

General Design Considerations at Contaminated and Remediated Sites

*Washington State Department of Ecology
Toxics Cleanup Program (February 2010)
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S. Bower '06

Puget Sound

Saving the Sound

Reaching the goal of a healthy,
sustainable Puget Sound
now and forever.

Climate Change

*in Washington
State...*

*meeting the challenge
and seizing opportunities*



Reducing Toxic Threats

Managing Our Water Successfully



Mitigation that works

*Sustaining our resources,
our communities &
our economy*



Program Goals and Mission

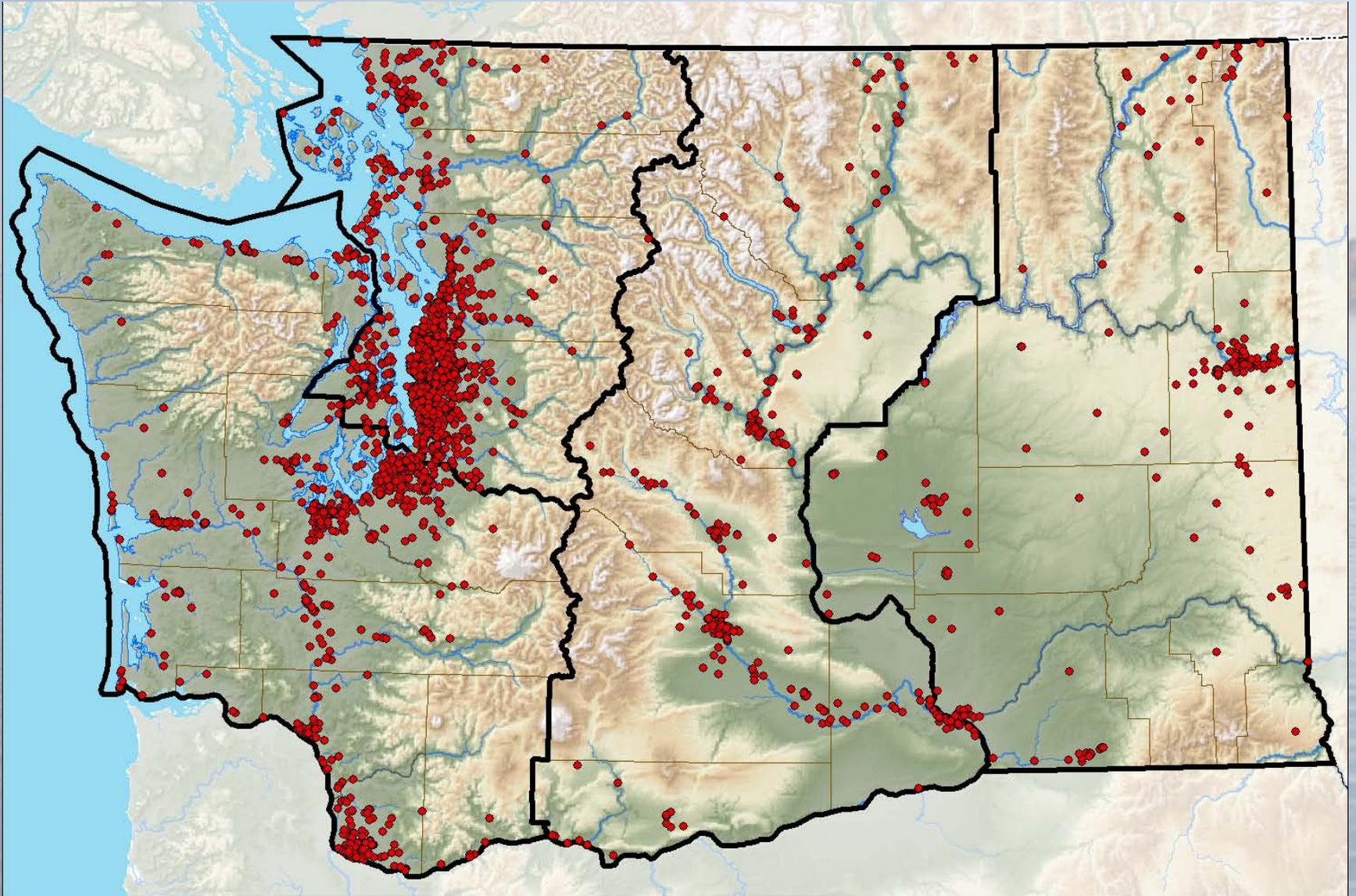
Preamble to the Model Toxics Control Act

“Each person has a fundamental and inalienable right to a healthful environment, and each person has a responsibility to preserve and enhance that right. The beneficial stewardship of the land, air, and waters of the state is a solemn obligation of the present generation for the benefit of future generations.”

The goals and mission of the Toxics Cleanup Program is to **get contaminants from the environment and keep them out.**



Contaminated Sites in Washington

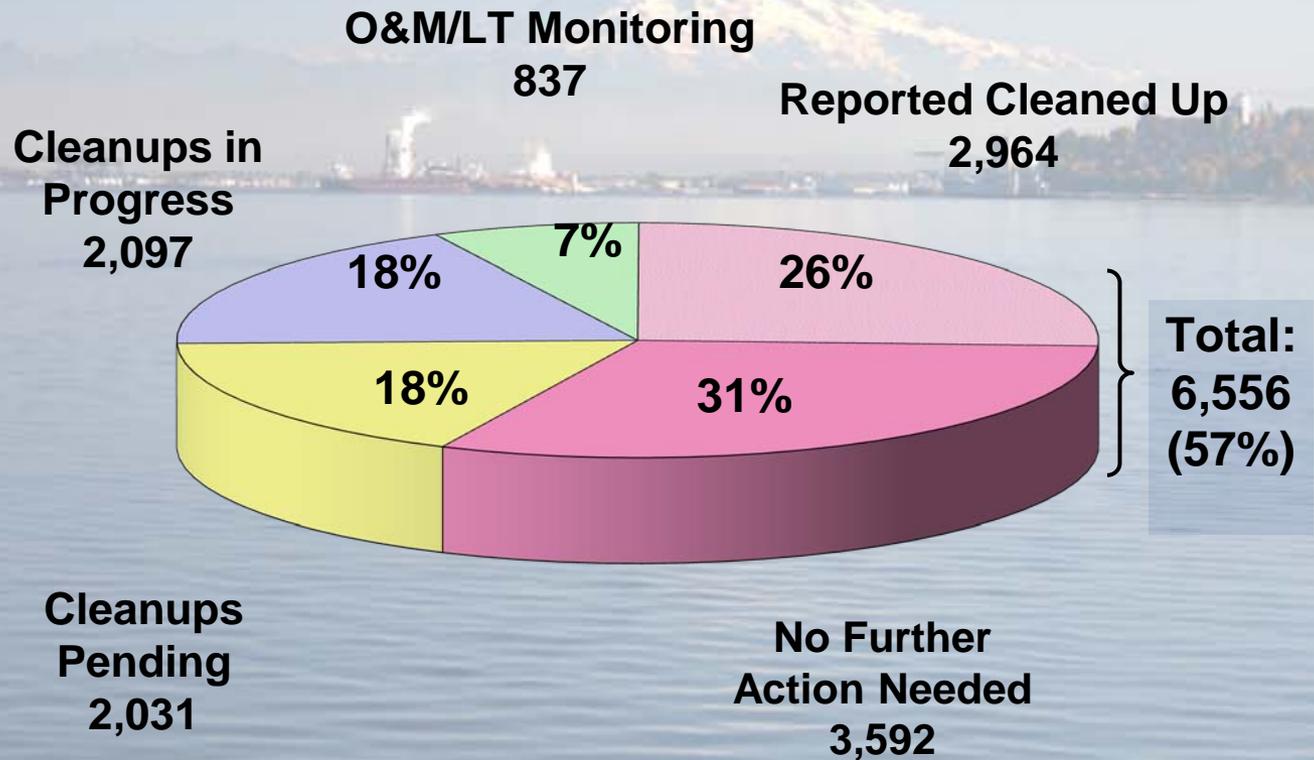


Current Program Status

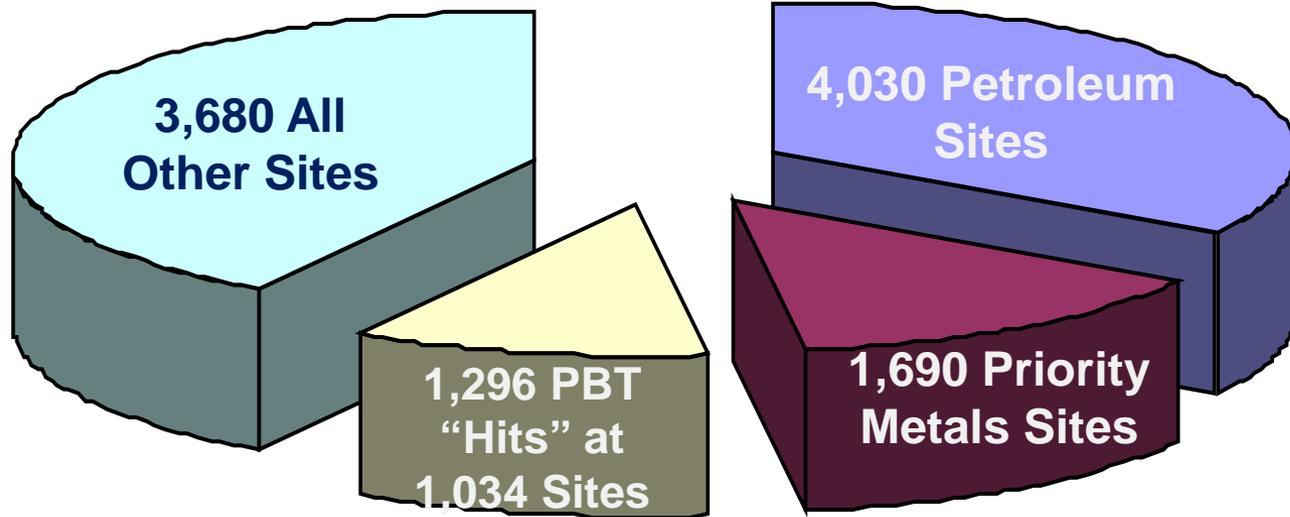
Total Sites: 11,521

Each year:
300-400 sites
are reported
to the
program.

200 to 300
sites are
cleaned up.



Contaminants at Sites



- Petroleum Contaminants
- Metals, including those in the PBT Rule
- PBTs (includes PAHs, Pesticides, PCBs, Dioxins)
- All other Contaminates

Petroleum, 4,030

Halogenated Organic Compounds, 987

Non-Halogenated Solvents, 958

PCBs, 483

Conventional Contaminants, Organic, 289

Phenolic Compounds, 213

Corrosive Wastes, 125

Dioxins, 54

Asbestos, 42

MTBE, 19

Priority Metals, 1,690

Other Metals, 448

PAHs, 569

Pesticides, 297

Conventional Contaminants, Inorganic, 225

Base Neutral Organics, 196

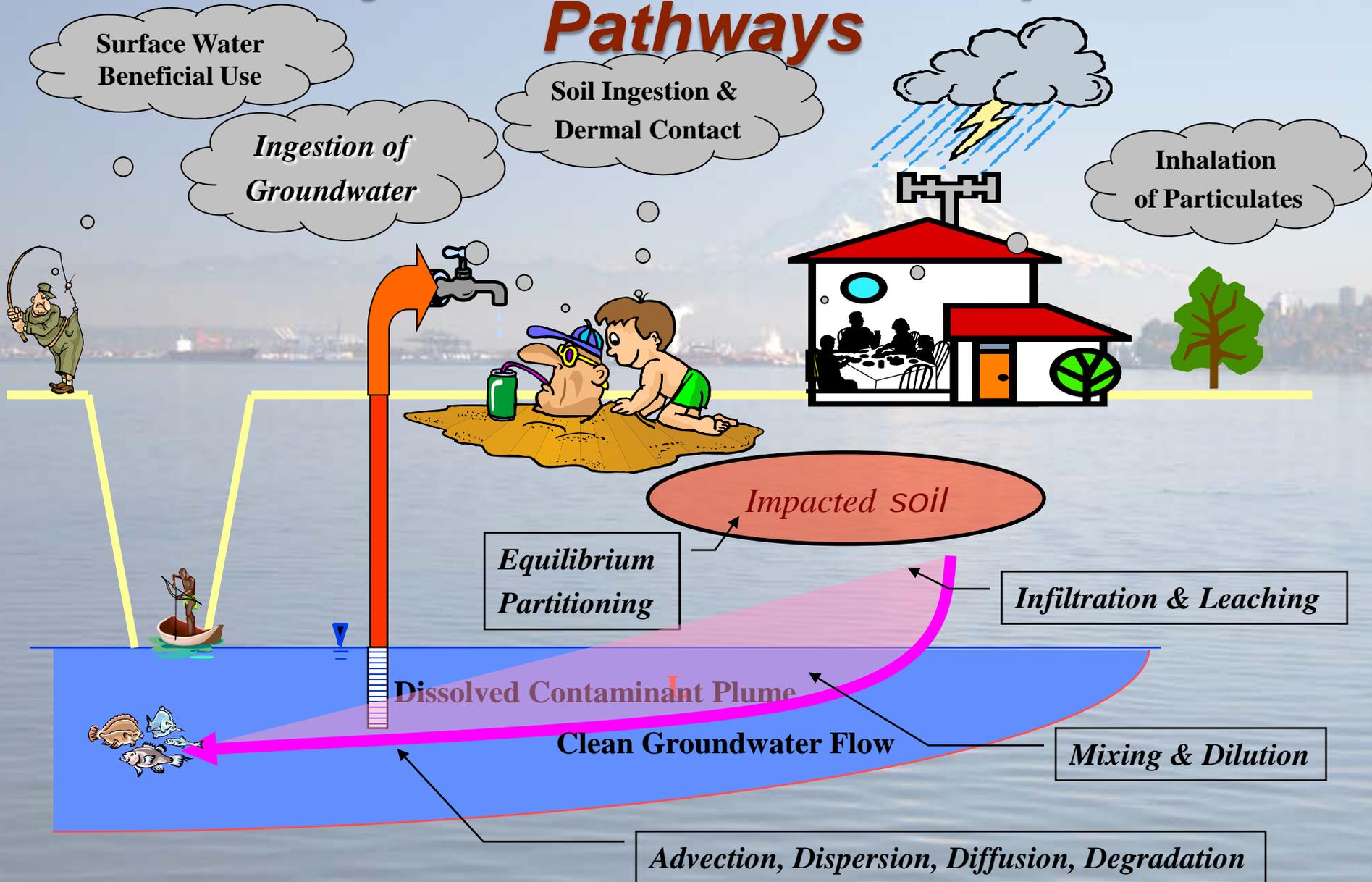
Arsenic, 112

Reactive Wastes, 43

Radioactive Wastes, 22

UXO, 1

Identify Land Uses and Exposure Pathways





Site Investigation and Study

A Remedial Investigation Answers Two Fundamental Questions

1. *What and where is the contamination?*
2. *What are the characteristics of the Site?*

A Feasibility Study Answers Two Fundamental Questions

1. *How can the site be cleaned up?*
2. *What cleanup approach is best?*

A Cleanup Action Plan Answers Two Fundamental Questions

1. *How will the contaminated site be cleaned up?*
2. *How will the site be used after cleanup?*

Vision of Future Land Use

A strong vision opens opportunities and provides momentum for restoration and redevelopment.



Deep Water Areas

Premium Nearshore Habitat

*Marine Buffer
(Preferred Approach)*

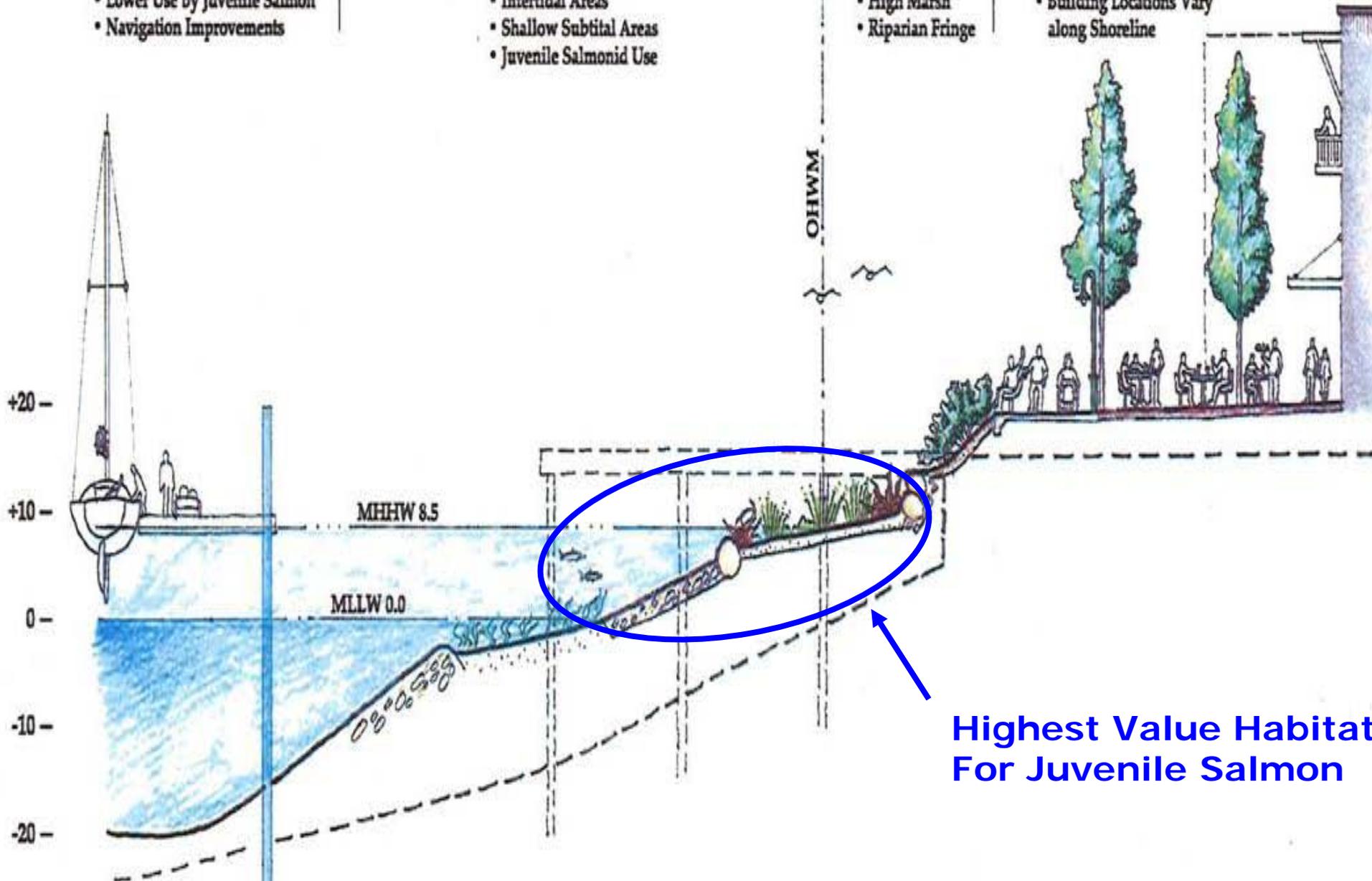
Upland Uses

- Lower Use by Juvenile Salmon
- Navigation Improvements

- Intertidal Areas
- Shallow Subtidal Areas
- Juvenile Salmonid Use

- High Marsh
- Riparian Fringe

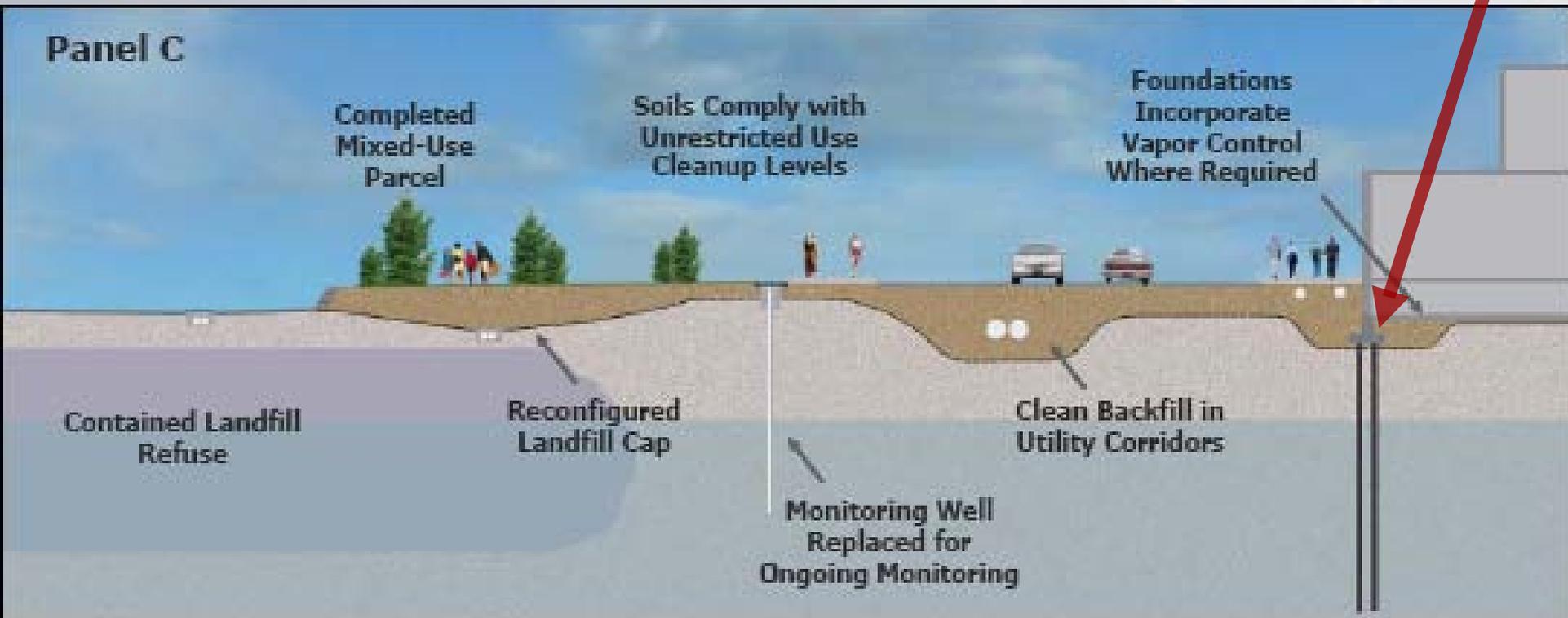
- Building Locations Vary along Shoreline



**Highest Value Habitat
For Juvenile Salmon**

Site and Design Choices

Building Foundation often serves as “environmental cap”



Developed Parcel

Cleanup and Landscape Design Creates Marine Park

**From
contaminated
areas....**



**...to
restored
areas for
public use.**

Cleanup and Landscape Design Creates Olympic Sculpture Park

Transformation of 9 acre industrial area.

Creation of an open space park which also addresses stormwater issues.

Trails run through native plant species and sculpture.



Cleanup and Landscape Design Creates Gasworks Park



Examples of Greener Cleanups in WA

Former landfills can become open space for wildlife or parks for people with walking trails.

Old treatment tanks at a Navy cleanup are now being used to raise trout and plants.

At another Navy site, poplars were planted instead of a mechanical pump and treat system for groundwater.

Ferns have been used to absorb arsenic.

Reused treated groundwater for areas such as golf course irrigation.

Recover petroleum from site cleanups to recycle/reuse.

**Washington State
Department of Ecology**

[http:// www.ecy.wa.gov](http://www.ecy.wa.gov)

Toxics Cleanup Program

[http:// www.ecy.wa.gov/cleanup.html](http://www.ecy.wa.gov/cleanup.html)

