



WPI



Encouraging Collaborations to Address Key Issues in Port Phillip Bay Supplemental Materials

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A: Stakeholder Research and Website Analysis

Objective: Recognize stakeholder priorities that align with the Eco Centre and build trust and communication. Form issues groups that can be a catalyst for positive environmental changes in the Port Phillip Bay

SPIDER CRABS

Brainstorming potential parties involved: fish and game organizations, scuba divers, tourism organizations that focus on spider crab aggregation, anglers, restaurants that serve spider crab dishes.

Stakeholder Name, Sector	Victorian Fisheries Authority , Independent Authority
Organization's Goal and priorities	<p>Three Objectives</p> <ul style="list-style-type: none"> ● Sustainable fishing and aquaculture ● Clear resource access and sharing arrangements for all parties ● Increased economic, social and cultural value.
How do the priorities align with the EcoCentre? Why are we reaching out?	<p>Overlapping interests with Eco Centre: sustainable fishing practices of spider crabs, social and cultural value of spider crab aggregation</p> <p>Reaching out because their research and insight into the spider crab issue can be valuable in a round table discussion.</p>
Research, Initiatives	<p>Proposed new Spider Crab Catch Limit: Approach: Listening to all parties' priorities in order to create the catch limit</p> <ul style="list-style-type: none"> ● 30 (original limit) to 15 (new limit) for amount of crabs that can be fished - more equitably shares spider crabs among fishers and other stakeholders. ● Spider crabs are valued for different reasons: recreational diving, fishing, conservation and tourism. ● Important to implement due to an increase in recreational fishing of the crabs. ● Understanding that some multicultural communities catch to cook or enjoy the act of fishing. <p>Research into Spider Crab fishing:</p> <ul style="list-style-type: none"> ● (Unreleased) survey for anglers to gain information as to why they fish spider crabs and certain habits when fishing (how many do they take? etc.)

	https://vfa.vic.gov.au/science-in-fisheries/spidercrabs/vfas-research-on-giant-spider-crab-fishing
Questions	<ul style="list-style-type: none"> • Who do you believe are the key stakeholders to be considering in managing the spider crab aggregation? • How do you believe the annual spider crab aggregation should be managed, how is the Spider Crab catch limit tailored towards that? • What other activities do you believe could complement the annual aggregation for the benefit of the wider community? • How have you observed the spider crab fishing issue progress over time? What questions were asked in the Angler survey? • How do you think the issue of spider crab fishing could gain more attention? • What other steps is your organization taking to combat litter due to spider crab fishing? • Is there evidence of the spider crab population being harmed due to fishing (direct visible impacts?)

Stakeholder Name, Sector	Victorian National Parks Association
Organization’s Goal and priorities	Broad organization. Has partnered with the VFA, Spider Crab Alliance on a petition that received 35,000 signatures. Supporting the “no take” time of March-July.
How do the priorities align with the EcoCentre? Why are we reaching out?	Overlapping interests with Eco Centre: sustainable fishing practices of spider crabs, social and cultural value of spider crab aggregation. Reaching out because their insight into the spider crab issue can be valuable in a round table discussion. May be able to largely contribute to spider crab celebration.
Questions	<ul style="list-style-type: none"> • Who do you believe are the key stakeholders to be considering in managing the spider crab aggregation? • How do you believe the annual spider crab aggregation should be managed, how is the Spider Crab catch limit tailored towards that? • What other activities do you believe could complement the annual aggregation for the benefit of the wider community?

	<ul style="list-style-type: none"> ● How do you think the issue of spider crab fishing could gain more attention? ● Is there evidence of the spider crab population being harmed due to fishing (direct visible impacts?) ● Is there a specific contact in the VFA that you've worked closely with?
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Stakeholder Name, Sector	Spider Crab Alliance , Small Independent Organization
Organization's Goal and priorities	The organization was created to highlight the community concerns of the crabbing and netting of the Giant Spider Crabs during their annual aggregation.
How do the priorities align with the EcoCentre? Why are we reaching out?	<ul style="list-style-type: none"> ● Community organization that is passionate about group involvement, policy change, and education
Research, Initiatives	<ul style="list-style-type: none"> ● SCA has a petition for a NO-TAKE policy during the critical moulting time, the petition has over 35,000 signatures ● An active Facebook group with frequent posts and photography to demonstrate the gravity of the spider crab litter issue. ● Encouraged members to submit support letters to the Public Consultation and share perspectives regarding protection measures for Spider Crabs. ● Creating awareness through social media and merchandise
Questions	<ul style="list-style-type: none"> ● Next steps after the NO-TAKE petition? How do you plan to implement a NO-TAKE policy? ● How do you believe the annual spider crab aggregation should be managed, how is the Spider Crab catch limit tailored towards that? ● How do you believe we should educate the community on the issue of spider crab fishing? ● What other activities do you believe could complement the annual aggregation for the benefit of the wider community? ● How have you observed the spider crab fishing issue progress over time? ● What other steps is your organization taking to combat litter due to spider crab fishing?

	<ul style="list-style-type: none"> ● Is there evidence of the spider crab population being harmed due to fishing (direct visible impacts?)
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Stakeholder Name, Sector	Josie Jones
Organization's Goal and priorities	<ul style="list-style-type: none"> -Has single-handedly picked up 5.6 tons of litter -Is someone to roll up your sleeves. -Freelance graphic designer -Recycling, cigarette bins outside of busy grocery stores
How do the priorities align with the EcoCentre? Why are we reaching out?	<p>Overlapping interests with Eco Centre: fishing related litter. Reaching out because their insight into the spider crab issue can be valuable in a round table discussion.</p> <p>May be able to largely contribute to spider crab celebration.</p>
Questions	<ul style="list-style-type: none"> ● You're an incredible example of tackling this issue and taking on ocean litter as a personal responsibility - what do you believe is the best way to convince others to do the same? ● Have you seen litter due to spider crab fishing - what have you seen? ● Since you have a graphic design background - what makes an effective graphic to prompt action? ● What is the best way to educate the community on the issue of spider crab fishing and litter? ● What initiatives are you working on to reduce litter?

Stakeholder Name, Sector	Chinese Angling Association
Organization's Goal and priorities	The CAA is the organization that manages the fishing of spider crabs. Since culturally, there are sensitivities and varied perspectives about spider crab fishing, we want to ensure all sides are heard and valued.
How do the priorities align with the EcoCentre? Why are we reaching out?	We are reaching out because we want to understand why spider crab fishing occurs during the moulting season, spider crab fishing habits, and coming to a middle ground on Spider Crab fishing.

Research, Initiatives	N/A
Questions	<ul style="list-style-type: none"> • How are Spider Crabs important to Chinese cuisine and culture? • How do you believe the annual spider crab aggregation should be managed? • How would you like to see communication between the CAA and other stakeholders? • How would the CAA like to fish spider crabs? Limited or a “no take” period during migration?

Stakeholder Name, Sector	Polperro Dolphin Swims , Ecotourism
Organization’s Goal and priorities	Established by the Muir Family
How do the priorities align with the EcoCentre? Why are we reaching out?	They host many events in the Mornington Peninsula and initiative much of the tourism in the bay. Polperro would be an excellent stakeholder to create a partnership with to celebrate spider crab aggregation and drive tourism to the bay.
Research, Initiatives	No specific initiatives but they did make a Facebook announcement in support of the VFA’s NO-TAKE season from April-July.
Questions	<ul style="list-style-type: none"> • What does tourism in the bay look like for Spider Crab Aggregation? How does Polperro play a role in that? • What events could you foresee being part of a Spider Crab aggregation celebration? • What conflicts of interest have you observed? What do you believe the best solution is given all parties’ perspectives? • How do you believe we should educate the community on the issue of spider crab fishing?

WASTE MANAGEMENT

Stakeholder Name, Sector	Aquatic Environmental Stress Research Group (RMIT University) , University Research Group
Organization’s Goal and priorities	As a research group, historically the focus has been on aquatic pollution, identification, research and management, assessed using both chemical and biological methods. While this focus continues, our

	definition of pollution/ environmental stressors has broadened further to include considering other stressors, such as assessing the benefits of environmental flows to aquatic biota.
How do the priorities align with the EcoCentre? Why are we reaching out?	<ul style="list-style-type: none"> ● Worked together in the past ● Hope to improve policies
Research, Initiatives	<p>Worked on Litter Tracker Project: “scientists will work with schools and community groups to launch GPS tracked bottles into Melbourne’s waterways to demonstrate how and where litter travels once it enters our waterways.”</p> <p>This project is no longer taking place, but RMIT plans on hosting future projects</p>
Questions	<ul style="list-style-type: none"> ● What draws your interest in helping solve pollution issues? ● Do you believe there are policies or strategies in place that may eventually solve this issue? <ul style="list-style-type: none"> ○ Are there any policies or strategies not yet implemented that you think would be effective? ● What other projects do you plan to host that would be beneficial in solving this issue? ● How do you plan on improving the community connection in regards to reducing pollution? (expected outcomes) ● What are your thoughts on the best methods to encourage others to get involved in solving these issues? ● Are there any other teams at RMIT that would be worth reaching out to?

Stakeholder Name, Sector	Sustainability Victoria
Organization’s Goal and priorities	Sustainability Vic. wants to reduce society’s current impact on the environment around Victoria including slimming the emission of greenhouse gasses, creating a closed loop system where most waste is recycled, and pushing for a zero waste community in an effort to rid of landfills.
How do the priorities align with the EcoCentre? Why	We would like to reach out as Sustainability Vic. has been one of the major sources of waste statistics and are constantly putting new plans into action.

are we reaching out?	
Research, Initiatives	<ul style="list-style-type: none"> ● Love Food, Hate Waste <ul style="list-style-type: none"> ○ Program working towards reducing food waste in everyday homes ● SV has a lot of plans in action working with regional and statewide waste, offering solutions, current data, and projections on the impact of their plans if put into action
Questions	<p>How have your recent actions been successful in limiting/reducing waste and how do you plan on following up with them?</p> <p>Many of your proposed plans rely on the individuals you call upon to carry them out, how do you intend to keep people on track?</p> <p>How do your current plans for the future differ from plans proposed (and taken) 5 years ago?</p> <p>What do you believe to be the largest pending issue in the next five years?</p> <p>Other than SV, who else has been pivotal in working towards a zero waste community?</p>

Stakeholder Name, Sector	Boomerang Alliance
Organization’s Goal and priorities	<ul style="list-style-type: none"> ● Drive the behavioural and systemic change required to deliver the social, economic and environmental benefits of a zero-waste society ● Support waste reduction across the Asia Pacific region. ● Believe that an empowered community taking action at individual, political and economic levels will prompt business and government to support community wishes and prioritise the shift towards a zero-waste society.
How do the priorities align with the EcoCentre? Why are we reaching out?	<ul style="list-style-type: none"> ● Prioritise shift to a zero-waste society ● Both teams attended a plastic pollution workshop held by DELWP and Sustainability Victoria ● Support for a ban on lightweight plastic shopping bags, including degradable, biodegradable and compostable bags ● The establishment of an advisory group to work on other plastic pollution issues ● The development of an overarching plastic pollution action plan for Victoria

	<ul style="list-style-type: none"> • A Victorian Government ‘plastic-wise procurement policy’ to reduce the use of single-use plastics.
Research, Initiatives	
Questions	

Stakeholder Name, Sector	Nationwide Waste Solutions
Organization’s Goal and priorities	Nationwide Waste Solutions’ goal is to bring cost-effective waste management services to the everyday resident of Australia. NWS has waste disposal services for any possible type of waste ranging from general waste to medical waste.
How do the priorities align with the EcoCentre? Why are we reaching out?	Similar to the EcoCentre, NWS is striving for proper disposal of waste. Though the EcoCentre is not directly focused on how waste is managed, they are focused on the impact of improper disposal. NWS is taking proper management of waste into their own hands.
Research, Initiatives	Recycling program works towards healthy recycling life cycles on domestic territory, due to a recent import ban on recyclables Australia (and more specifically NWS) has had to face the challenge of dealing with recycling internally. NWS has made large efforts to send recycling to reputable sources and waste management plants.
Questions	<p>Your company has worked with waste since before the new recycling regulations were put into place, how have you seen this affect the domestic recycling mentality/attitude?</p> <p>NWS deals with almost all types of waste imaginable, what are some challenges faced when trying to provide cleaner ways to dispose of waste when dealing with medical waste or batteries for example?</p> <p>What are some emerging challenges recycling-wise that you expect to deal with in the next few years?</p> <p>What immediate impact do communities you open branches in feel?</p> <p>What is something the everyday “recycler” should know about his/her impact on the environment? (Negative impacts of not recycling correctly or positive impacts of proper management)</p>

Stakeholder Name, Sector	Cleanaway
Organization's Goal and priorities	Cleanaway aims for a sustainable future and is constantly looking to raise the standards for environmental care. Cleanaway looks to lower the greenhouse gas emissions from landfills while also continually looking for new ways to benefit from recycling.
How do the priorities align with the EcoCentre? Why are we reaching out?	EcoCentre is also focused on recycling and environmental standards, thus working together can do nothing but further the conversation. Cleanaway is also striving to educate the community, much like the goals of the EcoCentre, on how to better dispose of public waste.
Research, Initiatives	Cleanaway is looking to tackle the issue of a growing population within Australia as it comes with increased waste management needs. Currently, within Victoria, Cleanaway has four different plants dealing with waste management (2 treatment, 1 management, and 1 transfer).
Questions	<p>As an organization, you do a lot of education work, have you seen clear impacts of teaching the youth in Australia to properly dispose of waste?</p> <p> Oftentimes people are irresponsible or lazy and will throw away recyclable items, what actions does Cleanaway take to combat this?</p> <p> On your website you talk about the dangers of contamination in recycling batches, what actions can be taken in the future to prevent entire batches of recycling from being sent to landfills due to pieces of garbage (non-recyclable)?</p> <p> What recent success have you had in preventing recycling from going to landfills and how do you plan to build on this?</p> <p> What progress in the recycling industry do you hope has been completed five years from now?</p>

Stakeholder Name, Sector	Wormlovers
Organization's Goal and priorities	Provide and educate the local community on the beneficial aspects of composting and creating green waste
How do the priorities align with the EcoCentre? Why are we reaching out?	Wormlovers aims to bring composting into all residences to increase the health of the local community by creating a “closed loop” system and works to combat the excess creation of organic waste much like the EcoCentre advocates for.

Research, Initiatives	Wormlovers aims to work with the municipality and individual residents on cutting their waste costs by switching to greener solutions. Their services range from delivering worm farm products for residents to creating and maintaining high volume worm farms for the councils.
Questions	<p>What would the first visible impact be of a major switch to a greener organic waste management plan using composting and worm farming?</p> <p>What kind of waste does this process create and why is it a more sustainable solution?</p> <p>How does a waste process like this suit the everyday person, especially one who might not manage a garden or plants?</p> <p>How can mass use of worm farms benefit the local community?</p> <p>What is the intended long term impact of using worm farms?</p>

Stakeholder Name, Sector	Ewaste Solutions
Organization's Goal and priorities	Ewaste Solutions focuses on the proper disposal of computer and electronic component parts. Their goal is to ensure that the entirety of the disposed product is reused, refurbished, or recycled.
How do the priorities align with the EcoCentre? Why are we reaching out?	Ewaste Solutions aligns with the EcoCentre with their mission of completely preventing their category of waste from going to landfills. On their website they ensure that all processed materials are either re-used, recycled, or refurbished.
Research, Initiatives	Reliable recycling service in a field that requires well-built recycling protocols while also guaranteeing clients secure data wiping. Ewaste Solutions focuses solely on technology waste.
Questions	<p>How detrimental can mistreatment of Ewaste be to the environment?</p> <p>What is the biggest obstacle faced when processing e-waste and how have you managed to subvert that?</p> <p>For the everyday consumer, what are some methods to better dispose of computer/electronics that provides a better waste management solution?</p> <p>Are there areas you are currently looking to improve upon within your</p>

	recycling process?
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Stakeholder Name, Sector	Newtecpoly Ltd.
Organization's Goal and priorities	NewtecPoly is a alternative plastic manufacturer developing new ways to use and recycle plastic materials. They are among the rest of the stakeholders trying to “close the loop”.
How do the priorities align with the EcoCentre? Why are we reaching out?	Both the EcoCentre and NewtecPoly work to create new solutions in recycling and waste management while educating the general public on greener solutions to processing waste.
Research, Initiatives	NewtecPoly melts down valueless plastic materials (often destined for waste sites such as landfills) and transforms them into “value-added” products.
Questions	<p>What is an example of a value-added product and how can this be accepted as a preferred solution to other waste management processes?</p> <p>What happens if the recycled plastic is too contaminated (>10%), will this result in a waste product that is non-recyclable? Is it often that waste is too contaminated for use?</p> <p>Who are the main proprietors that generate applicable waste for a process like this?</p> <p>Who benefits from closed loop processes such as creating ewood or melting plastics to cast other products?</p>

Stakeholder Name, Sector	Fieldtech Solutions / Beach Patrol
Organization's Goal and priorities	Fieldtech solutions aims to eliminate plastic from landfills using three types of different materials; landfill biodegradable plastics, oxo-degradable plastics, and composting.
How do the priorities align with the EcoCentre? Why are we reaching out?	The EcoCentre, while actively against the use of oxo-degradable plastics, is also a large advocate for sustainable plastics being put in the production streams for companies in favor of better plastic management and treatment.

Research, Initiatives	Fieldtech Solutions aims to present a product that, when used as a plastic additive, allows plastics to completely decompose while in typical landfill conditions.
Questions	<ul style="list-style-type: none"> • Why is a degradable plastic option a better solution than increasing efforts in recycling processes? • How large is the difference in degradability between oxo-degradable and landfill degradable? • If landfill degradable plastics are used, this may result in a surge of plastics sent to landfills where some of which may not degrade due to lack of oxygen. With this complication is landfill biodegradable plastic a better option than recycling?

Stakeholder Name, Sector	Bayside
Organization’s Goal and priorities	Bayside works with many surrounding communities in effort to empower them and aid them in solving local environmental issues. Bayside makes sure all waste management issues are solved; waste pickup and treatment.
How do the priorities align with the EcoCentre? Why are we reaching out?	The EcoCentre is also focused on enlightening the community and aiding them in solving their issues. We are reaching out to Bayside as they are a crucial contact in the collection and processing sector of the waste management cycle.
Research, Initiatives	Trash collection and treatment
Questions	<ul style="list-style-type: none"> • What issues do you constantly face with waste collection? • Where are areas citizens can improve when putting out bins for collections to help both the collecting crew and treatment centers? • What waste treatment issues do you see appearing within the next few years? (Backlogs, long-term effects of mismanaged material, etc.) • What areas of waste management regulations does the general public struggle with the most? (Recycling mix and match, littering, etc) • What is the current approach to educating the local youth on recycling and waste management?

MICROPLASTICS

EPA Victoria, The Catchment Management Authorities, Melbourne Waters (all directly named in Fam’s report)

Stakeholder Name, Sector	EPA Victoria, State Government
Organization’s Goal and priorities	To prevent and reduce the harmful effect of pollution and waste on Victoria’s environment and people
How do the priorities align with the EcoCentre? Why are we reaching out?	They are the main overarching government agency for all environmental issues, with a focus on pollution They were directly referenced as a prominent stakeholder in regards to Microplastics in the Clean Bay Blueprint form EcoCentre
Research, Initiatives	Mainly legislation and governance, but they also put on programs and organize projects
Questions	<ul style="list-style-type: none"> ● Of the different government programs and policies, which one or ones do you believe were the most successful in reducing microplastic pollution in the past? ● What do you think would be the most effective strategy to prevent further microplastic pollution in the bay going forward?

Stakeholder Name, Sector	Yarra Riverkeeper Alliance, Non-profit
Organization’s Goal and priorities	<ul style="list-style-type: none"> ● Work closely with the state government and community to raise awareness and get critical support for the Yarra. ● Add to our understanding of the river and build a better picture of the pressures it faces, it’s social significance and discover solutions for restoring the health of the Yarra ● Conduct research to better understand the extent of litter and pollution in our River and what they need to do to tackle the threat of litter on the Yarra.
How do the priorities align with the EcoCentre? Why are we reaching out?	<ul style="list-style-type: none"> ● This group understands that the Yarra river is the leading cause of microplastics and litter in the Bay and hosts projects to reduce this ● They both have the same goals and priorities
Research, Initiatives	<ul style="list-style-type: none"> ● Removed approximately 38,000 kg of polystyrene contaminated

	<p>soil and general waste from the Yarra’s riverbanks and reedbeds</p> <ul style="list-style-type: none"> ● Host clean up blitzes to get rid of litter and microplastics ● Research on polystyrene pollution ● “Litter and Flows Project”
Questions	<ul style="list-style-type: none"> ● How often are clean up blitzes hosted? Who does the cleaning? ● How are they trying to reduce single-use plastic, if at all? ● How are they trying to reduce the use of polystyrene products?

Stakeholder Name, Sector	Melbourne Water , State Government Agency
Organization’s Goal and priorities	<p>“</p> <ul style="list-style-type: none"> ● manage water supply catchments, supplying affordable and high-quality water ● treat and supply drinking and recycled water ● remove and treat most of Melbourne’s sewage, ensuring that sewerage is reliable ● manage waterways and major drainage systems in the Port Phillip and Westernport region ● provide integrated drainage and flood management services ● help to create outstanding natural community spaces. <p>“</p>
How do the priorities align with the EcoCentre? Why are we reaching out?	<ul style="list-style-type: none"> ● They were directly referenced as a prominent stakeholder in regards to Microplastics in the Clean Bay Blueprint form EcoCentre ● They have catchments in the Yarra river which is an important site for the EcoCentre
Research, Initiatives	<ul style="list-style-type: none"> ● They have protected water catchments that improved the quality of their water ● Seems their biggest priority is making the best use of water/not wasting it ● Healthy Waterways Strategy
Questions	<ul style="list-style-type: none"> ● Long term goals (10-50 years) have been set for the Healthy Waterways Strategy that plan to continue the use of catchments, how do you plan to continue to improve these?

Stakeholder Name, Sector	Tangaroa Blue , non-profit
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Organization's Goal and priorities	<ul style="list-style-type: none"> ● They believe prevention is more effective than cleaning ● Want to create a source reduction plan ● Want to create improved infrastructure such as rubbish bins, anti littering campaigns or a change in procedures or formerly polluting practices
How do the priorities align with the EcoCentre? Why are we reaching out?	<ul style="list-style-type: none"> ● They have worked together in the past ● Have the same priorities and goals ● We used their picture of nurdles
Research, Initiatives	<p>Current programs:</p> <ul style="list-style-type: none"> ● Ban on plastic strapping bands in WA ● Reduction of weather balloons ● Provision of rubbish bins ● Worked with the Australian plastics industry to implement an Australian version of the <u>Operation Clean Sweep</u> program that offers solutions to minimise pellet loss.
Questions	<ul style="list-style-type: none"> ● What draws your interest in helping solve microplastic issues? ● Do you believe there are policies or strategies in place that may eventually solve this issue? <ul style="list-style-type: none"> ○ Are there any policies or strategies not yet implemented that you think would be effective? ● What other work can be done to solve the issue, or to draw more attention to it?

Stakeholder Name, Sector	BioGone , private company
Organization's Goal and priorities	<ul style="list-style-type: none"> ● “We believe our generation's discarded waste should not be left for future generations to deal with and resources should not be unnecessarily wasted now, depriving our future generations of their use.” ● They want people to use biodegradable plastics to reduce plastic pollution moving forward
How do the priorities align with the EcoCentre? Why are we reaching out?	<ul style="list-style-type: none"> ● They advocate for the use of biodegradable plastics (and provide them) and are focused on the dangers of plastic pollution and microplastics in particular ● They have expertise on oxo-degradable plastics specifically, something that the EcoCentre is very keen on ● Neil directly mentioned them as someone we should talk to

<p>Research, Initiatives</p>	<ul style="list-style-type: none"> ● Produces and sells plastic products that are “Landfill Biodegradable” <ul style="list-style-type: none"> ○ A lot of pet-related products, as well as packing tape and wrap rolls, among others ● Recycles non-biodegradable plastics instead of sending them to a landfill, as it’s dangerous and a waste of resources ● Publishes articles about plastic pollution, microplastics and oxo-degradable plastics to educate people on the subject
<p>Questions</p>	<ul style="list-style-type: none"> ● In your opinion, what are some of the most effective ways to educate people about the differences between <i>Landfill Biodegradable</i> plastic products and, for example, oxo degradable plastics? ● Do you believe there are policies or strategies in place that may eventually solve this issue? (specifically with regards to advertising the degradability of plastic products) ● In your opinion, what are some possible ways that companies and manufacturers could be incentivised to use recycled plastics as opposed to throwing them away? ● What are the industries that you think could benefit the most from using more eco-friendly plastics, whether recycled, biodegradable, or both?

Stakeholder Name, Sector	Scouts Victoria
Organization's Goal and priorities	(specifically related to microplastics) <ul style="list-style-type: none"> ● Clean plastic litter off of the streets so that they don't wind up as microplastics in the bay
How do the priorities align with the EcoCentre? Why are we reaching out?	They are working with EcoCentre to try and clean plastics off the streets to prevent them from getting into the stormwater systems and eventually reaching the bay
Research, Initiatives	Street2Bay Project <ul style="list-style-type: none"> ● Scouts from around the bay area will be trained in systematic audit methods and given equipment to conduct street audits every 3 months
Questions	<ul style="list-style-type: none"> ● What draws your interest in helping solve microplastic issues? ● Do you believe there are policies or strategies in place that may eventually solve this issue? <ul style="list-style-type: none"> ○ Are there any policies or strategies not yet implemented that you think would be effective? ● What other work can be done to solve the issue, or to draw more attention to it?

Stakeholder Name, Sector	RMIT Plastics Lab, Research Institute
Organization's Goal and priorities	Identifying microplastics for community and researchers screening
How do the priorities align with the EcoCentre? Why are we reaching out?	
Research, Initiatives	They worked with EcoCentre on their Clean Bay Blueprint
Questions	<ul style="list-style-type: none"> ● What draws your interest in helping solve microplastic issues? ● Do you believe there are policies or strategies in place that may eventually solve this issue? <ul style="list-style-type: none"> ○ Are there any policies or strategies not yet implemented that you think would be effective?

	<ul style="list-style-type: none"> • What other work can be done to solve the issue, or to draw more attention to it?
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Stakeholder Name, Sector	Love our Street , non-profit
Organization’s Goal and priorities	<ul style="list-style-type: none"> • “Love Our Street aims to bring people together as a community to look after our environment, to keep our streets beautifully clean and stop litter getting into our creeks, canals, on to beach or in the ocean.” •
How do the priorities align with the EcoCentre? Why are we reaching out?	<ul style="list-style-type: none"> • They emphasize cleaning litter off the streets before they can get into the rivers and bays
Research, Initiatives	<ul style="list-style-type: none"> • “We aim to support the work of Beach Patrol by dealing with litter close to the source. Once a month, we meet at one of our local shopping streets for a clean-up and a cuppa afterwards.”
Questions	<ul style="list-style-type: none"> • What draws your interest in helping solve microplastic issues? • Do you believe there are policies or strategies in place that may eventually solve this issue? <ul style="list-style-type: none"> ○ Are there any policies or strategies not yet implemented that you think would be effective? • What other work can be done to solve the issue, or to draw more attention to it?

Stakeholder Name, Sector	Bellarine Catchment Network & Caring for Our Bays , Government funded program
Organization’s Goal and priorities	“The Bellarine Catchment Network region will work towards healthy, well connected and resilient wetlands, waterways and native vegetation ecosystems; sustainable agricultural and land management practices; and a community which is engaged and involved in protecting and managing the natural environment. “
How do the priorities align with the EcoCentre? Why are we reaching out?	They deal with citizen science and litter audits, something that EcoCentre frequently deals with Neil specifically recommended we speak with them

Research, Initiatives	“A major part the Caring For Our Bays program is a citizen science component. Litter audit volunteers monitor specific coastal sites on a regular basis at 16 locations throughout Geelong and the Bellarine. Since the inception of the program, over 18,000 items of litter has been counted and collected. Data collected feeds into a national database.”
Questions	<ul style="list-style-type: none"> ● What draws your interest in helping solve microplastic issues? ● Do you believe there are policies or strategies in place that may eventually solve this issue? <ul style="list-style-type: none"> ○ Are there any policies or strategies not yet implemented that you think would be effective? ● What other work can be done to solve the issue, or to draw more attention to it?

Stakeholder Name, Sector	Dept Environment Land Water & Planning - Litterwatch , Government program / Research
Organization’s Goal and priorities	<ul style="list-style-type: none"> ● Condense data on beach litter around Port Phillip Bay in a publicly accessible place
How do the priorities align with the EcoCentre? Why are we reaching out?	<ul style="list-style-type: none"> ● They deal more on the research end of microplastics, organizing data in a publicly accessible place
Research, Initiatives	<ul style="list-style-type: none"> ● “LitterWatch is an online system for managing the litter data, viewing different datasets, and providing reporting tools for comparing litter data from different locations and time periods.” (still in live testing as of June 2020)
Questions	<ul style="list-style-type: none"> ● Do you believe that Litterwatch will have a significant impact on microplastic pollution and awareness? ● Do you believe there are policies or strategies in place that may eventually solve this issue? <ul style="list-style-type: none"> ○ Are there any policies or strategies not yet implemented that you think would be effective? ● What other work can be done to solve the issue, or to draw more attention to it?

B: Stakeholder Interview Questions

Spider Crab Aggregation Questions

- How do you believe the annual spider crab aggregation should be managed, how is the Spider Crab catch limit tailored towards that?
- Is there evidence of the spider crab population being harmed due to fishing (direct visible impacts?)

Spider Crab Litter Questions

- How do you think the issue of spider crab fishing litter could gain more attention?
- Is there evidence of increased litter in the bay during the spider crab aggregation?
- What are some ways that you believe spider crab fishing related litter can be managed?
- You're an incredible example of tackling this issue and taking on ocean litter as a personal responsibility - what do you believe is the best way to convince others to do the same?

Nature-based Event Questions

- What other activities do you believe could complement the annual aggregation for the benefit of the wider community?
- What is the best way to educate the community on the issue of spider crab fishing and litter? How can this be tied to the activities?
- Barriers to the Mornington Peninsula Activities?
- Have you already been working on initiatives for this series of activities?

C: Spider Crab Interview Findings

Spider Crab Aggregation Management

M.Cheers, Rye:

Priority: Tourists and nature watchers. Emphasis on accessibility.

- All fishing should be last place.
- Only two places where people can observe the fishing: the pier and across the bay.

Josie Jones:

Priority: Observation/No-Take unless 100m from pier. Emphasis on accessibility for education. Fishing spider crabs for family/education

- Improper educate from opportunistic fishermen
- Instead of a no-take for the whole bay, make a compromise for man made structures with 100m radius
- Spider crabs actually can have a lot of meat on them and taste good, from an angler perspective
- Family event, educational to show the crabs and their anatomy

PT Spider Crabs Melbourne

Priority: No-take along with activities that promote the nature of the bay and educate about spider crab fishing.

- Similar idea to cuttlefish celebration
- Could be fishing-related activities at the festival, just not for spider crabs when they're vulnerable

SH, VNPA

Priority: Viewpoint from looking at all the stakeholders involved and what everyone's interest should be, Overall intentions should be to safeguard the marine aggregation, yet allow stakeholder groups to enjoy them in different ways

- -The ways we enjoy them shouldn't overtake the wellbeing of the species
- -Some mismanagement of the overall spectacle

Nature-Based Activity Ideas (and Barriers)

PT, SCM

Priority: Have a festival regardless of spider crab arrival. Need people who are dedicated to showcasing and educating others on the nature in Port Phillip Bay

- Having a festival during a pandemic is difficult (no public gatherings)
- Need someone who's dedicated and funded to run it, not sustainable from a volunteer point of view

- Timelines are a constraint (permits)
- Festival will not be elegant if accompanied with litter and stuff that comes from spider crabs
- Time and money are a problem, needs to grow organically over the years
- Crabs don't come at the same time every year

SH, VNPA

Priority: Pro-celebration. Taking all groups into account and make it a positive experience rather than just a no-take

- -Definitely agree with celebration idea
- -Similar to cuttlefish celebration in a neighboring state
- -Don't want it to be divers vs fishers, want everyone to enjoy them together
- -Other activities could satisfy anglers without having to catch crabs
- Making positive experiences with the ocean

M.Cheers, Rye Group

Priority: Single-minded focus on stopping crabbing. Nothing else other than a ban.

- Culturally important to Japanese, species of crab doesn't exist in China and Japan
- Nothing else other than a ban
- If we run a festival, you need to target one cultural group. No need to educate the general public, if you run a program to teach about biodiversity that's a different story that she supports.
- Festival will not attract the people, what is the point? Won't attract the people who are doing the crabbing

Fishing Litter Management

SH VNPA,

Priority: Fishing-related litter is a huge issue regardless who you are. Fishermen aren't always respectful of the policies.

- No-take policy usually respected (1/10 don't respect it based on data from the VFA)
- Litter is less respected. Lack of bins for disposal and fishermen don't want to take chicken carcasses back with them so they toss them into the ocean.
- Impact--attracts rays and sharks to the spider crabs and divers.
- In favor of taking steps to address spider crab fishing-related litter.

PT, SCM:

Priority: Spider crab fishing is so new that this issue hasn't gotten much attention. Responsibility of the VFA and pier managers to ensure there are enough bins.

- It's the responsibility of the Victoria fishing authorities and pier managers
- No bins on piers→ Dumping of carcasses, unwanted nets
- Bins at the end of the pier are not big enough, always overflowing. People won't take soggy chicken carcasses home with them.
- Talking to the minister for the environment to speak about the issue. Not something they can resolve at their level, so they're facilitating communication with the decision makers

- State government feels a long way away from passionate community
- Power resides in the hand of the fishing minister. Fisheries are too focused on fishing and not the other wildlife and litter issue. Doesn't have a solution (yet)

JJ: STWA:

Priority:

- Not just fishermen vs divers, it's about the entire community. Often with litter people get angry
- Education in Tahiti around waste is low
 - People throw litter in gutters on the side of the road, makes it very dirty
 - She would get in the gutters and clean them herself
 - "Just had greater awareness"
 - Lead by example. Pick up litter on the beach, and people would help her
- Hard to have a conversation with people about a real problem
- Picking up litter is seen as a punishment, when in reality it's rewarding
- Started a 1 ton challenge so no one can deny the amount of litter
 - Took 221 days to pick up a ton
 - Was able to change the perceptions because she had evidence
 - If you can't measure it you can't change it
- "If you care so much about the environment then why don't you care when you educate people" Make it fun and engaging (only butt campaign). It's all about how you package your message

D: Spider Crab Notes - Mechelle Cheers, Rye Community Group Interview

How do you believe the annual spider crab aggregation should be managed?

Two parts, annual molting happens across the bay, then on piers
Only two places people are able to watch
That's the area she is focused on
No reports of crabs being plundered out
Accessibility issue for tourists and nature watchers
What educational initiatives do you think is the best way to educate the community (broadly speaking) of spider crab fishing and litter?

What other activities do you believe could complement the annual aggregation for the benefit of the wider community?

Single minded at the moment, focus is stopping crabbing at locations at those times of year

Culturally important to Japanese, species of crab doesn't exist in China and Japan

Nothing else other than a ban

If we run a festival, you need to target one cultural group

No need to educate general public, if you run a program to teach about biodiversity that's different story that she supports

Festival will not attract the people, what is the point

Won't attract the people who are doing the crabbing

Have been accused of racism since there is a specific group of people that come

People just want to come watch and enjoy

She could get the pier to close due to COVID

Her concern is that crabs did not return

Researching why cohorts of crabs come to these places

This year spider crabs were much smaller than before

Destroying ecosystem (Seahorses shown trapped in cages)

Fisheries aren't doing research on the right things, they are just tagging them

Is there evidence of the spider crab population being harmed due to fishing (direct visible impacts?)

The rays were very hungry this year

Rays feed off spider crabs, but they couldn't compete with fishermen

Chicken carcasses would wash ashore with a bunch of other "rubbish"

People stand in very shallow water and pluck crabs out of the water to catch them

The issue needs to be exposed

Trash under the pier smelled very bad

Reports of rats (no photographic record)

Bins were overflowing with chicken carcass and nets

Most of the trash was from people who just showed up

- Bins overflowing with carcasses with nets
- 90% compliance with the catch limit (Michelle does not know)
- In Tasmania the crabs are bigger and in deep water, considered a delicacy but this is not the same crab they are dealing with

E: Spider Crab Notes - Josie Jones

You're an incredible example of tackling this issue and taking on ocean litter as a personal responsibility - what do you believe is the best way to convince others to do the same?

- Not just fishermen vs divers, it's about the entire community
- Often with litter people get angry
- If you understand why it's there you can become more proactive in preventing it
- Education in Tahiti around waste is low
 - People throw litter in gutters on the side of the road, makes it very dirty
 - She would get in the gutters and clean them herself
 - "Just had greater awareness"
 - Lead by example. Pick up litter on the beach, and people would help her
- Hard to have a conversation with people about a real problem
- Picking up litter is seen as a punishment, when in reality it's rewarding
- Started a 1 ton challenge so no one can deny the amount of litter
 - Took 221 days to pick up a ton
 - Was able to change the perceptions because she had evidence
 - If you can't measure it you can't change it
- "If you care so much about the environment then why don't you care when you educate people"
- Make it fun and engaging (only butt campaign)
- It's all about how you package your message

Have you seen litter due to spider crab fishing - what have you seen?

- Population aren't in threat, more about the behavior around the fishing
- Once Covid started, litter was down but increased "off the planet" once spider crabs came

Since you have a graphic design background - what makes an effective graphic to prompt action?

- In the current climate it's disruptive
- "Karpman Triangle"
 - If you ever want to find stuff, always put PDF at the end
- Have good boundaries, give people direction
- Don't want to be mean, dogmatic, or shame people
- Need to shift the consciousness
- Gaps provide opportunity to create change
- Reward people for doing the right thing
- Show how the issues can impact them

What is the best way to educate the community on the issue of spider crab fishing and litter?

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What initiatives are you working on to reduce litter?

- Instead of a no-take for the whole bay, make a compromise for man made structures with 100m radius

- Would love to see a national campaign educating people about the origins of litter and plastic pollution
 - Encourage people to clean out their cars so wrappers and stuff doesn't blow out onto the road, since nobody will pick it up
- A lot of litter happens by accident

Other notes:

- Population aren't in threat, more about the behavior around the fishing
- Not just fishermen vs divers, it's about the entire community
- "Crabs are not worth the toll"
- 161 species living under the pier that are threatened
- Crabs themselves will try and eat anything
- Improper educate from opportunistic fishermen
- Lack of trash bins on the shores and piers
- Litter increased "off the planet" once spider crabs came
- Instead of a no-take for the whole bay, make a compromise for man made structures with 100m radius
- Spider crabs actually can have a lot of meat on them and taste good, from an angler perspective
- As soon as people realize they taste good, it'll be a huge problem
- Crabs aren't just there to be eaten
- Think about the whole picture, not just the crabs
- Make it a nice experience for the people on the pier (education based)
 - Taking them changes the whole experience, people leave feeling sad
- People target vulnerable soft-shelled crabs on the pylons of the pier without understanding or respect for other marine life
- Some beaches are supposed to be smoke free, but there's nobody there to enforce it
- Most people try to throw their trash in bins instead of littering, causing them to overflow
- Find a lot of random junk on the beach that comes from other places and wash into the rivers
 - Lots of tile separators
- She made a map of Australia out of litter for Melbourne Zoo
- Make different states compete to create a fun healthy competition
- Sharejosie on instagram

F: Spider Crab Notes - Victorian National Parks Association Notes

Victorian National Parks Association Interview Notes

Who do you believe are the key stakeholders to be considering in managing the spider crab aggregation?

- Victorian Fisheries Authority
- Department of Environment, Land Water and Planning (DELWP)
- Parks Victoria
- EPA
 - Have a roll to play in litter management

How do you believe the annual spider crab aggregation should be managed, how is the Spider Crab catch limit tailored towards that?

Charlie	Hailey
<ul style="list-style-type: none"> ● Needs to take a viewpoint from looking at all the stakeholders involved and what everyone's interest should be ● Looking at the future of the species ● Overall intentions should be to safeguard the marine aggregation, but at the same time allow stakeholder groups to enjoy them in different ways ● The ways we enjoy them shouldn't overtake the wellbeing of the species ● Some mismanagement of the overall spectacle <ul style="list-style-type: none"> ○ Bag limit is not achieving the objectives, won't make any difference ● Specific evidence 	<ul style="list-style-type: none"> ● At the same time allow different stakeholder groups to enjoy it in a different way so the fishing community can enjoy them as well without jeopardizing other stakeholders. ● Really needs to look at all the different ways people enjoy them but not overtaking the future. ● Advocating for a no take period over a particular time frame to protect the crabs because of mismanagement. ● Bag limit is not achieving those objectives. <ul style="list-style-type: none"> ○ According to some work it's not addressing the issue at all and will not make a difference. ● Current bag limit is a way of doing something but not actually having a beneficial effect on the outcome. <ul style="list-style-type: none"> ○ For example, survey done of the different communities who like to fish the crabs, most people didn't take above 15 crabs anyways. ○ 1/10 people exceed the fishing limit but don't know by how much

What other activities do you believe could complement the annual aggregation for the benefit of the wider community?

Charlie	Hailey
<ul style="list-style-type: none"> ● Definitely agree with celebration idea ● Similar to cuttlefish celebration in a neighboring state ● Don't want it to be divers vs fishers, want everyone to enjoy them together ● Other activities could satisfy anglers without having to catch crabs <ul style="list-style-type: none"> ○ Making positive experiences with the ocean 	<ul style="list-style-type: none"> ● Having discussions with local ...? ● Celebrate them similar to cuttlefish celebration <ul style="list-style-type: none"> ○ Very well-known, brings a lot of benefit to the cuttlefish and economy ● Want everyone to be able to enjoy them going forward, just in a safer and better way.

How do you think the issue of spider crab fishing could gain more attention?

Charlie	Hailey
<ul style="list-style-type: none"> ● State media outlets <ul style="list-style-type: none"> ○ Had some in June during the aggregation ● Focus on the audience that will make the most difference ● People advocating for no take period should target specific stakeholders and community <ul style="list-style-type: none"> ○ Having conversations with them ● Needs to be a 2 way conversation <ul style="list-style-type: none"> ○ It's about listening ○ Have been doing that with fishing organizations, but it's challenging with differing views 	<ul style="list-style-type: none"> ● Media <ul style="list-style-type: none"> ○ Promoting problems and solutions in a better way ● What is putting the message out there going to do? <ul style="list-style-type: none"> ○ Need to get to the right audience ● Multicultural community are the ones fishing these crabs (chinese community) <ul style="list-style-type: none"> ○ Creating a dialogue with them and having conversations ○ Chinese want their kids to experience so maybe giving them other opportunities/activities to do instead ● Overall communication needs to be more specific ● Facebook advertising, emails, petitions, tourism bodies ● Conversation rather than just communicating

Is there evidence of the spider crab population being harmed due to fishing (direct visible impacts?)

Charlie	Hailey
<ul style="list-style-type: none"> ● Amount of crabs that have been taken out (people exceeding the bag limit) ● Amount of crabs under the pier is diminishing (observations from the public) 	<ul style="list-style-type: none"> ● 1/10 people exceed the bag limit

<ul style="list-style-type: none">● Survey done of different communities who like to fish the crabs<ul style="list-style-type: none">○ Most people don't take more than 15 crabs anyway, making bag limit redundant● Report found 1/10 people exceeded the bag limit, but never specified how far over they went●	
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G: Spider Crab Notes - Spider Crabs Melbourne

Orange highlight = possible data for infographics

Yellow highlight = possible data for issues papers

<p>What are some ways that you believe spider crab fishing related litter can be managed?</p>	<ul style="list-style-type: none"> ● It's the responsibility of the Victoria fishing authorities and pier managers ● No bins on piers ● Dumping of carcasses, unwanted nets ● Bins at the end of the pier are not big enough, always overflowing ● People won't take soggy chicken carcasses home with them ● Never been a structure for the fishing of the crabs because it's so new ● Talking to the minister for environment to speak about the issue ● Not something they can resolve at their level, so they're facilitating communication with the decision makers ● State government feels a long way away from passionate community ● Power resides in the hand of the fishing minister ● Fisheries are too focused on fishing and not the other wildlife and litter issue ● Doesn't have a solution (yet)
<p>How do you believe the annual spider crab aggregation should be managed, if at all?</p>	
<p>What is the best way to educate the community on the the issue of spider crab fishing and litter? How can this be tied to the activities?</p>	<ul style="list-style-type: none"> ● Advertising through facebook is difficult ● Reaching out to residents through local media articles ● Fishing community might see no take season as a threat to fishing liberties ● Lots of different strategies depending on the community ● Community of decision makers might have areas of expertise, but not beyond what's filtered to them surrounding the issue ● ● Try and raise awareness of the economic and social value of spider crabs is higher when trying to protect them vs fishing them ● Focusing on both young and old ● Difficult in the Pandemic ● Meeting with older, proactive members of

	the community rather than hitting the same people again and again
Barriers to the Mornington Peninsula Activities?	<ul style="list-style-type: none"> ● Having a festival during a pandemic is difficult (no public gatherings) ● Need someone who's dedicated and funded to run it, not sustainable from a volunteer point of view ● Liaising with council regulations ● Want festival by June of 2021 regardless of a no-take period ● Timelines are a constraint (permits) ● Festival will not be elegant if accompanied with litter and stuff that comes from spider crabs ● Time and money are a problem, needs to grow organically over the years ● Crabs don't come at the same time every year
Have you already been working on initiatives for this series of activities?	<ul style="list-style-type: none"> ● Similar idea to cuttlefish celebration ● Could be fishing-related activities at the festival, just not for spider crabs when they're vulnerable

- Victorian Recreational Fishing
- Fish Care?
- Battle lines have been drawn (pro safeguarding crabs is seen as anti fishing)
 - Less concerned about preventing litter, more concerned about fishing liberties
 - Potential threat to freedom is more concerning after all the restrictions with COVID

What are some ways that you believe spider crab fishing related litter can be managed?	<ul style="list-style-type: none"> ● “Responsibility of VFA and pier managers” -PT <ul style="list-style-type: none"> ○ Mass dumping of carcasses and nets ○ Bins at the piers are not adequate and do not reward those doing the right thing ● Never been a structure for fishing of crabs before, therefore no pre-existing rules/regulations ● Talking with the minister of environment on issues soon ● Not something this group can directly solve, above their heads. <ul style="list-style-type: none"> ○ They are working to push their narrative to those that hold the power to change and add regulations
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	<ul style="list-style-type: none"> ● A lot of the issues here are overseen by the fisheries director, but this is not exactly a fishing matter <ul style="list-style-type: none"> ○ Director not very worried about issues outside of fish ● Local community motivated to change the event due to the residue of anglers and those looking to catch the crabs <ul style="list-style-type: none"> ○ Trash piled up and leftover for a while after the event ● Pro-crab movements and policies are being viewed as anti-fish <ul style="list-style-type: none"> ○ Seen as a threat to fishing liberties ● Taking away fishing during the lockdown measures gave the idea of stripping people of their preferred daily activity
<p>How do you believe the annual spider crab aggregation should be managed, if at all?</p>	
<p>What is the best way to educate the community on the issue of spider crab fishing and litter? How can this be tied to the activities?</p>	<ul style="list-style-type: none"> ● Working to congregate the several different communities ● Trying to meet with people on zoom calls currently to raise awareness and educate on spider crabs ● Spider crabs can contribute to tourism if viewed as a phenomenon instead of a fishing venture <ul style="list-style-type: none"> ○ Community activities watching the crabs, not catching ● Want to branch out to new groups of people to educate, don't want to keep beating a dead horse ●
<p>Barriers to the Mornington Peninsula Activities?</p>	<ul style="list-style-type: none"> ● Having a festival early on in the re-opening process is not easy ● Need someone dedicated to run it as it is not sustainable ● Festival coordination is a full time role <ul style="list-style-type: none"> ○ Difficult to align with council regulations and booking the park ● A festival about celebrating and protecting the biodiversity can be difficult especially if it's a divided issue <ul style="list-style-type: none"> ○ Need to convince people crabs are worth protecting and celebrating ● Look at what other groups have done for other species (cuttlefish) and how they've

	<p>been able to turn a fishing/catching industry into a tourism industry</p> <ul style="list-style-type: none"> ○ Idea is not to have the event be focused on the “slaughter” of spider crabs
Have you already been working on initiatives for this series of activities?	

Activities:

- People who like to fish spider crabs don’t always like to eat them, simply use it as a pass-time
- EcoCentre feels like best bet is to group all the tourism activities together as a celebration
 - This should bring a wave of public support to the cause (no take period)
- PT wants fishing to be an activity during the festival, but wants a no take policy during the crabs’ “most vulnerable part of their life”
- PT is not anti-fishing, but wants to protect the crabs and would like to open talks into the fishing community

H: Waste Management Notes - Bayside City Council

- What issues do you constantly face with waste collection?

- Public-placed bins -- parks in major activity areas
- More visitors outside w Covid so up the collection frequency
- Full bin, people continue adding to it
- People don’t feel responsible
- In 1 yr → +240% increase. (Community groups and beach patrol collect data)
- Litter increase w masks and takeaway coffee cups

- Not as much of a problem for residential bins
Because of COVID people flock to the shore, really difficult to keep up with demand
Have to increase bin capacity

People don't put the trash in the bins, just near it (the council will take care of it)

From last October to this October, litter has gone up 240%, recycling has gone up 100% (no detail of what's in it)

Litter audits don't typically measure exactly what type of litter they collect, just general descriptions

- Where are areas citizens can improve when putting out bins for collections to help both the collecting crew and treatment centers?

-Avoidance is the preferred way of dealing with waste. Changes: FB marketplace, take advantage of second hand and reusable world

-People who visit haven't been influenced by education campaigns and don't take care of the area (ie cigarette butts)

-Council gets paid to pick it up but that isn't a job creation program

Council needs to provide resource and education to empower people to take care of their trash
Source separation; take the time to separate waste into the proper bins

People who come from far away don't feel a connection with the local community (outsiders don't really care)

People don't take their same environmental concerns they have at home with them. Freedom after COVID restrictions have caused people to relax their standards

- What waste treatment issues do you see appearing within the next few years? (Backlogs, long-term effects of mismanaged material, etc.)

Emergence of compostable, biodegradable alternatives to plastic (mainly take out) containers. Problem with that is that there are different standards on what qualifies as compostable / biodegradable. Organics facilities might not accept all these types of plastics (looks like the compost is contaminated)

Will correct itself once the processes are improved and facilities can actually accept everything

Australia eventually doesn't want to send any waste overseas. Councils used to get paid for sending recyclables away, but now they have to pay people to take it.

People might not accept new recycled materials

- Doesn't currently have infrastructure to support it
- If there's no one willing to purchase the recyclable material, it creates a large problem

Councils are running out of landfill space. By 2025 council wants a waste to energy facility, which needs funding.

- This could cause people's behaviors to regress, they think if waste is turned into energy they don't have to worry about separating waste and stuff

Council wants to have a separate glass recycling service

- Efficiencies in separating things like this
- Will end up costing everybody more

- What areas of waste management regulations does the general public struggle with the most? (Recycling mix and match, littering, etc)

-Everyone has different regulations, varies

-Difficult when you live in some and visit another, color coded bins change

-Not all bins accept the same materials, system makes it hard

Will be the same over the next 10yrs -> transition

-No specific enforcement for littering

Every municipality has different systems, borders aren't obvious. If you go to school in one municipality and live in another bin system might be different

Not all recycling bins accept the same materials. System makes it hard to do the right thing because it's not the same, even if people want to do the right thing. This is a big area in which all councils can improve

Victorian state government as adopted a circular economy model, which includes bin standardization

Not a culture of enforcement (no one actually gets fined for littering). They rely on it being culturally and socially enforced, which doesn't work as effectively

People don't know how their behavior affects other people / know how the system works. People don't see the link between their behavior now and how it helps people moving forward. (not necessarily selfish, more ignorance)

This council generally has lower than others, and population is generally more affluent and educated

A lot of the responsibilities fall to the manufacturers and the types of packaging they're using

New labeling system on packaging to denote what to do with each items (something to focus on moving forward)

- Hopefully manufacturers will make it so things that come packaged together are discarded the same way

Packaging is controlled nationally, waste collection is local

- What is the current approach to educating the local youth on recycling and waste management?

Goes into schools and do presentations on different systems, providing them with bins and signage and other resources

Tomorrow's leaders program

- Not just waste, but sustainability in general
- In conjunction with EcoCentre
- Work with 9-10 year olds
- Teaching them about sustainability and being leaders
- Waste is usually the first thing that comes up
- Have them think about ways to improve recycling systems

- Something gets lost between the age of 14 and university age, environmental concerns take a back seat to life
- Get the kids to train the parents

Many schools don't allow any trash

- Most schools have a policy where kids don't bring trash to school, you bring any trash from lunch home. As a result, most schools don't have bins in the schoolyards
- Trash can still turn up from people who use the schools after hours
-

Waste management issues that could appear in the next 5yrs?

- not knowing the difference between bio degradable and compostable -- they are different but should be put into the same bin
- target of no trash sent overseas until a specific year
- new facilities will need to be made as a result

I: Waste Management Notes - Fieldtech Solutions / Beach Patrol

Fieldtech related questions:

- Why is a degradable plastic option a better solution than increasing efforts in recycling processes?
 - Time related problem
 - Only recycle 10% of plastics right now, have limited recyclability in australia
 - Will take years to turn it around
 - 1.5-2 million tons of plastics generated in Australia
 - Making it biodegradable will address plastics sitting in a landfill
 - Biodegradability doesn't affect recyclability
 - Compostable plastics aren't recyclable
- How large is the difference in degradability between oxo-degradable and landfill degradable?
 - Oxo-degradable is a slow chemical reaction. When metal particles in the plastic is exposed to air it fractures
 - Turns into a "plastic soup"
 - Won't degrade in a landfill because there's no sunlight and it's too cold, which is where most litter ends up
 - Think about why people are using it
 - Oxo's break up while biodegradables break down
- If landfill biodegradable plastics are used, this may result in a surge of plastics sent to landfills where some of which may not degrade due to lack of oxygen. With this complication is landfill biodegradable plastic a better option than recycling?
 - Biodegradable plastics have both aerobic and anaerobic microbes, so it will still break down without oxygen
- Waste management plant
 - Australia probably won't be waste independent anytime soon

Beach Patrol questions:

- Beach Patrol is a very extensive group with seemingly very active members, how would you advise other environmental organizations on keeping volunteers engaged?
 - People are frustrated with plastics getting into the ocean
 - They just offered them a minimal outlet to vent that frustration, and give them the opportunity to meet new like minded people
 - Not a big time commitment
 - Send messages out to re enforce the risks, focus on wildlife
 - Not everyone logs their personal haul, the group leaders log everything for their group
- What would be a positive visible impact of total community involvement?
 - Even though they remove a lot of litter, it's only once a month
 - The biggest impact isn't removing litter, it's community awareness
 - Changing people's attitude towards plastic littering
 - Let big companies like Mars and Coke see the impact of their products first hand
- Thoughts on separating glass and plastic from cardboard and paper
 - Needs to happen, and is already starting in some areas
 - Still not convinced they can recycle glass in Australia, too small population
 - Melting glass is too expensive
 - Glass contaminates other recycling, so separating it makes plastic, cardboard and paper more valuable
 - Paper and cardboard is at 80% recycling, plastic is 25% (but really more like 10%)
 - Metals can bond any way, while plastic needs to bond in a certain way
 - Plastic can only be recycled up to 2 or 3 times, and it gets worse and worse over time
 - Pigtail economy instead of circular economy
 - The only way to get rid of the plastic problem is to get rid of it
 - If you get rid of single use plastics, you'd solve half the problem for not much inconvenience
- What policies can be pushed in the near future to add beneficial change to city regulations on litter?
 - Standard producer responsibility (getting a refund on bottles)
 - Government needs to figure out what to do with the bottles they collect
 - Plastics tax could encourage manufacturers to use recyclable products or paper equivalents
 - Federal government has tried to bring on some bans on microbeads. People manufacturing them need to stop, but they can still be imported no problem
 - Standardizing waste probably won't work
 - Every state needs to agree on a system, the federal government doesn't have that much power
 - Can't afford to sort through litter to determine what's recyclable and what's not
 - Biodegradable plastics are an interim solution for the next 10+ years
 - If anything can be recycled (computer parts, light switches), it should
 - Need to make multiple different solutions
-

J: Waste Management Notes - Cleanaway

As an organization, you do a lot of education work, have you seen clear impacts of teaching the youth in Australia to properly dispose of waste?

- Sharing knowledge that could make a huge difference
- Raising children who care about the environment
- Planting the seeds about recycling early on so it will stick in their minds
- Children often teach their parents
- Prompts them to ask questions at school and at home
- They measure results on a macro level, so they can't pinpoint what exactly is making an impact
- To them it has a huge impact, but they don't have specific stats

Preventing contamination

- Important to share educational materials within the communities to learn what can and can't go in each bin
- All about community awareness and education about putting hazardous materials in the wrong bins

Oftentimes people are irresponsible or lazy and will throw away recyclable items, what actions does Cleanaway take to combat this?

- They have many programs that make people responsible for the waste people put on their curbsides
 - Rejection of bins, letters, bin removals
 - The driver can leave them a sticker on their bin if they mess up. A letter will get sent from the council to the household to inform them of their mess up\
 - After 3 offences they'll just remove their bin
 - Focus on educating specific areas who aren't as good with bins though mainly social media posts and online info sessions
- With regards to education, they deal with all age groups, with a focus on residents
- Drop rate is significant after receiving a sticker and letter

On your website you talk about the dangers of contamination in recycling batches, what actions can be taken in the future to prevent entire batches of recycling from being sent to landfills due to pieces of garbage (non-recyclable)?

●

What recent success have you had in preventing recycling from going to landfills and how do you plan to build on this?

- Recently had great success working closely with one of the largest councils to reduce curbside contamination by 30%
- Same bin-blitz system, as well as completing waste audits at recycling centers
- Using social media posts to inform people about common misconceptions about recycling and the fines for messing it up, and having the stats to back it up
- Moving forward they'd like to start a positive program to encourage people who are doing the right thing. Discourage bad behavior and reward good behavior

What progress in the recycling industry do you hope has been completed five years from now?

- Circular economy loops for materials that are purchased, used, and recycled every day

- If items are not involved in a circular economy loop, the manufacturers take responsibility for the products lifetime
- The container deposit scheme, set to be implemented in 2023
 - Will reduce litter
- Would like to see consumer awareness improve, requires a better approach to product labeling and knowledge about sorting trash
 - Consumers will be able to better support manufacturers who are doing the right thing

As an organization, you do a lot of education work, have you seen clear impacts of teaching the youth in Australia to properly dispose of waste?

Tangible evidence:

- Teaching youths is sharing knowledge, if children think twice about recycling then they will raise their own children who do the right thing
- Children influence their parents
- Educate their mind, encourages them to ask questions
- Can't provide stats because they measure things on a macro level

Oftentimes people are irresponsible or lazy and will throw away recyclable items, what actions does Cleanaway take to combat this?

On your website you talk about the dangers of contamination in recycling batches, what actions can be taken in the future to prevent entire batches of recycling from being sent to landfills due to pieces of garbage (non-recyclable)?

What recent success have you had in preventing recycling from going to landfills and how do you plan to build on this?

- Worked with council in Victoria on tackling contamination
- Drove contamination down by 30%
- Using the 3 strike bin method
- Social media about common misconceptions about recycling
-

What progress in the recycling industry do you hope has been completed five years from now?

- Love to see circular economy , would make it more clean
If items do not have an end destination market , producers take responsibility for life cycle cost
- Container deposit scheme, should be implemented across victoria in 2023
- Consumer awareness improve, investment in proper disposal, proper labelling

How to help prevent contamination in the future?

- Community awareness
- Need to stop putting hazardous material in their recycling bin

Motivating people to keep up with recycling policies?

- Programs that make people responsible for the waste they put on their street
- Bin auditing, bin removal: driver tips bin into truck and can tag bin which lets the

resident know that their bin was contaminated and lets them know what was in it. If they get three tags the bin gets taken

- Targeting all ages
- Dealing with education is everyone, not just children
- You have to go to the person who is responsible, this will make change
- 1000 tags of contamination, then decreases to 200 tags, then 20 tags which is a great improvement
- Targeting contaminated bins, encourage the people who are doing a good job to keep it up, positive reinforcements
- Rewards system

As an organization, you do a lot of education work, have you seen clear impacts of teaching the youth in Australia to properly dispose of waste?

-sharing knowledge that makes a huge difference -- teaching children who care for the environment and that passes it on. Sticks in their minds. Evokes interests and prompts them to ask question. Contamination is measured at a macro level so there isnt any specific initiatives that have changed the view -- large impact is the goal.

Oftentimes people are irresponsible or lazy and will throw away recyclable items, what actions does Cleanaway take to combat this?

-share what can/cant go in bins. Educational materials prevent ppl placing hazardous material in the bins.

Eliminate fire risk

Recycle

All about community awareness

On your website you talk about the dangers of contamination in recycling batches, what actions can be taken in the future to prevent entire batches of recycling from being sent to landfills due to pieces of garbage (non-recyclable)?

Many programs make ppl aware of their waste -- bin tagging, auditing, "sticker : contaminated with x y z" , letter would go to the resident. If it happens 3x in a row, recycling bin gets removed from the person.

Education initiatives for communities that need reinforcement. Landfill bin is the last report
All age groups and residents. Pin responsibility
Significant drop rate - 1000 to 200 that go for a 2nd time -- then 20 ppl
150,000 tenants so it isnt a lot of people

What recent success have you had in preventing recycling from going to landfills and how do you plan to build on this?

-30% contaminants
3 strike rule, waste audits, social media- common misconceptions, explanation
And top contaminants found in the area
Port Phillip: plastic bags
Encourage people to keep up the good work

What progress in the recycling industry do you hope has been completed five years from now?

-circular economy loops
-producers pay for lifecycle costs
-container deposit idea 2023
-reprocessing infrastructure - more access
-reduces litter
-consumer awareness should improve
-better disposable instructions

K: Waste Management Notes - Newtecpoly

Summary:

- Born from Australian inventor, concern about plastic waste issues
- Worked in agricultural industry working on pumping equipment and noticed all the plastic
- Material can be fed in, doesn't have to be sorted, (usually needs to be sorted and cleaned), turns into pellets and beads
- Very tolerant to contamination
- Mix of plastic that goes in, hybrid plastic comes out
- Simple straight forward process
- Can manufacture worthwhile process that's cheaper
- Found other contaminants that can be blended with the plastics (running shoes, cigarettes, old tents, polyester based carpet)
- Process is energy efficient, polymer is only melted once
- Use this to consolidate film
- Protects environment by storing polymer as bars until use is found for it and it can be turned into something
- Prototype runs off a diesel generated motor

- Oxodegradables just blend in with all the others

Enemies of the process

- Cant handle all metals (aluminum)
- Can capture and clean the metals out of the machine, just become a maintenance issue
- Prototype handles plastics 1-7
- Cant handle PVC in certain quantities
- More sophisticated gas extraction system
- Need to convince people that the lazy way is not the best way

What is an example of a value-added product and how can this be accepted as a preferred solution to other waste management processes?

- Doesn't believe their products are inferior or superior
- Just does it with lower grade feedstock
- Up to the imagination of what can be produced
- Requirements at the center are much more lenient
- Believes technology will help clean up the world until they catch up with Europe and figure out how to separate polymers

What happens if the recycled plastic is too contaminated (>10%), will this result in a waste product that is non-recyclable? Is it often that waste is too contaminated for use?

- All materials are recyclable
- If there is a highly contaminated plastic it would just be blended in with plastic that they know is less contaminated.
- Too much paper- if they do not blend then a fire would occur
- Barely degraded plastic can be re-polymerized
- Targeting plastic that is not economical and nothing is being done to it, catching the plastic that cannot be sorted (which is such a high percentage of plastic that is out there)

Who are the main proprietors that generate applicable waste for a process like this?

- Grain bags (long plastic sock, but only single use)
- Strawberry farming
- Irrigation pipes
- Watering systems just get replaced on the farm
- Illegal to bury or burn it so farmers have no other choice but to use them
- Solution is to find a home for that plastic
- Make it easy and cost effective for the farmer
- Most plastics have labels

Who benefits from closed loop processes such as creating eWood or melting plastics to cast other products and are there any potentially negative impacts?

- The environment benefits because plastic is not finding its way in there
- You can harvest plastic from the ocean and put it in this machine
- Volume that's bringing out of the ocean they do not know what to do with it, they are demonstrating the possibility but need to make it commercial

- Can put machine on boats
- Can stop plastic from going to a landfill
- Landfills can be mined in the future to retrieve plastic
- Everyone is all for recycling until it gets too expensive
- Their technology works to save the cost of recycling

What is an example of a value-added product and how can this be accepted as a preferred solution to other waste management processes?

- Noticed plastic left on farms after different processes
- Material needs to be sorted to be cleaned-- makes beads and pellets
- Very tolerant to contamination -> produce hybrid plastic that comes out
- International implications, infrastructure for redeeming plastic from environment and converted into useful products for communities.
- Paper coffee cups, cigarette butts, polymer based clothes, old tents, even carpet or nylon, becomes more than a plastic recycling process

What happens if the recycled plastic is too contaminated (>10%), will this result in a waste product that is non-recyclable? Is it often that waste is too contaminated for use?

- Too much paper in the mix
- Barely degraded plastic can be repolymerized
- Targeting what is economical

Who are the main proprietors that generate applicable waste for a process like this?

- Everyone is recycling, everyone needs to do what they can
- Technology will allow people to do more
- What is produced needs to fit the purpose otherwise the process won't work
- Plastic products can reach other communities
- Grain bags, irrigation pipes, water systems (agricultural), can go into multiple sectors
- Beneficial contaminant
- To make it commercial-> large volume waste out of the ocean. Machine could be mounted on the ship and uses power generated by the ship

What about oxo-plastics? Acceptable contaminant

Enemies to the proces: aluminum (metals)
Not designed to handle pvc in high quantities

-\$300 a ton (landfill) to a few thousand dollars a ton

L: Waste Management Notes - Metropolitan Waste and Resource Recovery Group

How have your recent actions been successful in limiting/reducing waste and how do you plan on following up with them?

- Collaborating contracting, support networking
- Main strength is bringing people together and discussing their ideas
- Strategic plan and support upfield and downfield regarding policies and programs
- Research and identified that organic material does not belong in a landfill - will turn into greenhouse gas
- Educating community on organic material
- Multi- unit development (muds)
- Muds in Melbourne are extremely high
- Illegal dumping and litter
- Catchment work around litter hotspots
- Identification and support on what is a hotspot, how to improve and manage a hotspot
- Strategic plan, fogo, C&I, litter stuff (big 4)

Some of your current projects aim to reduce the pollution from already generated waste (tossed cigs, food wrappers, plastic bags), but what plans do you have to prevent waste generation in the future?

- WM like logistics
- There is a plan put in place for bins, you know what to do with your bins when you get them
- Service that operates and is well thought out, people need to feel its worth paying for
- He prefers to work on bringing people together and finding resources that make it easy
- Need to put bins where people expect to see it
- People are responsible for the world they create, bought pollution/slavery
- Each community deals with it in their own way
- Not a highly regulated community, but districts run their bins differently
- Parks aren't required to have bins (Parks Victoria does not want bins)
- Community does not realize there is a litter problem because litter workers go through over night
- Victoria has highest litter fines nationally (if not internationally) Whose job is it to enforce this?
- Regulation, systems, community engagement
- Litter is everyone's job
- Recycle bin colors are not uniform
- Costs a lot of money to put bins in / change color
- 90% of litter occurs extremely close to a bin
- Not a small number of people that litter a lot, its high population that litter very infrequently

How do your current plans for the future differ from plans proposed (and taken) 5 years ago?

- Resurge in changing to a circular economy
- Australia realized that it needed to local base for remanufacturing materials (due to China)
- Utilizing waste to make new product

- Education and network events for them to see (roads that are made from recycled material that's also cheaper)
- Need to become weary of trading internationally
- Building local economies and supporting those with disabilities
- Waste reduction is becoming more looked into
- Need to look at consumption issue, reducing waste in the first place

Plastic tax

- People have a gift for getting around taxes
- Inherently it is a good thing
- Country doesn't like taxes
- Need to have very high agreement for it to occur - need to ensure that the community behind it has very high agreement
- Need fines and regulation

What do you believe to be the largest pending issue in the next five years?

- Hard getting agreement on how things are made, who's responsible, how it gets back
- Doesn't have an answer
- Stimulate more growth in manufacturing
- Manufacturing bases are gone, no cars/shipping
- Need international change
- Locally - container deposit scheme has a lot of opportunity
- People are not even aware of how big the problem is

Other than SV, who else has been pivotal in working towards a zero waste community?

- Victorian govt, councils
- Need to be conservative
- Good govt action happening
- Great community groups: ecocentre, Scouts Victoria
- Groups need incentive, it's a risk to change their ways
- Things may be profitable but not ethical

Have you noticed an attitude change towards proper waste management in the last few years caused by increased attention to environmental health?

- Wants to say yes
- People buying greener houses, smaller cars, solar panels (this is more economic and not environmental)

Leaving us with a sense of hope <3 conversation has gotten bigger

How have your recent actions been successful in limiting/reducing waste and how do you plan on following up with them?

- -Planning for metro region, support network, collective contracting
- -Sust Victoria and the EPA

- -Main strength, bringing people and ideas together
- -Drive to reduce waste going to landfill -- organic material shouldn't go into landfill
- Some of your current projects aim to reduce the pollution from already generated waste (tossed cigs, food wrappers, plastic bags), but what plans do you have to prevent waste generation in the future?
- -Waste in multiunit areas --increase in multiunit areas. (muds)
- -Done work around litter hotspots - what is a hotspot and how do you measure it?
- -commercial and industrial section (c&i)
- -Stimulating cultural change is most important for Stan
- Issue about mainstreaming change → accessing ppl that don't have the drivers that we share, how do you make it low risk/high benefit, cost effective etc.

How do your current plans for the future differ from plans proposed (and taken) 5 years ago?

- Logistics and manufacturing logistics. Bin in front of the house, specific states things accepted, there needs to be a structure
- Local groups see it on the “ass end” and they do lots of cleanup. Trick is stopping it in the beginning
- How do you bring ppl together to be collectively following the regulations?
- Proper amount of bins- give ppl the opportunity to do the right thing
- Bins aren't given services (like electricity) seeks contracts. Capitalism system so that rules it.
- Local government picks up on the tab for litter cleanup - millions of \$
- You can't keep up w it. When you do, people don't think there's a problem because there's no consequences
- Party mode, people don't think about litter
- Victoria actually has the highest litter fees internationally
- Many components to the answer - adopting social responsibility for litter
- Geographically determined -which litter services take what. Varied contracts, not a lot of unison.
- Recent agreement on what color waste bins should be
- 9/10 litter sometimes (not a lot of ppl that litter a lot)

Have you noticed an attitude change towards proper waste management in the last few years caused by increased attention to environmental health?

- Yes - within some groups. Always been a % that are aware and another group that isn't. Bell curve is the classic example
- Need better than minimum
- Look for commonalities

How do current plans differ than 5 yrs ago?

- Resurgence of circular economy
- Same wheel spinning
- Manufacturing capacity
- Utilizing waste materials to make new products

- Bumper seat for example difficult to reuse
- Partner with manufacturers

Plastic Tax?

- Financial stimulus is a good thing but ppl can get around taxes
- Australia doesn't like tax things - high agreement needs to happen for it to occur
- Large community support needed

Biggest pending issue in 5yrs

- Hard getting world agreements, need some for how things are transported
- Issue still evolving

Who else is pivotal in working towards zero waste?

- All sectors need to be involved in order to accomplish
- Part of the power is you want synergy and alignment
- Bad behavior when people don't care and drag their feet
- He only invests in green funds

M: Waste Management Workshop Transcript

Education- what programs are in place

Richard Thomas

- didn't have resources to go out to schools to educate, small business didn't want to compete

Olivia oneill

- the kids learn a lot, can't really say it's successful
- Kids are happy and teachers are happy but there is not hard evidence
- Just have to have hope in the next generation
- Parents need to change their ways

Ross Headifen

- When kids enjoy cleaning up at age 6 will they still take part when they're 16

Julien (Bayside)

- <https://www.bayside.vic.gov.au/waste-wise-webinar-series>
- Recycling education used to be provided by the recycling companies as an incentive to get the contract from Councils. This was when Councils were paid for recycled material, only 2-3 years ago.

Cecile

- Play a game at ecocentre where they learn where to recycle things
- Changing the systems and giving kids ownership of that

Neil

- Streets2Bay

Ross

- Need bin standardization, common colors

Guy in car

- People get careless when they are not at their own home, they feel anonymous

John

- Different councils have different regulations on their bins so people don't know when they travel out of their own region

Fam

- People behave so different when they are not at home
- People in Airbnb do not care

Olivia

- Standardization is key
- Municipal bins need to line up with the commercial bins
- Common colors
- Goes back to education, if a child learns that yellow is a certain type of bin, they need to grow up where the yellow means the same color their entire life

Car guy

- Need to remove barriers
- Standardization
- Make it easier at the source, educate at the source

Fam

- Grew up with recycling, needed glass to be separated and taken to a specific place

Car guy

- Reward program, well sorted waste

Julian

- We probably have more opportunity to have standard bins around the foreshore, as all foreshore Councils would have to agree on a design (or have this imposed on them). Currently, each Council chooses its design of bins, and Urban designers can be fussy about looks. I agree Foreshore bins would probably be co-mingled as we've learnt people behave differently at the beach. Of course, these cost more to separate

Neil

- There were not bins in his little country town

Fam

- I think the same happens at Flinders St station; there are different bins but people do not look at which one they throw stuff into, especially when they are about to board their train

Olivia

- Need 100% closed loop
- Things wouldn't end up in landfills if they were not produced!
- Starts with production

Car guy

- Government needs to take a lead
- Their technology can handle any type of plastic!
- Not high quality like some products would be looking for
- Timber replacement products, car parking bumper stops

Julian

- On separate glass recycling, Victorian Councils have to introduce a household kerbside service for this by 2027. However, our Container Deposit Scheme will be introduced in 2023. So, some Councils will see how the CDS reduces the need for glass recycling bins in households before introducing a new service. It may be that CDS drop-off spots may be enough.

Ross

- Making plastic benches isn't going to solve the problem it just delays it 10 years

Car guy

- Only a certain number of park benches you can make

Fam

- Less than 10% of plastic can actually be put in roads

Uh oh there is tension

Car guy leaves

Olivia is very passionate about educating the children

Charlie:

Youth Education

Richard: They had an incursion program, but they found it difficult to implement because of costs. They found it more effective to make an online platform so that teachers can teach kids themselves

Neil: One of the difficulties is that there aren't that many programs that have had a long term evaluation (hard to track if there has been a shift in behavior)

Olivia: Pretty much aligned with Neil. From reviews it seems like they're doing well, but there's no easy way to really measure how it's been successful. Adults aren't very good at recycling, and it could be because recycling wasn't a part of their curriculum. There's no stats to prove what's more successful than others. Kids can teach their parents better practices, and are also the future generation

Ross: The younger ones are more enthusiastic, but kids 9-12 are less engaged, and harder to get them involved. If they're super keen when they're six, will it wear off when they're 16?

Ross: We don't run a program, but I listen to a podcast from whales. They have very little litter there because they drive home the importance of recycling

Cecile: We work on a series of programs to change the systems in schools that have been working really well. They change the habits in classrooms and allow students to conduct their own little audits around the school to get them engaged. They've seen litter reduce in those schools, and people will bring these games and practices back to their own schools / communities. Getting kids engaged and giving them ownership is very important

Neil: Over the past couple of years I've been doing litter audits with the scouts. Many said they were amazed by how much plastic there was in the environment when they started looking for it, and make them more engaged in the issue. The kids are generally age 13-22.

Bin Standardization

Ross: Absolutely we need bin standardization. It's not going to happen overnight, it'll be a multi-year process to get people to change their habits. If there are 2 bins next to each other, one with an open lid and one with a closed one, the open one will be overflowing and the green one will be empty. Increasing bins is only part of the solution

Peter : People act differently when they're away from their home and their community because they can act anonymously, so they feel they can do what they want

Fam: People who visit air B&Bs for example don't bother with recycling and stuff, and it's a big problem

Olivia: Bin standardization is key. People get confused on what they're supposed to do with differently colored bins and end up doing the wrong thing. It might be expensive, but the alternative is worse. Standardization is a big step in the right direction so it's easier for people to learn to do the right thing

Peter : It's a matter of removing as many barriers as possible, and bin standardization is one of those barriers. It's a cost, but it'll cost more if we do nothing. The system has promoted a bit of laziness at the source. Doing whatever we can to make it easier and educating at the source is key. It's a long term strategy, and bin standardization is an easy first step

Ross: In whales the government is on board with promoting recycling. If there's a standardization of bins and a lot of promoting it, it will make a difference

Olivia: If there were 5 buckets stacked next to your waste bin saying "cans", "plastic", etc it would be a lot easier for people.

Separating glass

Fam: I'm from northwestern europe where they already separate recycling. They are up to separating 5 different waste streams at home. That may not work in australia, but it shows that people can get used to this sort of thing when it's introduced slowly

Ross: If people get the messaging from multiple different avenues it's much easier to bring people along

Peter : A reward program of some sort in the long term would be great. Giving a value to the waste would get people to care more. In the future if bins were audited in some way and rewards were given to those who did right it would be an excellent step

Cecile: A container deposit scheme works well in other parts of the world

Fam: I agree, and having them linked to grocery stores is particularly good because people can coordinate returning bottles and stuff with their shopping

Cecilia & Olivia: Making it clear how packaging can be recycled is crucial. There needs to be guidelines for manufacturers and how they need to recycle the packaging they produce

Peter : Introducing regulations is important, especially since there's so many types of plastics. But it cannot happen unless the federal government gets involved and works with the major manufacturing companies

Ross: The government has talked a lot about a circular economy, but I've yet to hear any actual initiatives from them

Fam: I agree, and going back some form of incentive would be very helpful

Ross: The industry is full of smart people, so if a roadblock is put up for them (banning some form of plastic, for example), they'll find a way around it so in some cases incentives are not necessary.

Peter : If a marketing team is able to show that their product is better in terms of sustainability, a lot of people will go with the more sustainable option. That could be an incentive in it of itself

Landfills:

Ross: There's 4 levels: Refuse, Reuse, Recycle, and dump it. I'm working in Level 4, Peter is working on level 3. In that sense, they're working together towards the same issue, not competing. Plastic doesn't necessarily work as a circular economy, it's a pigtail. The government needs to understand that making a park bench is only delaying the problem 10 years

Peter: Our technology can recycle a park bench and maybe improve the quality of the plastic for a time. Upcycling plastic into something useful that can still be recycled at the end of its life is important

Julian: What are people's thoughts on using recycled plastics in roads, for example?

Peter: A lot of people see it as another landfill. The industry that's making those roads needs to be responsible for what happens to the plastic when the roads need to be dug up

Fam: I've done some research on plastic roads, and they actually can't use that much plastic in total. There's also a concern on what happens to the plastic roads in terms of microplastics

Ross: While people are excited about it, it's not a permanent solution. What disaster could be caused by these roads later on down the road?

N: Waste Management Analyzed Data

[Waste Management Analyzed Data](#)

O: Microplastics Notes - RMIT Plastics Lab

Julia's Notes

11/11

Graeme Allinson

Environmental Chemistry background

Meeting Notes:

Q: What about microplastics drew your attention - why important?

A: Scanning literature, being aware of the issues that are popping up. Had a couple of students do internships with the EcoCentre, Neil invited him to go to a stakeholder meeting to look at potential projects that could be funded by the state government. Pitched plastics lab at RMIT. Provided the community with information about what microplastics are.

He is interested in whether microplastics are transporting chemicals, if ingested are the organisms affected by the chemicals

Q: thoughts on strategies to raise awareness of microplastics issue (research and community)

A: Most people are aware. General advice for groups to keep pushing. (Neil chimes in - chemical contents are the key to prompt concern, need evidence on the side effects, how does it affect the food chain.)

Graeme: literature shows that invertebrates (prawns) stick the plastics in their guts. Bad when it goes from marine species to the person. Oysters could definitely store microplastics in their tissues as well. Getting the issue discussed in schools is important as well. More funding would be beneficial as well.

Q: What policy change could the research inspire?

1972 is when microplastics were first identified. (US and UK) more that the issue disappeared for 30 yrs and only effectively picked up in the past 10 yrs so there is alot of new research being published.

-Single use plastic items

-Straws

-Bags

-To maybe pet bottles to return to recycling

-Fragments come from bottles, degraded plastics under the sun

-Beer bottles even

Encourage a wider discussion around more recycling whether it is recycling into plants rather than closing loop - have to start somewhere

More conversations needed. Revisit. Source tracking could be helpful for debris.

Look for urban hotspots and what can be done to capture materials in those environments

Q: Positive changes thus far?

-No more single use plastic bags in grocery stores

-Hilton by double tree (students work with them) sprung off international study program. Looked at their plastic waste management plan

-local shops and retailers working on the issue as well

-student working on plastic management policy during festivals

-if bulk plastics were reduced by 90%, reduces number of small particles having an impact on organisms

Q: Whats the point of oxo degradable?

Replacement. Will break down quick but in reality they break up. Feels like plastic, acts like plastics.

John's Notes

<ul style="list-style-type: none">• What draws your interest in helping solve microplastic issues?	<ul style="list-style-type: none">• Being aware of the current issues popping up in the newspapers and working with interns and the EcoCentre
--	---

	<ul style="list-style-type: none"> ● Worked with professors in Japan to try and bring over their efforts working against microplastics ● Something that had been growing for a while and he got the right opportunity to do something about it ● Working on whether the microplastics carry chemicals <ul style="list-style-type: none"> ○ If yes are they able to be transferred to the organism that the plastics end up in ●
<ul style="list-style-type: none"> ● Do you believe there are policies or strategies in place that may eventually solve this issue? <ul style="list-style-type: none"> ○ Are there any policies or strategies not yet implemented that you think would be effective? 	<ul style="list-style-type: none"> ● Researchers don't know what microplastics are, they focus on their work ● Community might not know exactly what microplastics are but they might know plastic is an ongoing issue they are currently facing ● Chemical contamination on the microplastics might be enough to give the issue a public face <ul style="list-style-type: none"> ○ Could bring solid evidence to microplastic's effect on the food chain ● Literature showing muscles/prawns ingesting microplastics and entering the food chain that way <ul style="list-style-type: none"> ○ Consumption by fish or direct consumption by fish ● Getting the issue discussed in schools would be very effective <ul style="list-style-type: none"> ○ Getting children to understand ● More funding would be helpful to the cause <ul style="list-style-type: none"> ○ Could also drive politicians away if they know there are supporters in favor of the solution
<ul style="list-style-type: none"> ● What other work can be done to solve the issue, or to draw more attention to it? 	<ul style="list-style-type: none"> ●

Could lead to positive policy change in the future?

- First evidence of microplastics was in 1972, so it is not a “emerging issue” (UK/Rhode Island)
 - Issue was clouded by the general marine debris issue and will be hard to separate from that
- Single use plastic item use (straws, plastic bottles, etc) need to be replaced or recycled

- Could start an initiative to give rewards on returning/recycling bottles
- More conversations around river habits would drive progressive change
- Working on fixing the behavior of students/teenagers when dealing with plastic waste
- Developing land that has water from other rivers usually contains lots of plastic waste and other things lost/tossed in the river

Recent policy changes showing positive change?

- Change in use on plastic bags
 - Companies happy to enforce as it increases profits
- Students working with the Hilton group studying other groups plastic waste management policies/strategies
- Retailers want to work on this issue (as long as it doesn't cost them more)
- One of his students is working on a policy for use of single use plastics during festivals/fairs and the individual kiosk owners will have to abide by it
- Reducing the amount of plastic around the bay, simply because it ruins the views/beauty, will also result in a decrease in microplastics
- Plastic is too useful a material to “disappear” soon
 - Using glass in favor of plastic is not a viable solution
- Oxodegradable plastics might be better for animals that ingest them as they breakdown faster instead of remaining in the organism for life

P: Microplastics Notes - Love our Street

Julia's Notes

- What draws your interest in helping solve microplastic issues?
- Eyes open to beautiful nature -> geography passion, retired teacher
- Volunteer groups. Goal to reduce plastics, has worked w Neil at Earth Care
- Heads of the bay are narrow so we know it comes from urban areas
- Started Love our Streets as a result - education and normalizes social responsibility of picking up litter

Raising awareness:

- 10-20% people wont come along with you
- You need people that are in the middle, slow process
- Everyone counts, education and research is needed
- Person to person is most effective yet slowest
- Children education is very important
- Straw no more campaign, war on waste

- Do you believe there are policies or strategies in place that may eventually solve this issue?

Need legislature

Container deposit system? Glass, bottles, cans, every state a part from Victoria had a way to implement system now has announced that by 2022 there will be a container deposit scheme
Single use bags within supermarkets
Keeping the scheme away from manufacturers - no trust that they'd try to benefit the environment
Will take legislative change

What other work can be done to solve the issue, or to draw more attention to it?
-Look after marine life, connect why microplastics is an issue

Hailey's Notes

What draws your interest in helping solve microplastic issues?

Long term interest
Retired teaching, started volunteering at Beach Patrol Australia
Recognizing impacts on creatures
Discussing issues with different volunteer groups and expanding knowledge
Neil started Earth Care ~30 years ago
Heads of bay are narrow so pollution source is easily tracked
Started Love Our Streets to get litter out of street, raise awareness, normalize cleaning

Do you believe there are policies or strategies in place that may eventually solve this issue?

Legislative change is probably the only thing that will make a shift
Need government support, not just encouragement
Beach Patrol Organization has been pushing for container deposit system
2022-23 a container deposit program will be introduced
Campaign against single use coffee cups
You can encourage people to bring their own bags, but until the grocery stores implement rules, change won't really be made
People will still pay for single use bags
Consultation now for people to keep the container deposit scheme out of the hands of beverage companies, so they can set it up to fail
They would not run a scheme that would be beneficial to the environment
Use the power of people and also creatures

- dolphins

What other work can be done to solve the issue, or to draw more attention to it?

Educating, research
Need people who will help spread awareness and get other people involved
COVID has caused a regress
Takeout only has caused an increase in single use plastic
Power of children is a wonderful thing!

Drag their parents along to things which encourages parents to get involved
Person to person is powerful but slow

Education and research is huge on solving this problem.

Getting children involved is very affected because they will go home and share with their parents which inspires them to get involved.

Legislative change needs to be made or else progress will not be nearly as much as it could be. Govt support is needed, not just encouragement.

Connecting the issue to marine life and creatures

Q: Microplastics Notes - DELWP

Hailey's Notes

What draws your interest in helping solve microplastic issues?

- Circular economy policy
 - Plastic bag ban has made this a more pressing issue
- Container deposit scheme in the works
 - Refunds on bottles to encourage recycling
- The bay is extremely important to most citizens
- Litter is one of the key areas of the plan
- Marine debris is a threatening process under the National Bioconservation Act
 - Due to its harm on nature
-

What types of legislation do you think is necessary in order to solve this problem moving forward?

- More and more people are willing to make changes to avoid plastic use despite its usefulness
 - Some things need to be plastic or mixed material
- Lots of things only get one use and then are just sent to landfills
-

What other work can be done to solve the issue, or to draw more attention to it?

- Need good data to tell a story capable of moving the public
- Good infographics show that litter dropped in the streets ends up in the bay
- Education and networking is the main way to cause change
 - Majority of people smoking didn't know their cigarette butts were plastic and were breaking down

Oxo Degradable plastics:

- Definitely an issue
- Not sure what the current thoughts on oxodegradable plastics are
 - Plastic bag ban took precedent as they can harm the bay before they break down
-

John's Notes

What draws your interest in helping solve microplastic issues?

- Department has a circular economy policy
- Become more prevalent of an issue
- Plastic bag ban - > realized community is concern
- Container deposit scheme
 - Bring back plastic bottles, cans, etc. to get refund
- Environmental plan that lays out goals for next 10 years
- Litter is one of the key areas of the plan

- How Litterwatch Victoria came about
- Marine debris is a threatening process under the National Bioconservation act due to the harm it can cause on the environment and natures

What types of legislation do you think is necessary in order to solve this problem moving forward?

- She believes many people are willing to make changes
- Many things are made of plastic that do not need to be
- Many things just get used once and are sent right to landfill

What other work can be done to solve the issue, or to draw more attention to it?

- Data is important, good data can tell a story
- Stickers in kfc drive through to create a connection between the wildlife and the rubbish
- Education
- Coordination between groups/organization

Oxodegradables:

- Their team did not allow any degradable plastic bags, even compostable biodegradable plastic bags are a problem and risk to wildlife

R: Microplastics Notes - Tangaroa Blue

Charlie's Notes

What draws your interest in helping solve microplastic and marine debris issues?

- Used to be a dive instructor and was very concerned with the amount and variety of litter she found
- Made a datasheet to record all of the litter that she found

What types of legislation do you think is necessary in order to solve this problem moving forward?

- A very complex issue, there's not just 1 thing
- Vital thing is that every ocean is connected, so even if Australia had a good plan (it doesn't) they could still have a marine waste problem. Needs to be a international thing
- Can't rely on legislation
- Need to target it from a consumer, manufacturer, and legislation
 - Make sure manufacturers are giving good information to consumers
 - Need leaders in manufacturing to make good products, not just cheap
- Focus on scaling down plastic usage ,can't ever ban it

What other work can be done to solve the issue, or to draw more attention to it?

- Working specifically with the plastic resin pellet
- Operation clean sweep: have zero plastic resin pellets used in industry (worked with EcoCentre)
 - Basically good housekeeping processes
 - Been difficult to get all the players, especially the bad polluters, to get on board
 - Will be included in National Plastics Plan
 - Not mandatory, but probably should be (government would need to take over running it)
- Important to find industry champions within each sector to take it through their own networks
- New EPA program can be proactive in finding organizations with bad environmental practices, even if they haven't had any offence yet

Australian Marine Database

- Haven't seen a decrease because the population keeps increasing
- Database is used to monitor source reduction projects
- Marine debris signature varies a lot depending on where you are
- Helps to determine how items need to be tackled (local, national, etc.)
- Container deposit scheme in new south whales resulted in a massive decrease in those types of litter

Encouraging people to volunteer

- The issue itself has gained a lot of momentum, people are more aware of them problem than ever
- If all we do is clean up, that's all we'll ever do

- Finding people who are willing to clean up isn't a problem, it's finding people who want to collect data that's the difficult part
- EcoCentre has made an effort to use the same terminology as Tangaroa blue to make analysis easier

Biggest challenge

- The conservation sector is generally the least funded, so there's a lot of competition among different organizations to get funds
- Lack of coordination on a national scale is a massive challenge, needs overarching oversight
- Some process to coordinate which groups are cleaning where and who's getting funding
-

Julia's Notes

What draws your interest in helping solve microplastic and marine debris issues?

-Was a dive instructor

-Concerned by the amount of plastics along the coastline and the variety of marine debris and sources in the national park

-Data sheet started - understanding where it is coming from and how to stop it

What types of legislation do you think is necessary in order to solve this problem moving forward?

-complex issue

-95% offshore sources, international govt needs to agree, cant rely on legislation, only popular things tackled.

Consumer scale

Manufacturer/supplier scale

Correct info to consumers - no brainwashing, need to be held accountable

-Use plastic for its best application - keep out of the landfill

What other work can be done to solve the issue, or to draw more attention to it?

-plastic resin pellets, tackled Cleansweep (in US) now international. Victoria govt funded now.

Engaged industry, essentially good housekeeping practices, has been difficult to get polluters to agree. National Plastics Plan next year.

-to be made mandatory the govt needs to take over running it

-fine if controls arent in place - will be a massive driver for others to take up Cleansweep.

Population keeps increasing -> more stuff -> doesnt offset the effect

Data measuring impact:

Source reduction projects, look at data. Guide community to set up projects to tackle those items. Finding a community solution that works that can realistically be put in place. Container deposit scheme -- huge impact.

How do you encourage people to volunteer?

-Issue has created a lot of momentum

-There's plastic in the ocean, people want to get involved

-"If all we do it clean up, cleaning up is all we do."

Finding ppl to clean up - no problem. People to collect data: more difficult.

John's Notes

What draws your interest in helping solve microplastic and marine debris issues?

- Concerns built up in 2004 on plastic building up in areas along the coastline
- Started collecting trash/litter and wanted to record their long term collections
 - Wanted to discover where the waste was coming from and how they could stop it
-

What types of legislation do you think is necessary in order to solve this problem moving forward?

- Multiple issues combined, can't just fix one thing
- In remote areas (up North) a lot of the litter found comes from overseas
 - The only solution for this would be to have all governments work together on one legislation
- Three scales
 - Consumer scale (more aware of what they're buying)
 - Manufacturer (giving good materials and good instructions on how to properly recycle)
 - ?????
- Scaling out or reducing unnecessary plastic (flat out ban would be overboard)
 - Use plastic for its best applications not every application
-

What other work can be done to solve the issue, or to draw more attention to it?

- Work done around a particular microplastic
- Operation cleansweep made to eliminate plastic pellets
 - Works with EcoCentre
 - Came from US but got the contract to bring it international
 - Hard to get all the institutions (especially the bad polluters) to join this plan
- National Plastics Plan to be released in the near future
- Really important to have industry champions to take ideas/issues through their networks

- Work with operation cleansweep is not mandatory
- EPA can ask for evidence of control over pollution controls
 - If they find evidence of harm to humans or the environment they can deliver a fine
 - This act is put on hold for a year

Australia Marine Database

- Population is increasing so naturally the amount of plastic loss to the ocean will increase
- Marine debris signature/concentrations will vary depending on where you are along the coastline
- Some items have to be done locally and some nationally
 - Need strategies specific to items and areas
- Since container deposit schemes there have been measured positive impact on environmental health

How do you keep volunteers motivated

- In the beginning people didn't know the issues, people want to get involved but often don't realize there is a problem
- Finding people for cleaning is never a problem, finding people willing to collect the data

Conservation sector is the least funded in all of the industry

- Currently there is a lack of coordination on directing resources
 - Money is being wasted on cleanup equipment from lack of communication

R: Microplastics Analysed Data

The analyzed data from the stakeholder interviews can be found in this spreadsheet:

https://docs.google.com/spreadsheets/d/1oXC_tjek9jXsFN0dIA_hi3_8z4kcRU31r00h9F0HYac/edit?usp=sharing

S: Microplastics Focus Group Notes

Microplastic Workshop Notes

December 1st, 2020

Notes:

- Carmen replacing Heidi Tait from Tangaroa Blue, would like to be involved in future meetings as well
 - Scouts Victoria was invited as well but could not attend this workshop (future invites a good idea)
-

Objective: Bring different stakeholders together to address issue of microplastic pollution

- **Jill from Love Our Street**, 50 community groups that do beach cleans or parks; deals with microplastics (nurdles), can now commence despite COVID, weigh and sort the gather data, 28 categories of plastic items. Data collected by category -- items targeted specifically. Raise awareness and advocate for changes (container deposit scheme, next is coffee cups). Targeting low hanging fruit. The more members, the wider the vision and ability to catch what is happening.
- **Neil Blake, EcoCentre**, Wants everyone to be conscious that they are connected to the bay. Aiming for multiple sector communication (including academia) talking rather than exchanging fb posts. Developing a relationship for ongoing dialogue, trust and relatability. Increased confidence in the community.
- **Carmen, Tangaroa Blue Foundation**, Australia - wide. Cleanup events focused on marine debris. Large database in the main project -- invitation for groups to submit data to their database. Use in putting policy changes into place. In terms of microplastics, operation clean sweep (us initiative to aus). Goal to achieve zero-pellets. Putting in place with several organizations and looking to expand. Reef cleaning program working with Aus Plastics Organization -- they focus on microplastics specifically. Creates a picture of what it looks like.
- Bosnac wanted to create their own method - didn't want to work with Neil.
- **Fam Charko, EcoCentre**, researches microplastics in the environment. Yara river report about to be sent out. Waiting for the environmental minister to launch it. Collected 80 factory data points. Working w Carmen. Does nurdle surveys in Victoria - rated 1 to 5 in severity of pollution
- **Graeme Allinson, RMIT**, works in plastics lab - victoria state govt funded. Provides a facility for identifying polymers in microplastics. Seal vomit has recently come their way for analysis. 50+ student volunteers. ½ in Port Phillip ½ in Fiji.

1. **Discussing single use plastics, how to quantify and reduce. Contribution to pollution and representation in trash**

- Neil: Cigarette Butts. Filters are single use, not biodegradable. Tax generated income from selling cigarettes.
- Tangaroa: One of the most pervasive. Need to chunk things into baby steps to make an impact in councils. Projects that are too big don't do well. Hoping for that change as an end goal. Needs to be addressed at industry level
- Jill: Agrees. Data by item indicates cigarette butts are the most abundant. Not good solutions (bins outside etc), COVID-19 more single use cups. Without regulation we will slowly be picking at things 1 by 1. The pace isn't keeping up. We need broader changes in package and materials before a shift will be visible.
- Fam: Agrees. Biodegradable filters exist but aren't used. Needs to be a push for them. Networks need to work together
- Graeme: cost or regulations around human health. Filters aren't necessarily thought of or monitored health-wise.
- Jill: City of Bayside instituted a ban on smoking on all beaches. Trying to stop cigarettes being smoked around sanctuaries and decided to expand it to all beaches. Mornington Peninsula Shire campaign (Josie's) Only Butt Campaign. Wants to see a larger approach
- Carmen: Important to have research and data behind you. This is the problem & this is the proof. Each small organization needs to come together under one banner to say that this is a huge problem w information to support that. Does Not know of any organization can do that - we are all nonprofits.
- Neil: We need to agree on solutions. So next steps. Cigarette butts are an issue but no messaging on a specific solution. Product stewardship and regulation needs to happen.
- Jill: Is that part of the need for a broader push? If we are looking at multiple components should we be focusing on objects one by one
- Neil: Disagrees. Smoking generates the most. Needs to be addressed as single items. Not a huge priority for the govt
- Jill: could be a component of a larger strategy. Pursue alternatives. Need to have an overarching approach. Disagrees w Neil
- Neil: United voice, individual issues. That is achievable.
- Fam: Larger advancement in groups. Groups tackling the issue together and seeing the value of collecting data and cleaning up. Collecting data is what implements policy change and makes them effective. Next steps should be putting everyone together and creating a united statement to make an impact
- Carmen: Surge in other organizations joining them and their workshops. Want similar projects. Nationwide can also have an impact. More powerful when it's nationwide rather than local. Trend should continue.
- Jill: Who does the organizing? Who brings us together? We had a push to create an alliance and it brought together 30 groups but it couldn't be translated into action. @Fam we are nonprofits and volunteers , we need funding. BARRIER
- Advocacy role should be independent and funded.
- Neil: Agrees. Desirable for an umbrella organization. Need transparency and accountability. Challenge is deciding who will put their hand up to take a leadership role.
- Fam: RESOLUTION Could be a council system of multiple people

- Neil: Cultural groups in different regions that can be involved too, all about wider community focus
- Tangaroa Blue has a different focus compared to port phillip
- Carmen: Yes, but we are conscious of regional differences and our databases can show what comes from land vs overseas. Up the cape is a different landscape (90% overseas) versus the south. Bubble tea rubbish is in city areas. 4 pieces of plastic for one serving of bubble tea. Source reduction project locally there. New brand of chicken packages - New Guinea is the origin. Fascinating stories but the data informs us rather than assuming
- Fam: Strain the drain project results?
- Carmen: On our website!
<https://www.tangaroablue.org/resources/reports-publications/reports/national/>
- Neil: What if we have a day where local projects can present findings together → unity
Then a where to discussion

2. Strategic Communication.

- Fam: Raising awareness is a testament to how quickly people get on board and become engaged in the topic. 90% of Melbourne people aren't that aware so the education needs to continue especially w young people and kids. The EcoCentre educational team is important. Only awareness isn't enough anymore. Look at issues versus goals, needs more than just awareness. Do more with data and create change.
- Jill: recycling bin uniformity. Same color? Come on!

3. Oxo plastics - any insights?

- Neil: haven't seen evidence for why plastics need to be oxo. False perception of biodegradable. No more oxo plastics from manufacturers. Shift to recyclable plastics
- Carmen: on the fence. What damage are they causing? How degradable are they? Would rather go with something natural.
- Fam: Agrees
- Jill: Mislabeled is abundant and green washes. Infuriated by terms that con ppl. These items have consequences.
- Fam: Yes!! Why does the industry deceive and make a fool out of people. There is no Planet B bag -- the bag was not reusable! People want to do the right thing but this is misleading people and there is no regulation on the term. They get away with it
- Neil: Yup. That sums it up. RMIT?
- Graeme: Chemical structures of polymers. Metallic ions can absorb UV and split, you will only see PET. Same material but links that break easily. Has additives to absorb and transfer energy to the main polymer and breaks down.
- Neil: campaign needs a scientific method to prove it.
- Carmen: Plastic doesn't break down, it breaks up. It's still here! We stress this
- Jill: Some mention of the himalayas?

Where to from here?

Issues papers. Build relationships between organizations.

Neil: whole day workshop?

Purpose: Encourage collaboration past our time together

Jill Sokol - Started the Love our Street within Beach Patrol, still Victorian based. Working to clean up beaches, parks, shopping strips (public spaces). Deal less with microplastics unless they deal find nurdles on beaches. Groups range in size from 8-10 people to larger groups with 50-80 people. Quick cleans on bottles/glass containers, always increasing the amount of litter categories they pick up/track. Looking to advocate for change and deal with low hanging fruit when it comes to single use plastics. Recently dealt with a local tennis court that was allowing plastic to leak into the environment.

Graeme Allinson - RMIT: An environmental scientist at RMIT. Leads the plastics lab. Works to identify polymers in microplastics. Uses student volunteers. Half the volunteers work around port phillip and the other half works around Fiji

Carmen Torraca - Tangaroa Blue: Australia wide, hold clean events focused on Marine debris. Big project is the marine debris database that congregates a lot of smaller groups by collecting their data and using it as a whole. Plastic bag ban was a result of their workshop. Operation cleansweep program, originally an American operation that was implemented in Victoria and now is expanding due to its success. Currently working towards zero pellet loss. Reef clean program focuses on the great barrier reef. Focusing on cleaning up specifically microplastics on beaches.

Single Use Plastics:

Neil:

- Biggest one is cigarette butts, definitely single use. Tobacco manufacturers have not had motivation to produce a material that is not plastic.

Carmen:

- Cigarette butts are the most pervasive, never seem to go away. The end result we'd all love to see is a filter change, however, it does not seem like an easy change.

Jill:

- The data on number of items collected from street cleans, cigarette butts far outweigh the rest of items. Could end up with 3000 butts in an hour. In one clean up that lasted 11 hours, 40,000 butts were collected. Even though butts aren't as bad on beaches, they still are a very large problem. COVID has resulted in lots more single use plastics from places like coffee shops and such. Forever going to be trying to pick off issues one by one, need to push for much broader regulation change within packaging before we can observe a large shift.

Fam:

- Tap has to be turned off, especially with cigarette butts. The amount of energy put in to cleaning up after cigarette butts is immensely disproportional to simply creating a solution that would solve the issue.

Graeme:

- Why is there a barrier on solving this issue?

Carmen:

- From what I understand it is a financial decision.

Fam:

- Another barrier is trying to call up big tobacco companies asking these questions. Usually won't make it past the secretaries.

Graeme:

- Could also be with regulations on human health, keeping polymers clean and stable when shipping worldwide could also factor in.

Jill:

- There do seem to be positive changes, currently there is a ban on smoking on all public beaches. MorningtonPen. Campaign runs the "only butt that should be on the beach is the human butt", but may be too humorous of an approach.

Carmen:

- It might take the data being behind you when presenting these issues. Might take all organizations coming together under one message, showing the strength of the message. Hard to do as non-profits, especially with everyone prioritizing their own personal missions.

Neil:

- We need to agree on the solutions, it's already well known cigarette butts are the most littered object on the planet. If there are going to be cigarettes sold in this country it might be necessary to put a regulation in place.

Jill:

- A policy like this may need a bigger net.

Neil:

- Take-away plastics and plastic bags trying to be included within the issues may be too broad a push. Hard to tell the manufacturers what to do, product stewardship is a hard sell to the govt as it is not an issue that will keep the lights on.

Jill:

- Looking at the group in Morningsomething, there are alternatives available to the current issues. Easy to keep listing alternatives, hard to agree on one solution. Need an overarching approach to product stewardship.

Neil:

- Good to have this discussion, bringing groups together on issues such as this.

Fam:

- Volunteer groups used to just be cleaning up, but have shifted to cleaning and taking data to show the weight of the issues at hand. A lot more people are collecting data. These all come together and can be more powerful as a unified front.

Carmen:

- With COVID and the shift to digital platforms, there has been an increase in collaboration as it became easier to join discussions such as this. Nationwide support has increased as people realize that these are issues people are combatting nationwide.

Jill:

- Bringing groups together doesn't always transform into boots on the ground. Really need to emphasize the importance of a larger governing body. Has to be outside of government, but might be helpful to liaise with government affiliates.

Neil:

- Shouldn't have one central organization, instead use a regional approach. Methods used in one area may not be relevant to other places.

Carmen:

- Tangaroa Blue is very conscious of the differences of separate regions (landbased sources vs overseas). All the rubbish that has funneled down into PPB was coming from other areas, especially Bubble Tea! Four pieces of plastic come from one bubble tea thing. Let the data tell the story instead of using their own narrative. New chicken packaging can be traced to its source.

Neil:

- I dream of a day of the local organizations presenting their data to the public and asking where to go from here, trying to find a solution.

Carmen link: <https://www.tangaroablue.org/resources/reports-publications/reports/national/>

Point 3 - Looking for opportunities to collaborate:

Hailey:

- We've also pretty much covered this in general discussion

Fam:

- Raising awareness has been the method over the last few years. Having groups like Beach Patrol grow so quickly is a testament to the backing issues like this have. Apart from educating the non-converted masses that don't seem to care about nature, needs to be different strategies to

account for the change they don't contribute to. Just educating and creating awareness is not going to cut it anymore.

Hailey:

- Biggest common point found is education has been key, but it can no longer be the only solutions used.

Jill:

- Frustrated with having a population that differs on activity on issues like this, even with such a small population.

Point 2 - Oxo-degradable plastics:

Neil:

- Hasn't seen any good reason for plastics to be oxodegradable except for the appearance that they disappear. This class of plastics tends to leak into the environment.

Carmen:

- On the fence about biodegradable plastics. How long do they take to degrade and what damage are they doing as they degrade? Wants a better solution than this. (Fam agrees)

Jill:

- Mislabeling things like this is a way of "greenwashing" and cons people into thinking these items have no impact on the environment. Need a bigger solution that doesn't consume and overrun our planet.

Fam:

- Agrees very heavily, thinks its preposterous that industries pull the wool over people's eyes. There are no laws to mislabeling things as "biodegradable" and whatnot. Eggs claiming to be organic are bound by regulations before they can associate that word with their product. Need a similar system in place for using biodegradable or similar terms.

Graeme:

- System can detect oxodegradable products. Simplest pieces of equipment they have analyze the chemical makeup of the polymers. Hard to distinguish an oxodegradable plastic simply by its makeup. If it was part of the structure that had built in weak links designed to break later. Mainly look at floatable plastics (polyethylene).

Neil:

- Campaigning an oxodegradable plastic would need evidence that it still remains in the environment, need the equipment from RMIT.

Graeme:

- Hard to do as the evidence is designed to destroy itself.

Carmen:

- “Plastic doesn’t break down, it breaks up”

T: Issue Paper: Spider Crabs

PORT PHILLIP BAY ISSUES PAPER : SPIDER CRABS



This paper outlines recent problems with spider crab fishing litter and a potential NO-TAKE period during crab aggregation. Additionally, this paper identifies stakeholders and initiatives that might help address these problems

Species Background

Spider crabs are a large, native crustacean species found in the bays of Victoria. They can reach up to 70 centimeters in diameter across both their legs.¹ Each winter, spider crabs migrate inwards from deep waters and gather by the thousands to molt in Port Phillip Bay.² They gather in large numbers to protect themselves from predators by sticking algae and seaweed to their old shells to stay camouflaged. Then, the spider crabs molt by transferring shells. During this molting process, spider crabs are particularly vulnerable to predators.³

During the spider crab gathering, scuba divers and snorkelers flood to Port Phillip Bay to observe the molting process. Anglers also gather to go crabbing, but in the process they often litter the bay with used bait including chicken carcasses, netting, and miscellaneous fishing gear. Discarded bait attracts rays and sharks to the bay; along with other fishing refuse, this creates a danger to scuba divers and swimmers, and the debris threatens the 1500+ marine species that live in Port Phillip Bay.

The rising tension between fisheries and scuba divers has led to a proposal created via a joint effort between the Spider Crab Alliance and Spider Crabs Melbourne.⁴ They circulated a petition for a NO-TAKE fishing period for the crabs during the molting season, a petition which, as of present, garnered 35,000 signatures. This restriction would be implemented through April-July. The petition also calls for increased funding for government research into the Giant Spider Crab population in order to benefit the natural ecosystems. To achieve these objectives, vested stakeholders will need to unite and initiate communication in order to come to a resolution for the NO-TAKE period and spider crab waste management before it becomes a crisis.

Existing Fishing Policies

The Victorian Fisheries Authority has specific policies and guidelines targeting spider crab anglers. The current bag limit is defined as “1 litre or a combined total of 30 whole or parts of crab.”⁵ Spider crab collection is also prohibited in water less than 2 metres deep, and the only allowed means of crabbing are via hand, spear, use of up to 2 bait traps, or use of 2 hoop nets per angler during the molting season.⁶ The VFA encourages anglers to have properly labeled gear and reminds them that officers will be out during the spider crab aggregation to monitor the adherence to fishing rules. The Victorian Fisheries Authority directs anglers to put used or unwanted bait (in this

case, chicken carcasses) along with frames, nets and other fishing equipment, in bins, and to take these materials home and dispose of them properly bins are unavailable or full.”⁷

Causes of and Barriers to the Problem

The problem with spider crab fishing stems from the lack of adherence to VFA catch and disposal policies, which are often not enforced.

Fishing Malpractice

During the molting season, chicken carcass bait is often left to rot in the waters of Port Phillip Bay, which is dangerous for the marine ecosystem and attracts sharks and rays, putting divers at risk.



Rye pier littered with discarded bait.⁸

A large component of the crabbing issue is varying priorities among stakeholders. There are sensitivities around crabbing because anglers support less regulation around fishing, given that the species is not threatened. Certain cultural groups value spider crabs as a part of their cuisine, while tourists and divers are fascinated by spider crabs and flock to view their aggregation to the bay. There is a conflict of interest in the way that different groups enjoy the spider crabs. One way to bring these different groups together is to celebrate the wider ecosystem of the Bay is to hold nature-based events in Port Phillip Bay each year during molting season. Such events could

promote tourism, initiate conversations about crab fishing, crab cuisine and the value of the crabs.

There is also an overall lack of data to prove that the spider crab species or the greater ecosystem has been affected by fishing malpractice. Although there are photographs indicating the severity of spider crab fishing related litter, there has yet to be a widespread study tracking the amount of litter identified or collected in the bay.

Solutions

The idea for a series of nature-based events in Port Phillip Bay stemmed from a recognition that stakeholders and organisations all want to celebrate nature in the bay but have different ways of doing so. A series of nature-based events would allow for multiple means of celebration including educational events, showcases, boat tours, among others. The events would also be a large draw for tourism in the bay which has dwindled due to COVID-19.

Some specific solutions to problems surrounding a NO-TAKE period include:

- Writing to environmental ministers to advocate for a NO-TAKE period and emphasize its significance. The Victorian National Parks association has a step-by-step guide to help citizens write to ministers.⁹ <https://vmpa.org.au/protect-action/spidercrabs/>
- Spider Crabs Melbourne and the Spider Crab Alliance created a petition advocating for a NO-TAKE period during the spider crab aggregation. The petition is still open and can be signed using the link below.¹⁰ <https://www.change.org/p/victorian-fisheries-authority-save-the-iconic-australian-spider-crabs-from-rampant-overfishing-02538ffc-6c2c-4463-9b28-7a6b7a8acf72>
- Developing a unified planning group of interested organisations interested in creating a series of nature-based events and selecting a few individuals to lead the group. Ongoing meetings will be held to begin planning for a series of nature-based events in Port Phillip

Bay. A schedule for events, permits, and ensuring that multiple sectors (fisheries, non-profits, tourism) will be vital to the event's success. If you have any questions or your organisation would like to be involved in the initiatives, reach out to the Port Phillip Baykeeper: baykeeper@ecocentre.com

In terms of a solution for crabbing related litter, developing a strategy to communicate and educate others on the effects of litter would be the next step. An event centered around cleaning and educating others on fishing litter could be incorporated into the series of nature-based events.

Stakeholders, including responsible management agencies and vested organisations

Key stakeholders that are affected by the current spider crab fishing related issues are non-profit organisations, government organisations, and businesses involved with ecotourism. Ministers at the Victorian Fisheries Authority that hold a large responsibility in shaping fishing policy and regulation. The Victorian National Parks Association encourages organisations and individuals to write to The Hon. Melissa Horne (Minister for Fishing & Boating), Hon. Lily D'Ambrosio (Minister for Environment), and Hon. Martin Pakula (Minister for Tourism).¹¹ These ministers work to put policies into action and can be influential in the implementation of a NO-TAKE period.

Some stakeholders identified are displayed in Figure 1. Highlighted stakeholders indicate organisations that contributed input to the development of solutions in this paper.



Figure 1: Brief List of Stakeholders in Port Phillip Bay related to Spider Crab Fishing & Advocacy

Other Links and Important Information

This paper will be reviewed every 2 years and published by the PPB Baykeeper Organisation. If you have a correction or further information, contact the Baykeeper at baykeeper@ecocentre.com

Endnotes

Photos (Header)

Give spider crabs a no-take break in moulting season [Photograph found in Victorian National Parks Association]. (n.d.). Retrieved from <https://vnpa.org.au/protect-action/spidercrabs/>

Roberts, M. (2020, October 7). [Photograph found in Spider Crab Alliance]. Retrieved from <https://www.facebook.com/photo?fbid=10221029087130245&set=p.10221029087130245>

-
1. Victorian Fisheries Authority. (2020, June 23). *Giant Spider Crabs*. Retrieved September 17, 2020, from <https://vfa.vic.gov.au/science-in-fisheries/spidercrabs>
 2. Staufenberg, J. (2016, June 17). *Thousands of giant spider crabs gather in Australian port*. Retrieved September 17, 2020, from <https://www.independent.co.uk/news/world/australasia/giant-spider-crabs-gather-their-thousands-melbourne-port-a7087281.html>
 3. Staufenberg, J. (2016, June 17). *Thousands of giant spider crabs gather in Australian port*. Retrieved September 17, 2020, from <https://www.independent.co.uk/news/world/australasia/giant-spider-crabs-gatherS-their-thousands-melbourne-port-a7087281.html>
 4. Sign the Petition. (n.d.). Retrieved September 18, 2020, from <https://www.change.org/p/victorian-fisheries-authority-save-the-iconic-australian-spider-crabs-from-rampant-overfishing-02538fbc-6c2c-4463-9b28-7a6b7a8acf72>
 5. Victorian Fisheries Authority. (2020, August 04). *Giant Spider Crab Fishing Rules*. Retrieved December 07, 2020, from <https://vfa.vic.gov.au/science-in-fisheries/spidercrabs/giant-spider-crab-fishing-rules2>
 6. Victorian Fisheries Authority. (2020, August 04). *Giant Spider Crab Fishing Rules*. Retrieved December 07, 2020, from <https://vfa.vic.gov.au/science-in-fisheries/spidercrabs/giant-spider-crab-fishing-rules2>
 7. Victorian Fisheries Authority. (2020, August 04). *Giant Spider Crab Fishing Rules*. Retrieved December 07, 2020, from <https://vfa.vic.gov.au/science-in-fisheries/spidercrabs/giant-spider-crab-fishing-rules2>
 8. *Dead crabs next to a chicken carcass*. [Photographs found in The Sydney Morning Herald]. (2020). In 1110946286 839784218 M. Perkins (Author). Retrieved from Perkins, M. (2020, June 16). *Hunt for nature's bounty turns Rye Pier into a 'chicken cemetery'*. Retrieved December 07, 2020, from <https://www.smh.com.au/environment/sustainability/hunt-for-nature-s-bounty-turns-rye-pier-into-a-chicken-cemetery-20200616-p5537g.html>
 9. Give spider crabs a no-take break in moulting season. (2020, October 24). Retrieved December 07, 2020, from <https://vmpa.org.au/protect-action/spidercrabs/>
 10. Sign the Petition. (n.d.). Retrieved September 18, 2020, from <https://www.change.org/p/victorian-fisheries-authority-save-the-iconic-australian-spider-crabs-from-rampant-overfishing-02538fbc-6c2c-4463-9b28-7a6b7a8acf72>
 11. Give spider crabs a no-take break in moulting season. (2020, October 24). Retrieved December 07, 2020, from <https://vmpa.org.au/protect-action/spidercrabs/>

U: Issue Paper: Waste Management

PORT PHILLIP BAY ISSUES PAPER : WASTE MANAGEMENT



This paper outlines Port Phillip Bay EcoCentre and collaborators' perspectives on waste management issues affecting Port Phillip Bay and its environmental health.

Background

Waste management issues in Melbourne, Victoria have been accumulating since the 1800's. Until 1850, the general population developed an "out of sight, out of mind" approach to dealing with garbage ^[1]. People were responsible for their own waste, leading to lots of unregulated dumping and littering. Due to a lack of waste regulations, Melbourne was considered the world's dirtiest city in the 19th century ^[1]. It was only when poor waste management led to more community problems that action was taken ^[2].

Today, Melbourne is working to clean up their waste. In 2017, China passed new legislation, updating regulations on imported waste and reducing the acceptable contamination level. As a result, Victorian treatment companies could no longer export waste to China and thus had no way of handling the waste generated by the community ^[3]. Melbourne now has to deal with thousands of tonnes of waste built up across several different warehouses ^[4]. On top of this backlog, municipal collection rates all but halted, leading to the majority of waste being sent to landfills instead of proper treatment centres ^[5]. Looking forward, Victorian waste production is

estimated to rise 40% by 2046 from that in 2017-2018 ^[7].

Melbourne Warehouse

The image in the figure below offers a person in comparison to the amount of built up waste.



Warehouse completely filled by waste pallets ^[6]

Threat to Community and Bay Health

The issues Victoria faces surrounding waste management come from lack of public awareness and recycling contamination. Unfortunately, the two seem to work in tandem; when one problem gets worse, it develops new issues in the other.

The first issue in Victoria is the lack of accountability by individuals when in public. According to a study done by Sustainability Victoria, M. Ross claims there are 3180 different waste collection bins in Metropolitan Melbourne ^[9]. These bins can

bins. Metropolitan Melbourne occupies 9,993 km², and if each bin is equidistant there is 1 bin to every 3 square kilometres. Without bins in high risk littering areas, littering only increases.

On top of this, the existing public bins around Melbourne tend to overflow with waste before they are collected. Litter and overflowing trash on the ground is often carried by stormwater systems into Port Phillip Bay, decreasing the water quality and polluting the bay^[9]. An estimated 95% of litter on beaches is from urban areas and carried to the sea by stormwater^[10].

During COVID19's regulations, these problems were amplified. There was both an increased generation of single use plastics and a decline in collection rates. Coffee shops not allowing the use of reusable cups and an increase in take away food led to significantly higher waste generation. The shutdown also prevented bins from being collected by the workers. Both factors only aggravated the existing problems with public bins.

The second issue Victoria faces is the contamination of recyclable materials. While there are plenty of treatment plants capable of recycling used plastics, recyclable materials are often sent to landfills. Recycling processes are designed to deal with isolated recycling but can tolerate minor contamination. Thus, improper waste disposal by citizens can lead to entire batches of recycling being sent to landfills.

Recycling sent to landfills does more than take up space. When plastics sit in open dumps they react with the sunlight to produce greenhouse gasses – methane and ethane. In 2016, open dumps globally contributed to 5% of all generated greenhouse gas^[7].

Responsible Organizations

Our main contact was with the Port Phillip Bay EcoCentre. However, to understand the issues further, we completed background research on ten relevant waste management stakeholders around Victoria:

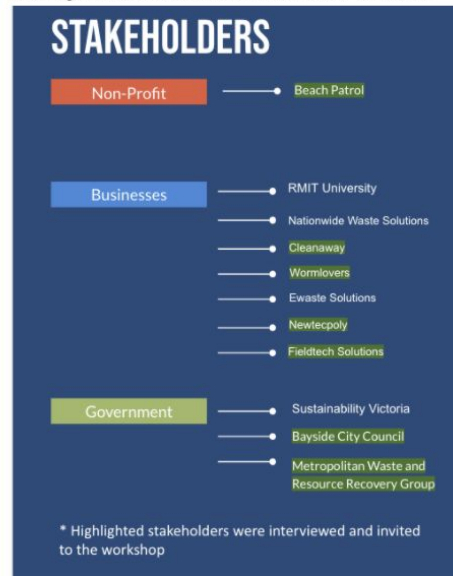


Figure 1: A list of researched stakeholders

Existing policy framework

There are currently several waste solutions being considered. Many organisations have been collaborating to solve smaller pieces of the larger problem. Recently, a new waste management act was proposed for Victoria, adding regulation and policies aimed at environmental protection.



Figure 3: The waste act's four main ideas ^[6]

These steps will create more progress towards a solution for waste management, however, none of these ideas solve the entire issue. The best way to solve these issues is to remove all the barriers that stop the everyday citizen from proper recycling and waste disposal. The goal is for recycling to be made easy. If the average person has to put in effort to carry their trash or sort their waste, it decreases the likelihood that they maintain good habits.

One common problem is the lack of enforcement on regulations surrounding litter and mishandled waste. Both Bayside City Council and Metropolitan Waste and Resource Recovery Group mentioned that people aren't afraid of being fined for littering. Victoria has some of the highest fines and punishments for littering, however the responsibility is passed around within the local government and is rarely enforced ^[11]. In fact, most littering occurs within 5 metres of the bin ^[11]. Currently there is a lot of public campaigning working through volunteer groups and social media working to engage the general public further.

Upcoming Waste Policies

Currently, Australia is working to implement new legislation working on solutions. One of which is called "the 3 R's plus 1" - Reduce, Reuse, Recycle, and Recover Energy ^[12]. This plan furthers the goal of a developing circular economy - a material economy relying on reimplementation of used products back into the market. The plan details multiple small scale solutions to combat the waste crisis.



Figure 2: A description of the "3 R's plus 1"

A threat to achieving this goal is the lack of manufacturer support. Many single use plastics are commonly littered items and oftentimes are improperly disposed of. There is a large movement working to encourage local and federal government officials to implement a policy holding manufacturing companies accountable for the waste they generate. This idea is twofold and involves manufacturers making a switch to environmentally friendly materials, or having a plan in place to make up for waste destined for landfills.

Coming soon, Victoria will implement a container deposit scheme, a program that has been successful in other states already. Victoria will begin to provide cash for

returned bottles and cans. This gives residents of Victoria an easy way to properly dispose of recyclable materials such as plastic, aluminum and glass. According to Fam Charko ^[13], container deposit schemes located at the front of grocery stores allow people to use the money from deposited containers as coupons on their grocery bills.

Barriers

Waste management is an ongoing issue and has no clear solution. There will always be new demand for more inclusive recycling processes and better ways to separate garbage. Right now, there are a few barriers imposing on waste issues from being resolved.

The first barrier comes from a diffusion of responsibility in the general public. Citizens tend to leave their recycling habits at home when they go into public, leading to litter and carefree waste disposal.

The second barrier comes from a lack of legislation restricting manufacturers. Manufacturers have turned a blind eye to their impact on waste. The companies responsible for making food packaging and plastic water bottles see nothing but decreased profits when it comes to changing their current habits. This leads to voices for change falling on deaf ears.

The last barrier concerns the different regulations surrounding public waste. Victorian municipalities don't have cohesive waste bin regulations. This leads to contamination and confusion when disposing of waste. With municipal codes not evident, citizens often use the regulations they're most familiar with.

Solutions

After organizing and hosting a workshop involving the previously mentioned stakeholders, our team noticed

many potential solutions arise during the discussion.

The first solution identified was the need for youth education and public awareness. Educating children in schools has a lasting impact on kids and an additional impact on their families. Lessons learned by children in school are later taught to their parents at home. Increasing social awareness is a huge factor in solving contamination problems also. Repeatedly teaching people what can go in certain bins and keeping people focused on environmental health leads to a more engaged community.

The second solution discussed involved a standard bin system across the entire Victorian state. Currently, the waste bin systems between different municipalities are asynchronous. People can cross over towns without realizing and won't know the proper codes for disposing of garbage. This leads to people contaminating recyclable materials with non-recyclable waste. Standardizing the bin systems across the entirety of Victoria will lead to increased recycling rates and less waste sent to landfills.

The third solution is incorporating alternative processes to avoid landfill use. During the roundtable discussion, two organizations detailed their work involving alternative processes. One partial solution involved biodegradable plastic - targeting plastic that is destined for landfill - and the other was capable of recycling plastic with higher levels of contamination. Having multiple angles to approach an issue will result in more help to solve it. Steps away from landfills can provide more funding to alternative research, resulting in new ways to recycle waste.

The final solution was creating a separate glass waste stream to isolate glass

from other types of recycling. This was met with a brief pushback as it was noted that having another waste bin in residential homes would not be accepted easily. However, it was decided that glass ultimately needed its own waste stream as its recycling process was unique to that of cardboard/paper and plastics. Isolating glass for recycling will only increase the quality of other recycled materials as there would be fewer contaminants in the batch. In the Netherlands, they already have a glass stream isolated, proof that the public will eventually adjust to the new policy.

Endnotes

^[1] - Nicholls, Philip H. (2002). [A review of issue relating to the disposal of urban waste in Sydney, Melbourne and Adelaide. An environmental history](#) (PDF). Adelaide: Faculty of Arts – University of Adelaide. [Archived](#) (PDF) from the original on 27 May 2019. Retrieved 3 June 2019

^[2] - Total Environment Centre. (2019). History of Waste. Retrieved December 07, 2020, from <https://wastenot.org.au/history-of-waste/>

^[3] - Morton, A. (2019, July 22). 20,000 tonnes of recycling dumped in Victorian landfill during SKM ban. Retrieved October 16, 2020, from <https://www.theguardian.com/environment/2019/jul/23/20000-tonnes-of-recycling-dumped-in-victorian-landfill-during-skm-ban>

^[4] - Taylor, J., & Butler, B. (2019, August 02). SKM to be wound up and 280,000 tonnes of recycling could end up in landfill. Retrieved October 06, 2020, from <https://www.theguardian.com/environment/2019/aug/02/skm-to-be-wound-up-and-280000-tonnes-of-recycling-could-end-up-in-landfill>

^[5] - Oaten, J. (2019, August 21). *Plans to revive SKM plants to ease Victoria's waste crisis*. Retrieved September 18, 2020, from

<https://www.abc.net.au/news/2019-08-21/skm-recycling-enters-receivership/11433932>

^[6] - Victorian Government. (2020, November 19). Transforming recycling in Victoria. Retrieved December 07, 2020, from https://www.vic.gov.au/transforming-recycling-victoria?_ga=2.68588434.2018768962.1607300474-437320327.1607300474

^[7] - Swaters. (2018, October 08). New Study Shows Plastics Release Greenhouse Gases, Contributing to Climate Change. Retrieved October 06, 2020, from <https://www.surfrider.org/coastal-blog/entry/new-study-shows-plastic-as-source-of-greenhouse-gases-potentially-contribut>

^[8] - South, J. (2019). *A warehouse in Victoria filled with compacted trash from SKM*. [Photograph]. Melbourne.

^[8] - City of Melbourne. (2020). Reducing litter. Retrieved December 07, 2020, from <https://www.melbourne.vic.gov.au/residents/home-neighbourhood/Pages/reducing-litter.aspx>

^[9] - Ross, M. (2020, January 16). *New report on microplastics in Port Phillip Bay*. Retrieved September 11, 2020, from <https://www.sustainableportphillip.com/articles/microplastics-port-phillip-bay>

^[10] - Sulaeman, D. (2018). *We apologize for the inconvenience...* Retrieved September 18, 2020, from <https://iopscience.iop.org/article/10.1088/1755-1315/148/1/012028/pdf>

^[11] - Eco Group (2020, 22 November). Metropolitan Waste and Resource Recovery Group Interview Transcript, <https://docs.google.com/document/d/12eO55DbSh1LzOsWUSvJcGyeyR1aEjBZS2B8fQ7SdP9Q/edit?usp=sharing>

^[12] - Pickin, J. (2018). National Waste Report 2018. Retrieved December 06, 2020, from <https://www.environment.gov.au/system/files/resources/7381c1de-31d0-429b-912c-91a6>

[dbc83af7/files/national-waste-report-2018.pdf](#)

^[13] - Eco Group (2020, 1 December). Workshop Transcript, <https://docs.google.com/document/d/1OIHwkryOX29DIMQ8m2INypsEKmwp35T-iOCiVAPtVao/edit?usp=sharing>

2020-11-12



PORT PHILLIP BAY ISSUES PAPER : MICROPLASTICS



Overview of Microplastic Pollution in Port Phillip Bay

This paper outlines Port Phillip EcoCentre and collaborators' perspectives on microplastic pollution affecting Port Phillip Bay and its water catchments and the regulation of plastic products.

Background

Microplastics are tiny pieces of plastic that are smaller than 5 mm.¹ Nurdles, plastic beads that are melted down for use in injection molding, are one example. But microplastics can also come from larger pieces of plastic that break up into smaller and smaller pieces over time. Most microplastics in Port Phillip Bay, upwards of 95% according to a study by Sustainability Victoria, began as plastic litter on the streets that was washed into urban stormwater systems, and then into creeks and rivers running into the bay.² Along the way this litter break up into smaller and smaller pieces until it is eventually reduced to microplastics. An estimated 2.5 billion pieces of microplastics are brought into the bay in this manner every year.³ Microplastics are extremely harmful to marine life and are difficult to remove from bodies of water because many cannot be seen by the naked eye, and the fine mesh filters required to capture them impede stream flows, potentially causing floods upstream.

Probable Threats to the Waterways and Bay Health

Microplastics are particularly dangerous to Port Phillip's diverse marine ecosystem, as their small size makes them more easily ingested by a range of wildlife. The process in manufacturing plastic requires the use of numerous chemicals, including but not limited to phthalates, organotin and BPA.⁴ The types of chemical residue found on these particles may vary greatly, but many are known carcinogens, endocrine disruptors, and neurotoxins.⁵ As described in Barboza, L., et al.'s 2018 article, many microplastic particles contain chemical residue on them. When ingested, the chemical residue can be absorbed through the gut and enter into the circulatory system of the organism, from which it is carried to tissue throughout the body.⁶ This is dangerous for not only the fish eating the plastic but could potentially be a health concern for any other creature or human that eats these fish later.

Microplastic pollution is not an issue specific to Port Phillip Bay. However, as explained by the Baykeeper Neil Blake, Port Phillip Bay is unique, as it is essentially a closed system. Unlike other places where microplastics can flow out into the open ocean, in Port Phillip Bay they are trapped and could build up within the Bay.

Responsible Management Agencies

There are many stakeholders working on managing this and related issues, across several different sectors. These include non-profit environmental organizations, research organizations, and government agencies, as well as some local entrepreneurs.

State government agencies have the responsibility of policy setting and major waste management infrastructure. Local governments are responsible for day-to-day street cleaning and waste collections. Local community volunteer groups conduct clean-up activities and data collection and advocacy. Non-profits conduct education and citizen science programs, as well as advocacy. A lot of data has been collected in this area for either operational or advocacy purposes, but various projects groups studying this topic use different data collection methods that aren't necessarily compatible.

Existing Policy Framework

There are two major pieces of legislation that relate to marine plastic pollution in Australia. The *Environment Protection and Biodiversity Conservation Act 1999* provides a general framework for dealing with threats to the ecosystem. It contains a list of key threats and threat abatement recovery plans.⁷ The second is the *Threat Abatement Plan for the Impacts of Marine Debris on Vertebrate Marine Life*, or TAP, which was released in 2009. It outlines several measures on how to prevent harmful impacts of marine debris, including microplastics.⁸

The first recommendation of the Federal Government Inquiry Toxic Tide: the threat of Marine Plastic Pollution Australia (2016) is:

The committee recommends that any future Australian Government policies on mitigating the threat from marine plastic be underpinned by sound, peer-reviewed research.⁹

In Victoria, a statewide ban on single-use plastic bags has recently been implemented. As single-use plastic products are a huge source of microplastics

in the environment, this is a large step in the right direction.

Additionally, recently a container deposit scheme has been implemented, encouraging people to properly dispose of plastic bottles and similar products.

Existing Knowledge

Several projects in recent years have focused on collecting data on litter and microplastics in Port Phillip Bay and its catchments. Beach Patrol – Love Our Streets have used the Litterstopper app to record the different types of litter collected in regular clean-ups on streets and beaches. The EcoCentre recently finished a three-year project called Clean Bay Blueprint in which they collected extensive data on microplastic pollution in the Yarra and Maribyrnong rivers and on seven reference beaches around Port Phillip Bay.² Street2Bay was a similar project conducted as a collaboration between the Port Phillip EcoCentre and Scouts Victoria, which focused on documenting the types of litter generated by six different street usage types.⁸

Common Forms of Litter

According to Love our Street founder Jill Sokol, cigarette butts are the most common item found during litter audits. The filters in these butts are made of plastic and will in time become microplastics.



Cigarette butts

Existing Management Responsibilities

Day-to-day litter and waste management operations are generally delivered in accordance with service contracts managed by local government agencies. Melbourne Water are responsible for maintaining healthy waterways that feed into the Bay. The Department of Environment Land Water and Planning have administered the Port Phillip Bay Fund which since 2017 has enabled many community-based litter projects.¹⁰

DELWP has also recently established a LitterWatch web platform for various organizations to publish litter data. Along with other responsibilities relating to regulation of waste, Environment Protection Agency Victoria is responsible for litter enforcement. Sustainability Victoria engages with all sectors to support policy development and education.¹¹

Non-profit & Community Initiatives

There are several groups dedicated to cleaning microplastics from the water and beaches. While working on Clean Bay Blueprint, the EcoCentre worked with the Yarra Riverkeeper Association to conduct monthly trawls of the Yarra and Maribyrnong rivers in order to measure amounts of microplastics carried by the rivers to the bay. Yarra Riverkeeper and Clean Water Group compiled a major report on polystyrene pollution in waters.¹² Werribee Riverkeeper Association conducts regular community clean-ups in collaboration with the local Beach Patrol – Love Our Streets. Tangaroa Blue has delivered several projects relating to microplastics across the greater Melbourne area. These include liaising with industry to adopt practices that prevent nurdles escaping to the environment; and the Let's Strain the Drains project which audited contents of filters installed in stormwater pits (more than 20 filters installed in 4 different street usage types).¹³

RMIT Plastics Lab has analyzed microplastics collected from different locations on eastern Port Phillip Bay to identify polymer types and any chemical contaminants they may be carrying.

In addition to the extensive activities of Beach Patrol – Love Our Streets there are numerous community groups dedicated to cleaning-up plastic and microplastic litter off the beaches.¹⁴

Source Reduction Discussion

Plastic is a material that is inexpensive and easy to work with, which has led it to be widely used in manufacturing and packaging. There are other environmentally friendly alternatives for many products made with plastic, but they are often more expensive. To stop the production of microplastics,

some form of legislation that either directly limits the use of plastic in manufacturing and/or incentivizes companies to produce environmentally friendly alternatives is necessary.

In order to get these types of legislation passed, stakeholders agree that there needs to be a unified approach and extensive data is needed to validate the severity of the issue to lawmakers. However, most of the stakeholders involved in this issue are non-profit, and therefore do not have the resources to organize a collaboration of this magnitude.

Case Study: Oxo-Degradable Plastic



Oxo-degradable plastic is a type of plastic containing small amounts of metal additives that makes the plastic more brittle, causing it to break apart faster.¹⁵ This type of plastic

Oxo-degradable Bag is commonly promoted as environmentally friendly thought to be biodegradable. However, contrary to the name, oxo-degradable plastics are not biodegradable, as they are not broken *down* into their base natural components by bacteria and fungi over time. Instead, they simply break up into smaller and smaller plastic pieces until they become microplastics, but never fully decompose.¹⁶ In this regard, oxo-degradable plastics can be more dangerous, as they simply break up into microplastics faster. However, the distinction between oxo-degradable and biodegradable is not well defined in advertising, which means companies can often legally label their products as biodegradable, when they are oxo-degradable.¹⁷ Common examples of oxo-degradable products include cutlery and shopping bags.

Gaps and Barriers

While there are already several groups dedicated to collecting microplastics from the bay, rivers, and beaches, along with plastic litter on the streets, this is not enough to control the microplastic problem.

More research is needed to quantify the negative impacts that this type of plastic has on the ecosystem. However, with the current technology, identifying oxo-degradable microplastic samples is challenging, as doing so often requires breaking the sample down to the molecular level, making the process of analyzing oxo-degradable plastic very time consuming.

Recommendations to the area surrounding the Port Phillip Bay

A group of stakeholders working on these issue recently came up with some goals and next steps towards addressing the issue

A short-term goal is to organize an event where different projects studying litter and microplastics can present their findings. The presentations would be followed by a workshop of all participating groups to discuss where to from here. This would help to move towards a more united and strategic approach to advocacy; and raise awareness of the issue among the general public.

A more long-term goal would be to form an umbrella group to lobby for new legislation. As mentioned, this would be a challenge for any one organization, but if the group consisted of delegates from various organizations, it would spread the burden of organizing it among several different stakeholders; and increase confidence of potential funding sources. It would be a challenge to get this started, but in the end could prove essential to effectively addressing this pervasive issue of microplastic pollution.

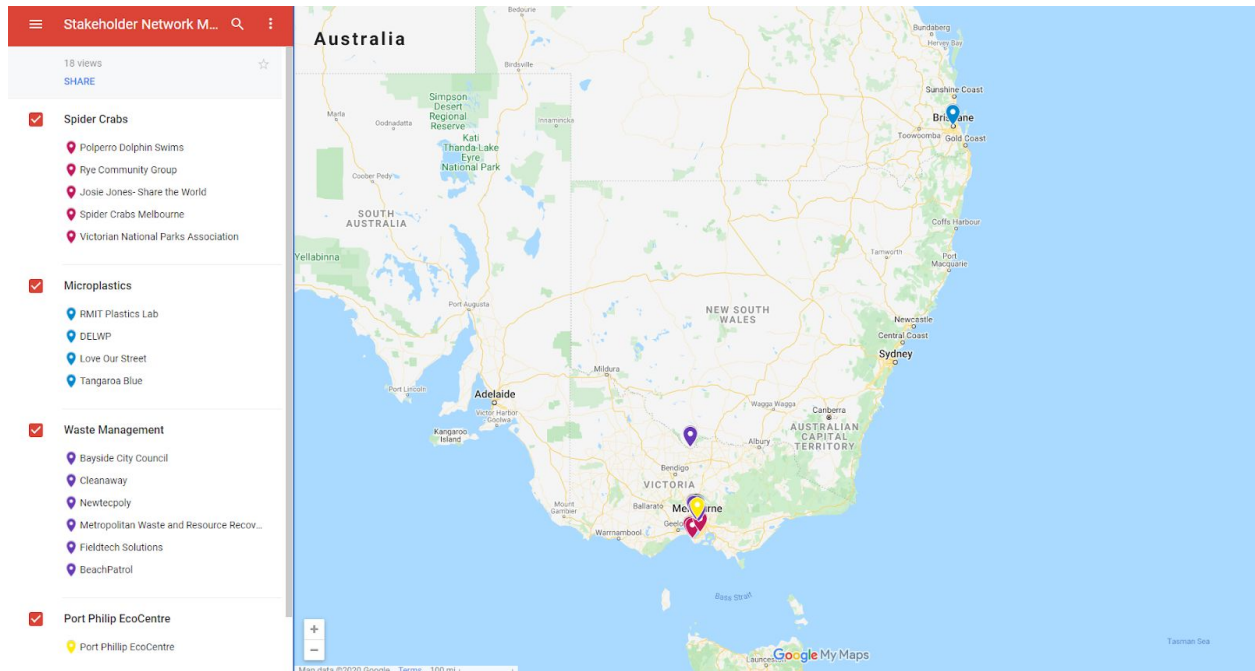
Other links and information

This paper will be reviewed every 2 years and published by the Port Phillip EcoCentre. If you have a correction or further information, contact the Port Phillip Baykeeper at baykeeper@ecocentre.com

Endnotes

1. de Souza Machado, A., et al. (2017). *Microplastics as an emerging threat to terrestrial ecosystems*. Wiley Global Change Biology. <https://onlinelibrary.wiley.com/doi/full/10.1111/gcb.14020>
2. Ross, M. (2020, January 16). *New report on microplastics in Port Phillip Bay*. <https://www.sustainableportphillip.com/articles/microplastics-port-phillip-bay>
3. Charko, F., Blake, N., Seymour A., Dr Johnstone C., Barnett E., Dr Kowalczyk N., Pattinson M. (2020) Clean Bay Blueprint: Microplastics in Melbourne
4. Teuten, E., et al. (2009) Transport and release of chemicals from plastics to the environment and to wildlife. *Philosophical Transactions: Biological Sciences, Vol 364 No 1526*
5. Barboza, L., Vethaak, A., Lavorante, B., Lundebye, A., Guilhermino, L. (2018) *Marine microplastic debris: An emerging issue for food security, food safety and human health*. Marine Pollution Bulletin.
6. Department of Agriculture, Water and the Environment. Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act). <https://www.environment.gov.au/epbc>
7. Department of Agriculture, Water and the Environment. (2018). Threat abatement plan for the impacts of marine debris on the vertebrate wildlife of Australia's coasts and oceans. <https://www.environment.gov.au/biodiversity/threatened/publications/tap/marine-debris-2018>
8. Scouts Victoria. (2020). Street2Bay Project Scouts Victoria: Australia. <https://scoutsvictoria.com.au/activities-events/activities/environment/street2bay-project/>
9. Environment and Communications References Committee. (2016). *Toxic tide: the threat of marine plastic pollution in Australia*. Senate Printing Unit, Parliament House, Canberra.
10. Department of Environment, Land, Water and Planning. (2019, September 09). Port Phillip Bay Fund. <https://www.marineandcoasts.vic.gov.au/grants/port-phillip-bay-fund>
11. Sustainability Victoria. (2020). Litter and illegal dumping. <https://www.sustainability.vic.gov.au/Government/Litter-and-illegal-dumping>
12. Barmand, S., Goodsell, K., Yardley, D., Kowalczyk, N. (2020). *Polystyrene Pollution in the Yarra River: Sources and Solutions*. Yarra Riverkeeper Association.
13. Torraca, C. (2019, December 01). *Let's Strain the Drains*. <https://www.tangaroablue.org/lets-strain-the-drains-port-phillip-bay-region-vic/>
14. Beach Patrol. (2020). Love Our Street Cleanest And Safest Streets. <https://www.beachpatrol.com.au/los>
15. Naturbag. (2019) What are Oxo-degradable plastics?: The Dangers of Degradable Plastics. (2019, November 05). <https://naturbag.com/oxodegradable-plastics/>
16. Thomas, N., McLauchlin, A., Clarke J., Patrick S. (2012) Oxo-degradable plastic: degradation, environmental impact and recycling. *Institution of Civil Engineers Waste and Resource Management, Vol. 165 (Issue WR3)*.
17. Millar, S. A. (2020). *NAD Says "Oxo-Biodegradable" Claims Not Supported*. Keller and Heckman. <https://www.khlaw.com/2313>

W: Stakeholder Map



https://www.google.com/maps/d/edit?mid=1889_9nO_0CzagiAAo426i_UFsj7j10TV&usp=sharing

The map is interactive. After following the link above, simply click on one of the stakeholder organizations to the left and it will highlight their location on the map, bring up a brief overview of their group, and any website links if applicable.

X: Bios

Julia Pope is an Architectural Engineering student at Worcester Polytechnic Institute, with a concentration in Mechanical Design. On campus, Julia is President of WPI's Architectural Engineering Institute. She is passionate about climate responsive buildings and energy optimization. In her free time, she can be found drawing, running, or drinking iced coffee.

Charlie Dursin is studying Mechanical Engineering at Worcester Polytechnic Institute. He has a passion for 3D design and manufacturing, as well as writing. He has a lot of experience with various CAD softwares, and hopes to one day become an engineer so he can put these skills into practice. In his free time he enjoys making content about movies and video games on the internet.

Hailey McCasland is a Biomedical Engineering student at Worcester Polytechnic Institute. She is also a member of the softball team. Hailey is passionate about animals and hopes to use her engineering degree to develop ways to help those in need. In her free time she can be found spending time with her dogs, her friends, and family.

John Laukaitis is a Chemical Engineering student at Worcester Polytechnic Institute. He is always willing to lend a hand or give advice. John is an incredible public speaker and takes charge managing communications between our team, sponsor and stakeholders. John likes to go on hikes and dog walks in his free time.

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Booklet Template Design	Julia Pope	All team members
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Spider Crabs Chapter & Issue Paper	Julia Pope	John Laukaitis
Microplastics Chapter & Issue Paper	Charlie Dursin	Hailey McCasland
Waste Management Chapter & Issue Paper	John Laukaitis	Julia Pope
Gantt Chart & Task Management	John Laukaitis & Julia Pope	
Stakeholder Map	Hailey McCasland	Charlie Dursin
Infographic Templates	Julia Pope	Hailey McCasland