Queensland Stock Status Assessment Workshop 2014

5-6 June, 2014

Queensland information for *Status of key Australian fish stocks report* 2014

Department of Agriculture, Fisheries and Forestry 2014, Queensland Stock Status Assessment Workshop 2014, Brisbane, Queensland Department of Agriculture, Fisheries and Forestry.

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Queensland Stock Status Assessment Workshop 2014

The Queensland Department of Agriculture Fisheries and Forestry (DAFF) held a workshop in June 2014 to help determine the stock status of 29 nationally important fishery species that occur in Queensland. The status of these stocks is reported in the *Status of key Australian fish stocks report 2014* (fish.gov.au). This document provides summaries of the Queensland-specific information considered in the workshop[1].

DAFF has assessed the status of Queensland's key fish stocks every year since 2010. These assessments follow a weight-of-evidence approach, whereby an expert panel reaches consensus on the status of Queensland's component of each stock.

Between 2010 and 2013, the process for assessing stock status was based on a Queensland-developed method (i.e. Queensland criteria and terminology). In 2014, the process was changed. In particular, the criteria and terminology used to determine status were modified to make them consistent with those used nationally for determining the status of stocks. This change ensured the results of the Queensland workshop were able to be used during the national process and should help to improve community confidence in the stock status findings. Stock status determinations help guide DAFF in decisions about fisheries management and research.

In addition to this report, up-to-date commercial catch data for individual species can be obtained from <qfish.qld.gov.au> and information about the fishery-dependent and -independent biological monitoring programs can be found at https://www.daff.qld.gov.au/fisheries/monitoring-our-fisheries/commercial-fisheries/species-specific-programs
.

[1] [1] Queensland-specific information for seven SAFS species (mulloway, black jewfish, yellowtail kingfish, golden snapper, blacktip shark, sandbar shark and Murray River cod) was not presented and discussed at the 2014 workshop.

Fin Fish

Barramundi (*Lates calcarifer*)

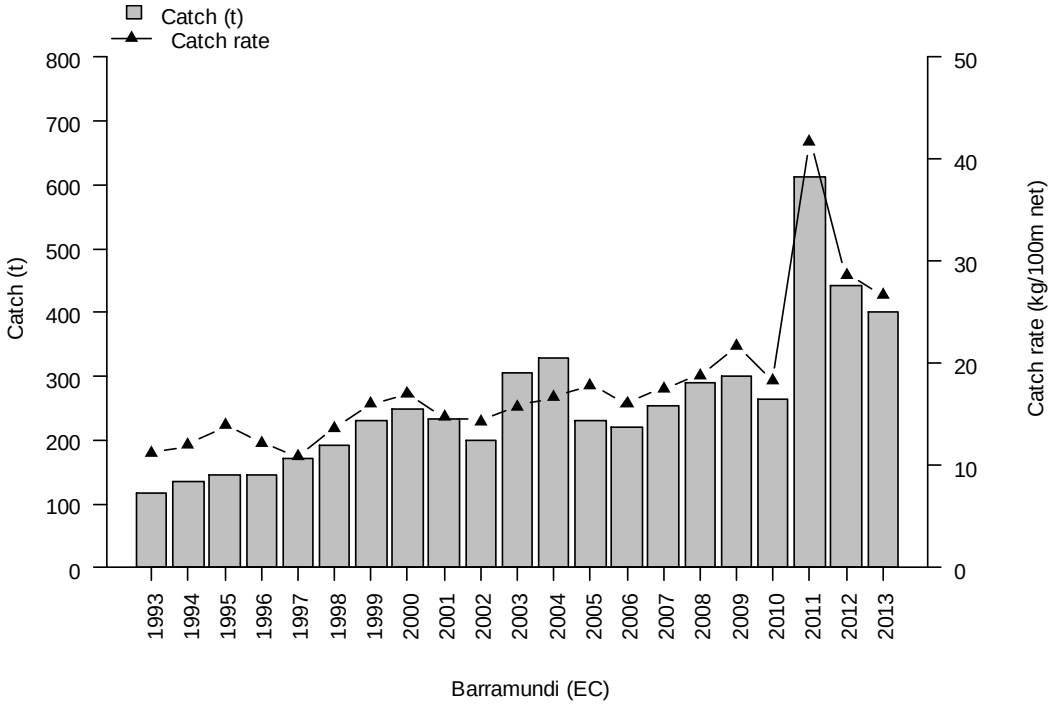

Figure 1. East coast barramundi – all stocks combined. Total reported annual commercial catch (tonnes) and raw annual catch rate for net fishing (kg/100m net).

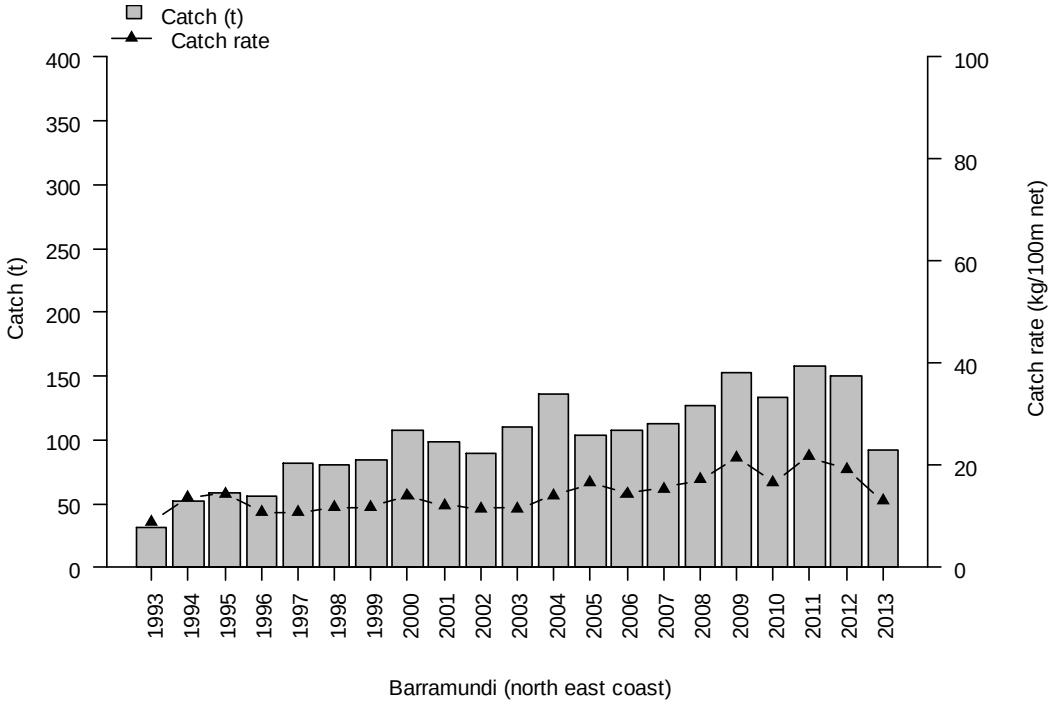

Figure 2. East coast barramundi – north east coast stock. Total reported annual commercial catch (tonnes) and raw annual catch rates for net fishing (kg/100 m of net).

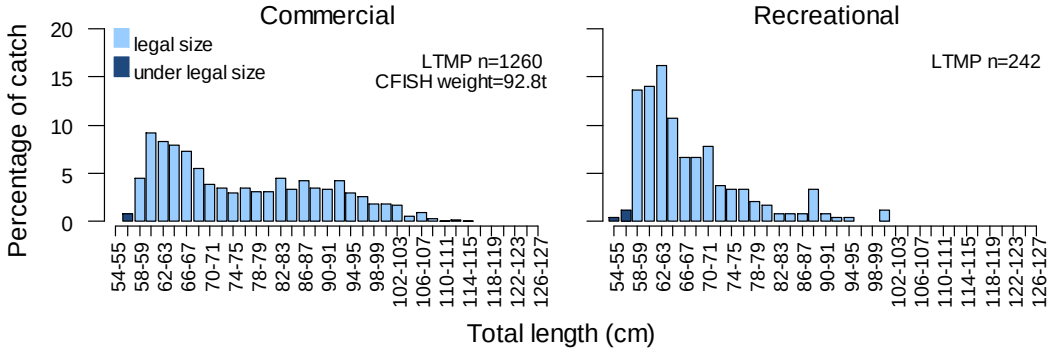

Figure 3. East coast barramundi – north east coast stock. Length frequency distributions of fish retained by commercial and recreational sectors in 2013.

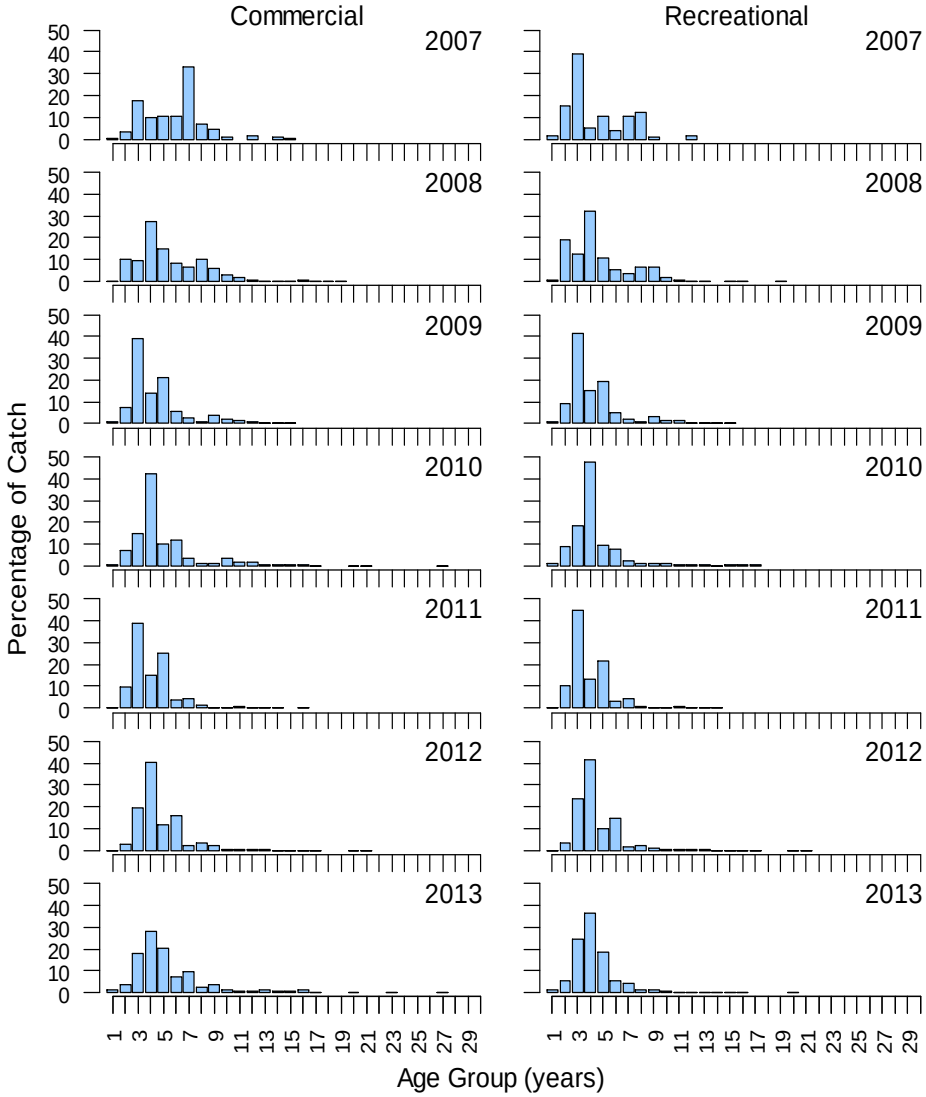

Figure 4. East coast barramundi – north east coast stock. Annual age frequency distributions of fish retained by commercial and recreational sectors.

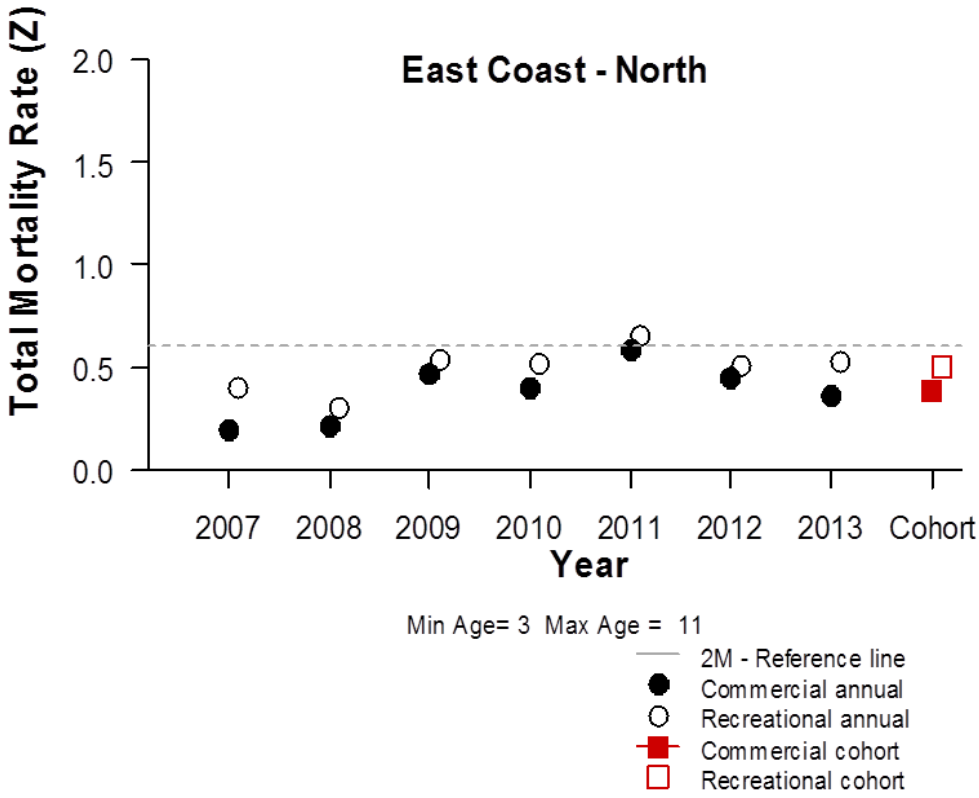

Figure 5. East coast barramundi – north east coast stock. Annual estimates of instantaneous rate of total mortality (Z) based on cross sectional analysis of annual age frequency distributions of fish retained by commercial and recreational sectors. 'Cohort' is a modelled average rate of total mortality calculated using all age-frequency distributions together (2007–2013) and taking account of year-to-year variation in year-class strength. The horizontal line indicates the rate of total mortality corresponding to twice the rate of natural mortality (2M). This is also the value for rate of total mortality where rates of fishing and natural mortality are equal (i.e. F=M).

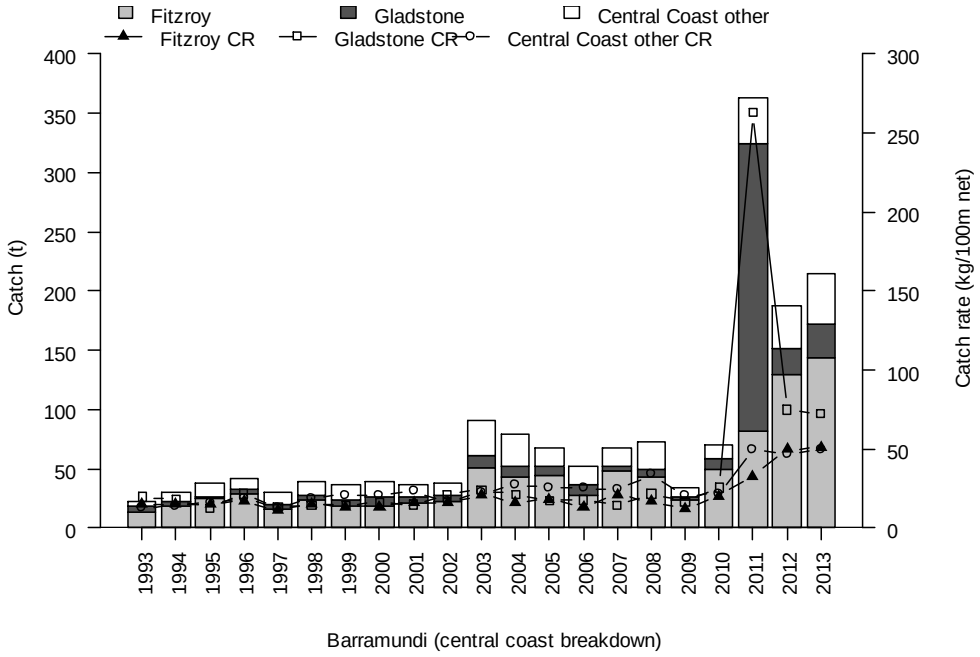

Figure 6. East coast barramundi – central coast stock. Total reported annual commercial catch (tonnes) grouped by subregion, plus raw annual catch rates for net fishing (kg/100 m of net).

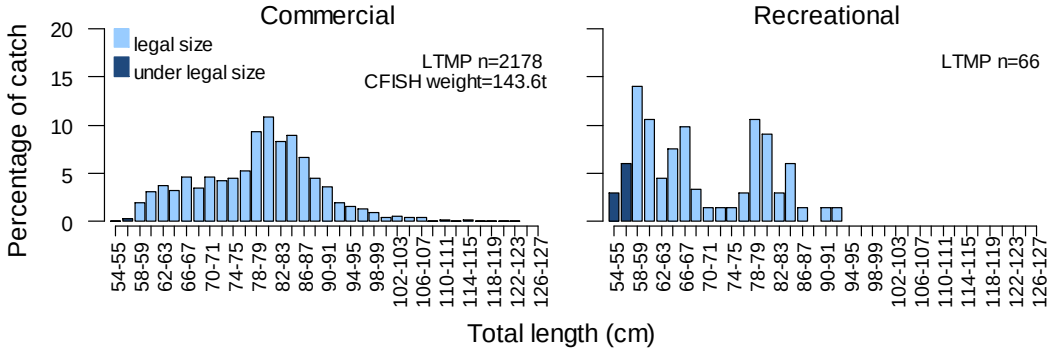

Figure 7. East coast barramundi – central coast stock (Fitzroy subregion only). Length frequency distributions of fish retained by commercial and recreational sectors in 2013.

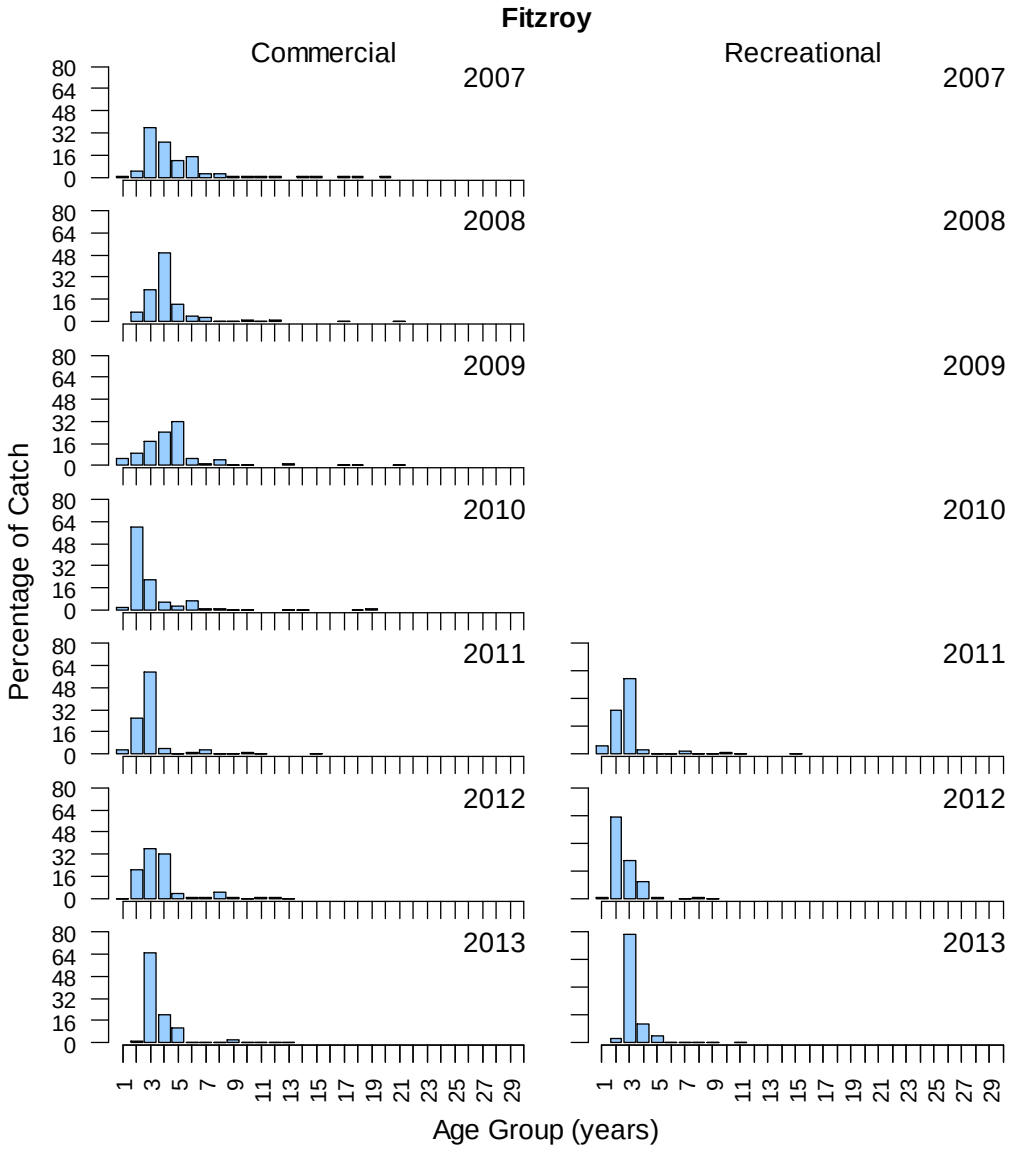

Figure 8. East coast barramundi – central coast stock (Fitzroy subregion only). Annual age frequency distributions of fish retained by commercial and recreational sectors.

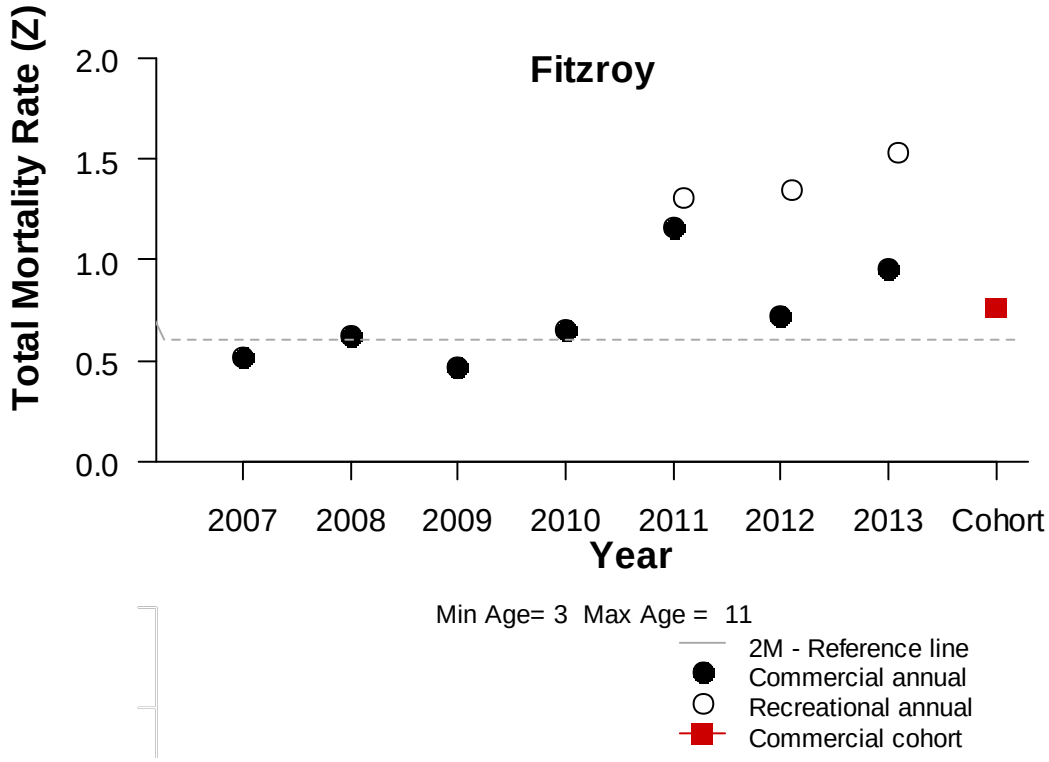

Figure 9. East coast barramundi – central coast stock (Fitzroy subregion only). Annual estimates of instantaneous rate of total mortality (Z) based on cross sectional analysis of annual age frequency distributions of fish retained by commercial and recreational sectors. 'Cohort' is a modelled average rate of total mortality calculated using all age-frequency distributions together (2007–2013) and taking account of year-to-year variation in year-class strength. The horizontal line indicates the rate of total mortality corresponding to twice the rate of natural mortality (2M). This is also the value for rate of total mortality where rate of fishing mortality equals the rate of natural mortality (i.e. F=M).

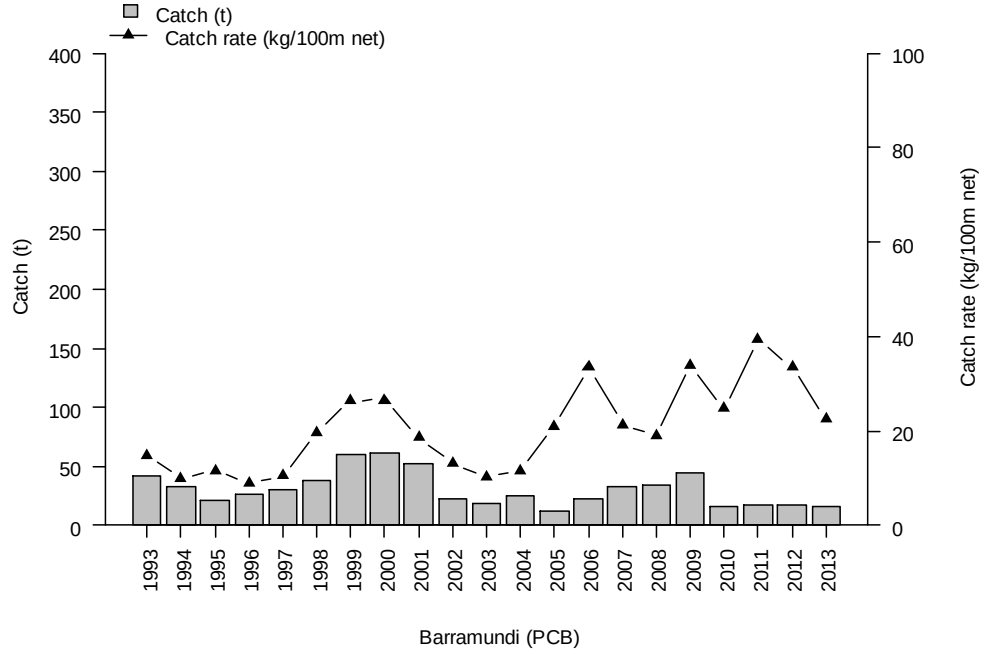

Figure 10. East coast barramundi – Princess Charlotte Bay stock. Total reported annual commercial catch (tonnes) and raw catch rates for net fishing (kg/100 m of net).

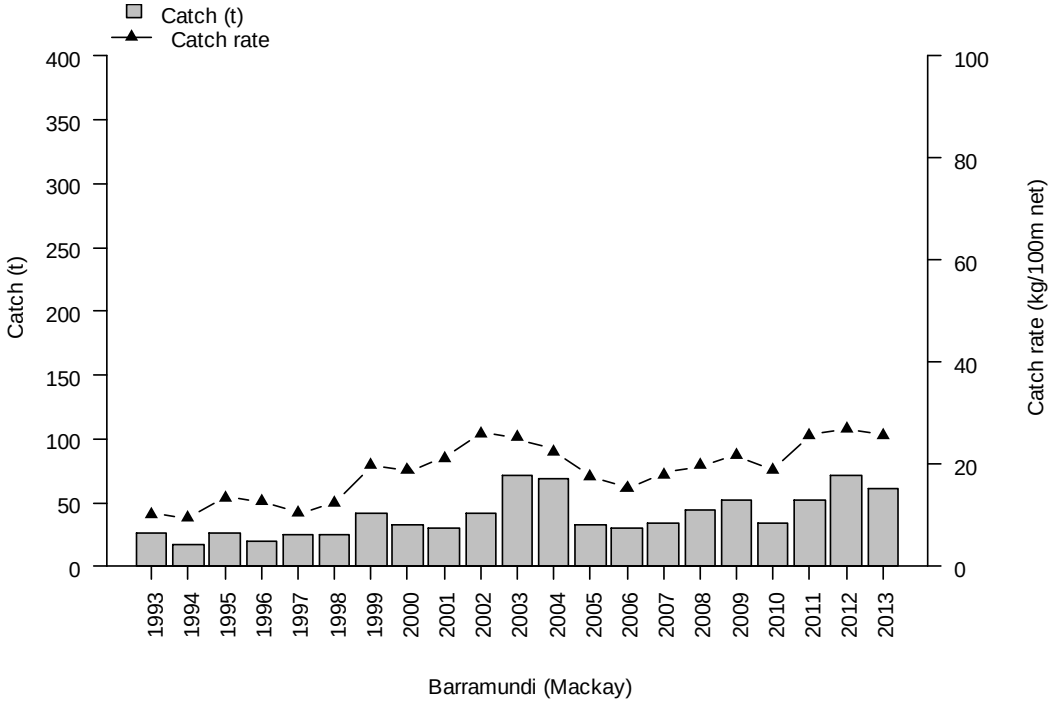

Figure 11. East coast barramundi – Mackay stock. Total reported annual commercial catch (tonnes) and raw catch rates for net fishing (kg/100 m of net).

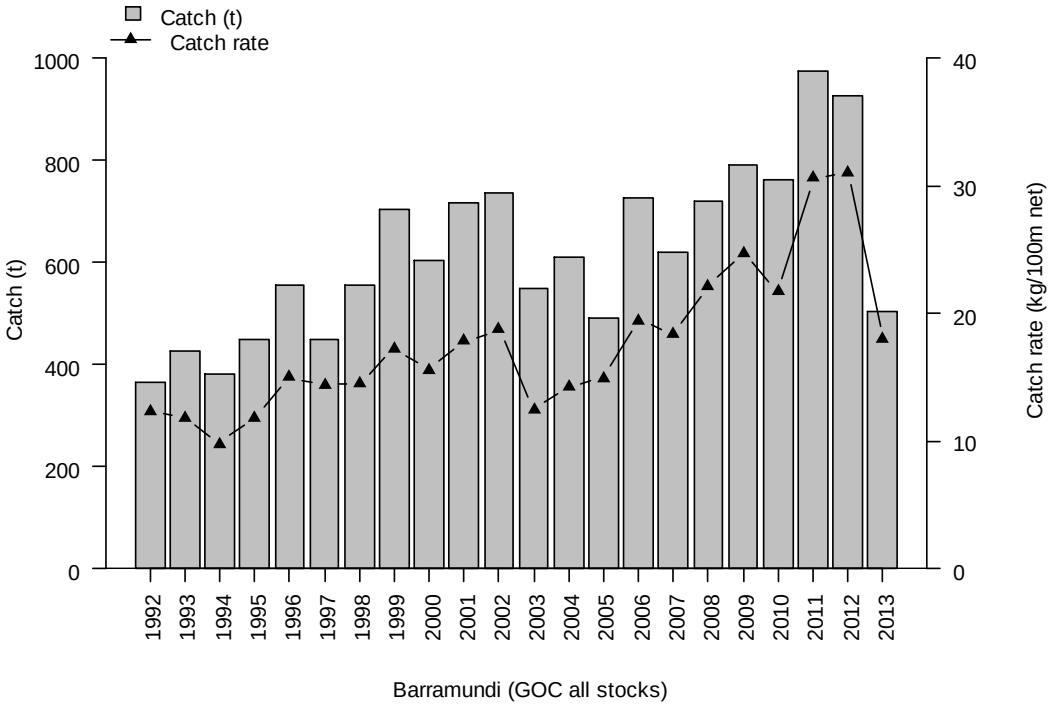

Figure 12. Gulf of Carpentaria barramundi – both stocks combined. Total reported annual commercial catch (tonnes) and raw catch rate for net fishing (kg/100m net).

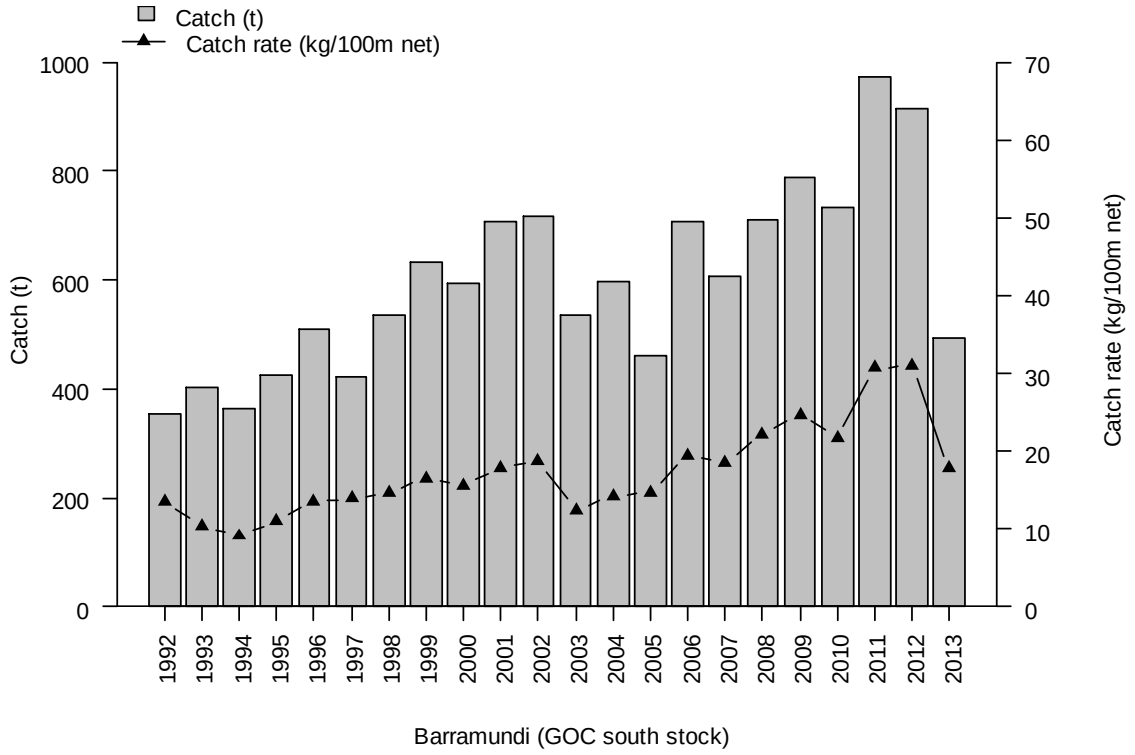

Figure 13. Gulf of Carpentaria barramundi – southern stock. Total reported annual commercial catch (tonnes) and raw catch rates for net fishing (kg/100 m of net).

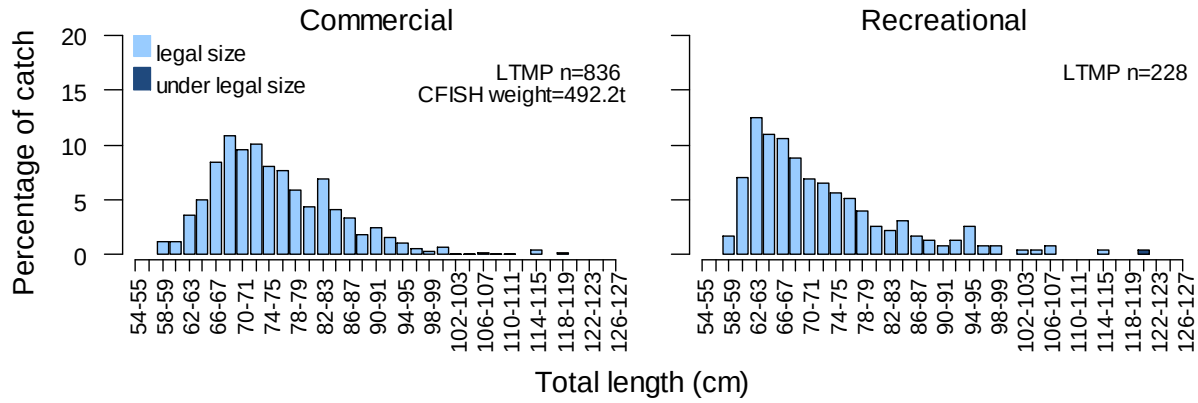

Figure 14. Gulf of Carpentaria barramundi – southern stock. Length frequency distributions of fish retained by commercial and recreational sectors in 2013.

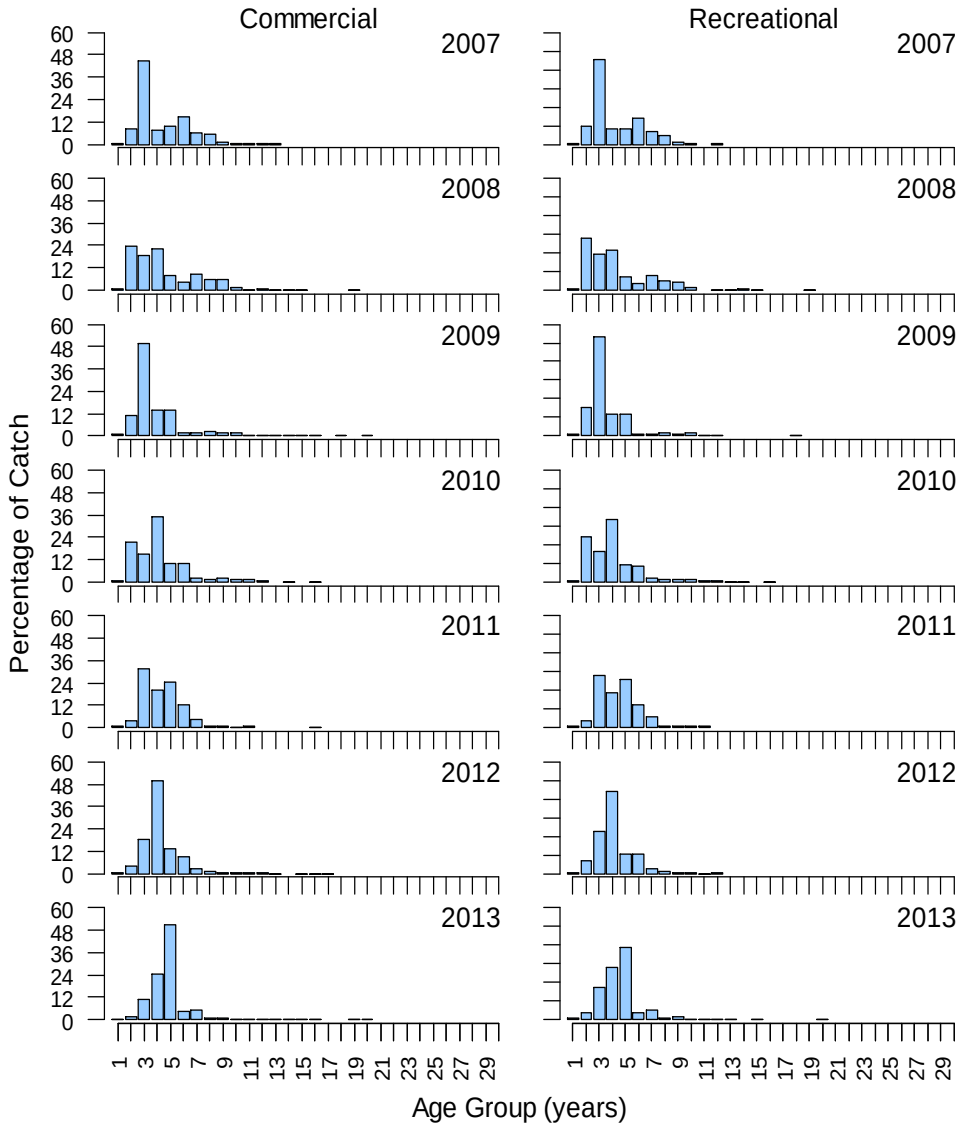

Figure 15. Gulf of Carpentaria barramundi – southern stock. Annual age frequency distributions of fish retained by commercial and recreational sectors.

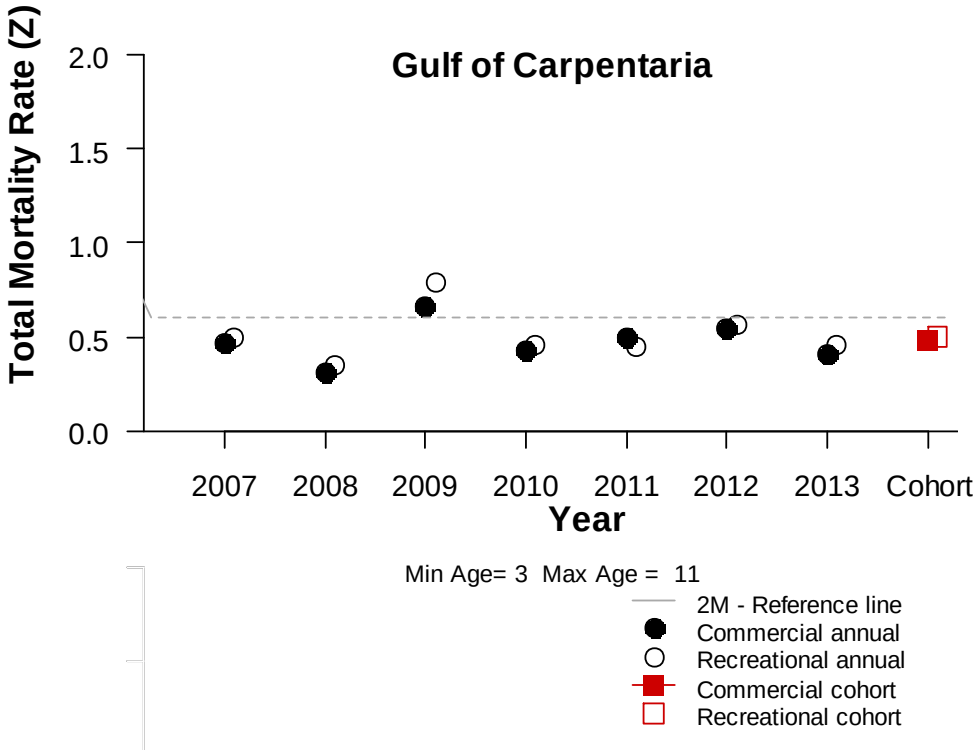

Figure 16. Gulf of Carpentaria barramundi – southern stock. Annual estimates of instantaneous rate of total mortality (Z) based on cross sectional analysis of annual age frequency distributions of fish retained by commercial and recreational sectors. 'Cohort' is a modelled average rate of total mortality calculated using all age-frequency distributions together (2007–2013) and taking account of year-to-year variation in year-class strength.The horizontal line indicates the rate of total mortality corresponding to twice the rate of natural mortality (2M). This is also the value for rate of total mortality where rate of fishing mortality equals the rate of natural mortality (i.e. F=M).

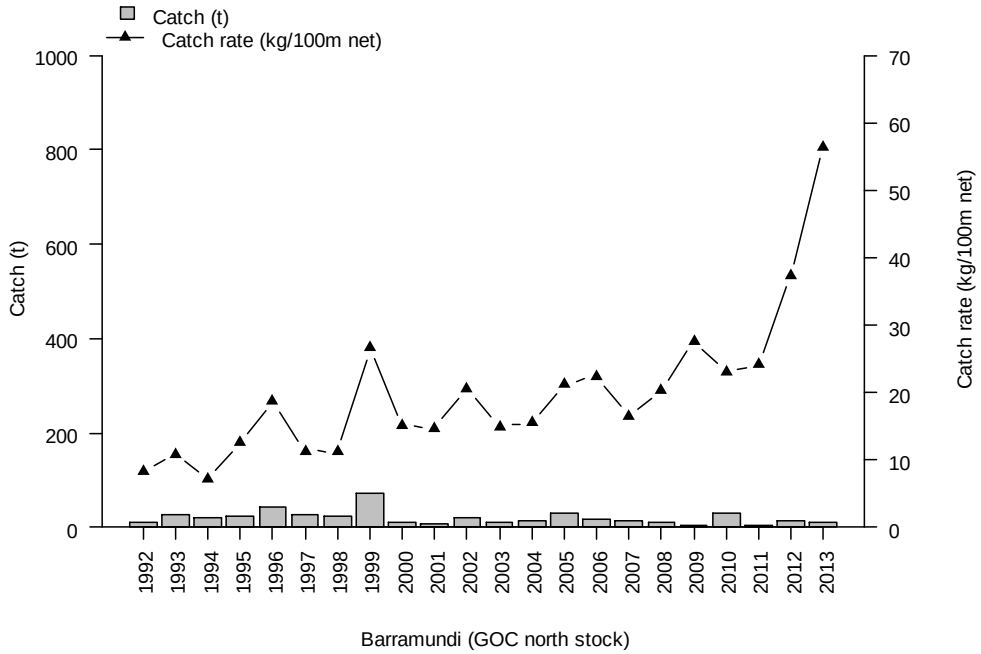

Figure 17. Gulf of Carpentaria barramundi – northern stock. Total reported annual commercial catch (tonnes) and raw catch rates for net fishing (kg/100 m of net).

Coral trout (*Plectropomus* and *Variola* spp.)

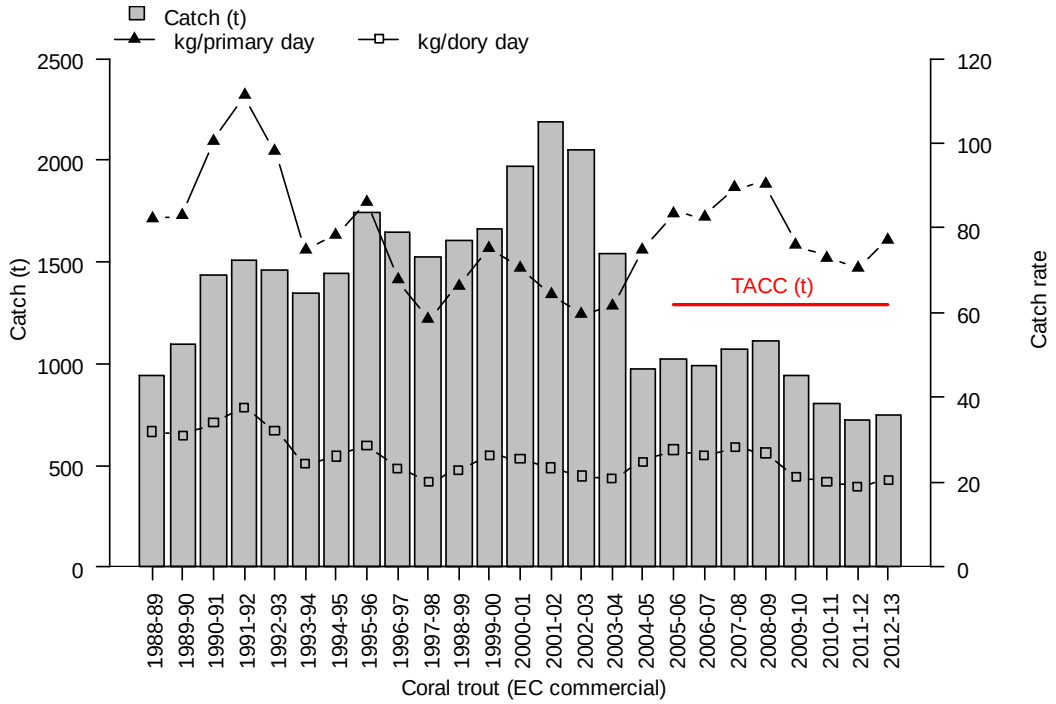

Figure 18. East coast coral trout. Total reported annual commercial catch (tonnes) and raw catch rates (kg/day per primary licence and kg/day per dory).

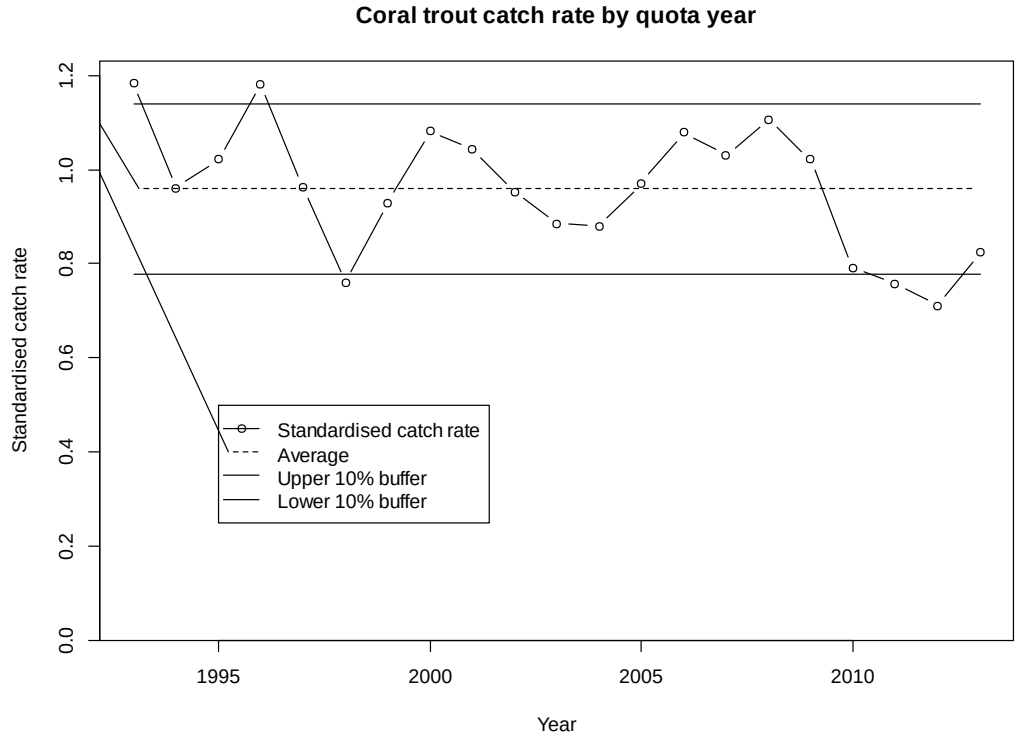

Figure 19. East coast coral trout. Annual standardised catch rate, taking into account differences in daily catch rates between different months, locations and fishers, and the effects of different numbers of crew and dories. Horizontal lines show the mean and 80% confidence intervals.

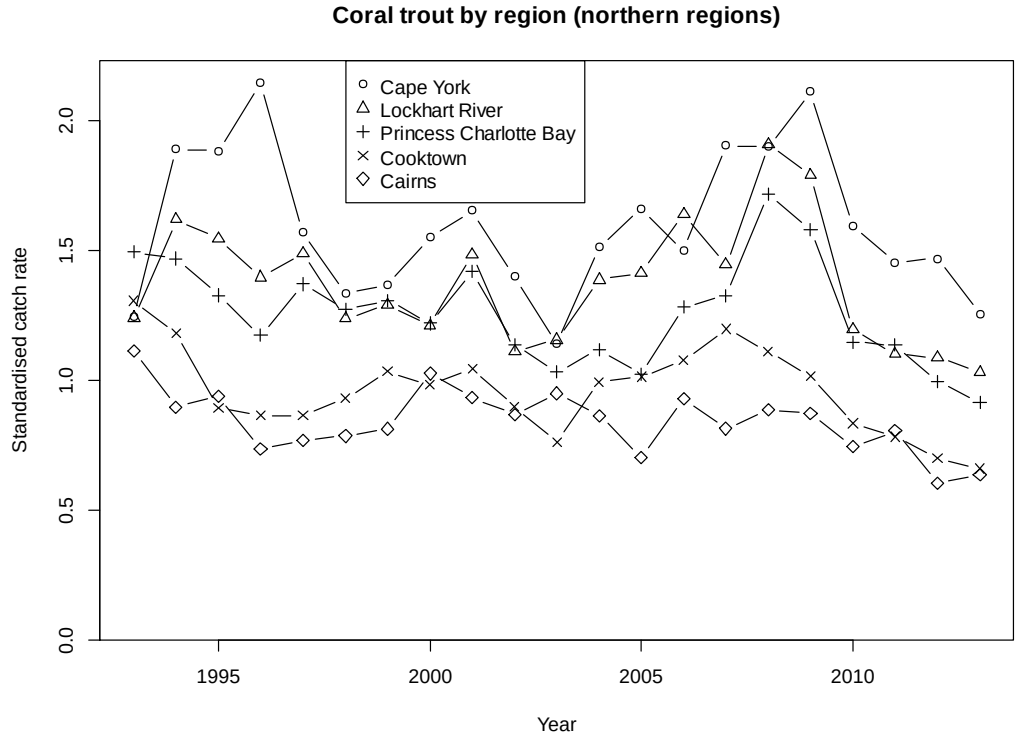

Figure 20. East coast coral trout – northern regions. Annual standardised catch rate by region, taking into account differences in daily catch rates between different months, locations and fishers, and the effects of different numbers of crew and dories.

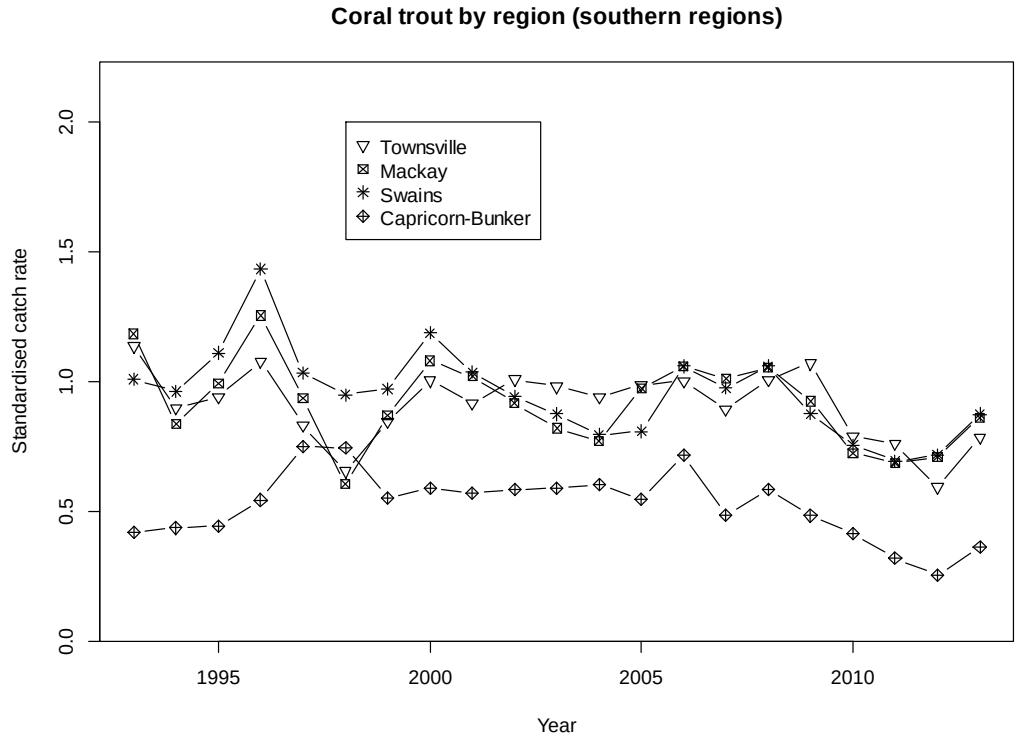

Figure 21. East coast coral trout – southern regions. Annual standardised catch rate by region, taking into account differences in daily catch rates between different months, locations and fishers, and the effects of different numbers of crew and dories.

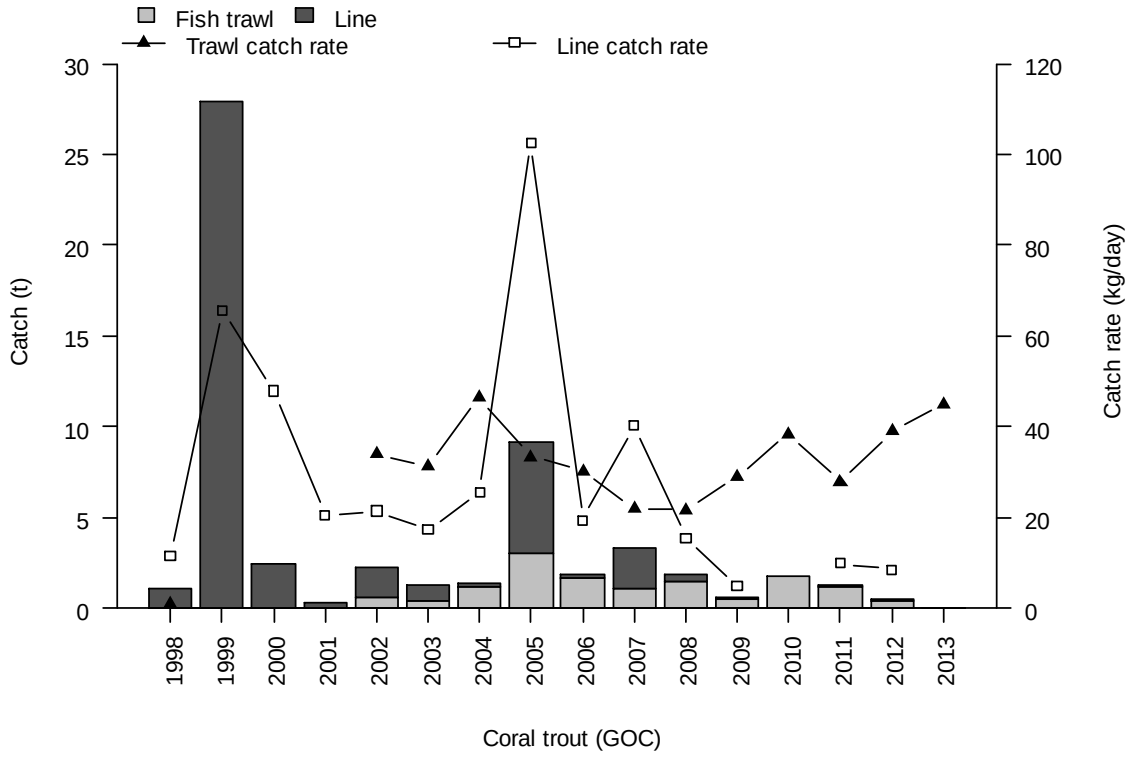

Figure 22. Gulf of Carpentaria coral trout. Total reported annual commercial catch (tonnes) and raw catch rate (kg/day), grouped by fishing method.

Crimson snapper (*Lutjanus erythropterus*)

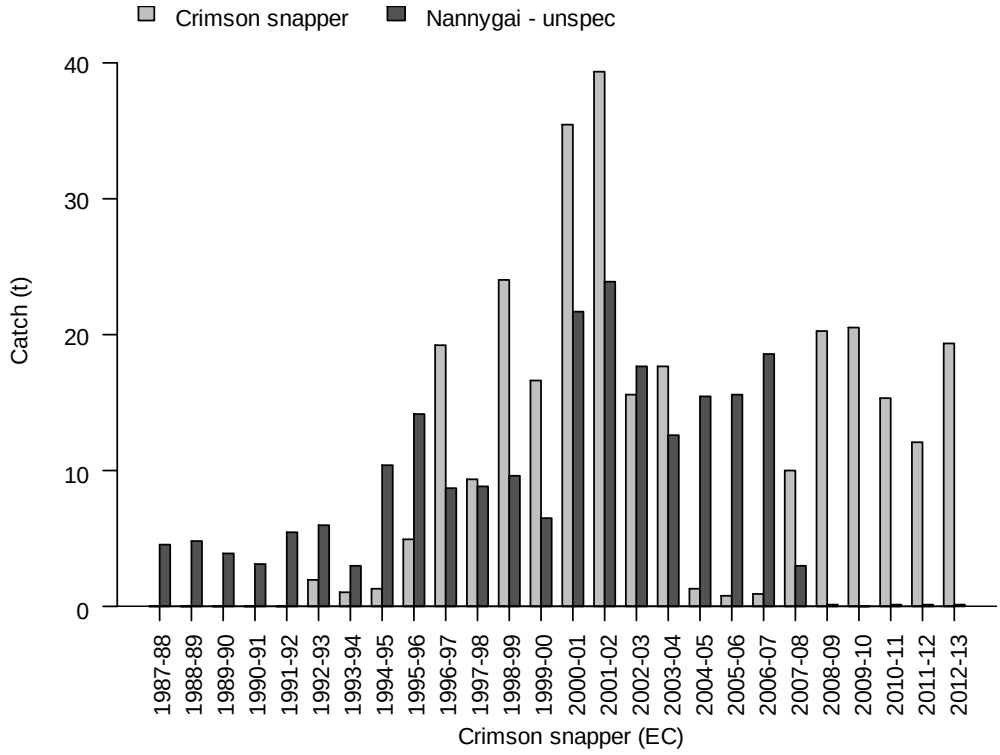

Figure 23. East coast crimson snapper and unspecified nannygai. Total reported annual commercial catch (tonnes).

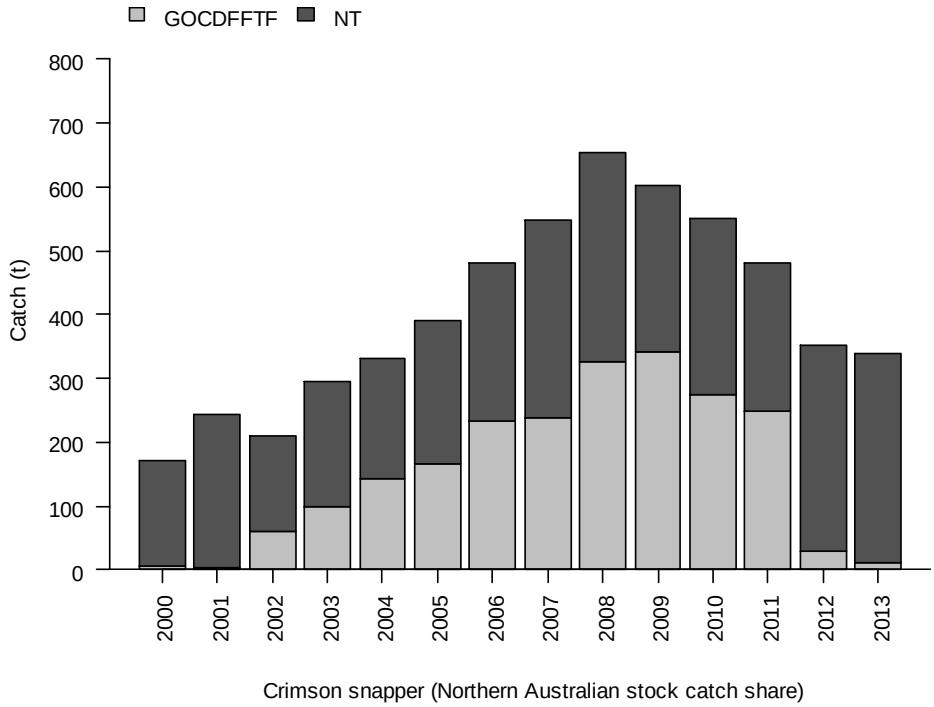

Figure 24. Gulf of Carpentaria crimson snapper. Total reported annual commercial catch (tonnes) for Gulf of Carpentaria Developmental Fin Fish Trawl Fishery (GOCDFFTF) and the Northern Territory.

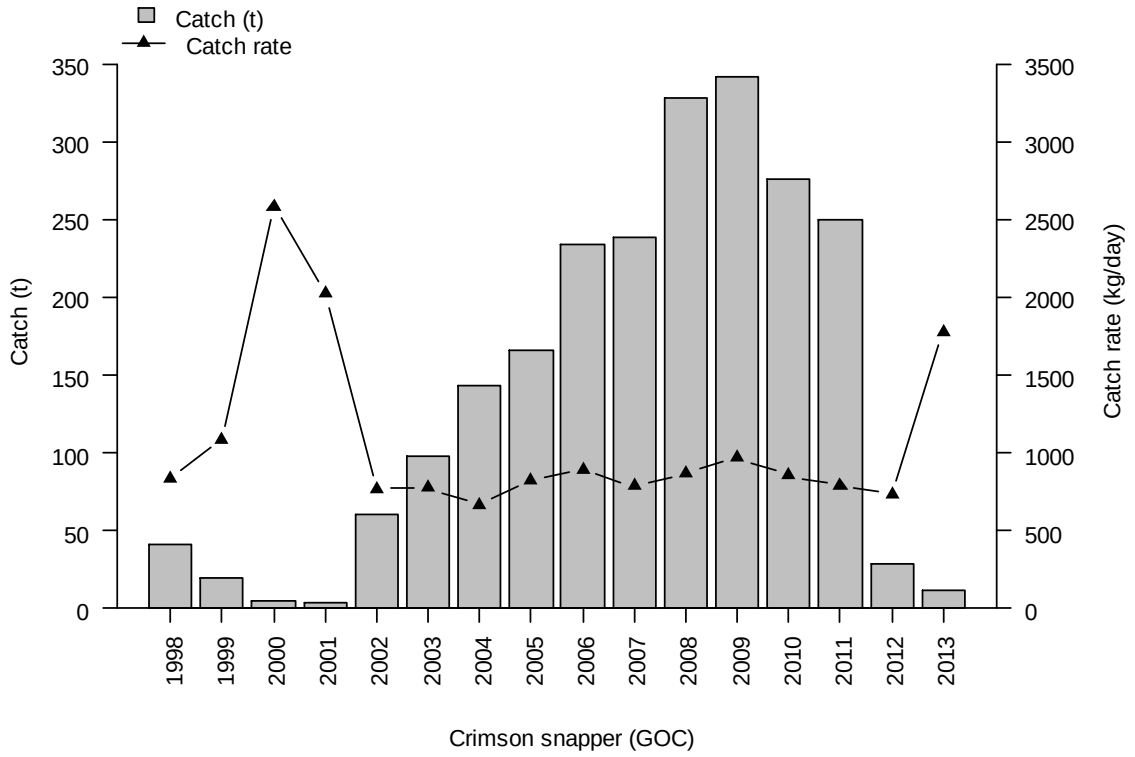

Figure 25. Gulf of Carpentaria crimson snapper. Total reported annual commercial catch (tonnes) and raw catch rate (kg/day) for Gulf of Carpentaria Developmental Fin Fish Trawl Fishery.

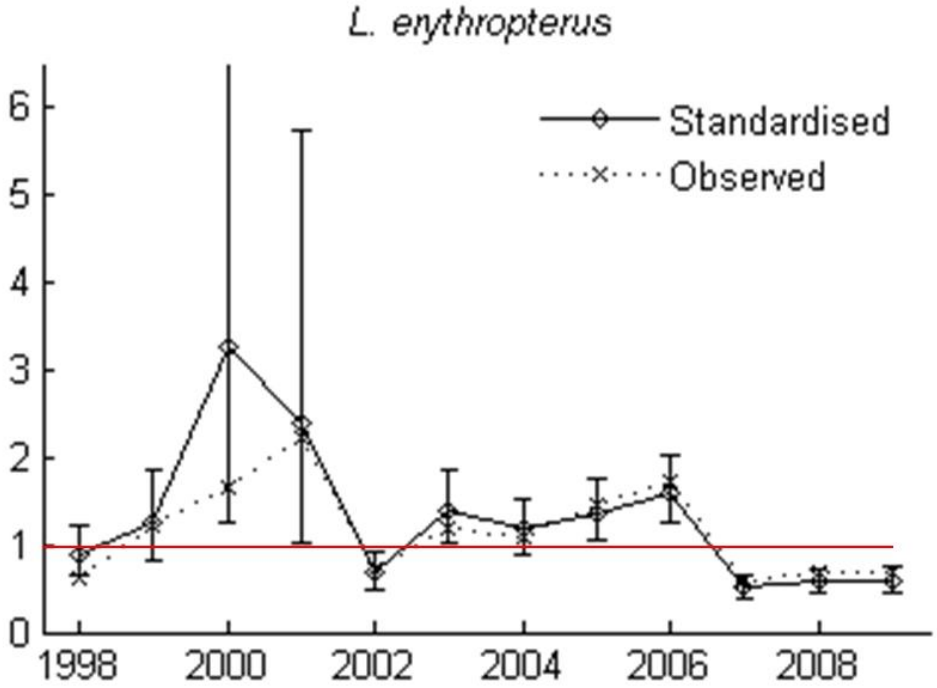

Figure 26. Gulf of Carpentaria crimson snapper. Observed (raw) and standardised catch rates for the Gulf of Carpentaria Developmental Fin Fish Trawl Fishery.

Dusky flathead (*Platycephalus fuscus*)

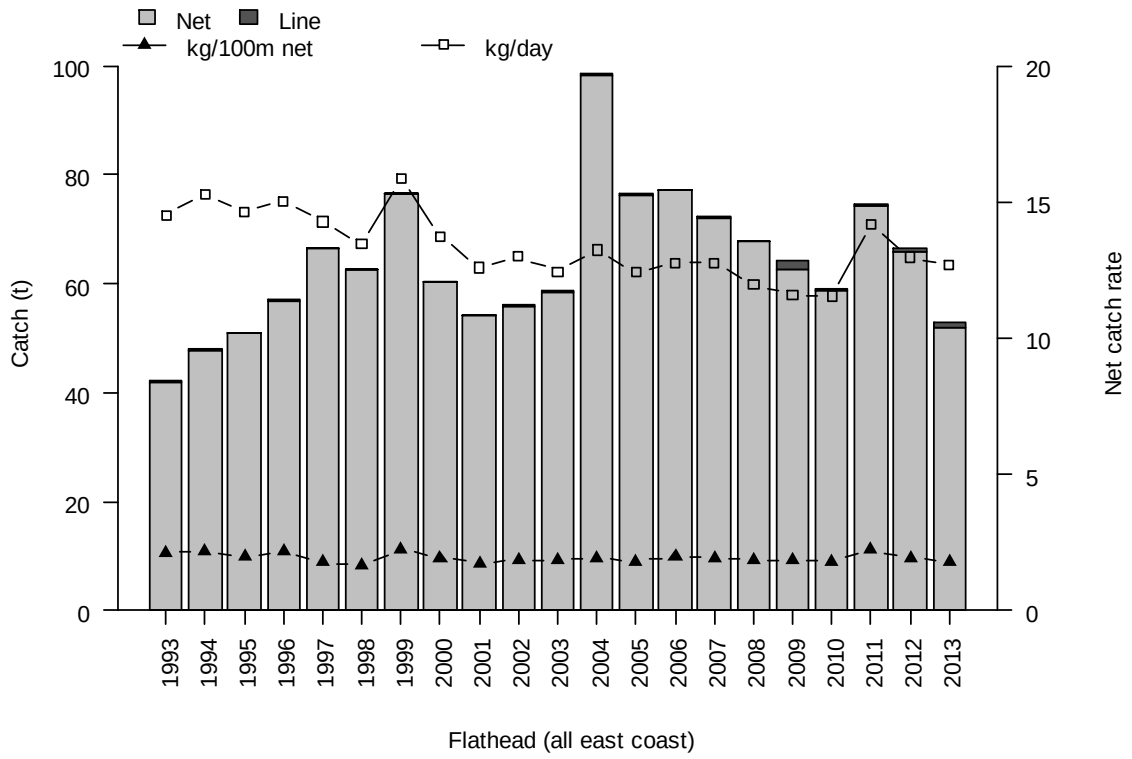

Figure 27. East coast dusky flathead. Total reported annual commercial catch (tonnes) grouped by fishing method, plus raw catch rates for net fishing (kg/100 m of net and kg/day).

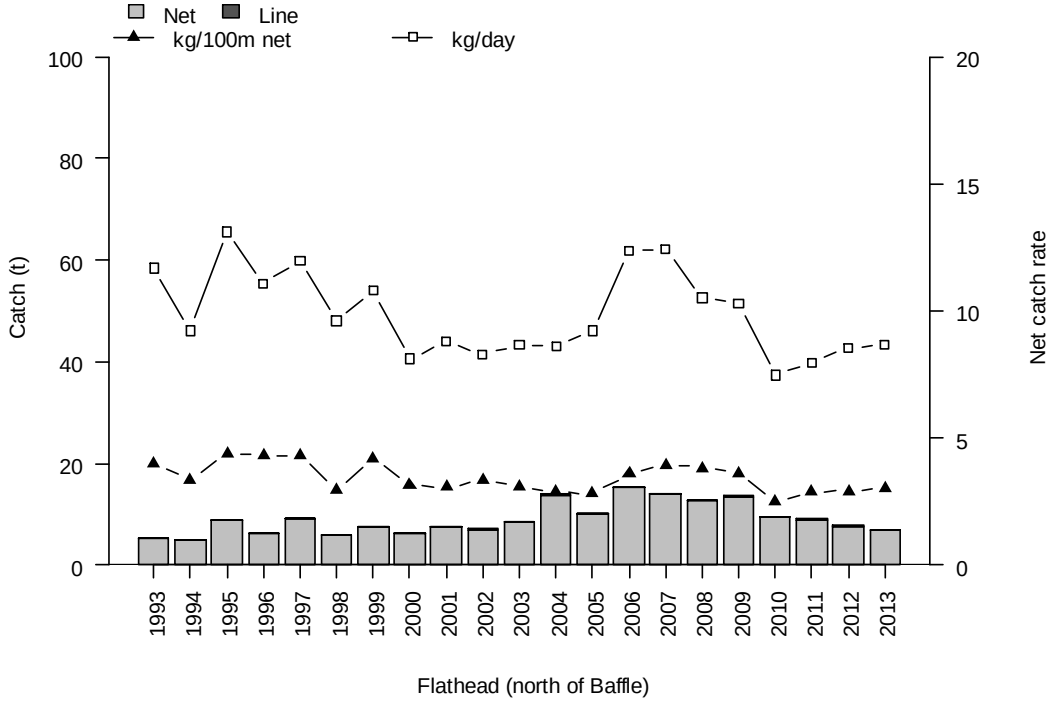

Figure 28. East coast dusky flathead – north of Baffle Creek. Total reported annual commercial catch (tonnes) grouped by fishing method, plus raw catch rates for net fishing (kg/100 m of net and kg/day).

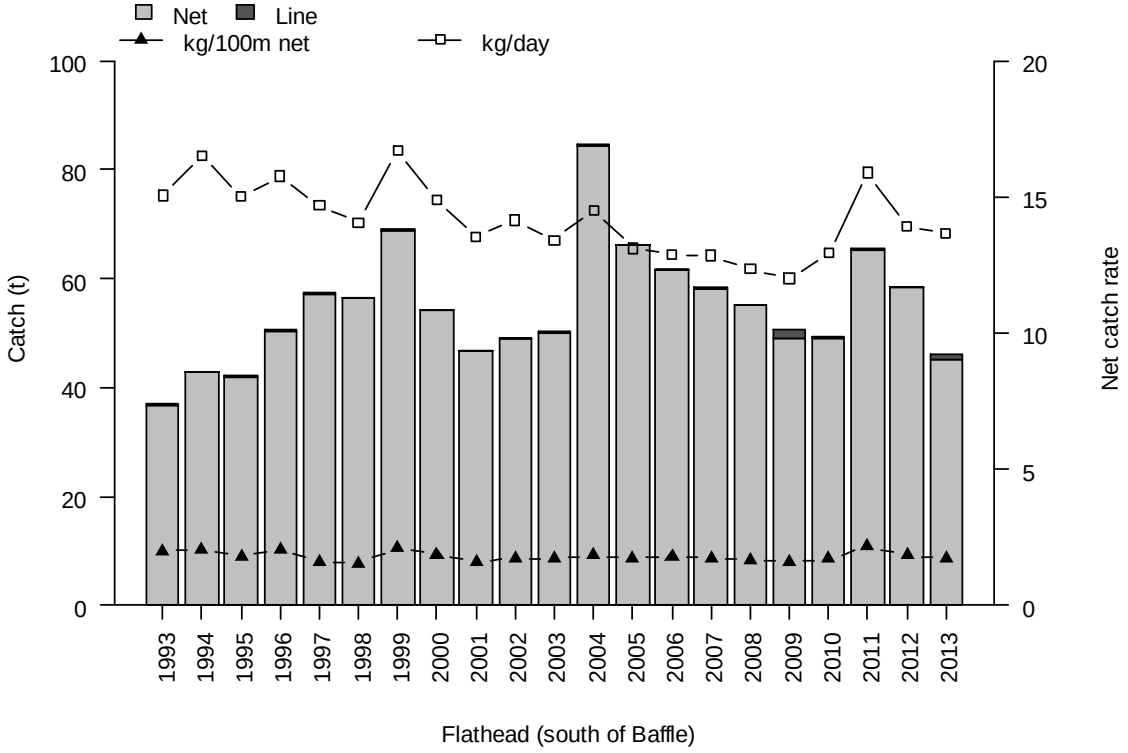

Figure 29. East coast dusky flathead – south of Baffle Creek. Total reported annual commercial catch (tonnes) grouped by fishing method, plus raw catch rates for net fishing (kg/100 m of net and kg/day).

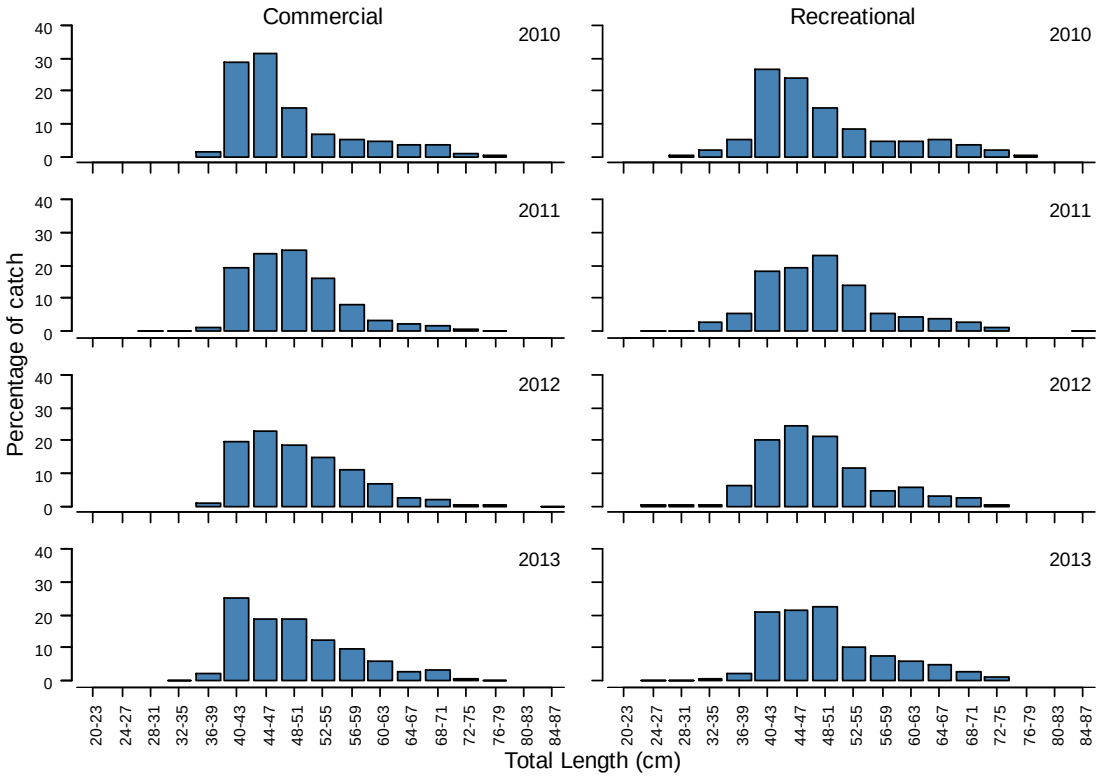

Figure 30. East coast dusky flathead – south of Baffle Creek. Annual length frequency distributions of fish retained by commercial and recreational sectors.

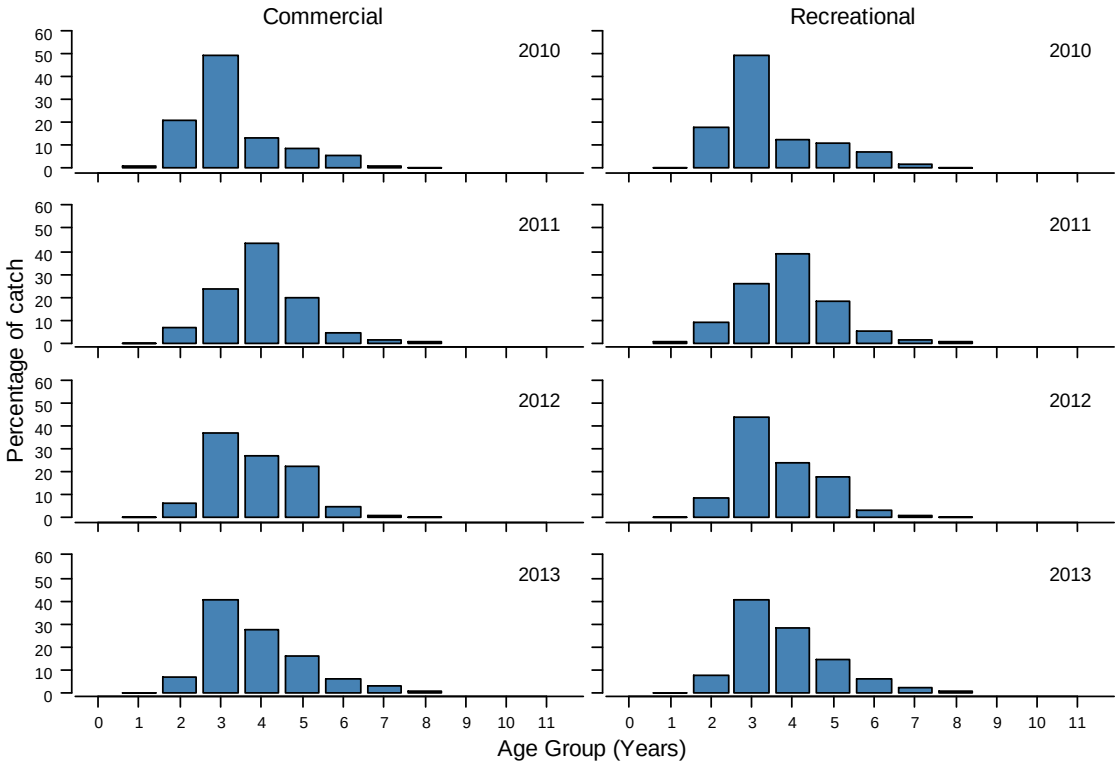

Figure 31. East coast dusky flathead – south of Baffle Creek. Annual age frequency distributions of fish retained by commercial and recreational sectors.

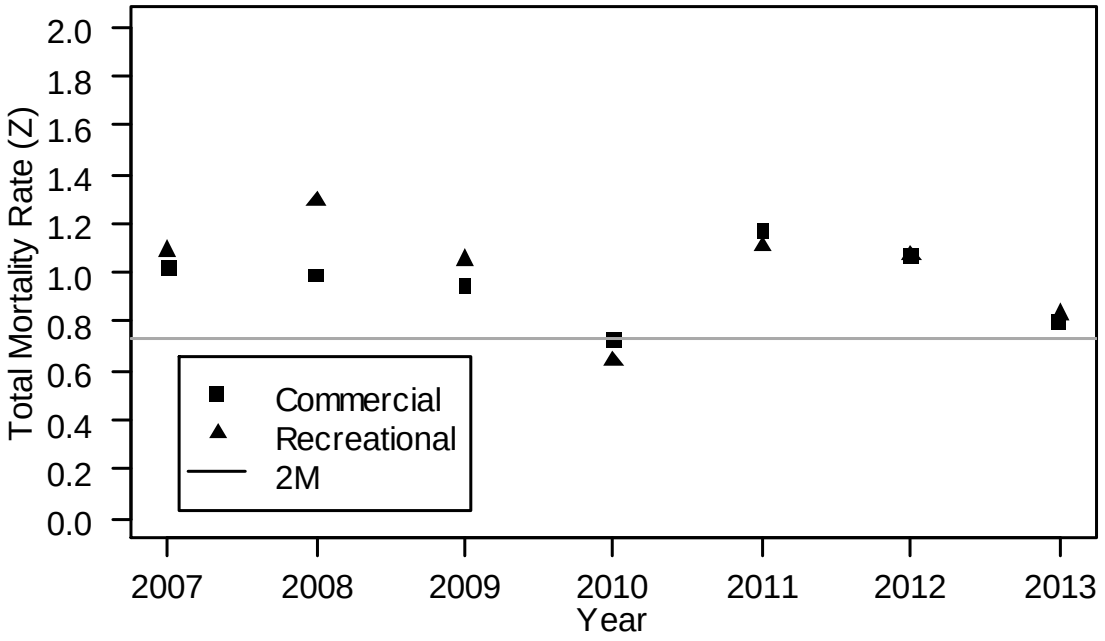

Figure 32. East coast dusky Flathead – south of Baffle Creek. Annual estimates of instantaneous rate of total mortality (Z) based on cross sectional analysis of age frequency distributions of fish retained by commercial and recreational sectors. The horizontal line indicates the rate of total mortality corresponding to twice the rate of natural mortality (2M). This is also the value for rate of total mortality where rates of fishing and natural mortality are equal (i.e. F=M).

Golden snapper (*Lutjanus johnii*)

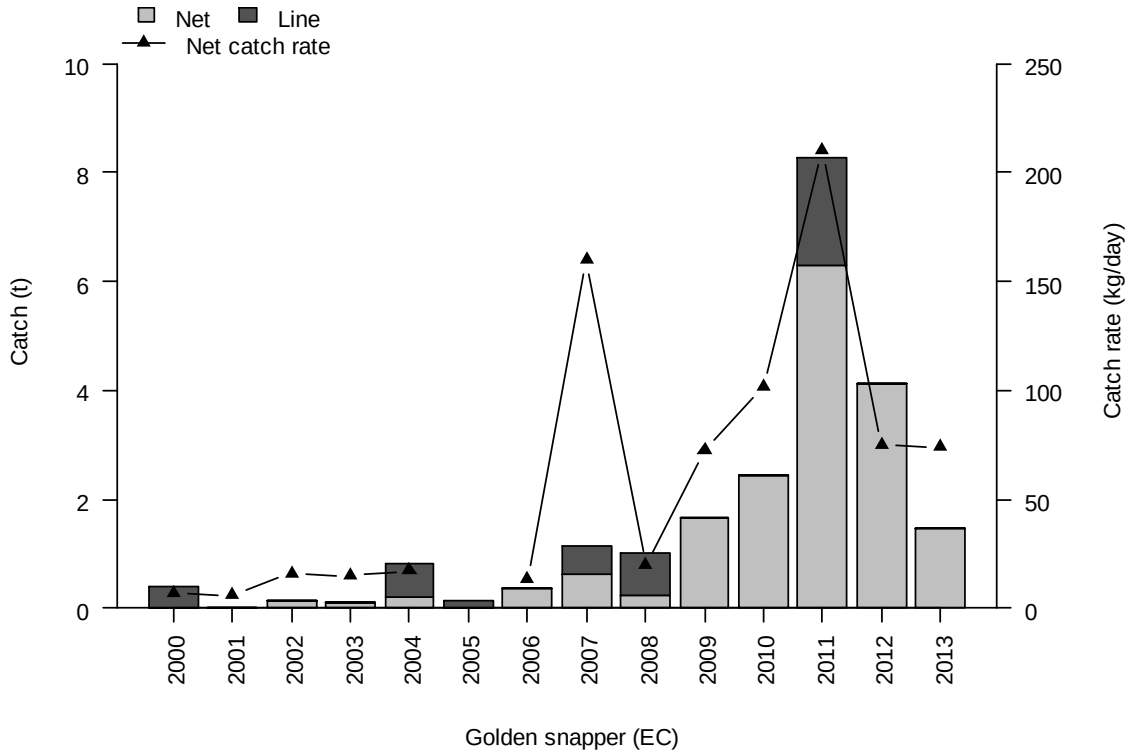

Figure 33. East coast golden snapper. Total reported annual commercial catch (tonnes) grouped by fishing method, plus raw catch rates for net fishing (kg/100 m of net and kg/day).

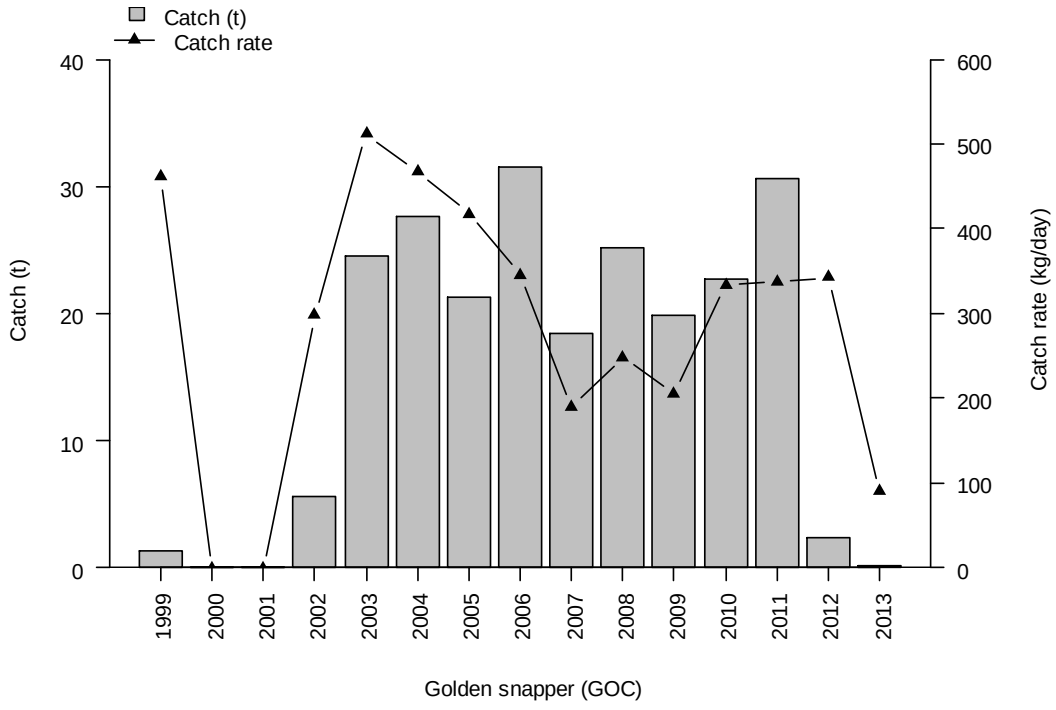

Figure 34. Gulf of Carpentaria golden snapper. Total reported annual commercial catch (tonnes) and raw catch rate (kg/day) for Gulf of Carpentaria Developmental Fin Fish Trawl Fishery.

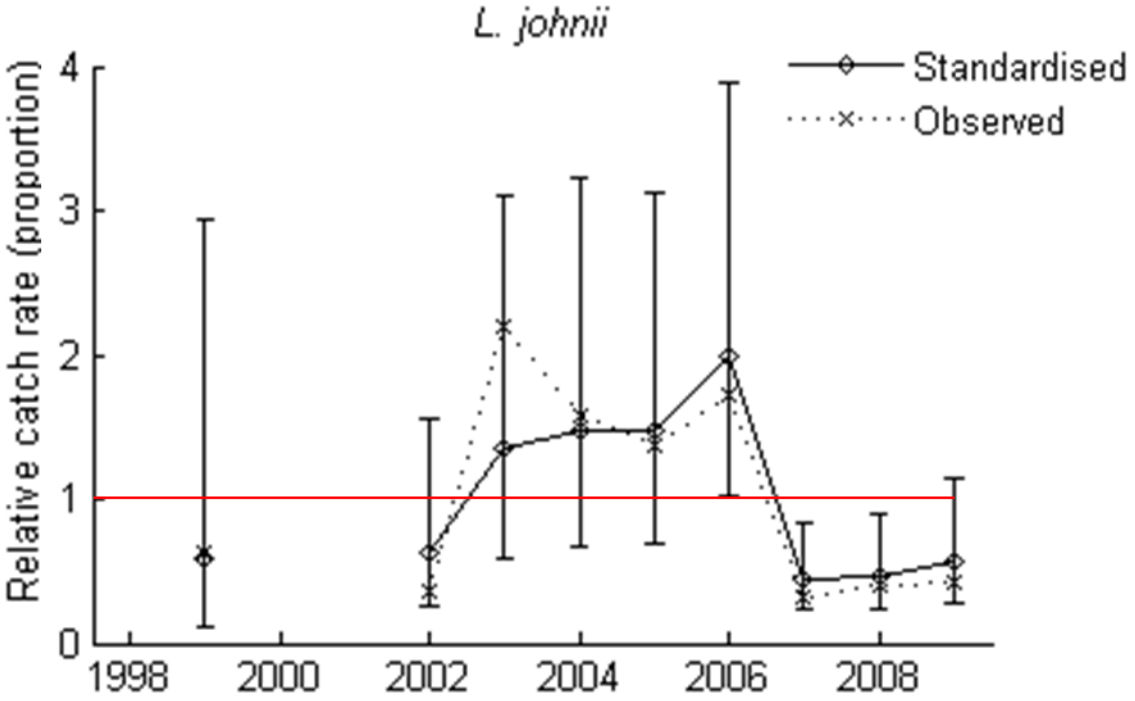

Figure 35. Gulf of Carpentaria golden snapper. Observed (raw) and standardised catch rates for the Gulf of Carpentaria Developmental Fin Fish Trawl Fishery.

Grey mackerel (*Scomberomorus semifasciatus*)

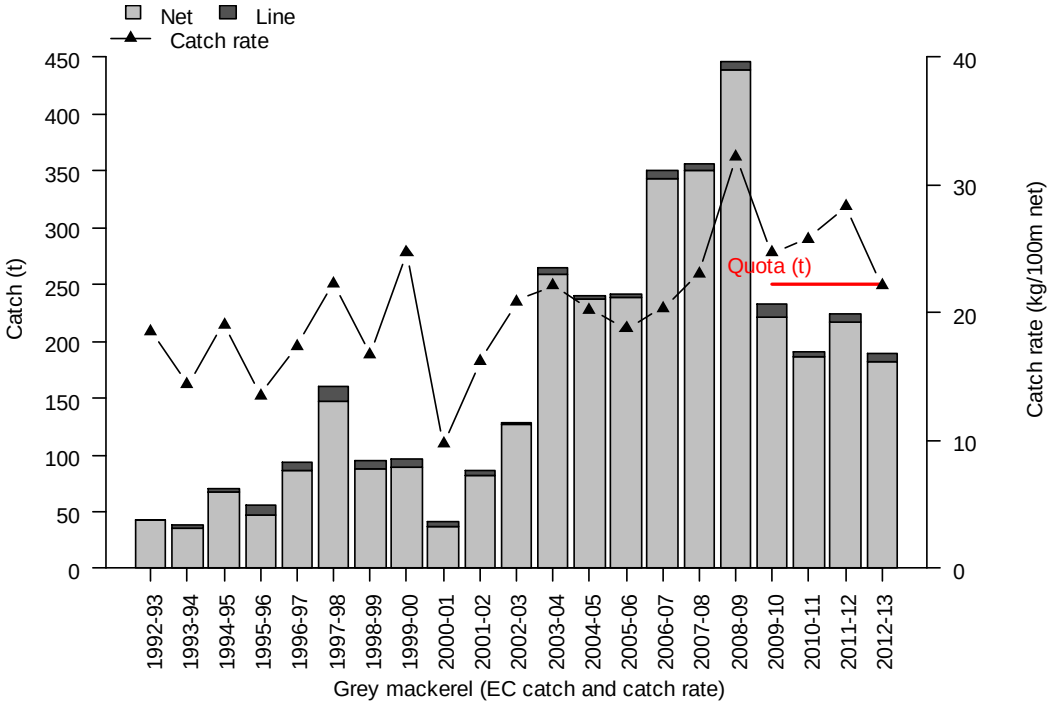

Figure 36. East coast grey mackerel. Total reported annual (financial year) commercial catch (tonnes) grouped by fishing method, plus raw catch rate for net fishing (kg/100 m net).

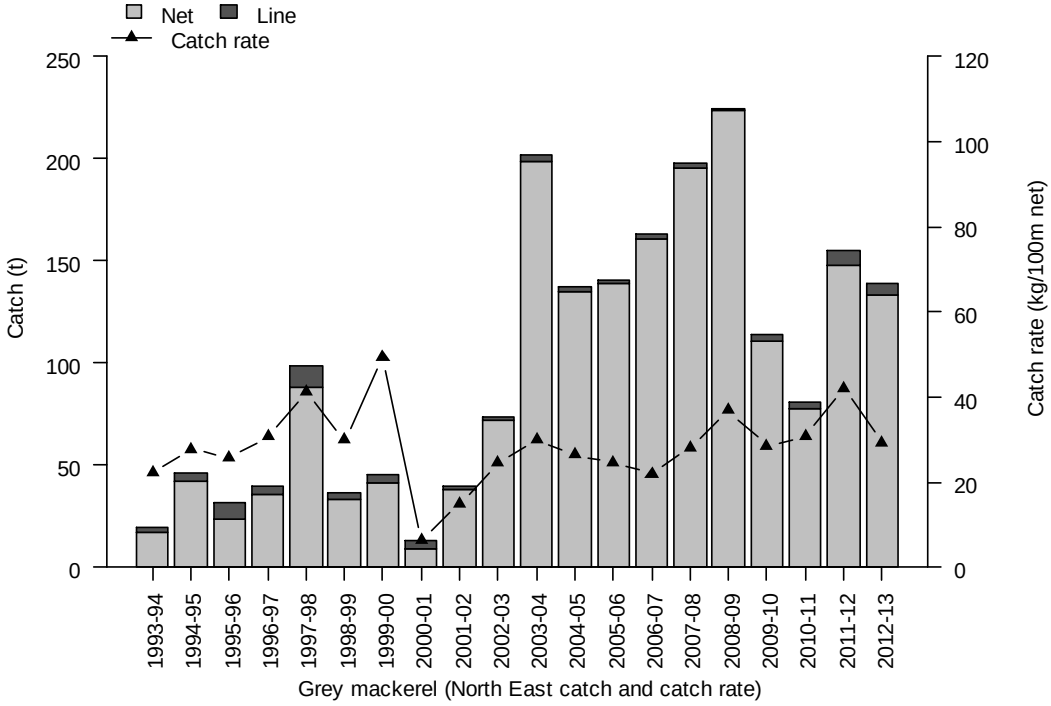

Figure 37. East coast grey mackerel – northern east coast stock. Total reported annual (financial year) commercial catch (tonnes) grouped by fishing method, plus raw catch rate for net fishing (kg/100 m net).

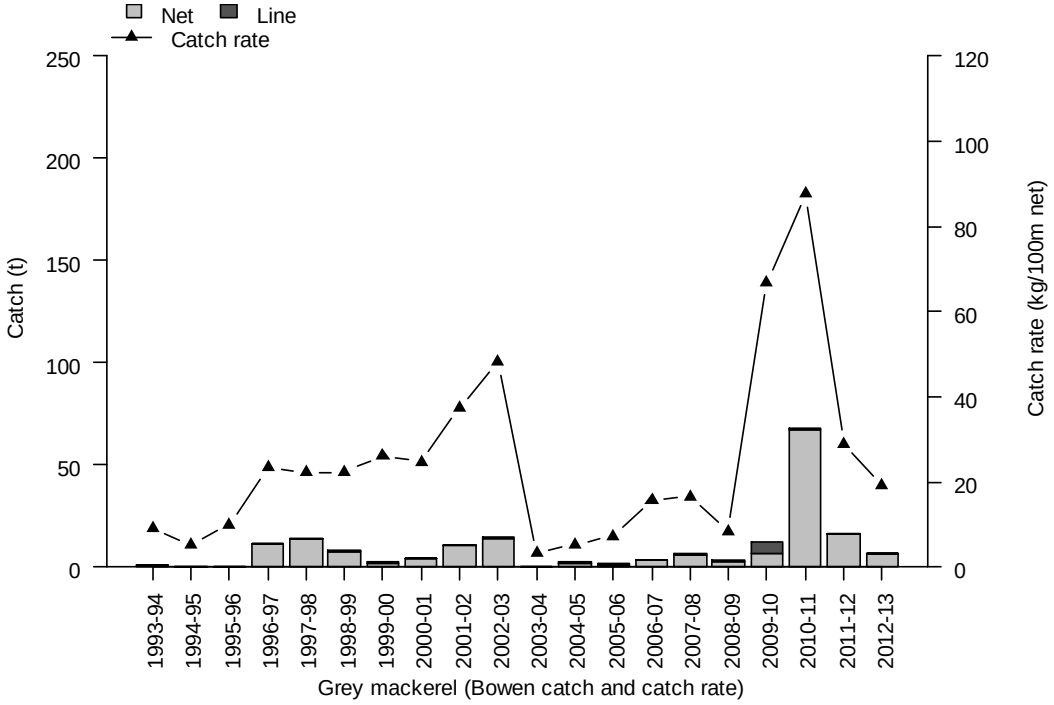

Figure 38. East coast grey mackerel – Bowen region (transitional zone between NE coast and SE coast stocks). Total reported annual (financial year) commercial catch (tonnes) grouped by fishing method, plus raw catch rate for net fishing (kg/100 m net).

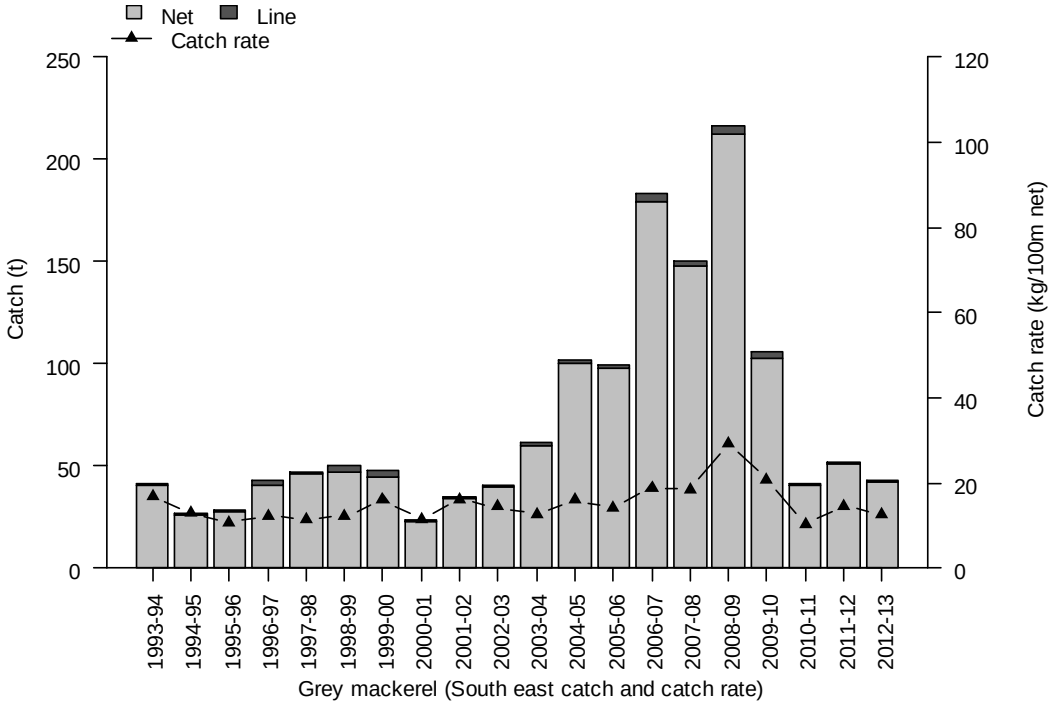

Figure 39. East coast grey mackerel – southern east coast stock. Total reported annual (financial year) commercial catch (tonnes) grouped by fishing method, plus raw catch rate for net fishing (kg/100 m net).

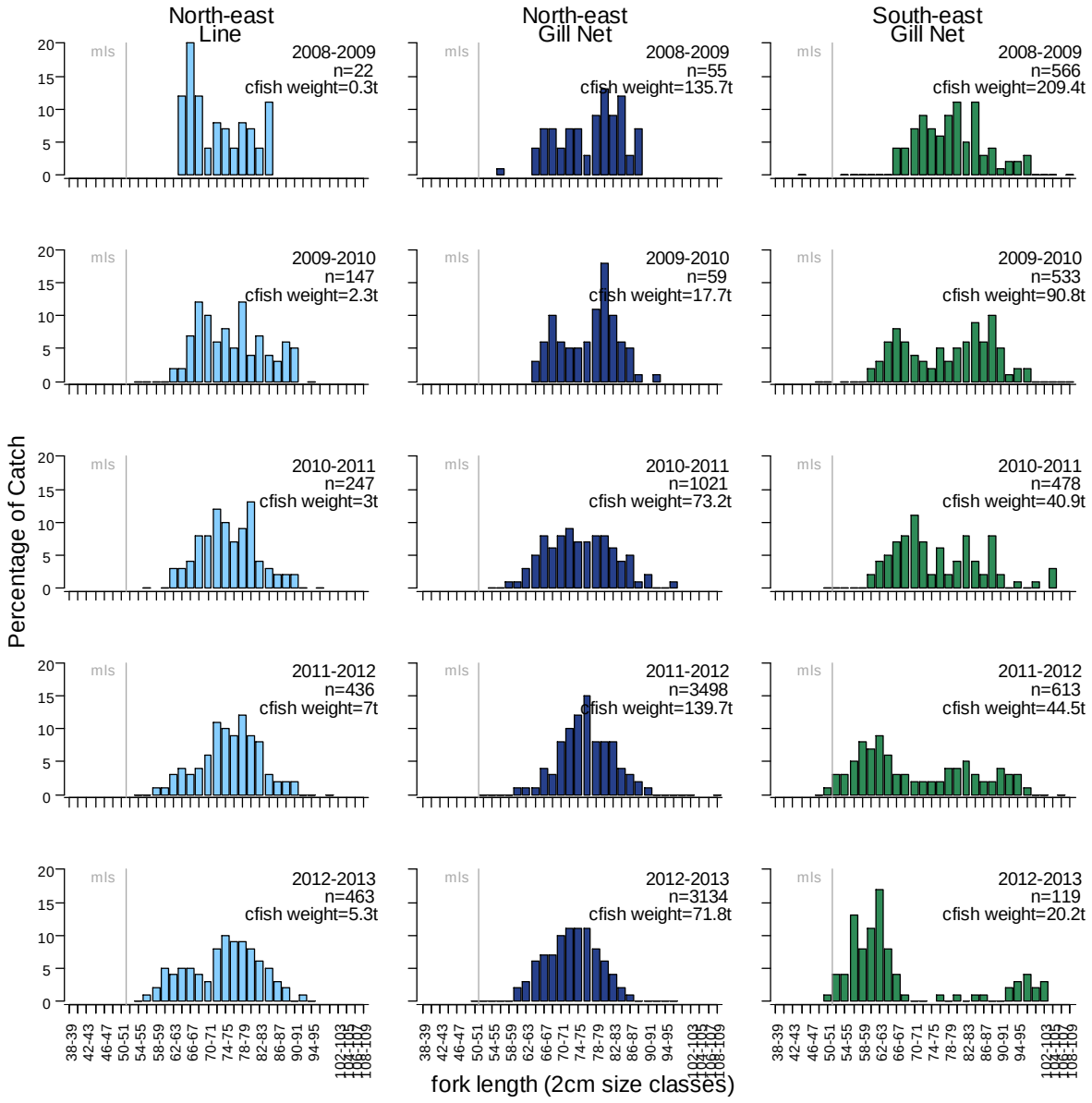

Figure 40. East coast grey mackerel – northern and southern east coast stocks. Annual length frequency distributions of fish retained by commercial line and gill net sectors.

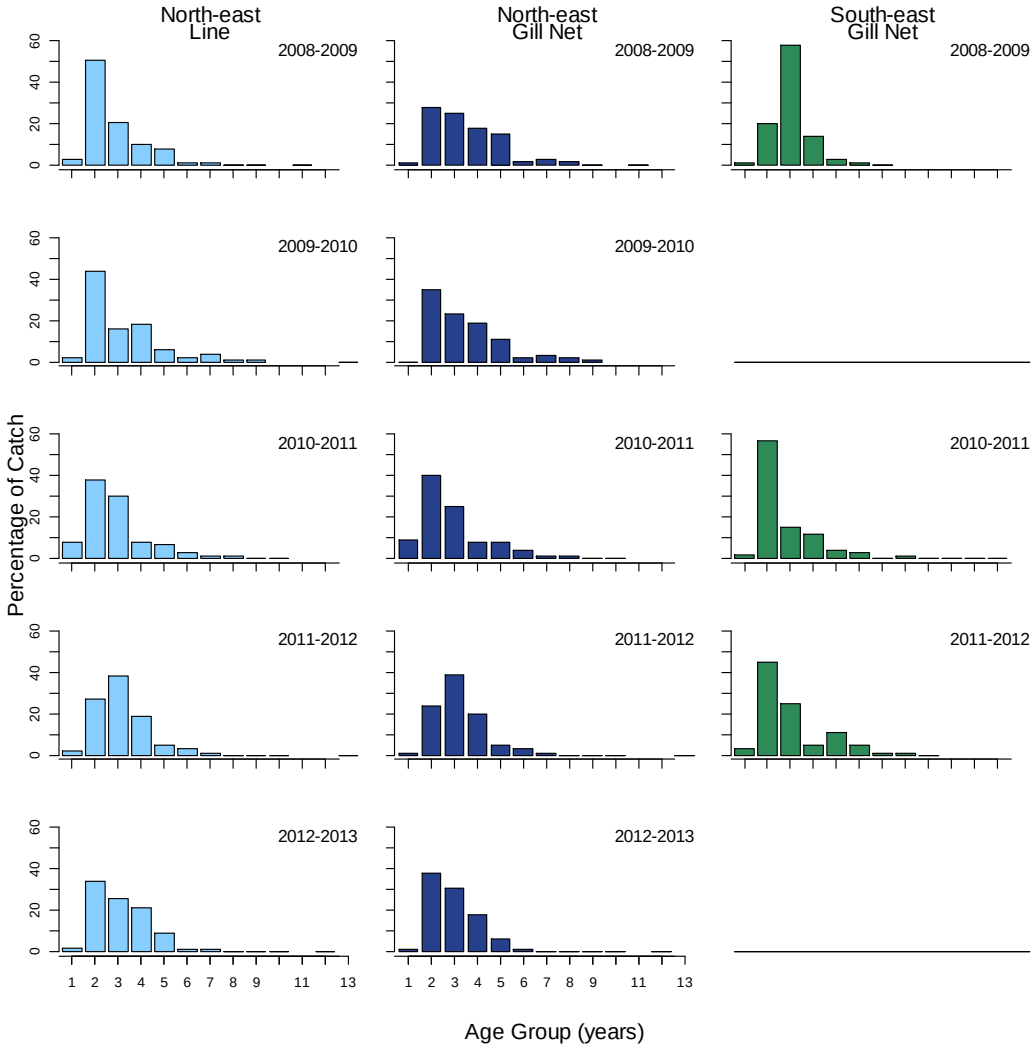

Figure 41. East coast grey mackerel – northern and southern east coast stocks. Annual age frequency distributions of fish retained by commercial line and gill net sectors.

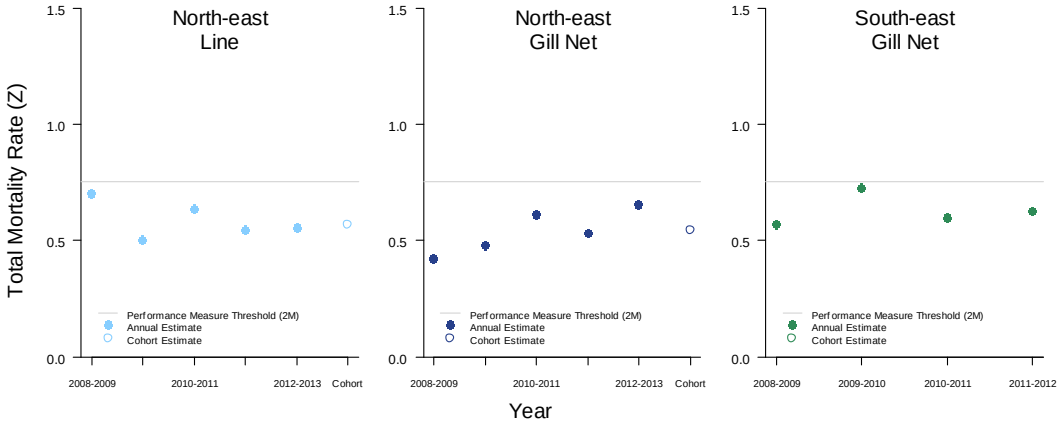

Figure 42. East coast grey mackerel – northern and southern east coast stocks. Annual estimates of instantaneous rate of total mortality (Z) based on cross sectional analysis of annual age frequency distributions of fish retained by commercial line and gill net sectors. 'Cohort' is a modelled average rate of total mortality calculated using all age-frequency distributions together (2007–2013) and taking account of year-to-year variation in year-class strength. The horizontal line indicates the rate of total mortality corresponding to twice the rate of natural mortality (2M). This is also the value for rate of total mortality where rates of fishing and natural mortality are equal (i.e. F=M).

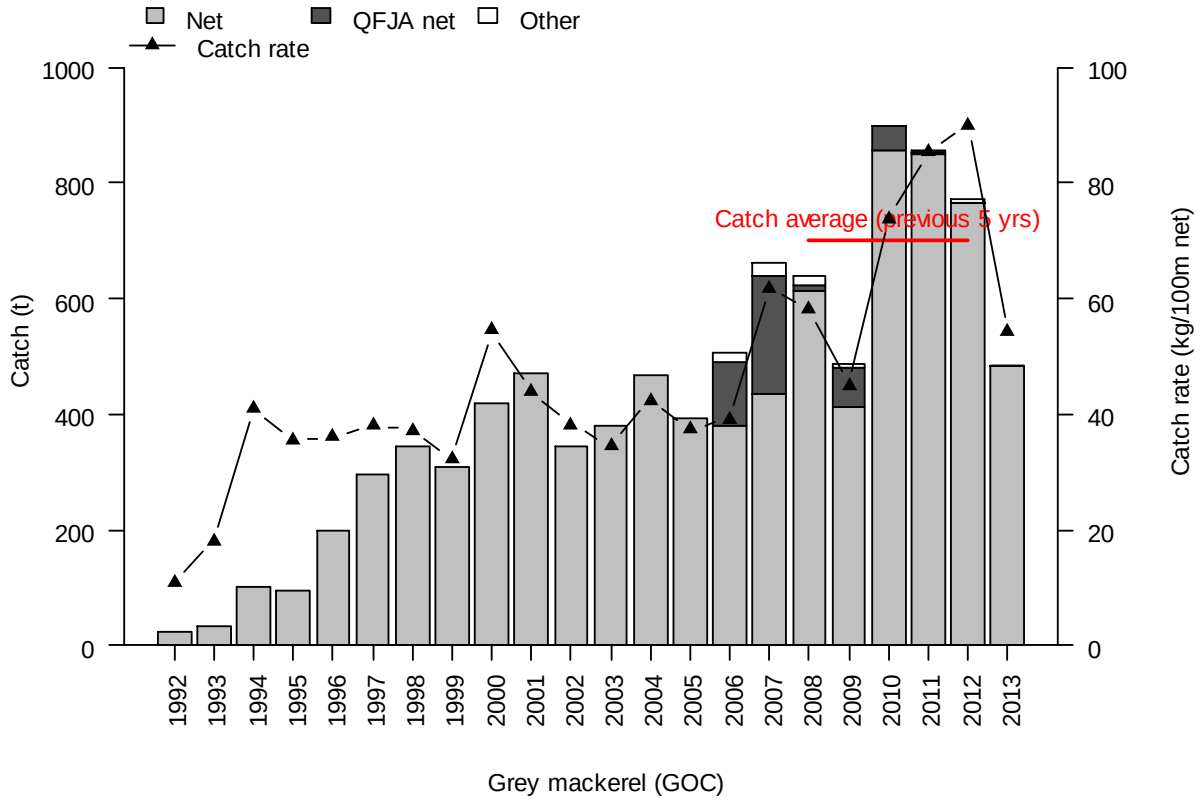

Figure 43. Gulf of Carpentaria grey mackerel. Total reported annual commercial catch (tonnes), plus raw catch rate (kg/100m net). QFJA net – net fishing under Queensland Fisheries Joint Authority.

Red emperor (*Lutjanus sebae*)

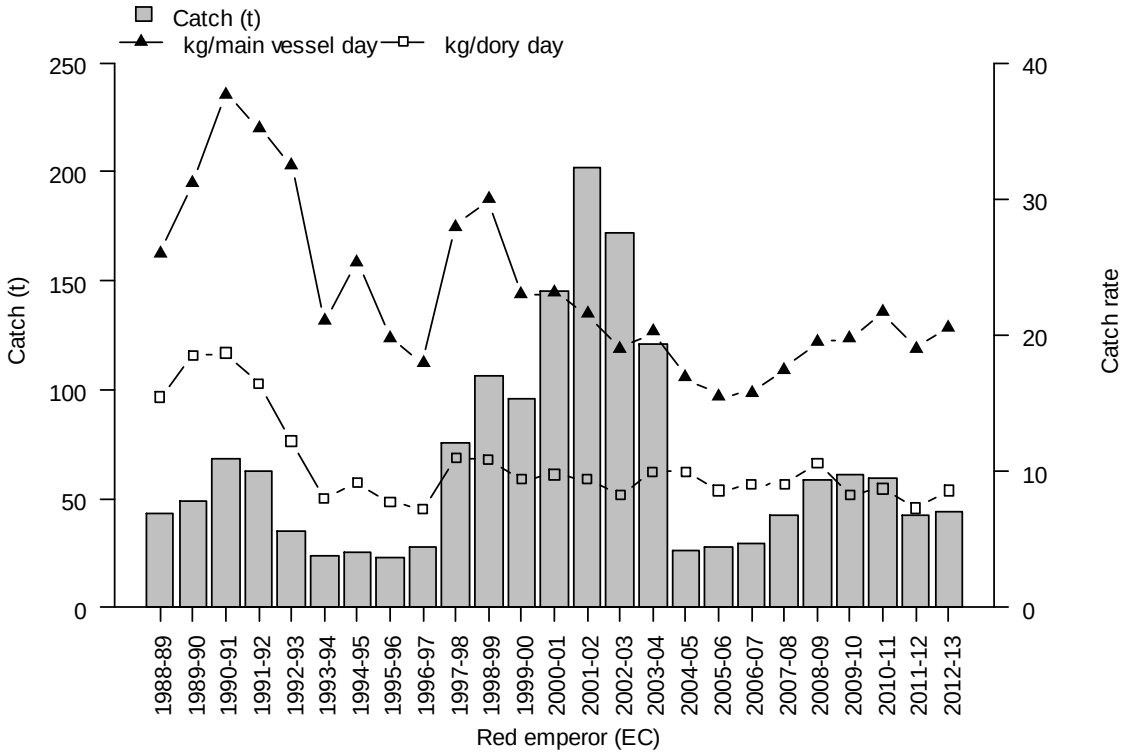

Figure 44. East coast red emperor. Total reported annual commercial catch (tonnes) and raw catch rates (kg/day per primary licence and kg/day per dory).

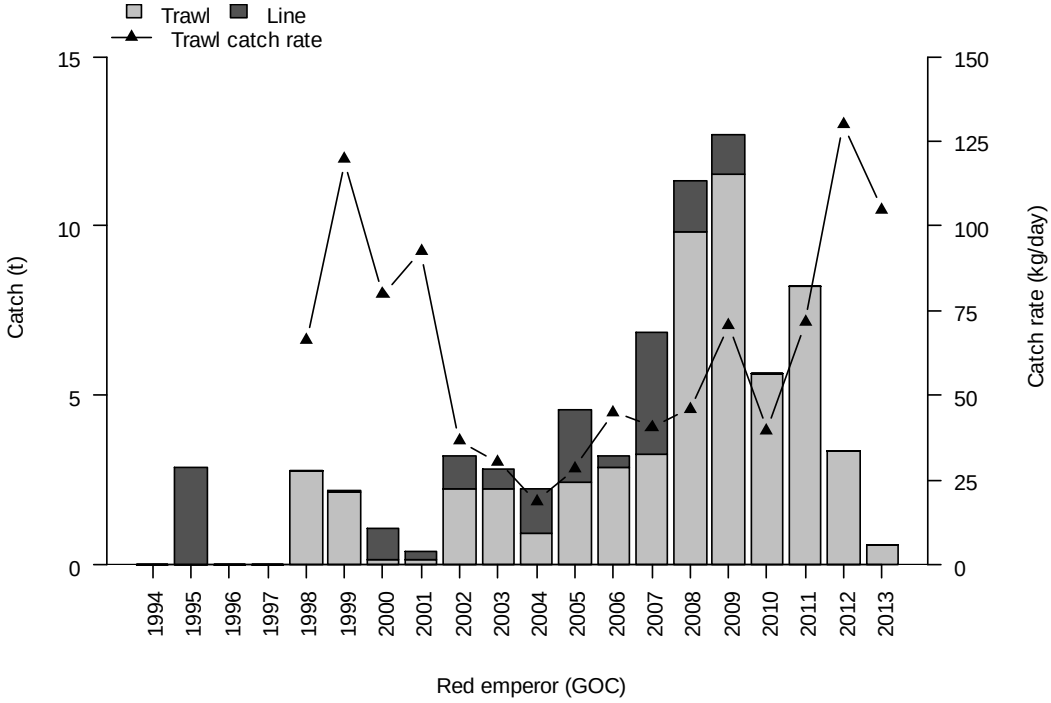

Figure 45. Gulf of Carpentaria red emperor. Total reported annual commercial catch (tonnes) grouped by fishing method, plus raw catch rate for trawling (kg/day).

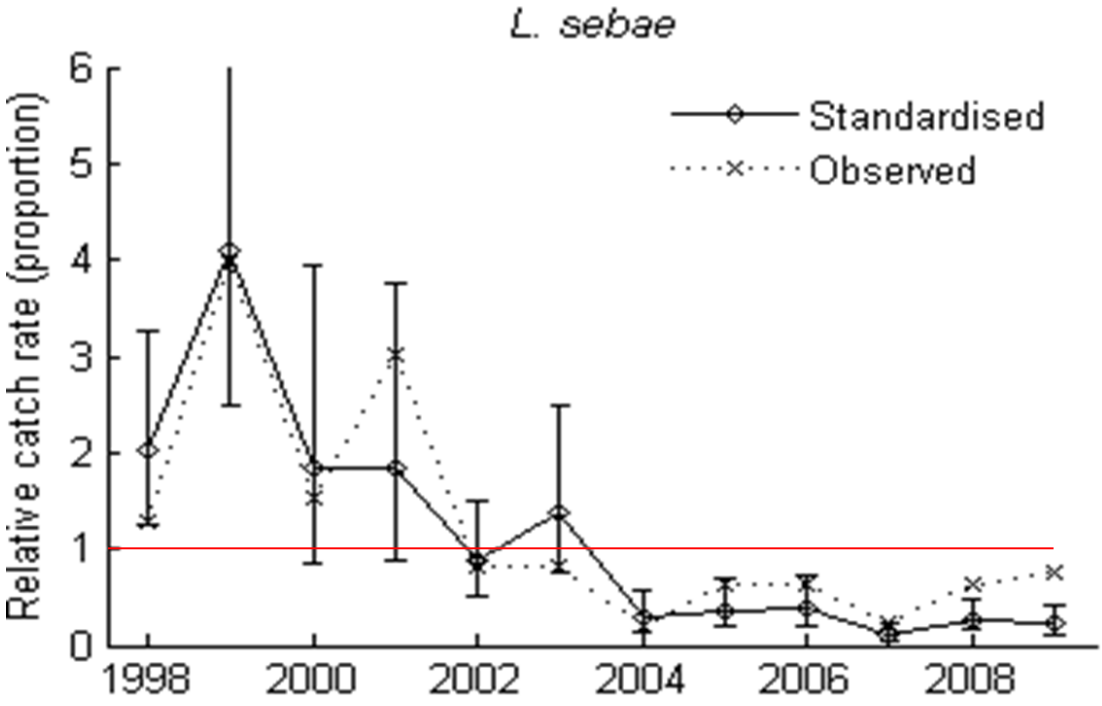

Figure 46. Gulf of Carpentaria red emperor. Observed (raw) and standardised catch rates for the Gulf of Carpentaria Developmental Fin Fish Trawl Fishery.

Redthroat Emperor (*Lethrinus miniatus*)

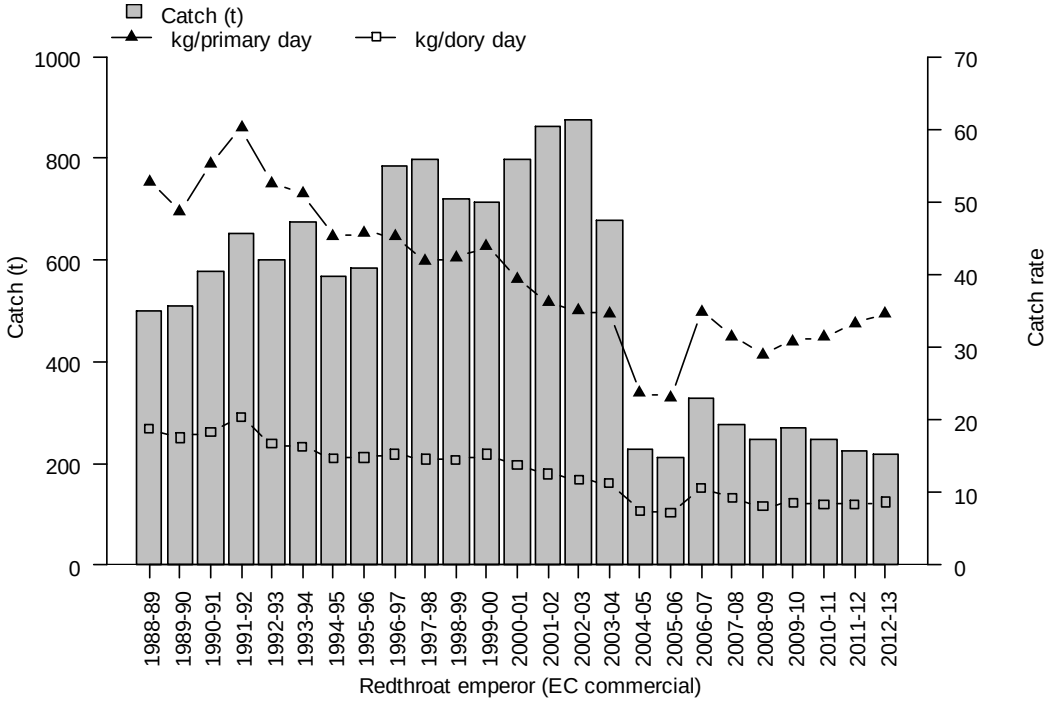

Figure 47. East coast redthroat emperor. Total reported annual commercial catch (tonnes) and raw catch rates (kg/day per primary licence and kg/day per dory).

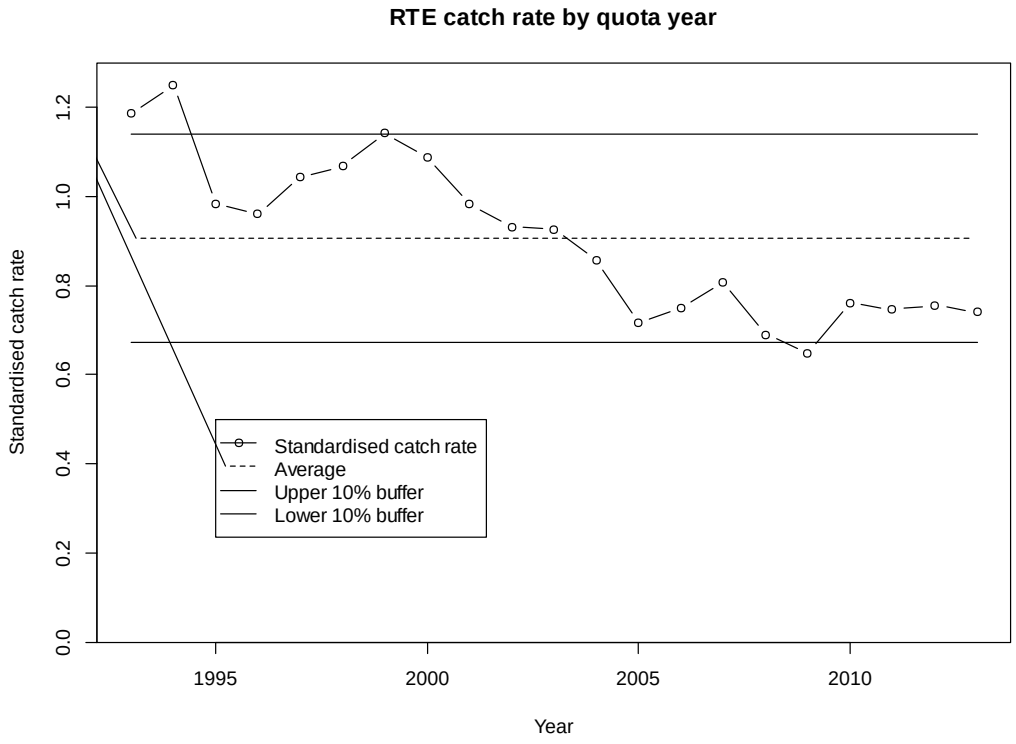

Figure 48. East coast redthroat emperor. Annual standardised catch rate, taking into account differences in daily catch rates between different months, locations and fishers, and the effects of different numbers of crew and dories. Horizontal lines show the mean and 80% confidence intervals.

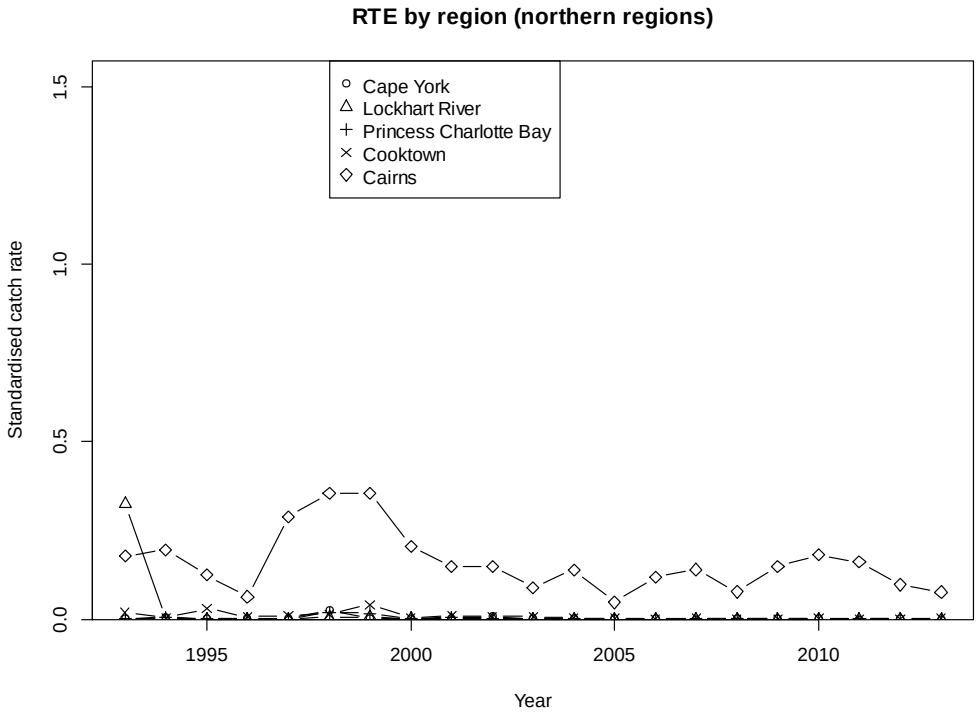

Figure 49. East coast redthroat emperor – northern regions. Annual standardised catch rate by region, taking into account differences in daily catch rates between different months, locations and fishers, and the effects of different numbers of crew and dories.

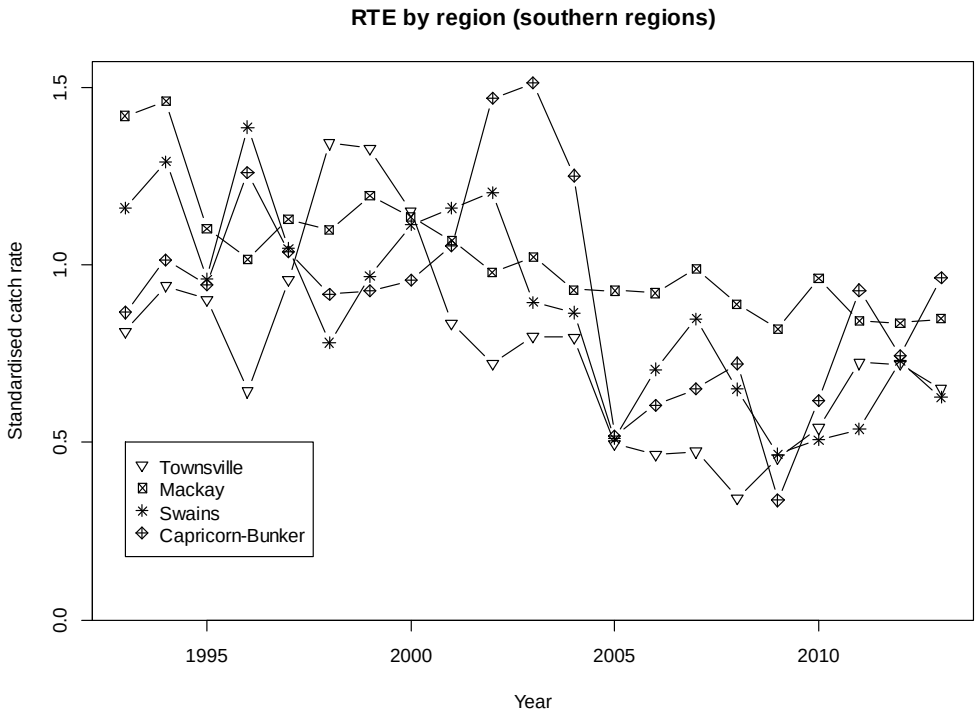

Figure 50. East coast redthroat emperor – southern regions. Annual standardised catch rate by region, taking into account differences in daily catch rates between different months, locations and fishers, and the effects of different numbers of crew and dories.

Saddletail snapper (*Lutjanus malabaricus*)

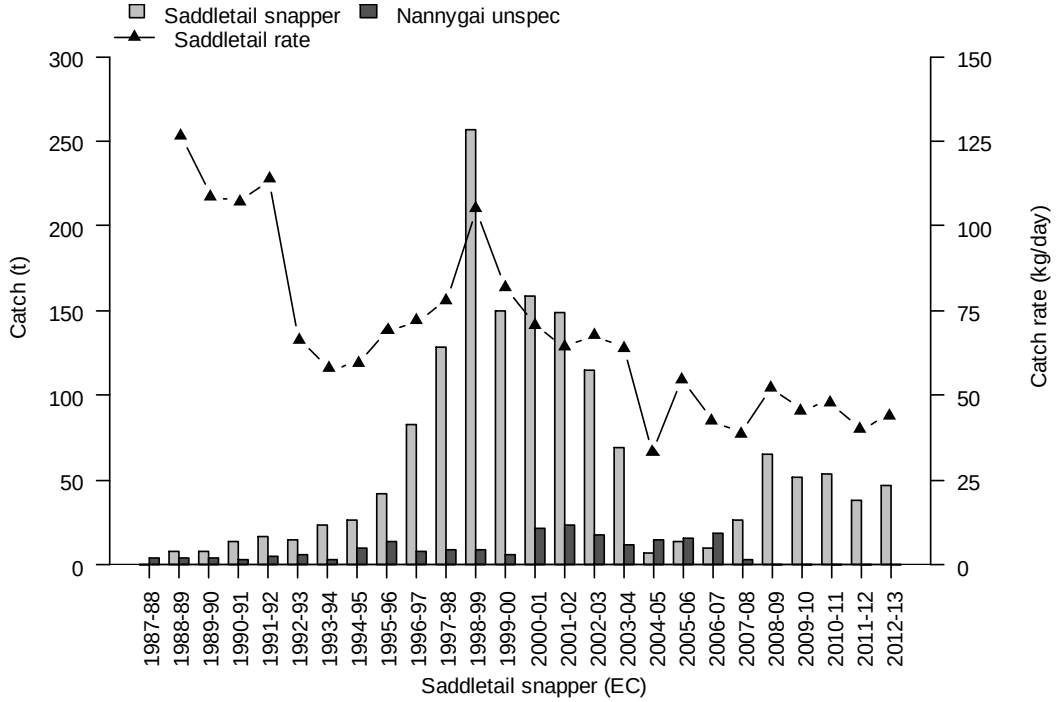

Figure 51. East coast saddletail snapper and unspecified Nannygai. Total reported annual commercial catch (tonnes) and raw catch rate (kg/day).

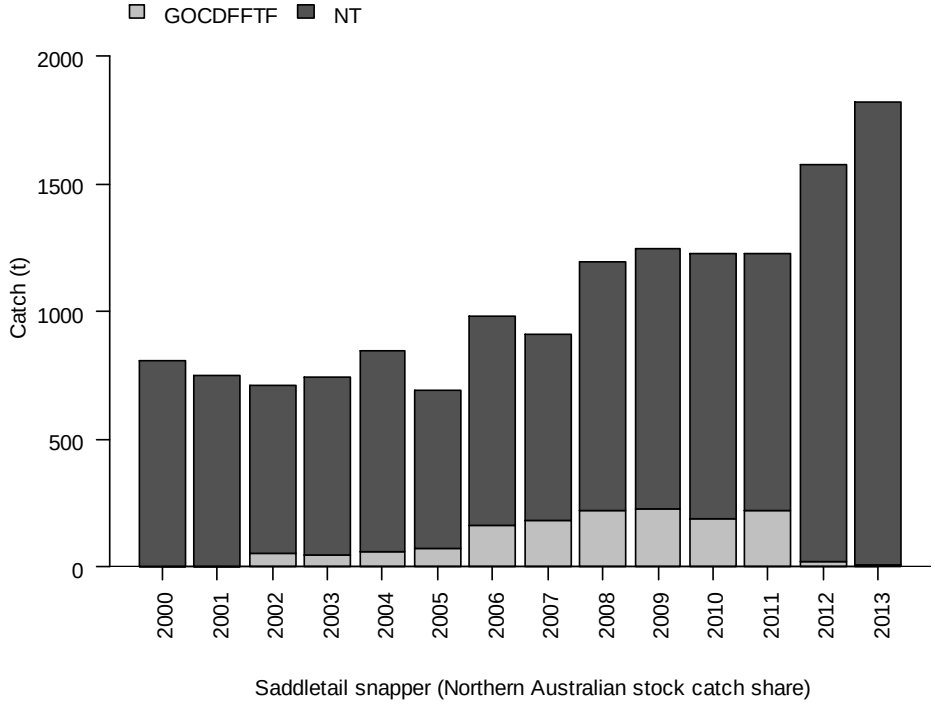

Figure 52. Gulf of Carpentaria saddletail snapper. Total reported annual commercial catch (tonnes) for Gulf of Carpentaria Developmental Fin Fish Trawl Fishery (GOCDFFTF) and the Northern Territory.

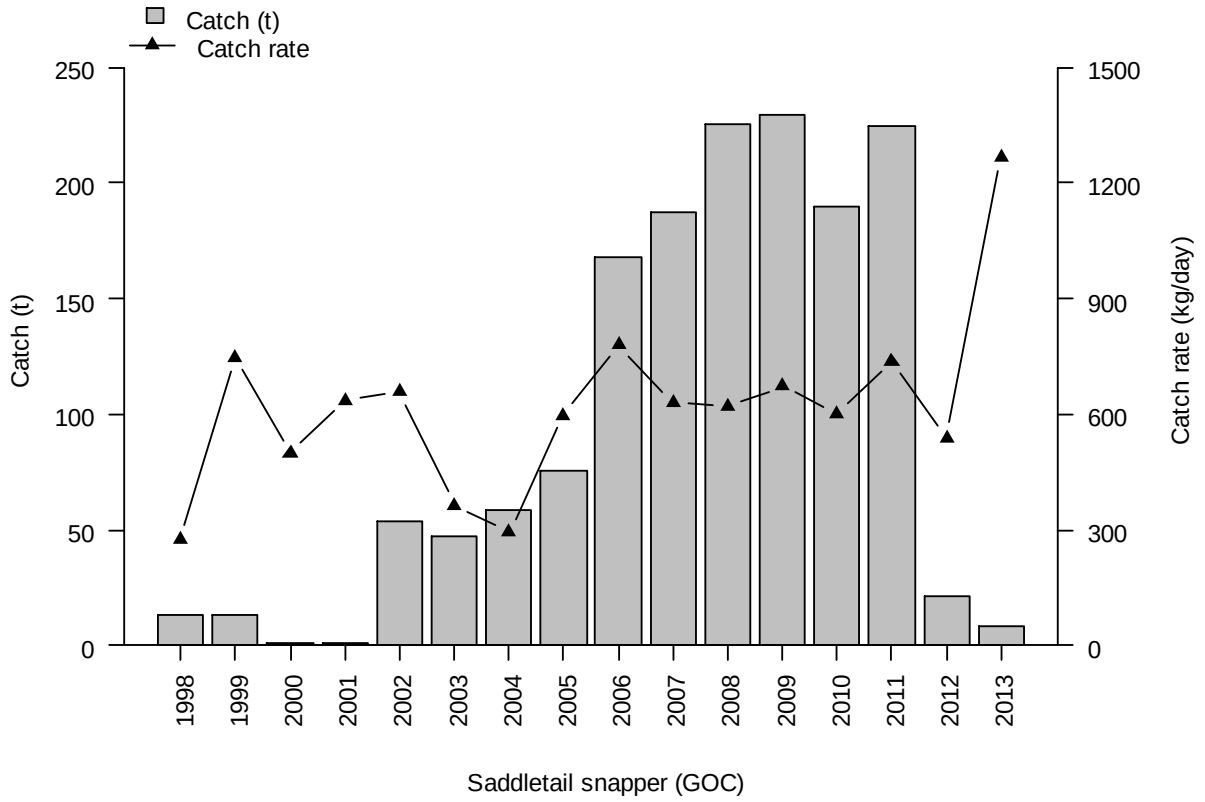

Figure 53. Gulf of Carpentaria saddletail snapper. Total reported annual commercial catch (tonnes) and raw catch rate (kg/day) for Gulf of Carpentaria Developmental Fin Fish Trawl Fishery.

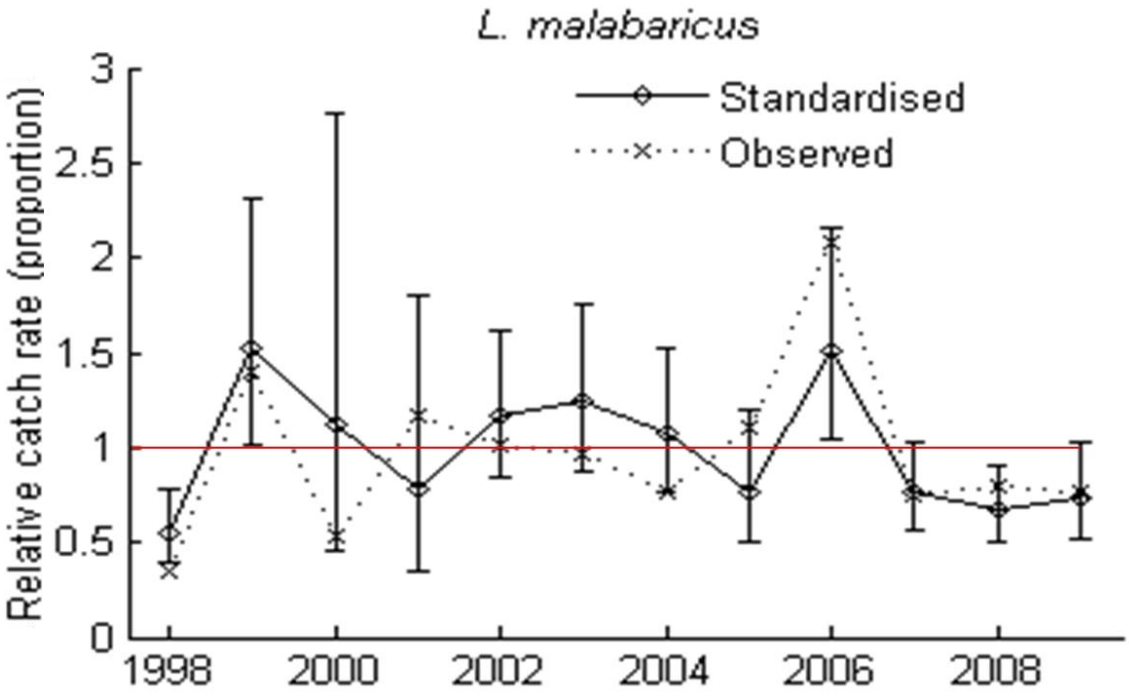

Figure 54. Gulf of Carpentaria saddletail snapper. Observed (raw) and standardised catch rates for the Gulf of Carpentaria Developmental Fin Fish Trawl Fishery.

Sand whiting (*Sillago ciliata*)

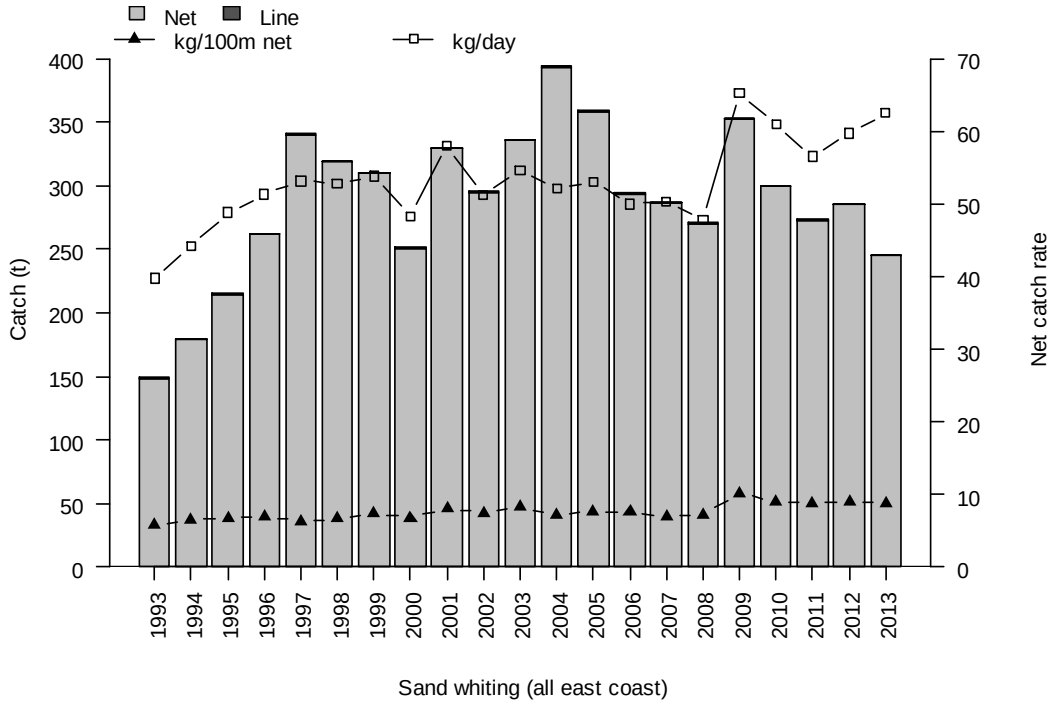

Figure 55. East coast sand whiting. Total reported annual commercial catch (tonnes) grouped by fishing method, plus raw catch rates for net fishing (kg/100 m of net and kg/day).

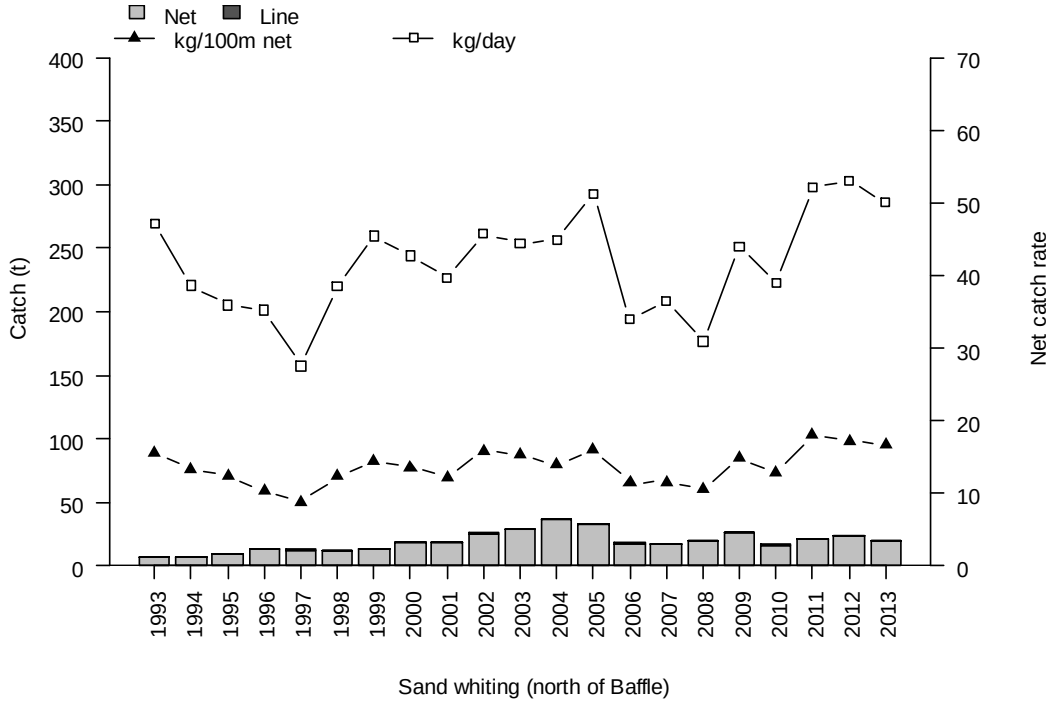

Figure 56. East coast sand whiting – north of Baffle Creek. Total reported annual commercial catch (tonnes) grouped by fishing method, plus raw catch rates for net fishing (kg/100 m of net and kg/day).

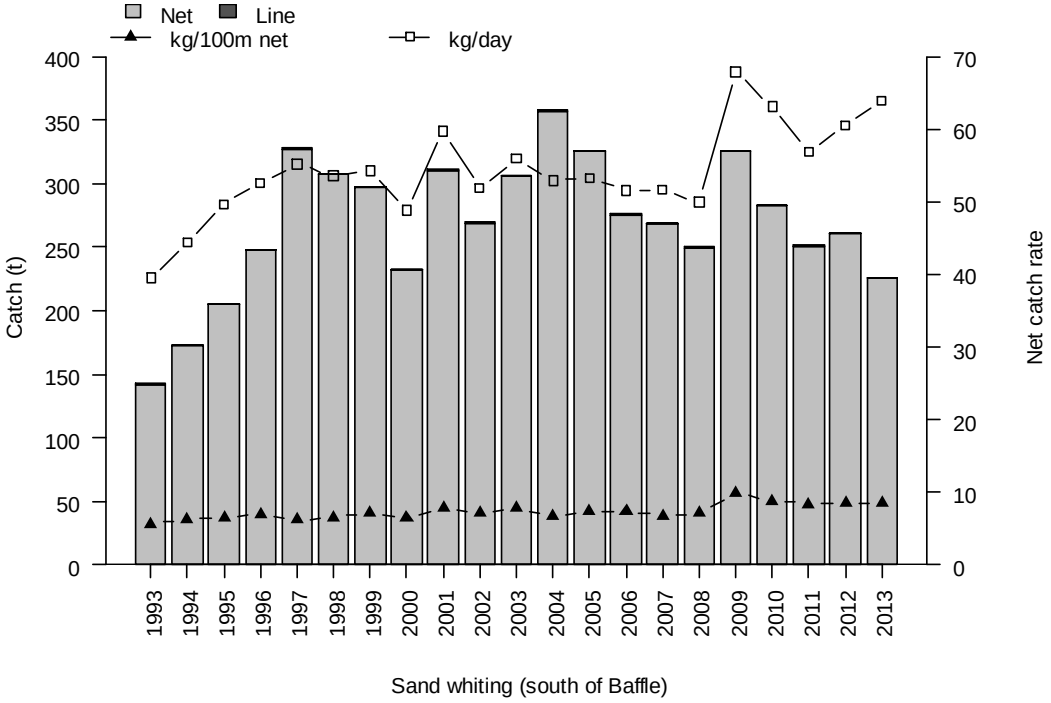

Figure 57. East coast sand whiting – south of Baffle Creek. Total reported annual commercial catch (tonnes) grouped by fishing method, plus raw catch rates for net fishing (kg/100 m of net and kg/day).

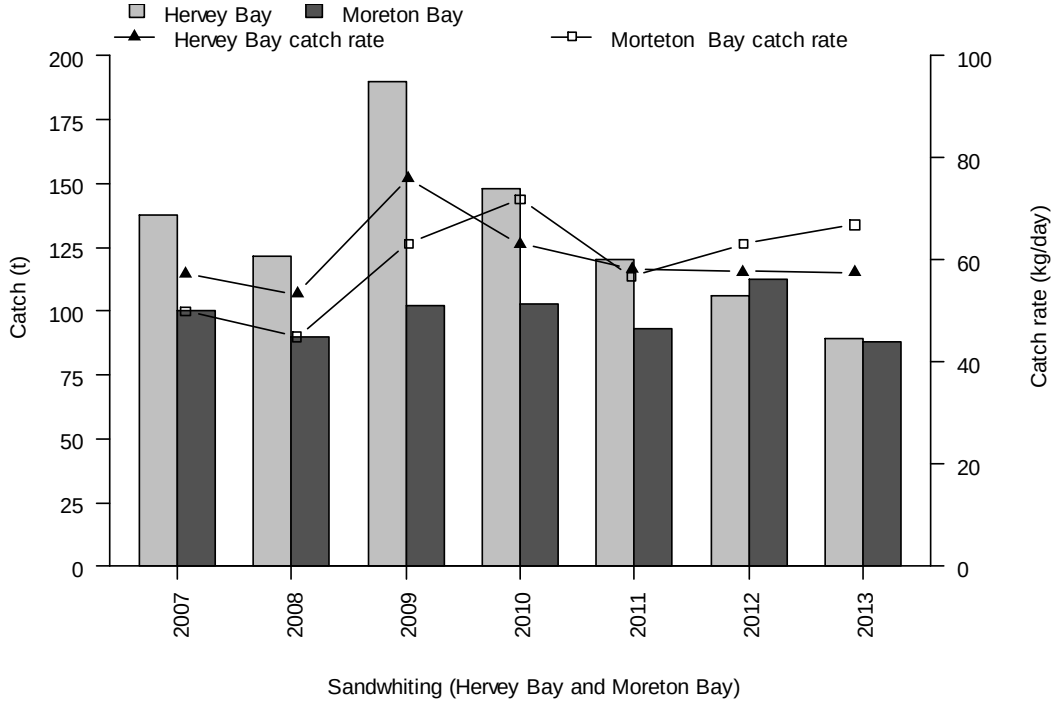

Figure 58. East coast sand whiting – Hervey and Moreton Bays. Total reported annual commercial catch (tonnes) and raw catch rates for net fishing (kg/100 m of net and kg/day).

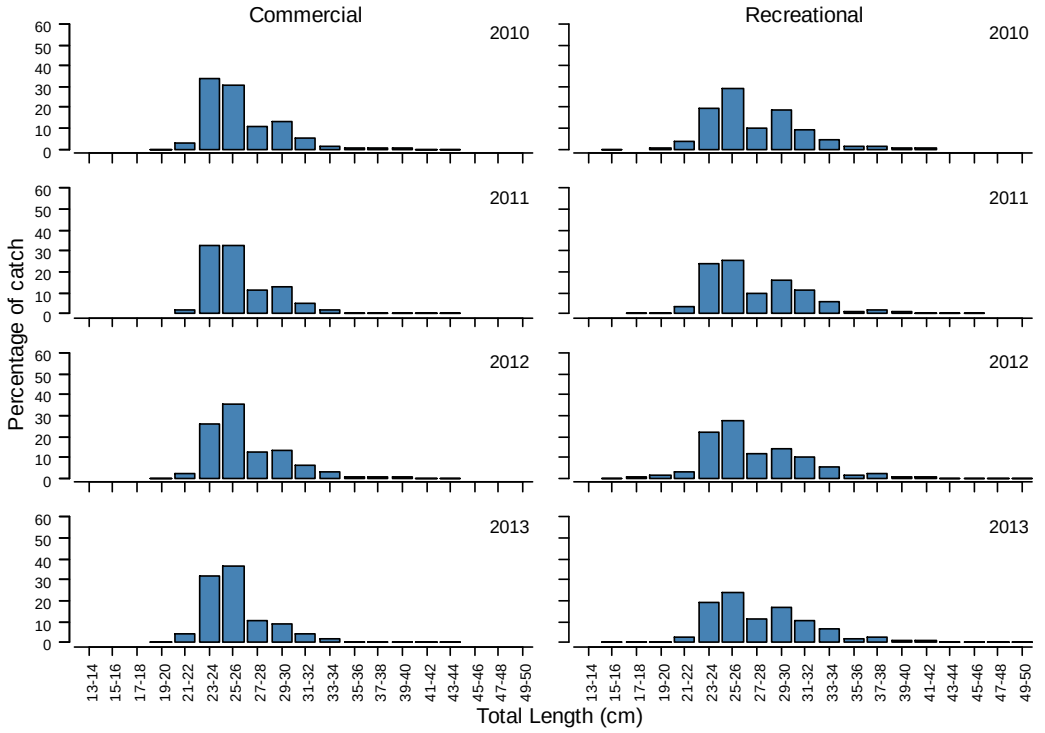

Figure 59. East coast sand whiting – south of Baffle Creek. Annual length frequency distributions of fish retained by commercial and recreational sectors.

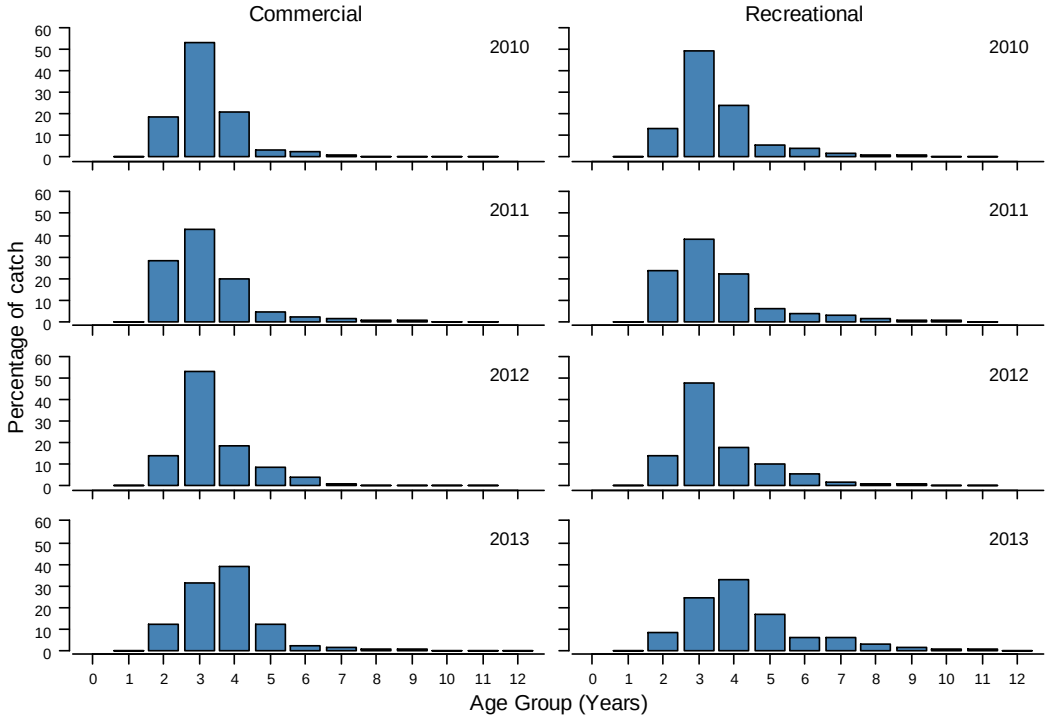

Figure 60. East coast sand whiting – south of Baffle Creek. Annual age frequency distributions of fish retained by commercial and recreational sectors.

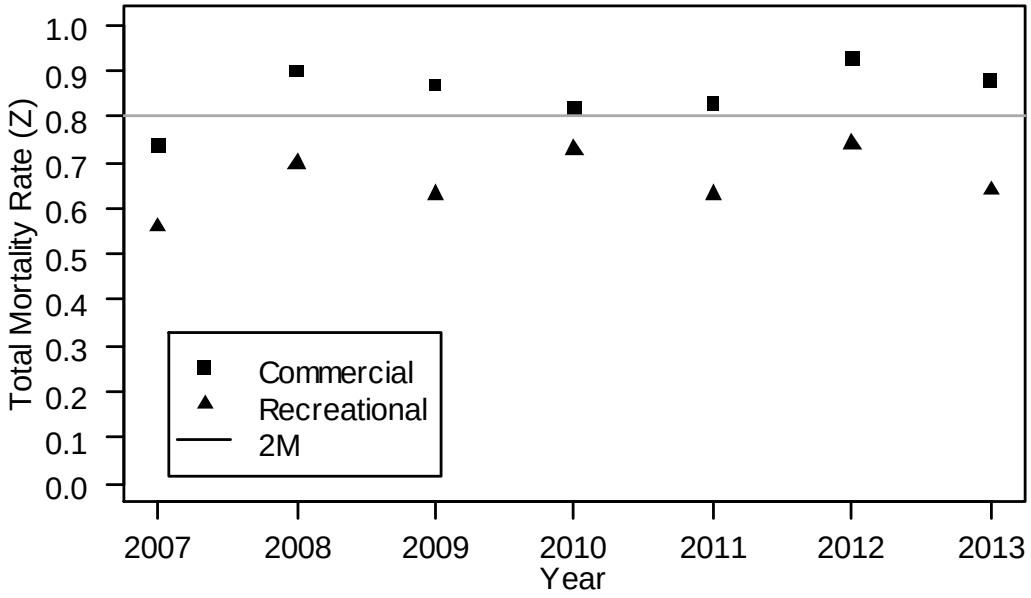

Figure 61. East coast sand whiting – south of Baffle Creek. Annual estimates of instantaneous rate of total mortality (Z) based on cross sectional analysis of age frequency distributions of fish retained by commercial and recreational sectors. The horizontal line indicates the rate of total mortality corresponding to twice the assumed rate of natural mortality (2M). This is also the value for rate of total mortality where rates of fishing and natural mortality are equal (i.e. F=M).

Sea mullet (*Mugil cephalus*)

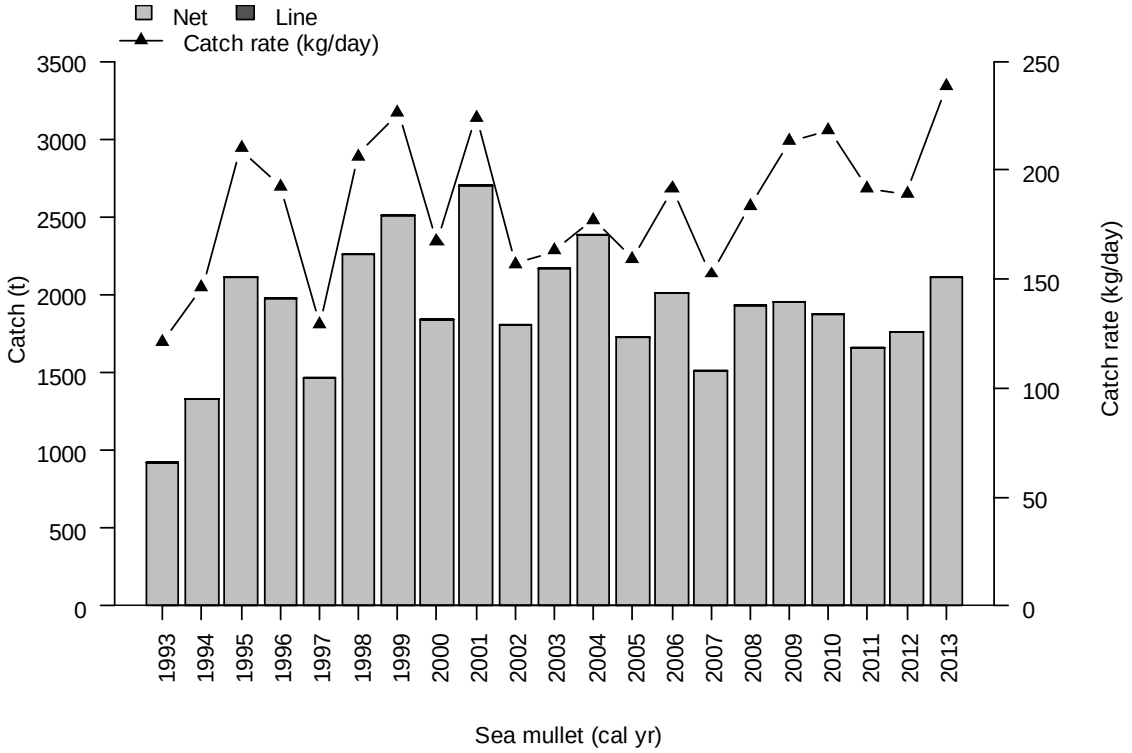

Figure 62. East coast sea mullet. Total reported annual commercial catch (tonnes) and raw catch rates for net fishing (kg/day).

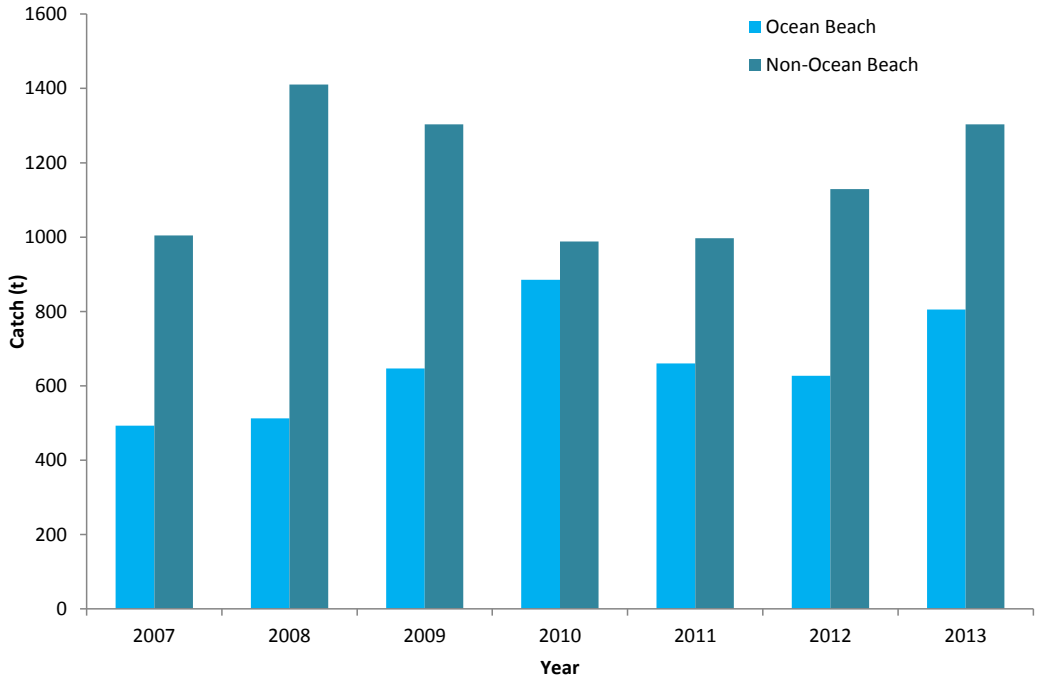

Figure 63. East coast sea mullet. Total reported annual commercial catch (tonnes) grouped by sector (Ocean Beach and Non-ocean Beach). Ocean Beach sector is defined by fishers requiring a K endorsement and fishing on designated ocean beaches between April and August. Non-ocean Beach sector includes all other catches.

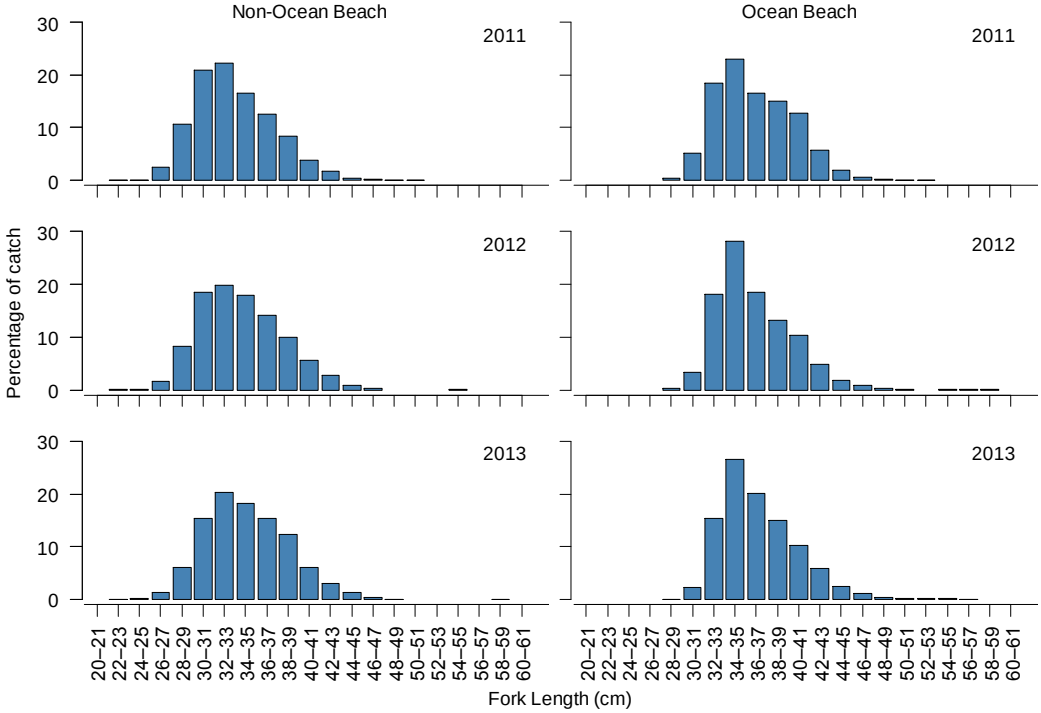

Figure 64. East coast sea mullet – south of Baffle Creek. Annual length frequency distributions of fish retained by commercial Ocean Beach and Non-ocean Beach sectors. Ocean Beach sector is defined by fishers requiring a K endorsement and fishing on designated ocean beaches between April and August. Non-ocean Beach includes all other catches.

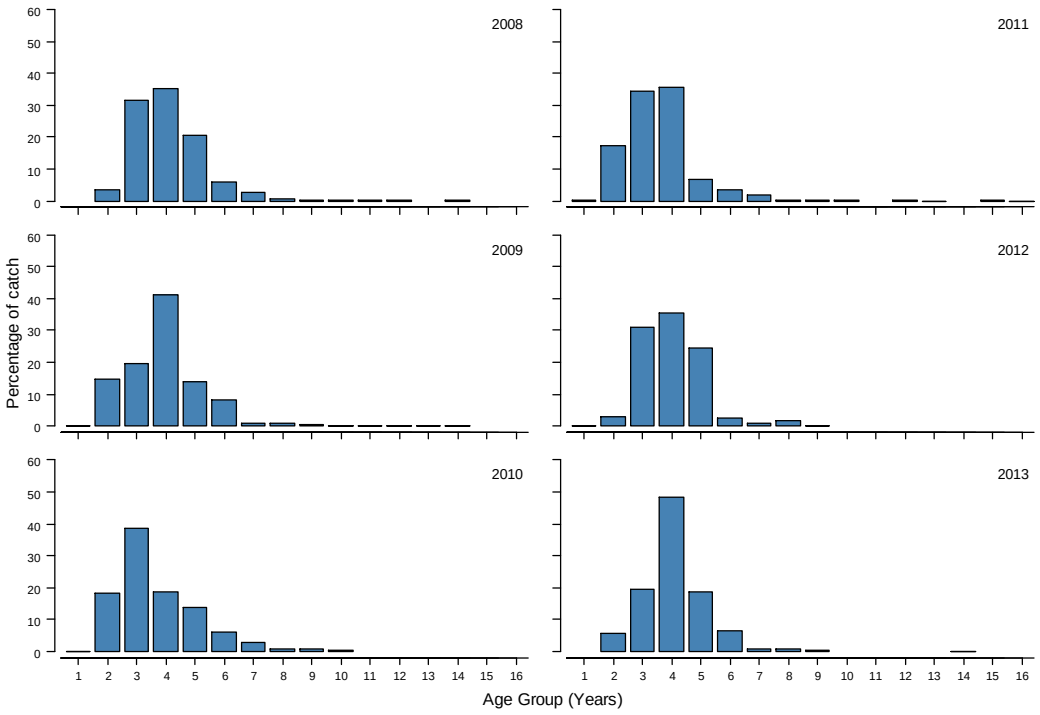

Figure 65. East coast sea mullet – south of Baffle Creek. Annual age frequency distributions of fish retained by commercial fishers (both sectors combined).

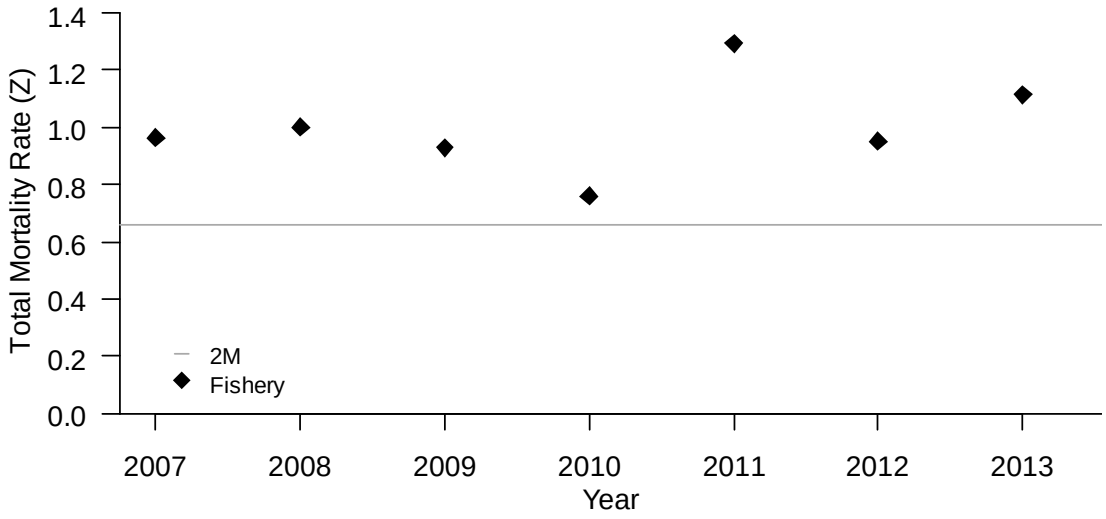

Figure 66. East coast sea mullet – south of Baffle Creek. Annual estimates of instantaneous rate of total mortality (Z) based on cross sectional analysis of age frequency distributions of fish retained by Ocean Beach and Non-ocean Beach sectors combined. The horizontal line indicates the rate of total mortality corresponding to twice the assumed rate of natural mortality (2M). This is also the value for rate of total mortality where rates of fishing and natural mortality are equal (i.e. F=M).

Snapper (*Chrysophrys auratus*)

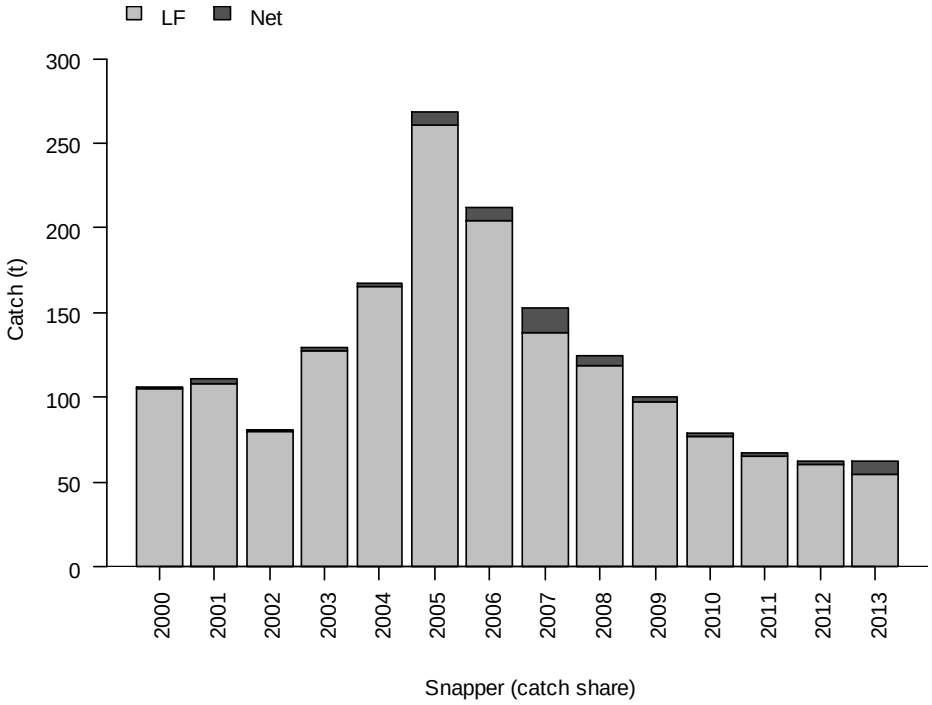

Figure 67. East coast snapper. Total reported annual catch (tonnes) grouped by fishing method.

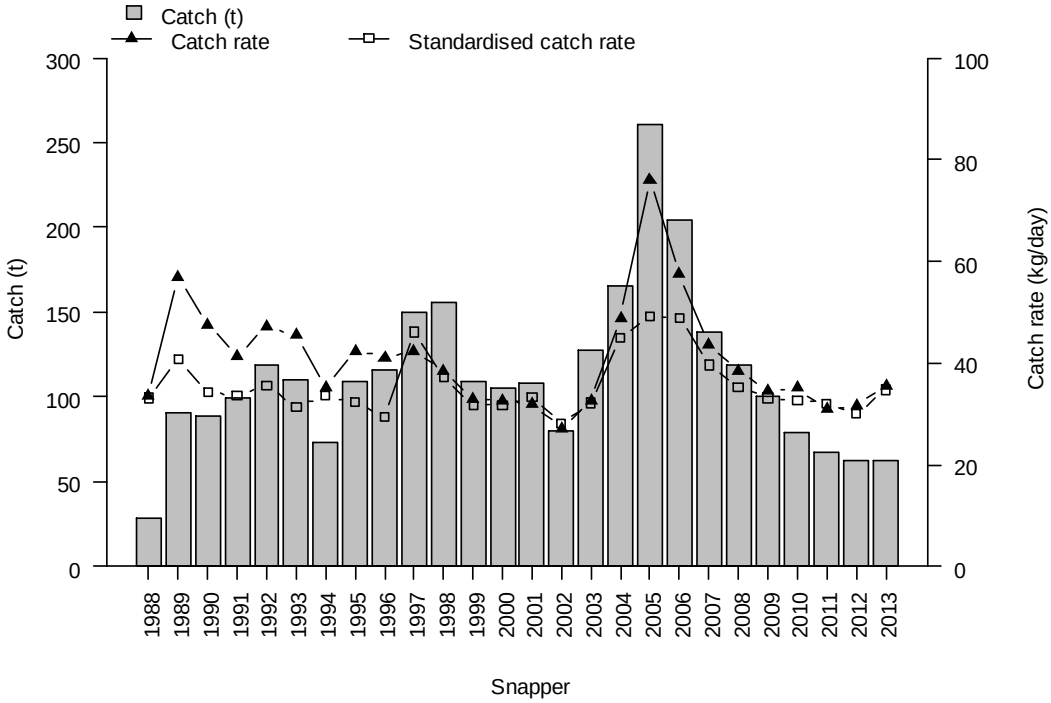

Figure 68. East coast snapper. Total reported annual commercial catch (tonnes), raw catch rate (kg/day) and standardised catch rate.

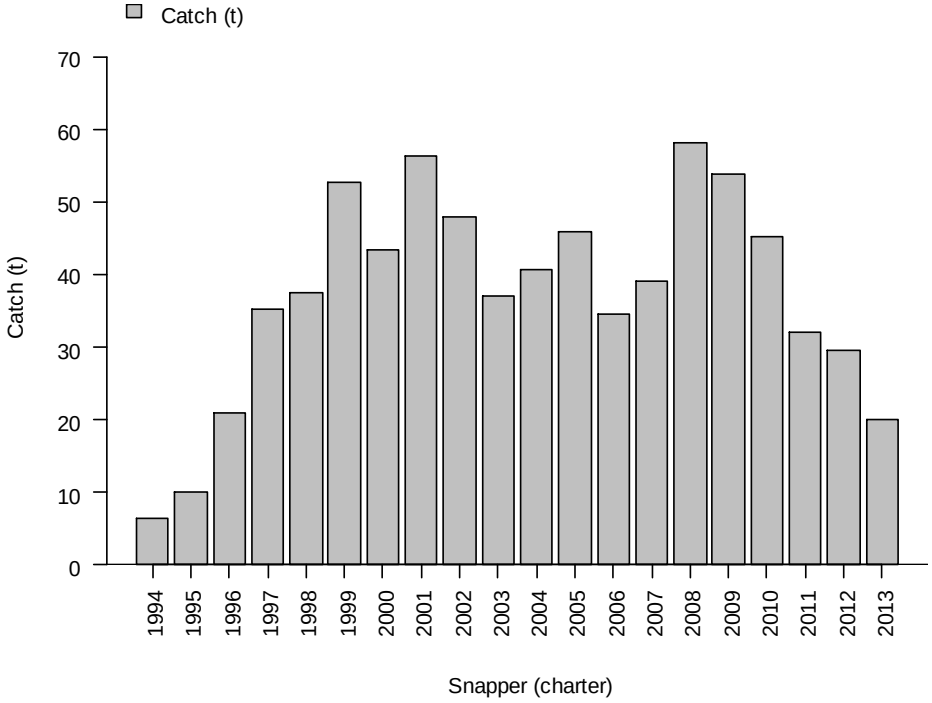

Figure 69. East coast snapper. Total reported annual reported recreational catch from charter boats (tonnes).

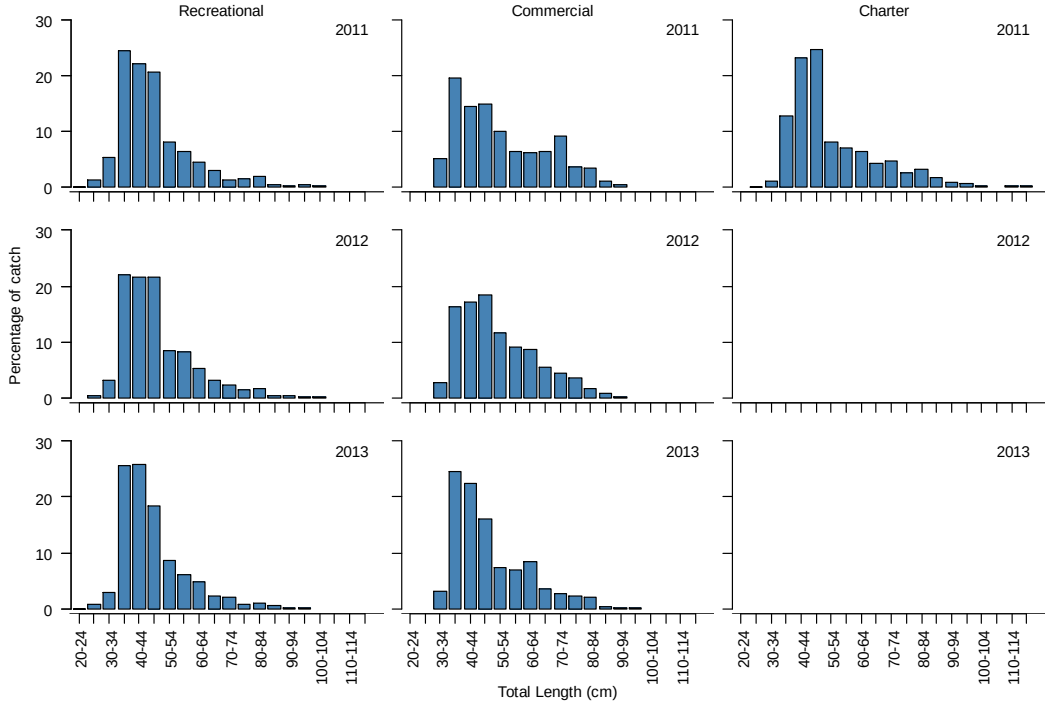

Figure 70. East coast snapper. Annual length frequency distributions of fish retained by commercial and recreational fishers. “Charter” refers to recreational fishers on board charter boats.

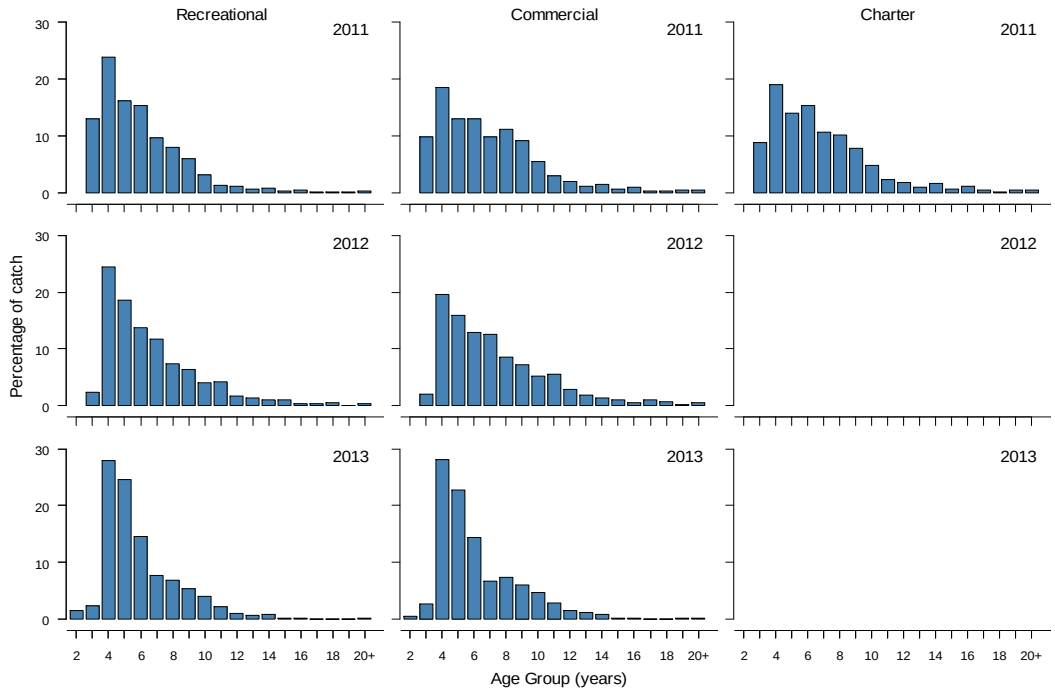

Figure 71. East coast snapper. Annual age frequency distributions of fish retained by commercial and recreational fishers. “Charter” refers to recreational fishers on board charter boats.

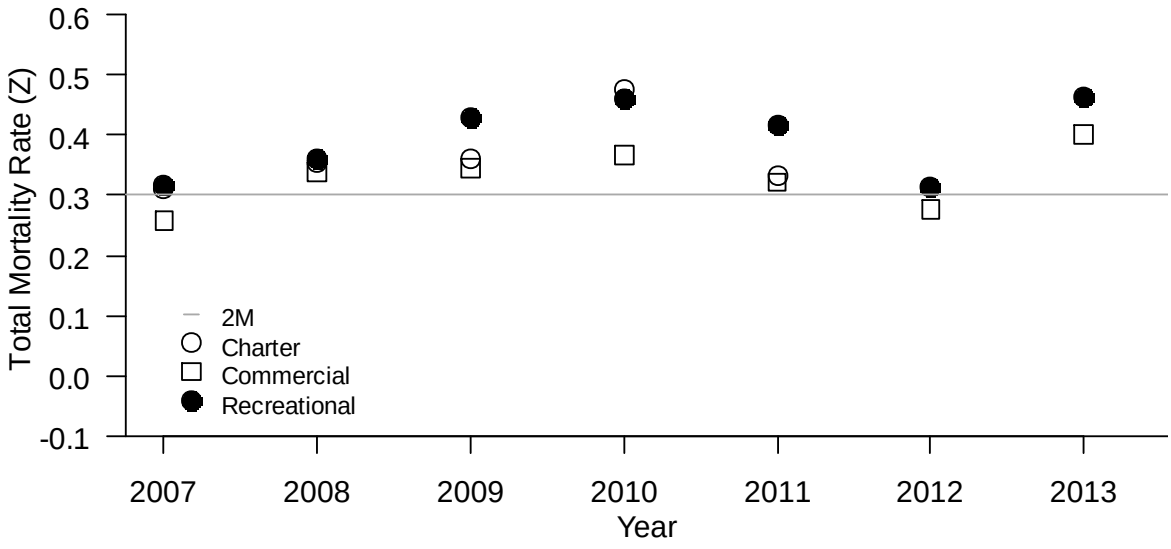

Figure 72. East coast snapper. Annual estimates of instantaneous rate of total mortality (Z) based on cross sectional analysis of age frequency distributions of fish retained by commercial and recreational fishers. “Charter” refers to recreational fishers on board charter boats. The horizontal line indicates the rate of total mortality corresponding to twice the assumed rate of natural mortality (2M). This is also the value for rate of total mortality where rates of fishing and natural mortality are equal (i.e. F=M).

Spanish mackerel (*Scomberomorus commerson*)

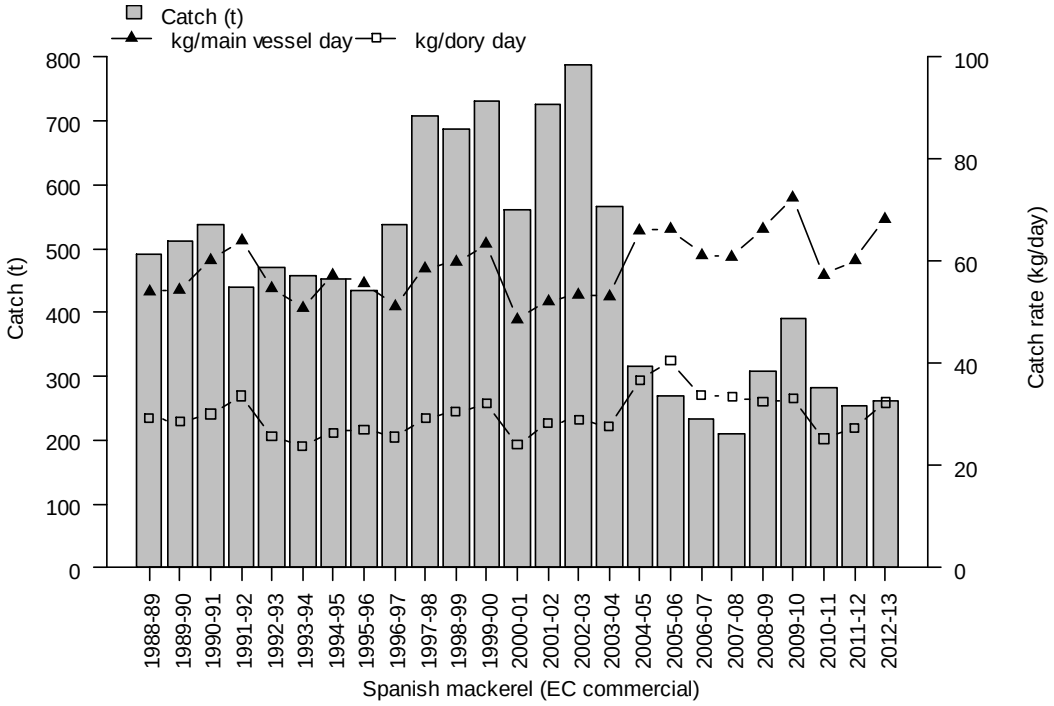

Figure 73. East coast Spanish mackerel. Total reported annual commercial catch (tonnes) and raw catch rates (kg/day per primary licence and kg/day per dory).

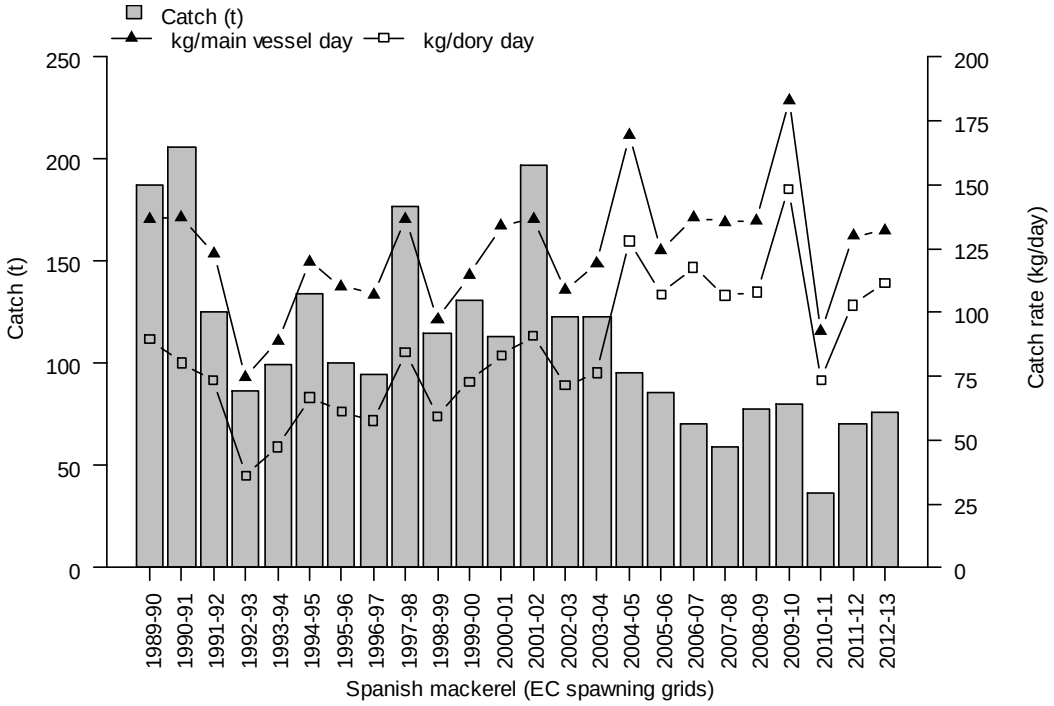

Figure 74. East coast Spanish mackerel – "spawning" CFISH grids only (3 grids off Townsville and 1 grid off Bowen). Total reported annual commercial catch (tonnes) and raw catch rates (kg/day per primary licence and kg/day per dory).

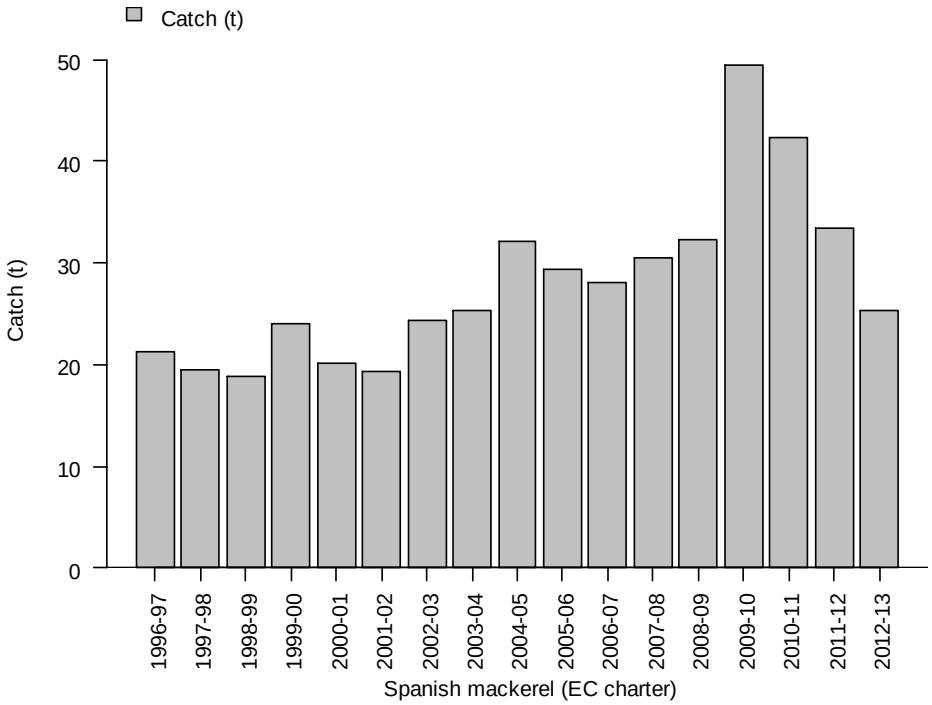

Figure 75. East coast Spanish mackerel. Total reported annual recreational catch from charter boats (tonnes).

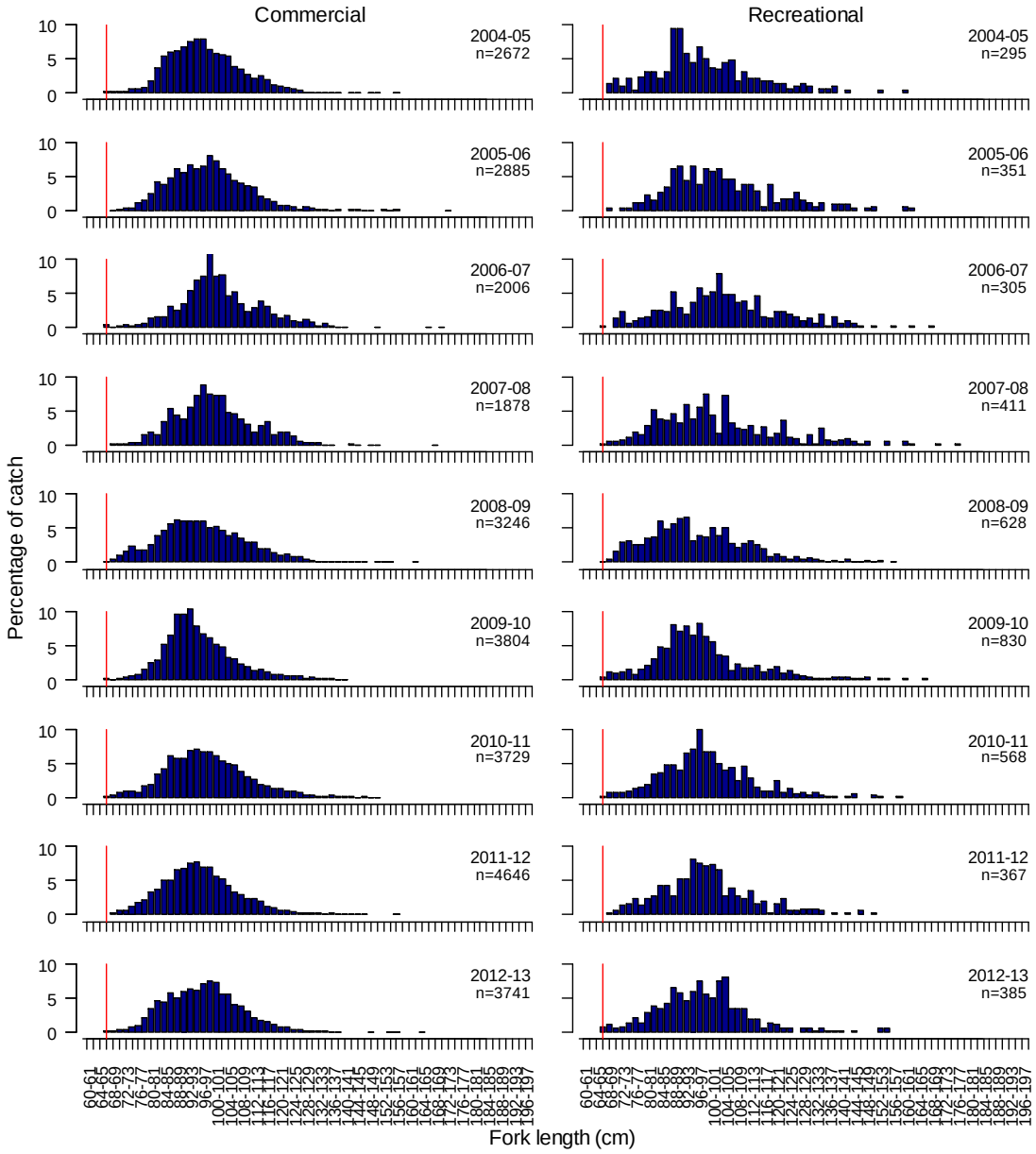

Figure 76. East coast Spanish mackerel. Annual length frequency distributions of fish retained by commercial and recreational fishers. Vertical line shows approximate minimum legal fork length (75cm total length≈67cm fork length).

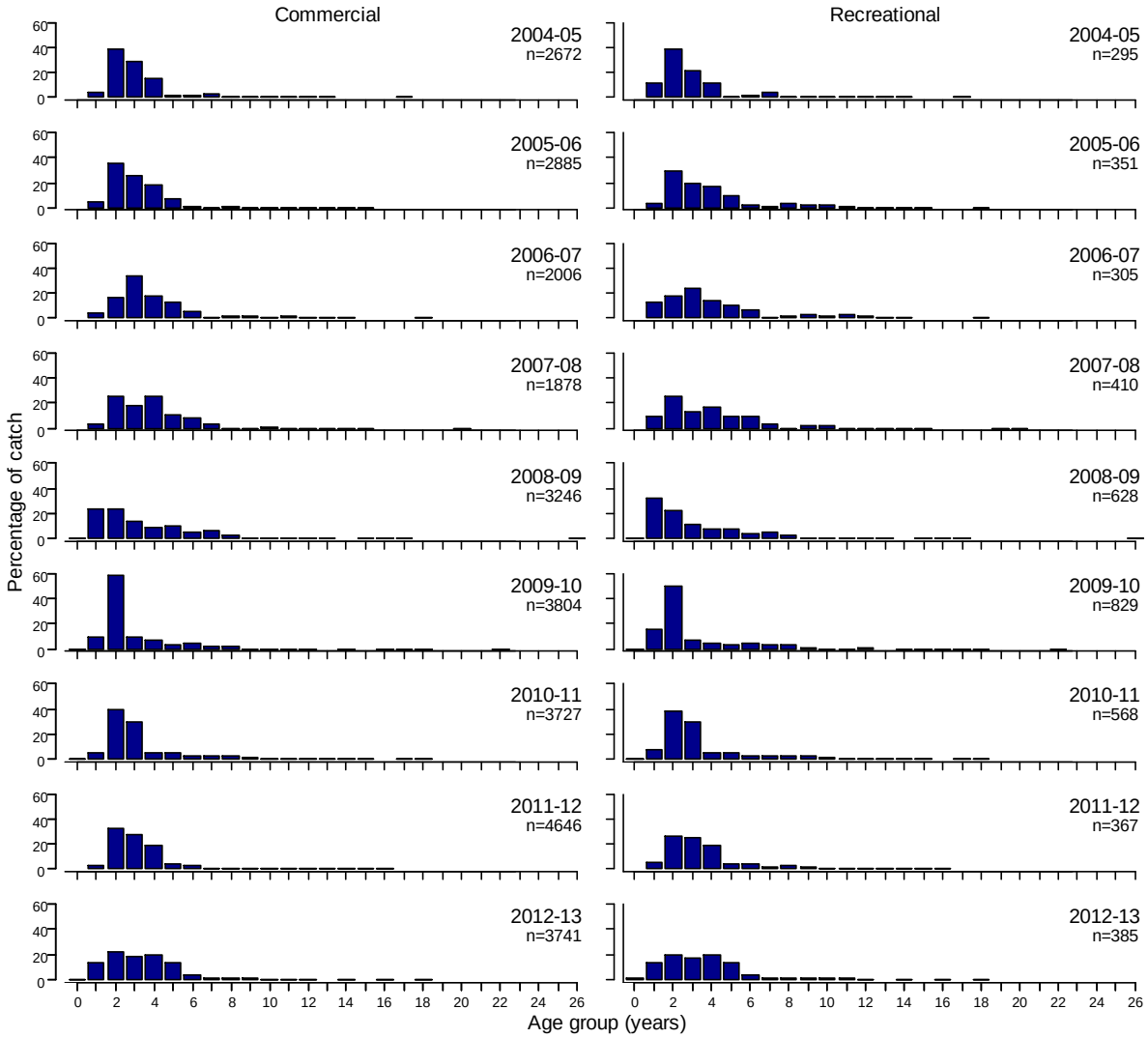

Figure 77. East coast Spanish mackerel. Annual age frequency distributions of fish retained by commercial and recreational fishers.

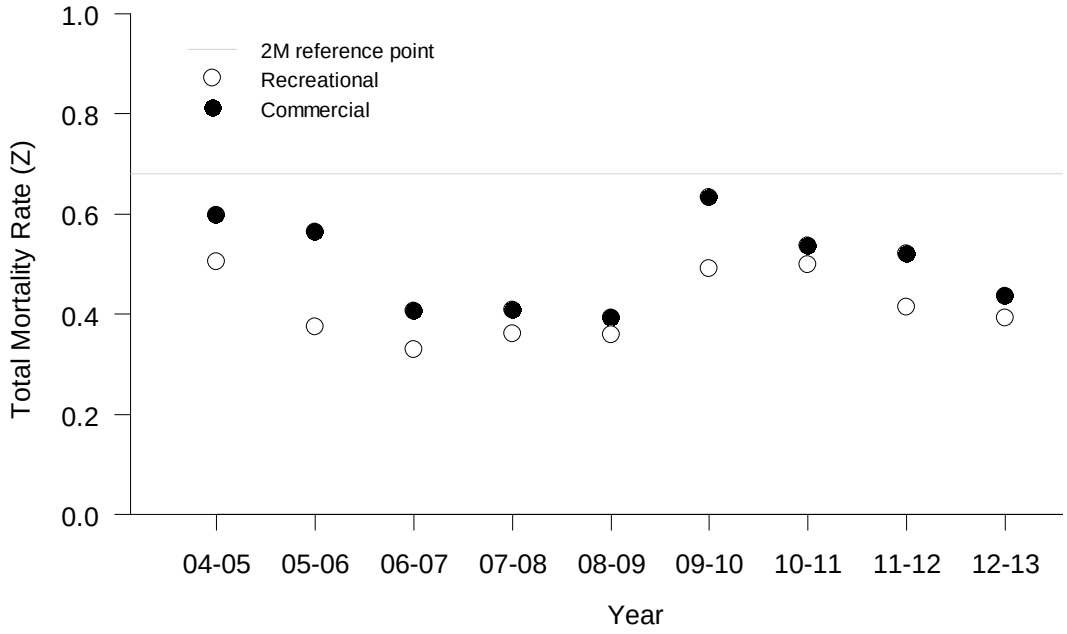

Figure 78. East coast Spanish mackerel. Annual estimates of instantaneous rate of total mortality (Z) based on cross sectional analysis of age frequency distributions of fish retained by commercial and recreational fishers. The horizontal line indicates the rate of total mortality corresponding to twice the assumed rate of natural mortality (2M). This is also the value for rate of total mortality where rates of fishing and natural mortality are equal (i.e. F=M).

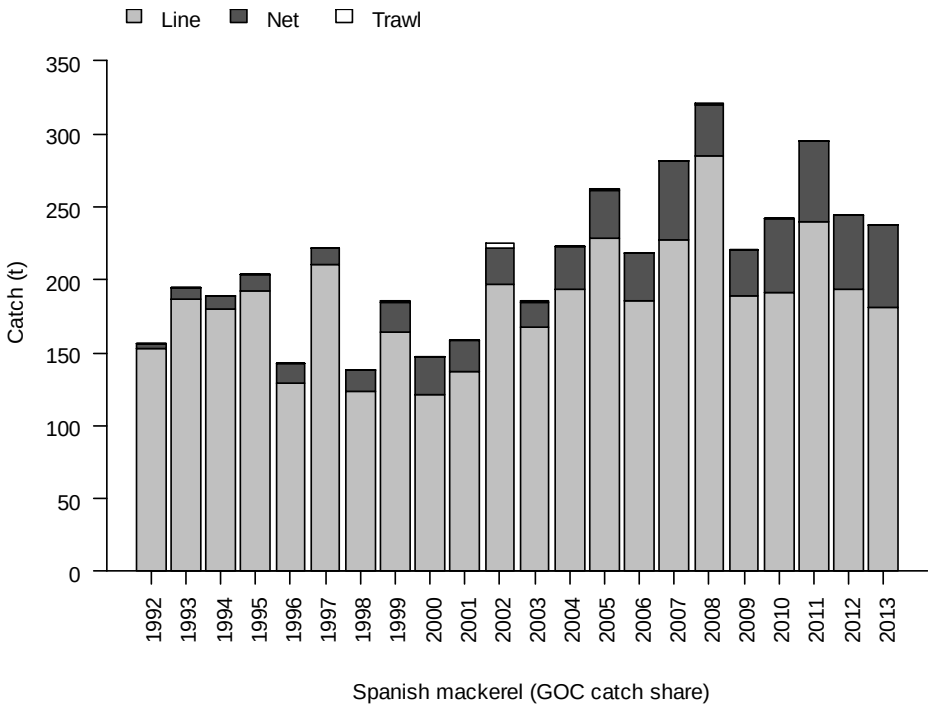

Figure 79. Gulf of Carpentaria Spanish mackerel. Total reported annual catch (tonnes) grouped by fishing method.

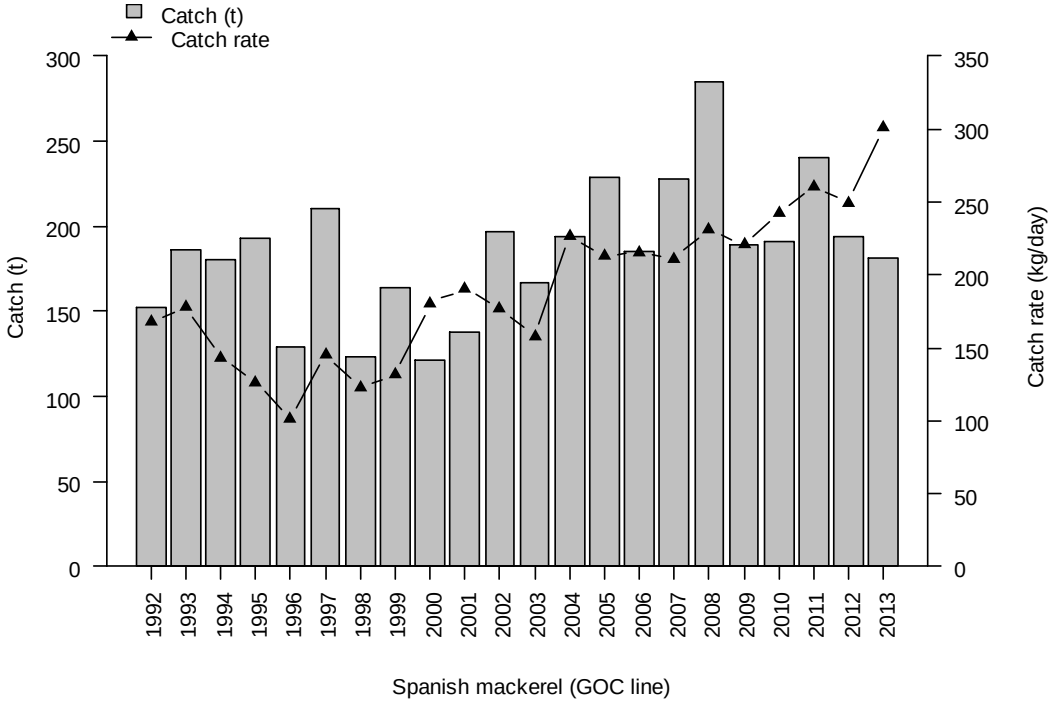

Figure 80. Gulf of Carpentaria Spanish mackerel. Total reported annual commercial catch (tonnes) and raw catch rate (kg/day) for line fishing.

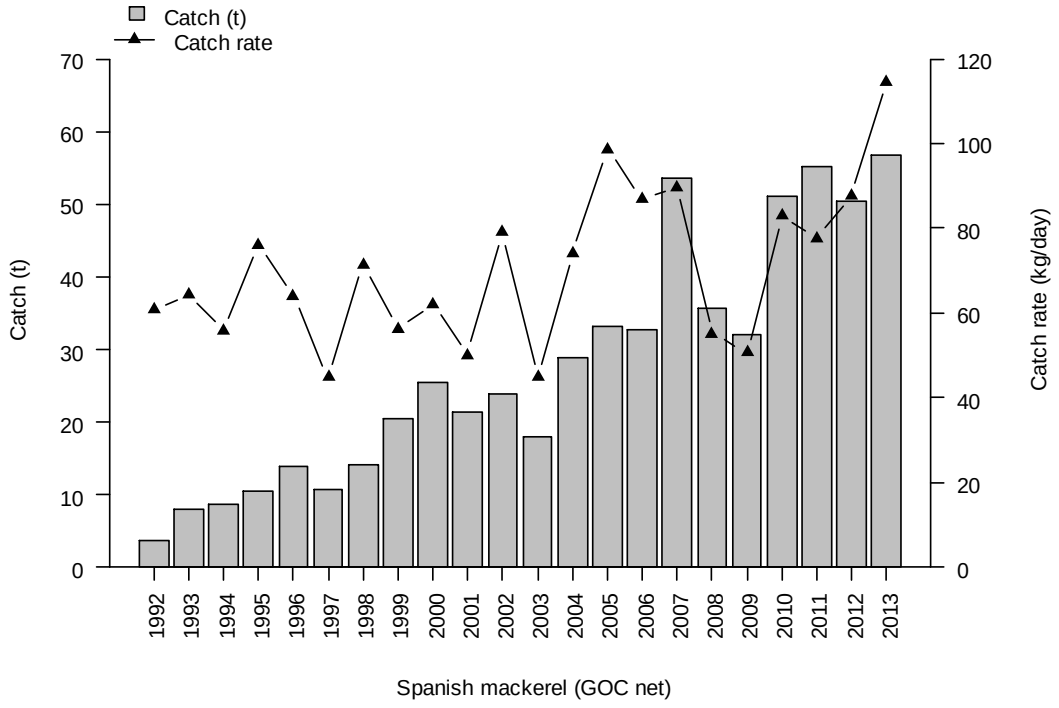

Figure 81. Gulf of Carpentaria Spanish mackerel. Total reported annual commercial catch (tonnes) and raw catch rate for net fishing (kg/day).

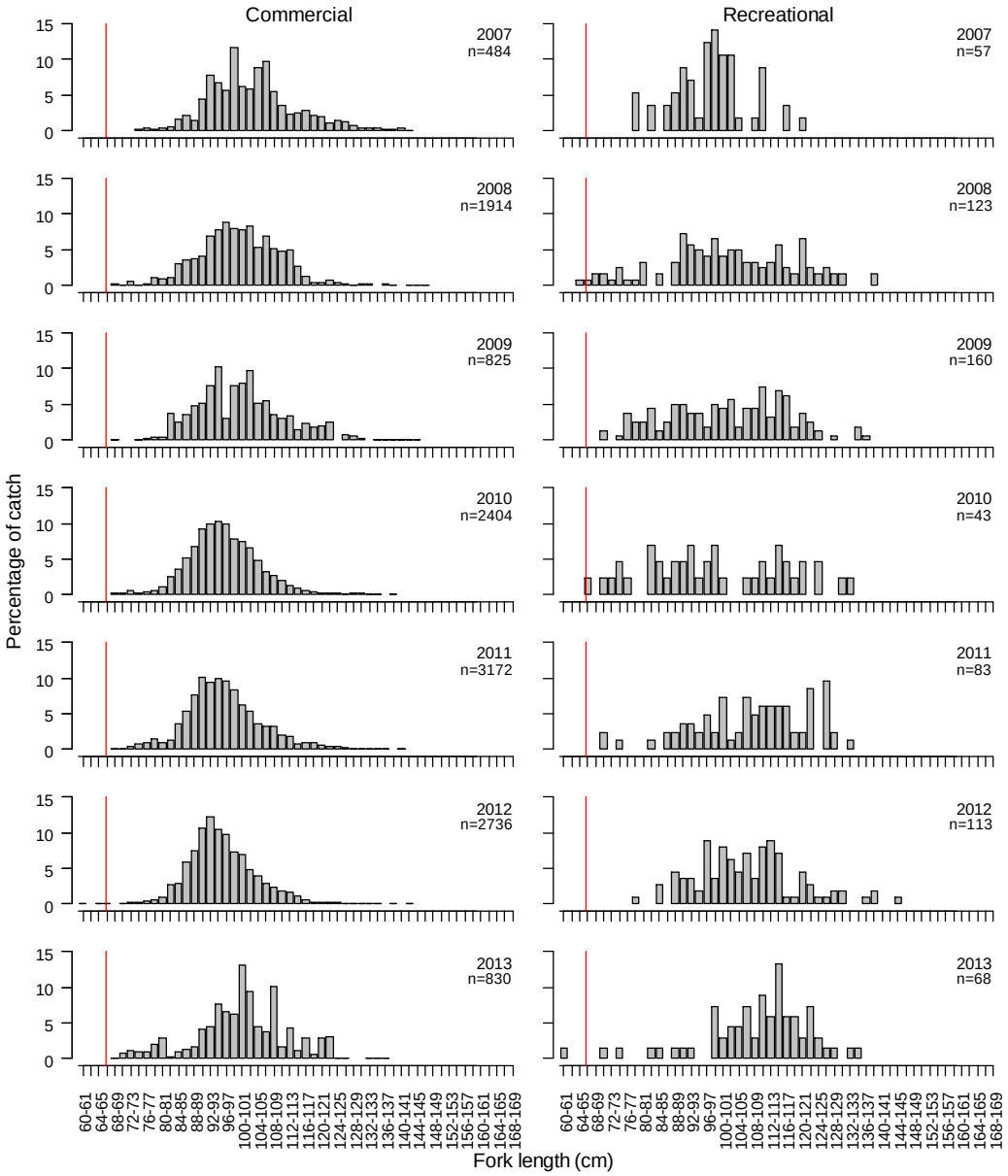

Figure 82. Gulf of Carpentaria Spanish mackerel. Annual length frequency distributions of fish retained by commercial and recreational fishers. Vertical line shows approximate minimum legal fork length (75cm total length≈67cm fork length).

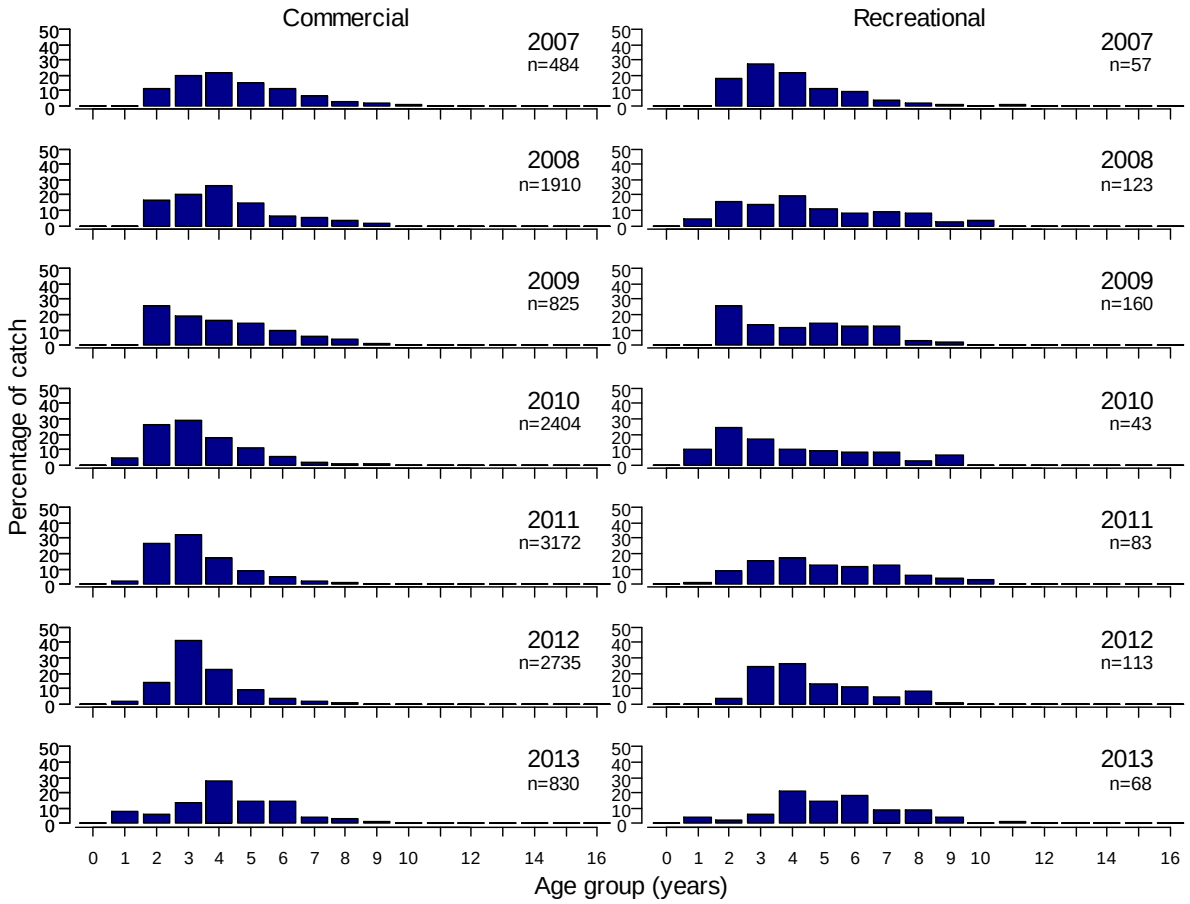

Figure 83. Gulf of Carpentaria Spanish mackerel. Annual age frequency distributions of fish retained by commercial and recreational fishers.

Stout whiting (*Sillago robusta*)

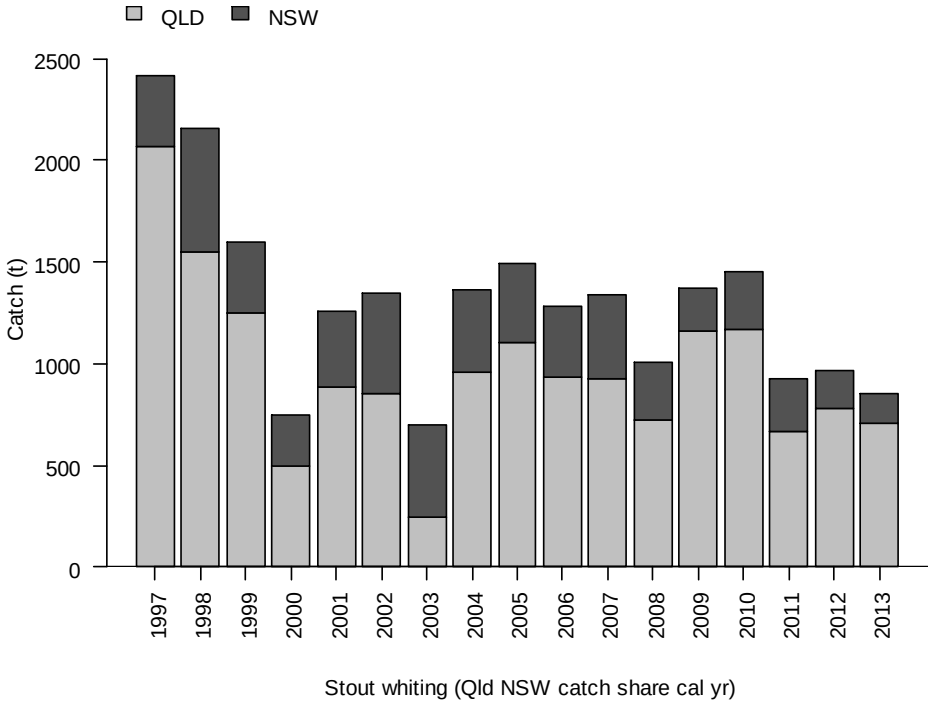

Figure 84. East coast stout whiting. Total reported annual commercial catch (tonnes) for Queensland and New South Wales.

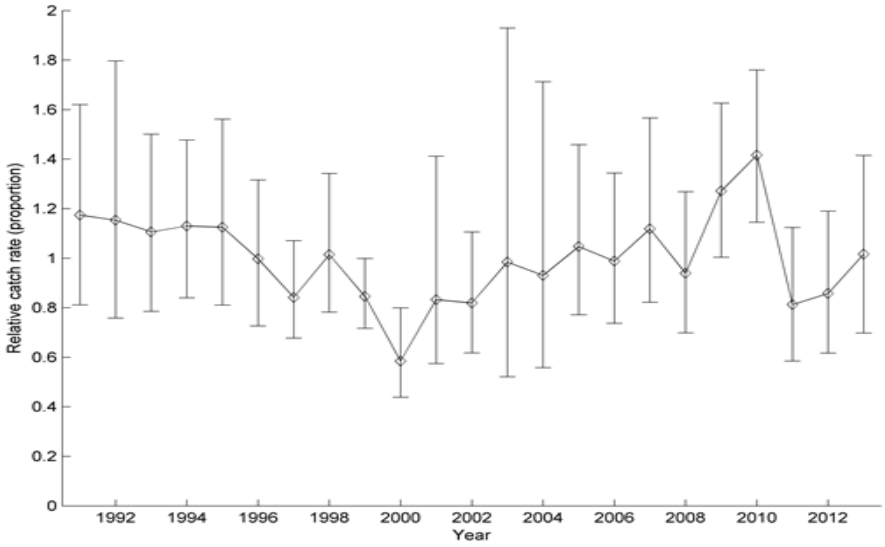

Figure 85. East coast stout whiting. Annual standardised catch rate, taking into account vessel, season, location, fishing gear and environmental factors. Error bars show 95% confidence intervals.

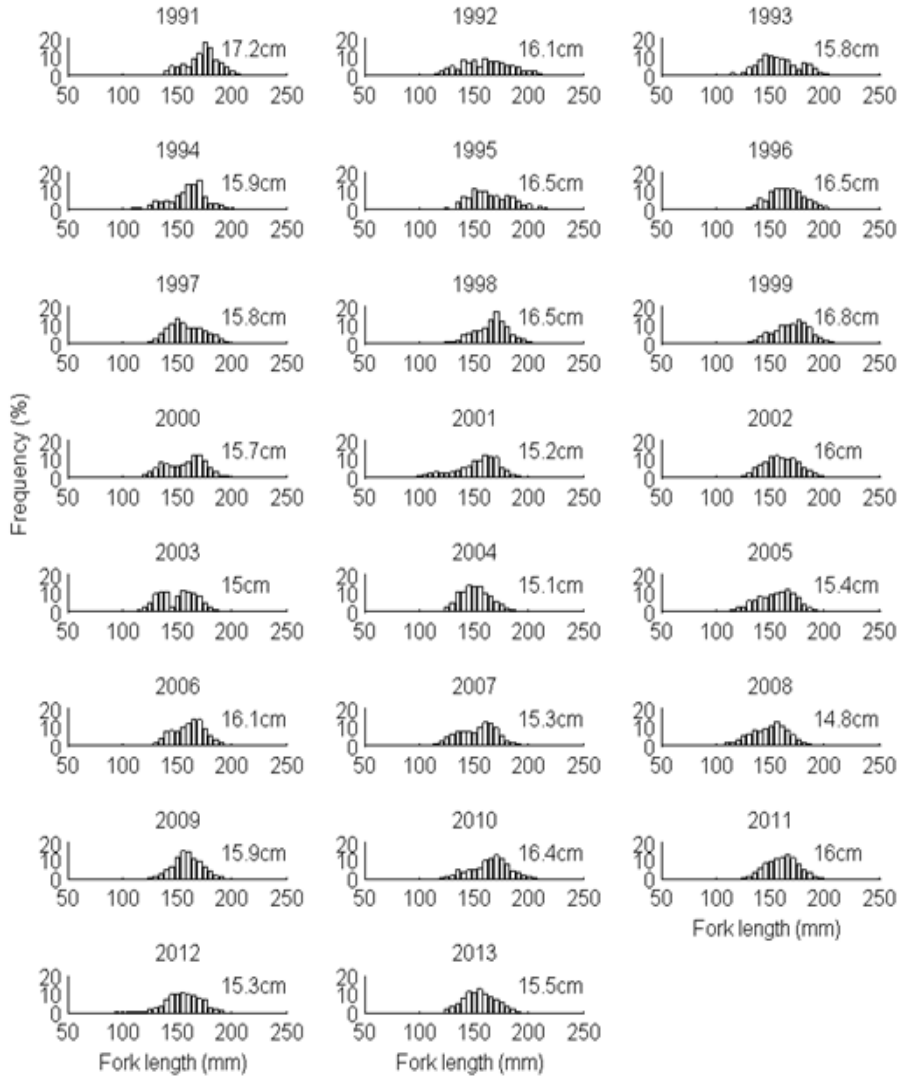

Figure 86. East coast stout whiting. Annual length frequency distributions of fish retained in the Fin Fish (Stout Whiting) Trawl Fishery.

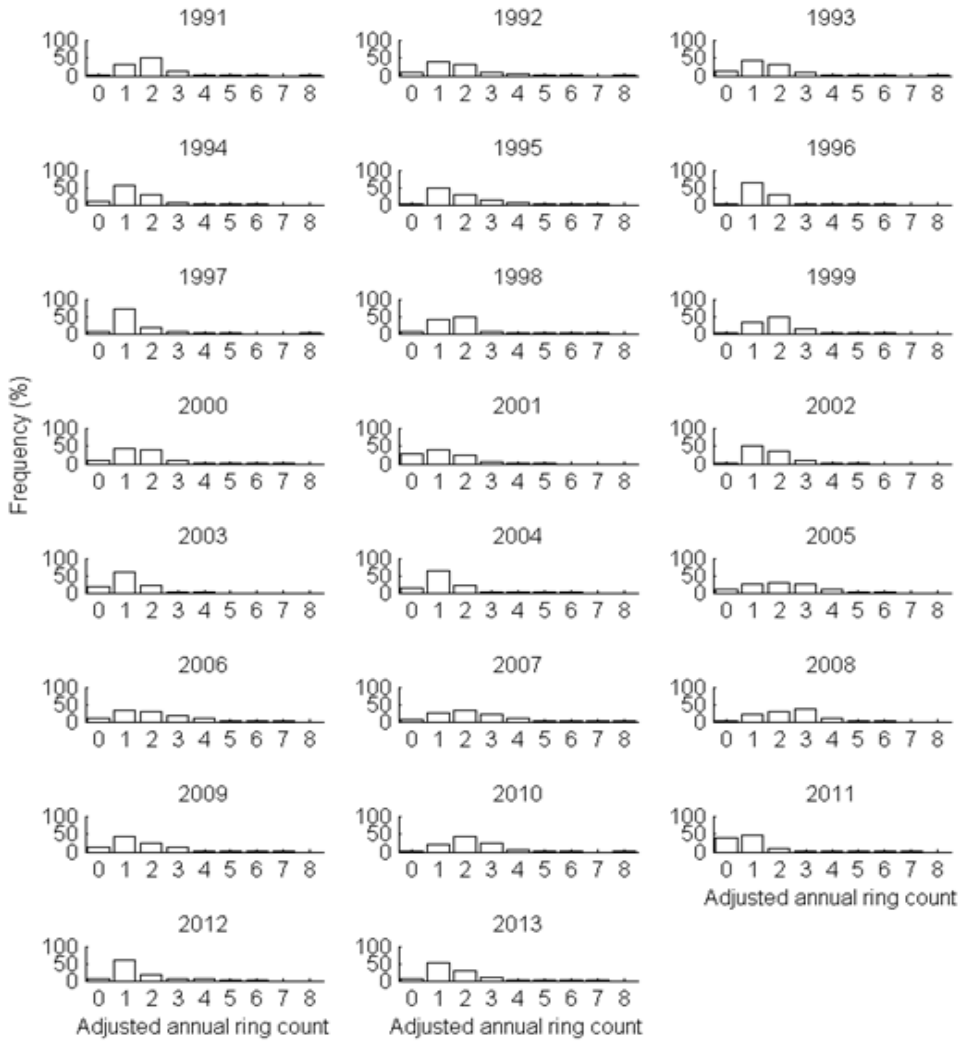

Figure 87. East coast stout whiting. Annual age frequency distributions of fish retained in the Fin Fish (Stout Whiting) Trawl Fishery.

Tailor (*Pomatomus saltatrix*)

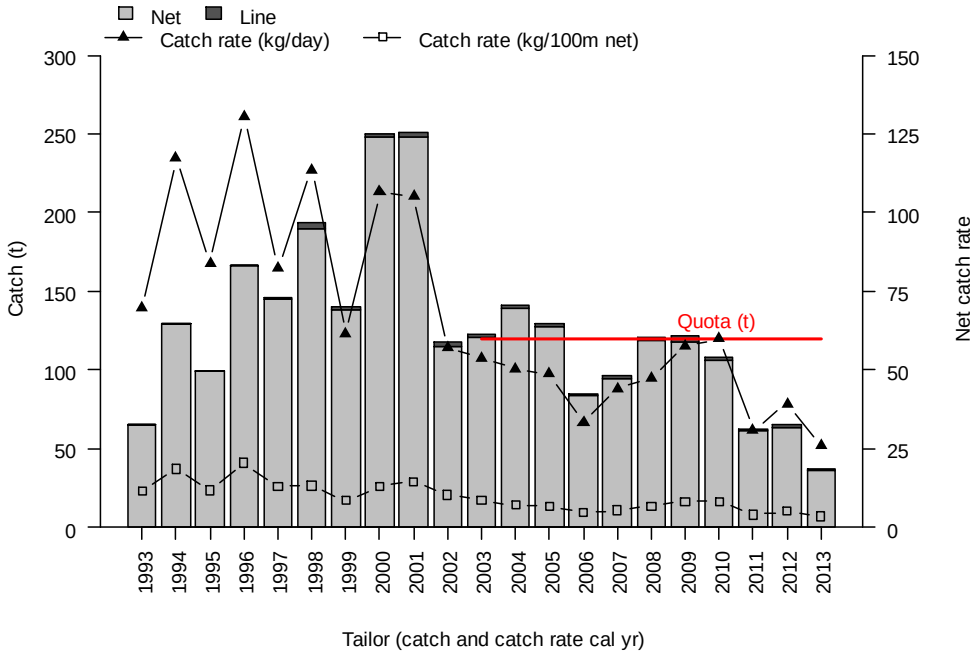

Figure 88. East coast tailor. Total reported annual commercial catch (tonnes) grouped by fishing method, plus raw catch rates for net fishing (kg/100 m of net and kg/day).

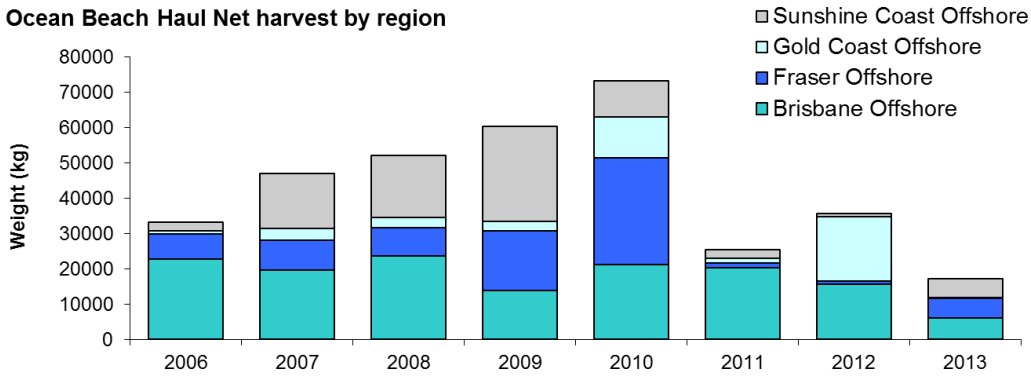

Figure 89. East coast tailor – south of Baffle Creek. Total reported annual commercial catch (tonnes) by haul netting on ocean beaches, grouped by region.

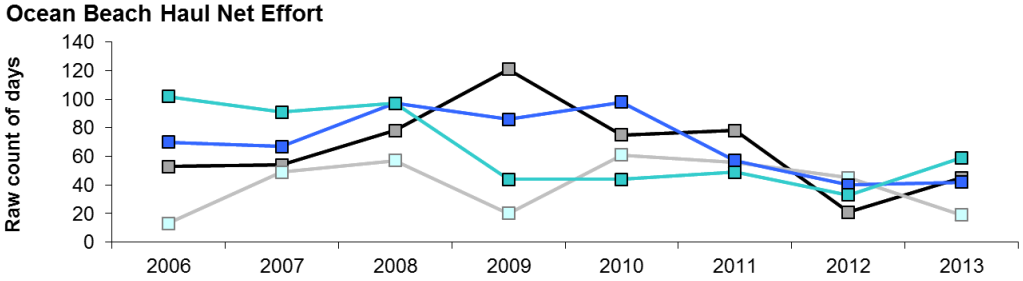

Figure 90. East coast tailor – south of Baffle Creek. Total reported annual commercial effort (days) by haul netting on ocean beaches, grouped by region.

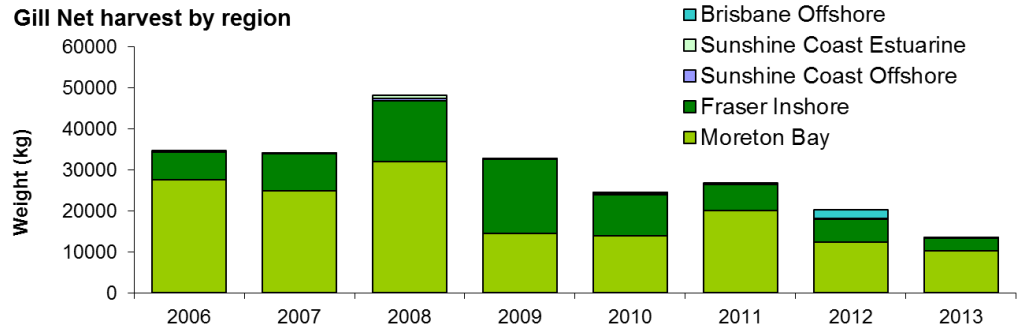

Figure 91. East coast tailor – south of Baffle Creek. Total reported annual commercial catch (tonnes) by gill netting, grouped by region.

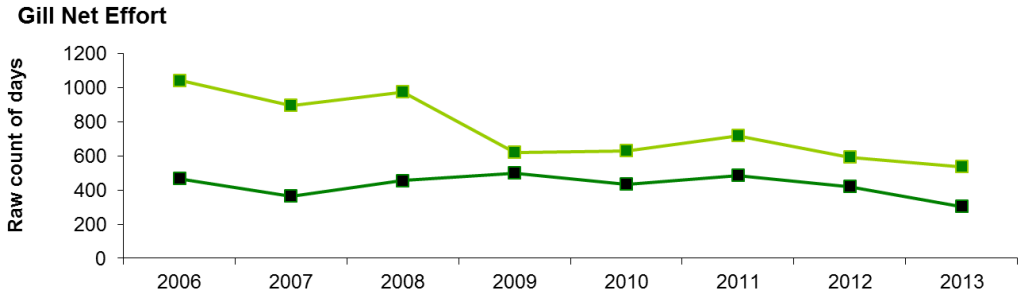

Figure 92. East coast tailor – south of Baffle Creek. Total reported annual commercial effort (days) by gill netting, grouped by region (Moreton Bay and Fraser Inshore only).

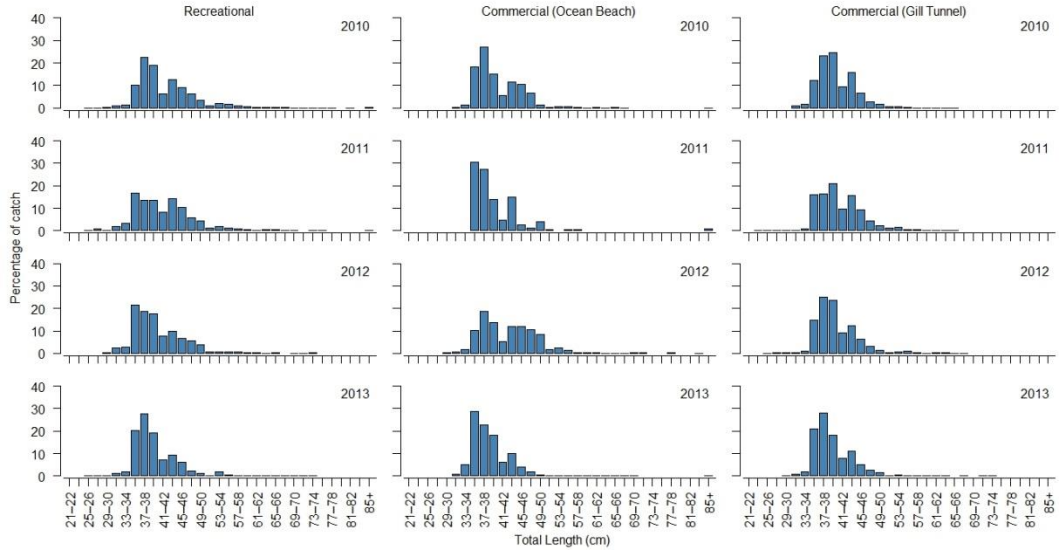

Figure 93. East coast tailor – south of Baffle Creek. Annual length frequency distributions of fish retained by recreational and commercial (ocean beach and gill net/tunnel net) sectors.

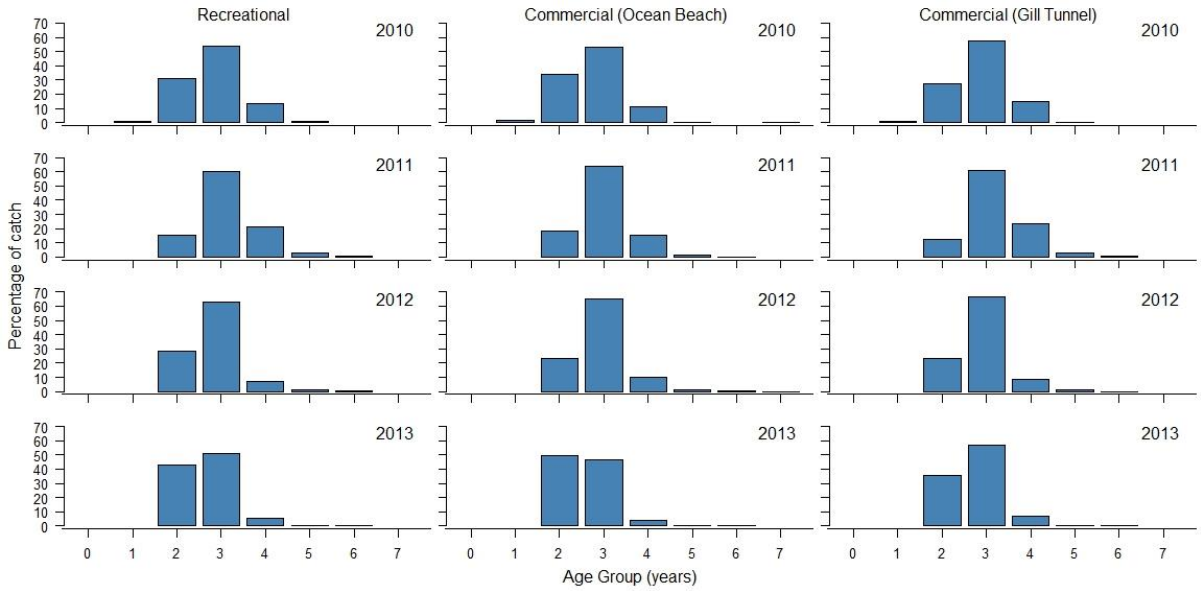

Figure 94. East coast tailor – south of Baffle Creek. Annual age frequency distributions of fish retained by recreational and commercial (ocean beach and gill net/tunnel net) sectors.

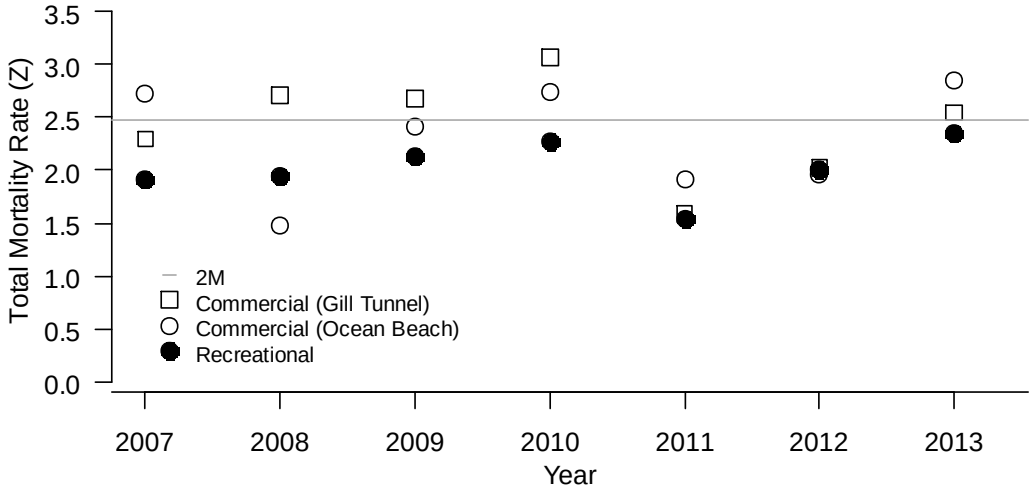

Figure 95. East coast tailor – south of Baffle Creek. Annual estimates of instantaneous rate of total mortality (Z) based on cross sectional analysis of age frequency distributions of fish retained by recreational and commercial (ocean beach and gill net/tunnel net) sectors. The horizontal line indicates the rate of total mortality corresponding to twice the rate of natural mortality (2M). This is also the value for rate of total mortality where rates of fishing and natural mortality are equal (i.e. F=M).

Yellowfin bream (*Acanthopagrus australis*)

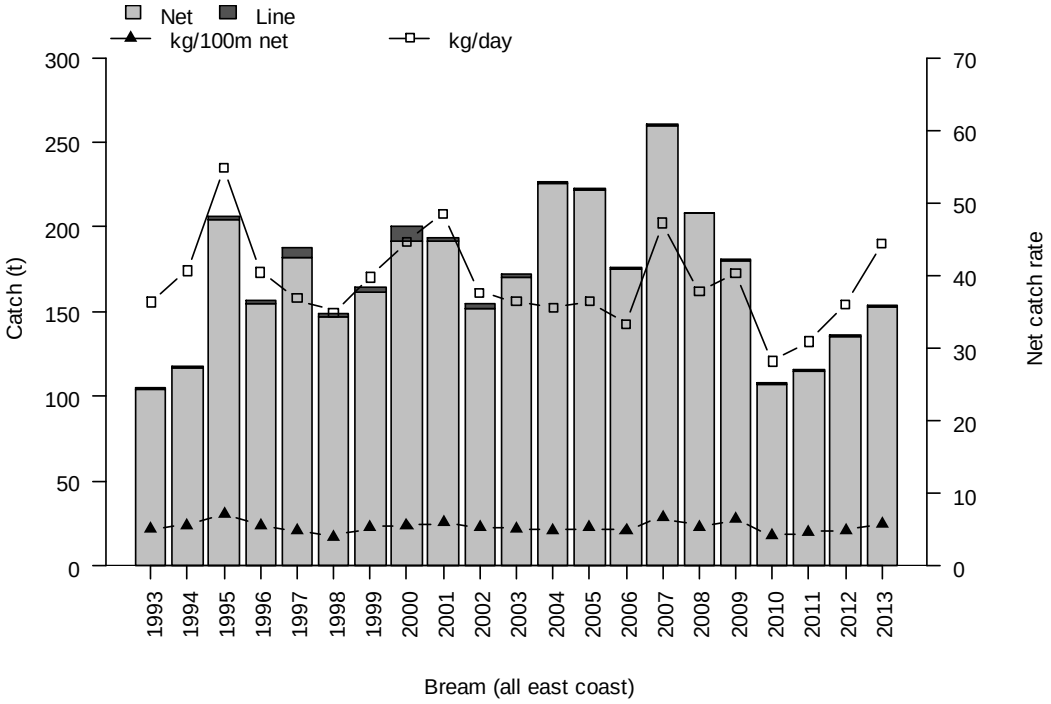

Figure 96. East coast yellowfin bream. Total reported annual commercial catch (tonnes) grouped by fishing method, plus raw catch rates for net fishing (kg/100 m of net and kg/day).

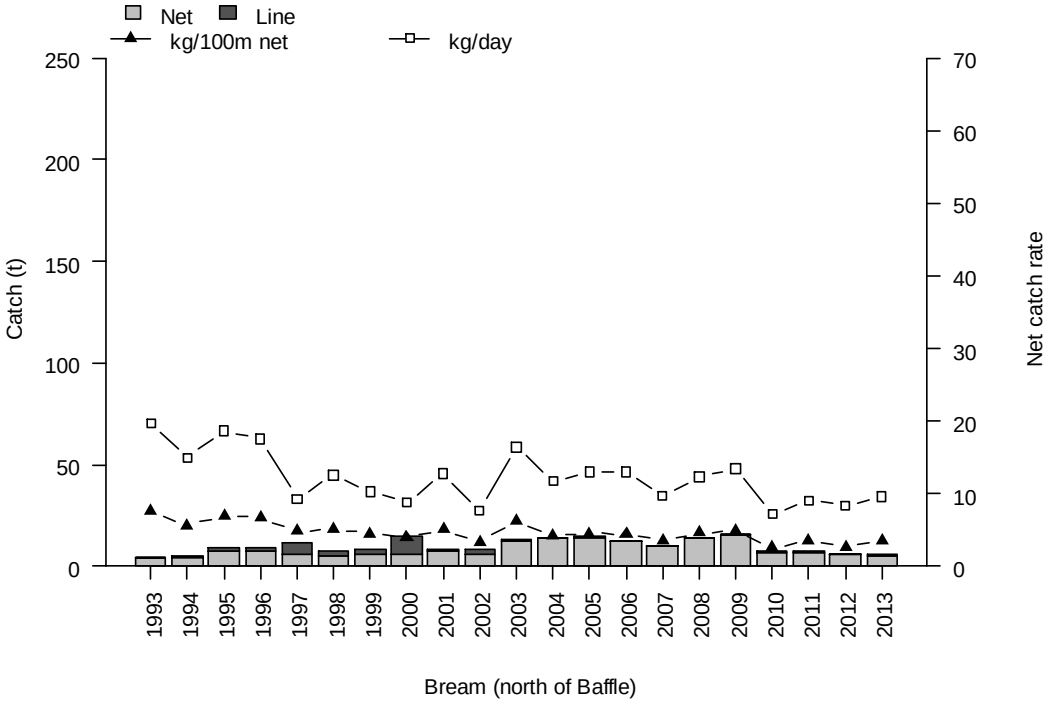

Figure 97. East coast yellowfin bream – north of Baffle Creek. Total reported annual commercial catch (tonnes) grouped by fishing method, plus raw catch rates for net fishing (kg/100 m of net and kg/day).

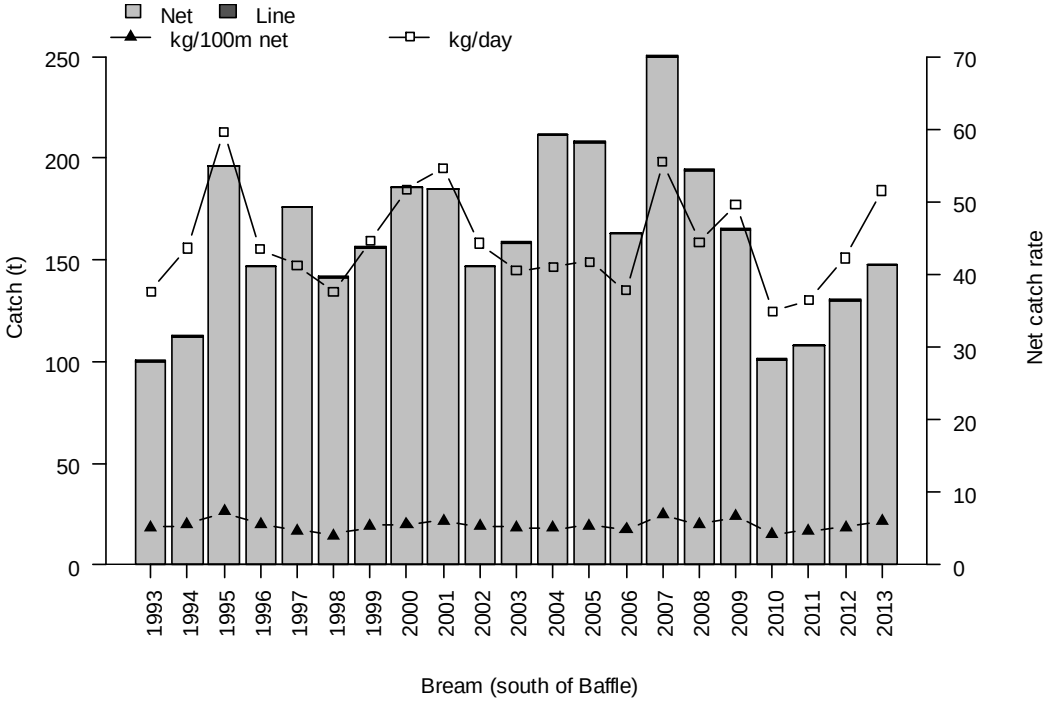

Figure 98. East coast yellowfin bream. Total reported annual commercial catch (tonnes) grouped by fishing method, plus raw catch rates for net fishing (kg/100 m of net and kg/day).

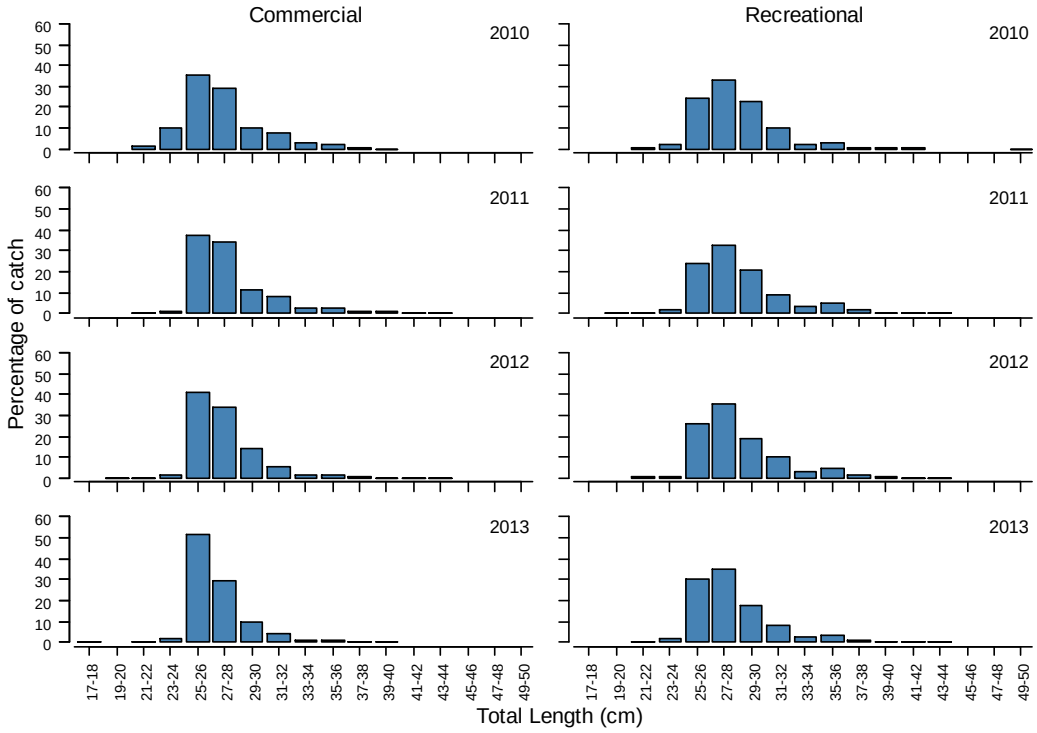

Figure 99. East coast yellowfin bream – south of Baffle Creek. Annual length frequency distributions of fish retained by commercial and recreational sectors.

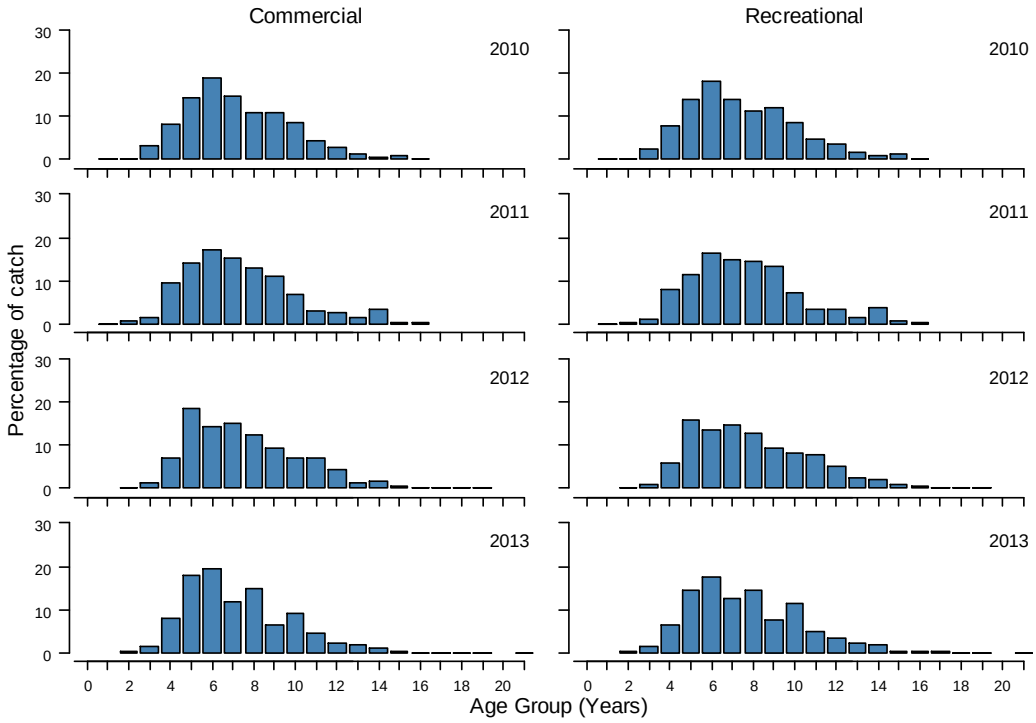

Figure 100. East coast yellowfin bream – south of Baffle Creek. Annual age frequency distributions of fish retained by commercial and recreational sectors.

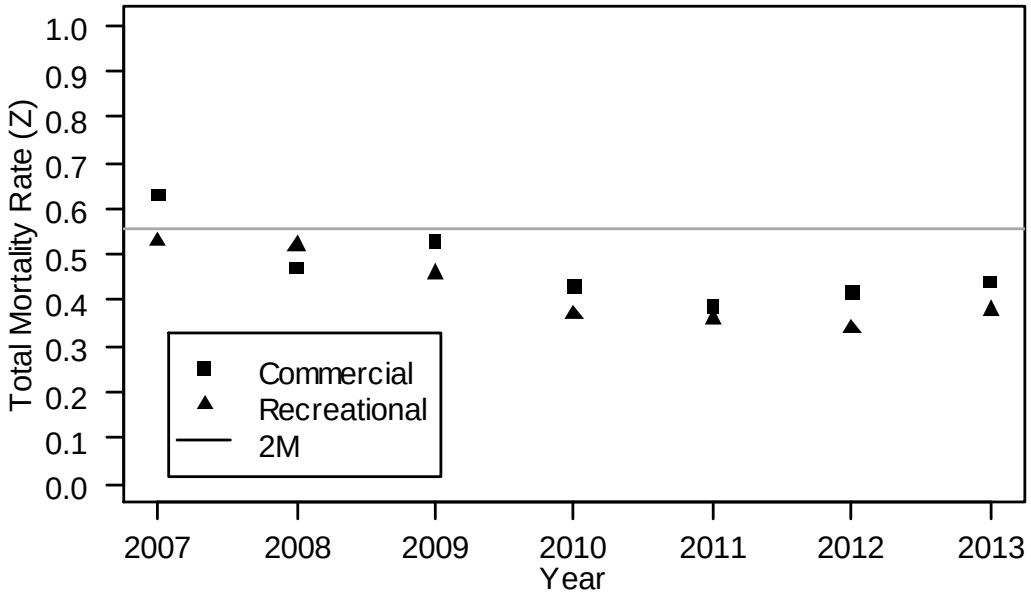

Figure 101. East coast yellowfin Bream – south of Baffle Creek. Annual estimates of instantaneous rate of total mortality (Z) based on cross sectional analysis of age frequency distributions of fish retained by commercial and recreational sectors. The horizontal line indicates the rate of total mortality corresponding to twice the rate of natural mortality (2M). This is also the value for rate of total mortality where rates of fishing and natural mortality are equal (i.e. F=M).

Crabs

Blue swimmer crab (*Portunus armatus*)

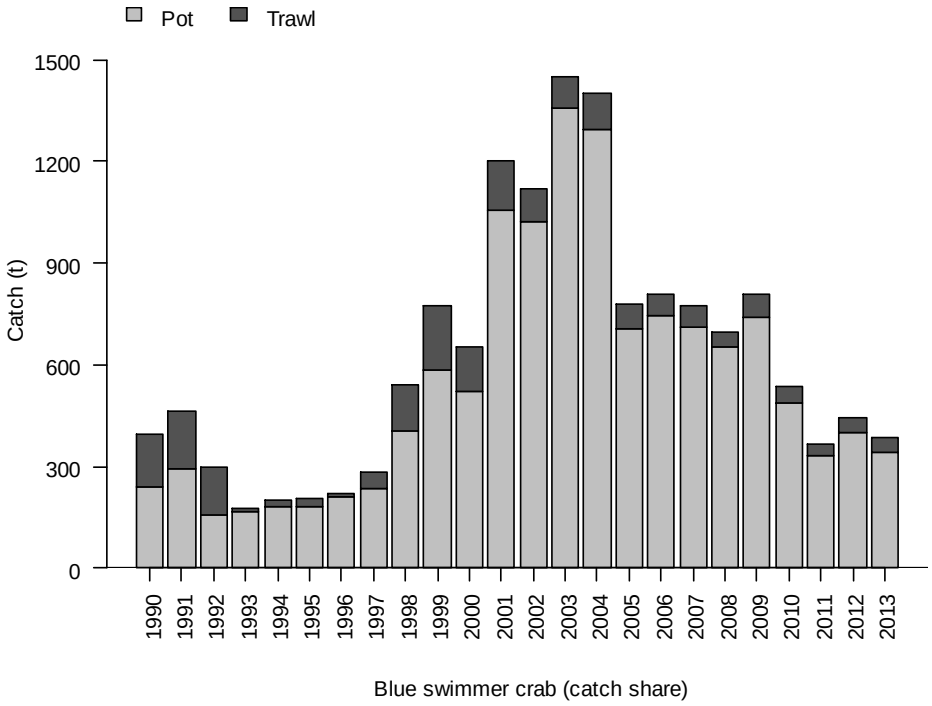

Figure 102. East coast blue swimmer crab. Total reported annual commercial catch (tonnes) grouped by fishing method.

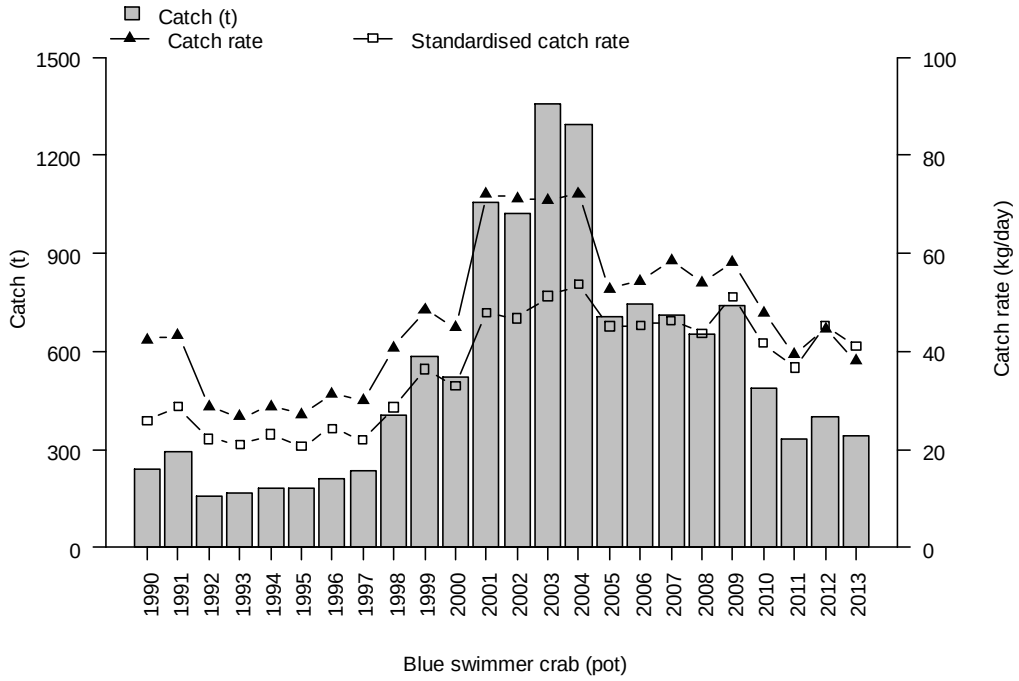

Figure 103. East coast blue swimmer crab. Total reported annual commercial catch (tonnes) by pot fishing, plus raw (kg/day) and standardised catch rates. Standardisation adjusts for factors like month, location, lunar phase and the effect of an investment warning in 2003.

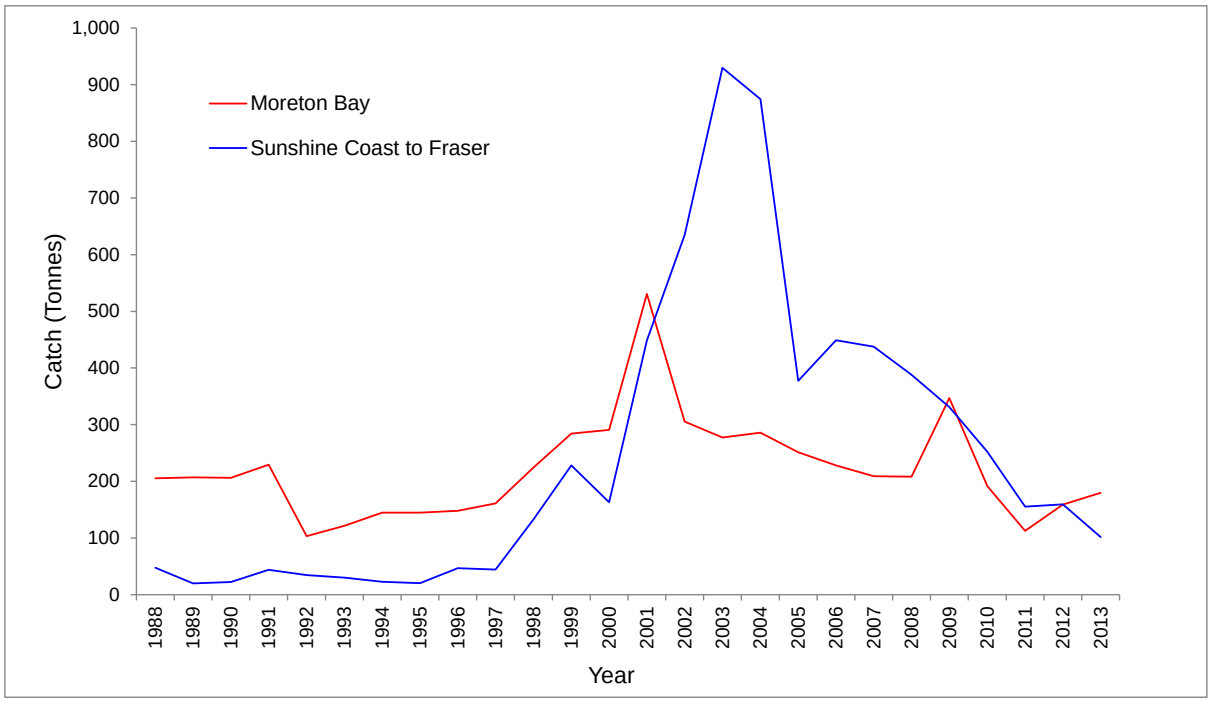

Figure 104. East coast blue swimmer crab – southern east coast. Total reported annual commercial catch (tonnes) by pot fishing, grouped by region.

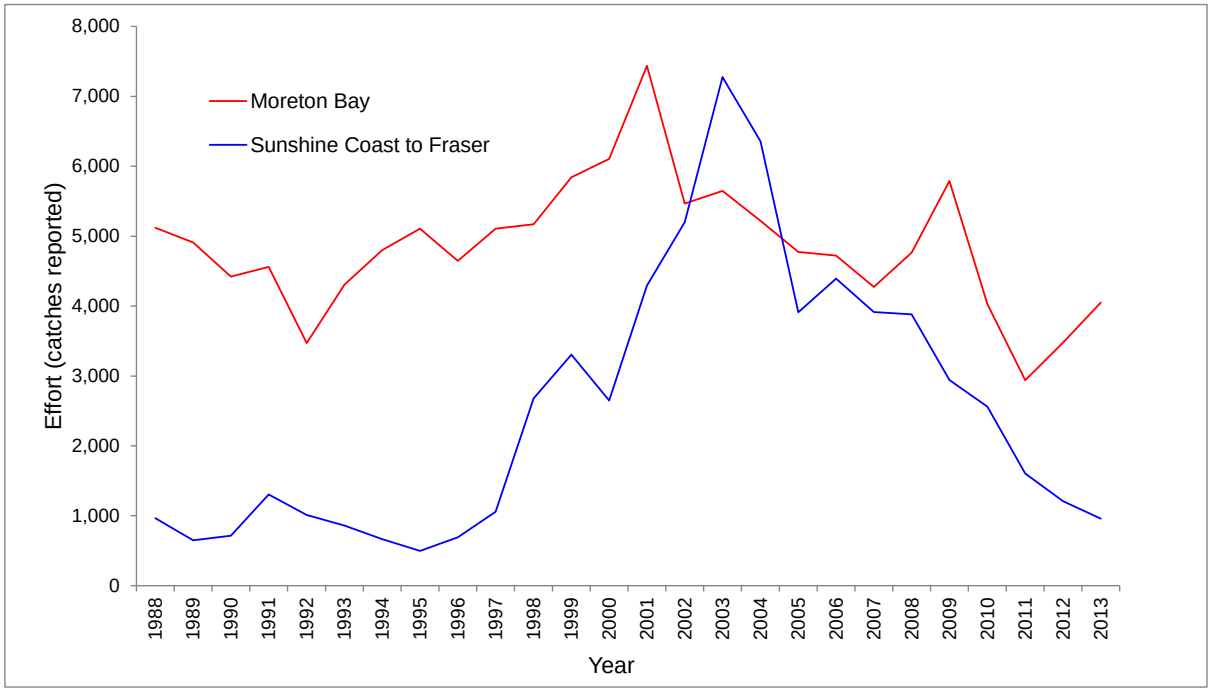

Figure 105. East coast blue swimmer crab – southern east coast. Total reported annual commercial effort (catches reported) by pot fishing, grouped by region.

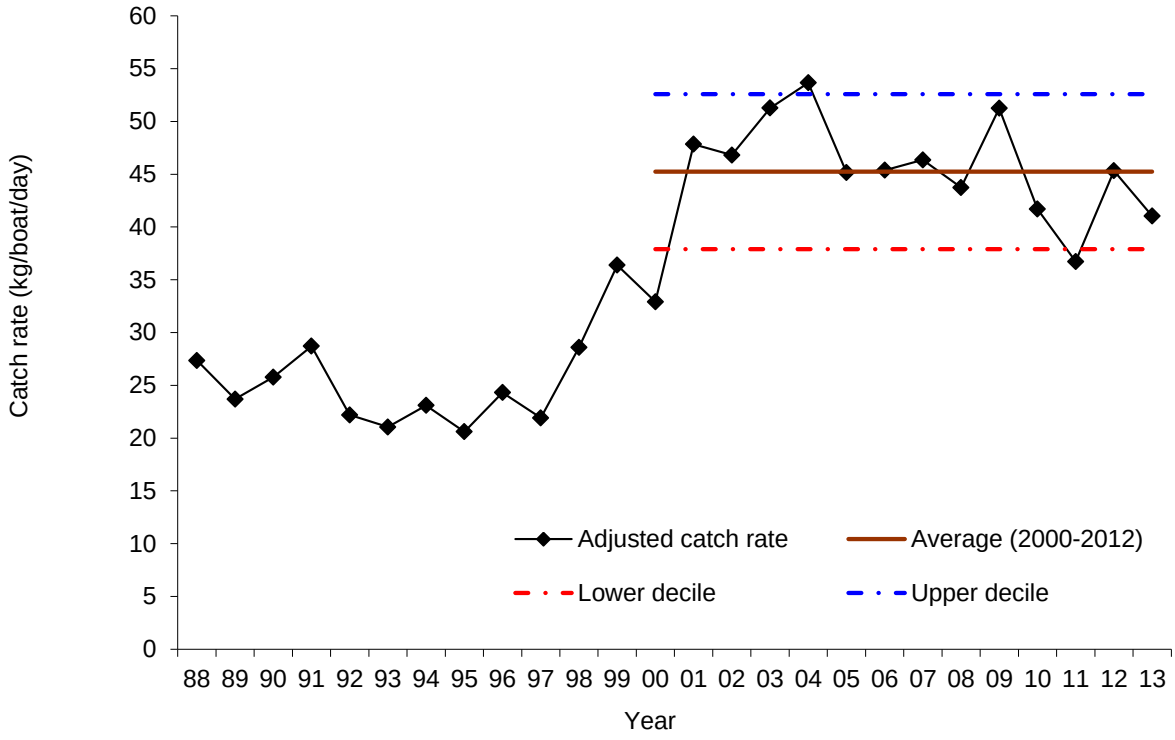

Figure 106. East coast blue swimmer crab. Annual standardised catch rates. Standardisation adjusts for factors like month, location, lunar phase and the effect of an investment warning in 2003. Horizontal lines show the mean catch rate between 2000 and 2012, and the upper and lower deciles.

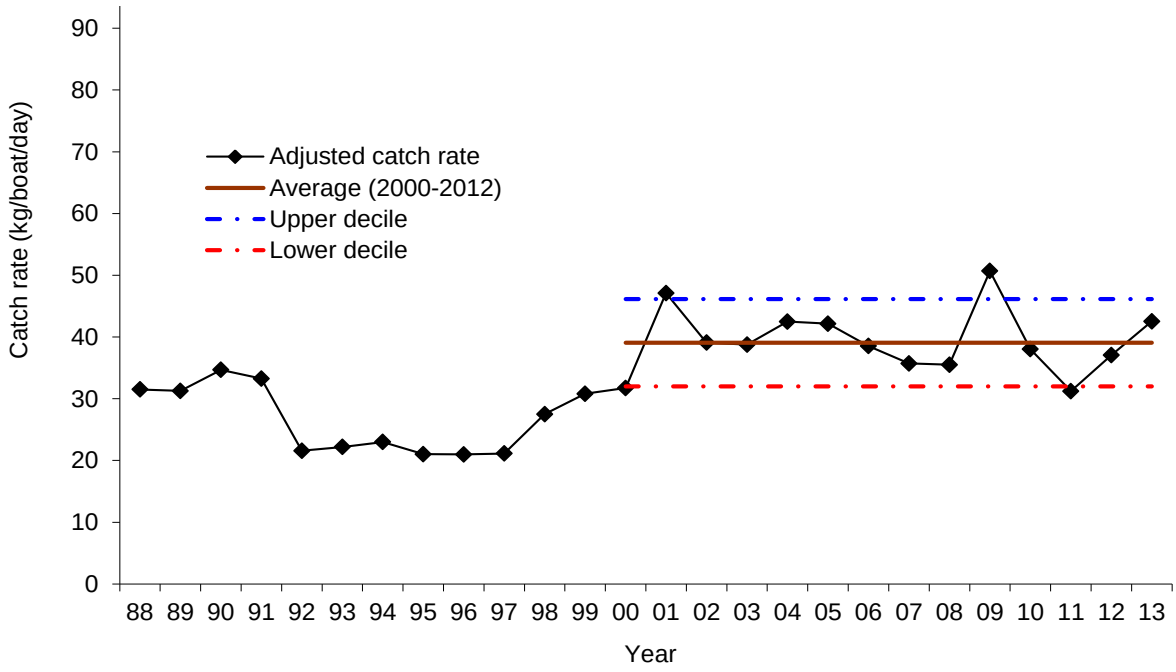

Figure 107. East coast blue swimmer crab – Moreton Bay. Annual standardised catch rates. Standardisation adjusts for factors like month, location, lunar phase and the effect of an investment warning in 2003. Horizontal lines show the mean catch rate between 2000 and 2012, and the upper and lower deciles.

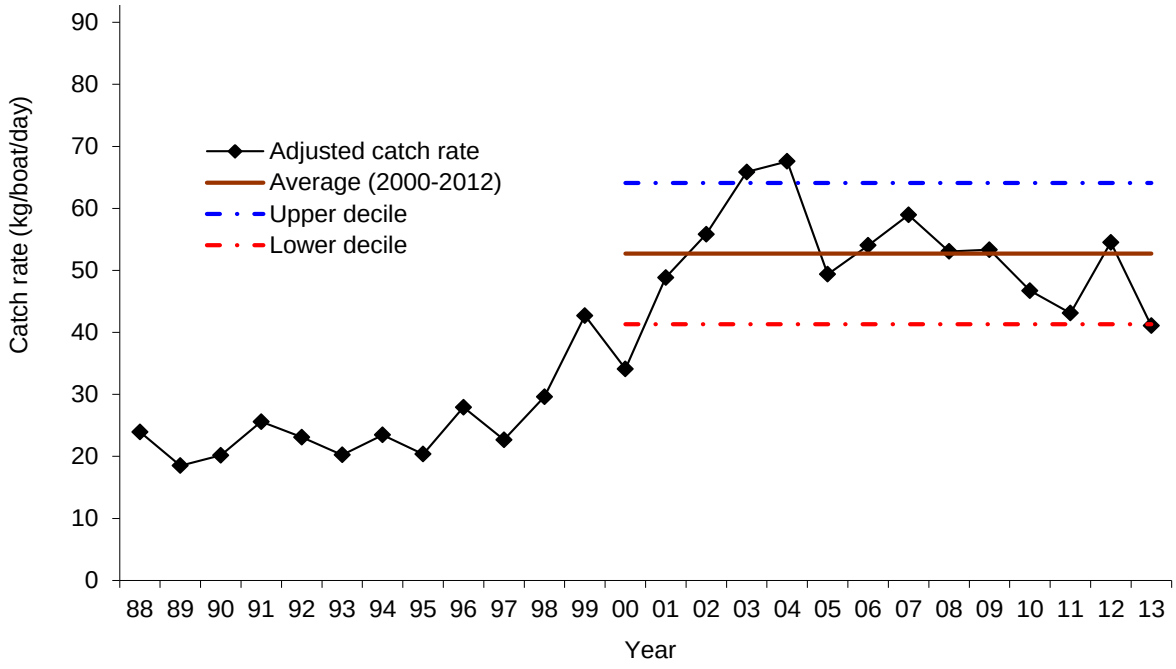

Figure 108. East coast blue swimmer crab – Sunshine Coast to Fraser Island. Annual standardised catch rates. Standardisation adjusts for factors like month, location, lunar phase and the effect of an investment warning in 2003. Horizontal lines show the mean catch rate between 2000 and 2012, and the upper and lower deciles.

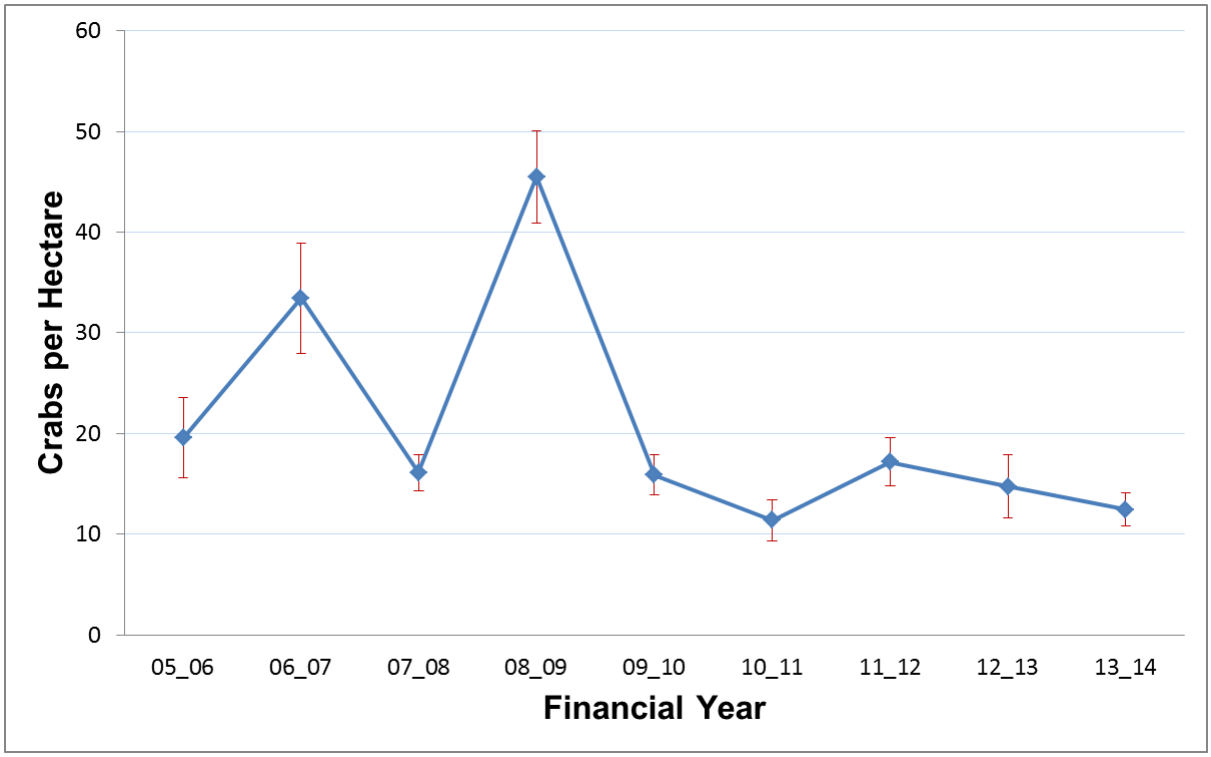

Figure 109. East coast blue swimmer crab – Moreton Bay. Annual index of abundance for juvenile crabs, estimated from fishery-independent trawl surveys.

Mud crab (*Scylla* spp.)

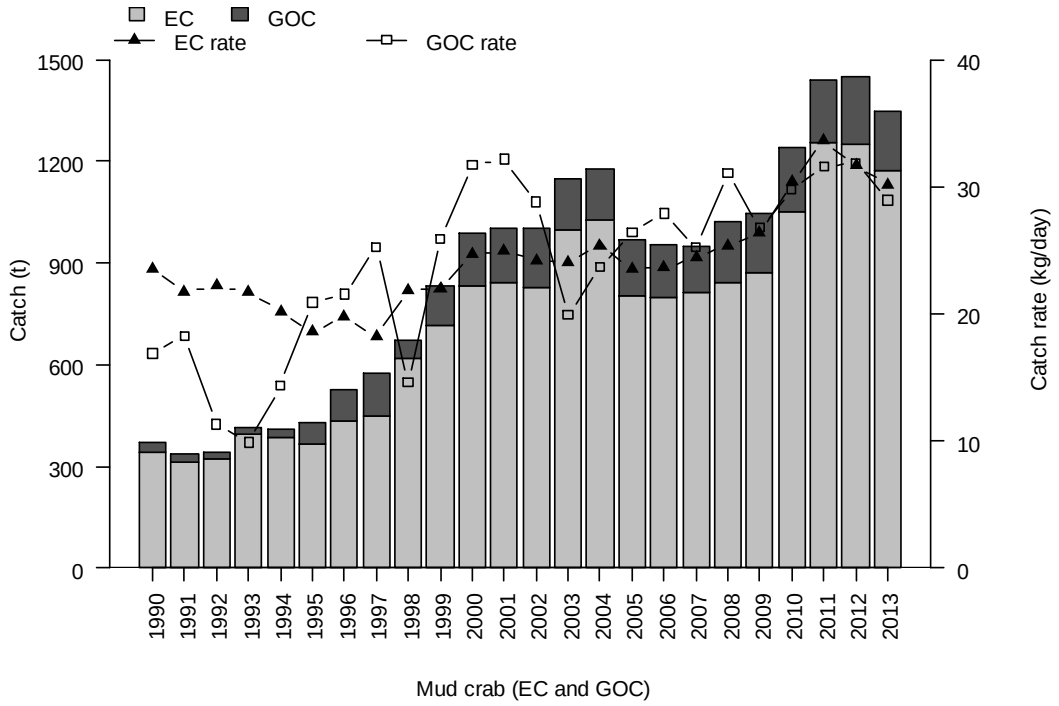

Figure 110. Queensland mud crab. Total reported annual commercial catch (tonnes) grouped by region (east coast and Gulf of Carpentaria), plus raw catch rates (kg/day).

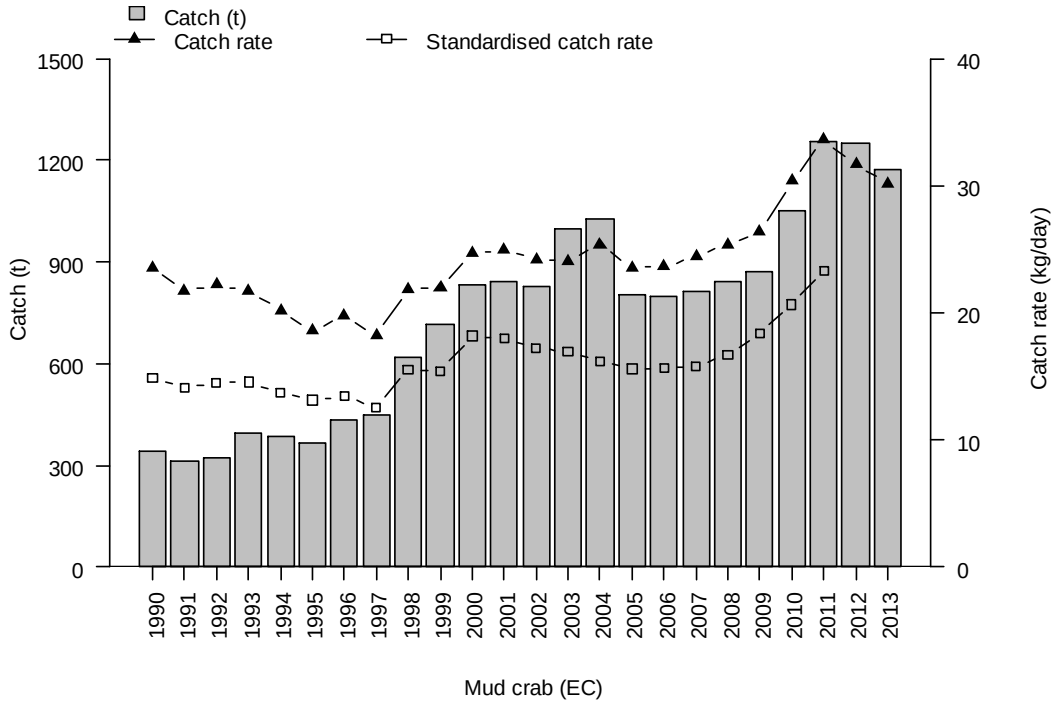

Figure 111. East coast mud crab. Total reported annual commercial catch (tonnes), plus raw (kg/day) and standardised catch rates. Standardisation adjusts for factors like month, location, lunar phase and the effect of an investment warning in 2003.

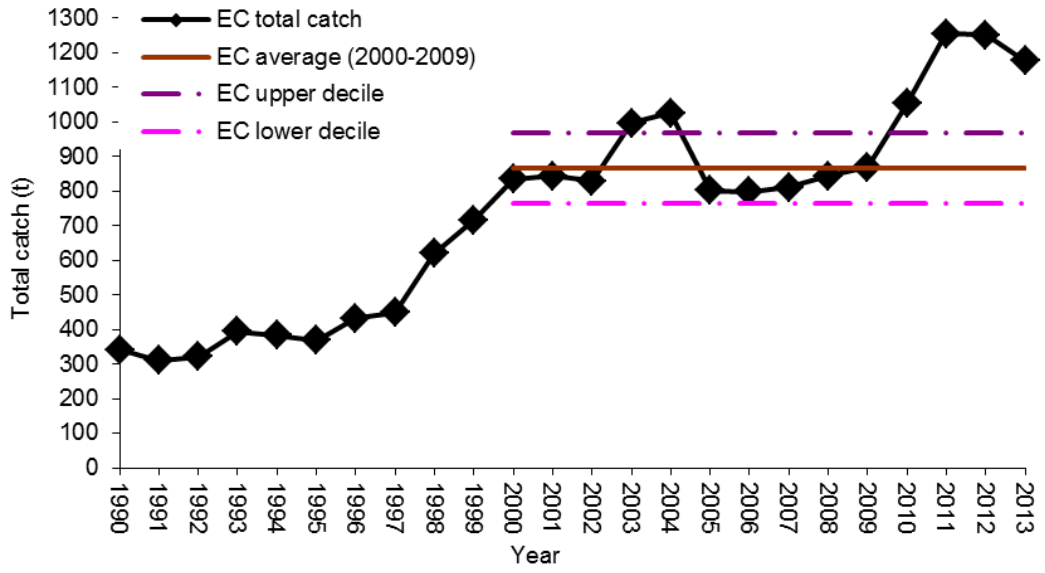

Figure 112. East coast mud crab. Total reported annual commercial catch (tonnes). Horizontal lines show the mean and upper and lower deciles from 2000 to 2009.

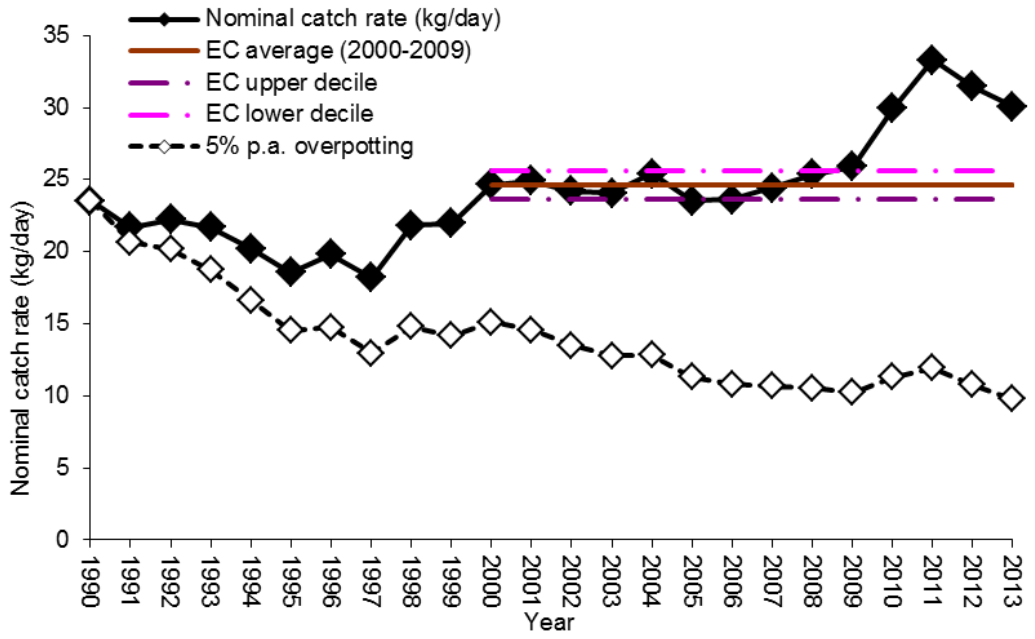

Figure 113. East coast mud crab. Annual raw catch rate (kg/day) and catch rate adjusted downwards by cumulative 5% each year from 1990. This adjustment takes into account an assumed 5% annual increase in the ratio of unreported to reported potting effort across the fishery. Horizontal lines show the mean and upper and lower deciles from 2000 to 2009.

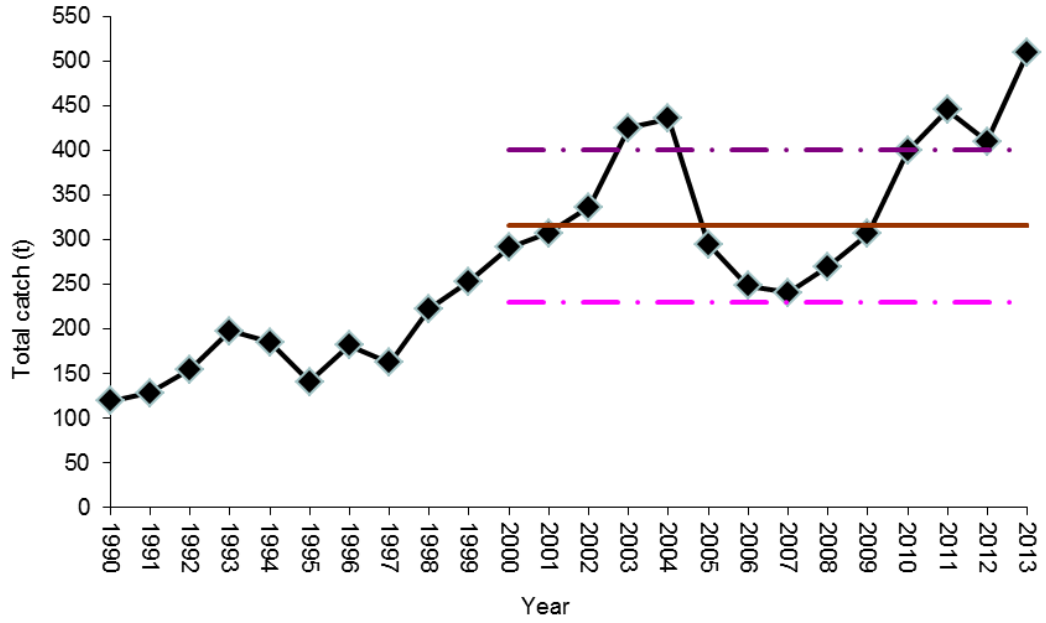

Figure 114. East coast mud crab – southern-central region. Total reported annual commercial catch (tonnes). Horizontal lines show the mean and upper and lower deciles from 2000 to 2009.

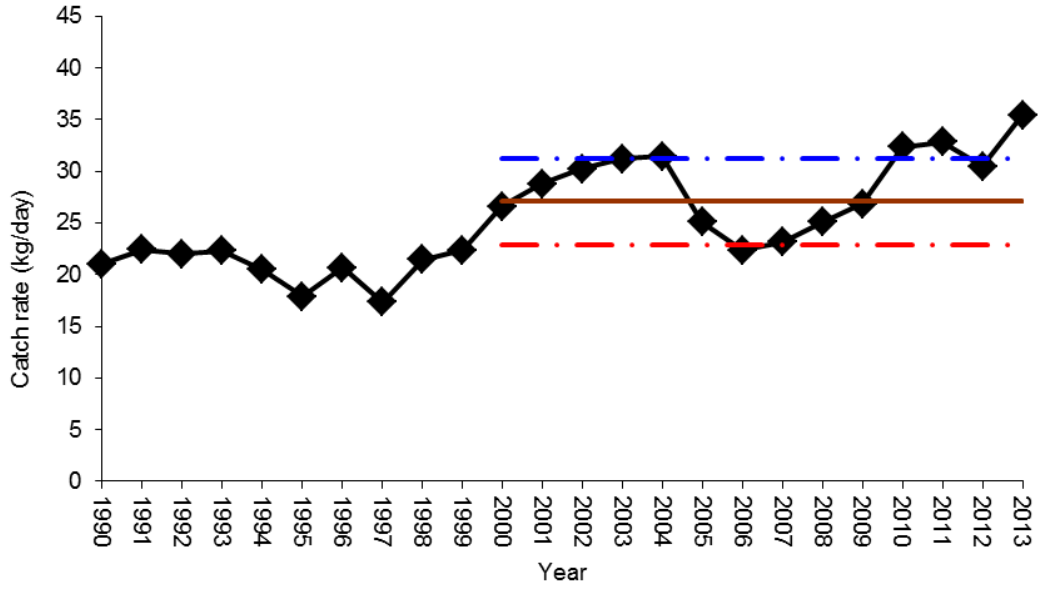

Figure 115. East coast mud crab – southern-central region. Annual raw catch rate (kg/day). Horizontal lines show the mean and upper and lower deciles from 2000 to 2009.

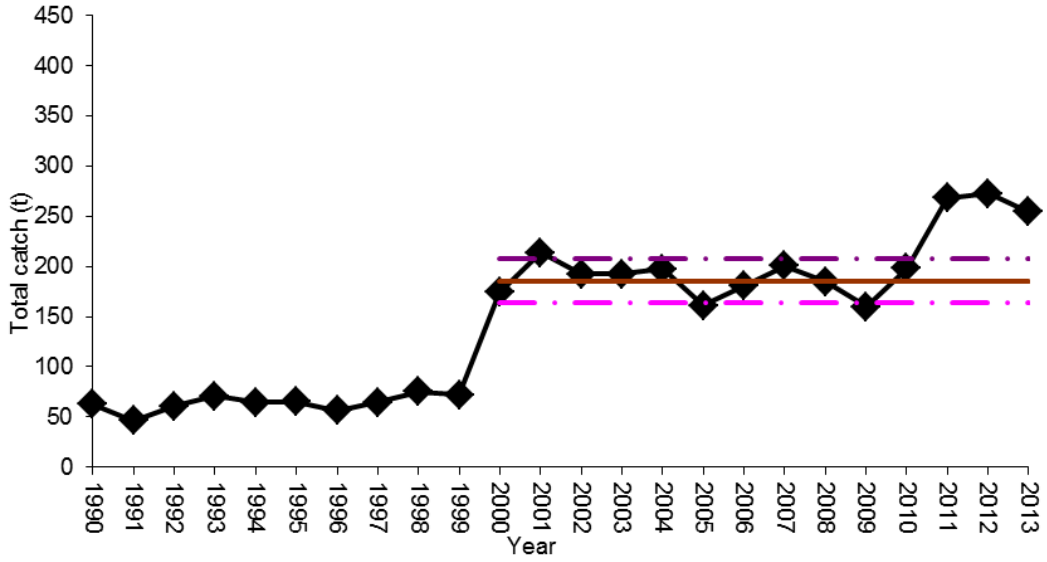

Figure 116. East coast mud crab – central region. Total reported annual commercial catch (tonnes). Horizontal lines show the mean and upper and lower deciles from 2000 to 2009.

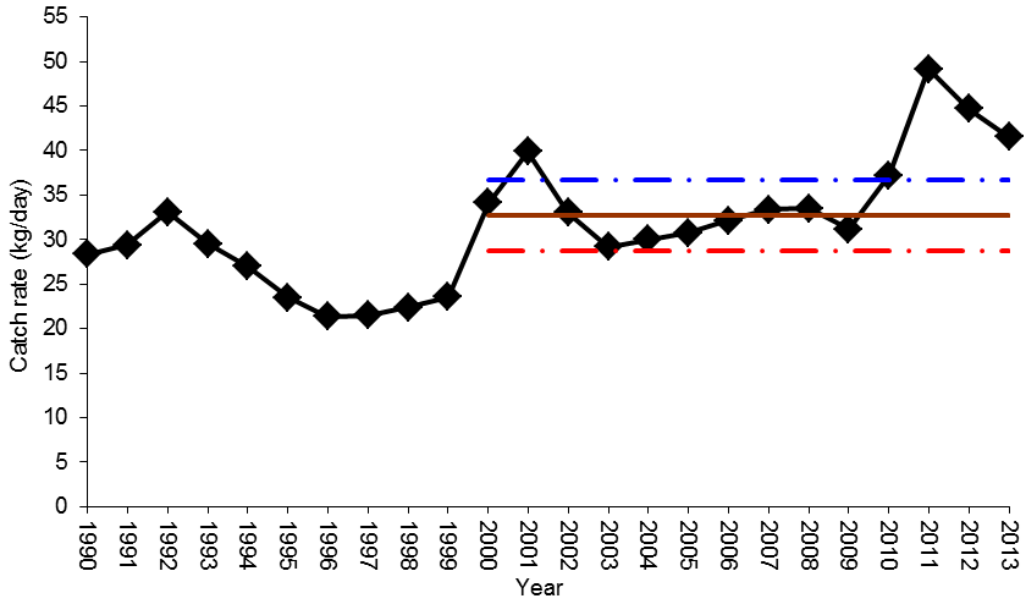

Figure 117. East coast mud crab – central region. Annual raw catch rate (kg/day). Horizontal lines show the mean and upper and lower deciles from 2000 to 2009.

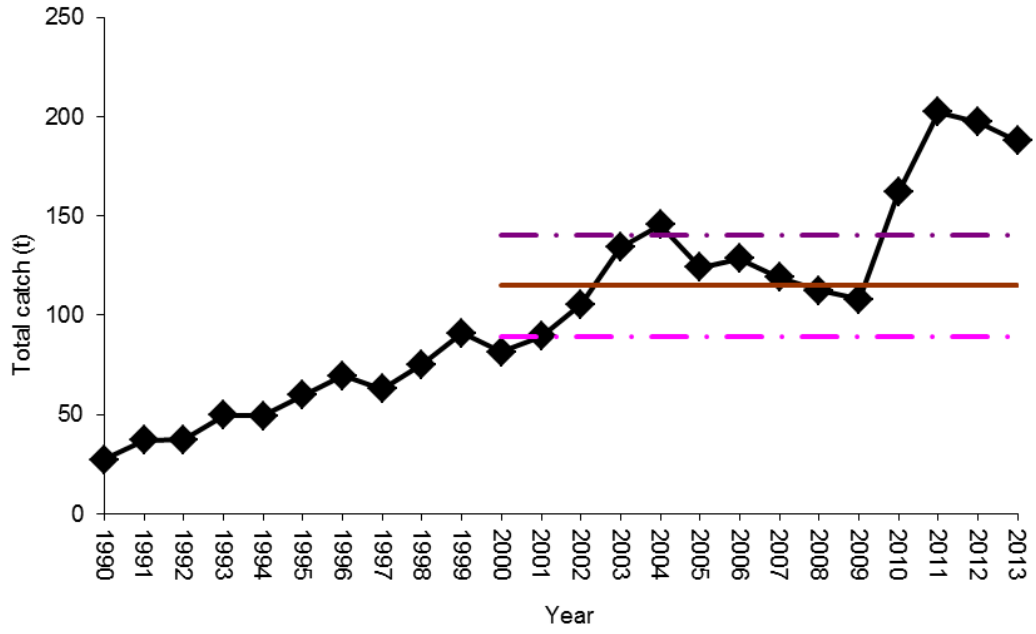

Figure 118. East coast mud crab – southern region. Total reported annual commercial catch (tonnes). Horizontal lines show the mean and upper and lower deciles from 2000 to 2009.

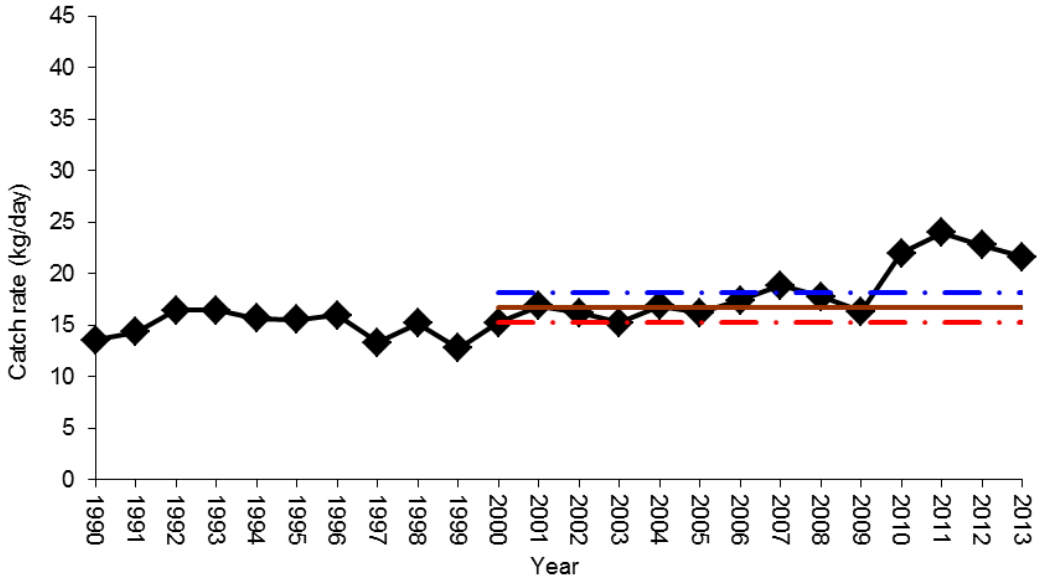

Figure 119. East coast mud crab – southern region. Annual raw catch rate (kg/day). Horizontal lines show the mean and upper and lower deciles from 2000 to 2009.

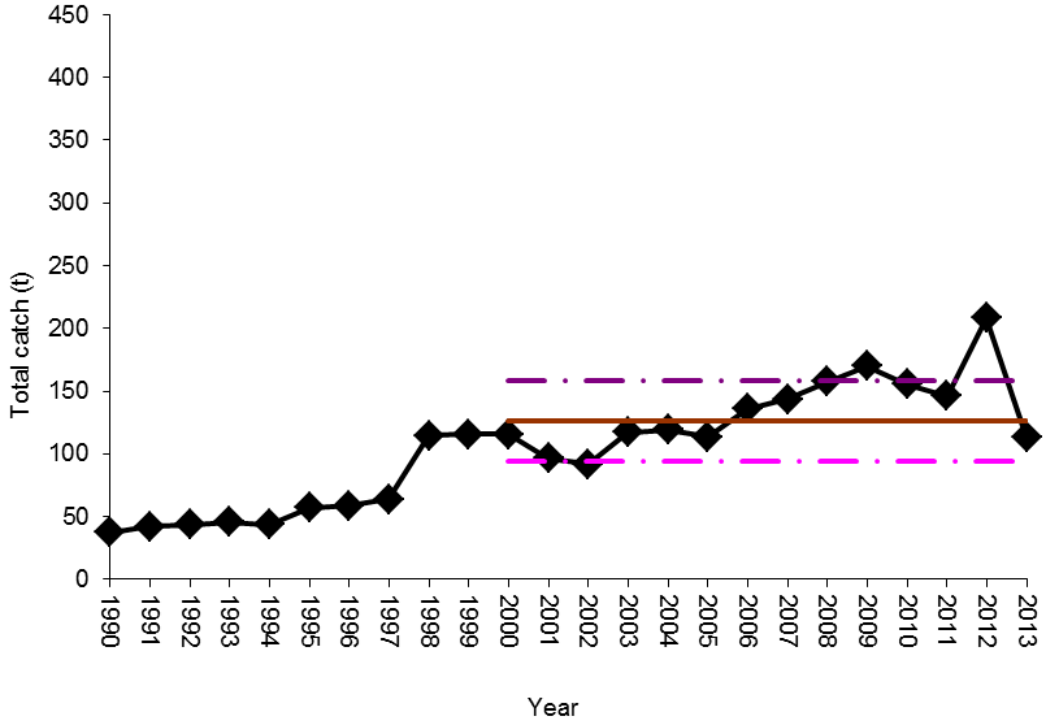

Figure 120. East coast mud crab – northern region. Total reported annual commercial catch (tonnes). Horizontal lines show the mean and upper and lower deciles from 2000 to 2009.

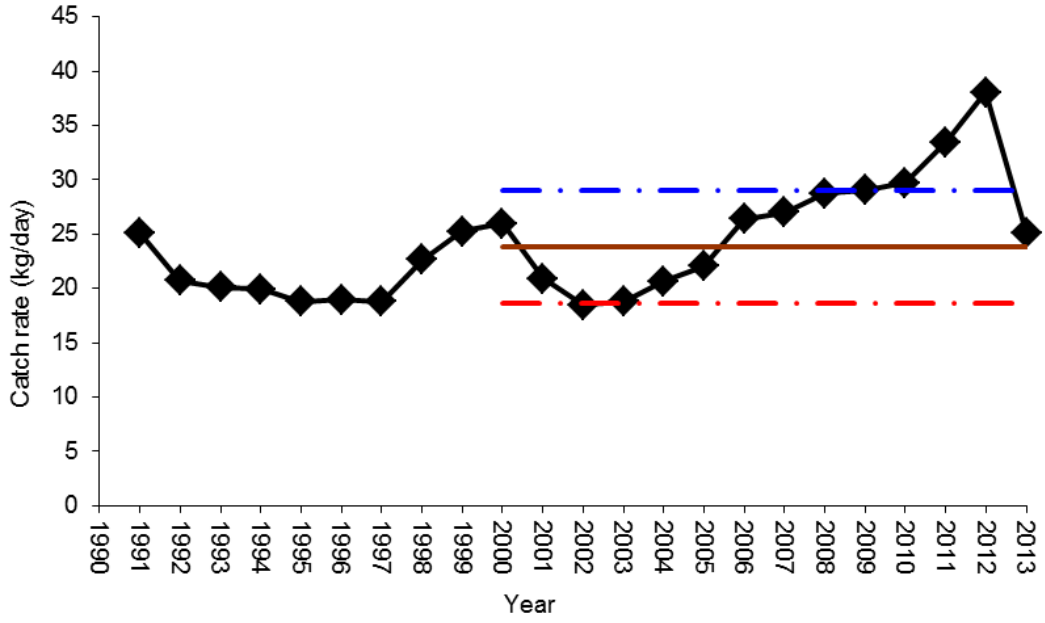

Figure 121. East coast mud crab – northern region. Annual raw catch rate (kg/day). Horizontal lines show the mean and upper and lower deciles from 2000 to 2009.

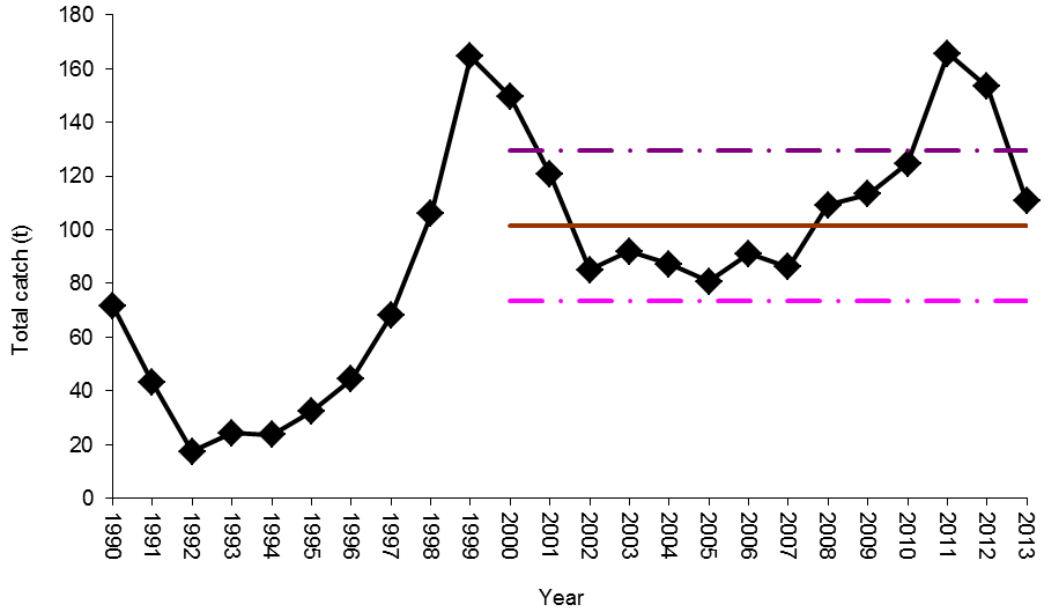

Figure 122. East coast mud crab – northern-central region. Total reported annual commercial catch (tonnes). Horizontal lines show the mean and upper and lower deciles from 2000 to 2009.

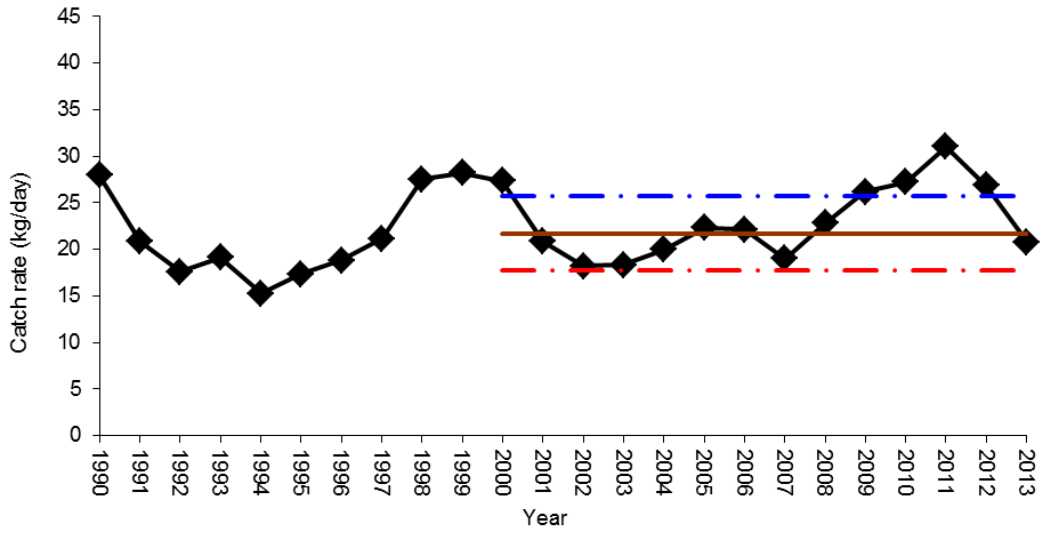

Figure 123. East coast mud crab – northern-central region. Annual raw catch rate (kg/day). Horizontal lines show the mean and upper and lower deciles from 2000 to 2009.

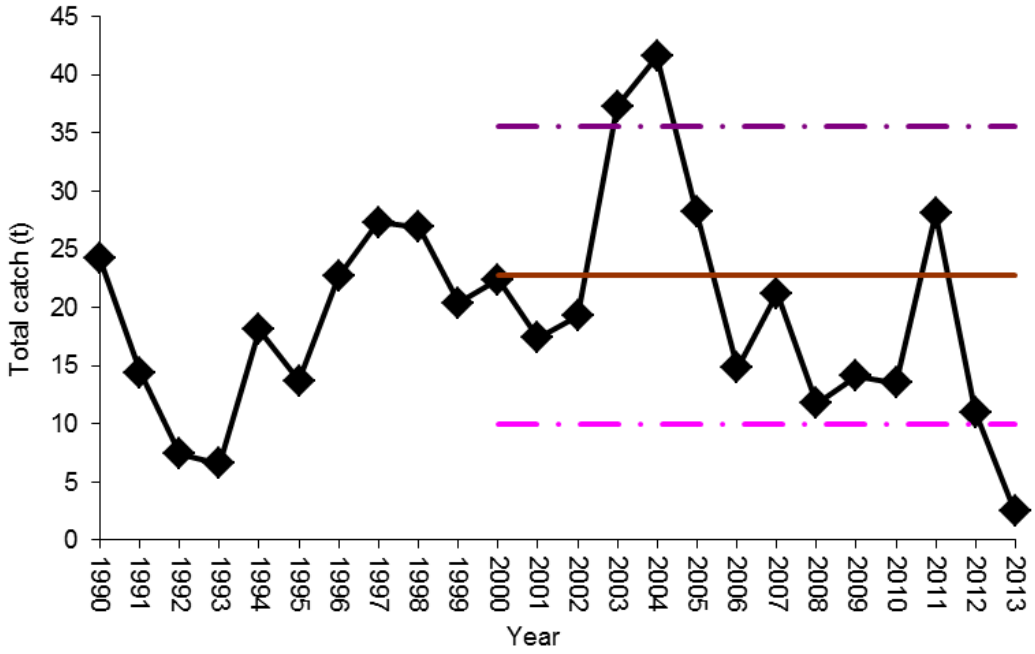

Figure 124. East coast mud crab – far northern region. Total reported annual commercial catch (tonnes). Horizontal lines show the mean and upper and lower deciles from 2000 to 2009.

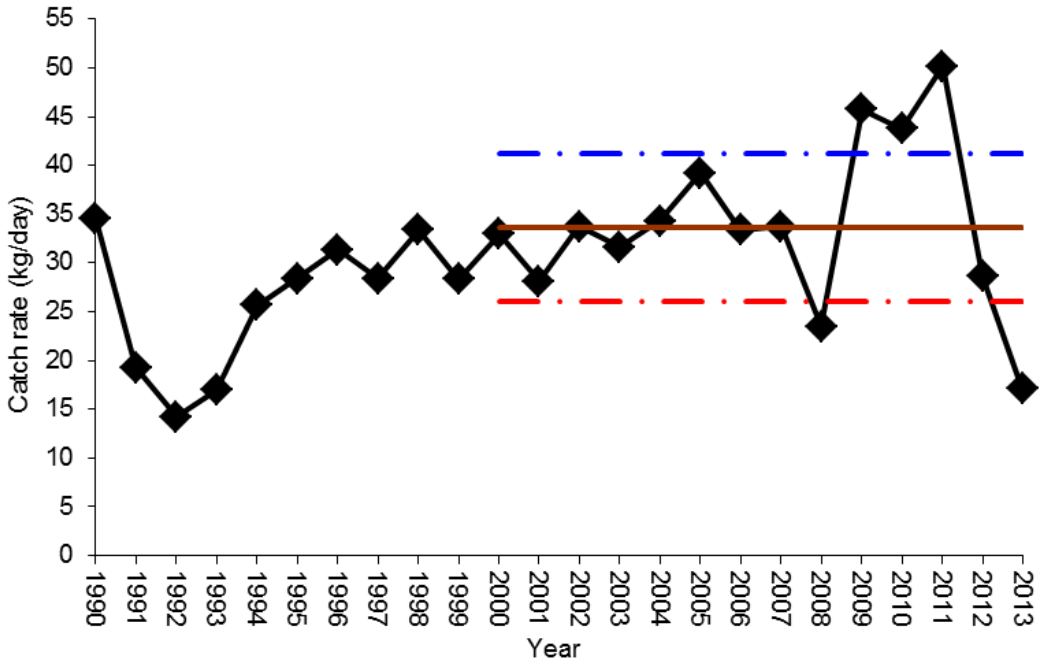

Figure 125. East coast mud crab – far northern region. Annual raw catch rate (kg/day). Horizontal lines show the mean and upper and lower deciles from 2000 to 2009.

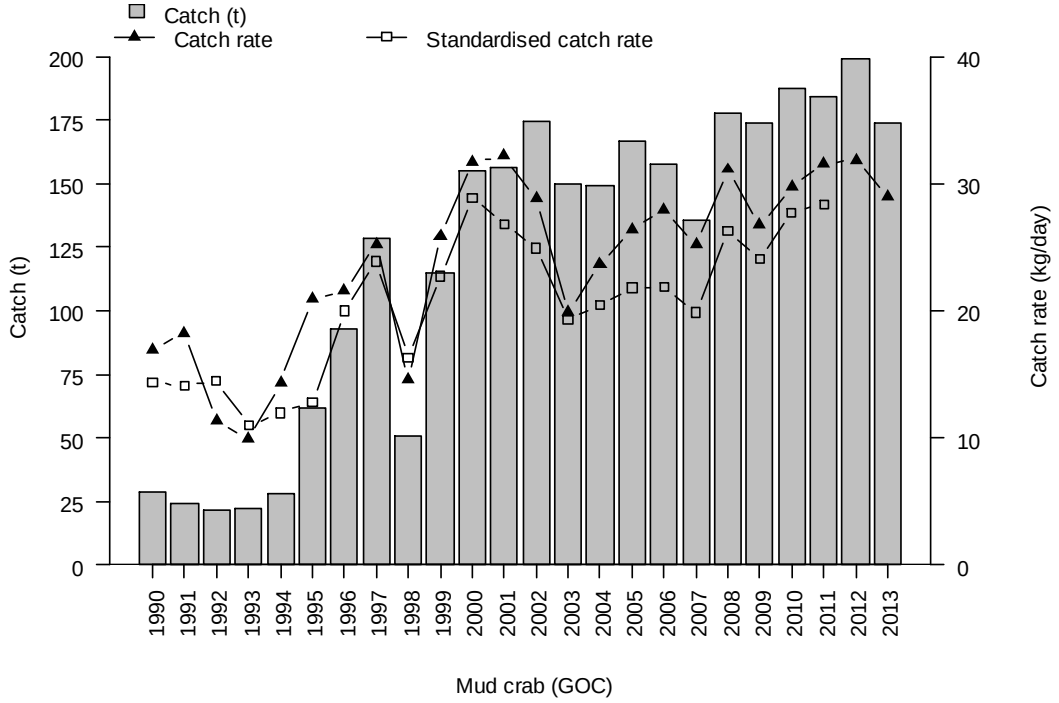

Figure 126. Gulf of Carpentaria mud crab. Total reported annual commercial catch (tonnes), plus raw (kg/day) and standardised catch rates. Standardisation adjusts for factors like month, location, lunar phase and the effect of an investment warning in 2003.

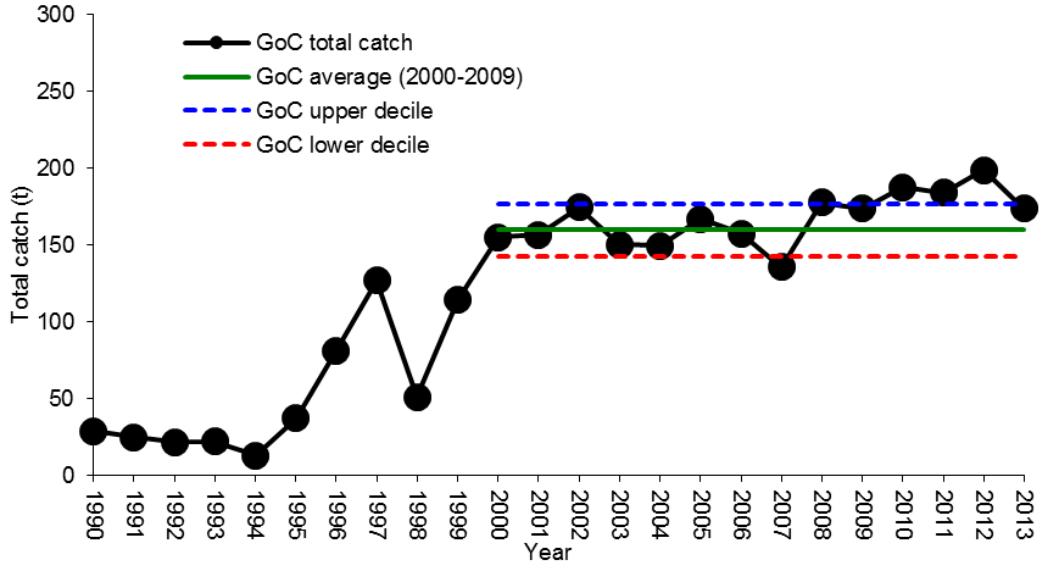

Figure 127. Gulf of Carpentaria mud crab. Total reported annual commercial catch (tonnes). Horizontal lines show the mean and upper and lower deciles from 2000 to 2009.

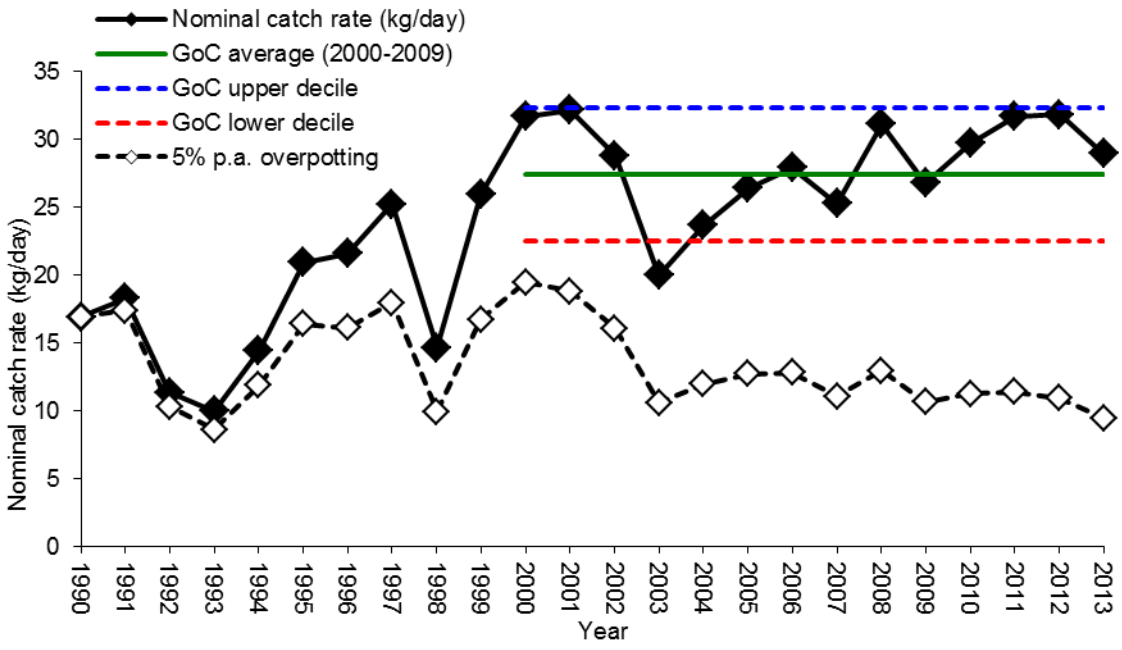

Figure 128. Gulf of Carpentaria mud crab. Annual raw catch rate (kg/day) and catch rate adjusted downwards by cumulative 5% each year from 1990. This adjustment takes into account an assumed 5% annual increase in the ratio of unreported to reported potting effort across the fishery. Horizontal lines show the mean and upper and lower deciles from 2000 to 2009.

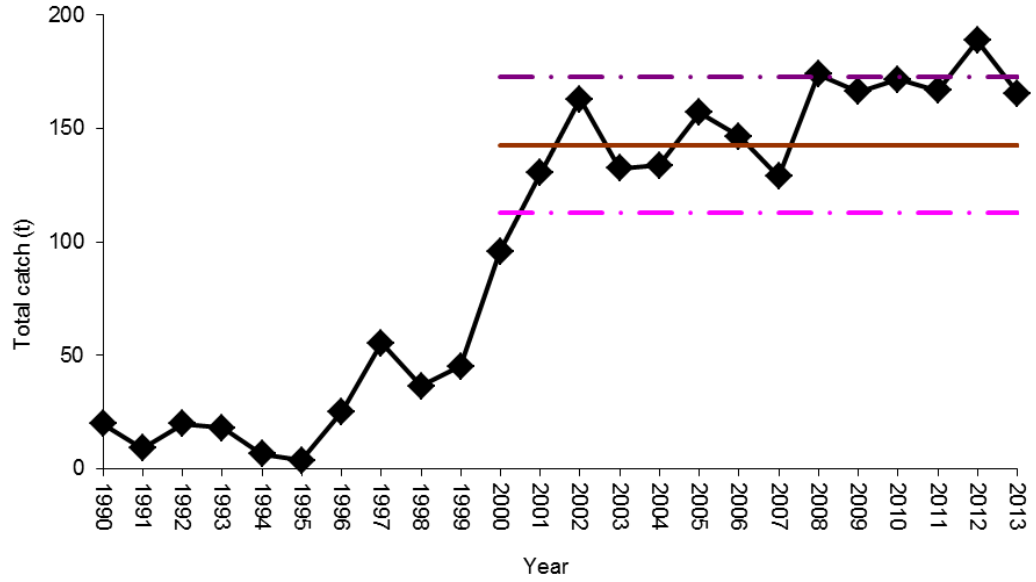

Figure 129. Gulf of Carpentaria mud crab – southern region. Total reported annual commercial catch (tonnes). Horizontal lines show the mean and upper and lower deciles from 2000 to 2009.

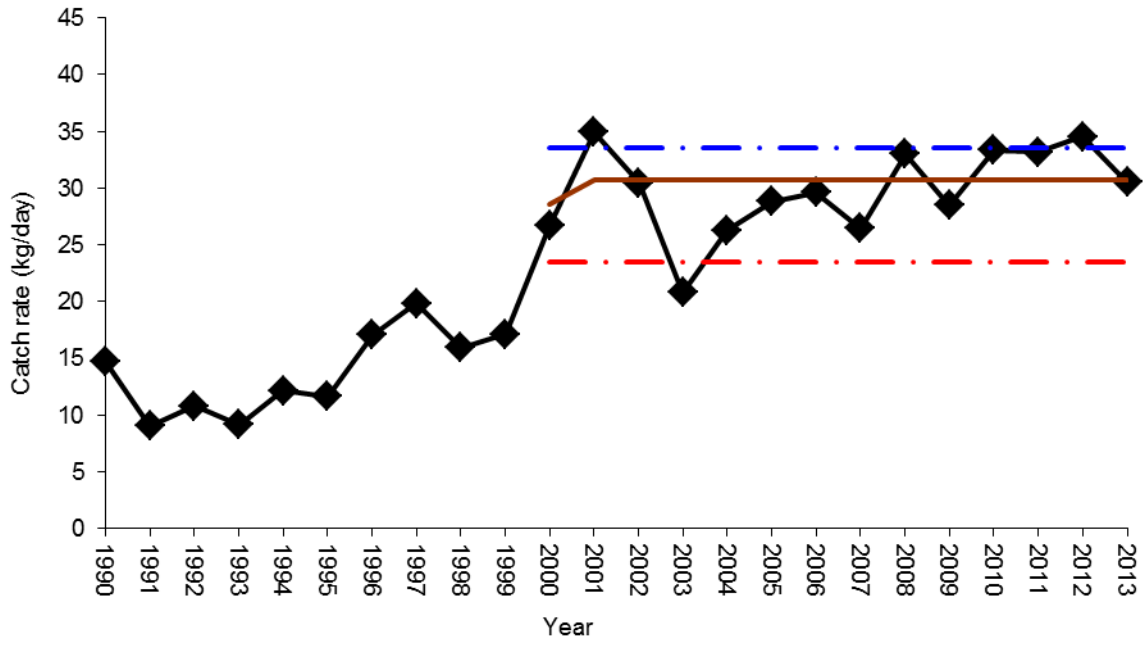

Figure 130. Gulf of Carpentaria mud crab – southern region. Annual raw catch rate (kg/day). Horizontal lines show the mean and upper and lower deciles from 2000 to 2009.

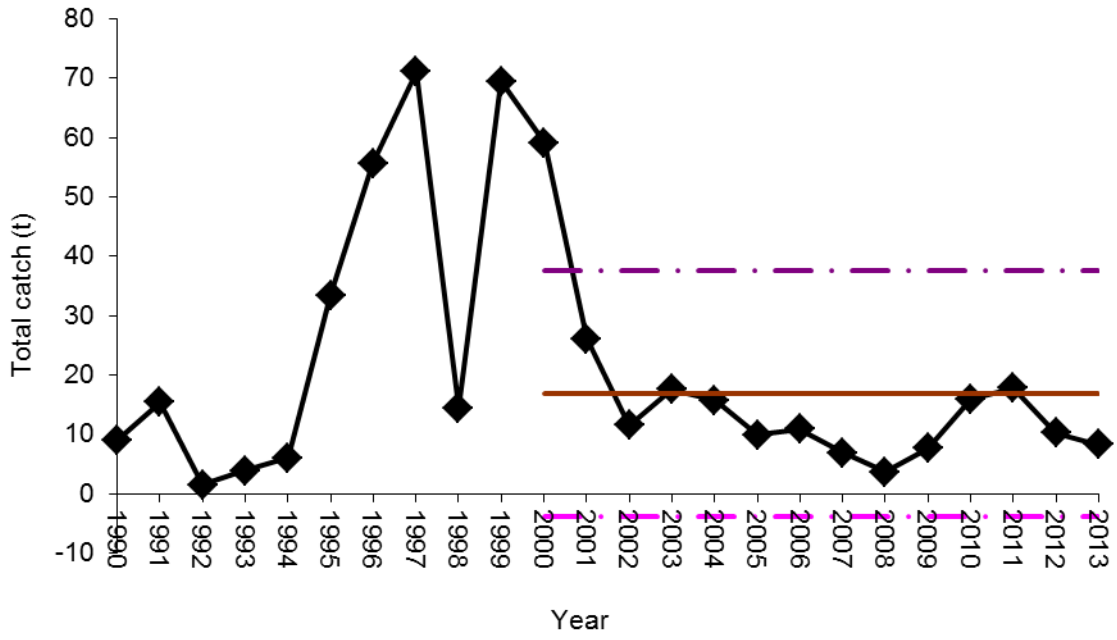

Figure 131. Gulf of Carpentaria mud crab – northern region. Total reported annual commercial catch (tonnes). Horizontal lines show the mean and upper and lower deciles from 2000 to 2009.

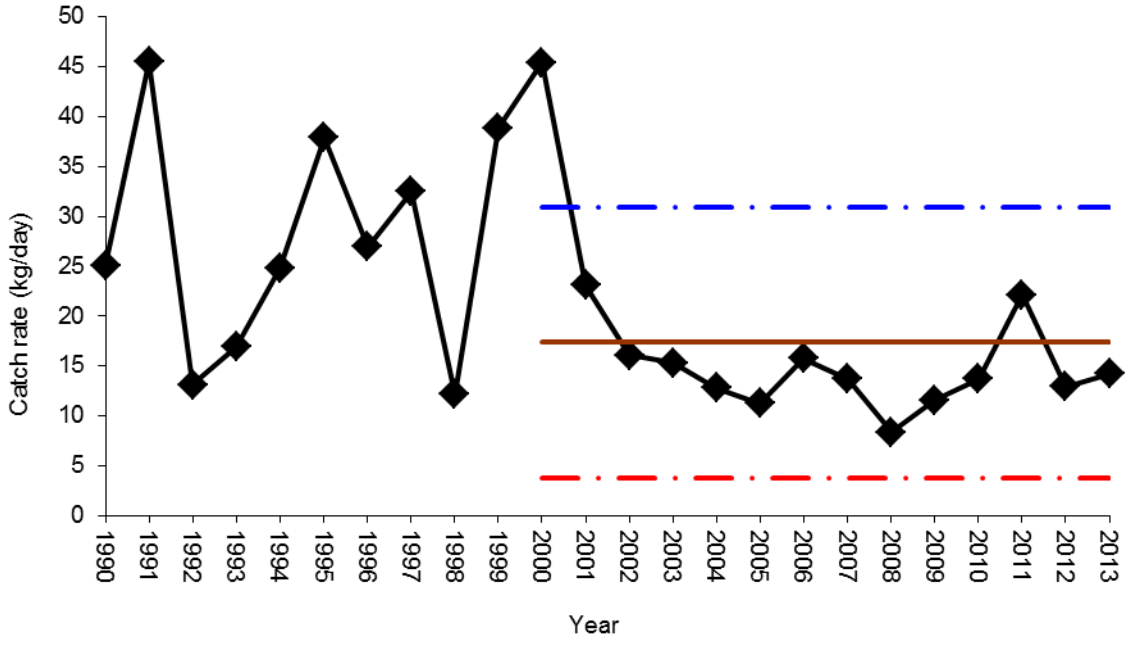

Figure 132. Gulf of Carpentaria mud crab – northern region. Annual raw catch rate (kg/day). Horizontal lines show the mean and upper and lower deciles from 2000 to 2009.

Spanner crab (*Ranina ranina*)

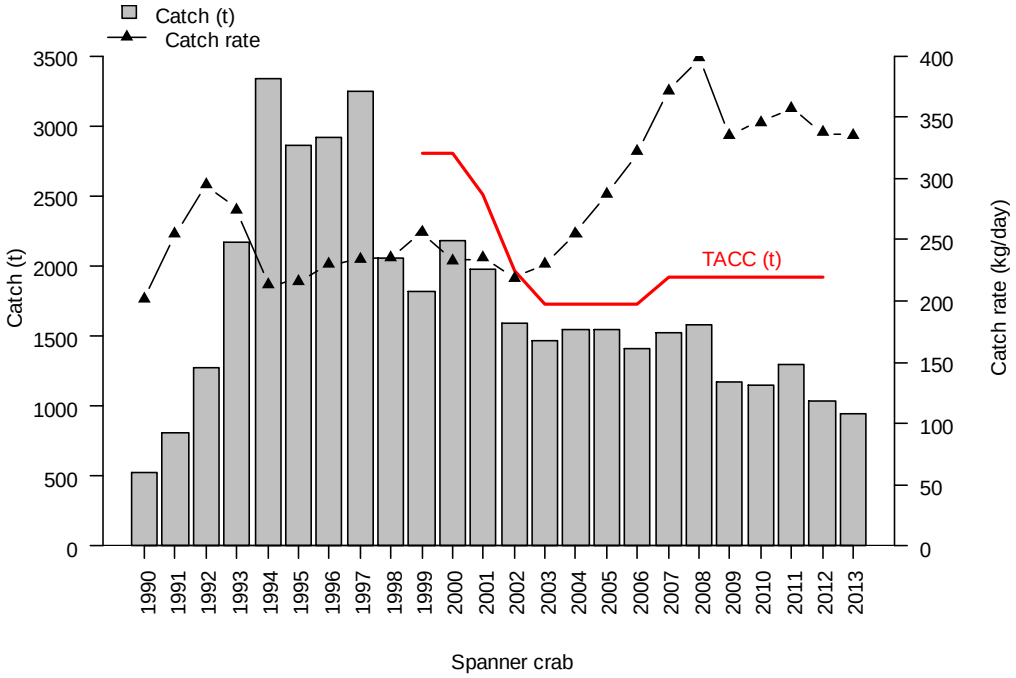

Figure 133. East coast spanner crab. Total reported annual commercial catch (tonnes) and raw catch rate (kg/day). Red line shows annual Total Allowable Commercial Catch.

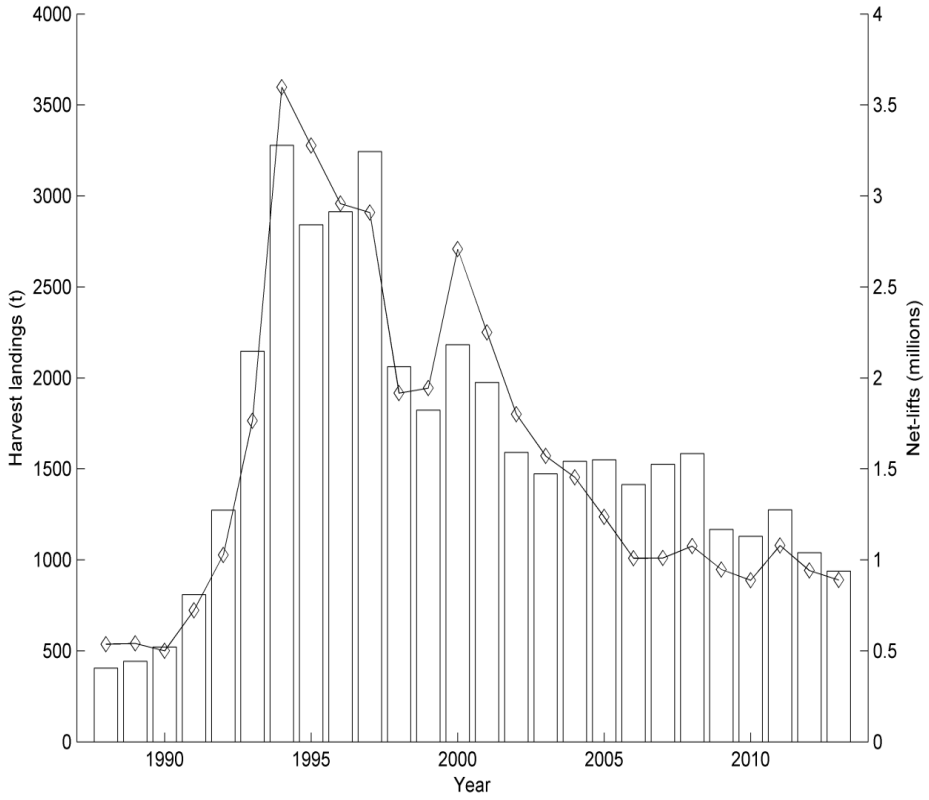

Figure 134. Queensland spanner crab. Total reported annual commercial catch (tonnes) and effort (net-lifts).

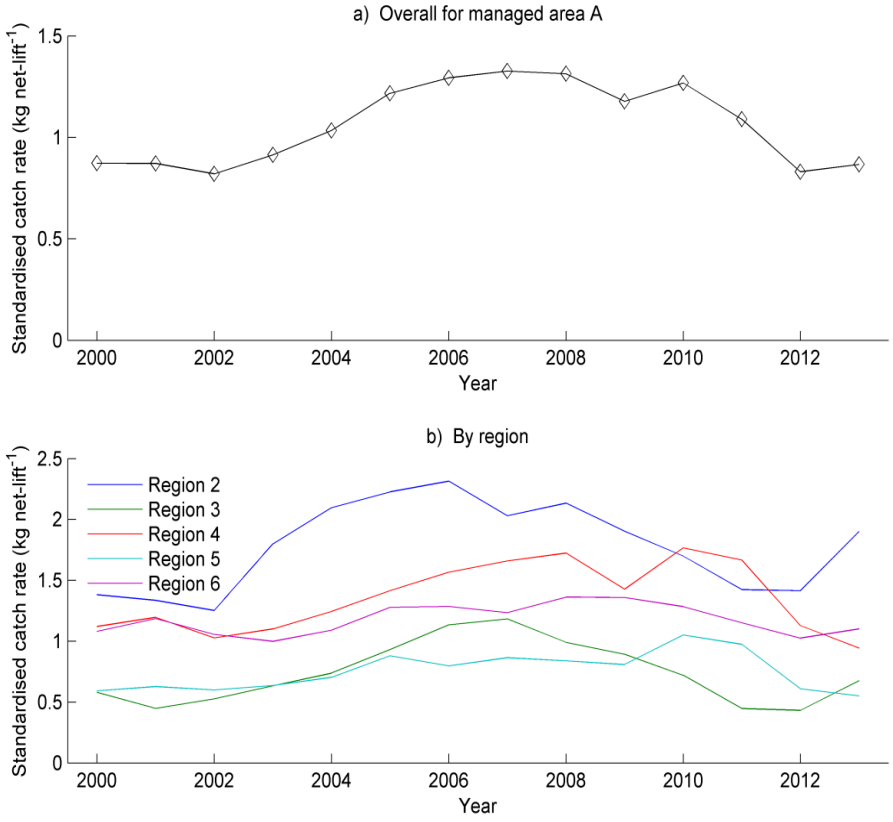

Figure 135. Queensland spanner crab. a) Standardised catch rate for all regions in Managed Area A combined. b) Standardised catch rates, grouped by Region for Managed Area A. Standarisation adjusts for factors like location, months, fishing power, lunar cycle and whether vessels have a permit to fish with extra gear.

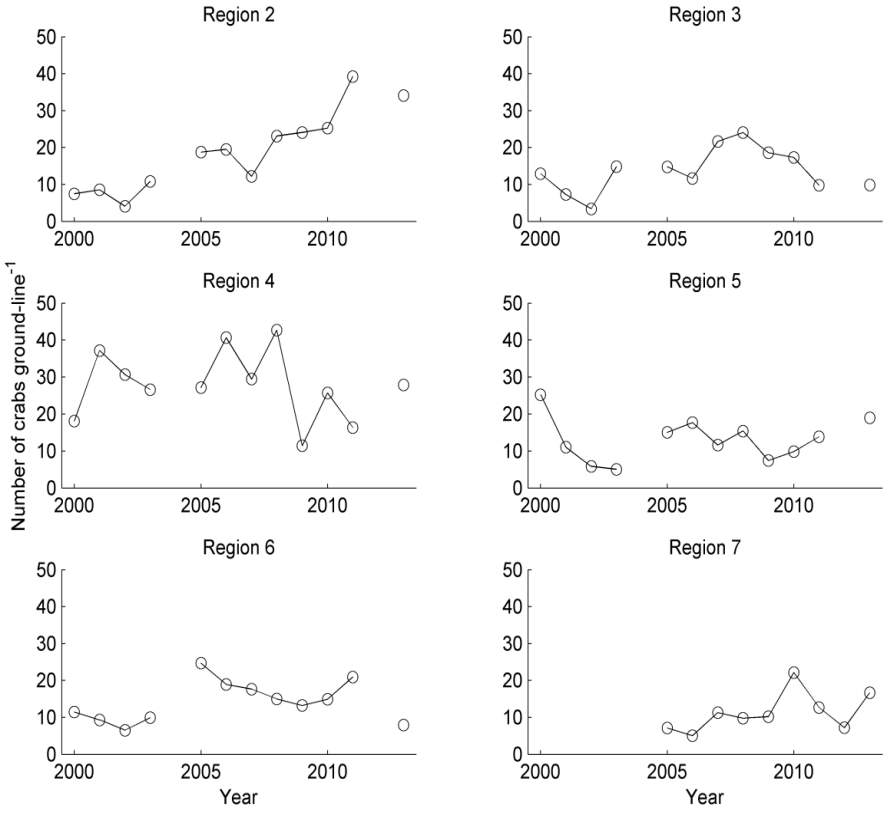

Figure 136. Queensland spanner crab. Raw annual index of abundance estimated from fishery-independent surveys in Managed Area A (Region 2–6) and New South Wales (Region 7).

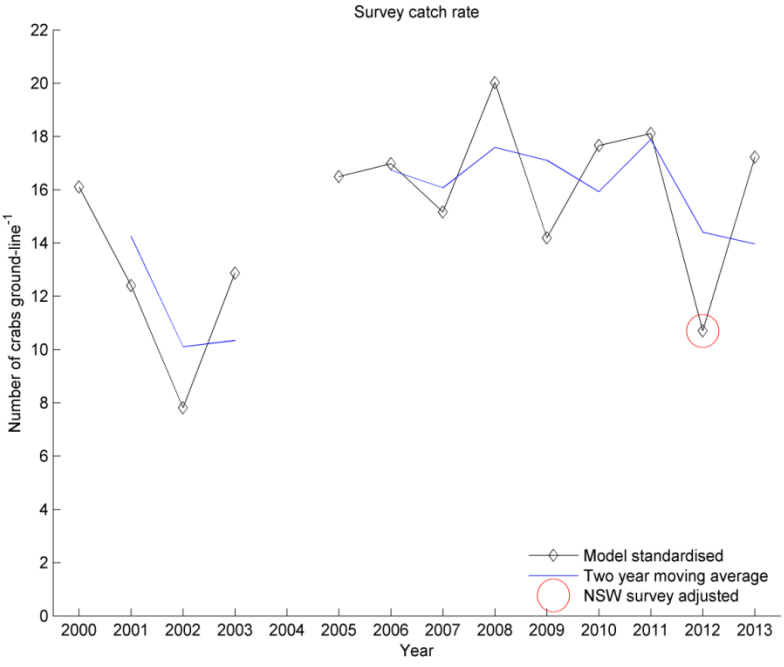

Figure 137. Queensland spanner crab. Standardised annual index of abundance estimated from fishery-independent surveys – all regions combined. Blue line shows 2-year moving average. Note that in 2012, the survey was carried out in New South Wales only (Region 7).

Prawns

Endeavour prawn (*Metapenaeus endeavouri* and *M. ensis*)

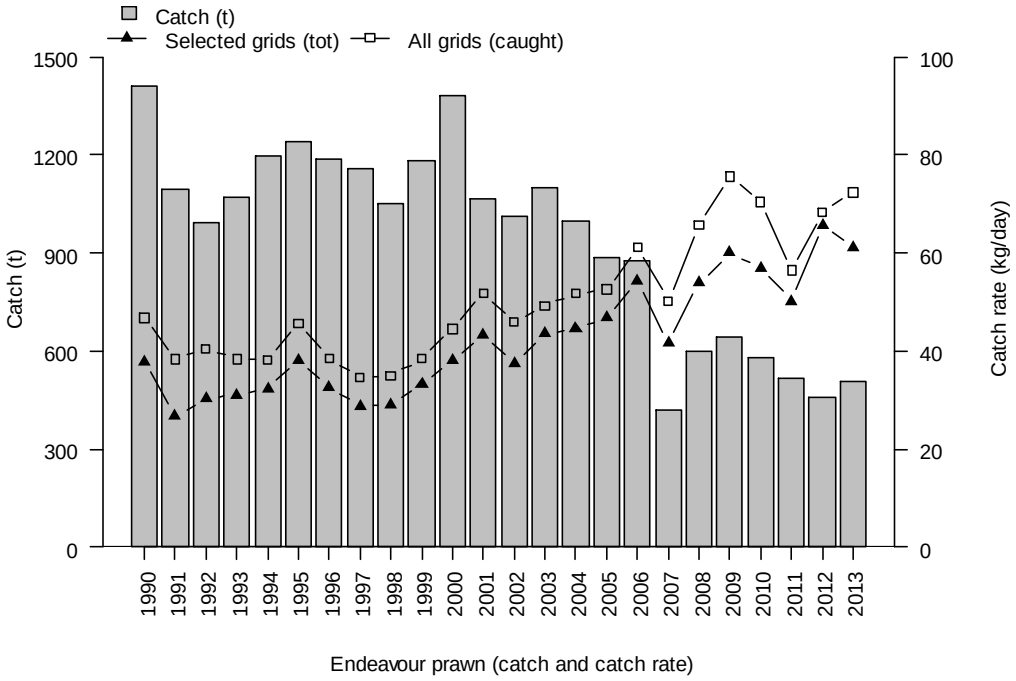

Figure 138. East coast Endeavour prawn. Total reported annual commercial catch (tonnes) and raw catch rate (kg/day) for all grids and for a subset of selected grids. For calculating catch rate for all grids, the effort used only included days when Endeavour prawns were reported. For calculating catch rate for selected grids, the effort used was all trawl effort in those grids, including days when Endeavour prawns were not reported.

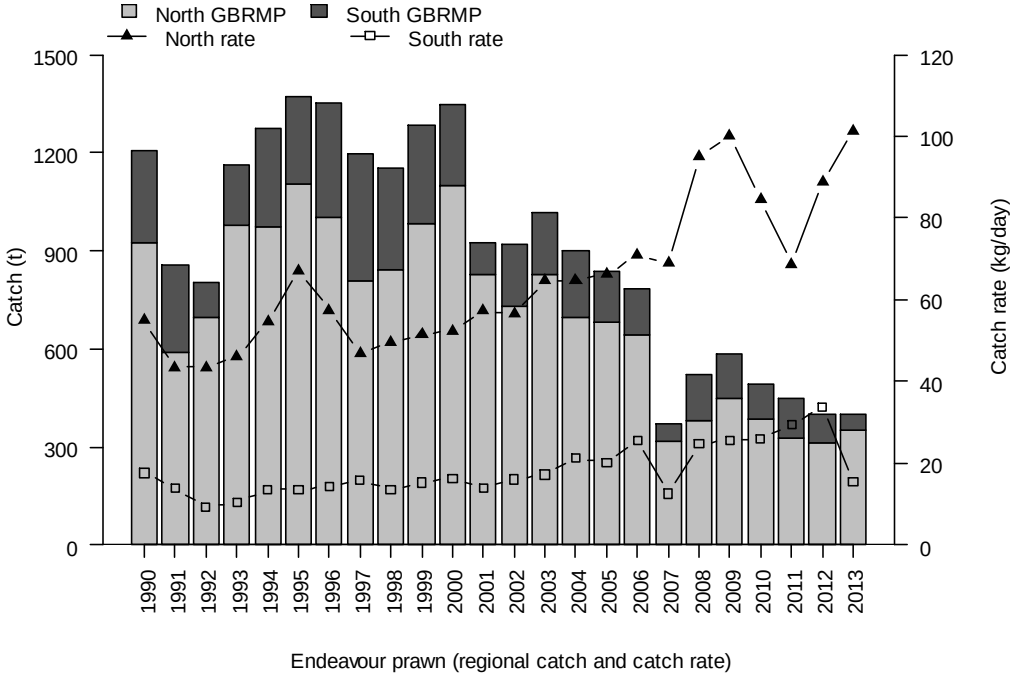

Figure 139. East coast Endeavour prawn. Total reported annual commercial catch (tonnes) and raw catch rates (kg/day), grouped by regions.

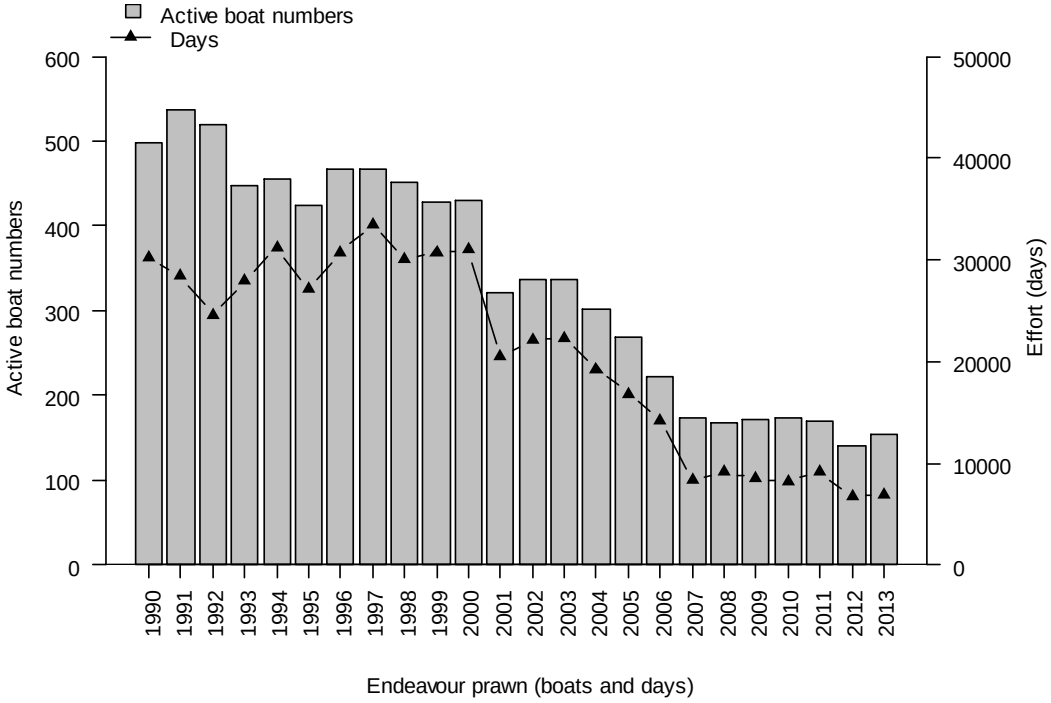

Figure 140. East coast Endeavour prawn. Annual number of boats reporting Endeavour prawns and number of days.

Eastern king prawn (*Melicertus plebejus*)

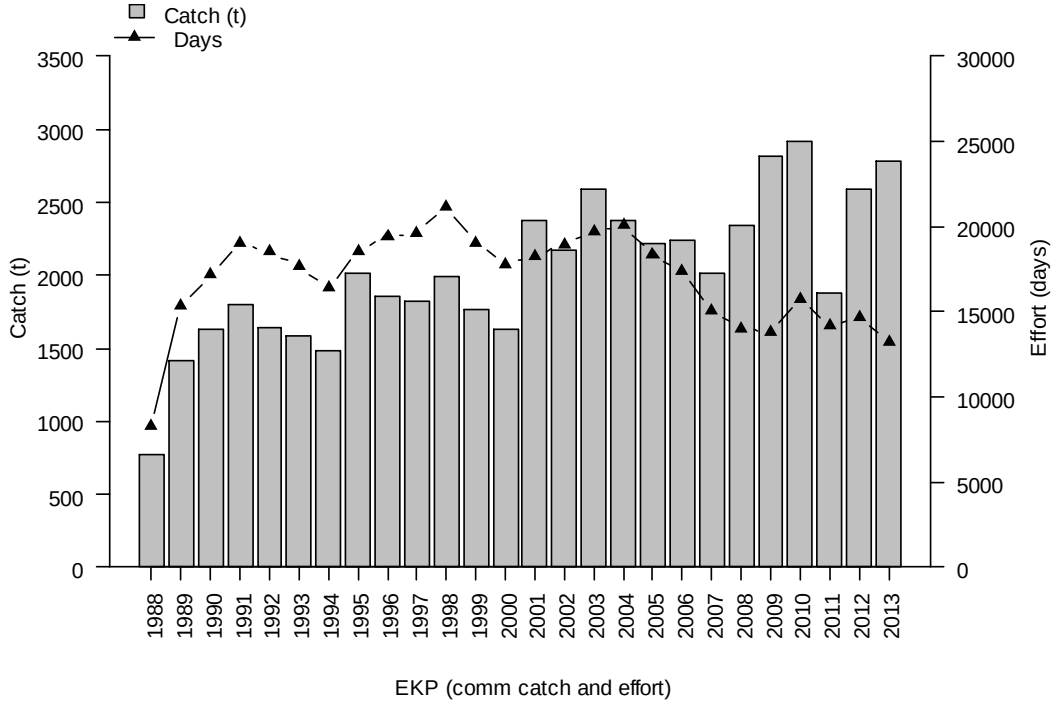

Figure 141. East coast eastern king prawn. Total reported annual commercial catch (tonnes) and effort (days), with decision rules of O'Neill *et al.* (2005) applied (p81).

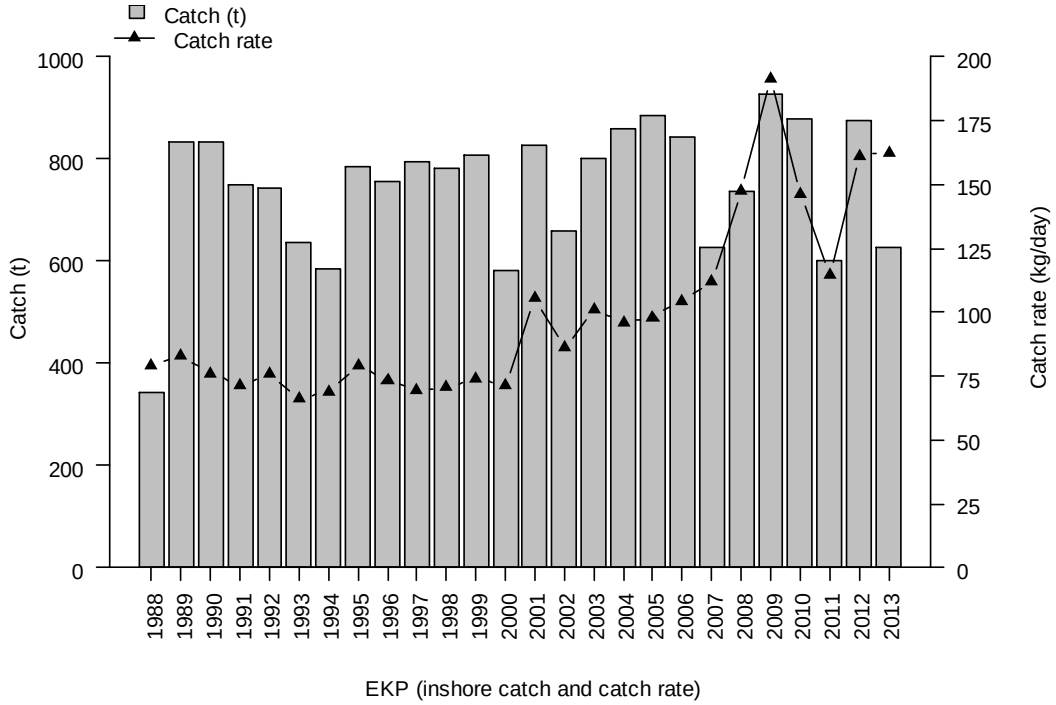

Figure 142. East coast eastern king prawn – inshore region (<50 fathoms). Total reported annual commercial catch (tonnes) and raw catch rate (kg/day).

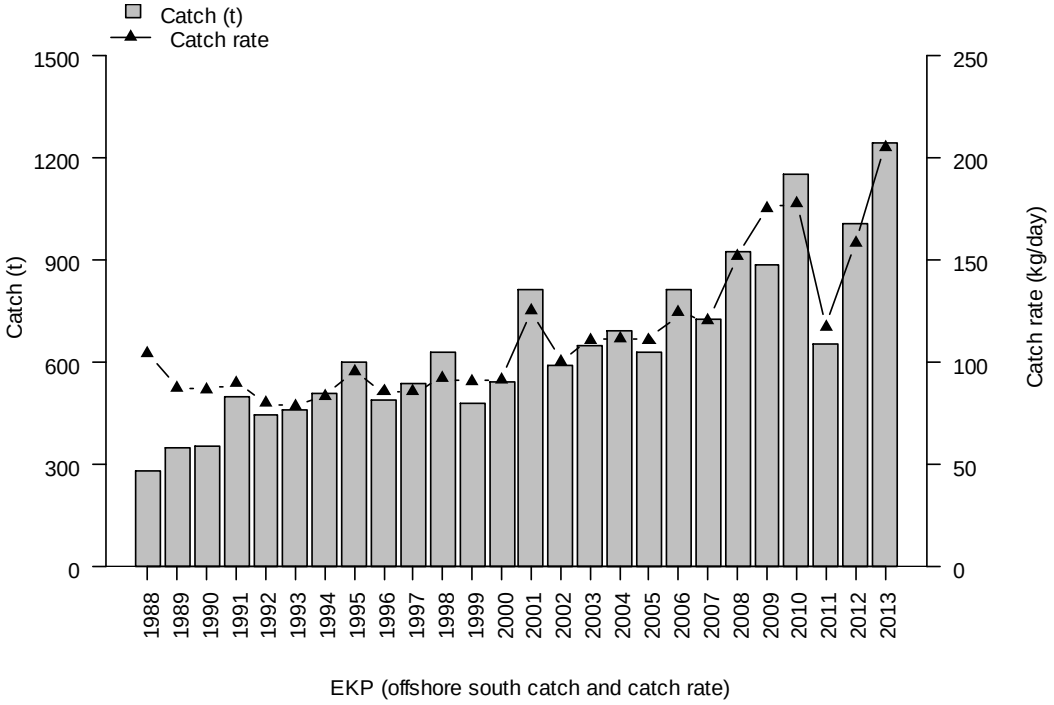

Figure 143. East coast eastern king prawn – offshore south region. Total reported annual commercial catch (tonnes) and raw catch rate (kg/day).

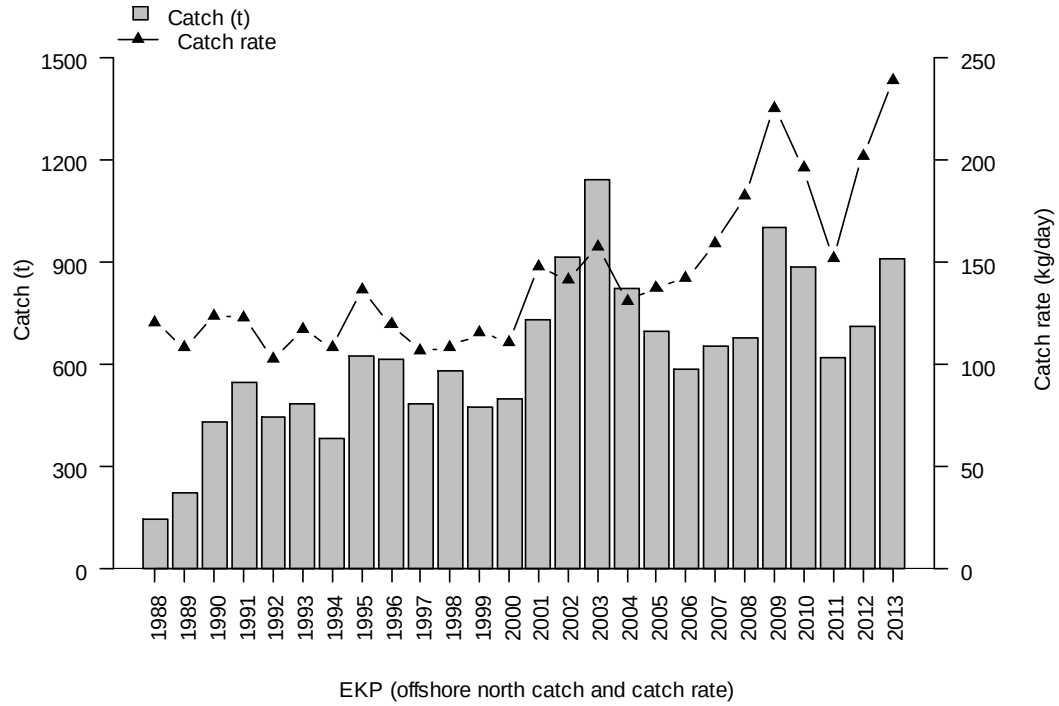

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Figure 144. East coast eastern king prawn – offshore north region. Total reported annual commercial catch (tonnes) and raw catch rate (kg/day).

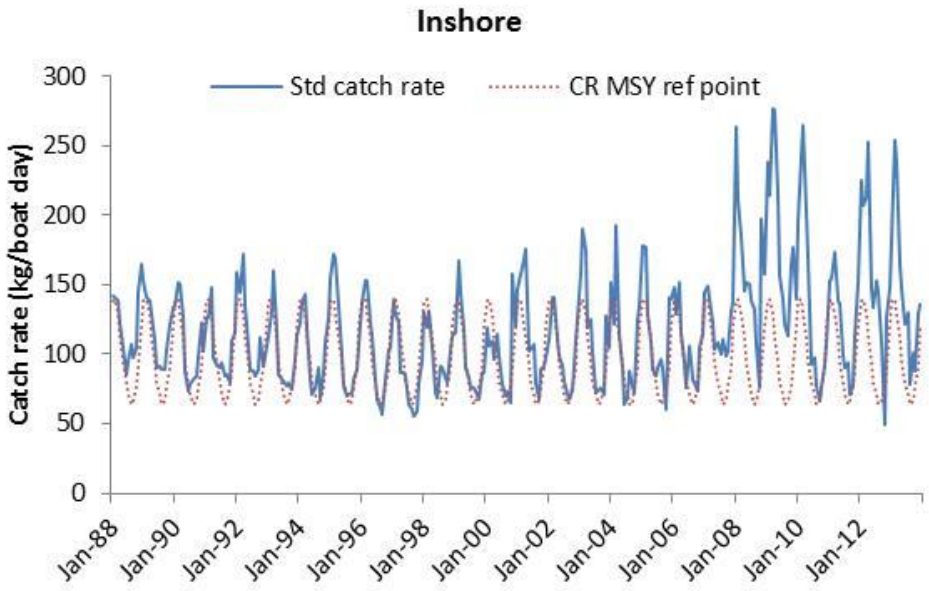

Figure 145. East coast eastern king prawn – inshore region (<50 fathoms). Standarised monthly catch rates and reference point catch rates for maximum sustainable yield. Standardisation adjusts for factors such as fishing power, lunar cycles, location and vessel. Reference points calculated according to O'Neill *et al.* (2014).

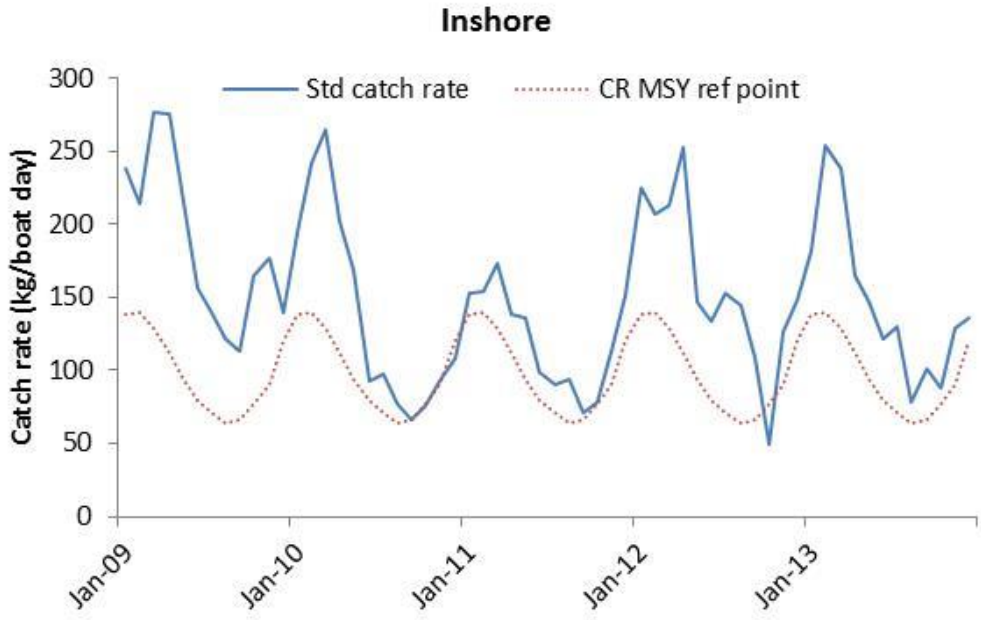

Figure 146. East coast eastern king prawn – inshore region (<50 fathoms). Standarised monthly catch rates and reference point catch rates for maximum sustainable yield. Standardisation adjusts for factors such as fishing power, lunar cycles, location and vessel. Reference points calculated according to O'Neill *et al.* (2014).

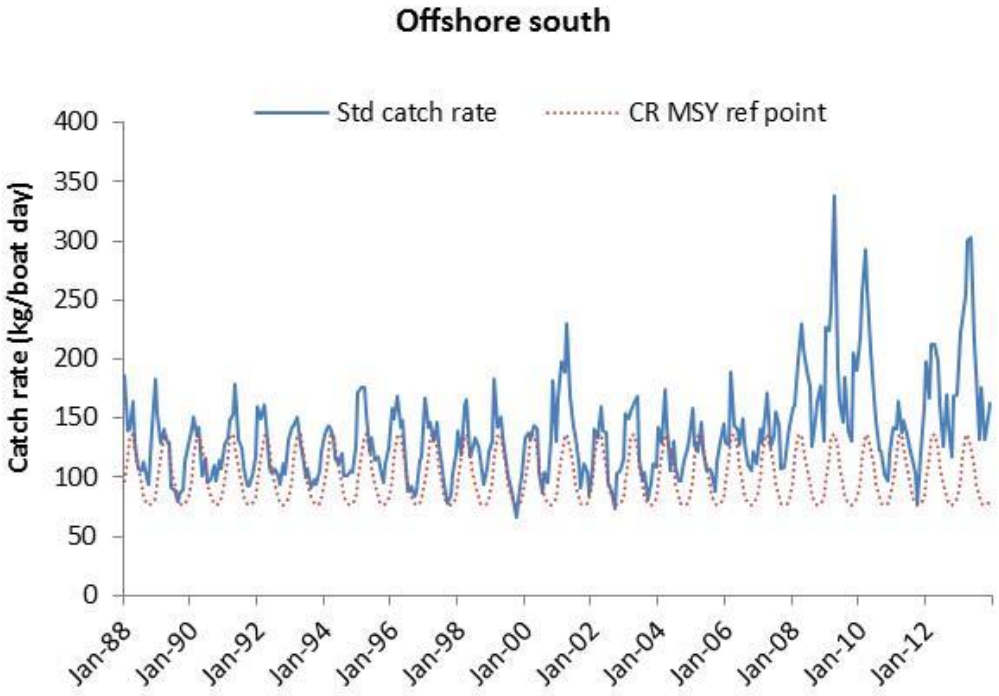

Figure 147. East coast eastern king prawn – offshore south region. Standarised monthly catch rates and reference point catch rates for maximum sustainable yield. Standardisation adjusts for factors such as fishing power, lunar cycles, location and vessel. Reference points calculated according to O'Neill *et al.* (2014).

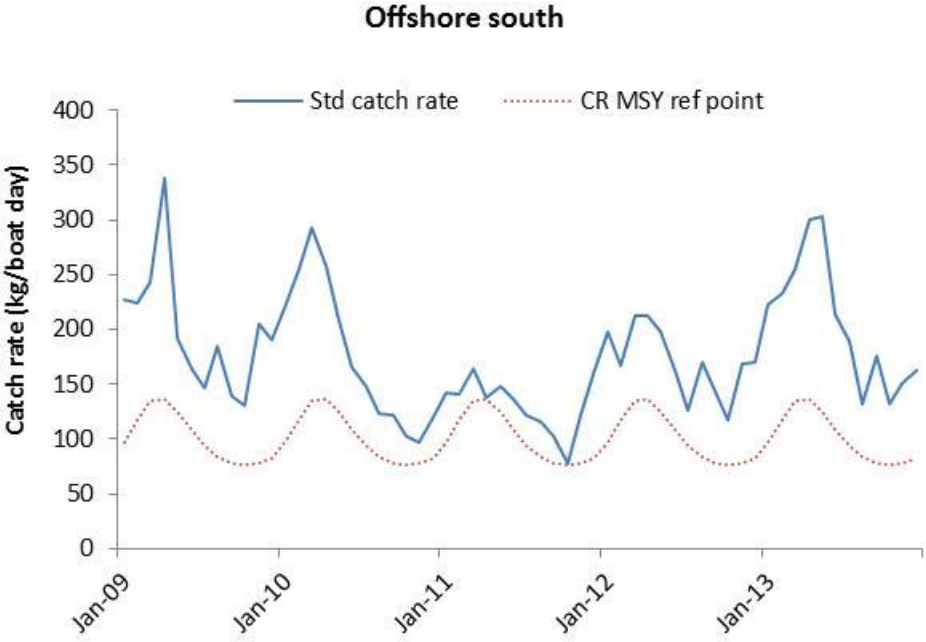

Figure 148. East coast eastern king prawn – offshore south region. Standarised monthly catch rates and reference point catch rates for maximum sustainable yield. Standardisation adjusts for factors such as fishing power, lunar cycles, location and vessel. Reference points calculated according to O'Neill *et al.* (2014).

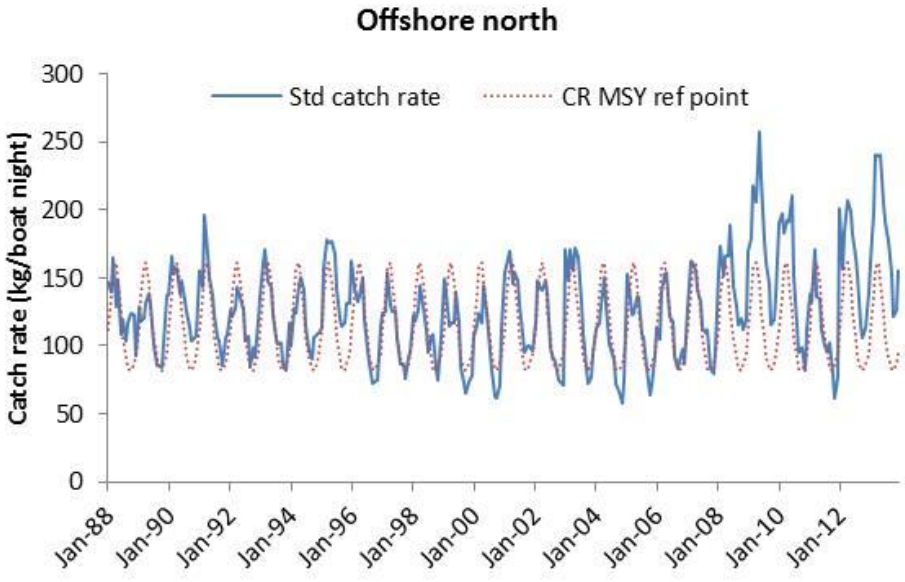

Figure 149. East coast eastern king prawn – offshore south region. Standarised monthly catch rates and reference point catch rates for maximum sustainable yield. Standardisation adjusts for factors such as fishing power, lunar cycles, location and vessel. Reference points calculated according to O'Neill *et al.* (2014).

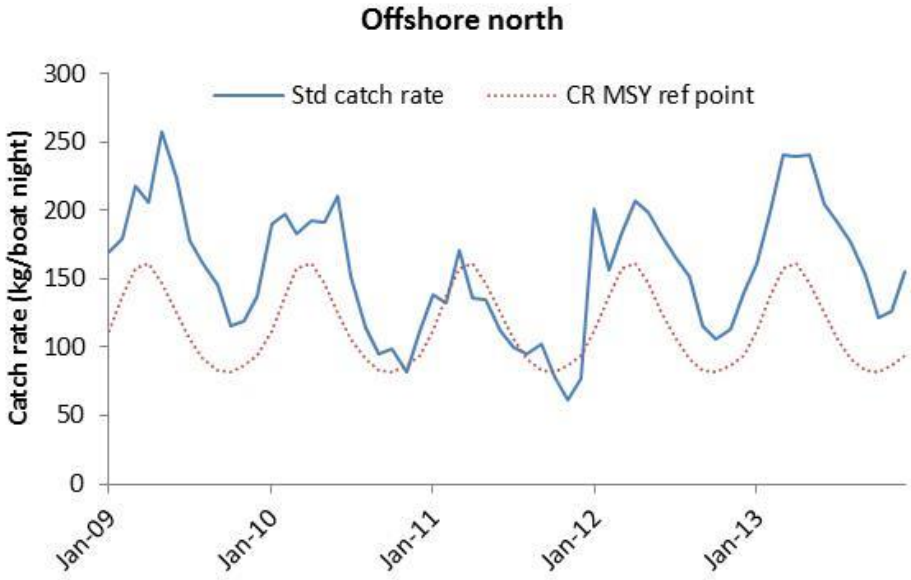

Figure 150. East coast eastern king prawn – offshore south region. Standarised monthly catch rates and reference point catch rates for maximum sustainable yield. Standardisation adjusts for factors such as fishing power, lunar cycles, location and vessel. Reference points calculated according to O'Neill *et al.* (2014).

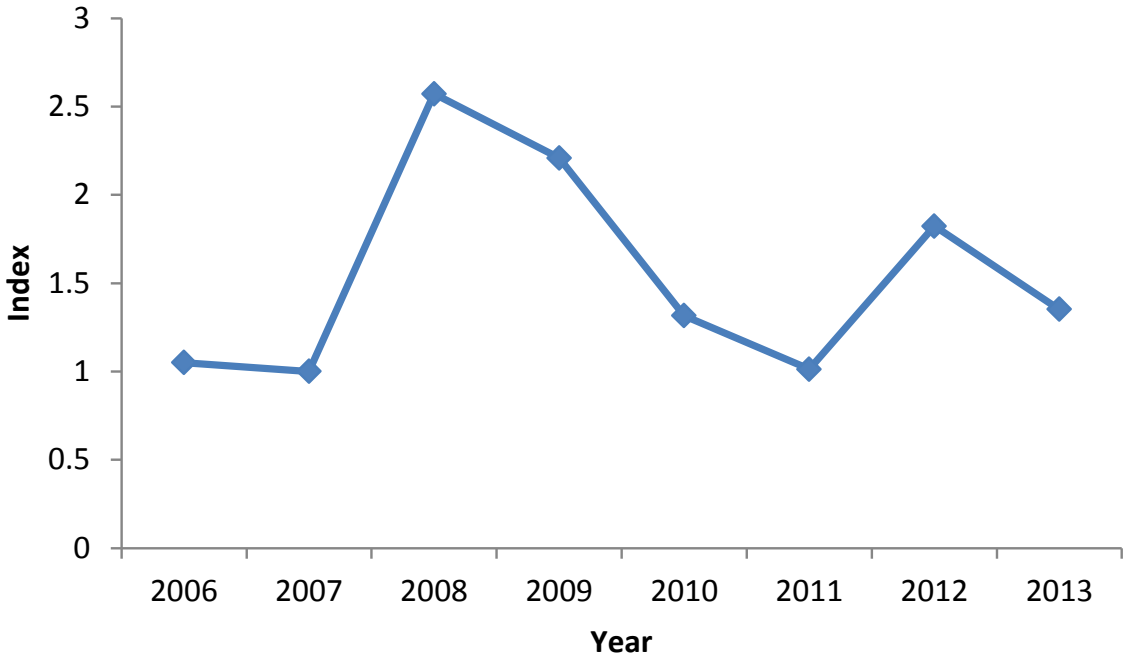

Figure 151. East coast eastern king prawn. Annual index of abundance, estimated from fishery-independent trawl surveys between Fraser Island and the Gold Coast.

Banana prawn (*Fenneropenaeus merguiensis*)

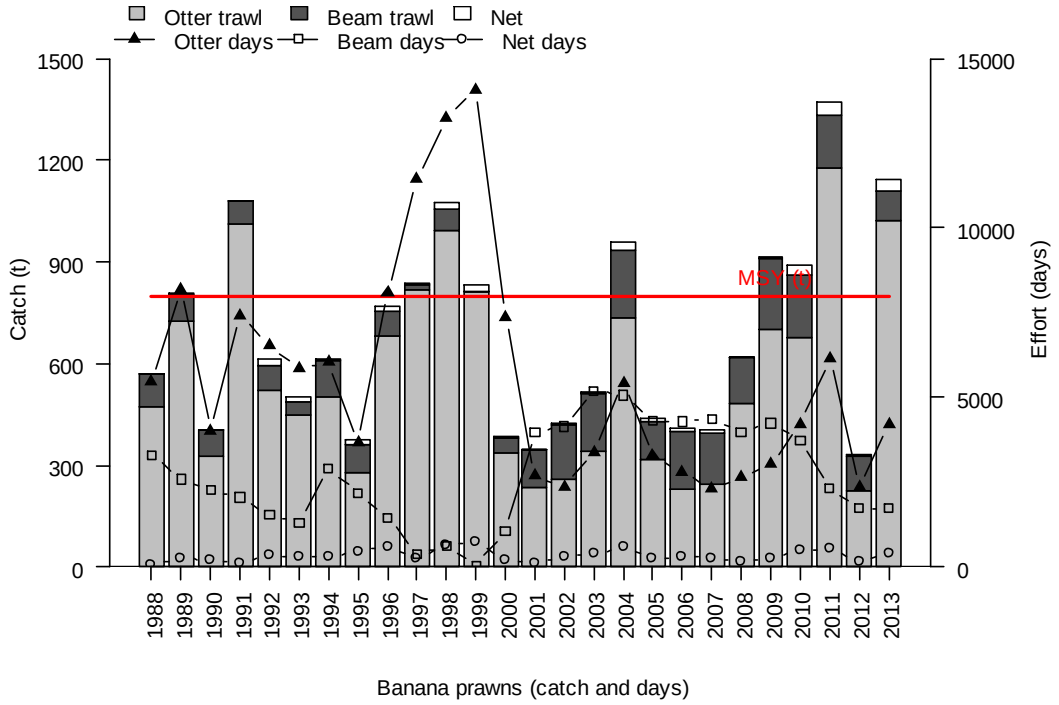

Figure 152. East coast banana prawn. Total reported annual commercial catch (tonnes) and effort (days), grouped by fishing method. Horizontal line shows estimated maximum sustainable yield calculated by Tanimoto *et al.* (2006).

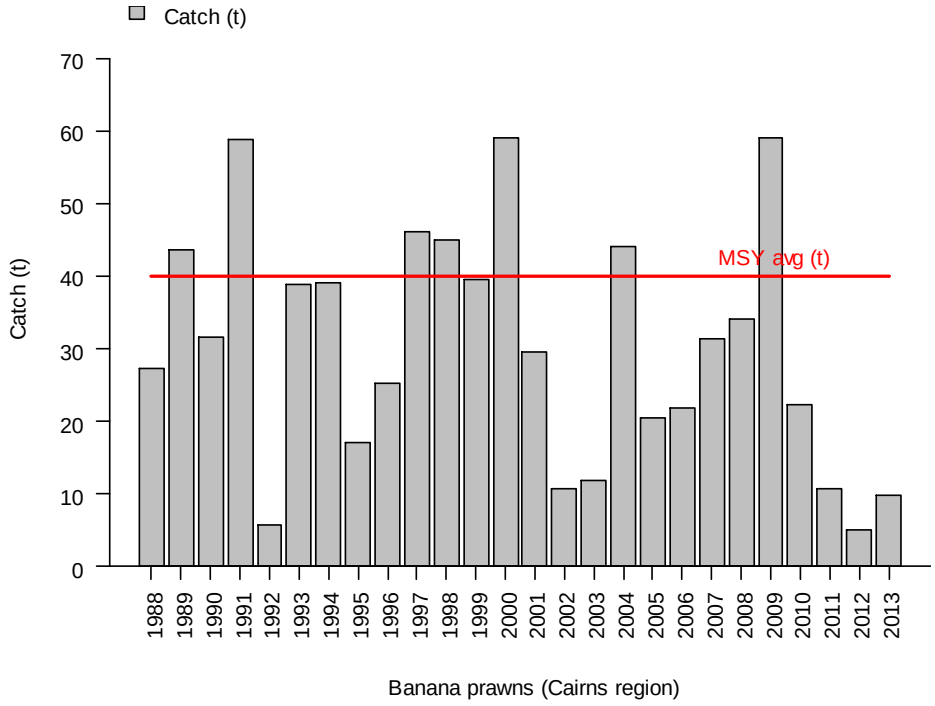

Figure 153. East coast banana prawn – Cairns region. Total reported annual commercial catch (tonnes) for otter trawling. Horizontal line shows estimated maximum sustainable yield calculated by Tanimoto *et al.* (2006).

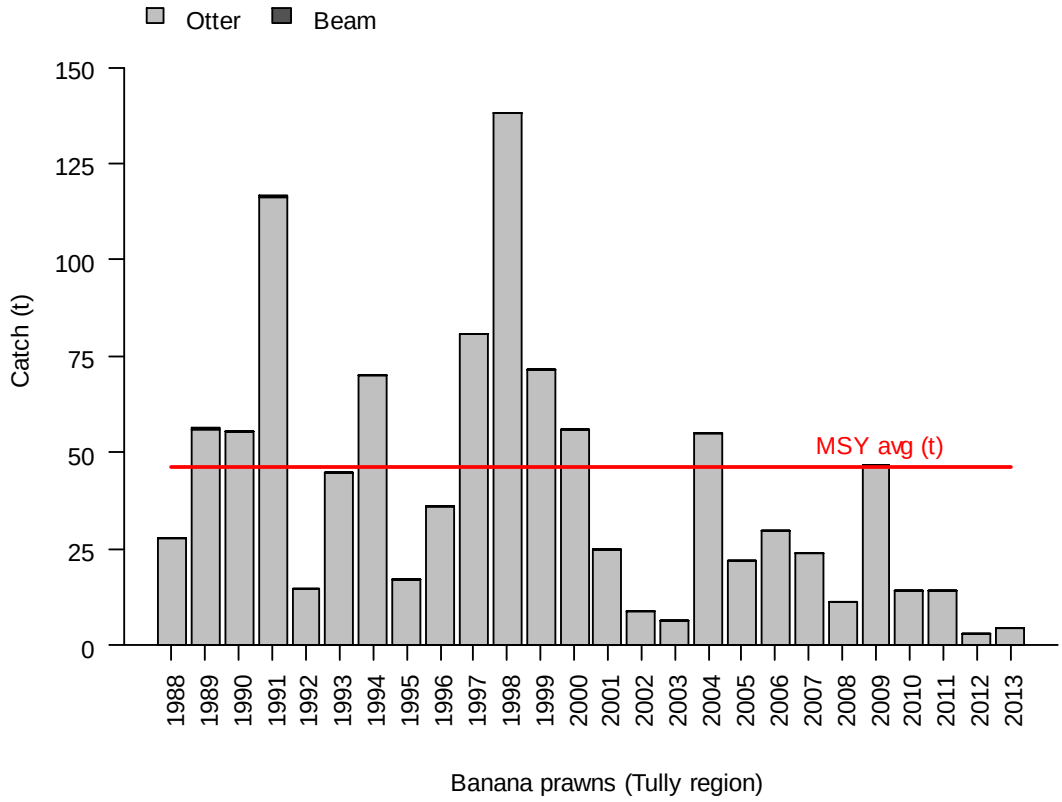

Figure 154. East coast banana prawn – Tully region. Total reported annual commercial catch (tonnes), grouped by fishing method. Horizontal line shows estimated maximum sustainable yield calculated by Tanimoto *et al.* (2006).

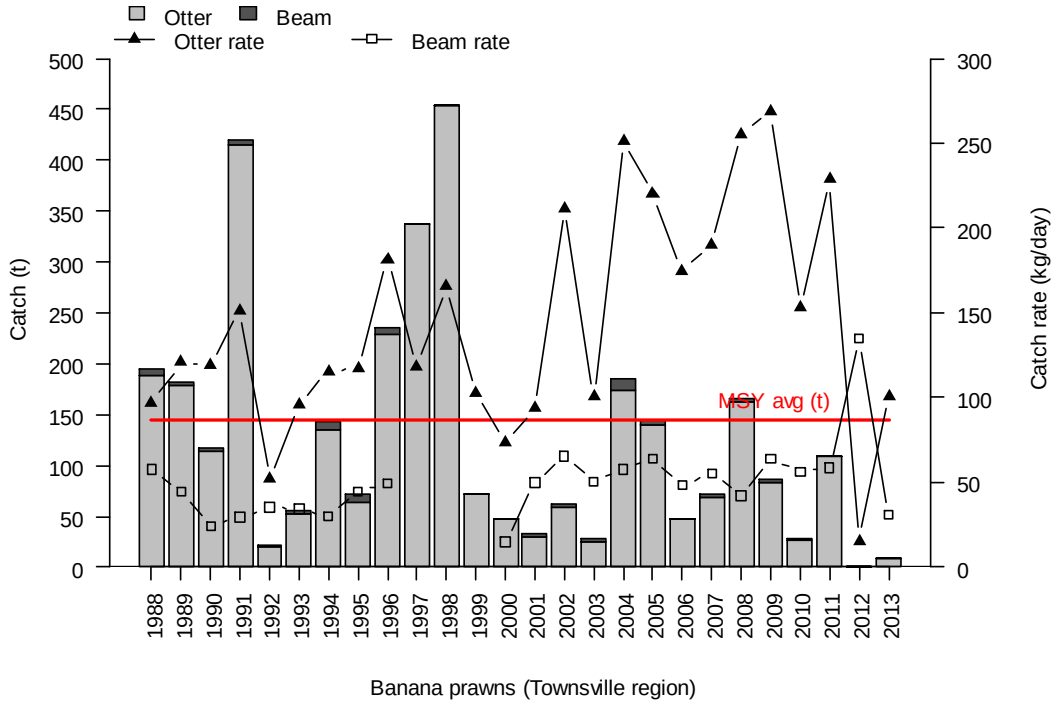

Figure 155. East coast banana prawn – Townsville region. Total reported annual commercial catch (tonnes) and raw catch rate (kg/day), grouped by fishing method. Horizontal line shows estimated maximum sustainable yield calculated by Tanimoto *et al.* (2006).

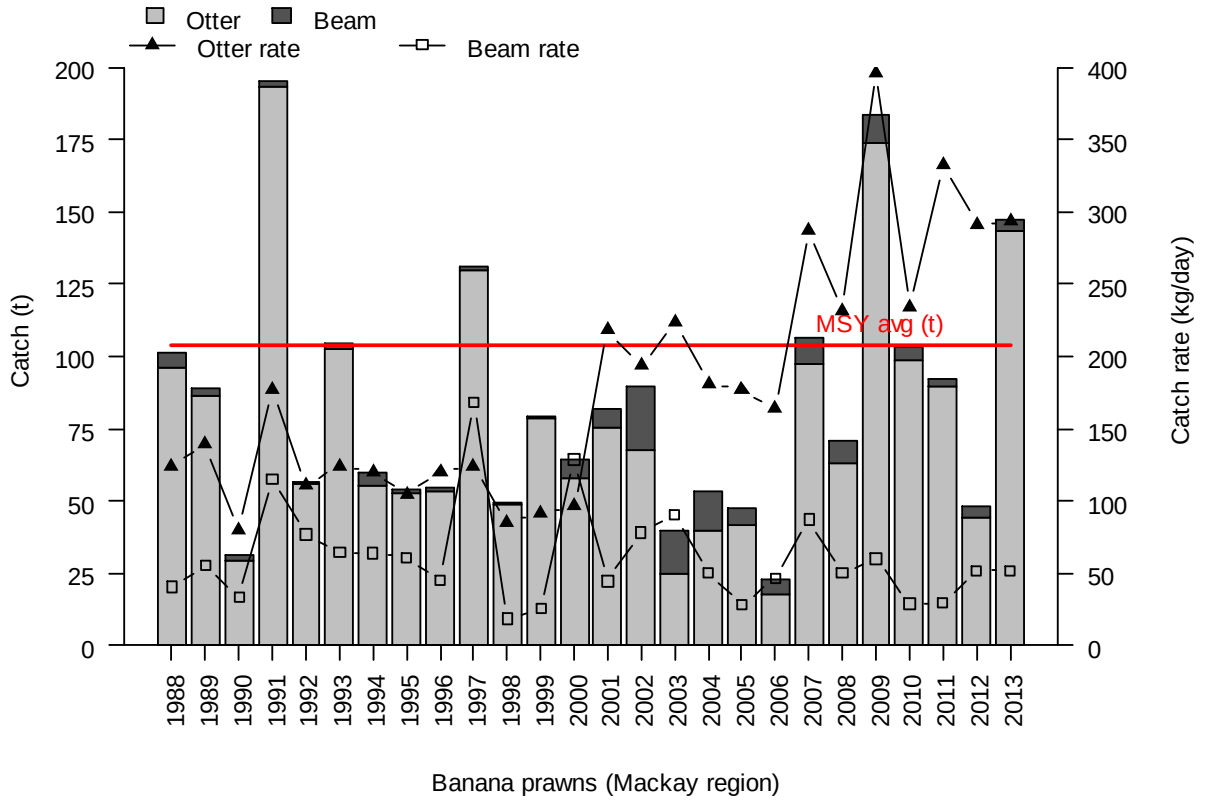

Figure 156. East coast banana prawn – Mackay region. Total reported annual commercial catch (tonnes) and raw catch rate (kg/day), grouped by fishing method. Horizontal line shows estimated maximum sustainable yield calculated by Tanimoto *et al.* (2006).

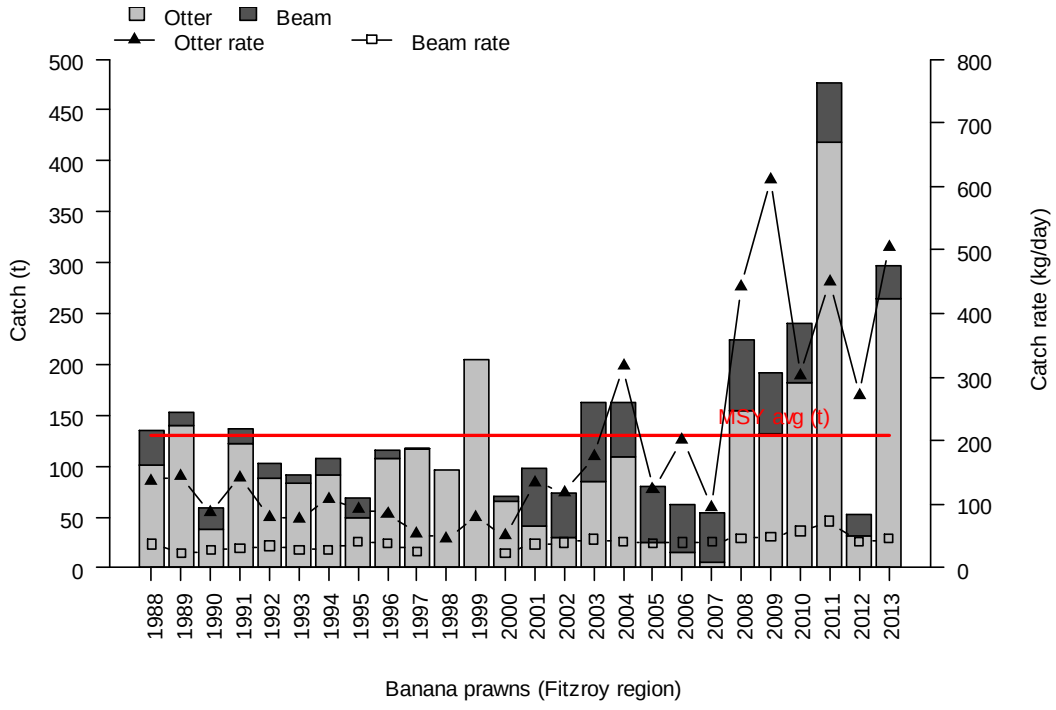

Figure 157. East coast banana prawn – Fitzroy region. Total reported annual commercial catch (tonnes) and raw catch rate (kg/day), grouped by fishing method. Horizontal line shows estimated maximum sustainable yield calculated by Tanimoto *et al.* (2006).

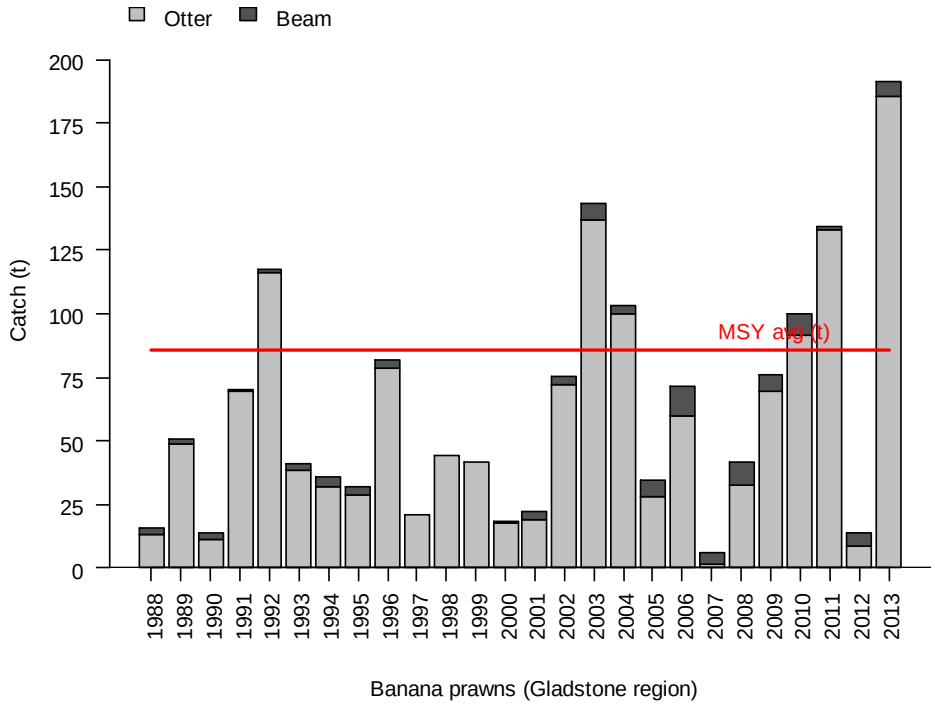

Figure 158. East coast banana prawn – Gladstone region. Total reported annual commercial catch (tonnes), grouped by fishing method. Horizontal line shows estimated maximum sustainable yield calculated by Tanimoto *et al.* (2006).

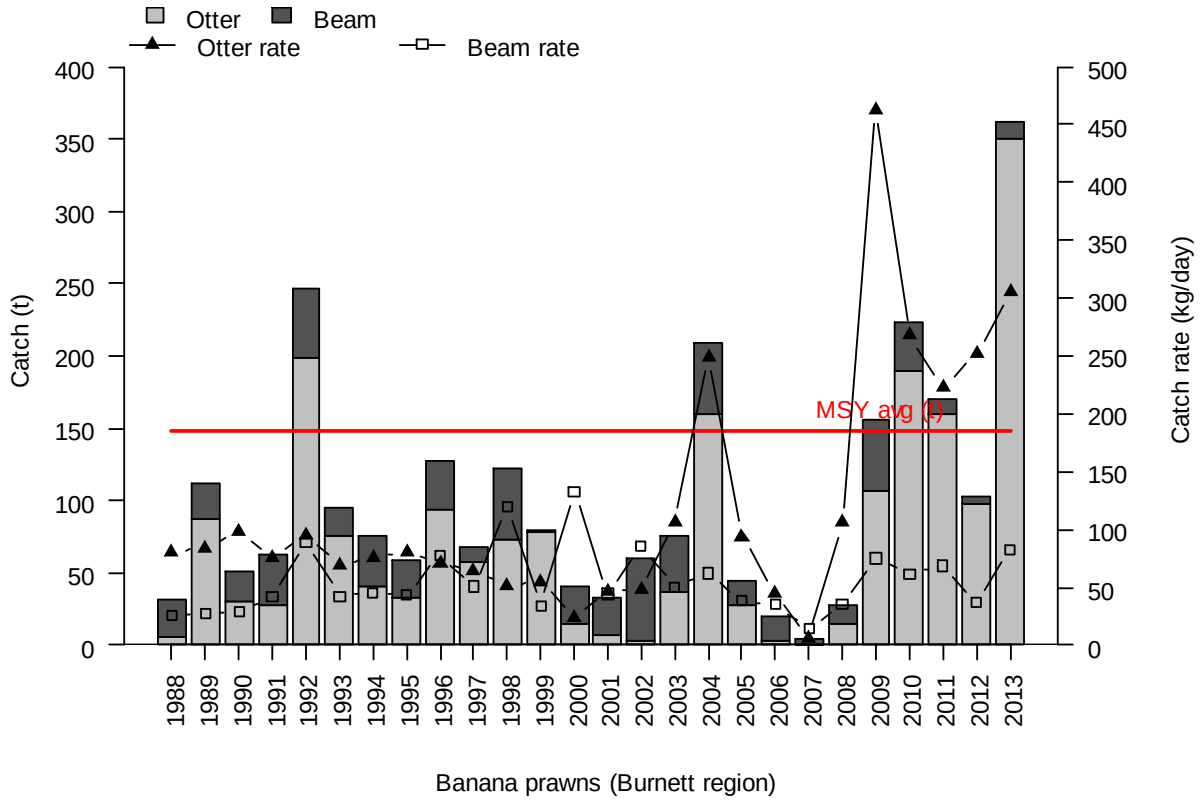

Figure 159. East coast banana prawn – Burnett region. Total reported annual commercial catch (tonnes) and raw catch rate (kg/day), grouped by fishing method. Horizontal line shows estimated maximum sustainable yield calculated by Tanimoto *et al.* (2006).

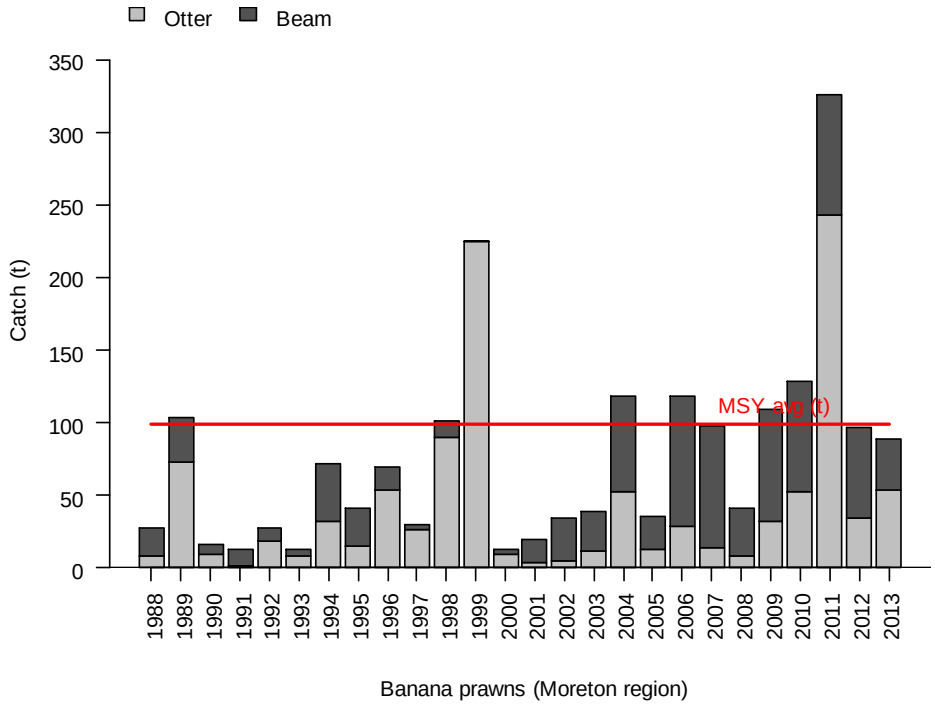

Figure 160. East coast banana prawn – Moreton region. Total reported annual commercial catch (tonnes), grouped by fishing method. Horizontal line shows estimated maximum sustainable yield calculated by Tanimoto *et al.* (2006).

School prawn (*Metapenaeus macleayi*)

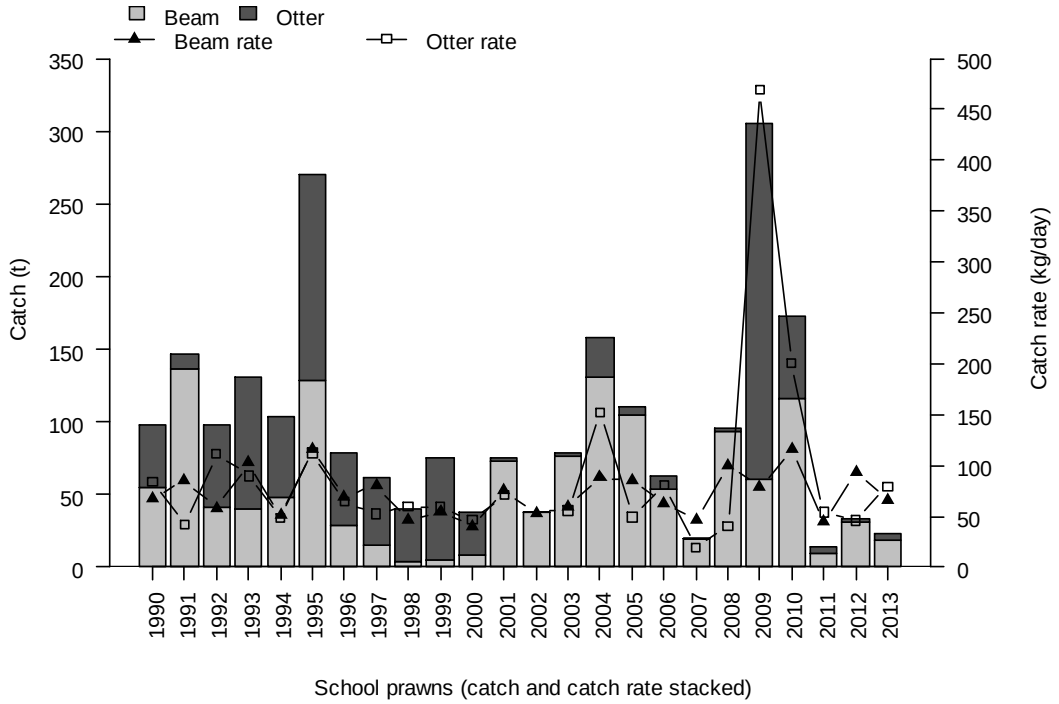

Figure 161. East coast school prawn. Total reported annual commercial catch (tonnes) and raw catch rate (kg/day), grouped by fishing method.

Tiger prawn (brown and grooved) (*Penaeus esculentus* and *P. semisulcatus*)

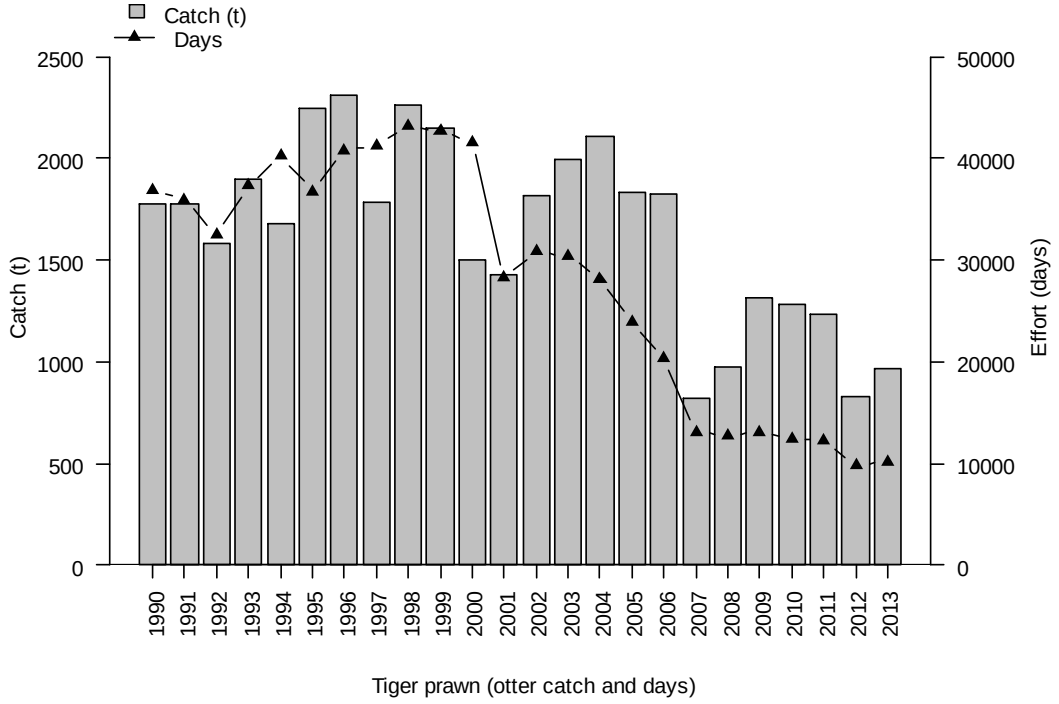

Figure 162. East coast tiger prawn. Total reported annual commercial catch (tonnes) and effort (days).

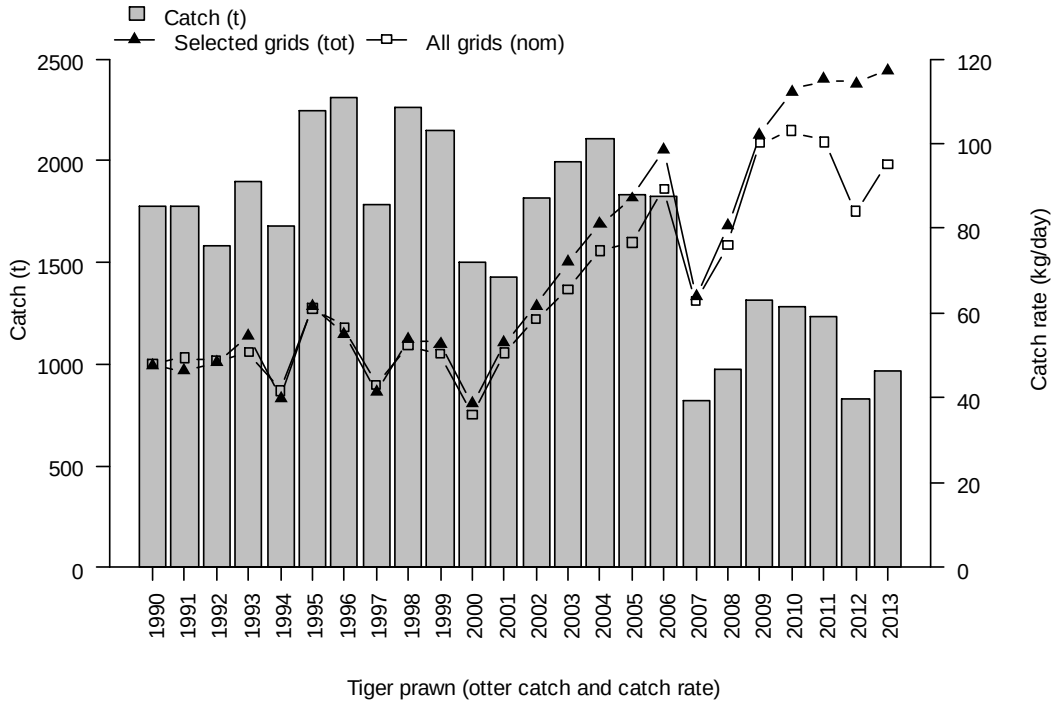

Figure 163. East coast tiger prawn. Total reported annual commercial catch (tonnes) and raw catch rates (kg/day) for all grids and a subset of selected grids. For calculating catch rate for all grids, the effort used only included days when tiger prawns were reported. For calculating catch rate for selected grids, the effort used was all trawl effort in those grids, including days when tiger prawns were not reported.

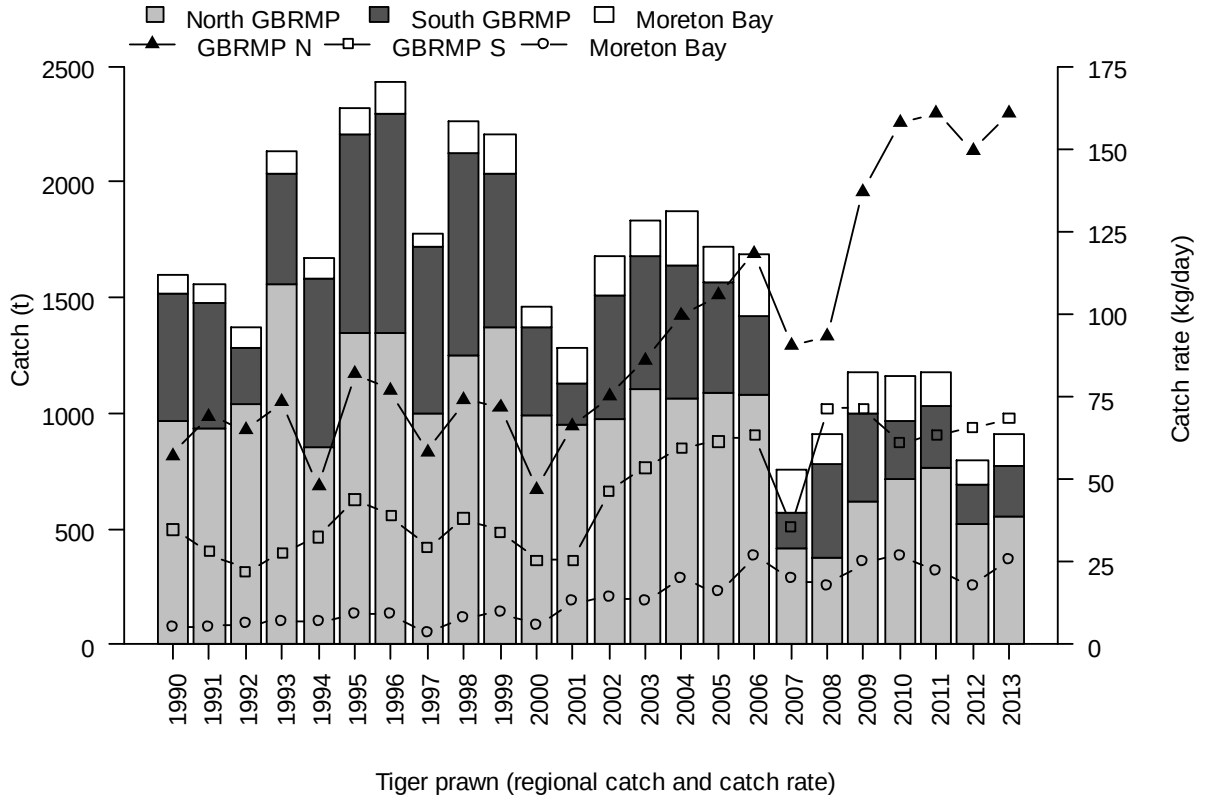

Figure 164. East coast tiger prawn. Total reported annual commercial catch (tonnes) and raw catch rate (kg/day), grouped by region.

Western king prawn (blue-legged) (*Melicertus latisulatus*)

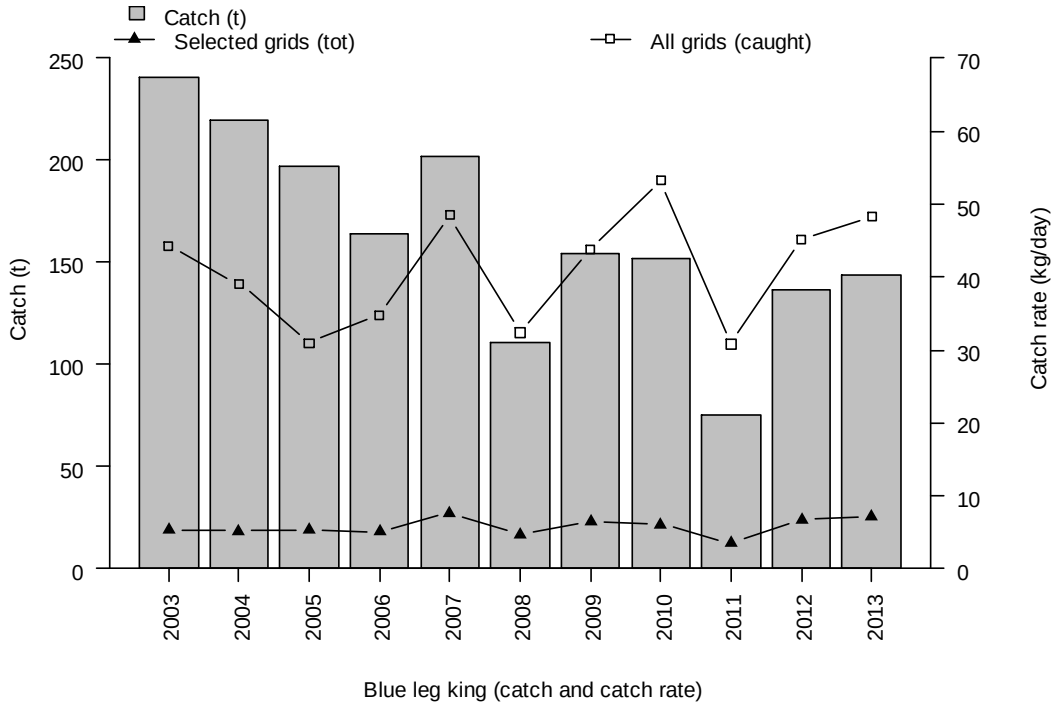

Figure 165. East coast western king prawn. Total reported annual commercial catch (tonnes) and catch rates (kg/day) for all grids and a subset of selected of selected grids. For calculating catch rate for all grids, the effort used only included days when western king prawns were reported. For calculating catch rate for selected grids, the effort used was all trawl effort in those grids, including days when western king prawns were not reported.

Other invertebrates

Balmain bugs (*Ibacus chacei and I. brucei*)

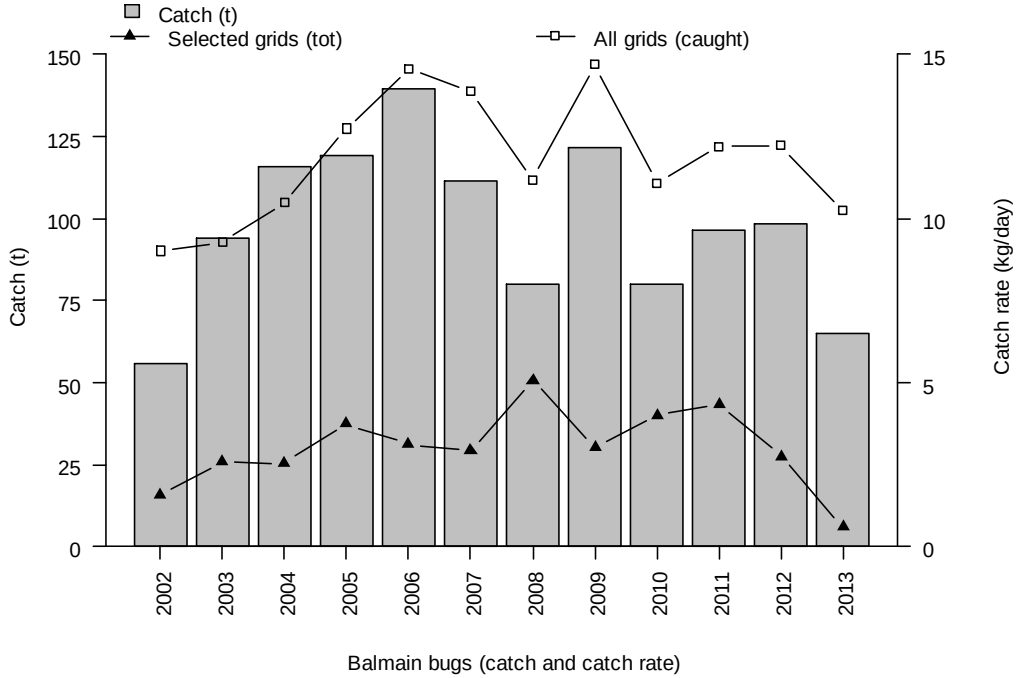

Figure 166. East coast Balmain bugs. Total reported annual commercial catch (tonnes) and raw catch rates (kg/day) for all grids and selected grids. For calculating catch rate for all grids, the effort used only included days when Balmain bugs were reported. For calculating catch rate for selected grids, the effort used was all trawl effort in those grids, including days when Balmain bugs were not reported.

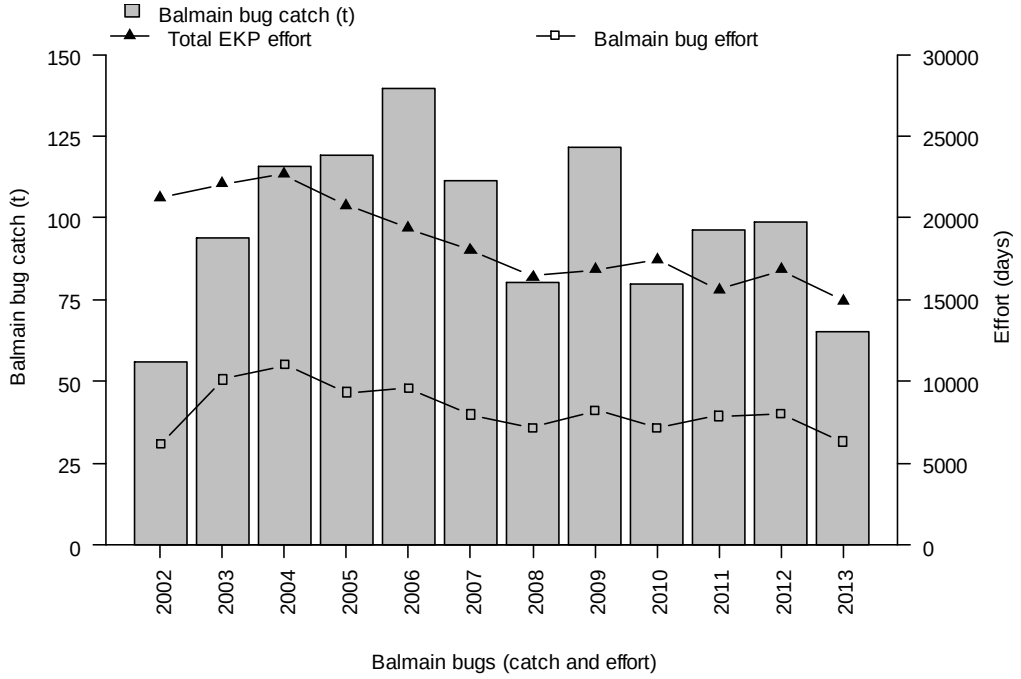

Figure 167. East coast Balmain bugs. Total reported annual commercial catch (tonnes) and effort (days when EKP were reported, and days when Balmain bugs were reported).

Moreton Bay bugs (*Thenus australiensis* and *T. parindicus*)

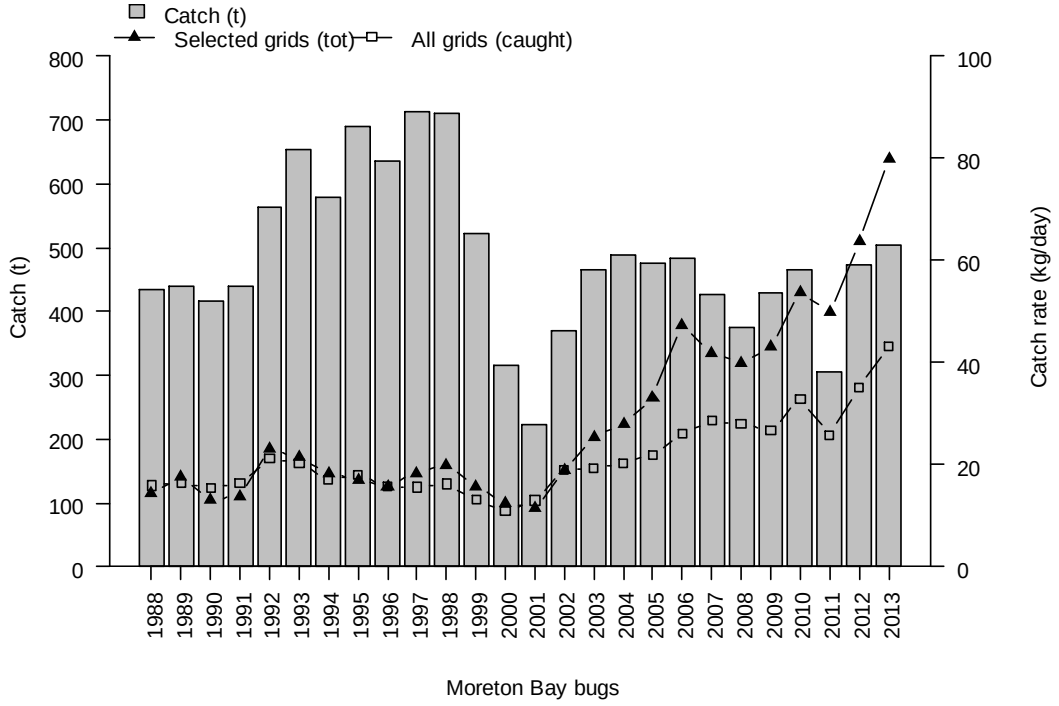

Figure 168. East coast Moreton Bay bugs. Total reported annual commercial catch (tonnes) and catch rates (kg/day) for all grids and selected grids. For calculating catch rate for all grids, the effort used only included days when Moreton Bay bugs were reported. For calculating catch rate for selected grids, the effort used included all trawl effort in those grids, including days when Moreton Bay bugs were not reported.

Tropical rock lobster (*Panulirus ornatus*)

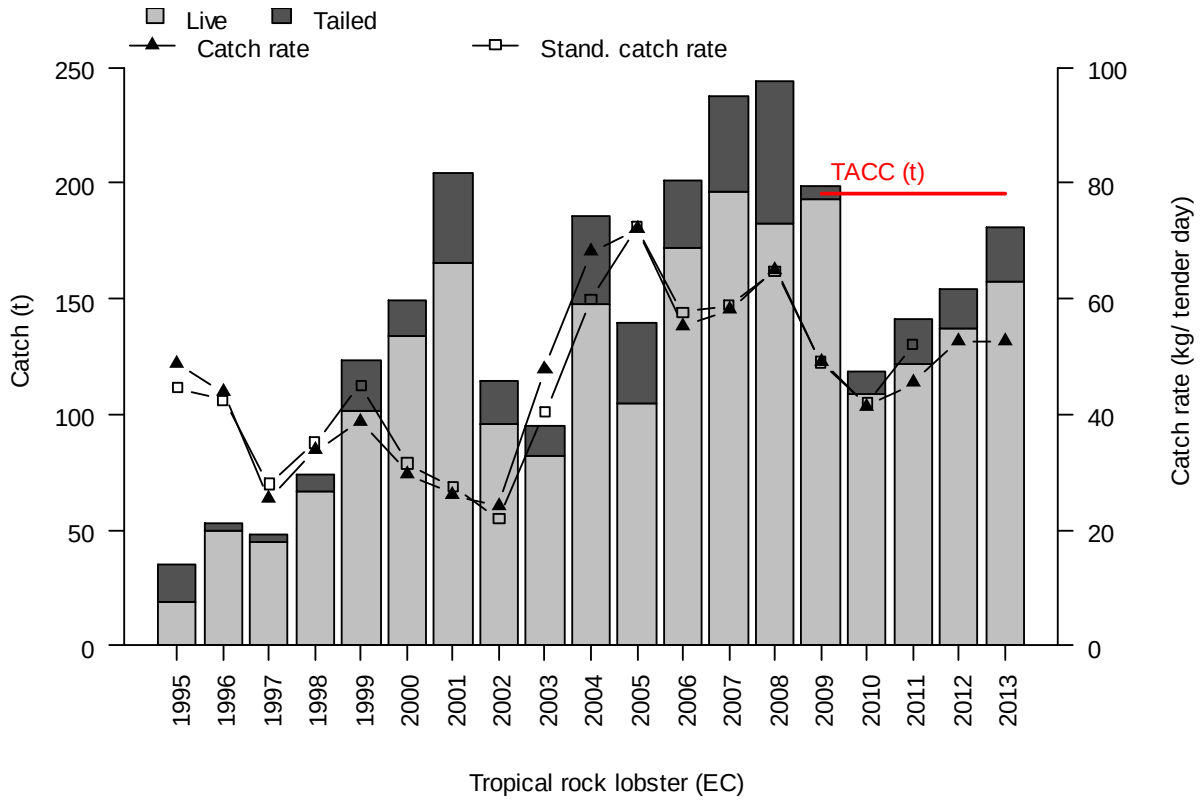

Figure 169. East coast tropical rock lobster. Total reported annual commercial catch (tonnes), grouped by product type, plus raw and standardised catch rate. Standardisation adjusts for factors like location, fishing method and the occurrence of short fishing days. Horizontal line shows Total Allowable Commercial Catch.

Saucer scallop (*Amusium balloti*)

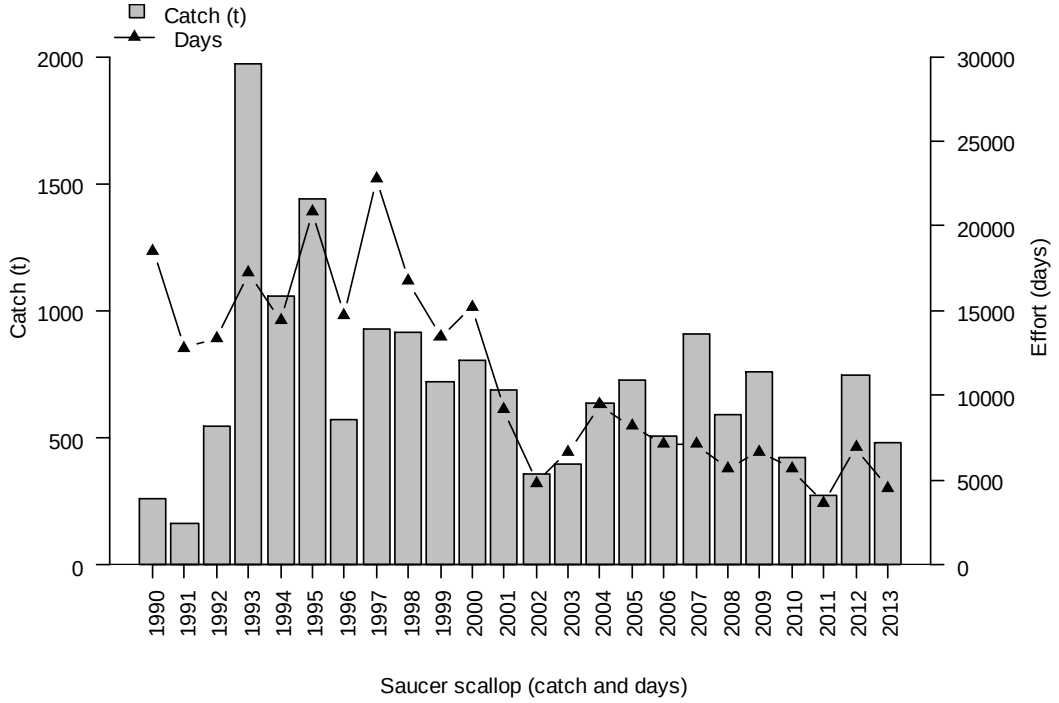

Figure 170. East coast saucer scallop. Total reported annual commercial catch (tonnes) and effort (days)

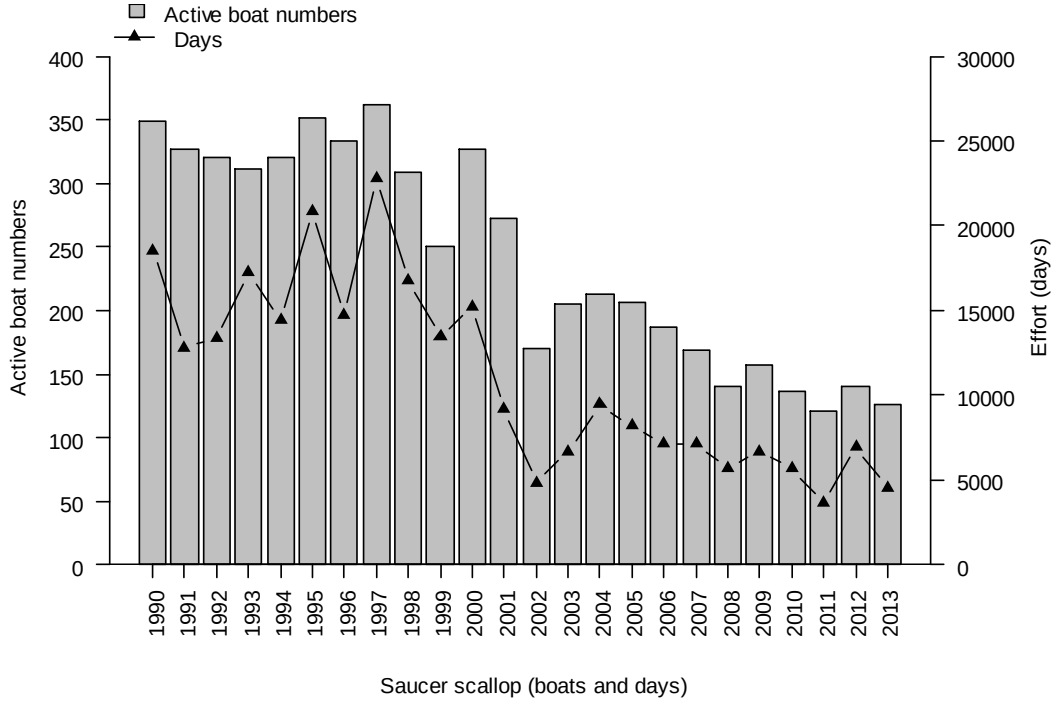

Figure 171. East coast saucer scallop. Total number of boats reporting Saucer scallops and effort (days)

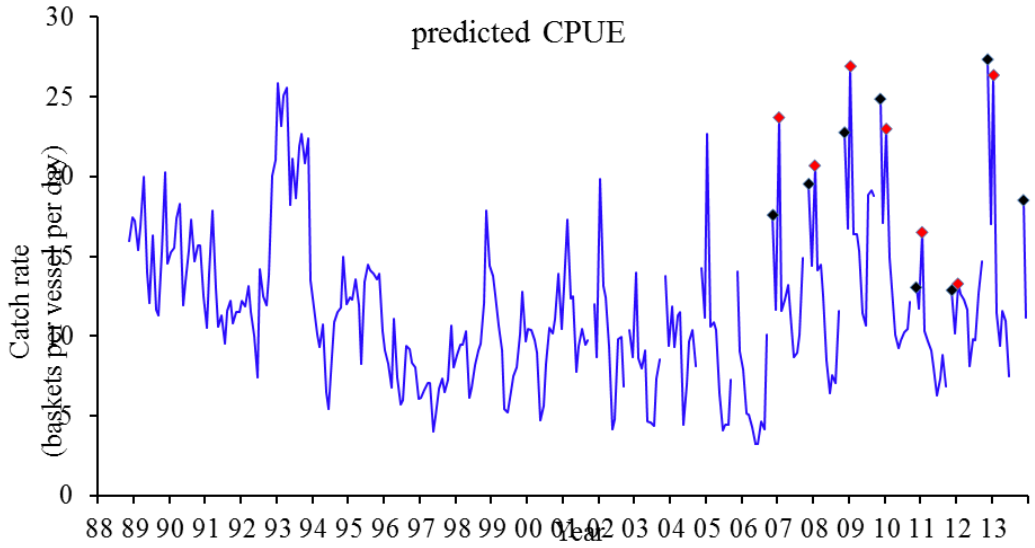

Figure 172. East coast saucer scallop – south of 22° S latitude. Monthly standardised catch rate (baskets per vessel per day). Standardisation adjusts for factors such as lunar effects and fishing gear (e.g. number of nets, otter board type and engine power). Black and red dots correspond to 1 November (end of trawl closure) and 1 January (opening of scallop replenishment areas) respectively.

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Tanimoto, M., Courtney, A.J., O'Neil, M.F. & Leigh, G.M., 2006. Stock assessment of the Queensland (Australia) east coast banana prawn (*Penaeus merguiensis*), Queensland Department of Primary Industries and Fisheries, Brisbane. QI06067.