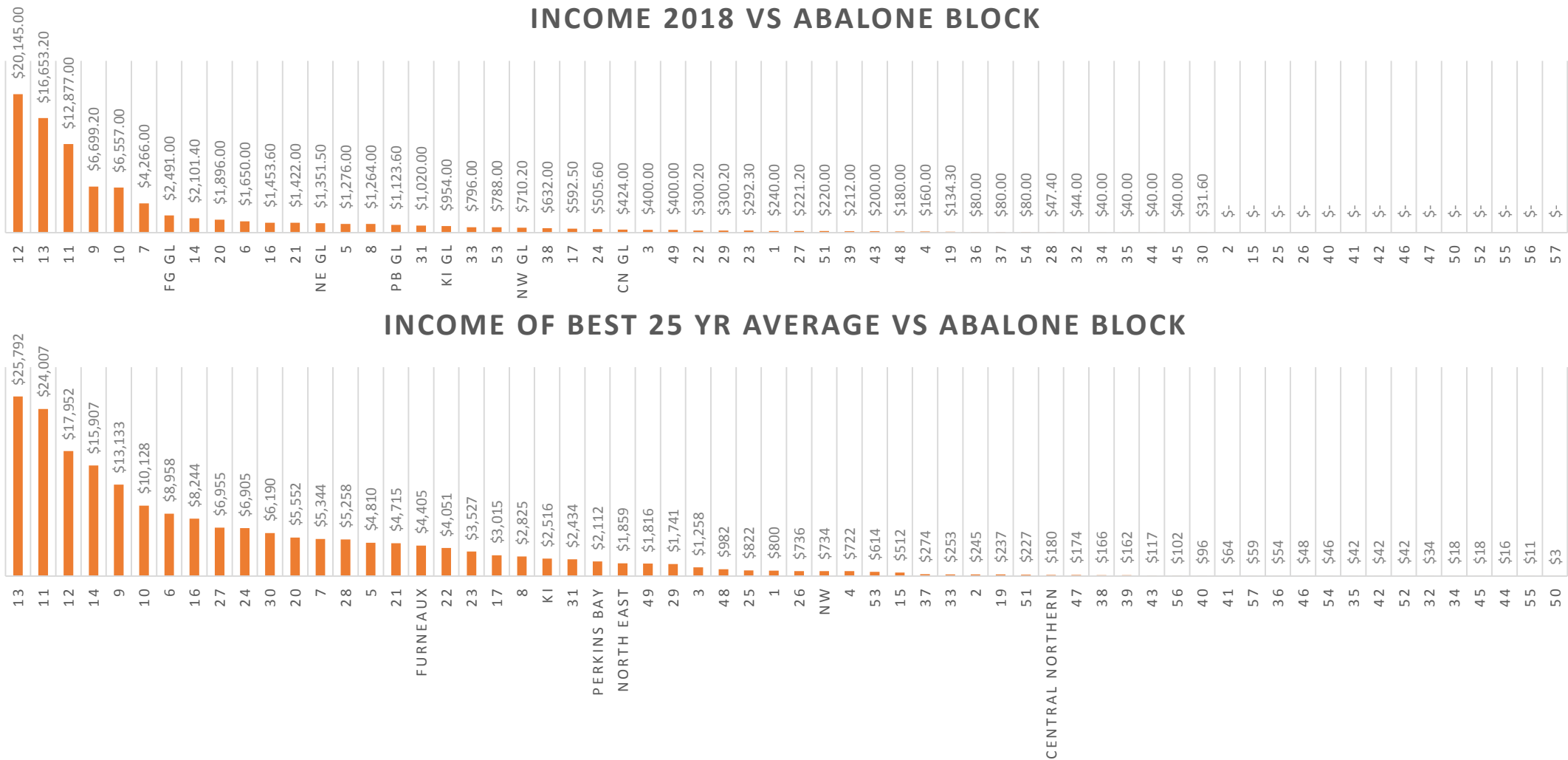


FIG. 42. This pile of shells is the result of one morning's cleaning operations at one abalone market. Photograph by Richard S. Croker, Monterey, California, September 5, 1930.

Risks from Overfishing

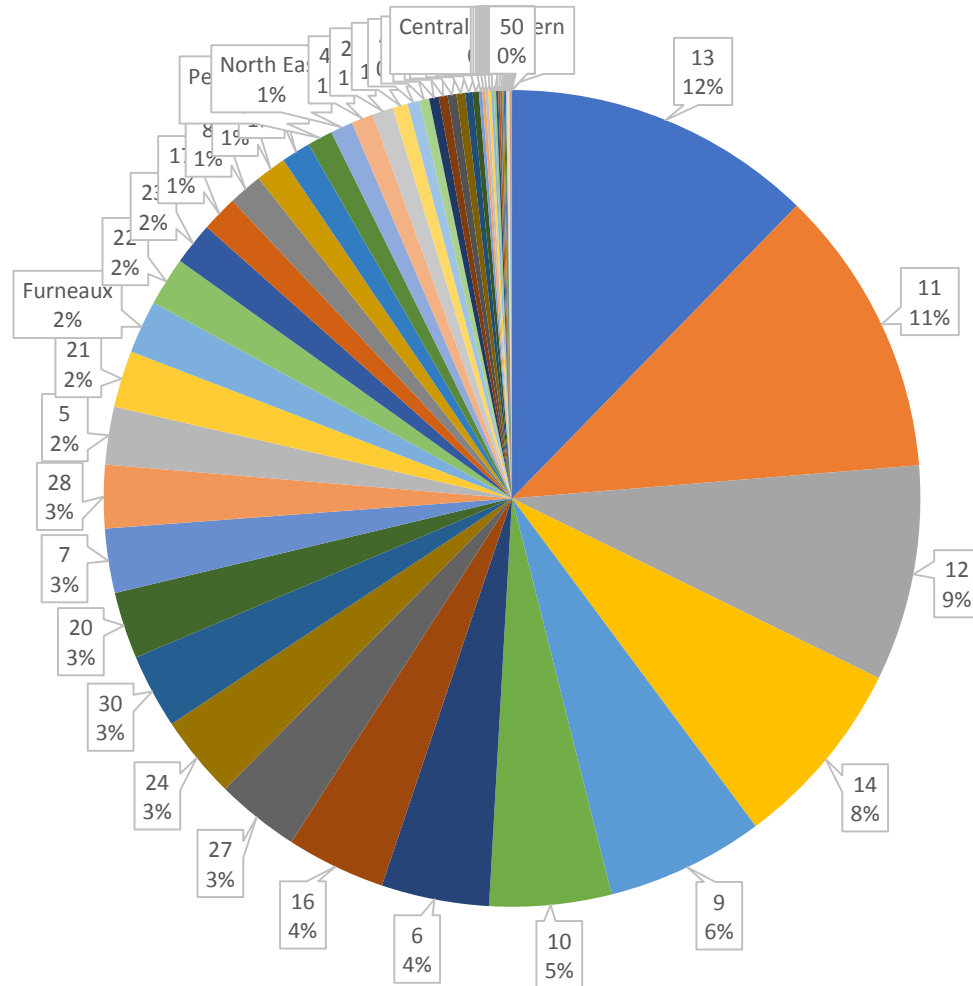
Darvin Hansen – a preliminary presentation for the TACL AGM 2018

Increased reliance on Fewer blocks

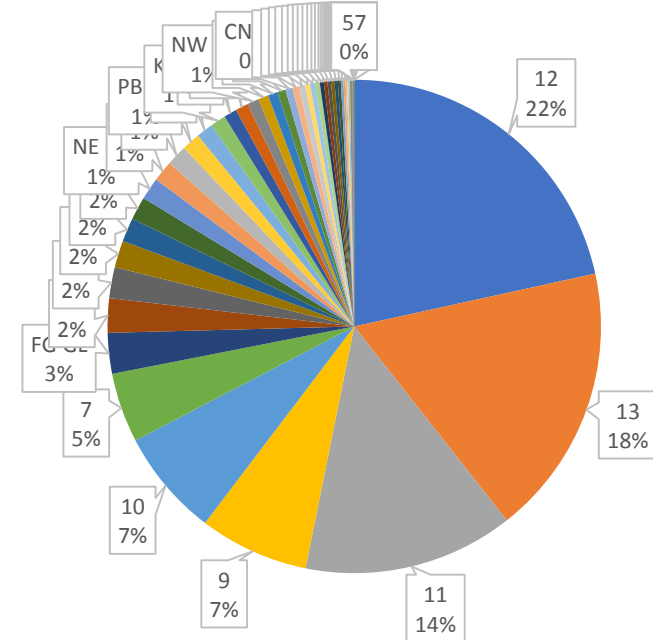


Increased Reliance on Fewer Blocks

INCOME BEST 25 YR VS ABALONE BLOCK



INCOME 2018 VS ABALONE BLOCK



Increased Risk Due to What?

- Lower biomass than historical. On the East Coast, mortality events...
- Small area of fishing, part of WZ plus block 13. Mortality event risk:
 - Hypoxia due to warm water/low water movement. Can happen in Western Zone too, e.g. ~1970 with weeks of sustained Easterly weather.
 - Storm Events
 - Toxic algal blooms. Some can kill abalone too, e.g. South Africa
 - Pathogens (e.g. AVG)
- Industry bias to optimism and high risk tolerance/enjoyment leading to overly-optimistic TACCs and overfishing
- Insufficient scrutiny of big zones. Large area CPUE masks bad news. Poor performing blocks eventually will have reduced catch, which doesn't contribute much to the average.

Maximum Sustainable Yield Is Not Always Achievable

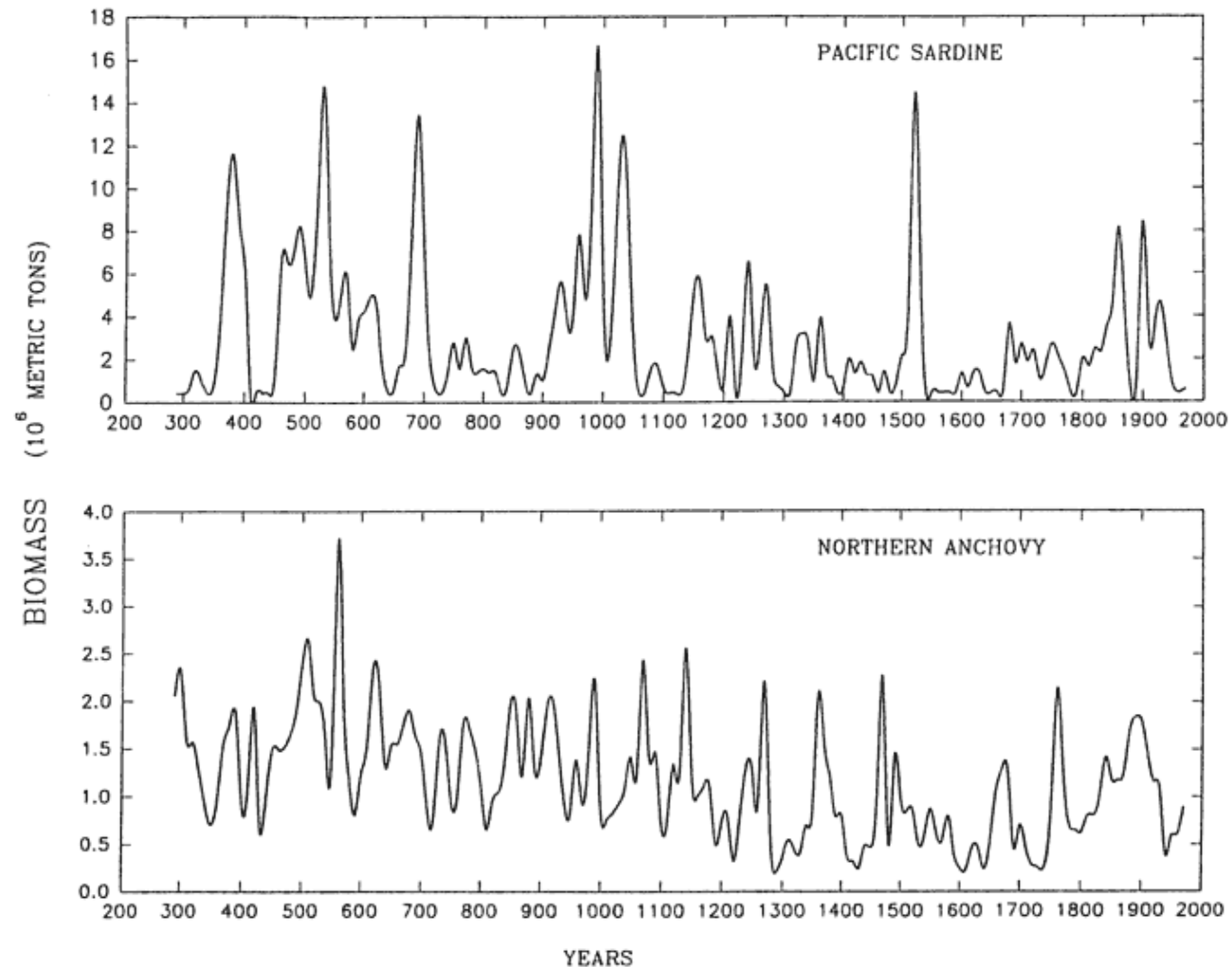
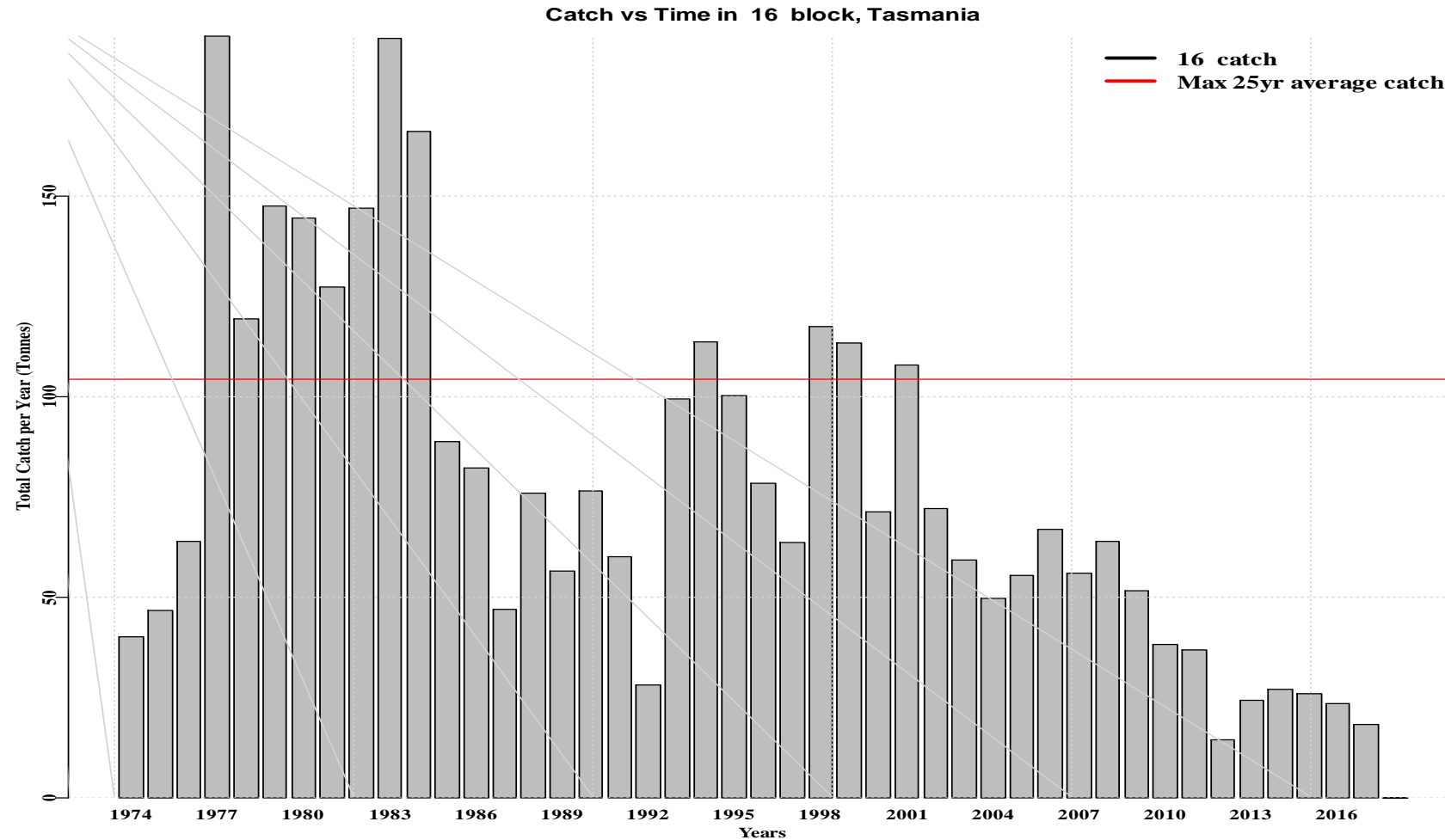


Figure 7. 1700-year hindcast series of Pacific sardine and northern anchovy biomasses off California and Baja California obtained by conversion of SDR data in figure 4 to units of biomass with the regression equations in figure 6.

Implications of Increased Risk Profile

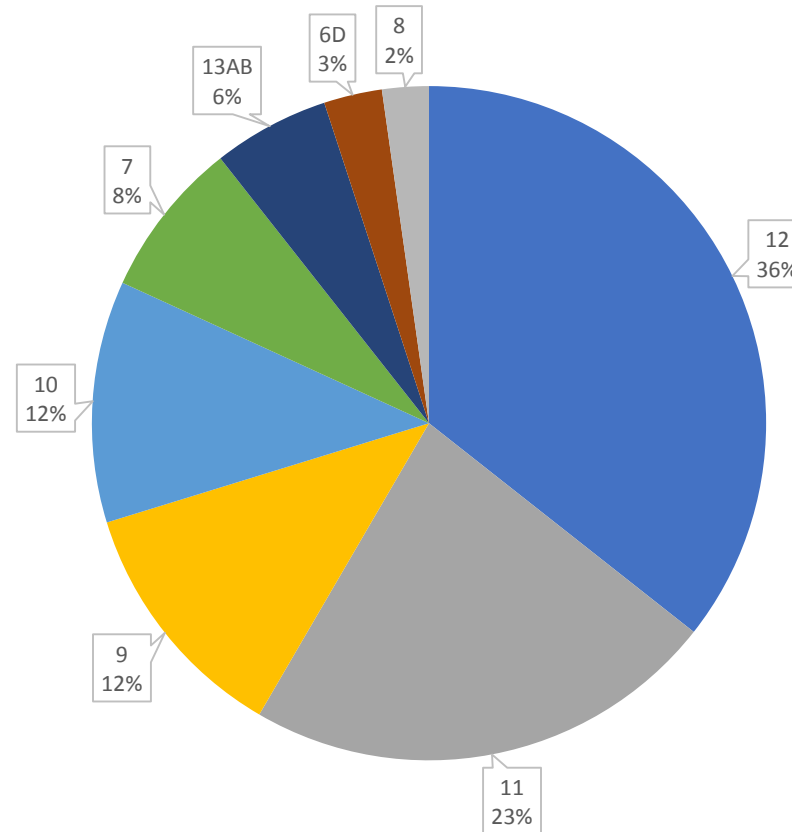
- Overfishing – Identify it in all stages of depletion, prevent it, secure a rebuild, treat causes of overruns by precautionary catch targets and zone TACCs, margin of safety.
- Increased scrutiny of high value zones and blocks
- Re-calibrate our fishery management responses.
 - Default to lower catch targets/TACCs (conservative) when in doubt
 - When catch cuts indicated, increase (double) the quantity
 - Extend time and decrease magnitude of rebuild to allow the biomass to increase
- Build up “fat”, margin for error in our biomass.

How to overfish an abalone block

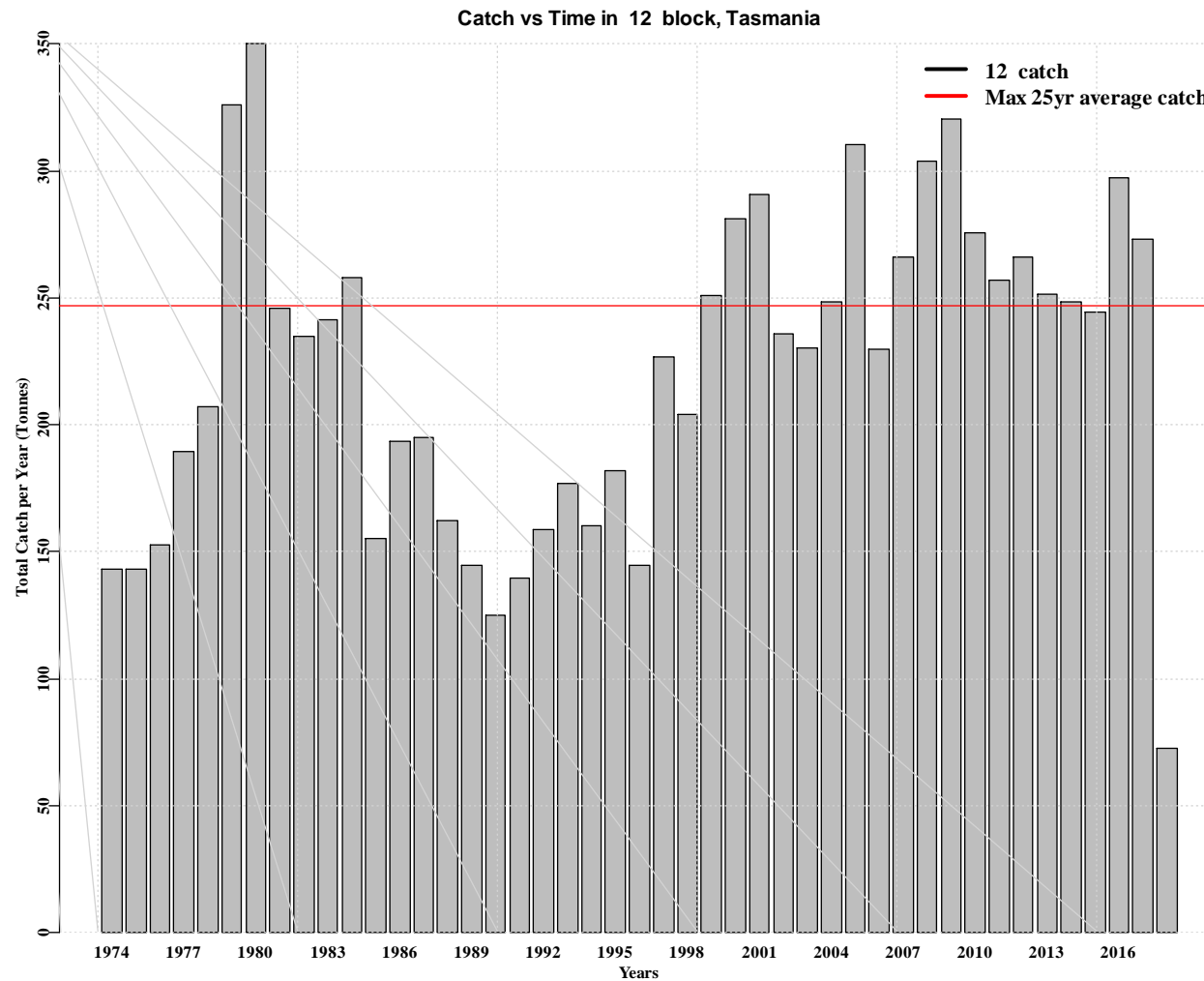


Western Zone – Is it recovering?

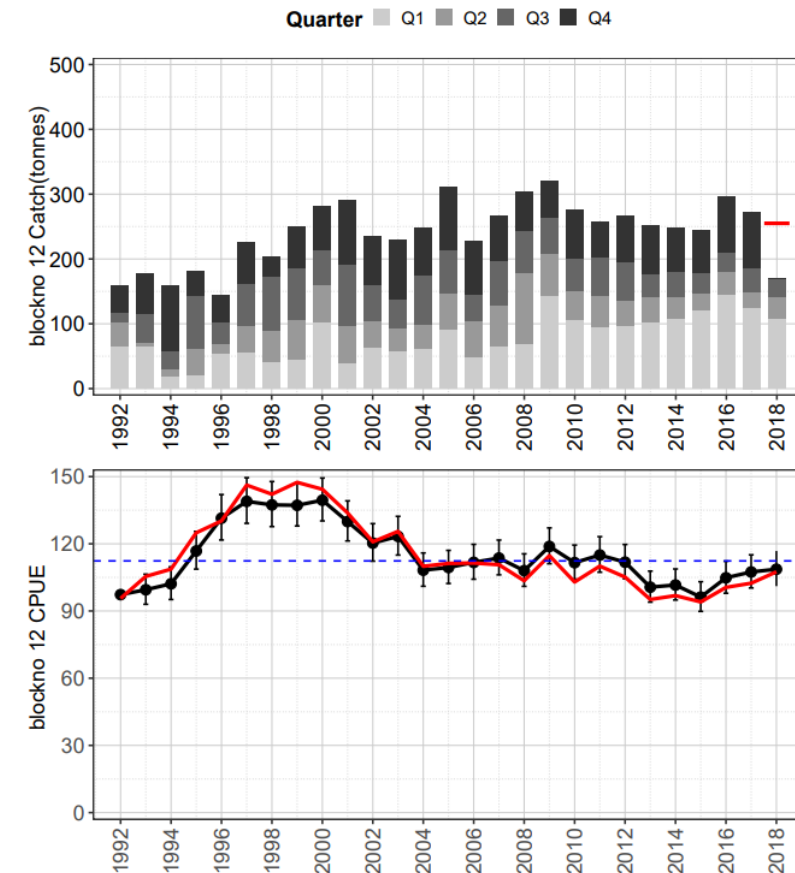
WZ INCOME AND CATCH TARGETS 2018 VS ABALONE BLOCK



Block 12 – About at MSY, over, is it prudent?

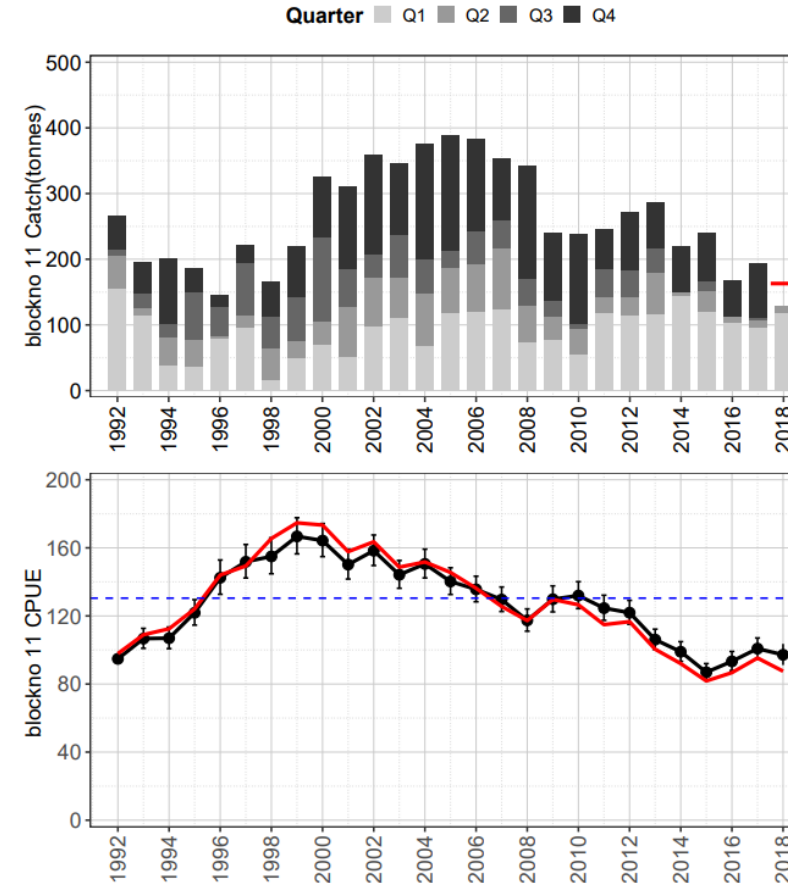
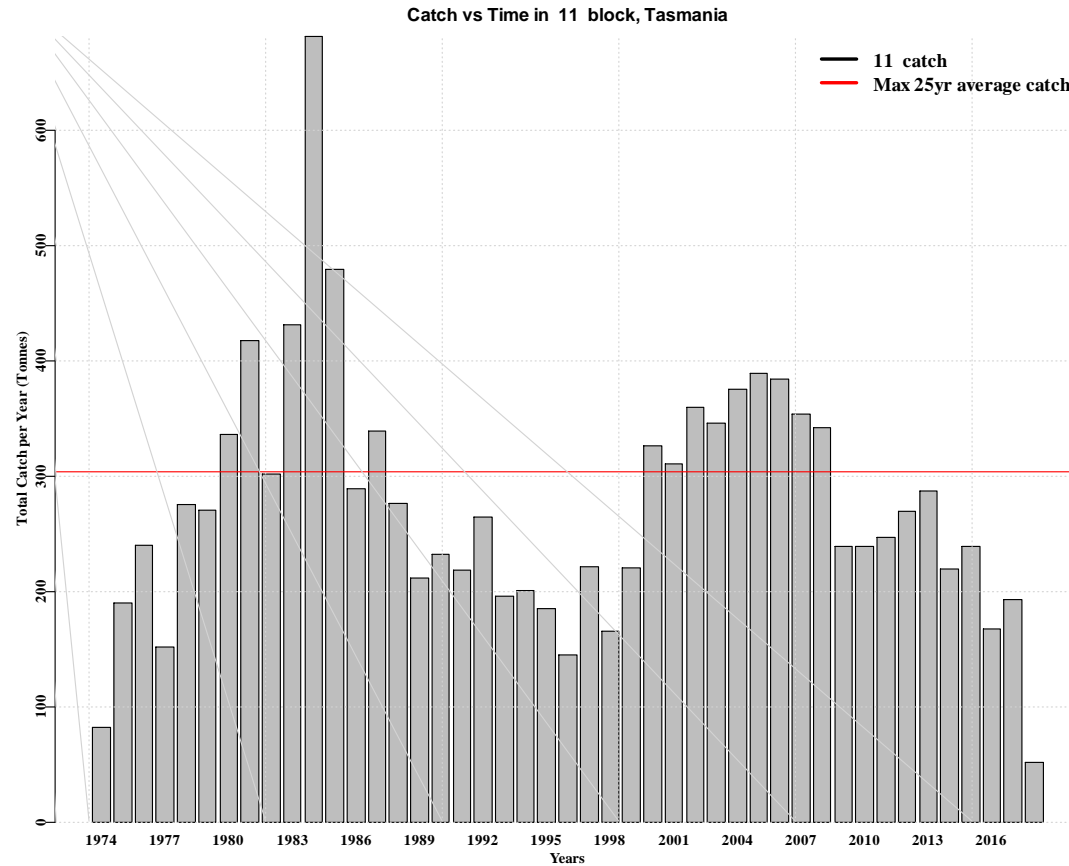


Block 12 - Faults Bay to Prion Beach



Block 11 – Maybe not recovering. Needs a Rebuild

Block 11 - Low Rocky Point to Faults Bay



Quotes

The easiest person to fool is yourself - Feynman

Live not by lies - Solzhenitsyn