Implementing Human Health Criteria in Oregon

Water Quality Permitting and Program Development

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State of Oregon
DEQ Department of Environmental Quality

Oregon Fish Consumption Rate

- Oregon Human Health Criteria updated in 2011
- Fish consumption rate of 175 g/day
  - Equivalent to 23 eight-ounce fish meals per month
  - 95th percentile value from a 1994 Columbia River Inter-Tribal Fish Commission study

Stock Image of Salmon fillet fity.club

Results in Some Really Low Criteria

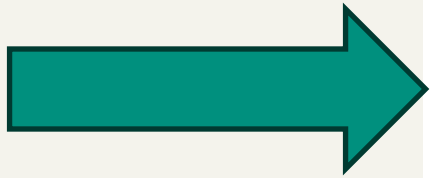

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Table 40

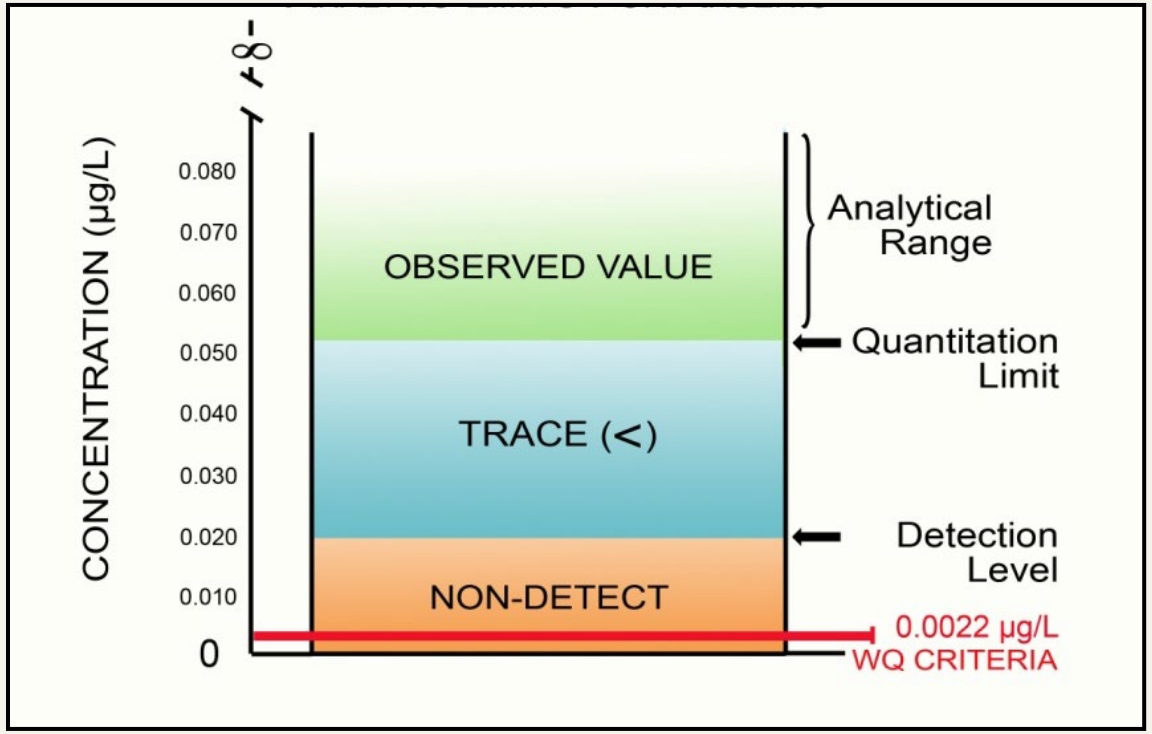
Human Health Water Quality Criteria for Toxic Pollutants

340-041-8033

No.	Pollutant	CAS Number	Carcinogen	Aquatic Life Criterion	*Human Health Criteria for the Consumption of:* Water + Organism (µg/L)	*Human Health Criteria for the Consumption of:* Organism Only (µg/L)
	[E] *The Chlorophenoxy Herbicide (2,4-D) criterion is the same as originally published in the 1976 EPA Red Book which predates the 1980 methodology and did not utilize the fish ingestion BCF approach. This same criterion value was also published in the 1986 EPA Gold Book. Human health risks are primarily from drinking water, therefore no "organism only" criterion was developed. The "water + organism" criterion is based on the Maximum Contaminant Level (MCL) established under the Safe Drinking Water Act.*					
33	Chrysene	218019	y	n	0.0013	0.0018
34	Copper [F]	7440508	n	y	1300	--
	[F] *Human health risks from copper are primarily from drinking water, therefore no "organism only" criterion was developed. The "water + organism" criterion is based on the Maximum Contaminant Level (MCL) established under the Safe Drinking Water Act.*					
35	Cyanide [G]	57125	n	y	130	130
	[G] *The cyanide criterion is expressed as total cyanide (CN)/L.*					
36	DDD 4,4'	72548	y	n	0.000031	0.000031
37	DDE 4,4'	72559	y	n	0.000022	0.000022
38	DDT 4,4'	50293	y	y	0.000022	0.000022
39	Dibenz(a,h)anthracene	53703	y	n	0.0013	0.0018

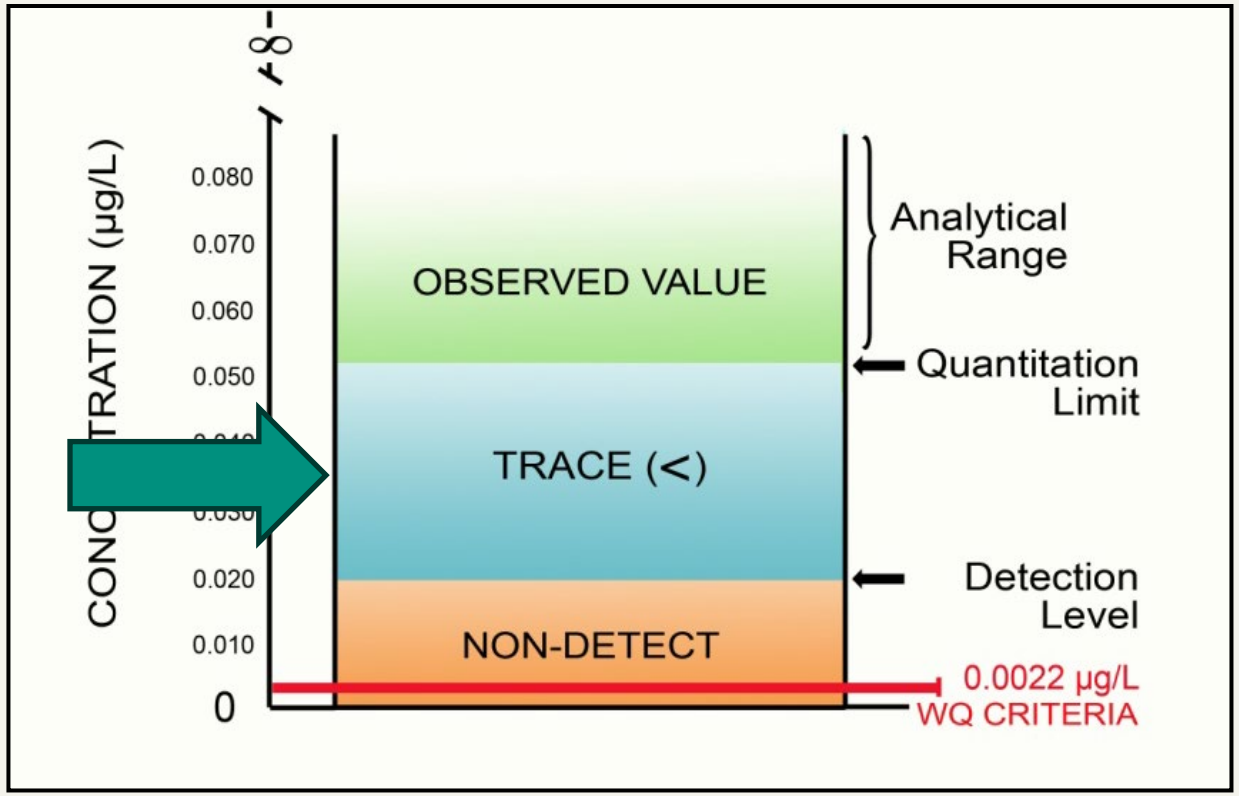
But Analytical Methods Aren't Sensitive Enough

- Permittees use 40 CFR 136 approved methodology
- Even the most sensitive approved methods may not be sensitive enough for some criteria
- Just because a data point is "non-detect" doesn't mean it is below the WQ criteria



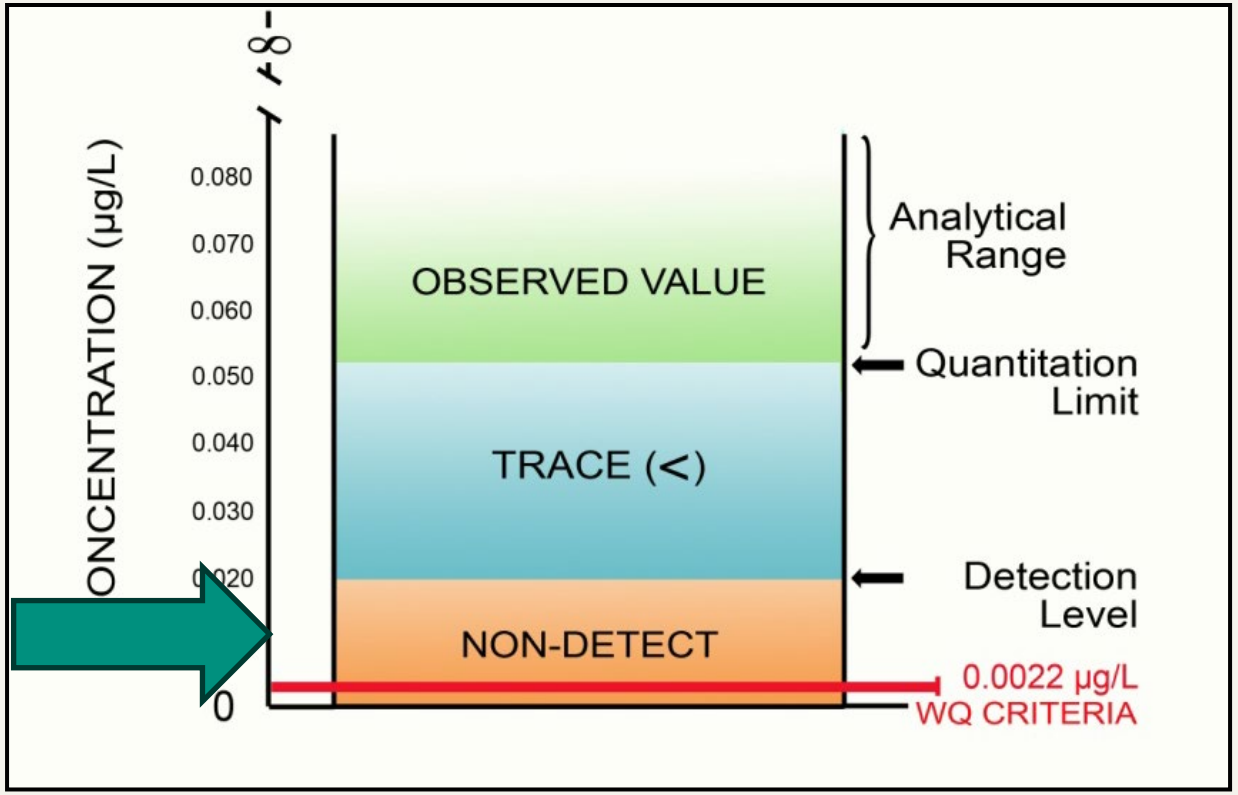
How to Interpret Datasets?

- Results in datasets that are primarily non-detect with the occasional trace detection
  - Can be hard to tell if the trace is an actual detection when all other data points are non-detect
  - But if the trace is a real detection, then there is evidence that the pollutant exists in the effluent above the human health criteria



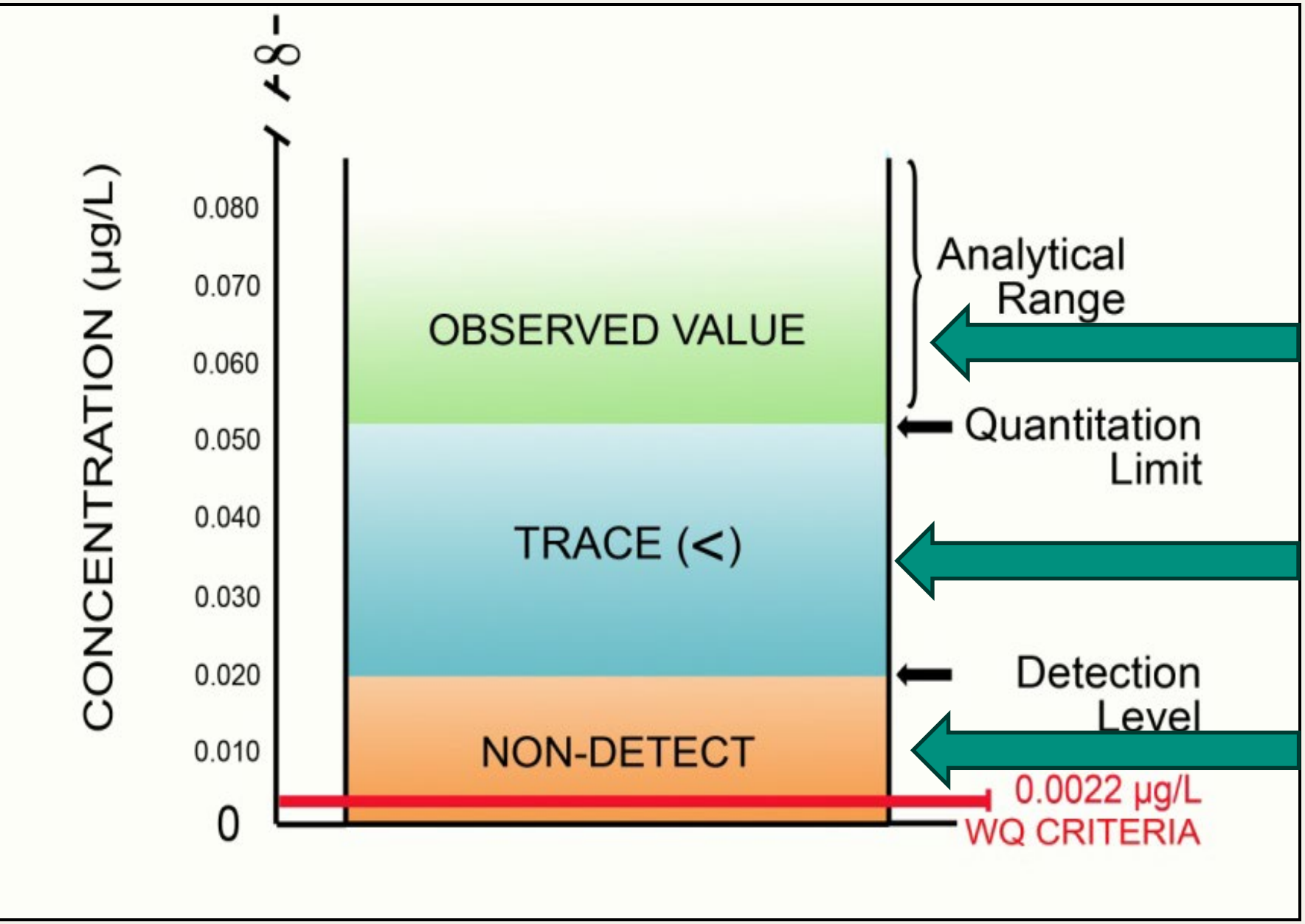
What Happens With the Regular TSD Approach?

- What to substitute for Non-Detects?
  - 0 if using arithmetic mean (non-carcinogens)
  - ½ Detection Limit if using geometric mean (carcinogens)
- Even using ½ Detection Limit is still above the criteria
- Datasets with majority non-detect don't fit the lognormal distribution assumptions outlined in EPA's TSD



What are the alternatives?

- Developed a “percent detected approach”
  - Figure out the % Non-detects, % trace, and # of quantified samples
- Requirements:
  - minimum dataset of 10 values
  - All data meets 40 CFR 122 “Sufficiently Sensitive” requirements
    - Used the most sensitive approved test



2+ Quantified Samples = RP

≥ 25% of samples detected = RP

< 25% samples detected = Inconclusive, include additional monitoring and source control study

All Samples ND = No RP

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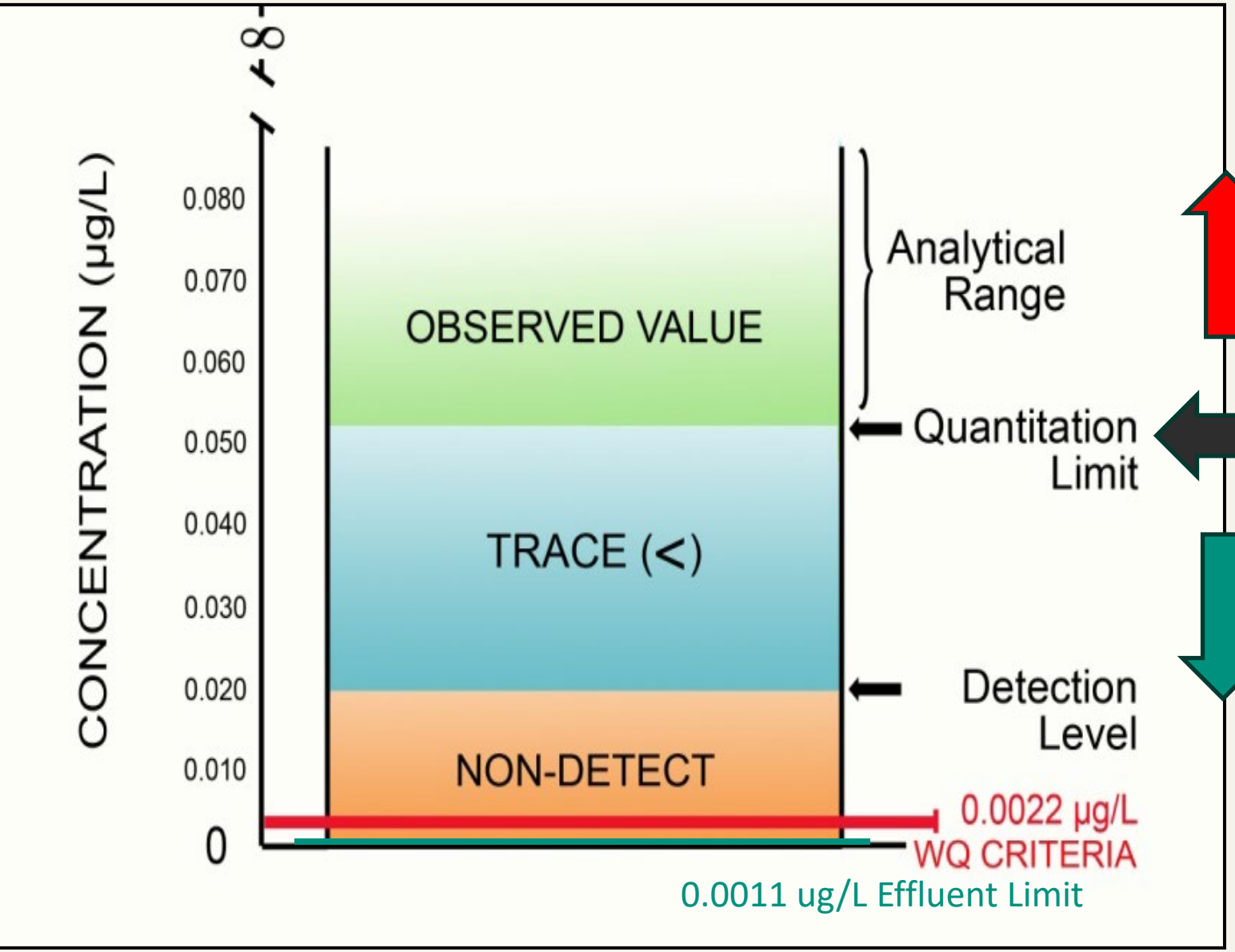
What About Limits?



Out of Compliance

Use a "Compliance Limit" set to the lowest available QL

- "Recommended QL List" based on 40 CFR 122 "Sufficiently Sensitive" requirements

In Compliance

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Parameter	Units	Average Monthly	Average Weekly	Daily Maximum	Semi-annual Average
Iron, Total Recoverable (Final, see note b.)	µg/L	819	-	1,640	-
Bis(2-ethylhexyl) phthalate (Final, see note b. and note c.)	µg/L	0.2	-	0.4	-
N-Nitrosodiethylamine (Final, see note b. and note d.)	µg/L	0.00079	-	0.0016	-
Phosphorus as P, Total					

quantitation limit, DEQ will use the reported quantitation limit as the compliance evaluation level.

b. The final limits for total ammonia, total phosphorus, total recoverable iron, total recoverable arsenic, chloride, bis(2-ethylhexyl) phthalate, N-Nitrosodiethylamine, and nitrate-nitrite nitrogen are effective after completion of the compliance schedules in Schedule C.

c. DEQ has established a quantitation limit of 7.25 µg/L for bis(2-ethylhexyl) phthalate. Any analysis done for bis(2-ethylhexyl) phthalate must have a quantitation limit that is either equal to or less than 7.25 µg/L. In cases where the average monthly or maximum daily limit for bis(2-ethylhexyl) phthalate is lower than the quantitation limit, DEQ will use the reported quantitation limit as the compliance evaluation level.

d. DEQ has established a quantitation limit of 2 µg/L for N-Nitrosodiethylamine. Any analysis done for N-Nitrosodiethylamine must have a quantitation limit that is either equal to or less than 2 µg/L. In cases where the average monthly or maximum daily limit for N-Nitrosodiethylamine is lower than the quantitation limit, DEQ will use the reported quantitation limit as the compliance evaluation level.

A Special Case - Methylmercury

Oregon's Human Health criteria for methylmercury is in fish tissue weight (0.040 mg/kg) instead of a concentration

How to determine reasonable potential?

How to implement limits in a permit?

Implementing the Methylmercury Criteria

Total mercury concentration in effluent is used as an indicator for Reasonable Potential

- RP if ≥25% of samples are detected for total mercury

Instead of numeric limit, permittee is required to develop a Mercury Minimization Plan (MMP). Permittee must:

- Evaluate and identify all current and potential mercury sources
- Develop and maintain an implementation plan that includes specific methods for reducing mercury
- Continue to monitor mercury to ensure reductions are occurring

Thank You!

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