Pierce County Environmental Health Trends 2008

Your Environment = Your Health
Why this report?
We want to better understand and communicate some important environmental conditions in Pierce County. We also want to show connections between these environmental conditions, how they impact your health and economics, and actions we can all take to improve environmental health.

To do this, we brought together agency and community members to decide what environmental conditions and other information to include in this report. In future reports we hope to have more data and be able to show more trends for these conditions.

What are environmental health indicators?
Environmental health is the connection between ecosystem and human health. This includes natural resources that help us thrive, such as clean air, water, food and access to parks. It also includes natural and man-made chemical, biological and physical hazards to our health.

Environmental health indicators are measures that can show if environmental conditions that impact our health are getting better, worse or staying the same. Indicators capture a piece of the bigger picture. With other information, they help us decide what we need to do to improve environmental health.

Why is improving environmental health critical to our future?
The first residents many years ago had abundant local food sources, especially from the Puget Sound and other waterways. By 2030 Pierce County expects to have over a million residents, all needing healthy air, water, food and more to thrive. This increased demand on resources will make improving environmental health now even more critical for future generations.

Who’s most vulnerable?
• Children are especially vulnerable because their bodies are still developing. They also eat, drink and breathe more in proportion to their smaller body size than adults, which results in a larger relative exposure to benefits or hazards. ¹

• Unemployment, discrimination and other sources of stress may make people more vulnerable to environmental hazards. ²

• Low-income residents and people of color are also more likely to have fewer benefits and resources, and be exposed to multiple hazards where they live. ³

What’s in this report?
We used the environmental health model developed by workgroups (see back cover) to organize information for each indicator:

• hazards and/or benefits associated with the indicator
• exposure to hazards or access to benefits
• human health impacts from exposure and/or access
• economic impacts from exposure and/or access
• personal actions you can take to improve the indicator
• policy actions taken or recommended to improve the indicator

¹ US Environmental Protection Agency Children’s Health Protection web pages.
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INDOOR AIR
Secondhand Smoke in Homes

Hazards
Secondhand smoke contains fine particulate matter (PM 2.5) and at least 250 chemicals known to be toxic.¹

Exposure
On average, people spend about 90% of their time indoors, including homes, offices, and other workplaces. Since smoking has been banned from most public spaces and workplaces, most exposure occurs in homes and vehicles.

Exposure to secondhand smoke has decreased over the years. Cotinine is a by product of nicotine metabolism, so is a measure of exposure to secondhand smoke.

- Cotinine levels in US nonsmokers fell by about 70% from 1988–91 to 1999–02.
- Cotinine levels for children were more than twice adult levels.
- Levels for non-Hispanic blacks were more than twice those of Mexican Americans and non-Hispanic whites.²

Data Source: Tacoma-Pierce County Health Department, Behavioral Risk Factor Surveillance Surveys. These data are estimates based on people who replied that someone “… smoked anywhere inside the home at least one day in the past 30 days.” People in prison, hospitals, dorms, barracks, and those without a landline phone are not surveyed. Responses from about 800 adults were adjusted to match the Pierce County population in age and gender.
Human Health Impacts

• Secondhand smoke exposure causes serious disease and death in nonsmoking adults, including respiratory illnesses, heart disease and lung cancer.

• In children it causes sudden infant death syndrome (SIDS), acute respiratory infections, ear problems, and more frequent and severe asthma attacks. ³

• Fine particulate matter is particularly harmful to young children, the elderly and those with existing respiratory problems.

Economic Impacts

• Medical care costs in 2004, in the US, were estimated at $2.6 billion for nonsmokers suffering from lung cancer or heart disease caused by exposure to secondhand smoke.

• Lost wages and benefits in 2004, in the US, were estimated at $3.2 billion from disability and premature death caused by exposure to secondhand smoke. ⁴

Policy Actions

State policies have helped reduce exposure to tobacco smoke in public spaces:

• In 1985 the Washington Clean Indoor Air Act prohibited smoking in many public places, including buses, stores and schools.

• In 1990 smoking was prohibited in child daycare centers when children are present and in cars when the daycare provider transports children.

• In 1994 the Environmental Tobacco Smoke in Office Work Environments code banned smoking in all indoor offices with more than one employee.

• In 2005 the Clean Indoor Air Act was expanded to include all restaurants, bars, bowling alleys, skating rinks and non-tribal casinos, and requires at least 75% of hotel rooms to be smoke-free.

Personal Actions

Help improve your own and your families’ health:

• Quit smoking. Get help by calling 1-800-QUIT-NOW

• Until you are able to quit, smoke outside at least 25 feet from windows, doorways, and play areas. Ask friends and family who smoke to smoke outside.

Resources

Tacoma-Pierce County Health Department:
  Clean Air for Kids: (253) 798-2954, www.tpchd.org/CAFK
  Tobacco Prevention and Control: (253) 798-2958, www.tpchd.org/tobacco


US Environmental Protection Agency Smoke Free Homes and Cars Program:
For information on health effects and more: www.epa.gov/smokefree/index.html

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³ Centers for Disease Control and Prevention Tobacco Use web page.

⁴ Costs Associated With Secondhand Smoke, American Academy of Actuaries, 2006.
Housing Age and Ownership

**Hazards**
Lead, dampness, mold, and other contaminants in the air, dust and water. Lead-based paint is the number one environmental hazard to children under age six. ¹

**Exposure**
We spend about 90% of our time indoors. The age and maintenance of our housing impact indoor air quality:

- About 40% of homes built before 1978 contain some lead-based paint. Deteriorating lead-based paint from walls and windowsills can get into dust, soil and air. ²
- Homes built since the 1970s may be more tightly built and need more ventilation.
- Poor building construction, maintenance and ventilation can lead to water leaks, higher humidity, mold and pests. ³
- Renters may have less control over maintenance than most owners, but but can control dust, ventilation and more.

**Human Health Impacts**
- Even low levels of lead can affect a child's mental and physical growth. Lead poisoning usually has no obvious symptoms, so frequently goes unrecognized and untested. ⁴
- Molds can trigger asthma and cause nasal stuffiness, coughing or wheezing, eye irritation, and skin irritation in sensitive people. People with mold allergies, chronic lung disease, or who are immune-compromised may have more severe reactions. ⁵

**Data Source:** US Bureau of the Census 2000. Homes include occupied and vacant houses, apartments, mobile homes, trailers, and rooms used as separate living quarters in 2000.
**Economic Impacts**

- Young children exposed to lead lose more than $40 billion per year from lower wages and earnings over their lifetime, in the US.  
- Dampness and mold exposure in homes cost about $3.5 billion annually, from impacts on people with asthma in the US.

**Policy Actions**

Lead policies have had some success. Lead levels in young children tested have gone down, but Pierce County rates remain slightly higher than other areas.

- In 1978 the US Environmental Protection Agency banned the manufacture and use of lead-based paint, under the Toxic Substances Control Act.
- Since 1989 Medicaid-eligible children are required to be screened for blood lead levels at 12 and 24 months. In Washington State most have not been tested due to providers’ perception of “no problem.”
- In 1991 the Centers for Disease Control and Prevention set the action level for children’s blood lead levels at 10 µg/dL (micrograms /deciliter). Some recommend lowering the action level, since health impacts have been seen in children with blood lead levels below 10 µg/dL.
- The Residential Lead-Based Paint Hazard Reduction Act of 1992 requires that people selling, leasing or renovating homes built before 1978 provide information on lead to the owner or occupant.

Currently there are no federal, state or local regulations or standards for airborne concentrations of mold or mold spores.

**Personal Actions**

Improve your home’s indoor air quality by reducing dust and mold growth:

- Dust with a damp cloth, take shoes off before coming indoors
- Ventilate your home, especially shower, laundry and cooking areas
- Keep relative humidity levels between 40% and 50% during the heating season
- Fix leaky roofs, windows and pipes

**Resources**

- **Clean Air for Kids Program**: call (253) 798-2954 or go to [www.tpchd.org/CAFK](http://www.tpchd.org/CAFK) for more information on making your home healthier or a free home environmental assessment.
- **Washington State Community, Trade and Economic Development Housing Division**: (360) 725-2908, [www.cted.wa.gov/housing](http://www.cted.wa.gov/housing)
- **National Center for Healthy Housing**: (410) 992-0712, [www.centerforhealthyhousing.org/](http://www.centerforhealthyhousing.org/)
- **US Environmental Protection Agency Indoor Air Quality Division**: Information on lead, mold and other pollutants at [www.epa.gov/iaq/ia-intro.html](http://www.epa.gov/iaq/ia-intro.html)

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5. Centers for Disease Control & Prevention Mold web pages.
8. CPSC Staff Recommendations for Identifying and Controlling Lead Paint on Public Playground Equipment.
OUTDOOR AIR
Air Quality Index Unhealthy Levels

Data Source: Puget Sound Clean Air Agency. In 1999 PM 2.5 (fine particulate matter) was added to the Air Quality Index (AQI). In 2008 the AQI was made consistent with EPA’s stricter 8-hour ozone standard.

Unhealthy for Sensitive Groups: members of sensitive groups may experience health effects, such as children and adults with asthma, lung disease or heart disease.

Unhealthy for Everyone: everyone may begin to experience health effects and members of sensitive groups may experience more serious health effects.

Hazards
The Air Quality Index measures 6 major air pollutants: ozone, fine particulate matter (PM 2.5), carbon monoxide, nitrogen dioxide, sulfur dioxide and lead.

Exposure
- Pierce County has some of the highest diesel particulate emissions and other air toxics in our state and in the US. Most Pierce County residents live in areas that don’t meet EPA’s PM 2.5 and ozone standards.
- Summer outdoor air pollution tends to be worse when it gets hotter, more ground level ozone (smog) forms, and pollutants from vehicles accumulate.
- Winter outdoor air pollution tends to be worse when people are heating their homes more. It’s also worse during air inversions, when a layer of warmer air above traps cold air and air pollution close to the ground.
- In December 2006 Pierce County had unhealthy fine particulate matter (PM 2.5) levels for several days after the windstorm – power outages resulted in more people using wood to heat their homes.
Human Health Impacts

- Fine particulates can get deep into our lungs and travel throughout our bodies. Particulate matter transports air toxics, which can accumulate in our bodies.

- Fine particulates contribute to respiratory illnesses and heart disease. Diesel fine particulates also contribute to cancer.

- Ground-level ozone (smog) can reduce lung function, cause respiratory irritation, aggravate asthma symptoms, and weaken the immune system. It is especially harmful to young children, the elderly and those with existing respiratory problems.

- Increased risk of death due to stroke has been associated with exposure to high concentrations of air pollution about 2 hours before death.

Economic Impacts

- Cancer risks from air pollution may result in as many as 30 cancer cases per year that would not otherwise have occurred in Washington. The cost of medical treatment alone for these is about $3 million.

- Washington citizens save more than $2 billion per year in health costs because the air is cleaner now than it was in 1990.

- Washington businesses save at least $17 million per year because cleaner air means fewer lost workdays or lost productivity due to illness caused by air pollution.

- Cleaner air helps Washington farmers by preventing more than $11 million per year in crop damage.

Policy Actions

Outdoor air quality regulations have led to decreased levels of many air pollutants:

- Banning lead gasoline has greatly decreased lead air pollution.

- Burn bans and wood stove replacement programs have decreased smoke.

- Vehicle emission regulations and inspections, improved fuel efficiency, cleaner burning engines, and driving less help decrease vehicle emissions.

- Using lower sulfur diesel fuel and cleaner diesel technology have reduced diesel emissions.

Personal Actions

- Heat your home using cleaner energy: if you use an old wood burning stove, replace it with a certified wood stove or cleaner heat source such as natural gas or propane.

- Drive less, use other transportation: carpool, bus, bike, and walk.

- Maintain your car.

- Turn your engine off when stopped for more than 30 seconds – this saves gas!

Resources

Puget Sound Clean Air Agency: (800) 552-3565

Health information:
www.pscleanair.org/airq/basics/health.aspx

Actions: www.pscleanair.org/actions/

US Environmental Protection Agency (EPA) Office of Air and Radiation: www.pscleanair.org/actions/
(206) 553-1814 or (800) 424-4EPA
OUTDOOR AIR
Greenhouse Gas Emissions

Hazards

- Carbon dioxide and other greenhouse gases increase the amount of heat trapped by our atmosphere. Ozone levels are likely to increase with higher temperatures.
- Predicted decreases in the availability of drinking water. ²
- Rising sea levels are expected to increase coastal erosion, landslides and flooding. ³

Exposure

Our region is predicted to have small changes in temperature and rain, compared to other parts of the planet. ⁴

Particulate air pollution may have different impacts on climate change depending on where it is:
- Particulates in the atmosphere may have slowed earlier effects of global warming by reflecting sunlight, preventing it from reaching the earth’s surface.
- Black carbon (soot) on snow and ice may contribute to global warming by darkening these surfaces and reducing reflection of solar radiation.

Human Health Impacts

- Extremely hot days contribute to heat exhaustion and heat stroke.
- More ozone-related chronic lung disease and other respiratory problems are expected. ⁵
- Many insects expand their ranges and reproduction with warmer temperatures, increasing risks from diseases such as West Nile Virus. ⁶

Data Source: Puget Sound Clean Air Agency. “Carbon dioxide (CO2) equivalents” are calculated so we can combine the impacts of different greenhouse gases. ¹
Economic Impacts

- Increases in water supply costs and conservation costs to offset declining water supply, lost hydropower revenues, shoreline protection costs from rising sea level, and costs of fighting wildfires are expected.  
- Acidification of marine waters from too much carbon dioxide is expected to increase threats to seafood supplies.  

Policy Actions

Legislation requiring cars, appliances and public buildings to be more energy efficient and providing tax incentives for more alternative fuel vehicles passed in 2005. 

- Implementing the 2005 Washington Clean Car Act is expected to reduce vehicle emissions and save over $1 billion in fuel costs for Puget Sound consumers by 2020. Improved vehicle fuel economy contributed to the decrease in greenhouse gas emissions in 2005 from 2002.

Tacoma’s Climate Action Task Force and others recommend that we:

- Improve transportation options, so people drive less.
- Invest in research and development of healthier and safer energy sources.
- Protect trees, forests, working farms, parks and natural areas that can reduce the carbon dioxide in the atmosphere, when managed properly.

Locally-relevant adaptation strategies that reduce climate impacts on vulnerable people and ecosystems, and protect valued resources are also critical as climates change.

Personal Actions

- Reduce energy used for transportation: drive less and walk, bike, bus and carpool more.
- Reduce energy used at home: turn off lights and appliances, use energy efficient light bulbs and appliances, lower your thermostat a few degrees and insulate your home better.
- Plant trees and other plants that use carbon dioxide and store carbon.

Resources

Tacoma Climate Action Task Force: (253) 591-5310, www.cityoftacoma.org/greenribbon

Puget Sound Clean Air Agency: (800) 552-3565, www.pscleanair.org/programs/climate

Washington Department of Ecology: (360) 407-6848
  Climate change: www.ecy.wa.gov/climatechange/index.htm
  Green economy: www.ecy.wa.gov/climatechange/GreenEconomy.htm

Washington State University Pierce County Extension Master Gardener Office Native trees and other plants suited to your area: (253) 798-7180, http://gardening.wsu.edu/text/nvintro.htm

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1 Pew Center on Global Climate Change GWP and Carbon Dioxide Equivalents web page.
2 Climate Impacts Group Climate Impacts in Brief web page.
3 Climate Impacts Group Climate Impacts in Brief web page, Washington Department of Ecology Climate Change web page.
4 Puget Sound Clean Air Agency, What is Climate Change? web page.
5 The Medical and Public Health Impacts of Global Warming, Physicians for Social Responsibility.
6 Driven to Extremes: Health Effects of Climate Change, Environmental Health Perspectives, April 2007.
10 Puget Sound Clean Air Agency Clean Cars Initiative web page.
12 The International Challenge of Climate Change: Thinking Beyond Kyoto, Steve Rayner, 2005.
13 Consumer Reports Greener Choices Global Warming Solutions web page.
LAND
What’s in Our Neighborhoods?

Number of Pierce County Residents living within 1/2 mile of a . . .

- Bus Stop
- Convenience Store
- Grocery Store
- Farmers’ Market
- Library
- School
- Open Space Corridor
- Park or Trail

Data Source: 2007 Pierce County Geographic Information System, Pierce Transit, tax parcels and 2000 census. If any part of a census block fell within the designated radius the entire block’s population is counted. Convenience Stores are grocery stores with up to 2 checkout stands. Grocery Stores have more than 2 checkout stands. Schools include universities, colleges, technical schools, but not pre-schools. Open Space Corridors include parks and trails.

Benefits and Access
- US adults with access to neighborhood parks are nearly twice as likely to be physically active as those without access to parks. ¹ Living within walking distance of bus stops, grocery stores, farmers markets, libraries, schools, open spaces, parks or trails is potentially beneficial for physical and social well-being.
- Walking and taking the bus more may also result in less polluted stormwater runoff, cleaner air and slower climate change. ²
- Open spaces help improve air and water quality, retain stormwater, reduce flooding, capture carbon dioxide and help regulate climate. They also provide sound and visual buffers. ³

Human Health Impacts
- Increased physical activity reduces risks for heart disease, diabetes, osteoporosis, depression, breast and colon cancer, and other diseases. ⁴
- Improving water and air quality reduces risks of many chronic diseases, including heart disease and cancer.
- Open spaces help reduce exposure to disease-carrying animals, by providing buffers between wildlife and people, and habitat for predators. ⁵
Economic Impacts

- Estimated Washington State 2004 physical inactivity costs are almost $200 million for direct medical costs, over $9 million for direct worker’s compensation costs, and over $4 billion for lost productivity, including time missed from work.  
- Walking more and using your car less will save you money, especially as gasoline prices rise. Healthier people and less traffic may increase productivity and time at work.
- Cleaner air and water, slower climate change, and healthier people are likely to result in lower health care and environmental cleanup costs.
- Open spaces and parks nearby improve property values.

Policy Actions

Local, regional, and national efforts to design and build communities that are healthier because of their recreation, education and transportation options:

- In 2002 the Growth Management Act required city and county comprehensive plans to integrate land use, transportation and economic development.
- In 2006 the Pierce County Council approved a program for owners of farms, timberland and other open spaces to sell or transfer development rights to their property.
- In 2008 the City of Tacoma’s Open Space Habitat and Recreation Plan was adopted.
- In 2008 the Tacoma-Pierce County Board of Health passed a Complete Streets resolution, endorsing policies and projects to improve our roadways and transportation networks for pedestrians, bicyclists, transit users and drivers.

Personal Actions

- Share your vision of what you want in your neighborhood with your mayor, council members, planners and others.
- Help develop and implement local and regional initiatives. Contact advocacy groups such as Green Tacoma Partnership, Cascade Land Conservancy, Futurewise, Audubon and others.
- Support libraries, parks, schools, grocery stores, farmers markets, community gardens and other resources you want to thrive in your neighborhood.
- Find a nearby park at www.discoverparks.org/ or trail at www.co.pierce.wa.us/pc/abtus/ourorg/parks/trails.htm and enjoy it!

Resources

- Tacoma-Pierce County Health Department
  Healthy Communities: (253) 798-3540, www.tpchd.org
- Municipal Research and Services Center of Washington:
  Environment, planning, parks and recreation, transportation information and more at www.mrsc.org
- Unnatural Causes Episode 5: Place Matters, www.unnaturalcauses.org
- PolicyLink Center for Health and Place:
  www.policylink.org

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2 A Study of Land Use, Transportation, Air Quality and Health (LUTAQH) in King County, WA, 2005 Executive Summary.
3 City of Tacoma Open Space Habitat Plan.
4 Centers for Disease Control and Prevention Impact of the Built Environment on Health fact sheet.
5 Unhealthy Landscapes: Policy Recommendations on Land Use Changes and Infectious Disease Emergence, Patz et al., Env. Health Perspectives, 2004
7 City of Tacoma Open Space Habitat Plan.
LAND

Wetlands

Benefits/Hazards

Wetlands are like big sponges that slow down and absorb water during storms and filter out contaminants.

- Contaminants include lead, mercury, and bacteria from animal and human waste. Without wetlands contaminants can end up in groundwater, rivers, streams and the Puget Sound.

- Loss of wetlands can result in flooding, surface water and ground water contamination.

Exposure

- Eating fish and shellfish from contaminated waters.
- Flooding from nearby rivers and streams.

Data Source: 2003 Pierce County Wetland Inventory map, 2007 Pierce County GIS data, National Wetlands Inventory. Inventories do not capture condition of wetlands.

- Pierce County Wetlands Inventory: about 38,211 land acres, 4% of total land
- Potential Wetlands: about 685,126 land acres, 64% of total land

Potential wetlands include historical wetlands identified on the National Wetland Inventory or Pierce County Wetland Inventory, areas of known flooding, or other areas regularly saturated with water.
Human Health Impacts

- Drinking water or eating fish with lead, mercury, and other toxics can result in a variety of diseases and disabilities, including cancer and birth defects. ³
- Drinking water or eating fish with human and animal wastes can result in E. coli infections and other gastrointestinal illnesses.
- Flooding can result in injury and loss of life.

Economic Impacts

- Wetlands help recharge aquifers and make water healthier for drinking and swimming. Replacing this free natural service with water treatment plants could cost $2000 to $10 million and up, depending on the type of treatment plant.
- Floods have become more costly in part because over half of the wetlands have been drained or filled in the US. ⁴
- Wetlands supply essential nurseries, shelter and food to 75% of fish and shellfish commercially harvested in the US, valued at over $1000 billion in 2004. ⁵
- Wetland-related ecotourism added over $50 billion to the US economy in 1991. ⁶

Policy Actions

Historical loss and degradation of wetlands were mainly due to expansion of agriculture and the siting of ports and industrial facilities. Continuing loss and degradation of wetlands are mainly from urban expansion, forestry and agricultural practices, and the invasion of exotic plants and animals. ⁷

- Since 1990 the Washington State Growth Management Act has required counties and local governments to protect wetlands. Protection strategies include acquisition, planning, mitigation and disincentives for turning wetlands into other uses. Washington is still experiencing a net loss of wetland acreage and functions, however.

Personal Actions

- Find out more about wetlands and how to protect them - contact your local watershed council at (253) 798-3096, or go to www.co.pierce.wa.us/pc/services/home/environ/water/ps/wcmain.htm
- Find out if you need a permit for activities near wetlands - contact Pierce County Planning and Land Services at (253) 798-7210 or go to www.co.pierce.wa.us/pc/services/home/property/pals/aboutus/resm.htm

Resources

US Fish & Wildlife National Wetlands Inventory: www.fws.gov/nwi/, (703) 358-2161


Permit information: http://apps.ecy.wa.gov/permithandbook/index.asp

Municipal Research and Service Center of Washington Wetlands page: www.mrsc.org/Subjects/Environment/wetlands.aspx#Local


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¹ Map of Pierce County wetlands at http://triton.co.pierce.wa.us/MapGallery/index.cfm
LAND
Developed Land in Urban Growth Areas (UGA)

Hazards
- Stormwater runs off developed land, carrying lead, mercury, and other pollutants into streams, rivers, lakes, Puget Sound, fish and shellfish.
- Flooding and landslides in areas where forests, wetlands, farmland and open spaces have been covered over, leaving nothing to absorb rain.

Exposure
- Drinking water and eating food contaminated by stormwater runoff.¹

Human Health Impacts
- Lead can cause behavioral problems, memory and learning difficulties, reduced IQ, anemia, high blood pressure and more.
- Mercury can cause behavioral and learning deficits in children exposed in the womb.² High levels of mercury effects include irritability, shyness, tremors, changes in vision or hearing, and memory problems.³

Economic Impacts 4

- Cleaning up stormwater contamination from heavy rain in a single watershed can cost up to $1.5 million.
- Protecting water resources from stormwater contamination costs Puget Sound jurisdictions from more than $100,000 to $5 million each year.
- Property damages from flooding in the Puget Sound region have cost more than $50 million since 1978.
- Pollution prevention and cleanup for one shellfish growing area can cost up to $200,000 annually.
- Lost shellfish sales from closing a harvest area range from $80,000 to $300,000 a year.

Policy Actions

Laws, regulations, and other policies that influence land development are numerous and often complex. Pressures increase with population growth. Pierce County population is expected to grow from about 750,000 in 2005 to about 1,000,000 in 2025. 5

- Since 1990 the Growth Management Act requires that counties, cities and towns develop and implement comprehensive plans for population growth over the next 20 years. One goal is to focus urban growth in designated Urban Growth Areas. 6
- Graham and Gig Harbor Community Plans require low impact development. Tacoma Housing Authority and others are using low impact development elements.

Personal Actions

- Get involved in development decisions made in your community.
  - If you live in a city or town, call your planning department or mayor.
  - If you live in unincorporated Pierce County call (253) 798-2785 or go to www.co.pierce.wa.us/pc/services/home/property/pals/landuse/commplans.htm

Resources

Washington State Community, Trade and Economic Development: Growth Management:
www.cted.wa.gov/site/375/default.aspx, (360) 725-3055

Washington State University Pierce County Extension Water Program: Low impact development and rain gardens:
www.pierce.wsu.edu/Water_Quality/LID/
(253) 798-3257

Puget Sound Georgia Basin Ecosystem Urbanization and Forest Change Indicator: www.epa.gov/region10/psgb/indicators/urbaniz_forest_change/index.htm

Sightline Institute: Reports, maps and more at www.sightline.org, (206) 447-1880

2 Washington State Dept. of Health Fish Facts for Healthy Nutrition web page.
3 Agency for Toxic Substances & Disease Registry (ATSDR) Lead and Mercury ToxFAQs.™
6 Pierce County Code Chapter 19.A.20 Introduction
Pierce County Environmental Health Trends 2008

WATER
Swimming Beach and Lake Use Advisories

Data Source: Tacoma-Pierce County Health Department. “Other” category includes alum treatment of Wapato Lake in 2008.

Toxic algae are monitored at 28 Pierce County lakes by health department staff and volunteers.

Bacteria are monitored at 8 marine swimming beaches at Ruston Way Waterfront, Owen, Titlow, Purdy Sandspit and Sunnyside; and 3 lakes with designated swimming beaches: American, Spanaway and Tapps.

Hazards
Bacteria, parasites, and toxic blue green algae.

Exposure
- No marine beaches had swimming advisories in 2006, 2007 or 2008.
- Fifteen lakes had use advisories in 2008: American, Bay, Bresemann, Chambers Creek, Clear, Josephine, Harts, Ohop, Palmer, Silver, Spanaway, Steilacoom, Tanwax, Wapato, and Waughop. Toxic algae advisories recommend avoiding areas with a heavy concentration of toxic algae.

Swimming during or after heavy rains or drought conditions:
- Heavy rains can overwhelm sewage treatment systems and wash bacteria and other pollutants into rivers, lakes and the Puget Sound.
- Lack of rain concentrates pollutants especially in lakes. Excessive amounts of nutrients such as nitrogen and phosphorous can lead to toxic algae blooms.
Human Health Impacts
Swimming in and ingesting contaminated waters can cause illness:

- E. coli infections can cause gastroenteritis with severe bloody diarrhea and abdominal cramps, and cause kidney failure in some people, particularly the very young and elderly. Sometimes there are no symptoms or non-bloody diarrhea.
- Cryptosporidium and Giardia cause diarrhea.
- Other parasites cause swimmer’s itch, a skin rash.
- Some blue-green algae produce toxins or poisons. Ingesting the algae while they are still poisonous can cause skin rashes, serious illness or even death.

Economic Impacts
- Estimated health costs associated with gastroenteritis are $21 - $51 million each year for Los Angeles County and Orange County beaches.
- For two Great Lakes beaches, the economic benefit of faster beach water testing methods and earlier posting of advisories or closings was about $202,000.¹

Policy Actions
- The Beaches Environmental Assessment and Coastal Health Act of 2000 (BEACH Act), provides assistance to state and local governments. Many beaches are still not monitored regularly, since Congress didn’t fully fund the BEACH Act.²
- The National Pollutant Discharge Elimination System permits discharges directly to surface waters from waste treatment plants, dairies, and other private and public facilities.³
- Low impact development (LID) is required in parts of Graham and Gig Harbor, and in larger cities and counties in Washington.⁴ LID techniques, including rain gardens, help prevent stormwater pollution from entering our waterways.
- Puget Sound Partnership 2020 Action Agenda strategies include low impact development and better management of wastewater treatment plants and onsite sewage systems.

Personal Actions
Find out if it’s safe to swim - don’t swim at a beach or lake during an advisory.
Help keep bacteria, nutrients and other pollutants out of the water:

- Practice natural lawn care: don’t use fertilizers, pesticides or other chemicals.
- Maintain your septic system.
- Properly dispose of boating wastes, pet waste and other contaminants.

Resources
Tacoma-Pierce County Health Department Swimming Beaches Program: (253) 798-6470
For beach advisories go to: www.tpchd.org/swimmingbeaches
For toxic algae information go to: www.tpchd.org/toxicalgae
Puget Sound Partnership:
(800) 54-SOUND www.psp.wa.gov/aa_action_agenda.php

¹, 2 Natural Resource Defense Council. Beach Pollution web page.
³ Washington Department of Ecology Water Quality Permits – Point Source Pollution web page
⁴ Gig Harbor and Graham Community Plans at Pierce County Public Works and Utilities Low Impact Development. Pollution Control Hearing Board 07-022, 07-023
**WATER**

Shellfish Growing Areas Closed

**Hazards**
- Biotoxins such as bacteria and toxins from algae that cause Paralytic Shellfish Poisoning and Amnesic Shellfish Poisoning.
- Bacteria, including *Vibrio parahaemolyticus*.
- Pollution from stormwater runoff, industrial activities and sewage: bacteria, lead, mercury and other pollutants.

**Exposure**
- Eating contaminated oysters, clams, mussels and other shellfish. Shellfish accumulate and concentrate contaminants from the water they live in.
- Heavy rains can overwhelm sewage treatment systems and wash contaminants into growing areas.

**Data Source:** Washington State Department of Health, Annual Inventory: Commercial & Recreational Shellfish Areas of Washington State. To capture the extent of closures, number of days areas were closed were multiplied by the miles of commercial and recreational shellfish growing area shoreline closed due to marine biotoxins, sewage, and other pollution.
Human Health Impacts

- Vibriosis symptoms include diarrhea, abdominal cramps, nausea, vomiting, headache, fever, and chills. In severe cases, hospitalization may be required.
- Paralytic Shellfish Poisoning symptoms include tingling of lips and tongue. They may progress to tingling of fingers and toes, loss of control of arms and legs, followed by difficulty in breathing. Death can result in as little as two hours.
- Amnesic Shellfish Poisoning symptoms include vomiting, nausea, diarrhea and abdominal cramps. In more severe cases neurological symptoms develop, including headache, dizziness, loss of short-term memory, seizures, coma and possibly death.
- Lead, mercury and other toxics can harm fetuses, infants and children’s brains and nervous systems.

Economic Impacts

- Pollution prevention and cleanup for one shellfish growing area can cost up to $200,000 annually.
- Lost shellfish sales from closing a harvest area range from $80,000 to $300,000 a year.

Policy Actions

- The Clean Water Act authorized the National Pollutant Discharge Elimination System permit program in 1972. Washington Department of Ecology issues these permits for discharges directly to surface waters.  
- In 2007 the Washington State legislature approved $25 million to help local communities restore Puget Sound and improve water quality. For Pierce County this includes $2 million to improve stormwater systems in Tacoma and Puyallup, and $1 million to install permeable pavement and rain gardens at a community center.
- The Puget Sound Partnership 2020 Action Agenda strategies include low impact development and better management of wastewater treatment plants and onsite sewage systems.

Personal Actions

Find out where it’s safe to harvest shellfish: call the state's Biotoxin Hotline at (800) 562-5632
Help keep contaminants out of the water:
- Properly dispose of all wastes, including pet waste
- Keep your septic system working properly

Resources

Tacoma-Pierce County Health Department Safe Shellfish Program: For information on safe shellfish harvesting and more call (253) 798-6470, extension 7, or go to www.tpchd.org/shellfish
Washington State Department of Health Office of Shellfish and Water Protection: For additional information call (360) 236-3330 or go to www.doh.wa.gov/ehp/sf/default.htm
Puget Sound Partnership: (800) 54-SOUND, For the action agenda go to: www.psp.wa.gov/aa_action_agenda.php
For information on the Puget Sound Assessment and Monitoring Program go to: www.psp.wa.gov/psamp.php

WATER
Precipitation, Stream Flow and Well Levels in Chamber-Clover Watershed

Benefits and Hazards
- Rain and melting snow provide us with drinking water, and water for our homes, farms, parks, businesses, rivers, lakes and more.
- Heavy rains, or stormwater, run off impervious, developed surfaces and carry pollutants into Puget Sound, rivers, and lakes.
- Heavy rains can cause flooding in areas that don’t have forests, wetlands, farmland, and open spaces to absorb the water.

Exposure
- Drinking contaminated water: about half of Pierce County’s water supply is from wells, about half from the Green River.
- Eating contaminated shellfish or fish, or swimming in contaminated water.

Drought and low water levels can result in more concentrated contaminants, saltwater intrusion, and shortages of clean, inexpensive water.

Data Source: Tacoma-Pierce County Health Department Long-Term Groundwater Monitoring Program: precipitation (rain) at McChord Air Force Base, stream flow at Chambers Creek and a shallow monitoring well in Lakewood.
**Human Health Impacts**
- Every system in our body depends on clean water. Lack of water can lead to dehydration, which can lead to fatigue, headaches, weakness and other symptoms.  
- Drinking, eating food from, swimming in and ingesting waters contaminated with bacteria and toxics can cause a variety of health impacts.

**Economic Impacts**
- We rely on an adequate supply of clean, fresh water for agriculture, fish, hydroelectricity generation, and public water systems that supply water to homes, businesses and other places.
- Pierce County residents and businesses used about 160 gallons per day, per person, in 2005. About 90 gallons per person is used each day at home, mostly for bathing, toilets, watering and washing. Drinking water costs about $2.00 per 1000 gallons, on average, in the US. This includes costs of operating, maintaining, and monitoring public water systems to ensure a safe, reliable supply.

**Policy Actions**
- In 2007 the state Water Use Efficiency rule requires large water systems to show they are using water efficiently. Large water systems are required to develop and implement comprehensive water system plans that include conservation.
- In 2006 and 2007 Washington legislation directed state agencies to develop and adopt water reclamation regulations by 2010, and to reduce barriers to water reclamation.
- National, state, regional and local organizations are promoting low impact development, rain gardens and other landscaping that reduces pollution from stormwater runoff and improves recharge of groundwater supplies.

**Personal Actions**
- Use less water at home and at work:
  - Install low-flow faucet aerators, showerheads, toilets and clothes washers.
  - Fix plumbing leaks – nearly 14% of household water leaks down the drain!
  - Plant rain gardens and native plants that don’t need watering once established.
- For more ideas, go to: www.h2ouse.org

**Resources**
- Tacoma-Pierce County Health Department Long-Term Groundwater Monitoring Program: (253) 798-2845, www.tpchd.org/groundwatermonitoring
- Washington State University Pierce County Extension Water Program. For information on low impact development and rain gardens call (253) 798-3257 or go to: www.pierce.wsu.edu/Water_Quality/LID/
- Washington Native Plant Society: For information on native plants call (888) 288-8022 or go to: www.wnps.org

1 Water: How much should you drink every day? Mayo Clinic Staff, April 2008.
2 Liquid Assets at www.liquidasses.psu.edu
3 2005 Pierce County water use data from US Geological Survey.
5 Washington State Department of Health Office of Drinking Water, Water Efficiency web page
7 Municipal Research and Services Center of Washington, Water Conservation web page.
**WATER AND FOOD**

**Mercury in Puget Sound Coho Salmon**

**Hazards**

Mercury and methylmercury.

**Exposure**

- About 1000 pounds of mercury are released into the Puget Sound Basin each year. Most comes from burning of fossil fuels such as coal, petroleum and natural gas. It also comes from improper disposal of fluorescent light bulbs and industrial wastes, and other human and natural sources.

- Mercury released into the air settles into water or onto land, where it runs off into water.

- Microorganisms change mercury into methylmercury, a highly toxic form that is stored in muscle and accumulates in fish and people.

**Human Health Impacts**

- Levels of methylmercury in people and fish depend on what we eat and how long we live – where we are in the food web.

- Nervous systems are sensitive to all forms of mercury, especially methylmercury. Mercury has been shown to cause behavioral and learning deficits in children exposed in the womb.

- High levels effects on the brain may include irritability, shyness, tremors, changes in vision or hearing and memory problems.

**Data Source:** Washington State Department of Fish and Wildlife, King County Department of Natural Resources laboratory analyses of mercury levels in composite Coho muscle/fillet tissue samples of wild, hatchery and unknown origin. Equal numbers of composites from Coho caught in the Nisqually and Duwamish rivers average, highest and lowest levels (range) are shown above.
Economic Impacts
Recreational and commercial fishing industry revenues may be lost when states issue advisories about eating fish.

Policy Actions
Washington’s Persistent Bioaccumulative Toxins Strategy addresses mercury and other contaminants.

- The 2003 Mercury Education and Reduction Act mandates reduced use and elimination of mercury in many consumer products. ⁵

Although Tacoma Power relies mostly on hydropower to generate electricity, area residents and businesses rely primarily on fossil fuels for transportation, industrial, commercial and residential energy. ⁶

- In 2005 state legislation passed requiring cars, appliances and public buildings to be more energy efficient and providing tax incentives for more alternative fuel vehicles. ⁷

Personal Actions
Help keep mercury and other contaminants out of water, air, soil and fish:

- Recycle or properly dispose of products containing mercury and other toxics, such as fluorescent light bulbs. To find out how, call (253) 798-2179 or go to www.co.pierce.wa.us/pc/services/home/environ/waste/hazardous.htm.
- Take unused medicines to a pharmacy that’s part of the unwanted medicine return program. Find out what they take and where they are at www.medicinereturn.com.
- Use fewer fossil fuels: drive less, conserve energy at home and work.

The American Heart Association recommends two meals of fish per week for a heart healthy diet. To reduce your possible exposure to mercury the Washington Department of Health recommends:

- Eating Coho and most other salmon, trout, cod, flounder and many other seafood 2-3 meals per week.
- Limiting Chinook salmon from the Puget Sound, halibut, rockfish and some other fish to 1 meal per week.

Resources
Washington Department of Health Office of Environmental Health Assessment:
For advisories on eating fish call (877) 485-7316 or go to www.doh.wa.gov/fish

Washington Department of Fish and Wildlife Puget Sound Ambient Monitoring Program: Call (360) 902-2843 or go to http://wdfw.wa.gov/fish/psamp/index.htm

Puget Sound Partnership: (360) 725-5444, www.psp.wa.gov

US Environmental Protection Agency Mercury web page: www.epa.gov/hg/index.htm

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¹ Washington State Department of Health, Mercury Chemical Action Plan and ATSDR ToxFAQs
³ Washington State Department of Health Fish Facts for Healthy Nutrition web page.
⁴ ATSDR ToxFAQs™ for mercury at www.atsdr.cdc.gov/toxfaq.html#p
FOOD AND LAND
Agricultural Land

Data Source: Pierce County Assessor’s Office 2005 data in Pierce County Agricultural Strategic Plan, January 2006.

- Almost 5% of Pierce County land is zoned agricultural based on soil types.
- Almost 3% of Pierce County land is used for agriculture, including vegetable, fruit, dairy, and beef production; horse farms; and ornamental plant production.

Hazards
Covering up prime agricultural soils:
- Increases transportation distances for food, which adds air pollution and greenhouse gases.
- Increases polluted storm water runoff into lakes, swimming beaches and shellfish growing areas.
- Reduces the ability of the land to absorb water, increasing flooding and decreasing groundwater recharge.
- Reduces the ability to grow healthy foods locally, which threatens food security.

Exposure
Exposure to benefits and hazards are through our food supply, air and water.
Human Health Impacts

- Well-managed agricultural lands contribute to healthier drinking water, improved air quality, productive green spaces, scenic relief and a greater sense of place.  
- Local farming helps ensure production of and access to fresher, safer food supplies. Food may be less processed and have fewer additives when sold closer to market.  
- Community Supported Agriculture members say they eat more vegetables.

Economic Impacts

- Local farms provide jobs.
- For every $100 spent at a farmers market, $62 is spent locally. For every $100 spent at the average grocery store, only $25 is spent locally.
- Farmlands generate about twice as much public revenues as public costs. In comparison, residential areas generally cost the public 20% more than the revenues they generate for the public.

Policy Actions

- The Pierce County Farming Assistance, Revitalization and Marketing (FARM) Program and FARM Advisory Board are helping implement the 2006 Pierce County Agricultural Strategic Plan.
- In 2007 the Pierce County Council passed a Purchase/Transfer of Development Rights ordinance allowing an owner of valuable agricultural land to sell or transfer development rights to a developer. The developer can then build to a greater density in urban growth areas. Agricultural land in Pierce County costs from $50,000 an acre in some rural areas, to as high as $1 million in more urban areas.

Personal Actions

- Buy from local farm stands and farmers markets.
- Ask for local farm products at supermarkets, restaurants and schools.

Resources

**Washington State University Small Farm Team:**
(253) 445-4566, smallfarms.wsu.edu
Farm & crop locator: smallfarms.wsu.edu/farms/locate_search.asp

**Washington State University Extension Pierce County:**
(253) 798-FARM (3276)
Agriculture & Land Management:
www.pierce.wsu.edu/Agriculture/

**Pierce Conservation District:** www.piercecountycd.org
Puyallup office: (253) 845-9770;
Key Peninsula office: (253) 884-9474
Farming assistance, resource conservation and more.

**Washington Municipal Research and Services Center:**
Farmland Preservation Techniques and Sustainable Agriculture web page: www.mrsc.org/subjects/planning/farmland.aspx

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2 *WSU Extension Small Farms Team; A Primer on Community Food Systems: Linking Food, Nutrition and Agriculture*, Cornell University.
6 *Farmland Information Fact Sheet: Cost of Community Services*, American Farmland Trust, August 2006.
7 A market-based way to save Pierce County farmland, Cascade Land Conservancy web site at cascadeland.org/news/recent-press/a-market-based-way-to-save-best-farmland/
8 *Preserving Farmland and Farmers: Pierce County Agriculture Strategic Plan*, Barney & Worth and Globalwise for Pierce County Economic Development Division, January 2006.
**Hazards**

Lead and arsenic.

**Exposure and Sources**

Breathing dirt or dust, and eating food contaminated with lead and arsenic.

- About 75% of the lead in old gasoline and paints settled in soils and on buildings. ¹
- Lead and arsenic in our soils came from the ASARCO smelter, closed in 1986, and from other industrial and agricultural activities.
- Arsenic also comes from burning fossil fuels and from treating and treated lumber. ²
- An organic form of arsenic is also naturally found in rocks, soil, water and shellfish. ³
**Human Health Impacts**

- Most people who play or garden in lead- and arsenic-contaminated soils are unlikely to become suddenly ill.⁴
- Arsenic exposure has been linked to heart disease, diabetes, and cancer of the bladder, lung, skin, kidney, liver, and prostate.⁵
- Lead can cause behavioral problems, permanent learning difficulties and lower IQ. Children under 6 years old are at greatest risk.⁶

**Economic Impacts**

- Lead exposure impacts on young children result in estimated losses of more than $40 billion per year in the US, from lower wages and earnings over their lifetime.⁷

**Policy Actions**

- In 1973 EPA issued standards that gradually reduced lead in gasoline, and banned lead in motor vehicle gasoline after 1995.⁸
- In 1978 the federal Lead Based Paint Poisoning Prevention Act limited lead in consumer paints to less than 0.06 percent.
- In 1983 EPA placed the Ruston ASARCO smelter and other sites on the Superfund National Priorities List due to widespread soil, sediment and water contamination.
- In 2005 the Washington State Legislature passed a law that helped provide soil contamination testing and resources for schools and daycares in western Washington.

**Personal Actions**

Eat a healthy diet, including fruits and vegetables rich in calcium, iron and Vitamin C which may help prevent absorption of lead.⁹

Reduce your exposure to lead, arsenic and other soil contaminants:

- Wash produce, hands and clothing, and remove shoes before going indoors.
- Keep soil moist. Wear a dust mask or respirator if it’s dusty outdoors.
- Test soils for lead and arsenic levels. Replace or cover contaminated soils.
- Don’t add contaminants to your soils – use Integrated Pest Management or organic gardening methods.

**Resources**

Tacoma-Pierce County Health Department Dirt Alert Program: (253) 798-6492, [www.tpchd.org/dirtalert](http://www.tpchd.org/dirtalert)

A Small Dose of... Information on lead, arsenic and other toxic chemicals at [www.asmalldoseof.org/toxicology/index.php](http://www.asmalldoseof.org/toxicology/index.php)

Washington State University Extension Integrated Pest Management: [http://ipm.wsu.edu](http://ipm.wsu.edu)

Seattle Tilth organic gardening information: (206) 633-0451, [www.seattletilth.org](http://www.seattletilth.org)

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5 Agency for Toxic Substances Disease Registry ToxFAQs™
6 Tacoma-Pierce County Health Department Dirt Alert Program.
8 US Environmental Protection Agency Gasoline Fuels web page.
9 Managing Elevated Blood Lead Levels Among Young Children, Chapter 4 -Nutritional Assessment and Interventions, Centers for Disease Control and Prevention, 2002.
**FOOD**

**Farmers Markets**

- **Benefits**
  - Eating more fresh fruits and vegetables: only about 22% of adults and 23% of 10th graders in Pierce County say they eat 5 or more servings of fruits and vegetables each day. ¹
  - Fruits and vegetables are full of vitamins and minerals. Vitamin C improves iron absorption, which decreases lead absorption. ²

- **Access**
  - Individuals living near farmers’ markets that sell fresh produce have easier access to fresh fruits and vegetables in season. Easier access may increase the amount of fresh, local produce people eat.

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**Data Source:** Pierce County FARM Program list of 2008 Farmers’ Market.

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¹ Pierce County Environmental Health Trends 2008
² Pierce County Environmental Health Trends 2008
Human Health Impacts
Eating more fruits and vegetables may help reduce your risk of stroke, high blood pressure, heart disease, some types of cancer, and birth defects. ³

Economic Impacts
Farmers’ markets provide jobs and keep more food dollars in the local economy:
- For every $100 spent at a farmers’ market, $62 is spent locally.
- For every $100 spent at the average grocery store, $25 is spent locally. ⁴

Policy Actions
- USDA Women, Infants and Children Farmers’ Market Nutrition Program provides coupons that can be used to buy fresh, unprepared fruits and vegetables from approved farmers, farmers’ markets or roadside stands. ⁵

Personal Actions
- Grow your own fruits and vegetables at home or in a community garden.
- Buy fresh, local fruits and vegetables at nearby grocery stores and farmers’ markets.
- Tell nearby grocery stores that you would like them to carry fresh, local produce.

Resources
Tahoma Food Policy Coalition:
Join farmers, farmers’ market representatives and others working on improving our local food system - call (253) 845-9770 x108

Washington State University Pierce County Extension:
Nutrition Program:
(253) 798-7180
www.pierce.wsu.edu/Nutrition/index.htm
Agriculture and Land Management:
(253) 798-3276, www.pierce.wsu.edu/ag

Cascade Harvest Coalition and Puget Sound Fresh:
Find farmers’ markets and farms: (206) 632-0606,
www.pugetsoundfresh.org

¹ Behavioral Risk Factor Surveillance Survey data from 2005 for adults and 2006 for 10th graders.
² Agency for Toxic Substances and Disease Registry Lead ToxFAQs™
³ Centers for Disease Control and Prevention Fruit & Vegetable Benefits web page.
⁵ USDA WIC Farmer’s Market Nutrition Program.
FOOD
Foodborne Illnesses

Data Source: Tacoma-Pierce County Health Department. “Other” sources of exposure to bacteria include traveling and contact with other people. These data represent only a fraction of foodborne illnesses that occur each year – many people don’t report or get treatment for symptoms, and even fewer are tested to find out what caused the illness. ¹
Hazards

Common organisms causing foodborne illnesses include bacteria such as Salmonella, Campylobacter and E. coli.²

Exposure and sources

- Raw foods from animals are the most likely to be contaminated with bacteria: raw meat and poultry, raw eggs, unpasteurized milk and raw shellfish.
- Fruits and vegetables processed under less than sanitary conditions may also be contaminated with bacteria.³
- Bacteria can contaminate food at any stage in the food system, from farm to your kitchen table. Changes in the food sources and production have increased new sources of foodborne illnesses.⁴

Human Health Impact

Foodborne illnesses range from short and mild to life-threatening. Symptoms are most often gastrointestinal, but can also be similar to allergies and general infections.

- Salmonellosis symptoms include fever, headache, nausea, vomiting, abdominal pain and diarrhea.
- Campylobacteriosis symptoms include severe abdominal pain, fever, nausea and diarrhea. In 2–10% of cases the infection may lead to chronic health problems, including reactive arthritis and neurological disorders.⁶
- E. coli symptoms include mild diarrhea or no symptoms at all. Most identified cases develop severe diarrhea and abdominal cramps. Blood is often seen in the stool.

Economic Impacts

Diseases from Salmonella, Campylobacter, and other major pathogens are estimated to cost up to $35 billion annually in the US, in medical costs and lost productivity.⁷

Policy Actions

- In 1906 Congress passed the Meat Inspection Act and the Pure Food and Drug Act to protect consumers against foodborne illness. Regulations and initiatives to improve food safety have focused on inspections, surveillance, research, education and more.⁸ The global nature of the food industry makes inspecting for and identifying foodborne illnesses a challenge. Authority to shut down facilities and recall food is limited.⁹
- The Organic Foods Production Act of 1990 and the National Organic Program Rule of December 2000 set requirements for composting and applying raw animal manure, to reduce risk of E. coli food contamination.¹⁰

Personal Actions

- Wash your hands, especially before and after handling food.
- Wash fresh fruits and vegetables thoroughly before eating.
- Clean surfaces and utensils thoroughly to avoid contaminating other foods.
- Call your local health department if you think something you ate made you sick.

Resources

Tacoma-Pierce County Health Department Food & Community Safety:
Food establishment inspection reports and other information: (253) 798-6460, www.tpchd.org/foodsafety

World Health Organization Food Safety and Foodborne Illness:

2 Washington State Department of Health Notifiable Conditions Disease of Foodborne Origin web page; World Health Organization Food safety and foodborne illness web page.
3 CDC Foodborne Illness web page, What foods are most associated with foodborne illness?
4 World Health Organization Foodborne diseases, emerging web page.
6, 7 World Health Organization Food safety and foodborne illness web page.
8 US National Food Safety Programs.
9 Food Attribution: Critical Data for FDA’s Regulator Programs, Buchanan, US FDA Center for Food Safety and Applied Nutrition
10 Organic Trade Association E. coli web page.
HAZARDOUS WASTE
Toxic Releases

Data Source: US Environmental Protection Agency Toxic Release Inventory (TRI). The TRI data above include over 500 chemicals and chemical categories disposed of or released on-site from certain industrial and federal facilities in Pierce County.

Hazards
More than 500 toxic chemicals, including lead and lead compounds, and mercury.

Exposure
- Almost 95,000 people live within 1/2 mile of Pierce County TRI sites.¹ Those living, working, and playing downwind and downstream from sites releasing chemicals are most exposed.
- Additional exposures may come from contaminated drinking water, soil, or food.
- Air releases often end up in soil and water.

Human Health Impacts
Some chemicals are more toxic than others, so smaller amounts are more likely to impact people’s health. Many of the chemicals accumulate and persist in our bodies.²
- Immediate and long-term health impacts include cancer, liver and kidney damage, and damage to nerves, blood, heart, digestive, respiratory and immune systems.³
Economic Impacts

- Between 2000 and 2004 Pierce County had an average of 26 children with cancer, each year, with an average $723,000 in direct and indirect costs.
- Lead and other toxics impact the brain, mind and intelligence. Each lower IQ point is estimated to result in a loss of about $13,000- $17,000 in lifetime earnings, per person. 4

Policy Actions

After chemical releases in Bhopal, India and in West Virginia, industrial workers, communities, public interest and environmental organizations in the US demanded information on toxic chemicals released.

- The Emergency Planning and Community Right to Know Act of 1986 established the TRI, to help communities be more informed about and prepared for chemical hazards in their areas.
- The Pollution Prevention Act of 1990 expanded the TRI. Medium, small and unpermitted facilities often aren’t tracked or easily accessible, however. 5
- In 2006 EPA issued the Toxics Release Burden Reduction Rule, exempting almost half of Washington facilities from reporting requirements. 6 The 2009 Omnibus Appropriations Act rescinded this rule.

The Washington State Legislature directed the Washington State Departments of Ecology (Ecology) to reduce persistent, bioaccumulative toxins.

- In 2003 the Mercury Education and Reduction Act mandated the proper disposal and recycling of many mercury-containing products.
- In 2007 the Washington State PBDE Law banned the manufacturing, knowingly selling, or distributing for in-state use products containing polybrominated diphenyl ethers, as of 2008.

Personal Actions

Find out about TRI facilities, releases, maps and additional information for your area at:
- www.epa.gov/triexplorer/
- www.epa.gov/enviro/
- www.scorecard.org

Resources

US Environmental Protection Agency:
- Toxic Release Inventory: www.epa.gov/tri/
- Envirofacts Data Warehouse: www.epa.gov/enviro/

Washington Department of Ecology:
- Toxic Hazards information: www.ecy.wa.gov/waste.html
- Hazardous Substance Information and Education Office: (800) 633-7585

Agency for Toxic Substances and Disease Registry:
- www.atsdr.cdc.gov, (800) 232-4636

A Small Dose of . . . : learn about the health effects of common chemicals at www.asmalldoseof.org/

Scorecard Pollution Information:
www.scorecard.org

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1 Based on a GIS analysis of 2000 US Census population estimates, including adults and children
2 New Jersey Department of Health and Human Services Right to Know Hazardous Substance Fact Sheets
3 Scorecard web site list of chemicals and health effects at www.scorecard.org
4 Societal Costs of Exposure to Toxic Substances: Economic and Health Costs of Four Case Studies that are candidates for Environmental Causation, Environmental Health Perspectives, December 2001
5 US Environmental Protection Agency Fact Sheet on EPCRA Section 313 Rulemaking, Persistant Bioaccumulative Toxic Chemicals
6 Environmental Justice Implications of Reduced Reporting Requirements of the TRI Burden Reduction Rule, Children’s Environmental Health Institute, 2008.
HAZARDOUS WASTE
Meth Labs and Dumpsites

Hazards

1. Unsanitary living conditions, infectious waste (needles) and chemicals.

2. Typical chemicals found at meth lab sites are poisonous, flammable, toxic, explosive, corrosive and/or carcinogenic. About six pounds of waste results from making one pound of meth.

3. There may be additional hazards from violence, child neglect/abuse and access to weapons.

Exposure

1. Chemicals can be breathed in, absorbed through skin, and ingested through water or food.

2. During a “cook” and after, meth lab chemicals are found in the air and soil, on furniture, flooring and personal belongings.

3. Chemicals end up in septic systems and abandoned wells, dumped in nearby forests, streams and other waterways.

Data Source: Washington State Department of Ecology. The average waste removed per meth lab is roughly estimated at 50 pounds.
Human Health Impacts

Many commonly used meth lab chemicals are fat-soluble and can accumulate in our bodies. In 2001 about 35 percent of the over 2,000 children found at US meth lab sites tested positive for toxic levels of chemicals in their bodies.³

- Adults and children exposed to meth lab chemicals, explosions and fires can suffer from eye, skin, heart, lung, liver and thyroid damage; kidney and respiratory failure; and other immediate and long-term health problems.
- Children are most at risk, and are likely to also suffer from neglect and abuse, poor hygiene, malnourishment and a variety of negative social and emotional effects.⁴

Economic Impacts

- About 95% of reported meth labs must be decontaminated before they can be used for another purpose. Decontamination costs to Pierce County property owners typically range from $9,000 to $18,000 for making a 3-bedroom home and lot usable again.⁵ Costs of cleaning up a meth site can reach $150,000.⁶
- About half of residential drug labs are found on rental properties – loss of rental income and tenant vandalism result in additional costs.

Policy Actions

Pierce County has been known as the state’s meth lab capital, with 40% of the labs and dumpsites reported in the state, in 2008. Some policies to address this:

- 2000: Washington State Methamphetamine Initiative brought together law enforcement, forensics, professional training, environmental and health services, community mobilization, and public education and treatment.
- 2006: Restrictions on the sale and purchase of some cold and sinus medicines used to make meth went into effect.⁷ The number of reported meth labs went down.

Personal Actions

- Be aware of signs of a meth lab, such as chemical odors, increased security or paranoia, and excessive garbage accumulation. If you suspect a meth lab, do not touch anything and call local law enforcement immediately!
- Develop neighborhood watches or community action teams. For assistance call (360) 870-4841 or (253) 820-9796, or go to www.meooow.org.

Resources

Pierce County Narcotics Hotline: Call (253) 798-7537 to report suspicious activity.

Tacoma-Pierce County Health Department Drug Lab Remediation Program: For general information on meth lab cleanup and waste issues call (253) 798-6566. Go to www.tpchd.org/meth for a map and list of identified meth labs.

Washington State Department of Health Clandestine Drug Lab Home Page: For information on certified cleanup contractors call (360) 236-3381 or go to www.doh.wa.gov/ehp/ts/CDL/default.htm


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2 Riverside County Drug Endangered Children Program web site.
3 National Drug Intelligence Center Children at Risk bulletin.
4 Washington State Department of Health Meth Lab Fact Sheet.
6 Washington State Attorney General’s Office Meth Statistics.
WASTE
Solid Waste Generated

Data Source: Washington State Department of Ecology. Data include municipal (residential and commercial) and industrial waste generated in Pierce County.

Benefits
- Reducing waste saves raw materials and the energy it takes to extract, transport, process, manufacture and dispose of products.
- Reducing waste saves money in Tacoma and other communities with “pay-as-you-throw” programs where residents pay for the amount of waste they dispose.

Hazards
- Transportation of waste contributes to traffic, noise, and air pollution, including diesel particulate matter and greenhouse gases.¹
- Burning garbage and construction debris contributes to particulate matter and other air toxics, and is illegal.²
- Liquids that leach from landfills may contain lead, mercury and other toxics, depending on what was put in the landfill.
- Decomposing waste produces methane, a greenhouse gas more potent than carbon dioxide.³
Exposure

• Breathing air downwind from waste transportation routes and facilities.

• Drinking water with contaminants that leach from leaking landfills. As of 2006 there were 31 closed dumpsites and landfills in Pierce County. 4

Human Health Impacts

• Breathing or swallowing hazardous materials that get into the air or water can cause dizziness, headaches, cancer, and other illnesses.

• Fine particulate matter contributes to respiratory illnesses, heart disease, and cancer.

Economic Impacts

• Disposing of garbage costs $166 a ton in unincorporated Pierce County in 2004. Recycling residential household waste is less expensive, at $112 a ton. 5

• When the main landfill we send our waste to in Graham fills up, waste disposal costs are expected to rise. The landfill is projected to close in 2028. 6

• Managing Pierce County's waste was expected to cost about $31 million in 2005. This includes costs of monitoring methane gases, and surface water and groundwater contamination at landfills.

Policy Actions

• In 1985 landfill regulations became more protective of environmental health.

• The Pierce County Council approved a single-family curbside recycling program using a single container for recyclables in 2004. Since then recycling has increased from an average of 30 pounds to almost 50 pounds in 2007, per year, per household. 7

• Pierce County Solid Waste Management Plans include increasing recycling and using waste to produce energy or products. 8

Personal Actions

Reduce the amount of waste we create:

• Precycle: think before you buy.

• Reduce, Reuse and Recycle - at home, work and play. Buy products that have less packaging, are reusable (not single-use), less hazardous, and recyclable.

• Recycle fluorescent light bulbs and all products that contain mercury and other toxics properly.

• Recycle TVs, computers and monitors: find out where at www.ecyclewashington.org or 1-800-RECYCLE.

Resources

Pierce County Solid Waste and Recycling: (253) 798-2179
www.co.pierce.wa.us/pc/abtus/ourorg/pwu/about/solwasterecmenu.htm

Tacoma-Pierce County Health Department Solid Waste Program: (253) 798-6047, www.tpchd.org/waste

Washington State Department of Ecology Beyond Waste Program: (360) 407-6654
www.ecy.wa.gov/beyondwaste/

Northwest Product Stewardship Council: (206) 723-0528
www.productstewardship.net/

1 Solid Waste Management, Local Government Environmental Assistance Network.
4 Closed Landfill Study, Tacoma-Pierce County Health Department, revised 2006.
5 Curbside Recycling: collection issues and trends, Pierce County Dept. of Public Works and Utilities, 2004
7 Single-Cart Curbside Recycling: 2 1/2 Years, Pierce County Dept. of Public Works and Utilities, 2008.
8 Pierce County Solid Waste Management Plan Supplement, November 2008.
WASTE
Litter, Illegal Dumping and Public Nuisance Vehicles

- Accumulation of garbage and abandoned vehicles attracts rats, mosquitoes and other disease-carrying creatures.
- Illegally dumped household, commercial, construction, and other garbage can contain medical waste, asbestos, chemicals, metals and dangerous objects.
- Illegally dumped waste may pose flooding hazards by blocking ravines, creeks, culverts and drainage basins.
- The waste can also pose fire hazards from spontaneous combustion or arson, and is associated with other forms of illegal activity.

Exposure

- Children playing near the waste may be exposed to hazardous liquids or dust.
- People may also be bitten by rats, mosquitoes, or raccoons attracted by waste.
- If hazardous materials get into rivers, streams, aquifers, or wells, they could contaminate drinking water, swimming areas and seafood.

Human Health Impacts

- Burns and bites, and mosquito-borne diseases such as West Nile Virus and encephalitis.
- Long-term risks from exposure to hazardous materials include cancer and neurological damage.

Economic Impacts

Illegal dumping, abandoned vehicles and litter result in lower property values, lost fees and tax revenue, and agency costs:

- Pierce County Responds received more than 5000 phone calls and 450 online complaints, inspected 1504 sites, assisted 384 property owners, and removed 1239 nuisance vehicles in 2008.
- Washington State Department of Ecology Litter Program spent over 6600 hours collecting over 90,000 pounds of litter in Pierce County, in 2007.
- Illegal dumping costs Fort Lewis over $500,000 annually. Over 25% of investigations into ownership of dumped or abandoned property done since June 2005 have led to voluntary cleanup actions, avoiding estimated direct costs of $80,000 to 100,000 per year.\(^2\)

Policy Actions

- Since 2005 a law requires that companies hauling recyclable materials register with Washington Department of Ecology and that they take materials to a recycling facility. Violators are subject to a $1000 fine.\(^3\) Several of Pierce County’s “Dirty Dozen” illegal dumpsites were associated with “sham” recyclers.
- Since 2004 Pierce County single-stream curbside recycling made recycling easier. Illegal dumping may increase as disposal costs increase, however.

Personal Actions

- Properly recycle and dispose of waste, and hire legitimate companies or individuals to haul waste. To find out how call Pierce County Solid Waste at (253) 798-2179.
- If you see someone littering or dumping waste illegally, get the license plate and make and model of the vehicle and call the Litter Hotline at (866) LITTER1.
- Report past illegal dumping ASAP to Pierce County Responds at (253) 798-4636.
- If you are a victim of illegal dumping, contact Pierce County Responds to see if they can help you with disposal fees.
- Organize a cleanup: for example, First Creek Neighbors holds regular cleanups. They and the City of Tacoma have hauled away over 140 tons of waste.

Resources

Pierce County Responds: (253) 798-4636
www.piercecountyresponds.org

Washington State Department of Ecology Litter Program:
To reach the Litter Hotline call (866) 548-8371
www.ecy.wa.gov/programs/swfa/litter/

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1 EPA Illegal Dumping Prevention Guidebook, March 1998.
2 January 2008 email from Ken Smith, Resource Conservation and Recovery Act Program Manager, Fort Lewis Public Works Environmental Division
3 Pierce County Solid Waste Plan Update 12/6/06, Sham Recycling.
**ZOONOTIC DISEASES**

**Animal Bites and Rabies**

**Hazards**
- Rabies virus is the greatest hazard, because it’s usually fatal.
- Injury and other infections are additional hazards.  

**Exposure and sources**
Bites by infected domestic or wild animals can expose people to the rabies virus.

- Bats are the main sources of the rabies virus in our area. About 5-10% of bats submitted for testing in Washington State are infected with the rabies virus. These bats tend to be sick or injured. About 1% of healthy bats are thought to be infected with the rabies virus.
- The last suspected rabid dog was identified in Pierce County in 1987.

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**Data Source:** Tacoma-Pierce County Health Department. Reported cases may represent a fraction of the actual number, since many people probably don’t report bites or seek treatment.
Human Health Impacts

Rabies is a severe viral disease that affects the central nervous system. Symptoms normally begin 2 - 8 weeks after exposure:

- Early symptoms include headache and fever.
- The disease rapidly progresses into a severe illness, which may include agitation, confusion, paralysis and difficulty swallowing.
- Once symptoms develop, most patients then die within a few days or weeks.
- Both people in Washington State most recently infected with the rabies virus died, in 1995 and 1997. They were not aware that they had been bitten. Both had a type of the rabies virus found in bats. 4

Economic Impacts 5

- Rabies prevention and control costs an estimated $300 million per year in the US.
- Rabies treatment is usually over $1,000.
- Costs are shared by health agencies, universities, veterinarians, humane societies and individuals. They often don’t have enough money to pay for testing and treatment.
- Medical costs related to dog bites were estimated at over $160 million in 1994, for the 17 deaths, nearly 6000 hospitalizations and more than 330,000 emergency department visits in the US.

Policy Actions

The number of people dying from rabies has decreased to an average of 2 or 3 per year in the US since animal control and vaccination programs begun in the 1940’s and oral rabies vaccination programs in the 2000’s have eliminated domestic dogs as reservoirs of rabies in the US. 6

Personal Actions

Protect pets and people – get pets vaccinated routinely. Consult your veterinarian.

Avoid contact with domestic and wild animals that might bite you.

- Leave domestic animals alone if you don’t know them.

If you are bitten:

- Clean the site of any animal bite with soap and water.
- Immediately contact the Tacoma-Pierce County Health Department and your health care provider to find out if you need treatment, and if you should have the animal tested for rabies.

Resources

Tacoma-Pierce County Health Department Zoonotic Disease Program:

For information or to report animal bites: (253) 798-7694
Veterinary Newsletters: www.tpchd.org/vetnewsletters

Washington State Department of Health Zoonotic Disease Program: For information call (360) 236-3372 or go to www.doh.wa.gov/ehp/TS/zoo.htm

Center for Disease Control and Prevention Rabies Web pages: www.cdc.gov/rabies/

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1 Washington State Department of Health Notifiable Conditions Disease Surveillance Data web page. Pierce County health care providers, hospitals, and veterinarians are required to notify the Tacoma-Pierce County Health Department of animal bites to humans.
2 For more information see the US National Library of Medicine Medline Plus Animals Bites web page.
5, 6 Centers for Disease Control and Prevention US Rabies Surveillance Data web page.
Hazard
West Nile Virus.

Exposure
- People and animals are exposed to West Nile virus by being bitten by infected mosquitoes. People can also get West Nile virus from organ transplants and blood transfusions, which are now screened.
- Only certain species of mosquitoes carry the virus and very few mosquitoes are actually infected. A mosquito becomes infected by feeding on an infected bird.
- Mosquitoes breed in stagnant water, and are more active during dawn and dusk. Climate changes may result in longer breeding seasons.2
- Mosquito-borne diseases spread most during more humid, warmer, and wetter months.

Data Source: Washington State Department of Health. This data represents a fraction of the actual number, since sick people do not always seek treatment and healthcare providers and others do not always recognize, test for or report notifiable conditions such as West Nile Virus.1 In 2008 only 33 birds were tested.
Human Health Impacts
About 20% of people infected with West Nile virus will show symptoms:

- Most of these people will develop West Nile Fever, with mild symptoms such as fever, headaches, body aches and swollen glands that normally last a few days.
- A few will have high fever, headaches, tremors, paralysis and coma. People over age 50 have the highest risk for serious illness.³
- A few may develop encephalitis (inflammation of the brain) or meningitis (inflammation of the lining of the spinal cord and brain).

Economic Impacts
- In 2007 the Washington State Department of Health spent almost $3,000 on equipment and shipping for Pierce County West Nile Virus testing. Tacoma-Pierce County Health Department West Nile Virus staff costs were about $55,000.
- If a West Nile Virus outbreak hits Pierce County or Washington State, all costs will increase.⁴ The June 2002 to February 2003 Louisiana West Nile Virus epidemic costs were estimated at over $20 million.⁵

Policy Actions
Since 2002 state and local health departments and others have been:

- Trapping, identifying, and testing mosquitoes and dead birds.
- Communicating information about the virus and how to control mosquitoes with health care providers, veterinarians, and the public.⁶

Personal Actions
Reduce mosquito habitat where larvae can grow:

- Empty stagnant water, clean clogged gutters, remove old tires and debris.
- Ensure wetlands are healthy habitat for mosquito predators.

Prevent mosquito bites:

- Repair torn screens.
- Avoid places with a lot of mosquitoes, when they’re most active: dawn and dusk.
- Wear long sleeves, long pants, and a hat when there are mosquitoes around.
- Consider using mosquito repellent products with the active ingredient “DEET.”

Leave bats alone – some carry rabies, but they eat thousands of mosquitoes each day.

Resources
Tacoma-Pierce County Health Department Zoonotic Disease Program: For information or reporting dead birds: (253) 798-6578, www.tpchd.org/WNV


1 Health care providers, hospitals, laboratories, and veterinarians are required to report suspected and confirmed cases of West Nile Virus cases to the Tacoma-Pierce County Health Department, who report cases to the Washington State Department of Health.


3 Centers for Disease Control and Prevention West Nile Virus Q & A: Transmission.


6 Washington State Department of Health What is being done in Washington? web page.
Air Quality Index is used to report how healthy or unhealthy and how clean or polluted an area’s air is. The index is calculated using ground-level ozone, particulate matter, carbon monoxide, sulfur dioxide, nitrogen dioxide and lead levels at air monitoring stations.

Carbon dioxide equivalents allow us to compare the impacts of different greenhouse gases. Emissions of gases are translated into carbon dioxide (CO2) equivalents using their global warming potentials over 100 years.

Carcinogens are substances and exposures that can lead to cancer. Risk of developing cancer depends on many factors, including the type, length and intensity of the exposure, and the person’s genetic makeup.

Ecosystems are all the interdependent living and non-living factors in an area: the plants, animals, micro-organisms, chemicals and physical aspects of the environment.

Ecosystem services are the direct and indirect benefits we obtain from nature. These include clean air, clean water, food, clothing, recreation, products, and flood control.

Environmental health addresses the physical, chemical and biological factors external to a person that can potentially affect health. It includes the assessment and control of environmental factors or conditions, to prevent disease and create environments that help people thrive.

Environmental health indicators are measures that provide information on environmental factors or conditions related to ecosystem and human health.

Food chains are the sequences of who eats whom, from bacteria and plants to animals and people. Energy and contaminants go from one organism to another, with contaminants concentrating in predators at the top of the food chain.

Food webs are networks of food chains in an ecosystem.

Greenhouse gases include carbon dioxide, methane, nitrous oxide, and hydrofluorocarbons. They allow sunlight to enter the atmosphere, and absorb and trap heat from sunlight in our atmosphere, preventing it from being reflected back toward space.

Hazards are threats to health, life, environment or property.

Impervious surfaces are surfaces that repel water and prevent it from seeping into soils. These surfaces include rooftops, sidewalks, roads, parking lots and compacted soils.

Integrated pest management uses a variety of strategies to reduce pests. One of the strategies is using limited amounts of synthetic chemicals including pesticides.

Ozone (O3) is a gas created by a chemical reaction between oxides of nitrogen and volatile organic compounds, helped by sunlight and hot weather. Ozone at ground-level, where we breathe, damages people and other life. Ozone about 10 to 30 miles above the earth’s surface forms a layer that protects life on earth from the sun’s harmful ultraviolet (UV) rays.

Particulate matter is a mix of extremely small particles and liquid droplets, of soil or dust particles, metals and other toxics. PM 10 are particles larger than 2.5 micrometers and smaller than 10 micrometers in diameter, such as those found near roadways and dusty industries. PM 2.5 are fine particles 2.5 micrometers in diameter and smaller, such as those found in smoke and haze.

Parts per billion (ppb) is one unit within a billion parts of soil, water, or air. One ppb is about one teaspoon of the substance in an Olympic-size swimming pool.

Parts per million (ppm) is one unit of something with a million parts of soil, water, air or other substance. One ppm is about 5 liters in an Olympic-size swimming pool.

Precipitation is rain.
Risks are probabilities or threats of disease, injury, death, or other negative outcome.

Stormwater is rain, melted snow, or other water that runs off surfaces and can be contaminated with bacteria, toxics, and other pollutants.

Toxics are substances that have a harmful effect on organisms, from human activities and naturally occurring.

Toxins are substances that have a harmful effect on organisms, from living cells, organisms, plants or animals.

Urban growth areas are designated by a county, with input from towns and cities, where urban development is encouraged and supported by urban services.

Wetlands are areas inundated or saturated by surface water or ground water often enough to support plants adapted to saturated soils. They generally include swamps, marshes, bogs, and other areas.

Zoonotic diseases are infectious diseases that can be transmitted from animals to humans or from humans to animals.
Environmental Health Indicators model above was developed by the agency and community members who helped select indicators in this report. It shows that people are part of ecosystems, and that awareness and actions impact ecosystem health. The model was used to structure this report, with information for each part of the model.

Please help us share and improve this report! Please call (253) 798-3823 or email mseifert@tpchd.org with any questions or suggestions.

A list of agency and community members who helped with this report and additional information are available at www.tpchd.org/ehindicators.