A historical black and white photograph of Portland Harbor. The scene is filled with various types of ships, including large multi-masted sailing vessels and smaller steam-powered boats. In the background, industrial buildings with smokestacks are visible, emitting plumes of white smoke into the air. The water is calm, reflecting the ships and buildings. The overall atmosphere is one of a busy, industrial port.

Source Identification and Control in Stormwater Conveyance Systems -- Portland Harbor

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What I Will Cover

- City Stormwater Work associated with Portland Harbor
- Context of City PH Work within Broader City Stormwater Programs

Accomplishments in City PH Source Control Program

- Developed source tracing process
- Identified new sources/sites for DEQ's Cleanup program
- Provided technical assistance to sites
- Changed programs to better address contaminated site issues

City Portland Harbor Outfall Investigation

Overall project goal:

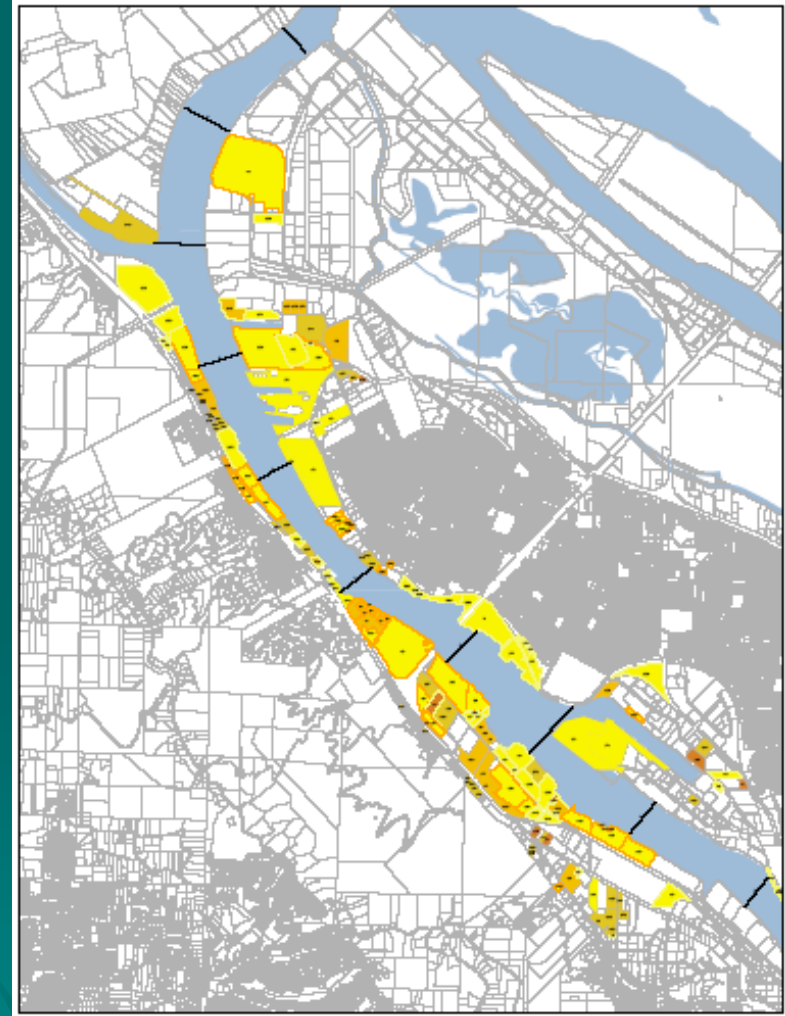
- Determine what additional source control activities are needed to prevent recontamination

Needs close coordination with:

- EPA's in-river evaluation
- DEQ's NPDES permitting and upland site source control efforts

Joint DEQ/City Source Investigation and Control Work

- Identify significant sources of upland contaminants using DEQ and City authorities (source tracing)
- Determine whether source control measures are needed for upland discharges (source control)



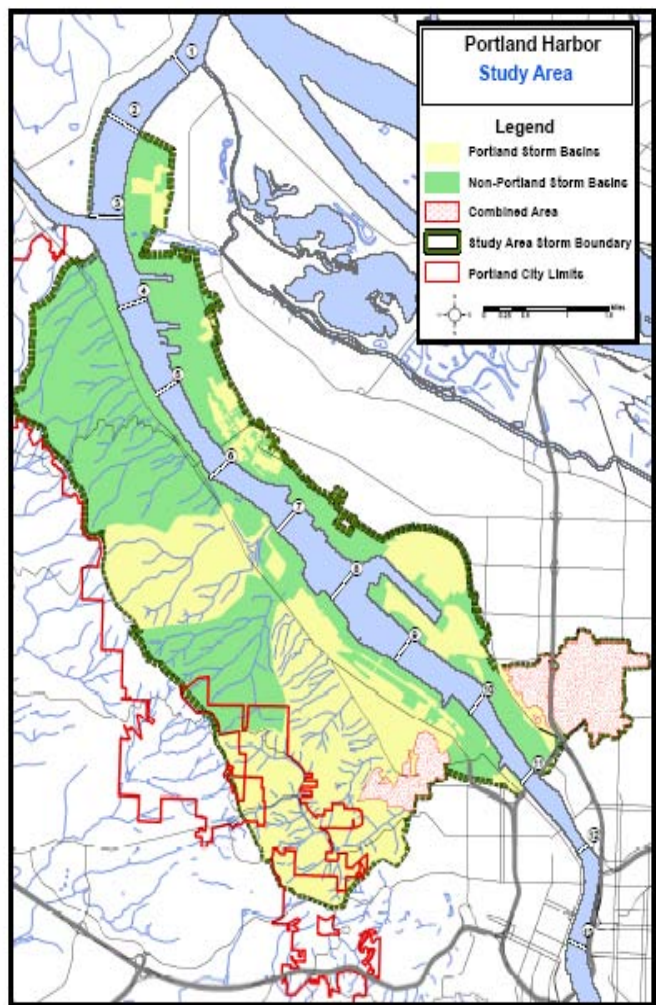
DEQ Cleanup Sites

Contaminant Source Tracing: Major Steps

1. Identify areas with elevated sediment concentrations near outfalls to prioritize source tracing efforts
2. Delineate properties that drain to City outfalls
3. Identify facilities in basins with high likelihood of use of chemicals found near outfall
4. Conduct Source Investigations/Source Tracing

Characterize Properties in the Basin

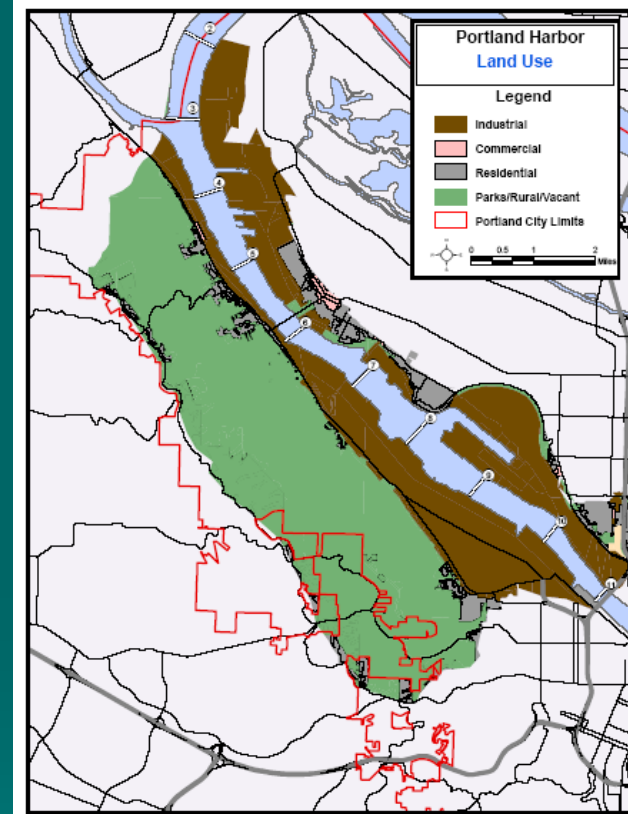
Delineations



Getting started...

- Basin delineations
- Current and historical land uses
 - Zoning changes
 - City directories
- Environmental databases
- State, Federal and/or Local WQ and Cleanup programs
- Contaminant uses

Land Use



...Evaluate info to identify where the largest potential sources may be.

City Source Tracing Efforts

- Broad spectrum of contaminants (PCBs, PAHs, pesticides, metals, phthalates) being evaluated
- Variety of solids and water sampling and analyses used to trace sources in the conveyance system
- Patterns and high concentrations can tell us where significant sources are discharging to the pipe

Inline Solids Sampling

- Grab sampling
- Sediment traps

Water Sampling

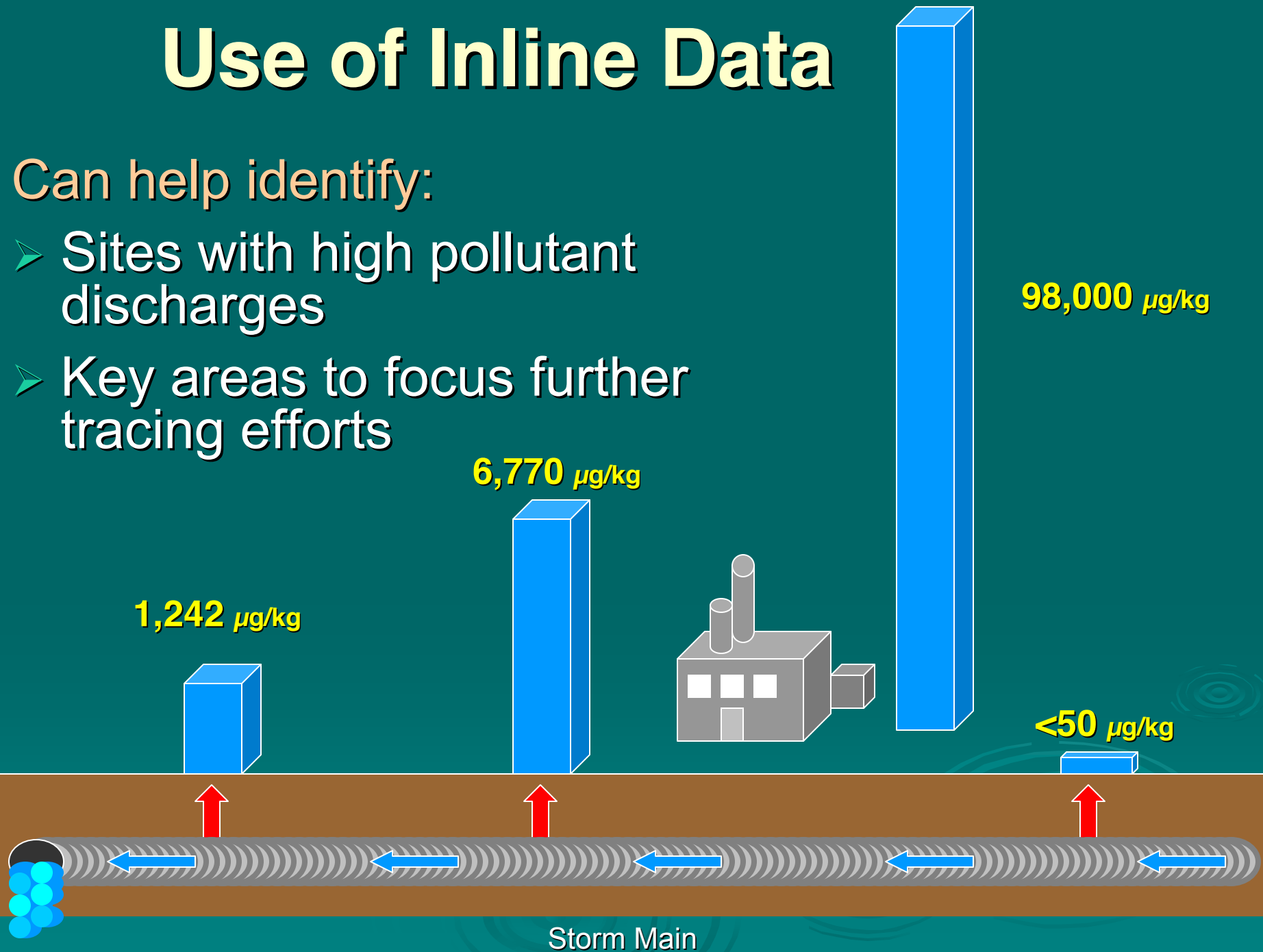
- Stormwater



Use of Inline Data

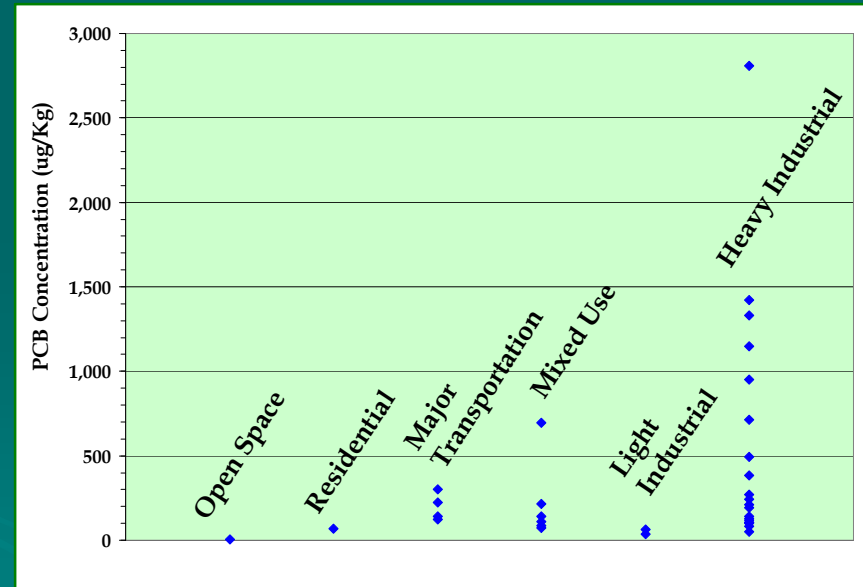
Can help identify:

- Sites with high pollutant discharges
- Key areas to focus further tracing efforts



Major Findings - Solids

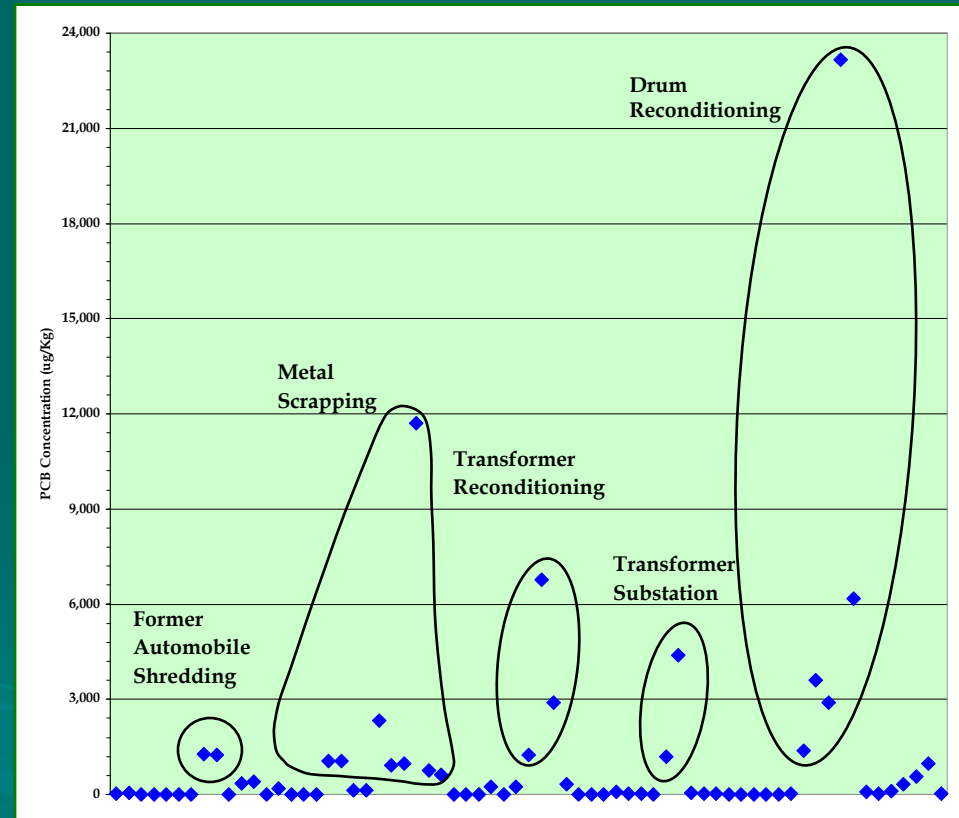
- Solids data have been more useful than water samples in identifying sources
- Initial City focus on industrial areas confirmed by LWG sediment trap PCB data
 - PCBs found at all land uses
 - Highest concentrations associated with current or historical industrial areas



Major Findings - Sources

Sites with high contaminants identified through inline samples, such as PCBs.

- Inline data within 13 industrial basins (some onsite data also shown for Metal Scrapper)
- Inline concentration $> 1,000$ ppb indicates significant source (site data typically $>>$ higher)
- PCB sources from:
 - Current activities
 - Legacy activities
 - Unknown (site investigation needed)



After Sources are Identified

- High to Medium Priority Sites enter DEQ Cleanup program
 - Site stormwater evaluations
 - Site cleanup and BMP implementation
- Low to Medium Priority Sites
 - NPDES general stormwater permitted sites
 - Non-permitted sites
 - Redeveloping sites

City PH Source Control Approach

- Start in areas with highest sediment contamination
- Focus on source tracing/identification of largest sources
- Manage stormwater as close to the source as possible
- Control largest contributors under DEQ's Cleanup Program
- Use other State and City programs to address low-level contaminant areas
- Potentially adjust existing or create new programs to address long-term control of stormwater

Successes in PH Source Control

- 7 PCB sites (+ 1 non-PCB site) entered DEQ Cleanup Program based on City source tracing work
- Additional sites identified for further DEQ or City action
- Changes in existing City and State programs to address sources
 - Stormwater pathway now being evaluated at ECSI sites
 - Coordination between DEQ Cleanup and City Industrial Stormwater groups
 - City Code changes to address contaminated site stormwater during redevelopment

Context for City PH Program: Guiding Principles for Stormwater Management in the City of Portland

- Develop our urban environment in ways that promote healthy rivers, watersheds, and natural resources
- Avoid impact to natural resources
- Use a natural system approach in existing, new, and redeveloped sites

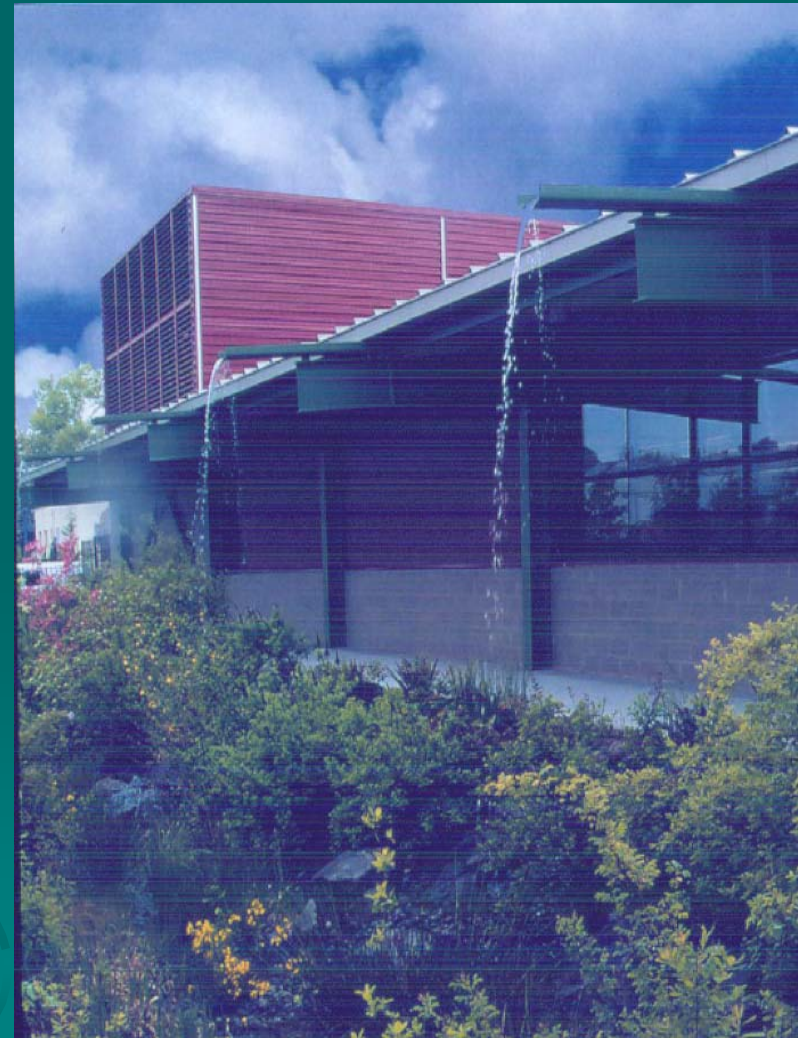
Implementation Strategies - I

Manage stormwater as close to the source as possible to reduce or eliminate the volume of water and pollutants leaving the site.



Implementation Strategies - II

Integrate stormwater
in site development,
building and
landscape design.



Implementation Strategies - III

Reduce impacts from impervious surfaces such as streets, parking lots, rooftops and other paved surfaces.



Regulatory Programs that Address Stormwater in the Harbor

Clean Water Act Regulations

- Municipal Permit
- Industrial Permits

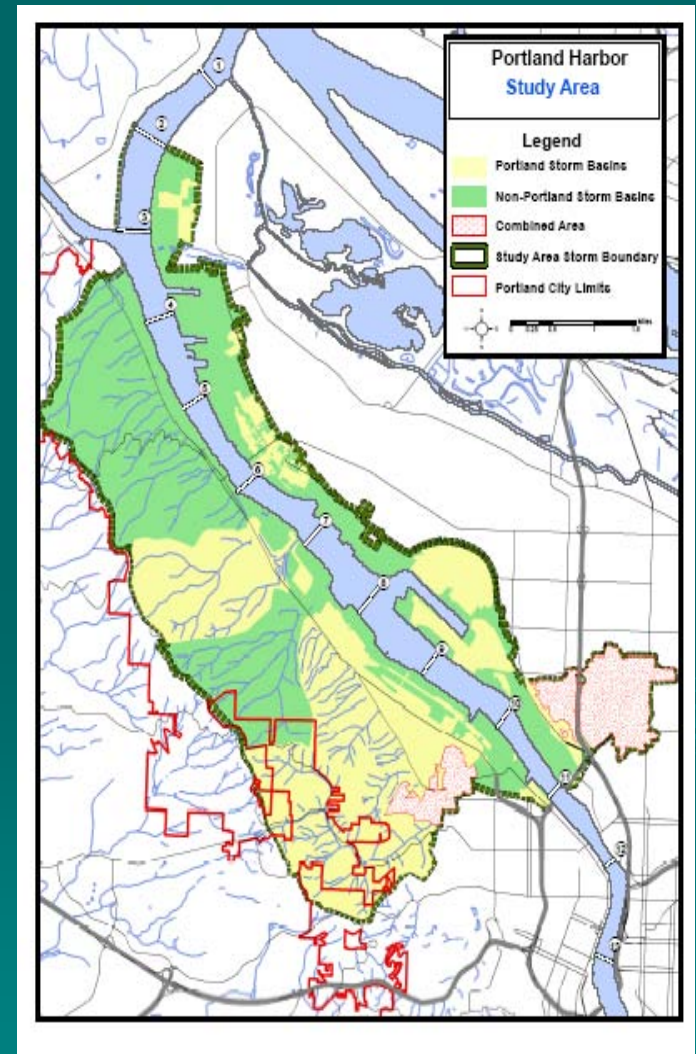
Oregon Administrative Rules

- DEQ Cleanup Program

Municipal NPDES Permit

City Stormwater Program

- New Development Standards
- Illicit Discharge Controls
- Structural Controls
- Operations and Maintenance
- Planning/System Preservation and Development
- Public Involvement and Education
- Industrial and Commercial Controls



City Administration of DEQ's NPDES Industrial Stormwater Program

MOA provides for City administration of general NPDES stormwater permits within City (currently 250 permits)

- **1200Z: stormwater from industrial facilities with SIC codes listed in CFR**
- **1300J: discharges from oil/water separators and oily discharge**

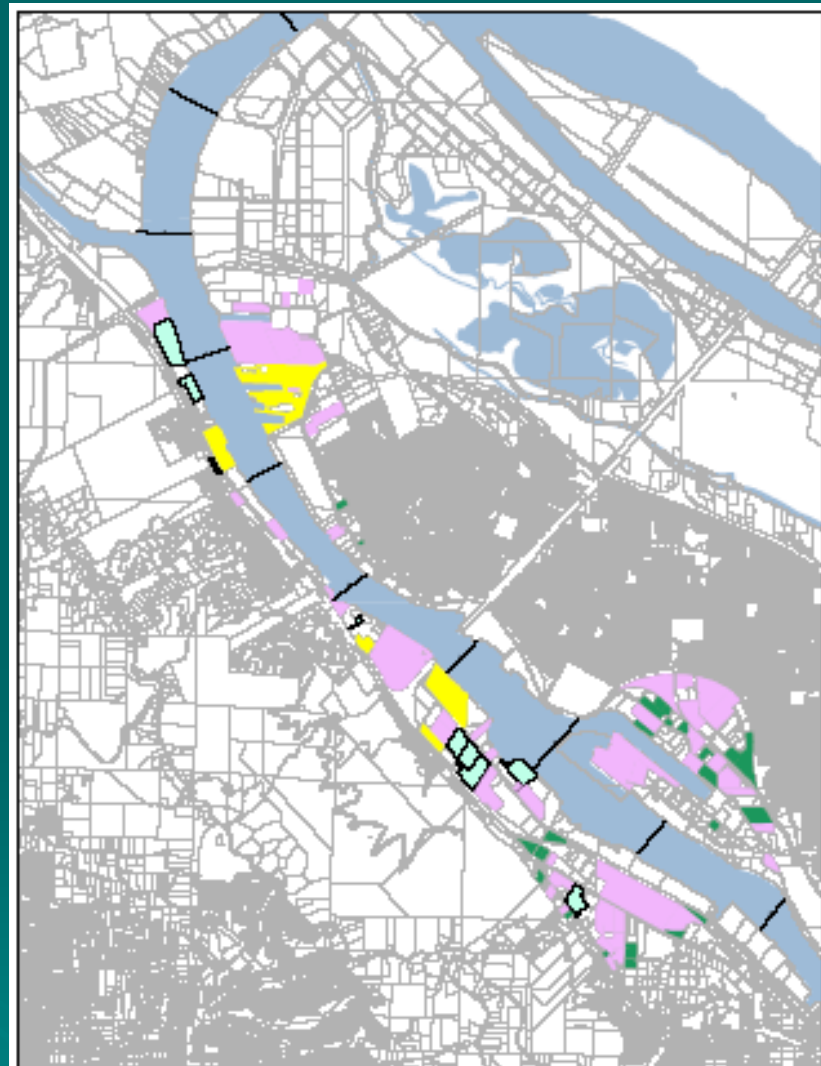
1994 MOA: covers facilities discharging to city conveyance systems

1999 Amendment: expanded to cover facilities discharging to waters of state

MOA Components

- Education
- Permit Administration
- Inspections and Complaint Response
- Enforcement (DEQ)

Note: permit only requires monitoring of 3 metals, O&G, and pH



NPDES Permitted Sites

Strategy 1: Manage stormwater as close to the source as possible

Source	Potential Control	Program
Contaminated Soils	<ul style="list-style-type: none">• Paving• Removal• Treat in place	DEQ Cleanup Program
Industrial Activities	<ul style="list-style-type: none">• Eliminate exposure (e.g. roofs)	DEQ WQ Program* City Stormwater Manual**
Urban pollutants (e.g. parking lots, air deposition)	<ul style="list-style-type: none">• Reduce runoff• Treatment	City Stormwater Manual**

* For specific industrial classes covered under federal regulations
**For new or redeveloped sites only

Strategy 2: Integrate stormwater in site development in site development

City of Portland Development Standards – Reducing Stormwater Runoff

➤ Parking Lots

- Bioretention
- Swales

➤ Roofs

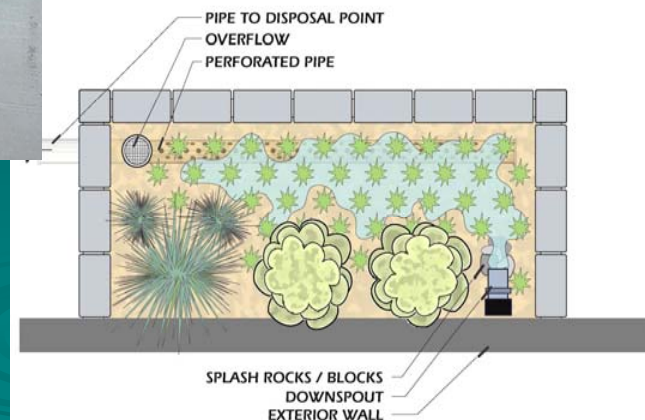
- Eco-roofs
- Planters

➤ Streets

- Inlet Controls
- Green Street Design
- Tree Planters



LEGEND



Strategy 3: Reduce impacts from impervious surfaces

Impervious areas in industrial areas



Sustainable Stormwater Program
Pilot Study at an Industrial Facility
– Owens Corning

