POP2015-06: Marine reptiles – review of interactions and populations

Dan Godoy
Karearea Consultants

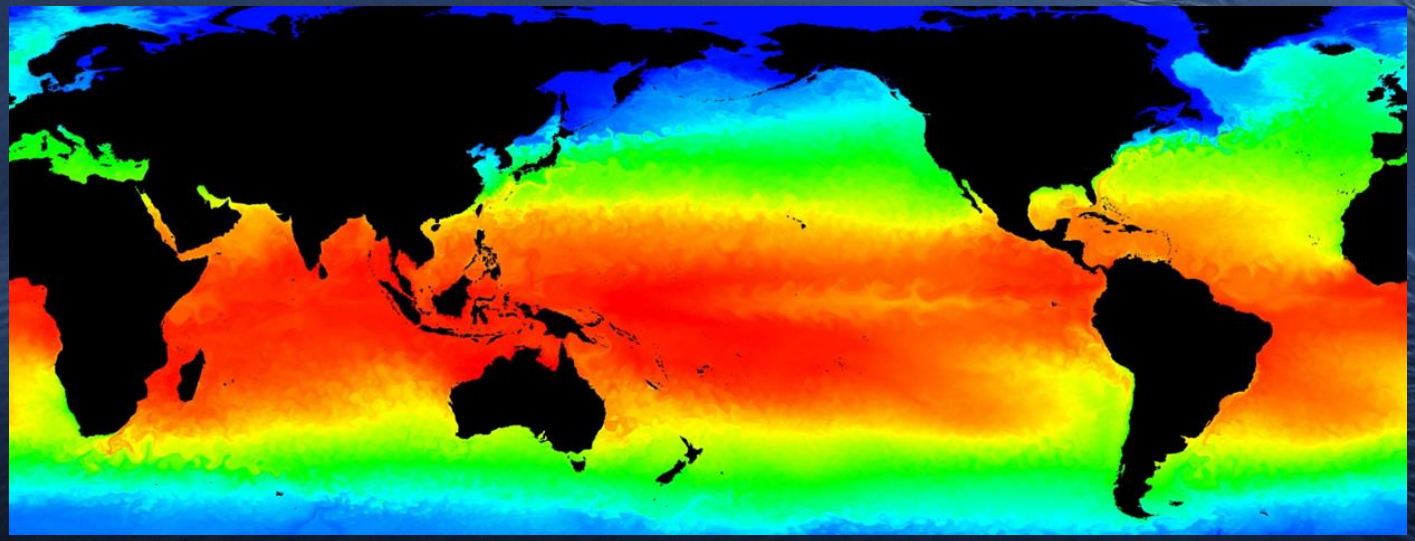
Department of Conservation CSP technical working group presentation: research results
22 September 2016

Background information

- Five species of marine turtle and four species of sea snakes recorded in New Zealand

- The reported bycatch of marine reptiles in New Zealand fisheries has been low
  - Based solely on CSP observer reports
  - Low observer coverage
  - Non-uniform distribution of observers across the fleet
  - Fisher reports not required or included

- Low bycatch fits in with our biological understanding of marine reptile distribution



Key objectives

Population project under the CSP framework

1. To review existing information to describe the nature and extent of interactions between commercial fishing and marine reptiles.

2. To review existing information to describe population information relevant to assessing risk from commercial fishing to marine reptiles.

3. To review existing information on possible mitigation options relevant to New Zealand fisheries to minimize marine reptile bycatch

4. To identify information gaps in the understanding of the nature and extent of interactions between commercial fishing and marine reptiles, population information and mitigation options, and provide recommendations for further research to address any gaps identified.

Research approach

1. Research period covered 7 years 4 months: 1 July 2008 – 30 November 2015
   - Based on fishing year: 1 July – 30 June

2. NZ EEZ fisheries interaction data obtained from five main sources:
   - Commercial catch database (warehou)
   - Central observer database (COD)
   - DOC herpetofauna database
   - New Zealand marine turtle sighting and stranding database
   - Published and unpublished literature

3. Bycatch data were cross-referenced and groomed e.g. duplicate CSP observer and commercial Non-fish protected species bycatch (NFPS) records combined.
   - Caveat: species identification assumed correct unless additional evidence confirmed other species

Research approach

3. Bycatch data were analysed by fishing year, FMA, fishing method and target species.
    - Bycatch rate calculated (per species and total) by fishing year and FMA
    - For each species, identify at risk:
        - FMA
        - Target fishery
        - Fishing method
        - Time period

4. Review published and unpublished population information within New Zealand and regional context
    - Identify gaps

5. Recommendations based on findings using best practice guidelines

Key results

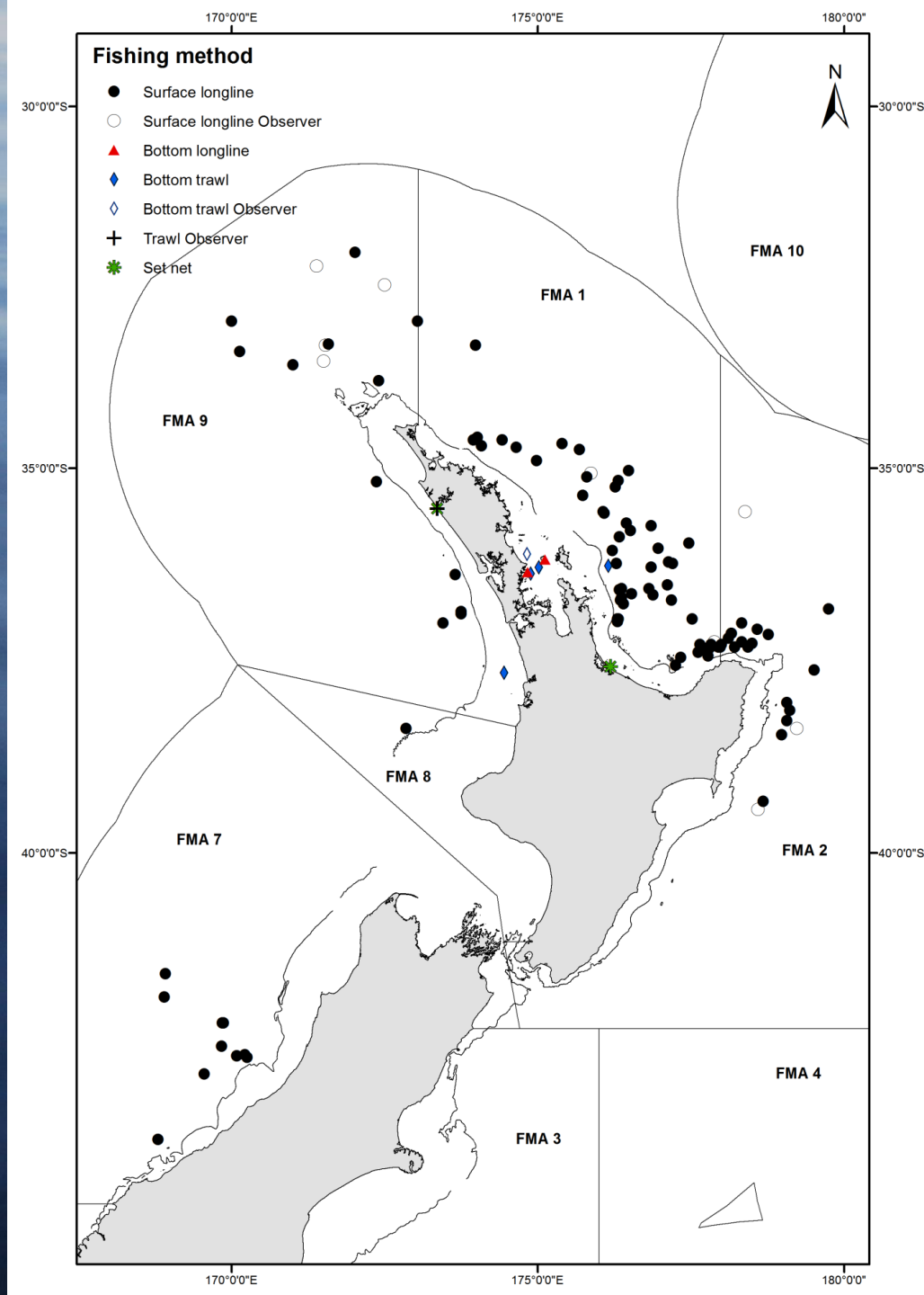
1. 120 marine reptile bycatch records
   - No sea snakes or kraits, all were marine turtles:
     - leatherback turtle, green turtle, hawksbill turtle, loggerhead turtle,
     - no olive ridley bycatch reported

2. Observed bycatch (9%, *n* = 11) vs non-observed bycatch (91%, *n* = 109)

Fishing year	Leatherback turtle	Green turtle	Hawksbill turtle	Loggerhead turtle	Unidentified turtle	Total
2008/2009	7	3				10
2009/2010	2	1			2	5
2010/2011	17	2	1	1	4	25
2011/2012	18	1	2			21
2012/2013	21	1	3		3	28
2013/2014	7	2		1	1	11
2014/2015	17	1				18
2015/2016¥	1	1				2

Key results

3. Distribution
   - North Island (90%, *n* = 106)
   - FMA 1 (55%, *n* = 66) and FMA 2 (19%, *n* = 23)
   - Summer (51%, *n* = 61) and autumn (38%, *n* = 45): 22.8 °C (March) and 15.1 °C (June)
   - Oceanic waters > 200 m (92%, *n* = 110)



Key results

4. Surface longliners targeting swordfish and tunas had highest bycatch
   - Only fishery with multiple captures during single fishing event (*n* = 5)
   - Bycatch rates frequently exceeded WCPFC recommended minimal interaction rate of 0.019 turtles per 1000 hooks in certain FMA

Fishing method Target species	Leatherback turtle	Green turtle	Hawksbill turtle	Loggerhead turtle	Unidentified turtle	Total
Bottom longline		**2**				**2**
Snapper		2				2
Bottom trawl	**1**	**3**		**1**	**1**	**6**
John dory		1				1
Scampi					1	1
Snapper		1				1
Tarakihi	1					1
Trevally				1		1
Unknown		1				1
Set net	**1**	**1**				**2**
Flatfish	1					1
Grey mullet		1				1
Surface longline	**88**	**5**	**6**	**1**	**9**	**109**
Bigeye tuna	48	2	4	1	6	61
Southern bluefin tuna	10	2			3	15
Swordfish	26	1	2			29
Pacific bluefin tuna	1					1
Unknown	3					3
Trawling		**1**				**1**
Trevally		1				1
Total	**90**	**12**	**6**	**2**	**10**	**120**

Key results

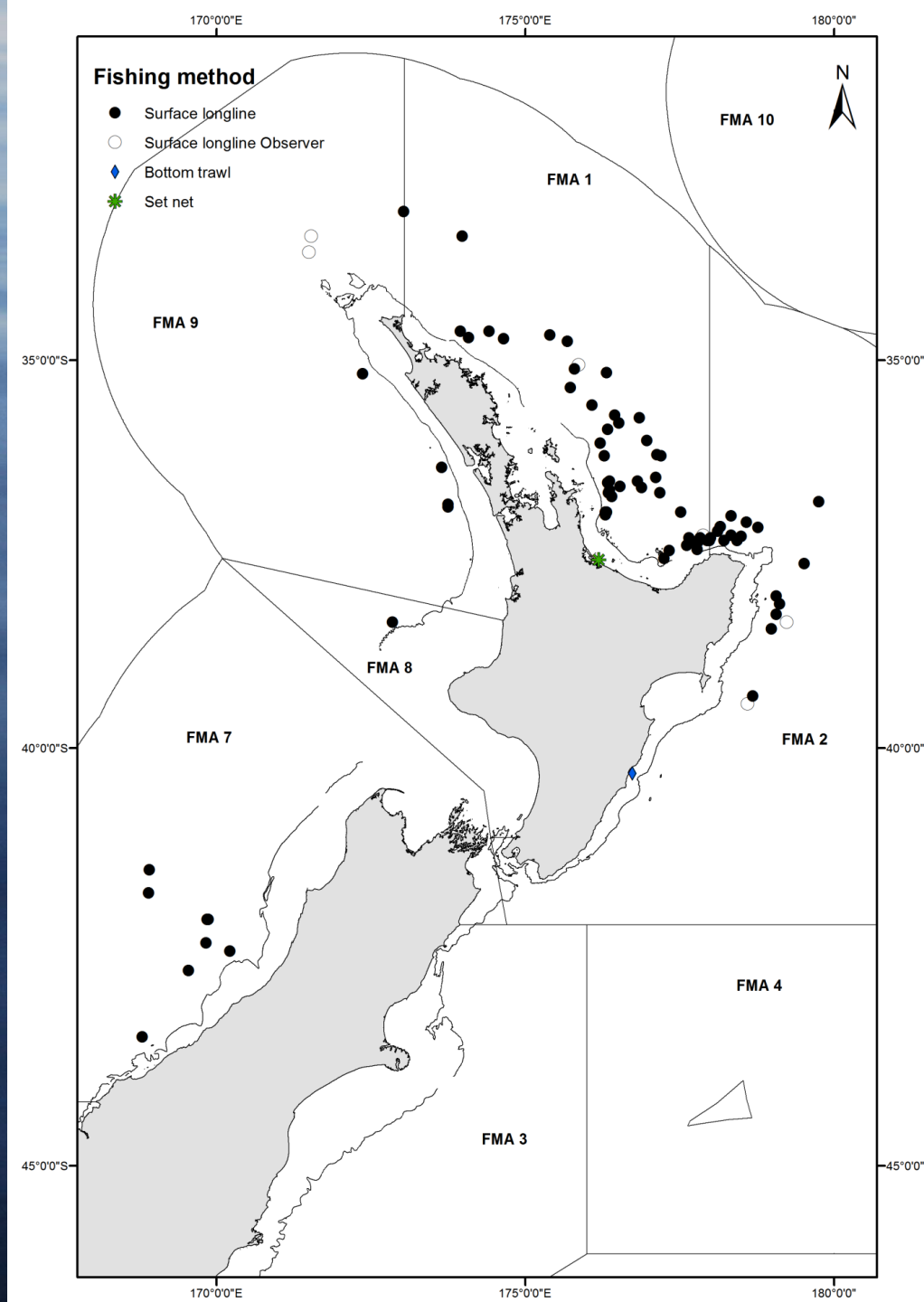
5. SLL observer coverage: domestic (5.8%) vs foreign charter (99.5%)

Target species	Domestic hooks set	Observed hooks	% observed	Bycatch no.	Charter hooks set	Observed hooks	% observed	Bycatch no.
Bigeye tuna	8,012,139	343,013	4.3	63	56,350	56,350	100	1
Southern bluefin tuna	6,908,081	520,052	7.5	13	4,049,398	4,004,912	98.9	2
Swordfish	1,527,353	101,778	6.7	29				
Pacific bluefin tuna	134,553	0	0.0	1				
Unknown	1,000	0	0.0	0				
Total	**16,582,126**	**964,843**	**5.8¥**	**106**	**4,105,748**	**4,061,932**	**99.5¥**	**3**

¥ Average percentage of hooks observed.

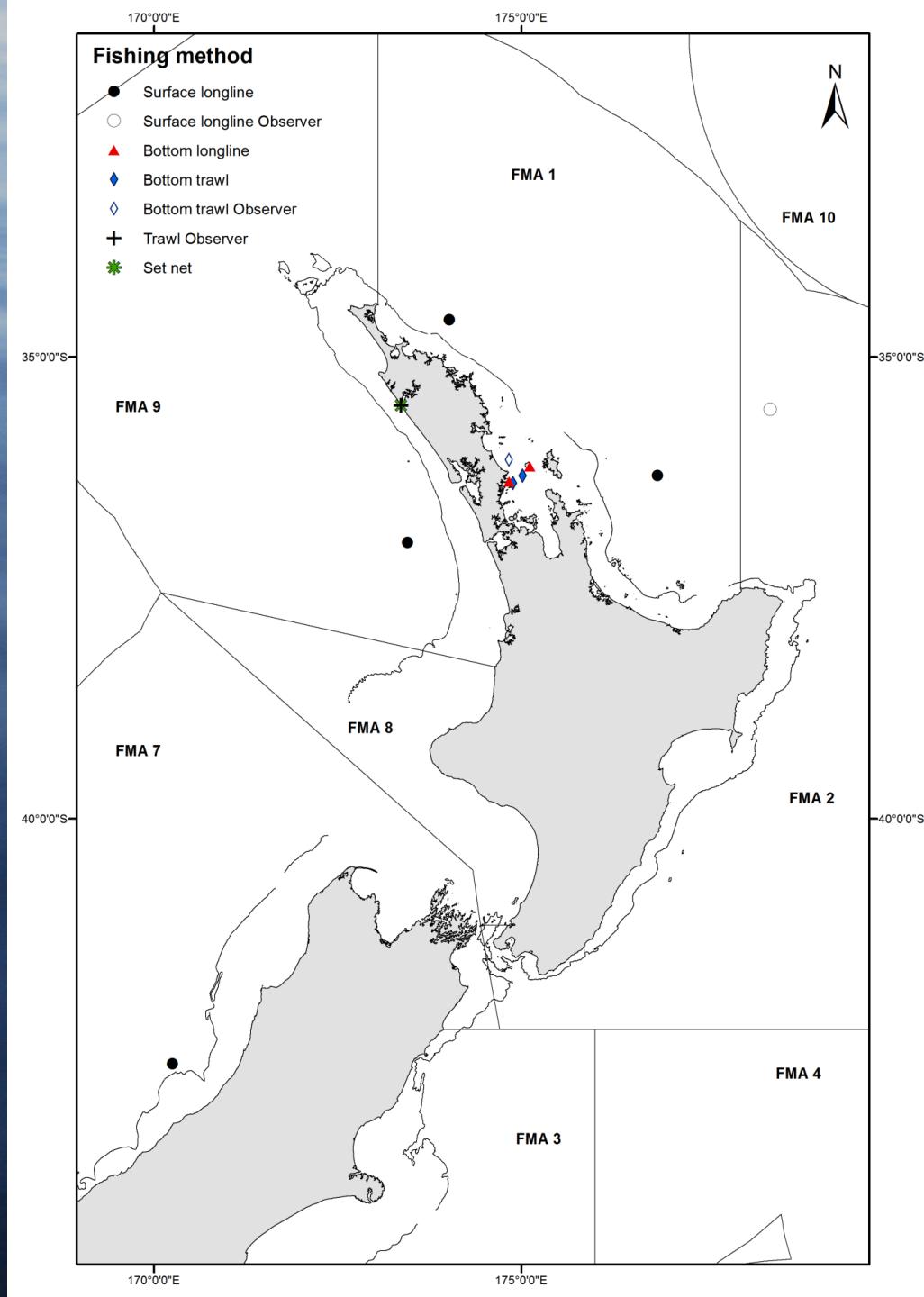
Leatherback turtle

- Most vulnerable species
  - Highest bycatch (75%, *n* = 90)
  - Average 13 turtles / year
  - Mostly in oceanic waters (98%, *n* = 88)
  - Summer and autumn
  - Multiple captures
  - Identification likely: unique morphology
- Widely distributed globally
- Seasonal foraging in temperate zones
- New Zealand population data very limited
- Two Pacific subpopulations: critically endangered
  - Fisheries bycatch significant threat



Green turtle

- Low reported bycatch
  - Inshore and oceanic zones
  - Recreational bycatch
- Extensive global distribution
  - Northern New Zealand
- Juveniles recruit to inshore habitats
- New Zealand population data limited
- Globally endangered
  - Fisheries bycatch moderate threat



Hawksbill turtle

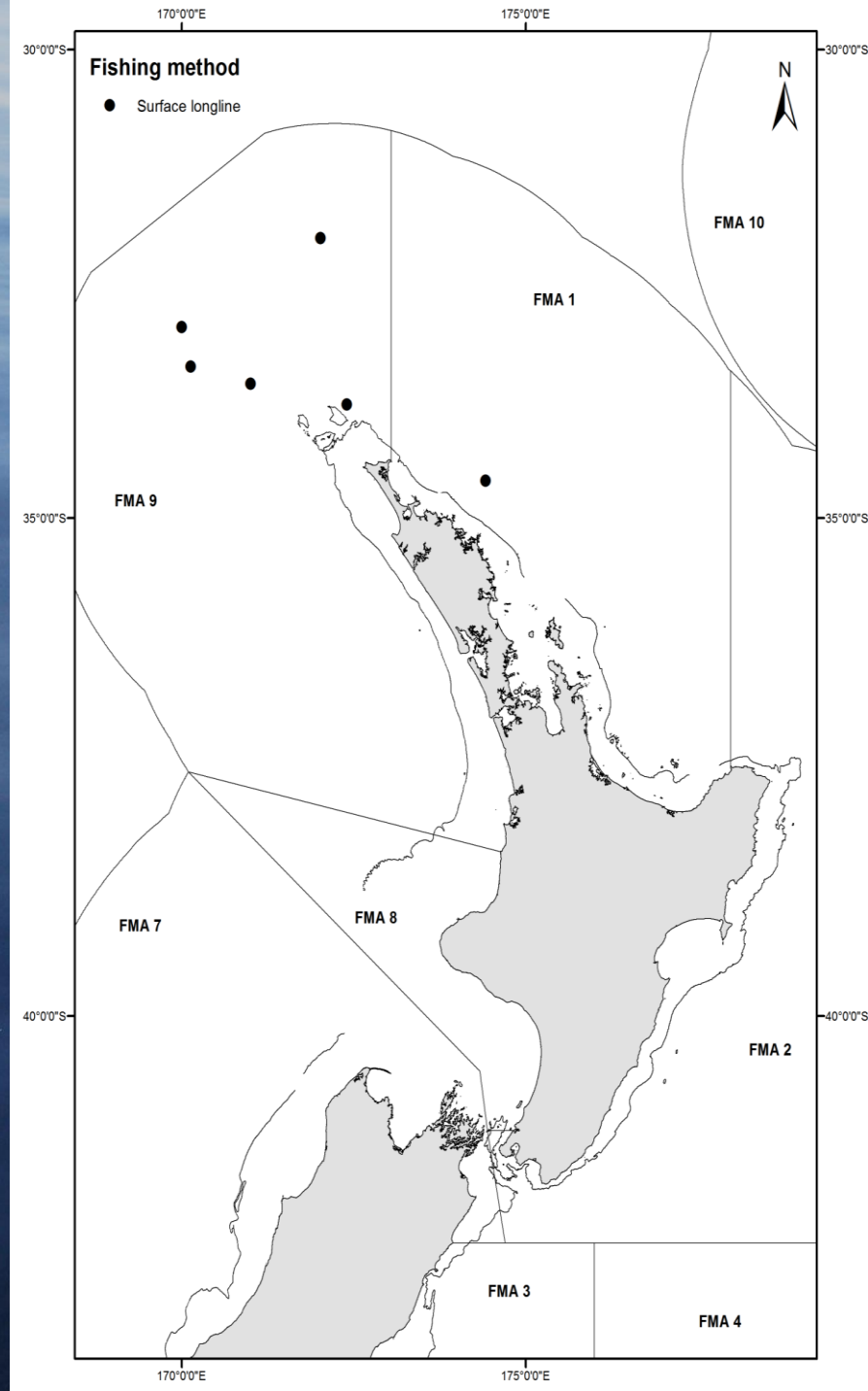
- Low reported bycatch
  - Oceanic zones
  - Misidentification?

- Narrow global distribution
  - Northern New Zealand

- Juveniles recruit to inshore habitats

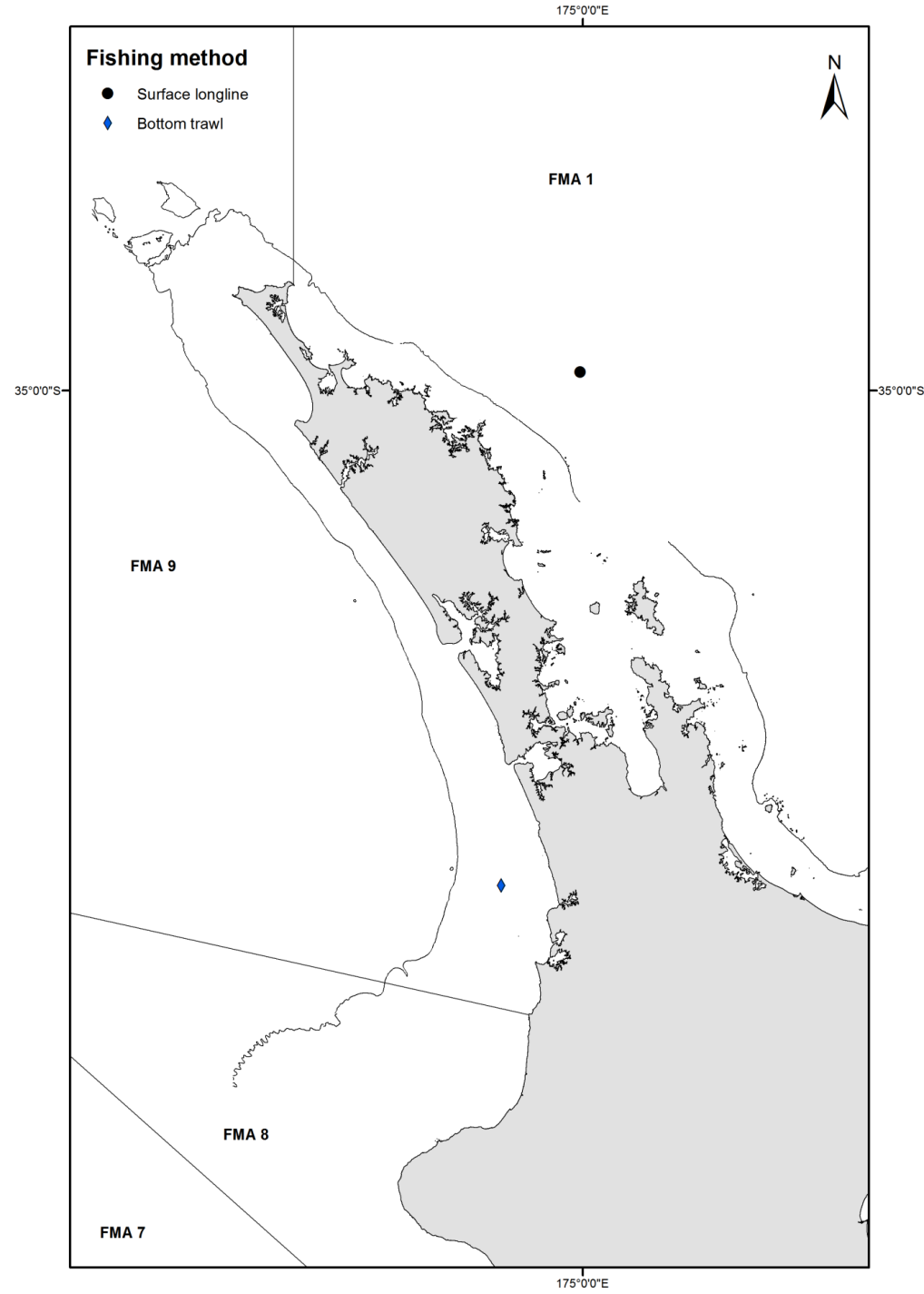
- New Zealand population data very limited

- Critically endangered
  - Fisheries bycatch significant threat



Loggerhead turtle

- Very low reported bycatch
  - Inshore and oceanic zones
- Wide global distribution
- Extended oceanic phase before large juveniles recruit to inshore habitats
- New Zealand population data very limited
- South Pacific subpopulation: critically endangered
  - Fisheries bycatch significant threat



Knowledge gaps

Several key gaps limit accurate risk assessment in New Zealand

1. Understanding of New Zealand populations (aggregations) very poorly understood
   - Population structure
   - Spatio-temporal distribution
   - Human effects
2. Regional connectivity of highly migratory species
3. Bycatch data validation and monitoring
4. Post-release survival unknown

Key recommendations

1. **Implement and monitor a minimal marine turtle interaction rate**
    - Western and Central Pacific Fisheries Commission (WCPFC)
    - Conservation and management measure CMM2008-03
    - Interaction rate of 0.019 turtles (all species combined) per 1000 hooks or less for shallow-set longline fisheries targeting swordfish in the Western and Central Pacific Ocean (WCPO).
        - Recommend per FMA to account for distribution
    - Other alternatives likely to result in better conservation outcomes
        - Upper limit reference points: require local population estimates
        - Area / time closures

2. **Implement the *Guidelines to Reduce Sea Turtle Mortality***
    - Under CMM2008-03, WCPFC commission members are to adopt the United Nations Food and Agriculture Organisation (FAO) guidelines
    - Because New Zealand interaction > 0.019
        - Investigate the use of wide circle hooks (18/0) instead of J hooks or tuna hooks
        - Investigate the use of fish bait instead of squid bait
        - Undertake research to identify locally appropriate measures

Key recommendations

3. **Review the allocation of observer coverage**
    - Observer coverage in the domestic longline fleet is very low yet accounts for the highest number of marine turtle bycatch.
    - Bycatch id highest in FMA 1 and FMA 2 during summer and autumn when observer coverage is lowest

4. Improve data quality and reporting
    - Training
        - Species identification
        - Photographs
    - Biological data
        - Biometric measurements
        - Tissue samples
    - Bycatch report forms
        - Align observer and fisher report forms to eliminate contradictory fields

5. **Improve population information and research**
        - population structure, spatio-temporal distribution and regional connectivity