Eastern King Prawn Habitat

Growing your fishery, naturally

We now know more than ever about the ways in which healthy habitat and good quality water benefit Eastern King Prawn, help them survive adversity and thrive in the good times. This resilience will help sustain an important commercial fishing industry and provide consumers with a much-loved seafood.

The most important habitat for Eastern King Prawn (EKP) is the estuary. In recent years, work has started to repair estuaries and return them to a more natural state. Prawns are just starting to take advantage of these improved conditions, which is good news for the prawns, the commercial fishers and local towns involved in the prawn fishery. Researchers have spent several years using a combination of methods, including specialised research sled nets and chemical 'signatures', to identify where the prawns came from, what they had been eating and where their food was from. This is what they found out.

- *Food + not too much freshwater + warm water is ideal.*
- *Rapid declines in temperature and salinity are not good.*
- *An estuary is not one big habitat: prawns live in the patches where conditions are favourable.*
- *Much of the food eaten by juveniles is coming from saltmarsh habitats.*

Good juvenile EKP habitat

- Ideal habitat areas are places within estuaries where there is a supply of food, the salinity isn't too low, and the temperature isn't too cold. Shallow sand flats with low currents and marsh channels that are submerged across all tides are ideal, particularly in the lower estuary.

- Stable temperature and salinity are best. Juvenile EKP do not like rapid declines in temperature and salinity levels, such as what can happen during flood events. More tend to die and the survivors generally don't grow well. This helps explain why commercial fishers tend to notice fewer, and smaller, EKP in wetter years.

- An estuary has many different habitats. Where EKP are found seems to depend on currents, salinity, and food availability.

- In some estuaries, the juveniles are more abundant along the edges of shallow, muddy creeks near mangroves, while in others they were found mainly on seagrass beds.

- Young EKP have a varied diet, eating plant material, crustaceans, microorganisms, small shellfish, and worms. Much of their nutrition is derived from saltmarsh habitats and is transported to the subtidal waters where the prawns live.

- Estuaries need to be connected to wetlands, saltmarsh areas and floodplains. Cutting-off tidal flows and draining wetlands reduces food availability, which can impact on EKP populations. Restoration of more natural tidal flows is producing benefits for juvenile EKP.

The Hunter – rehabilitation in action

The contribution of the Hunter River estuary as a juvenile EKP nursery depends on the area of habitat available. Shallow estuarine areas in the lower estuary are of high value, highlighting the likely impact of the extensive loss of this habitat through land reclamation. In the lower Hunter, approximately 21 ha of channel habitat and 1426 ha of saltmarsh were lost between the 1950s and 1990s. This could equate to a loss of several hundred thousand emigrating prawns each year. Rehabilitation projects have been reconnecting marsh and mangrove habitats to the estuary, thus allowing tidal flushing, restoration of saltmarsh and recruitment of important species. Monitoring indicates that prawns are moving into rehabilitated habitat around Hexham with the reopening of the floodgates on Ironbark Creek. When the floodgates were closed, the numbers of EKP were negligible. Catches increased after the first gate was opened and have further increased now that all the floodgates are open.

EKP are now being found much further into the tributary, with strong recruitment occurring. This is significant because it provides the first clear demonstration of the impact of restoring connectivity with estuarine wetlands for commercial species of prawns in New South Wales.

Before floodgates were installed in the early 1970s, Hexham swamp was considered to be the main EKP nursery for the Hunter River and beyond, even as far as Brisbane. In the 1920s, locals saw a stream of EKP 50cm wide and 50cm deep coming past the Heads and out to sea for over 7 miles towards the north.

The Clarence Estuary – the importance of Saltmarsh

Juvenile EKP were found 8-12 km from the mouth of the estuary in the main channel and north arm. Important areas were adjacent to saltmarsh and mangrove habitats in this region of the estuary. Saltmarsh grass was the dominant source of food supporting the growth of juvenile EKP, and mangroves were not as important for providing food. The areas of saltmarsh and seagrass in this estuary have both decreased substantially due to development. 64% of all saltmarsh has been lost - just 290 ha remain.

There were very few EKP found in the southern channels of the estuary, despite there being abundant habitat and appropriate salinity. This could be because these areas are not well connected to incoming tides due to a large training wall. There is suitable habitat and more natural tidal flow could boost the local EKP population.

Saltmarsh in the Clarence River has a significant economic value. The fisheries harvest coming from saltmarsh productivity yields around $25,000 per hectare per year.

The distribution of mangrove (green) and saltmarsh (yellow) in 2009 (top) compared to 1942 (bottom) near the mouth of the Clarence River.

Lake Macquarie – wind and seagrass

In Lake Macquarie, there is an abundance of seagrass important for juvenile EKP. However, seagrass beds in the northern basin received greater numbers of recruits than other areas. The supply of recruits was greatest in several shallow seagrass covered embayments on the eastern edge of the estuary, about 2 –3 km past the end of the entrance channel. EKP were largely absent from the south-western area of the lake. Very young EKP initially enter the system on the flood tide and are carried along the entrance channel by the strong tidal currents. At the end of the entrance channel, the wind conditions during the recruitment season transport the prawns from the end of the entrance channel into the northern basin. So, both wind and tide are important factors influencing which habitat areas in Lake Macquarie the prawns use. Habitat rehabilitation efforts do not usually take drivers of connectivity like seasonal wind into account. For the EKP, seagrass rehabilitation efforts (such as replacement of swing moorings with seagrass friendly moorings) could prioritise areas between 6 and 9 km from the estuary mouth to maximise any benefits for EKP.

Researchers used a combination of methods to understand where the prawns were in each of the estuaries, and what they had been eating. Specialised research sled nets were used to capture early juvenile prawns. Researchers were able to identify where in the estuary the prawns were sourcing their food by analysing isotopes from the prawns and comparing these against the unique isotope signatures of plants and algae that grow within the estuary.

About the project

Fishers have provided many anecdotal reports of the extensive use of estuarine swamps by young EKP prior to wetland degradation, and of the adverse effects of freshwater inundation and lowering of salinity in estuarine nurseries on the growth and abundance of prawns. However there has been a lack of quantitative research on the early estuarine stages of EKP in NSW to support this. Quantitative knowledge on the use of estuarine nurseries by EKP is essential to accurately value coastal wetland habitats, and assess the benefits of rehabilitation.

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The results of the research are summarised in the Project Updates and detailed methods and data have been published in scientific journals. Both the updates and details of the papers published are available on the project website, www.dpi.nsw.gov.au/fishing/habitat/rehabilitating/ekp, or contact Dr Matt Taylor, NSW DPI Fisheries.

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