



LAND-BASED SALMON FARMING

- Land-based farming is garnering global attention as a potential alternative to farming salmon at sea and Huon is closely watching as well as actively participating in its development and implementation.
- While land-based farming is an exciting prospect, it currently has several sustainability and financial drawbacks.
- Unlike other states in Australia, Tasmania does not allow the discharge of salt/saltwater into the ocean and as salmon need to spend part of their lifecycle in saltwater, this restricts how long we can farm them on land. The natural resources (land, electricity and water) required to house enough facilities to hypothetically cease sea-based operations is not feasible nor is it financially viable.
- Our \$43.7M Whale Point nursery is Australia's first land-based salmon farming facility enabling our fish to grow larger on land before they are transferred to sea.
- Despite the challenges, growing our salmon to a larger size on land for a part of their lifecycle improves the overall efficiency of our production cycle by reducing the time the salmon spend at sea (from 14 months, to between 9-10 months).
- It is Huon's view that the experience and reliability of completely growing salmon entirely on land (in commercial volumes) is not yet proven. We believe that a balance of growing our salmon on land and at sea will allow us to continue to farm sustainably and employ more local people.

GLOBAL ATTENTION

In recent years, global headlines have been made around land-based salmon farming. In Huon's view, it is an exciting prospect which we continue to be informed but it has not yet been proven to be financially viable. Even using aggressive growth estimates, industry analysts believe that over the next five years only 150,000 tonnes of salmon will come from this farming method – less than 4% of the current total global salmon production.

Growing salmon on land before they are transferred to sea has many benefits, primarily the ability to provide a stable environment favourable for best performance, however, farming entirely on land has many drawbacks in terms of the availability of resources, sustainability and questions around eating and flesh quality attributes if taken all the way to harvest. The majority of fish grown-out in RAS currently are small sized (less than 3kgs) whereas most markets, particularly international customers, require fish of 5kgs or larger.

In 2020, many countries have commenced building new facilities – the test will be if these facilities can farm commercially viable quantities while still meeting environmental requirements as well as the requirements of customer tastebuds (land-based facilities can [face muddy or earthy flavour issues known as 'off-flavour'](#). This is caused by metabolites released by microbes that grow within the land-based systems).

Even the world's largest producer of salmon, Norway, is only just taking small, tentative steps into the world of land-based farming. Just one company, Salmon Evolution, is involved in land-based salmon farming – it is still constructing a \$214M facility (as at October 2020) which will only produce 9,000 tonnes of fish in the first



year of operation hopefully rising to 36,000 tonnes. For a country that overall produces 1.7M tonnes of salmon, this is just 0.5% of total production.

LAND-BASED DRAWBACKS

Location:

In the event that 100% land-based salmon farming becomes commercially viable, it would make sense to establish these facilities closer to market areas on the mainland. As a proud and fiercely Tasmanian company, we want to avoid moving our assets and employees to the mainland. While we have no intention to move our operations, our Whale Point nursery allows us to continue to gain experience in this new technology.

We believe a balance of growing our salmon on land and at sea will allow us to continue to farm sustainably in Tasmania and employ more people locally.

Stocking Density:

A pillar of the RSPCA Approved Farming Scheme is to provide conditions where animals can be free to move and express their natural behaviours.

For land-based salmon farming to be commercially viable, the salmon would need to be held at high stocking densities. This would be up to 15 times higher than our current maximum sea pen stocking levels (which is 99 per cent water to 1 per cent fish) and could have implications for their health and wellbeing. Due to higher stocking densities, salmon would be unable to exhibit natural behaviours which is contrary to the philosophy that guides our farming.

Salt Disposal:

Theoretically, salmon can be grown on land in saltwater however, this raises an issue of how to dispose of waste collected within the facility. Current environmental legislation does not permit the disposal of saltwater waste on land, nor can the waste be recycled for fertiliser or compost due to its very high salt content.

In addition, the disposal of waste produced by on land salmon farming into the ocean is not permitted in Tasmania.

Salmon have evolved to migrate from freshwater to seawater and as a result, we mimic this in our farming operations. In addition, maintaining salmon in freshwater for their entire lifecycle would not be in accordance with RSPCA fundamental welfare requirements (ie this limitation could be compared with not allowing nesting boxes for chickens). Experience tells us that fish that are grown to harvest in seawater result in an excellent product, but it is not yet fully understood how the health and welfare of salmon grown entirely in freshwater (to a commercially viable size) would be impacted.

Electricity:

As the water within land-based facilities needs to be constantly moving to provide an optimal environment, a key resource needed for land-based farming is power and running costs are high. Putting aside all the drawbacks, if Huon were to hypothetically farm the equivalent volume of fish on land as we currently have at sea, we would require at least 30 Whale Point-equivalent facilities and we aren't sure there is enough electricity produced in Tasmania to power these facilities.

Additionally, in a land-based salmon farm, any electrical outages can result in the stock loss of an entire production cycle.

We believe that future salmon production methods should be seeking to reduce environmental impacts, not increase them, which would be the case if salmon farming was 100% land-based.

