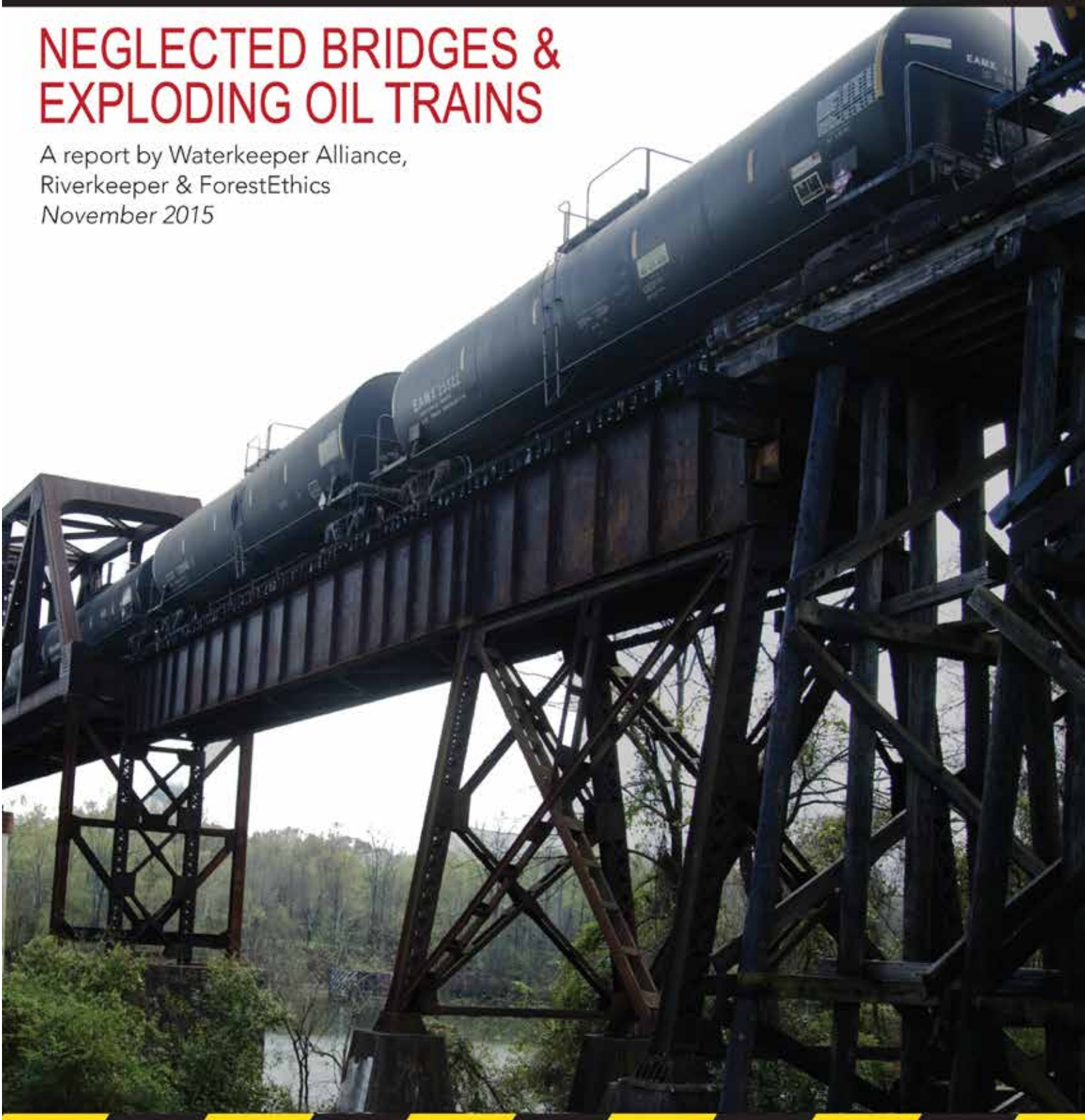
DEADLY CROSSING

NEGLECTED BRIDGES & EXPLODING OIL TRAINS

A report by Waterkeeper Alliance,
Riverkeeper & ForestEthics
November 2015



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Neglected Bridges and Exploding Oil Trains

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Published November 10, 2015

TABLE OF CONTENTS

INTRODUCTION

Oil trains, crumbling infrastructure, and inadequate federal oversight of rail bridges threaten the safety of millions of Americans, our waterways, and the environment.

Since 2008, oil train traffic has increased over 5,000 percent along rail routes leading from production fields in central Canada, the Great Plains, and the Rockies to refineries and crude oil hubs along our nation's coasts. There has also been a surge in the number of oil train derailments, spills, fires, and explosions. More oil was spilled from trains in 2013 than in the previous 40 years combined.[1]

On July 6, 2013, an oil train derailed and exploded in Lac-Mégantic, Quebec, killing 47 people. In 2014, the U.S. Department of Transportation estimated that there would be up to 10 oil train derailments in the U.S. and Canada per year over the next two decades.[2] Any of these derailments could result in a serious disaster, with oil spilled, fires, explosions, and even loss of life. In 2015 alone, six major oil train derailments and explosions have occurred as of November.[3]

Over the past 10 years, the federal government estimates that 24 train accidents were caused by misalignment or failure of railroad bridges.[4] The nation's 100,000 rail bridges cross nearly every major waterway, traverse highly populated areas, and present a recipe for catastrophe beyond the scale of anything we have seen – even if just one oil train derails, spills, and explodes.

Citizens Report on Rail Bridges

To shed light on this potential threat, a grassroots network of advocates conducted 250 citizen inspections of rail bridges in 15 different states. Riverkeeper, ForestEthics, and 22 Waterkeeper organizations noted and photographed bridges showing signs of concern. This report details the results of these citizen inspections and outlines our call to action for oil train and rail bridge safety.

Citizen inspectors identified deficiencies, defined as cracks or pieces missing, significant rusting, and/or deterioration or rotting of the foundation in 46 percent of the bridges inspected (114 of 250 bridges inspected).

Crumbling rail bridge infrastructure was common and easily visible. The most commonly identified deficiencies were:

- Missing and crumbling concrete
- Erosion of pilings
- Exposed rebar
- Loose and broken wooden/creosote beams
- Severe rusting and/or holes in structural steel
- Loose, and missing bolts
- Uneven tracks
- Crossties in poor condition
- Missing spikes
- Failing retaining walls

While Waterkeeper inspectors may not be bridge engineers, they are advocates with legal, public policy, and scientific experience monitoring waterways for water pollution and threats to human health and the environment. They found that failing, undermined, and missing structural materials were most common where foundations sit in waterways, especially below the high water mark. Waterkeepers observed makeshift repairs, including concrete patches and use of metal straps and brackets to reinforce failing and missing beams. In several cases Waterkeepers were present when crude oil unit trains passed over bridges and observed flexing, slumping, and vibrations that caused concrete to crumble and slough off.

Weak Federal Oversight

Our review of federal rail bridge safety standards shows that dangerously inadequate inspections and oversight, and lax regulations under federal law compound the already high risks posed by oil trains. There is no national inventory of rail bridges, no mandated submission of inspection records, and no required minimum engineering standard for rail bridges.

Under the Rail Safety Improvement Act, enacted on October 16, 2008, and a subsequent set of regulations issued by the Department of Transportation (DOT), the federal government cedes authority for bridge inspection and oversight to the owners of the approximately 100,000 rail bridges around the nation. Owners are left to determine safe load limits, inspection and maintenance schedules, and engineering standards with little or no independent oversight:

- Federal guidelines provide no minimum design standards for bridge construction or maintenance;
- State or federal safety officials provide little or no additional inspection, review or oversight;
- Federal regulations, which require that "competent persons" evaluate bridges and develop bridge management plans for railroads, fail to require any minimum qualifications for competence – not even an engineering degree; and
- When railroads conduct bridge inspections and do find safety issues, federal officials do not need to be informed, and have little authority to compel rail bridge owners to make repairs.

Immediate Action Needed

All oil train traffic must stop on all bridges with deficiencies that threaten safety. We call on the Federal Railroad Administration (FRA) to exert their authority to ensure that no rail bridge is used for oil trains or other hazardous materials unless it has passed a rigorous and recent third-party safety inspection under the oversight of federal safety authorities.

The rail and oil industry, and all other rail bridge owners, must assume responsibility for the danger created by oil trains and ensure the safety of every bridge carrying oil trains. The rail and oil industry must immediately stop routing oil trains and other hazardous material across bridges with known deficiencies, and ensure the safety of bridges they do opt to use. They should:

- Share existing inspection and repair information with public safety officials and the public;
- Allow rigorous, independent safety inspections of all rail infrastructure carrying oil trains; and
- Repair or replace all deficient infrastructure.

President Obama and Congress must take immediate action to prevent another fatal oil train disaster. We call upon the federal government to exercise its oversight authority here by:

- Implementing strong new rail safety rules and broadening FRA's mission to include responsibility for all rail infrastructure;
- Giving citizens and local governments the information they need to protect themselves and the power to say no; make rail bridge oversight more transparent;
- Preparing emergency responders for dealing with oil train derailments, including through the development of a national inventory of rail bridges; and
- Mandate trains reroute around rail bridges until new, transparent, independent inspections occur.

COMMUNITIES AND WATERWAYS AT RISK

Oil trains move toxic and explosive extreme oil thousands of miles across the U.S., through the downtown of many cities and towns in the United States, and over our waterways. Millions of Americans are living in the blast zone, and the drinking water supplies for tens of millions more are under severe threat by oil trains, especially where those trains cross over waterways on railroad bridges.

Surging Crude Oil Shipments in North America

In response to the boom in oil production in the U.S. and Canada, the oil and rail industry has increased the transportation of crude oil by train in the United States from 9,500 tank cars in 2008, to 493,126 tank cars in 2014.[5]

This 5,000 percent increase in oil train traffic brings with it the severe threat of oil train derailments that threaten communities and waterways.[6] ForestEthics used industry oil train routes and U.S. Census data to calculate that 25 million Americans live in the dangerous blast zone, the one-mile evacuation area in the case of an oil train derailment and fire.[7]

Are you in the blast zone? Blast-Zone.org

Explosive Danger of Extreme Oil

The crude oil transported by trains is generally either extreme tar sands or shale-fracked oil – both more volatile and toxic than conventional crude oil. Despite the large volume of oil being transported by rail, it actually only makes up less than five percent of total U.S. oil supplies. This oil is not necessary to meet demand for oil in the U.S., yet it presents a far greater threat to public health and safety than the vast conventional majority of the U.S. oil supply.[8]

Shale Oil

Shale oil is extracted using hydrofracking, which poses significant threats to groundwater and water supplies and leads to significant methane pollution. It contains high concentrations of dissolved gases and is very difficult to recover after a spill.[9] When a barge spilled 36,000 gallons of fracked shale oil in the Mississippi in May 2014, the Coast Guard waited 12 hours to begin cleanup operations due to the explosion risk. After this delay, they were only able to clean up 95 gallons.[10]

Bakken crude, a type of shale oil, has become notorious as explosive crude for its involvement in the Lac-Mégantic disaster and other high-profile oil train derailments and fires. However, all shale oil shares its volatile properties. Bakken crude comes from the Bakken Formation that underlies northwestern North Dakota and northeastern Montana in the U.S., and southern Saskatchewan and southwestern Manitoba in Canada.[11] Advances in drilling and fracking technology have turned the Bakken Formation into a major oil producer.[12] Oil from the Bakken Formation has high gas content, high vapor pressure, lower flash point and boiling point.[13] These qualities increase the risk of ignitability and flammability, making Bakken crude highly volatile compared with conventional liquid crude oil.[14]

In 2013, the U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration started Operation Classification[15]

in the Bakken Formation to ensure shippers were properly classifying crude for shipment and to better understand the characteristics of Bakken crude.[16] In a July 2014 update DOT stated,

> "[g]iven Bakken crude oil's volatility, there is an increased risk of a significant incident involving this material due to the significant volume that is transported, the routes and the extremely long distances it is moving by rail."[17]

Bakken crude trains typically have 100 tank cars, containing a total of 3 million gallons of oil and travel thousands of miles from the Bakken to refineries.[18]

In December 2014, the North Dakota Industrial Commission issued standards requiring the "conditioning" of Bakken crude prior to shipping.[19] Conditioning removes volatile elements such as propane and butane, and is intended to make the Bakken crude less volatile; the goal is volatility similar to automobile gasoline.[20] The conditioning standards require crude oil conditioning to below 14.7 psi, but field samples have showed most Bakken crude to be under that threshold to begin with. This rule was implemented, but whether it actually makes Bakken crude any safer to ship on trains has not been proven.[21]

Tar Sands

Tar sands, or bitumen, is fracked or mined in northern Alberta, Canada,[22] though deposits also exist in Colorado, Utah and Wyoming.[23] Bitumen is more toxic, including elevated levels of known carcinogens and heavy metals,[24] than conventional oil. Due to its asphalt-like consistency, bitumen must be mixed with a diluent in order to flow through pipelines and in and out of tank cars. The mixture of bitumen with light petroleum diluents is referred to as dilbit.[25] Before diluent is added, bitumen is considered non-flammable in a derailment event and is rarely considered in safety evaluations of oil trains.[26] The addition of the highly volatile diluents makes the mixture more prone to fires and explosions.[27] An article in Railway Age details a derailment and explosion of a train carrying diluted bitumen in Ontario in February 2015 that exploded and burned for six days. The title said it all: *Why bitumen isn't necessarily safer than Bakken.*[28]

November 2013 a 90-car oil train with Bakken crude derailed and caught fire in rural Aliceville, AL. The spilled oil was not fully cleaned up for months afterward.
Photo: John L. Wathen

Inside the Blast Zone

On July 6, 2013, 47 people were killed when a 74-car oil train carrying Bakken crude derailed and exploded in the small town of Lac-Mégantic, Quebec. More than 30 buildings were consumed in the fire. Major derailments and fires have continued since then, luckily none fatal. However, given that the oil train routes take them through the downtowns of cities and towns, by schools and stadiums, and across waterways and drinking water supplies, the Lac-Mégantic disaster is not the worst-case scenario for an oil train catastrophe.

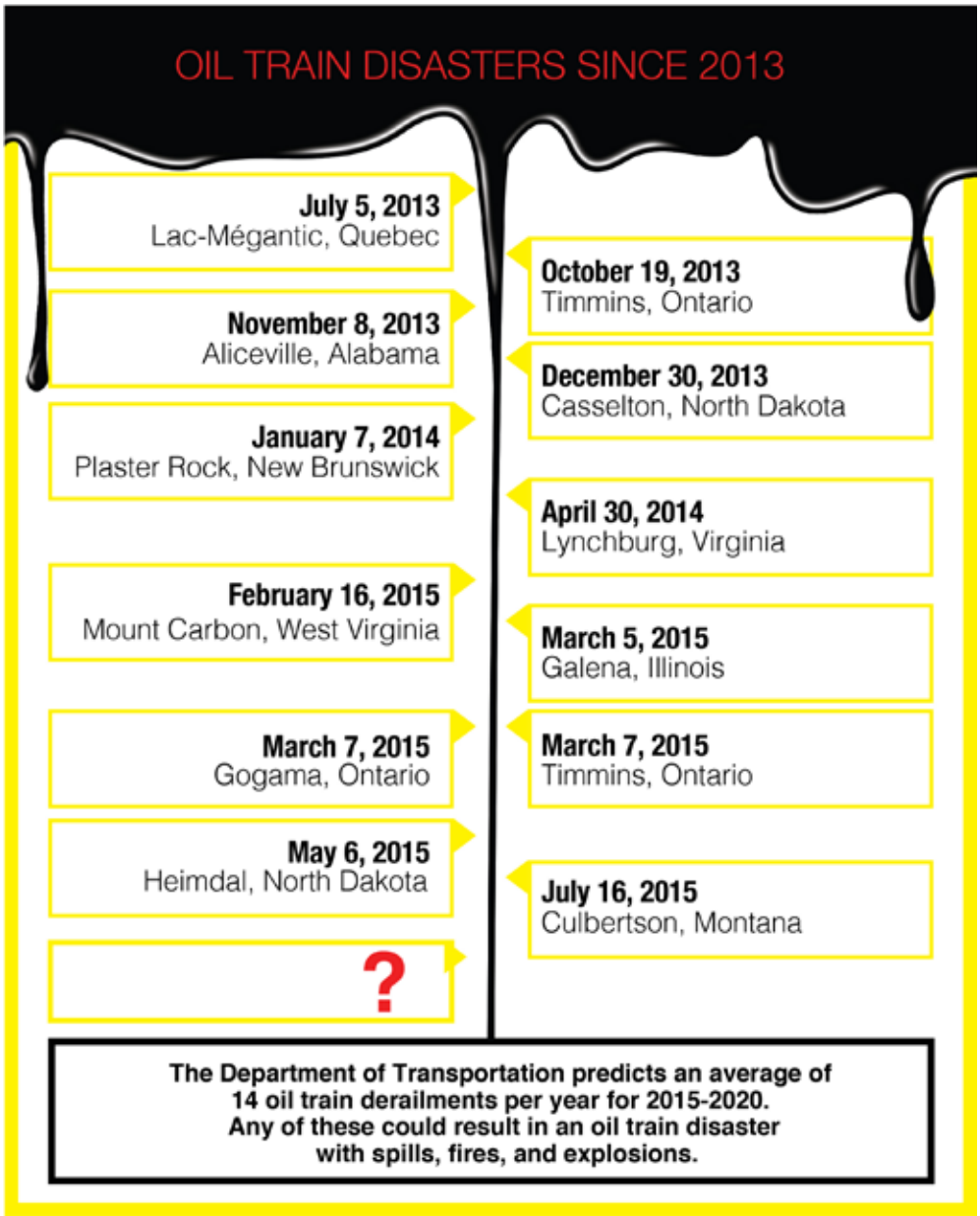
The DOT predicts that around 14 train derailments will occur each year between 2015 and 2020.[29] Each of these derailments will pose a serious risk of oil spills, fires, and explosions, risking lives and potentially poisoning drinking water and the environment. Over the next two decades, the DOT estimates there will be about 207 derailments total, at a cost of approximately $4.5 billion.[30] The costs, both in terms of loss of life and damage, would be far greater if these derailments occur in a densely populated area.[31]

ForestEthics calculated in 2014 that 25 million people reside within one mile of an oil train route.[32] In September 2015 ForestEthics reported that 5.7 million students attend 14,800 U.S. schools in the oil train blast zone.[33]

Just one gallon of oil contaminates approximately one million gallons of water, rendering it toxic to humans, mammals, and aquatic life.[34] Possibly the largest environmental threat of an oil spill is the detriment to the food chain.[35] Even the process of cleaning up oil spills can lead to long-term contamination of water bodies. Biodegradation, which is a process that uses nitrogen and phosphorus to break down the oil in fresh water,[36] can cause long-term contamination.[37]

Oil spills contaminate drinking water sources[38] and release cancer-causing benzene into the air.[39] After the fatal Lac-Mégantic disaster, towns downstream had to use alternate sources of drinking water as the oil spread.[40] In New Jersey, public pressure spurred improvements to an 86-year-old rail bridge that carries oil trains over the Oradell Reservoir, which supplies water for approximately 750,000 people in nearby counties.[41]

When shale oil and tar sands oil spill into any water source they have different effects. Light shale oil floats on the surface of the water while heavy tar sands sink.[42] Sticky tar sands are extremely difficult to dredge from ocean and river bottoms.[43] In the case of the 2010 Kalamazoo river tar sands pipeline spill, despite Enbridge spending more than $1 billion in cleanup and remediation costs, the oil still has not been fully cleaned up.[44]



Oil Train Safety

When an oil train derails, whether or not the derailment will result in an oil spill depends on whether the tank car breaks open, which is impacted by the speed of the train and the type of tank car being used. The likelihood of fire and explosion is increased when there is a high concentration of flammable vapors, and when pressure builds up inside the tank cars. Further, the severity of the impact of the derailment on communities and the environment varies based on the routes that these tank cars take, and the ability of communities to prevent and respond to derailments. Many of the practices currently followed by oil and rail companies increase these threats posed by oil trains.

The May 2015 train derailment in Cherry Valley, IL, spilled about 324,000 gallons of ethanol, about 75 percent of the product carried in the 15 DOT-111 tank cars, from shell breaches, damaged top fittings, or damaged bottom outlet valves. Photo: NTSB

Tank cars. DOT-111 cars, which make up the majority of U.S. and Canadian tank car fleet, have serious flaws that make them highly prone to puncture during a derailment.[45] In fact, DOT-111s can "almost always be expected to puncture in the case of an accident."[46] This means that derailments are more likely to result in an explosion and fire, as the volatile crude oil is released from the tank cars.[47] But recent accidents, including the high profile February 16, 2015, West Virginia derailment and fire prove that the updated CPC-1232 tank cars are no less likely to spill or ignite in a derailment.[48]

Oil tank cars with head shields, which are intended to decrease the chance of the cars breaking open during a derailment. Photo: Puget Soundkeeper

Speed. Higher speeds increase the amount of impact that occurs during a derailment, and therefore increases the likelihood of tank cars puncturing and the oil igniting.[49] The current speed limit for rail cars carrying crude oil is 50 mph, however there is strong evidence that a speed limit of 30 mph would be far more protective.[50] New regulations allow trains to travel at more than twice the rated puncture velocity of tank cars.[51] That means that oil trains carrying three million gallons of explosive crude will continue to travel at 50 mph across North America, except in a small number of "high threat" urban areas where they must go 40 mph.[52] The new speed limits offer little comfort because four of the five explosive accidents in 2015 occurred at speeds below 35 mph.[53]

Braking Systems. Electronically controlled brakes deploy quicker and may prevent tank cars from piling into one another if there is an emergency braking situation.[54] New regulations passed by the DOT will require the tank cars to have an electronically-controlled braking system, which will cut the time and distance needed to stop.[55] A number of major railroad companies are challenging these regulations as being too costly.[56]

Length of Trains. The American Association of Railroads stated that trains that are limited to carrying 4,000 tons have a significantly lower risk of derailment.[57] This would limit oil trains to 30 cars, instead of 100 cars, the amount that most oil trains carry.[58]

Volatility. The volatility of oil determines how readily the oil converts from liquid to highly flammable vapor, so more volatile oils tend to be more likely to ignite. Recent reporting by the American Petroleum Institute confirms that all types of shale oil appear to be as volatile as Bakken crude.[59] The explosive derailments of tar sands oil trains in Canada further support concerns related to volatility for all oil trains, in particular in accidents involving pool fires that continuously heat tank cars. Until volatility is once again taken into account as part of fuel profiles supporting packaging requirements under federal regulation, it will remain a significant concern for oil trains.[60]

Bottom and Pressure Release Valves. Pressure release valves help prevent tank cars from exploding, yet the tank cars currently used for oil often do not have adequate pressure release valves. Oil tank cars built under the DOT 117- standard after October 1, 2015 will have improved bottom release valves and pressure release valves.[61] The National Transportation Safety Board recommends a requirement for tank cars carrying ethanol and crude oil to have high capacity pressure relieve valves.[62]

Routing. Oil trains travel through almost every state in the U.S., and oftentimes pass through major cities and town, by schools, and over waterways. The routes the trains follow do not take into account risks to water and high-population areas, and states and local governments are not legally allowed to prohibit or limit what is transported on rails running through communities.[63]

Lack of Transparency. Information on the routes oil trains use and what type of oil is being transported when is extremely difficult for communities to obtain. It is often difficult for even first responders to be provided with enough information to prepare for and properly respond to a derailment. New regulations have characterized shipments as “security sensitive,” and have exempted rail companies from publicly disclosing details about rail shipments of crude oil and ethanol.[64]

A rail bridge in downtown Pittsburgh that carries oil trains. Photo: Three Rivers Waterkeeper.

Emergency Response. Emergency response is left to municipal fire departments that are not prepared for the derailments, spills, and fires from even a single 30,000 gallon oil train tank car, much less a train made up of dozens of tank cars. Most municipalities, when equipped to respond to oil fires, have sufficient supplies for only a single truck tanker containing 10,000 gallons of crude.[65] In the case of many recent oil train fires and explosions, often all emergency responders can do is evacuate the area and wait for the fire to burn out.[66]

Environmental Justice. As the presence of oil trains becomes all too common in many communities a startling correlation has been found regarding the number of oil trains that pass through communities of economic and racial minorities. Physicians for Social Responsibility have outlined the human health impacts of chronic exposure to oil trains, including mental health risks, impaired cognitive function, increase in development of cardiovascular and pulmonary diseases, and heightened stress hormone levels.[67]

ForestEthics highlighted the disproportionate health and safety threat, and emergency response issues, for vulnerable populations in the July 2015 report *Crude Injustice on the Rails: Race and the Disparate Risk from Oil Trains in California*.[68] The report shows that the highest threat from oil trains in California is aligned with race and income and demonstrates how federal and state laws requiring protections for vulnerable populations are routinely ignored in the permitting and policy-making around oil train routes, infrastructure and safety requirements. Further analysis using race, income, and language variables estimates that, nationwide, 60% of communities within one mile of oil train routes qualify as environmental justice communities.

The 2015 oil train derailment in downtown Lynchburg, VA, caused an enormous fire and spilled crude oil into the James River, primary source for drinking water for the city of Richmond. Photo: James River Association

RAIL BRIDGE OVERSIGHT AND REGULATION

Since the 1980s, there has been an average of two rail accidents per year caused by bridge problems. In the past decade, 24 train accidents were caused by rail misalignments or bridge failures, resulting in 392 injuries. Over this timeframe, railroad traffic has increased significantly, including the transport of hazardous materials such as crude oil and ethanol.[69] Though bridge accidents are rare, DOT records from 1982 to 2008 show 58 train accidents caused by railroad bridge structural failures.[70] The magnitude of the threat of an oil train derailment caused by a failing bridge to surrounding communities, waterways and drinking water means that even if rare, any accident has the potential to be catastrophic.

Under the Rail Safety Improvement Act of 2008, the United States Department of Transportation (DOT) was directed to establish a program that would "prevent accidents, incidents, injuries, and fatalities," caused by rail bridge failures. According to the Federal Railroad Administration (FRA), there are more than 100,000 rail bridges nationwide owned by 600 different entities, however, three-quarters of them are owned by freight railroads and Amtrak.[71]

Under this law, any entity that owns a railroad bridge is required to, at a minimum,

- Develop and maintain an accurate inventory of its railroad bridges (complete with details such as bridge location, length, type, or configuration);
- Ensure that a professional railroad bridge engineer has determined how much weight each of its bridges can safely carry;
- Maintain all available records about bridge designs, and keep a record of all repairs, modifications, and inspections of its railroad bridges; and
- Conduct annual "comprehensive inspections of each bridge," and maintain all records of those inspections (such as inspection date, bridge condition, and type of inspection conducted).

Moreover, by law, a rail bridge engineer must make the final decision as to all loading limits, inspection reports, and safety conclusions, and must be the one to develop all bridge maintenance and repair plans.

What's in a Bridge Management Program? The Railroad's Roles & Responsibilities

In order to implement this law, the DOT was directed to "develop a long-term strategy for improving railroad safety." DOT's 2010 Federal Bridge Safety Standards require that owners of a rail bridge create a "Bridge Management Program" (BMP).[72]

According to the Federal Railroad Administration, in creating their BMPs, railroads had to develop several inspection, monitoring, and recordkeeping procedures that, at a minimum, require:

- Annual inspections of rail bridges by qualified, professional bridge engineers;
- Special inspections of rail bridges if severe weather or other events damaged a bridge;
- Inventories of all bridges, their locations, and safe load capacities;
- Filing systems (electronic or not) where railroads must keep records of bridge designs, inspections, repairs, and modifications;
- Direct supervision of all bridge inspections and repairs by qualified inspectors; and
- Internally-conducted audits of bridge management programs and inspections by the railroads.

These program elements are entirely subject to the discretion of the railroads and bridge owners – each is free to develop BMPs, internal auditing guidelines, and metrics on their own, not subject to any agency approval. The only legal mandate is that the BMP "prevent deterioration of railroad

bridges by preserving their capability to safely carry the traffic." **The extent to which any given BMP achieves this standard is left up to the railroads themselves.**

In November 2012 a bridge near Paulsboro, NJ, collapsed sending four DOT-111 tank cars of vinyl chloride into Mantua Creek. Photo: NOAA

Loopholes and Leeway: Implementation Gaps in FRA Regulations

In implementing the Rail Safety Improvement Act of 2008, the DOT and the FRA released the 2010 Bridge Safety Standards – which required the development of BMPs – and a set of guidelines interpreting these federal rules.[73] Within both the regulations and guidelines are a host gaps and loopholes that weaken the safety intent of the original 2008 law.

Among the many weaknesses of these regulations, the following are perhaps the most egregious:

- In bridge inventories, railroads are not required to note what the bridge crosses over – whether it's a road, river, drinking water reservoir, or ravine;[74]
- There are no specific minimum standards for inspection methods, considerations, or procedures;[75]
- Rail bridge owners are free to determine whether an engineer, inspector, or bridge supervisor is "competent" – **there are no national metrics or federal standards, nor is there any way the FRA can intercede in the event it disagrees with a railroad's choice;**[76]
- Railroads are allowed to make initial load capacity determinations based on nothing more than a bridge's schematics, subject only to the requirement that the bridge seem to be in the same shape as when it was originally built;[77]
- Where bridges have unknown safe loading capacities, the largest railroads have until March, 2016 to determine those limits, and other, smaller railroads have until as late as 2017 – yet those bridges can still be used in the interim;[78]
- While the FRA notes that "the evaluation of a bridge requires the application of engineering principles by a competent person," the regulations do not actually require that a certified "Railroad Bridge Engineer" or "Rail Bridge Inspector" be on site or even present for inspections;[79]
- The regulations – developed **by the FRA** – put a limit on what evidence the FRA can use in enforcement cases: an auditor cannot use records more than two years old, even if the railroad has those records on file;[80]
- While the regulations say that "[b]ridge inspection reports shall be reviewed by railroad bridge supervisors and railroad bridge engineers," the agency interprets this to mean that those individuals do not have to read every report;[81]
- The regulations, in the words of FRA itself, "are silent about the design of a new railroad bridge;" in other words, Bridge Management Programs do not have to have a plan for new bridges;[82] and
- Most of the audits required by regulation are internal – the FRA does not specify who needs to conduct an audit (or even what their qualifications should be).[83]

As a whole, these regulations allow too many loopholes, leave too much deference to the railroads, and provide too few guidelines as to what the FRA determines to be "safe."

Railroads alone are responsible for inspecting, maintaining and repairing their privately owned bridges, as well as deciding what safety and engineering standards their bridges should meet. The Federal Railroad Administration, on the other hand, plays no role in approving or developing actual safety standards. According to the agency's own Fact Sheet on its bridge program, it doesn't even "maintain an inventory of railroad bridges" – instead, in order to even estimate the number of rail bridges in the nation, it must rely upon the Association of American Railroads, the industry trade group.

Before the Rail Safety Improvement Act of 2008, the DOT was not specifically involved in the oversight of rail bridge safety at all. The 2008 law did little to improve the situation. Under the 2008 Act, the DOT was directed to "establish a program to periodically review bridge inspection and maintenance data from railroad carrier bridge inspectors."

In the Bridge Safety Standards regulations issued in 2010, the FRA interpreted this to mean that its role is to audit BMPs and assess them for weaknesses. Such audits include visiting railroad bridges (with the bridge owners' inspection teams) and reviewing inspection reports on file at railroad company headquarters. Over the last four years, FRA press releases disclosed that officials "observed 4,000 bridges" while conducting 800 "field audits."[85] That means that, out of the 100,000 bridges in the US, federal safety officials inspected **fewer than five percent** of U.S. rail bridges over a four-year period.

The agency has dedicated few resources to correct this problem. Senator Charles Schumer (D-NY), called out the FRA's lack of staff in 2014 at a press conference at the base of a rail bridge when he said:

> It's truly alarming that only one person is responsible for auditing 3,000 privately owned rail bridges in New York, on top of being responsible for all of the rail bridges in thirteen other states. It does not take a rail safety expert to know the math doesn't add up.[86]

The FRA has acknowledged this failure; spokesman Kevin Thompson told the press that the agency has very limited oversight authority over the rail bridges, and that "[p]resent funding levels only permit FRA to observe about 2 percent of the nation's railroad bridges."[87]

While federal law directed the FRA to issue regulations, "requiring railroad track owners to adopt and follow specific procedures to protect the safety of their bridges," it did not require that FRA implement a national inspection program. FRA's role is limited to auditing BMPs by evaluating inspection and maintenance practices and identifying potential weaknesses – it conducts no inspections itself.[88] In cases where the agency does uncover rail bridge safety issues, FRA lacks authority to compel bridge owners to make repairs.

Crisis of Confidence

There is a growing list of specific examples of how lack of oversight or bridge inspections has produced a crisis of confidence in the nation's rail bridges.

- In Oregon, half of all railroad bridges would be expected to fail in an earthquake.[89]
- In Minnesota as in other states, inspectors only have the right to inspect bridges that cross roadways, meaning only 330 bridges are inspected by the state, with the remaining 970--many over waterways--never receiving independent inspections.[90]
- According to bridge inspector Kent Madsen as quoted by Minnesota NPR, "The railroad tells us, if we don't feel safe, close the road underneath... That's our only option." MPR's examination of public railroad bridge inspection reports further showed that "...in many cases, local and state inspectors have complained for years about deteriorating railroad bridges without action from the

railroads. In most cases, inspectors could not examine the decks of railroad bridges because railroads refused inspectors access."[91]

- In the Northeastern Corridor, the average age of major bridges is approximately 110 years old. According to the current FRA Administrator, these bridges "have remained in service well beyond their expected useful life and today require extensive maintenance and are major sources of corridor delays."[92]

The Known Unknowns

Inspection reports, when they are conducted, reside with the bridge owner, oftentimes the railroad itself. Electronic and physical copies are not provided to FRA for government oversight, and railroads often refuse to make them available to public inspectors. As a case in point, bridge inspections were denied to the City of Milwaukee for months, and FRA inspectors were told they could review paper copies in person, but could not take pictures or records. Eventually, it took an FRA order backed by a letter from United States Senator Tammy Baldwin to compel Canadian Pacific to release bridge inspection reports to the city.[93]

The bridge safety final rule issued by the DOT comments on accidents from railroad bridges:

> The responsibility for the safety of railroad bridges rests with the owner of the track carried by the bridge, together with any other party to whom that responsibility has been assigned by the track owner. **The severity of a train accident is usually compounded when a bridge is involved, regardless of the cause of the accident.**[94] (emphasis added)

The dramatic rise in oil trains means that many bridges on certain routes are seeing dramatically higher levels of long, heavy trains with high axle weights.[95] High axle weights have a strong negative impact on infrastructure integrity, and are credited with being a leading cause of track breakage. Broken rails are the leading cause of derailments in the U.S. A paper by engineers with the University of Illinois at Urbana-Champaign supported by BNSF Rail found,

> Understanding the factors related to broken rails is an important topic for U.S. freight railroads and is becoming more so because of the increase in their occurrence in recent years. This increase is due to several factors, but the combination of increased traffic and heavier axle loads are probably the most important.[96]

Derailments due to track breakage and buckling also shows the highest cost per derailment category.[97] A recent study by BNSF indicates that two recent oil train accidents were caused by tracks buckling due to heat.[98]

Because of the consequences of an oil train or other hazardous materials rail disaster, aging bridges or those bridges designed for lower numbers of lower axle weight trains that are now seeing substantial increases in oil train traffic should be inspected at a much higher rate of frequency than currently required, with third party inspections preferentially provided by government inspectors.

In sum, the law's requirements for what a bridge management program must include are far from robust, and lack any involvement by federal agencies whatsoever. Federal agencies only review plans intermittently and review actual bridge conditions less so. Transparency is nonexistent in this arena, no matter where a bridge is located or what it crosses (from downtowns to drinking water reservoirs, the public cannot access bridge records), and the agencies have expressed no inclination to open their records. Without top-down changes at the federal level, and a bottom-up recommitment to safety and transparency by the industry, absolutely nothing will change.

PRIVATE BRIDGES, PUBLIC PROBLEM

The recent upswing in oil train traffic unquestionably has a commensurate impact on maintenance needs for rail bridges. A number of recent accidents and close calls point to the very real need for upgraded inspection and safety programs:

A catastrophe was narrowly avoided in Philadelphia when six tank cars derailed on a rail bridge in January 2014

- In January 2014, seven train cars (six of them containing crude oil) derailed and dangled from a bridge over the Schuylkill River in Philadelphia. Faulty bridge maintenance was identified as the probable cause.[99]
- A 2012 railroad bridge collapse and subsequent release of hazardous materials in Paulsboro, NJ was blamed by the NTSB on the lack of a comprehensive safety management program. "Such a program," according to the safety board, "would have identified multiple bridge malfunctions, which had been increasing in frequency, and mitigated the risks associated with the continued operation of the bridge." Hal Hart, the then-vice chairman of the NTSB, concluded that "[i]nadequate bridge inspection procedures – compounded by the lack of a safety management system - were the problem."[100]

A recent derailment of an ethanol unit train from a bridge in South Dakota, and a derailment in Ontario, Canada serve to highlight the connections between bridges and potential impacts on waterways.

- In South Dakota, the small valley into which the ethanol spilled and burned leads directly to the Charles River. According to the Grand Forks Herald and Todd Yeaton of the South Dakota State Railroad Board, a wooden trestle bridge collapsed as part of the crash; in the rail network around town, the majority of bridges are still original, century-old, wooden bridges.[101]
- In Gogama, Ontario, a track repair of a part of a bridge failed; the subsequent derailment and explosion released tens of thousands of gallons of tar sands-derived crude oil into the river beneath the bridge. It is as yet unknown how much crude flowed downstream after burning oil melted the river's surface ice.[102]

Each July groups across North America participate in the Oil Train Week of Action to commemorate the fatal oil train disaster in Lac-Mégantic, Quebec.
Photo: Sûreté du Québec

CALL TO ACTION

Waterkeeper Alliance, Hudson Riverkeeper and ForestEthics are calling on the federal, state and local governments, the oil and train industries, and all bridge owners to take immediate, specific steps to protect citizens, drinking water, waterways, and the environment.

Immediate Action Needed

All oil train traffic must stop on all bridges with deficiencies that threaten safety. We call on the Federal Railroad Administration to exert their authority to ensure that no rail bridge be used for oil trains or other hazardous materials unless it has passed a rigorous and recent third-party safety inspection under the oversight of federal safety authorities.

The rail and oil industry, and all other rail bridge owners, must assume responsibility for the danger created by oil trains and ensure the safety of every bridge carrying oil trains. The rail and oil industry must immediately stop routing oil trains and other hazardous material across bridges with known deficiencies, and ensure the safety of bridges they do opt to use. They should:

- Share existing inspection and repair information with public safety officials and the public;
- Allow rigorous, independent safety inspections of all rail infrastructure carrying oil trains; and
- Repair or replace all deficient infrastructure.

President Obama and Congress must take immediate action to prevent another fatal oil train disaster. We call upon the federal government to exercise its oversight authority here by:

- Implementing strong new rail safety rules and broadening FRA's mission to include responsibility for all rail infrastructure;
- Give citizens and local governments the information they need to protect themselves and the power to say no; make rail bridge oversight more transparent;
- Prepare emergency responders for dealing with bridge-caused derailments, including through the development of a national inventory of rail bridges; and
- Mandate trains reroute around rail bridges until new, transparent, independent inspections occur.

Legislative and Regulatory Changes

Federal rail safety policy fails to address the severe increase in threat from oil trains. Congress must give the FRA the legal and financial tools it requires to run a robust rail bridge safety program. In the present climate of discord and inaction in Congress, however, new safety measures and new oversight programs may have to be implemented by the administration within the existing system – or outside of it at the State and local level.

There are three key targets for railroad bridge program reform that we call upon Congress, the FRA, and States to implement:

Robust Oversight. The FRA has no idea how many rail bridges exist nationwide, has only a handful of employees working on bridges, and has no standards actually guiding its review of rail bridges. More robust oversight is needed – including a publicly available national inventory of bridges, a protocol for following up on citizen complaints and concerns, and an enforceable set of standards to guide agency action and ensure the safety of railroad bridges.

Transparency & Accountability. It is entirely unacceptable that the existing rail bridge program permits self-certification and self-policing by the railroad industry, allows the industry to set its own structural standards of review, and (perhaps most egregiously) gives

railroads the power to decide whether a bridge is even a bridge. The FRA needs to create transparent, accountable internal and external programs for driving bridge safety.

Renewed Investments in Infrastructure. Citizen groups around the nation have reported a significant number of dilapidated, crumbling, and dangerously decrepit rail bridges across the United States. Congress, the FRA, and States should create jobs while protecting the environment by requiring timely inspection, maintenance, repair and replacement of dilapidated bridges.

Beyond these core concerns are specific calls for action:

Nationwide Bridge System Needs

- Immediate third party (or other independent agency) review of rail bridges over waterways and drinking water supplies, especially along routes carrying crude oil or other hazardous materials;
- Citizen, state, and environmental representation on the Railroad Safety Advisory Council;
- A national inventory of rail bridges, similar to programs for other types of infrastructure like the national inventory of dams;
- Federal rail bridge safety standards that include engineering specifications and maintenance schedules, as well as standards for upgrading rail bridge materials and designs over the long term; and
- A permitting system for rail bridges - both new and existing - which requires bridges to have information on ownership (and other relevant information) posted at or near both ends of every bridge.

Congressional Needs

- Congress should exercise its oversight authority to determine exactly what the existing capacity of the FRA's bridge program is, and what is needed beyond that capacity to implement the recommendations of this report;
- At a bare minimum, Congress should:
  - Increase funding for FRA inspections of rail bridges over drinking waters, along crude-by-rail routes, and along other high-risk corridors;
  - Reform the Railroad Safety Improvement Act to implement the reforms discussed above, such as requiring a national, constantly-updated inventory of rail bridges that is publicly accessible, creation of an independent oversight agency, and establishment of a rail bridge permitting system; and
  - Provide for the citizen enforcement opportunities by allowing citizen-suits, requiring that citizen complaints be made public, and by requiring that the FRA respond to public bridge safety concerns quickly and thoroughly.
- Finally, Congress must make it the policy of the federal government that self-policing, self-certification, and self-reporting by the railroad industry is not in the best interests of the nation, public safety, or of the environment.

Federal Railroad Administration and Department of Transportation Needs

- As the federal entities charged with overseeing the safety of rail transportation and infrastructure, the FRA, and its parent agency, the DOT, have the obligation to ensure the safety of every rail bridge in the nation; this should include:
  - Immediately demanding an updated set of inspection reports for every rail bridge in the nation, and prohibiting the use of any rail bridge for which no reports are submitted;
  - Requiring the submission of new rail

bridge inventories from every railroad in the nation that owns or operates over a rail bridge, levying fines against those railroads that fail to submit such inventories;

- Developing actual engineering specifications and use standards for any type of rail bridge permitted to carry trains laden with hazardous material or passengers, such that inspections can gauge a bridge's safety relative to a set of federal minimums;

- Creating a culture of system-wide improvement in rail bridge safety by requiring rebuilt or restored bridges, and any bridge undergoing significant maintenance, to use better designs, and be held to higher safety standards over time;

- Hiring sufficient rail bridge program capacity (whether at the FRA or with independent agencies or state agencies) such that all rail bridges will be inspected, reviewed, and certified as safe – each year.

• Beyond these first-order changes to the FRA agency oversight structure, the agency should:

- Convene a forum focused entirely on bridge safety, to better facilitate innovation, coordination, and transparency;

- Require that railroads prove that rail bridges are safe enough for trains transporting hazardous materials and passengers before use;

- Create heightened safety standards where bridges cross over drinking water supplies or densely populated urban centers;

- Reject – and call for updated documentation for – all current and future certification letters from railroads that are one-line or one-page safety assurances without any elaboration;

• In conjunction with FRA, the DOT should create an office of Rail Bridge Safety– like the Bureau of Safety and Environmental Enforcement within the Department of Interior – that is responsible for updating safety standards and inspection protocols; and

• In conjunction with FRA, the DOT should create an office of Rail Bridge Management – like the Bureau of Ocean Energy Management within the Department of Interior – that is responsible for permitting rail bridges and enforcing the rail bridge safety standards.

Taken together, with increased oversight (whether by the FRA, new agencies, independent auditors, or Congress), increased transparency (including bridge inventories and citizen-suit accountability), new standards (from design and maintenance engineering specifications to enforcement protocols), and infrastructure and agency capacity investments, rail bridges, and the communities, environment, and resources around them, would be safer.

Conclusion:

This report is the first of its kind to document such widespread potential deficiencies with rail bridges around the nation, with nearly half of the rail bridges inspected showing signs of deterioration noticeable with the naked eye. The compounded risk of neglected infrastructure and explosive, hazardous oil train traffic poses an immediate threat to communities and the environment. Decisive, nationwide action is needed, beginning with thorough, independent inspections of all bridges that carry oil trains.

APPENDIX A: A CLOSER LOOK AT RAIL BRIDGES

Summary of observations from citizen rail bridge inspections

Alabama

Black Warrior River
Nelson Brooke, Black Warrior Riverkeeper

Passing through historic Tuscaloosa, as well as downtown Northport and by the Tuscaloosa Amphitheater, is an elevated wooden and steel truss rail bridge built in 1898. After reports in 2014 brought attention to rotten and cracked wooden support poles some of the portions that were severely compromised were patched with makeshift repairs. The bridge still has rotten wooden beams, concrete piers with cracks, and severe rust on main support beams.

Mobile Bay Watershed
Casi Callaway, Mobile Baykeeper

In Mobile County a rail bridge crosses the primary drinking water source for the city of Mobile and surrounding communities, serving over 200,000 people. Rust on the steel supports pose a serious concern, especially considering the impact that a derailment could have.

Rail bridges crossing Chickasaw Creek and Bayou Sara in close proximity to residential areas receive a large amount of rail traffic and show signs of deteriorating, including rusting and slumping.

Coosa River Watershed
Frank Chitwood, Coosa Riverkeeper

A bridge with a deep washed out ravine running along seven rows of wooden support beams crosses the Coosa River in downtown Gadsden. A spill would threaten residents of Gadsden and Lake Neely Henry an important economic resource in area that relies on recreation fishing.

A wooden rail bridge crosses Black Creek and passes by a recreational facility that hosts hundreds of people. This bridge has wooden beams that are cracked, rotten, and detached from the support beams.

California

Lake Merritt Channel
Sejal Choksi, San Francisco Baykeeper

Bridge crossing the Lake Merritt Channel, a tributary of the San Francisco Bay, has cracked concrete pilings with exposed steel rebar. A derailment on this bridge would carry oil directly into the heart of Oakland and the Bay. A petroleum pipeline also runs along this bridge.

Georgia

Altamaha River Watershed
Jenifer Hilburn, Altamaha Riverkeeper

Three tributaries that flow into the Altamaha River have concrete bridges with extensive cracks and chunks missing from the foundations. All three of these bridges are near cities and communities that would be negatively impacted by any spill into these rivers.

A large trestle bridge crossing the Alcovy River has significant undercutting on its foundation and the bolts connecting the trestle to the foundation are warped and loose.

A bridge along the Oconee River is upstream from the City of Dublin water intake and has significant cracking of the foundation.

A bridge crossing the Ocmulgee River and near downtown Macon, Georgia has foundational cracks and pieces missing from its pillars.

Iowa

Mississippi River
Quad Cities Waterkeeper

The Crescent Rail Bridge across the Mississippi River, drinking water supply for 18 million people, shows extensive rusting and cracking. This bridge also has power lines spanning it and is near a public path and historic park.

Idaho

Lake Pend Orielle Watershed
Shannon Williamson, Lake Pend Orielle Waterkeeper

On a rail bridge crossing Trestle Creek a number of concrete supports show signs of deterioration. Trestle Creek, a tributary of Lake Pend Oreille, is best known for its superb bull trout habitat, a threatened species protected by the Endangered Species Act.

A bridge that crosses Sand Creek, a tributary of Lake Pend Oreille and the associated Pend Oreille River, has a foundation that appears slumped and cracked. The Sand Creek Bridge bisects two marinas and is adjacent to the most popular and frequented swim beach on the lake.

Snake River Watershed
F.S. "Buck" Ryan, Snake River Waterkeeper

On the Portneuf River a bridge appears to have a slab missing from its concrete that separated and collapsed. Another bridge in the Snake River Watershed that appears to be undergoing repairs has wood rotting and missing from tracks. This bridge is close to a number of popular public walkways used by residents to enjoy the riverfront.

New Jersey

New York/New Jersey Bay Watershed
Debbie Mans, NY/NJ Baykeeper

On the Passaic River, Point-No-Point Bridge is near an energy facility building and an Amtrak transit line. The swing bridge shows signs of crumbling bricks and cracks at its base. The surrounding area consists of delicate New Jersey Meadowlands, home to hundreds of species of wildlife and connects the densely populated cities of Newark and Kearny, both of which experience environmental justice issues.

New York

Hudson River Watershed
Paul Gallay, Hudson Riverkeeper

A bridge crossing high above Rondout Creek, a tributary of the Hudson River, is located near the mouth of the creek into the Hudson in Kingston and surrounded by residential areas and marinas. It has concrete support structures that are eroded at the base, as well as rusted and corroded steel structural elements.

Crossing the Hudson River north of West Point and west of Cold Spring is a bridge with entire pieces of concrete missing from the foundation and exposed steel that was once encased in concrete. Concrete that has eroded is also no longer supporting all of one or more steel footings resting atop it, which in turn support the rail bed structure. When trains travel over this span there is evidence of repeated vertical displacement, or flexing, of rail bed components.

On another tributary of the Hudson River a bridge spanning the Normans Kill in Albany shows extensive cracking and major deterioration of concrete, including large chunks of missing concrete on the bases of the bridge footings. Cracks and missing concrete is also observable on structures supporting the rail bed. A derailment on this bridge could threaten Port of Albany commerce.

Oregon

Columbia River Watershed
Brett VandenHeuvel, Columbia Riverkeeper

On the Klickitat River, a tributary of the Columbia River, there is a concrete bridge built in 1908. Despite signs of attempts to patch up deterioration, there is a long wave-like crack running along the top of the bridge and crumbling concrete on the underside exposes rebar. An accident on this bridge would not only impact the Columbia River but also the town of Lyle, Washington.

Pennsylvania

Allegheny River
Rob Walters, Three Rivers Waterkeeper

Located at mile marker 1 on the Allegheny River, the Fort Wayne Railroad Bridge, built around 1904, connects the Northshore of the city to the heart of downtown Pittsburgh. There is crumbling and cracked concrete with exposed rebar on each of the piers that affix the bridge to the riverbed. The main steel support has extensive rust, pitting, and holes throughout the underside of the bridge. If a train carrying crude oil derailed on this bridge the resulting explosion would have a catastrophic impact on the environment and the 130,000 people who live and work within the half mile evacuation zone of the Fort Wayne Railroad Bridge.

Youghiogheny River Watershed
Krissy Kasserman, Youghiogheny Riverkeeper

A rail bridge crossing a street in a residential neighborhood in the Youghiogheny watershed has crumbling concrete exposing the steel frame and loose or missing bolts. Most of the population of the town of Garrett, PA, would be in the evacuation zone in the case of an oil train derailment.

Located near a very popular recreation area and downtown Confluence, PA, is a rail bridge crossing Laurel Hill Creek. The main support on this bridge has crumbling concrete, exposing steel rebar.

A bridge crossing the Youghiogheny River was the site of a train derailment in 2014, where 10 rail cars, including one carrying light petroleum, derailed, causing three cars to be suspended above the water. This bridge has a bent steel beam, but it is unclear if this beam is the result of the derailment.

Adjacent to both a wastewater treatment plant and near a neighborhood and public park is a rail bridge crossing Mount's Creek. The foundation of this rail bridge appears to be deteriorated, and the concrete is cracked and crumbling.

Virginia

James River Watershed
Pat Calvert, Upper James Riverkeeper

A narrow rail bridge located immediately upstream of the Richmond City drinking water intake facility that provides water to approximately half a million people has significant cracking and steel braces on the foundation that appear to be a makeshift repair.

On Rockfish Run, a nearly 200 year-old culvert converted to a rail bridge has a wooden structure intended to contain loose rocks that make up part of the foundation. Four to six unit trains cross these bridges weekly. Timbers are bulging and coming apart, releasing the rocks.

The Bremo Creek culvert is a historical stone structure located immediately upstream of the James River confluence. Cracking in concrete is visible, and a large section of stones have fallen from the structure and is visible in the creek bed.

Washington

North Sound Bay Watershed
Wendy Steffensen, North Sound Baykeeper

A century old pivoting rail bridge crosses the northern end of the Swinomish Channel, which flows into the one river in the lower 48 where all wild-salmon species still survive. This area is part of the Swinomish tribe's historic fishing grounds, a derailment and oil spill would threaten the Swinomish way of life.

A bridge crossing the Skagit River has sunken, cracked, and eroded piers and significant rust on beams. This bridge is upstream from a water treatment plant that serves about 56,000. A derailment here could threaten the structural stability of levees, causing flooding in nearby cities.

Puget Sound Watershed
Chris Wilke, Puget Soundkeeper

The Steamboat Slough rail bridge in Everett, WA, exhibits cracking and erosion of the concrete footing. Steamboat Slough drains into Puget Sound and is a popular salmon fishing area.

The Ebey Slough rail bridge, in Marysville, WA, is adjacent to the Tulalip Reservation, a city park and about 355 feet from Interstate 5, the main North/South highway on the West Coast. Two of the three concrete footings appear to have been undermined by tidal currents. All three footings exhibit cracks in the concrete and considerable erosion or rotting of the footings. Ebey Slough drains into Puget Sound and is a popular salmon fishing area.

Spokane River
Jerry White, Spokane Riverkeeper

A rail bridge crossing the Spokane River near East Indiana street shows significant cracks in the bridge pilings from settling and erosion under the high water line underneath bridge footings. A derailment on this train would threaten critical native trout habitat and potentially contaminate the Spokane Valley Rathdrum Prairie Aquifer, a main source of drinking water for the region.

Two other bridge crossings over busy roadways in the urban core of Spokane, Monroe and Wall Streets, had extensive cracking and were missing concrete in some areas.

APPENDIX B: OVERVIEW OF INSPECTION REPORTS

This chart documents all of the inspections that found evidence of deficiencies.

			Deficiencies			
State	**Waterkeeper**	**Waterbody**	**Cracks in Foundation**	**Pieces missing from the foundation**	**Deterioration or rotting**	**Other Issues**
AL	Black Warrior Riverkeeper	Black Warrior River	Northport hillside above the river: cracks in two concrete foundation blocks	Damage and rotten wooden truss poles repaired with corrugated HDPE or steel & concrete patches	Concrete pier undermined underneath the water, wooden support pole rotten, bolt & nut in foundation plate severely pitted and rusted, riverbank erosion possibly undermining stone pier and wooden support beams.	Rust compromising main steel support beams at their connection with steel footers atop concrete foundation, steel beam connector plates rusted through, loose connection between wooden support pole and beam
AL	Coosa Riverkeeper	Little Wills Creek				Deterioration of rails. Wavy rails
AL	Coosa Riverkeeper	Coosa River				Broken supports and beams
AL	Coosa Riverkeeper	Line Creek, Coosa River near Gadsden		Makeshift repairs on pillars		Crossties in poor condition, wavy rails
AL	Coosa Riverkeeper	Coosa River on Upper Lay Lake	Cracks in foundation			
AL	Mobile Baykeeper	Big Creek Lake			Yes minor rusting will certainly become an issue in the future	
AL	Mobile Baykeeper	Bayou Sara	Minor damage in support beam -- Bolt slipping inside split in beam	Bolts loose, none missing	Significant rusting	Cross beams cracked, one side rail broken, tracks slightly wavy
AL	Mobile Baykeeper	Bayou Sara		Some bolts and nuts that fastened bridge rails to cross beams appeared to be missing	Significant rusting, large pieces starting to flake off	
AL	Mobile Baykeeper	Chickasaw Creek	Crack in SW corner ~12"X12", some repairs, hole likely from repeated boat wake and associated wave action		Slight slumping of structure near SW shore	Two sections of rail missing
AL	Coosa Riverkeeper	Black Creek	Yes	Notable bow in wooden bulkhead on the east side of bridge	Notable gap where the bridge rests on the pilings on the east side of the bridge	
CA	San Francisco Baykeeper	Arroyo del Hambre				Loose bolts
CA	San Francisco Baykeeper	Lake Merritt Channel	Concrete pilings cracked		Cracked and rotting concrete with rebar rust showing	
CA	San Francisco Baykeeper	Arroyo Viejo	Concrete is cracked the entire length of the bridge			
CA	San Francisco Baykeeper	Rodeo Creek				Significant dip in rail at crossing
CA	San Francisco Baykeeper	unknown				Significant dip caused by erosion and subsidence of fill which, in turn, is pulling out the rail spikes
GA	Altamaha Riverkeeper	Ocmulgee	Yes	Pieces missing from pillars. One pillar wrapped in sheet metal band.	Cracks and wear on each of the foundation pillars	
GA	Altamaha Riverkeeper	Oconee River	Yes	Concrete undercut by river. Concrete missing on bottom and top of foundation	Concrete is deteriorating along the edges, along the cracks, sometimes with pieces of concrete falling out/off	General deterioration of foundation/concrete beams
GA	Altamaha Riverkeeper	Alcovy River	Yes	Yes. Pieces broken off foundation in multiple location	Foundation undercut	Loose bolts securing the exposed steel beams to the foundation
IA	Quad Cities	Mississippi	Significant deteriation and cracked concrete	Yes - extensive	Yes	
ID	Lake Pend Oreille Waterkeeper	Trestle Creek		Deteriorated main support	Deteriorated supports	
ID	Lake Pend Oreille Waterkeeper	Pack River/Lake Pend Oreille			Minor flaking of exterior cement	
ID	Lake Pend Oreille Waterkeeper	Pend Oreille River	Cracks in foundation pilings			
ID	Lake Pend Oreille Waterkeeper	Sand Creek	Minor cracks in both supports	Minor damage to the foundation of the south support at the water line	Yes, where the bridge meets the ballast (foundation on the shoreline). Foundation appears structurally compromised -- cracked and slumping	
ID	Lake Pend Oreille Waterkeeper	Cocolalla Slough				The beams/concrete blocks where the bridge meets the grade slumping
ID	Lake Pend Oreille Waterkeeper	Clark Fork River				
ID	Snake River Waterkeeper	Powder River	Overpass under construction	Yes - large pieces removed for construction/repair		
ID	Snake River Waterkeeper	Grande Ronde River	Upper side concrete split	Yes		Large number of spikes missing from overlying track
ID	Snake River Waterkeeper	Five Points Creek	Cracks in abutment	Yes - abutments	Significant rust and corrosion.	
ID	Snake River Waterkeeper	Snake River				
ID	Snake River Waterkeeper	Boise River			Widespread rust and rotting worthy of note but consistent with age	

			Deficiencies			
State	**Waterkeeper**	**Waterbody**	**Cracks in Foundation**	**Pieces missing from the foundation**	**Deterioration or rotting**	**Other Issues**
ID	Snake River Waterkeeper	Payette River	Cracked abutment pillar, area under main foundation crossbar, possible recent repairs		Heavy rust and corrosion	
ID	Snake River Waterkeeper	Weiserr River	Yes			
ID	Snake River Waterkeeper	Malad River		Base and sides of main supports		
ID	Snake River Waterkeeper	Snake River	2 long cracks in the main side support	Small chunks missing from connecting section of main side supports	Concrete flaking and chipping off	
ID	Snake River Waterkeeper	Grande Ronde River	Extensive fissures in side foundation	Side and center main concrete supports		
ID	Snake River Waterkeeper	Snake River	Cracks in main side concrete foundation support	Yes - round hole in photo as well as chinks in main foundation support.		
ID	Snake River Waterkeeper	Diversion Canal off Snake River		No	Yes	
ID	Snake River Waterkeeper	Snake River		No	Yes	
ID	Snake River Waterkeeper	Portneuf River	Yes	No	Yes	Side support appears misaligned or loose, wood is substantially rotten
ID	Snake River Waterkeeper	Portneuf River	Yes	Yes - large slab gone from side foundation. Appears to have separated and collapsed.	Yes	
ID	Snake River Waterkeeper	Hams Fork of Green River	Yes	Yes - large chunk of side foundation corner missing.	Yes	
ID	Snake River Waterkeeper	Bear River	Yes, small but on main bridge supports	No	Yes	Makeshift repairs, exposed spikes on tracks
ID	Snake River Waterkeeper	Weber River		No	Rotten and missing wood on tracks	Logs piled up on upstream main supports sunk in river
NJ	NY/NJ Baykeeper	Rahway River	Cracks in the concrete foundation			Area subject to flooding during high tide and storm surge, debris was seen under the bridge
NJ	NY/NJ Baykeeper	Passaic River	Repairs to foundation			Area would be difficult to access if a derailment or spill were to occur
NJ	NY/NJ Baykeeper	Passaic River	Crumbling bricks and cracks on one end of the bridge		Yes - old bricks on one end of the bridge's foundation	
NY	Hudson Riverkeeper	Rondout Creek, trib of Hudson	Cracks in the outer concrete foundation	Major undermining of concrete support structures	Deterioration of concrete below the high water mark	Numerous broken, corroded or cut steel structural members and hardware, including rusted bolt heads, missing bolts and completely corroded metal
NY	Hudson Riverkeeper	Hudson River	Yes	Large portions of concrete missing	Deteriorated concrete throughout the foundation	
NY	Hudson Riverkeeper	Hudson River	Numerous horizontal and vertical cracks, missing concrete and undermined material beneath the steel footing.	Numerous pieces of foundation material missing	Yes	Missing bolts and loose nuts
NY	Hudson Riverkeeper	Great Chazy River, trib of Lake Champlain	Yes	Erosion of concrete supporting steel footing	Eroded concrete support	
NY	Hudson Riverkeeper	Norman's Kill, trib of Hudson	Extensive cracks in concrete support foundations and in concrete structure supporting rail bed above	Huge chunks of concrete missing below the high water mark on concrete foundations	Yes	
OR	Columbia Riverkeeper	Drano Lake and the Little White Salmon River	Cracks in abutments		Concrete erosion around the waterline of the abutment	Cracks in the concrete
OR	Columbia Riverkeeper	White Salmon River	Large crack on the east side abutment. Visibily repaired truss with new weld and metal. Crumbling on west side piller where it meets the pier.		Bottom of pillar cracked and crumbling, pieces missing	
OR	Columbia Riverkeeper	Klickitat River	Long wave-like crack under the tracks. Crumbling cement with exposed rebar on the underside of both east and west side of bridge. Multiple cement patch repairs visible.			Bridge built in 1908
OR	Columbia Riverkeeper	Columbia Shores Blvd	Cracks in concrete supports		Some deteriorating of concrete foundation	
OR	Columbia Riverkeeper	Beacon Rock Moorage Rd			Foundation on the east side of the overpass is crumbling in places	Retaining wall on the northwest side is separating and and beginning to lean away from the bridge
OR	Willamette Riverkeeper	Willamette River	Yes			
PA	Three Rivers Waterkeeper	Monongahela River	Cracks in the sandstone piers -- metal bracket around the piers may be repairs or enhancement	Chunks missing but there have been repairs, but they look to be failing	Yes	Railroad ties scattered all over the bridge walkways, makeshift additions and repairs

			Deficiencies			
State	**Waterkeeper**	**Waterbody**	**Cracks in Foundation**	**Pieces missing from the foundation**	**Deterioration or rotting**	**Other Issues**
PA	Three Rivers Waterkeeper	Monongahela River	Failing concrete and sandstone all around the piers. Repairs include: steel brackets, concrete walls and concrete caps			
PA	Three Rivers Waterkeeper	Allegheny River	Cracks in concrete foundation, crumbling exposed rebar	Large chunks of concrete missing around the foundation	Steel beams have rust and holes	
PA	Youghiogheny Riverkeeper	n/a- runs over Walker Street in Garrett Borough	Crumbling concrete and steel foundation	Missing nuts on bolts on the steel portions of supports	Crumbling concrete on the underside of the bridge exposing the steel mesh & other portions of the steel structure	
PA	Youghiogheny Riverkeeper	Buffalo Creek	Cracking and separation of the cut stone foundation and supports		Yes	
PA	Youghiogheny Riverkeeper	Swamp Creek	Cracks in the concrete structure		Yes	
PA	Youghiogheny Riverkeeper	Laurel Hill Creek			Yes	
PA	Youghiogheny Riverkeeper	Youghiogheny River			Yes	Bowing/buckling damage to one of the steel supports on the bridge
PA	Youghiogheny Riverkeeper	Youghiogheny River	Cracking around the base	Very small chunk missing from one pillar	Yes	
PA	Youghiogheny Riverkeeper	Hickman Run		The main component of this bridge appears to be cut sandstone, several places on the bridge where the concrete was crumbling or chunks had fallen off		
PA	Youghiogheny Riverkeeper	Mount's Creek	Damage to foundation damage -- may be more below the water line	Concrete on the bridge is clearly beginning to deteriorate	Yes	
TN	Tennessee Riverkeeper	Nicojack Lake				Crossties in poor condition, gravel washing out from underneath
TN	Tennessee Riverkeeper	Running Water Creek	Yes	Yes	Yes	A ravine is forming at the base of one large pillar, exposing the once buried foundation
VA	James Riverkeeper	James River	Cracks in concrete berm.			
VA	James Riverkeeper	Rockfish Creek (near the confluence with James River)	Yes	Broken masonry visible in creek -- historic stone culvert nearly completely collapsed. Wood rail ties used to contain gravel in the collapsed bank are bulging/protruding severely	Yes	
VA	James Riverkeeper	Bremo Creek (immediately upstream of the confluence with James River)	Yes	The south end of the bridge shows significant cracking & decay. This is a historic canal aqueduct dating from the 1800's	Several blocks from the left side have collapsed and fallen into the creek	
VA	James Riverkeeper	James River	Yes	Some repairs but evidence of cracked concrete visible	Not noticeable. Repairs had been made to the worst spots	not sure. the entire structure is exposed to the elements.
VA	James Riverkeeper	Little Creek		Missing pieces from ceiling of culvert		
WA	North Sound Baykeeper	Chuckanut Bay				Creosote timbers remain under the replaced bridge.
WA	North Sound Baykeeper	Dakota Creek	Cracks on southernmost concrete platform, some repairs			
WA	North Sound Baykeeper	Nooksack River	Cracks on the southern pier pad -- central pier pad appears to have been made to pivot, and is very rusty			Build up of large logs against one of the pilings
WA	North Sound Baykeeper	Padden Estuary Lagoon	Crumbling and erosion at N end of bridge span		Cracks on wood cross supports, some rot observed	
WA	North Sound Baykeeper	Skagit River	Pier pads have multiple small cracks -- One pad has a section that has eroded away and broken steel cable exposed	Eroded section. One pier has sunken down into earth and has been shimmed up with a new steel structure	Cracked concrete shim	
WA	North Sound Baykeeper	Swinomish Channel	Crack in one pier pad. West side has wooden pilings and wood cross beams, all wood is exposed.			
WA	North Sound Baykeeper	Stillaguamish River	Cracks in pier pads. Loose bolts on both sides of connector from concrete span to steel span	Northernmost pier pad has evidence of crumbling		
WA	North Sound Baykeeper	South Slough Stillaguamish River	Many small cracks in pier pad			Clips appear to be out of place as seen from below bridge
WA	North Sound Baykeeper	Oyster Creek	Deep flaking rust on lateral braces, in places where salt water may innundate		Very old creosote pilings were left in place under the bridge when it was replaced with a concrete span	
WA	North Sound Baykeeper	Indian Slough				Old creosote pilings remain under the bridge - they were not replaced when new concrete span was installed in 2014

			Deficiencies			
State	Waterkeeper	Waterbody	Cracks in Foundation	Pieces missing from the foundation	Deterioration or rotting	Other Issues
WA	North Sound Baykeeper	Big Indian Slough		Creosote foundation is in process of being replaced with steel. Large concrete parts for replacement are nearby. Some of the support plates appear to have vibrated loose. Rails are being replaced, some appear to be short, some cracks in cross supports	Old creosote supports remain in place under the structure	
WA	North Sound Baykeeper	Big Indian Slough #3			Rusty metal brackets, new concrete spans replaced old structure in 2003	Old creosote pilings remain under the replaced bridge
WA	North Sound Baykeeper	Samish Tributary (unnamed)				Lots of old creosote timbers remain under the bridge
WA	North Sound Baykeeper	Samish River	Steel bridge dated 1920 -- corrosion at either end			
WA	North Sound Baykeeper	Bayside Cove			Rot observed in two cross beams, rotten support beam under water	
WA	North Sound Baykeeper	Samish River headwaters				The tracks appear wavy and uneven
WA	North Sound Baykeeper	Samish River headwaters #2	Wavy looking tracks, not level			The tracks appear to be wavy
WA	North Sound Baykeeper	S Fork Nooksack River N of Acme	Cracks in foundation pier			
WA	North Sound Baykeeper	Big Indian Slough #2	Cracked cross supports -- Loose bolts		Bridge is being repaired: Some rot evident, loose metal bracket, missing bolts on metal strap	
WA	Puget Soundkeeper	Ballard/Puget Sound	Yes Concrete footings 3, 6.5,7	Yes. Over Seaview Ave NW, over Metal Support 5,Concrete Footings 3, 6.5, 7, 8 and South side of bridge	Yes - concrete footings 5.5, 6 and 8	Exposed rusted rebar on bottom of bridge. Concrete footing 6.5 rust track from crack.
WA	Puget Soundkeeper	Green River	No	No	Yes - metal attachments to west side of north footing	Bent bolt attaching bridge to concrete footing. Observed rusted cross beam under bridge.
WA	Puget Soundkeeper	Puyallup River	Yes. Cracks in North and South retaining walls	No	Center concrete footing in middle of Puyallup River is rotting on upriver (east), north and south sides of the footing	No
WA	Puget Soundkeeper	Chambers Creek/Puget Sound	Yes on North and South footings	No	Yes on North and South concrete footings	Loose bolts concrete footing, shore erosion near track
WA	Puget Soundkeeper	Nisqually River	Yes on North footing	Yes South Concrete Footing	Yes North footing and 1st South Footing	No
WA	Puget Soundkeeper	Steamboat Slough	Yes. Concrete footings number 1 and 6 South to North	Yes, Concrete footing number 6	Yes Concrete footings number 1-6	No
WA	Puget Soundkeeper	Ebey Slough	Yes on North and South footings	Yes on North and South concrete footings	Yes on North, Central and South concrete footings	South footing built on wood boards. South and North footings show signs of erosion under the footing
WA	Spokane Riverkeeper	Spokane River	Multiple cracks in footings and foundations	Timbers below the water line have washed away exposing the loose, unconsolidated rock beneath the pilings, some of which has washed away	Timbers missing, voids in cribwork once filled with stones and gravel	Bridge pilings cracked, signs of deterioration
WA	Spokane Riverkeeper	Busy downtown roadway	Cracks in the columns and the foundation of the bridge	Two areas of this bridge had chunks of concrete missing from the columns supporting it. Rebar was visible in the place of these missing pieces	Deterioration of columns	
WA	Spokane Riverkeeper	Busy downtown roadway	Cracks in columns	Concrete pieces missing from the columns and foundation	Foundation and columns deteriorating, multiple areas with missing concrete and rebar exposed	
WA	Spokane Riverkeeper	Busy downtown roadway	Cracks in foundation and columns, exposed rebar	Columns and underside of the bridge are missing substantial pieces of concrete	Deterioration on columns and underside of the bridge, exposed rebar	
WA	Spokane Riverkeeper	Busy downtown roadway	Cracks in columns	Chunks of concrete missing from columns, arches and foundation	Foundation cracked	
WA	Spokane Riverkeeper	Busy downtown roadway	Cracks in foundation	Bridge foundation missing pieces	Deterioration on the bridge	
WA	Spokane Riverkeeper	Busy downtown roadway	Cracks in foundation	Pieces missing from foundation, exposed rebar at the base of a column		
WA	Spokane Riverkeeper	Busy downtown roadway		Concrete missing from foundation and columns	Loose and missing concrete	
WA	Spokane Riverkeeper	Busy downtown roadway		Concrete missing from foundation and columns	Loose and missing concrete	
WA	Spokane Riverkeeper	Busy urban roadway	Cracks in foundation and columns	Concrete were missing from the foundation	Loose and missing concrete	
WA	Spokane Riverkeeper	Busy downtown roadway	Cracks in foundation of the bridge	Throughout the bridge large sections of concrete were missing -- underside, columns, and arches exhibited areas with missing pieces	Yes	

ENDNOTES

1 *More oil spilled from trains in 2013 than in previous 4 decades, federal data show,* McClatchy (January 20, 2014) *available at:* http://tinyurl.com/nt7a3b6 (www.mcclatchydc.com, last accessed Nov, 2015).

2 *Government Predicts 10 Oil-hauling Train Derailments a Year, $4 Billion in Damages*, Nola (Feb. 23, 2015 3:21 PM), *available at* http://www.nola.com/environment/index.ssf/2015/02/fuel-hauling_trains_could_dera.html. om/environment/index.ssf/2015/02/fuel-hauling_trains_could_dera.html.

3 *A Timeline of Recent Oil Train Crashes in the US and Canada*, StarTribune (Jul. 17, 2015 2:10 PM), *available at* http://www.startribune.com/a-timeline-recent-oil-train-crashes-in-the-us-and-canada/316217351/.

4 Audit Announcement-Federal Railroad Administration's Oversight of Railroad Bridge Safety Memorandum, Office of Inspector General (Feb. 24, 2015), available at https://www.oig.dot.gov/sites/default/files/FRA%20Bridge%20Safety%20Announcement%2002-24-15%20withMetadataPasseed_0.pdf.

5 *U.S. Rail Crude Oil Traffic*, Association of American Railroads, *available at* https://goo.gl/PzZCPE (aar.org, last accessed November 1, 2015). See also, AAR Reports Traffic for February 2015, Association of American Railroads (March, 2015), *available at* https://goo.gl/xYhYSw (aar.org, last accessed November 1, 2015).

6 *Railroads Moving More Crude Oil*, Association of American Railroads, *available at* https://goo.gl/zUkmA4 (aar.org, last accessed November 1, 2015).

7 *25 Million Live in Oil Train Blast Zone*, ForestEthics (July 7, 2014), *available at* http://goo.gl/tSSxkv (forestethics.org, last accessed November 1, 2015).

8 Gail Tverberg, *Why is US Oil Consumption Lower? Better Gasoline Mileage?*, Our Finite World (January 31, 2013), *available at* http://goo.gl/mbR7Rd (ourfiniteworld.com, last accessed November 1, 2015).

9 Lynn Cook, *Bakken Crude Is Highly Volatile, Oil Study Shows*, Wall Street Journal (May 14, 2014), *available at* http://goo.gl/qZ8A7u (wsj.com, last accessed November 1, 2015).

10 *See* Bakken Crude Oil Spill – Barge Case Study, http://goo.gl/QMwxDu (nrt.org, last accessed November 1, 2015).

11 *Bakken Formation*, Geology News, http://goo.gl/CwVWI9 (geology.com, last accessed November 1, 2015).

12 *Id.*

13 *Operation Safe Delivery Update*, Pipeline and Hazardous Materials Safety Administration, at 16 (July 23, 2014), *available at* http://goo.gl/aUdfGf (DOT.gov, last accessed November 1, 2015).

14 *Id.*, at 1.

15 *Id.*, *see also*, Pipeline and Hazardous Materials Safety Administration: Operation Classification Overview, *available at* http://goo.gl/k0RoJz (DOT.gov, last accessed November 1, 2015).

16 *Operation Safe Delivery Update*, *supra*, n.14.

17 *Id.*, at 1.

18 *Id.*, at 16.

19 *Industrial Commission of the State of North Dakota: Order of the Commission*, Order No. 25417 (December 9, 2014), *available at* https://goo.gl/LqEKN3 (ND.gov, last accessed November 1, 2015).

20 Ernest Scheyder, *North Dakota Proposes Rules to make its oil less volatile*, Reuters (November 13, 2014), *available at* http://goo.gl/Dacnwk (reuters.com, last accessed November 1, 2015).

21 Amy Dalrymple, *New Conditioning Rules for Bakken Crude Aims to Make Transportation Safer, Critics Say it Won't,* Grand Forks Herald (March 31, 2015), *available at* http://goo.gl/ERQW8n (grandforkherald.com, last accessed November 1, 2015).

22 Wendy Lyons, *Crude Oil Basics*, About.com: Energy, *available at* http://goo.gl/cAouO7 (about.com, last accessed November 1, 2015).

23 Oil Shale and Tar Sands PEIS Maps, Oil Shale and Tar Sans Programmatic EIS Information Center, *available at* http://goo.gl/L4ClxY (anl.gov, last Accessed November 1, 2015).

24 Diane Bailey & Danielle Droitsch, *Tar Sands Crude Oil: Health Effects of a Dirty and Destructive Fuel*, NRDC (February 26, 2014), *available at* http://goo.gl/00oYYS (nrdc.org, last accessed November 1, 2015).

25 *Diluted Bitumen in Pipelines*, Canadian Energy Pipeline Association, *available at* http://goo.gl/Hn3jsl (cepa.com, last accessed November 1, 2015).

26 David Thomas, *Why bitumen isn't necessarily safer than Bakken*, Railway Age (February 23, 2015), *available at* http://goo.gl/zv38V5 (railwayage.com, last accessed November 1, 2015).

27 *Id.*

28 *Id.*

29 *Draft Regulatory Impact Analysis*, DOT, Pipeline and Hazardous Materials Safety Administration, at 24 (July 2014), *available at* http://goo.gl/sGLznY (source: US DOT, nola.com, last accessed November 1, 2015).

30 *Id.*, at 24, 193.

31 *Id.*, at 193.

32 *25 Million Live in Oil Train Blast Zone*, ForestEthics (July 7, 2014), *available at* http://goo.gl/tSSxkv (forestethics.org, last accessed November 1, 2015).

33 Eddie Scher, *14,800 Schools, 5.7 Million Students in the Oil Train Blast Zone,* ForestEthics (September 8, 2015), *available at* http://goo.gl/7D7Mf7 (forestethics.org, last accessed November 1, 2015).

[34] *Why is it important to protect drinking water?,* Louisiana Department of Environmental Quality, *available at* http://goo.gl/Jq7rUD (Louisiana.gov, last accessed November 1, 2015).
[35] *Oil Spills Prevention and Preparedness Regulations*, U.S. Environmental Protection Agency, *available at* http://goo.gl/iSkp1O (epa.gov, last accessed November 1, 2015).
[36] *Id.*
[37] *Id.*
[38] *Id.*
[39] Sarah Lambert, *Oil Spill Area Evacuation Due to Air Quality*, Battle Creek Enquirer (July 30, 2010), *available at* http://goo.gl/QnIE9A (battlecreekenquirer.com, last accessed November 1, 2015).
[40] *Leaking oil from Lac-Mégantic Disaster affects nearby Towns*, CBC News (July 7, 2013), *available at* http://goo.gl/iZVII8 (cbc.ca, last visited November 1, 2015).
[41] Scott Fallon, *More work needed to shore up Oradell Reservoir bridge used by oil trains*, Bergen Record (June 3, 2015), *available at* http://goo.gl/4DXwxQ (northjersey.com, last accessed November 1, 2015).
[42] Anthony Swift, Joshua Axelrod & Danielle Droitsch, *West Coast Tar Sands Invasion*, NRDC, at 2 (April 2015), *available at* http://goo.gl/XJZBRN (nrdc.org, last accessed November 1, 2015).
[43] *Id.*, at 12.
[44] Lindsey Smith, *3 Years and Nearly $1 Billion Later, Cleanup of Kalamazoo River Oil Spill Continues*, Michigan Radio (July 25, 2013), *available at* http://goo.gl/2YXOxA (michiganradio.com, last accessed November 1, 2015).
[45] Michael W. Robbins, *Why do These Train Cars Carrying Oil Keep Blowing Up?*, Mother Jones (May 27, 2014), *available at* http://goo.gl/9wrBQ2 (motherjones.com, last accessed November 1, 2015)
[46] 79 F.R., at 45026. *See also*, National Transportation Safety Board, Cherry Valley, Illinois Derailment Report (February 14, 2012), *available at* http://goo.gl/EojfZa (NTSB.gov, last accessed November 1, 2015).
[47] 79 F.R., at 45059.
[48] Edward McAllister, *Derailed CSX Train in West Virginia Hauled Newer-Model Tank Cars*, Reuters (February 17, 2015), *available at* http://goo.gl/96IFzM (reuters.com, last accessed November 1, 2015).
[49] Steve Horn, *Rail CEOs to Investors: "Bomb Trains" Safe at Almost Any Speed*, The Huffington Post/DeSmogBlog (August 13, 2014), *available at* http://goo.gl/UcwqLy (huffingtonpost.com, last accessed November 1, 2015).
[50] *Id.*
[51] Todd Paglia, *Oil Trains Too Fast, New Safety Rules Too Slow*, ForestEthics (May 1, 2015), *available at* http://goo.gl/7P7VSM (forestethics.org, last accessed November 1, 2015).
[52] *Id.*
[53] *Id.*
[54] Richard Wronski, *Feds Unveil Rules for safer railroad tank cars, better braking system*, Chicago Tribune (May 1, 2015), *available at* http://goo.gl/wvx9CC (chicagotribune.com, last accessed November 1, 2015).
[55] *Id.*
[56] Laura Stevens, *Rail Executive Blasts Oil-Train Rules*, Wall Street Journal (May 5, 2015), *available at* http://goo.gl/TBLL7l (wsj.com, last accessed November 1, 2015).
[57] *Petition Seeks to Limit Length, Weight of Oil and Hazardous Material Trains to Prevent More Derailments*, Center for Biological Diversity (November 25, 2014), *available at* http://goo.gl/UD1Onu (biologicaldiversity.org, last accessed November 1, 2015).
[58] *Id.*
[59] Dave Kolpack, *Oil Company Officials Laud Findings on Crude Oil Volatility*, Bakken.com (September 24, 2015), *available at* http://goo.gl/Ud509o (source: AP, bakken.com, last accessed November 1, 2015).
[60] Hazardous Materials: Enhanced Tank Car Standards and Operational Controls for High-Hazard Flammable Trains, PHMSA, *available at* http://goo.gl/eJVXMg (dot.gov, last accessed November 1, 2015).
[61] Jad Mouawad, *New Oil Train Rules Are Hit From All Sides*, The New York Times (May 1, 2015), *available at* http://goo.gl/BrQikn (nytimes.com, last accessed November 1, 2015).
[62] *DOT Announces Final Rule to Strengthen Safe Transportation of Flammable Liquids by Rail*, U.S. Department of Transportation (May 1, 2015), *available at* http://goo.gl/JgrdmZ (transportation.gov, last accessed November 1, 2015).
[63] Richard Allan & Zachary Kearns, *Federal Agencies and States Pursue New Regulations for Oil Trains, Face Court Challenges*, Marten Law (April 8, 2015), *available at* http://goo.gl/iv6OZv (martenlaw.com, last accessed November 1, 2015).
[64] *New Rules Bar Disclosure of Oil Train Traffic and Routes*, Journal Star (May 6, 2015), *available at* http://goo.gl/VjHUiB (journalstar.com, last accessed November 1, 2015).
[65] Curtis Tate, *Oil Train Fires Require SWAT teams, Veteran Firefighters Tell States*, McClatchyDC (June 17, 2014), *available at* http://goo.gl/8bjv0d (mcclatchydc.com, last accessed November 1, 2015).
[66] Nick Smith, *Firefighters Watch Perimeter as Train Fire Burns Out*, Bismarck Tribune (May 6, 2015), *available at* http://goo.gl/QPtAs8 (bismarcktribune.com, last accessed November 1, 2015).
[67] *Position Statement on Crude Oil Transport & Storage*, Physicians for Social Responsibility, *available at* http://goo.gl/6V48cl (psr.org, last accessed November 1, 2015).

[68] Eddie Scher, *Crude Injustice on Rails in California*, ForestEthics (June 29, 2015), *available at* http://goo.gl/qecGEV (forestethics.org, last accessed November 1, 2015).
[69] Audit Announcement: Federal Railroad Administration's Oversight of Railroad Bridge Safety Memorandum, Office of Inspector General (February 24, 2015), *available at* https://goo.gl/cJYIv5 (dot.gov, last accessed November 1, 2015).
[70] Federal Railroad Administration: Bridge Safety Standards, 75 F.R. 41282 (July 15, 2010), *available at* https://goo.gl/yNeSjY (fra.dot.gov, last accessed November 1, 2015).
[71] *See* FRA: Bridges and Structures, *available at* https://goo.gl/1lSVKz (fra.dot.gov, last accessed November 1, 2015).
[72] 76 F.R. 41282.
[73] 76 F.R. 41306.
[74] 49 C.F.R. § 237.33.
[75] *Id.*
[76] 49 C.F.R. § 237.51.
[77] 49 C.F.R. § 237.71.
[78] *Id.*
[79] 49 C.F.R. Subpart E, and § 237.103, 107.
[80] 49 C.F.R. § 237.109.
[81] 49 C.F.R. § 237.111.
[82] 49 C.F.R. § 237.131.
[83] 49 C.F.R. § 237.151.
[84] FRA: Railroad Bridge Safety Factsheet, *available at* https://goo.gl/neuLy3 (fra.dot.gov, last accessed November 1, 2015).
[85] Bart Jansen, *Feds urge railroads to share more info about safety of aging bridges*, USA Today (September 10, 2015), *available at* http://goo.gl/KrJeNv (usatoday.com, last accessed November 1, 2015).
[86] Jerry Zremski, *Schumer urges better oversight of rail bridges*, Buffalo News (April 9, 2015), *available at* http://goo.gl/Vlk31A (buffalonews.com, last accessed November 1, 2015).
[87] *Id.*
[88] See FRA: Bridges and Structures, *available at* https://goo.gl/1lSVKz (fra.dot.gov, last accessed November 1, 2015).
[89] Courtney Sherwood, *Half of Oregon's Bridges Would Collapse in Major Quake: Officials*, Raw Story (September 28, 2015), *available at* http://goo.gl/WXnsFr (source: Reuters, rawstory.com, last accessed November 1, 2015).
[90] Dan Gunderson, *Inspectors Find Dozens of Rail Bridges Need Repair*, MPR News (July 23, 2015), *available at* http://goo.gl/qo3r4n (mprnews.org, last accessed November 1, 2015).
[91] *Id.*
[92] Written Statement of Sarah Feinberg, Acting Administrator, Federal Railroad Administration, before the Subcommittee on Railroads, Pipelines, and Hazardous Materials, U.S. House of Representatives (April 14, 2015), *available at* http://goo.gl/dKXNnt (house.gov, last accessed November 1, 2015).
[93] Brad Hicks, *Investigation Gets Results: Federal: Government Orders Canadian Pacific to Turn Over Bridge Inspection Reports*, FOX6 Now (Jul. 14, 2015), *available at* http://goo.gl/YT2sfV (fox6now.com, last accessed November 1, 2015).
[94] Federal Railroad Administration: Bridge Safety Standards, Final Rule (July 15, 2010), *available at* http://goo.gl/GvOvKl (gpo.gov, last accessed November 1, 2015).
[95] *Railroads Moving More Crude Oil*, Association of American Railroads, *available at* https://goo.gl/zUkmA4 (aar.org, last accessed November 1, 2015).
[96] Darwin H. Schafer II & Christopher P.L. Barkan, *A Prediction Model for Broken Rails and an Analysis for their Economic Impact* (July 11, 2008), *available at* http://goo.gl/ozkbqc (illinois.edu, last accessed November 1, 2015).
[97] Andrew Kish, Ph.D., Fundamentals of Track Lateral Stability (April 11, 2014), *available at* http://goo.gl/Tdqx9Q (illinois.edu, last accessed November 1, 2015).
[98] Amy Dalrymple, *Heat Caused Montana Train Derailments, BNSF Says*, Dickson Press (November 3, 2015), *available at* http://goo.gl/U2XoW7 (thedicksonpress.com, last accessed November 3, 2015).
[99] Alex Wigglesworth, *CSX Freight Train Partially Derails in South Philadelphia*, Philly.com (January 31, 2015), *available at* http://goo.gl/2xZB8b (philly.com, last accessed November 1, 2015). *See also*, Emily Babay, *Train Derails on Bridge over Schuylkill River in University City*, Philly.com (January 20, 2014), *available at* http://goo.gl/YHe4M2 (philly.com, last accessed November 1, 2015).
[100] *New Jersey Train Derailment and Hazardous Material Release Caused by Lack of Crew Training to Identify Locked Bridge*, National Transportation Safety Board (July 29, 2014), *available at* http://goo.gl/ATVCO8 (NTSB.gov, last accessed November 1, 2015).
[101] Jake Shama, *South Dakota Train Derailment Cause Still Unknown*, Grand Forks Herald (September 21, 2015), *available at* http://goo.gl/C9DtqU (grandforksherald.com, last accessed November 1, 2015).
[102] *Railway Investigation R15H0021: Derailment and Fire of Second Canadian National Crude Oil Train Near Gogama, Ontario*, Transportation Safety Board of Canada, *available at* http://goo.gl/YAiqOr (tsb.gc.ca, last accessed November 1, 2015).