

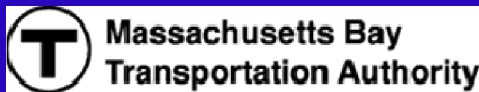
# Impacts of Winter 2015

**William McClellan**

Assistant General Manager Rail Ops

**Kimberly Woollard**

Deputy Director Light Rail Vehicle  
Maintenance & Engineering



**MBTA**  
**Boston, Mass**



13<sup>th</sup> National Light Rail & Streetcar Conference



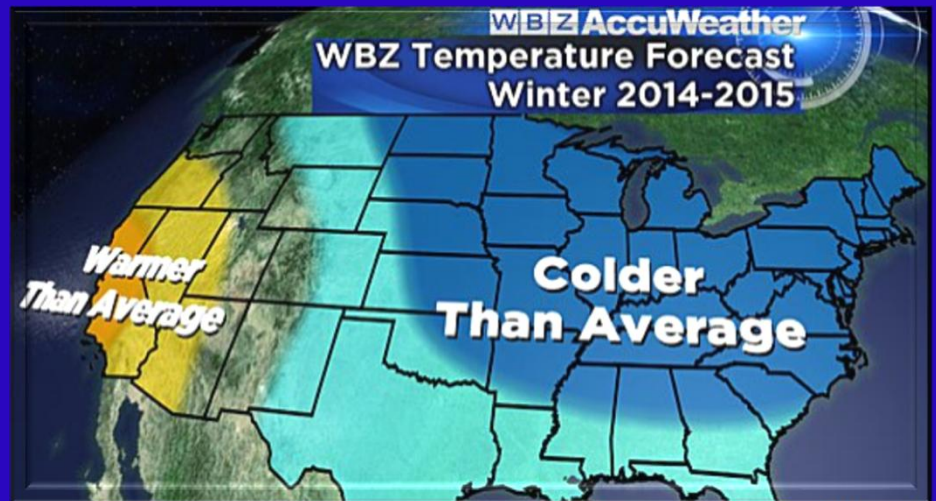
# Endless snow...

- Prior to January 24: 5.5"
- Jan 24-26: 24.6"
- Feb 2: 16.2"
- Feb 7-10: 23.8"
- Feb 14/15: 16.2"



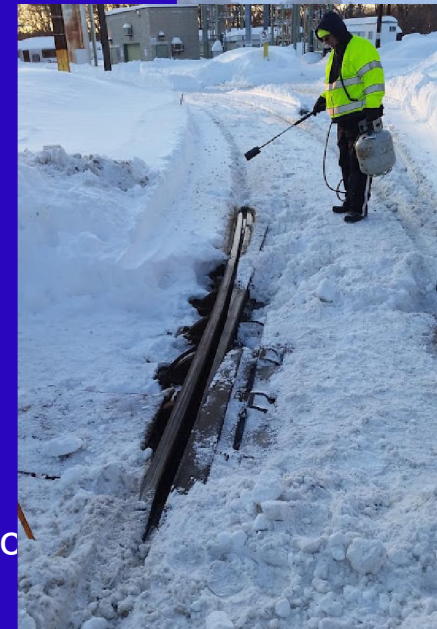
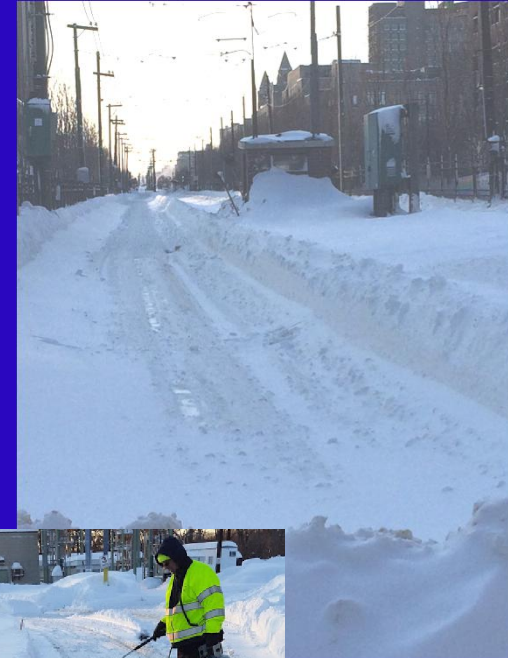
# Endless cold...

- Sub zero temperatures- 28 consecutive days with lows 20 degrees or colder from Jan. 25 through Feb. 21 ( since 1881)
- - Boston failed to reach 40 degrees from Jan 20 -March 3, a record streak of 43 consecutive days. The previous record was 42 straight days was set in the winter of 1968-1969.



# ...with severe impacts

- Up to 8" of ice coating rails
- Up to 6' snow drifts along Right of Way
- 2-3 feet of snow
- Significant snow accumulations and bitter cold severely disrupted MBTA operations
  - Interlocking, third rail, switches, crossings affected
  - Extensive traction motor damage and voltage spikes
- Red/Orange/Green Lines and select Bus routes most severely impacted; Yards/Garages also heavily impacted





# Key Events

- Governor declared State of Emergency 1/26 and 2/9
- Complete MBTA service suspension on 1/27, 2/9 (evening), 2/10, Feb 2/15
- Two in-service trains stranded and required evacuation
- Service on various subway lines suspended or severely disrupted for extended periods between late January and late February
- And on February 4<sup>th</sup> .....

# New England Patriots Superbowl Victory Parade!



# Impacts to Service



- Due to plowing and the lack of areas to remove the snow, a “BathTub” effect was created on the ROW.
- Ice build up in flange ways and large piles of snow, caused derailments.
- The use of revenue equipment for snow removal, caused damage to the streetcars.



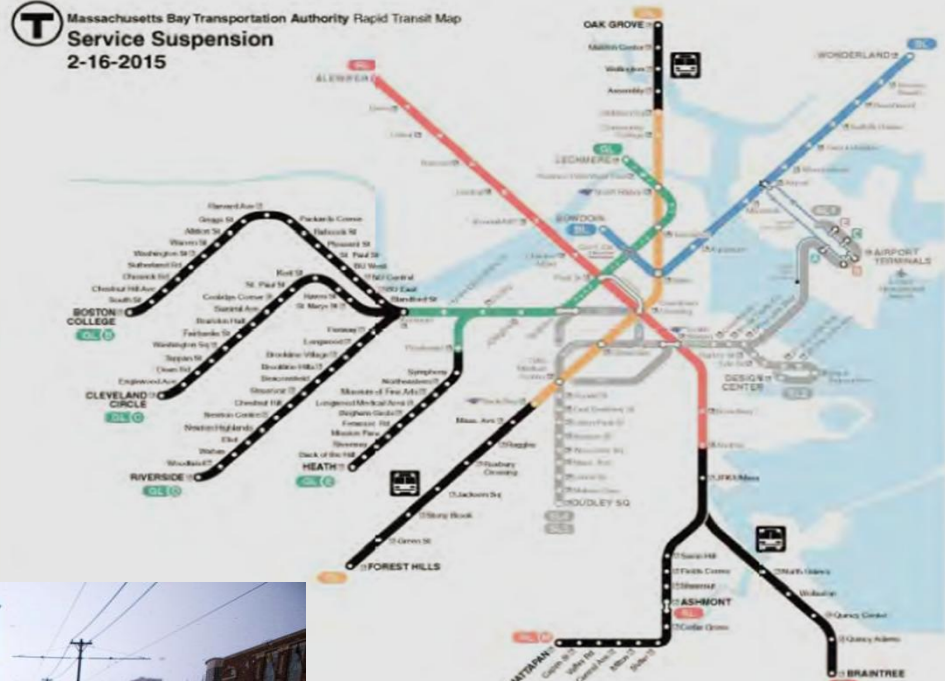


# Impacts to Service

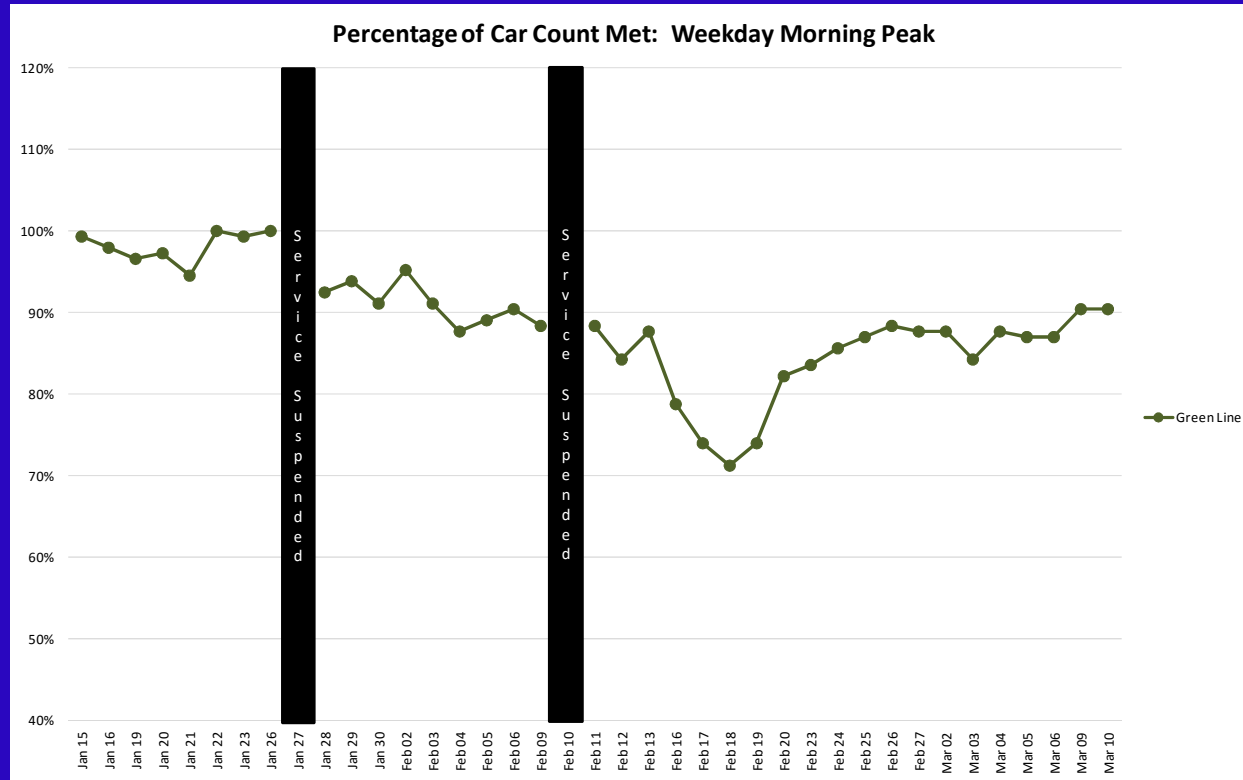
- Disabled trains caused snow and ice build up in the track area
- Inability to remove snow from yards and parking areas , hampered operations



# Scope of Limited Service

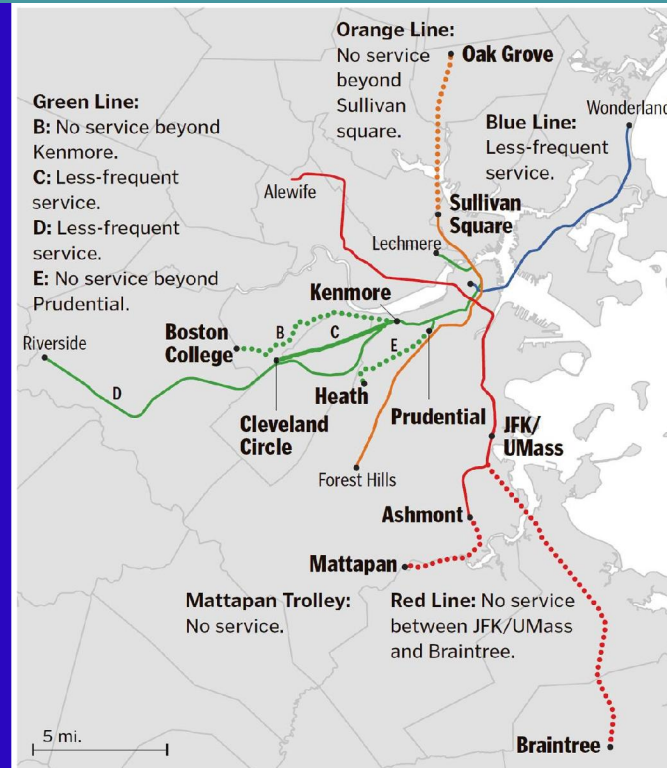


# Peak Rail Car Availability



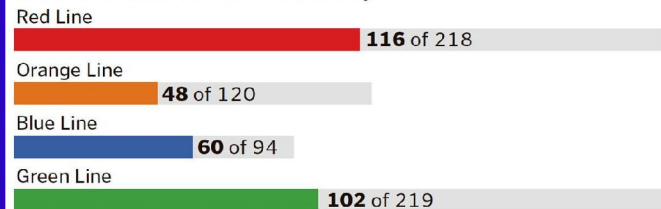
At times, vehicle availability declined to 40%

# Peak Rail Car Availability



## How many subway cars were running

Number of trains in service Tuesday

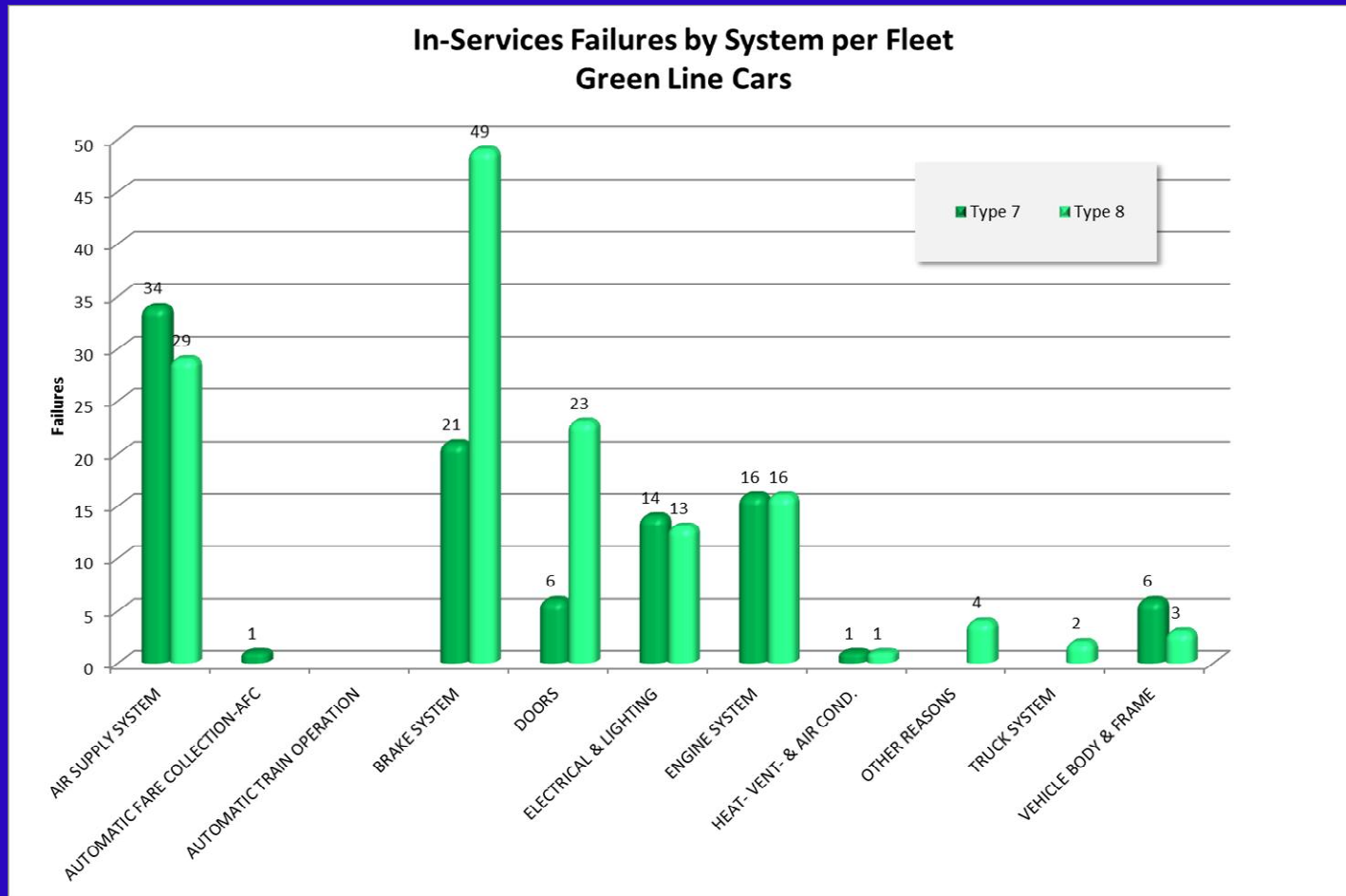


# Recovery



- Ordinary winter weather preparedness activities and equipment insufficient for these conditions
- During the week beginning Sunday, Feb 15, an unprecedented recovery effort consisting of multiple MBTA departments, contractors, state agencies, and other organizations was marshaled to restore system
- Hundreds of soldiers, inmates, laborers, MBTA employees, contractors and others contributed through hand shoveling of snow, use of heavy equipment, and also specialized high-rail snow clearing equipment.

# Light Rail Vehicle In-Service Failures



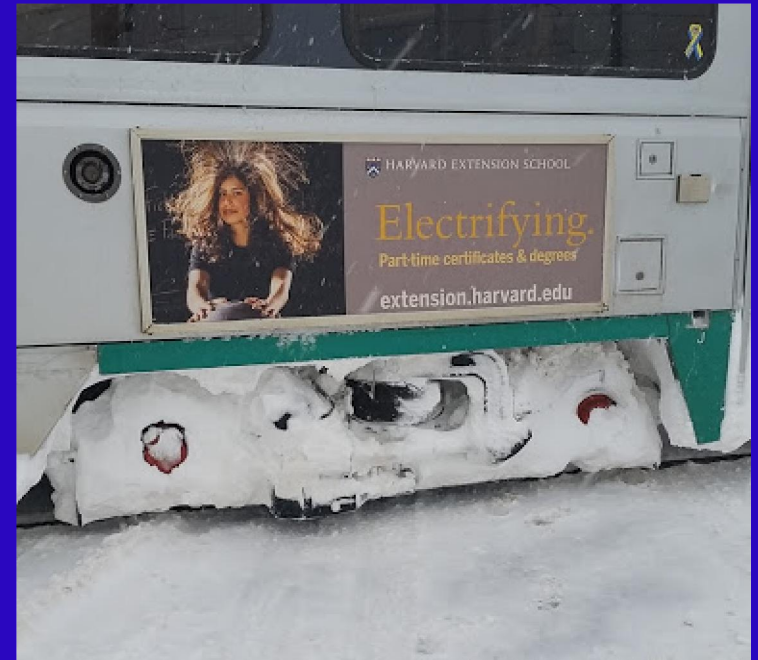
# Light Rail Vehicle In-Service Failures



- Snow Buildup Type 7 Truck



- Snow/ Ice Buildup Type 8 Truck



# Light Rail Vehicle In-Service Failures

## Green Line No. 7/8 Coupler

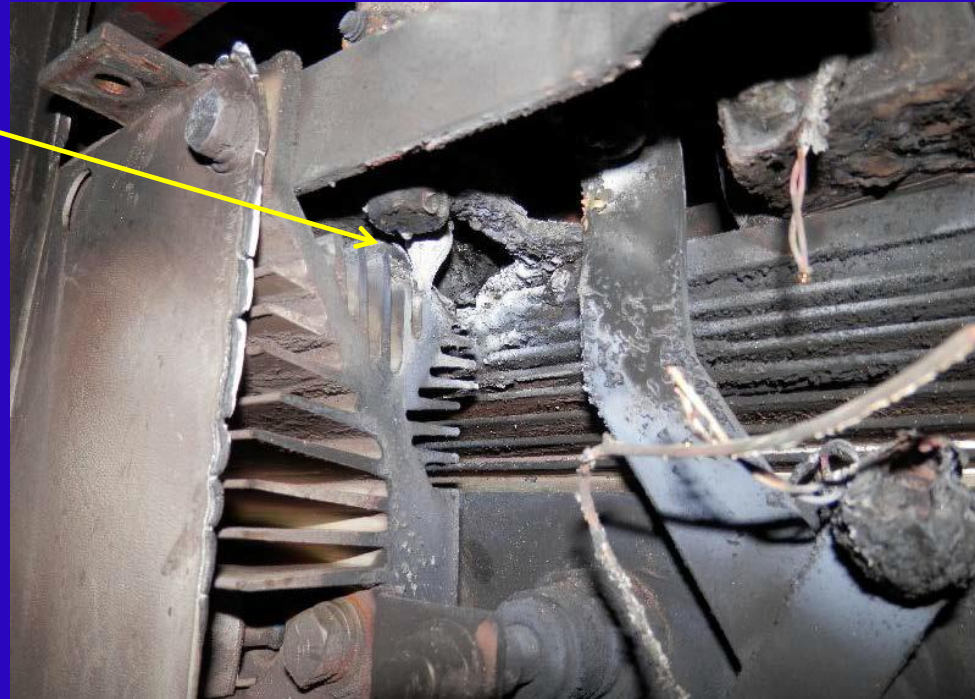




# Light Rail Vehicle In-Service Failures

## Thyristors Type 7

Melting on Thyristor



# Light Rail Vehicle In-Service Failures

## Cover for MCU Case-Type 7



**Warped MCU Cover**

# Light Rail Vehicle In-Service Failures

## HPCU – Type 8



# Lessons Learned

- Clear snow and icepack from Vehicle Components
- HPCU relocation program



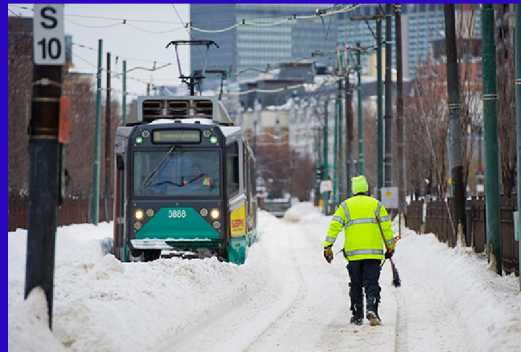
# Lessons Learned

- Evaluate Manpower availability/fatigue
- Equipment/Products mitigate snow /ice pack or ingestion
- Storage of Equipment in Core Subway



# Lessons Learned

- Use of Revenue Equipment for plowing
  - Coordination with City/Town on plowing
  - Protecting Core Subway
  - Alternative service plans
- 
- **SNOW & ICE OPERATIONS IMPROVEMENT PLAN**
    - Specific MBTA operational, preparedness, and coordination improvements



# Lessons Learned

- Snowfighting Equipment



# Lessons Learned

- Removal of Snow/Ice – ROW, Yards





# The End

