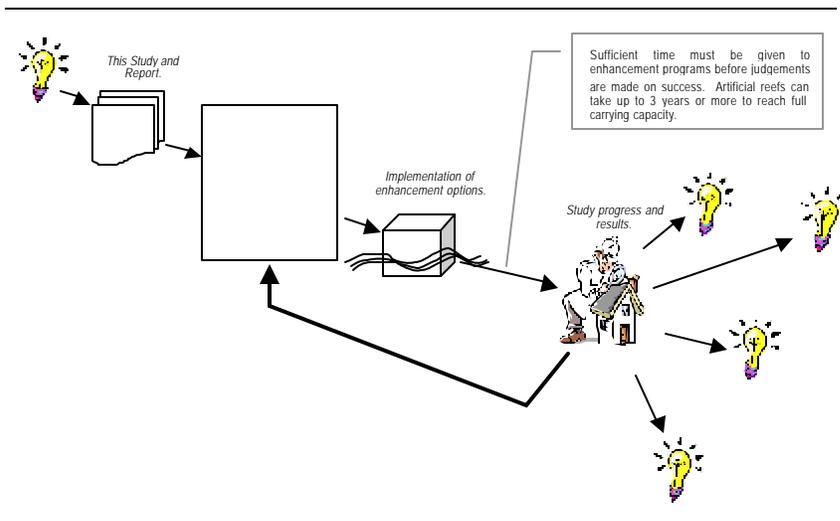


## 1.1 Enhancement of the Peel Waterways

The initiative to start exploring how the Peel Region's man-made waterways could be enhanced should be thought of a 'pilot study'. This investigation and report is one of the starting points of a program that will grow and evolve as experience is gained on how the area reacts to enhancement. This will provide valuable understanding of the how different species are using or not using added structures, and it will inevitably give birth to ideas and other programs as depicted in **Figure 1**. Progress can be reviewed and existing programs adjusted if necessary, and new ideas explored and developed.

At this stage of the program, there is no objective to target the enhancement of a specific species. However as experience is gained, it may then be appropriate to explore specific enhancement activities that target certain species, as well as how natural areas may be enhanced/restored or protected from wave erosion.



**Figure 1.** Pictorial representation of the enhancement program and its review and expansion.

## 1.2 Ranking of Sites for Enhancement

~~Objective is general enhancement of biodiversity with no specific species targeted during the first stage of the program.~~

In order to help prioritise where efforts and resources should first be directed, each site was judged on its merits for its potential to benefit from enhancement and/or its ability to respond to enhancement and provide a return value, eg species diversity or abundance, or community benefits. This was done using the criteria outlined in **Table 1**. Enhancement programs should have clear objectives, and the objectives for the first stage of this pilot study into enhancing the man-made waterways is to increase biodiversity in general and gain a better understanding of how local species are interacting with materials added.

Assessment of such criteria is subjective or based on data where available, and has been used as a guide to help the Steering Group understand the logic behind the selection of the most suitable sites. The criteria were not 'weighted' for this study, however the PHCC could easily add their own weighting to the criteria as part of their internal assessment of options and how to proceed.

**Table 1.** Criteria used to assess and rank each site for enhancement potential.

Feature / Attribute	Description	Rating
1. Water Quality	Clarity/turbidity, salinity fluctuations, residence time of water (flushing rate), potential for serious contamination, stratification.  NB: quality rating is relative to the existing system and between sites, and not pristine ocean or estuary waters.	☹ = very poor ☹☹ = poor ☹☹☹ = average ☹☹☹☹ = good ☹☹☹☹☹ = excellent
2. Existing Substrate Material	Sediments and ability to support concrete modules	☹ = very poor ☹☹☹☹☹ = excellent
3. Bottom Profile	Slope profile, space available for modules.	☹ = very poor ☹☹☹☹☹ = excellent
4. Neighbouring Habitats	Habitats considered productive and/or essential contributors of food or shelter such as wetlands, saltmarshes, seagrass meadows.	☹ = very poor ☹☹☹☹☹ = excellent
5. Existing Biota	Diversity/abundance of fish, crustaceans and fouling organisms as an indicative potential of what could be present.	☹ = very poor ☹☹☹☹☹ = excellent
6. Potential Diversity/Abundance	Estimated potential of the site to attract a range of species and/or increase abundance, as well as attract new species, relative to existing species at the site.	☹ = very poor ☹☹☹☹☹ = very high
7. Permit Requirements	Complexity of permit process to carry out enhancement options.	☹ = very complex/costly ☹☹☹☹☹ = none required
8. Access and Ease of Deployment	Availability of suitable access points and travel distance from module construction area (by land and water).	☹ = very limited access ☹☹☹☹☹ = excellent access
9. Educational Value	Ability for the site to be used for community, school, or university studies, or education.	☹ = very poor ☹☹☹☹☹ = excellent
10. Value Adding Potential	Ability for enhancement to contribute significantly to the 'value' of the area, or incorporate other value adding options such as underwater live video, educational trails.	☹ = very poor ☹☹☹☹☹ = excellent
11. Sponsorship Potential	Attractiveness of the site and its enhancement for sponsors, ie exposure, feel good factor, potential return on investment.	☹ = very poor ☹☹☹☹☹ = excellent
12. Cost – reported in Table 3	Estimated level of cost to implement a suitable enhancement program for the site, including transport, permits, number of modules, deployment, monitoring, and other ongoing costs.	☹ = very low ☹☹☹☹☹ = very high

**Table 2** Ranking of each site for enhancement potential.  
 ☺ = very poor, ☹ = poor, ☺☹☹ = average, ☺☺☺☺ = good, ☺☺☺☺☺ = excellent

Site	Water Quality	Existing Substrate Material	Bottom Profile + space	Neighbouring Habitats	Existing Biota	Potential Diversity/ Abundance	Permit Requirements	Access and Ease of Deployment	Educational Value	Value Adding Potential	Sponsorship Potential	TOTAL SCORE	RANKING
Ocean Marina (incl Dolphin Quay)	☹☹☹☹ (potential for oil/heavy metals)	☺☺☹☹	☹☹☹☹ ☺	☹☹☹	☺☺☹☹	☺☺☹☹ ☺	☹☹☹☹	☺☺☹☹☹	☹☹☹☹ ☺	☺☺☹☹	☺☺☹☹☹☹ (high public profile)	48	1
Hall Park Public Swim area	☹☹☹☹ ☺	☹☹☹☹ ☺  (currents could be an issue)	☹☹☹☹	☺☺☹☹☹	☺☺☹☹	☹☹☹☹ ☺	☹☹☹☹?	☹☹☹☹	☹☹☹☹ ☺	☺☺☹☹	☹☹☹☹☹☹ (high public profile)	48	1
Northport – Village Beach and Bouvard Village	☹☹☹☹ ☺	☺☺☹☹	☹☹☹☹	☹☹☹	☺☺☹☹	☹☹☹☹ ☺	☹☹☹☹	☹☹☹	☹☹☹☹ ☺  (snorkelling beach for school projects)	☹☹☹☹ ☺  (options such as u/w webcam)	☹☹☹☹☹☹ (high public profile)	46	2
Mariners Cove (Sales Office + marina area)	☹☹☹☹	☺☺☹☹ ☺	☹☹☹☹	☺☺☹☹☹☹  (Creery Wetlands Nature Reserve)	☺☺☹☹	☹☹☹☹	☹☹☹☹	☹☹☹	☹☹☹☹ ☺	☹☹☹☹	☹☹☹☹☹☹ (high public profile)	46	2
Leeward Canals	☹☹☹☹	☺☺☹☹ ☺  (good mix of rock sizes)	☹☹☹☹ ☺  (incl ledge at foot of canal wall)	☺☺☹☹☹☹  (Nature Reserve)	☺☺☹☹	☹☹☹☹	☹☹☹☹	☹☹☹	☹☹☹☹	☹☹☹☹	☹☹☹☹☹☹ (tie-in with Nature Reserve)  (mainly residents)	45	3
Eastport Marina	☹☹☹☹ (potential for oil/heavy metals)	☺☺☹☹	☹☹☹☹	☺☺☹☹☹☹  (diverse channel plus Nature Reserve)	☹☹☹☹	☹☹☹☹ ☺	☹☹☹☹	☹☹☹☹	☹☹☹☹	☹☹☹☹	☹☹☹☹☹☹ (high public profile)	44	4
Eastport – Foreshore Reserve Canal	☹☹☹☹	☺☺☹☹	☹☹☹☹  (mattress revetment)	☺☺☹☹☹☹  (Adjacent to Nature Reserve)	☹☹☹☹	☹☹☹☹ ☺  (not established)	☹☹☹☹	☹☹☹	☹☹☹☹	☹☹☹☹	☹☹☹☹☹☹	43	5

<title>

Site	Water Quality	Existing Substrate Material	Bottom Profile + space	Neighbouring Habitats	Existing Biota	Potential Diversity/ Abundance	Permit Requirements	Access and Ease of Deployment	Educational Value	Value Adding Potential	Sponsorship Potential	TOTAL SCORE	RANKING
Reserve Canal				Reserve))	yet)								
Soldiers Cove	----	----- g	-----	(small barrier saltmarsh island)	-----?	-----	-----?	-----	-----	-----	(mainly residents)	41	6
Performing Arts Complex boardwalk	----	-----	-----	-----	-----	-----	-----	-----	----- g	-----	(high public profile)	39	7
Mandurah Quays	-----	-----? (excellent varying rock sizes)	-----?	(nearby saltmarsh islands)	-----	-----	-----?	-----	-----	-----	(mainly residents)	38	8
Santavea Rd Canals	-----	----- (good variable rock rip rap, 30cm soft mud)	-----?	(potential for seagrass?)	-----	-----	-----	-----	-----	-----	(mainly residents)	35	9
Cambria Is Canals	-----	-----	-----?	-----	-----	-----	-----	-----	-----	-----	(mainly residents)	32	10
Waterside Canals	-----	-----	-----?	-----	-----	-----	-----	-----	-----	-----	(mainly residents)	32	10
Yanderup Canals	----- (estuarine, tannin rich, turbid)	-----	-----?	-----	-----	-----	-----	-----	-----	-----	(mainly residents)	32	10

From this ranking, the sites that fall within the top three are:

1. Mandurah Ocean Marina and Hall Park Public Swim area.
2. Port Bouvard – Northport, and Port Mandurah – Mariners Cove.
3. Port Mandurah – Leeward.

This system of ranking the sites has limitations just as any system does. It is however a useful starting point and encourages discussion and analysis of the sites. It also provides a useful summary of the merits of each site, which the Steering Committee or other groups can take into consideration and perhaps narrow down. For example, a group or Council could choose to select the sites only on their ability to attract maximum diversity, or closeness to natural wetland areas.

The following points should be considered regarding the ranking of sites.

- /// Assessing the sites required a level of judgement based on experience of similar areas, and the information gained during the short time available for the site visit. Therefore the rankings are a starting point and a guide only, and should not be considered to be absolute and final, or a mandate that the PHCC can not choose to prioritise other sites. Comments from the PHCC are welcome.
- /// At the end of the day, it will be the decision of the groups involved as to which areas are enhanced first.
- /// Available funding and its source, eg sponsorship, will also play a role in dictating where efforts are directed.
- /// The rankings should NOT be taken to mean that the lower ranked areas are not worth attention. It is likely that residents or other groups could have different objectives than those represented by the attributes used in this ranking system, therefore lower ranked areas could become higher priorities.
- /// The rankings have no weightings attached to the different attributes, therefore all attributes are considered to be of equal importance. The PHCC may wish to add weightings if necessary to help internal decision making.
- /// The success of each program at each site, and the ability for each site to achieve the ranking it has been given is very much dependent upon the effort put into it. For example, one of the reasons the No. 1 ranked site the Ocean Marina (and proposed Dolphin Quay) is a leading site is because of its close vicinity to Mandurah, its public access and significant potential to use the enhancement for public display/education. However, if this aspect is not utilised or utilised fully, then the value of the site is decreased.
- /// The rankings can be extrapolated to cover the other canals, within the same development as the site surveyed, ie the rankings for Santavea Rd canal could be used for other canals nearby. However, prior to deployment some investigations of factors such as canal floor should be made.

### 1.2.1 Ranking by Cost

Cost was separated from the main ranking table because it is highly variable. For example one site may only require a few modules, however a canal estate could utilise hundreds. Cost was included however to provide an indication of the relative approximate cost of initiating a reasonable level of enhancement at each site. The costs are relative to the specific area,

therefore the lowest and simplest enhancement option is used as a benchmark for the others. Costs also take into account expenses such as transport of modules to site, deployment, promotion, permits, signage, and additional design studies. Details of enhancement strategies for the top sites are provided in Section **Error! Reference source not found.**

**Table 3** Approximate enhancement cost to initiate enhancement.

☞ = very low, ☞☞ = low, ☞☞☞ = medium, ☞☞☞☞ = high, ☞☞☞☞☞ = very high cost

Site	Cost
Ocean Marina (incl proposed Dolphin Quay)	☞☞☞☞
Cambria Is	☞☞☞
Santavea Rd	☞☞☞
Mariners Cove (Sales Office + marina)	☞☞☞
Leeward	☞☞☞
Waterside Canals	☞☞☞
Performing Arts Complex boardwalk (u/w lighting could add an ongoing cost)	☞☞☞
Hall Park Public Swim area	☞
Soldiers Cove	☞☞☞
Mandurah Quays	☞☞☞
Yanderup Canals	☞☞☞
Northport	☞☞☞☞
Eastport	☞☞☞
Eastport Marina	☞☞☞☞

The least expensive option is the Hall Park Public Swim area. This site only requires several modules and has minimal transport and deployment difficulties. This is discussed further in Section **Error! Reference source not found.**

The most expensive sites are the Ocean Marina, Northport, and Eastport. This relates to the number of modules that would be used, time to position and deploy them, signage for public education, school programs that may participate, monitoring costs, and distance of transport of modules to actual deployment location.

Obviously some expenses are not actual costs as some resources will be donated.