

Adapting to Climate Variability

Climate Variability will bring challenges to many agricultural industries across the South Coast region of Western Australia. Understanding the risks of projected climate variability may help us to plan and adapt to a more variable climate.

COMMERCIAL AND RECREATIONAL FISHERIES

There are a number of different types of recreational and commercial fishing practised along the south coast of Western Australia. Beach-based, near-shore, commercial fishers target various finfish species, mainly using beach seines, haul nets, gill nets and trap-nets. Target species include Australian salmon (*Arripis truttaceus*), Australian herring (*Arripis georgianus*), and southern sea garfish (*Hyporhamphus melanochir*). Australian salmon form large migratory schools that move along the coast in near-shore waters between South Australia and Kalbarri, and fishers target these schools mainly during late summer and autumn.

Fishers set beach seine nets using either row boats or small powered boats. Most of the commercial catch of Australian herring is taken on beaches along the south coast using herring trap nets (also known as 'G' trap nets). Trap nets are used principally during the autumn migration of this species, whilst seine nets, gill nets and line fishing are used to take the remainder of commercial herring landings. There is also a multi-species fishery in estuaries, targeting mainly cobbler (*Cnidoglanis macrocephalus*), black bream (*Acanthopagrus butcheri*), sea mullet (*Mugil cephalus*) and Australian herring. Most finfish caught recreationally in South Coast estuaries and near-shore waters are taken by line fishing. Recreational fishers most commonly capture species such as Australian herring, whiting, trevally, black bream, Australian salmon, cobbler, flathead, leatherjackets and southern sea garfish.

Climate change is expected to have impacts on near-shore and estuarine ecosystems, that could create both difficulties and opportunities for fisheries. Many fish species are known to have their abundance levels affected by annual variations in coastal currents and water temperature, which affect the recruitment patterns of fish larvae, and may subsequently affect the catch levels of these species.



West Australian salmon
(Photograph: Bevans Seafood Processors and Exporters)

What are the changes to South Coast region climate?

Higher temperature in all seasons with more frequent hot days;
Decrease in rainfall (relative humidity, soil moisture and run off) in winter and spring;
Increase in drought duration and frequency;
Increase in solar radiation in winter and evaporation rate;
Higher sea levels; and
Higher sea surface temperature and more ocean acidification.

Climate Change in Australia: <http://www.climatechangeinaustralia.gov.au>

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POTENTIAL RISKS ASSOCIATED WITH CLIMATE VARIABILITY AND MANAGEMENT ACTIONS TO REDUCE THE RISK

The climate projection	Potential risk	Management action to reduce the risk
Higher sea water temperatures	Changed recruitment patterns of fish larvae and subsequent changes in abundance and location of stocks	Consider use of alternative fishing grounds
Changes in Leeuwin Current resulting from temperature changes	Recruitment of some species may be reduced, other species increased	Consider switching fishing effort to alternative species
The ability of the Leeuwin Current to round Cape Leeuwin and remain a coherent system along the South Coast could decline	The resulting cooler waters may not sustain tropical species such as Mud Crabs, causing the system to shift to local species;	Consider switching fishing effort to alternative species
Upwelling could increase as the Leeuwin Current decreases	Increased upwelling could change productivity	Could result in changed Total Allowable Catch of some fish species (both positive and negative)
Increased water temperatures in estuaries	Water temperatures may exceed thermal tolerance of estuarine biota, reducing food available for fish	Consider switching fishing effort to alternative species
Rising temperatures and reduced rainfall may force western estuaries in the South Coast region to experience conditions similar to those currently experienced in warmer/dryer areas further east	Potential changes in estuarine biodiversity Loss of seagrass in estuaries could lead to reduced fish abundance	Consider changing fishing methods and target species Consider changing fishing methods and target species to suit new conditions
Increased water temperature affecting disease organisms	Warming waters may encourage the spread of pathogens, especially where organisms become stressed with environmental change;	Monitor fish diseases associated with temperature changes
Increased water temperature -effect on dissolved oxygen	Low oxygen level in warmer water could reduce fish biomass	Consider changes in Total Allowable Catch

References

Pettit, N. E., R. J. Naiman, J. M. Fry, D. J. Roberts, P. G. Close, B. J. Pusey, G. Woodall, C. J. MacGregor, P. Speldewinde, B. Stewart, R. Dobbs, H. Paterson, P. Cook, S. Toussaint, S. Comer, and P. M. Davies. 2015. Environmental change: prospects for conservation and agriculture in a southwest Australia biodiversity hotspot. *Ecology and Society* 20(3): 10. <http://dx.doi.org/10.5751/ES-07727-200310>

W.A.F.I.C. (2018) Sustainable fishing. <http://www.wafic.org.au/what-we-do/access-sustainability>

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