SUMMARY OF LONGLINE FISHERY BYCATCH AT A REGIONAL SCALE, 2003-2017

WCPFC-SC14-2018/ST-WP-03

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OVERVIEW

- WCPFC has responsibility to assess the impact of fishing on non-target species
- Estimated bycatch for longline fisheries in the WCPFC Convention Area
- Annual bycatch estimates for 2003 to 2017
  - Covering finfish, billfish, sharks and rays, turtles and marine mammals
  - Seabird bycatch covered by Project 68
- Updated bycatch estimates for purse seine fisheries in the WCPFC Convention Area covered in ST-IP-04
- Presentation will focus on longline fisheries
  - Will also cover purse seine bycatch in recommendations

DEFINITIONS

- Catch
  - All catch events recorded by observers, regardless of fate or condition of individuals
- Bycatch
  - We don’t define bycatch species & estimate catches for all species
  - Target / retained species vary by fleet & fishery
  - Mainly focus are species of special interest and species not covered by logsheet catch data
- West-tropical domestic fisheries
  - Domestic longline fisheries in the Philippines, Vietnam and Indonesia
  - SPC hold very few observer data
  - Available observer data unlikely to be representative of bycatch rates
- Regions and strategy
  - North of 10°N – north temperate, 10°N to 10°S – tropical; South of 10°S – south temp.
  - HBF ≤ 10 – shallow, HBF > 10 – deep
  - Regions and deep / shallow used to present estimates at different levels of aggregation

OBSERVER COVERAGE

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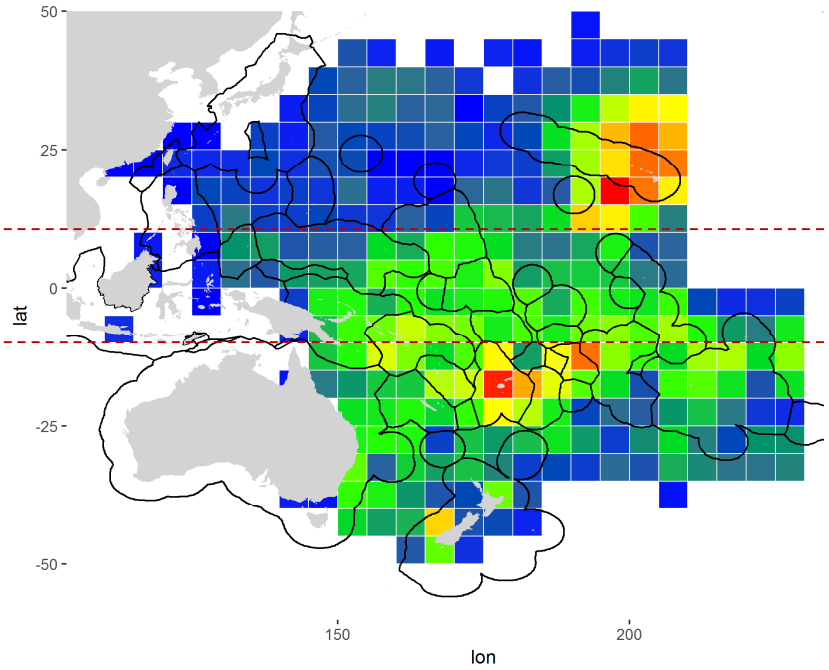
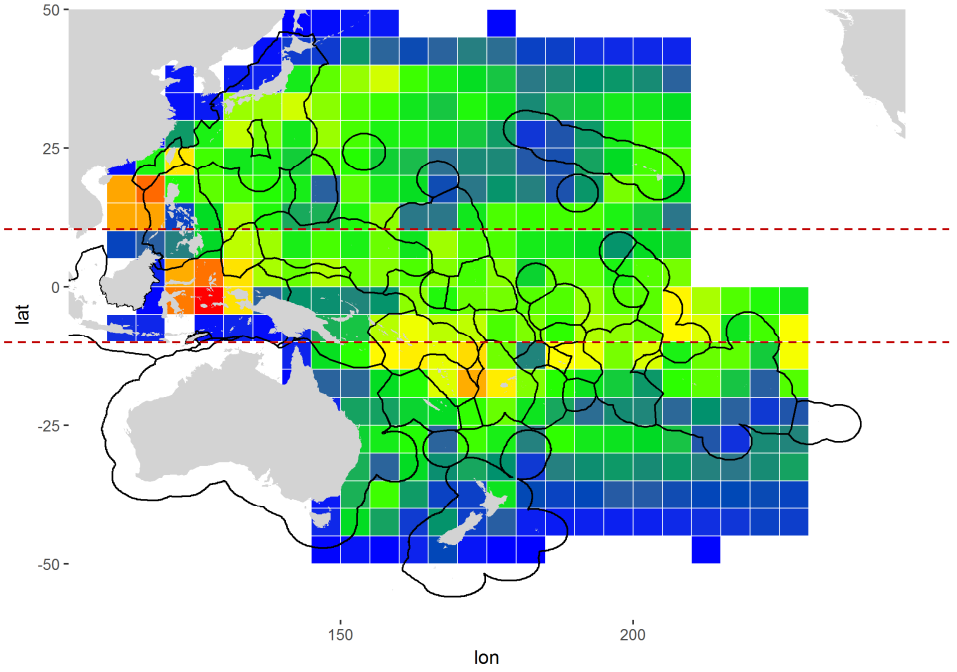
Observed effort



Total effort



METHODOLOGY

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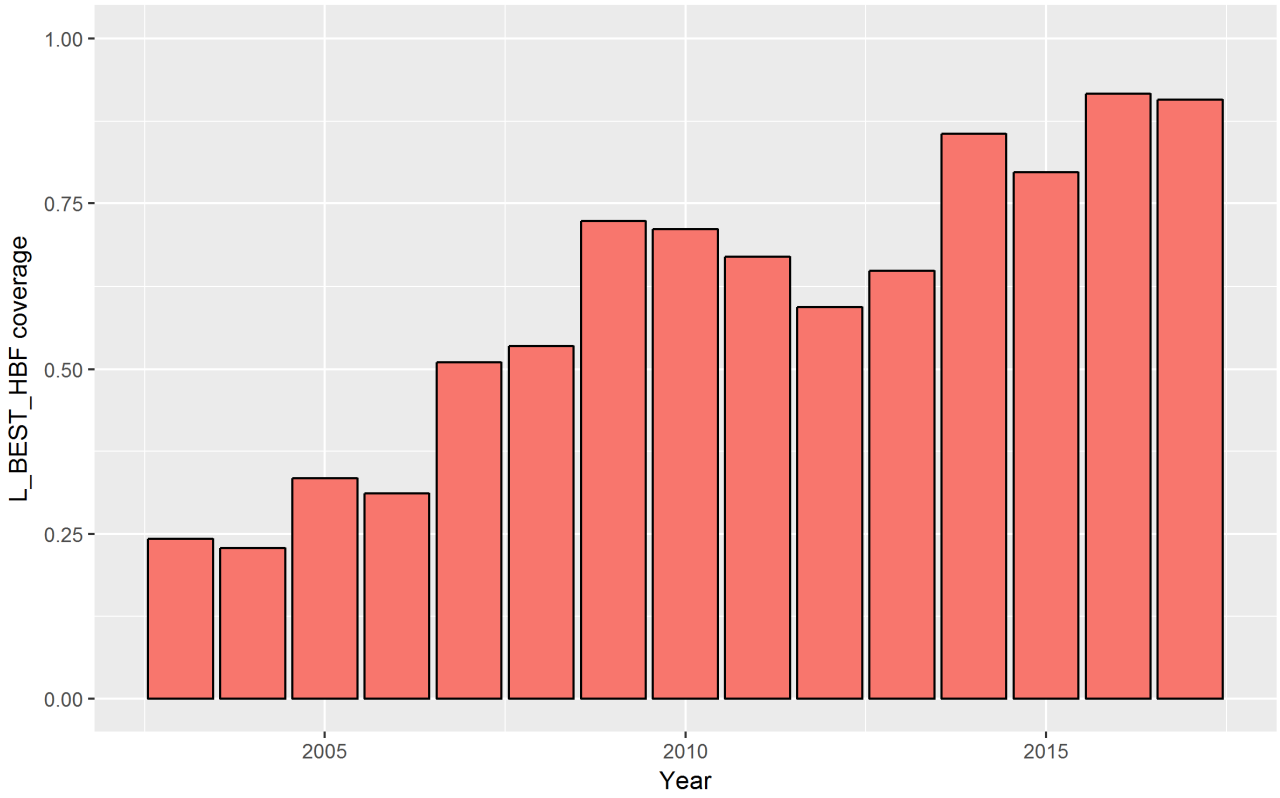
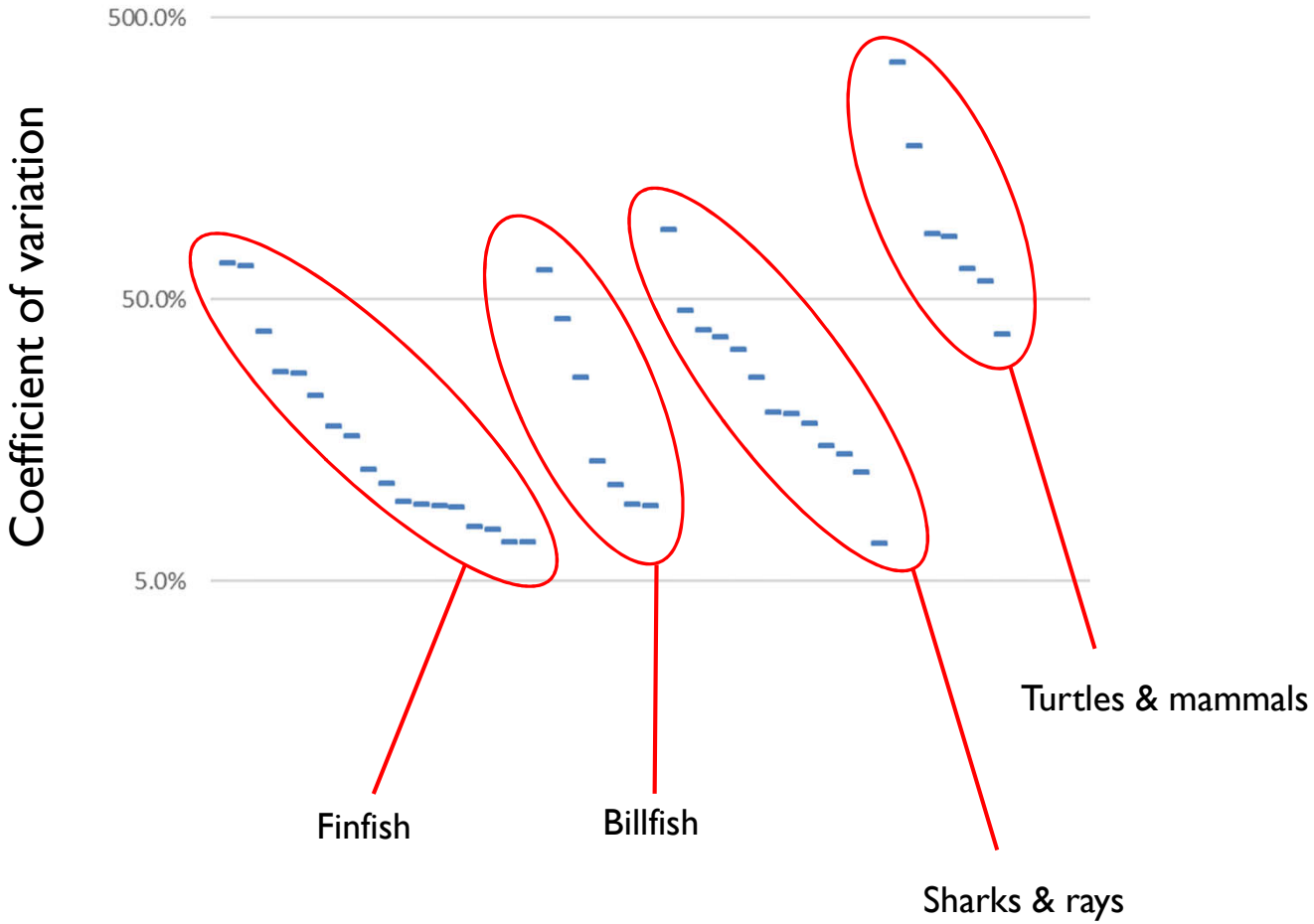
- Catch rates, and catches, estimated for 45 species / groups of species
- Catch rate model specification:
  - (Quasi) Poisson response where possible. Otherwise delta-lognormal
  - Effects for year, HBF, SST and species composition cluster from aggregate data
  - Choice of effects constrained to variables available in aggregate effort data
- Catch rates raised to catches using HBF-specific effort estimates
- Catch unit = individuals
  - For finfish, billfish and sharks and rays, also converted catches from numbers to weight using region and strategy specific average weights

EFFORT BREAKDOWN BY HBF

- Estimated HBF-specific effort proportions using HBF-specific aggregate effort data held by SPC
- Assumed that available data are representative



UNCERTAINTY IN CATCH RATE ESTIMATES



PRELIMINARY CATCH ESTIMATES

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	Finfish ('000s)			Billfish ('000s)			Sharks ('000s)			Turtles ('000s)			Marine mammals ('000s)		
Year	Low	Med	High	Low	Med	High	Low	Med	High	Low	Med	High	Low	Med	High
2003	10,690.5	11,134.5	11,715.3	1,874.9	2,041.9	2,233.2	2,167.8	2,327.6	2,525.6	10.8	16.6	28.7	1.9	3.0	5.0
2004	9,734.4	10,150.7	10,725.8	1,648.1	1,790.7	1,949.9	2,465.7	2,656.4	2,896.3	12.0	17.5	25.3	1.7	2.6	4.0
2005	8,690.6	9,022.6	9,406.7	1,530.9	1,665.9	1,812.4	2,120.5	2,285.3	2,476.7	10.3	13.6	19.3	1.2	1.7	2.6
2006	8,610.0	8,926.2	9,264.1	1,440.5	1,581.5	1,751.2	1,996.3	2,157.4	2,355.6	10.3	14.3	21.5	1.1	1.7	2.5
2007	8,124.4	8,410.4	8,706.5	1,915.0	2,111.6	2,421.0	2,095.5	2,254.4	2,440.6	22.0	32.8	62.3	1.2	1.9	3.0
2008	7,578.3	7,848.6	8,137.3	1,564.2	1,726.0	1,911.0	1,985.9	2,140.9	2,325.5	23.7	36.1	70.1	1.3	2.0	3.2
2009	9,111.9	9,417.8	9,758.5	1,870.3	2,059.4	2,269.6	2,400.7	2,611.9	2,855.1	29.2	44.2	76.5	1.5	2.3	3.6
2010	11,038.2	11,471.4	11,923.2	1,836.6	2,030.3	2,235.3	2,581.1	2,821.0	3,123.3	19.7	29.2	53.6	1.6	2.4	3.5
2011	10,932.7	11,277.5	11,677.1	1,993.3	2,188.5	2,416.9	2,801.8	3,039.1	3,324.3	14.8	21.7	39.2	2.0	2.8	4.2
2012	10,632.7	11,036.1	11,456.7	1,716.3	1,859.5	2,053.7	2,373.2	2,588.4	2,910.8	15.7	24.2	43.1	2.2	3.2	5.1
2013	8,639.2	8,941.6	9,225.8	1,166.4	1,254.4	1,358.7	1,541.0	1,647.5	1,769.8	13.2	18.5	30.1	2.2	3.1	4.2
2014	8,276.4	8,579.7	8,870.4	1,148.5	1,246.3	1,359.8	1,558.6	1,670.8	1,804.4	15.5	21.6	32.1	2.4	3.4	4.9
2015	8,971.9	9,255.6	9,542.3	1,211.2	1,307.4	1,408.4	1,851.9	1,990.4	2,148.0	24.7	32.1	44.8	2.1	3.0	4.3
2016	8,118.8	8,359.9	8,631.9	1,077.2	1,166.3	1,262.2	1,825.7	1,957.8	2,097.3	18.3	24.1	35.4	2.0	2.8	4.2
2017	8,276.9	8,620.2	8,953.2	1,036.9	1,117.0	1,209.4	1,686.9	1,796.2	1,919.5	12.5	17.8	26.1	3.3	5.0	7.9

OCEANIC WHITETIP

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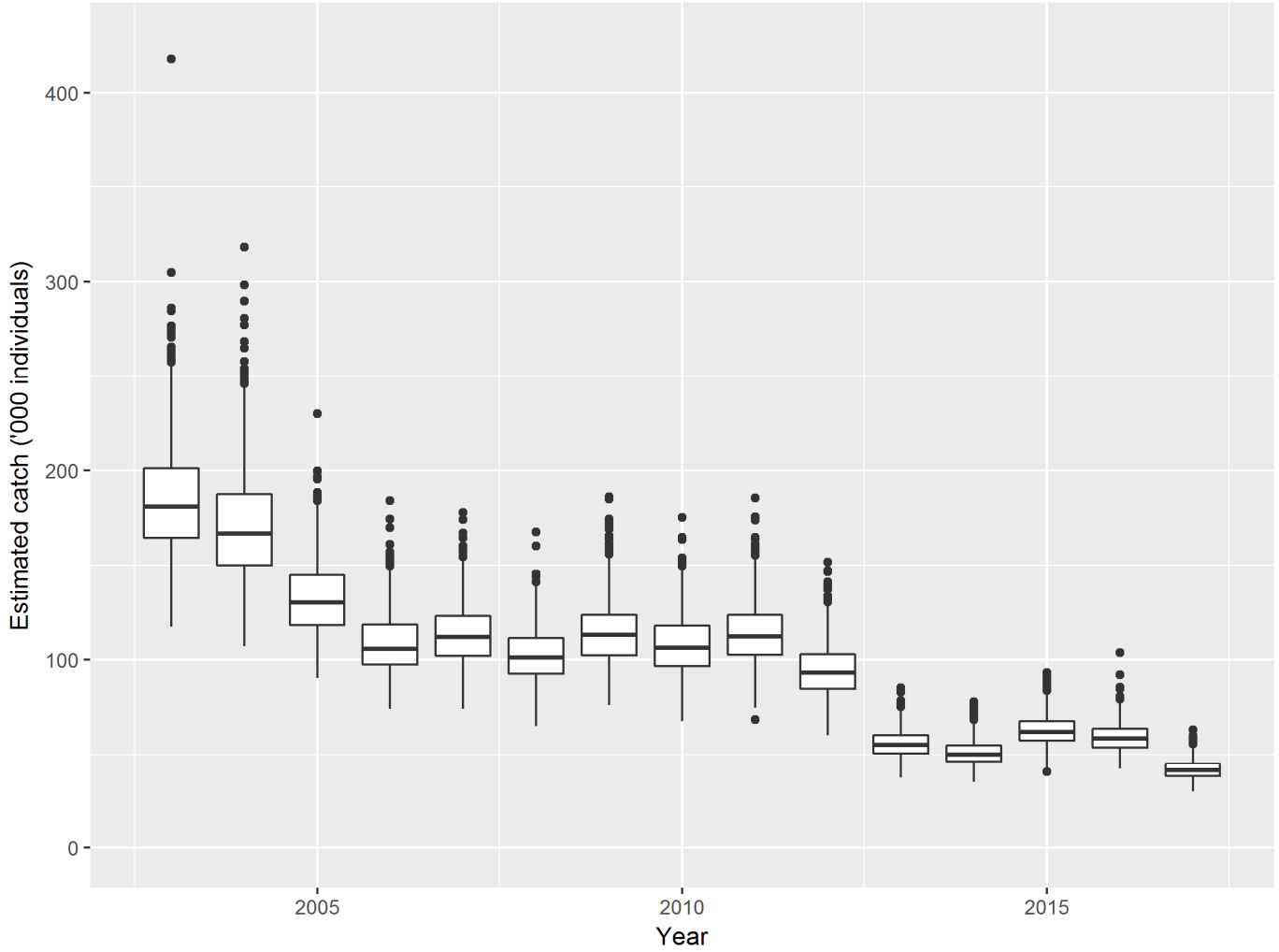

DISCUSSION

- Uncertainty in catch does not include uncertainty in HBF-specific effort proportions
  - Uncertainty in catches from 2003 to 2009 underestimated
- Approach assumes available HBF-specific aggregate effort data is representative
  - EDA suggests that this is not always true
  - Might explain step changes in shallow effort (doubles from 2006 to 2007, halves from 2012 to 2013
- Lack of fit for log-normal components of catch rate models suggests targeting behaviour not adequately captured by models
  - Is there a need to estimate catches of ALB, BET, YFT and SWO in future analyses?
- Catch estimates do not necessarily reflect trends & levels of mortalities for species that are not retained
  - Particularly species with no-retention policies through domestic or regional measures
  - In future work, would be informative to look at changes in fate & condition through time

PURSE SEINE BYCATCH

- Updated purse seine bycatches to cover 2003 to 2017 (WCPFC-SC14-2018/ST-IP-04)
  - No changes to methodology
- Observer coverage for 2017 was quite limited when report prepared (early July 2018)
  - 2017 estimates should be considered preliminary

RECOMMENDATIONS – I

- SC note the difficulties in robust estimation of longline catches from observer data, given the very low levels of observer coverage, and for some years (2003-2008) the coverage of L_BEST_HBF data
- SC note that longline observer coverage levels in the region have generally been less than 5%, though acknowledging that observer coverage can be expressed in a variety of units, and varies between flags
- SC note of the regions of the WCPFC-CA with substantial longline effort and low levels of available observer coverage, and the implications this has on bycatch estimation at a regional level

RECOMMENDATIONS – II

- SC consider whether historic L_BEST_HBF aggregate data can be derived by members (where necessary), to support future analysis of longline observer data
- SC decide on whether the preliminary estimates of longline bycatch are suitable for public release in the context of the associated uncertainties
- SC consider whether estimates of purse seine bycatch should be made publicly available in electronic format to facilitate extraction and use of data by CCMs, and potentially other stakeholders, and
- SC consider the utility of the longline and purse seine bycatch summaries, and whether annual and/or periodic future updates would be helpful.

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THANKS FOR LISTENING!