Projects to Protect Salmonids from Toxic Tire Dust

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Overview

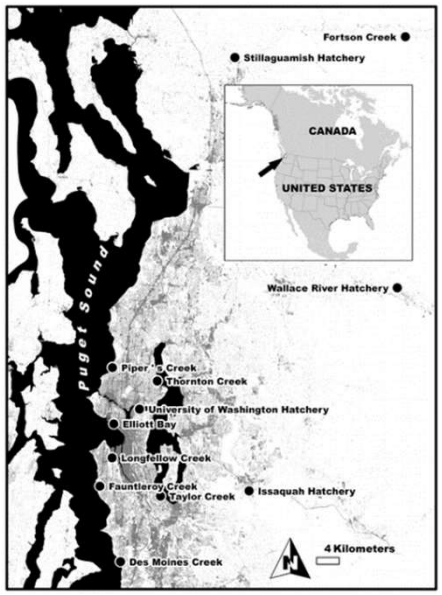
1. Introduction to toxic tire dust (6PPD-Q)
2. Relevance to Oregon's aquatic species
3. Implications for PFA Grantees

1. Introduction to Toxic Tire Dust (a.k.a. 6PPD-Q)

- Salmon die-off events observed starting in early 2000's

Recurrent Die-Offs of Adult Coho Salmon Returning to Spawn in Puget Sound Lowland Urban Streams

Nathaniel L. Scholz[1]*, Mark S. Myers[1], Sarah G. McCarthy[2], Jana S. Labenia[1], Jenifer K. McIntyre[1], Gina M. Ylitalo[1], Linda D. Rhodes[1], Cathy A. Laetz[1], Carla M. Stehr[1], Barbara L. French[1], Bill McMillan[3], Dean Wilson[2], Laura Reed[4], Katherine D. Lynch[4], Steve Damm[5], Jay W. Davis[5], Tracy K. Collier[1]



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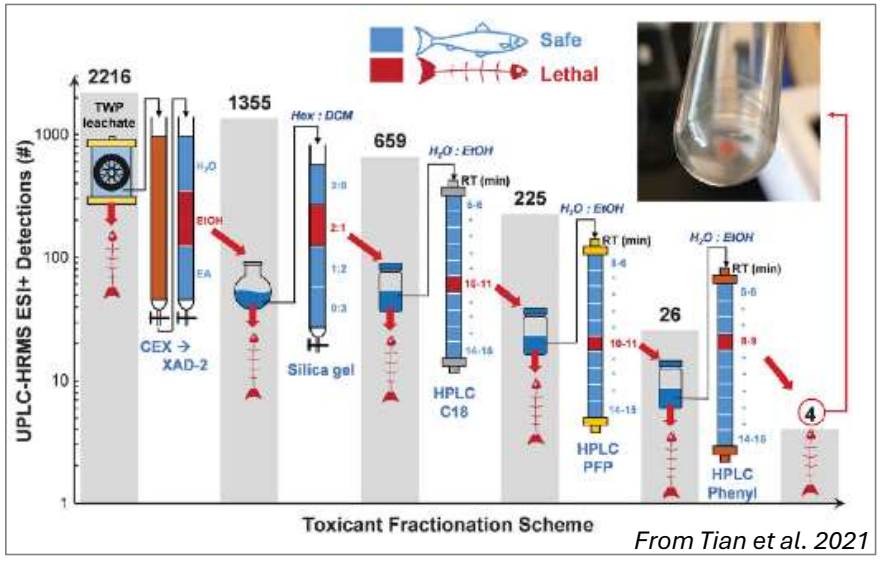
Narrowing it Down

Urban stormwater runoff

-> tires

-> specific tire chemical (6PPD-Q)



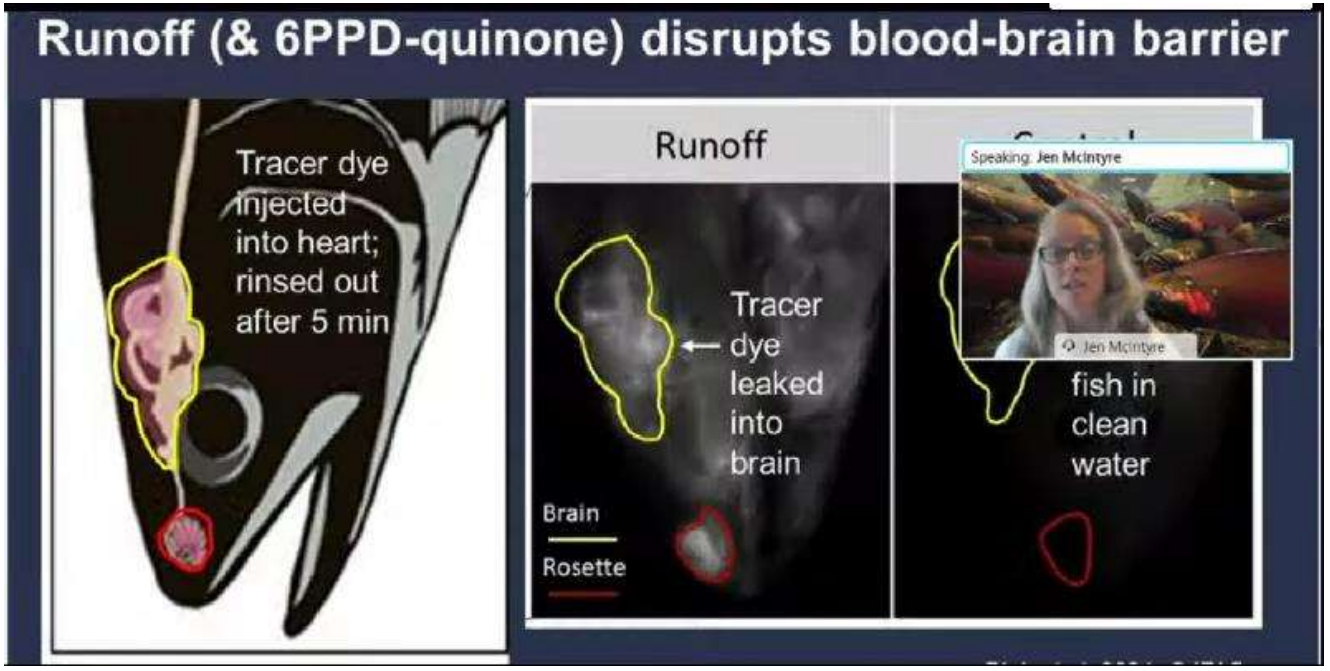
From Tian et al. 2021

Sources of Toxic Tire Dust

- Major source: Runoff from high traffic roads which drain to streams

Lethality of Toxic Tire Dust

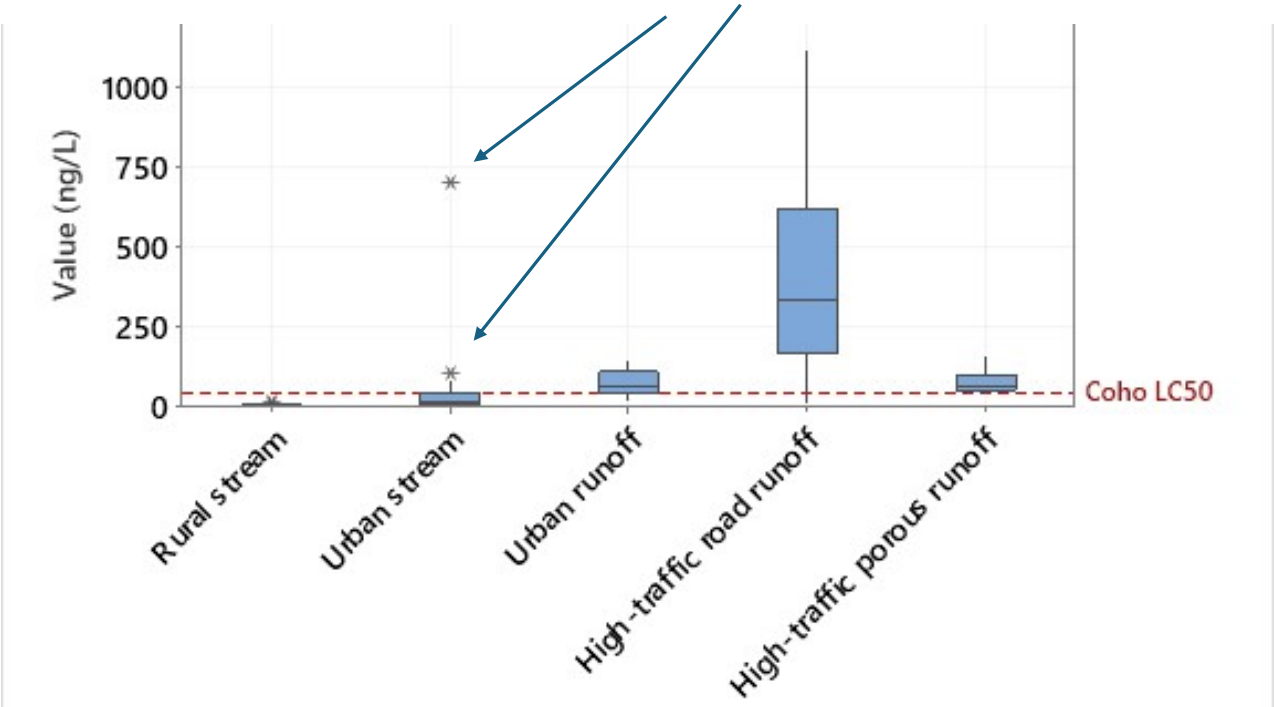
- Second most toxic compound ever tested (after DDT)
- Highly toxic to coho salmon: LC_{50} = 40-95 ng/L
- Disrupts the blood-brain barrier



Oregon 6PPD-Q Data

- Present wherever road runoff reaches streams
- Lethal levels near outfalls

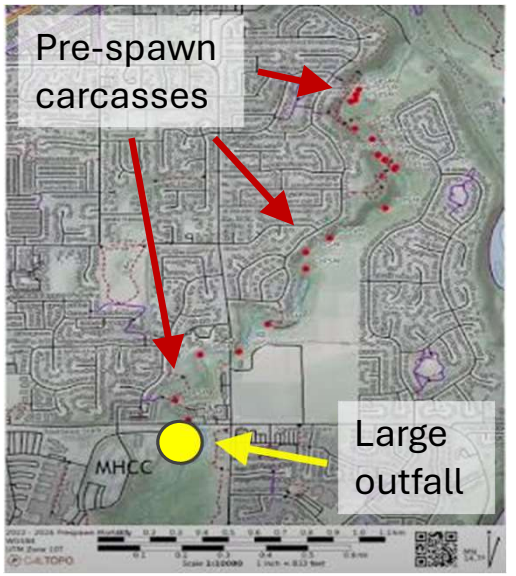
Near outfalls during rain events

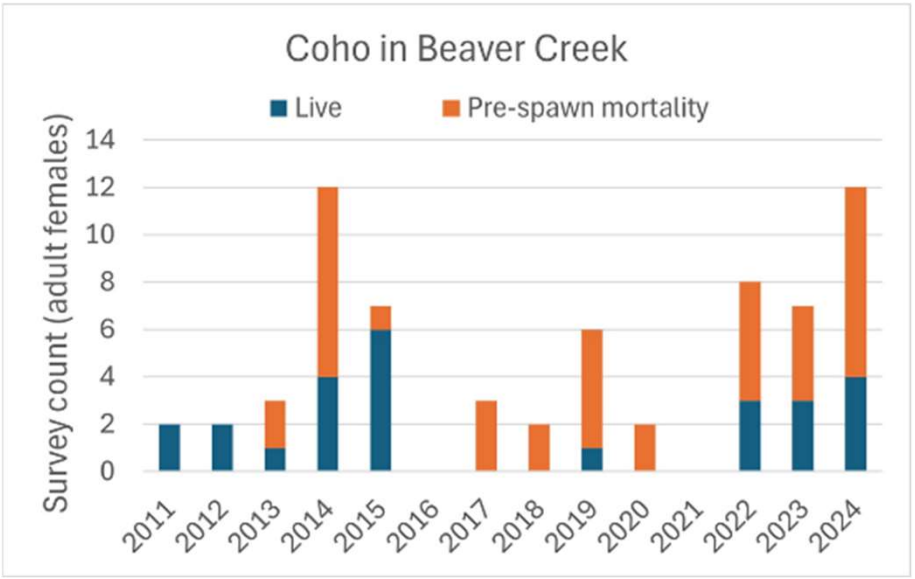


Preliminary – Lab methods still in development

Beaver Creek Example

- Fish passage and stream restoration projects
- Coho returning, but many dying pre-spawn
- All pre-spawn death downstream of large outfall with high 6PPD-Q
- Could retrofit outfall and/or contributing roads





Treatment

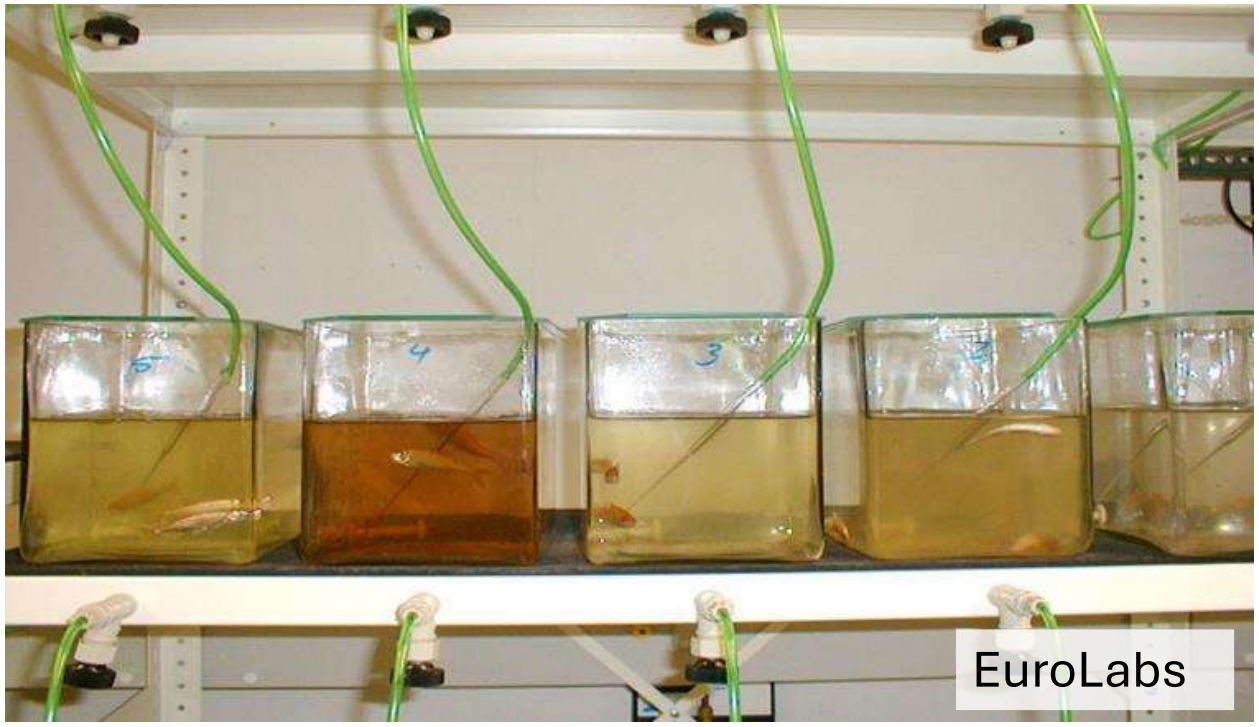
- Typical stormwater treatment generally works well!
  - Sorbs to organic matter
  - Bioretention, rain gardens, porous pavement, tree wells
- Infiltration is best
- Filter with organic material
  - Compost, biochar, soil, coconut coir, etc.

Importance of Addressing this Issue

- Fish passage and stream restoration projects can only be effective if the fish aren't poisoned

2. Relevance to Oregon's Aquatic Species

- Chemical still relatively new, but testing has been conducted on some aquatic species, several of which are in Oregon



Fish Species Tested for 6PPD-Q Lethality

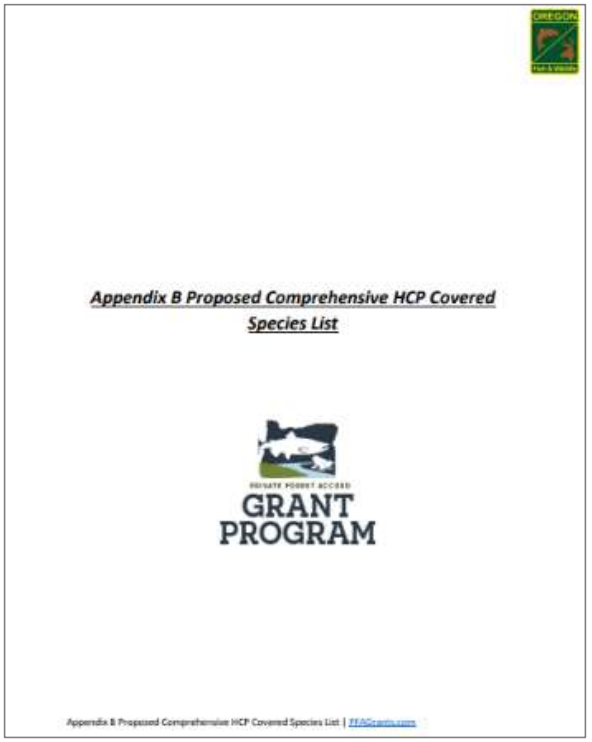
Species	LC_{50} (µg/L)
Coho salmon (*Oncorhynchus kisutch*)	0.04, [24] 0.08, [25] 0.095 [2]
White-spotted char (*Salvelinus leucomaenis pluvius*)	0.51 [26]
Brook trout (*Salvelinus fontinalis*)	0.59 [3]
Rainbow trout/steelhead (*Oncorhynchus mykiss*)	0.64,[29] 1.0,[3] 2.26 [5]
Chinook salmon (*Oncorhynchus tshawytscha*)	67.3 [24], 82.1 [25]
Sockeye salmon (*Oncorhynchus nerka*)	Not acutely toxic at 50 [25]
Atlantic salmon (*Salmo salar*)	Not acutely toxic at 12.2 [28]
Brown trout (*Salmo trutta*)	Not acutely toxic at 12.2 [28]
Arctic char (*Salvelinus alpinus*)	Not acutely toxic at 12.7 [3]
Southern Dolly Varden (*Salvelinus curilus*)	Not acutely toxic at 3.8 [26]
Cherry salmon (*Oncorhynchus masou masou*)	Not acutely toxic at 3.5 [26]

*Coastal cutthroat trout (*Oncorhynchus clarkii clarkii*)

**Likely similar to Coho (publication coming soon)*

Covered Species

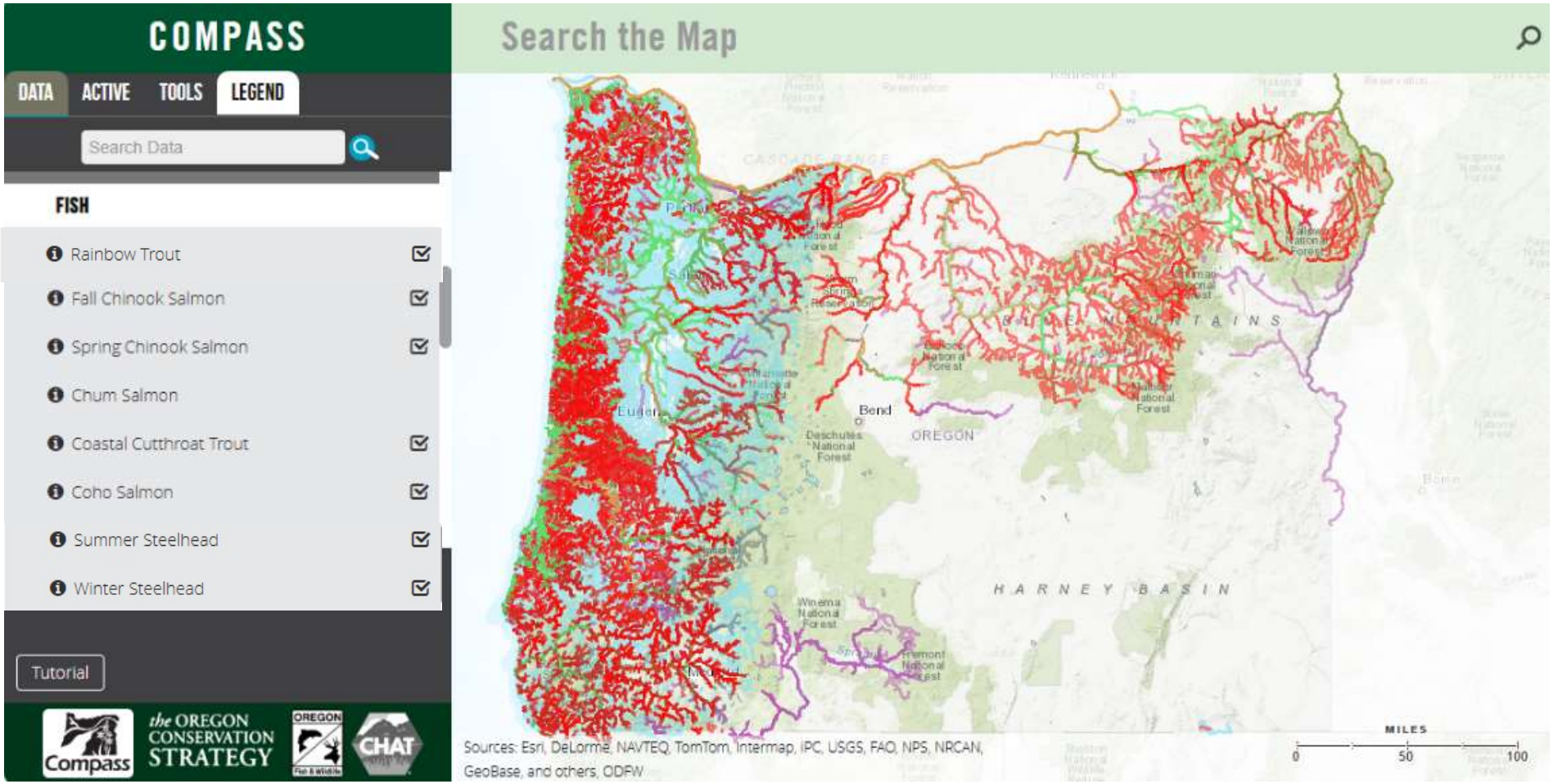
- Requirement of PFA grant applications: “All projects propose ecological uplift to at least one or more of the HCP Covered Species”
  - Appendix B Proposed Comprehensive HCP Covered Species List.pdf



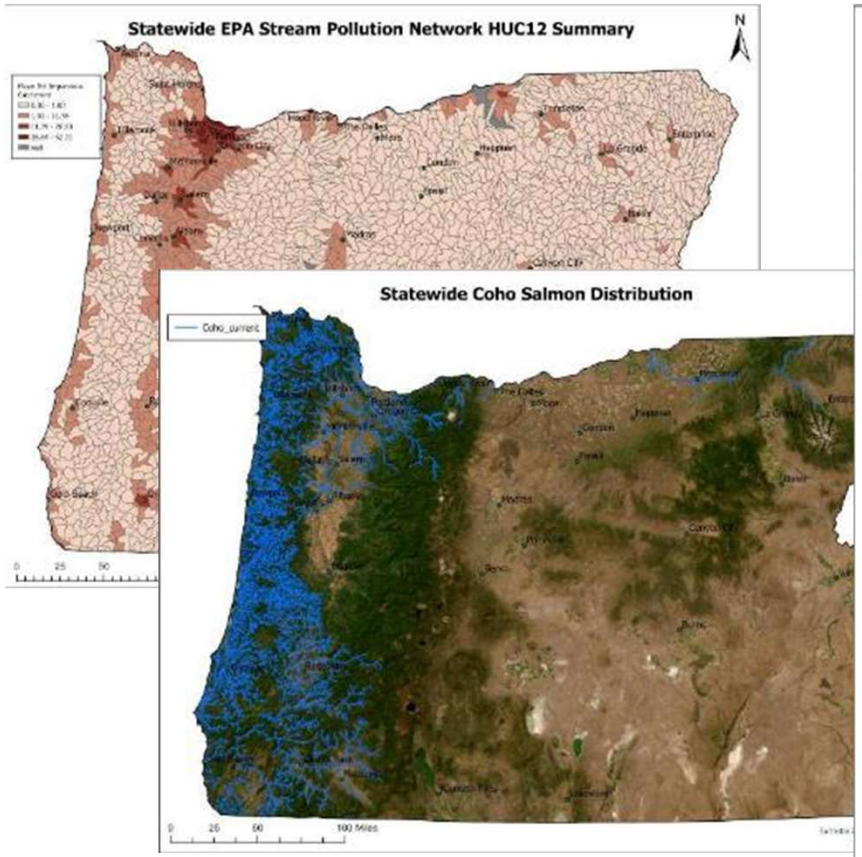
Oregon HCP Species Impacted by 6PPD-Q

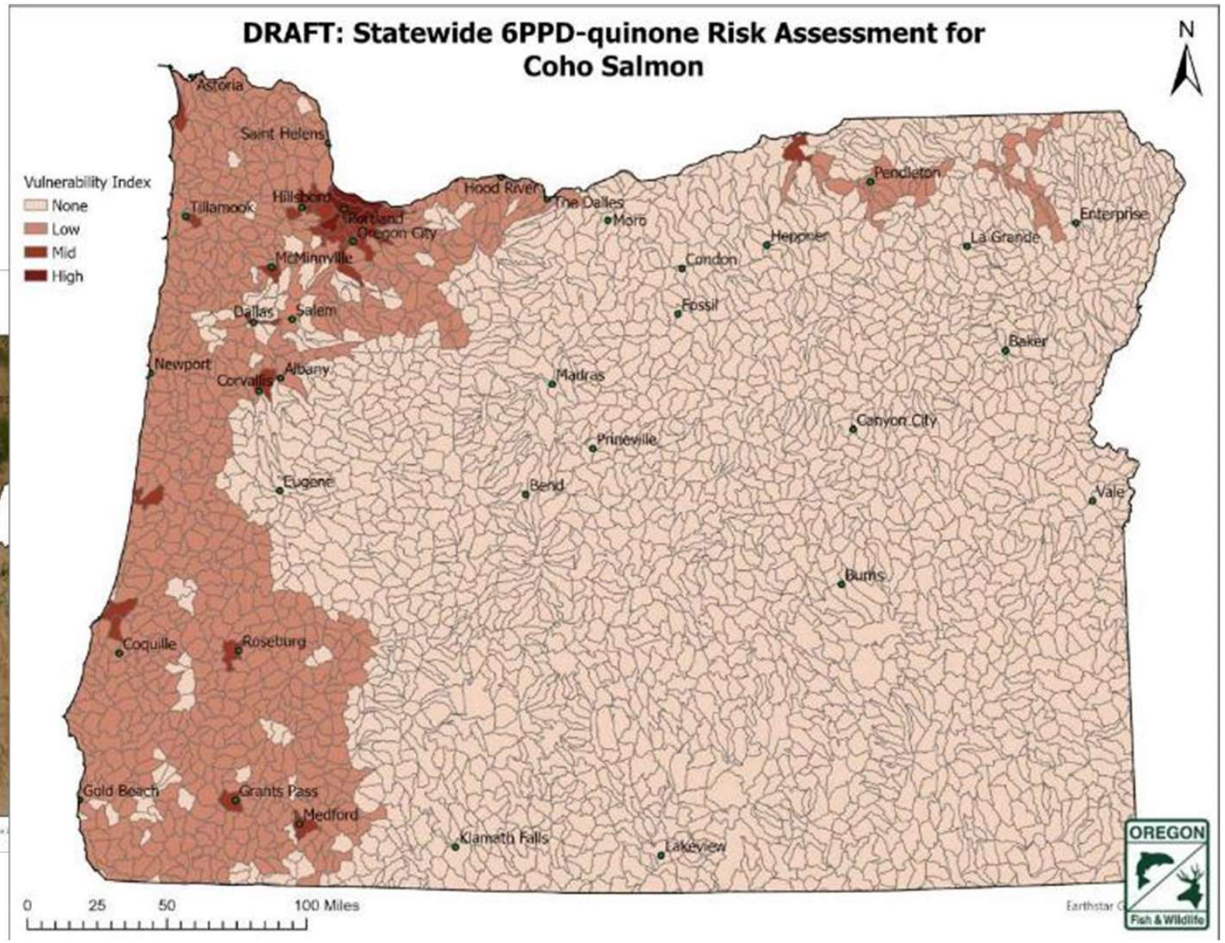
- Coho salmon
- Coastal cutthroat trout
- Steelhead/rainbow trout
- Chinook salmon

Distribution of Species



ODFW Coho Vulnerability Assessment



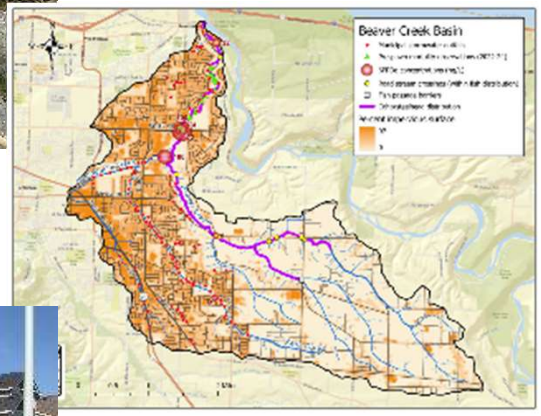


3. Implications for PFA Grantees

- Mitigation of 6PPD-q can be eligible under the PFA Grants Program if tied to conservation benefits for HCP species

Project Type Examples

- Monitoring and data collection
  - e.g. 6PPD-Q testing in the field, spawning surveys
- Mapping and prioritization
  - e.g. Collecting and analyzing GIS data to understand where the issues are and where treatment is most needed
- Mitigation
  - e.g. designing and constructing stormwater treatment for 6PPD-Q



Mitigation Project Type Examples

- Outfall treatment
  - Bioretention
  - Filter cartridge vaults
- Roadside treatment
  - Swales
  - Planters
  - Tree wells
- Treatment with pavement
  - Full-depth porous for infiltration
  - Friction course for filtration

Follow Up for More Information

- Contact us with ideas and questions:
  - Roy Iwai – Roy.Iwai@MultCo.us
  - Katie Holzer – Katie.Holzer@GreshamOregon.gov
  - Neil Schulman – Neil@NCWatersheds.org
- Join Oregon 6PPD-Q Workgroup meetings
  - Virtual meetings 3rd Thursday of the month, 1-3pm
  - Email Roy to get on list for email invite
  - https://www.tryoncreek.org/6ppd-q/

Questions?