FORSYTH BARR

Seafood Sector

Open Ocean Optionality

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Open ocean farming represents a significant opportunity for the New Zealand aquaculture sector, offering meaningful upside potential to both New Zealand King Salmon (NZK) and Sanford (SAN). A single open ocean King salmon farm (10,000MT harvest capacity) could add NZ$55m–NZ$165m each to our valuations of each company, on our estimates. However, at this stage open ocean represents long term option value rather than forecastable cash flows. We have a positive view of the long-term prospects for the aquaculture industry with OUTPERFORM ratings on both NZK and SAN.

The Government is backing growth in aquaculture

The Government recently announced a long-term strategic goal for the Aquaculture sector, putting in place a target to grow it to an NZ$3bn industry by 2035 (2019 ~NZ$620m). Underpinning the growth target are volume opportunities, namely those enabled by open ocean marine farming. We understand the Government is exploring targeted marine spatial planning, which we expect will both speed up and remove a lot of the uncertainty in the current consenting process.

The blue horizon — open ocean farming could offer material upside

Open ocean finfish farming is a significant opportunity for aquaculture operators, in our opinion, and provides option value upside to our forecasts for both NZK and SAN. The New Zealand industry currently produces ~13,000MT of King salmon annually across nine farms; a single open ocean farm could produce ~10,000MT. We estimate one of these farms could be worth NZ$55m to NZ$165m. Whilst offering material upside to future owners, we note that full open ocean technology remains in a developmental phase with both capital cost and commercial timeframes highly uncertain at this stage. We expect it will be at least 10 years before open ocean farmed salmon is harvested in New Zealand.

New Zealand King Salmon and Sanford well positioned

NZK and SAN are both well positioned to benefit from increased Government support of aquaculture, being the largest producers of King salmon and Greenshell mussels respectively. NZK recently applied for resource consent for its first semi-open ocean farm in the Cook Strait, which would utilise current technology. If approved the farm would provide an initial 4,000MT over an 18 month cycle.

Figure 1. Company valuation summary (NZ$)

Ticker	Share price	Target price	Rating	Fwd EV/EBITDA	Fwd PE
NZK	$2.11	$2.65	OUTPERFORM	10.6x	20.3x
SAN	$7.50	$8.35	OUTPERFORM	7.9x	13.8x

Source: Bloomberg, Forsyth Barr analysis

Investment View

Global wild catch supply is likely constrained, while underlying population growth and consumer dietary trends underpin long-term demand growth for protein. Aquaculture is likely to be a key driver of protein supply growth, which, given its established premium record and extensive water space, New Zealand is well positioned to grow the sector. We have a positive view of the long-term prospects for the aquaculture industry with OUTPERFORM ratings on both listed companies with direct exposure, Sanford (SAN) and New Zealand King Salmon (NZK).

Open ocean option value

In this report we explore the option value of open ocean salmon farming for New Zealand King Salmon (NZK) and Sanford (SAN). Open ocean farming represents the single biggest growth opportunity for New Zealand aquaculture, in our opinion, given the lack of available coastal water space and its meaningful scale. However, the technology remains in a developmental phase with economic outcomes unlikely in the next 10 years. Given the material uncertainty around cost and timing, we do not include open ocean outcomes explicitly in our company forecasts.

We estimate a single 10,000MT farm, delivering its first commercial harvest in 2030 has a net present value in the range of NZ$55m to NZ$165m, with a base case of NZ$125m which represents c. +30% and c. +15% upside to our NZK and SAN valuations respectively. More details of our analysis, such as the assumptions used can be found on page 4.

Value in aquaculture recognised by the Government

The Government recently announced a long-term strategic goal for the aquaculture industry, putting in place a target to grow it to NZ$3bn by 2035 (2019 ~NZ$620m, +10% CAGR). Although the release is light in detail, we view this commitment to the industry as a material positive, given the potential to release value and accelerate growth in the sector, with a clear indication to increase public funding available to facilitate innovation. The strategy is centred on volume opportunities, primarily in open ocean marine farming.

- **Timing:** The Government remains committed to hitting the previously communicated target of NZ$1bn by 2025, which is underpinned by current consented water space and provides an indication of when it expects to see tangible production outcomes from open ocean farming.
- **Open ocean targets:** We understand that the modelling behind the strategy includes 11 open ocean finfish farming sites, each with an annual production of ~10,000MT.
- **Water space allocation:** We understand the Government strategy involves targeted marine spatial planning with water space allocation methods under consideration including a tender process or possible joint ownership.
  - We have a positive view on any nationally led marine spatial planning, with consenting of water space a large barrier for growth in the current regulatory environment.
  - We expect there will be a certain allocation of marine space to iwi, similar to what is done under the current quota management system in wild catch (e.g. 20% of new space).

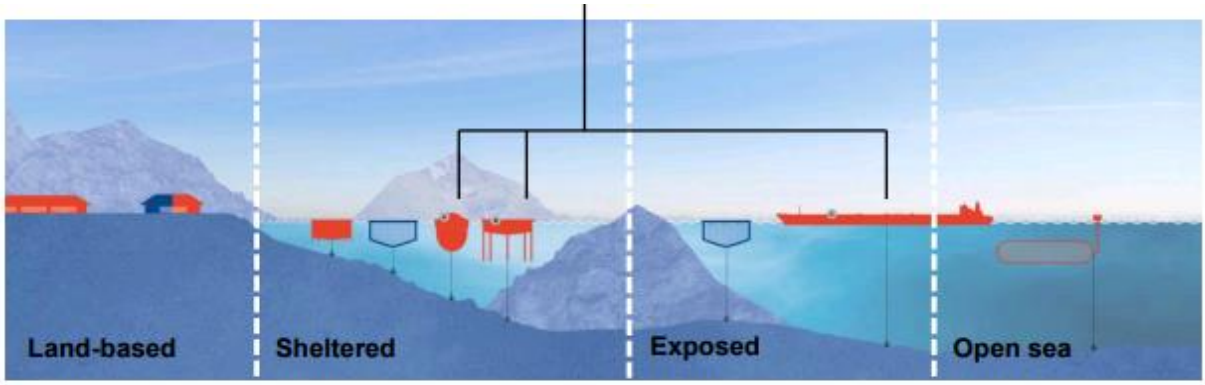
Location, location, location — Open ocean the next frontier

Marine farming is all about location with specific environmental conditions necessary and varying capital requirements. The terms inshore, coastal, and open ocean are not necessarily driven by proximity to shore, instead determined by degree of exposure to the wind and sea conditions, and the pen and anchoring designs that are consequently required.

- **Land based:** Fully vertically operational land based facilities require significant upfront investment in Reticulated Aquaculture Systems (RAS). RAS involves rearing fish in higher density indoor tanks in a controlled environment. The system filters and cleans the water for recycling back through tanks, as opposed to natural water flow in other environments. RAS globally produces ~3,000MT, although planned volume growth is substantial.
  - *"While land-based appears to solve many of the problems inherent to coastal farming, such as pathogens and remoteness of farms, the bankruptcy of start-ups in this area has been almost 100%" — Rabobank, 2016*.
- **Inshore:** All of New Zealand's ocean marine farming currently occurs in coastal locations. Whilst these are generally easier to farm, there is little coastal space available in New Zealand and such space can face depth/current challenges.
- **Exposed:** These sites require more robust farming systems and are modelled to deal with ~6m wave heights. A number of international operators commercially rear fish in exposed sites. Storm Bay in Tasmania is one example.

- **Open ocean:** Offshore sites tend to be deeper, with high wave-energy, and stronger currents and are modelled to deal with +11m wave heights. These sites require a technological shift before being commercially viable. A number of open ocean farming technologies are currently being trialled globally.

Figure 2. Finfish farming methods



Source: MOWI, Forsyth Barr analysis

Additional inshore space is unlikely

Additional inshore water space for finfish farming in New Zealand is unlikely in our opinion, given a mixture of cultural, environmental, and political concerns. Due to the nature of salmon farming, suitable water space is limited globally. Water temperature profiles constrain salmon farming operations in New Zealand to South Island coastal waters, with ideal locations more limited to the bottom end of the south. Further farming opportunities in areas where activity already occurs (Marlborough, Akaroa, Central Otago and Stewart Island) exist, although are likely to be notional in the scheme of the wider New Zealand industry.

RAS offers incremental volume opportunity through longer grow outs

We do not expect to see fully vertical salmon RAS in New Zealand, given the high capital requirements, high running costs, and land footprint. However, RAS farming does provide a medium-term opportunity to lift salmon production through increased smolt grow out times. Smolt typically go out to sea at ~130g; delaying smolt transfer to 1kg through use of a RAS reduces time spent at sea farms and allows the site to be farmed more intensely. Salmon currently spend ~16 months at a sea farm.

Open ocean opportunities

Offshore sea farms represent the largest opportunity for the finfish aquaculture sector, in our opinion. The New Zealand industry currently produces ~13,000MT of King salmon annually; a single open ocean salmon farm could produce ~10,000MT. The environmental and production quality benefits are also considerable given the greater oxygen availability and quicker flushing, reducing any benthic or water column impacts. However, New Zealand is located in the roaring 40s and this brings with it unique challenges in engineering, with structures needing to withstand waves of up to 12m in some places.

International experience

Open ocean farming of Atlantic salmon is currently occurring, in a developmental sense, in Norway and explored in many other jurisdictions. In 2015 the Norwegian Government launched a scheme that allowed marine farmers additional output quotas for experimental projects that bring technological innovation to the industry. One such farm, SalMar's Ocean Farm 1, cost ~NZ$120m and is targeting annual production of ~8,000MT. The farm is managed, under normal conditions, by a crew of four, which is similar to NZK's much smaller farms. In Tasmania, a number of aquaculture companies farm in exposed (~6m wave height) conditions.

Option value

We estimate a single 10,000MT farm, delivering its first commercial harvest in 2030 has a net present value in the range of NZ$55m to NZ$165m, with a base case of NZ$100m, and delivering attractive return on capital under all scenarios modelled. Our analysis reflects a number of assumptions (Figure 3), with the significant valuation range representative of the high degree of uncertainty involved in making forecasts at this early stage.

Figure 3. Key assumptions used in base case

Key assumptions	Input	Comment
Price (NZ$/kg)*	22.50	Marginally below NZK's average realised price in FY19. There is some short-term downside risk to this number as volume enters the market, however, we see medium-term upside as it enables an improvement in sales mix
Mortality	11.0%	This is below our long run NZK assumption (13%) based on the higher quality water column. We expect there is positive risk (lower mortality rates) given the cooler temperature profiles
Feed Conversion Ratio (FCR)	1.80x	Consistent with industry King salmon FCR. We believe there is positive risk (lower FCR) to this number given the higher quality water column and lower temperature profile
Feed cost (NZ$/kg)*	2.50	Based on current NZK feed mix and cost. We assume cost increases at inflation of +1.5% through the forecast period
Other cost (NZ$/kg)*	9.70	We assume cost increases at inflation of +1.5% through the forecast period. Additional marketing and transport cost likely offset by scale gains and automation of farms and processing facilities
Time (years until first harvest)	11	Consistent with industry views. High uncertainty exists in the timeframes assumed but valuation is not overly sensitive to delays
Capital cost (NZ$m)	140	Based on international assumptions and includes cost associated with lifting processing and hatchery capacity. High level of uncertainty
WACC	9.00%	NZK WACC assumed

Source: Forsyth Barr analysis, *dollar amounts based on today's prices and adjusted for modelling purposes based on +1.5% inflation rate

Figure 4. Base case NPV analysis (NZ$m)

Year from first harvest	**-3**	**0**	**+1**	**+2**	**+3**	**+4**	**+5**	**+6**	**+7**	**+8**	**+9**	**+10**	**Terminal**
Base case financial year	2028	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	
Volume (MT)		10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	
Revenue		**261.1**	**265.0**	**269.0**	**273.0**	**277.1**	**281.3**	**285.5**	**289.8**	**294.2**	**298.6**	**303.0**	
Expenses		(209.7)	(212.9)	(213.4)	(216.6)	(217.0)	(217.5)	(220.7)	(224.1)	(227.4)	(230.8)	(234.3)	
D&A		(14.0)	(14.0)	(14.0)	(14.0)	(14.0)	(14.0)	(14.0)	(14.0)	(14.0)	(14.0)	(14.0)	
EBIT		**37.4**	**38.2**	**41.7**	**42.5**	**46.1**	**49.8**	**50.8**	**51.8**	**52.7**	**53.7**	**54.8**	
NOPAT		**26.9**	**27.5**	**30.0**	**30.6**	**33.2**	**35.9**	**36.6**	**37.3**	**38.0**	**38.7**	**39.4**	**40.0**
Capex	**(155.4)**												
Discount factor	1.30	1.00	0.92	0.84	0.77	0.71	0.65	0.60	0.55	0.50	0.46	0.42	5.63
PV of cash flow	**(201.2)**	**26.9**	**25.2**	**25.2**	**23.6**	**23.5**	**23.3**	**21.8**	**20.4**	**19.1**	**17.8**	**16.7**	**225.4**
NPV at harvest date (2031)													**227.9**
NPV today (2019)													**96.2**

Source: Forsyth Barr analysis

Sensitivity — Price achieved biggest question

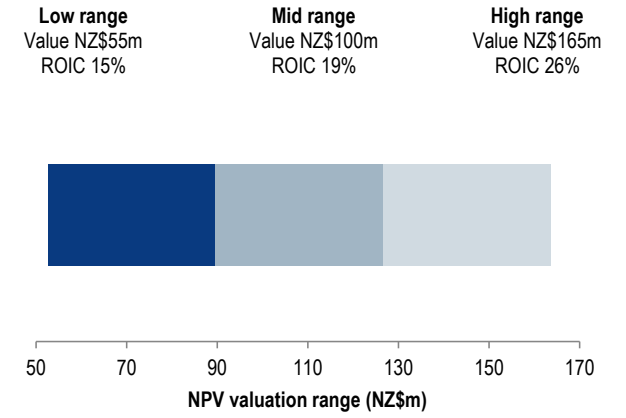
We have tested our valuation sensitivity to changes in key assumptions, with price (ultimately EBIT dollar margin) achieved the largest driver of valuation. Our base case uses EBIT margins broadly in line with our NZK assumptions.

Figure 5. Assumptions used to produce value range

	Low	Base	High
Price (NZ$/kg)*	22.00	22.50	23.00
FCR	1.80x	1.80x	1.70x
Mortality	13.0%	11.0%	7.0%
Feed cost (NZ$/kg)*	2.50	2.50	2.50
Capex (NZ$m)	150	140	130
Time (years until first harvest)	12	10	9

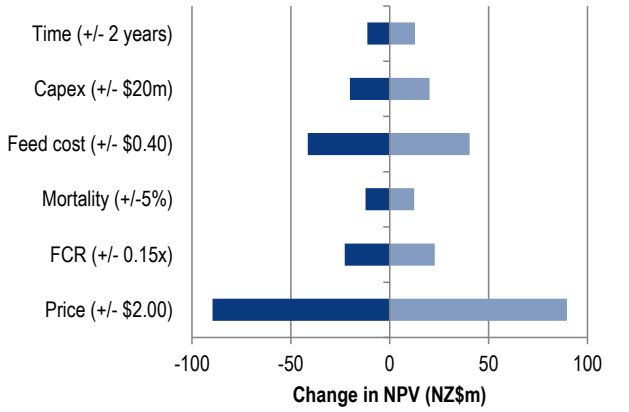
Source: Forsyth Barr analysis, *dollar amounts based on today's prices

Figure 6. Valuation range (NZ$m)



Source: Forsyth Barr analysis

Figure 7. NPV sensitivity (base case NZ$100m)



Source: Forsyth Barr analysis

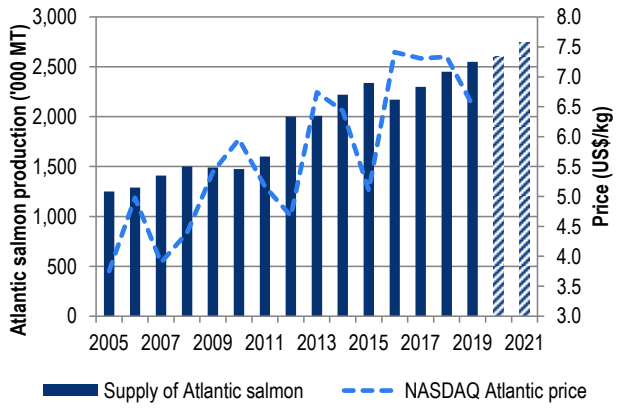
New Zealand production small in a global context, we expect premium prices are sustainable

New Zealand open ocean volume will have limited to no impact on the medium-term market price of King salmon, in our opinion, given volumes remain miniscule in context of global salmon supply.

The Federation of European Aquaculture Producers expects European aquaculture supply will nearly double by 2030 to 4.5 million MT, led by open ocean developments in Norway (Norway targets 5.0 million MT Atlantic salmon production by 2050). Rabobank estimates there is also an additional ~700,000MT of planned RAS production, led by developments in China and the US. By comparison, New Zealand would have to expand supply 3x just to maintain its current market share (<1%). Anecdotal evidence suggests demand far exceeds supply for New Zealand King salmon.

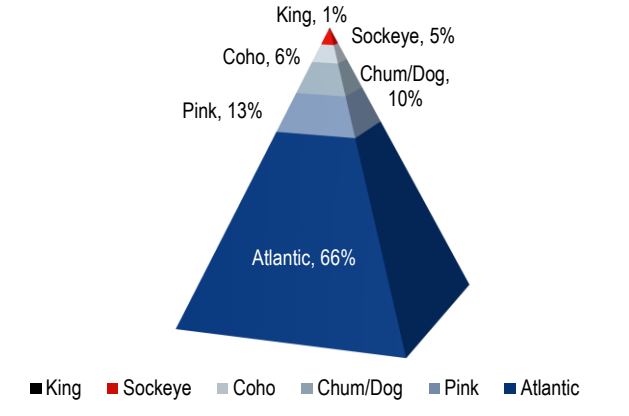
Our base case assumes an average price of NZ$22.50/kg today, growing at an annual CAGR of +1.5%. Whilst there may be some initial price shock, we see risk to the upside from our medium to long term price assumptions given expected improvements in product mix enabled by additional volume.

Figure 8. Global Atlantic salmon production and price



Source: Kontali, NASDAQ, Forsyth Barr analysis

Figure 9. Global salmon production/catch by species



Source: NZK, Forsyth Barr analysis

Scale should offer some cost benefits although feed, the single largest expense, linked to harvest volume

The single largest expense is feed cost, which is driven by the feed conversion ratio (FCR) and mortality rate. We assume an FCR in line with current NZK operations and a mortality rate in line with our long run assumption; however, we see positive risk to these estimates as a result of higher water column quality and lower temperature profile.

Other costs include harvest and processing, we assume costs similar to those achieved by NZK today, adjusted for inflation at +1.5% a year, though note there may be some automation and scale benefits.

Capital requirements and time frames highly uncertain

The technology required for either exposed or open ocean farms is not currently in use anywhere in New Zealand. Whilst exposed farming structures are successfully being used globally, for example in Storm Bay in Australia, open ocean technology remains in the developmental/trial phase. We have looked to international examples to get a sense of the capital costs required.

Figure 10. Capex base case estimates (NZ$m)

	Capex	Comment
Farm infrastructure	90	Largest capital cost category. Cost is based on global estimates adjusted for development timeframe
Vessels	10	Harvest and smolt transfer vessel. Well boats are not required in New Zealand as sea lice are not an issue
Hatchery	25	Based on recent RAS hatchery announcements (Huon, SAN)
Processing	15	Based on a recently built red meat processing plant, although we suspect there is spare processing capacity in NZ
Total	**140**	**There is a high degree of uncertainty to our capex estimates**

Source: Forsyth Barr analysis

Additional risks likely to be addressed through regulatory decisions

- **Licence/consent cost:** It is highly likely that the consenting process for marine farming in New Zealand will change, and in our opinion could lead to higher upfront licencing costs for producers. However, we view this as being compensated by the removal of costs associated with determining suitability of the site (would be paid by Government through marine special planning) and the possibility of drawn out court processes.
- **Environmental:** Risk that space identified for marine farming is no longer suitable, due to a change in the environment, exists, and has been exhibited recently in a number of sites in the Marlborough Sounds. We expect this risk could be mitigated through the adoption of a more adaptive marine farm licence structure, where by licences are granted on a biomass basis and shifted between aquaculture areas depending on environmental or market needs. This is similar to the Norwegian model.

New Zealand King Salmon (NZK) — Making initial waves

NZK has identified 13 potential open ocean sites around the southern (mostly eastern) coast line. Three areas have been highlighted as of particular interest being Cook Straight, Canterbury, and Stewart Island. Data collected on flow, temperature, and, most importantly, wave height has occurred at one site with monitoring to occur at the others over time.

Blue Endeavour

NZK has recently applied for an open ocean farming consent in the Cook Strait. The proposed open ocean farm is less exposed than previously thought meaning exposed farming technology currently available, though not in use by NZK, could be utilised. Site details include:

- **Size:** 1,792 ha (3.3km by 5.4km) and is located 6km to 12km due north of Cape Lambert.
- **Depth and current:** It ranges in depth from approximately 60-110m with average mid-depth current speeds of 0.35m/s (max. recorded 1.24m/s).
  - Other NZK costal high flow sites are ~45m deep with flows of ~0.22m/s.
- **Exposure:** Probability of any wave exceeding a significant wave height of 3m is stated as <2%. On average, waves are <2m in height for periods of 21 to 35 days at a time.
- **Temperature:** Long-term (13 years) sea surface temperature (SST) data suggests temperatures >18°C were uncommon and rarely exceeded 19°C.

The resource consent application has been accepted but still has additional consultation to go (application is currently open for public input until 16 December 2019). If approved investment would be in two stages as dictated by the resource consent. An initial farm, able to produce 4,000MT over an 18 month cycle, could possibly provide harvest volumes as early as late FY23, assuming a smooth consenting process. We view the timeframe as unlikely given the complexities of the legislation, the vocal minority, and learning curve associated with new farming techniques. The consent would eventually allow for a second farm on the site, lifting total production across the site to 8,000MT over an 18 month cycle.

The initial farm would involve a capital investment of NZ$25m to NZ$35m, with ~NZ$10m targeted towards vessels involved in harvest and smolt delivery, and the remaining ~NZ$20m directed towards farm infrastructure such as pens and nets.

Option value of NZ$0.40 per share

Repeating our open ocean optionality analysis using Blue Endeavour inputs, we estimate the first farm adds ~NZ$0.40 per share or +15% upside to our NZK valuation.

Figure 11. NZK's Blue Endeavour assumptions

Key assumptions	Input
Price (NZ$/kg)*	22.50
Mortality	13.0%
FCR	1.80x
Feed cost (NZ$/kg)*	2.50
Other cost (NZ$/kg)*	9.70
Year of first harvest	FY26
Capital cost (NZ$m)	35

Source: Forsyth Barr analysis, *dollar amounts based on today's prices

Balance sheet headroom sufficient

Our current forecasts assume FY20 net debt of NZ$18m (net debt/EBITDA of 0.7x), which suggests reasonable head room, ~NZ$35m. We expect NZK will fully debt fund its Blue Endeavour project.

However, should further volume opportunities arise, such as (1) a farm relocation outcome (not expected until FY21) or (2) a second exposed site, then additional investment will likely be required to lift both hatchery and processing capacity. Under this scenario we see NZK as having to explore equity funding options.

Sanford (SAN) — Watching closely

SAN has been less vocal to date on the possibility of open ocean salmon farming, however, we suspect it is watching developments domestically and overseas closely. Whilst SAN does not have any monitoring buoys in the water, its wild catch operations likely collect enough data to provide an idea of conditions in different areas.

Southland opportunity on the cards

We understand that possible exposed sites have been identified in Southland, which could be explored by SAN. The Provincial Growth Fund (PGF) announced in December 2018 that it had provided funding for a salmon hatchery feasibility study in Southland, with the goal of lifting green weight aquaculture production by +25,000MT per annum in the area.

SAN has subsequently committed to the development of a RAS salmon hatchery, based in Southland, in partnership with Iwi. The hatchery provides SAN smolt capacity to lift volume under current consents with possible volume upside should it lengthen land based grow out.

We understand the hatchery has capacity for 1.1m smolt (~3,500 GWT harvest) but with the ability to be scaled further. Whilst the hatchery development provides notable benefits in relation to current operations, it also offers SAN flexibility to execute on open ocean farming should opportunities arise.

Having recently moved its white fish processing operations to Timaru, SAN's Bluff plant also has spare capacity for further salmon volume growth. Encouragingly, SAN appears to be positioning with future growth in mind.

Mussel farms also an option

Although not included in this analysis, Government support of Greenshell mussel production (of which SAN represents ~40% of national production) also provides upside to SAN forecasts.

SPATnz, SAN's partially Government funded mussel hatchery, recently published the final results of its Greenshell Mussel breeding programme, showing mussels from its SPATnz hatchery can grow up to twice as fast as those caught from the wild. The hatchery has GWT (green weight tonne) production capacity of ~30,000MT (industry harvest volume ~90,000MT, SAN ~34,000MT). SPATnz is a key enabler of growing

SAN's EBIT/kg in our opinion, providing security of supply, desirable product characteristics through selective breeding, and improved production economics. Upside to our forecasts exist should SAN leverage additional mussel volume through the hatchery at a faster rate (currently assume ~+2% a year).