

# Reasonable Potential Analysis & Compliance Strategies for Priority Pollutants

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# Outline

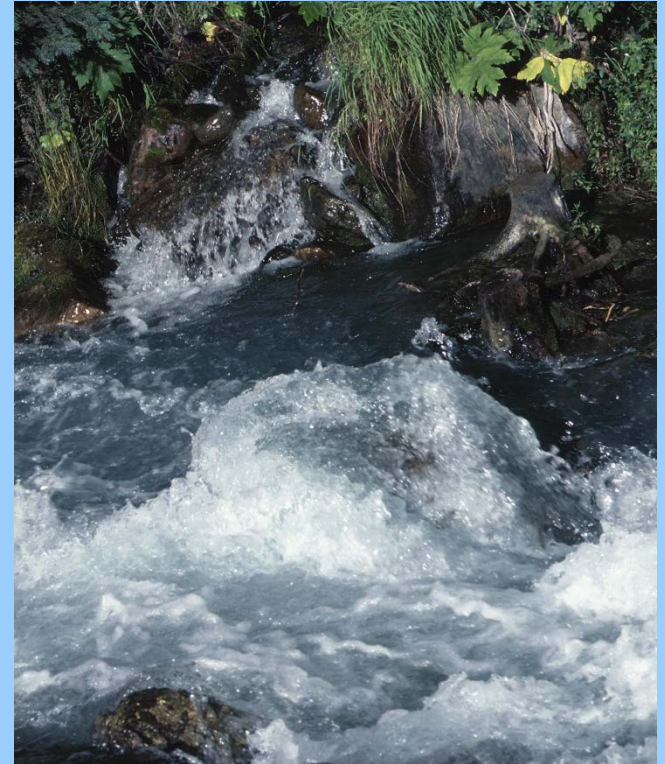
- **Background**
- **Reasonable Potential Analysis**
- **RPA spreadsheet**
- **Data considerations**
- **Compliance strategies**
- **Conclusions**



# Water Quality Standards

## States:

- Designate uses
- Establish criteria
- Standards are reviewed every 3 years (triennial review)
- EPA has oversight authority review and approval



# Water Quality Standards

- Significant changes to Oregon WQS
- Human health standards
  - Standards based on higher fish consumption rates
  - Resulting standards that are 10 times more stringent for carcinogens
- Aquatic life standards
  - Approved some/disapproved some other aquatic life standards
  - Total recoverable and dissolved standards

# Pollutant Categories

## Conventional pollutants

- BOD, TSS, oil and grease, bacteria, and pH

## Toxic pollutants – 126 *priority pollutants*

- metals (e.g., Cu, Pb, Zn, Hg)
- organic compounds (e.g., volatiles, semi-volatiles, PAHs, PCBs, pesticides)

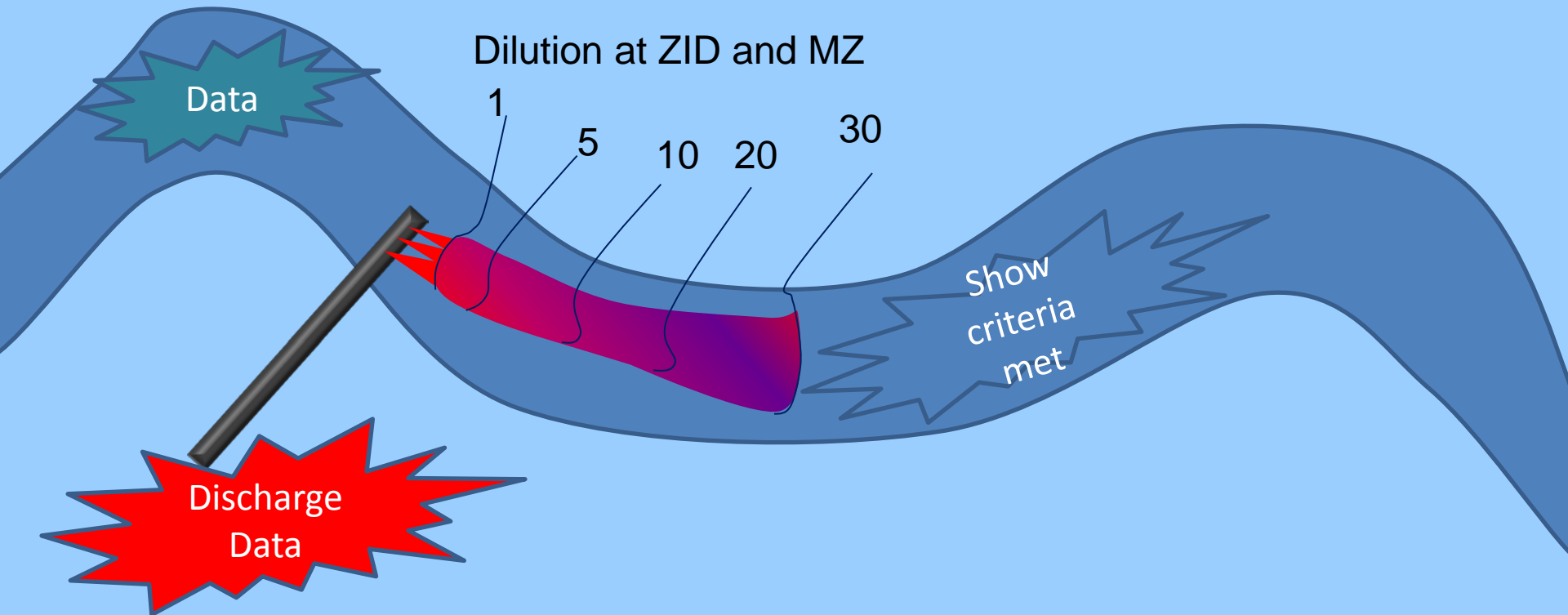
## Nonconventional pollutants

- everything else...
- e.g., chlorine, ammonia, nitrogen, phosphorus

# Reasonable Potential Analysis

- What: A statistically based approach to determine if a discharge may cause or contribute to a water quality problem
- Method: EPA's Technical Support Document for Water Quality Based Toxics Control
- Data: Effluent data from NPDES Permit Application  
Receiving stream characterization  
Mixing conditions
- New: New Standards, updated state directives, improved analytical thresholds

# Dilution and RPA



# Basic Questions

- RPA is used to answer two basic questions:
  - Is there reasonable potential for a discharge to exceed water quality criterion?
  - If yes, what effluent limits should be established such that water quality criterion are met?
- RPA spreadsheet is the tool used to answer questions



# RPA Spreadsheet

- RPA spreadsheet divided into three categories
  - First tab is monitoring req'd (effluent data)
  - Determine reasonable potential
    - Aquatic life RP and Human Health RP tabs
  - Effluent limits (limits tabs)

# Water Quality Standards

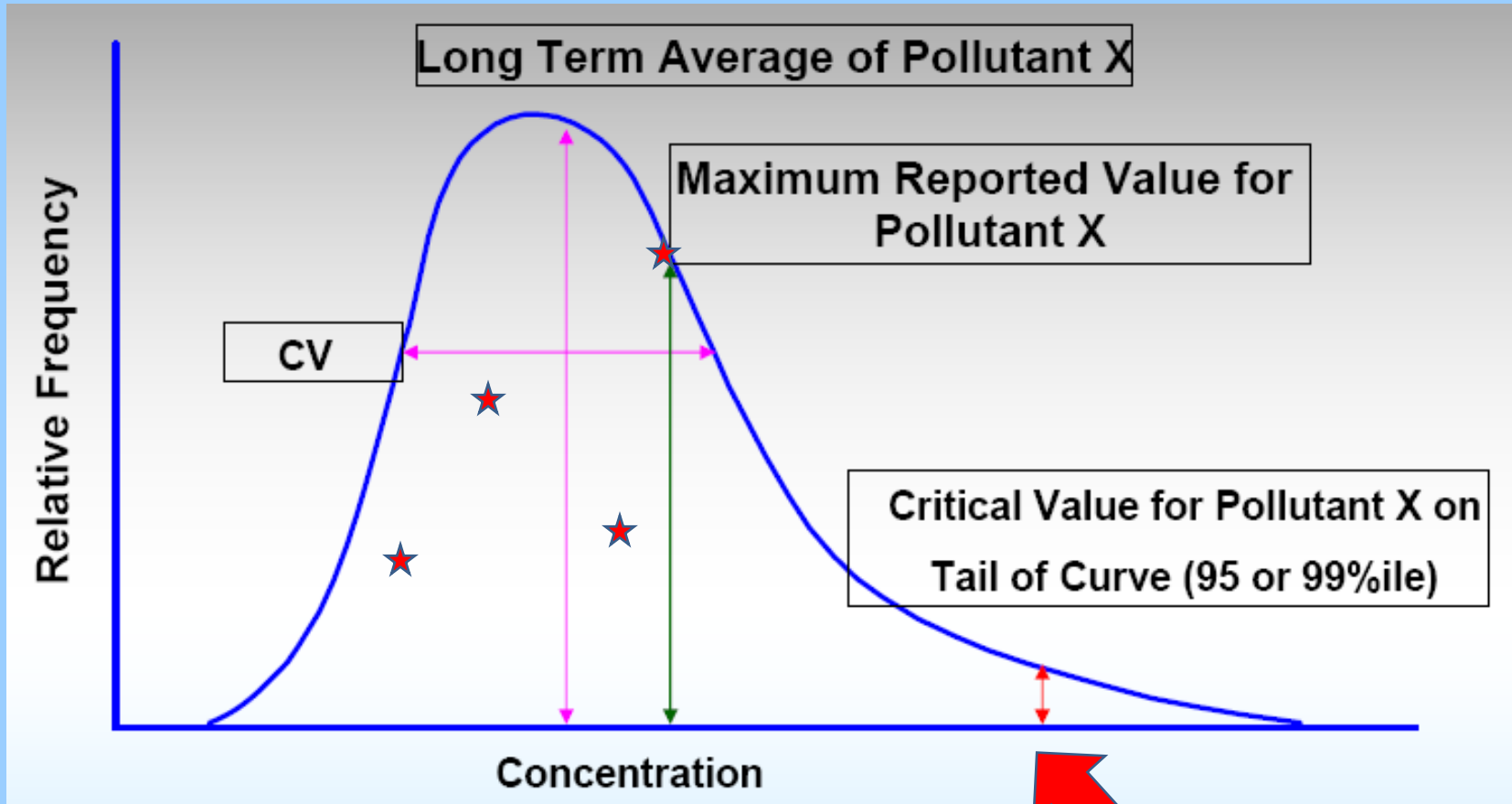
- Aquatic life standards/Human health standards
- Statistics for effluent concentrations/stream background levels
- Statistics for effluent flows/stream flows to define dilution factors

# RPA Inputs

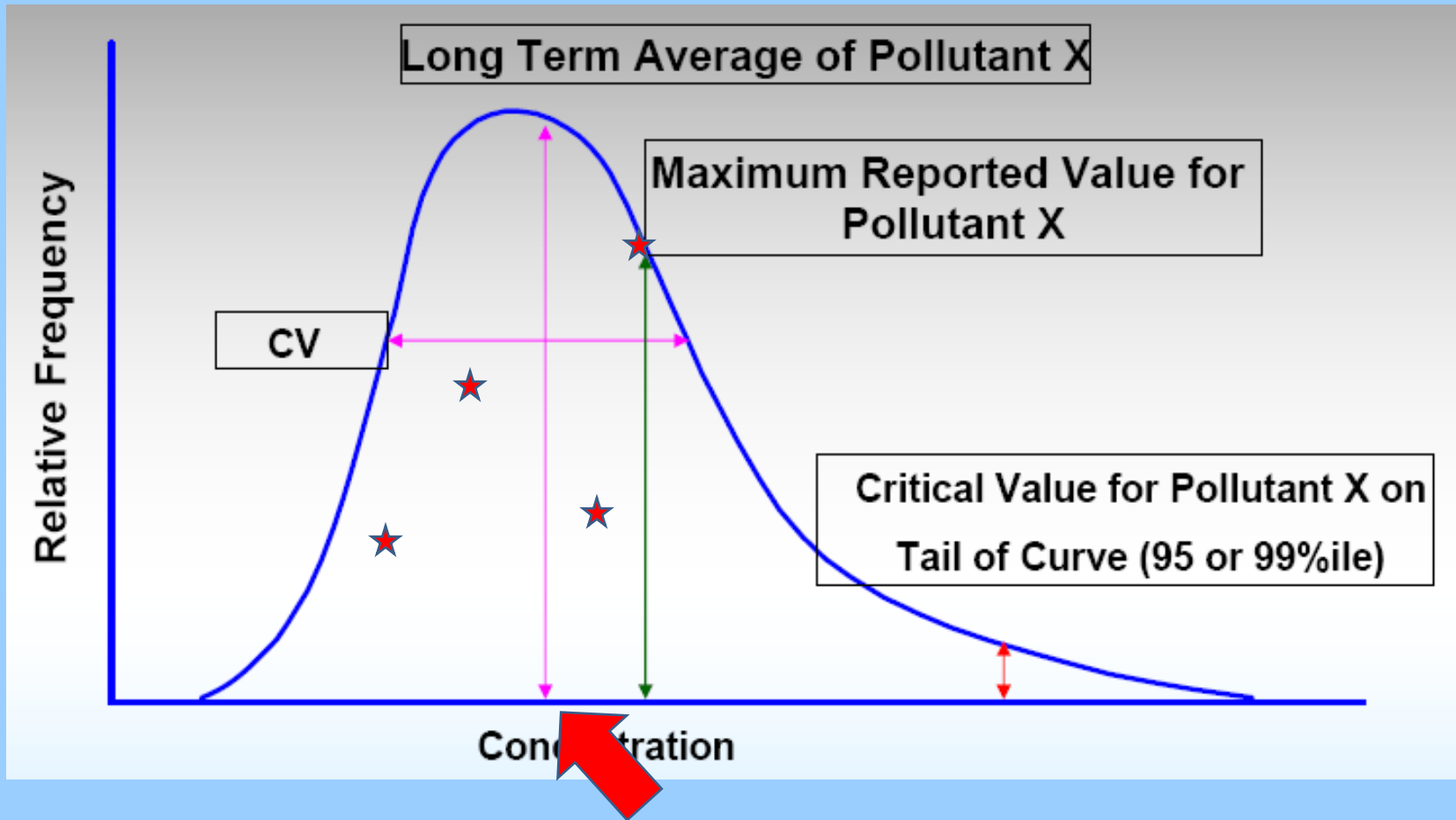
**Table 5-1  
Summary of RPA Variables**

RPA Type	Effluent Concentration	Ambient Concentration	Effluent Flow Rate	Ambient Flow Rate	% Confidence/ % Probability
<b>Aquatic Life: Acute</b>	Max Conc.	<ul style="list-style-type: none"> <li>• 1-3 samples: Max. Conc.</li> <li>• <math>\geq 4</math> samples: 90<sup>th</sup> percentile</li> </ul>	See RMZ IMD Part 2, Sec. 4.4	1Q10	99% / 95%
<b>Aquatic Life: Chronic</b>	Max Conc.	<ul style="list-style-type: none"> <li>• 1-3 samples: Max. Conc.</li> <li>• <math>&gt; 4</math> samples: 90<sup>th</sup> percentile</li> </ul>	See RMZ IMD Part 2, Sec. 4.4	7Q10	99% / 95%
<b>Human Health</b>	<ul style="list-style-type: none"> <li>• Carcinogens: Geometric Mean</li> <li>• <u>Non-Carcin.:</u> Max Conc.</li> </ul>	Geometric Mean	<ul style="list-style-type: none"> <li>• Carcinogens: Average Annual Flow</li> <li>• <u>Non-Carcin.:</u> ADWDF</li> </ul>	<ul style="list-style-type: none"> <li>• Carcinogens: Harmonic Mean Flow</li> <li>• <u>Non-Carcin.:</u> 30Q5<sup>56</sup></li> </ul>	NA

# Effluent Variability



# Effluent Variability



# Metals Translators

- Some recently approved aquatic life standards expressed as “dissolved”
- NPDES limits expressed as “total recoverable”
- Requires use of translators/conversion factors
- Generally very conservative – assumes the total recoverable and dissolved forms are similar
- Develop site specific translators if necessary

Table 1. Freshwater Criteria Conversion Factors for Dissolved Metals

Metal	Conversion Factors	
	Acute	Chronic
Arsenic	1.000	1.000
Cadmium *	0.944	0.909
Chromium (III)	0.316	0.860
Chromium (VI)	0.982	0.962
Copper	0.960	0.960
Lead *	0.791	0.791
Mercury	0.85	N/A
Nickel	0.998	0.997
Silver	0.85	N/A
Zinc	0.978	0.986

\* Conversion factors for Cd and Pb are hardness dependent. The values shown are with a hardness of 100 mg/L as calcium carbonate (CaCO<sub>3</sub>).



United States  
Environmental Protection  
Agency

Office Of Water  
(4305)

EPA 823-B-96-007  
June 1996

## The Metals Translator: Guidance For Calculating A Total Recoverable Permit Limit From A Dissolved Criterion

# RPA – next steps

## Enhanced Data:

- Effluent data
- Receiving stream data

## Dynamic Analysis:

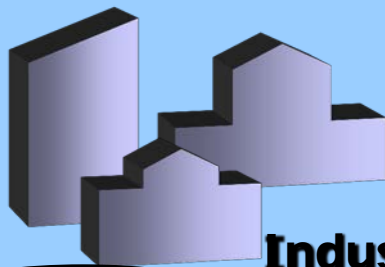
- Seasonality
- Mixing zone dilutions



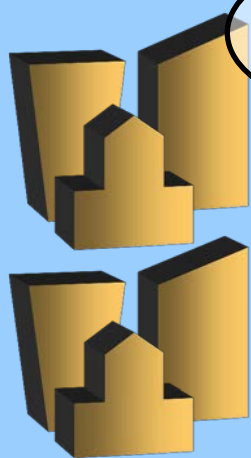


# Compliance Options

**Domestic**



**Industrial**



**Commercial**

Education/  
outreach

Reduce Sources

Process enhancement/  
Treatment

Influent  
Wastewater

Reuse

Outfall mod./re-  
evaluate mixing zone

Compliance Schedules  
Enforcement Orders  
Clean Water Services

Wherever there's water, there's Clean Water.



# Pollutants of Concern

- Industrial Compounds
  - Metals, toxic organics
- Chlorination byproducts
  - THMs (chloroform, bromoform, etc.)
- Consumer Products/non-industrial
  - phthalates
- Legacy Pollutants
  - Pesticides, PCBs

# Oregon Water Quality

pollution prevention tools  
from the oregon association of  
clean water agencies (ORACWA)

[How to Use This Info](#)
[Pollution Prevention Program Categories](#)
[Chemical Profiles](#)
[FAQs](#)
[What's New](#)
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## Welcome to the Oregon Water Quality website

Content on this website is available exclusively to participating members of the Oregon Association of Clean Water Agencies. Please [contact us](#) to learn about the work of the organization and to find out about membership.

The 2007 Oregon Legislature passed [SB 737](#) requiring Oregon DEQ to develop an inventory of Priority Persistent Pollutants that pose a threat to Oregon's rivers and streams, people, fish or wildlife.

## Oregon Priority Persistent Pollutants

DEQ developed an inventory of 118 Priority Persistent Pollutants. The inventory includes both pollutants that are found in current use products and products that are now restricted. The types of chemicals included on the list include:

- Consumer Related Chemicals
- Halogenated Flame Retardants
- Industrial Chemicals
- Metals
- Perfluorinated Surfactants
- Perfluorinated Surfactants
- Pesticides
- Polychlorinated Biphenyls (PCBs)
- Polychlorinated Naphthalenes
- Polycyclic Aromatic Hydrocarbons

Learn more about the [Priority Persistent Pollutant list](#) at the Oregon Department of Environmental Quality (DEQ) web site.

Learn what you can do to [reduce toxics in Oregon's water](#).



# Regulatory Relief

## Bridging strategy

- TMDLs
- Variances
- Integrated Planning

## Water Quality Standards

- Site specific standard
- Use attainability analysis (UAA)



# RPA Toolbox

- **Data precession and amount,**
  - False positives, outliers, ultra clean, background
- **Representative Information**
  - Has something changed ?
- **Application of discretion within method**
  - Coefficient of variation, sample frequency, Probability
- **Refined analytical methods**
  - Seasonal analysis
  - Rigorous statistical analyses, dynamic simulation
- **Mixing Zone**
  - Design, dilution, location, flows, dynamic analysis
- **If not, compliance strategies**
  - Treatment, pretreatment, pollution prevention
  - Regulatory





RPA

POTW