Winds of fortune

Many New Zealanders doubt their daily weather forecast but as Brendon Burns discovers, an SIL-funded research project is matching climate patterns with other data to predict mussel growth.

Last summer, mussel farmers in the Marlborough Sounds enjoyed some of their best growth rates in years. While some saw it as a windfall, others had early signals through a climate predicting project part-funded by Seafood Innovations Ltd (SIL).

Dr Mark James of Aquatic Environmental Sciences Ltd is heading the five-year project to establish better relationships between mussel condition and environmental variables and provide predictions of greenshell mussel condition. Now in its third year, it extends to the major mussel growing regions - Firth of Thames, Stewart Island, Pegasus Bay and Golden/Tasman Bays - but initially centres on Pelorus Sound. The project is co-funded by Sanford and the Marine Farming Association (MFA).

"We know that Pelorus accounts for about two-thirds of New Zealand's greenshell mussel production but we see large annual fluctuations in the meat yield, sometimes more than 20 percent," says James.

That can create real headaches for companies like Sanford.

Mussel farming manager Zane Charman says that in the past seasonal fluctuations in crop condition have caused unpredictability in harvest levels.

"This creates challenges with forecasting of future vessel and farm capacity requirements."

The project supported by SIL, Sanford and MFA is using environmental variables including climatic trends and other data to give predictions which Charman says to date are proving highly promising.

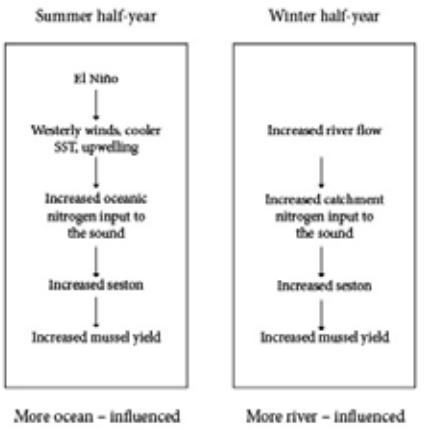
One key factor is whether the New Zealand summer will be in an El Nino or La Nina pattern. Last summer brought the usual strong westerly wind patterns of the El Nino/Southern Oscillation (ENSO) climate cycle.

James says that causes ocean upwelling and movement of nutrient-rich water towards the Marlborough Sounds.

"As these waters are drawn into Pelorus Sound, the nitrogen drives higher phytoplankton production (seston) which mussels consume and can result in higher meat yield."

Past NIWA research on the Pelorus Sound and Pelorus River, not yet matched in other mussel production areas, has provided the basis for predictions about Pelorus Sound.

"Wetter winters increase river flows and also add more nutrients to the



Mussel farming manager Zane Charman

Sound while in summer nutrients from outside Pelorus are important."

This summarises the chain of climatic effects that drive seston and mussel yield. In the summer half-year (October through March) effects are mainly from oceanic effects (El Niño, westerlies and upwelling), whereas in winter (April through September) local effects of increased river flow become more important.

"Essentially we are using the past to predict the future," says James. Initially predictions are limited to a three-month horizon but with some indications for up to a year also being provided from ENSO predictions.

And his forecast for the 2016/17 summer?

"The predictions are that we are now heading more into a possibly weak La Nina/neutral pattern; if it coincides with more easterly winds then conditions may not be as good as they were last summer for good mussel growth."

James says monitoring of yield and condition is critical over the final two years of the project to assess if the predictions are correct and allow the mussel industry to respond.

MFA's President Jonathan Large says a website developed and hosted by NIWA as part of this SIL project will allow members to go on-line and check yield predictions. "MFA supported this project because we will all benefit from being able to better plan seeding, harvest and processing."

SIL's Mike Mandeno says the mussel growth prediction project fits neatly into SIL's objectives.

"What we are really looking for is projects where new research or technology will deliver significant benefits and there is a clear pathway for translating the science into business benefits."

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