CRC Case Studies

Lobster Translocation Boosts Economic Return
OVERVIEW

The future potential of Australia’s already lucrative Southern Rock Lobster industry has been unlocked by that most elusive of scientific goals – a simple idea that really works.

Comprehensive research in Tasmania funded by the Australian Seafood CRC shows that “translocation” – moving lobsters from areas where they don’t grow well to areas where they do – is biologically, environmentally and economically feasible, and produces startling results.

Translocated lobsters grow more quickly (up to five times so in some trials), produce more eggs, receive higher market prices and have exceptional levels of healthy fish oils. The process of translocation also does not carry the same disease and genetic risks as the release of hatchery reared juveniles, which is used to boost stocks in some fisheries.

The project developed processes and governance for ongoing commercial-scale operations, and the Tasmanian Rock Lobster Fishermens’ Association (TRLFA) grabbed the idea with both hands. Up to 100,000 lobsters are now translocated each year, increasing revenue by over $3 million and adding $13.6 million to the capital value of quota across the fishery.

Both the novel nature of the project and its scientific rigour have also been recognised, with the researchers receiving awards at international conferences at which they have presented.

THE ECONOMIC DRIVER

Lobster fisheries are Australia’s largest fisheries in terms of economic yield and we have been harvesting Southern Rock Lobster (Jasus edwardsii) in Tasmania, South Australia and, to a lesser extent, Victoria since the late 1800s.

It is a valuable commercial fishery. Total production across the three States was worth an estimated $165 million (at producer prices) in 2012, with 90% of the catch finding its way to Asia. Everyone involved has always known things could be even better, however.

A critical but challenging issue is that there are significant regional differences in stock abundance, recruitment patterns, growth rates and egg production.

Some areas are “growth overfished”, meaning larger harvests would be sustainable if lobsters could grow a little more before being caught. At the other extreme, some deep-water areas, particularly off Tasmania’s west coast, have high population densities but the lobsters grow slowly and tend to be pale, rather than the bright red colour favoured by Asian consumers.

The innovative proposal was to move juvenile lobsters from areas where they are abundant but grow slowly, to areas where stocks are depleted but conditions favour rapid growth and colour change. Although conceptually simple, there were a number of issues and concerns that needed to be addressed.
A TEAM APPROACH

Without doubt, the key to the success of this project was that there was a genuine partnership between science and industry from day one, with lines of communication always open.

In fact, the project itself grew out of the partnership. Researchers had asked the industry for their ideas on possible ways to change and improve things then modelled those ideas to see which had the greatest chance of success.

Translocation was top of the list, and Tasmania was the obvious place to test the viability of the concept (there is potential in South Australia, but the differences between fishing areas are not so pronounced).

The TRLFA came on board from the start, with industry meetings and port visits built into the research program. Feedback helped shape the research agenda, in particular in relation to understanding the health and genetic implications of translocation and the need to monitor removal sites. An industry committee was later formed to oversee commercial-scale translocations and determine the pace of change.

It was, in the words of University of Tasmania fisheries scientist and project leader Dr Caleb Gardner, “a flagship project in more ways than one: successful, profitable and highlighting a genuine working relationship with industry”.

Most of the work was undertaken at the University of Tasmania, with support from colleagues at CSIRO and the University of Washington. The project was carried out as part of the Seafood CRC’s Future Harvest theme.

THE SCIENCE

The difficult aspect of applying translocation is assessing the numerous possible impacts. This project combined many complex experiments to be able to provide overall conclusions on feasibility. Lobster movement and foraging was tracked by triangulation of acoustic tags, survival models were adapted from bird methodology, ecological effects were assessed as per oil spill methods, and egg production by Bayesian population models.

The project began in 2004 with economic and biological modelling followed by a two-year proof-of-concept trial. One thousand tagged lobsters were moved onto reefs that should have been productive but had been depleted by fishing. Within months fishers started catching tagged lobsters that had grown remarkably quickly. They were also excited because these lobsters had changed colour to become premium-grade quality for markets.

Larger scale translocations were conducted over the next five years, with 30,000 lobsters shifted to different locations around Tasmania. In each case they increased their growth rate, usually five-fold compared those at their original location. Growth of females was especially rapid and was often double that of local lobsters — for reasons that still remain unclear.

Survival was high after release, egg production was enhanced, and lobsters remained close to the release site establishing new home dens and foraging ranges. The enhanced populations made the eco-
system more natural because density was closer to the natural state. The effect of removing lobsters from the deep-water reef was also examined with growth picking up a little as density was reduced.

Population and economic analyses showed that larger scale movement of at least 200,000 lobsters a year was sustainable and economically feasible.

ENVIRONMENTAL SUSTAINABILITY

There are several environmental issues associated with sustainable translocation and examining these was a focus of the research program.

Protecting the natural genetics of lobsters: Three-dimensional oceanographic modelling had found that lobster larvae naturally drift thousands of kilometres so translocations over 100 kilometres would have no impact on genetics.

Preventing diseases being transferred between regions: Baseline screening of disease across the region was carried out in collaboration with the Tasmanian Government’s fish health laboratories. An independent review concluded that there was negligible risk.

Ensuring healthy stock levels in deep water sites: Research was carried out to determine the size of deep-water populations and sustainable levels of translocation. Density in these locations remains higher than in other areas of the fishery. Spreading the effects of fishing is considered ecologically desirable as it restores depleted inshore areas.

Protecting egg production in the lobster population: Overall it was found that translocation leads to a slight improvement in egg production. Importantly this improvement is mainly in the depleted areas that need it most.

Helping ecosystem function: Translocation was found to help the coastal ecosystem by restoring populations of lobsters in depleted areas, where they are a natural part of that ecosystem.

A COMMERCIAL REALITY

The results of a commercial-scale trial run in 2012-13 were compelling. 100,000 lobsters were translocated each year, producing a net economic yield of $2.9 million and a return on investment of 2900%.

There were other incentives as well. Because modelling showed a predictible increase in the overall productivity of the fishery, the State Government increased the total allowable catch to take into account translocation, thus enhancing the value of the quota and of individual licences.

While existing fishers could have carried out the physical process of translocation during the trial process, it was decided to charter a separate vessel. This not only allowed for closer scrutiny of the process, it gave an exact picture of how many lobsters were being moved, allowing extra quota to be allocated immediately.

In 2014 the industry voted to continue translocation – initially at the same scale as during the pilot study – and to take control of the process itself. It will be reviewed in 2016.