Next Generation Baykeeper: Encouraging Strategic Collaborations Around Port Phillip Bay

An Interactive Qualifying Project submitted to the Faculty of WORCESTER POLYTECHNIC INSTITUTE in partial fulfilment of the requirements for the degree of Bachelor of Science

Peter Jonathan Dentch

Salvatore Joseph Lombardo III

Shelby Page Morrison

Nicole Amanda Shedd

Submitted to:
Fabio Carrera, Advisor
Stephen McCauley, Advisor

Project Liaison:
Neil Blake and Fam Charko, Port Phillip EcoCentre

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Abstract

This project trials processes to create cross-sectoral collaborations for Bay management. Surveys, workshops, and interviews were conducted with a range of stakeholders. Priority issues were identified and relevant information gathered. 'Climate change' and 'marine pests' were selected as topics for workshops with stakeholders to contribute to issue papers. Network maps were created to display organizations working on issues. This document outlines how to foster cooperative environmental protection through processes that synthesise knowledge gained from different stakeholders for better Bay health.

Acknowledgements

Our team would like to thank the following individuals for their assistance in helping us present a successful project:

- **Professor Stephen McCauley and Professor Fabio Carrera**, our advisors, for their insight on our project to help us succeed and their contributions to our project, report, and presentations.
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- **All survey and workshop participants,** for being willing to participate, enabling us to complete such an impactful project, and helping us get a taste of Melbourne while working remotely.
- **The Port Phillip EcoCentre and Worcester Polytechnic Institute** for giving us the opportunity to take part in this experience, even if we were not able to travel to Melbourne.

Executive Summary

Within the past decade, Port Phillip Bay in Victoria, Australia, has undergone a large-scale deterioration. Climate change and other anthropogenic activities are diminishing the biodiversity of the Bay and destroying habitats. Rising sea levels from climate change are eroding the shores of beaches around the Bay, as well as playing a role in the habituation of marine pest species. These threats are not only affecting flora and fauna of the Bay, but also commercial fisheries, businesses, and recreational users.

Figure 1: Aerial View of Port Phillip Bay and Melbourne (source: Google Earth)

Port Phillip EcoCentre

Our sponsor, the Port Phillip EcoCentre, was conceived by the City of Port Phillip in collaboration with local community groups to create a hub for environmental action. It was founded on relationships between government and community sectors, creating a strong partnership that encouraged stakeholder investments.

This collaboration between sectors is exemplified by the declaration of the St Kilda Breakwater Co-operative Management Area for Wildlife in 1992. In response to the settlement of a colony of Little Penguins in the area, a Cooperative Management Advisory Committee convened with representatives from 5 different sectors. The 'cooperative' representation ensured the aims and responsibilities of all stakeholders were considered to inform necessary management actions, eventually renovating the breakwater, increasing the safe boating capacity of the harbor, and growing the size of the penguin colony.

The EcoCentre is advocating that similar cross-sectoral collaboration be adopted for other issues affecting the Bay. The organization has 32 officially affiliated groups and over 240 partner organizations, including the Waterkeeper Alliance, a grassroots organization that advocates for healthy waterways. Neil Blake, one of the founding members of the EcoCentre, is the Port Phillip Baykeeper, acting as a voice for the Port Phillip Bay. Neil has decided that 2020 will be his last year with the EcoCentre, and this project is a critical step in assisting him to strengthen collaboration around the Bay and pass the baton to the next generation Baykeeper.

Our Project had Four Objectives

The goal of this project was to assist the Port Phillip Baykeeper Program in developing a cross-sectoral collaboration model to promote cooperative action among the stakeholders of the Bay. We developed four objectives to meet this goal:

1. Identify stakeholders' priorities with regards to Port Phillip Bay
2. Promote conversations about priority issues among stakeholders
3. Develop issue papers on priority issues to cement EcoCentre stance
4. Promote action among stakeholders in issue-based networks

Figure 2 is a diagram showing the process that we used to meet all four objectives.

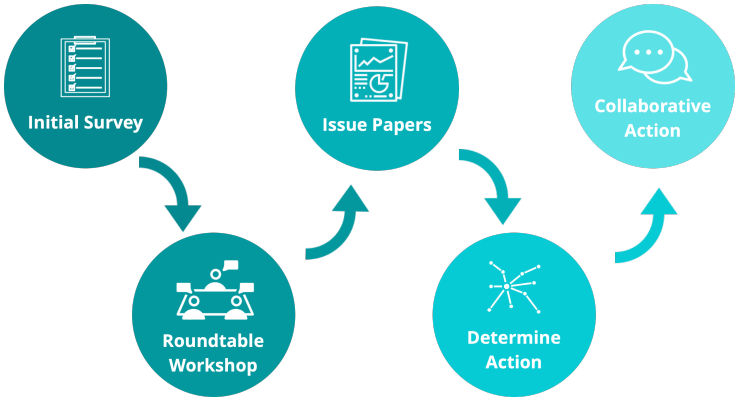

Figure 2: Overall Process of Our Project

Surveys of Stakeholders Revealed Six Main Priorities

We surveyed the stakeholders of Port Phillip Bay to get insight on their organizational priorities that could be used to create partnerships and promote collaboration. These surveys primarily focused on gathering information on the long-term priorities of stakeholders, asking them to list Bay health issues requiring attention. The stakeholders were from a variety of sectors, including regional not-for-profits, local community groups, local and state governments, research institutes, and businesses. We sent the survey to about 50 stakeholders, and we received 30 responses. We garnered a variety of issues and were able to identify six main priorities. These priorities were plastics and litters, chemical runoff and pollution, management plans and protections, human activity (such as recreation and dredging), marine pests, and climate change as seen below in Figure 3.

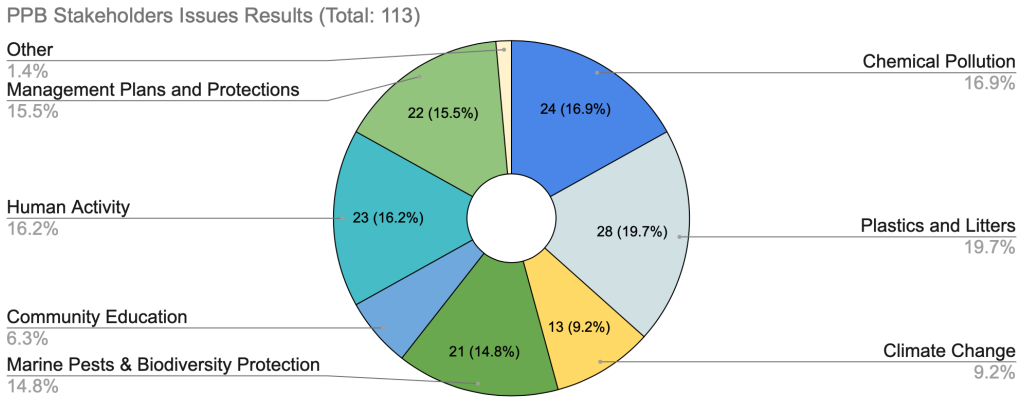

Figure 3: Number of issues raised in each category

Climate Change and Marine Pests Were Two of the Prioritized Issues

In the next five years, the EcoCentre plans to create 10 issue papers to summarize some of the key issues in the Bay. Our project focused on designing a process for creating them and using this process to develop two papers. We selected the topics of climate change and marine

pests based on the number of responses in each category and the diversity of sectors prioritizing this issue from the survey results. Nine stakeholders listed 14 issues related to climate change. These nine stakeholders represented 6 of the 7 sectors that we surveyed. Seventeen stakeholders, representing 6 of the 7 sectors surveyed, expressed concern for 21 issues relating to marine pests with over half coming from not-for-profit organizations.

Workshops Opened Dialogue Between Stakeholders

We then conducted two issue-based workshops through an online video conferencing platform. The stakeholders that were invited had indicated in the survey that they were concerned with climate change or marine pests. We then used the outline in Figure 4 to direct one-hour conversations.

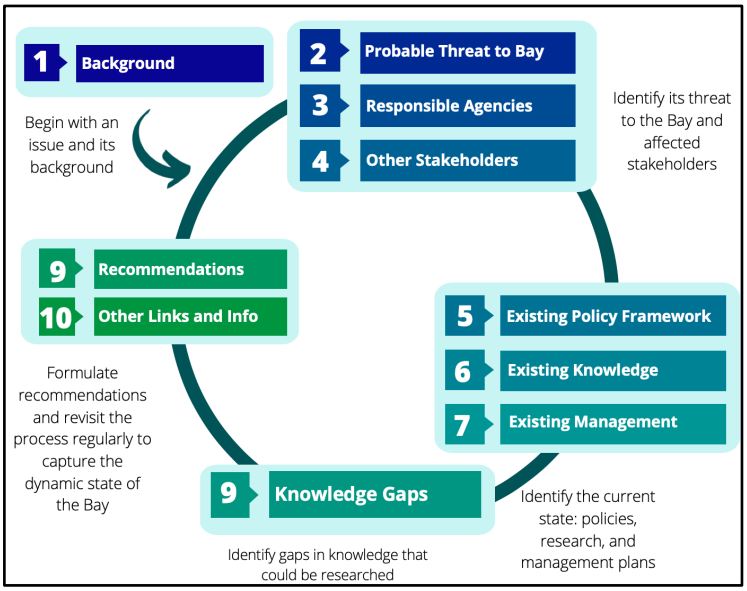

Figure 4: Issue Paper Content Outline

The goal was to begin dialogue between stakeholders and include them in the collaborative process from the beginning. If they are having conversations with other sectors and contributing to an issue paper, they will be more likely in the future to participate in the collaborative projects addressing Bay health.

Workshops Obtained Detailed Information from a Variety of Sectors

The climate change workshop had 3 participants from 3 different sectors: business, not-for-profit, and community groups. The primary concerns were related to shore erosion caused by rising sea levels and higher intensity winter storms. The main management strategy is building "hard structures," which are built perpendicular to the shoreline to reduce erosion but these are more reactive approaches than proactive. However, local universities are researching a "Grey to Green" project, which aims to replace artificial breakwaters with reefs or other natural elements.

The marine pests workshop had 9 participants from 4 different sectors: not-for-profit, community groups, business, and state government. Government agencies generally do not participate in discussions like this, so being able to engage them in the workshop was a massive step toward building a collaborative future for the Bay. The discussion of this workshop primarily focused on the Northern Pacific Seastar, a pest species, and the Purple Sea Urchin, a native species with suddenly overgrowing populations. The participants discussed physical removal as the most common management strategy, and identified current and future research needs to manage these populations effectively.

We used the online workshop format because of the stay-at-home orders in effect due to the COVID-19 outbreak. However, it was very successful and other organizations even began to

mirror this format for their own online events. In addition, stakeholders commented the format could be an effective strategy in the future, enabling discussion between geographically distant groups around the large bay. There were workshop attendees from Mornington Peninsula, which is typically too far from the EcoCentre for physical collaboration or discussion.

Issue Papers Summarize Knowledge, Opinions, and Recommendations of Stakeholders

Using information from the workshops, we developed 4-page issue papers for each of the topics. The papers briefly outlined the issue, compiling the knowledge and opinions of stakeholders. They summarized the current knowledge on an issue as well as outlined future steps for stakeholders to take. Most importantly, they will inform the public and serve as a template for the creation of future issue papers, potentially by other organizations.

The health of the Bay is very dynamic, so these issue papers will be evolving documents. They will be revisited repeatedly in the future to update them with new knowledge and recommendations and to continue involving other stakeholders to make the process more collaborative. Even in the next few months, the papers that we created will be discussed by the EcoCentre and other stakeholders to formulate further concrete recommendations, partnerships, and potential projects to help address climate change and marine pests.

Network Maps and Funding Research Encourages Organizations to Endeavor in Collaborative Projects

We also generated a geographic network map that will allow stakeholders to locate other groups that are focusing on similar issues, shown in Figure 4.

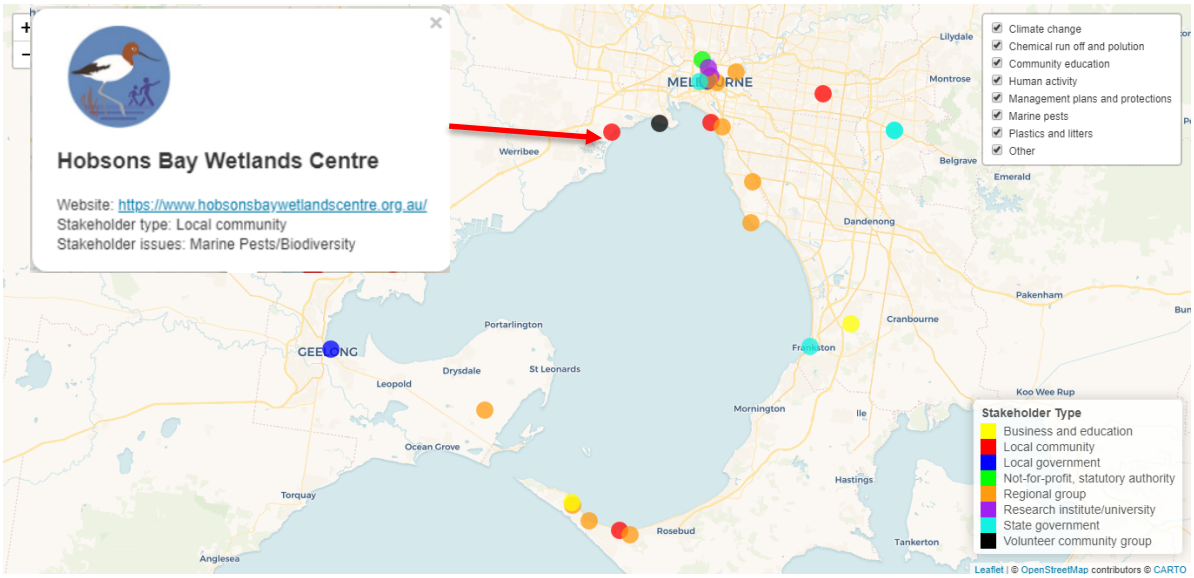

Figure 4: Image of Network Map and Menu for One Organization

The map has points representing 30 stakeholders around the Bay. Each point is color-coded by their sector, and priority issues are a filter for the map. Clicking on a point brings up an information box that shares details about the activities of that stakeholder. For example, if a not-for-profit wanted to begin a collaborative project related to marine pests and was hoping to

collaborate with a government organization or get information from a research institute, they could consult the map and find potential partners. The map will be hosted on the EcoCentre's website and draw on information from a spreadsheet on the site, allowing easy updating and maintenance by the EcoCentre. Stakeholders can contact the EcoCentre about adding information to the map.

We also did research on 17 grantmakers that fund projects relating to marine environments. Many organizations in Melbourne are concerned about their future financially, especially due to COVID-19 drastically affecting their fundraising season. We hope the collaboration tools we have developed will encourage stakeholders to pursue opportunities collaboratively and improve their chances for securing grants. An example of the grant information sheets we developed is shown in figure 5.

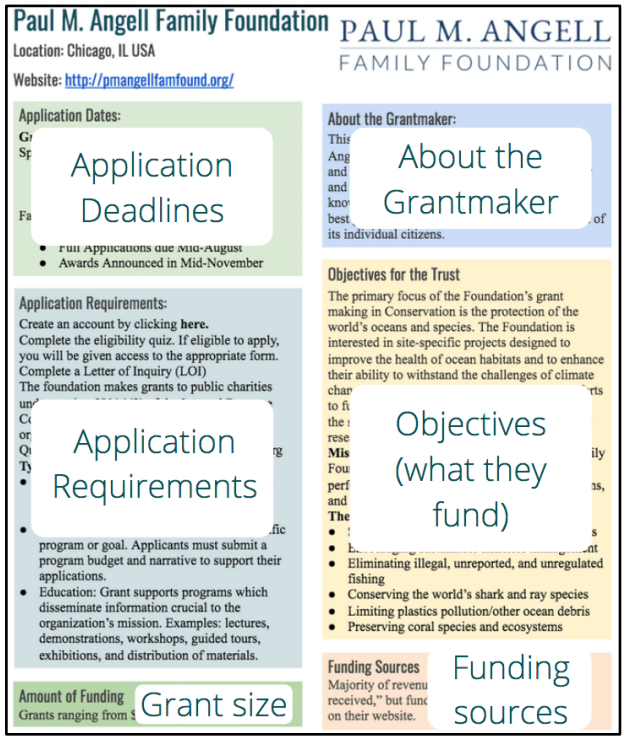

Figure 5: Example of grantmaker information

Conclusions and Recommendations

We developed a 20-page booklet outlining this process for stakeholders. The long-term goal is for the EcoCentre and stakeholders to participate in workshops and develop issue papers for all of the threats to the Bay. Other organizations will conduct new issue-based workshops and revisit old topics. From here, they can cooperatively develop recommended actions for stakeholders, and those that are interested can actively plan and deliver collaborative projects. One measure of the long-term success of this program would be measured by the number of stakeholders around the Bay that participate in collaborative projects.

Executing the process that we have developed and laid out will normalize collaboration around the Bay. The process will benefit all of the stakeholders by improving Bay management and health. It could be a framework for future projects with the EcoCentre and potentially the basis of a new era of collaboration around Port Phillip Bay. It is our final recommendation that this process is utilized by future IQP teams to collaborate with the EcoCentre and identify achievable projects for the stakeholders of the Bay. This continuation of our project will further strengthen the commitment to cross-sectoral collaboration.

Authorship

Peter Dentch completed all of the R coding for the creation of the Network map. He also wrote a user guide to the program for the EcoCentre to use as well as the sections in the paper and sponsor booklet describing the network map.

Salvatore Lombardo analyzed the workshop data and created correlating graphics that were included in the paper and the sponsor booklet. He wrote, formatted, and created infographics for the sponsor booklet and wrote the recommendation and conclusion sections in the paper. He also created the majority of the agendas for each meeting.

Shelby Morrison was the main creator of the climate change issue paper as well as formatted and researched the funding grant 1 pagers. She wrote sections to summarize information and formatted the sponsor booklet. She was the main author in the survey and funding result sections as well as the primary editor of the issue paper result section and the conclusion.

Nicole Shedd was the main creator of the marine pest issue paper and researched grantmakers for the funding grant 1 pagers. She analyzed the audio recording for both workshops. Nicole wrote, formatted, and created infographics for the sponsor booklet and the paper. She was the main author of the executive summary as well as the workshop, issue paper, and network map result sections. Nicole was also the leading editor.

All the authors and editors of the introduction, background, and methodology were the result of collaborative writing processes where sections were divided up and the author and editors always changed.

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1. Introduction

The protection of marine environments in a rapidly changing world is more pivotal now than ever before. Globally, there are countless factors in the deterioration of these aquatic habitats. From microplastics to climate change to direct human degradation, the pressures would be crippling without intervention (Hitz and Smith, 2004). Luckily, over the past two decades, as climate change has become a household topic of discussion, the level of environmental awareness has grown tremendously.

In Melbourne, the protection of marine habitats has grown in importance as more than a dozen documents of legislation have been put into place surrounding their main body of water, the Port Phillip Bay (PPB), and its surrounding catchments. However, this legislation has not stopped widespread deterioration of the Bay as the city's population has doubled since 1970 from 2.5 million citizens to 5 million and is expected to surpass 6 million in 2035 (Macrotrends, 2020).

In 1999, the city of Port Phillip and several local community groups conceived the idea of the EcoCentre, and Neil Blake, a local activist and council member, became Founding Director. Neil was given the title of Baykeeper in 2008 and became the face of PPB. Since its creation, the EcoCentre has grown to create over 240 partnerships, supported countless legislative acts, and spread knowledge of the Bay throughout the community and region. In 2015, Neil stepped down from his position of Director to direct his focus on community outreach. However, he still maintains his role as Baykeeper and plays a role in the direction of the organization. Neil has decided that 2020 will be his last year with the EcoCentre, and he will retire after developing a successful succession of his Baykeeper position.

The EcoCentre's goal is to encourage the collaborative model that was used in their creation and previous local projects. Cooperative action could help tackle the key environmental problems facing the Bay and encourage creative solutions. This project is intended to assist the Port Phillip Baykeeper Program in developing a cross-sectoral collaboration model to promote cooperative action among the stakeholders of the Bay. The project will develop a process for evaluating long-term threats to the Bay and developing issue papers based on discussions between organizations. The collaborative issue paper development process, paired with using an issue-based network mapping tool we developed to identify potential partners, will promote cooperative action around the Bay. This process was applied in the project for two issues -- marine pests and climate change -- and will eventually be used to document other priority issues surrounding the Bay.

2. Background

Within the past decade, Port Phillip Bay has undergone a large-scale deterioration. First-hand accounts say species of fish and invertebrates have disappeared as their natural habitats have been destroyed (Jung et al., 2011). Climate change will have an increased impact on the Bay, resulting in salinity reaching critical levels at over 38 g/kg, compared to the Bay's 30 year average of 35.6 g/kg (Lee et al., 2012), more severe weather events, and accelerated coastal erosion (Burton, 2014). There are a large number of invasive species that now live in the Bay. About 13% of the species are invasive or cryptogenic, meaning their origin is unknown. These species most densely populate the seven shipping ports that exist in PPB (Hewitt et al., 2004). The Port of Melbourne, located in PPB, has undertaken a large-scale dredging project to deepen certain areas that could affect the health of the Bay (Port of Melbourne 2012).

In this chapter, we first introduce the history of Port Phillip Bay and its significance to the community in Melbourne. Next, we describe the main challenges facing the Bay and their impact on the community and biodiversity. We then define the Baykeeper program at PPB, as well as the current state of the Port Phillip EcoCentre and their connection to collaborative environmental action.

2.1 Port Phillip Bay

Port Phillip Bay (PPB) is a large bay in Melbourne, Victoria, spanning about 30 miles north-south and 25 miles east-west (Editors of Encyclopaedia Britannica, 2017). Figure 1 shows a satellite view of PPB. Its cultural significance dates back thousands of years and has a place in

Figure 1: Aerial View of Port Phillip Bay (source: Google Earth)

Aboriginal culture. PPB was once a flat, grassy plain known as Nairm. In the Aboriginal tale of how the Bay formed, a people called the Boonwurrung, who cared for the grasslands and forest, fought with other groups in the Kulin nation. The conflict, along with their neglect for Nairm and abuse of natural resources, was a sign of imbalance with nature. The ocean began to rise and flood the plain because of the chaos. The Boonwurryng sought guidance from Bundjil, their spiritual leader, and begged him to stop the ocean from rising. Bundjil walked out into the ocean, raised his

spear, and directed the ocean to stop flooding. To stop the destruction of their home, the Boonwurrung promised to respect their land. The ocean stopped rising further but did not retreat, leaving part of the plain filled with water and creating what is now known as Port Phillip Bay (Briggs, 2016).

As well as having historical significance, Port Phillip Bay has cultural significance today, as it is a central component of recreation in Victoria. Many water activities allow visitors to swim with fur seals and dolphins, kitesurf, snorkel, scuba dive, canoe and kayak, fish, and stand-up paddleboarding. There are also extensive walking and biking trails around the Bay. (State of Victoria, 2017) Port Phillip Bay is also host to many unique species. Data shows that it is host to more than 1,860 native flora and 600 native vertebrates. The Bay has beautiful starfish, birds, and even dolphins that are endemic, or unique, to Victoria (Museum Victoria, n.d.).

Port Phillip is also a hub of economic activity, as it hosts the Port of Melbourne. The Port of Melbourne is the largest container port in Australia, seeing over 3,000 ships annually and having a trade value of around $102 billion. Shipments entering and leaving the port affect thousands of businesses, as well as the people of Victoria (Port of Melbourne, 2019).

2.2 Challenges Facing the Port Phillip Bay

As the population grows in Melbourne, the human impact on the bay increases in severity (Harvey and Canton, 2010). Invasive marine pests disrupt the natural ecosystem in the Bay as well as climate change increases coastal erosion. Current community outreach needs to improve to create awareness of these problems facing Port Phillip Bay.

2.2.1 Marine Pests

Marine pests, or species that disrupt the natural environment, have been introduced to the coastal waters of Australia. In Port Phillip Bay, more than 160 species were potentially invasive. In an area with mostly native and endemic species, this is a considerable amount (Hewitt, 2004). An estimated 30 percent of these foreign pests found their way into this ecosystem from boat travel, as over 95 percent of Australian trade cargo is transported by ships (Marine Pest Plan, 2018). Active carrier transportation through international waters allows for species to move themselves to new locations by attaching themselves to hulls or remaining in the ballast water used by large ships for stability.

In recognition of this threat, the Australian government has committed to contributing $5 million to improving the biosecurity of the country (Marine Pest Plan, 2018). Australia also issued legislation for ballast water management in 2001 and additional requirements in 2004 for ships entering Victorian ports from other ports in the country. More recently, the Marine Pest Plan 2018-2023 is a collaboration between the Australian government and organizations to research and assess the current state of marine pest life in Australian waters to develop methods for removing these organisms and preventing their continued growth.

Once these species are introduced, eradicating them is nearly impossible due to their often aggressive feeding and reproductive habits. As a result, preventative measures against their introduction are the most effective ways of stopping new threat species. The Australian CSIRO agency, or Commonwealth Scientific and Industrial Research Organization, is researching more

advanced procedures of biological control such as genetic manipulation and developing species-specific bodies to target the unwanted ones, essentially biological warfare. (Hewitt, 2004).

2.2.2 Climate Change

Climate change is a global problem, but the primary concern for Port Phillip Bay is accelerated coastal erosion. To reduce the impact of rising sea levels, the city of Melbourne has placed low seawalls on some of the beaches, such as the Kilda Sea Baths, but these walls will not be effective in protecting against the rising storm surges (NATCLIM, 2007). Since the Water Act of 1989, Melbourne has started planning floodplain management in vulnerable areas of the Bay (Water Act, 1989). In the last decade, the Australian government has created initiatives to combat climate change. They understand that climate change will result in increased coastal erosion due to flooding and king tides (Port Phillip City Council, 2010). The government has funded assessments of the Bay to determine the future impacts of climate change (Department of Environment, 2019).

These assessments have determined that some stretches of the coast have a low vulnerability to coastal erosion due to PPB being mostly enclosed (Department of Environment, 2019). However, some beaches have a high vulnerability, such as the Chelsea Foreshore on the northeastern side of the Bay. Predicted increases of coastal erosion by 2040 will develop with more locations in PPB that used to have low vulnerability changing to high (Farrell, 2017). The most extensive impact on PPB due to climate change will be an increase in sea surface temperature (NATCLIM, 2007). Sea level rise will have an impact in all floodplain areas, but new infrastructure like sea walls can help protect against this.

2.2.3 Community Outreach

Education programs exist in Melbourne to get local students involved in the environment around them. Two of these curriculums from the EcoCentre are called "Tomorrow's Leaders of Sustainability," and "Expert in Residence," which embed sustainability and environmental learning in the classroom. Volunteer options are available such as building nesting boxes or collecting data on waterways by being a marine biologist for the day (EcoCentre, 2020).

The EcoCentre works with a variety of organizations that include other non-profits, both at the international, national, and local scale. They work with Tangaroa Blue to remove plastic debris from waterways and communicate with local waterkeepers. They also have relationships with government organizations at the state and regional levels, such as the City of Port Phillip and the Environmental Protection Authority. The Baykeeper has also built a relationship with local businesses that host recreation in the Bay. They partner with research organizations, including local universities, for data collection purposes. Lastly, they advocate for community organizations and groups, such as yacht clubs (EcoCentre, 2020).

2.3 The Case for Collaboration

The community-managed Port Phillip EcoCentre was conceived in 1998 by the City of Port Phillip in collaboration with Earthcare St Kilda and other local community groups to create a hub for environmental action. This initiative was founded on the strong relationships between the

local government and several community groups that had formed since the mid-1980s to protect the local environment. The local government and community sectors each had essential strengths to contribute, and the strong partnership encouraged external stakeholders to invest in the project (Port Phillip EcoCentre, n.d).

The benefits of cross-sectoral collaboration had been highlighted locally by the state government declaration of St Kilda Breakwater Co-operative Management Area for Wildlife in 1992. In response to a 6-year study documenting the presence of a colony of around 100 Little Penguins, a Cooperative Management Advisory Committee convened, with representatives from the Department of Conservation and Environment, Earthcare St Kilda, Port of Melbourne Authority, Royal Melbourne Yacht Squadron, St. Kilda City Council, and a penguin researcher. The 'cooperative' representation ensured the aims and responsibilities of all stakeholders were considered to inform necessary management actions, such as reconstructing the deteriorating breakwater. By 1998 the breakwater had been completely renovated, and by 2013 the safe boating capacity of St Kilda harbor was substantially increased, and the penguin colony had increased to around 1,400 (Earthcare St. Kilda, 2016).

The EcoCentre is advocating that similar cross-sectoral collaborations be adopted for other issues affecting the Bay. In 2020, the EcoCentre has 32 officially affiliated groups and over 240 partner organizations. These include valued international affiliations with the Waterkeeper Alliance. The City of Port Phillip continues to provide base funding, which has enabled the EcoCentre to effectively seek project funding from a range of other sources, including state and federal government and the philanthropic sector.

Neil Blake (the current Port Phillip Baykeeper) was conferred the honorary title in 2008, in recognition of his work to protect the Bay: commencing as a volunteer with the St Kilda Penguin Study (1985-2002); founding member of Earthcare St Kilda (1989); and founding Director of Port Phillip EcoCentre (1999). The Port Phillip Baykeeper program is a part of the International Waterkeeper Alliance, comprising non-governmental defenders for specific bodies of water, such as rivers, lakes, and bays. Waterkeepers act as the voice for the body of water they represent.

3. Methodology

This project is intended to assist the Port Phillip Baykeeper Program in developing a cross-sectoral collaboration model to promote cooperative action among the stakeholders of the Bay. To obtain this goal, we completed the following objectives:

1. Identify stakeholders' priorities with regards to Port Phillip Bay
2. Promote conversations about priority issues among stakeholders
3. Develop issue papers on priority issues to cement EcoCentre stance
4. Promote action among stakeholders in issue-based networks

These steps and the desired outcomes are illustrated in Figure 2. To complete the first objective, we worked with the EcoCentre to survey stakeholders' priorities and partnerships. For the second objective, we helped organize and facilitate two issue-based stakeholder workshops, promoting conversations between a diverse range of stakeholder types. For the third objective, we developed two 4-page issue papers outlining the research, ideas, and solutions of stakeholders. To complete the final objective, we developed issue-based network maps to visualize actors and organizations that are working on those issues and promote collaboration between stakeholders. For this final objective, we also developed 1-page outlines of grant requirements to aid stakeholders in getting funding for collaborative projects.

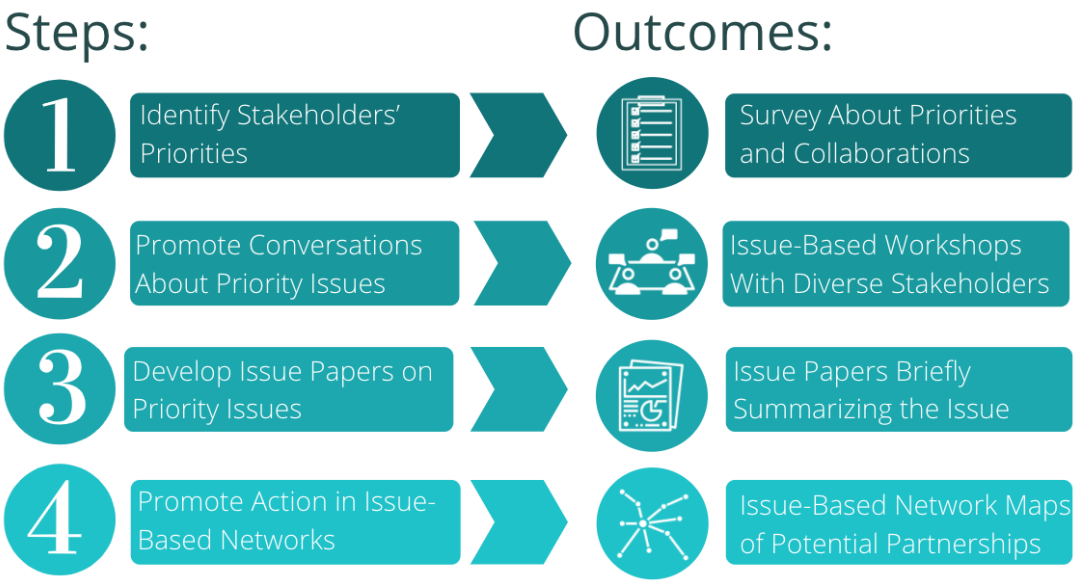

Figure 2: Steps and Outcomes of the Collaboration Plan

All of the work for this project was done remotely. The worldwide coronavirus outbreak in early 2020 prevented our group from traveling to Melbourne to complete the project as planned and forced most of the stakeholders to work from home. The original plan to do in-person interviews and discussions changed as a result. However, this opened up opportunities to reduce geographic barriers and establish a virtual workshop system that may be a valuable collaboration approach even after the removal of stay-at-home restrictions.

This project focuses on the environmental state of Port Phillip Bay and the surrounding areas. The Waterkeeper Alliance has connections to waterways worldwide. Research of the Waterkeeper Alliance revealed connections and global priorities, but the primary focus of this research was on the Port Phillip Bay Area. The city of Melbourne is large and densely populated, so it has the most consequential impact on PPB. Figure 3 is a map of the Bay and its watersheds. There are many organizations responsible for individual watersheds and individual sections of the Bay, as well as volunteer and government organizations at the state and national levels.

The research for this proposal was conducted over four months, consisting of both desktop research and surveys and interviews of stakeholders. The data for this project formulated a stakeholder workshop process, issue papers to summarize priority issues of the Bay, and geographic network maps to visualize organizations and promote a new era of cross-sectoral collaboration. The primary stakeholder is the EcoCentre, but this project aims to have effects on other organizations and individuals that have priorities in the PPB. This methodology identifies the most critical aspects of creating networks and promoting collaboration and what information is necessary to contribute to this process.

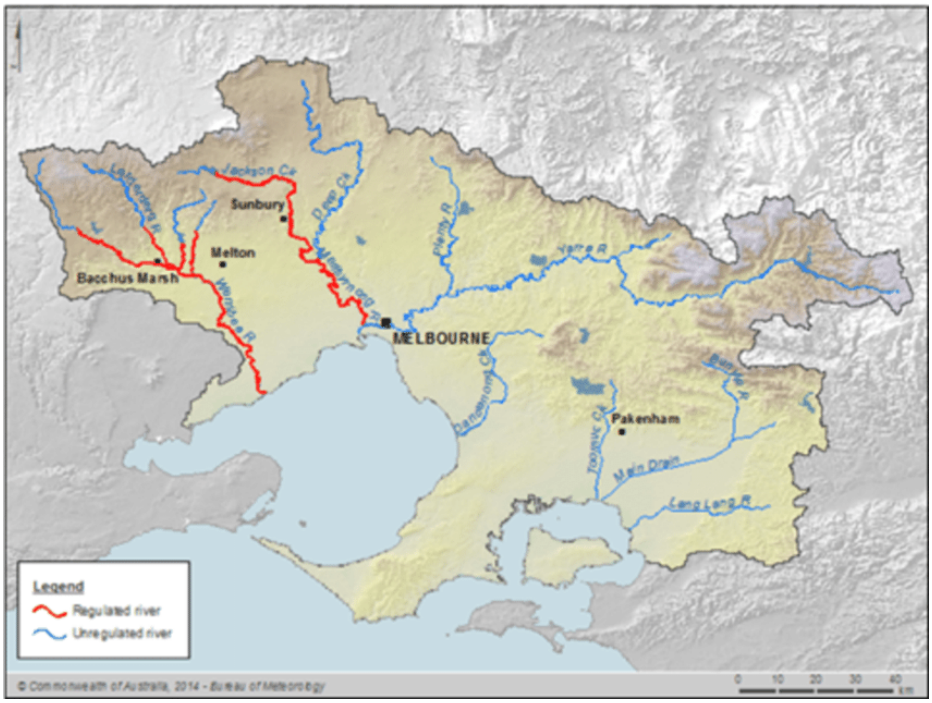

Figure 3: Watersheds of PPB

Reprinted from Furlong, C.R., Uittenbroek, C.J., Gulsrud, N.M., Termes-Rifé, M., Dodson, J., & Skinner, R. (2018). Understanding the role of the water sector in urban liveability and greening interventions: Case studies on Barcelona, Rotterdam, Amsterdam, Copenhagen and Melbourne.

3.1 Identifying Stakeholders' Priorities With Regards to Port Phillip Bay

The first step in this project was to understand the issues facing Port Phillip Bay. The Baykeeper provided a list of organizations that have an interest in the Bay (See Appendix A). This list is not complete, and more organizations will be added and potentially sent a survey after this project concludes. Initially, the partners of the Baykeeper program completed the survey, called

the Baykeeper Strategy Survey, to identify the issues on which each organization focuses. Each survey began with a written consent form and took into account ethical concerns. The consent form explained what the information would be used for and allowed the participant to maintain confidentiality if desired (See Appendix B). This survey also included an invitation to participate in additional interviews and a roundtable discussion based on the issues identified later on in the project.

Using good survey practices ensured that the data collected was as complete and accurate as possible. We followed five guidelines in survey design. First, the questions are multiple-choice or "select all that apply" when possible to make sure the respondents understood the question. Second, all of these types of questions contained an "other" selection, where participants could write in anything that was not listed. Third, the length of the survey was limited by asking only questions that would provide useful data. Fourth, the language of the questions was professional, concise, and easily understood by an Australian audience. Lastly, the language of the questions minimized bias and ensured the accuracy of all data collected (Tartell, 2015).

The content of this survey focused on the individual's thoughts on where the Baykeeper program could have the most impact on the health of the Bay (See Appendix C). Some of the questions that were asked in the survey focus on how stakeholders can be organized which is illustrated in Figure 4. The survey aimed to identify five key attributes of the stakeholders of Port Phillip Bay. These five attributes are:

1. Bay Health Issue Focuses
2. Types of Organisational Work
3. Community Outreach Practices
4. Limitations and Resources
5. Collaborations with the Baykeeper

Figure 4: Focus Areas in the Survey to Identify Stakeholder Priorities

3.2 Promoting Conversations About Priority Issues Among Stakeholders

The Baykeeper had initially planned to begin the term by hosting a roundtable workshop at the EcoCentre to gather stakeholders and promote collaboration between the groups. However,

the workshop moved to an online platform and occurred after establishing a connection with the stakeholders. We worked to create a format for the workshop that could be replicated by the EcoCentre or other organizations on further issues.

3.2.1 Facilitating Online Roundtable Workshops

Two stakeholder workshops ran on the online video-conferencing platform, Zoom. The first workshop focused on the impacts of climate change. The second workshop focused on marine pests. The roundtable began with reiterating the purpose of the workshop and introducing the goals of our project. We gave a brief tutorial of zoom, and the participants introduced themselves and the organization that they worked for and discussed what outcomes they hope to see as a result of the forum. We followed the outline of the issue paper for the structure of the workshop (See Appendix D).

Throughout the workshop, our group took notes on the discussions. These notes mostly focused on the overall issue and solutions, as the participants already filled out surveys outlining their organization's priorities. The workshop was also later transcribed and any key points or additional information was noted. Each workshop provided in-depth content for one of the issue papers. The main goal was to promote communication between different groups, allowing them to come up with solutions to common problems jointly. Also, it promoted collaboration by encouraging the sharing of resources that other organizations are lacking.

3.2.2 Facilitating Additional Conversations

After the workshop, participants filled out a follow-up survey to give feedback on how the workshop went and provide suggestions (See Appendix E). This survey was emailed to participants with the notes from the workshop and allowed the participants to alter or add information. We also developed follow-up interview questions to obtain more information from stakeholders who were not at the workshop, but could still give key information (See Appendix F). None of these interviews were conducted, due to time constraints, but they are still an important resource for continuing to develop these papers and beginning the development of new ones.

3.3 Developing Issue Papers on Priority Issues to Cement the EcoCentre's Stance

Short issues papers were developed from desktop research, information from stakeholders through the workshop, and follow-up interviews from the Baykeeper. In this case, we did not conduct formal follow-up interviews, but the Baykeeper gave additional information and feedback after the workshop. The issue papers were developed based on an outline from the EcoCentre on what content should be included similar to Figure 5 that breaks down the sections of the issue paper (See Appendix G).

An issue paper published in 2019 by April Seymore and the EcoCentre was an example of the content and structure of the paper (Port Phillip EcoCentre, 2019). They will also have infographics and charts to convey information similar to a fact sheet entitled Insatiable Thirst by

Figure 5: The Issue Paper Structure with Guiding Thoughts for Each Section

End Coal, an advocacy group (EndCoal, n.d.). The overall goal of the issue paper is to compile a general overview of the issue.

The first step in developing the issue paper was to perform desktop research. This research provided information to answer the research question in Appendix G and develop each section in the paper. After the desktop research, any gaps were identified and filled through feedback from the Baykeeper. The roundtable workshops enhanced the information with the perspectives of other stakeholders and allowed us to focus on the sub issues that stakeholders were most concerned with. The information was examined, and strategies to visualize the data were developed. Infographics and other images were developed to enhance the delivery of the information and included in the paper.

3.4 Promoting Action Among Stakeholders in Issue-Based Networks

The final goal of this project is to visualize issue-based networks and promote action amongst stakeholders. Stakeholders will be encouraged to work with organizations that have similar focuses and will be encouraged to begin joint projects to receive more funding.

3.4.1 Developing a Network Map

The data about stakeholder type and priority issues were used to create issue-based networks for each problem sector identified in the survey. A simple yet effective means of displaying this information is through a geographic network map. The graphic visualizes the relationships between the organizations in the Port Phillip Bay area. The graphic also displays which issues are most relevant to each organization. The map was developed in Javascript, primarily with a library called Leaflet, an application programming interface or API for creating interactive geographic maps. Because this package is in JavaScript, it is able to be run on a web page so that it can be viewed by anyone interested in using this tool. The program reads from a CSV or comma-separated values file, a table which can be edited in Microsoft Excel in order to

plot the colored circles on the map and formats a menu based on the additional information of the table. An editor would need to provide a name and the latitude and longitude coordinates to add a location on the map, then input issue focuses, organization type, and other information to format the remainder of the map. This functionality was developed so the EcoCentre can update the map with new organizations in a simple and intuitive manner without needing to alter any Javascript code.

3.4.2 Organizing Funding Sources

The EcoCentre and the Baykeeper program primarily runs through partnerships and grants from local organizations. With Neil retiring soon, this was the optimal time to look for new funding streams. International partners could provide some untapped potential to help fund more projects with the new Baykeeper. Then the analysis of these sources prioritized each in terms of their benefits to the Baykeeper program.

A database called Foundation Directory Online provides information on grantmakers and the grants they fund as well as the recipients. These can be categorized based on the subject area of the grants as well as the locations of previous allocations (See Appendix H). There are several grantmakers in the Melbourne area as well as in the United States that fund environmental topics, such as climate change and biodiversity. The primary search areas are environment, climate change, and biodiversity since these have the majority of grants. The geographic focus is Melbourne to ensure that funding will reach this area. The support strategy that was targeted was outreach since that is one of the challenges that the Baykeeper program faces (Foundation Directory Online, 2020). Other than funding streams in Victoria, there are foundations in the United States that have previously funded projects in Melbourne. Besides looking at online databases for potential funding streams, another approach was working with the Waterkeeper Alliance to use their sources to determine new funding partners for the Baykeeper Program in the Port Phillip Bay.

The next step was to prioritize the potential funding sources for the EcoCentre to use. The current funding sources of the Baykeeper Program also factored into this analysis. The EcoCentre wants to place its focus on finding individual donors, foundations, and grants rather than government funding. We further researched grants to determine the requirements and monetary sources, then included this information in a 1-page outline. The organization of these funding streams will aid the EcoCentre in understanding these opportunities. Each potential funding stream found through desktop research and from the Waterkeeper Alliance has a page outlining the amount that the grant is worth, application requirements, and what Baykeeper Program Projects could earn the grant. These funding outlines will allow the EcoCentre to evaluate if the funding stream is worth pursuing. All of the above objectives were completed according to a 7-week timeline (see Appendix I).

4. Results

This project helped to establish the priorities of stakeholders around the Bay starting with the survey results from current and potential Baykeeper partners. These survey results informed the network map data and the two issues discussed at the workshop. The roundtable workshops initiated dialogue between different organizations to bring them together for the common problem. Analysis of the workshop information guided the issue papers for a collaborative effort. Along with organizing priority issues across the Bay, a potential funding stream document that contains information on grants and the grantmakers was provided to help the creation of new collaborative projects.

4.1 Stakeholders' Priorities With Regards to Port Phillip Bay

The Baykeeper Strategy Survey (See Appendix C) was utilized to understand the five key attributes of the stakeholders of Port Phillip Bay:

1. Bay Health Issue Focuses
2. Types of Organisational Work
3. Community Outreach Practices
4. Limitations and Resources
5. Collaborations with the Baykeeper

With this information, our project and the Port Phillip Baykeeper can effectively evaluate each of the stakeholders who respond. This information was used to determine the participants of the roundtable workshops and to develop the network map tool that will help promote cross-sectoral. The survey also obtained information about organizational work (See Appendix K), community outreach practices (See Appendix L), resources offered and needed by each stakeholder (See Appendix M), and previous collaborations with the Baykeeper and their success (See Appendix N). While these data could be used in the future to organize partnerships, they ultimately were not impactful to the later development of this project. In the following sections, we outline the results that determined the topics of the workshop: climate change and marine pests.

4.1.1 Overall Priorities Revealed in the Survey

The survey was sent out by the Baykeeper to 50 stakeholders and there were 30 responses, 2 of which were received after we completed our analysis. Organizations reported 113 issues. The stakeholders included the local, state, and federal government, the local community, regional not-for-profit organizations, research institute/universities, tourism and education, as well as statutory not-for-profits. The six main priorities revealed in the survey from the current and potential partners of the Port Phillip Baykeeper were:

1. Plastics and litters
2. Chemical runoff and pollution
3. Management Plans and Protections
4. Human Activity
5. Marine Pests/ Biodiversity
6. Climate Change

The graph with the percentage of stakeholders that share the concern for the issue can be seen in Figure 6. A broader breakdown of the issues and the sectors concerned with the threat can be seen in Appendix J.

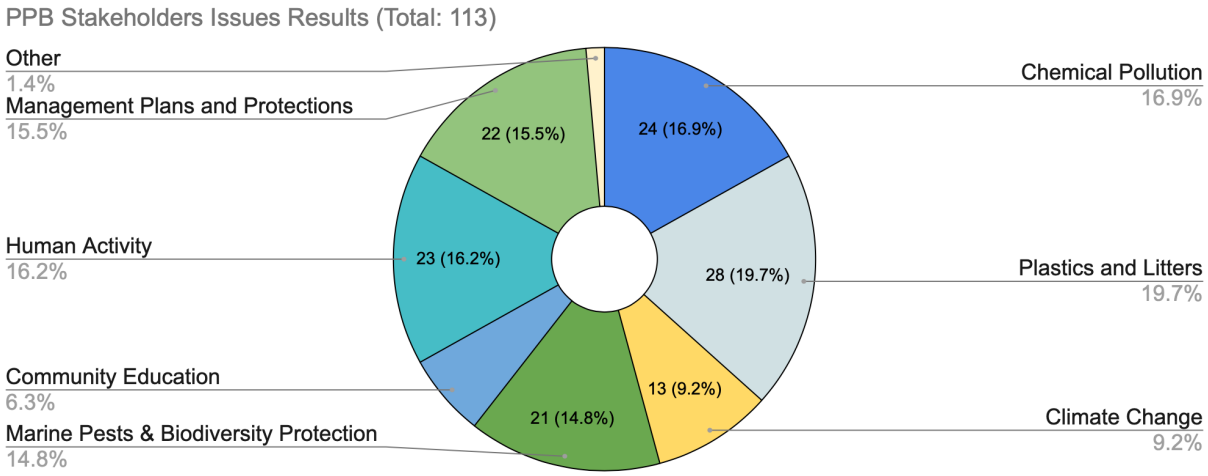

Figure 6: The 27 PPB Stakeholders Organized by Priority Issues

The local community groups were most concerned with chemical runoff and pollution as well as human activity. The local government mostly documented issues in the climate change category. Not-for-profits had most issues in both marine pests and biodiversity and plastics and litters. Research institutes and universities had equal interests in plastics and litters, management plans, and chemical runoff and pollution. State government respondents had spread out concerns but focused more on marine pests and biodiversity. Businesses were most concerned with human activity and climate change.

The two issues that we chose for issue papers were climate change and marine pests because they are a high priority for different sectors and had many subcategories for more information. Marine pests and biodiversity issues are a concern for six different stakeholder types, and eight subcategories showed this is a significant issue in the Bay. Climate change issues are a concern for six stakeholder types, and there were four subcategories.

4.1.2 Stakeholder Priorities Related to Climate Change

There were fourteen issues raised related to climate change by nine stakeholders. These stakeholders include two local community groups, each raising concerns as well as one tourism business that raised two issues concerning climate change. A research institute listed one threat and a state government organization listed two. Two local government organizations listed five concerns, and two regional not-for-profits each listed one issue categorized under climate change. There were also four main categories within the climate change issue. They were coastal erosion, the impact of climate change, a lack of education, and water temperature. The graph showing these subcategories and the number of issues from each can be seen in Figure 7.

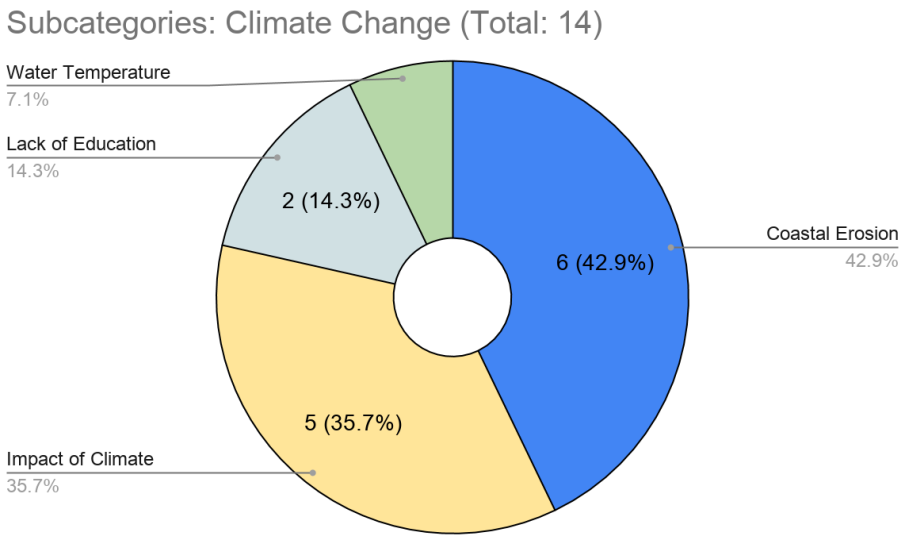

Figure 7: 14 Stakeholder Concerns Related to Climate Change Organized into Subcategories

4.1.3 Stakeholder Priorities Related to Marine Pests

There were 17 stakeholders in PPB that raised 21 issues relating to marine pests and biodiversity. These stakeholders include three local community groups that each raised a concern related to marine pests and one local government organization that had an issue. Nine regional not-for-profit organizations listed 11 threats and a statutory authority not-for-profit listed two. Two state government organizations raised three issues categorized under marine pests, and a research institute raised one. There were eight subcategories within the marine pests and biodiversity category, shown in figure 8. The largest subcategory was invasive or pest species in general. The next largest group was biodiversity protection. Following was threatened species, habitat

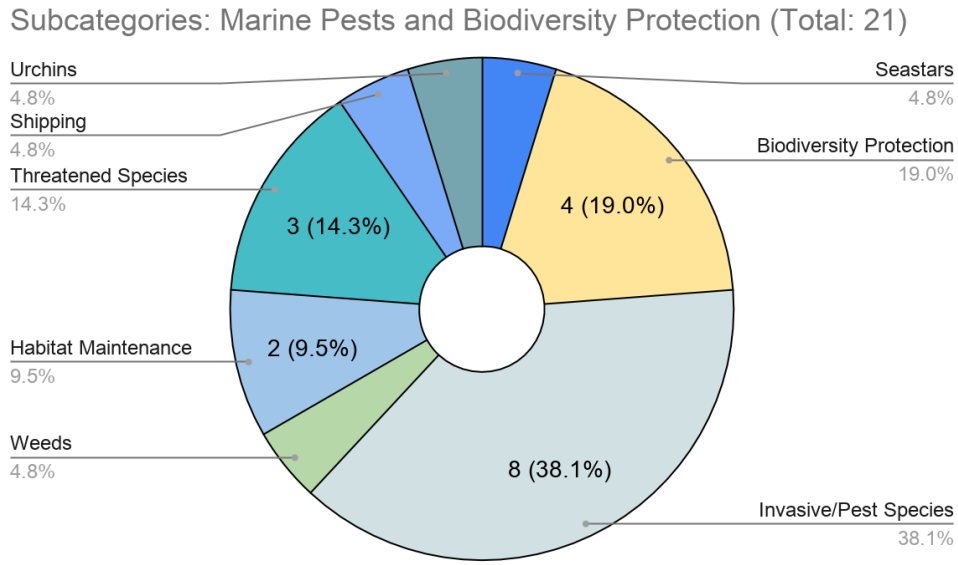

Figure 8: 21 Stakeholder Concerns Related to Marine Pests and Biodiveristy Organized into Subcategories

maintenance, and shipping with some specific examples of species, including urchins, sea stars, and weeds.

4.2 Stakeholder Conversations About Priority Issues

The two main topics that were determined to be the most beneficial in collecting information from the roundtable workshop was marine pests and climate change. As described in section 4.1.1, several stakeholders expressed issues related to marine pests and climate change. Participants in the roundtable workshop shared additional information about these two areas, and the Baykeeper communicated some of his knowledge.

4.2.1 Stakeholder Conversations About Climate Change

The first roundtable workshop was on climate change. The Baykeeper sent an invitation to all groups that indicated an interest in climate change in the survey (See Appendix O). It took place on Monday, April 20, 2020. Three stakeholders attended, from Rye Community Group, Canopy of Care, and Polperro Dolphin Swims (See Appendix P). We took notes on the conversation on-screen during the workshop and later compiled them to use (see Appendix Q). We learned that specific beaches and locations were being affected by coastal erosion to different degrees, depending on the destruction caused by sand movement on those beaches. The participant also noted current studies, such as Grey to Green, that are working on artificial breakwaters with reefs and the research organizations that are working on other projects (National, 2019). They discussed multiple policies that affect the Bay relating to climate change protection. This information helped fill the gaps in knowledge from the beginning desktop research related to climate change. The workshop was transcribed and some key points were noted in Figure 9.

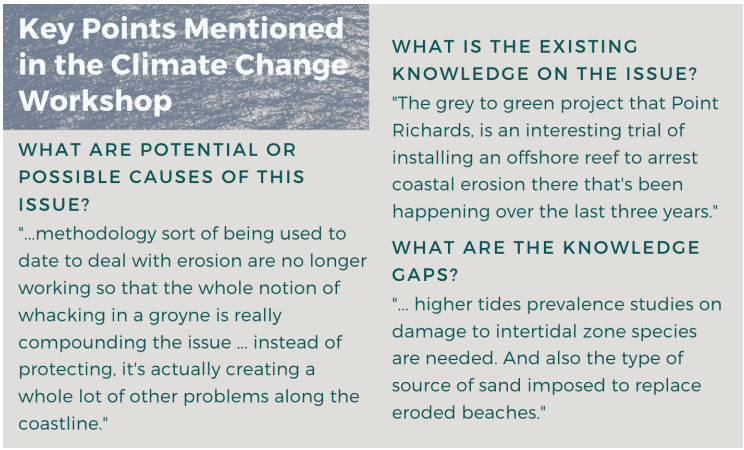

Figure 9: Key Points by Stakeholders from the Climate Change Workshop

4.2.2 Stakeholder Conversations About Marine Pests

The second roundtable workshop was on marine pests. The Baykeeper sent an invitation to all groups that indicated an interest in marine pests in the survey (See Appendix R). It was held on Tuesday, April 21, 2020. Nine stakeholders attended, from the Department of Environment, Land, and Water Planning (DELWP), Jawbone Marine Sanctuary Care Group, Polperro Dolphin Swims, and Victorian National Parks Association (See Appendix S). We took notes of the

conversation on-screen during the workshop and later compiled them (See Appendix T). The discussion focused on the effects that Northern Pacific Seastars and Purple Sea Urchins are having on the Bay. Participants discussed current management strategies, including their fallbacks, and mentioned several studies that are being done at universities to understand the species. They also discussed knowledge gaps that they thought researching would help address the issue. All of this information helped build the issue paper content. The workshop was also transcribed and key points were noted, as shown in Figure 10.

4.3 Issues Papers on Priority Issues

We developed four-page issue papers for each of the two priority issues: climate change and marine pests. The papers start with a vulnerability background and history of the issue. The next sections describe the current threats in PPB and the stakeholders. There is a brief portion

Figure 11: Key Points by Stakeholders from the Marine Pest Workshop

listing some existing policy frameworks. The last two sections are about prior and existing knowledge as well as the knowledge gaps around the issue. The issue paper structure is similar to

Figure 10: The Issue Paper Cycle Outline that Summarizes Knowledge

workshops but it is also a changing and growing document that is demonstrated in Figure 11. The paper includes infographics and figures to illustrate the problem clearly for the audience. The issue paper for climate change focuses on rising sea temperature as well as erosion and sand movements that threaten beaches, vegetation, and marine species (See Appendix U). The issue paper for marine pests focuses in particular on the management of Northern Pacific Seastars and Purple Sea Urchins and their impact on the Bay and its stakeholders (See Appendix V).

4.4 Action Among Stakeholders

We also created a geographic network map for stakeholders to use as a tool to foster action and collaboration around Port Phillip Bay. It helps visualize the organizations that have an interest in specific issues. This map could be used as a tool by stakeholders around the Bay looking for groups to collaborate with. Collaborative efforts could result in more progress. We also created 1-page outlines of grants. The outlines could not only help the EcoCentre find funding but could also assist other organizations in funding new collaborative projects. With more resources and abilities, they would be more likely to get grants and have a greater ability to effect change around the Bay.

4.4.1 Network Map

For each issue, a colored dot appears on the map. The dot represents the actual geographic location of the organization or is placed in the Melbourne Central Business District if a specific location cannot be provided. The color represents the stakeholder type (e.g., not-for-profit). Hovering over the dot reveals a menu, including the name of the organization, the issues they focus on, and the link to the organization's webpage. Figure 12 is an image of the network map.

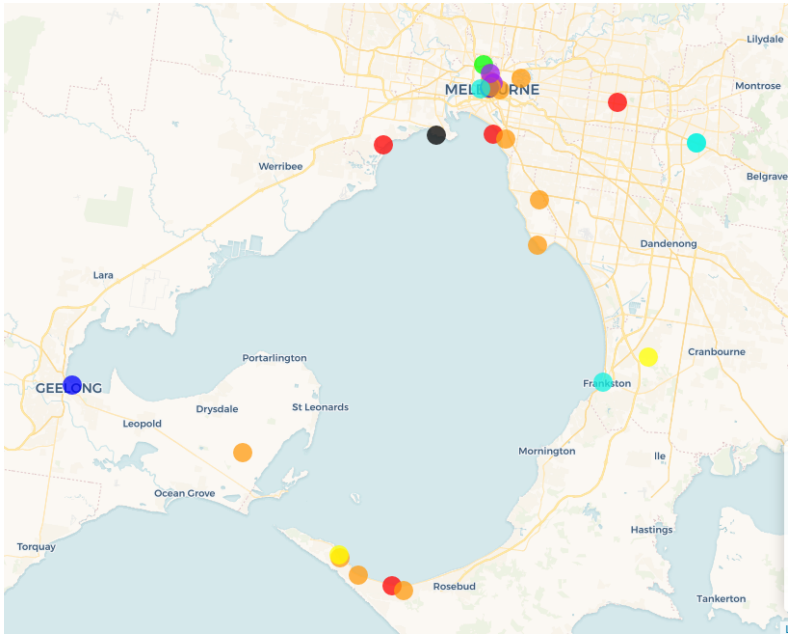

Figure 12: Example of a Network Visualization

The map organizes this information of 30 stakeholders (See Appendix W). At a glance, the map displays their location, organization type, and broad issue focuses. If the user clicks on a dot, the name of the organization, logo, website, and issue focuses are displayed in a menu, as shown in Figure 13 below. In Figure 13, the map also filters the data to only display organizations that are concerned with marine pests.

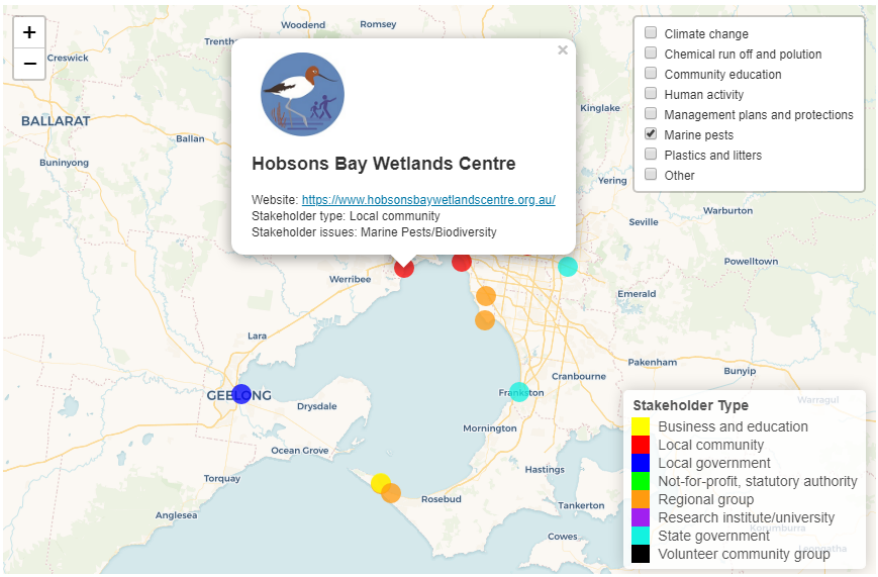

Figure 13: Network Visualization Graph Selecting Only Marine Pests and Showing Menu

The map will be hosted on the EcoCentre website. The program populates the map using data from a spreadsheet that will be available to view on the EcoCentre's servers. Should a new stakeholder wish to be added to the map, the EcoCentre will be able to alter the map by modifying the spreadsheet and then simply reloading the web page on which the map is displayed. While anyone can view the map, only the EcoCentre may directly modify this spreadsheet to prevent any undesirable change to the map. On the webpage, there are instructions on who to contact if an organization wants their information added or updated. For full detail there is a "how-to" guide that the EcoCentre can use to fully manipulate the map in the future (See Appendix X)

4.4.2 Funding Streams

Using Foundation Directory Online, 17 possible grantmakers have values similar to the Ecocenter and Baykeeper program. The EcoCentre has already used four of the grantmakers, and six are international organizations. In Figure 14, shows all the grantmaker organization logos that could be useful to the Baykeeper. We used the organization's website and the Australian Charities and Not-For-Profit Commission database to obtain the information.

Figure 15: Potential Grantmakers Found Through Foundation Directory Online

The information sheet for each grantmaker has six sections with details on the application rounds, application requirements, about the grantmakers, the objectives for the trust, the primary funding sources, and the usual amount of funding. A page with these sections outlined can be seen in Figure 15. The full document of possible funding grants and grantmakers is in Appendix Y. The

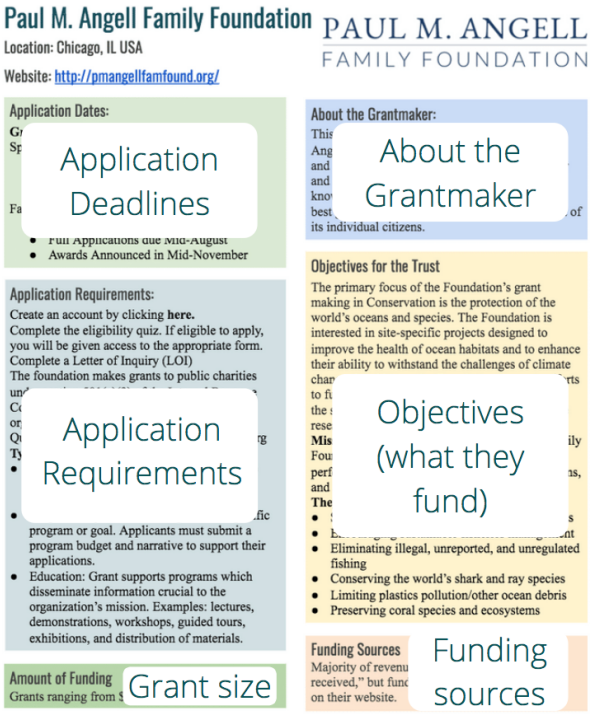

Figure 14: Example of Grant Information Sheet

information is for use by the Port Phillip Baykeeper and the Port Phillip EcoCentre. They may also choose to share this information with other stakeholders around the Bay to promote finding grants for collaborative projects. This would be an effective way to effect change on the Bay and snowball into multiple cooperative projects targeting common issues.

5. Recommendations

Our recommendations for the stakeholders of Port Phillip Bay can be summarized by the recommended collaboration plan implementation cycle. As seen in Figure 16 below, this cycle includes four steps:

1) Expanding Workshop Topics
2) Initiating New Workshops
3) Consolidating Viewpoints
4) Implementing the Collaboration Plan

Figure 16: Recommended Collaboration Plan Implementation Cycle

These recommendations show how the process developed through this project is not meant to be utilized only once. It is a cyclic process in which the implementation of collaboration on one project can lead to a cascade effect throughout the Bay.

Through this project, examples of Steps 1 through Step 3 were completed by the project team and the EcoCentre. The process of determining a workshop topic was more in-depth due to the desire of the EcoCentre to have further information of their potential partners as the Baykeeper program transitions. However, it was determined that there was interest and a need for workshops on Marine Pests and Climate Change. The EcoCentre took the lead for these two workshops but moving forward, any organisation can organise and lead a workshop. The discussion of the two workshops followed the layout of an issue paper. This is an easy way to organise the general thoughts from the participants of the workshop and easily translate the current state of a bay health issue for those not in attendance. From here, discussions can begin between the participants of the workshops as to what the best course of action is. Utilizing the network map tool and the issue paper developed through the workshop, stakeholders can expand their potential partnerships across the Bay. It is a general understanding that two groups can do more together than a single group can do alone. This idea was showcased well in the St. Kilda Breakwater project referenced in the background and applies to projects moving forward. As it applies to funding, there may be more success in diversifying the organisations partnering together as each may bring a new area of expertise and strengthen the case of the whole project. Once a project is collaborated on, it is our hope that each of the groups involved will continue to implement collaborative methods into their future projects.

6. Conclusion

The findings in this project have led to the development of an easy-to-implement collaboration plan that can help restore and maintain the health of Port Phillip Bay. This collaborative approach is outlined in a booklet that will be made available to all stakeholders (See Appendix Z).

Figure 17: Title Page of the Port Phillip Baykeeper Strategic Collaboration Plan

Within this booklet, the collaboration plan is outlined so that any stakeholder of Port Phillip Bay can begin the process of implementing it. Each step of the process is discussed in-depth. This includes opening the communication pathways through workshops, consolidating viewpoints through a structured issue paper, determining actions through stakeholder to stakeholder conversations, and leading collaborative efforts. The steps taken by this project to begin this process for the issue of Marine Pests is also explained. With both the process explained and an example available, the goal is for stakeholders to take charge on this idea and communicate with the EcoCentre on any questions they may have.

Along with the booklet, this project created two issue papers (See Appendix U and V) as a part of the EcoCentre project to establish ten issue papers for the stakeholders of the Bay. These issue papers consolidated the viewpoints of multiple organizations around the Bay and focused on the issues of Marine Pests and Climate Change. Moving forward, the goal of these workshops and papers is for the stakeholders who contributed to continue their conversations and take action.

The last two deliverables this project produced for the EcoCentre was a network mapping tool for visualizing the stakeholders around the Bay in issue-based networks and a series of grants that the sponsors can continue to research and hopefully utilize for projects in the future (See Appendix Y). These grants can also be used in joint-ventures by the EcoCentre to implement cross-sectoral collaborative projects across the Bay. These deliverables can be used to help increase collaboration with Port Phillip Bay stakeholders by increasing communication to show the rewards of a joint effort, providing visualizations of organizations across the Bay, and potential grants to fund new collaborative projects. It is our final recommendation that this process is utilized by a future IQP team to collaborate with the EcoCentre and identify achievable projects for the various sponsors of the Bay. This continuation of our project will further submerse the stakeholders of Port Phillip Bay into the new approach of cross-sectoral collaboration.

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Appendices

Appendix A: List of Organizations to Interview, Survey, and Participate in Forum

National Not-for-profits	Tangaroa Blue Nature Conservancy	
Regional Not-for-Profits	Werribee River Association Yarra Riverkeeper Dolphin Research Institute Beach Patrol Australia Bellarine Catchment Network	Zoos Victoria Victorian National Parks Association Hobsons Bay Wetlands Centre Saltwater Projects
State Government Agencies	Parks Victoria CoastCare Dept Environment Land Water & Planning Melbourne Water	Environment Protection Authority Port Phillip & Westernport Catchment Management Authority Victorian Fisheries Authority (Fishcare)
Local Government	City of Port Phillip City of Bayside City of Greater Geelong	City of Hobsons Bay Association of Bayside Municipalities
Businesses	Dive 2U Polperro Dolphin Swims	Sunbutter Oceans Cleanwater Group
Research orgs/institutes	National Centre for Coasts & Climate RMIT Applied Chemistry & Environmental Science RMIT School of Biosciences & Food Technology Monash University School of Biological Science	Melbourne University Environmental Science Deakin University RMIT Business IT Victorian Field Naturalists Club (Marine group) Phillip Island Nature Parks
Local Community Groups	Earthcare St Kilda Balcombe Estuary Reserve Group Marine Care Ricketts Point	Jawbone Sanctuary Care Group Frankston Beach Association South Melbourne Nippers
Community Clubs	Port Phillip Conservation Council Rye Community Group Alliance Scouts Victoria	Royal Melbourne Yacht Squadron Blairgowrie Yacht Club Geelong Yacht Club
Individual	Josie Jones	

Existing project partner

Longterm contact continuing

Longterm contact lapsed

Potential partner

Appendix B: Consent Agreement

Informed Consent Agreement for Participation in a Research Study

Investigators: Nicole Shedd, Peter Dentch, Salvatore Lombardo, and Shelby Morrison

Contact Information: mpc-ecoD20@wpi.edu

Title of Research Study: Port Phillip Bay: Baykeeper Succession Plan

Sponsor: Port Phillip EcoCentre

Introduction

You are being asked to participate in a research study. Before you agree, however, you must be fully informed about the purpose of the study, the procedures to be followed, and any benefits, risks or discomfort that you may experience as a result of your participation. This form presents information about the study so that you may make a fully informed decision regarding your participation.

Purpose of the study: This project is intended to assist the Port Phillip Baykeeper Program in designing a strategic five-year plan based on innovative global practices. This study aims to understand how we can create a network of community collaborations by leveraging existing networks and identifying issue-based partnerships and potential funding streams.

Procedures to be followed: The participants will be asked a series of questions related to our study in a semi-structured interview. If not in person, a survey will be given with related questions and the participants will be prompted to write their answers on the survey. This should last between 30 minutes to an hour.

Risks to study participants: Information will be shared with the Port Phillip EcoCentre and the Baykeeper program staff. Results may be included in a public report. Surveys will be kepts anonymous if requested.

Benefits to research participants and others: Participant organizations may be included in EcoCentre collaborations.

Record keeping and confidentiality: Audio recording or written notes will be taken during the interview with the participant's permission. Audio recordings and notes or survey results will be stored on an encrypted thumb drive. Study investigators and sponsors will have access to these recordings and notes or surveys. Records of your participation in this study will be held confidential so far as permitted by law. However, the study investigators, the sponsor or it's designee and, under certain circumstances, the Worcester Polytechnic Institute Institutional Review Board (WPI IRB) will be able to inspect and have access to confidential data that identify you by name.

Compensation or treatment in the event of injury: You do not give up any of your legal rights by signing this statement.

For more information about this research or about the rights of research participants, or in case of research-related injury, contact: Contact information for the investigators is provided at the top of the first page. In addition, you may contact the IRB Manager, Ruth McKeogh (Tel. 508 831- 6699, Email: irb@wpi.edu) and the Human Protection Administrator, Gabriel Johnson (Tel. 508-831-4989, Email: gjohnson@wpi.edu).

Your participation in this research is voluntary. Your refusal to participate will not result in any penalty to you or any loss of benefits to which you may otherwise be entitled. You may decide to stop participating in the research at any time without penalty or loss of other benefits. The project investigators retain the right to cancel or postpone the experimental procedures at any time they see fit.

By signing below, you acknowledge that you have been informed about and consent to be a participant in the study described above. Make sure that your questions are answered to your satisfaction before signing. You are entitled to retain a copy of this consent agreement.

By checking the box below, you are allowing the use of your name and organization you are a part of to be cited in this study.

☐ **yes** ☐**no**

_____ Date: _____
Study Participant Signature

_____
Study Participant Name (Please print)

_____ Date: _____
Signature of Person who explained this study

Appendix C: Survey for Potential Stakeholders

Baykeeper Strategy Survey

This project aims to gather information on Bay health issues and organisations working to address them. A suitably skilled team of students from Worcester Polytechnic Institute (Massachusetts) are working with Port Phillip EcoCentre to gather relevant stakeholder information and report on the project findings. The goal of this survey is to obtain information about organisational priorities around Port Phillip Bay. The results will be used to create networks and promote strategic collaborations between groups around the Bay and its waterways to increase productivity and Bay health.

1. Informed Consent Agreement for Participation in this Research Study:

   Investigators: Nicole Shedd, Peter Dentch, Salvatore Lombardo, and Shelby Morrison
   Contact Information: mpc-ecoD20@wpi.edu
   Title of Research Study: Port Phillip Bay: Baykeeper Strategic Collaborations Plan
   Sponsor: Port Phillip EcoCentre

   Procedures to be followed: As the person filling out this survey, you will be asked a series of questions that will last about 15 minutes.
   Risks to study participants: The information will be shared with the Port Phillip EcoCentre and the Baykeeper program staff as well as the WPI study investigators. The results may be included in a public report.
   Benefits to research participants and others: Participating organisations will be given access to the stakeholder mapping outcome and priority issues analysis (stage 1). Subsequently, it is envisaged that stakeholders with common goals and management issues will be invited to contribute to one or more 'issues round-table' to workshop shared solutions to their priority goals. There is a high probability that the outcomes of the 'issues round-tables' will provide a basis for tangible collaborations with EcoCentre and/or other round-table workshop contributors.

   Your participation is voluntary and by agreeing below you acknowledge that you have been informed about and consent to be a participant in the study described above.

   ☐ I agree ☐ I don't agree

2. Will you allow the use of your name and organization you are a part of to be cited in this study?

   ☐ Yes ☐ No

Your Feedback for the Baykeeper Program

3. Are you aware that the Baykeeper program is based on collaboration and resource sharing?

   ☐ Yes ☐ No

4. In which way has your organisation collaborated with the Baykeeper before? (select all that apply)
   - ☐ practical, funded projects
   - ☐ information sharing (e.g. reporting wildlife issues, water quality breaches)
   - ☐ Receiving organisational support (e.g. strategic planning, how to start an incorporated organisation, receiving letters of support)

- ☐ Receiving support and advice (e.g. on environmental issues, connecting you with relevant stakeholders)
- ☐ Receiving consultation services (e.g. Baykeeper attendance at community consultations, policy development workshops)
- ☐ Baykeeper presentations (e.g. at community AGMs and government forums)
- ☐ My organisation has never collaborated with the Baykeeper before.
- ☐ Other:_____

5. If you have collaborated with the Baykeeper before, how successful were the outcomes of this collaboration?

Not at all successful				Very successful
O	O	O	O	O
1	2	3	4	5

About Your Organisation

6. What is the name of your organisation?
7. What is your name and position? (this is not required but could be helpful for the survey)
8. Is your organisation: (select one)
   - Local government
   - State government
   - Federal government
   - Local community
   - Regional not-for-profit
   - Research Institute/University
   - Other...
9. What activities does your organisation focus on? (List up to 5)
10. What percentage of your resources/time goes to:
    (Select one option from each row)

	0-15%	16-30%	31-50%	51-75%	76-100%
Physical environmental works	o	o	o	o	o
Community engagement/education	o	o	o	o	o
Issues research and reporting	o	o	o	o	o
Issues campaign and advocacy	o	o	o	o	o
Other	o	o	o	o	o

11. If you said “other” above, please specify
12. What are your community outreach practices? (Select all that apply)
    - ☐ Social media
    - ☐ Electronic newsletter
    - ☐ Paper newsletter
    - ☐ Working Bees
    - ☐ Public Events/Talks/Displays
    - ☐ Face to Face Communications
    - ☐ We don’t do community outreach
    - ☐ Other:_____
13. What other limitations have you encountered in your group’s more specific environmental work? (Select all that apply)
    - ☐ Lack of funding
    - ☐ Lack of necessary knowledge in the group to solve a problem
    - ☐ Problems we are dealing with are not well-documented
    - ☐ Lack of hands-on people power
    - ☐ Lack of management agency support
    - ☐ Lack of public interest
    - ☐ Active opposition and lobbying against your objectives
    - ☐ Competing community environment organisations giving mixed messages
    - ☐ Other: _____
14. What are the top resources your organisation offers towards Bay health? (Select all that apply)
    - ☐ Volunteer hands to get things done
    - ☐ Paid staff to get things done
    - ☐ Specialist scientific expertise
    - ☐ Organisational and project planning
    - ☐ Regular communication with local/regional networks
    - ☐ Other: _____
15. What kind of resources are you in need of? (Select all that apply)
    - ☐ Volunteer hands to get things done
    - ☐ Paid staff to get things done
    - ☐ Specialist scientific expertise
    - ☐ Organisational and project planning
    - ☐ Regular communication with local/regional networks
    - ☐ Other: _____
16. Does your organisation have established Bay health policy or issues papers?

☐ Yes ☐ No ☐ Working on it

17. If yes, what are the policies/papers related to?

Your Organisation's Previous and Existing Collaborations

18. In the past 3 years, has your organisation had regular dialogue with:
    - ☐ Local government
    - ☐ State government
    - ☐ Federal government
    - ☐ Local community organisations
    - ☐ Regional not-for-profit organizations
    - ☐ Research Institute/University
    - ☐ Other:_____
19. In the past 3 years, has your organisation collaborated with or received support from:
    - ☐ Local government
    - ☐ State government
    - ☐ Federal government
    - ☐ Local community organisations
    - ☐ Regional not-for-profit organizations
    - ☐ Research Institute/University
    - ☐ Other:_____

Your Organisation's Input on Bay Health Priorities

20. List, in priority order, up to 5 Bay health issues requiring attention:
21. What are the 3 priority areas that stronger partnerships can have the most impact on for the health of Port Phillip Bay?
22. To which of your priority issues could your organization contribute to developing issues papers?

Further Input

23. Would you be interested and able to be interviewed by the WPI student team to gather your further insights on Bay and waterway health issues?

    ☐ Yes ☐ No ☐ Maybe

24. Are you interested and able to participate with other organizations in a virtual roundtable discussion on a common issue?

    ☐ Yes ☐ No ☐ Maybe

Thank you for your time!

25. Any further comments or thoughts you wish to share?

Appendix D: Roundtable Workshop Format

10am. Welcome & introduction (Neil)

1. Acknowledgement of Traditional Owners (1 minute)
2. Purpose of workshop (2 minutes)

- Introduce the 'issues paper' template document
- Capture a snapshot of current situation (policy and action)
- Test stakeholder interest in ongoing cross-sector dialogue

3. Brief intro to Zoom tech and recording (2 minutes)
4. Participant introductions (1 minute each)

10.15am. Background (Fam)

History and potential/probable causes of the issue. What has been done in the past about this and where are we now? (5 minutes)

Probable threat to waterways and/or Bay health

How is this issue threatening waterway and Bay health? Is this a local issue, or is it waterway and/or Bay-wide? (5 minutes)

Responsible management agencies (Neil)

List of agencies and their particular responsibility (e.g. policy making, management, on-ground works) (5 minutes)

Other stakeholders

Who else is involved in/affected by this issue? Including community, recreation groups, businesses, education sector, etc. (5 minutes)

Existing policy framework (Fam)

Existing laws and policies that manage and frame this issue and how they relate to each other. Includes potential/existing management practices. (5 minutes)

Existing knowledge

What existing studies are there to help understand and research the issue? Anecdotal and Science and research based, incl local, national and international examples. (5 minutes)

Existing management practices (Neil)

What is already being done about this issue now? (5 minutes)

Knowledge gaps

Why has this issue not been resolved yet? What are the gaps in knowledge and management that are perpetuating the issue? (5 minutes)

Appendix E: Workshop Follow-Up Survey

The goal of this survey is to evaluate the round table workshop. It will take about 5 minutes and the results remain anonymous and will be used by the student team from Worcester Polytechnic Institute (Massachusetts) and the Port Phillip EcoCentre to gather relevant information for future workshop improvements.

1. Would you participate in future roundtable workshops?
    - Yes
    - No
    - Maybe
2. How was the length of the workshop?

1	2	3	4	5
O	O	O	O	O
Too short				Too long

3. Was the workshop useful?

1	2	3	4	5
O	O	O	O	O
Not Useful				Very Useful

4. Is there anything that could be changed to improve the workshop?
5. Are there any important points that were not discussed that you believe need to be considered?
6. Do the workshop notes present an accurate summary of the information shared?
7. If you believe they are inaccurate, what changes are required?

Any other comments?

Appendix F: Follow-Up Interview for Stakeholders

A roundtable workshop has already been conducted on climate change and marine pests in Port Phillip Bay. The goal of this interview is to obtain further information about the issue.

1. What about this issue is most concerning?

2. What are the management agencies that focus on this issue and what management guidelines are in place?

3. Have you been involved in any research regarding this issue? If so, what was it?

4. What are some knowledge gaps that are propagating the issue?

5. How do you think collaboration could help solve this issue?

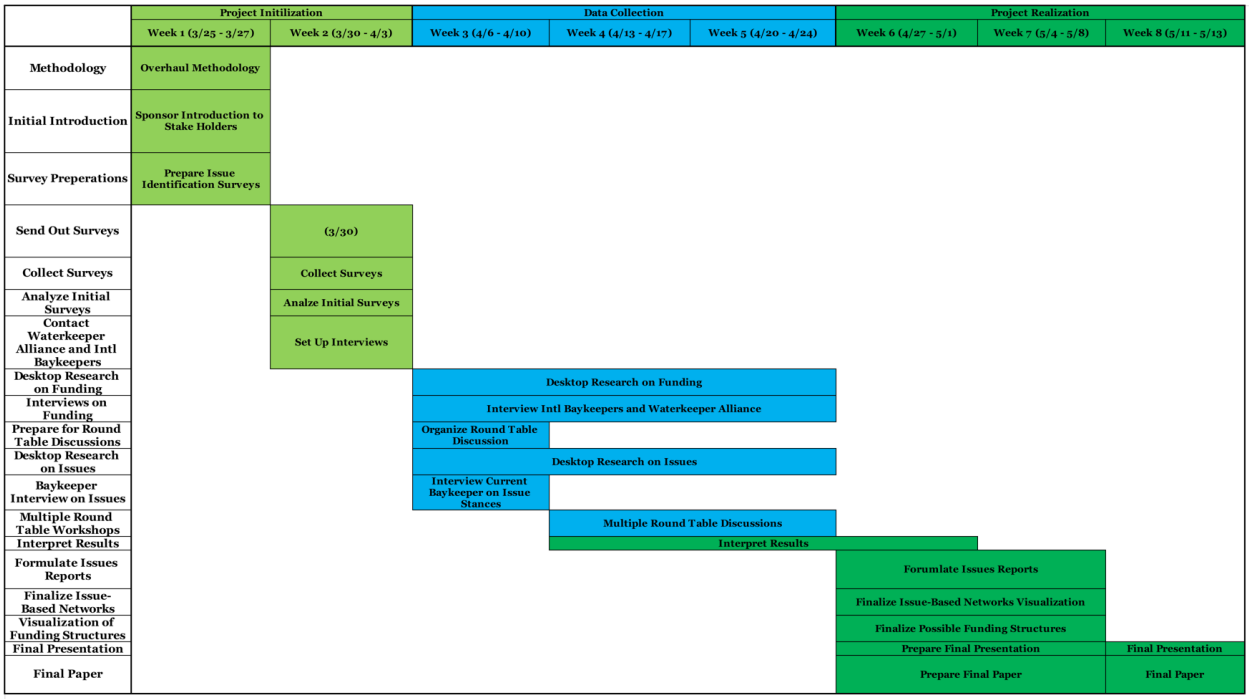
Appendix G: Issues Paper Template

1. Background
    - History and potential/probable causes of the issue. What has been done in the past about this and where are we now?
2. Probable threat to waterways and/or Bay health
    - How is this issue threatening waterway and Bay health? Is this a local issue, or is it waterway and/or Bay-wide?
3. Responsible management agencies
    - List of agencies and their particular responsibility (e.g. policy making, management, on-ground works)
4. Other stakeholders
    - Who else is involved in/affected by this issue? Including community, recreation groups, businesses, education sector, etc.
5. Existing policy framework
    - Existing laws and policies that manage and frame this issue and how they relate to each other. Includes potential/existing management practices.
6. Existing knowledge
    - What existing studies are there that help understand and research the issue? Science and research based, incl local, national and international examples.
7. Existing management practices
    - What is already being done about this issue now?
8. Knowledge gaps
    - Why has this issue not been resolved yet? What are the gaps in knowledge and management that are perpetuating the issue?
9. Recommendations
    - This info will be a result of the outcomes of the issues round tables.
10. Other links and information

Appendix H: Data Table of Potential Funding Streams

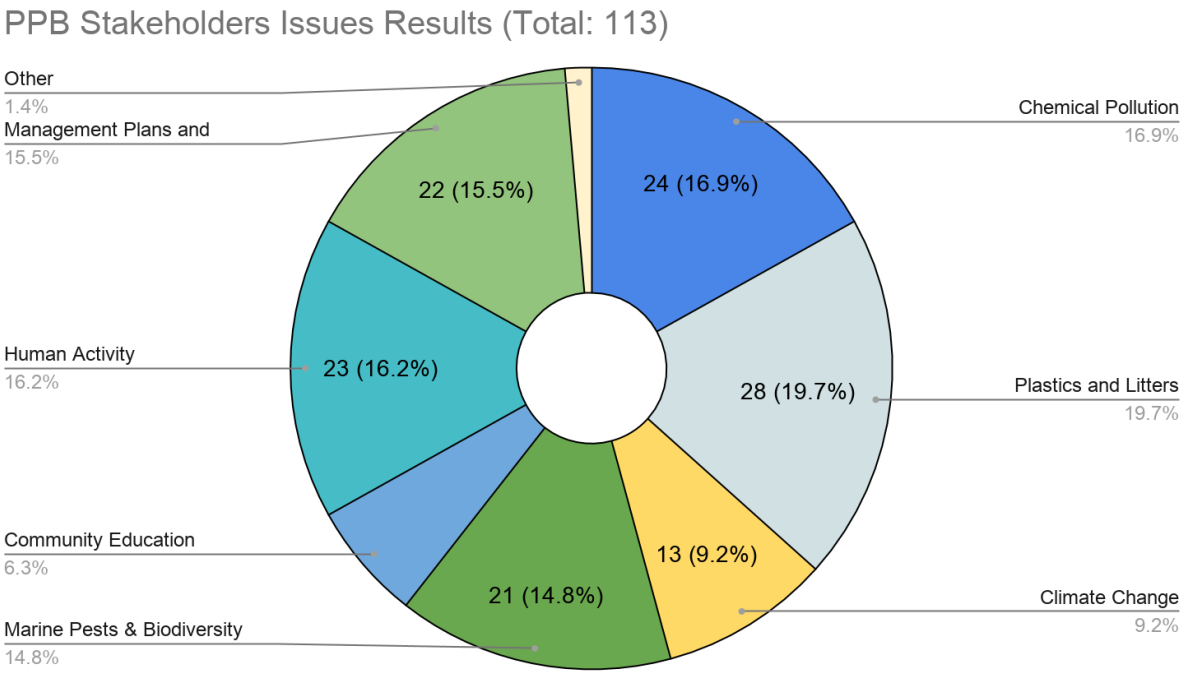
Grant Maker	Location of Grant Maker	Primary Focus	Recipients	Location of Recipient	Year	Subject
Lord Mayor's Charitable Foundation	Melbourne	Community development Education environment	Monash University	Melbourne	2018	Environment & Energy Efficiency
			Climarte	Melbourne	2017	
			Australian Marine Mammal Conservation Foundation	Melbourne	2017	
The Ian Potter Foundation	Melbourne	Education community development environment	Australian Environmental Grantmakers Network	Melbourne		philanthropy
			BirdLife Australia Pty Ltd	Melbourne		public policy
Legacy Alcoa Foundation	Pittsburgh, USA	Education Community Development Environment	Greening Australia	Melbourne	2010	Climate Change
					2014	Biodiversity
					2015	Forest Preservation
The San Diego Foundation	San Diego, USA		Institute for Public Affairs	Melbourne	2010	Climate Change
The Bristol-Myers Squibb Foundation, Inc.	New York City, USA	Health Education	Australian Bush Heritage Foundation	Melbourne	2005	Natural Resources
The Wettenhall Environment Trust	Castlemaine Australia	Environment	Royal Melbourne Institute of Technology	Melbourne	2019	Wildlife Biodiversity

Appendix I: Methodology Timeline



Appendix J: Survey Results - Issues

Broad Category Breakdown:



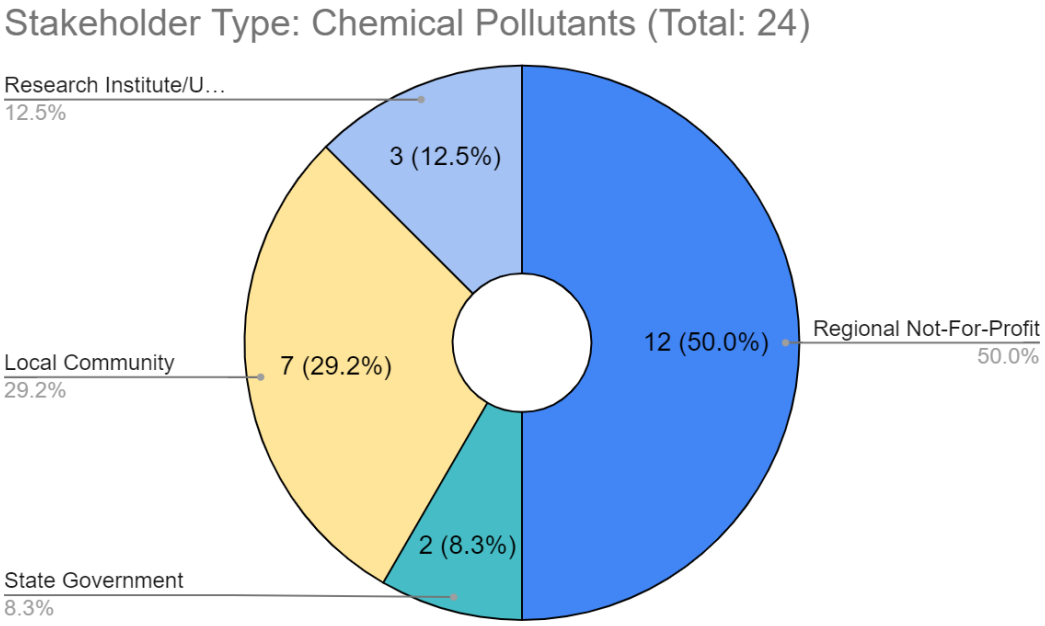
Some responses can be categorized as multiple issues, those responses are not reflected in the chart above but are shown in the following sections. The chart above displays the primary characterization of each response. Each issue category below is broken down into Organisation Type and Subcategories:

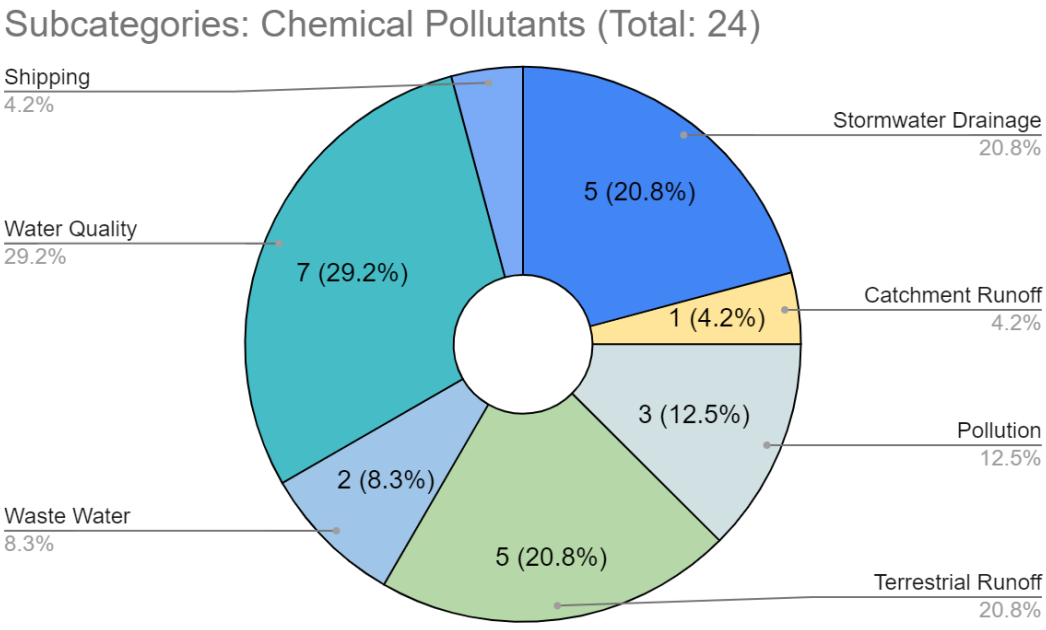
Organisation Type was indicated through the initial survey and consists of:

- Local Government
- State Government
- Federal Government
- Local Community
- Regional Not-for-Profit
- Research Institute/University
- Other (Written Response)

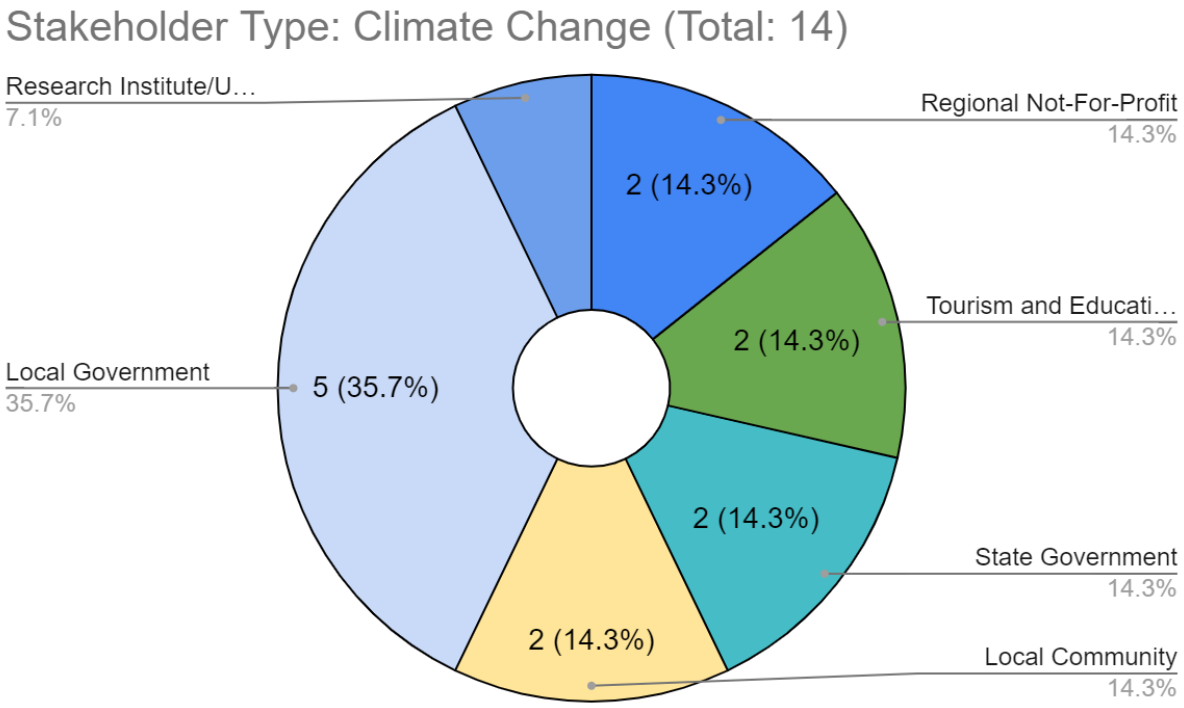
Subcategories are used to group responses within a broader issue. The issues were seperated into a range of four to eight (4-8) subcategories depending on the diversity and quantity of responses. Full analysis of the results are available upon request.

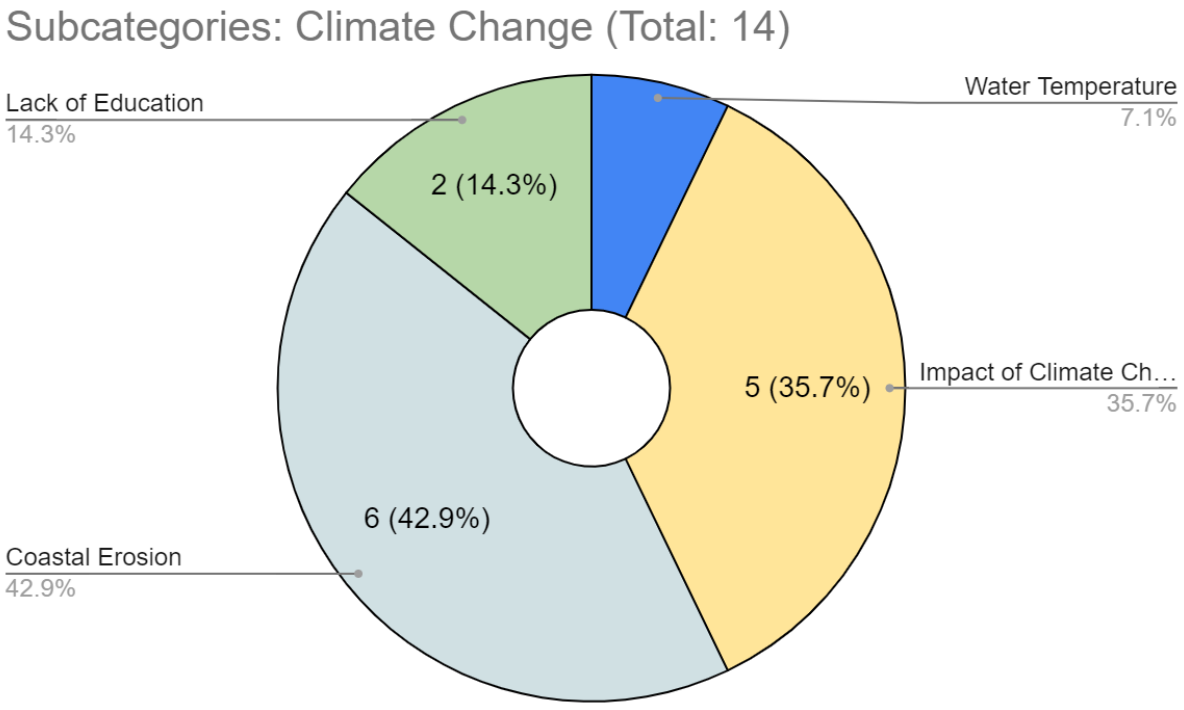
Chemical Runoff and Pollution:



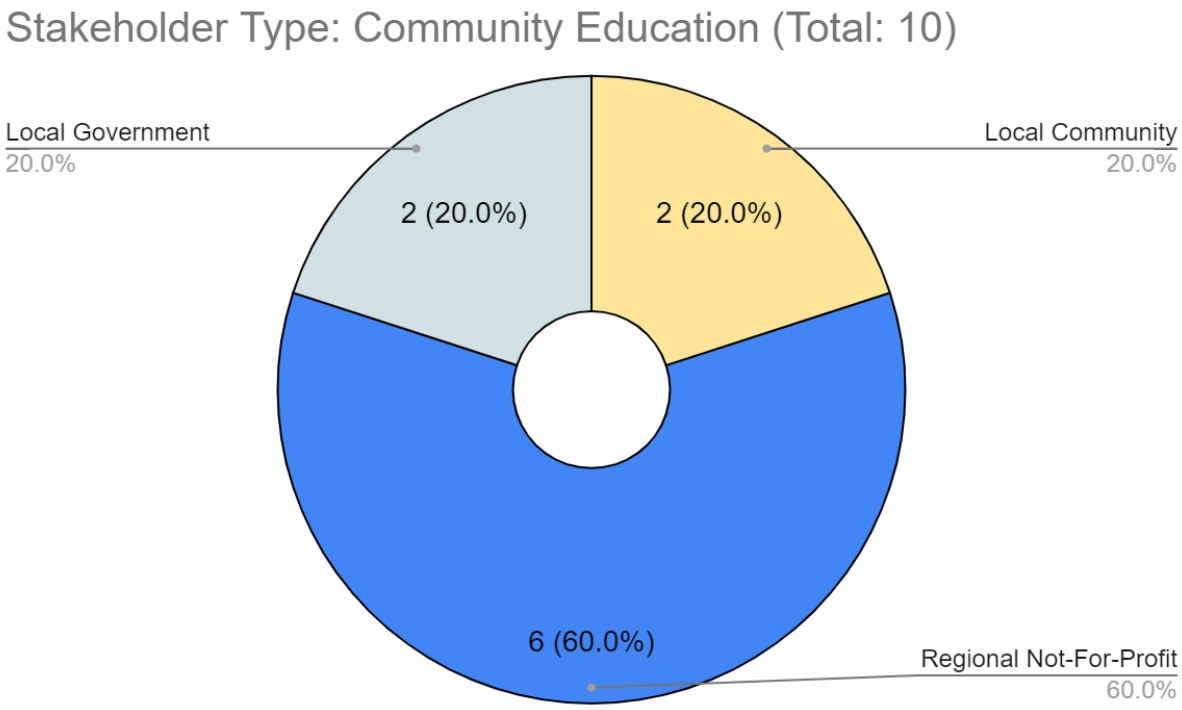


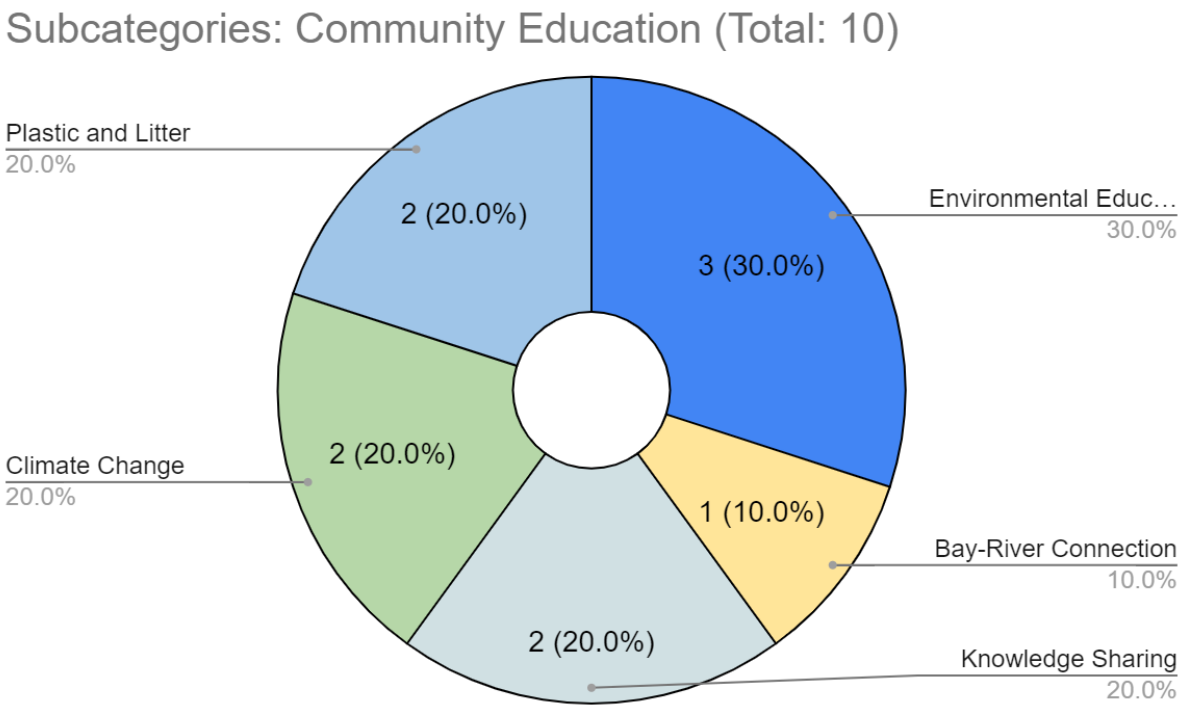
Climate Change:



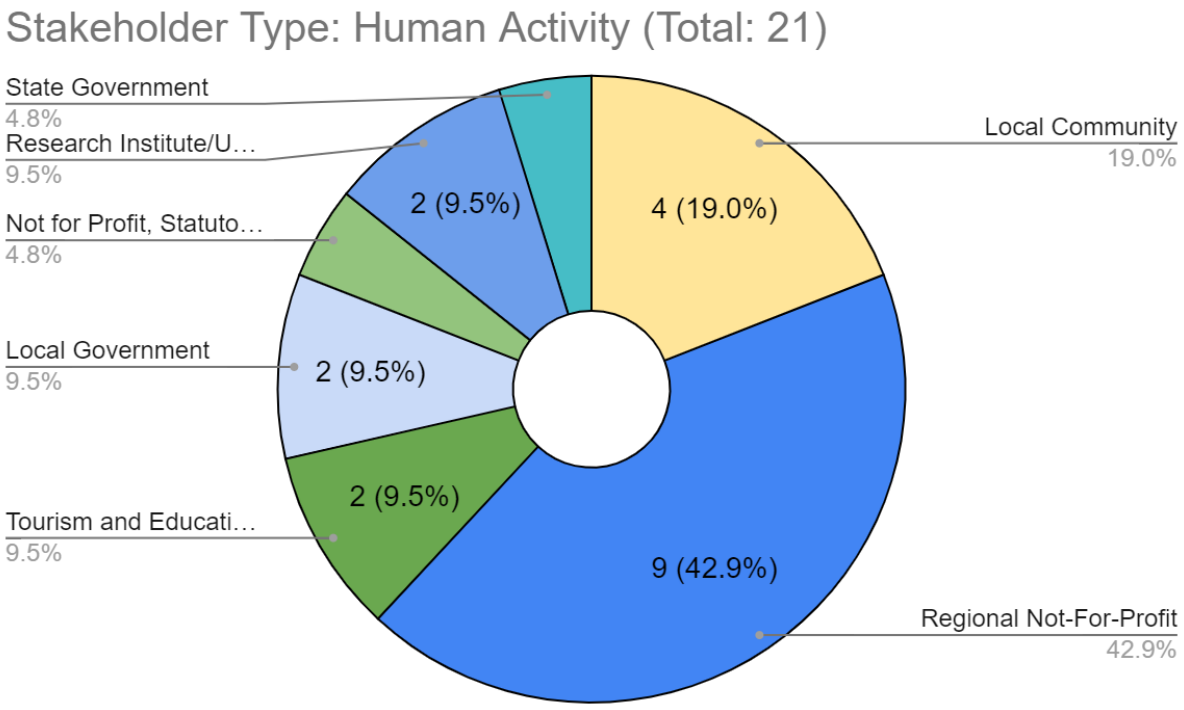


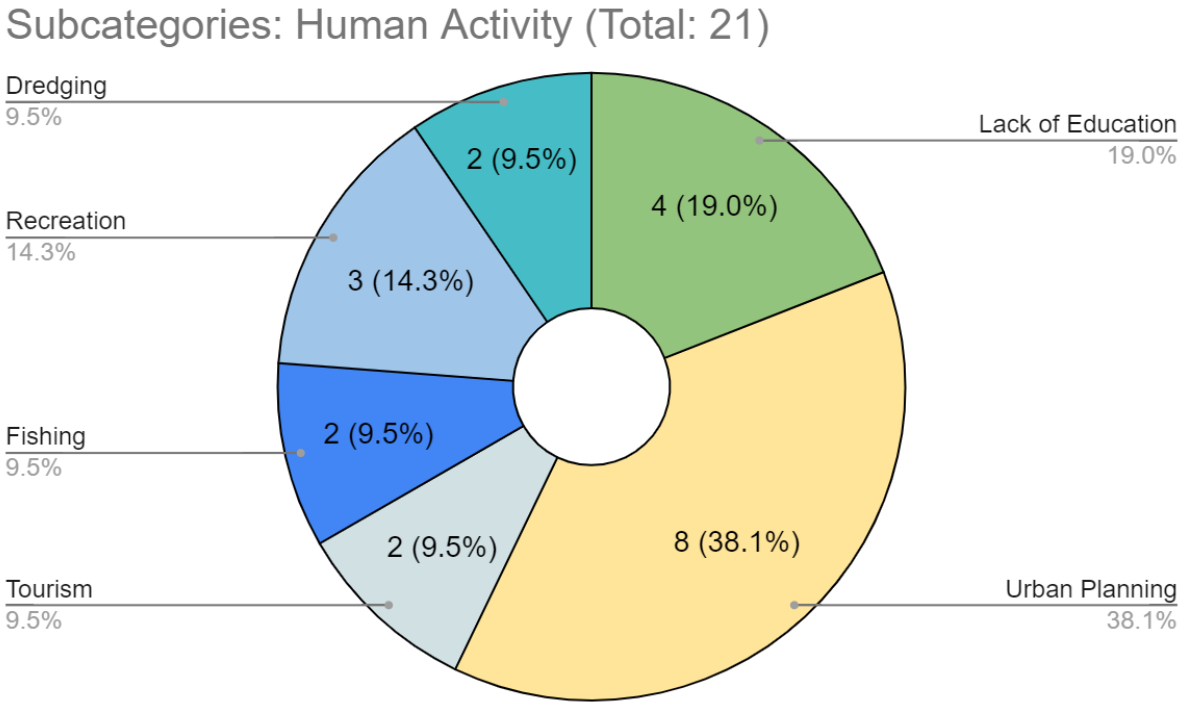
Community Education:



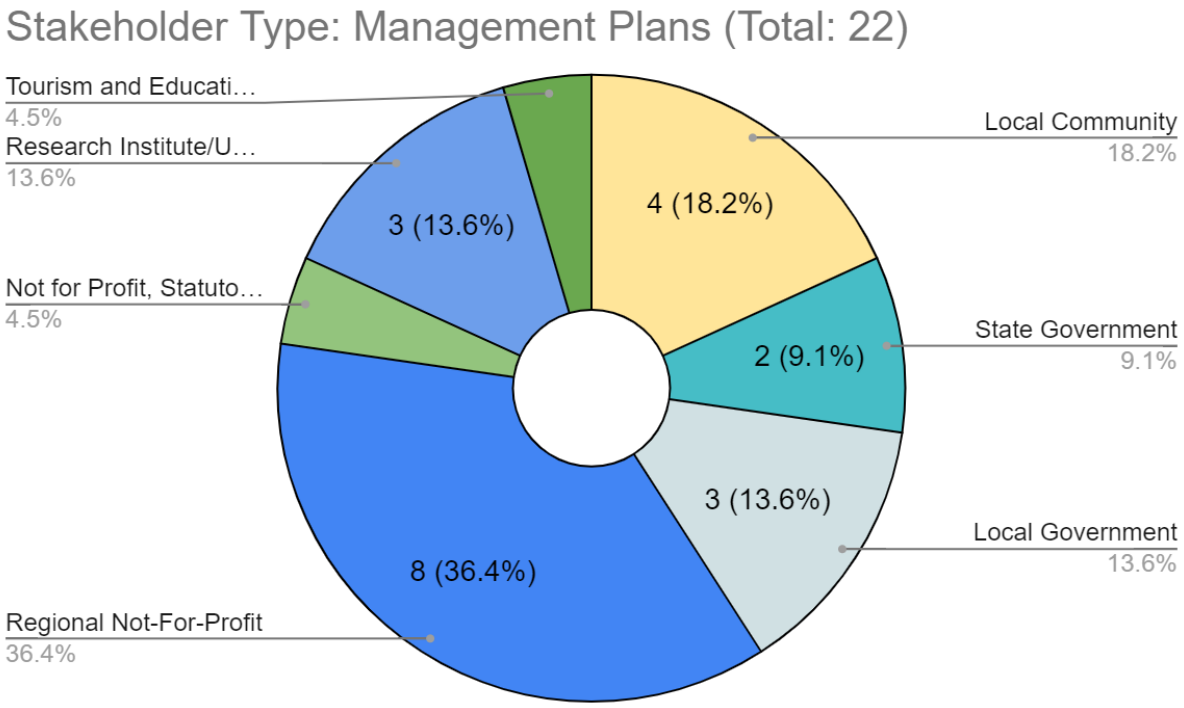


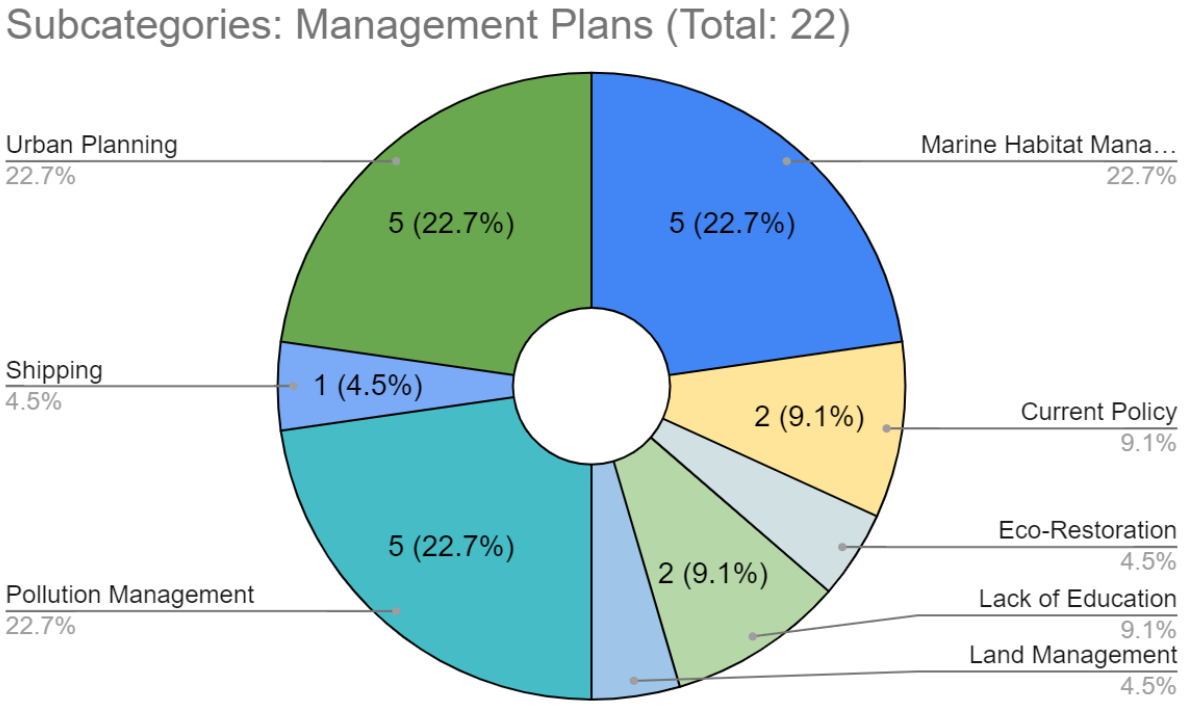
Human Activity:



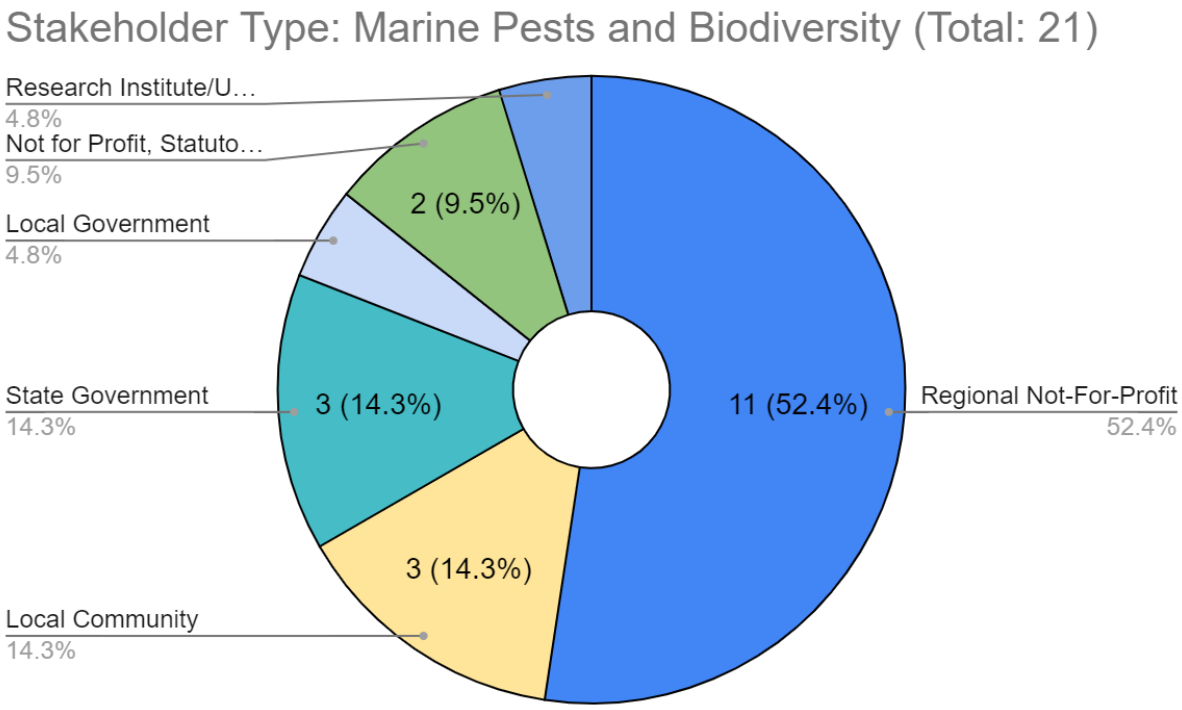


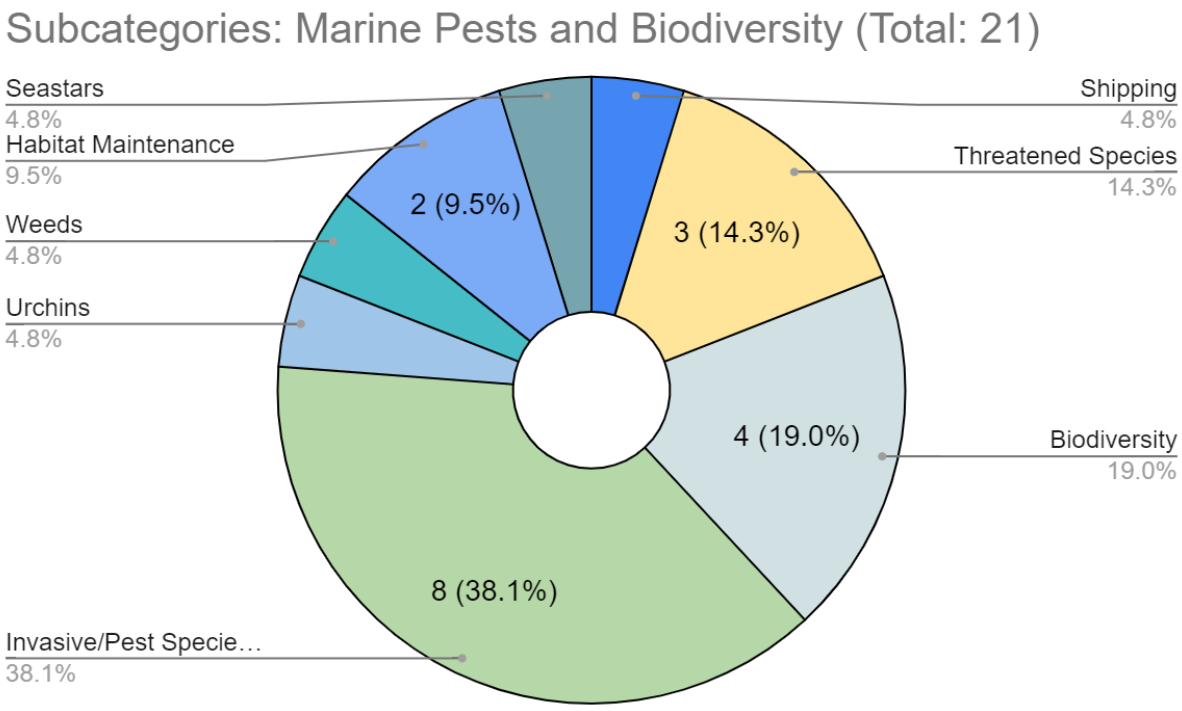
Management Plans:



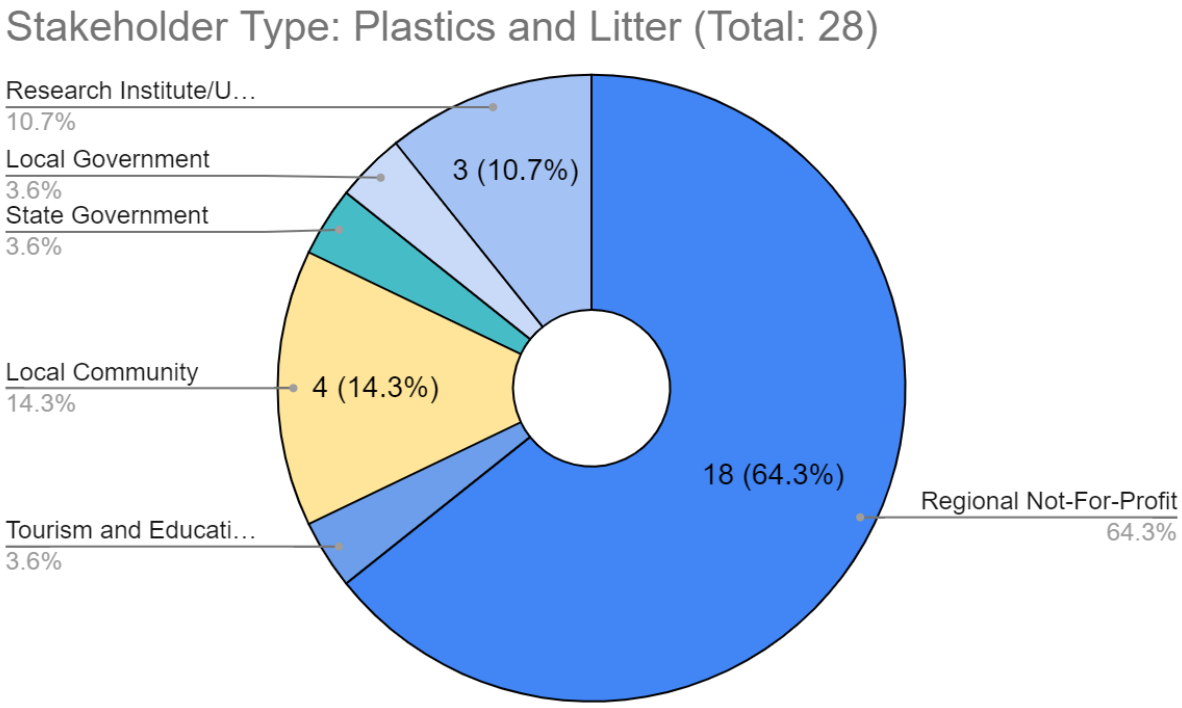


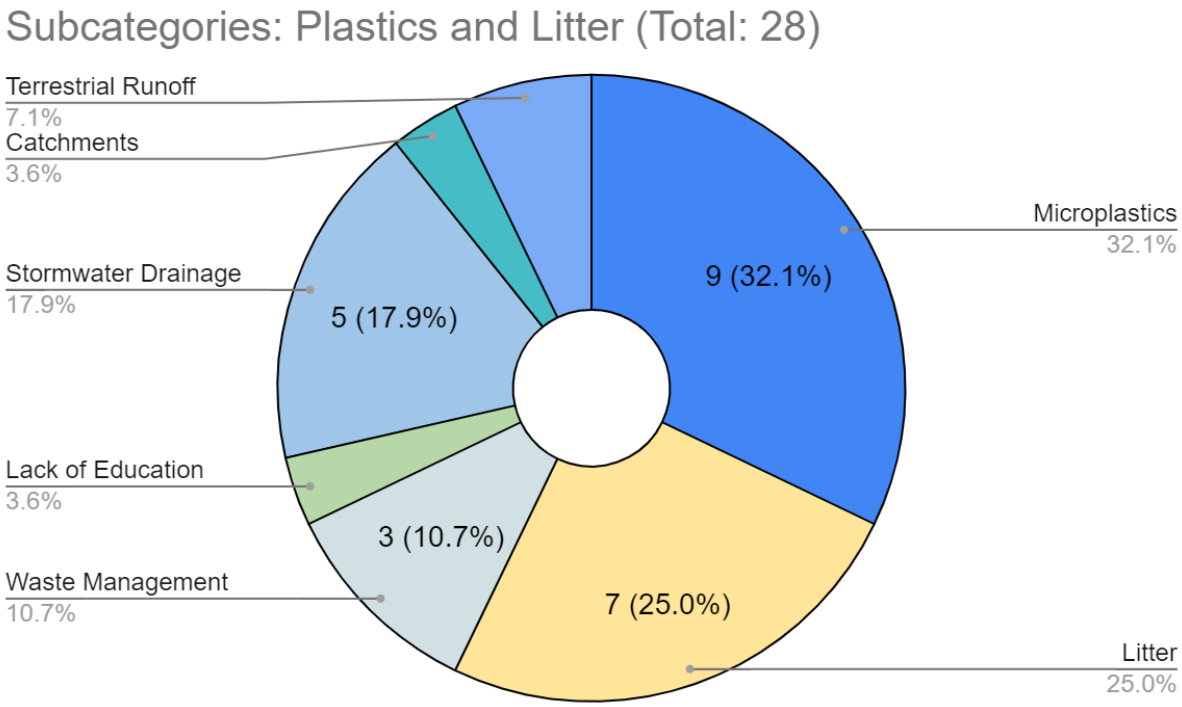
Marine Pests and Biodiversity:



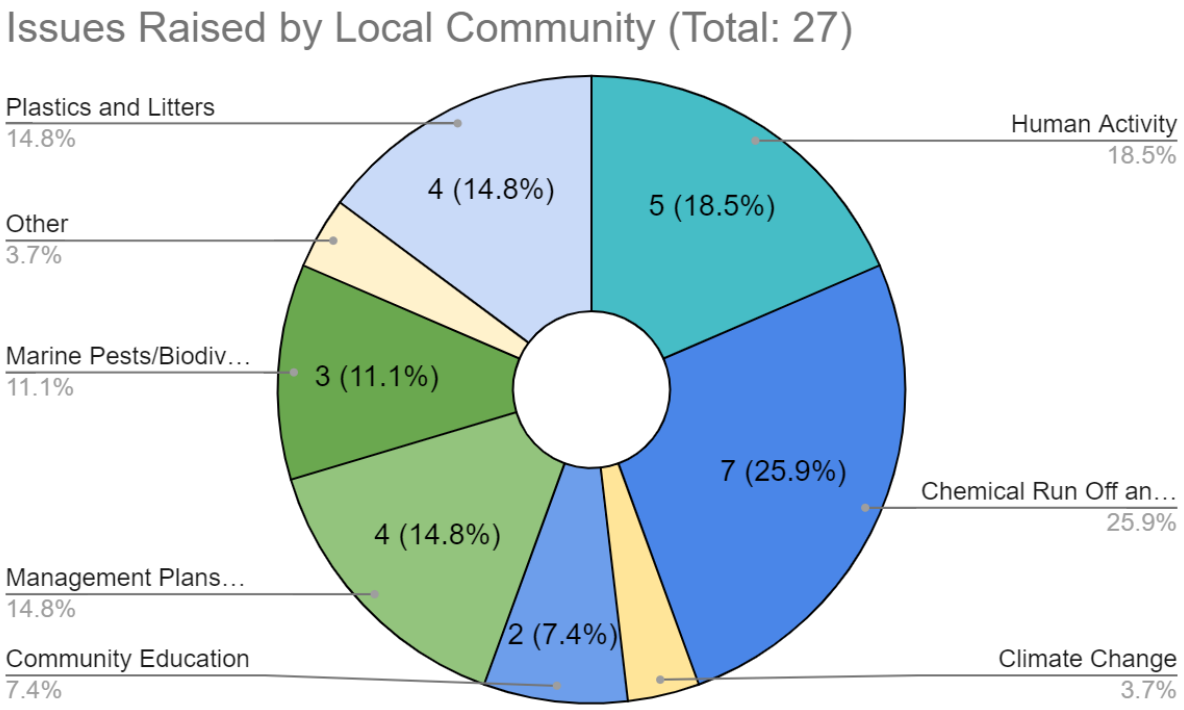


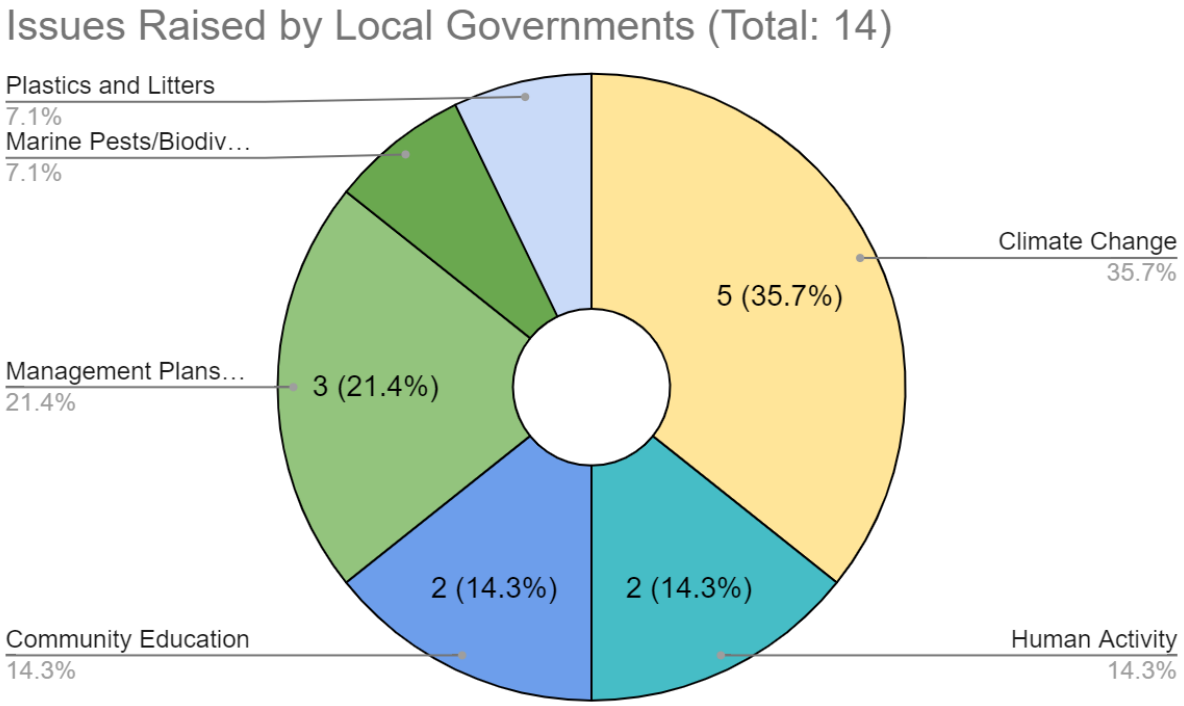
Plastics and Litter:



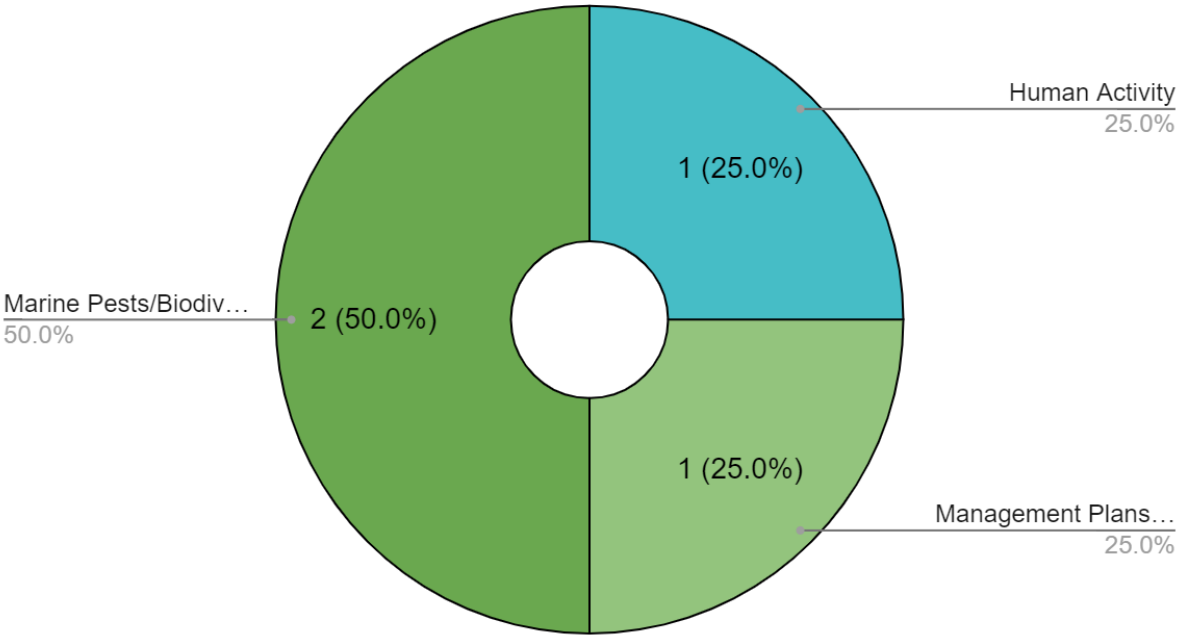


Issues Raised by Organisation Type

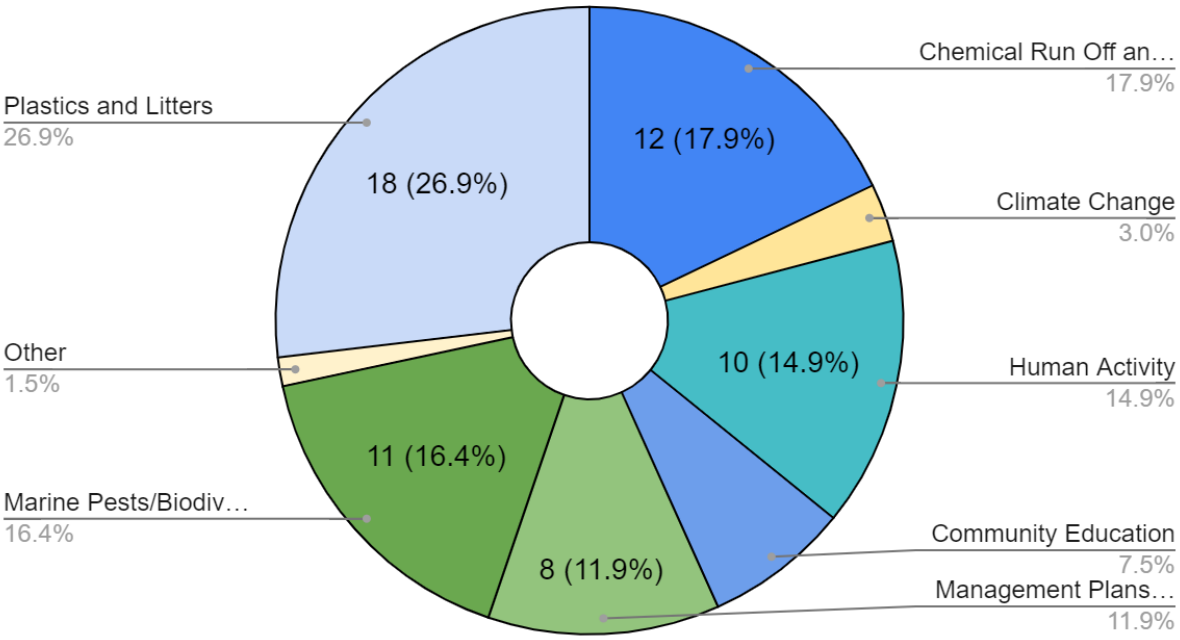




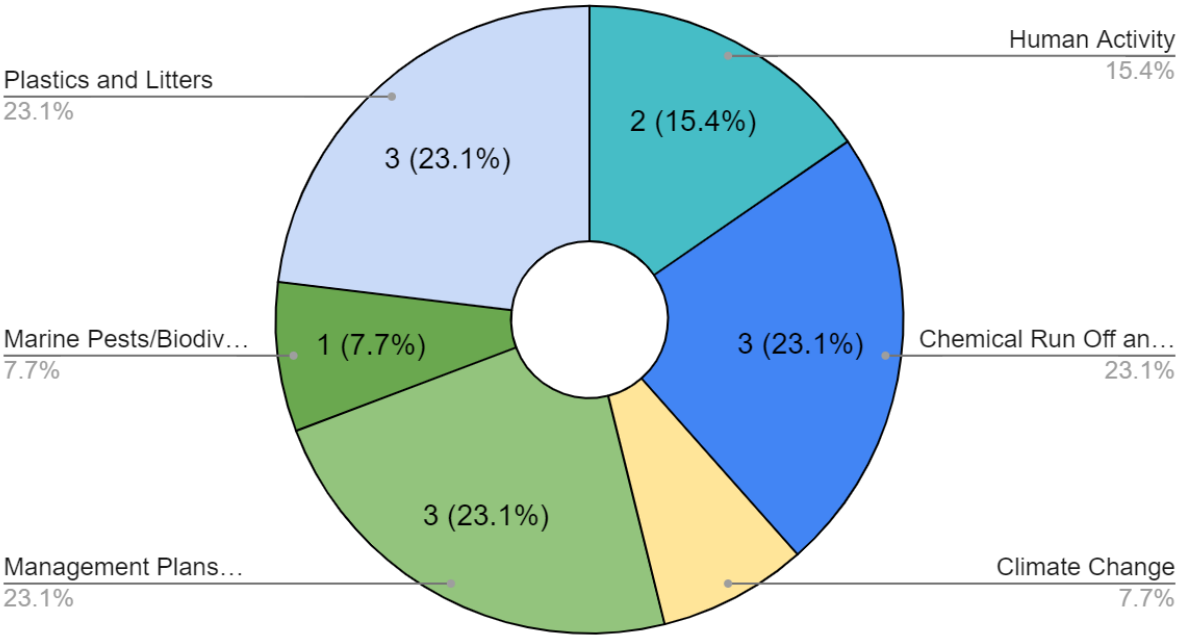
Issues Raised by Not for Profit, Statutory Authority (Total: 4)



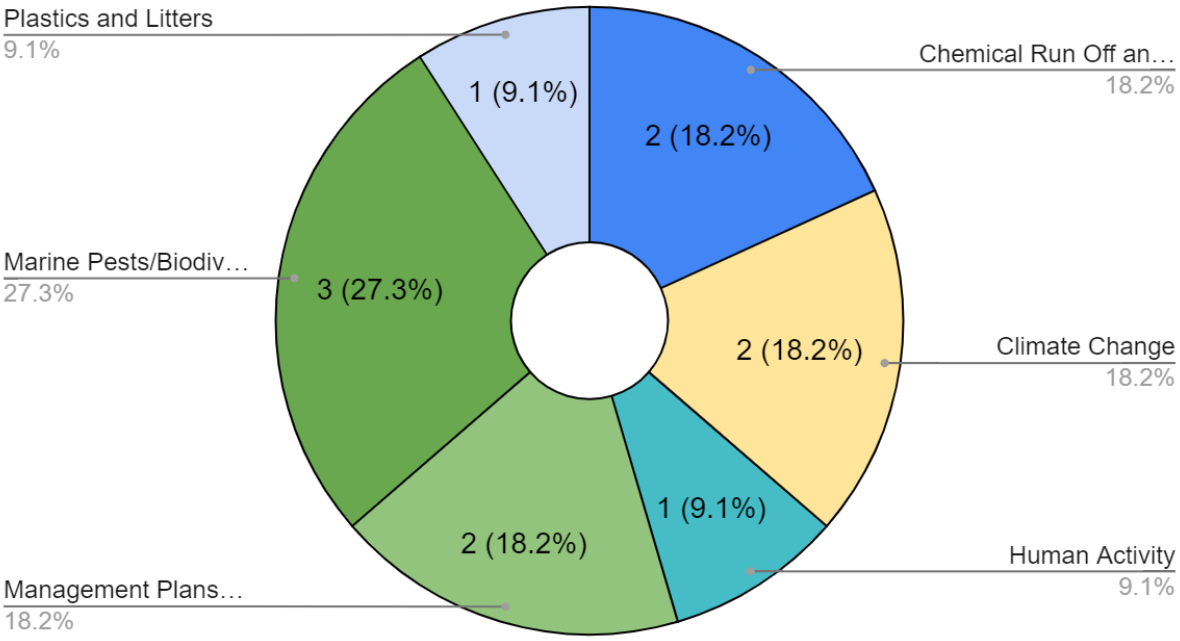
Issues Raised by Regional Not-For-Profit (Total: 67)

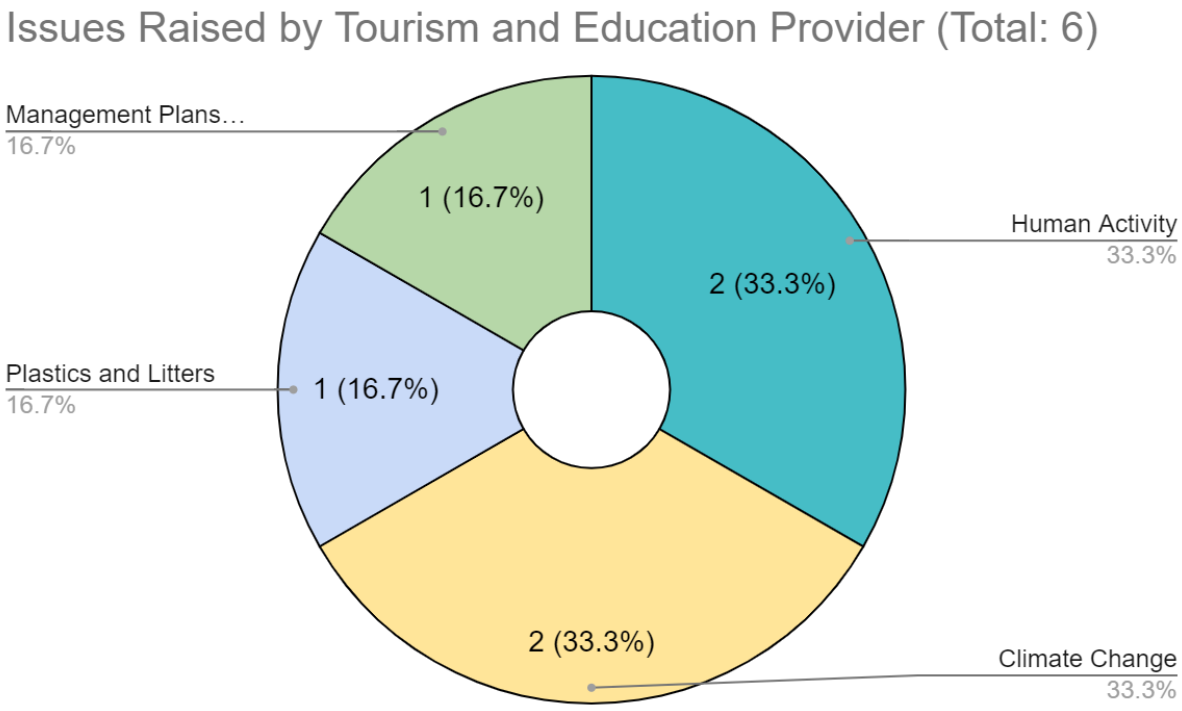


Issues Raised by Research Institutes/University (Total: 13)

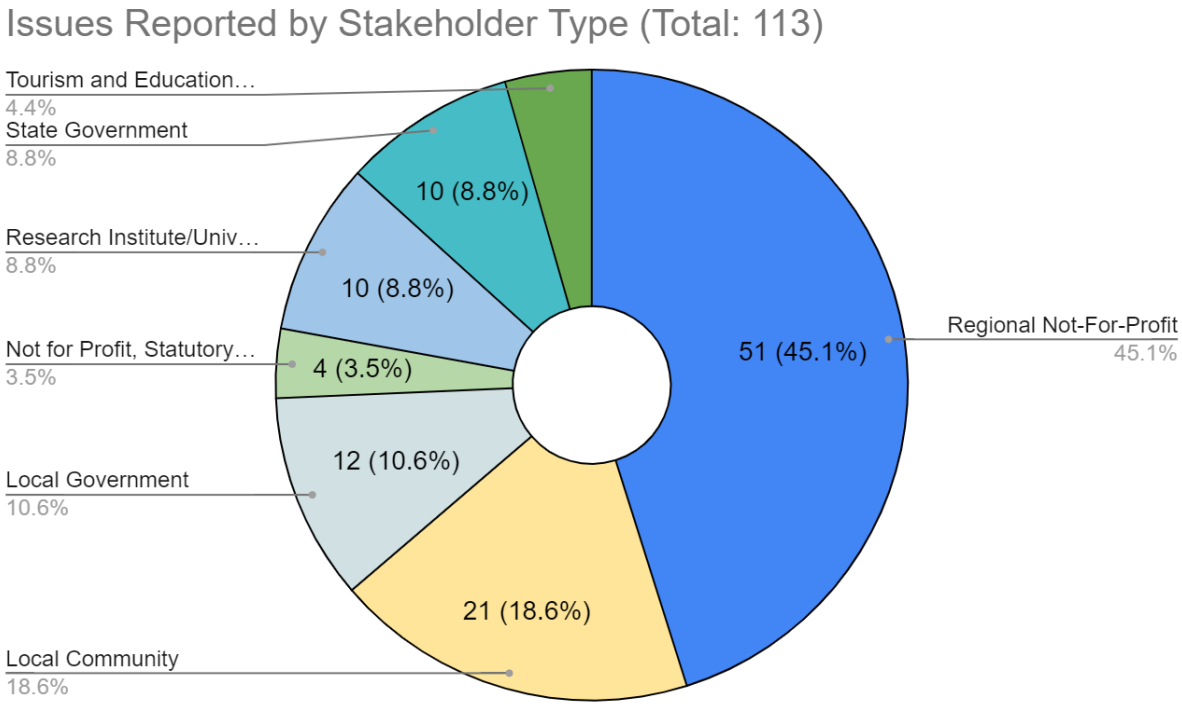


Issues Raised by State Governments (Total: 11)

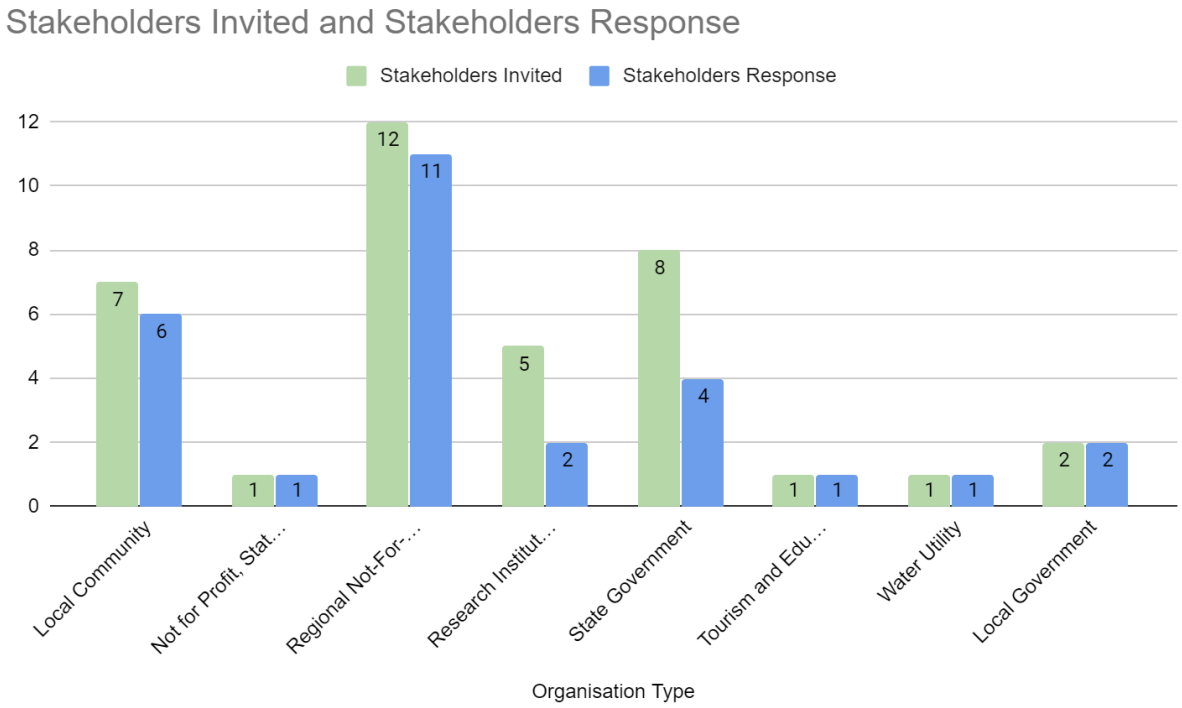




Issues Reported by Organisation Type



Organisation Responses/Invites



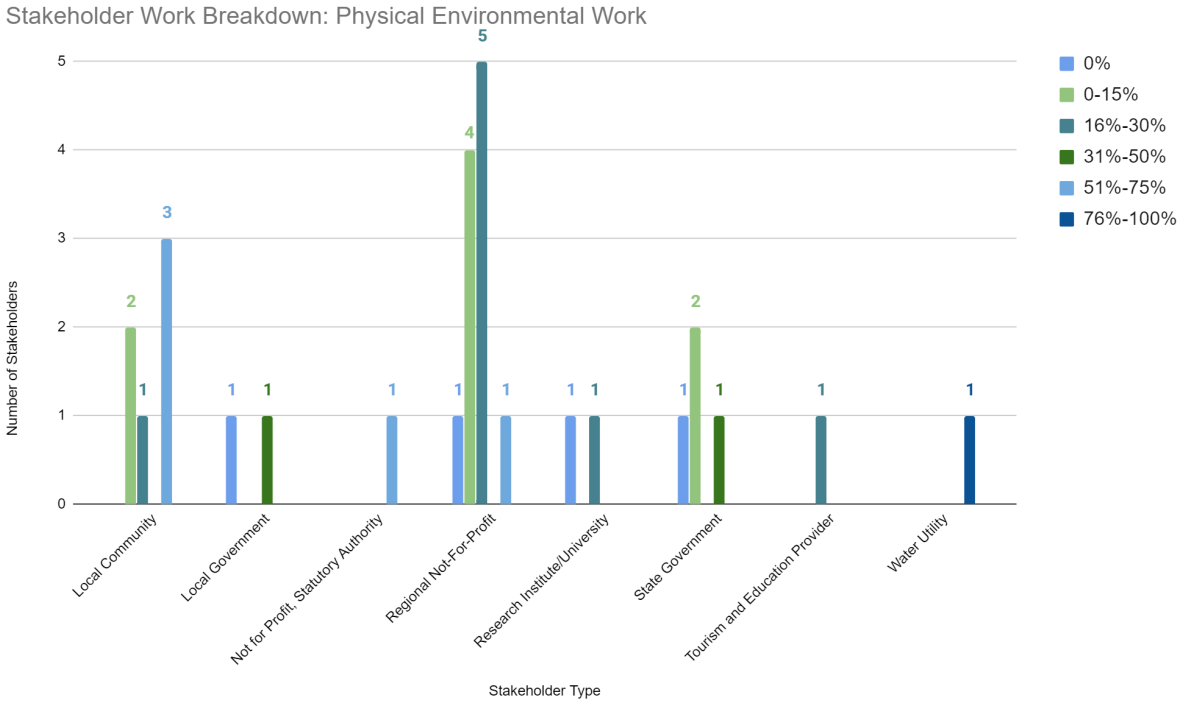
Appendix K: Survey Results - Organizational Work

Overall

The areas listed on the previous page cover the majority scope of work done by the stakeholder organisations around PPB with 86% (24 out of 28) stating that "Other" work utilizes 0-15% of their efforts and resources. Community Engagement/Education covered the largest area of work with 50% of stakeholders reporting that over 31% of their work goes towards it. Issues Research and Reporting was the second largest area with 68% of stakeholders committing over 16% of their efforts towards it. The chart below displays these results.

Percentage of Work	Physical Environmental Works	Community Engagement/Education	Issues Research and Reporting	Issues Campaign and Advocacy	Other
0-15%	**12**	8	9	**16**	**24**
16%-30%	8	6	**11**	6	0
31%+	8	**14**	8	6	4
0-15%	**43%**	29%	32%	**57%**	**86%**
16%-30%	29%	21%	**39%**	21%	0%
31%+	29%	**50%**	29%	21%	14%

Physical Environmental Works

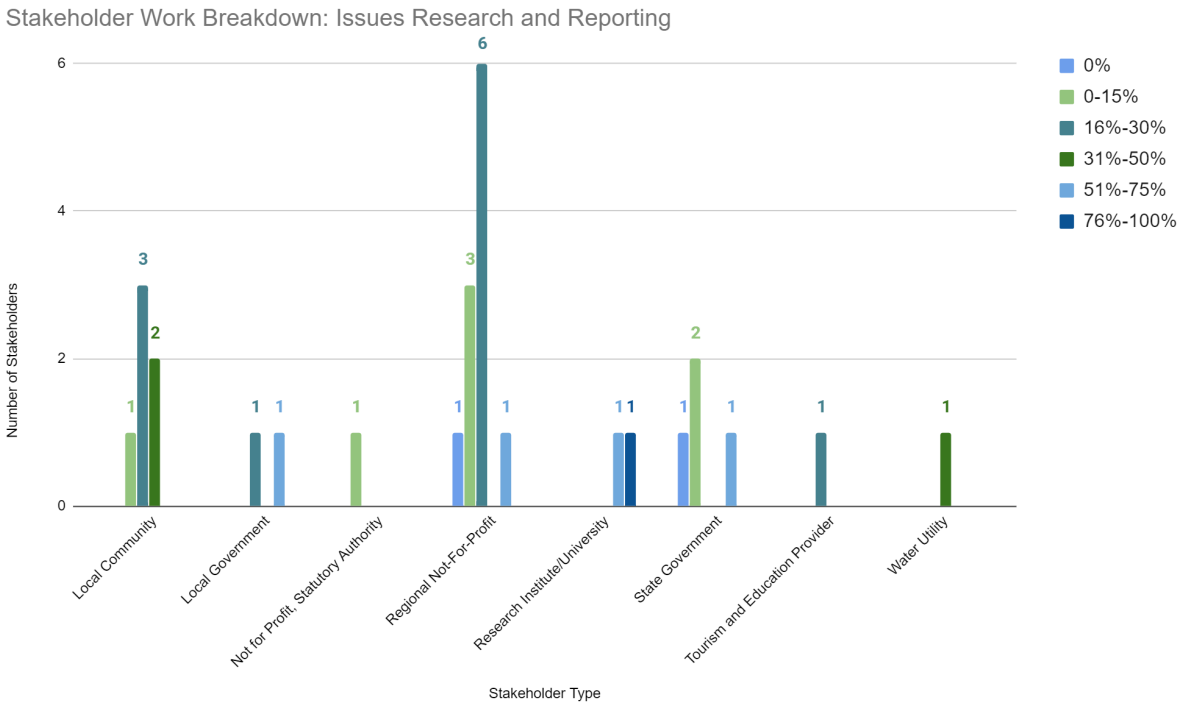


The graph above displays the percentage of work breakdown per stakeholder type as it pertains to Physical Environmental Works.

Key Points:

- Half of the Local Community Organisations reported spending over 50% of their efforts and resources on Physical Environmental Works.
- 91% (10 out of 11) Regional Not-For-Profit organisations reported less than 30% of their efforts and resources go towards Physical Environmental Works.

Issues Research and Reporting

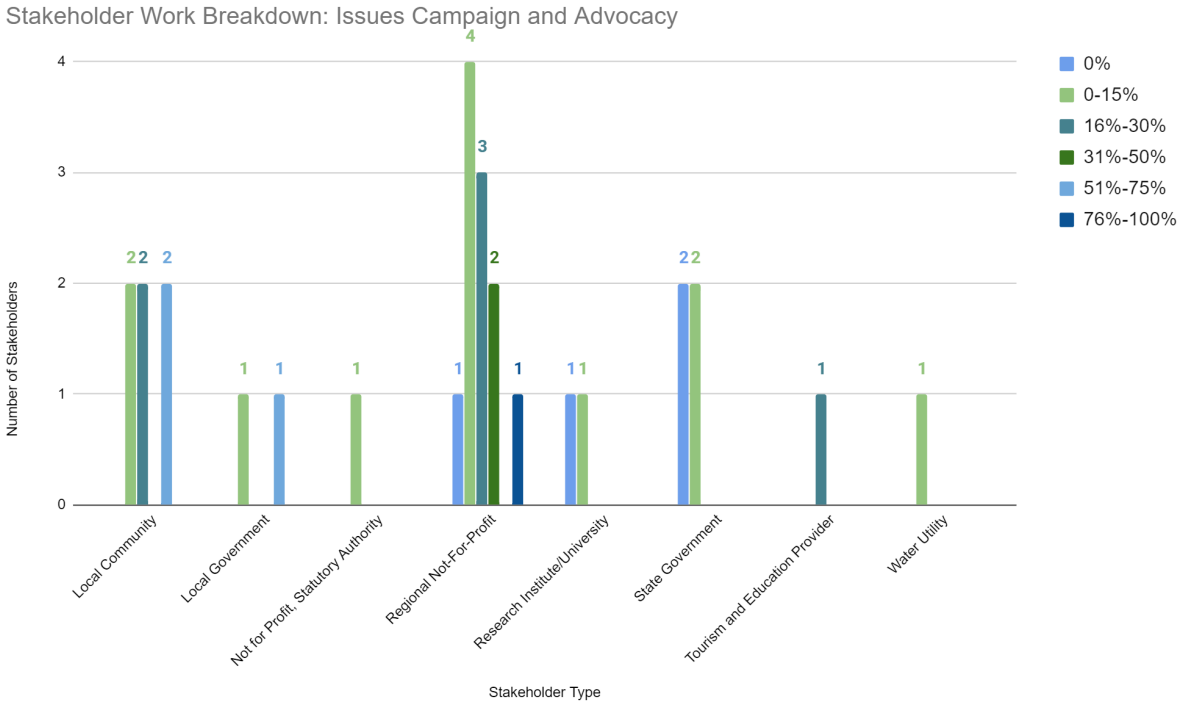


The graph above displays the percentage of work breakdown per stakeholder type as it pertains to Issue Research and Reporting.

Key Points:

- Both Research Institutes reported spending greater than half their efforts and resources on Issues Research and Reporting.
- 75% (3 out of 4) State Government organisations reported spending 15% or less of their efforts and resources on Issues Research and Reporting.

Issues Campaign and Advocacy

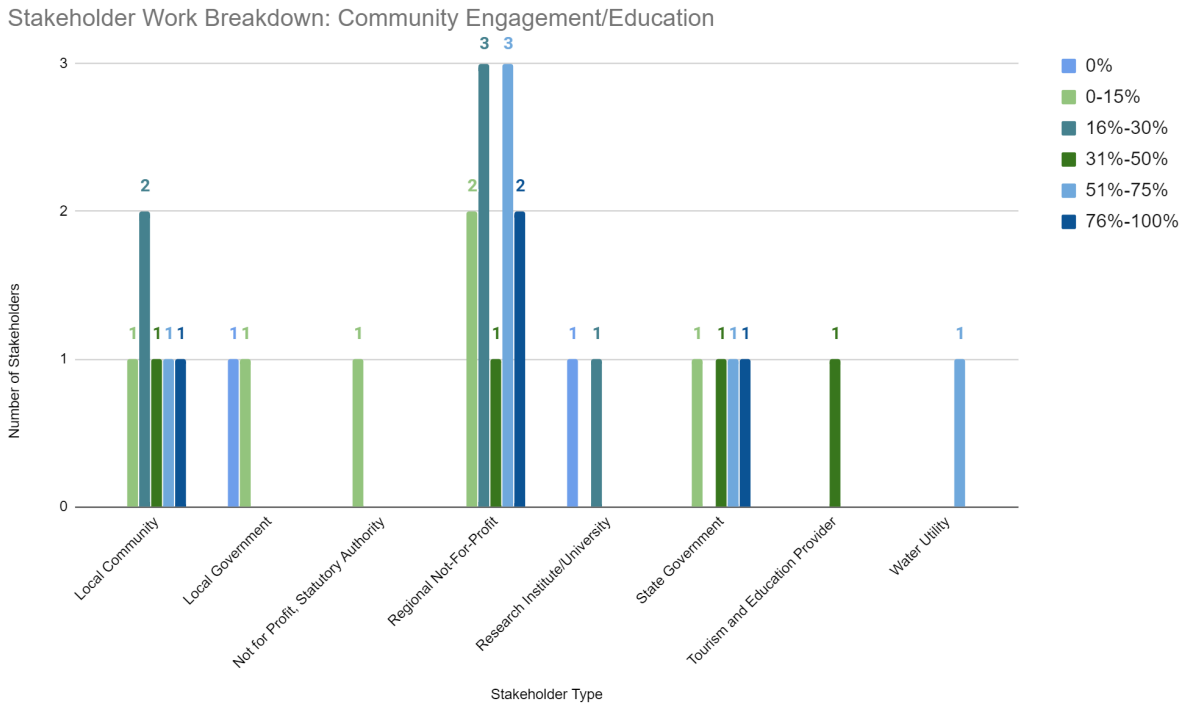


The graph above displays the percentage of work breakdown per stakeholder type as it pertains to Issues Campaign and Advocacy.

Key Points:

- 78% (22 out of 28) organisations reported spending less than 30% of their efforts and resources on Issues Campaign and Advocacy.
- 18% (5 out of 28) organisations reported spending greater than half of their efforts and resources on Issues Campaign and Advocacy.

Community Engagement/Education

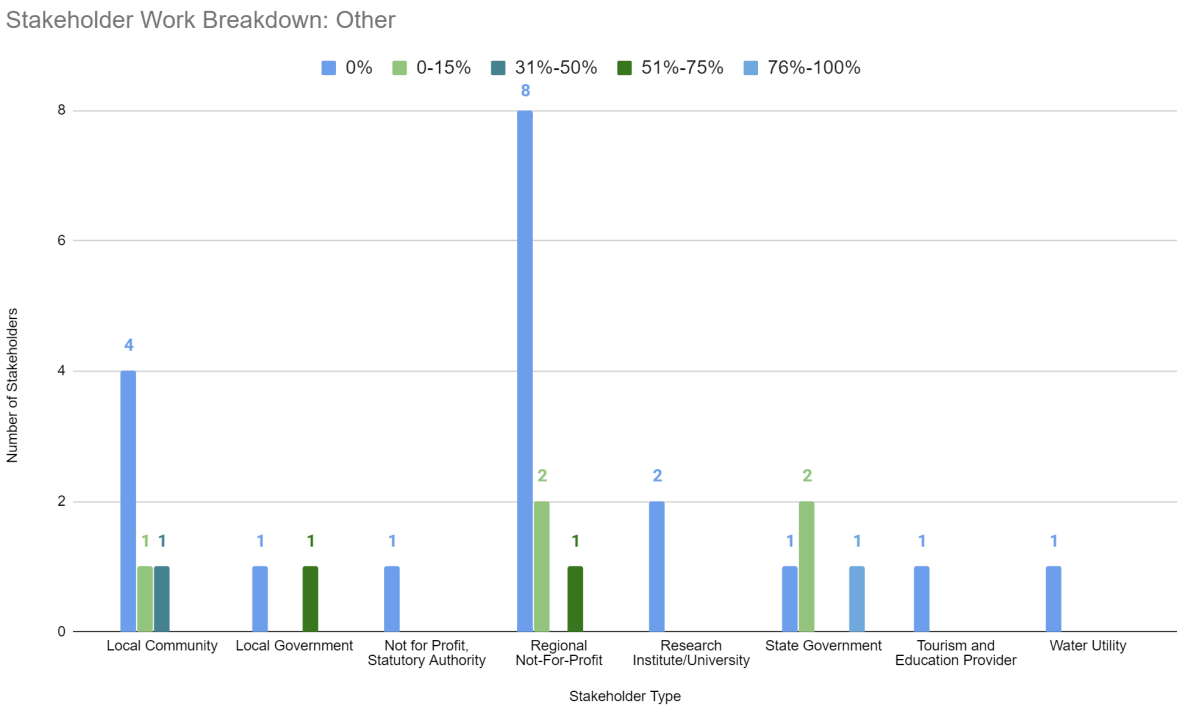


The graph above displays the percentage of work breakdown per stakeholder type as it pertains to Community Engagement/Education.

Key Points:

- 50% (3 out of 6) Local Community organisations reported spending greater than 31% of their efforts and resources on Community Engagement/Education.
- 45% (5 out of 11) of Regional Not-For-Profits reported spending greater than half of their efforts and resources on Community Engagement/Education.
- 75% (3 out of 4) State Government organisations reported spending greater than 31% of their efforts and resources on Community Engagement/Education.

Other



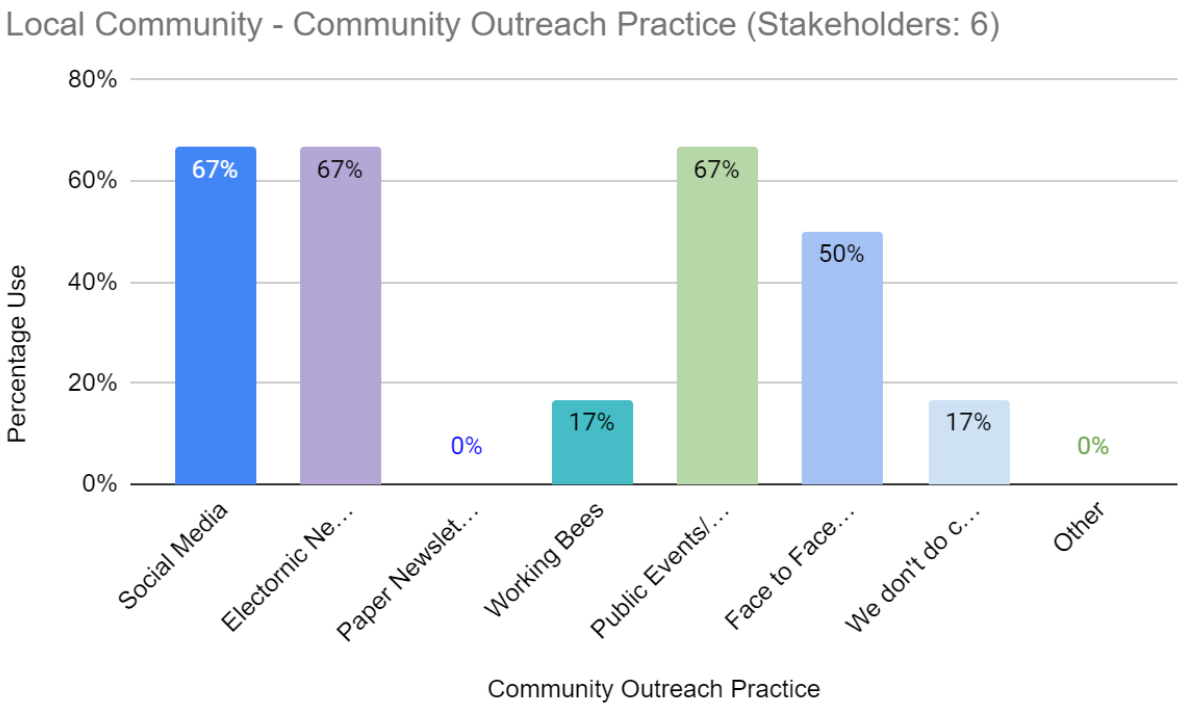
The graph above displays the percentage of work breakdown per stakeholder type as it pertains to “Other” work.

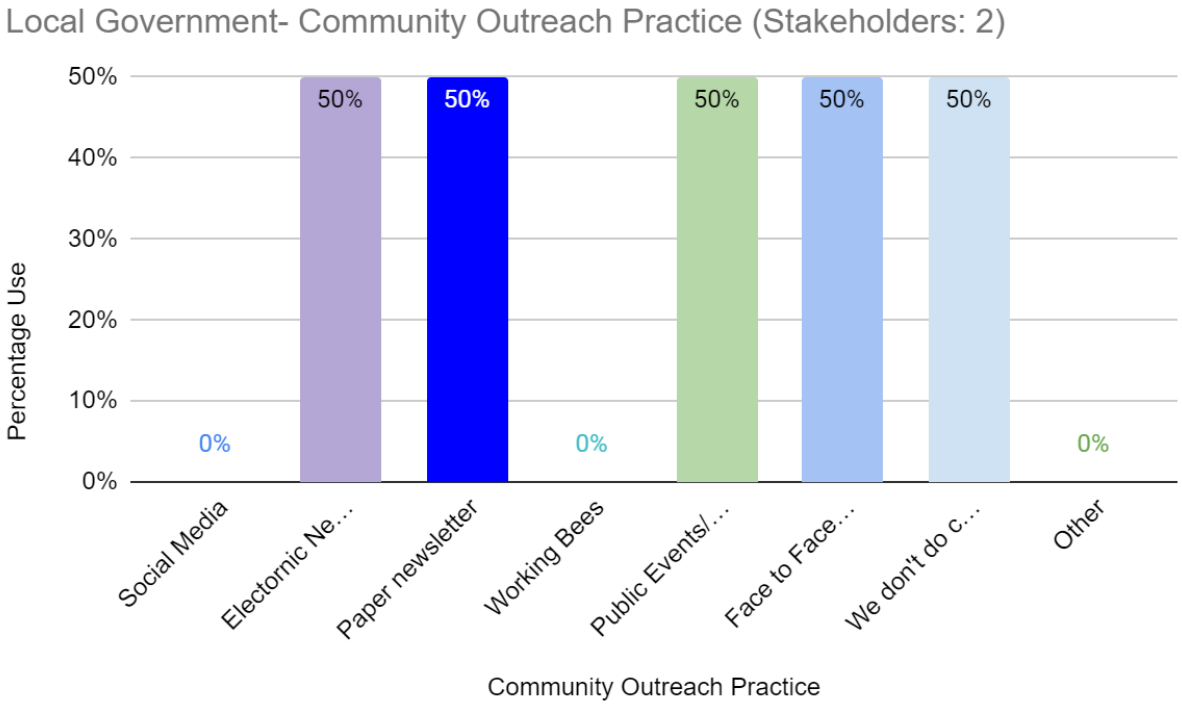
Key Points:

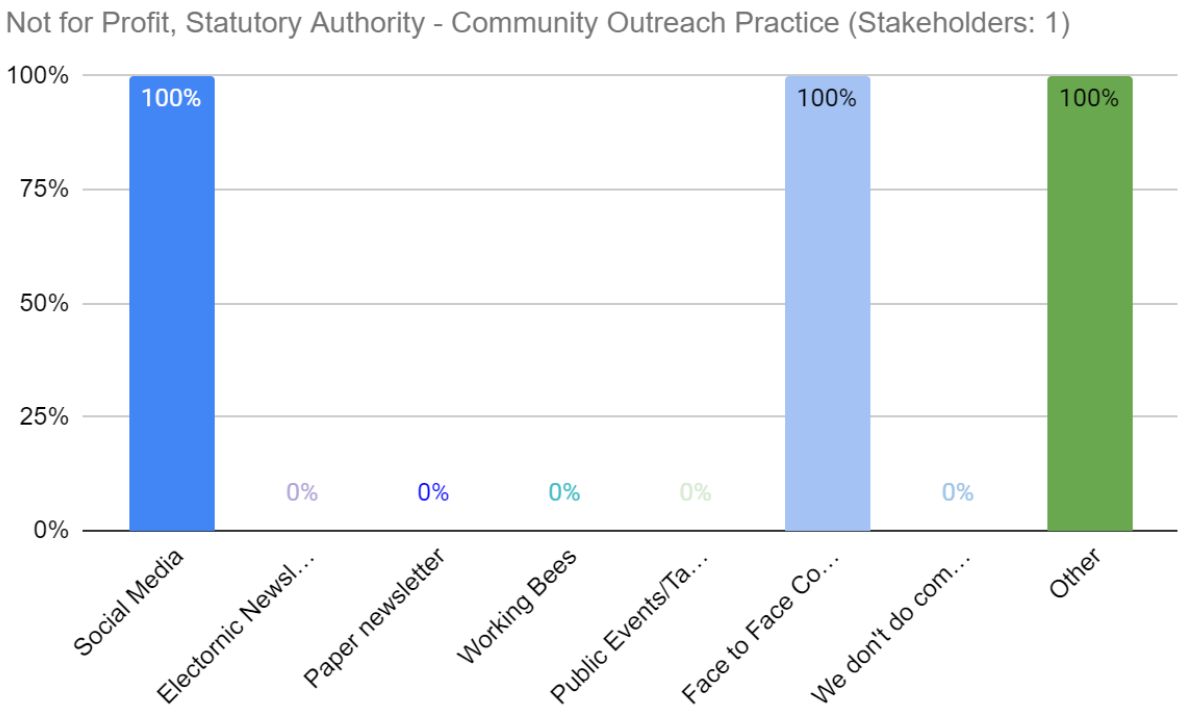
- 86% (24 out of 28) of stakeholders reported spending less than 15% of their efforts and resources on “Other” work.

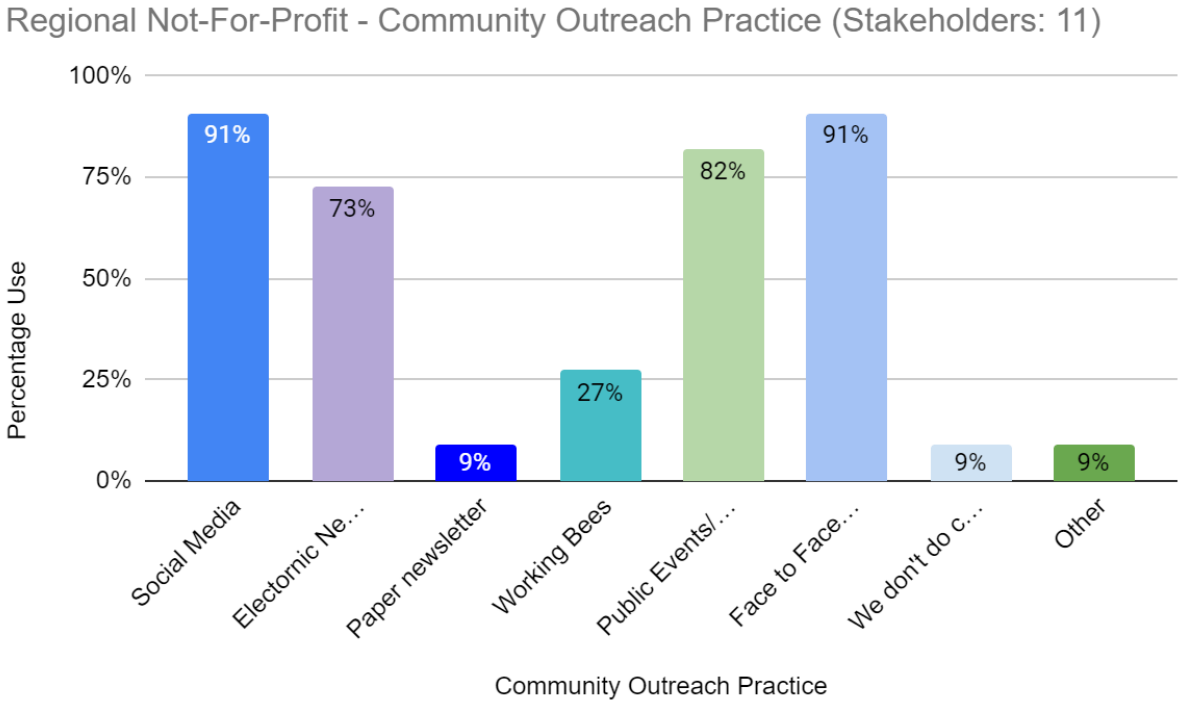
11% (3 out of 28) of stakeholders reported spending greater than half of their efforts and resources on “Other” work.

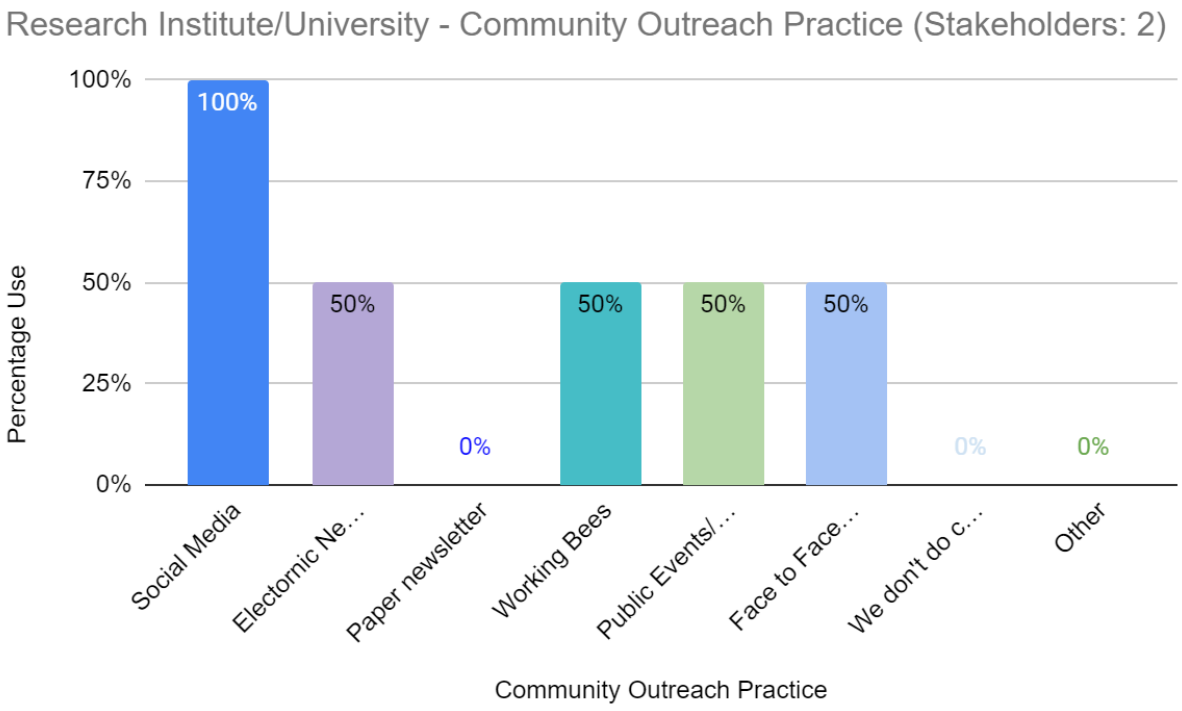
Appendix L: Survey Results - Community Outreach Practices

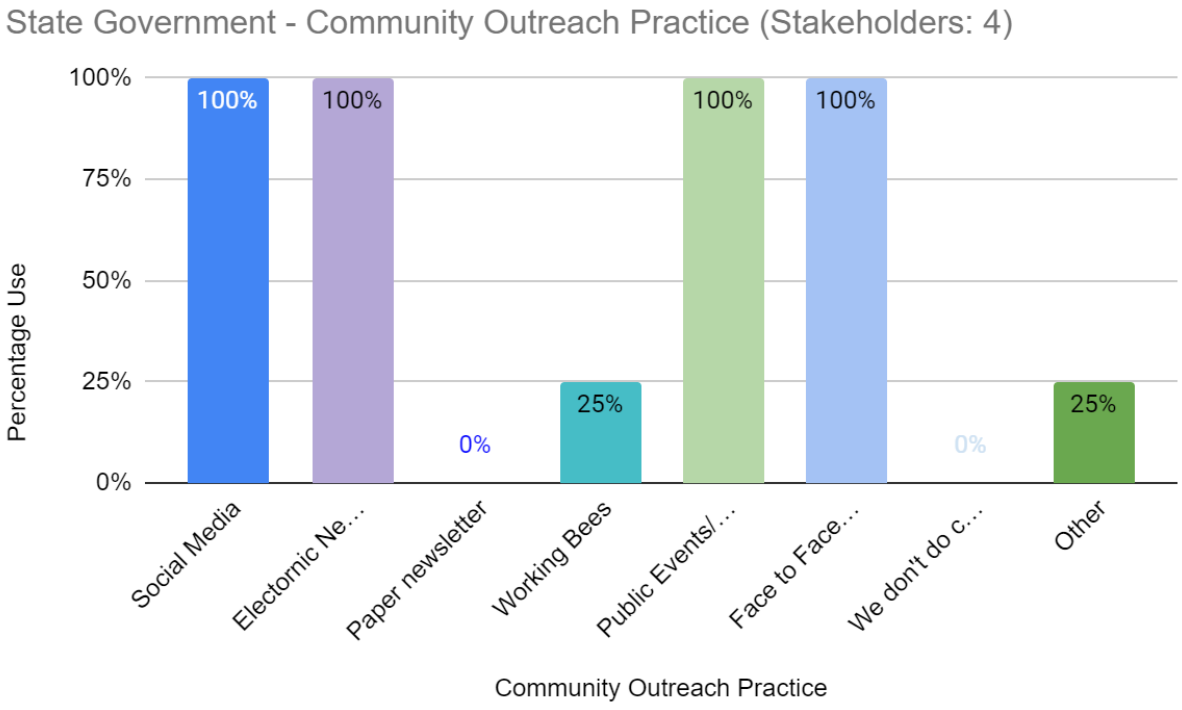


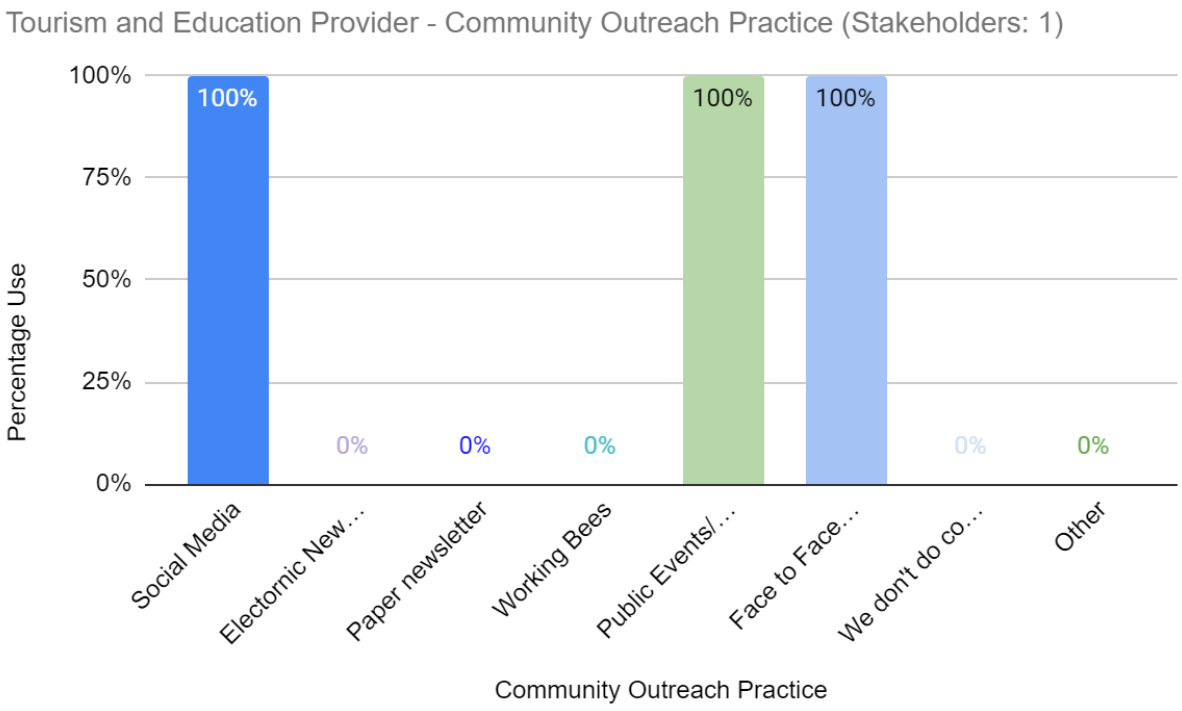


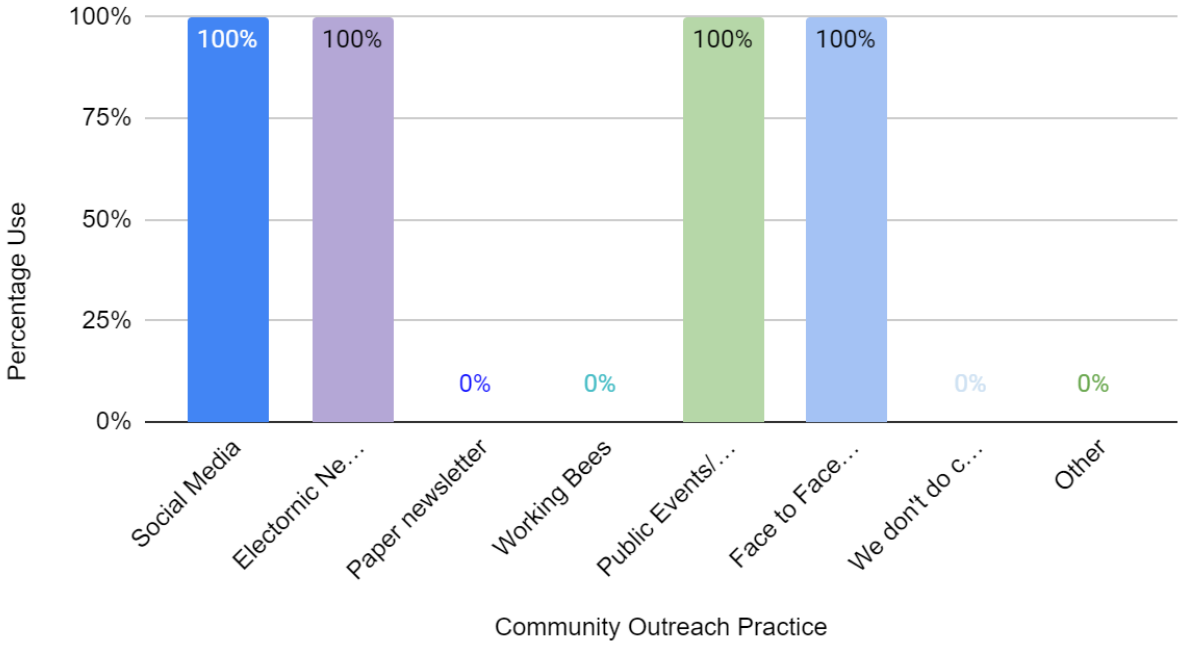

Not for Profit, Statutory Authority - Community Outreach Practice (Stakeholders: 1)
100%
75%
50%
25%
0%
100%
0%
0%
0%
0%
100%
0%
100%
Social Media
Electornic Newsl…
Paper newsletter
Working Bees
Public Events/Ta…
Face to Face Co…
We don't do com…
Other

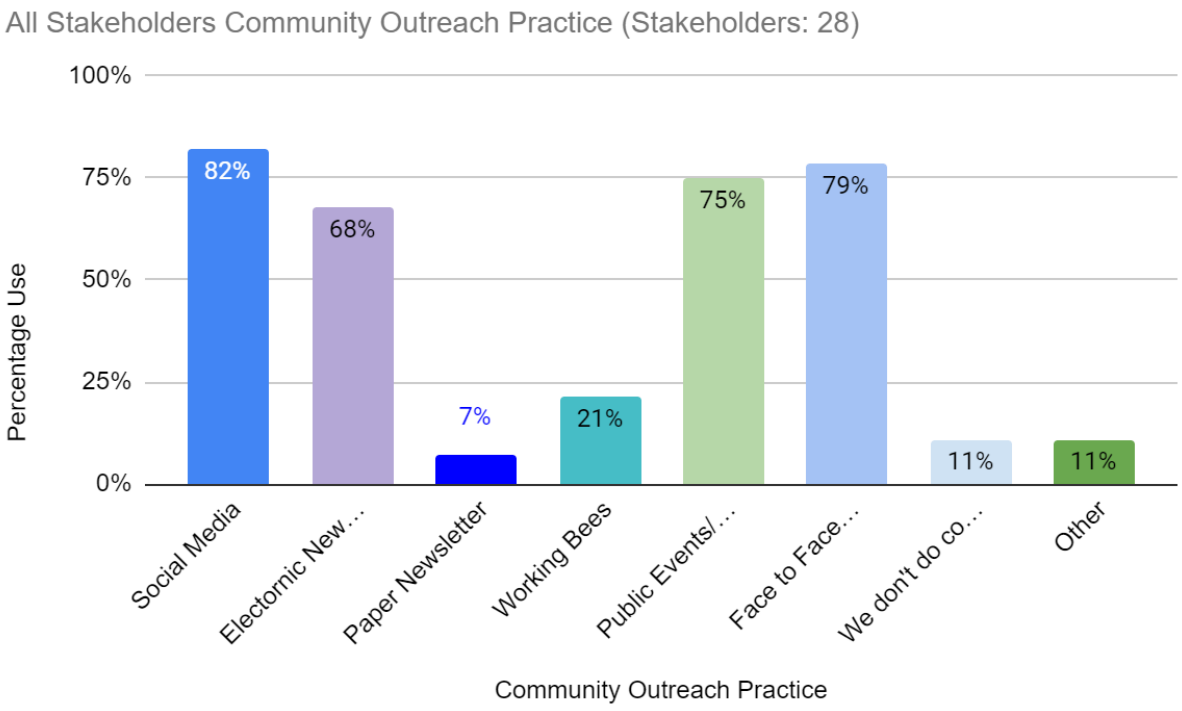

Regional Not-For-Profit - Community Outreach Practice (Stakeholders: 11)
Percentage Use
100%
75%
50%
25%
0%
91%
73%
9%
27%
82%
91%
9%
9%
Social Media
Electornic Ne…
Paper newsletter
Working Bees
Public Events/…
Face to Face…
We don't do c…
Other
Community Outreach Practice


Research Institute/University - Community Outreach Practice (Stakeholders: 2)
100%
75%
50%
25%
0%
Percentage Use
100%
50%
0%
50%
50%
50%
0%
0%
Social Media
Electornic Ne…
Paper newsletter
Working Bees
Public Events/…
Face to Face…
We don't do c…
Other
Community Outreach Practice


State Government - Community Outreach Practice (Stakeholders: 4)
100%
75%
50%
25%
0%
Percentage Use
100%
100%
0%
25%
100%
100%
0%
25%
Social Media
Electornic Ne…
Paper newsletter
Working Bees
Public Events/…
Face to Face…
We don't do c…
Other
Community Outreach Practice

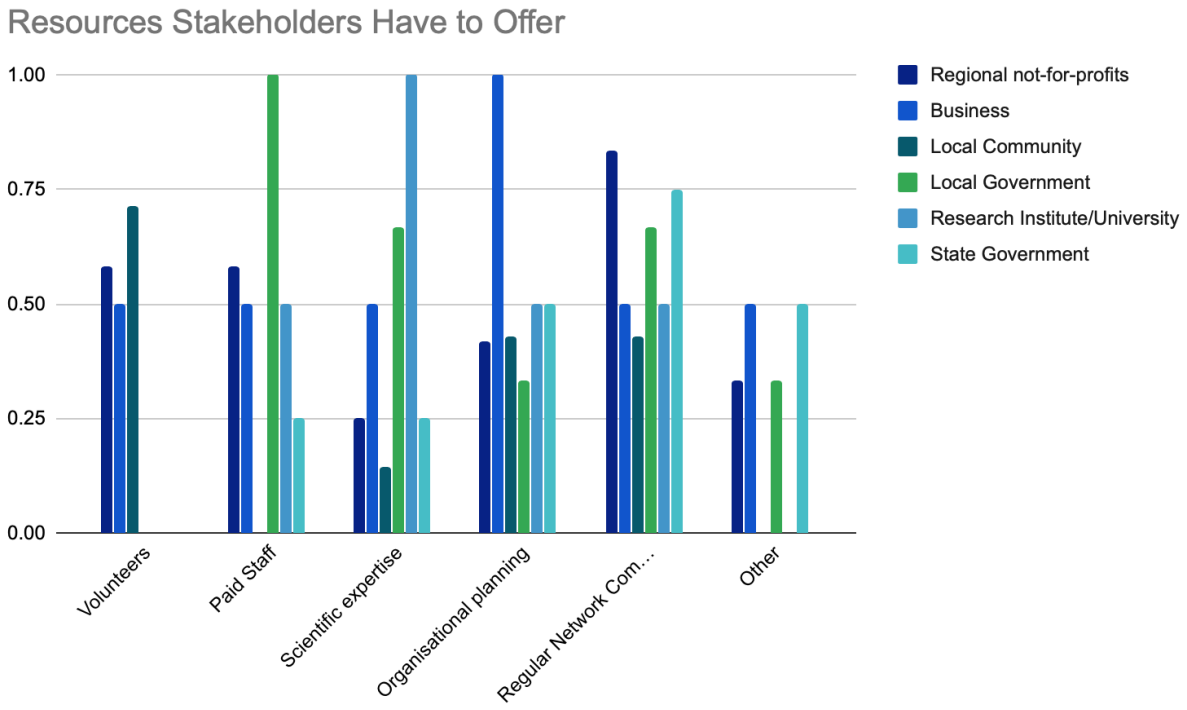

Tourism and Education Provider - Community Outreach Practice (Stakeholders: 1)
100%
75%
50%
25%
0%
Percentage Use
100%
0%
0%
0%
100%
100%
0%
0%
Social Media
Electornic New…
Paper newsletter
Working Bees
Public Events/…
Face to Face…
We don't do co…
Other
Community Outreach Practice


Water Utility - Community Outreach Practice (Stakeholders: 1)
100%
75%
50%
25%
0%
Percentage Use
100%
100%
0%
0%
100%
100%
0%
0%
Social Media
Electornic Ne…
Paper newsletter
Working Bees
Public Events/…
Face to Face…
We don't do c…
Other
Community Outreach Practice

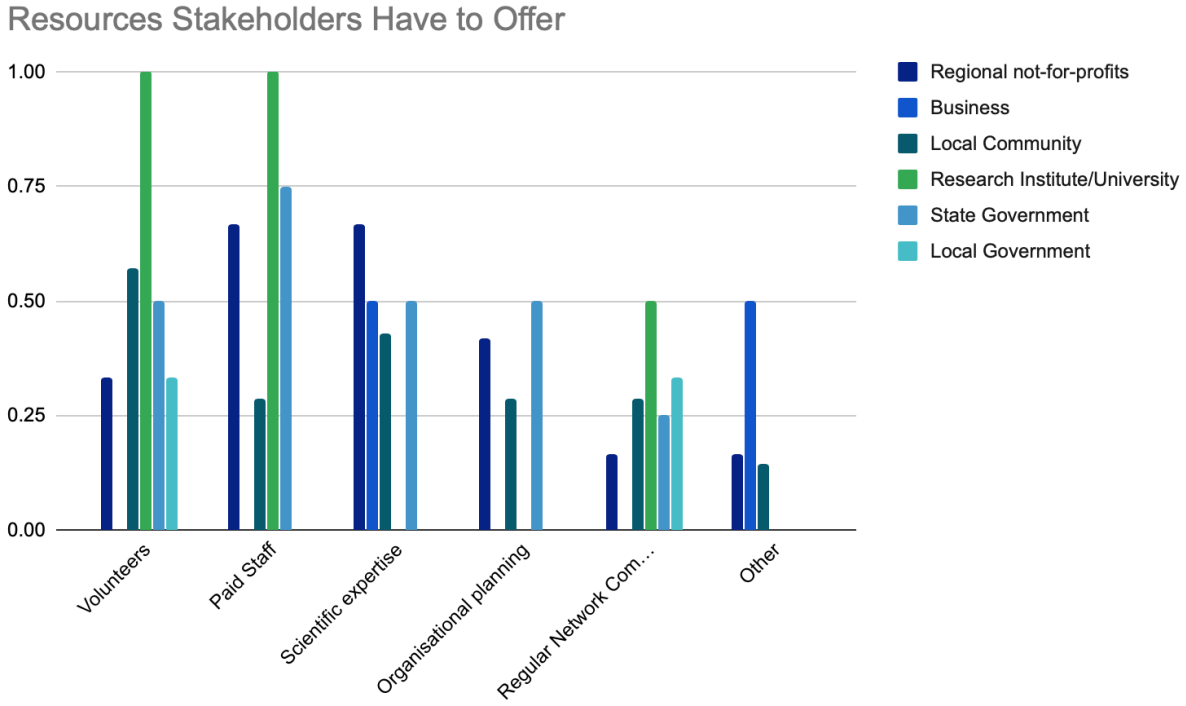

All Stakeholders Community Outreach Practice (Stakeholders: 28)
100%
75%
50%
25%
0%
Percentage Use
82%
68%
7%
21%
75%
79%
11%
11%
Social Media
Electornic New…
Paper Newsletter
Working Bees
Public Events/…
Face to Face…
We don't do co…
Other
Community Outreach Practice

Appendix M: Survey Results - Limitations and Resources

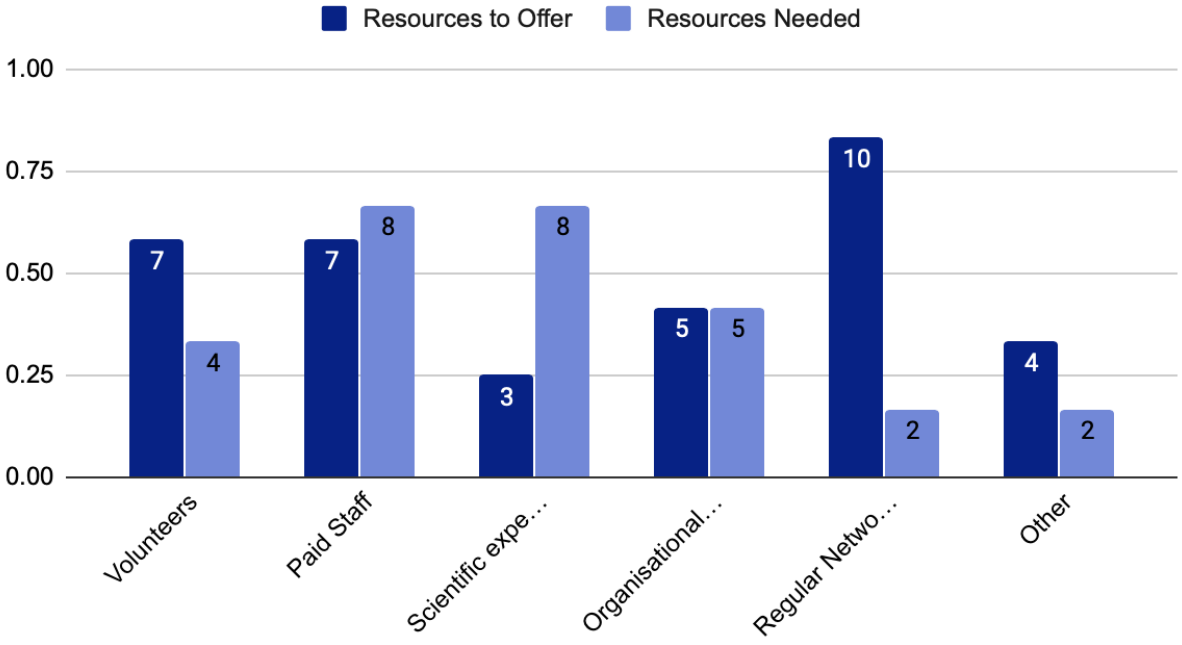
	Regional not-for-profits	Business	Local Community	Local Government	Research Institute/University	State Government
Volunteers	7	1	5	0	0	0
Paid Staff	7	1	0	3	1	1
Scientific expertise	3	1	1	2	2	1
Organisational planning	5	2	3	1	1	2
Regular Network Communication	10	1	3	2	1	3
Other	4	1	0	1	0	2
Total Groups	12	2	7	3	2	4



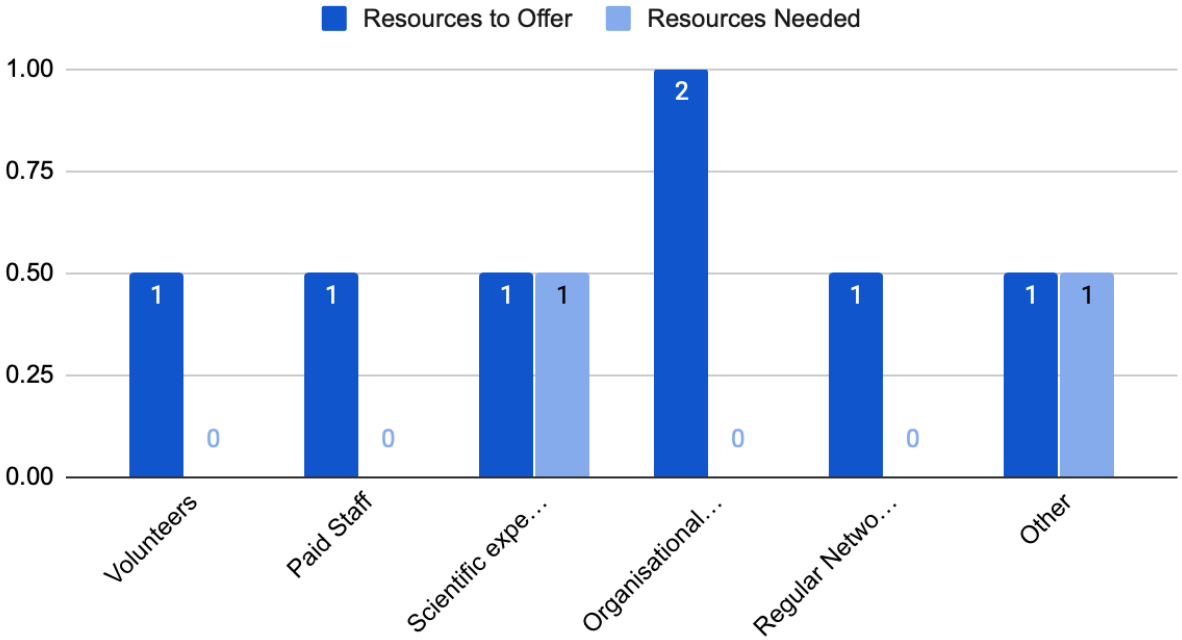
	Regional not-for-profits	Business	Local Community	Local Government	Research Institute/University	State Government
Volunteers	4	0	4	1	2	2
Paid Staff	8	0	2	0	2	3
Scientific expertise	8	1	3	0	0	2
Organisational planning	5	0	2	0	0	2
Regular Network Communication	2	0	2	1	1	1
Other	2	1	1	0	0	0
Total Groups	12	0	0	3	2	4



Not-for-Profits Resources to Offer and Resources Needed

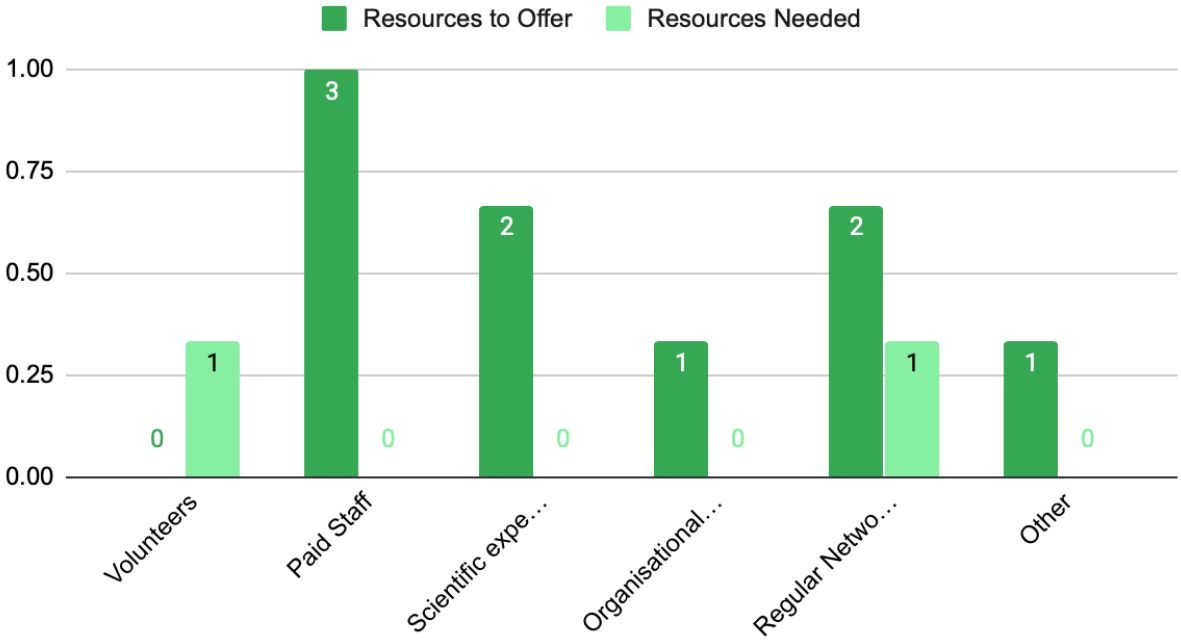


Businesses Resources to Offer and Resources Needed

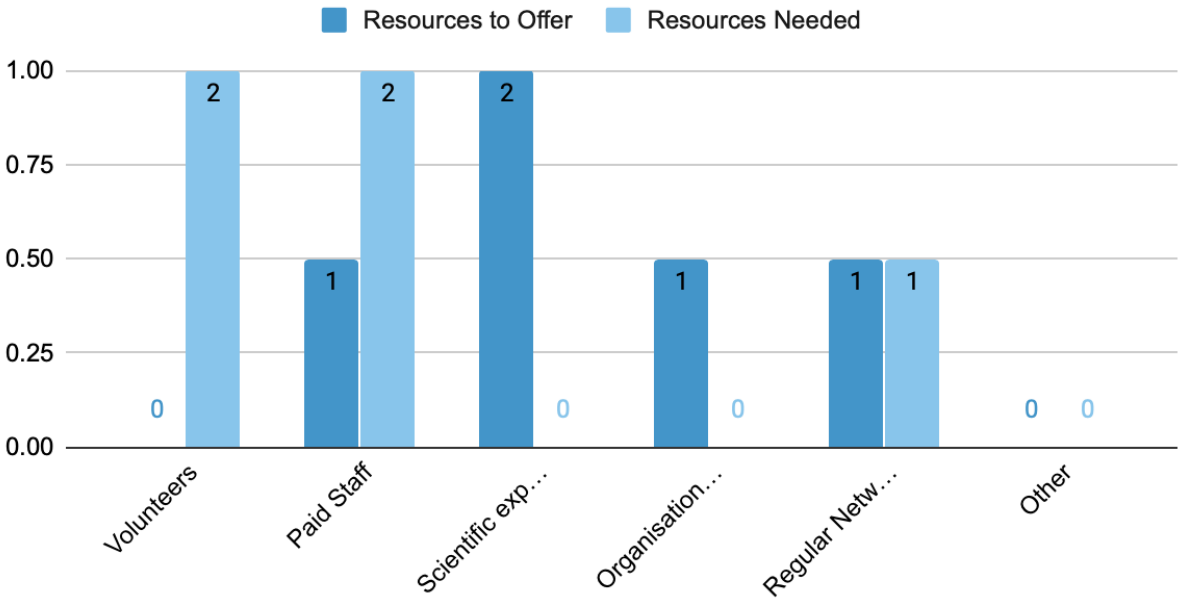


Local Community Groups Resources to Offer and Resources Needed

Local Government Resources to Offer and Resources Needed

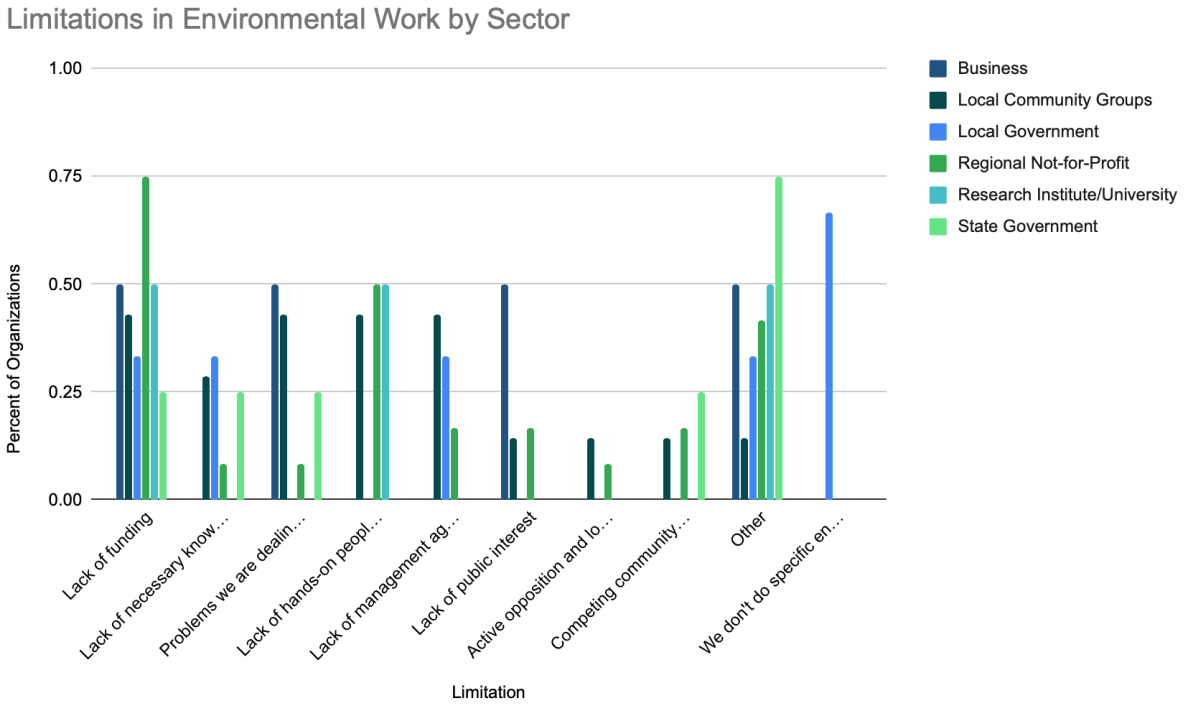


Research Institute/University Resources to Offer and Resources Needed

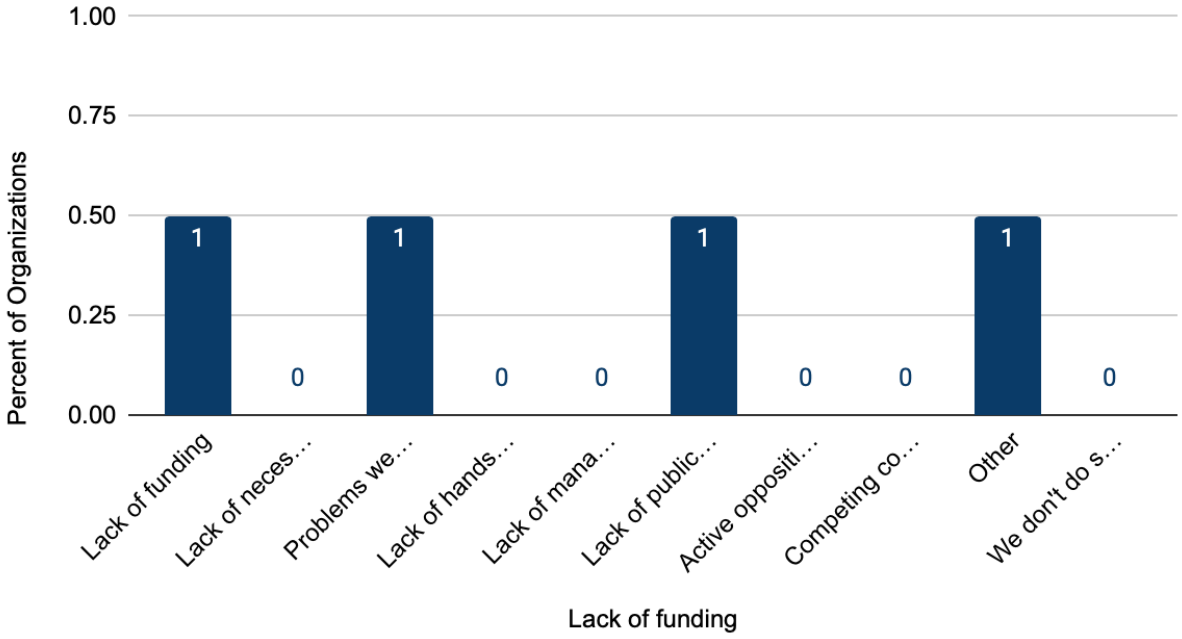


Resources to Offer and Resources Needed

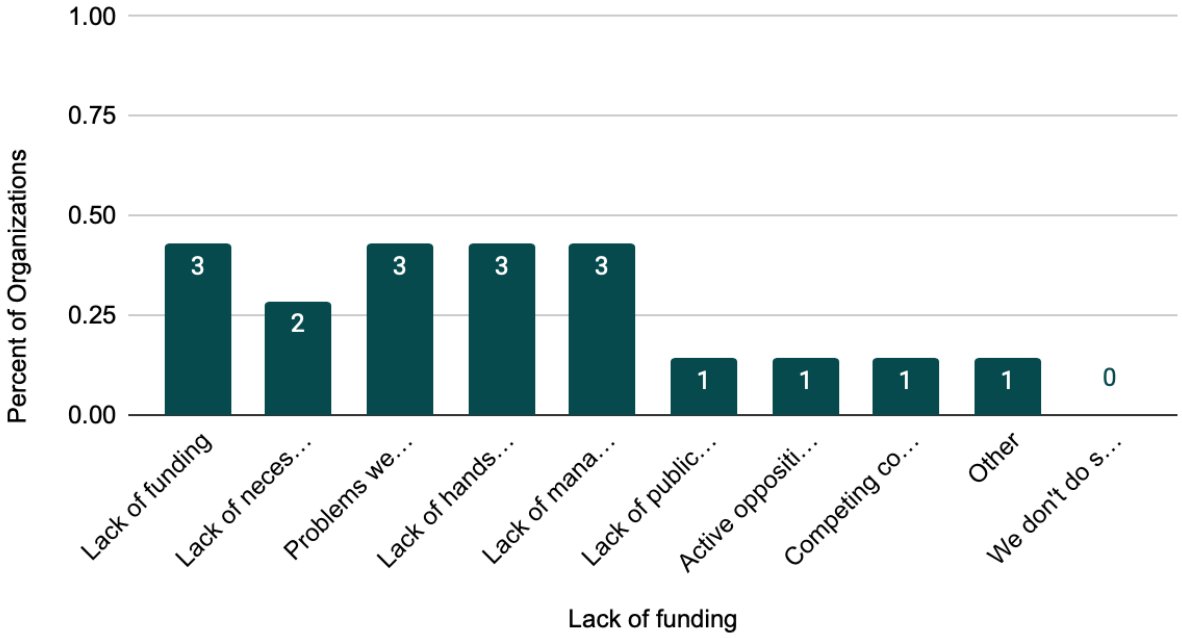
Limitations in Specific Environmental Work	Business	Local Community Groups	Local Government	Regional Not-for-Profit	Research Institute/University	State Government
Lack of funding	1	3	1	9	1	1
Lack of necessary knowledge in the group to solve a problem	0	2	1	1	0	1
Problems we are dealing with are not well-documented	1	3	0	1	0	1
Lack of hands-on people power	0	3	0	6	1	0
Lack of management agency support	0	3	1	2	0	0
Lack of public interest	1	1	0	2	0	0
Active opposition and lobbying against your objectives	0	1	0	1	0	0
Competing community environment organisations giving mixed messages	0	1	0	2	0	1
Other	1	1	1	5	1	3
We don't do specific environmental work	0	0	2	0	0	0
Total	2	7	3	12	2	4


Limitations in Environmental Work by Sector
1.00
0.75
0.50
0.25
0.00
Percent of Organizations
Lack of funding
Lack of necessary know…
Problems we are dealin…
Lack of hands-on peopl…
Lack of management ag…
Lack of public interest
Active opposition and lo…
Competing community…
Other
We don't do specific en…
Limitation
Business
Local Community Groups
Local Government
Regional Not-for-Profit
Research Institute/University
State Government

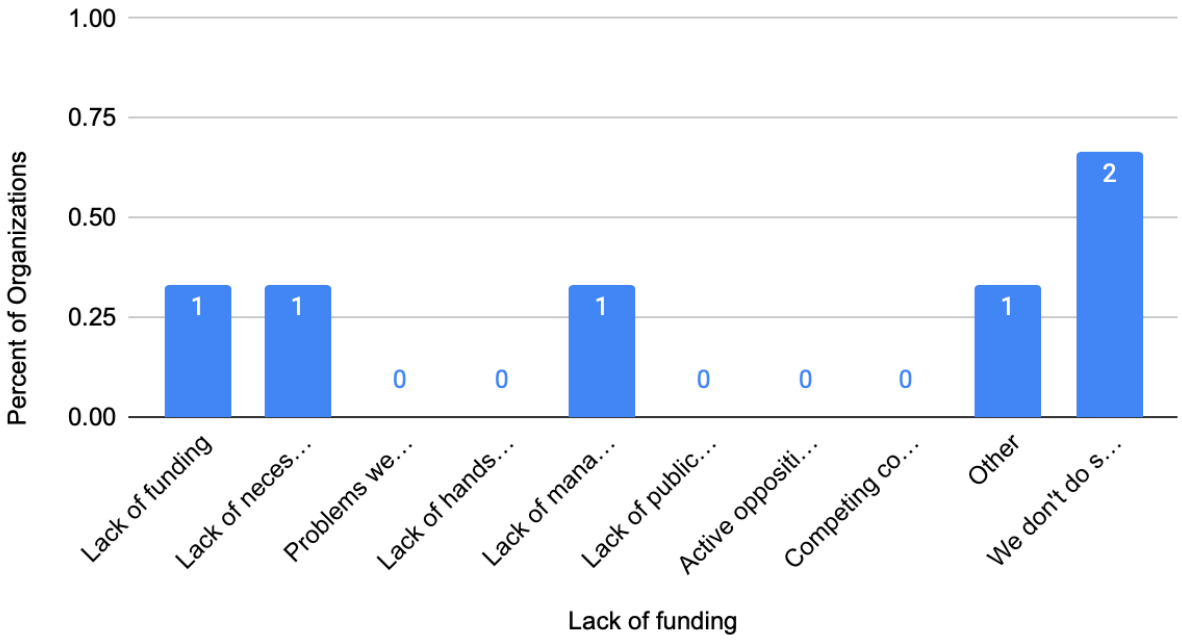
Limitations for Businesses



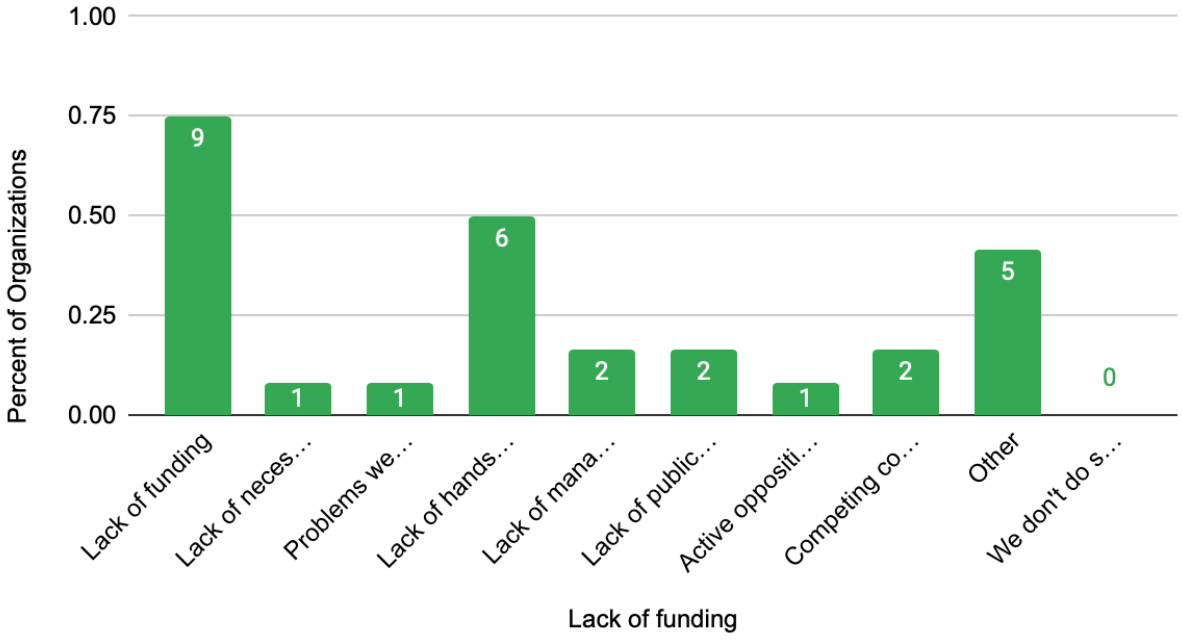
Limitations for Local Community Groups



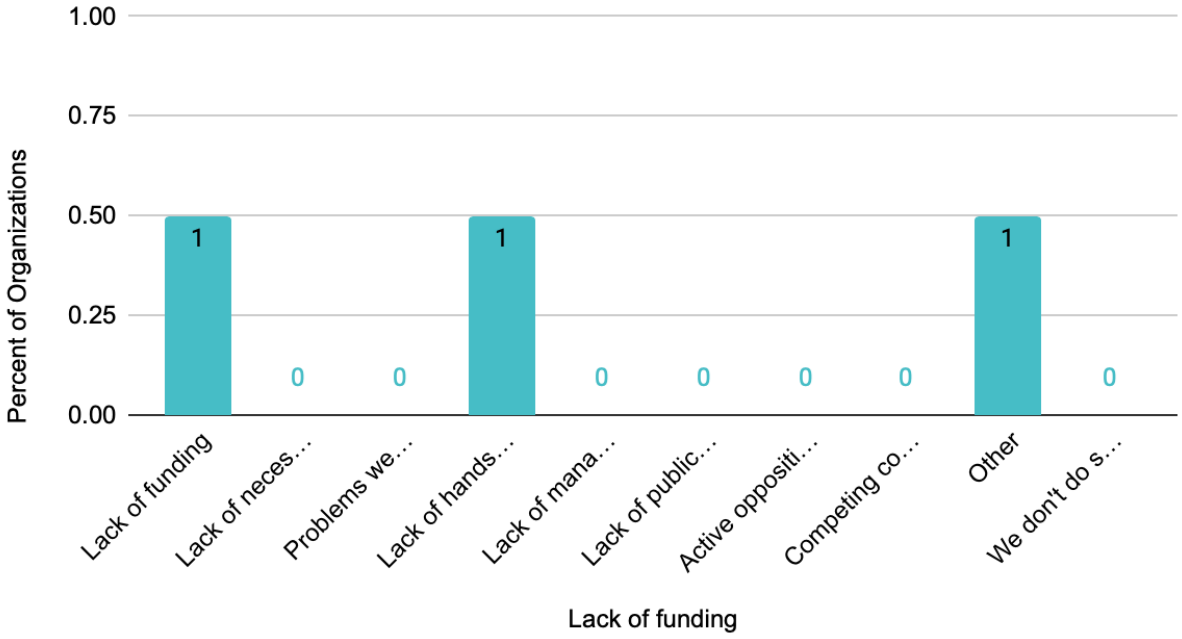
Limitations for Local Government



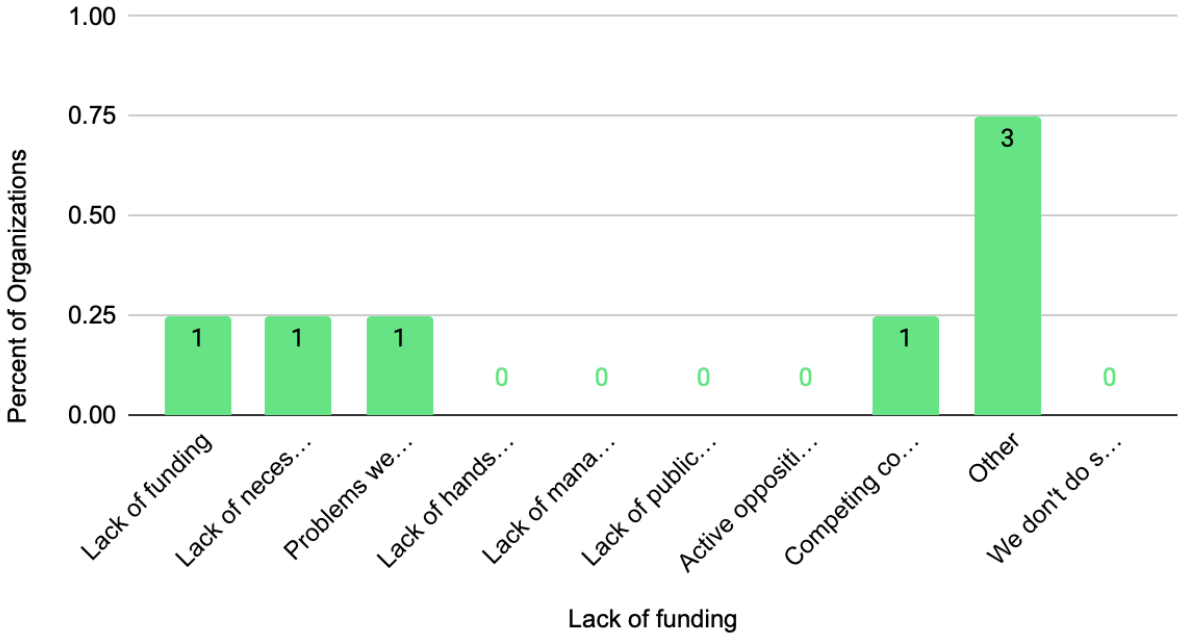
Limitations for Regional Not-for-Profits



Limitations for Research Institutes and Universities



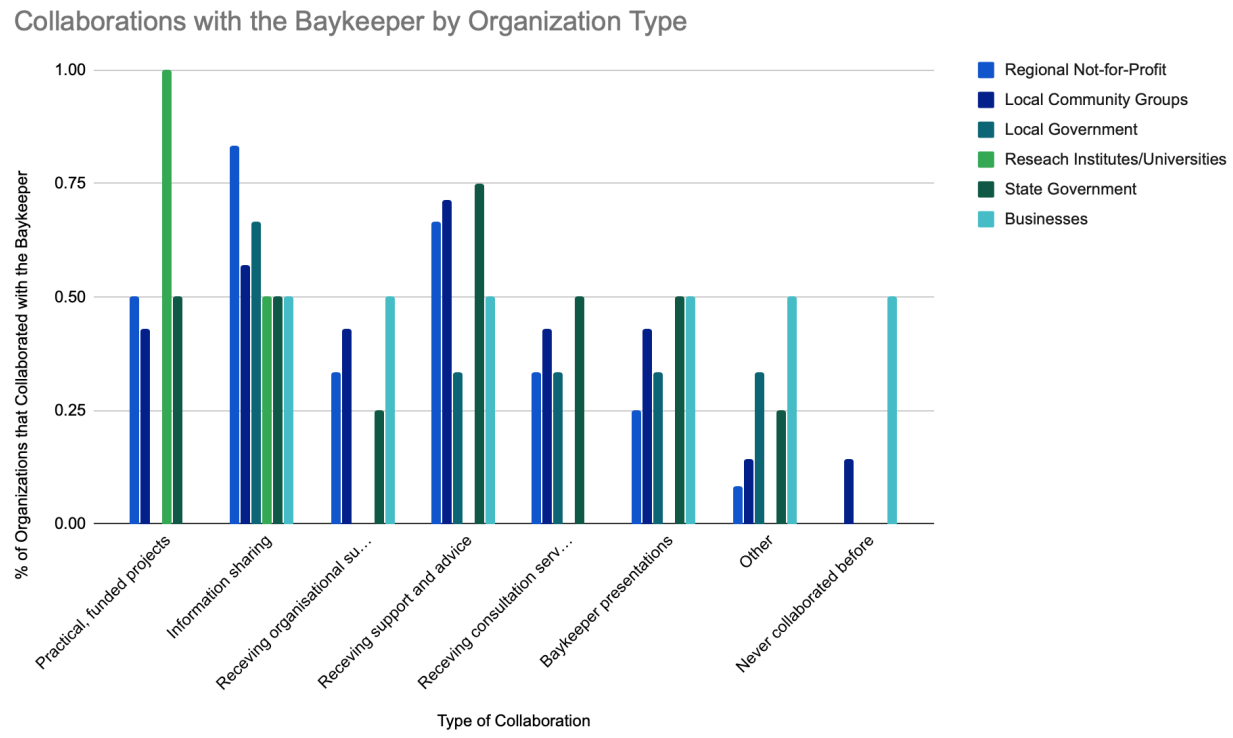
Limitations for State Government



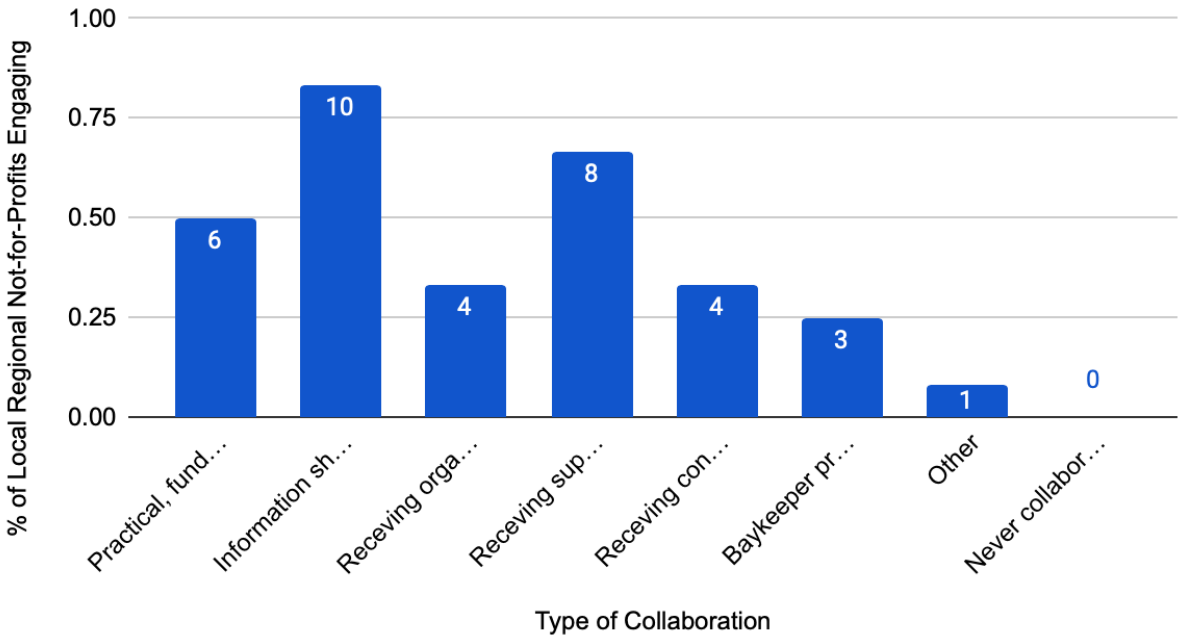
Appendix N: Survey Results - Collaborations with the Baykeeper

Overall

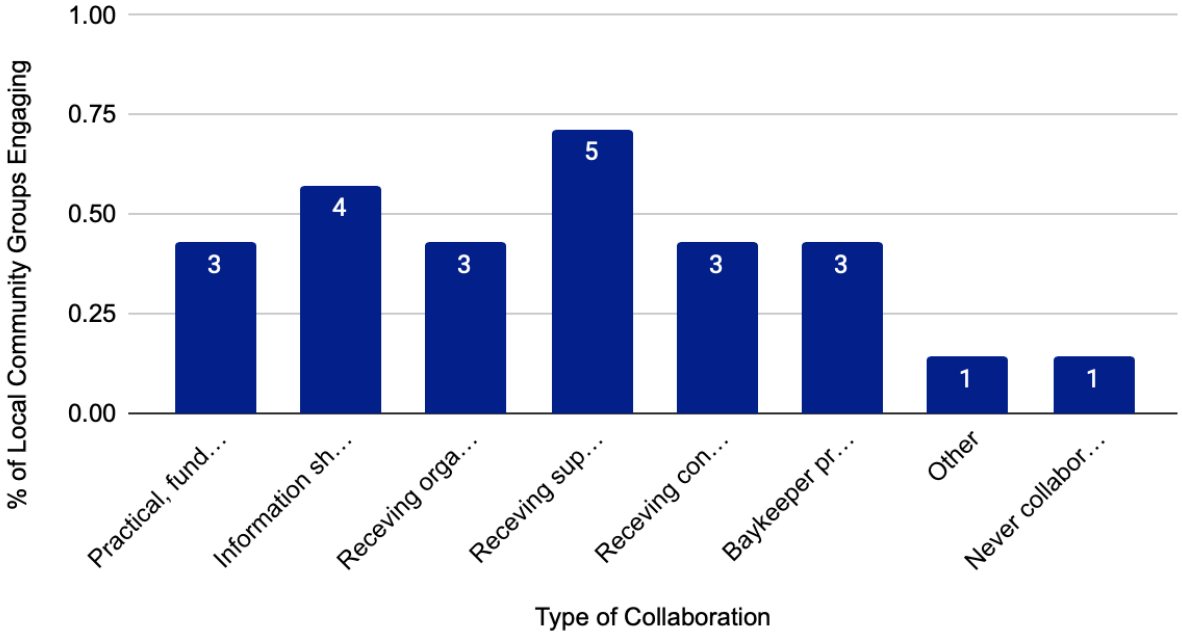
	Regional Not-for-Profit	Local Community Groups	Local Government	Research Institutes/Universities	State Government	Businesses
Practical, funded projects	6	3	0	2	2	0
Information sharing	10	4	2	1	2	1
Receving organisational support	4	3	0	0	1	1
Receving support and advice	8	5	1	0	3	1
Receving consultation services	4	3	1	0	2	0
Baykeeper presentations	3	3	1	0	2	1
Other	1	1	1	0	1	1
Never collaborated before	0	1	0	0	0	1
Total groups	**12**	**7**	**3**	**2**	**4**	**2**



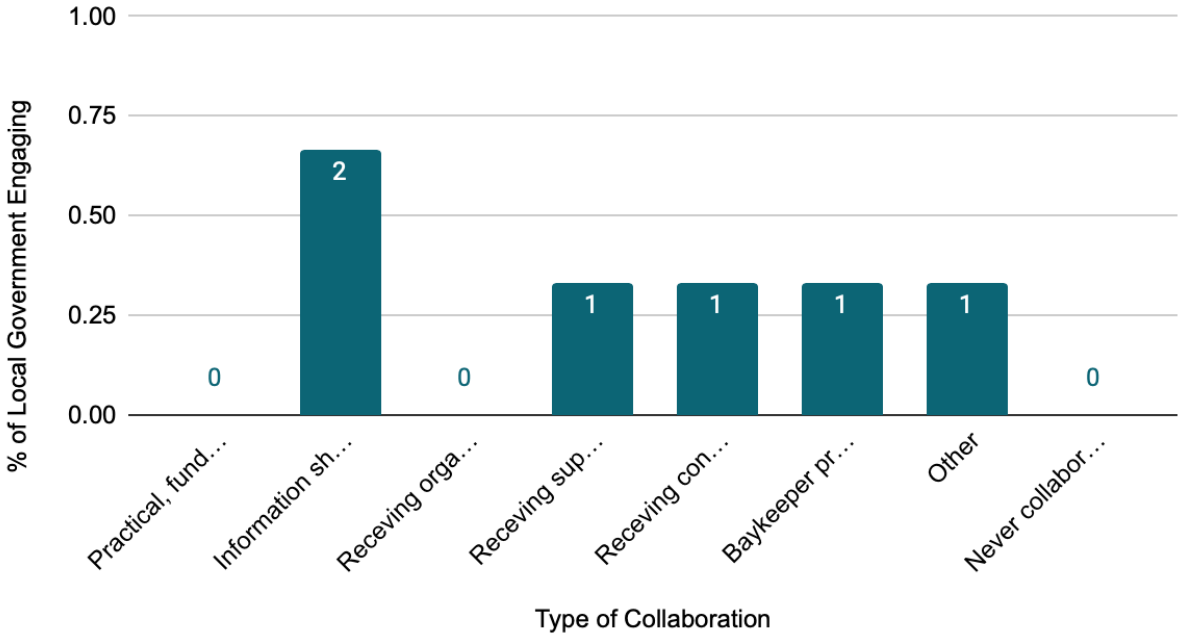
Regional Not-for-Profits Collaboration with Baykeeper



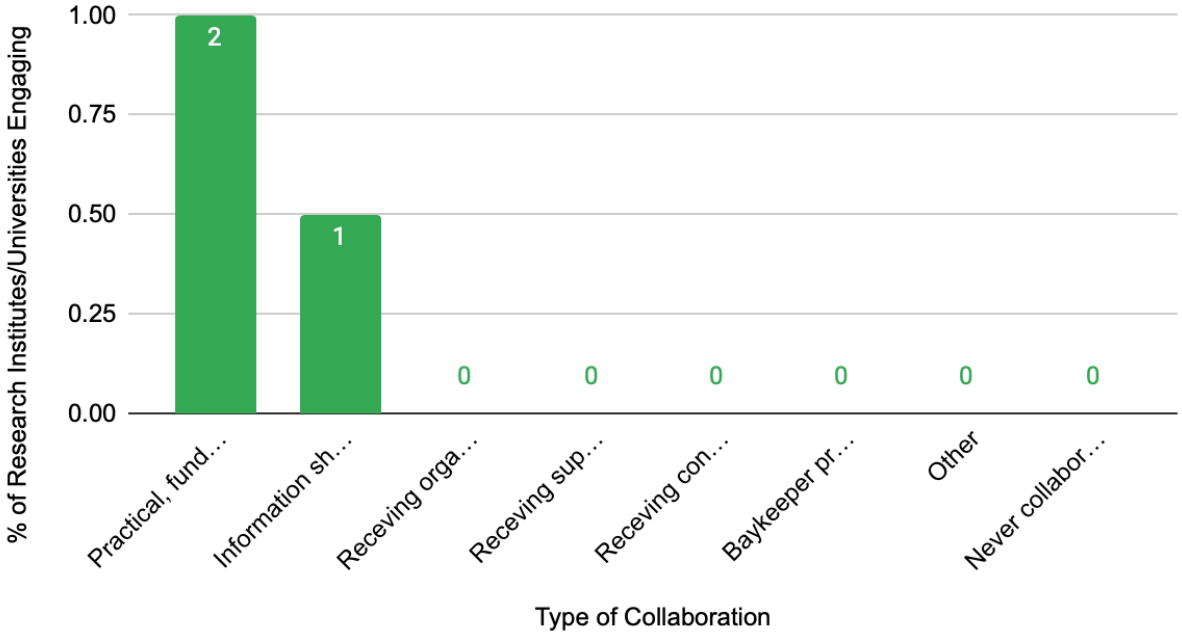
Local Community Groups Collaboration with Baykeeper



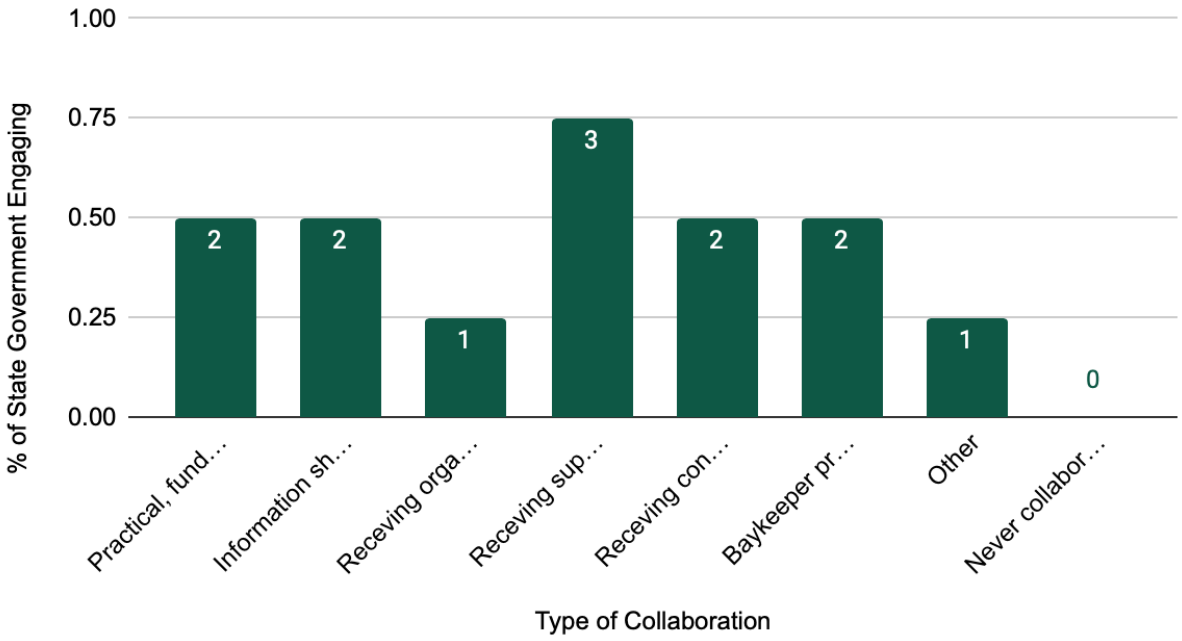
Local Government Collaboration with Baykeeper



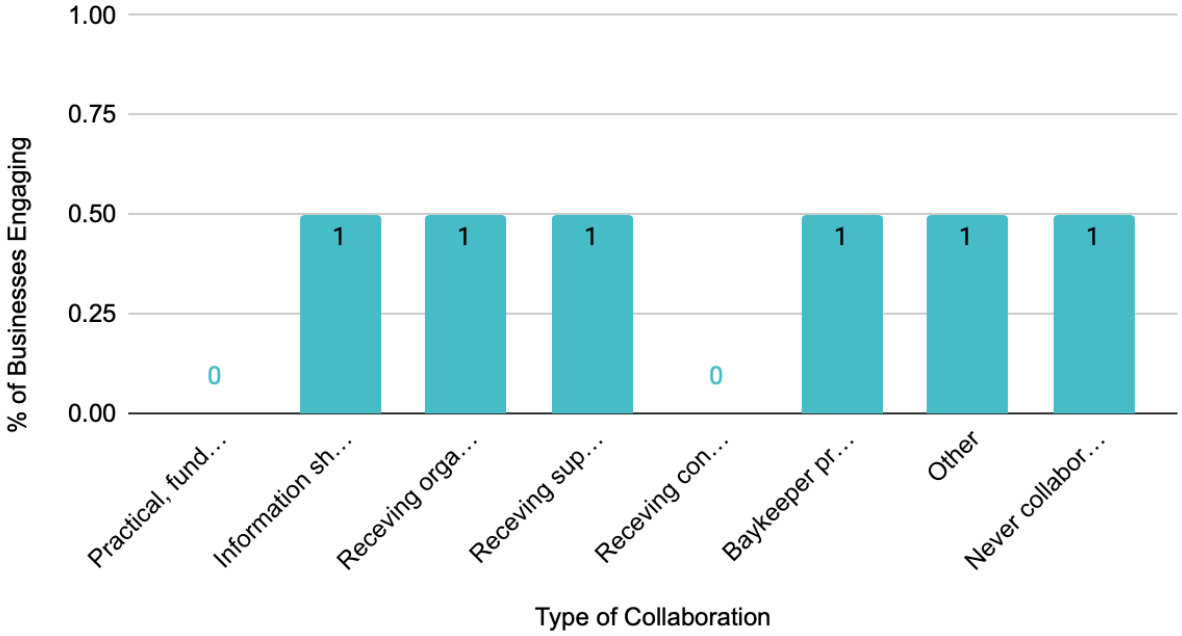
Research Institutes/Universities Collaboration with Baykeeper

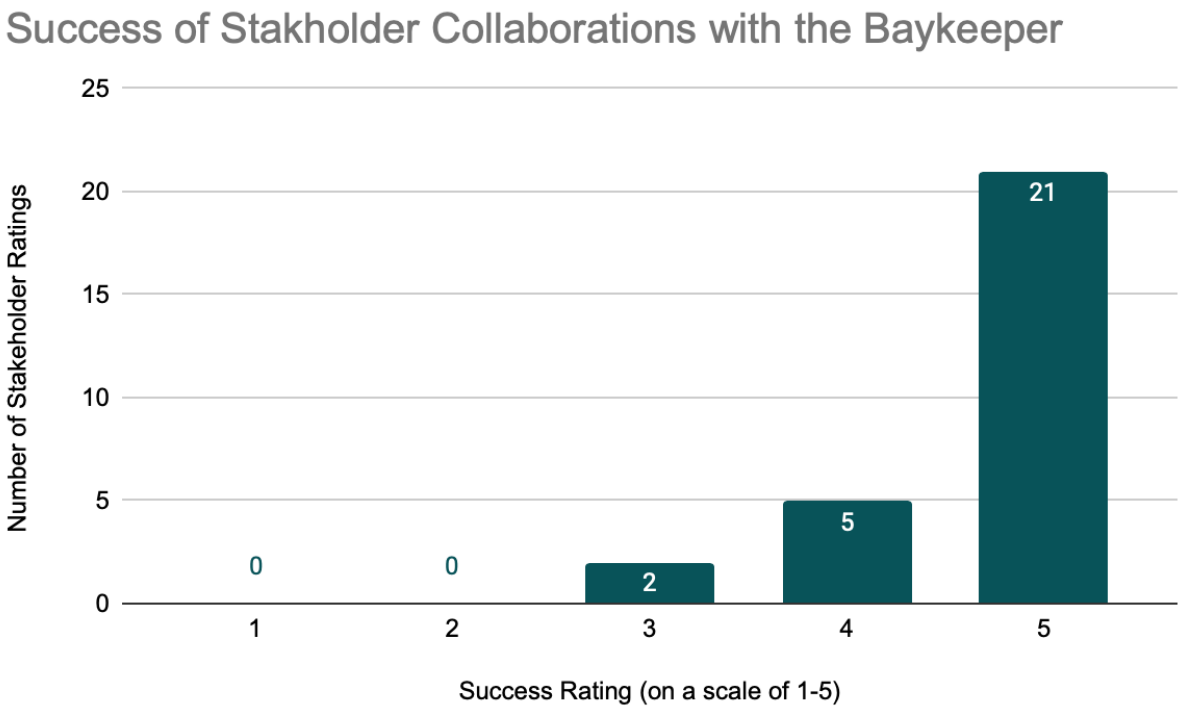


State Government Collaboration with Baykeeper



Businesses Collaboration with Baykeeper




Success of Stakholder Collaborations with the Baykeeper
Number of Stakeholder Ratings
25
20
15
10
5
0
0
0
2
5
21
1
2
3
4
5
Success Rating (on a scale of 1-5)

Appendix O: Stakeholders Invited to Climate Change Workshop

Name	Organization
Raymond Lewis	Marine Education Science and Community inc (MESAC)
Pete Lindner	Canopy of Care
Phillip Wierzkbowski	Department of Environment, Land, Water and Planning / Coastcare Victoria
Mechelle Cheers	Rye Community Group Alliance + Rye Coastal Advisory Group
Ralph Roob	City of Greater Geelong
Jenny Warfe	Blue Wedges
Rebecca Morris	National Centre for Coasts and Climate, University of Melbourne
Judith Muir	Polperro Dolphin Swims and Charter Service Pty Ltd
Jacquie White	Association of Bayside Municipalities

Appendix P: Stakeholders that Attended Climate Change Workshop

Name	**Organization**
Pete Lindner	Canopy of Care
Mechelle Cheers	Rye Community Group Alliance + Rye Coastal Advisory Group
Judith Muir	Polperro Dolphin Swims and Charter Service Pty Ltd

Appendix Q: Climate Change Workshop Notes

Climate Change Workshop Notes
Hosted by the Port Phillip EcoCentre
April 20th, 2020

Background:
History and potential/probable causes of the issue. What has been done in the past about this and where are we now?

- Projected sea level rises are 800 mm by 2100
- Intensified erosion, particularly in the south eastern region of the bay, exacerbated by dredging at Port Phillip Heads increasing tidal currents and storm surges
- Tidal movements are greater, ie. high tides are higher than previously.
- Intensity of winter storms, sand movement is greater
- Rate of erosion is accelerated, exposing tree roots, undermining and killing long-established trees.
- Rate of warm water marine species making way into the Bay - ecosystem changing
    - several tropical turtles over last 15 years
    - Bluebottles found on various Bay beaches January 2020
    - A juvenile Japanese Devilray washed up at Brighton April 2020.
- Structures installed to control erosion may no longer be effective in current conditions.

Probable threat to waterway/Bay health:
How is this issue threatening waterway and Bay health? Is this a local issue, or is it waterway and/or Bay-wide?

- Localised erosion is occurring in all regions of the Bay, eg, St Leonards cliff collapsing on the Western Shore, beach erosion at Point Richards (Corio Bay) and Middle park (NE shoreline), dune erosion at Seaford (eastern shore); but practically all beaches at Mornington Peninsula are affected to some degree.
    - Local residents and property owners are more directly affected by coastal erosion.
    - Imposition of coastal infrastructure affects recreational amenity of beaches
    - Hardening of surfaces
- Threat to marine vegetation habitats: seagrass meadows smothered by sand movement.
- Threat to terrestrial vegetation habitats: loss of dune trees/shrubs/grasses which provide a linear habitat corridor for migratory bush birds.
- Wind and water direction
- Loss or displacement of intertidal sandy sediment habitat currently supporting bivalve molluscs.
- Potential nutrient overload flushed from catchments to the Bay by heavy rainfall events.
- Increasing sea surface temperature and pH having ecological impacts

- Molluscs - struggle to grow shells in more acidic pH
- Tube worms, oysters

Responsible Management Agencies:
List of agencies and their particular responsibility (e.g. policy making, management, on-ground works)

- DELWP
  - Jenny Priestly re: groynes
- Individual local governments and Association of Bayside Municipalities
- Foreshore Committees of Management
- Shipping channel authority
  - Port of Melbourne
- Parks Victoria
- Victorian Fisheries Authority
- Victorian Coastal Council
- Department of Primary Industries
- Coastcare Victoria

Other Stakeholders:
Who else is involved in/affected by this issue? Including community, recreation groups, businesses, education sector, etc.

- First peoples: Boon Wurrung, Bunorong, Woiwurrung/Wurundjeri, Wauthurong
- People that live by the Bay
- Anyone that uses the coast
- Local Traders
- Tourism
  - Participants and providers
- Fishers and Boaters - Recreational sector, eg. local Yacht Clubs
- Unpowered, recreational water users - Divers, swimmers, paddle boarding… etc
- Shipping industry
- Commercial fishers
- Aquaculture industry
- Coastal infrastructure, main roads on the fringe of erosion undercutting
  - VicRoads
- Research Institutes - schools and universities

- Bellarine Catchment Network
- Wildlife

Existing Policy Framework:
Existing laws and policies that manage and frame this issue and how they relate to each other. Includes potential/existing management practices.

- Marine and Coastal Policy 2018
- Port Phillip Bay Environmental Management Plan 2017-2027
- EPBC - Environmental Protection and Biodiversity Conservation Act
    - Limited practical use due primarily to focus on documented impacts on listed Threatened species, as opposed to incremental loss of general habitat values.
    - Only applies to formally protected areas (need to check!!!)
- Port Phillip and Western Port Regional Catchment Strategy
- Climate Change Act
- EPA Act (currently under review, expected for application in July 2021)
- Biodiversity Plan, not legislative
- Does SEPP apply? - check (State Environmental Protection Policy - Waters)
- Planning Act in local government for infrastructure
- Melbourne Water Healthy Waterways Strategy - needs to be climate proof
- Council management plans for climate change

Existing Knowledge:
What existing studies are there to help understand and research the issue? Anecdotal and Science and research based, including local, national and international examples.

- Blue carbon lab-Deakin University
    - Studying carbon sequestration in seagrasses, saltmarshes, and mangroves: research coming soon
- Grey to Green - National Centre for Coasts and Climate
    - Living breakwater - offshore reefs to modify coastal processes
- CSIRO
    - Climate change on the national level (need to link to latest CSIRO initiatives)
- The Nature Conservancy
    - Artificial reefs replacing known sites of disappeared reefs - Simon Branigan
- EPA Randall Lee
- Sea level rise - paper citing DELWP Coastal hazards study (not sure what this is!!!)
- Parks Victoria
    - tracking warmer water species movement
- Baykeeper beach profile and live mollusc surveys: ongoing monitoring of local beaches

to document change over time.

- Bellarine Catchment Network are conducting beach profiles at various location on the western side of the Bay.

Existing Management Practices:
What is already being done about this issue now?

- Annual beach renourishment program conducted by DELWP in consultation with Bayside Councils.
- Historically, sands have been trucked from inland quarries to replace eroded beaches
    - Gippsland sands from inland quarries replaced much of Portseas beach following CDP
    - Renourishing beaches with sands with grain characteristics that are easily eroded.
    - More recently, offshore sandy sediments have been pumped back onto beaches, eg Middle Park renourishment (2017).
- Are old techniques still effective, eg. 22 new hard structures on Mornington Peninsula
-
    - Old approaches considered reactive, not proactive - just putting in hard structures
- Grey to green project
    - Installation of a 'living breakwater' off Point Richards in 2017 has resulted in the recovery of the previously eroding beach.

Knowledge Gaps:
Why has the issue not been resolved yet? What are gaps in knowledge and management that are perpetuating the issue?

- Methods other than hard structures
- Lack of evaluation of existing methods
- Lack of evaluation of environmental impact of current methods
- Studies on damage to intertidal zones species as a result of higher tides
- Type and source of sands imposed to replace eroded beaches
    - Probably won't be continued?
    - Gippsland sands from inland quarries replaced much of Portseas beach following CDP
- Climate change research and policy adaptation takes time
    - Limited funds likely for climate change research, especially post-corona?
- Anecdotal observations of species coming from warm water tend not to reach wider community.
- Research not always making it to the public - hidden knowledge, research of PhD students
- Not enough ongoing monitoring of the Bay

    - Last State of the Bays report for existing knowledge and gaps
- First Peoples speaking of surviving history of climate change
    - how to adapt
- General public are largely unaware - education

Existing links

Port Phillip Bay Coastal Hazard Assessment
https://www.marineandcoasts.vic.gov.au/coastal-programs/port-phillip-bay-coastal-hazard-assessment
Victorian Coastal Council
https://www.marineandcoastalcouncil.vic.gov.au/__data/assets/pdf_file/0021/411717/VCC-Science-Panel-Report-2018_Summary-8pp_WEB.pdf

Victorian Government Marine & Coastal Policy (April 2020)
https://www.marineandcoasts.vic.gov.au/coastal-management/marine-and-coastal-policy

Participating Organisation Logos:

Appendix R: Stakeholders Invited to Marine Pests Workshop

Name	Organization
Raymond Lewis	Marine Education Science and Community inc (MESAC)
Marylin Olliff	Hobsons Bay Wetlands Centre
Pete Lindner	Canopy of Care
Kade Mills	Victorian National Parks Association
Phillip Wierzkbowski	Department of Environment, Land, Water and Planning / Coastcare Victoria
Elysia Gustafson	Fishcare Victoria
Andrew Kelly	Yarra Riverkeeper
Kimberley Macdonald Regan East	Department of Environment, Land, Water and Planning Biodiversity Division
David Buntine	Port Phillip & Westernport CMA
Blair Stafford	Individual?
Dr Kate Robb	Marine Mammal Foundation
John Forrester	Werribee River Association Inc.
Ross Kilborn	Blairgowrie Yacht Squadron
Mark Keenan	Marine Response Unit (Melbourne Zoo)
Michelle O'Dea	Earthcare St Kilda
Rebecca Morris	National Centre for Coasts and Climate, University of Melbourne

Appendix S: Stakeholders that Attended Marine Pests Workshop

Name	Organization
Nick & Marylin Olliff	Hobsons Bay Wetlands Centre
Kade Mills	Victorian National Parks Association
Phillip Wierzkbowski	Department of Environment, Land, Water and Planning / Coastcare Victoria
Kimberley Macdonald	Department of Environment, Land, Water and Planning Biodiversity Division
Regan East	Department of Environment, Land, Water and Planning Biodiversity Division
David Buntine	Jawbone Marine Sanctuary Care Group
Sandra Webb	Jawbone Marine Sanctuary Care Group
Judith Muir	Polperro Dolphin Swims and Charter Service Pty Ltd

Appendix T: Marine Pests Workshop Notes

Marine Workshop Notes
Hosted by the Port Phillip EcoCentre
April 21th, 2020

Background:
History and potential/probable causes of the issue. What has been done in the past about this and where are we now?

- Numerous exotic species have been introduced to Port Phillip Bay on ship hulls or in ballast water.
- The most concerning marine pest species in Port Phillip Bay include:
    - Northern Pacific Seastar – *Asterias amurensis*
    - Wakame – *Undaria pinnatifida*
    - Pacific Oyster – *Crassostrea gigas*
    - Green Shore Crab – *Carcinus maenus*
    - European Fan Worm – *Sabella spallanzanii*
    - Purple Sea-urchin *Heliocidaris erythrogramma* is an over-abundant native species recognised as a potential threat to local habitats.
- Government responses focus on measures to prevent spread of pests from the Bay; and to conduct localised culls where pests have invaded marine sanctuary areas.
    - Mostly just accepting pests will never be eliminated due relative absence of predators or other biological controls.
- Local community groups, eg Eathcare St Kilda, have conducted regular culls of Northern Pacific Seastars in St Kilda harbour and neighbouring region since 2005.
- Port Phillip EcoCentre prepared a ‘Best Practice Guide to Removal of Northern Pacific Seastars in 2013 which raised no comment/interest from government stakeholders.
- Limited information available on:
    - Where key breeding sites are located;
    - Native species and habitats most impacted by pests;
    - If community cull techniques are working;
- Studies from Deakin University in collaboration with Parks Victoria and University of Melbourne

Probable threat to waterway/Bay health:
How is this issue threatening waterway and Bay health? Is this a local issue, or is it waterway and/or Bay-wide?

- Biodiversity issue!
    - Sea urchin created barrens, no kelp
- Waterways
- Northern Pacific Seastars eat molluscs, which play a key role in exchanging nutrients -

potential reduction of mollusc community has implications for changing ecology of Bay

Responsible Management Agencies:
List of agencies and their particular responsibility (e.g. policy making, management, on-ground works)

- Department of Jobs Precincts & Regions
  - Biosecurity incursion response
  - Then refer to local land managers if pest species establishes
- Parks Victoria
  - National Introduced Marine Pest Information System
  - Mark Rodrigue - state-wide leader marine and coasts environment and science division Parks Victoria, mark.rodrigue@parks.vic.gov.au
  - Jacqui Pocklington Parks Vic Pest species info ***
- VFA - marine pests working group
- Parks Victoria MARINE PESTS : https://www.parks.vic.gov.au/get-into-nature/conservation-and-science/conserving-our-parks/marine-pests

Other Stakeholders:
Who else is involved in/affected by this issue? Including community, recreation groups, businesses, education sector, etc.

- Marine Care groups
- Earthcare St Kilda
- Fishcare
- Recreational fishers and boaters, divers
- Port Phillip EcoCentre
- Education groups, two bays
- Schools and research (universities)
- Shipping Industry
- Commercial fishers
- Aquaculture industry
- EPA - ballast water restrictions?
- Community radio marine programs - Out of the Blue and Radio Marinara

Existing Policy Framework:
Existing laws and policies that manage and frame this issue and how they relate to each other. Includes potential/existing management practices.

- Ballast Water Management Requirements (National) Dept of Agriculture Water & Environment (DAWE)

- https://www.agriculture.gov.au/biosecurity/avm/vessels/marine-pest-biosecurity/ballast
- (National) Marine Pest Plan 2018-2023, (DAWE) https://www.marinepests.gov.au/what-we-do/publications/marine-pest-plan
- Port Phillip Bay Environmental Management Plan - looking for new monitoring sites
    - Monitoring priority locations for introductions (7.2), done by Parks Vic & DJPR
- Marine and Coastal Act 2018)
- Check Clean Dry - education campaign to reduce boat hull and trailer biofouling to prevent spread of pests beyond Port Phillip Bay
- Commissioner for Environmental Sustainability : https://www.ces.vic.gov.au/sotb/case-study/where-did-port-phillip-bays-shellfish-reefs-go For further information visit: http://www.shellfishrestoration.org.au

Existing Knowledge:
What existing studies are there to help understand and research the issue? Anecdotal and Science and research based, incl local, national and international examples.

- Deakin, University of Melbourne
    - Dr. Paul Carnell Blue Carbon Lab Conservation Science Lab Deakin Marine Mapping
- Sea urchin research focused on determining the most efficient timing for culling
- University of Tasmania
    - Research on different Urchins, more far eastern coastal
- EcoCentre
    - Northern Pacific Seastar study 2013 - comparing effects in St Kilda and Mornington Harbours
- Greg Parry, Parks Victoria - seastar studies
- Richard Stafford-Bell (Pest Species Response) Dept Jobs Precincts and Regions
- Port Phillip Bay Shellfish Reef Restoration Project Update : https://www.shellfishrestoration.org.au/port-phillip-bay-shellfish-reef-restoration-project-update/
- Shellfish Reef Progress https://www.natureaustralia.org.au/what-we-do/our-insights/perspectives/shellfish-reef-project-update-march-2019/
- Anecdotal reports of NPS movements based on food, eg. targeting *Electroma georgiana*

Existing Management Practices:
What is already being done about this issue now?

- Manual removal by community groups - asteria and urchins
- Urchin culling
- Sporadic monitoring by different organizations

- Education campaigns for recreational boat users/sellers (check, clean, dry?)
- Commercial vessels have strict hull cleaning procedures/ballast water recommendations
- PPB EMP Annual Report (https://www.marineandcoasts.vic.gov.au/__data/assets/pdf_file/0032/457736/PPB-EMP-2017-2027-Annual-Report-2019.pdf) has an update on the 6 actions under marine biodiversity being completed by PV and DJPR under the EMP page 55
- Mud Island
- Instruction on seastar identification and removal
- Citizen Science Programs such as Sea Search : https://www.parks.vic.gov.au/get-into-nature/volunteering/sea-search

Knowledge Gaps:
Why has the issue not been resolved yet? What are gaps in knowledge and management that are perpetuating the issue?

- Unrealistic to expect pest species to be eliminated from the Bay. No dialogue thus far to determine what is realistic.
- No attempt has been made to clearly define the "issue" and the future implications for the Bay ecosystem.
- Attempts to address and or better understand the "issue" have been sporadic and by organisations in isolation rather than in collaboration.
- Talk to fishcare about rec anglers and introduced species
- Urchins:
    - Climate change, warm water expansion
    - Ecosystem out of balance
    - Increased nutrients (study from California?)
        - https://www.theguardian.com/environment/2019/oct/24/sea-urchins-california-oregon-population
- Lack of awareness/understanding of permit system requirements for pest removal and disposal prevents general community response to major aggregations of pests.
- Reefs being naturally resilient to invasive species and urchin barrens
    - What's different about these areas?
    - NZ experienced over abundance of sea urchins in areas overfished for a lobster species. NZ experienced over abundance of sea urchins in areas overfished for a lobster species. This study was used by Tim Allen when Vic campaigned for MPAs and NMPs. They settle in depleted areas and by memory this study showed that if restrictions are in place on fishing as in MPNP, the area can restore balance.

Links to further information
National Marine Pests Information System https://www.marinepests.gov.au/pests/nimpis

Participating Organisation Logos:

EcoCentre and Collaborators Overview of Climate Change in Port Phillip Bay

This paper outlines Port Phillip EcoCentre and collaborators perspectives on protecting waterways and the Bay from climate change that causes coastal erosion, rising sea levels and water temperatures.

Vulnerability Background

Port Phillip Bay (PPB) is home to over 1,000 different species of flora and fauna as well as around 5 million people living in the Greater Metropolitan Melbourne area around the Bay.[1] A changing climate threatens these species and the people that live off of the Bay. Since 1910, Australia's average air temperature has warmed 1˚C.[2] With the warming air, sea surface temperatures in the oceans are also increasing. As the oceans warm, ice caps melt and the water expands creating a larger volume.[1] From 1993 to 2015, sea levels have risen an average of 3.4 mm per year.[3] The Victorian Government has accepted a projected sea level rise of 800 mm by 2100.[4]

Rising temperature and sea levels will have the largest impact on species with low mobility, have specific localised habitats, or narrow living temperatures.[2] There will also be significant erosion and increased intensity of winter storms creating larger sand movements. Intensified erosion, particularly in the south eastern region of the bay, has been exacerbated by dredging at Port Phillip Heads. The deepened channel at the Heads allows greater volumes of water to enter the Bay on incoming tides. Combined with rising sea levels, this greater volume has resulted in an increased occurrence of extreme high tides. The rate of beach erosion is accelerated, exposing tree roots, undermining and killing long-established trees. The structures installed to control erosion may no longer be effective in current conditions.

Erosion, increased pH and water temperatures are threatening the Bay

Climate change is a global problem, and one of the primary concerns for Port Phillip Bay. Climate change will impact the Bay by causing

Figure 1: Localised Erosion and Effects of Climate Change in Port Phillip Bay

erosion, sand movements, and introduction to warm water species as well as other effects.

Erosion currently affects locations across the Bay. Figure 1 lists some of the specific locations in Port Phillip Bay with the related problem to the area caused by erosion. Local residents and property owners are more directly affected by coastal erosion since they live and operate close to the shore. Coastal infrastructure such as rock and timber groynes have been installed to combat erosion to varying effect; and arguably affect recreational amenity of beaches. Erosion can also cause rock on shores and cliffs to be exposed and some types develop a hardened surface through induration from iron minerals.[5]

With erosion, there are also large sand movements in the Bay. These threaten marine vegetation habitats such as seagrass meadows being smothered from soil eroded and displaced from nearby beaches.[6] Terrestrial vegetation habitats are also being affected from a loss of dune trees, shrubs, and/or grasses which provide a linear habitat corridor for migratory bush birds. The potential loss or displacement of intertidal sandy sediment habitat currently supporting bivalve molluscs is not well understood. Sand movements are generated by a combination of different wind strengths and direction and tidal currents. Intense rainfall events causes potential nutrient overload flushed from catchments to the Bay.[7]

Climate change is also increasing sea surface temperatures and rising pH levels from the increased dissolved carbon dioxide. These conditions create ecological impacts such as molluscs struggling to grow shells in more acidic pH.[8] The rate of warm water marine species making way into the Bay signals the ecosystem is also changing from climate change.[9] There have been several tropical turtles over the last 15 years and Bluebottles found on various Bay beaches.[10,11] A juvenile Japanese Devilray, well beyond its natural range, was washed up at Brighton in April, 2020.[12]

Erosion Example

Observatory Point in Port Phillip Bay is an example of rapid erosion due to higher high tides. This is caused by the combined impacts of climate change and the deepening of the shipping channel. The two images below are 3 years apart and they show how the beach has eroded causing the sign to fall.[13]

Observatory Point from 2012 to 2015 with the same No Boating Sign

Stakeholders, including responsible management agencies and existing management practices

Key stakeholders that are affected by climate change in Port Phillip Bay are non-profit organisations, government agencies, local businesses, human activities, research organisations

Figure 2: Brief Summary of Stakeholders in Port Phillip Bay related to Climate Change

as well as others. Some examples from each main group are listed in Figure 2. Not-for-profits work on different projects and government agencies create policies and laws to manage the Bay. To reduce the impact of rising sea levels, various municipalities have placed low seawalls on some vulnerable beaches, such as the St Kilda beach, but these walls will ultimately not be effective in protecting against the rising storm surges.[14]

Existing policy framework to combat the effects of climate change on the Bay

Since the Water Act of 1989, Melbourne has started planning floodplain management in vulnerable areas of the Bay.[15] In the last decade, the Australian government has created initiatives to combat climate change and funded assessments of the Bay to determine the future impacts. These assessments have determined stretches of the coast that have high and low vulnerability to coastal erosion.[16] Some policies that affect the Bay include:

- Marine and Coastal Act 2018[17]
- Port Phillip Bay Environmental Management Plan 2017-2027[18]
- Environmental Protection and Biodiversity Conservation Act (EPBC)[19]
- Port Phillip and Westernport Regional Catchment Strategy[20]
- Climate Change Act 2017[21]
- EP Act (currently under review, expected for application in July 2021)[22]
- Protecting Victoria's Environment - Biodiversity 2037[23]
- Planning and Environment Act[24]
- Healthy Waterways Strategy 2018[25]
- Climate Adaptation Plan [26]

Prior and existing knowledge on climate change impacts and protection

Current studies and projects occurring include the Blue Carbon lab at Deakin University studying carbon sequestration in seagrasses, saltmarshes, and mangroves.[27] There is also a project called From Grey to Green which focuses on nature based solutions for coastal protection. The University of Melbourne and the National Centre for Coasts and Climate, through this study, are looking into living breakwater which are offshore reefs to modify coastal processes.[28,29] From this project, installation of a 'living breakwater' off Point Richards has resulted in the recovery of the previously eroding beach.[30] The Nature Conservancy is working on artificial reefs replacing known sites of disappeared reefs.[31] To combat erosion, there is an annual beach renourishment program conducted by DELWP in consultation with Bayside Councils.[32]

Historically, sands have been trucked from inland quarries to replace eroded beaches. Sands from inland quarries replaced much of Portsea beach.[33] In

this process, renourishing beaches uses sand with grain characteristics that are easily eroded. More recently, offshore sandy sediments have been pumped back onto beaches like the Middle Park renourishment in 2015.[34]

There is ongoing monitoring and tracking including Park Victoria which is working on tracking warmer water species movements.[35] The Baykeeper beach profile and live mollusc surveys are ongoing monitoring of local beaches to document the changes over time.[36] Bellarine Catchment Network is also conducting beach profiles at various locations on the western side of the Bay.[37] Other organisations include the EPA Victoria and CSIRO, which looks into climate change on the national level.[38, 39]

Old approaches are considered reactive, not proactive such as putting in hard structures to help already eroded beaches. Could there be a better way to do this?

Knowledge gaps on the effects of climate change and how to adapt

There is a plethora of knowledge gaps which will briefly be discussed. Further existing knowledge and gaps can be read from the last State of the Bays report.[40] Current knowledge gaps include having not enough methods other than hard structures for erosion protection. There is also a lack of evaluation of existing methods and the environmental impact of current methods. One evaluation that is needed is how the type and source of sands imposed to replace eroded beaches affect them.

There is a large gap in research and studies to help prepare for how climate change will affect Port Phillip Bay. Some studies that are needed are on the damage to intertidal zone species as a result of higher tides and anecdotal observations of species coming from warmer water. The knowledge from this research, and others from PhD students, tends to not spread to the wider community creating hidden knowledge. There is not enough ongoing monitoring of the Bay. Climate change research and policy adaptation takes time. There are also limited funds likely for climate change research, especially post-corona.

The First Peoples have a history of surviving climate change and how to adapt to it.[41] They are a valuable source that needs to be considered more. The general public are largely unaware so there needs to be greater community education to face these problems as a larger group.

Recommendations to the area surrounding the Port Phillip Bay

Recommendations will be made after further discussion with stakeholders to determine future courses of action

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

Other links and information

Port Phillip Bay Coastal Hazard Assessment
https://www.marineandcoasts.vic.gov.au/coastal-programs/port-phillip-bay-coastal-hazard-assessment
Victorian Coastal Council
https://www.marineandcoastalcouncil.vic.gov.au/__data/assets/pdf_file/0021/411717/VCC-Science-Panel-Report-2018_Summary-8pp_WEB.pdf
Victorian Government Marine & Coastal Policy (April 2020)
https://www.marineandcoasts.vic.gov.au/coastal-management/marine-and-coastal-policy
2016 State of the Bays Report:
https://www.ces.vic.gov.au/sites/default/files/reports/State%20of%20the%20Bays%20Report%202016.pdf

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Port Phillip Bay Issue Paper: Marine Pest Species

EcoCentre and Collaborators Overview of Pest Species in Port Phillip Bay

This paper outlines Port Phillip EcoCentre and Collaborators perspectives on protecting waterways and the Bay from marine pests.

Port Phillip Bay history with marine pests.

Marine pests, or species that disrupt the natural environment, have been introduced to the coastal waters of Australia. Since the 1800's more than 160 species have been introduced to Port Phillip Bay.[1] An estimated 30 percent of these foreign pests were introduced through boat travel.[2] Active carrier transport through international waters allows for species to invade locations by attaching to hulls or remaining in the ballast water of ships.

Beyond affecting the biodiversity of marine environments, these pests have the ability to disrupt the economic benefits that the Bay provides. These include aquaculture, recreational and commercial fishing, and domestic and international shipping.

Government responses to this threat have focused on measures to prevent new introductions of marine pests; and to prevent the spread of pests from the Bay to other waters. These responses are based on accepting that pests will never be eliminated due to a relative absence of biological controls.

Community responses include Earthcare St Kilda culls of Northern Pacific Seastars from St Kilda harbour and neighbouring sites since 2005; and two research projects by Port EcoCentre in 2013:

- study of impacts of Northern Pacific Seastars in St Kilda and Mornington harbours; and
- Best Practice Guide to Removal of Northern Pacific Seastars

Some of the species threatening the Bay are: Northern Pacific Sea Star, Purple Sea Urchins, Undaria, European Fan Worms

A number of pest species have been introduced to Port Phillip Bay, mostly through ships entering the Port of Melbourne. These species reduce the biodiversity of the Bay through competition, predation, and herbivory that affect other populations.[3]

Species Name	Resources it Uses	Effect on Other Species	Additional Impacts
Northern Pacific Seastar *Asterias amurensis*	Preys on molluscs, barnacles, crabs, crustaceans, worms, echinoderms, sea urchins, and even other sea stars.[4]	Can reduce populations of native fish through competition and reduce shellfish populations through predation.[5]	Have been found to negatively affect aquaculture by eating molluscs meant to be harvested.[6]
Japanese Kelp "Wakame" *Undaria pinnatifida*	Photosynthetic, grows in large amounts creating thick canopies and underwater forests.[7]	Can reduce populations of native kelp through competition and take up enough space and light to displace species.[7]	Nearly impossible to eradicate once an area is affected.[8]
European Fan Worm *Sabella spallanzanii*	Filter feeders: consume plankton and other nutrients in the water.[9]	Can outcompete native species for space and food, particularly mollusc species.[10]	Have been found on mussel grow out lines. Can outcompete these species and reduce the catch.[11]
Purple Sea Urchin *Heliocidaris erythrogramma*	Mostly consume drifting kelp, but have the ability to easily overgraze and prevent any kelp from repopulating.[12]	Overgrazes kelp, reducing the population and could outcompete species that also feed on native kelp.[12]	Can essentially eliminate kelp forests and displace all species that rely on them.[13]

Summary of Pest Species in Port Phillip Bay

Stakeholders in this issue, including responsible management agencies and their existing pest management practices.

Some of the key stakeholders include the aquaculture industry. They can be directly affected by marine pests because of their ecological effects. Shipping industries and recreational boaters are also affected due to their potential to spread marine pests.

Other stakeholders include marine care groups, recreational fishers and divers, education groups such as Two Bays, radio shows such as Out of the Blue and Radio Marinara, schools and universities, and other community groups or not-for-profit organizations.

Additional key stakeholders in this issue are the management agencies responsible for marine pests. The Department of Jobs, Precincts, and Regions, under Agriculture Victoria, has responsibilities for prevention of marine pest incursions. They try to track newly arrived pest species and take steps to prevent them becoming established.[14] Management of established pests are the responsibility of Parks Victoria. However, their authority only includes Victorian national parks.[15] Commonwealth Scientific and Industrial Research Organization is a federal government agency that does marine pest research. They created the National Introduced Marine Pest Information System. It was created to help identify pest species as well as help biosecurity managers develop response plans.[16] The Victorian Fisheries Authority has a marine pests working group that focuses primarily on campaigns to prevent the spread of marine pests.[17] The national government, particularly the Department of Agriculture, Water, and the Environment, is a responsible agency that has funded projects related to marine pests, created legislation to prevent incursions, and compiled research on to develop response plans.[18]

The following figure details the potential physical, biological, and chemical controls for each prevalent invasive species. Generally, the physical control methods are the ones being implemented already to manage pest populations. There is a potential to use biological controls as a more long-term solution, but most would require more extensive research in a controlled environment before they could be used in Port Phillip Bay.

Species Name	Physical Controls: Includes mechanical removal or removal by hand	Biological Controls: Introduction of a predator, disease, or parasite	Chemical Controls: Use of herbicides or pesticides
Northern Pacific Seastar *Asterias amurensis*	Trapping was effective in areas of high density, but only for temporary population reduction.[19]	Introducing parasitic *Orchitophyra stellarum or* rehabilitating predators, such as *Coscinasterias muricata.*[19]	Not recommended for Port Phillip Bay.[19]
Japanese Kelp "Wakame" *Undaria pinnatifida*	Physical removal is the only successful control method.[20] Divers have done large-scale removals in Port Phillip Bay.[21]	No known biological control options that could be used in Port Phillip Bay[20]	Not recommended for Port Phillip Bay.[20]
European Fan Worm *Sabella spallanzanii*	Most successful method is wrapping structures in plastic to create anoxic conditions.[22]	No known biological control options that could be used in Port Phillip Bay.[22]	Not recommended for Port Phillip Bay.[22]
Purple Sea Urchin *Heliocidaris erythrogramma*	Physical removal by fisheries[23] and through culling projects run by groups such as EarthCare St. Kilda.[12]	Enhancement of natural predator populations[23] or introduction of bacterial diseases that affected other populations.[24]	Not recommended for Port Phillip Bay.

Potential Controls of Pest Species in Port Phillip Bay

Existing policy framework for biodiversity in the Bay.

First, the Catchment and Land Protection Act 1994 allows animals to be declared as pest animals. It also defines the responsibilities for the management of pest species and outlines regulations for the importation, keeping, selling and releasing of declared pest animals.[25]

A number of policies and plans focus on preventing further spread of marine pests and detecting new pests. The Department of Agriculture, Water, and Environment has ballast water management requirements to prevent the spread of marine pests. These provide instruction on how to manage ballast water during both domestic and international travel.[26] This management plan works in conjunction with the Biosecurity Act 2015, which includes provisions for enforcement and prosecution of parties that fail to comply.[27]

The National Government also has the Marine Pest Plan 2018-2023. This plan aims to:

1. Minimise the risk of marine pest introductions, establishment, and spread
2. Strengthen the marine pest surveillance system
3. Increase preparedness and response capability for marine pest introductions
4. Support marine pest biosecurity research and development
5. Engage stakeholders to better manage marine pest biosecurity.[2]

The Marine and Coastal Act 2018 gives power to this and any other management plans related to marine pest species in Victoria.[28]

Lastly, the Victorian government has been promoting "Check, Clean, Dry," an education campaign to reduce boat hull and trailer biofouling to prevent the spread of pests beyond Port Phillip Bay.[29]

Prior and existing knowledge on marine pest ecology and impact.

In general, the reproduction, life cycles, or genetics are studied in the pest species affecting the Bay. These provide additional understanding of the species, how they affect the ecosystem of Port Phillip Bay, and how the populations could be managed.[30,31,32,33,34]

Deakin University's Blue Carbon Lab does research on marine biosecurity. They created the Australian Marine Biosecurity Database to centralise

research on marine pathogens and pests.[35] They have done case studies and other research in southeast Australia on several pest species, including the Northern Pacific Seastar and sea urchins.[36] They, along with the University of Melbourne also does a number of studies aimed toward restoring Port Phillip Bay, and is doing a study with the National Centre for Coasts and Climate, Deakin University, and Parks Victoria to identify the optimal management of sea urchin populations in Port Phillip Bay.[37]

The University of Tasmania has also been doing research on sea urchins and potential methods for restoring kelp forests.[38] They have surveyed nearby barrens and studied the ecology of urchins to understand why their populations are suddenly growing out of control[39] - in their case climate change and overfishing of lobsters.[40] Anecdotal evidence showed the Northern Pacific Seastar's movement relative to food supply, particularly *Electroma georgiana*.[41]

The Port Phillip EcoCentre did a Northern Pacific Seastar study in 2013 comparing the species effects in St Kilda and Mornington Harbours.[42]

Knowledge gaps in potential management strategies and ecology of the Bay.

There are several knowledge gaps that prevent the proper management of pest species. It is unrealistic to expect pest species to be eliminated from the Bay. However, there has been no dialogue thus far to determine what is realistic.

In addition, nearly no attempt has been made to clearly define the "issue" and the future implications for the Bay ecosystem. Any attempts have been sporadic and by organisations in isolation rather than in collaboration.

Scientists have noticed that many reefs appear to be naturally resilient to invasive species and sea urchin barrens. Research needs to be done on these areas to determine why they are different and what makes them resilient to pest species.

In addition, there is limited information on where key breeding sites of pest species are located, or of native species and their habitats that are most impacted by pests, nor evaluation / consideration if community cull techniques are successful reducing the impacts of pests.

On the citizen level, lack of awareness or understanding of permit system requirements for pest removal and disposal prevents general community response to major aggregations of pests.

Recommendations to the area surrounding Port Phillip Bay.

Recommendations will be made after further discussion with stakeholders to determine future courses of action

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

Contributing Groups

Endnotes

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Appendix W: Stakeholder Information Used to Formulate Map

Stakeholder name	Latitude	Longitude	Stakeholder type	Broad stakeholder issues category	Logo link	Website link
Port Phillip EcoCentre	-37.87	144.9823	Regional not-for-profit	Climate Change, Chemical Run Off and Pollution, Community Education, Human Activity, Management Plans and Protections, Marine Pests/Biodiversity, Plastics and Litters, Other	https://ecocentre.com/sites/all/themes/ecocentre/logo.png	https://ecocentre.com
Yarra Riverkeeper	-37.8027	145.0042	Regional not-for-profit	Marine Pests/Biodiversity, Community Education, Human Activity, Chemical Run Off and Pollution, Other, Plastics and Litters	https://envic.wpengine.com/wp-content/uploads/2016/07/yarra-riverkeepers.jpg	http://yarrariver.org.au/
FishCare Victoria	-37.8152	144.9744	Regional not-for-profit	Marine Pests/Biodiversity, Chemical Run Off and Pollution, Plastics and Litters	https://fishcare.org.au/wp-content/uploads/2019/08/Website-Logo.jpg	https://fishcare.org.au/
The Plastics Lab (RMIT University)	-37.8079	144.9645	Research institute/university	Plastics and Litters, Chemical Run Off and Pollution, Human Activity, Management Plans and Protections	https://upload.wikimedia.org/wikipedia/commons/thumb/5/51/RMIT_University_Logo.svg/1200px-RMIT_University_Logo.svg.png	https://www.rmit.edu.au/
Werribee River Association Inc.	-37.8137	144.9576	Regional not-for-profit	Marine Pests/Biodiversity, Human Activity, Chemical Run Off and Pollution, Plastics and Litters	https://werribeeriver.org.au/wp-content/uploads/2019/03/wrk_logo2_fin2.png	https://werribeeriver.org.au/
Marine Education Science and Community inc (MESAC)	-37.9893	145.0279	Regional not-for-profit	Marine Pests/Biodiversity, Chemical Run Off and Pollution, Climate Change, Plastics and Litters	http://mesac.org.au/wp-content/uploads/2019/01/cropped-MESAC_logo_240x240-50.jpg	http://mesac.org.au/

Coastcare	-37.8744	145.2541	State government	Climate Change	https://www.marineandcoasts.vic.gov.au/__data/assets/image/0020/31556/coastcare.jpg	https://www.marineandcoasts.vic.gov.au/coastal-programs/Coastcare-Victoria
Hobsons Bay Wetlands Centre	-37.8771	144.8082	Local community	Human Activity, Marine Pests/Biodiversity, Community Education, Management Plans and Protections, Marine Pests/Biodiversity	https://img.evbuc.com/https%3A%2F%2Fcdn.evbuc.com%2Fimages%2F61624197%2F305651293249%2F2%2Foriginal.png?w=225&auto=format%2Ccompress&q=75&sharp=10&s=d80dd877c1a10c8b83a940d143790211	https://www.hobsonsbaywetlandscentre.org.au/
Canopy of Care	-38.339	144.7457	Regional not-for-profit	Marine Pests/Biodiversity, Climate Change, Human Activity, Plastics and Litters	https://polperro.com.au/wp-content/uploads/2019/01/polperro.png	https://polperro.com.au/
Polperro Dolphin Swims and Charter Service Pty Ltd	-38.3366	144.7447	Business and education	Human Activity, Climate Change, Plastics and Litters	https://polperro.com.au/wp-content/uploads/2019/01/polperro.png	https://polperro.com.au/
Victorian National Parks Association	-37.8049	144.9608	Regional not-for-profit	Marine Pests/Biodiversity, Chemical Run Off and Pollution	https://vnpa.org.au/wp-content/themes/vnpa/assets/dist/img/logo.png	https://vnpa.org.au/
Department of Environment, Land, Water and Planning / Coastcare Victoria	-37.8744	145.2541	State government	Marine Pests/Biodiversity, Chemical Run Off and Pollution, Climate Change	https://upload.wikimedia.org/wikipedia/commons/0/05/DELWP_logo_%28cropped%29.png	https://www2.delwp.vic.gov.au/
Rye Community Group	-38.3705	144.8206	Local community	Climate Change, Chemical Run Off and Pollution, Human		https://mpcommunity.com.au/user/ry

Alliance + Rye Coastal Advisory Group				Activity, Plastics and Litters		e-community-group-alliance/
Malacological Society of Australasia, Victorian Branch	-37.8297	145.1424	Local community	Human Activity, Chemical Run Off and Pollution, Marine Pests/Biodiversity, Plastics and Litters	http://malsocaus.org/testwp/wp-content/uploads/2013/08/cropped-MSALogo_colour_thumbnail.jpg	http://www.malsocaus.org/?page_id=91
Share The Word Design Studio	-38.3762	144.8364	Regional not-for-profit	Human Activity, Plastics and Litters	https://www.sharetheword.com.au/wp-content/uploads/2015/03/Logo450_111pxl.png	https://www.sharetheword.com.au/
Port Phillip & Westernport CMA	-38.1432	145.1205	State government	Marine Pests/Biodiversity, Chemical Run Off and Pollution, Human Activity, Management Plans and Protections, Plastics and Litters	https://www.ppwcma.vic.gov.au/wp-content/themes/ppwcma/res/logo.png	https://www.ppwcma.vic.gov.au/
Association of Bayside Municipalities	-37.813	144.9597	Local government	Community Education, Climate Change, Human Activity, Management Plans and Protections	https://abm.org.au/wp-content/uploads/2018/05/ABM_logo_01_retina1.jpg	https://abm.org.au/
Blairgowrie Yacht Squadron	-38.359	144.7729	Regional not-for-profit	Marine Pests/Biodiversity, Chemical Run Off and Pollution, Human Activity	https://mk0blairgowrieybedwh.kinstacdn.com/wp-content/uploads/2018/10/Blairgowrie-Yacht-Squadron-Logo.png	https://www.bys.asn.au/
City of Greater Geelong	-38.1465	144.365	Local government	Marine Pests/Biodiversity, Human Activity, Climate Change, Plastics and Litters	https://orbitgt.com/wp-content/uploads/2019/04/city-of-greater-geelong.png	https://www.geelongaustralia.com.au/environment/default.aspx
Blair Stafford	-37.8123	144.9623	Regional not-for-profit	Marine Pests/Biodiversity, Chemical Run Off and Pollution, Human Activity, Management Plans and Protections, Plastics and Litters		

Blue Wedges	-37.8115	144.9647	Local community	Chemical Run Off and Pollution, Human Activity		http://www.bluewedges.org.au/
Marine Response Unit (Melbourne Zoo)	-37.7872	144.9507	Not-for-profit, statutory authority	Marine Pests/Biodiversity, Human Activity, Management Plans and Protections	https://zoosvic-endpoint-website-prod-public.azureedge.net/assets/svg/logos/zoos-victoria--colour.svg?v=1.0.153.241	https://www.zoo.org.au/fighting-extinction/marine-response-unit/
Earthcare St Kilda	-37.8647	144.9648	Local community	Chemical Run Off and Pollution, Marine Pests/Biodiversity, Other	http://earthcarestkilda.org.au/wp-content/uploads/2016/01/ecsk_logo_100.png	https://earthcarestkilda.org.au/
Marine Mammal Foundation	-37.9383	145.0305	Regional not-for-profit	Marine Pests/Biodiversity, Chemical Run Off and Pollution, Management Plans and Protections	https://assets-global.website-files.com/5cfe1ff171000a855754a32f/5d308ce16c4ba5e3e639395c_marine_mammal_foundation_(1).png	https://marinemammal.org.au/
National Centre for Coasts and Climate, University of Melbourne	-37.7963	144.9611	Research institute/university	Marine Pests/Biodiversity, Human Activity, Chemical Run Off and Pollution, Climate Change, Management Plans and Protections	https://encrypted-tbn0.gstatic.com/images?q=tbn%3AANd9GcQ74vmK8XxEv8esMtOBkdO6YIZv4PtvFAT967R2z2K9UzZkHxC-&usqp=CAU	https://nccc.edu.au/
Melbourne Water	-37.8142	144.9471	State government	Management Plans and Protections	https://victoriancollections.net.au/media/collectors/4f729f7f97f83e0308601902/collector-avatar/5b06136121ea670cb463cf57/org-logo-1200x1200.png	https://www.melbournewater.com.au/
Dive2U	-38.1151	145.1864	Business and	Other	https://static.wi	https://www.

			education		xstatic.com/media/fb0463_ca9561789b2d406daf0bf3c93647fd26~mv2.png/v1/fill/w_560,h_186,al_c,q_85,usm_0.66_1.00_0.01/Dive%202U%201%20copy_edited.webp	dive2u.com/
Jawbone Marine Sanctuary Care Group	-37.866	144.8837	Volunteer community group	Other	https://static1.squarespace.com/static/5c2c12ee5b409b7ffc78d945/t/5c2c15e4cd836676a1bd209a/1580436199042/	https://www.jawbone.org.au/
Bellarine Catchment Network	-38.2215	144.6082	Regional not-for-profit	Plastics and Litters, Chemical Run Off and Pollution, Community Education, Human Activity	http://www.environmentbellarine.org.au/images/BCN_logo.png	http://www.environmentbellarine.org.au/

Appendix X: Network Map Program Guide

Where to access the map

The network map is available for viewing at the Port Phillip EcoCentre website using this link: http://ecocentre.com/baykeeper/stakeholders

How to use the map

The network map was made using the Leaflet library for JavaScript, allowing it to be easily run on any web browser with internet access. It allows for pan and zoom functionality akin to common online maps as well as an interactive display for viewing information listed for each organisation. This is accessed by clicking on the coloured dot markers to view a popup menu listing the organisation type, main issue focus, and a link to their website for further details. The markers are colour-coded by their affiliation type and belong to one or more issue focuses with regards to the health of Port Phillip Bay. The legend in the bottom right corner of the map details the stakeholder type while the checkboxes in the top right allow filtering of locations based on which issue categories they possess. This feature of checking the boxes next to which issues the user wishes to see can be used to find which organisations are concerned with one or more of these topics in an easy to view manner.

How to update the map

A CSV or Comma-Separated Values file is used to give data to the map necessary for displaying a stakeholder's name, location, and contact information. Because this information is carefully compiled by the EcoCentre, only individuals with permission may edit the spreadsheet. Should new organisations wish to be added to this map, they should contact the EcoCentre and provide them with the necessary information. This file which can easily be modified using Microsoft Excel, a common spreadsheet editing software, has a total of seven different column labels under which the specific information of an organisation should be stored. These categories are in order as: Stakeholder name, latitude, longitude, stakeholder type, broad stakeholder issues category, logo link, and website link. The map requires that any plotted location have at least a name, coordinates, and one or more broad stakeholder issues category. The latitude and longitude values must be numbers, while the stakeholder type and broad issues category must be specific key entries, with anything else seen as an invalid entry. For the stakeholder type, these are: "Business and education", "Local community", "Local government", "Not-for-profit, statutory authority", "Regional group", "Research institute/university", "State government", and "Volunteer community group". For the broad stakeholder issues category, these include: "Climate Change", "Chemical Run Off and Pollution", "Community Education", "Human Activity", "Management Plans and Protections", "Marine Pests/Biodiversity", "Plastics and Litters", and "Other". It is crucial that the entries for these two column categories consist only of the group listed, without using quotation marks. Stakeholders with multiple broad issue categories should list them in the appropriate column by separating them with a comma and space, as a normal list would be written. An example would be "Climate Change, Marine

Pests/Biodiversity” for an organisation focusing on both of these issues, again without the quotation marks. Links to logo images displayed in the popup menus of the icons should be sourced from a reliable stored location such as on the organisation website if possible. Any edits to this spreadsheet once saved should immediately affect the map, as it reads from the file every time its webpage is refreshed to display the locations.

Possible Funding Grants and Grantmakers:

1 Page Information Sheets

May 13th, 2020

For use by the Port Phillip Baykeeper and EcoCentre

Information has been obtained from respective organisations' websites.

Created by the Worcester Polytechnic Institute Student Team:
Shelby Morrison, Nicole Shedd, Salvatore Lombardo, Peter Dentch

Advisors: Professor Fabio Carrera and Professor Stephen McCauley

Grantmakers

International:

National:

Paul M. Angell Family Foundation

PAUL M. ANGELL
FAMILY FOUNDATION

Location: Chicago, IL USA

Website: http://pmangellfamfound.org/

Application Dates:

Grant Cycles:

Spring:

- Apply November 1st to December 1st
- Full Applications due End of January
- Awards Announced in Mid-May

Fall:

- Apply Mid-April to Mid June
- Full Applications due Mid-August
- Awards Announced in Mid-November

Application Requirements:

Create an account by clicking **here.**
Complete the eligibility quiz. If eligible to apply, you will be given access to the appropriate form.
Complete a Letter of Inquiry (LOI)
The foundation makes grants to public charities under section 501(c)(3) of the Internal Revenue Code. If you are an international Conservation organisation, you are still eligible to apply.
Questions -email wendy@pmangellfamfound.org

Types of Support-

- General Operating: This is the most flexible type of grant. Funds may be applied in any manner in which the organisation sees fit
- Program/Project Grants: Targeted to a specific program or goal. Applicants must submit a program budget and narrative to support their applications.
- Education: Grant supports programs which disseminate information crucial to the organisation's mission. Examples: lectures, demonstrations, workshops, guided tours, exhibitions, and distribution of materials.

Amount of Funding

Grants ranging from $10,000 to $200,000

About the Grantmaker:

This foundation is intended to honor Paul M. Angell and his ideals by endowing organisations and activities that are emblematic of his character and sensitive to his concerns in the certain knowledge that change for the better in society is best gained through the constructive involvement of its individual citizens.

Objectives for the Trust

The primary focus of the Foundation's grant making in Conservation is the protection of the world's oceans and species. The Foundation is interested in site-specific projects designed to improve the health of ocean habitats and to enhance their ability to withstand the challenges of climate change. In addition, the Foundation supports efforts to fund species protection, particularly regarding the seas' apex predators. Eligible projects include research, conservation and/or restoration.

Mission: The mission of the Paul M. Angell Family Foundation is to advance society through the performing arts, conservation of the world's oceans, and alleviation of poverty.

They Fund:

- Supporting creation of Marine Protected Areas
- Encouraging sustainable fisheries management
- Eliminating illegal, unreported, and unregulated fishing
- Conserving the world's shark and ray species
- Limiting plastics pollution/other ocean debris
- Preserving coral species and ecosystems

Funding Sources

Majority of revenue comes from "contributions received," but funding sources are not mentioned on their website.

Rockefeller Brothers Fund

Location: New York City, NY USA

Website: https://www.rbf.org/grantmaking

Application Dates:

None listed

Application Requirements:

The link below will take you to the Fund's online grant application. You will then be prompted to create an account and respond to questions about your organisation and the work for which you are seeking support.
Application(https://rbf-portal.givingdata.com/campaign/programapp)
Email, grantsmgmt@rbf.org, with any questions for applying
Organisations should be tax-exempt or seeking support for a project that would qualify as educational or charitable.

About the Grantmaker:

The Rockefeller Brothers Fund advances social change that contributes to a more just, sustainable, and peaceful world.
The Rockefeller Brothers Fund is committed to being a center of philanthropic excellence. As a grantmaking institution, we place significant emphasis on program impact assessment.

Amount of Funding

The average grant size in 2018 was $97,000

Objectives for the Trust:

They fund 3 main project categories: democratic practice, peacebuilding, and sustainable development.
Sustainable development: Conservation and the environment are among the most enduring commitments of the Rockefeller Brothers Fund. Throughout the early 2000s, the Sustainable Development program operated with two goals:
1) to protect ecosystems and preserve biodiversity through grants for innovative natural resource management efforts including sustainable forestry and fishery management.
2) to combat climate change by funding energy efficiency and emissions reduction efforts.
In 2009, the program took on much of the grantmaking from the 2006 cross-programmatic initiative to accelerate a transition to alternative energy, and in 2010 shifted its entire portfolio to addressing climate change.

Funding Sources:

"Mission aligned investment" - Portfolio is 99% fossil fuel free. In 2014, pledged to divest from fossil fuels in a 2-step plan. Overall, it seems to have very socially and environmentally conscious investments with environmental, social, and governance screening criteria, proxy voting, and readily available endowment summaries and investment policies.

The Christensen Fund

Location: San Francisco, CA USA

Website: https://www.christensenfund.org/

Application Dates:

Their website says that they are going through a "review period" 2017-2019, however this could be a good grant to apply for in the next few years.

Application Requirements:

Apply: https://www.christensenfund.org/funding/

The new strategy, which we are in the process of finalising, will be informed by our partner consultations, rooted in a rights-based framework and guided by the UN Declaration on the Rights of Indigenous Peoples and the Convention on Biological Diversity. Taking a thematic and rights-based approach to philanthropy will enable Christensen to reimagine our grantmaking strategies and build on the strengths and experiences of our partners — and ourselves — while working to become a strategic and effective philanthropic ally to the Indigenous Peoples' Movement. This grantmaking transition will happen over the course of 2019, and our goal is to resume grantmaking under the new program strategy in 2020.

About the Grantmaker:

Vision: The Christensen Fund envisions a bioculturally diverse world enriched and sustained by beautiful, bountiful and resilient communities, landscapes and seascapes.

Mission: Christensen backs the global Indigenous Peoples movement in its efforts to advance the rights and opportunities of stewards of biocultural diversity.

Funding Sources

Has not completely divested from fossil fuel but "has below 1% portfolio exposure to the Carbon 200"

Objectives for the Trust:

Diversity: We believe in the power of biocultural diversity stewarded by Indigenous lifeways and values to sustain and enrich a world faced with great change and uncertainty.

Reciprocity: We adhere to the Indigenous value of reciprocity that recognises the interdependence and interconnectedness of all beings.

Resilience: We support the inherent capacity of Indigenous lifeways and ecosystems to innovate and transform, thereby securing resilient biocultural land and seascapes in the face of rapid and unpredictable change.

Solidarity: We practice solidarity with Indigenous peoples by engaging them as equal partners and supporting their self-determined needs, priorities and visions for the future.

Networks, Collaborations and Alliances: We advocate the power of strategic alliances, inter-cultural collaborations and thriving networks between Indigenous Peoples, nation states, other social movements and allied individuals and groups to stem and reverse the forces eroding biocultural diversity.

Trust: We work to build trusting relationships with Indigenous Peoples and their allies by investing in processes that engender respectful, authentic and long-lasting relationships

Amount of Funding

$50,000 - $100,000

Past Grants:
https://www.christensenfund.org/funding/grants-search/?f_year=all&gregion=all&theme=all

Funding Sources

Endowment portfolio not readily available, see https://www.christensenfund.org/about/impact-investment-statement/ for more information

The Thomas Foundation

Location: Columbus, OH USA

Website: https://thomasfoundation.org.au/

Application Dates:
Not Listed

Application Requirements:
The Thomas Foundation does not accept unsolicited proposals for project funding. We work in partnership with principals, who advise us on projects that are likely to achieve optimal results within our focus and guidelines. Our current focus is on marine conservation.
See the foundations currently and previously funded projects:
https://thomasfoundation.org.au/funding/

About the Grantmaker:
In 1998 David and Barbara Thomas established The Thomas Foundation to pursue their long-time philanthropic interests.
They saw the opportunity for a business in Australia and started Cellarmaster Wines in 1982. Over 14 years they launched 12 more wine clubs in Australia and New Zealand. In 1996 they sold the business to Fosters for $160 million, providing the capital to endow The Thomas Foundation. Initially the Foundation supported projects in Education, the Arts and Conservation.
In 2013 the David Thomas Challenge was included in Australia's 'Top 50' philanthropic gifts.
The Foundation is also recognised for its creativity and efficiency, and for its growing list of legacies.

Objectives for the Trust:
Our Mission: To halt the alarming decline in Australia's biodiversity
They have a focus on climate change and biodiversity
The Foundation will invest around $35m in conservation and conservation-related activities over the decade 2008-18. This is in addition to $17m distributed over the last decade.

Funding Sources
Not available on their website

Amount of Funding
Varied widely from programs from $100,000 to 3 million.

Tides Foundation

Location: San Francisco, CA USA

Website: https://www.tides.org/

Application Dates:

Does not list

Application Requirements:

The Tides does not accept unsolicited applications for funding. Option to Partner with the organisation to gain more insight on funding.
Page to fill out Partner Application:
https://www.tides.org/partner-with-us/
To read about current Tides Partners:
https://www.tides.org/impact-partners/

Funding Sources

Relevant Partners in Australia:

- Great Barrier Reef Foundation
- Friends of the Earth Australia
- Climate Council of Australia
- Take 3 Ltd
- Nature Conservancy Australia

They accept individual donations and pair with businesses, but investment portfolio is not readily available on their website

Amount of Funding

$15.8 Million have gone to Sustainable Environment Grants

About the Grantmaker:

Tides is a philanthropic partner and nonprofit accelerator dedicated to building a world of shared prosperity and social justice.
Tides' vision of a world of shared prosperity and social justice is founded on equality and human rights; a sustainable environment; healthy individuals and communities; and quality education. We work at the nexus of funders, changemakers and policy, bringing together a large and diverse coalition of mission aligned actors to amplify our power to scale positive impact.
Tides' impact solutions include philanthropic giving and grantmaking, impact investing, fiscal sponsorship and acceleration services for social ventures, collaborative workspaces, collective initiatives, and advocacy services for policy change. Our extensive tools and know-how give our partners the freedom to hit the ground running and drive change faster than they can on their own.

Objectives for the Trust:

Vision: A world of shared prosperity and social justice, founded on equality and human rights, a sustainable environment, healthy individuals and communities, and quality education.
Mission: Tides accelerates the pace of social change, working with innovative partners to solve society's toughest problems.
Approach: We believe that to achieve shared prosperity and social justice, we must take a collaborative, bold approach to the work.

Australian Communities Foundation

Location: Melbourne, VIC AUS

Website: https://www.communityfoundation.org.au/

Application Dates:

Grants are distributed through an annual grant round, as well as in response to timely issues throughout the year

Application Requirements:

Grantseekers can submit funding proposals via the website. Approved proposals are published to our Granting Opportunities directory and shared with our community of givers.

What is needed:

- Applicants must have both TCC (Tax Concession Charity) and DGR Item 1 (Deductible Gift Recipient) endorsements
- The funding proposal submitted must be for activities in line with your organisation's charitable purpose.
- Organisations can submit a maximum of two proposals to the site per calendar year.

Fill out application form:
https://storage.googleapis.com/communityfoundation.appspot.com/1/2020/04/Australian-Communities-Foundation-Funding-Form.pdf

After Applying:

- Once submitted, a confirmation and copy of your proposal will be emailed to the address provided in the contact information section of the form.
- Also an email notifying the outcome once your proposal has been reviewed.
- The team will endeavor to review your proposal within seven days of the submission date. This may take slightly longer during busy periods.
- We will contact you if a donor is interested in your project.
- Proposals will remain live for a period of three months, or until fully funded.

About the Grantmaker:

The Melbourne Community Foundation was established in 1997. It was the first independent, not-for-profit community foundation in Australia. The purpose of the foundation is to build a permanent pool of funds to support local communities and to create an active community of engaged philanthropists in Australia.

Objectives for the Trust:

Values:
Inclusion - Respecting and understanding the perspectives and experiences of others. Collaboration and working collectively is essential to solve community issues in isolation.
Agency- Support self-determination and believe that people and communities have the power and the right to determine the solutions to their challenges.
Courage - Takes courage to pursue a fairer and more sustainable Australia.
Fairness - Taking a stand for social, environmental, cultural and economic justice. Addressing power imbalances is central to creating a fairer Australia.
Projects Should: Safe-Guard the Ecosystem - Supporting projects and organisations protecting Australia's natural ecosystems and working towards a safe and stable climate.

Funding Sources

Working to ensure that 100% of portfolio is responsibly invested (socially and environmentally conscious) by 2021

Amount of Funding

Average grant awarded is between $2,000 to $15,000

Foundation for Rural & Regional Renewal

Location: Melbourne, VIC AUS

Website: https://www.frrr.org.au/

Application Dates:

Different mostly annual grants

Application Requirements:

Multiple grants are available to apply at a time. View current opportunities for information on how to apply.
See Current grants:
https://www.frrr.org.au/grant_calendar.php

Grant information:
Call: 1800 170 020
Email: info@frrr.org.au

Funding Sources

They appear to get funding mostly through donations and other grants.

Amount of Funding

Around $20,000-$150,000

About the Grantmaker:

The Foundation for Rural & Regional Renewal (FRRR) is a not-for-profit organisation that harnesses the power of collective investment between government, business and philanthropy to improve the lives of those living in rural, regional and remote Australia.
FRRR is the only national organisation offering small, discretionary funds to small regional communities across Australia. We are both a grant maker and a grant seeker - distributing funds through a number of programs for the benefit of rural and regional Australia. We play a critical role as a connector, working across the philanthropic sector as a conduit for philanthropy to rural communities. We work hard to identify the ways that philanthropy can best support communities – cutting out the noise and deepening the focus to understand what will really make a difference.

Objectives for the Trust:

Mission: to champion the economic and social strength of Australia's rural, regional and remote communities through partnerships with the private sector, philanthropy and governments.
Vision: for vibrant, sustainable and adaptive communities across rural, regional and remote Australia.

Gary White Foundation

Location: Melbourne, VIC AUS

Website: http://www.gwf.org.au/

Application Dates:

None listed

Application Requirements:

Contact Organisation to Apply-
Mail: PO Box 259, Beaconsfield, VICTORIA 3807
Phone: (03) 9707 2802
E-mail: info@gwf.org.au

About the Grantmaker:

The Garry White Foundation is a philanthropic organisation based in Melbourne, Victoria that has ten years of giving so far.
Founded by the family of Garry White. He lived in Victoria and was passionate about regenerating the biodiversity in the state. He bought 40 acres of cleared land and worked to plant native species on the plot to make it home to native flora and fauna.

Objectives for the Trust:

Mission: The GWF works for a sustainable Australia by funding inspirational people, projects and campaigns in the areas of education, conservation, climate pollution and agriculture. They support work in:

- Equitable access to sustainable, healthy produce
- Climate change education and solutions
- Conservation of Australian natural ecosystems
- Advocating for a transition to a fairer, cleaner and sustainable future
- Youth and family welfare and community wellbeing

Funding Sources

Information not available on website

Amount of Funding

Funding has ranged from $28,000 to $620,000 for multi year funding.
They have worked with: Bush Heritage, Australian Wildlife Conservancy, Invasive Species Council, FareShare, Tree Project, The Australian Marine Conservation Society, and The Australian Youth Climate Coalition.

Hamer Sprout Fund

Location: Melbourne, VIC AUS

Website: https://www.thehamersproutfund.com/

Application Dates:

The closing date for Hamer Sprout Fund Grant applications is 30 September each year. The Sprout Fund committee will endeavour to respond to all applicants within two months.

Application Requirements:

Application for project funding from the Hamer Sprout Fund should be made in the attached application form. The proposal should clearly state:

- Objectives
- Timeline
- Project / Service outline
- Target audience
- Financial requirements and budget
- Criteria and targets for measurement of results
- Alignment with Hamer Sprout Fund's aims and objectives

Funding Sources

Working to ensure that 100% of portfolio is responsibly invested (socially and environmentally conscious) by 2021

Amount of Funding

A total of $25,000 is available for the Sprout Grants each year. Up to $5,000 is available per project, however more (up to $10,000) may be awarded in exceptional circumstances.

About the Grantmaker:

The original Hamer Family Fund was set up in 2004 as a sub-fund of the Australian Communities Foundation. It commemorates the lives and work of the senior generation of the Hamer family.
The Hamer Sprout Fund is an offshoot of the Hamer Family Fund and represents the next generation of the Hamer family. We are part of the fifth and sixth generations of the family encompassing almost 100 cousins spread across the globe. We share the goals of the Hamer Family Fund with an emphasis on the environmental aspects of the Hamer family's legacy.

Objectives for the Trust:

Their aim is to support projects and organisations that:

- Promote innovation in environmental education
- Facilitate engagement in environmental action
- Advocate for environmental sustainability
- Foster collaboration between young people engaged in environmental leadership

The Sprout Grants are provided as an incentive to new or established groups to develop initiatives that achieve this aim. However, they are particularly interested in giving to small organisations and projects to "get them off the ground"

John T. Reid Charitable Trusts

Location: Canterbury, VIC

Website: https://www.johntreidtrusts.com.au

Application Dates:

Will be posted closer to the enquiry deadline

Application Requirements:

The application is a 2-step process, an enquiry and submission.

- Enquiry: There are 2 enquiry periods per year: January/February and June/July. Trustees will decide if the application will be further considered. "This decision is based on many factors, including funds available for distribution, and other grants committed within each funding sector." Enquiry form
- Submission: If enquiry is approved, submission guidelines will be sent. This will decide if you get the grant.

Funding Sources

Almost all revenue is revenue from investments. However, they do not provide any information on their portfolio on their website or annual reports.

Amount of Funding

In 2018, they gave $4M overall, giving to about 45 organisations. $2,748,000 went to 4 environmental grants in 2018

About the Grantmaker:

The John T Reid Charitable Trusts are governed by ten Trustees who manage the Trusts' assets and distribute the income in line with the changing needs of the Australian community. The Trustees bring a broad range of professional skills and experience to the task, particularly in the areas of business/finance, education, the law and social policy. The Trustees include representatives of urban and regional Australia, as well as different states and territories. Of the ten Trustees, five are descendents of the Trusts' founder and five are independent.

Objectives for the Trust:

The John T Reid Charitable Trusts distributes funding within six main categories. Many projects will fall within more than one category of support; we encourage each applicant to present their proposal in their own words as it best promotes their needs rather than try to fit within a rigid category.

- Aged and palliative care
- Arts and cultural heritage
- Community and social welfare
- Education and youth support
- Environment
- Health support

Previously worked with:

- The Nature Conservancy, Restoring South Australia's Lost Oyster Reefs
- Climate Council, Climate Media Centre
- The Nature Conservancy, Great Southern Seascapes

Morris Family Foundation

Location: Port Melbourne, VIC AUS

Website: https://www.morrisgroup.com.au/foundation/

Application Dates:

They do not take unsolicited requests for funding. Can contact through the above website.

Application Requirements:

We use the Sustainable Development Goals for reporting and require all organisations we financially support to submit impact reports that measure their achievements in line with this framework.
Our involvement in projects can often exceed traditional grant-making as we take an active role in the process of creating the desired impact. This can range from engagement and support from our employees and assistance in creating collaborations with other funders and NGO's on a particular issue

Funding Sources

"The Morris Group invests in people, places, renewable energy, technology, and transport – creating opportunities for connection with nature, and with one another."
They own a number of businesses (Morris Groups), which it seems is where they get the majority of their funding
https://www.morrisgroup.com.au/portfolio/

Amount of Funding

Gave $42,500 in grants

About the Grantmaker:

The Morris Family Foundation invests in projects and organisations with meaningful social, economic and environmental impact both at home in Australia, and internationally. We support innovative organisations that shape real and lasting change by building strong foundations for education and empowerment.
The Morris Family Foundation is a private charitable foundation and was established in 2009 as the philanthropic arm of the Morris Group.

Objectives for the Trust:

What they fund:

- Equitable growth and just societies
- Food security and sustainable agriculture
- Health and well-being for all
- Protection and restoration of the environment: We believe that Mother Nature should be given the opportunity to provide the earth and all inhabitants with a stable climate, clean water, healthy soils and fresh air. We support diverse projects from advocacy to research and direct conservation that we believe can achieve a sustainable impact.

Relevant Recently Funded Projects

- Farmers for Climate Action
- Australian Environmental Grantmakers Network
- https://www.morrisgroup.com.au/reef-keepers/

Purves Environmental Fund

Location: Sydney, NSW AUS

Website: https://www.purvesenvirofund.org.au

Application Dates:

No set timeline or application closing date.

Application Requirements:

The application is a 2-step process.

1. Write a one-page proposal to the Environmental Officer with a brief explanation of:
   - Yourself/organisation
   - Summary of proposed activity
   - Amount of grant being sought
   - Activity's objectives
   - Activity's outcomes

   Sent by email to: envirooofficer@purvesenvirofund.org.au
   These are evaluated on an as comes basis
2. If your initiative is deemed to meet the Fund's objectives and key focus areas, you will be invited to submit a formal application by the Environmental Officer.

About the Grantmaker:

Established in August 2004 by Robert Purves AM, who is committed to making an impact for a better environment.The Fund is registered on the Register of Environmental Organisations.

Funding Sources

Majority of funding from the Purves Private fund (undefined investments) and public donations.
Member of AEGN

Amount of Funding

Funding can be received for up to 12 months.
You can reapply for funding for the same project, but it goes through application process.
Gave $821,300 in 2019 to 14 organisations ($58,000 on average)

Objectives for the Trust:

Vision: The Fund's vision is an environmentally sustainable world in which biodiversity is preserved.
Mission: The mission of the Fund is to advance, primarily through education of individuals and organisations, environmental sustainability and preservation of biodiversity.
Objectives:

- Act as a catalysts to change
- Fill gaps in effecting change
- Break down barriers to action
- Support creation of new thinking and practice
- Provide bold leadership
- Encourage participation of stakeholders

Charitable Purpose:

- To protect and enhance the natural environment.
- To enhance the protection of Australia's unique biodiversity for the benefit of future generations through the protection of native species and the ecological processes that support them, particularly in the primary production landscape.
- To provide information and education about the natural environment and to improve the Australian community's understanding of the urgent need for greater sustainability.
- To support scientific research and field projects that are aimed at supporting catalytic work to find solutions for important environmental issues that are not currently supported by environmental groups or governments.

Focus Areas:

- Plastic pollution
- Broad-scale land clearing
- Renewable energy and climate change advocacy
- NGO capacity building

Reichstein Foundation

Location: East Melbourne, VIC

Website: https://reichstein.org.au

Application Dates:

For the 2019/2020 financial year, the Reichstein Foundation will be granting principally through invitation. We are not taking applications at this time. Our grants strategy will be reviewed again in 2020.

Application Requirements:

We have a particular emphasis on projects with purposes and benefits in Victoria.
Visit our Past Grants page to see some of our featured grant partners and projects.

Funding Sources

Seeks funding through networks such as:

- The Australian Environmental Grantmakers Network
    - Encourages grantmakers to divest from fossil fuels
- The Australian Women Donors Network
- The Indigenous-philanthropic partnership, Woor-Dungin
- Philanthropy Australia, the peak body for our sector
- The Law and Justice Funders Network

Some funding is also in the Lance's inheritance

REICHSTEIN FOUNDATION

change not charity

About the Grantmaker:

The Reichstein Foundation was established by Lance Reichstein in 1970. Lance was an engineer, industrialist, entrepreneur, civic leader, and quiet philanthropist. Upon his death in 1979, the Foundation inherited a significant proportion of his wealth.

Objectives for the Trust:

The Foundation grants in the areas of:

- Reducing inequality
- Social justice and the law
- Environmental sustainability

Amount of Funding

- **Australian Marine Conservation Society:** Saving the Great Barrier Reef 2018 - $9,000
- **Climate Council of Australia:** Climate Media Centre - $30,000
- **Environment Victoria:** Protecting Westernport and stopping polluting fossil fuel projects - $5,000
- **Environmental Justice Australia:** REST Super case - $5,000
- **Purves Environmental Fund:** Stop Tree Clearing - $30,000

The Ian Potter Foundation

Location: Melbourne, VIC AUS

Website: https://www.ianpotter.org.au/

Application Dates:

Due to COVID-19, they will consider grant applications by invitation only for the remainder of 2020. They may begin funding rounds for 2021 in October 2020

Application Requirements:

- You must speak with a Program Manager before submitting an Expression of Interest (EOI). After the initial conversation, the Program Manager will invite suitable candidates to apply.
- The Foundation only considers grant applications in excess of $100,000 in this program area.
- The Foundation prioritises applications with evidence of collaboration.
- Applications must be accompanied by a letter from the requesting organisation's Chief Executive Officer or equivalent person (e.g. Director of Institute, University Vice-Chancellor or Deputy Vice-Chancellor Research) attesting to the value of the application to the organisation.
- In the case of multiple applications, advice must also be provided as to the priority ranking of all such applications.

Funding Sources

"The corpus of The Ian Potter Foundation is invested in a diversified portfolio including investment companies, managed funds, and ETFs." There is no specific portfolio information on their website.

Amount of Funding

Around $100,000

About the Grantmaker:

The Ian Potter Foundation is a major Australian philanthropic foundation that supports and promotes excellence and innovation. Support outstanding charitable organisations and invest in Australia's innovative and creative people, protect the environment and alleviate disadvantage.

Objectives for the Trust:

To support ambitious and transformative environmental initiatives including:

- Support for the environment sector
- Applied environmental science research projects
- On ground conservation of natural environment projects.

We prioritise projects that employ several of the following approaches:

- Work collaboratively with multiple stakeholders.
- Enhance the capacity of the environment sector.
- Take an ecosystem or landscape-scale approach.
- Adopt a community-based approach, where relevant.
- Develop or incorporate a strong scientific evidence base.
- Develop translational frameworks and/or strategies that can be adapted and implemented widely.
- Promote sustainable resource management.
- For research projects, preference will be given to projects that engage early or mid-career researchers. Such projects to be strongly supported by their host organisation and be strategically aligned to the institution's mission.

The Myer Fund

Location: Melbourne, VIC AUS

Website: http://myerfoundation.org.au

Application Dates:

The Large Grant Program is not currently taking applications but would be a good grant to apply to in the future.
It is likely that two to three multi-year grants for core operational support will be approved each year.

Application Requirements:

Sustainability and Environment Grants-
Large Grant Program: The focus area for FY19-23 is to support organisations that seek to influence key stakeholders to take action on climate change.
The Myer Foundation will work with organisations who align with the focus area, with a view to making a commitment each year to support an organisation's core operations.
Email to admin@myerfoundation.org.au to introduce yourself to the Program Manager.
Find Current Available Grants:
http://myerfoundation.org.au/grants/grant-finder/

Objectives for the Trust:

They focus on four main areas such as Arts & Humanities, Sustainability & Environment, Education, and Poverty & Disadvantage
The Sustainability & Environment Program is supporting organisations that seek to catalyse positive action on climate change in an Australian context.
Case studies, like Australian Native Grasslands, from grants can be read here:
http://myerfoundation.org.au/grants/sustainability-environment/case-studies/

SIDNEY MYER FUND THE MYER FOUNDATION

About the Grantmaker:

The Sidney Myer Fund and The Myer Foundation are two separate philanthropic entities of Myer family philanthropy. They are both managed by the same team and have separate but complementary philanthropic programs and activities.
Sidney Myer, a generous philanthropist in his lifetime, left a portion of his estate upon his death in 1934 to be invested for the benefit of the community in which he made his fortune. That act created the Sidney Myer Fund which exists in perpetuity, the income from which will be distributed annually.
The Myer Foundation was established in 1959 by Sidney Myer's sons, the late Kenneth Myer AC DSC, and Baillieu Myer AC, as a way to support initiatives and new opportunities arising from contemporary issues. The Myer Foundation was endowed through Kenneth Myer's estate following his death in 1992.
The Sidney Myer Fund and The Myer Foundation continue the legacy of Myer family generosity, through members of four succeeding generations of the Myer family, who give in many ways, to make significant and lasting changes in our society.

Funding Sources

All revenue is exclusively from investments, however there is no information on their website about their investment portfolio

Amount of Funding

Previous grants around $25,000 to $160,000

The Wettenhall Environmental Trust

Location: Castlemaine, VIC AUS
Website: https://wettenhall.org.au/

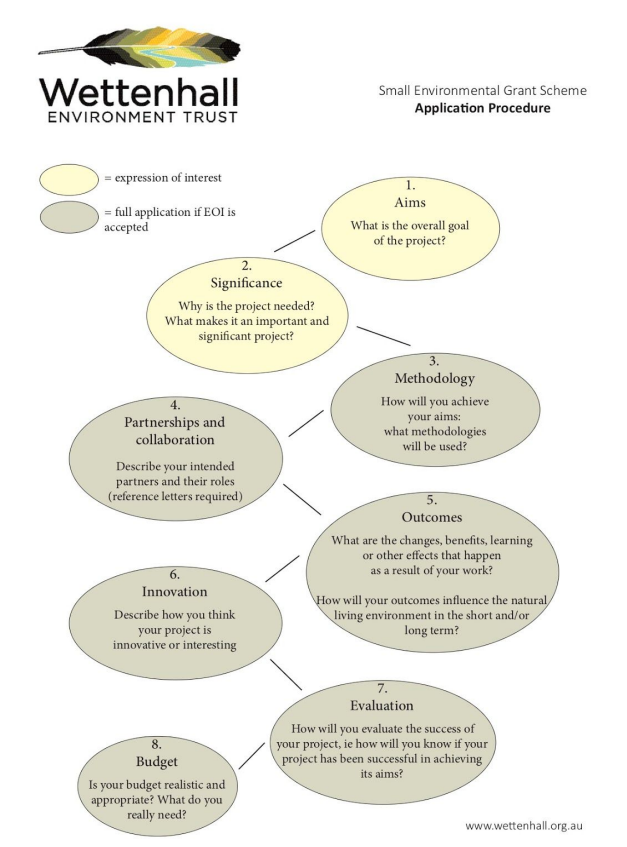
Application Dates:

Four rounds every year (February, May, August, November)

- 1st July 2020 (funding released August 2020)
- 1st October 2020 (funding released November 2020)
- 1st December 2020 (funding released February 2021)

Application Requirements:

- Read First: Can you Apply
- Email beth@wettenhall.org.au with a paragraph about the project
- Apply: https://wettenhall.org.au/grants/apply/
- Application Process:



Wettenhall
ENVIRONMENT TRUST

About the Grantmaker:

Wettenhall Environment Trust began granting in 1997. Support is given to projects that enhance or maintain the vitality and diversity of the Australian natural living environment. The trust looks to support groups undertaking projects that will make a positive difference to the natural living environment, in land, sea or air, rural or urban.

Objectives for the Trust:

Flora and fauna or threatened mammal conservation projects involving any of the following:

- monitoring, recording and sharing data
- delivering community education
- providing community capacity building
- research and science

Projects Should:

- Directly make positive changes to biodiversity conservation in Australia.
- Have some short term outputs, but also have long term objectives and values.
- Show the following: enthusiasm, collaboration, passion, innovation.
- Use citizen science; or are about community education that leads to conservation.

Funding Sources

Albert George and Nancy Caroline Youngman Trust, Biophilia Foundation, Brian and Diana Snape, Purryburry Trust, RE Ross Trust, Vera Moore Foundation, Williams Fund, and other individual donations

Amount of Funding

Usually under $10,000

The William Buckland Foundation

Location: Melbourne, VIC AUS

Website: http://williambucklandfoundation.org.au/

Application Dates:

Annual Application varying depending on the program

Application Requirements:

We have a three step application process:
Step 1. Contact us (via the link below) to let us know how your grant application aligns with the program strategy (download the program theory of change from the relevant link above)
Step 2. If your grant is eligible, we will send you a link to submit an Expression of Interest (EOI).
Step 3. If your EOI is successful, we will invite you to make a full application and the relevant links to our online application form will be provided for you.
Please note, it will take around 4-6 months for the process above and all of our grant rounds are highly competitive, so being asked to submit an application is not a guarantee of success.
Please CONTACT US prior to submitting an expression of interest.
Call or send an email so the Grant Program Manager can discuss your project in advance, help guide you through the process and offer any feedback before you submit

About the Grantmaker:

The William Buckland Foundation aims to improve the lives of disadvantaged Victorians through grants that support better housing, health, education and employment outcomes. We also fund initiatives that build resilience in rural and regional communities.

Objectives for the Trust:

Focus on Enabling Education, Improved health, advancing agriculture, and vulnerable Victorians

Funding Sources

Most of their funding comes from managed investments, particularly equities. However, beyond highlighting "impact investments" there is no information about the environmental consciousness of their portfolio

Amount of Funding

Previous environmental grants:
Australian Environmental Grantmakers Network – $25,000
Ripe for Change Sustainable Agriculture and Biodiversity Research Partnership
Australian Environmental Grantmakers' Network – $6,000 one year
Annual donation
Foundation for Rural & Regional Renewal – $5,500
Grant for regional Victorian Women to further their environmental leadership
Wettenhall Environment Trust – $110,000 (3rd of 3 instalments)
Small Grants Partnership Program

Appendix Z: Project Booklet to be Distributed to Stakeholders

Port Phillip Baykeeper Strategic Collaboration Plan

May 2020

Thanks to Funders

Helen Macpherson Smith Trust

Student Team, Advisors, and Sponsors

WPI

Student Team

(Left to Right)
Salvatore Lombardo, Shelby Morrison, Nicole Shedd, Peter Dentch

Advisors

Prof. Fabio Carrera
Professor of International and Global Studies
Director of Venice and Santa Fe Project Centers

Prof. Stephen McCauley
Assistant Teaching Professor - Interdisciplinary
Co-director of Melbourne Site

PORT PHILLIP ecocentre

Sponsors

Neil Blake
Port Phillip Baykeeper
Founding Director of the EcoCentre
Order of Australia Medal Recipient

Fam Charko
Marine Biologist at the EcoCentre
Fellow of the Centre for Sustainability Leadership in Melbourne

Abstract

Port Phillip Bay faces issues that threaten marine species and other ecosystem services. There are many government and community organisations with diverse responsibilities and/or interests in 'issues'. This project trials processes to create cross-sector collaborations on Bay management issues. Surveys, workshops, and interviews were conducted with a wide-range of stakeholders. Priority issues were identified and relevant information gathered.

'Climate change' and 'marine pests' were selected as topics for separate workshops with relevant stakeholders to contribute to a paper on the issue. Network maps were created to help consolidate knowledge of issues and organisations working on them. This document outlines how to foster a cooperative environment through processes that incorporate and synthesise knowledge gained from different stakeholders, for better outcomes for the Bay. The 'Marine pests issue paper' is included in this booklet as an example outcome of this collaborative approach.

Table of Contents

The Case for Collaboration

The community-managed Port Phillip EcoCentre was conceived in 1998 by City of Port Phillip in collaboration with Earthcare St Kilda and 4 other local community groups to create a hub for environmental action. Within 3 years Port Phillip EcoCentre Incorporated had attained not-for-profit 'charitable organisation' status which enabled funding from a range of funding sources thats were not open to local government. This initiative was founded on the strong relationships between the local government and several community groups that had formed since the mid 1980's to protect the local environment. The local government and community sectors each had essential strengths to contribute and the strong partnership encouraged external stakeholders to invest in the project.

The benefits of cross-sectoral collaboration had been highlighted locally by the state government declaration of St Kilda Breakwater Co-operative Management Area for Wildlife in 1992. In response to a 6 year study documenting the presence of a colony of around 100 Little Penguins, a Cooperative Management Advisory Committee was convened, with representatives from the Department of Conservation and Environment, Earthcare St Kilda, Port of Melbourne Authority, Royal Melbourne Yacht Squadron, St. Kilda City Council, and a penguin researcher.

The 'cooperative'approach ensured the aims and responsibilities of all stakeholders were considered to inform strategies to achieve essential major works to install an extra 20,000 tonnes of rock to restore the deteriorating breakwater, without harm to the penguins. By 1998 the breakwater had been completely renovated; and by 2013 the safe boating capacity of St Kilda harbor was substantially increased; and the penguin colony had increased to around 1,400.

The EcoCentre is advocating that similar cross-sectoral collaborations be adopted for other issues affecting the Bay. In 2020, the EcoCentre has 32 officially affiliated groups and over 240 partner organisations. These include valued international affiliations with the Waterkeeper Alliance and Worcester Polytechnic Institute (Massachusetts, USA). The City of Port Phillip continues to provide base funding which has enabled the EcoCentre to effectively seek project funding from a range of other sources including state and federal government and the philanthropic sector.

Neil Blake, was conferred the honorary title of Port Phillip Baykeeper in 2008, in recognition of his work to protect the Bay: commencing as a volunteer with the St Kilda Penguin Study (1985-2002); founding member of Earthcare St Kilda (1989); and founding Director of Port Phillip EcoCentre (1999). The Port Phillip Baykeeper program is a part of the Waterkeeper Alliance, an international network comprising non-governmental defenders for specific bodies of water, such as rivers, lakes, and bays. Waterkeepers act as the voice for the body of water they represent.

The Port Phillip Baykeeper Strategic Collaborations Plan is a key step in Neil's preparations to pass the baton to the next generation Baykeeper.

Creating the Collaboration Plan

This project is intended to assist the Port Phillip Baykeeper developing a cross-sectoral collaboration model to promote cooperative action among the stakeholders of the Bay.

We completed the objectives in steps, since each part of the project would build on the next. The outcomes of each part is illustrated on the right.

Steps:	Outcomes:
1 Identify key stakeholders and their priorities	Survey stakeholders on priorities and activities
2 Promote dialogue on priority issues	Issue-based workshops iwith diverse stakeholders
3 Develop issue papers on priority Issues	Issue summary and recommended actions
4 Promote action in Issue-based networks	Promote network maps and potential partnerships

Our Approach

Initial Survey

- Formulate an intial survey and distribute among the Bay stakeholders
- Identify priority issues, limitations, outreach practices, and more

Roundtable Workshop

- Hosted through online video conferencing
- Participants spanned a range of sectors
- Conversation followed issue paper outline

Issue Papers

- All research is compiled into an issue paper
- Issue's specifics agreed on and shared by multiple organizations around the Bay.

Determine Action

- Stakeholders converse to determine the best course of action
- Issue paper used as an outline for gathering information

Collaborative Action

- Utilise network maps to collaborate on shared issues
- Identify potential partners
- Apply for grants and resources in collaboration for more success

Steps to collect and format issues information:

- **Work with EcoCentre to construct and conduct a survey to gather stakeholder information and priority issues**
- **Select topics for 2 roundtable workshops.**
- **Conduct workshops with interested stakeholders.**
- **Combine desktop research with workshop outcomes to create 2 draft issue papers, incorporating information from the different sectors.**

The next step to review the issue paper with the stakeholders to determine recommendations (managment actions required to respond to the issue).

Opening Stakeholder Dialogue with Workshops

Conducting a roundtable workshop should:

Open Communication
Opens communication pathways between stakeholders about shared issue.

Promote Understanding
Voices from different sectors are heard and considered

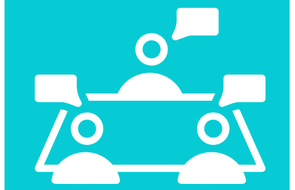
Provide Information
Each participant brings different information from first-hand experience

Foster Collaboration
Involve a variety of stakeholders to contribute to the process

Our Process to Choose Workshop Topics:

Analysis of Initial Survey
- Survey sent to ~50 stakeholders
- High priority issues identified

Workshop Determination
- Identify the highly prioritised issues from initial survey.
- Determine the diversity of stakeholders invested in the issue.



Issue-Based Workshops
- Issue-based workshops in person or through video conference used to populate the issue paper.
- Utilised to promote cross-sectoral communications around PPB.

Developing Issue Papers

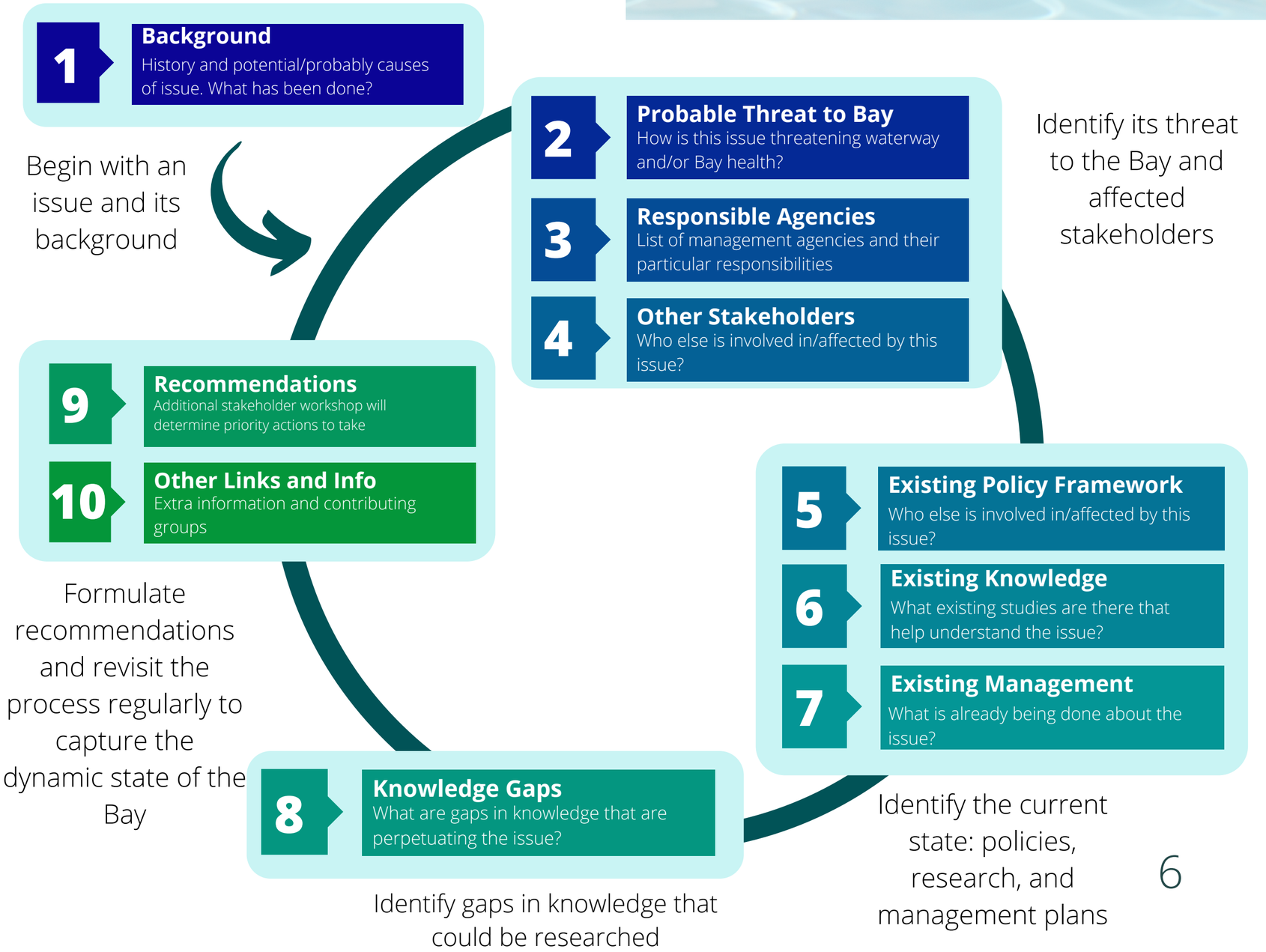
An Issue paper should:

Briefly outline the issue
Outline a summary of the issue, compiling the priorities and knowledge of stakeholders

Summarise knowledge
Summarises current knowledge about the issue's background, impacts, stakeholders, and management

Outline future steps
Points for further research on the issue to fill knowledge gaps and inform additional recommendations

Inform the public
The paper is used to inform the public and provide a template for the creation of future papers



Encouraging further action

To determine the best course of action, the issue paper draft can be used as conversation starters among stakeholders and set the agenda for another roundtable workshop.

To promote collaboration, a network map (shown on next page) helps to visualise where each organisation is located and what they work on. The survey provided information on the high priority issues each stakeholder focuses on. The network map uses this information, displaying each organisation as a coloured dot, with the coulour representing its organization type, or sector.

After a plan of action has been decided on, the network map can be used to identify stakeholders who may be interested in collaborative effort on issues they have in common.

Utilising Collaborative Networks

Determine Action

- Stakeholders begin conversations to determine the best course of action
- Issue paper utilised as conversation starter to understand the current state of an issue

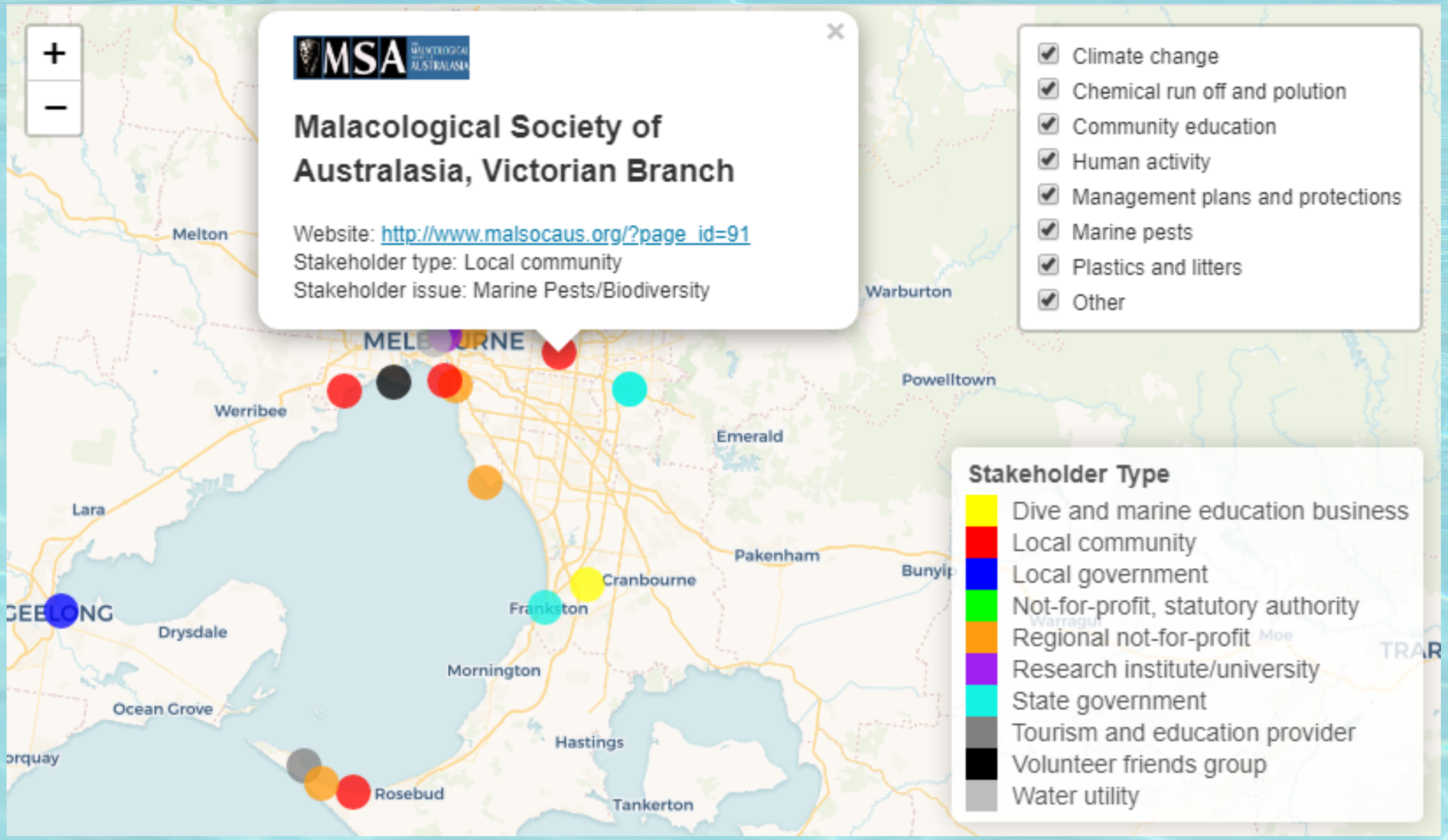
Network Mapping

- Used survey results for a network map connecting stakeholders by issues
- Programmed using VisNetwork package in R

Take Action with Cross-Sectoral Collaboration

- Utilise the Network Map Tool to identify possible partner organisations
- Connect with a variety of organisations to lead a collaborative effort

Stakeholders network map



Examples in action: Marine Pests

Opening cross-sector dialogue: summary of workshop method and outcome

4 Stakeholder Types

- Not-for-profits
- State Government
- Businesses
- Community Groups

9 Attending Participants

- 4 WPI students
- 3 EcoCentre staff
- 9 other participants

1 Hour Workshop

- 5 minute discussions on each section of the paper
- Took notes during and sent them out in a workshop follow-up

Marine Pests Issue Paper

Port Phillip Bay Issue Paper: Marine Pest Species

EcoCentre and Collaborators Overview of Pest Species in Port Phillip Bay

This paper outlines Port Phillip EcoCentre and Collaborators perspectives on protecting waterways and the Bay from marine pests.

Port Phillip Bay history with marine pests.

Marine pests, or species that disrupt the natural environment, have been introduced to the coastal waters of Australia. Since the 1800's more than 160 species have been introduced to Port Phillip Bay.[1] An estimated 30 percent of these foreign pests were introduced through boat travel.[2] Active carrier transport through international waters allows for species to invade locations by attaching to hulls or remaining in the ballast water of ships.

Beyond affecting the biodiversity of marine environments, these pests have the ability to disrupt the economic benefits that the Bay provides. These include aquaculture, recreational and commercial fishing, and domestic and international shipping.

Government responses to this threat have focused on measures to prevent new introductions of marine pests; and to prevent the spread of pests from the Bay to other waters. These responses are based on accepting that pests will never be eliminated due to a relative absence of biological controls.

Community responses include Earthcare St Kilda culls of Northern Pacific Seastars from St Kilda harbour and neighbouring sites since 2005; and two research projects by Port EcoCentre in 2013:

- study of impacts of Northern Pacific Seastars in St Kilda and Mornington harbours; and
- Best Practice Guide to Removal of Northern Pacific Seastars

Some of the species threatening the Bay are: Northern Pacific Sea Star, Purple Sea Urchins, Undaria, European Fan Worms

A number of pest species have been introduced to Port Phillip Bay, mostly through ships entering the Port of Melbourne. These species reduce the biodiversity of the Bay through competition, predation, and herbivory that affect other populations.[3]

1. **Background**
2. **Probable Threat to Bay**
3. **Responsible Agencies**
4. **Other Stakeholders**

2 of 4 Pages Shown

Marine Pest and Climate Change Issue Papers are available on the EcoCentre Website

Species Name	Resources it Uses	Effect on Other Species	Additional Impacts
Northern Pacific Seastar *Asterias amurensis*	Preys on molluscs, barnacles, crabs, crustaceans, worms, echinoderms, sea urchins, and even other sea stars. [4]	Can reduce populations of native fish through competition and reduce shellfish populations through predation. [5]	Have been found to negatively affect aquaculture by eating molluscs meant to be harvested. [6]
Japanese Kelp "Wakame" *Undaria pinnatifida*	Photosynthetic, grows in large amounts creating thick canopies and underwater forests. [7]	Can reduce populations of native kelp through competition and take up enough space and light to displace species. [7]	Nearly impossible to eradicate once an area is affected. [8]
European Fan Worm *Sabella spallanzanii*	Filter feeders: consume plankton and other nutrients in the water. [9]	Can outcompete native species for space and food, particularly mollusc species. [10]	Have been found on mussel grow out lines. Can outcompete these species and reduce the catch. [11]
European Green Shore Crab *Carcinus maenas*	Preys on bivalves and other crustaceans, such as soft-shell clams and scallops. [25]	Can reduce shellfish populations and potentially outompete native crab populations. [26]	Has the potential to negatively impact mollusc aquaculture. [27]
Purple Sea Urchin *Heliocidaris erythrogramma*	Mostly consume drifting kelp, but have the ability to easily overgraze and prevent any kelp from repopulating. [13]	Overgrazes kelp, reducing the population and could outcompete species that also feed on native kelp. [13]	Can essentially eliminate kelp forests and displace all species that rely on them. [14]

Summary of Pest Species in Port Phillip Bay

Stakeholders in this issue, including responsible management agencies and their existing pest management practices.

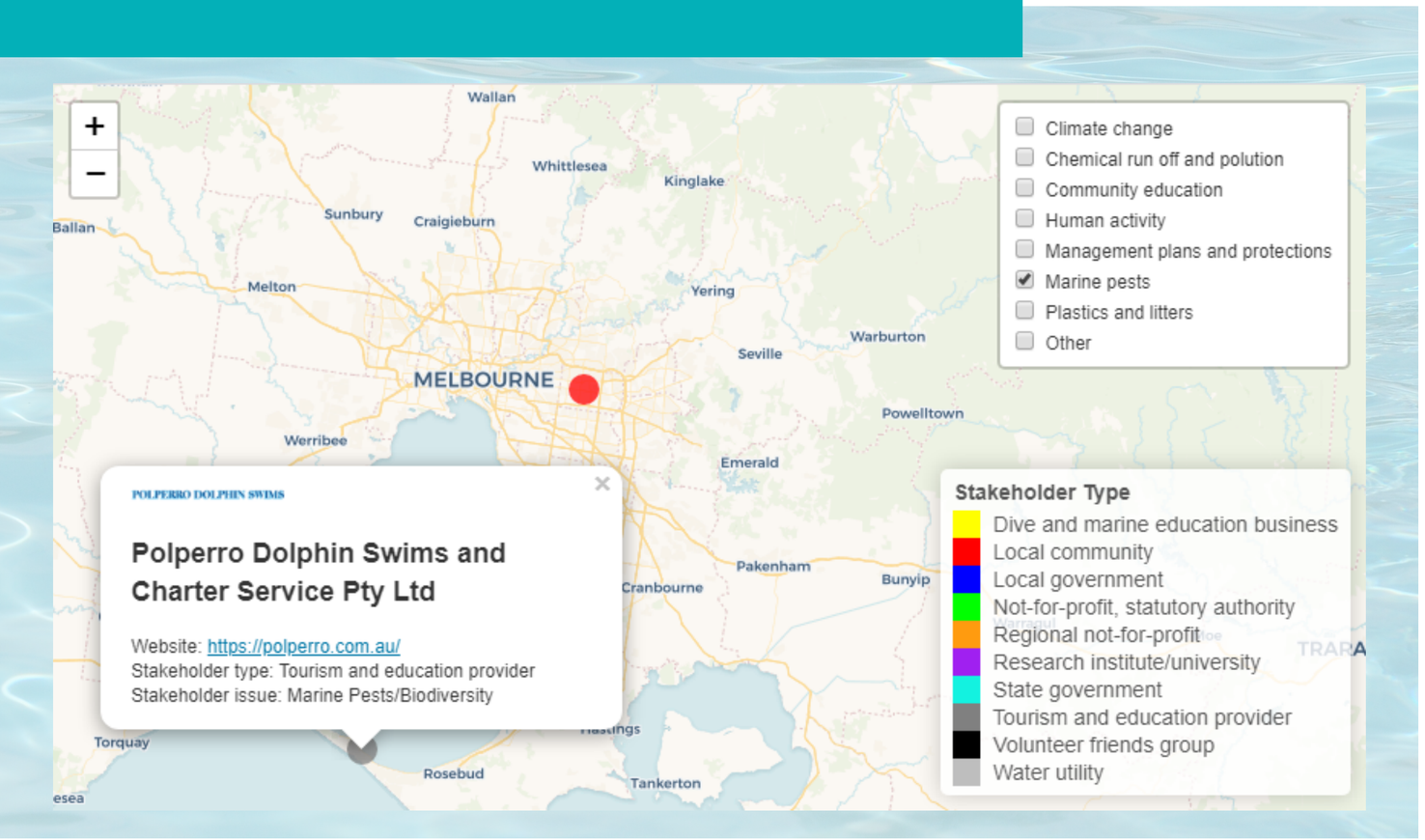
Some of the key stakeholders include the aquaculture industry. They can be directly affected by marine pests because of their ecological effects. Shipping industries and recreational boaters are also affected due to their potential to spread marine pests.

Other stakeholders include marine care groups, recreational and divers, education groups such as Two Bays, schools and universities, and other community groups or not-for-profit organizations.

Additional key stakeholders in this issue are the management agencies responsible for marine pests. The Department of Jobs, Precincts, and Regions has responsibilities for prevention of marine pest incursions. They try to track newly arrived pest species and take steps to prevent them becoming established. Management of established pests are the responsibility of Parks Victoria. Commonwealth Scientific and Industrial Research Organization is a federal government agency that does marine pest research. They created the National Introduced Marine Pest Information System. It was created to help identify pest species as well as help biosecurity managers develop response plans. Lastly, the Victorian Fisheries Authority has a marine pests working group that focuses primarily on campaigns to prevent the spread of marine pests. The national government is also a responsible agency and has compiled research on marine pests to begin developing response plans.

The following figure details the potential physical, biological, and chemical controls for each prevalent invasive species. Generally, the physical control methods are the ones being implemented already to manage pest populations. There is a potential to use biological controls as a more long-term solution, but most would require more extensive research in a controlled environment before they could be used in Port Phillip Bay.

How to use the Network Map



Users can navigate the map by panning and zooming while selecting the desired stakeholder issues. More organisation information can be found in a popup menu by clicking the colour-coded icons on the map.

The network map can help to:

Identify Potential Partners

Identify and learn about other organisations working on marine pests

Determine Actions

Begin conversations with organisations across sectors on the best course of action to take

Lead a Collaborative Effort

Connect with a variety of organisations around the Bay to lead a collaborative effort

Implementing the Collaboration Plan

Identify workshop topics
Cover all long-term threats to the the Bay (eg. Microplastics, Chemical Runoff, Dredging, etc.)

Initiate workshops
Any organisation can lead new issue-based workshops and re-visit past workshops

Consolidate viewpoints
Develop recommended actions for stakeholders to align their own missions with

Implement the collaboration plan
Stakeholders actively plan and deliver partnership projects

Cross-sector collaborations - new way to a healthy Bay

Benefits of Cross-sector collaboration

- Diverse views lead to an overall higher understanding
- Aligned planning helps government, researchers, environmentalists, and community to be more effective and efficient.

"A rising tide lifts all boats"

Normalising collaboration benefits all stakeholders of Port Phillip Bay, not just certain groups

Additional Links

EcoCentre Website: https://ecocentre.com

Project Website: https://sites.google.com/view/mcp-eco-d20/home