The California State University
COUNCIL ON OCEAN AFFAIRS, SCIENCE & TECHNOLOGY (COAST)

STATE SCIENCE INFORMATION NEEDS PROGRAM (SSINP)
Request for Proposals (RFP)
ROUND 1: Microplastics and Microfibers

KEY DATES & INFORMATION

Application deadline:	Due to COVID-19, the proposal deadline has been extended to Thursday, April 23, 2020 5:00 p.m. Pacific time
Amount available:	Up to $800,000
Award funding range:	Most awards will range from $200,000-$400,000; requests up to $500,000 with significant justification may be considered.
Who can apply:	Lead PIs must be from the CSU; non-CSU co-PIs are permitted. See Grant Guidelines for additional information.
Start date:	Applicant will specify date between August 1 and October 31, 2020.
Project duration:	30 months
Informational webinar:	A two-part webinar will be held on Wednesday, February 5, 2020. For more details and to register, please go to COAST's SSINP webpage.

PROGRAM DESCRIPTION

With funding from a one-time appropriation of funds in the FY 2019-2020 state budget, the CSU Council on Ocean Affairs, Science & Technology (COAST) has established a new research funding program called the State Science Information Needs Program (SSINP). The overall purpose of SSINP is to fund research to support the state of California's highest priority marine, coastal, and coastal-watershed science information needs.

SSINP Grant Guidelines are available on COAST's website and articulate the basic purpose of the grant program, outline program restrictions such as eligibility requirements and award conditions, describe how funds will be administered, and describe the required components of an application. Please be sure to review the Grant Guidelines carefully in considering your application to this program. The Grant Guidelines are incorporated by reference into this present RFP.

Please refer to the Grant Guidelines for information on anticipated subsequent RFPs.

RESEARCH PRIORITIES

For Round 1 of SSINP funding, COAST will accept proposals that address the topic of **microplastics and microfibers.**

Microplastics and microfibers (generally defined as materials <5mm in length and including nanomaterials <1 micron) are found ubiquitously throughout ocean and coastal waters globally, and they are increasingly being studied for their impacts on the environment and wildlife and human health. Microplastics may be discharged directly or indirectly into the environment (e.g. small plastic spheres used in personal care products), or they may originate from larger pieces of plastic marine debris that fragment into smaller and smaller pieces over time. Microfibers are thought to originate primarily from the shedding of clothing fibers, although carpets, fishing nets, and plastic bags may be sources as well. Microplastic and microfiber identification and quantification is a nascent field of study. Given the extremely rapid increase in global consumption of plastics and other synthetics and low recycling rates, their abundance in the environment is only anticipated to increase in the future.

The majority of microplastics and microfibers found in ocean and coastal waters are believed to originate from land-based sources. The identification of microfibers from synthetic clothing and microplastics from personal care products indicates that treated wastewater may be a primary source. Other studies show that stormwater runoff can contain extremely high concentrations of microplastics and may be a significant source as well. Contributions from atmospheric deposition are largely unknown but are also being considered in attempts to comprehensively identify and quantify sources.

Microplastics and microfibers are thought to affect marine, estuarine, and anadromous organisms primarily through through ingestion and subsequent chemical exposure. Ingestion, particularly of nanoplastics, may transfer chemicals into the tissues of organisms. These chemicals may be inherent to the plastic itself or chemicals adsorbed onto the plastic from the environment. Toxicological studies to determine the health risk to organisms are increasingly appearing in peer-reviewed scientific journals, however this is an emerging area of inquiry and the science is still at early stages. More work is required to understand how microplastics and microfibers and the contaminants associated with them impact marine and coastal organisms.

The research objectives posed below reflect iterative discussions with state of California management and regulatory agency representatives as well as Action Items in the California Ocean Litter Prevention Strategy (OLPS). These objectives have emerged as some of the state's highest priority science information needs within the topic of microplastics and microfibers. Please note that the inclusion of these questions in the RFP does not constitute a commitment on behalf of COAST to fund projects addressing each of them.

1. Quantification and mitigation of microplastic and microfiber sources

1.1 Identify type and quantify microfibers and microplastics from wastewater, stormwater, airborne, and agricultural sources that enter California's ocean and estuarine environments.

1.2 Develop a watershed-scale program to model and monitor microplastics and macro-debris flux, transport, degradation, and fate according to a variety of endpoints (e.g., street litter, stormwater, wastewater, and direct discharges). Macro-debris flux is included because it can be a source of microplastic as the material weathers and breaks down in the environment.

1.3 Determine the feasibility and effectiveness of technical solutions for microfibers in wastewater treatment plants, washing machines, and other points in the wastewater management system.

1.4 Quantify the effectiveness of green infrastructure and low impact development (LID) in removing and sequestering microplastics from stormwater, and determine whether traditional best management practice designs need to be modified to address microplastics in stormwater.

2. Ecotoxicology

2.1 Determine the role of microplastics and microfibers as transfer mechanisms for contaminants to marine, estuarine and anadromous organisms under environmentally-realistic conditions (e.g., UV exposure, oxidation, temperature regimes, bacterial degradation) and at environmentally relevant exposure concentrations. Contaminant transport mechanisms may focus on, but are not limited to, ingestion, inhalation, trophic transfer, placental transfer, gill uptake, gut translocation into tissues and organs, and dermal absorption. Categories of contaminants may include, but are not limited to, flame retardants, plastic-associated chemicals, chemicals in pharmaceuticals and personal care products and unknown chemicals. Approaches that include *in vivo* testing and characterization of sub-organismal and organismal level impacts (e.g. protein synthesis, metabolism, growth and reproduction) are strongly desired.

3. Economics of microplastic and microfiber source control

3.1 Conduct cost-benefit analyses for implementation of policies and/or strategies to reduce common ocean litter items. This can include policies and/or strategies for reducing macrodebris (e.g., local ordinances to ban expanded polystyrene and single-use plastic bags, deposit schemes, packaging redesign) as well as microdebris (e.g., wastewater filtration, green infrastructure/LID) in point and non-point source discharges. It is anticipated that state agencies would make such analyses available to local governments and businesses to support decision-making.

4. Other microplastic or microfiber research questions

4.1 Proposals addressing state needs for scientific information on microplastics or microfibers outside of the priority research objectives listed above will also be

accepted. A successful proposal must concretely demonstrate the relevance of the research project to state needs, including identification of specific state agencies that will benefit in the form of a detailed letter of support from said agency.

For further information contact:
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