SUB-SECTION 4T.16

PUYALLUP TRIBE ALL HAZARD MITIGATION PLAN
HAZARDOUS MATERIALS HAZARD

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Identification Description

Definition

Hazardous materials are materials, which because of their chemical, physical or biological properties, pose a potential risk to life, health, the environment, or property when not properly contained. A hazardous materials release then is the release of the material from its container into the local environment.

Types

It includes materials that are explosive, flammable, combustible, corrosive, reactive, poisonous, biological or radioactive. They can be in a solid, liquid or gaseous state.
Of increasing interest is Bakken crude oil. This is due to a combination of the physical and chemical properties, and related hazards, combined with the fact that the very large quantities transported have the potential to create very large explosions, fires and environmental degradation of the environment. Prior to 2012 there were no trains carrying Bakken oil into or through Pierce County. Today that has changed. There are on average an estimated 15 trains of around 100 cars each week carrying Bakken Oil into or through Pierce County.
Note that there is a variation in the properties of crude oil since each oil field or even wells in the same oilfield will not produce the same type of crude oil.[1]

Table 4.16-1. List of constituents or ingredients found in Bakken crude oil.[2]

Chemical Name	CAS#	Percent		Chemical Name	CAS#	Percent
Crude Oil (Petroleum)	8002-05-9	100 by weight		N-Hexane	110-54-3	<5 by volume
Ethyl Benzene	100-41-4	<3 by weight		Xylenes	1330-20-7	<1 by weight
Benzene	71-43-2	<1 by weight		Hydrogen Sulfide	7783-06-4	<0.2 by volume
Naphthalene	91-20-3	0 - 0.9 by weight		Total Sulfur:		< 0.5 wt%
Crude oil, natural gas and natural gas condensate can contain minor amounts of sulfur, nitrogen and oxygen containing organic compounds as well as trace amounts of heavy metals like mercury, arsenic, nickel, and vanadium. Composition can vary depending on the source of crude.						

Profile

Location and Extent

Hazardous materials incidents may be either generated from a fixed site or the result of a transportation related accident or release. Not included here are terrorist incidents or radioactive releases from a fixed nuclear facility (FNF). Hazardous materials use, in terrorism, is covered in the Terrorism chapter. As there are currently no local fixed nuclear facilities that would be an immediate threat, through the release of material, to the Planning Area or within Pierce County, they are not included in this chapter.

Hazardous materials are classified into four groups of chemicals under Title III of the Superfund Amendments and Reauthorization Act of 1986. These are:

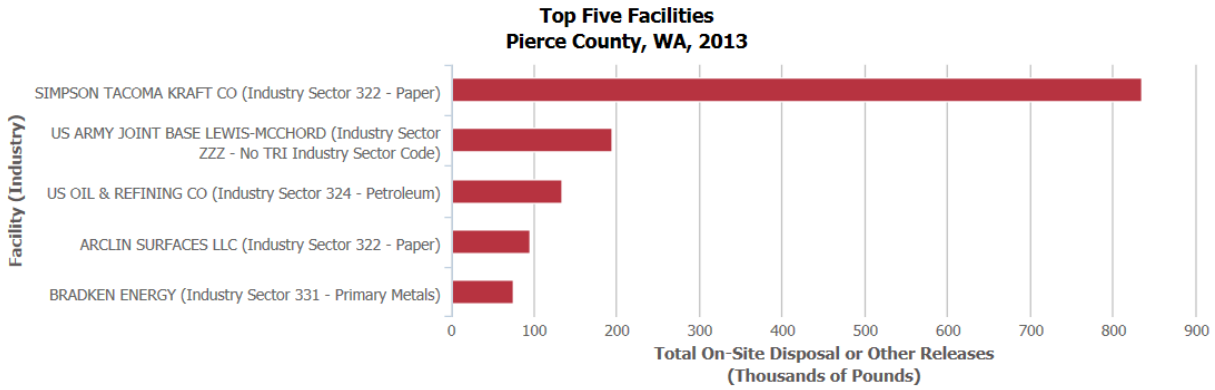
1. **Extremely Hazardous Substances –** These chemicals have acutely toxic properties. Includes approximately 366 chemicals.
2. **Hazardous Substances –** Includes approximately 720 chemicals
3. **Hazardous Chemicals –** Inventories of these chemicals and material safety data sheets for each must be submitted if they are present at the chemical facility in certain amounts.
4. **Toxic Chemicals –** Chemicals or chemical categories that appear on the list because of their chronic or long-term toxicity. Includes 325 chemicals.

Chemicals within these categories have different reporting requirements as to quantities on site that need to be reported. The reporting forms, Tier II forms, go to the Washington State Department of Ecology, the Local Emergency Planning Committee of Pierce County located at the Department of Emergency Management and the local fire department or district.

Table 4.16-2. Environmental Protection Agency's Toxic Release Inventory (TRI) for Pierce County 2013.[3]

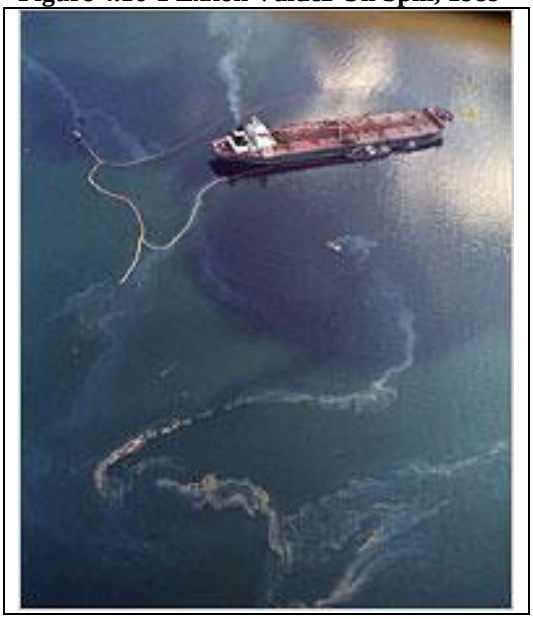
Number of TRI Facilities:	**35**
Facilities Reporting Newly Implemented Source Reduction:	**5**
Total On-site and Off-site Disposal or Other Releases:	**1,427,980 lbs**
Total On-site:	**1,334,995 lbs**
• Air:	**1,087,951 lbs**
• Water:	**53,983 lbs**
• Land:	**193,061 lbs**
Total Off-Site:	**92,985 lbs**

Table 4.16-3. Environmental Protection Agency's Identified Top Five Facilities.[4]



Occurrences

Figure 4.16-1 Exxon Valdez Oil Spill, 1989



The defining moment in the control of hazardous materials is the December 1984 Union Carbide release of Methyl Isocyanate gas in Bhopal, India. This, the worst industrial accident in history, killed over 3,000 people initially and left others blinded or with other handicaps. Over one million claims were made for damages from the release, of which 574,366 claims were awarded damages.[5] Hazardous material spills are a regular part of response organizations' operations in Pierce County. While most of them are relatively minor, with things like small amounts of hydraulic fluid, or diesel being reported, there are occasional ones that tax response organizations. Notification of many small spills initially comes to the County from Washington Emergency Management who may receive a notification from a citizen, a local jurisdiction, the Department of Ecology or the National Response Center, an office within the U.S. Coast Guard.

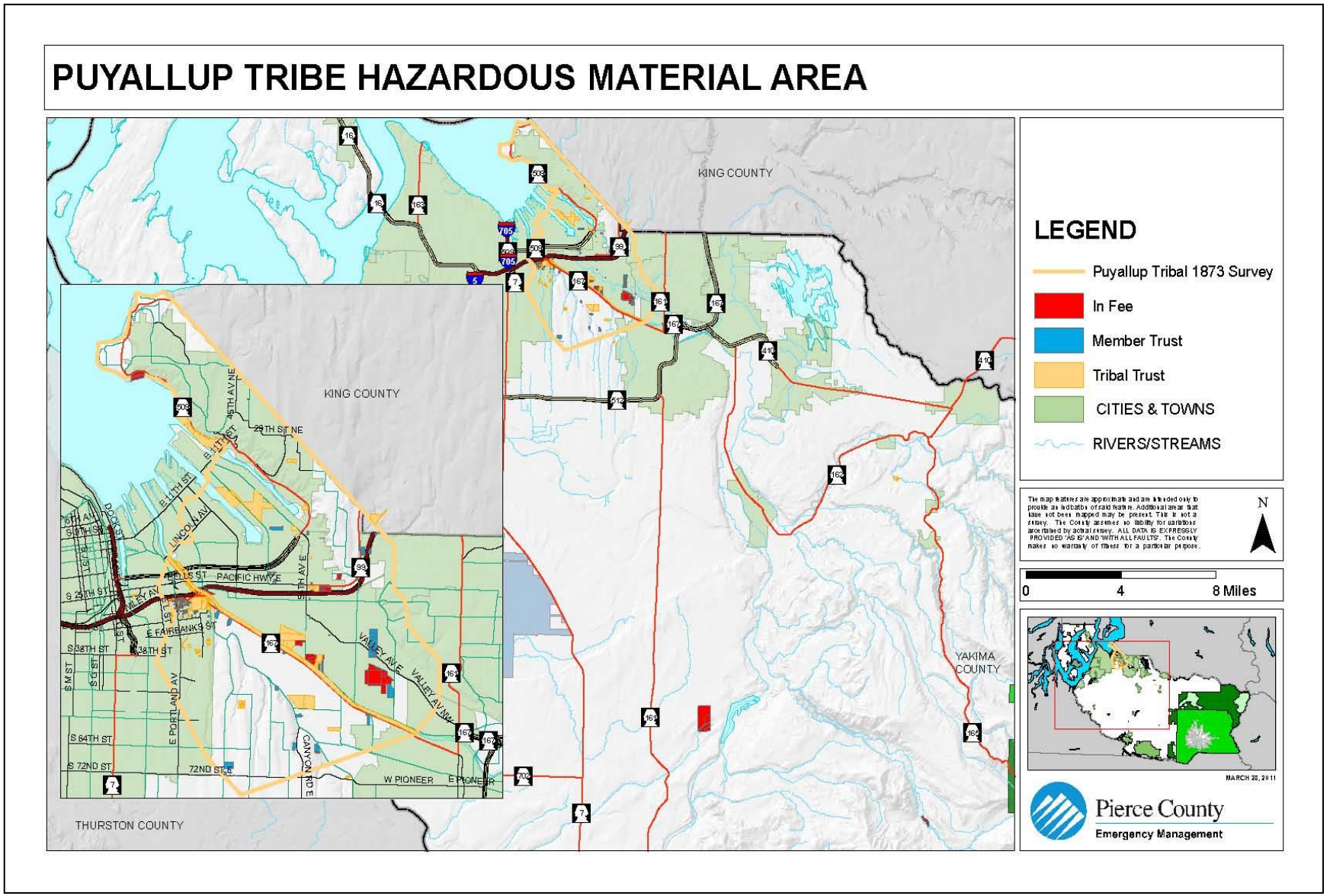
While there have been hazardous material releases in Pierce County, some of which have had fatal consequences, there has not been a truly large scale incident that resulted in a number of deaths or injuries. This is also true when it comes to railroad accidents. Although there have not been any major hazardous materials derailments in Pierce County that have resulted in loss of life, there have been cases in Canada and other areas of the United States. With the rise of crude oil incidents, "crude oil emergency incidents have now become higher probability – high consequence events." The Pipeline and Hazardous Materials Safety Administration (PHMSA) further indicates that there is a higher risk as seen with recent derailments and the resulting fires. There are two major derailments of significance, the first is the Lac-Mégantic, Quebec, Canada 63 car derailment on July 5, 2013 which resulted in the death of 47 people due to fire and other affects of the accident.[6] The other derailment was on April 30, 2014 in Lynchburg, Virginia where 17 of 105 tank cars fell into the James River, spilling almost 30,000 gallons of oil.[7]

The last two largest spills that have caused major problems within Pierce County are the February 12, 2007 Chlorine Spill in the Port of Tacoma[8] and the Dalco Passage oil spill of October 13, 2004.[910] Both of these required major response by responders and, in the case of the Dalco Passage spill it took many days to clean up.

Recurrence Rate

Spills of small quantities of hazardous materials happen regularly. These can range from a meth lab being located and needing clean up to a diesel spill on the highway. Taking all these factors into account we could say that there are hazardous chemical spills annually. However, the large spills that could impact a significant portion of the public, and create major economic or environmental problems are a five year, or less, occurrence.

Map 4.16-1 Puyallup Tribe Hazardous Materials Hazard



Impacts

Health and Safety of Persons in the Affected Area at the Time of the Incident

Depending on the hazardous material(s) involved, the quantity, proximity of exposures and the current environmental factors during the time of the incident, the impact to persons in the affected area may range from negligible to fatal.[11] Initial reactions to inhaled hazardous gasses may include respiratory problems, burning sensation in the mouth, nose, and eyes, loss of consciousness, dizziness, suffocation and death. Some substances in a solid or liquid state can be absorbed through the skin. Others, like caustics and acids, may cause burns on contact. For some chemicals there are residual problems that might not present themselves for years. Some of these leave lung lesions or impact other internal organs. These may result in late the development of emphysema or various cancers.

Health and Safety of Personnel Responding to the Incident

Personnel responding to a hazardous chemical spill, if not properly protected, are subject to the same physical problems as the initial victims.

Continuity of Operations and Delivery of Services

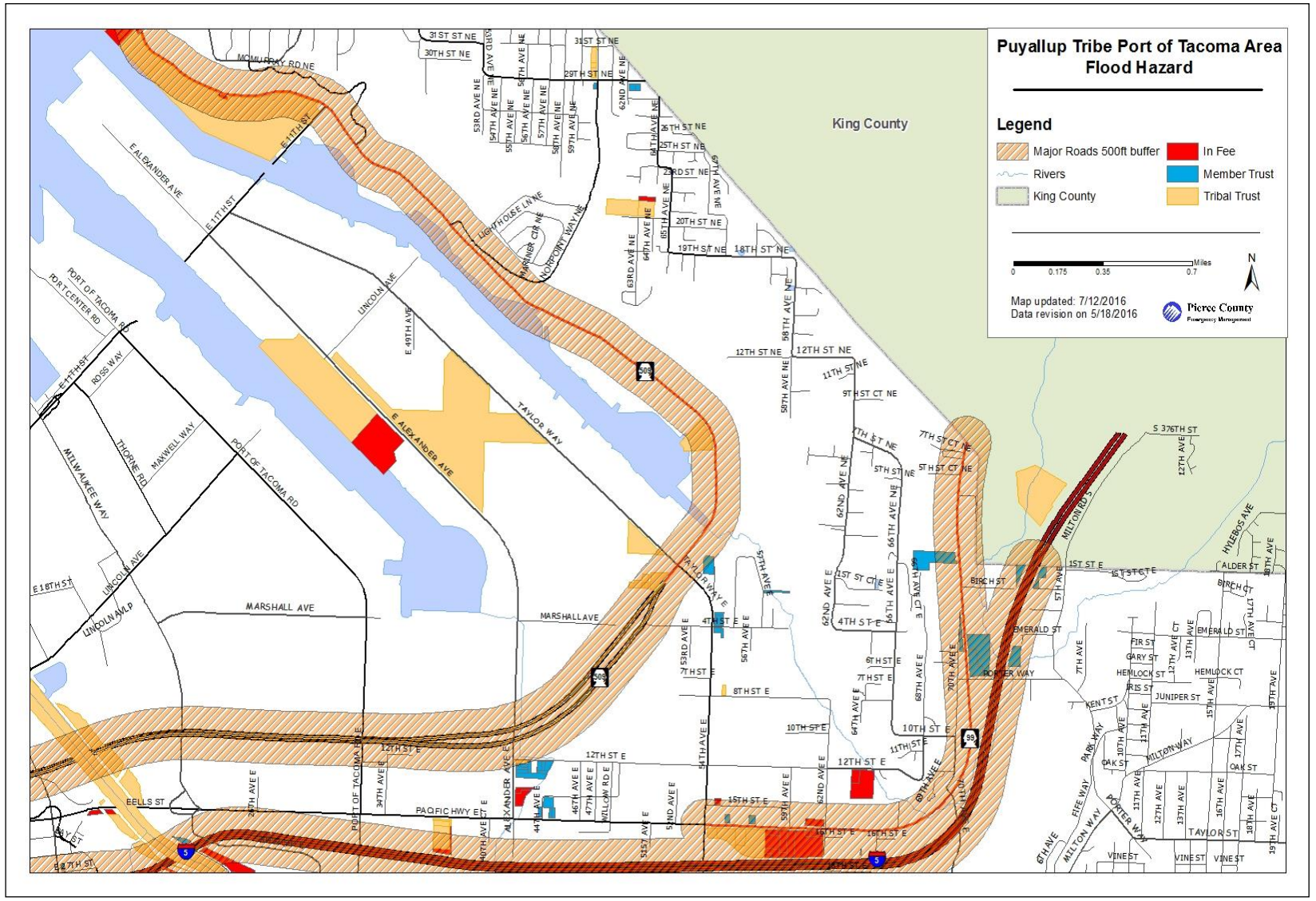
Most hazardous materials spills will impact a limited area (see Map 4.16-1 for potential impact area). If within that area are governmental operations that may be impacted then there could be a decrease in the delivery of services. If the chemical is such that an area must be closed for a lengthy period of time or destroys the method of service delivery then for the necessary services to be maintained new routing or a new method of delivery will need to be developed. If the spill impacts some portion of an agency or government directly then there may be a loss in operational continuity.

Property, Facilities, and Infrastructure

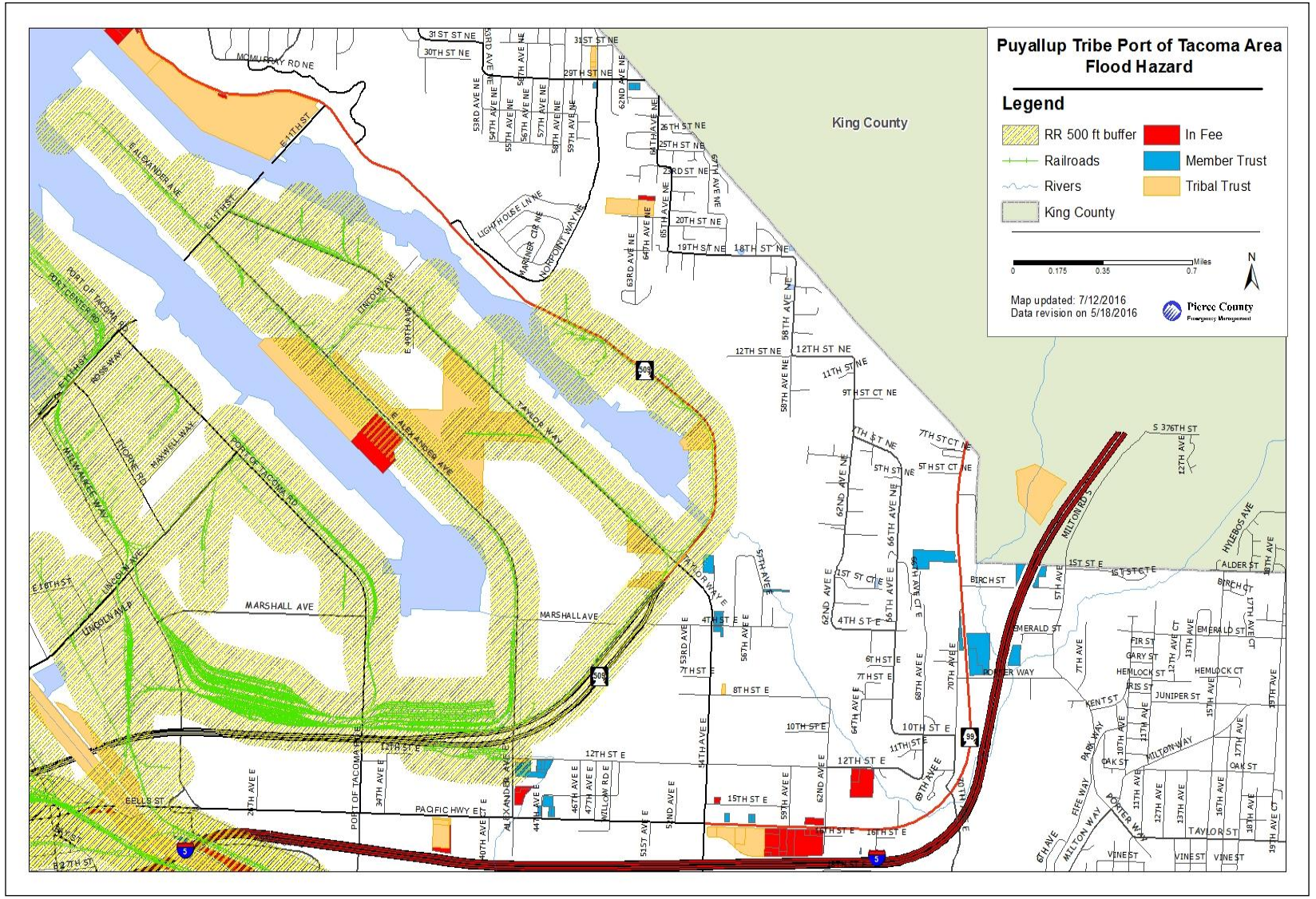
Property, facilities and the infrastructure may all be damaged by different individual spills. Hazardous material spills may contaminate a facility so that it must undergo extensive cleaning, or in the case of some radioactive materials, abandoned permanently. They may ignite or explode, destroying any object in their proximity. They may corrode facilities or infrastructure leaving it in need of replacement.

The Puyallup Tribe owns many properties and facilities that are located in the Port of Tacoma area and along the Puyallup River which are both subject to potential hazardous material spills either by railroad or commercial trucks. Map 4.16-2 and Map 4.16-3 identifies the Puyallup Tribal Trust lands at risk for hazardous spills in the Port of Tacoma area. Map 4.16-4 and Map 4.16-5 identifies the infrastructure at risk for hazardous spills in the "downtown area." Map 4.16-6 and Map 4.16-7 identifies the Tribal Trust properties along lower Puyallup River. These detailed maps will allow better identification of property, facilities and infrastructure at risk for

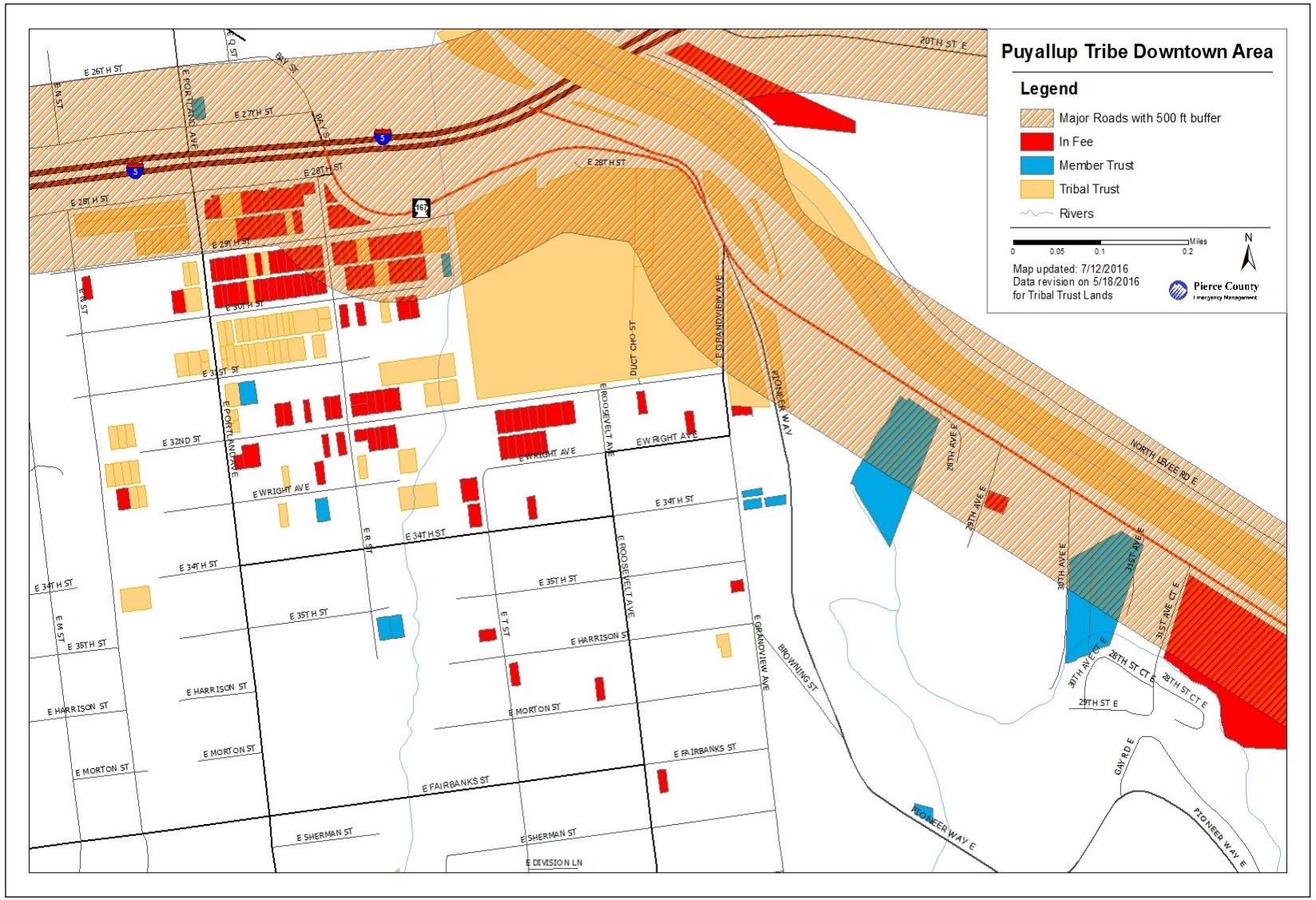
Map 4.16-2 Puyallup Tribe Hazardous Materials Hazard – Port of Tacoma Roads



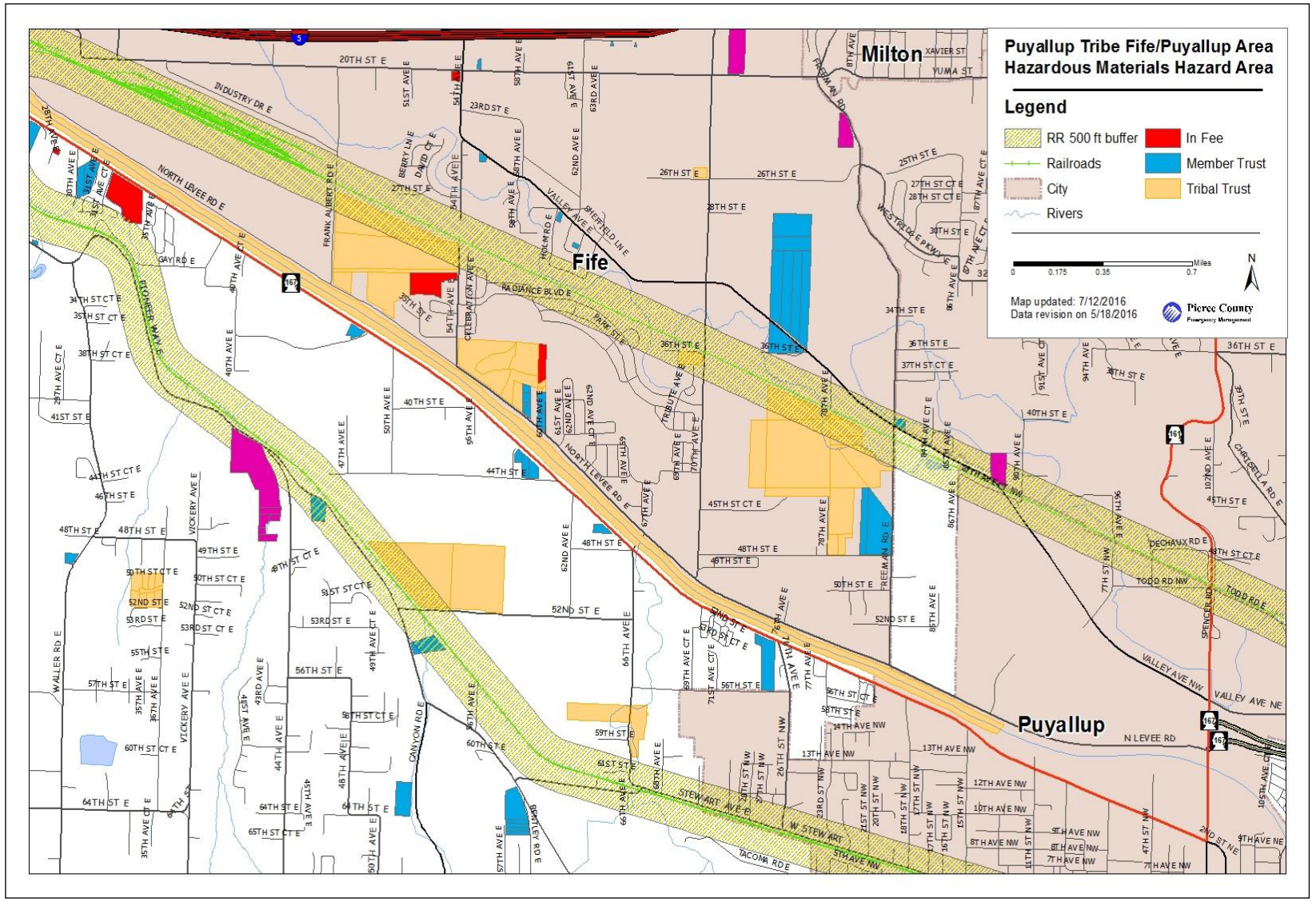
Map 4.16-3 Puyallup Tribe Hazardous Materials Hazard – Port of Tacoma Railroads



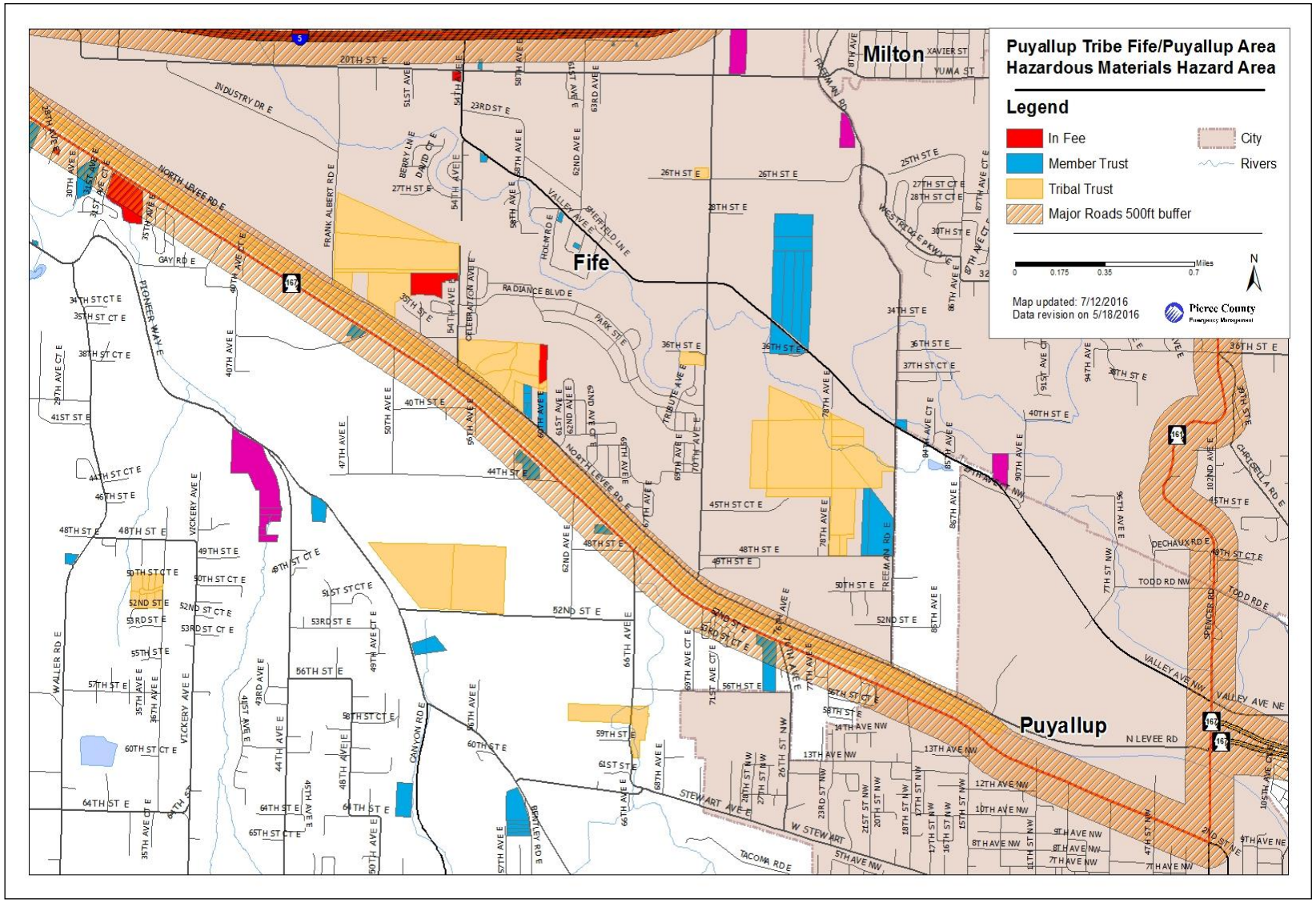
Map 4.16-4 Puyallup Tribe Hazardous Materials Hazard – Downtown Area Major Roads



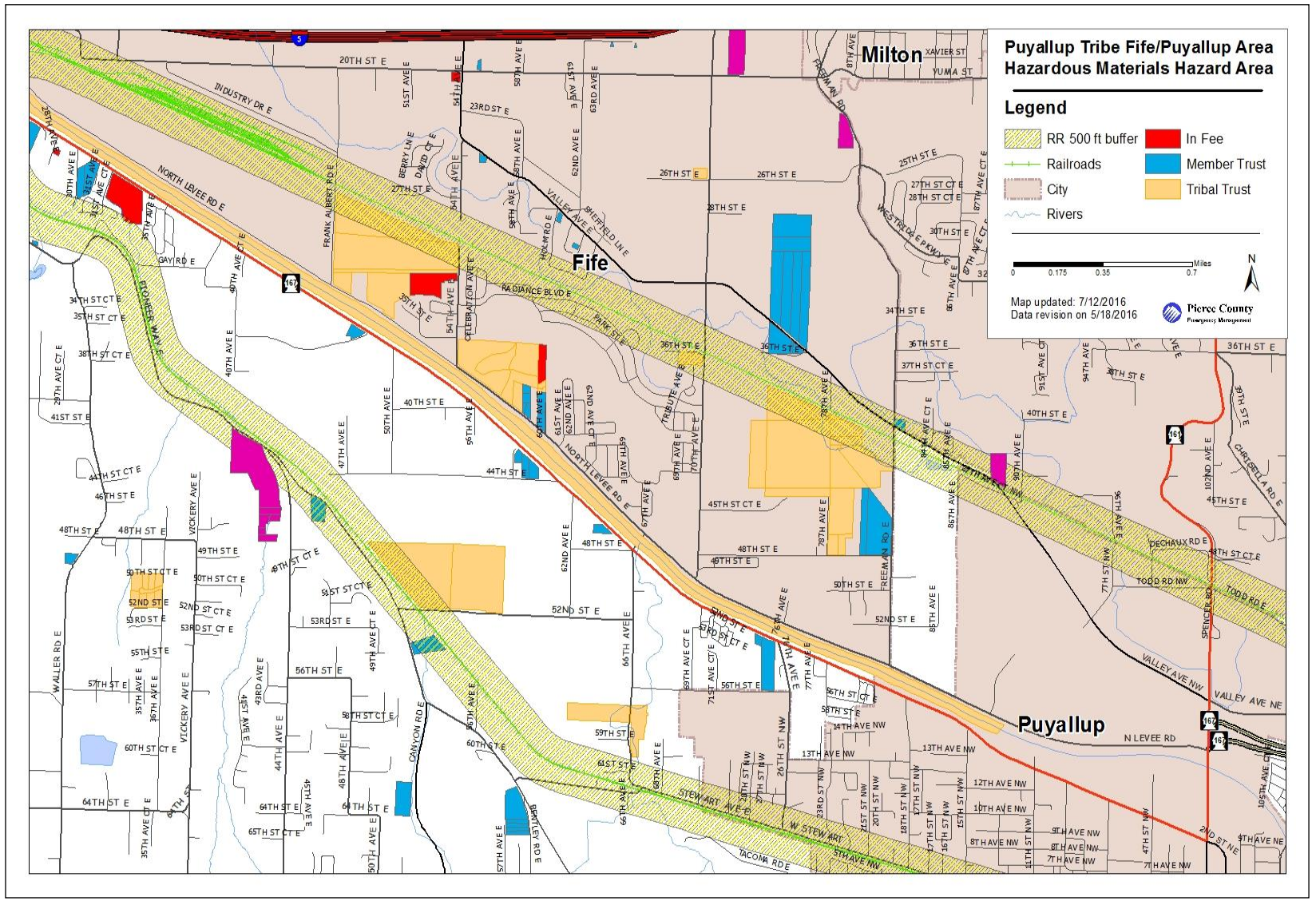
Map 4.16-5 Puyallup Tribe Hazardous Materials Hazard – Downtown Area Railroads



Map 4.16-6 Puyallup Tribe Hazardous Materials Hazard– Fife/Puyallup Area Roads



Map 4.16-7 Puyallup Tribe Hazardous Materials Hazard– Fife/Puyallup Area Railroads



potential hazardous material spills. A 500 foot buffer was used along the railroad lines and major traffic routes to identify areas at risk for hazardous spills.

Environment

Environmental impacts can range from the relatively minor or short term, as are many of the spills that happen in the County, on an annual basis to those that cause major impacts over multiple years. Two major national incidents, the Exxon Valdez oil spill and the Cantara/Dunsmuir spill show how a major spill can damage the environment, sometimes for decades.

The damage in the aftermath of the 1989 Exxon Valdez oil spill has continued to plague the environment. While the actual death of wildlife has declined over the years, other issues have continued. Studies have shown that "lingering oil deposits affect species over many years…" In many species "sub-lethal, chronic doses compromise health, growth and reproduction…" This can have a cascading impact as the various "impaired species interact negatively with one another…[13]"

Figure 4.16-2 Dalco Passage Oil Spill Clean Up[12]

In the case of the Cantara/Dunsmuir chemical spill of July 14, 1991, approximately 19,000 gallons of metam sodium, a potent herbicide and pesticide that is usually used to sterilize soil, spilled from a train tank car into the Upper Sacramento River. It killed off all aquatic life in the river and damaged the riparian habitat for 41 miles to Lake Shasta. Its initial reaction with water created a toxic cloud that kept responders away until it had dissipated.

> Vegetative damage from the spill resulted in a sudden and catastrophic reduction in canopy cover and foliage along the river, with a corresponding dramatic loss of many wildlife species dependent on the river's riparian vegetation. Wildlife such as birds, bats, otters, and mink either starved or were forced to move because their food sources were no longer available.
>
> Ultimately, over a million fish, and tens of thousands of amphibians and crayfish were killed. Millions of aquatic invertebrates, including insects and mollusks, which form the basis of the river's ecosystem, were destroyed. Hundreds of thousands of willows, alders,

> and cottonwoods eventually died. Many more were severely injured. The chemical plume left a 41-mile wake of destruction, from the spill site to the entry point of the river into Shasta Lake.[14]

The damage caused by both of these spills to the environment has taken many years to overcome. Residual impacts may still be felt.

Due to the high volume of semi-truck transportation, potential for hazardous waste spills and critical habitat sensitivity along State Route 167 a recent ruling was past preventing semi-trucks traveling from 70 St. downstream to Interstate 5. This was a major transportation route which follows the Puyallup River within the Planning Area. Alternate and less sensitive routes are currently in use.
The Puyallup Tribe of Indians' Usual and Accustomed Fishing Areas (U&A) encompasses the lower Puget Sound Area as well as numerous rivers, streams and creeks within Pierce County. The Port of Tacoma, marinas, numerous towns, Interstate 5, railroad tracks, and major arterials line the banks of this critical habitat within the Planning Area. The potential for major oil or other hazardous material spills is high within the Planning Area and could have a catastrophic economic effect on the fisheries and environment for years to come.

Economic and Financial Condition

The economic consequences of a large hazardous material spill can be wide ranging and can last for years. How deep the financial problems go, depends on the chemical released; the size of the spill; the number and size of the businesses impacted; the number of homes impacted or destroyed; which pieces of infrastructure have been impacted; and, how long will it take for the cleanup to be accomplished. If the facilities have burned or the cleanup takes a lengthy period of time, the economic losses are compounded. If the chemical released does not allow for cleanup, as a radioactive substance might, the economic impact could be permanent.

Public Confidence in the Jurisdiction's Governance

Generally there is no change in the public's confidence in a jurisdiction for the routine small spills. They pay no attention to how they are handled. Public scrutiny of the role local government played in the handling of a large or dangerous spill will impact the way it is regarded in the future. This can be seen in the case of the February 12, 2007 Chlorine Spill in the Port of Tacoma. The press became very negative about the role the City of Tacoma's Fire Department played in the response, and a lengthy article in the Tacoma News Tribune ends with the following quote from one of the people impacted by the spill.

> "The next time we're going to take matters into our own hands and get out of here. We cannot rely on the City of Tacoma to help us out. There's no way."[15]

Resource Directory

Regional

- **Washington State Department of Ecology** http://www.ecy.wa.gov/
- **Pierce County Department of Emergency Management**
- http://www.piercecountywa.org/DEM
- **Washington State Patrol, Office of the State Fire Marshal** http://www.wsp.wa.gov/fire/hazmat.htm

National

- **Emergency Planning for Chemical Spills** http://www.chemicalspill.org/EPCRA-facilities/other.html
- **Environmental Protection Agency** http://www.epa.gov
- **FEMA, Hazardous Materials Incidents** http://www.fema.gov/business/guide/section3b.shtm
- **National Response Center** http://www.nrc.uscg.mil/nrchp.html
- **Pierce County Department of Emergency Management**

Endnotes

[1] NW Area Committee. (February 2015). *Bakken crude oil pamphlet* Page 2. Retrieved on February 27, 2015 from http://www.rrt10nwac.com/Files/FactSheets/150213064220.pdf
[2] Ibid, page 2.
[3]United States Environmental Protection Agency. (2015). TRI Explorer (2013 National Analysis dataset (released October 2014) (Updated Nov 24, 2014)) [Internet database]. Retrieved from http://www.epa.gov/triexplorer, (February 27, 2015).
[4] Ibid.
[5] Bhopal Gas Tragedy Relief and Rehabilitation Department, Government of Madhya Pradesh, http://www.mp.gov.in/bgtrrdmp/default.htm
[6] NW Area Committee. (February 2015). *Bakken crude oil pamphlet.* Retrieved on February 27, 2015 from http://www.rrt10nwac.com/Files/FactSheets/150213064220.pdf
[7] Ibid, page 7.
[8] Thousands could have been exposed to deadly gas on Tacoma's Tideflats Susan Gordan, Tacoma News Tribune, 03/09/08, updated 04/01/10, http://www.thenewstribune.com/2008/03/09/304409/thousands-could-have-been-exposed.html
[9] Dalco Passage Spill, U.S. Coast Guard and Washington Department of Ecology Timeline.
[10] Polar Texas – Conoco Phillips Spill, Washington Department of Ecology, http://www.ecy.wa.gov/programs/spills/incidents/dalco/dalcobase.htm
[11] NW Area Committee. (February 2015). *Bakken crude oil pamphlet.* Retrieved on February 27, 2015 from http://www.rrt10nwac.com/Files/FactSheets/150213064220.pdf
[12] Dalco Passage Oil Spill Photo Album, U.S. Coast Guard, Department of Homeland Security, http://www.uscg.mil/d13/diraux/albums/dalco/slides/02060026.asp

[13] Exxon Valdez oil spill impacts lasting far longer than expected, scientists say, David Williams, University of North Carolina News Services, http://www.unc.edu/news/archives/dec03/peters121803.html

[14] Final Report on the Recovery of the Upper Sacramento River – Subsequent to the 1991 Cantara Spill, The Cantara Trustee Council, 2007, p. 3
[15] Thousands could have been exposed to deadly gas on Tacoma Tideflats Susan Gordon, Tacoma News Tribune, 03/09/08, updated 04/01/10, http://www.thenewstribune.com/2008/03/09/304409/thousands-could-have-been-exposed.html