



## FISH FEED INGREDIENTS

- The ingredients in salmon feed, like all stock feed in Australia, are rigorously controlled and audited, and fully traceable back to the original source.
- All feed ingredients are approved under the Australian Stockfeed and Petfood Regulations, governed by the Australian Pesticides and Veterinary Medicines Authority (APVMA), and feed companies are legally required to disclose ingredient details which is why Tasmanian farmed salmon is a safe, nutritious, healthy, and sustainable food.
- Equally as important as what is in our feed, is what we leave out—our feed does not contain ingredients of genetically modified (transgenic) origin. We never feed our fish dyes, growth hormones or growth promoters, nor does our feed contain pork or pork by-products. In addition, the Tasmanian Government has a ban on the use of genetically-modified organisms (GMOs) in any product within the state until 2029. This ban has been in place since 2001 which means that no GM raw materials including GM canola is used in any fish feed pellet used in Tasmania.
- Our main feed supplier, BioMar, has reduced fish meal and fish oil in its feed to less than 20%, a reduction from 80% thirty years ago. Marine ingredients in BioMar feed are sourced from responsibly managed fisheries and are often by-products of fish that are caught for direct human consumption, or low-value fisheries.
- We report our feed ingredients on our [Sustainability Dashboard](#).
- We also undertake feed trials, which are an essential component in researching and developing new fish feed formulations and specialised diets. Feed trials are conducted in-house in partnership with leading feed companies, and by research partners such as IMAS at their Taroona Research Laboratories. Our Hideaway Bay site is home to Australia's only dedicated sea-based fish feed trial facility. Here new diets are fed to a small population of salmon who are closely monitored throughout the process to evaluate the performance of the new feed. The salmon involved in these trials are of the same genetic stock as the farmed population.

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## WHAT'S IN OUR FISH FEED?

Our feed is made up of a range of ingredients including:

- Plant based ingredients such as wheat, soya derivatives, corn gluten, and vegetable oils. Huon has been steadily increasing the percentage of plant-based ingredients. In 2015, the percentage was 31 per cent; compared with 65 per cent in 2021.
- Vitamins and minerals and Astaxanthin. Astaxanthin is a powerful antioxidant that salmon need for healthy muscle growth and egg production. Astaxanthin is a carotenoid that provides the salmon the signature orange hue to the flesh. Astaxanthin is highly sought after and available at health food shops as a high-potency human antioxidant.
- Meat and chicken meal, blood meal, and poultry oil. By using land-animal by-products in our feed, we are helping to utilise 'waste' from other farming, which improves the sustainability of both land-based and sea-based aquaculture farming production. Our use of land animal by-products has



significantly reduced; in 2015, our fish were fed a diet which comprised 45 per cent land animal by-products; in 2021 that had reduced to just 15 per cent - a 66% decline! The use of land-animal by-products sourced outside of Australia is strictly controlled by national biosecurity laws.

- Fish meal and fish oil which is sourced from certified wild fisheries (typically small, bony pelagic fish that aren't used for human consumption) and trimmings from other fish species. Salmon farmers world-wide have been working on a fish oil and fish meal substitute for many years and during this time Huon has reduced the amount of combined fish oil/meal from 30 per cent in 2017 down to 20 per cent composition in 2021.
- The percentage of some components (like fish meal) can vary depending on the season and fish catches etc. Prior to its use for salmon farm feed, fish meal was primarily used for pig and poultry production. As the level of fishmeal in salmon feed is reduced, primary industry feed manufacturers will continue to use sustainably created fish meal as a key ingredient.
- Our primary feed supplier BioMar continues to work hard to improve the sustainability profile of its sourced fisheries including the introduction of DNA testing of marine ingredients (to determine the species composition of marine ingredients) and significant investment in insect meal ([www.biomar.com/en/emea-blog/articles/solutions-targeted-towards-consumers](http://www.biomar.com/en/emea-blog/articles/solutions-targeted-towards-consumers))
- The preservative, ethoxyquin, can be added to livestock feed, including salmon feed. Its use in Australia is approved by Australian Stockfeed and Petfood Regulations, governed by the Australian Pesticides and Veterinary Medicines Authority (APVMA). The World Health Organisation recommends consuming no more than 4 kilos of farmed salmon every day to remain within safe ethoxyquin levels.
- As at January 2022, all of our market salmon are fed on BioMar feed from egg to plate which is ethoxyquin free.

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## WHAT ISN'T IN OUR FISH FEED?

Equally as important as what is in our feed, is what we leave out:

- Our feed does not contain ingredients of genetically modified (transgenic) origin.
- We never feed our fish dyes, growth hormones or growth promoters,
- Our feed does not contain pork or pork by-products.
- Our fish are fed heat-treated diets which cannot and do not contain live worms/larvae.

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## OUR FEED SUPPLIERS

Our feed suppliers disclose the species, origin and conservation status of marine feed ingredients in their respective sustainability reports/online reporting.

Our feed suppliers only source raw materials from responsible suppliers that meet strict social and environmental standards. They do not source species that are endangered or from illegal fishing operations. All suppliers to our feed suppliers agree to codes of conduct which stipulate social and environmental expectations, and these same suppliers are regularly audited against the code of conduct to ensure they can demonstrate compliance against the supplier agreement. Our feed suppliers purchase fish meal and fish oil from countries with full traceability throughout the supply chain – from fishing ground to customer farm site. Suppliers are required to give species % inclusion and catching area for each delivery of fishmeal and fish oil. The majority of fish used to produce fish meal and fish oil are small bony species for which there is little or no demand for human consumption.



Our major supplier BioMar requires suppliers to sign codes of conduct and regularly audits their suppliers against the codes of conduct. These audit checklists incorporate a number of evaluations about human rights issues such as child and freely chosen labour, as well as environmental criteria. Of course, the introduction of any new or alternative ingredient raises new challenges as each has its own environmental footprint.

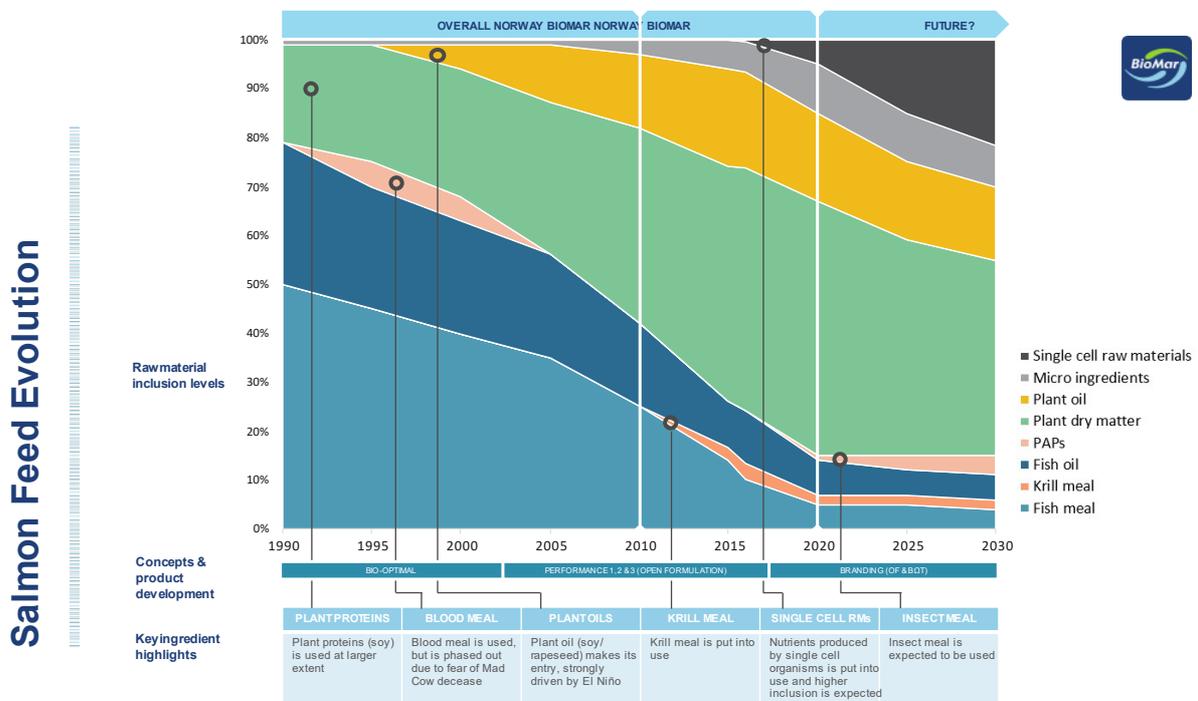
In September 2021 BioMar announced it had reached an important milestone; producing 1 million tonnes of feed incorporating algae oil, AlgalPrimeDHA, as an alternative to fish oil. AlgalPrime is grown in tanks from sugar cane waste and has a very low environmental footprint.

Huon has trialled feed containing AlgalPrime since August 2021 and found that it has not impacted fish health or the nutritional composition of Huon Salmon. Algal oil is expected to remain an important sustainable component in the diet of Huon Salmon for years to come.

Check out the website of our major feed supplier; [BioMar](https://www.biomar.com) and search for the company's Sustainability Report to read about their ethical sourcing practices.

As a result of research and development, BioMar, has reduced fish meal and fish oil in its feed to less than 20%, a reduction from 80% thirty years ago.

The graphic below illustrates the actions taken by BioMar over the past three decades to improve the sustainability of salmon feed.



## FISH-IN/FISH-OUT (FIFO) RATIO

Does our salmon feed deplete scarce marine resources? NO.

Fish-in/fish-out (FIFO) outlines the amount of wild fish trimmings it takes to produce one kilogram of salmon.



An ideal FIFO ratio should be less than 1.0 (meaning more fish protein is produced than utilised). **As outlined previously, the species used in fish meal and fish oil production are from trimmings or reduction fisheries that are not used for human consumption.**

Huon's forage fish FIFO ratio (fish-in/fish-out) is 0.87 (for 2020 Year Class), meaning that for every 1kg of salmon grown, 870g of forage fish is utilised; in effect, the salmonid industry produces more farmed fish than it uses as fish feed. Our feed includes alternative proteins and starch (such as vegetable and land-animal by-products) which increases the sustainability of our operations.

This statistic is comparable with the global salmon farming average of 0.82 (last calculated in 2015). <https://www.fishfarmingexpert.com/article/fish-in-fish-out-record-for-salmon-farming/> the FIFO for salmon and trout in 2015 was 0.82, compared with 1.38 in 2010 and 2.57 in 2000.

## FEED TRIALS

- Feed trials are an essential component in researching and developing new fish feed formulations and specialised diets.
- Feed trials are conducted in-house in partnership with leading feed companies, and by research partners such as IMAS at their Taroom Research Laboratories.
- Huon's Hideaway Bay site is home to Australia's only dedicated sea-based fish feed trial facility. Feed trials are also undertaken across Huon's freshwater sites.

Feed trial facilities are used for two purposes; for comparing the performance (i.e. growth, feed conversion and health) of commercially available diets, and for testing feed ingredients or feed formulations that could improve the health and performance of commercially available diets. Trials are undertaken in these pens every winter and every summer so are in operation 12 months of the year. The salmon involved in these trials are of the same genetic stock as the farmed population.

These benchmarking trials are undertaken in conjunction with several local and overseas feed companies to ensure that Huon is using the best available commercial feeds. A previous trial resulted in BioMar developing a new diet for high performance at times when warmer water temperatures are experienced.

Freshwater feed trials are undertaken by feed companies to determine the best diet from the moment fish first feed, through to when they are ready to go to sea. These diets provide different essential nutrients at each step of the lifecycle to produce the strongest, healthiest juvenile fish.

At Huon's New Norfolk facility, BioMar conducts feed trials on pre-smolt, and have recently developed a new diet to help smolt adapt to life in saltwater. In addition to trials run in conjunction with feed partners, Huon staff run their own trials to benchmark the performance of competing brands of feed for juvenile salmon.

To determine if a diet has been successful, the fish are monitored for four main areas; Specific Feed Rate (SFR), Biological Feed Conversion Ratio (bFCR), Specific Growth Rate (SGR), and condition factor. These tell us how much feed the fish need to eat to attain their end weight, and how much (relatively) they have grown over the trial period and how this changes their body shape compared to length.

## RESOURCES

- 2021 – James Cook University – The Future of Aquatic Protein: Implications for Protein Sources in Aquatic Diets
- 2021 – Insect meal trials underway in WA – in conjunction with FRDC, Curtin University and Ridley Corporation
- 2021 – Queensland based PacificBio growing macroalgae (seaweed) for use as an animal feed ingredient

