

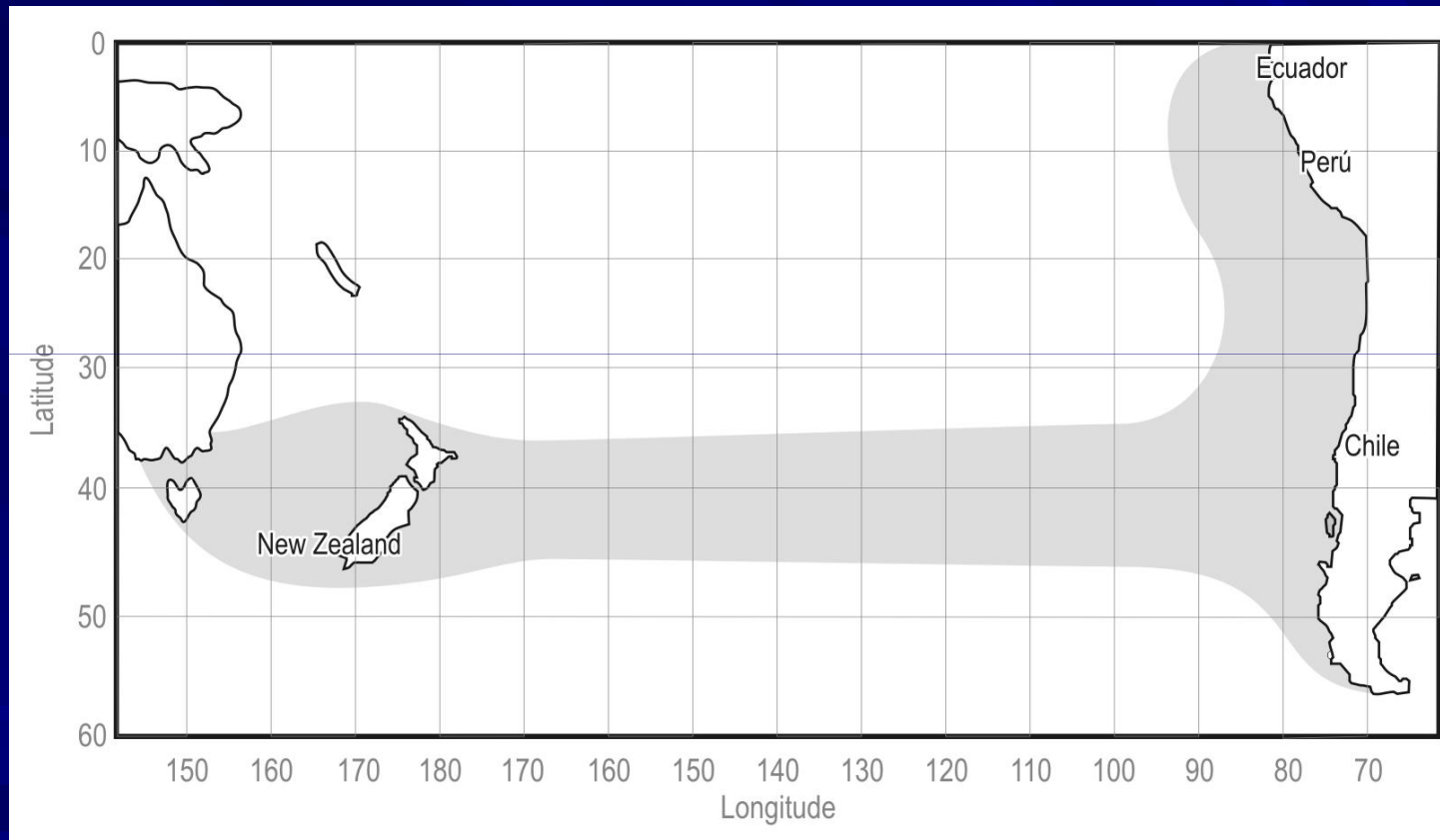
International Consultations on the Establishment of the  
South Pacific Regional Fisheries Management Organisation

**Population structure of the jack  
mackerel, *Trachurus murphyi*, in the  
South Pacific Ocean: regional joint  
research proposal.**

**Chilean Jack Mackerel Workshop  
SWG, Jack Mackerel Sub-Group.  
Santiago, Chile. July, 2008.**

Chilean Jack Mackerel  
Workshop

# Distribution and background knowledge on stock structure



# Objectives

- **The overall objective of the research is to determine the stock structure of *Trachurus murphyi* throughout its distribution to inform future fisheries management.**
- **The specific objectives are:**
  - To describe the stock structure
  - To define the discrete stock boundaries
  - To determine mixing rates among relevant stocks

# Holistic approach: Why?

- Fish stocks are identified on the basis of differences in characteristics between stocks. Investigation of any single characteristic will not necessarily reveal stock differences even when “true” stock differences exist (Type I error). To overcome this difficulty, a holistic approach of fish stock identification, involving a broad spectrum of techniques, appears to be pertinent (Iles et al., 1981; Begg & Waldman, 1999).
- HOMSIR “When the differences are detected with whatever technique (parasites as tags, morphometry, genetics, life history traits, etc.) those are true and one have to explain why there are differences. Thus, only heterogeneity and not homogeneity can be demonstrated (Waldman, 1999).”

# Proposed techniques

- Body morphometry
- Otolith morphometry
- Genetics tags (mtDNA, msDNA)
- Parasites
- Microchemistry of otoliths
- Life history patterns

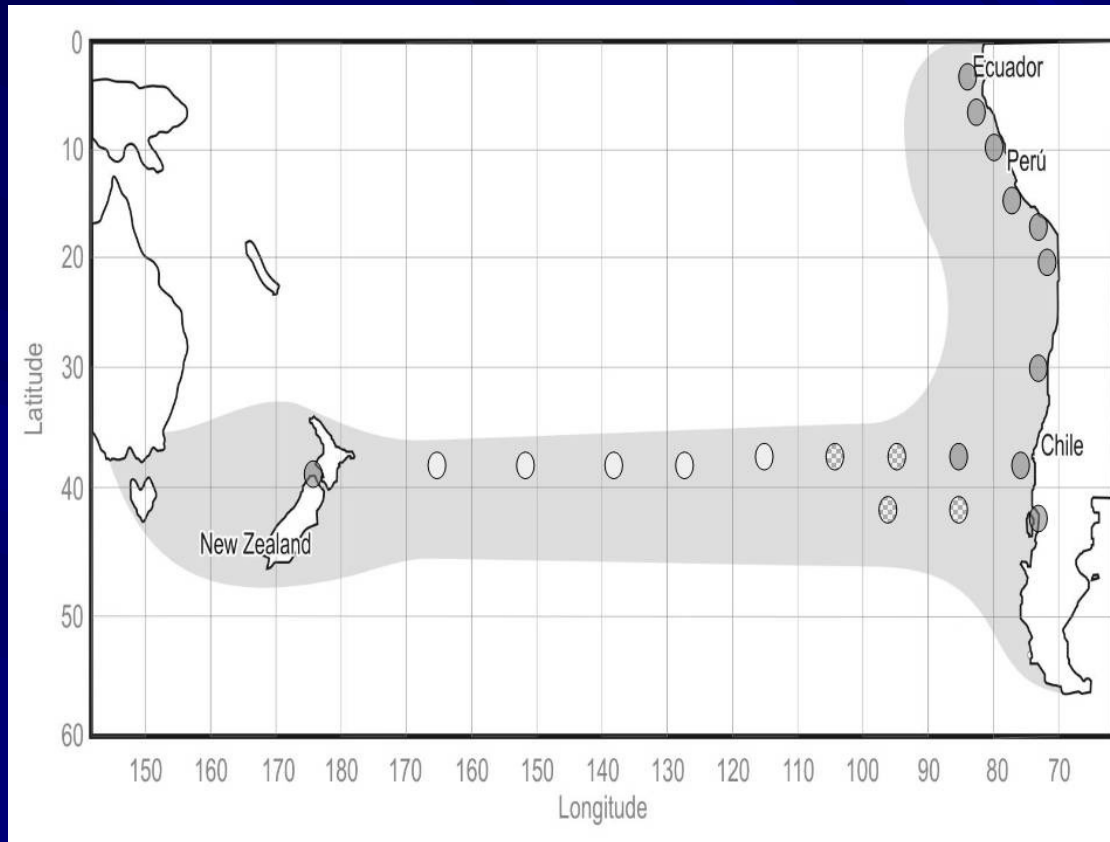
**If a techniques is subject to process in two or more countries then standarized procedures is a must.**

# Sampling scheme: two scales of variability

- Geographic scale
- Temporal scale

**Thus it is advisable to repeat the sampling throughout the jack mackerel distribution what needs to be decide depending on available funds.**

# Sample distribution: geographic scale



Darker circles: samples to be taken from coastal fisheries;  
Circles with dots: samples taken from the international fleet;  
Empty circles: samples collected on research vessel.

# Sampling details

- Sample size: 120 (effective 100)
- Fish size: adults 30 – 45 cm FL (approximate)
- Sample for juveniles
- Detailed biological information per individual fish
- Samples processing: simultaneousness

If one sampling exercise: spawning season  
otherwise: spawning season, autumn, winter

# Project Budget

- All the countries that fish for jack mackerel (coastal and distant flag vessels) and that are part of the RFMO negotiation process was assumed that would participate. These countries are Ecuador, Peru, Chile, New Zealand, Vanuatu, Russia, Holland, Faroe Islands and the Popular Republic of China.
- It is also considered that all countries will participate in the five techniques identified, which are genetics, morphometry, parasites, microchemistry of otoliths and life history patterns and oceanography. This means 6 scientists per country.
- The number of countries plus scientist makes 54 scientist per WS. 5 WS (1 sampling exercise) and 6 WS (3 sampling exercise) were identified; plus 2 additional (1 for oceanography and 1 for life history pattern)
- The baseline for the calculations is a sample size of 100 fish per sampling site and a sampling exercise in the whole region. The sampling exercise involve the 15 sampling locations (Ecuador, Peru, Chile and N. Zealand), plus 3 samples extra of juveniles for microchemistry and 5 samples taken with a research vessel.
- The cost of scientist and technicians was assumed that it will be financed by each country. Exceptions are additional man power (for example for oceanography or an expert in microchemistry).
- Two scenarios were developed, one with one sampling (main spawning season) and another with three sampling events (autumn, winter and main spawning season).
- The cost to survey the zone between 100° and 170° W is identified separately due to its high cost and uncertainty.
- After knowing the effective participating countries and number of scientists per country, the budget can be adjusted easily.

# Scenario: One sampling exercise

## Research vessel samples

	US\$
Sampling	30070
Genetic technique	127500
Mprphometry: body	18000
Morphometry: otolith	141298
Parasites technique	118500
Life history pattern	
Microchemistry of otolith	130604
Oceanography	14000
Workshops (travel)	1000000
Unforeseen expenses (10%)	157997
<b>SUBTOTAL</b>	<b>1,737,969</b>

	US\$
Sampling	44800
Genetic technique	42500
Mprphometry: body	4000
Morphometry: otolith	4000
Parasites technique	5000
Life history pattern	
Microchemistry of otolith	12000
<b>SUBTOTAL</b>	<b>112,300</b>

<b>TOTAL</b>	<b>1,732,792</b>
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# Scenario: Three sampling exercise

	US\$
Sampling	90210
Genetic technique	382500
Morphometry: body	36000
Morphometry: otolith	159298
Parasites technique	235500
Life history pattern	
Microchemistry of otolith	333686
Oceanography	14000
Workshops (travel)	1192700
Unforeseen expenses (10%)	244389
<b>TOTAL</b>	<b>2,688,283</b>

	US\$
Sampling	44800
Genetic technique	42500
Morphometry: body	4000
Morphometry: otolith	4000
Parasites technique	5000
Life history pattern	
Microchemistry of otolith	12000
<b>SUBTOTAL</b>	<b>112,300</b>

<b>TOTAL US\$</b>	<b>2800583</b>
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# Research vessel

Research vessel cost 1	US\$	4,740,000
Research vessel cost 2	US\$	3,160,000

Russian vessel: cost 1 or 2 depend on Russian funding for a CCAMLR survey