

Report to Congress

**National Strategy to Prevent Trespassing
on Railroad Property**



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Federal Railroad Administration
U.S. Department of Transportation

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National Strategy to Prevent Trespassing on Railroad Property

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Abbreviations in this Report

AIS	Abbreviated Injury Scale
CRISI	Consolidated Rail Infrastructure and Safety Improvements
FRA	Federal Railroad Administration
FY	Fiscal Year
VSL	Value of a Statistical Life

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National Strategy to Prevent Trespassing on Railroad Property

Executive Summary

Trespassing on railroad property is the leading cause of all rail-related deaths in the United States. More people are struck and killed by trains each year while trespassing – illegally entering or remaining on a railroad right-of-way – than in motor vehicle collisions with trains at highway-rail grade crossings. Between 2012 and 2017, the annual number of trespass-related pedestrian fatalities increased 18 percent, from 725 people killed in 2012 to 855 in 2017. In calendar year 2018, 324 pedestrian trespass fatalities had occurred by July 31, 2018. Data indicates that the number of trespassing occurrences each year far exceeds the number of fatalities and injuries. This raises serious concern of the potential for even more trespasser accidents.

In its report on the fiscal year (FY) 2018 Department of Transportation appropriation,¹ the U.S. House of Representatives Committee on Appropriations requested the Federal Railroad Administration (FRA) study and identify the causal factors that lead to trespassing incidents on railroad property. The Committee also asked FRA to develop a national strategy to prevent trespasser incidents and submit it to the House and Senate Committees on Appropriations by August 1, 2018. This document responds to the Committee's request.

In October 2017, FRA formed a team of experts to study the problem of people being killed or injured while trespassing on railroad property. To help understand the problem's scope, the team analyzed the costs to railroads and society. The team found that trespass accidents during the five-year period from 2012 to 2016 cost society approximately \$43 billion.² The team also reviewed existing research and data related to railroad trespasser fatalities nationwide for the four-year period between November 2013 and October 2017. The team found that, of the 3,100 counties and county equivalents in the United States, approximately 14 percent of trespasser fatalities occurred in 10 counties in 4 different states.³ Moreover, 74 percent of all trespasser deaths and injuries in that four-year period occurred within 1,000 feet (less than ¼ of 1 mile) of a grade crossing.

FRA regional teams conducted field surveys in 6 of the top 10 counties to gather data related to rail operations, social demographics, and circumstances surrounding individual trespass incidents in those counties. FRA's research and field surveys identified several contributing factors, including the behavior and choices of individuals who trespass on railroad property and lack of knowledge and appreciation of trespassing dangers. FRA found that communities tend to focus

¹ U.S. House of Representatives, House Report No. 115-237, July 21, 2017.

² This cost includes the value of fatalities, injuries, and travel time delay due to trespassing incidents. It does not include indirect costs such as emotional distress or productivity losses.

³ In this report, FRA refers to these as the *top 10 counties*.

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their finite resources on higher-priority law enforcement issues, such as homicides, illegal drugs, and highway crashes. These issues often take precedence over the investigation and prosecution of trespasser offenses. As a result, even when railroad trespass violations are reported to law enforcement, the violations are rarely prosecuted, reducing the perceived negative consequences for trespassing. FRA also found that community-planning decisions (such as the location of bus stops in relation to safe crossing paths) might lead to trespassing.

FRA's past efforts to address the problem of people trespassing on railroad property have focused on outreach to the public, railroads, and law enforcement agencies. FRA's approach has not been a national, proactive approach to address the root causes of trespassing. Instead, FRA's historical approach has been dependent its regional staff and resources reacting to specific safety issues on a case-by-case basis.

FRA's current analysis demonstrates that it needs to do more than educate and facilitate mitigation measures when issues arise. To this end, FRA developed the National Strategy to Prevent Trespassing on Railroad Property. It focuses on four strategic areas: (1) data gathering and analysis; (2) community site visits; (3) funding; and (4) partnerships with stakeholders. The key elements of each of these strategic areas are listed below.

Strategic Area 1. Data Gathering and Analysis

- Transition to a data driven, centrally managed, regionally implemented program.
- Identify new data sources and explore statutory, regulatory, or other authorities to protect new data.
- Develop and use a trespasser risk model.
- Consider changes to railroad reporting regulations to improve the data available to FRA and other stakeholders.

Strategic Area 2. Community Site Visits

- Communicate information to FRA regional staff for targeted engagement.
- Develop standard operating procedures for conducting regional community site visits.
- Assign regional assets to identified hot spots to engage railroads, police, and local governments in partnerships using data to identify location-specific causal factors and assist with identifying and implementing mitigation strategies.

Strategic Area 3. Funding

- Work through the executive and Congressional budget cycles to identify funding to strengthen grant programs for trespasser mitigation, such as engineering solutions, law enforcement overtime, school resource officers, and outreach.

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- Include information on the availability of grants and other funding as part of FRA's survey and outreach program.
- Work through the executive and Congressional budget cycles to identify funding for a national trespasser public service announcement campaign.

Strategic Area 4. Develop Partnerships with Stakeholders

- Convene trespasser prevention summits with representatives from each of the top 10 counties for trespasser casualties to engage local community leaders, law enforcement, railroads, and the public.
- Collaborate with government agencies and other organizations, including the Substance Abuse and Mental Health Services Administration and Global Railway Alliance for Suicide Prevention, on targeted outreach to address suicides.
- Share trespasser hot spot data with advocacy organizations, such as Operation Lifesaver, Inc., so they can focus their activities to yield the greatest returns on investment.

The success of this national strategy is dependent on several factors outside of FRA's control. For example, gathering and analyzing the railroads' close call data⁴ would help FRA identify and target trespassing hot spots more effectively. However, FRA does not have specific statutory authority to protect this data from disclosure and use in judicial actions to determine damages or liability for trespasser accidents. FRA expects railroads would be more likely to share this information with such protection in place. Successful implementation of this national strategy will be best served by sufficient resources and cooperation of all stakeholders.

⁴ A trespassing *close call* is a situation in which a trespasser is almost struck by a train, but escapes without injury and the incident is captured by a locomotive camera and/or reported by a train crew.

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National Strategy to Prevent Trespassing on Railroad Property

Introduction

Trespassing on railroad property is the leading cause of all rail-related deaths in the United States. Annually, more fatalities and injuries occur due to trespassing on railroad property than motor vehicle collisions with trains at highway-rail grade crossings. Total annual trespass-related pedestrian fatalities have increased 18 percent from 725 in 2012 to 855 in 2017. In calendar year 2018, 324 pedestrian trespass fatalities had occurred by July 31, 2018.

In its report on the FY 2018 Department of Transportation appropriation, the U.S. House of Representatives Committee on Appropriations asked FRA to study and identify the factors that lead to trespassing incidents on railroad property and to develop a national strategy to prevent them. The Committee directed FRA to include milestones, timelines, and metrics to define success in its strategy. The Committee expects FRA to implement its trespasser accident prevention strategy within the specified timelines. The Committee asked FRA to submit the strategy to the House and Senate Committees on Appropriations by August 1, 2018. This report responds to this request and contains the results of FRA's research and field surveys.

FRA's analysis of available data for the period between November 2013 and October 2017 identified the ten counties in the United States where most pedestrian trespasser casualties occurred.⁵ Table 1 lists these counties from most to least casualties.

**Table 1: U.S. Counties with the Most Railroad Trespasser Casualties, Not Including Suicides
November 2013 to October 2017**

Rank	County	Casualties	Rank	County	Casualties
1	Los Angeles, California	110	6	Palm Beach, Florida	47
2	Cook (Chicago), Illinois	109	7	Fresno, California	46
3	San Bernardino, California	59	7	Riverside, California	46
4	Harris (Houston), Texas	52	9	Contra Costa, California	44
5	Broward, Florida	51	9	San Diego, California	44

Source: FRA analysis

⁵ Casualties include fatalities and injuries.

Trespassing on Railroad Property

Definition

Railroads own their rights-of-way and have a reasonable expectation of operating on their property without the presence or interference of unauthorized people. Any unauthorized person who enters or remains on a railroad right-of-way, equipment, or facility is trespassing.

Trespassing on private railroad property, including a railroad's right-of-way, is illegal.

Pedestrians and motorists are permitted on railroad property where an authorized crossing (either roadway or pedestrian) intersects with the railroad right-of-way at a grade crossing, provided highway traffic control signals and other signage are obeyed.

FRA distinguishes between trespass accidents and trespass incidents for its national strategy.

Trespass Accidents. When one or more trespassers is struck and killed or injured by a train or other means while on railroad property without authority. This report refers to individuals injured or killed because of trespassing on railroad property as casualties.

Trespass Incidents. When law enforcement, railroad personnel, or cameras observe one or more trespassers on railroad property. Instances of trespassing in which the trespasser is not struck by a train or otherwise injured or killed on railroad property.

Types of Accidents

FRA grouped trespass accidents into three categories for analysis and development of its national strategy.

Accidents Involving Trespass Casualties at Grade Crossings. This type of trespass casualty occurs when a pedestrian climbs either through a train stopped at a grade crossing or over or around gates or other physical barriers to enter a grade crossing when a train is approaching. FRA data shows 12 percent of trespassing pedestrian casualties, not including suicides, occur at grade crossings. About 2 percent (3,000 miles) of U.S. rail miles are at grade crossings.

Accidents Involving Trespass Casualties on All Other Segments of Railroad Rights-of-Way. The remaining 98 percent (137,000 miles) of U.S. route miles not at grade crossings are other segments of railroad rights-of-way. Although trespassing can occur anywhere along a right-of-way, 74 percent of trespassing casualties, not including suicides, occur within 1,000 feet (less than ¼ of 1 mile) of a grade crossing.

Suicides and Suicide Attempts. This type of trespass accident occurs when a person enters a railroad right-of-way with the intent of being struck and killed by a train. FRA data indicate that at least 30 percent of fatalities that occur on the rail system result from an intentional act of suicide. Similar to trespass casualties on segments of railroad rights-of-way other than grade

crossings, 73 percent of suicide attempts occur within 1,000 feet of a grade crossing. When an accident is classified as a suicide, it is removed from the casualty data.

Complexities of the Problem

Trespassing on railroad property is a complex problem because of the differing priorities of individuals and the communities in which trespassing occurs. FRA's limited authority to address the issue and varying state laws affecting how a railroad or local authority may enforce trespassing laws are compounding factors. For FRA and many affected communities, a lack of sufficient resources and clear data are primary concerns.

Individuals. At its core, the problem of trespassing starts when an individual enters private railroad property without authority to do so. Most trespassers make this choice because crossing railroad property provides the most direct route to a desired destination. The person might be unaware of the dangers involved in trespassing on railroad property. The person could be distracted by another activity (e.g., hunting, bicycling, riding all-terrain vehicles, using a cell phone or earbuds). These circumstances can lead to deadly consequences.

Communities. From a community's perspective, public safety issues, such as homicides, illegal drugs, and highway crashes, can take precedence over investigating and prosecuting railroad trespass offenses. FRA found in each of the top 10 counties, over a four-year period, the number of railroad trespass casualties was less than two percent of the respective county's total homicides, drug-related deaths, and highway fatalities. Local and state governments often focus their finite resources on their higher-priority issues. In many instances, railroad trespassers are not prosecuted even when law enforcement is aware of the incidents.

Local land use decisions can affect the likelihood of trespassing on railroad property or rights-of-way. For example, community decisions regarding the placement of public buildings and services, such as homeless shelters, food pantries, and schools, or approval of new construction can affect the number of railroad trespassers.

FRA. In 2008, Congress directed the U.S. Department of Transportation to develop and maintain a comprehensive outreach program to address trespassing on railroad property and strengthen relevant enforcement strategies by improving communication among Federal, state, and local entities.⁶ FRA's efforts to mitigate trespassing on railroad property have focused on data gathering and sharing and outreach to the public, railroads, and law enforcement. FRA regulations require railroads to report deaths, injuries, and occupational illnesses arising from the operation of a railroad.⁷ This reporting requirement includes trespasser casualties. However, trespassing on railroad property is a law enforcement issue governed by state and local law,

⁶ United States Code, title 49, section 20151(b).

⁷ Code of Federal Regulations, title 49, part 225.

which limits FRA's authority to address the issue. FRA, however, encourages railroads to consider the risks of trespassing accidents as part of their safety planning. When providing grants or other funding for new or existing railroads, when allowable, FRA conditions the funding on the railroad's consideration of mitigation of identified risks, including the risk of trespassing accidents.

State and Local Law Enforcement. Trespassing on railroad property is a law enforcement issue governed by state and local law. State and local law enforcement administer state trespass laws. Railroads (particularly Class I and commuter railroads) employ railroad police, whose duties typically include investigating incidents of trespassing and confronting trespassers they observe in the act of trespassing. Nationwide, railroads employ more than 1,200 railroad police personnel, whose duties include railroad employee safety, lading protection, theft investigation, and trespasser enforcement. Their status and authority as law enforcement officers varies from state to state, as does their ability to enforce state and local trespass laws.

Differences in state laws can hinder the efforts of state and local law enforcement officers, as well as those of railroad police, by making it difficult for railroads to enforce or legally address trespassing. In some states, a person who trespasses on railroad property could be guilty of a misdemeanor – punishable by a fine and/or imprisonment in state prison or county jail. Other states appear to have carved out “permissive use” or “frequent trespass” exceptions to the general rule. Under these exceptions, if the railroad has permitted the public to travel over its track at a specific location for a considerable period and a sizeable number of people have done so, the railroad could be liable for injuries to trespassers. Some states impose a knowledge requirement, i.e., a person who enters or remains on railroad property without the owner's consent must know that it is railroad property, to be guilty of trespassing. In other states, local law enforcement can address trespassing concerns on private property only when its department receives written authorization from the private property owner.

Scope of the Problem

Each day on average in the United States three people are killed or injured while trespassing on railroad property, including over 1,100 pedestrians in 2017. Approximately 800 railroads operate over 140,000 route miles and through 210,093 grade crossings to serve the communities and industries in which the U.S. population, more than 325 million people in 2017, lives and works.⁸ Railroads operate through diverse geographical areas, including congested urban centers and sparsely populated rural areas. Around major cities, the larger and denser populations result in increased passenger and freight train traffic to support that population. This increased train traffic increases the likelihood of trespassing accidents. In more sparsely populated rural areas,

⁸ FRA data and U.S. Census Bureau, *Annual Estimates of the Resident Population: April 1, 2010 to July 1, 2017*, December 2017.

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local law enforcement officers and railroad police face challenges monitoring and enforcing trespassing activity along remote stretches of railroad right-of-way.

FRA presumes the number of reported trespassing accidents is a small fraction of the number of trespassing occurrences. Using data one Class I railroad shared voluntarily, FRA found the railroad's reported number of close calls⁹ was much larger than the number of casualties, excluding suicides, over the same timeframe. This difference indicates that the potential for additional trespassing casualties is significant.

In response to the House Committee's request to identify and study the factors that lead to trespassing incidents, FRA's experts from its Offices of Railroad Safety and Railroad Policy and Development studied available data. For the four-year period between November 2013 and October 2017, the team determined:

- Nationwide, excluding suicides, 4,242 pedestrians were killed or injured while trespassing on railroad property. With the 1,175 suicides included, the total rises to 5,417 people.
- Of the approximately 3,100 counties and county-equivalents in the United States, approximately 14 percent of all trespasser casualties occurred in 10 counties in 4 different states.
- In the top 10 counties, excluding suicides, 300 pedestrian trespassers were killed. With the 169 suicides included, the total increases to 469.
- 6 of the top 10 counties for trespasser casualties were in California and accounted for 7.9 percent of the U.S. total.
- The county with the most trespasser casualties, 110, was Los Angeles County, California, followed closely by Cook County(Chicago), Illinois, with 109 casualties.
- 74 percent of trespassing casualties occurred within 1,000 feet of a grade crossing.
- Slips, trips, and falls while trespassing caused 185 casualties, or 5 percent of trespassing casualties not at grade crossings.

Distance Between Trespassing Accidents and Grade Crossings

Approximately 73 percent of trespassing suicides and attempted suicide casualties and 74 percent of trespassing casualties excluding suicides occur within 1,000 feet (less than ¼ of 1 mile) of a highway-rail grade crossing. FRA global information system mapping data includes the locations of all reported pedestrian trespasser accidents, including suspected suicides and

⁹ A trespassing *close call* is a situation in which a trespasser is almost struck by a train, but escapes without injury and the incident is captured by a locomotive camera and/or reported by a train crew.

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attempted suicides that have occurred since July 2012. Table 2 below shows the percentage of suicide and attempted suicide trespasser accidents nationwide by distance from a grade crossing from November 2013 to October 2017. The cumulative percentage of casualties by distance from a grade crossing is also listed. Table 3 shows the number of non-suicide trespasser casualties and cumulative percentage nationwide and in the top 10 counties by distance from a grade crossing for the same period.

Table 2: Location of Suicides and Attempted Suicides, November 2013 to October 2017

Distance from a Highway-Rail Grade Crossing (feet)	Percentage of Suicides and Attempts	Cumulative Percentage of Suicides and Attempts
At a grade crossing	11 %	11 %
Within 50	7 %	18 %
50 to 100	6 %	24 %
100 to 200	10 %	34 %
200 to 300	9 %	43 %
300 to 400	7 %	50 %
400 to 500	5 %	55 %
500 to 1,000	18 %	73 %
1,000 to 5,000	24 %	97 %
5,000 to 10,000	2 %	99 %
More than 10,000	1 %	100 %

Source: FRA analysis

Table 3: Location of Pedestrian Trespasser Casualties, Excluding Suicides, November 2013 to October 2017

Distance from a Highway-Rail Grade Crossing (feet)	Casualties Nationwide		Casualties in Top 10 Counties	
	Cumulative Number	Cumulative Percentage	Cumulative Number	Cumulative Percentage
At a grade crossing	516	12 %	102	18 %
Within 50	853	20 %	27	23 %
50 to 100	1,116	26 %	29	28 %
100 to 200	1,608	38 %	56	38 %
200 to 300	1,973	46 %	49	47 %
300 to 400	2,232	53 %	42	55 %
400 to 500	2,462	58 %	31	60 %
500 to 600	2,658	63 %	20	64 %

Table 3: Location of Pedestrian Trespasser Casualties, Excluding Suicides, November 2013 to October 2017

Distance from a Highway-Rail Grade Crossing (<i>feet</i>)	Casualties Nationwide		Casualties in Top 10 Counties	
	Cumulative Number	Cumulative Percentage	Cumulative Number	Cumulative Percentage
600 to 700	2,798	66 %	21	67 %
700 to 800	2,945	69 %	16	70 %
800 to 900	3,049	72 %	10	72 %
900 to 1,000	3,142	74 %	12	74 %
1,000 to 1,250	3,328	78 %	25	79 %
1,250 to 1,500	3,477	82 %	21	82 %
1,500 to 2,000	3,711	87 %	30	88 %
2,000 to 3,000	3,950	93 %	21	92 %
3,000 to 5,000	4,107	97 %	24	96 %
5,000 to 10,000	4,186	99 %	12	98 %
More than 10,000	4,242	100 %	11	100 %
Total Casualties	4,242		559	

Source: FRA analysis.

FRA Efforts to Address Trespassing

FRA has worked extensively with railroads; state, county, and local governments; and other organizations to raise awareness about the inherent dangers and consequences of trespassing. The paragraphs below describe some of the work FRA has done to address the issue. FRA's trespass prevention website¹⁰ contains many of the research and other documents referenced below.

Research. FRA research examines all aspects of trespass prevention with a focus on education, engineering, and enforcement. FRA researches new technology prototypes, systems, and components, and education and enforcement initiatives that have the potential to decrease or eliminate railroad trespassing. FRA research includes the demonstration and evaluation of new technologies and innovative safety treatments and technology transfer initiatives from other modes of transportation (e.g., use of artificial intelligence). These studies enable FRA to develop effective methods that, combined with local efforts, reduce railroad trespassing. In July 2018,

¹⁰ <https://www.fra.dot.gov/Page/P0846>.

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FRA published a report intended to provide a baseline measure of trespassing and suicide incident data from 2012 to 2014.¹¹

Data Analysis. FRA conducted national studies of demographic and market analysis of rail trespass fatalities in 2008 and a follow up study in 2013.¹² The objective was to establish a foundation to build an outreach or public education program and assist law enforcement to identify demographic populations most at risk. Results indicated that trespassers involved in fatal accidents are typically identifiable as white males, with an average age of 38, and with low socioeconomic status. These studies led FRA to conclude that many in this demographic might be intoxicated at the time of trespassing.

Community, Analysis, Response, and Evaluation Rail Trespass Problem-Solving Model. FRA in collaboration with Transport Canada developed and published the *Community Trespass Prevention Guide* (Guide) in 2003.¹³ This guide details a collaborative, systematic problem-solving approach for communities. Called the Community, Analysis, Response, and Evaluation rail trespass problem-solving model, the guide presents a non-regulatory approach to addressing railroad trespassing in local communities.

Collaboration with National Organizations. FRA promotes trespass prevention programs through cooperative efforts with public and private entities to encourage enforcement, educational, and engineering activities that effectively reduce trespass incidents and associated casualties. FRA collaborates with national organizations, such as Operation Lifesaver, Inc., for public outreach and education activities to increase awareness of the dangers of railroad trespassing. FRA has provided \$1 million annually through grants to Operation Lifesaver, Inc., which conducts public outreach and education activities to increase awareness of the dangers of railroad trespassing.

National Workshops. FRA hosted three workshops (in 2008, 2012, and 2015) to provide stakeholders updates on right-of-way fatality and trespass prevention activities and to solicit ideas for future actions and research priorities. The attendees generated more than 80 ideas ranging from expanded initiatives to new research projects. Their recommendations included increased signage, use of unmanned aerial vehicles, model state laws, and enforcement grants.

¹¹ FRA, *Characteristics of Trespassing Incidents in the United States (2012-2014)*, at <https://www.fra.dot.gov/eLib/Details/L19581>.

¹² <https://www.fra.dot.gov/eLib/details/L04702>.

¹³ <http://www.fra.dot.gov/Elib/Document/1265>.

Law Enforcement Outreach. Through the right-of-way workshops and local activities, FRA learned that law enforcement wanted a state-by-state listing of trespassing laws. FRA issued the *Compilation of State Laws and Regulations Affecting Highway-Rail Grade Crossings* in 2013, which is also a mobile application downloadable to any handheld device.¹⁴

Costs and Effects of Railroad Trespassing

According to FRA's economic analysis, the benefits of reducing trespassing accidents can be measured in lives saved, injuries reduced, and train delays avoided. This analysis uses data reported to FRA over the five-year period from 2012 to 2016. The 9,363 reported trespassing accidents during this period cost society \$43.2 billion in fatalities and injuries (with an average cost of \$4.6 million per accident) and more than \$56.0 million in travel time delays. These calculations do not include unquantified costs to the economy, such as lost productivity, and society, such as emotional distress.

Fatalities and Injuries. The benefit of preventing a fatality or injury is measured by the value of a statistical life (VSL). VSL is the additional cost society is willing to bear for improvements in safety that reduce the expected number of fatalities by one. The U.S. Department of Transportation currently sets VSL at \$9.6 million.¹⁵ In cases of injury, a value is assigned based on a fraction of the VSL using the abbreviated injury scale (AIS). AIS categorizes injuries into levels of severity from AIS 1 (minor) to AIS 5 (critical) and assigns a dollar value to each category of injury. FRA calculated the values of the reported trespasser fatalities and injuries.

- The 4,291 reported trespasser fatalities equate to a value of fatalities over the five-year period of approximately \$41.2 billion.
- The 5,072 reported trespasser injuries equate to a value of injuries over the five-year period of approximately \$2.0 billion.¹⁶

Travel Time Delays. When a trespassing accident occurs, the train is required to stop at the accident site. One Class I railroad told FRA each time a train strikes a trespasser the initial investigation and restoration of traffic flow takes an average of four hours. During this time, passengers are waiting on the involved train. FRA estimated the value of this time by assuming

¹⁴ <https://www.fra.dot.gov/StateLaws>.

¹⁵ *2016 Revised Value of a Statistical Life Guidance.pdf* at <https://www.transportation.gov/office-policy/transportation-policy/revised-departmental-guidance-on-valuation-of-a-statistical-life-in-economic-analysis>.

¹⁶ FRA used National Automotive Sampling System values to assign a monetary value to each individual injury type.

200 passengers per train¹⁷ and each passenger's time on the train is worth \$20.40 per hour.¹⁸ If the involved train is carrying freight, FRA estimated the value of this time as \$637.26 per hour.¹⁹ In addition, the conductor or engineer on the involved train has a wage rate of \$31.57 per hour.²⁰ FRA used these assumptions to estimate the value of a reduction in train delays, if all expected trespass accidents were avoided.

- The value of passenger train delays over the five-year period is \$34.1 million.²¹
- The value of freight train delays over the five-year period is \$21.9 million.²²

Unquantified Economic and Societal Costs. FRA's analysis does not include other costs that trespasser accidents impose on the economy and society. For example, accident response and investigation can delay motorists and their passengers at highway-rail grade crossings. Similarly, commercial trucks carrying freight or providing services can incur delays. Other trains must be held until a trespass accident is cleared. Costs such as wages and expenses of law enforcement personnel who conduct the initial investigations and emergency responders who assist the passengers and trespasser(s) are not quantified.

Other unquantified costs include the negative effects on the trespassers and their families and the emotional distress of involved railroad personnel and emergency responders. One railroad representative told FRA that trespasser accidents often affect even the most experienced engineers to the extent they are unable to continue to work. The railroad then has to replace them with less experienced ones. The railroad's labor and training costs rise and safety could be adversely impacted as those more experienced engineers leave the workforce.

¹⁷ FRA estimate.

¹⁸ *2016 Revised Value of Travel Time Guidance.pdf* at <https://www.transportation.gov/office-policy/transportation-policy/revised-departmental-guidance-valuation-travel-time-economic>.

¹⁹ National Cooperative Highway Research Program, *Comprehensive Costs of Highway-Rail Grade Crossing Crashes*, Report 755.

²⁰ Surface Transportation Board, 2016, at <https://www.stb.gov/econdata.nsf/WageStatistics?OpenView>.

²¹ 2,035 passenger incidents * [(\$31.57 train employee wage rate * 1.75 burdened wages * 2 employees per train * 4 hours per delay) + (200 passengers per train * \$20.40 per passenger per hour * 4 hours per delay)].

²² 7,328 freight incidents * [(\$637.26 value of goods per hour * 4 hours) + (\$31.57 * 1.75 burdened wages * 2 employees per train * 4 hours per delay)].

FRA's Field Survey - Site Review Teams' Executive Summaries

Based on the data and analysis described above, FRA deployed four trespasser site review teams to six counties in California, Illinois, Texas, and Florida. The teams were composed of FRA regional grade crossing inspectors and went to six of the top 10 counties nationwide for trespasser casualties. Each team had maps, tools, and data and reported on the number of trains passing through the area; the number of trespass violations local authorities and railroad police submitted and prosecuted; the amount of time law enforcement dedicated to addressing the issue of trespassing on railroad property; and the locations where trespassing was occurring. The teams also identified how close trespassing locations were to homeless communities and shelters, food pantries, and schools. Finally, the teams interviewed trespassers to find out why they were trespassing, if they knew they were trespassing, if they knew trespassing was illegal, and to explain the dangers of trespassing. The teams gathered data for the period November 2013 to October 2017.

In summary, the site review teams found that individuals were often making conscious decisions to trespass as a matter of convenience and generally reported that they knew they were illegally trespassing. In one instance, FRA personnel observed schoolchildren and a school official trespassing on a railroad's right-of-way. The site review teams also found that some locations lacked fencing or other physical barriers to the railroad's right-of-way, while other locations had fences that did not effectively deter trespassers. In one instance, trespassers regularly climbed or crawled through the cars of stopped trains to get to the other side of the tracks. The teams identified examples of potential poor community planning (e.g., parking lots intended for a building on the opposite side of the track from the building), and where prevention and engineering controls, such as fences, had been installed. Tables 4 to 7 below highlight each team's findings by state.

Table 4: California Counties Reviewed by FRA Region 7 Grade Crossing Inspectors

County	Rank for Number of Casualties	Number of Casualties
Los Angeles	1	110
Riverside	7	46
San Diego	9	44

Contributing Factors

- Trespassing for convenience.
- Lack of deterrence, such as fencing, enforcement, or education.

Table 4: California Counties Reviewed by FRA Region 7 Grade Crossing Inspectors

Considerations for Mitigation

- Trespassers interviewed said they knew they were illegally trespassing.
- Railroad management reported frustration with ineffective education and enforcement efforts and stated that the next step is to explore the use of engineering solutions.
- Railroads are using a tracking process to report homeless encampments on railroad right-of-way for targeted enforcement actions.

Table 5: Illinois County Reviewed by FRA Region 4 Grade Crossing Inspectors

County Name	Rank for Number of Casualties	Number of Casualties
Cook (focused on Chicago)	2	109

Contributing Factors

- Of 1,081 railroad trespasser violations, 435 (40 percent) were not prosecuted; 1,034 (almost 96 percent) were filed by railroad police.
- County or city police departments issued less than 50 trespasser violations.
- Chicago Police stated that less than 1 percent of their calls are directly related to railroad trespassing, and they divert those calls to railroad police.

Considerations for Mitigation

- A significant number of trespasser fatalities occurred near homeless shelters, schools, and food pantries.
- Most track is railroad over grade (elevated track).
- Fencing was already installed at all locations visited; the assumption is that trespassers are climbing fences.

Table 6: Texas County Reviewed by FRA Region 5 Grade Crossing Inspectors

County Name	Rank in Number of Casualties	Number of Casualties
Harris (focused on Houston)	4	52
Contributing Factors		
<ul style="list-style-type: none"> Of 228 trespassing violations issued October 2013-November 2017, 1 was prosecuted. Trespassers regularly climb or crawl through the cars of stopped trains rather than wait or walk around. 		
Considerations for Mitigation		
<ul style="list-style-type: none"> City of Houston officials advocated for federal funding for cameras. High levels of trespassing near shelters and food banks. 		

Table 7: Florida County Reviewed by FRA Region 3 Grade Crossing Inspectors

County Name	Rank in Number of Casualties	Number of Casualties
Palm Beach County	6	47
Contributing Factors		
<ul style="list-style-type: none"> Trespass occurs for convenience allowing the pedestrian a most direct path to their desired location. Lack of grade crossings in large sections of track contributes to trespassing for convenience. Mid-block public bus stops between crossings were a contributing factor to trespass. Multiple groups of schoolchildren and a vice-principal were observed trespassing upon school dismissal. 		
Considerations for Mitigation		
<ul style="list-style-type: none"> Trespassers interviewed admitted they knew they were illegally trespassing. Moving public bus stops closer to grade crossings could be a viable mitigation strategy. Location specific mitigations (physical barriers) to create more resistance, and in others, a need to provide a safer path of least resistance. A more comprehensive and focused survey should be performed to identify specific areas and effective methods of mitigation. This survey should be guided by the railroads, and should include state/local officials, state/local police departments, state/county school boards, and county/city transportation boards. 		

Contributing Factors

FRA's analysis of previous research and field survey identified two primary factors that contributed to trespassing incidents on railroad property and rights-of-way. First, trespassing starts with an individual choosing to enter or remain on railroad property without authority to do so. Most trespassers make this choice because crossing railroad property provides the most direct route to a desired destination. FRA's survey teams found that trespassers often knew they were illegally on railroad property. Trespassers often do not have a sufficient understanding or appreciation for the dangers of trespassing on railroad property.

Individual Contributing Factors

- a) Personal convenience.
- b) Lack of knowledge of or appreciation for the dangers of trespassing.

Second, from a community's or local government's perspective, other law enforcement and public safety issues are often the focus of their resources. FRA found in each of the top 10 counties, over a four-year period, the number of railroad trespass casualties was less than two percent of the respective county's total homicides, drug-related deaths, and highway fatalities. As a result, many communities prioritized their resources in ways that limit their ability to address railroad trespassing issues either through engineering solutions or public outreach and education. FRA's field survey confirms that railroad trespassers are rarely prosecuted, thereby reducing the perceived negative consequences of trespassing. Finally, community decisions, such as putting bus stops too far from safe crossing paths, might contribute to an increased number of trespassers.

Community Contributing Factors

- a) No (or insufficient) dedicated resources (personnel or funding).
- b) Lack of physical deterrents, such as fences, natural or engineered barriers, or obstacles.
- c) Failure to prosecute trespassers by local judicial process.
- d) Public perception of the dangers of trespassing on railroad property.
- e) Poor community planning.

Conclusion

FRA's approach to the trespassing issue has not been national or proactive, but rather a program of national outreach and education. Regional FRA staff and resources react to specific trespasser issues on a case-by-case basis. FRA's efforts have focused on data gathering, sharing, and outreach to the public, railroads, and law enforcement. FRA has considered specific trespassing problems as local problems and regional FRA safety personnel assisting local authorities and communities as the best way to address these issues. Regional FRA safety staff work with these communities and railroads to facilitate solutions to specific, local trespasser issues.

FRA's current analysis demonstrates that it needs to do more than educate and facilitate mitigation when issues arise. Proactive use of current, relevant data and analysis to identify areas at systemically high-risk for trespassing incidents is the best way to develop and facilitate implementation of specific mitigation strategies with communities, local governments, law enforcement, and impacted railroads. Education and outreach are not enough. Engineering solutions (e.g., fencing, automated video detection systems) designed to prevent or discourage trespassing on railroad property can be utilized in conjunction with frequent and consistent enforcement of trespasser laws. FRA has developed the following national strategy, focusing on four strategic areas: (1) data gathering and analysis; (2) community site visits; (3) funding, and (4) partnerships with stakeholders.

The success of this national strategy depends on several factors outside of FRA's control. FRA's ability to gather and analyze railroad trespasser close call data is the cornerstone of this strategy. Railroads have been reluctant to share this information, because FRA does not have specific statutory authority to protect this data from disclosure and use in judicial or other actions to determine damages or liability for trespasser accidents. Without this data, FRA will be unable to understand fully this complex problem and target trespassing hot spots. Trespassing is generally a matter of state and local law, and enforced at each state and municipality's discretion. Higher-priority law enforcement and other issues compete for the resources of local governments to address trespassing on railroad property. Successful implementation of this strategy will depend on the availability of sufficient resources and all stakeholders working together.

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National Strategy to Prevent Trespassing on Railroad Property

FRA's national strategy to prevent trespassing on railroad property includes four strategic focus areas: data gathering and analysis, community site visits, funding, and partnerships with stakeholders. None of these focus areas alone is sufficient for preventing trespassing and a successful strategy must include a combination of approaches. Focusing on data gathering and analysis will enable FRA to target its resources to trespassing hot spots. Conducting community site visits will help FRA and other stakeholders build a pool of successful mitigation strategies. Requesting and providing funding will assist communities directly in securing solutions and resources they need to deter trespassing and build partnerships with communities, law enforcement, railroads and other organizations in addressing the trespassing problem. FRA will be able to leverage available resources, expertise, and local knowledge to combat the problem of trespassing.

Implementation of this strategy will transition FRA's trespasser prevention program from regionally managed reactive efforts, to a centrally managed, data driven program designed to evaluate the risks of trespasser incidents throughout the Nation's rail network. It will also help FRA work with communities and local law enforcement to identify and facilitate implementation of effective mitigation strategies.

The strength of this approach is demonstrated by the following examples, identified when FRA developed this strategy.

One Central Problem. FRA survey teams identified convenience as the most consistent problem across surveyed areas—trespassers simply take the most direct routes to their desired destinations—and a main cause of trespassing, regardless of geographic location.

Three Local Solutions. FRA teams visited three communities that data indicated were hot spots for trespasser activity. FRA personnel observed trespassers crossing railroad property to travel from a bus stop to a residential neighborhood in West Palm Beach, Florida. Moving the bus stop closer to an authorized, safer crossing could eliminate the current path of convenience. FRA personnel observed people from a homeless encampment trespassing across railroad property to go into town near Riverside, California. In this case, solutions could include physical barriers, enhanced law enforcement presence, or relocating the homeless population to a safer location. In Oceanside, California, FRA personnel observed trespassers crossing railroad property to travel from a residential neighborhood to the beach. Because neither the neighborhood nor the beach is a candidate for relocation, solutions to this problem could include physical barriers and additional enforcement.

FRA's initial focus on gathering and analyzing appropriate data to identify trespassing hot spots led the agency to send teams to conduct site visits. FRA identified mitigation strategies based on

the specific local circumstances. FRA's next step is to engage with local partners at each location to examine the feasibility of implementing appropriate mitigation measures.

The Four Strategic Areas of the National Strategy

Strategic Area 1. Data Gathering and Analysis. FRA's strategy will be driven by reliable data. FRA will seek ways to improve the integration and presentation of this data into a more thorough picture of the trespass issue. FRA identified the 10 counties in the United States with the highest number of railroad trespassing casualties, yet FRA is missing a key piece of data that will enable it to identify geographical areas for the highest risk of trespassing incidents in the future.

FRA might not receive data related to trespassing incidents that do not result in death or injuries. A trespasser close call (or sometimes referred to as a *near-hit*) is a situation in which a trespasser is almost struck by a train, but escapes without injury and the incident is captured by a locomotive camera or reported by a train crew. This data is critical to identify the areas that are at high risk of trespasser accidents due to the number of trespasser close calls that occur in the area.

Obtaining trespasser close call incident data is essential to successful implementation of any data driven proactive approach to addressing the trespasser issue. Close call data would enable FRA to better identify trespasser hot spots and could be particularly beneficial in deploying law enforcement and railroad police more efficiently and determining what, if any, engineering solutions may be feasible in particular circumstances. Thorough analysis of close call data would allow FRA to direct our resources to areas of highest value and to share risk information with our partners.

Many railroads already collect trespasser close call data for their own use. Railroads have not been willing to share this information with FRA without specific statutory authority to protect the data from disclosure and use in judicial or other actions to determine damages or liability for trespasser accidents or incidents. However, federal law does not prohibit the use of this data as evidence in federal or state court proceedings or other actions for damages or to determine liability for trespasser accidents or incidents. Other operating administrations, such as the Federal Highway Administration, have statutory authority²³ to protect disclosure of data gathered for highway safety projects.

Strategic Area 2. Community Site Visits. FRA will send teams to conduct site visits in communities with high numbers of trespass incidents. These teams will learn more about the specific local factors that contribute to trespassing and will work with local partners to help them implement, and evaluate the effectiveness of, targeted mitigation strategies. Curtailment of trespassing in these areas will contribute to a pool of successful strategies for use in other

²³ United States Code, title 23, section 409.

communities. FRA will use this data to develop a trespass risk model to identify the current and future risk of trespassing for communities across the country.

Strategic Area 3. Funding. Funding is an important part of the direct and tangible support necessary to help communities reduce the number of trespassing incidents. Funding is necessary to enable local communities to implement targeted trespasser mitigation strategies, such as engineering solutions, law enforcement overtime, school resource officers, or community outreach. In February 2018, FRA published a notice of funding opportunity for a law enforcement pilot grant program aimed at evaluating the effectiveness of local law enforcement activities intended to reduce trespassing on railroads.²⁴ This \$150,000 grant opportunity was open to state, county, municipal, local, and regional law enforcement agencies in communities with a demonstrated rail trespass problem. FRA received final applications in April 2018 and expects to award the grants in the fall of 2018. FRA will evaluate the programs over six-month periods of performance.

FRA will work to increase stakeholder awareness of other funding opportunities. For example, trespassing prevention projects, including grade crossing improvements and engineering solutions targeting trespassing (e.g., barriers), could be eligible for funding under the Consolidated Rail Infrastructure and Safety Improvements (CRISI), Restoration and Enhancement, or Federal State Partnership for State of Good Repair grant programs. Congress provided approximately \$960 million in FYs 2017 and 2018 for these grants, with some set-asides for specific priorities. FRA encourages potential applicants to contact FRA for technical assistance before applying for these programs, given the variation in program requirements.

Strategic Area 4. Partnerships with Stakeholders. FRA will continue to work with communities, local governments, law enforcement agencies, railroads, and other interested parties to combat the problem of trespassing. To maximize our reach and effectiveness, FRA will work with organizations whose goals align with ours, collaborating and breaking down silos to share knowledge and data, thematic with the Department's priorities on safety. This includes sharing information and meeting directly with leadership from groups such as Operation Lifesaver, Inc., to raise awareness in hot spot communities; the Global Rail Alliance for Suicide Prevention to share strategies to deter suicides by rail; the Substance Abuse and Mental Health Services Administration to reduce the number of suicides; International Association of Chiefs of Police to share ideas with law enforcement; the National Organization of Youth Safety to find ways to reach younger populations more effectively; and community groups and leaders who have in-depth knowledge of their local problem areas.

Transport Canada, the Department's counterpart agency, is considering options for addressing the railroad trespasser issue in Canada. Transport Canada is developing a document addressing the history of the trespassing issue, access controls, and policy options for consideration. FRA

²⁴ Federal Register, volume 83, number 7842, Feb. 22, 2018.

reviewed Transport Canada’s draft document, shared a draft of this report with Transport Canada, and held a teleconference to discuss both documents. Transport Canada’s findings are similar to the findings in this report and FRA intends to continue collaborating with Transport Canada to share ideas and additional discoveries to create a stronger strategy for both agencies.

Metrics for Success

The success of this national strategy depends not only on FRA’s actions, but also on the resources and actions of stakeholders. FRA will measure the success of this national strategy by the relative levels of stakeholder engagement on the issue and implementation of specific mitigation strategies that reduce trespasser accidents at identified hot spots. FRA will also measure the success of this national strategy by the change in the nationwide number of trespassing accidents.

Implementation Milestones and Timeline by Strategic Area

FRA expects to implement the national strategy, subject to the availability of resources, according to the following milestones in Table 8.

Table 8. Implementation Milestones and Timeline by Strategic Area

Milestone	Timeline
Strategic Area 1. Data Gathering and Analysis	
1. Transition from a regionally managed to a centrally managed, data driven program to support trespasser prevention activities.	Complete by January 2019
2. Identify, through independent analysis and collaboration with railroads and other stakeholders, known and new data sources that could better identify trespasser hot spots or risk factors that lead to trespassing.	Start by January 2019
3. Explore statutory, regulatory, or other authorities to protect railroad near-hit and close-call data from disclosure.	Start in FY 2019
4. Identify, through collaboration with railroads as appropriate, existing and potential new analytical tools (including risk models) to effectively analyze trespasser data.	Start by January 2019
5. Develop an FRA trespass risk model to identify current and future risk of rail trespassing in communities across the country (identify hot spots).	Complete by December 2019
6. Use developed risk model to perform initial risk assessments on identified hot spots	Complete by January 2020
7. Consider changes to accident and incident reporting regulations to improve rail trespasser data. Propose rule, if changes justified.	Complete by September 2020

Table 8. Implementation Milestones and Timeline by Strategic Area

Milestone	Timeline
Strategic Area 2. Community Site Visits	
8. Develop system of communicating currently available data to FRA regions for targeted grade crossing and trespasser prevention program inspector and specialist actions.	Complete by March 2019
9. Develop standard operating practices and procedures for FRA community site visits, reporting, and monitoring effectiveness of any mitigation strategy employed.	Complete by June 2019
10. Assign regional assets to identified hot spots and arm them with data necessary to engage railroads, police and local governments in partnerships to identify location specific causal factors and assist with identifying and implementing mitigation strategies.	Start in July 2019
Strategic Area 3. Funding	
11. Work through the executive and Congressional budget cycles and reauthorization process to identify funds to strengthen grant programs that provide funding for trespasser mitigation, such as engineering solutions, law enforcement overtime, school resource officers, and outreach.	Start in FY 2019
12. Work through the executive and Congressional budget cycles to identify funds for a national trespasser public service announcement campaign. Develop a series of announcements for distribution in targeted areas with high number of trespassing accidents.	Start in FY 2019
13. Work through the executive and Congressional budget cycles to identify funds for advocacy organizations to develop focused surveys of communities where trespasser incidents have been a persistent problem. Additional funding will be used to develop forms to collect information from the surveys, establish a database, and prepare reports for the communities and FRA.	Start in FY 2019
14. Provide information on availability and process for applying for FRA grants and other funding (e.g., law enforcement and CRISI grants) during focused surveys and outreach.	As funding becomes available

Table 8. Implementation Milestones and Timeline by Strategic Area

Milestone	Timeline
Strategic Area 4. Partnerships with Stakeholders	
15. Develop system of sharing trespasser hot spot data with advocacy organizations to focus their activities where they will yield the greatest returns on investment and establish communication and reporting procedures to share information and provide feedback on effectiveness of efforts.	Complete by April 2019
16. Collaborate and partner with government agencies, such as the Substance Abuse and Mental Health Services Administration, to develop and implement targeted outreach to address suicides by train.	Complete by December 2020
As appropriate, collaborate with international organizations, such as the Global Rail Alliance for Suicide Prevention, to share ideas on effective strategies to deter suicides by rail.	
17. Partner with law enforcement and other organizations (e.g., International Association of Chiefs of Police, National Organization of Youth Safety) to collaborate on effective trespass prevention and mitigation measures (e.g., enforcement of trespass laws, methods to raise awareness and more effectively reach younger population to prevent trespassing)	Complete by December 2019
18. Partner with the leaders of local communities to improve trespass prevention. Initially, FRA will communicate directly with the leadership of counties identified as having the highest number of railroad trespasser casualties.	Start by July 2019
19. Host trespasser prevention summits with representatives of the top 10 counties. Summits will include local community leaders, law enforcement, railroads and the public.	Complete by July 2020
20. Assist other agencies and organizations in developing and targeting trespasser prevention outreach campaigns to localities identified as trespassing hot spots.	Complete by July 2020