ductive failure in mink; the number of mink trapped has declined

substantially. The Columbia River is neglected by both States due

17. James River - Portland

During the early 1980s, when this facility was operate

vinyldiene chloride into the Columbia River. The fac

the water source for this water is pumped from on-si

18. Oregon Waste Systems

road facilities and other businesses. OWS wants to buil

a waste transfer station on this property. In 1987 low

evels of petrochemicals, DCE, PCBs, PCE, VOCs and

vinyl chloride were found in soils and groundwate

Columbia River showed elevated levels of chromius

ommended OWS and other parties conduct further

WDOE and EPA appear satisfied with clean-up resul

21. Tidewater Barge Lines

TBL dumped waste and bilge water from barges and

tugboats into a pond here for over 15 years. Petroleu

pounds were found in soils after the pond was drain

admium, zinc, copper and nickel. DEQ has rec-

19. Harbor Oil, Inc

RM 106.2, Petrochemical facility

by Crown Zellerbach, there were 5 spills of poly-

3400 N Marine Dr. Portland OR 97217 RM 106, Packaging operations Minor permit

to its scale and because it is an interstate waterway.

1. ALCOA - Vancouver Vancouver WA 98666
RM 101, Metals production

ALCOA began operating an aluminum smelter here in 1940, but recently leased the facility and permits to oth companies. ALCOA dumped 56,000 tons of waste potinings from 1973-80, contaminating the groun extensively with cyanide and fluoride. In 1990, the site ras added to the Superfund list, but clean-up has not yet begun. TCE has also contaminated groundwater. There is he Columbia River, Between 1970-80, PCB contaminated was dumped on soils 1,300 feet from the Columbia R er. In 1990, ALCOA spent \$1 million to ship 350 truckrater in 1989, although they appear to have been cause

2. Port of Vancouver Ore **Transfer Facility** Copper ore is loaded onto ships by a conveyor system his site. In 1987, WDOE discovered that the Port had

een spilling unknown quantities of copper ore con

over 5,000 cubic yards of river sediment had been con-

ardous to aquatic life. By 1991, 95% of the sediment had site apparently caused a major fish kill in adjacent Fore 3. Carborundum Co. 20. Cascade Tempering 2550 NW Lower River Rd. 2501 SE Columbia Way, Buildings 5 & 39 RM 103, Metals production, inactive This plant produced bulk silicon carbide, an abrasive. The process generated a fine dust which was dumped into two RM 108, Construction materials manufacturing

6 Beach Dr. SE

water per day.

NE 4th & Adams St. Camas WA 98607

24. James River - Camas

wastes, and paper products. EPA has restricted IR's

exceed state standards. JR, like other pulp and paper

gnoring the available alternatives. This mill also uses

of wastewater per day, including 25,000 lbs of BOD and

37,000 lbs of TSS. Other significant pollutants in the

25. Pendleton Woolen Mills

plant waste was discharged into a slough at the sout

end of the property which was flooded each spring

which was used for decades for mothproofing. Dield

cadmium, chromium, copper and lead. Dieldrin, pet-

with an EPA clean-up plan. Some of the contaminate

26. City of Washougal STP

This is one of the smallest STPs in the Portland area

27. Advanced Silicon

28. Exterior Wood, Inc.

29. Fiberware NA

ecycles all of its water and does not use its discharge

Materials

wastewater include cyanide, copper, zinc, and for

oil spill and high levels of pH and BOD).

RM 109. Port facilities

ponds, resulting in 16,000 cubic yards of wastes. Studies in rsenic, lead, or zinc, but WDOE is concerned about 4. GATX - Vancouver Chemical plant RM 103.5, Minor permit This facility formulates and stores chemicals. There are extremely high levels of PCE, and high levels of DCE and TCE, present in the groundwater. WDOE considers this a

he company removed 2,800 cubic yards of soil in 1988 high priority site, and GATX indicates it is willing to but WDOE strengthened clean-up regulations that 5. Vancouver Sewage 22. Vancouver Sewage Treatment Plant - Westside **Treatment Plant - Eastside** 1800 Del Monte Way 210 E 13th St. ancouver WA 98660 er WA 98668 RM 104.9

'ancouver's STP receives industrial wastev companies. The City had a history of problems with its than one third the capacity of the Westside Vanc nvested in and expanded its facilities recently, and 23. City of Camas - Sewage and maintained. The Westside STP has a capacity of 15 **Treatment Plant** to 5,400 lbs each of TSS and BOD daily. 12th & Polk 6. Vancouver Groundwater Contamination

n this area, WDOE is presently conducting an investig 7. Great Western Malting 1200 W 11th St. parently from sources off-site. Wastewater is dis-

ged to the Vancouver STP (#5). 8. Vanrich Casting Foundry and metal casting began here in 1928. Used ca ing sands have been stored on-site for decades and peri dically removed to landfills. Heavy metals present in 9. Fort Vancouver Plywood

RM 105.6, Minor permi ISS and pH. An \$11,000 fine, reduced to \$8,700 on appeal. as levied by WDOE. In 1990, the local health depa rned the company to dispose of its wastes properly

10. Boise Cascade - Vancouver 907 W 7th St. RM 106, Major permit 989, resulting in illegal discharges, for which no enfor nent action has been taken. Between 200-27,000 gallons of

11. Vancouver Gas Manufacturing 9th St. & Lincoln Ave. Vancouver WA 98660 RM 105.7, Petrochemical facility, inact

12. Vancouver Ice & Fuel Oil

In the process of fighting a 1983 arsonist's fire, oil was released into the Columbia. WDOE later assessed a \$4,000 fine and required the company to build containment facil-13. Hayden Island Dumping Area

chultz Sanitation spread wastewater and waste oil, c minated with PCP from McCormick and Baxter Co. (#87), on land owned by Union Pacific RR on this island ween 1957-77. A 1983 EPA investigati Creek, a tributary of the Columbia River. 14. Stauffer Chemical 30. City of Gresham STP 429 N Suttle Rd. Portland OR 97217 RM 105.6, Chemical plant tauffer formulated aluminum sulfate between 1941-87 nd pesticides between 1954-85. Wastewater with alumodate population growth; its capacity is 15 million

inum sulfate was discharged into the Columbia River 31. Reynolds Metal Company sposed of at St. John's Landfill (#34). The soils and roundwater contain DDT and aldrin. Methyl Chloride nyl chloride, TCE and TCA are found in groundwat o clean-up is planned at this time. 15. Fuel Processors mony, 125 lbs of nickel, 365 lbs of cyanide, 5,400 lbs of aluminum and 54,000 lbs of fluoride annually into the

his facility reprocesses used oil. There were documente

pills in 1985, 1986 and 1987, with visible oil cont

High levels of petrochemicals were found in every sample tested in 1990. VOCs were also found con-

16. Morrison Oil Co.

747 N Suttle Rd.

aminating the site.

32. AAR Western Skyways In 1987, high levels of cyanide

Columbia River, although some plant operations ha

known to have used PCB-contam

tamination. A clean-up plan is being formulated 53. Auric Enterprises E was another site used during the mid-1980s l soils, PCBs, cyanide, lead, arsenic, copper and dioxi are suspected or confirmed on-site. It is probable that Haney dumped wastes illegally to a ditch that drains to the Columbia Slough. There are extensive and pre-

The Columbia Slough is all that remains of the network of marshes, lakes, and channels that once covered 50 square miles of the south shore of the Columbia River between the mouths of the Willamette and Sandy Rivers. In the nearly 150 years since the first European divided the waterway with a large dike near NE 17th Avenue. The Lower Slough begins at this pump station and flows by Smith and Twelve CSOs discharge over 900 million gallons of untreated sew-The Upper Slough begins at Blue and Fairview Lakes and flows past agriculture, industry and golf courses until it is pumped into "Columbia South Shore." Approximately 95% of the wetlands have been destroyed, leaving 2,800 acres of natural habitat left. Already (PDC), seek to turn the remaining natural portions of the Columbia 54. Redi-Strip of Oregon/

Superior Stripping

of hazardous waste handling. Its metal stripping pro esses produced zinc, chromium, lead and cyanide reen 1984-86, the City repeatedly disconnecte RSO's sewers for discharging toxic pollutants to the ver system and RSO repeatedly reconnected then Columbia Slough. In 1986, DEQ fined RSO \$2,500, bu Stripping, a new company, began operating with safe ocedures. DEQ has not taken action on the site since

55. Ameron Pipe Group NW 750 NE Columbia Blvd. RM 8, Manufacturing buried on an adjacent site.

56. Sped-de-Way Products

cury, zinc, cyanide, and organic solvents. Even though the site is less than 2 blocks from residences, DEQ has admium, chromium, lead, PCBs, and VOCs were 44. Pacific Meat Co/Northwest dumped on this property. They were discovered in 198 57. Anodizing, Inc 7933 NE 21st St. This is another site once operated by Peter Haney (see #43 & #53), used for re-smelting lead and recovering precious metals. The following wastes are co

This facility had an acid spill into the slough in 1986 58. Halton Tractor Co 4421 NE Columbia Blvd.

59. Nu Way Oil 7039 NE 46th Ave. RM 10.1, Petrochemical facility on oil recycling facility operated on this site between 935-87. It generated waste acid sludge and clay waste In 1985, EPA discovered that soils and groundwate and arsenic. Surface and groundwater are carrying to pollutants to the slough. Clean-up efforts are stalled because the property owner and DEQ lack funds.

60. AB Finishing Tech 6724 NE 46th Ave. RM 10.3. Metal Plating and as a result chromic and Hydrochloric acid have leached into soils. Chromium levels in groundwater valuated AB as a "no priority" site under the Super 61. Riedel Compost Facility 5611 NE Columbia Blvd.

Portland OR 97218 and diesel fuel. Clean-up efforts are underway. 62. Portland International Airport

There have been numerous spills at PDX: kerosene, jet fuel and motor oil are the most common contaminants.
Potentially contaminated stormwater from part of PD: site, which lies directly adjacent to the slough. goes directly to the storm sewer and the Columbia spills which were washed into these storm drains. 63. Portland-Willamette Co

65. Drum Recovery Inc

loppy handling of PCP, PCBs, PCE, and heavy meta

harges. There appears to have been soil and surface

alts from Teledyne Wah Chang (#144) hoping to rep

ess them. It proved uneconomical, but when DEC

uptcy. The salts, which are flammable and corrosiv

68. East Multnomah County

69. Boeing of Portland

Groundwater Contamination

er with TCE and PCE. This groundwater

ontaminated with TCE. Boeing has spent

ninated wells. EPA's goal for this site is

nillion on investigation, groundwater pumping a

erations are expected to take 20-40 years.

VI's diesel storage tank leaked into groundwater, ar methylene chloride was dumped on-site. There is a

potential threat to Portland's well fields from this sit

70. Viking Industries

71. Swift Adhesives

18600 NE Wilkes Rd. Portland OR 97230

18408 NE San Rafael St. Portland OR 97230

been sent back to TWC in Albany

67. Wagner Mining

RM 16.5, Manufacturing

66. TRANSCO Industries

11104 NE Holman Portland OR 97220 RM 13.6, Transportation, inactive

have leaked into the Slough during rain. Prior to 1974, waste chemical sludge was spread of this site, which is adjacent to the slough. The sludg contained cyanide, copper, chromium and nickel. 51. Precision Equipment, Inc. 64. Columbia Woodworking 6432 NE Columbia Blvd. In 1984, this company dumped its haza torm sewers which discharge to the slough. Portions o of chromium, as well as PCBs, acids and organic sol were dumped into 3 dry wells on-site. The area has

41. City of Portland Sewage **Treatment Plant** 5001 N Columbia Blvd Portland OR 97203 RM 105.5 (discharge pipe on the Columbia River)

COLUMBIA SLOUGH

as well as resident wildlife.

33. Beall Trans-Liner

oily wastewater onto soils at this site.

34. St. John's Landfill

between 1932-90. St. John's is the largest and most expensive landfill closure in Oregon. Original closure

ts were estimated at \$1 million; current estimates ar

over \$34 million. The landfill is located in what was on a wetland, immediately adjacent to Smith and Bybee

akes. It is believed that groundwater from the landfill

nixing with both surface and groundwater. This lea-

astes (dieldrin, 2,4-D and 2,4,5-T), non-halogenated

ents, petrochemicals, lead, mercury and others

JC disposed of liquid waste in unlined sludge pon

37. Chapman Chemical Co

CC handles wood preservatives containing lead, cop

er, PCP, and related chemicals. Wastewater con-aminated with these toxins was historically dumped

facturing (#38). Some soils on-site showed high level

eatment plant, using PCP, on this site between 1950-

Wastewater, containing PCP and creosote, was deposed into a pond shared with Chapman Chemical (#37).

er, PCP, and PAHs, is directly adjacent and used to

39. Widing Transportation

40. Pacific Carbide & Alloys

ouse solids into the slough. Over 90,000 cubic yards of

cords indicate that waste solids have slid into the

Columbia Steel Casting, and a clean-up is planned.

nto a pond owned by neighboring Joslyn Mar

38. Columbia Steel

10425 N Bloss Ave. Portland OR 97203 RM 4.2, Wood treatment facility, inactive

jacent to the slough between 1953-1981. A 1989 stud

35. Union Carbide

minated with PAHs and cyanide.

36. Gilmore Steel

GS discharges cooling waters

s into the Columbia Slough and the adjacent lake

9200 N Ramsey Blvd

settlers arrived, the slough has been changed from a magnificent

wetland into a slow moving drainage canal, used by many as an

open industrial sewer. In 1949, the U.S. Army Corps of Engineers

Bybee Lakes to Kelley Point Park where it joins the Willamette.

the Lower Slough at the dike. Part of this area is termed the

under siege by the Portland Airport and other industrial sprawl,

developers, headed by the Portland Development Commission

South Shore into an "industrial park" by destroying wetlands

which are critical to migrating waterfowl from the Pacific Flyway

The wealth of wildlife (bobcat, otter, coyote and over 100 species

of birds) that manages to live in the Slough stands in stark contrast

to the degraded conditions in the region. Poison run-off from agri-

affect the slough. The result: fish, wildlife, and sediments are highly

ticides. Neither the City of Portland nor DEQ, which recognized the

culture and golf courses, 215 toxic industries, 21 industrial dis-

chargers and innumerable stormdrains carrying polluted waters

contaminated with dioxin, PCBs, heavy metals, PAHs, and pes-

slough's problems in 1974, have planned a clean-up. The slough

and swimming mostly by low-income people of color.

receives little governmental attention because it is used for fishing

dumped on-site, as well as into the Columbia Slough.

from dental wastes) exists, and the site is believed to be

vents, lead, mercury, dioxins, and zinc. Some clean-up

may have occurred, but DEO has not examined the situation

out tanks may have been dumped on-site; the status of

47. Simpson Timber - Portland

This facility has a long history of spills to the slough, pri

marily phenols and formaldehyde. There were 4 spills in 1977, and one each in 1978, 1983, 1985 and 1988. This

ooden doors were manufactured at this plant for ove

by PCBs, PCP, petrochemicals, and PCE. A clean-up wa

50 years. In 1988, the site was found to be contain

completed to DEQ's satisfaction in 1991.

49. P & C Development

50. Waymire Drum Co.

facility is one of the largest sources of toxic emis

48. Nicolai Company

nols, primarily to the air.

Portland OR 97217

955 N Columbia Blvd.

RM 7, Chemical plant, inactiv

contaminated with PCBs, dioxins, lead, arsenic, mer-

not acted on this site since April 1988.

RM 6.1, Metals recycling, inactive

45. Armor Food Co

AFC discharges cooling and defrost water

46. Container Care Inc

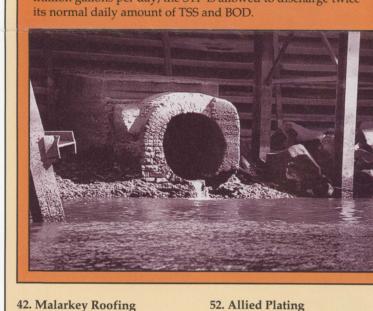
9208 N Tyndall Ave.

RM 6.3, Food processing

Cast Metal

age and toxic waste each year into the Lower Slough.

RM 5.3 (on the Columbia Slough) The Columbia Blvd. Sewage Treatment Plant is the largest in Oregon, yet it is completely inadequate for both the current population and projected growth in Portland. During the winter, this STP is overwhelmed with the quantity of the City's wastewater flow, by-passing secondary treatment up to 18 times per month and discharging millions of gallons of waste into the Columbia River with only primary treatment. On some days this STP discharges 40 million gallons of only partially treated sewage. DEQ has given Portland's STP a generous permit: when inflow to the plant exceeds its capacity of 100 million gallons per day, the STP is allowed to discharge twice its normal daily amount of TSS and BOD.



42. Malarkey Roofing Company emoved from the site. DEQ decided no further clear

43. Northwest Cast/Universal Silver

luminum was used on this site from 1978-84. It was one of several such operations run by Peter Haney (see #44 & #53). It may have been used for reclaiming preous metals from dental waste. The former owner is melter (producing dioxins). Buildings, storm drains,

8135 NE Martin Luther King Jr Blvd. Portland OR 97211 RM 7.8, Metal plating, inactive AP re-chromed car bumpers from 1957-86. It had a list. Soils and an on-site pond are contaminated with copper, nickel, chromium and lead. Sediments in the adjacent Columbia Slough also show evidence of cor

taminated soils, but the company did not keep track its dumping before 1980. Trace levels of PCE and TCE are present in Swift's groundwater, and DEQ is con-72. Cascade Corporation Troutdale OR 97060

tinuing to investigate whether the site is a source of

Other laws govern hazardous materials. The federal Superfund law is intended to inves-

tigate and clean up highly contaminated

sites, but it moves very slowly. The

states have also adopted laws similar

to Superfund, laws which are even

less effective due to states' even

greater funding problems.

•Talk to store managers about carrying prod- laws, and enforce them. Explain that you ucts that don't hurt rivers.

Don't flush things down toilets that

of the Willamette River.

storm drains.

you wouldn't want to see on the banks

Don't pour wastes down

Johnson Creek. In 1973, 10,000 lbs of a red-brown liq were spilled into the creek, killing thousands of fish. Smurfit later corrected its poor practices. Soil around the

Raw sewage from CSOs also discharges into the Willamette and Lower Columbia Slough during dry months, although in smaller volumes. Sewage poses a threat to human health from the bacteria and viruses in fecal matter that cause numerous diseases. CSO sewage carries toxic wastes from industries, businesses and households, as well as floatable wastes — such as toilet paper, condoms, tampon applicators and syringes all of which freely enter the water when discharged from a **TUALATIN RIVER**

The Tualatin River carries most of Washington County's run-off

to West Linn where it joins the Willamette River. Its only significant

JOHNSON CREEK Johnson Creek is one of the region's last free-flowing urban streams. Much of the upper creek has a natural appearance and supports wildlife. It receives substantial amounts of poisoned runoff from agriculture. The lower 10 miles of the creek have been modified and paved, and industries along Johnson Creek have a long history of disposing of toxins in this waterway. DEQ suspects ohnson Creek violates water quality standards for chromium, cop-

In Portland, human sewage is collected in the same pipes as

handle during times of rain. As a consequence, four billion gal-

lons of untreated sewage is discharged out of "Combined Sew-

er Outfalls" (CSO) each year, at the rate of once every four days

during the rainy season. Forty-three CSOs discharge into the

Slough, providing seventy percent of the slough's volume dur-

Willamette, and twelve empty into the Lower Columbia

LOWER WILLAMETTE RIVER

The lower 27 miles of the Willamette River, from the Willamette

Falls Locks to the confluence with the Columbia, are the most inten-

sively used section of surface water in Oregon. It is also the most

heavily industrialized waterway in the state. Shipping, industry,

recreation, fish and wildlife all compete for use of the lower Wil-

sewage into the Willamette. While four major industrial polluters

and one federal and one state Superfund site are situated on the

pollution in this section, including poison run-off from Portland

area streets. The most obvious pollution was eliminated during

lamette. Forty-three City of Portland CSOs routinely discharge raw

banks of the Lower Willamette, there are dozens of other sources of

Tom McCall's term as governor, but "invisible" toxic pollution has

fish lesions, tumors, missing fins, eyes and gill covers along the riv-

er. Despite the Willamette's importance, state government has done

relatively little testing of its waters. Even so, DEQ has determined

that the lower 8 miles of the Willamette violate state water quality

standards for dioxin, chromium, copper, lead, zinc, DDT and arsen-

ic, and suspects this part of the river violates standards for PCB,

and impairing human recreation.

This company dumped paint solvent, waste paint, and

AC discharges storm run-off, lime kiln, and seal water.

This site was contaminated with PCBs, PAHs, and petro leum products. NP&C removed some soil, but did not

The soil at this site is contaminated with PCBs, PCP,

City sewer system, corroding pipes, contaminating soils

The Port leases out this ship-to-rail transfer facility to Hall-Buck Marine. When coal tar pitch (used by smelt-

ers to make aluminum) is unloaded by crane and shove

pitch contains PAHs and affects humans through con-

through. There is no information that indicates the prob-lems have been corrected. In 1989, PCBs in an oil solu-

eaned up to EPA's satisfaction. Very high levels of

mium, cadmium and DDT/DDE are found in river sedi-

but no tests found dangerous levels of contaminants in

GATX to Linnton Planing mill (#79). Many oil spills to the Willamette in the eighty years this facility has open

EPA considered legal action, but did not follow

tion were spilled onto concrete and soil; this was

79. Linnton Planing Mill

RM 4.1, Wood treatment facility, inactive

80. GATX St. Helens Rd.

Benzene is apparently migrating in grou

ated have been reported.

ing the rainy season.

11444 NW St. Helens Rd.

Facility

CSOs

to railcars or trucks, operators spill much into the river and onto the dock, which is routinely hosed off. Coal tar

emission control dust (a hazardous waste) on-site. OSM cleaned up most of these wastes. Two PCB spills also

73. Oregon Steel Mills

occurred from leaking transformers.

13939 N Rivergate Blvd. Portland OR 97203 RM 3, Cement, sand and gravel Minor permit

investigate or clean up all areas.

Casing Co.

12005 N Burgard St. Portland OR 97203

76. Time Oil

lead, and petroleum products

RM 4.4, Chemical plant

Terminal 4

Portland OR 97203 RM 4.5,Port facilities

9504 N Bradford St.

and potentially polluting gro

78. Port of Portland

77. KLIX Corporation

74. Ashgrove Cement

75. Northwest Pipe &

cadmium, mercury, PAHs, DDT and phenol. Wetlands and river-

banks have been filled and modified, further imperiling aquatic life

81. West Coast Adhesive

82. Linnton Plywood

LPA discharges sawdust to the Willamette River

ARCO discharges oily stormwater from the plant site to

BP spilled 46,000 gallons of petroleum into the Willamette from this site in 1985; it recovered 35,000.

85. Pacific Northern Oil Co.

5900 NW 61st Ave Portland OR 97210 RM 6.4, Petrochemical facility Decades of on-site disposal of oily wastewater, tar, and

soils and groundwater. Rain run-off flows through soils

petroleum products have resulted in highly polluted

the river: a 1987 study demonstrated ongoing pollution

from this site into the Willamette. No clean-up action is

86. Northwest Natural Gas Co.

dumped in ponds on this site. It is likely that soil and

Minor permit McC&B, built on sandy dredge spoils in 1945, has

also contaminated the surrounding area, including res

nay be contaminated with dioxin dozens of feet below

McC&B did not fence the site (including beaches) until

obtained in 1987 that dioxin-contaminated crayfish in

ordered a clean-up in 1987, allowing McC&B to continue operating in exchange for a \$250,000 annual contribution for clean-up. In 1991, the company went bank-

the area posed a an unreasonable risk of cancer. DEO

rupt, leaving the state with a clean-up bill exceeding

dences. Contamination from the site has migrated i

87. McCormick & Baxter

83. Atlantic Richfield

More investigation is needed to determine the extent of

Company

RM 4.4, Chemical plant

Association

84. BP Oil

9420 NW St. Helens Rd.

7540 NW St. Helens Rd.

Company

RM 5.3, Petrochemical facility

not stopped. The lower Willamette has the highest percentage of

per, lead, mercury, nickel, DDT and PCBs. 128. Milwaukie Area 133. JB's Metal Finishing 5215 SE Flavel Dr. Portland OR 97206 **Groundwater Contamination** ounded by Johnson Creek, 82nd Avenue, and Hwy e contaminated with TCE and PCE. In 1988, Milaukie discovered 3 of its 7 wells were producing water

129. Cornell Pump

taminated with phenols into a dry well 800 feet from 130. East Side Plating -26th Place environmental threat exists. 135. SP Anodizing RM 1.6, Metal platin were found; the soils were removed from the site in a dry well, and had several documented spills directly

131. Associated Chemists 4401 SE Johnson Creek Blvd. 1990 EPA report states that PCBs and copper appear to be migrating off-site. SPA has not operated on this site. Creek, leaked a mixture of xylene, toluene and other 136. Apollo Metal Finishing

132. Precision Castparts Co

buses. In 1988, DEQ fined PCC \$8,500 for improper haz-rdous waste handling. In April 1989, PCC was notified DEO has requested that the company put together a hat it was discharging a low-level radioactive sub-137. Interstate Salvage Site ered PCC was still discharging radioactive mater RM 5, Metals recycling, inactive C's own multi-million dollar treatment facility. PC 988 for which PCC was fined \$2,000; there were thre n 1990. In January 1991, there was a caustic spill. Two nonths later, PCC discharged acid wastewater, and the Portland \$3,250 fine. PCC also discharged to Johnson Creek via

vaged and drained on this site, which drains to Joh 138. Smurfit Newsprint -

134. Alpine Veneer, Inc

copper, nickel, silver and zinc are present in the soil ar

undwater. Elevated levels of PCBs are also prese

was dumped by neighboring Apollo Metal Finishing.

since 1984, which is now occupied by another man-

RM 4.4, Metal plating
AMF and adjacent SP Anodizing shared a cess

verflowed directly into Johnson Creek. Sediments in

7525 SE Johnson Creek Blvd.

point sources of pollution are the USA Sewage Treatment Plants see #139). The river has relatively low flows, especially in the summer months, which slows the dilution and flushing of pollution. DEQ has identified the Tualatin as violating state water quality standards for BOD, pH and nuisance algal growth (during the summer). Fecal coliform standards are exceeded at different times of the year throughout the river; in the upper reaches (south of Forest Grove) the standards are exceeded all summer. DEQ believes this is due to agricultural run-off, poor septic systems, urban run-off and raw sewage overflows from USA plants. 139. Unified Sewerage Agency (USA) of Washington County

Durham Sewage Treatment Plant

88. Wacker Siltronic Corp

Minor permit
WS purchased this property in 1978, apparently una-

ware that its soils were contaminated with coal tar res

dues. Petroleum products, PAHs, xylene, toluene, ar

refuses to co-operate with DEQ's Doane Lake study and

Kin o., i erroriential facility
(infor permit
Coppers operated a plant producing coal tar pitch, used
n smelting by the aluminum industry, from 1966-73.

During that time polluted wastewater was dumped ont

the site; petroleum products, PAHs, benzene, creosote and lead have contaminated the soils and may be migrating to the Willamette via surface or groundwate

lo clean-up is presently planned. Koppers refuses to

operate with DEQ's Doane Lake study and has been

90. Gould Inc/NL Industries

acid were dumped into adjacent Doane Lake. The site

was placed on the Superfund list in 1983; by 1988, a plan for addressing soil contamination was selected. The new technology for processing the waste was developed and tested in 1991. Groundwater clean-up is hampered by

the lack of cooperation from neighboring industries (see

Doane Lake). Estimates for the cost of the clean-up are \$13-20 million. EPA is investigating 20 companies for

6200 NW St. Helens Rd.
Portland OR 97210
RM 7.1, Petrochemical manufacturing, inactive
Major permit
Since 1943, when this facility began making chemicals, it

has operated under 5 different owners. The plant closed

in November of 1990, after having manufactured 30 different chlorinated pesticides and herbicides, including 2,4-D and 2,4,5-T. Operating and waste disposal prac-

tices for 1943-64 are sketchy, although large quantitie

of liquid toxic wastes are believed to have been dump on-site. Company records show over 40 spills of toxic substances between 1969-86, contaminating soils,

ground and surface water. In 1982 EPA found 37 toxic

are scheduled for demolition, RP has a major permit

have contaminated each other, further complicating

92. Atochem North America

Major permit ANA processes sodium chlorate. In 1989-90, the plant

nickel and copper, and 2,500 lbs. of residual chlorine ir

dumped on this site, and some materials have leached

onto adjacent properties. Soils and surface and groun

Shell's past disposal pract. 25 included dumping an

burying unknown quantities of DDT, TCE, ammonia

petroleum products, and tank bottom sludge. Soil, su face and groundwater are thought to be contaminated

Minor permit
The Port of Portland operates this drydock, which is the

third largest in the world and the largest on the West

mulating in the drydock. DEQ wants the Port to clear

the drydock of this material completely prior to each re-submersion, but the Port has maintained that this would

95. Port of Portland - Ship

93. Liquid Air Corp

6400 NW Front Ave

6501 NW Front Ave Portland OR 97210

94. Shell Oil

Repair Yard

5880 NW St. Helens Rd. Portland OR 97210 RM 7.6, Petrochemical facility

RM 7.4, Chemical plant

91. Rhone-Poulenc

been referred to EPA for enforcemen

89. Koppers Co

7540 NW St. Helens Rd. Portland OR 97210

5909 NW 61st Ave

96. Chevron Oil

5531 NW Doane Ave Portland OR 97210 RM 7.6, Petrochemical facility

97. Union Oil Co

the Willamette in 1982. A soil and grou

98. Berry Transport

near the surface and the facility is not fenced

This facility discharges oily run-off from truck

ICE, and PCE by leaking underground storage tanks.

101. Fred Meyer Property

Groundwater wells were installed to evaluate possible

flow through this area. It then became a wetland until it

was documented on-site in 1987. It has since been paved

trucks. Phenols, methyl chloride, and petroleum prod-

ucts have contaminated soils, some of which have be relocated on-site. Spills of petrochemicals to the Wil-

was filled 40 years ago. The site was used for reclai

102. Burlington Northern

Railroad - HUB Center

100. Freightliner Corp

5315 NW St. Helens Rd. Portland OR 97210

99. Maletis

6840 N Cutter Circle Portland OR 97217

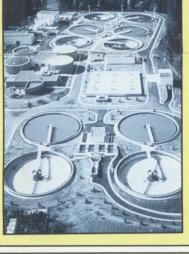
Swan Island

leakage) have contaminated soil and groundwater with petroleum products. There were 13 spills between 1973

5500 NW Doane Ave Portland OR 97210 RM 7.7, Petrochemical facility Oil was discovered seeping from soils along the bank of

84, and the US Coast Guard fined Chevron 5 times for

perated by USA. The others are in Hillsboro, Rock usually treated, into the Tualatin. Even though USA problems. As a result of citizen suits, the seway in April 1989, DEQ fined USA \$4,000 for spilling 432,0 gallons of raw sewage. In January 1991, 43,000 gallor spilled, and USA was fined \$1,100. In August of 991, 460,000 gallons were spilled in two separate in dents, and USA was fined \$6,000.



YAMHILL RIVER Agriculture and forestry are the primary land uses in the Yamhill

River basin, which drains part of the eastern Coast Range Mountains. Stream flows are typical for drainages in the western Willamette Valley, with very low flows during the summer months when demands are the highest. The McMinnville Sewage Treatment Plant is the major source of nutrients in the Yamhill River basin. The Yamhill has pH and algal growth problems, due to excessive nutrients, during the summer. 141. Whiteson Garbage Dump/

Riverbend Landfill

Located in the floodplain of the South Yamhill River,

flushed down the drain.

Riverbend Rd. McMinnville OR 97128

140. Taylor Lumber and Treating

This site shows elevated levels of arsenic, copper, mercury, nickel, zinc, PAHs, PCP, and dioxin in soils and stream sediments. TLT is preparing a clean-up plan. The hill River 2.5 miles downstream of this site.

these adjacent landfills pose a threat to local comon the Whiteson dump, now closed, shows that leacha itoring wells. Riverbend, which opened in 1981 when Whiteson closed, only has a permit as a county landfil but it has taken hundreds of thousands of tons of Port land area garbage.

expect government to stop polluting too: to

eliminate raw sewage overflows, to stop using

weed killers and fertilizers on publicly-owned

• Ask your local small businesses how they

dispose of their wastes: dry cleaners, auto

parks, golf courses, and forests.

147. Albany Municipal Dump 144. Teledyne Wah Chang Before closing in 1975, this city garbage dump accepted low-level radioactive waste from Teledyne Wah Chang (#144), OREMET (#146), and the US Bureau of Mines nd the production of nuclear weapons. TWC has a his report found run-off from the dump in the adjacent Calapooia River, which enters the Willamette 5 mile iving organisms in adjacent Truax Creek. TWC has downstream. There is a potential for radioactive wast o migrate through groundwater bs of cyanide, 2,300 lbs of copper, and 1,570 lbs of nick

148. Evanite Fiber Corp nd VOCs. In 1991, 10,000 truckloads of this sludge vere moved to an off-site landfill. The focus of inves-igation has now shifted to the rest of the site; including undwater and soils. A separate DEQ investigation i idying problems with arsenic, ammonia, PCP, and

fiber production facilities. In 1977, TCE was discovered in soils and groundwater under this facility. A multi-million dollar clean-up plan has been moderately suc-cessful in removing the TCE. Groundwater pumping i 145. Willamette Industries 149. United Chrome

195 Foothills Rd. This facility was originally built in 1964 to treat sewage from Tryon and Arnold Creek Sewage basins. It was expanded in 1976 to accommodate most of Southwes Portland and Lake Oswego. Its capacity is 8.3 million gallons per day and it has a permit to discharge up to 4,153 lbs of both TSS and BOD daily. 120. Martin Electric

119. Tryon Creek Sewage

Treatment Plant (City of Portland OR 97209 Portland) RM 12.2 was previously used by industry. There may be coal tar 111. East Side Plating Works - Stephens

110. North Waterfront Park

Station L

South

300 SE Ivon St

RM 13.7, Storage yard, inactive

PGE used this site to store electrical transfe

114. Lone Star Industries

This facility discharges truck washing water and rock

are found in the soils of the southern part of the part

as a result of sloppy metal recycling operations. Lead

of the metals found in the groundwater, which flow into the Willamette. The site is being cleaned up for

116. Zidell Explorations

RM 14.1, Metals recycling and fabrication, inactive

history took place here: 50,000 gallons were relea

the Willamette in 1973. DEQ suspects soils, river se

ments and groundwaters may be contaminated wit

117. Ross Island Sand &

Gravel

UPPER WILLAMETTE RIVER

The Willamette River is the 12th largest river in the U.S., and its

of Oregonians live within 35 miles of this river, and hundreds of

is the greatest non-point polluter in the 11,500-square-mile Wil-

lamette River basin; its run-off includes nutrients, fertilizers, ani-

mal wastes, pesticides, and silt. Forestry occurs on more than half

of the land in the basin, increasing stream sedimentation and

destroying critical streamside vegetation. The Willamette is con-

taminated in scattered sections by phenols, heavy metals and PCBs.

Dioxin standards are violated along the entire 148 miles of the Wil-

(site #150). The inset map of the Upper Willamette includes only the

lamette downstream from the Pope & Talbot pulp and paper mill

major industrial polluters and a few point sources; no municipal

STPs or minor industrial polluters are included on this portion of

thousands depend on its tributaries for drinking water. Agriculture

315 SE McLoughlin Blvd. ortland OR 97202

RM 14.5, Cement, sand & gravel

with rock crushing operations.

118. Huntington Park

tion activities. Soils were contaminated with PCE, TCE,

evelopers have been working with DEQ, but clean-up

day. It has, in general, complied with these limits. In December 1990, however, the mill had three spills of over 70,000 gallons of white liquor (with an extremely high pH) into a side channel of the Willamette River.

Major permit OREMET, a titanium manufacturing plant, has operated

ow drinking water wells nearby. In 1991, OREMET was fined \$7,000 for improper handling of hazardous waste.
The City of Albany draws its water from an open canal
hat flows within 100 feet of OREMET's property, and

into this canal. In 1991, DEO again granted OREMET a

146. OREMET Titanium

DEO fined WI \$5,000.

RM 118, Metal manufacturing

been found in the groundwater. Groundwater flows

petroleum products, asbestos, copper, aluminum, leac PCBs and dioxins. Remedial action is being considered

quality violations. The largest known oil spill in Orego

screening process water into the Willamette.

RM 13.8, Cement, sand & gravel

Corp - Moody St.

103. Union Pacific Railroad

104. States Battery Co.

105. Hercules Inc

3366 NW Yeon Ave Portland OR 97210 RM 12, Chemical plant

4927 NW Front Ave Portland OR 97210

ficult renewal process.

931 N River St. Portland OR 97227 RM 11.1, Cement, sand & gravel

Seventy five percent of the employees at this facility have

levels of urinary lead twice the state health standard. Soils

arsenic and zinc; sewers and surface waters have likely

This facility has a long history of air pollution in NV

RM 11, Metals recycling
Minor permit (now terminated)
This facility operated an incinerator to remove insulation
from recycled wire. In 1989, the company had several sig-

nificant permit violations, including high pH, high levels

107. Lone Star Industries North

At this facility, LSI discharges non-contact cooling water

lons of heavy metal solutions down a dry well here. In 1980, leachate was seen seeping out of the ground, and

wastewater has been reported leaking onto city streets,

Decades of improper handling of materials (oil spills, pes

ticide and battery dumping) have contaminated 20 block in Northwest Portland. Lead, petroleum products, PAH

and zinc can all be found on-site. Over a quarter million

site drains via the Tanner Creek CSO to the Willamette

cubic yards of soil is contaminated with petroleum prod-

109. Hoyt Street Train

NW 11th, between Hoyt and Raleigh Portland OR 97209 RM 11.5, Transportation, inactive

Yard (BNRR)

This lake and wetland area, between sites #90-93, was used as an

open sewer by local industries for decades. It has been filled and

oisoned. The surface and groundwater have been contaminated

by PCP, creosote, PAHs, radioactive sands, heavy metals, sulfuric

acid, lead, and pesticides. The lake periodically overflows, and the

overflow water eventually drains to the Willamette. The NL/Gould

Superfund site is directly adjacent to the lake; several local indus-

tries have formed a group to respond to environmental regulations

Wacker Siltronic, Koppers and Liquid Air refuse to cooperate with

the DEQ and EPA, even though they all have toxins buried on-site.

The DEQ's groundwater study of the area has been mired in legal

address surface water contamination. This is one of the most pol-

the map.

Newberg

33 Ferry St. SE alem OR 97301

3251 NE Old Salem Rd. Millersburg OR 97321 RM 116, Pulp & paper mill

scharge up to 15,590 lbs of BOD and 24,475 lbs of TSS

142. Smurfit Newsprint

n 1981, a lagoon dike failed, causing a 60 million gallon

in 1981, a lagoon dike falled, causing a 60 million gallon sludge spill into the Willamette River. The sludge was contaminated with low levels of cadmium, chromium, and lead. This is a mechanical pulp and paper mill and

5,000 lbs of TSS daily. It generates 18 million gallon

This 87-acre landfill, located in the Willamette River flood plain, began operating in 1967. It has accepted municipal waste, chemicals, and hazardous waste, but

143. Salem Landfill

and technical wrangling, and the agency has not yet begun to

luted pieces of real estate in Oregon.

108. Pacific States Galvanizing

of TSS, lead and copper. ATC elected to chang

106. Acme Trading Co

RM 10.3, Transportation

cleaned up.

ESPW had a history of discharging high levels of toxi copper, and acids were dumped into sewers until the 1968-78. In 1987, the Lake Oswego Fire Department reported to EPA that PCB-contaminated drums were here. Soils were heavily contaminated by PCBs from 112. South Waterfront Redevelopment transformer oils. The EPA completed the removal if it is a source of Lake Oswego groundwater TCE Over 100 years of industrial activities have left this site 121. Oak Lodge Sewage

asbestos, and PCBs. Pacific Power & Light (PP&L) ope **Treatment Plant** 13707 SE Fair Oaks Milwaukie OR 97222 spills occurred during this period, and surface wate n-off has probably led to on-going pollution of the Willamette. The Portland Development Commission although the DEQ determined levels of PCBs were low Willamette River. See STP box for permit details

113. Portland General Electric 122. Rossman's Landfill Oregon City OR 97045 RM 25.5 hold waste between 1969-83, with closure plans finalized nerous PCB hotspots were identified on this propin 1991. Low levels of VOCs, benzene, and vinyl chlorid erty; PCB-contamination of river sediments at this site is

extremely high. A clean-up (costing over \$3.5 million) is in the landfill are leaching out. TSS, iron, manganese an in progress, and a portion of the site will be used for the

123. Tri-City Service District **Sewage Treatment Plant**

902 Abernethy Rd. Oregon City OR 97045 RM 25.2 This plant serves Oregon City, Gladstone and West Linr Tri-City has 3 CSOs which discharge raw sewage to the Willamette and Clackamas Rivers. This STP had at least five by-passes in November of 1991.

115. Schnitzer Investment 124. Smurfit - Oregon City 427 Main St. Oregon City OR 97045 Oregon City OR 97045 RM 27, Pulp & paper mill Smurfit is an old facility with a history of envi-

problems, primarily illegal discharges to the Willamette It has a permit to discharge 25,173 lbs of BOD and 31,573 pesticides. Petroleum products, PCBs and heavy meta lbs of TSS per day, generating 10.25 million gallons of admium, zinc, chromium, cyanide, and zinc are some in November 1989, a \$1,900 fine in May 1990, and a \$5,000 fine in July 1990. The plant had a fire in July 1991 causing contaminated run-off for ten consecutive days.

The Oregon Department of Fish and Wildlife reported a fish kill at the same time in the same area. The plant ma for another illegal discharge. DEO also took enforcement Iron and steel salvaging operations from 1919-1980 his torically resulted in oil spills, waste dumping and air

125. Simpson Timber -West Linn 400 Mill St. RM 27, Pulp & paper mill

Major permit
ST's plant was built in 1888, but has been upgraded. The facility had four oil spills during the 1980s, three of which reached the Willamette. The fourth involved a ransformer with PCB-contaminated oil which was fined to a building. During the late 1980s, the mill

exceeded permit limits for TSS, but the problems appea 126. Willamette Falls Locks West Linn OR 97068 RM 27

area for transporting liquid chemicals, and numerous nated soils alongside the river. Test Between 1924-1982, a dry cleaning business and a rubber ammonia and methylene chloride. Later testing refuted company occupied this site. The current property owner

> 127. Gross Property Disposal Site East of 11th St. West Linn OR 97068 RM 28

This farmland is northeast of Willamette Park and adja cent to wetlands that drain to the river. In 1990, abandoned industrial capacitors were discovered, and soils were found to have been contaminated with PCBs. Soils were scheduled to be removed in 1991.

> in groundwater. The chromium poses a threat to drink-ing water supplies. About 350 tons of contaminated soil 150. Pope & Talbot/ James River - Halsey 3400 American Dr. Halsey OR 97348 RM 147, Pulp & paper mill

he same pipe. P&T is a bleached-kraft pulp mill, pro-

ducing pulp for tissue and newsprint. The mill uses chlorine to bleach pulp, in the process producing diox

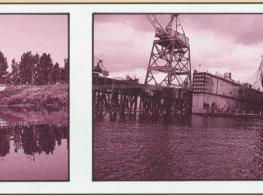
evels of dioxin in the Willamette downstream of this

nill exceed state standards causing EPA and DEQ to restrict the discharges of dioxin from pulp mills, including P&T. In response, P&T changed its process to reduce he production of dioxin as well as chloroform, a cance causing air toxin. P&T uses secondary treatment to process its wastes, which range up to 5,000 lbs of BOD and 10,500 lbs of TSS per day. The mill discharges over 11 million gallons of wastewater per day. The DEQ has sers of the river about the color and odor of P&T's ffluent. The City of Corvallis, 13 miles downstream, as complained of P&T's contribution of cancer-caus nd foul-tasting chemicals to City drinking water. The ames River pulp mill is a proposed recycling, de-inking acility that will make pulp for tissue and office paper A \$65 million plant, scheduled for completion in Mare 1992, it does not have a permit at this writing. JR prothe-art treatment for its effluent. Nevertheless it will daily discharge up to 5,700 lbs of BOD and 6,700 lbs of SS in an average of 3.5 million gallons of wastewater IR also predicts discharges of low concentrations of capermit, DEQ has not required JR to monitor these or a be present in its discharge.

151. Potter Manufacturing This silk screening facility has operated since 1923. Dec ades of dumping toxic waste directly onto soils has

clean-up in 1988, but its reluctance to act led to a \$38,00 of contamination has not yet been done. 152. Weyerhaeuser -Springfield

M 15 (on the McKenzie River), Pulp & paper mill his is a kraft pulp and paper mill, discharging up to 28,000 lbs of TSS and 6,000 lbs of BOD per day. Up to 2 the McKenzie River, a tributary of the Willamette



SOURCES OF POLLUTION

Point Source Pollution Wastewater discharged from pipes is called "point source" pollution, and is subject to regulation by state agencies. This map includes the most serious point source threats in the Willamette River Basin.

Municipal sewage treatment plants (STPs) are a major pollution source, contributing conventional pollutants and chlorine, as well as toxic pollutants. The toxins come from some industries, termed "pretreaters," which dump their wastes into city sewers and others which illegally dump down storm drains. The use of chlorine to disinfect sewage creates additional pollutants such as dioxin which STPs cannot remove. Pretreaters have permits issued by municipalities, and are not shown on this map. Some sewage systems also discharge large quantities of raw and partially-treated sewage. Industries, such as wood processors, are also a large source of pollution. Bleached-kraft pulp

and paper mills, which use chlorine, are thought to be the greatest sources of dioxin to the region's rivers. These mills also discharge massive quantities of TSS and BOD. Wood treatment facilities, including plywood and planing mills, have used wood preservatives such as creosote and pentachlorophenol ("penta" or PCP) for decades, in the process contaminating surrounding soils, groundwater and river sediments. They are a major source of dioxins. Other industrial sources of pollution include metal manufacturing and plating facilities, chemical manufacturers, and petroleum facilities. Contaminated water or leachate leaking from toxic wastes that have been dumped in municipal garbage dumps and industrial sites contaminates ground and surface waters. Shipping and transportation also threaten water quality. Railroad yards leak petrochemicals, public ports dispose of wastes to rivers accidentally and intentionally, and transportation accidents result in oil spills. Thoughtless recreational boaters contribute floating gar-

bage and human sewage to local rivers. **Non-Point Source Pollution** The water that runs off lawns and city streets,

over leaking septic systems, farms and clearcut forests is called non-point source pollution or poison run-off. It is as significant a source of pollution as point sources. While this map shows less than 5% of the Willamette River Basin, activities throughout its 11,500 square miles affect the Willamette. Government regulation of non-point source pollution is lax and ineffective. Non-point sources are not shown on this map except for sites known to be contaminated with toxic pollutants.

Non-point sources contain both conventional and toxic pollutants. Run-off, including fertilizincreasingly larger insects, fish and animals. At ers high in nutrients, cause large amounts of algae to grow in waterways which, in turn, reduces the dissolved oxygen (DO) in water, suffocating aquatic life. Non-point sources also

teria, and oil. Air pollution deposited in water is also a significant non-point source including auto exhaust collected on city streets. Toxic pesticides used in farming and home gardening persist in soils and gradually enter waterways. For example, the pesticide DDT,

taminated with toxins from poor industrial practices also contribute high levels of toxic pollution to area waters. Stormwater is also considered to be nonpoint source pollution despite the fact that it charged without treatment, new federal

care and other household activities.

SEWAGE TREATMENT PLANTS Human sewage, sometimes in combination with stormwater and industrial wastes, is co ected under city streets and pumped to nunicipal sewage treatment plants (STPs). The treatment level provided at any given STP depends on its size, age, and local politics. In "primary treatment," solids settle while floating wastes are skimmed, and the result is quickly treated with chlorine during discharge. This partially-treated wastewater contains high levels of solid materials and pacteria. "Secondary treatment" speeds up he natural biological breakdown of human wastes by aeration; the resulting sludge repesents the amount of solid materials that are cept out of waterways. Even so, sewage givn secondary treatment still contains high evels of TSS and BOD, and may contain subantial amounts of nutrients and toxins. All the STPs on this map have secondary reatment facilities. However, STPs which collect sewage and stormwater together are often unable to handle the volumes collected

SYMPTOMS OF POLLUTION

Effects of water pollution The pollution that enters rivers, lakes, and

streams through discharge pipes, by running off land, and by mixing with groundwater has many and varied effects. While conventional pollutants tend to contaminate the water itself, toxic and radioactive pollution often accumulates in sediments at the bottom of rivers. From there, these toxins contaminate the small creatures in the water who are, in turn, eaten by by the states. If states find that pollution in each step in the "food chain," the levels of toxins increase in amount. Birds and animals who feed at the top of this "food chain" (such as

the water, or far downstream. The DDT banned for use in the United States in 1974, is still present in local soils, streams and rivers, causing damage in fish and wildlife. Soils con-

enters waterways through pipes. Presently disrequirements are slowly beginning to address this significant source of pollution, which includes chemicals from industries, cars, lawn

n rainy days, discharging sewage which has y-passed secondary treatment and received nly primary treatment. Cities which collect

only sewage dump all of their stormwater intreated into rivers.

eagles, mink, and humans) are at the greatest

Toxic pollutants can cause immediate injuries, failure to reproduce, chronic diseases, and death to fish and wildlife. Contamination may occur at the point where the pollution enters washed into Johnson Creek may settle into "toxic hotspots" at its bottom or be washed downstream to pollute the Columbia River

Estuary. Toxic contamination of fish in the Estuary continues to

cause serious reproductive failure in bald eagles there.

Water Quality Affects Human Health Human health is affected by poor water quality through contact with polluted water and by eating fish and shellfish. Water contaminated with untreated human sewage, such as the Willamette and the Columbia Slough, creates a risk of contracting hepatitis, dysentery and other serious diseases. Even a brief hand-to-mouth contact can cause infection. These same human pathogens may also be conveyed through raw

or undercooked fish and shellfish Eating fish and shellfish is the primary way that most people are exposed to water-borne toxins, although contact with contaminated fish build up ever increasing levels of toxins depending on where they live as well as how cer, diseases, and genetic defects.

SOLUTIONS TO POLLUTION

Under the Clean Water Act, passed by Conakes and groundwater. For point sources, state agencies issue permits which require monitoring and set limits on the amount of polin two ways. First, treatment levels are set according to national expectations for that type of industry. These "technology-based" regulations are intended to force all factories across the country to meet minimum levels of treatment. The second approach is intended to protect the specific waterbody that is being polluted. Where a factory could over-pollute a river, even if it meets the national technology standards, the state must require even more stringent treatment. This is called the "water quality-based" approach.

The water quality-based approach only works if states monitor rivers and lakes and compare them to water quality standards concentrations of pollutants deemed acceptable these waterbodies exceeds standards, the waters are put on lists. Congress intended these lists to lead to regulatory actions. Unfortunately, states are unable to conduct sufficient monitoring, reluctant to put waters on lists, and contribute high levels of suspended solids, bac-risk of suffering ill effects from toxic pollution. unlikely to take enforcement action.

POLLUTION

office paper and other supplies.

waters and beaches and drinking contaminated groundwater is also hazardous. Fish and shellold and fat they are and where they feed. When eaten, they build up in people too, causing can-

gress in 1972, states regulate pollution of rivers, utants discharged. States establish these limits **Clean Rivers**

Depend on You lowing are some things that you can do: •Switch from chlorine-bleached white paper

State governments are overwhelmed with environmental problems, are grossly underfunded and under attack by industry. Therefore, what happens to our rivers and streams depends to a large extent on you! From changing your personal habits to getting involved in a lawsuit, you can make a difference. Fol-

to unbleached recycled paper — in toilet tissue,

ell other readers about the problems faced by our water-• Talk to your friends, neighbors, teachers and members of your church, civic clubs and school associations.

 Stop using products whose production requires the use of toxic materials, including: nail polish, hair dye, drain decloggers, pesticides, weed killers and chemical fertilizers.

• Think before you buy! • Demand that your elected representatives at all levels of government — federal, state, county, and city — pass tough environmental

NORTHWEST ENVIRONMENTAL ADVOCATES

I his map is a product of the Columbia/Willamette RiverWatch program of Northwest Environmental Advocates. The RiverWatch program offers hands-on activities, educa-

free public tours of the Columbia Slough, Lower Willamette River and the Columbia River Estuary on its 26-

tional literature and

foot boat. We hope that this map, in conjunction with other RiverWatch educational opportunities and materials, will help you understand how human activities harm these waterways. We urge you to share this

information with your family, neigh-

bors, co-workers, teachers and com

munity leaders. Northwest Environmental Advocates, River Watch's parent organization,

> to protect and restore the environment in the Columbia River basin using education, research, advocacy and litigation. Additional copies of this map may be NWEA, 133 S.W.

> > Second Ave., Suite

was formed in 1969

302, Portland, Oregon 97204-3526, phone: (503) 295-0490. Folded copies are \$3.00 and poster versions are \$5.00. Please call us for bulk order prices. An environmental map of the Columbia River basin will be published in the Summer of 1992.

cates. You can answer skills, we'll be happy to put you to work!

and lots more! If you have the time and the • Join Northwest Environmental Advocates as a member. Your tax-deductible contributions are critical to our success in stopping pollution at its source and cleaning up our rivers.

TYPES OF POLLUTANTS There are three broad categories of pol-

lutants: conventional, toxic, and nonconventional/non-toxic. Specific pollutants and categories, both in boldface type, are mentioned in site descriptions. Many more exist. Conventional Pollutants are substances routinely found in water, but human activities often raise or lower levels of these pollutants in the process, impairing aquatic life and human uses of the river.

of organic solids, such as sediment, suspended in water. Too much TSS can smother fish and aquatic plants, destroy habitat and make water unpleasant for swimming. TSS comes from mining and farming run-off as well as sewage treatment plants and industries. Biological Oxygen Demand (BOD) is the mount of oxygen which is required to break down wastes such as bacteria. High BOD lev-

Total Suspended Solids (TSS) is the amount

gen (DO) in rivers and streams; DO is needed to support the respiration of aquatic life. Sewage treatment plants and industrial facilities Fecal coliform bacteria in water is an indicator of the presence of disease-causing organisms, called human pathogens. These bacteria and viruses cause a variety of illnesses such as hepatitis, etc. through direct water contact and eating contaminated shellfish. Untreated sewage and run-off from urban streets and farms

els in discharges result in less Dissolved Oxy-

The **pH** measures the acidity of water. Aquatic species are very sensitive to changes in acidity, such as that caused by acid rain in lakes. Runvell as industrial facilities, can alter pH. Oil and grease are petroleum products conaining toxic chemicals which destroy or injure the ability of animals and plants to function. Nearly every human activity involving machinery has the potential to discharge oil and grease in most living organisms.

are large contributors of human pathogens.

Thermal pollution is heat added to water posing serious hazards to fish and other aquatic life. Thermal pollution can come from waters which are slow-flowing due to withdrawals and dams, as well as from thermal discharges of industries and farms.

Nutrients, such as nitrogen and phosphorus, •Write letters to the editor repairs, etc. all use products that should not be stimulate the growth of some aquatic plants, and can cause fish kills, excess weed growth, unpleasant odors and tastes, and impaired rec- Volunteer with Northwest Environmental Advorreation on rivers. Run-off from fertilized agricultural land is the most common source of phones, prepare mailings, untrients. Most phosphorus from household do research, skipper River- sources, such as detergents, passes through of your local newspaper to Watch trips, participate in citizens monitoring, sewage treatment plants into our region's

TOXIC POLLUTANTS

Toxic pollutants are chemical agents that, even in tiny amounts, hurt the health of living

Heavy metals are used by many types of industries. Some are outright poisonous and others can cause cancer; all cause chronic diseases. Antimony, cadmium, chromium, copper, lead, nickel, selenium, silver, thallium, vanadium, and zinc are examples. Mercury is acutely toxic in minute amounts. Copper and silver, in salt form, are highly lethal to fish. Lead is known to cause death, mental retardation, and other effects of poisoning in peo

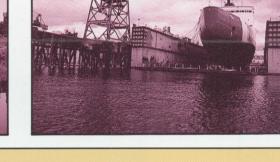
ple, wildlife and fish. Other metals include those with a lighter atomic weight, and tend to be less toxic. Fluo ride has effects on fish ranging from disorientation to death. Radioactive materials, such as Thorium-232,

are used in nuclear reactors and in metals production. Radiation from these materials causes cancer, chronic diseases, genetic defects and death. When Radium-226 is ingested, it is absorbed into tissues, lodging in bones and causing cancer and blood disorders; it has a half-life of 1600 years and is extremely toxic. Reactive wastes are materials that are unstable and react violently or explosively under normal conditions. Zirconium and magnesium chloride salts are examples. Corrosive wastes, such as pulp mills discharge wastes high in BOD. a sub-set of reactive wastes, are strong acids or bases that are capable of dissolving metal. Hydrochloric, chromic and sulfuric acids can

all be highly corrosive.

Organic compounds are materials whose chemical make-up includes carbon atoms. Many manufactured organic compounds also have chlorine atoms, including chlorinated pesticides. Most of these pesticides are no longer made, but are extremely persistent in the environment. DDT, along with its breakdown products DDE and DDD, are still found in the off from mining, farming, and urban sources, as waterways of the Pacific Northwest almost 20 years after being banned. Aldrin, chlordane, dieldrin, endrin, and 2,4,5-T are other examples of pesticides now banned. Chlorinated pesticides cause cancer in animals and reproductive failure in birds, and chronic diseases Chlorinated organics are other similarly per-

sistent compounds.



Dioxin is the term used for the most potent — 2,3,7,8 TCDD — of a group of over 200 com-

pounds known as dioxins and furans. Con-

sidered the most toxic chemical ever produced,

2,3,7,8 TCDD is a by-product of pulp mills and

sewage treatment plants using chlorine, wood

treatment facilities, leaded gasoline, and her-

bicides. Dioxin bioaccumulates in fish at very high rates, posing an even greater threat to wildlife and humans. Quantities that are so small as to be immeasurable cause a range of effects, from aching joints to cancer. Dioxin is known for its presence in "Agent Orange," used as a defoliant in the Vietnam War. Over 200 compounds are known as PCBs (polychlorinated biphenyls), which are used as insulators and coolants in electrical transformers and capacitors. Production of PCBs was banned in 1976, but they are still in use.

PCBs are highly persistent and cause a range of

effects on humans, including cancer, birth

defects, stillbirth, liver disorders, and joint

deformity. PCBs concentrate in the fatty tissues Several kinds of organic cleaning solvents are common toxic pollutants. Non-halogenated organic solvents, such as benzene, toluene, xylene, and acetone can cause cancer and birth defects. Chlorinated organic solvents, such as trichloroethylene (TCE), trichloroethane (TCA) and tetrachloroethylene (PCE), when taken internally, cause cancer and a breakdown of the central nervous system. Methylene chloride is an organic solvent, and vinyl chloride is a halogenated solvent. These solvents are part

of a larger group of chemicals, called volatile

ly evaporate when exposed to air.

organic compounds (VOCs), because they easi-

PAHs (Polycyclic Aromatic Hydrocarbons) include about 20 compounds, all derived from petroleum products, and therefore produced by almost all human activities. Benzo(a)pyrene (BAP) is the most common and most hazardous. It is a probable carcinogen for humans. Some PAHs are naturally-occurring and not toxic. Pentachlorophenol (PCP or "penta") has been used principally as a wood preservative and less often as an herbicide/insecticide in agriculture; PCP causes illnesses, cancer and

OTHER POLLUTANTS

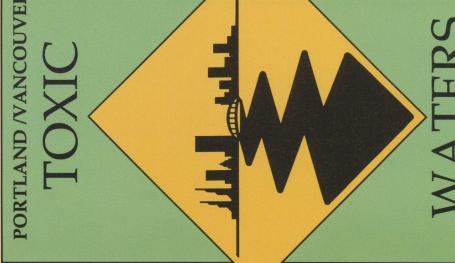
death in people, animals and fish. Creosote is

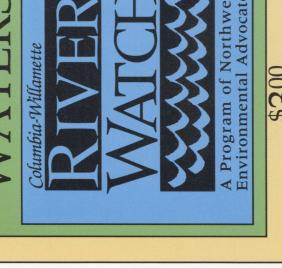
illness and death when ingested.

another wood preservative; it can cause extreme

Non-toxic/non-conventional pollutants are not usually found in waterways in their pure form, but can be lethal in the mixing zones where pipes discharge pollution. They also affect aquatic ecosystems. Ammonia affects the pH and nitrogen balance in waterways, and can lead to algal blooms.

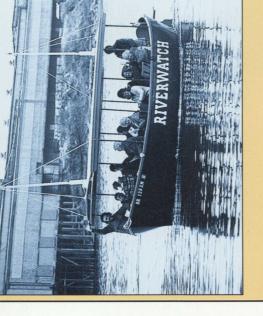
Ammonia can be lethal to aquatic life. Chlorine is often discharged by sewage treatment plants because it is used to kill diseasecausing organisms in sewage. It can be lethal to fish and other aquatic life.











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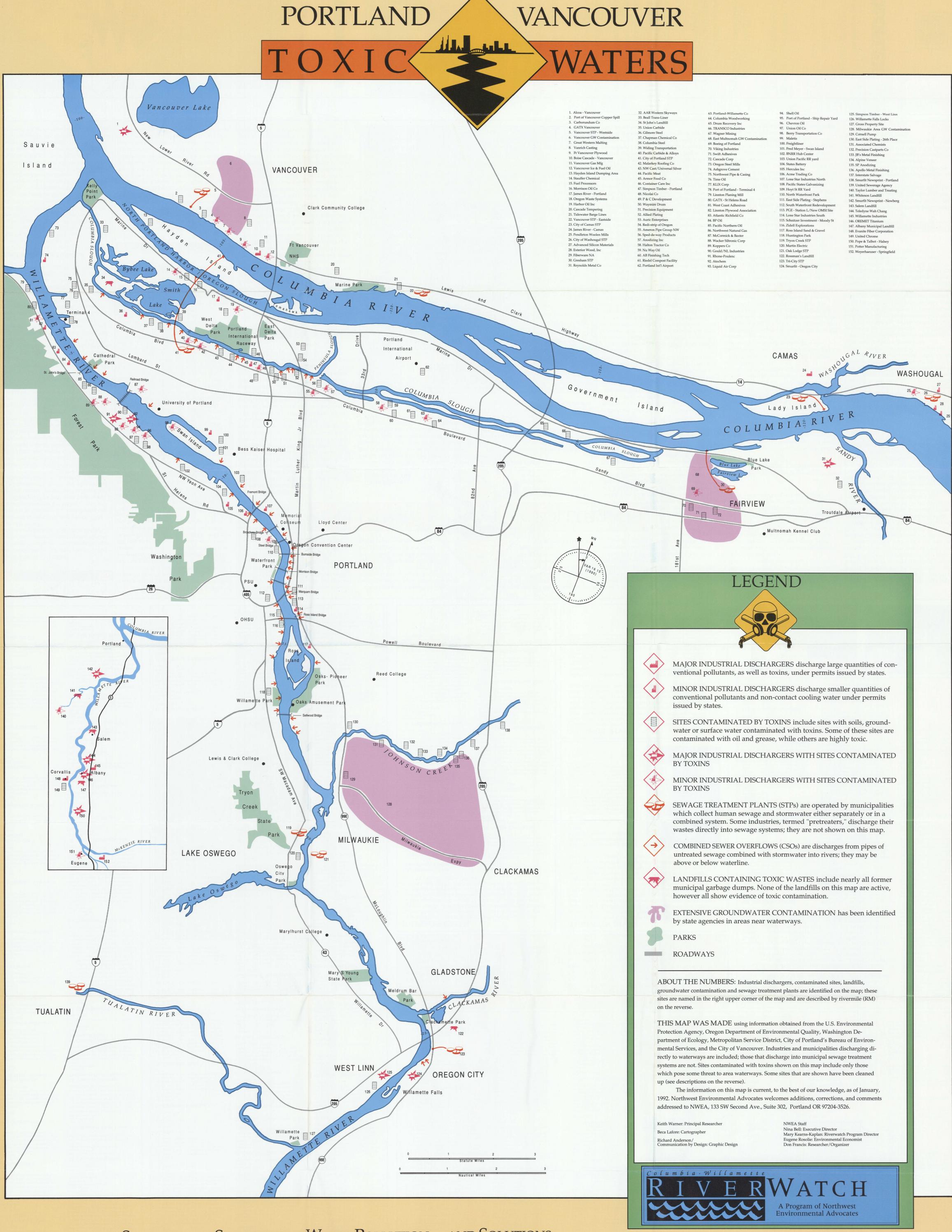


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SOURCES AND SYMPTOMS OF WATER POLLUTION... AND SOLUTIONS

POLLUTION can be as obvious as the styrofoam you see floating on the surface of the Willamette River. It is also as insidious as the toxins that are hidden at the bottom of the Columbia Slough. Water pollution can be as fleeting as an accidental burst of raw sewage that lingers overnight, or as persistent as DDT — banned in 1974, but still found in local fish and wildlife.

The sources of pollution are many and varied: pipes from factories and sewage treatment plants are the most conspicuous, but the chemicals washed into the run-off from city streets and farms pose as great a threat to the environment. From the water, pollution makes its way into fish, which are eaten by birds, animals and people.

The symptoms of water pollution in fish and wildlife are the inability to reproduce, diseases, genetic defects and death. These effects are measured by looking — not only in the water, the sediments, the fish and crayfish — but also at the health of the birds and animals that depend on water. The impacts of water pollution on people are similar, although more difficult to determine.

The solutions to the problems of water pollution rest first with the state and federal regulatory agencies. They are responsible for monitoring the levels and effects of chemicals, and for taking steps to restrict discharges of pollution to rivers, lakes, streams and groundwater. All of these agencies operate with inadequate funding, but political pressure also acts to prevent them from protecting the environment.

Solutions also lie with individuals — citizens who change their personal habits, who challenge the practices of businesses, and who pressure the government to do a better job protecting the environment.

We hope that this map provides you with some insight into the threats posed by water pollution. Each site is described by rivermile on the reverse, where there is more information on the dangers of water pollution and how you can be part of the solution.