STUDY

Higher Dietary EPA & DHA Levels Improve Salmon Farming Productivity and Predictability

Manolin

VERAMARIS

Summary

This study confirms that higher dietary levels of EPA & DHA lead to significant improvements across a range of production metrics, including an 8% reduction in total mortality and a 13% improvement in economic Feed Conversion Ratio (eFCR).

Investing in EPA & DHA rich feeds boosts fish health, produces better quality whole fish and fillets dependably, improving profitability across the value chain.

Independent research firm, Manolin, Inc., compared the performance and quality differences of Atlantic salmon on commercial farms based on varying dietary levels of Omega-3, EPA & DHA. This research based on large-scale, complex datasets, quantifies the benefits of increased EPA & DHA levels for better harvest results based on feed. This data provides valuable insights for strategic, data-driven decision making by importers, retailers, and farmers.

Key Findings

Farm Data Performance Results

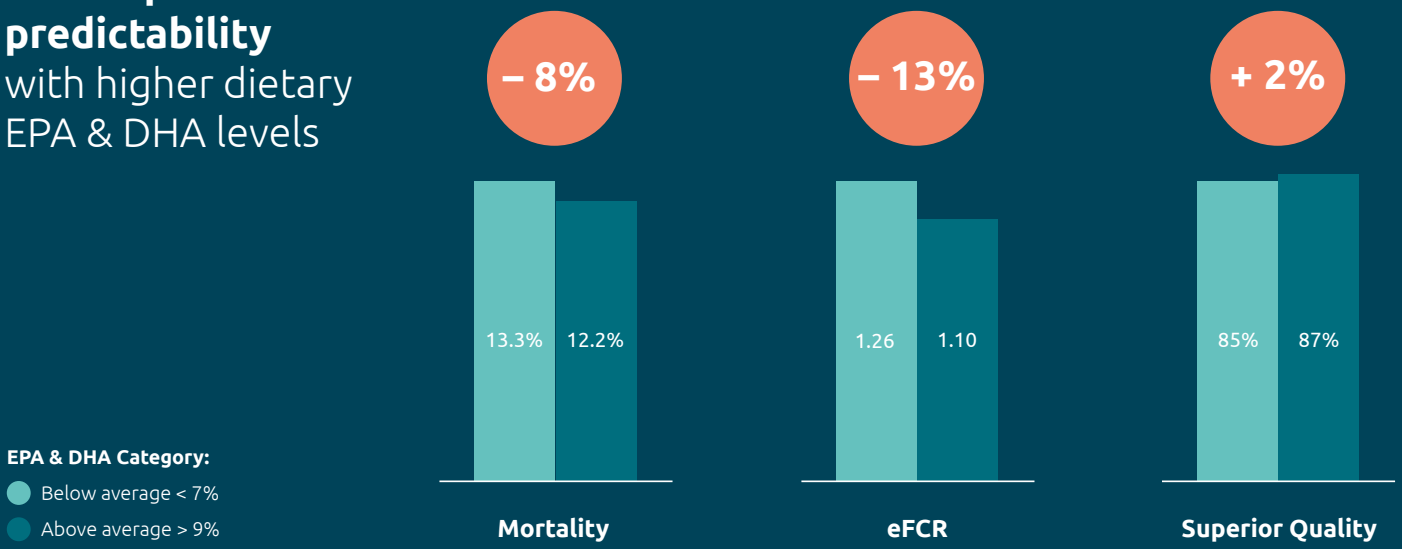
Big Data Mindset: Improved predictability narrows the range of outcomes providing greater control over harvest performance and quality.

Under comparable conditions, salmon fed above-average levels of EPA & DHA demonstrated significantly better and more predictable performance compared to those fed below-average levels. Specifically:

- 8% less mortality, with 50% increase in predictability
- 13% lower eFCR with 27% better predictability
- 2% increase in superior/premium quality with 29% more predictability

These results are important for the salmon industry. Any reduction in eFCR and mortality translates to improved fish health and welfare, reduced waste, and a lower environmental footprint through more efficient use of resources. Furthermore, a reliable uptick in the superior/premium quality at harvest means stable, higher average selling prices along with customer satisfaction and trust.

Better performance & predictability with higher dietary EPA & DHA levels



Predictability improvement: 50% | 27% | 29%

Processor Data Results

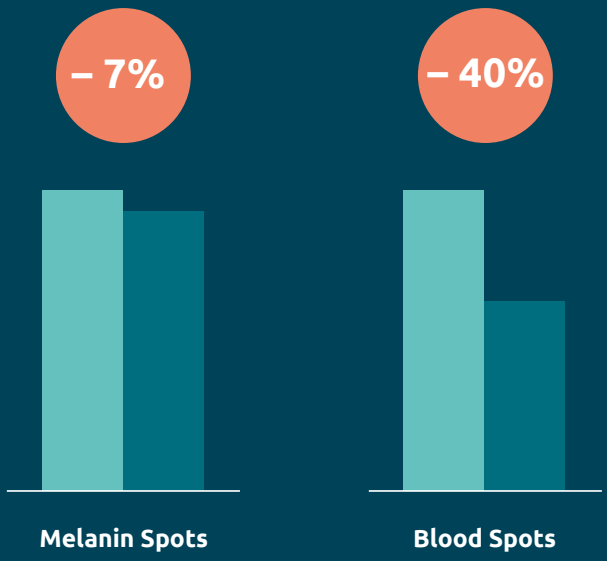
Data from processors revealed that above-average levels of EPA & DHA in fish feed consistently delivered better flesh quality. Fillets showed:

- 7% less melanosis, with 36% greater predictability
- 40% fewer blood spots with 7% greater predictability

Reduced melanosis and blood spots in salmon fed higher levels of EPA & DHA reaffirms previous research findings.

Both present serious concerns for the industry, often forcing downgrades, reprocessing, or waste. Improvements in these two key quality metrics safeguards value, avoids supply chain disruptions, and builds reputation in the marketplace at every level.

Improved fish flesh quality & predictability with higher dietary EPA & DHA levels



EPA & DHA Category:

- Below average < 7%
- Above average > 8%

	Melanin Spots	Blood Spots
Predictability improvement:	**36%**	**7%**

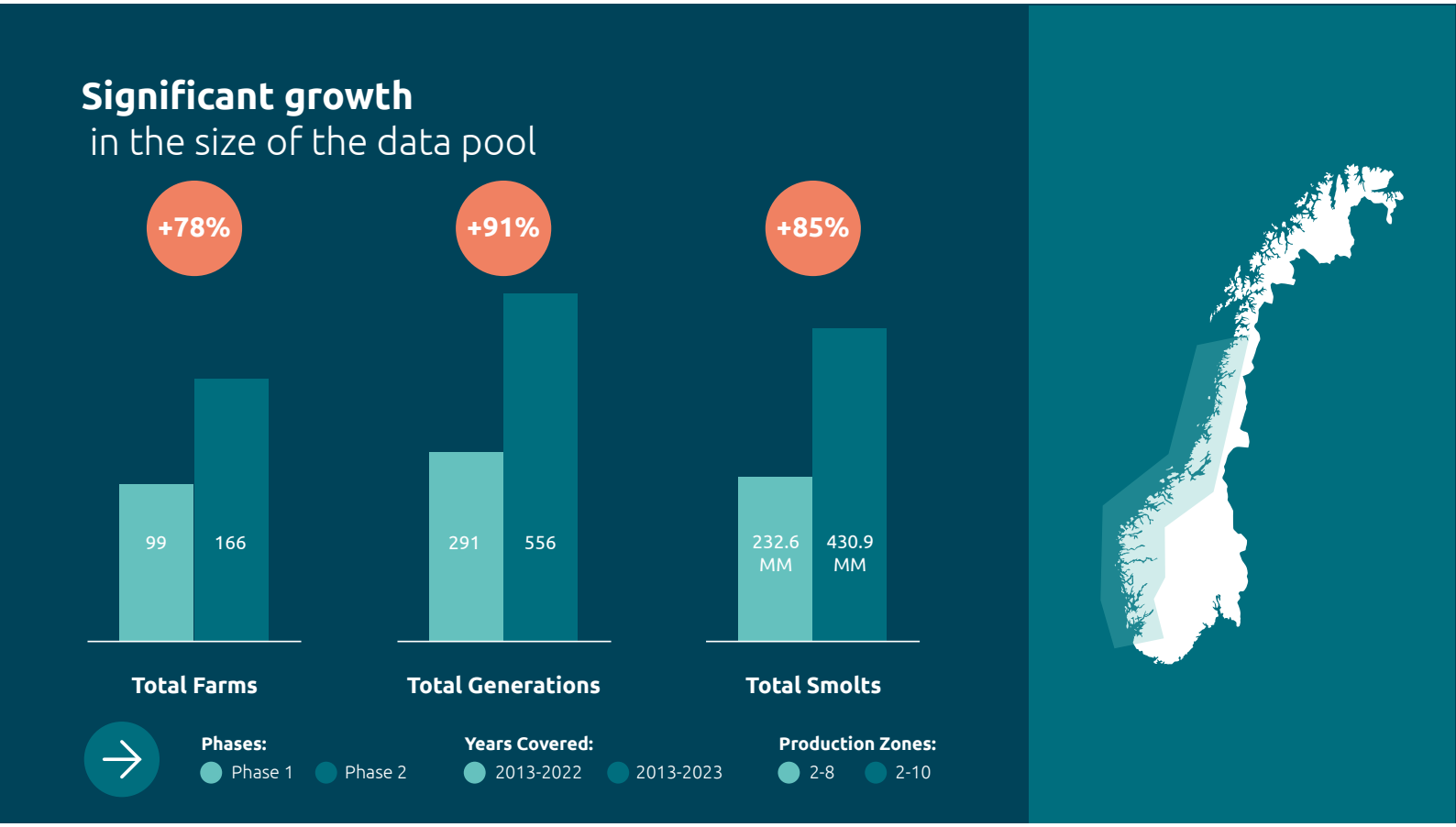
Background

This study is a continuation of earlier work published in 2023, which analyzed data from 2013 to 2022, revealing that higher EPA & DHA levels significantly enhanced salmon production metrics, including improvements in eFCR and a greater share of superior/premium quality at harvest when dietary levels exceeded 8% of total fatty acids (TFAs).

Typical salmon grow-out diets range between 35-38% fats.

Study Goals and methodology

Building on the findings from our first study, an expanded data pool with inputs from additional farmers and production zones increased the diversity in environmental conditions, practices, genetics, and feed compositions. This expansion nearly doubled the data pool, allowing for a broader understanding of how varying EPA & DHA levels in feed influenced fish performance and quality.



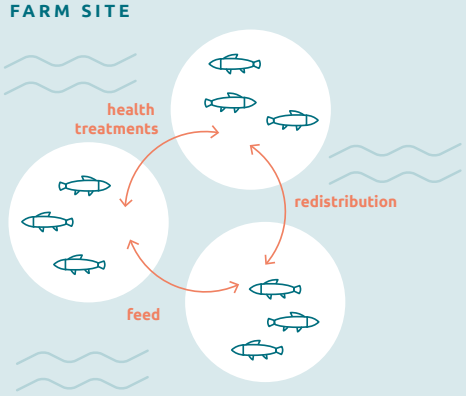
Manolin's advanced data analysis aimed for improved accuracy and granularity of EPA & DHA inclusion levels in feed.

The revised methodology was improved in three key aspects:

1 Advanced data processing improved the accuracy and granularity of feed mapping with regard to EPA & DHA levels.

2 The study used populations of fish rather than generations, providing a more detailed dataset for performance measurement.

3 The population-based approach facilitated robust comparisons between groups with similar operational, disease, and environmental profiles.



The challenge in comparing farm sites

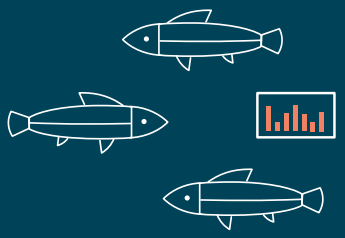
In every farm site, **fish move between pens for various reasons** – redistribution, health treatments, or other factors.

This means they experience **different conditions even within the same farm.** When analyzing all fish together, these variations create **data noise**, making comparisons between farms unreliable.

1

How we solved this problem

To get clearer data, **fish are tracked**. This allows their journey to be recorded, regardless of changes or environmental differences.



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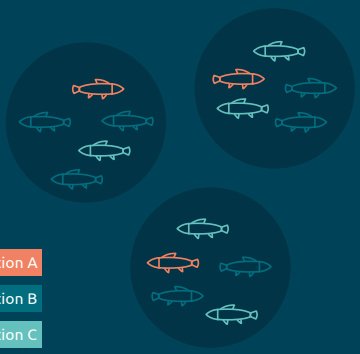

Creating populations for better analysis

By tracking fish, we can **group them into populations** based on similar conditions, such as lice treatments received, vaccinations, environmental patterns, and smolt size. This makes it easier to analyze fish with shared experiences rather than mixing all data together.

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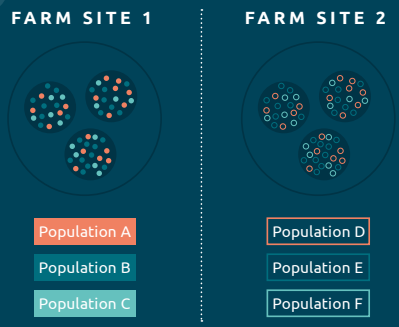

Comparing different farm sites

Each site has its own populations, such as A, B, C in farm site 1 and D, E, F in farm site 2. Instead of comparing entire farms, we now focus on specific **populations that experienced comparable conditions.**

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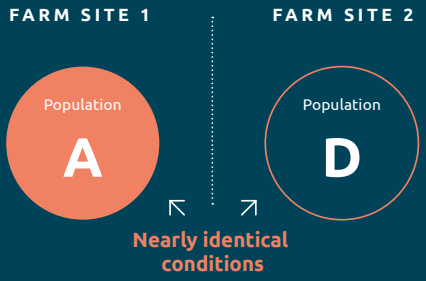

Finding true comparisons

For example, population A in farm site 1 and population D in farm site 2 may have **grown under nearly identical conditions.** By connecting these populations, we can make accurate, meaningful comparisons between farms.

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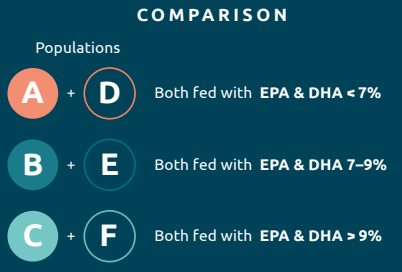

Conclusion: less data noise better predictions

Tracking and grouping fish into populations reduces data noise and **improves analytical accuracy.** This enables better predictions for feed conversion and health – leading to smarter, more controlled farm management.

Comparing populations instead of farms gives more detailed insights.

More

By focusing on populations, the study minimized data noise and enhanced the reliability of findings. Dietary EPA & DHA level categories were adjusted so that each category had a similar and therefore representative number of populations. EPA & DHA levels were categorized into three groups: "below-average" (below 7% of TFAs), "average" (7–9% of TFAs), and "above-average" (above 9% of TFAs). This targeted examination aimed to provide clearer insights into fish health and performance.

Additionally, data was gathered from processors to examine the impact of dietary levels on key flesh quality characteristics post-fileting.

Conclusion

This study unleashes the power of big data from commercial salmon farms in Norway to confirm what we already know from scientific studies: Dietary EPA & DHA levels have a significant impact on fish health & welfare, feed conversion, and product quality. Improving these metrics reduces waste and smooths the supply chain with more certainty of high-quality fish.

Salmon raised on diets with higher EPA & DHA levels perform consistently better on a range of production metrics: Improved eFCR and superior/premium quality at harvest, reduced mortality, and better flesh quality.

Furthermore, the enhanced predictability of outcomes provides farmers with greater control as well as dependability and confidence to the entire value chain.

Smart salmon farmers are investing in better nutrition through higher dietary EPA & DHA levels, yielding a substantial return on investment through better biology, better productivity, and better quality.

For further inquiries regarding this project or research, please contact the team at

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