



# **DTSC's Safer Consumer Products Program and Work on the Coho Salmon Toxicant 6PPD**

April 28, 2021

Anne-Cooper Doherty, PhD  
Kelly Grant, PhD



Department of Toxic Substances Control

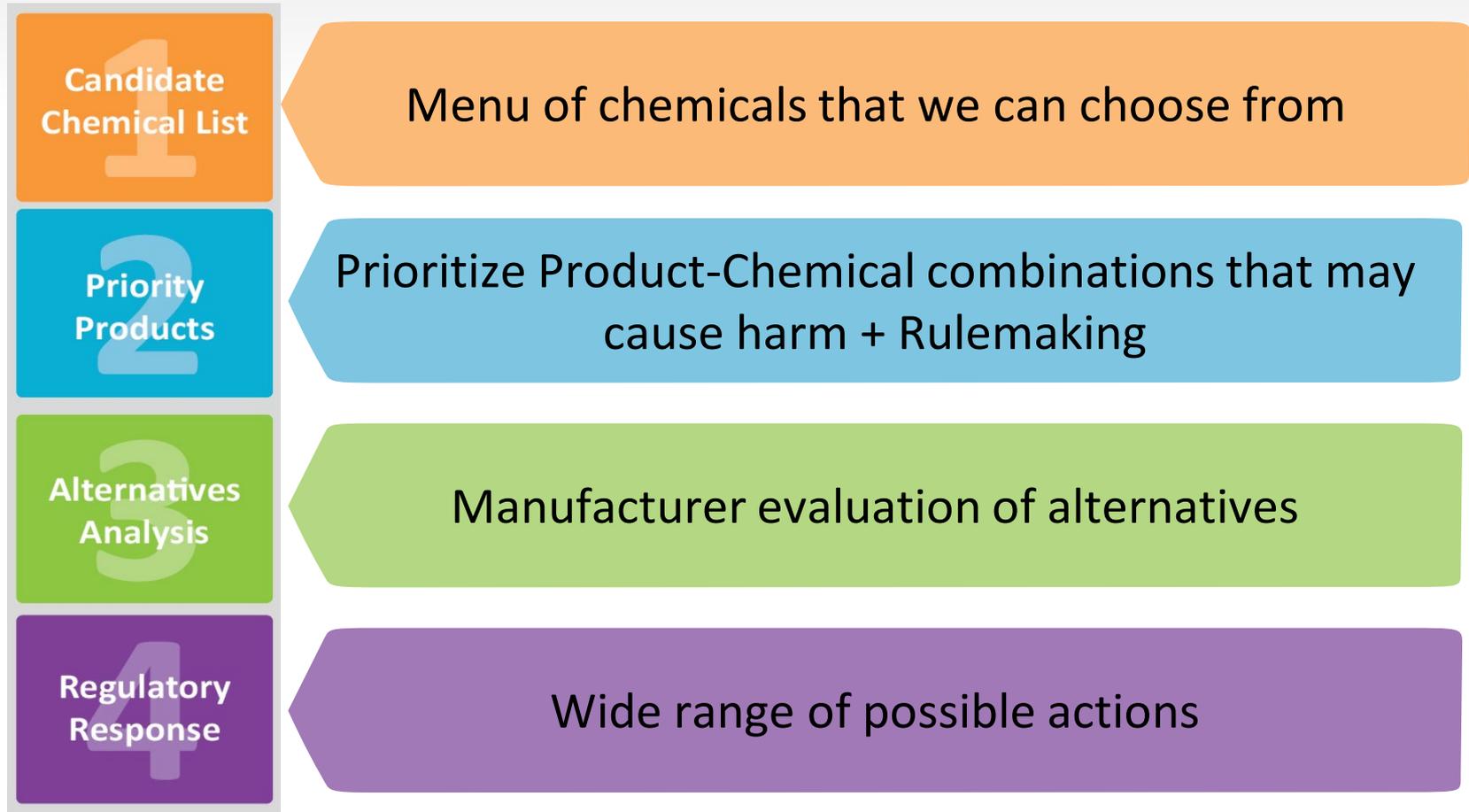


CalEPA

# **SAFER CONSUMER PRODUCTS (SCP) PROGRAM**



# SCP Process



# SCP Process



Menu of chemicals that we can choose from.



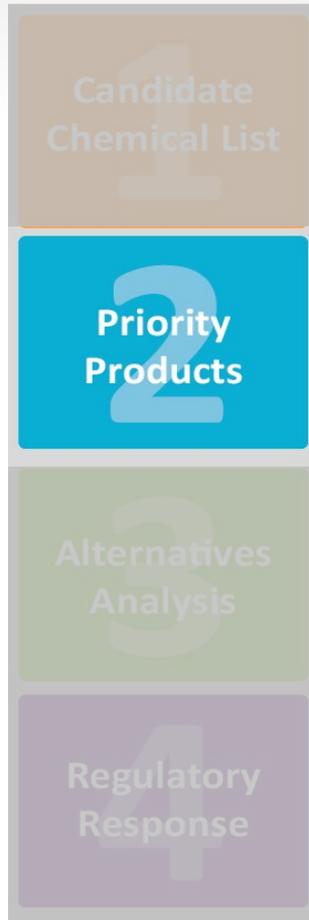
# SCP Process

## 1 Candidate Chemical List

Menu of chemicals that we can choose from.

- Taken from 23 authoritative lists.
- Viewable on CalSAFER (<http://calsafer.dtsc.ca.gov>)
- Includes individual chemicals (e.g., 6PPD) as well as large classes (e.g., PFASs)

# SCP Process



Prioritize Product-Chemical combinations that may cause harm + Rulemaking

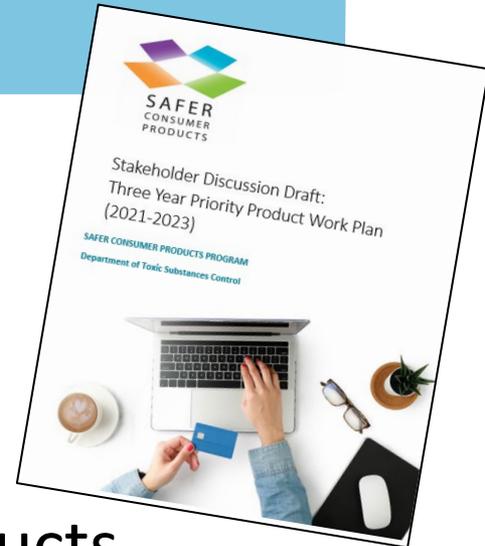


# SCP Process

## Priority Products

Prioritize Product-Chemical combinations that may cause harm + Rulemaking

- Menu of products comes from Work Plan
  - Draft 2021-2023
  - New addition: motor vehicle tires
- Evaluate chemicals in the context of products.
- Consider the potential for:
  - Exposure to the chemical from the product
  - Significant or widespread harm from that exposure



Work Plan website: <https://dtsc.ca.gov/scp/priority-product-work-plan/>



# SCP Process

Priority  
Products

Prioritize Product-Chemical combinations that may cause harm + Rulemaking

- Potential is important
- Definition of harm is inclusive:
  - Sensitive sub-populations disproportionately impacted by a chemical or product exposure
  - Environmentally sensitive habitats
  - Endangered and threatened species
  - Impaired environments



# SCP Process

## 2 Priority Products

Prioritize Product-Chemical combinations that may cause harm + Rulemaking

- Research & prioritize product-chemical combinations
- Stakeholder engagement
- Rulemaking
- Officially a Priority Product

### Adopted

- > [Children's Foam-Padded Sleeping Products with TDCPP or TCEP](#)  
Effective as of 7/1/17
- > [Spray Polyurethane Foam with Unreacted MDI](#)  
Effective as of 7/1/18
- > [Paint or Varnish Paint Strippers Containing Methylene Chloride](#)  
Effective as of 1/1/19

### Proposed

- > [Carpets and Rugs with Perfluoroalkyl and Polyfluoroalkyl Substances \(PFASs\)](#)
- > [\\*Laundry Detergents Containing the Surfactants Nonylphenol Ethoxylates \(NPEs\)](#)
- > [\\*Paint and Varnish Strippers and Graffiti Removers Containing N-Methylpyrrolidone](#)
- > [\\*Nail Products Containing Toluene](#)
- > [\\*Treatments Containing PFASs for Use on Converted Textiles or Leathers](#)
- > [\\*Nail Products Containing Methyl Methacrylate](#)
- > [\\*Food Packaging Containing PFASs](#)
- > [\\*Motor Vehicle Tires Containing Zinc](#)

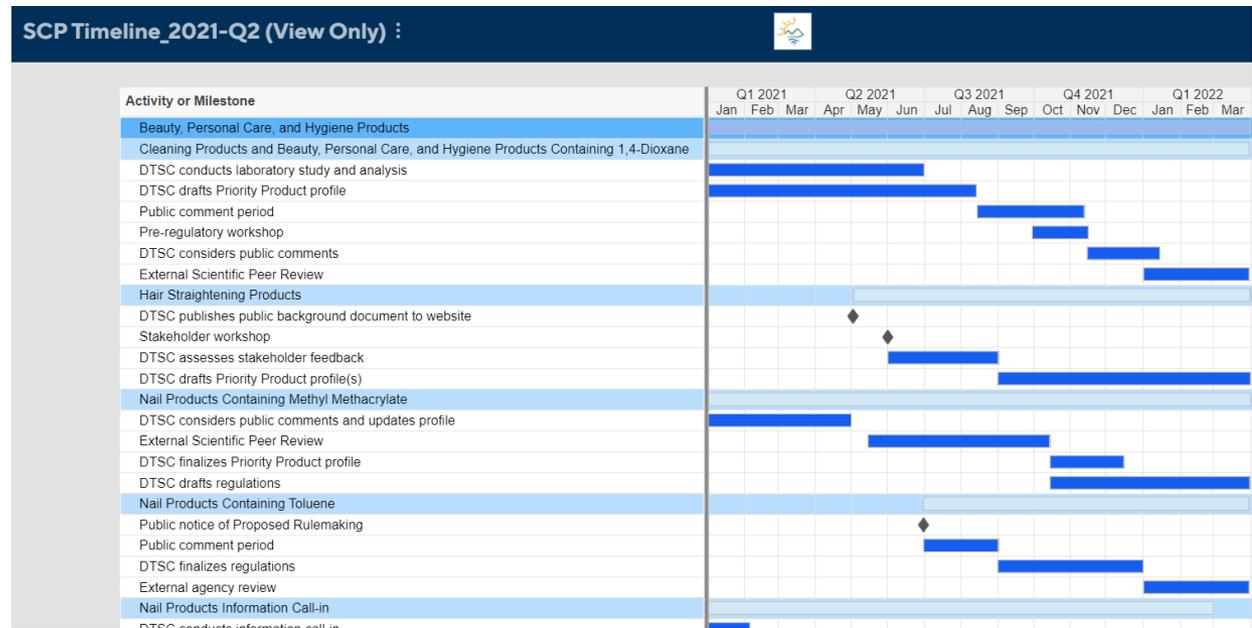
\*Pre-regulatory Priority Products

# SCP Process

## 2 Priority Products

Prioritize Product-Chemical combinations that may cause harm + Rulemaking

- SCP Timeline provides up-to-date information about our work.



<https://dtsc.ca.gov/scp>



# SCP Process



Manufacturer evaluation of alternatives



# SCP Process



## 3 Alternatives Analysis

Manufacturer evaluation of alternatives

- Manufacturers notify DTSC if they sell a Priority Product in California (public)
- In most cases, each manufacturer conducts an Alternatives Analysis (AA):
  - Life cycle evaluation of the chemical in the product
  - Comparison of possible alternatives
  - Use their own knowledge and values to decide on alternatives

# SCP Process

## 3 Alternatives Analysis

Manufacturer evaluation of alternatives

- Key questions:
  - Is the chemical of concern necessary?
  - Is there a safer alternative?
  - Have regrettable substitutes been avoided?
- AAs are submitted to DTSC
  - Posted on CalSAFER, final AAs available for public comment

# SCP Process



Wide range of possible actions



# SCP Process

## 4 Regulatory Response

Wide range of DTSC responses

- DTSC proposes regulatory response for each responsible entity
  - Available for public comment
- Menu of responses:
  - No response
  - Additional info to DTSC
  - Additional info to consumers
  - Additional safety measures
  - Sales restrictions/prohibitions
  - End-of-life product stewardship
  - Research funding



# We're hiring!

- Scientific Aid – part time position
  - Due May 14, 2021

<https://www.calcareers.ca.gov/CalHrPublic/Jobs/JobPosting.aspx?JobControlId=248088>

CalCareers



Home



Get a State Job



State Employees



Veterans



Persons with Disabilities



State Retirees

Create Account

## Job Posting: SCIENTIFIC AID

### Department of Toxic Substances Control

JC-248088 - SCIENTIFIC AID

SCIENTIFIC AID

\$15.00 - \$17.79 per Hour

**Final Filing Date: 5/14/2021**

Apply Now

**Application Methods:**

Electronic (Using your CalCareer Account)

By Mail

Drop-off

Print Job

Save Job

**QUESTIONS?**



Cite as: Z. Tian *et al.*, *Science* 10.1126/science.abd6951 (2020).

# A ubiquitous tire rubber-derived chemical induces acute mortality in coho salmon

Zhenyu Tian<sup>1,2</sup>, Haoqi Zhao<sup>3</sup>, Katherine T. Peter<sup>1,2</sup>, Melissa Gonzalez<sup>1,2</sup>, Jill Wetzel<sup>4</sup>, Christopher Wu<sup>1,2</sup>, Ximin Hu<sup>3</sup>, Jasmine Prat<sup>4</sup>, Emma Mudrock<sup>4</sup>, Rachel Hettinger<sup>1,2</sup>, Allan E. Cortina<sup>1,2</sup>, Rajshree Ghosh Biswas<sup>5</sup>, Flávio Vinicius Crizóstomo Kock<sup>5</sup>, Ronald Soong<sup>5</sup>, Amy Jenne<sup>5</sup>, Bowen Du<sup>6</sup>, Fan Hou<sup>3</sup>, Huan He<sup>3</sup>, Rachel Lundeen<sup>1,2</sup>, Alicia Gilbreath<sup>7</sup>, Rebecca Sutton<sup>7</sup>, Nathaniel L. Scholz<sup>8</sup>, Jay W. Davis<sup>9</sup>, Michael C. Dodd<sup>3</sup>, Andre Simpson<sup>5</sup>, Jenifer K. McIntyre<sup>4</sup>, Edward P. Kolodziej<sup>1,2,3\*</sup>

<sup>1</sup>Center for Urban Waters, Tacoma, WA 98421, USA. <sup>2</sup>Interdisciplinary Arts and Sciences, University of Washington Tacoma, Tacoma, WA 98421, USA. <sup>3</sup>Department of Civil and Environmental Engineering, University of Washington, Seattle, WA 98195, USA. <sup>4</sup>School of the Environment, Washington State University, Puyallup, WA 98371, USA. <sup>5</sup>Department of Chemistry, University of Toronto, Scarborough Campus, 1265 Military Trail, Toronto, ON M1C1A4, Canada. <sup>6</sup>Southern California Coastal Water Research Project, Costa Mesa, CA 92626, USA. <sup>7</sup>San Francisco Estuary Institute, 4911 Central Avenue, Richmond, CA 94804, USA. <sup>8</sup>Environmental and Fisheries Sciences Division, Northwest Fisheries Science Center, National Marine Fisheries Service, National Oceanic and Atmospheric Administration, Seattle, WA 98112, USA. <sup>9</sup>United States Fish and Wildlife Service, Washington Fish and Wildlife Office, Lacey, WA 98503, USA.

## THE 6PPD STORY

Tian, Zhenyu, Haoqi Zhao, Katherine T. Peter, Melissa Gonzalez, Jill Wetzel, Christopher Wu, Ximin Hu, et al. “A Ubiquitous Tire Rubber–Derived Chemical Induces Acute Mortality in Coho Salmon.” *Science* 371, no. 6525 (January 8, 2021): 185–89. <https://doi.org/10.1126/science.abd6951>.



# Mass die-offs of coho salmon in Washington

- Washington state has observed mass pre-spawn die-offs of coho salmon for years
  - Discovered during surveys of habitat restoration efforts
  - Urban Runoff Mortality Syndrome (URMS)
- Die-offs correlated with:
  - Rain events
  - Proximity to roads/impervious surfaces

WASHINGTON STATE  
DEPARTMENT OF  
E C O L O G Y

RECURRENT COHO SALMON MORTALITY AT  
MARITIME HERITAGE FISH HATCHERY, BELLINGHAM:  
A SYNTHESIS OF DATA COLLECTED FROM 1987-1989

---

by  
Will Kendra  
Roger Willms



<https://apps.ecology.wa.gov/publications/documents/90e54.pdf>

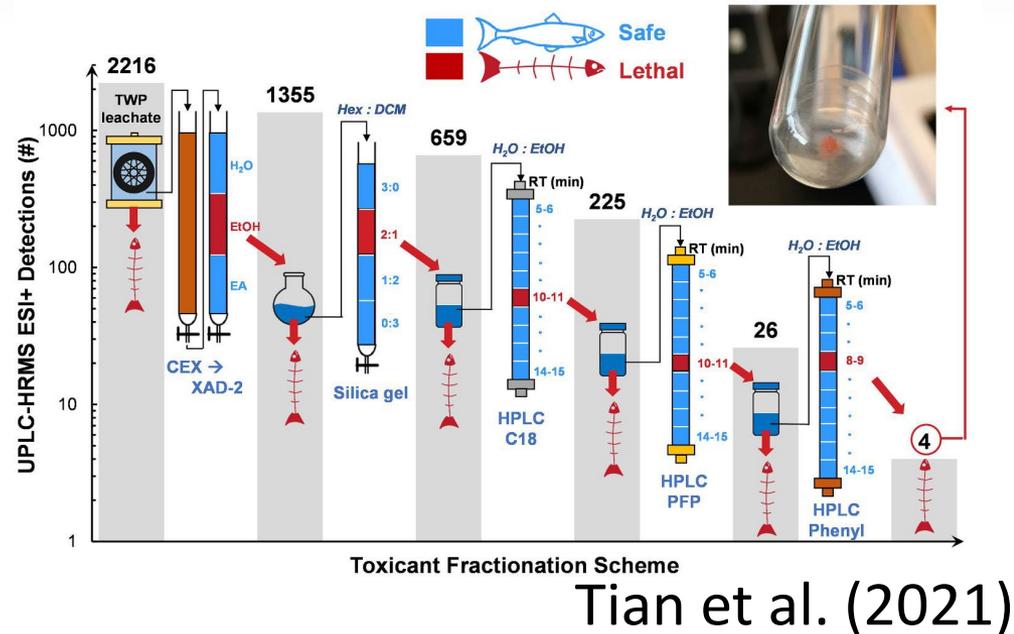
# Unique impacts to coho salmon

- In the lab, coho died in a number of hours after exposure to road stormwater, but not chum.
- Observed impacts:
  - Surface swimming and gaping
  - Sideways or circular swimming
  - Loss of equilibrium
  - Splaying of fins
- Not able to reproduce with typical stormwater toxicants



# Finding the culprit

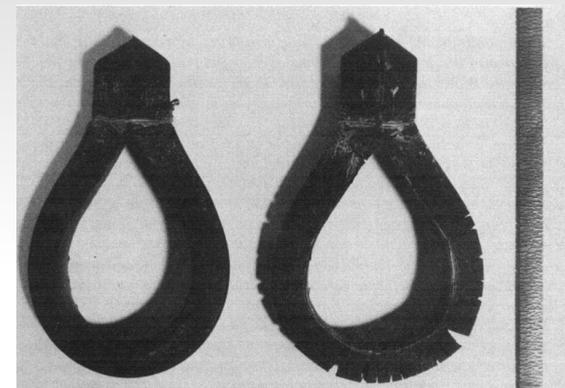
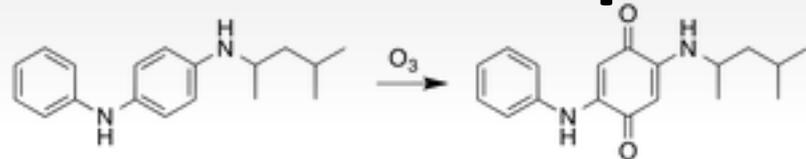
- Intensive forensic effort, toxicant a previously unreported compound
- Employed:
  - non-targeted analysis
  - successive chemical separations and regroupings
  - repeated exposures to coho salmon



**The culprit: 6PPD-quinone.**



# 6PPD and 6PPD-quinone



*Lewis et al. 1986*

## ■ 6PPD:

- Antidegradant used in presumably all tires
- Prevents cracking of rubber
- 1-2% concentration (10,000-20,000 µg/g)
- Migrates to the tire surface by design, creates protective film

## ■ 6PPD-quinone:

- Reaction product of 6PPD and ozone
- Previously unknown
- Detected in San Francisco streams, LA runoff above LC50

Lewis, P.M. "Effect of Ozone on Rubbers: Countermeasures and Unsolved Problems." *Polymer Degradation and Stability* 15, no. 1 (January 1986): 33–66.

[https://doi.org/10.1016/0141-3910\(86\)90004-2](https://doi.org/10.1016/0141-3910(86)90004-2).



# 6PPD-quinone

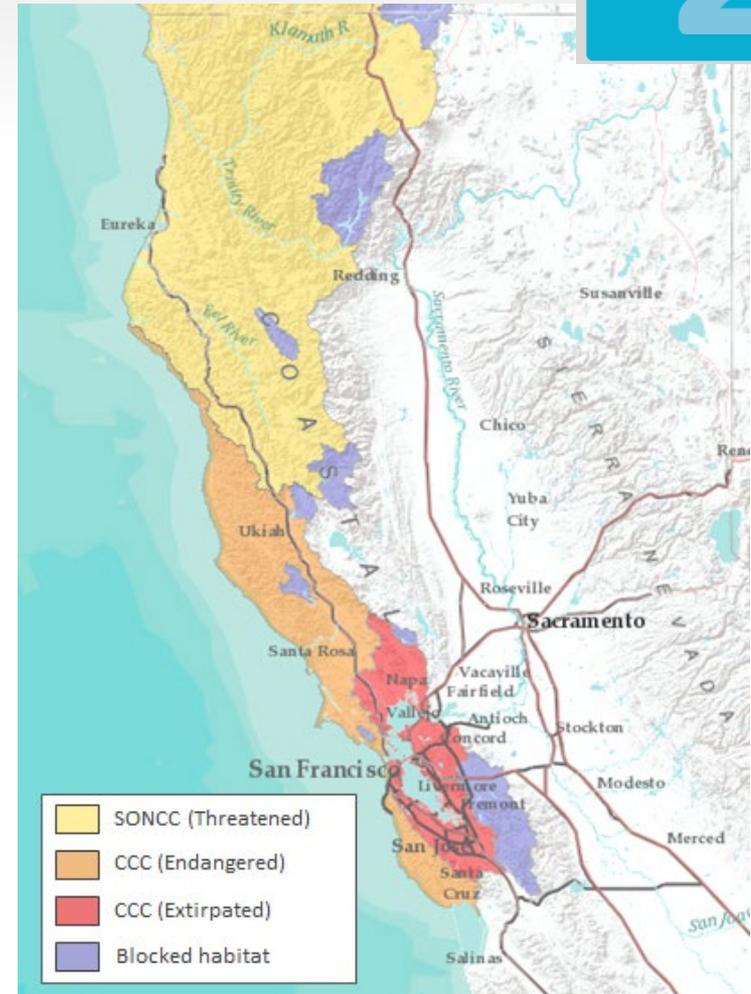


- Many unknowns, including:
  - Exactly how and where it forms
  - Physical properties and environmental fate
  - Presence in the environment beyond initial detections
  - Impacts to other aquatic organisms



# DTSC and 6PPD

- Currently in step 2:
  - Evaluating **potential** for exposure to 6PPD, 6PPD-quinone from tires
  - Evaluating **potential** for resulting harm to California people & environments
- Part of larger tire effort
- Technical document preparation underway



# DTSC Next Steps

- Document release end of May/early June
- Summer workshop on 6PPD, zinc, and other chemicals of concern in tires
  - Continue to gather information
- Specific information needs:
  - Importance of coho to tribal communities
  - Any recent or historical observations that may indicate presence of Urban Runoff Mortality Syndrome in California



[anne.doherty@dtsc.ca.gov](mailto:anne.doherty@dtsc.ca.gov)

[kelly.grant@dtsc.ca.gov](mailto:kelly.grant@dtsc.ca.gov)

**QUESTIONS?**

