Progress Report SP 2018-033

Investigating fish communities as an indicator of estuarine condition

Rivers and Estuaries Science

Project Core Team

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Update requested

Document endorsements and approvals as of Aug. 13, 2021, 12:24 p.m.

Project Team	granted
Program Leader	granted
Directorate	required

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Context

Fish communities exhibit predictable responses to ecosystem degradation/stress, and thus may be used as sensitive indicators of the ecological condition of these systems. Biotic indices, based on fish and other biological communities, are now used worldwide to quantify the ecological health of rivers, lakes, estuaries and many other environments. This project applies a Fish Community Index developed by Murdoch University in collaboration with government agencies (2007-2012) as a measure of the condition of the Swan Canning River system. This has been part of regular monitoring and reporting on the waterway since 2012 and a report on fish communities in the Swan Canning Riverpark is released to the public annually.

Aims

- Undertake the evaluation of the fish communities in the Swan Canning Riverpark for the purposes of applying the fish assemblage based index of estuarine condition and reporting.

Progress

- Fish communities were sampled at 48 sites through February and April.
- At each site fish, collected using either seine or gill nets, were identified, counted and returned to the water alive.
- Species abundances in each sample were used to derive values for core metrics including the numbers, diversity and identities of species, and the relative proportions of species with different feeding and habitat requirements. These underpinned the calculation of the nearshore and offshore fish community index and were used to calculate and overall index score for each zone.
- A report and summary paper documenting the 2020 results was completed. The report translates index scores to quantify ecological health and results are reported as a conceptually simple letter grade.

Management implications

- The Fish Community Index considers the fish community as a whole and provides a means to assess how fish communities in shallow nearshore and deeper offshore waters respond to an array of stressors affecting the ecosystem.
- In 2020, the shallow nearshore areas and offshore waters were assessed as fair to good, overall. These results are consistent with the relatively stable trend in condition since 2011.
- Since the start of regular fish community monitoring in 2012, the offshore waters of the Canning Estuary have consistently scored poorly relative to those of the other zones across both seasons (receiving a D grade in 50 percent of monitored seasons).
- DBCA is working with UWA and Murdoch University to apply the Swan Canning Estuary Model in hindcasting water quality across the four zones over the past decade. This will help to discern factors influencing index scores in the Canning Estuary.

Future directions

- A report documenting the results of the 2021 sampling will be completed.
- Analyse data sets arising from the Swan Canning Estuary Response model to evaluate patterns in the 2012-2020 fish communities.