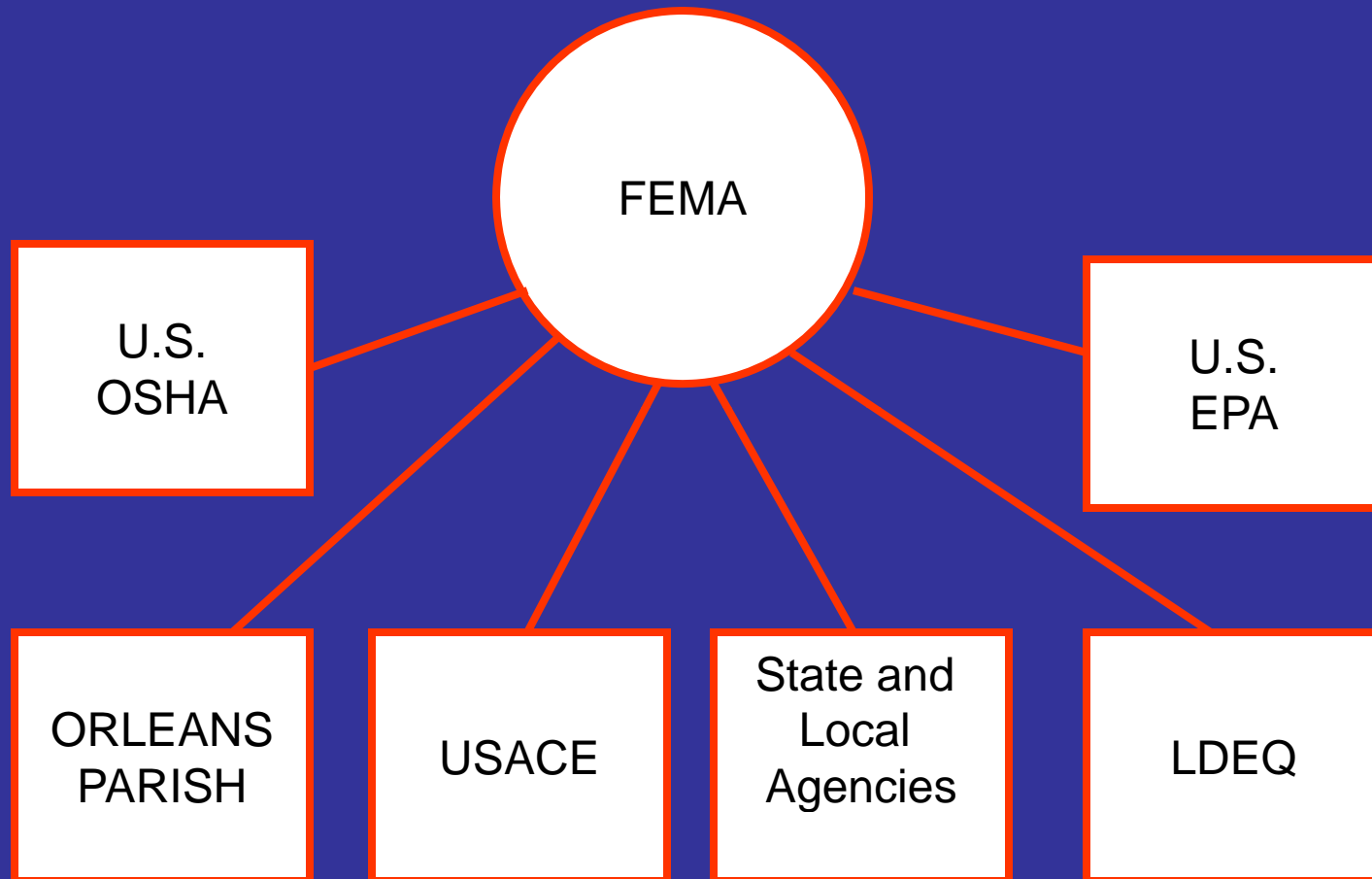
Debris from Levee Break



Residual Solids from Floodwaters



Multi-Agency Planning & Coordination



Inter-Agency Development of Work Plans

- Environmental & Waste Segregation Plan
- Labor Management Plan
- Residual Solids Removal Plan
- White Goods Management Plan
- Electronic Waste Management Plan
- Small Motorized Equipment Management Plan
- HHW Management Plan
- ACM Management Plan
- Home Decommissioning Plan
- Demolition Plan



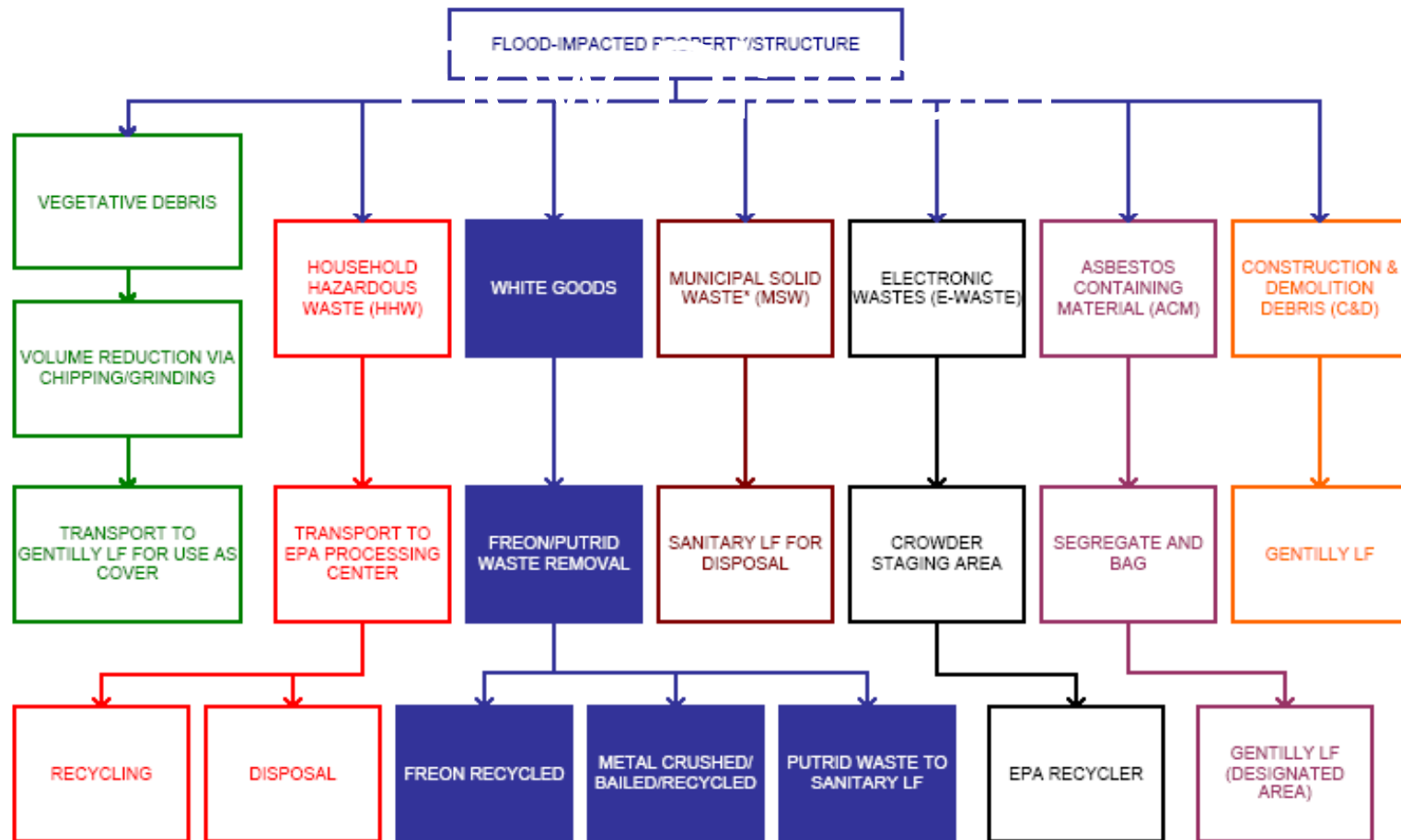
Waste Segregation Program

Primary Objectives:

- Removal of ineligible wastes from C&D.
- Conserve Type I & II MSW landfill space.
- Minimize the potential for C&D landfills from becoming future superfund sites.
- Protection of the Workers and population through an aggressive H&S Program



WASTE SEGREGATION PROCESS FLOW



*NON-RECOVERABLE MUNICIPAL SOLID WASTE INCLUDE TIRES AND MOTORIZED DEVICES. THESE ITEMS ARE SEGREGATED, BUT NOT CURRENTLY PICKED UP.



What are Ineligible Wastes?

- Household Hazardous Waste (HHW)
- Asbestos Containing Materials (ACM)
- Appliances (White Goods)
- Electronic Wastes (eWastes)
- Gas-powered Small Motorized Equipment (SME)
- Municipal Solid Wastes (MSW)
- Tires
- Munitions & Guns
- Automobiles / Boats



HOUSEHOLD HAZARDOUS WASTES (HHW)

- Cleaning products
- Automotive products
- Lawn and garden products
- Flammable products
- Indoor pesticides
- Workshop/painting supplies
- Mercury containing bulbs, ballasts , and switches.







HHW Segregation Crew



At peak operations, EE&G HHW crews exceeded 1200 staff daily



Removal of HHW from Curbside Debris





HHW Staged Curbside Awaiting Pickup



HHW Pickup.



EPA HHW Collection Facility



Asbestos Containing Material (ACM)

New Orleans is an “Asbestos City”

**Construction of most homes occurred
during peak years of ACM use in building
materials.**



ACM was blown off of some structures during the Hurricanes



ACM Commingled with C&D



Flagged Debris Pile Containing ACM



ACM Removal from Curbside Debris Pile



The bags containing ACM are sealed with duct tape



ACM Bags Loaded into Box Trucks



ACM Bags Offloaded at Designated Landfill



Electronic Wastes (E-Wastes)



E-Wastes Commingled with Curbside C&D



Curbside Ewaste



E-Wastes Loaded for Hauling to Processing Area



E-Waste Processing Area



E-Wastes are placed on pallets after being further segregated into item types (PCs, TVs, etc.)



**Some E-Wastes are wrapped on the pallets
prior to shipping to the recycler**



Some E-Wastes are loaded into boxes for shipping to the recycler



White Goods



Curbside White Goods. Most Contain Putrid Waste



Offloading of White Goods at Processing Area



Removal of Putrid Wastes “Americas Dirtiest Job!”



Staging of “Cleaned” Refrigerators



Removal of Refrigerant



White Goods Crushed and Baled for Recycling



WASTE SEGREGATION STATISTICS

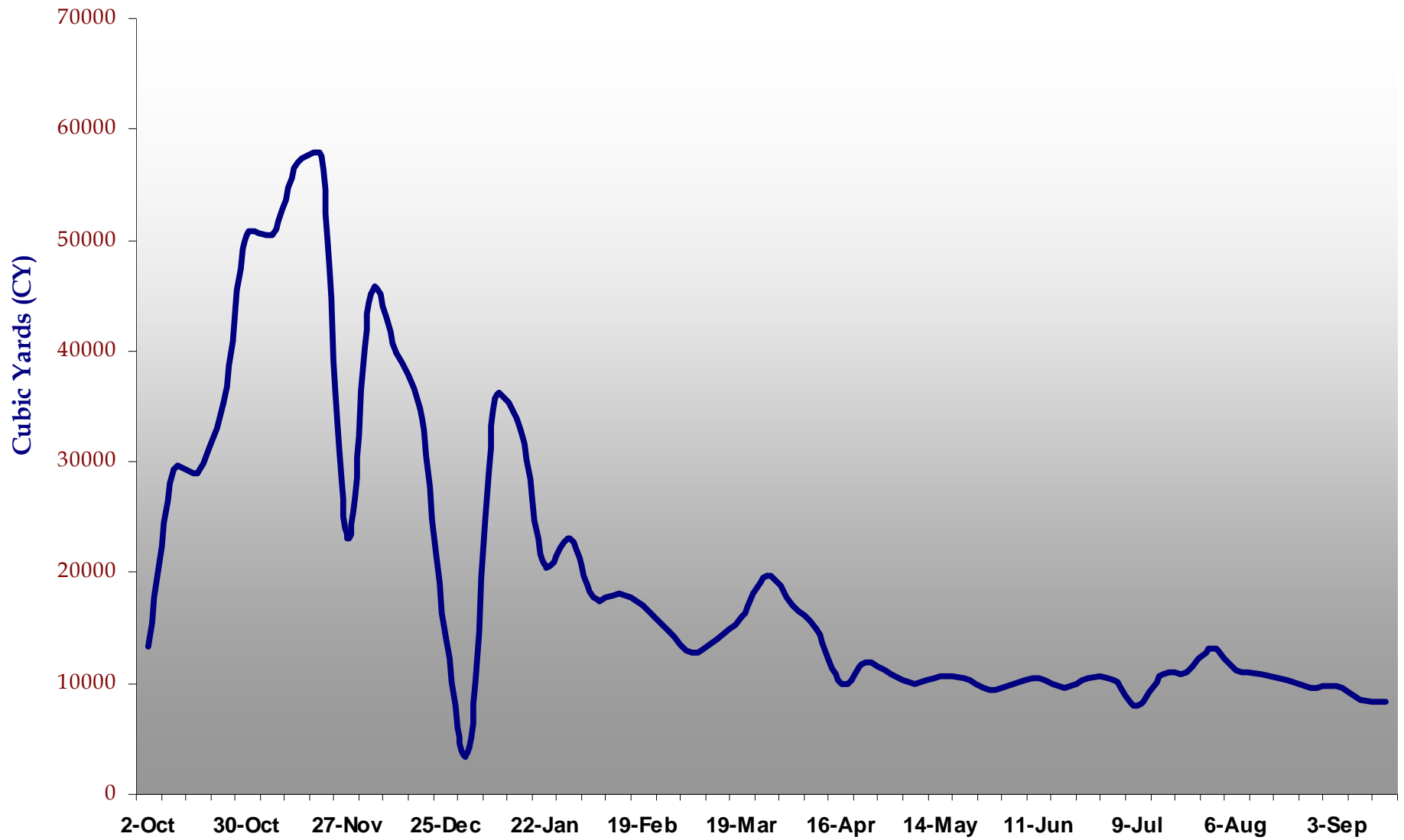


SUMMARY (as of 9/30/06)

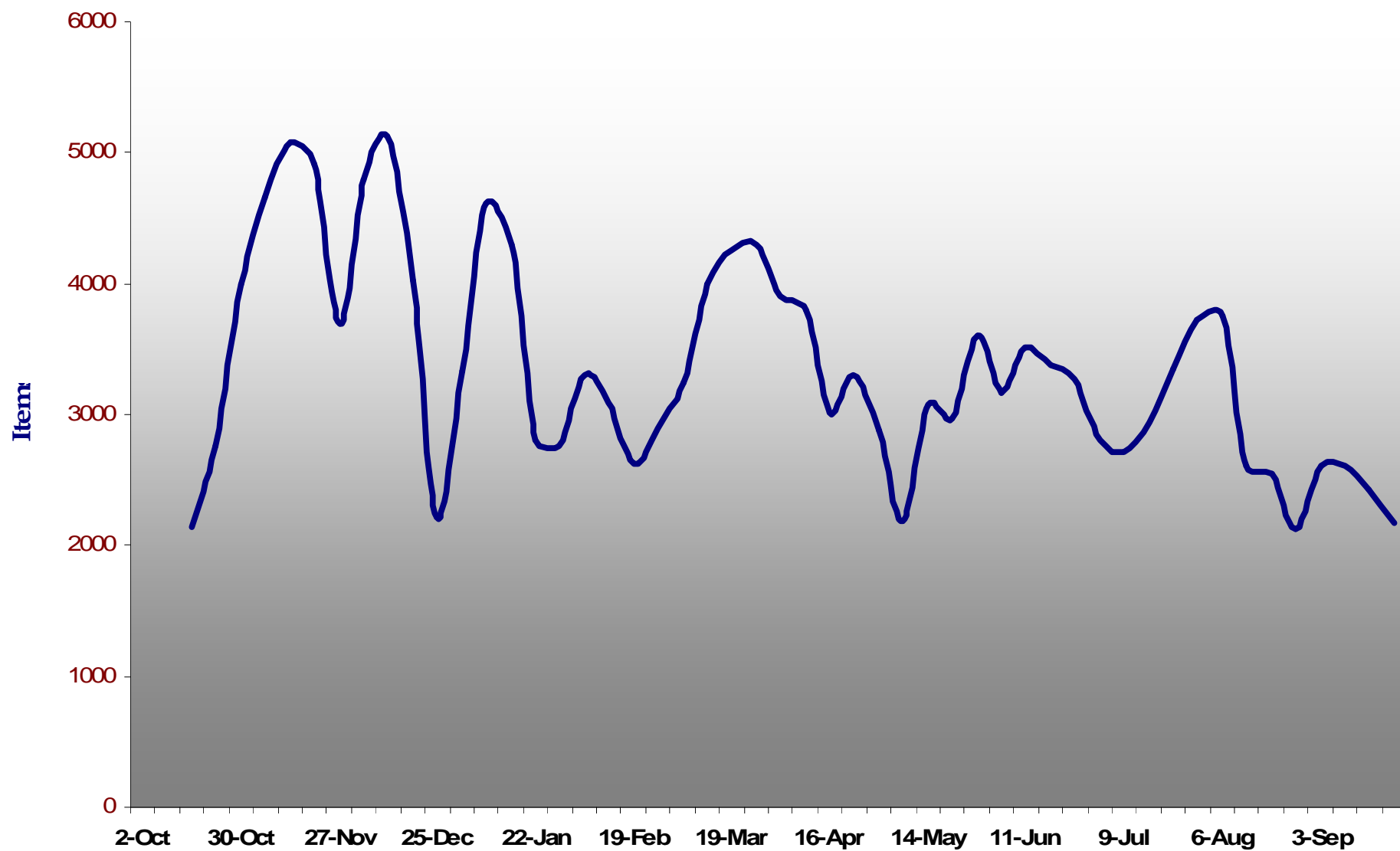
- 1,115,977 HHW Items.
- 1,711,150 Bags of ACM
- 433,216 eWaste Items
- 589,628 White Goods
- 43,389 Small Motorized Equipment



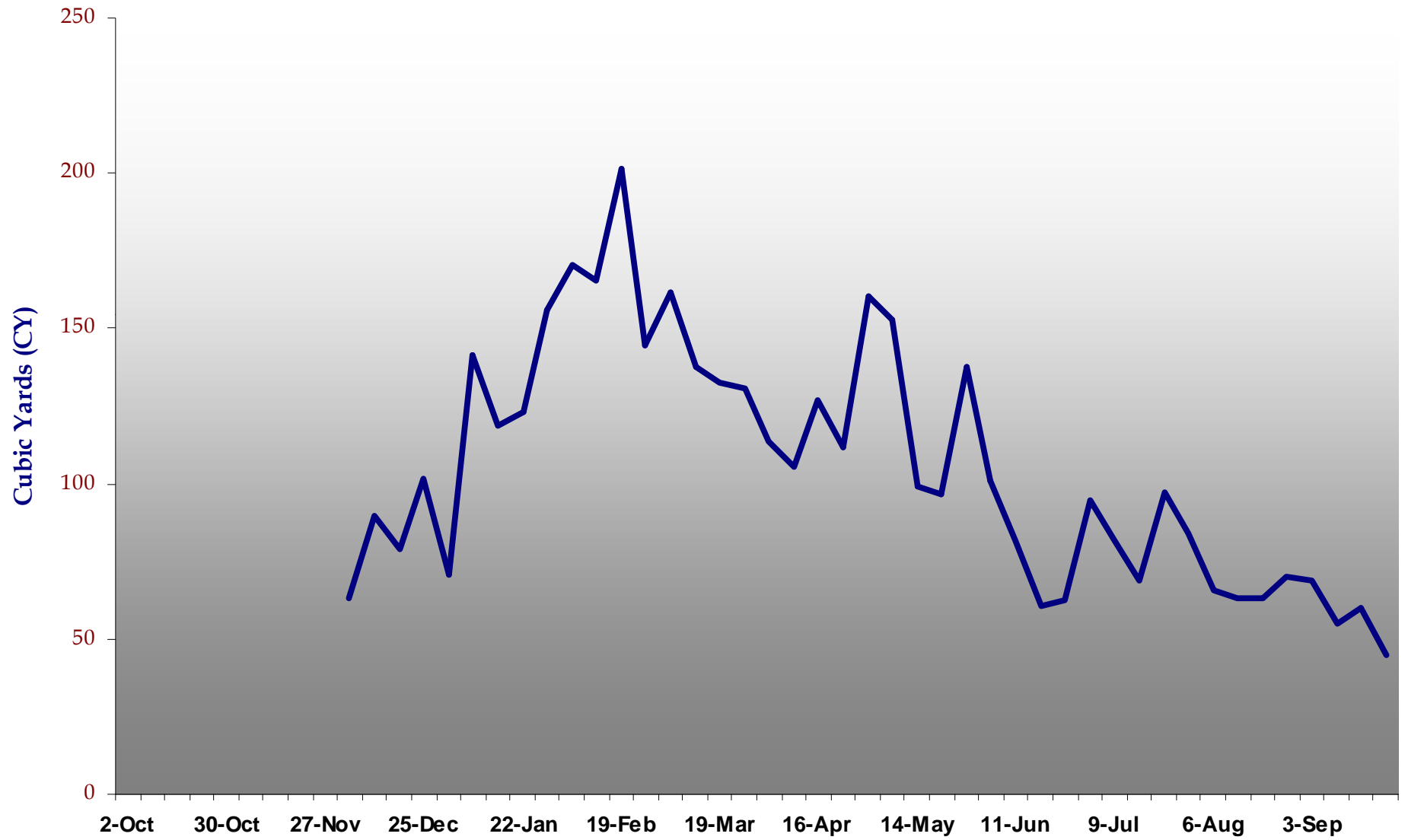
C&D Hauling



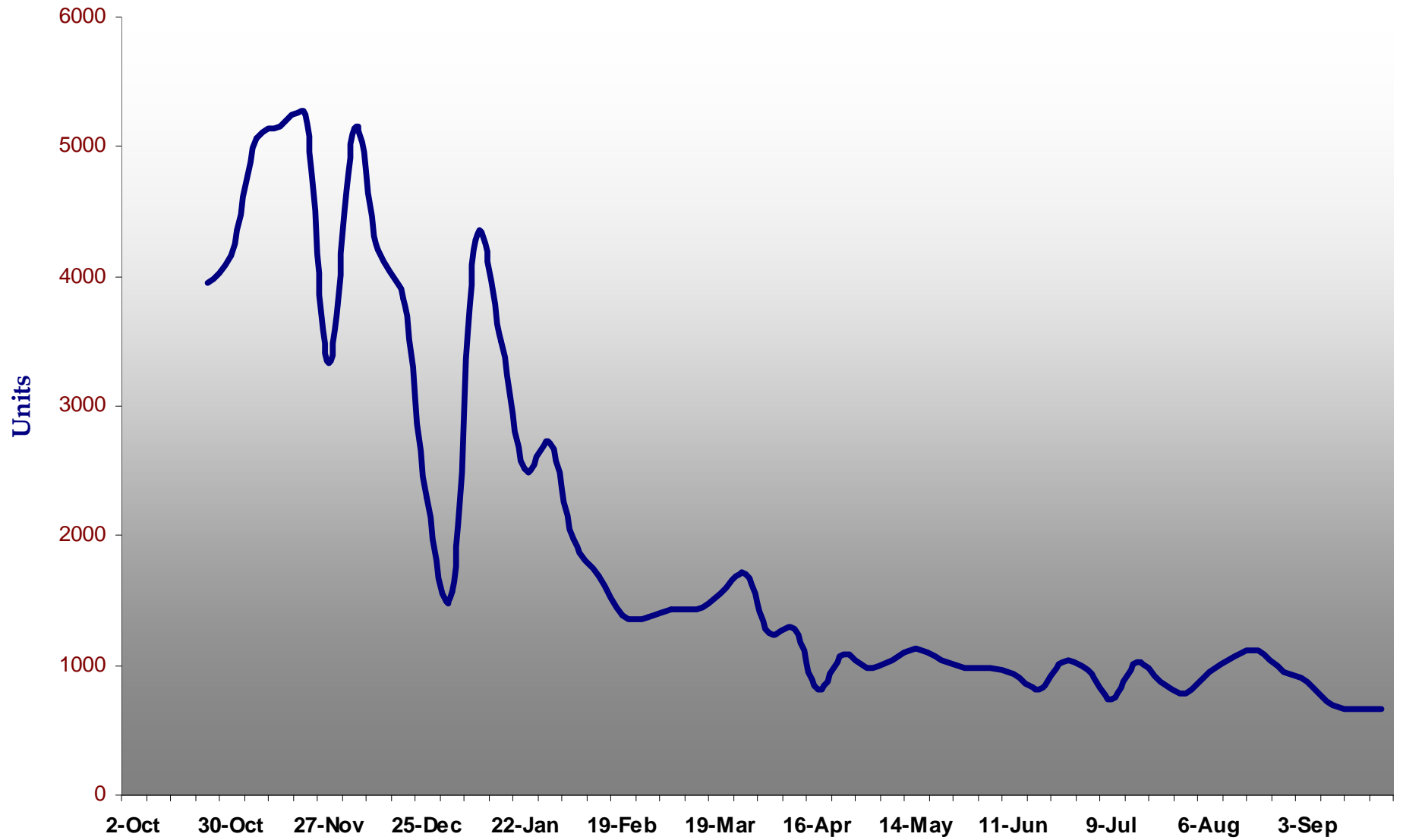
HHW Collection



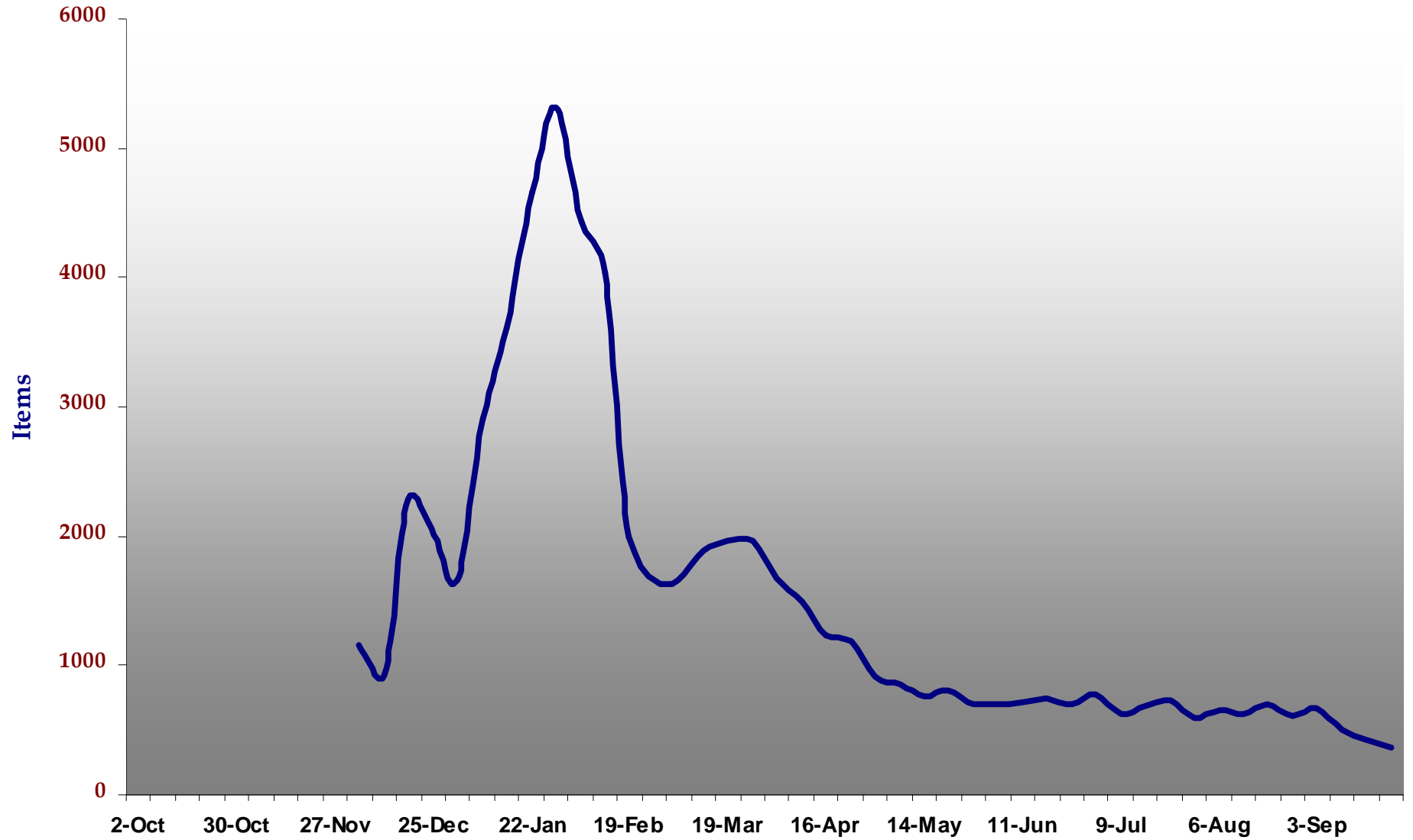
ACM Collection



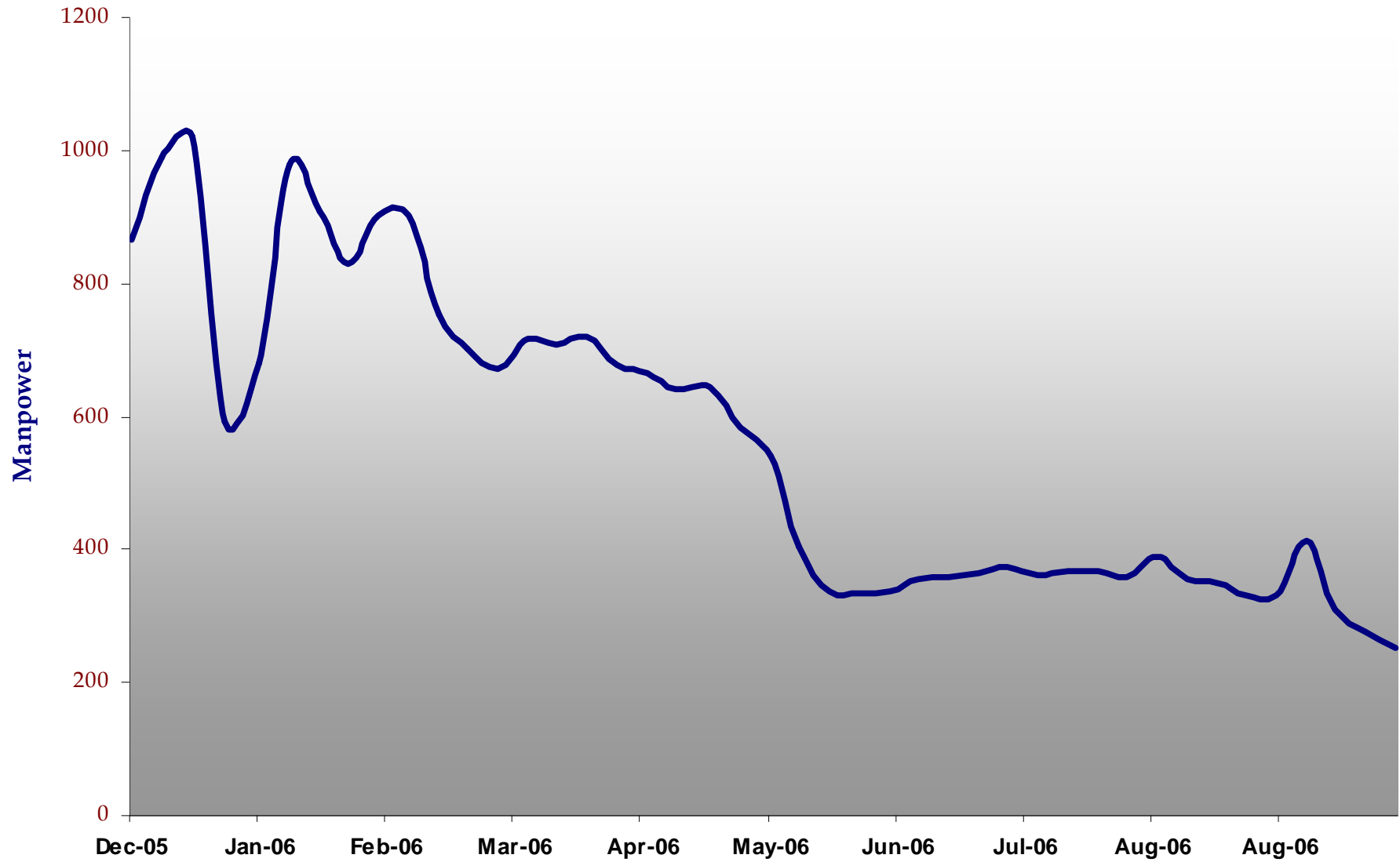
White Goods Processing



E-Waste Collection



Labor History



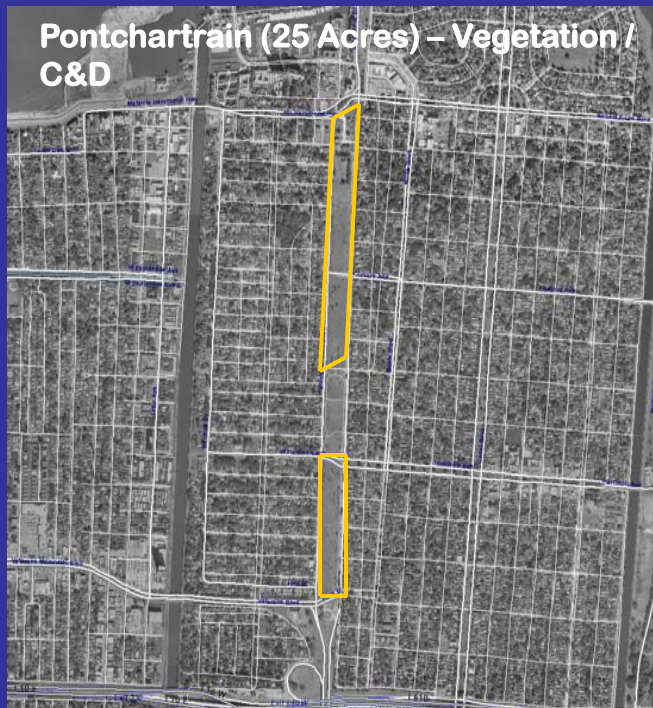
Debris Disposal Management

- Operations
- Debris Management
- Waste Disposal
- Solid Waste and Land Use Planning



Temporary Debris Staging & Reduction

Orleans Parish – Sector 1



Temporary Debris Staging & Reduction

- RECYCLE
- REDUCE
- DISPOSE

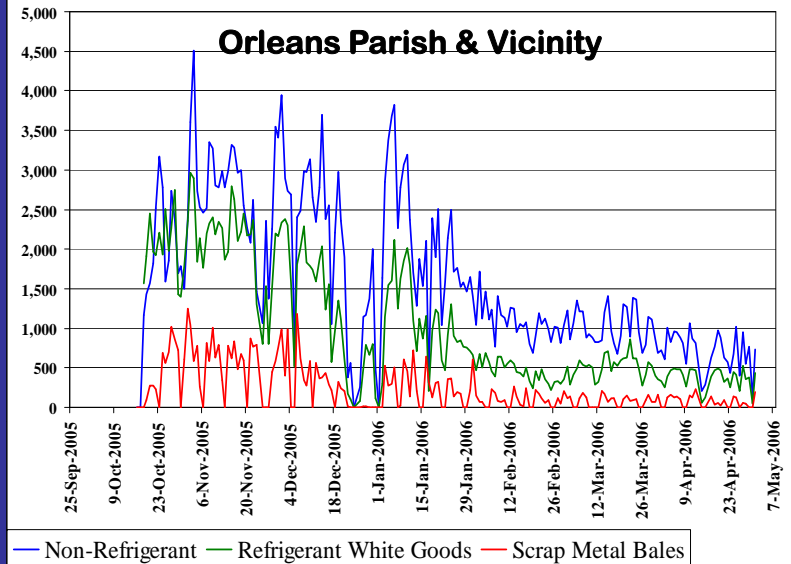
Debris Types:

- Vegetative debris
- C&D
- White Goods
- Automobiles / Boats
- Residual Solids
- Oil-Coated Debris
- Household Hazardous Waste
- Electronic Debris
- Asbestos
- Munitions
- Carcasses, etc.

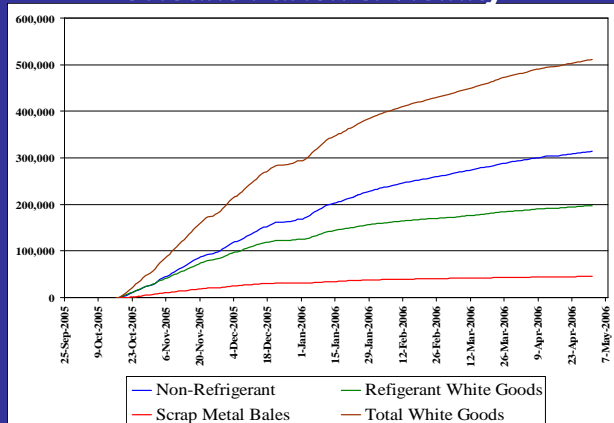


Recycling White Goods

Gentilly Landfill – Orleans Parish



Orleans Parish & Vicinity



Bella Road – Western Parishes



Reduction

- Chipping/Grinding
 - Vegetation
 - C&D pilot tests
- Incineration
 - Vegetation
 - C&D pilot tests
 - Open burning
 - Air curtain
 - Potential emissions
 - Fire control
 - Incomplete combustion

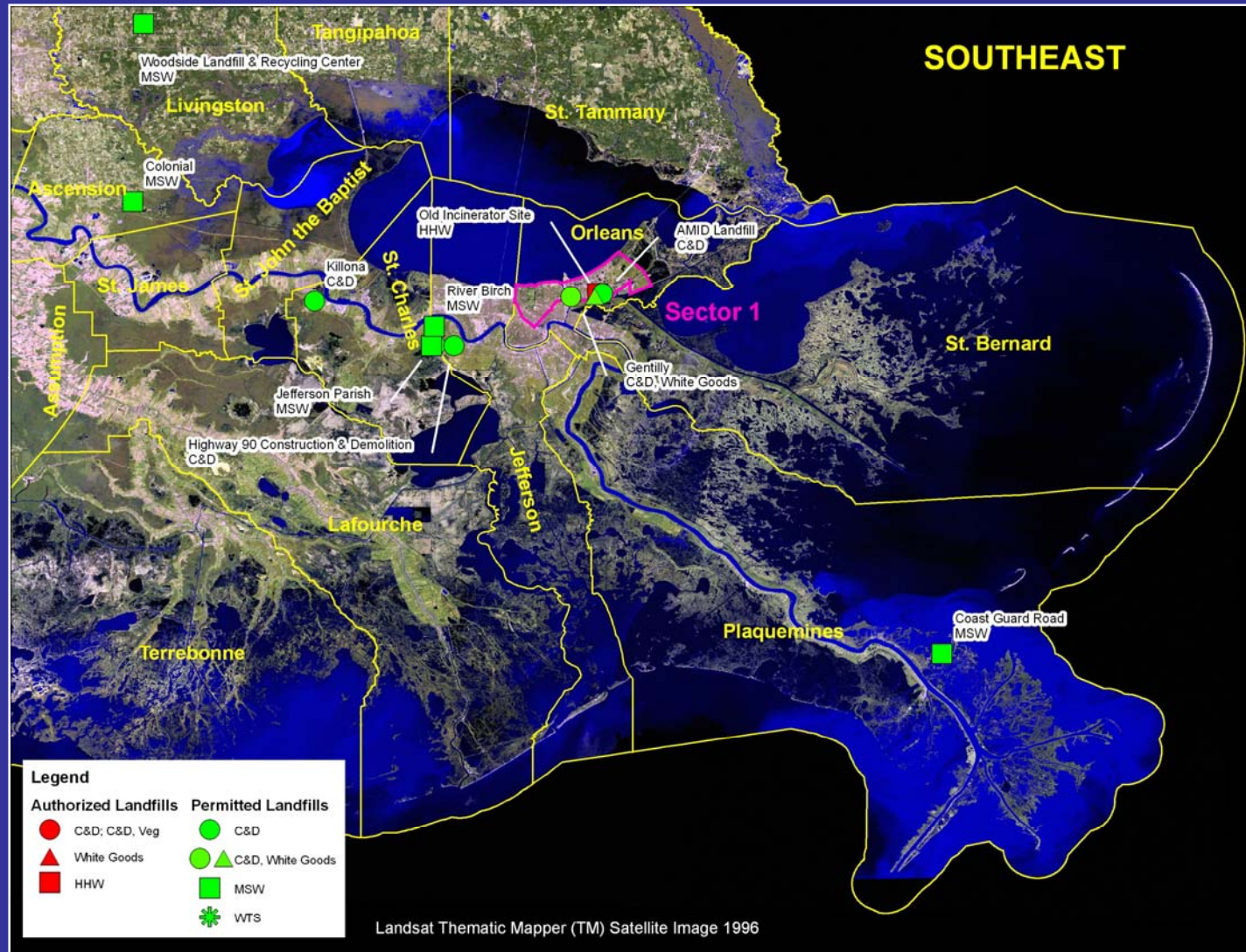


Reduction

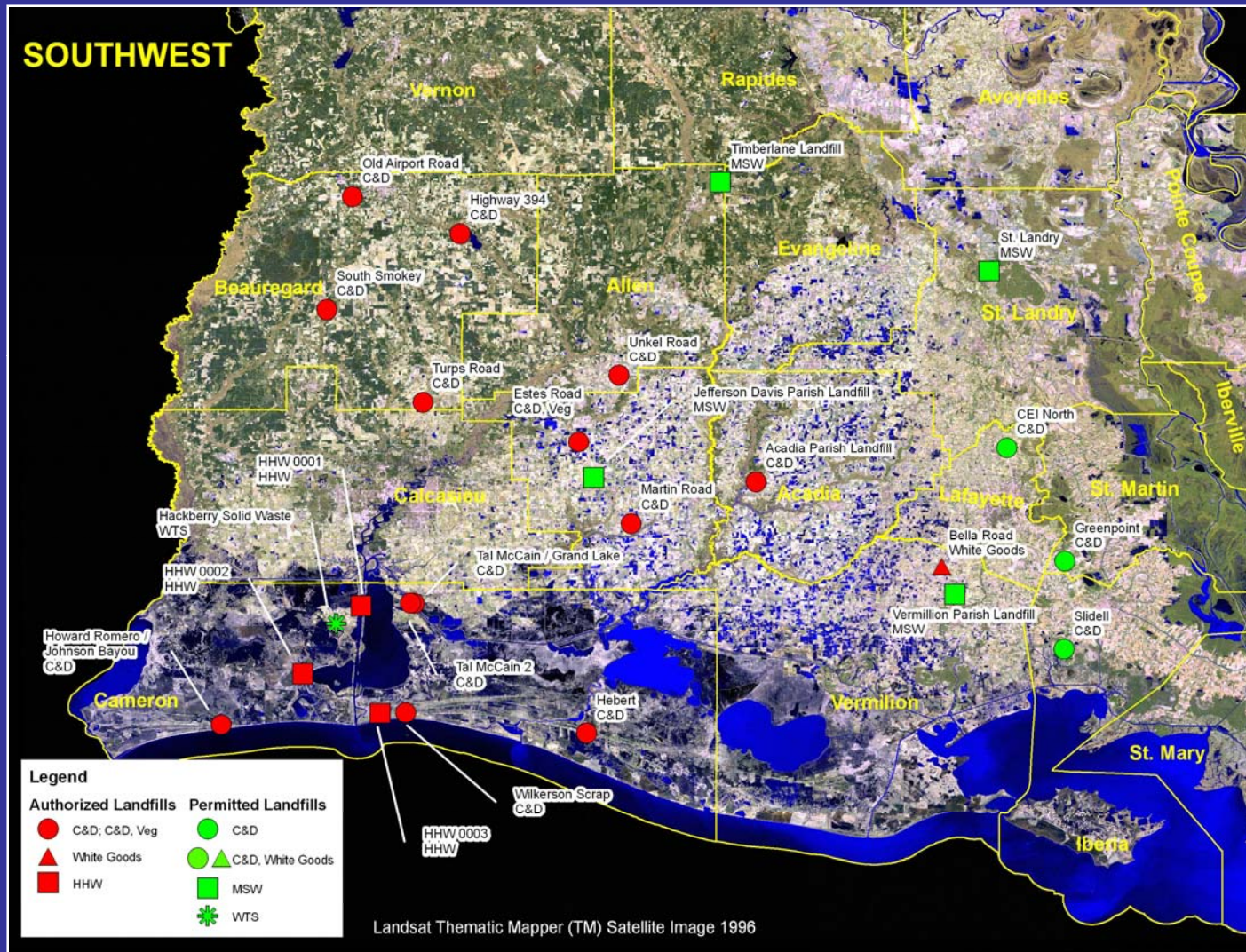
- **Landfill Types & Locations**
 - Hazardous Waste (Subtitle C)
 - Municipal Solid Waste (Subtitle D)
 - Construction & Demolition Debris (C&D)
 - Asbestos debris
 - Non-permitted storage/disposal sites
- **Landfill Management**
 - Infrastructure
 - Waste flow
 - Cover / compaction
 - Safety
- **Permitted vs. Authorized**



Southeast Louisiana Disposal Facilities



Southwest Louisiana Disposal Facilities



Example Sites

- **C&D**
- **Vegetation**
- **Residual Solids**
- **Asbestos**

Gentilly Landfill – Orleans Parish



Romero – Johnson Bayou



Hurricane Katrina & Rita Debris Management

Issue	Southeast Louisiana	Southwest Louisiana
Debris Volume	Extremely high, estimates vary from 10M yds to > 100M yds	Accessible debris likely less than 2M yd
Debris Distribution/Access	High volume in place debris, infrastructure obstacles	Remote areas, scattered debris – largely inaccessible
Debris Reduction	Limited vegetative grinding & isolated incineration	Open burn for vegetative only
Landfill Proximity	Nearby C&D. Subtitle C further.	Lack of permitted facilities. Approved sites – stage, dispose
Landfill Capacity	> 40M Yds Permitted C&D & Type I/II MSW.	Vermilion limited. No Cameron capacity. Jeff Davis > 20M Yds
White Goods, HHW, E-Debris	Massive operation, ongoing, Gentilly, Crowder, HHW sites.	Small operations - < 3 weeks white goods
Special Waste	High volume oil-coated debris, residual solids, etc.	Sparse occurrence of special waste

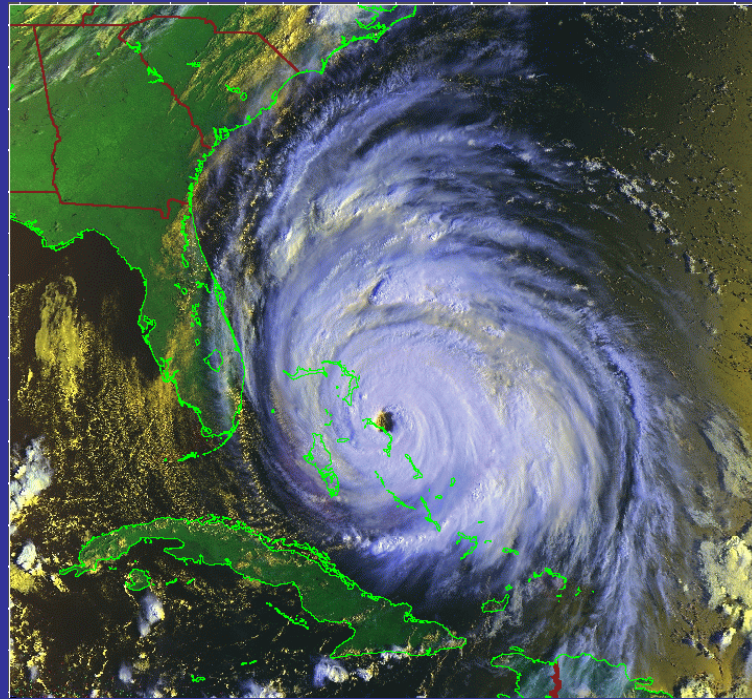


Proactive Solid Waste Planning

- **Land Use for Operations**
 - Potential operational areas
 - H&S concepts
 - Guidelines for waste transportation
 - Infrastructure for haulers (Food, Fuel, Water, Sewer)
- **Communications**
 - Phone (cellular, land lines, satellite)
 - Internet
- **Debris Management**
 - Temporary storage facilities
 - Recycling programs
 - Reduction strategies
 - Disposal facilities
 - Beneficial reuse of closed landfills, where feasible
- **Regulatory Considerations**
 - Conceptual waivers
 - Conceptual emergency operations
 - Streamlined permitting guidelines
 - Limitations regarding regional solid waste facilities

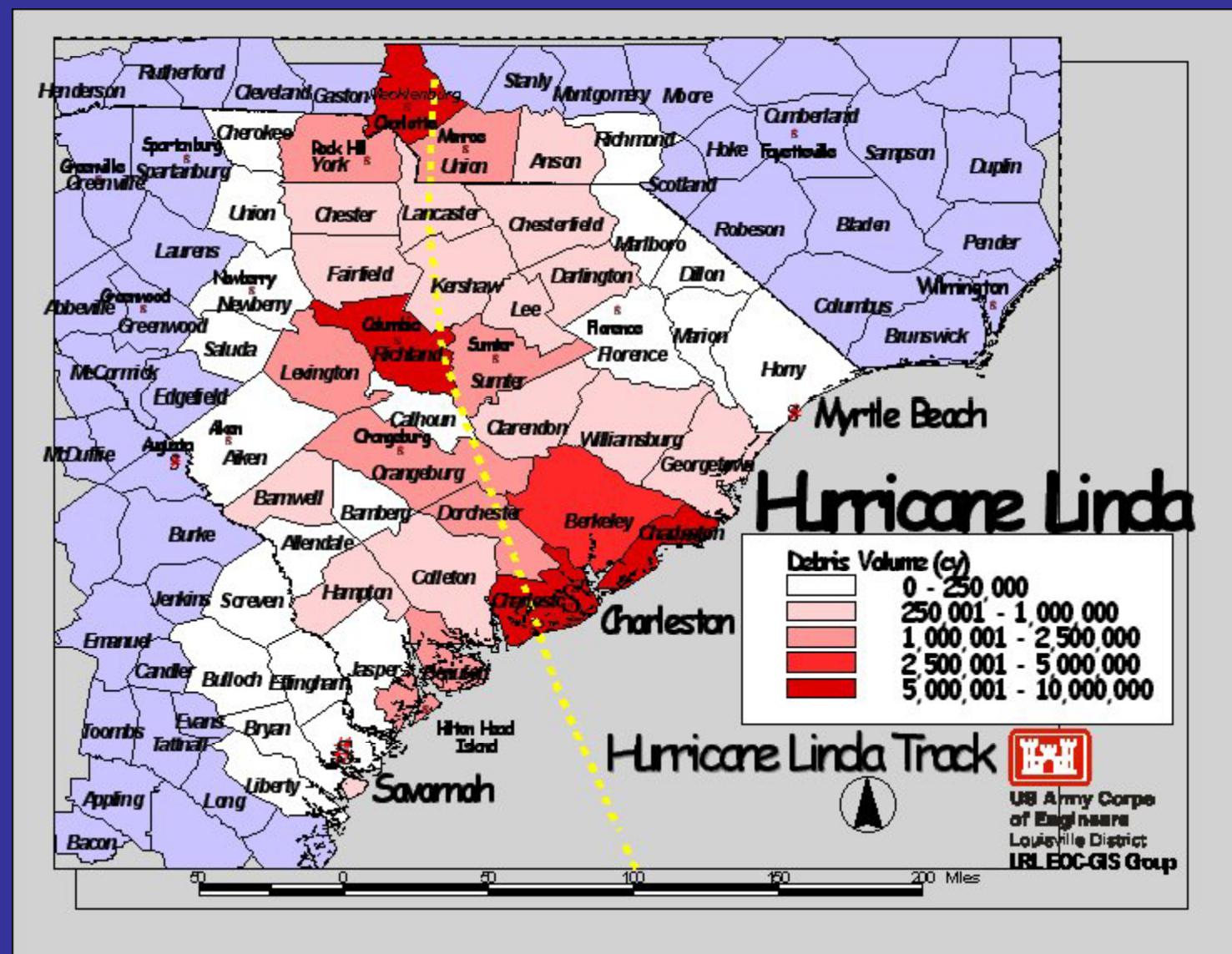


Pre-landfall and Post Landfall Debris Modeling



www.englink.usace.army.mil





Corps of Engineers Debris Model

Output:

South Carolina

35,964,493 cubic yards

County	Quantity (cy)
Berkeley	3,627,191
Charleston	8,438,115
Dorchester	1,216,567
Colleton	503,508
York	2,311,191
Lancaster	798,478
Chester	471,183
Chesterfield	565,024
Kershaw	638,580
Fairfield	326,547
Darlington	905,911
Lee	270,041
Richland	5,021,815
Lexington	2,454,942
Sumter	1,803,948
Clarendon	416,698
Williamsburg	539,217
Calhoun	186,789
Georgetown	678,170
Orangeburg	1,490,498
Barnwell	297,225
Bamberg	247,558
Hampton	266,438
Jasper	226,833
Beaufort	1,519,006
Cherokee	50,143
Union	34,180
Marlboro	33,080
Dillon	32,802
Newberry	37,374
Florence	154,593
Horry	194,760
Marion	38,193
Saluda	18,429
Aiken	136,259
Allendale	13,207
	35,964,493





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Questions & Discussion

Thank You

