Plastic Free Bay Report: Bay Beach Litter Audit Findings and Plastic Pellet Pollution

Supporting Evidence from Seaford BeachPatrol's Plastic Pellet Project - *Nurdle Anymore!*

*Port Phillip Bay's latest microplastic report has sounded the alarm: tiny plastic production pellets ('nurdles') are washing up on our beaches in staggering numbers. The **Plastic Free Bay** report reveals nurdles are now the most common pollution in our Bay, prompting urgent calls for action. This article dives into what the Plastic Free Bay project and report found about bay litter, why it matters, and how the BeachPatrol Australia community and partners are providing data to inform policy.*
Read the entire Plastic Free Bay report here.

Microplastic Snapshot: What the *Plastic Free Bay* Report Reveals

The Plastic Free Bay Report (July 2025) delivers a powerful update on the state of plastic pollution across Port Phillip Bay and its catchments. Building on the Port Phillip EcoCentre's landmark Clean Bay Blueprint (2020), the report revisits the scale of microplastics in Melbourne's waterways and tracks how the problem has evolved. The Clean Bay Blueprint first revealed that an estimated 2.85 billion pieces of debris enter the Bay each year via the Yarra and Maribyrnong Rivers, with a staggering 85 per cent classified as microplastics.

The Plastic Free Bay Project, led by the Port Phillip EcoCentre, in partnership with Tangaroa Blue Foundation and Pipe Management Australia, extends this work with updated research and recommendations. Supported by the Victorian Government through the Port Phillip Bay Fund, volunteers contributed more than 1,200 hours collecting samples from streets, drains, rivers and beaches, demonstrating how community-led monitoring continues to play a vital role in understanding — and responding to — microplastic pollution. Five years on, the picture is complex. There are signs of progress: pollution from major rivers appears to have dropped compared to earlier surveys, and items targeted by recent bans, such as straws and bags, are showing up less frequently. At the same time, microplastics remain deeply embedded in the system. Both primary microplastics, manufactured by industry, and secondary microplastics, formed from the breakdown of larger plastic items, continue to accumulate across the Bay.

The scale of the issue is stark in Seaford, where a single year of surveys recorded more litter than all Bay beaches combined in the previous three-year study. A large proportion of the plastic identified during the study was primary microplastics, specifically plastic resin pellets, making the prevention of plastic leakage at the source more important than ever.

Nurdles: Plastic Pre-Production/Resin Pellets - Polluting our beaches

Primary microplastics emerged as a dominant concern in the Plastic Free Bay report particularly in the form of industrial plastic resin pellets known as **nurdles**. These tiny, round pellets— used as raw material in plastic manufacturing — were identified as the single most prevalent pollutant in the study. More than **282,000 pellets were found in stormwater drains**, and a further **8,231 were collected from Bay beaches**, clearly indicating that pellets are escaping industrial sites and travelling through drainage systems into Port Phillip Bay.

Figure: A visual representation of what nurdles are. Plastic feedstock that is melted down to make into plastic products.

Small Pellets, Overwhelming Presence

191 nurdles found in this ¼ square metre on Kananook Beach, October 2024 - Image courtesy Jaqui O'Leary

Despite their size, nurdles make up a disproportionate share of the pollution recorded in Bay litter audits. The data shows they account for **more than half of all items collected on the most affected beaches**. Nowhere is this more apparent than at **Kananook Beach in Seaford**, where **57 per cent of the 12,641 items logged during audits were nurdles**. On average, volunteers recorded **approximately 73 nurdles per square metre of sand**.

By contrast, traditional "gross" litter such as bottles, bags and cigarette butts was comparatively rare, accounting for just **0.5 per cent of the total debris (77 items out of 12,000+)**. In practical terms, this means the tideline was dominated not by visible rubbish, but by broken plastic fragments and nurdles, underscoring the scale and persistence of microplastic pollution.

Nurdles Should Be Considered Hazardous

The significance of nurdle pollution extends well beyond numbers. Nurdles are harmful to humans, wildlife and ecosystems. Their small size makes them easily mistaken for food by fish and seabirds, often leading to starvation when ingested, with animals dying with stomachs full of plastic, or suffering from poisoning. Compounding this risk, nurdles act like **chemical sponges**, absorbing toxins such as **PCBs and other persistent pollutants** that are known endocrine disruptors and carcinogens. When consumed, these toxin-laden pellets can leach chemicals into animal tissues and move through the food chain.

The Plastic Free Bay Report warns that pellet pollution is an **escalating issue** that existing containment systems are failing to manage effectively. The findings highlight an urgent priority: **stopping nurdles at their source**, before they escape into waterways and become an almost impossible problem to reverse.

Nurdles and hard plastic fragments washed up on Kananook Beach in Seaford, Victoria (September 2024)

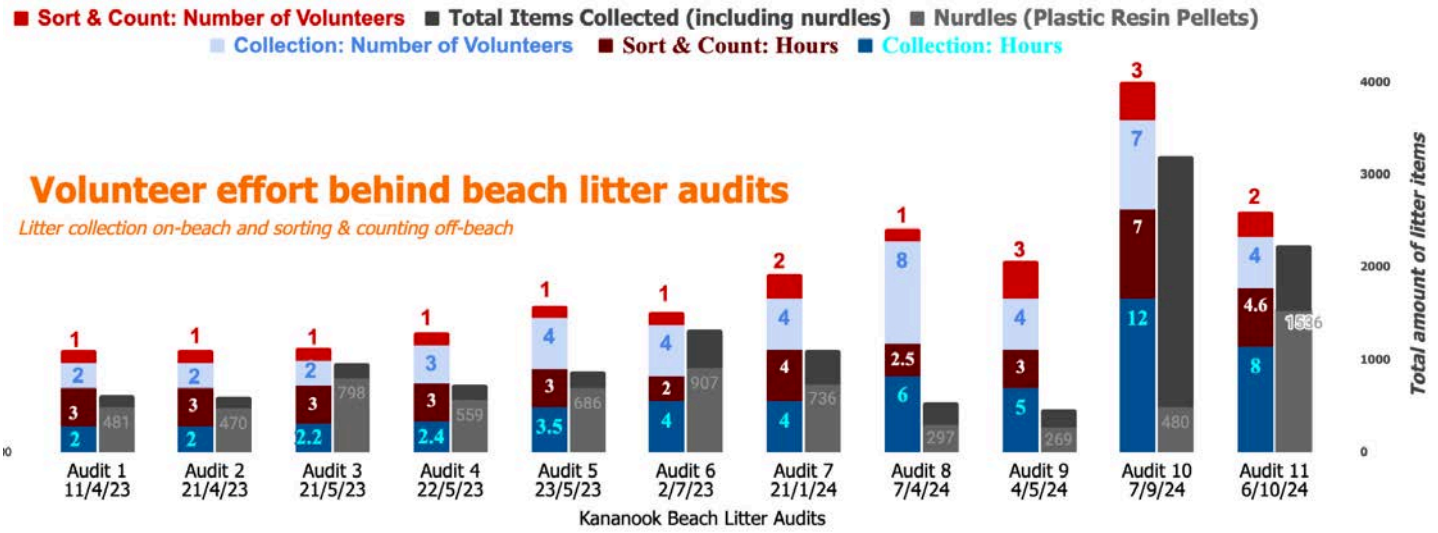
Local Action in Seaford: Plastic Pellet Project - *Nurdle Anymore!* and Citizen Science Impact

Faced with increasing numbers of nurdles washing up along Seaford's shoreline, the manager of 3198 Seaford BeachPatrol began with targeted pellet hunts, recording and sharing the findings through established reporting pathways. In January 2023, just three volunteers collected 5,873 nurdles by hand and early data was logged in LitterStopper, submitted to AMDI and Tangaroa Blue, contributed to the Great Nurdle Hunt and Sea Shepherd's Nurdle Hunt, in addition to being reported to the EPA, in an effort to alert authorities to the scale of the issue. By March 2023, five volunteers had collected more than 9,000 nurdles in 20 hours, making it increasingly clear that informal reporting and clean-ups alone were not prompting action. In response, Jaqui O'Leary, former Vice President of BeachPatrol Australia and 3198 group manager, launched the *Plastic Pellet Project – Nurdle Anymore!* to formally document and quantify the problem.

Using the Port Phillip EcoCentre's established beach litter audit methodology, already applied at sites such as Keast Park, O'Leary created a formal audit site at Kananook Beach and began conducting standardised litter audits there.

The *Plastic Pellet Project – Nurdle Anymore!* refers specifically to the intensive Kananook Beach audit series led by Seaford BeachPatrol. A particularly revealing element of the project was a three-days-in-a-row audit of the same location, which demonstrated that new plastic litter — including nurdles — continued to accumulate day after day, even after removal, indicating this wasn't historic litter being collected. The resulting dataset was provided to the Port Phillip EcoCentre and incorporated into the *Plastic Free Bay Report*, ensuring that Kananook Beach — a significant nurdle hotspot — was formally counted and recognised within the broader Bay-wide study.

Plastic Pellet Project – Nurdle Anymore! confirmed the scale and intensity of the issue. On just 9 square metres of sand, volunteers recorded **12,641 litter items**, with **99.9 per cent identified as plastic**, averaging **127 items per square metre of beach**. More than **7,200 of these items were nurdles**, reinforcing the finding that plastic resin pellets were the dominant form of pollution at the site. Every item was **collected on the beach by volunteers working on their hands and knees**, ensuring the data was both thorough and reliable.



Beyond the numbers, O'Leary's *Plastic Pellet Project – Nurdle Anymore!* provided a clear, evidence-based contribution to the Port Phillip EcoCentre's reporting and helped galvanise broader community awareness and now both Keast Park and Kananook Beach are monitored under the broader Plastic Free Bay program.

The strength of the data and the project's impact were recognised when it was **shortlisted and later named a finalist in the 2024 Keep Australia Beautiful Tidy Towns & Cities Awards**, demonstrating how locally generated data can drive wider recognition and action. The project documented one of the most striking results in the Bay: **127 pieces of litter per square metre on a Bay beach, with 57 per cent of that pollution made up of nurdles**. Jaqui O'Leary's leadership has been instrumental in this success, earning her and the 3198 group recognition in local volunteer awards for her initiative and impact. 3198 Seaford BeachPatrol has won awards three years in a row at the Frankston Volunteer Awards, 2023 Initiative, 2024 Leadership and 2025 for Teamwork.

The Seaford audits also helped trigger broader participation across the Bay. In addition to establishing the audit site at Kananook Beach, **Neil Blake and Jaqui O'Leary reached out to other BeachPatrol leaders to undertake same day audits of their own beaches**. Leaders of **Chelsea BeachPatrol**, Simon and Jimmy, agreed to conduct **same-day audits** (where sites at Chelsea, Seaford and Frankston were audited on the same day), leading to the creation of a new audit site in Chelsea. These coordinated, same-day efforts across multiple beaches are helping build a clearer picture of what is washing up where and supporting efforts to **identify patterns and trace the problem upstream**.

Launch of the Plastic Free Bay Report and The Nurdle Cup

Volunteers from Warrnambool and Seaford BeachPatrol and Caulfield Love Our Street attended the launch of the Plastic Free Bay report and participated in the Nurdle Cup in October 2025. Winners and second and third place pictured here holding brooms to send industry a clear message to 'pick up the broom!'

The Nurdle Cup: A Cross-Bay Demonstration with a Clear Message! Watch the Nurdle Cup here

As part of the *Plastic Free Bay Report* launch, The Nurdle Cup was created by Neil Blake OAM, Port Phillip Baykeeper, and held inside the EcoCentre's new **Citizen Science Lab**. The event brought together volunteers from across the Bay — including **Luke from Warrnambool BeachPatrol**, **Julian, leader of Caulfield Love Our Street 3162**, and members of **3198 Seaford BeachPatrol** — in a timed challenge to extract plastic resin pellets (nurdles) from sand trays designed to mimic beach conditions.

The Nurdle Cup was deliberately light-hearted, but its message was serious. By gamifying the monitoring of nurdles, the activity drew attention to just how widespread pellet pollution has become on Victorian beaches. With volunteer nurdle counts from Port Phillip Bay recently ranking among the highest recorded globally, the event underscored the scale of the issue and put Australia firmly on notice. While each winning team earned bragging rights, the real outcome was the visibility and awareness generated through the exercise.

The challenge was also designed to make a practical point. Using simple clean-up tools, teams demonstrated how quickly nurdles can be removed when action is taken — reinforcing a clear message to industry: **"pick up the broom."** The event was filmed, and the short clip is now being shared with stakeholders as a visual reminder that pellet pollution is both obvious and preventable when addressed at the source.

Conceived and organised by Neil Blake OAM, the Nurdle Cup turned the report launch into a hands-on, engaging demonstration of citizen science in action. Pellets collected from the foreshore were poured into sand trays, and teams raced against the clock to dig, extract and count as many nurdles as possible under

timed conditions. The mix of friendly rivalry and data collection highlighted how effective community action can be when people are resourced and supported to act.

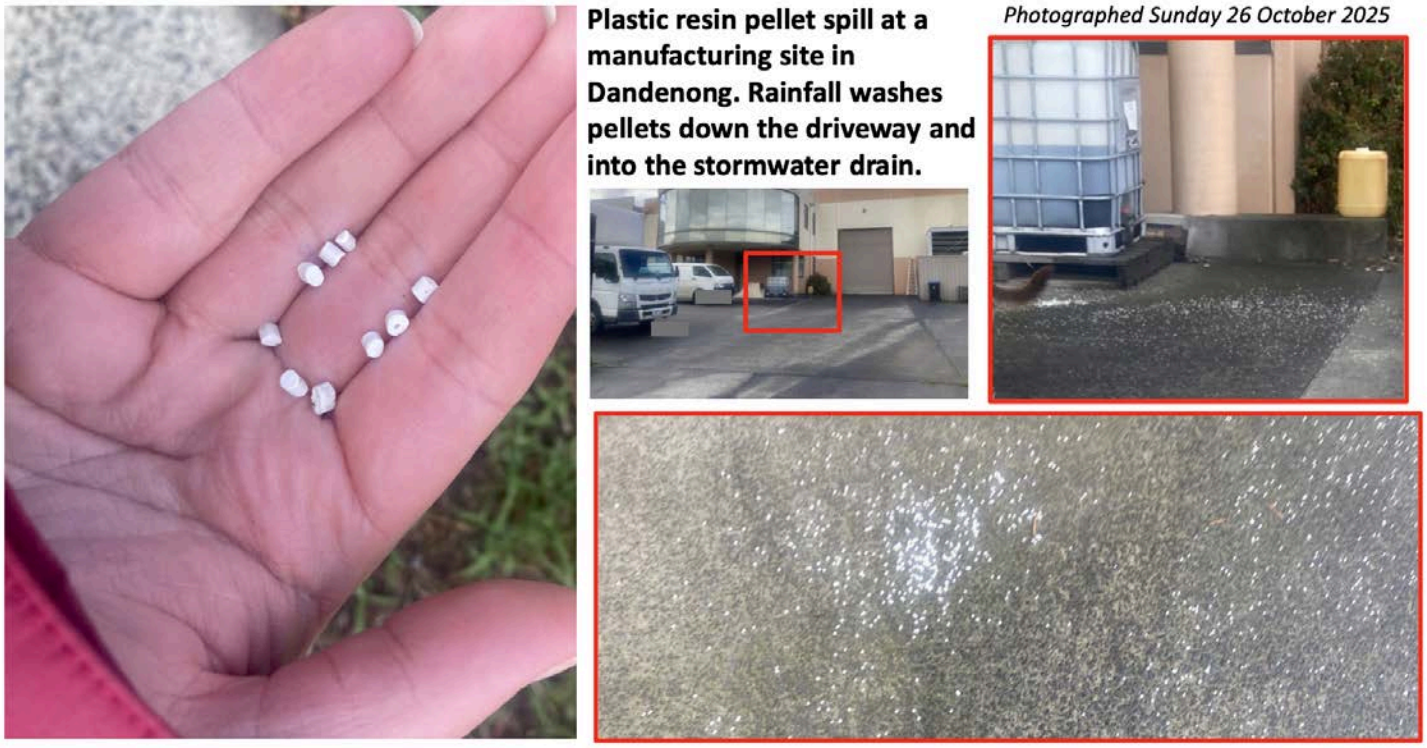
Reflecting on the event, Blake described it as “a fantastic display of community spirit calling on plastics manufacturers to clean up their act — **JUST PICK UP THE BROOM!**” The winners of the cup were the Blue Bob Broom team — Saphira, Yarra and their dad — who had also contributed data earlier in the year to the International Pellet Count, which placed Victoria as the second worst state globally for nurdle pollution. Participants also used the moment to reinforce calls for accountability.

“I think the industries that release these nurdles should be traced upriver to the sources and be made to pay for the clean-up. EPA is not going to do this — it will be up to frustrated volunteers.” Luke from Warrnambool BeachPatrol

That sentiment reflects long-standing concerns raised on Victoria’s western coastline, where **Warrnambool BeachPatrol**, led by community advocate **Colleen Hughson**, has played a key role in exposing plastic resin pellet pollution beyond Port Phillip Bay. Following the discovery of widespread nurdle contamination on Warrnambool’s beaches, Hughson initiated sustained community action through targeted nurdle hunts and the grassroots awareness campaign **Good Will Nurdle Hunting**, while escalating the issue to regulators and authorities. Her work combined citizen-science data with direct engagement with **EPA Victoria** and **Wannon Water**, pushing for accountability and spill prevention well beyond the Bay.

Partners and Accountability: Tangaroa Blue & Tackling Nurdle Spills

Tangaroa Blue Foundation, responsible for the Australia’s Marine Debris Initiative, leads national and international work on plastic pellet pollution and is a key partner in the Plastic Free Bay project. Their work combines on-ground monitoring, industry engagement and pressure on regulators such as the EPA, and promote Operation Clean Sweep—a best-practice program that shows factories and transporters how to keep nurdles locked inside their sites—but participation is voluntary!



Plastic Free Bay's report shows that in one municipality, pellet counts rocketed by 500 per cent between 2022 and 2023 and no audited district recorded a sustained decline, as despite years of campaigning for Operation Cleansweep to be mandatory, it is still an optional program for plastic manufacturers to be a part of.

The data continues to show that protecting the Bay—and Australia's wider coastline—depends on moving Operation Clean Sweep from a "nice-to-have" guideline to a mandatory, enforceable standard across the entire plastics supply chain.

Why all this matters for Beach Patrol Australia

The Plastic Free Bay Report demonstrates that well-structured, supported citizen science can generate credible, policy-relevant evidence capable of informing regulatory reform. Contributions span rigorous data collection by BeachPatrol groups in Seaford, Frankston, Chelsea, Mt Martha and Rye; public awareness initiatives such as the Nurdle Cup involving groups including Caulfield Love Our Street; and sustained advocacy leading to tangible change, exemplified by the work of Warrnambool BeachPatrol. Together, these efforts show that locally led volunteer action is central to understanding and addressing plastic pollution, and that the community leaders who initiate, coordinate and sustain this work must be adequately supported for it to continue and have impact.

For Beach Patrol Australia, the report reinforces the importance of supporting projects that combine consistent methodology, strong partnerships and a focus on upstream prevention. Together, the data, partnerships and findings presented in the report illustrate how community-based monitoring can play a meaningful role in understanding and addressing plastic pollution across Port Phillip Bay.

Written by Jaqui O'Leary - December 2025

The Nurdle Turtle is pictured here with the Nurdle Cup

The Nurdle Turtle art work was generously donated by Seaford BeachPatrol to the Port Phillip EcoCentre at the launch of the Plastic Free Bay report in October.