

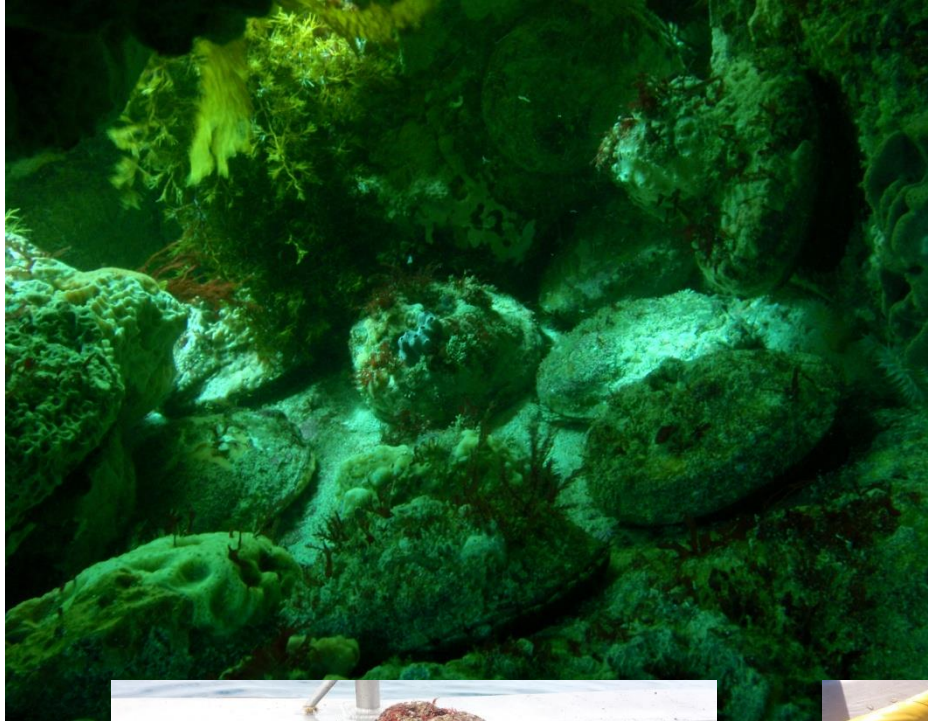
Presentation by
Jonas Woolford
Nuffield Scholar 2017

**‘Overview of the world’s wild
harvest abalone fisheries and their
utilization of stock enhancement’**



← Blacklip

Greenlip →







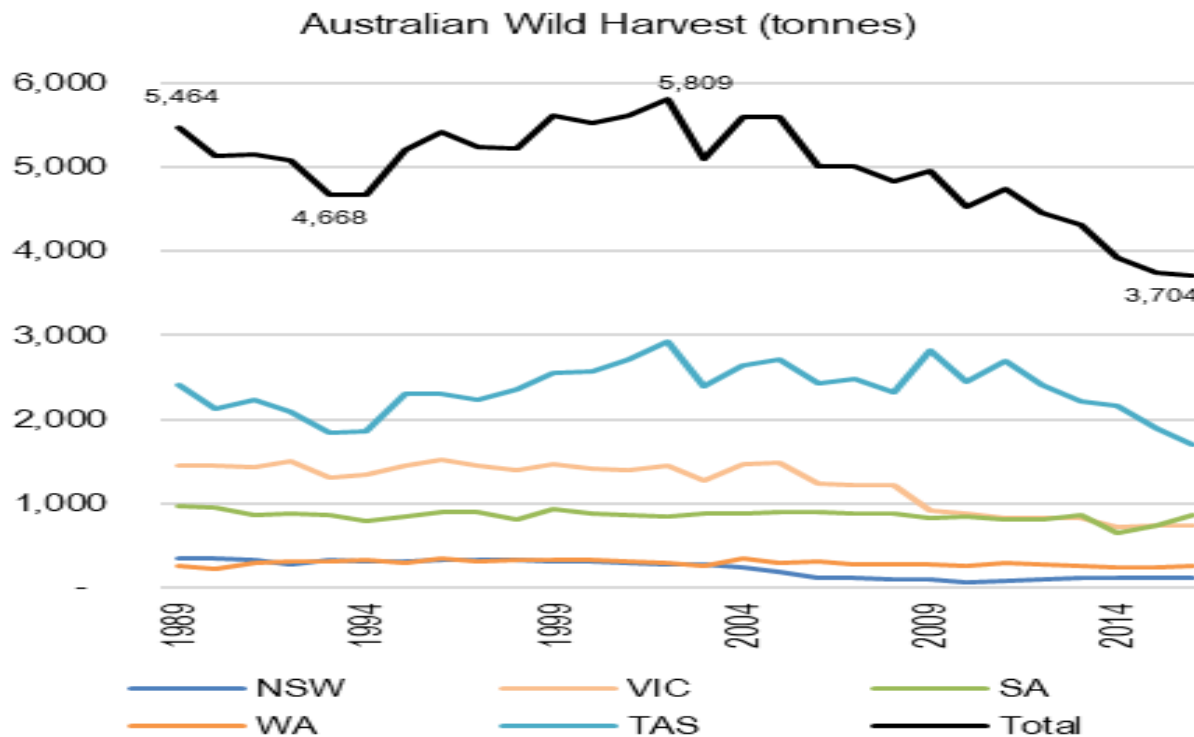
Australia

2018 TACC 2,899 tonne

Blacklip *H.rubra* 2,336 tonne 77%

Greenlip *H.laevigata* 478 tonne 19%

Stock enhancement? Only a trial in Western Australia in 2004



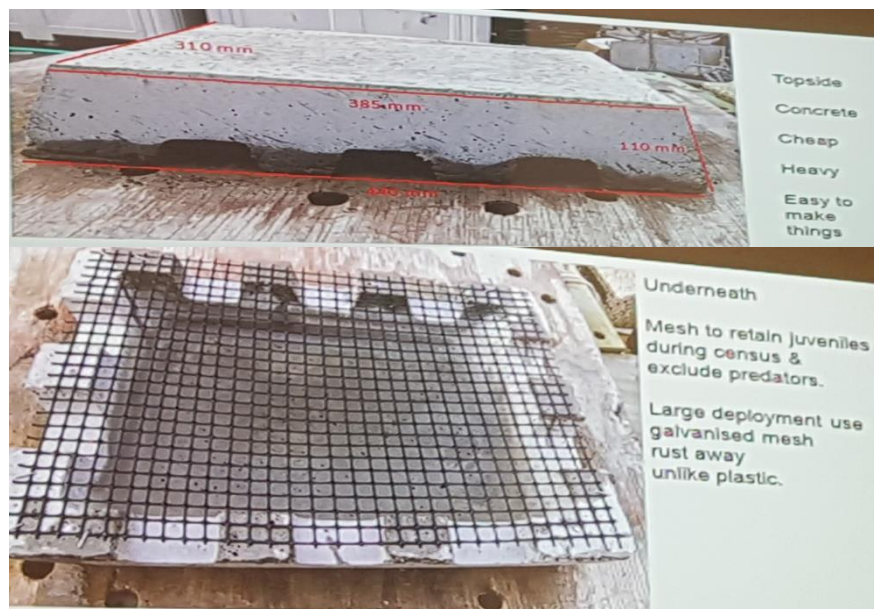
Florida, USA

- Professor's Ken Lebber & Kai Lorrenzen
Genetic Diversity and Genetic Fitness
- **Brood stock selection – source from location intended for seeding, use many (10's + M&F) & change regularly**
- **Juvenile abalone & genetic fitness – too small not strong enough and still susceptible to the environmental mortality, too big and too domesticated, around 30mm considered ideal as the trade off between survival and cost**
- 'The Responsible Approach 2010'



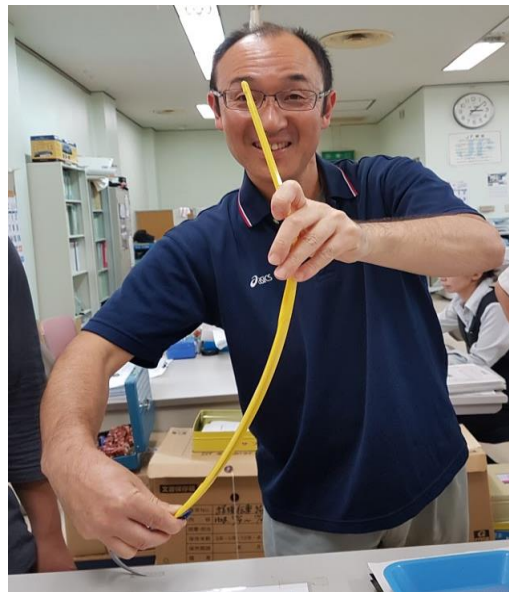
New Zealand's stock enhancement

- Hard to determine results of trials
- **Large trial using CPUE as PI needed \$1m+**
- **Security of investment for large trial – poaching, sedimentation must be mitigated**
- Kīakōura earthquake (2016) reseeding opportunity where different methods can be trialled - **rotation harvesting** - translocation
- Predation upon release, designing release modules to overcome this



Japan

- Iwate Prefecture – 27 Co-ops in 2014 producing 304 tonnes of Japans 1363 tonne
- Method for harvest 'hooking', Awabi *H.discus hannai*, winter harvest
- Southern Prefectures dive harvest method, warmer water *H.discus discus*
- Issues – current too warm or cold,
 - break wall construction disrupting natural flows



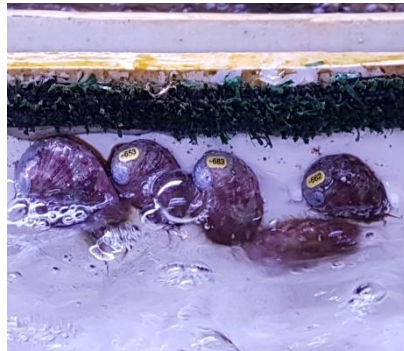
Japan's stock enhancement

- Iwate Prefecture – up to 9 million Awabi seed pa
- Subsidised seed by Prefecture Government
- **Reseeded Awabi makes up 30% of total harvest**
- **Survival of 10 – 15%**
- **Size at release 30 mm**
- Varying methods – dumping over the side, transparent bowel, hand release by divers considered best (time & cost factor)
- Reseeding has priority over adjacent land based activity like forestry
- **Understand the ecology of the release area – settlement depth of that size, seasonal predators**



California's stock enhancement

- Many experiments over many decades with limited to unknown success
- Many methods; timed release @ dusk from PVC pipe to allow conditioning for 18 hours. Filmed predators - Octopus
- Size 20 – 50 mm for Red abalone *H.rufescens*
- **About to release the endangered White *H.sorenseni* - genetic fitness challenge**



Baja California, Mexico stock enhancement

- **16 Co-ops delegated local area management & reseeding since 2012, 6 subsidised hatcheries**
- No guidance of how to release or measuring success of release
- Tried many methods from larval release up to 40mm with no standout success
- **Developing a reseeding plan to try and determine/improve results and justify the investment by Government**



South Africa's enhancement

- Wild Coast Abalone farm – Cape Recife project
- Reseeding with excess farm stock 30 – 40 mm
- Low cost of production – electricity & wages
- 10 year experiment with 25 year right beyond that to harvest seeded stock only? (under review)
- **Protected by a security team**
- **Dive @ .5 – 2 meters – strong natural recovery**
- **Travel factor – rough roads and handling**



Seed cost comparison 30mm \$AUS

- Australia; 75 cents
- New Zealand; 112 cents
- Japan; 75 cents = subsidised
- South Africa; 45 cents = farm excess
- Mexico; 101 = subsidised
- USA; 133 cents
- China; 42 cents



Hong Kong

- Market – consumer perception
- Would the premium price for ‘wild’ abalone be compromised?
- Stock enhanced products already in the market like Japanese Awabi, Scallops, Salmon & Eel with no adverse affect to \$\$\$'s
- **The story of stock enhanced abalone is a positive – ensuring sustainability**
- Ensure it's safe food – no antibiotics, no chemicals



Conclusion

- Every abalone fishery is experiencing declining stocks driven by **environmental factors** and then subsequently over fishing. Management responses must be quick - **Technology**
- Reseeding is in its infancy other than Japan
- It is expensive and currently security of investment is low
- It will work in select locations by understanding the ecology of those locations
- Combine with rotation harvesting. Resting areas works too
- Genetic fitness is key to survival and success
- The size at release seems best at 30 mm
- Larval reseedling is yet to work
- Keep handling to a minimum



Recommendations

- Share knowledge & partner with aquaculture
- Form a global working group of expert skill sets to explore and steer stock enhancement (national at least)
- Ensure governance arrangements are sufficient to provide the security necessary to make the investment
- Inclusive & transparent for community support
- Develop projects (genetics) and start identifying suitable reefs
- Tell the good story of stock enhanced abalone whereby sustainability of abalone stocks is being ensured



The Future

- **Luxury Branding** – emotional desire = make more \$ from less
- **Technology** – full transparency = efficiency = optimum production
- **Reseed** – maximum return from investment