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Ms. Ann Bailey, Director
ENERGY STAR Product Labelling
U.S. Environmental Protection Agency
Washington, DC 20460
Submitted via email: MostEfficient@energystar.gov

RE: Comments on Proposed Recognition Criteria for ENERGY STAR Most Efficient 2021

Dear Director Bailey,

The Nature Conservancy's California Chapter (TNC California) is committed to conserving the lands and waters on which all life depends. Our vision is a world where the diversity of life thrives, and people act to conserve nature for its own sake and for its ability to fulfill our needs and enrich our lives. **As a sustainability leader, the ENERGY STAR program has the opportunity to help advance this vision by championing clothes washer design solutions that mitigate the pressing threat that plastics pose to our global oceans.** The prevalence and persistence of microplastics (plastics < 5 mm) in our oceans raises significant ecological and human health concerns. The laundering of synthetic textiles—which releases plastic microfibers into the natural environment through clothes washer effluent—is a major source of microplastics entering the ocean today (Boucher & Friot, 2017; Singh et al., 2020).

As the Environmental Protection Agency (EPA) revises its Recognition Criteria for ENERGY STAR Most Efficient 2021 for clothes washers, TNC California urges you to begin documenting whether or not clothes washer models incorporate effective microfiber filters or filter technology.

<u>*The growing problem of plastics in the environment*</u>
We are in the midst of a plastic pollution crisis. Estimates of total global plastic production to date hover around 8.3 billion metric tons (Geyer et al., 2017). Only a small fraction of plastic has been recycled or incinerated; most of the plastic ever produced sits in landfills, is still in use, or accumulates in marine and terrestrial systems where it poses threats to wildlife, the marine ecosystem, and likely human health.

Globally, about 1.5 million tons of microplastics enter the oceans each year from land-based sources such as effluent and run-off (Boucher & Friot, 2017). Many of these microplastic particles have escaped wastewater treatment plants (WWTPs) and flow with the discharge into aquatic and marine environments (Browne et al., 2011). While all shapes and sizes of plastic litter and waste are problematic, microfibers and other microplastics are a particularly challenging form of plastic pollution to address. Microplastics can absorb persistent bioaccumulative toxins and then be ingested by a range of animals in the marine food chain, from plankton to top-tier predators.

The international scientific community is working to better understand the ecological and potential human health impacts associated with microplastic pollution. Microplastics have been found in samples from headwater streams, rivers, lakes, ocean water, the deep sea, soils, indoor and outdoor air, wildlife, arctic sea ice, drinking water (Koelmans et al., 2019; Kosuth et al., 2018), and have even entered our seafood supply (Rochman et al., 2015). Researchers have estimated that Americans ingest tens of thousands of microplastic particles per person each year (Cox et al., 2019). The long-term health impacts of human ingestion of microplastics are still largely unknown but ingestion of microplastics raises concern given the ubiquity of microplastics in the environment, and the chemical and microbial contaminant pathway that microplastic ingestion may provide (Kershaw & Rochman, 2015).

Clothes washers as a significant source of microfiber pollution

An important source of microplastics to the aquatic environment is from effluent contaminated by microfibers from washing clothes. **The laundering of synthetic textiles accounts for approximately 35% of the global release of primary microplastics** (Boucher & Friot, 2017). Globally, more than 840 million domestic clothes washers are in use; a single wash cycle of synthetic textiles can release about 700,000 microfibers (De Falco et al., 2019). The problem of microfiber pollution in clothes washer effluent is expected to dramatically increase, with global synthetic fiber production projected to triple by 2050 as demand soars in developing nations (Textile Exchange, 2018).

Mitigation measures to reduce flows of microfibers to the environment

Microfiber pollution occurs at a number of points: the production and fabrication of synthetic textiles and garments, the use and washing of synthetic garments, and wastewater treatment plants, among many others. Effective interventions to address this pollution are needed at every step. The most direct interventions involve collection of microfibers at either the municipal (i.e., WWTP) or the consumer (e.g., clothes washer) level.

While many WWTPs already remove a significant number of microfibers from effluent (between 71 and 99%), the sheer volume of effluent per day still results in significant concentrations of microfibers entering waterways (Conley et al., 2019; ASCE, 2019). Researchers estimate that in the state of California, alone, billions of microfibers escape WWTPs each day (Rochman et al., 2015). While advanced methods of processing, such as membranes, electrodeposition and coagulation, make further improvements in WWTP filtration possible, achieving very high levels of microplastic filtration can often require high capital and energy inputs, and has high associated operating costs (U.S. Environmental Protection Agency, 2007). The cost of membrane bioreactors can be in the tens of millions of dollars. In addition, researchers have estimated that the energy requirements of full-scale membrane bioreactor facilities are approximately 30-50% higher than conventional technology, but can be as much as 75-95% higher (Barillon et al., 2013).

We cannot rely on WWTPs as the sole solution to the prolific release of microfibers into natural environments. Even if WWTPs removed all microfibers from effluent, those microfibers filtered out can still enter the environment in the form of sewage sludge, a byproduct of the wastewater treatment process that is often applied to land as fertilizer and reaches surface waters through soil erosion or stormwater runoff (Horton et al., 2017). Additionally, in many countries waste water treatment systems are rudimentary or are not used at all.

At the consumer level, microfiber capture in clothes washers—a solution that is relatively cost- and energy-efficient—has the potential to dramatically reduce the volume of microfibers entering the environment. Effective clothes washer effluent filtration (or the functional equivalent) could capture microfibers at the source before they reach WWTPs, and enable consumers to dispose of microfibers in controlled landfill environments as part of the solid-waste stream. If widely adopted, microfiber filtration in clothes washers could add value to efforts to reduce microfiber pollution without the high cost, lead time, and potentially significant public expense and energy consumption associated with wholesale WWTP infrastructure and technology upgrades.

Consumer interest in the problem of microfiber pollution and clothes washer filtration
Popular press coverage on microfiber pollution has increased significantly in the past five years. With increased public awareness of and concern regarding microplastic pollution, there is growing consumer interest in clothes washers that filter out microfibers. In a U.S. nationwide survey commissioned by TNC California earlier this year, 95% of respondents reported they are willing to take action to reduce microplastic pollution. Of those polled, 38% reported they would be willing to buy a filter for their washer or dryer, and 26% would be willing to replace their washer or dryer in order to reduce microplastic pollution. Additionally, in a 2019 survey in Belgium, 96% of respondents answered “yes” when asked if they were interested in a product that tackles microplastic fiber pollution from domestic washing machines (Herweyers et al., 2020).

Microfiber filter technology availability
While technology development and adoption of built-in microfiber filtration in clothes washers is early-stage, new solutions are rapidly emerging. The world’s first clothes washer with a built-in filter designed to capture synthetic microfibers is expected to launch in Europe later this year; manufacturers claim their product filters 90% of microfibers from effluent. At least one microfiber filter technology company is actively licensing filtration technology designed to be integrated into clothes washing machines. Public policies—such as a new law passed in France requiring new clothes washers (sold after January 1, 2025) to be equipped with filters designed

to prevent microfiber release—likely will further spur innovation and adoption of microfiber filter technology in clothes washers.

Suitability of ENERGY STAR to highlight solutions to reduce microfiber pollution
The EPA's ENERGY STAR program is well positioned to highlight and advance design solutions that significantly reduce microfiber pollution and improve ocean ecosystem health. In addition to being a trusted symbol for energy efficiency, the ENERGY STAR label represents products with the features and performance that consumers demand. As the market responds to demand for ENERGY STAR-qualified products, sales of those products increase as does the collective potential environmental benefits of those products over their lifetimes. Greater market penetration can enable further technological advances and reduced production costs, spurring a positive cycle of innovation for environmental protection, and resulting reductions in energy use, water use, and environmental pollution.

There is precedent in the ENERGY STAR program for identifying and highlighting product attributes beyond energy efficiency. While energy efficiency clearly is the basis for ENERGY STAR top performer selection, in order to ensure the maintenance of overall product performance, ENERGY STAR has a longstanding practice of including performance attributes such as brightness, noise level, expected lifetime and warranty in its specifications. In addition, in some cases in which an environmental problem specific to a product emerges, ENERGY STAR has been responsive to consumer concerns regarding the resource, cost or health impacts of a product by including standardized information regarding, for example, a product's water use, use of hazardous materials, or waste generation. **As consumers become increasingly interested in the ecological and human health impacts of microfiber pollution from clothes washer effluent, ENERGY STAR can help identify those leading products that offer effective microfiber filtration solutions.**

As an important first step, we recommend that EPA require manufacturers to report on the presence or absence of microfiber filters or filtration technology for clothes washers in the Most Efficient category for 2021. ENERGY STAR's Most Efficient Criteria have achieved significant success in identifying, promoting—and ultimately helping to increase market share of—consumer products that lead their field in terms of energy efficiency, and in some cases, water efficiency, reduced greenhouse gas emissions, hazardous substance exposure, and other important factors. Identifying and promoting market leaders in clothes washer microfiber filtration both encourages and advances technological innovation aimed at reducing harmful microplastic pollution.

Conclusion
ENERGY STAR can help lead the way to advance clothes washer design to better mitigate flows of microfibers into the natural environment. **Requiring reporting on the presence of microfiber filter or filtration technology can incentivize and accelerate sustainability focused innovation for clothes washers.** Highlighting leading products that reduce microplastic pollution also accommodates growing consumer concern about microplastics in our environment, and growing consumer interest in microfiber filtration performance of clothes washers. Such

clothes washer filtration technologies could prove a low cost and energy efficient pathway to drastically reducing the magnitude of microfiber pollution, and ensure healthier, more resilient ocean ecosystems.

Sincerely,

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