



OFFICE OF RESEARCH & DEVELOPMENT

**2012** **R&D**  
**REVIEW**

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# Grade Crossing & Trespasser Suicides: Current Research & Future Directions



U.S. Department  
of Transportation

Federal Railroad  
Administration

# Program Area & Risk Matrix

## Grade Crossing & Trespasser Suicides: Current Research & Future Directions

Program Areas	Risk Factors	Trespass	Grade Crossing	Derailment	Train Collision	All Other Safety Hazards
Railroad Systems Issues						
Human Factors		X	X			
Track & Structures						
Track & Train Interaction						
Facilities & Equipment						
Rolling Stock & Components						
Hazardous Materials						
Train Occupant Protection						
Train Control & Communications						
Grade Crossings & Trespass						

# Acknowledgements & Stakeholders

## Acknowledgements

- Volpe Center
- Association of American Railroads (AAR)
- Railroad Research Foundation (RRF)
- Volpe Center
- George Washington University
- American Association of Suicidology

## Stakeholders & Project Partners

- Scott Gabree (Volpe)
- Stephanie Chase (Volpe)
- Michael Martino (AAR/RRF)
- Ann Doucette (GWU)

# Overview

**Goal:** Take existing data and display it in a visual way which makes it easier to understand the interacting variables and complexity of each individual incident. Additionally, when taken as a whole, the data visualization will help to identify specific locations that are at an increased risk for trespasser or grade crossing incidents (hotspots\*).

*\* Though a more precise definition of “hotspot” may be developed through this effort, our current working definition is a location where more than 1 suicide has occurred within 5 years across a 2-mile span of track.*



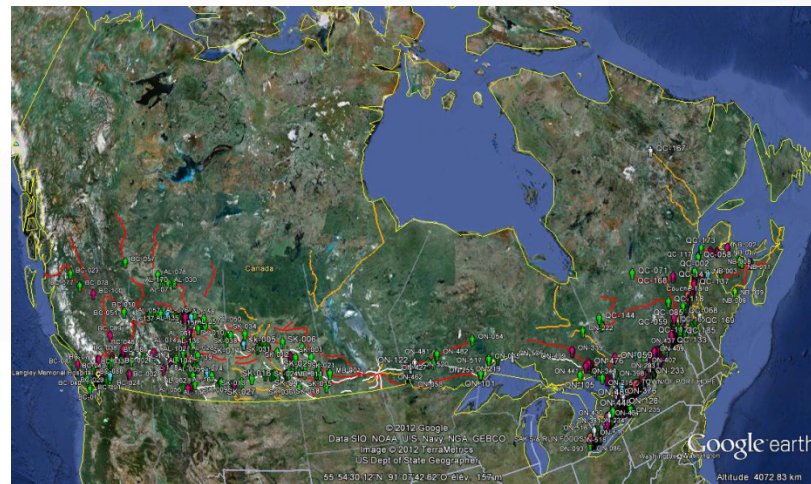
# Objectives

- Previous research has shown a need for a more systematic way to track incidents on the railroad rights-of-way and disseminate this information to interested parties
- Especially important with expansion of high-speed rail in the US
- A visual map of these incidents will provide an easy and quick way to identify areas of concern
- Use data describing the incident and interacting characteristics of the individual and site to identify potential reasons why the incident occurred
  - For example: 45 years old, male, in a car at passive grade crossing, 11 pm, etc.
  - Is there a known shortcut path which crosses the tracks?
  - Was there a highly publicized incident near that location?
- Identify stakeholders who should be made aware of findings:
  - Railroad
  - Local community
  - Schools

# Previous Methods

## ■ Previous Efforts:

- Demographic profiles of trespasser and suicide victims (typically for a subset of known instances)
  - More common in Europe and Australia
  - Some have recently been conducted in the US
- GIS software has been used to identify hotspots
- Mapping of trespasser incidents on Google Maps by Brian Mishara and Cecil Bardon – Université du Québec à Montréal with Transport Canada.

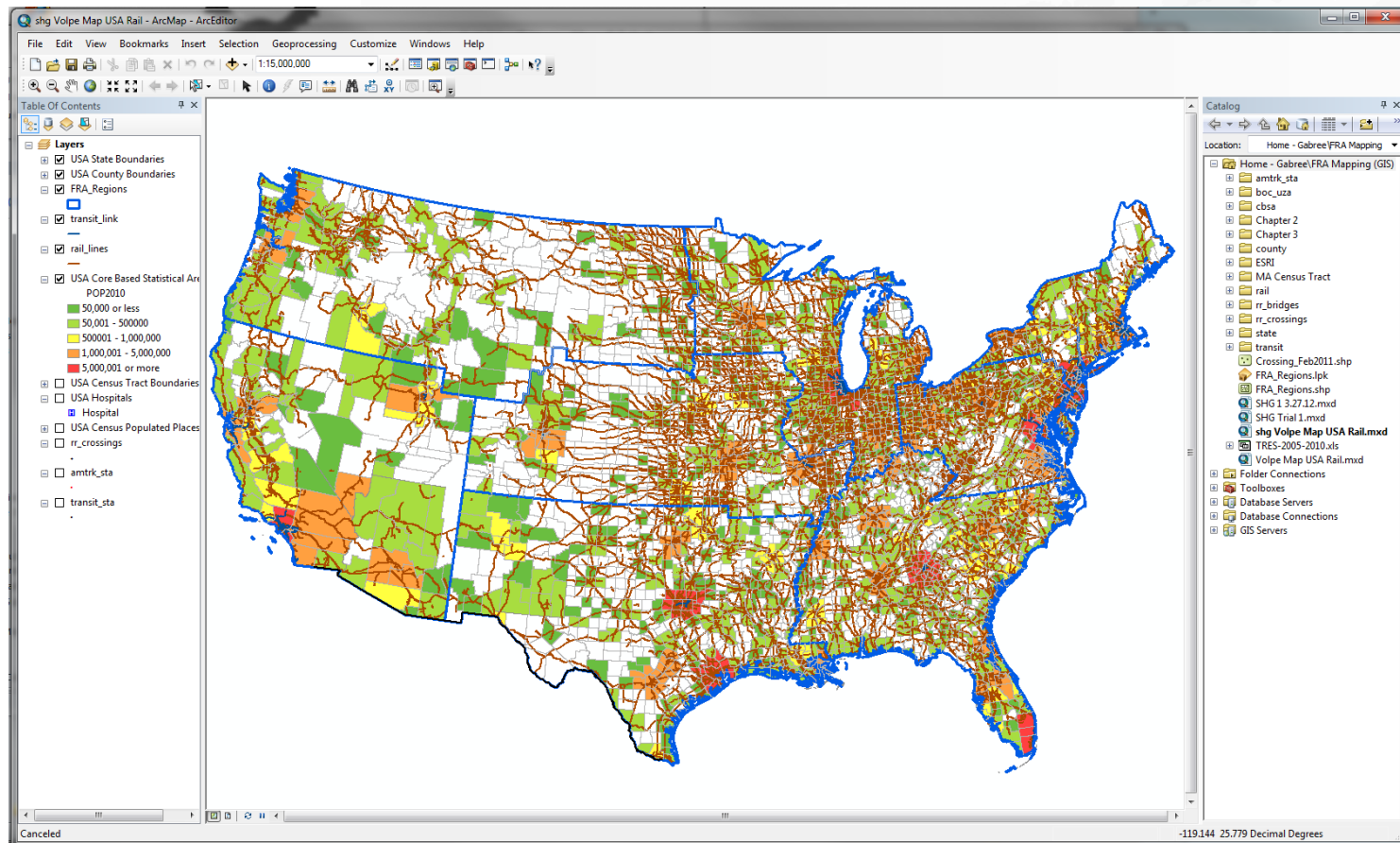


## ■ This Effort:

- Similar to the Canadian effort with added variables and computing power
- Combine aspects of previous methods (e.g., demographic/site information and GIS mapping capabilities) to identify hotspots and suggest targeted countermeasure strategies
- Provide a quicker/easier way to visualize trespasser and grade crossing incidents over time

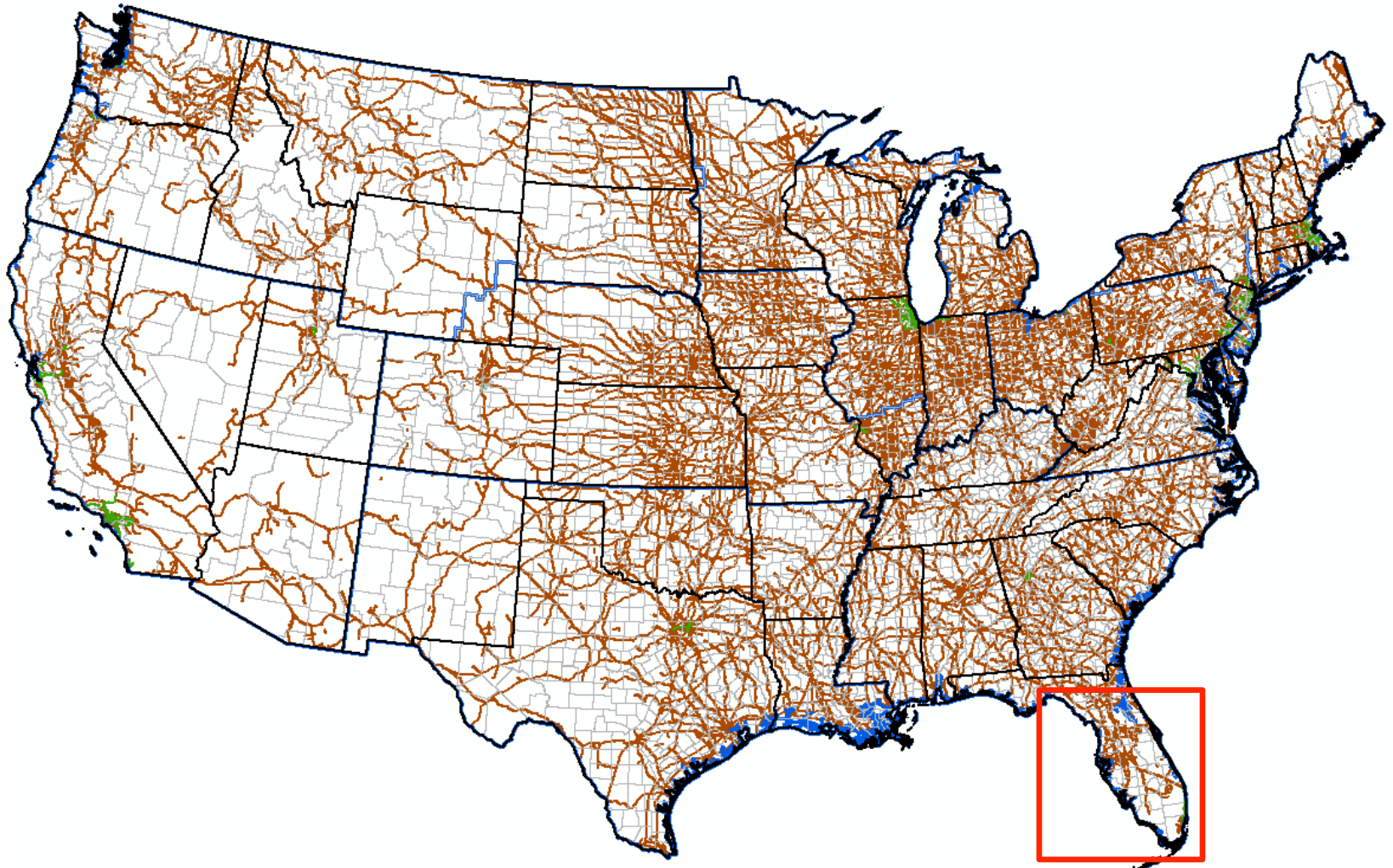
# Technology Evolution

- ArcGIS Software – ArcMap 10

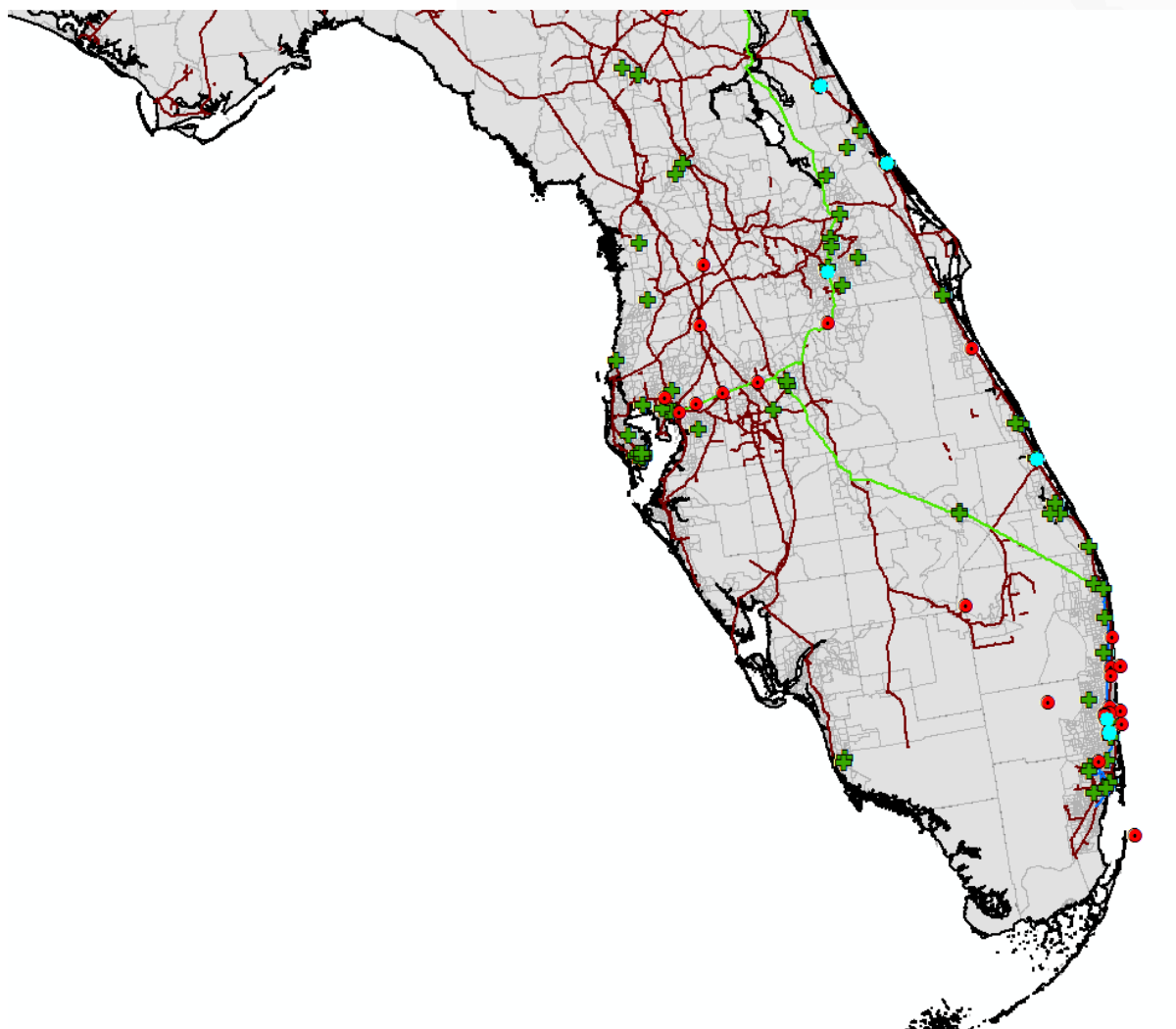




# GIS Mapping of Trespasser and Grade Crossing Incidents



# GIS Mapping of Trespasser and Grade Crossing Incidents



## Examples of possible queries:

- Incident occurred in the State of Florida
- Trespasser incidents between 6/2011 and 2/2012
- Incident was less than 2 miles from a mental health facility



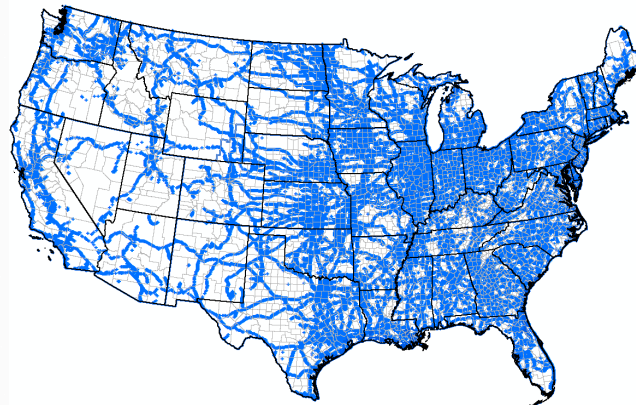
# GIS Mapping of Trespasser and Grade Crossing Incidents



# GIS Mapping of Trespasser and Grade Crossing Incidents

## Data to be included on the map:

- Demographics of the individual (if available)
- Intentional vs. Unintentional (if available)
- Characteristics of the site and surrounding area
- Hospitals, schools, parks, & playgrounds
- Grade crossings (with characteristics of the x-ing)
- Time of day
- Date
- Location





# Benefits & Disadvantages

## Benefits

- Provides a data visualization tool that is easy to use and maintain
- Will allow for the identification of hot spots and target demographics
- Possibly identify why events occurred (e.g., shortcut to school)
- Possibly identify community based interventions
- Explore the effectiveness of past and current countermeasures

## Disadvantages

- Data from FRA before June 2011 is only specified to the county level (may require supplemental information from other parties)
- Available data is not very detailed or consistent due to current data reporting protocols

# Methods being evaluated in project

- **Investigation of existing/past countermeasures to look for evidence of effectiveness**
  - Signage
  - Media training
  - Means restriction
- **Investigate the differences between suicide and trespasser hot spots**
- **When a hot spot is identified**
  - Why at this location?
    - Media driven
    - Geographical
    - What type of person (age, gender, etc.)?
  - To whom should the information be disseminated?
    - Communities
    - Railroads
    - Schools
    - Other stakeholders

# Necessary Project Support

- This effort will require close communication between several partners:
  - FRA
  - Volpe
  - RRF
  - Academia (George Washington University)
  - Railroads
  - Communities
- This partnership can help everyone involved