

Superstorm Sandy: The Immediate Response

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Assistant Superintendent for
Environmental Stewardship

Minneapolis Park and Recreation Board



NYC Parks



NYC Parks' Forestry Response to Superstorm Sandy

1. Introduction
2. The History and Background of Parks' Storm Response in New York City
3. Super Storm Sandy
4. The Aftermath and Going Forward



Introduction

University of Minnesota

B.S. Urban and Community Forestry



Rainbow Treecare

Consulting Arborist '06-'08



City of New York Department of Parks & Recreation

Borough Forester ('04- '06)

Capital Arborist ('08 – '11)

Deputy Chief of Forestry, Horticulture & Natural Resources ('11 – '15)



City of San Diego Planning Department

Urban Forestry Program Manager ('15 – '17)



Minneapolis Park & Recreation Board

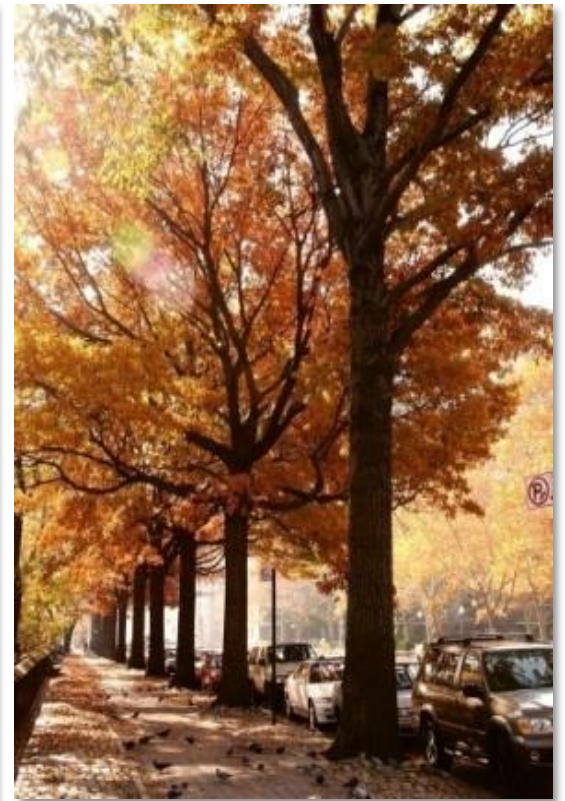
Assistant Superintendent for Environmental Stewardship



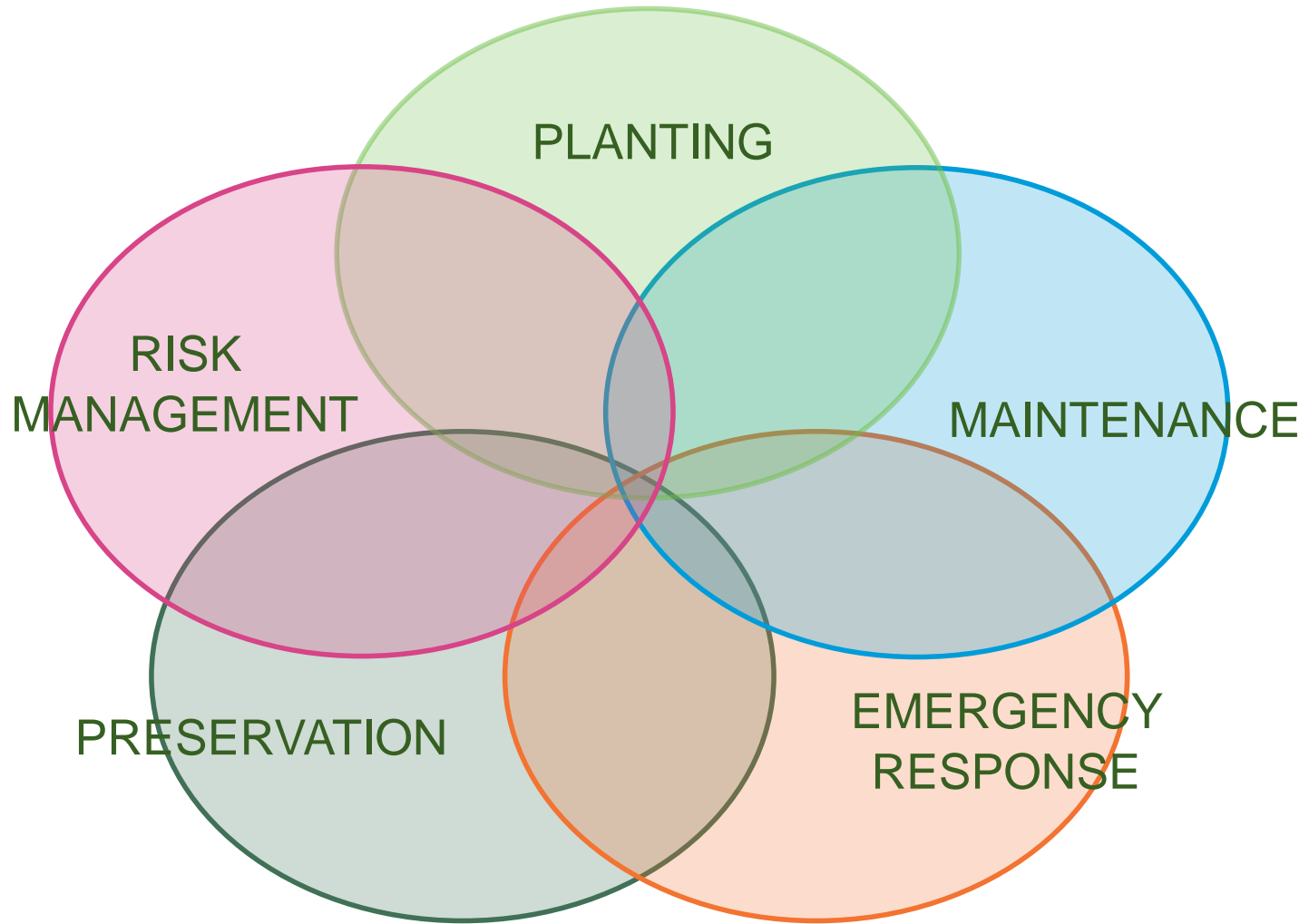
Estimated 2 million trees in landscaped parks & natural areas



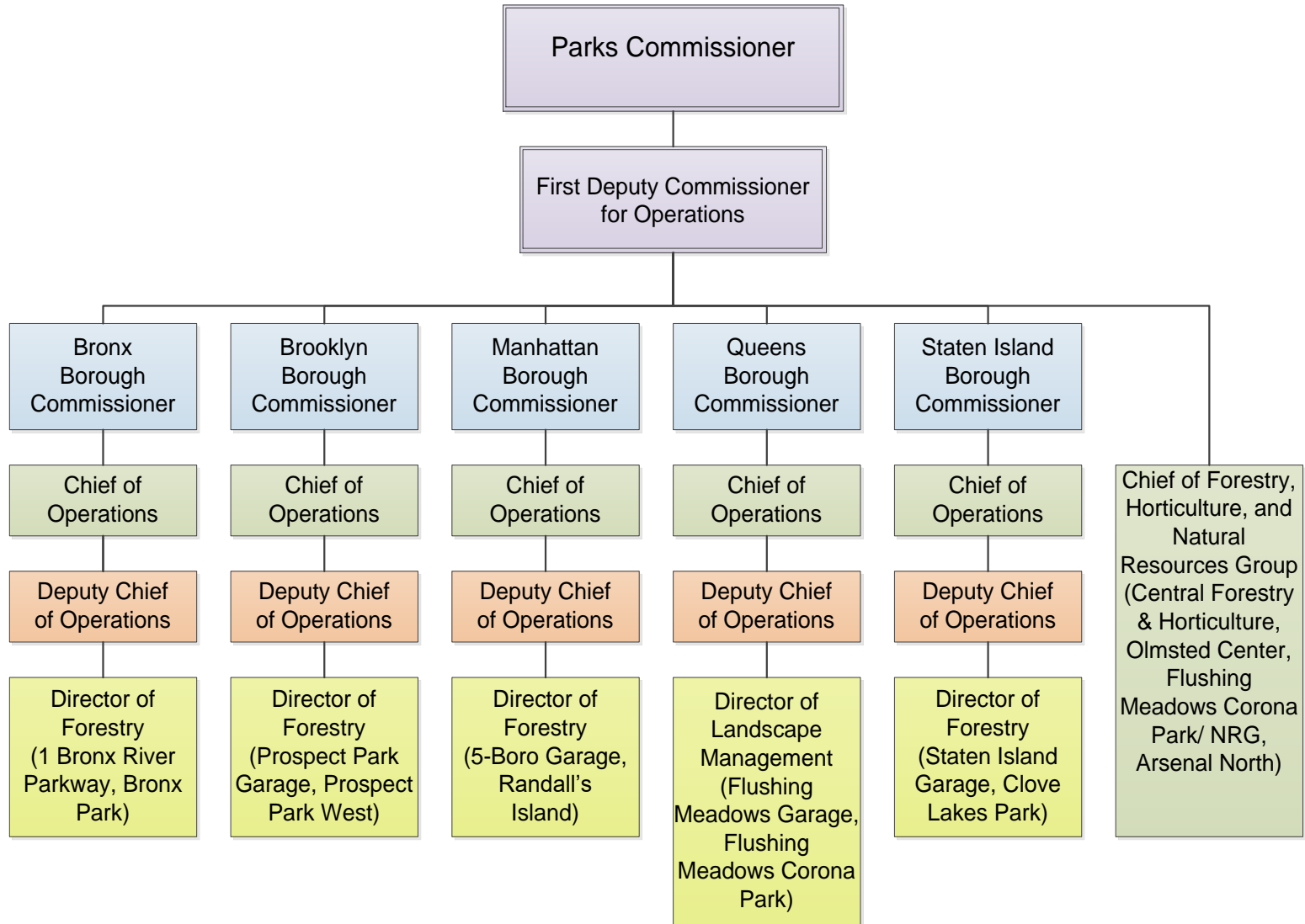
600,000 Street Trees



NYC Urban Forest Management



NYC Urban Forest Management

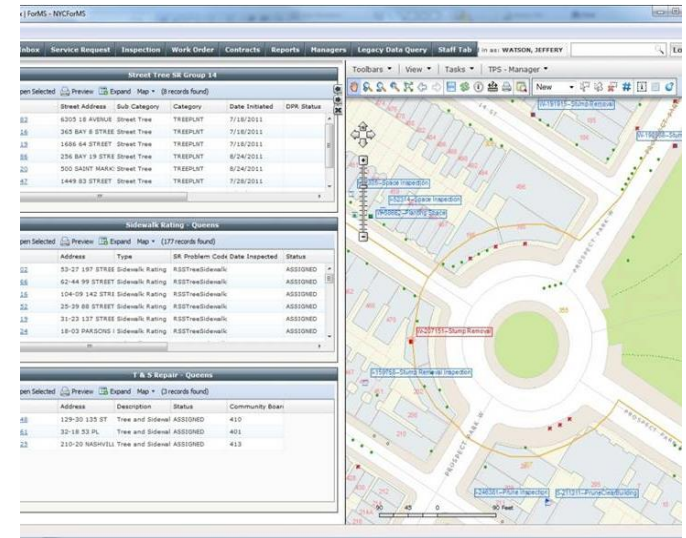


ForMS – Forestry Management System

Computerized inventory and work management database

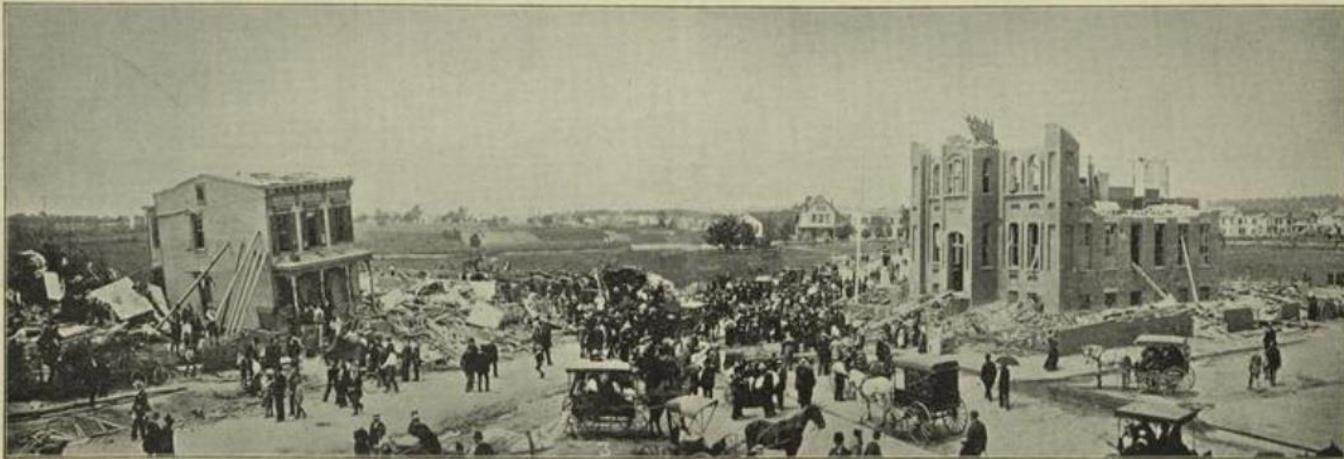
2-way integration with **311** – public request comes in, forestry response comes out

During storms, the system may be limited to just tree-related emergencies



The History of Parks' Storm Response in NYC





SCENES WROUGHT BY THE RECENT TORNADO AT WOODHAVEN, LONG ISLAND.

1. View on Rockaway avenue, showing Schaeffer's house, near which Mrs. Petroquien was killed. 2. Soliciting contributions for the Relief Fund. 3. Panoramic view, showing wrecked schoolhouse.

(From photographs by J. H. Hare, THE ILLUSTRATED AMERICAN PHOTOGRAPHER.)

12th July 1895

M. F. PUBLIC LIBRARY
PASTOR COLLECTION

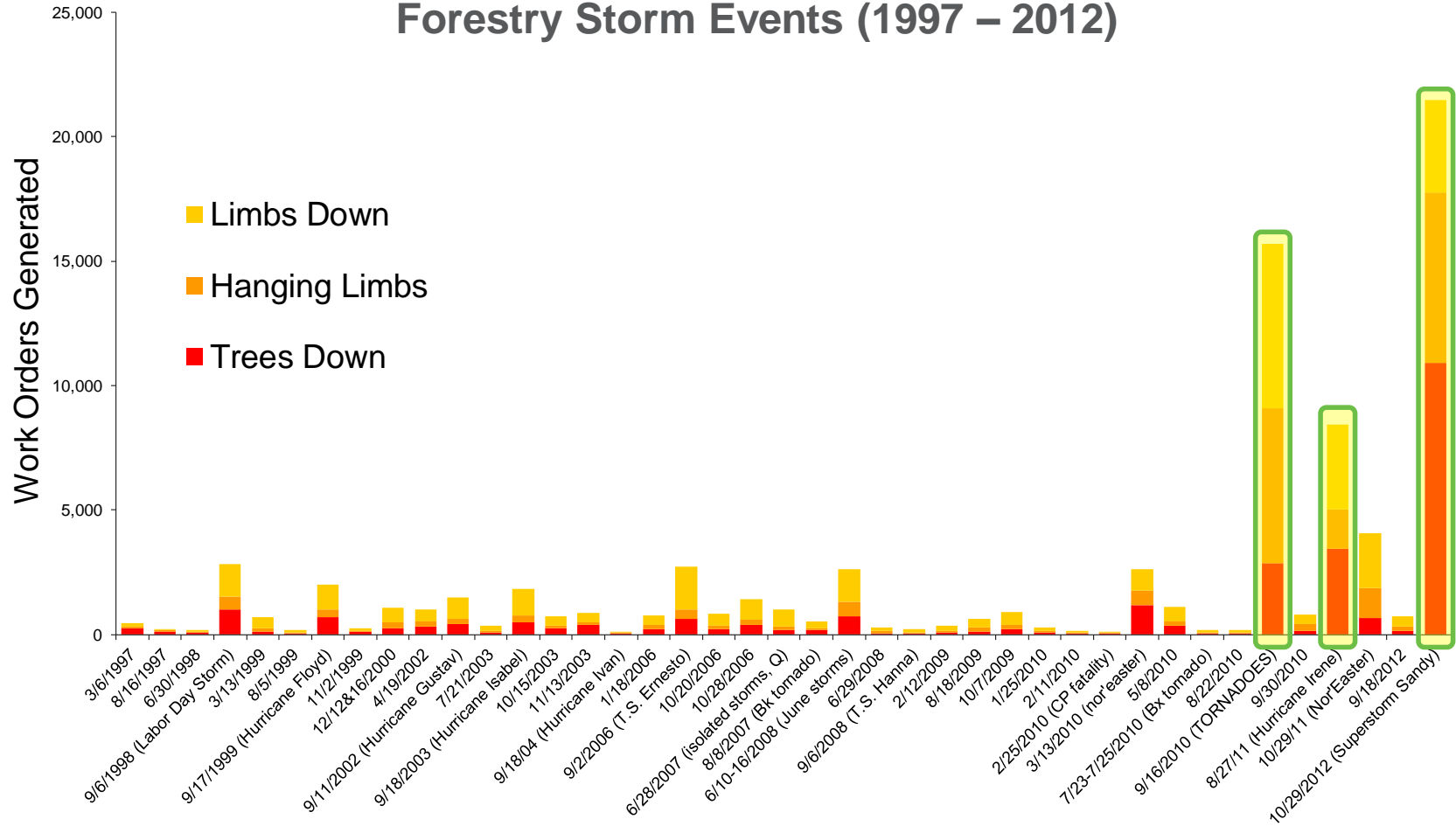


NYC Parks

From photographs by J.H. Hare, The Illustrated American Photographer.

NYC Storm History

Forestry Storm Events (1997 – 2012)



Emergency Protocol for Parks Forestry – an Evolution

City of
Parks &



FOREST
PLAN OF

Director of

City of
Parks &



FORESTRY
RESPON

Fiona V
Tom R

The C
Parks

FORESTRY
PLAN OF

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The City of New York
Parks & Recreation

**FORESTRY EMERGENCY
PLAN OF OPERATIONS**
DRAFT

Michael R. Bloomberg
Mayor

Adrian Benepe
Commissioner

March 2011



NYC Parks

“Everyone has a plan ‘til they
get punched in the mouth”

– Mike Tyson



September 16, 2010 Tornadoes

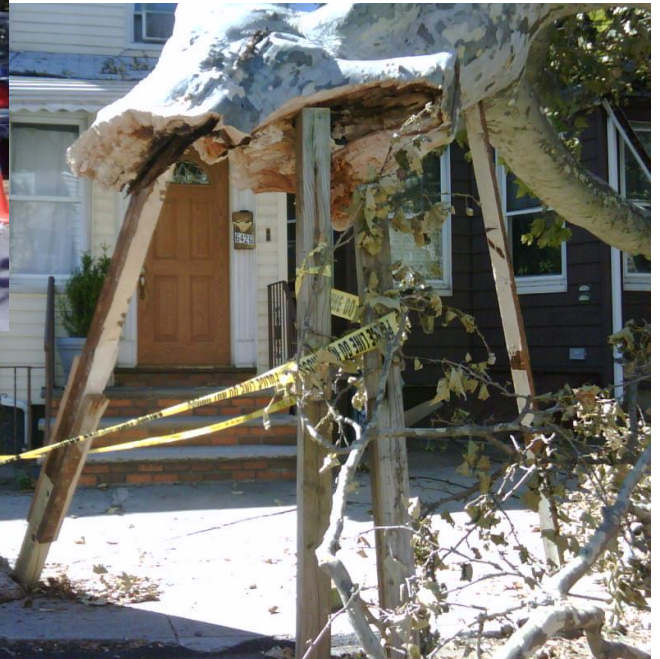








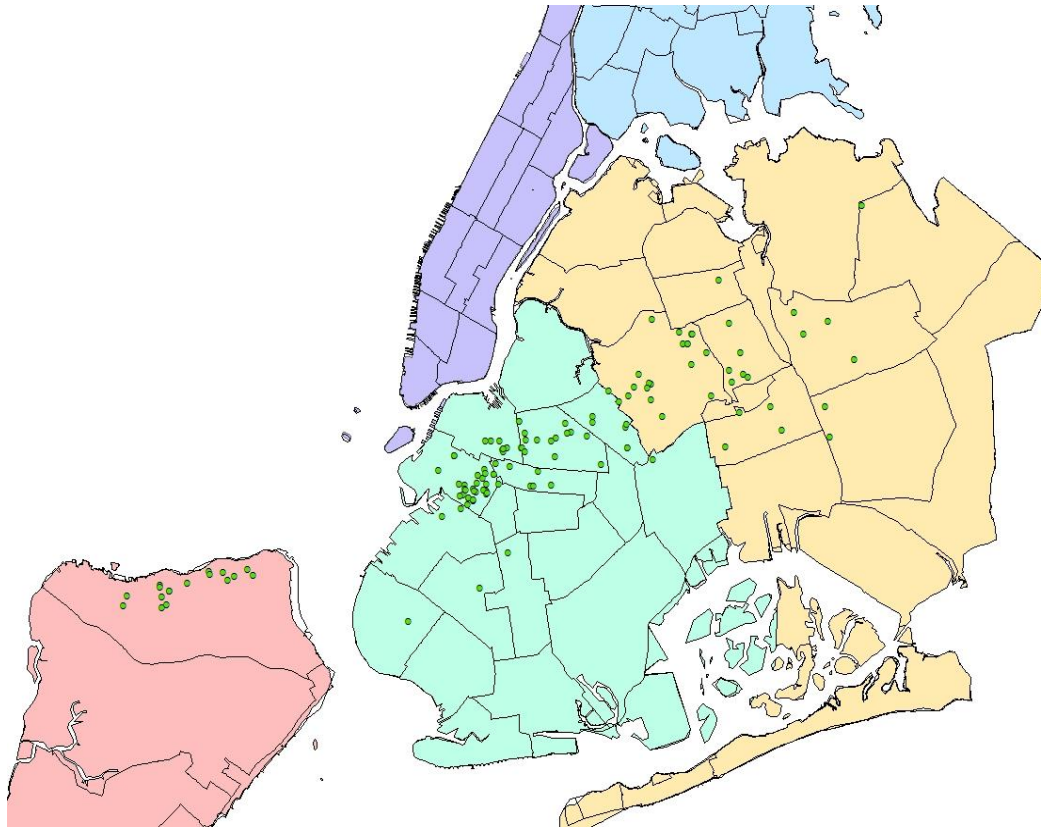




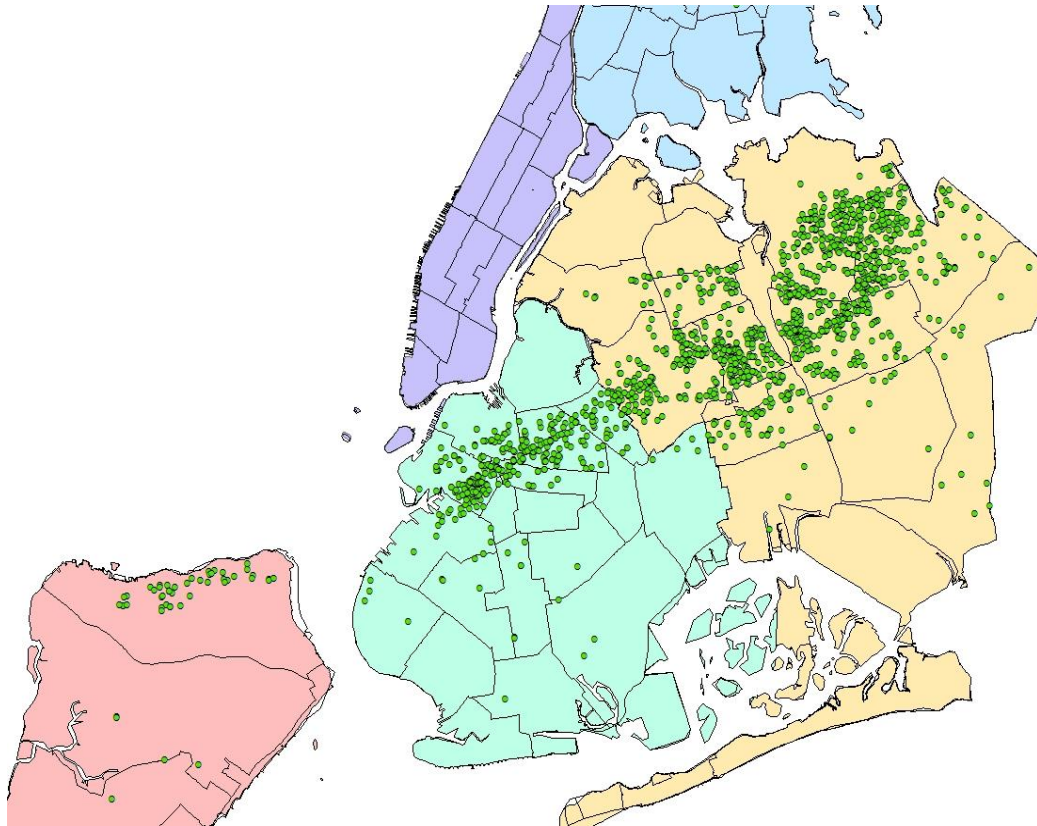




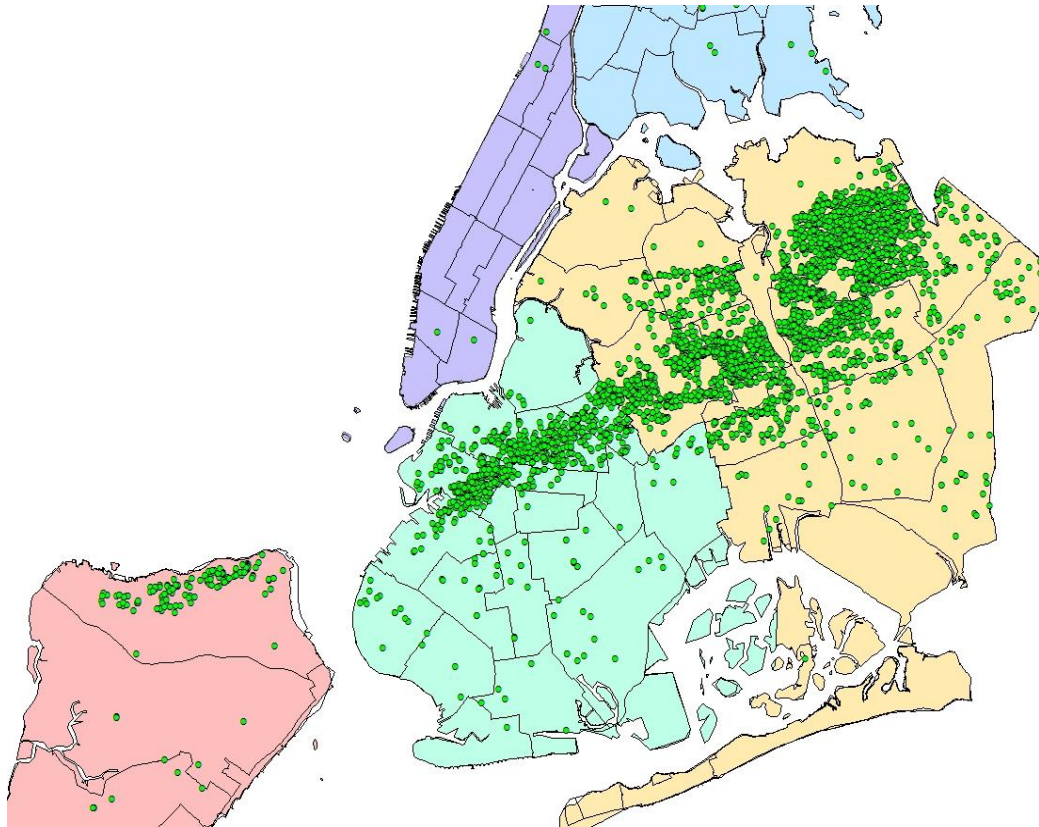
9/16 18:00
134 Service Requests



Brooklyn / Queens (9/16 24:00) 1,612 Service Requests



Brooklyn / Queens Day 3 (9/18 19:00) 5,506 Service Requests



Outside Help

Federal & State Agencies

USFS

- 'Hot-Shot' crew
- APHIS
- FEMA
- National Guard



Mutual Aid

- Nassau County
- Westchester County
- Suffolk County



State Agencies

- NYSDAM
- Port Authority
- DOT
- NYSOEM



New York State
Department of Transportation

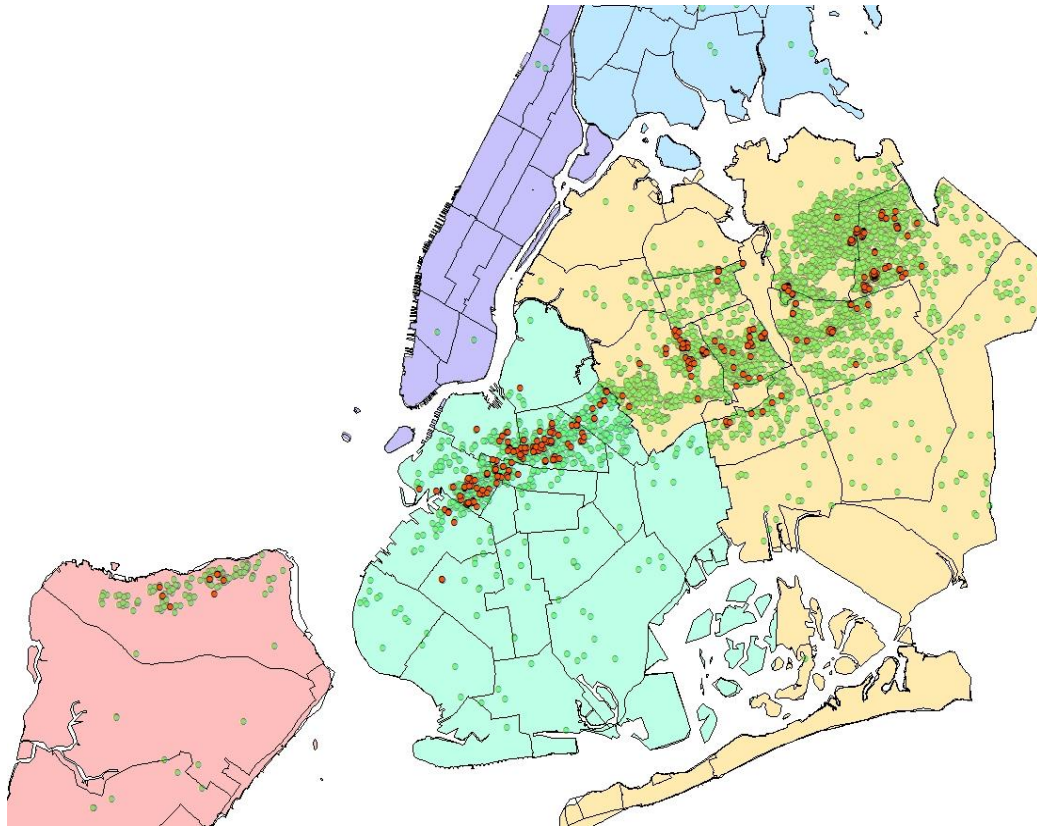
Private Contract

- Lewis Tree Service

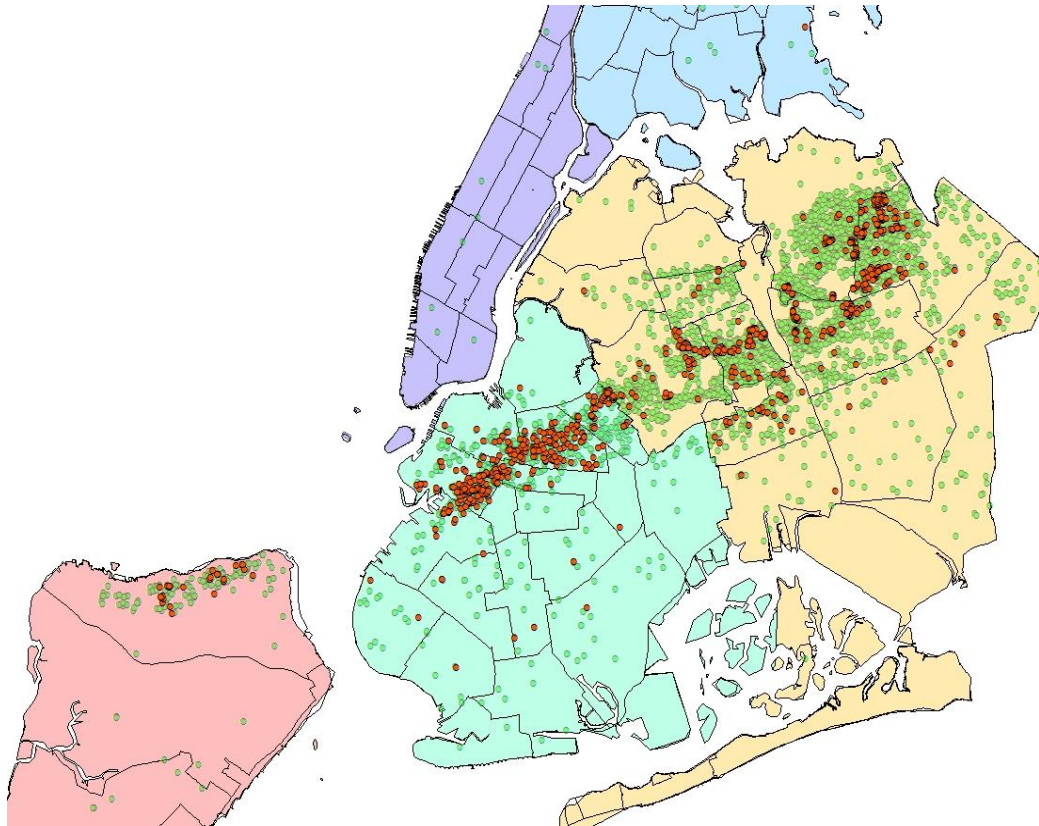


NYC Parks

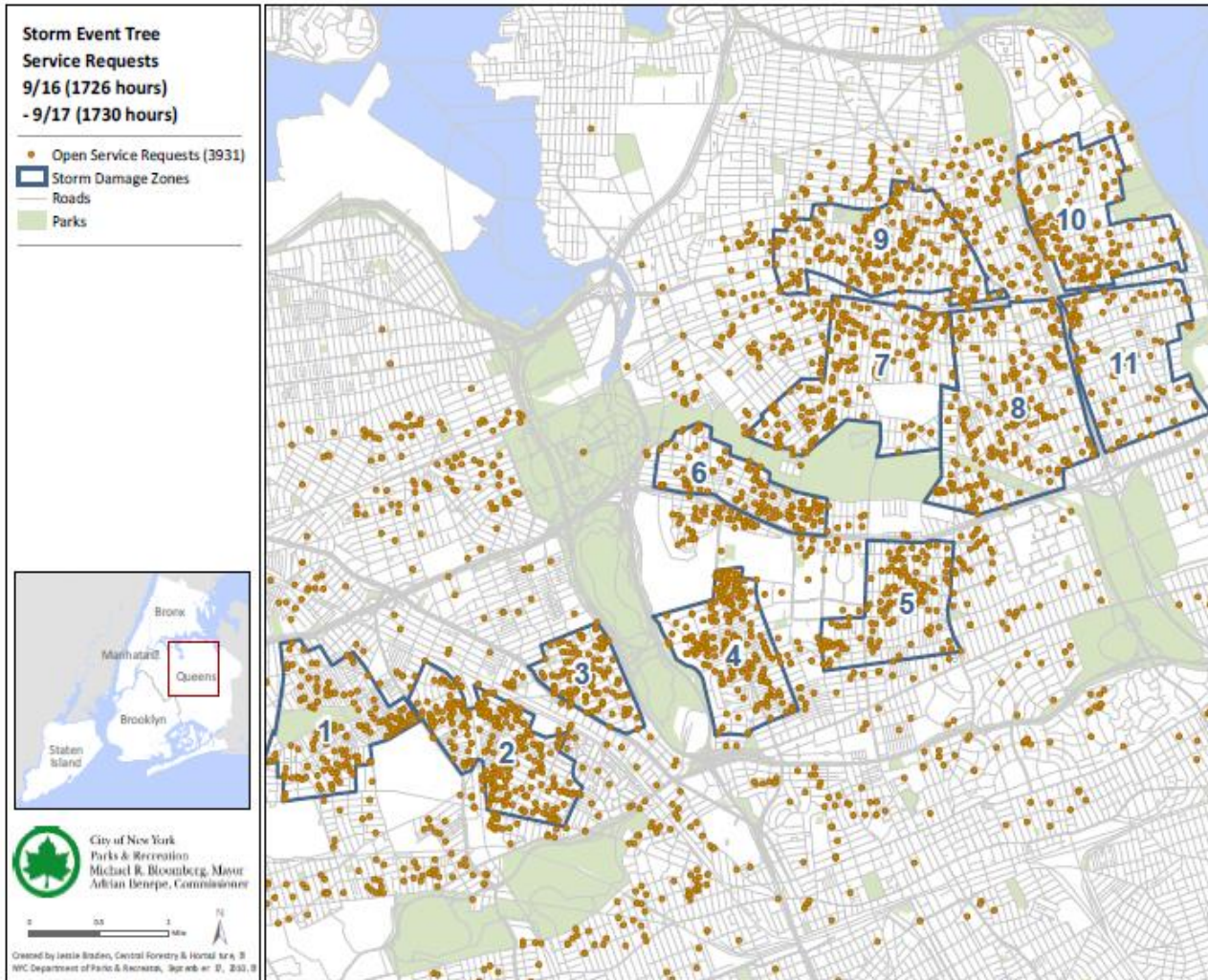
Day 2 (9/17 19:00) 239 Work Orders Closed



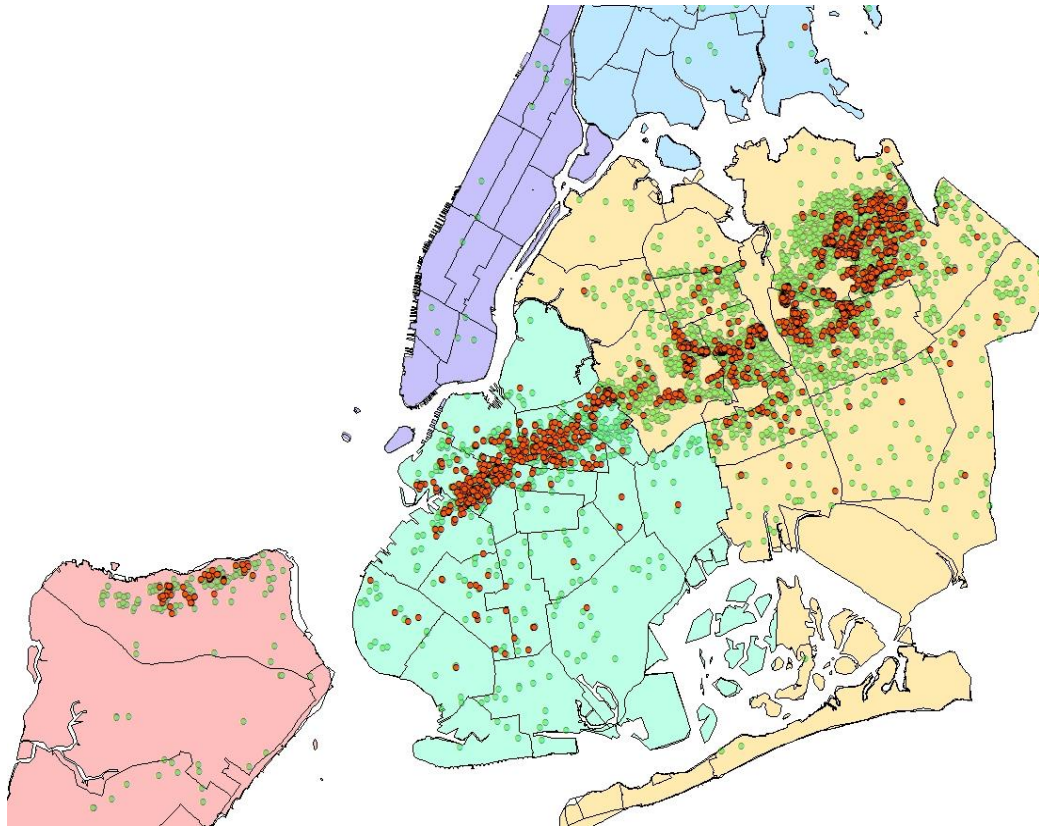
Day 3 (9/18 19:00) 536 Work Orders Closed



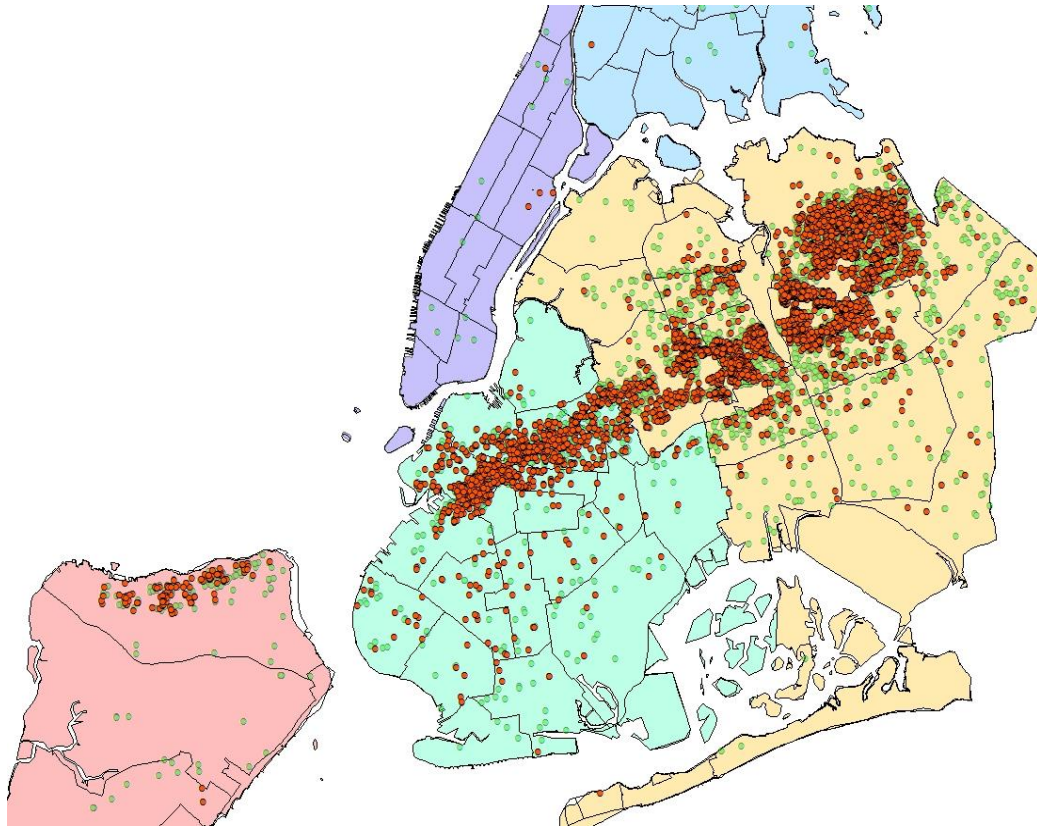
Defined Storm Zones



Brooklyn / Queens
Day 7 (9/23 19:00)
2,556 Work Orders Closed



Brooklyn / Queens Day 14 (9/30 19:00) 6,175 Work Orders Closed



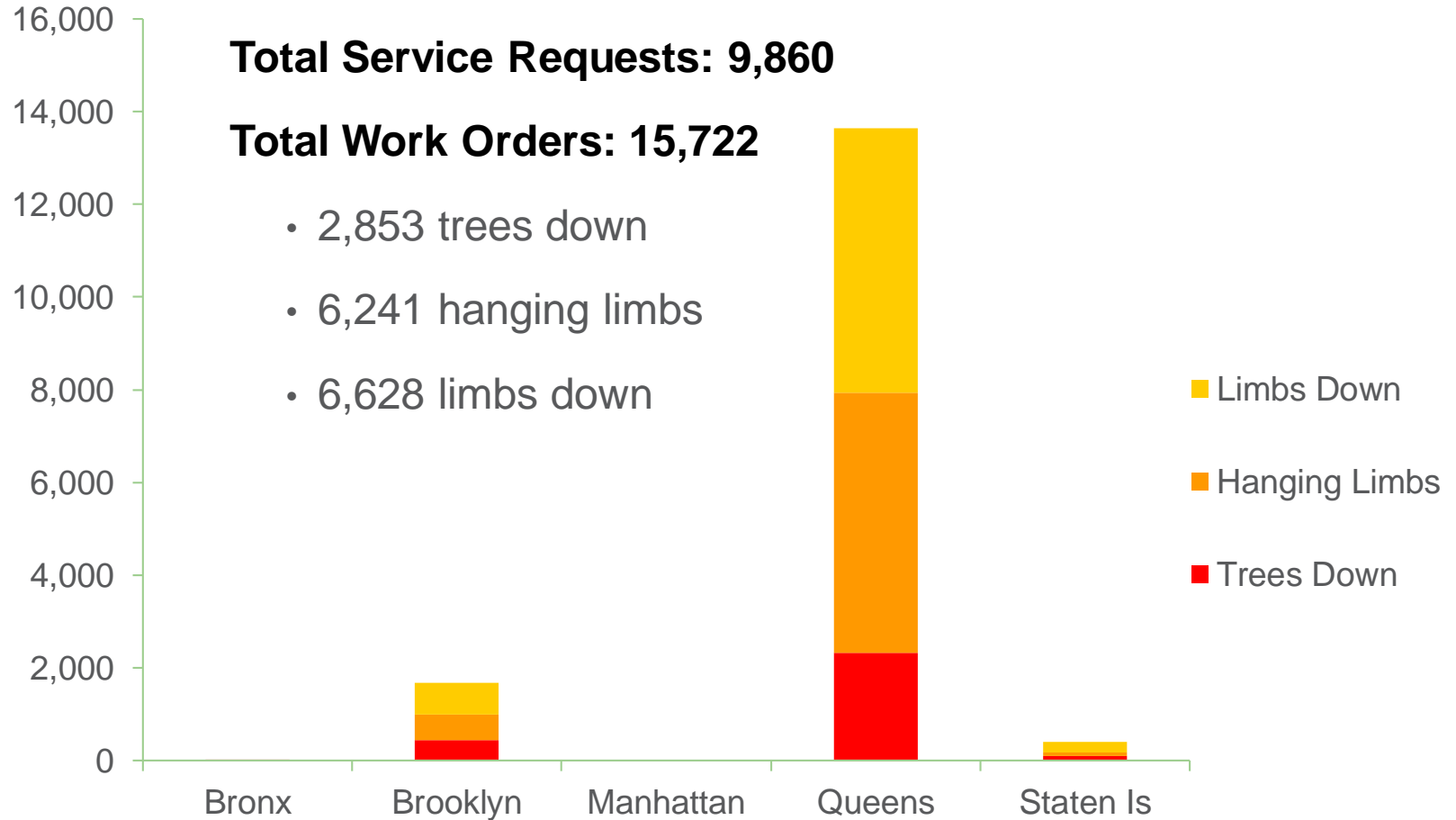
Two Tornadoes and a Macroburst vs NYC Trees

42 Days of Storm Activation

Total Service Requests: 9,860

Total Work Orders: 15,722

- 2,853 trees down
- 6,241 hanging limbs
- 6,628 limbs down



Lessons Learned From the September 16th Tornadoes

- Forestry specialists at OEM Emergency Ops Center (EOC)
- Clearly prioritize inspections and work orders
- Be able to report live from the field in order to update forestry database
- Be able to produce work lists for other agencies and organizations
- Need to approach storm response more strategically and utilize sister agencies
- Update forestry emergency response protocol and train all staff accordingly



Forestry Storm Emergency – ForSE



Forestry Storm Emergency (ForSE) – 2012

- **Incorporate ICS Framework**
 - **Defined Chain of Command**
- **Developed Strategic Response Tactics**
 - **Request Based**
 - **Storm Zone**
 - **Combined**
- **Defined Prioritization:**
 - **Life Safety**
 - **Property Preservation**
 - **Quality of Life**
 - **All other work**



The City of New York
Department of Parks & Recreation

FORESTRY STORM EMERGENCY (ForSE)

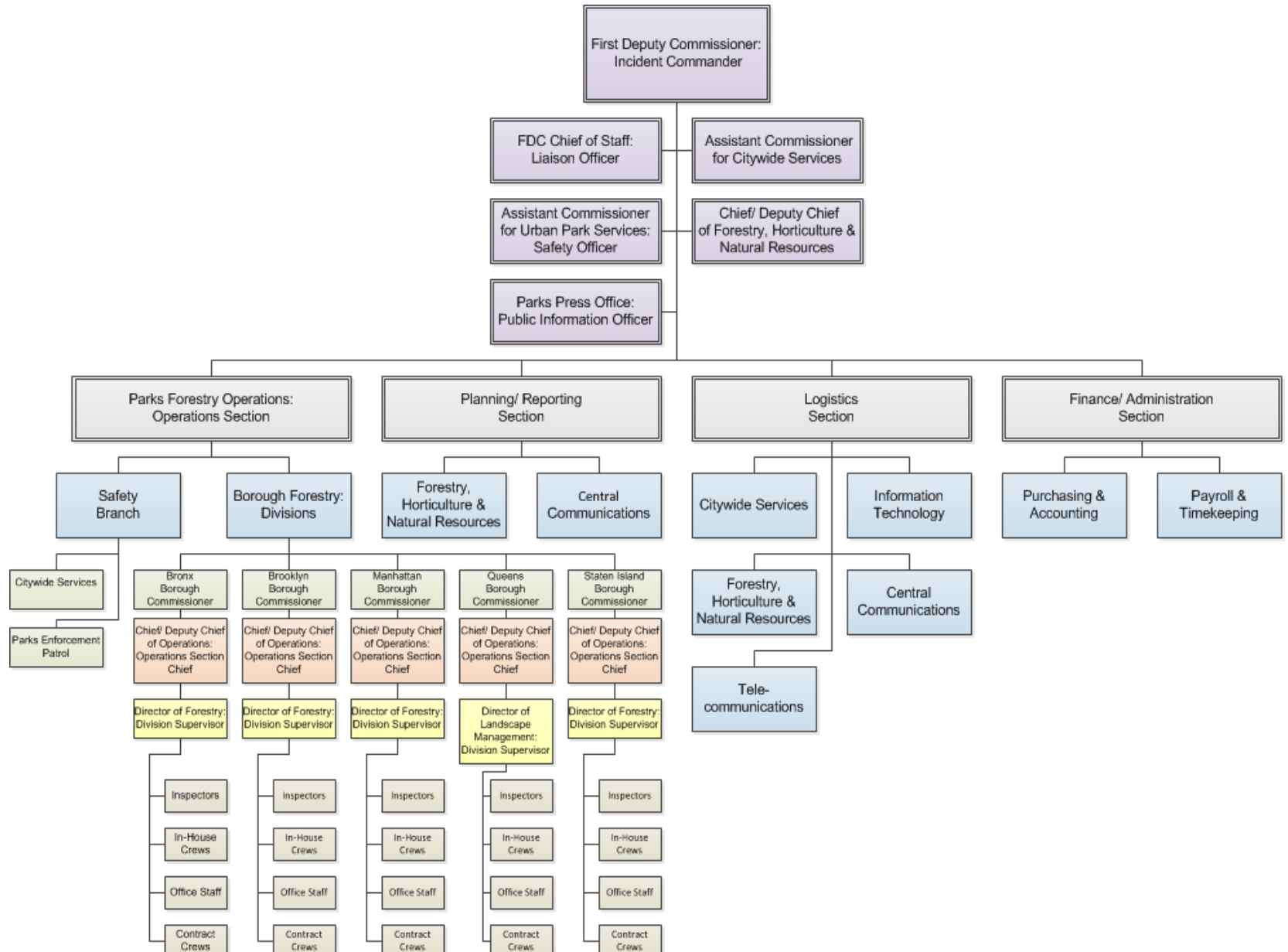
OPERATIONAL PLAN

Michael R. Bloomberg, Mayor
Adrian Benepe, Commissioner

August 2012



Incident Command Structure



Incident Levels

Incident Level	Intensity	Tree Down SRs (greater than or equal to)					Exceeds Weekly Average by
		BX	BK	M	Q	SI	
5	Low	10	15	5	40	10	~ 3 x
4		25	45	10	100	25	~ 8 x
3	Medium	70	110	30	250	60	~ 20 x
2		175	275	80	625	150	~ 50 x
1	High	350	550	170	1,250	300	~ 100 x

Shaded boxes indicate levels at which OEM may convene the Interagency Committee for Downed Trees Emergencies.

Incident levels are based on the number of Tree Down SRs received within 24 hours in any one borough.



Defined Initial Response

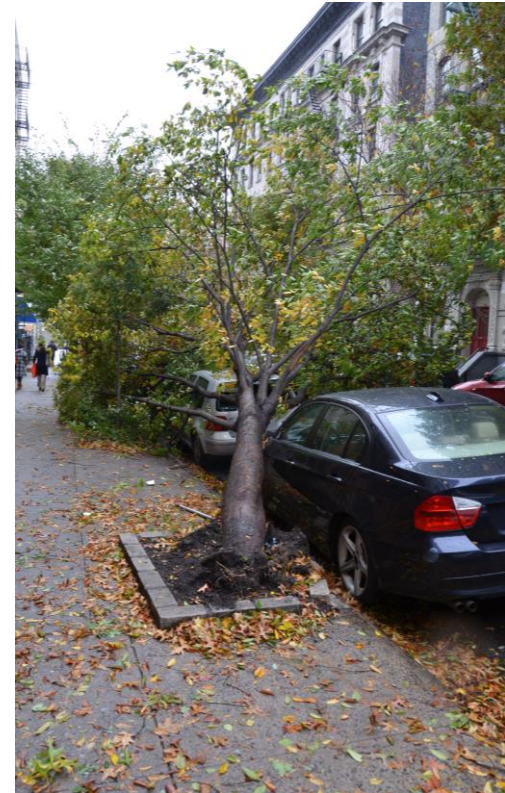
- Remove high priority downed trees.
- Ascertain the extent of the storm damage to gain situational awareness.
- Deploy resources including inspectors and debris removal crews based solely on Service Requests and field observations.



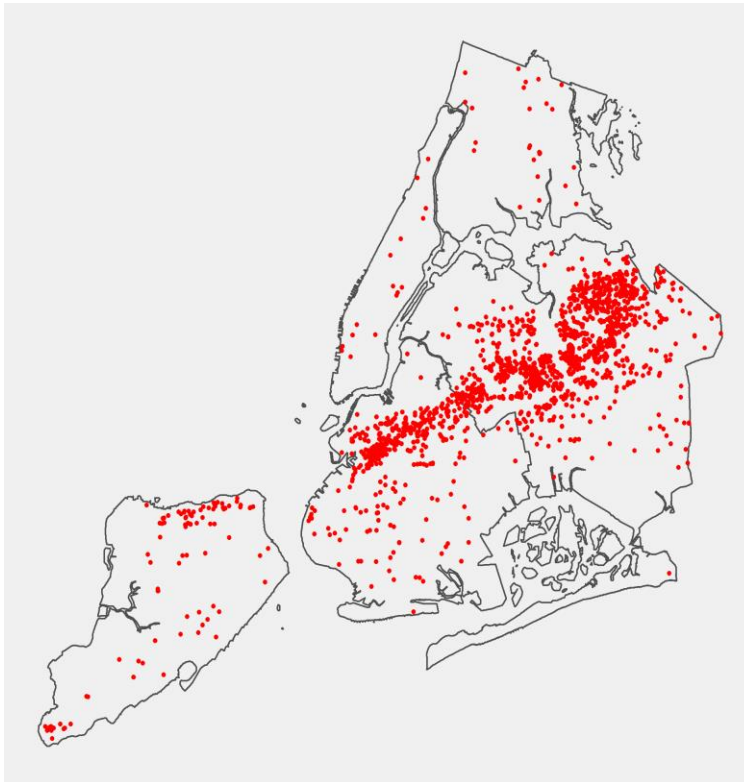
Initial Response – Tactical Decision-Making

Situational awareness

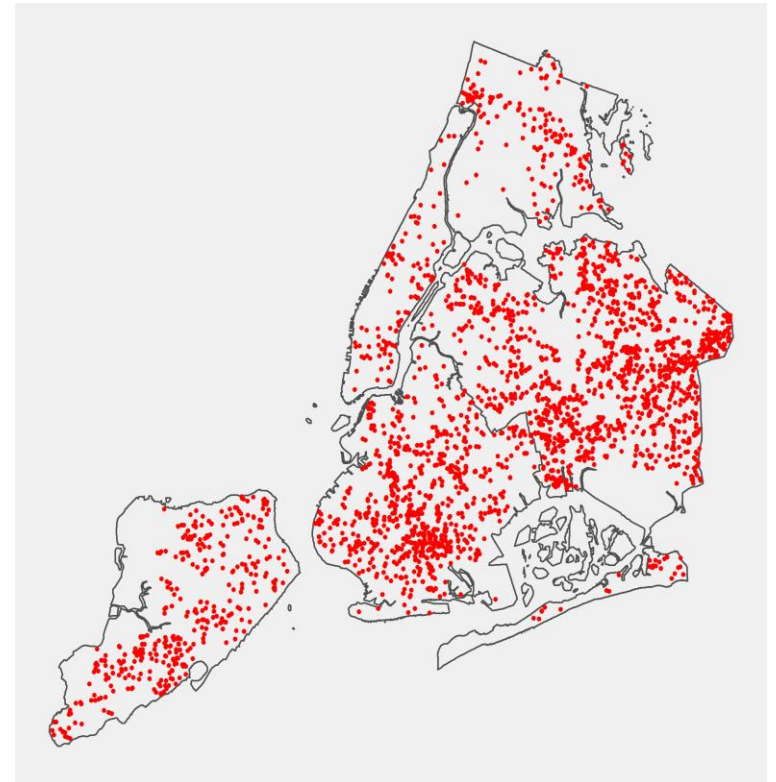
- Request-Based Response
- Storm Zone Response
- Combined Response



Tactical Decision-Making



Tornadoes – September 16, 2010



Irene – August 27, 2011



Inspection & Work Order Prioritization

Incidents are prioritized in the following order:

1. Life safety and obstructed roadways
2. Property preservation
3. Quality of life
4. Vegetative debris reduction and collection
5. Sidewalk restoration and replanting



“No plan survives contact
with the enemy.”

– US Navy Seals



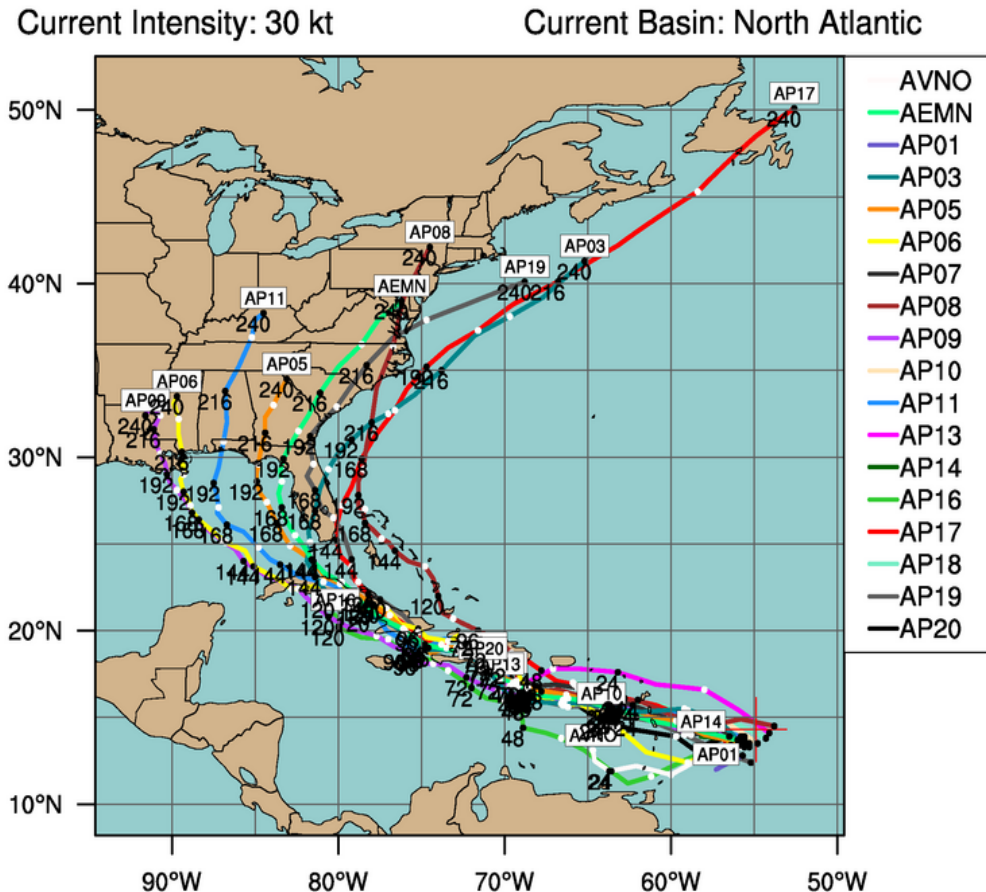
Tropical Storm Irene

August 28, 2011



DISTURBANCE INVEST (AL97)

NCEP GFS Ensemble track guidance initialized at 1200 UTC, 20 August 2011

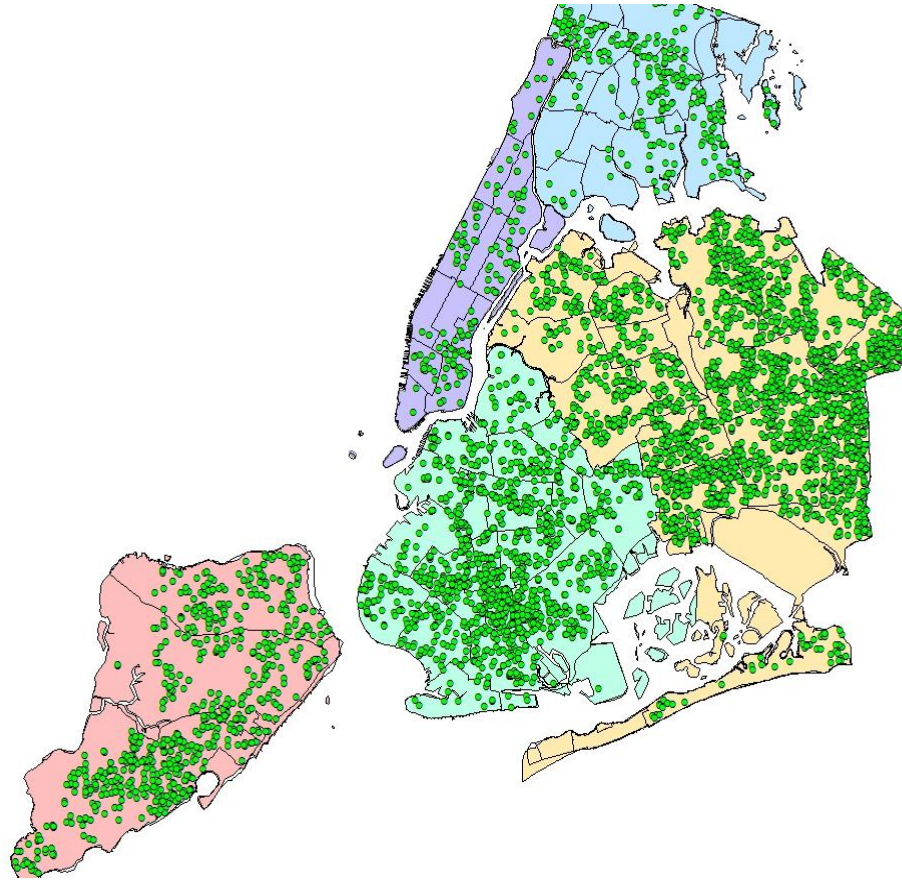


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8/29 22:00

5,394 Service Requests



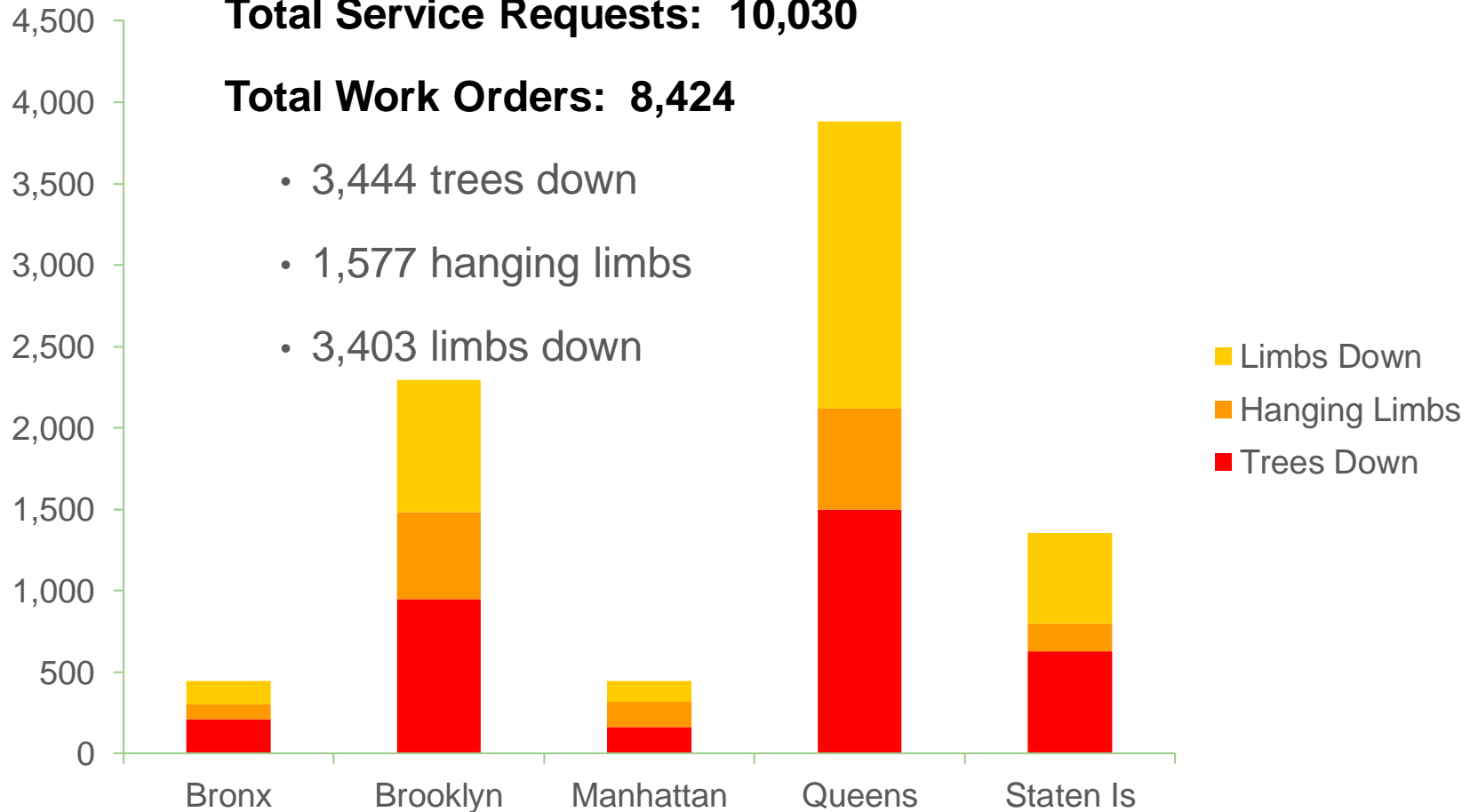
Irene vs NYC Trees

21 Days of Activation

Total Service Requests: 10,030

Total Work Orders: 8,424

- 3,444 trees down
- 1,577 hanging limbs
- 3,403 limbs down



Lessons Learned From Tropical Storm Irene

Downed Tree Task Force

Situational Awareness

Emergency Contracts

**Develop Debris
Management Strategy**

Technology Challenges



Storm Mobile



Storm Mobile – StoMo

- Windows application optimized for tablet computers
- 2-way integration with 311
- Utilizes citywide wireless network
- SRs & WOs are updated upon syncing
- Near real-time data updating

- Significant reduction of paperwork
- Ability to assign inspectors by zones
- Ability to quickly see where blocked streets are located
- Rapid field inspection of service requests
- Ability to handle duplicate service requests in the field
- Streamlined generation and closure of work orders
- Ability to report in near real time



“come on, hit me with your
best shot”

– Pat Benatar



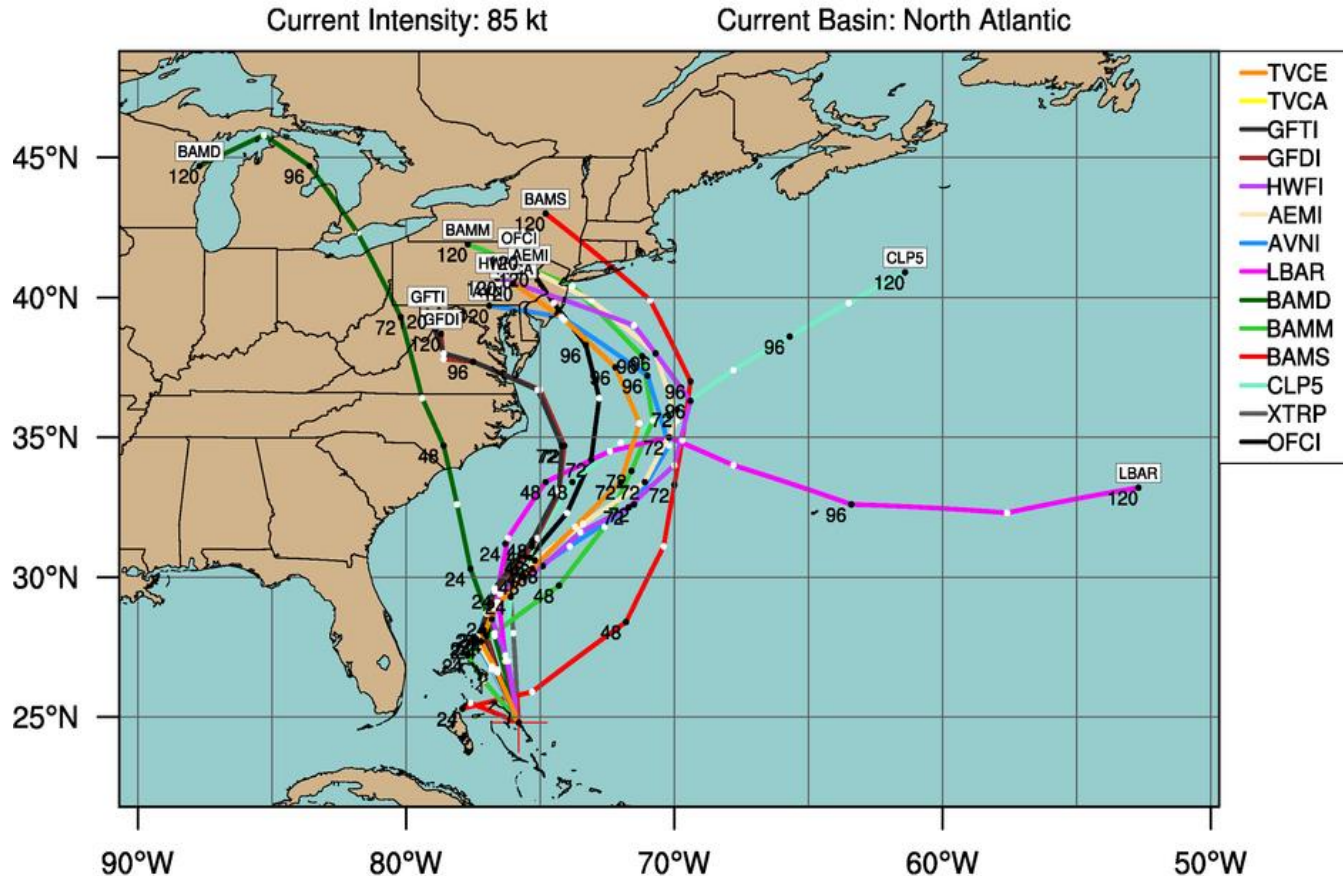
Superstorm Sandy

October 29, 2012



HURRICANE SANDY (AL18)

Early-cycle track guidance initialized at 0000 UTC, 26 October 2012



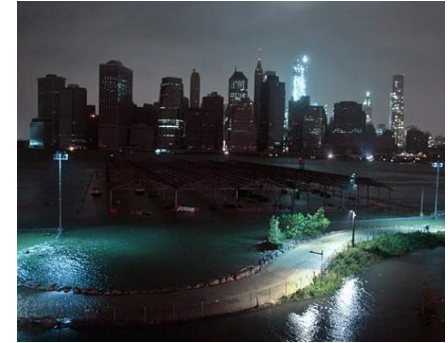
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Plot generated at 0119 UTC 26 October 2012



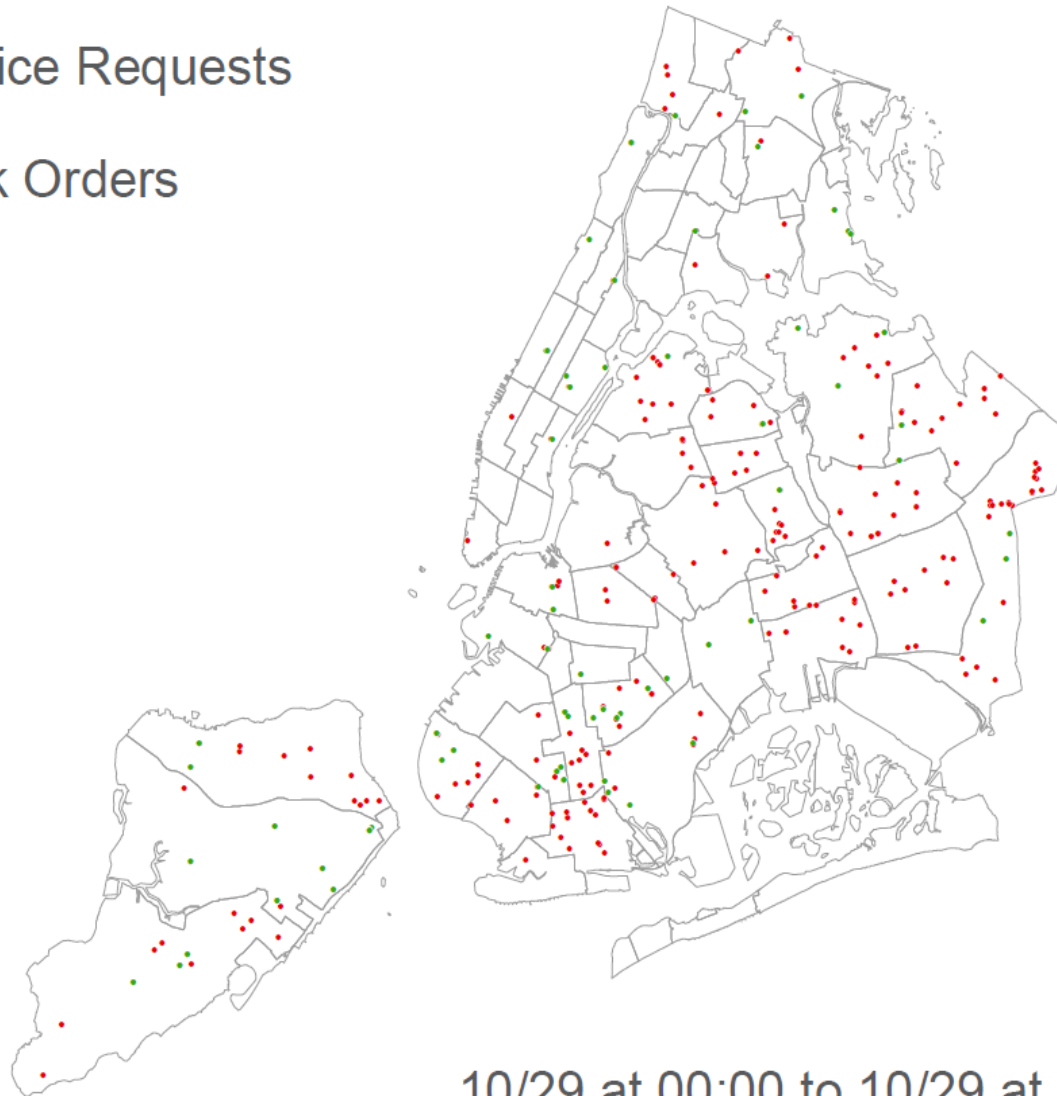
Superstorm Sandy's Strength

- Storm surge was 13-14 feet above Mean Low Water
- Massive power and transportation suspensions
- Second-costliest storm in U.S. history (after Katrina)
- Estimated \$19 billion in damage to NYC
- For the first time since 1888, NYSE was closed for two days in a row
- 10,926 street and park trees lost
- 4 dozen lives lost in NYC



● Service Requests

● Work Orders

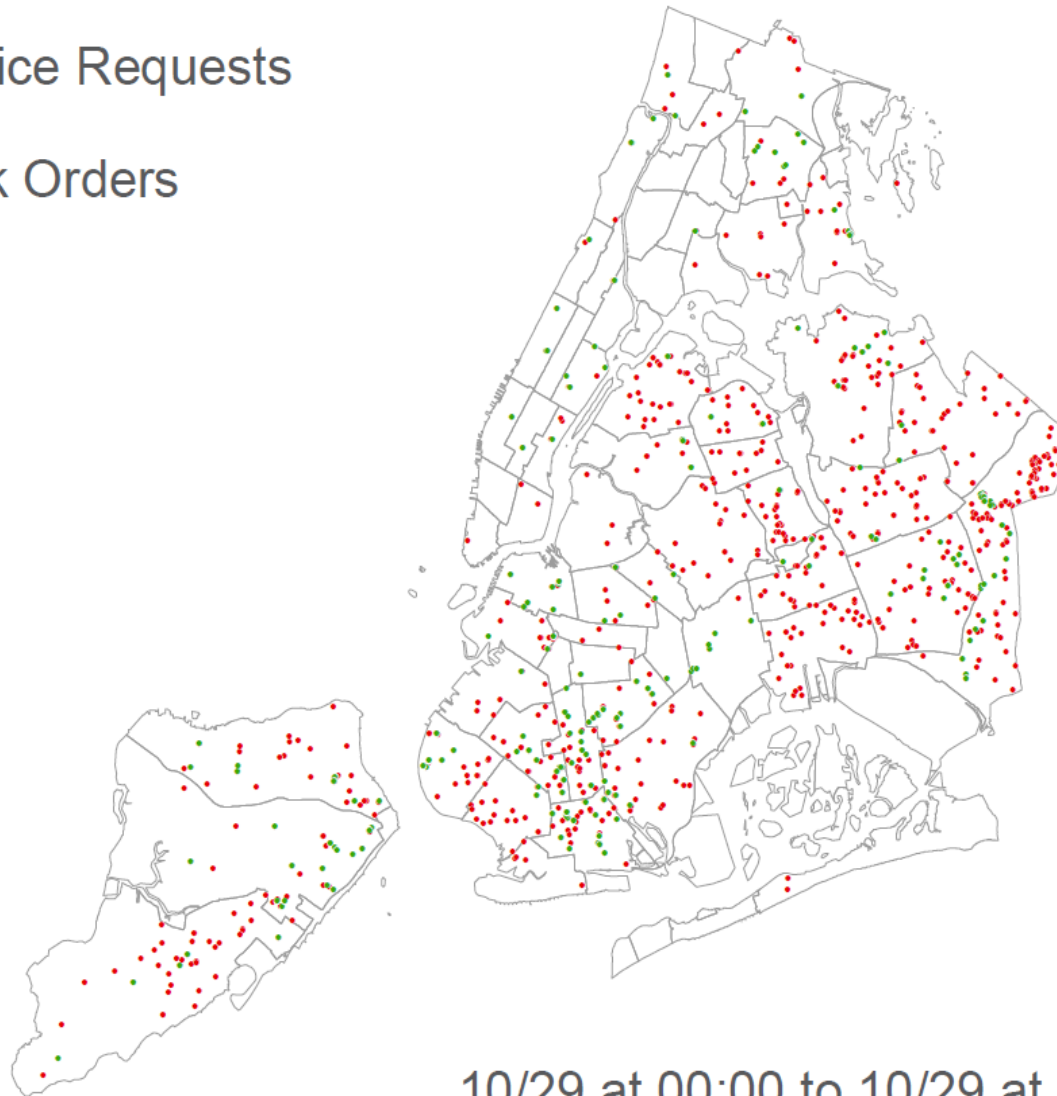


10/29 at 00:00 to 10/29 at 12:00



- Service Requests

- Work Orders

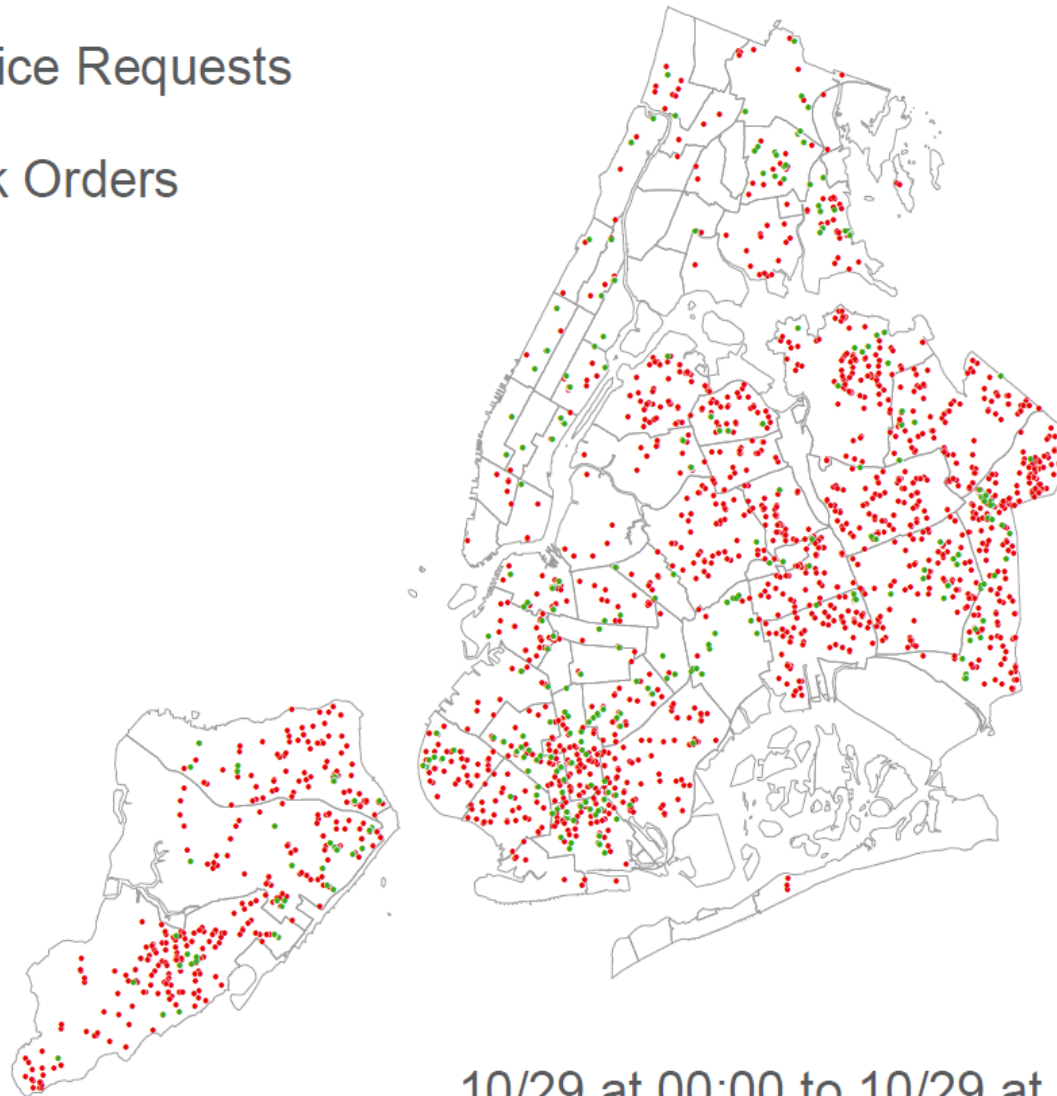


10/29 at 00:00 to 10/29 at 15:00



- Service Requests

- Work Orders

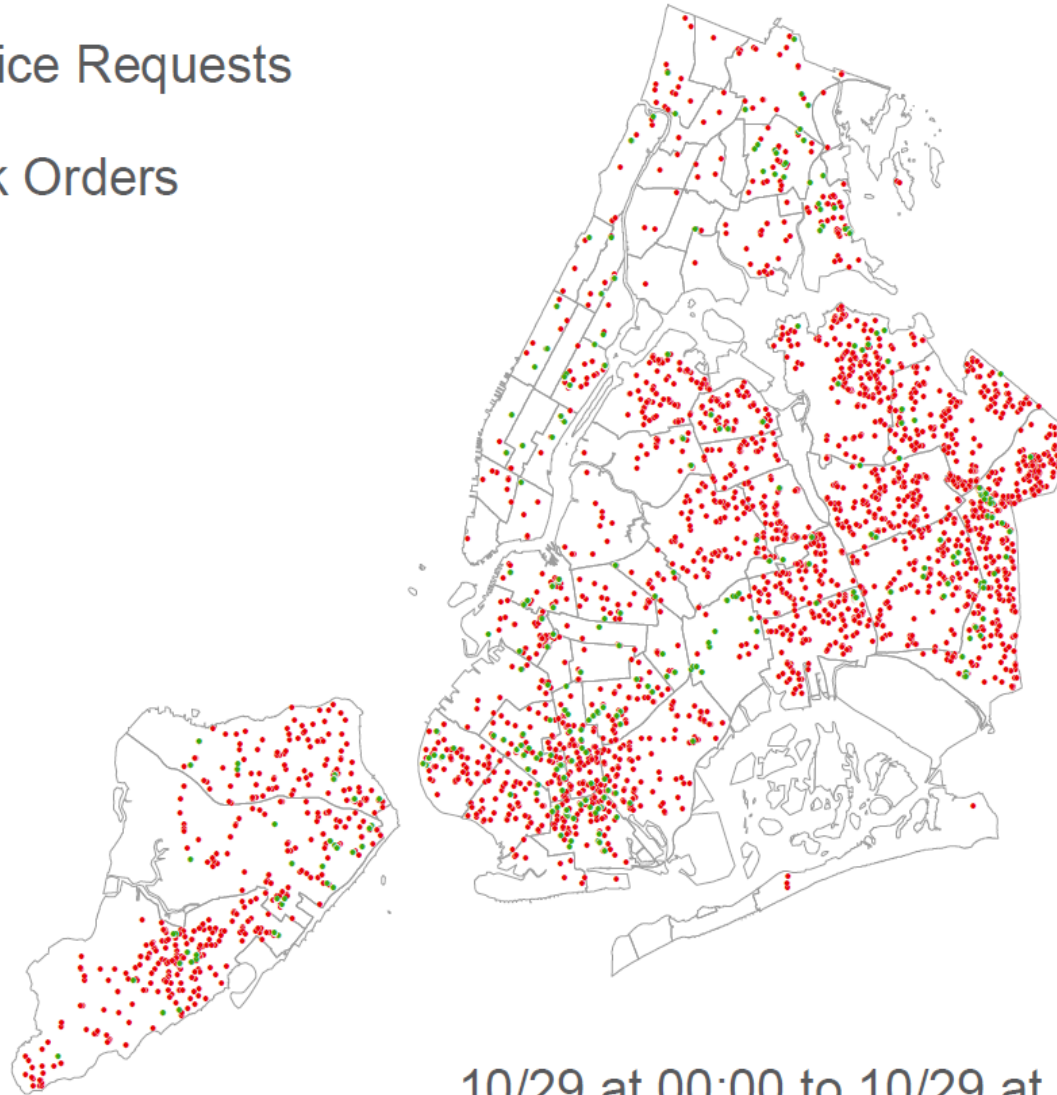


10/29 at 00:00 to 10/29 at 18:00



- Service Requests

- Work Orders

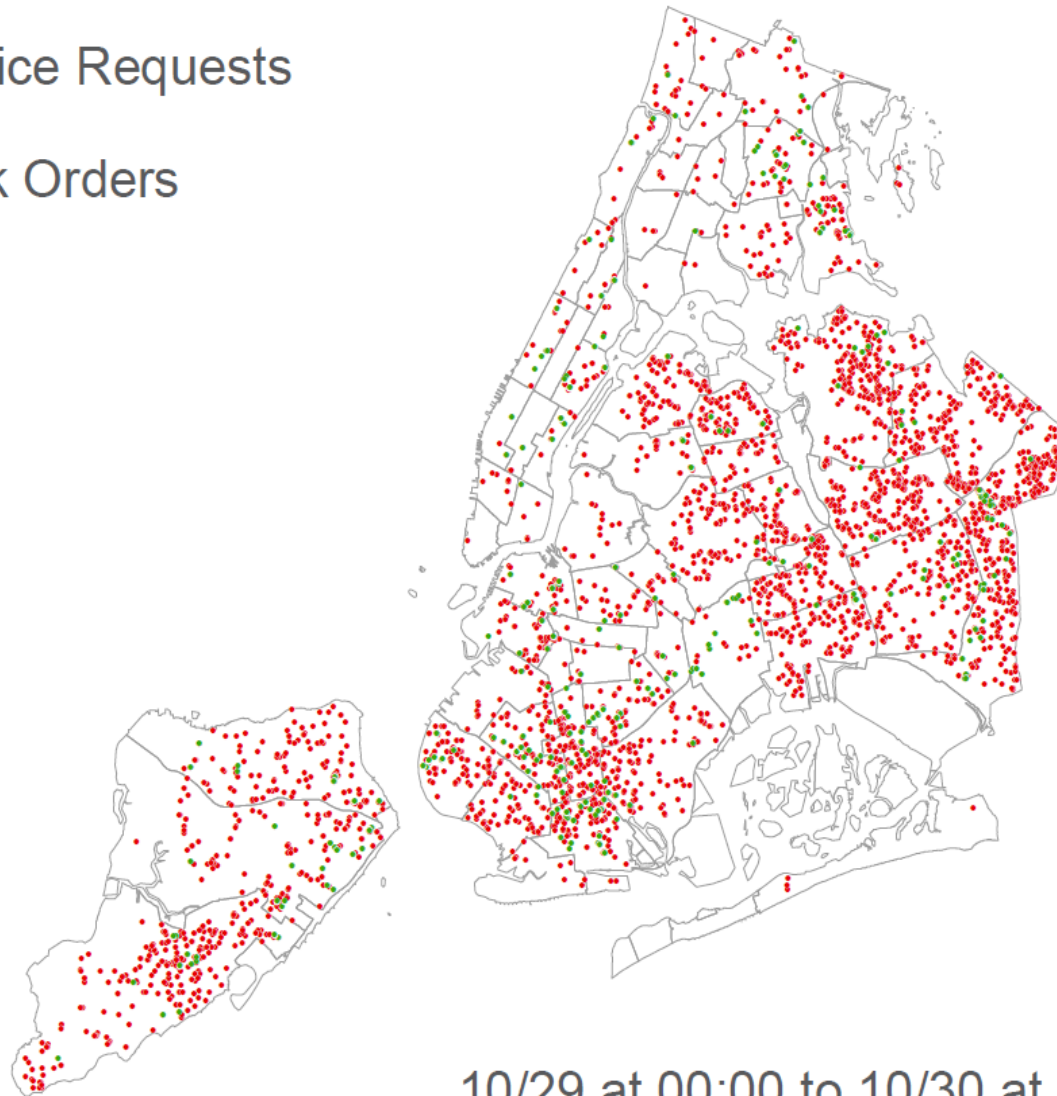


10/29 at 00:00 to 10/29 at 21:00



- Service Requests

- Work Orders

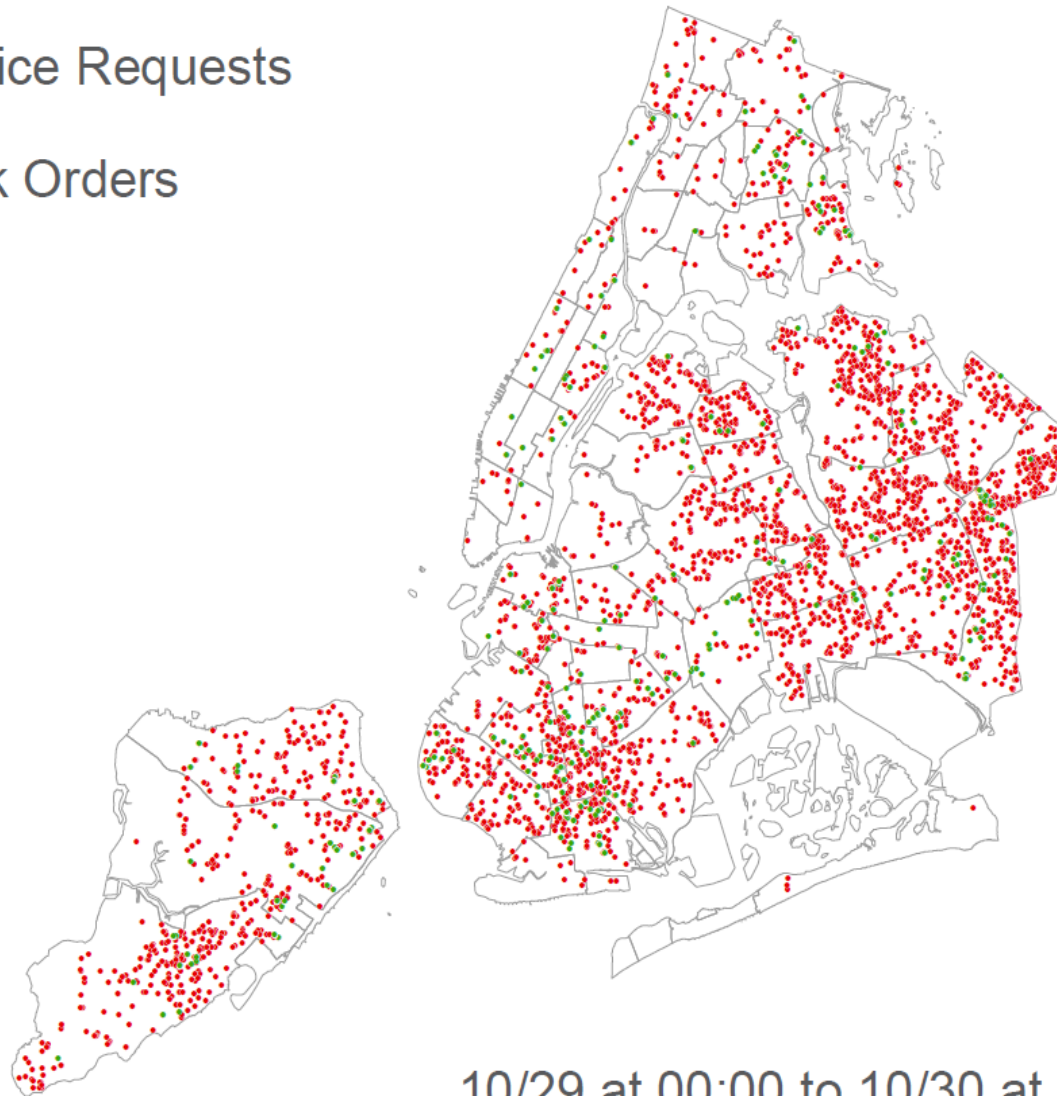


10/29 at 00:00 to 10/30 at 00:00



- Service Requests

- Work Orders

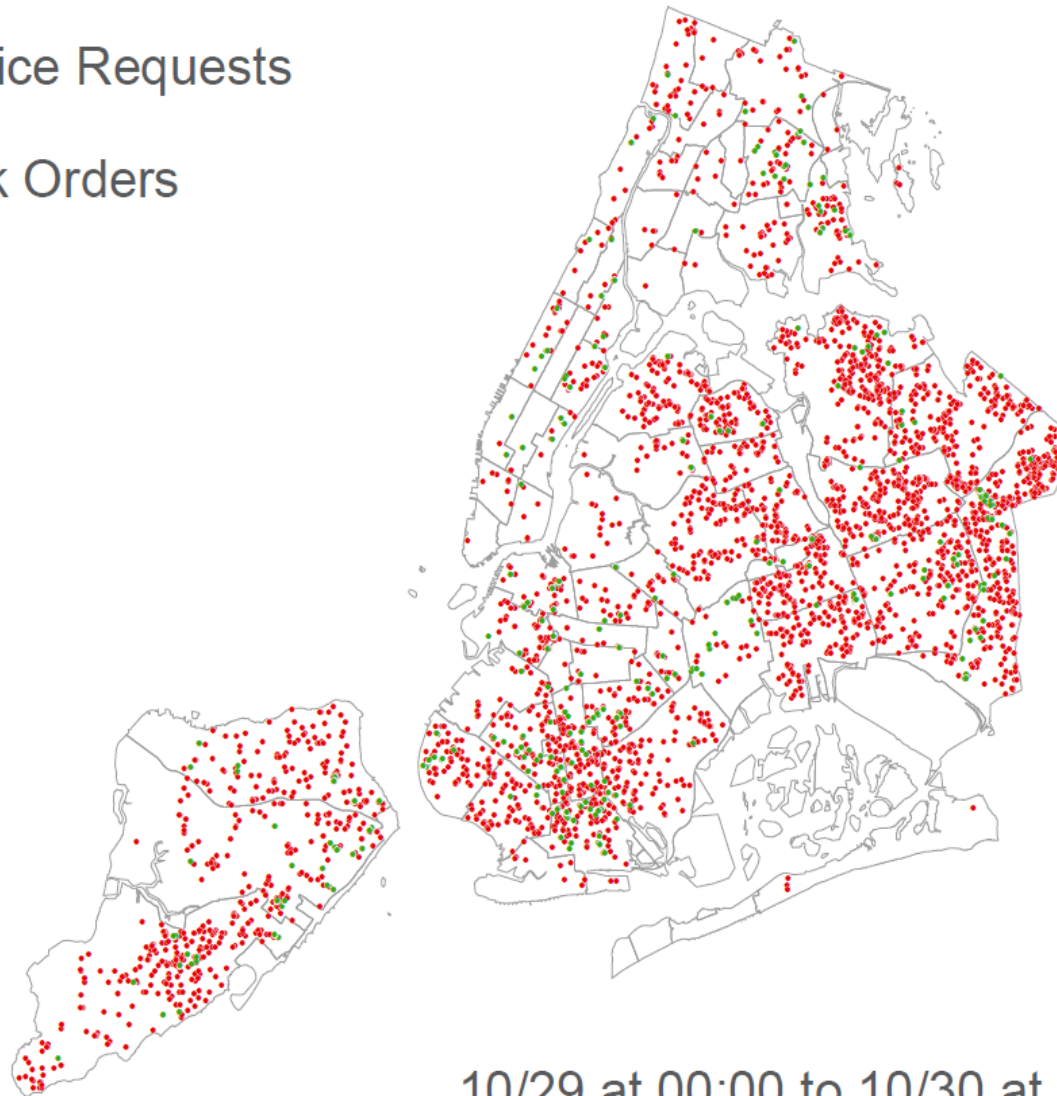


10/29 at 00:00 to 10/30 at 03:00



- Service Requests

- Work Orders

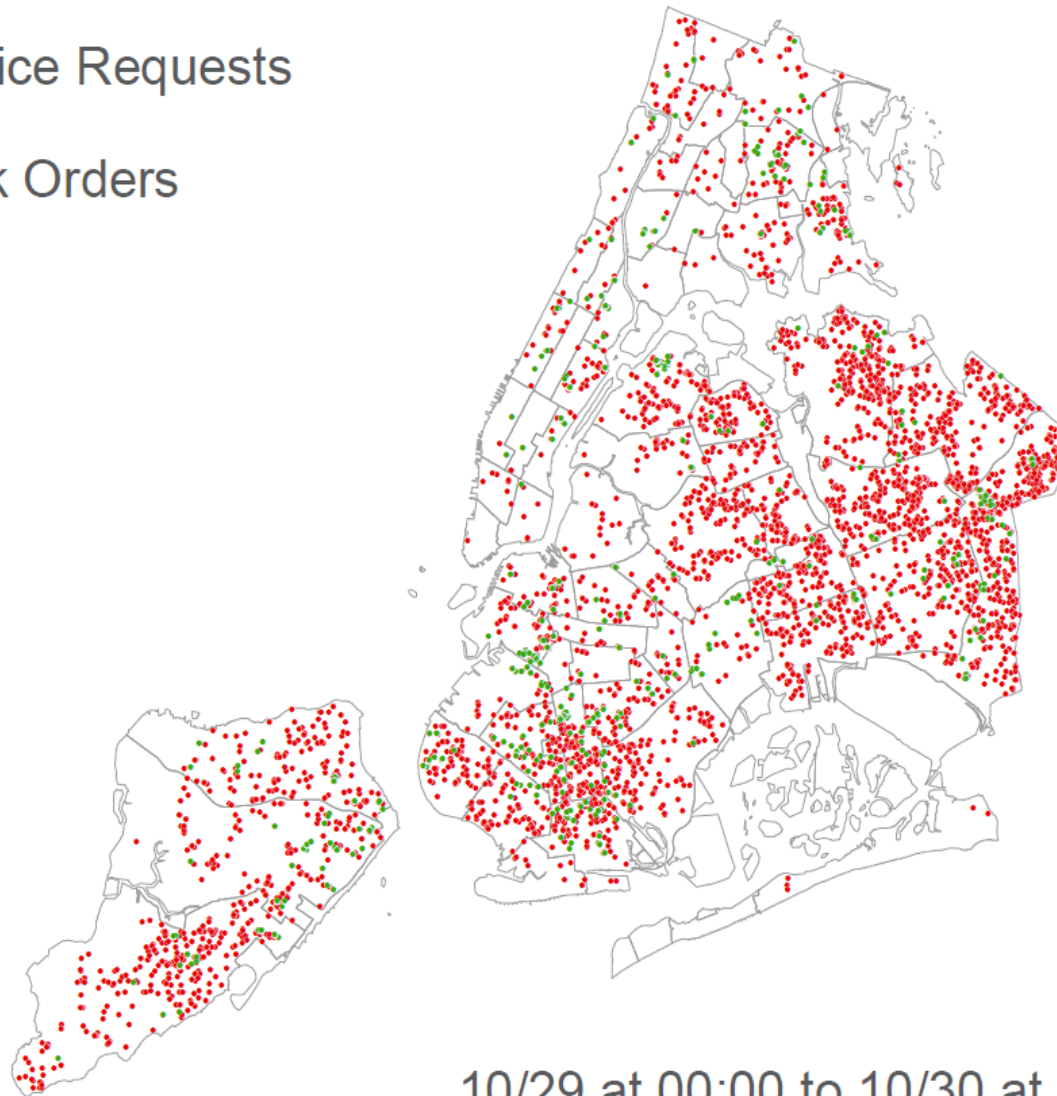


10/29 at 00:00 to 10/30 at 06:00



- Service Requests

- Work Orders

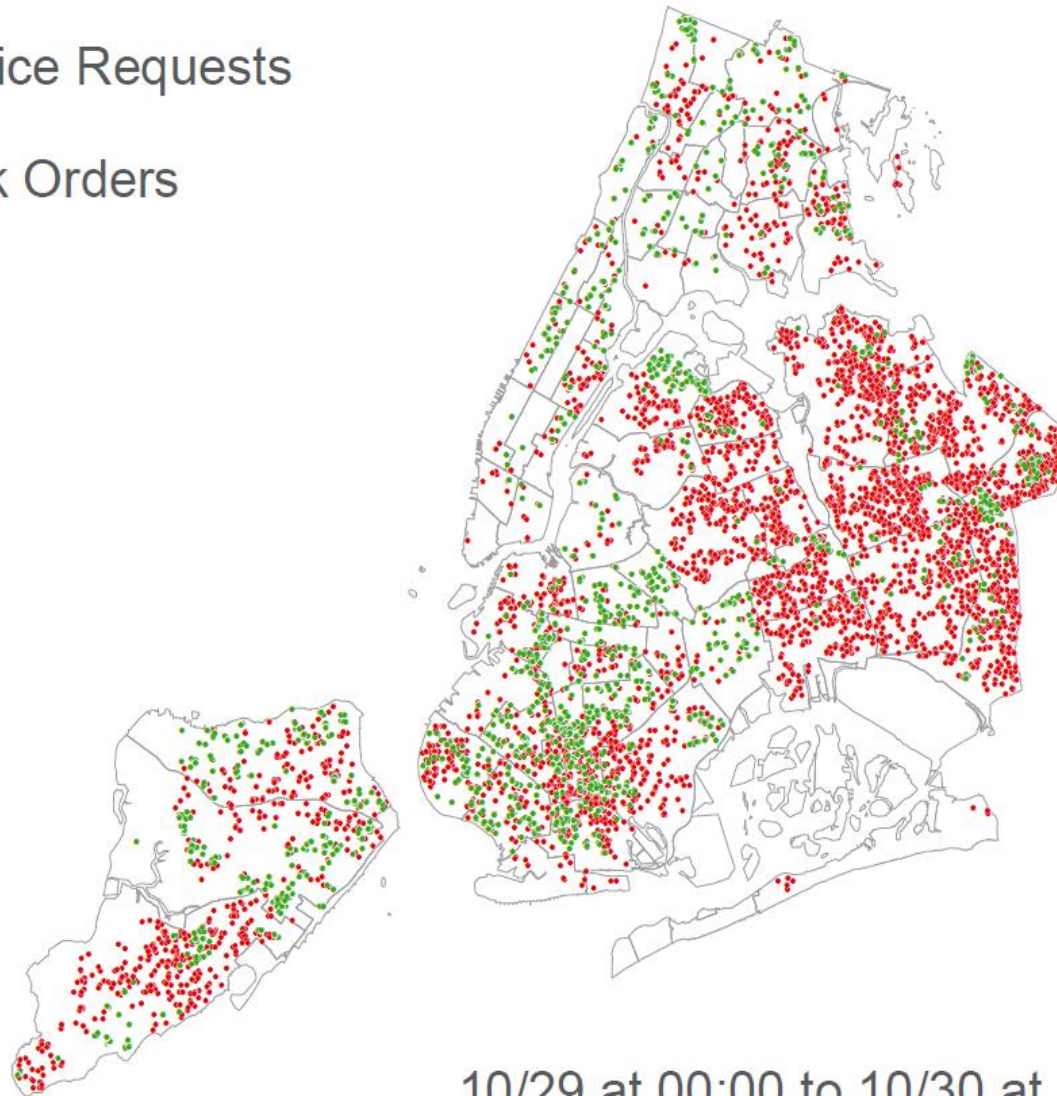


10/29 at 00:00 to 10/30 at 09:00



- Service Requests

- Work Orders

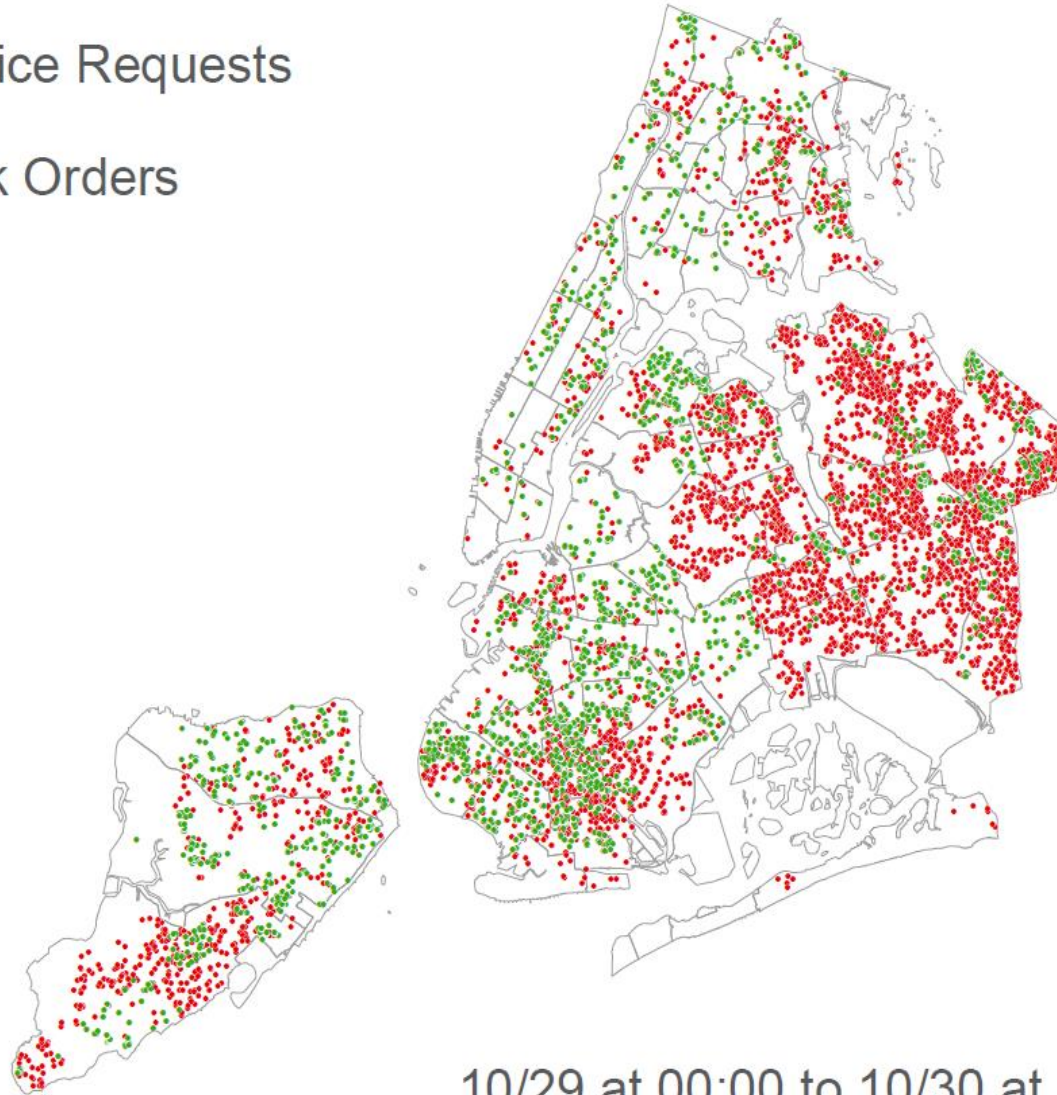


10/29 at 00:00 to 10/30 at 15:00



- Service Requests

- Work Orders

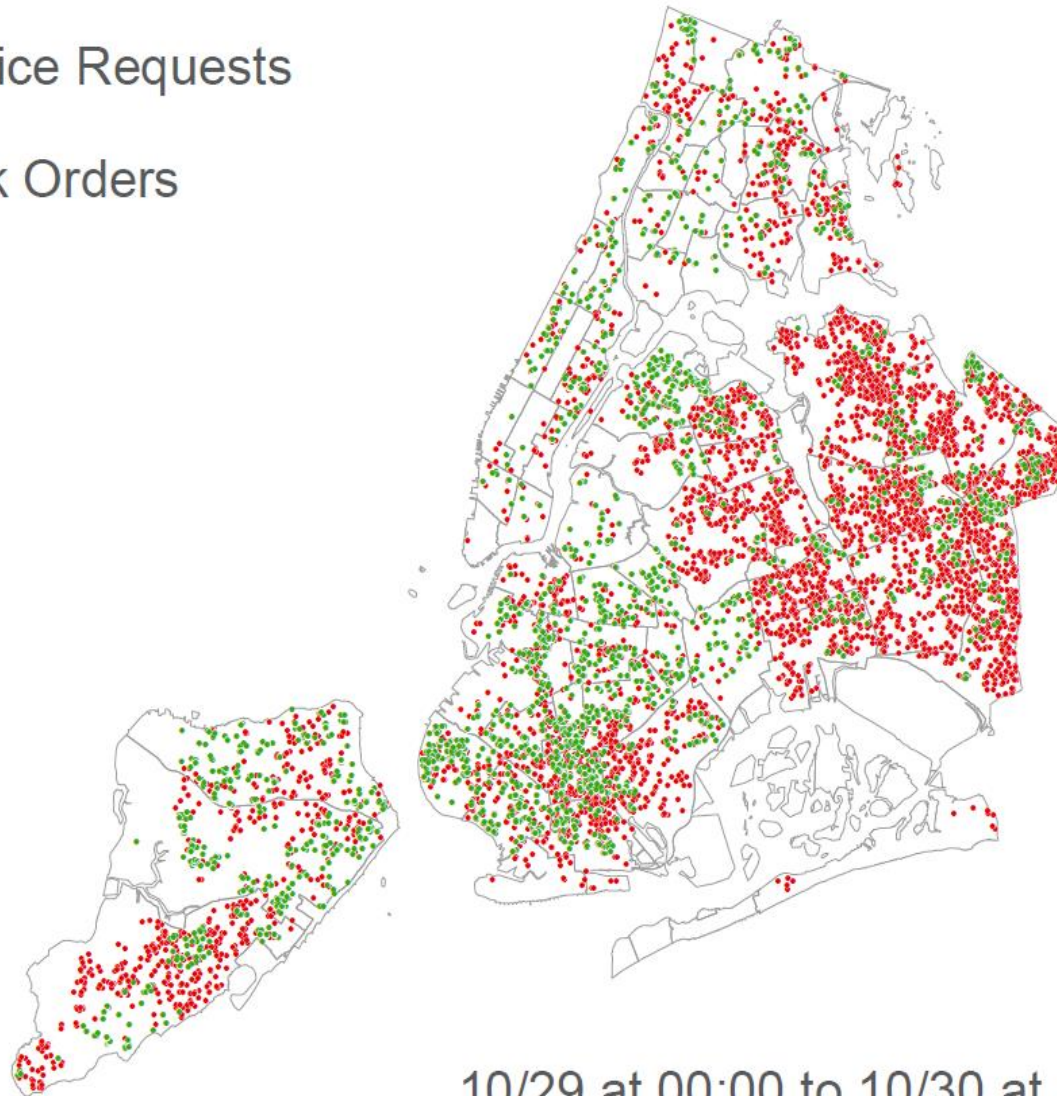


10/29 at 00:00 to 10/30 at 18:00



- Service Requests

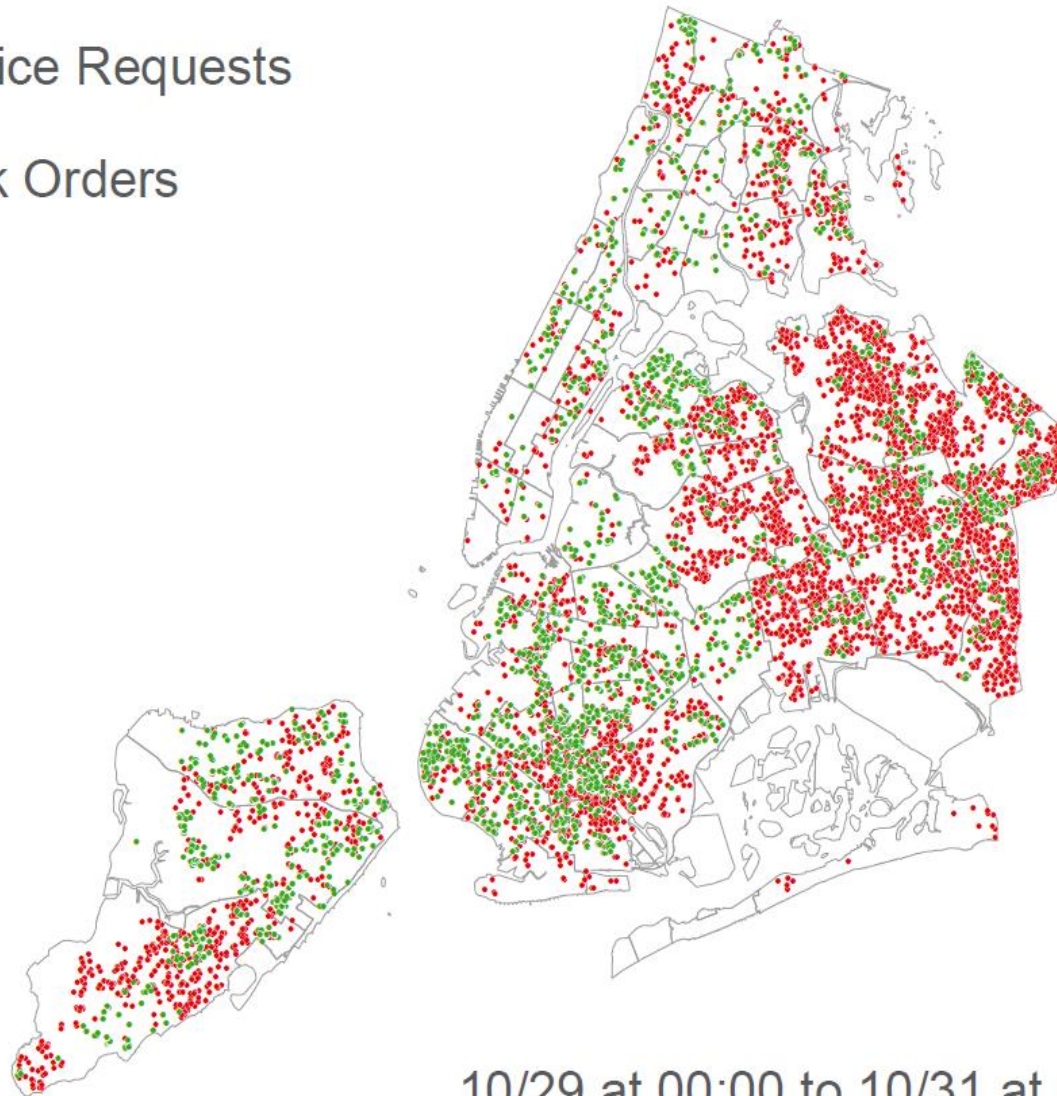
- Work Orders



10/29 at 00:00 to 10/30 at 21:00



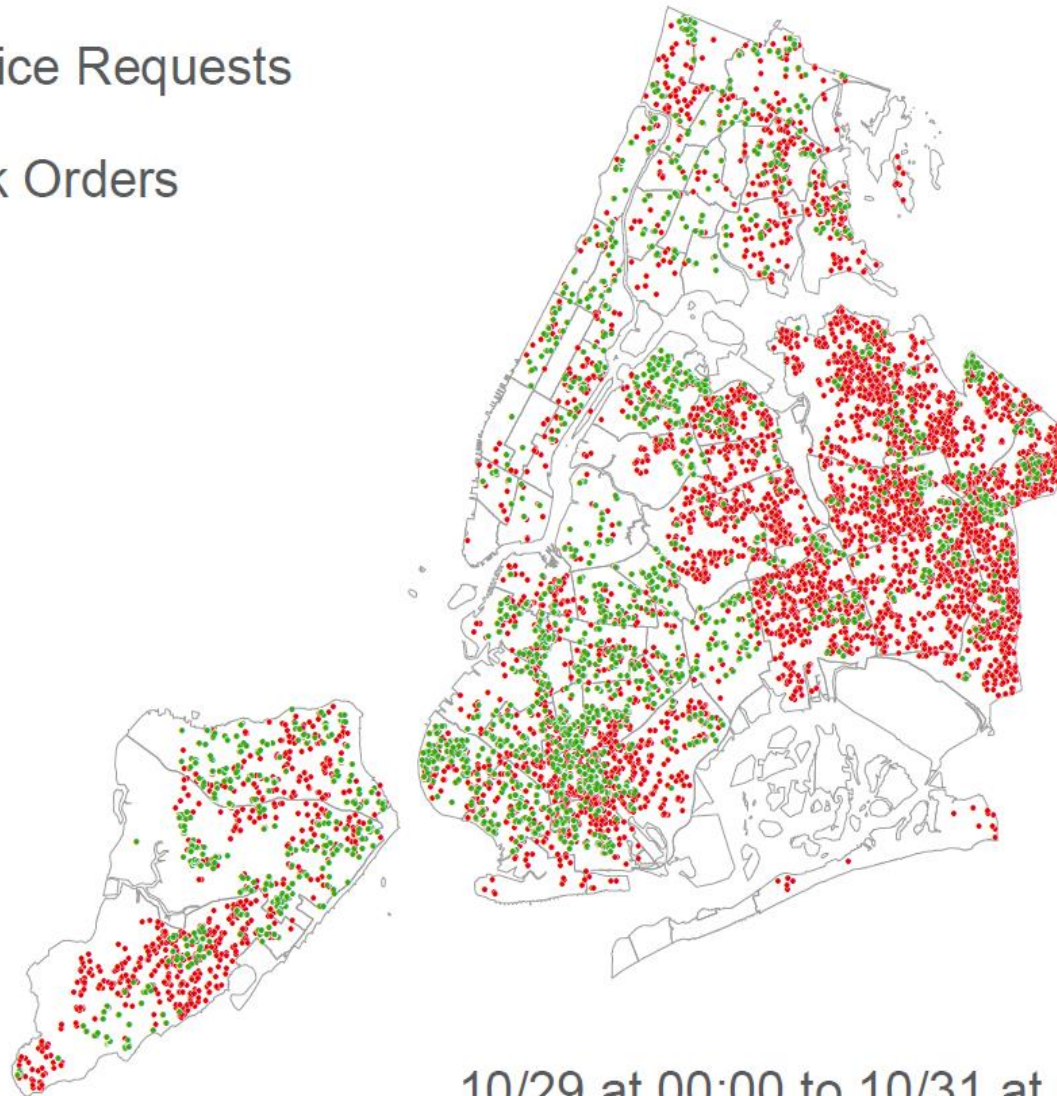
- Service Requests
- Work Orders



10/29 at 00:00 to 10/31 at 00:00



- Service Requests
- Work Orders

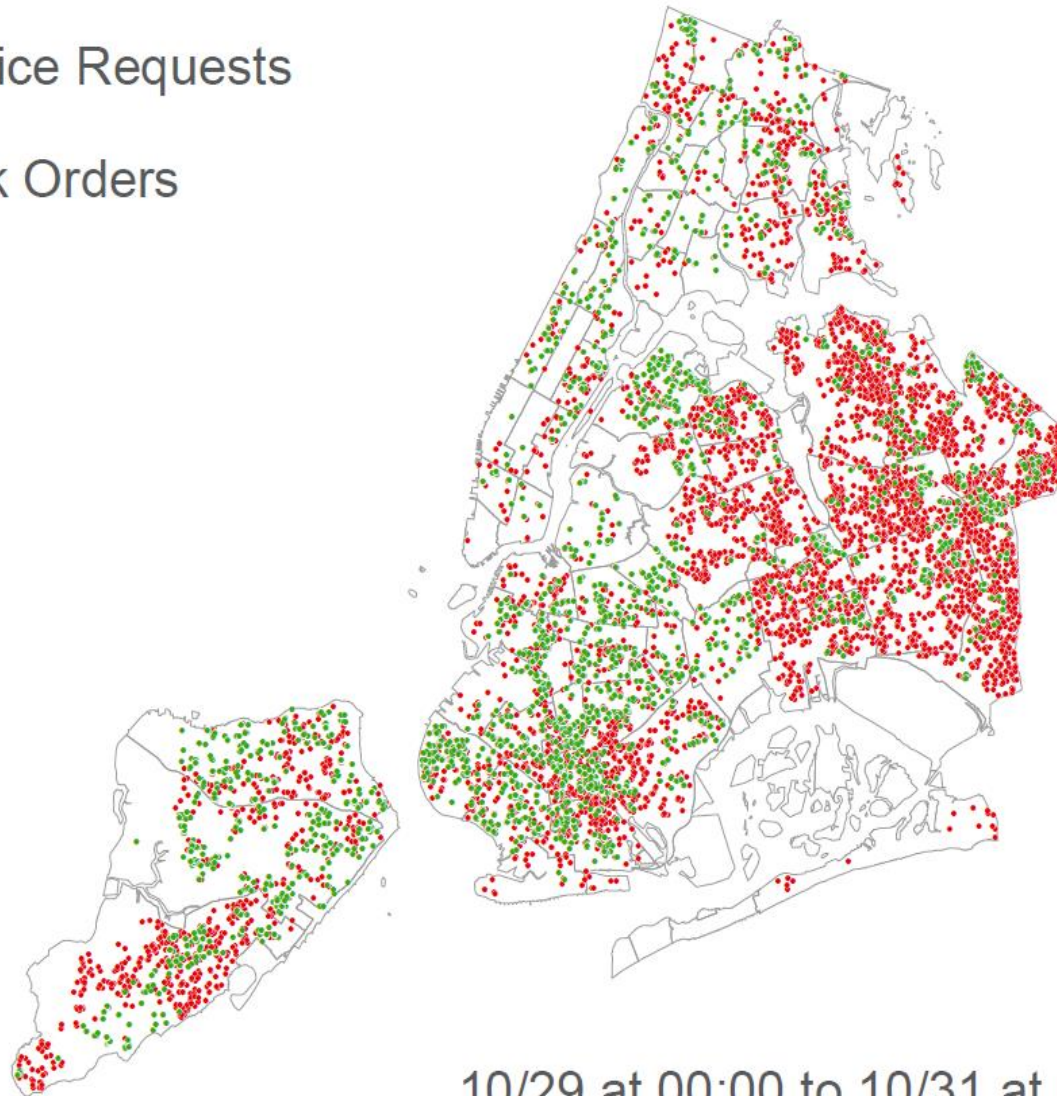


10/29 at 00:00 to 10/31 at 06:00



- Service Requests

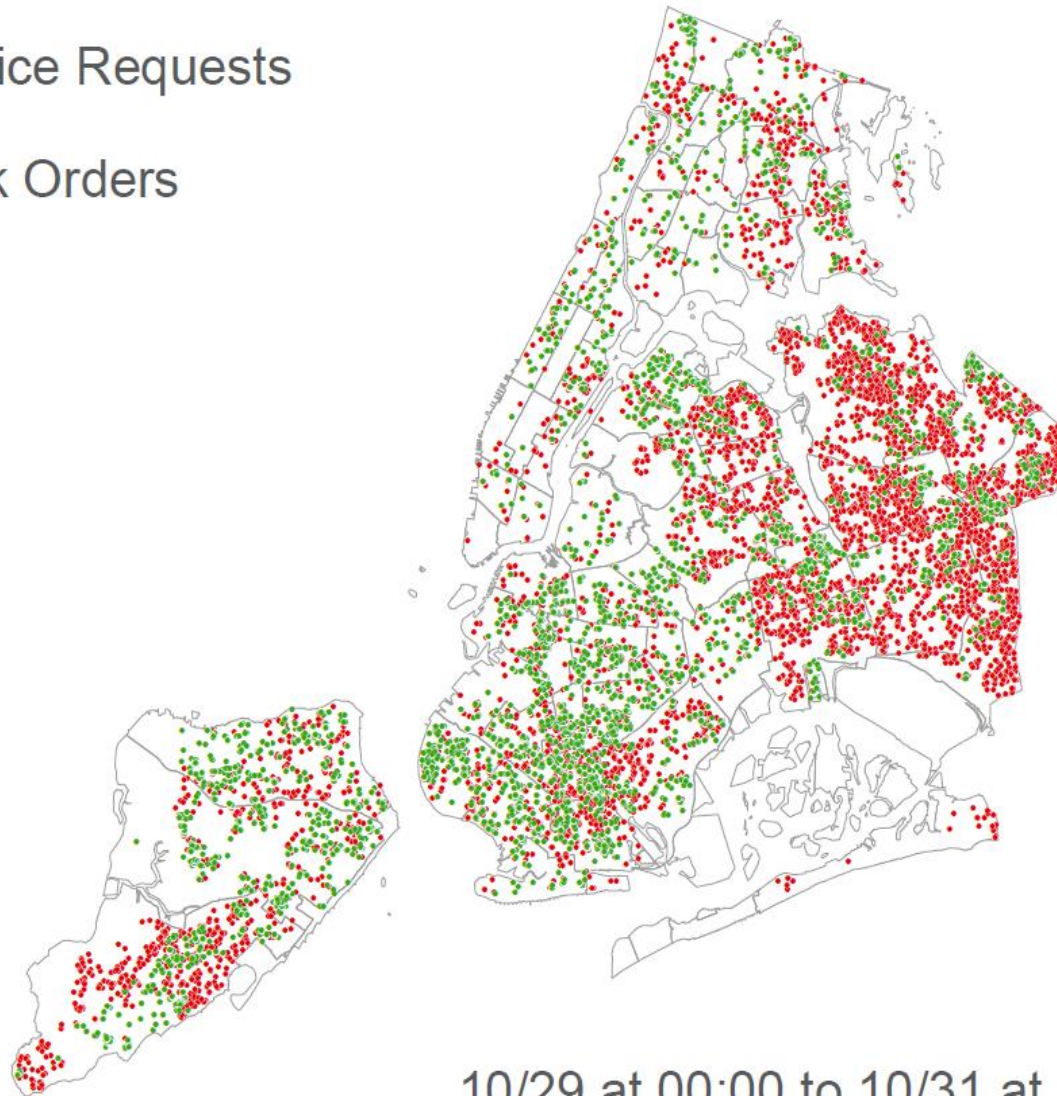
- Work Orders



10/29 at 00:00 to 10/31 at 09:00



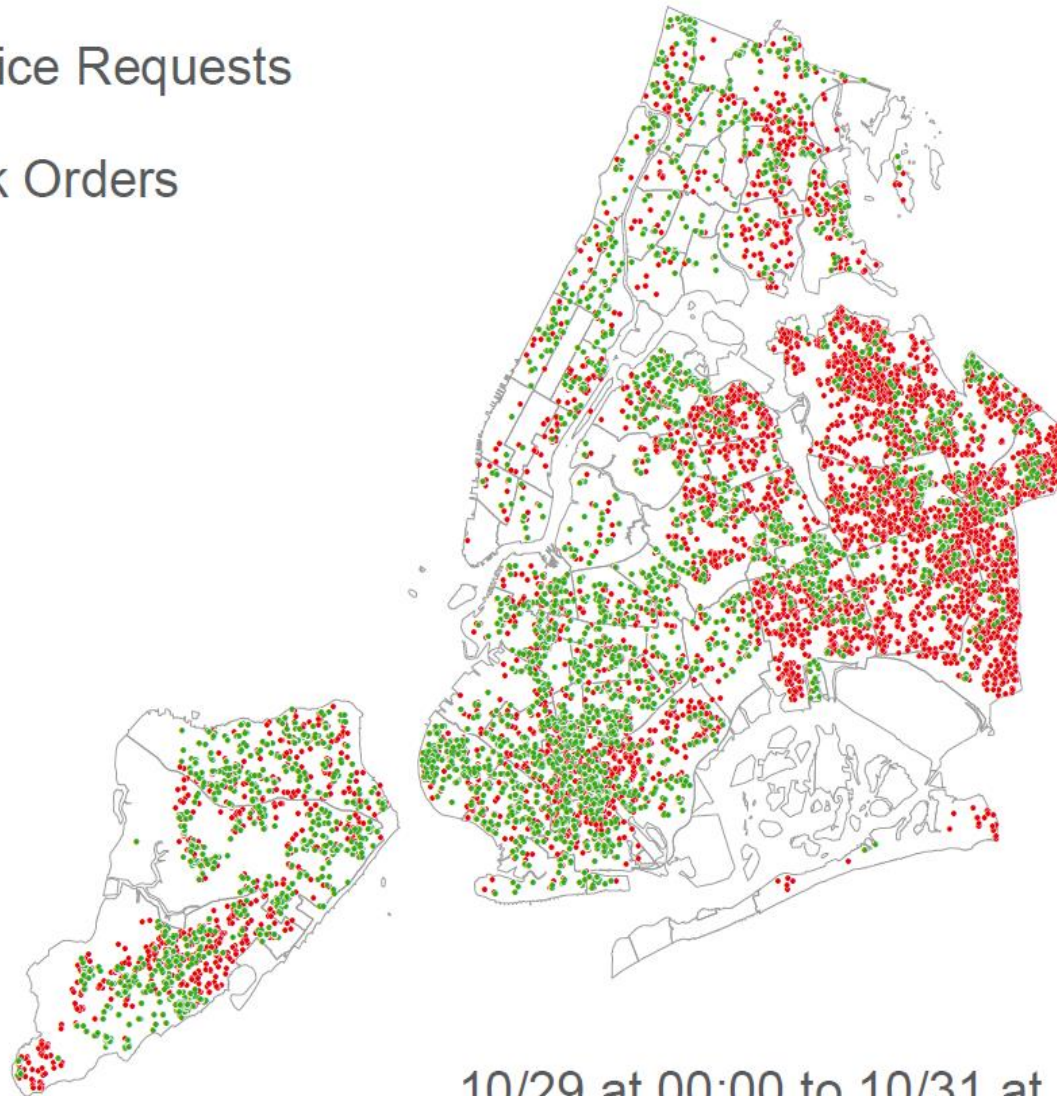
- Service Requests
- Work Orders



10/29 at 00:00 to 10/31 at 12:00



- Service Requests
- Work Orders

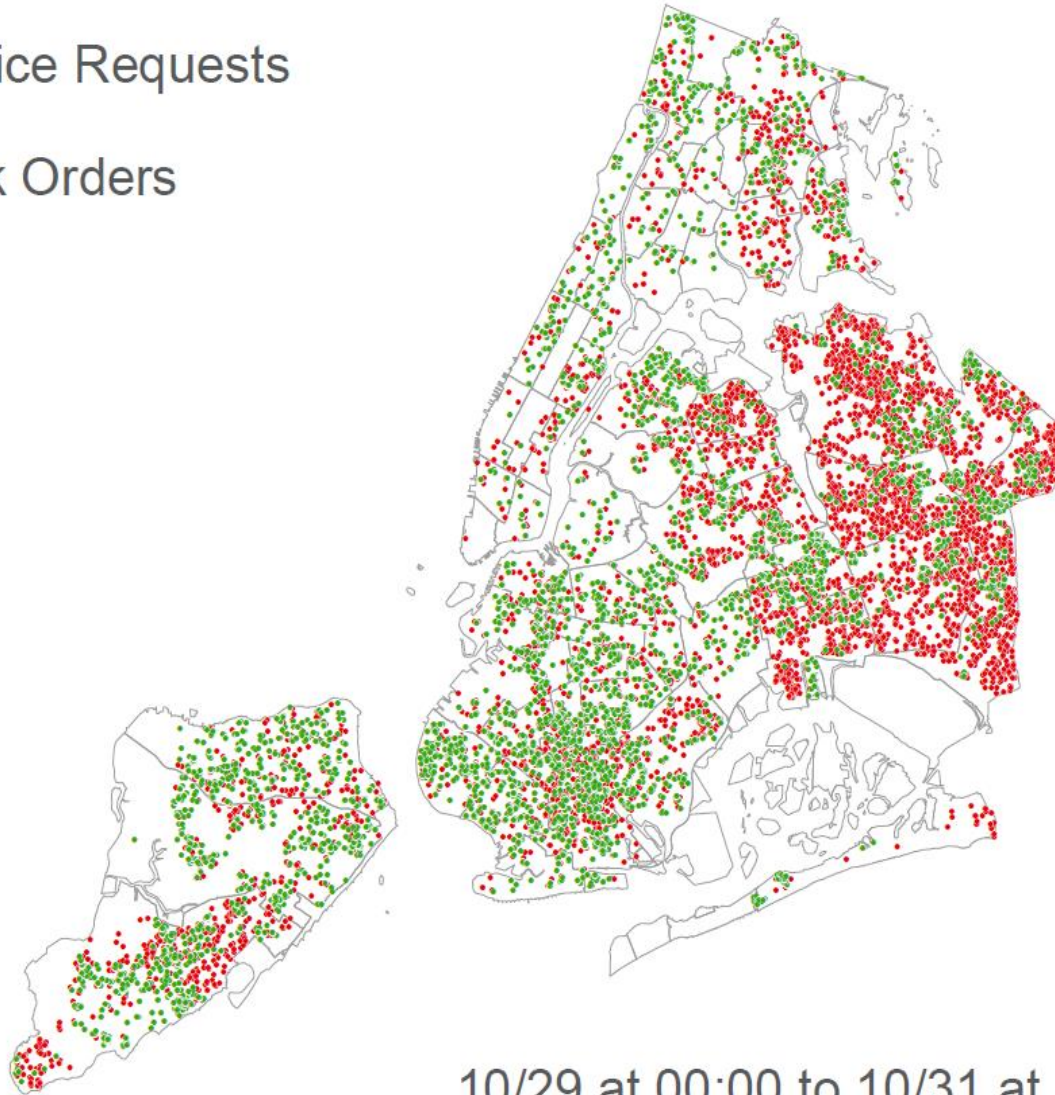


10/29 at 00:00 to 10/31 at 15:00



- Service Requests

- Work Orders

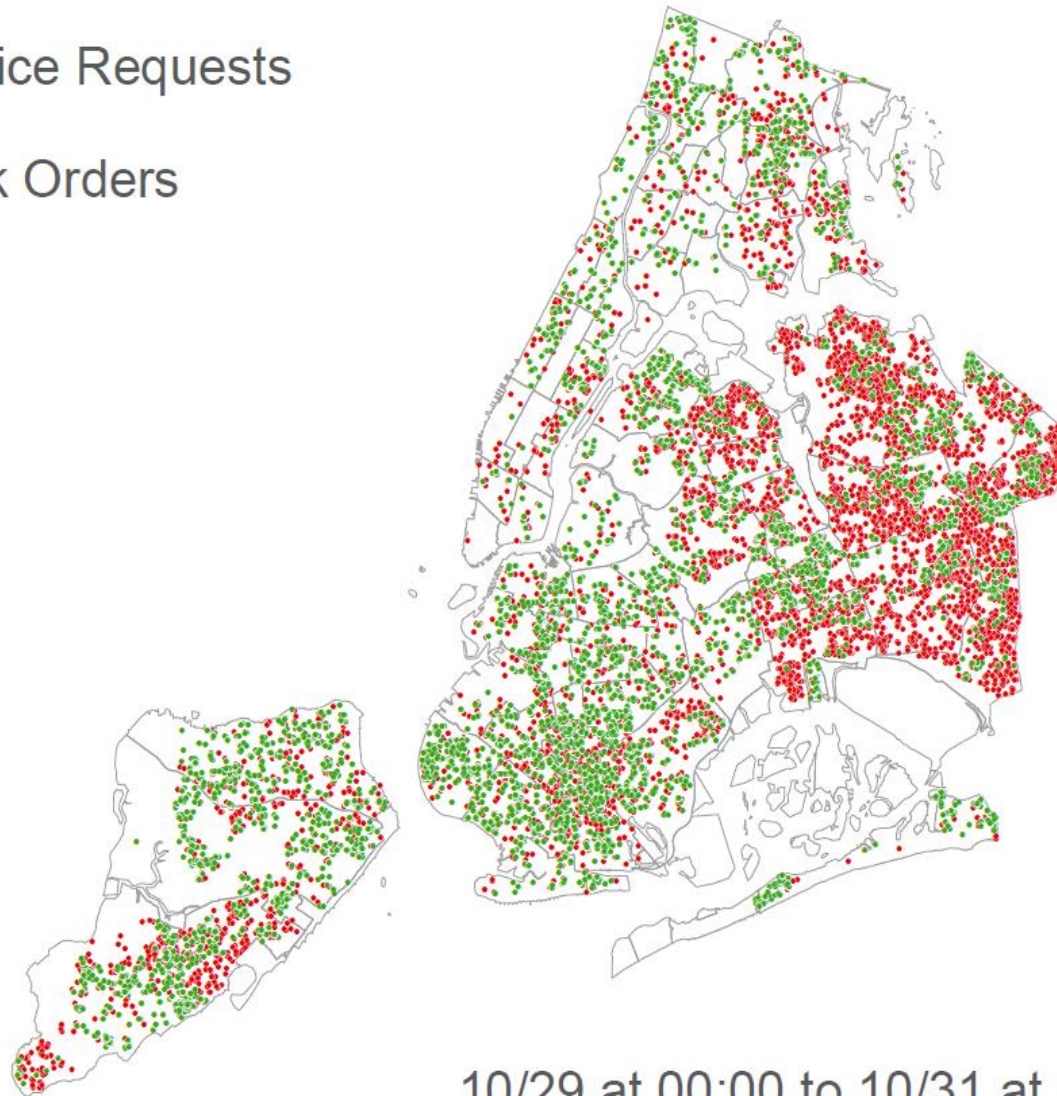


10/29 at 00:00 to 10/31 at 18:00



- Service Requests

- Work Orders

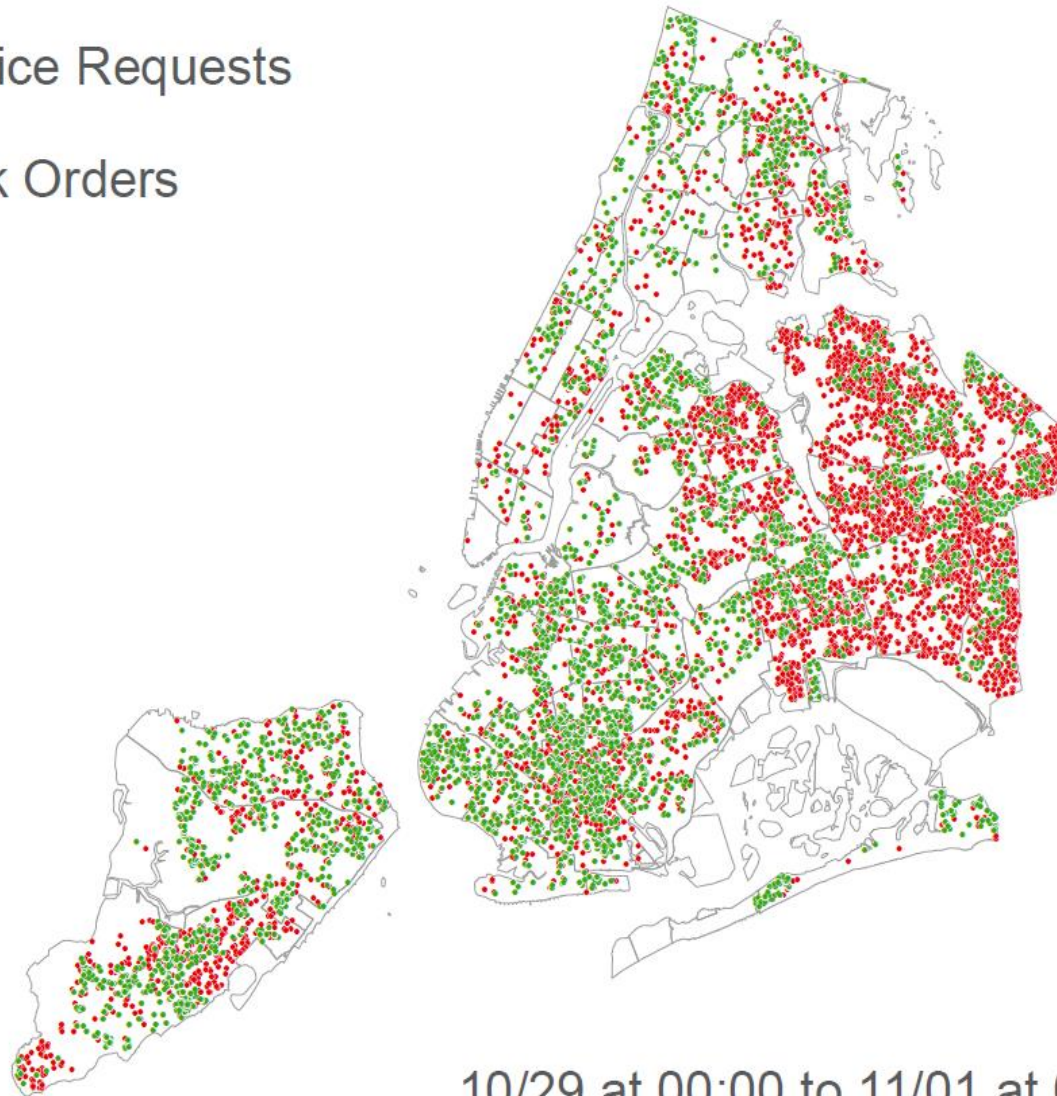


10/29 at 00:00 to 10/31 at 21:00



- Service Requests

- Work Orders



10/29 at 00:00 to 11/01 at 00:00



Sandy Damage



Office of Emergency Management's Emergency Operations Center



Office of Emergency Management's Emergency Operations Center - Staffing

6AM		
	Forestry Operation Crews Deployed	CFH & NRG Staffing Coordinators
8AM		
	1st Daily Forestry Report	Gabe S/Shana W.
	Downed Tree Task Force Debrief	DTTF Reps
	Personnel Report Due to Liz Rip	CFH Staffing Coordinator & Contract Coord
9AM		
	Daily Borough Forestry Response Conference Call	CFH & DTTF Reps
10AM		
	Sanitation & Con Ed Lists Come Back to DPR	DTTF & Big Red Data Entry
12PM		
	2nd Daily Forestry Report	Gabe S/Shana W.
2PM		
	Agency Response Conference Call	CFH & DTTF Reps
	Borough Peronnell Needs for the Following Day Due	CFH & NRG Staffing Coordinators
4PM		
	Big Red Data Entry Begins	Big Red Data Entry
	3rd Daily Forestry Report	Gabe S/Shana W.
7PM		
	Personnell Allocation for Following Day	CFH & NRG Staffing Coordinators
	GIS Mapping Requests for the Next Day Due	GIS Coverage Team
	Downed Tree Task Force Debrief	DTTF Reps
12AM		
	Con Ed List for the Following Day Due	DTTF Reps
	Borough Operations Maps Due	GIS Coverage Team



	Friday 11/16/2012												Saturday 11/17/2012												Sunday 11/18/2012																	
	AM						NOON						PM						AM						NOON						PM											
	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	12	1	2	3	4	5	6	7	8	9	10	11	12	12	1	2	3
Chief/Deputy Chief	Bram/Jennifer/Jeremy												Bram G./Jennifer G.												Bram G./Jennifer G.																	
DTTF	Danielle G.												Danielle G.												Nette C.																	
DTTF																																										
Contractor Coordinator	Matt S./Matt W.												Matt S./Matt W.												Matt S./Matt W.																	
Big Red Data Entry	Gabe S.												Gabe S.												Gabe S.																	
F & H Staff Coordinator	Fio/Yi-Wen												Yi-Wen												Yi-Wen																	
NRG Staff Coordinator	Brian A.												Brian A.												Brian A.																	
GIS Coverages	Jackie L./Craig M./Peter T./Abby J./Chisato S.												Jackie L. (on call)												Jackie L. (on call)																	
GIS Coverages																																										
Reporting	Sandra V.												Gabe S.												Gabe S.																	



Office of Emergency Management's Emergency Operations Center - Storm Reporting



Storm Date: 8/27/2011

Print Date: 8/28/2011 4:35:36PM

Report Range: 8/27/2011 5:00:00PM - 8/28/2011 3:00:00PM

	Bronx			Brooklyn			Manhattan			Queens			Staten Island			Citywide		
	Opened	Cmpl'd	%	Opened	Cmpl'd	%	Opened	Cmpl'd	%	Opened	Cmpl'd	%	Opened	Cmpl'd	%	Opened	Cmpl'd	%
Emergency Totals																		
Service Requests	92	11	11%	488	52	10%	40	0	0%	839	63	7%	213	19	8%	1,672	145	8%
(Duplicates Received)	10	-		56	-		0	-		0	-		0	-		66	-	
Inspections	78	0	0%	8	0	0%	6	1	16%	704	21	2%	190	1	0%	986	23	2%
Work Orders	25	4	16%	27	2	7%	5	0	0%	27	3	11%	2	0	0%	86	9	10%
Work Orders Made Pass. & Safe	1	-		1	-		0	-		1	-		0	-		3	-	
Trees Down, Split, Uprooted																		
Service Requests	59	10	16%	309	38	12%	27	0	0%	537	51	9%	138	13	9%	1,070	112	10%
(Tree Down on House SR)	8	-		45	-		1	-		99	-		18	-		171	-	
(Duplicates Received)	8	-		40	-		0	-		0	-		0	-		48	-	
Insp. Created from Tree Down SR	42	0	0%	1	0	0%	1	0	0%	430	15	3%	112	1	0%	586	16	2%
Work Orders	13	0	0%	23	1	4%	3	0	0%	19	3	15%	0	0	-	58	4	6%
(Tree Down on House WOs)	1	0	0%	1	0	0%	0	0	-	3	1	33%	0	0	-	5	1	20%
Work Orders Made Pass. & Safe	0	-		1	-		0	-		1	-		0	-		2	-	
(Tree Down on House Pass/Safe)	0	-		0	-		0	-		0	-		0	-		0	-	
Hanging Limbs																		
Service Requests	4	0	0%	39	1	2%	6	0	0%	61	1	1%	22	1	4%	132	3	2%
(Duplicates Received)	0	-		3	-		0	-		0	-		0	-		3	-	
Insp. Created from Hanging Limb SR	4	0	0%	2	0	0%	2	0	0%	43	0	0%	17	0	0%	68	0	0%
Work Orders	5	0	0%	0	0	-	2	0	0%	0	0	-	1	0	0%	8	0	0%
Work Orders Made Pass. & Safe	0	-		0	-		0	-		0	-		0	-		0	-	
Limbs Down																		
Service Requests	29	1	3%	140	13	9%	7	0	0%	241	11	4%	53	5	9%	470	30	6%
(Duplicates Received)	2	-		13	-		0	-		0	-		0	-		15	-	
Insp. Created from Limb Down SR	25	0	0%	4	0	0%	1	0	0%	191	6	3%	43	0	0%	264	6	2%
Work Orders	7	4	57%	4	1	25%	0	0	-	8	0	0%	1	0	0%	20	5	25%
Work Orders Made Pass. & Safe	1	-		0	-		0	-		0	-		0	-		1	-	
Other Hazard Inspections																		
Non-Hazard SR Types	7	0	0%	1	0	0%	1	0	0%	39	0	0%	16	0	0%	64	0	0%
Field Pickups	0	0	-	0	0	-	1	1	100%	0	0	-	1	0	0%	2	1	50%

* Some of the calls (i.e. requests received) will be duplicates. We often receive multiple requests for one incident.

** The status of inspections and work orders (created and completed) will not be accurate on the report during a storm (and for a period afterwards) as there can be a significant lag time between actually doing work and updating ForMS. More accurate work reporting is compiled from the boroughs directly during a storm using hand counts of paper records.



Title of Presentation Goes Here



Office of Emergency Management's Emergency Operations Center - Downed Tree Task Force

Time	Date	CB	Borough	Inspector Name	Street Segment	Clear (Y/N)	Blocked (by wire, water, tree, other)
16:15	8/28/2011	12	Bronx	Jamie Warren	2904 Kingsland Avenue	N	Tree, Wire
16:45	8/28/2011	12	Bronx	Jamie Warren	Opposite 1531 233 Street	N	Tree, Wire
13:45	8/28/2011	15	Bronx		Middletown Road Between Ampere & Robinson Place	N	Tree
15:45	8/28/2011	15	Bronx		Middletown Road Between Ampere & Robinson Place	N	Tree
13:45	8/28/2011	15	Bronx		Agar Place & Stadium Avenue	N	Wire
15:45	8/28/2011	15	Bronx		Agar Place & Stadium Avenue	N	Wire
18:00	8/28/2011		Bronx	MTA	Gunther and Bartow	N	Wire
17:11	8/28/2011	1	Brooklyn	Greg Ferguson	140 Veadel Street	N	Tree
17:14	8/28/2011	1	Brooklyn		Marcy green north park s3 st & marcy ave	N	Tree
18:10	8/28/2011	1	Brooklyn	Greg Ferguson	Driggs Ave. and Union Ave.	N	Tree
19:38	8/28/2011	1	Brooklyn	Greg Ferguson	137 Calyer St. and Clifford Place	N	Tree
17:05	8/28/2011	1	Brooklyn		2184 havenmeyer corp bk ny 11211	Y	Tree
17:07	8/28/2011	1	Brooklyn		172A havenmeyer bk ny 11211	Y	Tree
17:20	8/28/2011	1	Brooklyn	Mike Michajlo	216 Freeman	Y	Tree
18:31	8/28/2011	1	Brooklyn	Greg Ferguson	S. 3rd St. btw Berry St. and Bedford Ave, on sidewalk	Y	Tree
16:34	8/28/2011	1	Brooklyn		s5st & roebling st continental army plaza	N	Tree
16:06	8/28/2011	2	Brooklyn	Luigi Rondinella	152 Willow st	N	Tree
16:29	8/28/2011	2	Brooklyn	Luigi Rondinella	Nassau Street / Bridge Palza Court	N	Tree
15:11	8/28/2011	2	Brooklyn	Luigi Rodinella	152 Hicks St.	Y	Tree
22:25	8/28/2011	2	Brooklyn	Mike Lazery	Joralemon Street between Columbia and Willow Place	N	Tree
19:32	8/28/2011	2	Brooklyn	Lou Rondinella	Tillary St. and Johnson St.	N	Tree
19:32	8/28/2011	2	Brooklyn	Lou Rondinella	Atlantic Ave. btw Cumberland St. and Carlton Ave.	N	Tree
19:32	8/28/2011	2	Brooklyn	Lou Rondinella	Adelphi St. and Greene Ave.	N	Tree
17:06	8/28/2011	3	Brooklyn	PS1 Chopin Berry	Intersection of MacDonough St. and Throop Ave.	Y	Tree
17:06	8/28/2011	3	Brooklyn	PS1 Chopin Berry	Intersection of MacDonough St. and Throop Ave.	Y	Tree
17:06	8/28/2011	3	Brooklyn	PS1 Chopin Berry	Intersection of MacDonough St. and Throop Ave.	Y	Tree
19:41	8/28/2011	4	Brooklyn	Robert Lewis	80 Aberdeen St. nr. Thomas Boyland Park	N	Tree
15:53	8/28/2011	5	Brooklyn	Shirly Echeverria	Jamiaca Ave btwn Warwick ave and Jerome ave	N	Tree
16:20	8/28/2011	5	Brooklyn	Gabriel Colon	Bulwer btwn Crosby Ave and Highland ave	N	Wire
17:04	8/28/2011	5	Brooklyn	Gabriel Colon	Atlantic Ave btw Essex st and Linwood st	N	Tree, Wire
19:22	8/28/2011	5	Brooklyn	Shirley Echeverria	Sutter Ave. btw 79	N	Tree
17:25	8/28/2011	5	Brooklyn	Gabriel Colon	Williams Ave btw Liberty ave and Atlantic ave	N	Tree
14:00	8/28/2011	6	Brooklyn	David Wysocki	18 Lincoln Place	Y	Tree



Sandy Damage



Sandy Damage



Sandy Damage



Woody Debris Disposal



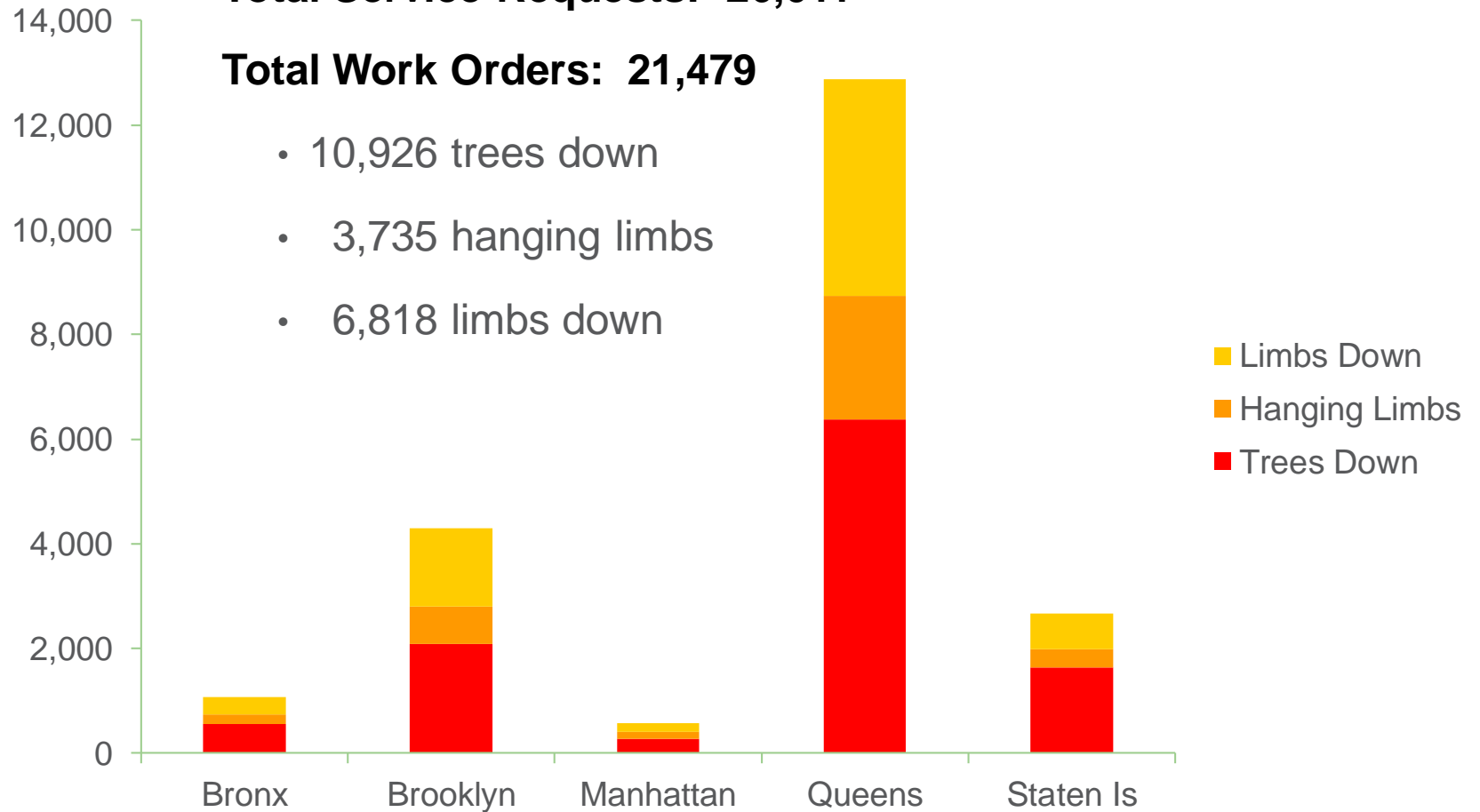
Sandy vs NYC Trees

47 Days of Activation

Total Service Requests: 26,011

Total Work Orders: 21,479

- 10,926 trees down
- 3,735 hanging limbs
- 6,818 limbs down



Lessons Learned From Super Storm Sandy

Situational Awareness

Utility Coordination

**Develop Debris
Management Strategy**



Thank You!

Jeremy Barrick

Assistant Superintendent for Environmental Stewardship

Minneapolis Park and Recreation Board

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NYC Parks

