Work Plan Implementation:

Potential Aquatic Impacts and Continued Uses of Nonylphenol Ethoxylates and Triclosan

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SAFER CONSUMER PRODUCTS

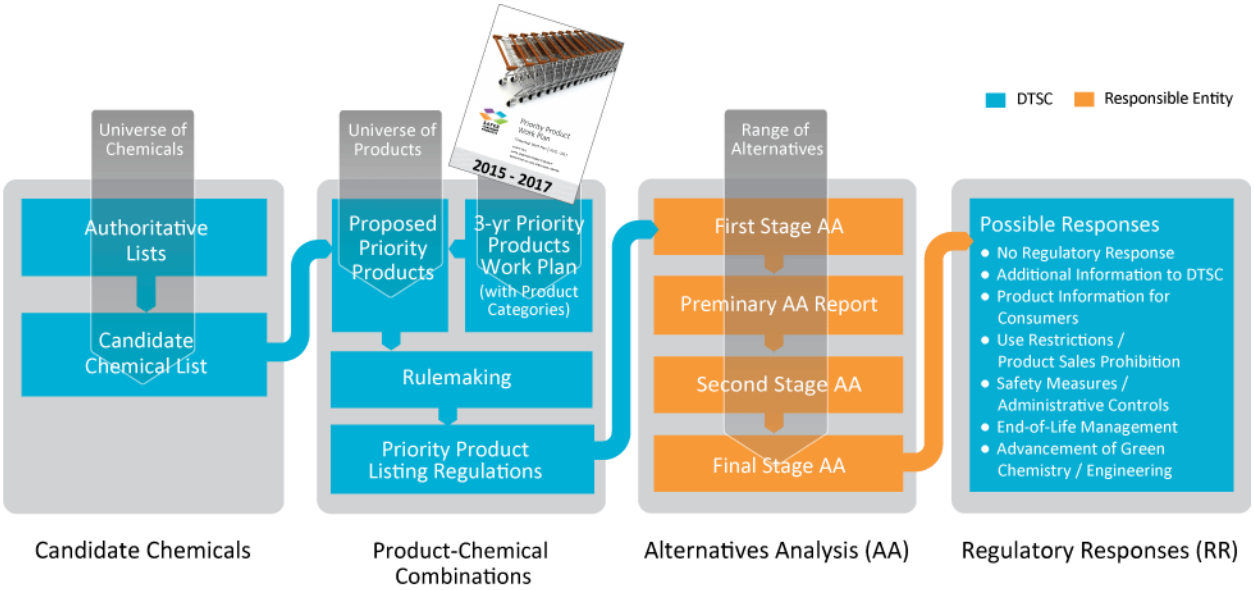
Department of Toxic Substances Control

CalEPA California Environmental Protection Agency

Introduction

The Department of Toxic Substances Control's (DTSC) Safer Consumer Products (SCP) Regulations specify the process and criteria by which DTSC evaluates consumer products for possible designation as Priority Products. Every three years, DTSC issues a Priority Product Work Plan, which "... identifies and describes the product categories that [DTSC] will evaluate..." over the subsequent three years. DTSC's current Work Plan includes seven product categories and lists the five policy priorities that informed their selection.

Since issuing the Work Plan, DTSC has conducted a review of the product categories and has identified specific subcategories, chemicals, and chemical classes that align with our policy priorities. This document is one of three that summarizes the findings of the research on a specific topic. It describes our preliminary findings and concerns around the topic and identifies data gaps we would like to fill and specific questions we hope our stakeholders can help answer. This document signals the beginning of dialogue with interested stakeholders from all sectors (manufacturers, NGOs, governments, and academia). We believe the dialogue will ultimately inform our selection of future Priority Products.



Background

The Priority Products Work Plan (Work Plan) prioritized product categories containing chemicals that may adversely impact aquatic resources or have been observed through water quality monitoring. Many chemicals in consumer products are washed down the drain, are partially removed in wastewater treatment, and enter the aquatic environment. This may lead to potential adverse impacts to diverse aquatic environments (Figure 1). These chemicals can enter the wastewater system through product use, including down-the-drain product disposal and laundry wastewater [1, 2].

In evaluating the Work Plan product categories, nonylphenol ethoxylates (NPEs) and triclosan were identified as Candidate Chemicals that may warrant further research. These chemicals and their transformation products (e.g., nonylphenol (NP), nonylphenol ethoxycarboxylates, methyl triclosan) are found in California aquatic environments and can be hazardous to aquatic organisms. The types of products that may contain these Candidate Chemicals are listed in Table 1. While these chemicals are not the only Candidate Chemicals that may have aquatic impacts, SCP is focusing on them first because they are found in multiple Work Plan product categories.

We are beginning the process of collecting information from stakeholders about how California's environment can be affected by NPE and triclosan in aquatic environments, and about continued uses for these chemicals in the Work Plan product categories. Understanding these potential impacts supports California's efforts to protect the environment and maintain water quality. Reducing chemicals like NPEs and triclosan in wastewater streams is also crucial to reduce waste generation and efficiently manage water resources through the reuse of waste stream byproducts such as treated wastewater effluent and sewage sludge [3].

Concern for NPE and Triclosan in California

California government agencies and expert panels have highlighted NPEs, the NPE degradation product nonylphenol (NP), and triclosan as chemicals that can impact the aquatic environment and resources [3-6]. NPEs and triclosan are partially removed from wastewater through degradation or adsorption to sewage sludge [7, 8]. However, they are still detected throughout California in a variety of aquatic compartments, including surface waters, sediments, aquatic biota, and wastewater effluents [5, 9, 10]. Irrigation of fields using recycled wastewater [11] and land application of sewage sludge as fertilizer [12] may be additional routes of exposure to the aquatic environment (Figure 1).

We are concerned about NPEs because aquatic toxicity increases as NPEs degrade to NP [13] , which can persist and bioaccumulate in the aquatic environment [14, 15]. Effects of NP exposure to aquatic organisms such as fish and invertebrates may include reproductive toxicity, altered endocrine activity, and developmental impairment [13, 14, 16]. Triclosan and its transformation products, including methyl triclosan, may also persist and bioaccumulate in organisms in the aquatic environment [17]. The presence and fate of triclosan in the aquatic environment is of concern due to acute toxicity to crustaceans, fish, and algae [17]. In the questions below, we ask for additional information about environmental detections and hazard traits as some of these data are limited.

Uses in Work Plan Product Categories and Market Trends

NPEs are surfactants that have been frequently used in cleaning products and are also incorporated into clothing products during manufacturing. Global concern for the aquatic impacts caused by the use of these chemicals has led to a number of restrictions [18-20], proposed actions [21, 22], industry phase-outs [23-26] and alternatives assessments [14, 27-29]. However, these restrictions are not universally adopted in California and there is concern that NPEs may continue to be used in the products listed in Table 1. For example, it is uncertain if all commercial laundry detergents were included in the industry phase-outs. In our stakeholder questions, we ask for information to better understand how these restrictions and voluntary efforts listed above will reduce the use of NPE in clothing in California.

Triclosan is used as an antimicrobial in soaps, for odor-control in clothing, and as a preservative in deodorants and cosmetics. It is regulated by the U.S. Environmental Protection Agency (U.S. EPA) when it is used as a pesticide, which does not cover all consumer uses of the chemical. The U.S. Food and Drug Administration (U.S. FDA) and other government bodies have raised concern about the human [30] and aquatic impacts [31, 32] of triclosan. Some retailers have echoed those concerns by asking for triclosan to be removed from some of the products they sell [26]. U.S. FDA recently determined that consumer antiseptics containing triclosan are not safe or effective. As a result of their 2016 rule [30], manufacturers will have to reformulate their products to remove the active ingredient or remove the antiseptic product from the market. While these various actions cited above may reduce the presence of triclosan in the aquatic environment, we are posing questions to better understand how triclosan is used in other consumer products, and how triclosan is released into the aquatic environment. SCP would like to better understand the impacts of the FDA ruling to manufacturers to better understand how product labeling and ingredients will change as a result of the rule.

Next Steps

SCP is asking stakeholders to address the questions listed below by providing written comments via our online information management system, CalSAFER. In addition, we will have public roundtable meetings with invited participants to engage with DTSC and ensure our questions are answered. Stakeholders can also provide comment during portions of these meetings. We will host a public workshop at our Sacramento headquarters after we have gathered this information to summarize what has been learned and to receive any remaining public comments. We will close our comment period following this final workshop. This stakeholder engagement process will help inform continuing research that may result in proposing a Priority Product for regulation. Please monitor our Priority Products Work Plan webpage for updates on this topic.

We are also conducting a survey to better understand the types of input stakeholders may offer, and preferred ways to engage with us throughout this process. If you are interested in participating in these roundtable meetings, please completely fill out this survey by November 30, 2016: https://www.surveymonkey.com/r/Aquatic_Impacts.

While the aquatic environment is the focus of this workshop, input on how these chemicals affect humans is also welcome. Studies [33-35] have measured NPEs, NP and triclosan in humans and the indoor environment. There is also growing concern about the potential for triclosan to contribute to antimicrobial resistance in a variety of environments [35]. If you have data to support human health effects from these chemicals, please provide a general comment on this document via CalSAFER.

Questions for Stakeholders

Theme 1. Nonylphenol ethoxylates in cleaning and clothing products

- What are the challenges associated with removing NPEs from laundry detergents, including household and commercial uses?
- What are the challenges associated with removing NPEs from household cleaning products?
- What are the challenges associated with removing NPEs from the clothing supply chain?
- What progress has been made to remove NPEs from the clothing supply chain, given the recent restriction in the European Union?

Theme 2. Triclosan product uses, removal, and substitution

- What is the safety or benefit, or lack thereof, of triclosan in product types identified in Table 1?
- What are the challenges associated with removing or replacing triclosan from the product types identified in Table 1?
- What chemical and non-chemical alternatives are used in light of the removal of triclosan from many consumer products? Are they safe or beneficial?

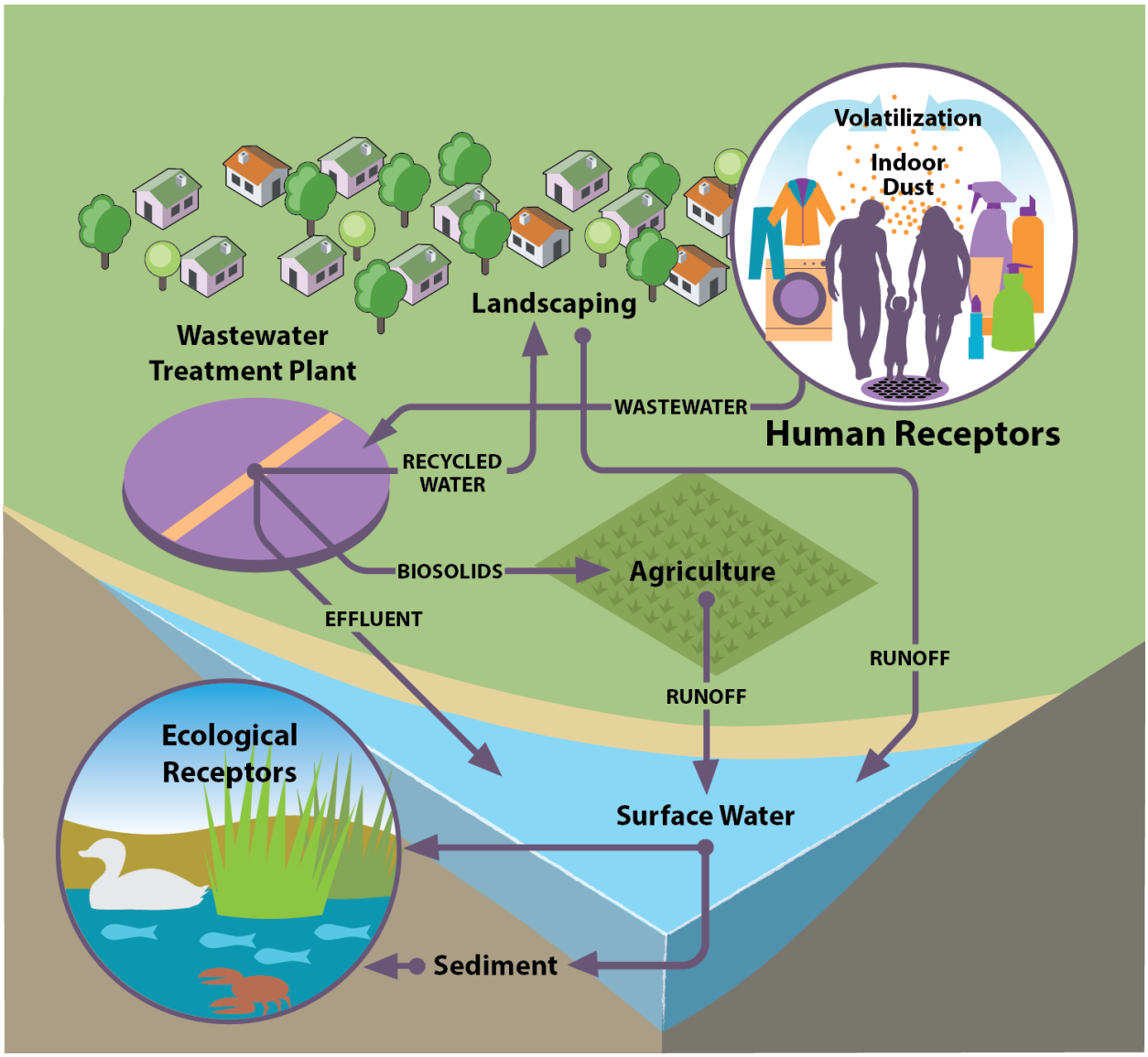
Theme 3. Aquatic hazards and detection of NPEs, NP, triclosan, methyl triclosan, and other transformation products that can impact the aquatic environment or resources

- What are the most recent data available for the presence of NPE, NP, triclosan, methyl triclosan, and other transformation products in wastewater treatment plants and the aquatic environment?
- What hazard traits are most well understood for aquatic organisms for these chemicals?

Theme 4. Other Candidate Chemicals or products that may impact the aquatic environment or resources

- What are other Candidate Chemicals in consumer products that are of concern due to aquatic impacts?
- What are other continued uses of NPEs not identified in Table 1, such as toilet paper?
- What are the continued uses of triclosan in product categories not identified in Table 1, such as building product?

Figure 1. Potential exposure pathways of products that may contain nonylphenol ethoxylates and triclosan



This figure includes products that are in the Work Plan and may results in exposure to the aquatic environment. It does not include all possible exposure sources and pathways.

Table 1. Products that may contain nonylphenol ethoxylates and triclosan

Chemical	Product Category	Product types
Nonylphenol ethoxylates	Cleaning Products	Laundry detergent, commercial and household cleaners
	Clothing	
Triclosan	Cleaning products	Dish soap, possibly laundry products
	Clothing	
	Personal Care Products	Soaps, deodorant, cosmetics

This table includes products that are in the Work Plan, and may results in exposure to the aquatic environment.

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