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# Fish and seagrass – determining the links that drive fisheries production in Corner Inlet.

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*DPI scientists with funding from Fisheries Victoria and the West Gippsland Catchment Management Authority have determined that seagrasses and the filamentous algae that grow on seagrass leaves underpin fisheries production in Corner Inlet.*

Corner Inlet is an internationally recognised Ramsar wetland supporting a rich diversity of plants and animals as well as significant commercial and recreational fisheries.

Seagrass, a flowering plant, is the dominant vegetation in Corner Inlet. Among Victoria's bays and inlets, Corner Inlet is unique in that it supports at least three species of seagrass (*Heterozostera*, *Halophila* and *Posidonia*). In addition, seagrass supports filamentous algae (epiphytes) that grow on the leaves.

While it is generally known that many fish are seen in and around seagrasses, the relative importance of seagrass and other types of marine vegetation (e.g. seaweed or phytoplankton) for producing food for fish in this inlet is not well understood. To ensure sustainable fisheries there is a need to identify which habitats are crucial to fish production.

Stable isotopes are forms of common chemical elements that do not degrade (i.e. are not radioactive). Each plant type (e.g. seagrass, algae or phytoplankton) has a distinctive stable isotopic profile. When plant matter is consumed by an organism, the isotopic signals in the organism are altered in a predictable way. Analysis of the isotopic signals indicates which types of vegetation were initially consumed and the degree of reliance an organism has on one particular vegetation type.

DPI scientists used stable isotopes of carbon,  $\delta^{13}\text{C}$ , and nitrogen,  $\delta^{15}\text{N}$ , to identify distinctive profiles for all major vegetation types in Corner Inlet. Stable isotope profiles

were also taken from three fish species targeted by recreational and commercial fishers.

For the first time, DPI scientists identified that the nutrition of King George whiting, southern sea garfish and yellow-eye mullet, was predominately obtained from food-webs that are derived from seagrass.

King George whiting nutrition depended most strongly on seagrass, which contributed over 80% to its nutrition. Green algae were the only other marine plants that contributed significantly to the production of King George whiting, providing about 10% of the nutrition.

Southern sea garfish and yellow-eye mullet nutrition was more broadly based being derived from seagrass (about 45% to 50%), green algae (around 20%), suspended plant matter (~10%) and brown algae (~10%).

Mangroves and saltmarshes did not contribute significantly to the food webs that support King George whiting, southern sea garfish or yellow-eye mullet in Corner Inlet.

Having found that seagrasses are a major nutrition source for key fisheries species, DPI scientists set out to see what proportion of total seagrass-based nutrition in Corner Inlet is contributed by each seagrass species and by the algal epiphytes that grow on seagrass leaves.

Using isotopic signals from epiphytes and each of the seagrass species, DPI scientists found that the three seagrass species, *Heterozostera*, *Halophila* and *Posidonia*, collectively contributed around 70% of total seagrass-based nutrition to King George whiting, with seagrass epiphytes contributing the remaining ~30%.

In contrast, most of the total seagrass-based nutrition for southern sea garfish and yellow-eye mullet was derived from algal epiphytes (~60%). For yellow-eye mullet the

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remaining seagrass-based nutrition was derived equally from each of the three seagrass species, whereas for southern sea garfish *Heterozostera* was slightly more important than *Halophila* and *Posidonia*.

The study has demonstrated seagrass habitat is crucial in driving fisheries production in Corner Inlet, contributing up to 90 % of the total nutrition of key fisheries target species. While few of these species directly eat seagrass or epiphytes, these plants are eaten by small animals that are eaten by larger animals, which in turn are eaten by fish. Given this importance, large-scale change in seagrass cover will significantly affect Corner Inlet's fisheries production.

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For more information about his project please contact Andy Longmore at DPI Queenscliff on 03 5258 0111.

Fisheries Research and Education Notes are available on the web at the following address: [www.dpi.vic.gov.au](http://www.dpi.vic.gov.au). Follow the prompts to Fishing and Aquaculture and then to Publications and Fisheries Notes. The notes are listed under the heading Research and Education.

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