



Demersal scalefish science: Frequently asked questions

1. General demersal scalefish information

What are demersal scalefish?

Demersal scalefish are long-lived, slow growing species that are typically found close to the sea floor. There are 5 demersal scalefish resources within Western Australia's (WA) oceanic waters - Kimberley, Pilbara, Gascoyne, west coast and south coast. These resources include more than 100 tropical and temperate species in inshore (20-250 m depth) and offshore (>250 m depth) waters.

When do key demersal scalefish species spawn in the west coast?

Most marine fish are 'batch spawners', meaning female fish release numerous batches of eggs during a spawning season.

There is limited overlap in the spawning seasons of key demersals in the west coast:

Species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
WA dhufish												
Pink snapper – south												
Pink snapper – north												
Baldchin groper												
Breaksea cod												
Blue morwong												
Blue-eye trevalla												
Greybanded grouper												
Hapuku												
Bass groper												
Bight redfish												
Foxfish												
Sea sweep												
Ruby snapper												

Why do some species have spawning closures, and some don't?

Demersal scalefish species spawn in different ways:

- **Snapper** often gather in large aggregations to spawn. In places like Cockburn Sound, this happens in a predictable place and time of year. When they aggregate in large groups, they become easy targets for fishers unless protected by a spawning closure.
- **WA dhufish** spawn in pairs or small groups. There is no spawning closure in place for WA dhufish as spawning occurs throughout its distribution and can extend for up to 6 months of the year. Catching a dhufish before it spawns, or during spawning, has the same impact on the stock.



What is barotrauma?

Barotrauma is the physical injuries to a fish caused by a rapid change in water pressure, e.g. when a fish is caught at depth and brought to the surface quickly. Like how a diver can get the bends!

Due to their biology, some demersal species are particularly susceptible to barotrauma, including baldchin groper, WA dhufish, Western blue groper, Breaksea cod and saddletail snapper.

The pressure difference causes gases within the fish's body (swim bladder), to expand faster than its body can handle, leading to injuries. Not all symptoms of barotrauma are visible, with internal injuries causing haemorrhaging. Fish may appear to release well, only to die minutes, hours or even days after release.

Visible symptoms include:

- swollen midsection
- bulging eyes
- stomach protruding from mouth
- intestine poking out of anus
- lifted skin.

Internal symptoms include:

- blood clots
- internal bleeding
- ruptured swim bladder
- damaged organs
- affected vision.

What is post-release mortality?

Post-release mortality (PRM) is the term used to describe fish that die after being caught and released. This can be the result of barotrauma, hooking injuries, handling practices or depredation. For example, PRM is estimated to be around 90% for baldchin groper, 50% for WA dhufish and breaksea cod and 25% for snapper.

Why are older fish important to the population?

A healthy population has fish of all ages, from a good number of young fish entering the fishery to a good proportion of older fish contributing to the reproductive success of the population.

In the case of WA dhufish, [larger and older female fish](#) contribute a lot more to the reproductive potential of the stock, compared to smaller, younger females. Having a strong representation of these larger and older female WA dhufish in the population is extremely important for the recovery of the resource.

Large, old male fish are also important, because they are responsible for fertilising eggs of an individual female at a time within a social group. Maintaining social structures also contributes to ensuring recruitment success.

2. Stock assessments

What is a stock assessment?

Periodic [stock assessments](#) are undertaken to monitor stock status over time. They include a range of analyses to understand the sustainability of stocks, this can include:

- assessing commercial and recreational fishery performance, by comparing catch against relevant catch limits
- the sampling of fishers' catches to gather biological information including age, length and reproductive data
- analyses of lengths and ages of fish in catches to evaluate trends in population characteristics and comparing these with international standards.

This information is used to construct population models, which indicate if the spawning biomass and fishing pressure are at acceptable levels, and what degree of sustainability risk the stock is facing.

What is the current sustainability risk to demersal scalefish in WA?

The latest stock assessments show that demersal scalefish populations across WA are facing serious sustainability concerns, you can find out more about each region:

- [Kimberley science update](#)
- [Pilbara science update](#)
- [Gascoyne science update](#)
- [West Coast science update](#)
- [South Coast science update](#).

Why are stock assessments focused on the 'indicator species'?

There are hundreds of demersal scalefish species in WA, and it's not possible to undertake stock assessments on all of them. Instead, several species are used as an 'indicator' for how the resource is tracking.

These species are selected based on their inherent biological vulnerability to fishing, current or future management risk and social value. The indicator species facing the greatest sustainability risk is then taken to represent the risk of the entire resource.

Are stock assessments independently reviewed?

The stock assessment methods and data used to determine the status of demersal species in WA have been independently reviewed by an international expert which confirmed DPIRD's assessments of sustainability risk to demersal species.

Why do you monitor the age structure of a population?

Monitoring the ages of fish in a population provides insights into how stocks are tracking over time, and how they respond to changes in fishing pressure and the environment. Fish die from various natural causes, including predation, disease and old age, which naturally reduces the number of fish in older age classes. However, high fishing pressure can lead to a greater decline in the proportion of large and old fish, resulting in a less resilient population.

What is spawning biomass?

Spawning biomass is the estimated total weight of all the fish in the population who are mature enough to reproduce (or spawn).

What is fishing mortality?

Fishing mortality is a measure of fishing pressure. It is like a "harvest rate", or simply, the proportion of fish taken out of the population each year from commercial, recreational and charter fishing activities.

Why aren't stocks healthy if I'm seeing lots of fish?

Seeing lots of fish on its own isn't necessarily a sign that a fish stock is 'healthy'. A healthy fish stock comprises of fish of all ages.

Seeing lots of young fish with the occasional older fish is characteristic of a depleted population with limited reproductive capacity and ability to replenish the population.

Seeing lots of fish of a similar size may indicate that a dominant cohort of fish, arising from one good spawning season, has recruited to the population. While it is promising to see, they can be easily fished down if fishing pressure remains too high. Strong cohorts are also rare; in WA dhufish and snapper stocks they only occur ~1-2 times every decade. The more heavily a stock is fished, the more apparent strong cohorts of fish become.

Advances in technology over the last few decades have made targeting demersal scalefish such as WA dhufish and snapper much easier for most recreational fishers. Fishers can now locate demersal scalefish more effectively than ever before, which may also give the false impression of a healthy stock.

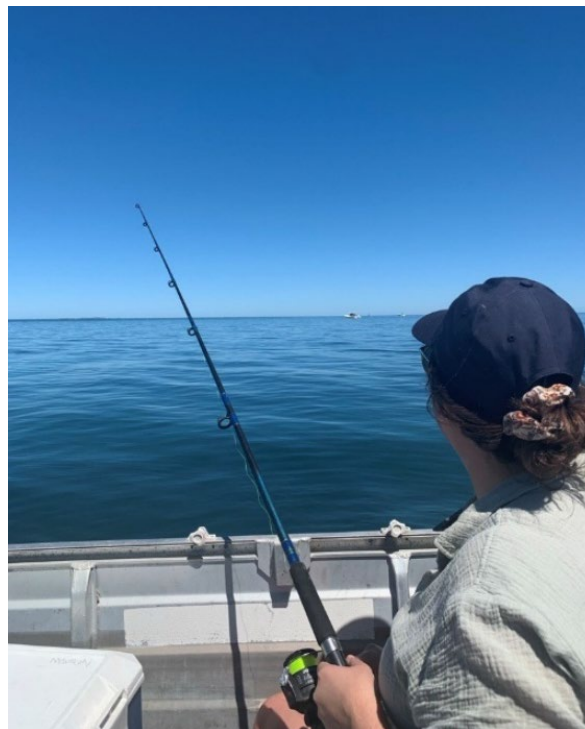


3. Recreational fishing surveys

How do you monitor recreational fishing activity?

The [statewide boat-based recreational fishing survey](#) is one method DPIRD uses to better understand and measure recreational fishing activity in WA. This survey uses 3 methods to gather information:

1. **Offsite phone diary surveys** conducted by researchers from the Edith Cowan University Survey Research Centre to collect data for estimating participation, effort and catch for key species.
2. **Onsite surveys at boat ramp** access points to collect data for estimating average length and weight of retained key species.
3. **Remote camera monitoring** to collect data on where and when boats are launched and retrieved.



During the statewide surveys, we collect the following information:

- the number of people fishing recreationally
- how much time is spent fishing
- how often recreational fishers go fishing
- where and when they go fishing
- what fishing methods are used
- the fish species they are targeting
- how many fish are caught, kept and released
- the total harvest for key species
- satisfaction and motivation of recreational fishers
- fishing-related expenditure.

Information on recreational catches of demersals is also gathered through the [metropolitan monitoring program](#) and FishCatchWA.

4. Management and governance

What is a harvest strategy?

Harvest strategies are recognised globally as best practice in fisheries management, and formal harvest strategies have been developed for many of WA's fish resources, in accordance with WA's overarching harvest strategy policy.

A harvest strategy outlines agreed objectives, reference levels, control rules and timelines that provide a transparent decision-making framework and they're used to ensure the sustainability of our fish stocks.

Harvest strategies are available from the [DPIRD digital library](#).

What are reference levels?

Harvest strategies include 'reference levels' for spawning biomass and fishing mortality:

- **Target:** The desired level of spawning biomass for the stock to be sustainable.
- **Threshold:** A bad place to be - below this, the stock is considered at high risk and management action is required to rebuild the stock.
- **Limit:** A very, very bad place to be - below this, the stock is considered at severe risk and significant management action is required to recover the stock.

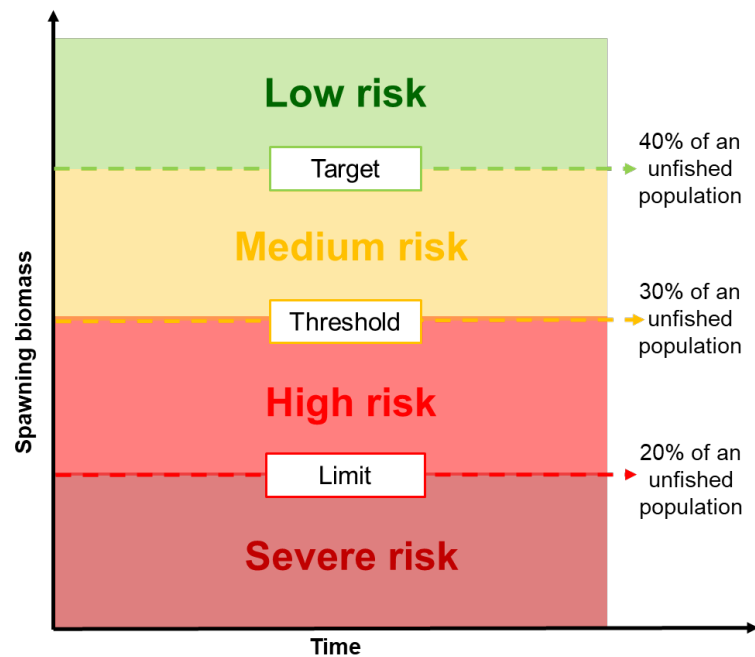


Figure 1. Relationship between spawning biomass, reference levels, and risk status.

What are 'total removals'?

Total removals of fish accounts for the combined mortality associated with both retained catch and post-release mortality due to fishing.

How do you work out when additional management is required?

There are two review processes that help assess if additional management is required:

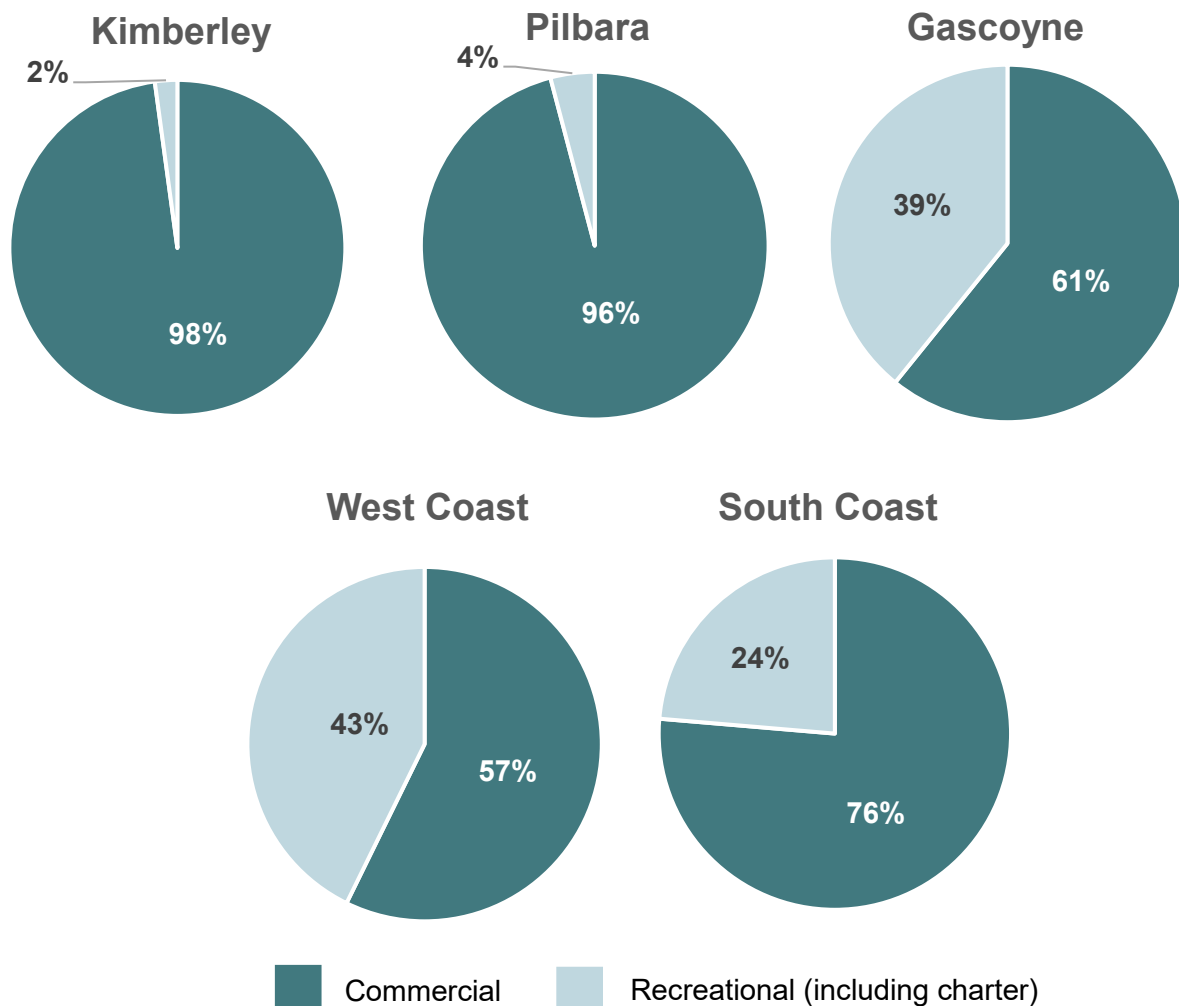
- **Catch reviews:** Every year an annual catch update is available, we look at each fishery's total removals against the sustainable limits to see if things are on track. If total removals are too high, additional action is required.
- **Stock assessment reviews:** Every time a new stock assessment is delivered, we look at how spawning biomass and fishing mortality are tracking against the target, threshold and limit (Figure 1). If the threshold or limit are breached, additional action is required.



5. WA's demersal scalefish resources

Who fishes for demersal scalefish in WA?

Demersal scalefish species are important to commercial, recreational, charter and customary fishers. In 2023-24, the proportion of demersal scalefish caught by commercial and recreational (including charter) sectors were:



Why are snapper recovering in the Gascoyne but not in the west coast?

Snapper in the west coast has been under a recovery plan since 2010, and oceanic snapper in the Gascoyne since 2018.

Snapper in the Gascoyne is showing strong signs of recovery because strong management action was taken in 2018 to significantly reduce catches (by ~80%). These management arrangements have successfully kept annual catches below recovery benchmarks.

In the west coast, fishing pressure remains too high as annual catches have frequently exceeded recovery benchmarks. This means that not enough fish are left in the water to support recovery.

Does the latest west coast stock assessment include catch data after the 2023 rule change?

Yes, the 2025 WCDSR stock assessment includes recreational, charter and commercial catch data up to 2024 (inclusive). This allows for an initial evaluation of the effects of management measures introduced in 2023 on catches, and for each sector to be tracked against its updated WCDSR recovery benchmark.

Why were size limits removed from WA dhufish, baldchin groper and breaksea cod?

WA dhufish, baldchin groper and breaksea cod have high rates of post-release mortality, meaning they have a low chance of surviving if returned to the water. Removing size limits for these demersal scalefish species reduces the need for fishers to return fish to the water that are unlikely to survive, therefore lowering the overall post-release mortality of fish.

Since the introduction of management changes in 2023, which included the removal of the size limits for WA dhufish, baldchin groper and breaksea cod (amongst other measures), the post-release mortality of these species in a year has collectively reduced by 29 tonnes.

Does the removal of the WA dhufish size limit mean juvenile fish are being taken before they have the chance to breed?

WA dhufish reach sexual maturity at between 30-35 cm in length, so the removal of the size limit for this species does mean that juvenile fish can now be retained by fishers.

However, <1% of the more than 2,000 WA dhufish sampled from boat-based recreational catches since the removal of the size limit have been less than 35 cm in length. So even with the removal of the size limit, the vast majority (99%) of WA dhufish landed by recreational fishers since 2023 have been mature fish.

Why was the previous individual bag and boat limit for WA dhufish removed in the West Coast?

The removal of the WA dhufish bag limit of one within the mixed species bag limit of two aims to reduce the need to release WA dhufish, reducing post-release mortality.

Previously if you caught a WA dhufish and then continued to fish for a second demersal as part of your demersal bag limit, you would have been forced to release any additional WA dhufish you caught. It's assumed that on average, only 50% of released WA dhufish will survive.

The effectiveness of this change is reliant on recreational fishers doing the right thing, and not high grading their catch. Since the introduction of management changes in 2023, 67% fewer WA dhufish were released by boat-based recreational fishers, resulting in an annual post-release mortality reduction of 11 tonnes.

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