Supplementary Appendix 1

The RAM Legacy Stock Assessment database has undergone several updates since the publication of Szuwalski et al. (2015). 45 of the 224 stocks included in the original analysis have been split, merged, or deprecated. Table 1 lists each of the 45 stocks that underwent some modification. A full list of the stocks included in Szuwalski et al. (2015) is included in our GitHub repository (https://github.com/emilysellinger/revamped-sr-analysis).

253 stocks that met our analysis criteria were added to the RAM database. A full list of these new stocks is available in our GitHub repository. The majority of stocks added were Pacific salmon stocks in Alaska (see Figures S1 and S2).

Table S.A.1. Modified stocks from Szuwalski et al. (2015).

Species	Common Name	Agency	Area	Change
Thunnus alalunga	Albacore tuna	ICCAT	Northern Atlantic	deprecated
Sebastes melanostomus	Blackgill rockfish	NMFS	Pacific coast	excluded, new time series data off stock-recruitment curve
Thunnus obesus	Bigeye tuna	ICCAT	Atlantic pelagic	deprecated
Thunnus obesus	Bigeye tuna	SPC	Pacific pelagic	deprecated
Sebastes melanops	Black rockfish	NWFSC	U.S. West Coast, north of Cape Falcon	split, now BLACKROCKCAL, BLACKROCKORECOAST, BLACKROCKWASH
Sebastes melanops	Black rockfish	NWFSC	U.S. West Coast, south of Cape Falcon	split, now BLACKROCKCAL, BLACKROCKORECOAST, BLACKROCKWASH
Mallotus villosus	Capelin	NWWG	Iceland shelf	deprecated
Gadus morhua	Atlantic cod	NAFO-SC	Newfoundland-Labrador Shelf	deprecated
Gadus morhua	Atlantic cod	NEFSC	Northeast U.S. Continental Shelf	deprecated
Gadus morhua	Atlantic cod	WGNSSK	North Sea	deprecated
Mycteroperca microlepis	Gag	SEFSC	Gulf of Mexico	deprecated
Melanogrammus aeglefinus	Haddock	DFO	Northeast U.S. Continental Shelf	deprecated
Melanogrammus aeglefinus	Haddock	WGNSSK	North Sea	merged, now HADNS.IIa.Via
Melanogrammus aeglefinus	Haddock	WGNSDS	Celtic-Biscay Shelf	merged, now HADNS.IIa.Via

Clupea harengus	Herring	WGBFAS	Baltic Sea	redefined, now HERR2529.32
Clupea harengus	Herring	WGBFAS	Baltic Sea	merged, now HERR30.31
Clupea harengus	Herring	WGBFAS	Baltic Sea	merged, now HERR30.31
Clupea harengus	Herring	DFO	Scotian Shelf	excluded, new time series data missing observations
Clupea harengus	Herring	HAWG	North Sea	redefined, now HERRNS.IIIa.VIId
Scomber scombrus	Mackerel	NEFSC	Northeast U.S. Continental Shelf	deprecated
Nemadactylus macropterus	Jackass morwong	CSIRO	Southeast Australian Shelf	split, now MORWONGESE and MORWONGWSE
Lutjanus analis	Mutton snapper	SEFSC	Southeast U.S. Continental Shelf	deprecated
Gadus macrocephalus	Pacific cod	AFSC	East Bering Sea	split, now PCODAI and PCODBS
Pleuronectes platessa	European plaice	WGNSSK	Baltic Sea	redefined, now PLAICNS
Pollachius virens	pollock	DFO	Scotian Shelf	deprecated
Eopsetta jordan	Petrale sole	NWFSC	Gulf of Alaska	merged, now PSOLEPCOAST
Eopsetta jordan	Petrale sole	NWFSC	California Current	merged, now PSOLEPCOAST
Pagrus pagrus	Red porgy	SEFSC	Southeast U.S. Continental Shelf	deprecated
Lutjanus campechanus	Red snapper	SEFSC	Eastern Gulf of Mexico	deprecated
Lutjanus campechanus	Red snapper	SEFSC	Western Gulf of Mexico	deprecated
Sardinops sagax	Pacific sardine	SWFSC	California Current	deprecated
Sardinops sagax	Pacific sardine	MARAM	Benguela Current	split, now SARDSAS and SARDSAW
Ammodytes marinus	Sand lance	WGNSSK	North Sea	split, now now SEELNSSA1, SEELNSSA2, SEELNSSA3, SEELNSSA4

Epinephelus niveatus	Snowy grouper	SEFSC	Southeast U.S. Continental Shelf	deprecated
Solea vulgaris	common European sole	WGBPAS	Baltic Sea	deprecated
Solea vulgaris	common European sole	WGHMM	Celtic-Biscay Shelf	deprecated
Kajikia audax	Striped marlin	SPC	Pacific pelagic	deprecated
Xiphias gladius	Swordfish	ICCAT	North Atlantic pelagic	deprecated
Rhomboplites aurorubens	Vermilion snapper	SEFSC	Gulf of Mexico	deprecated
Merlangius merlangus	Whiting	WGNSSK	North Sea	redefined, now WHITNS.VIId
Merlangius merlangus	Whiting	WGSSDS	Celtic-Biscay Shelf	redefined, now WHITVIIbce.k
Thunnus albacares	Yellowfin tuna	ICCAT	Atlantic pelagic	deprecated
Thunnus albacares	Yellowfin tuna	SPC	Pacific pelagic	deprecated
Ocyurus chrysurus	Ocyurus chrysurus	SEFSC	Southeast U.S. Continental Shelf	deprecated

Table S.A.2. Unmodified stocks from Szuwalski et al. (2015) that were also included in this analysis where a primary recruitment driver was unable to be determined by Szuwalski et al. (2015). Spawning biomass and environment columns indicate the primary recruitment driver found in this analysis. Stocks in the "no re-classification" column had no primary driver in the previous analysis, as well as ours. The managing agency and area code are included beneath each stock.

Spawning Biomass	Environment	No re-classification
Atlantic cod	Albacore tuna	Anchovy
ICES I-II	*WCPFC SPAC*	*DETMCM South Africa*
Common gemfish	Arrowtooth flounder	Chilean jack mackerel
Australian southeast shelf	*Bering Sea and Aleutian Islands*	*Chile*
Whiting	Atlantic cod	Pacific chub mackerel
ICES VIa	*DFO 4T*	*US West Coast*
	Atlantic cod	Atlantic cod
	ICES 22-24	*ICES 25-32*
	Atlantic cod	Atlantic cod
	ICES Va	*NMFS 5Z*
	Atlantic cod	English sole
	ICES VIIa	*US West Coast*
	Greenland halibut	Gray triggerfish
	ICES I-II	*Gulf of Maine*
	Haddock	Haddock
	NMFS GB	*ICES I-II*
	Gulf menhaden	Herring
	Gulf of Mexico	*ICES VIIa*
	Pacific Ocean perch	Herring
	US West Coast	*NMFS NWATLC*
	Red snapper	Herring
	NMFS Southern Atlantic Coast	*ICES VIIa-g-h-j-k*
	Skipjack tuna	Herring
	WCPFC CWPAC	*Prince William Sound*
	Walleye pollock	Herring
	Gulf of Alaska	*Strait of Georgia*
	Widow rockfish	Herring
	US West Coast	*ICES VIa*
		American lobster
		NMFS Gulf of Maine
		Megrim
		ICES VIIIc-IXa
		Peruvian anchoveta
		IMARPE NC
		Scup
		US Northwest Atlantic
		Sprat
		ICES 22-32
		Walleye pollock
		Aleutian Islands
		Yellowtail flounder
		Gulf of Alaska

Yellowfin tuna
Eastern Pacific Ocean

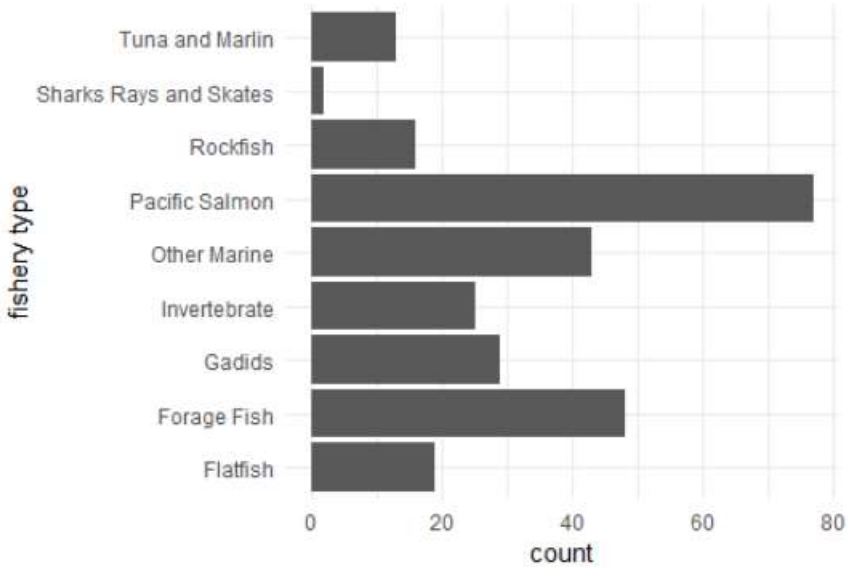


Figure S.1. Stocks added to the RAM Legacy Stock Assessment database since Szuwalski et al. (2015) by fishery type.

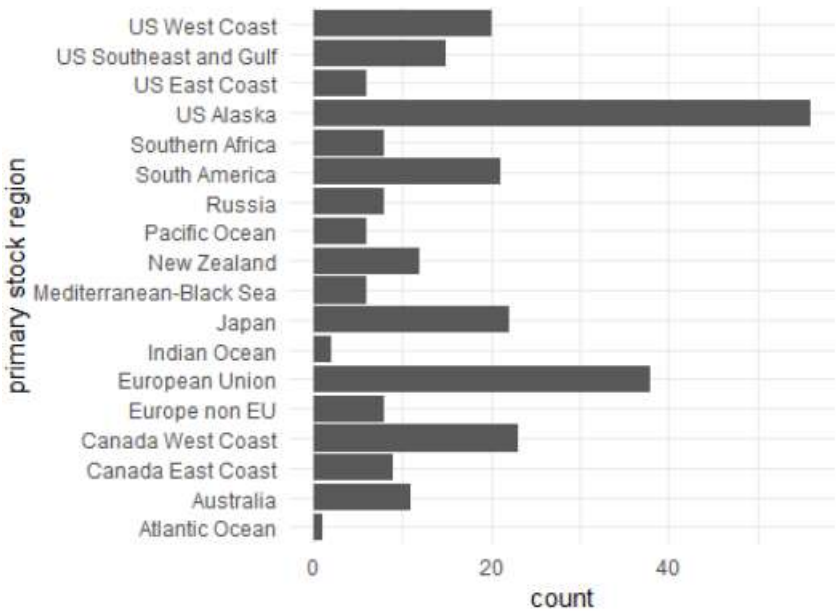


Figure S2. Stocks added to the RAM Legacy Stock Assessment database since Szuwalski et al. (2015) by primary FAO region.

Supplementary Appendix 2

Kristoufek (2013) found that DCCA coefficients can be sensitive to the window size. Window sizes of 5, 10, and 15 years were tested on the 432 stocks to determine the most appropriate for detrending the time series. Figure S.3 shows density plots of the estimated DCCA correlation coefficient for each of the three window sizes. A window size of 15 years led to the largest absolute correlation coefficient on average for spawning biomass influenced and environmentally influenced stocks (Figures S3a and S3c).

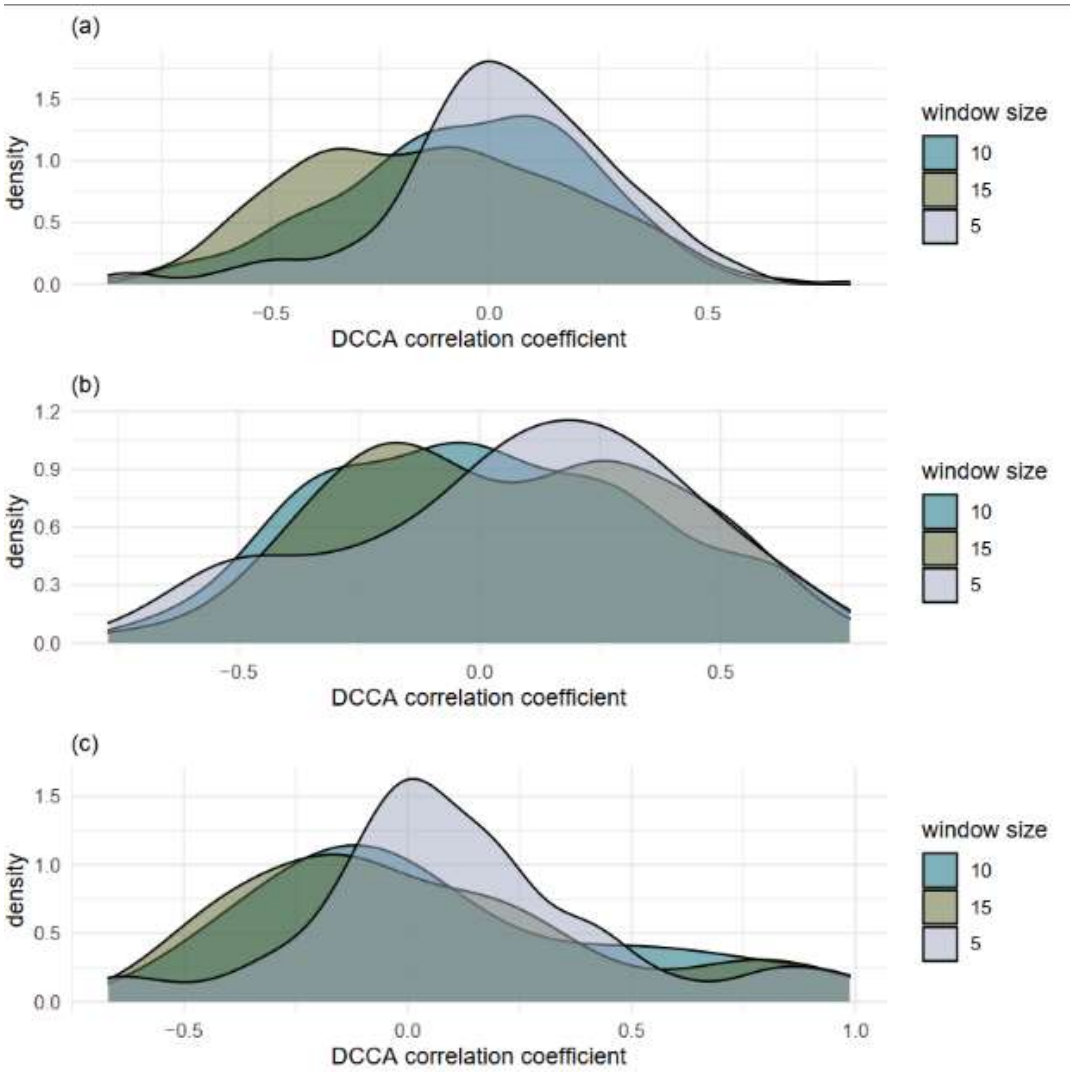
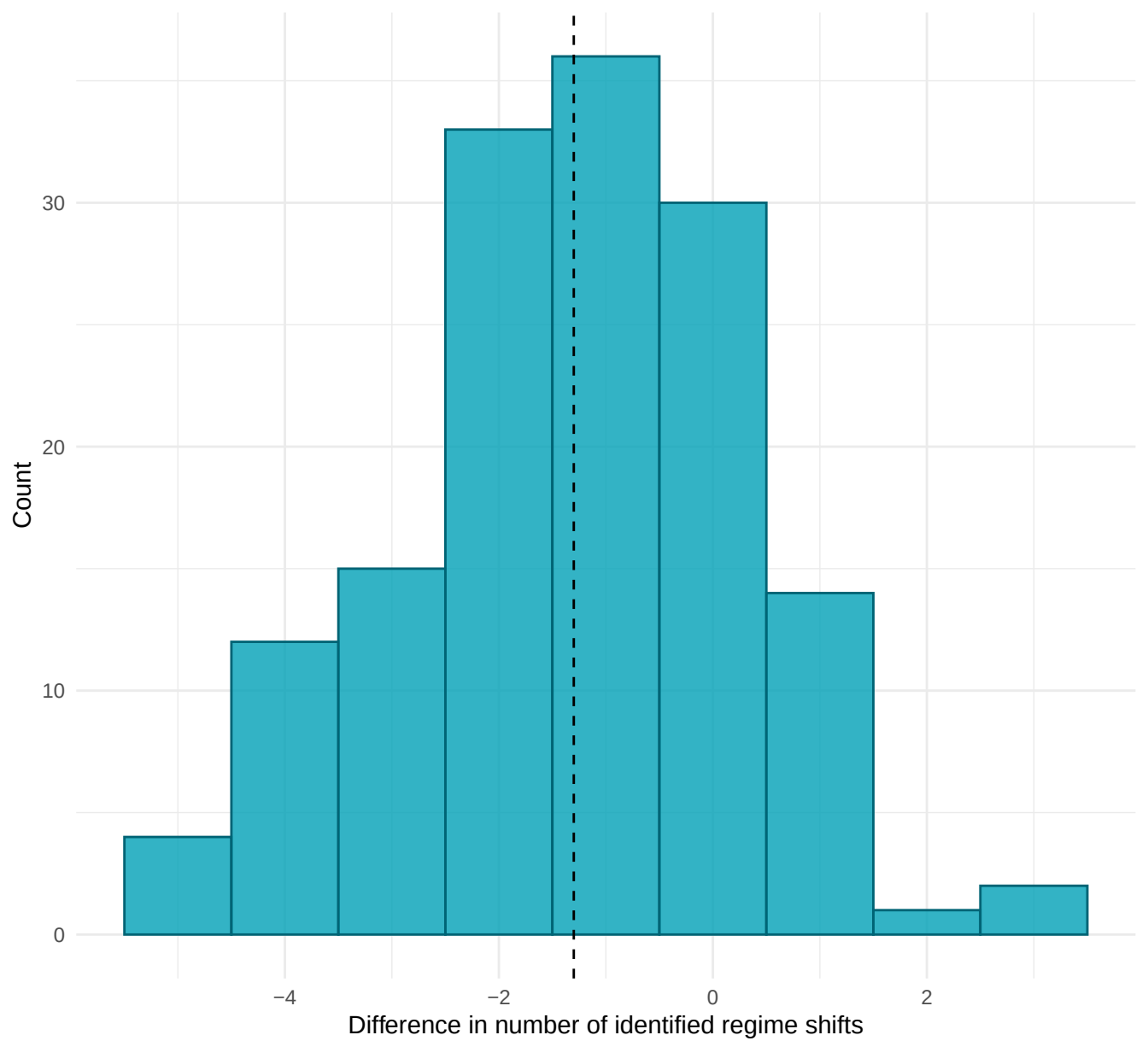


Figure S3a-c. Density plots for the DCCA correlation coefficient by window size: (a) stocks classified as primarily environmentally influenced; (b) stocks for which a primary influence on recruitment could not be determined ("edge cases"); and (c) is stocks classified as primarily spawning biomass influenced.

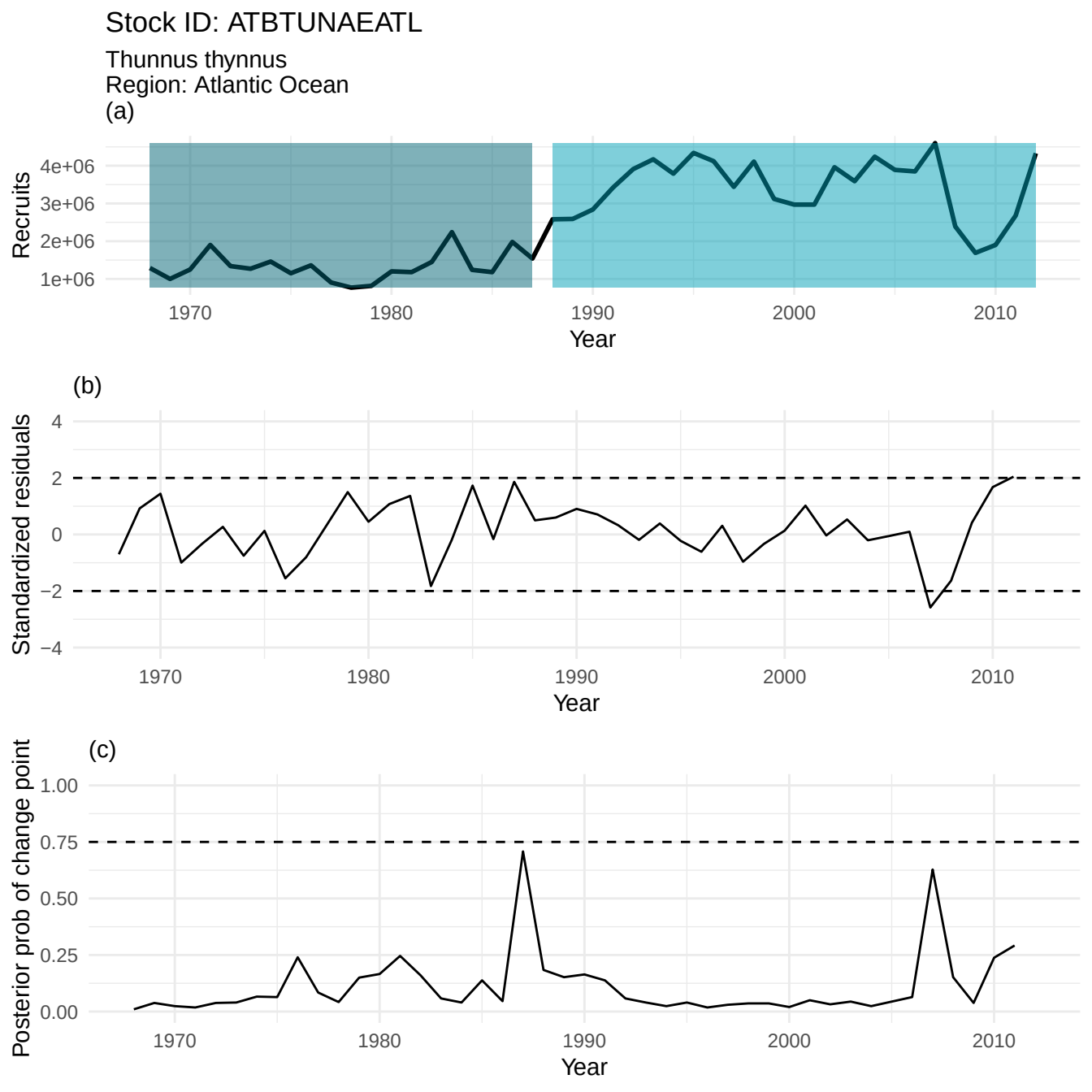
References

Kristoufek, L., 2014. Measuring correlations between non-stationary series with DCCA coefficient. Physica A: Statistical Mechanics and its Applications 402, 291–298. https://doi.org/10.1016/j.physa.2014.01.058

Supplementary Appendix 3

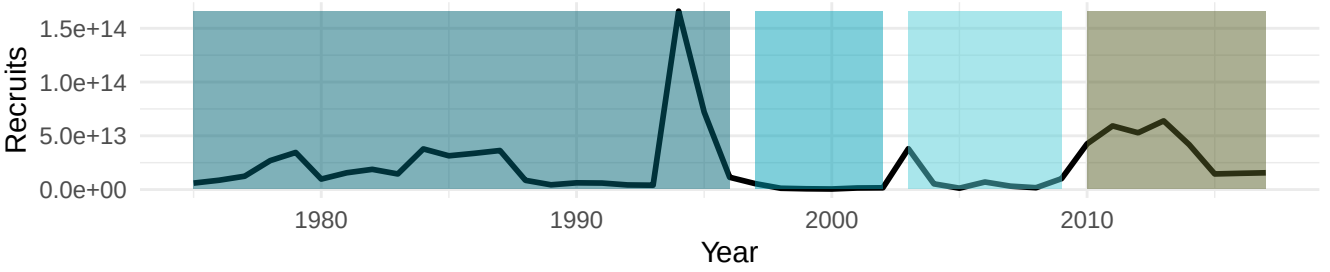


Histogram of the difference in the number of indentified regimes shifts for PELT and STARS. Recruitment regimes were identified for each of the 371 stocks with some influence of environment on recruitment. The dotted line represents the mean difference in the number of recruitment regimes. On average, PELT identified one fewer regime than STARS.

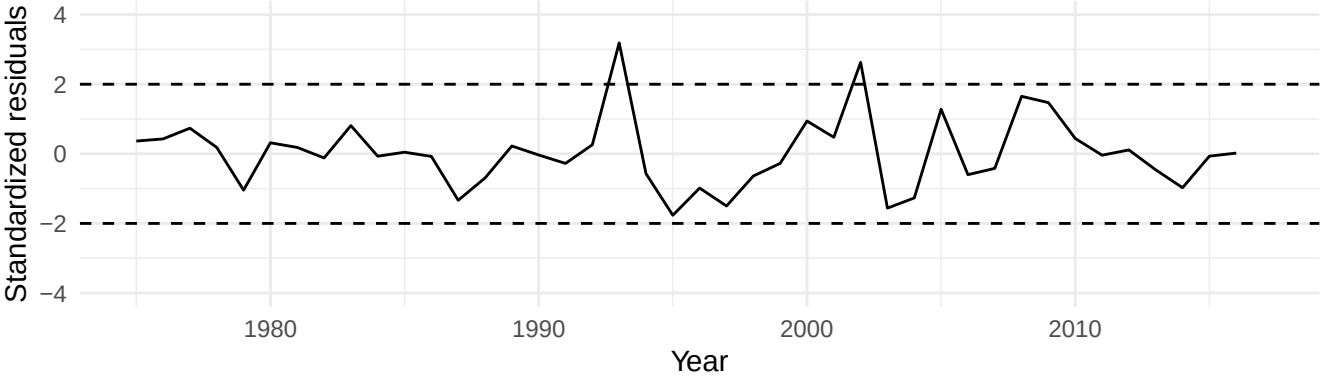

Stock ID: ATBTUNAEATL
Thunnus thynnus
Region: Atlantic Ocean
(a)
Recruits
4e+06
3e+06
2e+06
1e+06
1970
1980
1990
2000
2010
Year
(b)
Standardized residuals
4
2
0
−2
−4
1970
1980
1990
2000
2010
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1970
1980
1990
2000
2010
Year

Stock ID: BGRDRNSWWA

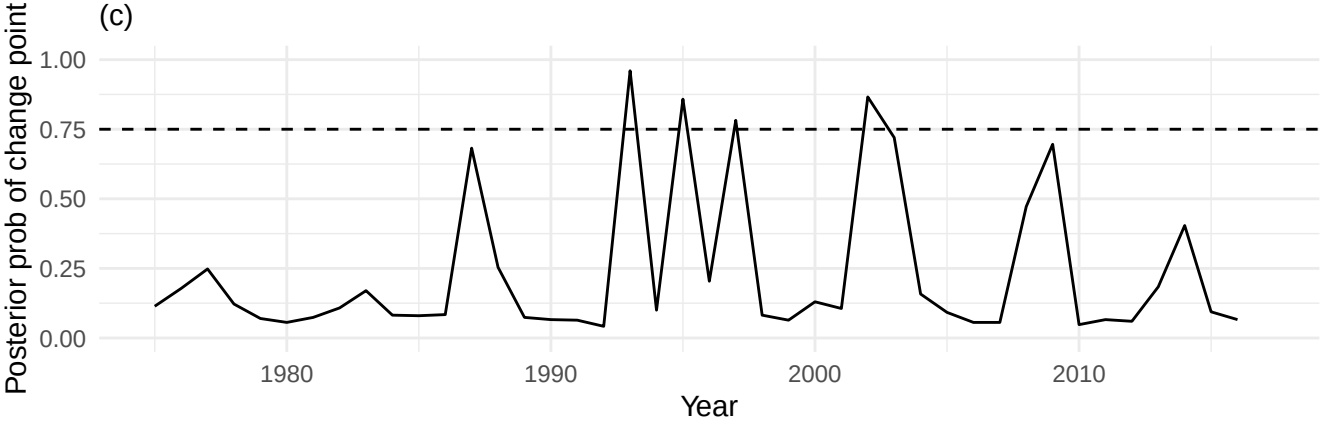
Macruronus novaezelandiae
Region: Australia
(a)

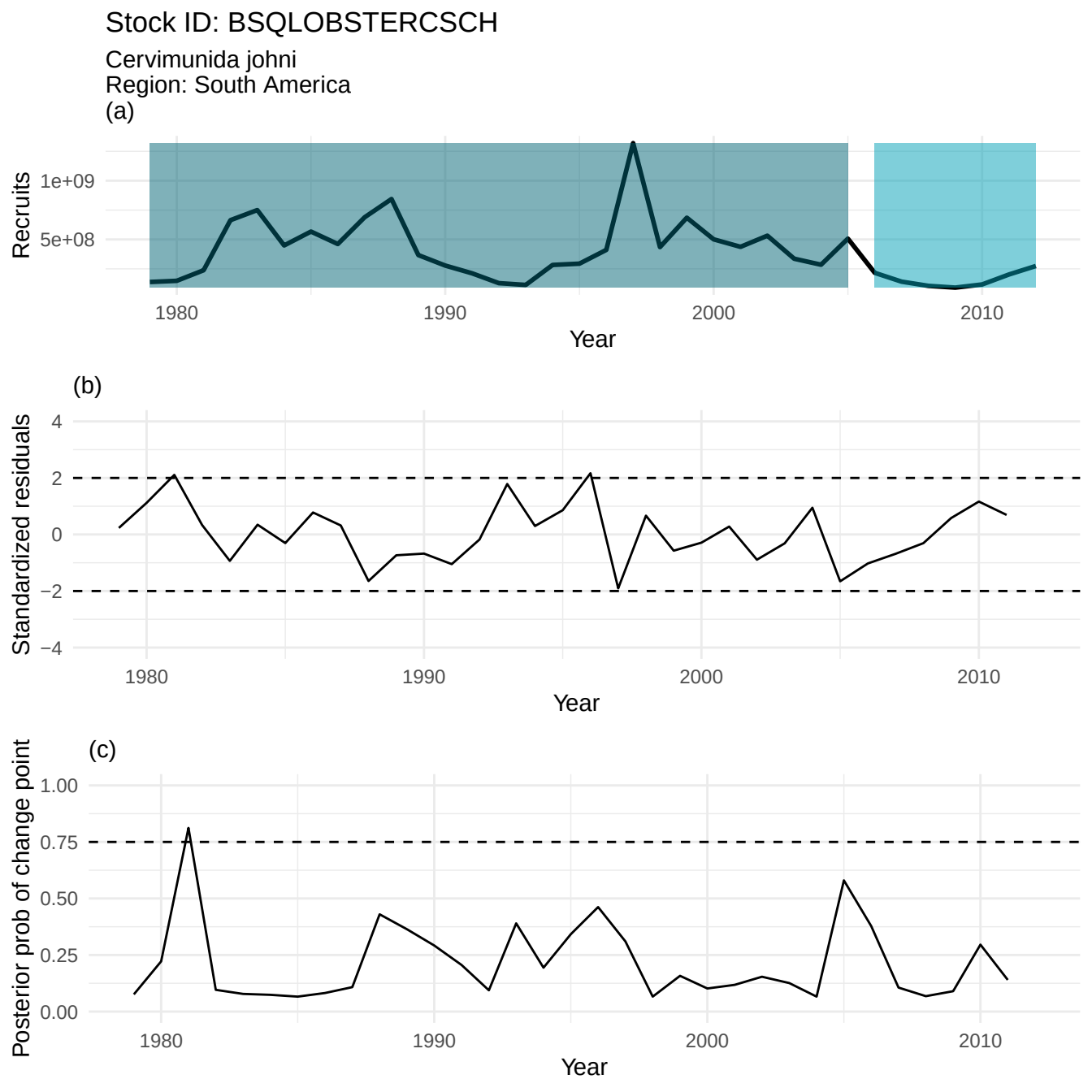


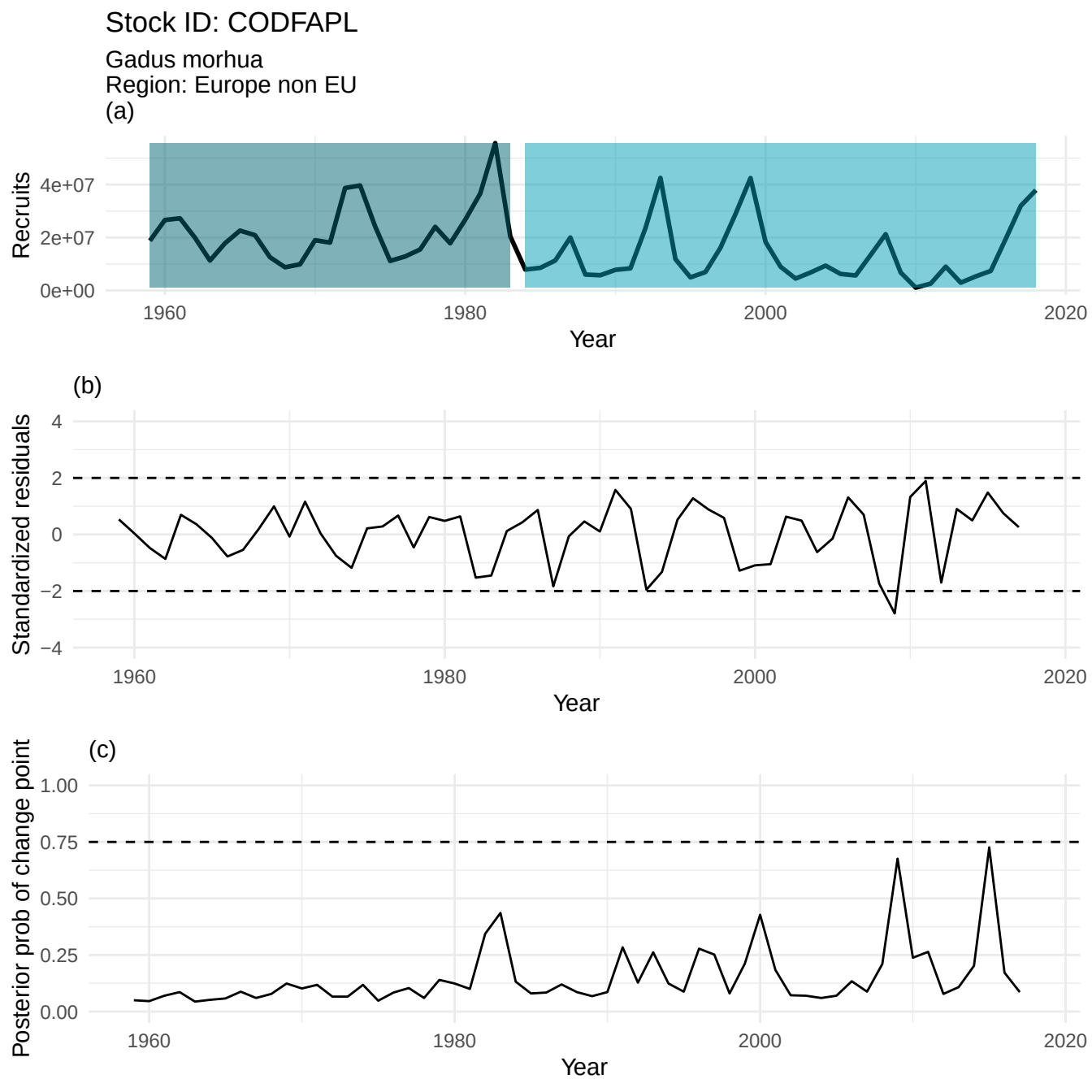
(b)



(c)

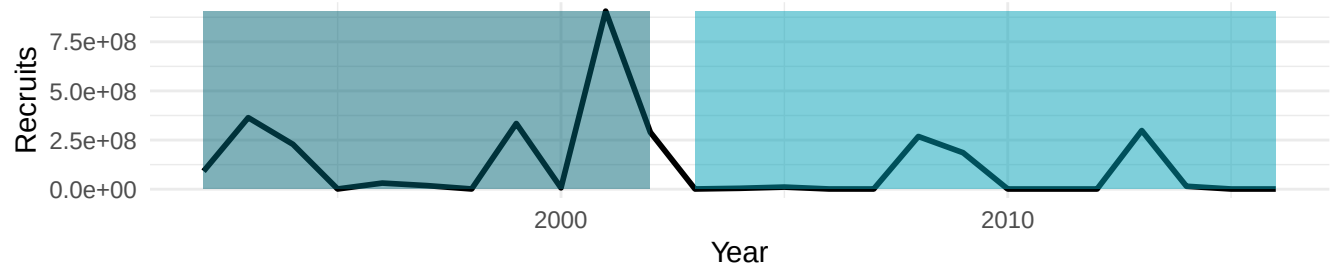



Stock ID: BSQLOBSTERCSCH
Cervimunida johni
Region: South America
(a)
Recruits
1e+09
5e+08
1980
1990
2000
2010
Year
(b)
Standardized residuals
4
2
0
−2
−4
1980
1990
2000
2010
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1980
1990
2000
2010
Year

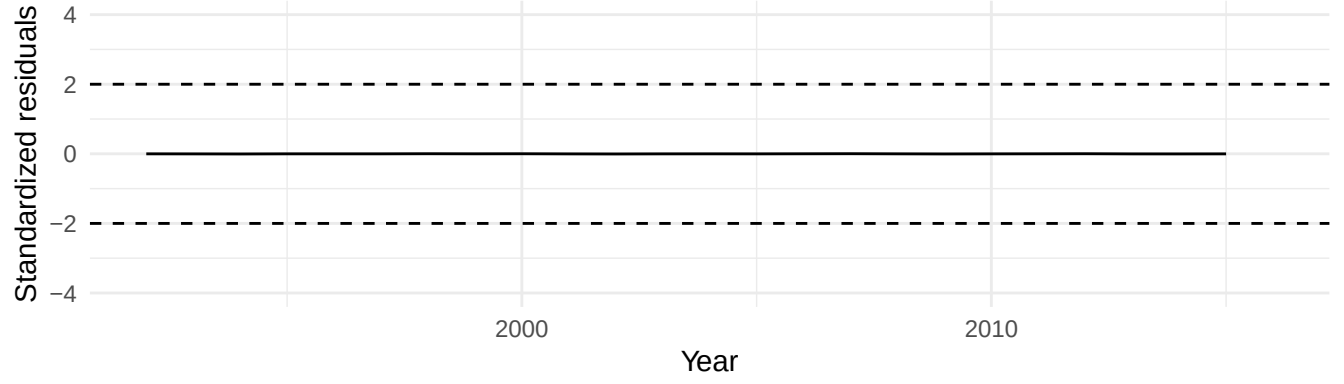

Stock ID: CODFAPL
Gadus morhua
Region: Europe non EU
(a)
Recruits
4e+07
2e+07
0e+00
1960
1980
2000
2020
Year
(b)
Standardized residuals
4
2
0
−2
−4
1960
1980
2000
2020
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1960
1980
2000
2020
Year

Stock ID: GHALNEAR

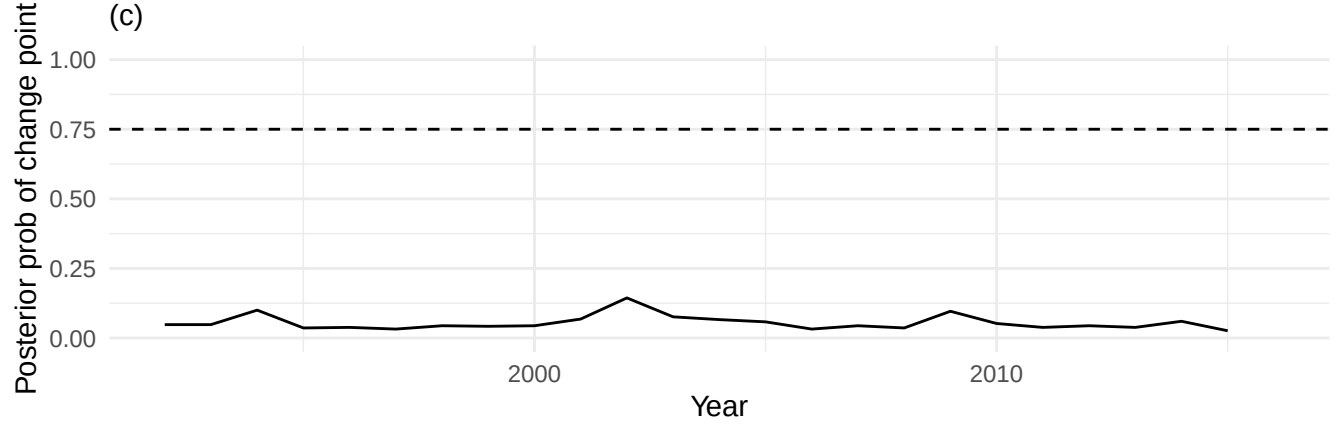
Reinhardtius hippoglossoides
Region: Europe non EU
(a)

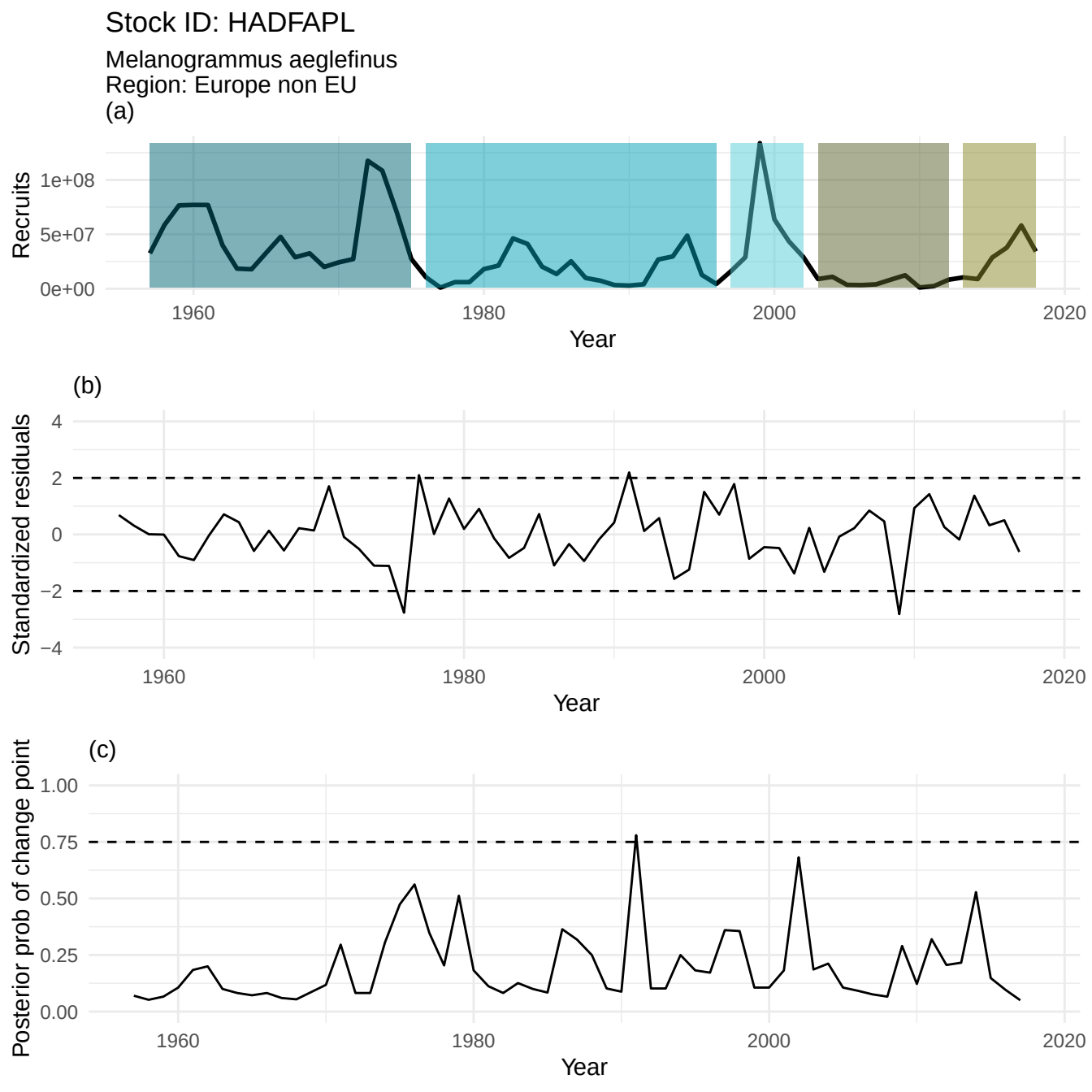


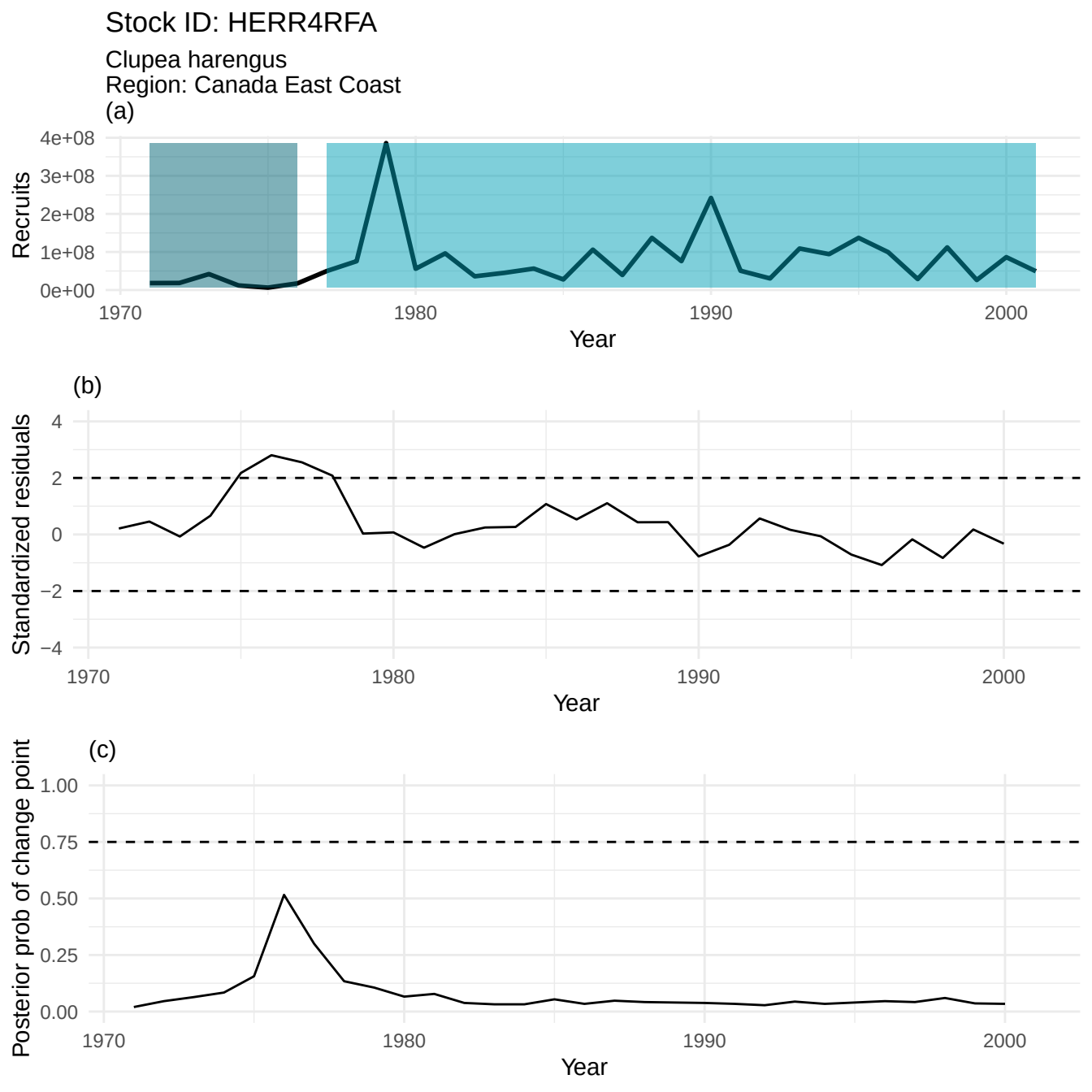
(b)

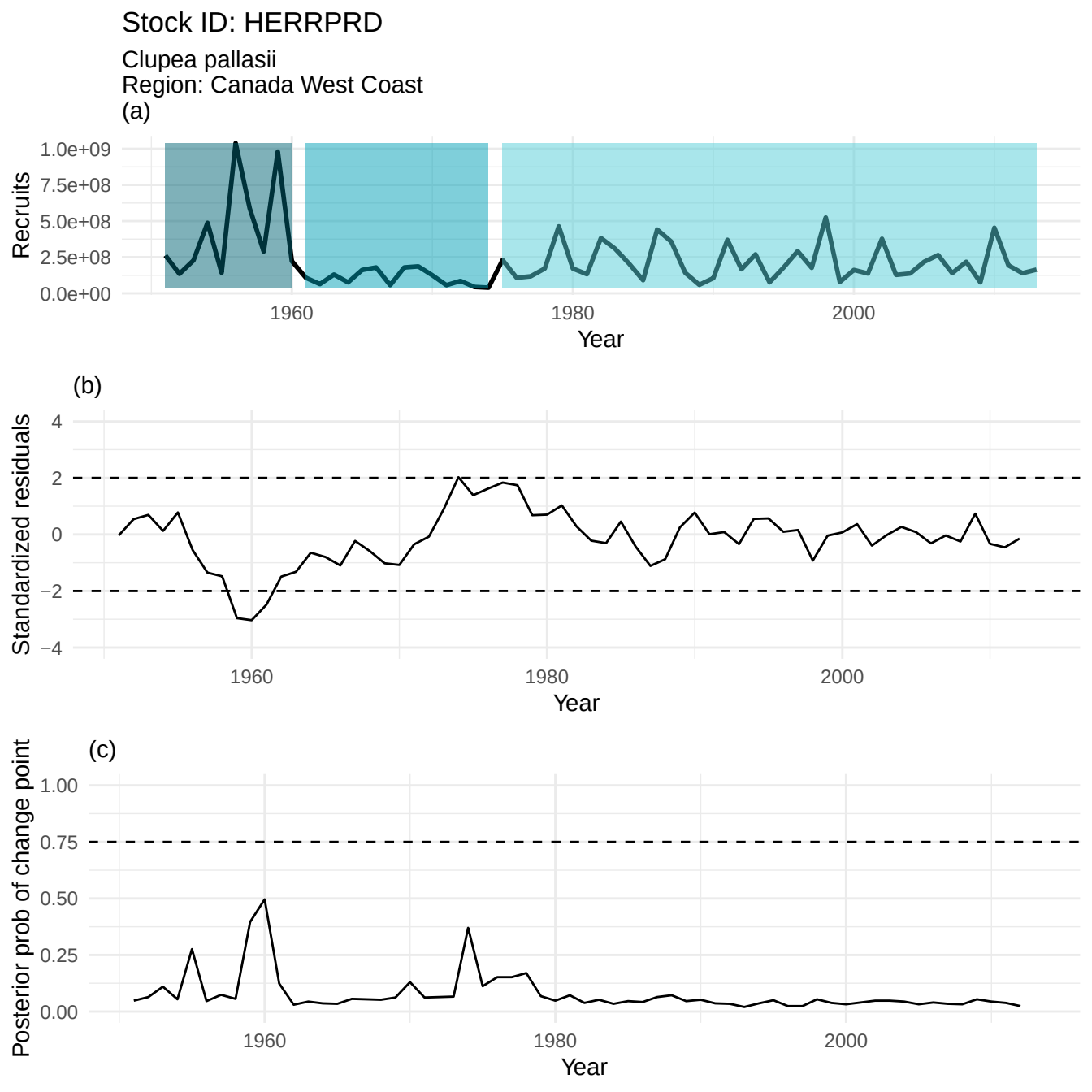


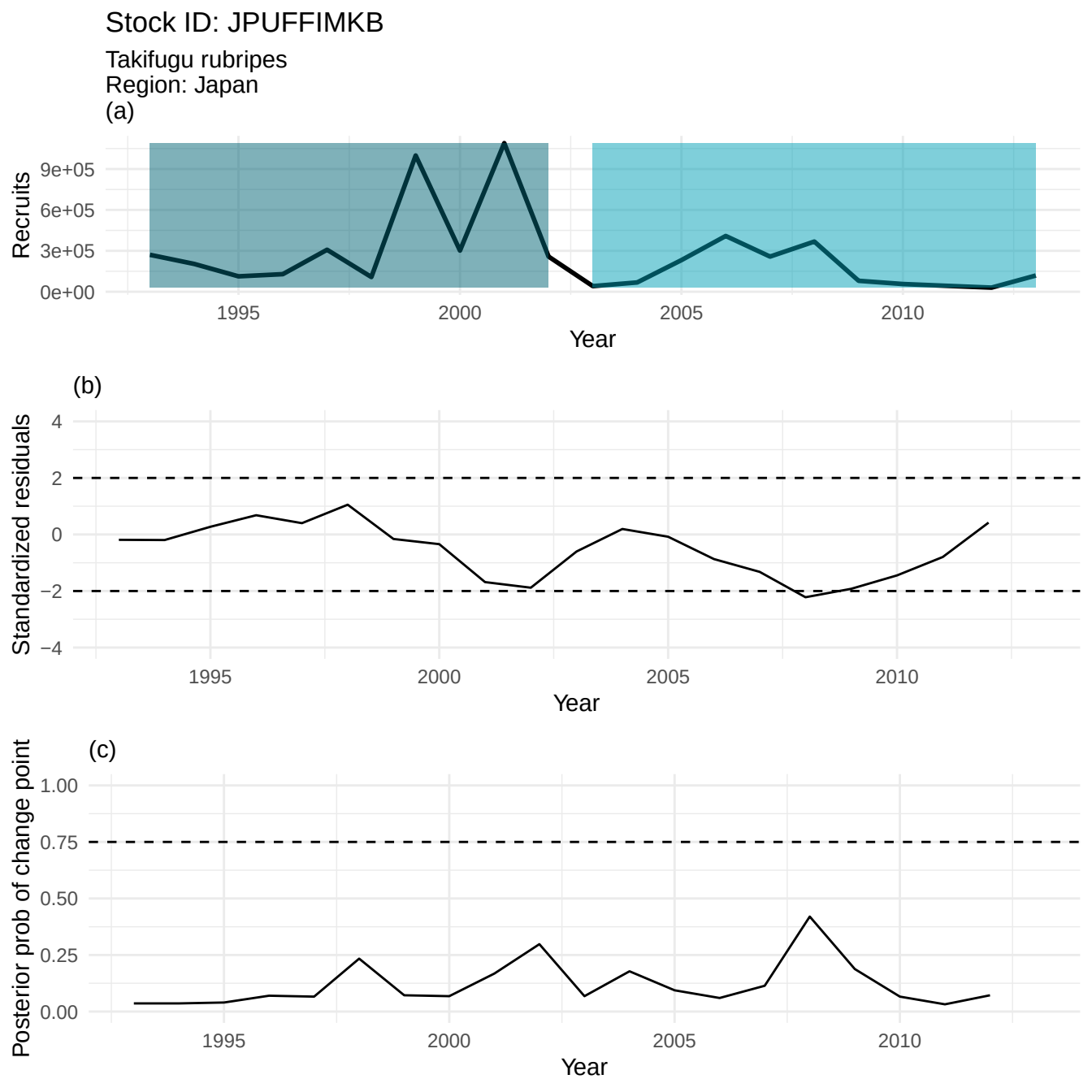
(c)

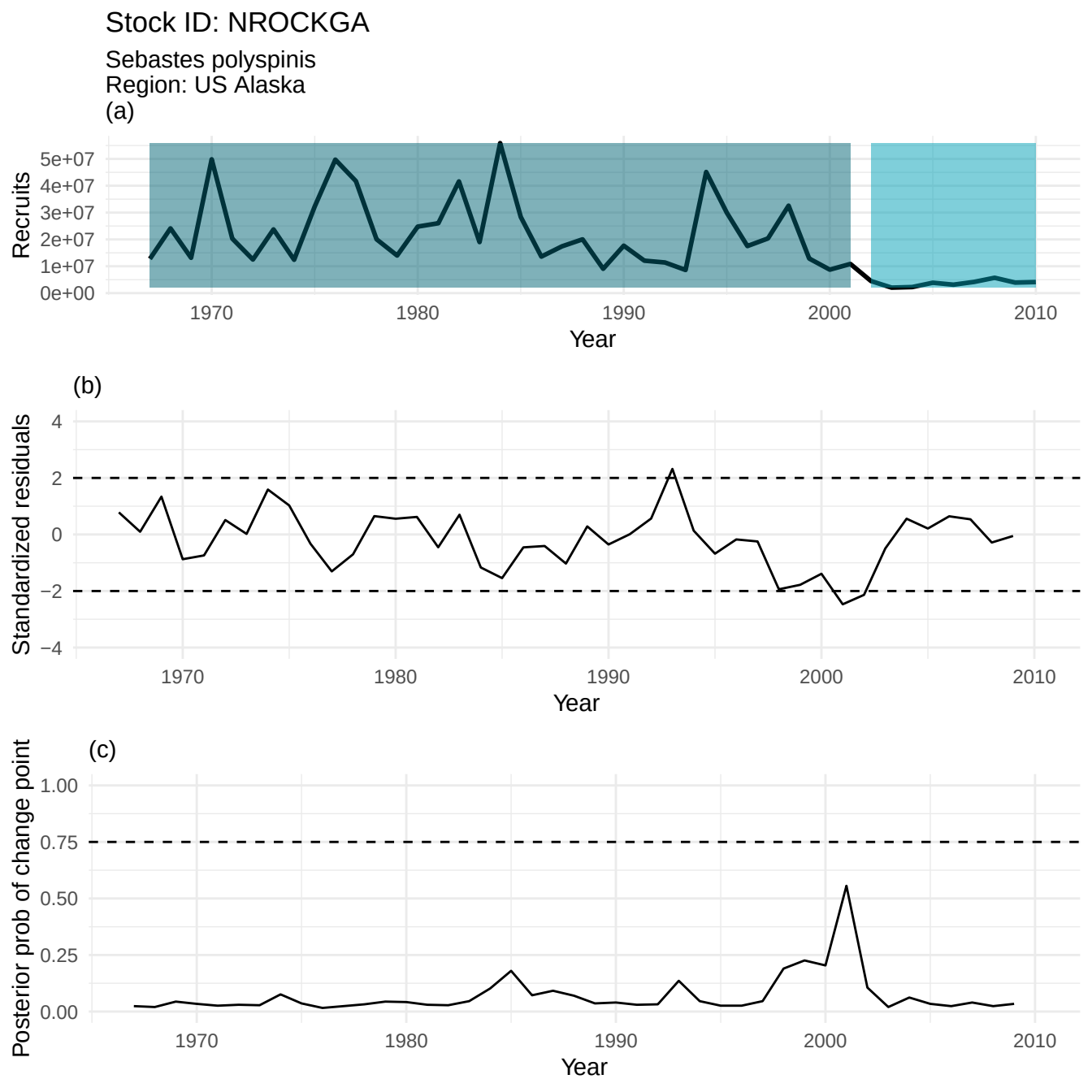


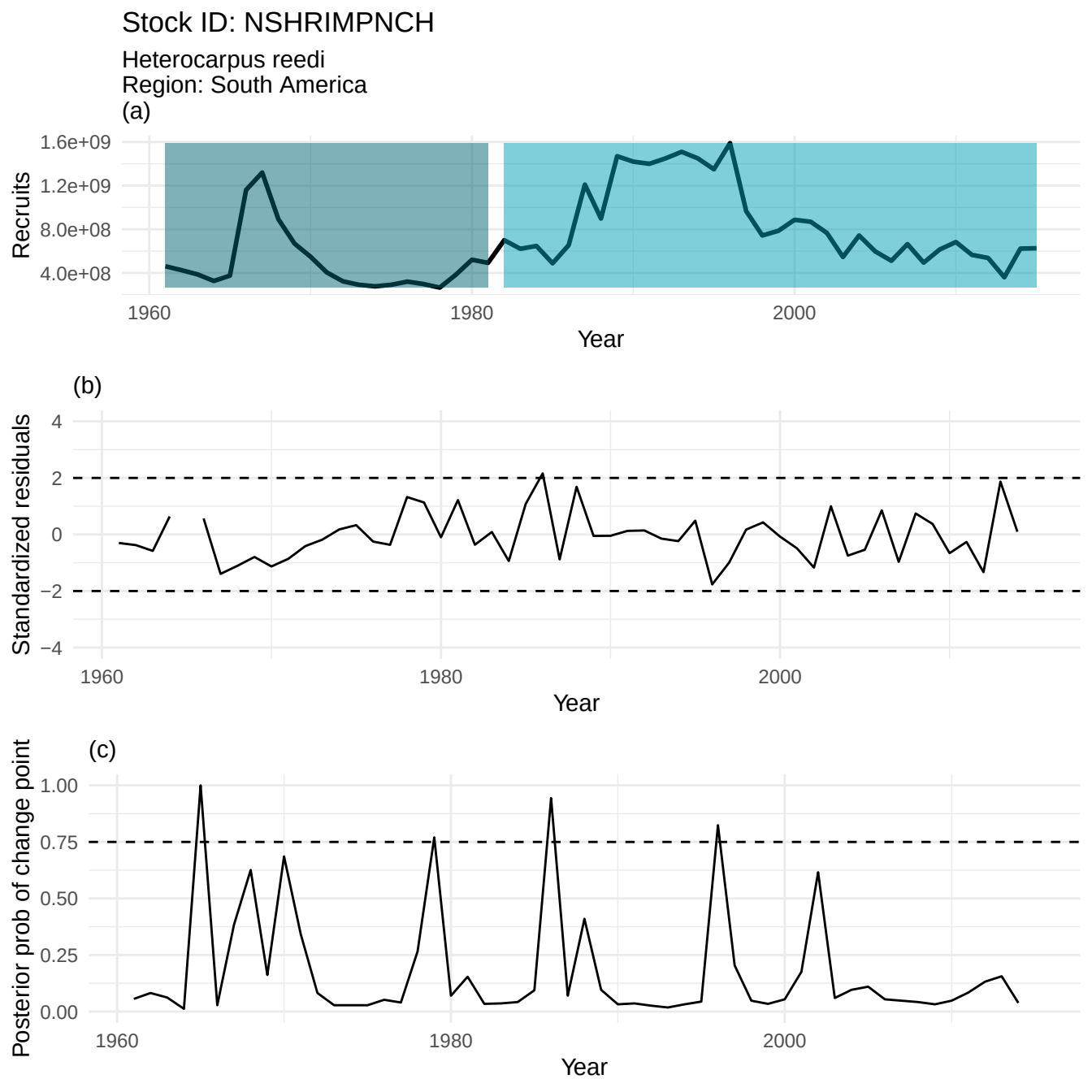

Stock ID: HADFAPL
Melanogrammus aeglefinus
Region: Europe non EU
(a)
Recruits
1e+08
5e+07
0e+00
1960
1980
2000
2020
Year
(b)
Standardized residuals
4
2
0
−2
−4
1960
1980
2000
2020
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1960
1980
2000
2020
Year

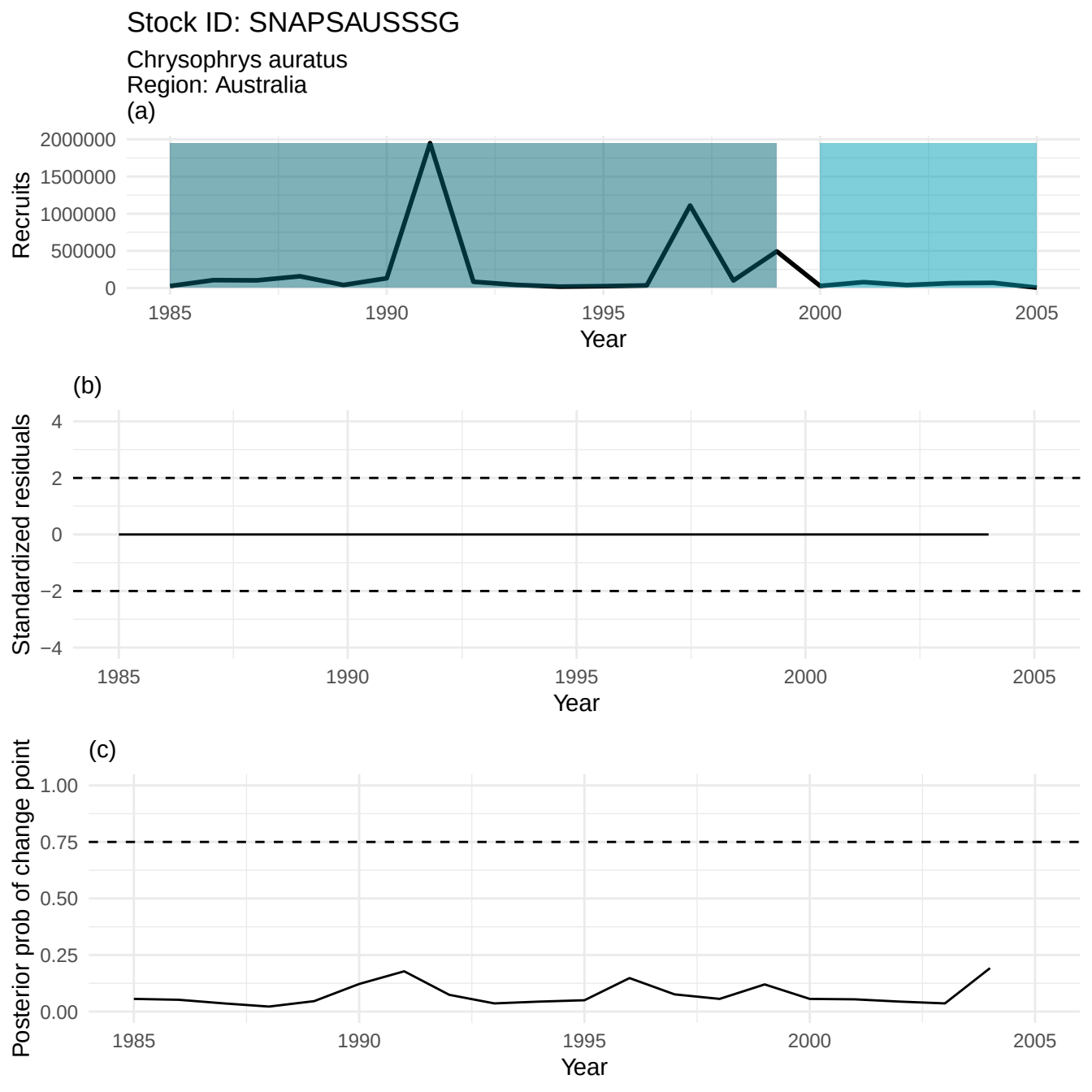

Stock ID: HERR4RFA
Clupea harengus
Region: Canada East Coast
(a)
Recruits
4e+08
3e+08
2e+08
1e+08
0e+00
1970
1980
1990
2000
Year
(b)
Standardized residuals
4
2
0
−2
−4
1970
1980
1990
2000
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1970
1980
1990
2000
Year

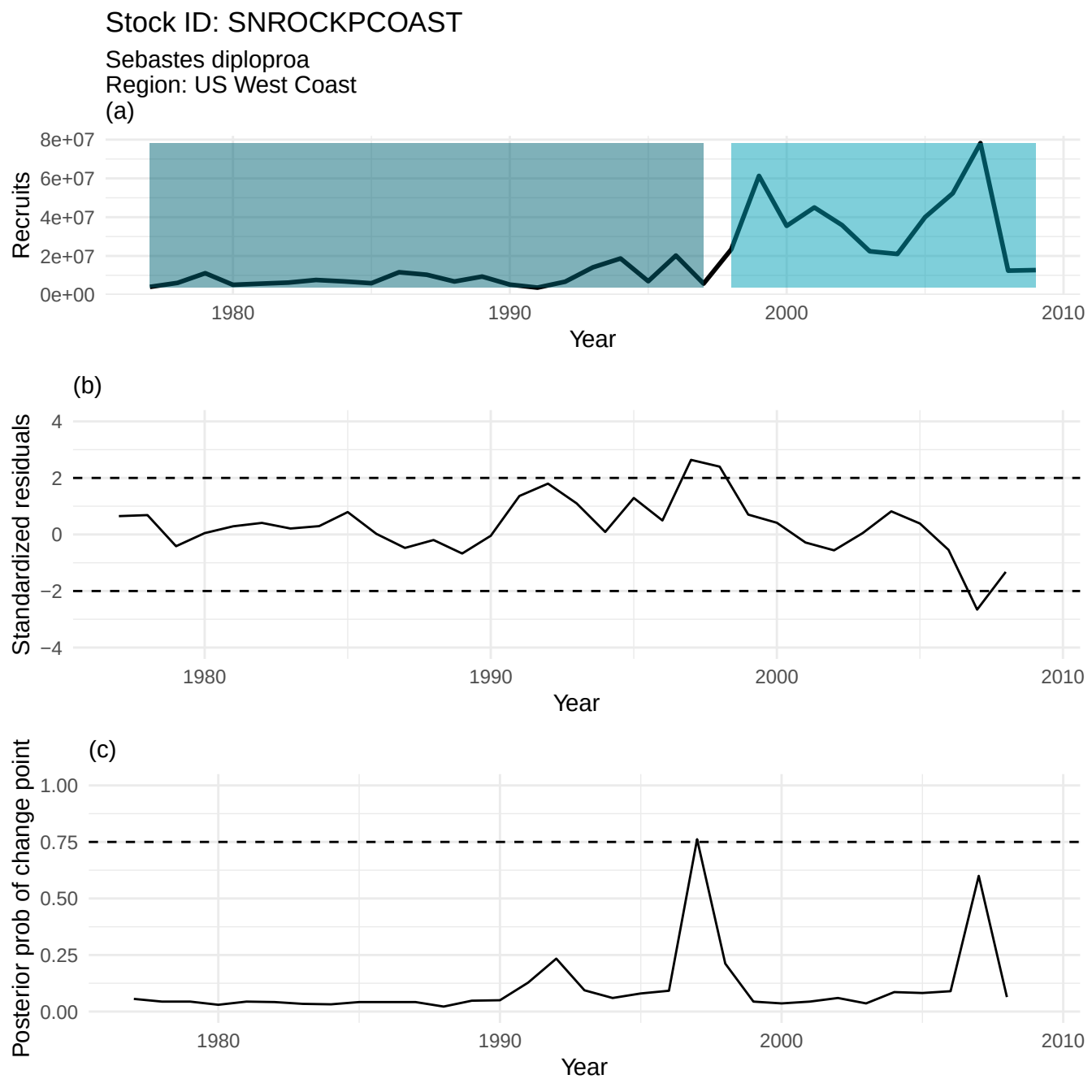

Stock ID: HERRPRD
Clupea pallasii
Region: Canada West Coast
(a)
Recruits
1.0e+09
7.5e+08
5.0e+08
2.5e+08
0.0e+00
1960
1980
2000
Year
(b)
Standardized residuals
4
2
0
−2
−4
1960
1980
2000
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1960
1980
2000
Year

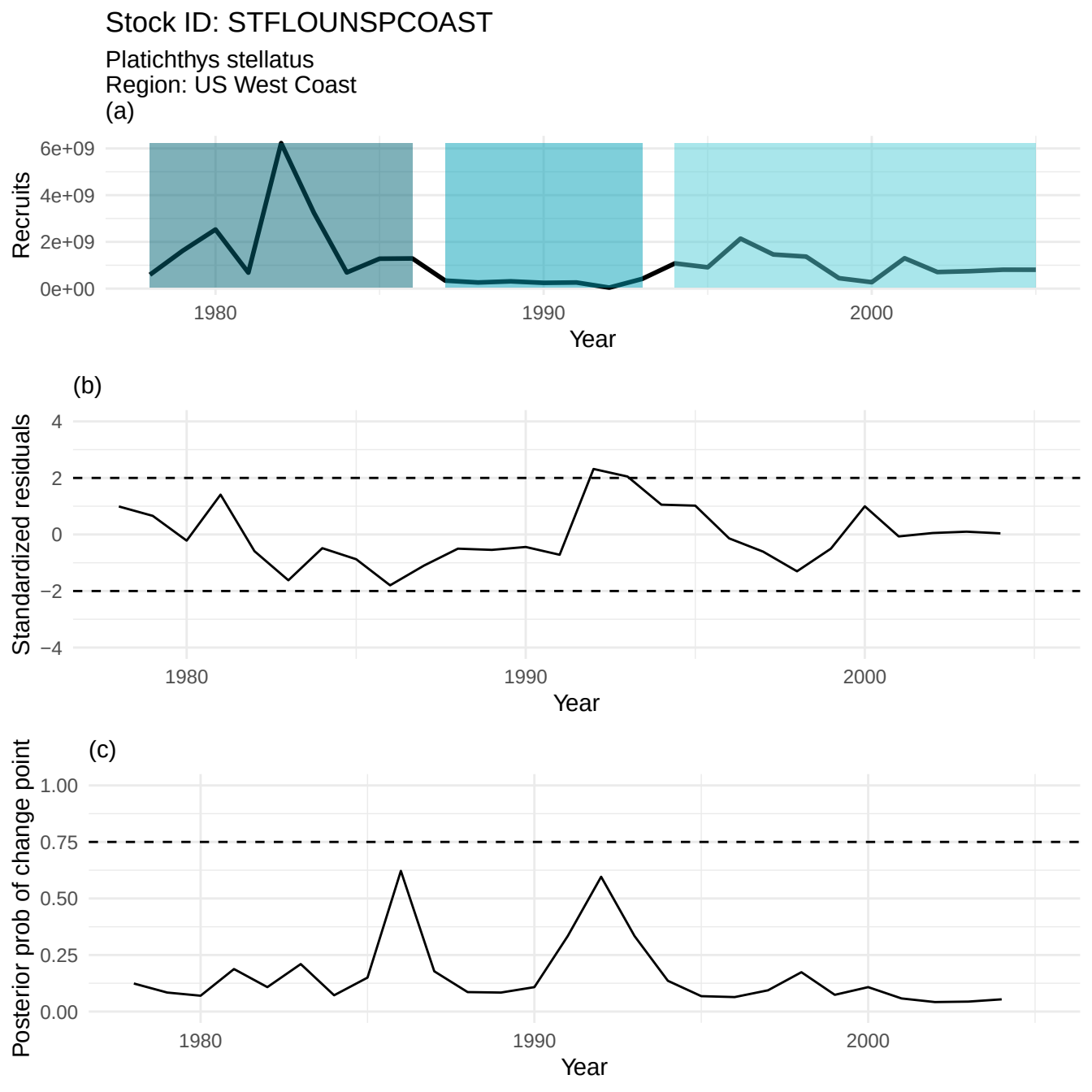

Stock ID: JPUFFIMKB
Takifugu rubripes
Region: Japan
(a)
Recruits
9e+05
6e+05
3e+05
0e+00
1995
2000
2005
2010
Year
(b)
Standardized residuals
4
2
0
−2
−4
1995
2000
2005
2010
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1995
2000
2005
2010
Year

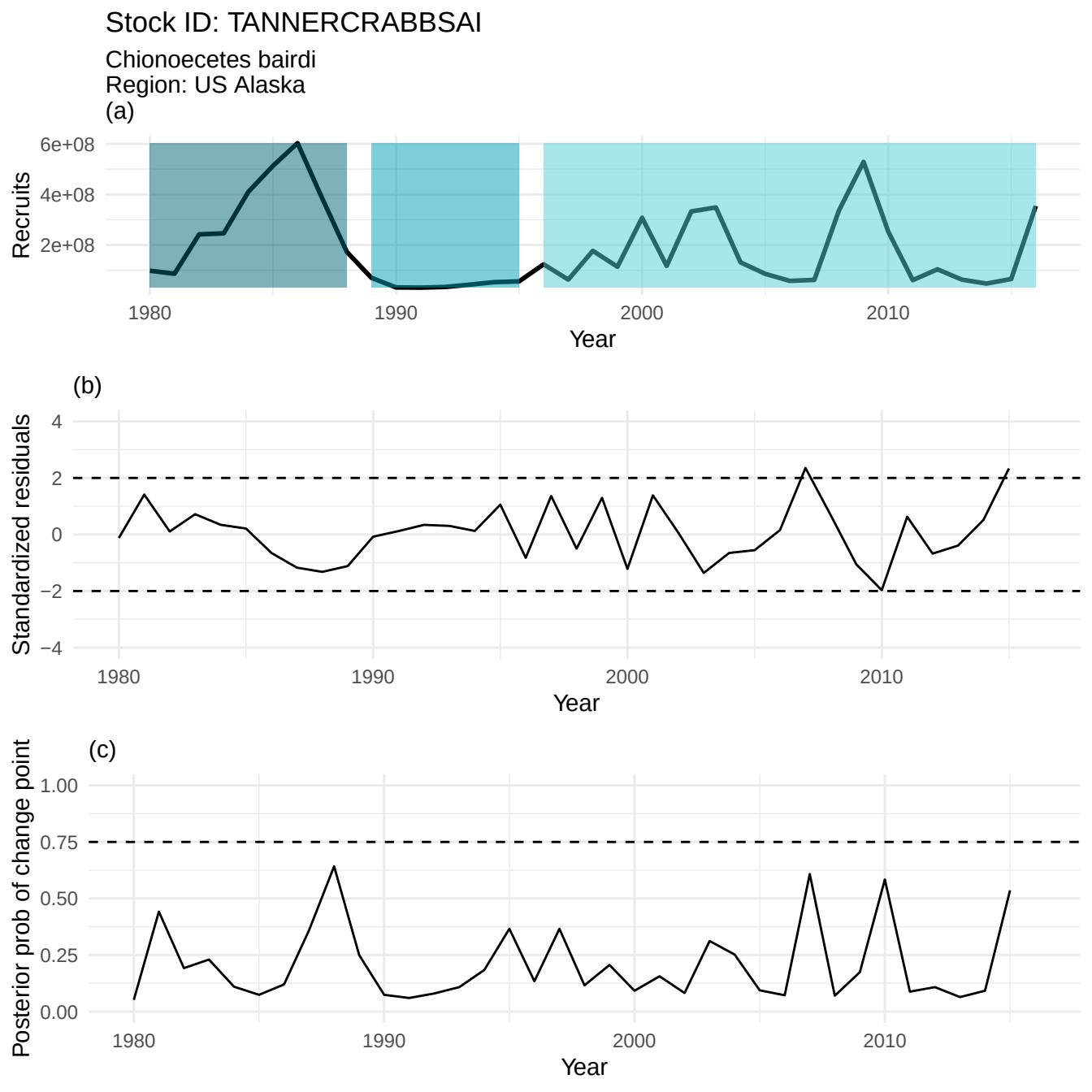

Stock ID: NROCKGA
Sebastes polyspinis
Region: US Alaska
(a)
Recruits
5e+07
4e+07
3e+07
2e+07
1e+07
0e+00
1970
1980
1990
2000
2010
Year
(b)
Standardized residuals
4
2
0
−2
−4
1970
1980
1990
2000
2010
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1970
1980
1990
2000
2010
Year

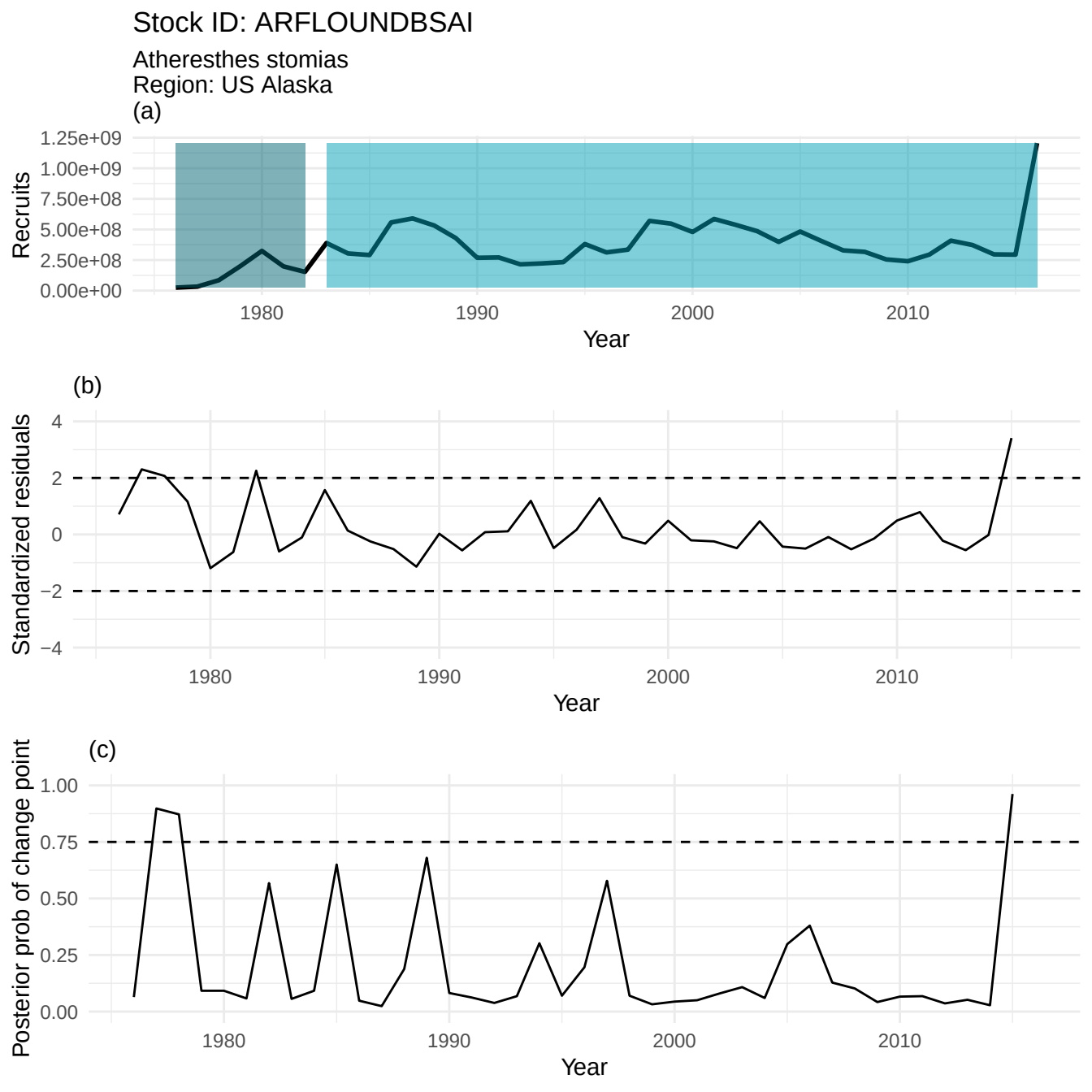

Stock ID: NSHRIMPNCH
Heterocarpus reedi
Region: South America
(a)
Recruits
1.6e+09
1.2e+09
8.0e+08
4.0e+08
1960
1980
2000
Year
(b)
Standardized residuals
4
2
0
−2
−4
1960
1980
2000
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1960
1980
2000
Year

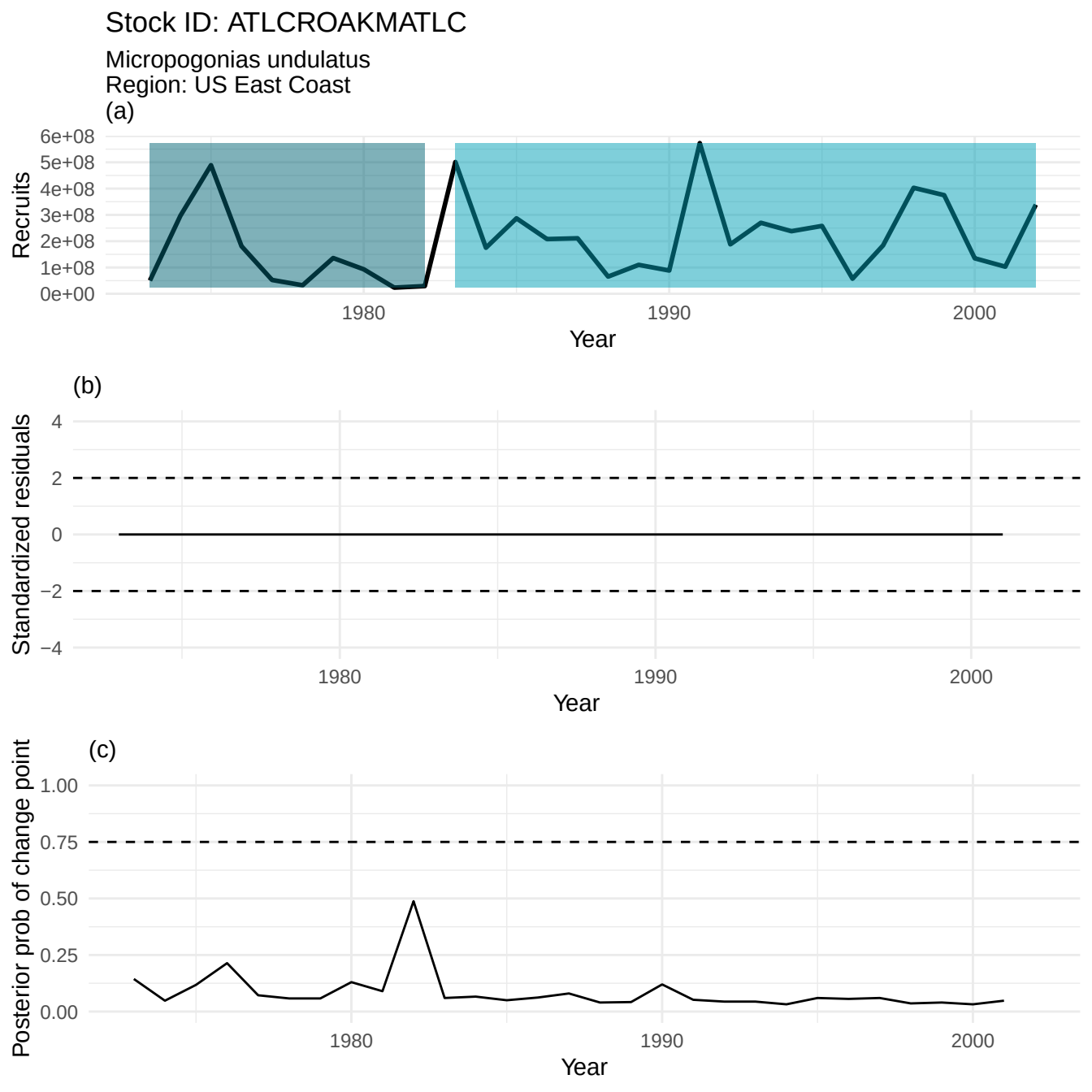

Stock ID: SNAPSAUSSSG
Chrysophrys auratus
Region: Australia
(a)
Recruits
2000000
1500000
1000000
500000
0
1985
1990
1995
2000
2005
Year
(b)
Standardized residuals
4
2
0
−2
−4
1985
1990
1995
2000
2005
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1985
1990
1995
2000
2005
Year

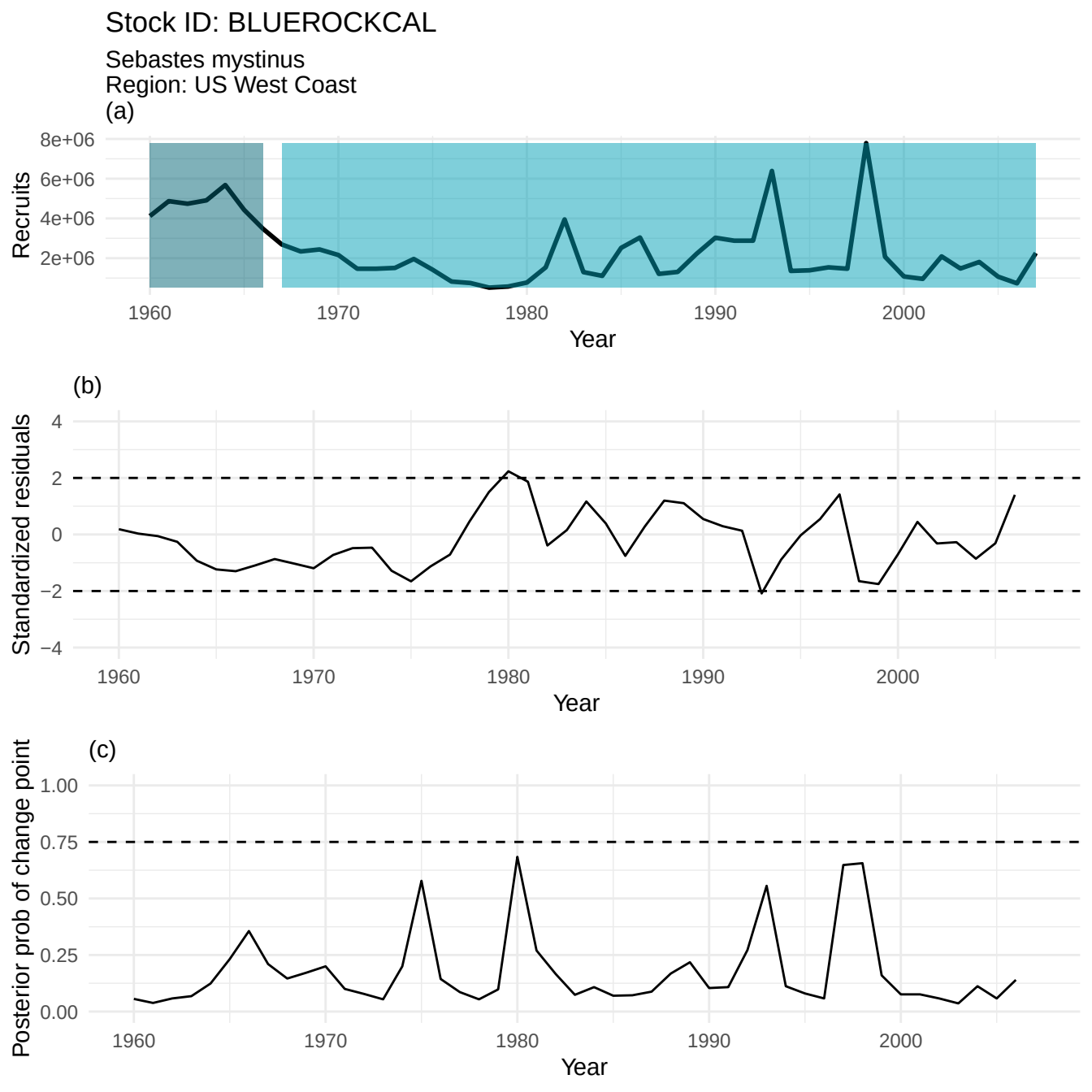

Stock ID: SNROCKPCOAST
Sebastes diploproa
Region: US West Coast
(a)
Recruits
8e+07
6e+07
4e+07
2e+07
0e+00
1980
1990
2000
2010
Year
(b)
Standardized residuals
4
2
0
−2
−4
1980
1990
2000
2010
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1980
1990
2000
2010
Year

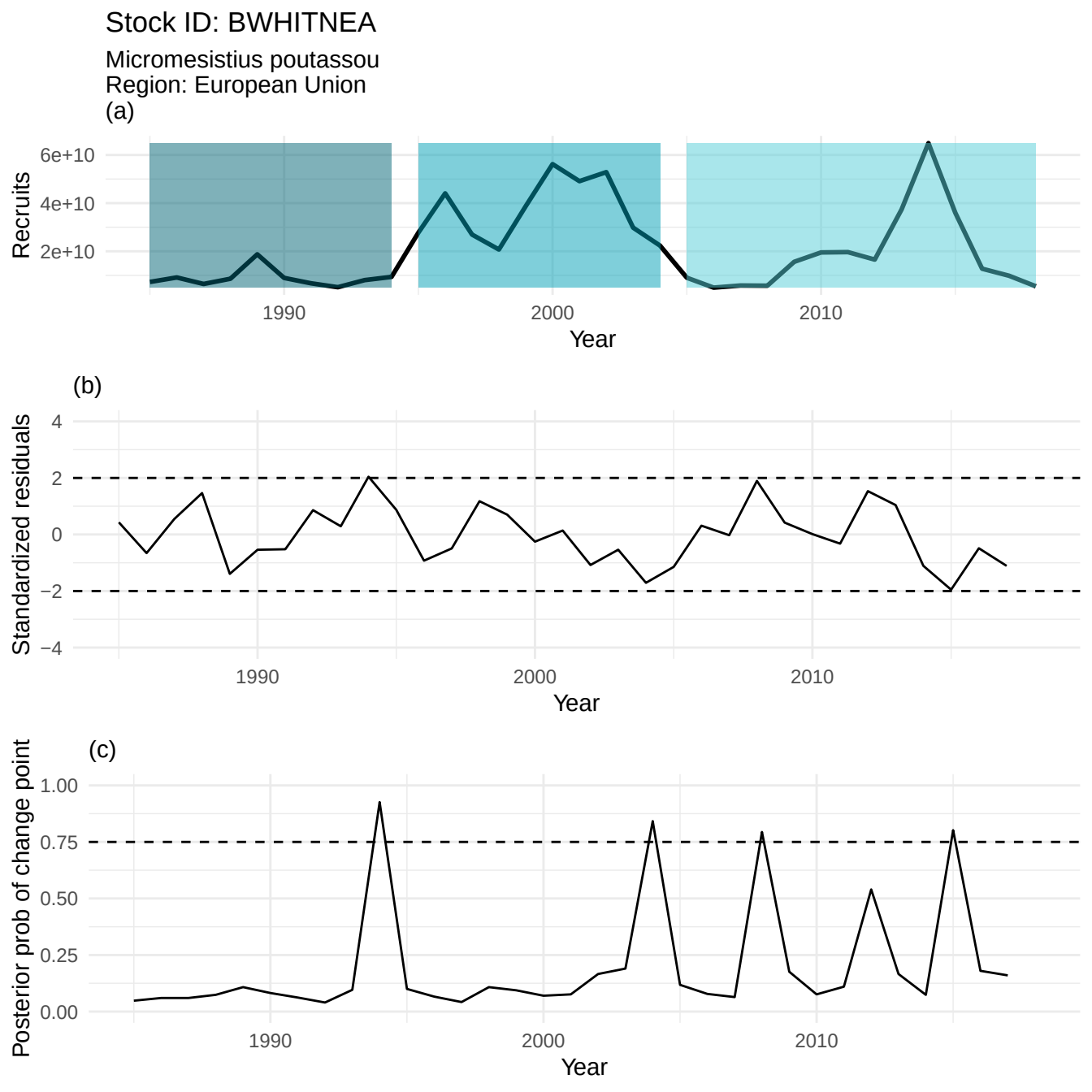

Stock ID: STFLOUNSPCOAST
Platichthys stellatus
Region: US West Coast
(a)
Recruits
6e+09
4e+09
2e+09
0e+00
1980
1990
2000
Year
(b)
Standardized residuals
4
2
0
−2
−4
1980
1990
2000
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1980
1990
2000
Year

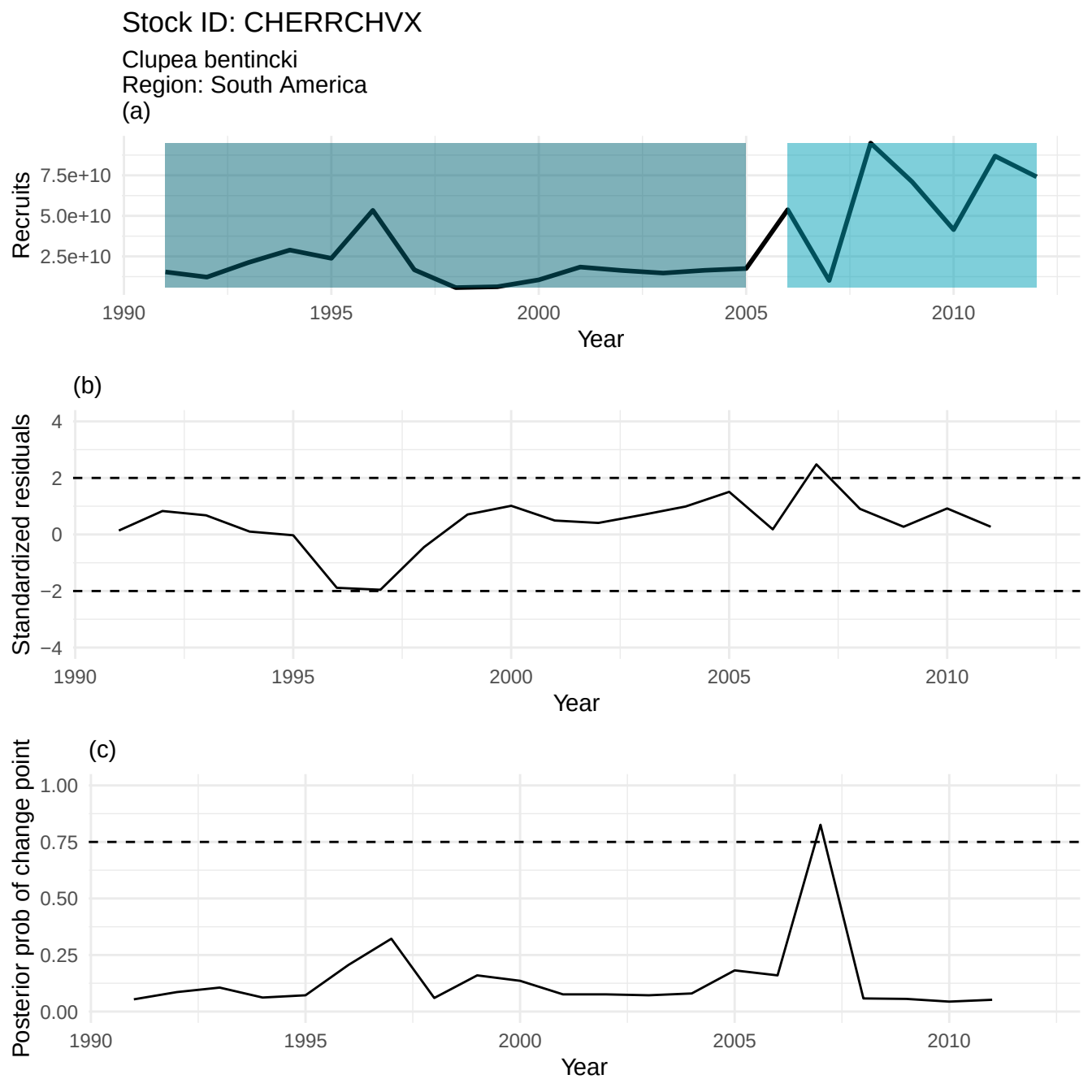

Stock ID: TANNERCRABBSAI
Chionoecetes bairdi
Region: US Alaska
(a)
Recruits
6e+08
4e+08
2e+08
1980
1990
2000
2010
Year
(b)
Standardized residuals
4
2
0
−2
−4
1980
1990
2000
2010
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1980
1990
2000
2010
Year

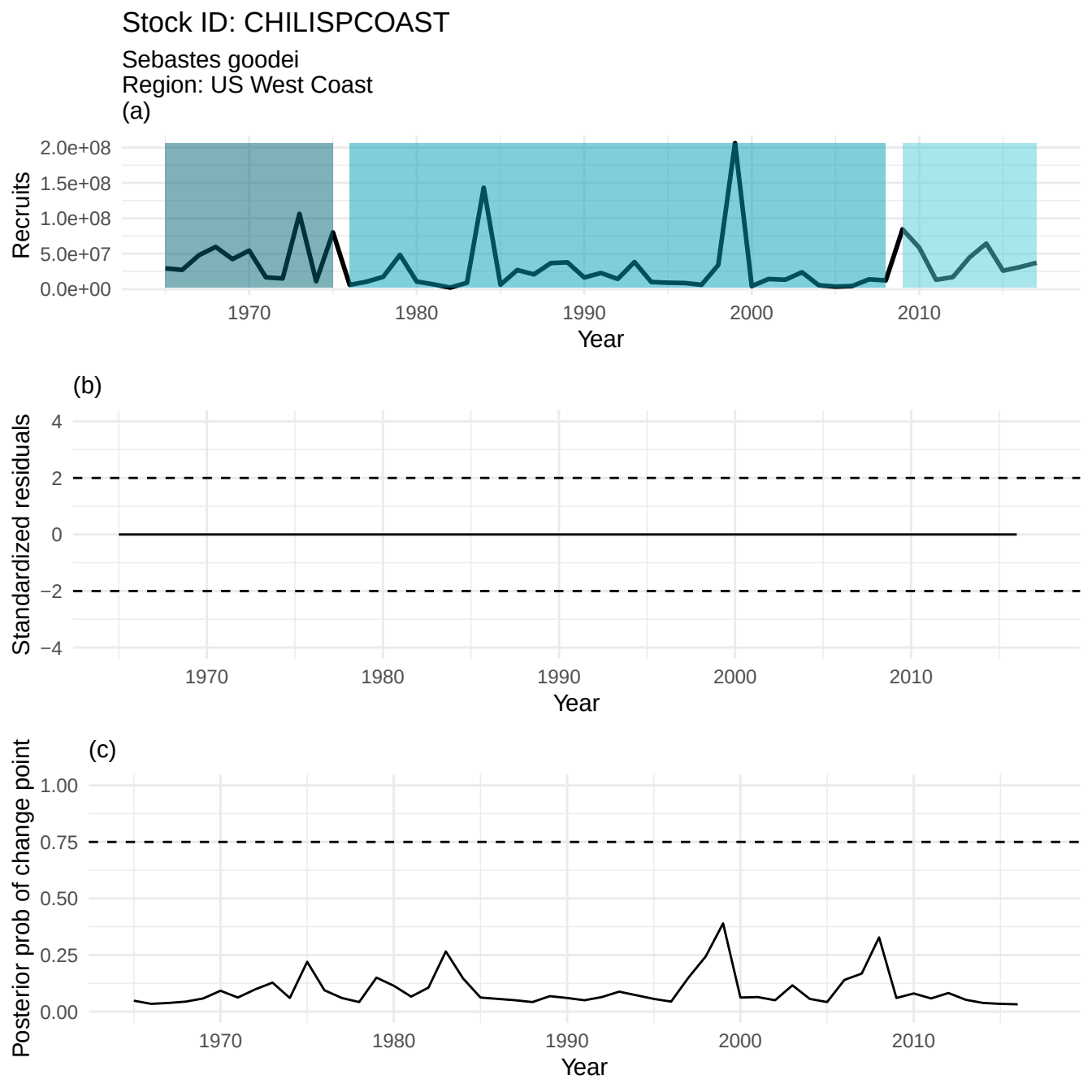

Stock ID: ARFLOUNDBSAI
Atheresthes stomias
Region: US Alaska
(a)
Recruits
1.25e+09
1.00e+09
7.50e+08
5.00e+08
2.50e+08
0.00e+00
1980
1990
2000
2010
Year
(b)
Standardized residuals
4
2
0
−2
−4
1980
1990
2000
2010
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1980
1990
2000
2010
Year

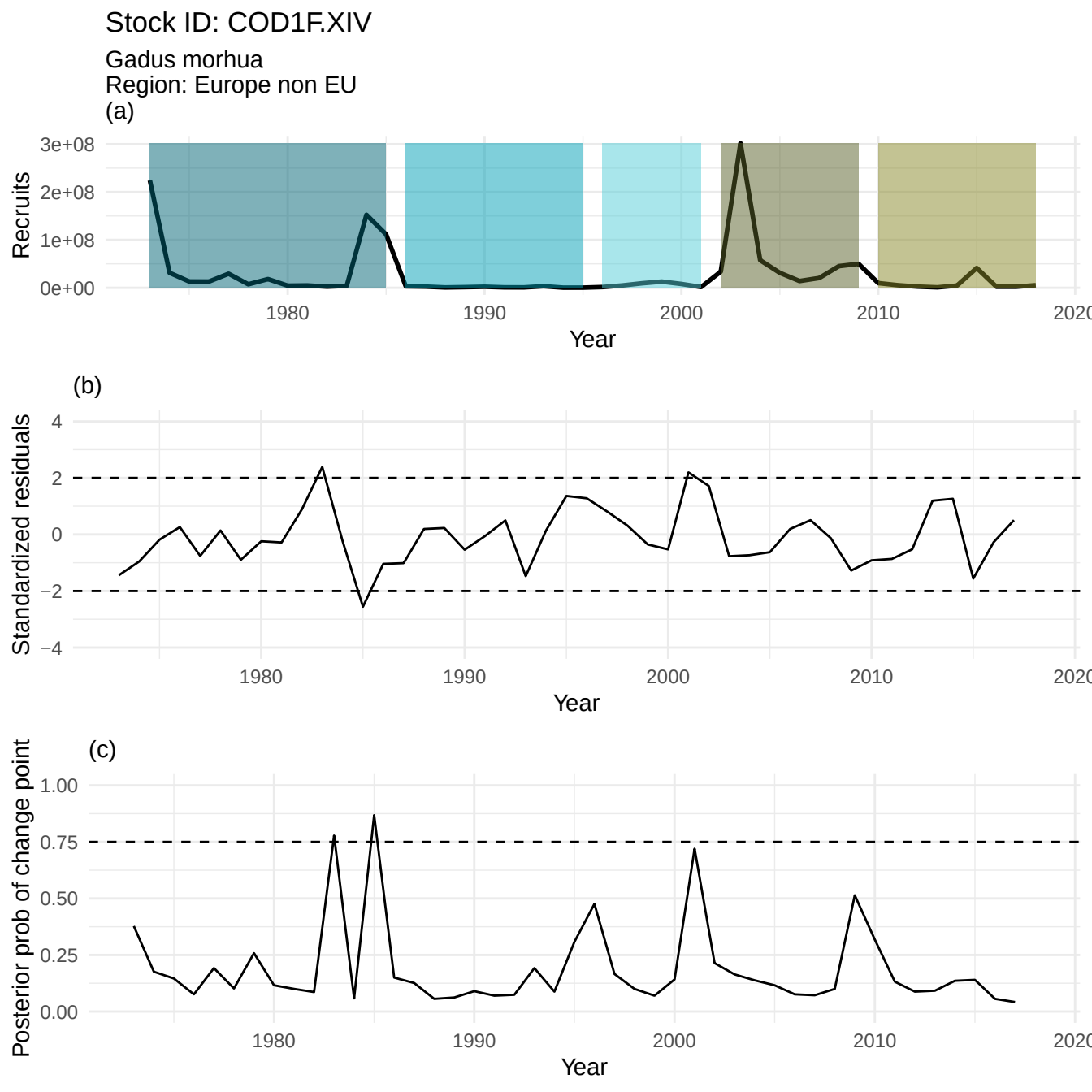

Stock ID: ATLCROAKMATLC
Micropogonias undulatus
Region: US East Coast
(a)
Recruits
6e+08
5e+08
4e+08
3e+08
2e+08
1e+08
0e+00
1980
1990
2000
Year
(b)
Standardized residuals
4
2
0
−2
−4
1980
1990
2000
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1980
1990
2000
Year

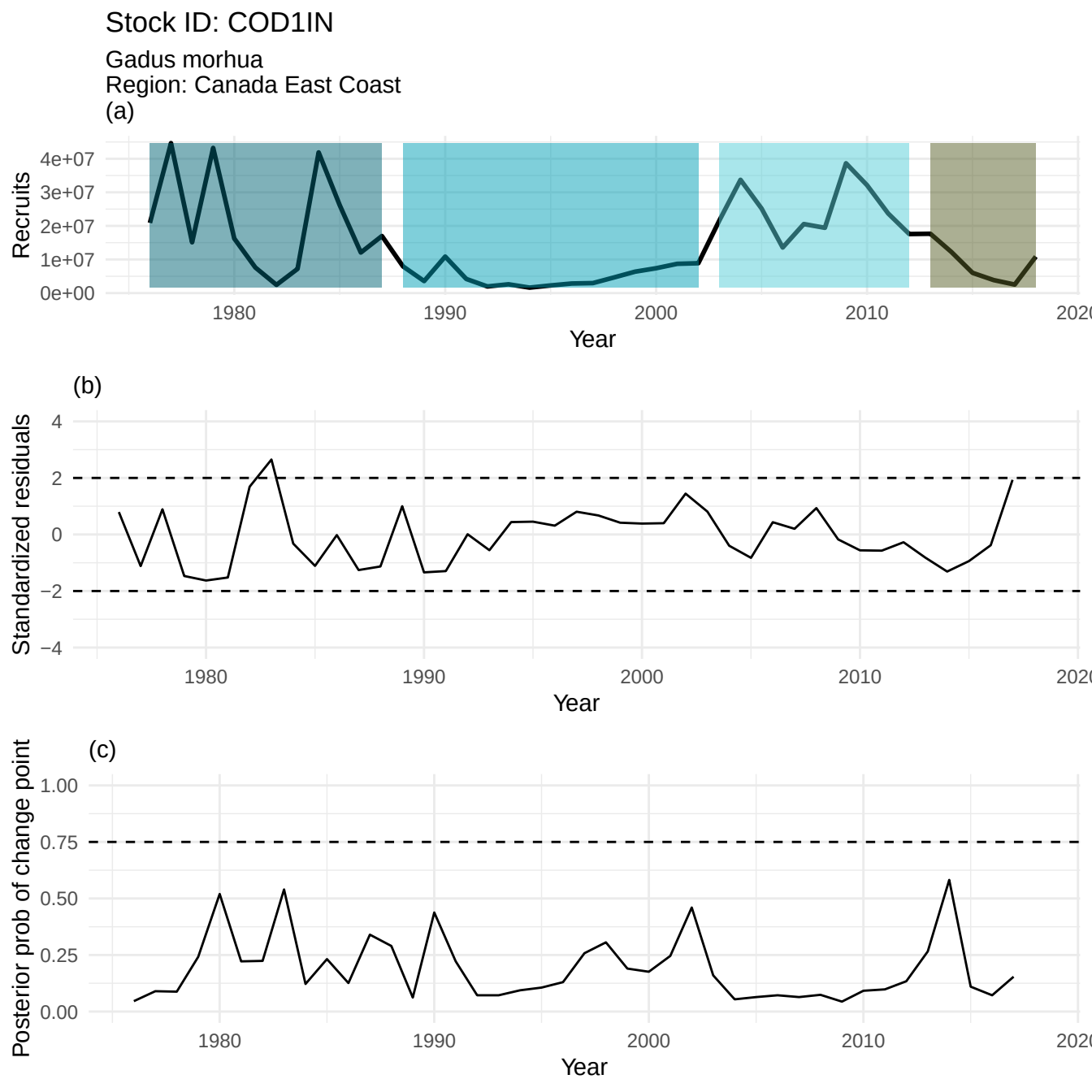

Stock ID: BLUEROCKCAL
Sebastes mystinus
Region: US West Coast
(a)
Recruits
8e+06
6e+06
4e+06
2e+06
1960
1970
1980
1990
2000
Year
(b)
Standardized residuals
4
2
0
−2
−4
1960
1970
1980
1990
2000
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1960
1970
1980
1990
2000
Year

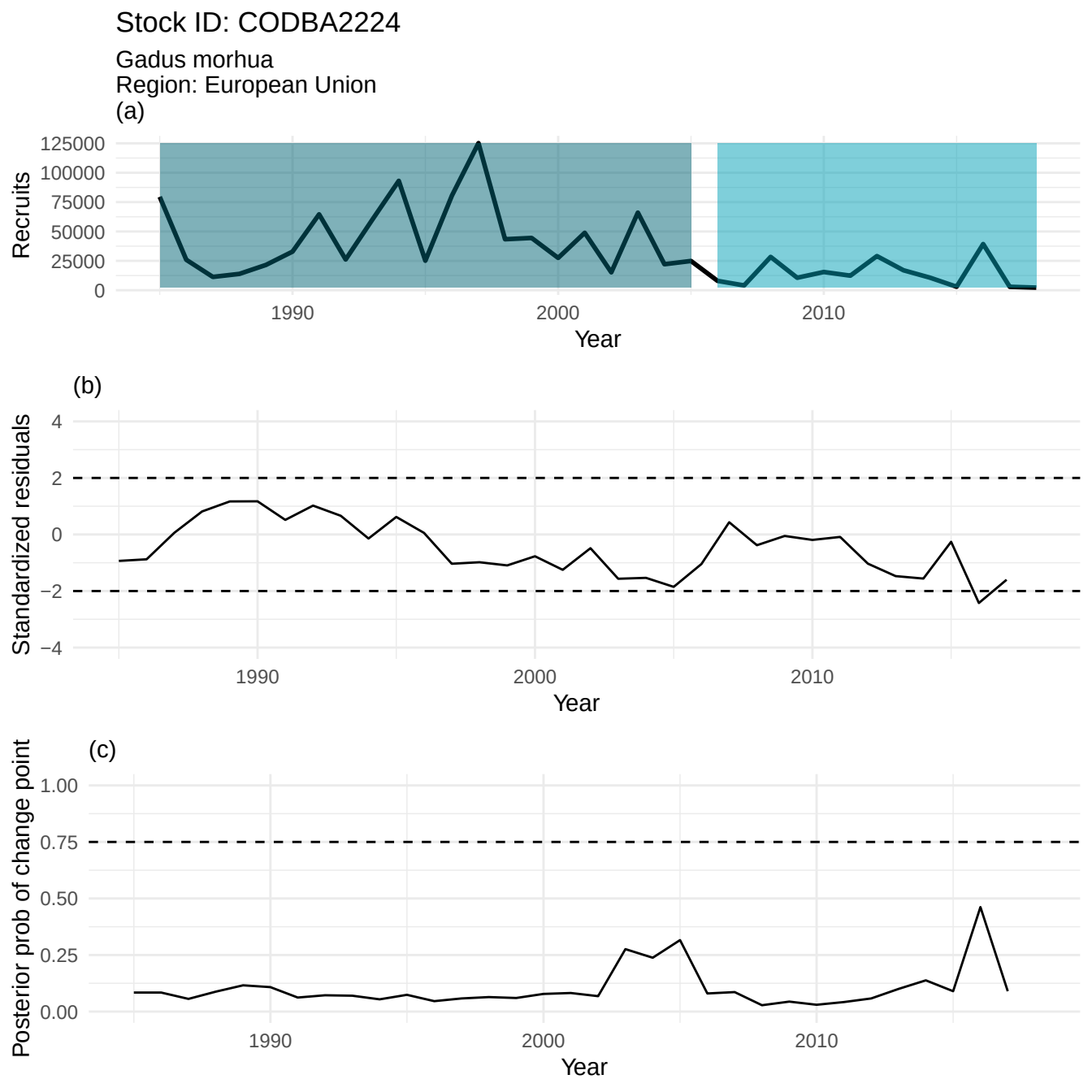

Stock ID: BWHITNEA
Micromesistius poutassou
Region: European Union
(a)
Recruits
6e+10
4e+10
2e+10
1990
2000
2010
Year
(b)
Standardized residuals
4
2
0
−2
−4
1990
2000
2010
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1990
2000
2010
Year

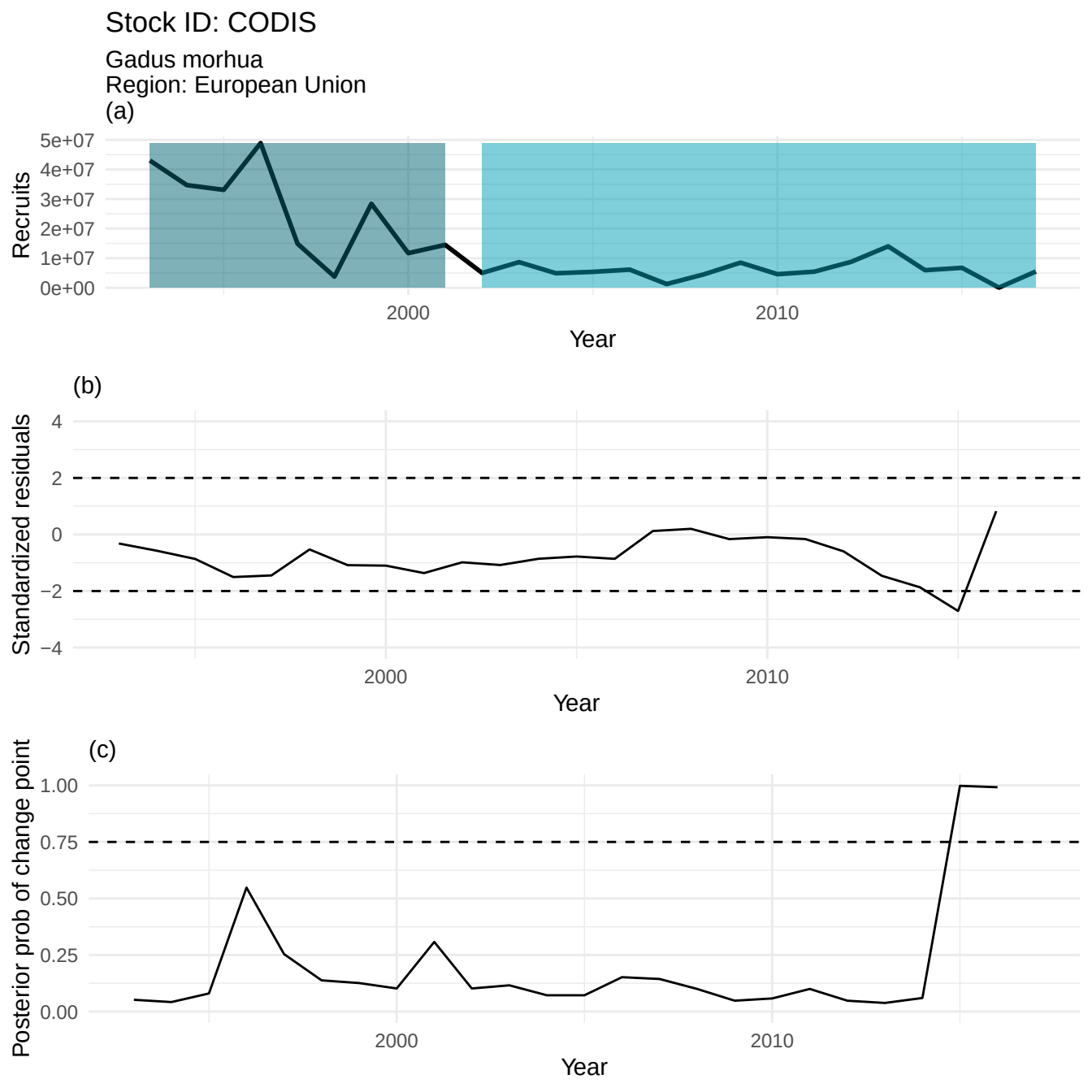

Stock ID: CHERRCHVX
Clupea bentincki
Region: South America
(a)
Recruits
7.5e+10
5.0e+10
2.5e+10
1990
1995
2000
2005
2010
Year
(b)
Standardized residuals
4
2
0
−2
−4
1990
1995
2000
2005
2010
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1990
1995
2000
2005
2010
Year

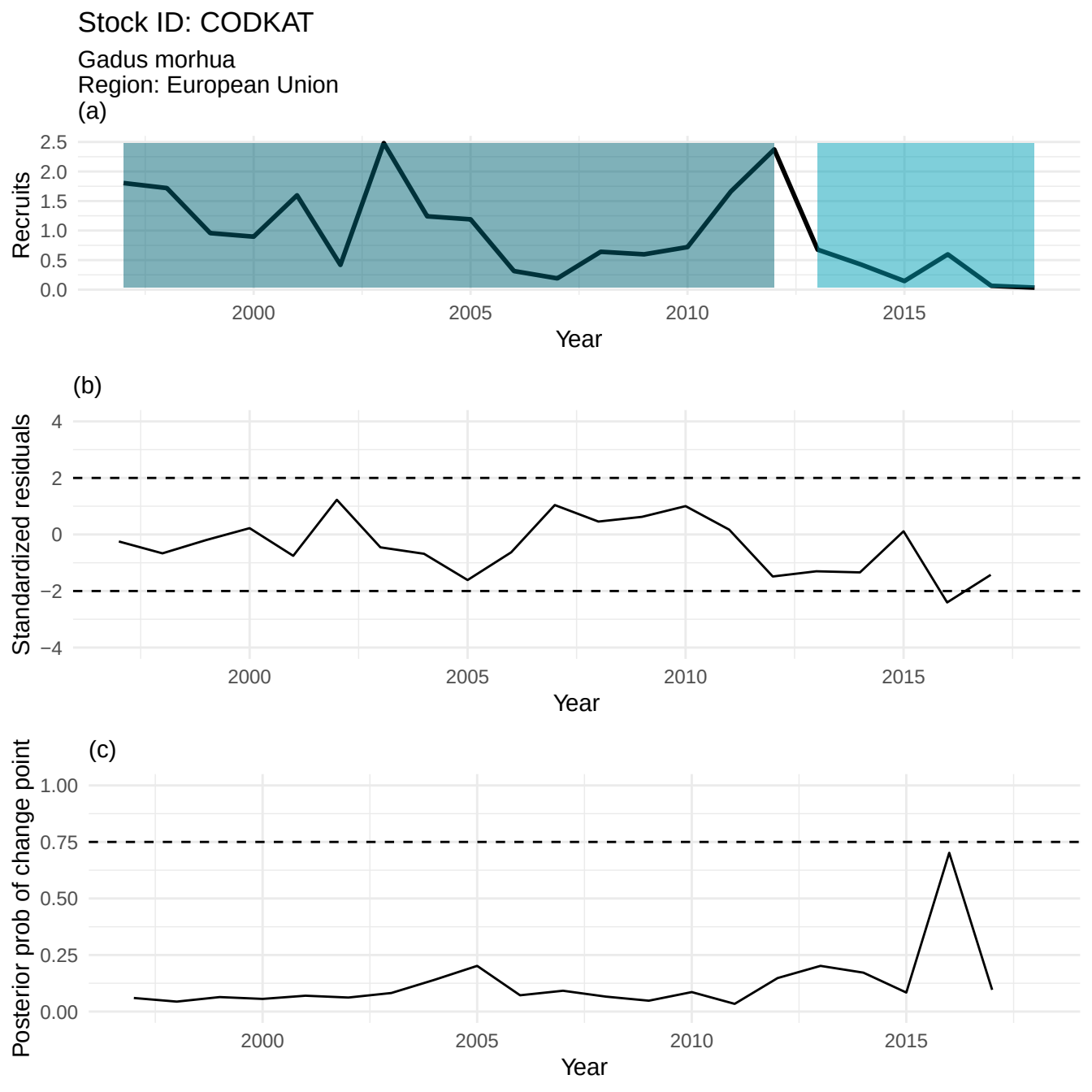

Stock ID: CHILISPCOAST
Sebastes goodei
Region: US West Coast
(a)
Recruits
2.0e+08
1.5e+08
1.0e+08
5.0e+07
0.0e+00
1970
1980
1990
2000
2010
Year
(b)
Standardized residuals
4
2
0
−2
−4
1970
1980
1990
2000
2010
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1970
1980
1990
2000
2010
Year

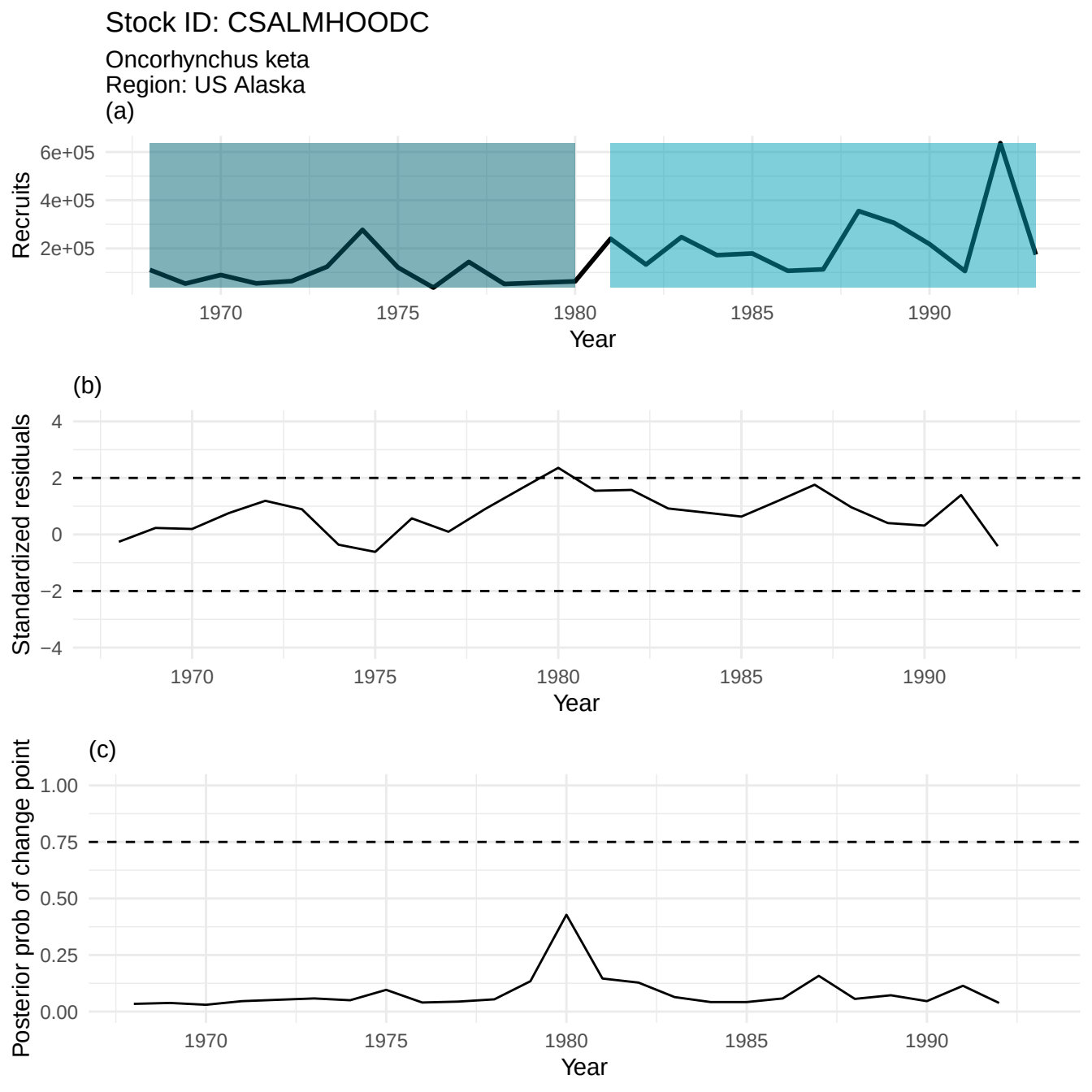

Stock ID: COD1F.XIV
Gadus morhua
Region: Europe non EU
(a)
Recruits
3e+08
2e+08
1e+08
0e+00
1980
1990
2000
2010
2020
Year
(b)
Standardized residuals
4
2
0
−2
−4
1980
1990
2000
2010
2020
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1980
1990
2000
2010
2020
Year

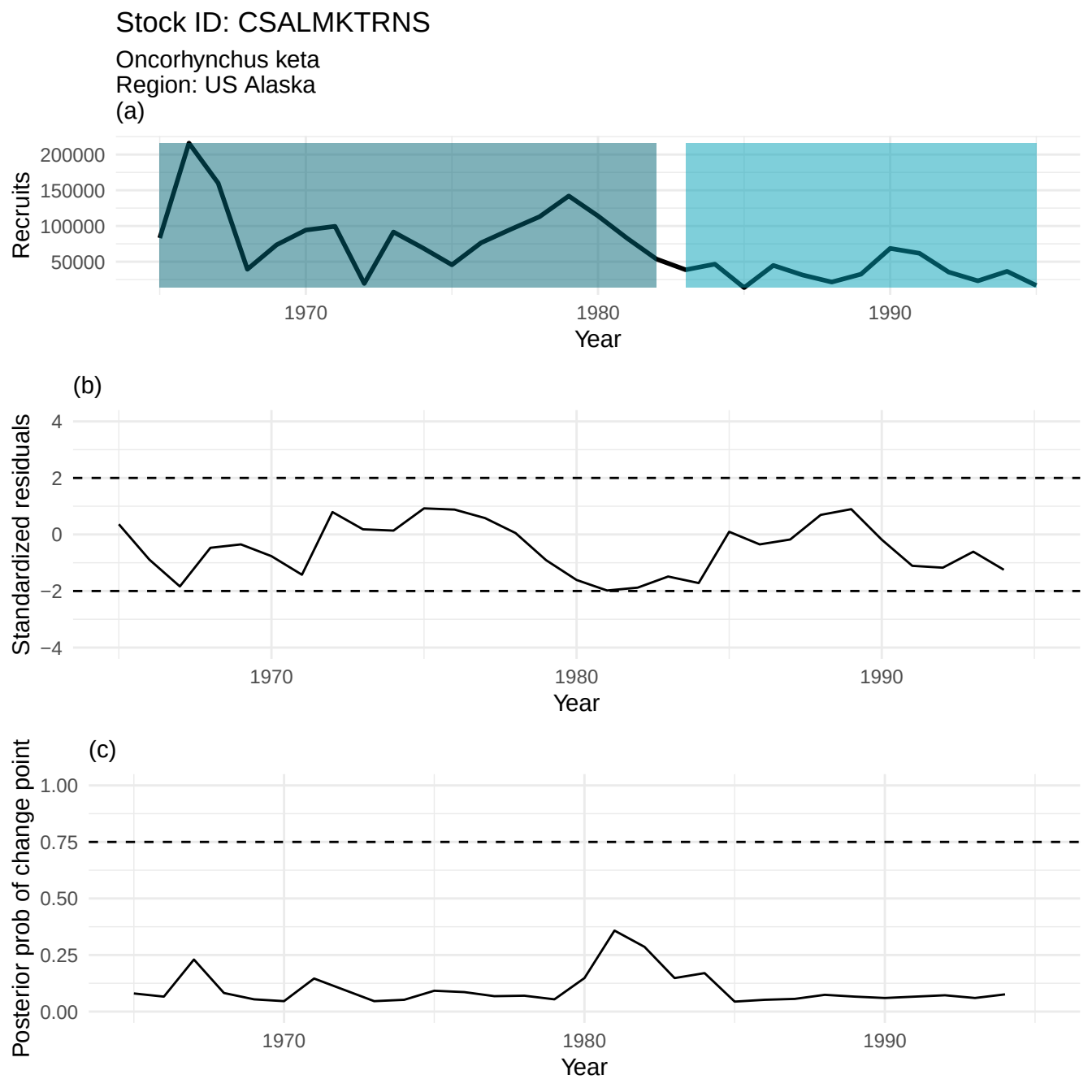

Stock ID: COD1IN
Gadus morhua
Region: Canada East Coast
(a)
Recruits
4e+07
3e+07
2e+07
1e+07
0e+00
1980
1990
2000
2010
Year
(b)
Standardized residuals
4
2
0
−2
−4
1980
1990
2000
2010
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1980
1990
2000
2010
Year

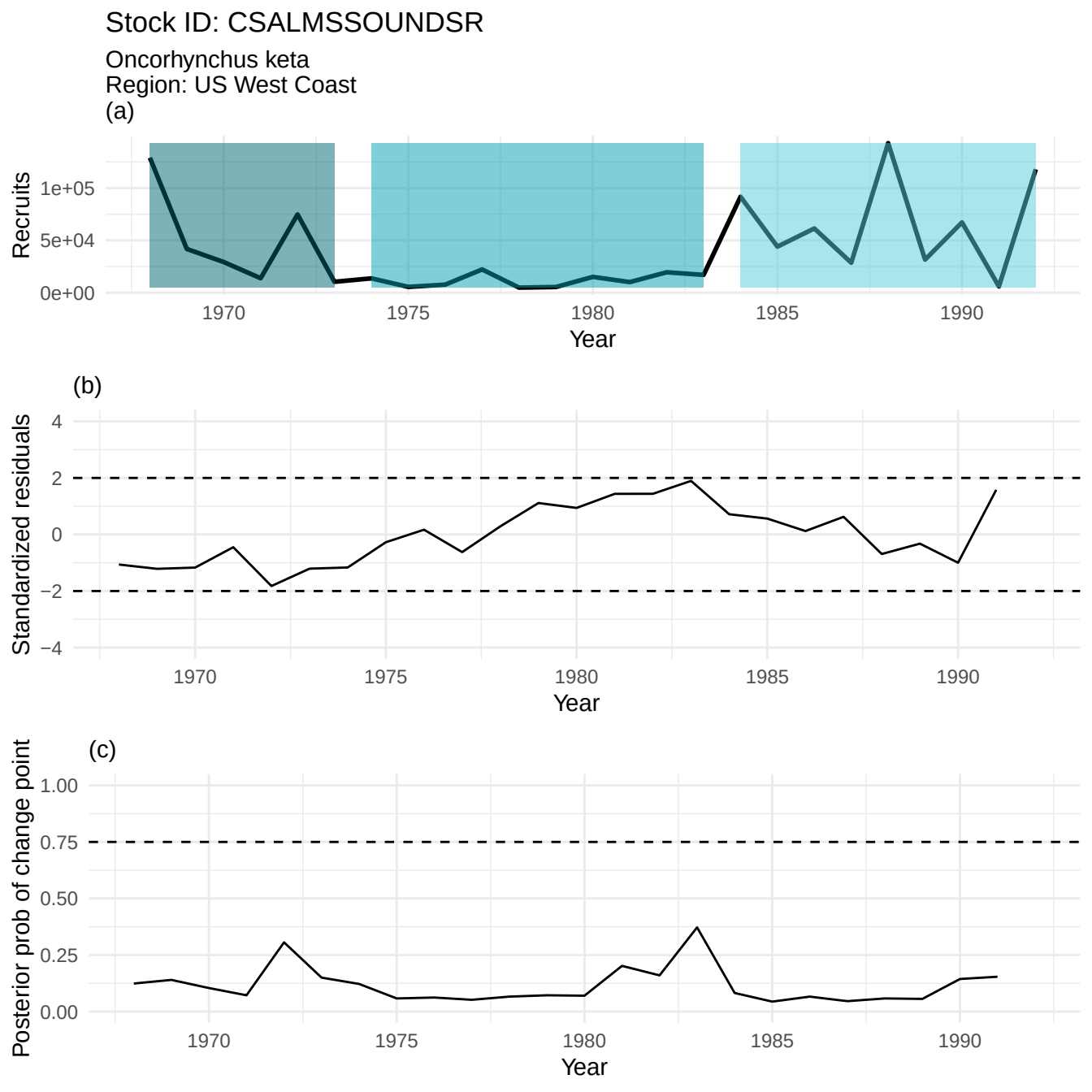

Stock ID: CODBA2224
Gadus morhua
Region: European Union
(a)
Recruits
125000
100000
75000
50000
25000
0
1990
2000
2010
Year
(b)
Standardized residuals
4
2
0
−2
−4
1990
2000
2010
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1990
2000
2010
Year

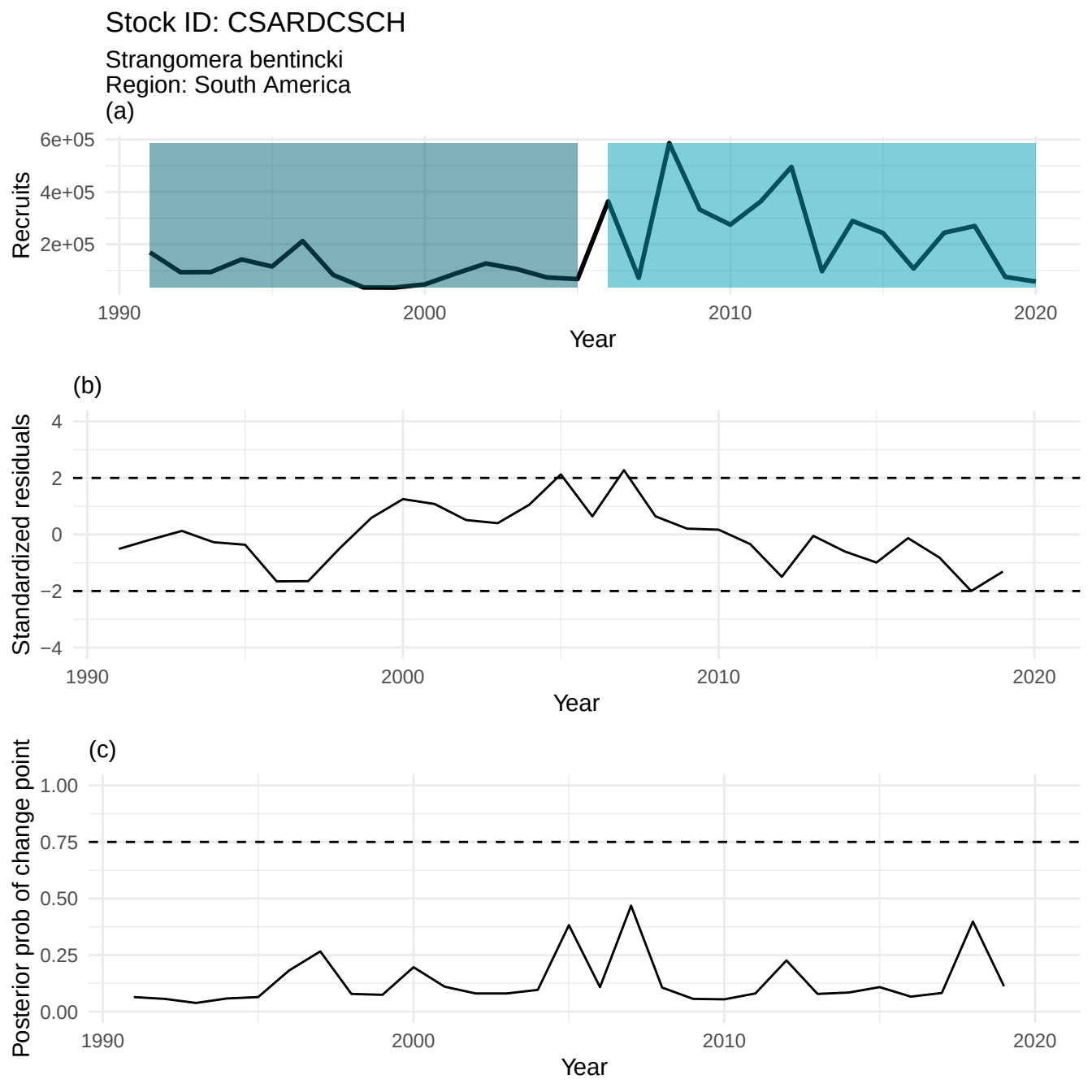

Stock ID: CODIS
Gadus morhua
Region: European Union
(a)
Recruits
5e+07
4e+07
3e+07
2e+07
1e+07
0e+00
2000
2010
Year
(b)
Standardized residuals
4
2
0
−2
−4
2000
2010
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
2000
2010
Year

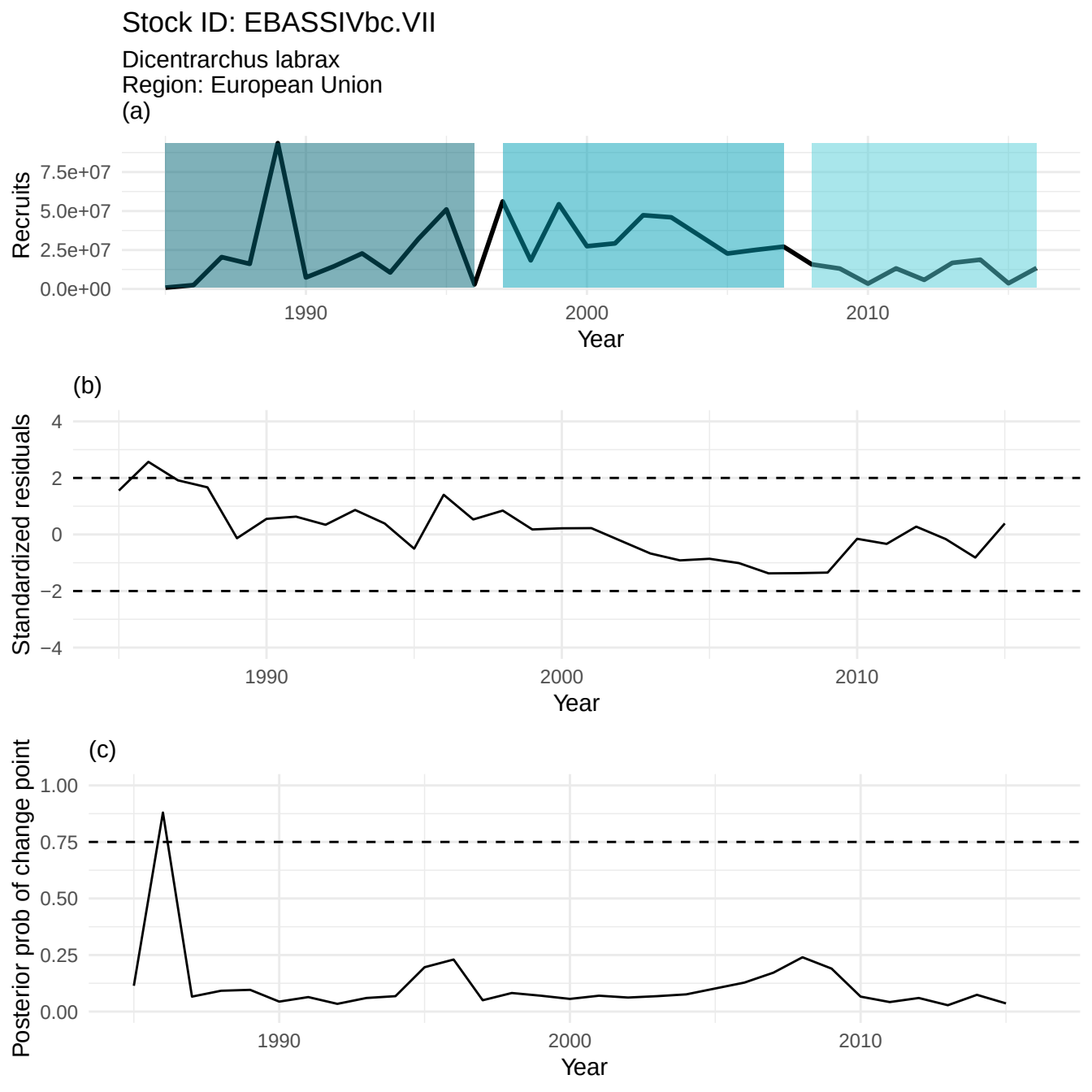

Stock ID: CODKAT
Gadus morhua
Region: European Union
(a)
Recruits
2.5
2.0
1.5
1.0
0.5
0.0
2000
2005
2010
2015
Year
(b)
Standardized residuals
4
2
0
−2
−4
2000
2005
2010
2015
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
2000
2005
2010
2015
Year

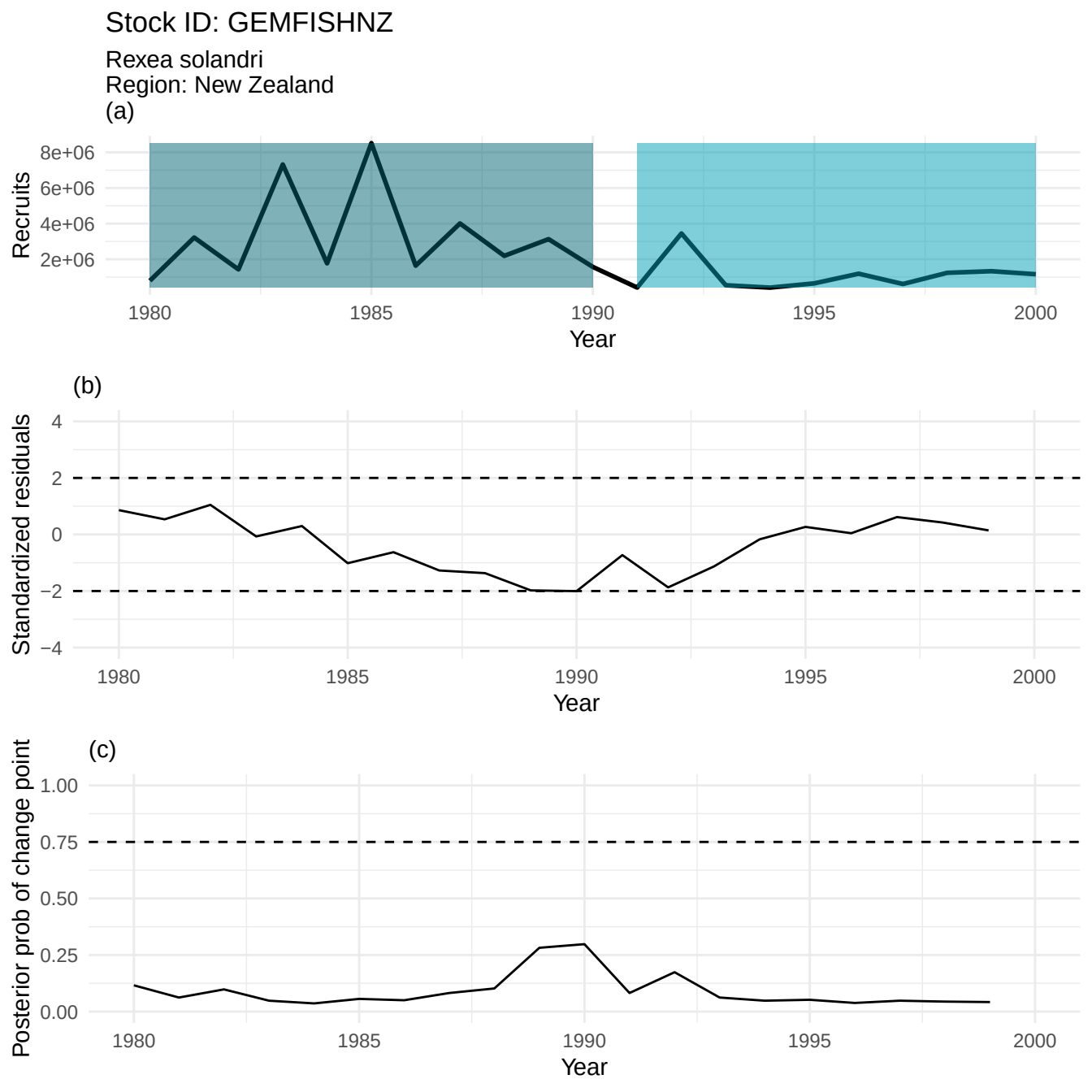

Stock ID: CSALMHOODC
Oncorhynchus keta
Region: US Alaska
(a)
Recruits
6e+05
4e+05
2e+05
1970
1975
1980
1985
1990
Year
(b)
Standardized residuals
4
2
0
−2
−4
1970
1975
1980
1985
1990
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1970
1975
1980
1985
1990
Year

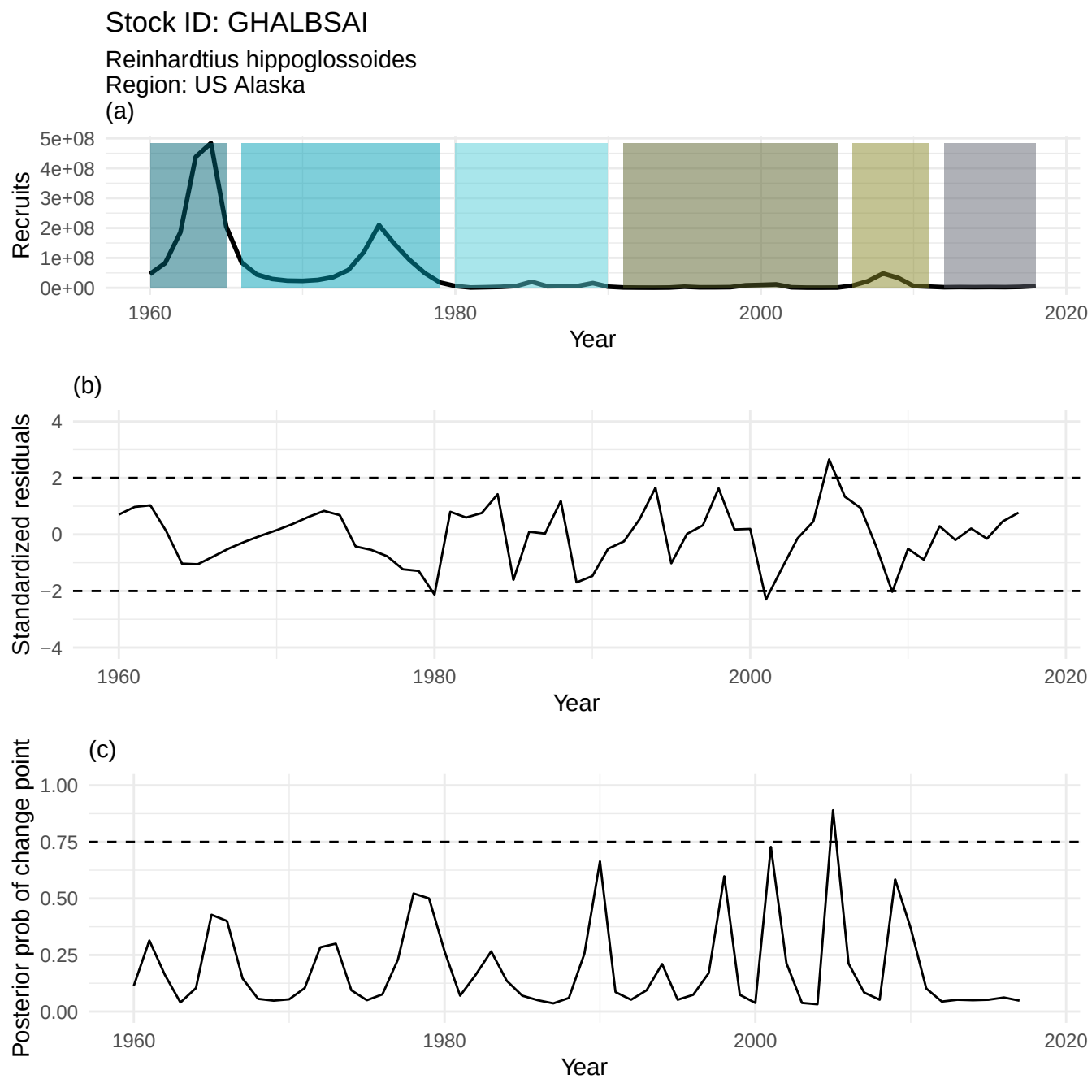

Stock ID: CSALMKTRNS
Oncorhynchus keta
Region: US Alaska
(a)
Recruits
200000
150000
100000
50000
1970
1980
1990
Year
(b)
Standardized residuals
4
2
0
−2
−4
1970
1980
1990
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1970
1980
1990
Year

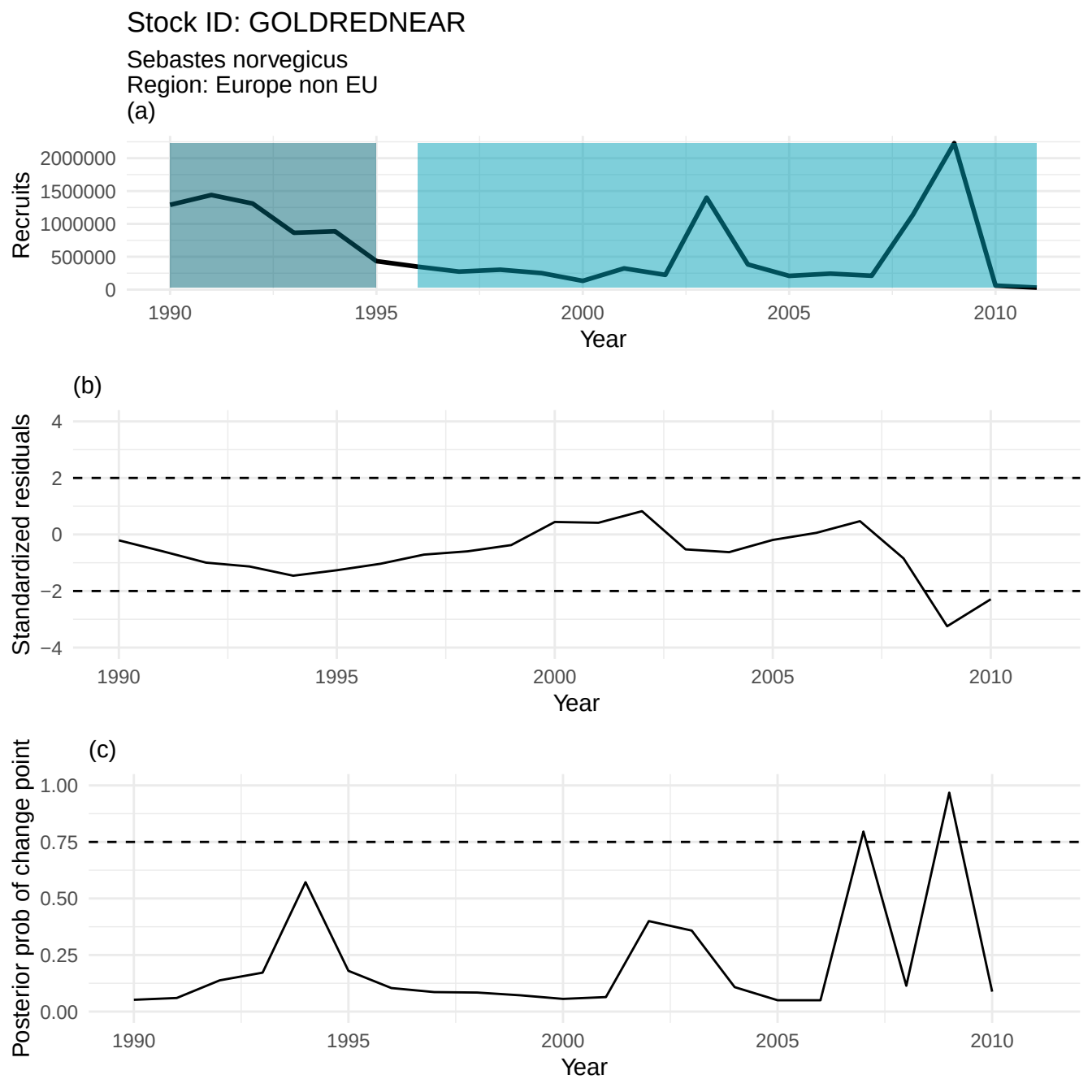

Stock ID: CSALMSSOUNDSR
Oncorhynchus keta
Region: US West Coast
(a)
Recruits
1e+05
5e+04
0e+00
1970
1975
1980
1985
1990
Year
(b)
Standardized residuals
4
2
0
−2
−4
1970
1975
1980
1985
1990
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1970
1975
1980
1985
1990
Year

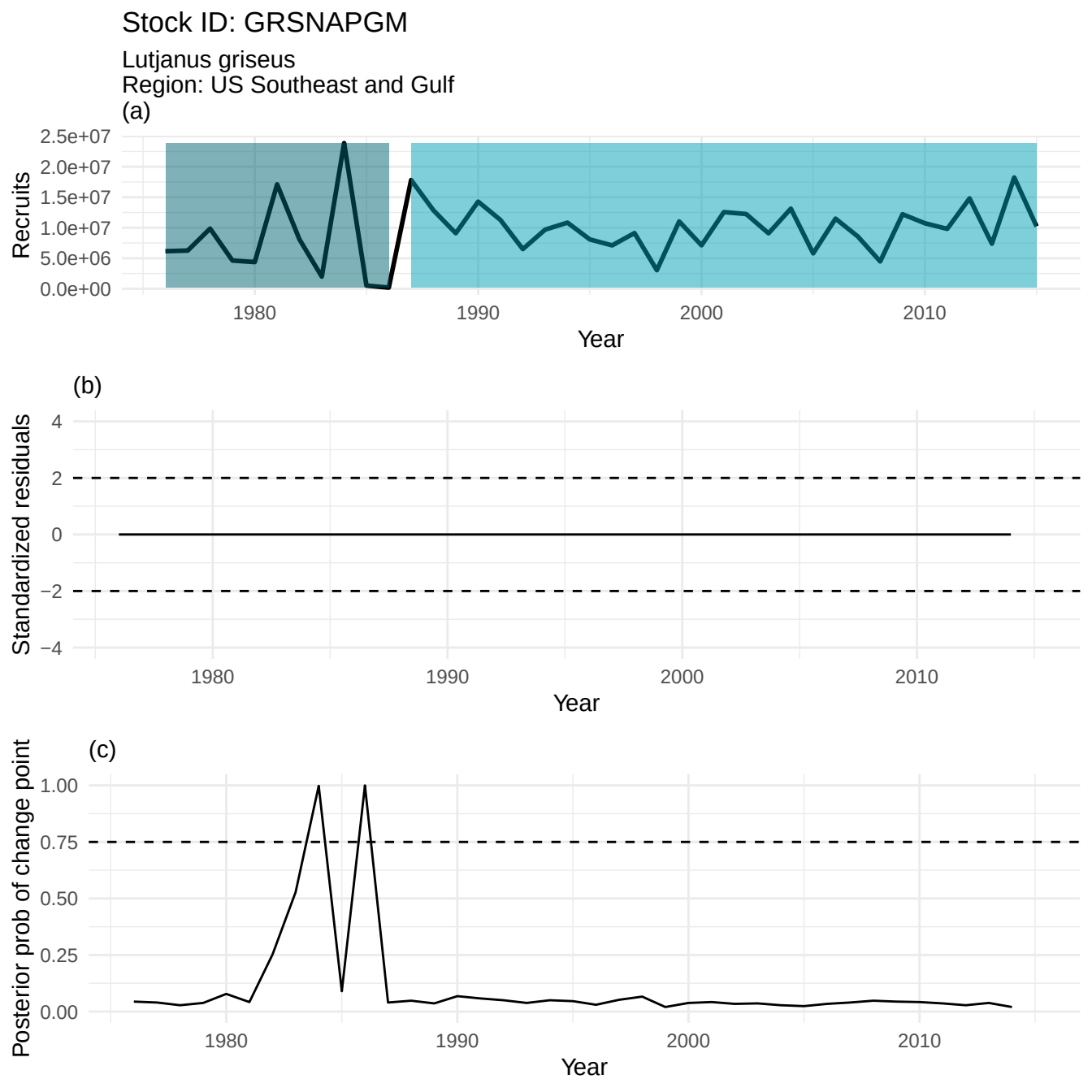

Stock ID: CSARDCSCH
Strangomera bentincki
Region: South America
(a)
Recruits
6e+05
4e+05
2e+05
1990
2000
2010
2020
Year
(b)
Standardized residuals
4
2
0
−2
−4
1990
2000
2010
2020
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1990
2000
2010
2020
Year

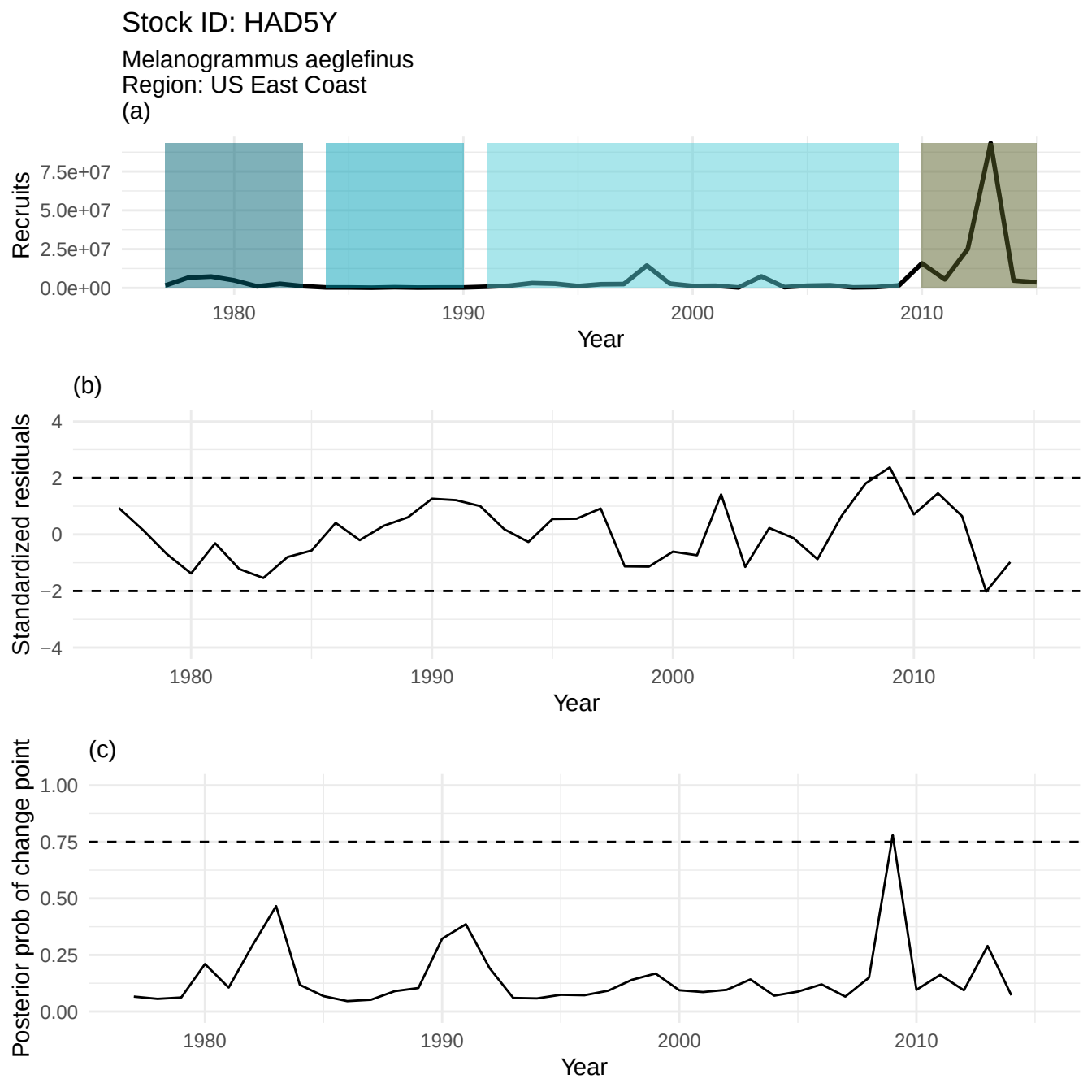

Stock ID: EBASSIVbc.VII
Dicentrarchus labrax
Region: European Union
(a)
Recruits
7.5e+07
5.0e+07
2.5e+07
0.0e+00
1990
2000
2010
Year
(b)
Standardized residuals
4
2
0
−2
−4
1990
2000
2010
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1990
2000
2010
Year

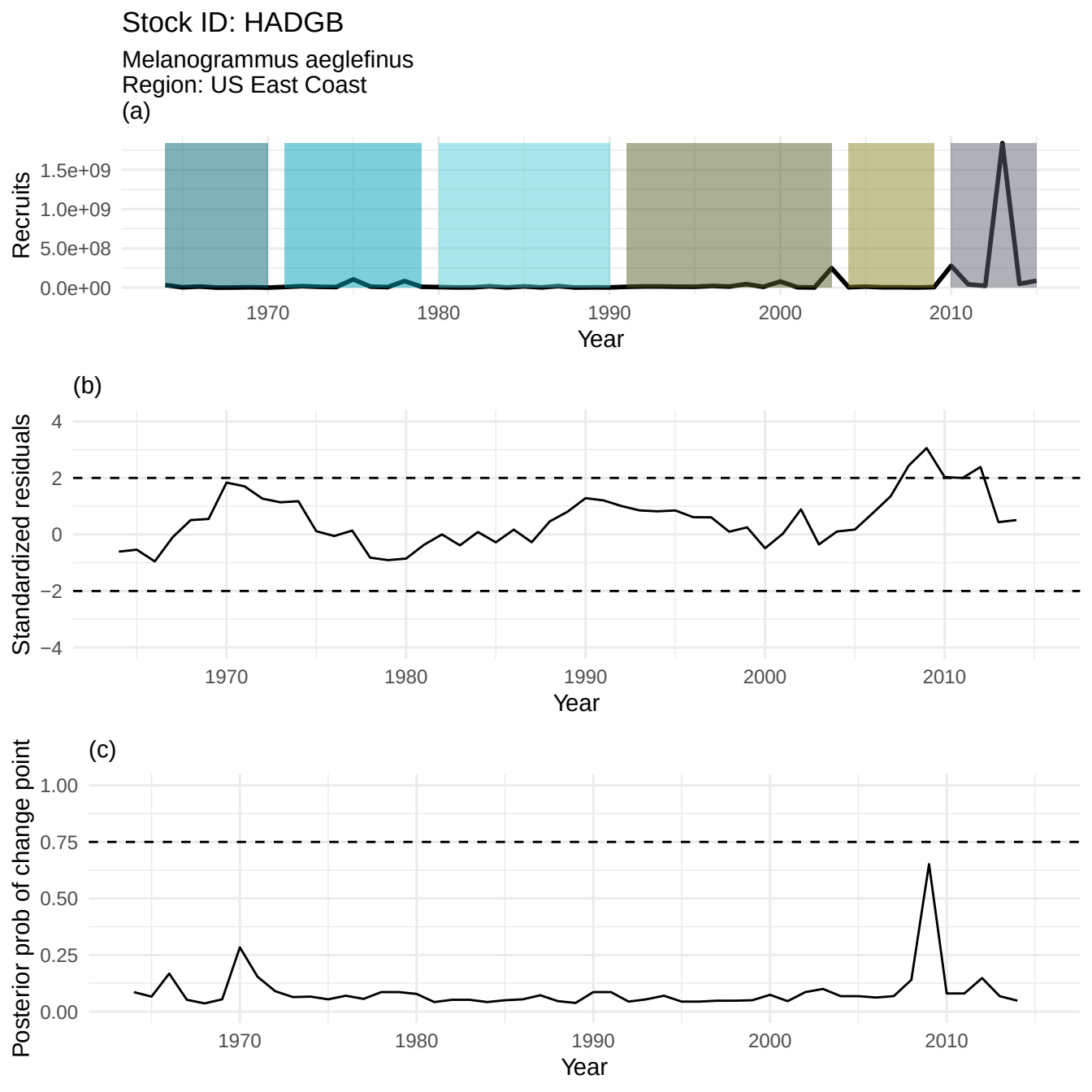

Stock ID: GEMFISHNZ
Rexea solandri
Region: New Zealand
(a)
Recruits
8e+06
6e+06
4e+06
2e+06
1980
1985
1990
1995
2000
Year
(b)
Standardized residuals
4
2
0
−2
−4
1980
1985
1990
1995
2000
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1980
1985
1990
1995
2000
Year

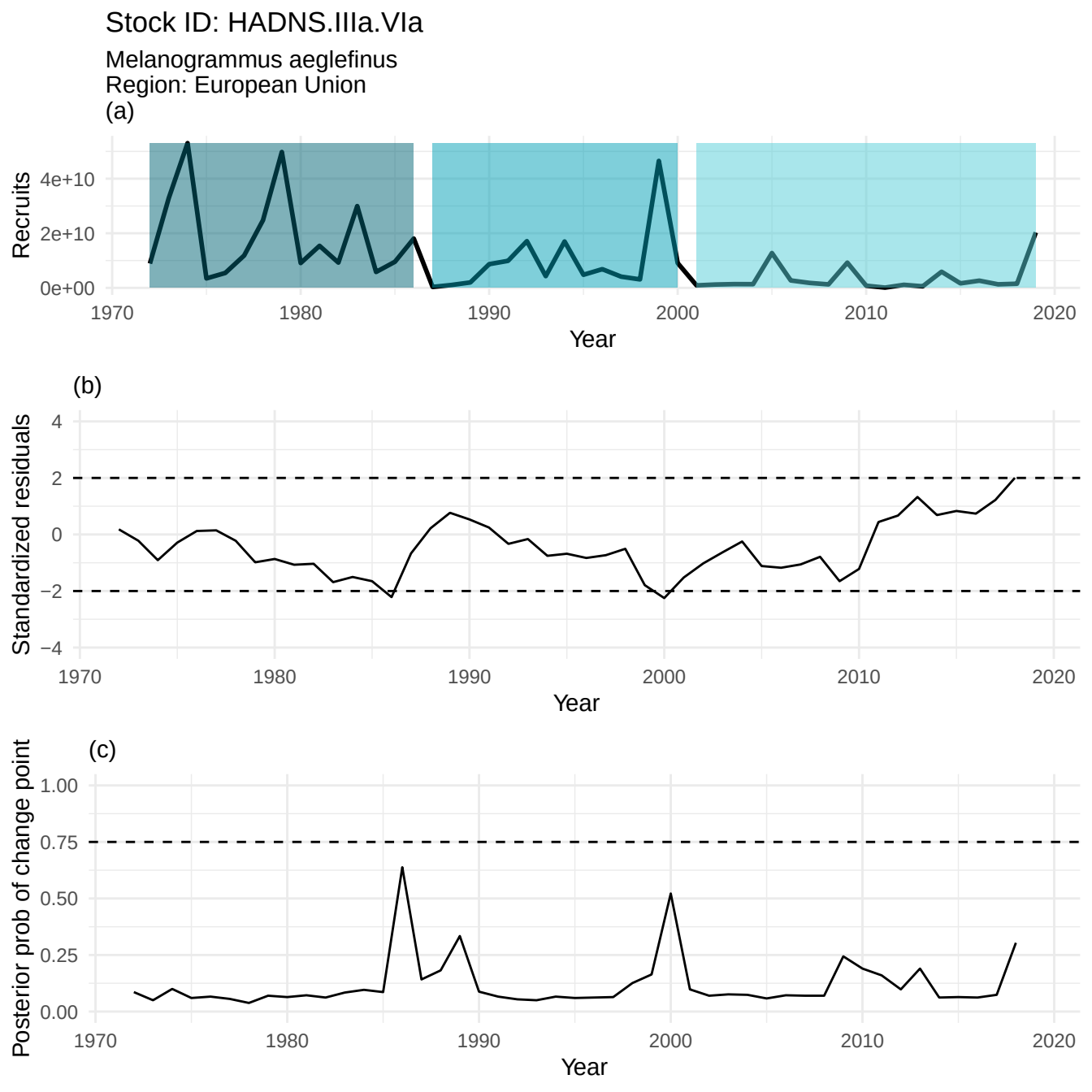

Stock ID: GHALBSAI
Reinhardtius hippoglossoides
Region: US Alaska
(a)
Recruits
5e+08
4e+08
3e+08
2e+08
1e+08
0e+00
1960
1980
2000
2020
Year
(b)
Standardized residuals
4
2
0
−2
−4
1960
1980
2000
2020
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1960
1980
2000
2020
Year

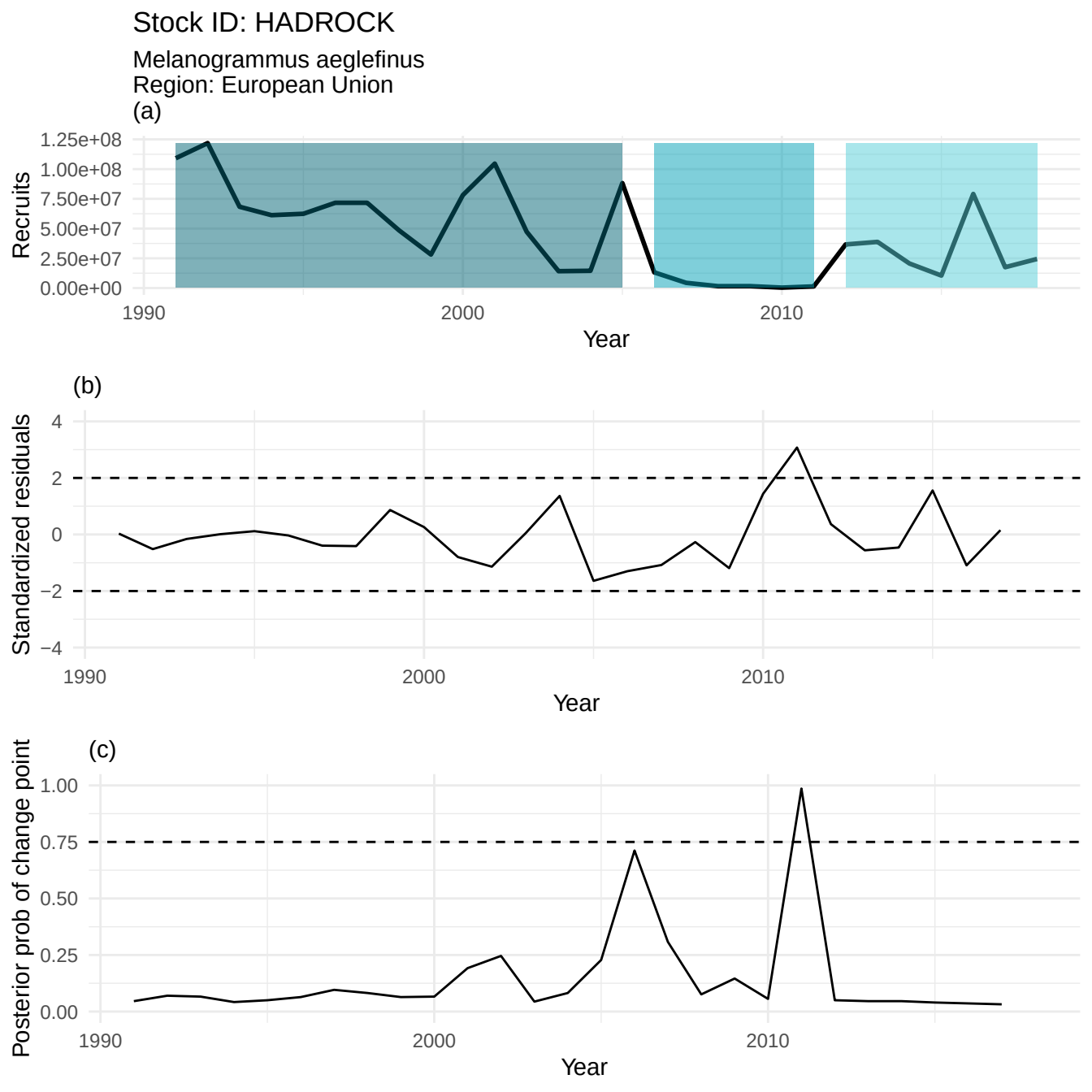

Stock ID: GOLDREDNEAR
Sebastes norvegicus
Region: Europe non EU
(a)
Recruits
2000000
1500000
1000000
500000
0
1990
1995
2000
2005
2010
Year
(b)
Standardized residuals
4
2
0
−2
−4
1990
1995
2000
2005
2010
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1990
1995
2000
2005
2010
Year

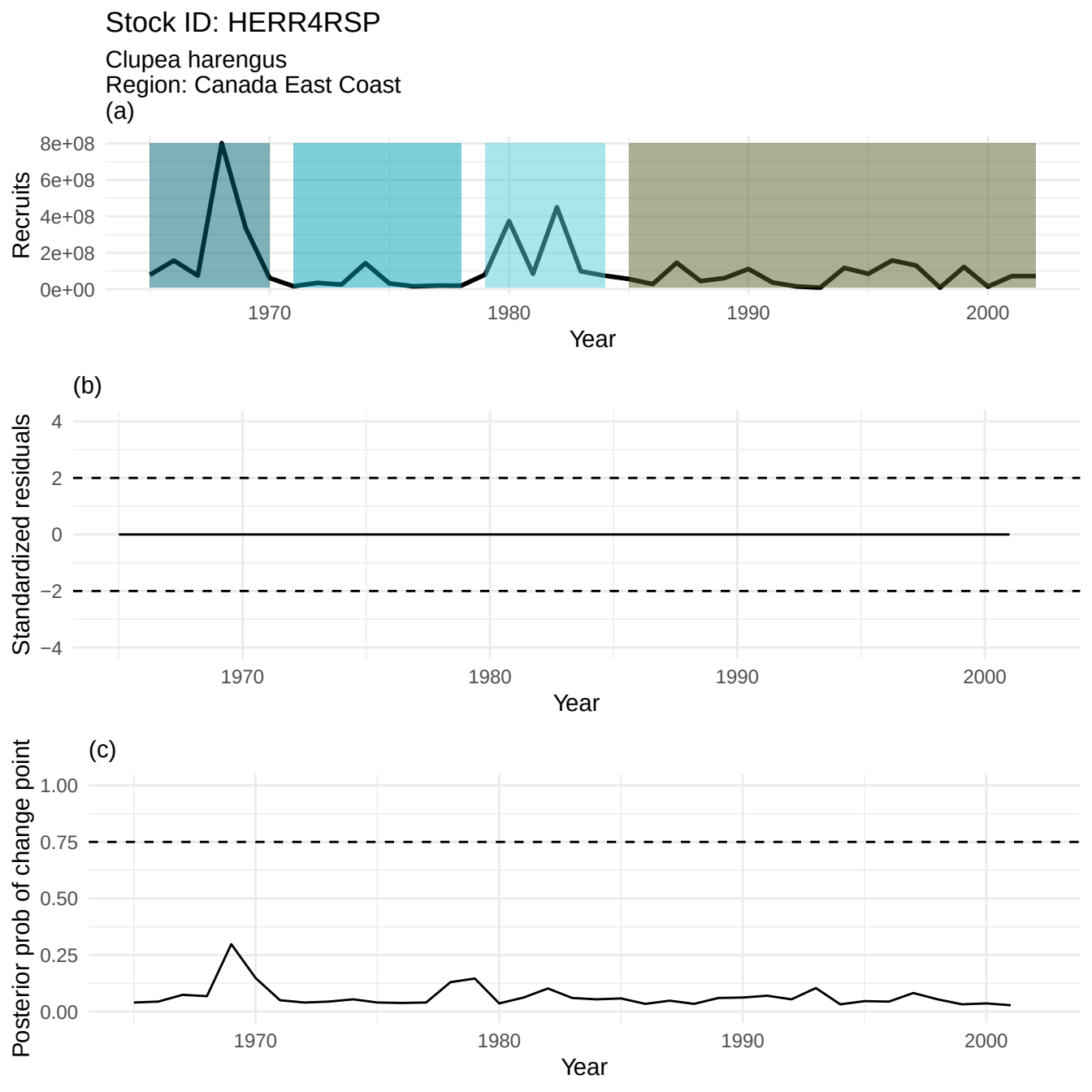

Stock ID: GRSNAPGM
Lutjanus griseus
Region: US Southeast and Gulf
(a)
Recruits
2.5e+07
2.0e+07
1.5e+07
1.0e+07
5.0e+06
0.0e+00
1980
1990
2000
2010
Year
(b)
Standardized residuals
4
2
0
−2
−4
1980
1990
2000
2010
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1980
1990
2000
2010
Year

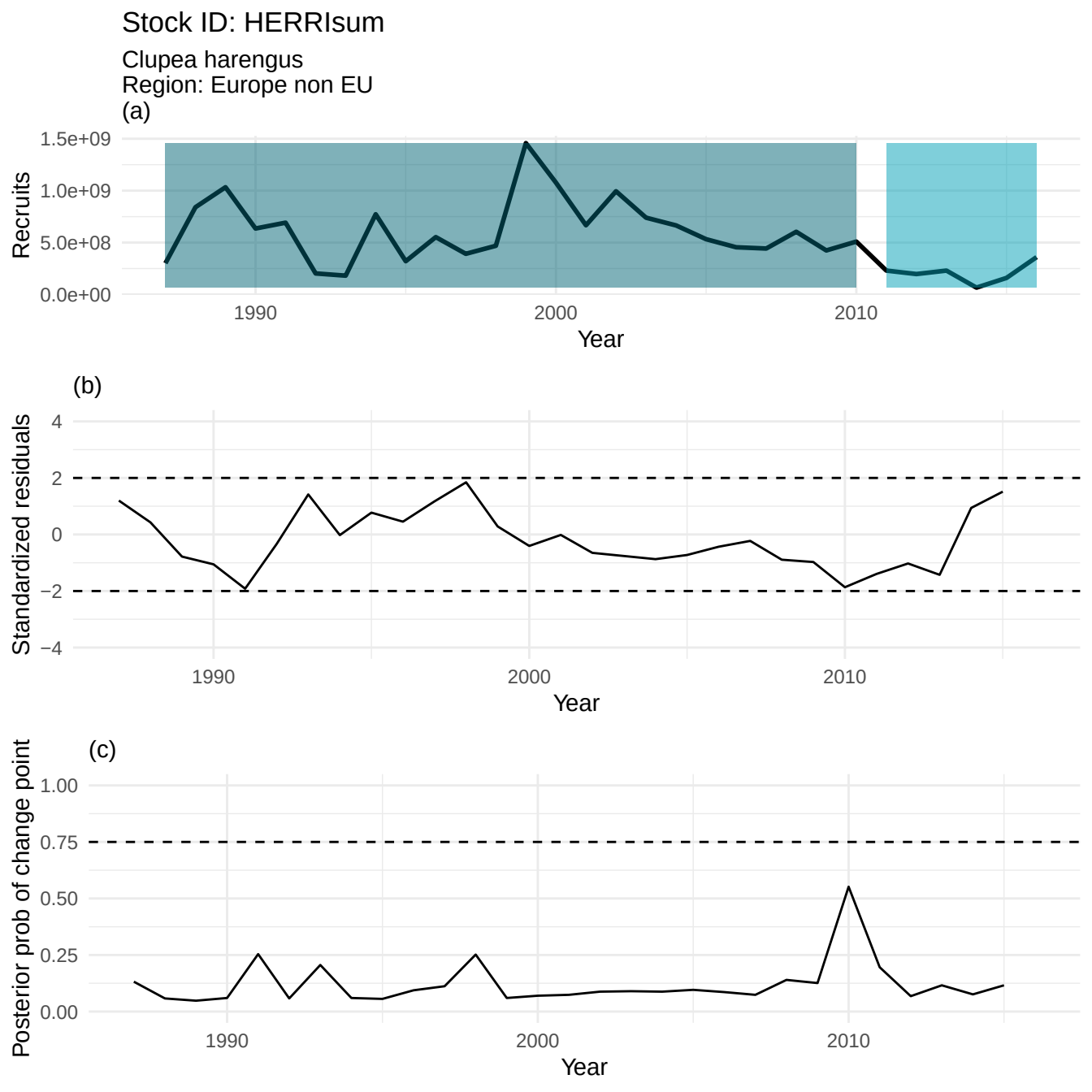

Stock ID: HAD5Y
Melanogrammus aeglefinus
Region: US East Coast
(a)
Recruits
7.5e+07
5.0e+07
2.5e+07
0.0e+00
1980
1990
2000
2010
Year
(b)
Standardized residuals
4
2
0
−2
−4
1980
1990
2000
2010
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1980
1990
2000
2010
Year

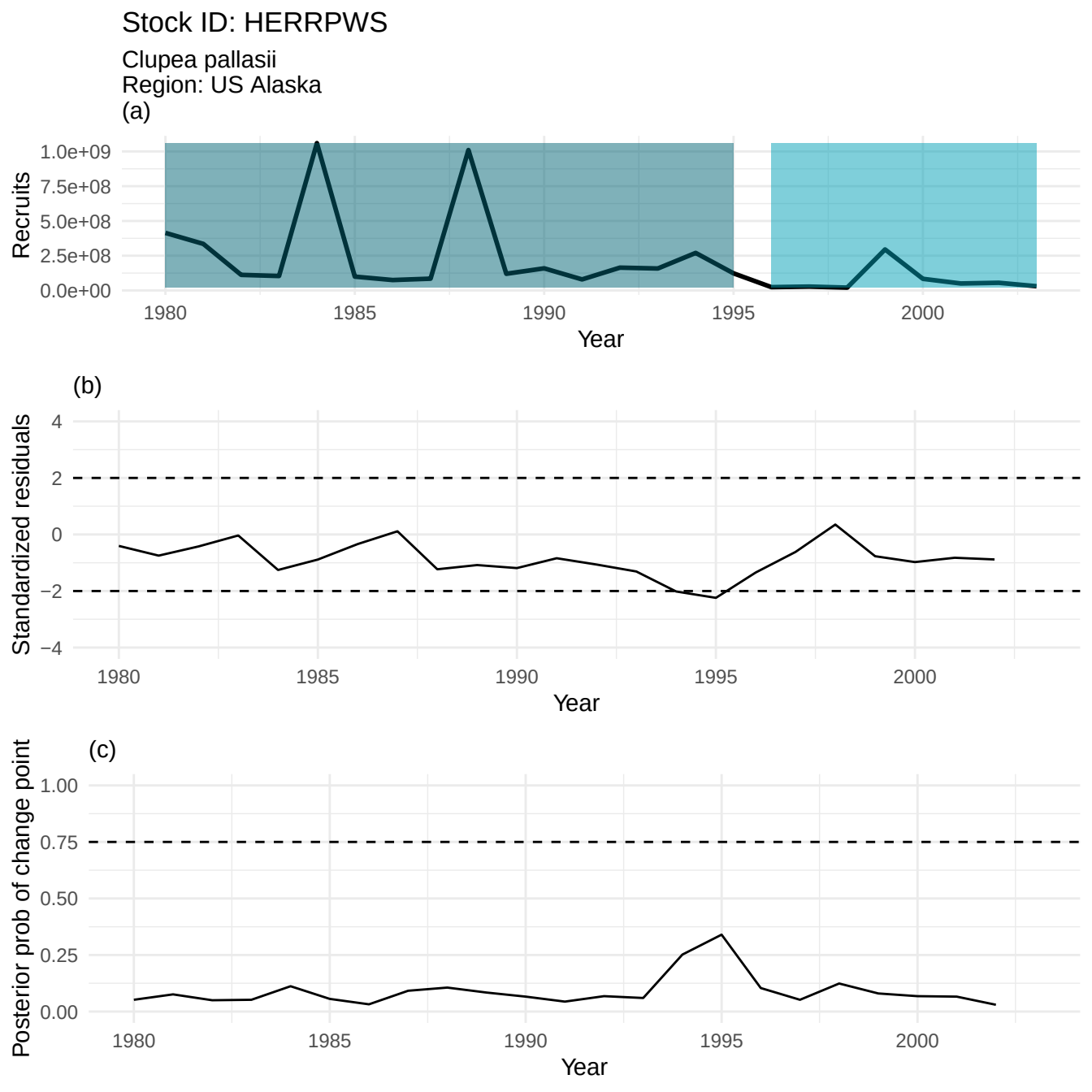

Stock ID: HADGB
Melanogrammus aeglefinus
Region: US East Coast
(a)
Recruits
1.5e+09
1.0e+09
5.0e+08
0.0e+00
1970
1980
1990
2000
2010
Year
(b)
Standardized residuals
4
2
0
−2
−4
1970
1980
1990
2000
2010
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1970
1980
1990
2000
2010
Year

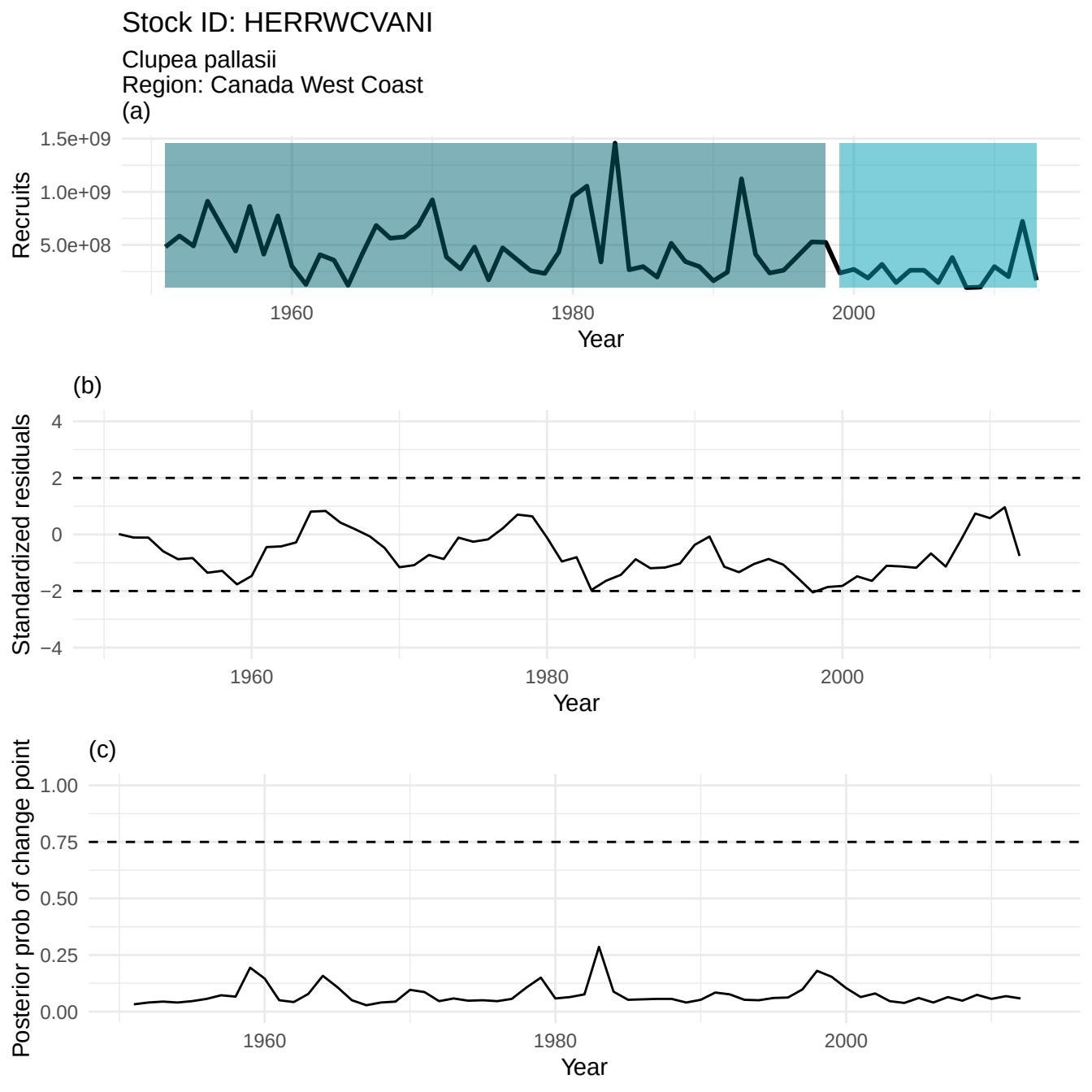

Stock ID: HADNS.IIIa.VIa
Melanogrammus aeglefinus
Region: European Union
(a)
Recruits
4e+10
2e+10
0e+00
1970
1980
1990
2000
2010
2020
Year
(b)
Standardized residuals
4
2
0
−2
−4
1970
1980
1990
2000
2010
2020
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1970
1980
1990
2000
2010
2020
Year

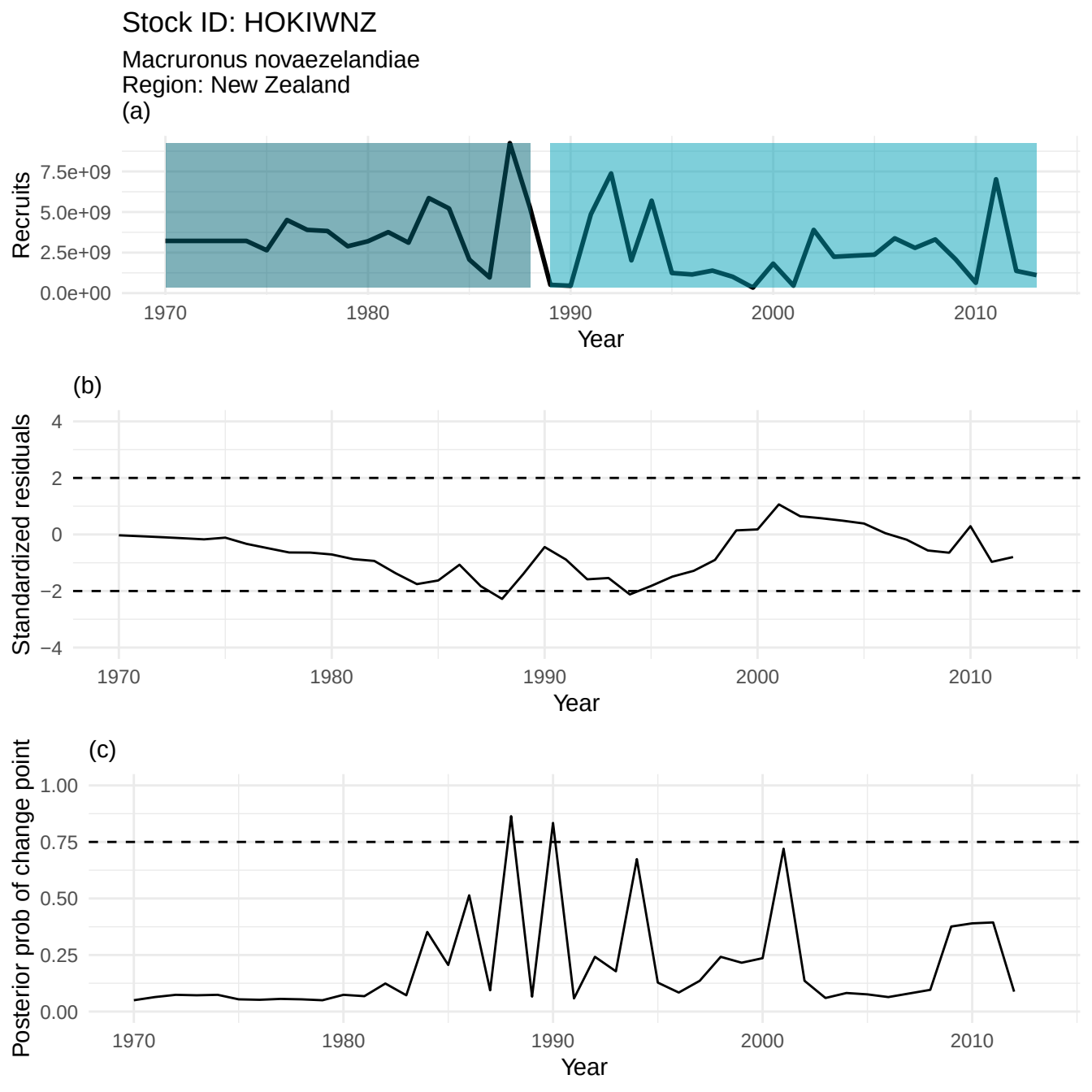

Stock ID: HADROCK
Melanogrammus aeglefinus
Region: European Union
(a)
Recruits
1.25e+08
1.00e+08
7.50e+07
5.00e+07
2.50e+07
0.00e+00
1990
2000
2010
Year
(b)
Standardized residuals
4
2
0
−2
−4
1990
2000
2010
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1990
2000
2010
Year

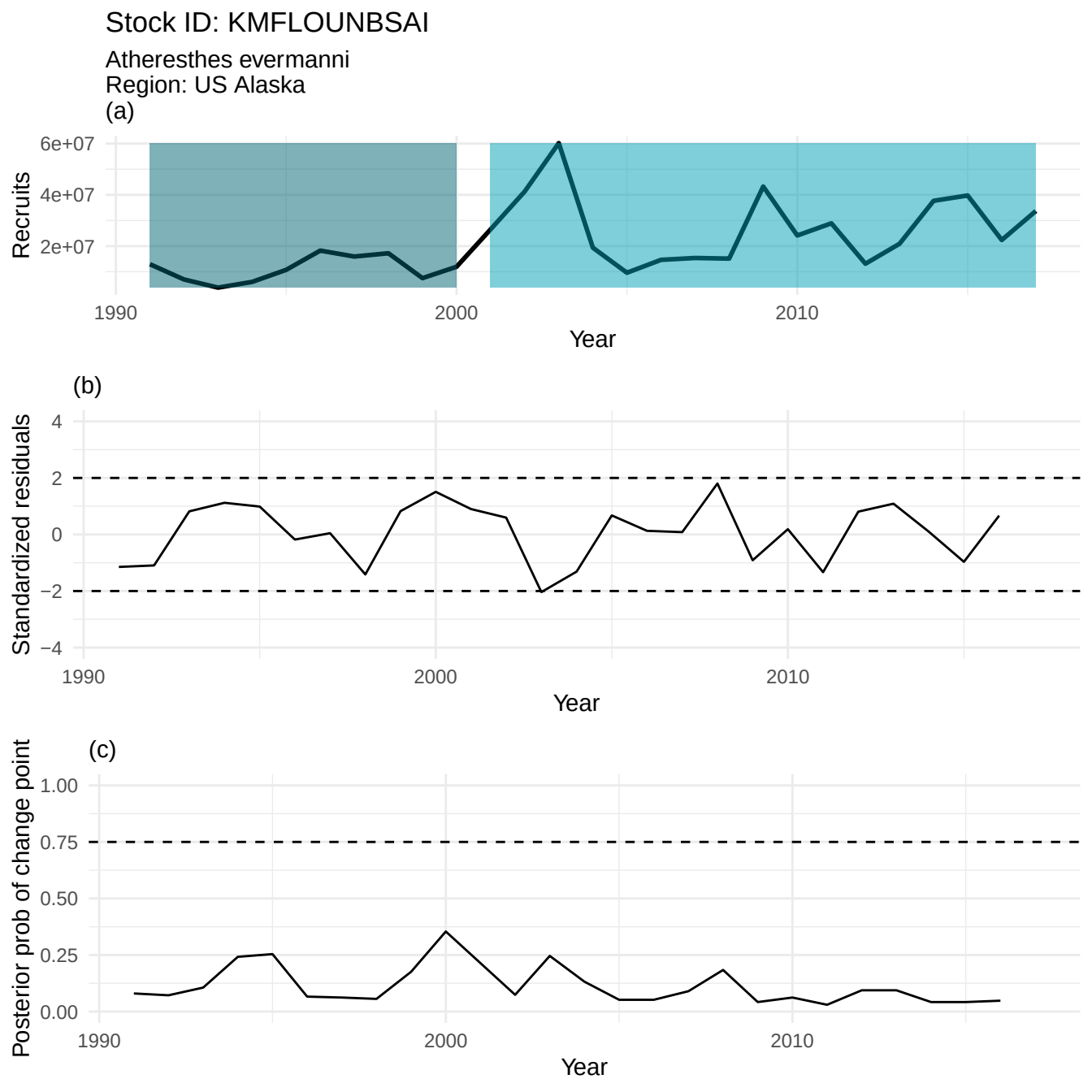

Stock ID: HERR4RSP
Clupea harengus
Region: Canada East Coast
(a)
Recruits
8e+08
6e+08
4e+08
2e+08
0e+00
1970
1980
1990
2000
Year
(b)
Standardized residuals
4
2
0
−2
−4
1970
1980
1990
2000
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1970
1980
1990
2000
Year

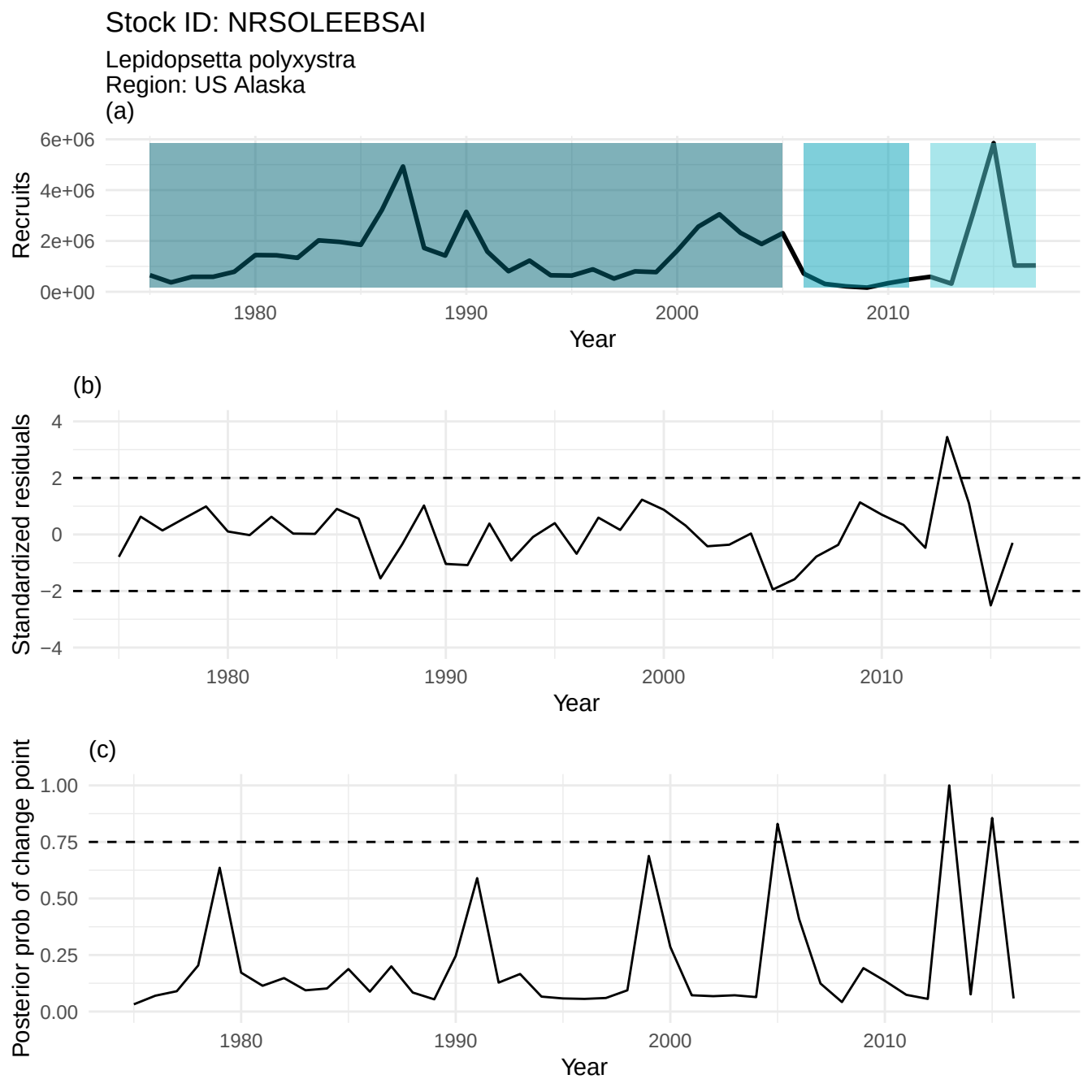

Stock ID: HERRIsum
Clupea harengus
Region: Europe non EU
(a)
Recruits
1.5e+09
1.0e+09
5.0e+08
0.0e+00
1990
2000
2010
Year
(b)
Standardized residuals
4
2
0
−2
−4
1990
2000
2010
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1990
2000
2010
Year


Stock ID: HERRPWS
Clupea pallasii
Region: US Alaska
(a)
Recruits
1.0e+09
7.5e+08
5.0e+08
2.5e+08
0.0e+00
1980
1985
1990
1995
2000
Year
(b)
Standardized residuals
4
2
0
−2
−4
1980
1985
1990
1995
2000
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1980
1985
1990
1995
2000
Year


Stock ID: HERRWCVANI
Clupea pallasii
Region: Canada West Coast
(a)
Recruits
1.5e+09
1.0e+09
5.0e+08
1960
1980
2000
Year
(b)
Standardized residuals
4
2
0
−2
−4
1960
1980
2000
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1960
1980
2000
Year

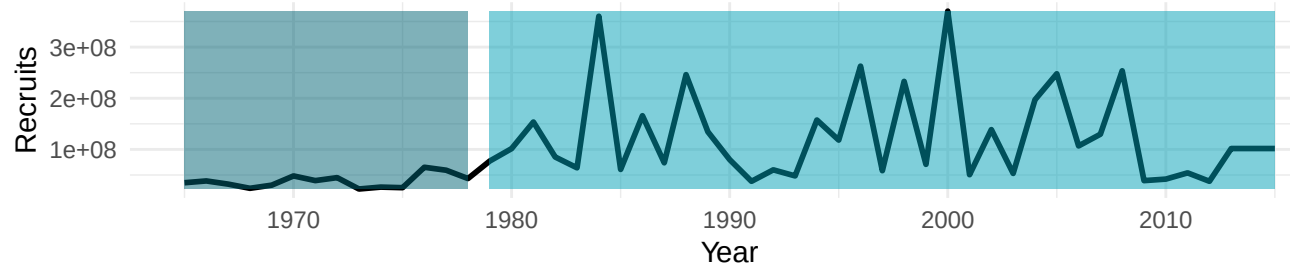

Stock ID: HOKIWNZ
Macruronus novaezelandiae
Region: New Zealand
(a)
Recruits
7.5e+09
5.0e+09
2.5e+09
0.0e+00
1970
1980
1990
2000
2010
Year
(b)
Standardized residuals
4
2
0
−2
−4
1970
1980
1990
2000
2010
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1970
1980
1990
2000
2010
Year


Stock ID: KMFLOUNBSAI
Atheresthes evermanni
Region: US Alaska
(a)
Recruits
6e+07
4e+07
2e+07
1990
2000
2010
Year
(b)
Standardized residuals
4
2
0
−2
−4
1990
2000
2010
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1990
2000
2010
Year

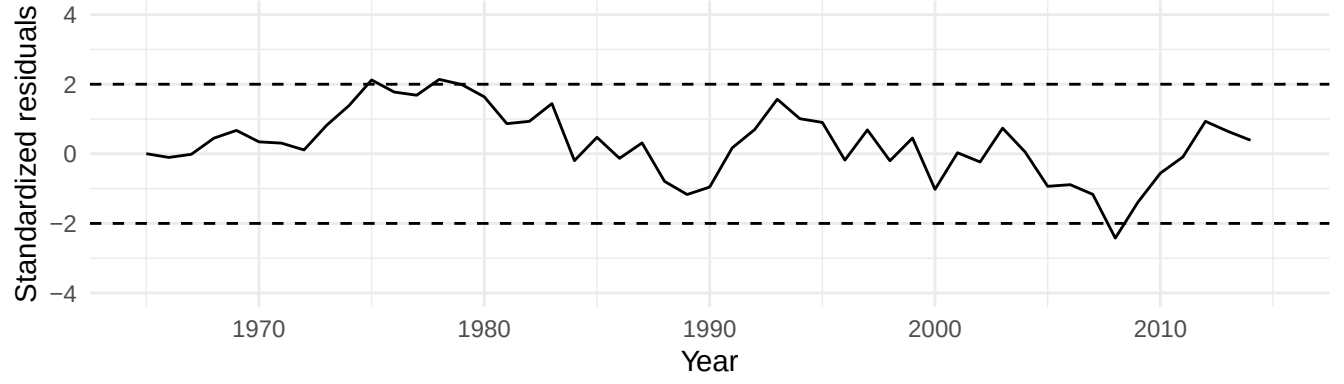

Stock ID: NRSOLEEBSAI
Lepidopsetta polyxystra
Region: US Alaska
(a)
Recruits
6e+06
4e+06
2e+06
0e+00
1980
1990
2000
2010
Year
(b)
Standardized residuals
4
2
0
−2
−4
1980
1990
2000
2010
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1980
1990
2000
2010
Year

Stock ID: PERCHEBSAI

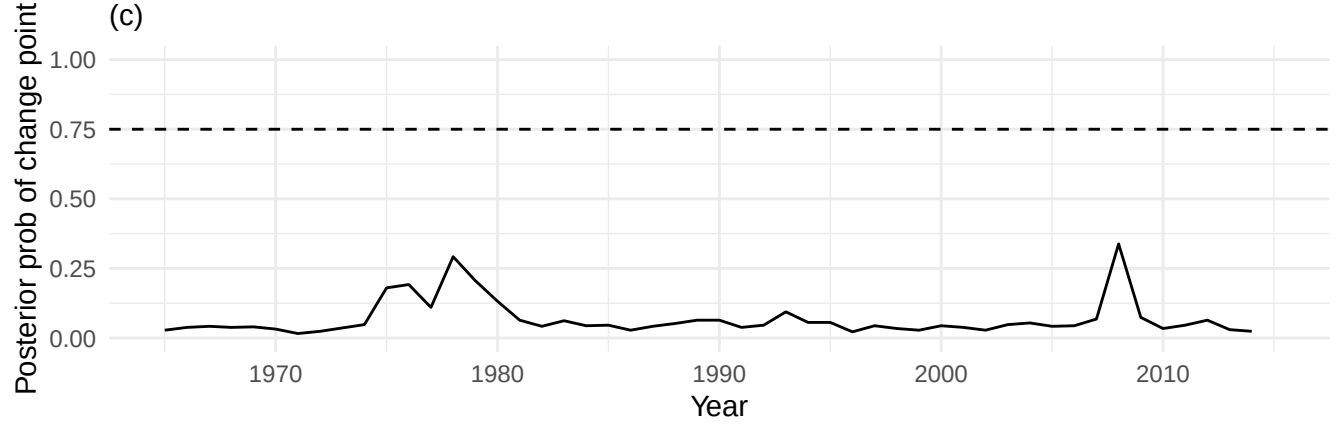
Sebastes alutus
Region: US Alaska
(a)

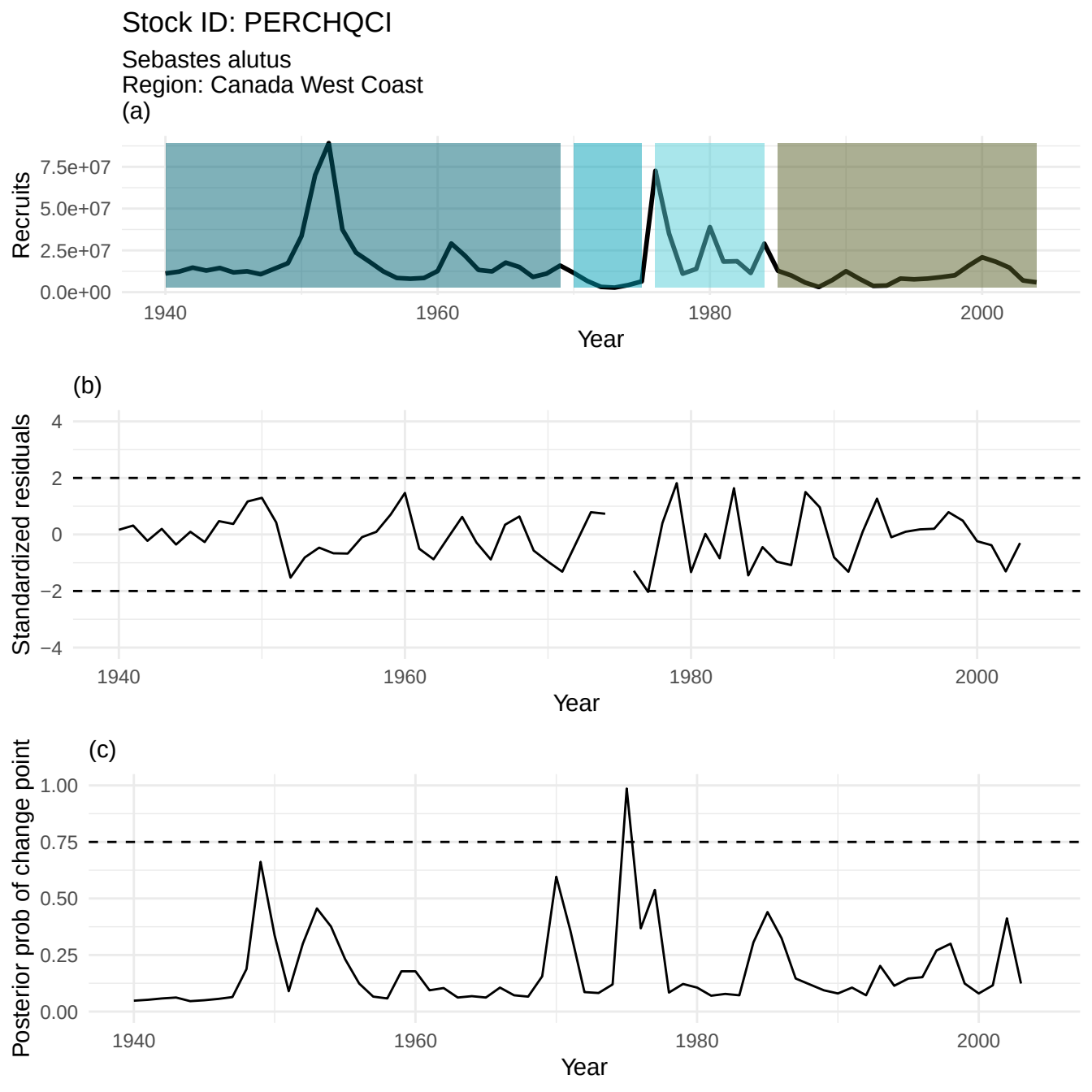


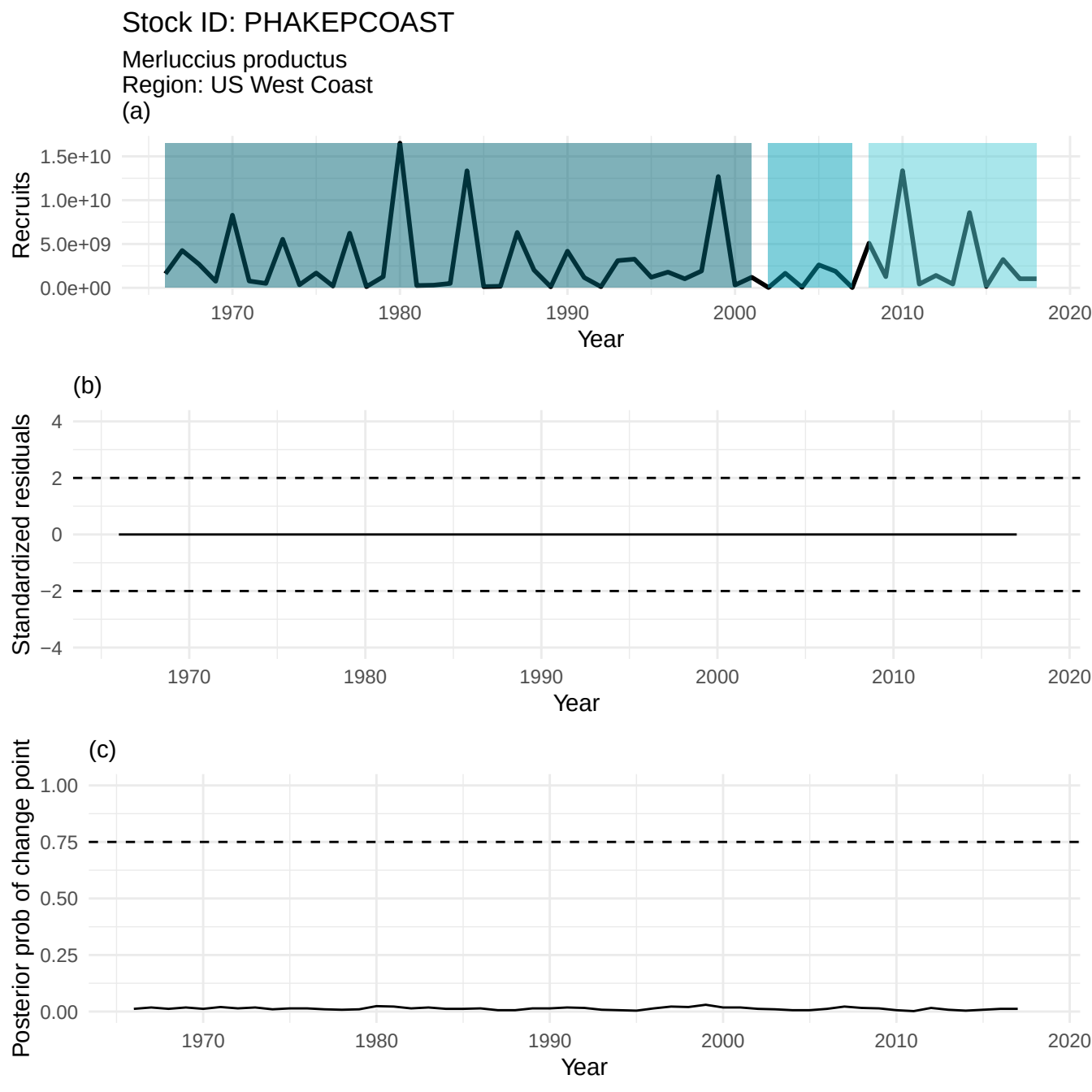
(b)

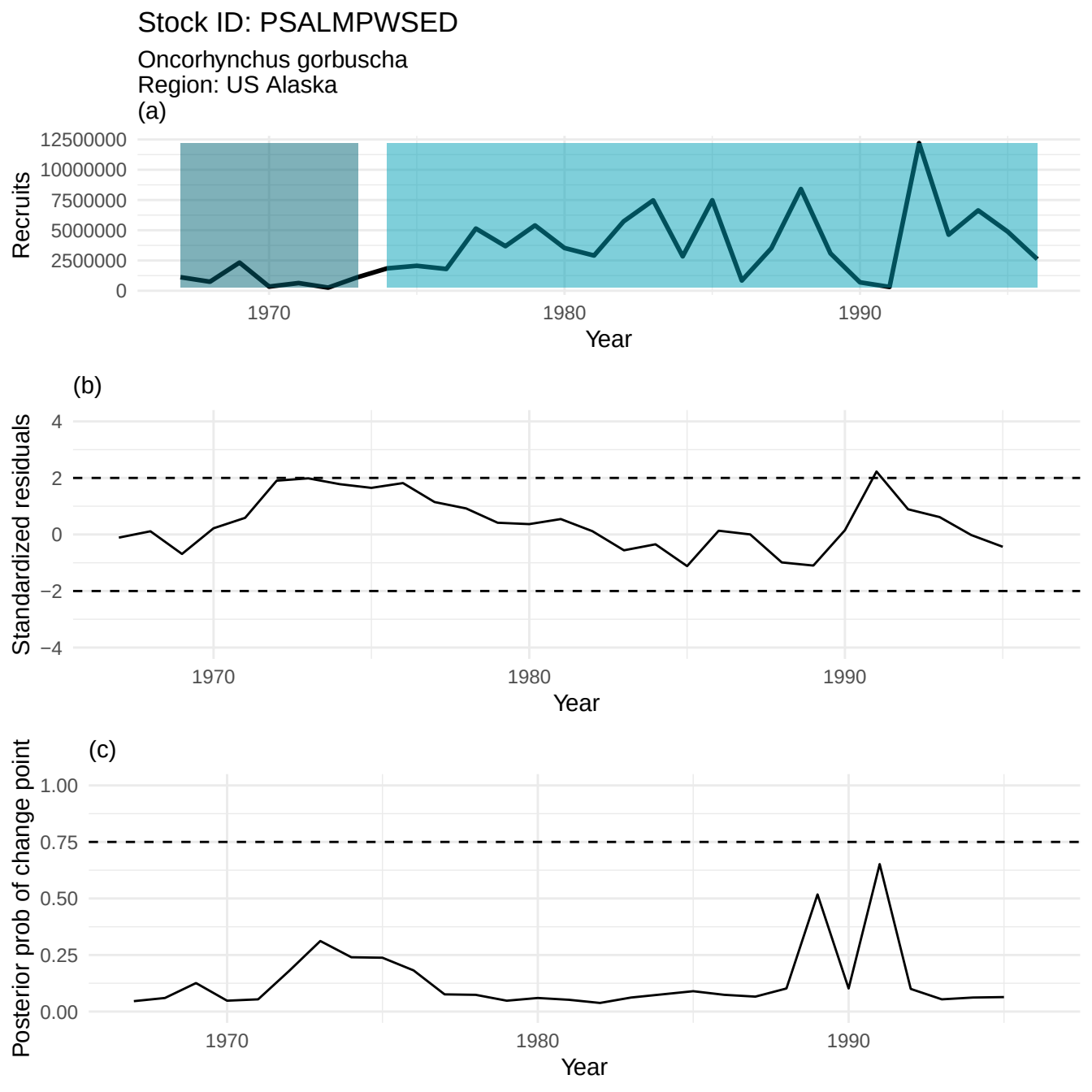


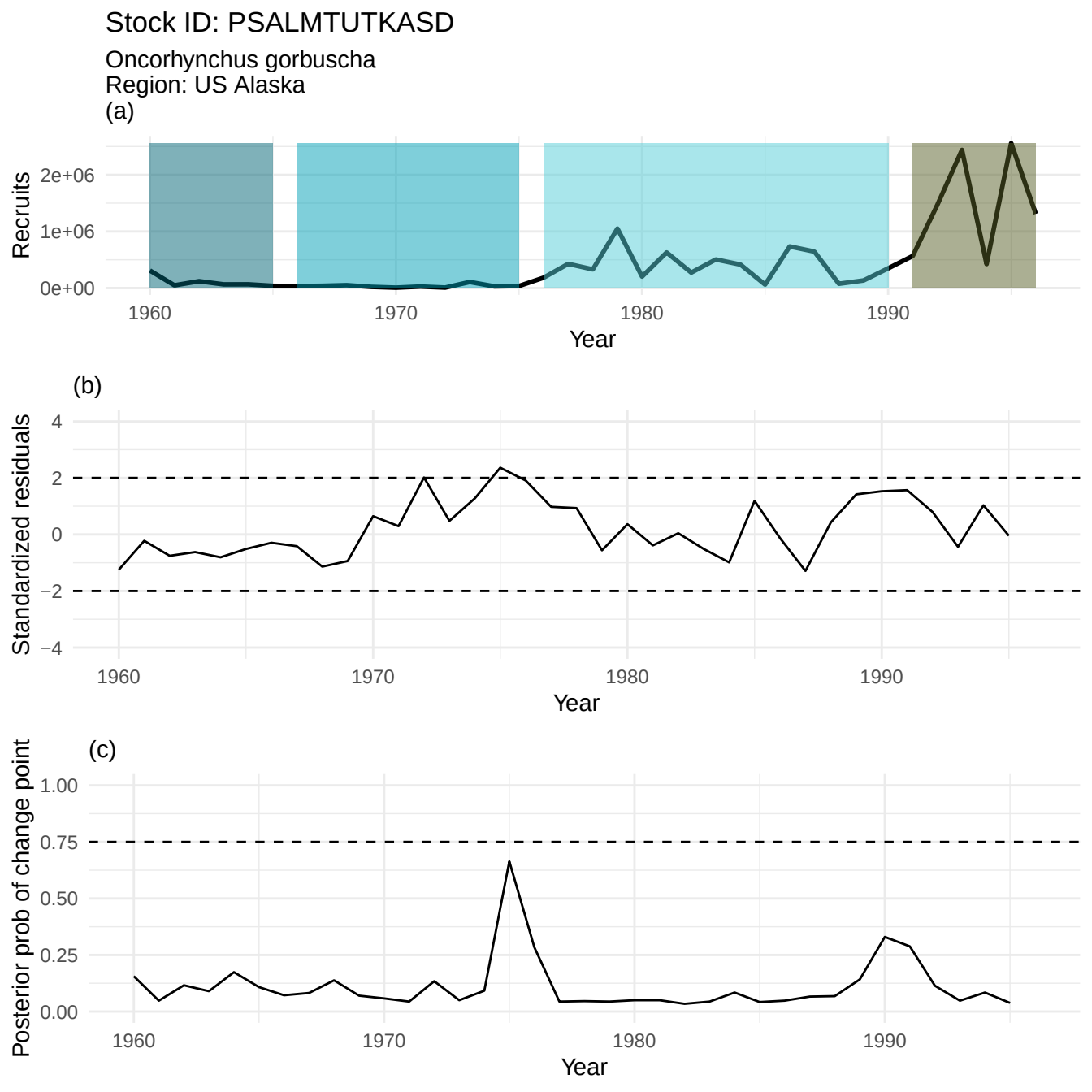
(c)

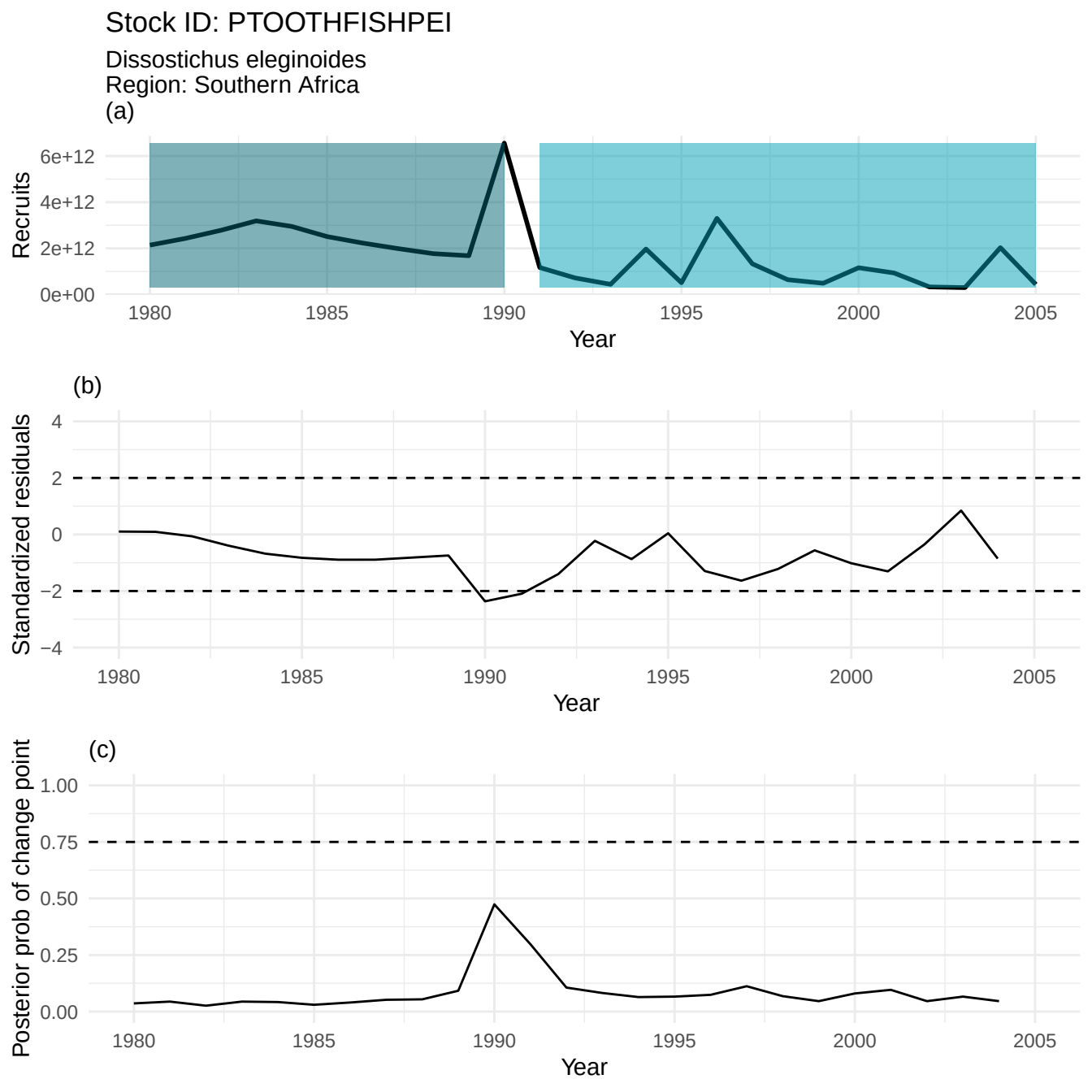


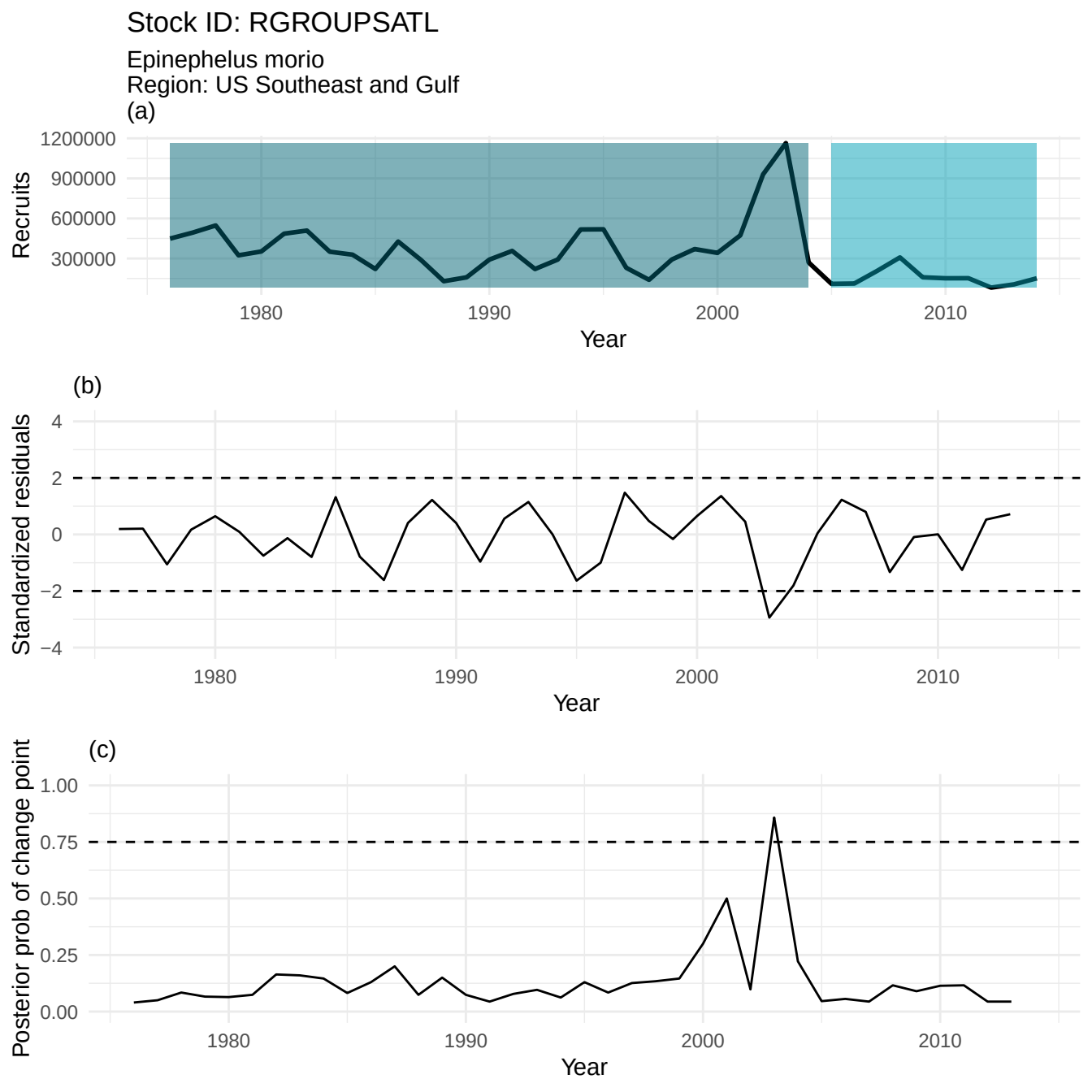

Stock ID: PERCHQCI
Sebastes alutus
Region: Canada West Coast
(a)
Recruits
7.5e+07
5.0e+07
2.5e+07
0.0e+00
1940
1960
1980
2000
Year
(b)
Standardized residuals
4
2
0
−2
−4
1940
1960
1980
2000
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1940
1960
1980
2000
Year

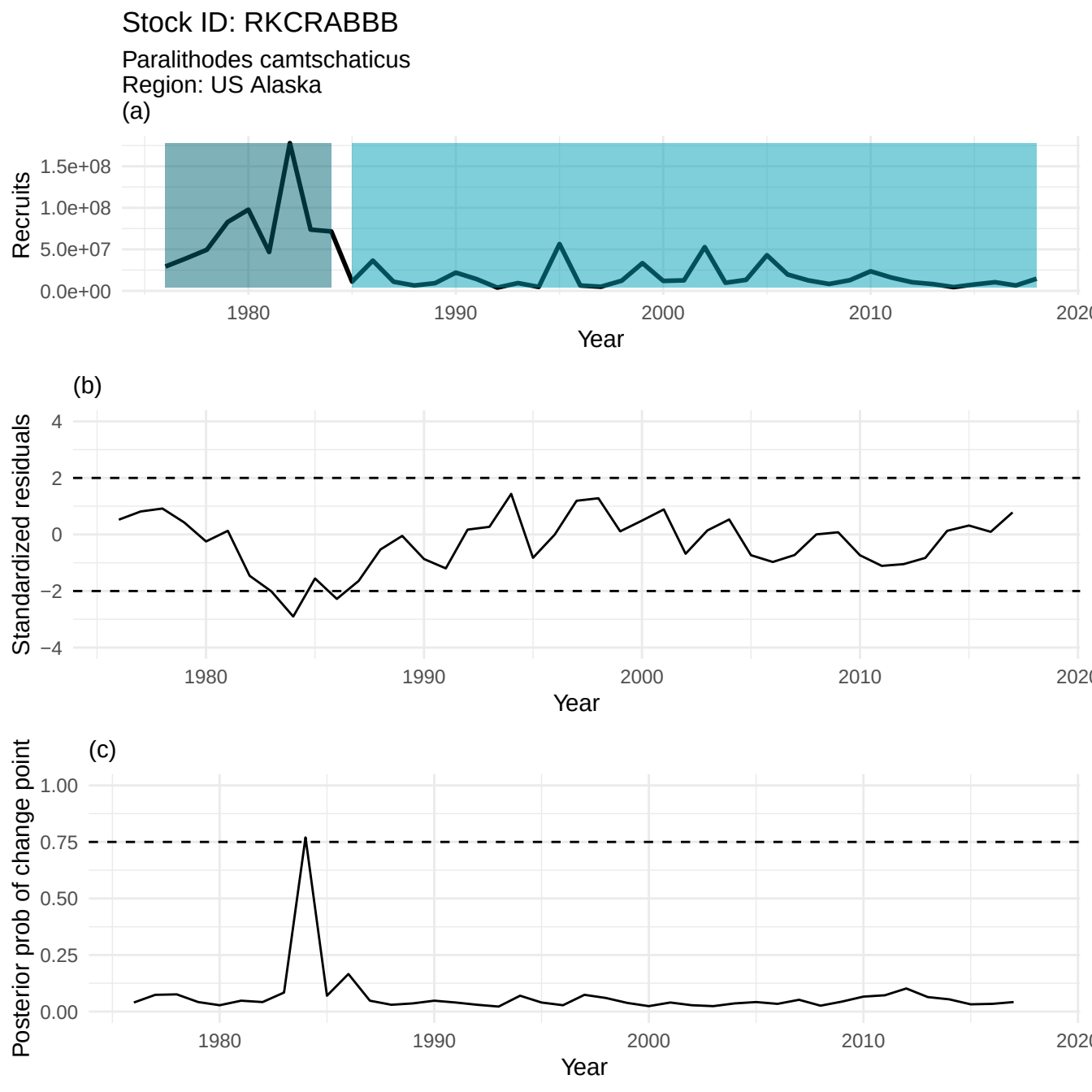

Stock ID: PHAKEPCOAST
Merluccius productus
Region: US West Coast
(a)
Recruits
1.5e+10
1.0e+10
5.0e+09
0.0e+00
1970
1980
1990
2000
2010
2020
Year
(b)
Standardized residuals
4
2
0
−2
−4
1970
1980
1990
2000
2010
2020
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1970
1980
1990
2000
2010
2020
Year

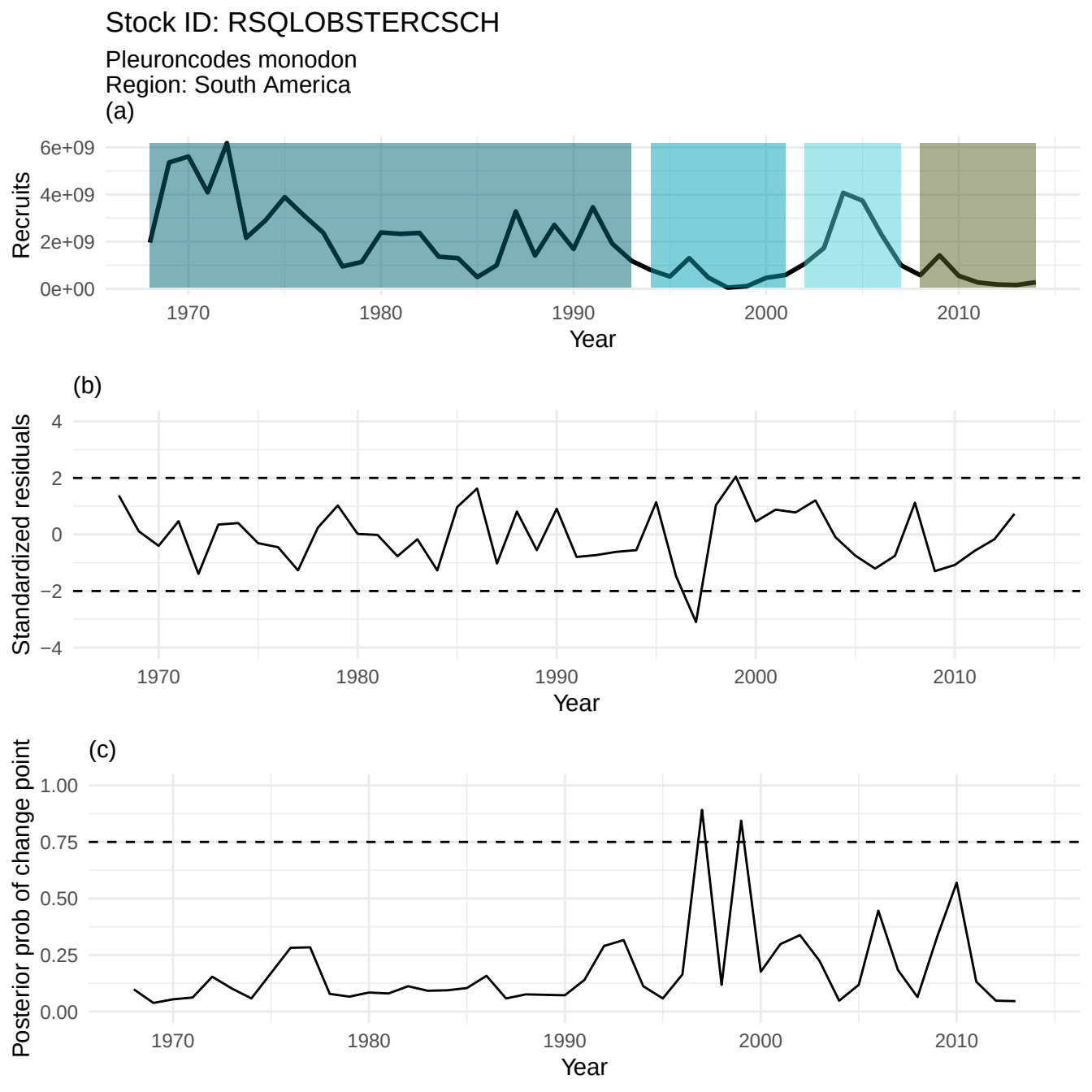

Stock ID: PSALMPWSED
Oncorhynchus gorbuscha
Region: US Alaska
(a)
Recruits
12500000
10000000
7500000
5000000
2500000
0
1970
1980
1990
Year
(b)
Standardized residuals
4
2
0
−2
−4
1970
1980
1990
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1970
1980
1990
Year

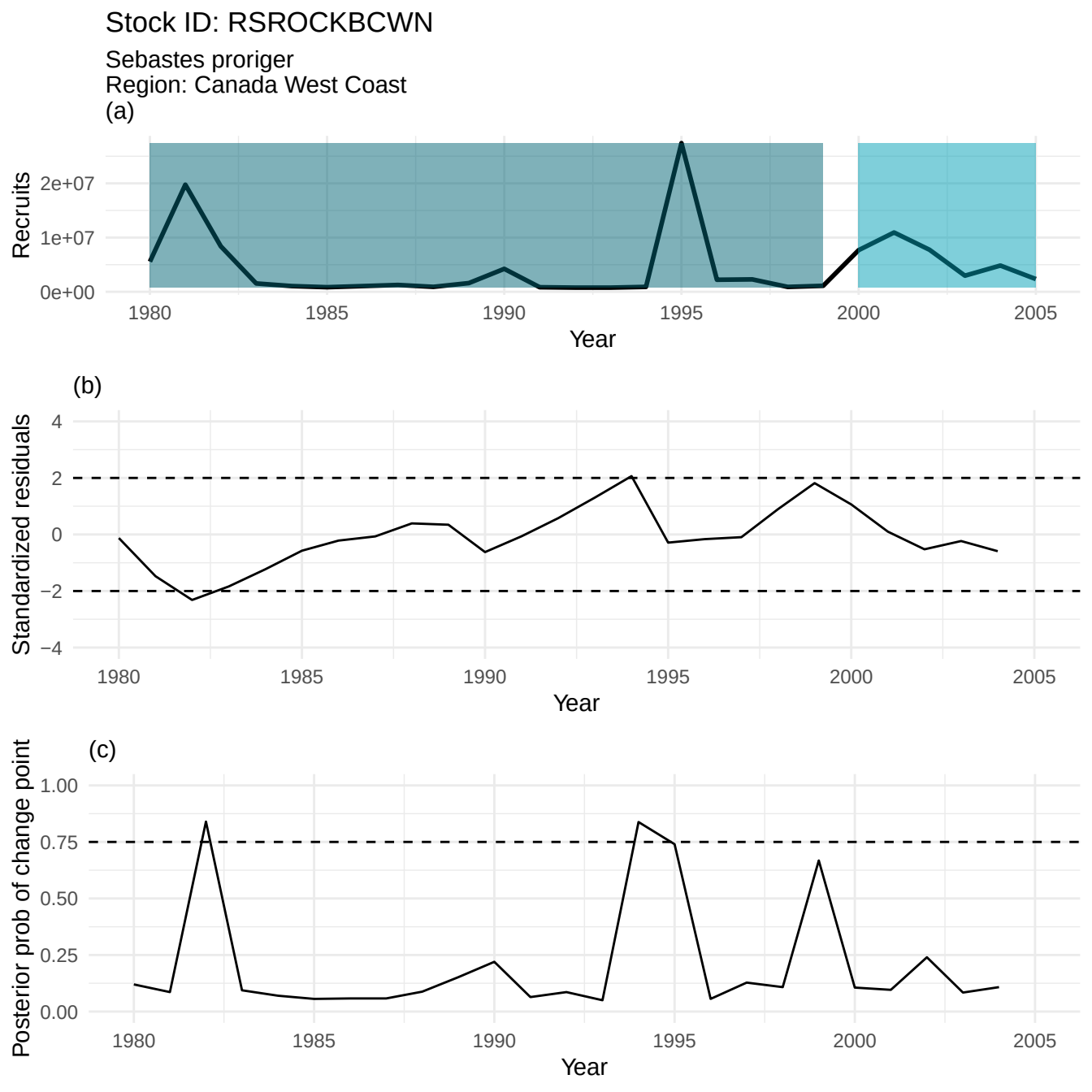

Stock ID: PSALMTUTKASD
Oncorhynchus gorbuscha
Region: US Alaska
(a)
Recruits
2e+06
1e+06
0e+00
1960
1970
1980
1990
Year
(b)
Standardized residuals
4
2
0
−2
−4
1960
1970
1980
1990
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1960
1970
1980
1990
Year

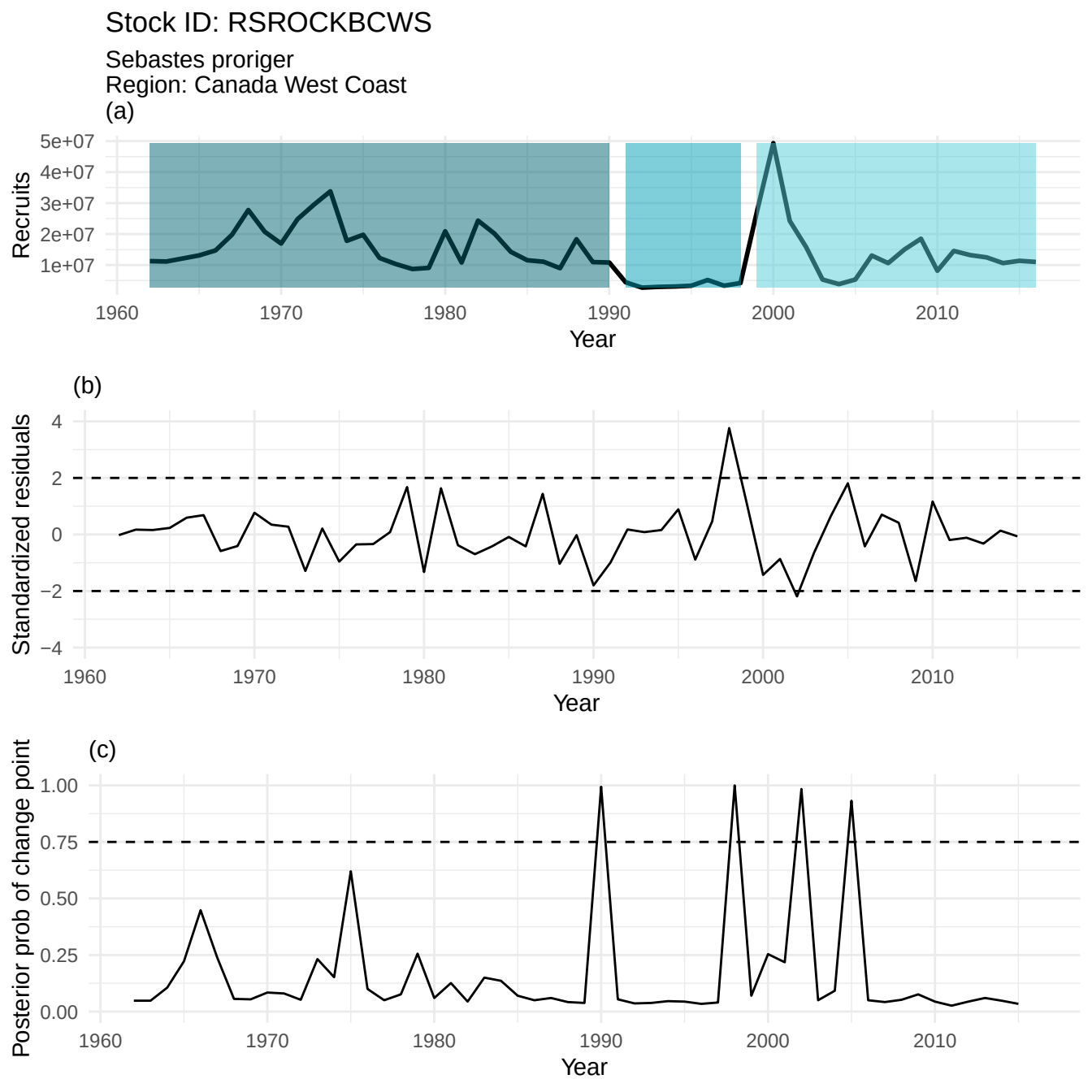

Stock ID: PTOOTHFISHPEI
Dissostichus eleginoides
Region: Southern Africa
(a)
Recruits
6e+12
4e+12
2e+12
0e+00
1980
1985
1990
1995
2000
2005
Year
(b)
Standardized residuals
4
2
0
−2
−4
1980
1985
1990
1995
2000
2005
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1980
1985
1990
1995
2000
2005
Year

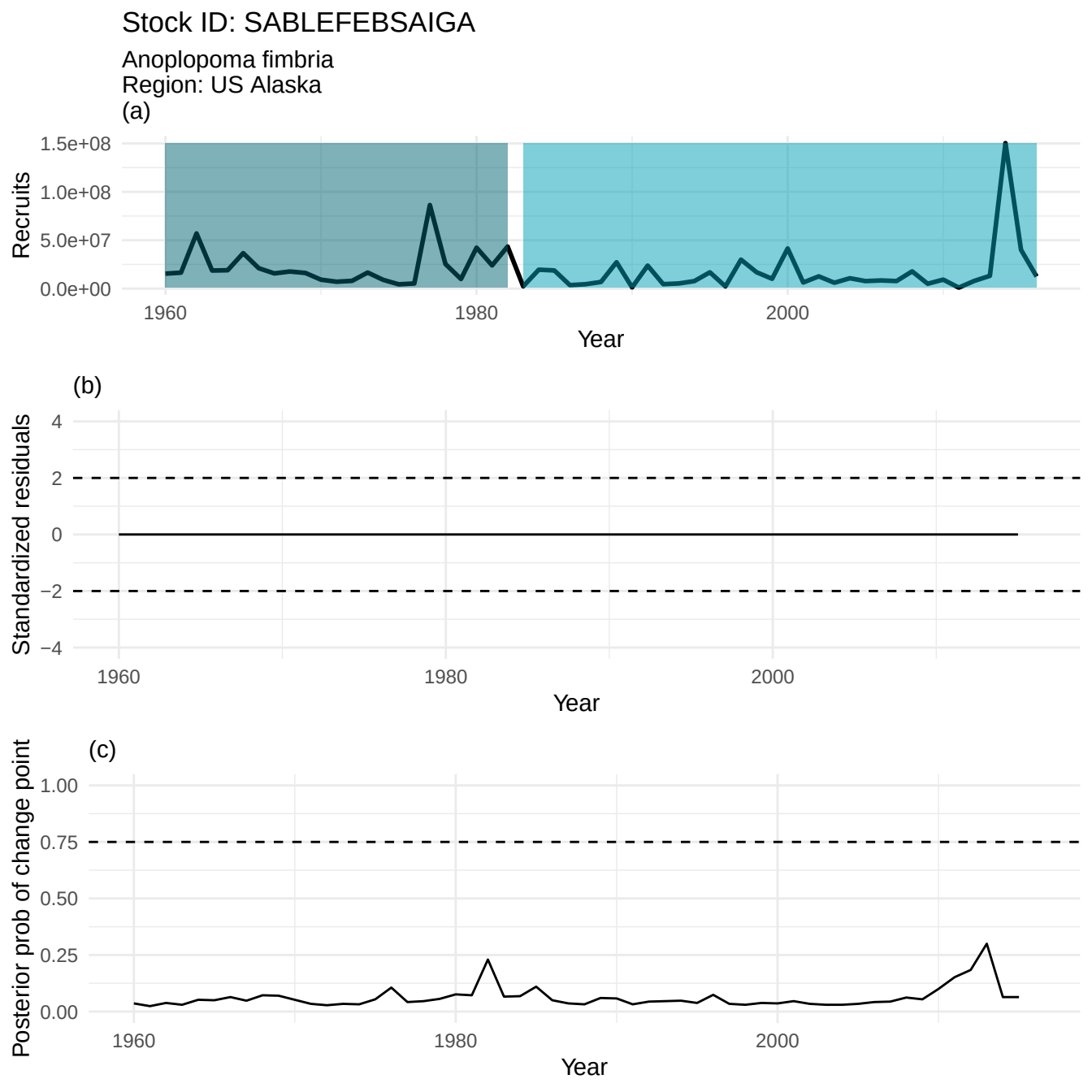

Stock ID: RGROUPSATL
Epinephelus morio
Region: US Southeast and Gulf
(a)
Recruits
1200000
900000
600000
300000
1980
1990
2000
2010
Year
(b)
Standardized residuals
4
2
0
−2
−4
1980
1990
2000
2010
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1980
1990
2000
2010
Year

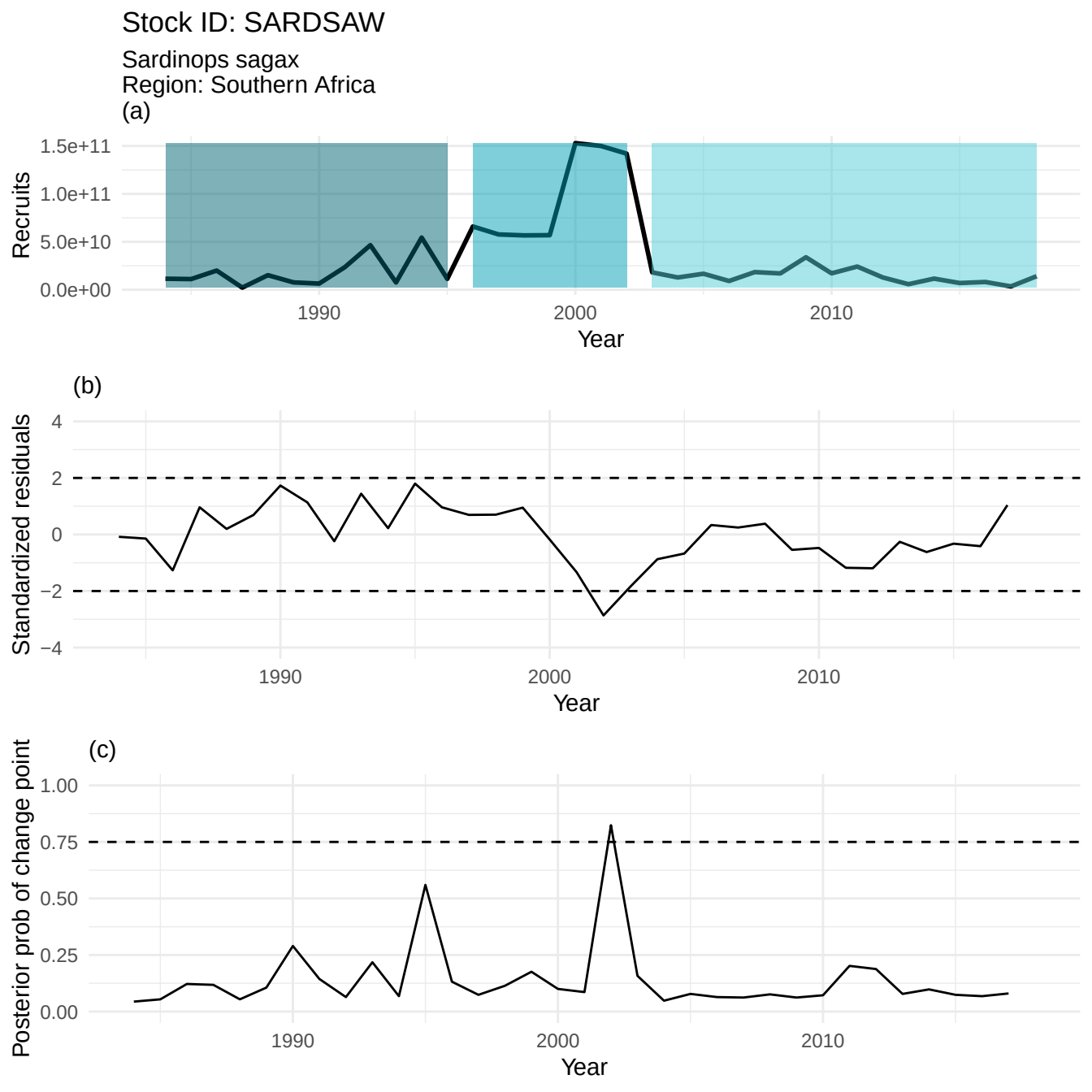

Stock ID: RKCRABBB
Paralithodes camtschaticus
Region: US Alaska
(a)
Recruits
1.5e+08
1.0e+08
5.0e+07
0.0e+00
1980
1990
2000
2010
Year
(b)
Standardized residuals
4
2
0
−2
−4
1980
1990
2000
2010
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1980
1990
2000
2010
Year

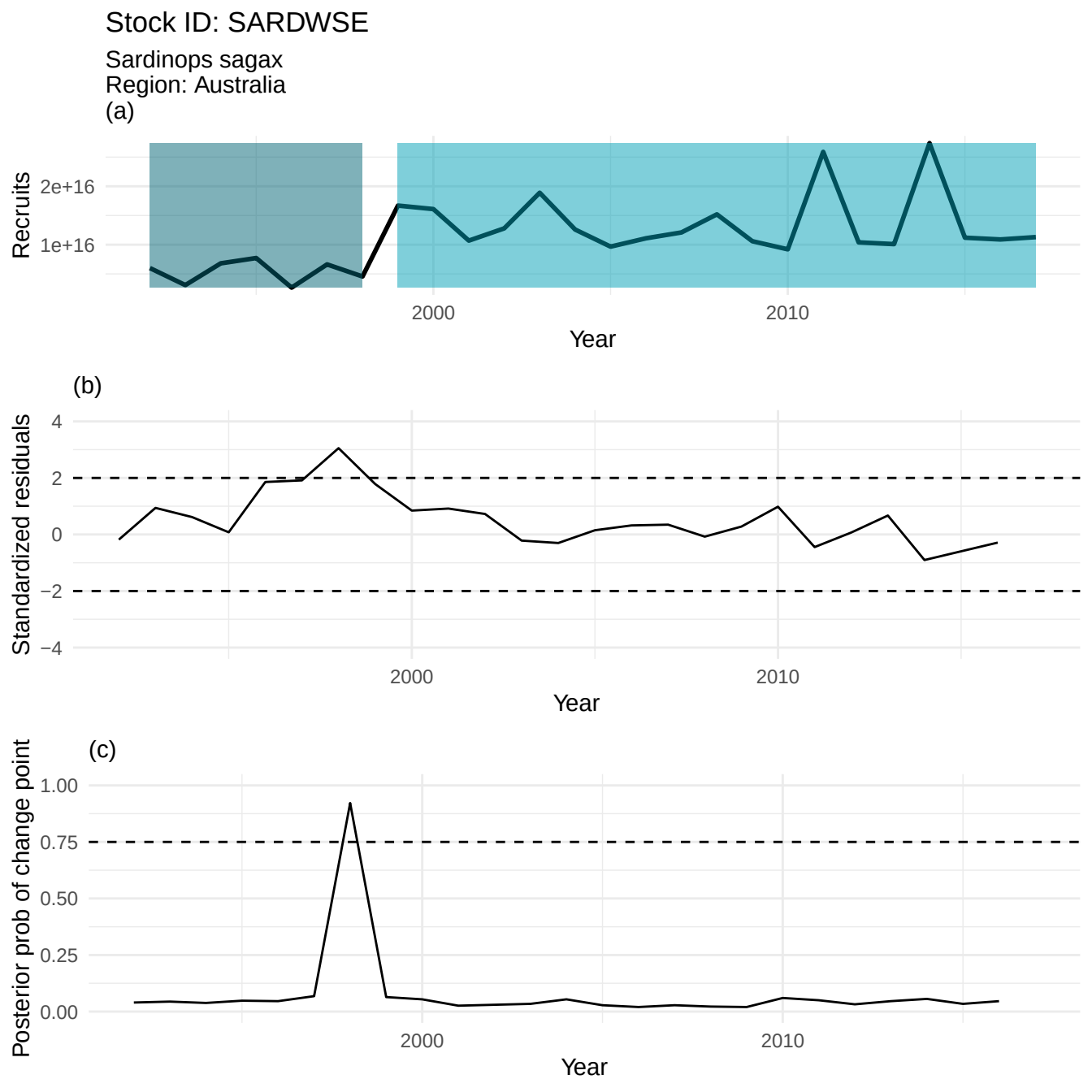

Stock ID: RSQLOBSTERCSCH
Pleuroncodes monodon
Region: South America
(a)
Recruits
6e+09
4e+09
2e+09
0e+00
1970
1980
1990
2000
2010
Year
(b)
Standardized residuals
4
2
0
−2
−4
1970
1980
1990
2000
2010
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1970
1980
1990
2000
2010
Year

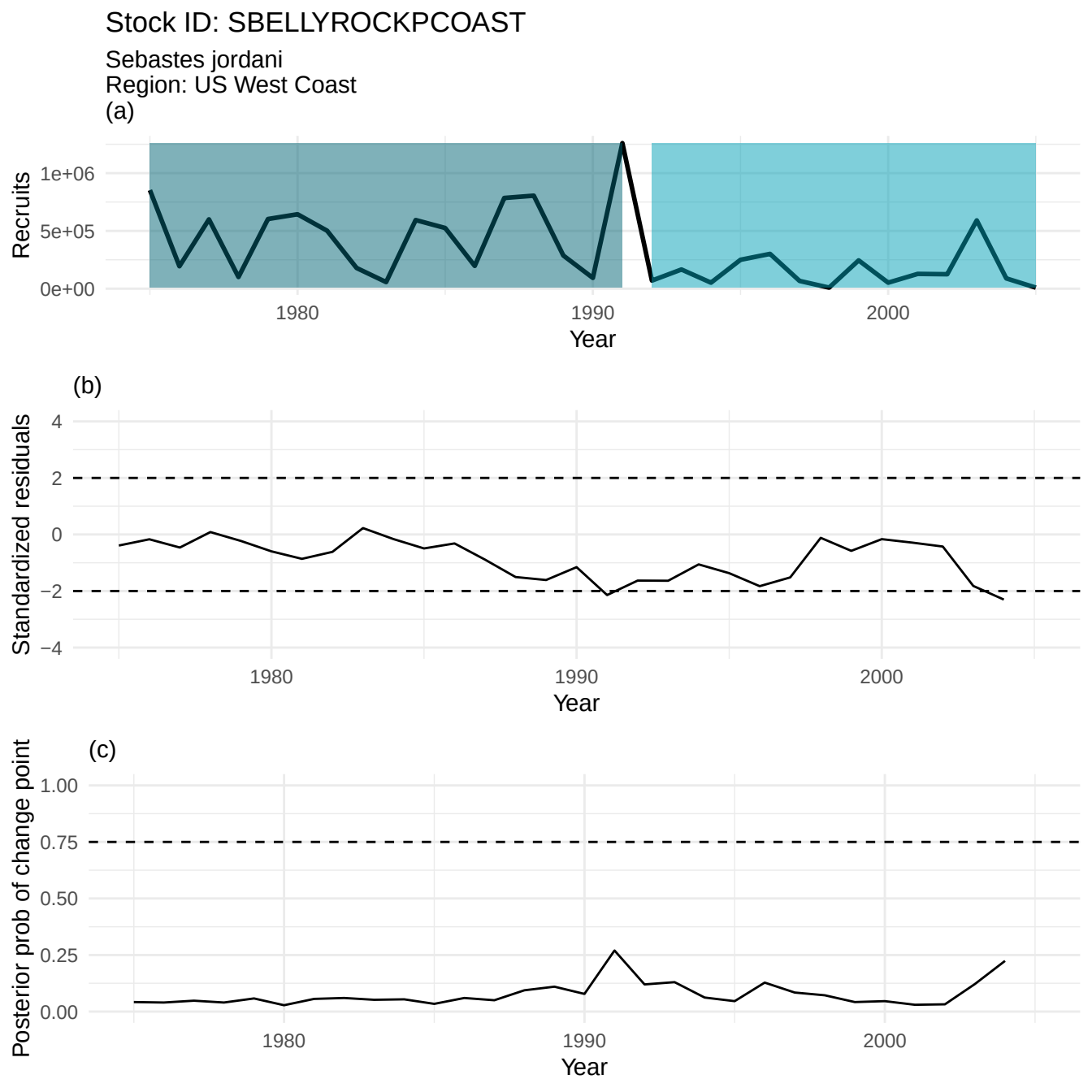

Stock ID: RSROCKBCWN
Sebastes proriger
Region: Canada West Coast
(a)
Recruits
2e+07
1e+07
0e+00
1980
1985
1990
1995
2000
2005
Year
(b)
Standardized residuals
4
2
0
−2
−4
1980
1985
1990
1995
2000
2005
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1980
1985
1990
1995
2000
2005
Year

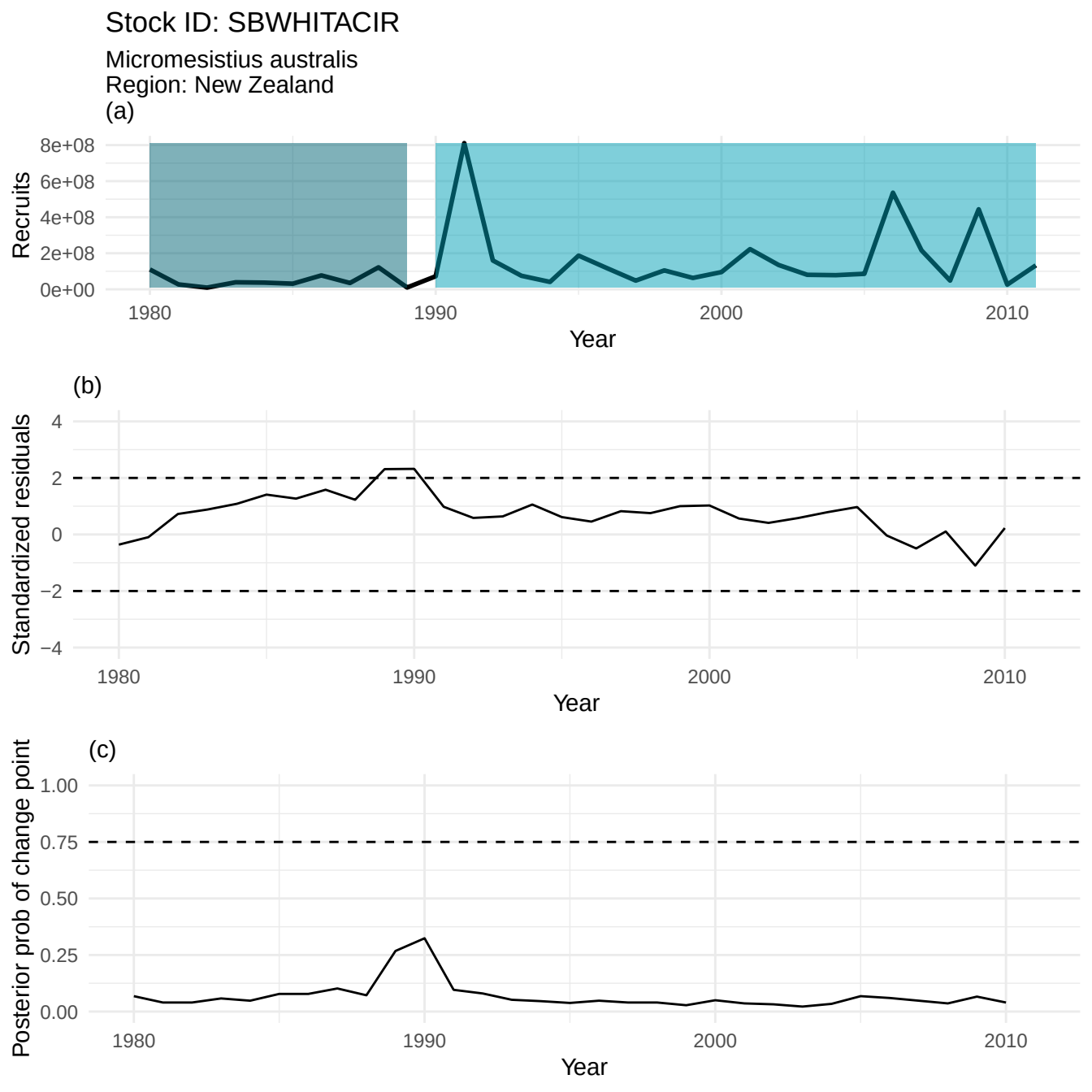

Stock ID: RSROCKBCWS
Sebastes proriger
Region: Canada West Coast
(a)
Recruits
5e+07
4e+07
3e+07
2e+07
1e+07
1960
1970
1980
1990
2000
2010
Year
(b)
Standardized residuals
4
2
0
−2
−4
1960
1970
1980
1990
2000
2010
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1960
1970
1980
1990
2000
2010
Year

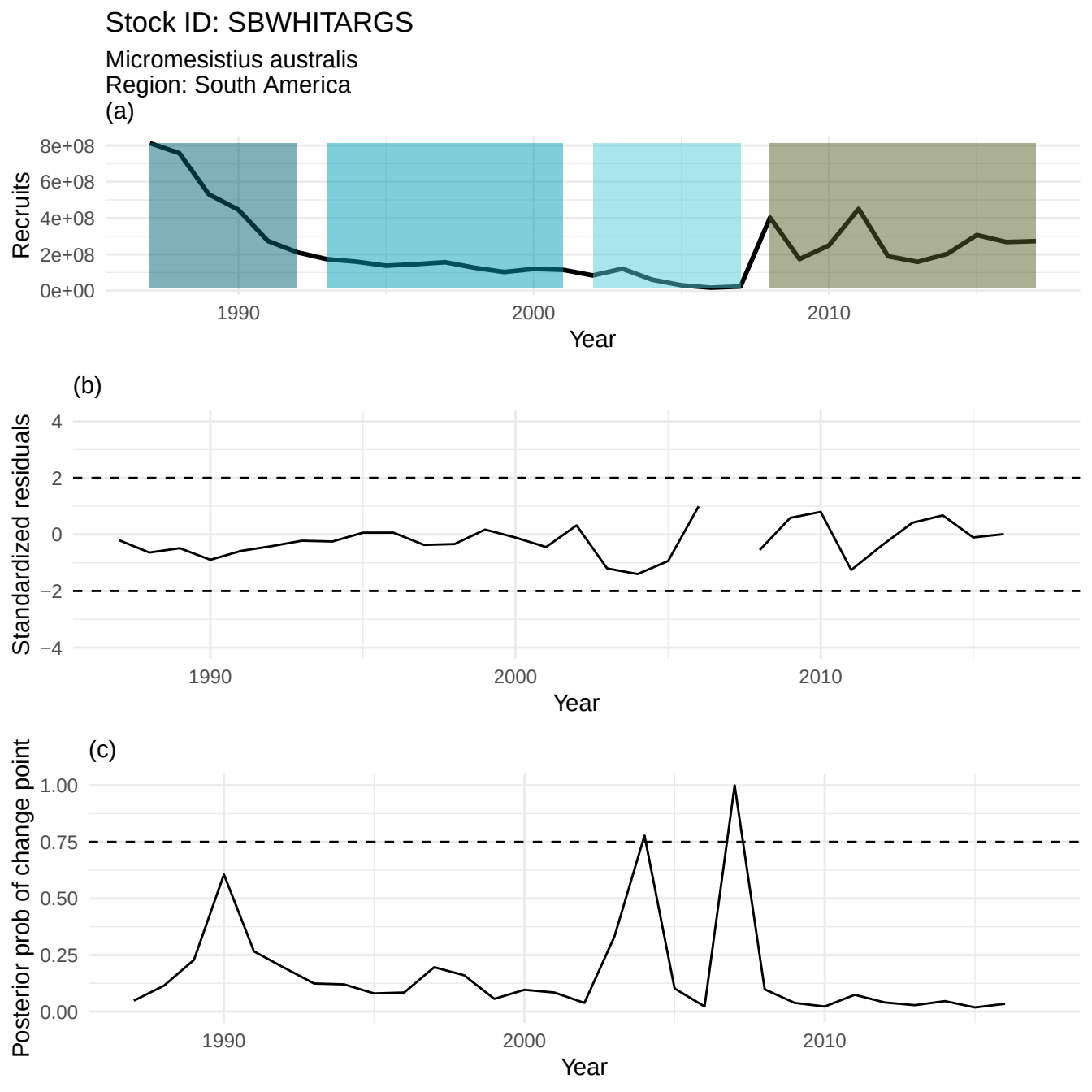

Stock ID: SABLEFEBSAIGA
Anoplopoma fimbria
Region: US Alaska
(a)
Recruits
1.5e+08
1.0e+08
5.0e+07
0.0e+00
1960
1980
2000
Year
(b)
Standardized residuals
4
2
0
−2
−4
1960
1980
2000
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1960
1980
2000
Year

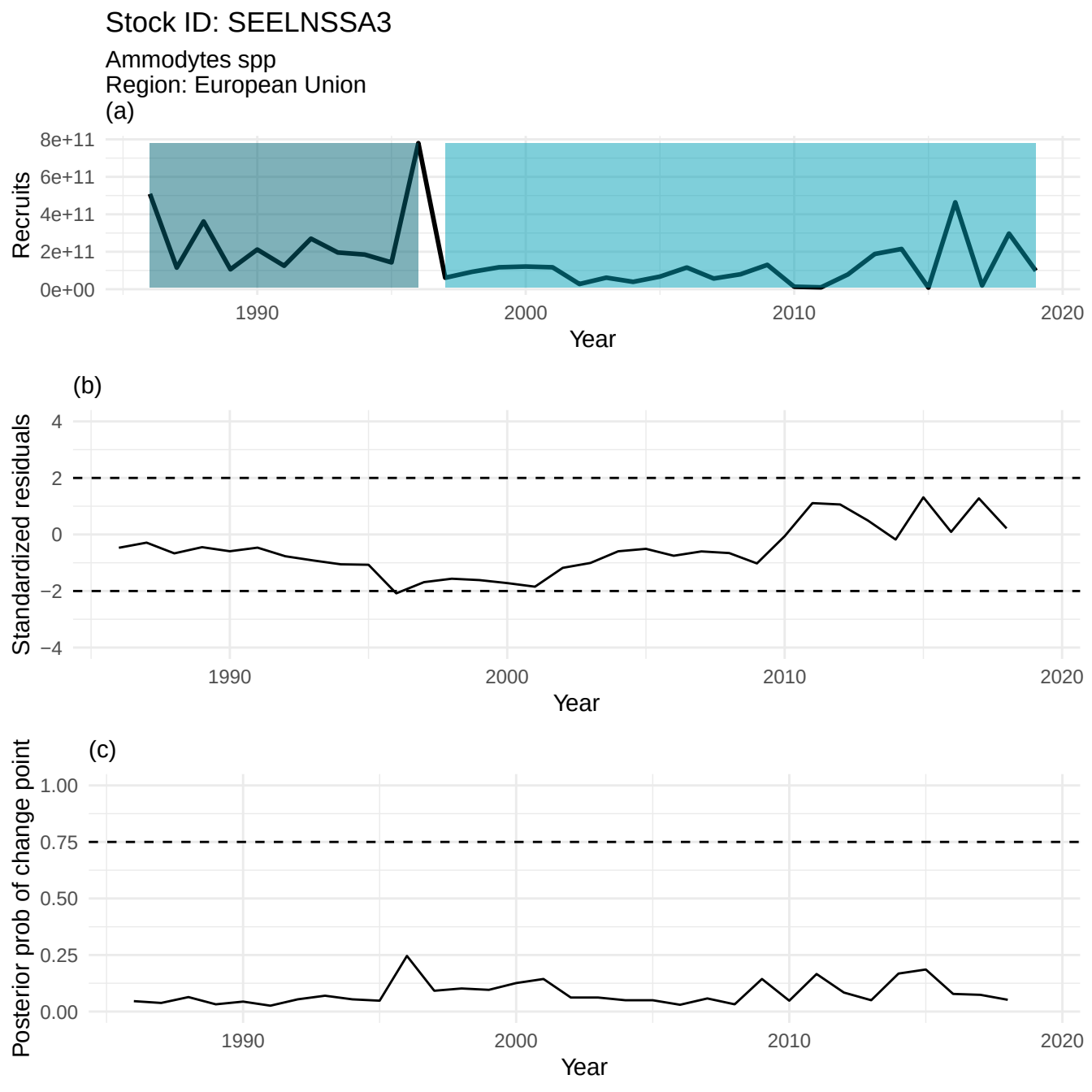

Stock ID: SARDSAW
Sardinops sagax
Region: Southern Africa
(a)
Recruits
1.5e+11
1.0e+11
5.0e+10
0.0e+00
1990
2000
2010
Year
(b)
Standardized residuals
4
2
0
−2
−4
1990
2000
2010
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1990
2000
2010
Year

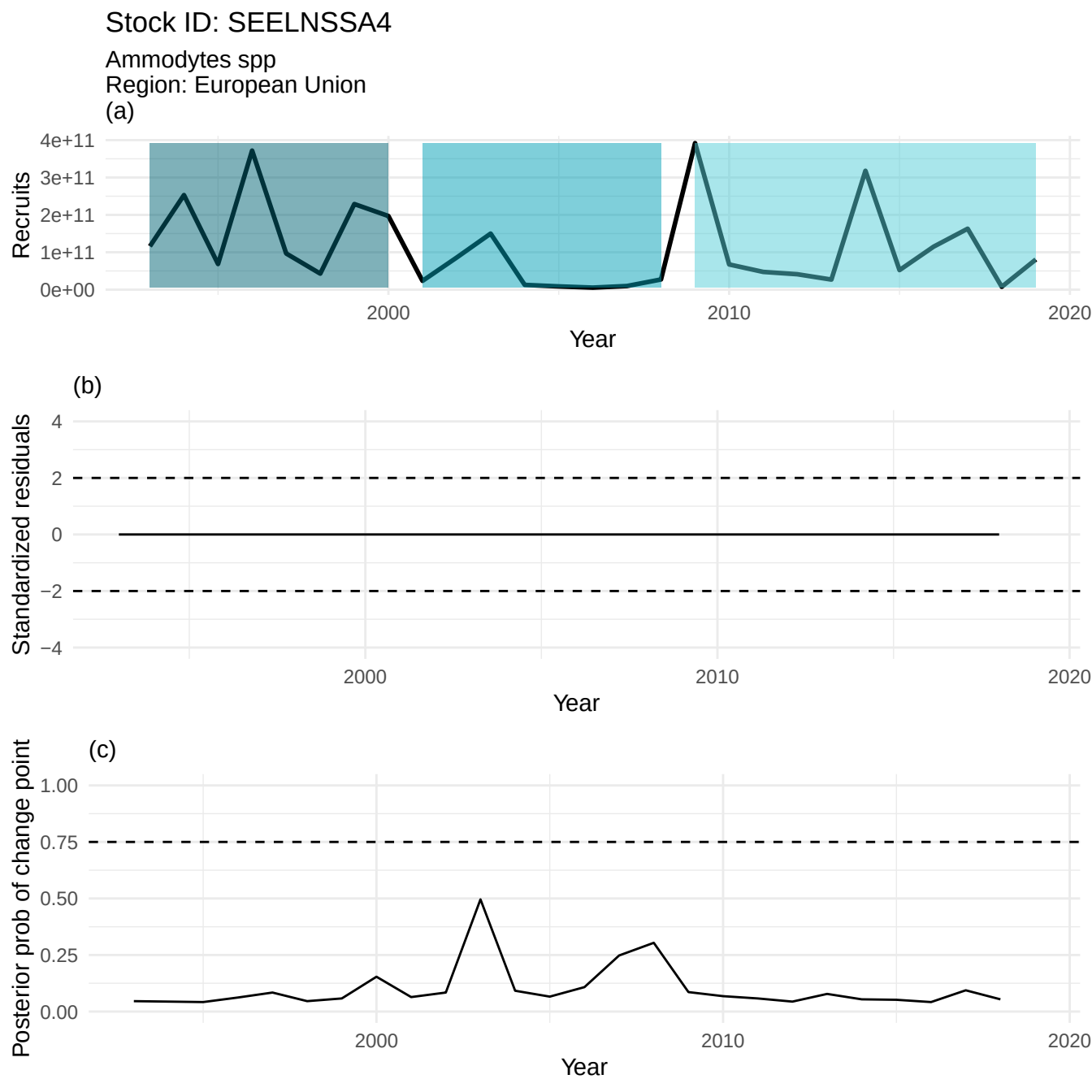

Stock ID: SARDWSE
Sardinops sagax
Region: Australia
(a)
Recruits
2e+16
1e+16
2000
2010
Year
(b)
Standardized residuals
4
2
0
−2
−4
2000
2010
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
2000
2010
Year

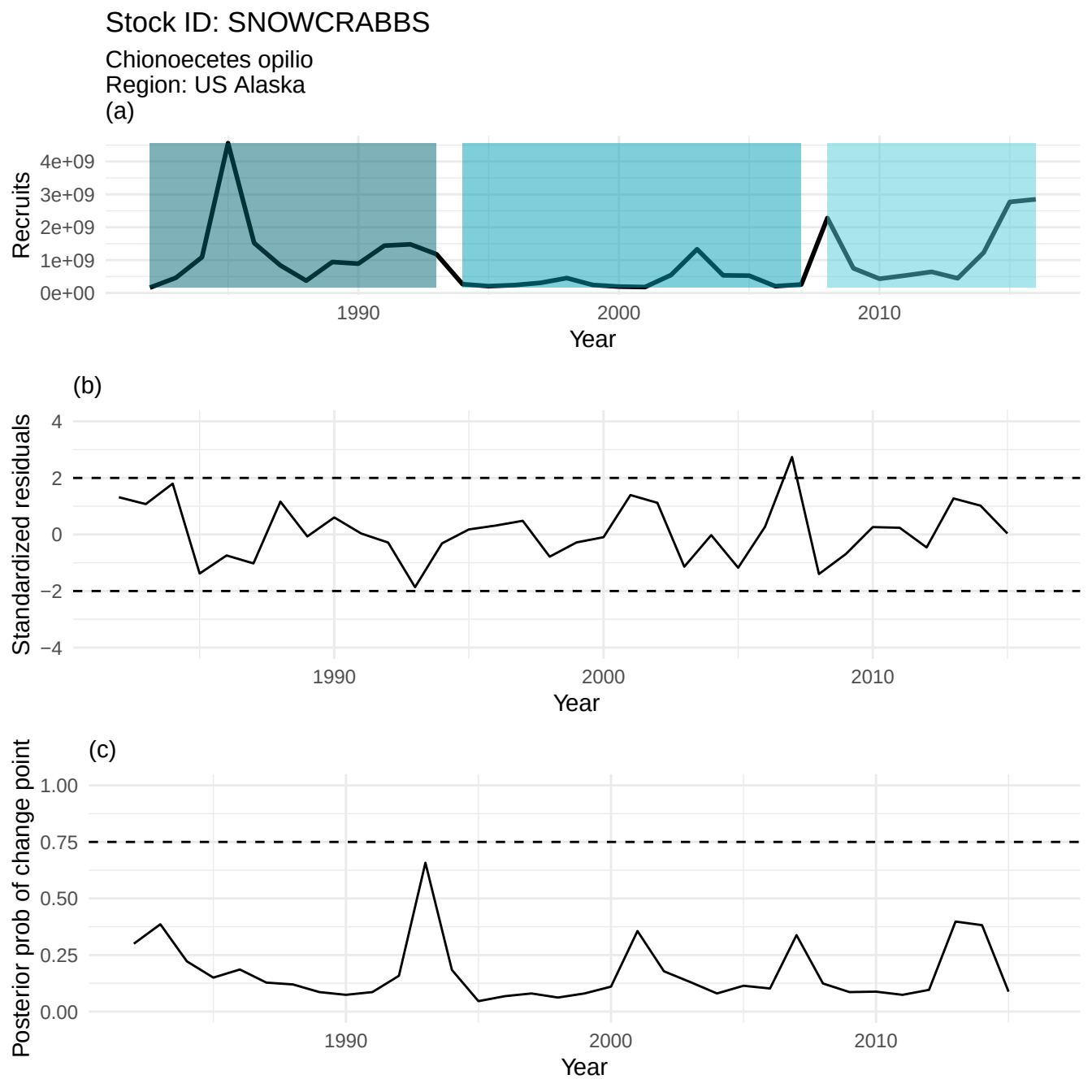

Stock ID: SBELLYROCKPCOAST
Sebastes jordani
Region: US West Coast
(a)
Recruits
1e+06
5e+05
0e+00
1980
1990
2000
Year
(b)
Standardized residuals
4
2
0
−2
−4
1980
1990
2000
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1980
1990
2000
Year

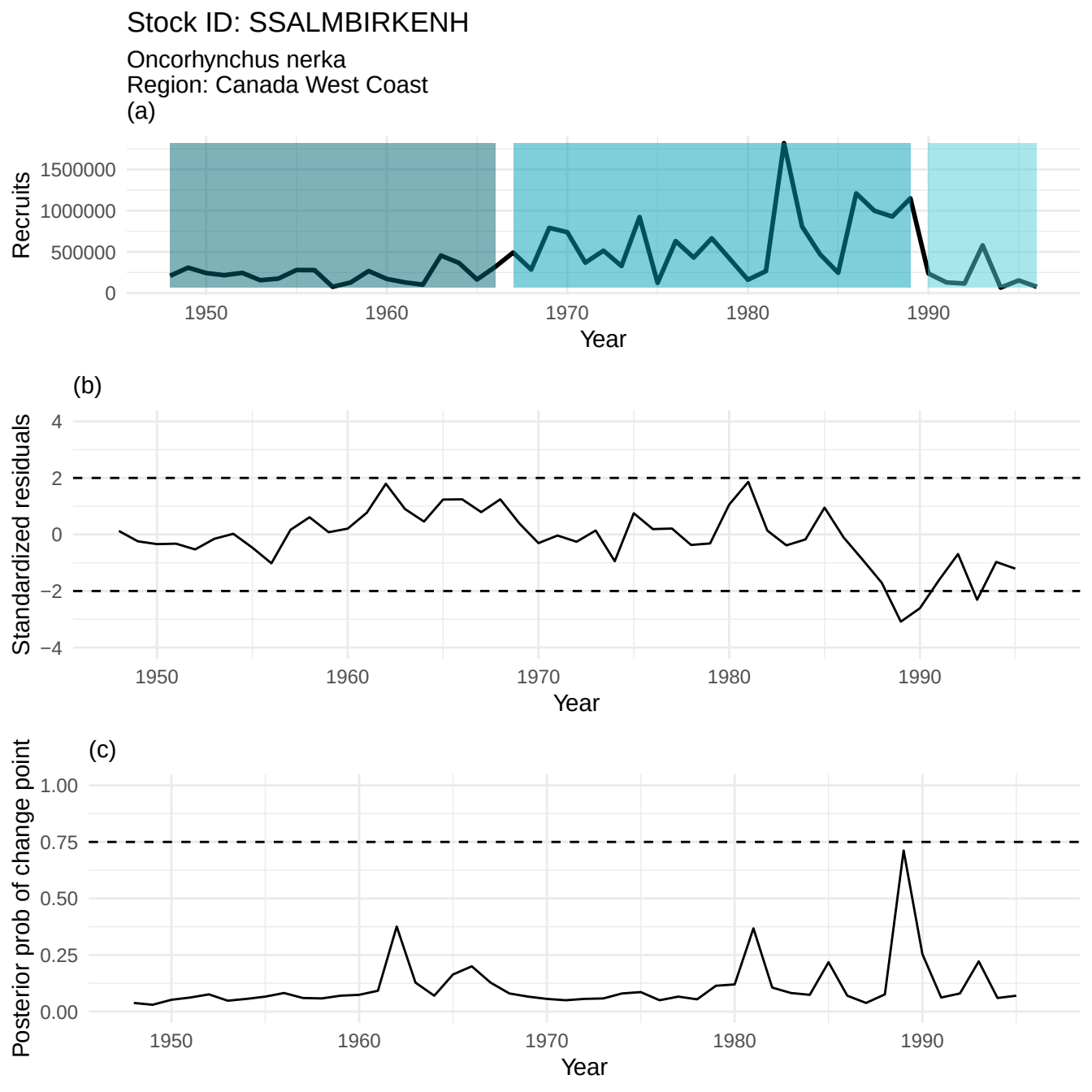

Stock ID: SBWHITACIR
Micromesistius australis
Region: New Zealand
(a)
Recruits
8e+08
6e+08
4e+08
2e+08
0e+00
1980
1990
2000
2010
Year
(b)
Standardized residuals
4
2
0
−2
−4
1980
1990
2000
2010
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1980
1990
2000
2010
Year

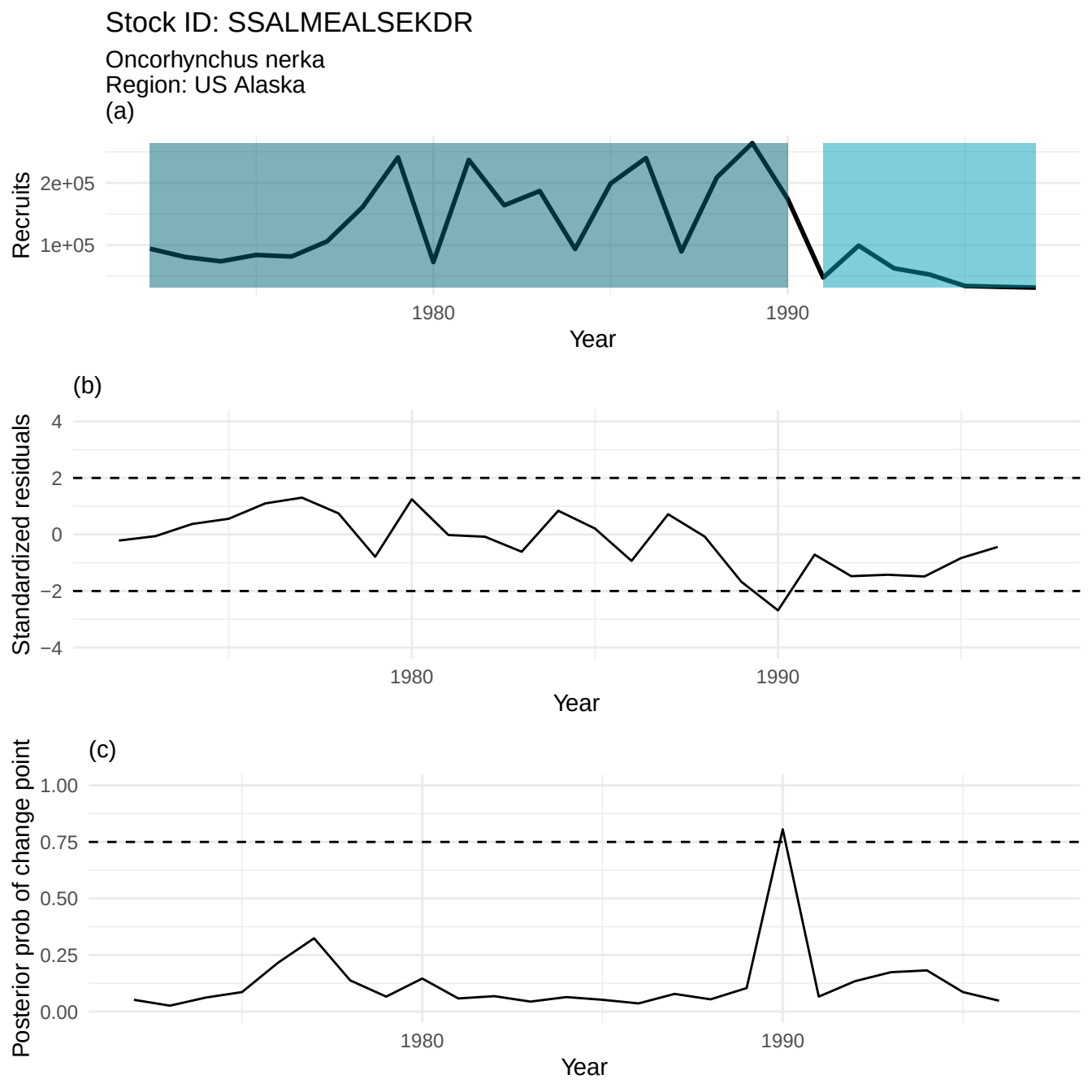

Stock ID: SBWHITARGS
Micromesistius australis
Region: South America
(a)
Recruits
8e+08
6e+08
4e+08
2e+08
0e+00
1990
2000
2010
Year
(b)
Standardized residuals
4
2
0
−2
−4
1990
2000
2010
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1990
2000
2010
Year

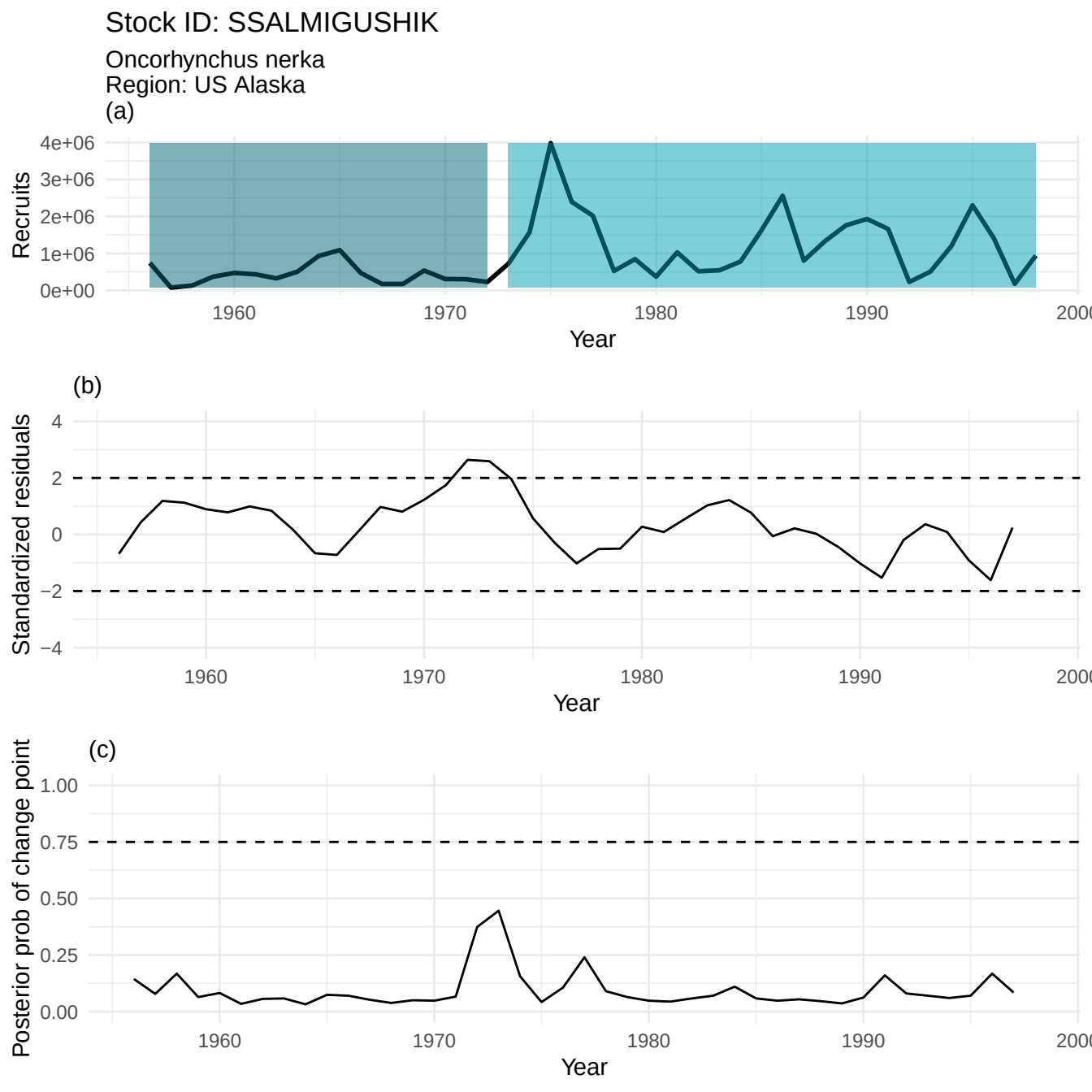

Stock ID: SEELNSSA3
Ammodytes spp
Region: European Union
(a)
Recruits
8e+11
6e+11
4e+11
2e+11
0e+00
1990
2000
2010
2020
Year
(b)
Standardized residuals
4
2
0
−2
−4
1990
2000
2010
2020
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1990
2000
2010
2020
Year

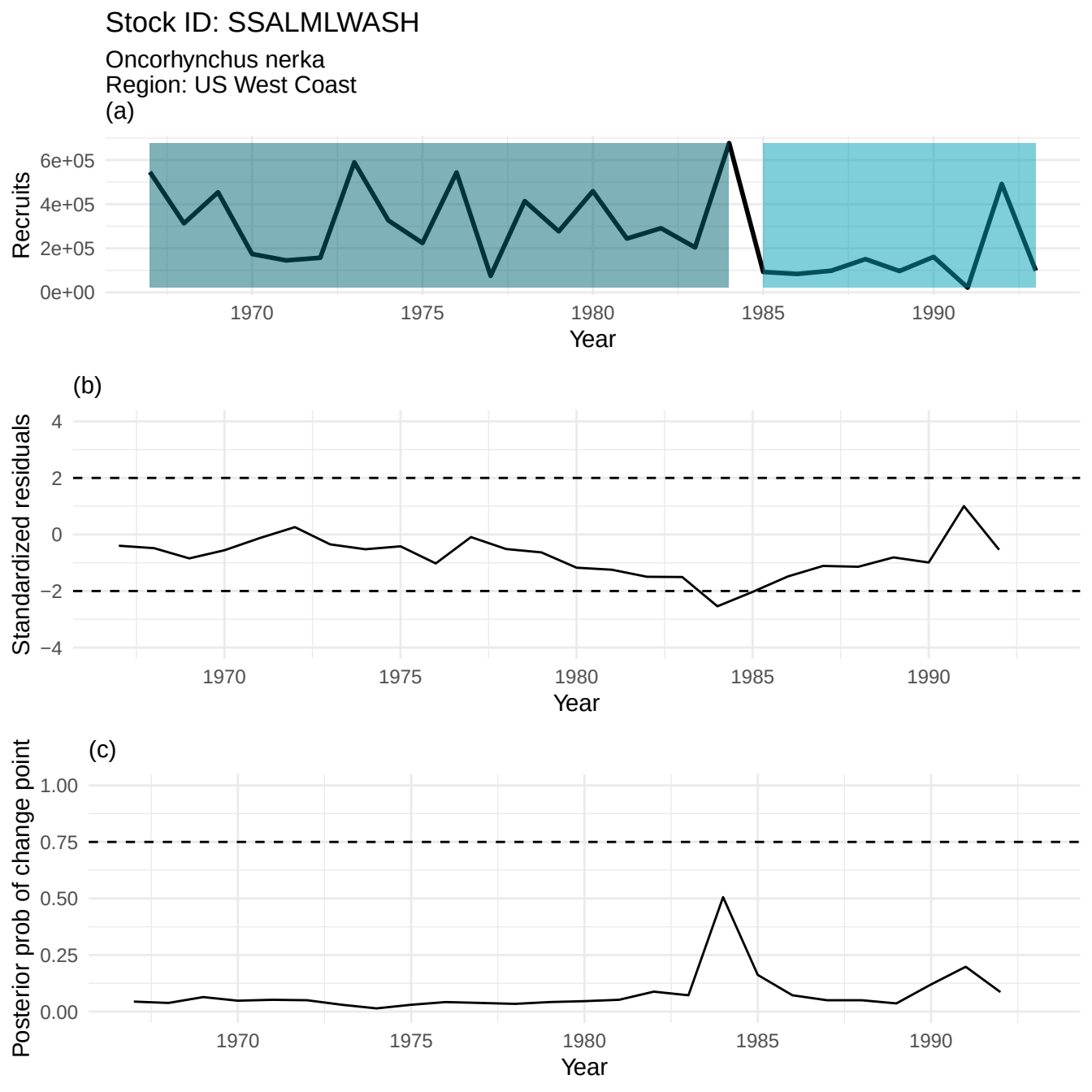

Stock ID: SEELNSSA4
Ammodytes spp
Region: European Union
(a)
Recruits
4e+11
3e+11
2e+11
1e+11
0e+00
2000
2010
2020
Year
(b)
Standardized residuals
4
2
0
−2
−4
2000
2010
2020
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
2000
2010
2020
Year

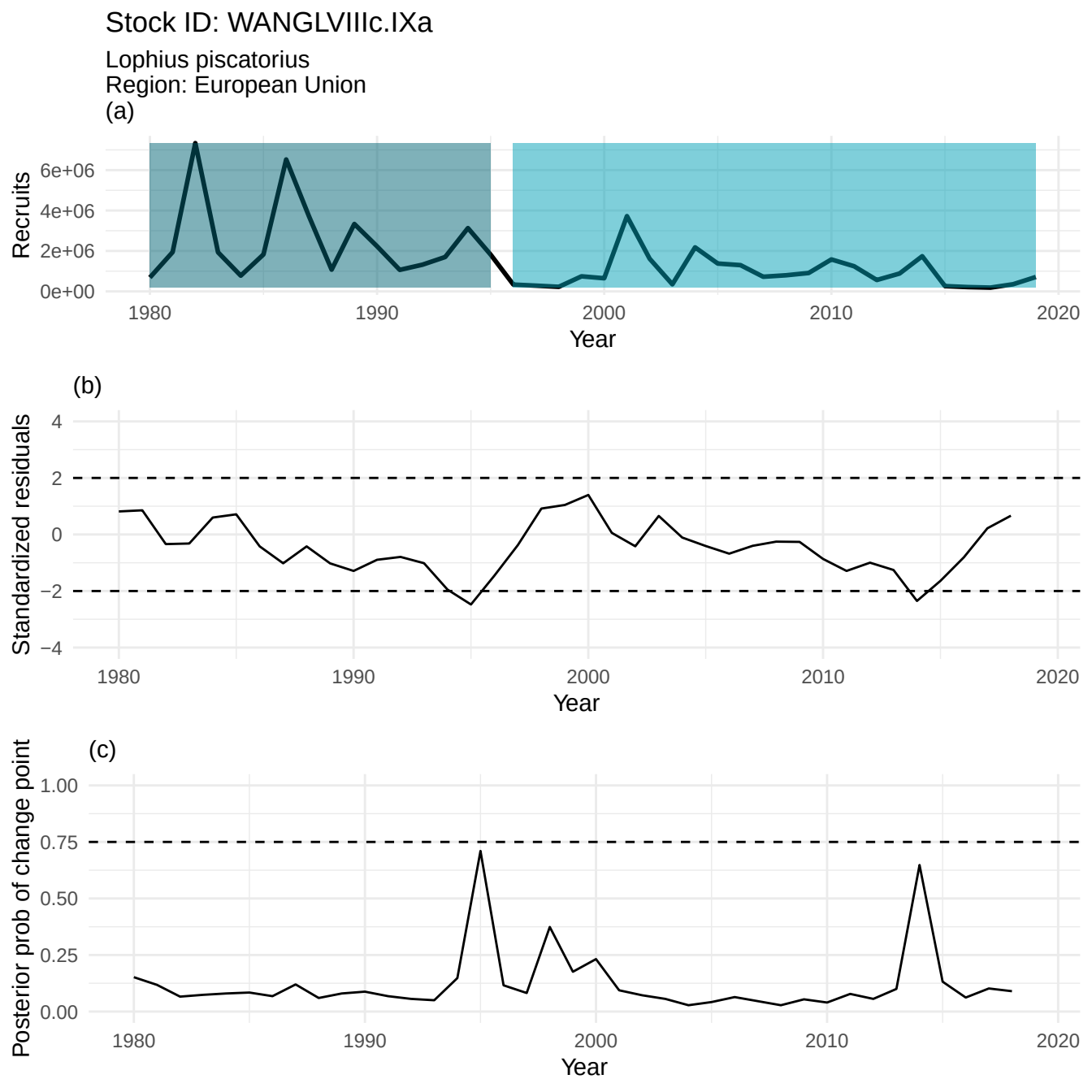

Stock ID: SNOWCRABBS
Chionoecetes opilio
Region: US Alaska
(a)
Recruits
4e+09
3e+09
2e+09
1e+09
0e+00
1990
2000
2010
Year
(b)
Standardized residuals
4
2
0
−2
−4
1990
2000
2010
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1990
2000
2010
Year

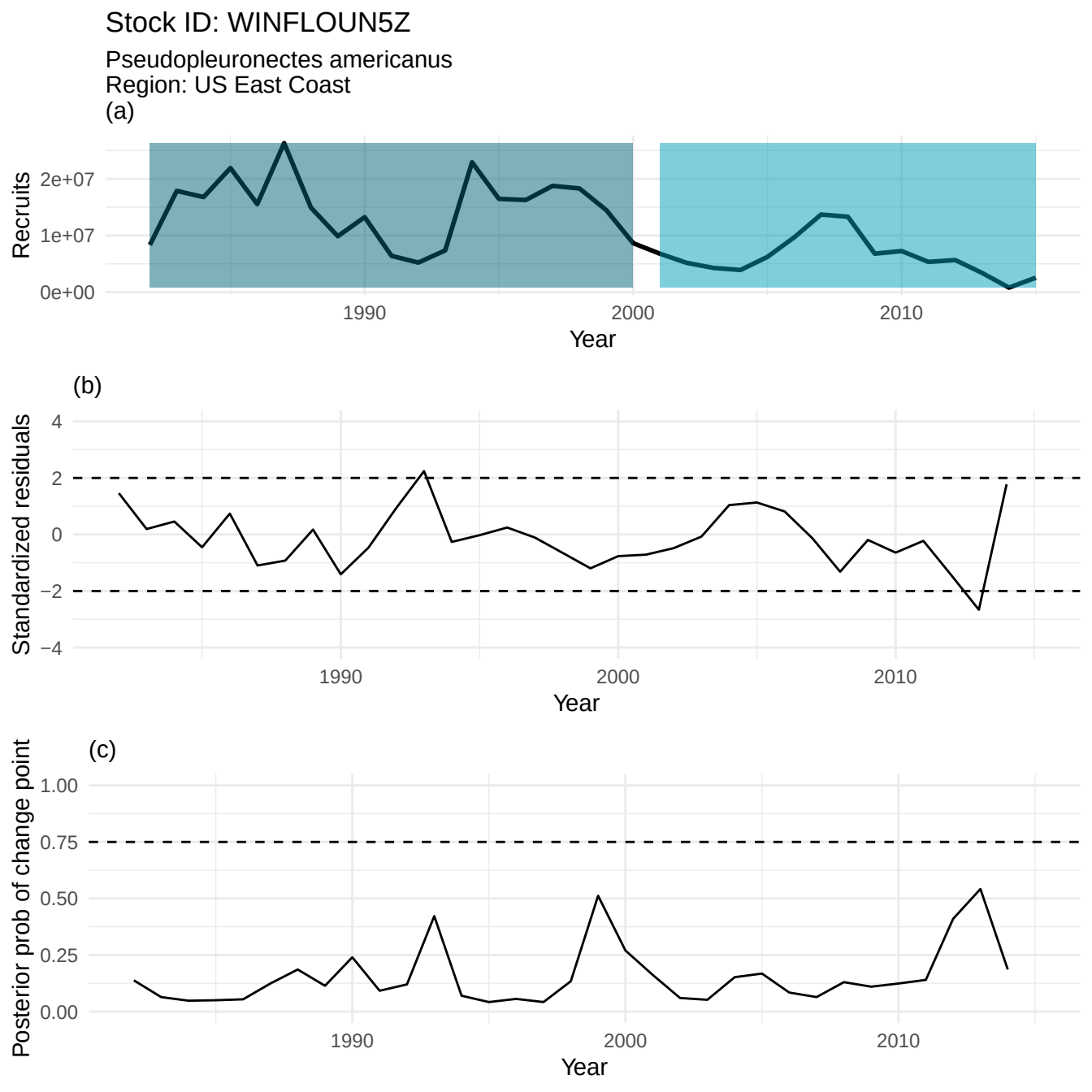

Stock ID: SSALMBIRKENH
Oncorhynchus nerka
Region: Canada West Coast
(a)
Recruits
1500000
1000000
500000
0
1950
1960
1970
1980
1990
Year
(b)
Standardized residuals
4
2
0
−2
−4
1950
1960
1970
1980
1990
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1950
1960
1970
1980
1990
Year

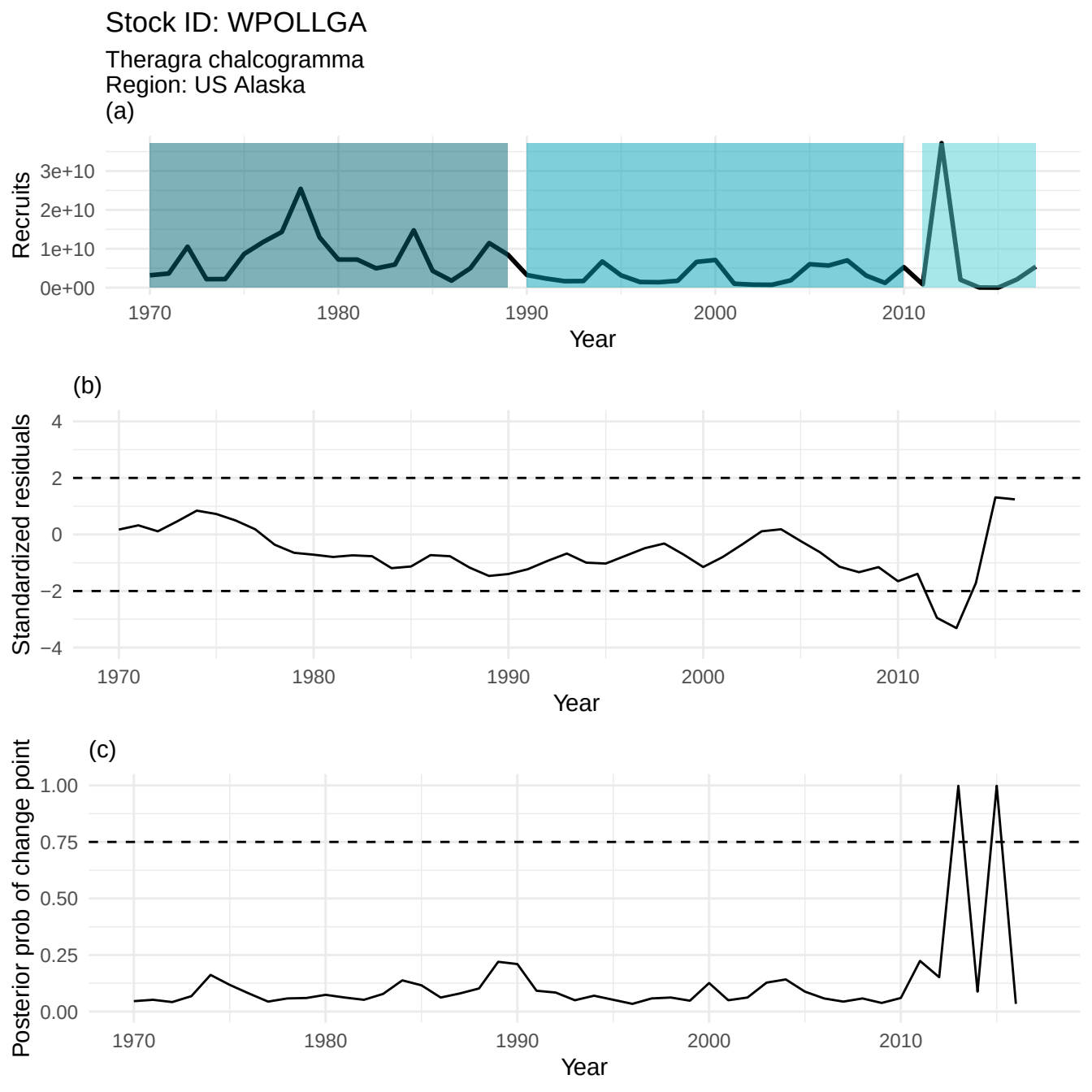

Stock ID: SSALMEALSEKDR
Oncorhynchus nerka
Region: US Alaska
(a)
Recruits
2e+05
1e+05
1980
1990
Year
(b)
Standardized residuals
4
2
0
−2
−4
1980
1990
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1980
1990
Year

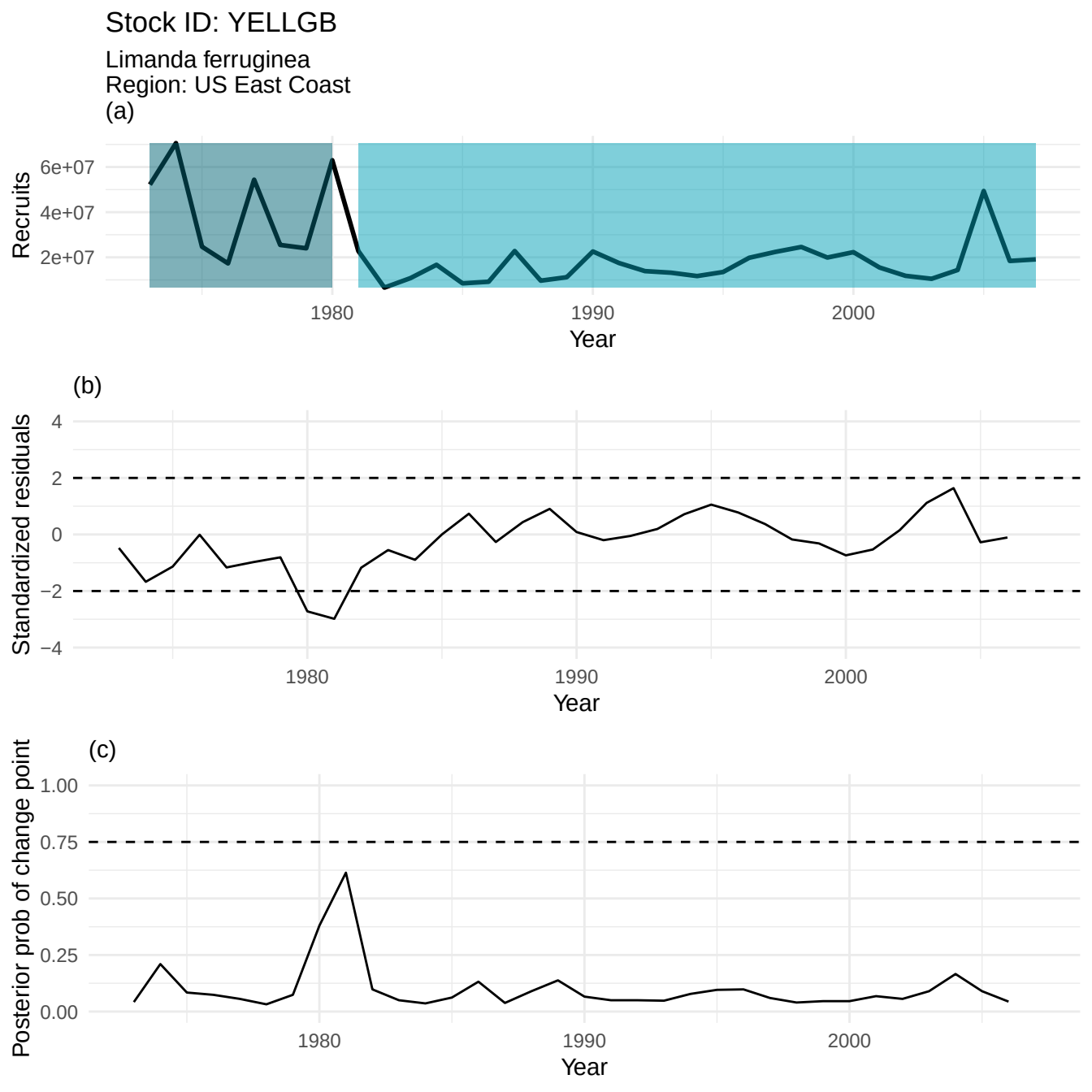

Stock ID: SSALMIGUSHIK
Oncorhynchus nerka
Region: US Alaska
(a)
Recruits
4e+06
3e+06
2e+06
1e+06
0e+00
1960
1970
1980
1990
2000
Year
(b)
Standardized residuals
4
2
0
−2
−4
1960
1970
1980
1990
2000
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1960
1970
1980
1990
2000
Year

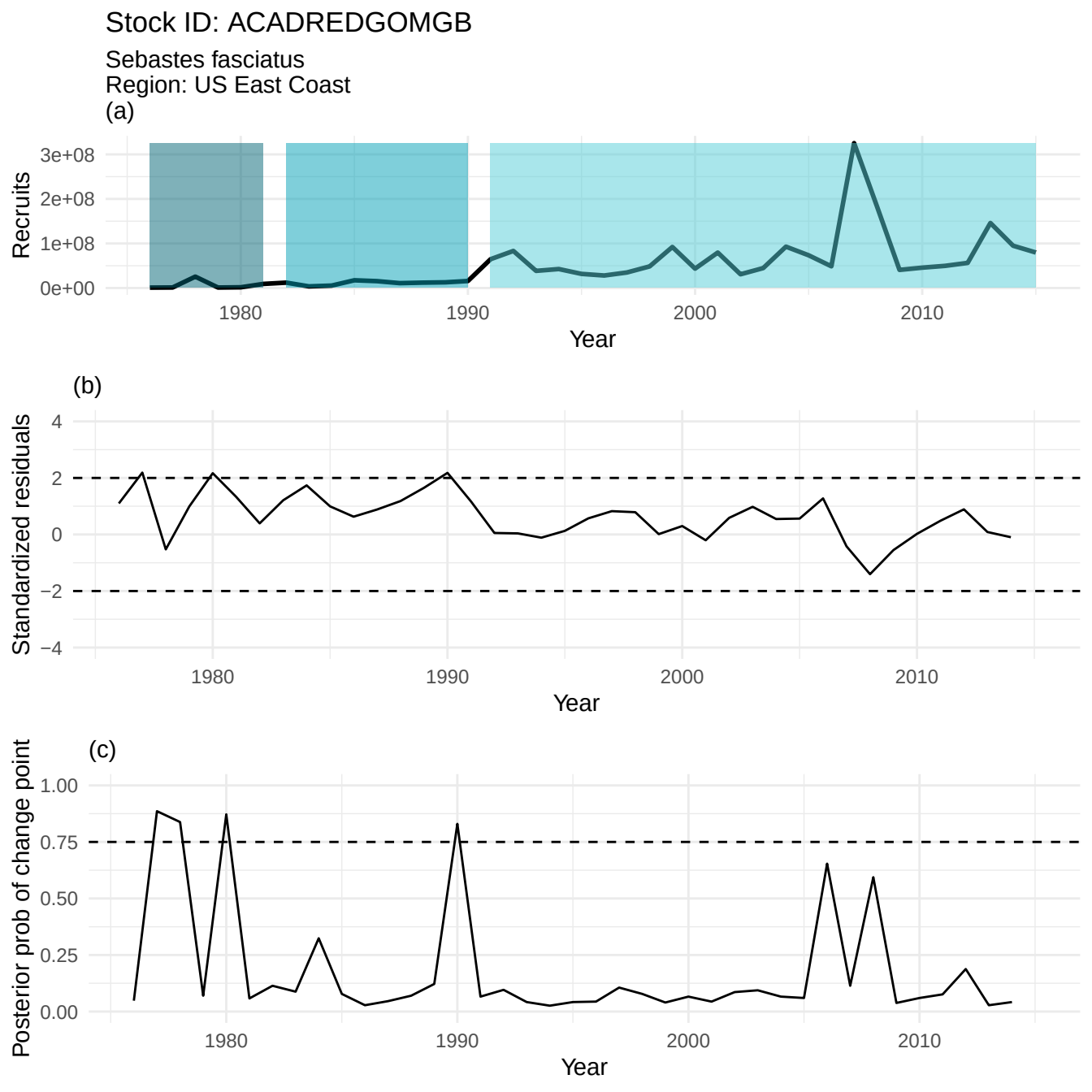

Stock ID: SSALMLWASH
Oncorhynchus nerka
Region: US West Coast
(a)
Recruits
6e+05
4e+05
2e+05
0e+00
1970
1975
1980
1985
1990
Year
(b)
Standardized residuals
4
2
0
−2
−4
1970
1975
1980
1985
1990
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1970
1975
1980
1985
1990
Year

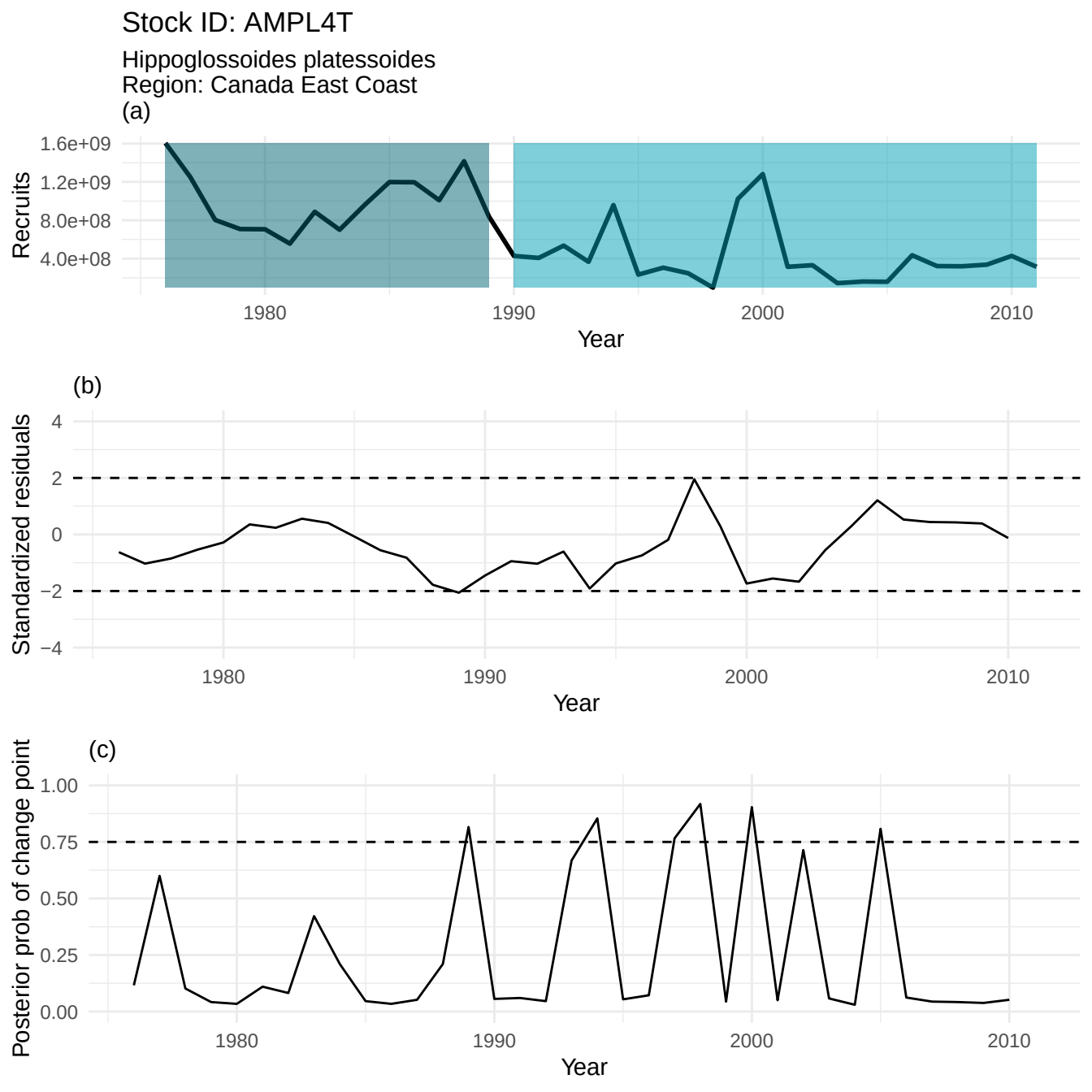

Stock ID: WANGLVIIIc.IXa
Lophius piscatorius
Region: European Union
(a)
Recruits
6e+06
4e+06
2e+06
0e+00
1980
1990
2000
2010
2020
Year
(b)
Standardized residuals
4
2
0
−2
−4
1980
1990
2000
2010
2020
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1980
1990
2000
2010
2020
Year

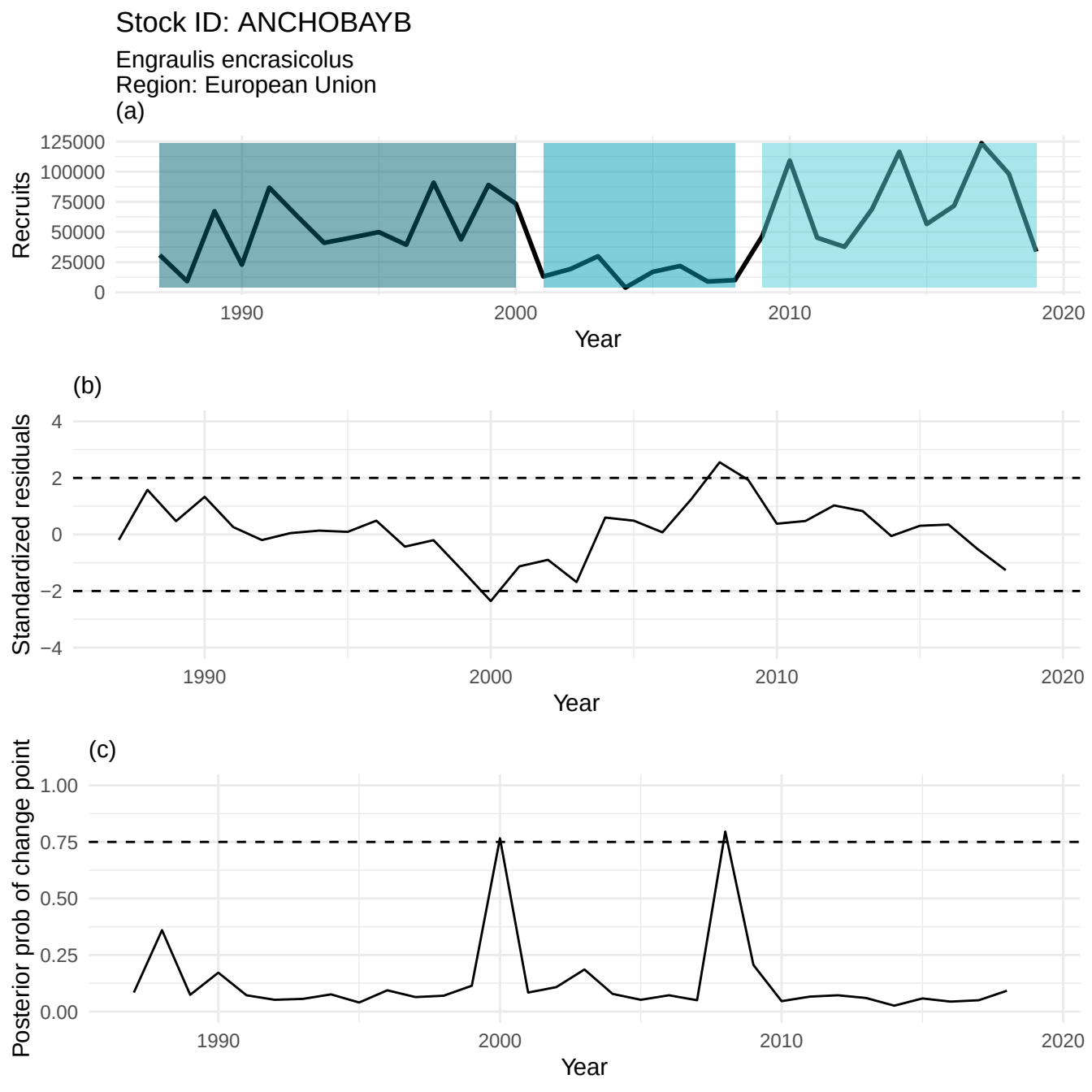

Stock ID: WINFLOUN5Z
Pseudopleuronectes americanus
Region: US East Coast
(a)
Recruits
2e+07
1e+07
0e+00
1990
2000
2010
Year
(b)
Standardized residuals
4
2
0
−2
−4
1990
2000
2010
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1990
2000
2010
Year

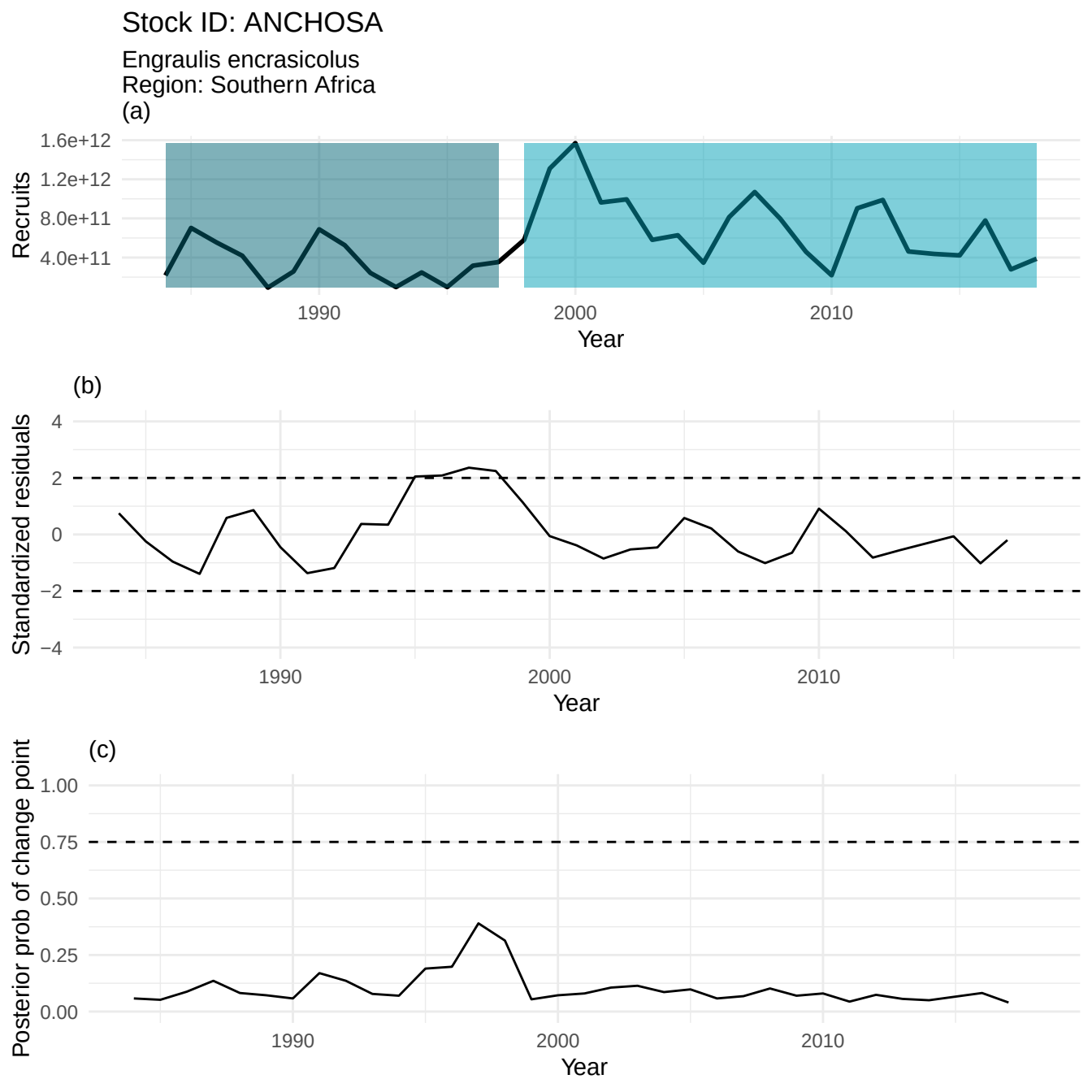

Stock ID: WPOLLGA
Theragra chalcogramma
Region: US Alaska
(a)
Recruits
3e+10
2e+10
1e+10
0e+00
1970
1980
1990
2000
2010
Year
(b)
Standardized residuals
4
2
0
−2
−4
1970
1980
1990
2000
2010
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1970
1980
1990
2000
2010
Year

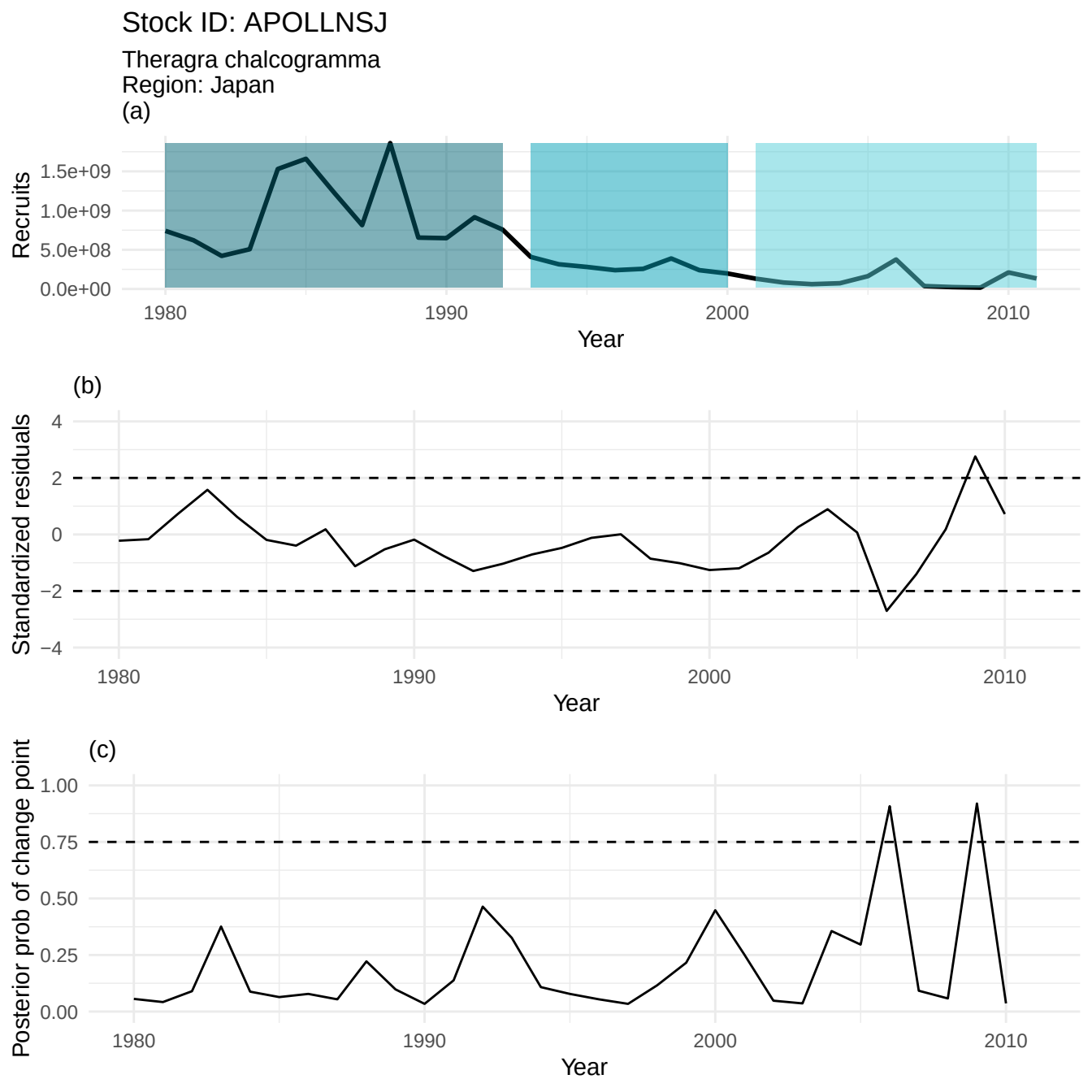

Stock ID: YELLGB
Limanda ferruginea
Region: US East Coast
(a)
Recruits
6e+07
4e+07
2e+07
1980
1990
2000
Year
(b)
Standardized residuals
4
2
0
−2
−4
1980
1990
2000
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1980
1990
2000
Year

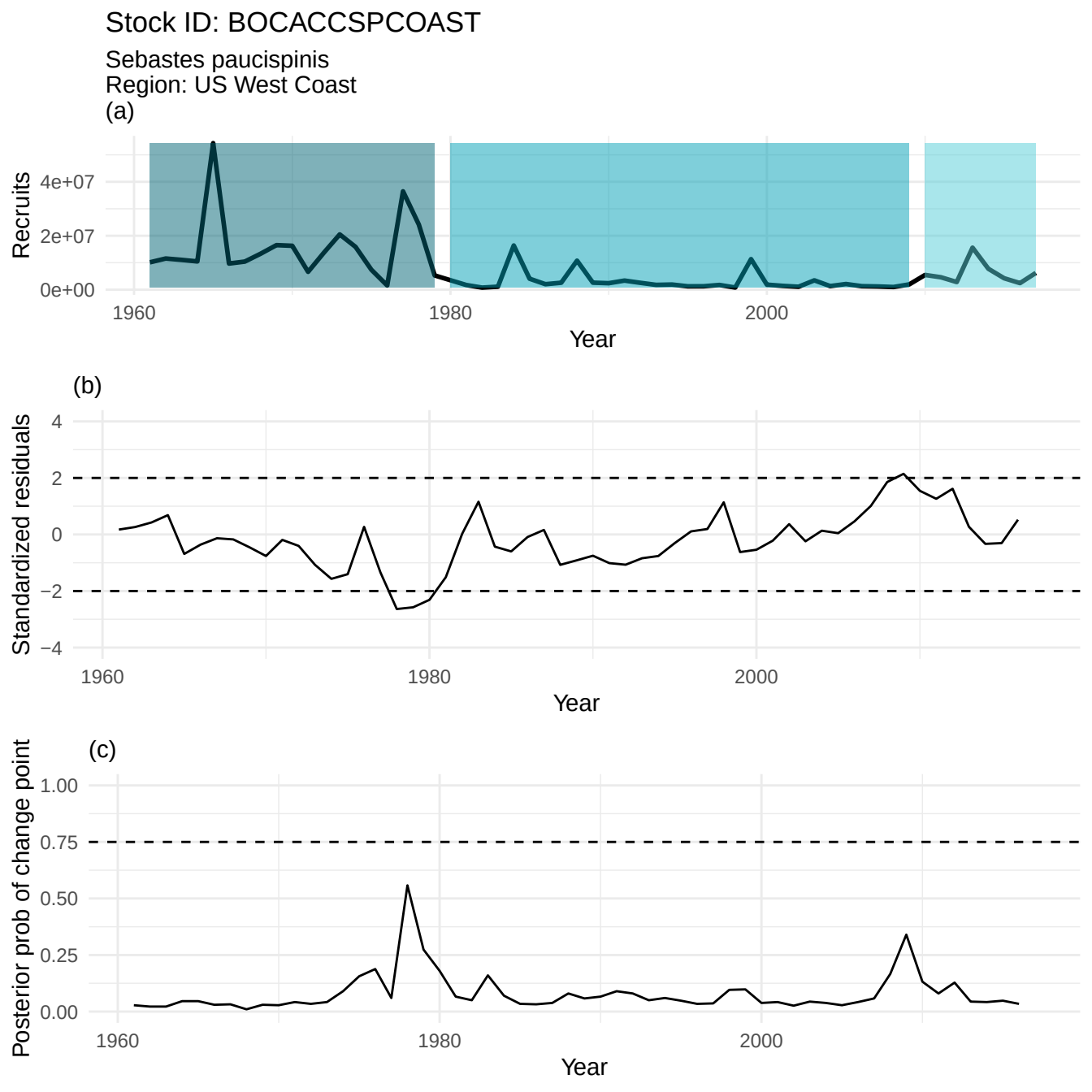

Stock ID: ACADREDGOMGB
Sebastes fasciatus
Region: US East Coast
(a)
Recruits
3e+08
2e+08
1e+08
0e+00
1980
1990
2000
2010
Year
(b)
Standardized residuals
4
2
0
−2
−4
1980
1990
2000
2010
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1980
1990
2000
2010
Year

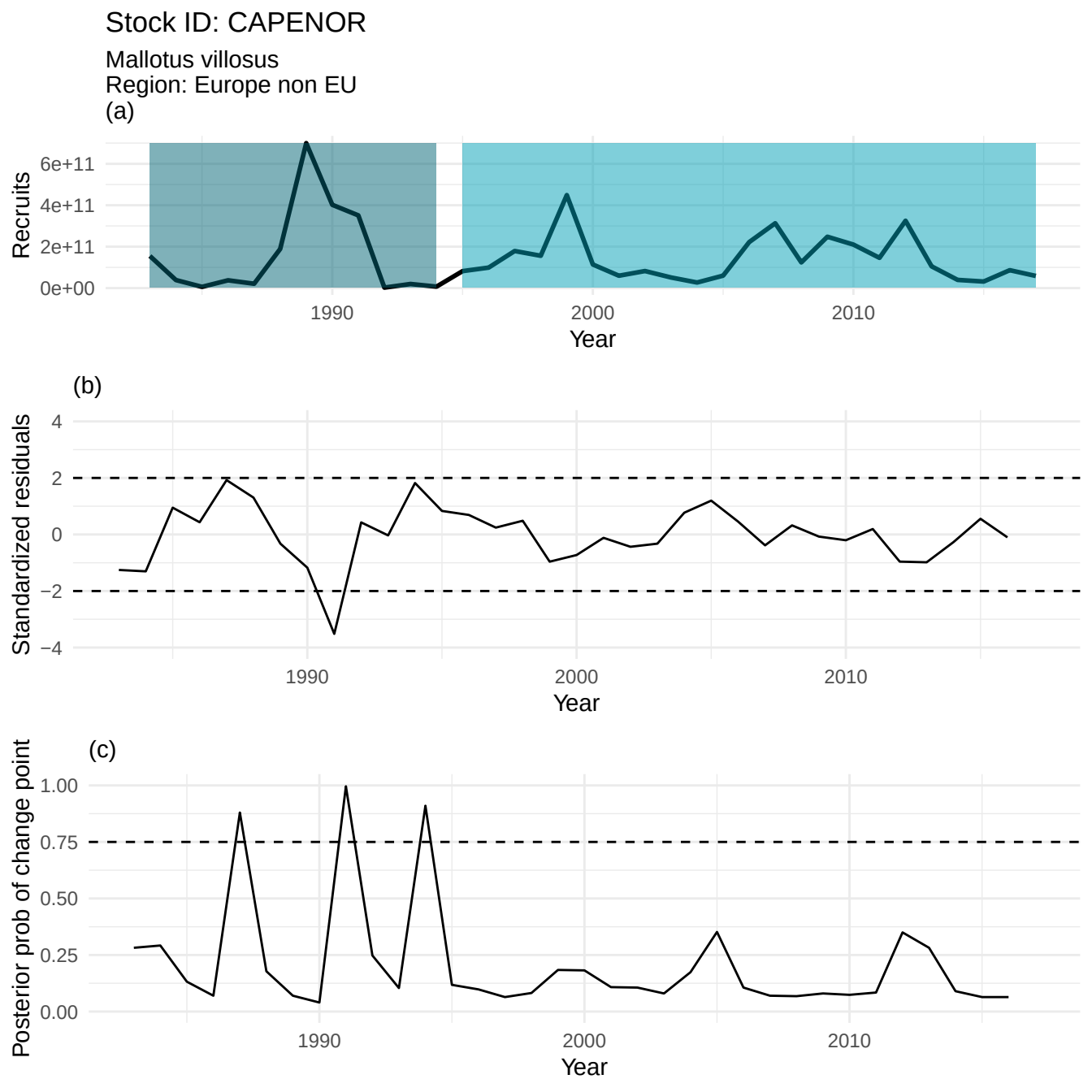

Stock ID: AMPL4T
Hippoglossoides platessoides
Region: Canada East Coast
(a)
Recruits
1.6e+09
1.2e+09
8.0e+08
4.0e+08
1980
1990
2000
2010
Year
(b)
Standardized residuals
4
2
0
−2
−4
1980
1990
2000
2010
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1980
1990
2000
2010
Year

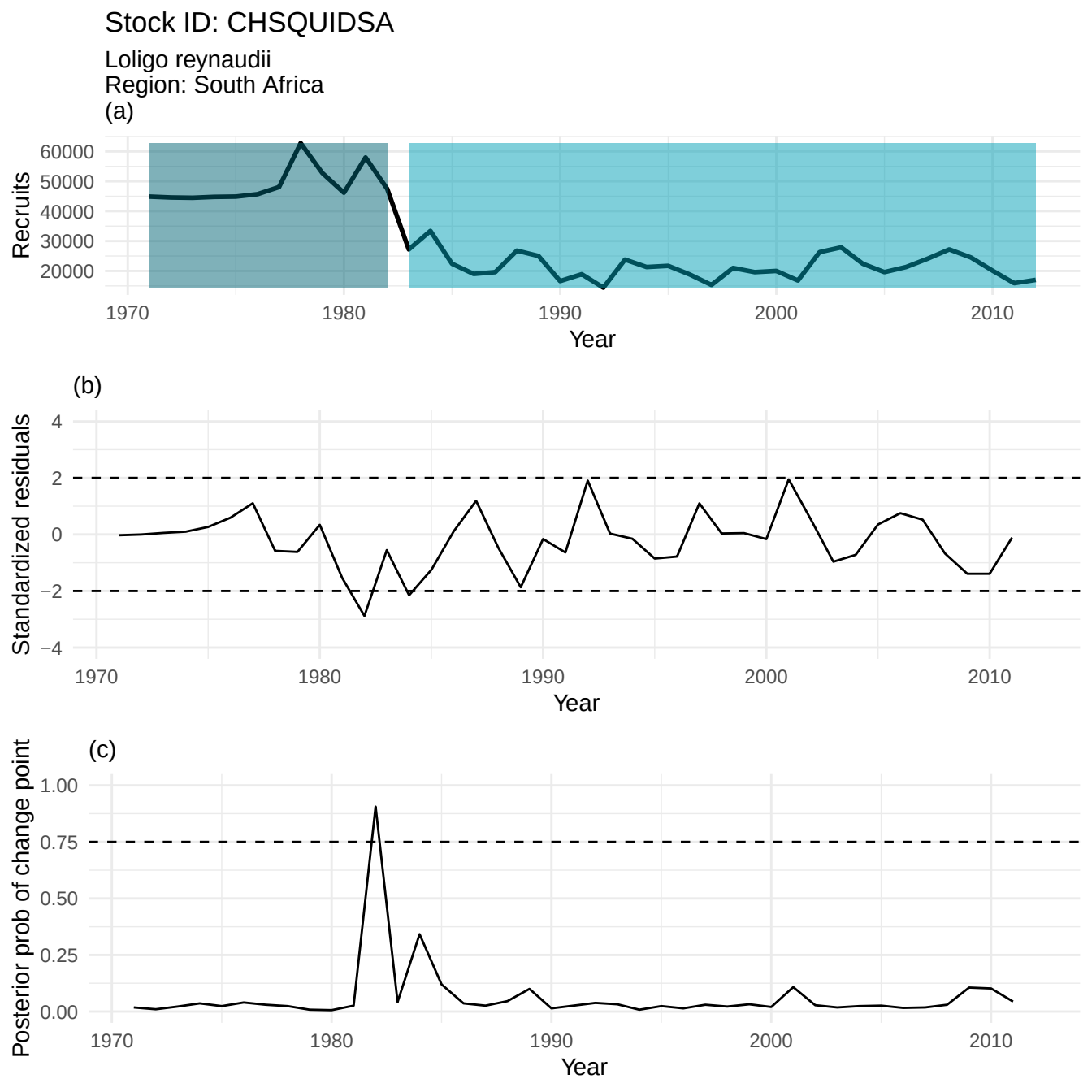

Stock ID: ANCHOBAYB
Engraulis encrasicolus
Region: European Union
(a)
Recruits
125000
100000
75000
50000
25000
0
1990
2000
2010
2020
Year
(b)
Standardized residuals
4
2
0
−2
−4
1990
2000
2010
2020
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1990
2000
2010
2020
Year


Stock ID: ANCHOSA
Engraulis encrasicolus
Region: Southern Africa
(a)
Recruits
1.6e+12
1.2e+12
8.0e+11
4.0e+11
1990
2000
2010
Year
(b)
Standardized residuals
4
2
0
−2
−4
1990
2000
2010
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1990
2000
2010
Year


Stock ID: APOLLNSJ
Theragra chalcogramma
Region: Japan
(a)
Recruits
1.5e+09
1.0e+09
5.0e+08
0.0e+00
1980
1990
2000
2010
Year
(b)
Standardized residuals
4
2
0
−2
−4
1980
1990
2000
2010
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1980
1990
2000
2010
Year

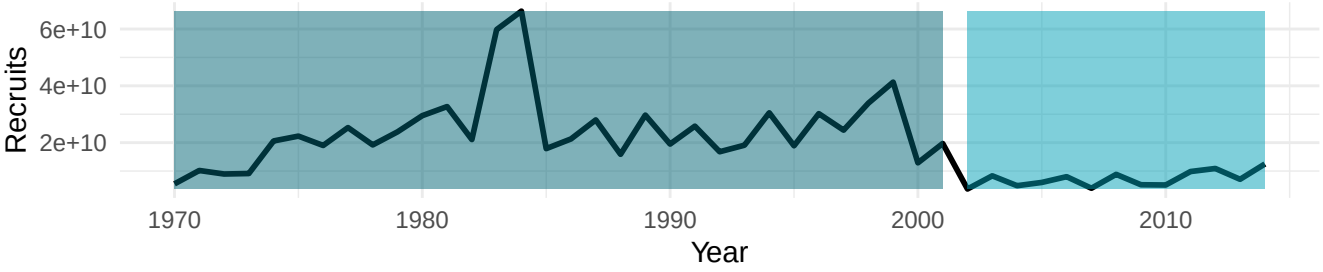

Stock ID: BOCACCSPCOAST
Sebastes paucispinis
Region: US West Coast
(a)
Recruits
4e+07
2e+07
0e+00
1960
1980
2000
Year
(b)
Standardized residuals
4
2
0
−2
−4
1960
1980
2000
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1960
1980
2000
Year


Stock ID: CAPENOR
Mallotus villosus
Region: Europe non EU
(a)
Recruits
6e+11
4e+11
2e+11
0e+00
1990
2000
2010
Year
(b)
Standardized residuals
4
2
0
−2
−4
1990
2000
2010
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1990
2000
2010
Year

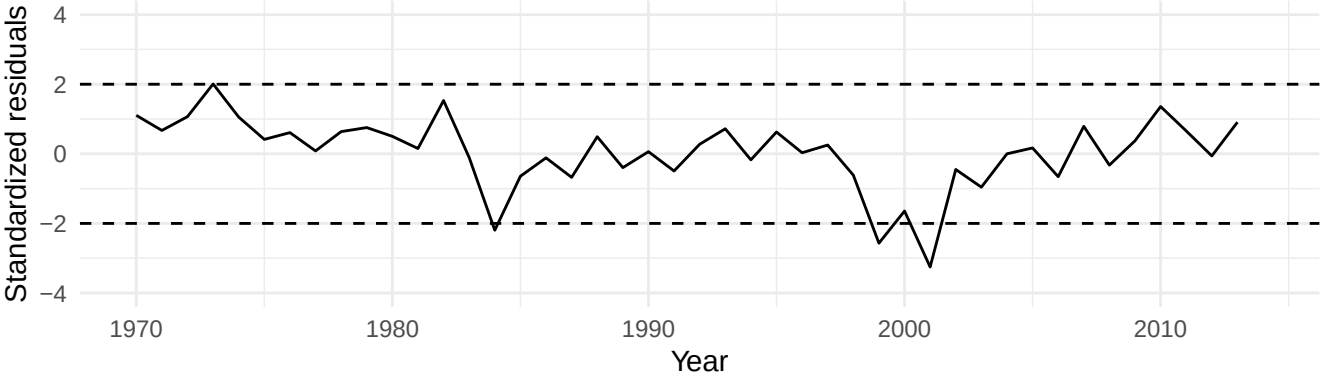

Stock ID: CHSQUIDSA
Loligo reynaudii
Region: South Africa
(a)
Recruits
60000
50000
40000
30000
20000
1970
1980
1990
2000
2010
Year
(b)
Standardized residuals
4
2
0
−2
−4
1970
1980
1990
2000
2010
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1970
1980
1990
2000
2010
Year

Stock ID: CHTRACCH

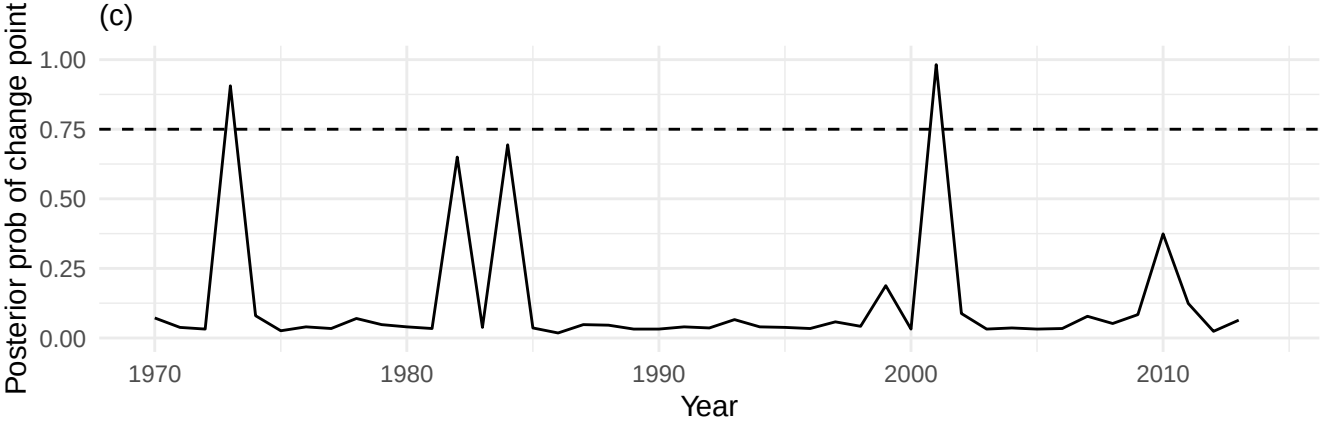
Trachurus murphyi
Region: South America
(a)

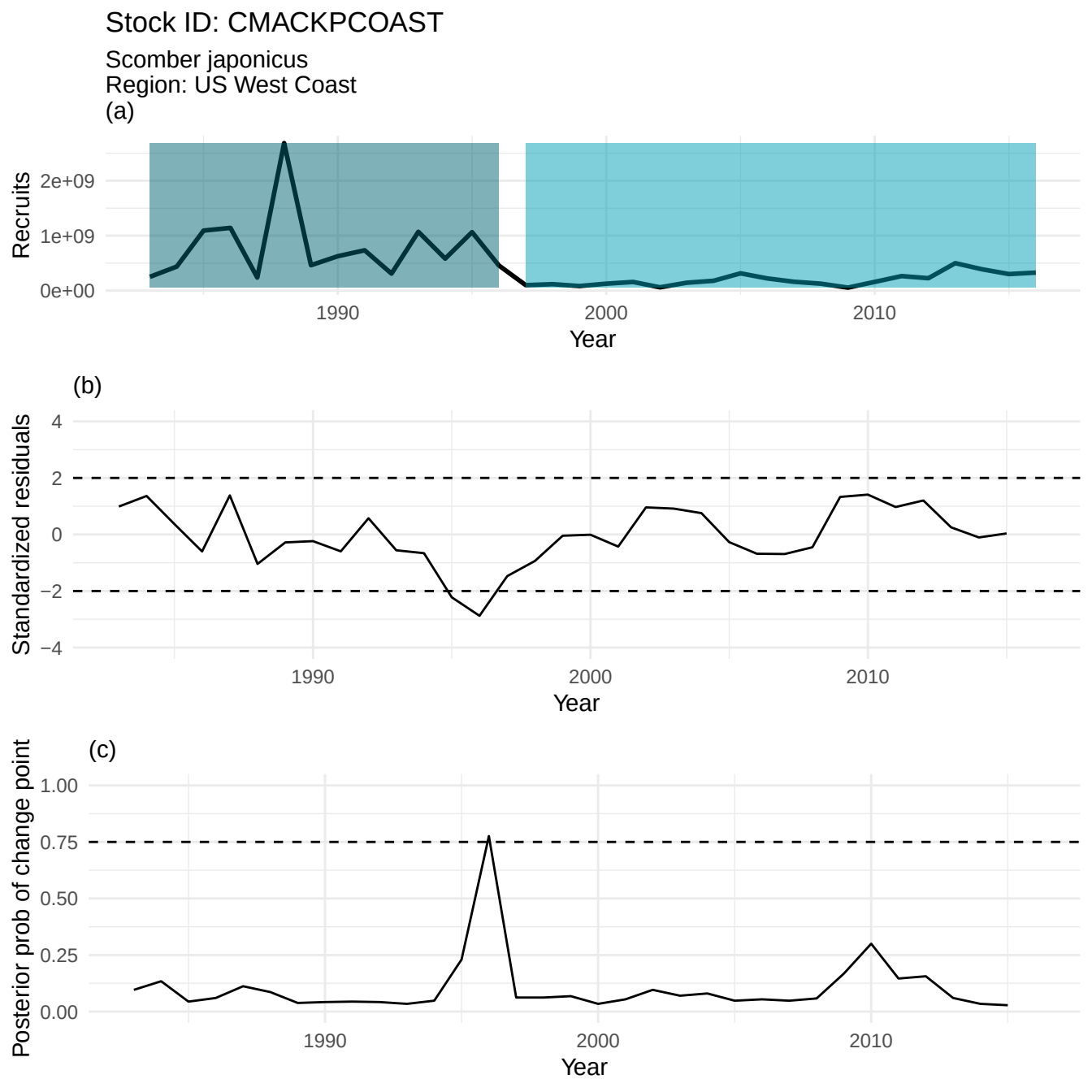


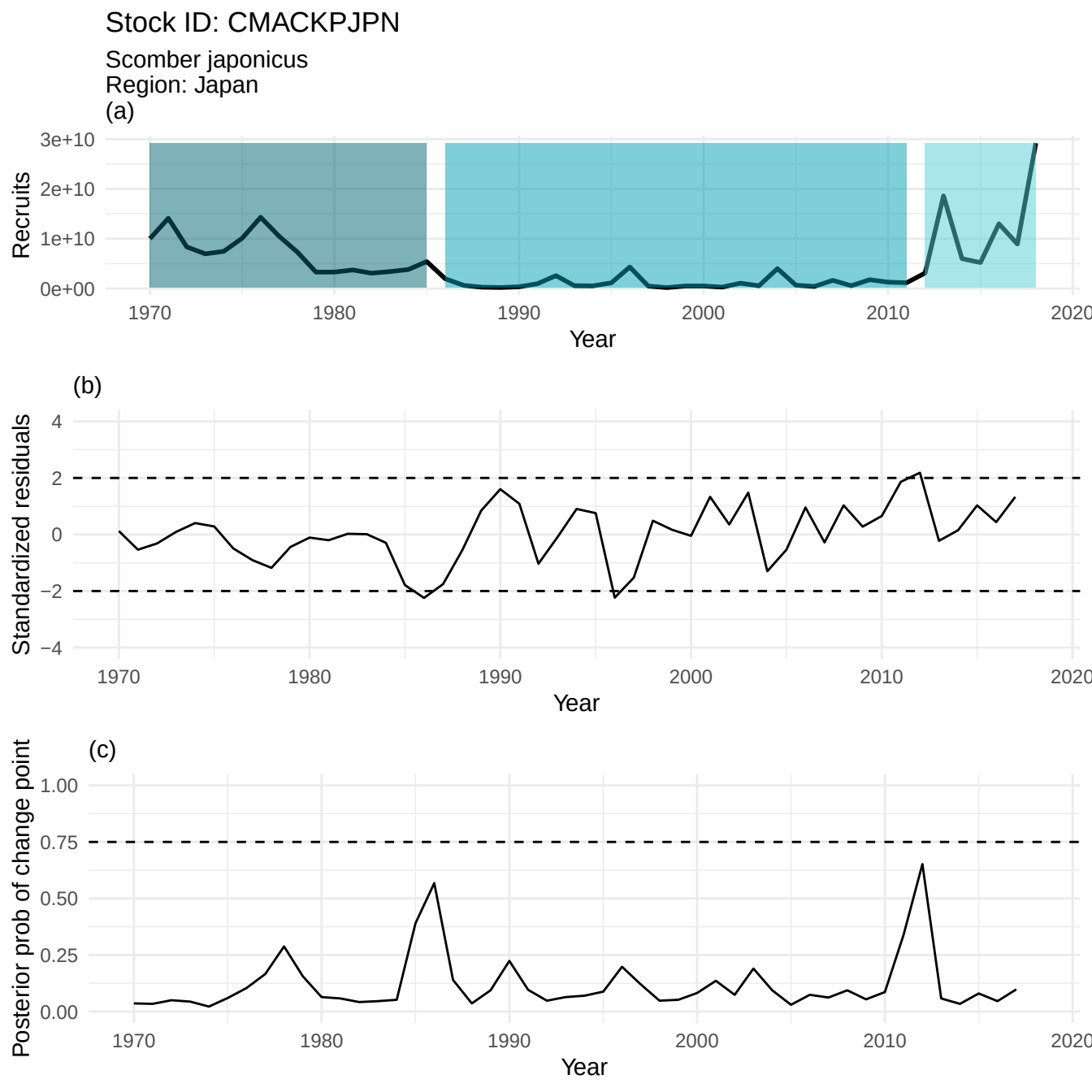
(b)

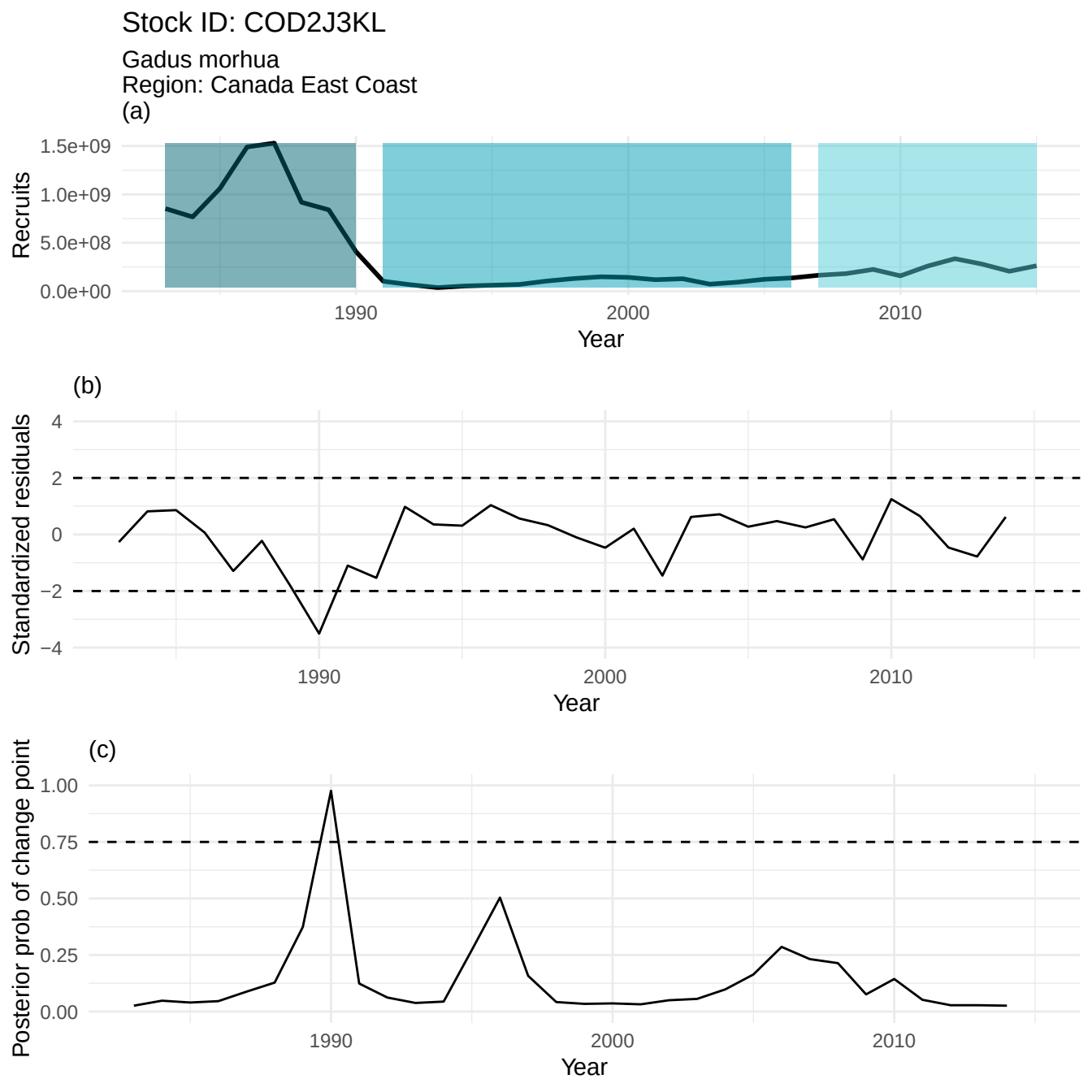


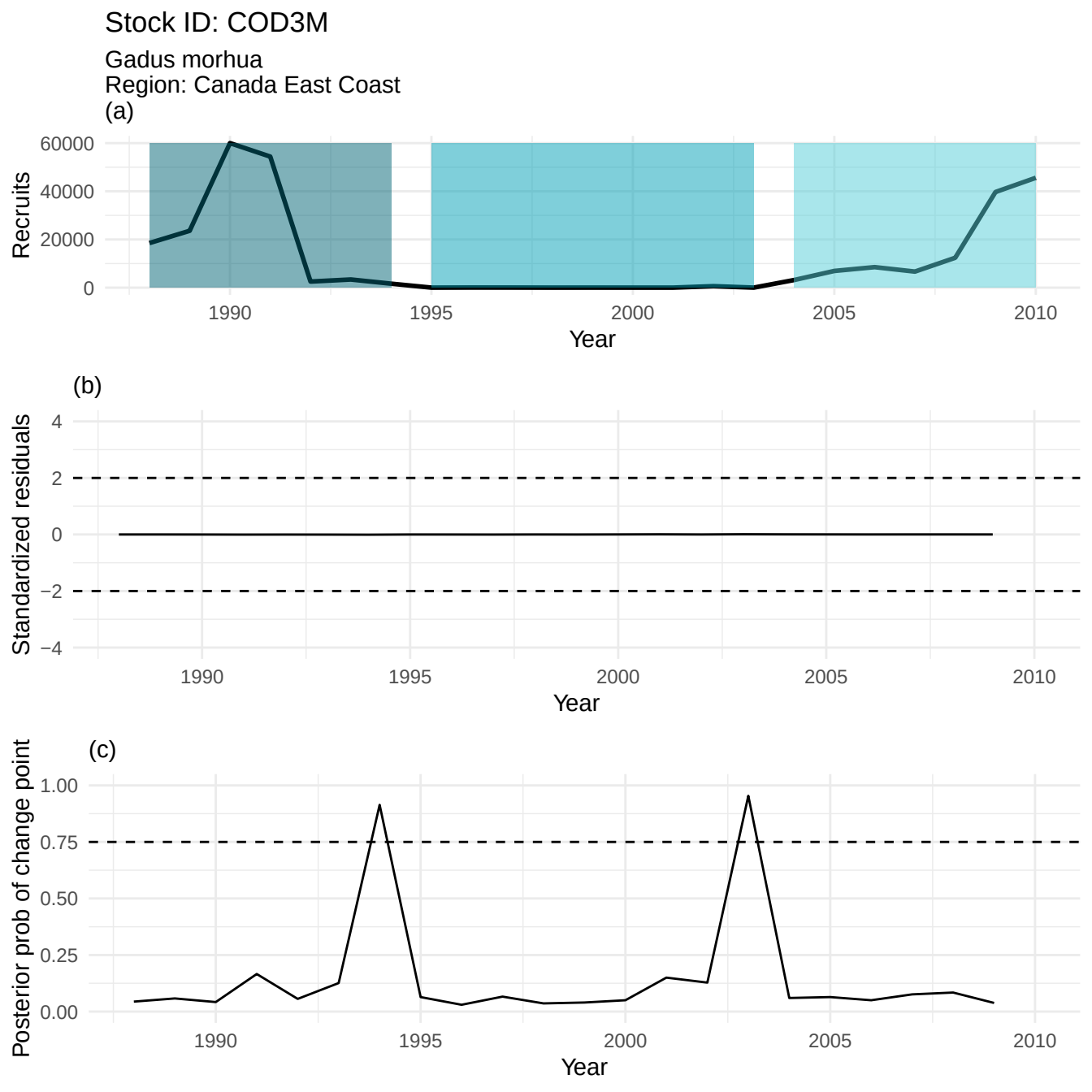
(c)

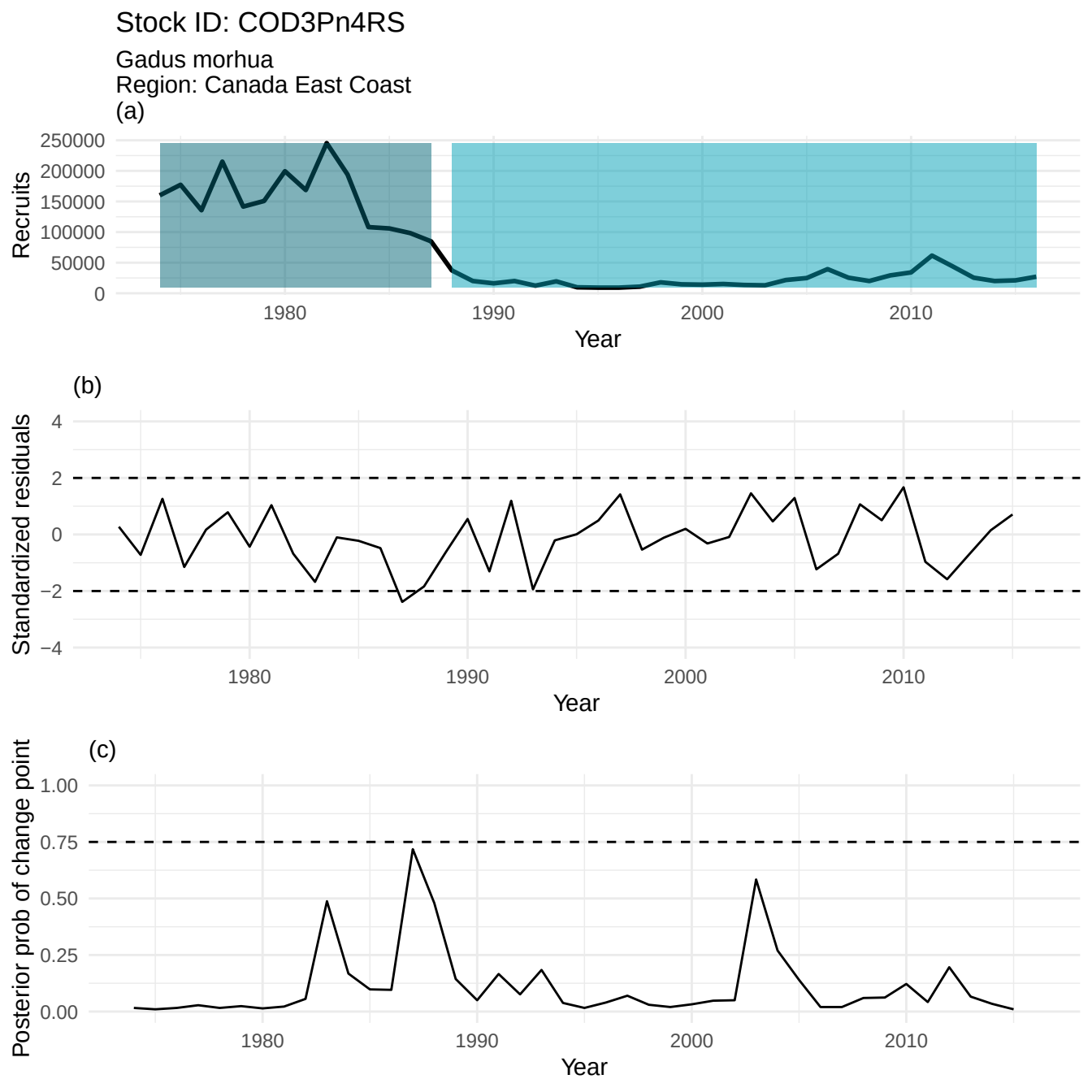


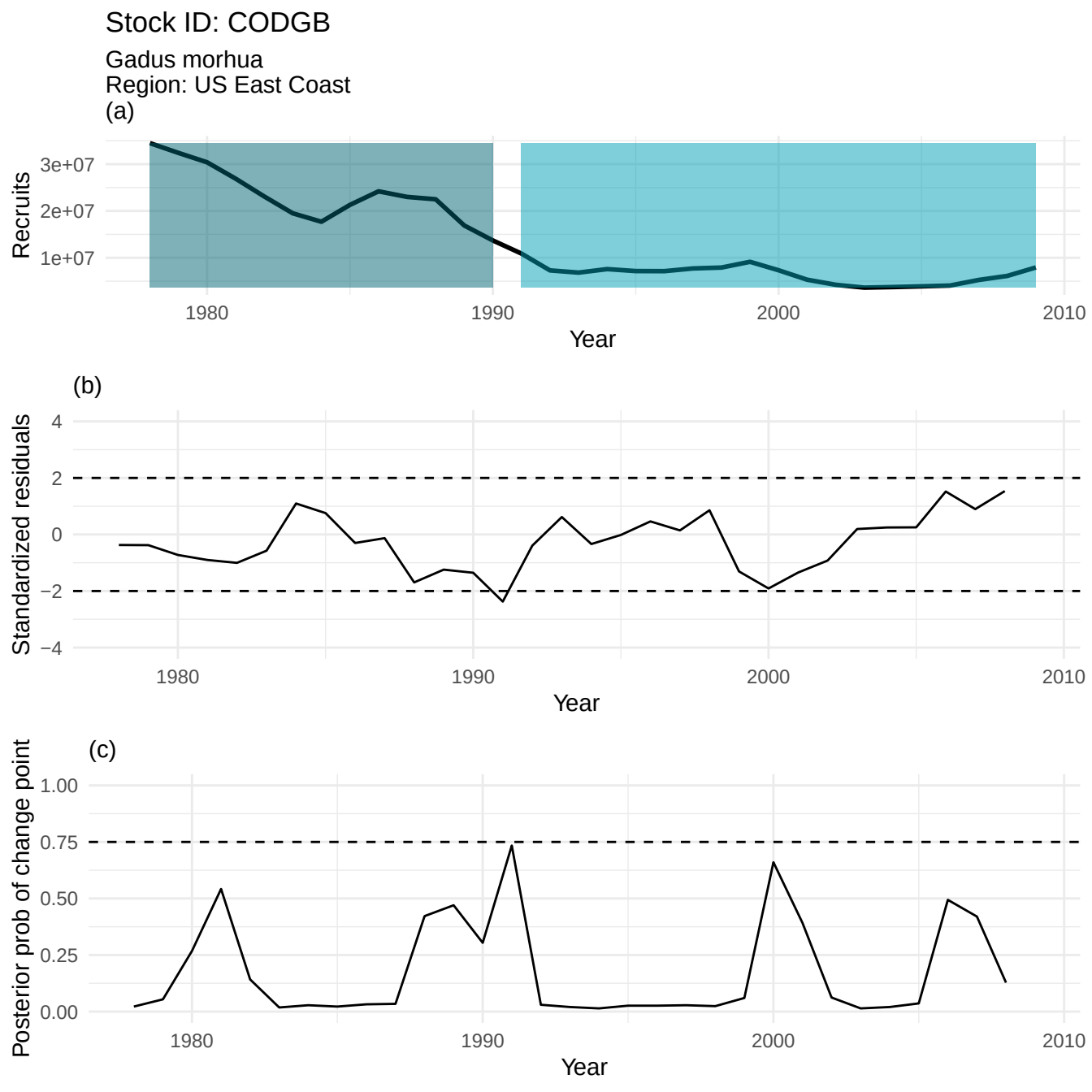

Stock ID: CMACKPCOAST
Scomber japonicus
Region: US West Coast
(a)
Recruits
2e+09
1e+09
0e+00
1990
2000
2010
Year
(b)
Standardized residuals
4
2
0
−2
−4
1990
2000
2010
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1990
2000
2010
Year

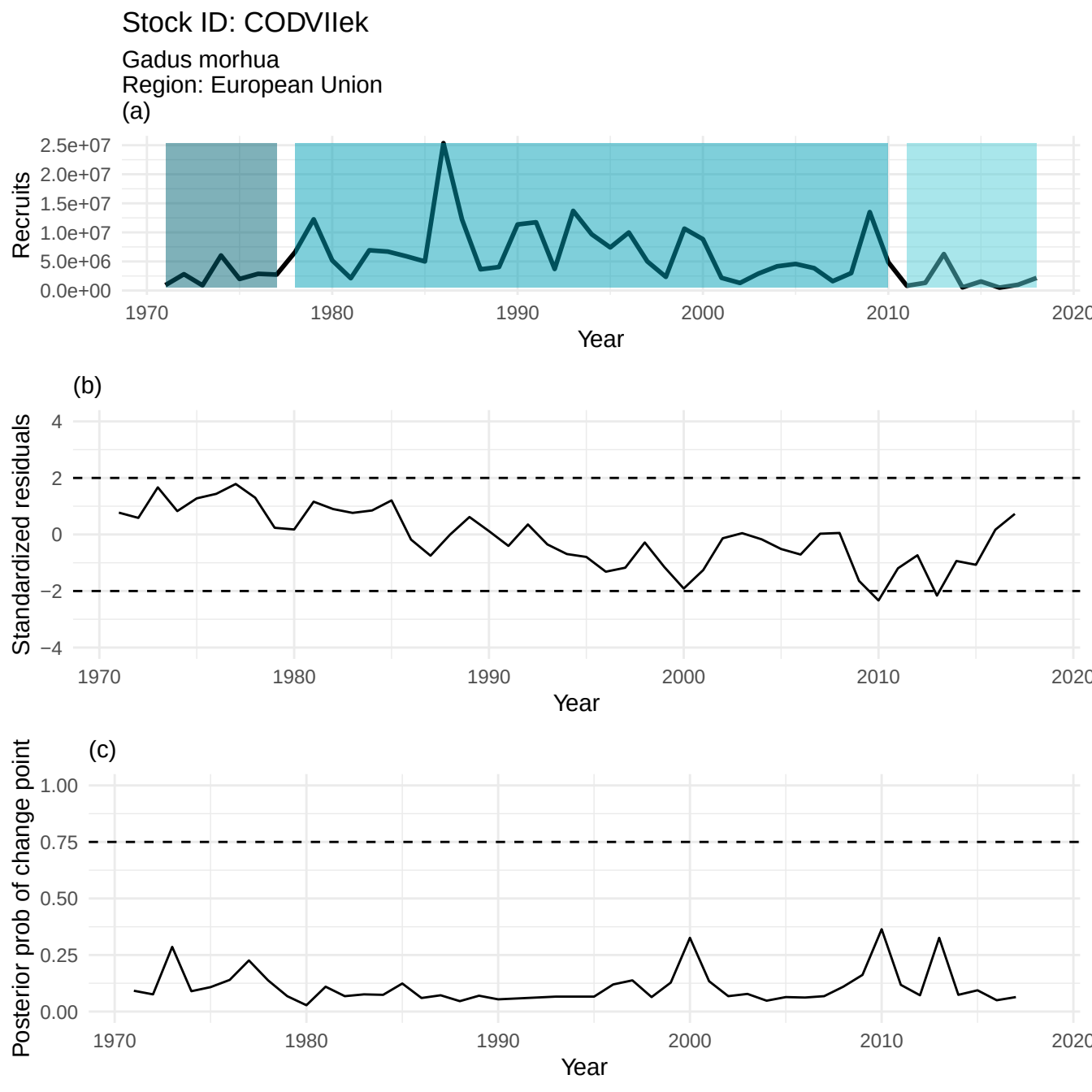

Stock ID: CMACKPJPN
Scomber japonicus
Region: Japan
(a)
Recruits
3e+10
2e+10
1e+10
0e+00
1970
1980
1990
2000
2010
2020
Year
(b)
Standardized residuals
4
2
0
−2
−4
1970
1980
1990
2000
2010
2020
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1970
1980
1990
2000
2010
2020
Year

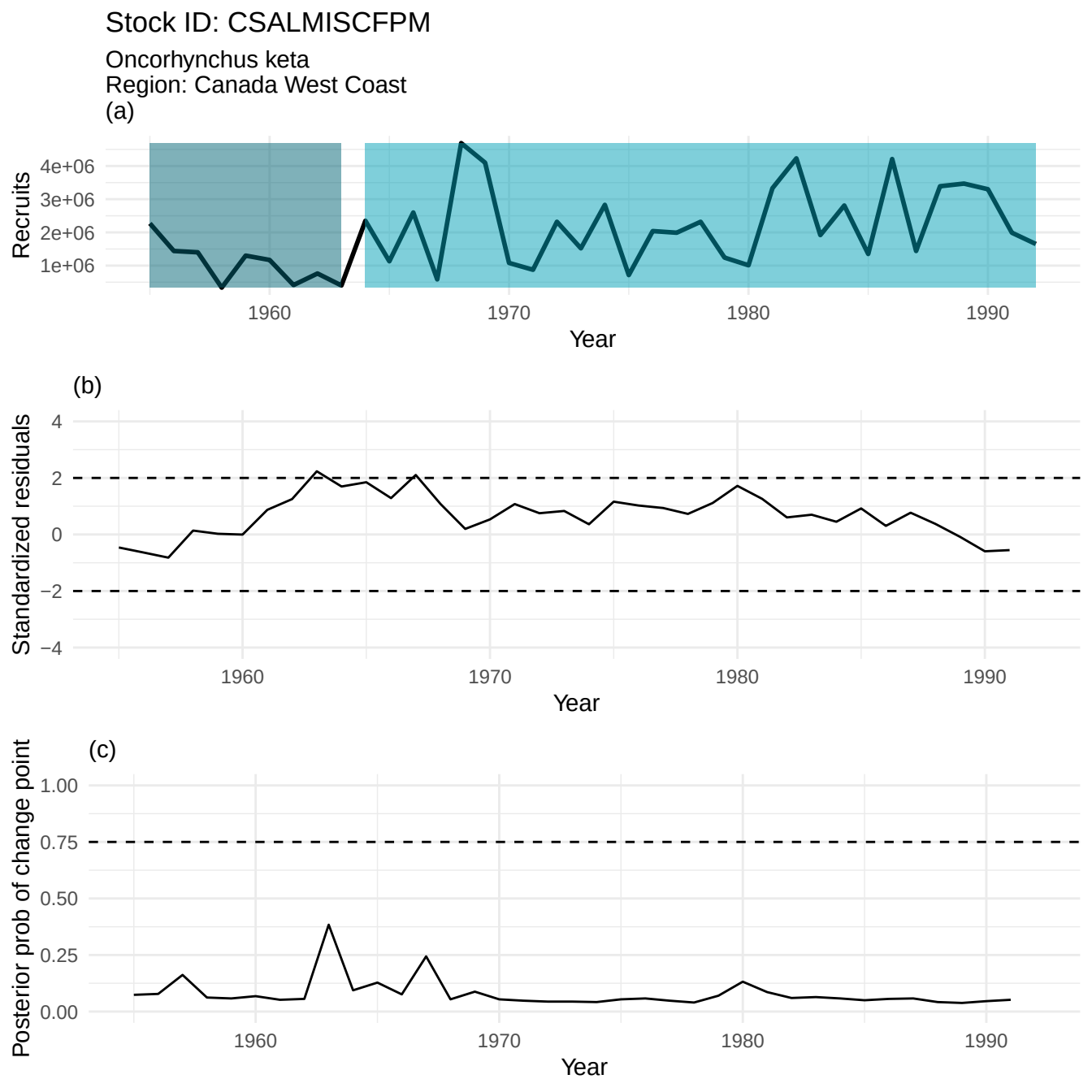

Stock ID: COD2J3KL
Gadus morhua
Region: Canada East Coast
(a)
Recruits
1.5e+09
1.0e+09
5.0e+08
0.0e+00
1990
2000
2010
Year
(b)
Standardized residuals
4
2
0
−2
−4
1990
2000
2010
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1990
2000
2010
Year

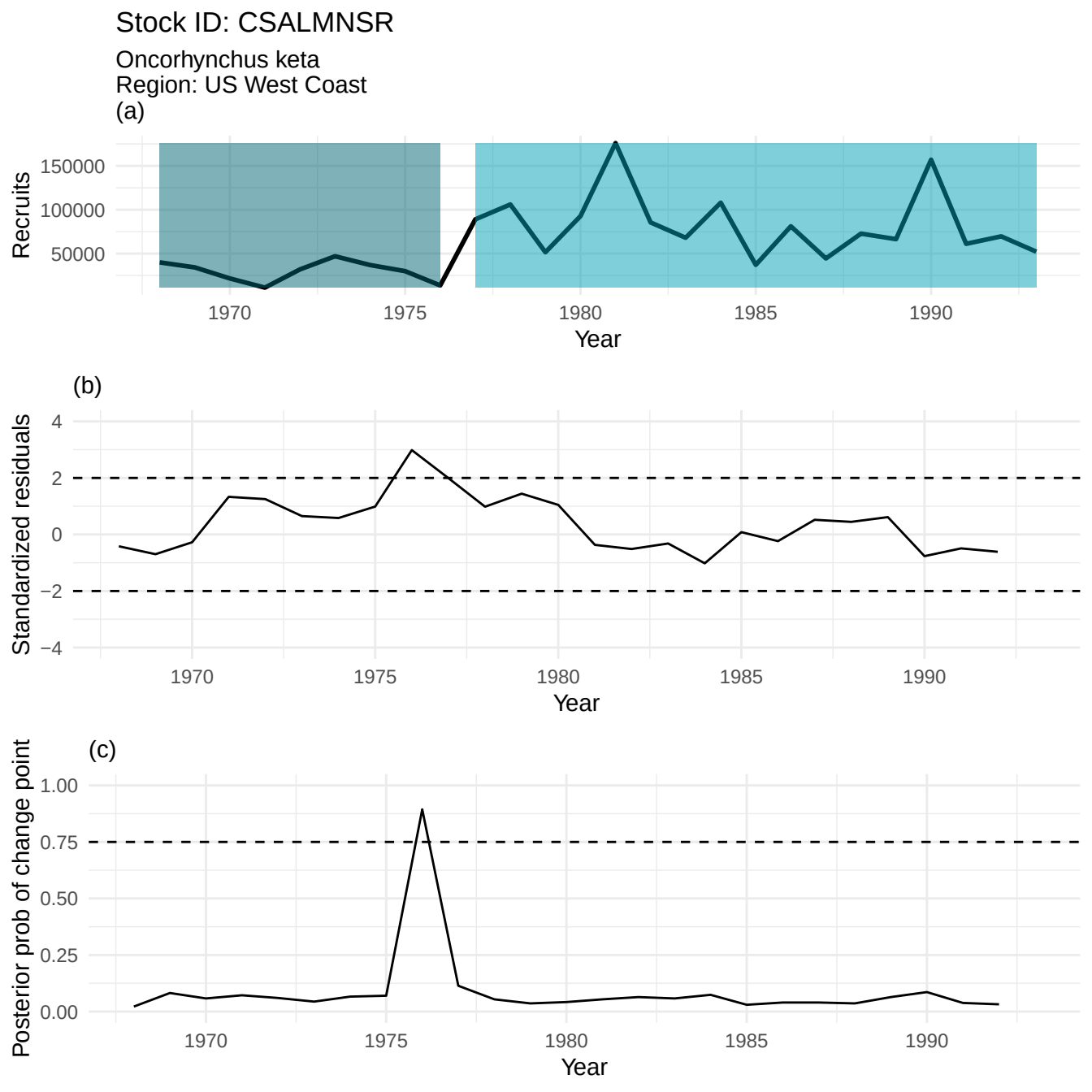

Stock ID: COD3M
Gadus morhua
Region: Canada East Coast
(a)
Recruits
60000
40000
20000
0
1990
1995
2000
2005
2010
Year
(b)
Standardized residuals
4
2
0
−2
−4
1990
1995
2000
2005
2010
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1990
1995
2000
2005
2010
Year

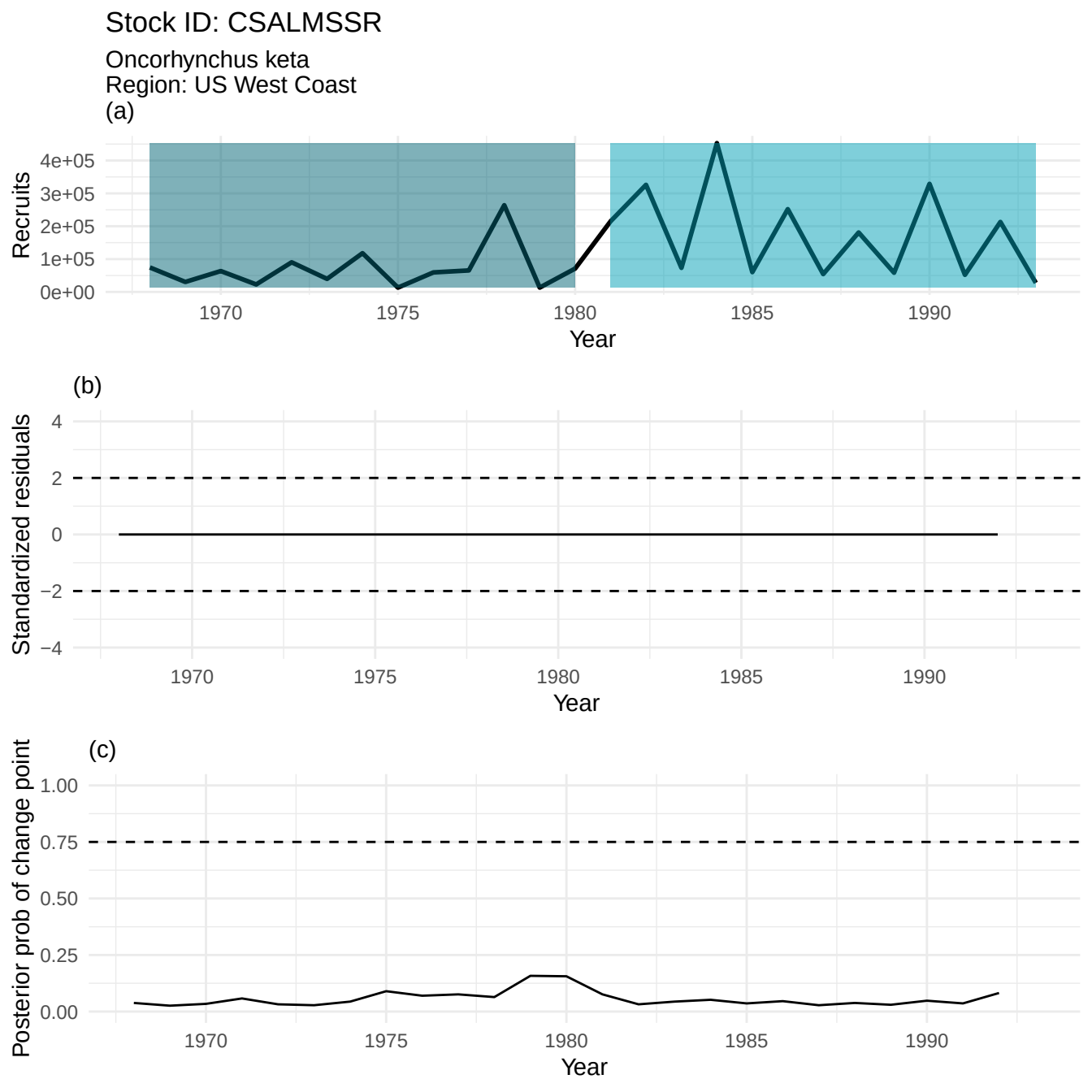

Stock ID: COD3Pn4RS
Gadus morhua
Region: Canada East Coast
(a)
Recruits
250000
200000
150000
100000
50000
0
1980
1990
2000
2010
Year
(b)
Standardized residuals
4
2
0
−2
−4
1980
1990
2000
2010
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1980
1990
2000
2010
Year

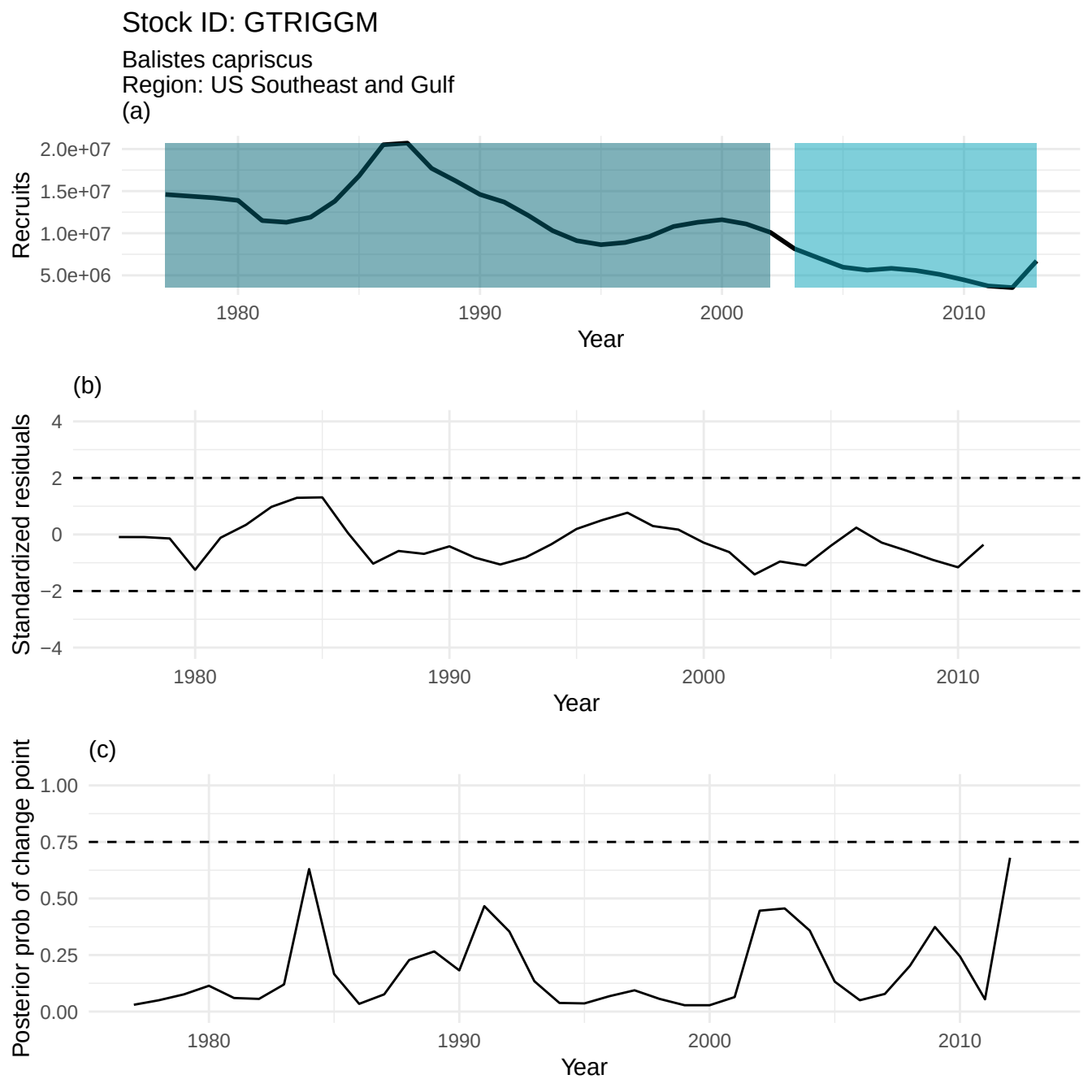

Stock ID: CODGB
Gadus morhua
Region: US East Coast
(a)
Recruits
3e+07
2e+07
1e+07
1980
1990
2000
2010
Year
(b)
Standardized residuals
4
2
0
−2
−4
1980
1990
2000
2010
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1980
1990
2000
2010
Year

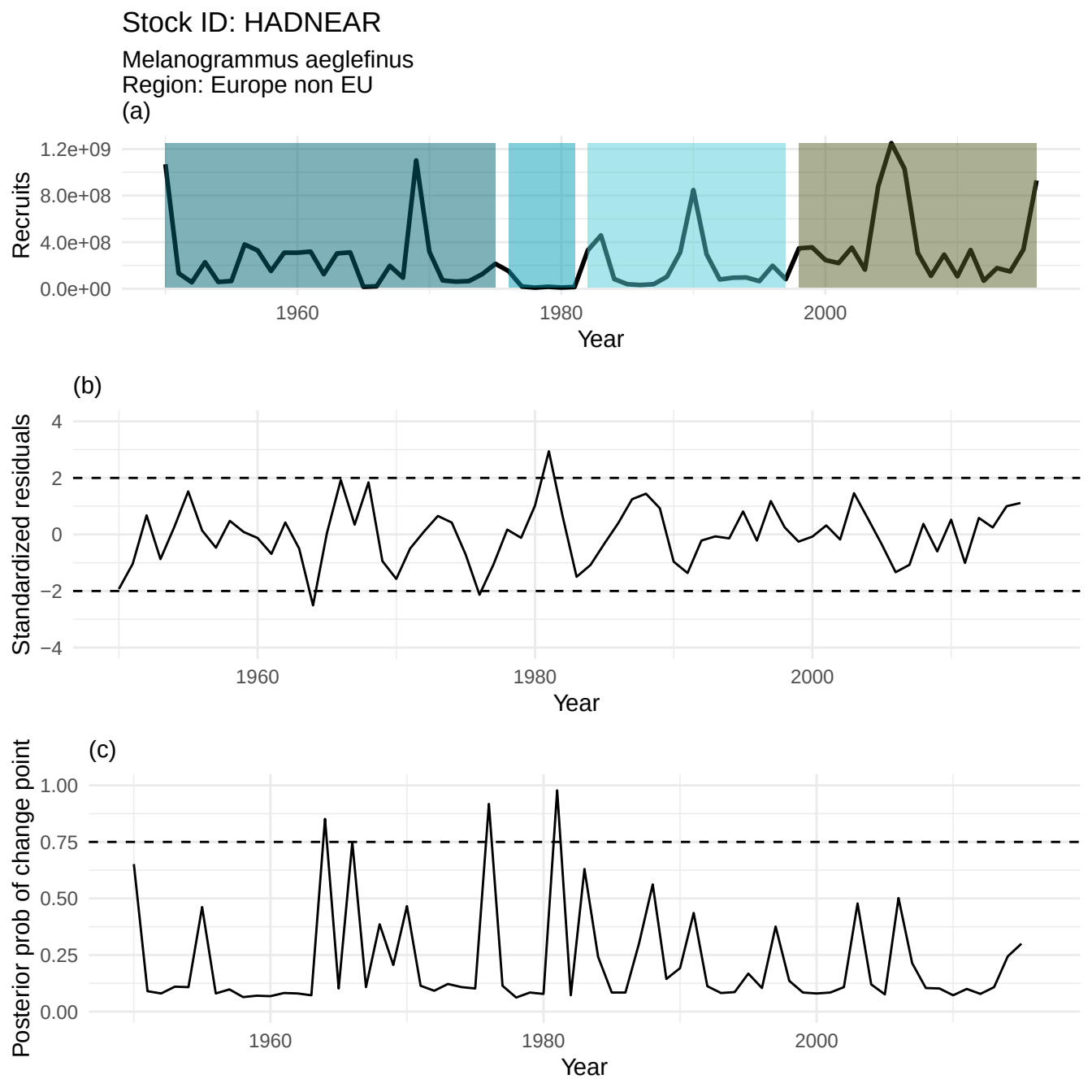

Stock ID: CODVIIek
Gadus morhua
Region: European Union
(a)
Recruits
2.5e+07
2.0e+07
1.5e+07
1.0e+07
5.0e+06
0.0e+00
1970
1980
1990
2000
2010
2020
Year
(b)
Standardized residuals
4
2
0
−2
−4
1970
1980
1990
2000
2010
2020
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1970
1980
1990
2000
2010
2020
Year

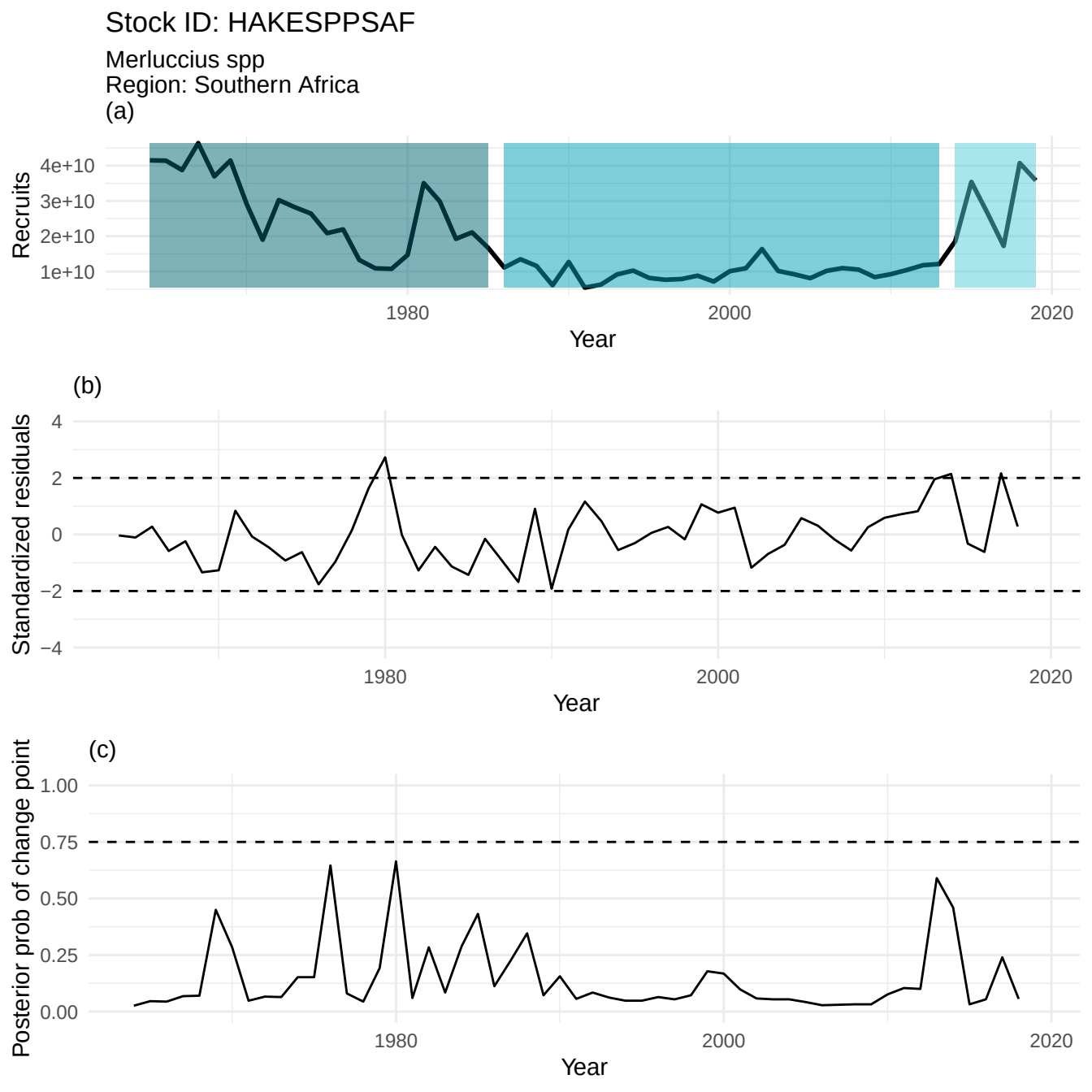

Stock ID: CSALMISCFPM
Oncorhynchus keta
Region: Canada West Coast
(a)
Recruits
4e+06
3e+06
2e+06
1e+06
1960
1970
1980
1990
Year
(b)
Standardized residuals
4
2
0
−2
−4
1960
1970
1980
1990
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1960
1970
1980
1990
Year


Stock ID: CSALMNSR
Oncorhynchus keta
Region: US West Coast
(a)
Recruits
150000
100000
50000
1970
1975
1980
1985
1990
Year
(b)
Standardized residuals
4
2
0
−2
−4
1970
1975
1980
1985
1990
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1970
1975
1980
1985
1990
Year


Stock ID: CSALMSSR
Oncorhynchus keta
Region: US West Coast
(a)
Recruits
4e+05
3e+05
2e+05
1e+05
0e+00
1970
1975
1980
1985
1990
Year
(b)
Standardized residuals
4
2
0
−2
−4
1970
1975
1980
1985
1990
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1970
1975
1980
1985
1990
Year

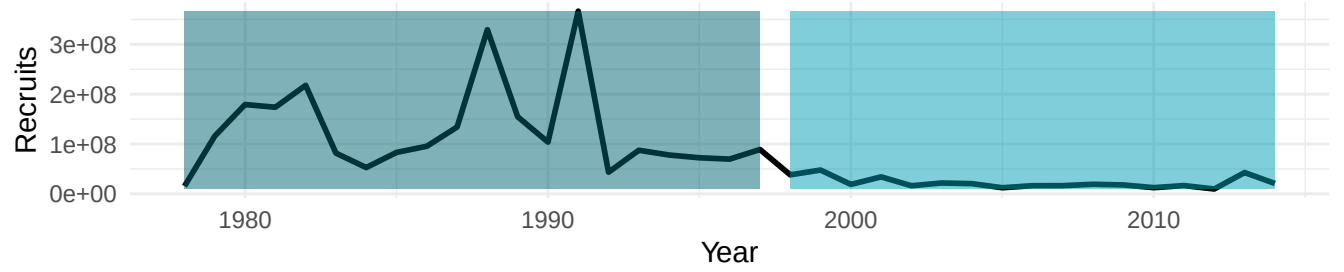

Stock ID: GTRIGGM
Balistes capriscus
Region: US Southeast and Gulf
(a)
Recruits
2.0e+07
1.5e+07
1.0e+07
5.0e+06
1980
1990
2000
2010
Year
(b)
Standardized residuals
4
2
0
−2
−4
1980
1990
2000
2010
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1980
1990
2000
2010
Year


Stock ID: HADNEAR
Melanogrammus aeglefinus
Region: Europe non EU
(a)
Recruits
1.2e+09
8.0e+08
4.0e+08
0.0e+00
1960
1980
2000
Year
(b)
Standardized residuals
4
2
0
−2
−4
1960
1980
2000
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1960
1980
2000
Year

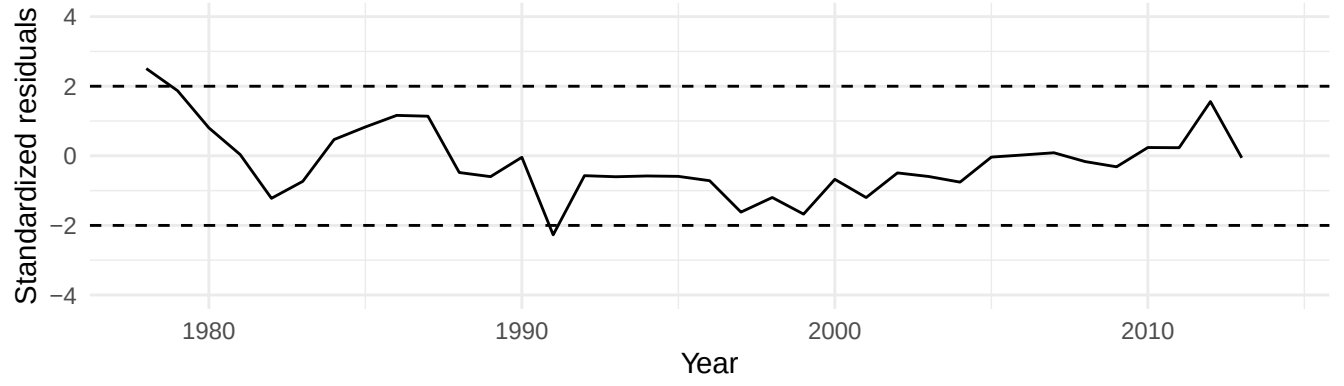

Stock ID: HAKESPPSAF
Merluccius spp
Region: Southern Africa
(a)
Recruits
4e+10
3e+10
2e+10
1e+10
1980
2000
2020
Year
(b)
Standardized residuals
4
2
0
−2
−4
1980
2000
2020
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1980
2000
2020
Year

Stock ID: HERR4TSP

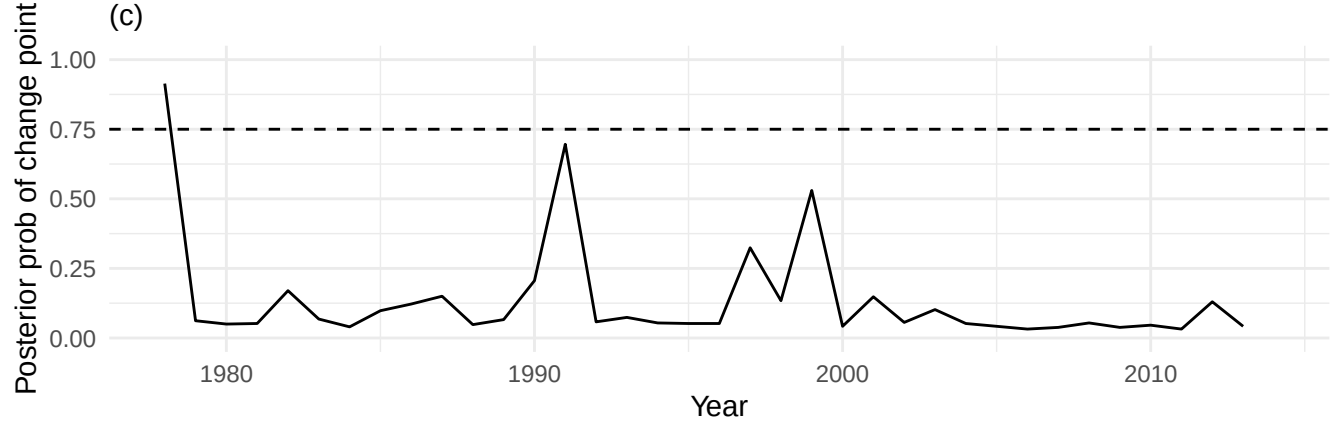
Clupea harengus
Region: Canada East Coast
(a)

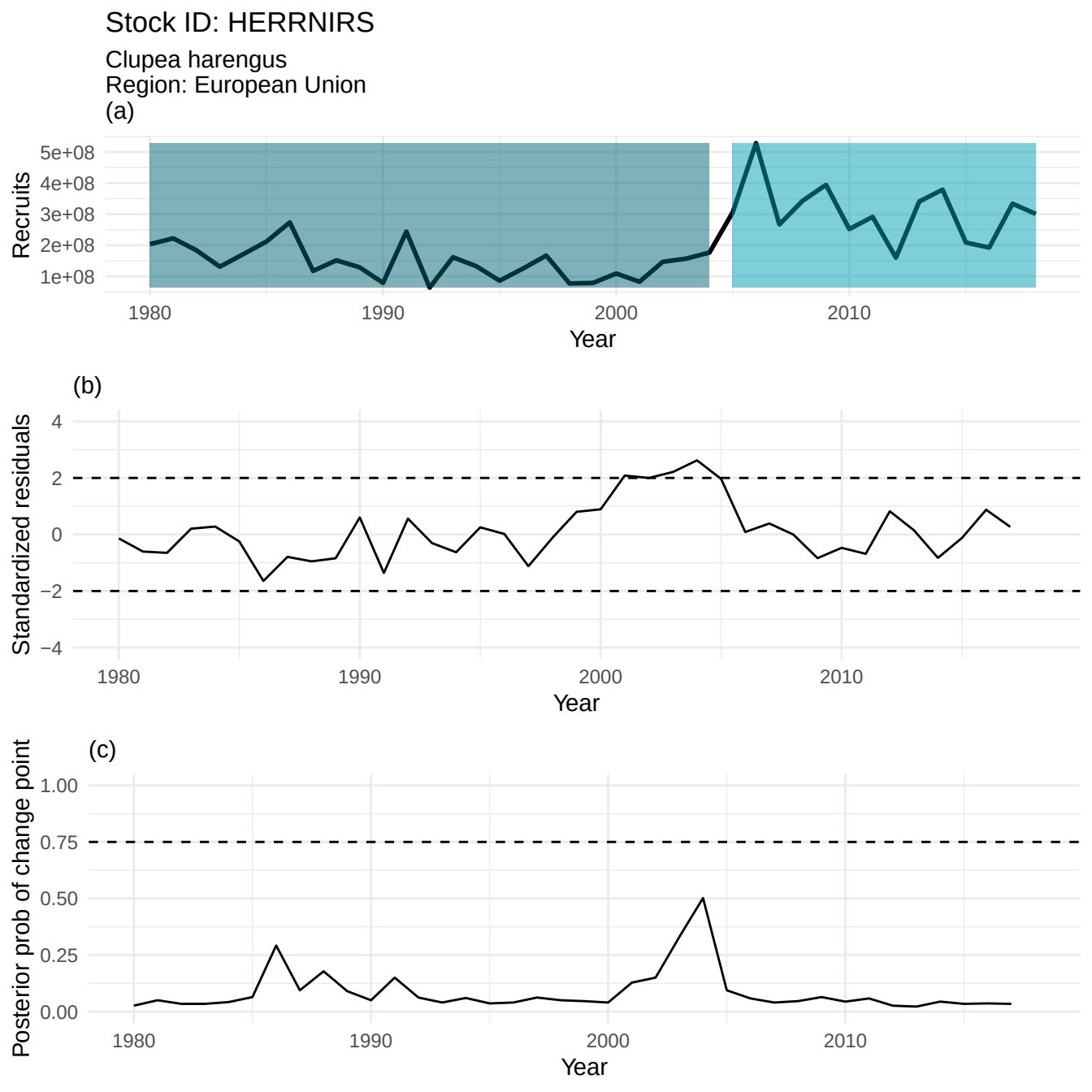


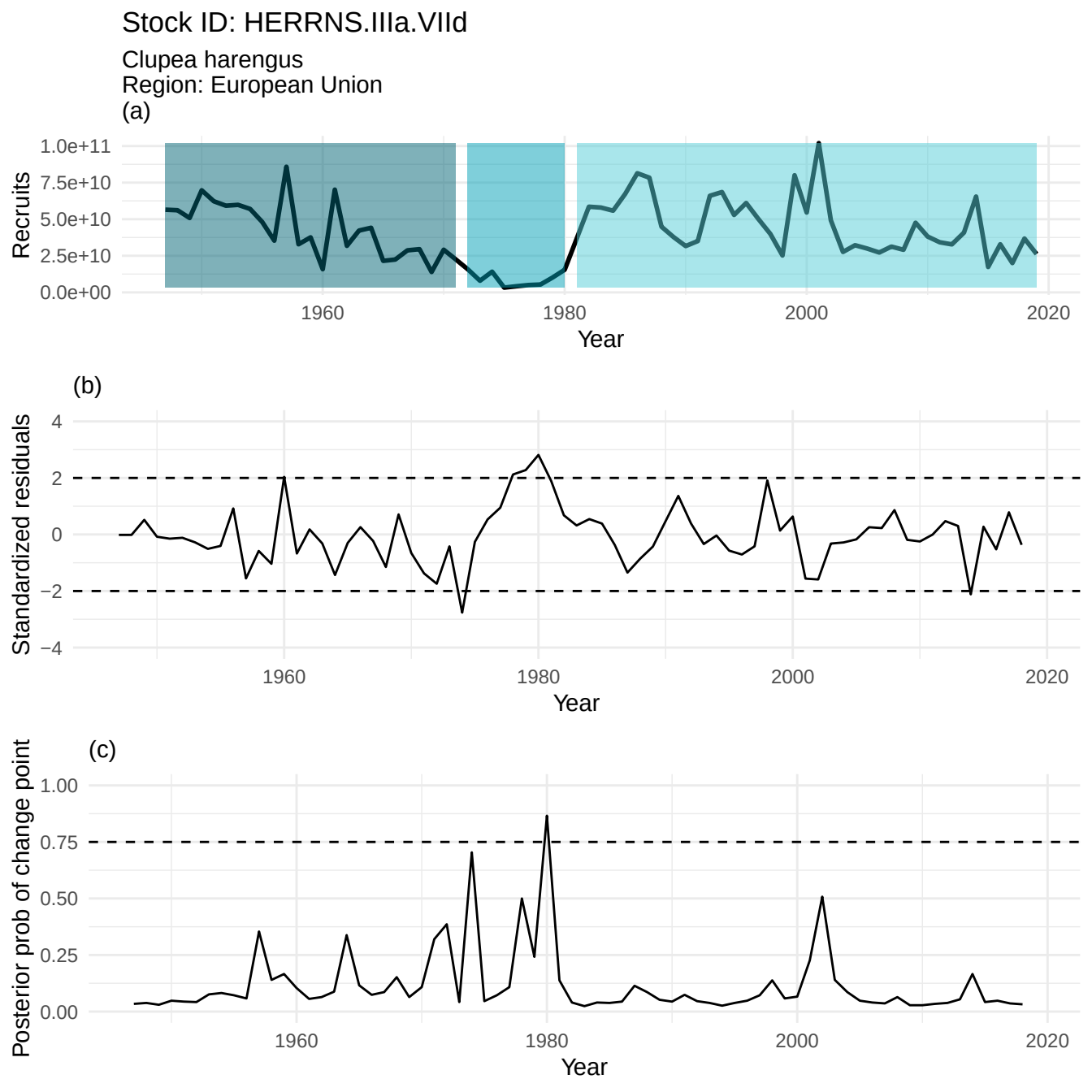
(b)

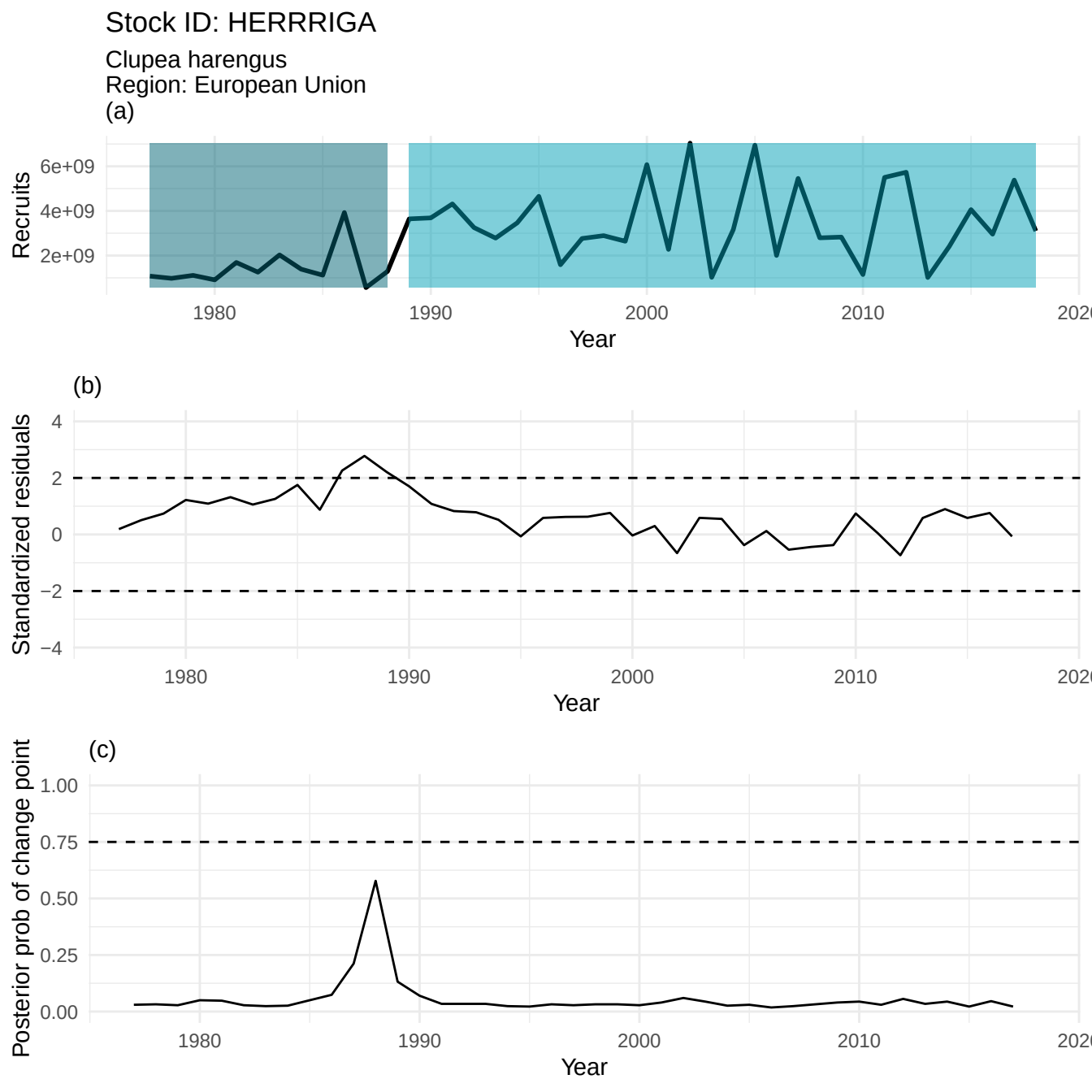


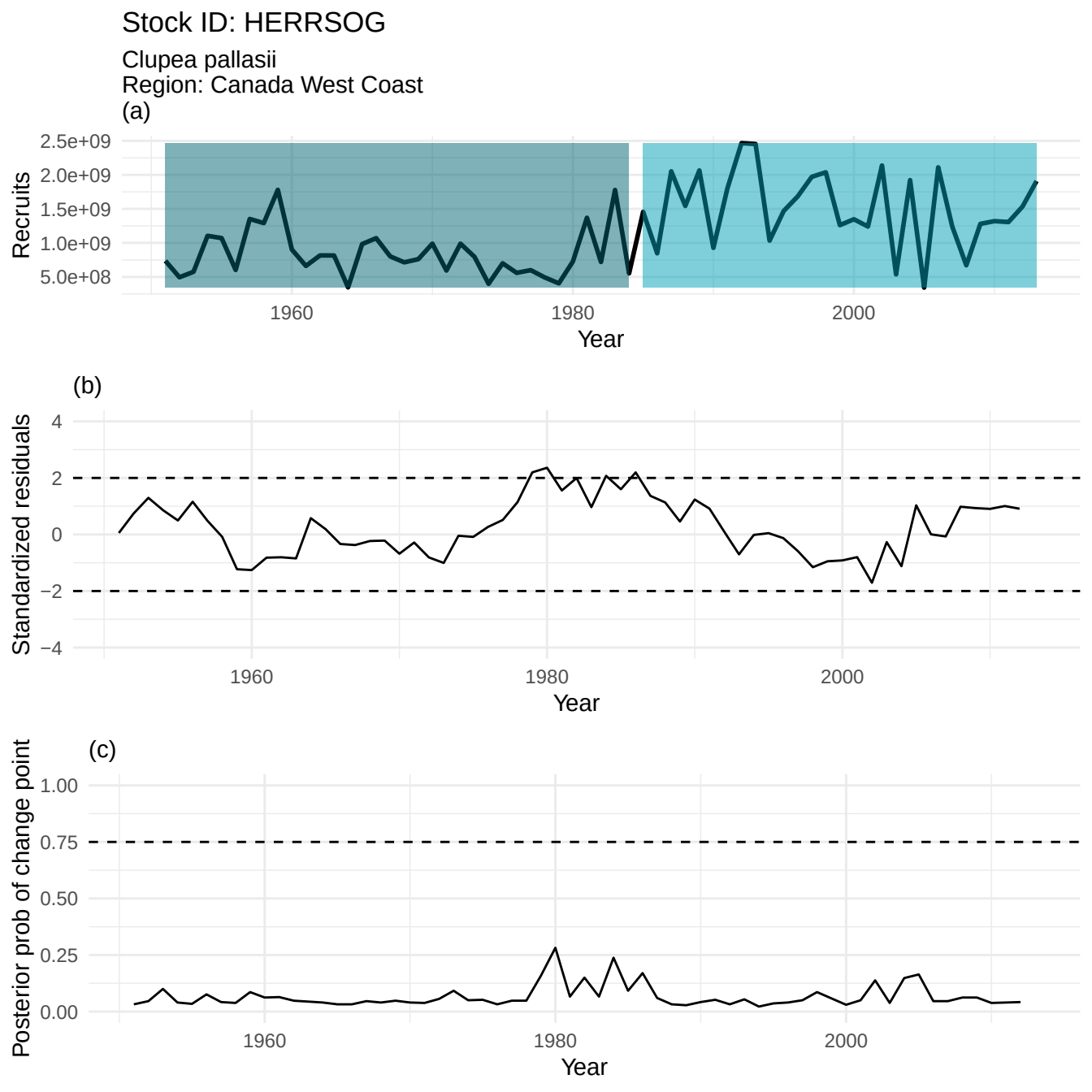
(c)

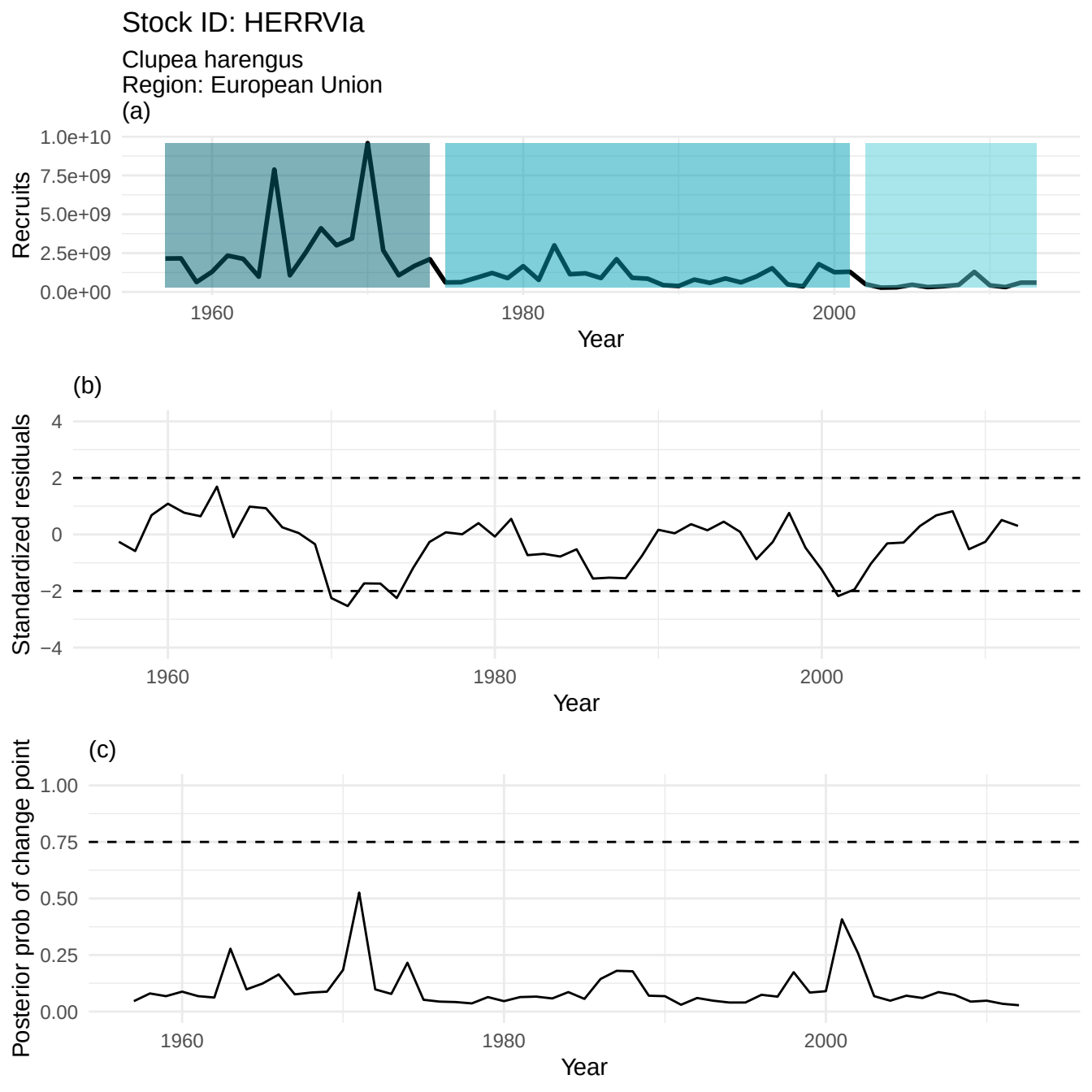


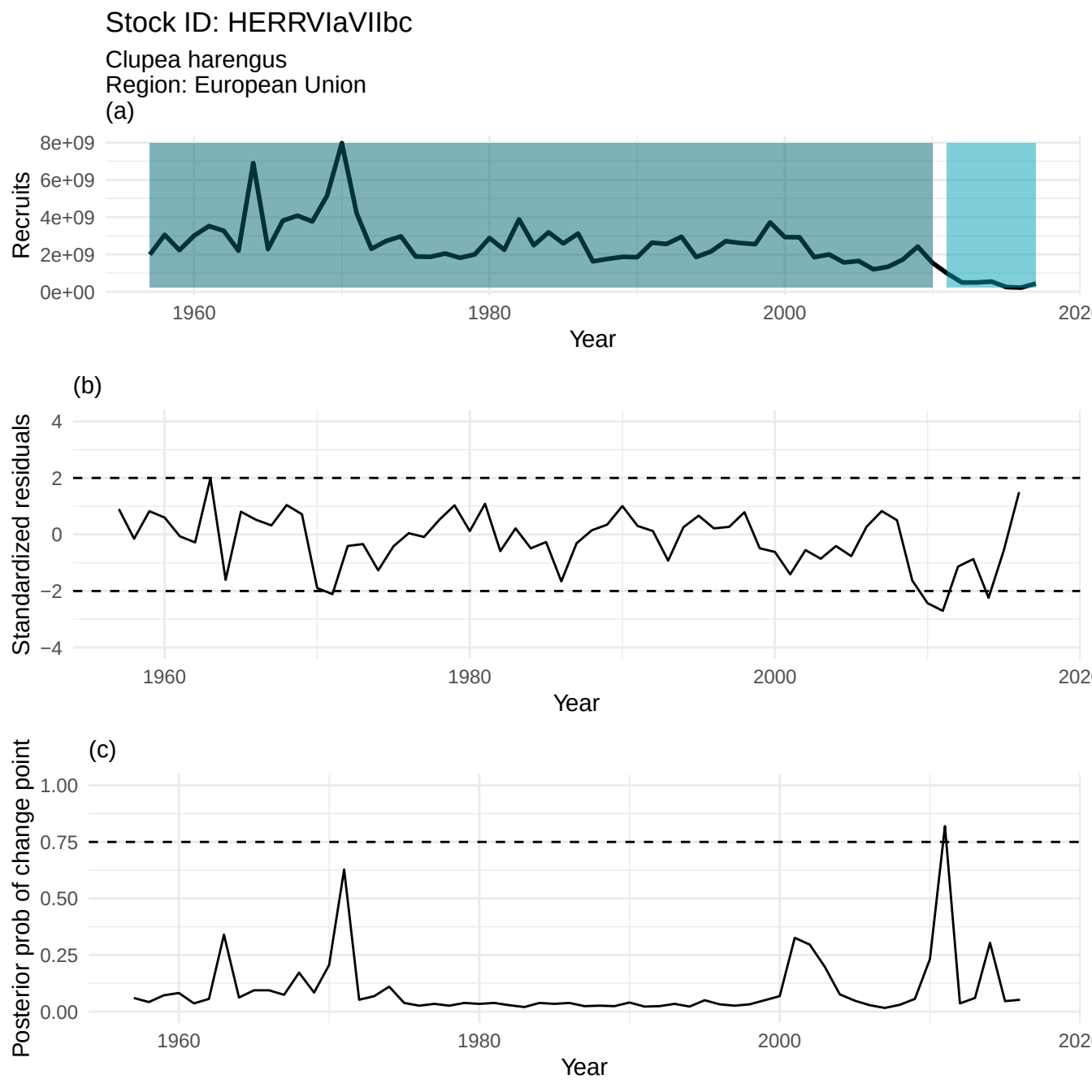

Stock ID: HERRNIRS
Clupea harengus
Region: European Union
(a)
Recruits
5e+08
4e+08
3e+08
2e+08
1e+08
1980
1990
2000
2010
Year
(b)
Standardized residuals
4
2
0
−2
−4
1980
1990
2000
2010
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1980
1990
2000
2010
Year

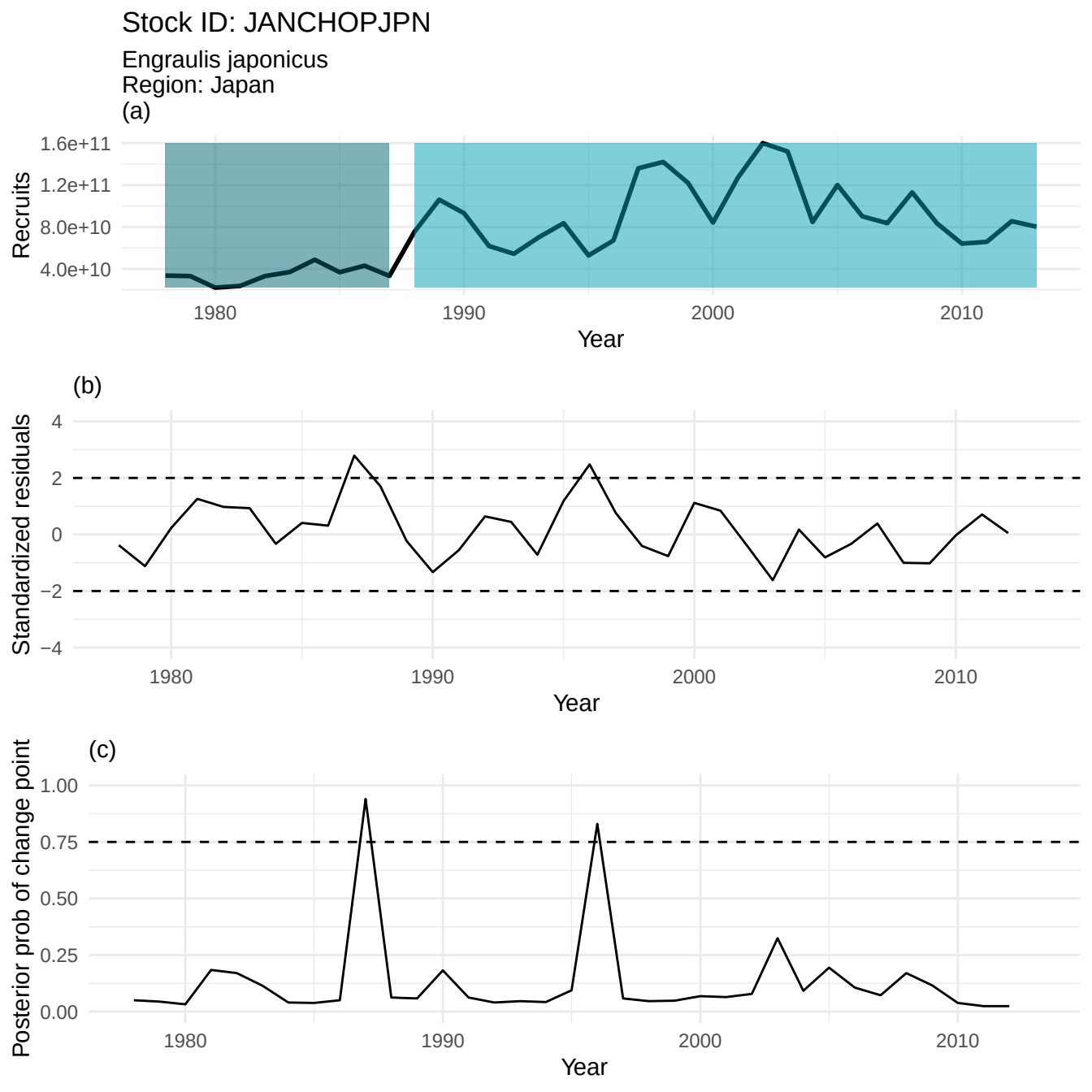

Stock ID: HERRNS.IIIa.VIId
Clupea harengus
Region: European Union
(a)
Recruits
1.0e+11
7.5e+10
5.0e+10
2.5e+10
0.0e+00
1960
1980
2000
2020
Year
(b)
Standardized residuals
4
2
0
−2
−4
1960
1980
2000
2020
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1960
1980
2000
2020
Year

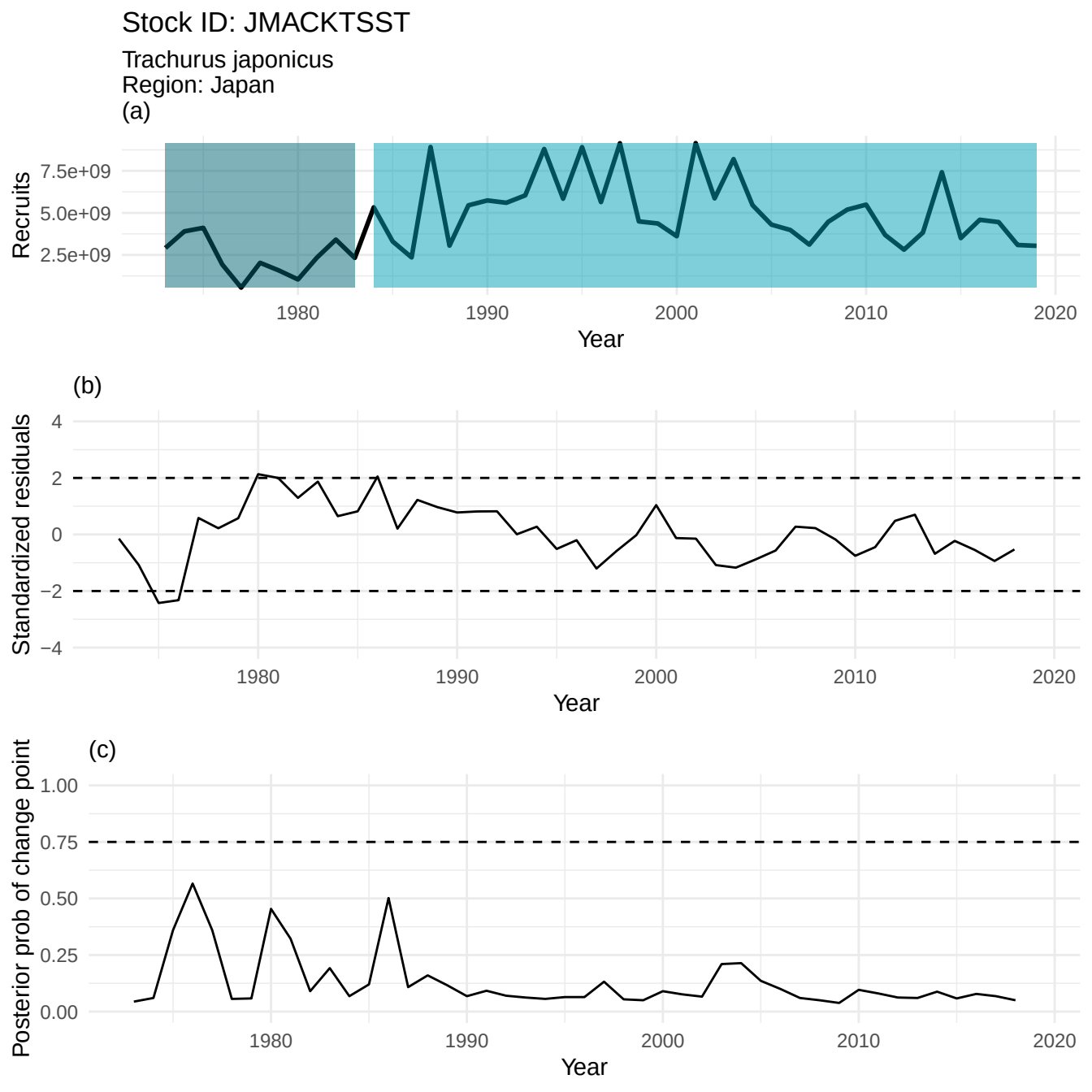

Stock ID: HERRRIGA
Clupea harengus
Region: European Union
(a)
Recruits
6e+09
4e+09
2e+09
1980
1990
2000
2010
Year
(b)
Standardized residuals
4
2
0
−2
−4
1980
1990
2000
2010
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1980
1990
2000
2010
Year

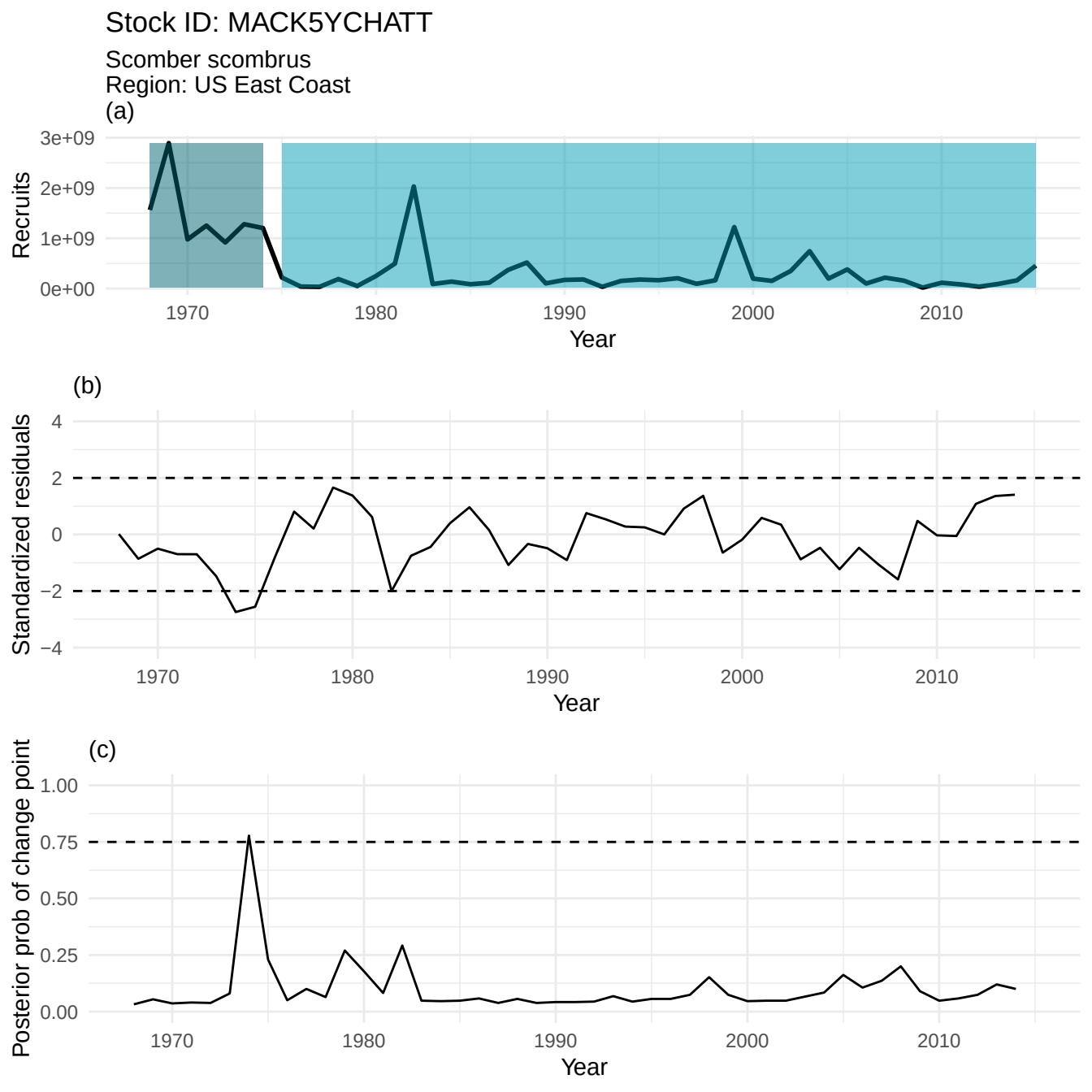

Stock ID: HERRSOG
Clupea pallasii
Region: Canada West Coast
(a)
Recruits
2.5e+09
2.0e+09
1.5e+09
1.0e+09
5.0e+08
1960
1980
2000
Year
(b)
Standardized residuals
4
2
0
−2
−4
1960
1980
2000
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1960
1980
2000
Year


Stock ID: HERRVIa
Clupea harengus
Region: European Union
(a)
Recruits
1.0e+10
7.5e+09
5.0e+09
2.5e+09
0.0e+00
1960
1980
2000
Year
(b)
Standardized residuals
4
2
0
−2
−4
1960
1980
2000
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1960
1980
2000
Year


Stock ID: HERRVIaVIIbc
Clupea harengus
Region: European Union
(a)
Recruits
8e+09
6e+09
4e+09
2e+09
0e+00
1960
1980
2000
Year
(b)
Standardized residuals
4
2
0
−2
−4
1960
1980
2000
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1960
1980
2000
Year

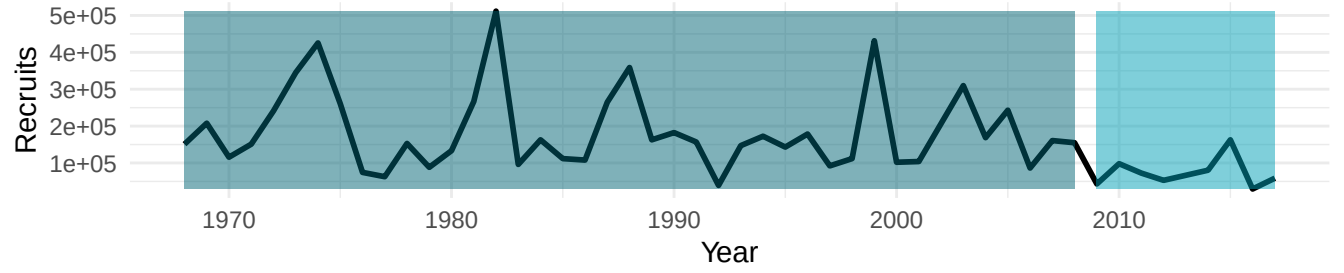

Stock ID: JANCHOPJPN
Engraulis japonicus
Region: Japan
(a)
Recruits
1.6e+11
1.2e+11
8.0e+10
4.0e+10
1980
1990
2000
2010
Year
(b)
Standardized residuals
4
2
0
−2
−4
1980
1990
2000
2010
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1980
1990
2000
2010
Year


Stock ID: JMACKTSST
Trachurus japonicus
Region: Japan
(a)
Recruits
7.5e+09
5.0e+09
2.5e+09
1980
1990
2000
2010
2020
Year
(b)
Standardized residuals
4
2
0
−2
−4
1980
1990
2000
2010
2020
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1980
1990
2000
2010
2020
Year

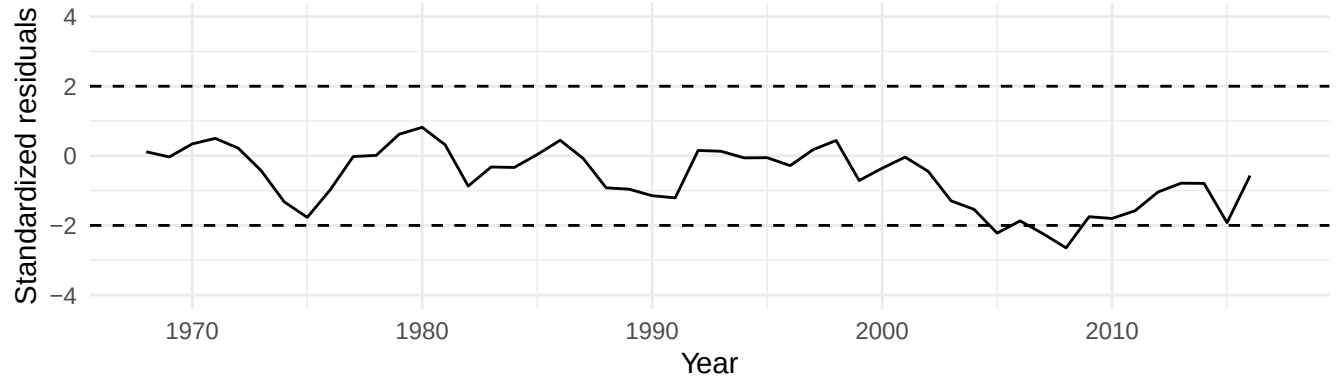

Stock ID: MACK5YCHATT
Scomber scombrus
Region: US East Coast
(a)
Recruits
3e+09
2e+09
1e+09
0e+00
1970
1980
1990
2000
2010
Year
(b)
Standardized residuals
4
2
0
−2
−4
1970
1980
1990
2000
2010
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1970
1980
1990
2000
2010
Year

Stock ID: MACKNWATLSA3.4

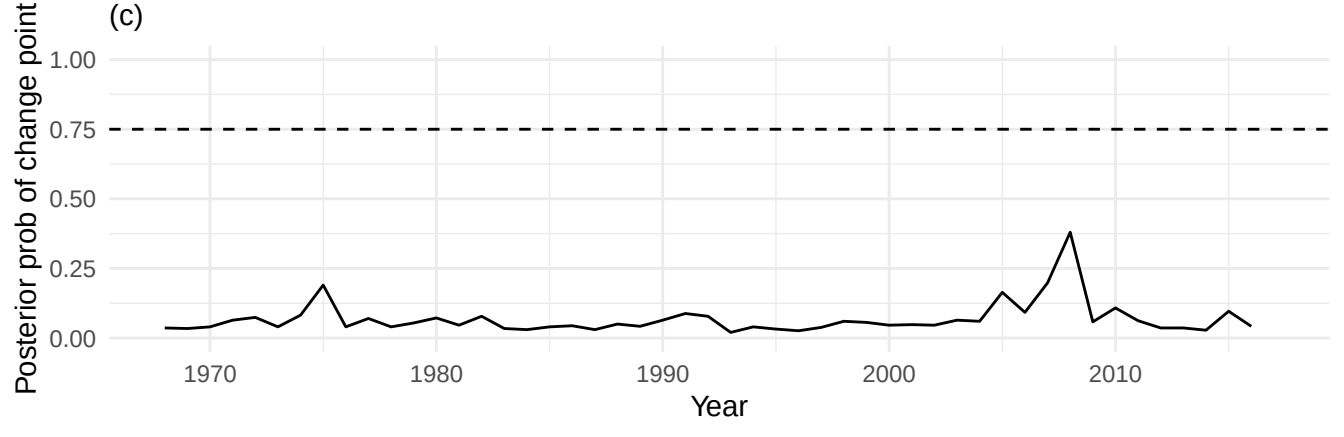
Scomber scombrus
Region: Canada East Coast
(a)

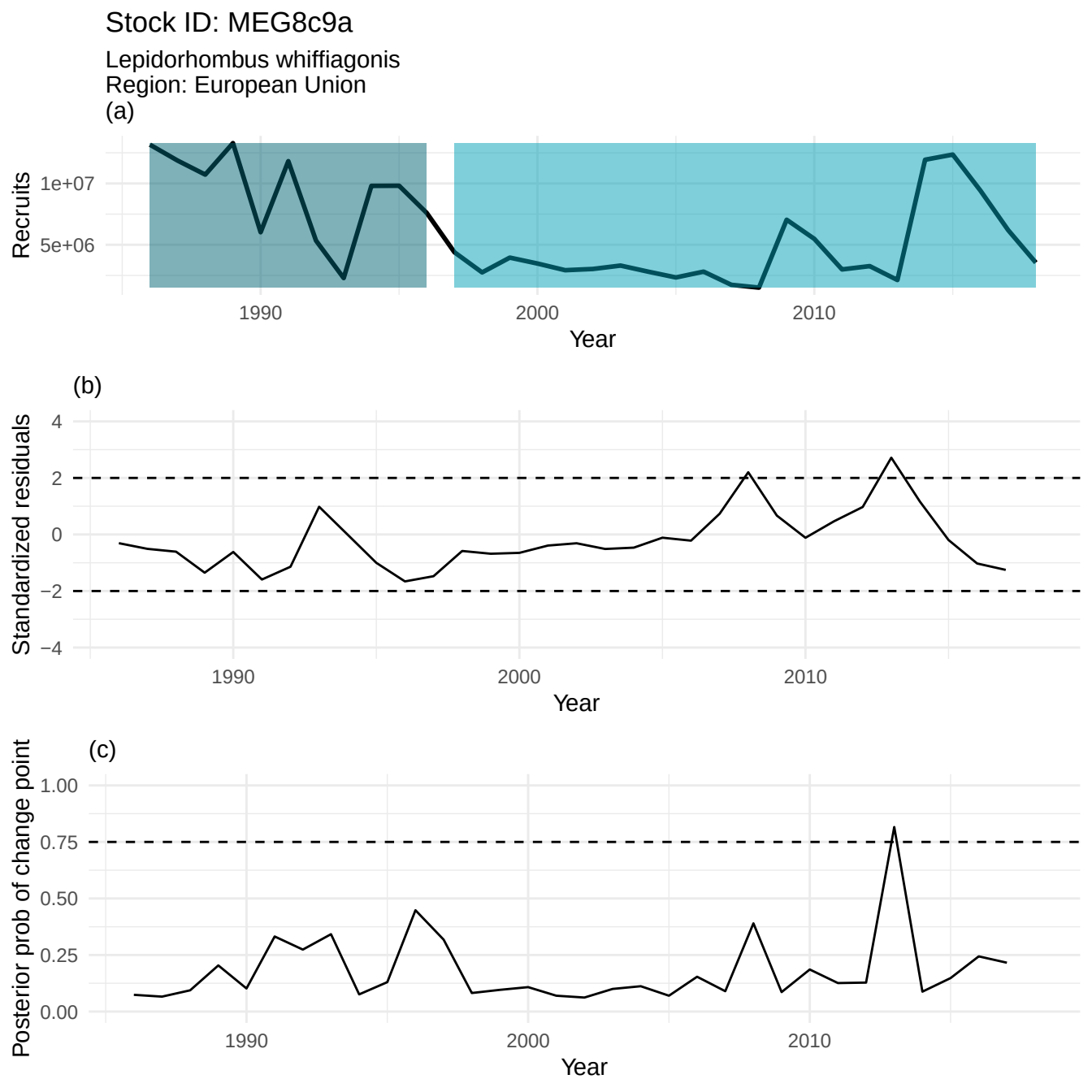


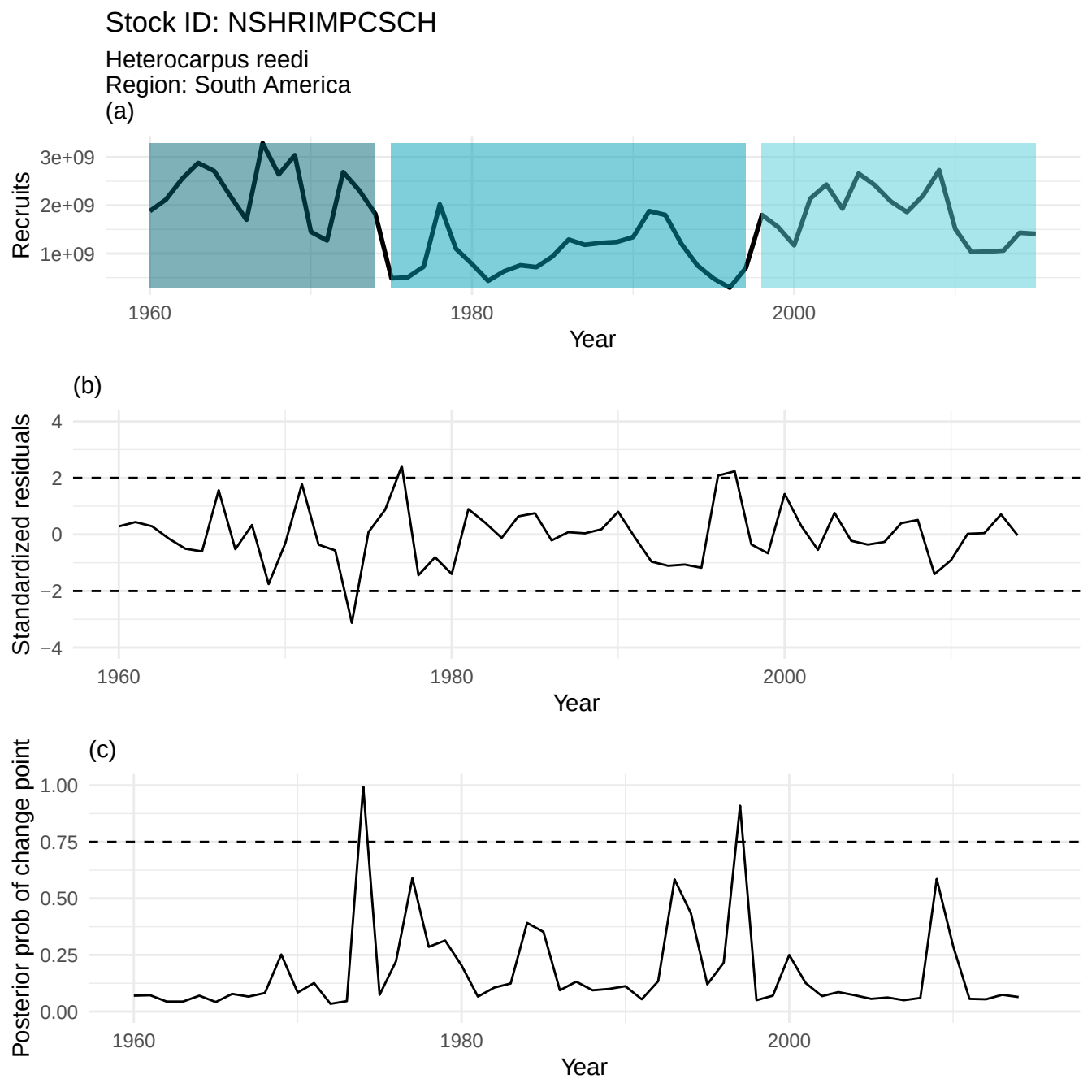
(b)

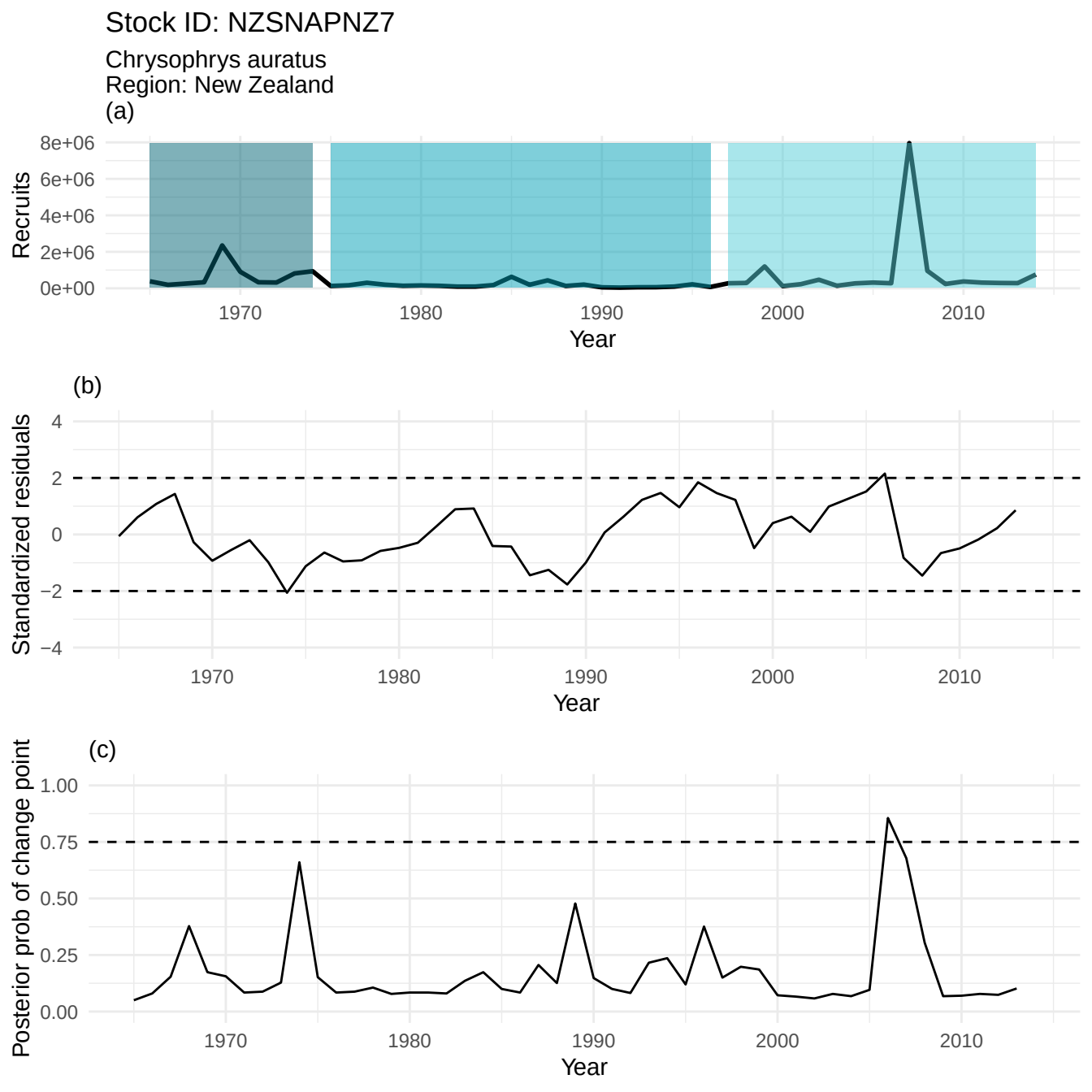


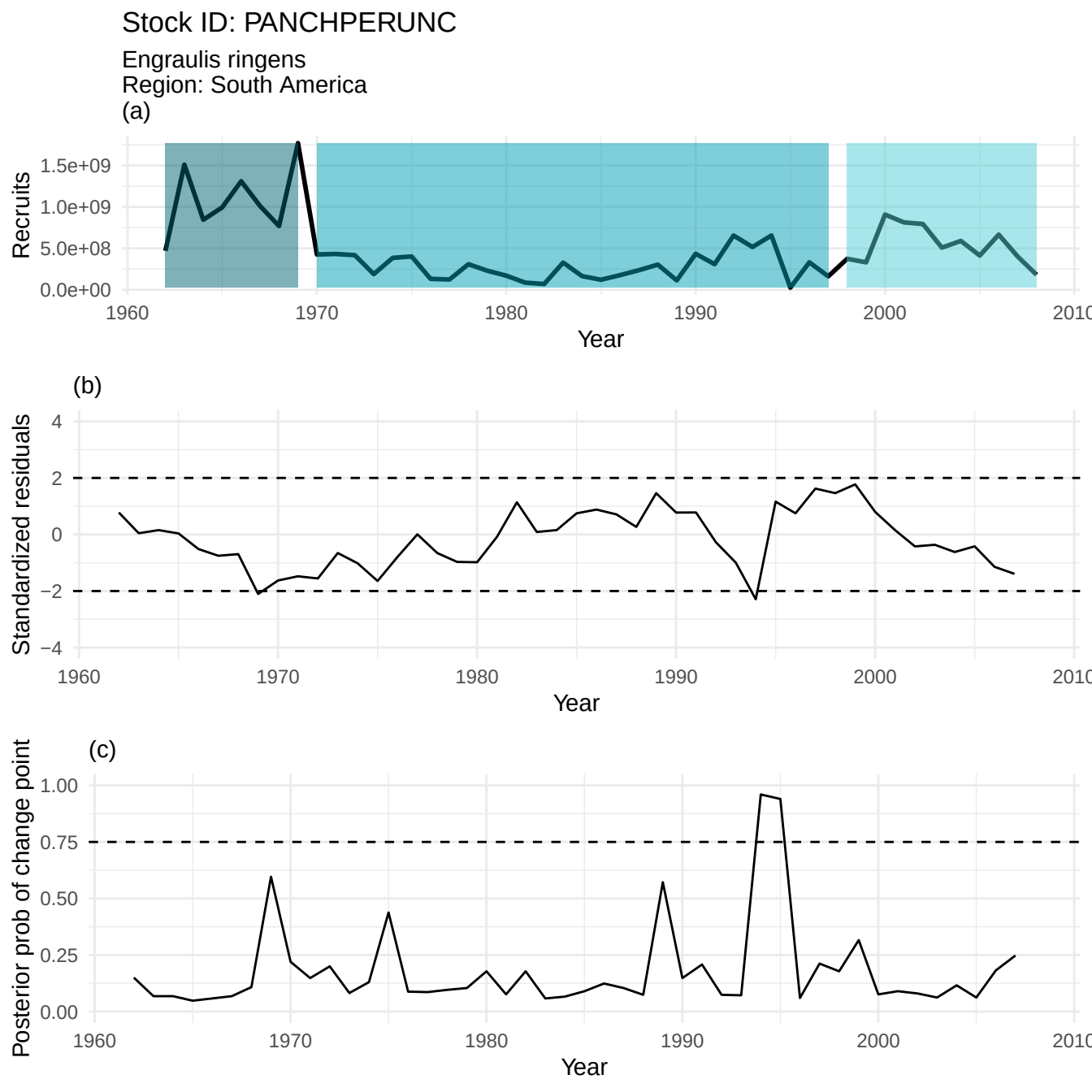
(c)

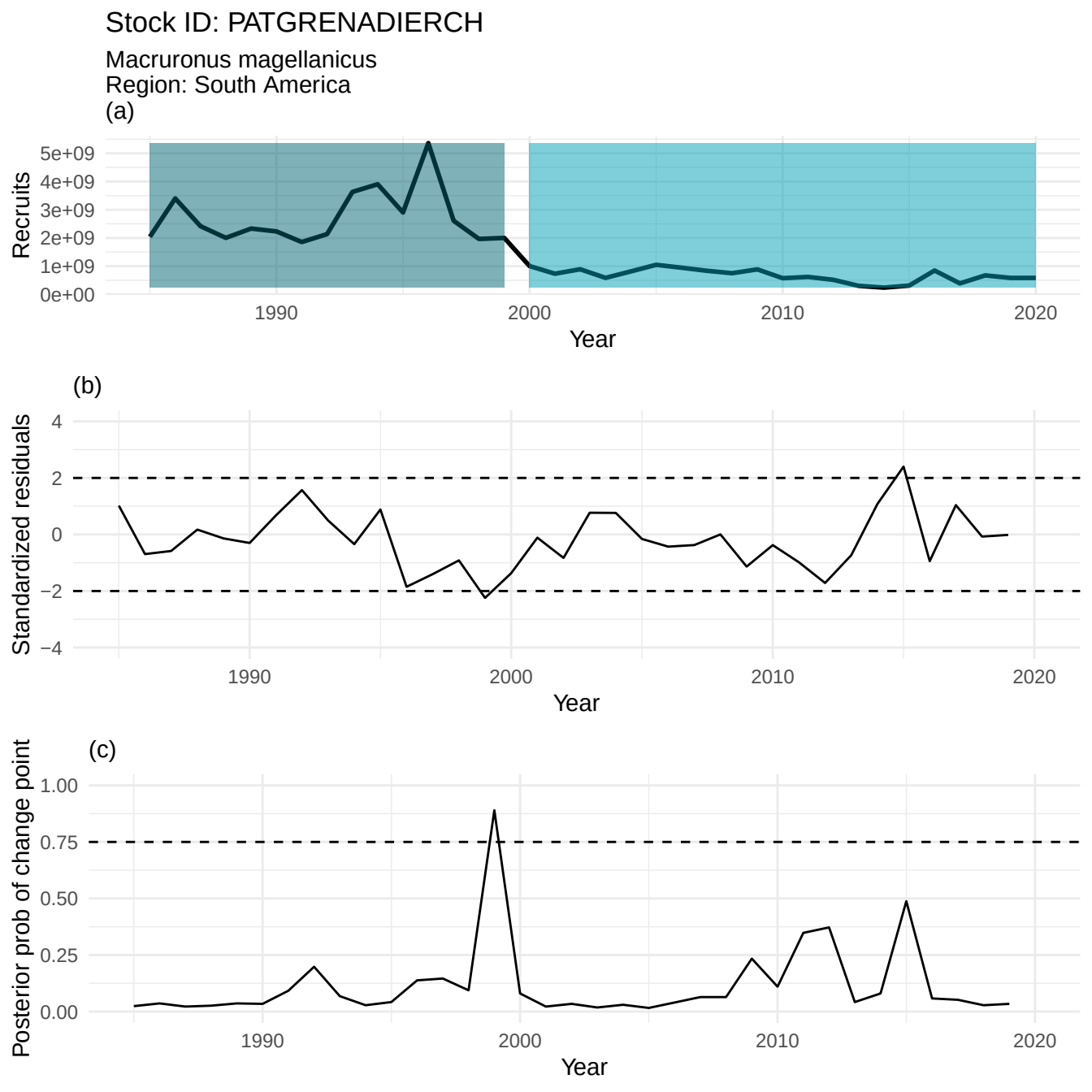


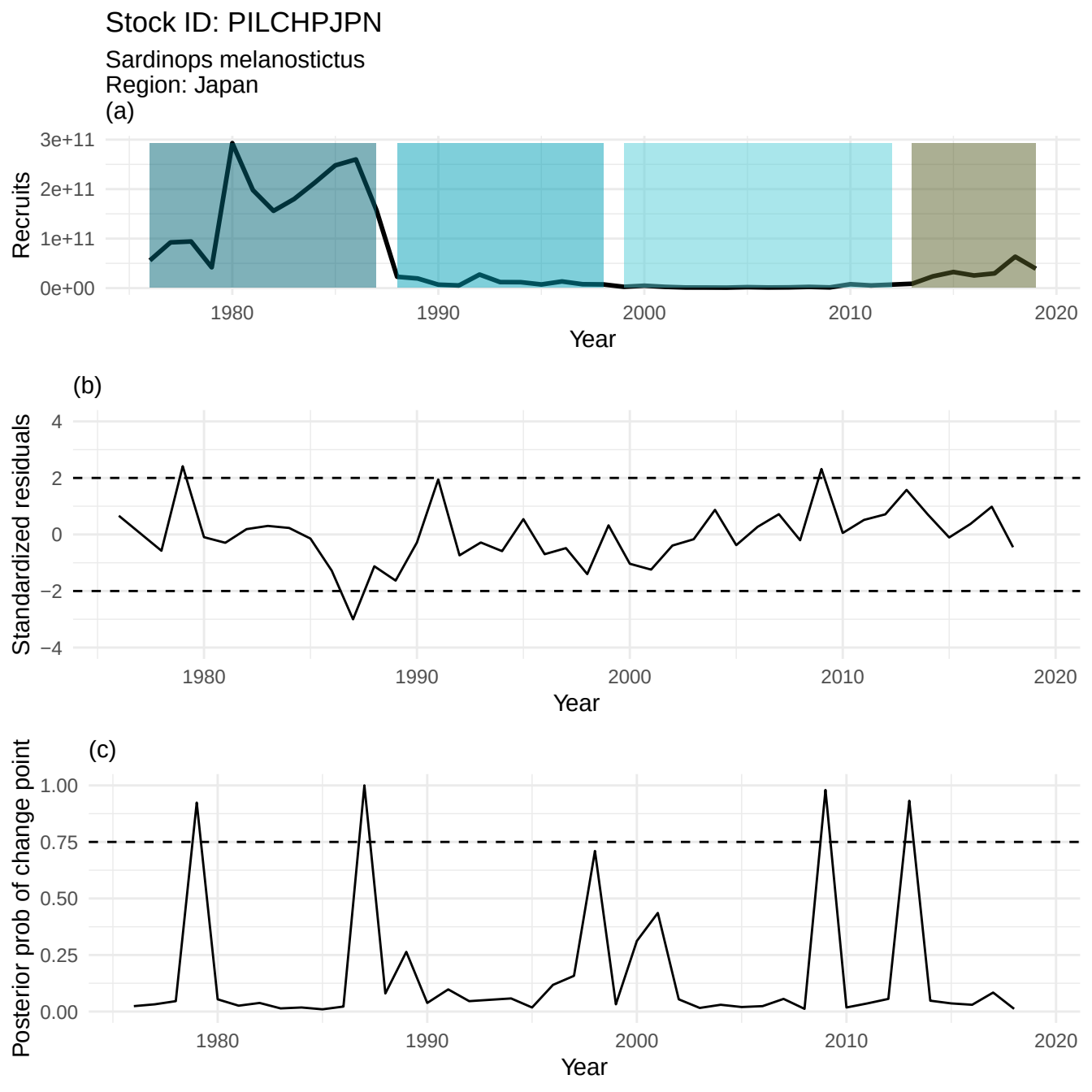

Stock ID: MEG8c9a
Lepidorhombus whiffiagonis
Region: European Union
(a)
Recruits
1e+07
5e+06
1990
2000
2010
Year
(b)
Standardized residuals
4
2
0
−2
−4
1990
2000
2010
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1990
2000
2010
Year

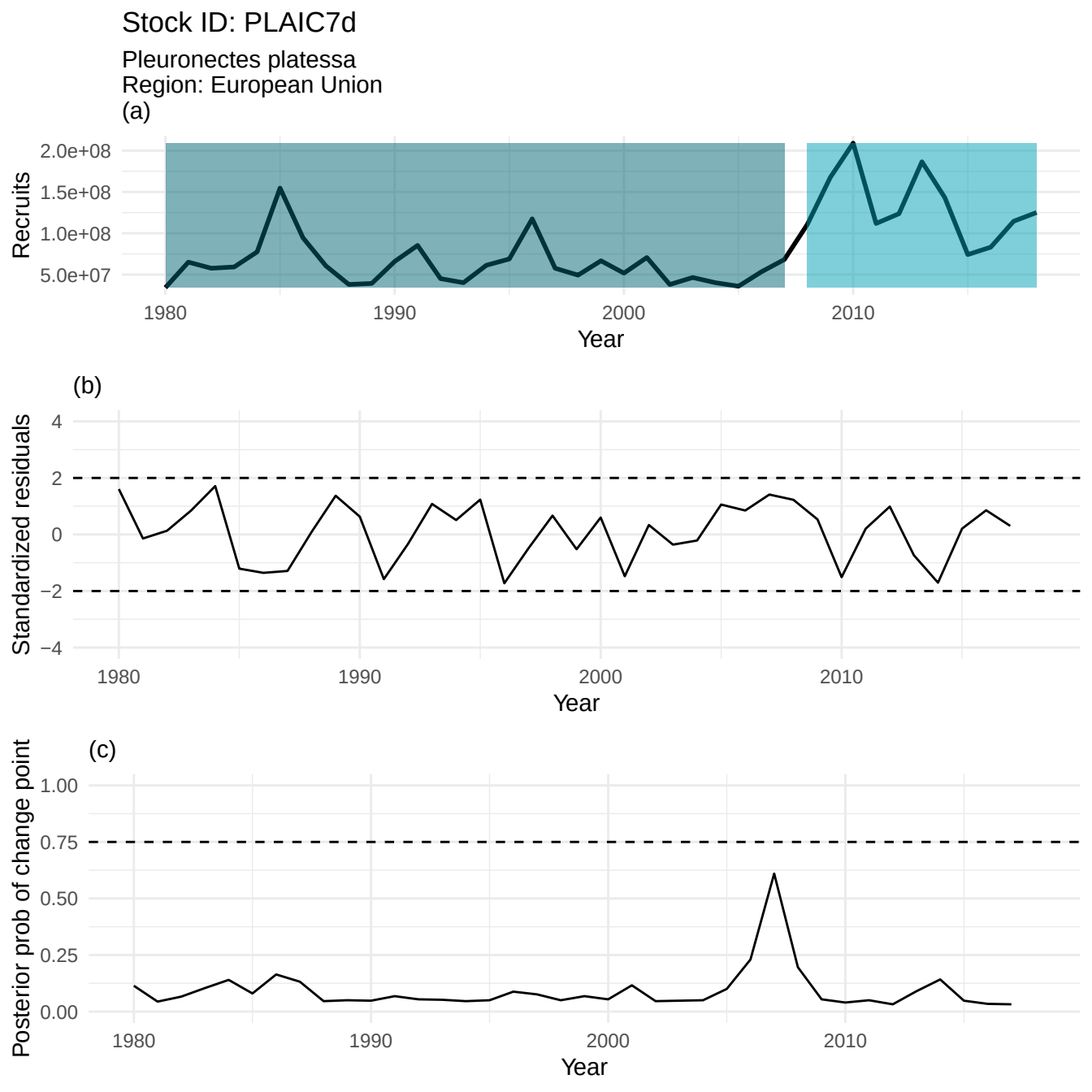

Stock ID: NSHRIMPCSCH
Heterocarpus reedi
Region: South America
(a)
Recruits
3e+09
2e+09
1e+09
1960
1980
2000
Year
(b)
Standardized residuals
4
2
0
−2
−4
1960
1980
2000
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1960
1980
2000
Year

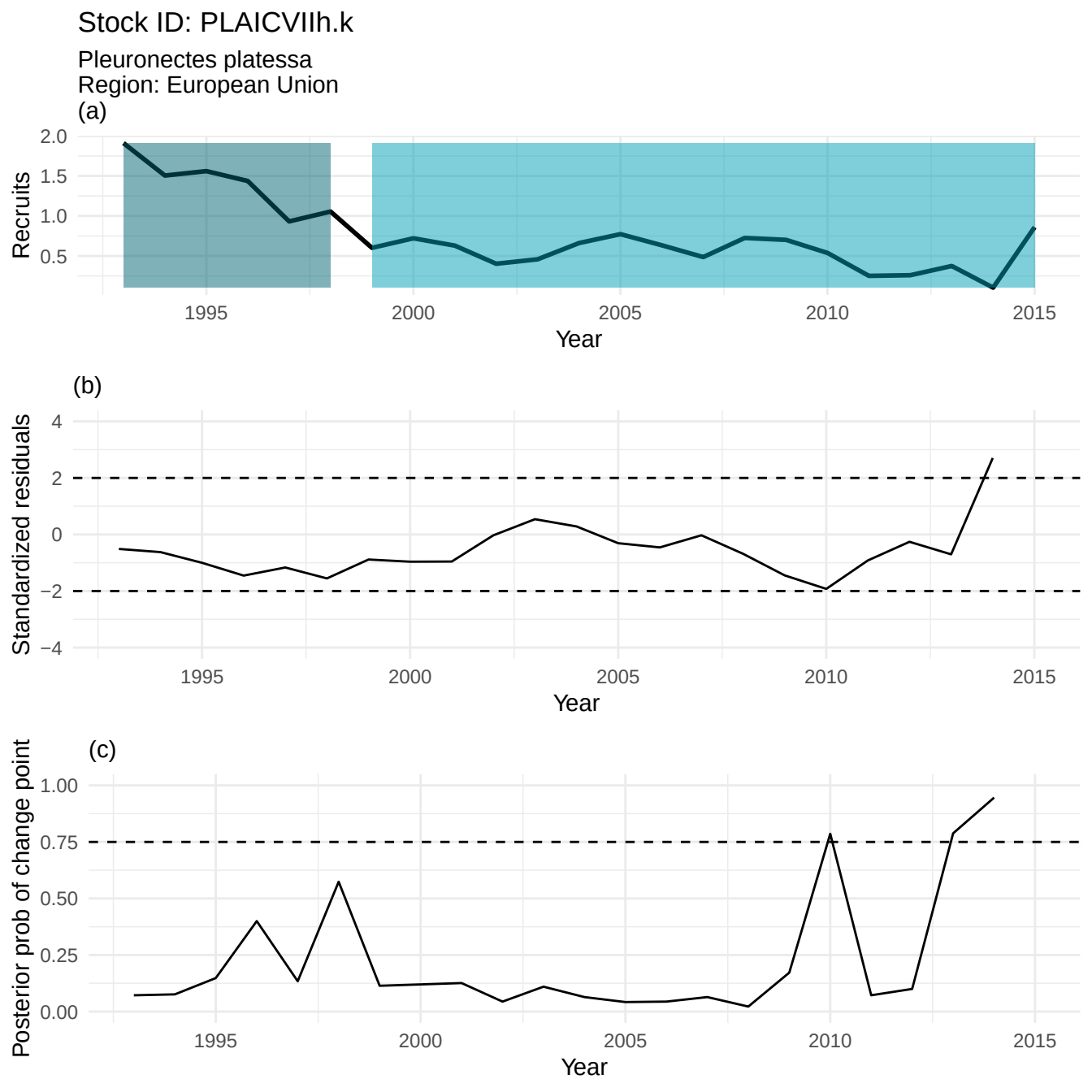

Stock ID: NZSNAPNZ7
Chrysophrys auratus
Region: New Zealand
(a)
Recruits
8e+06
6e+06
4e+06
2e+06
0e+00
1970
1980
1990
2000
2010
Year
(b)
Standardized residuals
4
2
0
−2
−4
1970
1980
1990
2000
2010
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1970
1980
1990
2000
2010
Year

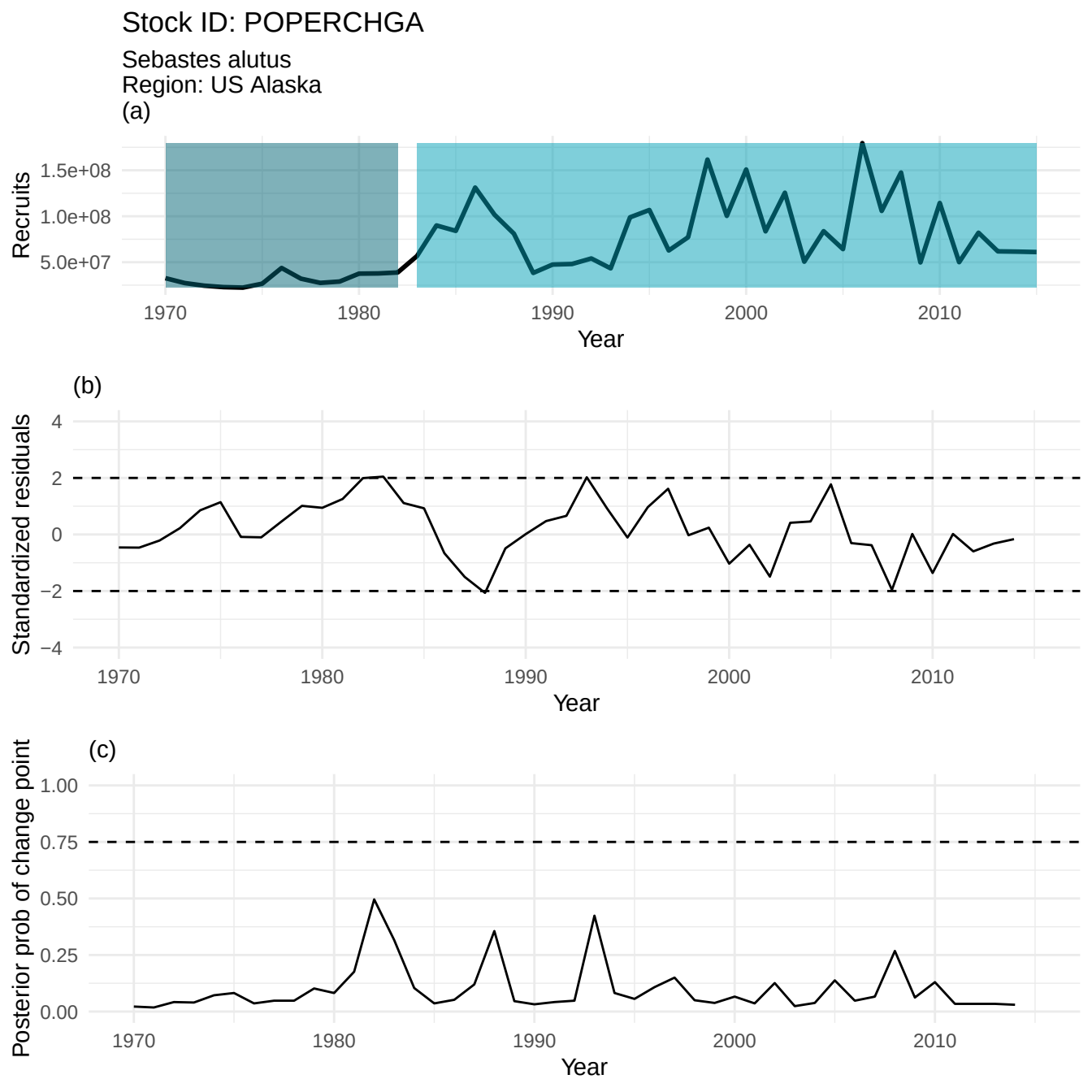

Stock ID: PANCHPERUNC
Engraulis ringens
Region: South America
(a)
Recruits
1.5e+09
1.0e+09
5.0e+08
0.0e+00
1960
1970
1980
1990
2000
2010
Year
(b)
Standardized residuals
4
2
0
−2
−4
1960
1970
1980
1990
2000
2010
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1960
1970
1980
1990
2000
2010
Year

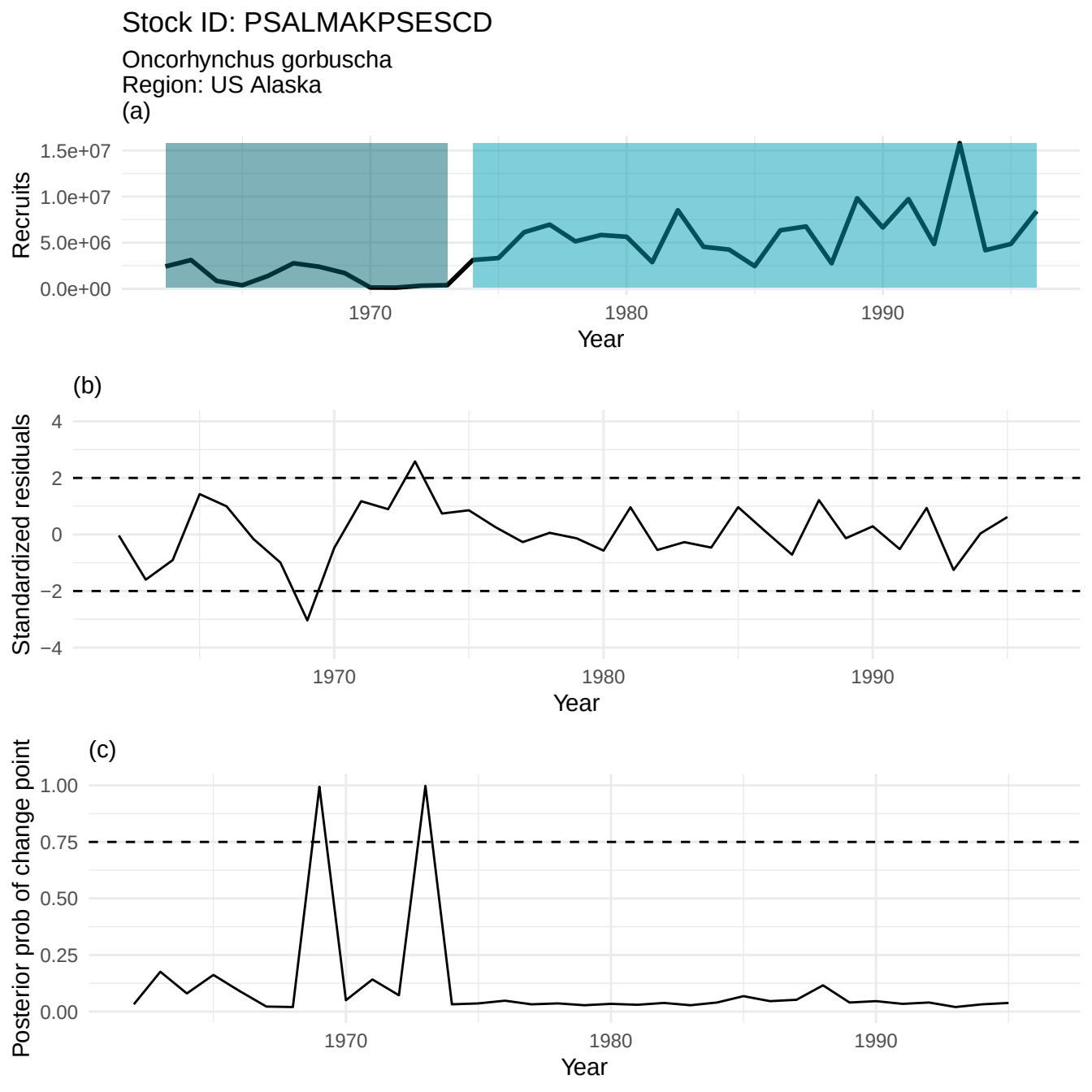

Stock ID: PATGRENADIERCH
Macruronus magellanicus
Region: South America
(a)
Recruits
5e+09
4e+09
3e+09
2e+09
1e+09
0e+00
1990
2000
2010
2020
Year
(b)
Standardized residuals
4
2
0
−2
−4
1990
2000
2010
2020
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1990
2000
2010
2020
Year

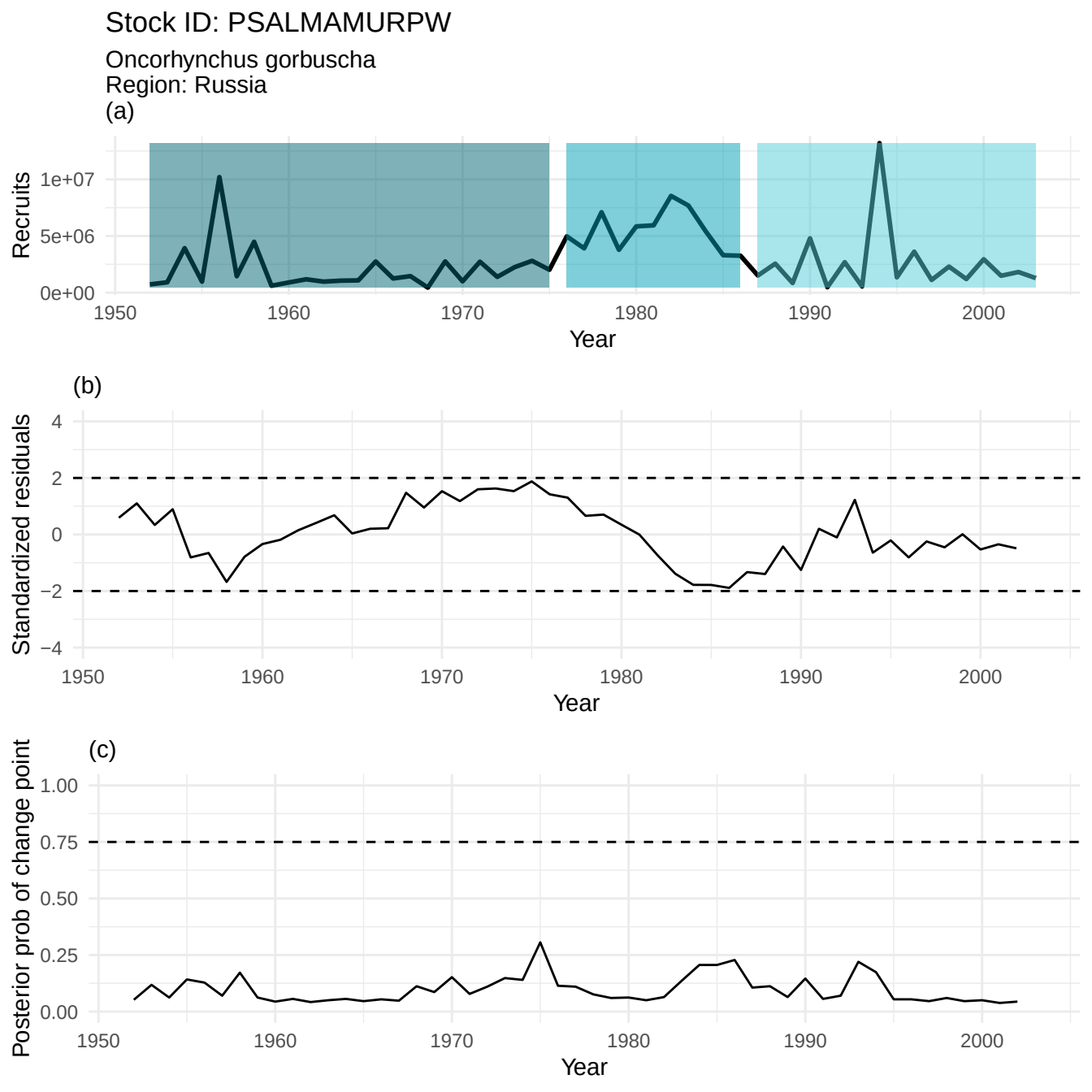

Stock ID: PILCHPJPN
Sardinops melanostictus
Region: Japan
(a)
Recruits
3e+11
2e+11
1e+11
0e+00
1980
1990
2000
2010
2020
Year
(b)
Standardized residuals
4
2
0
−2
−4
1980
1990
2000
2010
2020
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1980
1990
2000
2010
2020
Year

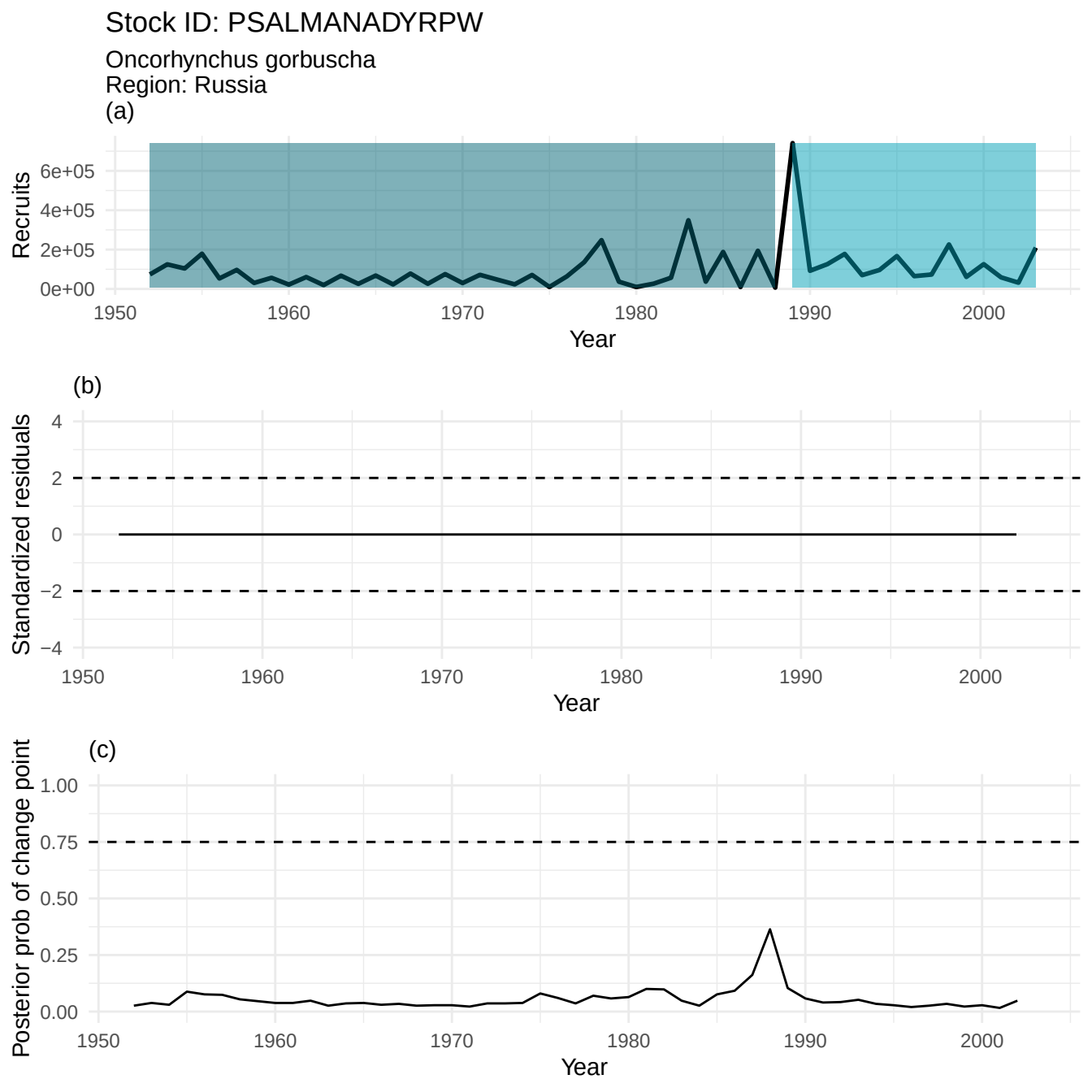

Stock ID: PLAIC7d
Pleuronectes platessa
Region: European Union
(a)
Recruits
2.0e+08
1.5e+08
1.0e+08
5.0e+07
1980
1990
2000
2010
Year
(b)
Standardized residuals
4
2
0
−2
−4
1980
1990
2000
2010
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1980
1990
2000
2010
Year

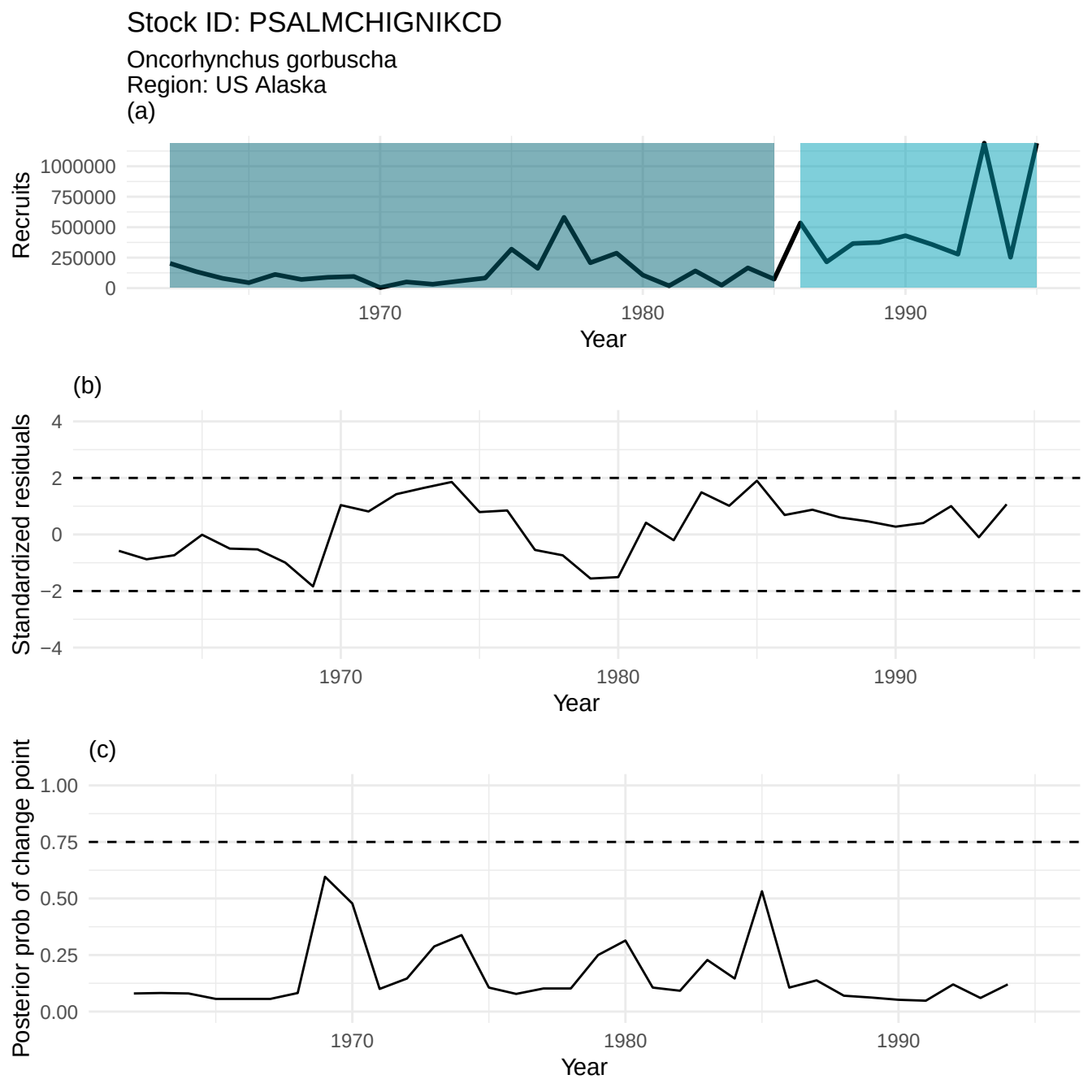

Stock ID: PLAICVIIh.k
Pleuronectes platessa
Region: European Union
(a)
Recruits
2.0
1.5
1.0
0.5
1995
2000
2005
2010
2015
Year
(b)
Standardized residuals
4
2
0
−2
−4
1995
2000
2005
2010
2015
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1995
2000
2005
2010
2015
Year

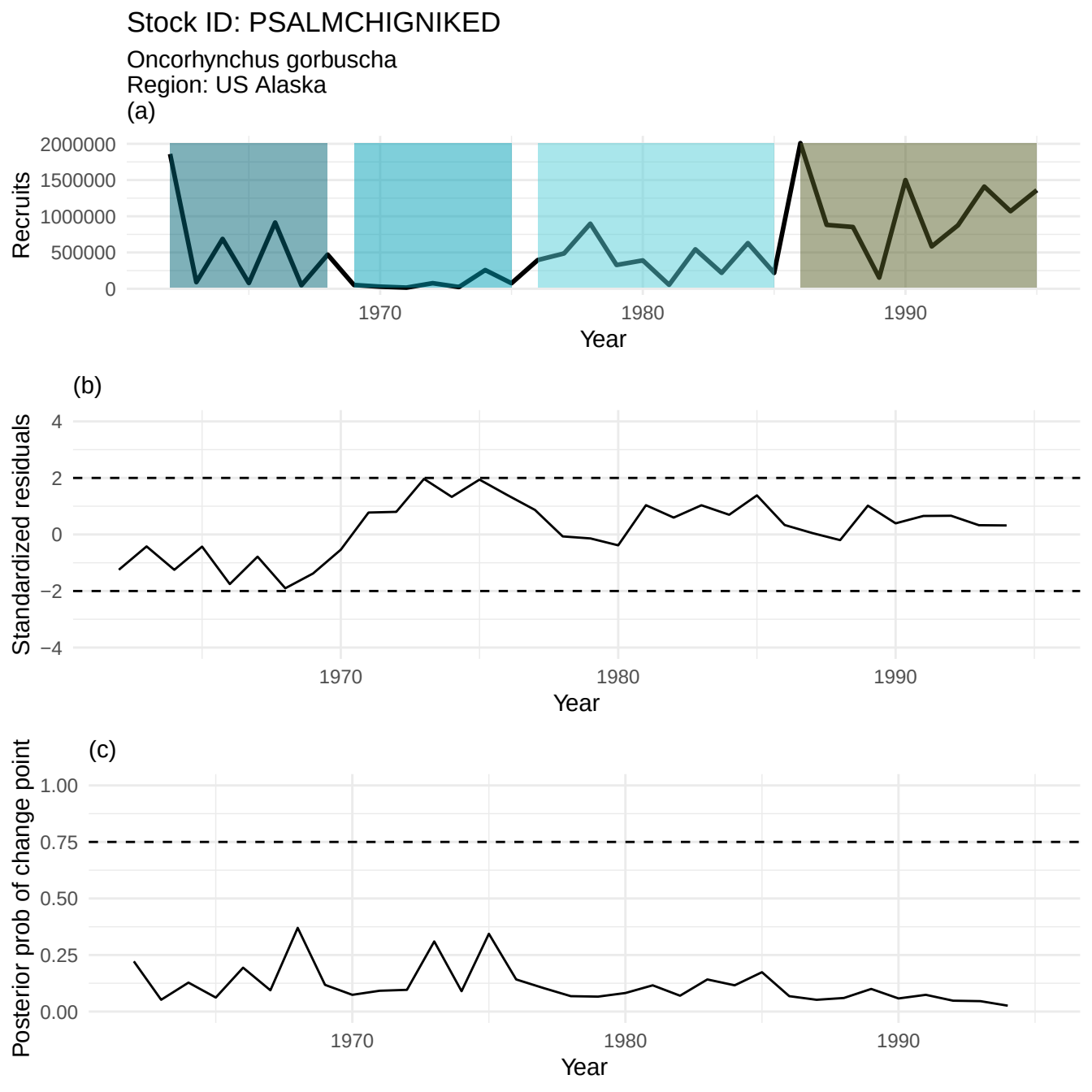

Stock ID: POPERCHGA
Sebastes alutus
Region: US Alaska
(a)
Recruits
1.5e+08
1.0e+08
5.0e+07
1970
1980
1990
2000
2010
Year
(b)
Standardized residuals
4
2
0
−2
−4
1970
1980
1990
2000
2010
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1970
1980
1990
2000
2010
Year

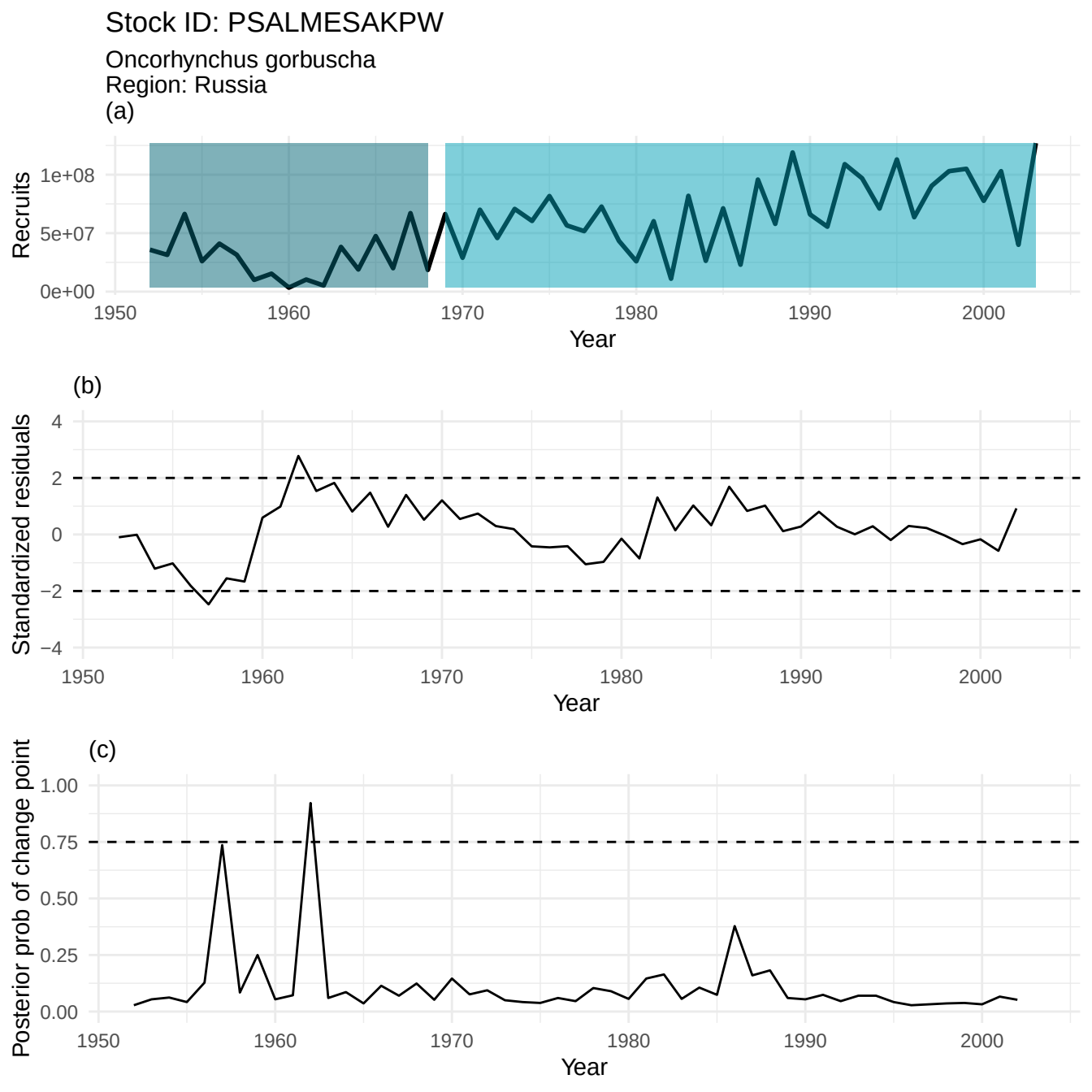

Stock ID: PSALMAKPSESCD
Oncorhynchus gorbuscha
Region: US Alaska
(a)
Recruits
1.5e+07
1.0e+07
5.0e+06
0.0e+00
1970
1980
1990
Year
(b)
Standardized residuals
4
2
0
−2
−4
1970
1980
1990
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1970
1980
1990
Year

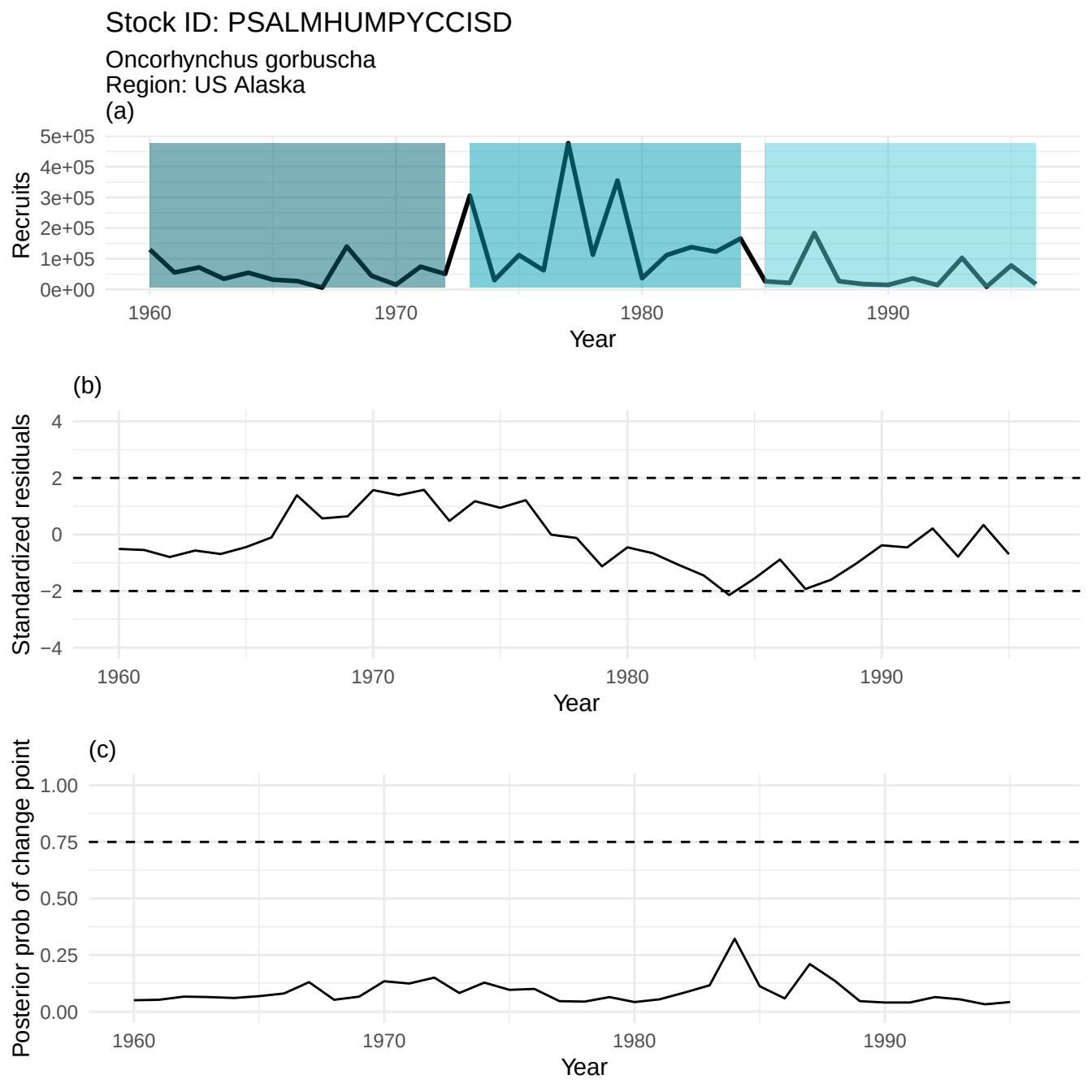

Stock ID: PSALMAMURPW
Oncorhynchus gorbuscha
Region: Russia
(a)
Recruits
1e+07
5e+06
0e+00
1950
1960
1970
1980
1990
2000
Year
(b)
Standardized residuals
4
2
0
−2
−4
1950
1960
1970
1980
1990
2000
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1950
1960
1970
1980
1990
2000
Year

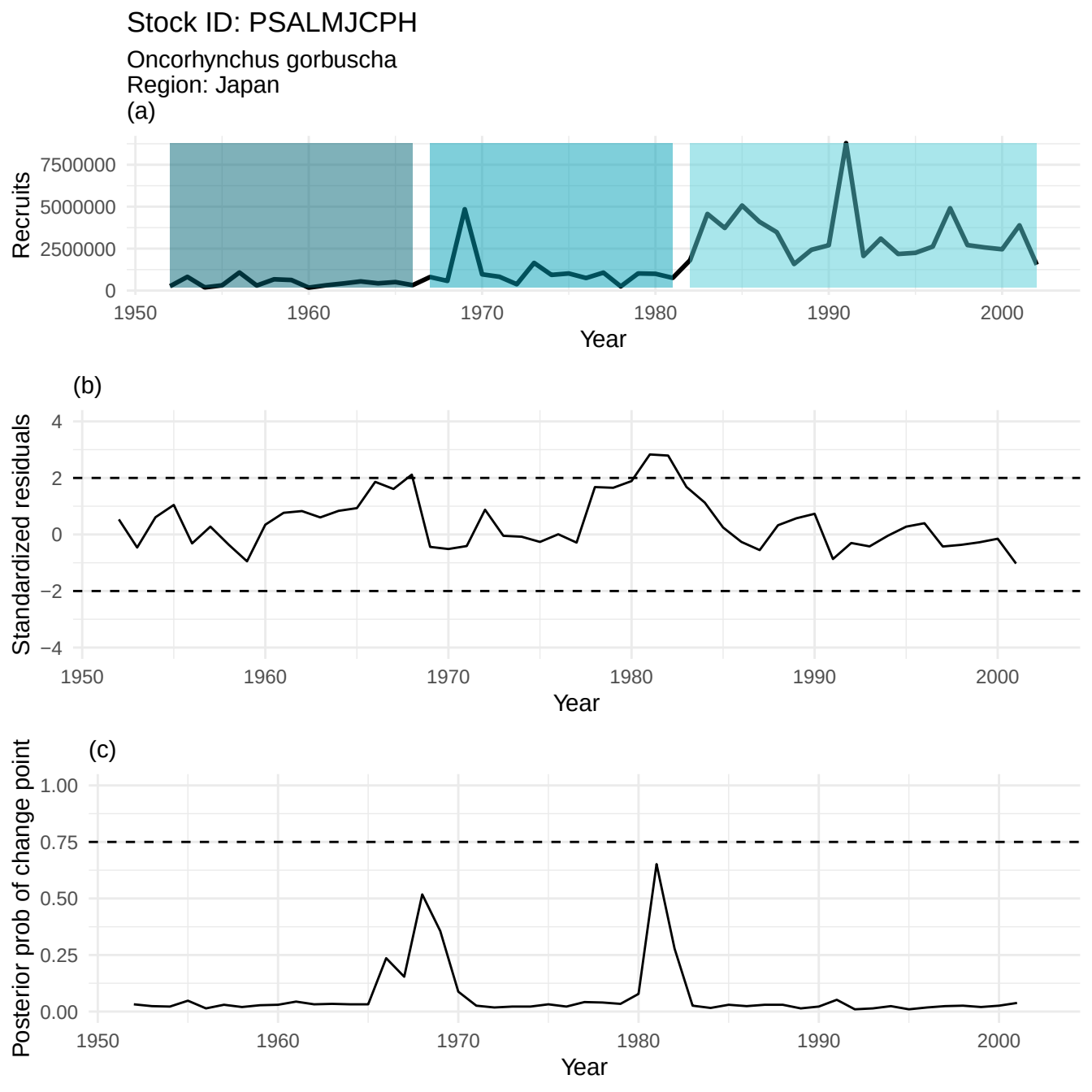

Stock ID: PSALMANADYRPW
Oncorhynchus gorbuscha
Region: Russia
(a)
Recruits
6e+05
4e+05
2e+05
0e+00
1950
1960
1970
1980
1990
2000
Year
(b)
Standardized residuals
4
2
0
−2
−4
1950
1960
1970
1980
1990
2000
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1950
1960
1970
1980
1990
2000
Year

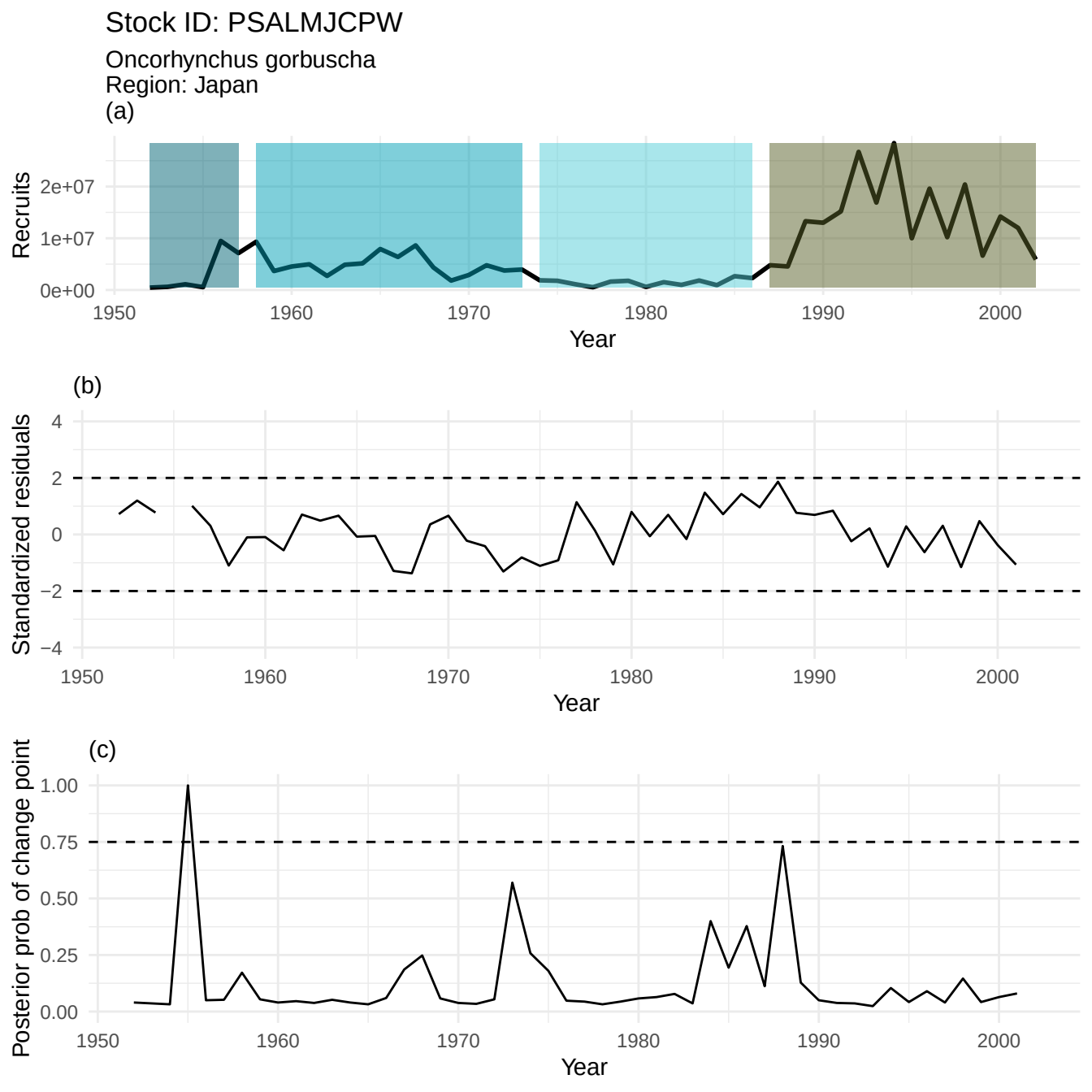

Stock ID: PSALMCHIGNIKCD
Oncorhynchus gorbuscha
Region: US Alaska
(a)
Recruits
1000000
750000
500000
250000
0
1970
1980
1990
Year
(b)
Standardized residuals
4
2
0
−2
−4
1970
1980
1990
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1970
1980
1990
Year

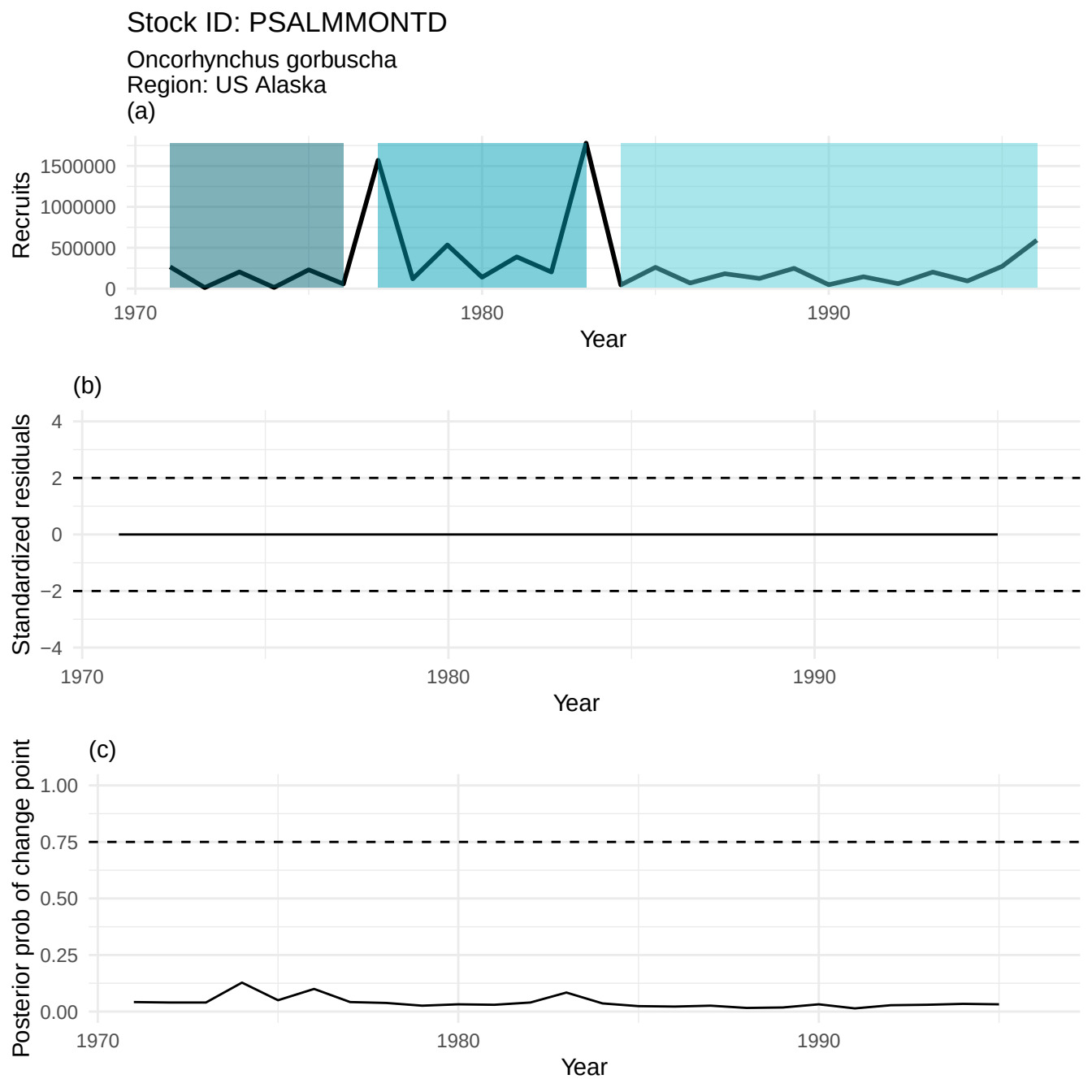

Stock ID: PSALMCHIGNIKED
Oncorhynchus gorbuscha
Region: US Alaska
(a)
Recruits
2000000
1500000
1000000
500000
0
1970
1980
1990
Year
(b)
Standardized residuals
4
2
0
−2
−4
1970
1980
1990
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1970
1980
1990
Year

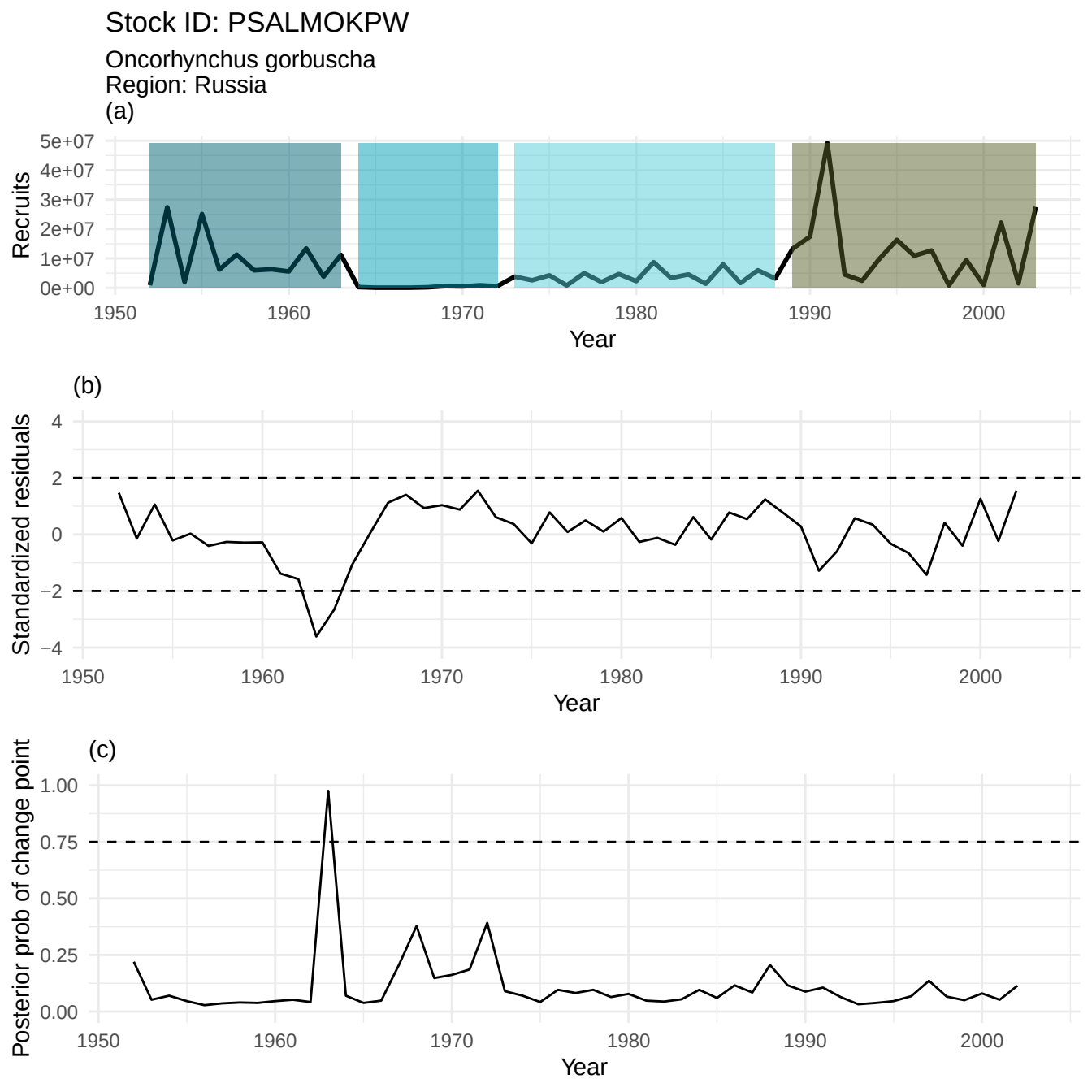

Stock ID: PSALMESAKPW
Oncorhynchus gorbuscha
Region: Russia
(a)
Recruits
1e+08
5e+07
0e+00
1950
1960
1970
1980
1990
2000
Year
(b)
Standardized residuals
4
2
0
−2
−4
1950
1960
1970
1980
1990
2000
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1950
1960
1970
1980
1990
2000
Year

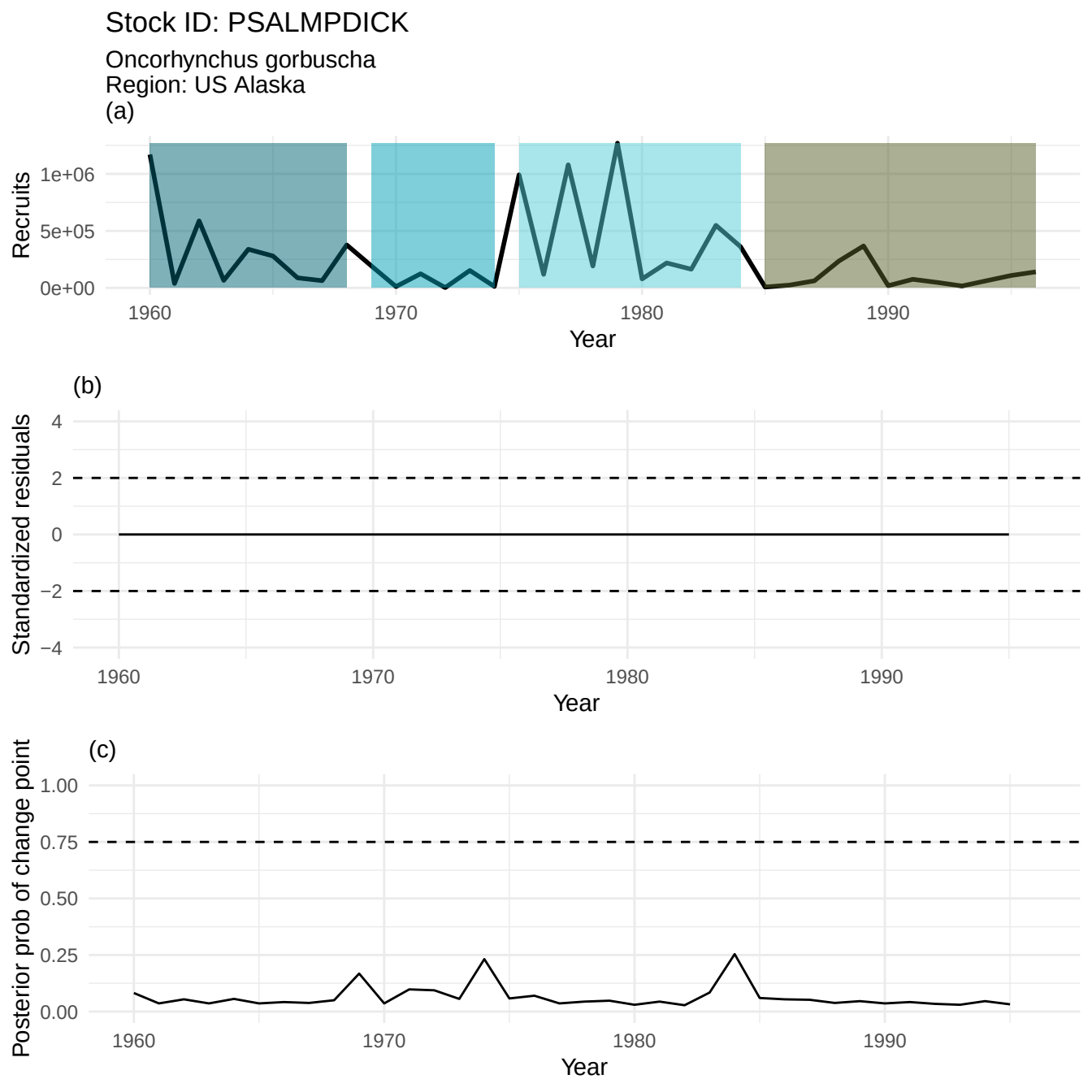

Stock ID: PSALMHUMPYCCISD
Oncorhynchus gorbuscha
Region: US Alaska
(a)
Recruits
5e+05
4e+05
3e+05
2e+05
1e+05
0e+00
1960
1970
1980
1990
Year
(b)
Standardized residuals
4
2
0
−2
−4
1960
1970
1980
1990
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1960
1970
1980
1990
Year

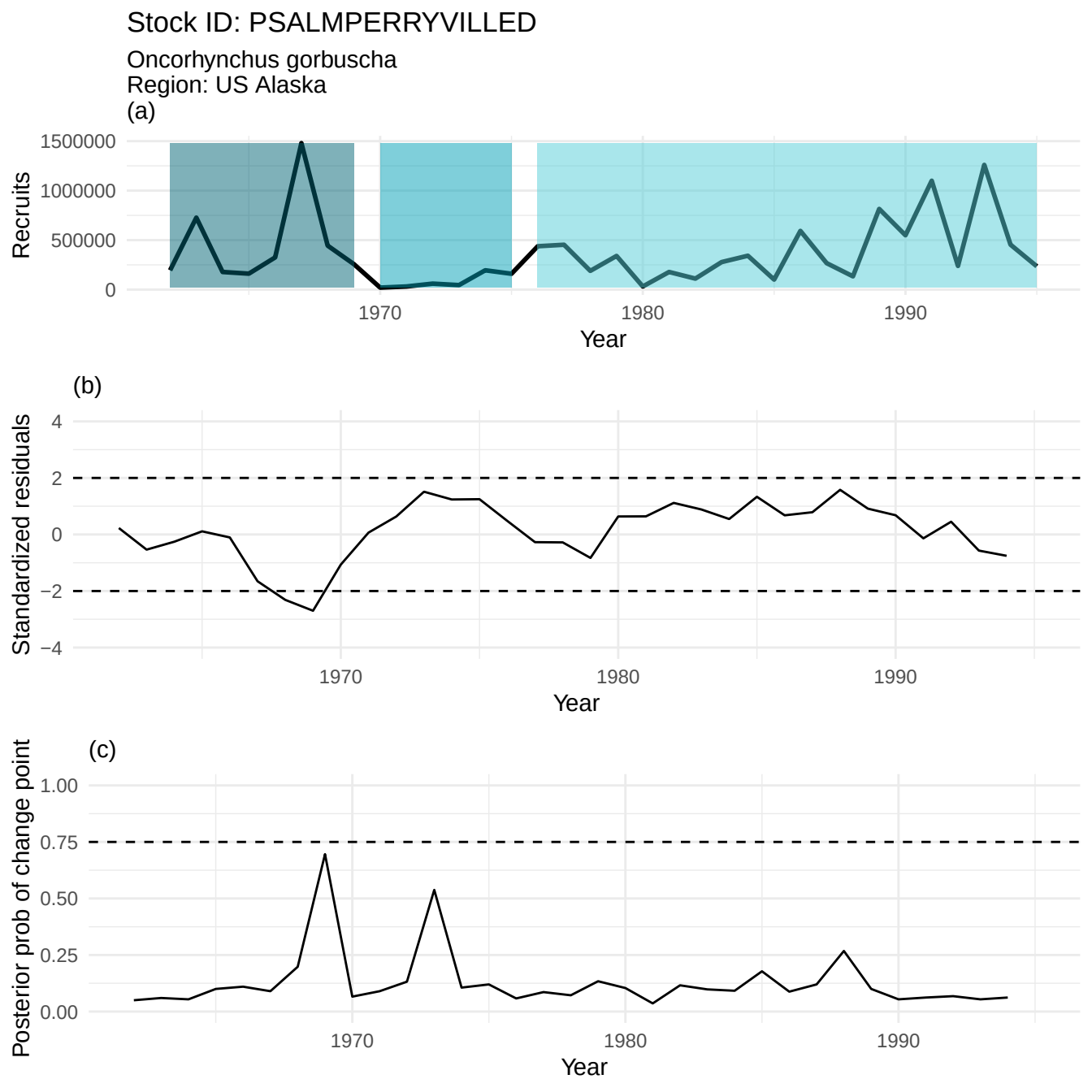

Stock ID: PSALMJCPH
Oncorhynchus gorbuscha
Region: Japan
(a)
Recruits
7500000
5000000
2500000
0
1950
1960
1970
1980
1990
2000
Year
(b)
Standardized residuals
4
2
0
−2
−4
1950
1960
1970
1980
1990
2000
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1950
1960
1970
1980
1990
2000
Year


Stock ID: PSALMJCPW
Oncorhynchus gorbuscha
Region: Japan
(a)
Recruits
2e+07
1e+07
0e+00
1950
1960
1970
1980
1990
2000
Year
(b)
Standardized residuals
4
2
0
−2
−4
1950
1960
1970
1980
1990
2000
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1950
1960
1970
1980
1990
2000
Year


Stock ID: PSALMMONTD
Oncorhynchus gorbuscha
Region: US Alaska
(a)
Recruits
1500000
1000000
500000
0
1970
1980
1990
Year
(b)
Standardized residuals
4
2
0
−2
−4
1970
1980
1990
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1970
1980
1990
Year

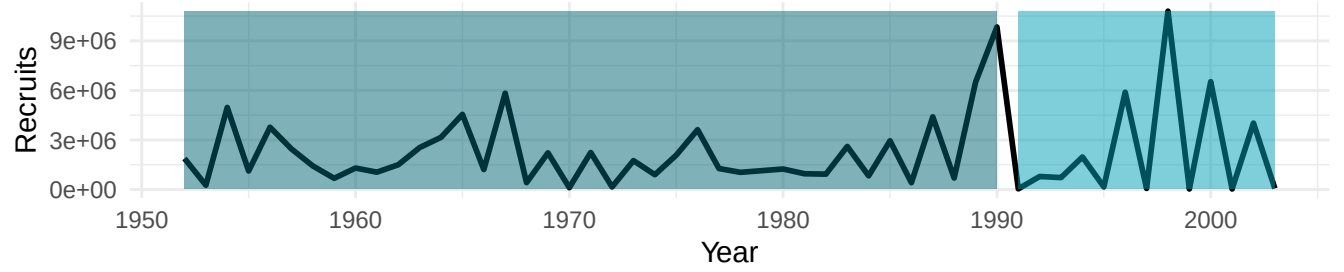

Stock ID: PSALMOKPW
Oncorhynchus gorbuscha
Region: Russia
(a)
Recruits
5e+07
4e+07
3e+07
2e+07
1e+07
0e+00
1950
1960
1970
1980
1990
2000
Year
(b)
Standardized residuals
4
2
0
−2
−4
1950
1960
1970
1980
1990
2000
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1950
1960
1970
1980
1990
2000
Year


Stock ID: PSALMPDICK
Oncorhynchus gorbuscha
Region: US Alaska
(a)
Recruits
1e+06
5e+05
0e+00
1960
1970
1980
1990
Year
(b)
Standardized residuals
4
2
0
−2
−4
1960
1970
1980
1990
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1960
1970
1980
1990
Year

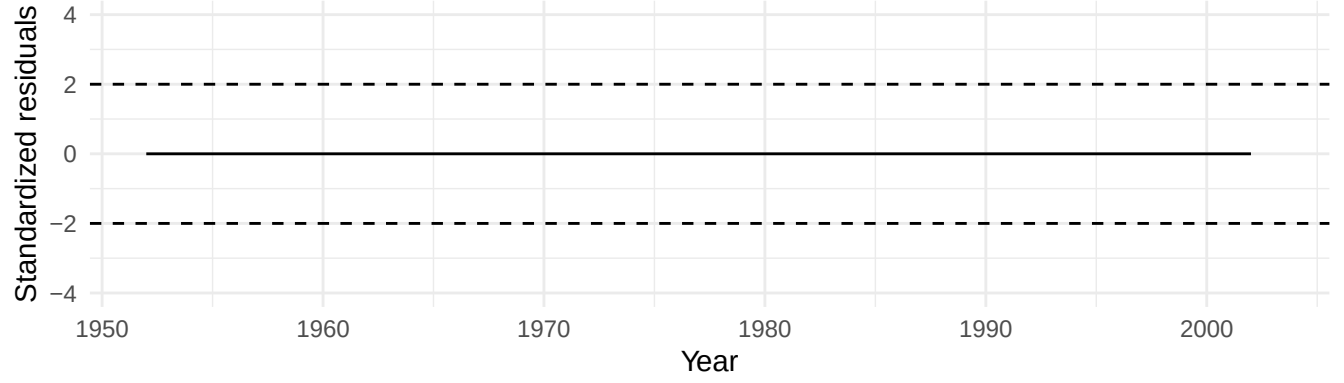

Stock ID: PSALMPERRYVILLED
Oncorhynchus gorbuscha
Region: US Alaska
(a)
Recruits
1500000
1000000
500000
0
1970
1980
1990
Year
(b)
Standardized residuals
4
2
0
−2
−4
1970
1980
1990
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1970
1980
1990
Year

Stock ID: PSALMPRIMPW

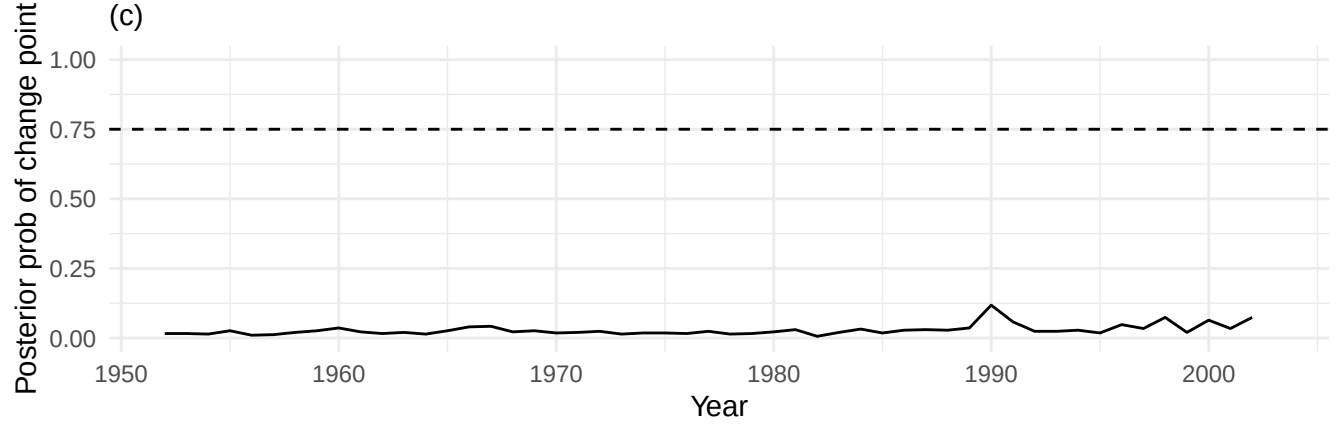
Oncorhynchus gorbuscha
Region: Russia
(a)

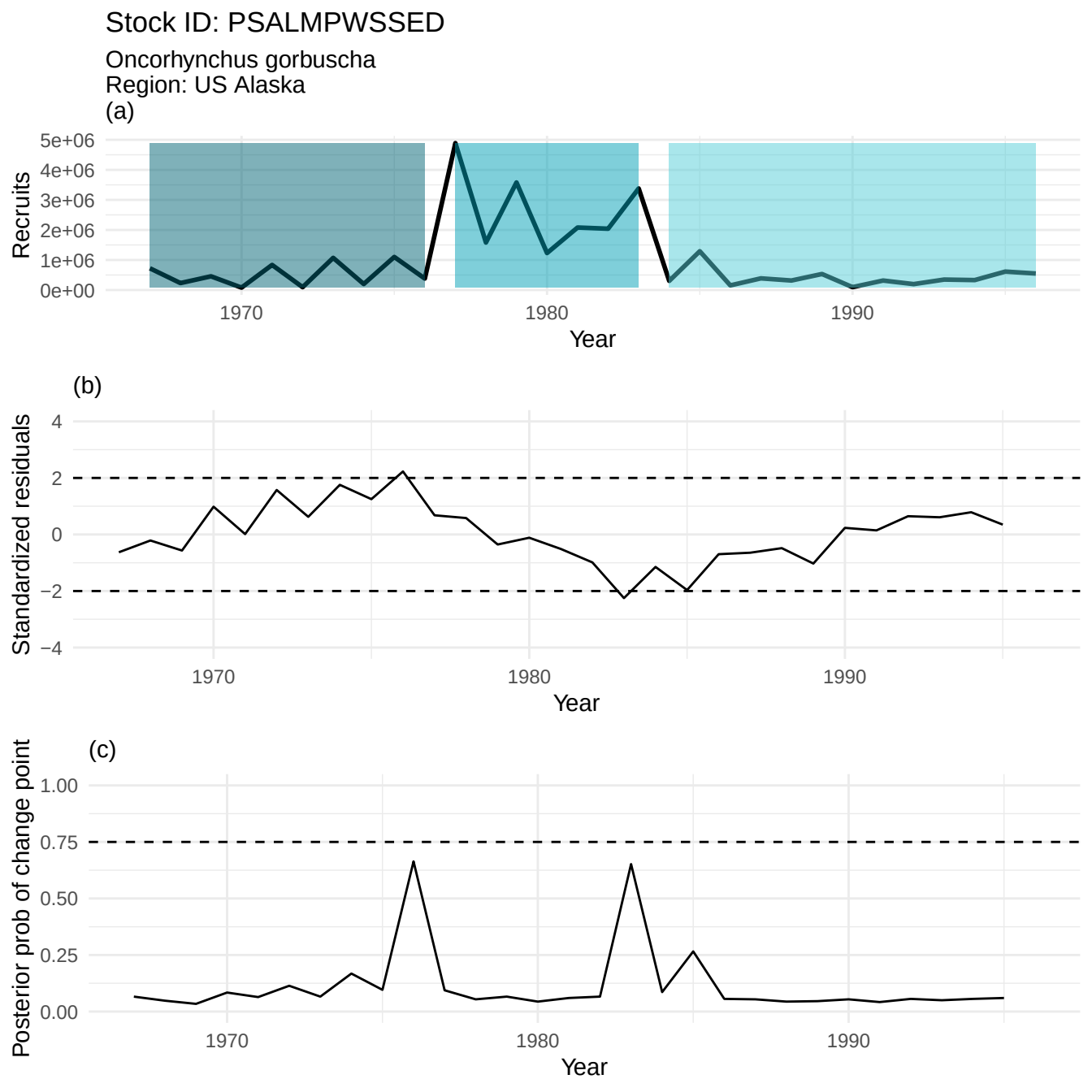


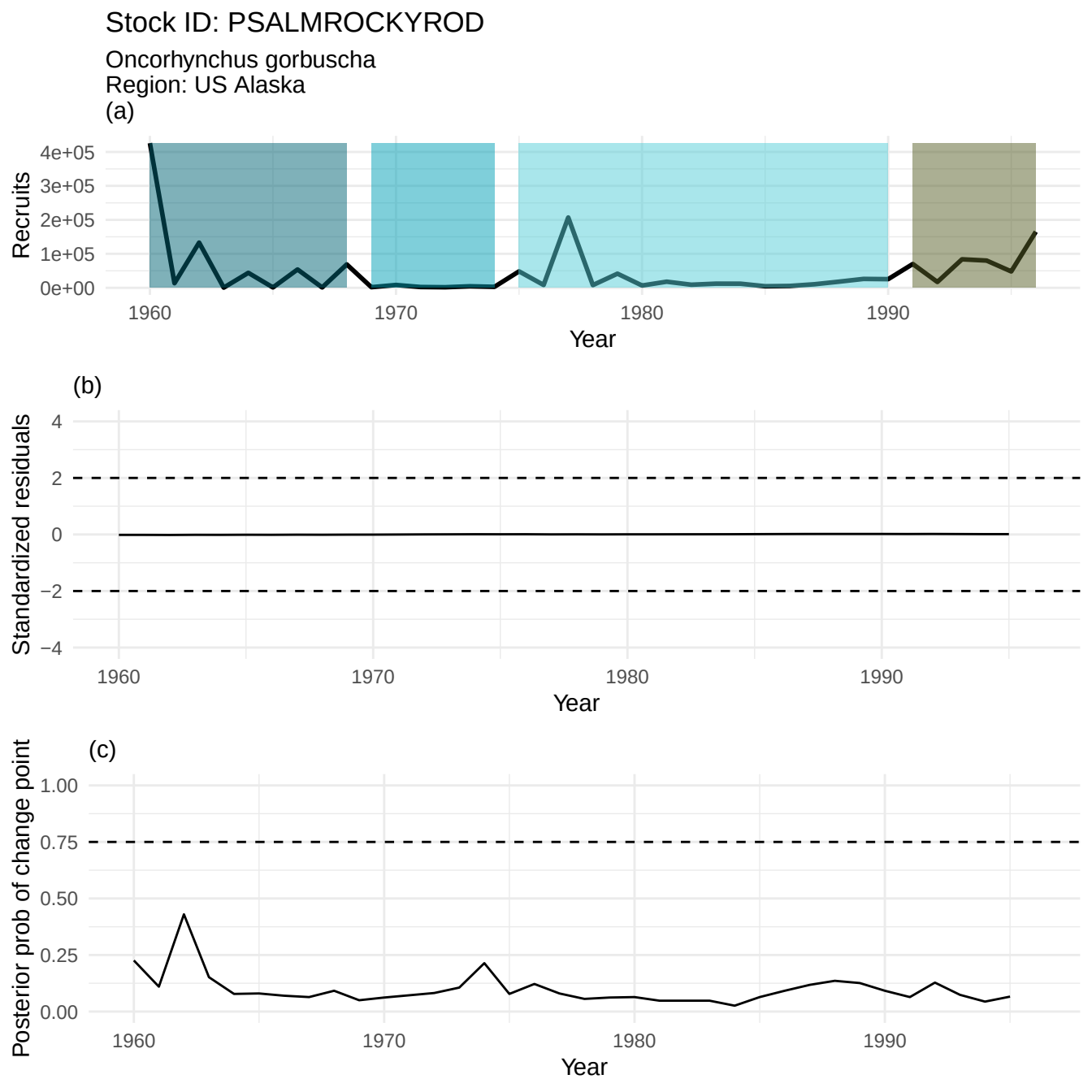
(b)

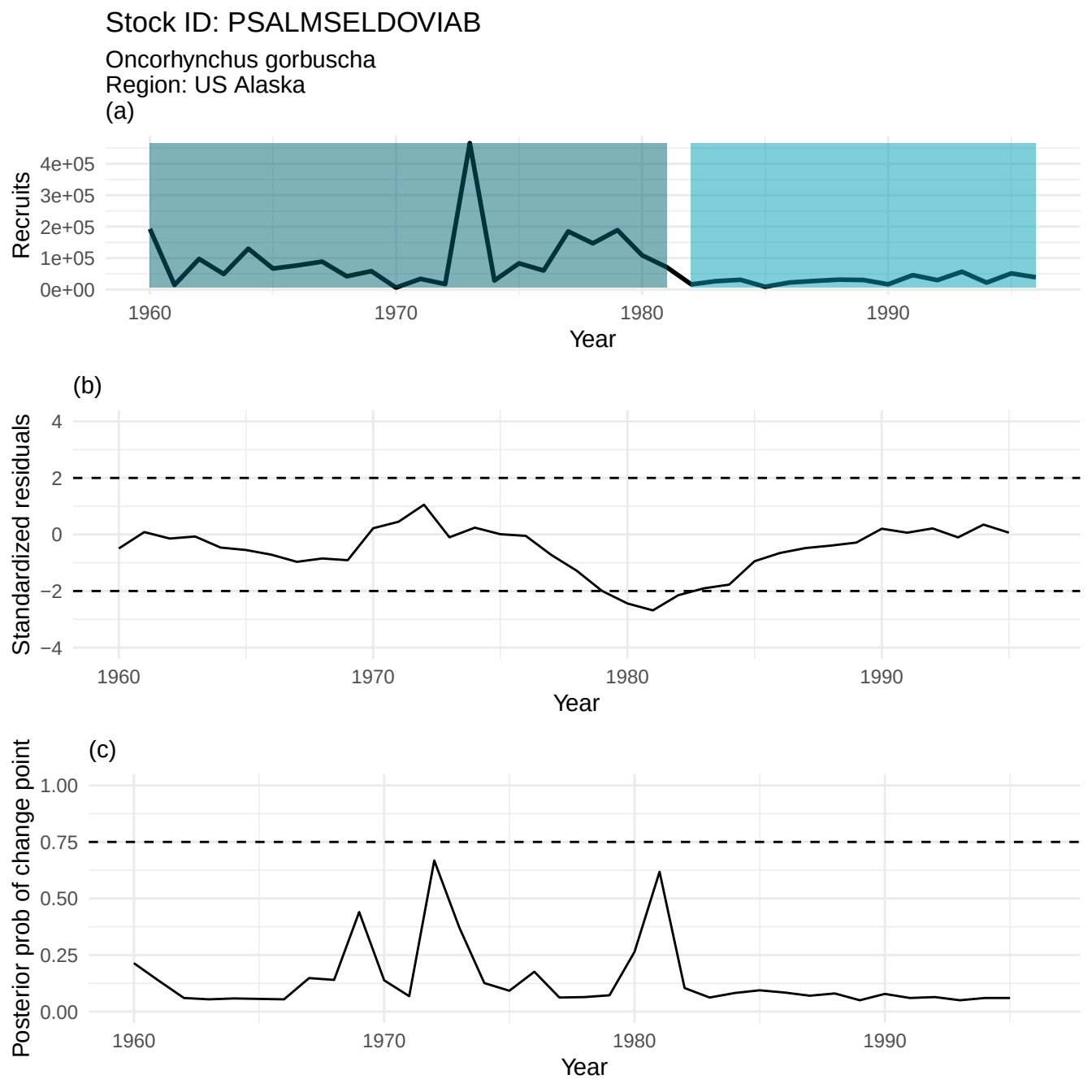


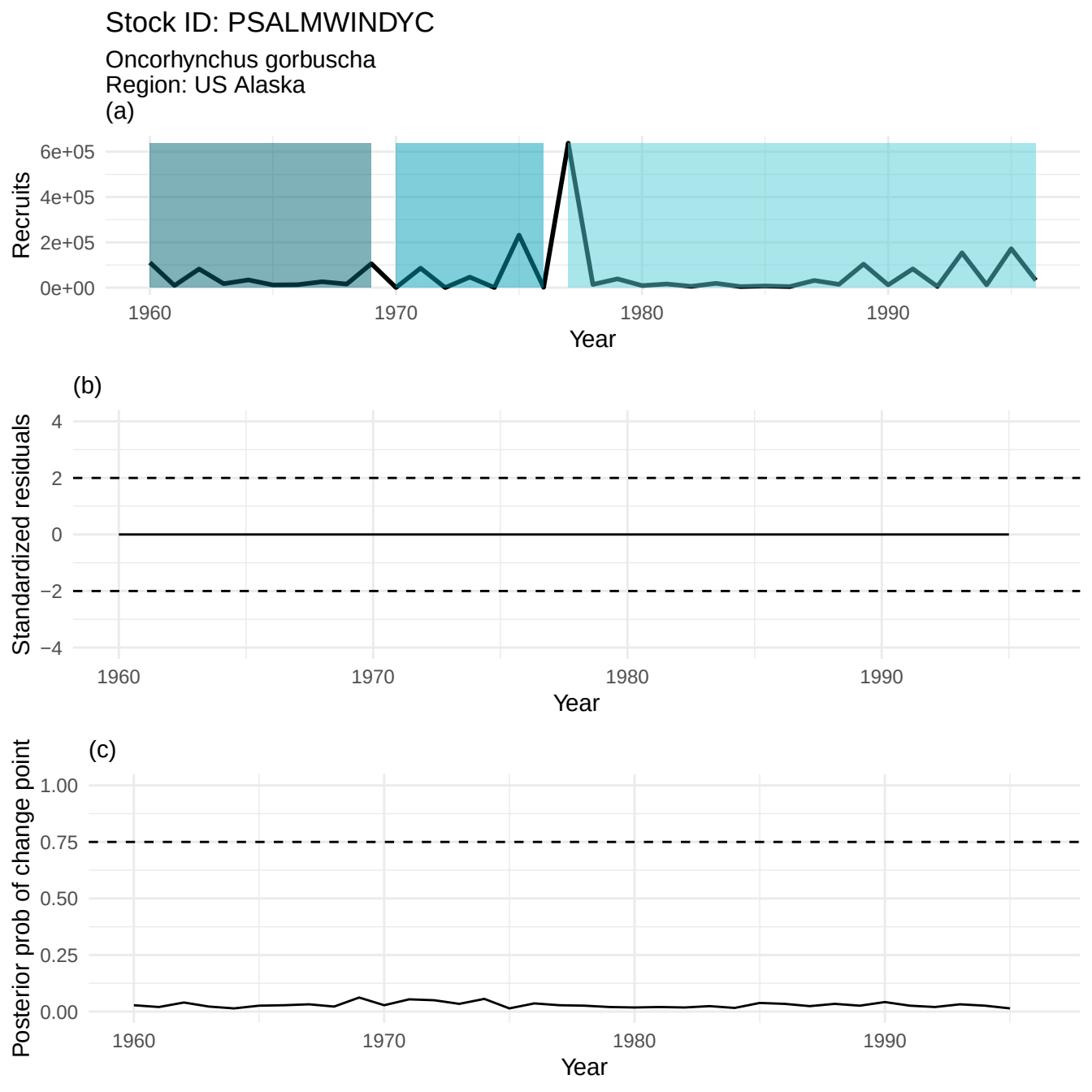
(c)

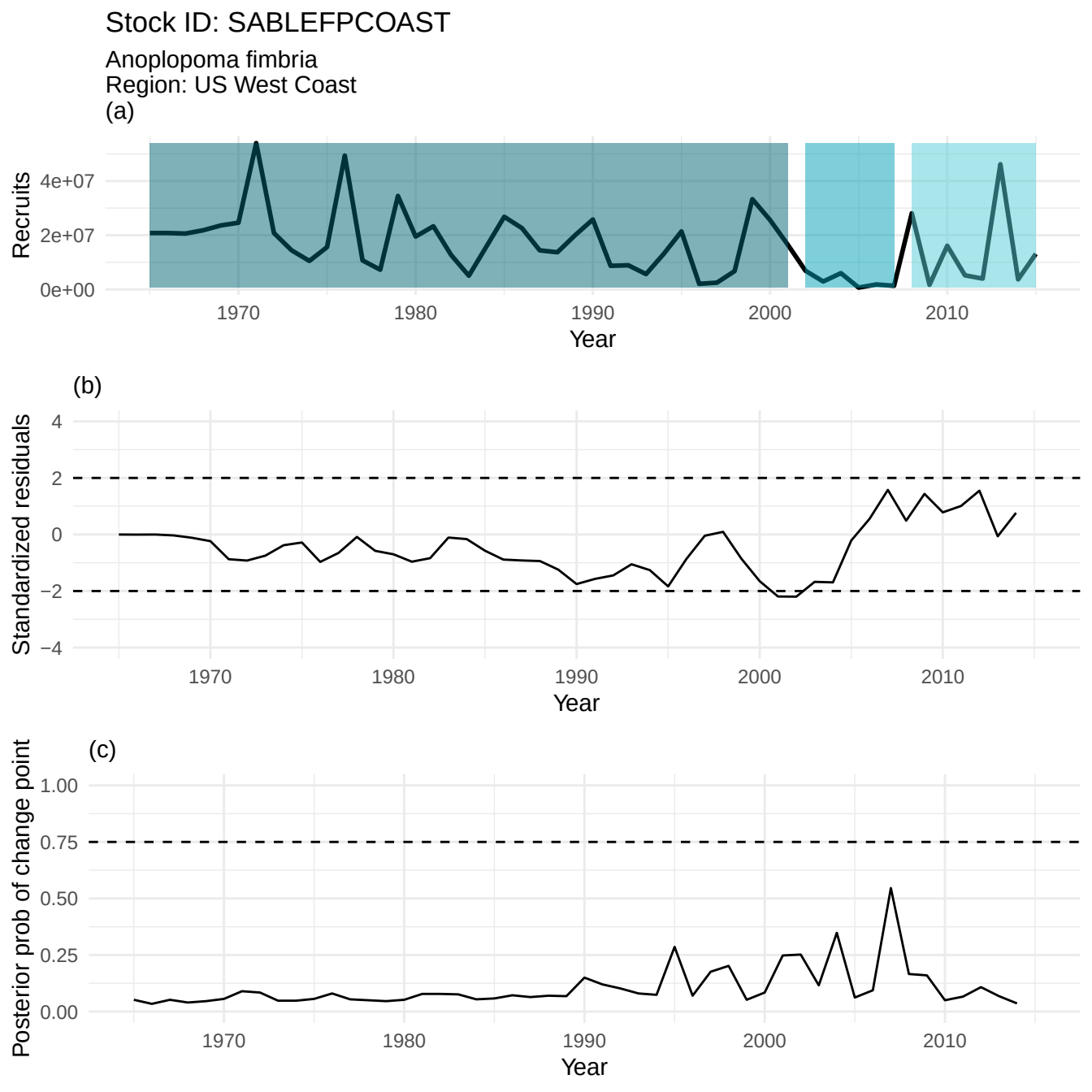


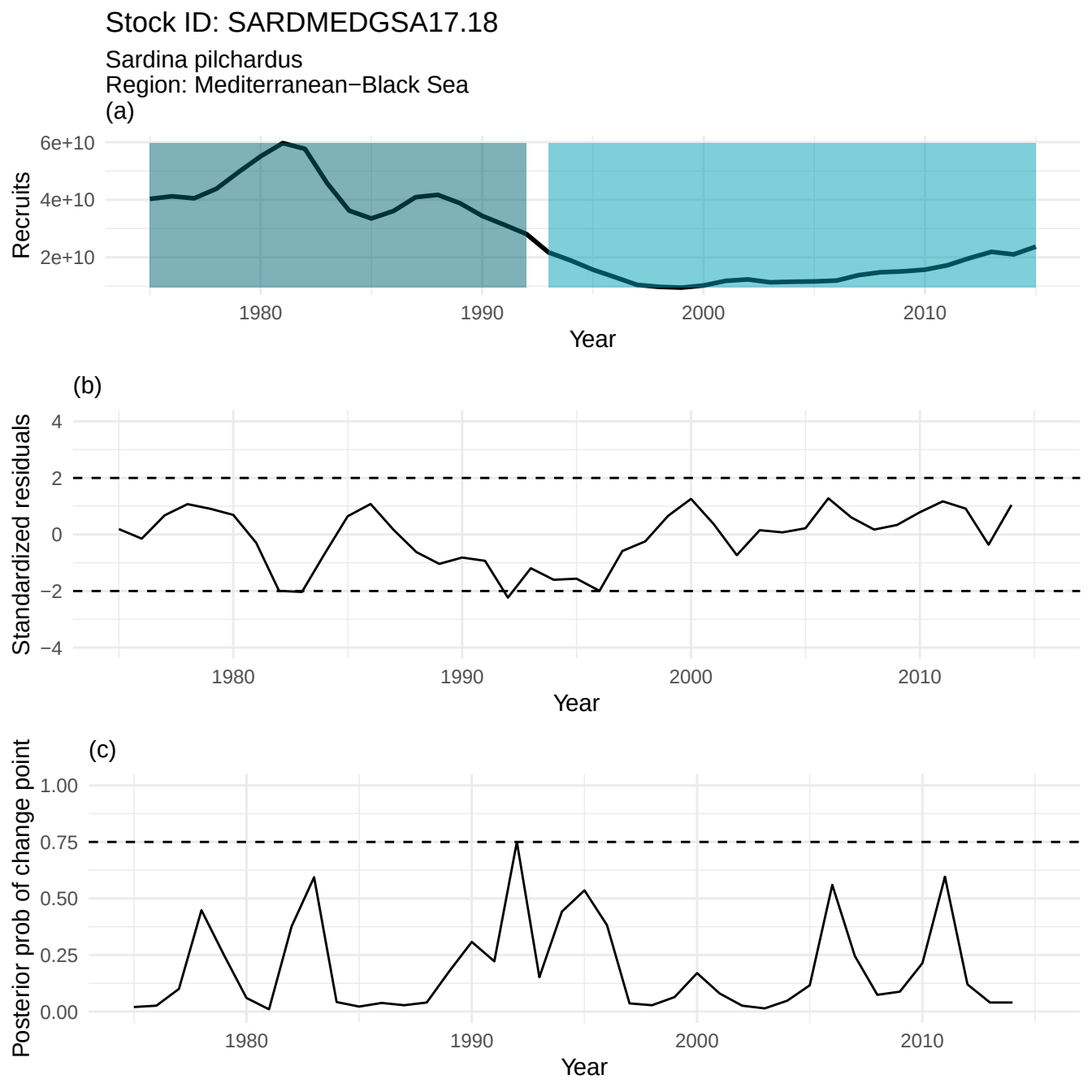

Stock ID: PSALMPWSSED
Oncorhynchus gorbuscha
Region: US Alaska
(a)
Recruits
5e+06
4e+06
3e+06
2e+06
1e+06
0e+00
1970
1980
1990
Year
(b)
Standardized residuals
4
2
0
−2
−4
1970
1980
1990
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1970
1980
1990
Year

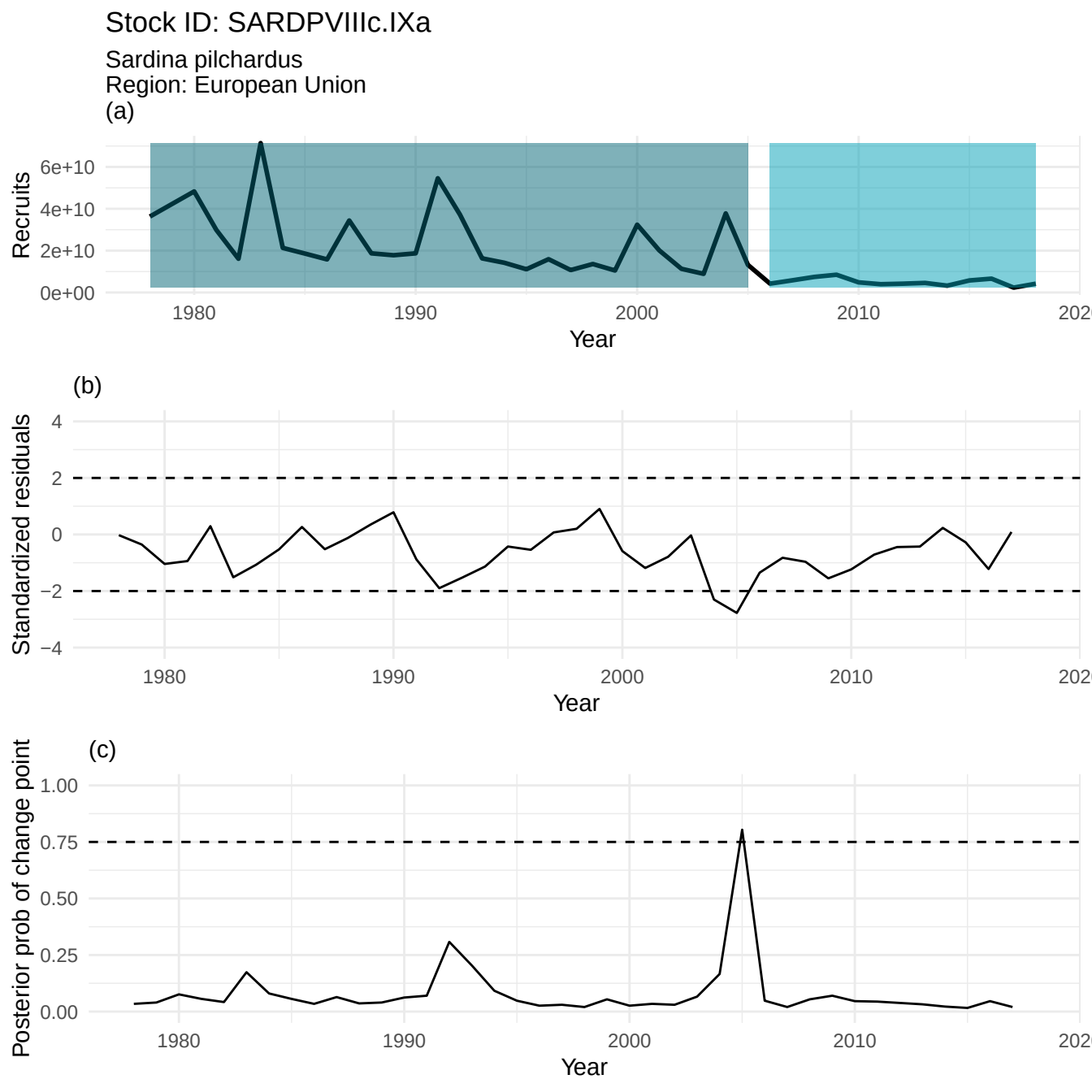

Stock ID: PSALMROCKYROD
Oncorhynchus gorbuscha
Region: US Alaska
(a)
Recruits
4e+05
3e+05
2e+05
1e+05
0e+00
1960
1970
1980
1990
Year
(b)
Standardized residuals
4
2
0
−2
−4
1960
1970
1980
1990
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1960
1970
1980
1990
Year

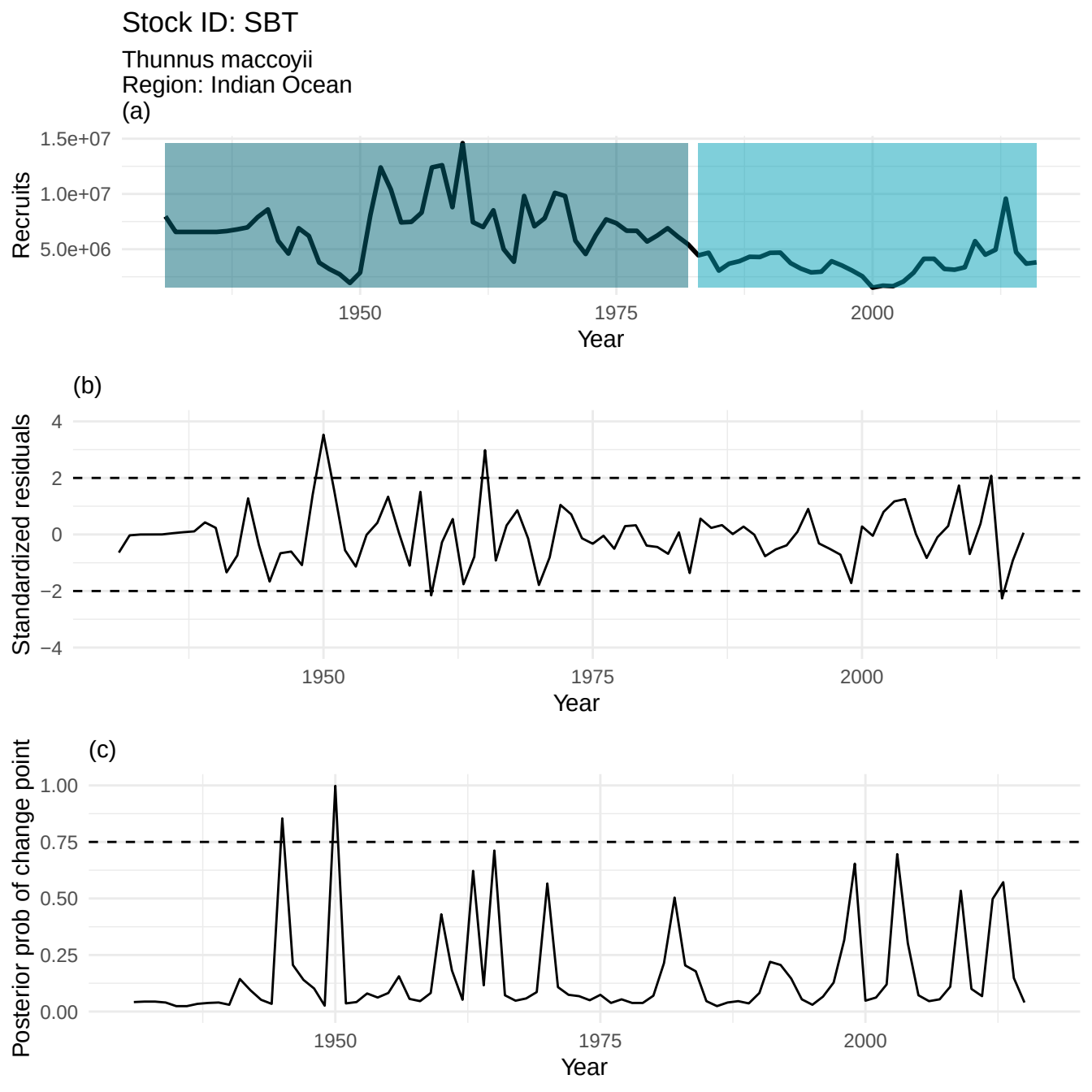

Stock ID: PSALMSELDOVIAB
Oncorhynchus gorbuscha
Region: US Alaska
(a)
Recruits
4e+05
3e+05
2e+05
1e+05
0e+00
1960
1970
1980
1990
Year
(b)
Standardized residuals
4
2
0
−2
−4
1960
1970
1980
1990
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1960
1970
1980
1990
Year

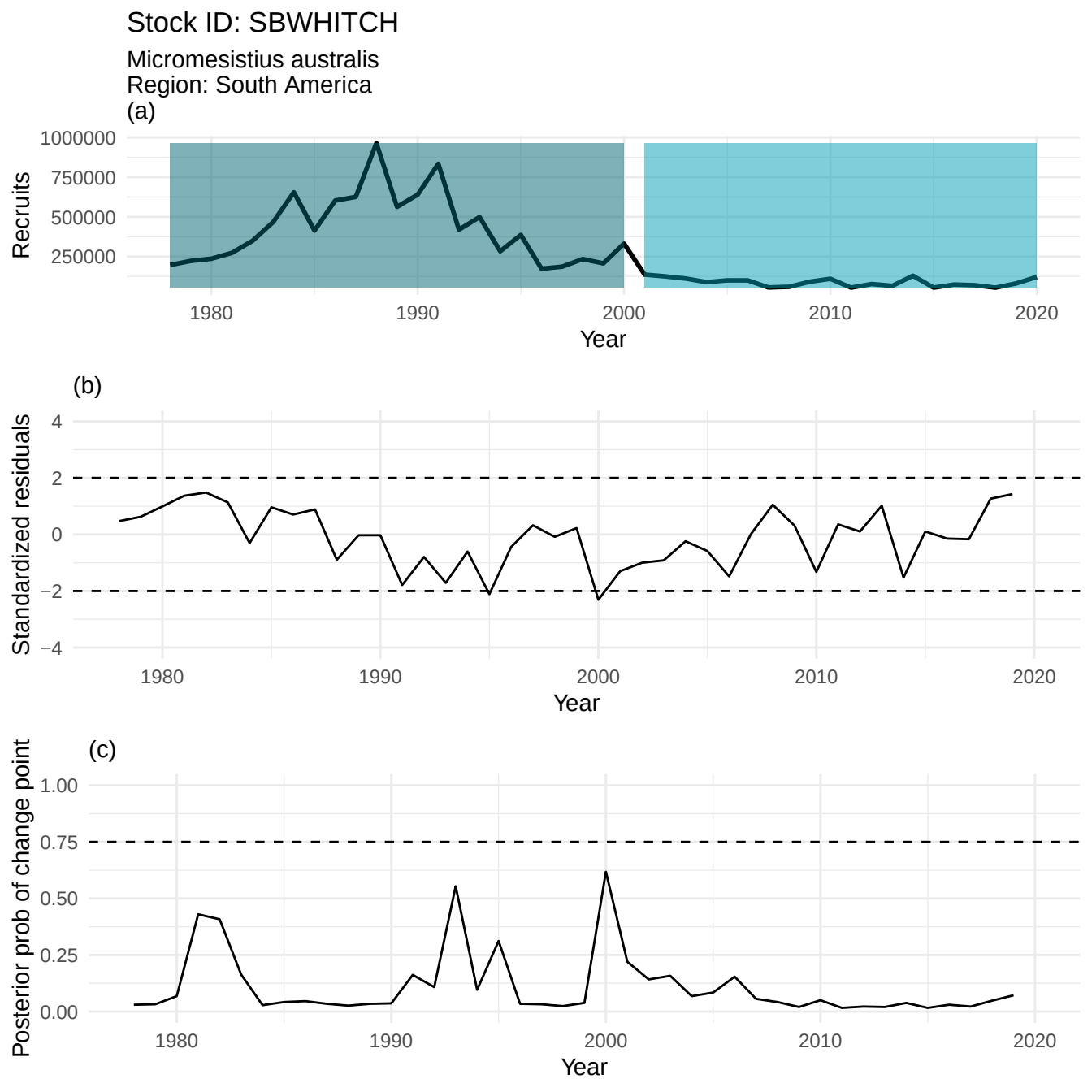

Stock ID: PSALMWINDYC
Oncorhynchus gorbuscha
Region: US Alaska
(a)
Recruits
6e+05
4e+05
2e+05
0e+00
1960
1970
1980
1990
Year
(b)
Standardized residuals
4
2
0
−2
−4
1960
1970
1980
1990
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1960
1970
1980
1990
Year

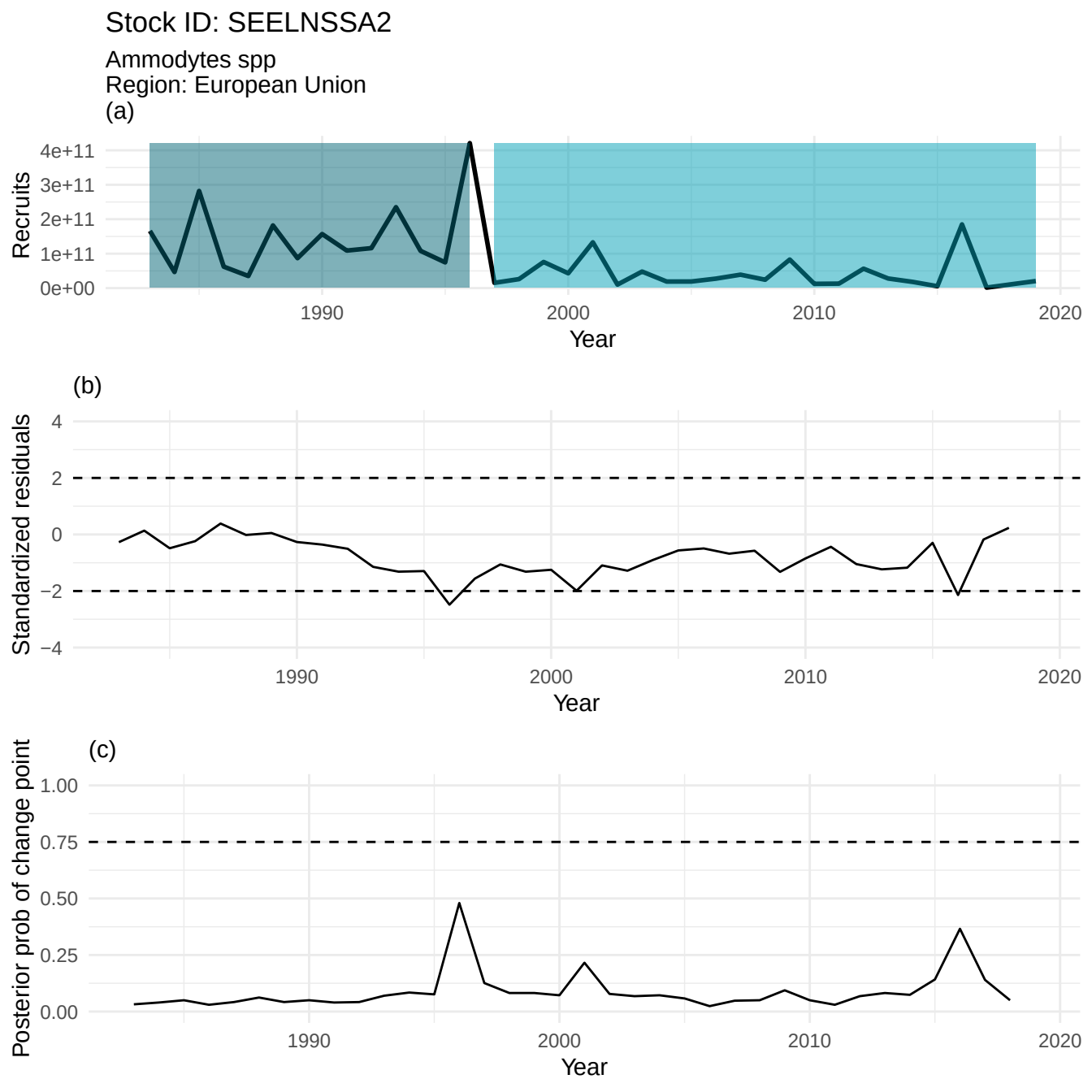

Stock ID: SABLEFPCOAST
Anoplopoma fimbria
Region: US West Coast
(a)
Recruits
4e+07
2e+07
0e+00
1970
1980
1990
2000
2010
Year
(b)
Standardized residuals
4
2
0
−2
−4
1970
1980
1990
2000
2010
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1970
1980
1990
2000
2010
Year

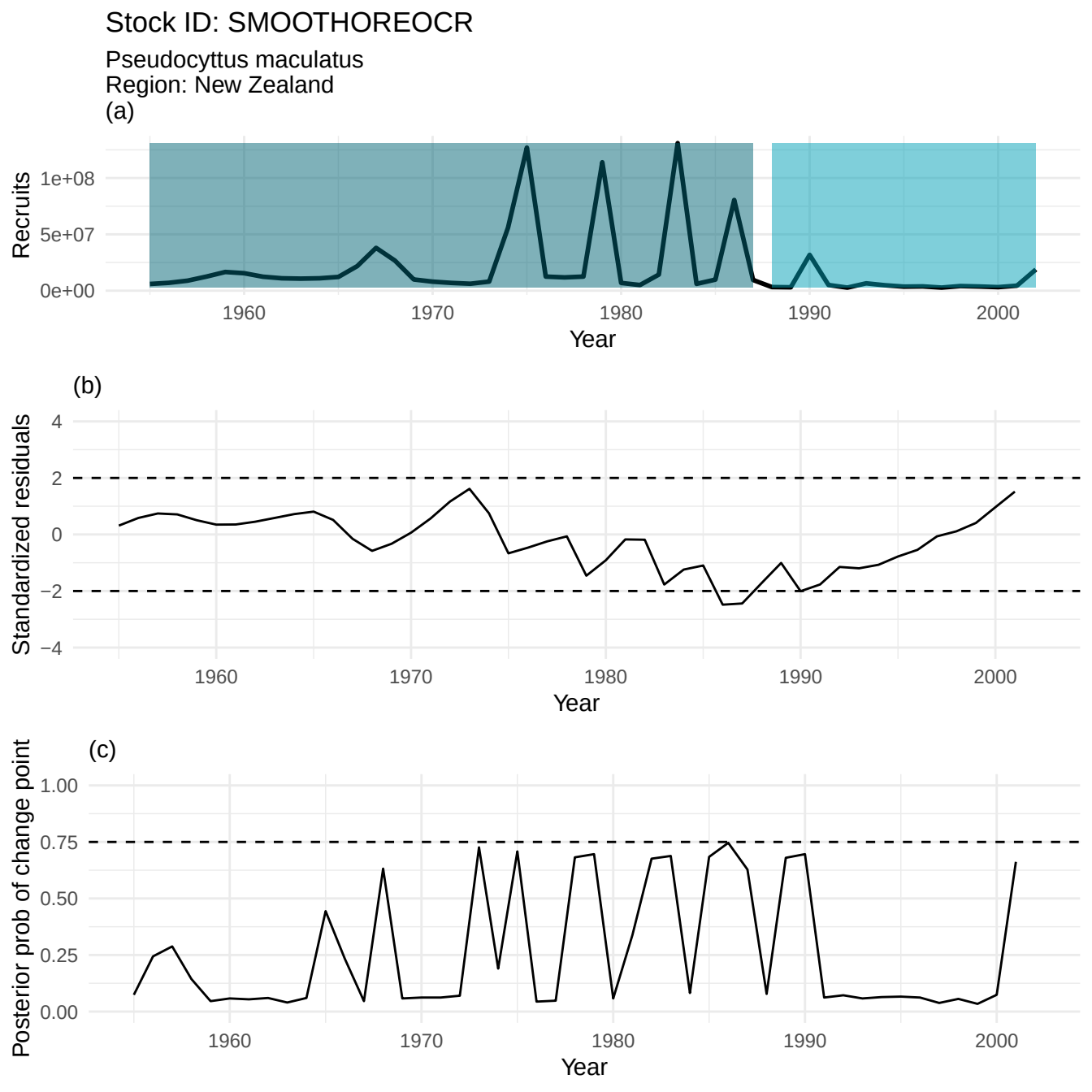

Stock ID: SARDMEDGSA17.18
Sardina pilchardus
Region: Mediterranean−Black Sea
(a)
Recruits
6e+10
4e+10
2e+10
1980
1990
2000
2010
Year
(b)
Standardized residuals
4
2
0
−2
−4
1980
1990
2000
2010
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1980
1990
2000
2010
Year


Stock ID: SARDPVIIIc.IXa
Sardina pilchardus
Region: European Union
(a)
Recruits
6e+10
4e+10
2e+10
0e+00
1980
1990
2000
2010
Year
(b)
Standardized residuals
4
2
0
−2
−4
1980
1990
2000
2010
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1980
1990
2000
2010
Year


Stock ID: SBT
Thunnus maccoyii
Region: Indian Ocean
(a)
Recruits
1.5e+07
1.0e+07
5.0e+06
1950
1975
2000
Year
(b)
Standardized residuals
4
2
0
−2
−4
1950
1975
2000
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1950
1975
2000
Year

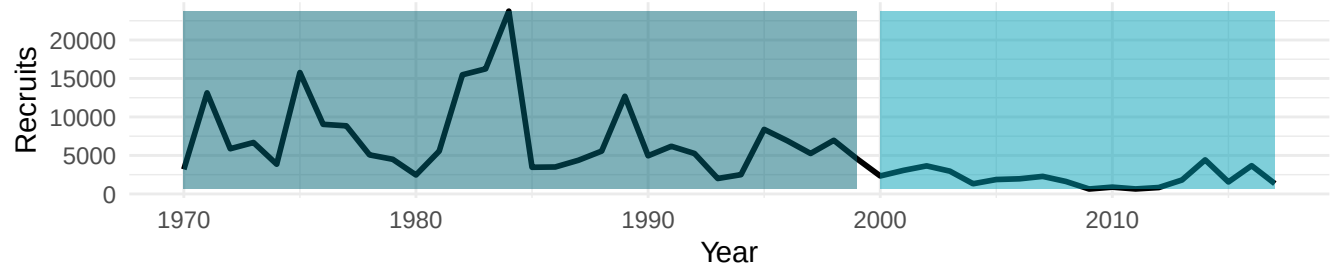

Stock ID: SBWHITCH
Micromesistius australis
Region: South America
(a)
Recruits
1000000
750000
500000
250000
1980
1990
2000
2010
2020
Year
(b)
Standardized residuals
4
2
0
−2
−4
1980
1990
2000
2010
2020
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1980
1990
2000
2010
2020
Year


Stock ID: SEELNSSA2
Ammodytes spp
Region: European Union
(a)
Recruits
4e+11
3e+11
2e+11
1e+11
0e+00
1990
2000
2010
2020
Year
(b)
Standardized residuals
4
2
0
−2
−4
1990
2000
2010
2020
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1990
2000
2010
2020
Year

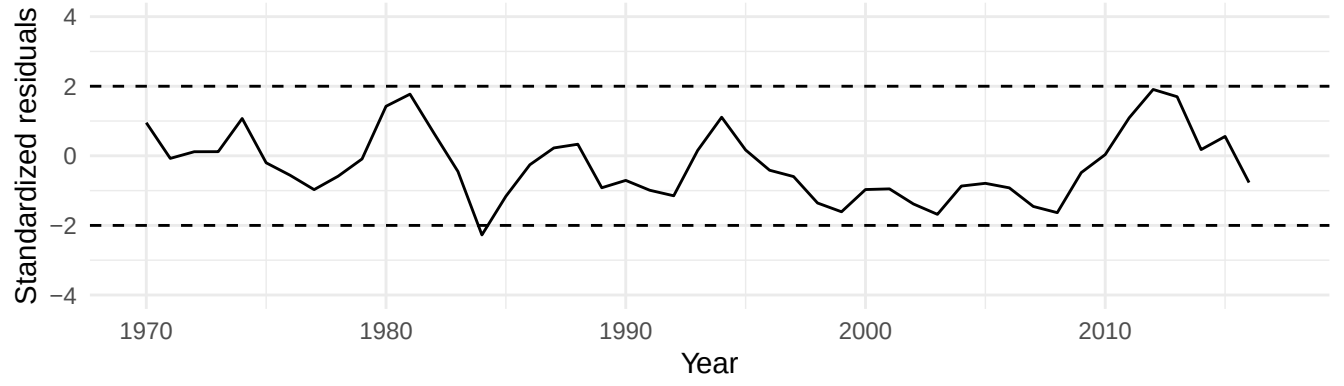

Stock ID: SMOOTHOREOCR
Pseudocyttus maculatus
Region: New Zealand
(a)
Recruits
1e+08
5e+07
0e+00
1960
1970
1980
1990
2000
Year
(b)
Standardized residuals
4
2
0
−2
−4
1960
1970
1980
1990
2000
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1960
1970
1980
1990
2000
Year

Stock ID: SOLEIS

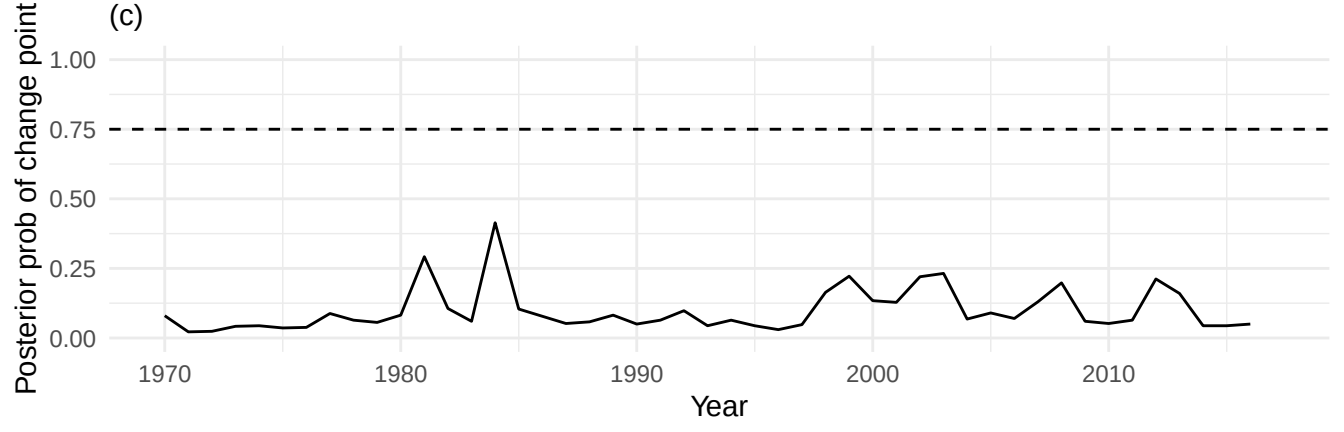
Solea solea
Region: European Union
(a)

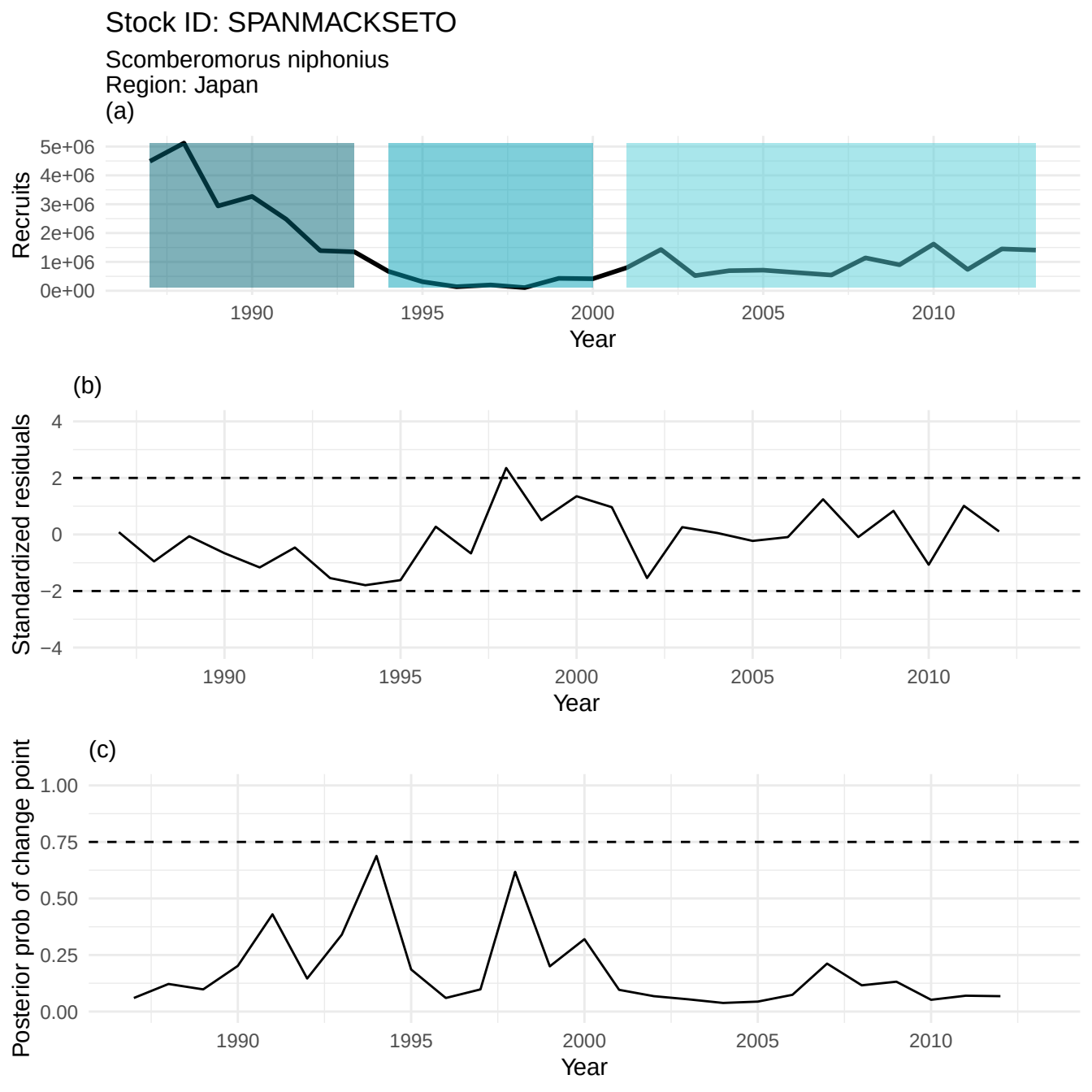


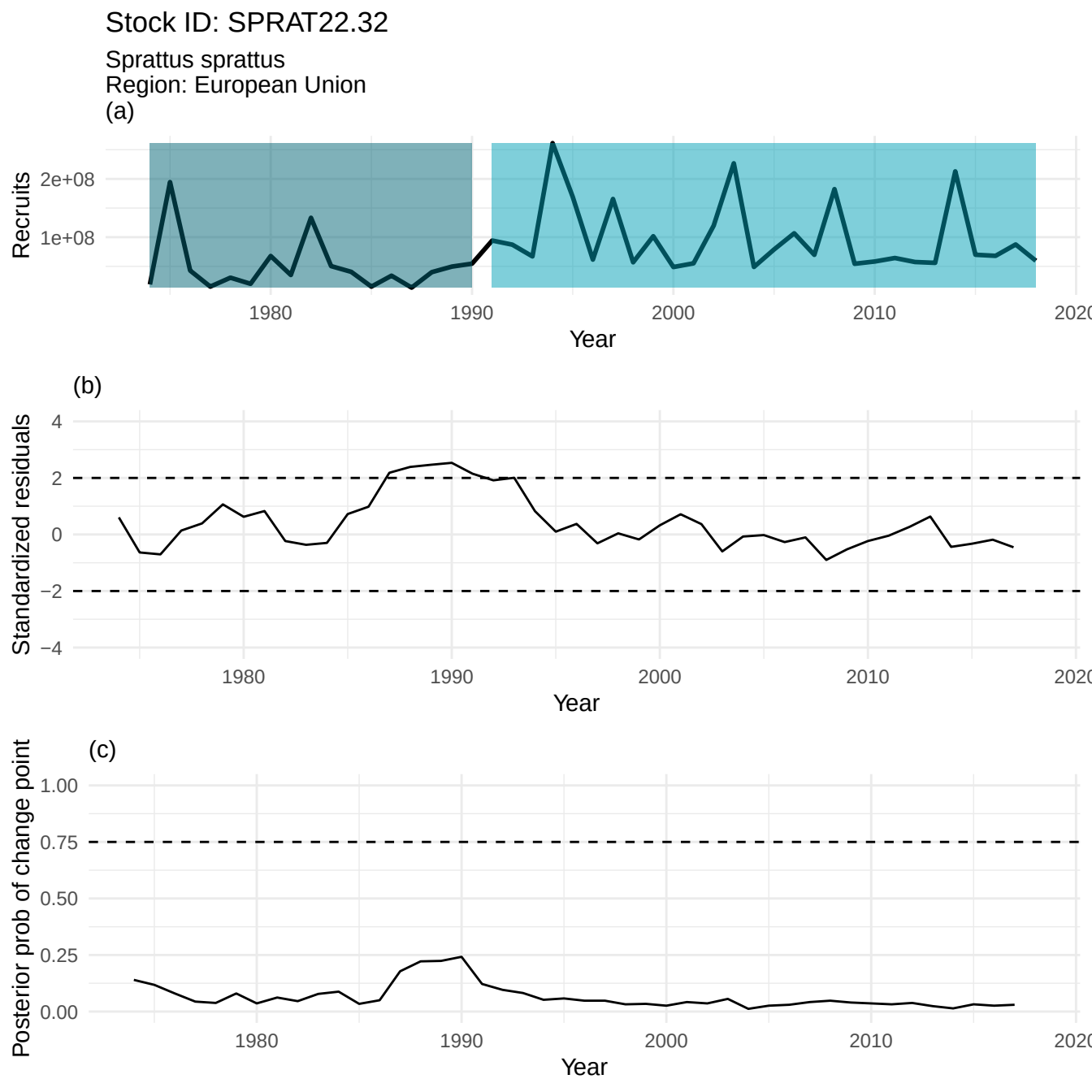
(b)

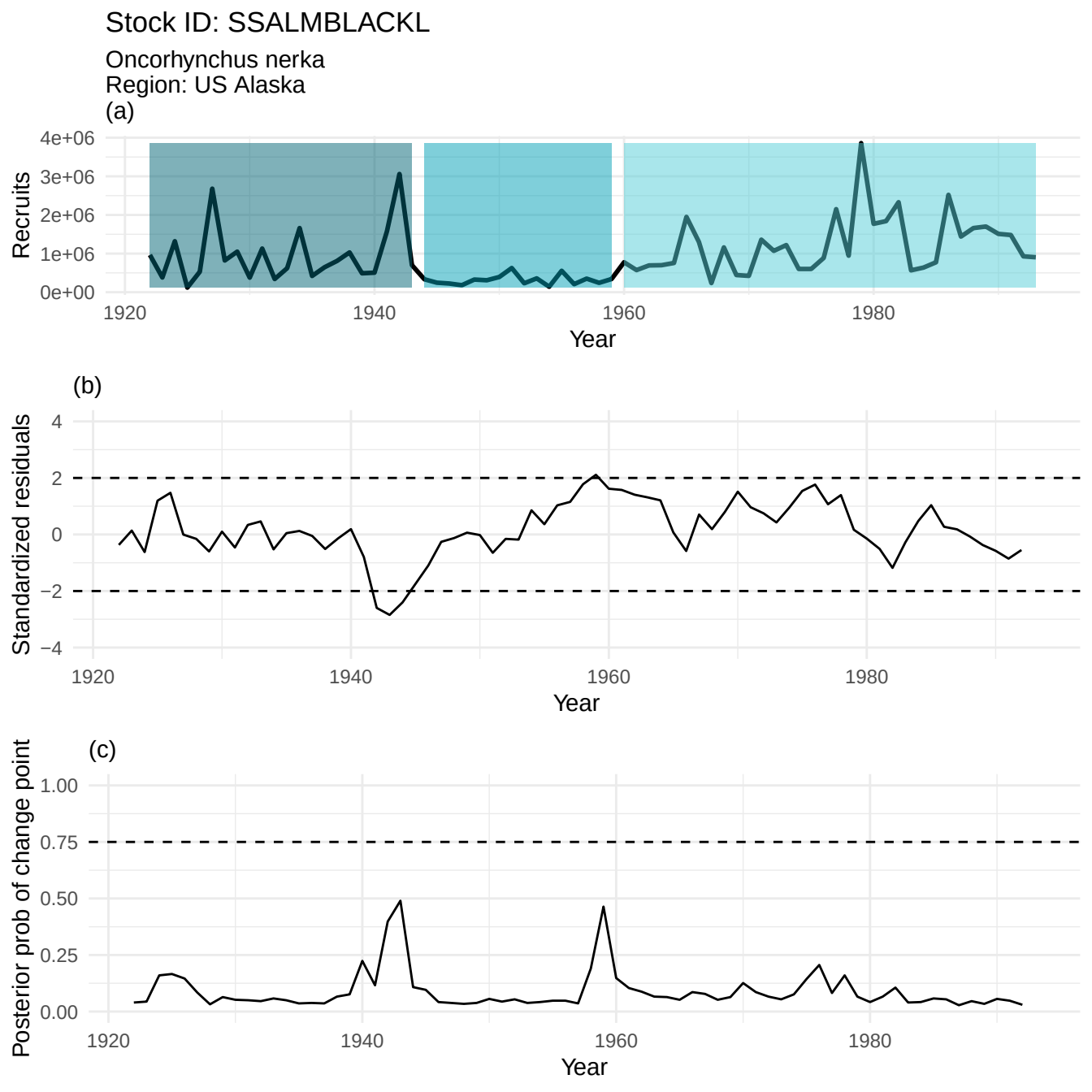


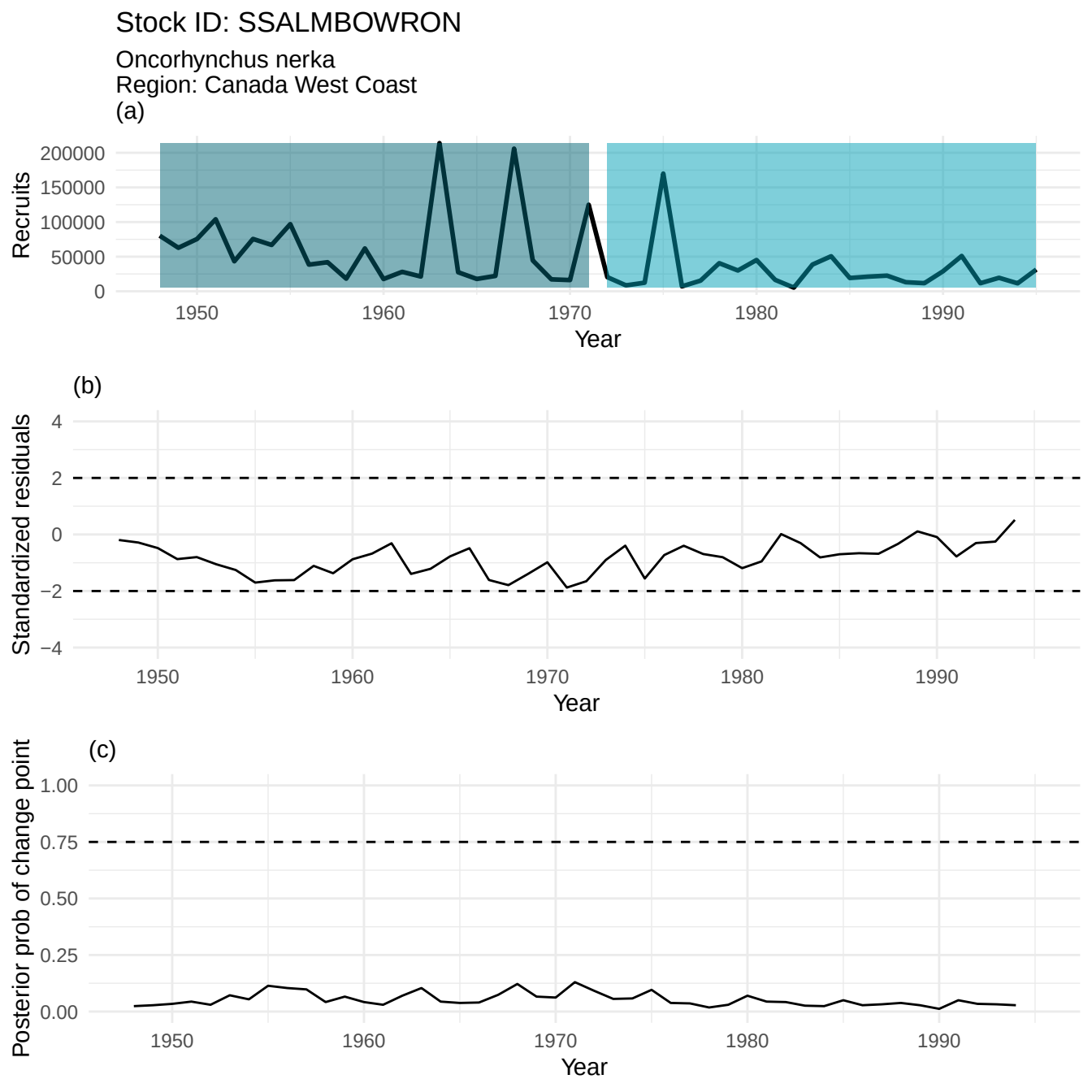
(c)

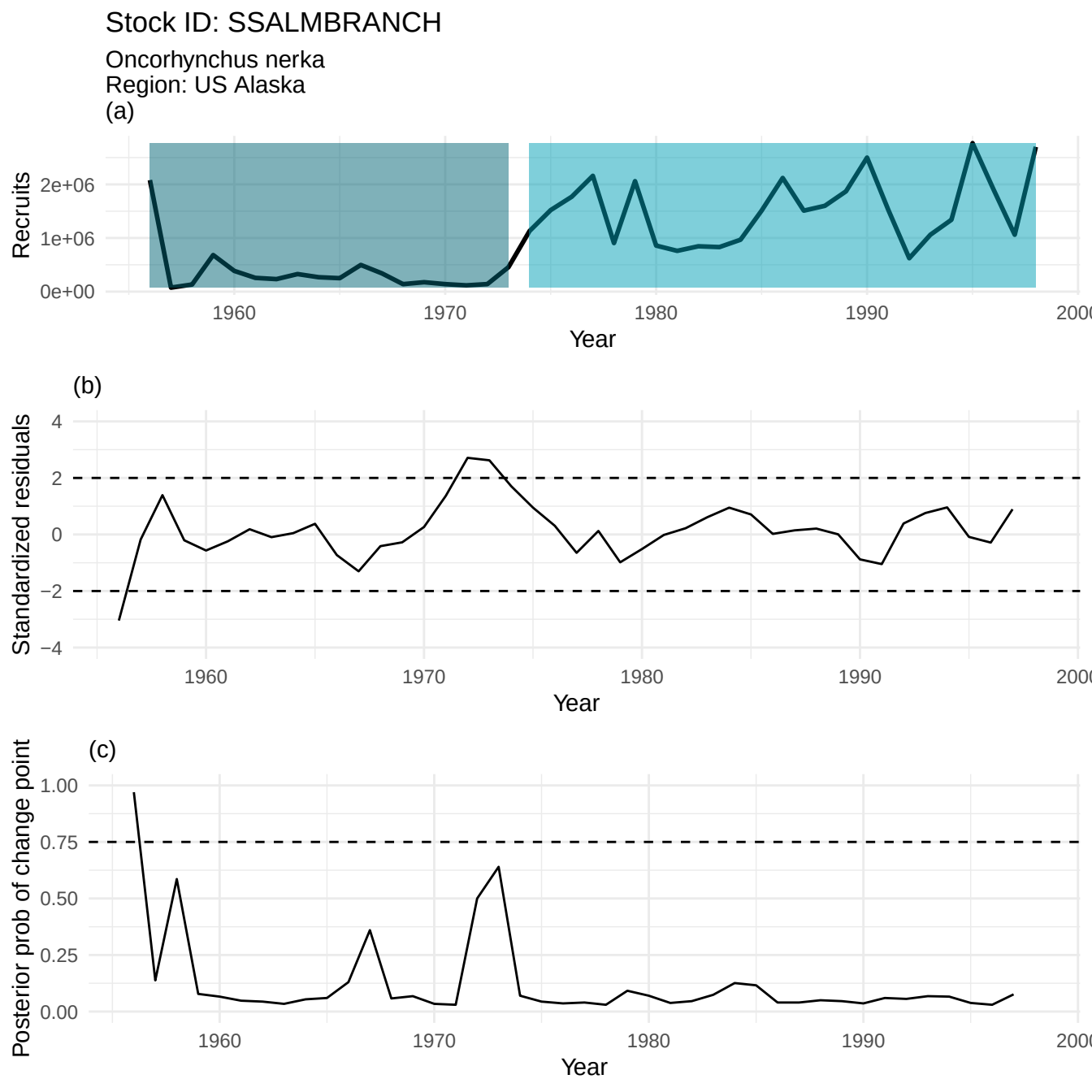


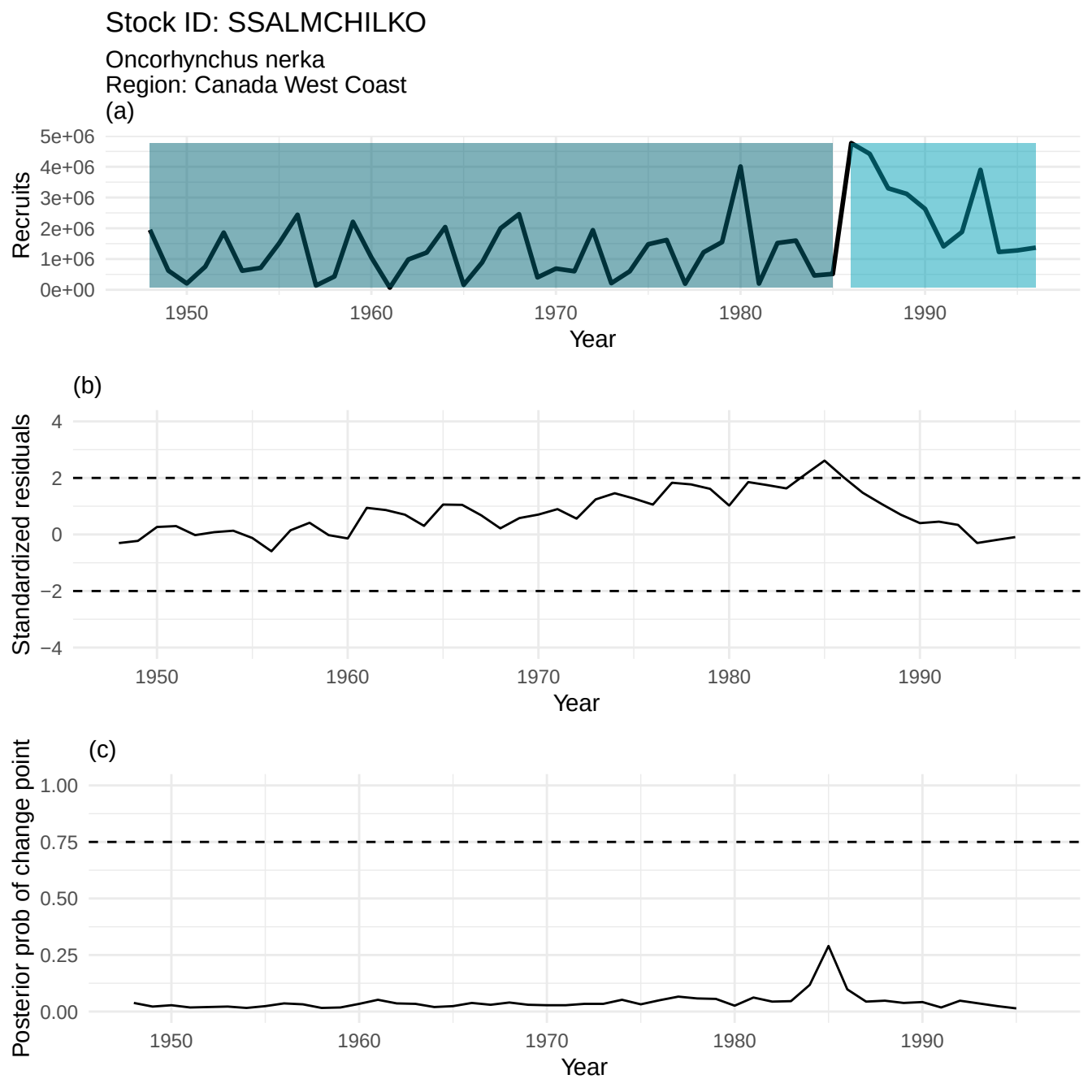

Stock ID: SPANMACKSETO
Scomberomorus niphonius
Region: Japan
(a)
Recruits
5e+06
4e+06
3e+06
2e+06
1e+06
0e+00
1990
1995
2000
2005
2010
Year
(b)
Standardized residuals
4
2
0
−2
−4
1990
1995
2000
2005
2010
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1990
1995
2000
2005
2010
Year

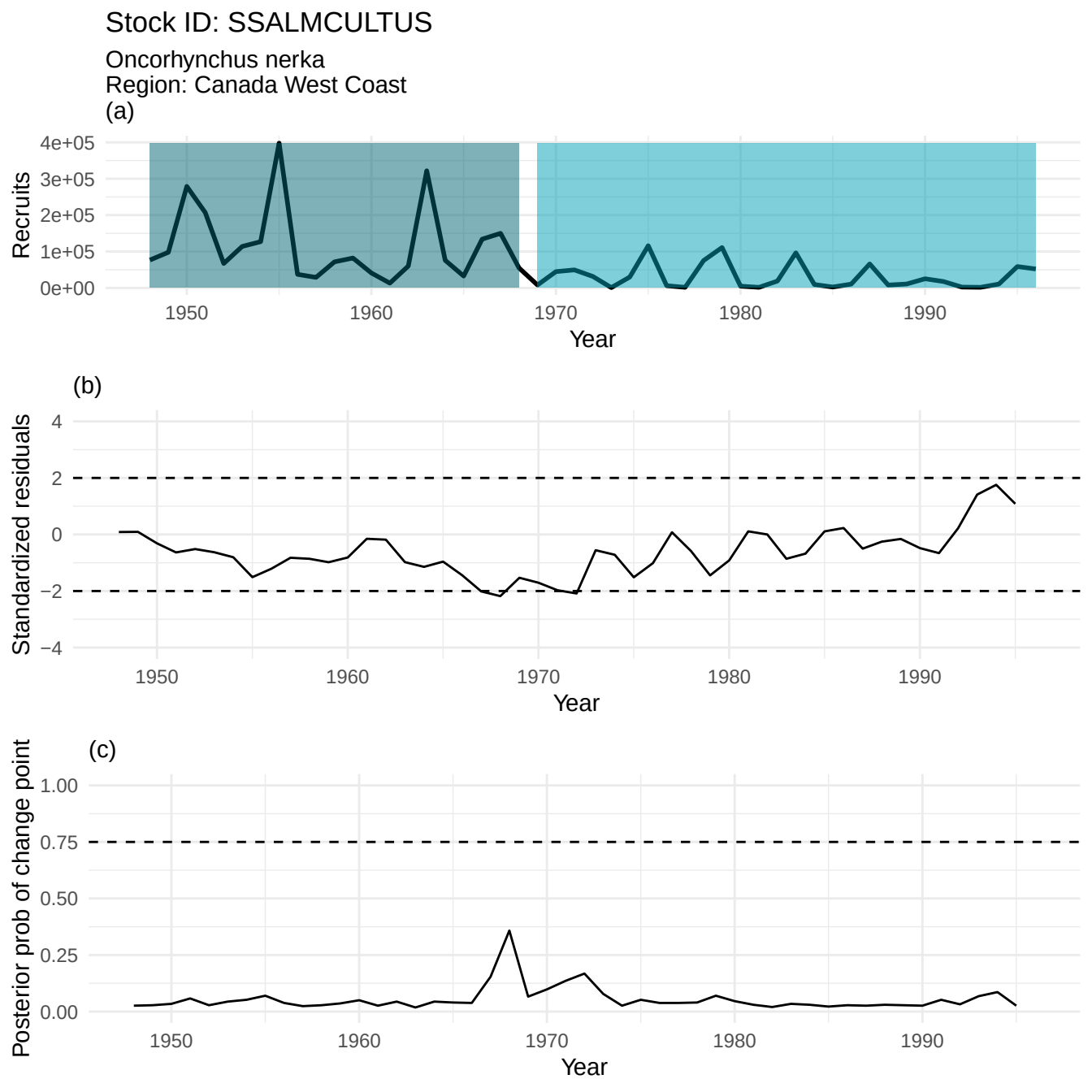

Stock ID: SPRAT22.32
Sprattus sprattus
Region: European Union
(a)
Recruits
2e+08
1e+08
1980
1990
2000
2010
2020
Year
(b)
Standardized residuals
4
2
0
−2
−4
1980
1990
2000
2010
2020
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1980
1990
2000
2010
2020
Year

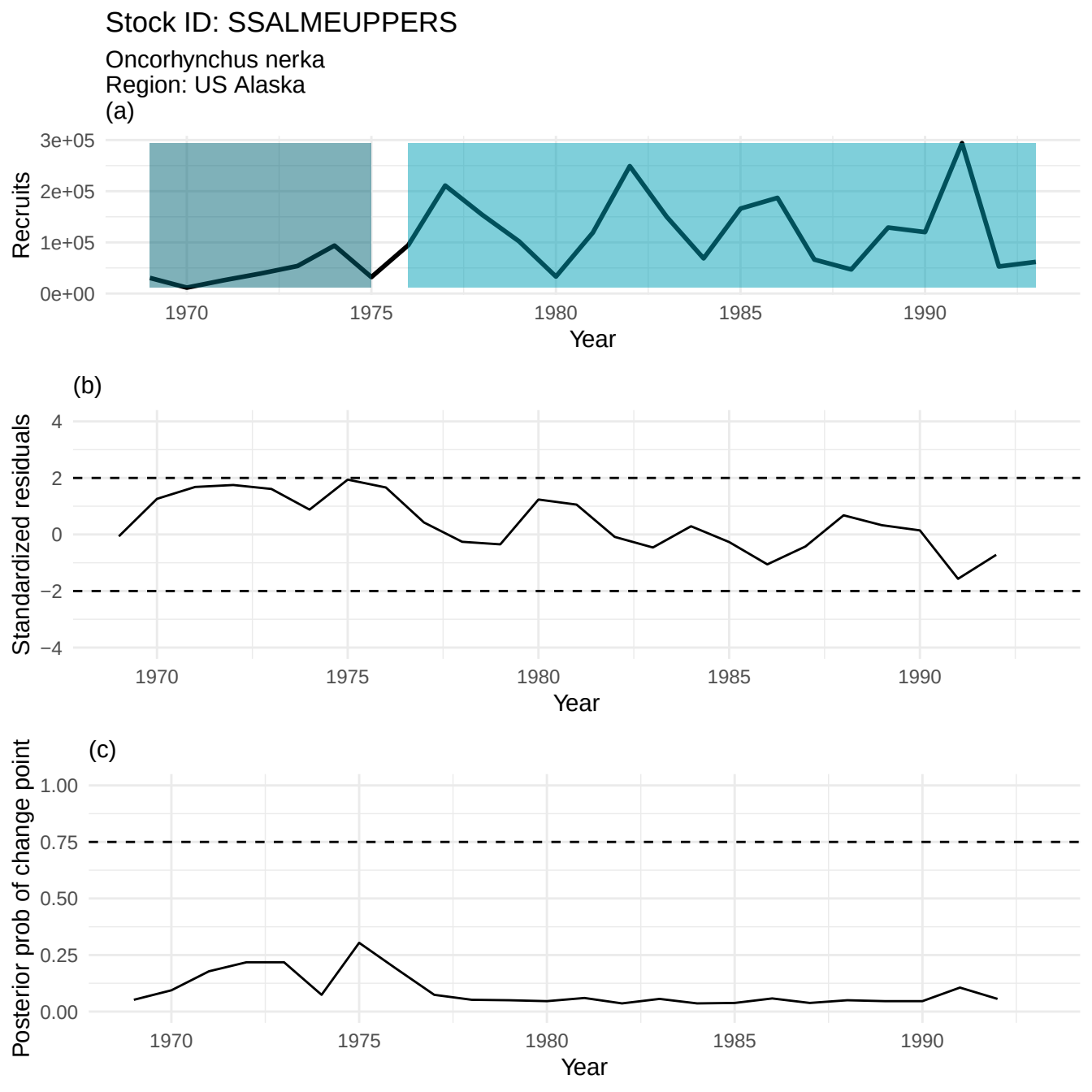

Stock ID: SSALMBLACKL
Oncorhynchus nerka
Region: US Alaska
(a)
Recruits
4e+06
3e+06
2e+06
1e+06
0e+00
1920
1940
1960
1980
Year
(b)
Standardized residuals
4
2
0
−2
−4
1920
1940
1960
1980
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1920
1940
1960
1980
Year

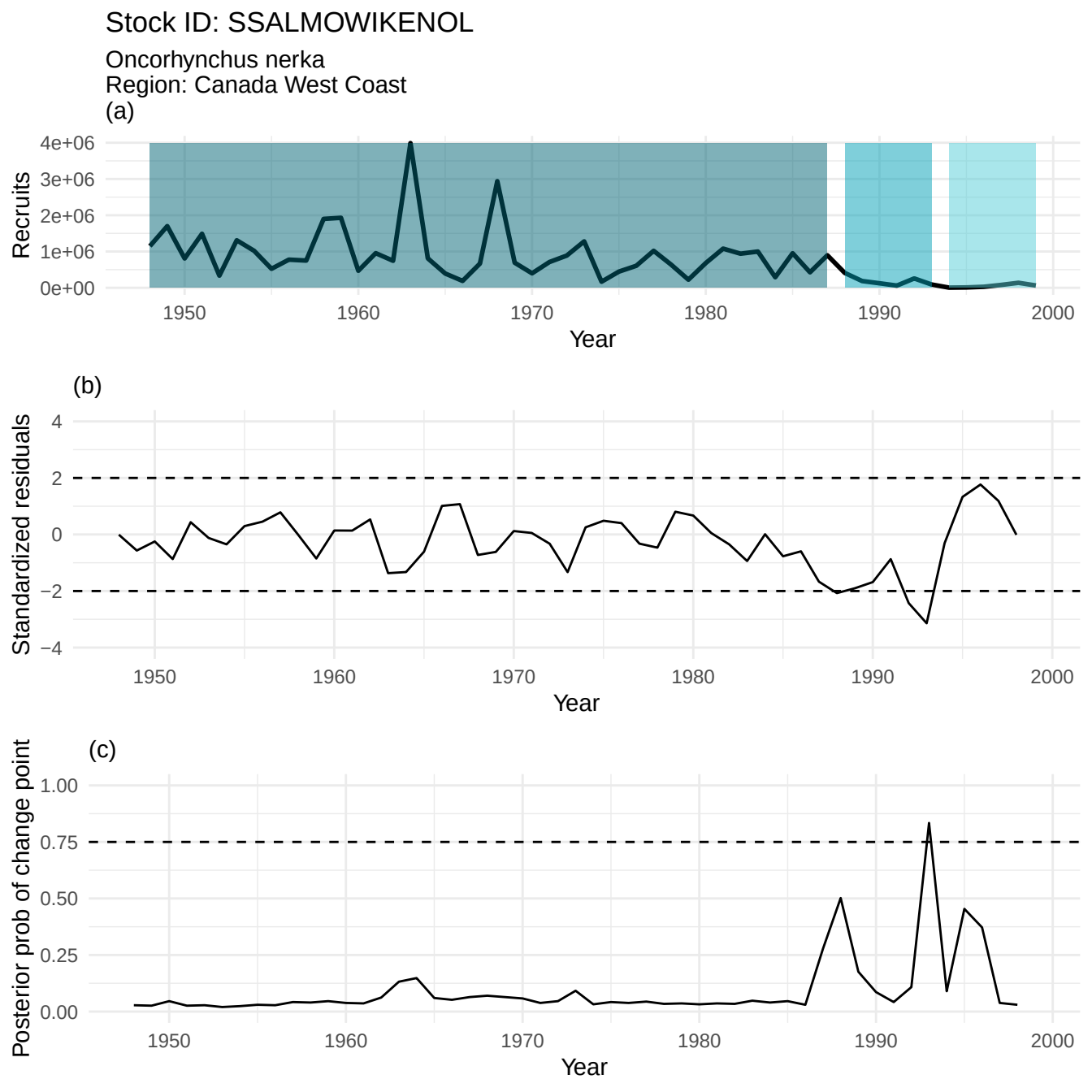

Stock ID: SSALMBOWRON
Oncorhynchus nerka
Region: Canada West Coast
(a)
Recruits
200000
150000
100000
50000
0
1950
1960
1970
1980
1990
Year
(b)
Standardized residuals
4
2
0
−2
−4
1950
1960
1970
1980
1990
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1950
1960
1970
1980
1990
Year

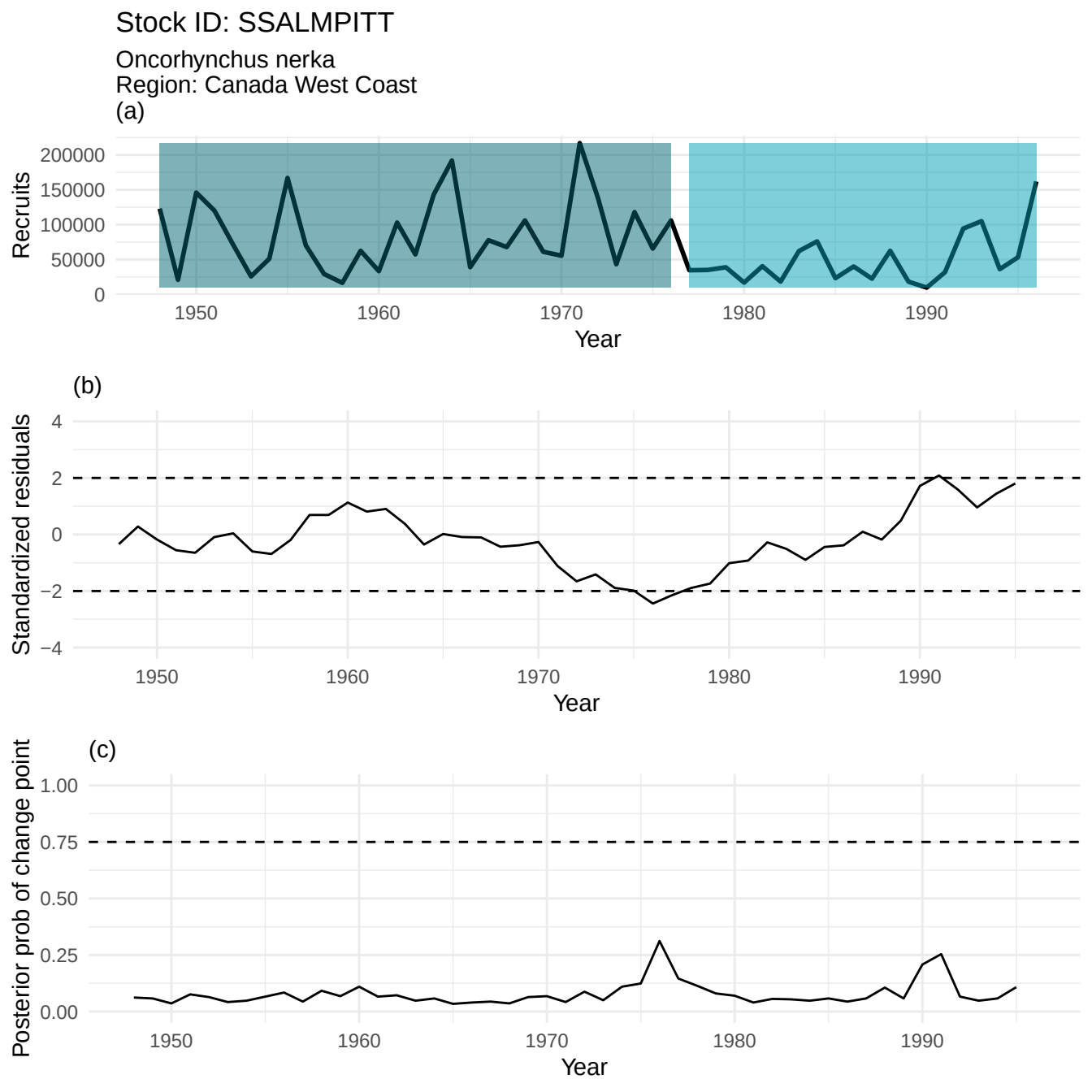

Stock ID: SSALMBRANCH
Oncorhynchus nerka
Region: US Alaska
(a)
Recruits
2e+06
1e+06
0e+00
1960
1970
1980
1990
2000
Year
(b)
Standardized residuals
4
2
0
−2
−4
1960
1970
1980
1990
2000
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1960
1970
1980
1990
2000
Year

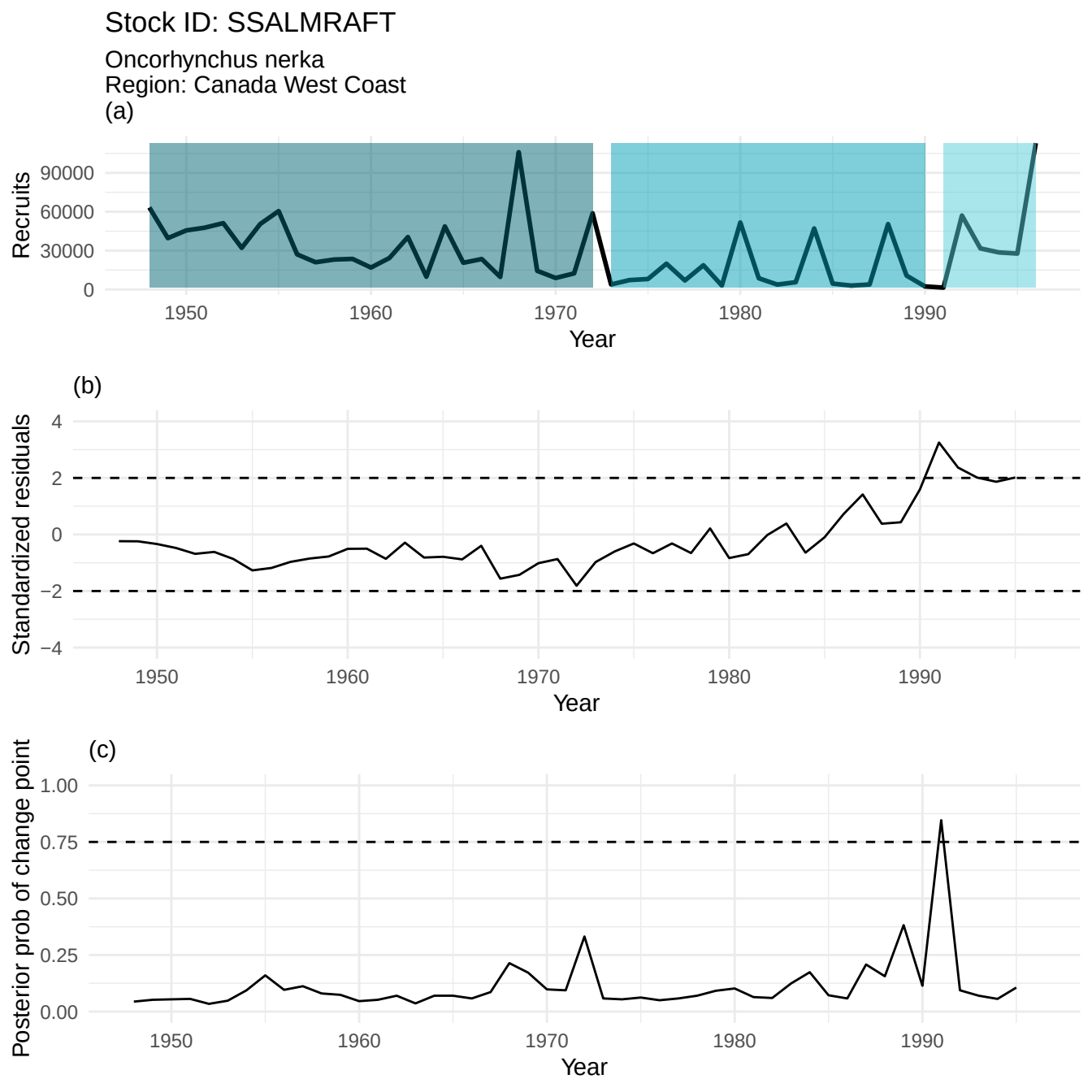

Stock ID: SSALMCHILKO
Oncorhynchus nerka
Region: Canada West Coast
(a)
Recruits
5e+06
4e+06
3e+06
2e+06
1e+06
0e+00
1950
1960
1970
1980
1990
Year
(b)
Standardized residuals
4
2
0
−2
−4
1950
1960
1970
1980
1990
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1950
1960
1970
1980
1990
Year

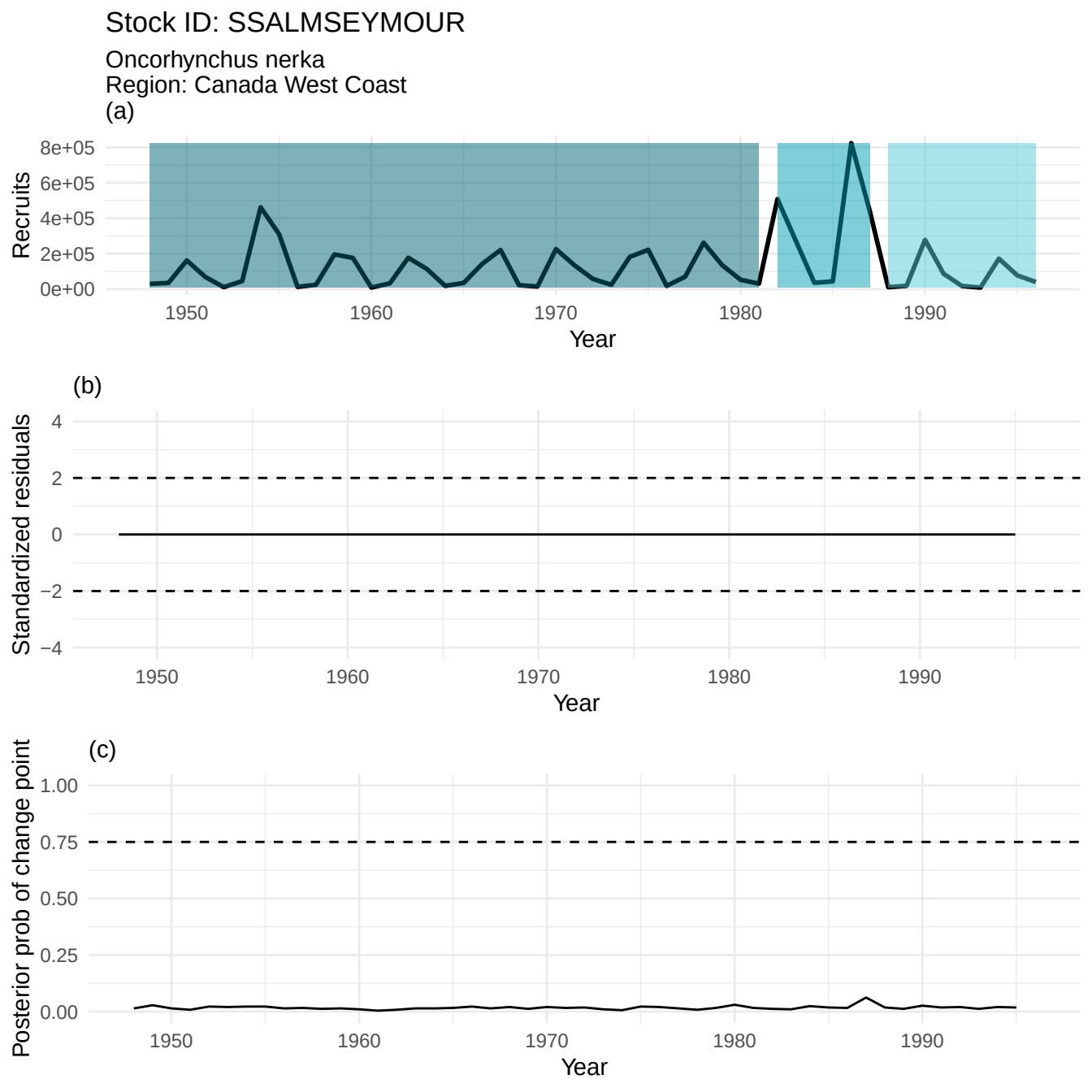

Stock ID: SSALMCULTUS
Oncorhynchus nerka
Region: Canada West Coast
(a)
Recruits
4e+05
3e+05
2e+05
1e+05
0e+00
1950
1960
1970
1980
1990
Year
(b)
Standardized residuals
4
2
0
−2
−4
1950
1960
1970
1980
1990
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1950
1960
1970
1980
1990
Year

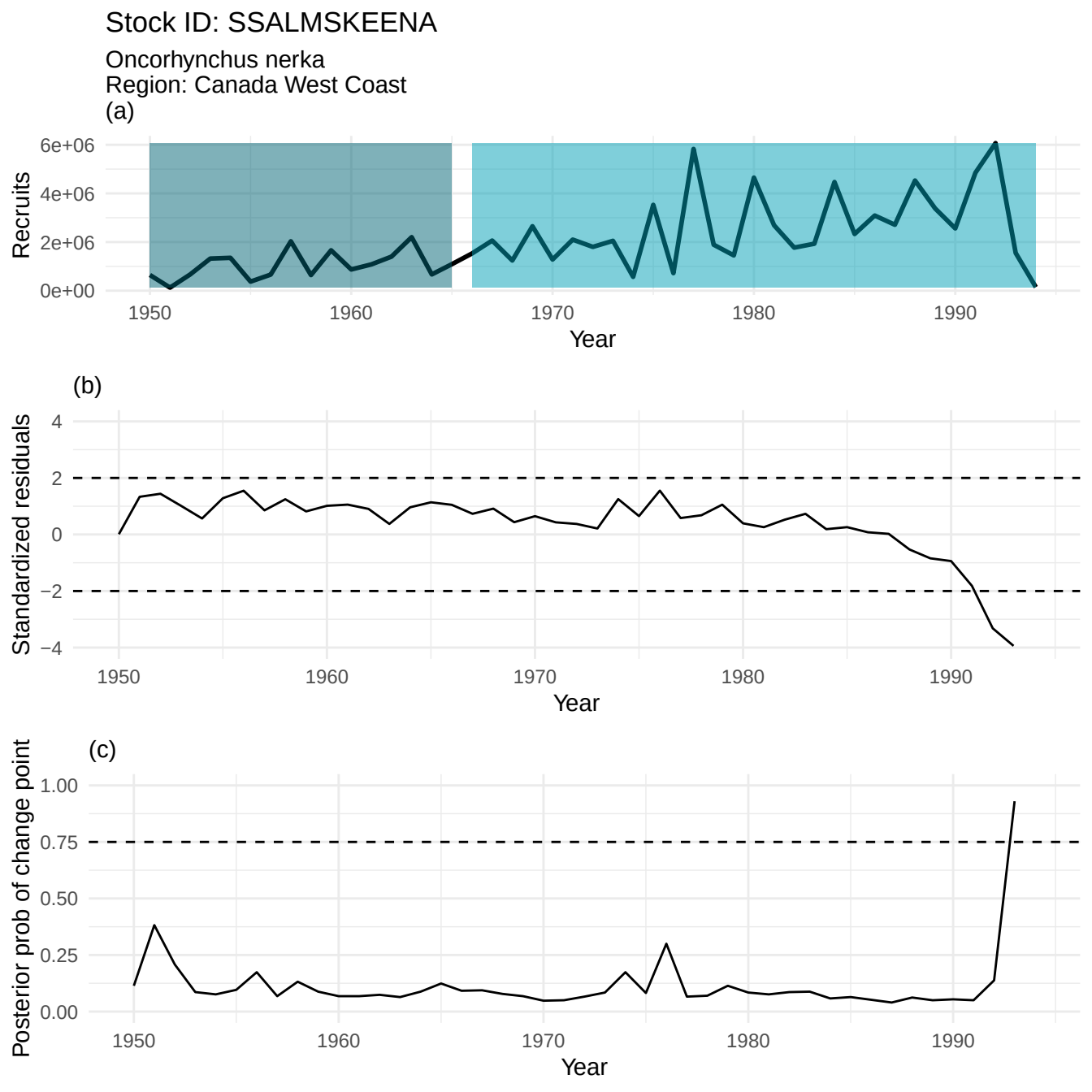

Stock ID: SSALMEUPPERS
Oncorhynchus nerka
Region: US Alaska
(a)
Recruits
3e+05
2e+05
1e+05
0e+00
1970
1975
1980
1985
1990
Year
(b)
Standardized residuals
4
2
0
−2
−4
1970
1975
1980
1985
1990
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1970
1975
1980
1985
1990
Year

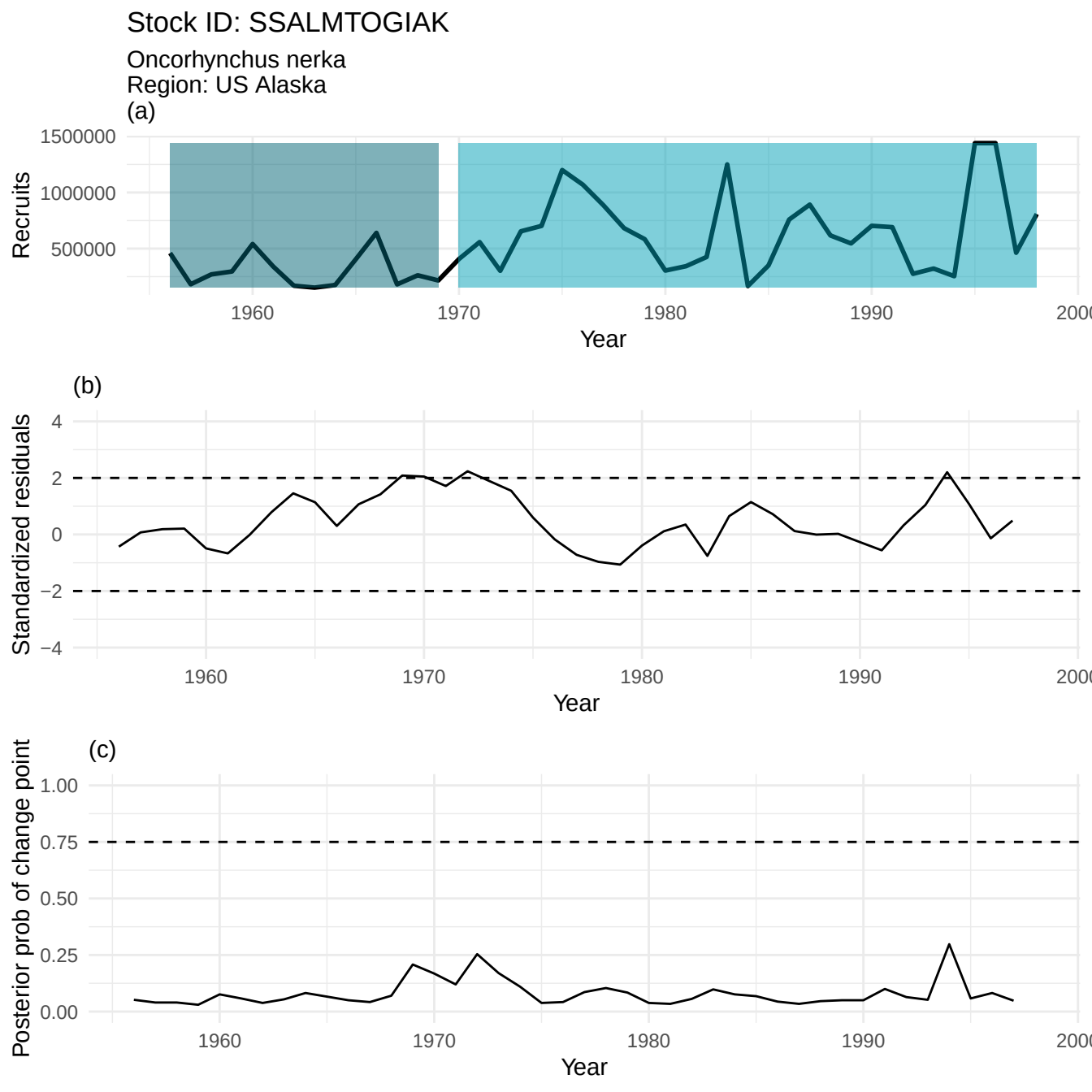

Stock ID: SSALMOWIKENOL
Oncorhynchus nerka
Region: Canada West Coast
(a)
Recruits
4e+06
3e+06
2e+06
1e+06
0e+00
1950
1960
1970
1980
1990
2000
Year
(b)
Standardized residuals
4
2
0
−2
−4
1950
1960
1970
1980
1990
2000
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1950
1960
1970
1980
1990
2000
Year

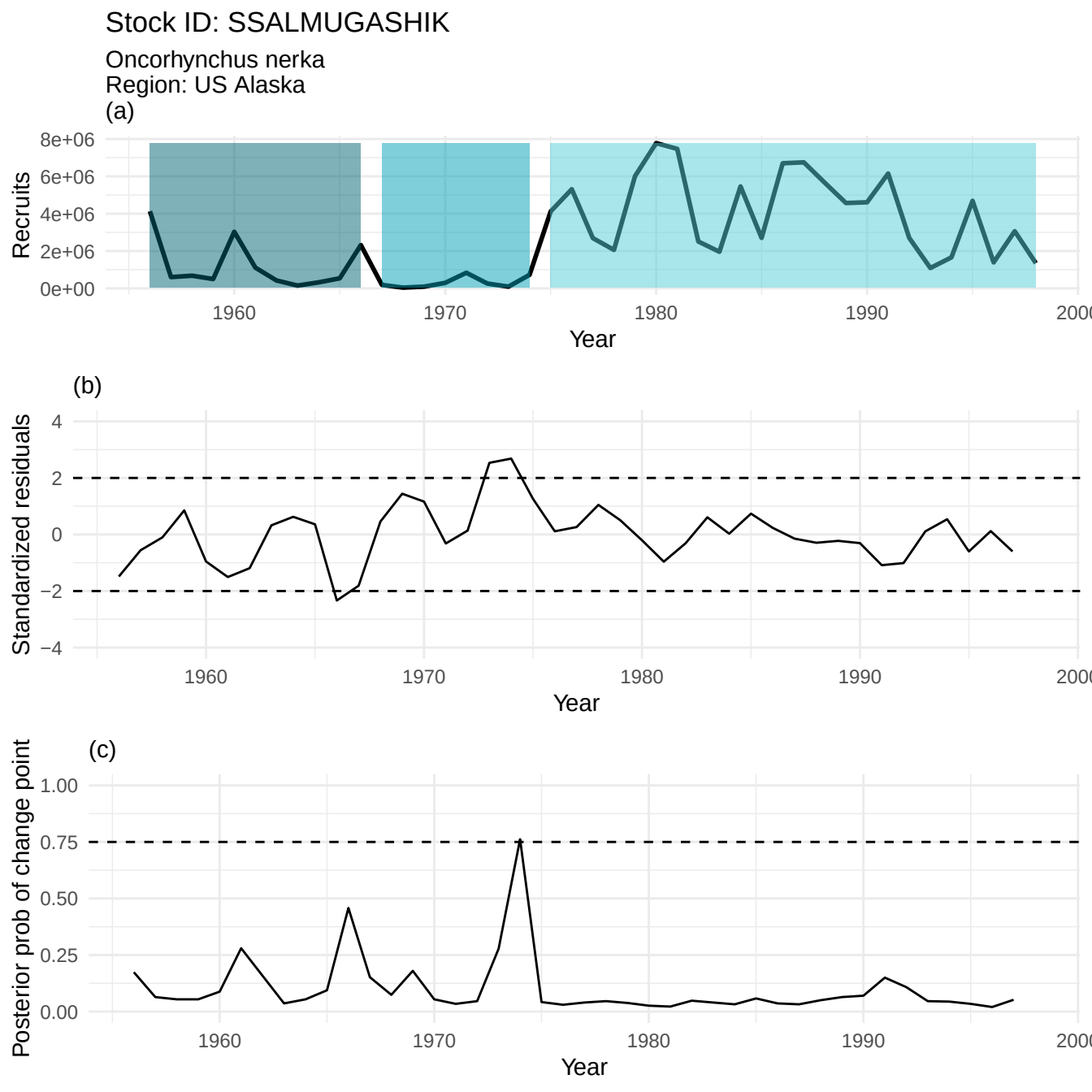

Stock ID: SSALMPITT
Oncorhynchus nerka
Region: Canada West Coast
(a)
Recruits
200000
150000
100000
50000
0
1950
1960
1970
1980
1990
Year
(b)
Standardized residuals
4
2
0
−2
−4
1950
1960
1970
1980
1990
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1950
1960
1970
1980
1990
Year

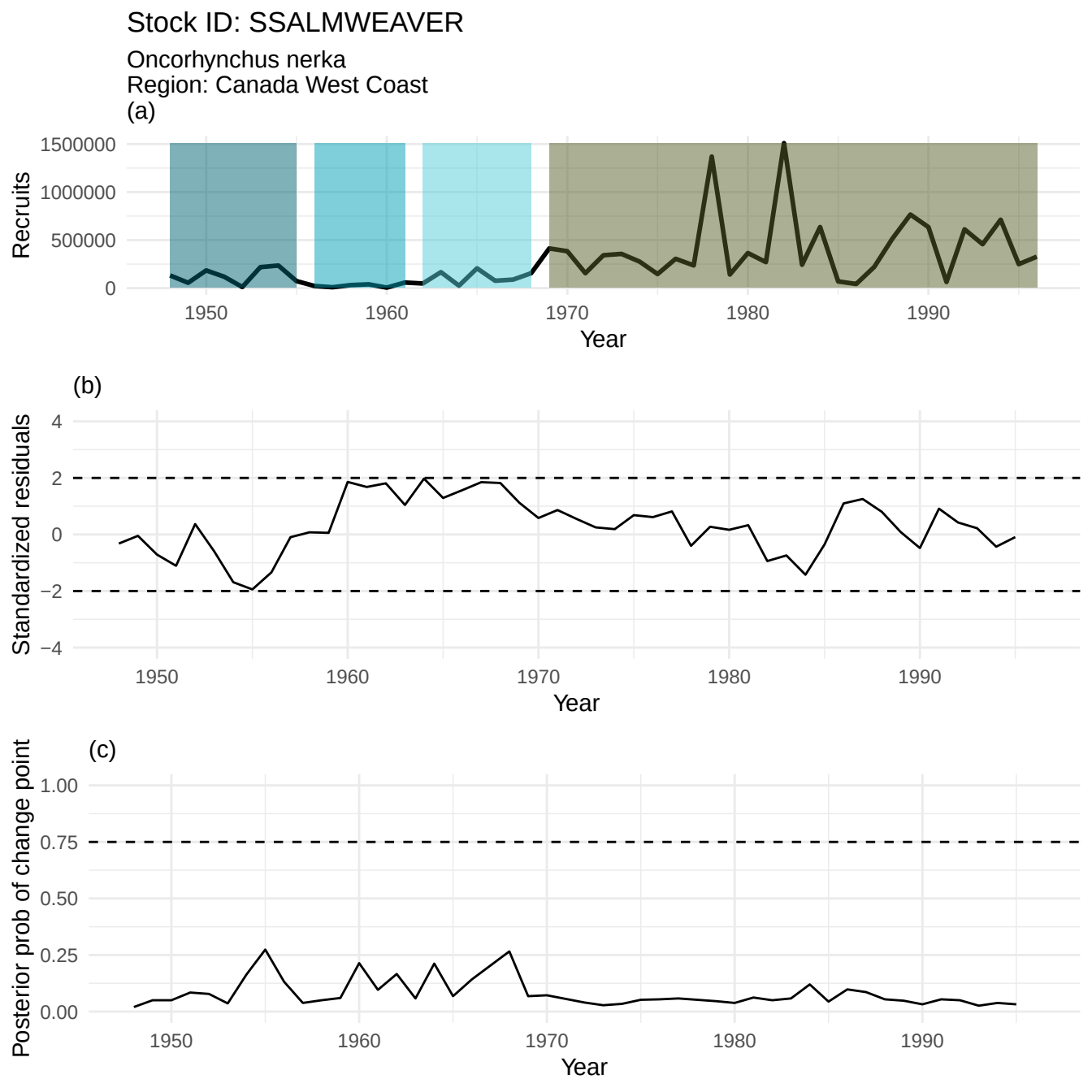

Stock ID: SSALMRAFT
Oncorhynchus nerka
Region: Canada West Coast
(a)
Recruits
90000
60000
30000
0
1950
1960
1970
1980
1990
Year
(b)
Standardized residuals
4
2
0
−2
−4
1950
1960
1970
1980
1990
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1950
1960
1970
1980
1990
Year

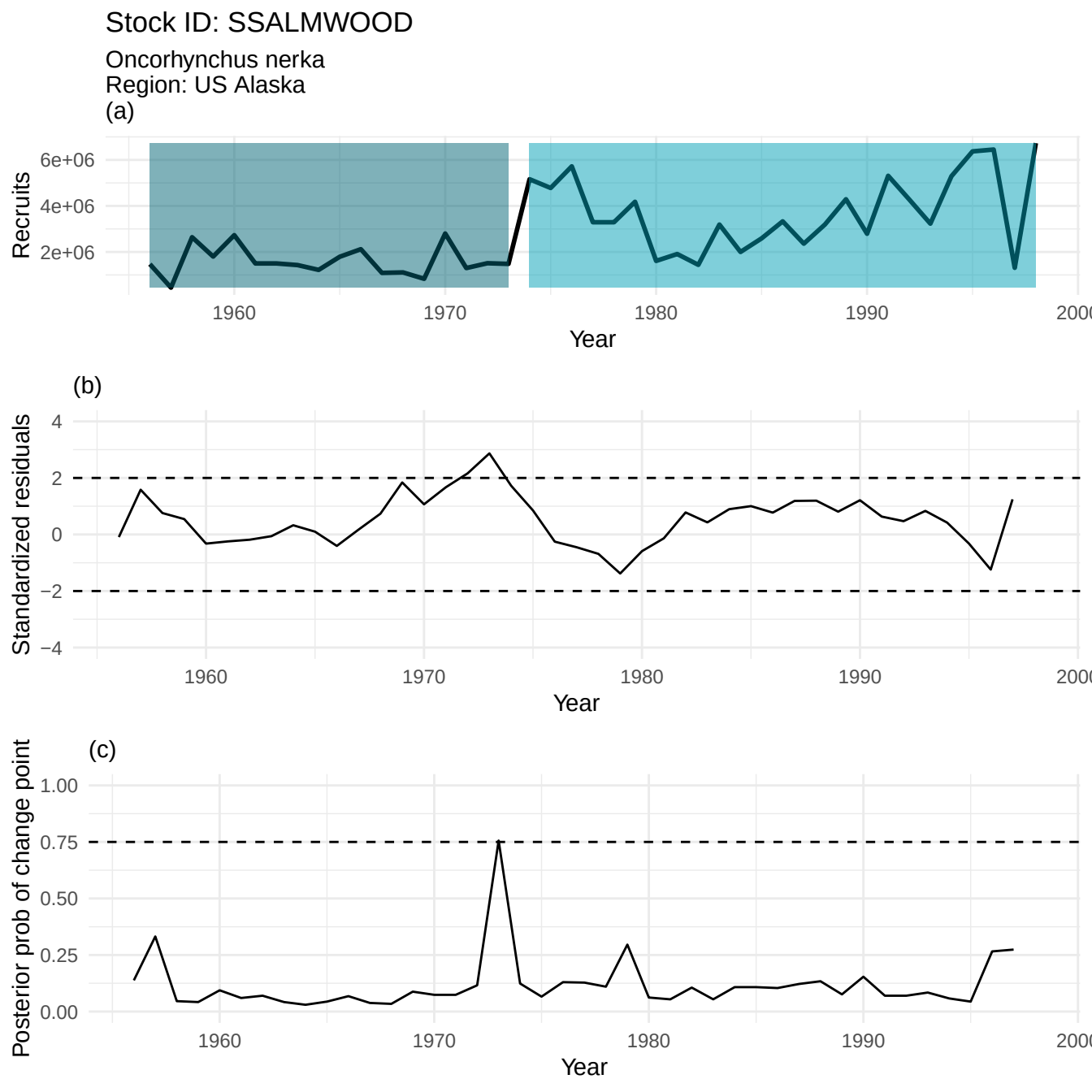

Stock ID: SSALMSEYMOUR
Oncorhynchus nerka
Region: Canada West Coast
(a)
Recruits
8e+05
6e+05
4e+05
2e+05
0e+00
1950
1960
1970
1980
1990
Year
(b)
Standardized residuals
4
2
0
−2
−4
1950
1960
1970
1980
1990
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1950
1960
1970
1980
1990
Year

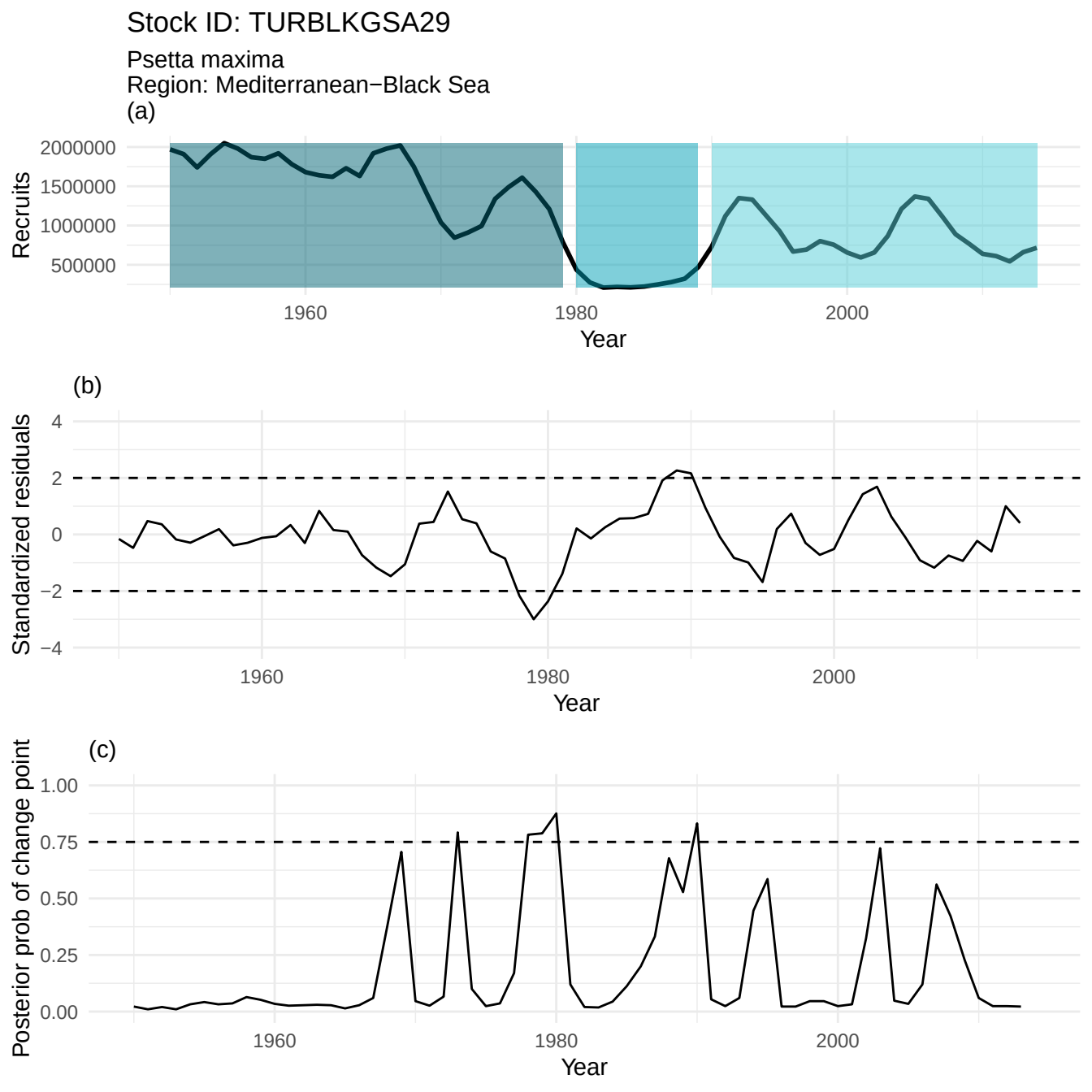

Stock ID: SSALMSKEENA
Oncorhynchus nerka
Region: Canada West Coast
(a)
Recruits
6e+06
4e+06
2e+06
0e+00
1950
1960
1970
1980
1990
Year
(b)
Standardized residuals
4
2
0
−2
−4
1950
1960
1970
1980
1990
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1950
1960
1970
1980
1990
Year

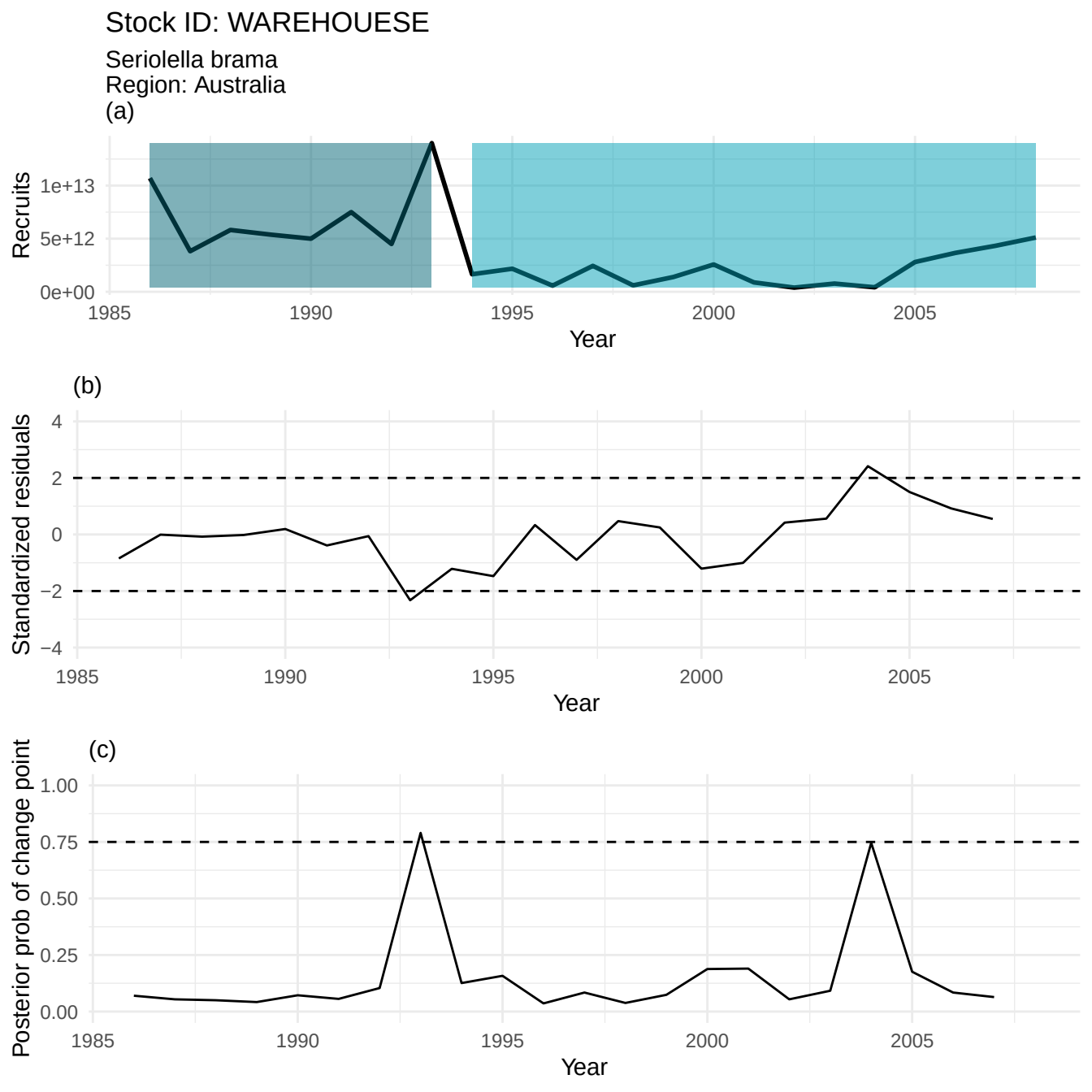

Stock ID: SSALMTOGIAK
Oncorhynchus nerka
Region: US Alaska
(a)
Recruits
1500000
1000000
500000
1960
1970
1980
1990
Year
(b)
Standardized residuals
4
2
0
−2
−4
1960
1970
1980
1990
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1960
1970
1980
1990
Year

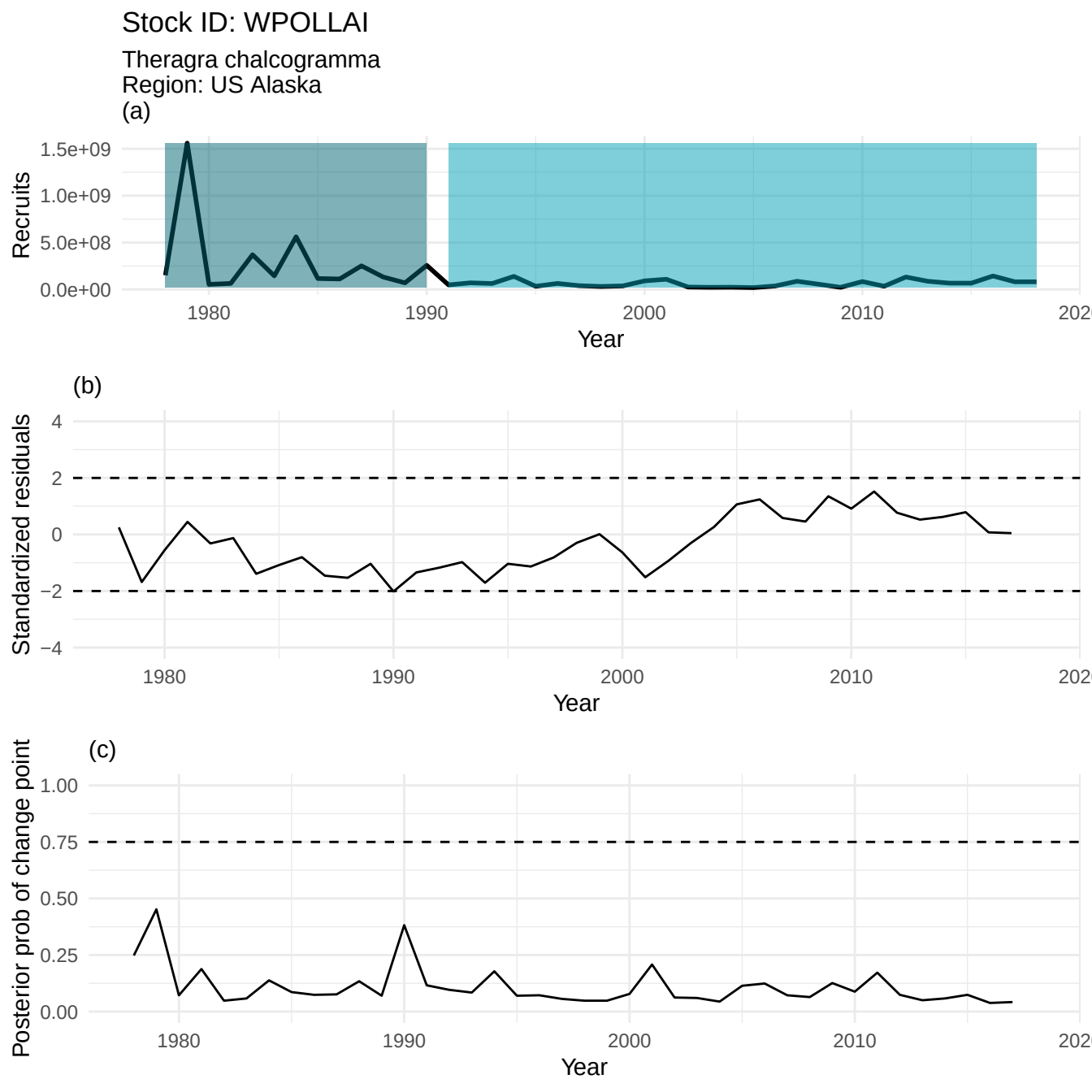

Stock ID: SSALMUGASHIK
Oncorhynchus nerka
Region: US Alaska
(a)
Recruits
8e+06
6e+06
4e+06
2e+06
0e+00
1960
1970
1980
1990
Year
(b)
Standardized residuals
4
2
0
−2
−4
1960
1970
1980
1990
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1960
1970
1980
1990
Year

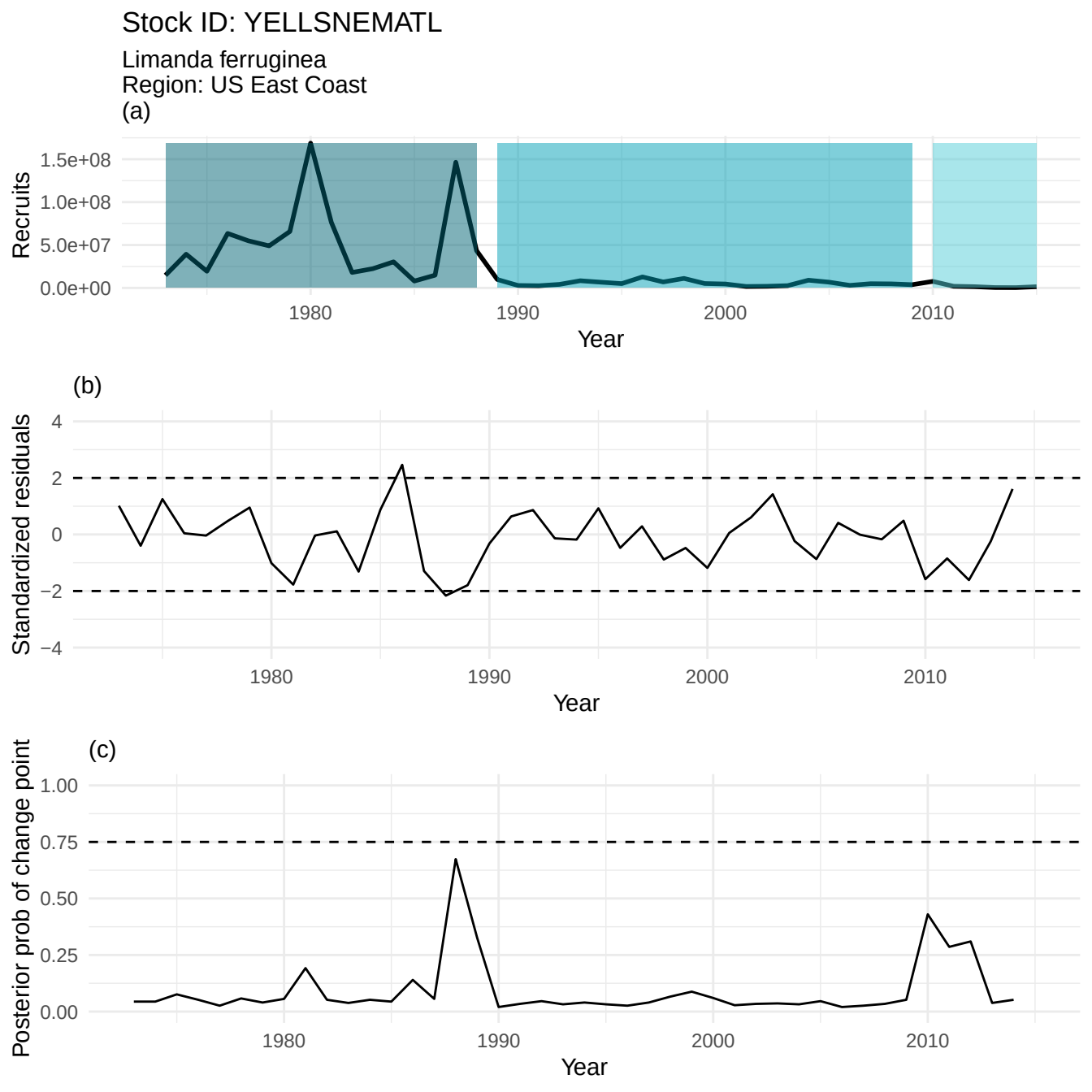

Stock ID: SSALMWEAVER
Oncorhynchus nerka
Region: Canada West Coast
(a)
Recruits
1500000
1000000
500000
0
1950
1960
1970
1980
1990
Year
(b)
Standardized residuals
4
2
0
−2
−4
1950
1960
1970
1980
1990
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1950
1960
1970
1980
1990
Year


Stock ID: SSALMWOOD
Oncorhynchus nerka
Region: US Alaska
(a)
Recruits
6e+06
4e+06
2e+06
1960
1970
1980
1990
Year
(b)
Standardized residuals
4
2
0
−2
−4
1960
1970
1980
1990
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1960
1970
1980
1990
Year

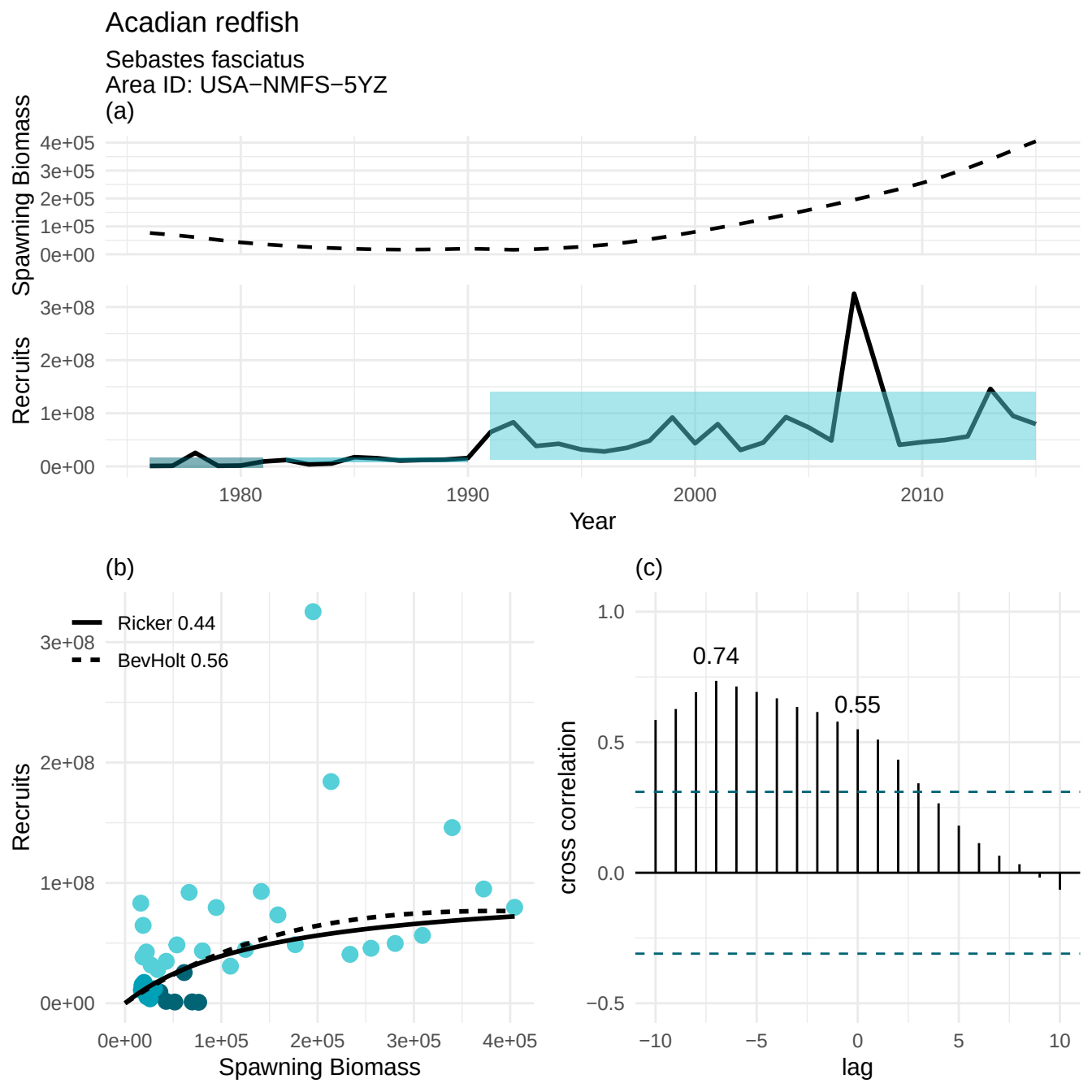

Stock ID: TURBLKGSA29
Psetta maxima
Region: Mediterranean−Black Sea
(a)
Recruits
2000000
1500000
1000000
500000
1960
1980
2000
Year
(b)
Standardized residuals
4
2
0
−2
−4
1960
1980
2000
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1960
1980
2000
Year

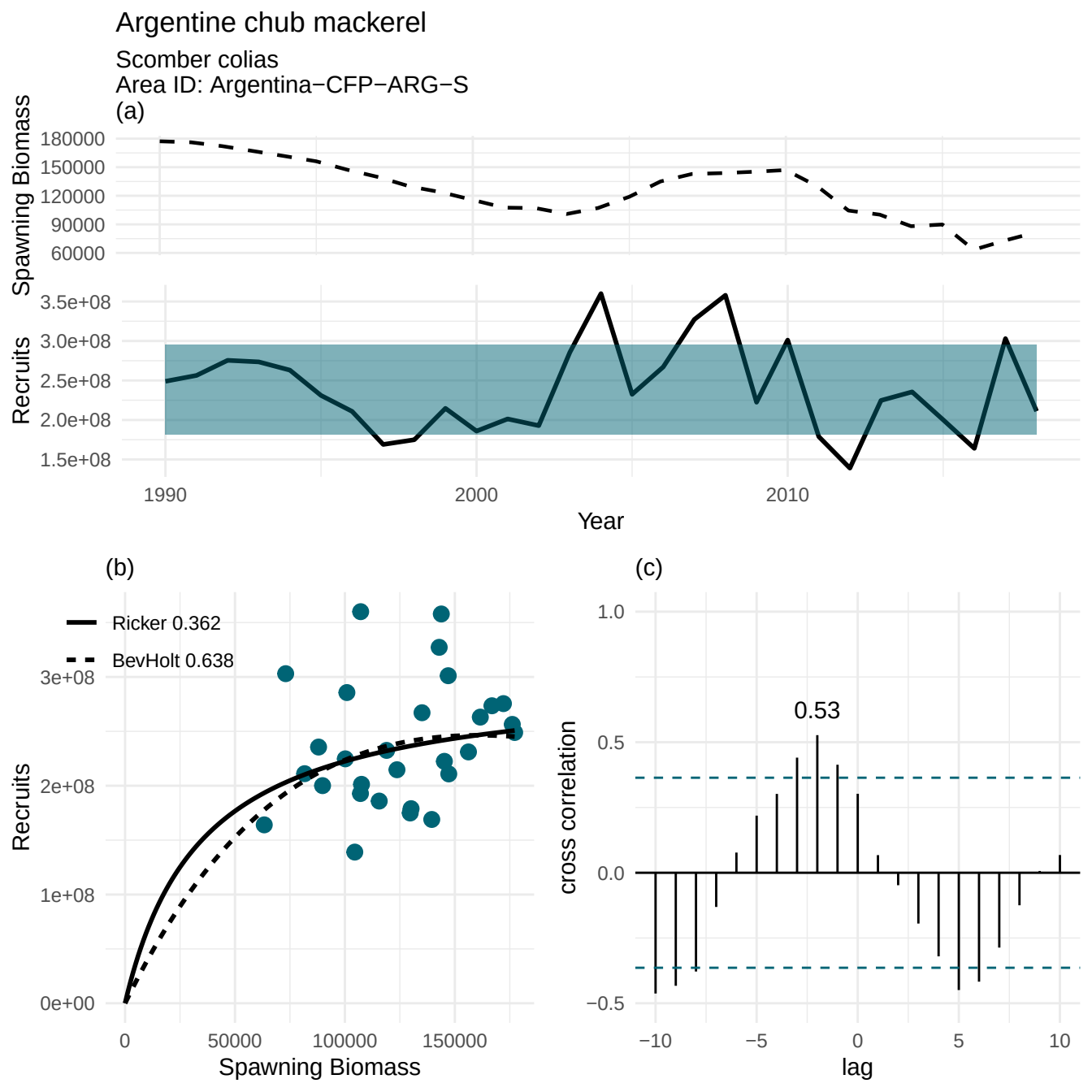

Stock ID: WAREHOUESE
Seriolella brama
Region: Australia
(a)
Recruits
1e+13
5e+12
0e+00
1985
1990
1995
2000
2005
Year
(b)
Standardized residuals
4
2
0
−2
−4
1985
1990
1995
2000
2005
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1985
1990
1995
2000
2005
Year

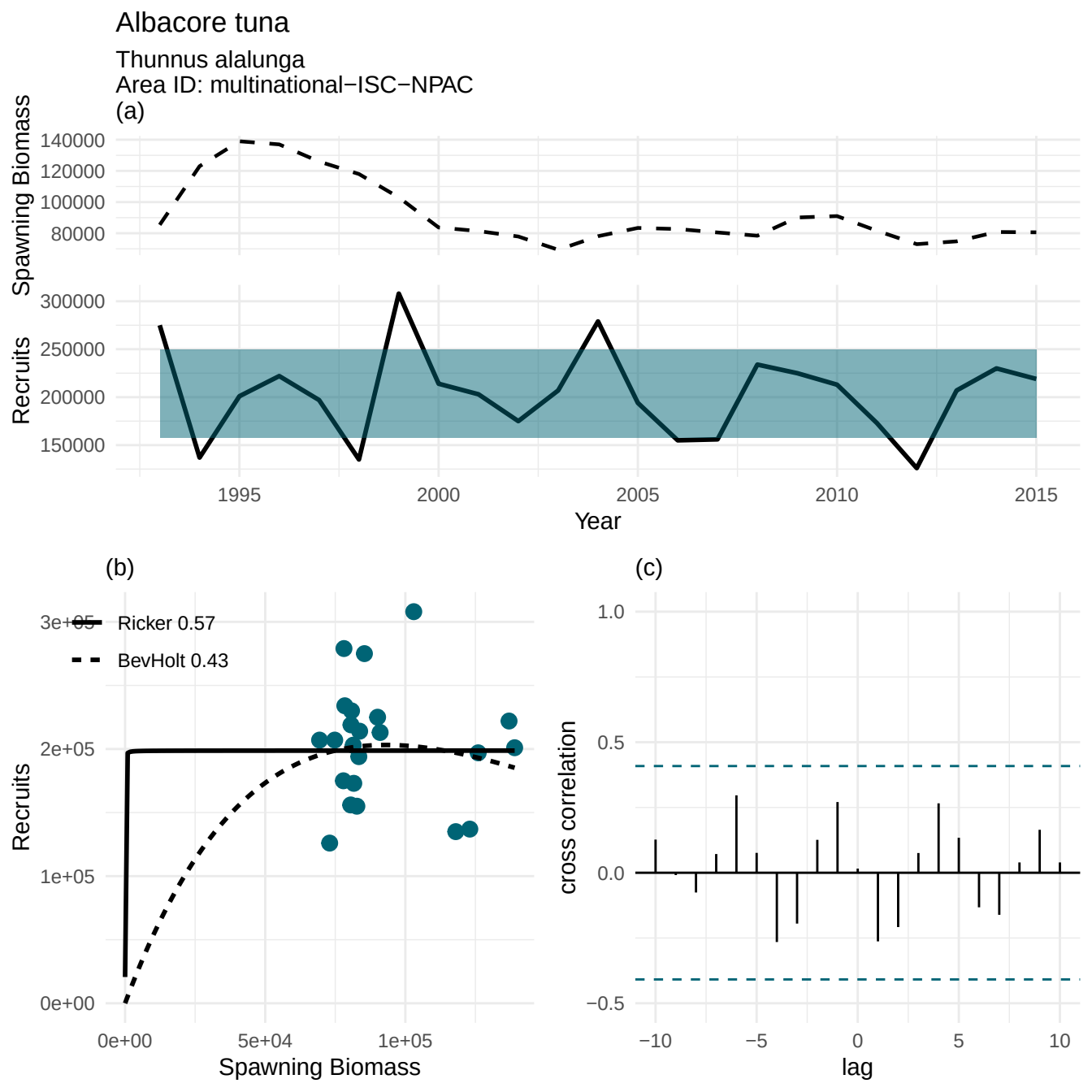

Stock ID: WPOLLAI
Theragra chalcogramma
Region: US Alaska
(a)
Recruits
1.5e+09
1.0e+09
5.0e+08
0.0e+00
1980
1990
2000
2010
Year
(b)
Standardized residuals
4
2
0
−2
−4
1980
1990
2000
2010
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1980
1990
2000
2010
Year

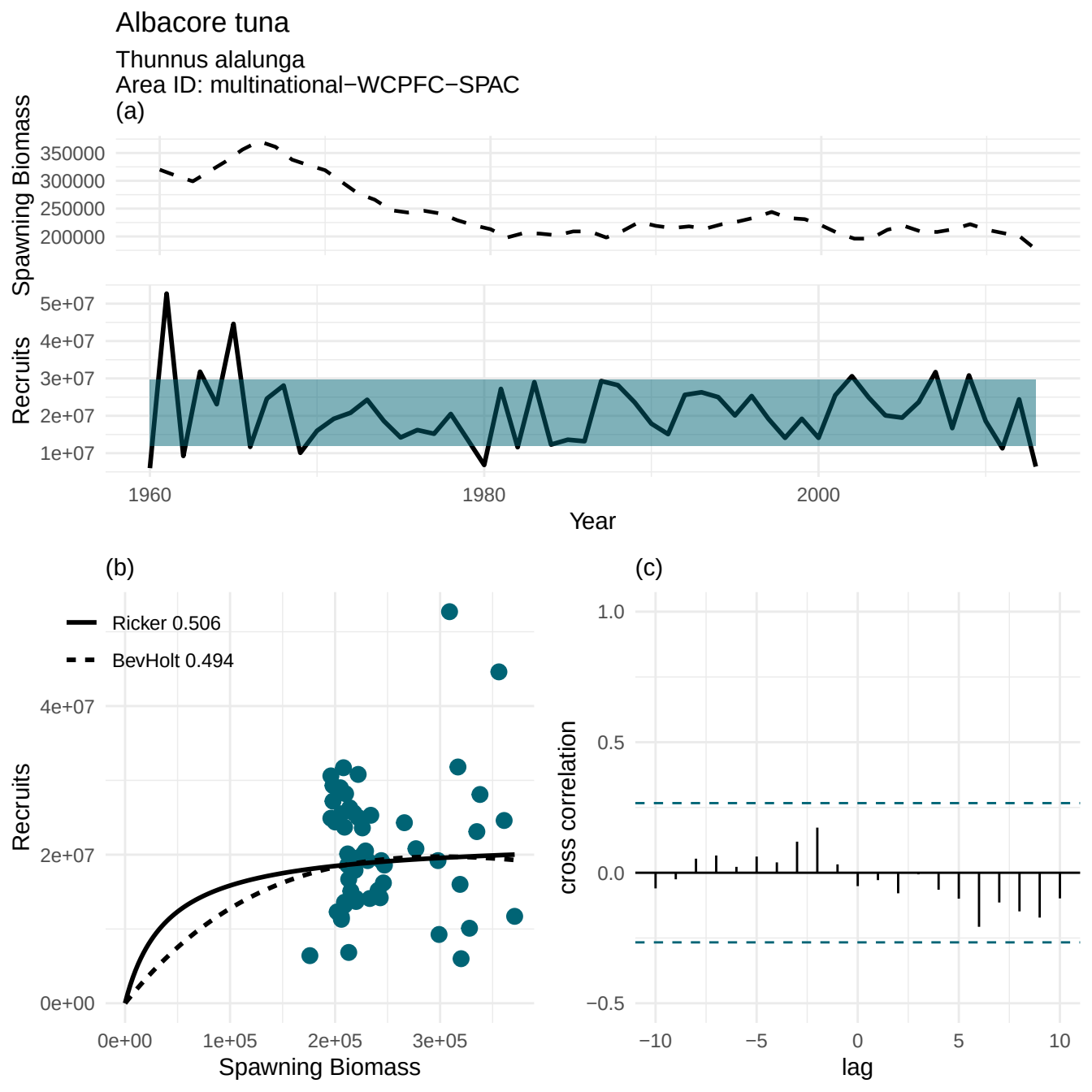

Stock ID: YELLSNEMATL
Limanda ferruginea
Region: US East Coast
(a)
Recruits
1.5e+08
1.0e+08
5.0e+07
0.0e+00
1980
1990
2000
2010
Year
(b)
Standardized residuals
4
2
0
−2
−4
1980
1990
2000
2010
Year
(c)
Posterior prob of change point
1.00
0.75
0.50
0.25
0.00
1980
1990
2000
2010
Year

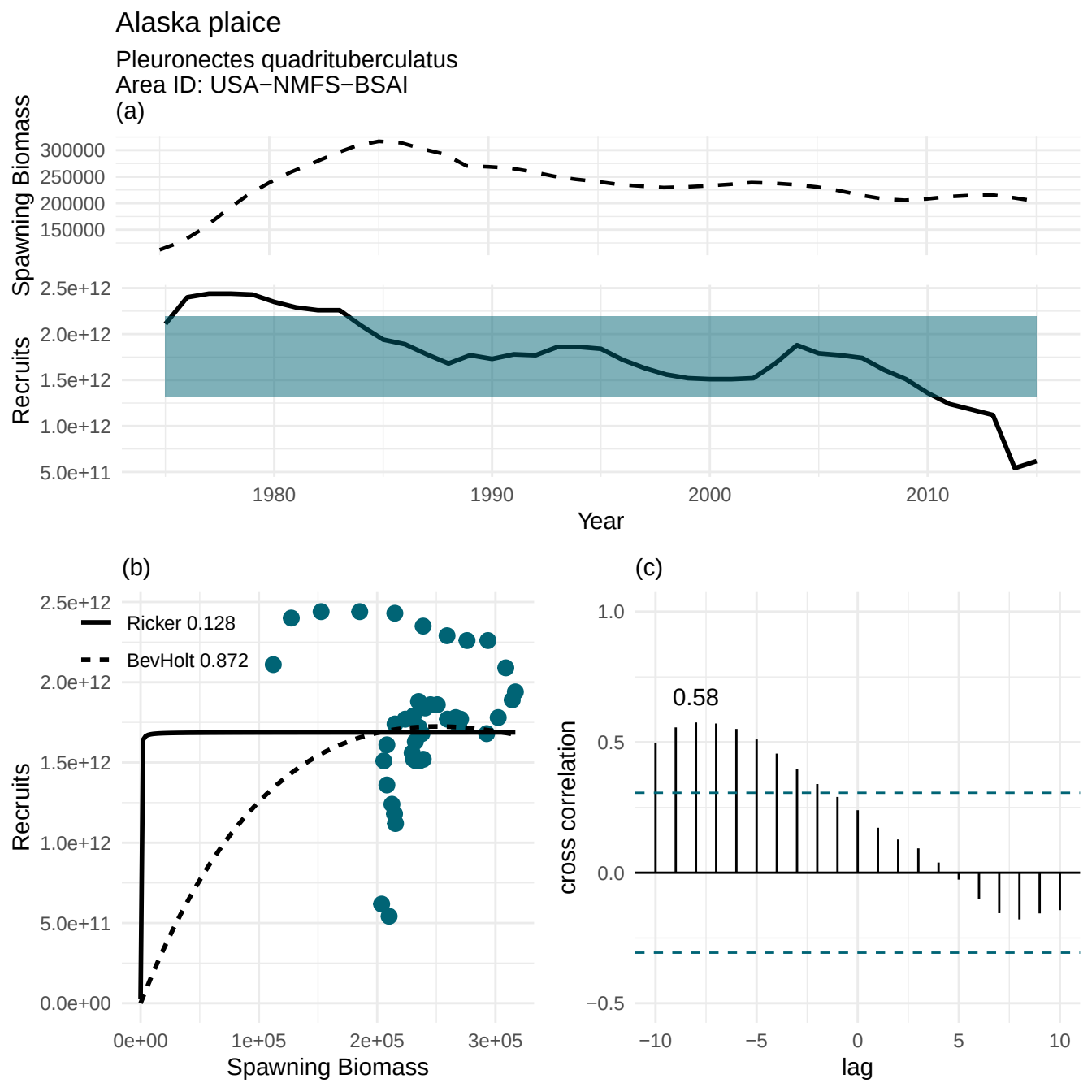
Supplementary Appendix 4

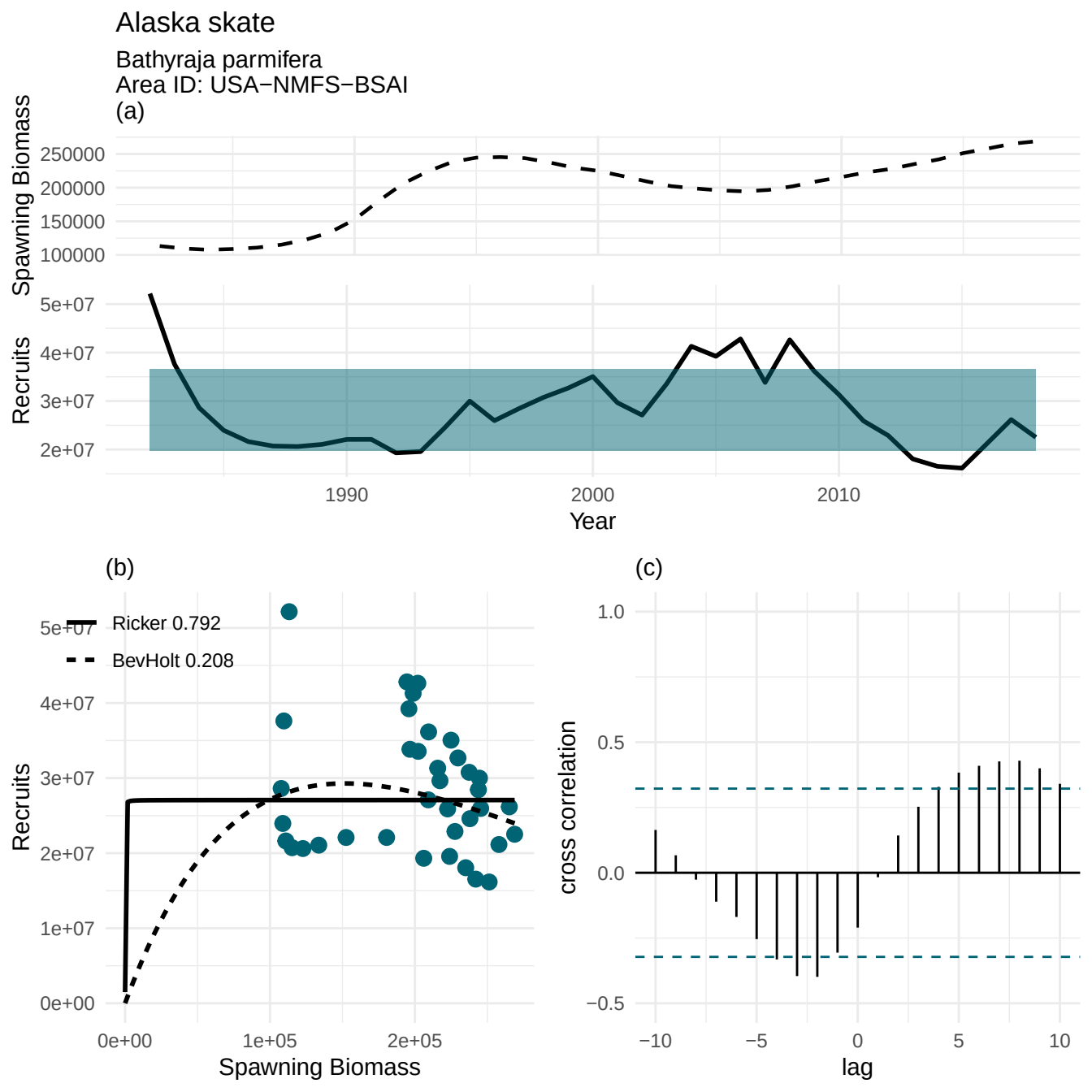

Acadian redfish
Sebastes fasciatus
Area ID: USA−NMFS−5YZ
(a)
Spawning Biomass
4e+05
3e+05
2e+05
1e+05
0e+00
Recruits
3e+08
2e+08
1e+08
0e+00
1980
1990
2000
2010
Year
(b)
Ricker 0.44
BevHolt 0.56
Recruits
3e+08
2e+08
1e+08
0e+00
0e+00
1e+05
2e+05
3e+05
4e+05
Spawning Biomass
(c)
1.0
0.5
0.0
−0.5
cross correlation
0.74
0.55
−10
−5
0
5
10
lag

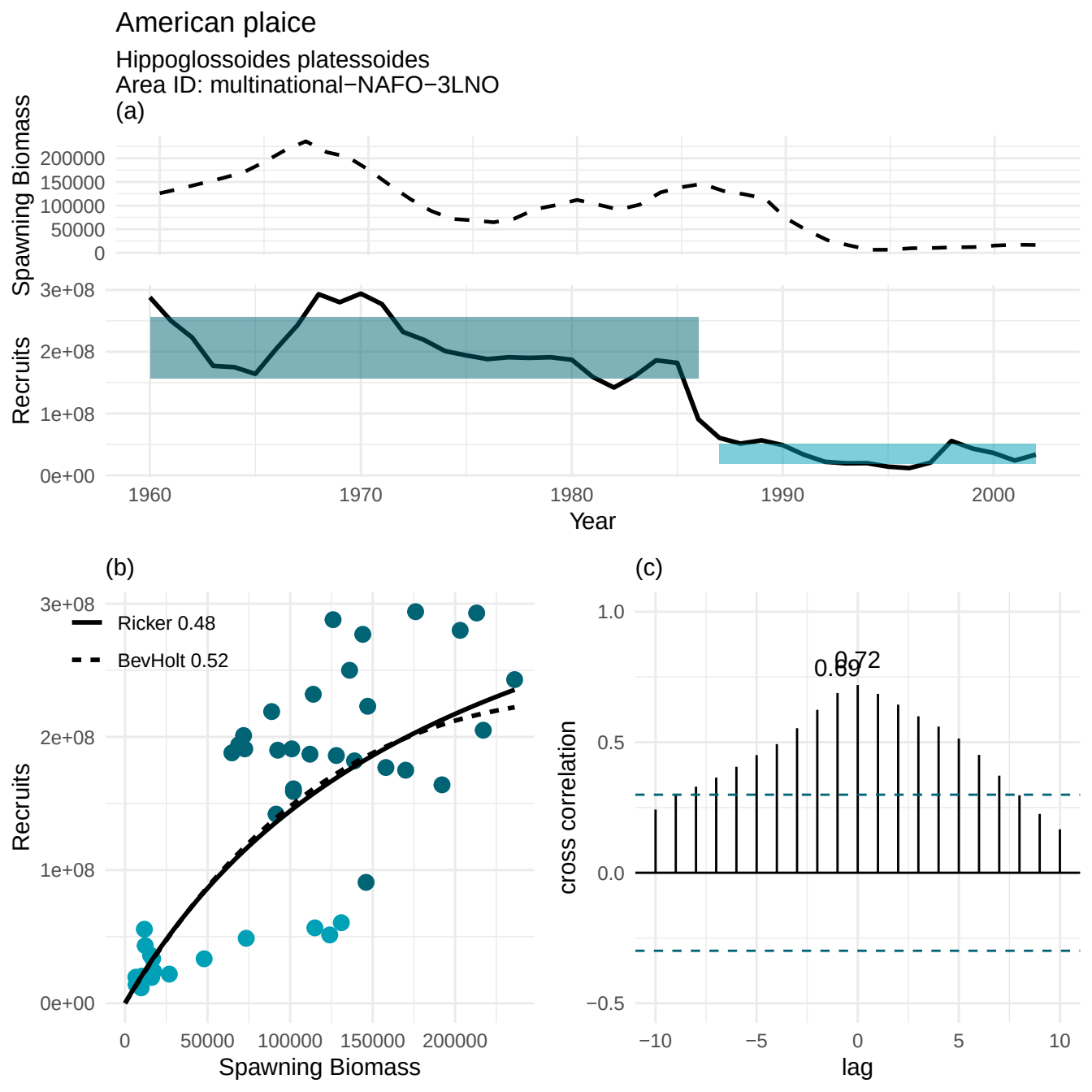

Argentine chub mackerel
Scomber colias
Area ID: Argentina−CFP−ARG−S
(a)
Spawning Biomass
180000
150000
120000
90000
60000
Recruits
3.5e+08
3.0e+08
2.5e+08
2.0e+08
1.5e+08
1990
2000
2010
Year
(b)
Ricker 0.362
BevHolt 0.638
Recruits
3e+08
2e+08
1e+08
0e+00
0
50000
100000
150000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.53
−10
−5
0
5
10
lag

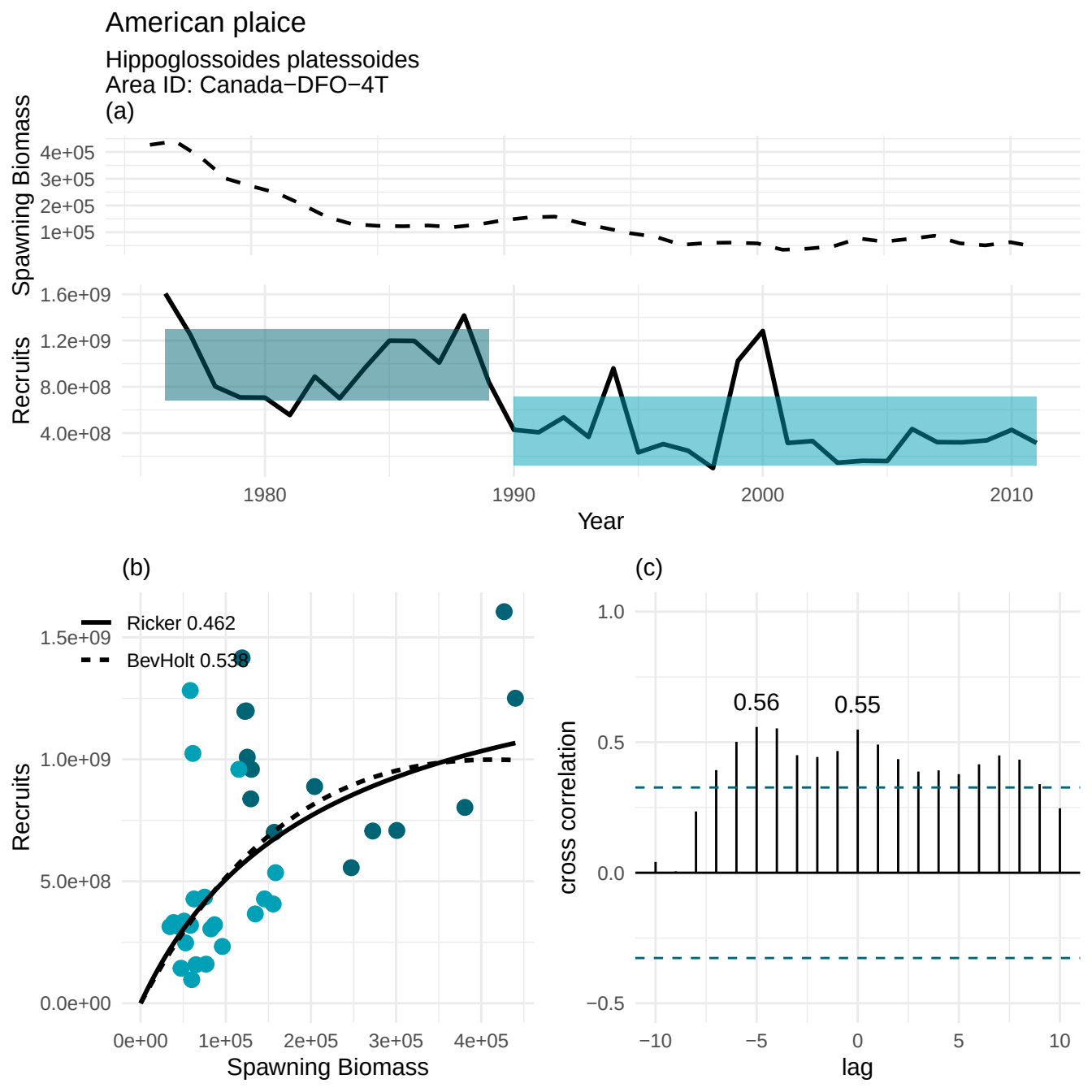

Albacore tuna
Thunnus alalunga
Area ID: multinational−ISC−NPAC
(a)
Spawning Biomass
140000
120000
100000
80000
Recruits
300000
250000
200000
150000
1995
2000
2005
2010
2015
Year
(b)
Ricker 0.57
BevHolt 0.43
Recruits
3e+05
2e+05
1e+05
0e+00
0e+00
5e+04
1e+05
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

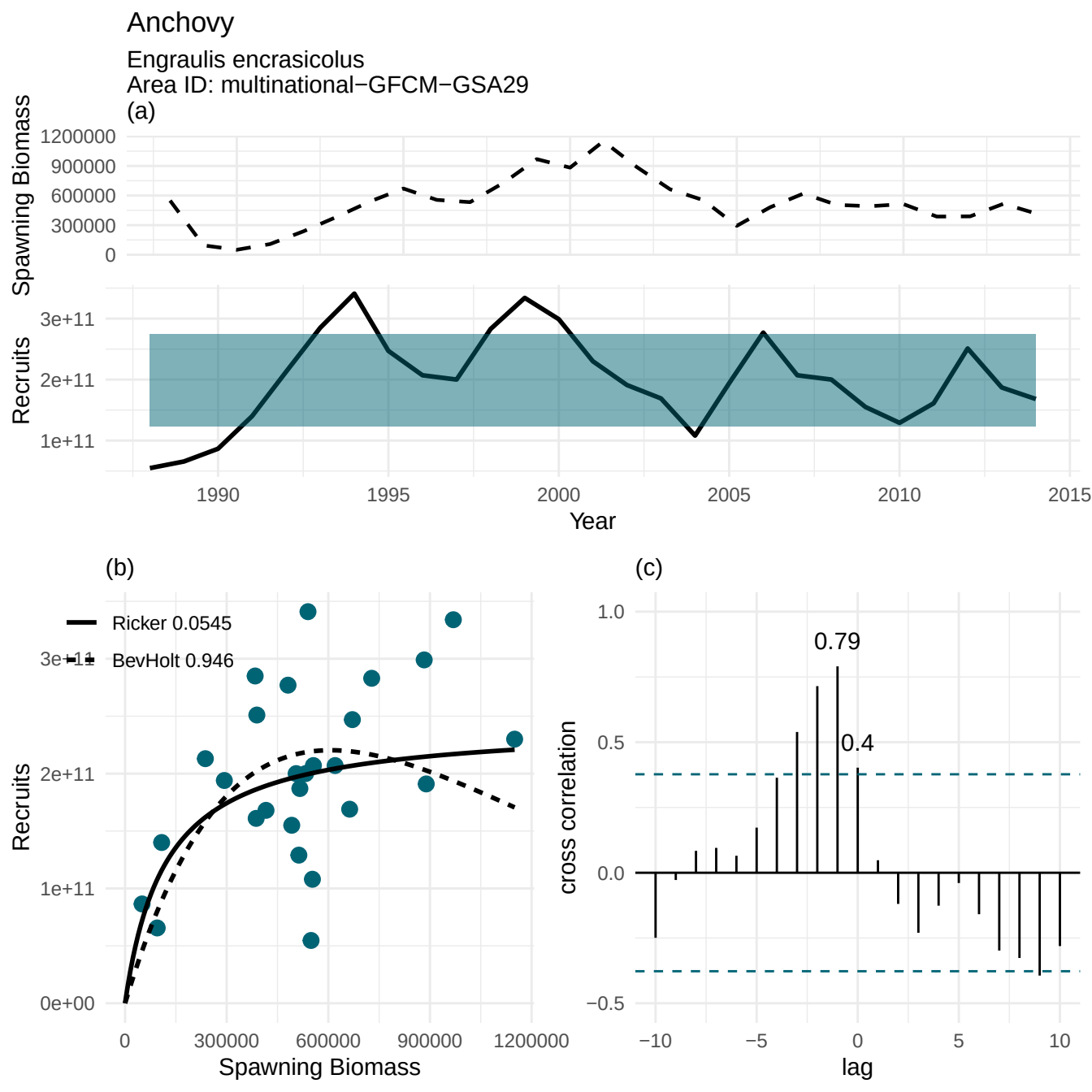

Albacore tuna
Thunnus alalunga
Area ID: multinational−WCPFC−SPAC
(a)
Spawning Biomass
350000
300000
250000
200000
Recruits
5e+07
4e+07
3e+07
2e+07
1e+07
1960
1980
2000
Year
(b)
Ricker 0.506
BevHolt 0.494
Recruits
4e+07
2e+07
0e+00
0e+00
1e+05
2e+05
3e+05
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

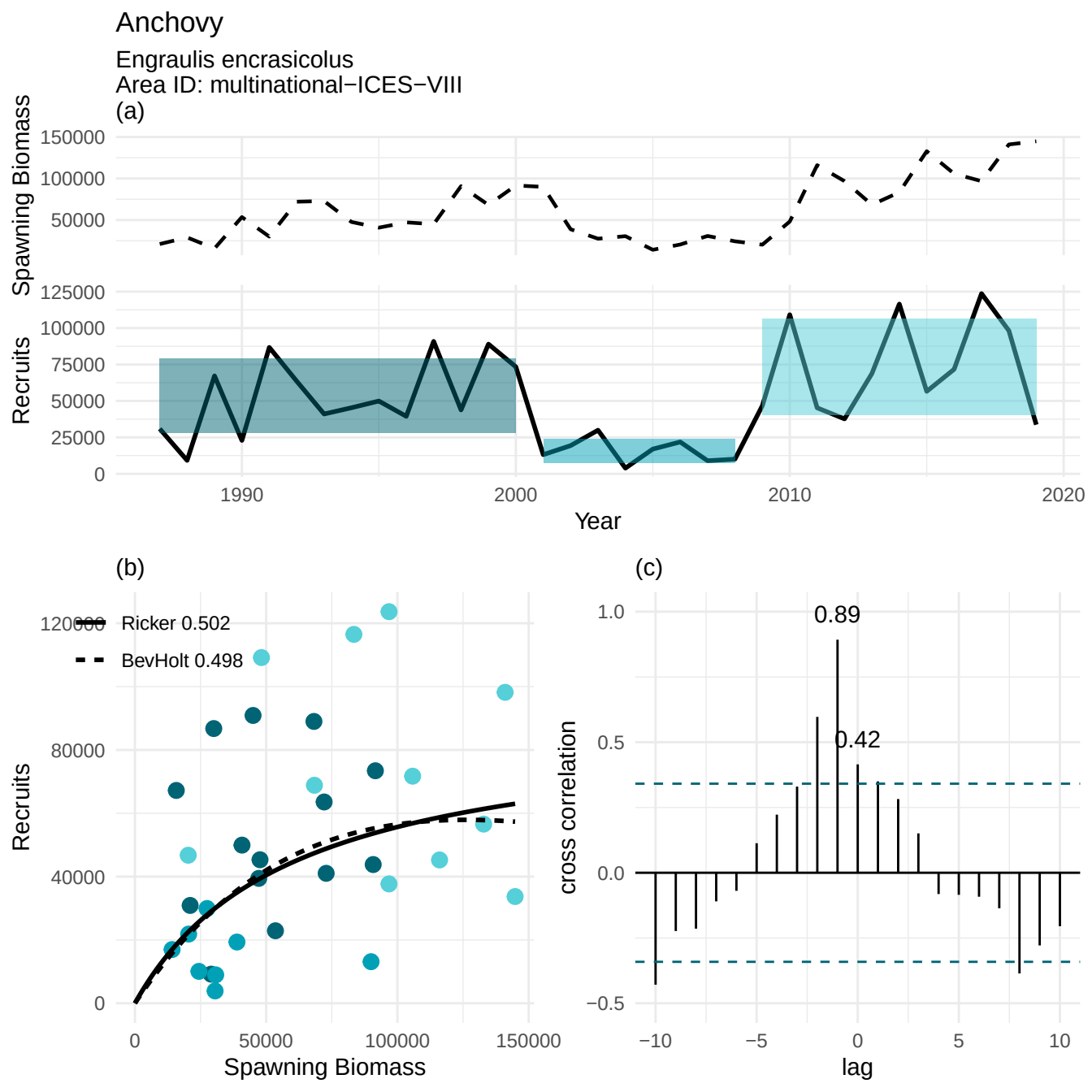

Alaska plaice
Pleuronectes quadrituberculatus
Area ID: USA−NMFS−BSAI
(a)
Spawning Biomass
300000
250000
200000
150000
Recruits
2.5e+12
2.0e+12
1.5e+12
1.0e+12
5.0e+11
1980
1990
2000
2010
Year
(b)
Ricker 0.128
BevHolt 0.872
Recruits
2.5e+12
2.0e+12
1.5e+12
1.0e+12
5.0e+11
0.0e+00
0e+00
1e+05
2e+05
3e+05
Spawning Biomass
(c)
0.58
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

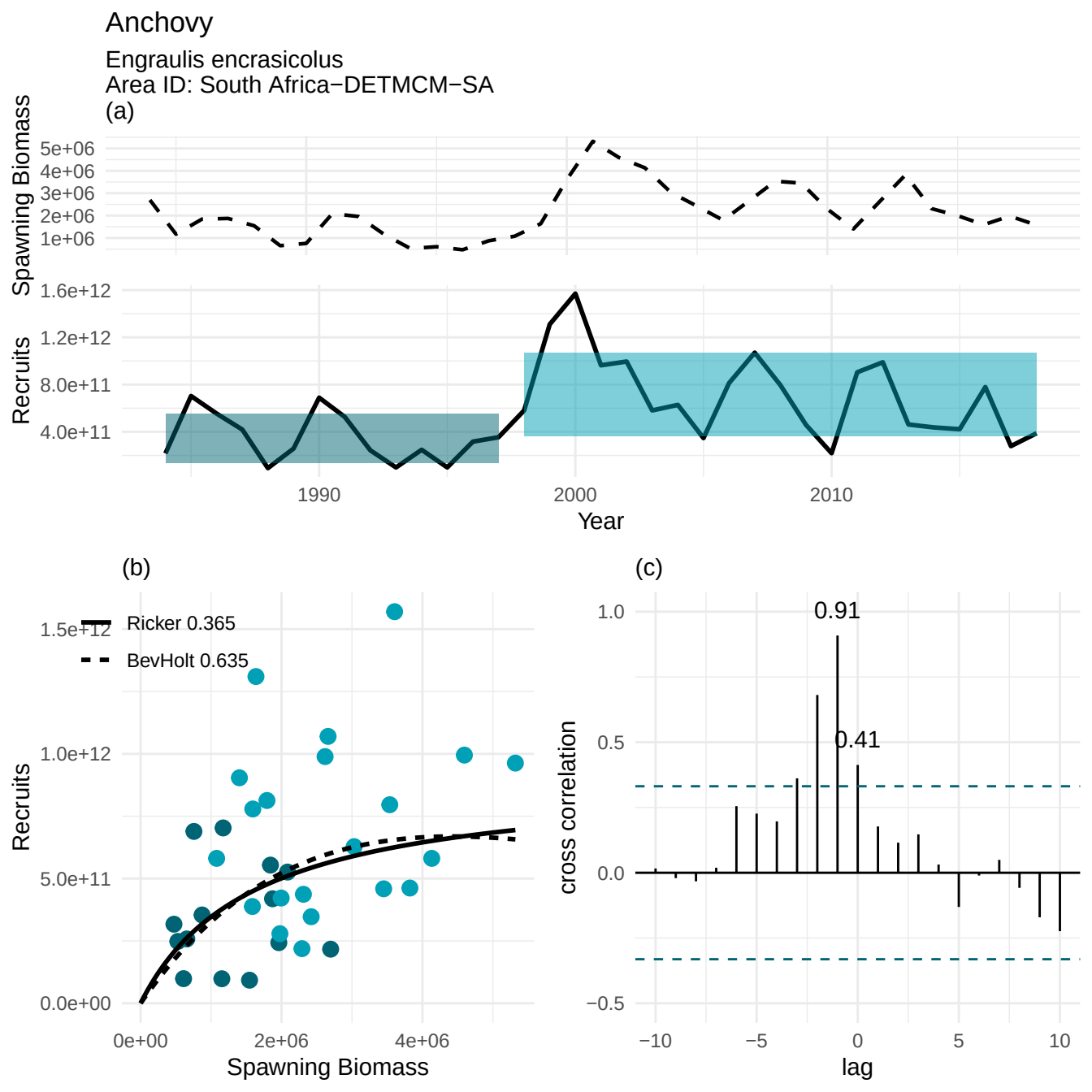

Alaska skate
Bathyraja parmifera
Area ID: USA−NMFS−BSAI
(a)
Spawning Biomass
250000
200000
150000
100000
Recruits
5e+07
4e+07
3e+07
2e+07
1990
2000
2010
Year
(b)
Ricker 0.792
BevHolt 0.208
Recruits
5e+07
4e+07
3e+07
2e+07
1e+07
0e+00
0e+00
1e+05
2e+05
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

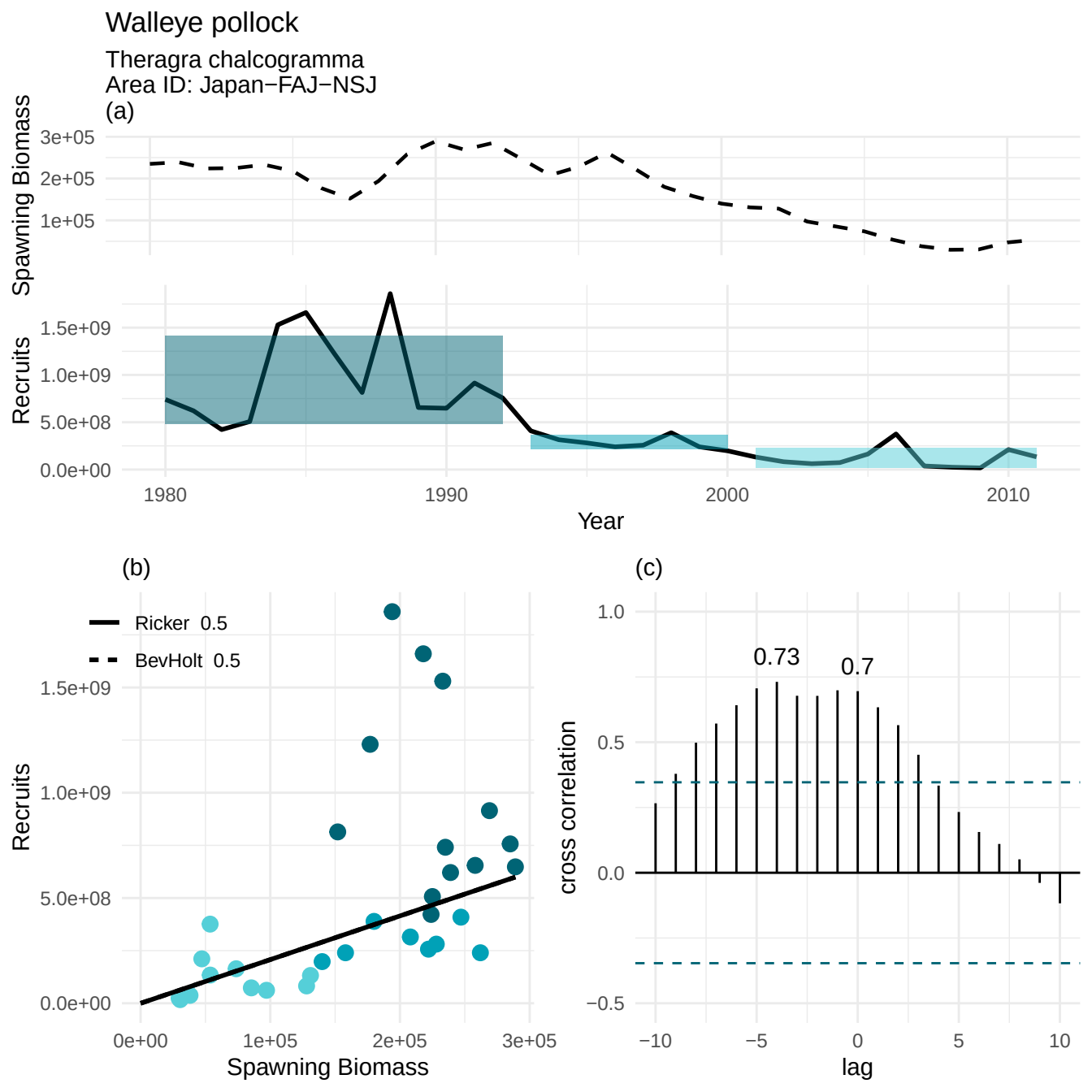

American plaice
Hippoglossoides platessoides
Area ID: multinational−NAFO−3LNO
(a)
Spawning Biomass
200000
150000
100000
50000
0
Recruits
3e+08
2e+08
1e+08
0e+00
1960
1970
1980
1990
2000
Year
(b)
Ricker 0.48
BevHolt 0.52
Recruits
3e+08
2e+08
1e+08
0e+00
0
50000
100000
150000
200000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.72
0.69
−10
−5
0
5
10
lag

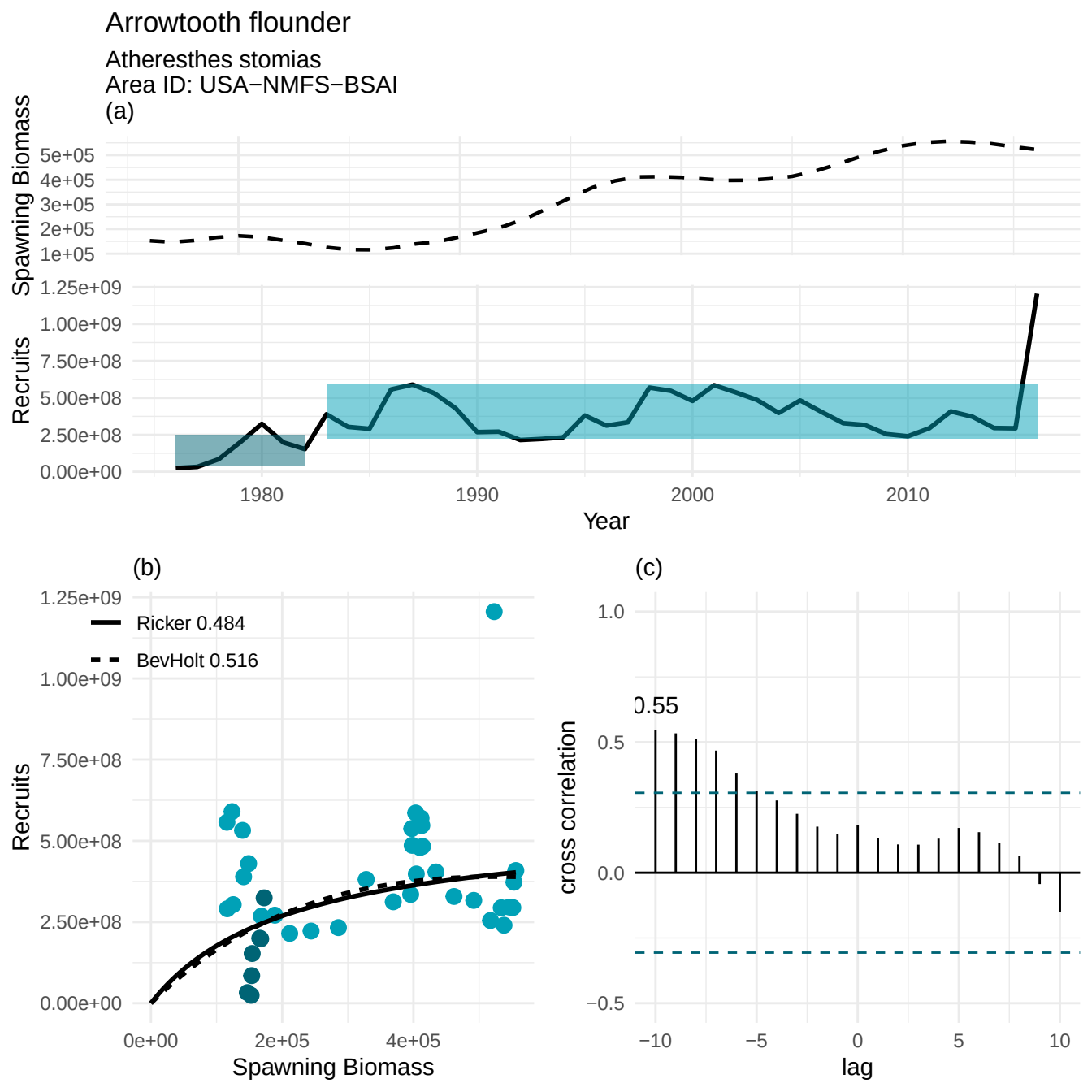

American plaice
Hippoglossoides platessoides
Area ID: Canada−DFO−4T
(a)
Spawning Biomass
4e+05
3e+05
2e+05
1e+05
Recruits
1.6e+09
1.2e+09
8.0e+08
4.0e+08
1980
1990
2000
2010
Year
(b)
Ricker 0.462
BevHolt 0.538
Recruits
1.5e+09
1.0e+09
5.0e+08
0.0e+00
0e+00
1e+05
2e+05
3e+05
4e+05
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.56
0.55
−10
−5
0
5
10
lag

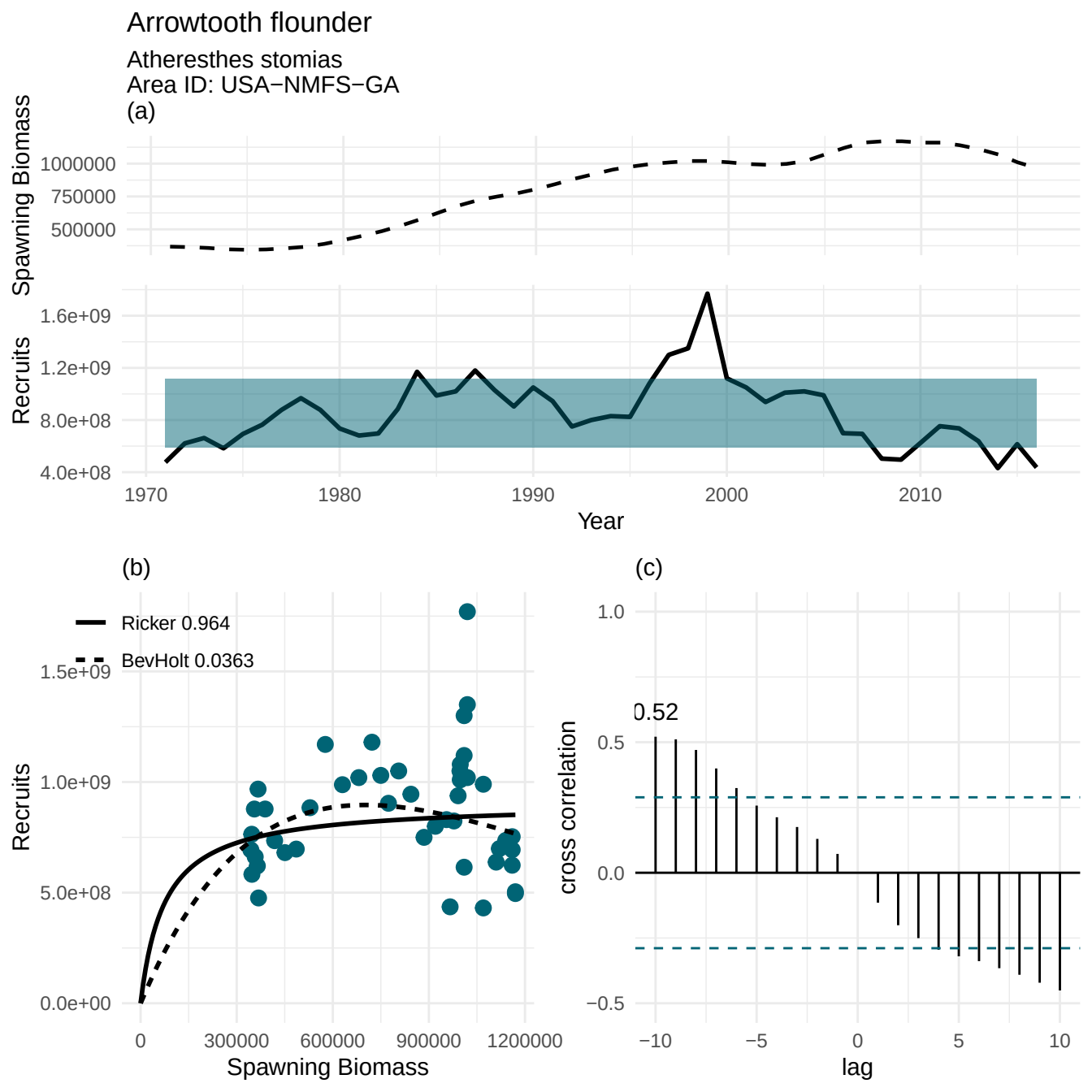

Anchovy
Engraulis encrasicolus
Area ID: multinational−GFCM−GSA29
(a)
Spawning Biomass
1200000
900000
600000
300000
0
Recruits
3e+11
2e+11
1e+11
1990
1995
2000
2005
2010
2015
Year
(b)
Ricker 0.0545
BevHolt 0.946
Recruits
3e+11
2e+11
1e+11
0e+00
0
300000
600000
900000
1200000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.79
0.4
−10
−5
0
5
10
lag

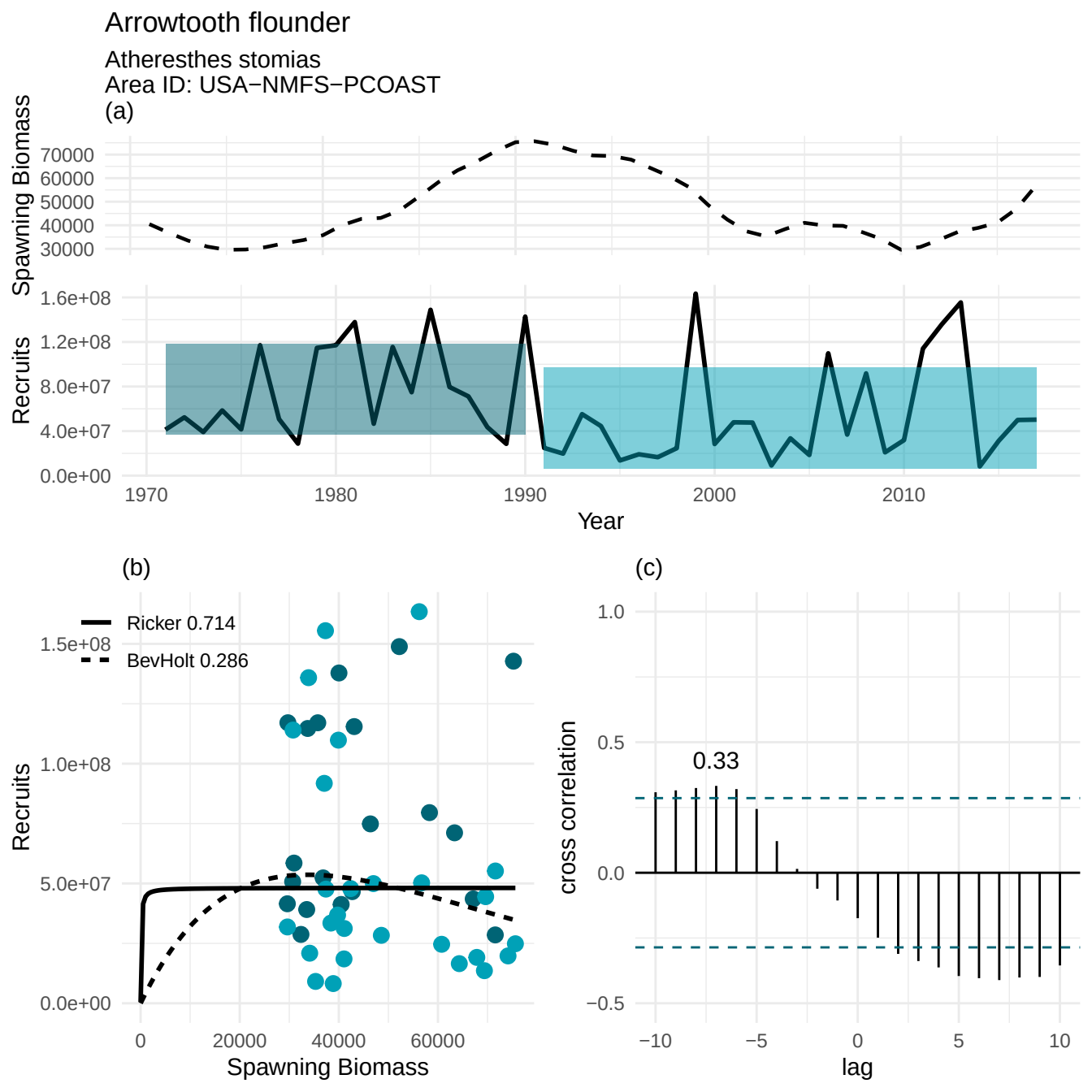

Anchovy
Engraulis encrasicolus
Area ID: multinational−ICES−VIII
(a)
Spawning Biomass
150000
100000
50000
Recruits
125000
100000
75000
50000
25000
0
1990
2000
2010
2020
Year
(b)
Ricker 0.502
BevHolt 0.498
Recruits
120000
80000
40000
0
0
50000
100000
150000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.89
0.42
−10
−5
0
5
10
lag

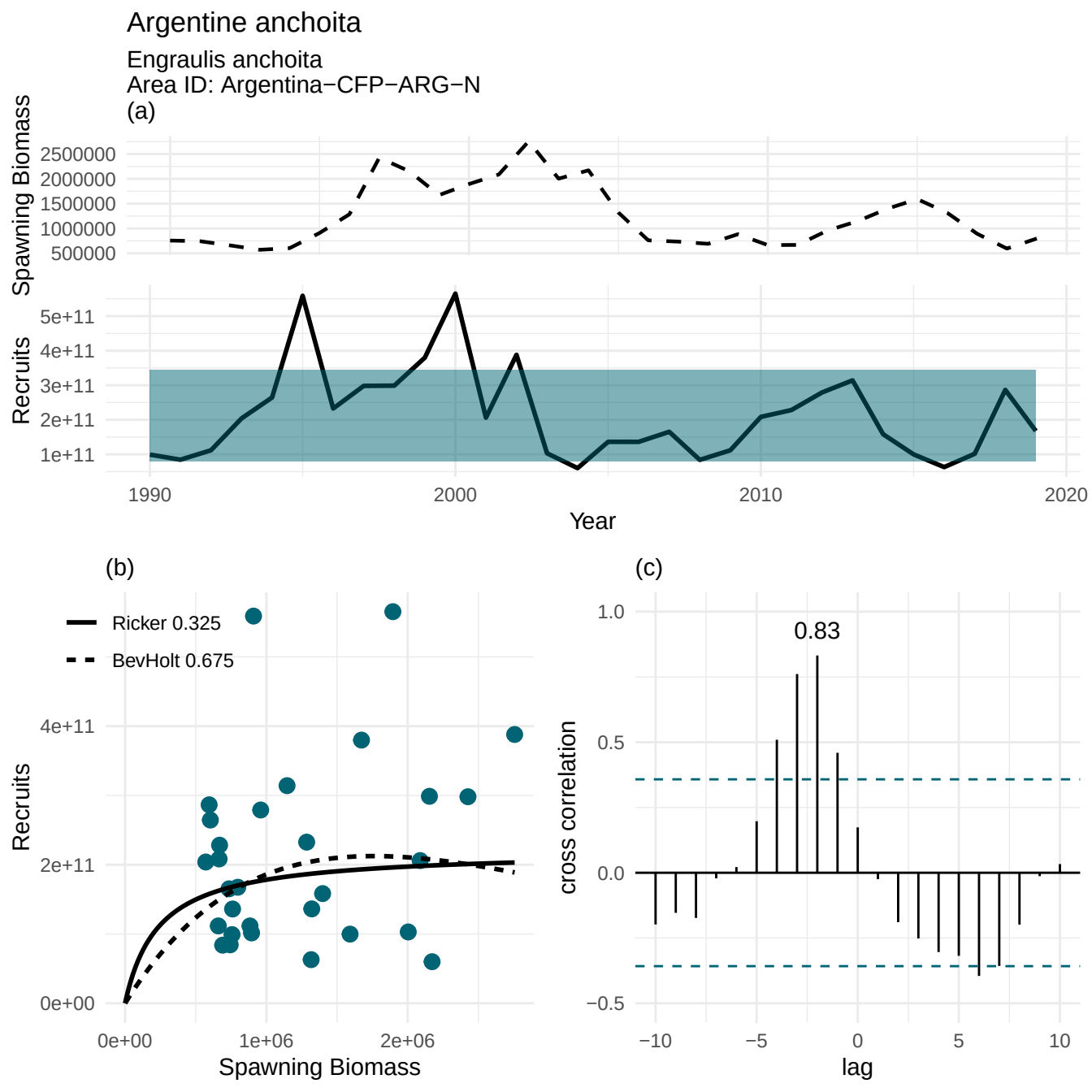

Anchovy
Engraulis encrasicolus
Area ID: South Africa−DETMCM−SA
(a)
Spawning Biomass
5e+06
4e+06
3e+06
2e+06
1e+06
Recruits
1.6e+12
1.2e+12
8.0e+11
4.0e+11
1990
2000
2010
Year
(b)
Ricker 0.365
BevHolt 0.635
Recruits
1.5e+12
1.0e+12
5.0e+11
0.0e+00
0e+00
2e+06
4e+06
Spawning Biomass
(c)
0.91
0.41
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

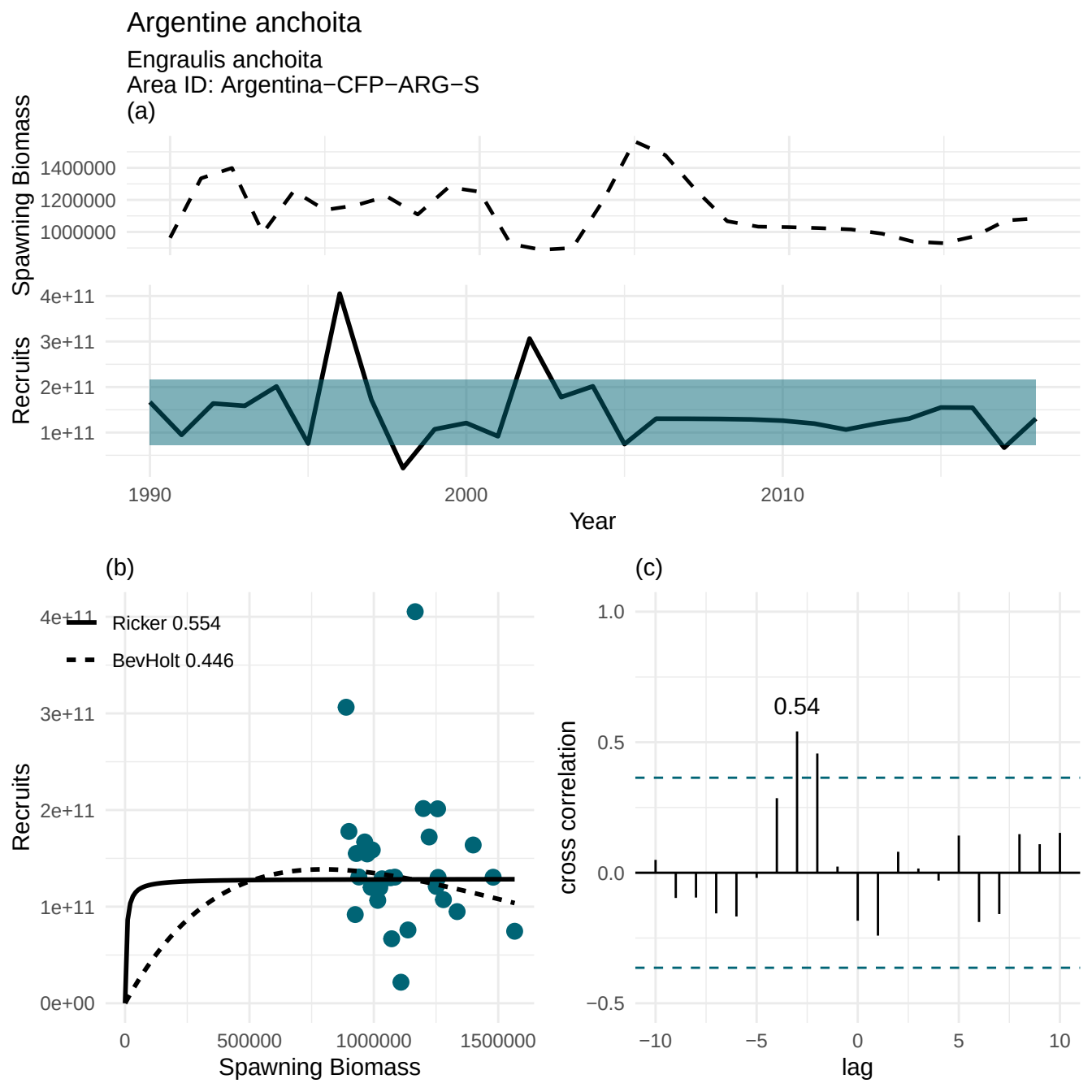

Walleye pollock
Theragra chalcogramma
Area ID: Japan−FAJ−NSJ
(a)
Spawning Biomass
3e+05
2e+05
1e+05
Recruits
1.5e+09
1.0e+09
5.0e+08
0.0e+00
1980
1990
2000
2010
Year
(b)
Ricker 0.5
BevHolt 0.5
Recruits
1.5e+09
1.0e+09
5.0e+08
0.0e+00
0e+00
1e+05
2e+05
3e+05
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.73
0.7
−10
−5
0
5
10
lag

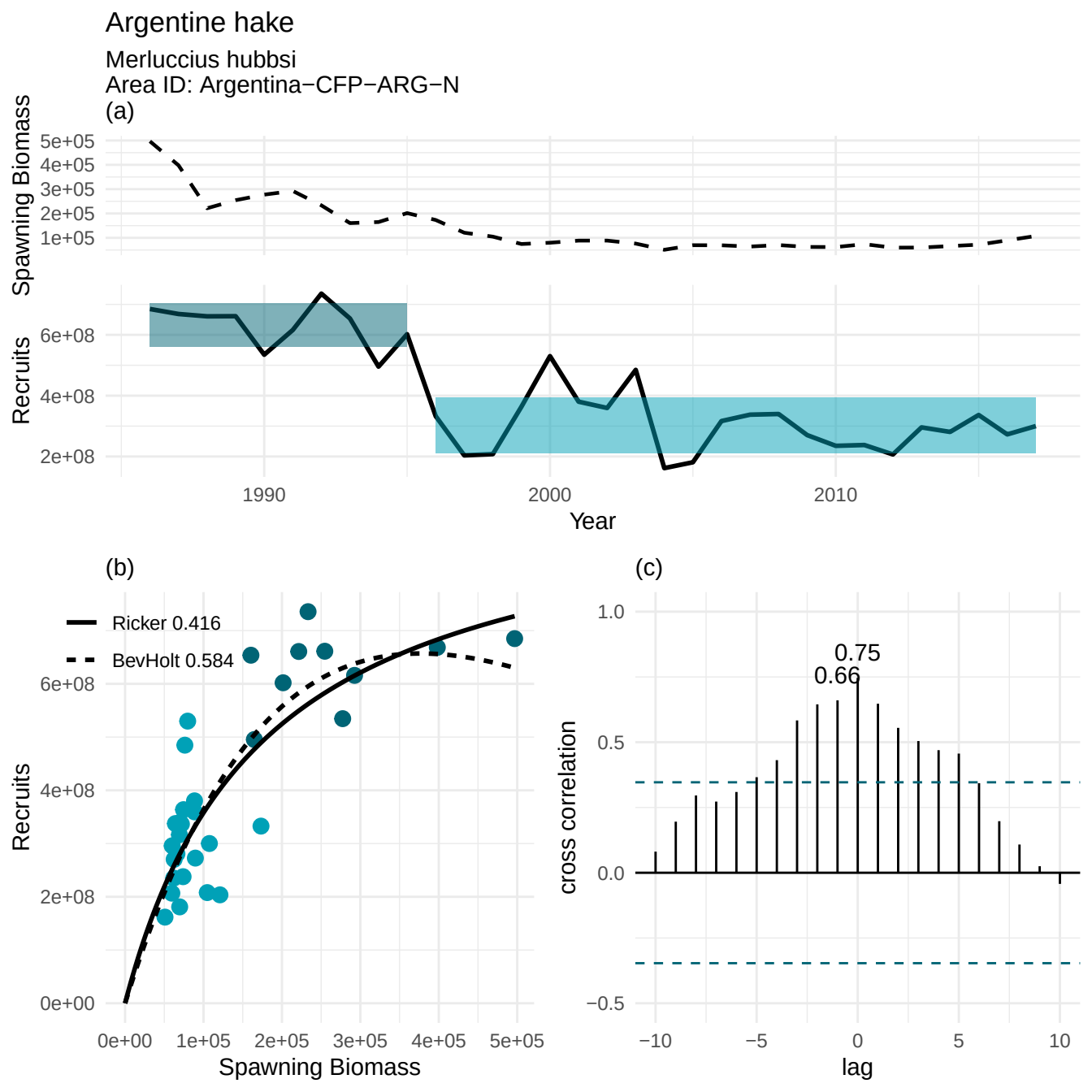

Arrowtooth flounder
Atheresthes stomias
Area ID: USA−NMFS−BSAI
(a)
Spawning Biomass
5e+05
4e+05
3e+05
2e+05
1e+05
Recruits
1.25e+09
1.00e+09
7.50e+08
5.00e+08
2.50e+08
0.00e+00
1980
1990
2000
2010
Year
(b)
Ricker 0.484
BevHolt 0.516
Recruits
Spawning Biomass
0e+00
2e+05
4e+05
(c)
cross correlation
0.55
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

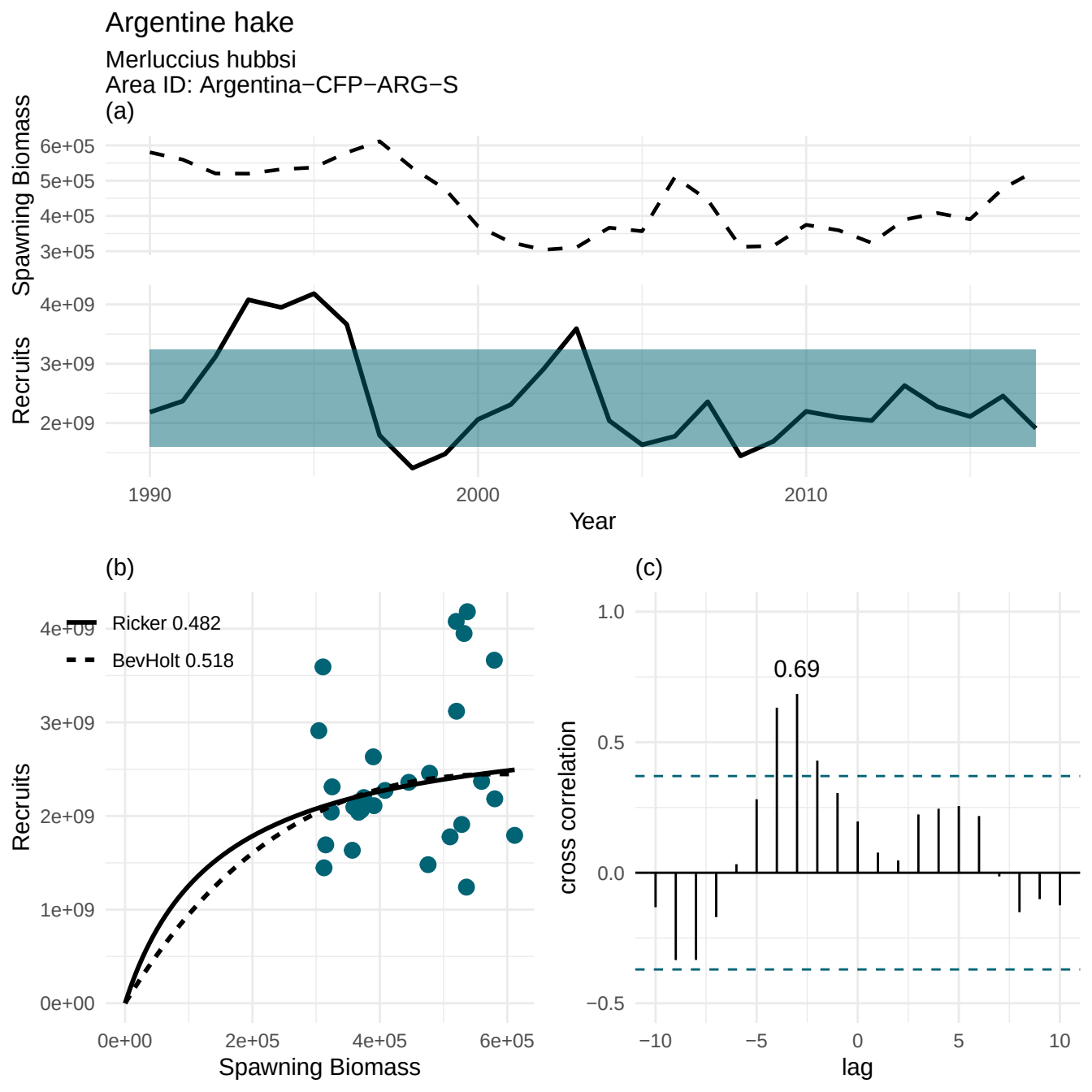

Arrowtooth flounder
Atheresthes stomias
Area ID: USA−NMFS−GA
(a)
Spawning Biomass
1000000
750000
500000
Recruits
1.6e+09
1.2e+09
8.0e+08
4.0e+08
1970
1980
1990
2000
2010
Year
(b)
Ricker 0.964
BevHolt 0.0363
Recruits
1.5e+09
1.0e+09
5.0e+08
0.0e+00
0
300000
600000
900000
1200000
Spawning Biomass
(c)
1.0
0.52
0.5
0.0
−0.5
cross correlation
−10
−5
0
5
10
lag

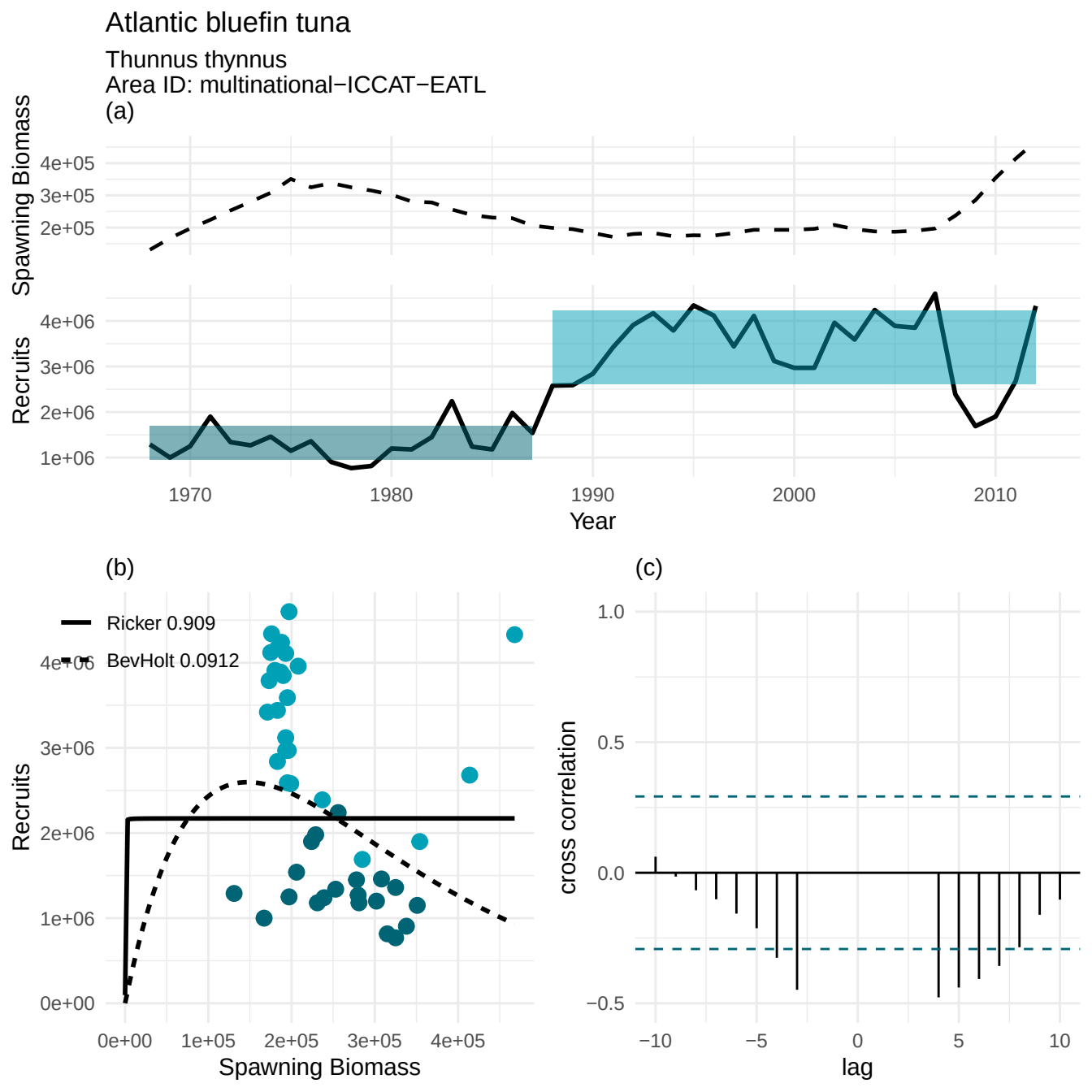

Arrowtooth flounder
Atheresthes stomias
Area ID: USA−NMFS−PCOAST
(a)
Spawning Biomass
70000
60000
50000
40000
30000
Recruits
1.6e+08
1.2e+08
8.0e+07
4.0e+07
0.0e+00
1970
1980
1990
2000
2010
Year
(b)
Ricker 0.714
BevHolt 0.286
Recruits
1.5e+08
1.0e+08
5.0e+07
0.0e+00
0
20000
40000
60000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.33
−10
−5
0
5
10
lag

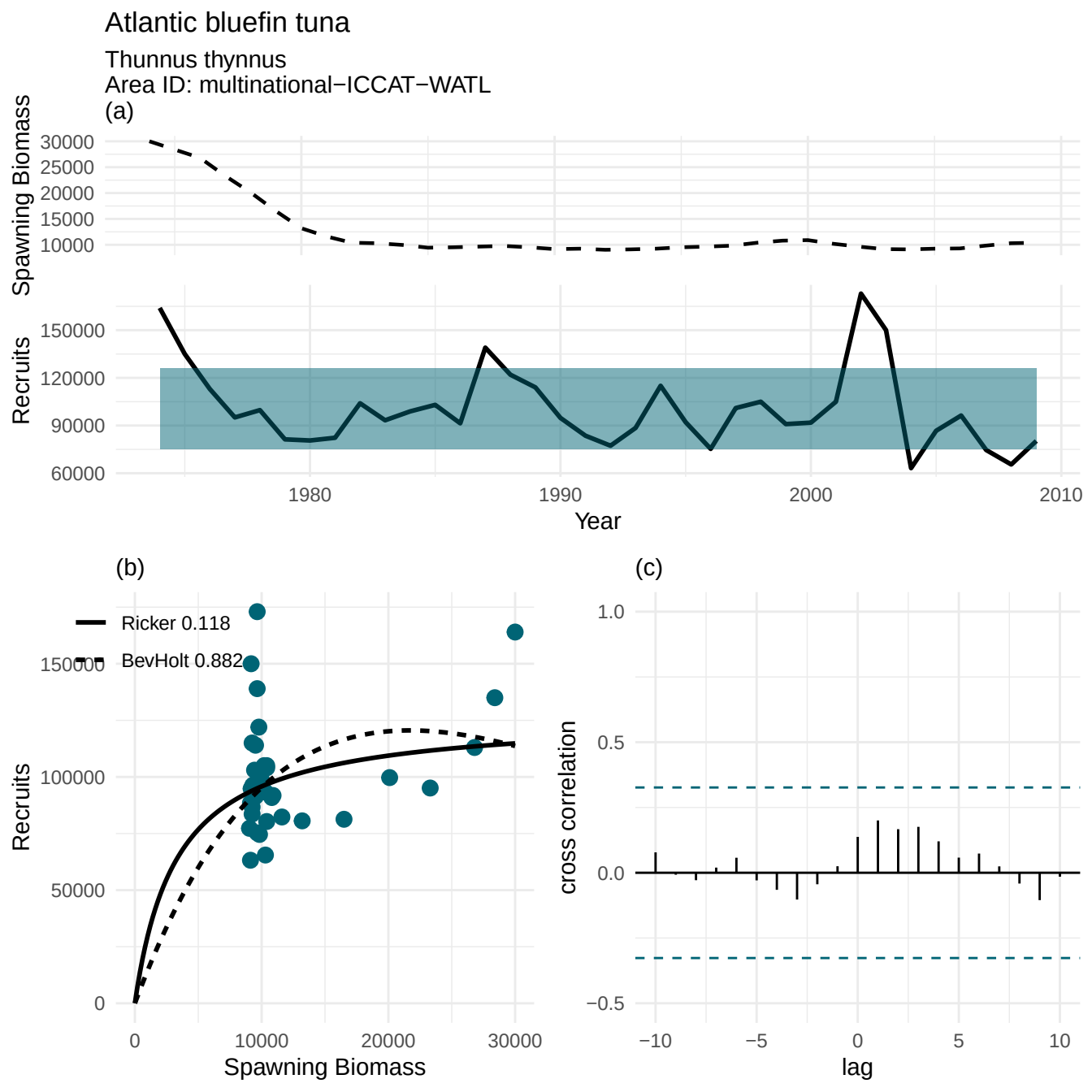

Argentine anchoita
Engraulis anchoita
Area ID: Argentina−CFP−ARG−N
(a)
Spawning Biomass
2500000
2000000
1500000
1000000
500000
Recruits
5e+11
4e+11
3e+11
2e+11
1e+11
1990
2000
2010
2020
Year
(b)
Ricker 0.325
BevHolt 0.675
Recruits
4e+11
2e+11
0e+00
0e+00
1e+06
2e+06
Spawning Biomass
(c)
0.83
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

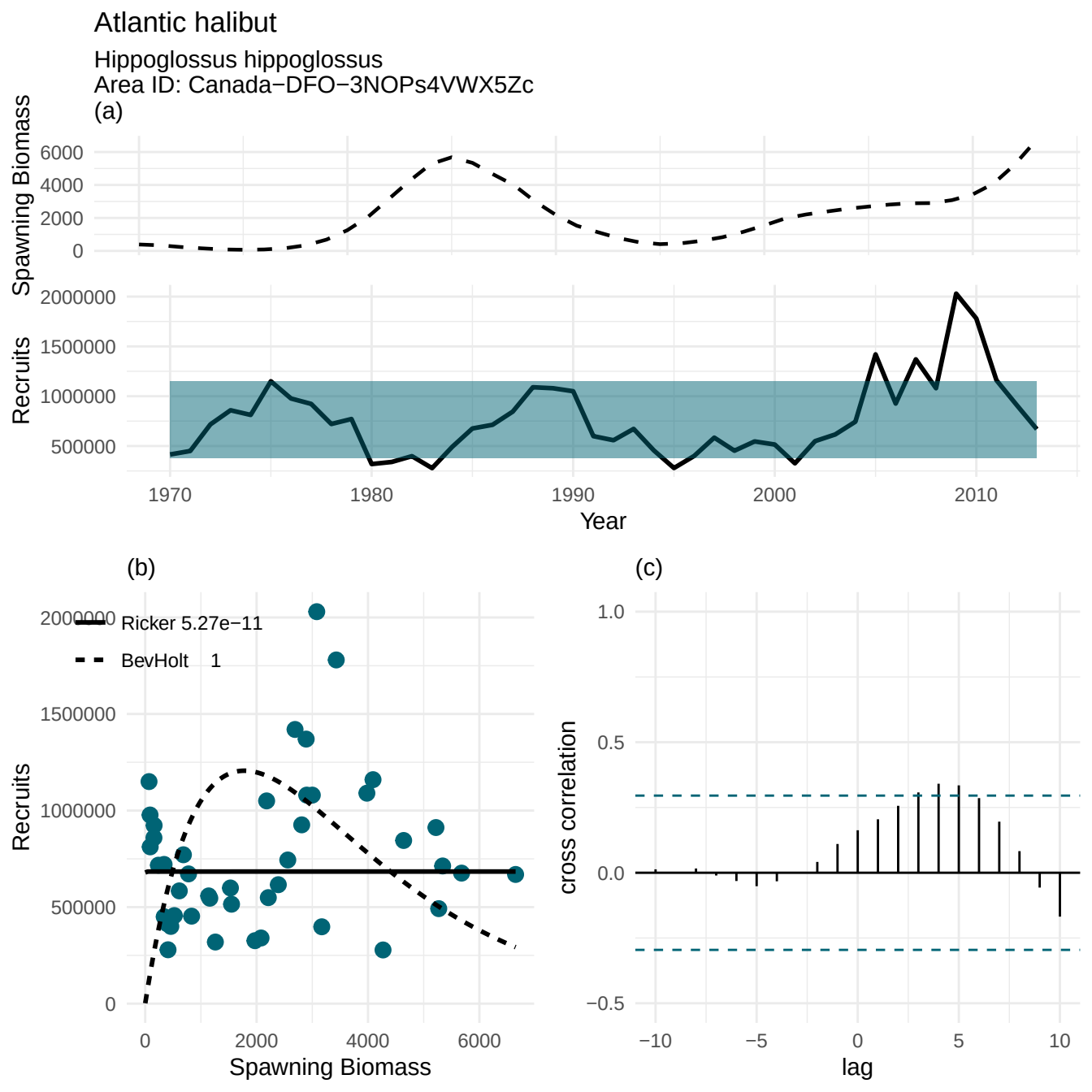

Argentine anchoita
Engraulis anchoita
Area ID: Argentina−CFP−ARG−S
(a)
Spawning Biomass
1400000
1200000
1000000
Recruits
4e+11
3e+11
2e+11
1e+11
1990
2000
2010
Year
(b)
Ricker 0.554
BevHolt 0.446
Recruits
4e+11
3e+11
2e+11
1e+11
0e+00
0
500000
1000000
1500000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.54
−10
−5
0
5
10
lag

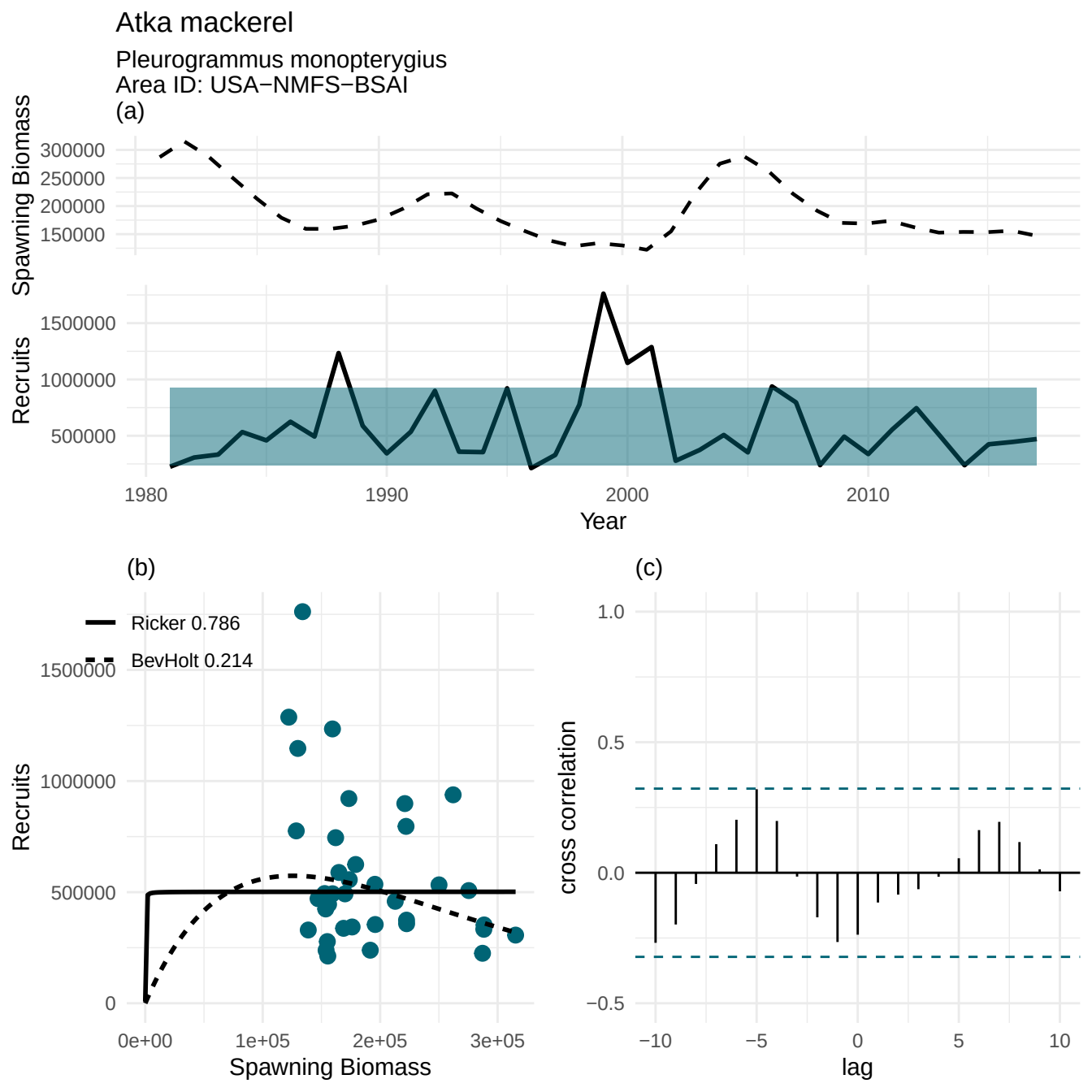

Argentine hake
Merluccius hubbsi
Area ID: Argentina−CFP−ARG−N
(a)
Spawning Biomass
5e+05
4e+05
3e+05
2e+05
1e+05
Recruits
6e+08
4e+08
2e+08
1990
2000
2010
Year
(b)
Ricker 0.416
BevHolt 0.584
Recruits
6e+08
4e+08
2e+08
0e+00
0e+00
1e+05
2e+05
3e+05
4e+05
5e+05
Spawning Biomass
(c)
1.0
0.5
0.0
−0.5
0.75
0.66
cross correlation
−10
−5
0
5
10
lag

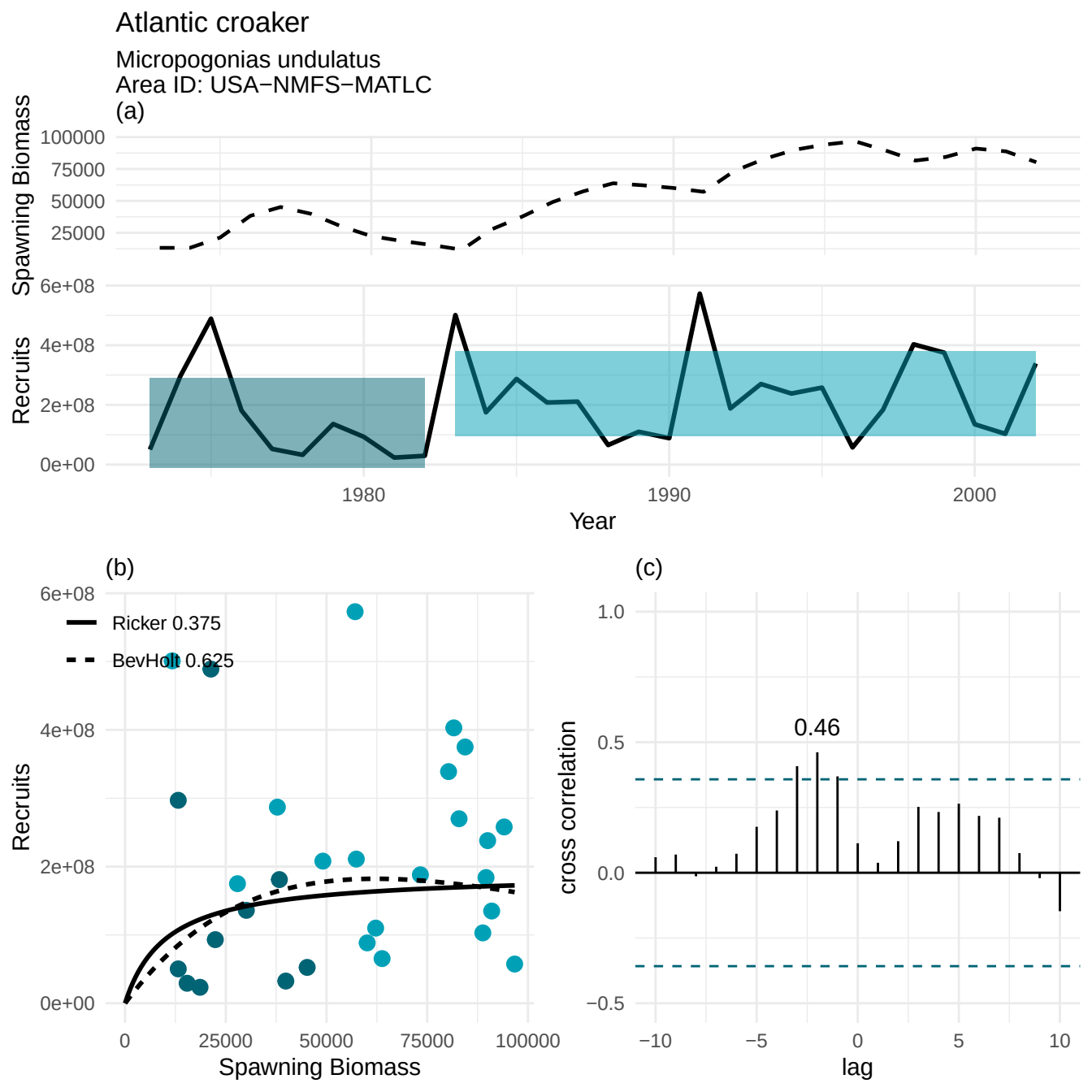

Argentine hake
Merluccius hubbsi
Area ID: Argentina−CFP−ARG−S
(a)
Spawning Biomass
6e+05
5e+05
4e+05
3e+05
Recruits
4e+09
3e+09
2e+09
1990
2000
2010
Year
(b)
Ricker 0.482
BevHolt 0.518
Recruits
4e+09
3e+09
2e+09
1e+09
0e+00
0e+00
2e+05
4e+05
6e+05
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.69
−10
−5
0
5
10
lag

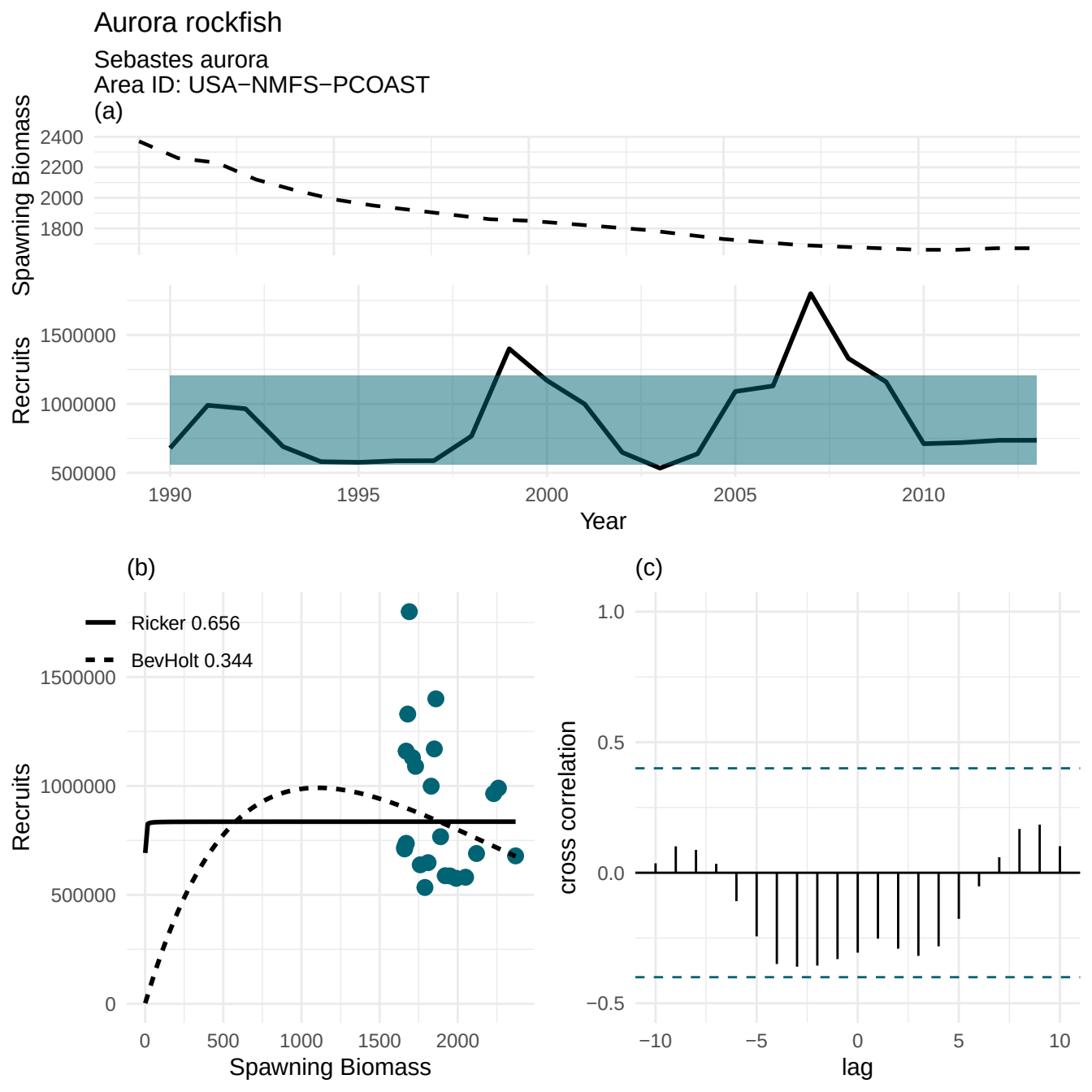

Atlantic bluefin tuna
Thunnus thynnus
Area ID: multinational−ICCAT−EATL
(a)
Spawning Biomass
4e+05
3e+05
2e+05
Recruits
4e+06
3e+06
2e+06
1e+06
1970
1980
1990
2000
2010
Year
(b)
Ricker 0.909
BevHolt 0.0912
Recruits
4e+06
3e+06
2e+06
1e+06
0e+00
0e+00
1e+05
2e+05
3e+05
4e+05
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

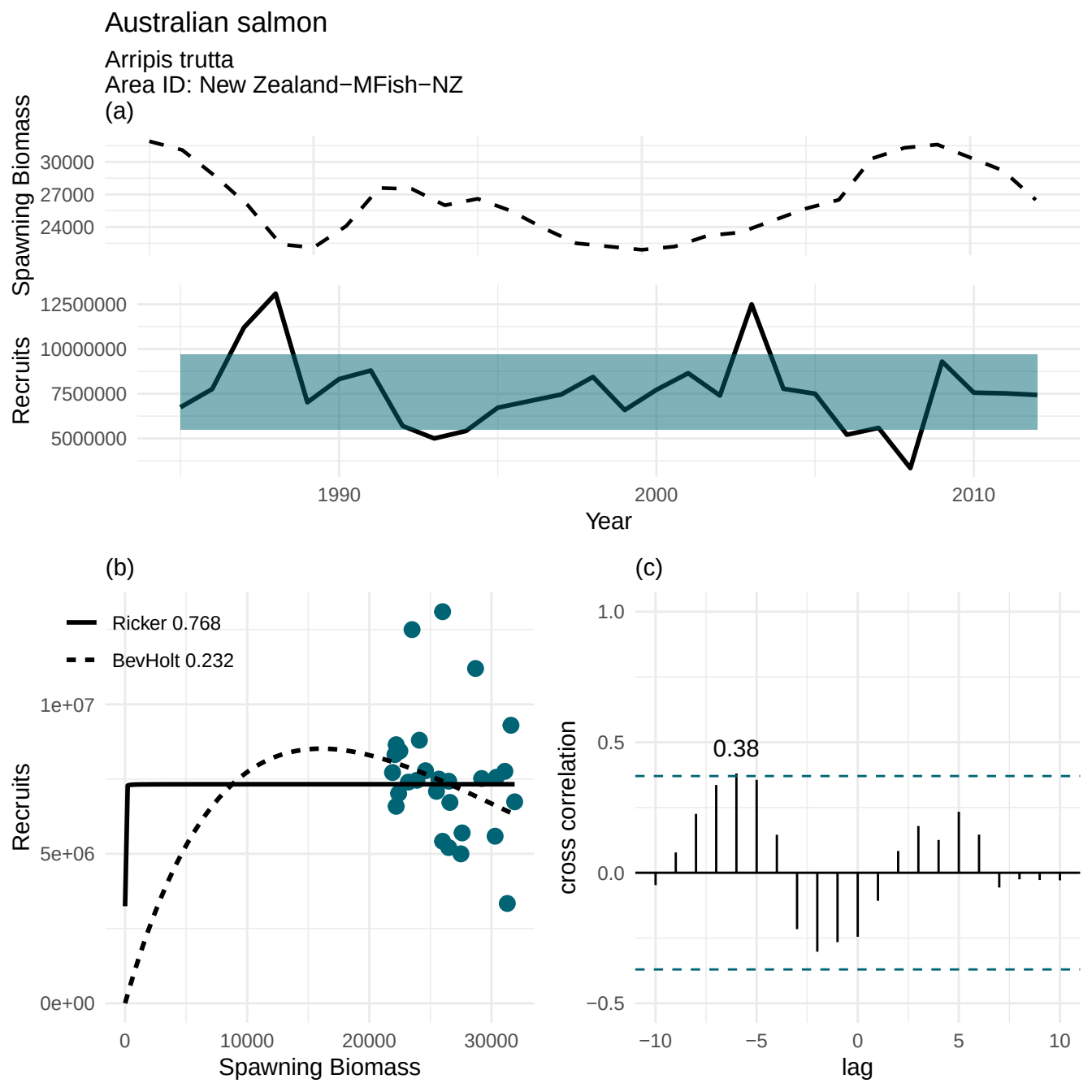

Atlantic bluefin tuna
Thunnus thynnus
Area ID: multinational−ICCAT−WATL
(a)
Spawning Biomass
30000
25000
20000
15000
10000
Recruits
150000
120000
90000
60000
1980
1990
2000
2010
Year
(b)
Ricker 0.118
BevHolt 0.882
Recruits
150000
100000
50000
0
0
10000
20000
30000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

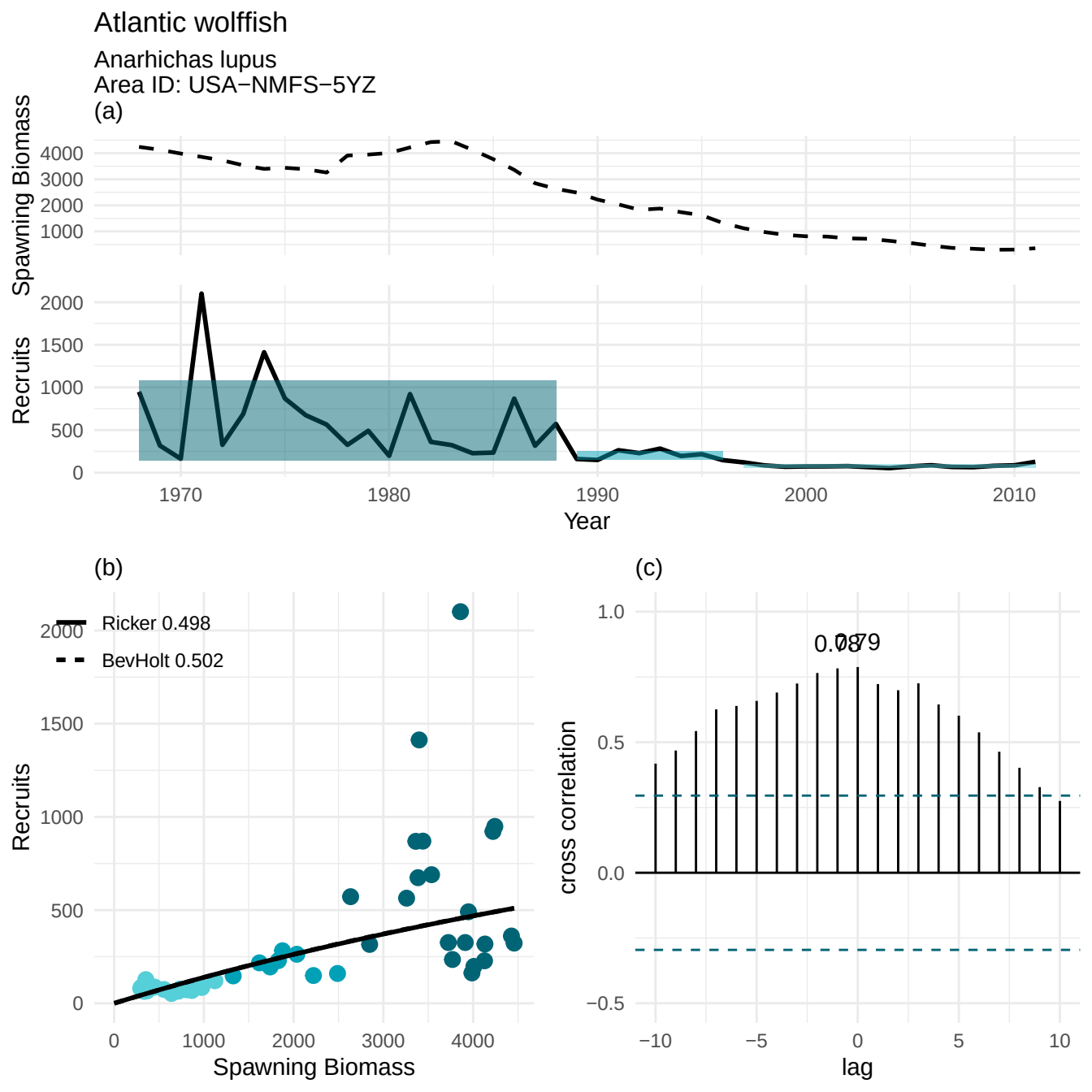

Atlantic halibut
Hippoglossus hippoglossus
Area ID: Canada−DFO−3NOPs4VWX5Zc
(a)
Spawning Biomass
6000
4000
2000
0
Recruits
2000000
1500000
1000000
500000
1970
1980
1990
2000
2010
Year
(b)
Ricker 5.27e−11
BevHolt 1
Recruits
2000000
1500000
1000000
500000
0
0
2000
4000
6000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

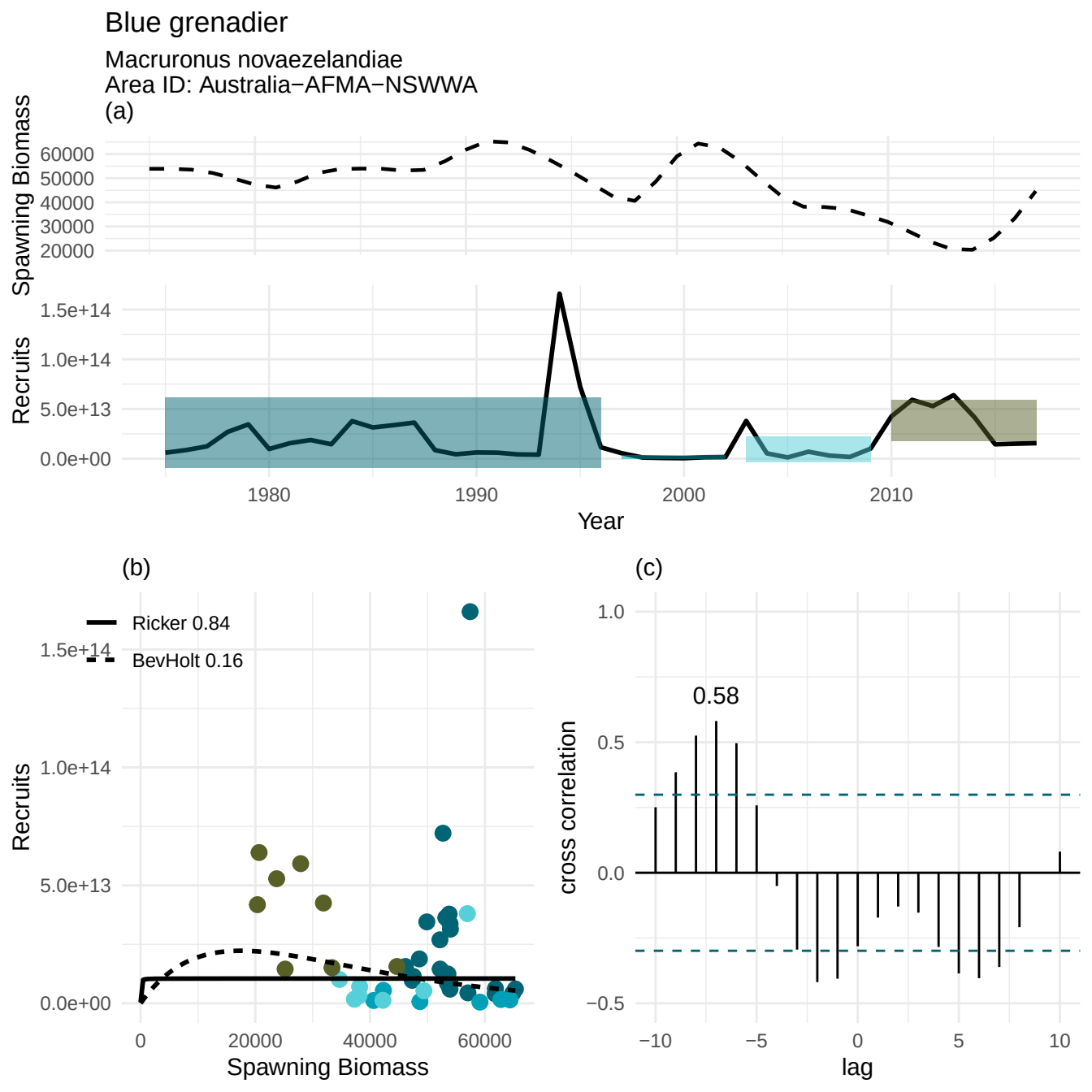

Atka mackerel
Pleurogrammus monopterygius
Area ID: USA−NMFS−BSAI
(a)
Spawning Biomass
300000
250000
200000
150000
Recruits
1500000
1000000
500000
1980
1990
2000
2010
Year
(b)
Ricker 0.786
BevHolt 0.214
Recruits
1500000
1000000
500000
0
0e+00
1e+05
2e+05
3e+05
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

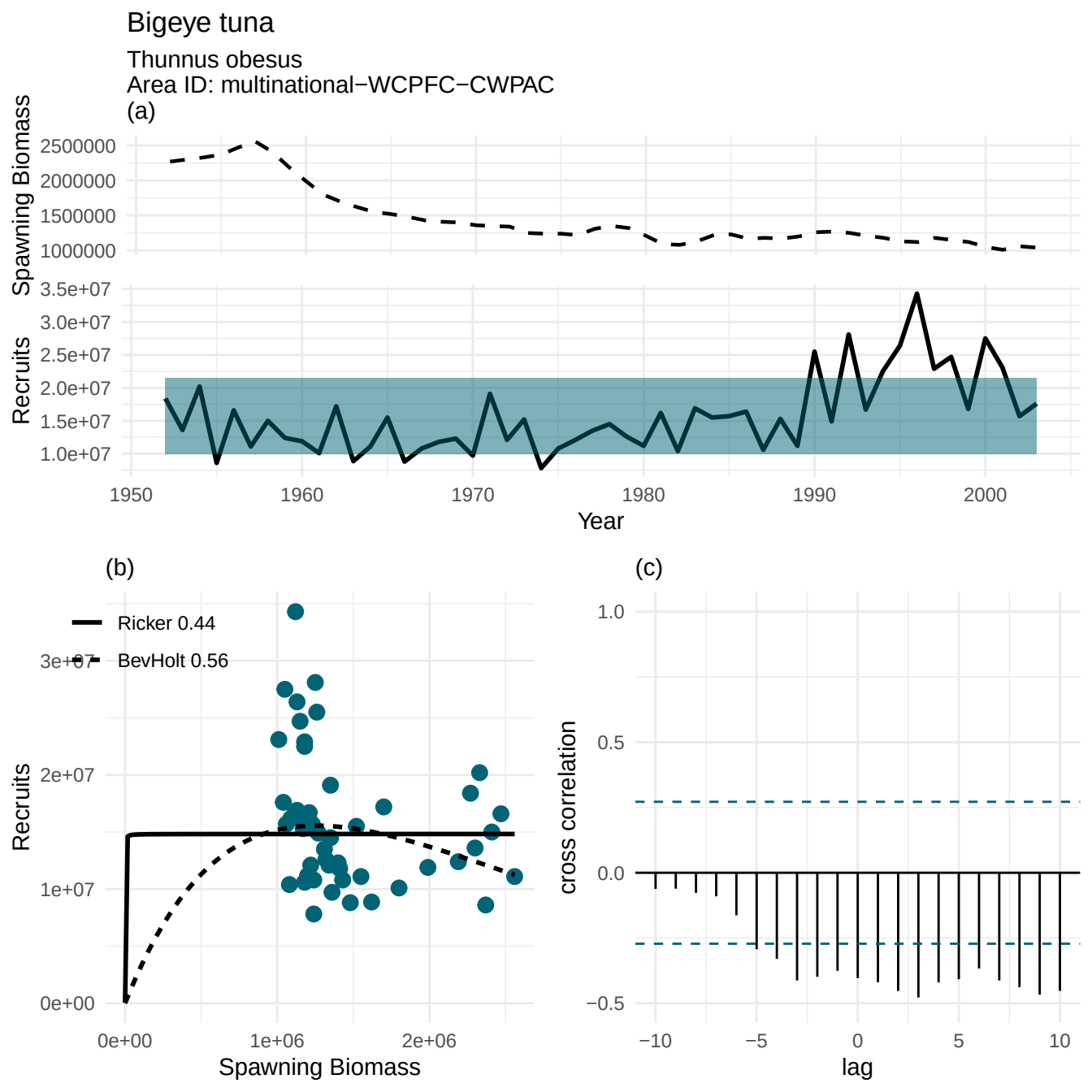

Atlantic croaker
Micropogonias undulatus
Area ID: USA−NMFS−MATLC
(a)
Spawning Biomass
100000
75000
50000
25000
Recruits
6e+08
4e+08
2e+08
0e+00
1980
1990
2000
Year
(b)
Ricker 0.375
BevHolt 0.625
Recruits
6e+08
4e+08
2e+08
0e+00
0
25000
50000
75000
100000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.46
−10
−5
0
5
10
lag

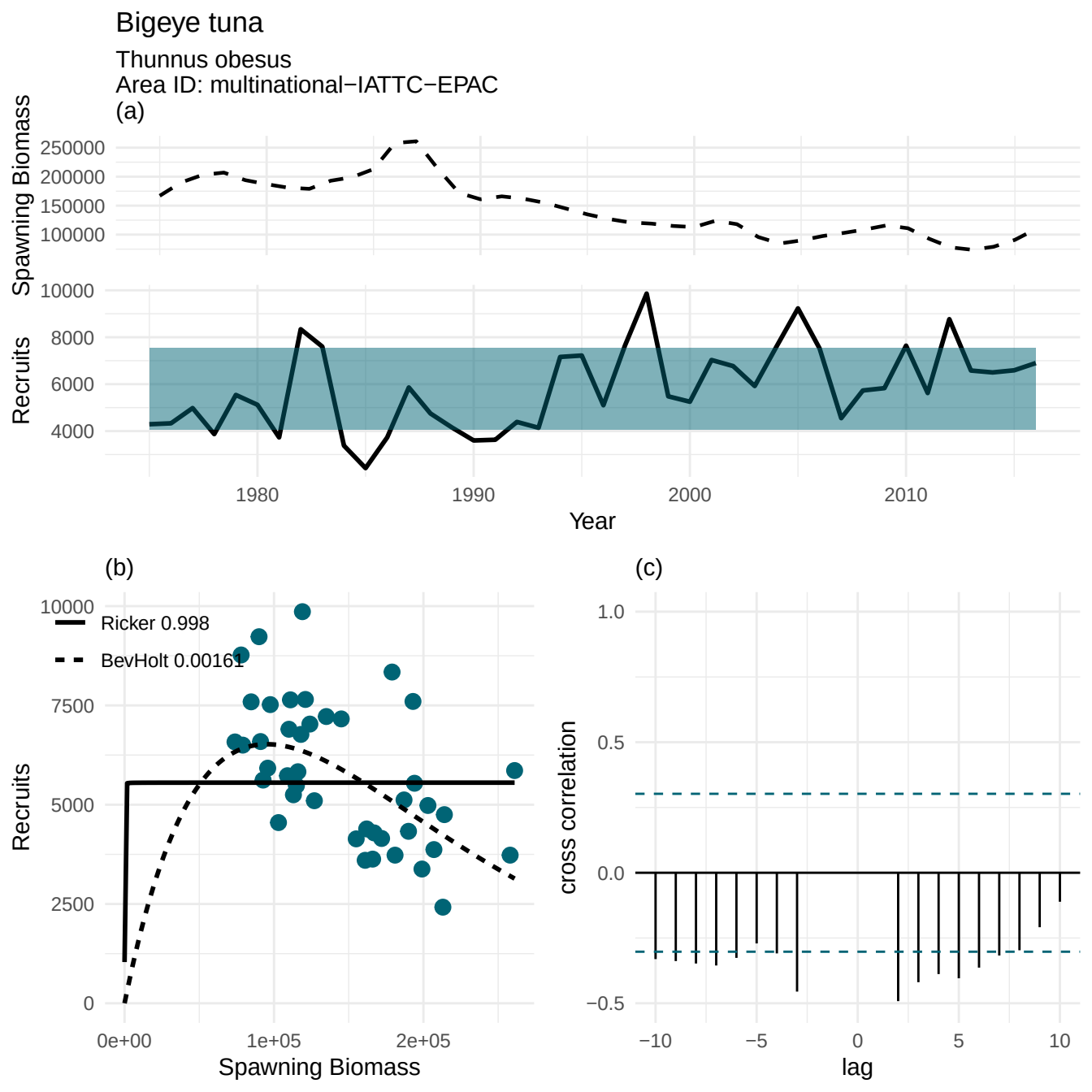

Aurora rockfish
Sebastes aurora
Area ID: USA−NMFS−PCOAST
(a)
Spawning Biomass
2400
2200
2000
1800
Recruits
1500000
1000000
500000
1990
1995
2000
2005
2010
Year
(b)
Ricker 0.656
BevHolt 0.344
Recruits
1500000
1000000
500000
0
0
500
1000
1500
2000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

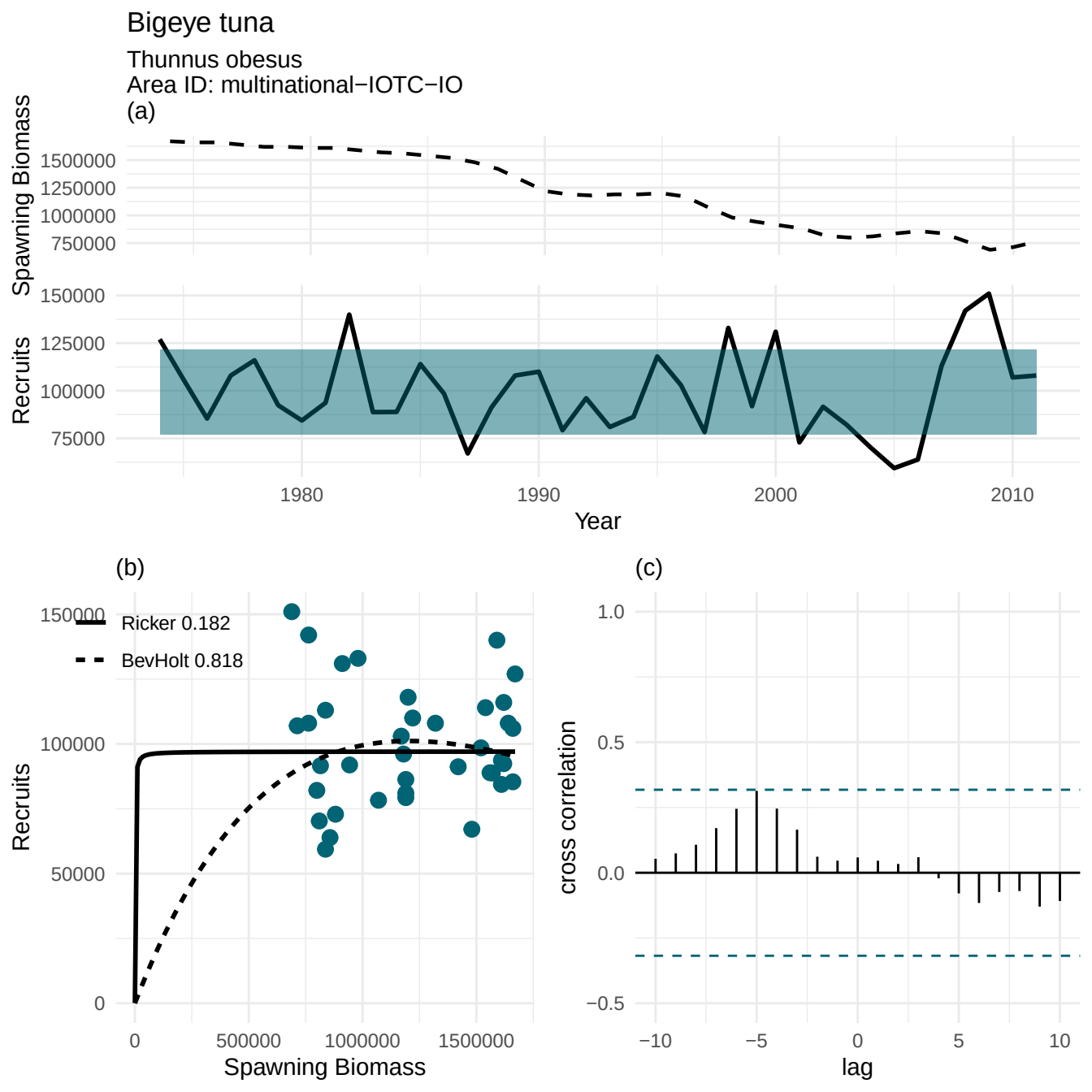

Australian salmon
Arripis trutta
Area ID: New Zealand−MFish−NZ
(a)
Spawning Biomass
30000
27000
24000
Recruits
12500000
10000000
7500000
5000000
1990
2000
2010
Year
(b)
Ricker 0.768
BevHolt 0.232
Recruits
1e+07
5e+06
0e+00
0
10000
20000
30000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.38
−10
−5
0
5
10
lag

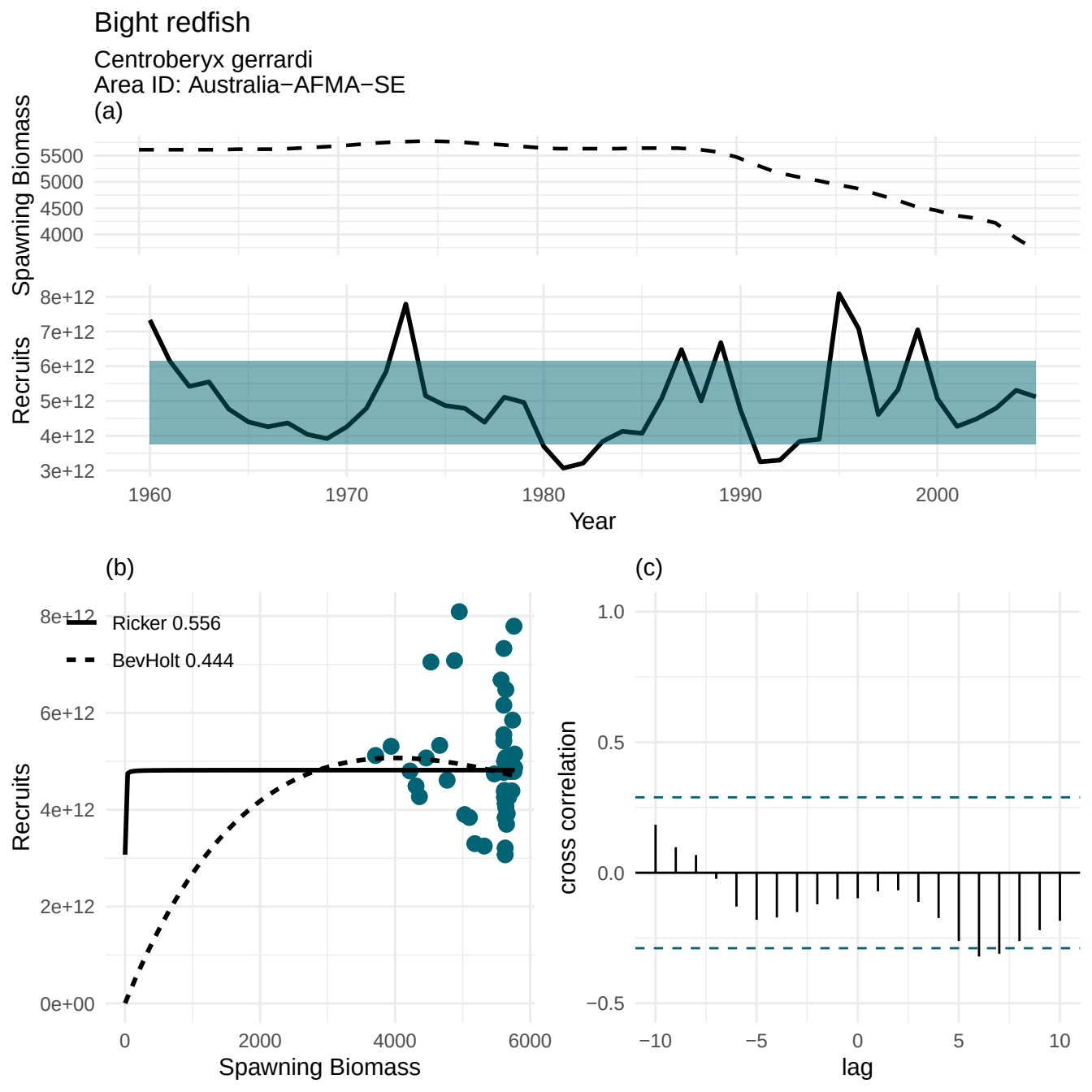

Atlantic wolffish
Anarhichas lupus
Area ID: USA−NMFS−5YZ
(a)
Spawning Biomass
4000
3000
2000
1000
Recruits
2000
1500
1000
500
0
1970
1980
1990
2000
2010
Year
(b)
Ricker 0.498
BevHolt 0.502
Recruits
Spawning Biomass
0
1000
2000
3000
4000
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.879
−10
−5
0
5
10
lag

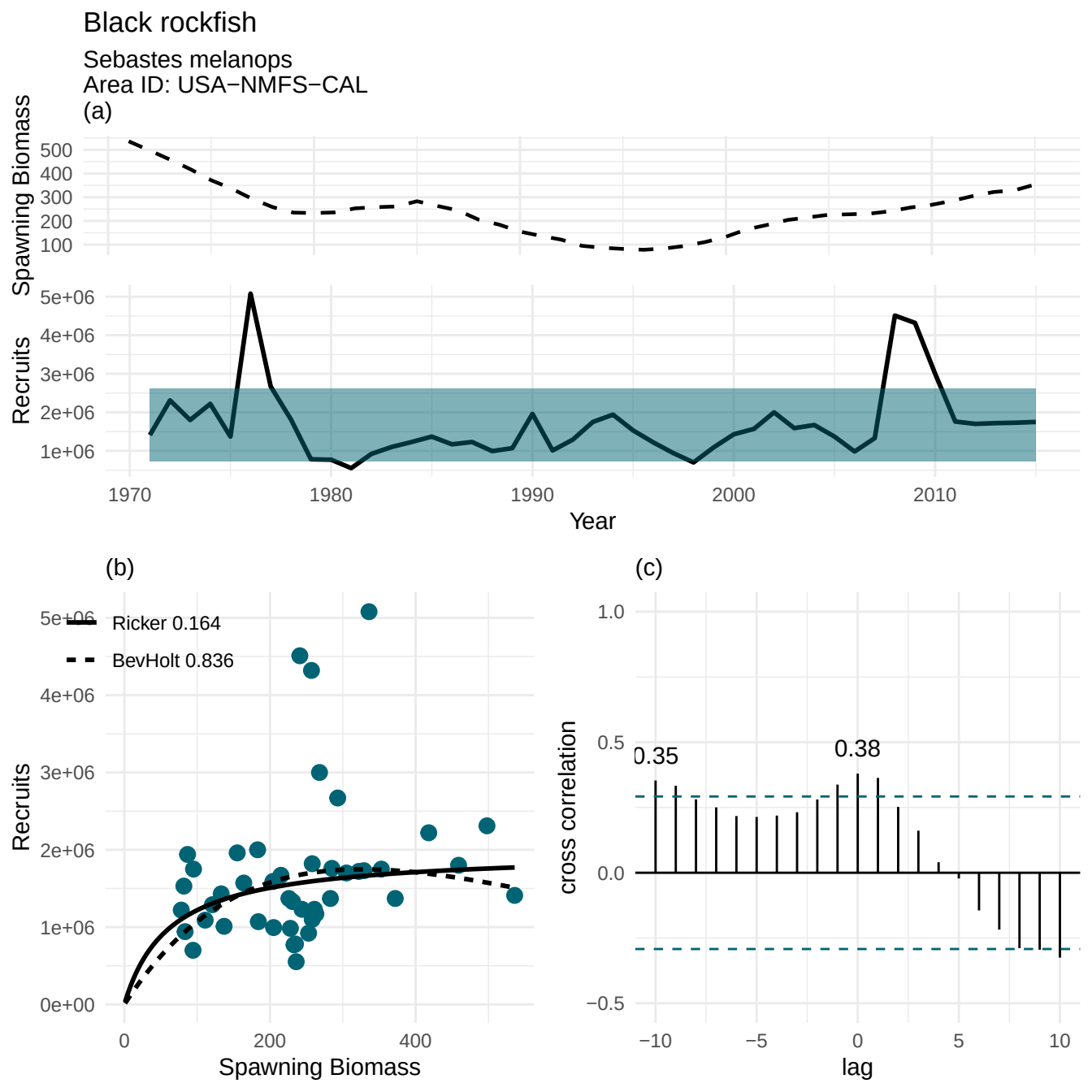

Blue grenadier
Macruronus novaezelandiae
Area ID: Australia−AFMA−NSWWA
(a)
Spawning Biomass
60000
50000
40000
30000
20000
Recruits
1.5e+14
1.0e+14
5.0e+13
0.0e+00
1980
1990
2000
2010
Year
(b)
Ricker 0.84
BevHolt 0.16
Recruits
1.5e+14
1.0e+14
5.0e+13
0.0e+00
0
20000
40000
60000
Spawning Biomass
(c)
0.58
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

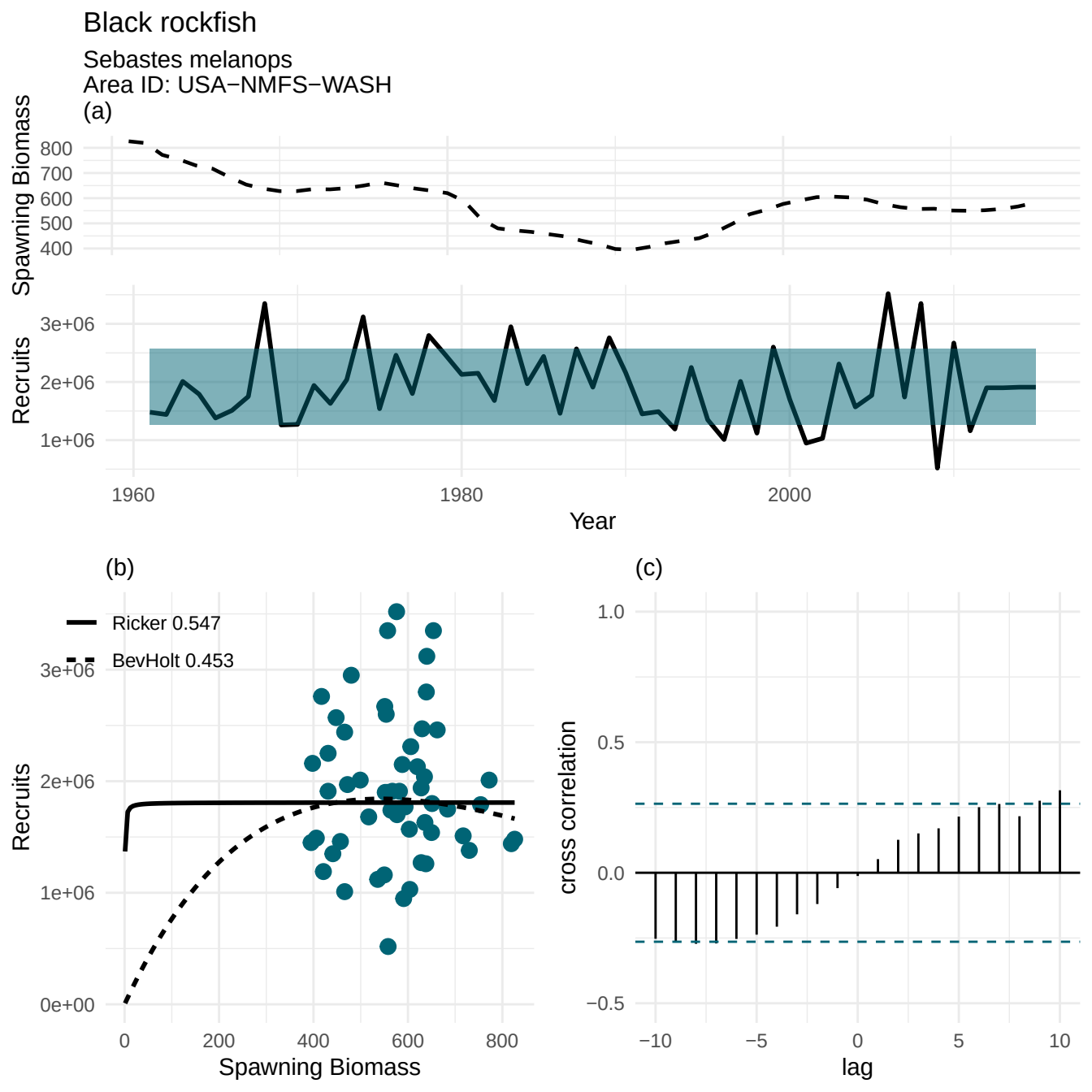

Bigeye tuna
Thunnus obesus
Area ID: multinational−WCPFC−CWPAC
(a)
Spawning Biomass
2500000
2000000
1500000
1000000
Recruits
3.5e+07
3.0e+07
2.5e+07
2.0e+07
1.5e+07
1.0e+07
1950
1960
1970
1980
1990
2000
Year
(b)
Ricker 0.44
BevHolt 0.56
Recruits
3e+07
2e+07
1e+07
0e+00
0e+00
1e+06
2e+06
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

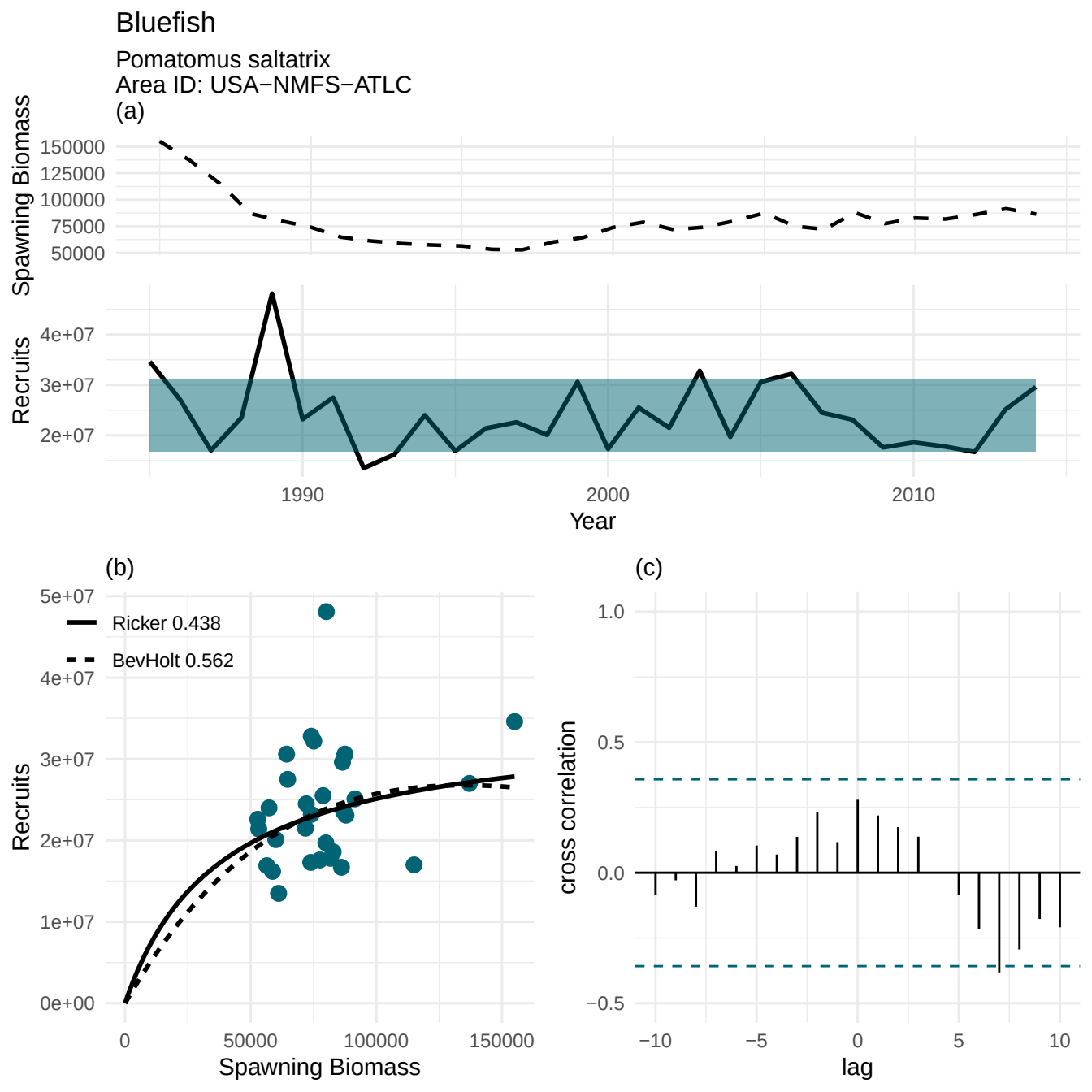

Bigeye tuna
Thunnus obesus
Area ID: multinational−IATTC−EPAC
(a)
Spawning Biomass
250000
200000
150000
100000
Recruits
10000
8000
6000
4000
1980
1990
2000
2010
Year
(b)
Ricker 0.998
BevHolt 0.00161
Recruits
10000
7500
5000
2500
0
0e+00
1e+05
2e+05
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

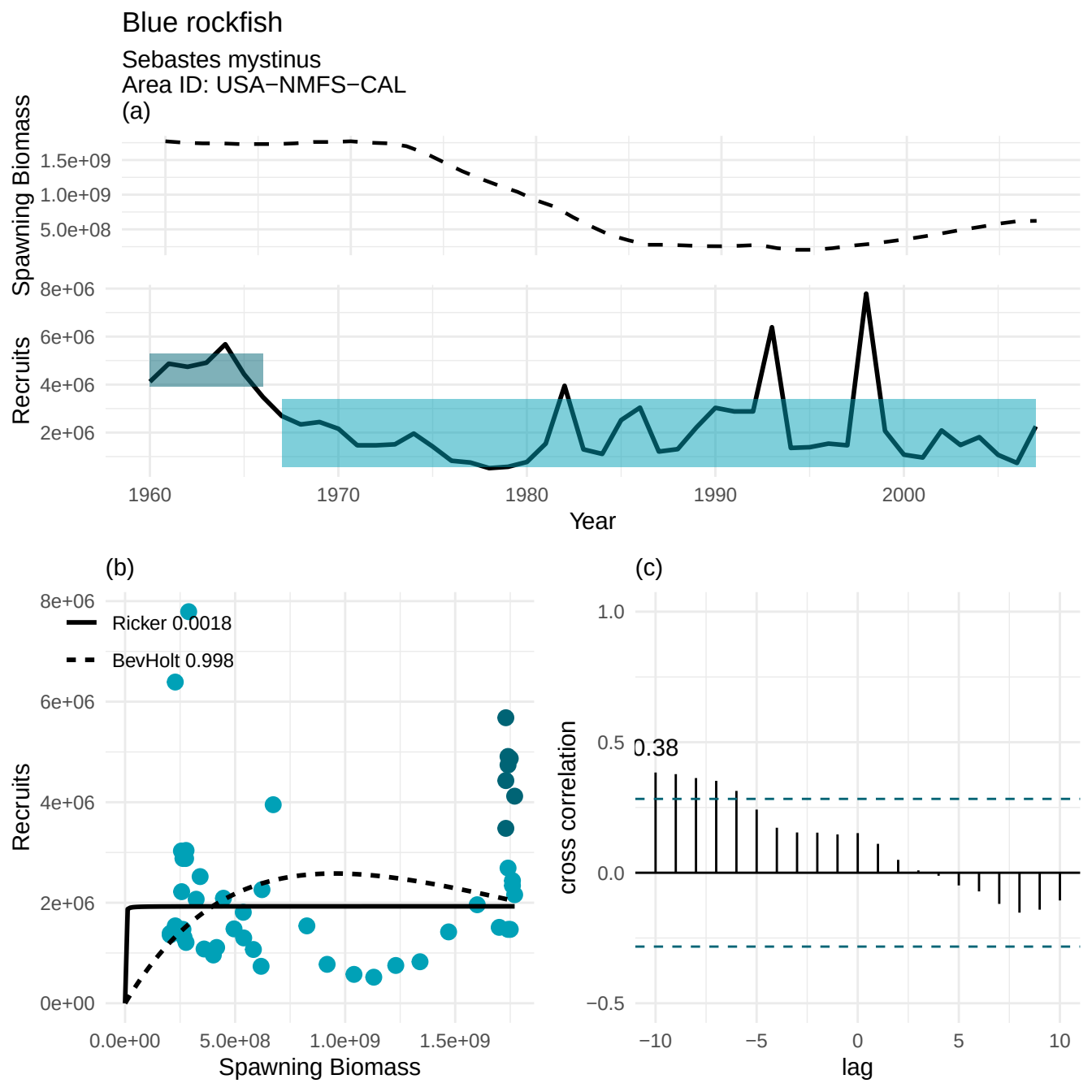

Bigeye tuna
Thunnus obesus
Area ID: multinational−IOTC−IO
(a)
Spawning Biomass
1500000
1250000
1000000
750000
Recruits
150000
125000
100000
75000
1980
1990
2000
2010
Year
(b)
Ricker 0.182
BevHolt 0.818
Recruits
150000
100000
50000
0
0
500000
1000000
1500000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

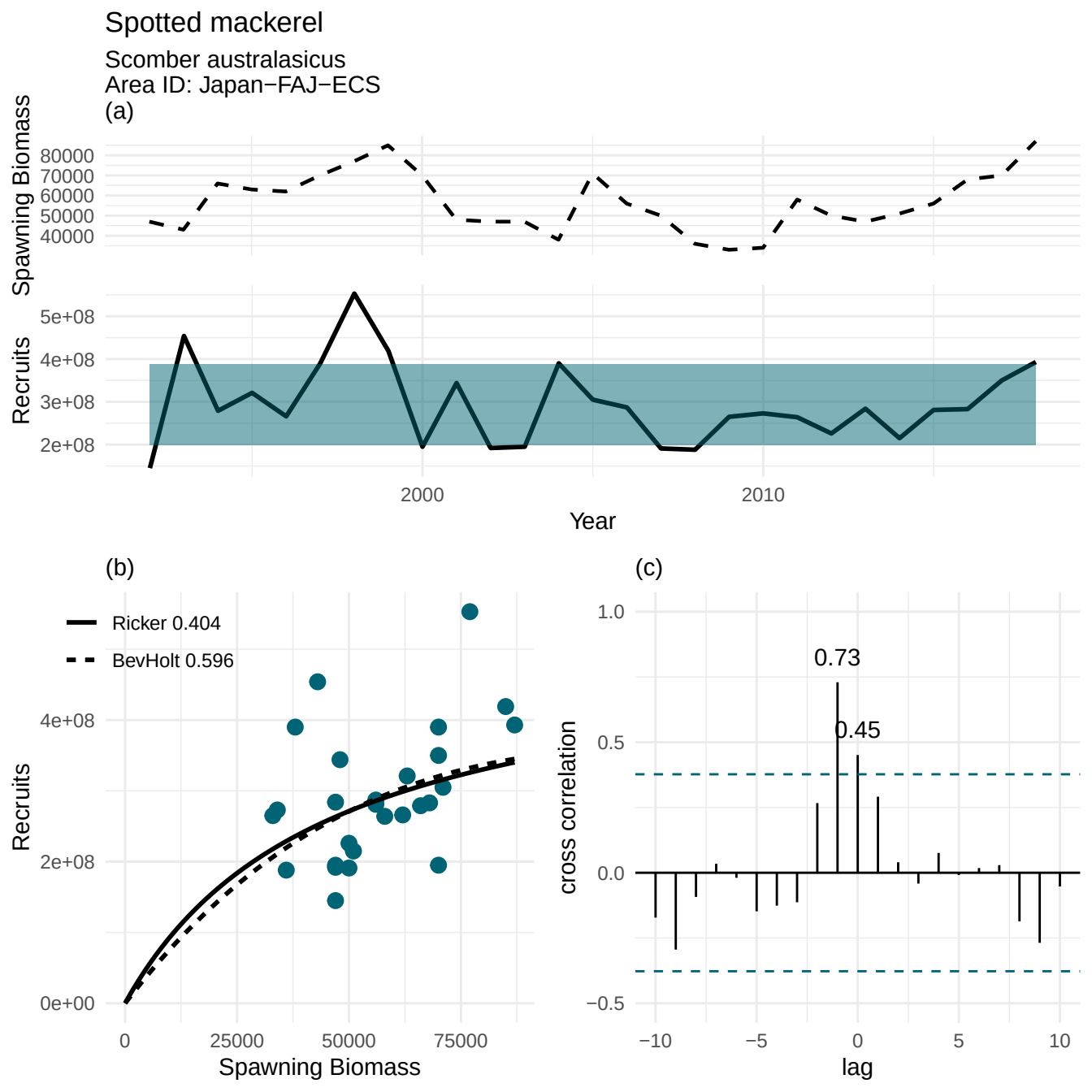

Bight redfish
Centroberyx gerrardi
Area ID: Australia−AFMA−SE
(a)
Spawning Biomass
5500
5000
4500
4000
Recruits
8e+12
7e+12
6e+12
5e+12
4e+12
3e+12
1960
1970
1980
1990
2000
Year
(b)
Ricker 0.556
BevHolt 0.444
Recruits
8e+12
6e+12
4e+12
2e+12
0e+00
0
2000
4000
6000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

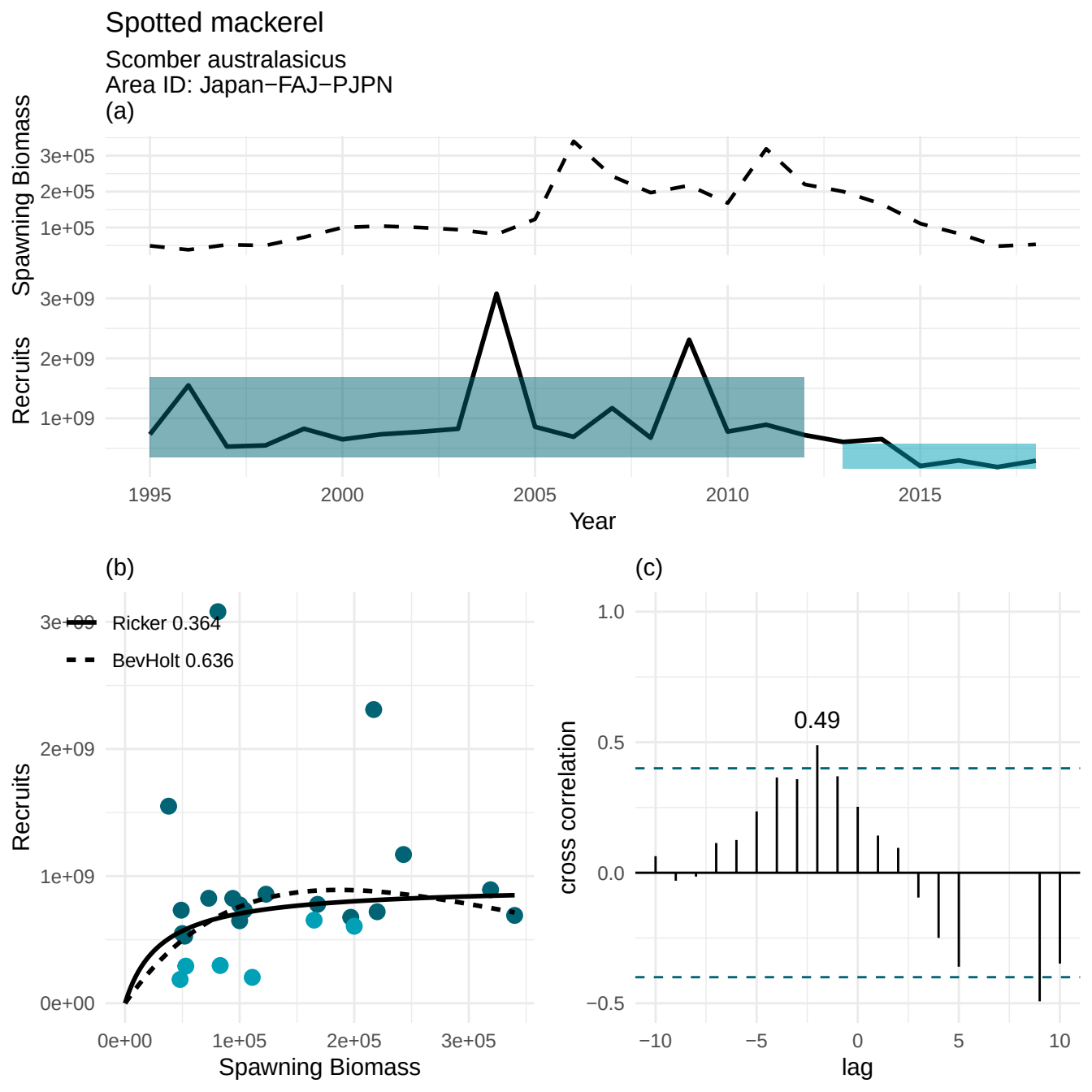

Black rockfish
Sebastes melanops
Area ID: USA−NMFS−CAL
(a)
Spawning Biomass
500
400
300
200
100
Recruits
5e+06
4e+06
3e+06
2e+06
1e+06
1970
1980
1990
2000
2010
Year
(b)
Ricker 0.164
BevHolt 0.836
Recruits
5e+06
4e+06
3e+06
2e+06
1e+06
0e+00
0
200
400
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.35
0.38
−10
−5
0
5
10
lag

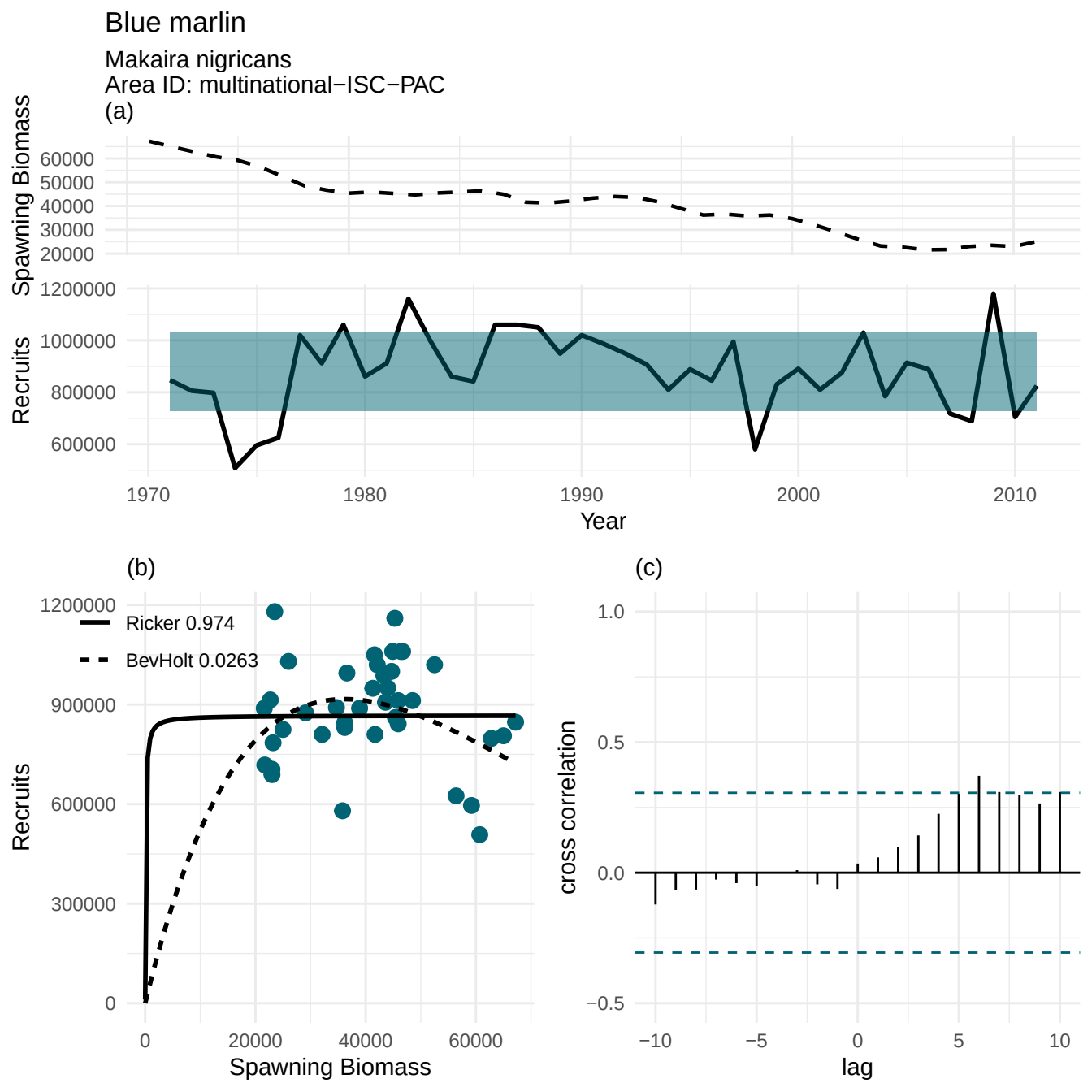

Black rockfish
Sebastes melanops
Area ID: USA−NMFS−WASH
(a)
Spawning Biomass
800
700
600
500
400
Recruits
3e+06
2e+06
1e+06
1960
1980
2000
Year
(b)
Ricker 0.547
BevHolt 0.453
Recruits
3e+06
2e+06
1e+06
0e+00
0
200
400
600
800
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

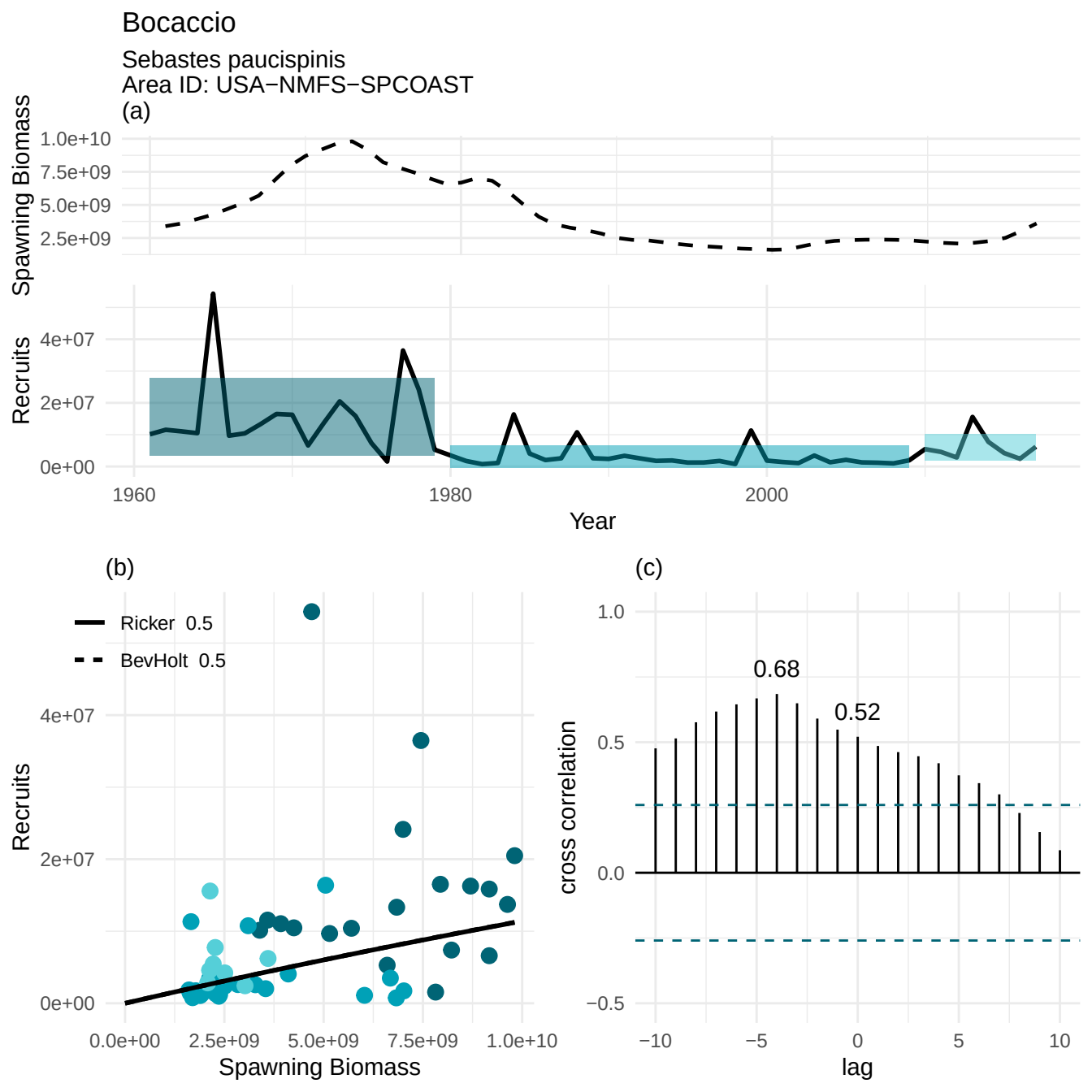

Bluefish
Pomatomus saltatrix
Area ID: USA−NMFS−ATLC
(a)
Spawning Biomass
150000
125000
100000
75000
50000
Recruits
4e+07
3e+07
2e+07
1990
2000
2010
Year
(b)
5e+07
Ricker 0.438
BevHolt 0.562
4e+07
Recruits
3e+07
2e+07
1e+07
0e+00
0
50000
100000
150000
Spawning Biomass
(c)
1.0
0.5
0.0
−0.5
cross correlation
−10
−5
0
5
10
lag

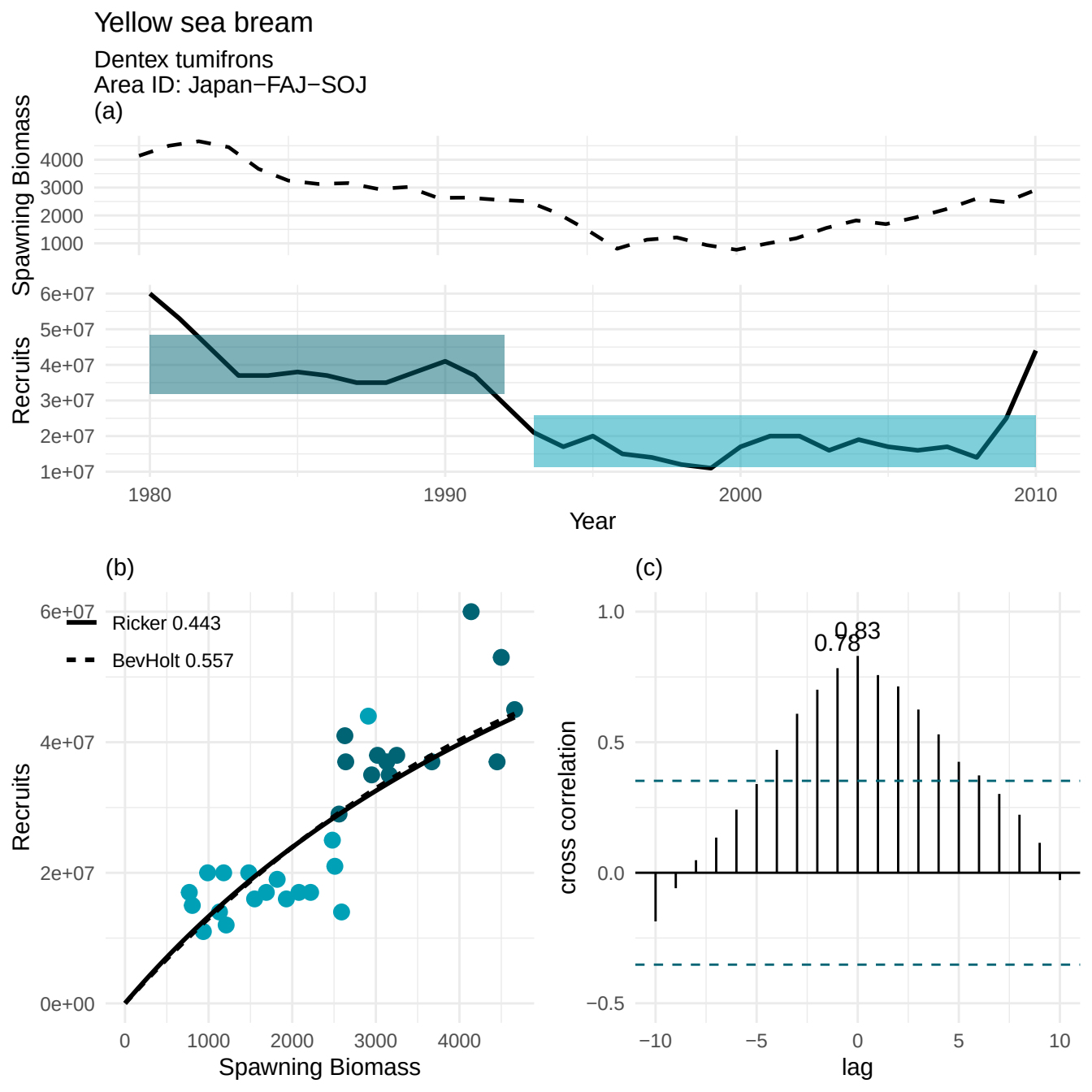

Blue rockfish
Sebastes mystinus
Area ID: USA−NMFS−CAL
(a)
Spawning Biomass
1.5e+09
1.0e+09
5.0e+08
Recruits
8e+06
6e+06
4e+06
2e+06
1960
1970
1980
1990
2000
Year
(b)
Ricker 0.0018
BevHolt 0.998
Recruits
8e+06
6e+06
4e+06
2e+06
0e+00
0.0e+00
5.0e+08
1.0e+09
1.5e+09
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.38
−10
−5
0
5
10
lag

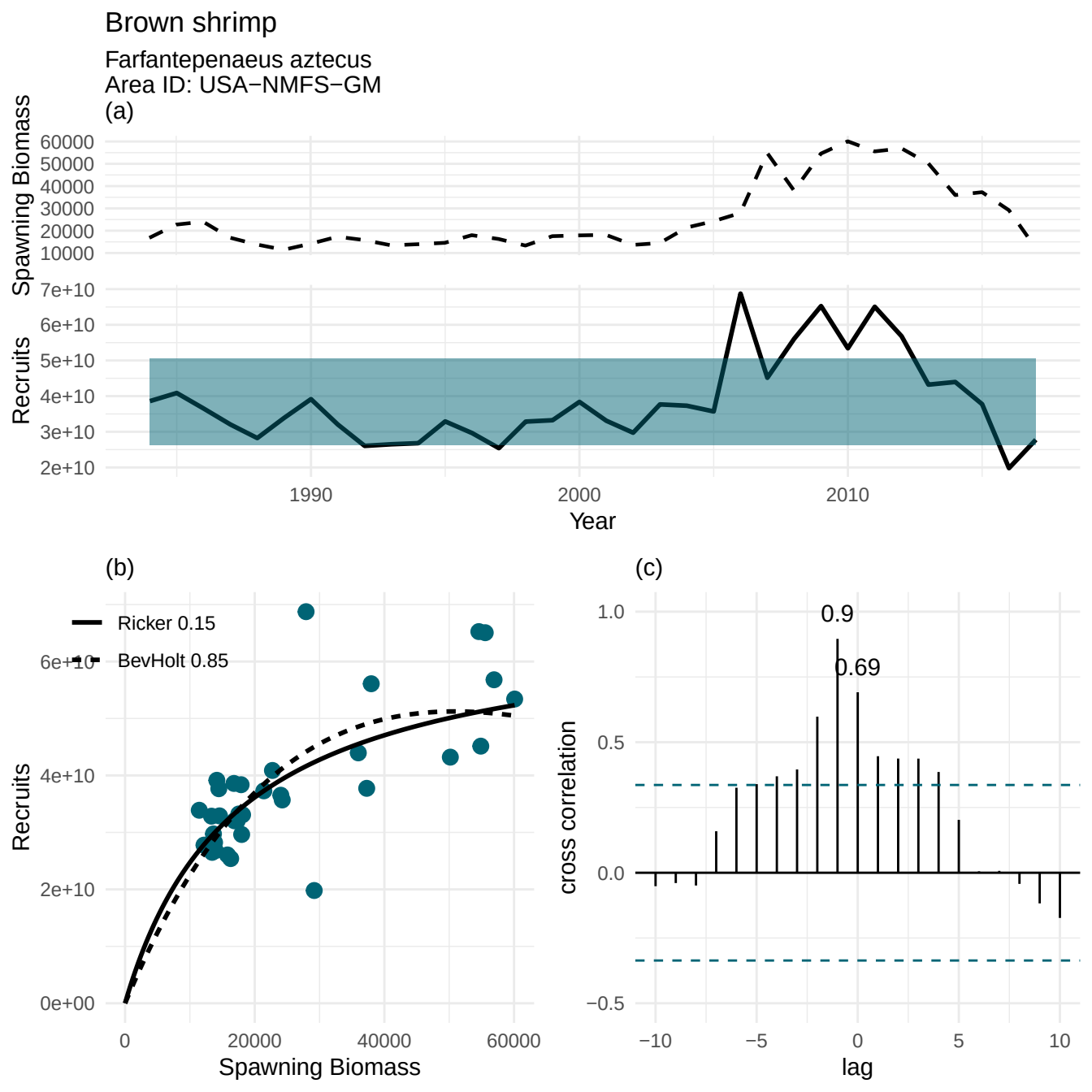

Spotted mackerel
Scomber australasicus
Area ID: Japan−FAJ−ECS
(a)
Spawning Biomass
80000
70000
60000
50000
40000
Recruits
5e+08
4e+08
3e+08
2e+08
2000
2010
Year
(b)
Ricker 0.404
BevHolt 0.596
Recruits
4e+08
2e+08
0e+00
0
25000
50000
75000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.73
0.45
−10
−5
0
5
10
lag

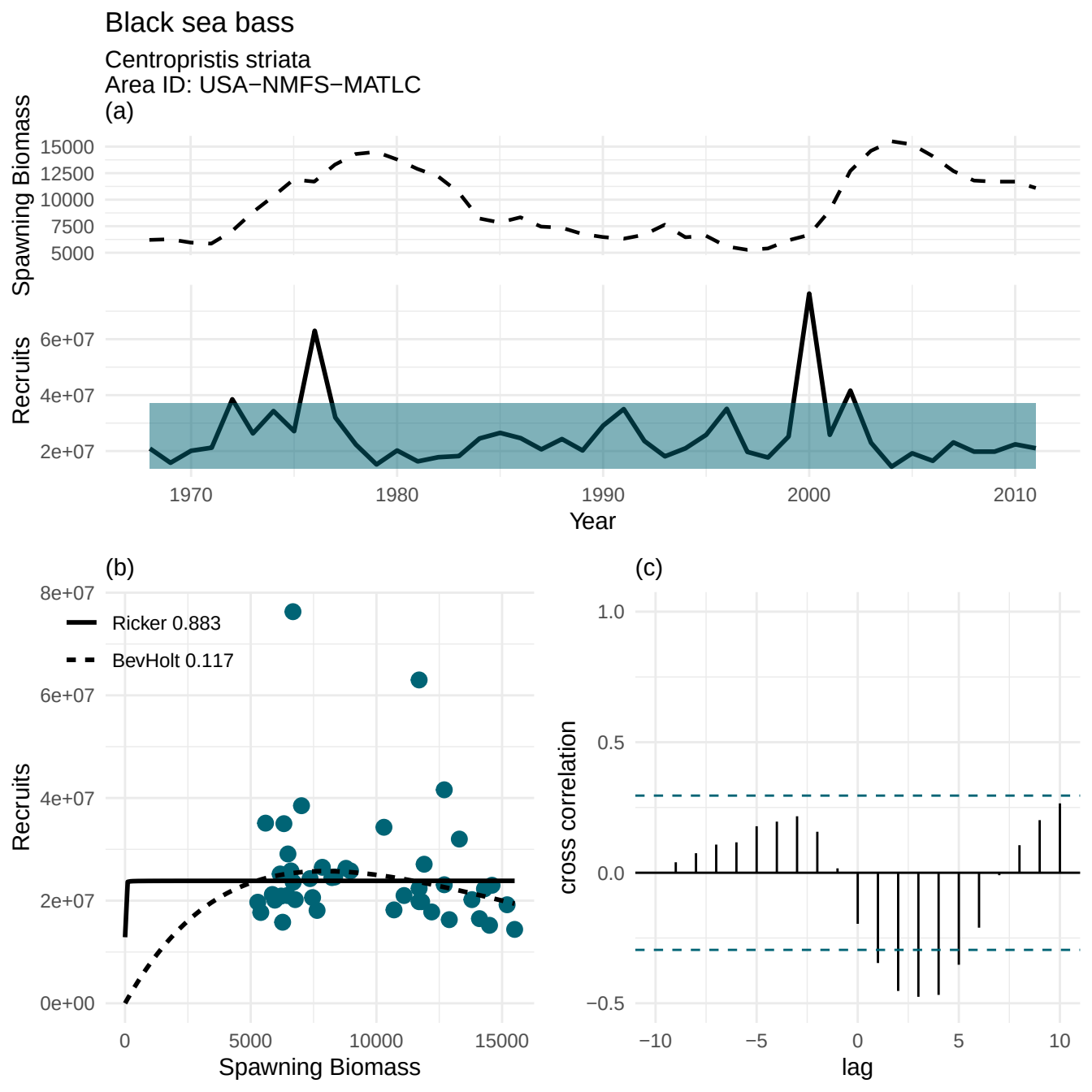

Spotted mackerel
Scomber australasicus
Area ID: Japan−FAJ−PJPN
(a)
Spawning Biomass
3e+05
2e+05
1e+05
Recruits
3e+09
2e+09
1e+09
1995
2000
2005
2010
2015
Year
(b)
Ricker 0.364
BevHolt 0.636
Recruits
2e+09
1e+09
0e+00
0e+00
1e+05
2e+05
3e+05
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.49
−10
−5
0
5
10
lag

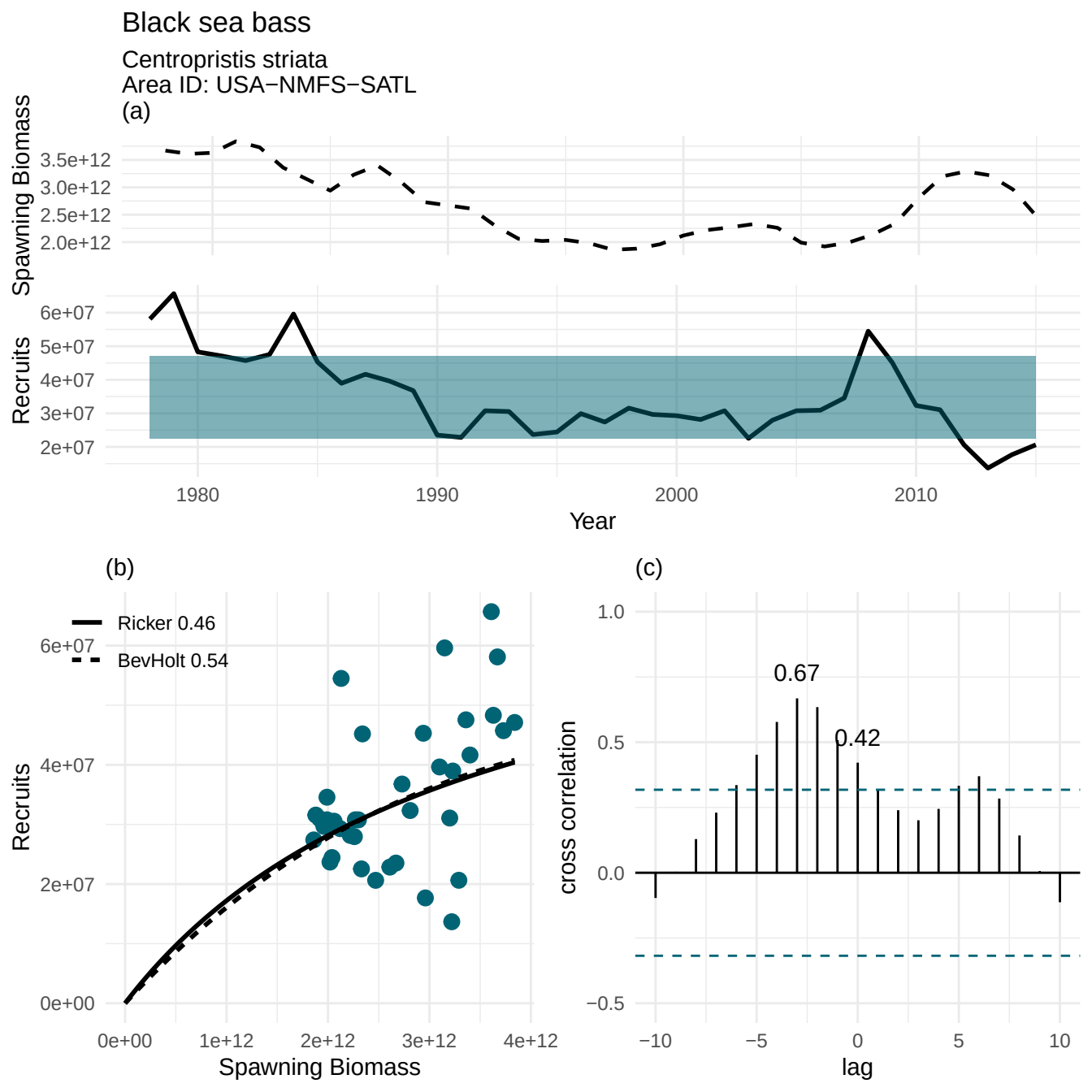

Blue marlin
Makaira nigricans
Area ID: multinational−ISC−PAC
(a)
Spawning Biomass
60000
50000
40000
30000
20000
Recruits
1200000
1000000
800000
600000
1970
1980
1990
2000
2010
Year
(b)
Ricker 0.974
BevHolt 0.0263
Recruits
1200000
900000
600000
300000
0
0
20000
40000
60000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

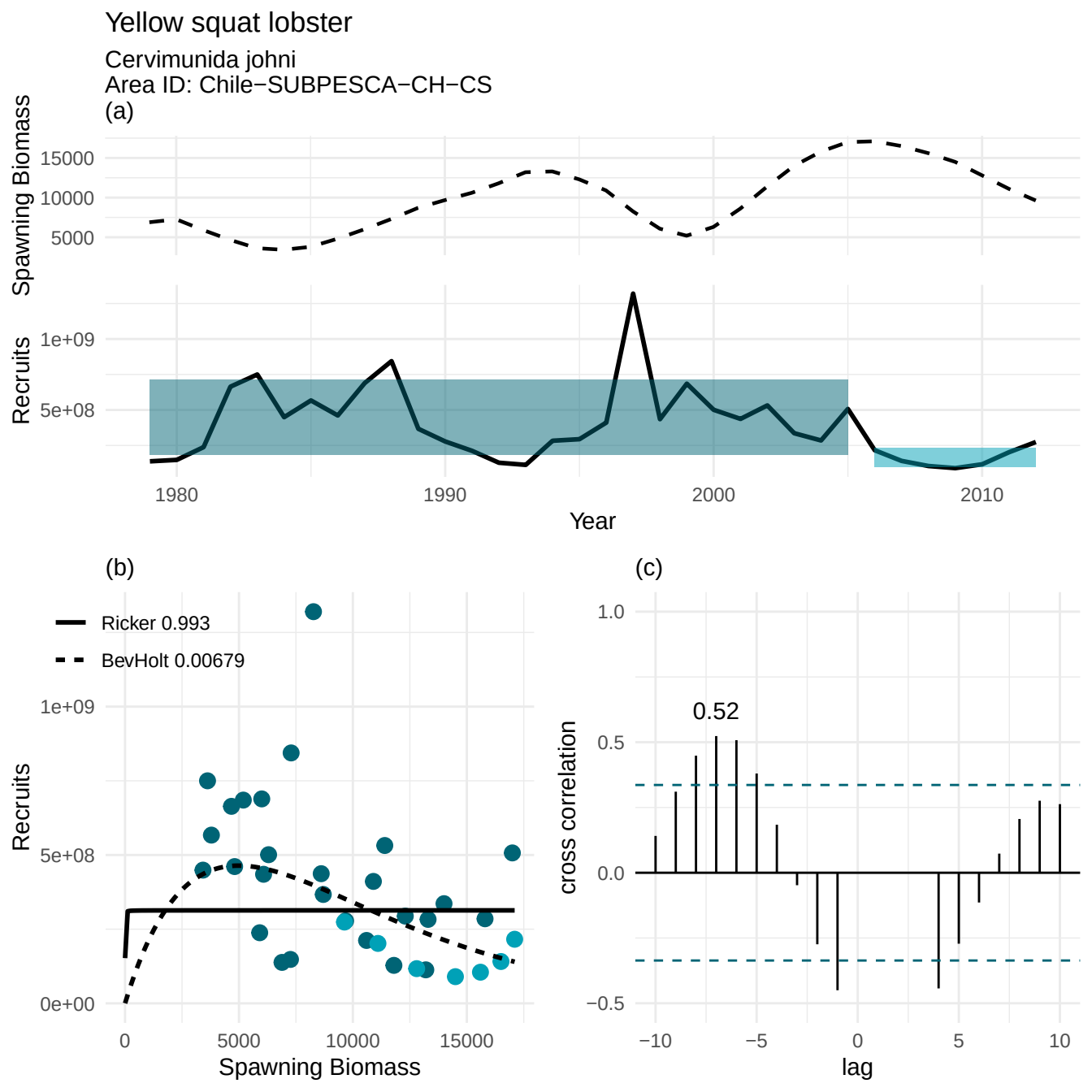

Bocaccio
Sebastes paucispinis
Area ID: USA−NMFS−SPCOAST
(a)
Spawning Biomass
1.0e+10
7.5e+09
5.0e+09
2.5e+09
Recruits
4e+07
2e+07
0e+00
1960
1980
2000
Year
(b)
Ricker 0.5
BevHolt 0.5
Recruits
4e+07
2e+07
0e+00
0.0e+00
2.5e+09
5.0e+09
7.5e+09
1.0e+10
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.68
0.52
−10
−5
0
5
10
lag

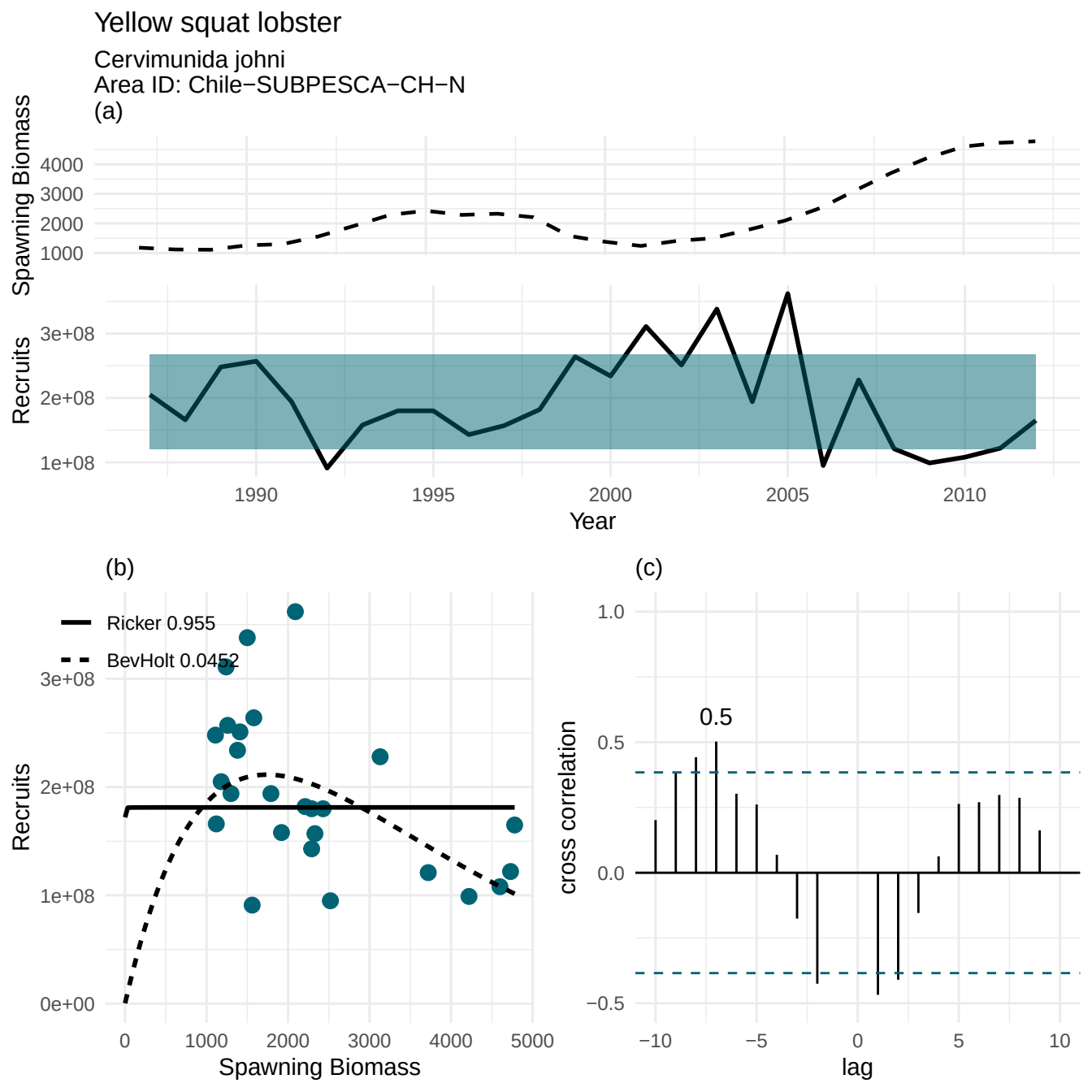

Yellow sea bream
Dentex tumifrons
Area ID: Japan−FAJ−SOJ
(a)
Spawning Biomass
4000
3000
2000
1000
Recruits
6e+07
5e+07
4e+07
3e+07
2e+07
1e+07
1980
1990
2000
2010
Year
(b)
Ricker 0.443
BevHolt 0.557
Recruits
6e+07
4e+07
2e+07
0e+00
0
1000
2000
3000
4000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.83
0.78
−10
−5
0
5
10
lag

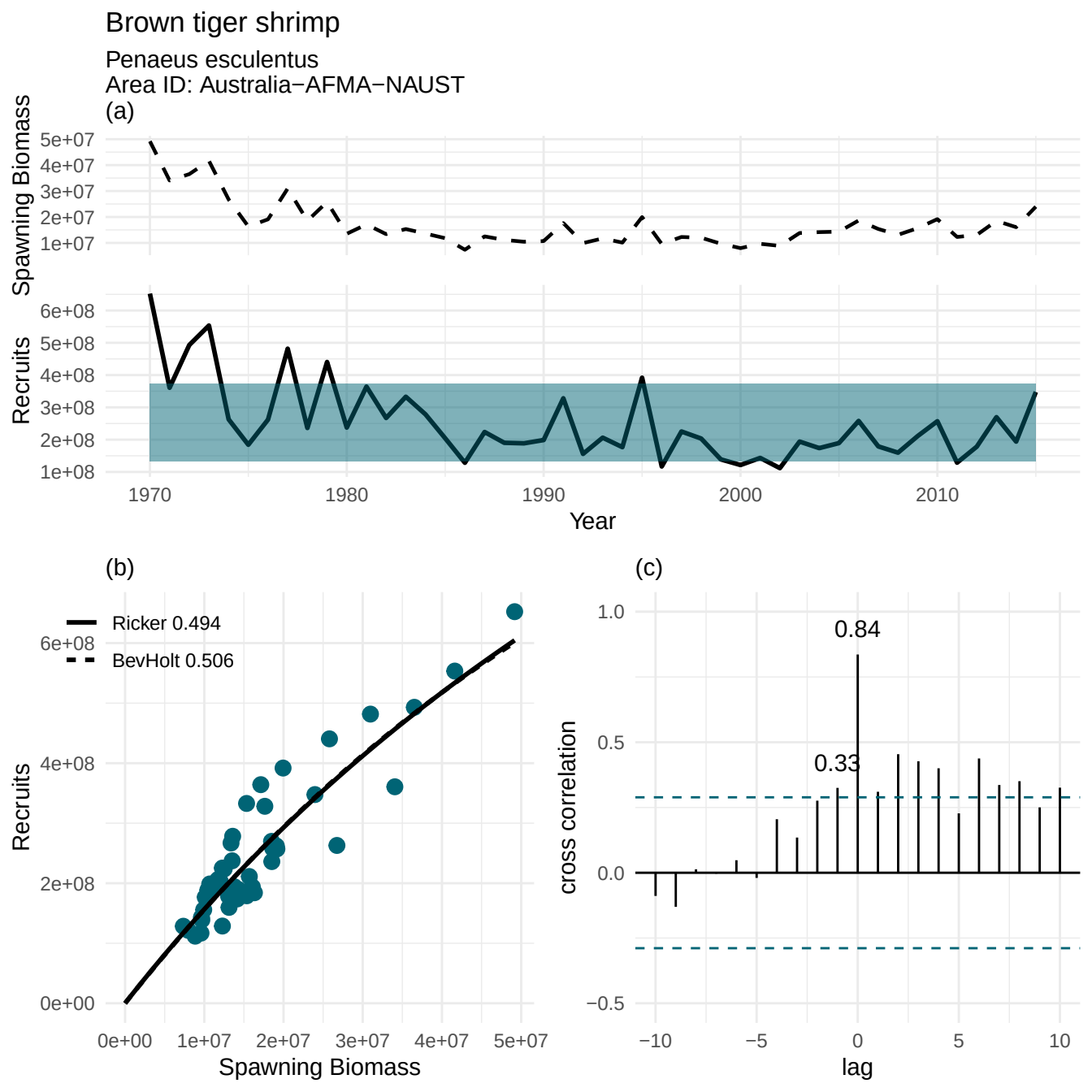

Brown shrimp
Farfantepenaeus aztecus
Area ID: USA−NMFS−GM
(a)
Spawning Biomass
60000
50000
40000
30000
20000
10000
Recruits
7e+10
6e+10
5e+10
4e+10
3e+10
2e+10
1990
2000
2010
Year
(b)
Ricker 0.15
BevHolt 0.85
Recruits
6e+10
4e+10
2e+10
0e+00
0
20000
40000
60000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.9
0.69
−10
−5
0
5
10
lag

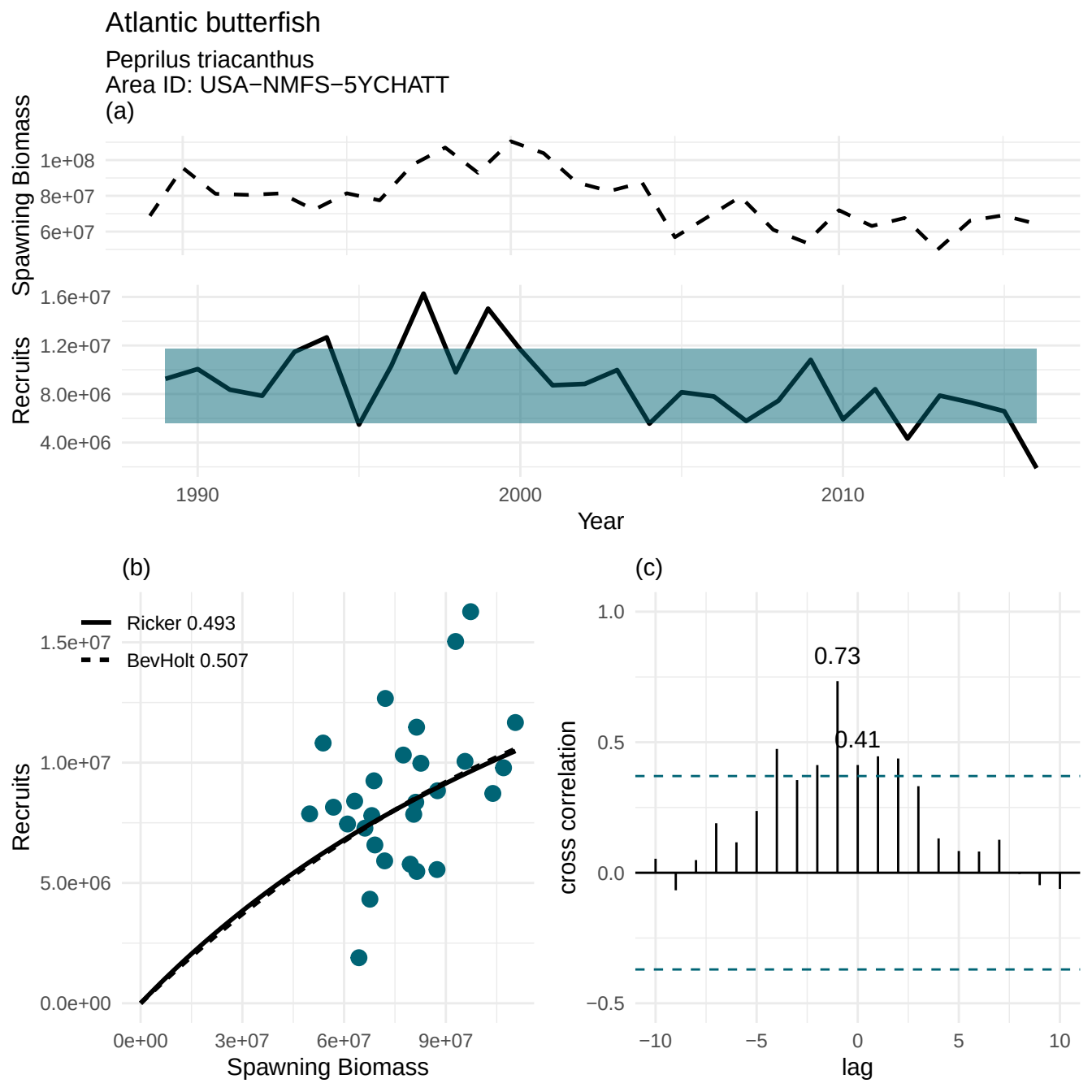

Black sea bass
Centropristis striata
Area ID: USA−NMFS−MATLC
(a)
Spawning Biomass
15000
12500
10000
7500
5000
Recruits
6e+07
4e+07
2e+07
1970
1980
1990
2000
2010
Year
(b)
8e+07
6e+07
4e+07
2e+07
0e+00
Ricker 0.883
BevHolt 0.117
Recruits
0
5000
10000
15000
Spawning Biomass
(c)
1.0
0.5
0.0
−0.5
cross correlation
−10
−5
0
5
10
lag

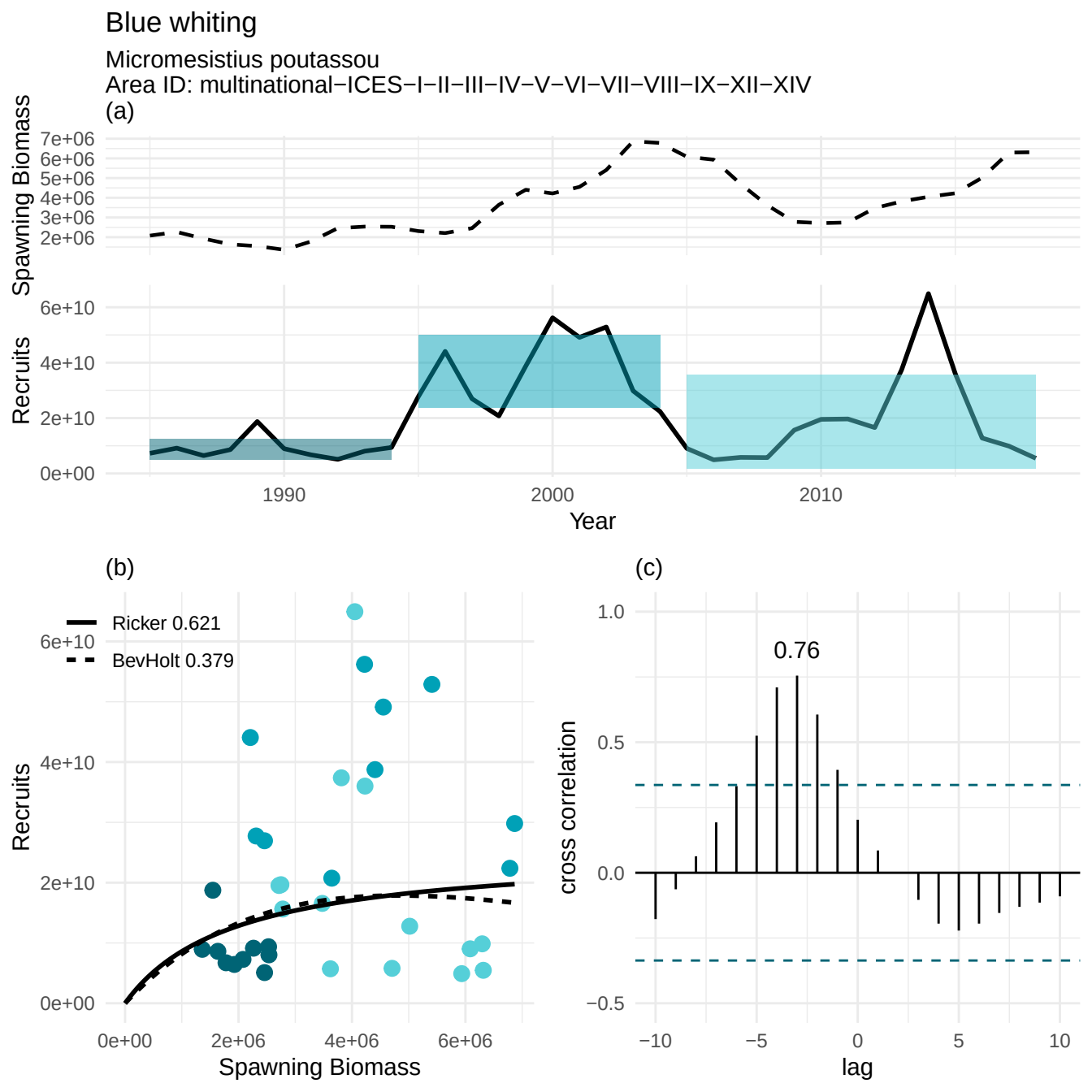

Black sea bass
Centropristis striata
Area ID: USA−NMFS−SATL
(a)
Spawning Biomass
3.5e+12
3.0e+12
2.5e+12
2.0e+12
Recruits
6e+07
5e+07
4e+07
3e+07
2e+07
1980
1990
2000
2010
Year
(b)
Ricker 0.46
BevHolt 0.54
Recruits
6e+07
4e+07
2e+07
0e+00
0e+00
1e+12
2e+12
3e+12
4e+12
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.67
0.42
−10
−5
0
5
10
lag

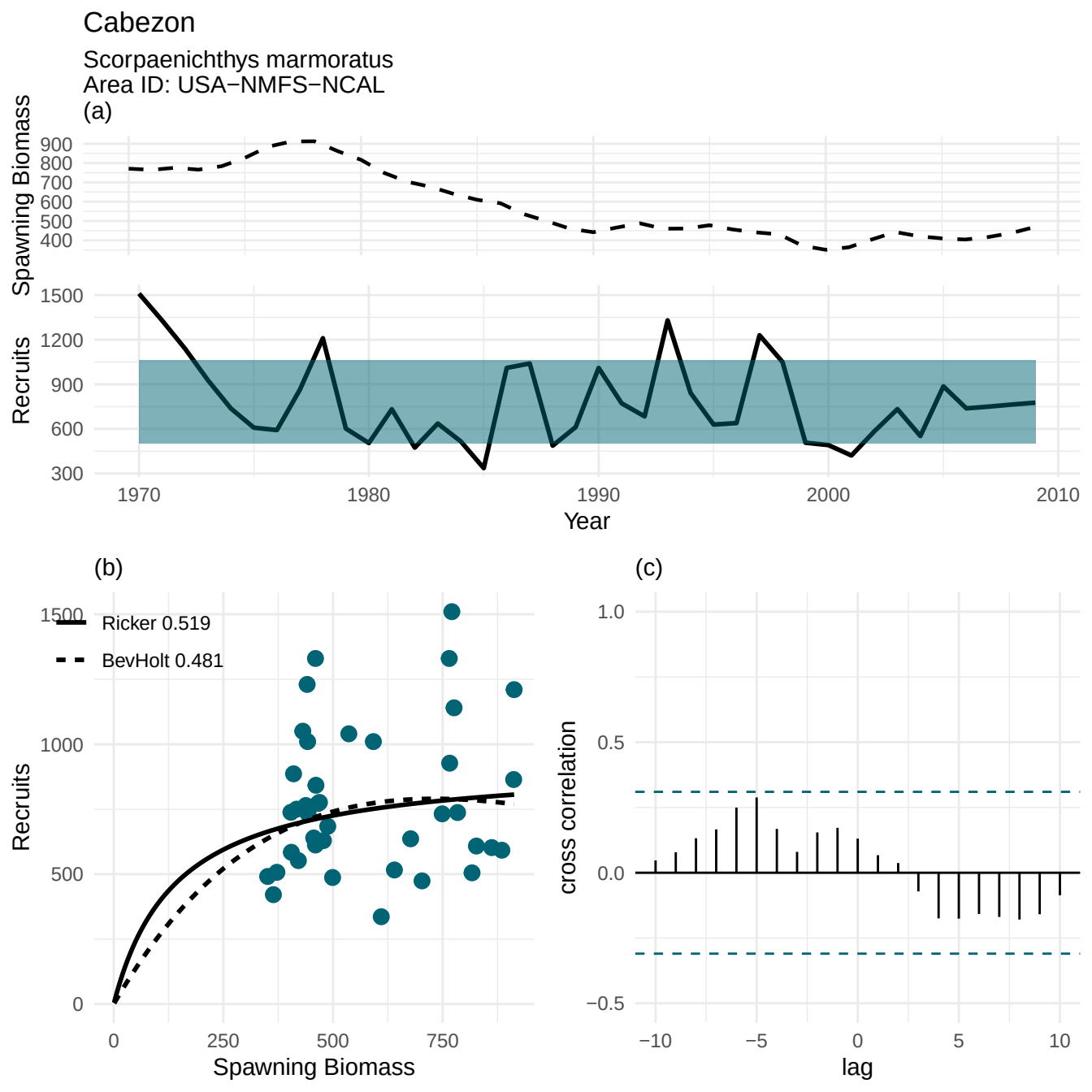

Yellow squat lobster
Cervimunida johni
Area ID: Chile−SUBPESCA−CH−CS
(a)
Spawning Biomass
15000
10000
5000
Recruits
1e+09
5e+08
1980
1990
2000
2010
Year
(b)
Ricker 0.993
BevHolt 0.00679
Recruits
1e+09
5e+08
0e+00
0
5000
10000
15000
Spawning Biomass
(c)
1.0
0.5
0.0
−0.5
0.52
cross correlation
−10
−5
0
5
10
lag

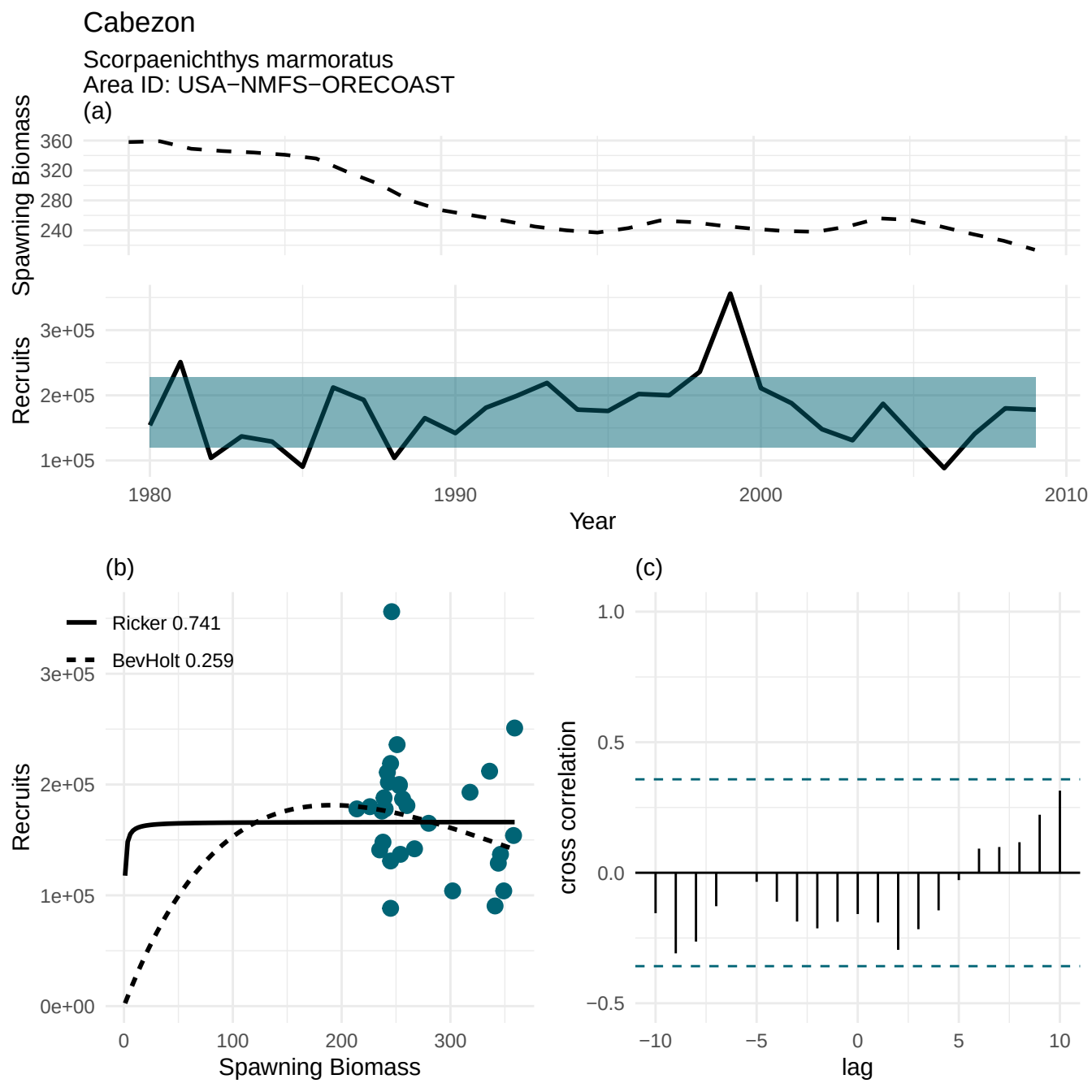

Yellow squat lobster
Cervimunida johni
Area ID: Chile−SUBPESCA−CH−N
(a)
Spawning Biomass
4000
3000
2000
1000
Recruits
3e+08
2e+08
1e+08
1990
1995
2000
2005
2010
Year
(b)
Ricker 0.955
BevHolt 0.0452
Recruits
3e+08
2e+08
1e+08
0e+00
0
1000
2000
3000
4000
5000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.5
−10
−5
0
5
10
lag

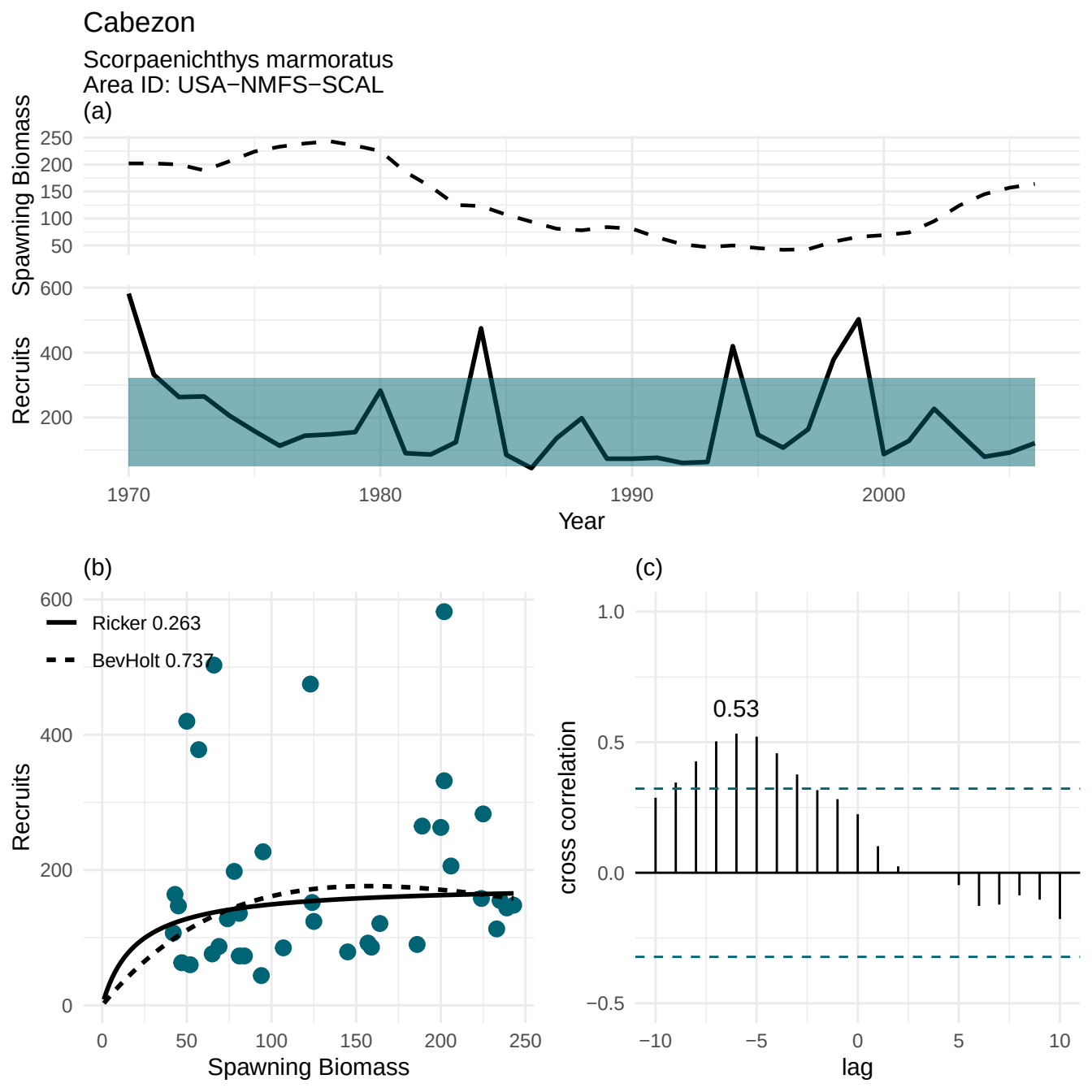

Brown tiger shrimp
Penaeus esculentus
Area ID: Australia−AFMA−NAUST
(a)
Spawning Biomass
5e+07
4e+07
3e+07
2e+07
1e+07
Recruits
6e+08
5e+08
4e+08
3e+08
2e+08
1e+08
1970
1980
1990
2000
2010
Year
(b)
Ricker 0.494
BevHolt 0.506
Recruits
6e+08
4e+08
2e+08
0e+00
0e+00
1e+07
2e+07
3e+07
4e+07
5e+07
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.84
0.33
−10
−5
0
5
10
lag

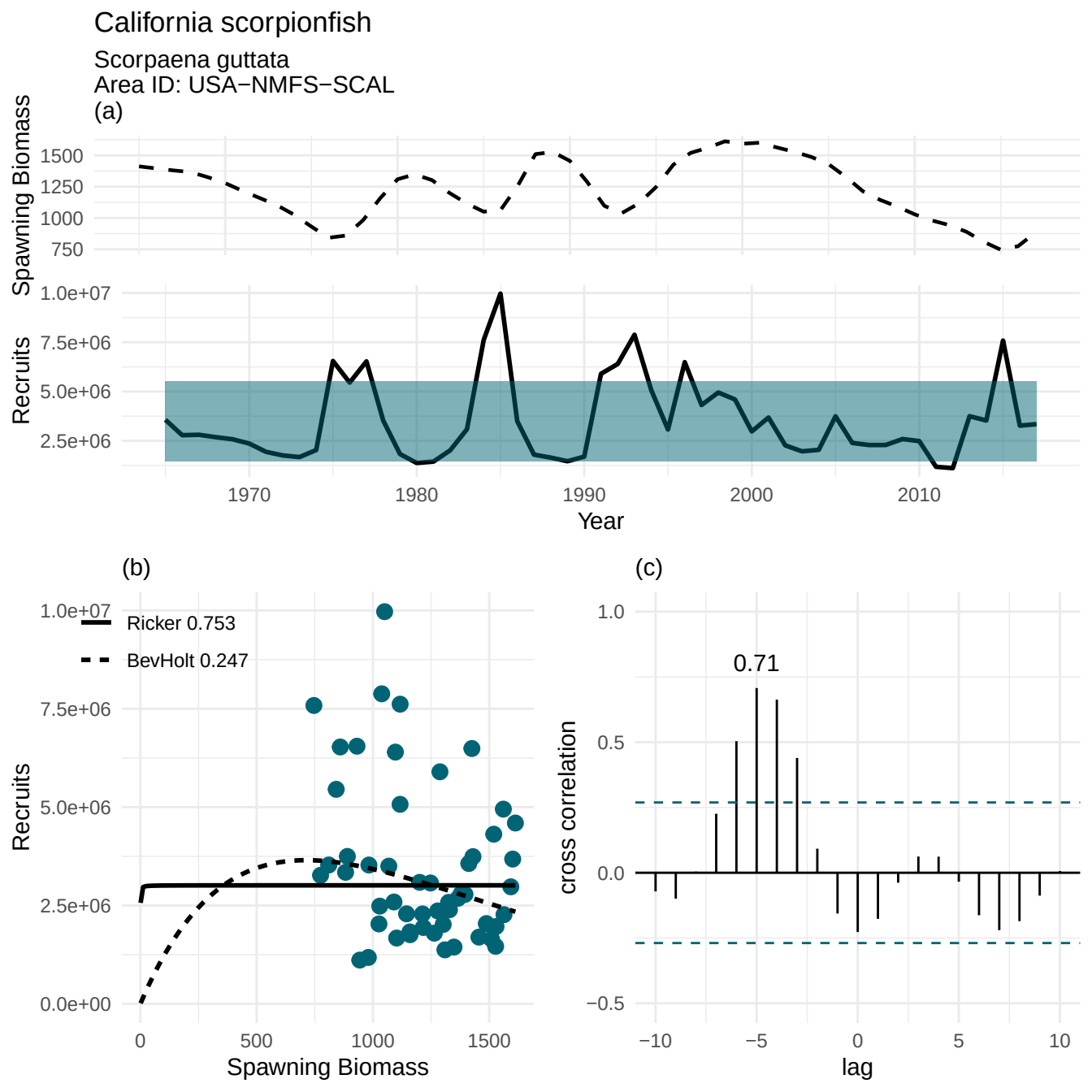

Atlantic butterfish
Peprilus triacanthus
Area ID: USA−NMFS−5YCHATT
(a)
Spawning Biomass
1e+08
8e+07
6e+07
Recruits
1.6e+07
1.2e+07
8.0e+06
4.0e+06
1990
2000
2010
Year
(b)
Ricker 0.493
BevHolt 0.507
Recruits
1.5e+07
1.0e+07
5.0e+06
0.0e+00
0e+00
3e+07
6e+07
9e+07
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.73
0.41
−10
−5
0
5
10
lag

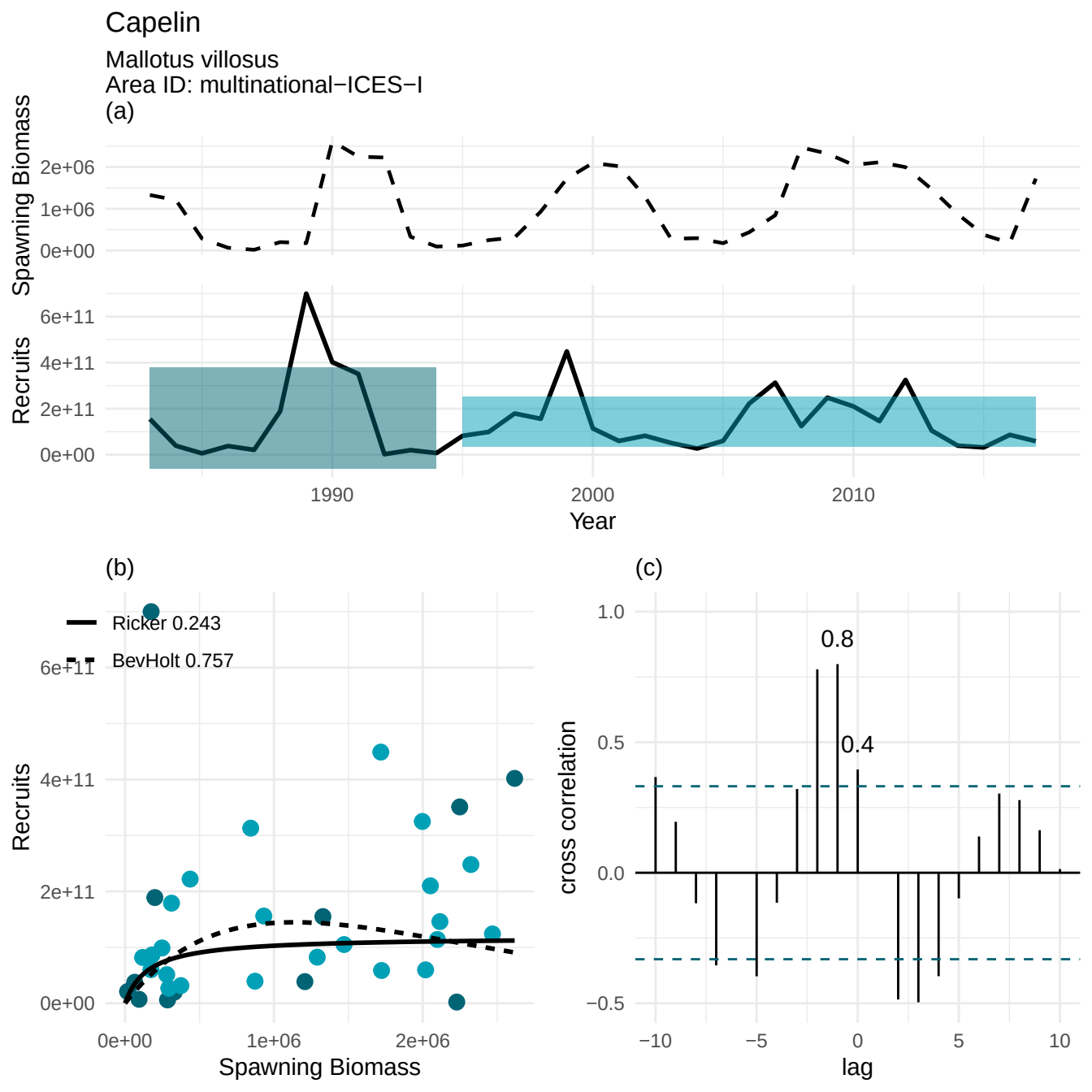

Blue whiting
Micromesistius poutassou
Area ID: multinational−ICES−I−II−III−IV−V−VI−VII−VIII−IX−XII−XIV
(a)
Spawning Biomass
7e+06
6e+06
5e+06
4e+06
3e+06
2e+06
Recruits
6e+10
4e+10
2e+10
0e+00
1990
2000
2010
Year
(b)
Ricker 0.621
BevHolt 0.379
Recruits
6e+10
4e+10
2e+10
0e+00
0e+00
2e+06
4e+06
6e+06
Spawning Biomass
(c)
0.76
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

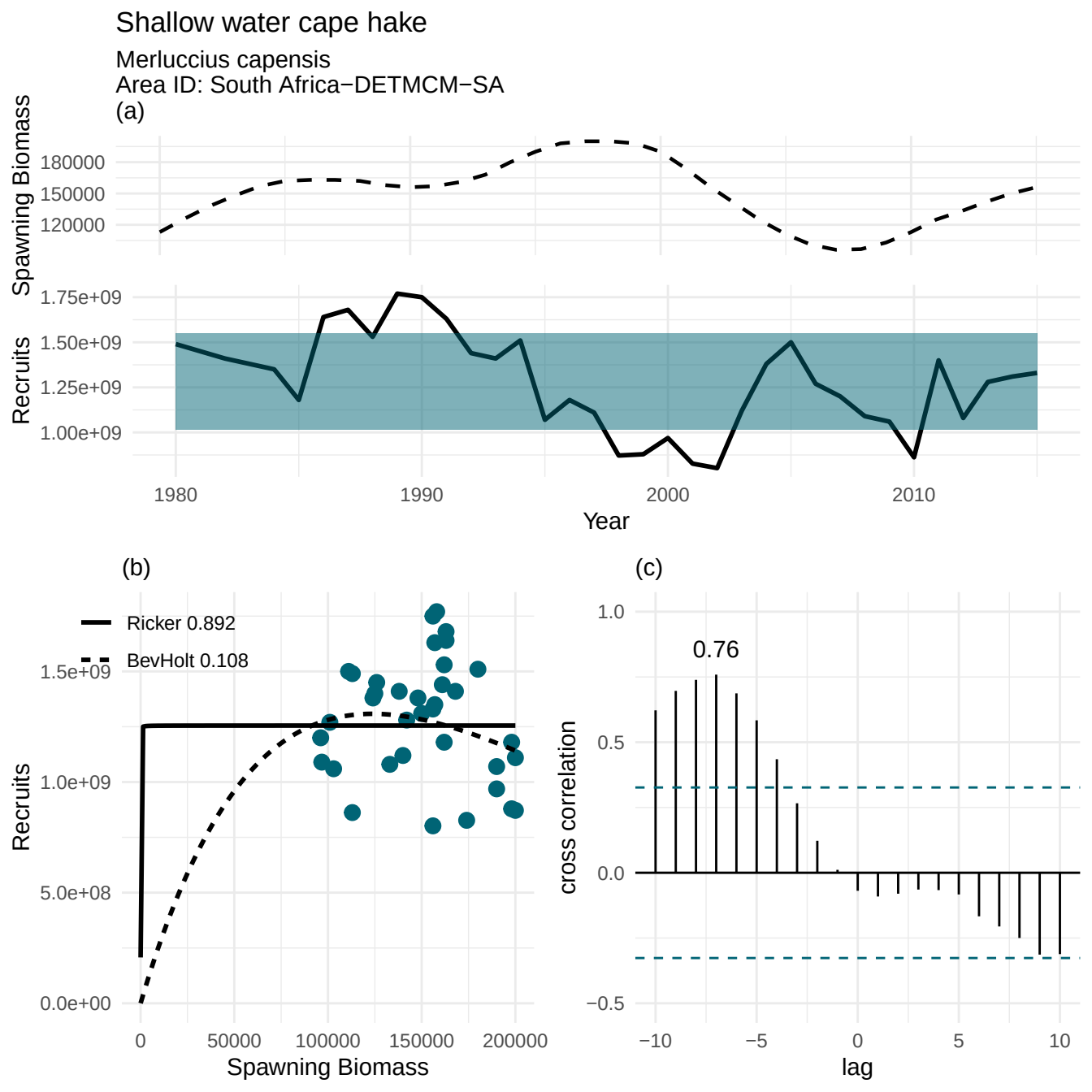

Cabezon
Scorpaenichthys marmoratus
Area ID: USA−NMFS−NCAL
(a)
Spawning Biomass
900
800
700
600
500
400
Recruits
1500
1200
900
600
300
1970
1980
1990
2000
2010
Year
(b)
Ricker 0.519
BevHolt 0.481
Recruits
1500
1000
500
0
0
250
500
750
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

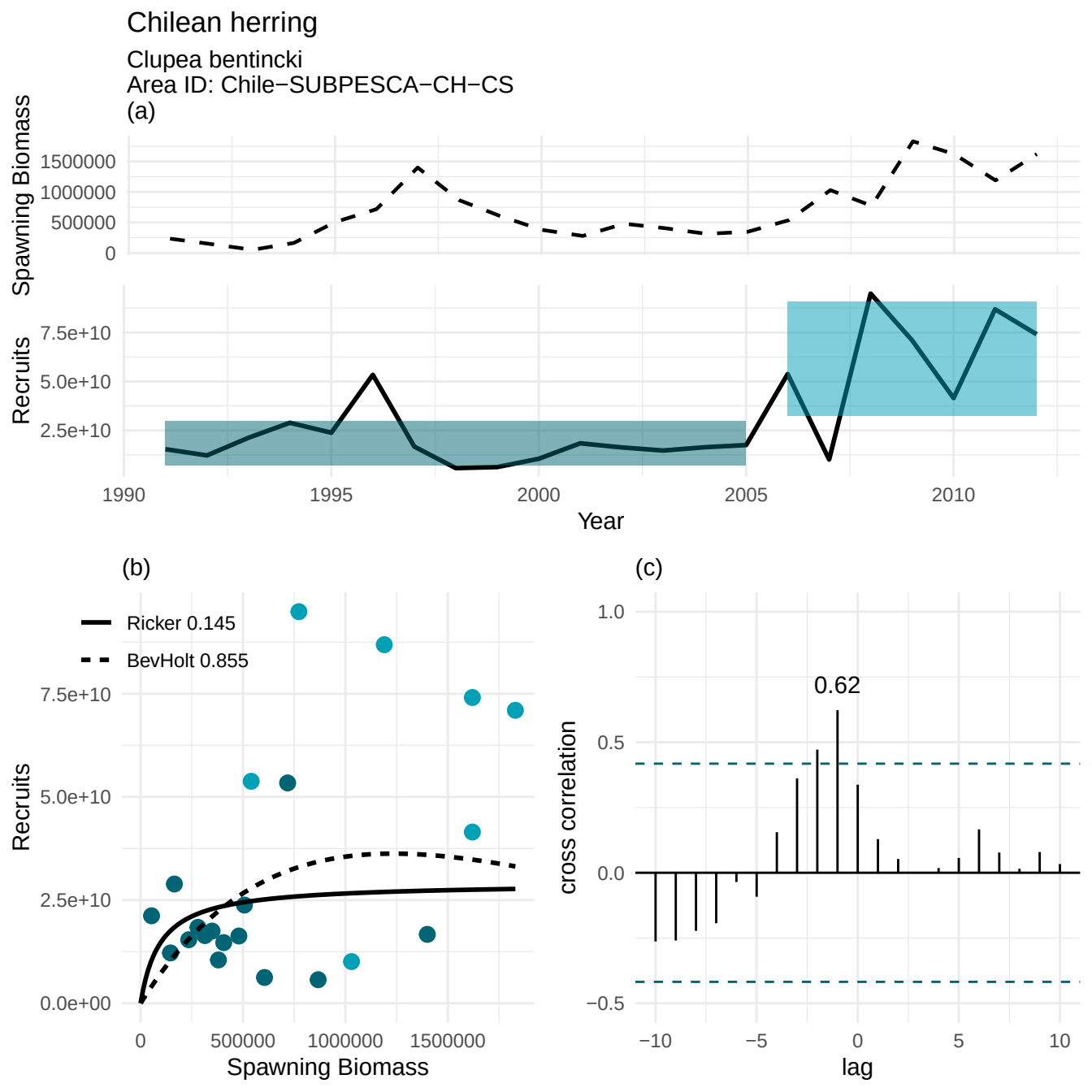

Cabezon
Scorpaenichthys marmoratus
Area ID: USA−NMFS−ORECOAST
(a)
Spawning Biomass
360
320
280
240
Recruits
3e+05
2e+05
1e+05
1980
1990
2000
2010
Year
(b)
Ricker 0.741
BevHolt 0.259
Recruits
3e+05
2e+05
1e+05
0e+00
0
100
200
300
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

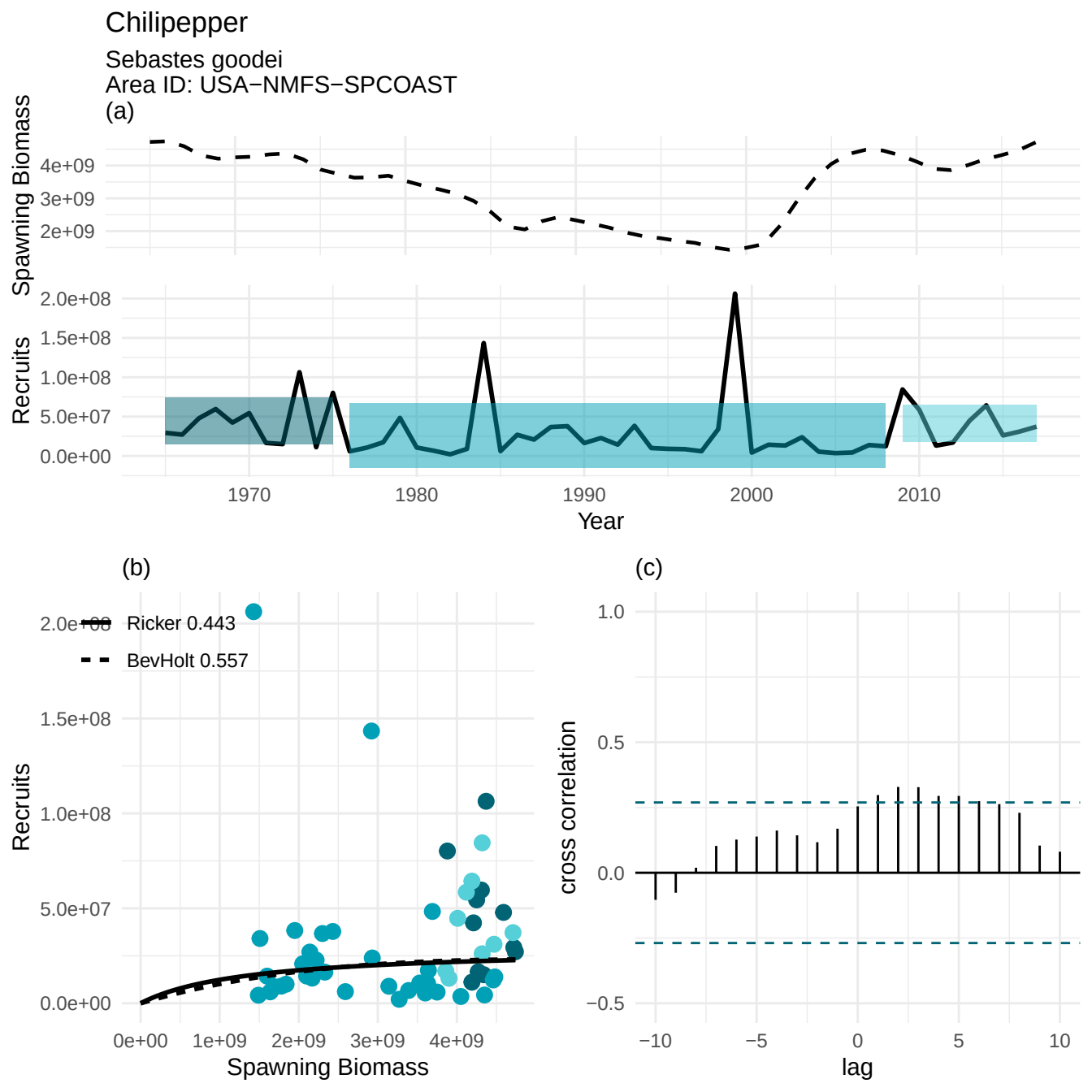

Cabezon
Scorpaenichthys marmoratus
Area ID: USA−NMFS−SCAL
(a)
Spawning Biomass
250
200
150
100
50
Recruits
600
400
200
1970
1980
1990
2000
Year
(b)
Ricker 0.263
BevHolt 0.737
Recruits
600
400
200
0
0
50
100
150
200
250
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.53
−10
−5
0
5
10
lag

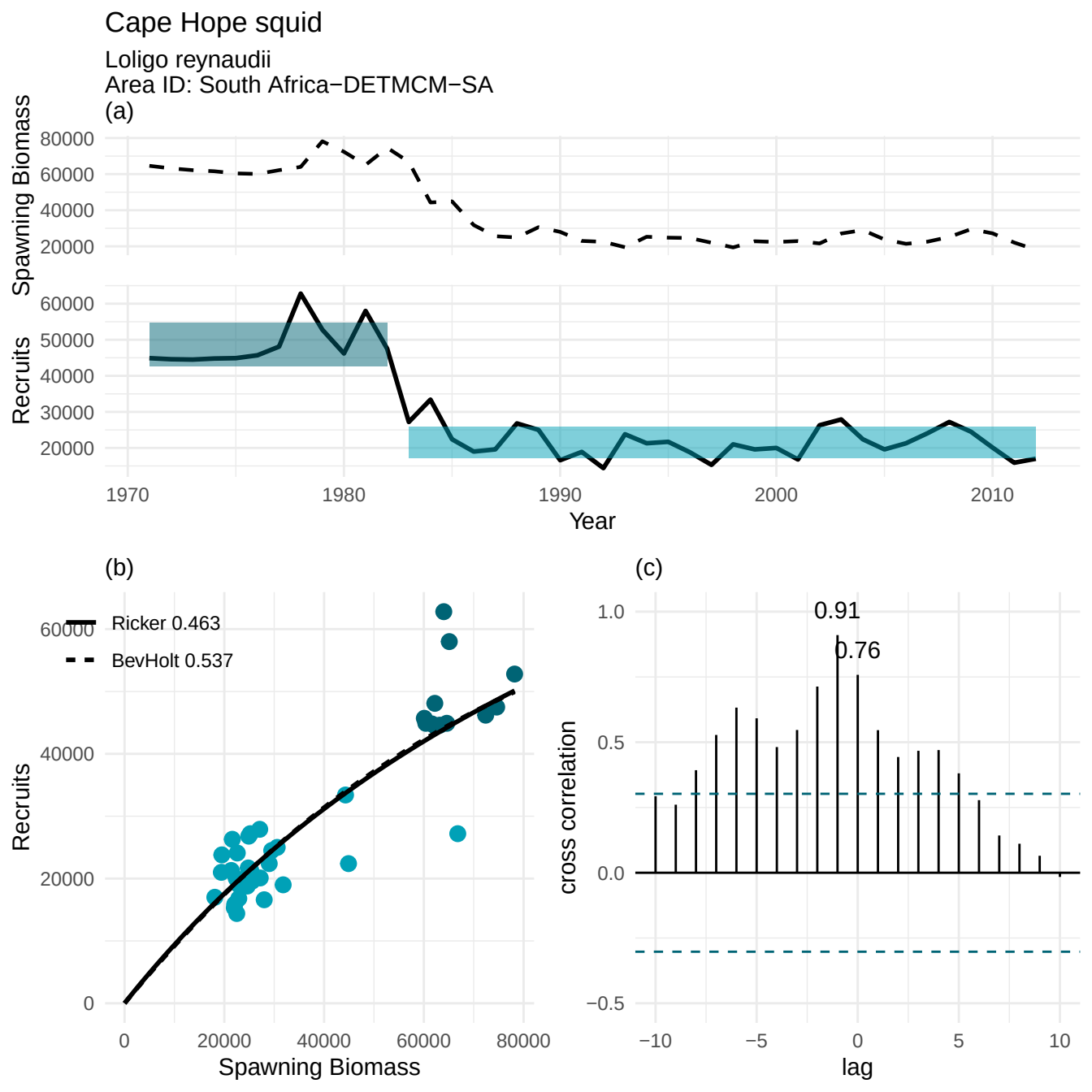

California scorpionfish
Scorpaena guttata
Area ID: USA−NMFS−SCAL
(a)
Spawning Biomass
1500
1250
1000
750
Recruits
1.0e+07
7.5e+06
5.0e+06
2.5e+06
1970
1980
1990
2000
2010
Year
(b)
Ricker 0.753
BevHolt 0.247
Recruits
1.0e+07
7.5e+06
5.0e+06
2.5e+06
0.0e+00
0
500
1000
1500
Spawning Biomass
(c)
0.71
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

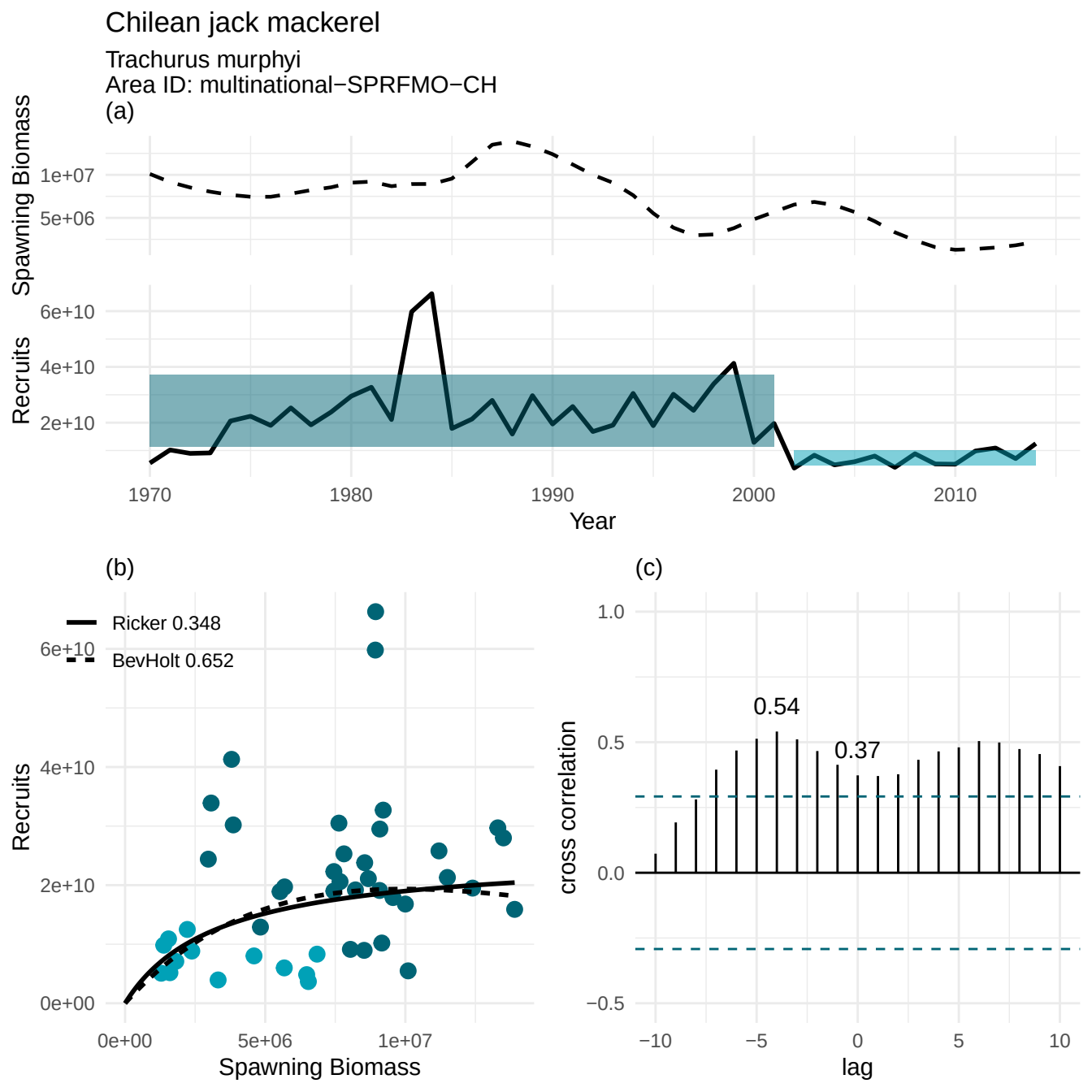

Capelin
Mallotus villosus
Area ID: multinational−ICES−I
(a)
Spawning Biomass
2e+06
1e+06
0e+00
Recruits
6e+11
4e+11
2e+11
0e+00
1990
2000
2010
Year
(b)
Ricker 0.243
BevHolt 0.757
Recruits
6e+11
4e+11
2e+11
0e+00
0e+00
1e+06
2e+06
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.8
0.4
−10
−5
0
5
10
lag

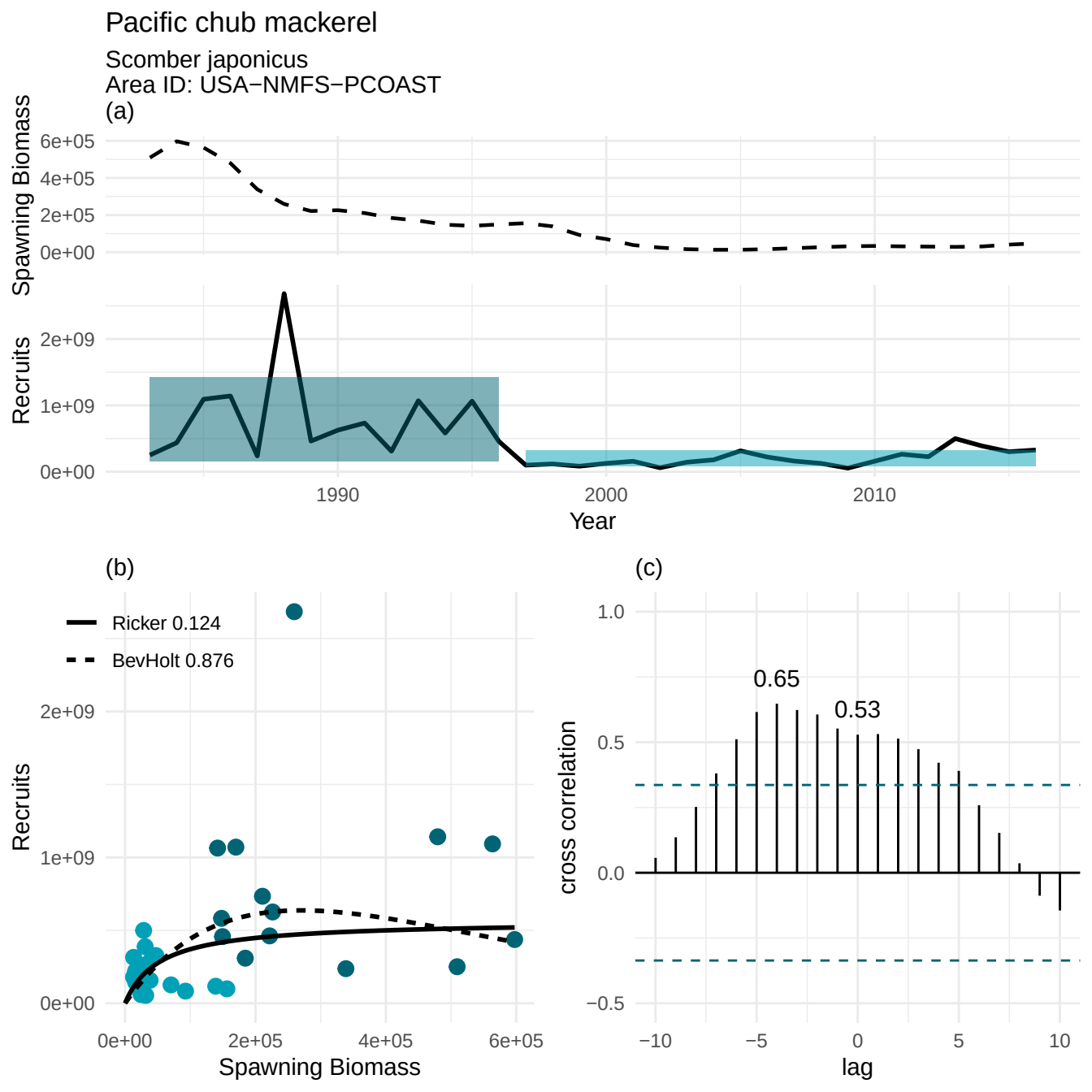

Shallow water cape hake
Merluccius capensis
Area ID: South Africa−DETMCM−SA
(a)
Spawning Biomass
180000
150000
120000
Recruits
1.75e+09
1.50e+09
1.25e+09
1.00e+09
1980
1990
2000
2010
Year
(b)
Ricker 0.892
BevHolt 0.108
Recruits
1.5e+09
1.0e+09
5.0e+08
0.0e+00
0
50000
100000
150000
200000
Spawning Biomass
(c)
0.76
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

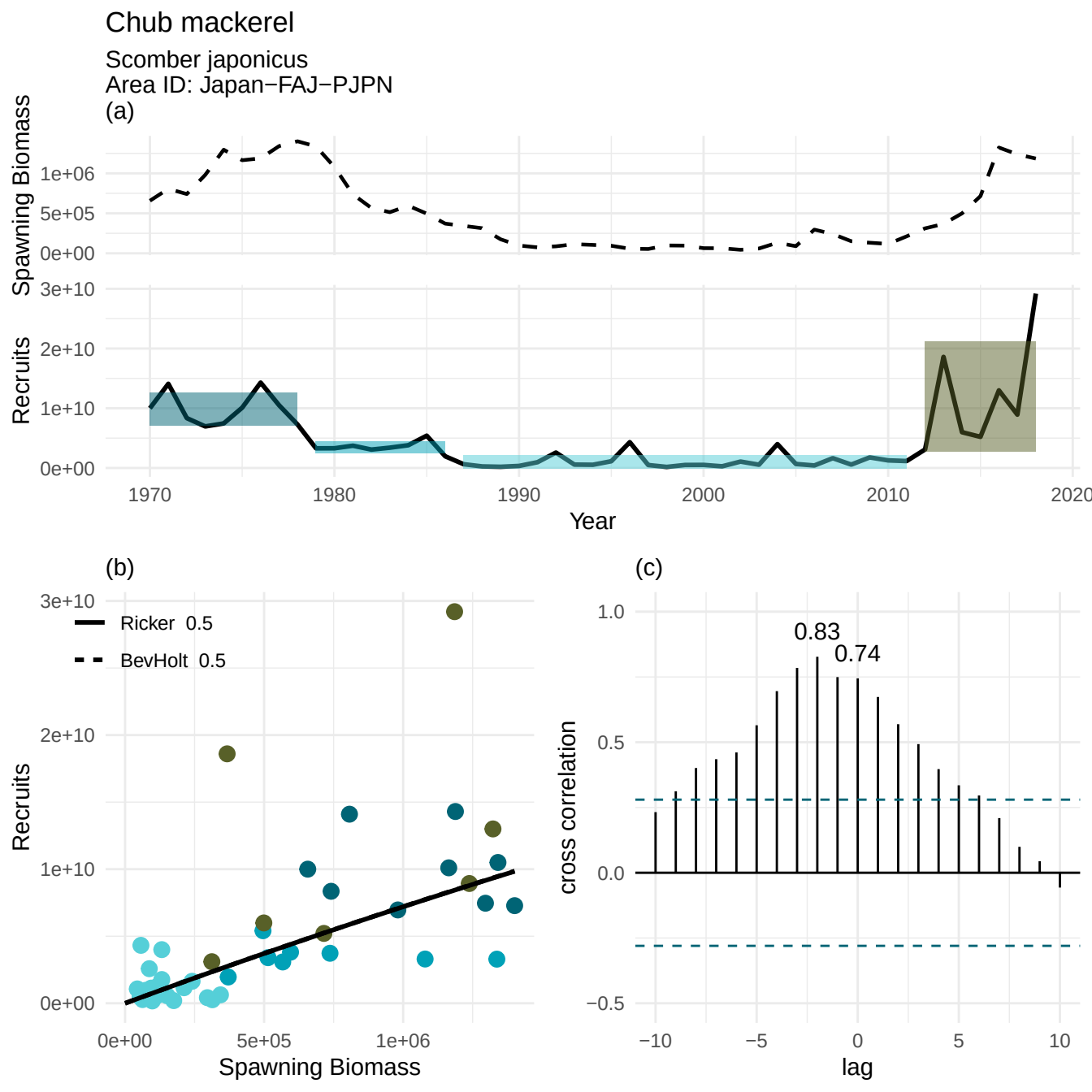

Chilean herring
Clupea bentincki
Area ID: Chile−SUBPESCA−CH−CS
(a)
Spawning Biomass
1500000
1000000
500000
0
Recruits
7.5e+10
5.0e+10
2.5e+10
1990
1995
2000
2005
2010
Year
(b)
Ricker 0.145
BevHolt 0.855
Recruits
7.5e+10
5.0e+10
2.5e+10
0.0e+00
0
500000
1000000
1500000
Spawning Biomass
(c)
1.0
0.5
0.0
−0.5
0.62
cross correlation
−10
−5
0
5
10
lag

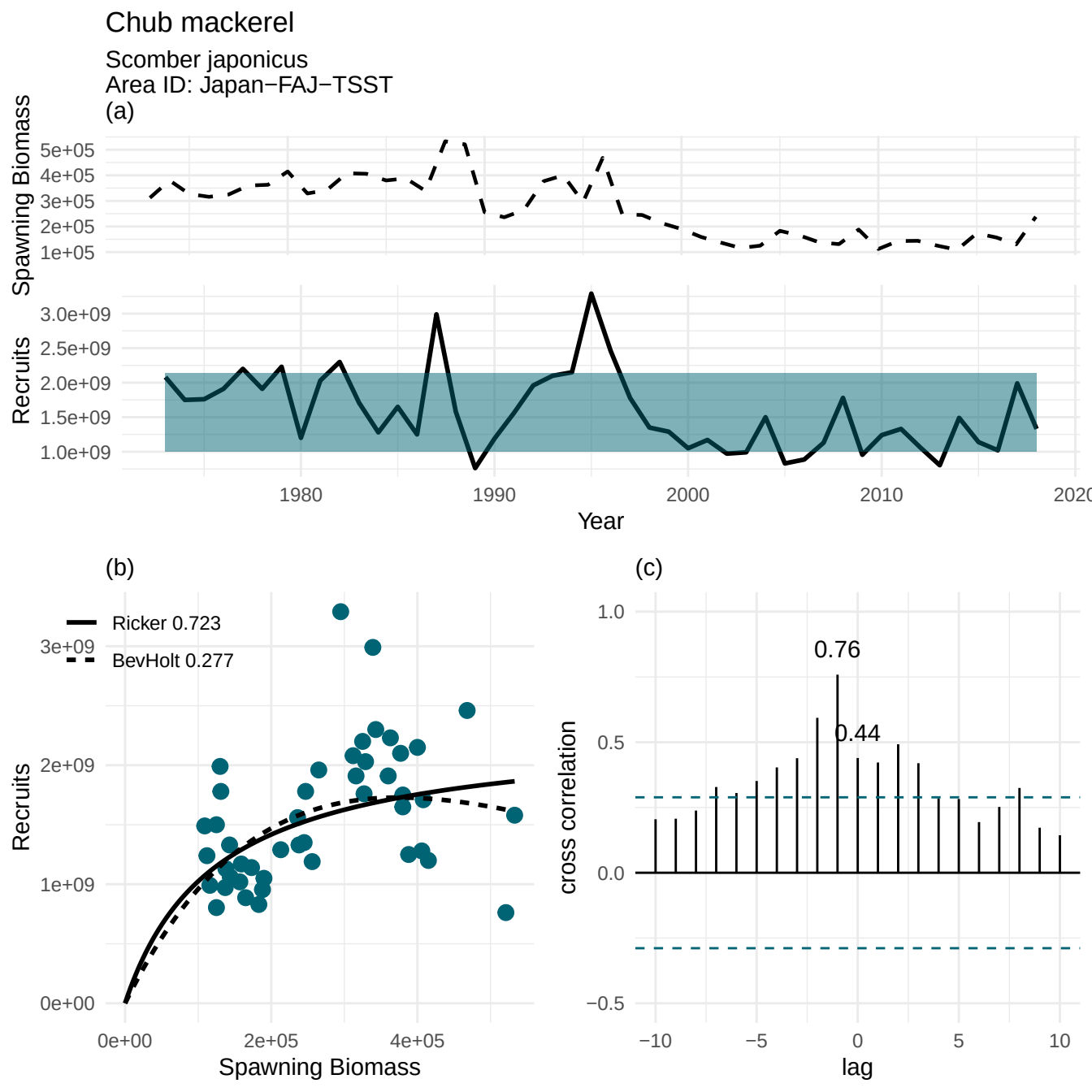

Chilipepper
Sebastes goodei
Area ID: USA−NMFS−SPCOAST
(a)
Spawning Biomass
4e+09
3e+09
2e+09
Recruits
2.0e+08
1.5e+08
1.0e+08
5.0e+07
0.0e+00
1970
1980
1990
2000
2010
Year
(b)
Ricker 0.443
BevHolt 0.557
Recruits
Spawning Biomass
0e+00
1e+09
2e+09
3e+09
4e+09
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

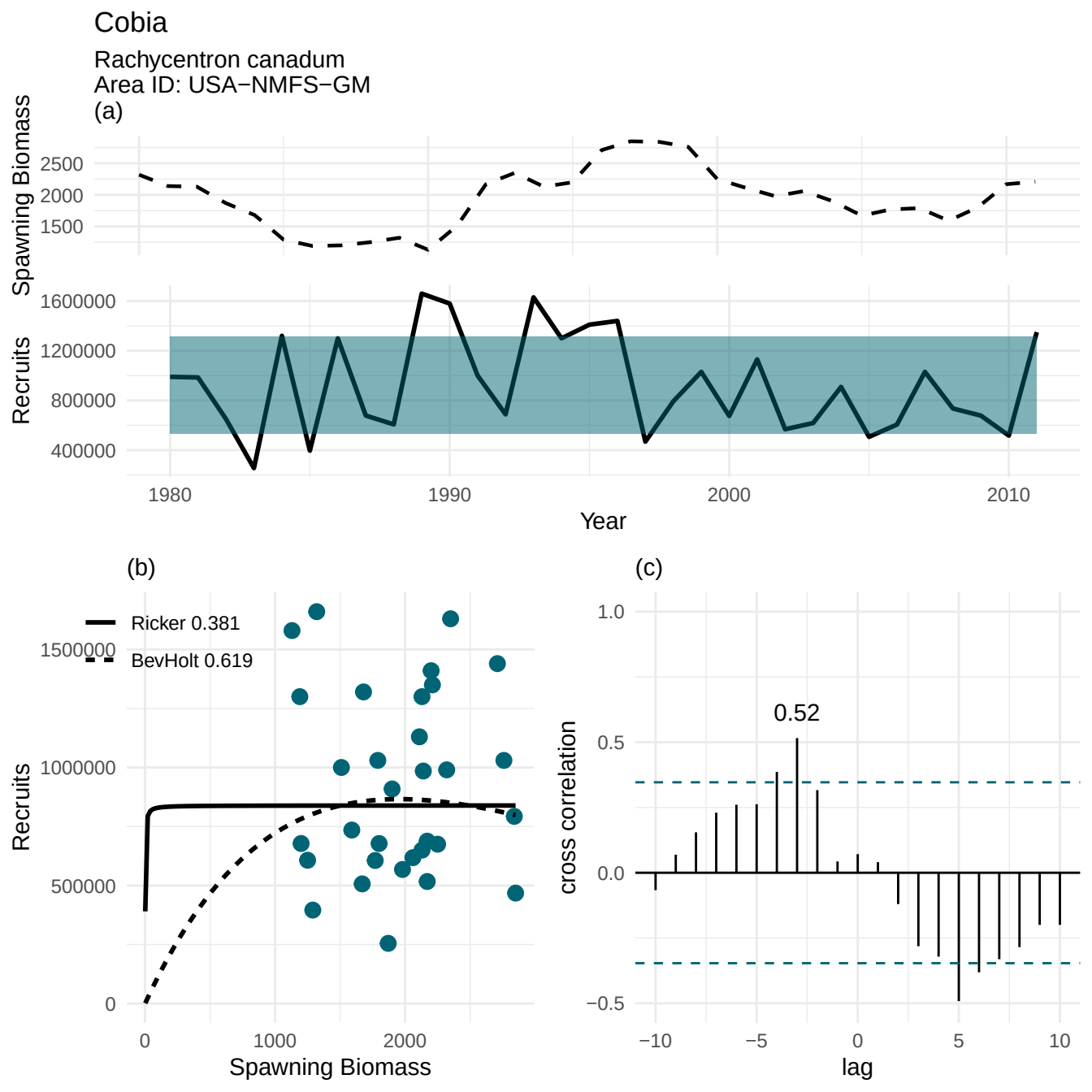

Cape Hope squid
Loligo reynaudii
Area ID: South Africa−DETMCM−SA
(a)
Spawning Biomass
80000
60000
40000
20000
Recruits
60000
50000
40000
30000
20000
1970
1980
1990
2000
2010
Year
(b)
Ricker 0.463
BevHolt 0.537
Recruits
60000
40000
20000
0
0
20000
40000
60000
80000
Spawning Biomass
(c)
0.91
0.76
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

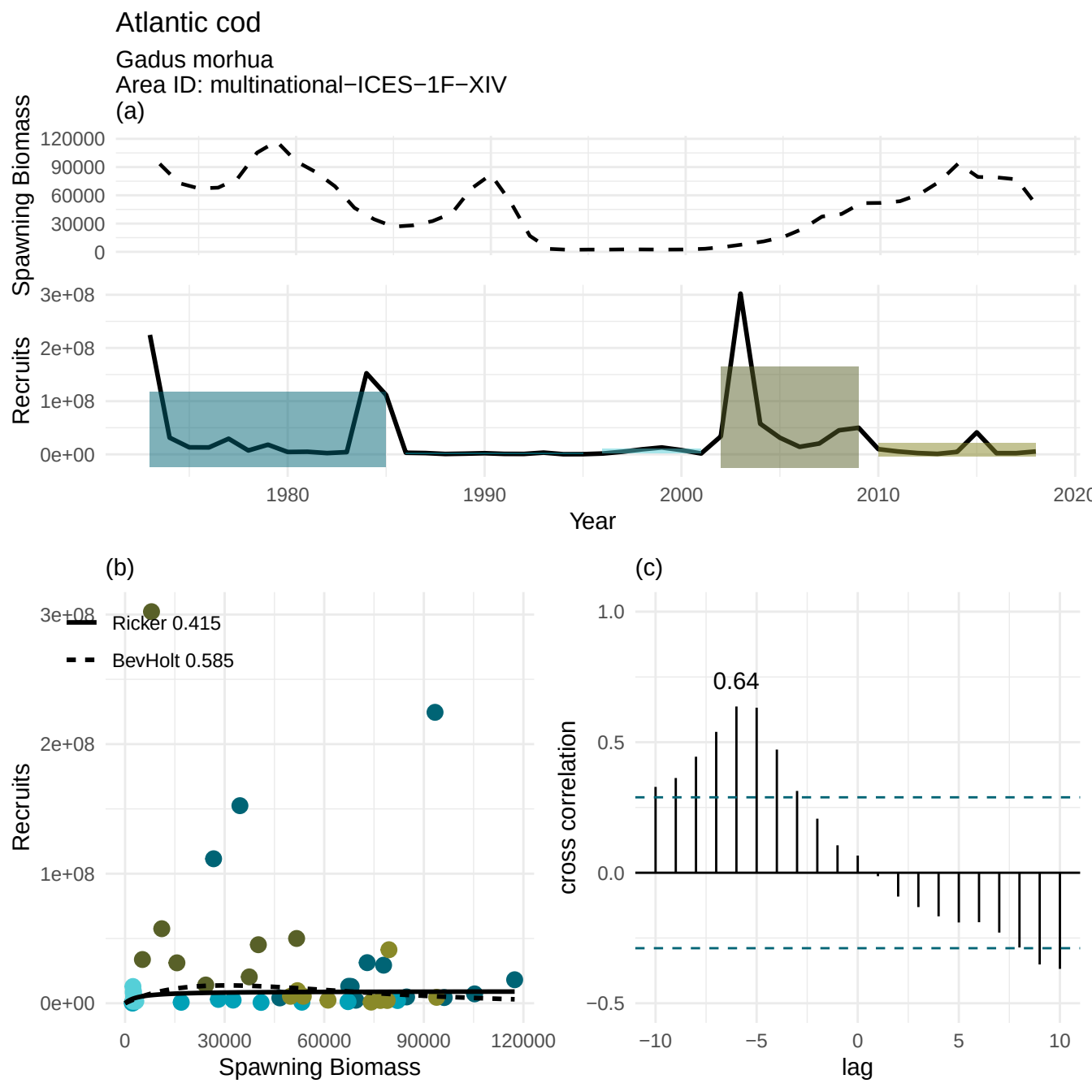

Chilean jack mackerel
Trachurus murphyi
Area ID: multinational−SPRFMO−CH
(a)
Spawning Biomass
1e+07
5e+06
Recruits
6e+10
4e+10
2e+10
1970
1980
1990
2000
2010
Year
(b)
Ricker 0.348
BevHolt 0.652
Recruits
6e+10
4e+10
2e+10
0e+00
0e+00
5e+06
1e+07
Spawning Biomass
(c)
1.0
0.5
0.0
−0.5
cross correlation
0.54
0.37
−10
−5
0
5
10
lag

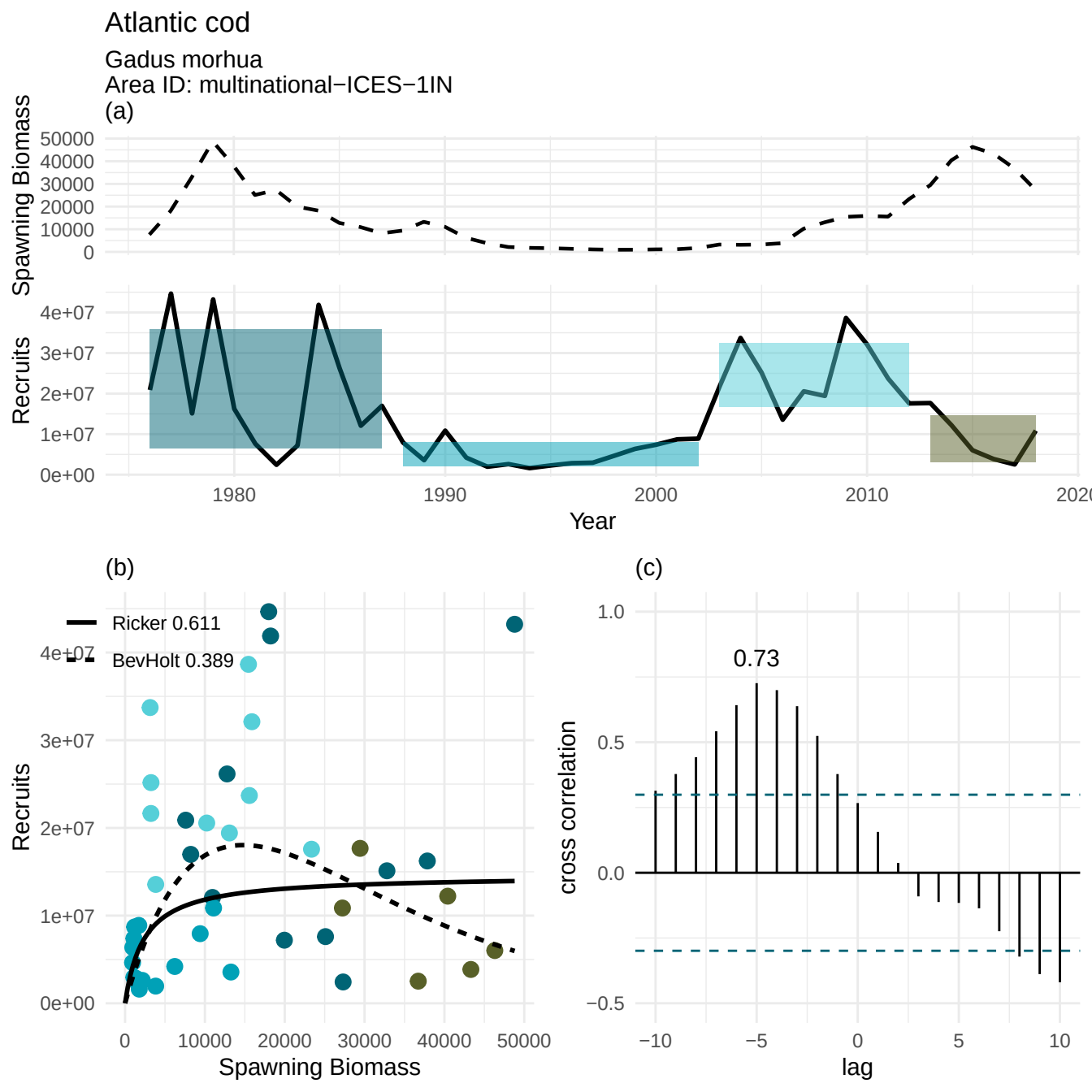

Pacific chub mackerel
Scomber japonicus
Area ID: USA−NMFS−PCOAST
(a)
Spawning Biomass
6e+05
4e+05
2e+05
0e+00
Recruits
2e+09
1e+09
0e+00
1990
2000
2010
Year
(b)
Ricker 0.124
BevHolt 0.876
Recruits
2e+09
1e+09
0e+00
0e+00
2e+05
4e+05
6e+05
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.65
0.53
−10
−5
0
5
10
lag

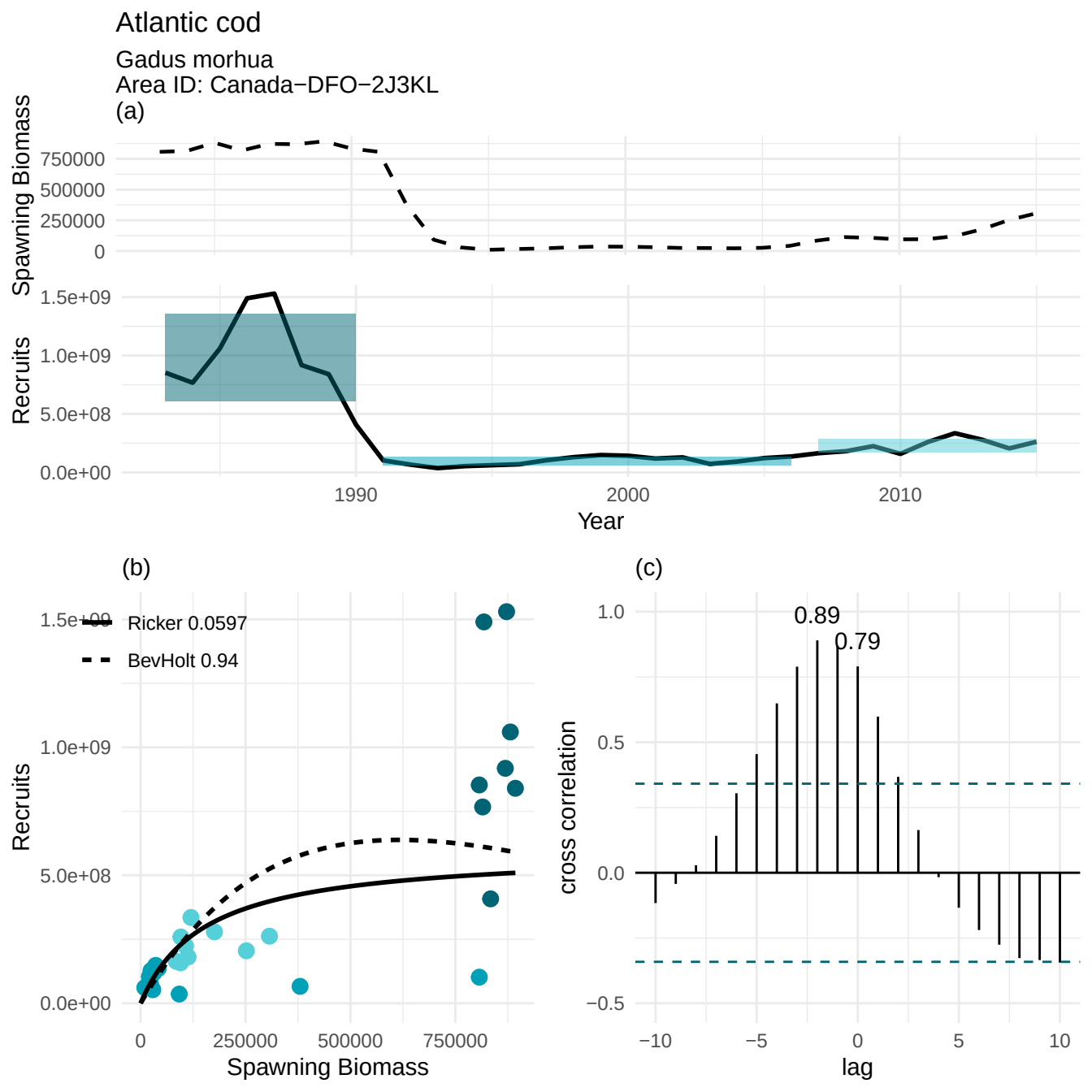

Chub mackerel
Scomber japonicus
Area ID: Japan−FAJ−PJPN
(a)
Spawning Biomass
1e+06
5e+05
0e+00
Recruits
3e+10
2e+10
1e+10
0e+00
1970
1980
1990
2000
2010
2020
Year
(b)
Ricker 0.5
BevHolt 0.5
Recruits
3e+10
2e+10
1e+10
0e+00
0e+00
5e+05
1e+06
Spawning Biomass
(c)
0.83
0.74
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

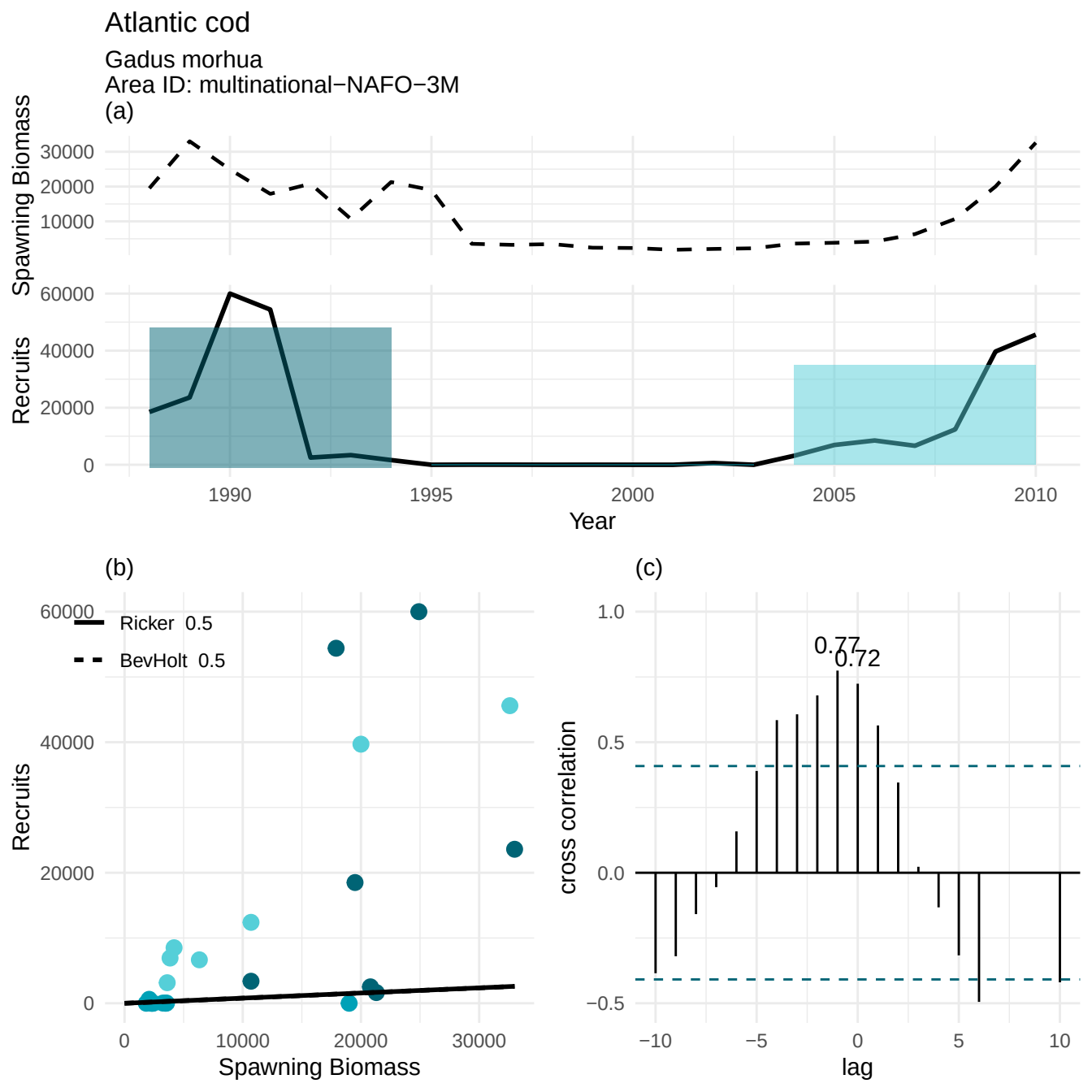

Chub mackerel
Scomber japonicus
Area ID: Japan−FAJ−TSST
(a)
Spawning Biomass
5e+05
4e+05
3e+05
2e+05
1e+05
Recruits
3.0e+09
2.5e+09
2.0e+09
1.5e+09
1.0e+09
1980
1990
2000
2010
2020
Year
(b)
Ricker 0.723
BevHolt 0.277
Recruits
3e+09
2e+09
1e+09
0e+00
0e+00
2e+05
4e+05
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.76
0.44
−10
−5
0
5
10
lag

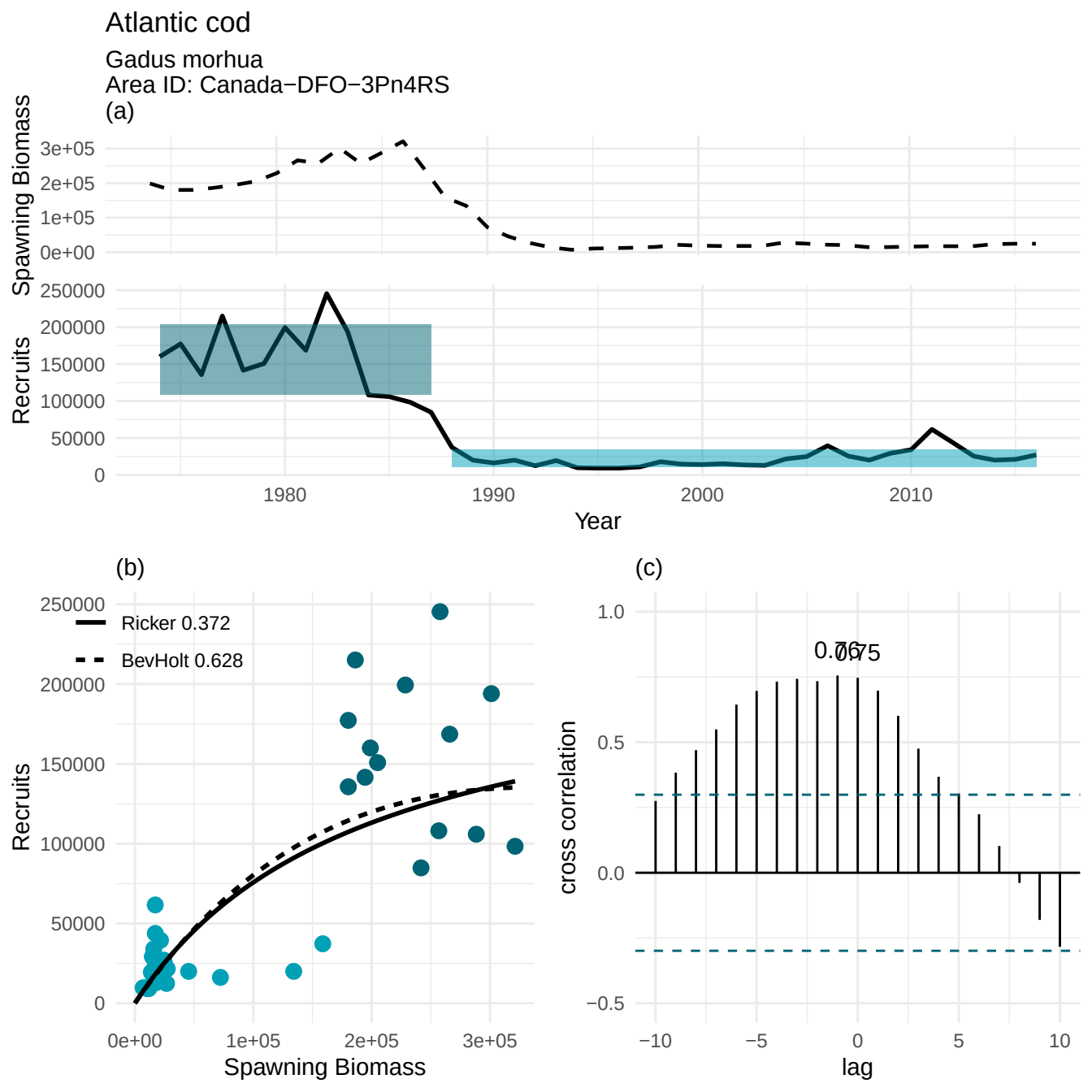

Cobia
Rachycentron canadum
Area ID: USA−NMFS−GM
(a)
Spawning Biomass
2500
2000
1500
Recruits
1600000
1200000
800000
400000
1980
1990
2000
2010
Year
(b)
Ricker 0.381
BevHolt 0.619
Recruits
1500000
1000000
500000
0
0
1000
2000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.52
−10
−5
0
5
10
lag

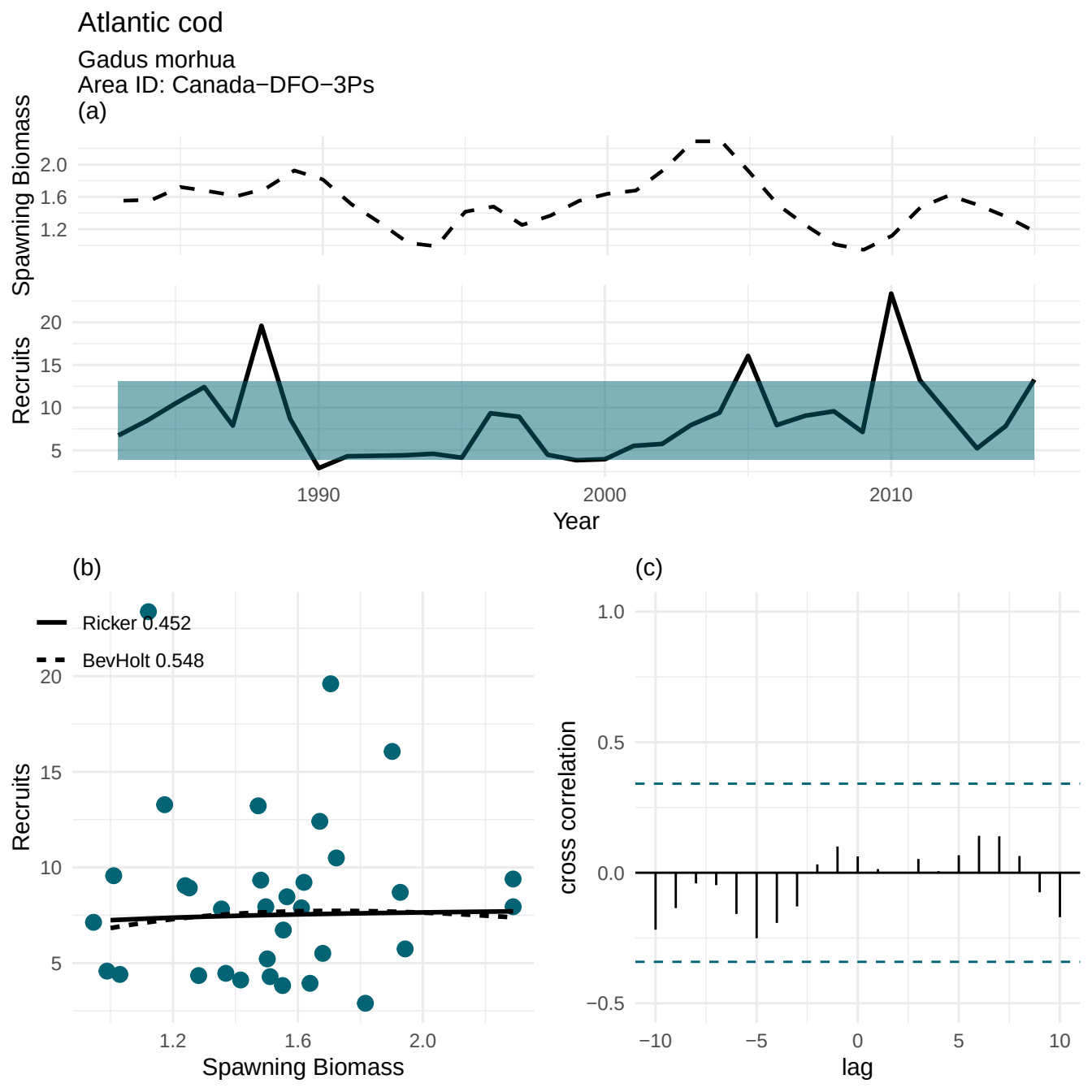

Atlantic cod
Gadus morhua
Area ID: multinational−ICES−1F−XIV
(a)
Spawning Biomass
120000
90000
60000
30000
0
Recruits
3e+08
2e+08
1e+08
0e+00
1980
1990
2000
2010
2020
Year
(b)
Ricker 0.415
BevHolt 0.585
Recruits
3e+08
2e+08
1e+08
0e+00
0
30000
60000
90000
120000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.64
−10
−5
0
5
10
lag

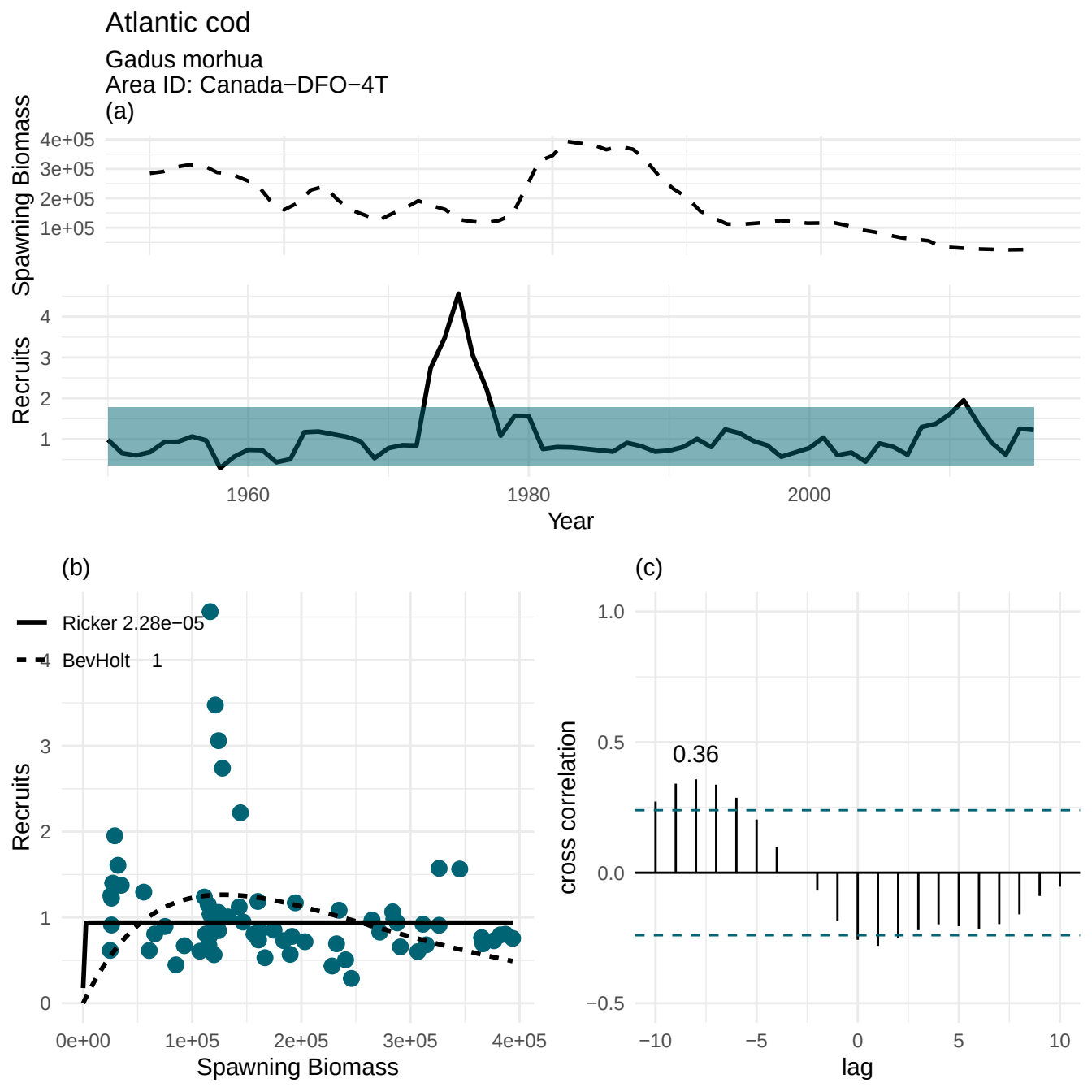

Atlantic cod
Gadus morhua
Area ID: multinational−ICES−1IN
(a)
Spawning Biomass
50000
40000
30000
20000
10000
0
Recruits
4e+07
3e+07
2e+07
1e+07
0e+00
1980
1990
2000
2010
Year
(b)
Ricker 0.611
BevHolt 0.389
Recruits
Spawning Biomass
(c)
cross correlation
0.73
lag

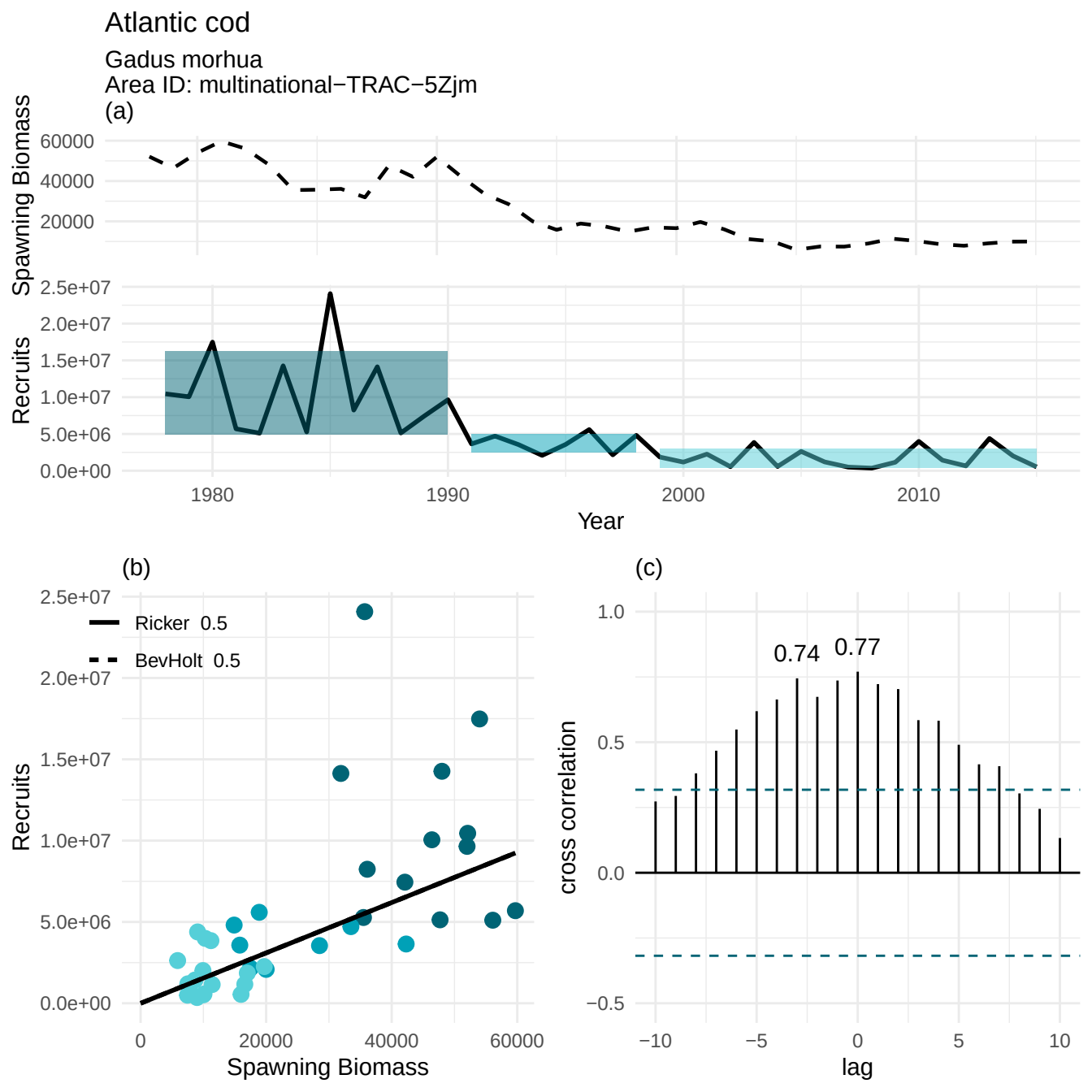

Atlantic cod
Gadus morhua
Area ID: Canada−DFO−2J3KL
(a)
Spawning Biomass
750000
500000
250000
0
Recruits
1.5e+09
1.0e+09
5.0e+08
0.0e+00
1990
2000
2010
Year
(b)
Ricker 0.0597
BevHolt 0.94
Recruits
1.5e+09
1.0e+09
5.0e+08
0.0e+00
0
250000
500000
750000
Spawning Biomass
(c)
0.89
0.79
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

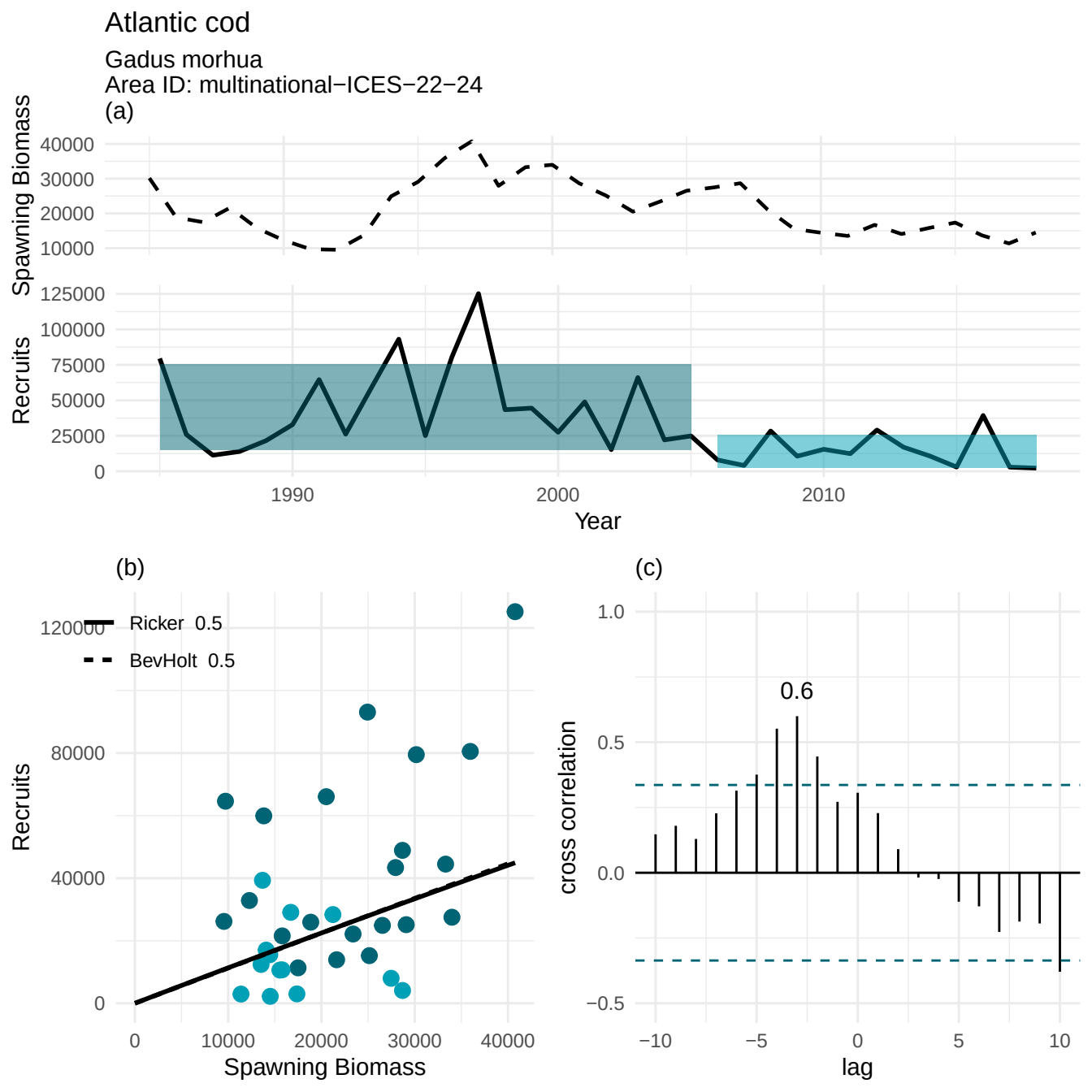

Atlantic cod
Gadus morhua
Area ID: multinational−NAFO−3M
(a)
Spawning Biomass
30000
20000
10000
Recruits
60000
40000
20000
0
1990
1995
2000
2005
2010
Year
(b)
Ricker 0.5
BevHolt 0.5
Recruits
60000
40000
20000
0
0
10000
20000
30000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.77
0.72
−10
−5
0
5
10
lag

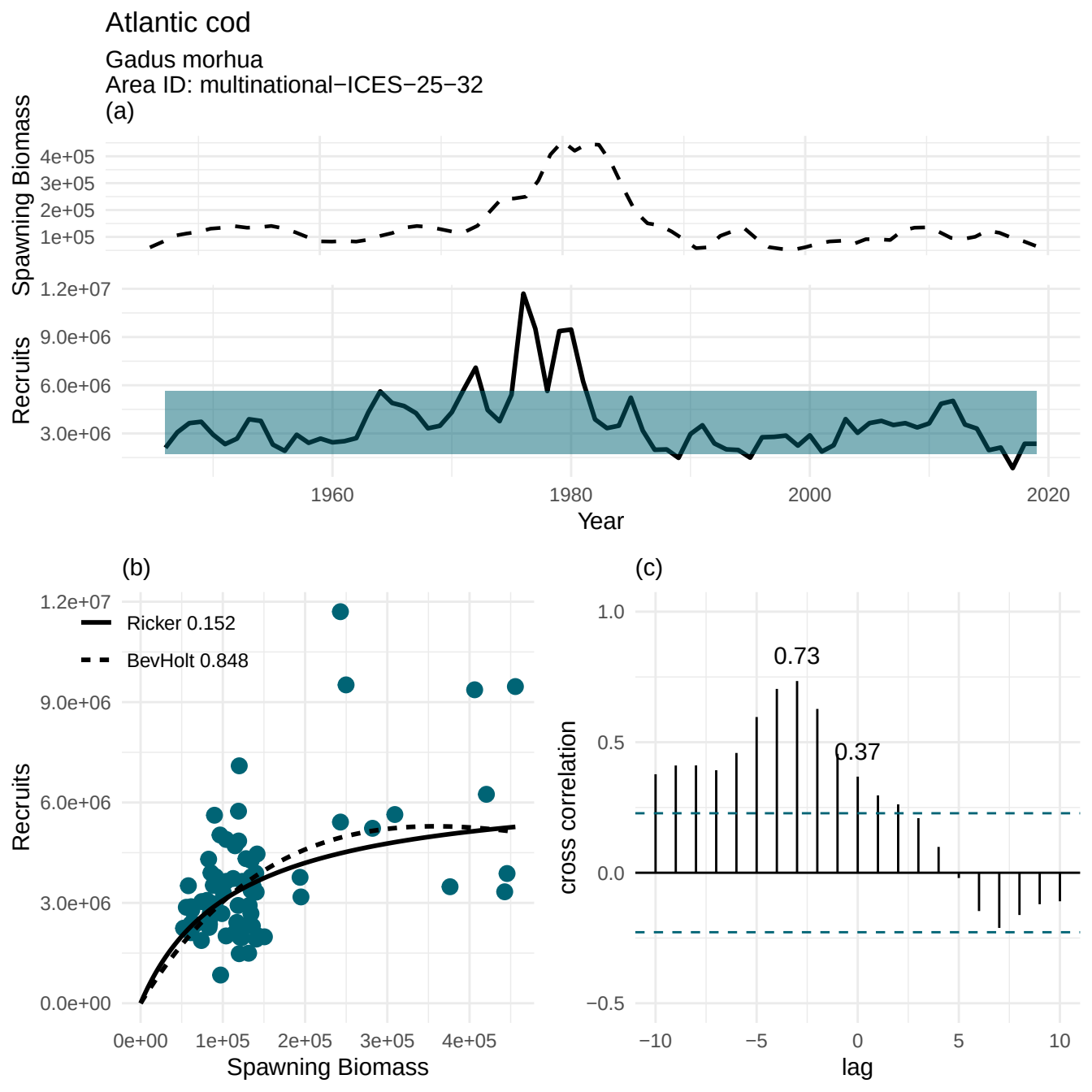

Atlantic cod
Gadus morhua
Area ID: Canada−DFO−3Pn4RS
(a)
Spawning Biomass
3e+05
2e+05
1e+05
0e+00
Recruits
250000
200000
150000
100000
50000
0
1980
1990
2000
2010
Year
(b)
Ricker 0.372
BevHolt 0.628
Recruits
Spawning Biomass
0e+00
1e+05
2e+05
3e+05
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.775
−10
−5
0
5
10
lag

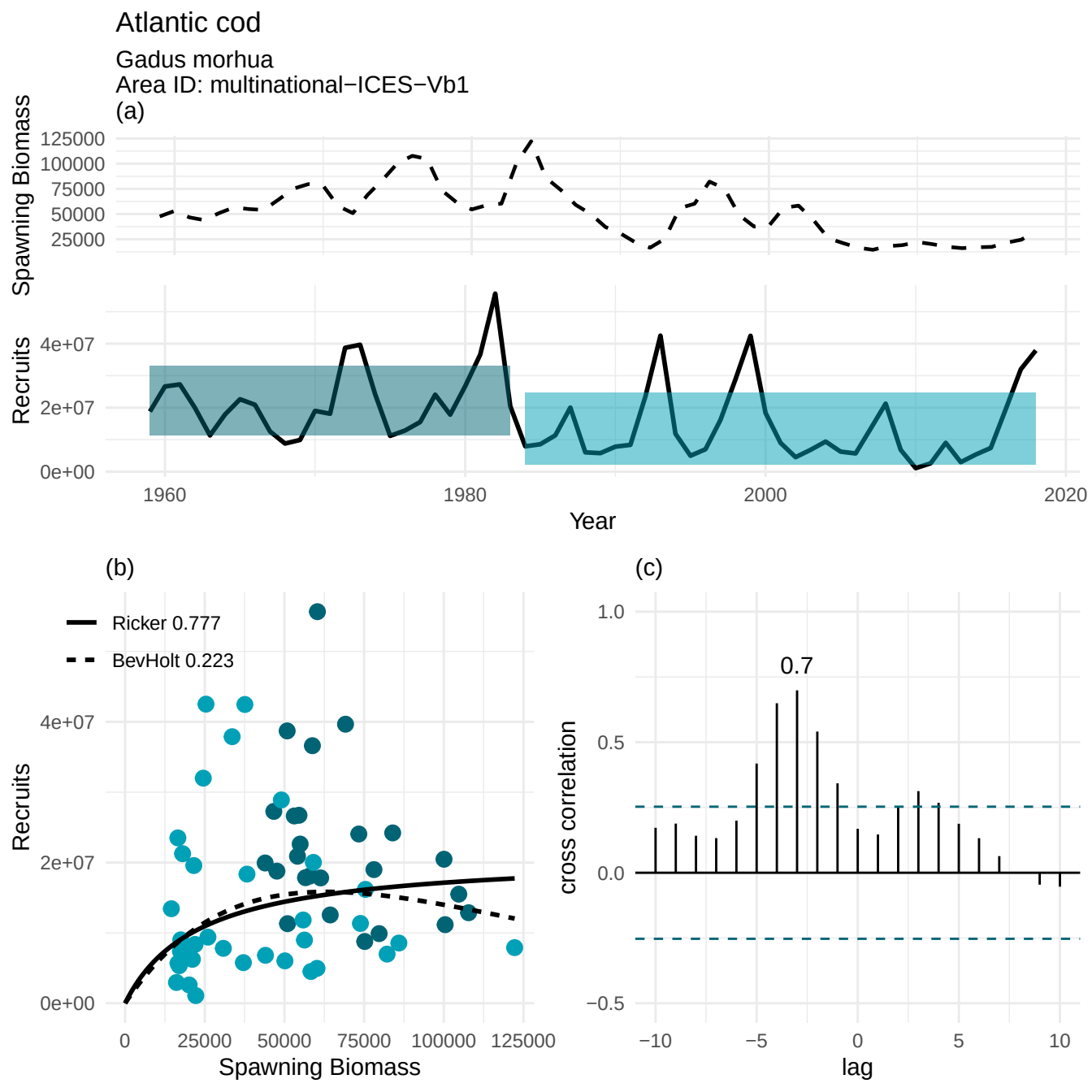

Atlantic cod
Gadus morhua
Area ID: Canada−DFO−3Ps
(a)
Spawning Biomass
2.0
1.6
1.2
Recruits
20
15
10
5
1990
2000
2010
Year
(b)
Ricker 0.452
BevHolt 0.548
Recruits
20
15
10
5
1.2
1.6
2.0
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

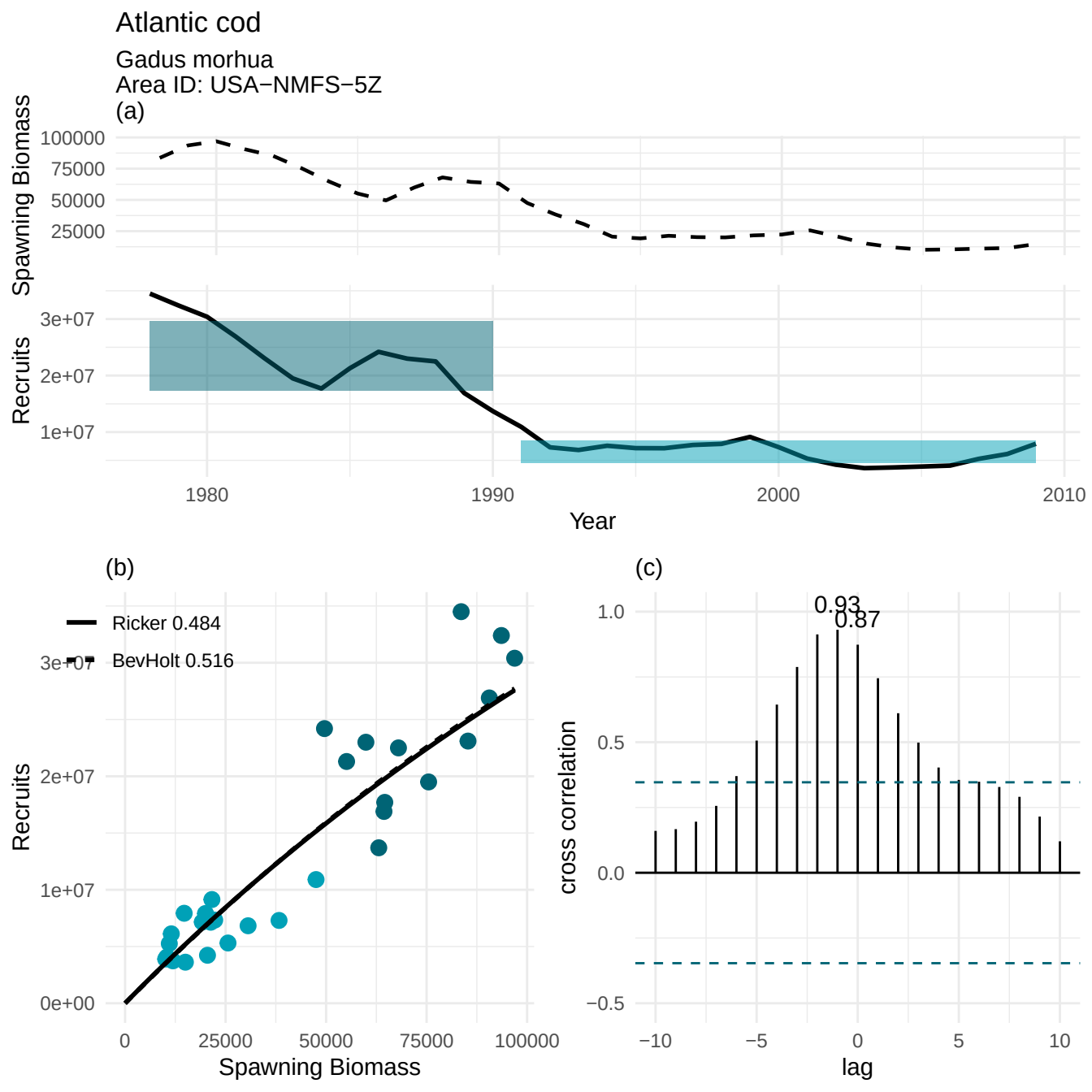

Atlantic cod
Gadus morhua
Area ID: Canada−DFO−4T
(a)
Spawning Biomass
4e+05
3e+05
2e+05
1e+05
Recruits
4
3
2
1
1960
1980
2000
Year
(b)
Ricker 2.28e−05
BevHolt 1
Recruits
0e+00
1e+05
2e+05
3e+05
4e+05
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.36
−10
−5
0
5
10
lag

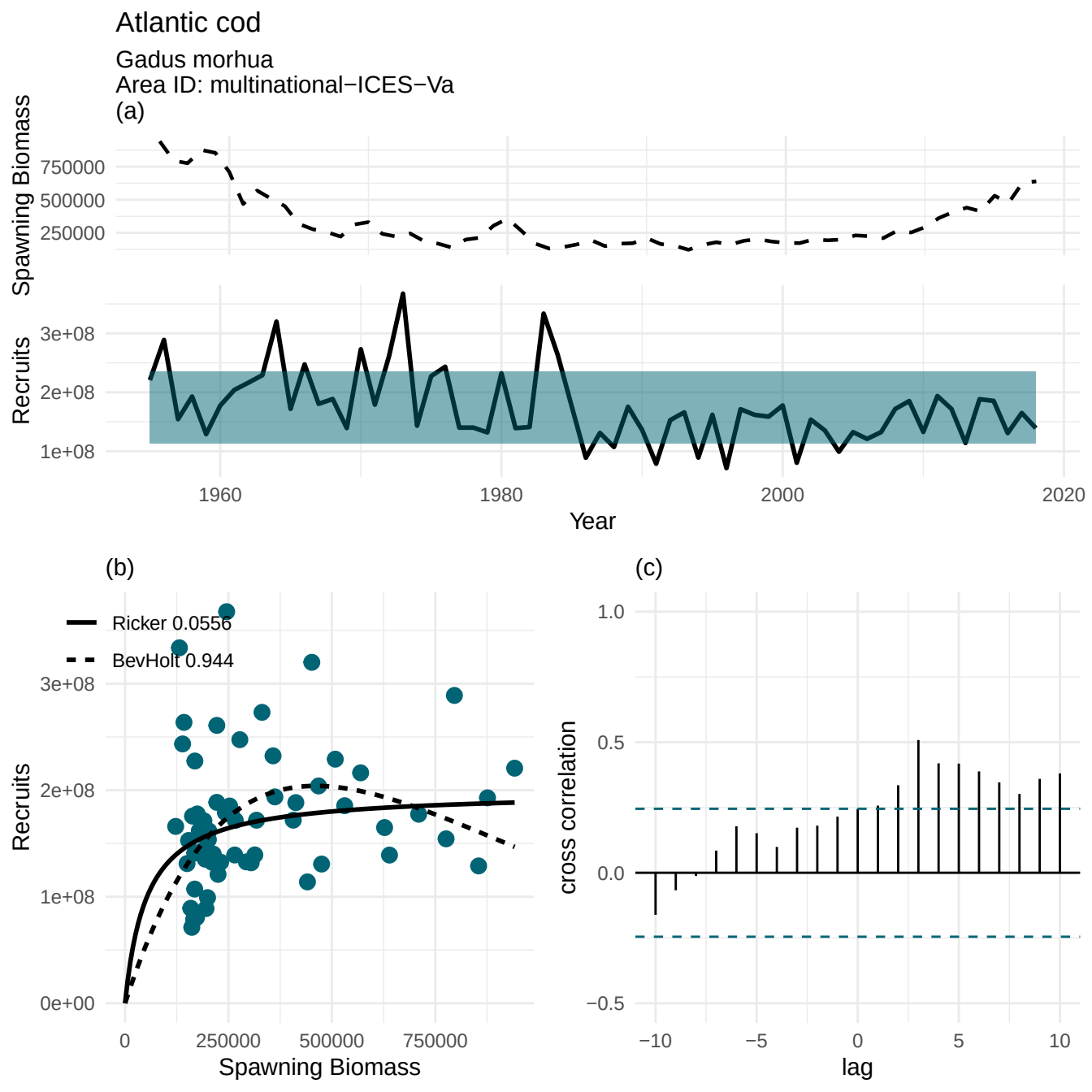

Atlantic cod
Gadus morhua
Area ID: multinational−TRAC−5Zjm
(a)
Spawning Biomass
60000
40000
20000
Recruits
2.5e+07
2.0e+07
1.5e+07
1.0e+07
5.0e+06
0.0e+00
1980
1990
2000
2010
Year
(b)
Ricker 0.5
BevHolt 0.5
Recruits
Spawning Biomass
0
20000
40000
60000
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.74
0.77
−10
−5
0
5
10
lag

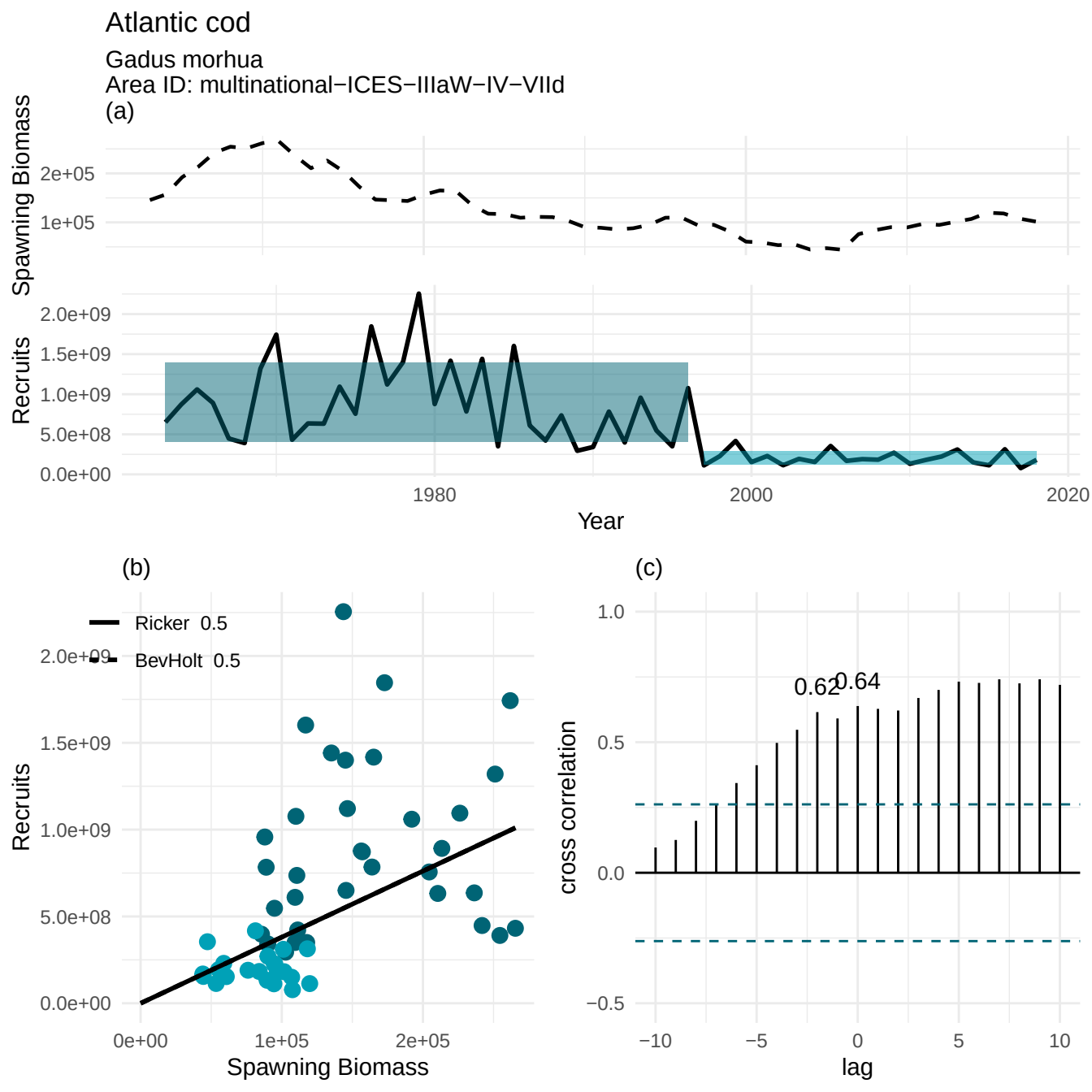

Atlantic cod
Gadus morhua
Area ID: multinational−ICES−22−24
(a)
Spawning Biomass
40000
30000
20000
10000
Recruits
125000
100000
75000
50000
25000
0
1990
2000
2010
Year
(b)
Ricker 0.5
BevHolt 0.5
120000
80000
40000
0
Recruits
0
10000
20000
30000
40000
Spawning Biomass
(c)
1.0
0.5
0.0
−0.5
0.6
cross correlation
−10
−5
0
5
10
lag

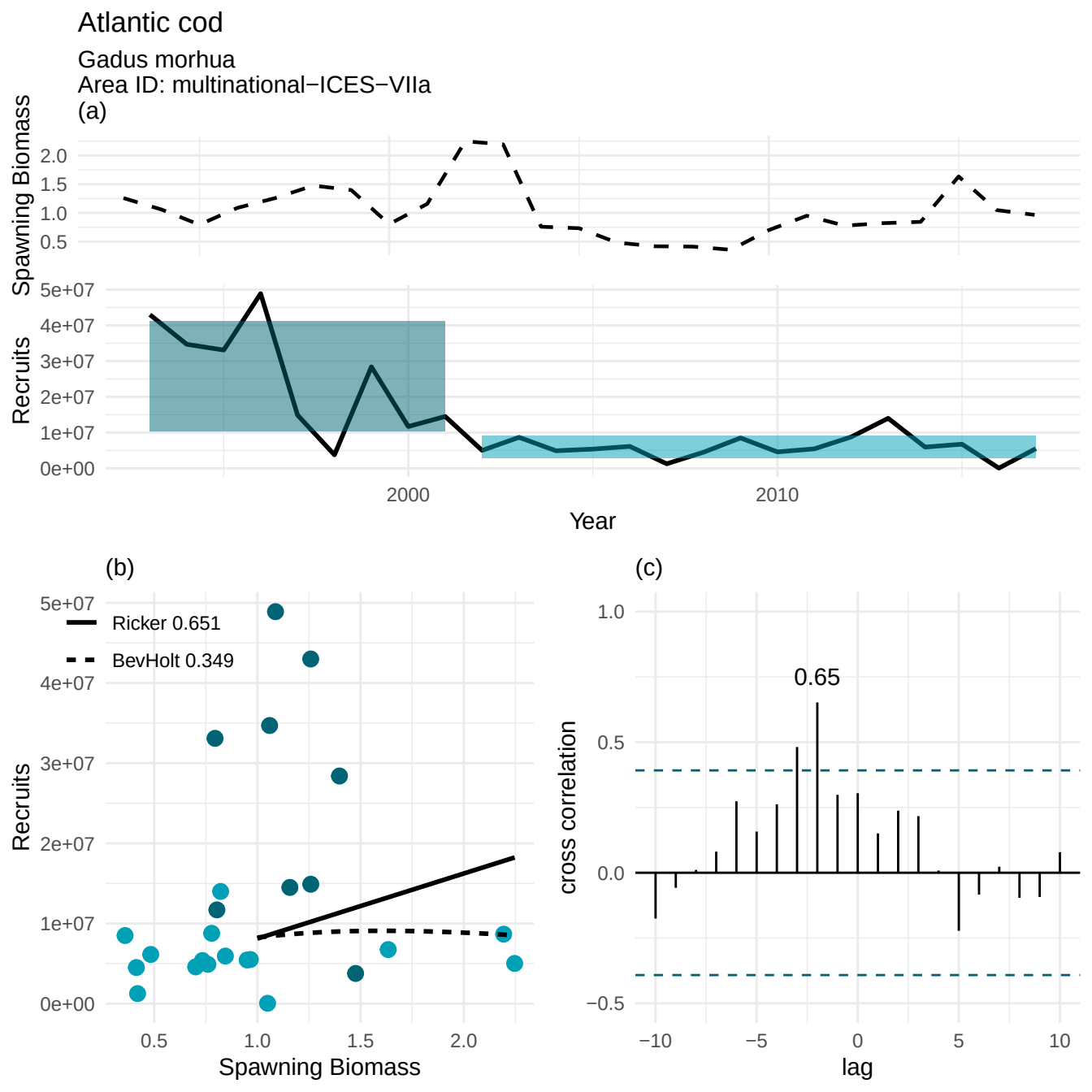

Atlantic cod
Gadus morhua
Area ID: multinational−ICES−25−32
(a)
Spawning Biomass
4e+05
3e+05
2e+05
1e+05
Recruits
1.2e+07
9.0e+06
6.0e+06
3.0e+06
1960
1980
2000
2020
Year
(b)
Ricker 0.152
BevHolt 0.848
Recruits
1.2e+07
9.0e+06
6.0e+06
3.0e+06
0.0e+00
0e+00
1e+05
2e+05
3e+05
4e+05
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.73
0.37
−10
−5
0
5
10
lag

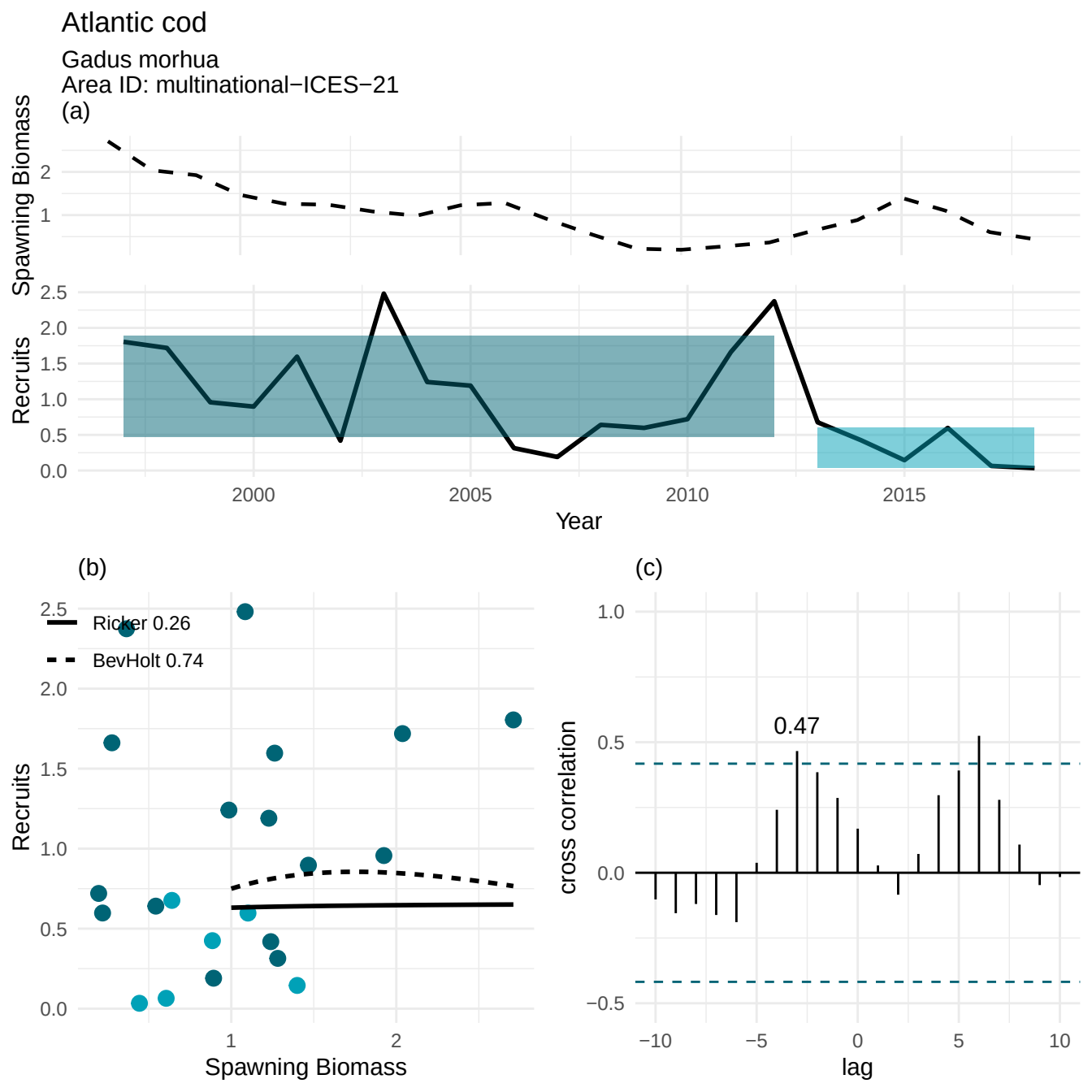

Atlantic cod
Gadus morhua
Area ID: multinational−ICES−Vb1
(a)
Spawning Biomass
125000
100000
75000
50000
25000
Recruits
4e+07
2e+07
0e+00
1960
1980
2000
2020
Year
(b)
Ricker 0.777
BevHolt 0.223
Recruits
4e+07
2e+07
0e+00
0
25000
50000
75000
100000
125000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.7
−10
−5
0
5
10
lag

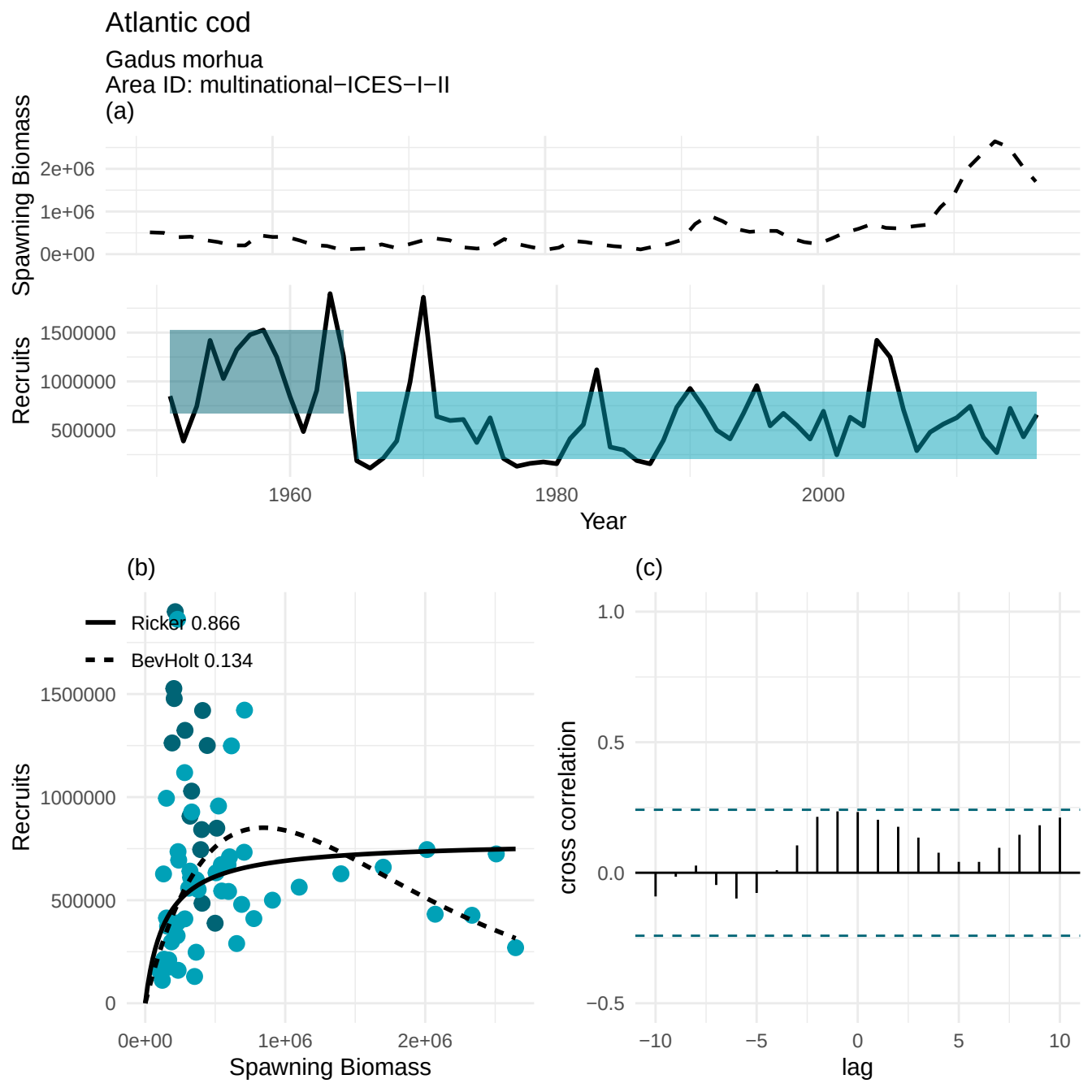

Atlantic cod
Gadus morhua
Area ID: USA−NMFS−5Z
(a)
Spawning Biomass
100000
75000
50000
25000
Recruits
3e+07
2e+07
1e+07
1980
1990
2000
2010
Year
(b)
Ricker 0.484
BevHolt 0.516
Recruits
3e+07
2e+07
1e+07
0e+00
0
25000
50000
75000
100000
Spawning Biomass
(c)
0.93
0.87
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

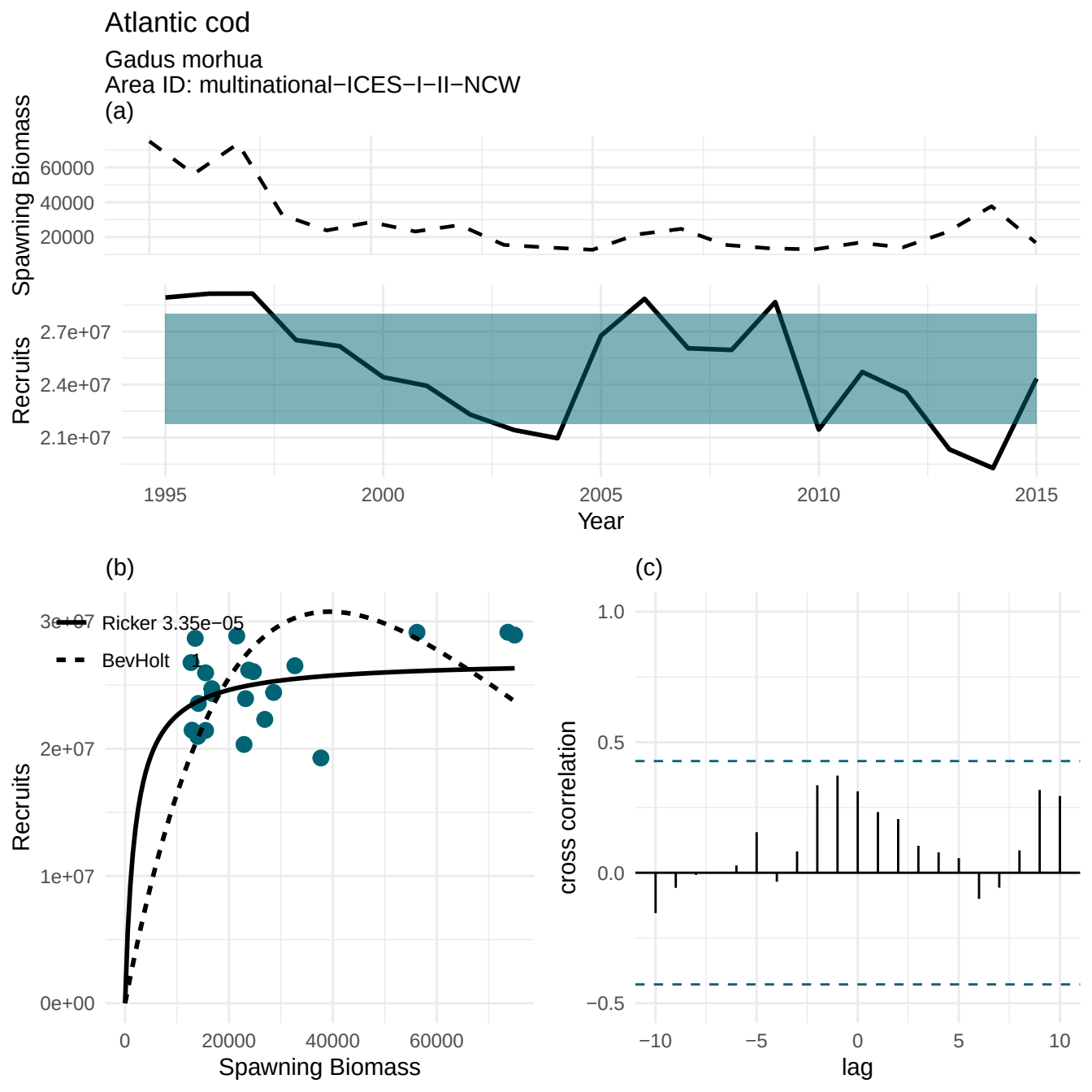

Atlantic cod
Gadus morhua
Area ID: multinational−ICES−Va
(a)
Spawning Biomass
750000
500000
250000
Recruits
3e+08
2e+08
1e+08
1960
1980
2000
2020
Year
(b)
Ricker 0.0556
BevHolt 0.944
Recruits
3e+08
2e+08
1e+08
0e+00
0
250000
500000
750000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

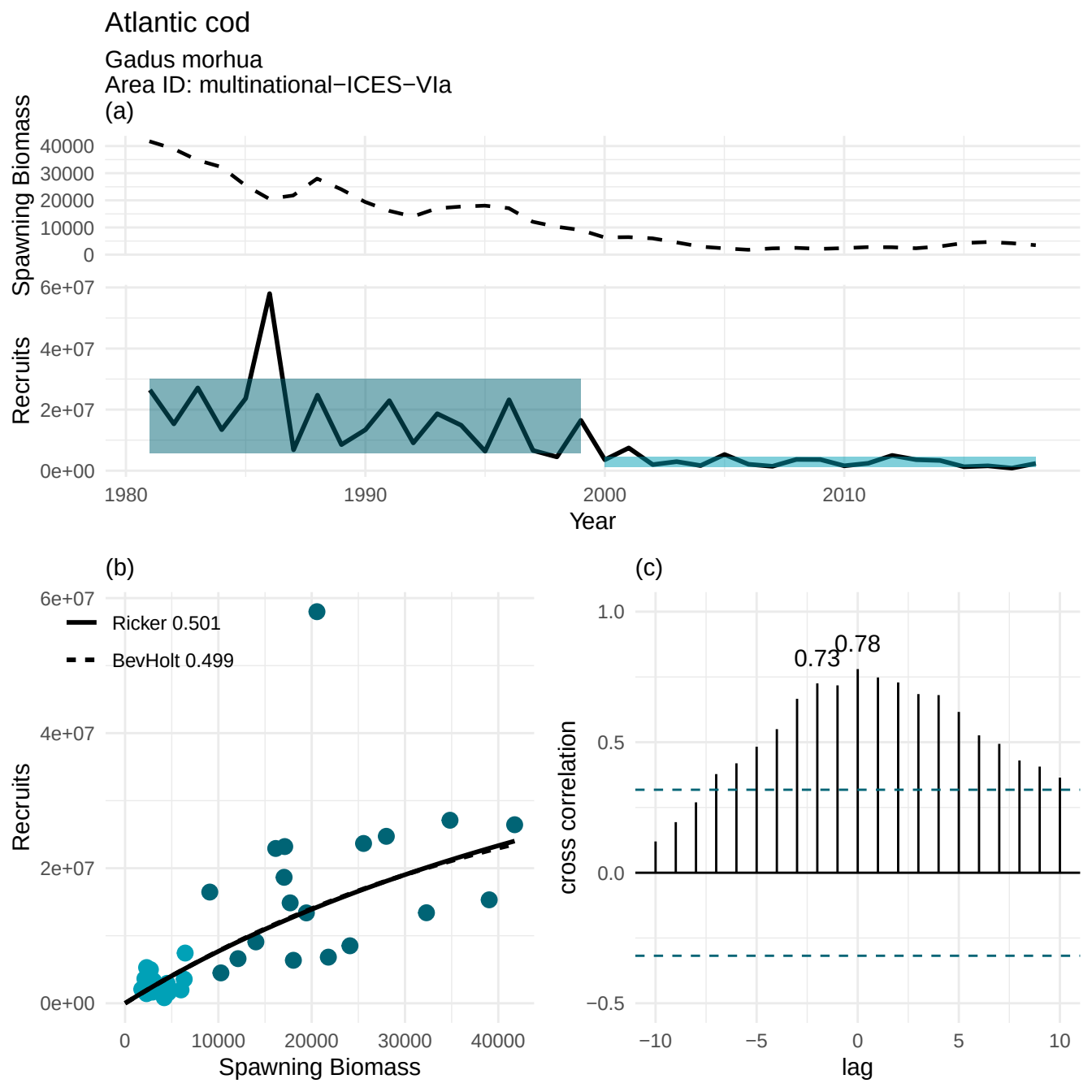

Atlantic cod
Gadus morhua
Area ID: multinational−ICES−IIIaW−IV−VIId
(a)
Spawning Biomass
2e+05
1e+05
Recruits
2.0e+09
1.5e+09
1.0e+09
5.0e+08
0.0e+00
1980
2000
2020
Year
(b)
Ricker 0.5
BevHolt 0.5
Recruits
2.0e+09
1.5e+09
1.0e+09
5.0e+08
0.0e+00
0e+00
1e+05
2e+05
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.62
0.64
−10
−5
0
5
10
lag

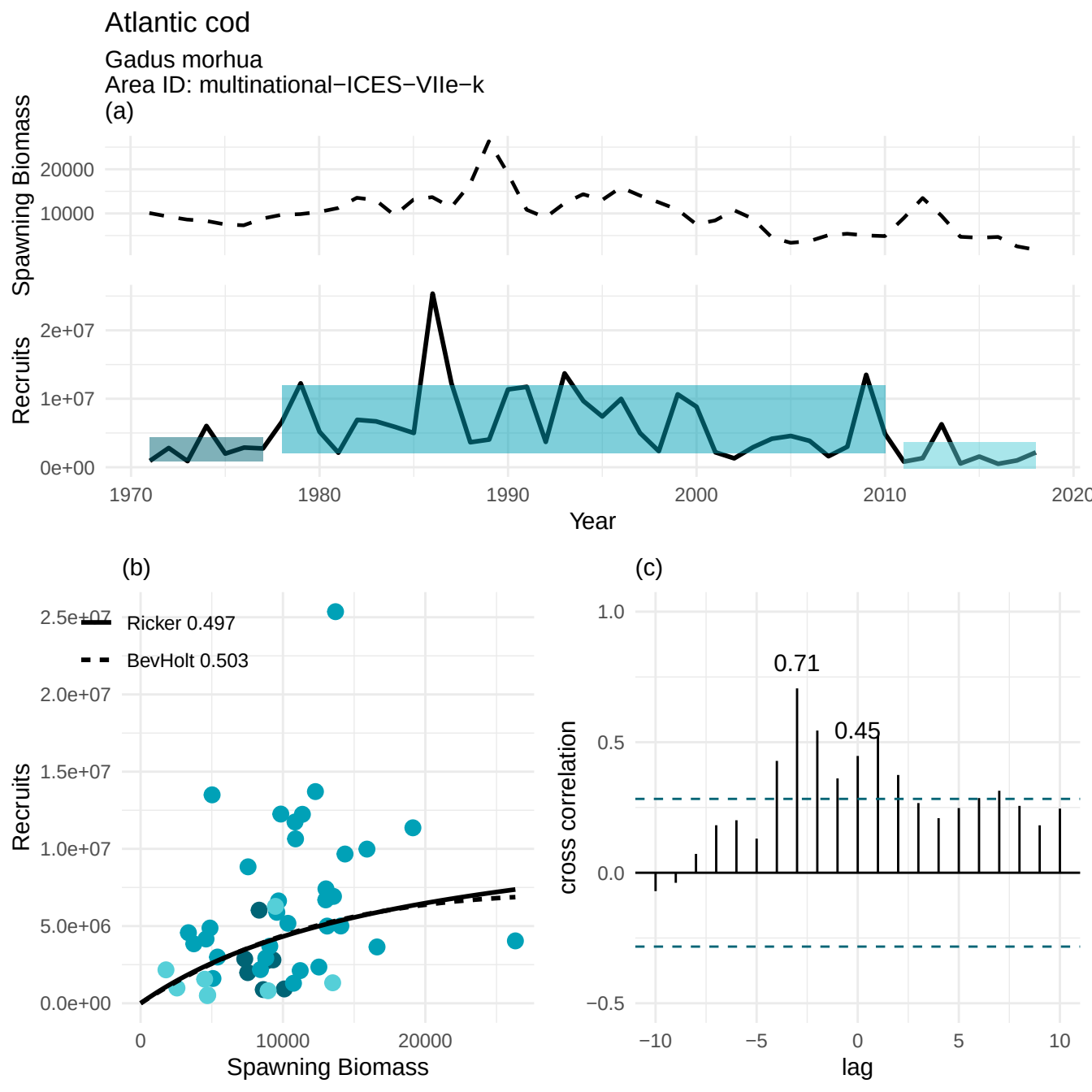

Atlantic cod
Gadus morhua
Area ID: multinational−ICES−VIIa
(a)
Spawning Biomass
2.0
1.5
1.0
0.5
Recruits
5e+07
4e+07
3e+07
2e+07
1e+07
0e+00
2000
2010
Year
(b)
Ricker 0.651
BevHolt 0.349
Recruits
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.65
−10
−5
0
5
10
lag

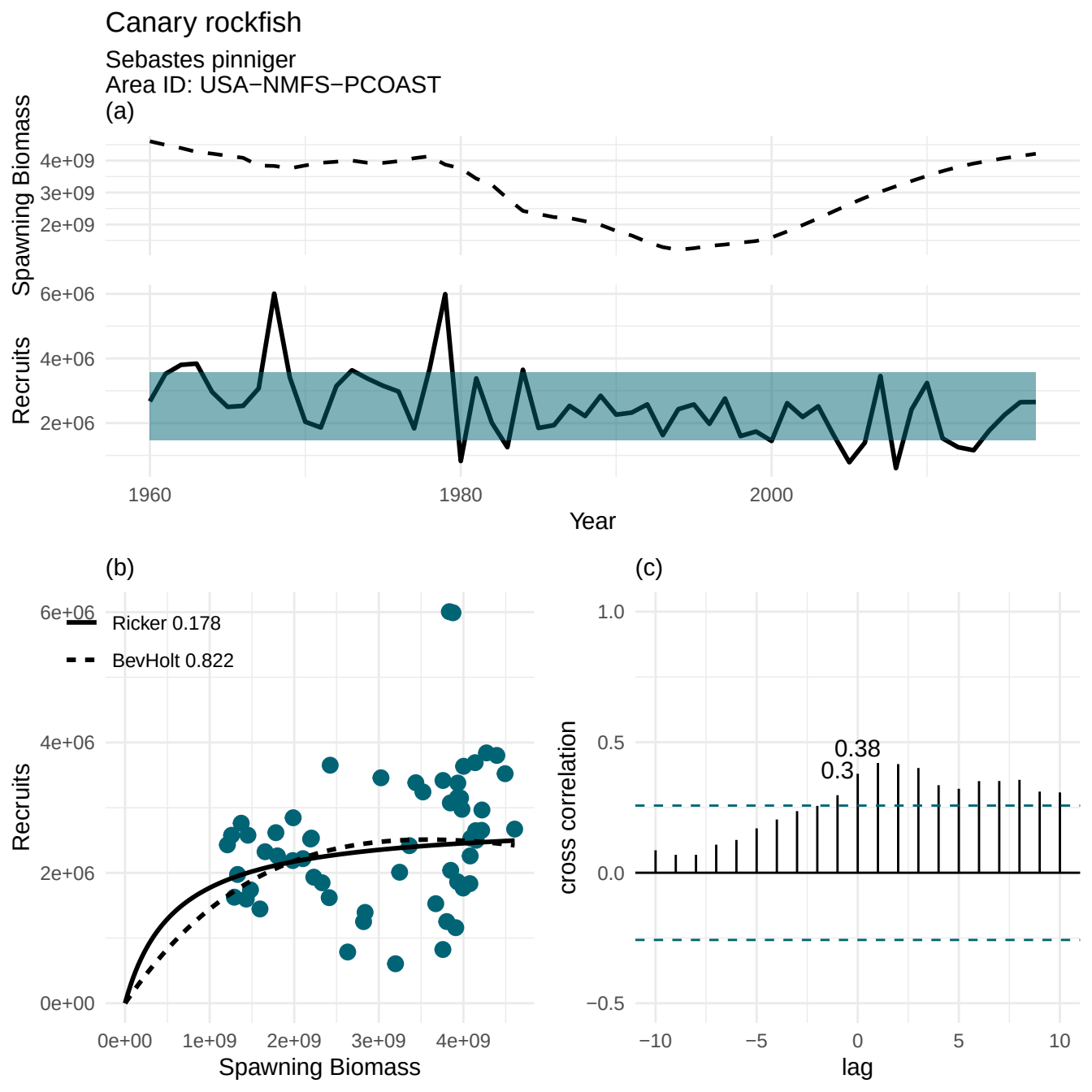

Atlantic cod
Gadus morhua
Area ID: multinational−ICES−21
(a)
Spawning Biomass
Recruits
Year
(b)
Ricker 0.26
BevHolt 0.74
Recruits
Spawning Biomass
(c)
0.47
cross correlation
lag

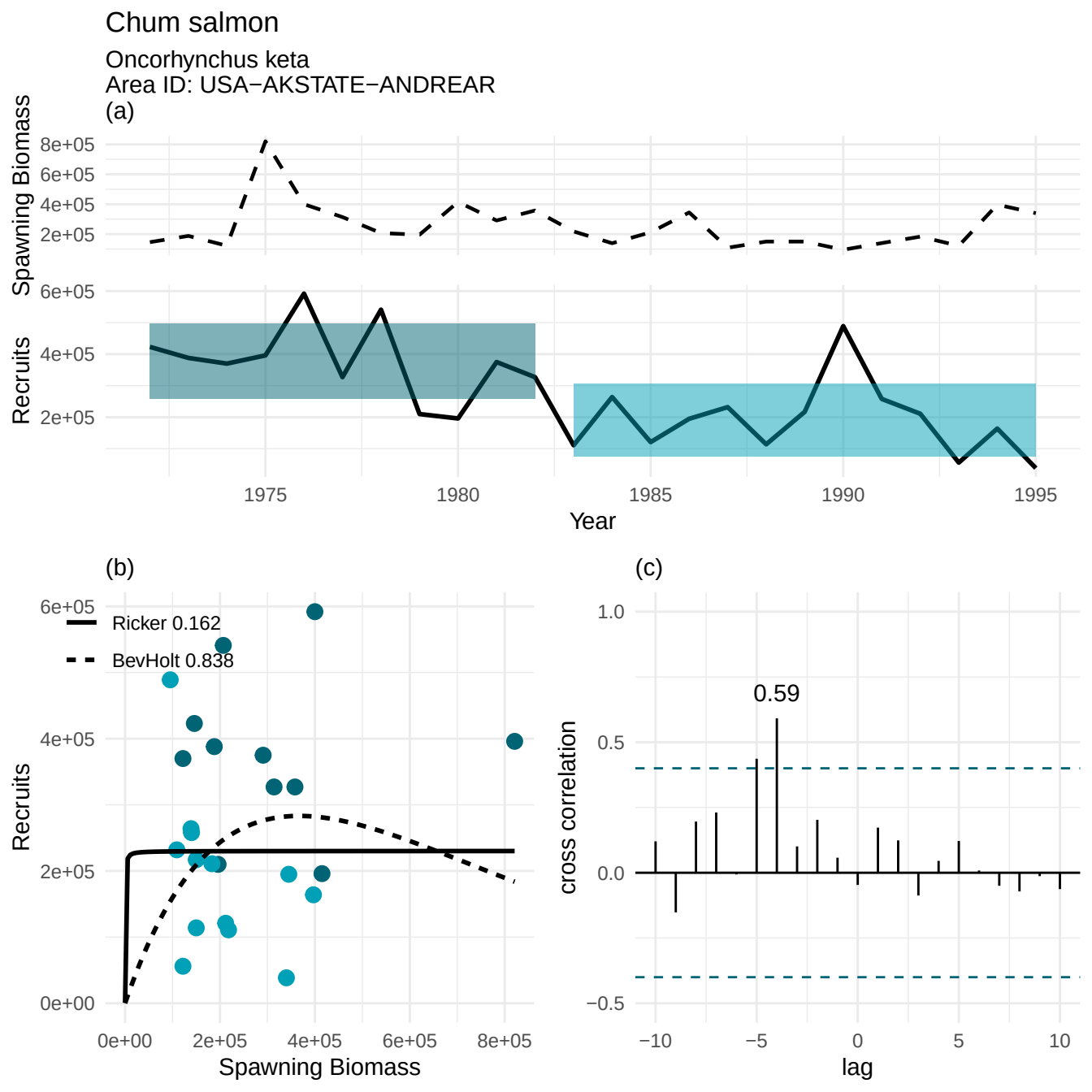

Atlantic cod
Gadus morhua
Area ID: multinational−ICES−I−II
(a)
Spawning Biomass
2e+06
1e+06
0e+00
Recruits
1500000
1000000
500000
1960
1980
2000
Year
(b)
Ricker 0.866
BevHolt 0.134
Recruits
1500000
1000000
500000
0
0e+00
1e+06
2e+06
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

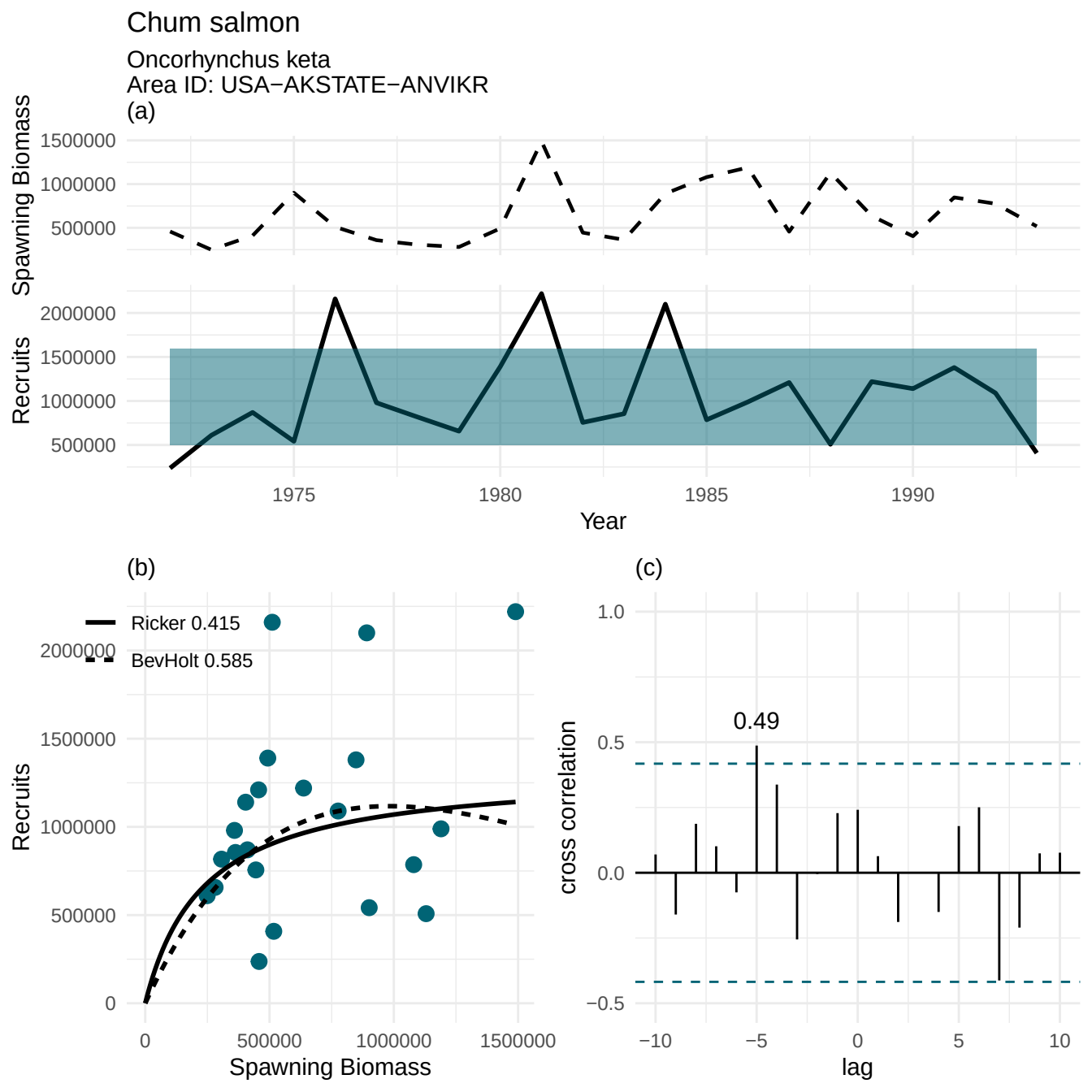

Atlantic cod
Gadus morhua
Area ID: multinational−ICES−I−II−NCW
(a)
Spawning Biomass
60000
40000
20000
Recruits
2.7e+07
2.4e+07
2.1e+07
1995
2000
2005
2010
2015
Year
(b)
Ricker 3.35e−05
BevHolt 1
3e+07
2e+07
1e+07
0e+00
Recruits
0
20000
40000
60000
Spawning Biomass
(c)
1.0
0.5
0.0
−0.5
cross correlation
−10
−5
0
5
10
lag

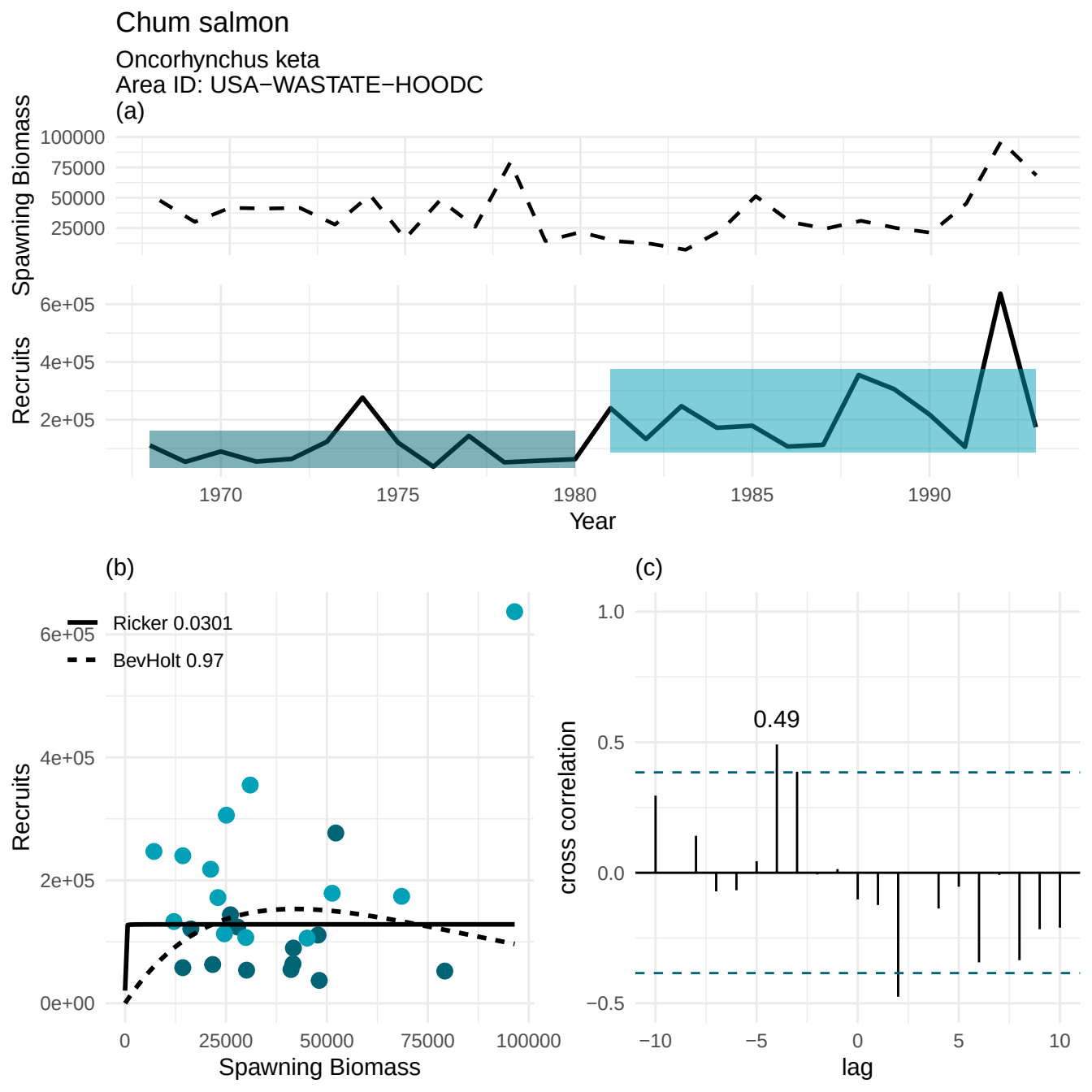

Atlantic cod
Gadus morhua
Area ID: multinational−ICES−VIa
(a)
Spawning Biomass
40000
30000
20000
10000
0
Recruits
6e+07
4e+07
2e+07
0e+00
1980
1990
2000
2010
Year
(b)
Ricker 0.501
BevHolt 0.499
Recruits
6e+07
4e+07
2e+07
0e+00
0
10000
20000
30000
40000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.73
0.78
−10
−5
0
5
10
lag

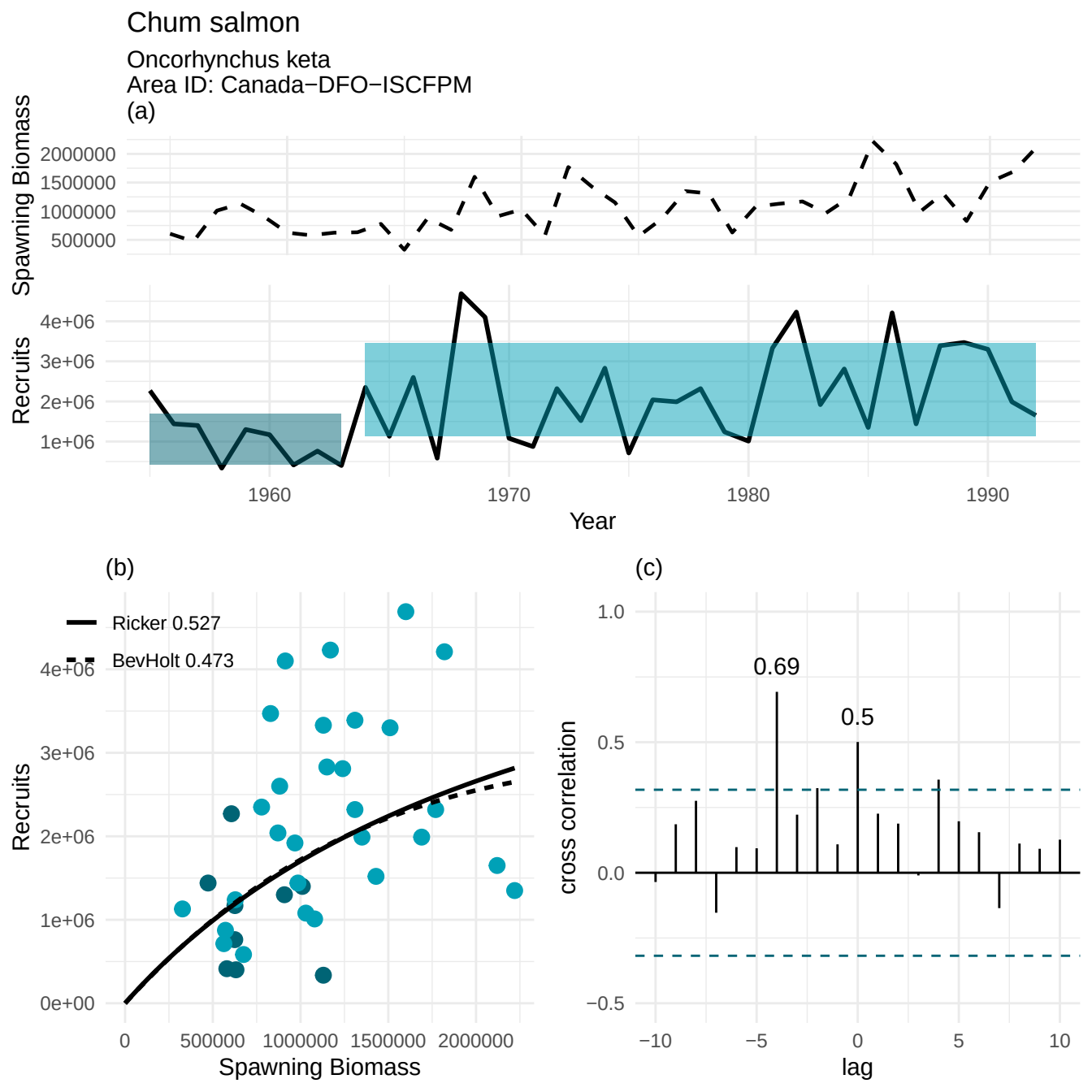

Atlantic cod
Gadus morhua
Area ID: multinational−ICES−VIIe−k
(a)
Spawning Biomass
20000
10000
Recruits
2e+07
1e+07
0e+00
1970
1980
1990
2000
2010
2020
Year
(b)
Ricker 0.497
BevHolt 0.503
2.5e+07
2.0e+07
1.5e+07
1.0e+07
5.0e+06
0.0e+00
Recruits
0
10000
20000
Spawning Biomass
(c)
1.0
0.5
0.0
−0.5
cross correlation
0.71
0.45
−10
−5
0
5
10
lag

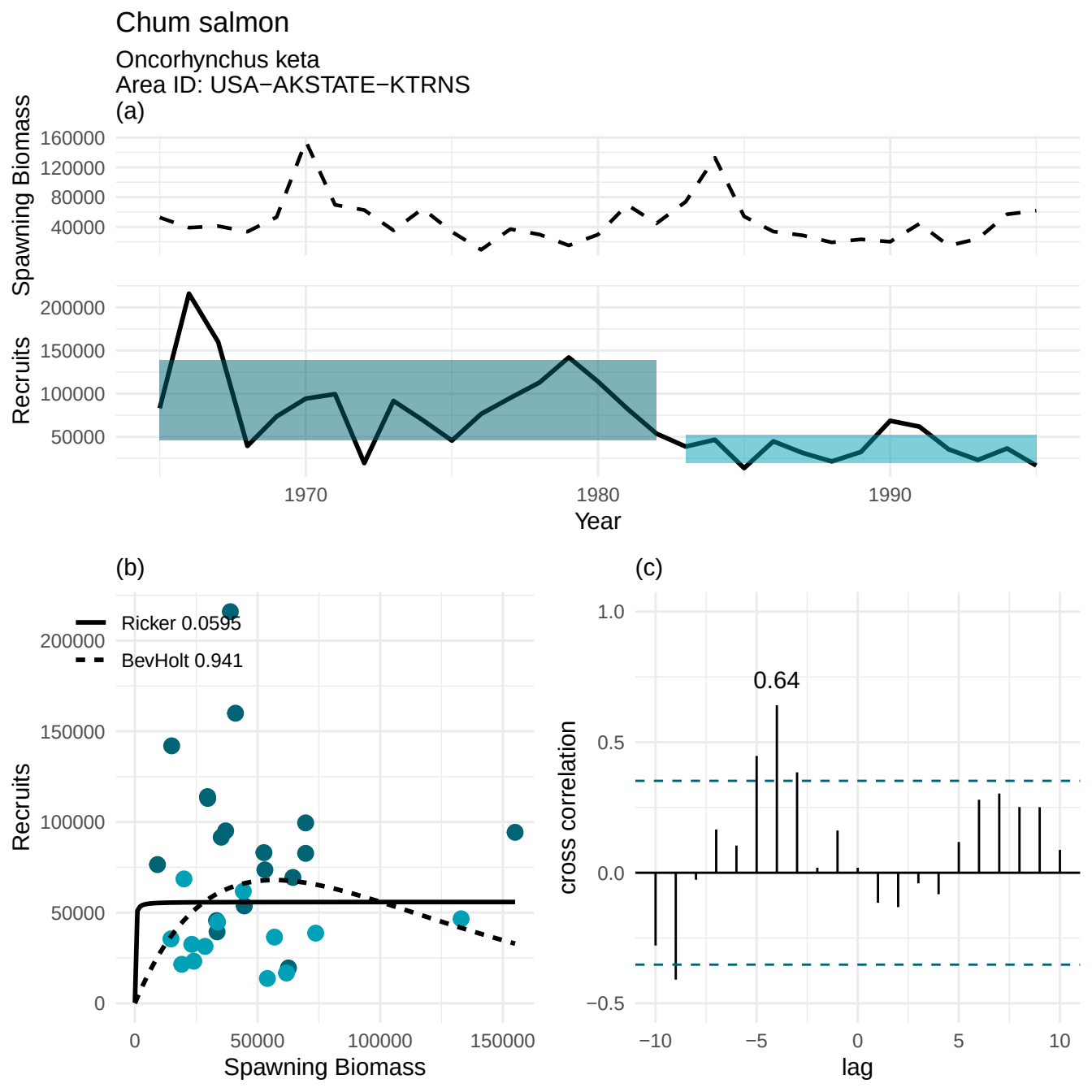

Canary rockfish
Sebastes pinniger
Area ID: USA−NMFS−PCOAST
(a)
Spawning Biomass
4e+09
3e+09
2e+09
Recruits
6e+06
4e+06
2e+06
1960
1980
2000
Year
(b)
Ricker 0.178
BevHolt 0.822
Recruits
6e+06
4e+06
2e+06
0e+00
0e+00
1e+09
2e+09
3e+09
4e+09
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.38
0.3
−10
−5
0
5
10
lag

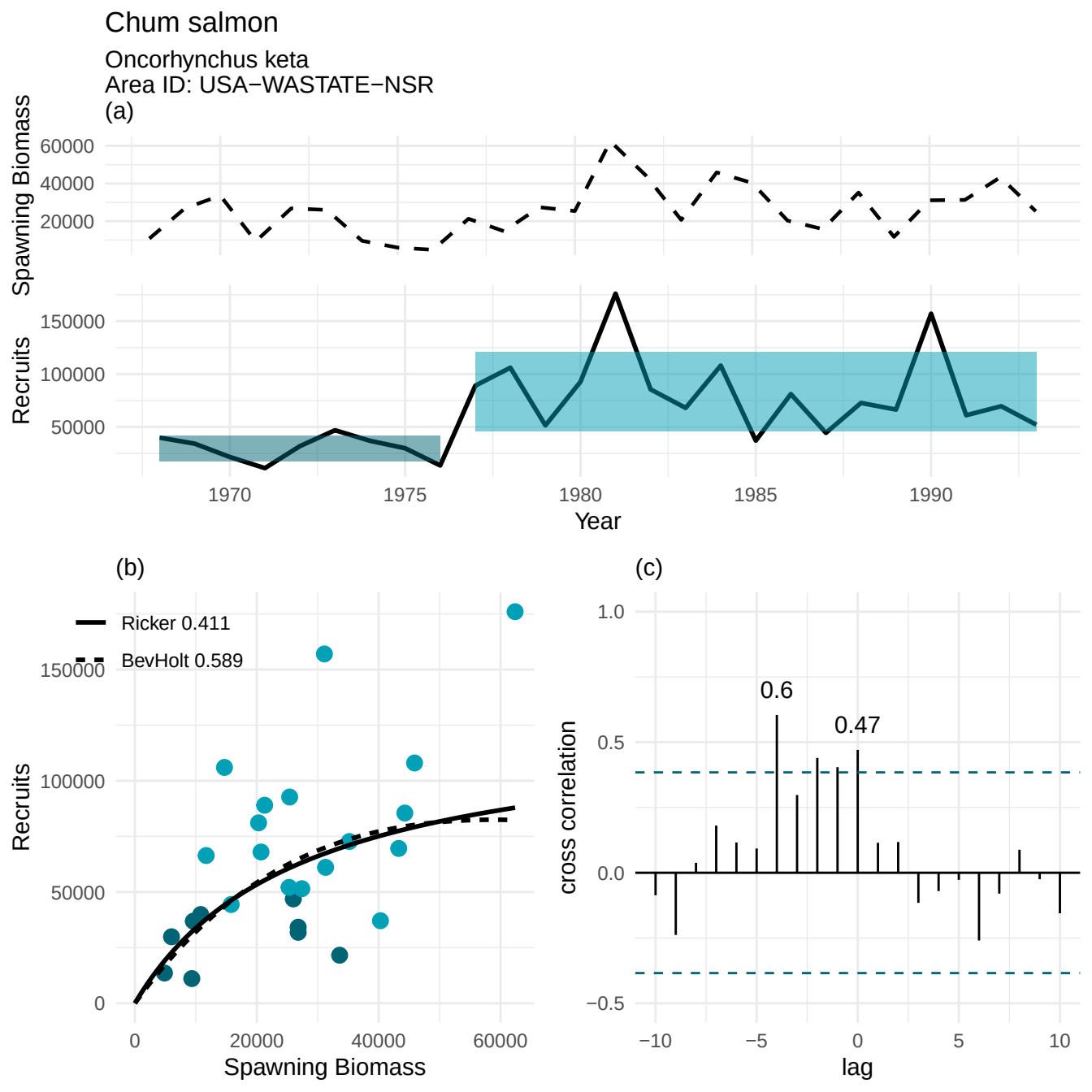

Chum salmon
Oncorhynchus keta
Area ID: USA−AKSTATE−ANDREAR
(a)
Spawning Biomass
8e+05
6e+05
4e+05
2e+05
Recruits
6e+05
4e+05
2e+05
1975
1980
1985
1990
1995
Year
(b)
Ricker 0.162
BevHolt 0.838
Recruits
6e+05
4e+05
2e+05
0e+00
0e+00
2e+05
4e+05
6e+05
8e+05
Spawning Biomass
(c)
0.59
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

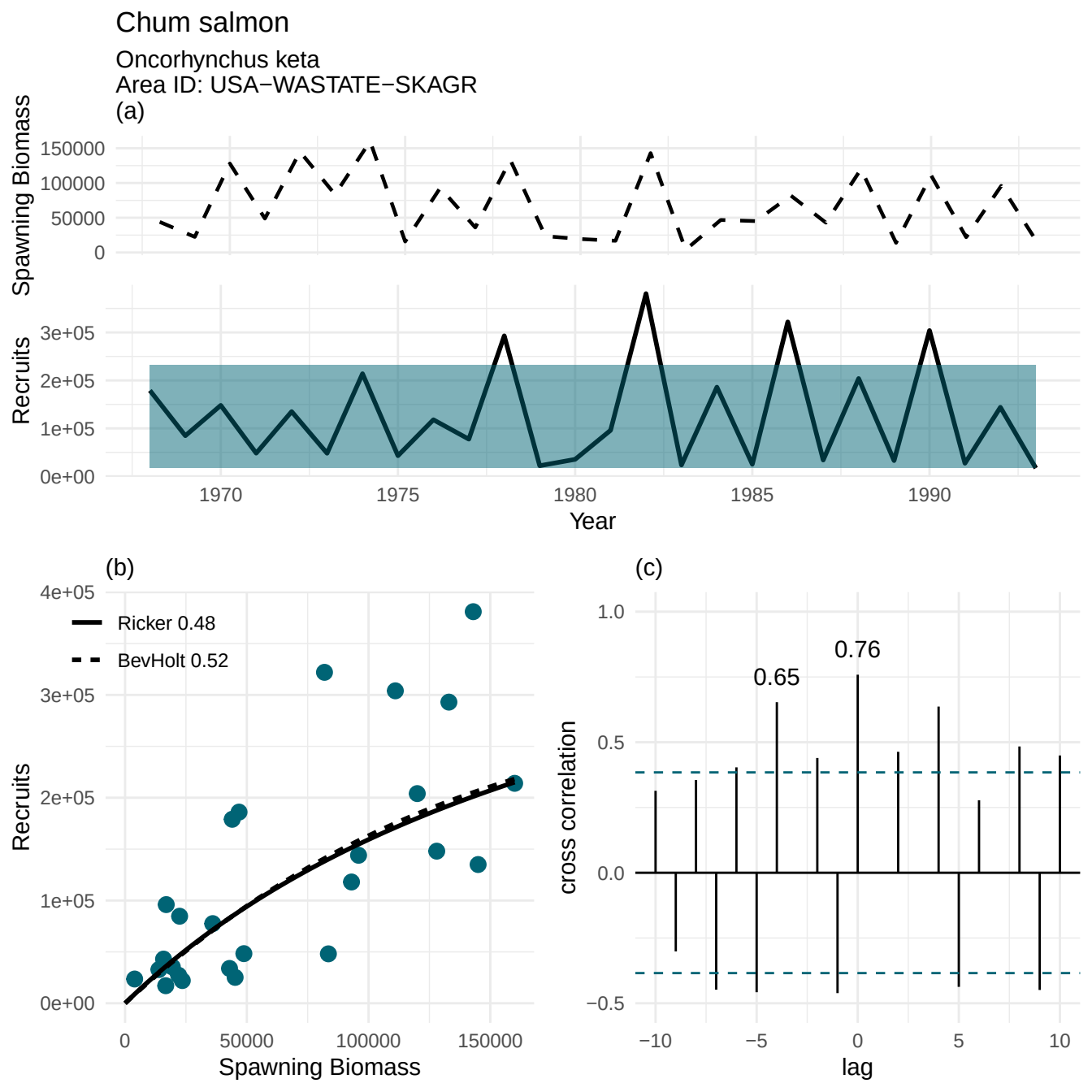

Chum salmon
Oncorhynchus keta
Area ID: USA−AKSTATE−ANVIKR
(a)
Spawning Biomass
1500000
1000000
500000
Recruits
2000000
1500000
1000000
500000
1975
1980
1985
1990
Year
(b)
Ricker 0.415
BevHolt 0.585
Recruits
2000000
1500000
1000000
500000
0
0
500000
1000000
1500000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.49
−10
−5
0
5
10
lag

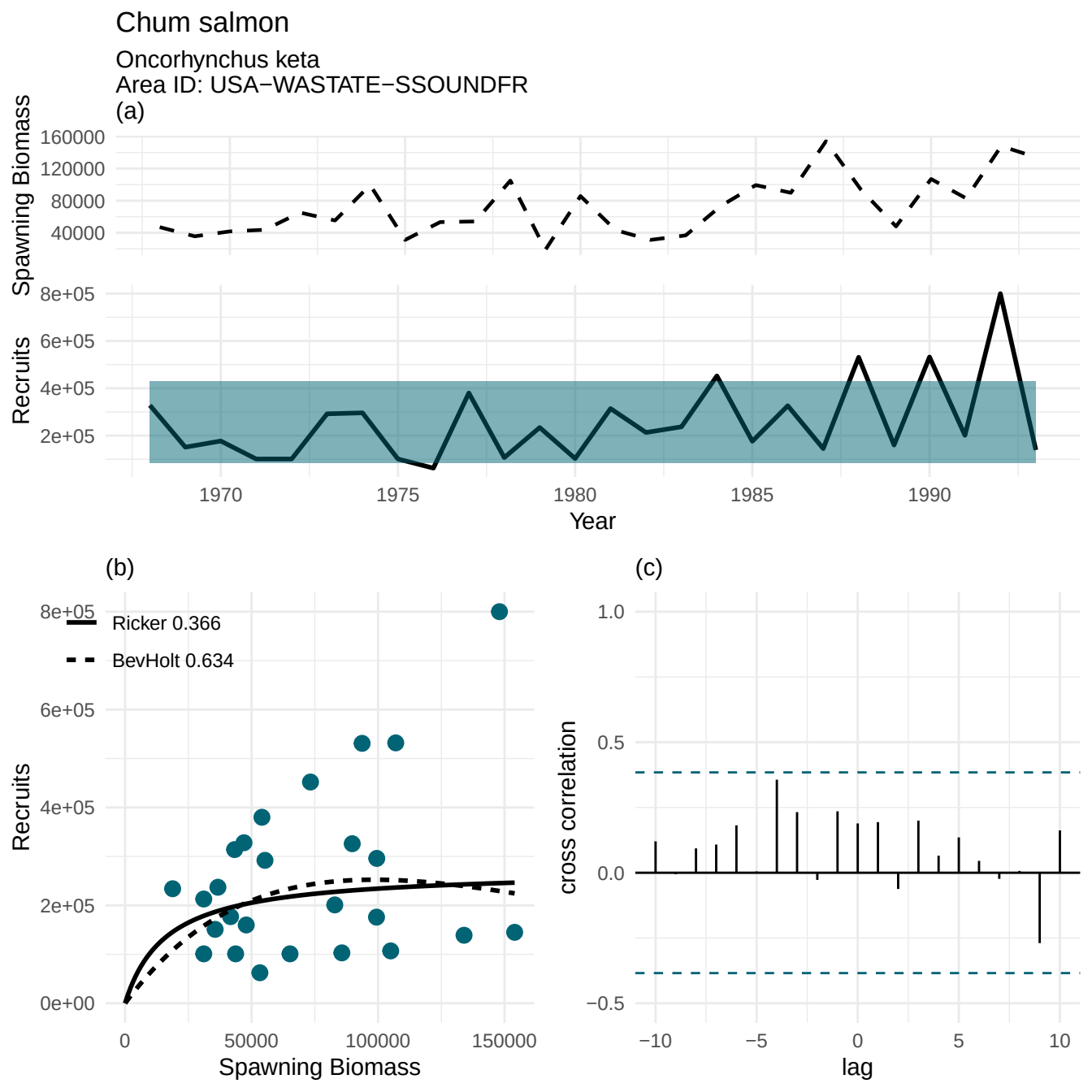

Chum salmon
Oncorhynchus keta
Area ID: USA−WASTATE−HOODC
(a)
Spawning Biomass
100000
75000
50000
25000
Recruits
6e+05
4e+05
2e+05
1970
1975
1980
1985
1990
Year
(b)
Ricker 0.0301
BevHolt 0.97
Recruits
6e+05
4e+05
2e+05
0e+00
0
25000
50000
75000
100000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.49
−10
−5
0
5
10
lag

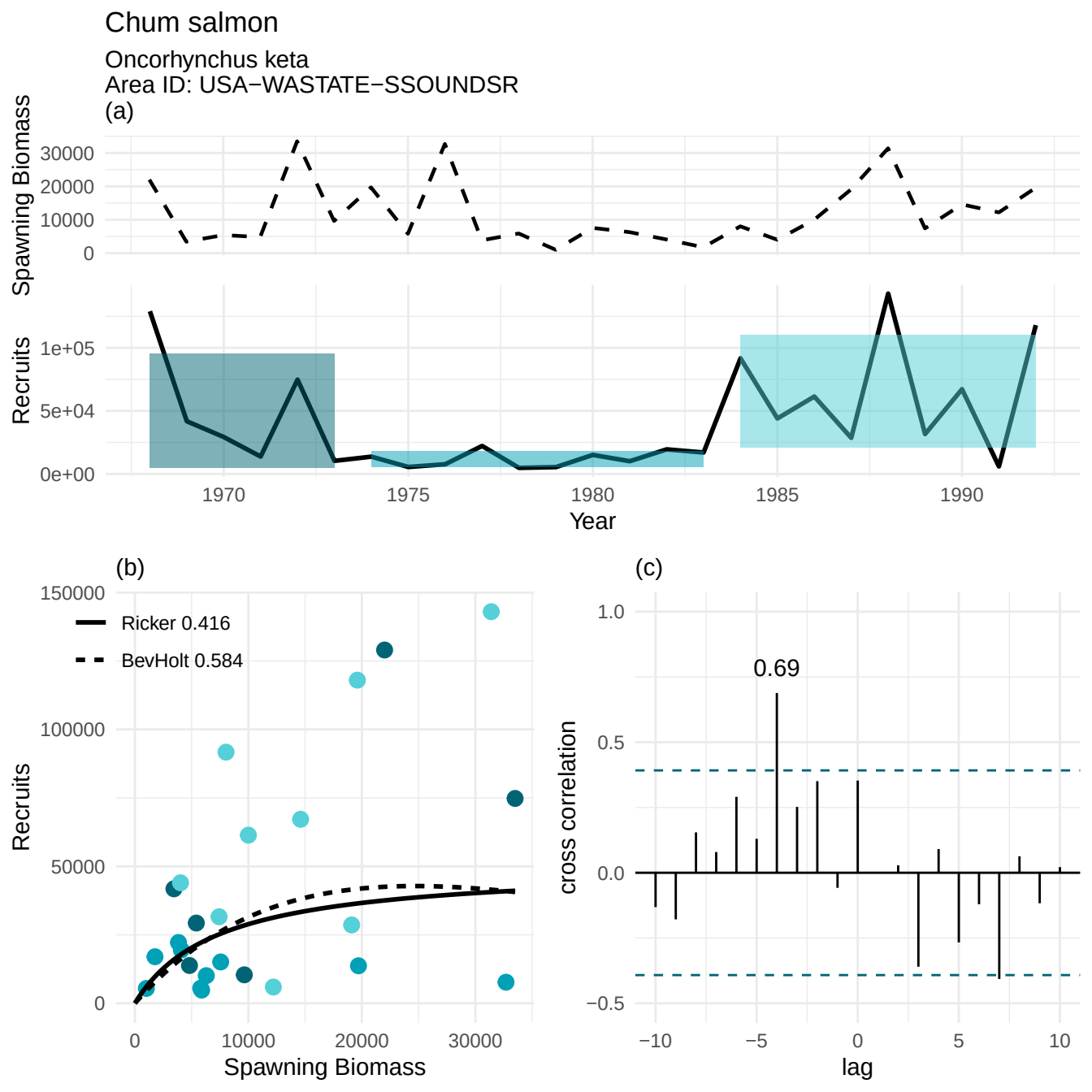

Chum salmon
Oncorhynchus keta
Area ID: Canada−DFO−ISCFPM
(a)
Spawning Biomass
2000000
1500000
1000000
500000
Recruits
4e+06
3e+06
2e+06
1e+06
1960
1970
1980
1990
Year
(b)
Ricker 0.527
BevHolt 0.473
Recruits
4e+06
3e+06
2e+06
1e+06
0e+00
0
500000
1000000
1500000
2000000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.69
0.5
−10
−5
0
5
10
lag

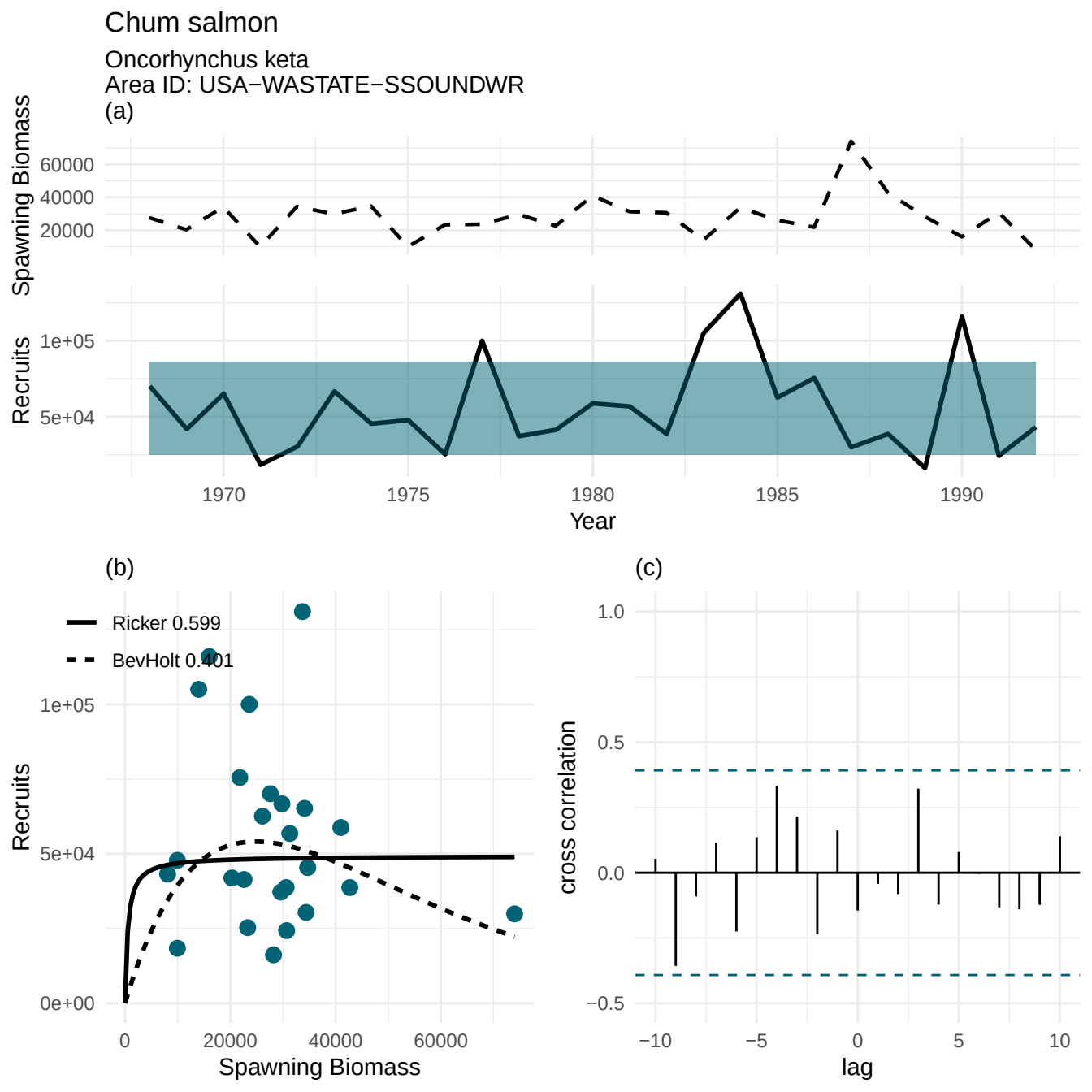

Chum salmon
Oncorhynchus keta
Area ID: USA−AKSTATE−KTRNS
(a)
Spawning Biomass
160000
120000
80000
40000
Recruits
200000
150000
100000
50000
1970
1980
1990
Year
(b)
Ricker 0.0595
BevHolt 0.941
Recruits
200000
150000
100000
50000
0
0
50000
100000
150000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.64
−10
−5
0
5
10
lag

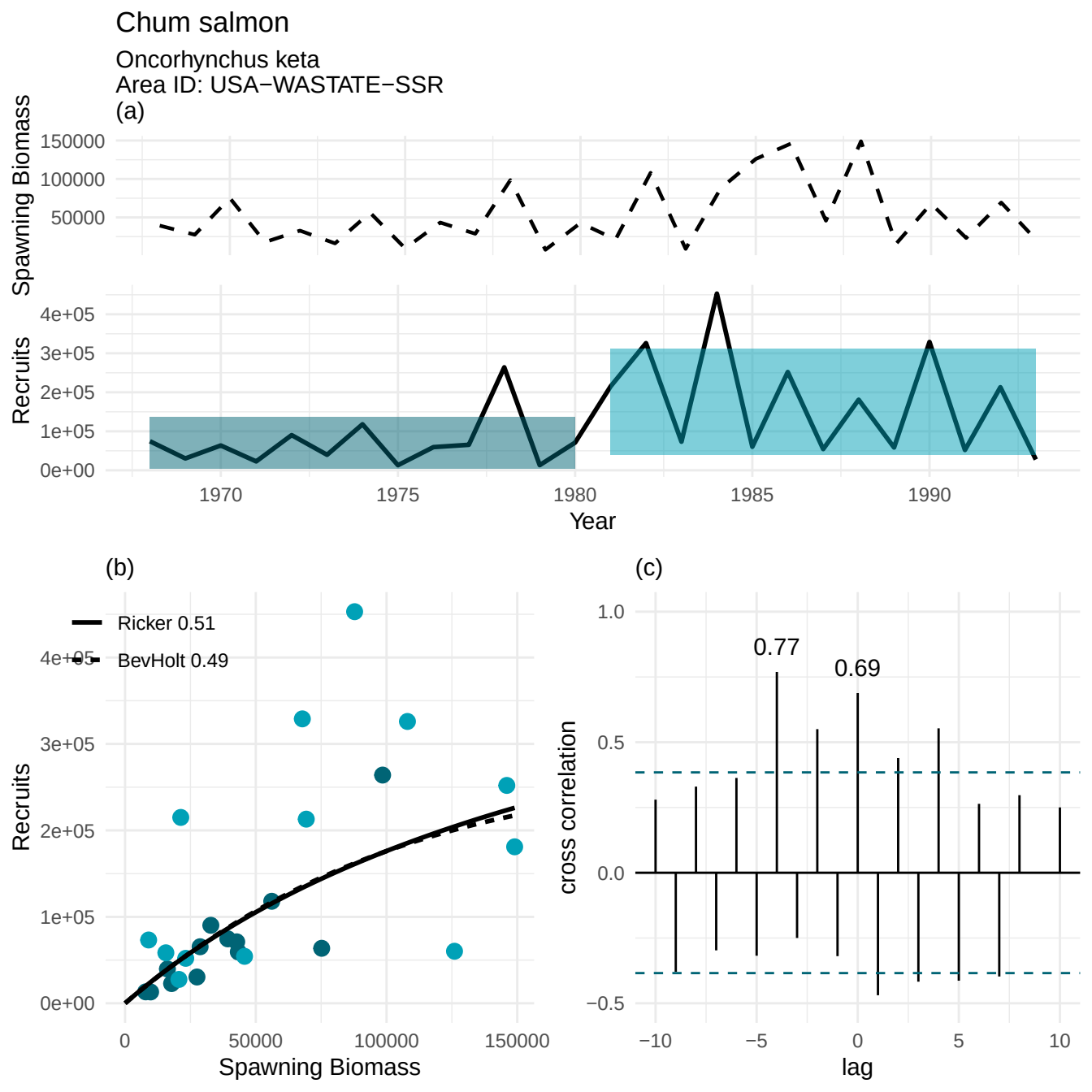

Chum salmon
Oncorhynchus keta
Area ID: USA−WASTATE−NSR
(a)
Spawning Biomass
60000
40000
20000
Recruits
150000
100000
50000
1970
1975
1980
1985
1990
Year
(b)
Ricker 0.411
BevHolt 0.589
Recruits
150000
100000
50000
0
0
20000
40000
60000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.6
0.47
−10
−5
0
5
10
lag

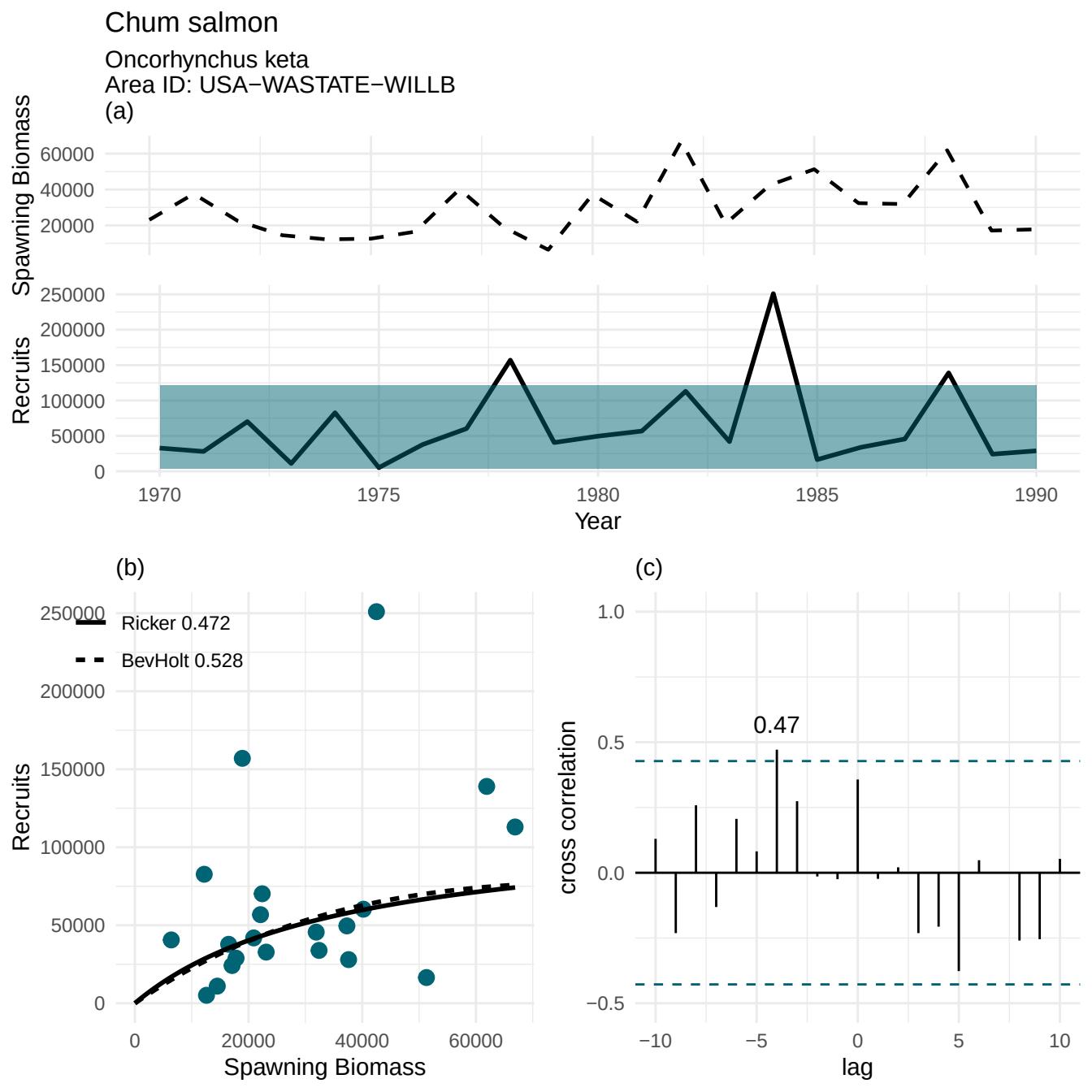

Chum salmon
Oncorhynchus keta
Area ID: USA−WASTATE−SKAGR
(a)
Spawning Biomass
150000
100000
50000
0
Recruits
3e+05
2e+05
1e+05
0e+00
1970
1975
1980
1985
1990
Year
(b)
Ricker 0.48
BevHolt 0.52
Recruits
4e+05
3e+05
2e+05
1e+05
0e+00
0
50000
100000
150000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.65
0.76
−10
−5
0
5
10
lag

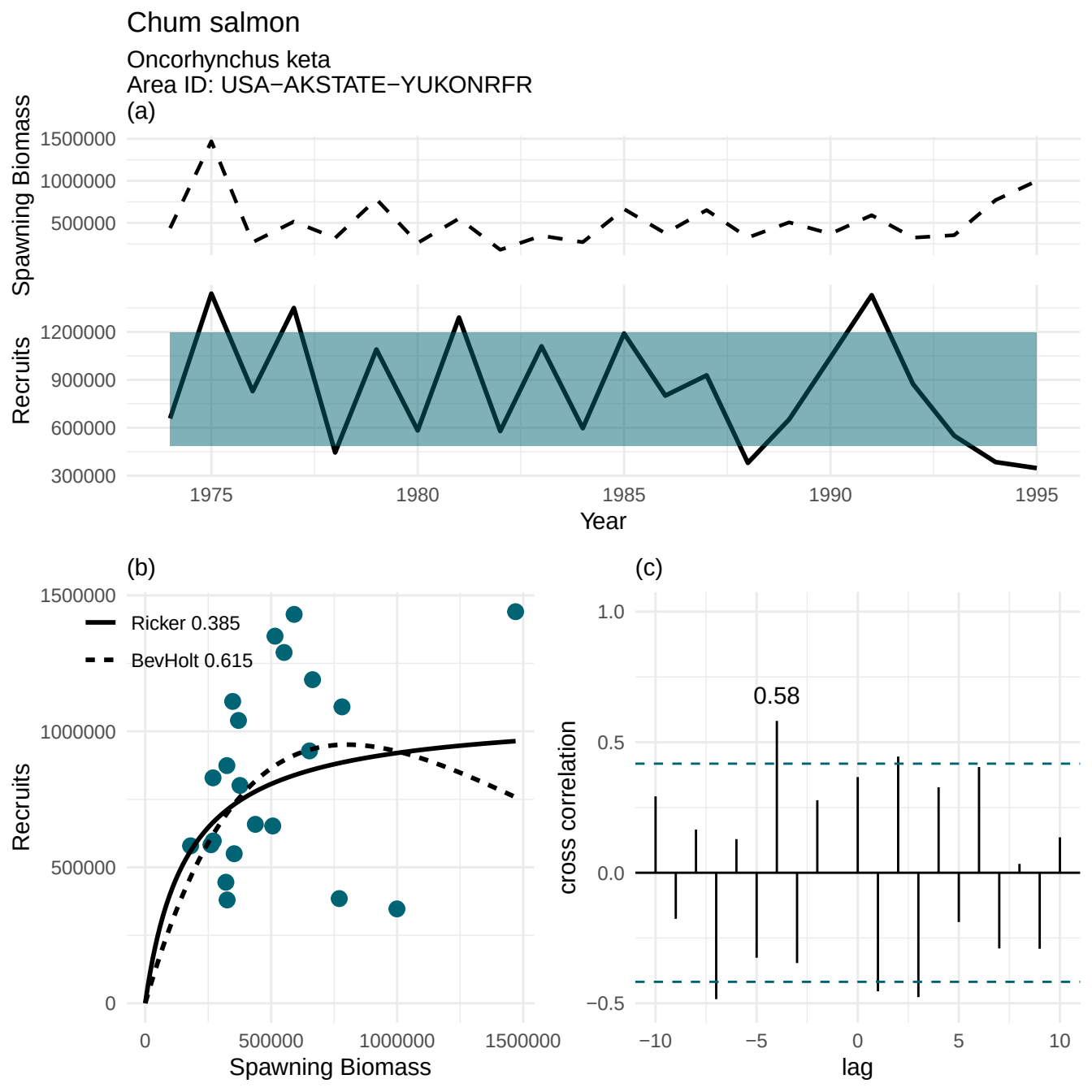

Chum salmon
Oncorhynchus keta
Area ID: USA−WASTATE−SSOUNDFR
(a)
Spawning Biomass
160000
120000
80000
40000
Recruits
8e+05
6e+05
4e+05
2e+05
1970
1975
1980
1985
1990
Year
(b)
Ricker 0.366
BevHolt 0.634
Recruits
8e+05
6e+05
4e+05
2e+05
0e+00
0
50000
100000
150000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

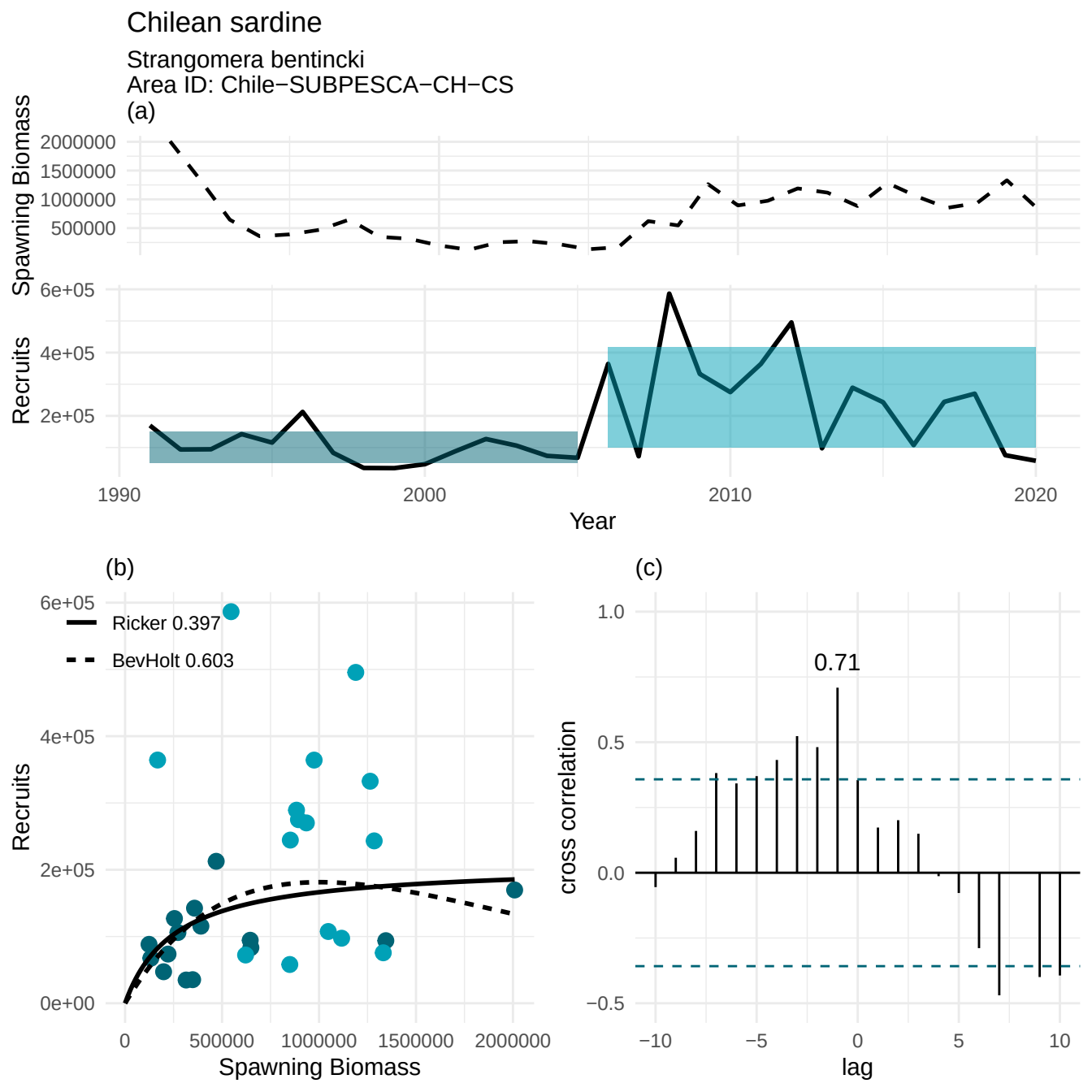

Chum salmon
Oncorhynchus keta
Area ID: USA−WASTATE−SSOUNDSR
(a)
Spawning Biomass
30000
20000
10000
0
Recruits
1e+05
5e+04
0e+00
1970
1975
1980
1985
1990
Year
(b)
Ricker 0.416
BevHolt 0.584
Recruits
150000
100000
50000
0
0
10000
20000
30000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.69
−10
−5
0
5
10
lag

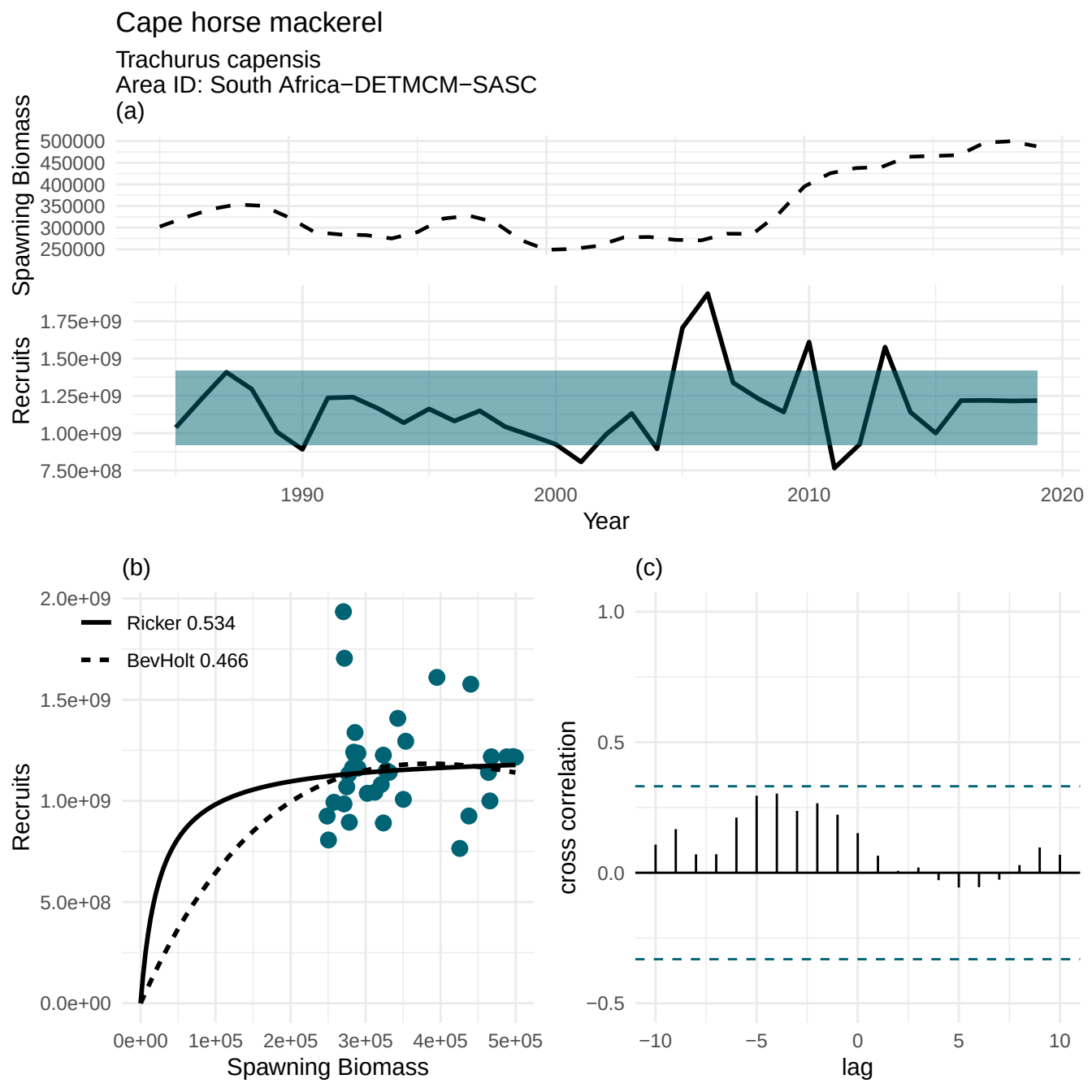

Chum salmon
Oncorhynchus keta
Area ID: USA−WASTATE−SSOUNDWR
(a)
Spawning Biomass
60000
40000
20000
Recruits
1e+05
5e+04
1970
1975
1980
1985
1990
Year
(b)
Ricker 0.599
BevHolt 0.401
Recruits
1e+05
5e+04
0e+00
0
20000
40000
60000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

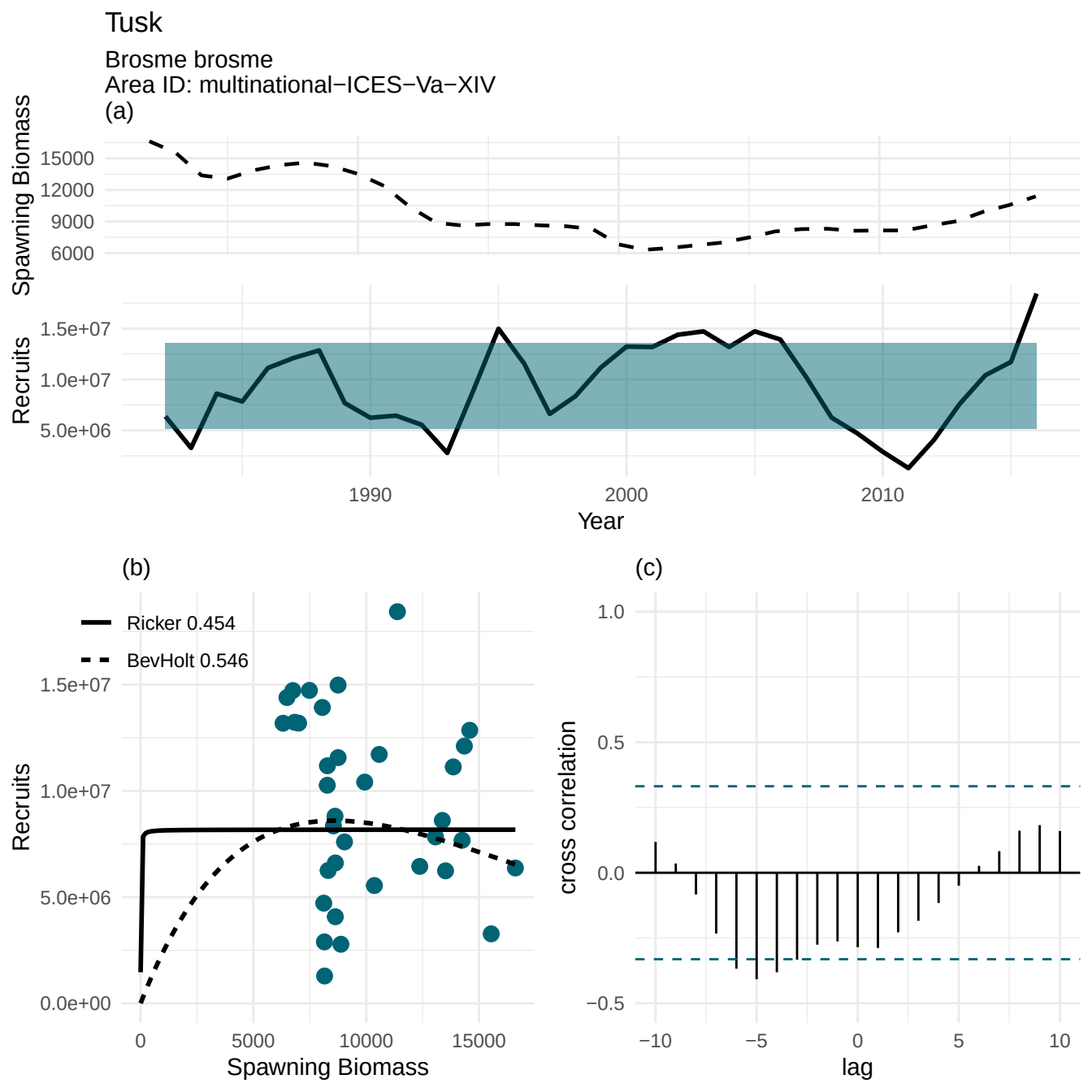

Chum salmon
Oncorhynchus keta
Area ID: USA−WASTATE−SSR
(a)
Spawning Biomass
150000
100000
50000
Recruits
4e+05
3e+05
2e+05
1e+05
0e+00
1970
1975
1980
1985
1990
Year
(b)
Ricker 0.51
BevHolt 0.49
Recruits
4e+05
3e+05
2e+05
1e+05
0e+00
0
50000
100000
150000
Spawning Biomass
(c)
1.0
0.5
0.0
−0.5
0.77
0.69
cross correlation
−10
−5
0
5
10
lag

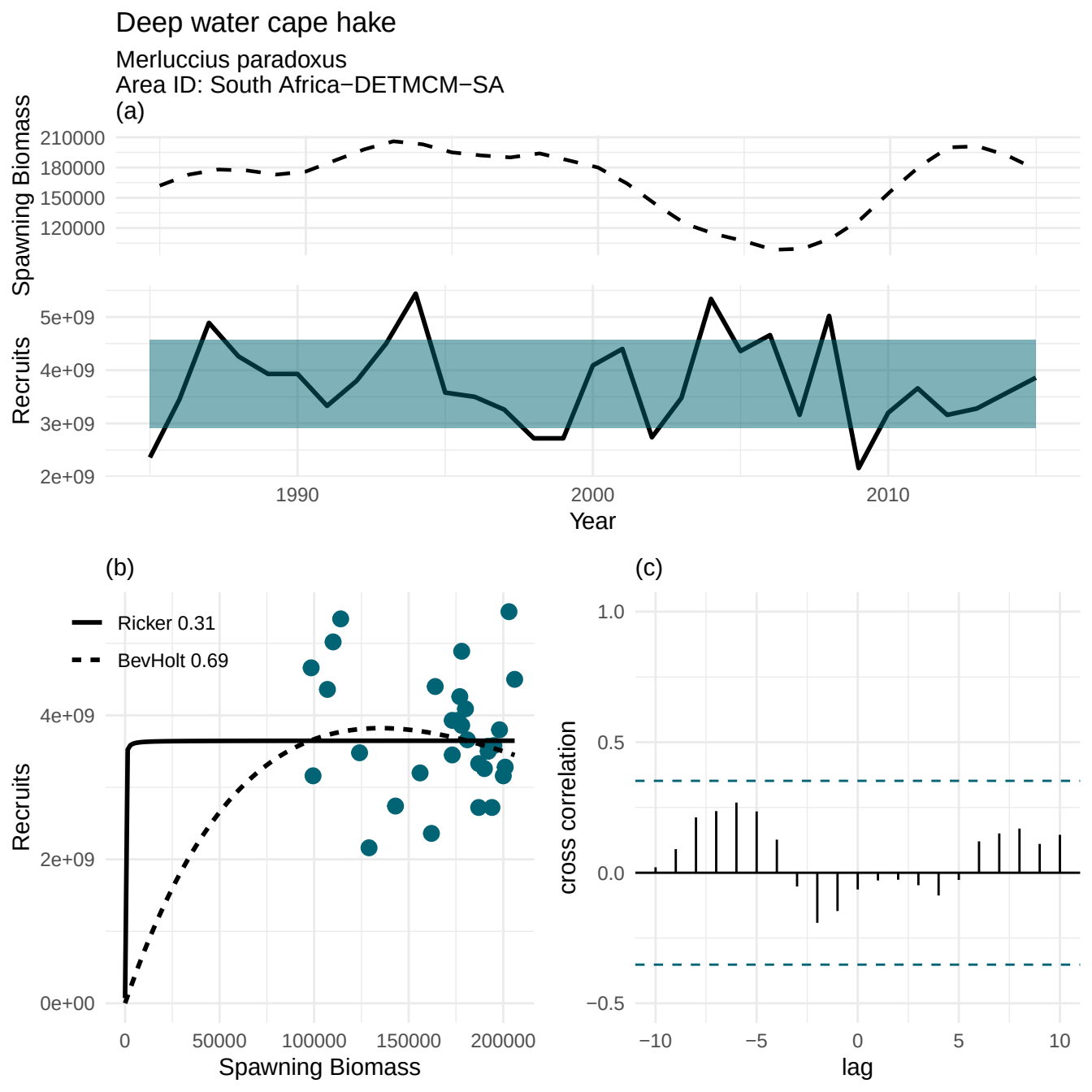

Chum salmon
Oncorhynchus keta
Area ID: USA−WASTATE−WILLB
(a)
Spawning Biomass
60000
40000
20000
Recruits
250000
200000
150000
100000
50000
0
1970
1975
1980
1985
1990
Year
(b)
Ricker 0.472
BevHolt 0.528
Recruits
Spawning Biomass
(c)
cross correlation
0.47
lag

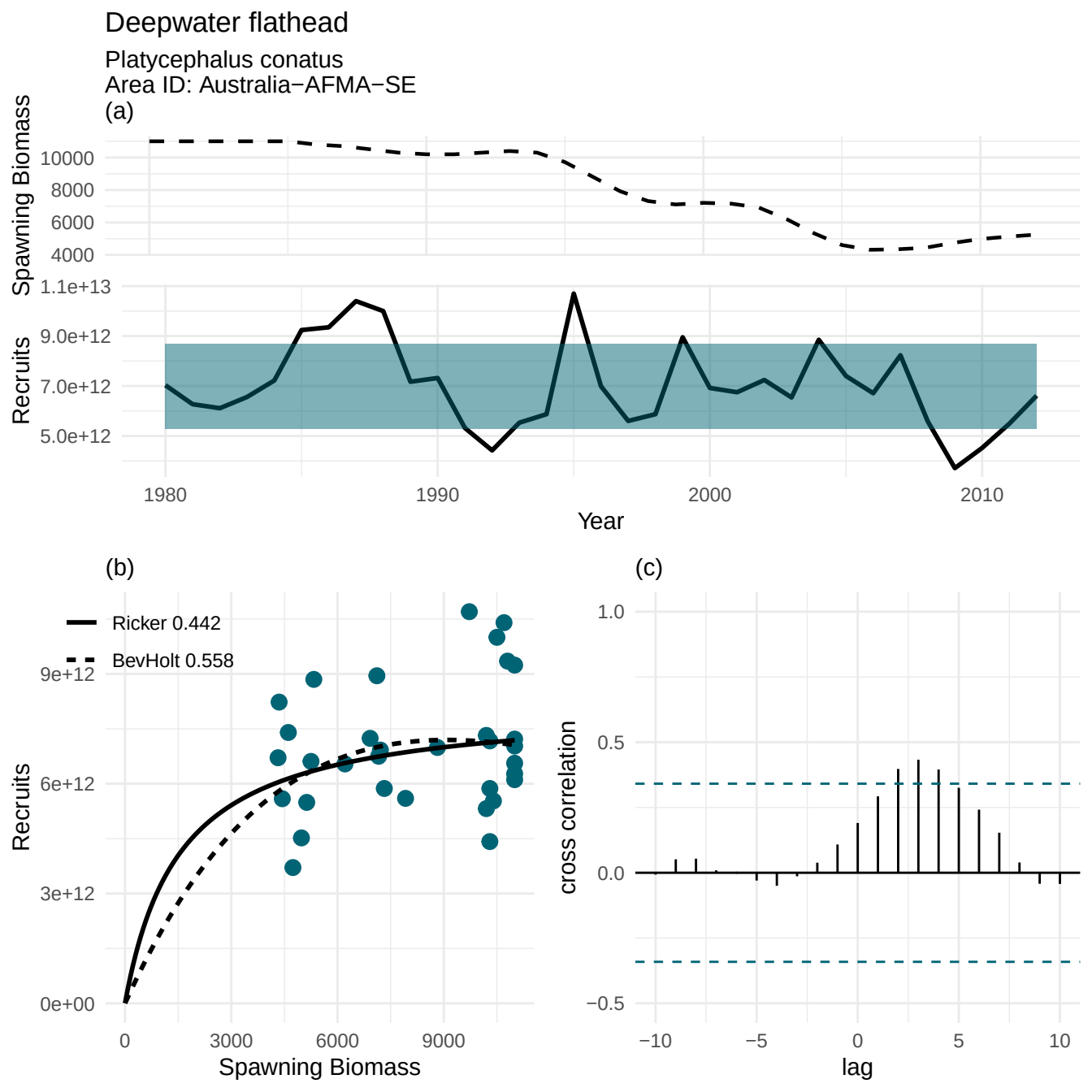

Chum salmon
Oncorhynchus keta
Area ID: USA−AKSTATE−YUKONRFR
(a)
Spawning Biomass
1500000
1000000
500000
Recruits
1200000
900000
600000
300000
1975
1980
1985
1990
1995
Year
(b)
Ricker 0.385
BevHolt 0.615
Recruits
1500000
1000000
500000
0
0
500000
1000000
1500000
Spawning Biomass
(c)
0.58
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

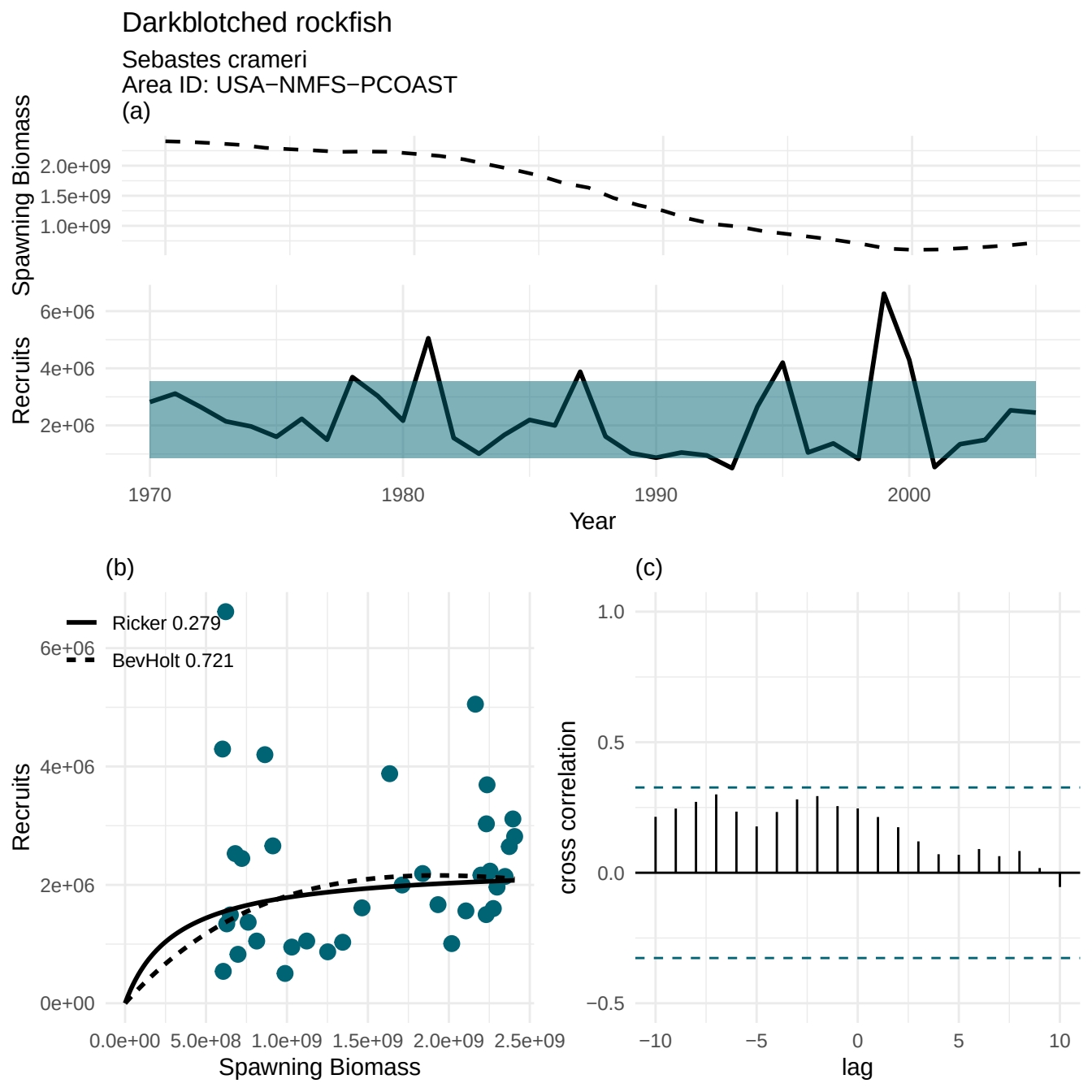

Chilean sardine
Strangomera bentincki
Area ID: Chile−SUBPESCA−CH−CS
(a)
Spawning Biomass
2000000
1500000
1000000
500000
Recruits
6e+05
4e+05
2e+05
1990
2000
2010
2020
Year
(b)
Ricker 0.397
BevHolt 0.603
Recruits
6e+05
4e+05
2e+05
0e+00
0
500000
1000000
1500000
2000000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.71
−10
−5
0
5
10
lag

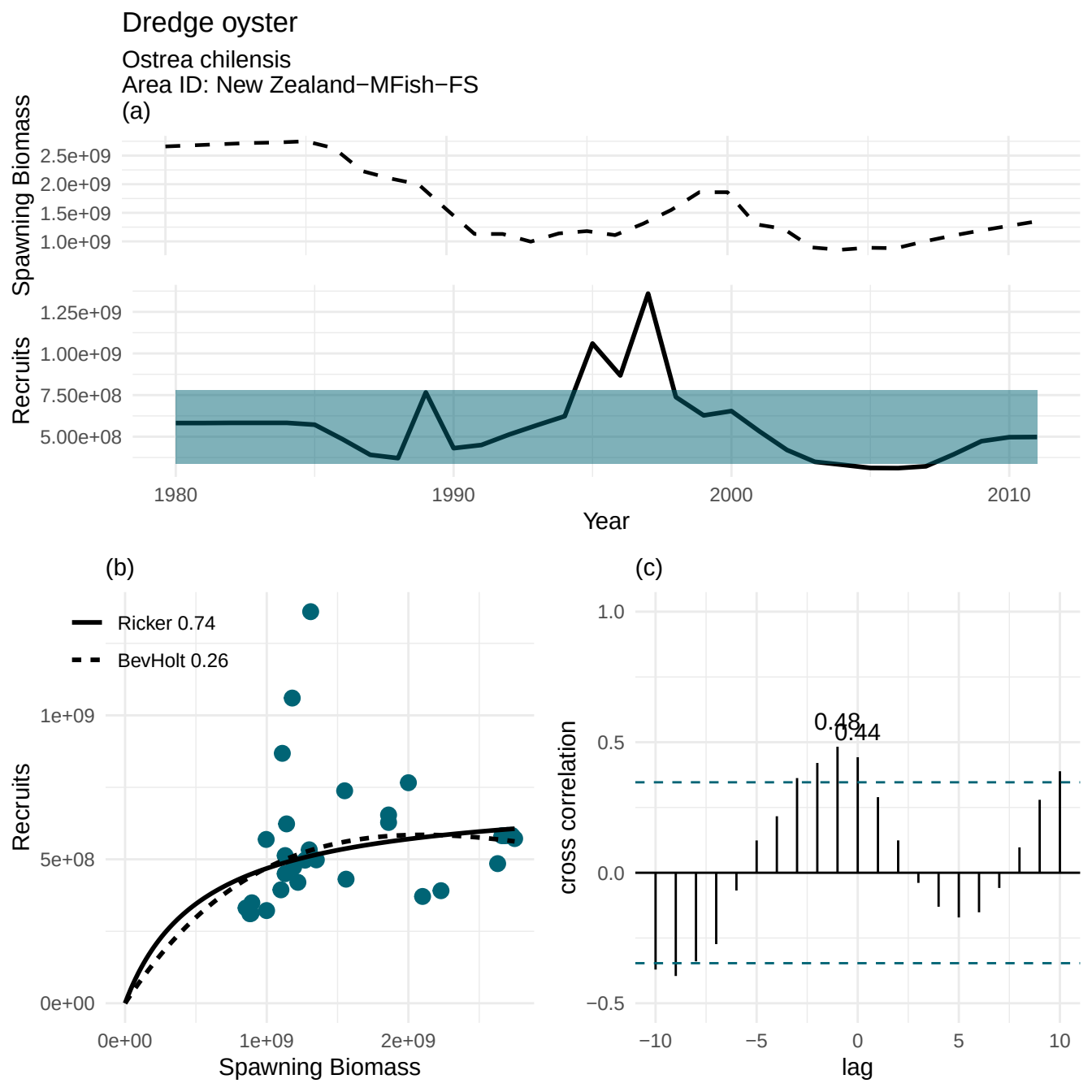

Cape horse mackerel
Trachurus capensis
Area ID: South Africa−DETMCM−SASC
(a)
Spawning Biomass
500000
450000
400000
350000
300000
250000
Recruits
1.75e+09
1.50e+09
1.25e+09
1.00e+09
7.50e+08
1990
2000
2010
2020
Year
(b)
Ricker 0.534
BevHolt 0.466
Recruits
2.0e+09
1.5e+09
1.0e+09
5.0e+08
0.0e+00
0e+00
1e+05
2e+05
3e+05
4e+05
5e+05
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

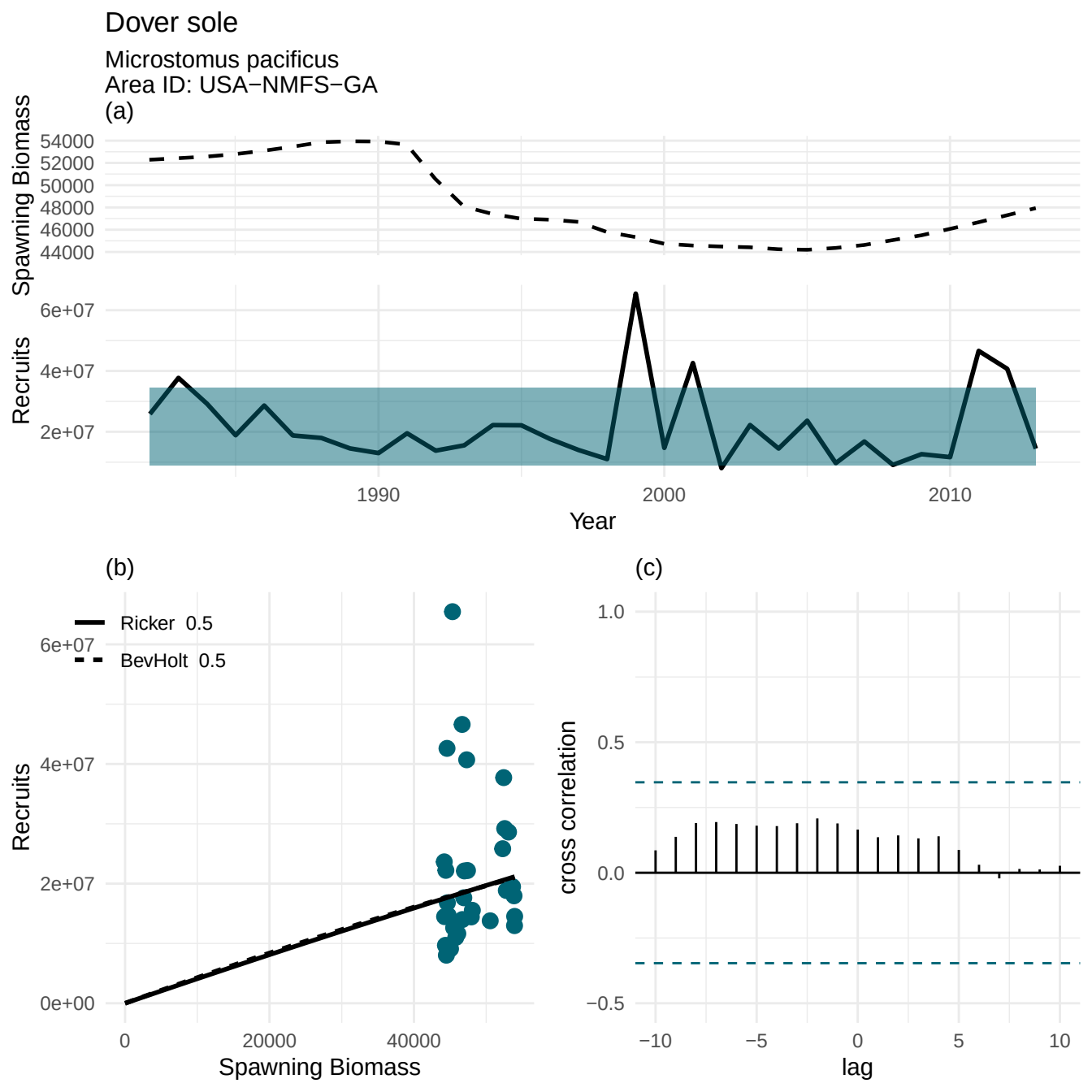

Tusk
Brosme brosme
Area ID: multinational−ICES−Va−XIV
(a)
Spawning Biomass
15000
12000
9000
6000
Recruits
1.5e+07
1.0e+07
5.0e+06
1990
2000
2010
Year
(b)
Ricker 0.454
BevHolt 0.546
Recruits
1.5e+07
1.0e+07
5.0e+06
0.0e+00
0
5000
10000
15000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

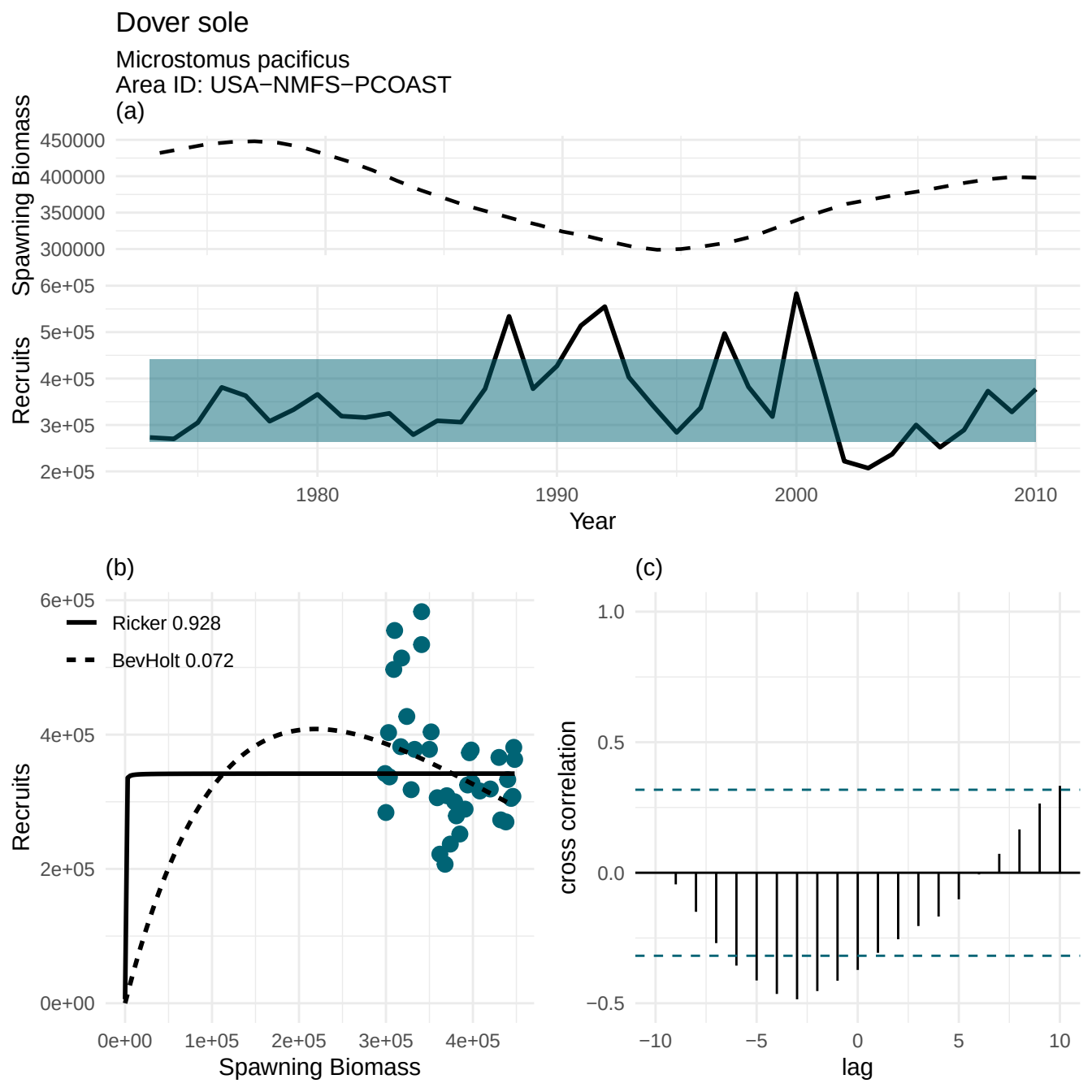

Deep water cape hake
Merluccius paradoxus
Area ID: South Africa−DETMCM−SA
(a)
Spawning Biomass
210000
180000
150000
120000
Recruits
5e+09
4e+09
3e+09
2e+09
1990
2000
2010
Year
(b)
Ricker 0.31
BevHolt 0.69
Recruits
4e+09
2e+09
0e+00
0
50000
100000
150000
200000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

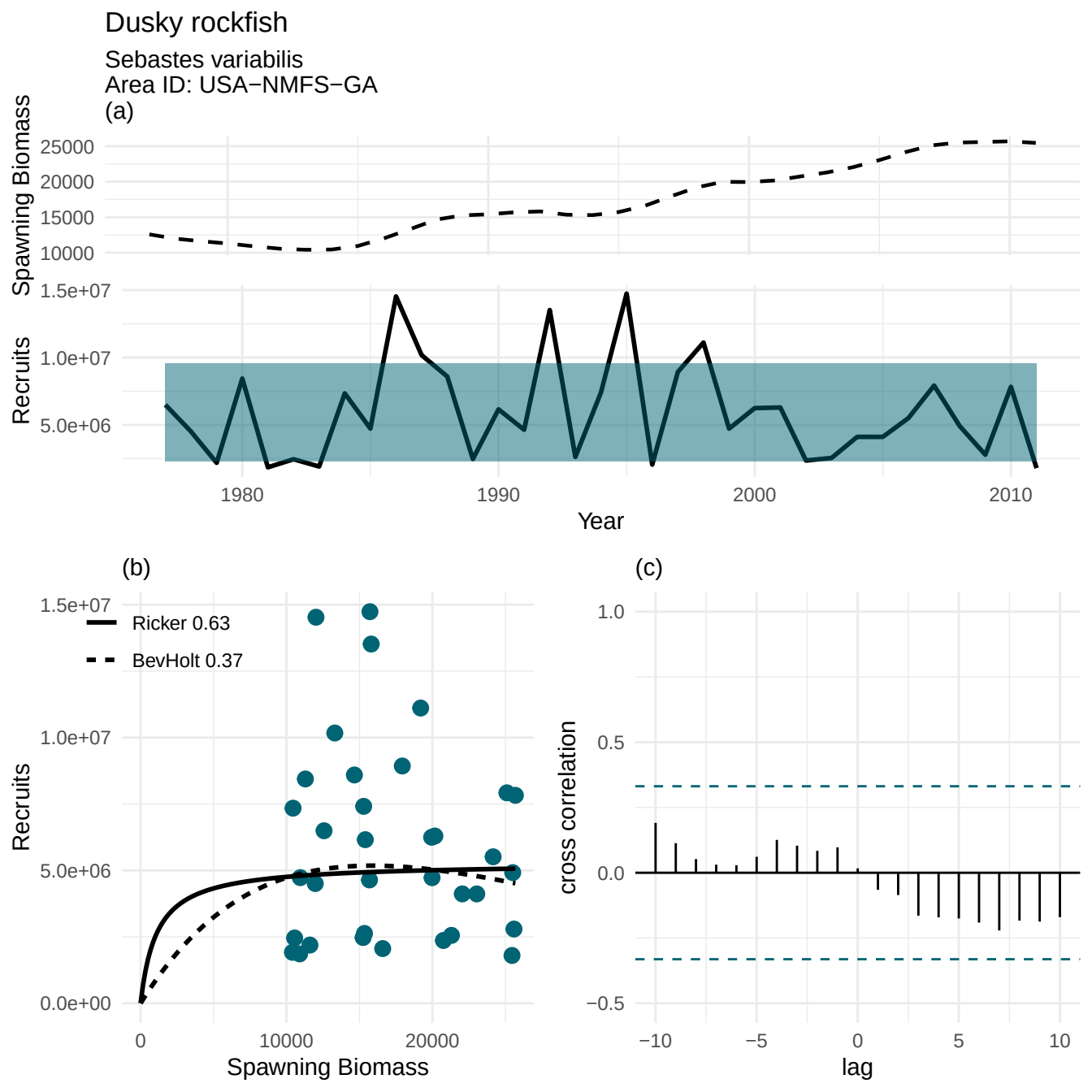

Deepwater flathead
Platycephalus conatus
Area ID: Australia−AFMA−SE
(a)
Spawning Biomass
10000
8000
6000
4000
Recruits
1.1e+13
9.0e+12
7.0e+12
5.0e+12
1980
1990
2000
2010
Year
(b)
Ricker 0.442
BevHolt 0.558
Recruits
9e+12
6e+12
3e+12
0e+00
0
3000
6000
9000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

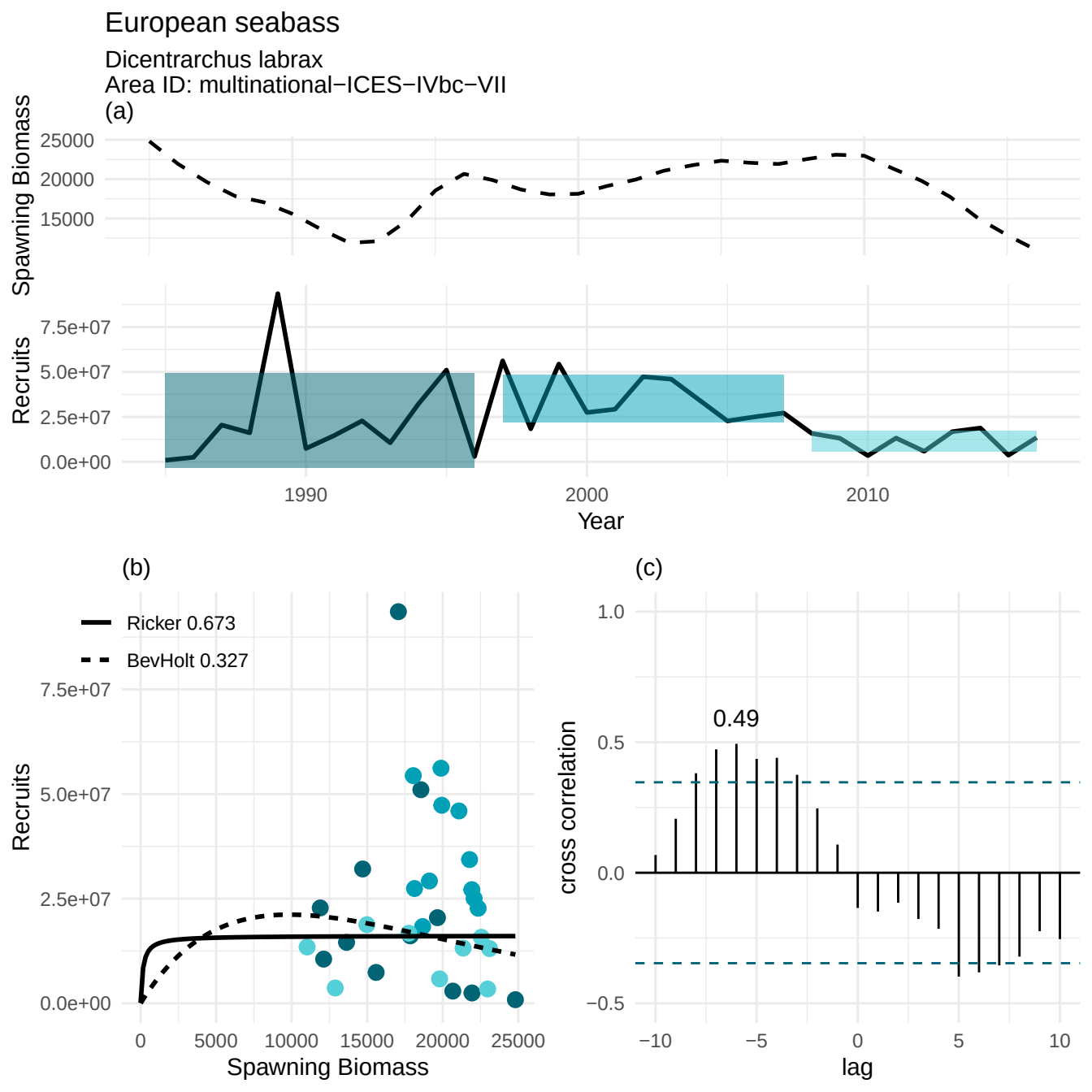

Darkblotched rockfish
Sebastes crameri
Area ID: USA−NMFS−PCOAST
(a)
Spawning Biomass
2.0e+09
1.5e+09
1.0e+09
Recruits
6e+06
4e+06
2e+06
1970
1980
1990
2000
Year
(b)
Ricker 0.279
BevHolt 0.721
Recruits
6e+06
4e+06
2e+06
0e+00
0.0e+00
5.0e+08
1.0e+09
1.5e+09
2.0e+09
2.5e+09
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

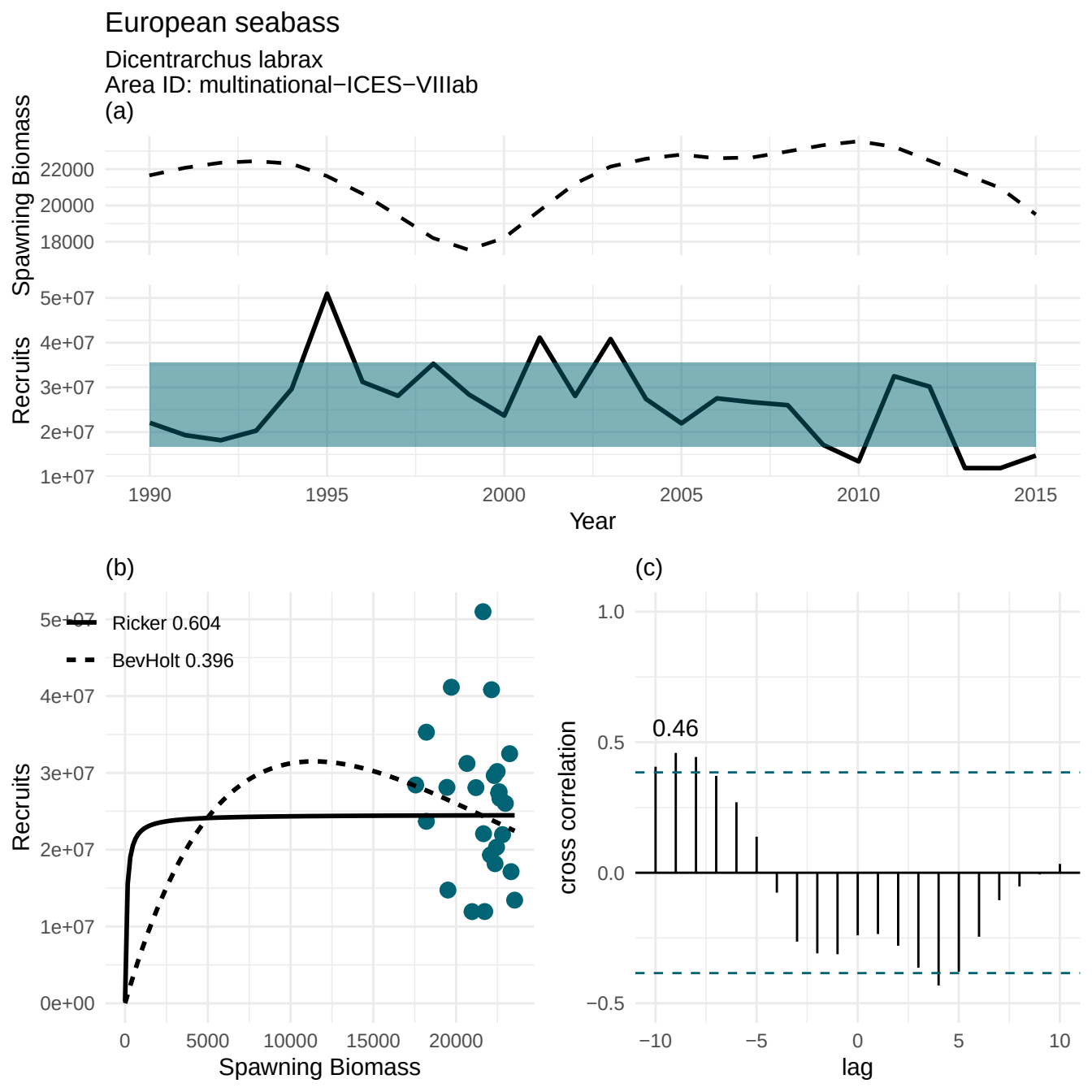

Dredge oyster
Ostrea chilensis
Area ID: New Zealand−MFish−FS
(a)
Spawning Biomass
2.5e+09
2.0e+09
1.5e+09
1.0e+09
Recruits
1.25e+09
1.00e+09
7.50e+08
5.00e+08
1980
1990
2000
2010
Year
(b)
Ricker 0.74
BevHolt 0.26
Recruits
1e+09
5e+08
0e+00
0e+00
1e+09
2e+09
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.48
0.44
−10
−5
0
5
10
lag

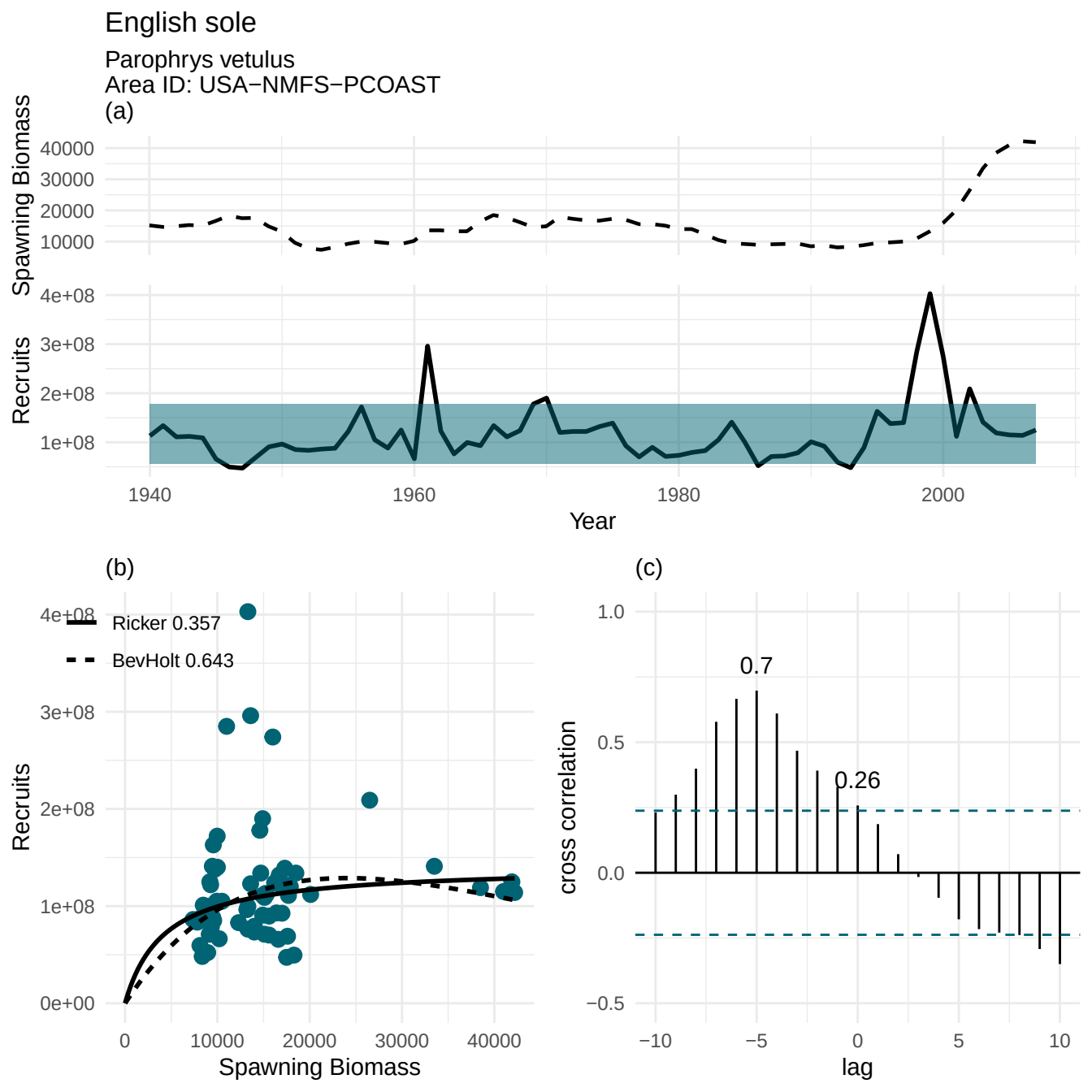

Dover sole
Microstomus pacificus
Area ID: USA−NMFS−GA
(a)
Spawning Biomass
54000
52000
50000
48000
46000
44000
Recruits
6e+07
4e+07
2e+07
1990
2000
2010
Year
(b)
Ricker 0.5
BevHolt 0.5
Recruits
6e+07
4e+07
2e+07
0e+00
0
20000
40000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

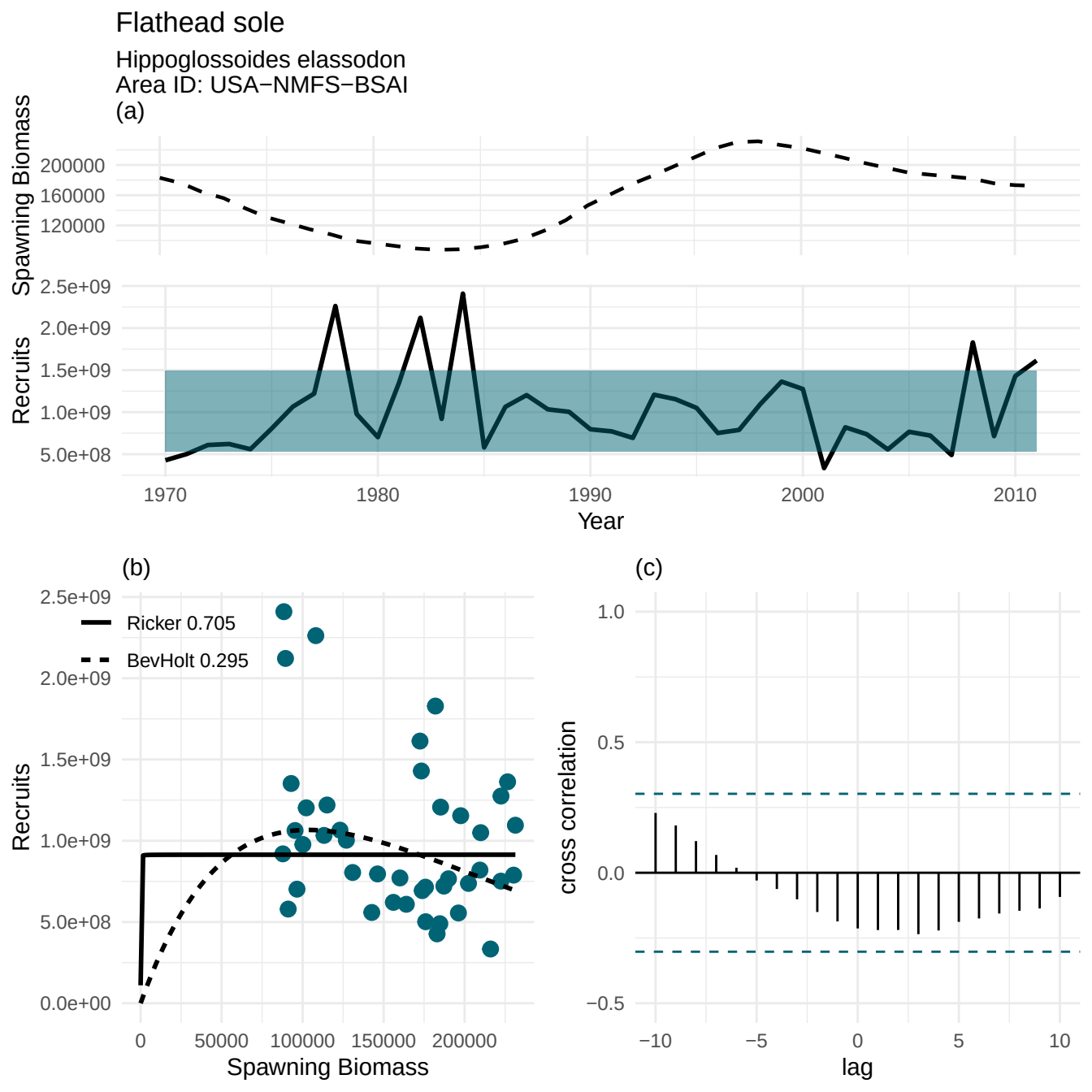

Dover sole
Microstomus pacificus
Area ID: USA−NMFS−PCOAST
(a)
Spawning Biomass
Recruits
450000
400000
350000
300000
6e+05
5e+05
4e+05
3e+05
2e+05
1980
1990
2000
2010
Year
(b)
Ricker 0.928
BevHolt 0.072
Recruits
6e+05
4e+05
2e+05
0e+00
0e+00
1e+05
2e+05
3e+05
4e+05
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

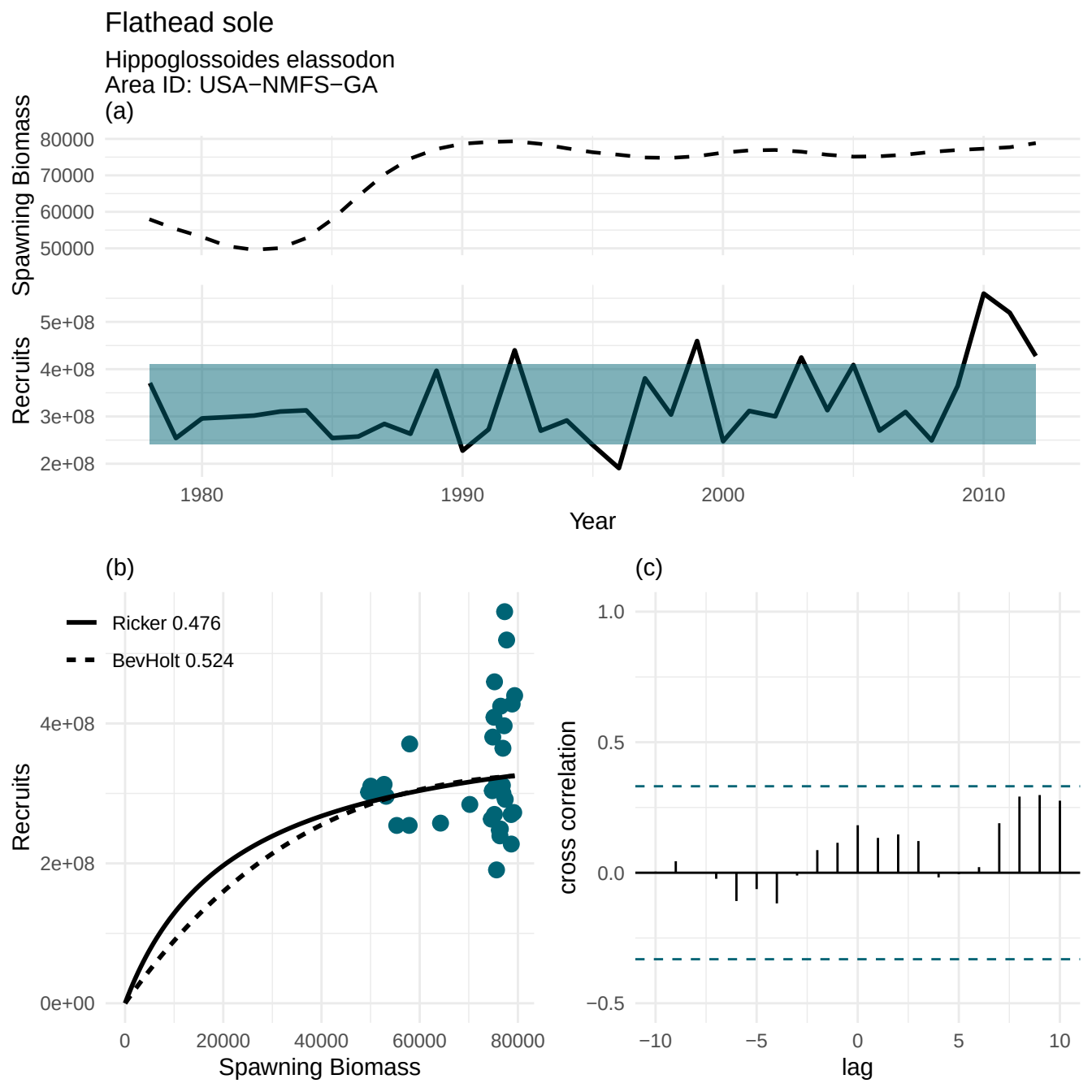

Dusky rockfish
Sebastes variabilis
Area ID: USA−NMFS−GA
(a)
Spawning Biomass
25000
20000
15000
10000
Recruits
1.5e+07
1.0e+07
5.0e+06
1980
1990
2000
2010
Year
(b)
Ricker 0.63
BevHolt 0.37
Recruits
1.5e+07
1.0e+07
5.0e+06
0.0e+00
0
10000
20000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

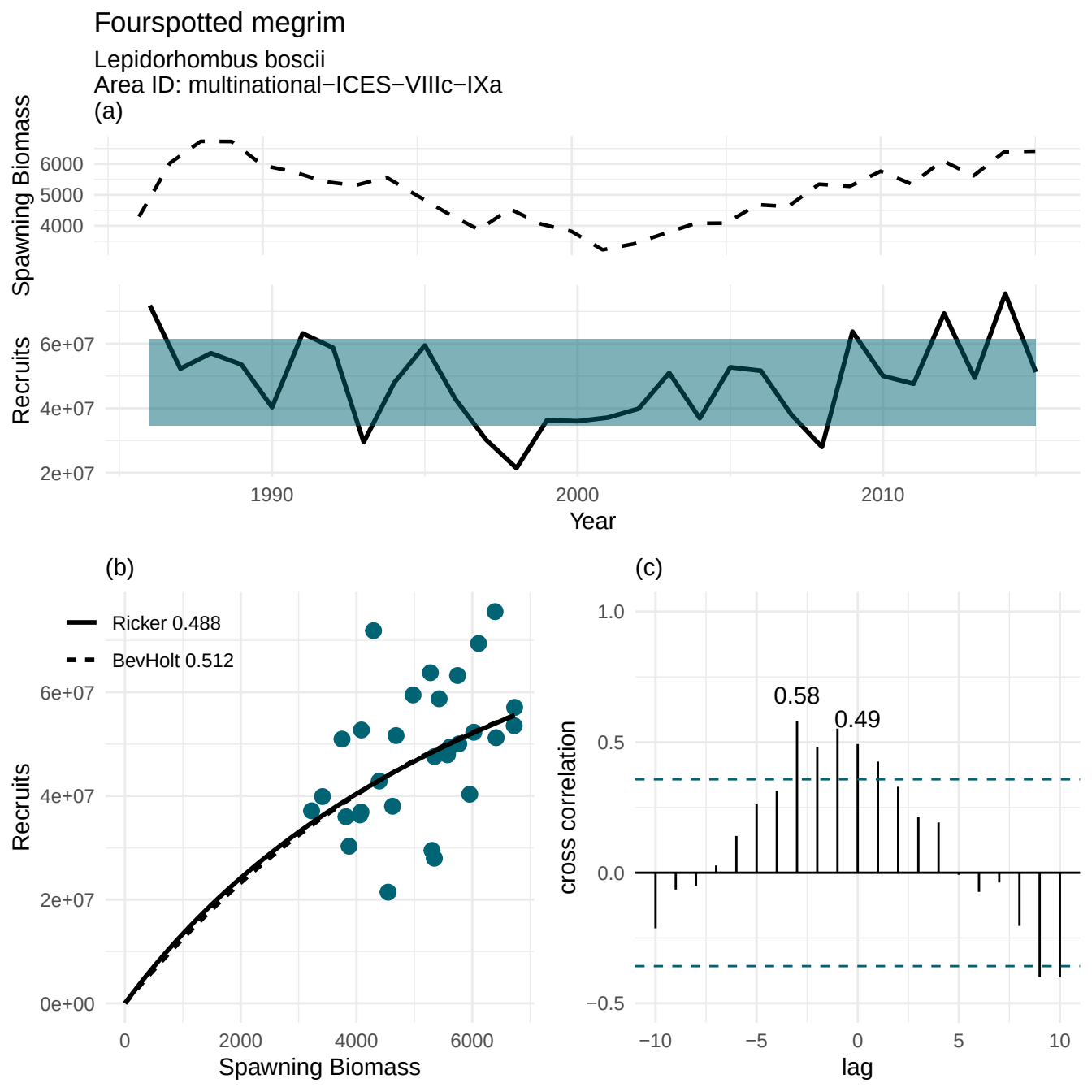

European seabass
Dicentrarchus labrax
Area ID: multinational−ICES−IVbc−VII
(a)
Spawning Biomass
25000
20000
15000
Recruits
7.5e+07
5.0e+07
2.5e+07
0.0e+00
1990
2000
2010
Year
(b)
Ricker 0.673
BevHolt 0.327
Recruits
7.5e+07
5.0e+07
2.5e+07
0.0e+00
0
5000
10000
15000
20000
25000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.49
−10
−5
0
5
10
lag

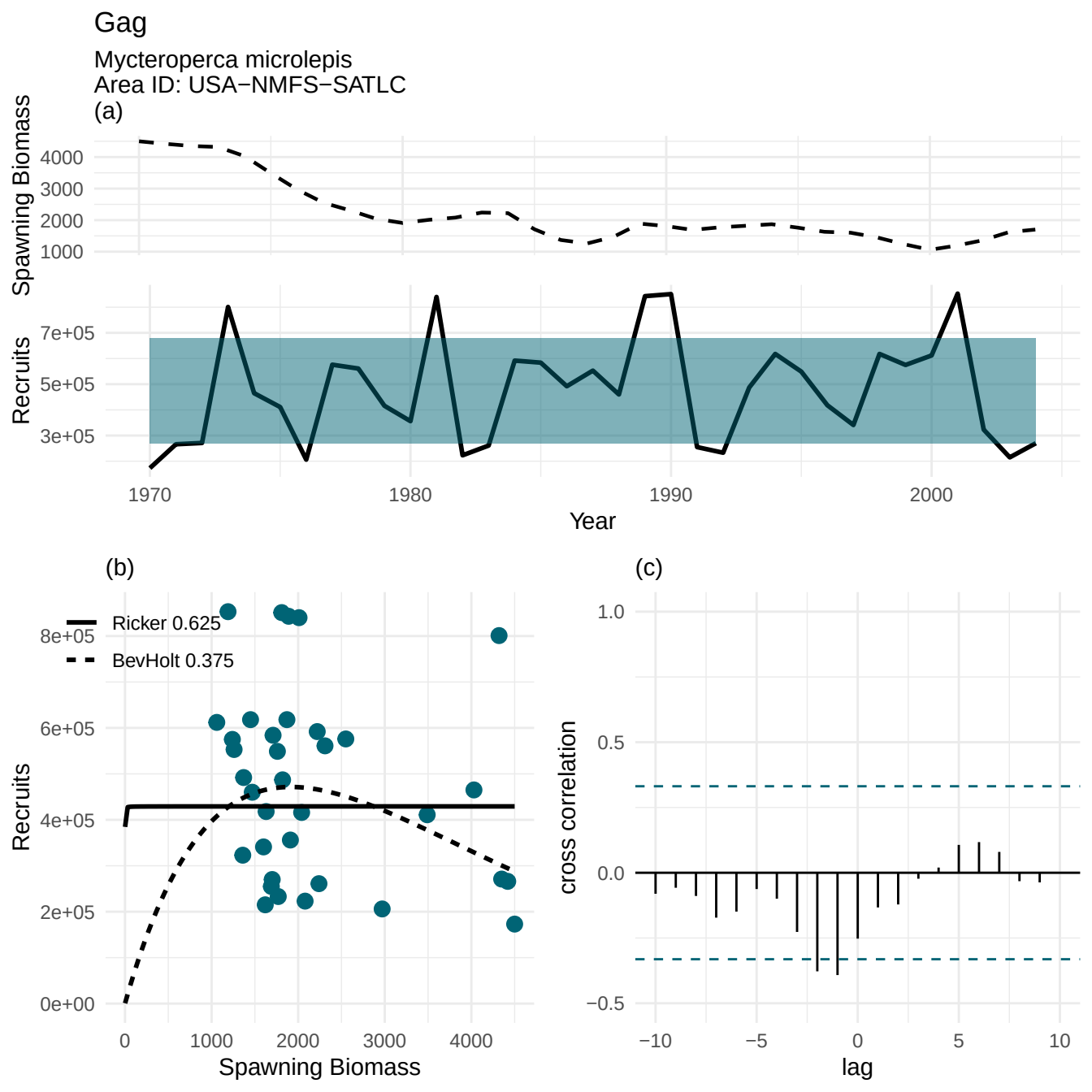

European seabass
Dicentrarchus labrax
Area ID: multinational−ICES−VIIIab
(a)
Spawning Biomass
22000
20000
18000
Recruits
5e+07
4e+07
3e+07
2e+07
1e+07
1990
1995
2000
2005
2010
2015
Year
(b)
Ricker 0.604
BevHolt 0.396
Recruits
5e+07
4e+07
3e+07
2e+07
1e+07
0e+00
0
5000
10000
15000
20000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.46
−10
−5
0
5
10
lag

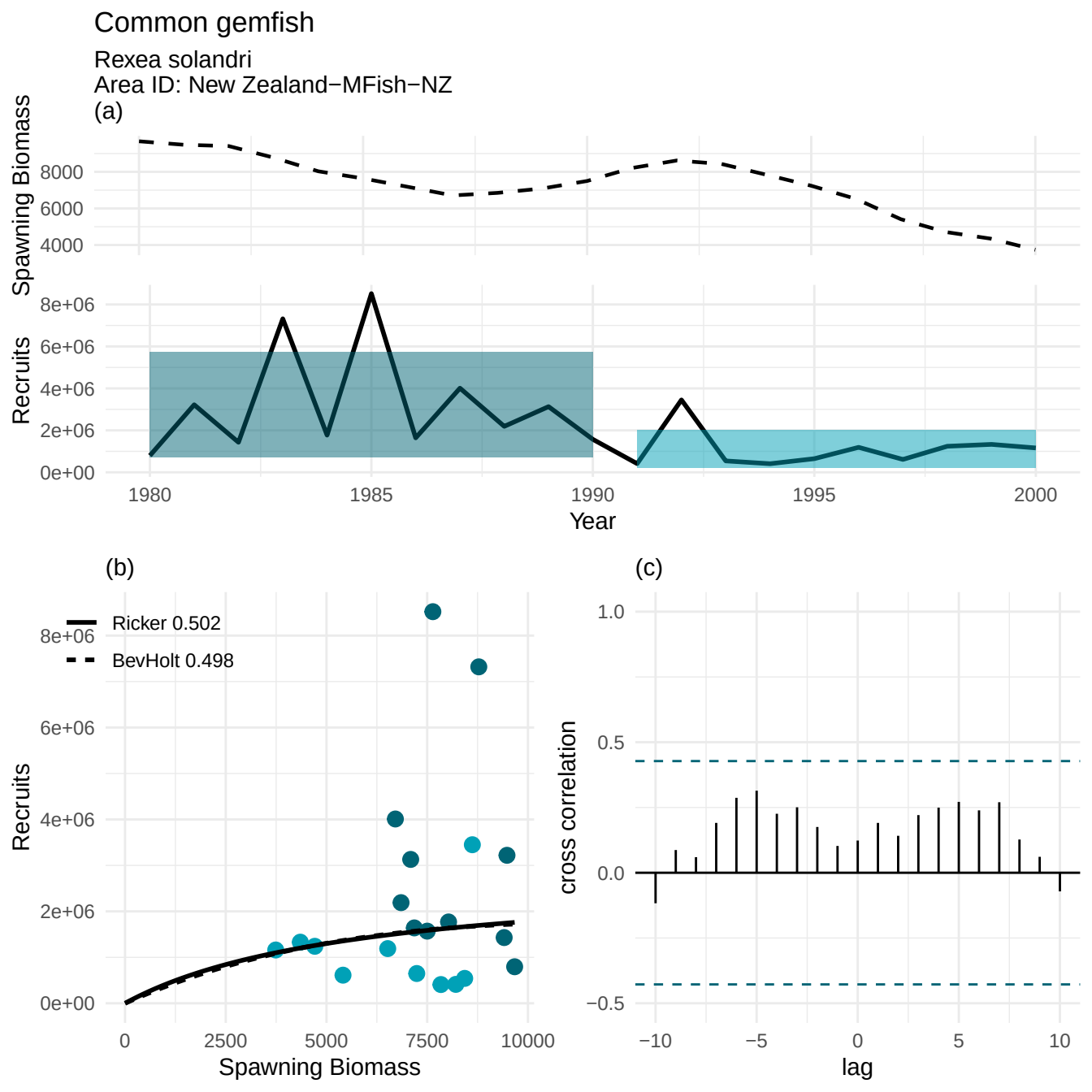

English sole
Parophrys vetulus
Area ID: USA−NMFS−PCOAST
(a)
Spawning Biomass
40000
30000
20000
10000
Recruits
4e+08
3e+08
2e+08
1e+08
1940
1960
1980
2000
Year
(b)
Ricker 0.357
BevHolt 0.643
Recruits
4e+08
3e+08
2e+08
1e+08
0e+00
0
10000
20000
30000
40000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.7
0.26
−10
−5
0
5
10
lag

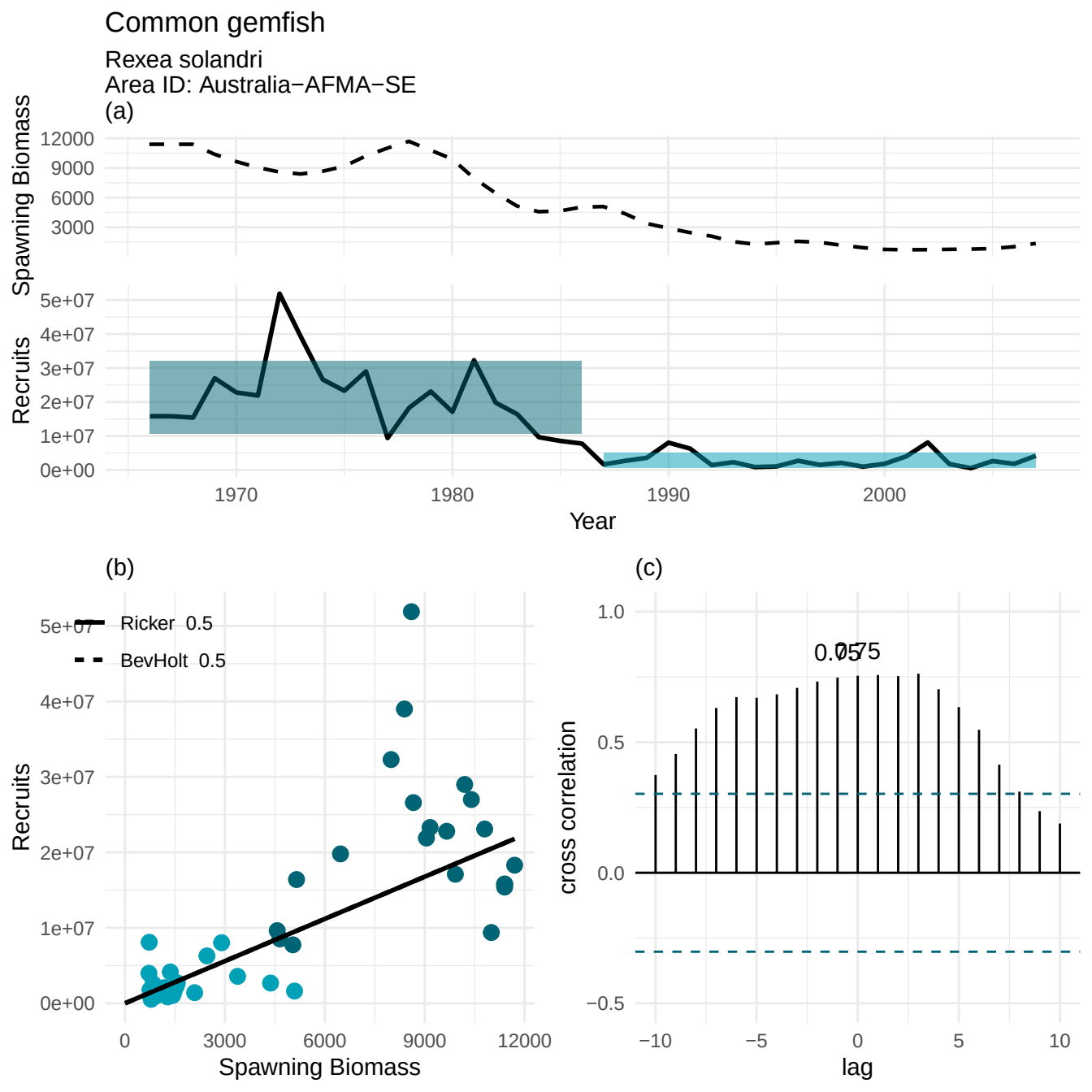

Flathead sole
Hippoglossoides elassodon
Area ID: USA−NMFS−BSAI
(a)
Spawning Biomass
200000
160000
120000
Recruits
2.5e+09
2.0e+09
1.5e+09
1.0e+09
5.0e+08
1970
1980
1990
2000
2010
Year
(b)
Ricker 0.705
BevHolt 0.295
Recruits
2.5e+09
2.0e+09
1.5e+09
1.0e+09
5.0e+08
0.0e+00
0
50000
100000
150000
200000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

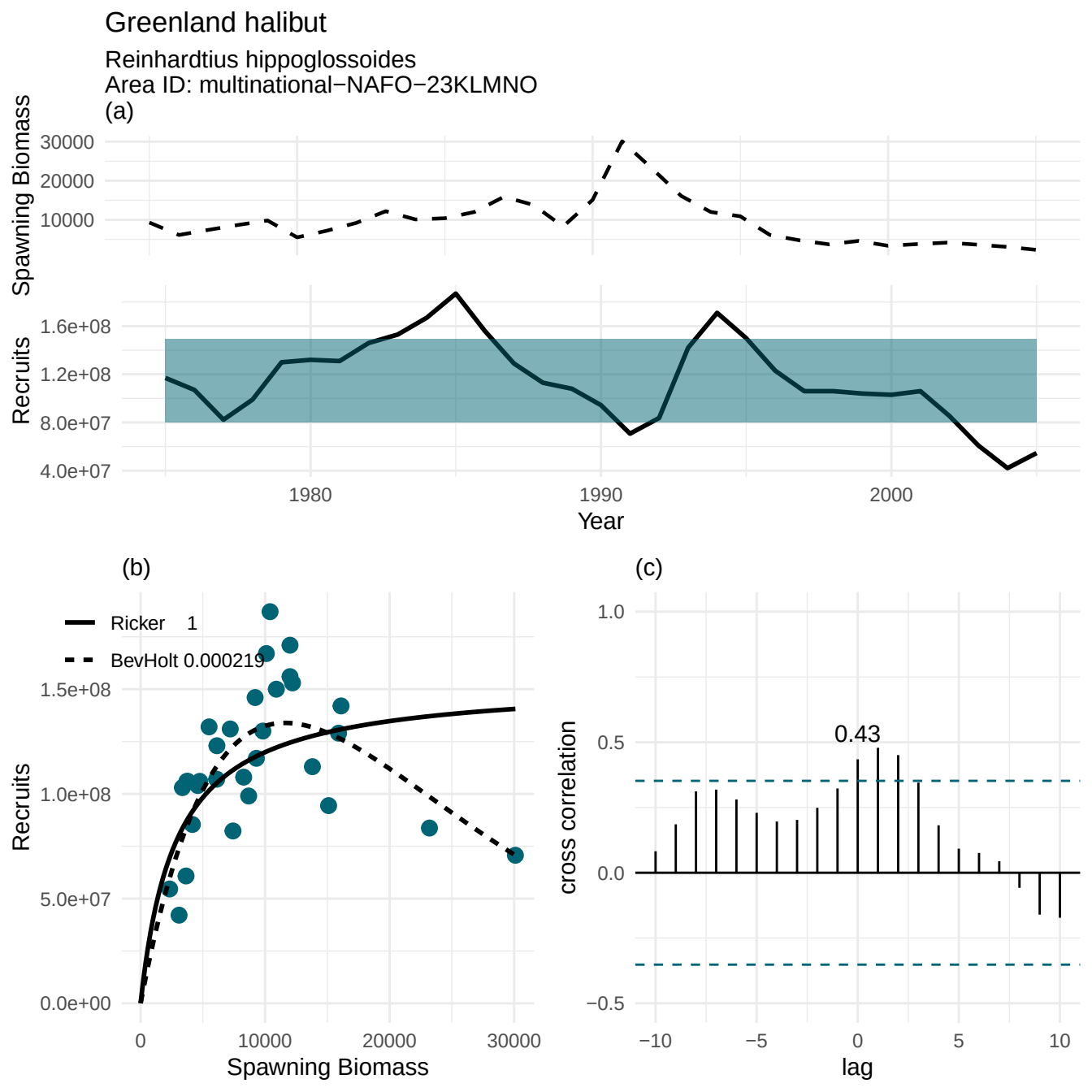

Flathead sole
Hippoglossoides elassodon
Area ID: USA−NMFS−GA
(a)
Spawning Biomass
80000
70000
60000
50000
Recruits
5e+08
4e+08
3e+08
2e+08
1980
1990
2000
2010
Year
(b)
Ricker 0.476
BevHolt 0.524
Recruits
4e+08
2e+08
0e+00
0
20000
40000
60000
80000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

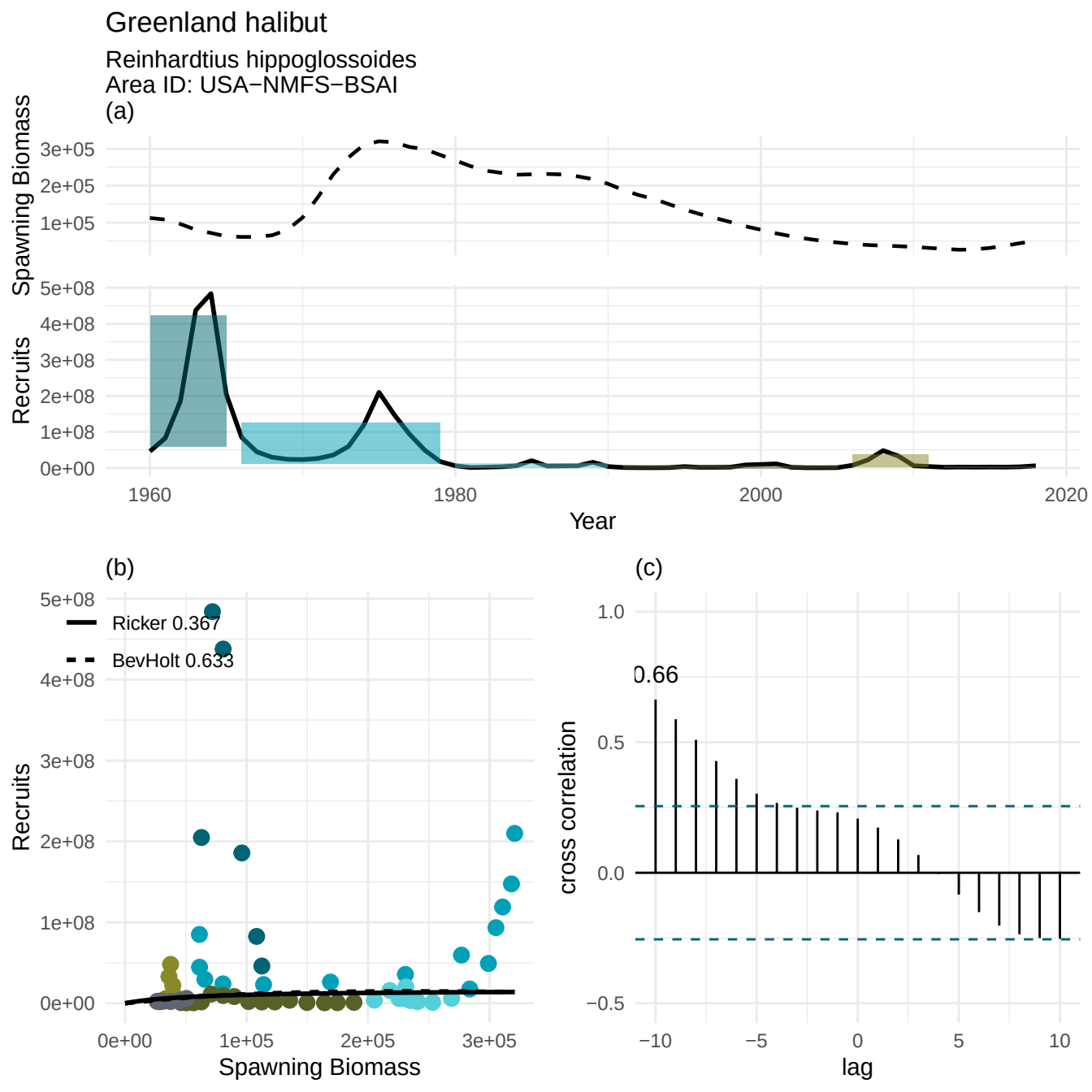

Fourspotted megrim
Lepidorhombus boscii
Area ID: multinational−ICES−VIIIc−IXa
(a)
Spawning Biomass
6000
5000
4000
Recruits
6e+07
4e+07
2e+07
1990
2000
2010
Year
(b)
Ricker 0.488
BevHolt 0.512
Recruits
6e+07
4e+07
2e+07
0e+00
0
2000
4000
6000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.58
0.49
−10
−5
0
5
10
lag

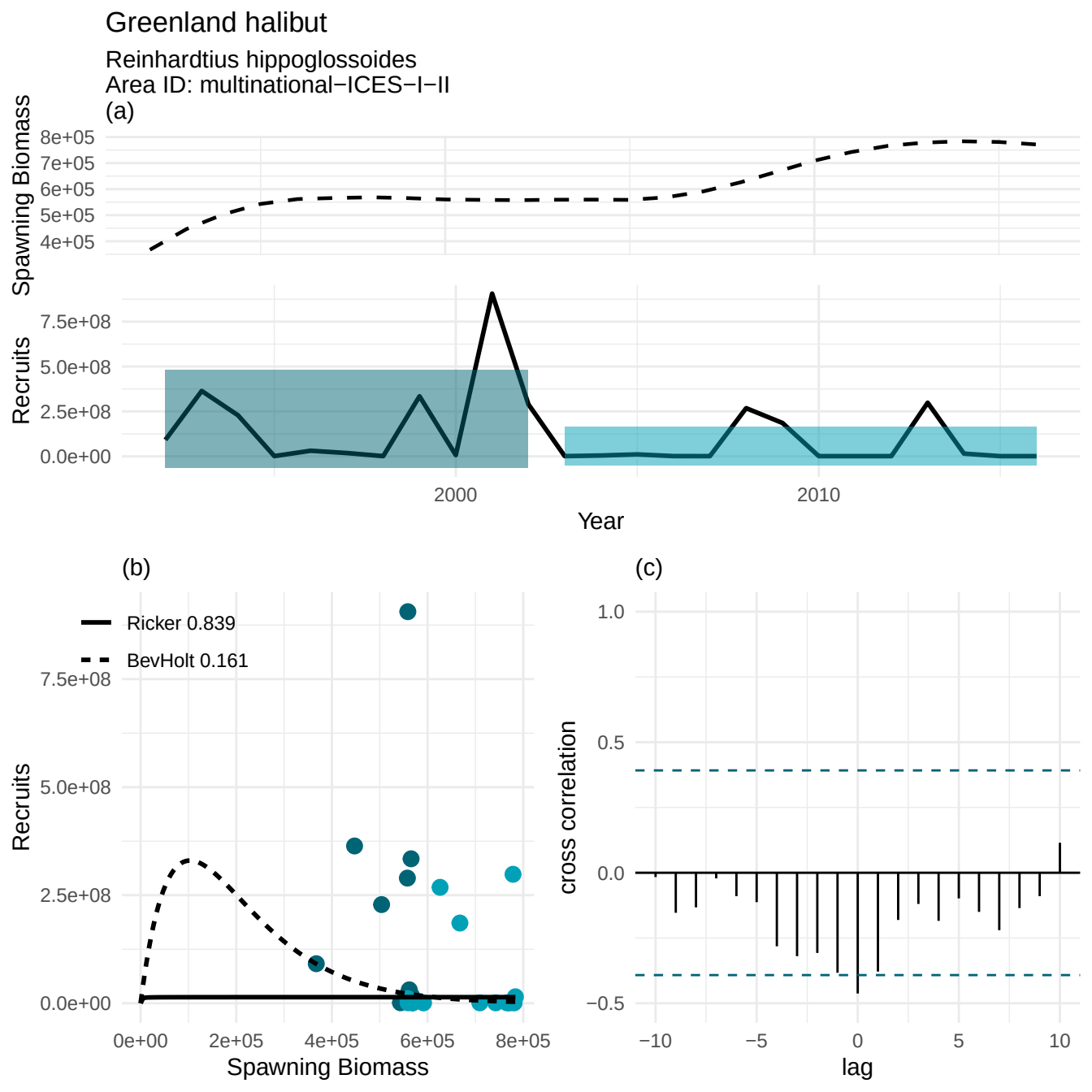

Gag
Mycteroperca microlepis
Area ID: USA−NMFS−SATLC
(a)
Spawning Biomass
4000
3000
2000
1000
Recruits
7e+05
5e+05
3e+05
1970
1980
1990
2000
Year
(b)
Ricker 0.625
BevHolt 0.375
8e+05
6e+05
4e+05
2e+05
0e+00
Recruits
0
1000
2000
3000
4000
Spawning Biomass
(c)
1.0
0.5
0.0
−0.5
cross correlation
−10
−5
0
5
10
lag

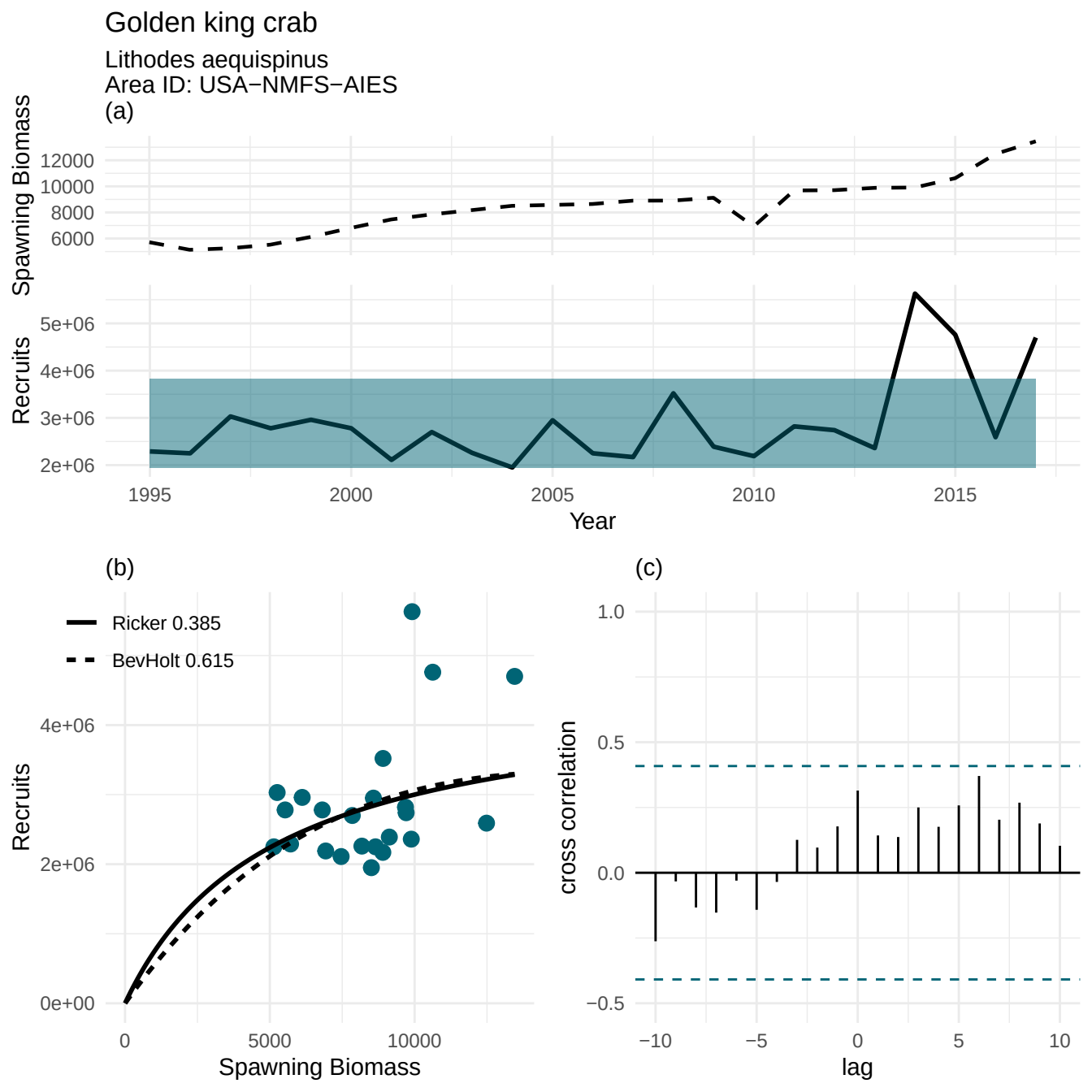

Common gemfish
Rexea solandri
Area ID: New Zealand−MFish−NZ
(a)
Spawning Biomass
8000
6000
4000
Recruits
8e+06
6e+06
4e+06
2e+06
0e+00
1980
1985
1990
1995
2000
Year
(b)
Ricker 0.502
BevHolt 0.498
Recruits
8e+06
6e+06
4e+06
2e+06
0e+00
0
2500
5000
7500
10000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

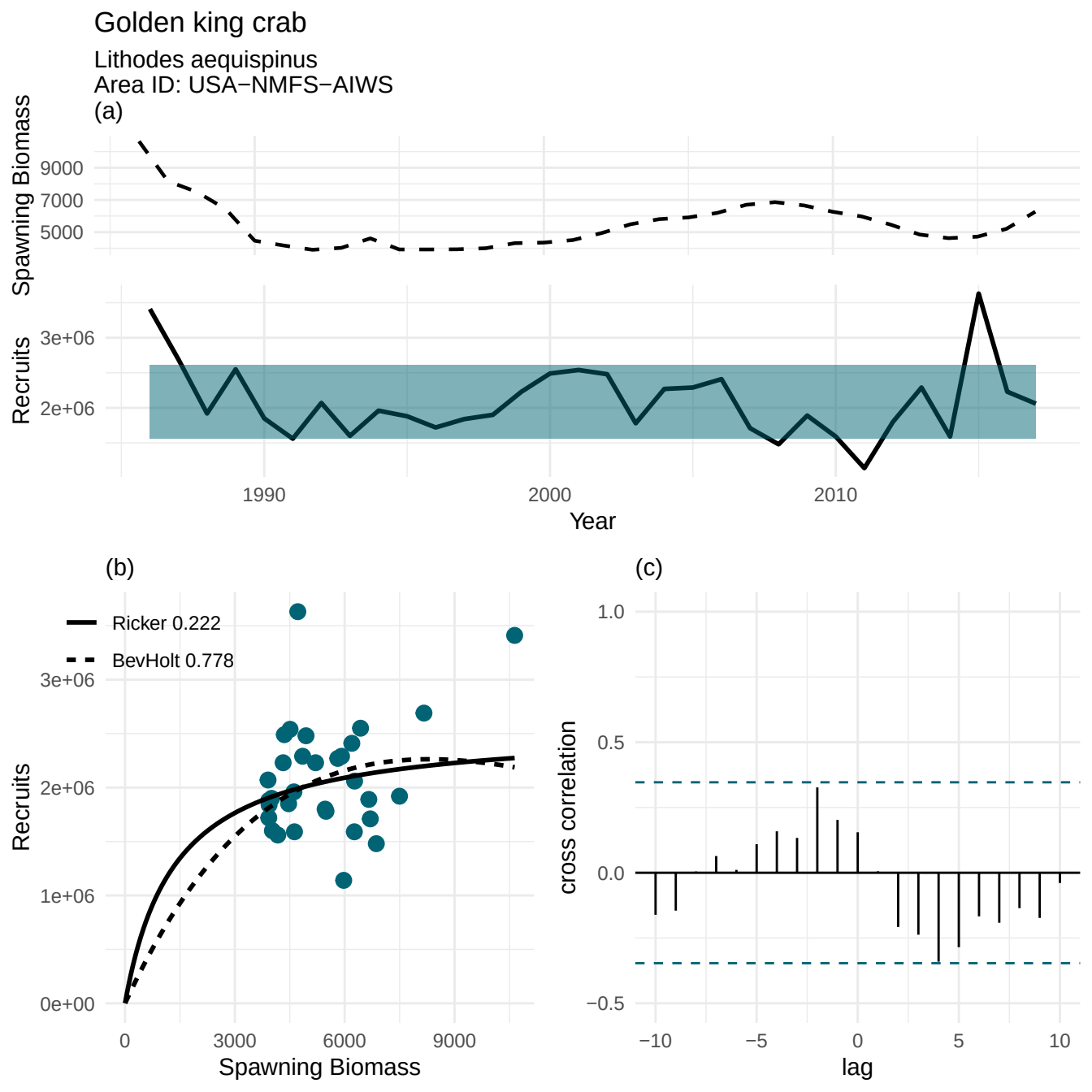

Common gemfish
Rexea solandri
Area ID: Australia−AFMA−SE
(a)
Spawning Biomass
12000
9000
6000
3000
Recruits
5e+07
4e+07
3e+07
2e+07
1e+07
0e+00
1970
1980
1990
2000
Year
(b)
Ricker 0.5
BevHolt 0.5
Recruits
Spawning Biomass
0
3000
6000
9000
12000
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.575
−10
−5
0
5
10
lag

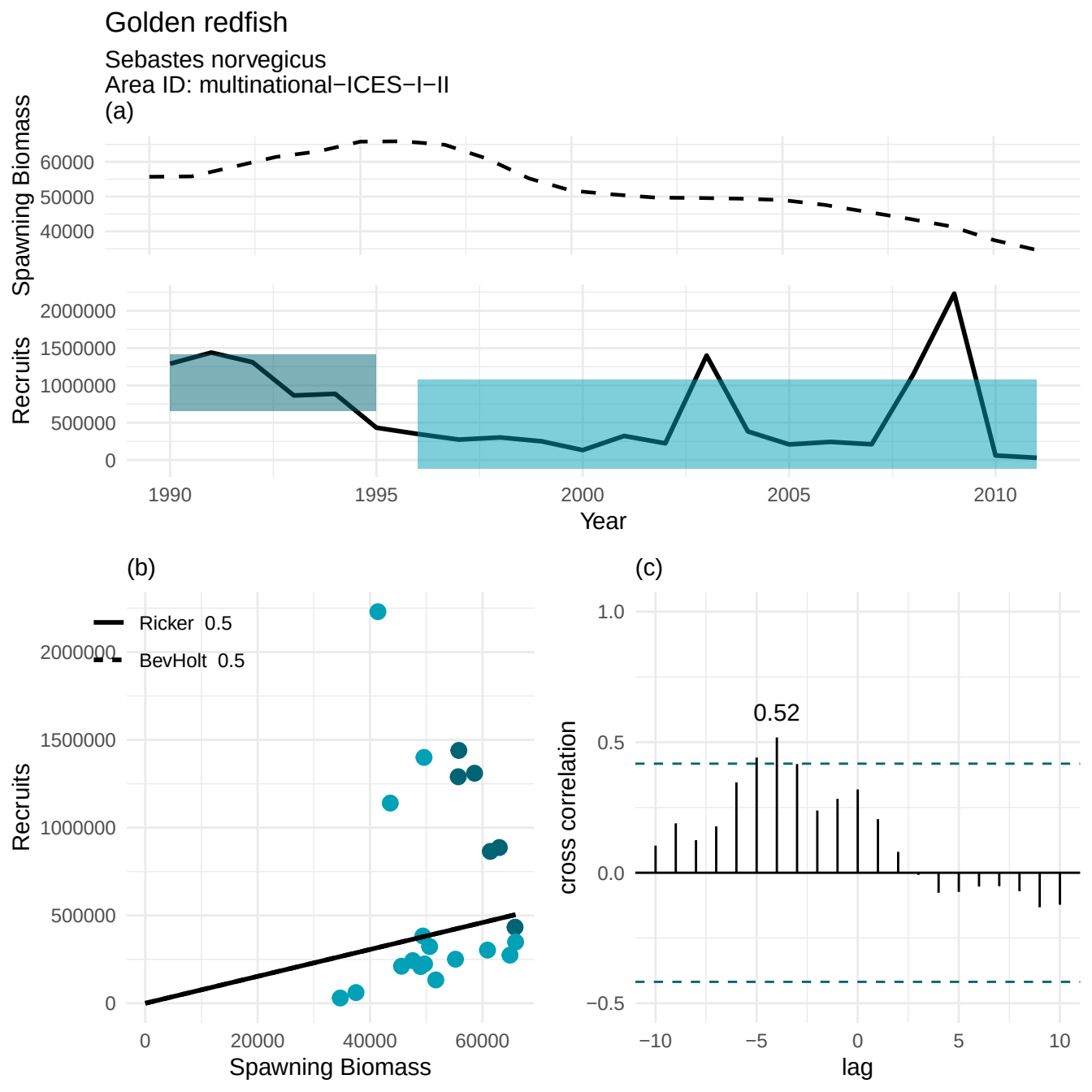

Greenland halibut
Reinhardtius hippoglossoides
Area ID: multinational−NAFO−23KLMNO
(a)
Spawning Biomass
30000
20000
10000
Recruits
1.6e+08
1.2e+08
8.0e+07
4.0e+07
1980
1990
2000
Year
(b)
Ricker 1
BevHolt 0.000219
Recruits
1.5e+08
1.0e+08
5.0e+07
0.0e+00
0
10000
20000
30000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.43
−10
−5
0
5
10
lag

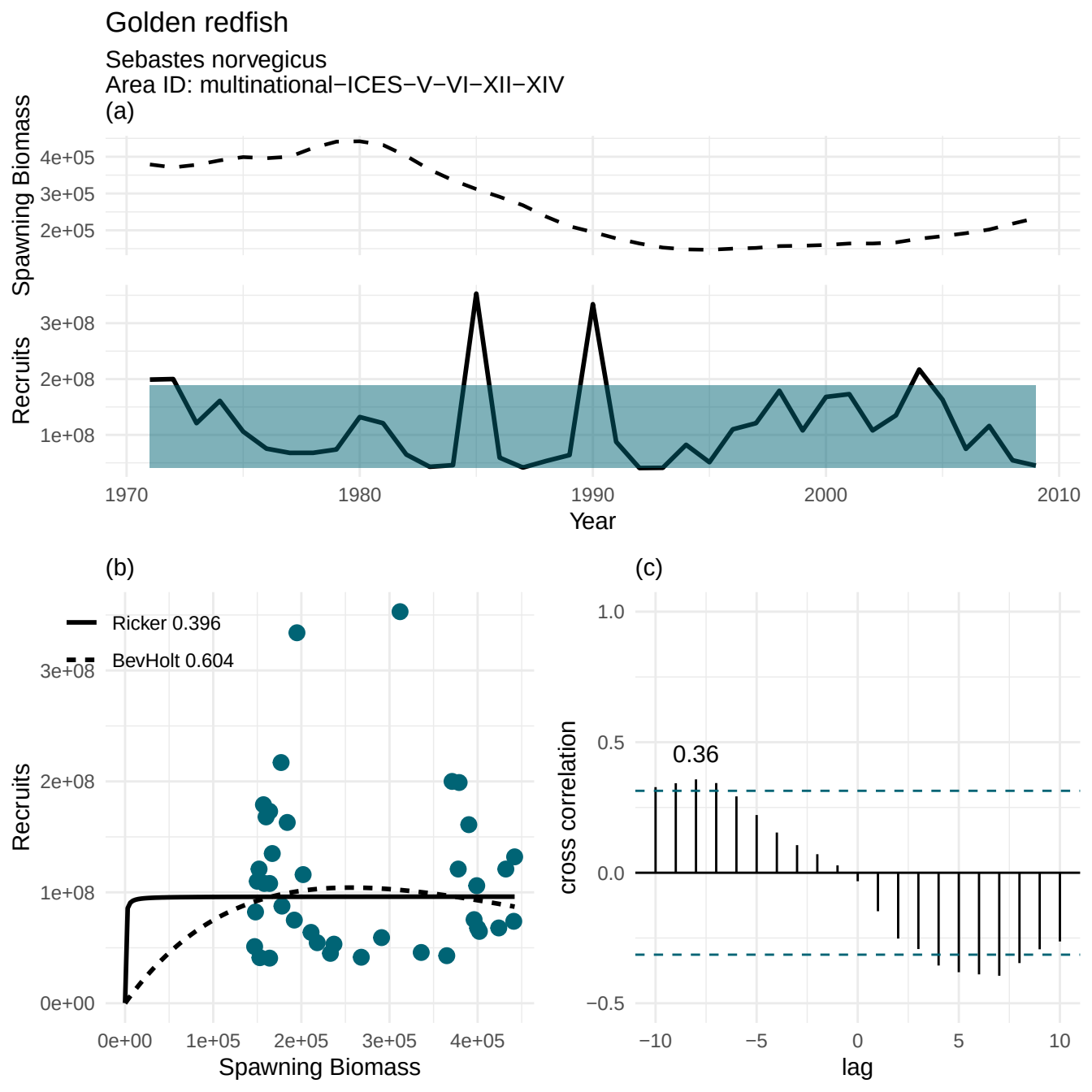

Greenland halibut
Reinhardtius hippoglossoides
Area ID: USA−NMFS−BSAI
(a)
Spawning Biomass
3e+05
2e+05
1e+05
Recruits
5e+08
4e+08
3e+08
2e+08
1e+08
0e+00
1960
1980
2000
2020
Year
(b)
Ricker 0.367
BevHolt 0.633
Recruits
Spawning Biomass
0e+00
1e+05
2e+05
3e+05
(c)
0.66
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

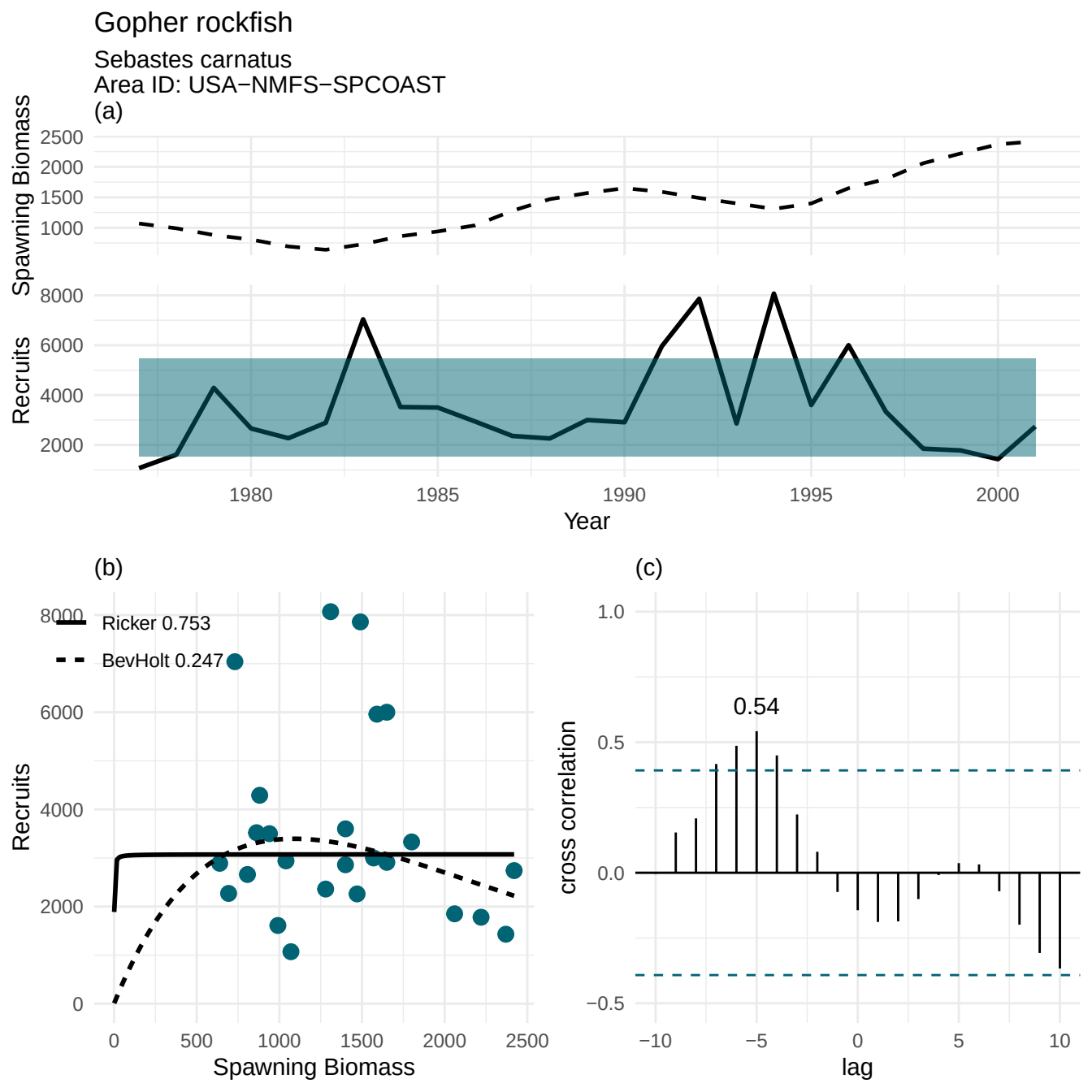

Greenland halibut
Reinhardtius hippoglossoides
Area ID: multinational−ICES−I−II
(a)
Spawning Biomass
8e+05
7e+05
6e+05
5e+05
4e+05
Recruits
7.5e+08
5.0e+08
2.5e+08
0.0e+00
2000
2010
Year
(b)
Ricker 0.839
BevHolt 0.161
Recruits
7.5e+08
5.0e+08
2.5e+08
0.0e+00
0e+00
2e+05
4e+05
6e+05
8e+05
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

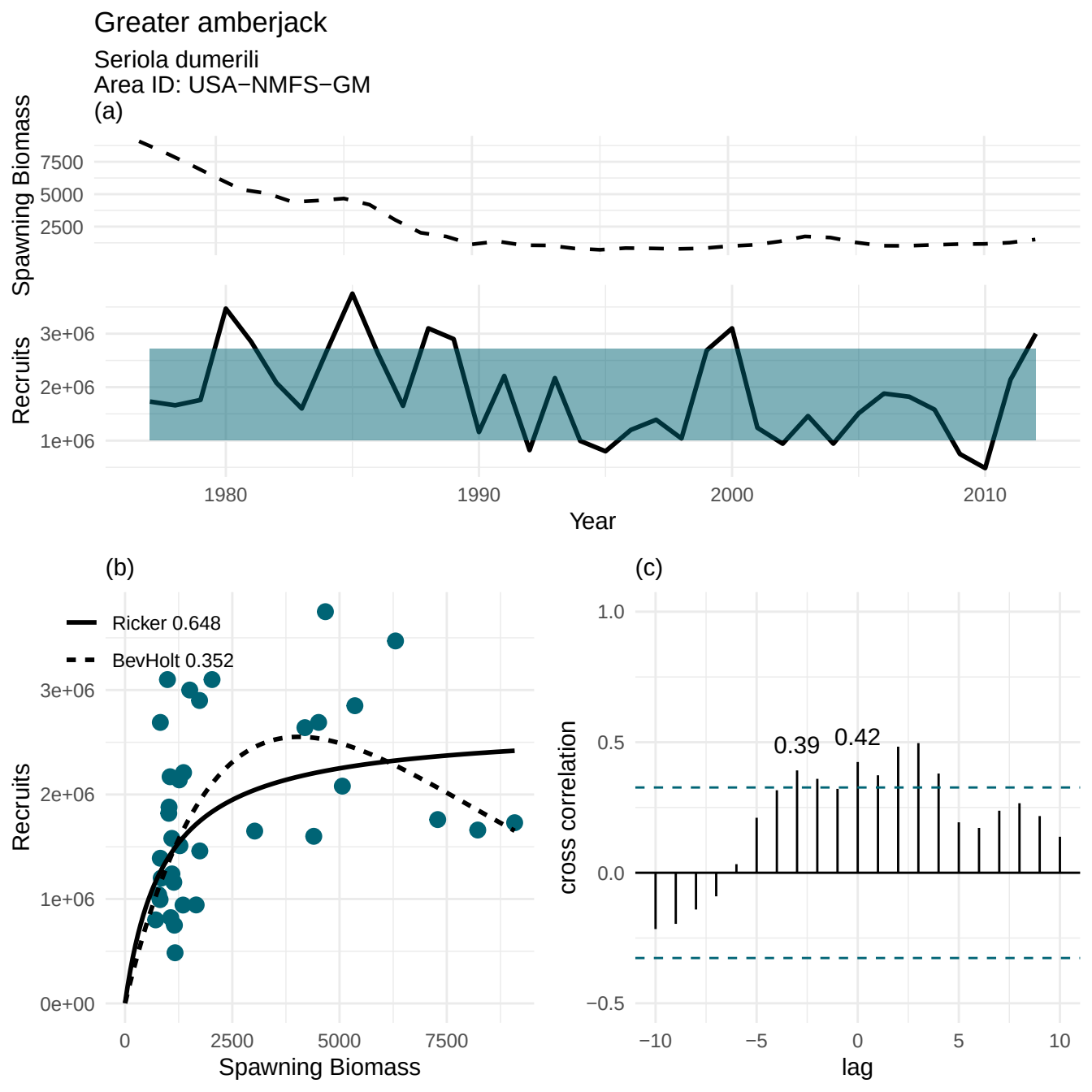

Golden king crab
Lithodes aequispinus
Area ID: USA−NMFS−AIES
(a)
Spawning Biomass
12000
10000
8000
6000
Recruits
5e+06
4e+06
3e+06
2e+06
1995
2000
2005
2010
2015
Year
(b)
Ricker 0.385
BevHolt 0.615
Recruits
4e+06
2e+06
0e+00
0
5000
10000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

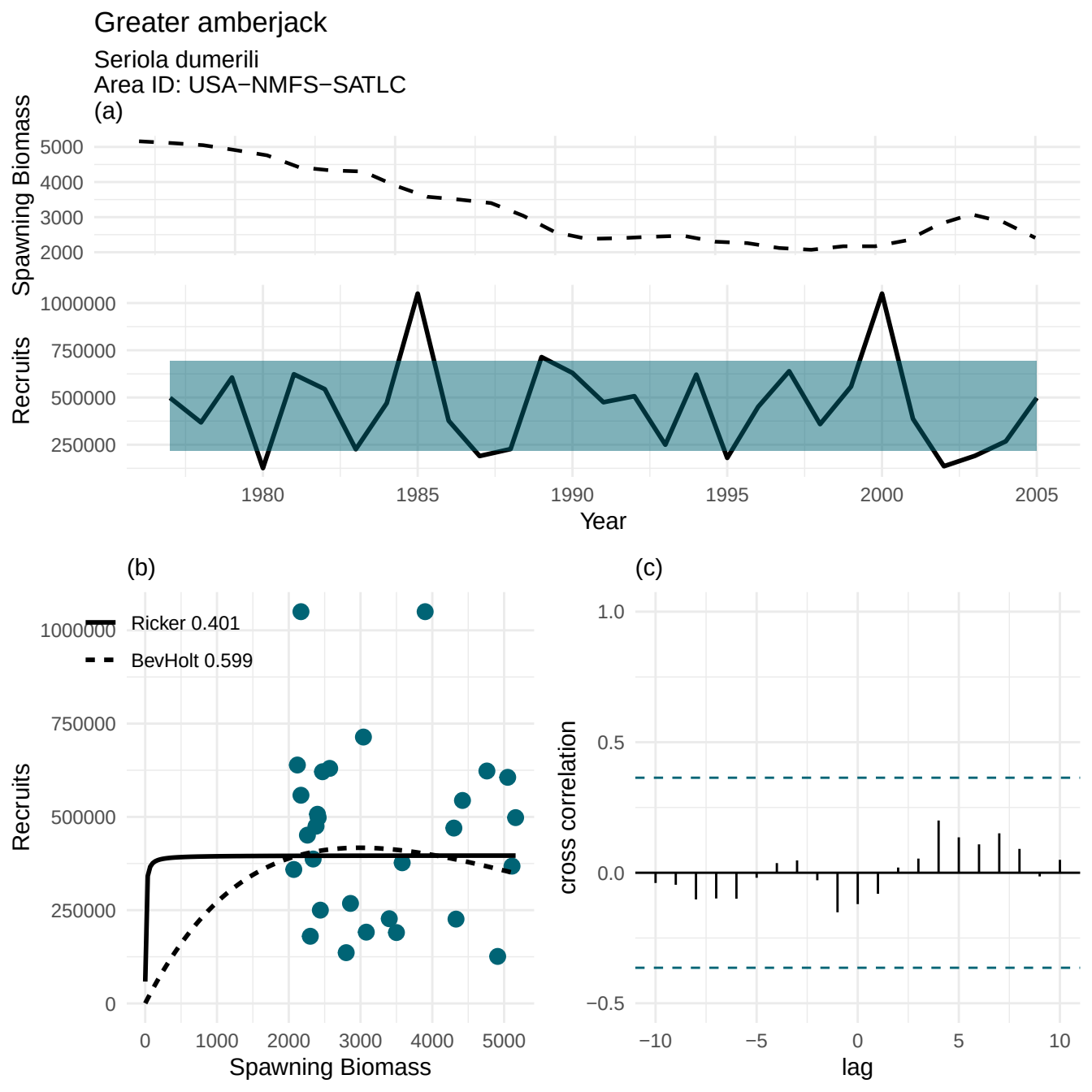

Golden king crab
Lithodes aequispinus
Area ID: USA−NMFS−AIWS
(a)
Spawning Biomass
9000
7000
5000
Recruits
3e+06
2e+06
1990
2000
2010
Year
(b)
Ricker 0.222
BevHolt 0.778
Recruits
3e+06
2e+06
1e+06
0e+00
0
3000
6000
9000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

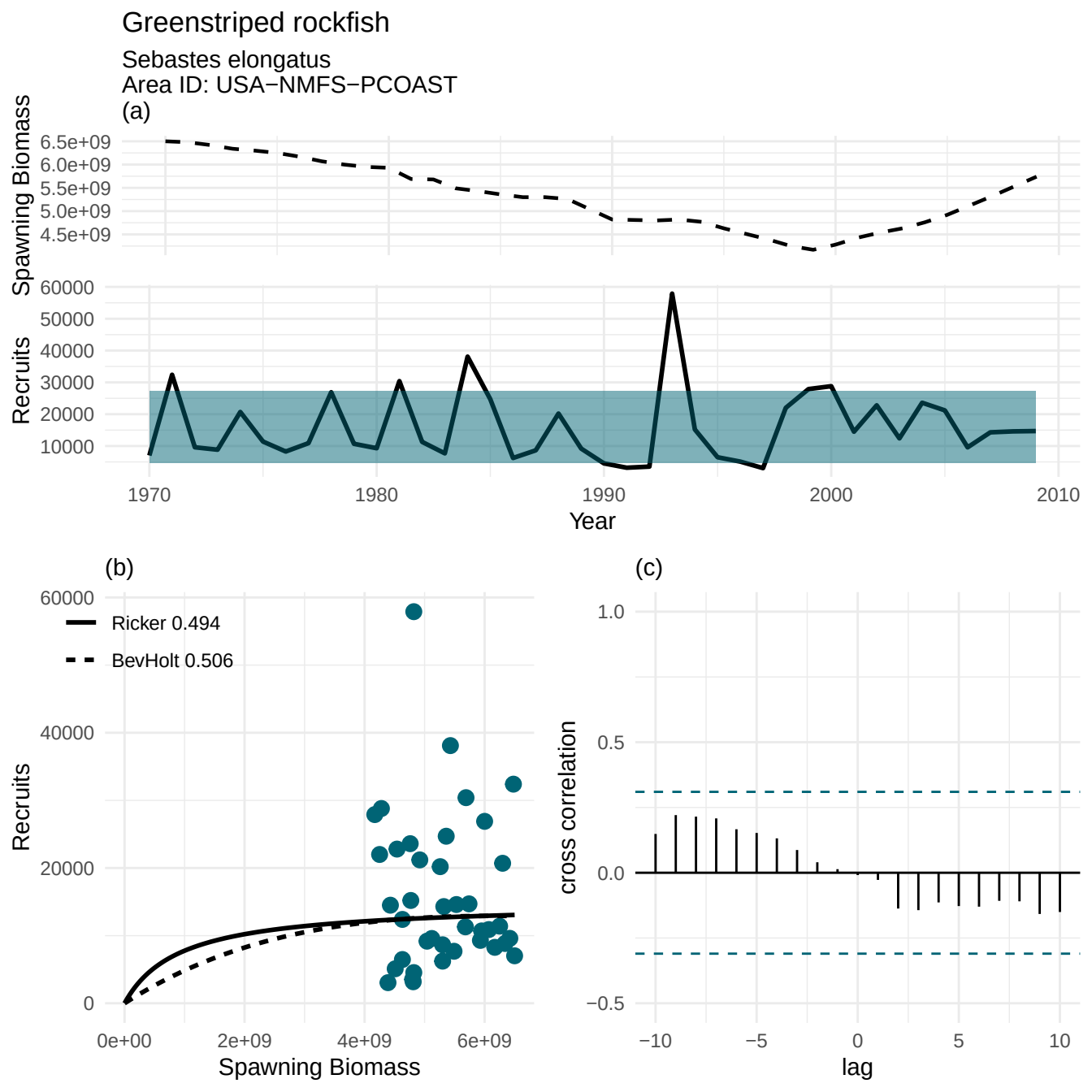

Golden redfish
Sebastes norvegicus
Area ID: multinational−ICES−I−II
(a)
Spawning Biomass
60000
50000
40000
Recruits
2000000
1500000
1000000
500000
0
1990
1995
2000
2005
2010
Year
(b)
Ricker 0.5
BevHolt 0.5
Recruits
2000000
1500000
1000000
500000
0
0
20000
40000
60000
Spawning Biomass
(c)
1.0
0.5
0.0
−0.5
0.52
cross correlation
−10
−5
0
5
10
lag

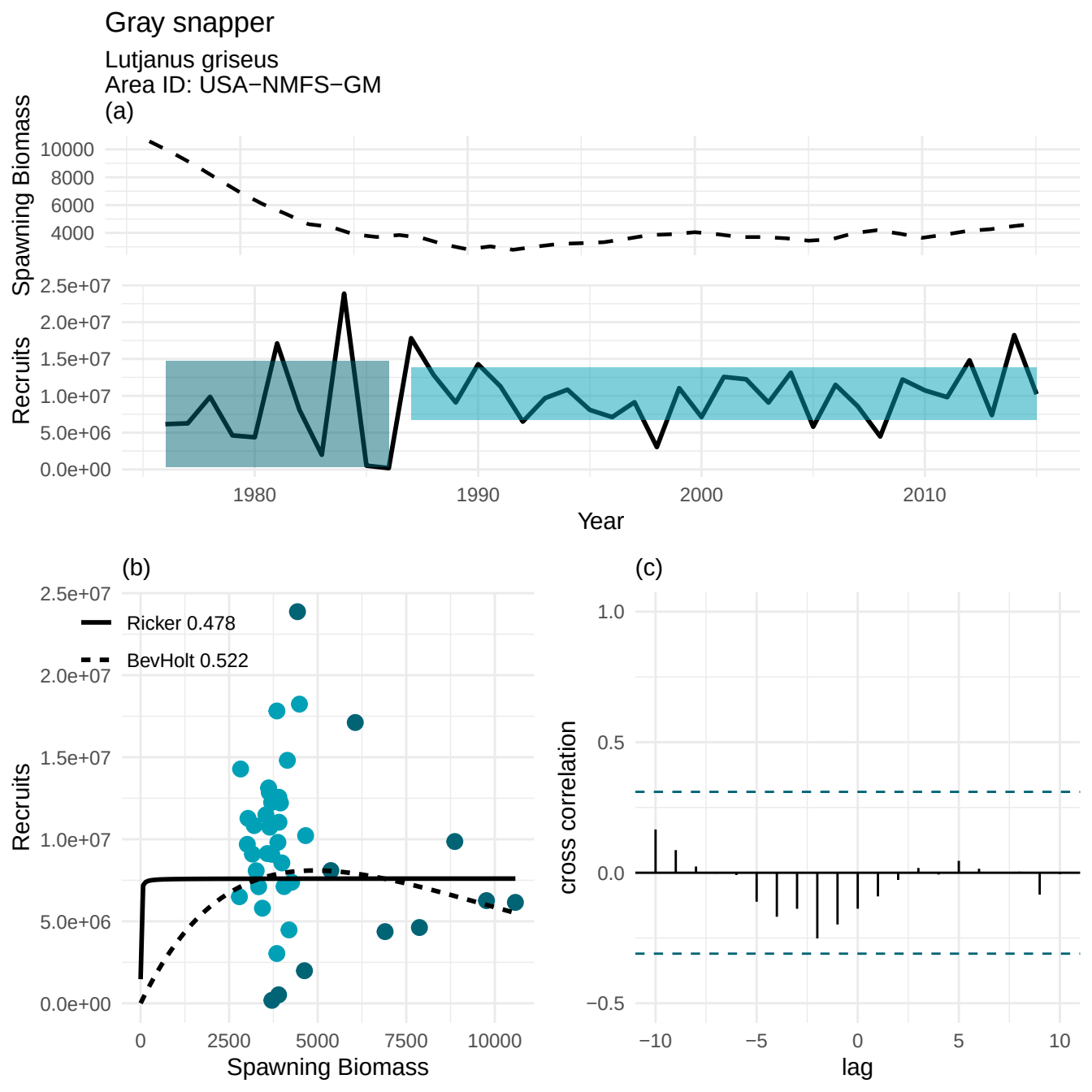

Golden redfish
Sebastes norvegicus
Area ID: multinational−ICES−V−VI−XII−XIV
(a)
Spawning Biomass
4e+05
3e+05
2e+05
Recruits
3e+08
2e+08
1e+08
1970
1980
1990
2000
2010
Year
(b)
Ricker 0.396
BevHolt 0.604
Recruits
3e+08
2e+08
1e+08
0e+00
0e+00
1e+05
2e+05
3e+05
4e+05
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.36
−10
−5
0
5
10
lag

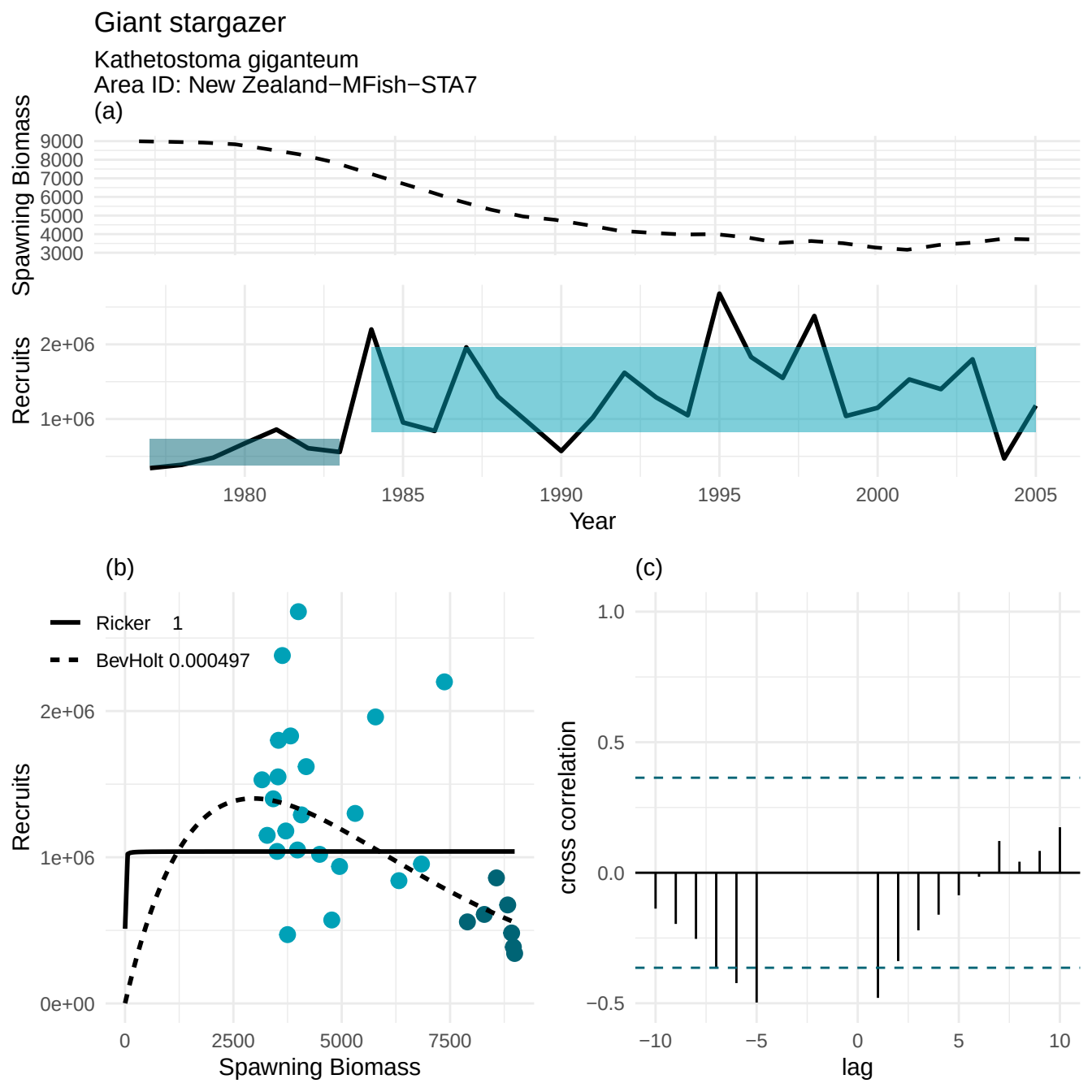

Gopher rockfish
Sebastes carnatus
Area ID: USA−NMFS−SPCOAST
(a)
Spawning Biomass
2500
2000
1500
1000
Recruits
8000
6000
4000
2000
1980
1985
1990
1995
2000
Year
(b)
Ricker 0.753
BevHolt 0.247
Recruits
8000
6000
4000
2000
0
0
500
1000
1500
2000
2500
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.54
−10
−5
0
5
10
lag

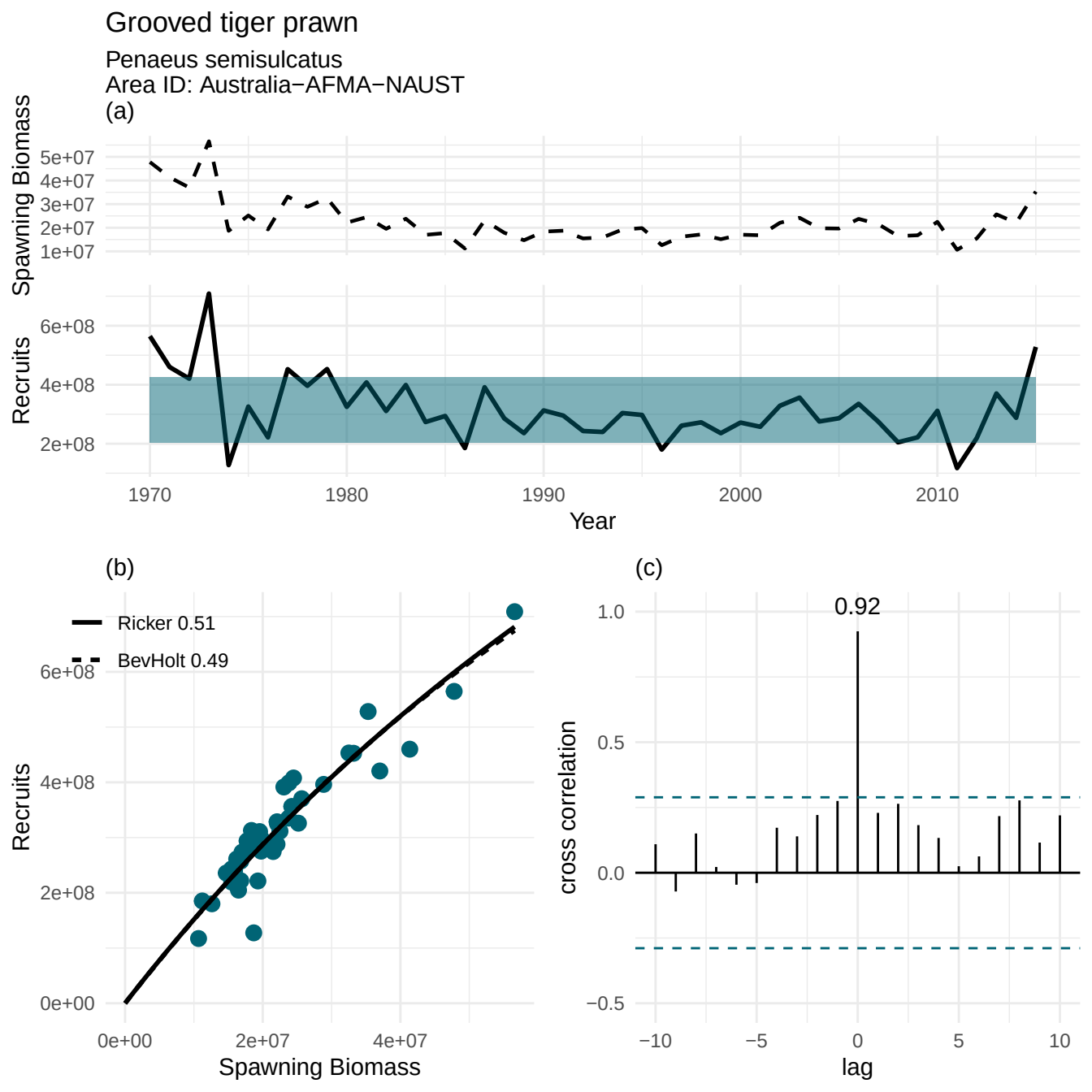

Greater amberjack
Seriola dumerili
Area ID: USA−NMFS−GM
(a)
Spawning Biomass
7500
5000
2500
Recruits
3e+06
2e+06
1e+06
1980
1990
2000
2010
Year
(b)
Ricker 0.648
BevHolt 0.352
Recruits
3e+06
2e+06
1e+06
0e+00
0
2500
5000
7500
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.39
0.42
−10
−5
0
5
10
lag

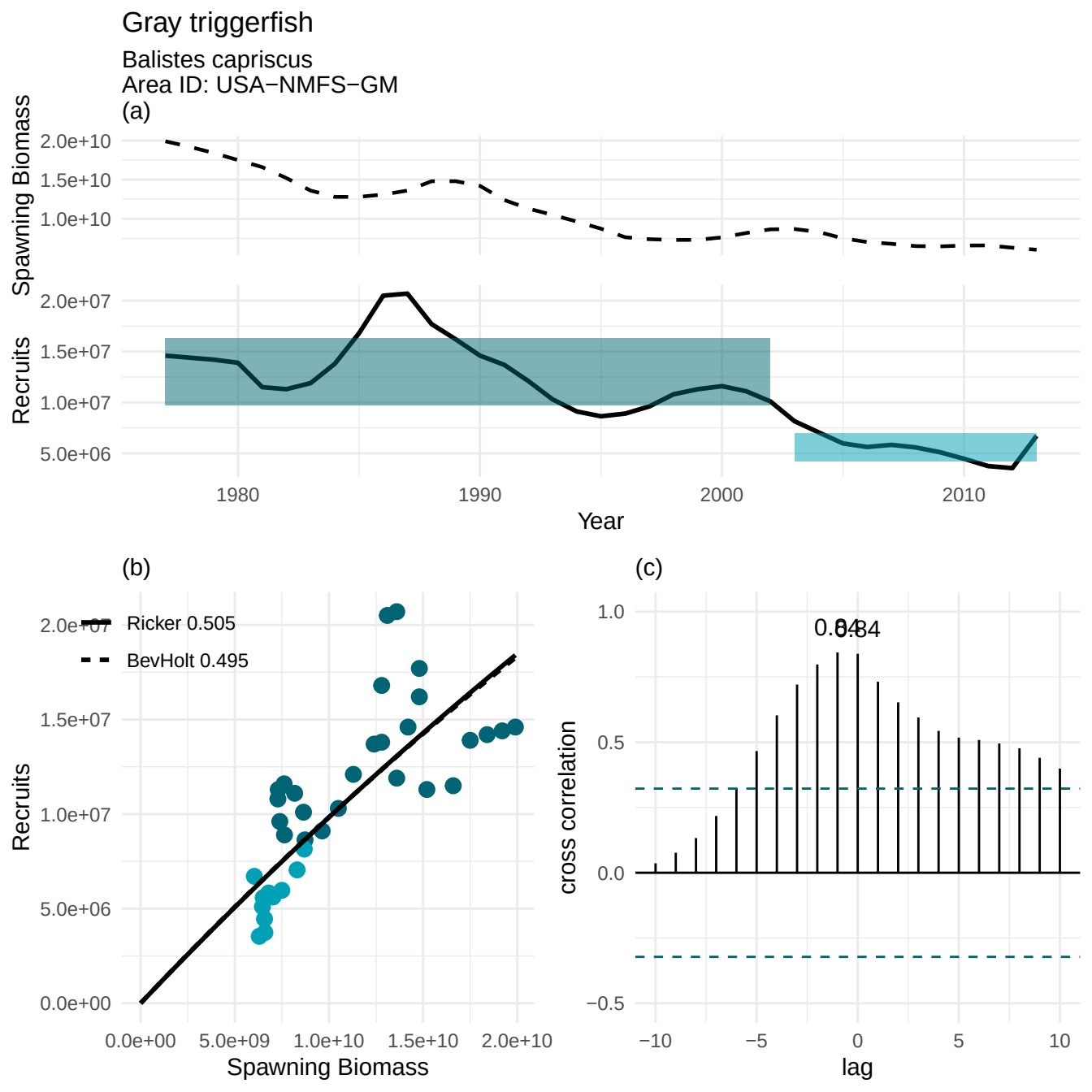

Greater amberjack
Seriola dumerili
Area ID: USA−NMFS−SATLC
(a)
Spawning Biomass
5000
4000
3000
2000
Recruits
1000000
750000
500000
250000
1980
1985
1990
1995
2000
2005
Year
(b)
Ricker 0.401
BevHolt 0.599
Recruits
1000000
750000
500000
250000
0
0
1000
2000
3000
4000
5000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

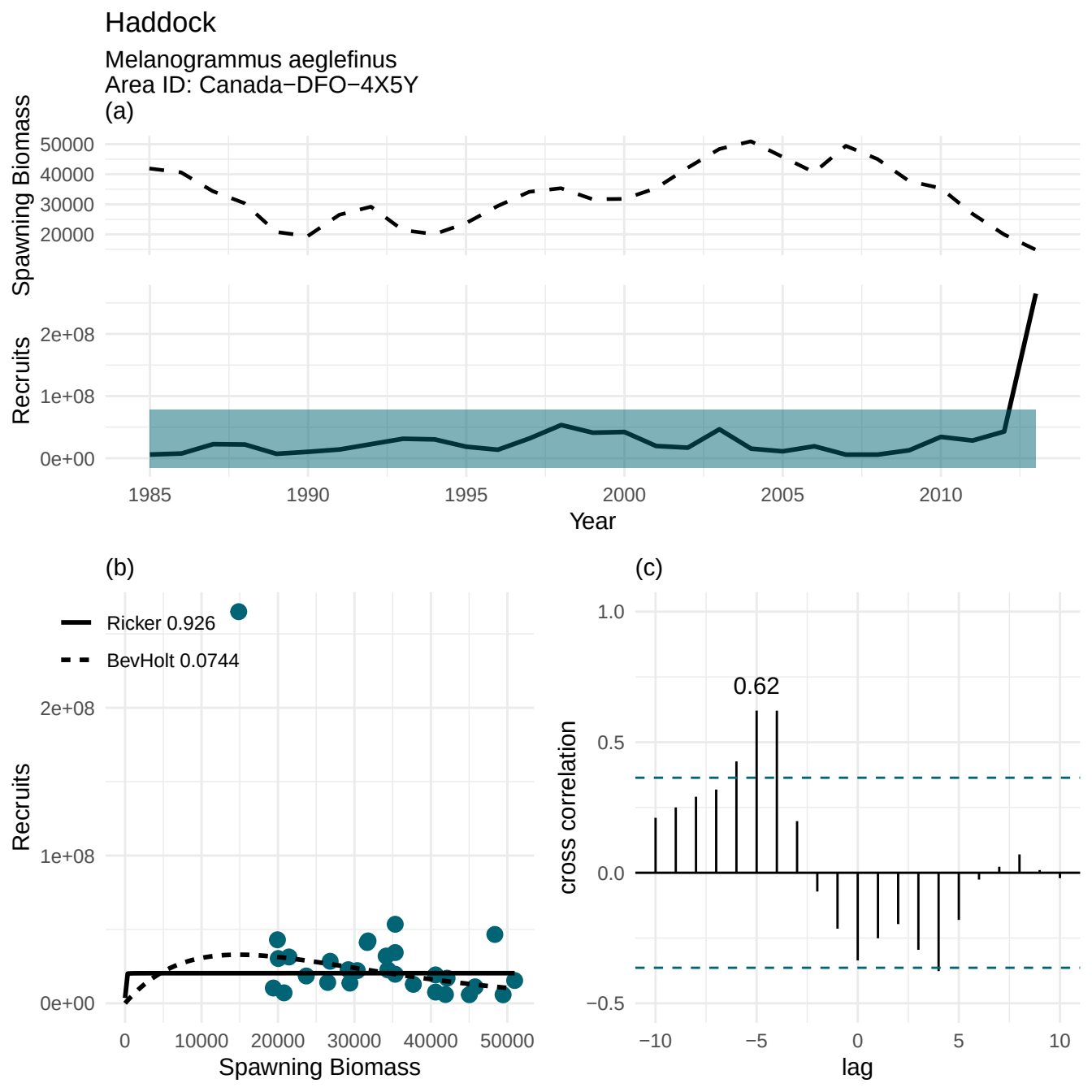

Greenstriped rockfish
Sebastes elongatus
Area ID: USA−NMFS−PCOAST
(a)
Spawning Biomass
6.5e+09
6.0e+09
5.5e+09
5.0e+09
4.5e+09
Recruits
60000
50000
40000
30000
20000
10000
1970
1980
1990
2000
2010
Year
(b)
Ricker 0.494
BevHolt 0.506
Recruits
60000
40000
20000
0
0e+00
2e+09
4e+09
6e+09
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

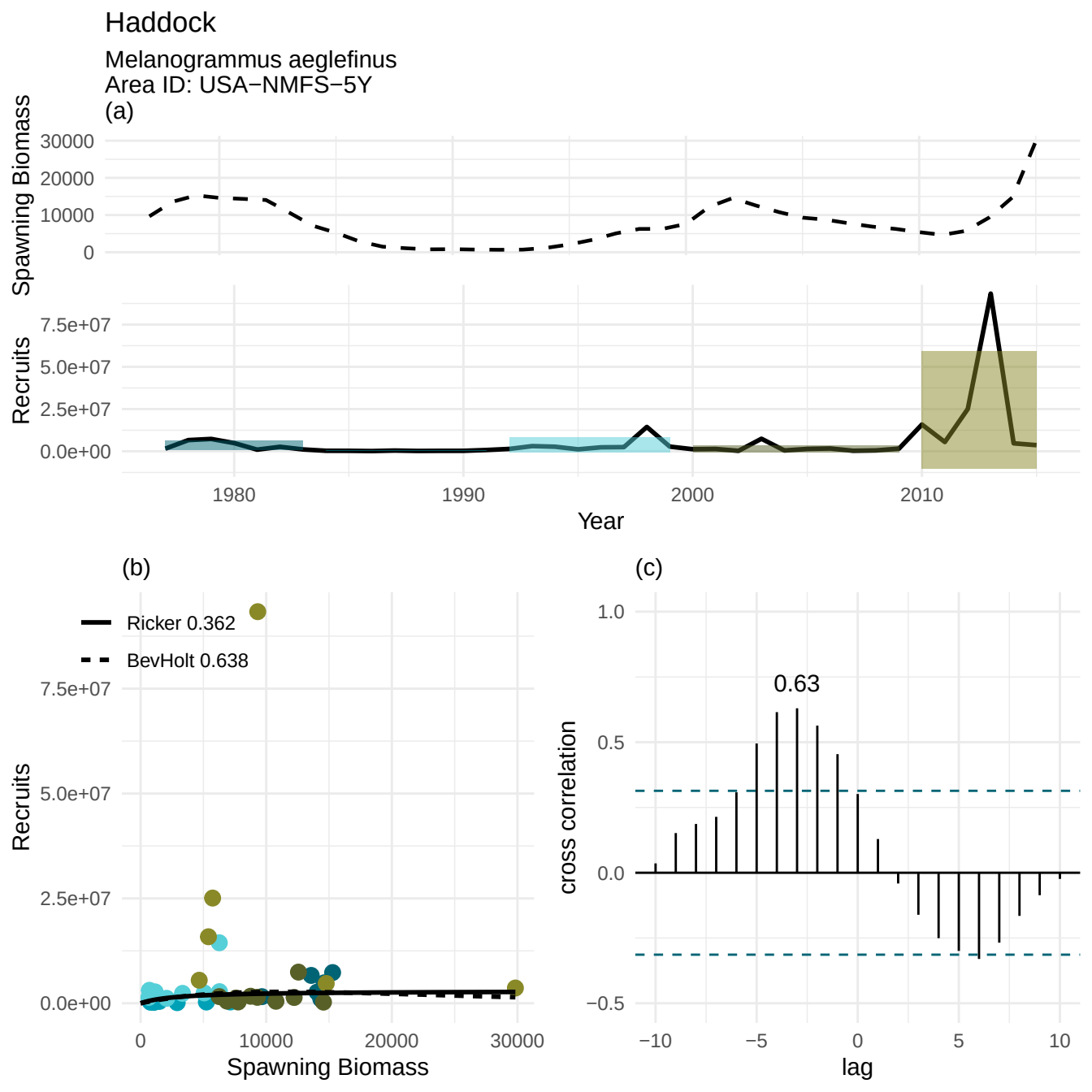

Gray snapper
Lutjanus griseus
Area ID: USA−NMFS−GM
(a)
Spawning Biomass
10000
8000
6000
4000
Recruits
2.5e+07
2.0e+07
1.5e+07
1.0e+07
5.0e+06
0.0e+00
1980
1990
2000
2010
Year
(b)
Ricker 0.478
BevHolt 0.522
Recruits
Spawning Biomass
0
2500
5000
7500
10000
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

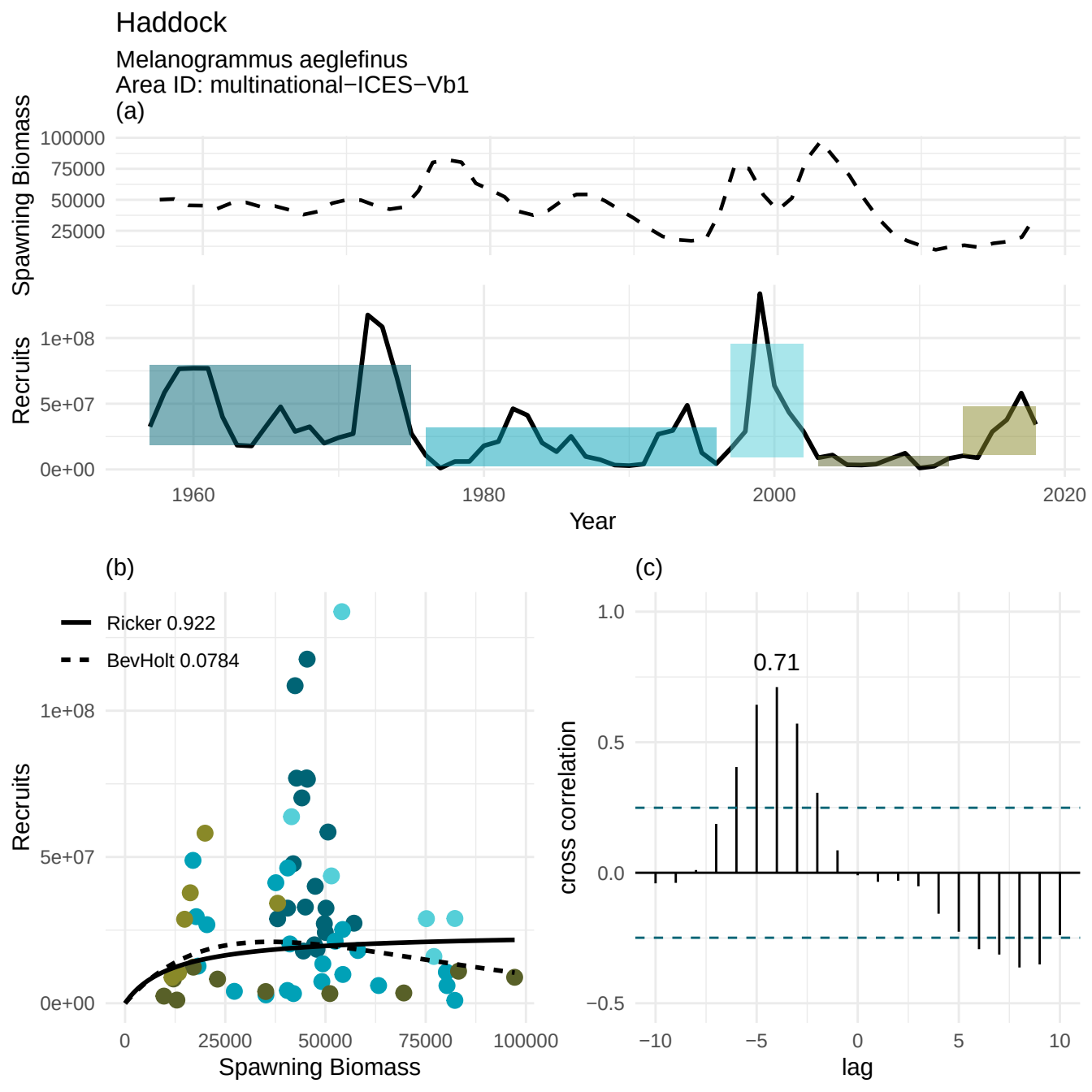

Giant stargazer
Kathetostoma giganteum
Area ID: New Zealand−MFish−STA7
(a)
Spawning Biomass
9000
8000
7000
6000
5000
4000
3000
Recruits
2e+06
1e+06
1980
1985
1990
1995
2000
2005
Year
(b)
Ricker 1
BevHolt 0.000497
Recruits
2e+06
1e+06
0e+00
0
2500
5000
7500
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

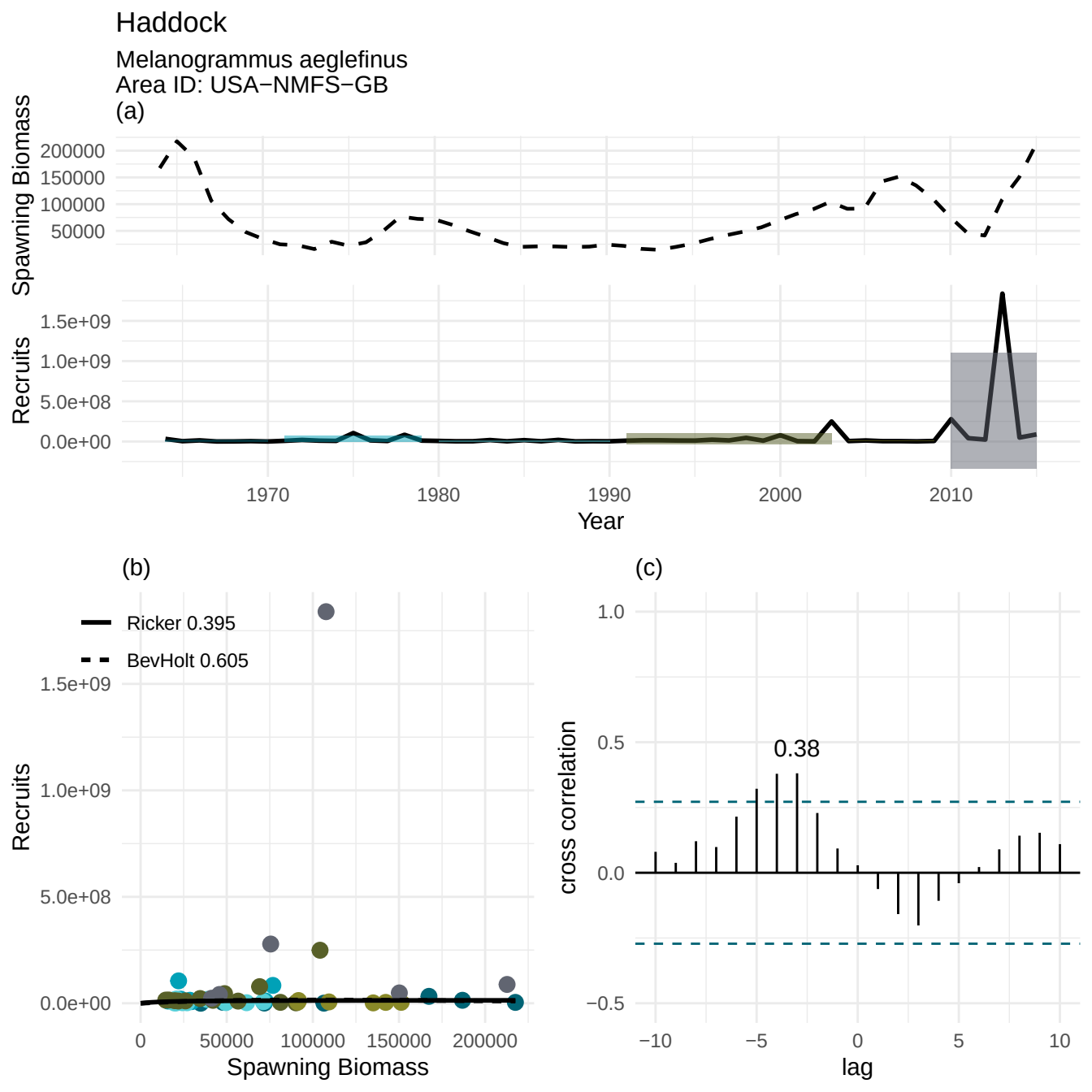

Grooved tiger prawn
Penaeus semisulcatus
Area ID: Australia−AFMA−NAUST
(a)
Spawning Biomass
5e+07
4e+07
3e+07
2e+07
1e+07
Recruits
6e+08
4e+08
2e+08
1970
1980
1990
2000
2010
Year
(b)
Ricker 0.51
BevHolt 0.49
Recruits
6e+08
4e+08
2e+08
0e+00
0e+00
2e+07
4e+07
Spawning Biomass
(c)
0.92
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

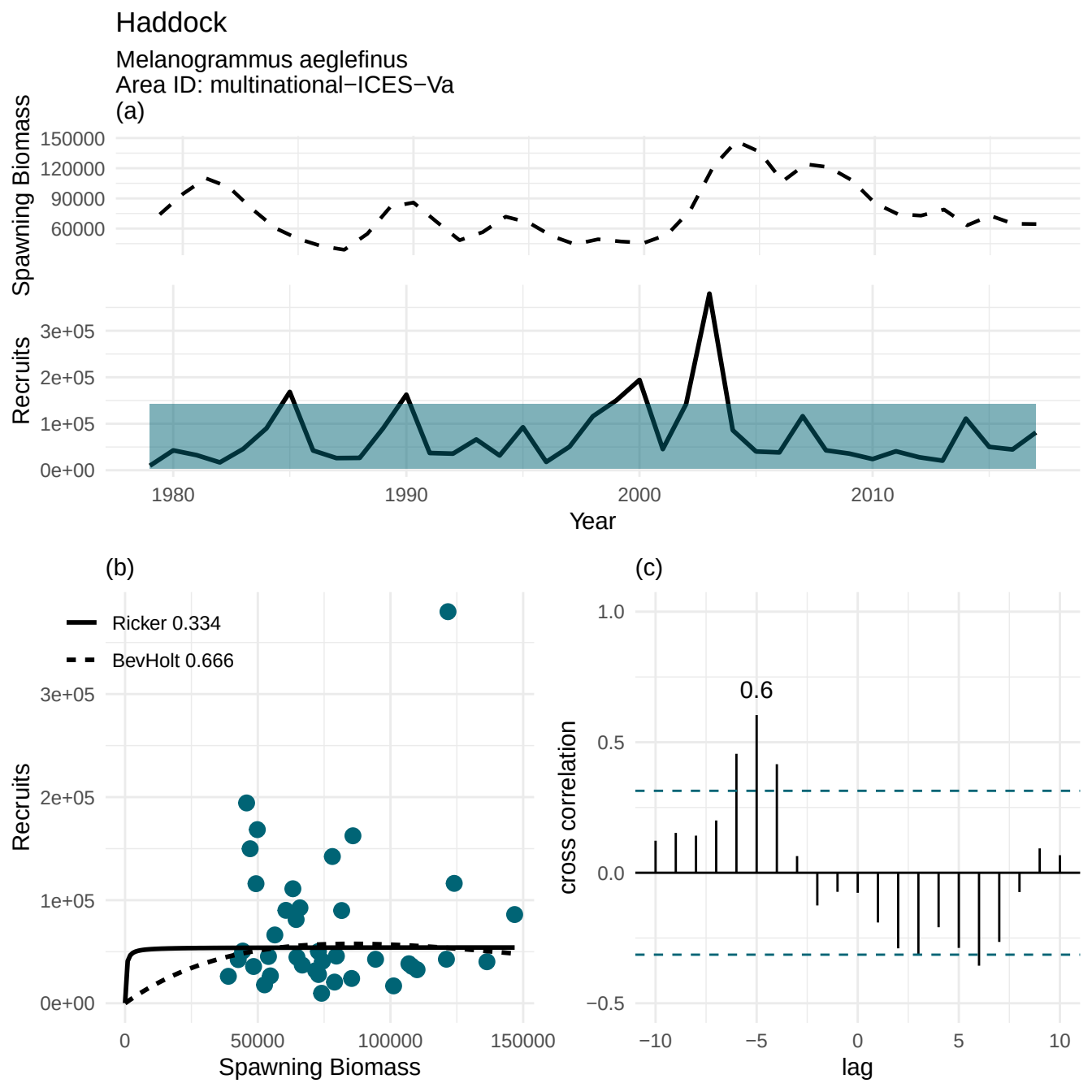

Gray triggerfish
Balistes capriscus
Area ID: USA−NMFS−GM
(a)
Spawning Biomass
2.0e+10
1.5e+10
1.0e+10
Recruits
2.0e+07
1.5e+07
1.0e+07
5.0e+06
1980
1990
2000
2010
Year
(b)
Ricker 0.505
BevHolt 0.495
Recruits
2.0e+07
1.5e+07
1.0e+07
5.0e+06
0.0e+00
0.0e+00
5.0e+09
1.0e+10
1.5e+10
2.0e+10
Spawning Biomass
(c)
0.684
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

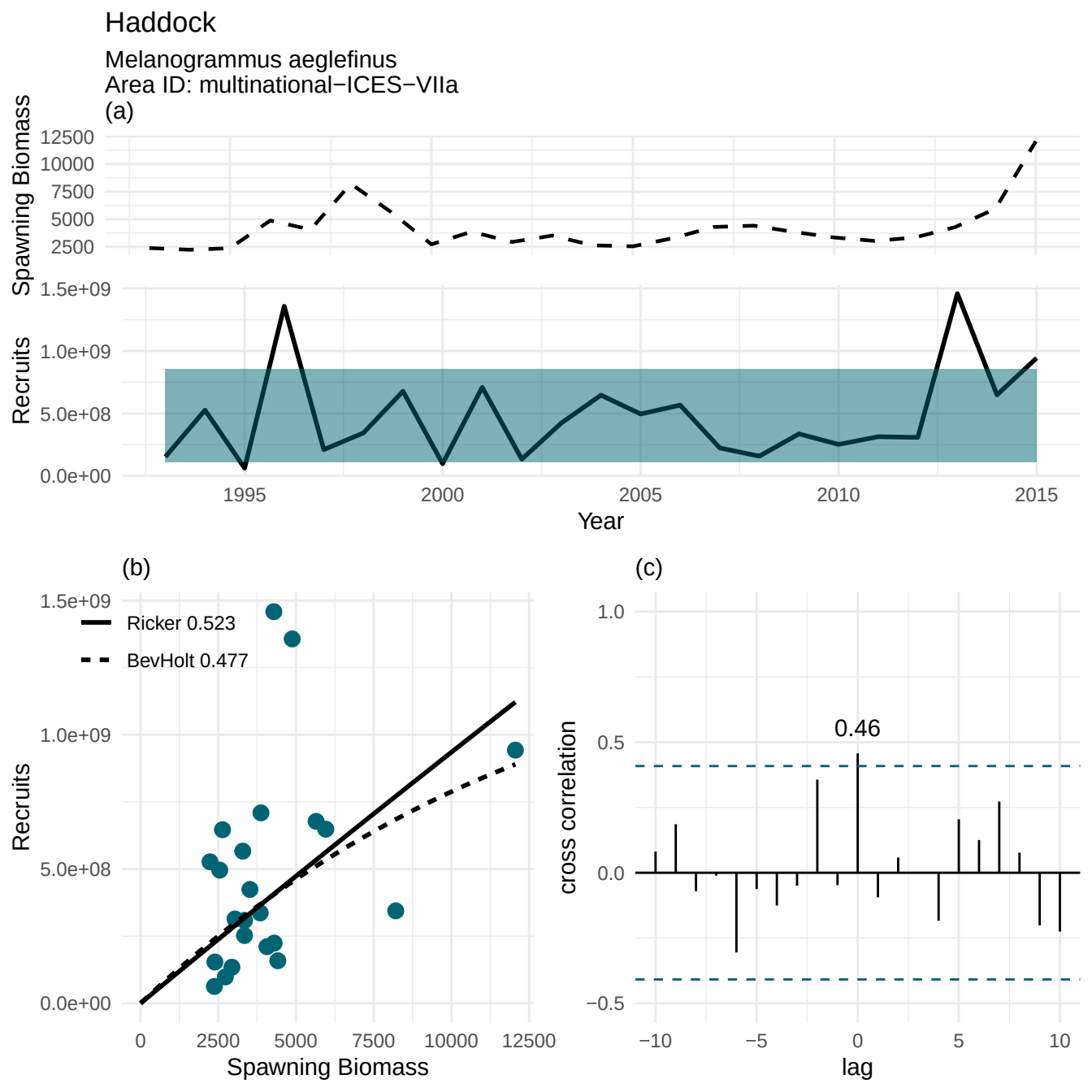

Haddock
Melanogrammus aeglefinus
Area ID: Canada−DFO−4X5Y
(a)
Spawning Biomass
50000
40000
30000
20000
Recruits
2e+08
1e+08
0e+00
1985
1990
1995
2000
2005
2010
Year
(b)
Ricker 0.926
BevHolt 0.0744
Recruits
2e+08
1e+08
0e+00
0
10000
20000
30000
40000
50000
Spawning Biomass
(c)
1.0
0.5
0.0
−0.5
0.62
cross correlation
−10
−5
0
5
10
lag

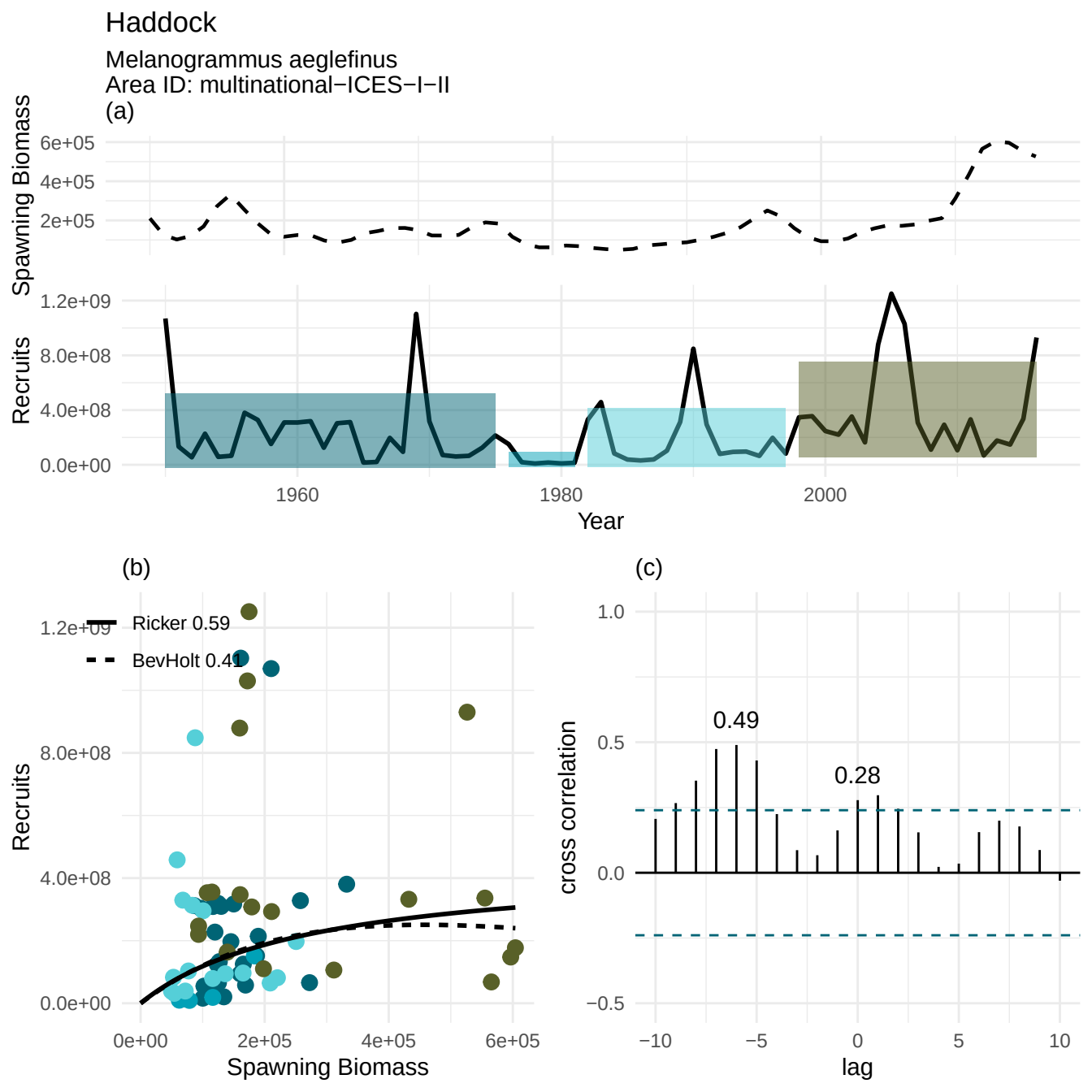

Haddock
Melanogrammus aeglefinus
Area ID: USA−NMFS−5Y
(a)
Spawning Biomass
30000
20000
10000
0
Recruits
7.5e+07
5.0e+07
2.5e+07
0.0e+00
1980
1990
2000
2010
Year
(b)
Ricker 0.362
BevHolt 0.638
Recruits
7.5e+07
5.0e+07
2.5e+07
0.0e+00
0
10000
20000
30000
Spawning Biomass
(c)
1.0
0.5
0.0
−0.5
0.63
cross correlation
−10
−5
0
5
10
lag

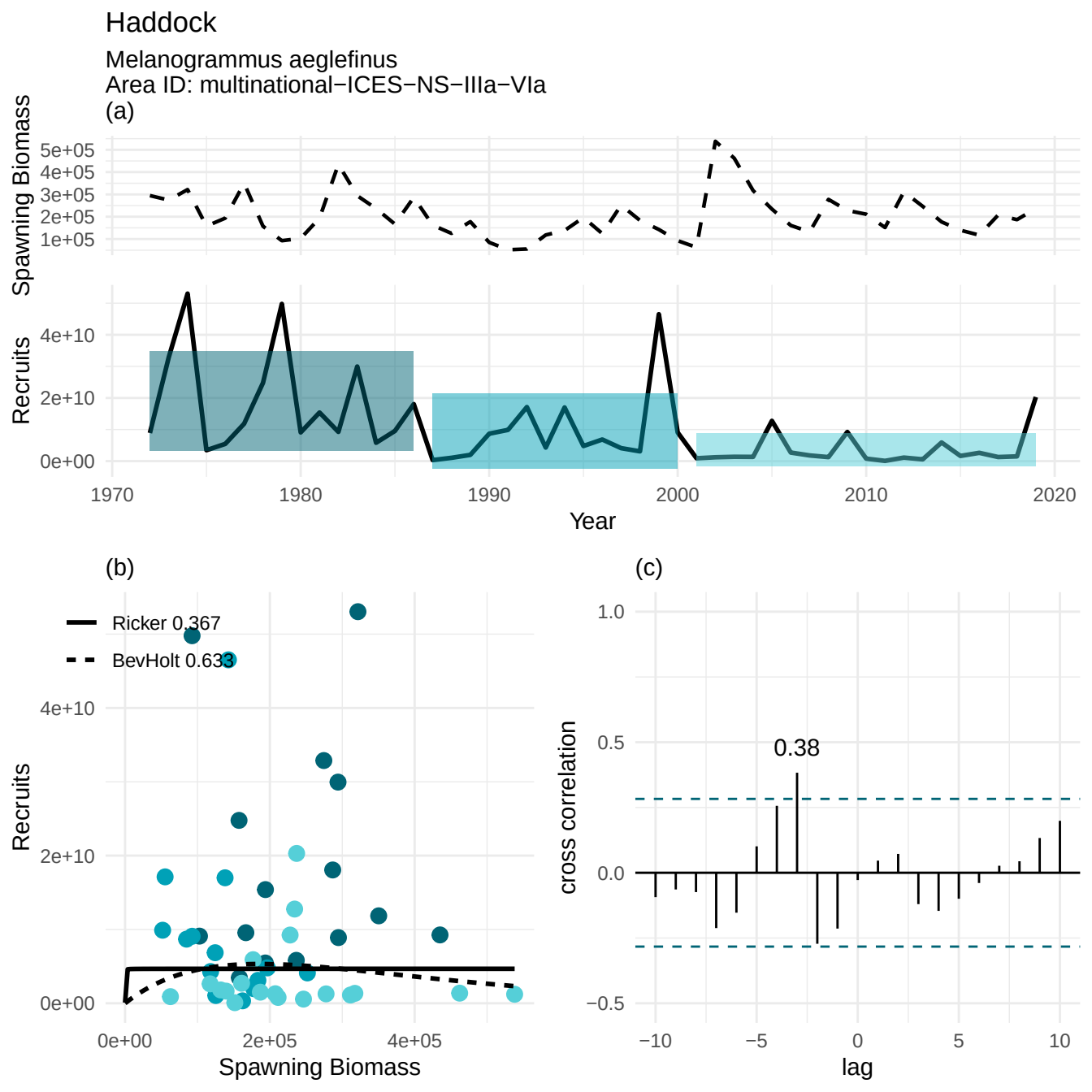

Haddock
Melanogrammus aeglefinus
Area ID: multinational−ICES−Vb1
(a)
Spawning Biomass
100000
75000
50000
25000
Recruits
1e+08
5e+07
0e+00
1960
1980
2000
2020
Year
(b)
Ricker 0.922
BevHolt 0.0784
Recruits
1e+08
5e+07
0e+00
0
25000
50000
75000
100000
Spawning Biomass
(c)
0.71
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

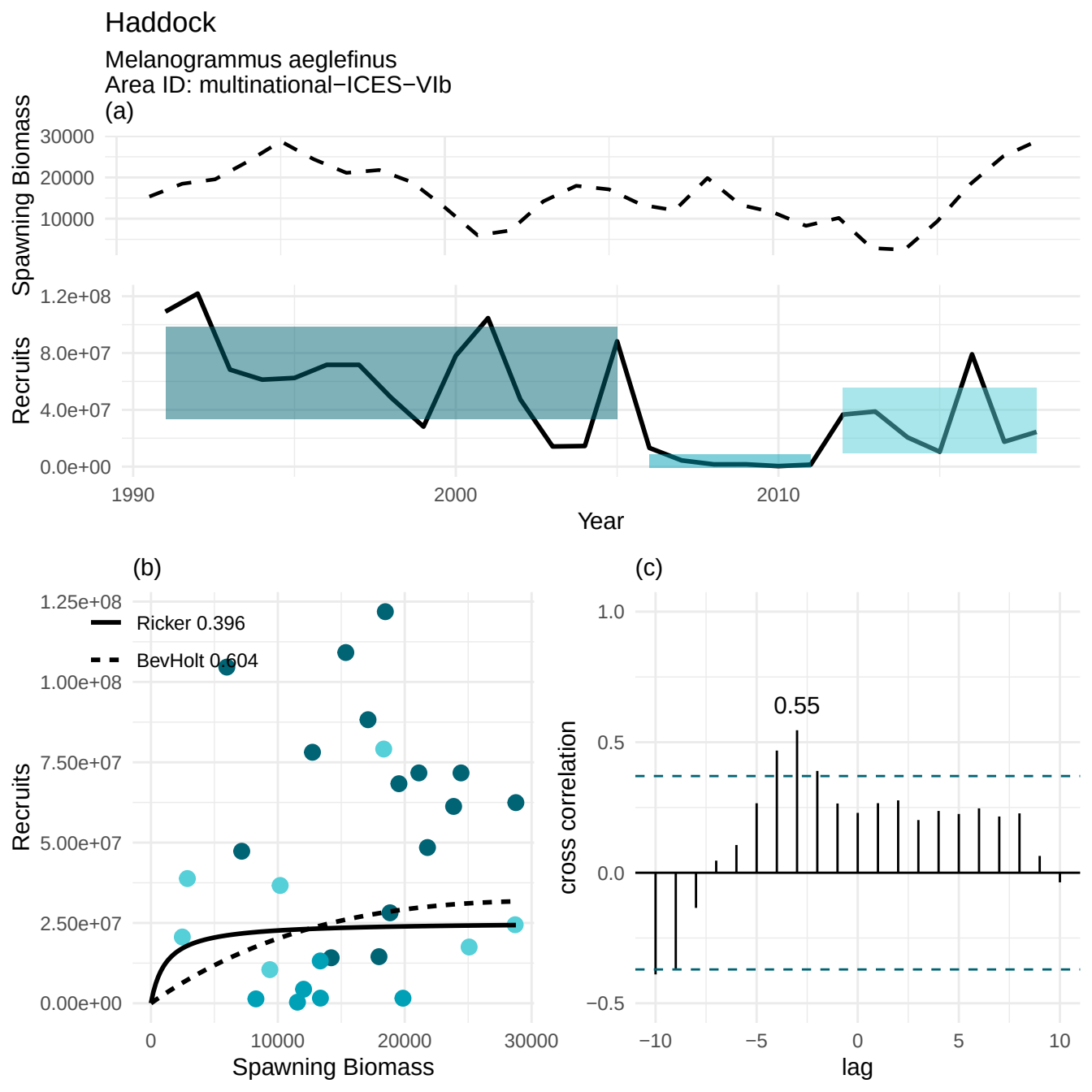

Haddock
Melanogrammus aeglefinus
Area ID: USA−NMFS−GB
(a)
Spawning Biomass
200000
150000
100000
50000
Recruits
1.5e+09
1.0e+09
5.0e+08
0.0e+00
1970
1980
1990
2000
2010
Year
(b)
Ricker 0.395
BevHolt 0.605
Recruits
1.5e+09
1.0e+09
5.0e+08
0.0e+00
0
50000
100000
150000
200000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.38
−10
−5
0
5
10
lag

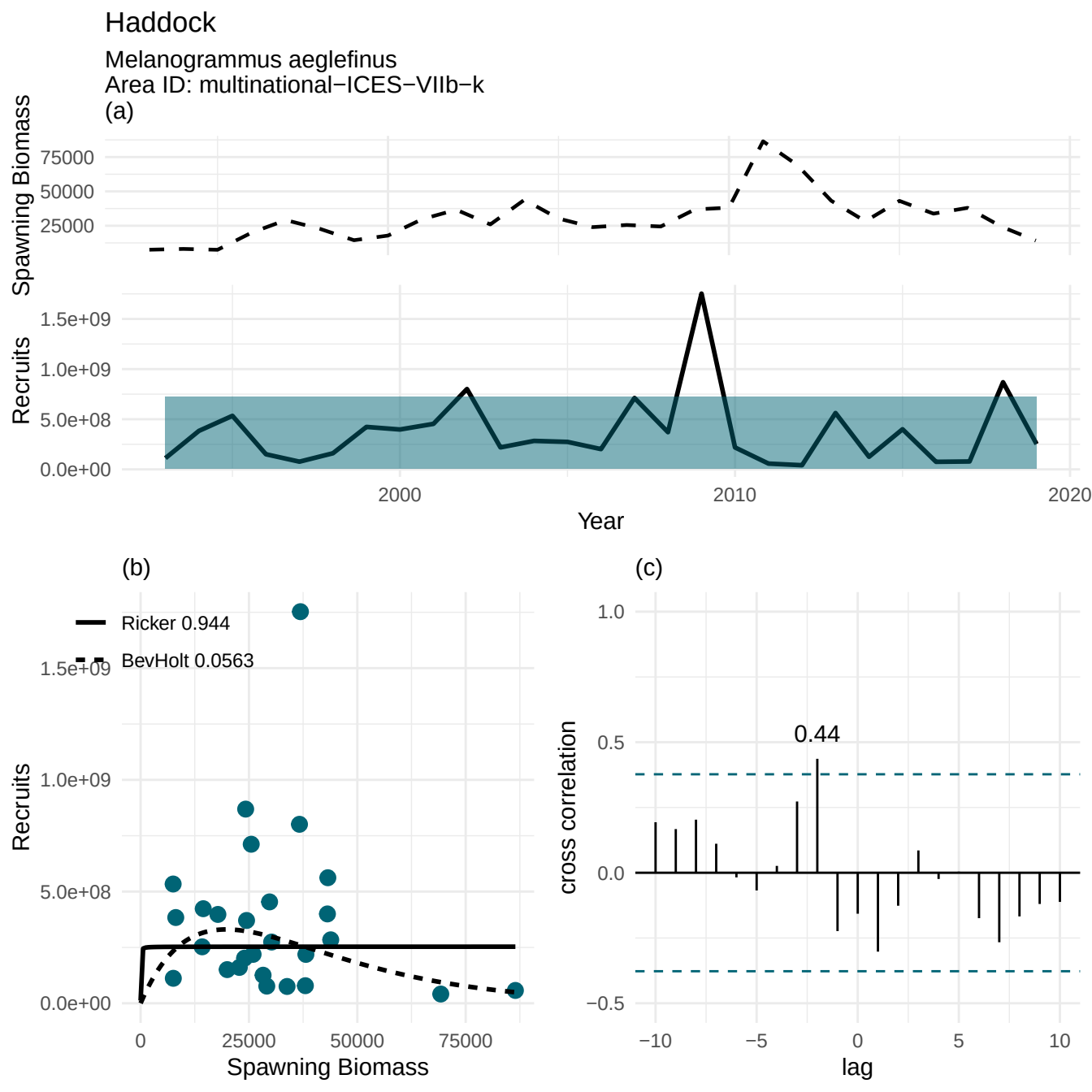

Haddock
Melanogrammus aeglefinus
Area ID: multinational−ICES−Va
(a)
Spawning Biomass
150000
120000
90000
60000
Recruits
3e+05
2e+05
1e+05
0e+00
1980
1990
2000
2010
Year
(b)
Ricker 0.334
BevHolt 0.666
Recruits
3e+05
2e+05
1e+05
0e+00
0
50000
100000
150000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.6
−10
−5
0
5
10
lag

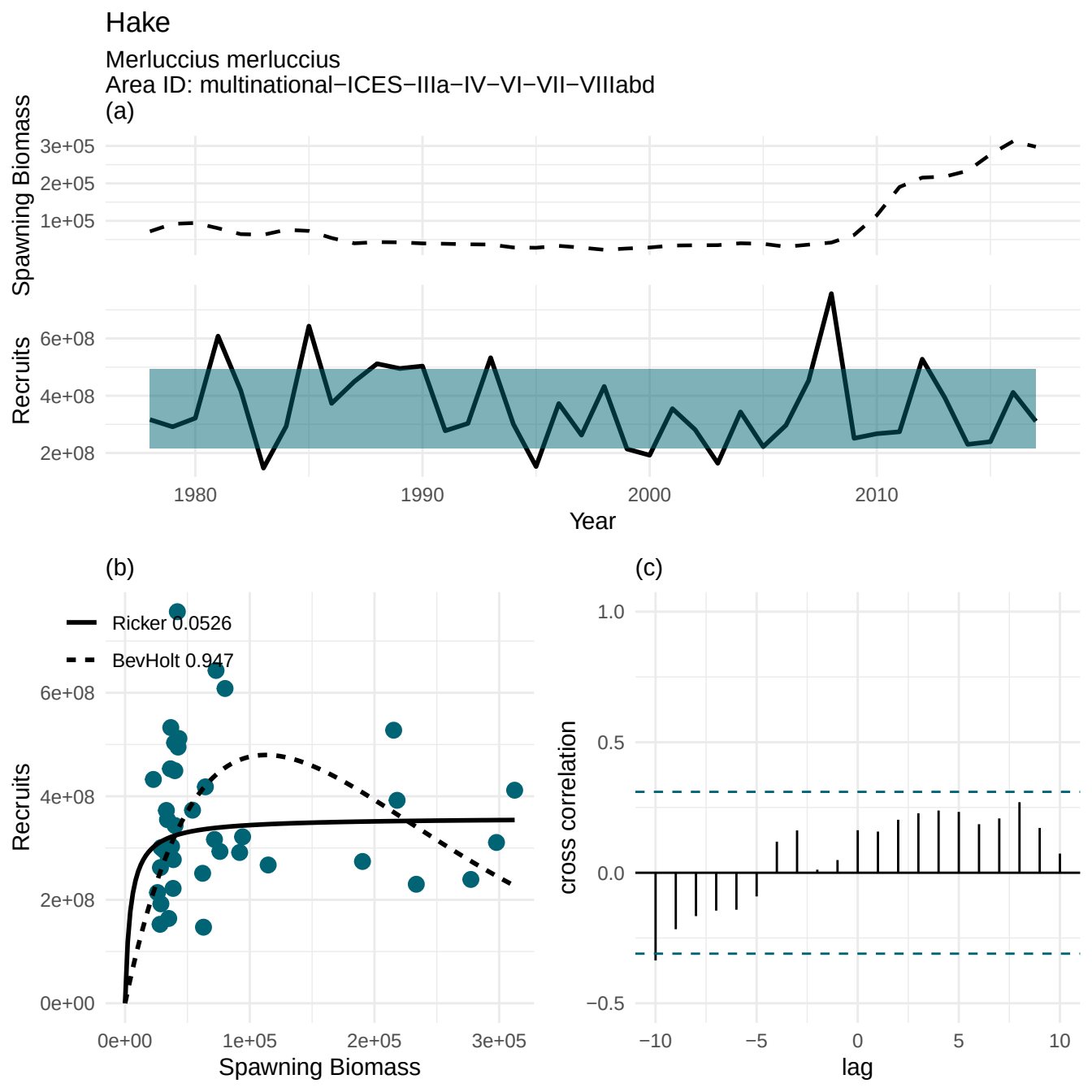

Haddock
Melanogrammus aeglefinus
Area ID: multinational−ICES−VIIa
(a)
Spawning Biomass
12500
10000
7500
5000
2500
Recruits
1.5e+09
1.0e+09
5.0e+08
0.0e+00
1995
2000
2005
2010
2015
Year
(b)
Ricker 0.523
BevHolt 0.477
Recruits
1.5e+09
1.0e+09
5.0e+08
0.0e+00
0
2500
5000
7500
10000
12500
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.46
−10
−5
0
5
10
lag

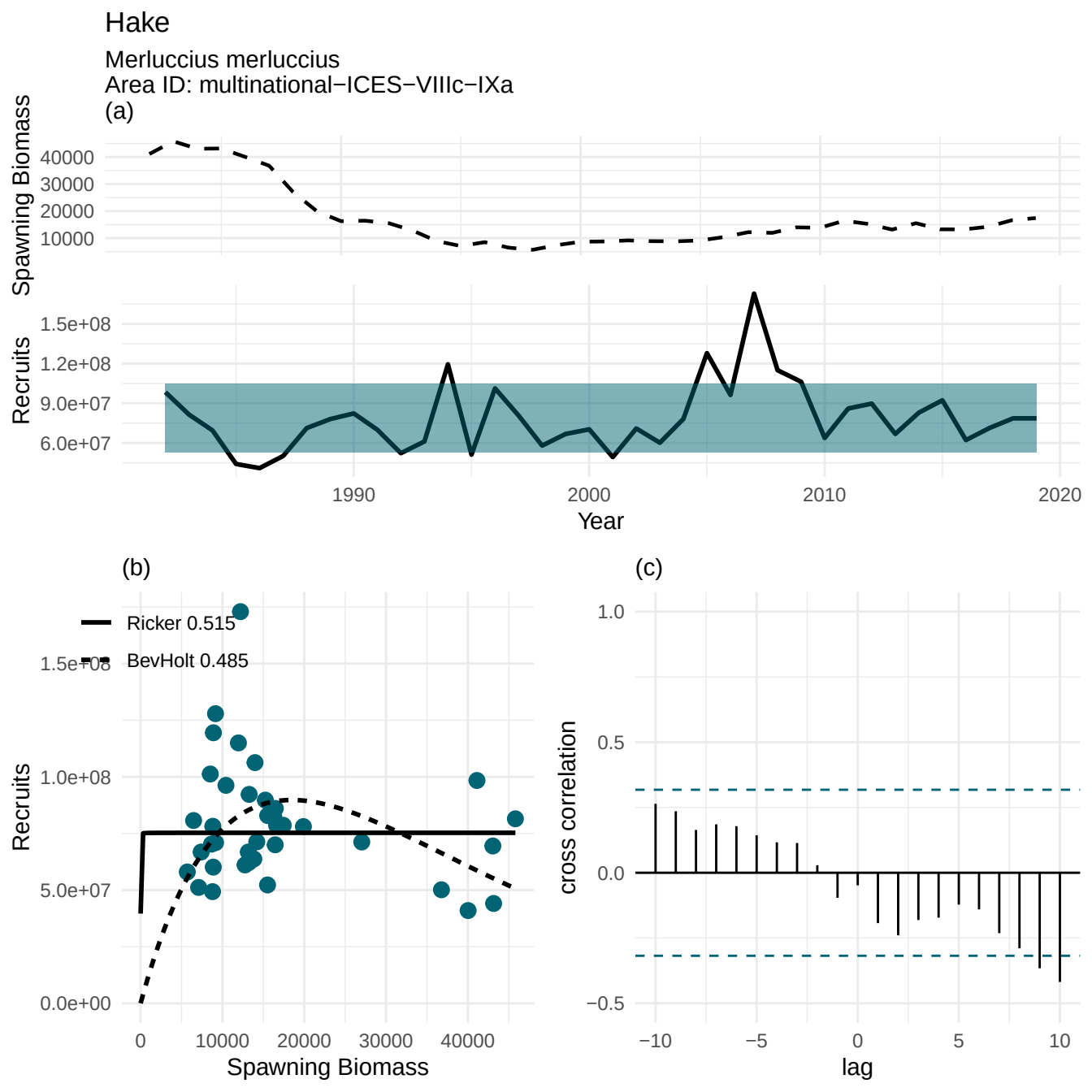

Haddock
Melanogrammus aeglefinus
Area ID: multinational−ICES−I−II
(a)
Spawning Biomass
6e+05
4e+05
2e+05
Recruits
1.2e+09
8.0e+08
4.0e+08
0.0e+00
1960
1980
2000
Year
(b)
Ricker 0.59
BevHolt 0.49
Recruits
1.2e+09
8.0e+08
4.0e+08
0.0e+00
0e+00
2e+05
4e+05
6e+05
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.49
0.28
−10
−5
0
5
10
lag

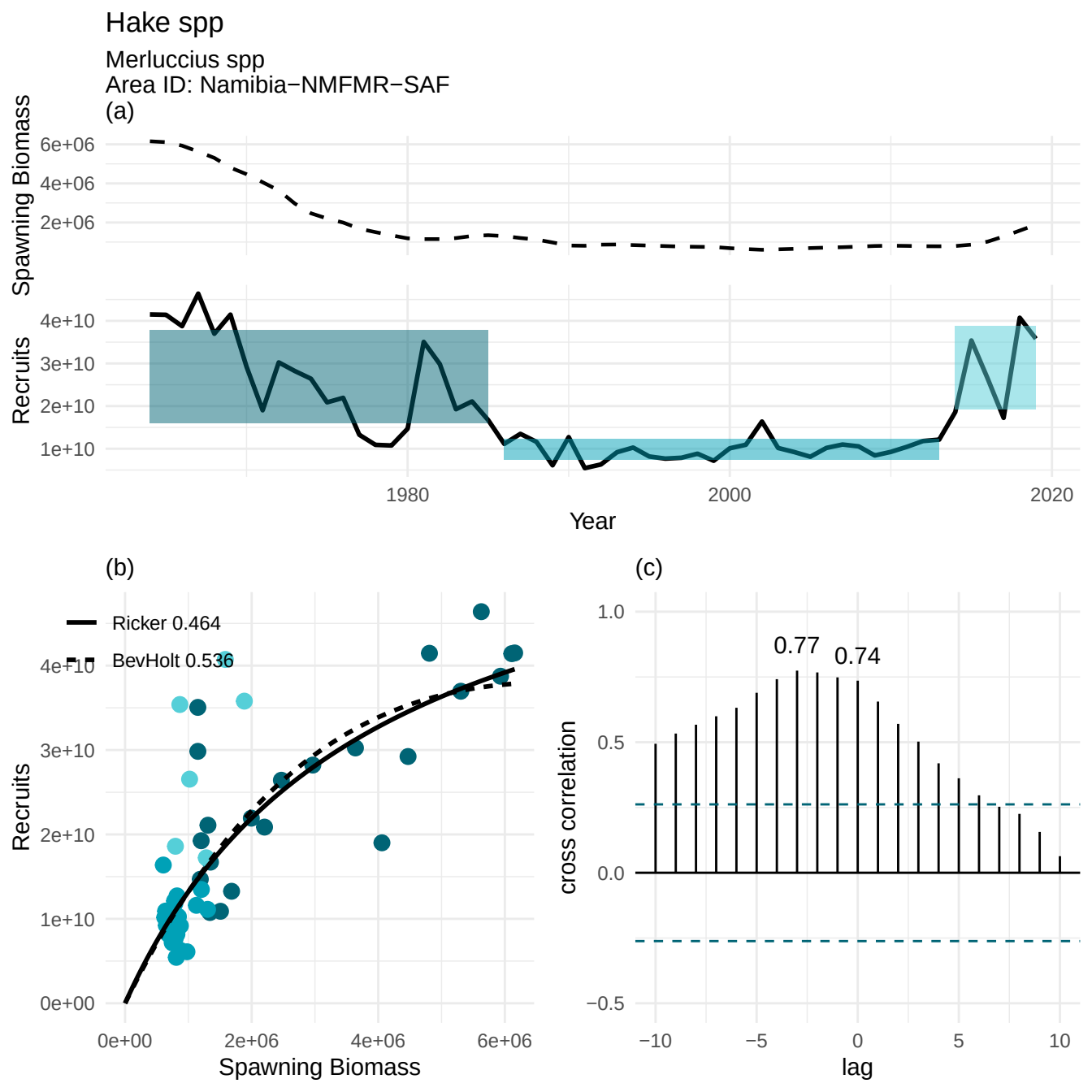

Haddock
Melanogrammus aeglefinus
Area ID: multinational−ICES−NS−IIIa−VIa
(a)
Spawning Biomass
5e+05
4e+05
3e+05
2e+05
1e+05
Recruits
4e+10
2e+10
0e+00
1970
1980
1990
2000
2010
2020
Year
(b)
Ricker 0.367
BevHolt 0.633
Recruits
4e+10
2e+10
0e+00
0e+00
2e+05
4e+05
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.38
−10
−5
0
5
10
lag

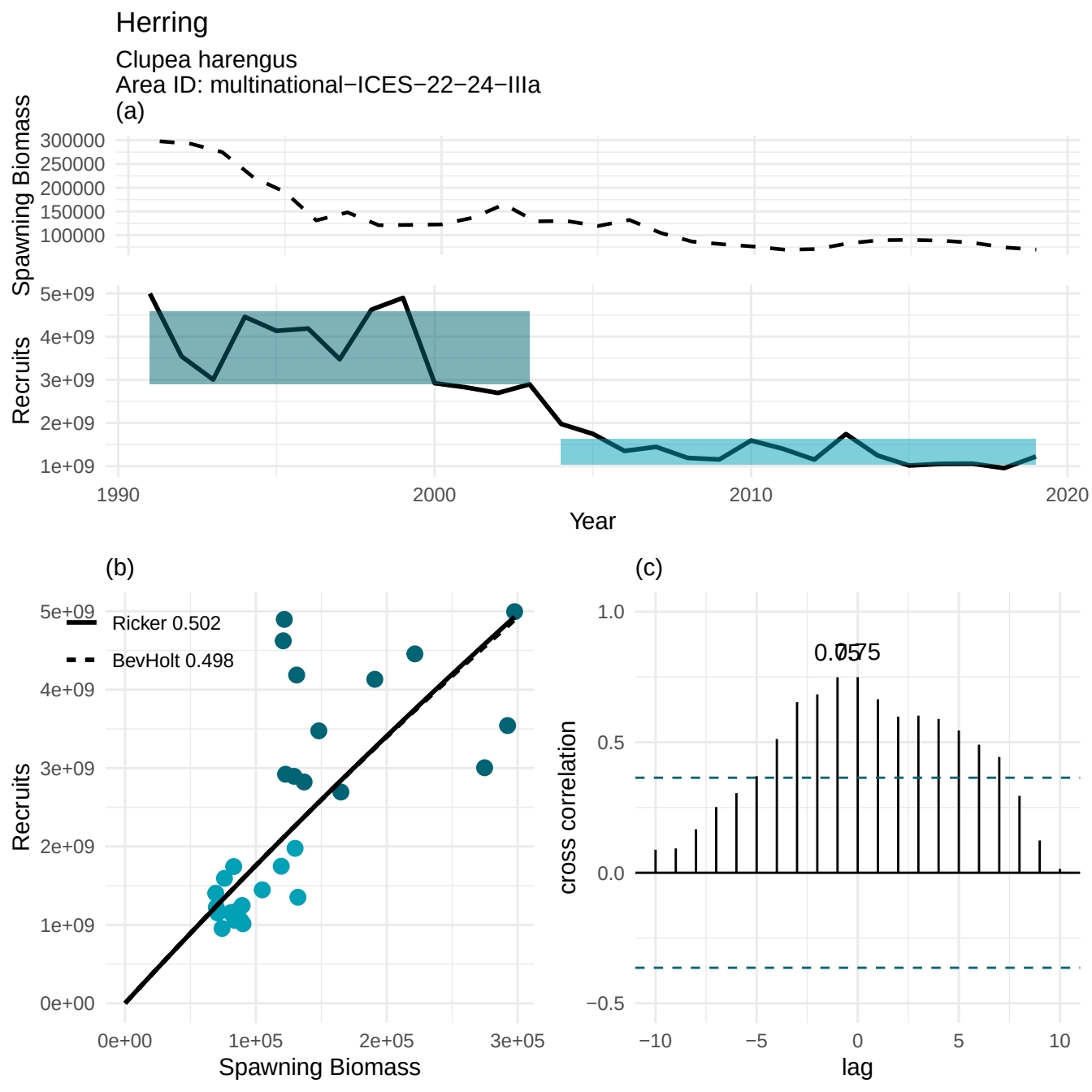

Haddock
Melanogrammus aeglefinus
Area ID: multinational−ICES−VIb
(a)
Spawning Biomass
30000
20000
10000
Recruits
1.2e+08
8.0e+07
4.0e+07
0.0e+00
1990
2000
2010
Year
(b)
1.25e+08
1.00e+08
7.50e+07
5.00e+07
2.50e+07
0.00e+00
Recruits
Ricker 0.396
BevHolt 0.604
0
10000
20000
30000
Spawning Biomass
(c)
1.0
0.5
0.0
−0.5
cross correlation
0.55
−10
−5
0
5
10
lag

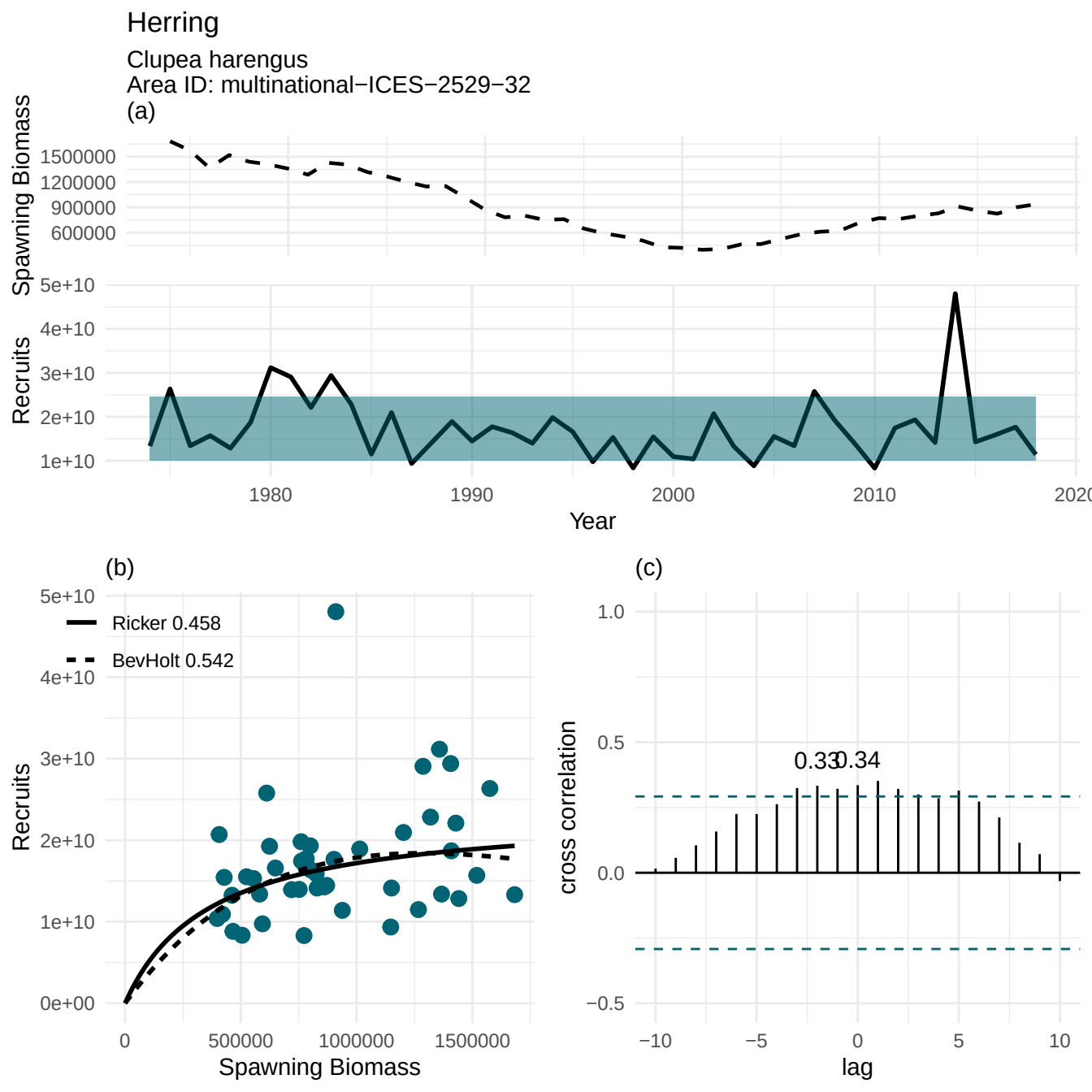

Haddock
Melanogrammus aeglefinus
Area ID: multinational−ICES−VIIb−k
(a)
Spawning Biomass
75000
50000
25000
Recruits
1.5e+09
1.0e+09
5.0e+08
0.0e+00
2000
2010
2020
Year
(b)
Ricker 0.944
BevHolt 0.0563
Recruits
1.5e+09
1.0e+09
5.0e+08
0.0e+00
0
25000
50000
75000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.44
−10
−5
0
5
10
lag

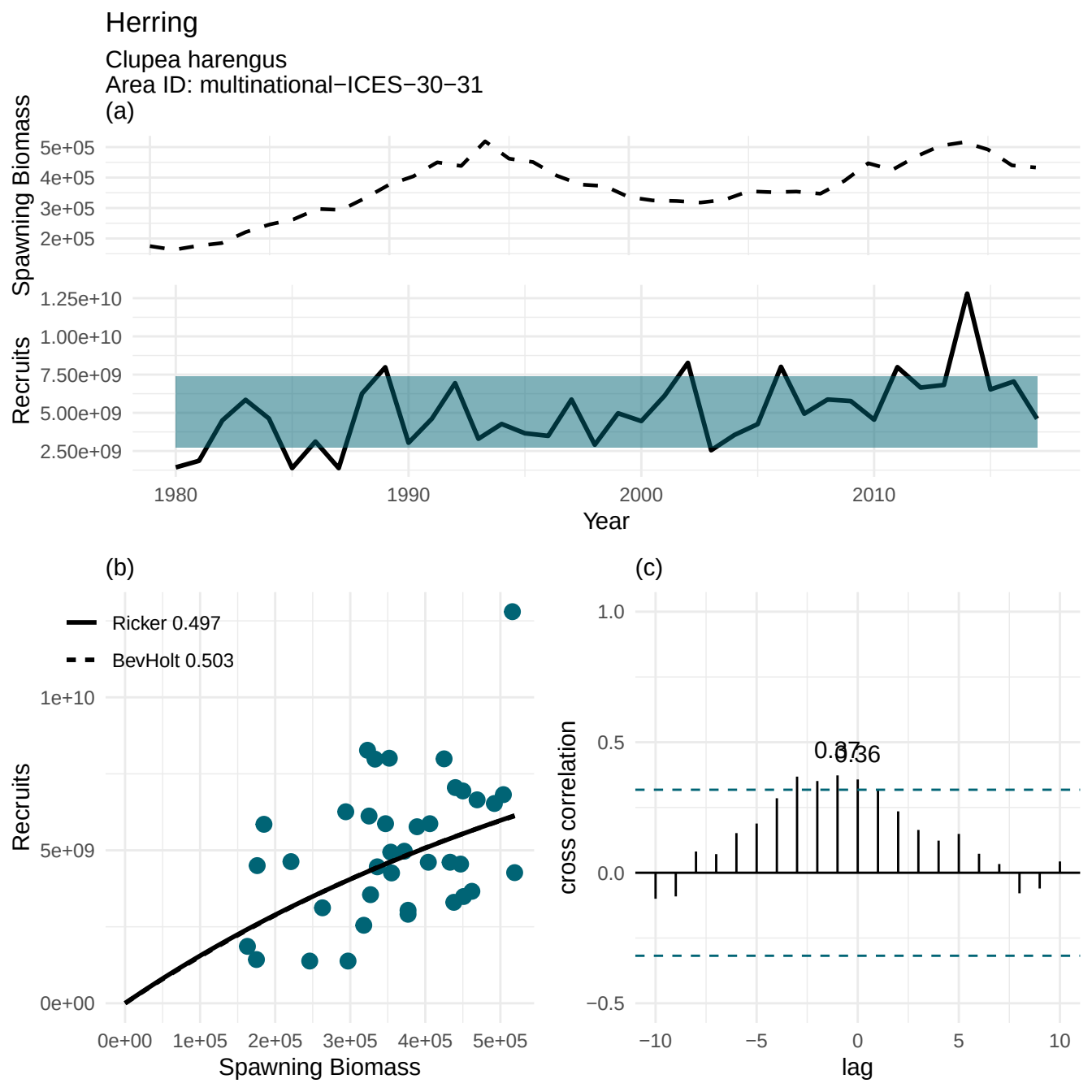

Hake
Merluccius merluccius
Area ID: multinational−ICES−IIIa−IV−VI−VII−VIIIabd
(a)
Spawning Biomass
3e+05
2e+05
1e+05
Recruits
6e+08
4e+08
2e+08
1980
1990
2000
2010
Year
(b)
Ricker 0.0526
BevHolt 0.947
Recruits
6e+08
4e+08
2e+08
0e+00
0e+00
1e+05
2e+05
3e+05
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

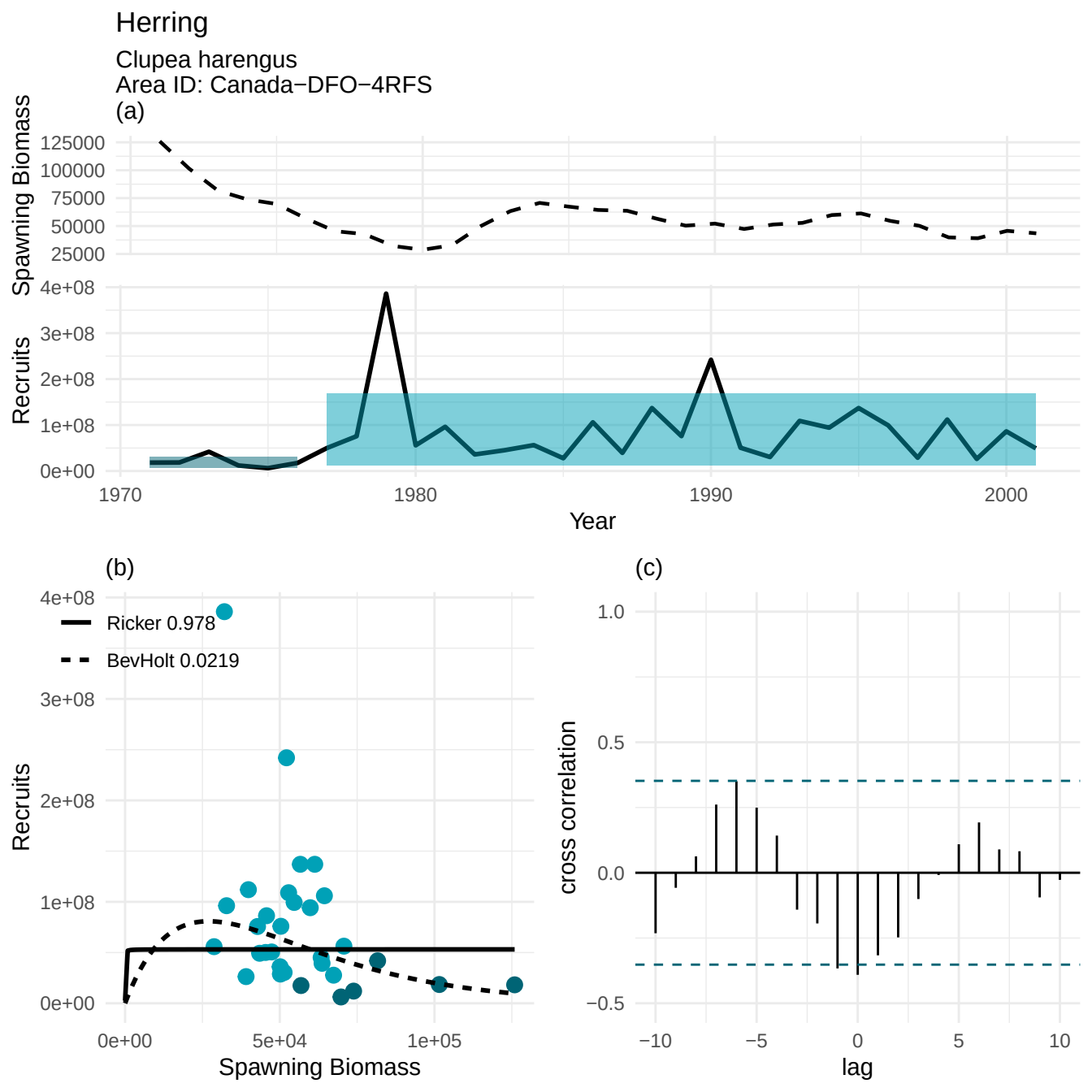

Hake
Merluccius merluccius
Area ID: multinational−ICES−VIIIc−IXa
(a)
Spawning Biomass
40000
30000
20000
10000
Recruits
1.5e+08
1.2e+08
9.0e+07
6.0e+07
1990
2000
2010
2020
Year
(b)
Ricker 0.515
BevHolt 0.485
Recruits
1.0e+08
5.0e+07
0.0e+00
0
10000
20000
30000
40000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

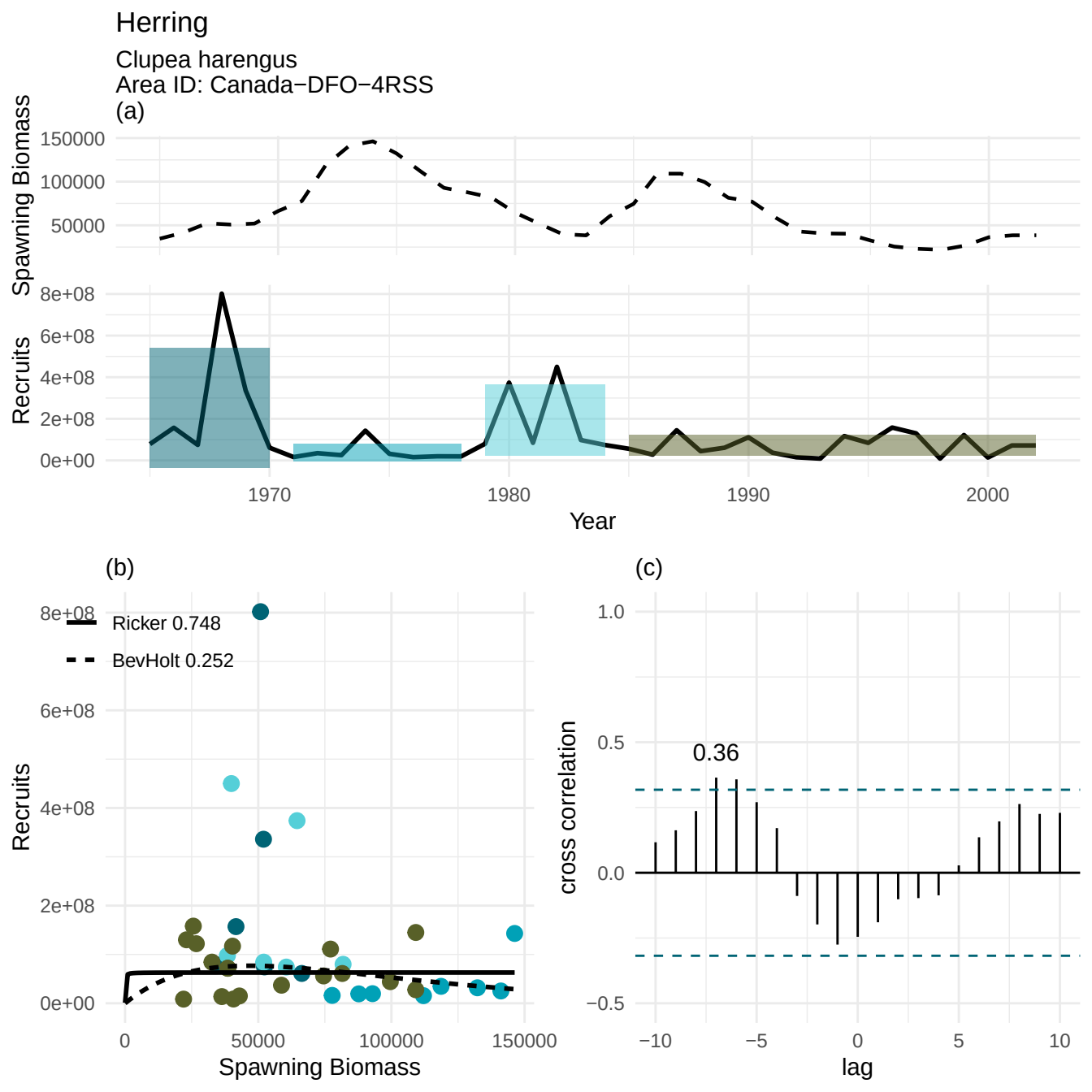

Hake spp
Merluccius spp
Area ID: Namibia−NMFMR−SAF
(a)
Spawning Biomass
6e+06
4e+06
2e+06
Recruits
4e+10
3e+10
2e+10
1e+10
1980
2000
2020
Year
(b)
Ricker 0.464
BevHolt 0.536
Recruits
4e+10
3e+10
2e+10
1e+10
0e+00
0e+00
2e+06
4e+06
6e+06
Spawning Biomass
(c)
1.0
0.5
0.0
−0.5
0.77
0.74
cross correlation
−10
−5
0
5
10
lag

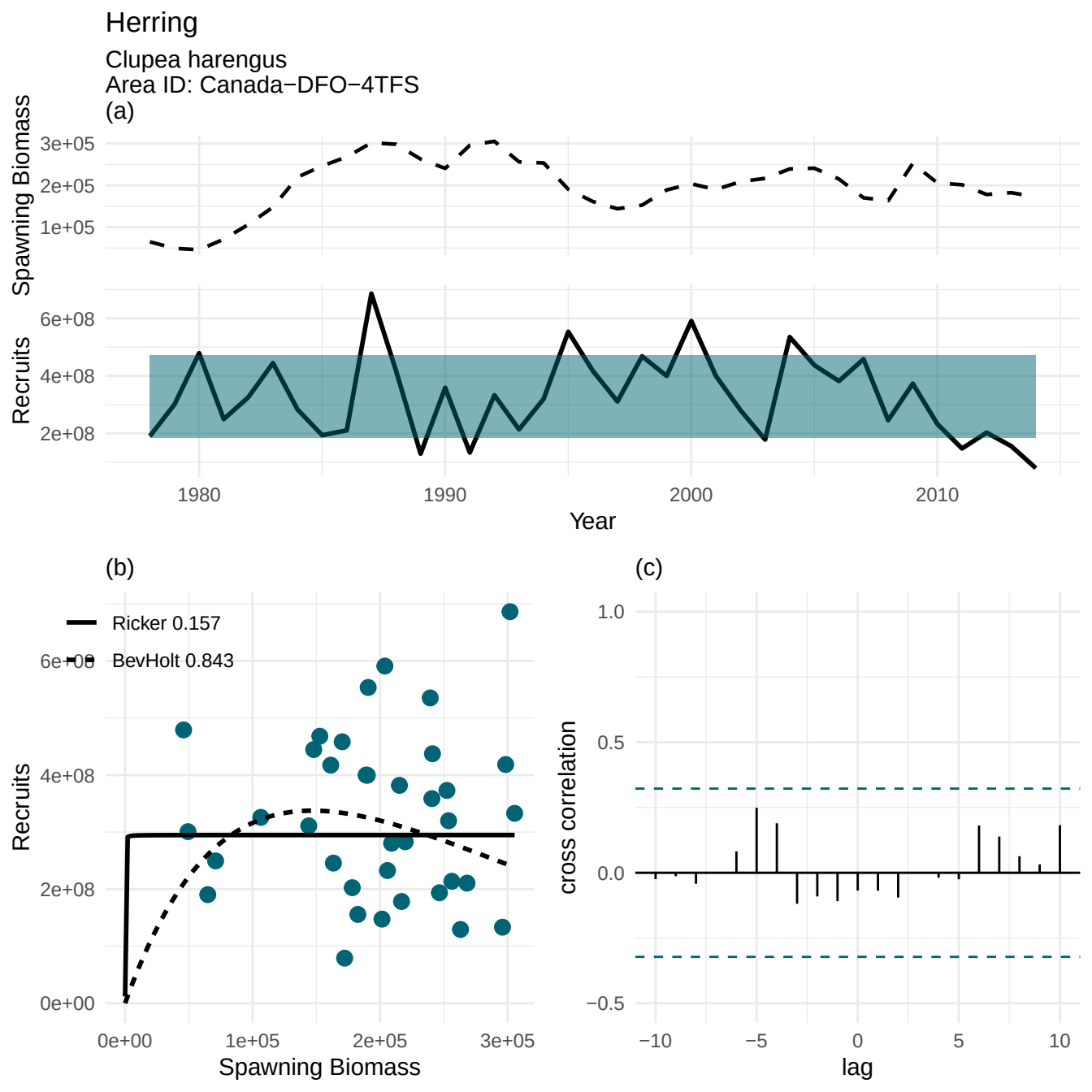

Herring
Clupea harengus
Area ID: multinational−ICES−22−24−IIIa
(a)
Spawning Biomass
300000
250000
200000
150000
100000
Recruits
5e+09
4e+09
3e+09
2e+09
1e+09
1990
2000
2010
2020
Year
(b)
Ricker 0.502
BevHolt 0.498
Recruits
5e+09
4e+09
3e+09
2e+09
1e+09
0e+00
0e+00
1e+05
2e+05
3e+05
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.575
−10
−5
0
5
10
lag

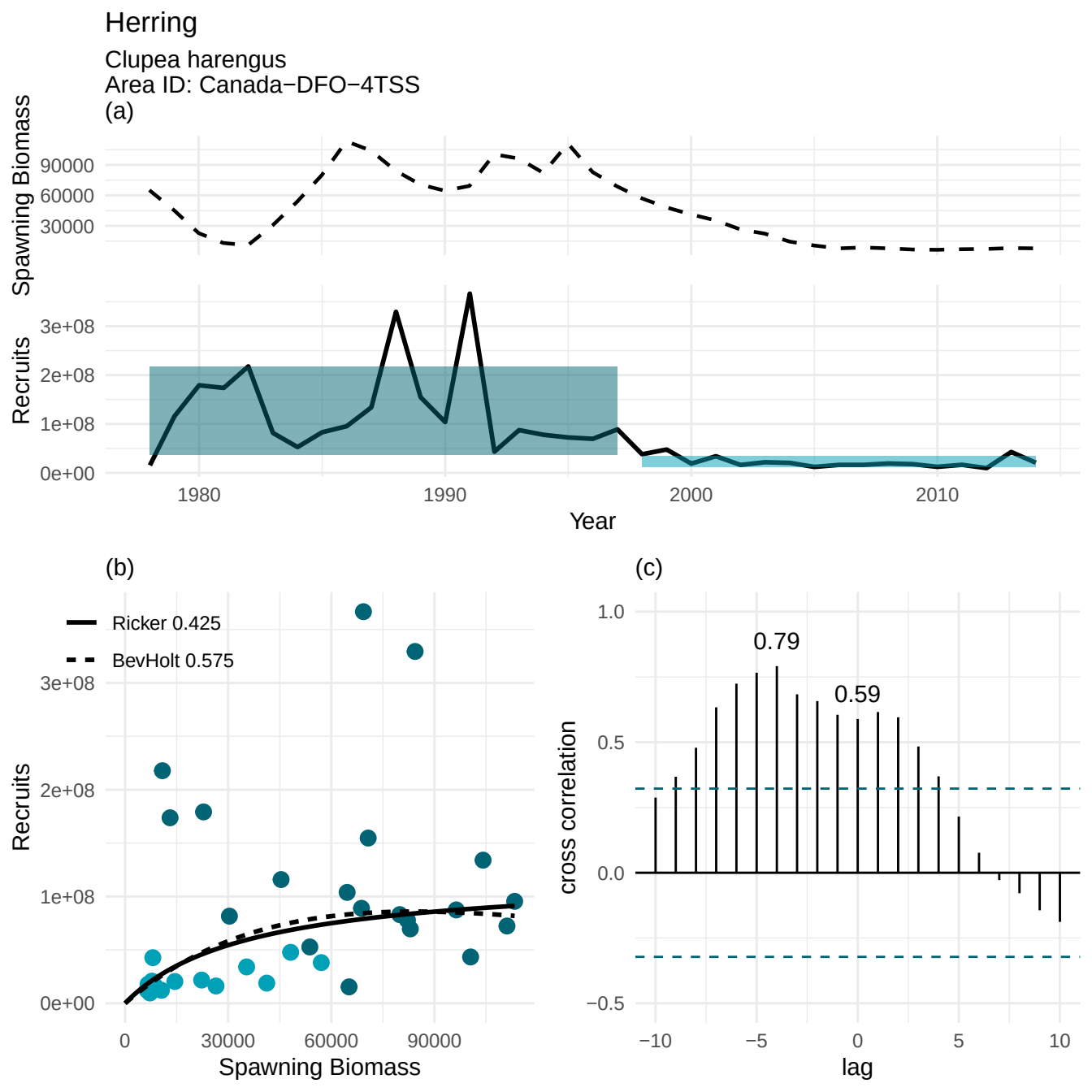

Herring
Clupea harengus
Area ID: multinational−ICES−2529−32
(a)
Spawning Biomass
1500000
1200000
900000
600000
Recruits
5e+10
4e+10
3e+10
2e+10
1e+10
1980
1990
2000
2010
2020
Year
(b)
Ricker 0.458
BevHolt 0.542
Recruits
5e+10
4e+10
3e+10
2e+10
1e+10
0e+00
0
500000
1000000
1500000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.33
0.34
−10
−5
0
5
10
lag

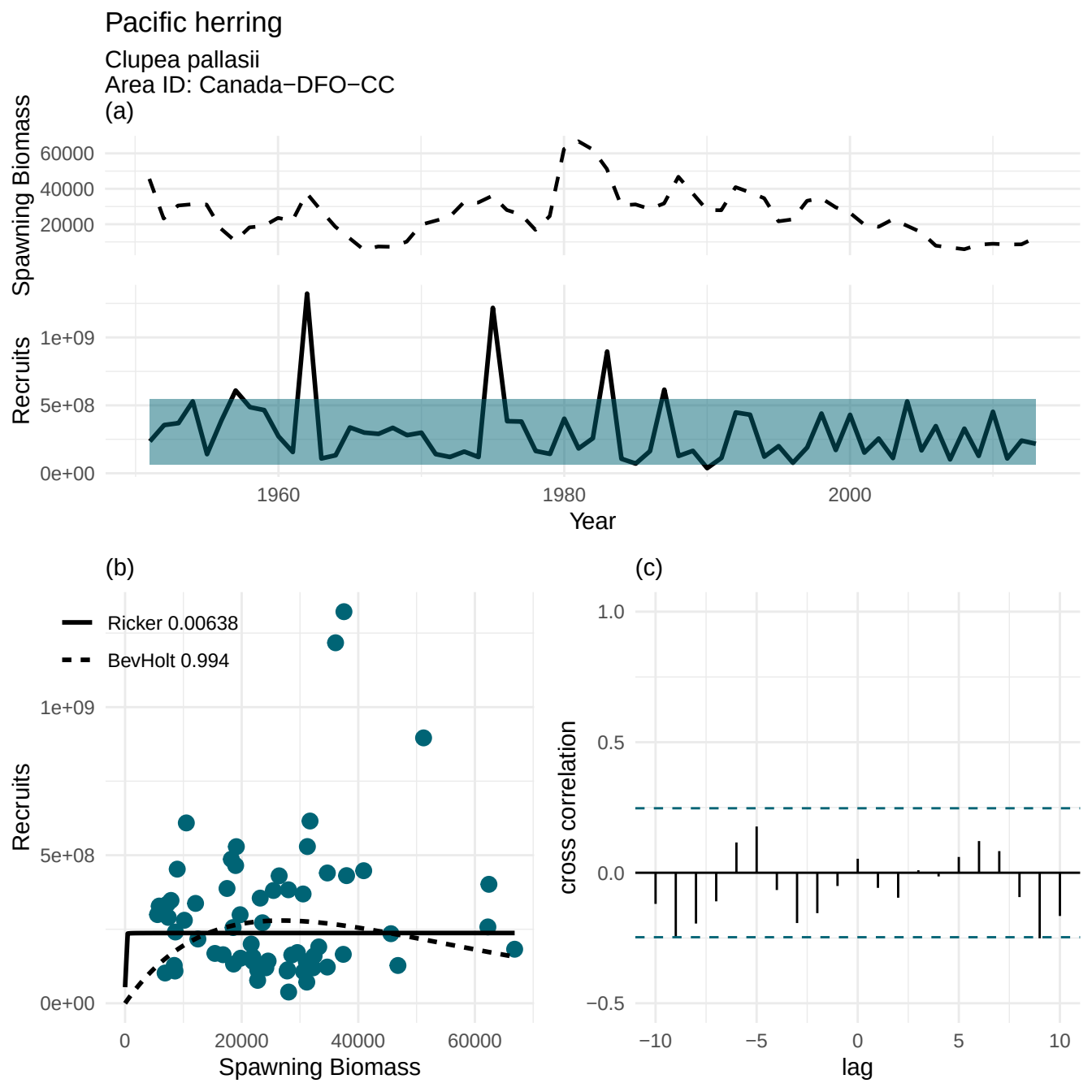

Herring
Clupea harengus
Area ID: multinational−ICES−30−31
(a)
Spawning Biomass
5e+05
4e+05
3e+05
2e+05
Recruits
1.25e+10
1.00e+10
7.50e+09
5.00e+09
2.50e+09
1980
1990
2000
2010
Year
(b)
Ricker 0.497
BevHolt 0.503
Recruits
1e+10
5e+09
0e+00
0e+00
1e+05
2e+05
3e+05
4e+05
5e+05
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.36
−10
−5
0
5
10
lag

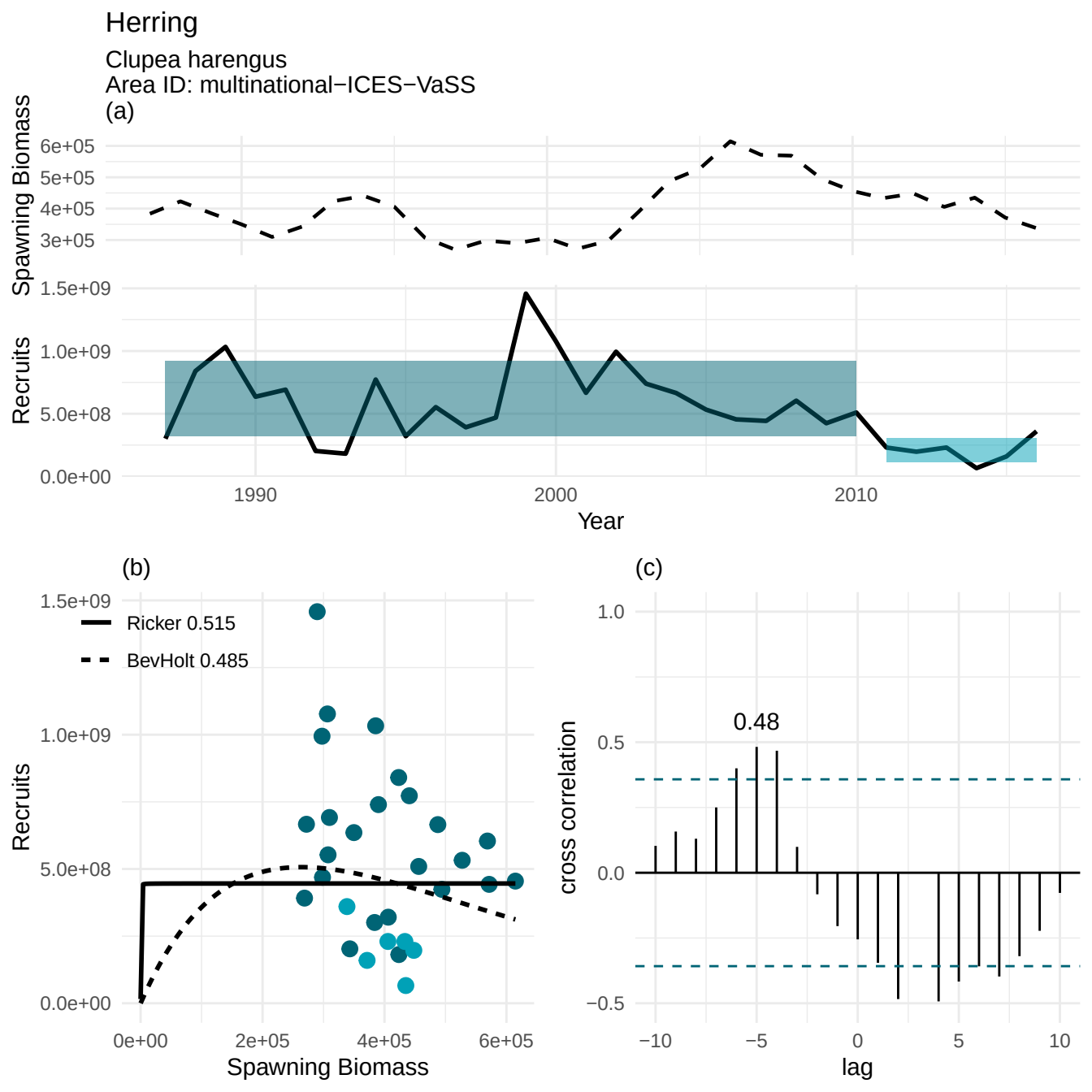

Herring
Clupea harengus
Area ID: Canada−DFO−4RFS
(a)
Spawning Biomass
125000
100000
75000
50000
25000
Recruits
4e+08
3e+08
2e+08
1e+08
0e+00
1970
1980
1990
2000
Year
(b)
Ricker 0.978
BevHolt 0.0219
Recruits
4e+08
3e+08
2e+08
1e+08
0e+00
0e+00
5e+04
1e+05
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

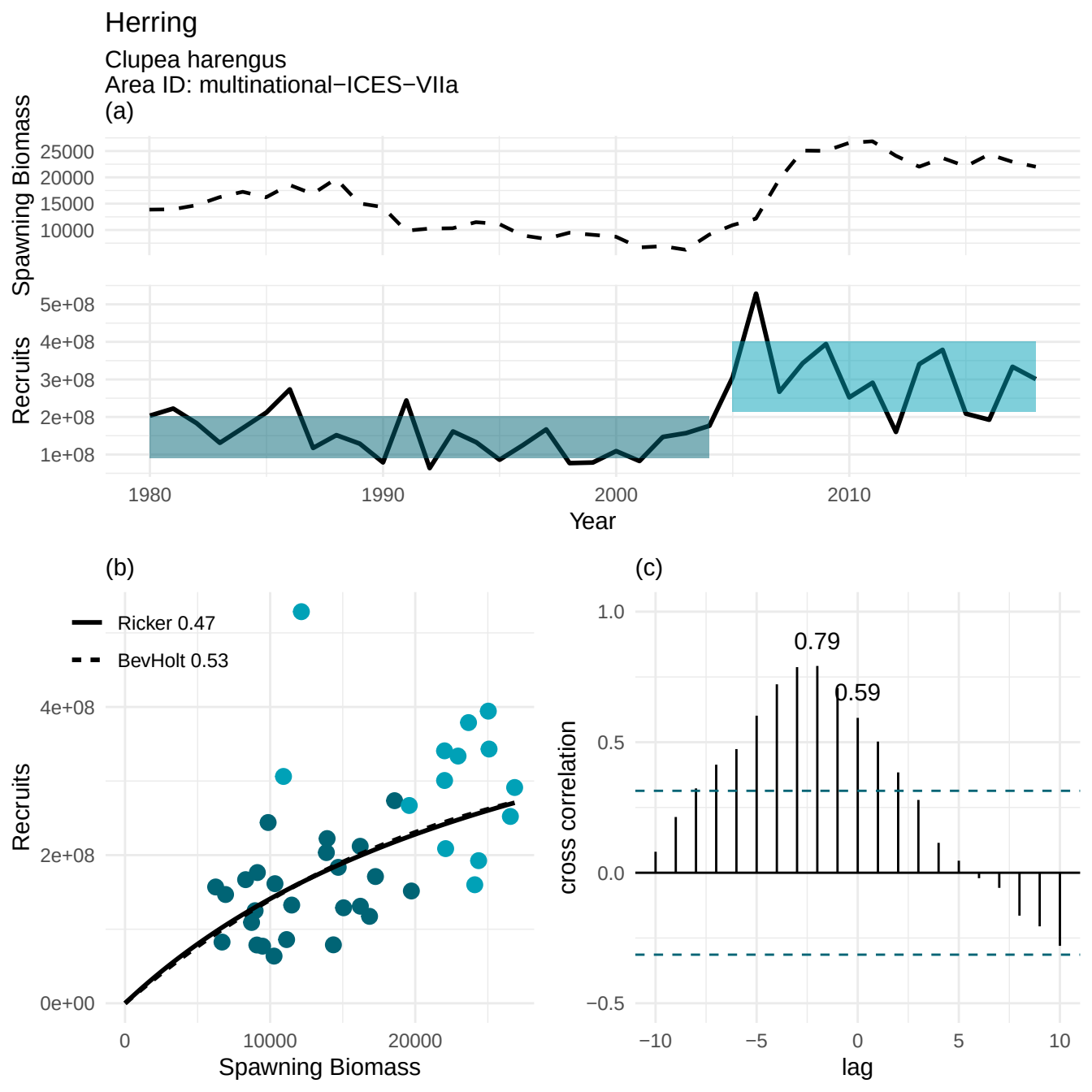

Herring
Clupea harengus
Area ID: Canada−DFO−4RSS
(a)
Spawning Biomass
150000
100000
50000
Recruits
8e+08
6e+08
4e+08
2e+08
0e+00
1970
1980
1990
2000
Year
(b)
Ricker 0.748
BevHolt 0.252
Recruits
Spawning Biomass
0
50000
100000
150000
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.36
−10
−5
0
5
10
lag

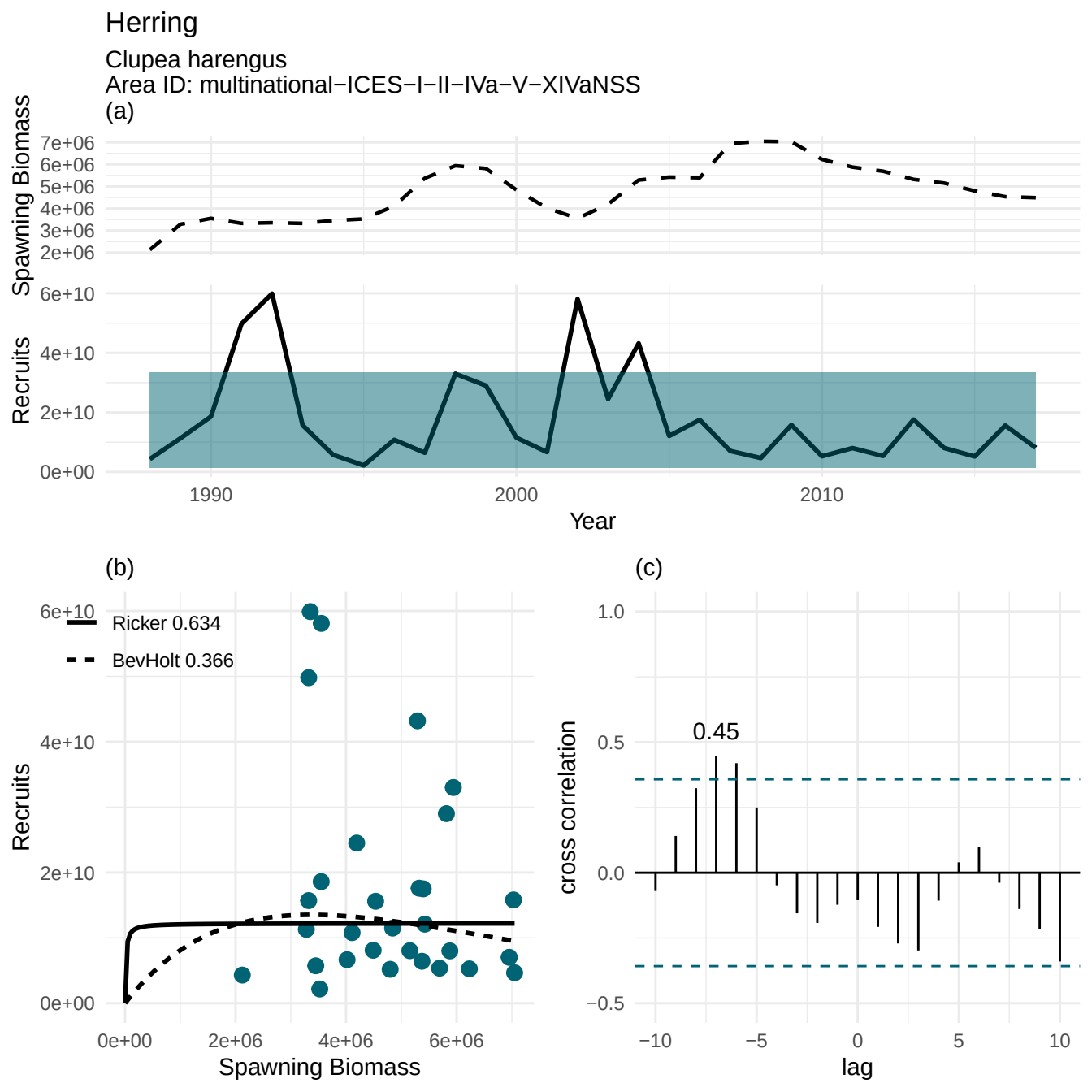

Herring
Clupea harengus
Area ID: Canada−DFO−4TFS
(a)
Spawning Biomass
3e+05
2e+05
1e+05
Recruits
6e+08
4e+08
2e+08
1980
1990
2000
2010
Year
(b)
Ricker 0.157
BevHolt 0.843
Recruits
6e+08
4e+08
2e+08
0e+00
0e+00
1e+05
2e+05
3e+05
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

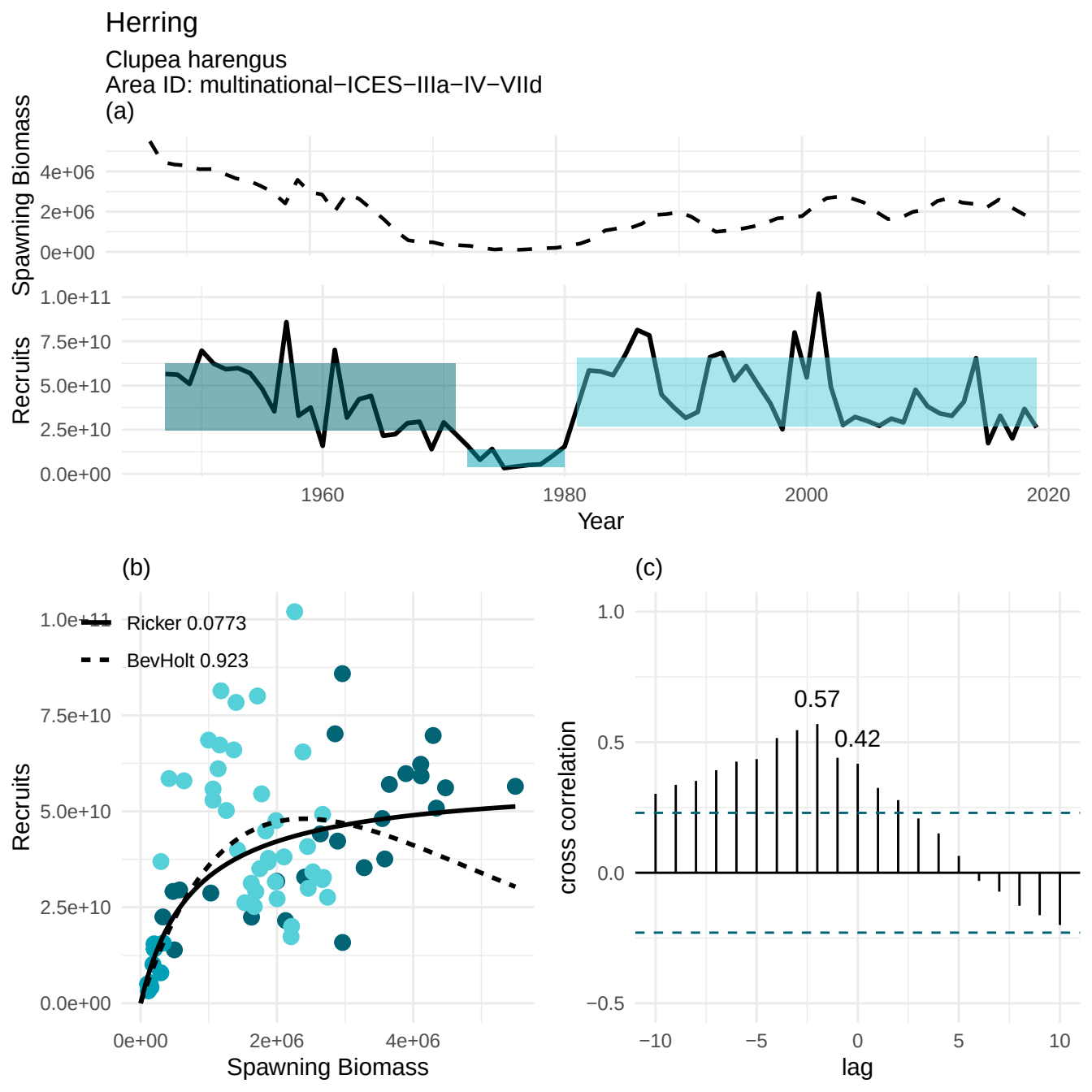

Herring
Clupea harengus
Area ID: Canada−DFO−4TSS
(a)
Spawning Biomass
90000
60000
30000
Recruits
3e+08
2e+08
1e+08
0e+00
1980
1990
2000
2010
Year
(b)
Ricker 0.425
BevHolt 0.575
Recruits
3e+08
2e+08
1e+08
0e+00
0
30000
60000
90000
Spawning Biomass
(c)
1.0
0.5
0.0
−0.5
cross correlation
0.79
0.59
−10
−5
0
5
10
lag

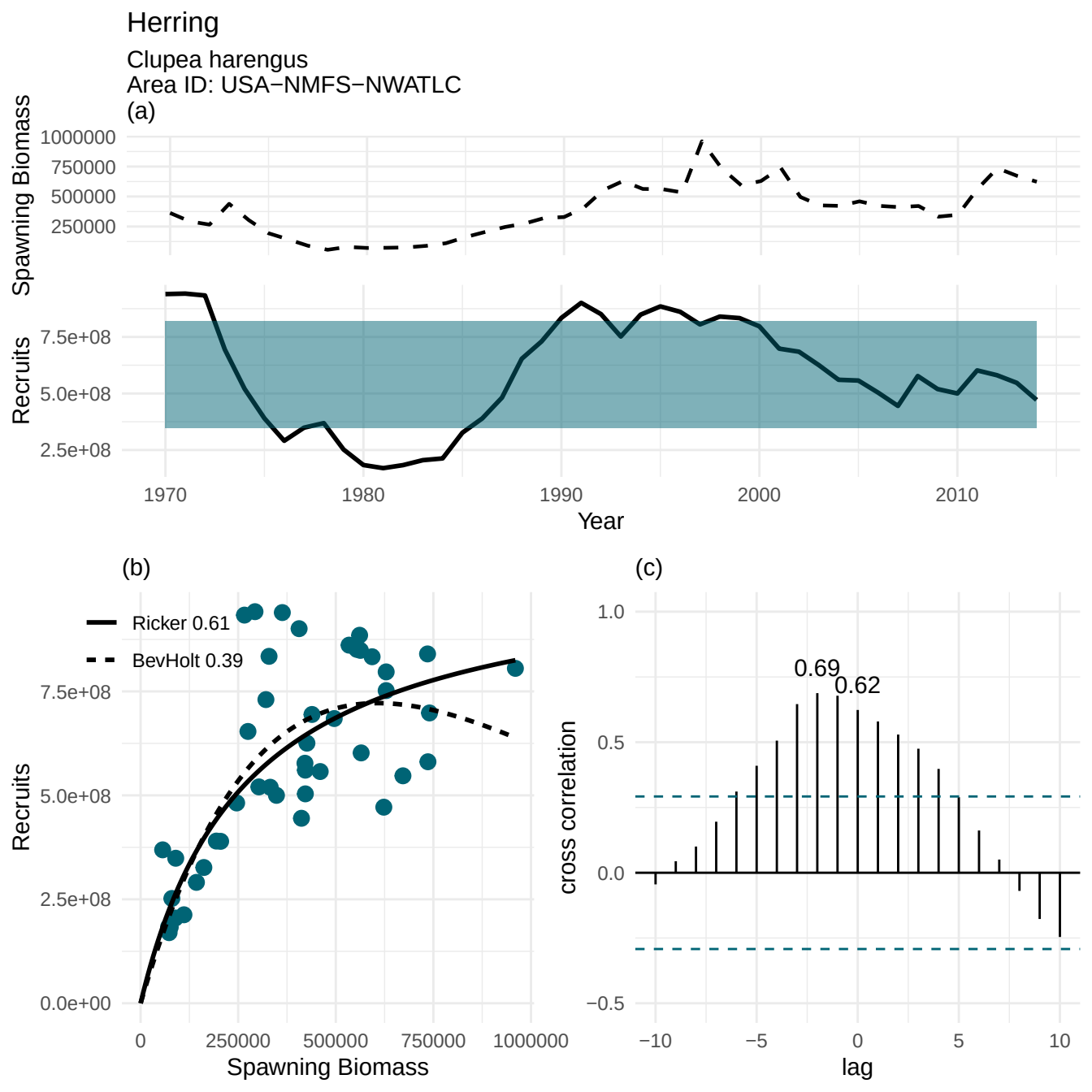

Pacific herring
Clupea pallasii
Area ID: Canada−DFO−CC
(a)
Spawning Biomass
60000
40000
20000
Recruits
1e+09
5e+08
0e+00
1960
1980
2000
Year
(b)
Ricker 0.00638
BevHolt 0.994
Recruits
1e+09
5e+08
0e+00
0
20000
40000
60000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

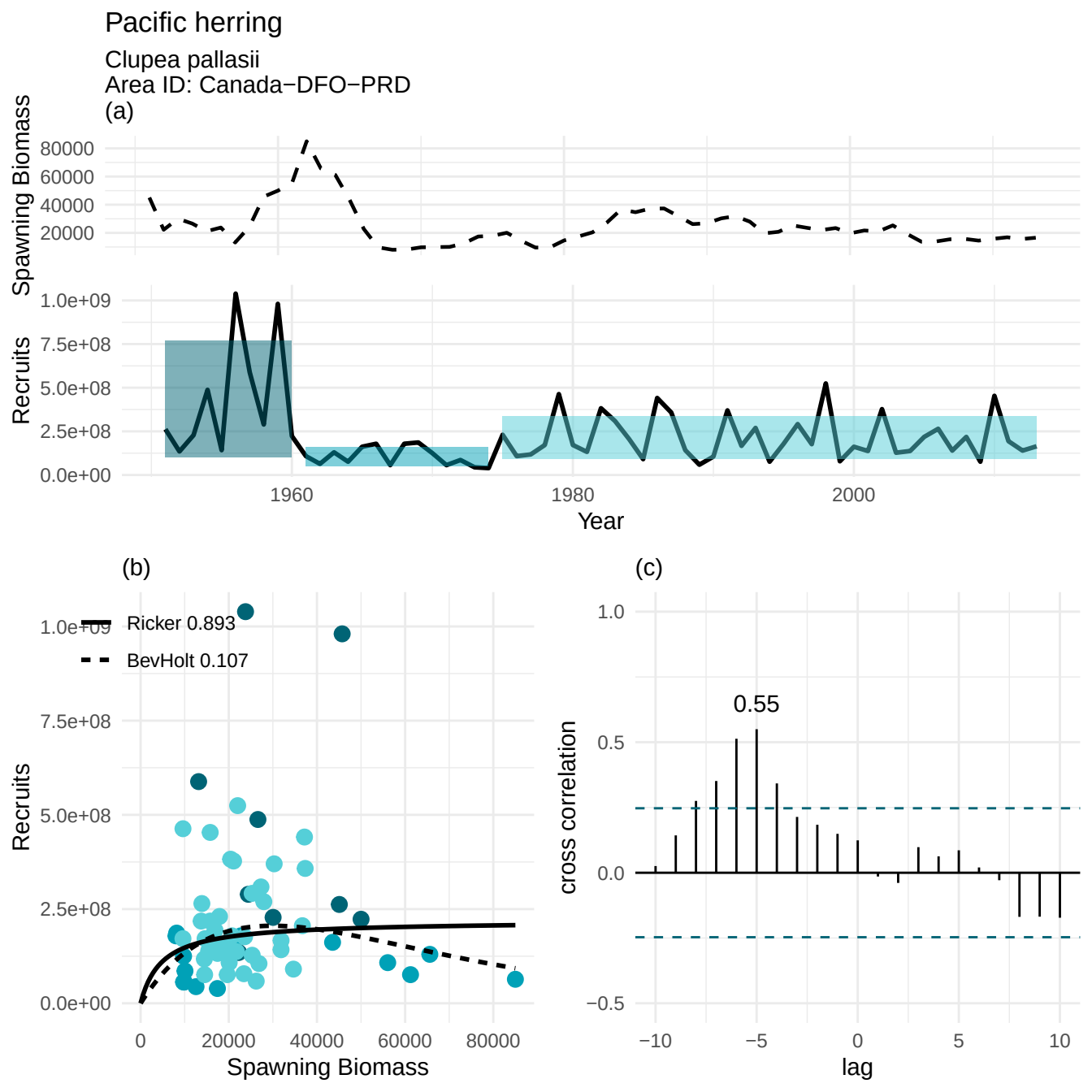

Herring
Clupea harengus
Area ID: multinational−ICES−VaSS
(a)
Spawning Biomass
6e+05
5e+05
4e+05
3e+05
Recruits
1.5e+09
1.0e+09
5.0e+08
0.0e+00
1990
2000
2010
Year
(b)
Ricker 0.515
BevHolt 0.485
Recruits
1.5e+09
1.0e+09
5.0e+08
0.0e+00
0e+00
2e+05
4e+05
6e+05
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.48
−10
−5
0
5
10
lag

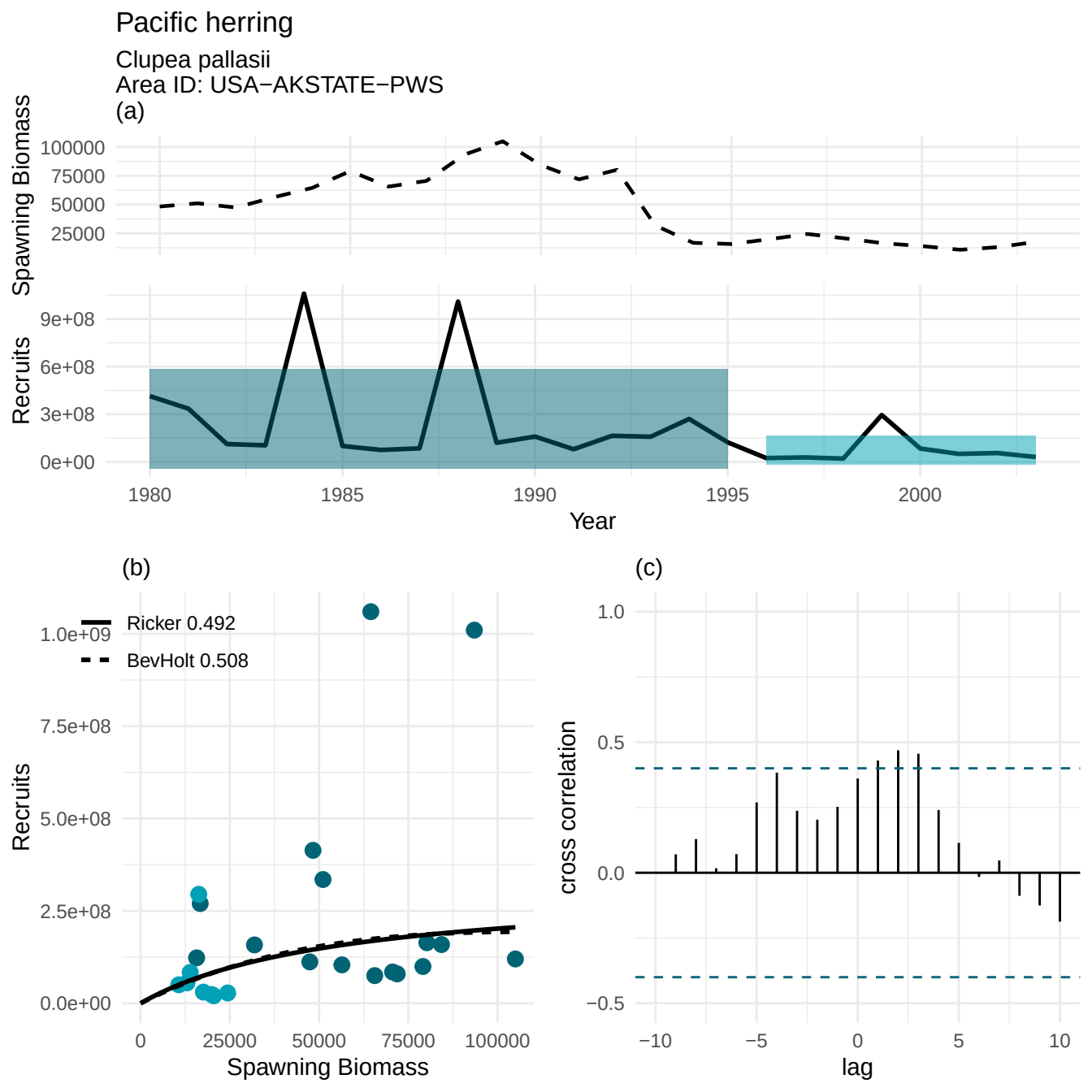

Herring
Clupea harengus
Area ID: multinational−ICES−VIIa
(a)
Spawning Biomass
25000
20000
15000
10000
Recruits
5e+08
4e+08
3e+08
2e+08
1e+08
1980
1990
2000
2010
Year
(b)
Ricker 0.47
BevHolt 0.53
Recruits
4e+08
2e+08
0e+00
0
10000
20000
Spawning Biomass
(c)
1.0
0.5
0.0
−0.5
0.79
0.59
cross correlation
−10
−5
0
5
10
lag

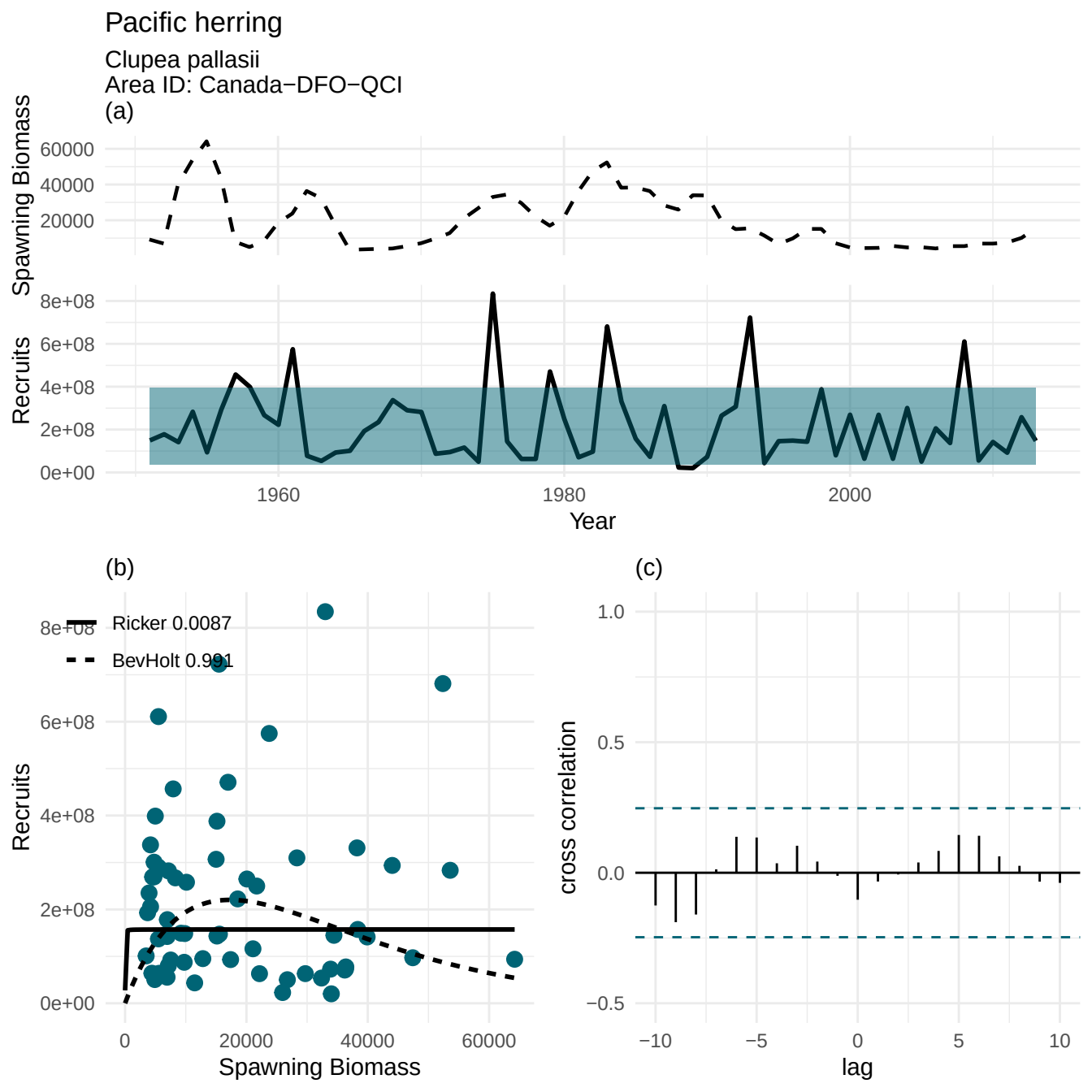

Herring
Clupea harengus
Area ID: multinational−ICES−I−II−IVa−V−XIVaNSS
(a)
Spawning Biomass
7e+06
6e+06
5e+06
4e+06
3e+06
2e+06
Recruits
6e+10
4e+10
2e+10
0e+00
1990
2000
2010
Year
(b)
Ricker 0.634
BevHolt 0.366
Recruits
6e+10
4e+10
2e+10
0e+00
0e+00
2e+06
4e+06
6e+06
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.45
−10
−5
0
5
10
lag

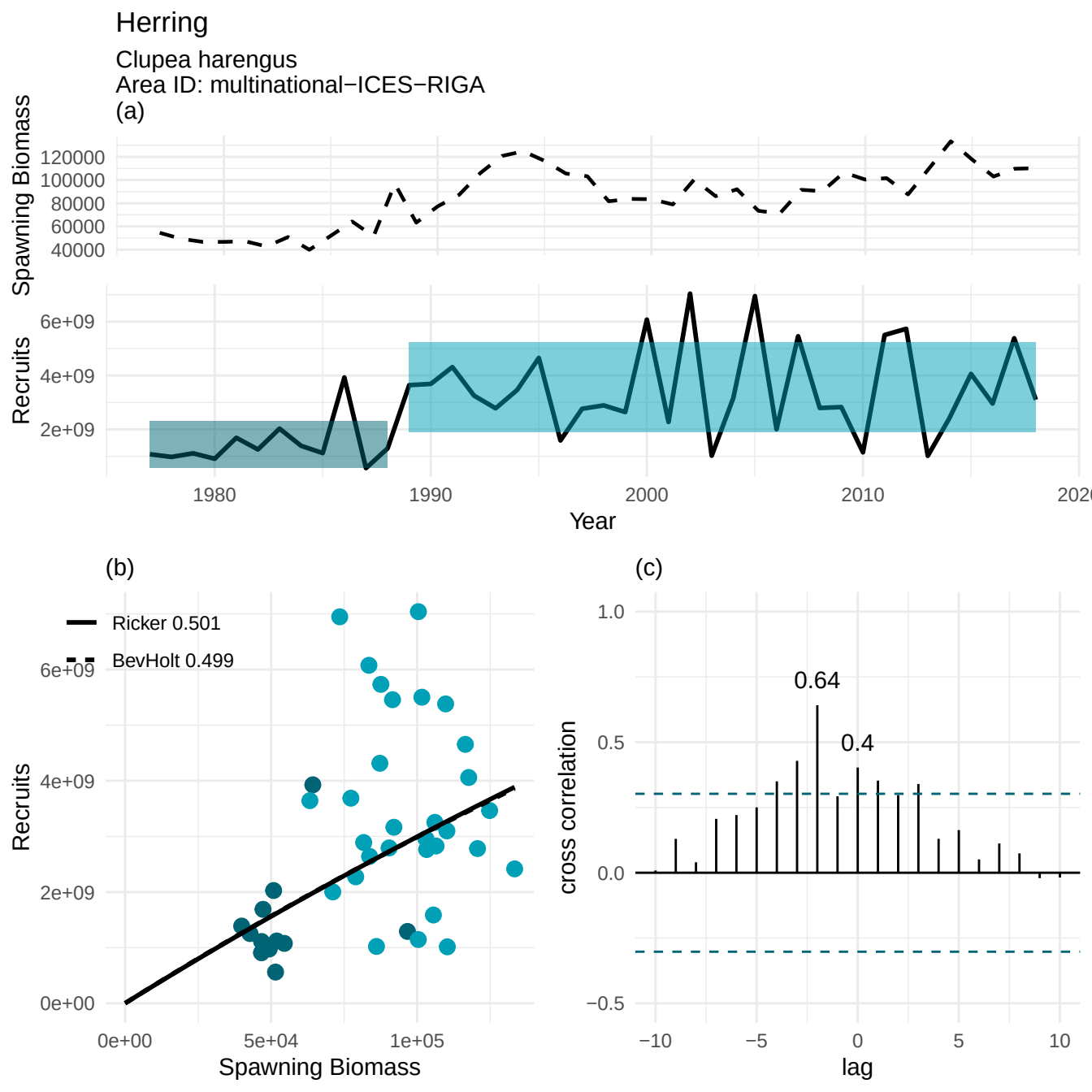

Herring
Clupea harengus
Area ID: multinational−ICES−IIIa−IV−VIId
(a)
Spawning Biomass
4e+06
2e+06
0e+00
Recruits
1.0e+11
7.5e+10
5.0e+10
2.5e+10
0.0e+00
1960
1980
2000
2020
Year
(b)
Ricker 0.0773
BevHolt 0.923
Recruits
Spawning Biomass
0e+00
2e+06
4e+06
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.57
0.42
−10
−5
0
5
10
lag

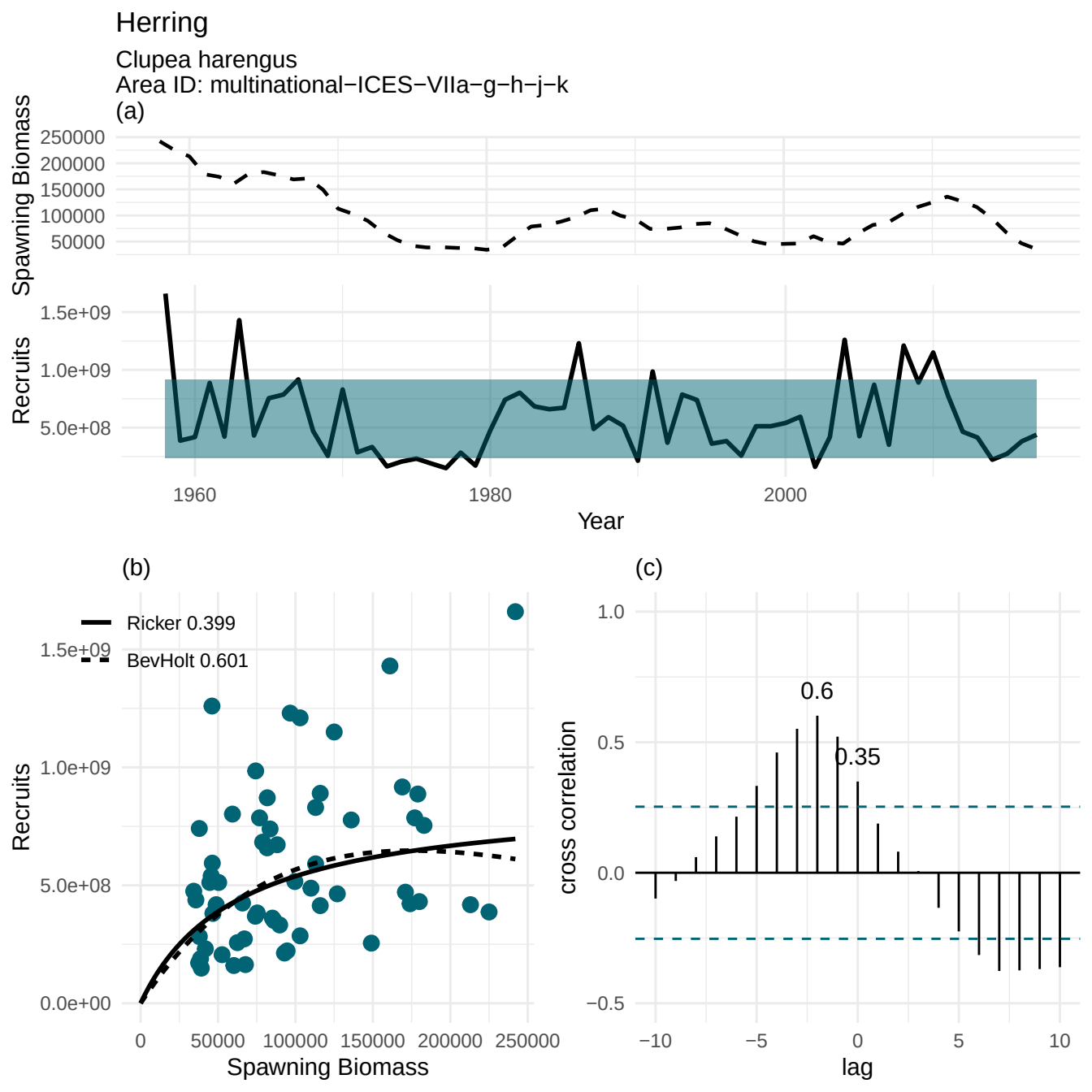

Herring
Clupea harengus
Area ID: USA−NMFS−NWATLC
(a)
Spawning Biomass
1000000
750000
500000
250000
Recruits
7.5e+08
5.0e+08
2.5e+08
1970
1980
1990
2000
2010
Year
(b)
Ricker 0.61
BevHolt 0.39
Recruits
7.5e+08
5.0e+08
2.5e+08
0.0e+00
0
250000
500000
750000
1000000
Spawning Biomass
(c)
1.0
0.5
0.0
−0.5
0.69
0.62
cross correlation
−10
−5
0
5
10
lag

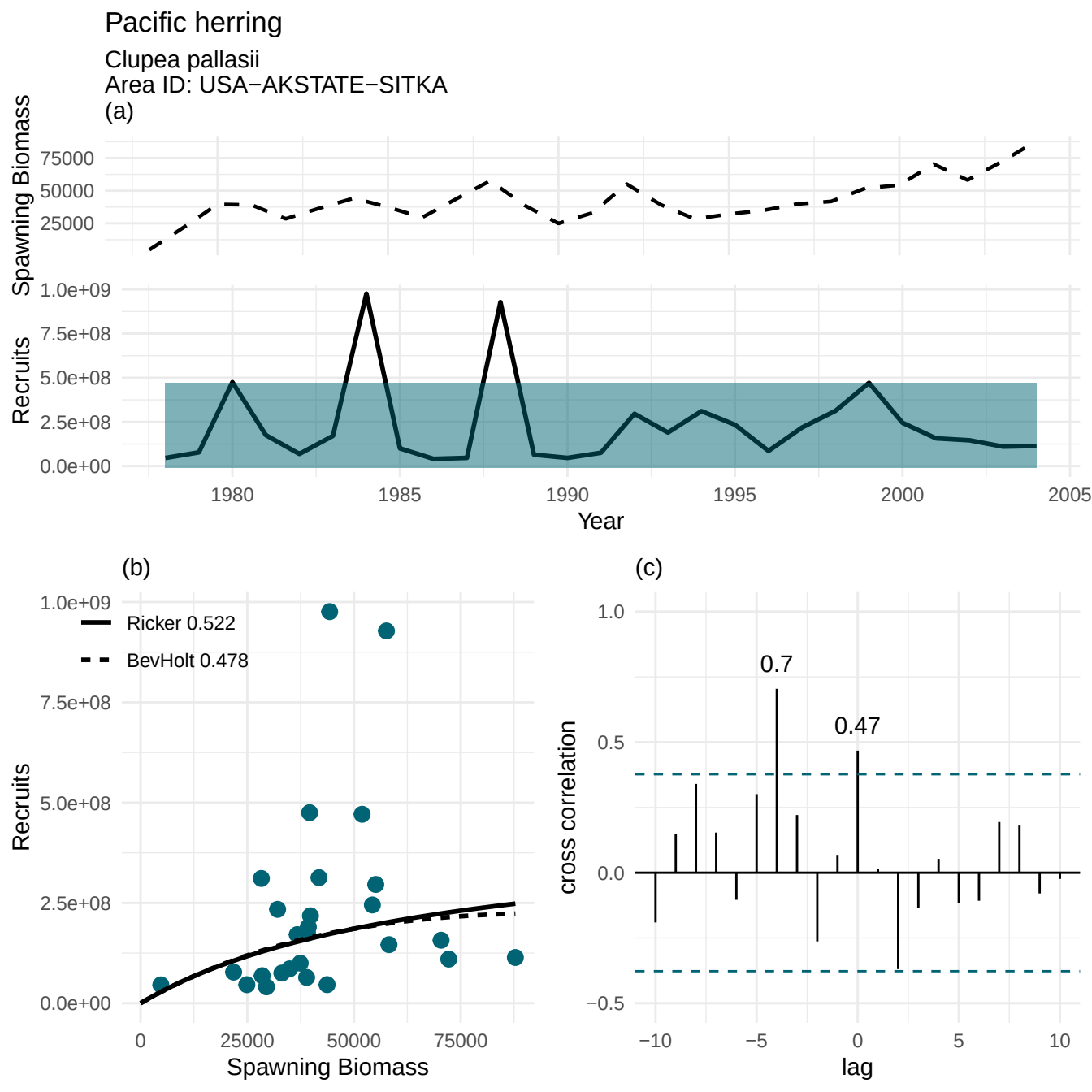

Pacific herring
Clupea pallasii
Area ID: Canada−DFO−PRD
(a)
Spawning Biomass
80000
60000
40000
20000
Recruits
1.0e+09
7.5e+08
5.0e+08
2.5e+08
0.0e+00
1960
1980
2000
Year
(b)
Ricker 0.893
BevHolt 0.107
Recruits
Spawning Biomass
(c)
cross correlation
0.55
lag

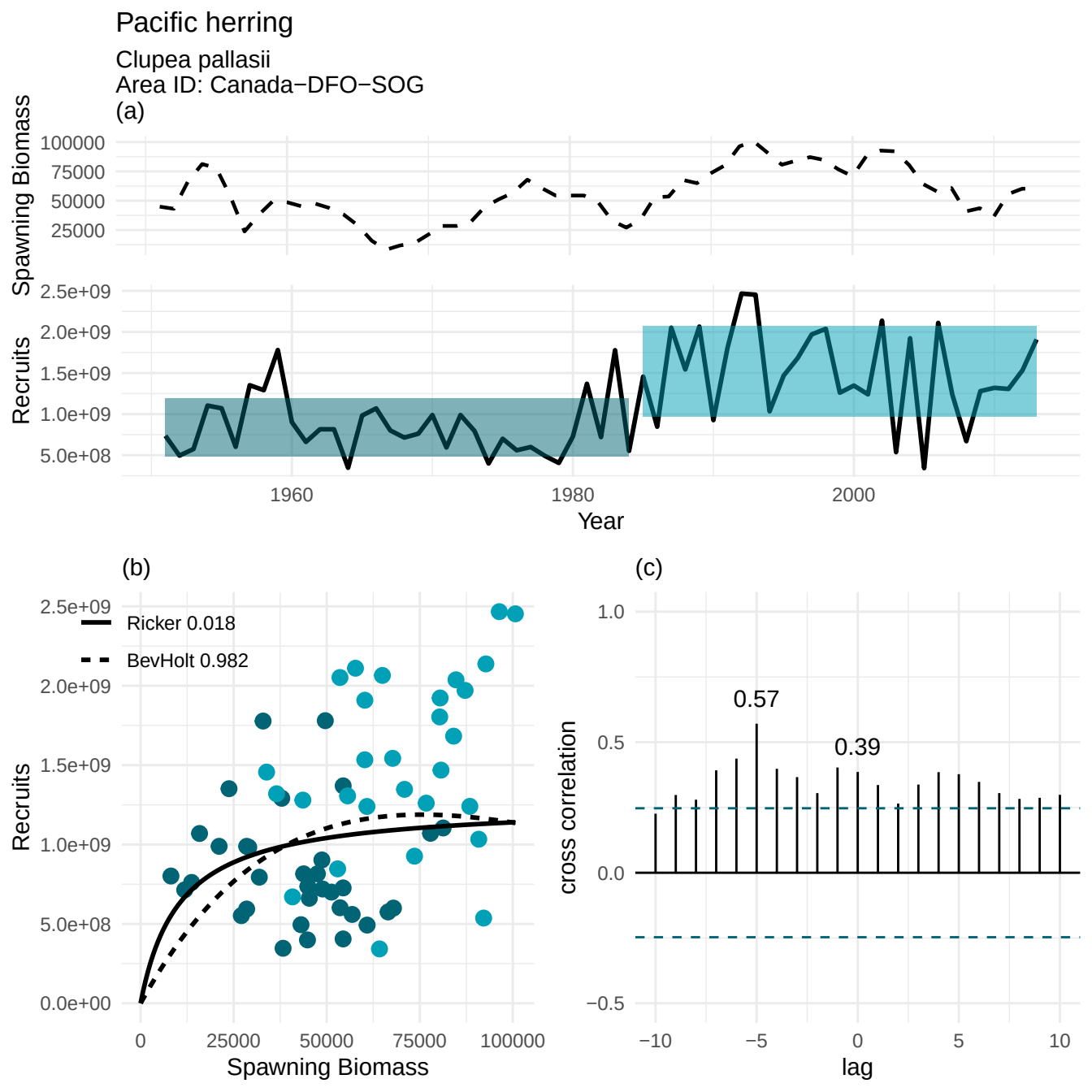

Pacific herring
Clupea pallasii
Area ID: USA−AKSTATE−PWS
(a)
Spawning Biomass
100000
75000
50000
25000
Recruits
9e+08
6e+08
3e+08
0e+00
1980
1985
1990
1995
2000
Year
(b)
Ricker 0.492
BevHolt 0.508
Recruits
1.0e+09
7.5e+08
5.0e+08
2.5e+08
0.0e+00
0
25000
50000
75000
100000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

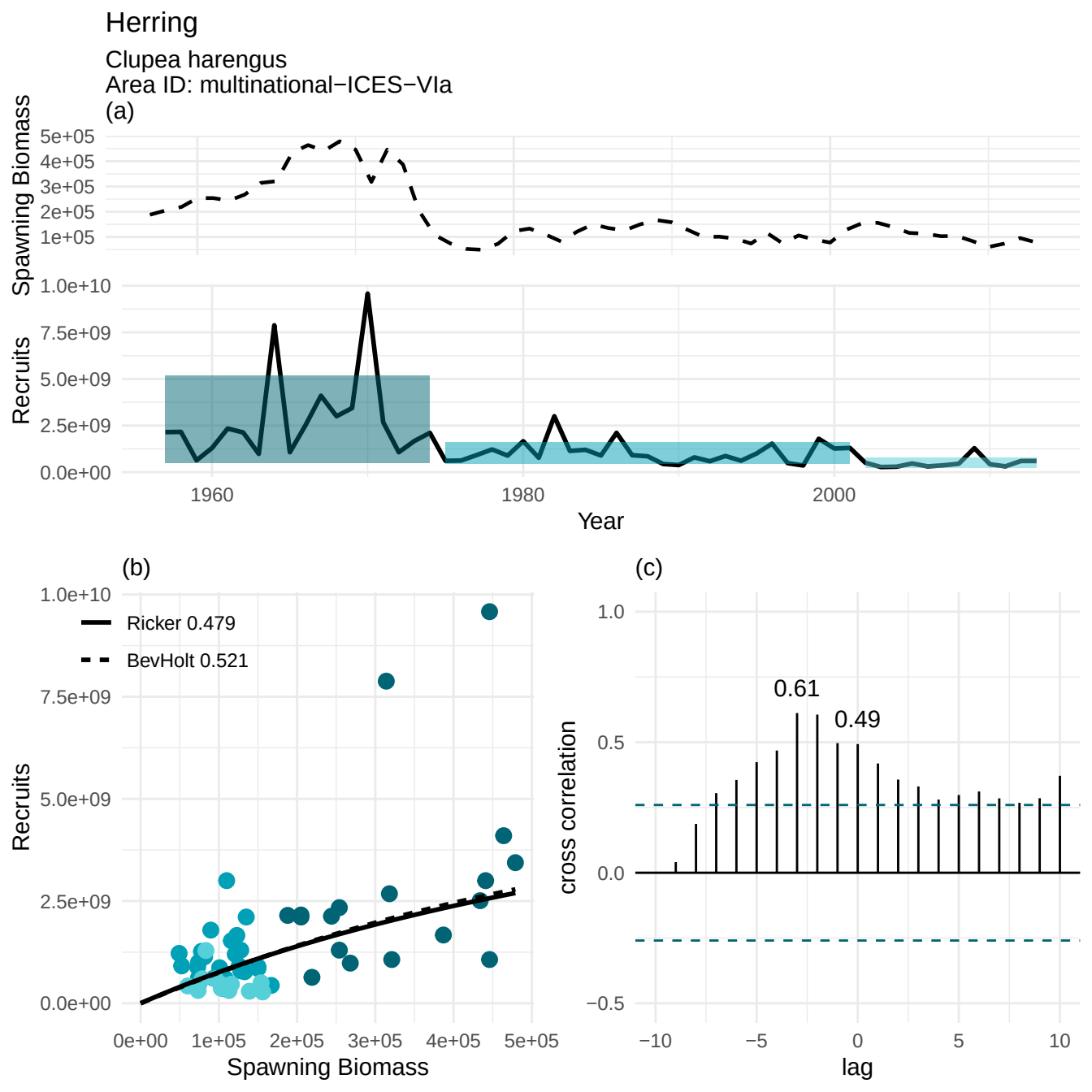

Pacific herring
Clupea pallasii
Area ID: Canada−DFO−QCI
(a)
Spawning Biomass
60000
40000
20000
Recruits
8e+08
6e+08
4e+08
2e+08
0e+00
1960
1980
2000
Year
(b)
Ricker 0.0087
BevHolt 0.991
Recruits
8e+08
6e+08
4e+08
2e+08
0e+00
0
20000
40000
60000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

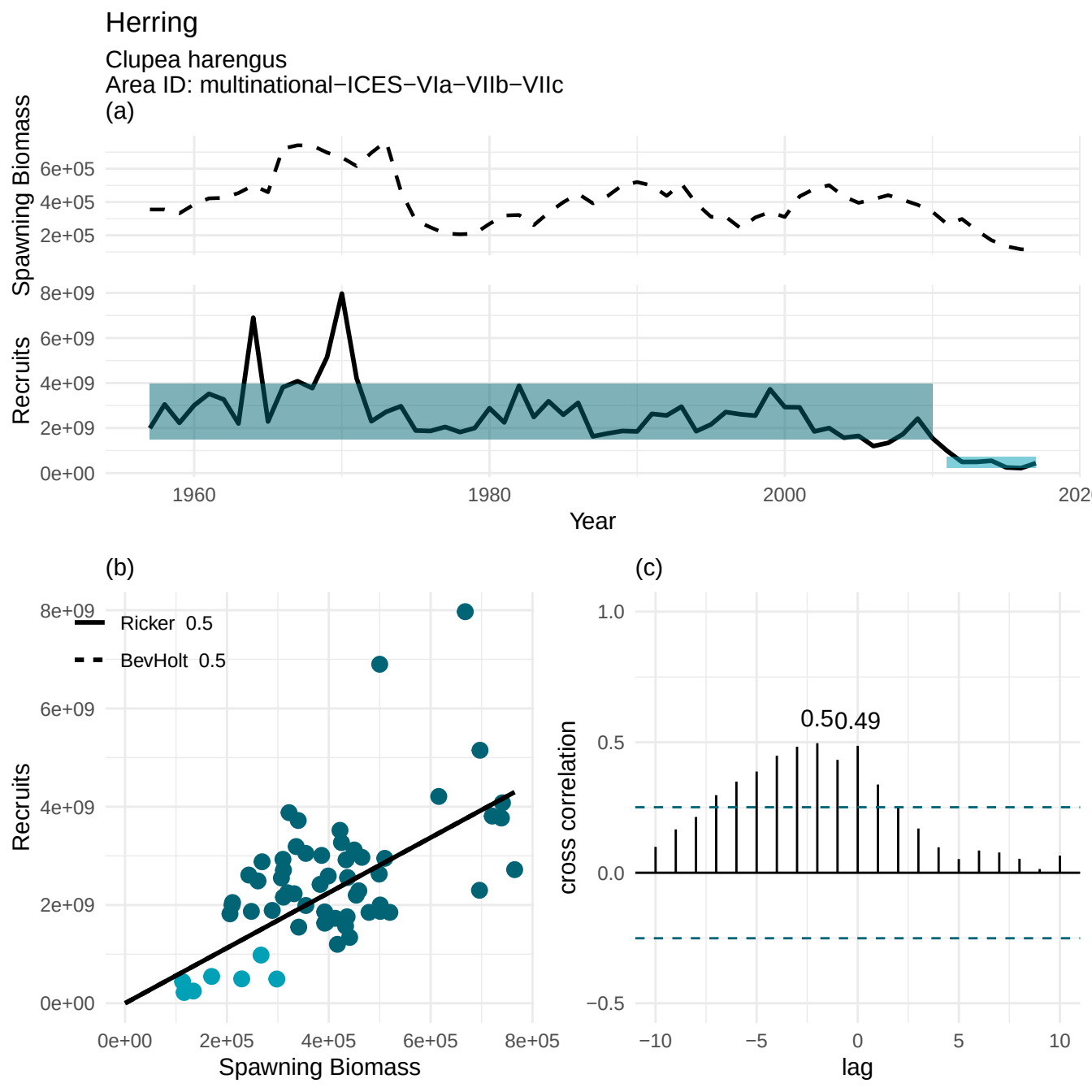

Herring
Clupea harengus
Area ID: multinational−ICES−RIGA
(a)
Spawning Biomass
120000
100000
80000
60000
40000
Recruits
6e+09
4e+09
2e+09
1980
1990
2000
2010
Year
(b)
Ricker 0.501
BevHolt 0.499
Recruits
6e+09
4e+09
2e+09
0e+00
0e+00
5e+04
1e+05
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.64
0.4
−10
−5
0
5
10
lag

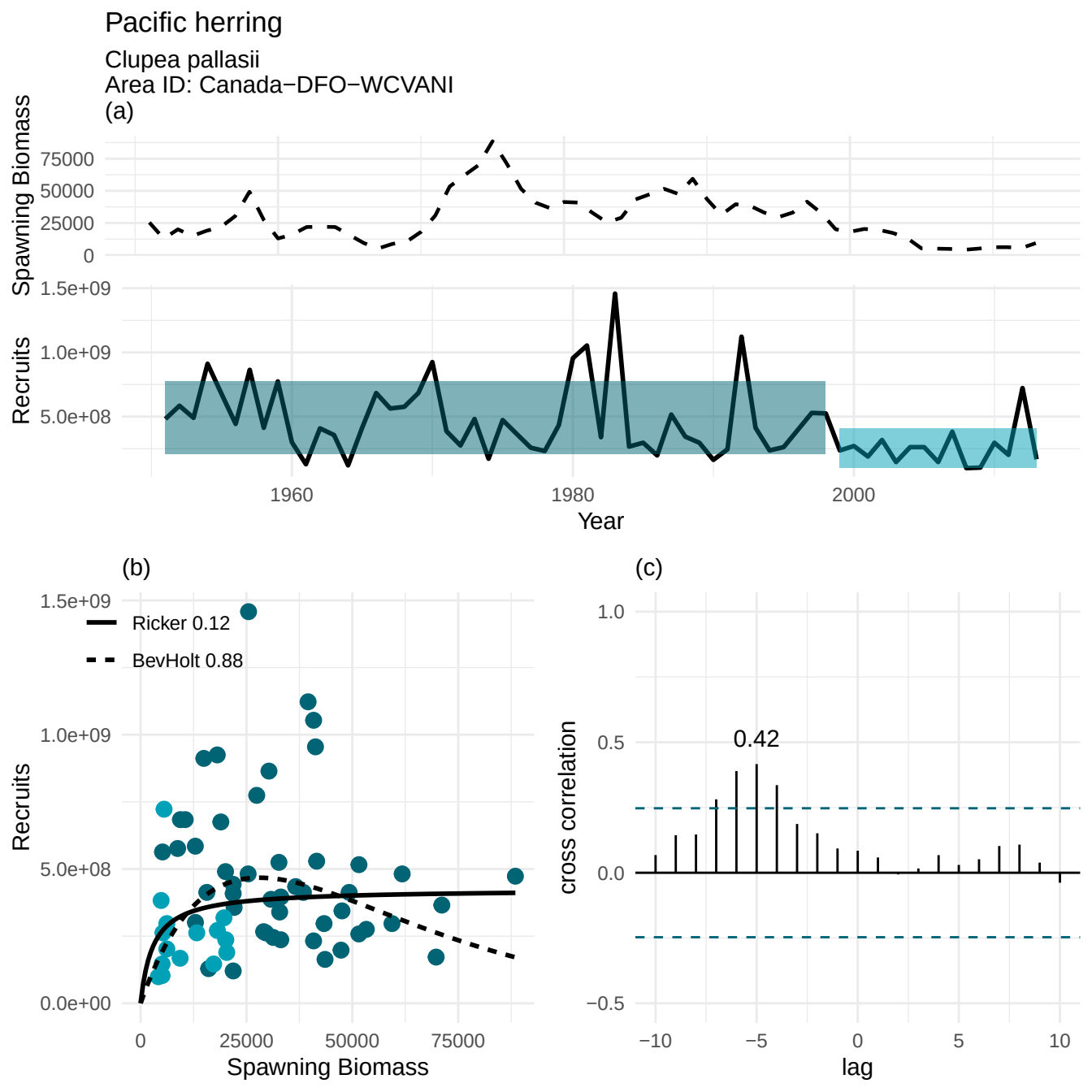

Herring
Clupea harengus
Area ID: multinational−ICES−VIIa−g−h−j−k
(a)
Spawning Biomass
250000
200000
150000
100000
50000
Recruits
1.5e+09
1.0e+09
5.0e+08
1960
1980
2000
Year
(b)
Ricker 0.399
BevHolt 0.601
Recruits
1.5e+09
1.0e+09
5.0e+08
0.0e+00
0
50000
100000
150000
200000
250000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.6
0.35
−10
−5
0
5
10
lag

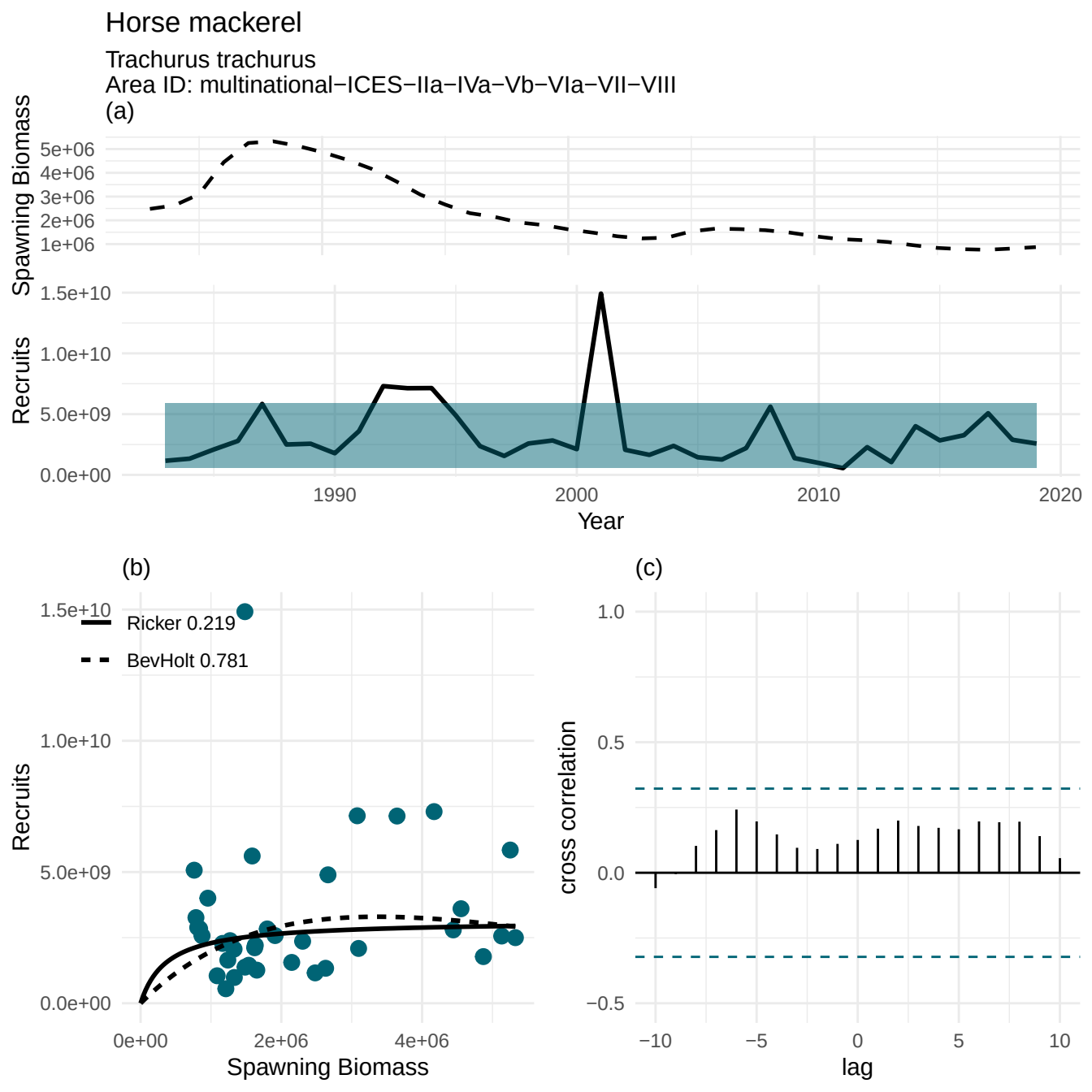

Pacific herring
Clupea pallasii
Area ID: USA−AKSTATE−SITKA
(a)
Spawning Biomass
75000
50000
25000
Recruits
1.0e+09
7.5e+08
5.0e+08
2.5e+08
0.0e+00
1980
1985
1990
1995
2000
2005
Year
(b)
Ricker 0.522
BevHolt 0.478
Recruits
Spawning Biomass
0
25000
50000
75000
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.7
0.47
−10
−5
0
5
10
lag

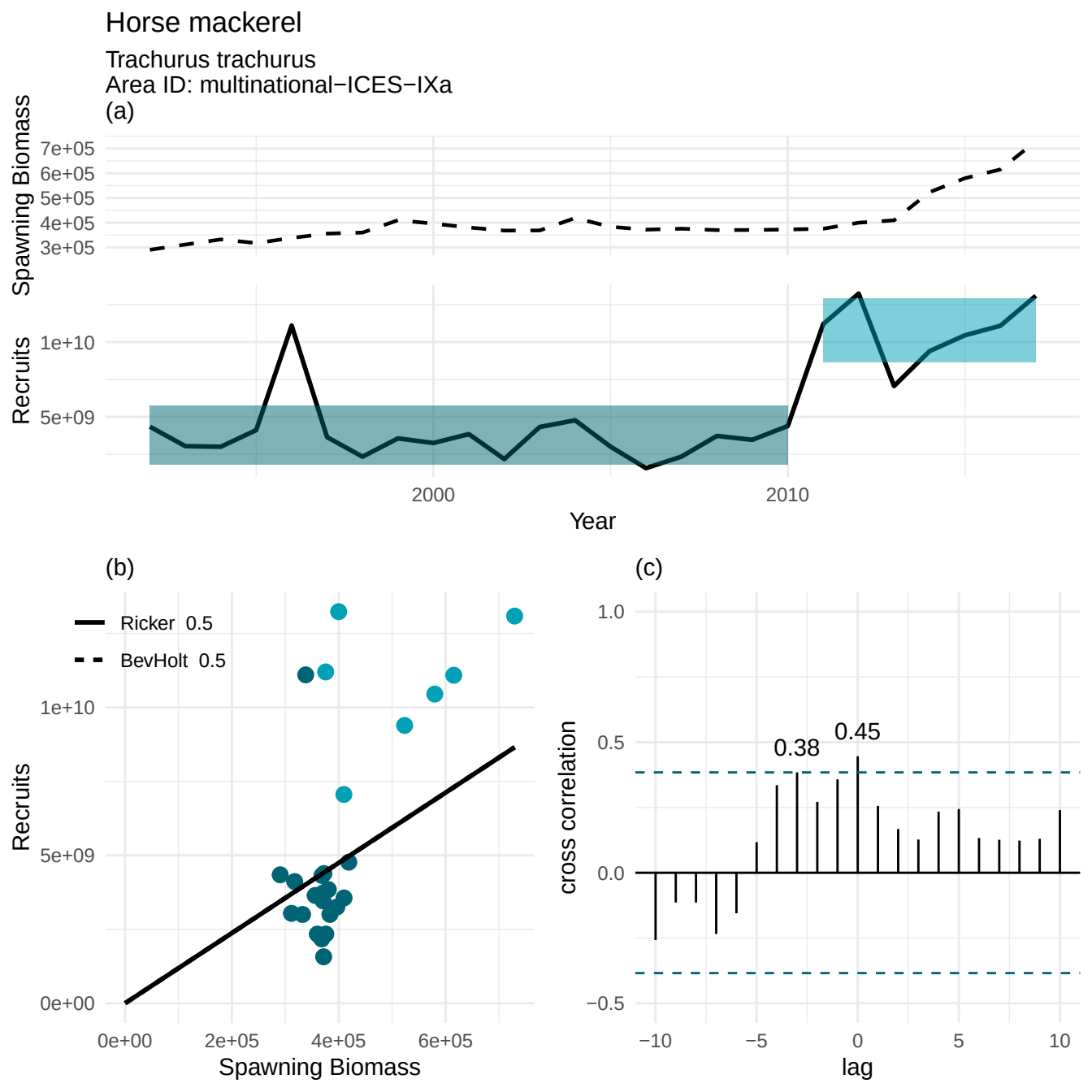

Pacific herring
Clupea pallasii
Area ID: Canada−DFO−SOG
(a)
Spawning Biomass
100000
75000
50000
25000
Recruits
2.5e+09
2.0e+09
1.5e+09
1.0e+09
5.0e+08
1960
1980
2000
Year
(b)
Ricker 0.018
BevHolt 0.982
Recruits
2.5e+09
2.0e+09
1.5e+09
1.0e+09
5.0e+08
0.0e+00
0
25000
50000
75000
100000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.57
0.39
−10
−5
0
5
10
lag

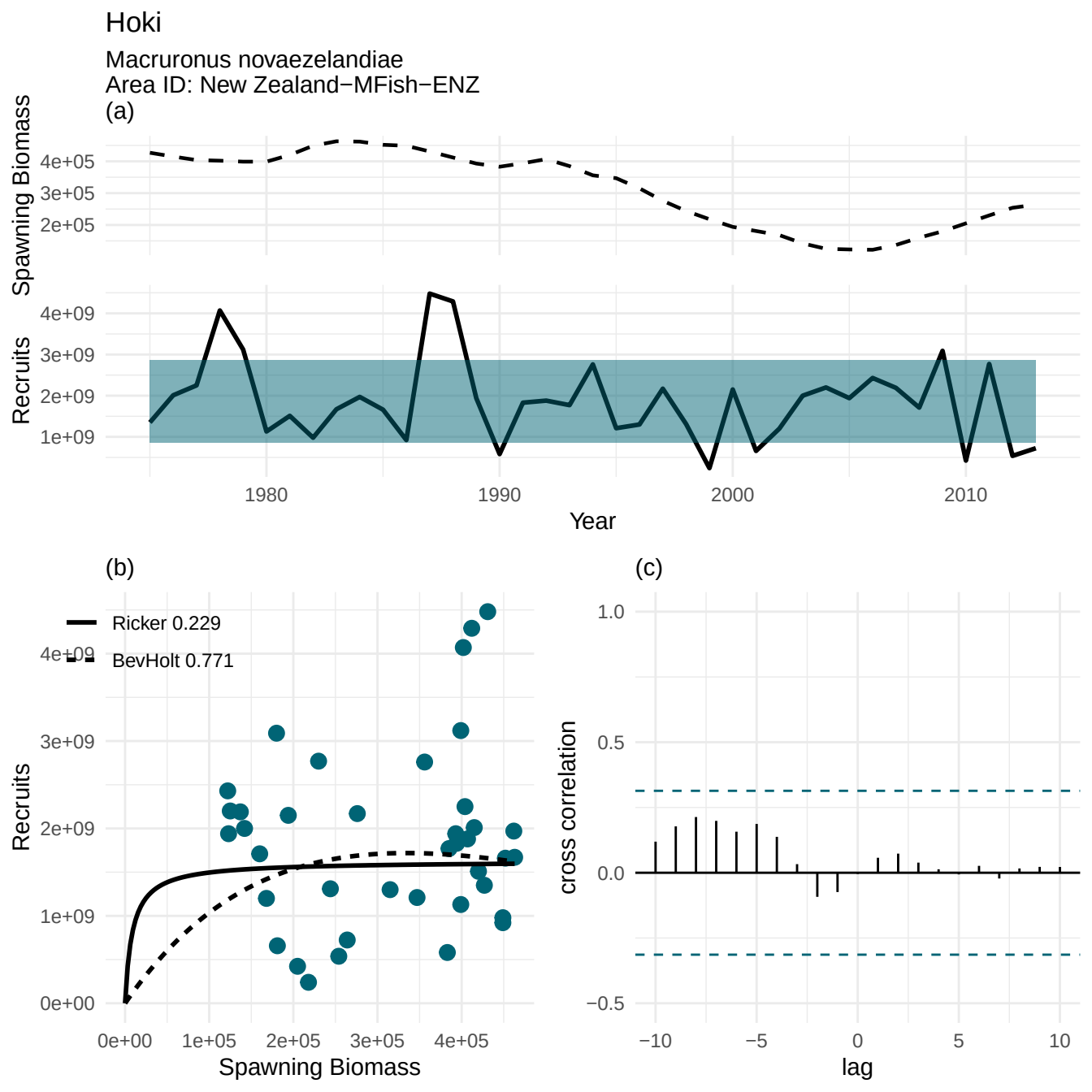

Herring
Clupea harengus
Area ID: multinational−ICES−VIa
(a)
Spawning Biomass
5e+05
4e+05
3e+05
2e+05
1e+05
Recruits
1.0e+10
7.5e+09
5.0e+09
2.5e+09
0.0e+00
1960
1980
2000
Year
(b)
Ricker 0.479
BevHolt 0.521
Recruits
Spawning Biomass
0e+00
1e+05
2e+05
3e+05
4e+05
5e+05
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.61
0.49
−10
−5
0
5
10
lag

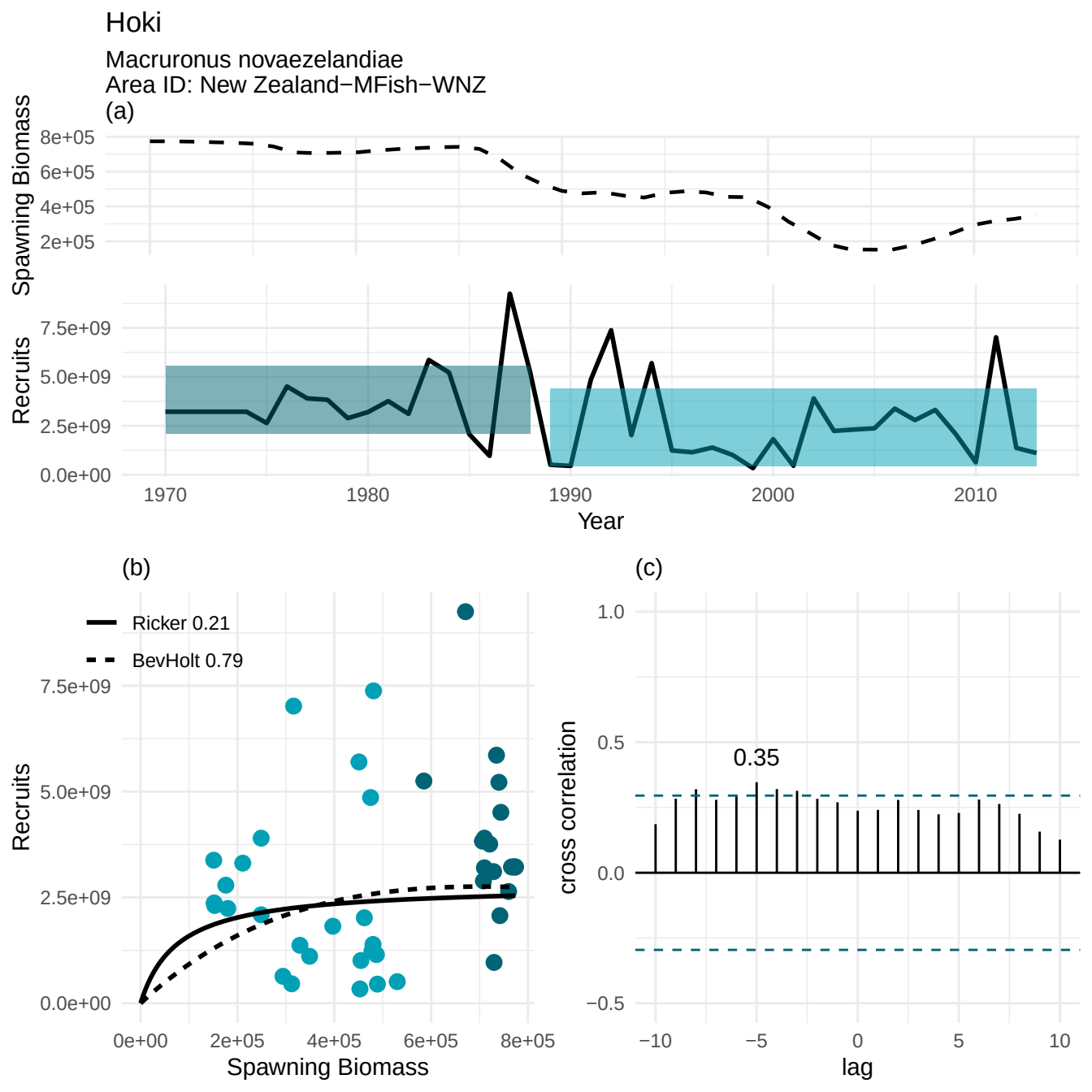

Herring
Clupea harengus
Area ID: multinational−ICES−VIa−VIIb−VIIc
(a)
Spawning Biomass
6e+05
4e+05
2e+05
Recruits
8e+09
6e+09
4e+09
2e+09
0e+00
1960
1980
2000
202
Year
(b)
Ricker 0.5
BevHolt 0.5
Recruits
8e+09
6e+09
4e+09
2e+09
0e+00
0e+00
2e+05
4e+05
6e+05
8e+05
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.50.49
−10
−5
0
5
10
lag

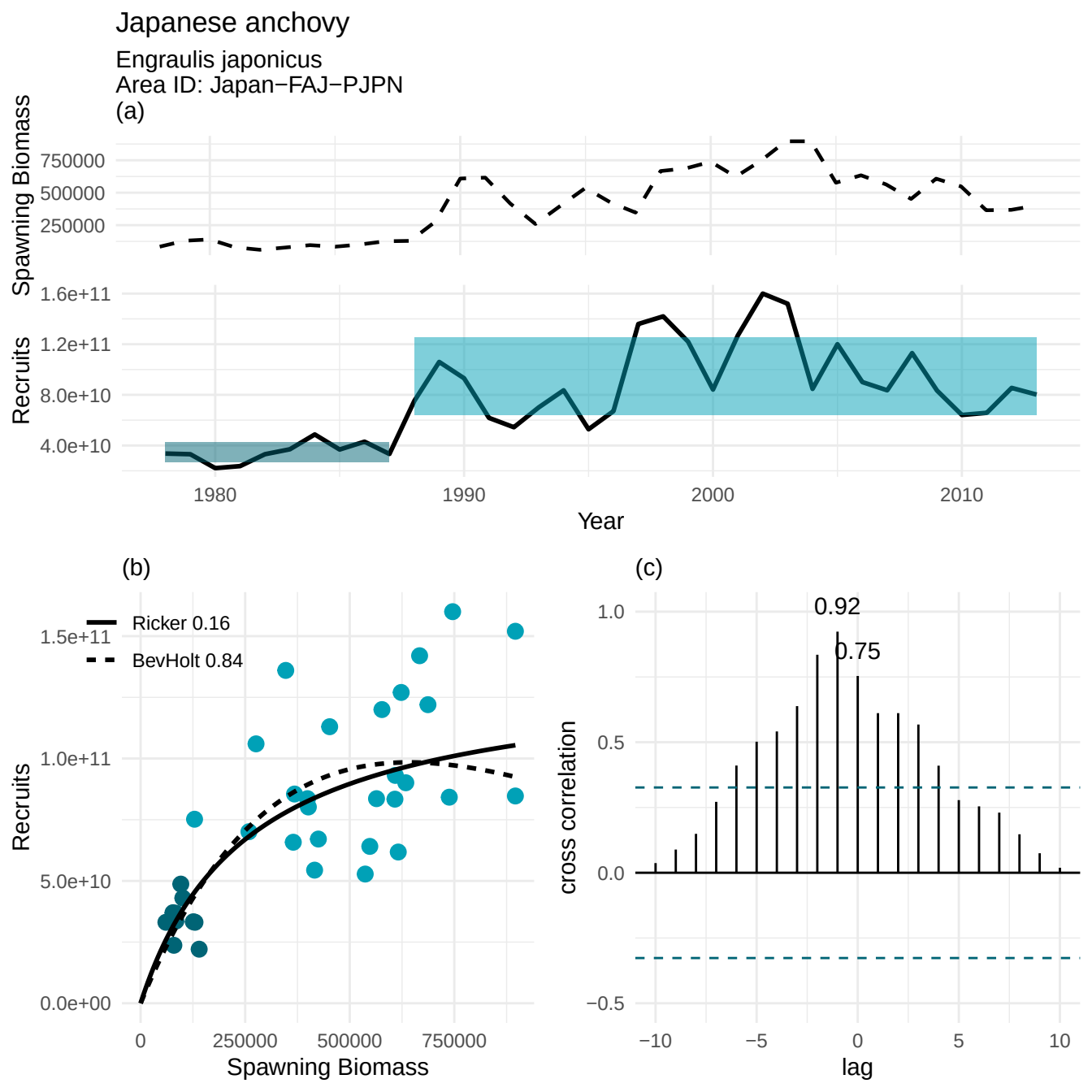

Pacific herring
Clupea pallasii
Area ID: Canada−DFO−WCVANI
(a)
Spawning Biomass
75000
50000
25000
0
Recruits
1.5e+09
1.0e+09
5.0e+08
1960
1980
2000
Year
(b)
Ricker 0.12
BevHolt 0.88
Recruits
1.5e+09
1.0e+09
5.0e+08
0.0e+00
0
25000
50000
75000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.42
−10
−5
0
5
10
lag

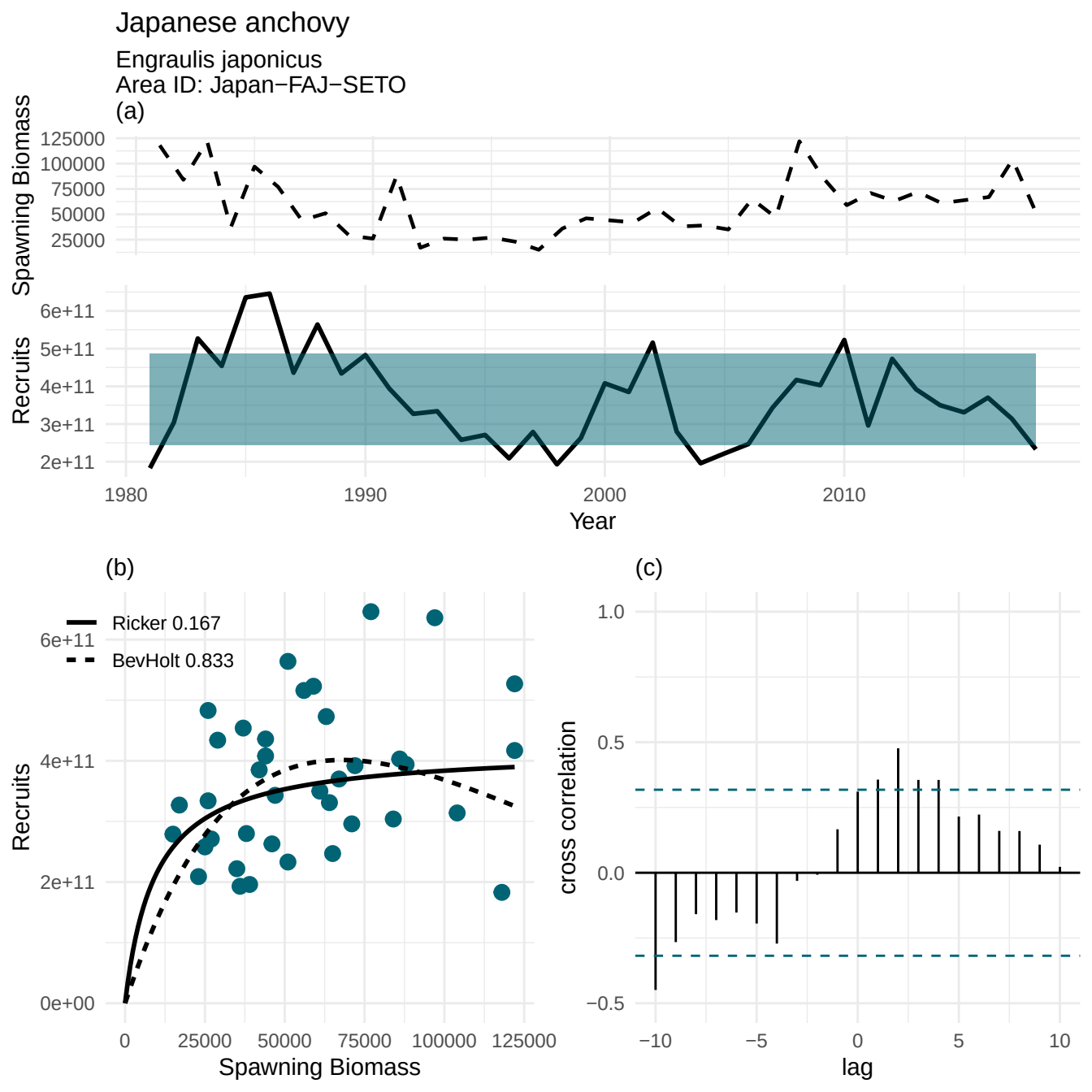

Horse mackerel
Trachurus trachurus
Area ID: multinational−ICES−IIa−IVa−Vb−VIa−VII−VIII
(a)
Spawning Biomass
5e+06
4e+06
3e+06
2e+06
1e+06
Recruits
1.5e+10
1.0e+10
5.0e+09
0.0e+00
1990
2000
2010
2020
Year
(b)
Ricker 0.219
BevHolt 0.781
Recruits
Spawning Biomass
0e+00
2e+06
4e+06
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

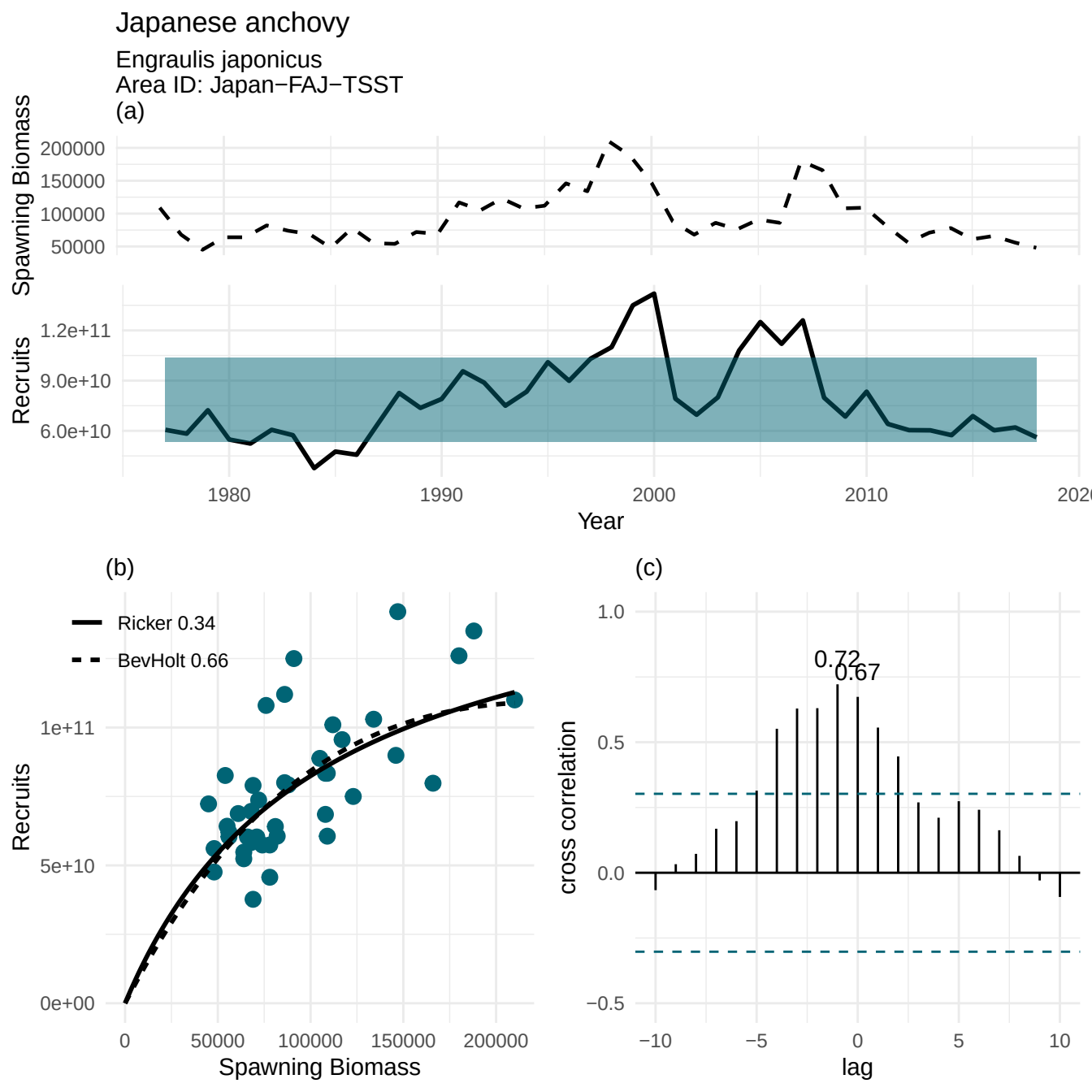

Horse mackerel
Trachurus trachurus
Area ID: multinational−ICES−IXa
(a)
Spawning Biomass
7e+05
6e+05
5e+05
4e+05
3e+05
Recruits
1e+10
5e+09
2000
2010
Year
(b)
Ricker 0.5
BevHolt 0.5
Recruits
1e+10
5e+09
0e+00
0e+00
2e+05
4e+05
6e+05
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.38
0.45
−10
−5
0
5
10
lag

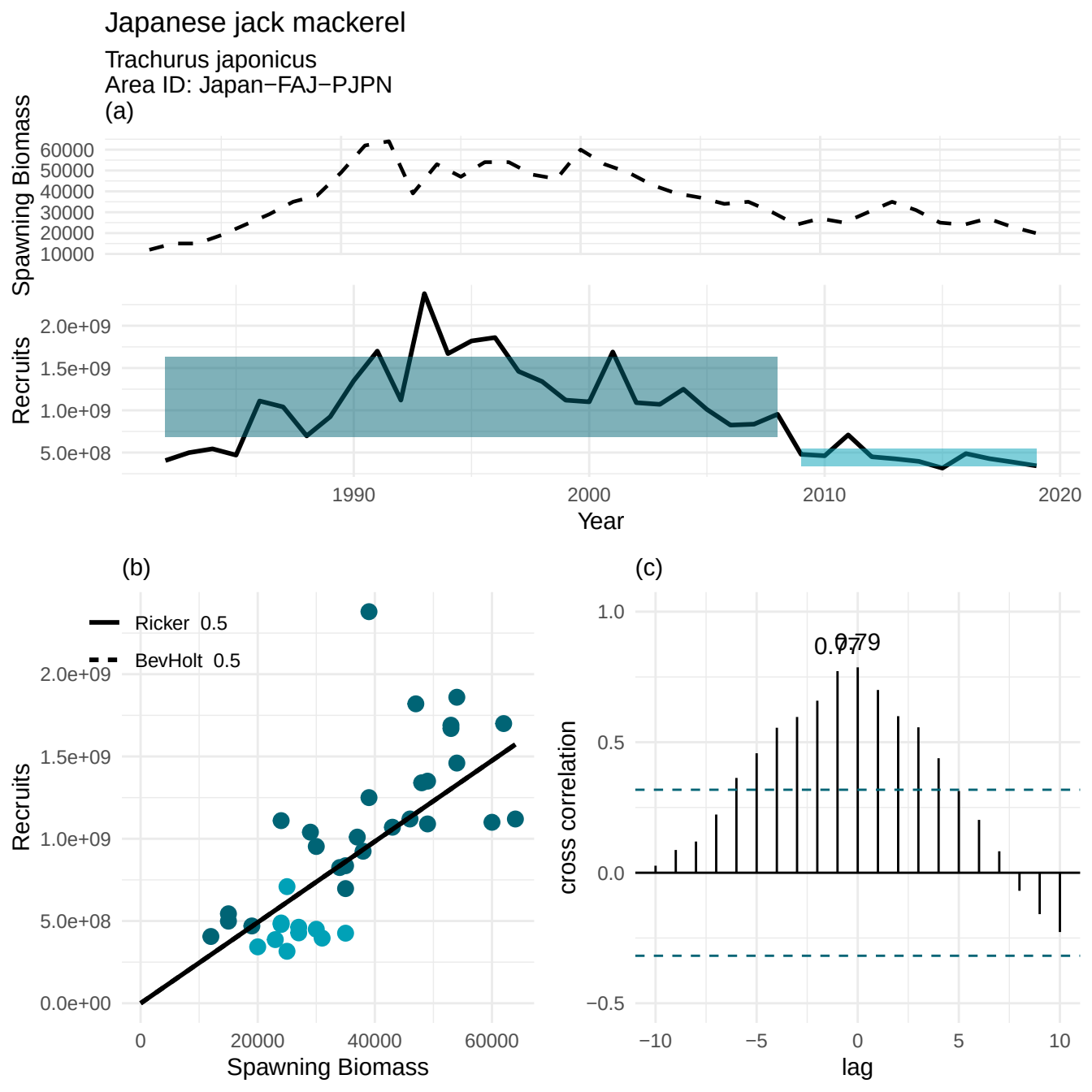

Hoki
Macruronus novaezelandiae
Area ID: New Zealand−MFish−ENZ
(a)
Spawning Biomass
4e+05
3e+05
2e+05
Recruits
4e+09
3e+09
2e+09
1e+09
1980
1990
2000
2010
Year
(b)
Ricker 0.229
BevHolt 0.771
Recruits
4e+09
3e+09
2e+09
1e+09
0e+00
0e+00
1e+05
2e+05
3e+05
4e+05
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

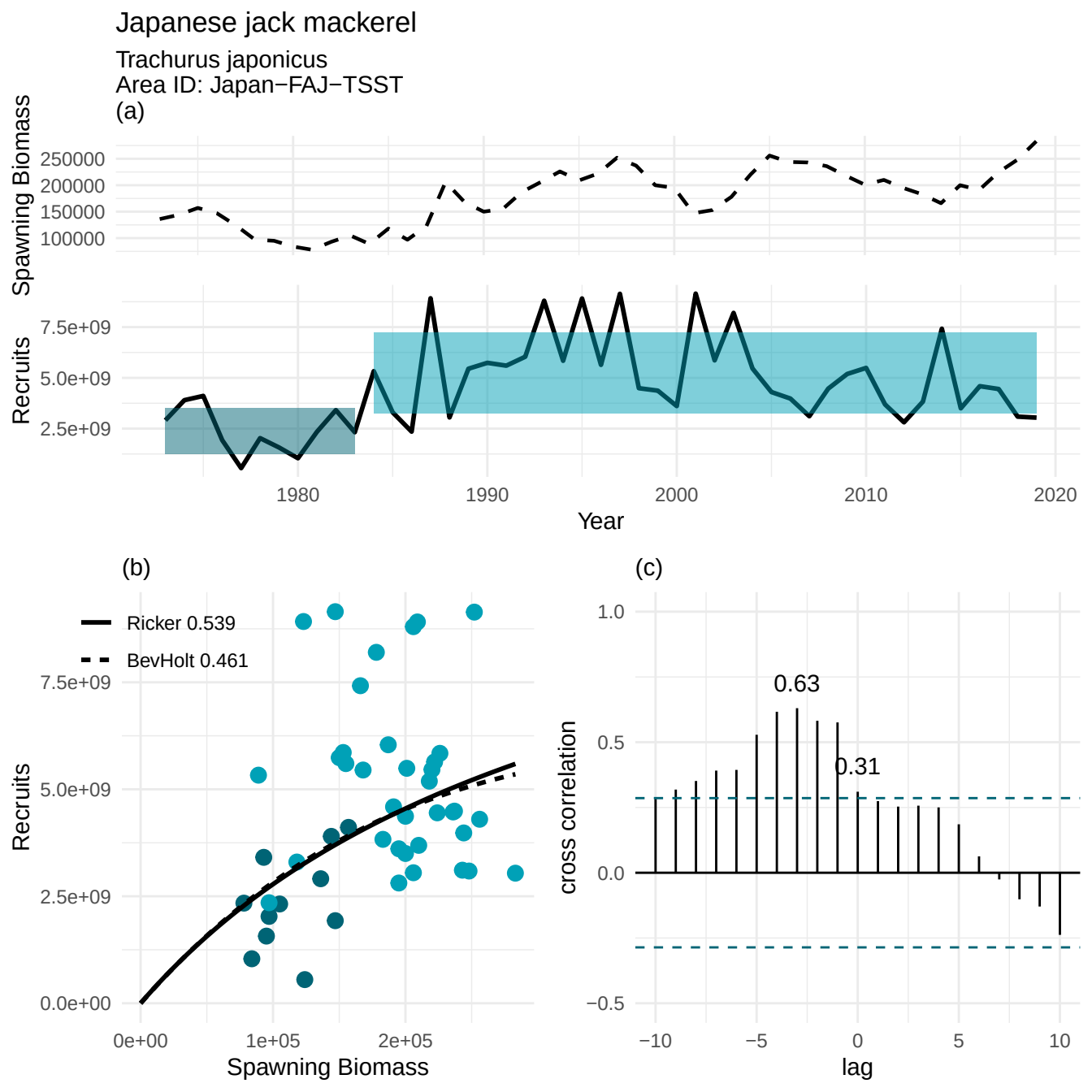

Hoki
Macruronus novaezelandiae
Area ID: New Zealand−MFish−WNZ
(a)
Spawning Biomass
8e+05
6e+05
4e+05
2e+05
Recruits
7.5e+09
5.0e+09
2.5e+09
0.0e+00
1970
1980
1990
2000
2010
Year
(b)
Ricker 0.21
BevHolt 0.79
Recruits
7.5e+09
5.0e+09
2.5e+09
0.0e+00
0e+00
2e+05
4e+05
6e+05
8e+05
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.35
−10
−5
0
5
10
lag

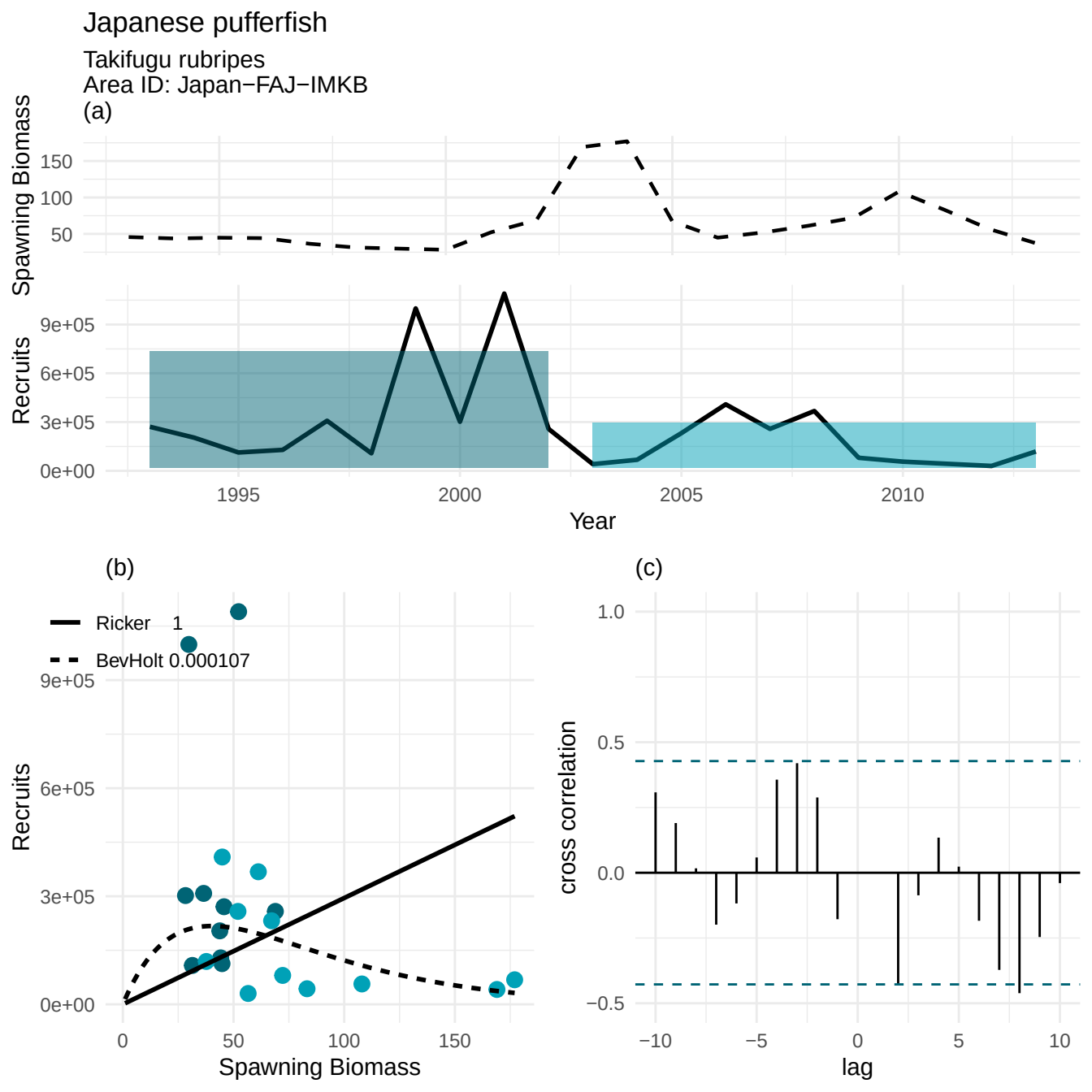

Japanese anchovy
Engraulis japonicus
Area ID: Japan−FAJ−PJPN
(a)
Spawning Biomass
750000
500000
250000
Recruits
1.6e+11
1.2e+11
8.0e+10
4.0e+10
1980
1990
2000
2010
Year
(b)
Ricker 0.16
BevHolt 0.84
Recruits
1.5e+11
1.0e+11
5.0e+10
0.0e+00
0
250000
500000
750000
Spawning Biomass
(c)
0.92
0.75
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

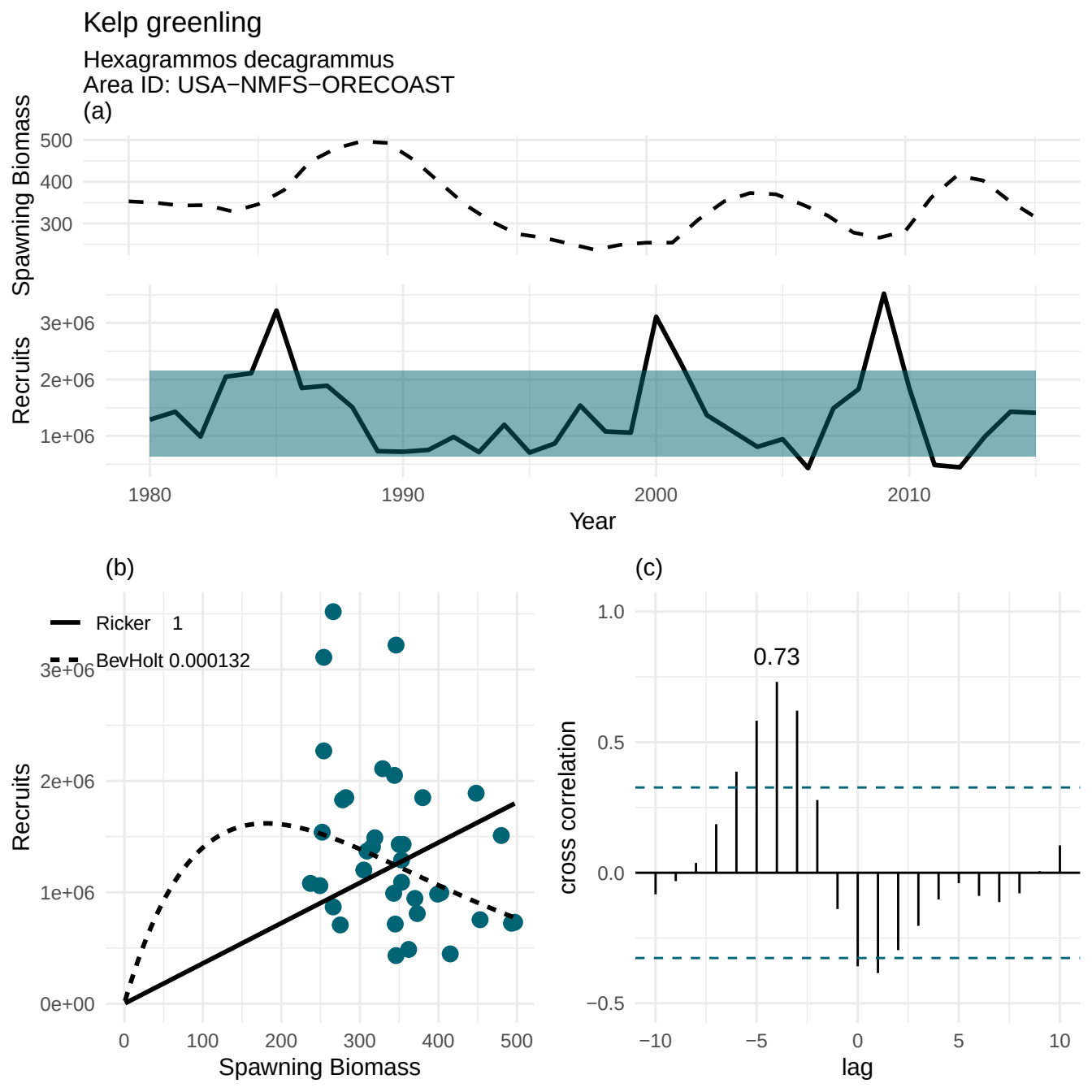

Japanese anchovy
Engraulis japonicus
Area ID: Japan−FAJ−SETO
(a)
Spawning Biomass
125000
100000
75000
50000
25000
Recruits
6e+11
5e+11
4e+11
3e+11
2e+11
1980
1990
2000
2010
Year
(b)
Ricker 0.167
BevHolt 0.833
Recruits
6e+11
4e+11
2e+11
0e+00
0
25000
50000
75000
100000
125000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

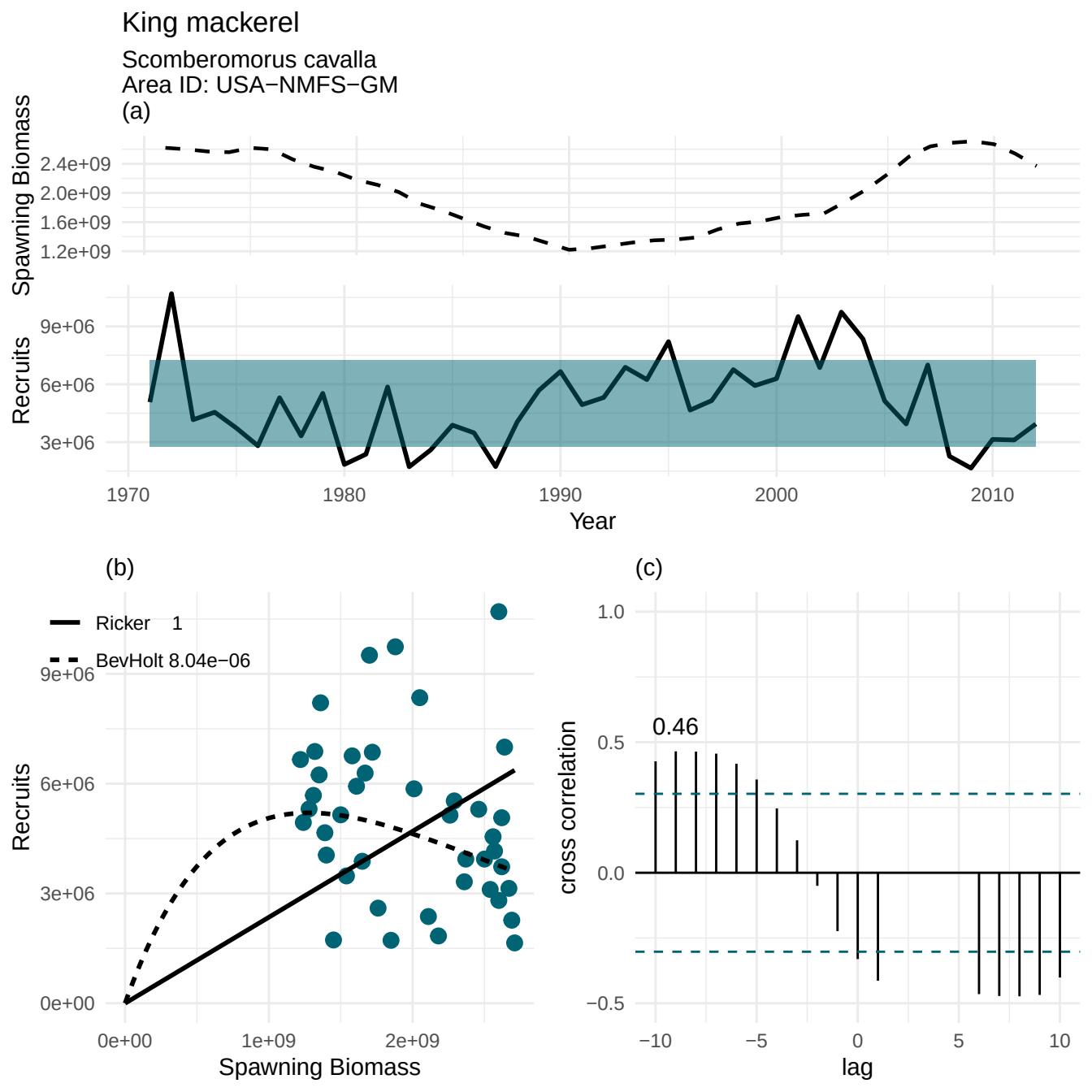

Japanese anchovy
Engraulis japonicus
Area ID: Japan−FAJ−TSST
(a)
Spawning Biomass
200000
150000
100000
50000
Recruits
1.2e+11
9.0e+10
6.0e+10
1980
1990
2000
2010
Year
(b)
Ricker 0.34
BevHolt 0.66
Recruits
1e+11
5e+10
0e+00
0
50000
100000
150000
200000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.72
0.67
−10
−5
0
5
10
lag

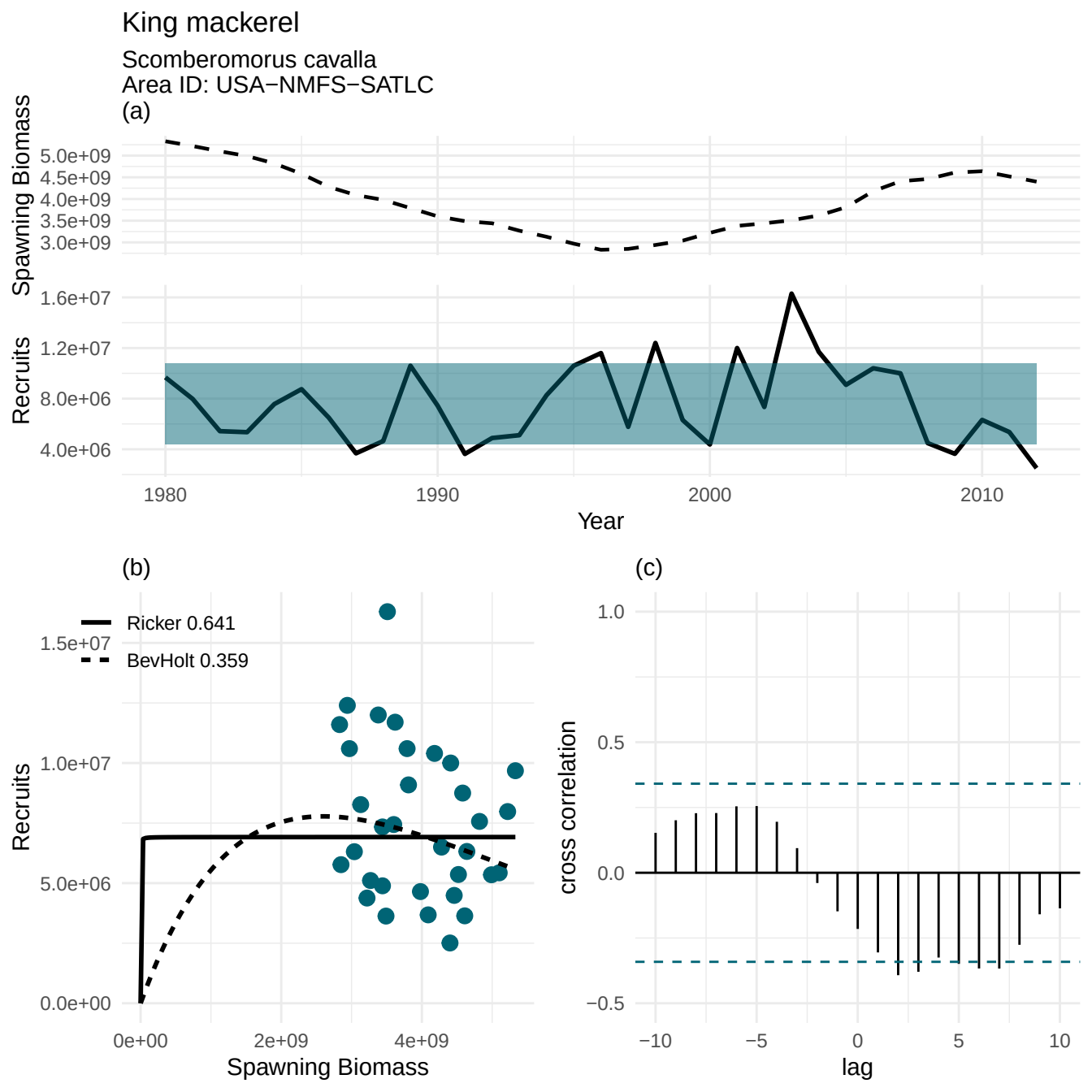

Japanese jack mackerel
Trachurus japonicus
Area ID: Japan−FAJ−PJPN
(a)
Spawning Biomass
60000
50000
40000
30000
20000
10000
Recruits
2.0e+09
1.5e+09
1.0e+09
5.0e+08
1990
2000
2010
2020
Year
(b)
Ricker 0.5
BevHolt 0.5
Recruits
2.0e+09
1.5e+09
1.0e+09
5.0e+08
0.0e+00
0
20000
40000
60000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.79
−10
−5
0
5
10
lag

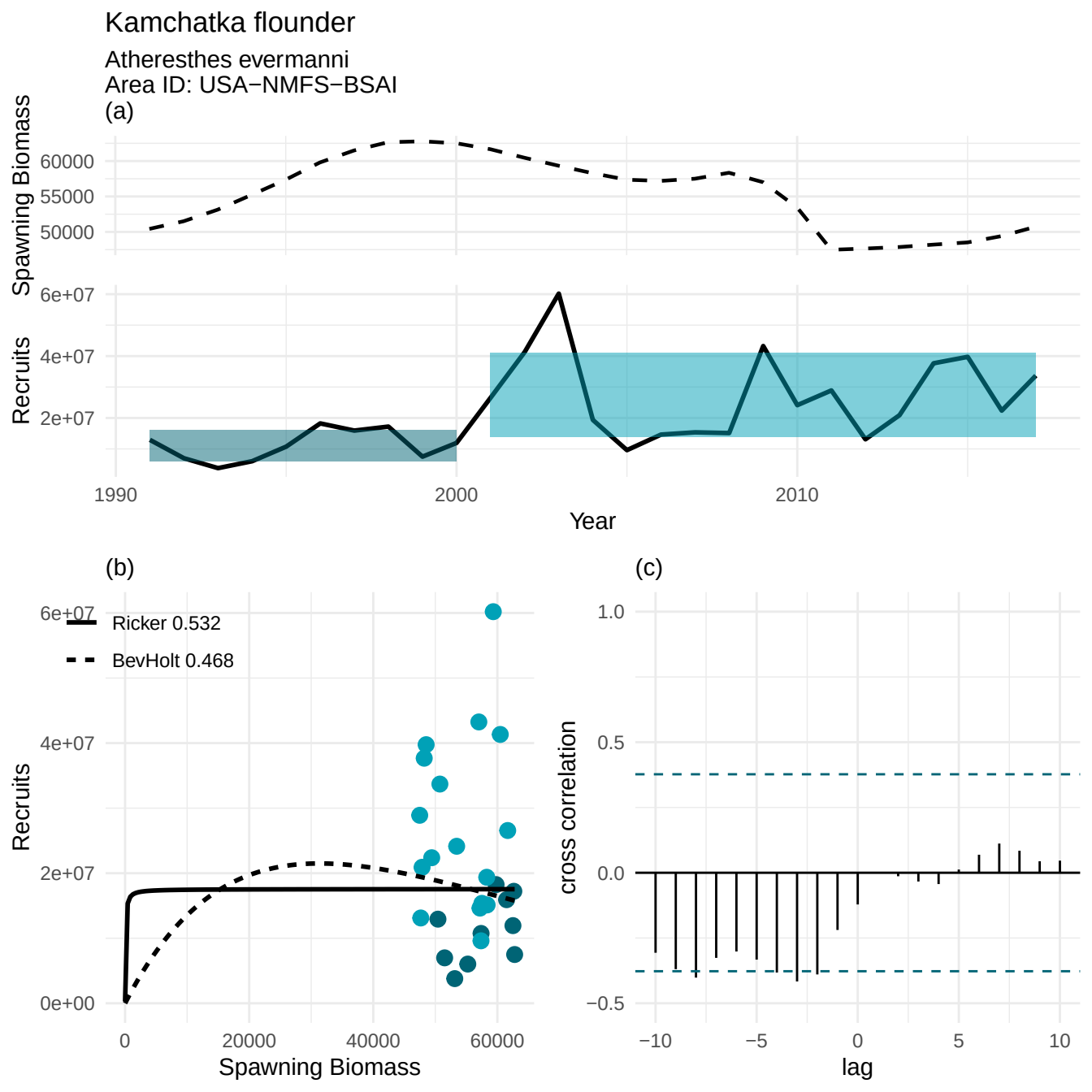

Japanese jack mackerel
Trachurus japonicus
Area ID: Japan−FAJ−TSST
(a)
Spawning Biomass
250000
200000
150000
100000
Recruits
7.5e+09
5.0e+09
2.5e+09
1980
1990
2000
2010
2020
Year
(b)
Ricker 0.539
BevHolt 0.461
Recruits
7.5e+09
5.0e+09
2.5e+09
0.0e+00
0e+00
1e+05
2e+05
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.63
0.31
−10
−5
0
5
10
lag

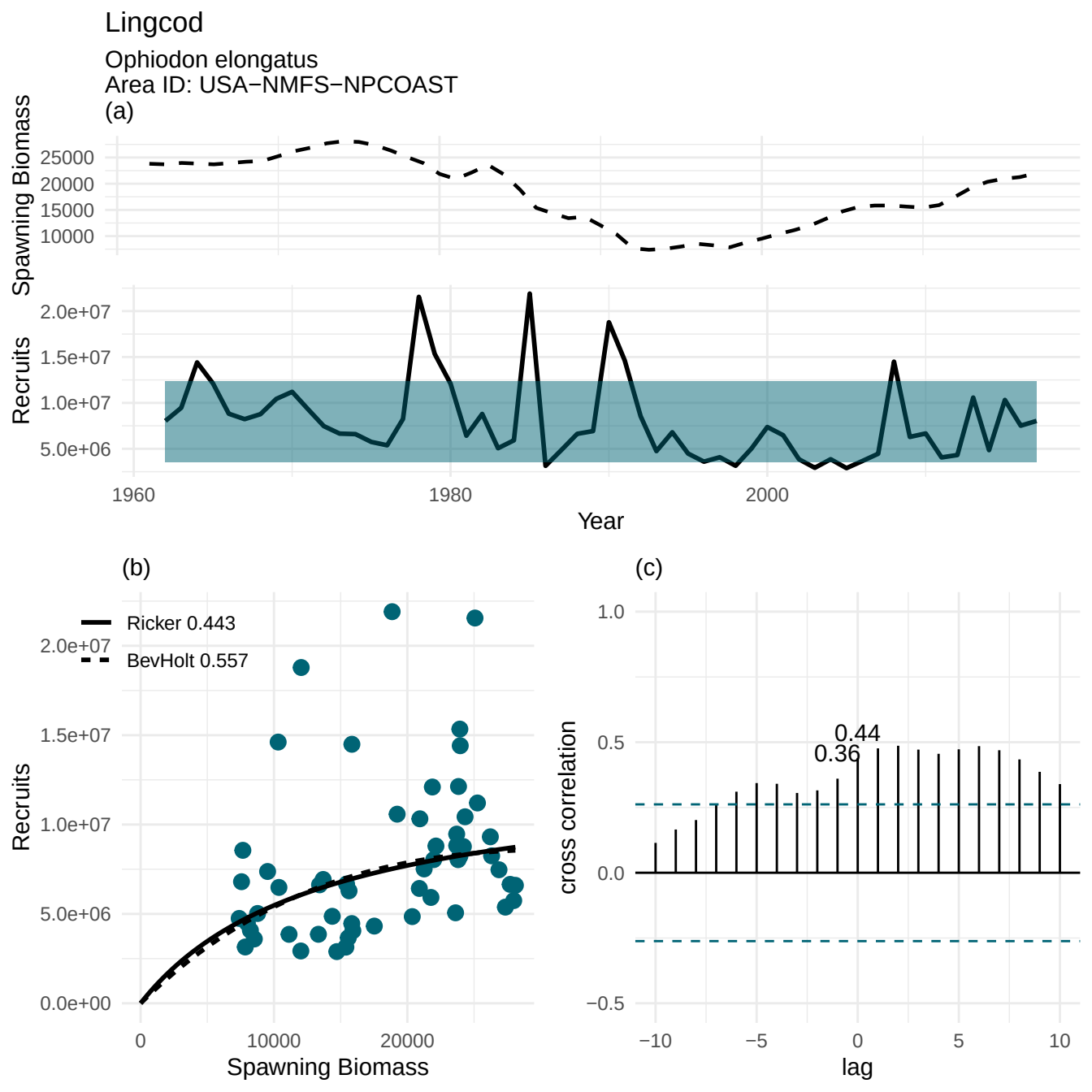

Japanese pufferfish
Takifugu rubripes
Area ID: Japan−FAJ−IMKB
(a)
Spawning Biomass
150
100
50
Recruits
9e+05
6e+05
3e+05
0e+00
1995
2000
2005
2010
Year
(b)
Ricker 1
BevHolt 0.000107
Recruits
9e+05
6e+05
3e+05
0e+00
0
50
100
150
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

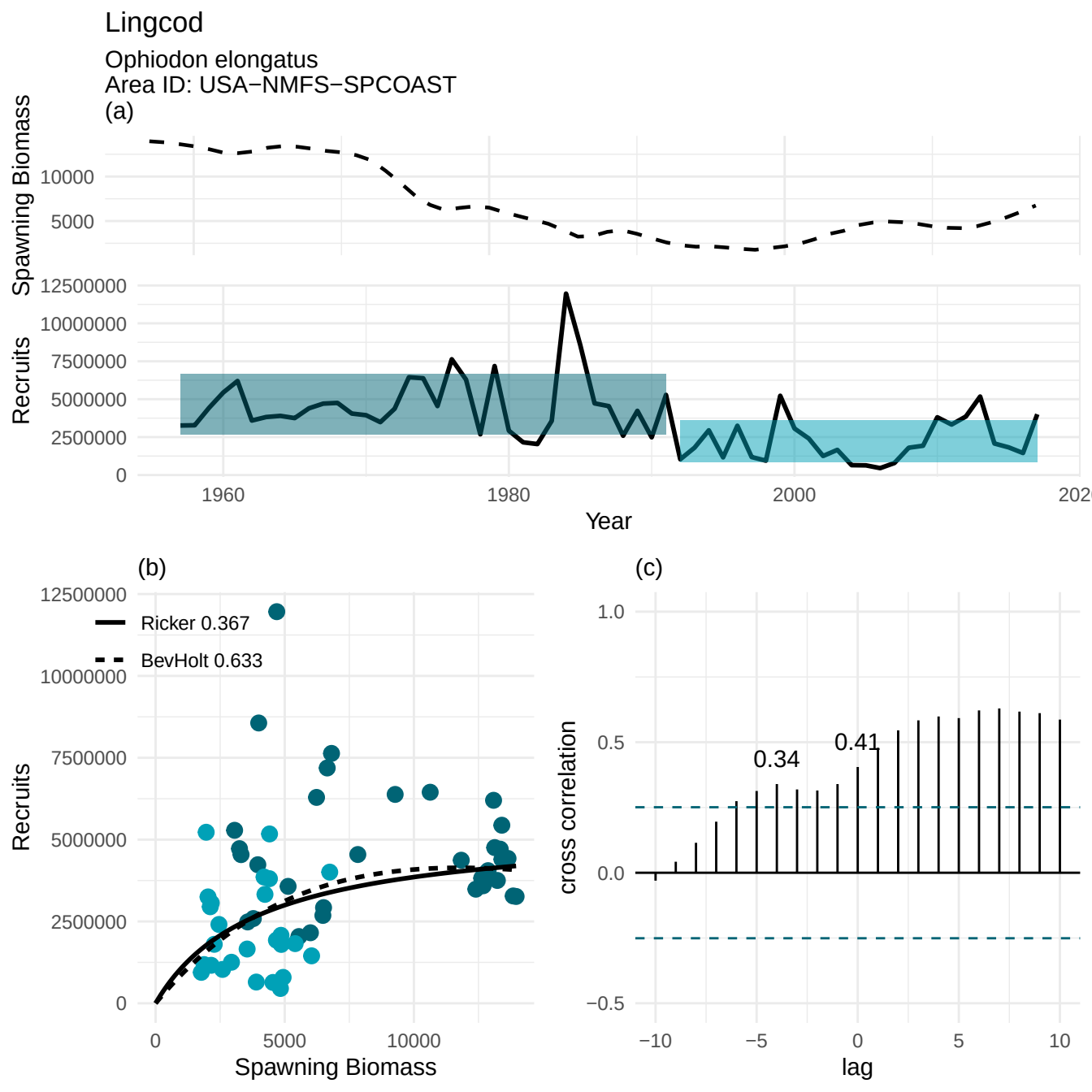

Kelp greenling
Hexagrammos decagrammus
Area ID: USA−NMFS−ORECOAST
(a)
Spawning Biomass
500
400
300
Recruits
3e+06
2e+06
1e+06
1980
1990
2000
2010
Year
(b)
Ricker 1
BevHolt 0.000132
Recruits
3e+06
2e+06
1e+06
0e+00
0
100
200
300
400
500
Spawning Biomass
(c)
1.0
0.5
0.0
−0.5
0.73
cross correlation
−10
−5
0
5
10
lag

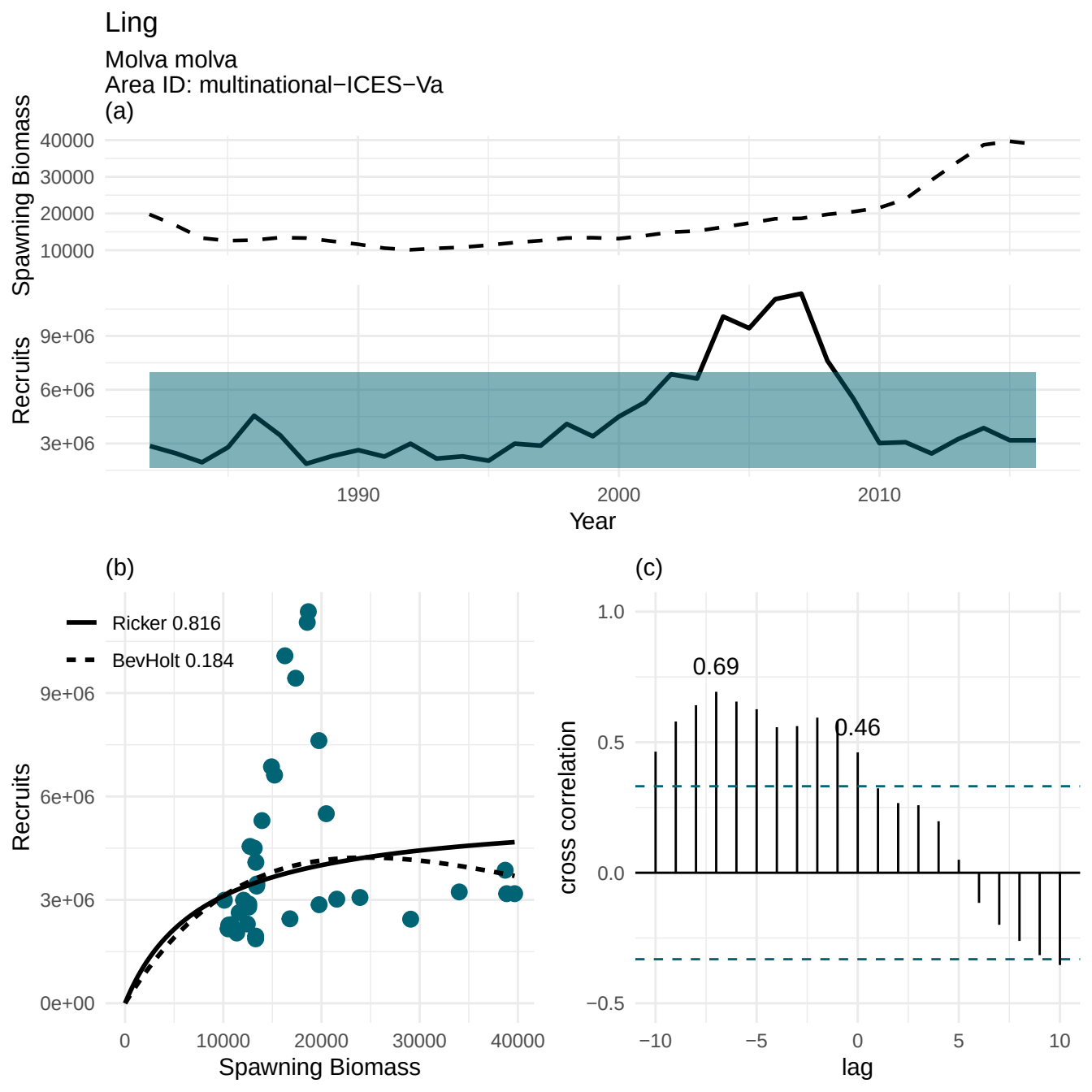

King mackerel
Scomberomorus cavalla
Area ID: USA−NMFS−GM
(a)
Spawning Biomass
2.4e+09
2.0e+09
1.6e+09
1.2e+09
Recruits
9e+06
6e+06
3e+06
1970
1980
1990
2000
2010
Year
(b)
Ricker 1
BevHolt 8.04e−06
9e+06
6e+06
3e+06
0e+00
Recruits
0e+00
1e+09
2e+09
Spawning Biomass
(c)
1.0
0.5
0.0
−0.5
0.46
cross correlation
−10
−5
0
5
10
lag

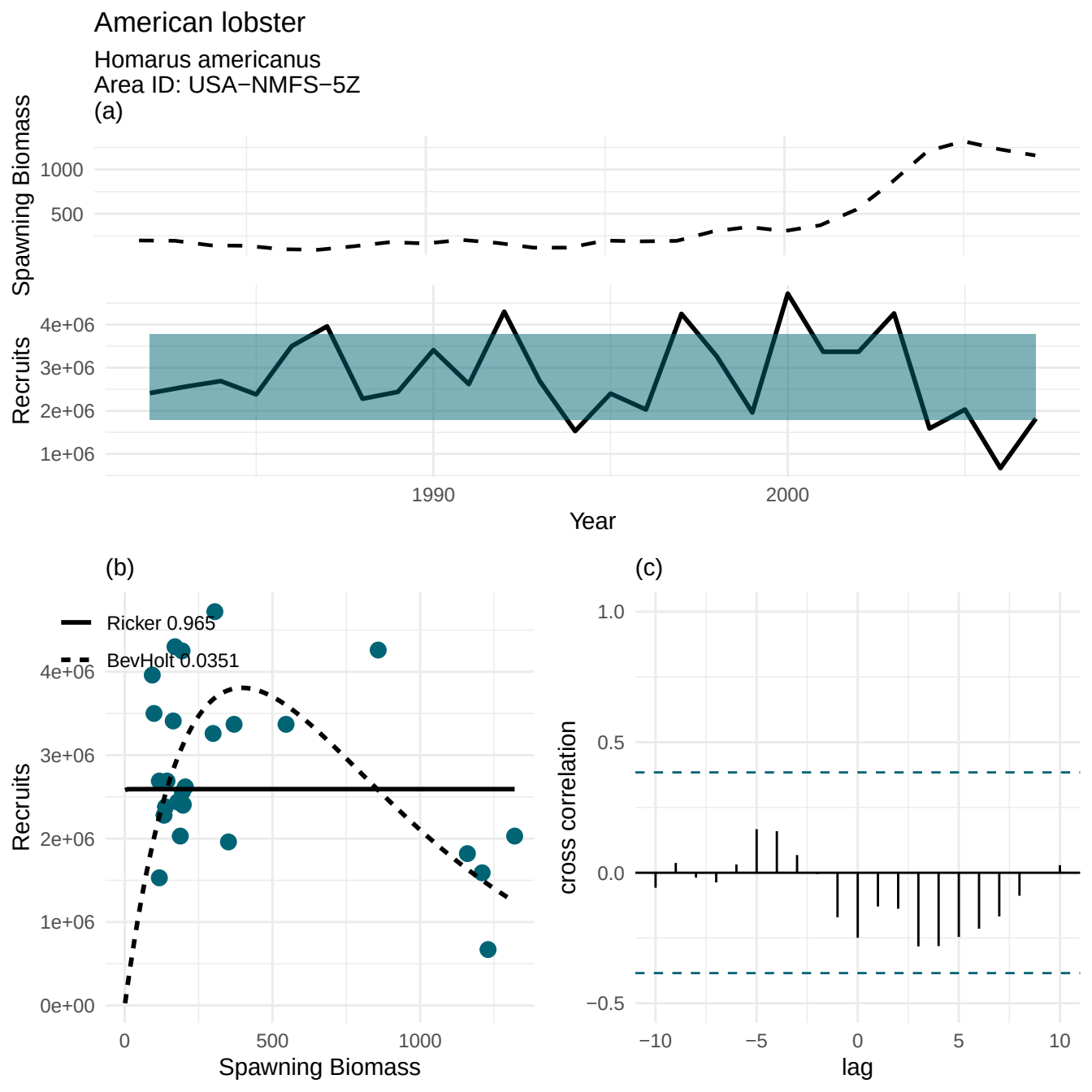

King mackerel
Scomberomorus cavalla
Area ID: USA−NMFS−SATLC
(a)
Spawning Biomass
5.0e+09
4.5e+09
4.0e+09
3.5e+09
3.0e+09
Recruits
1.6e+07
1.2e+07
8.0e+06
4.0e+06
1980
1990
2000
2010
Year
(b)
Ricker 0.641
BevHolt 0.359
Recruits
1.5e+07
1.0e+07
5.0e+06
0.0e+00
0e+00
2e+09
4e+09
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

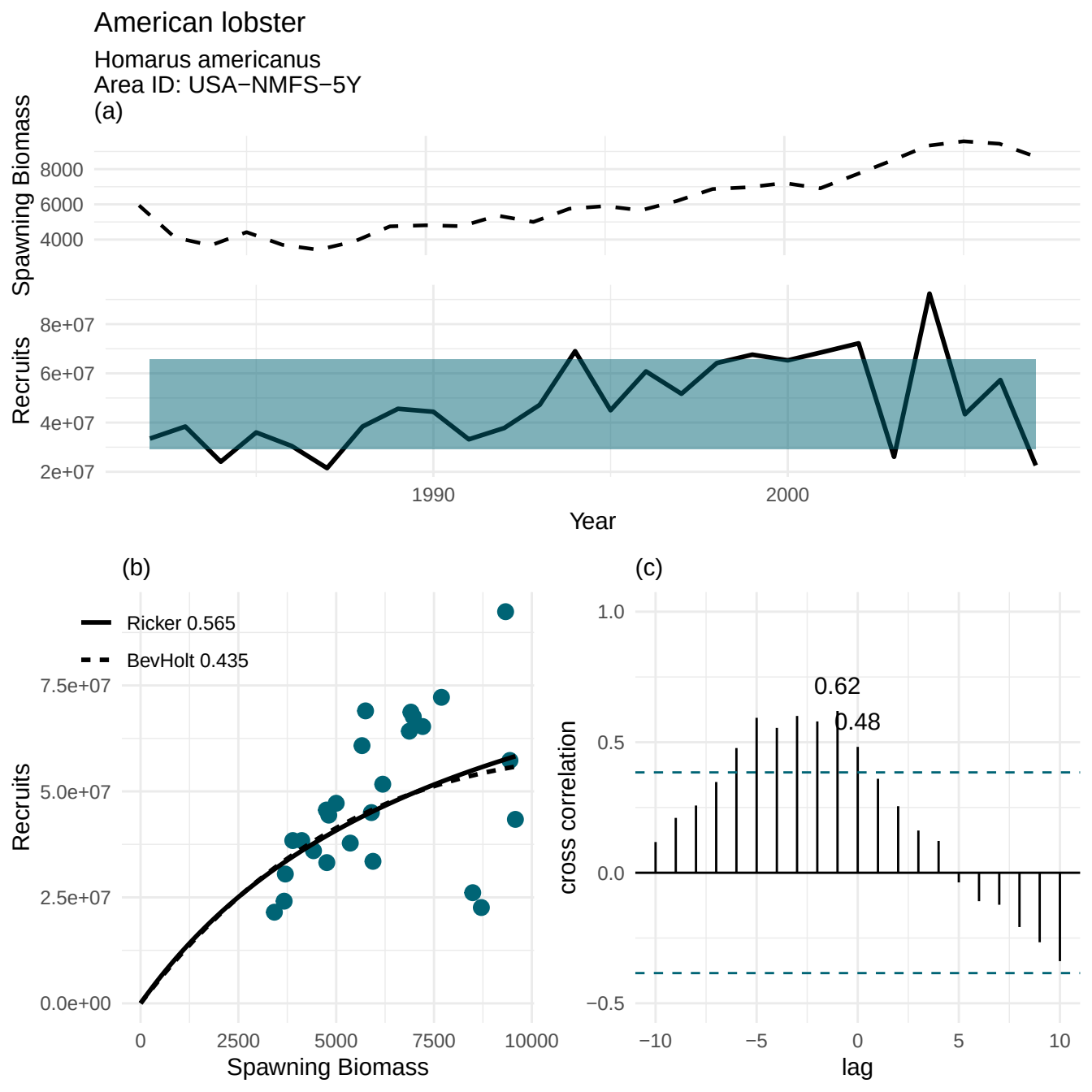

Kamchatka flounder
Atheresthes evermanni
Area ID: USA−NMFS−BSAI
(a)
Spawning Biomass
60000
55000
50000
Recruits
6e+07
4e+07
2e+07
1990
2000
2010
Year
(b)
Ricker 0.532
BevHolt 0.468
Recruits
6e+07
4e+07
2e+07
0e+00
0
20000
40000
60000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

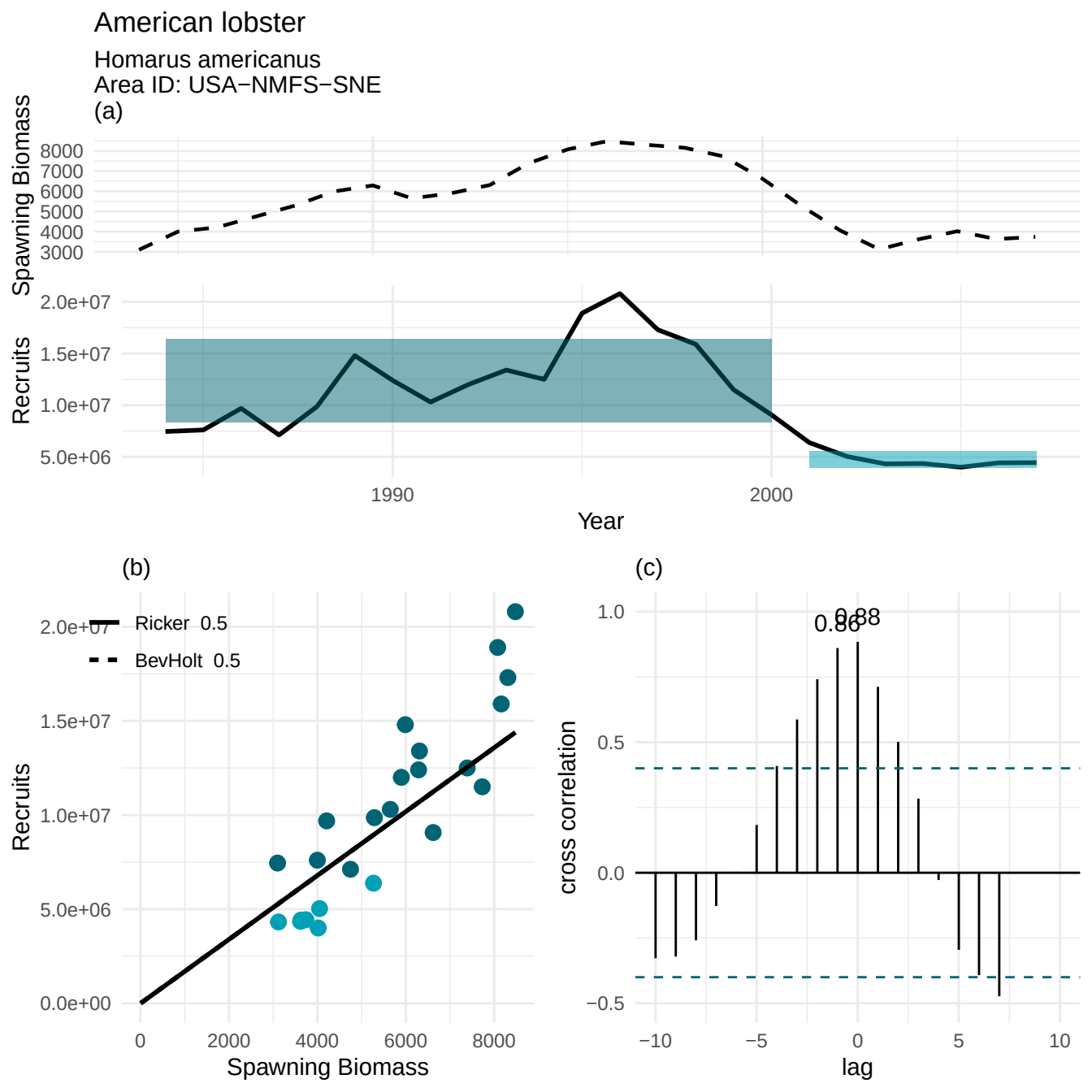

Lingcod
Ophiodon elongatus
Area ID: USA−NMFS−NPCOAST
(a)
Spawning Biomass
25000
20000
15000
10000
Recruits
2.0e+07
1.5e+07
1.0e+07
5.0e+06
1960
1980
2000
Year
(b)
Ricker 0.443
BevHolt 0.557
Recruits
2.0e+07
1.5e+07
1.0e+07
5.0e+06
0.0e+00
0
10000
20000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.44
0.36
−10
−5
0
5
10
lag

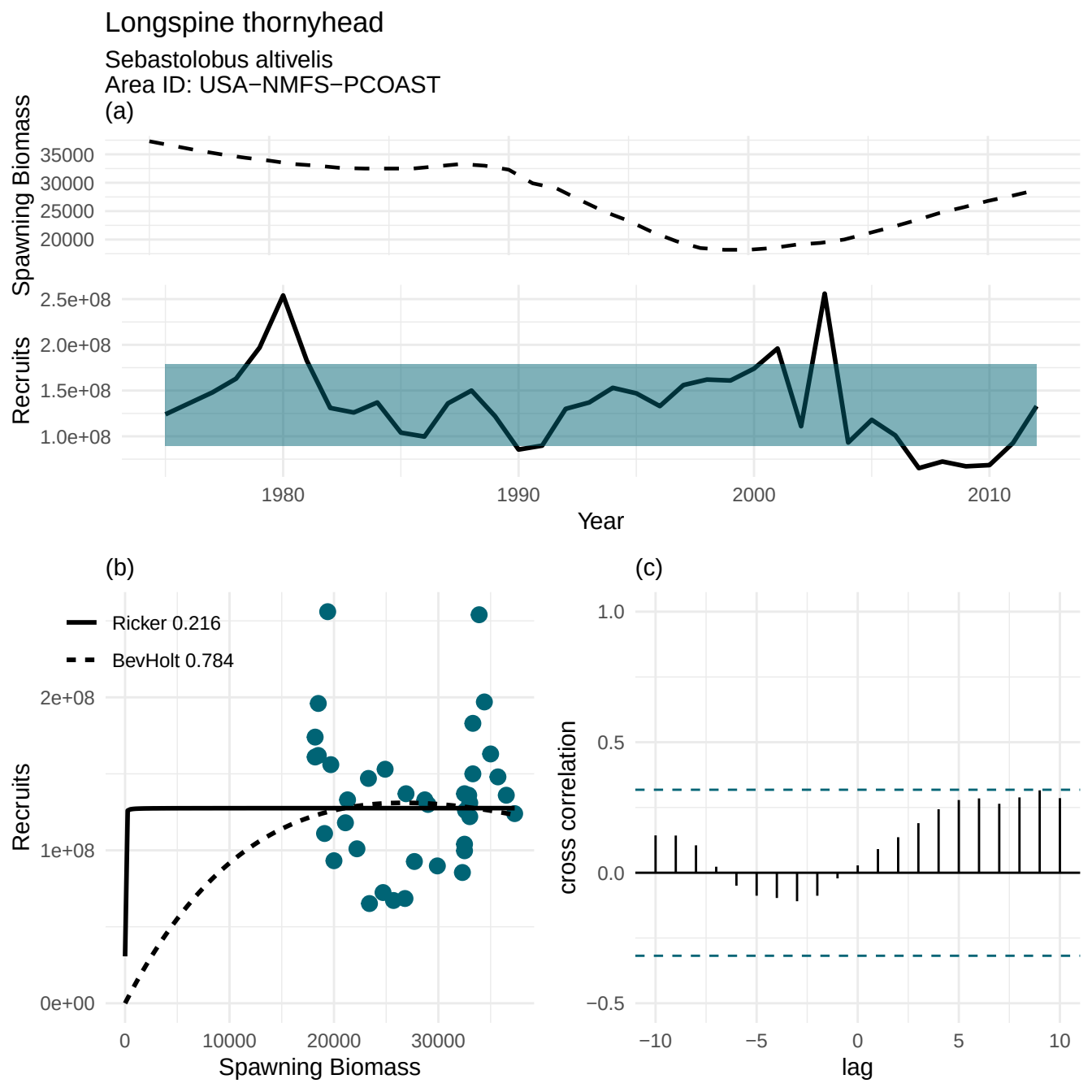

Lingcod
Ophiodon elongatus
Area ID: USA−NMFS−SPCOAST
(a)
Spawning Biomass
10000
5000
Recruits
12500000
10000000
7500000
5000000
2500000
0
1960
1980
2000
Year
(b)
Ricker 0.367
BevHolt 0.633
Recruits
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.34
0.41
−10
−5
0
5
10
lag

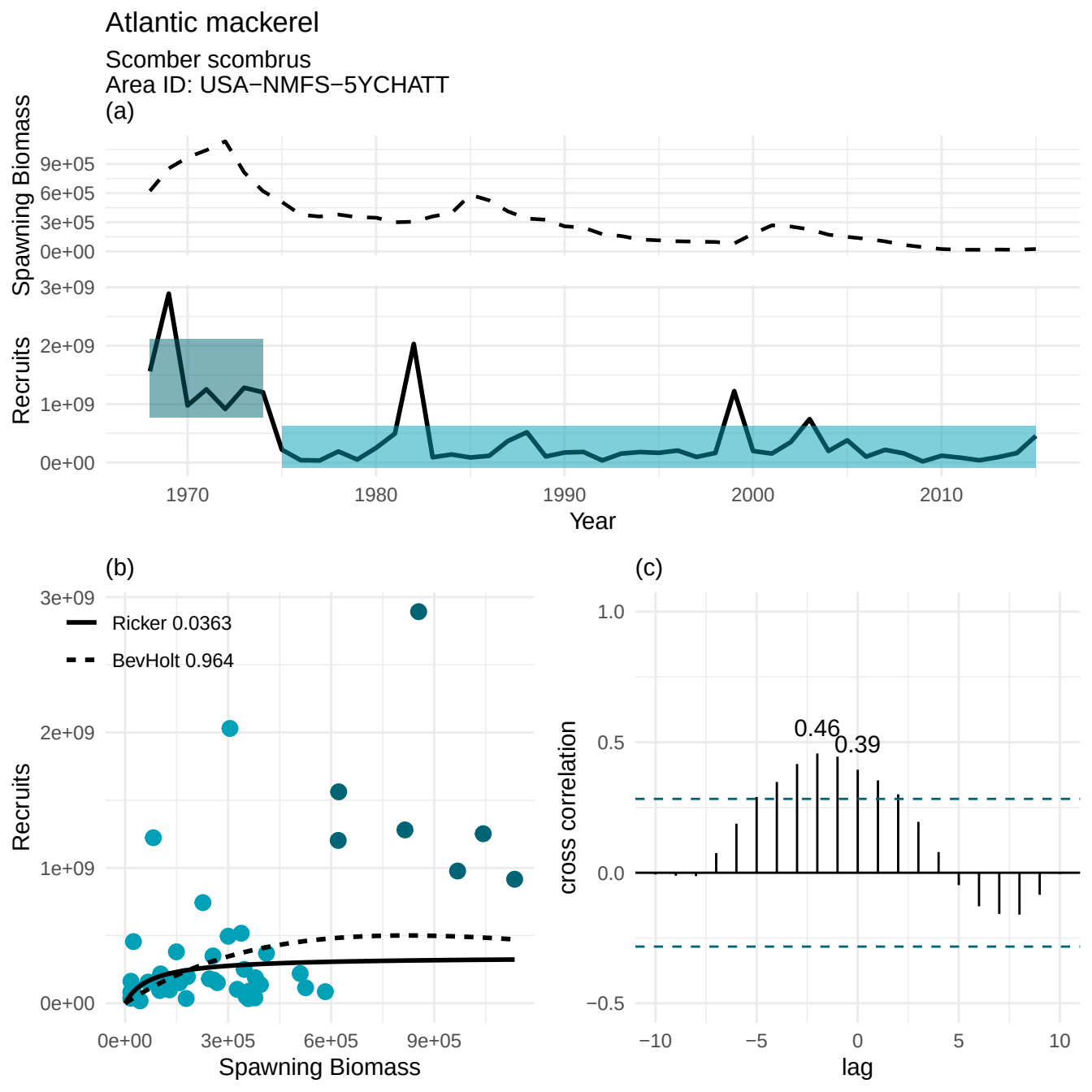

Ling
Molva molva
Area ID: multinational−ICES−Va
(a)
Spawning Biomass
40000
30000
20000
10000
Recruits
9e+06
6e+06
3e+06
1990
2000
2010
Year
(b)
Ricker 0.816
BevHolt 0.184
Recruits
9e+06
6e+06
3e+06
0e+00
0
10000
20000
30000
40000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.69
0.46
−10
−5
0
5
10
lag

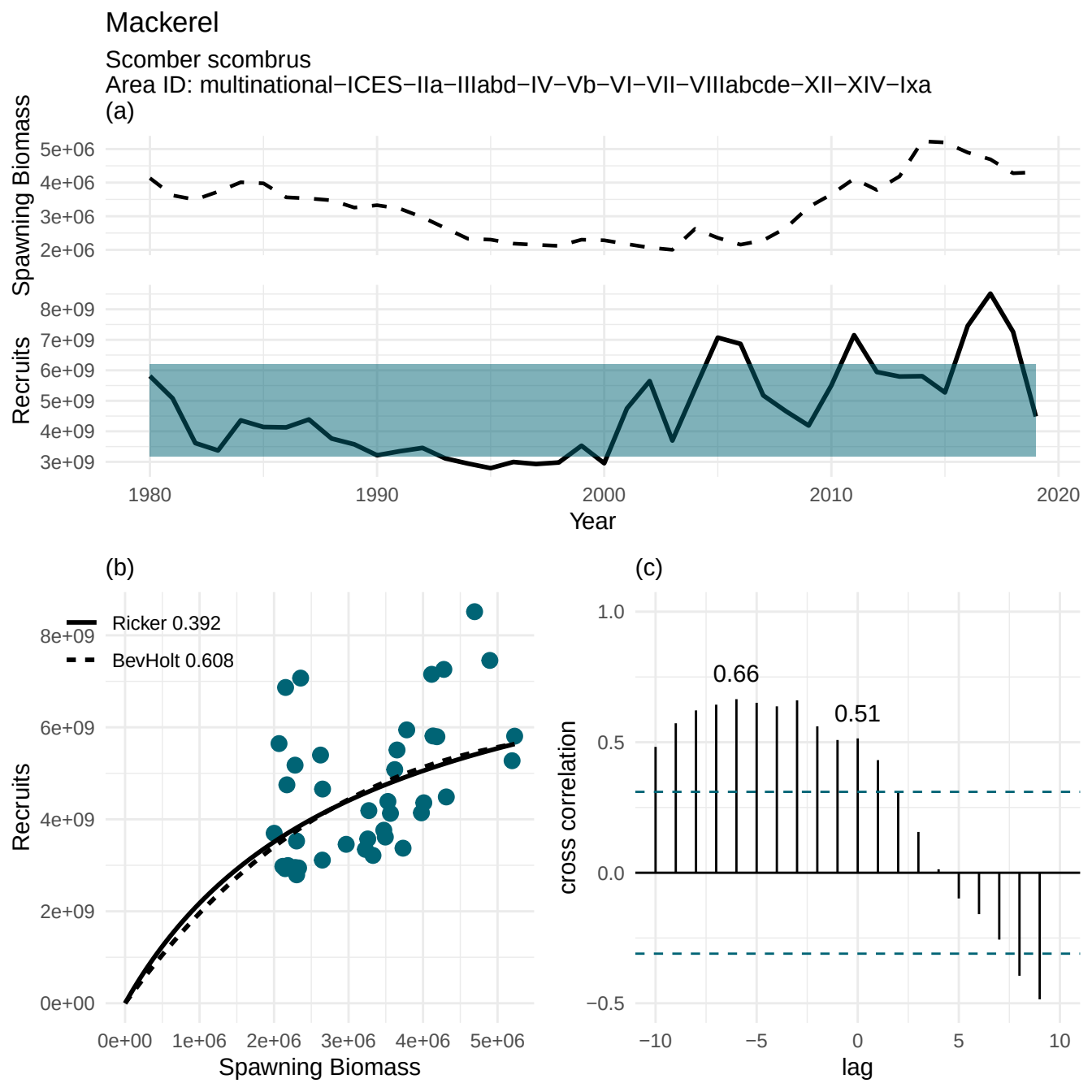

American lobster
Homarus americanus
Area ID: USA−NMFS−5Z
(a)
Spawning Biomass
1000
500
Recruits
4e+06
3e+06
2e+06
1e+06
1990
2000
Year
(b)
Ricker 0.965
BevHolt 0.0351
Recruits
4e+06
3e+06
2e+06
1e+06
0e+00
0
500
1000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

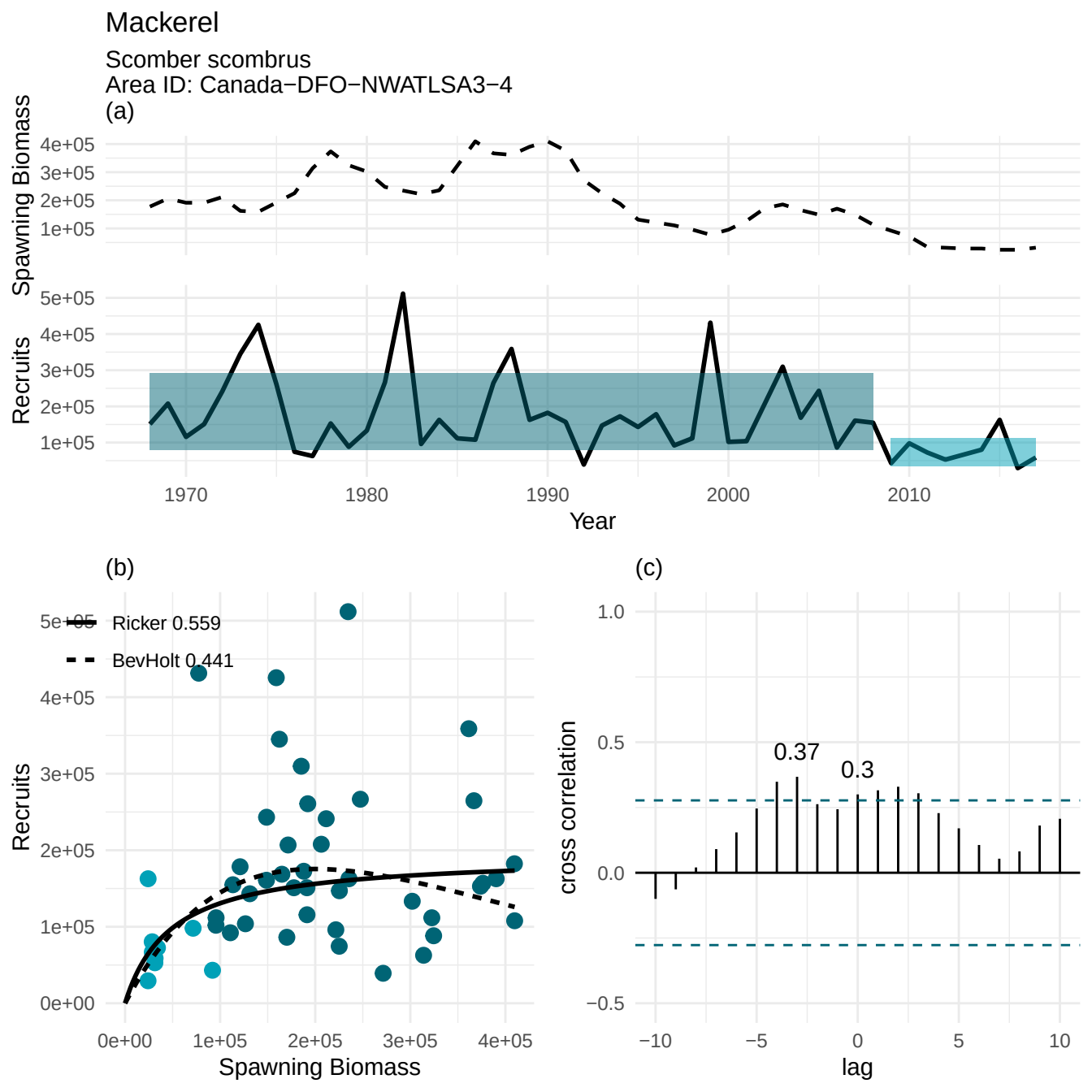

American lobster
Homarus americanus
Area ID: USA−NMFS−5Y
(a)
Spawning Biomass
8000
6000
4000
Recruits
8e+07
6e+07
4e+07
2e+07
1990
2000
Year
(b)
Ricker 0.565
BevHolt 0.435
7.5e+07
5.0e+07
2.5e+07
0.0e+00
Recruits
0
2500
5000
7500
10000
Spawning Biomass
(c)
1.0
0.5
0.0
−0.5
0.62
0.48
cross correlation
−10
−5
0
5
10
lag

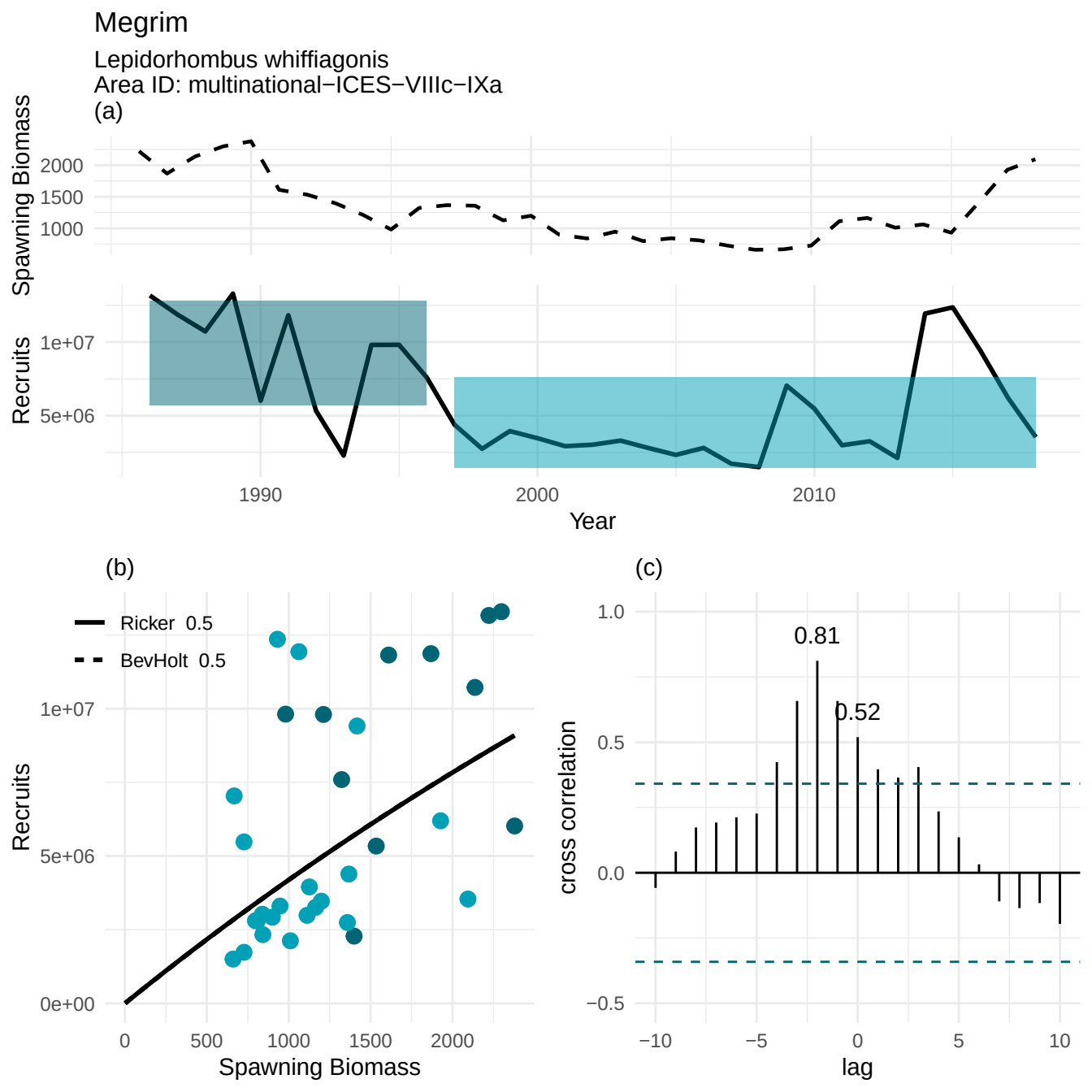

American lobster
Homarus americanus
Area ID: USA−NMFS−SNE
(a)
Spawning Biomass
8000
7000
6000
5000
4000
3000
Recruits
2.0e+07
1.5e+07
1.0e+07
5.0e+06
1990
2000
Year
(b)
Ricker 0.5
BevHolt 0.5
Recruits
2.0e+07
1.5e+07
1.0e+07
5.0e+06
0.0e+00
0
2000
4000
6000
8000
Spawning Biomass
(c)
0.88
0.86
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

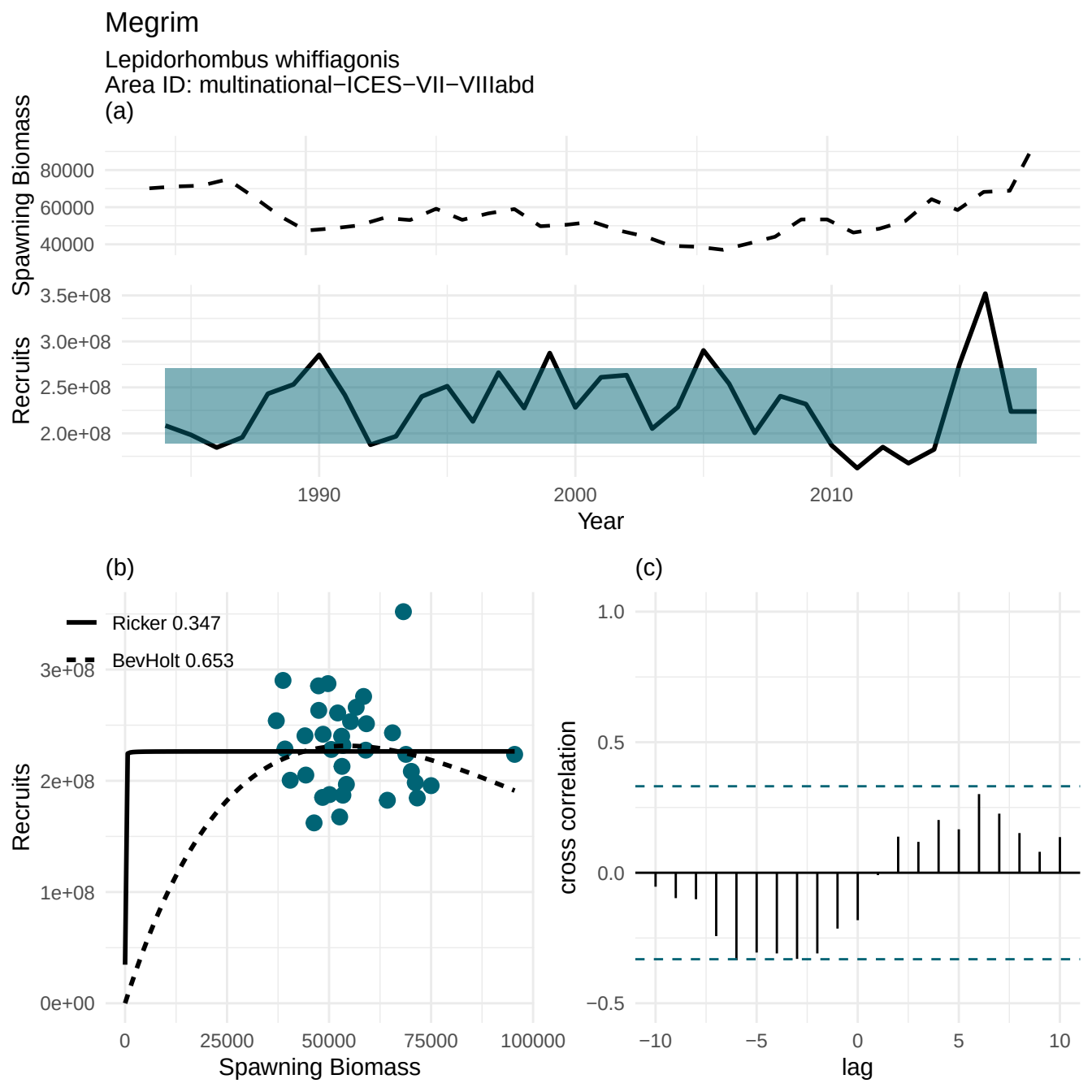

Longspine thornyhead
Sebastolobus altivelis
Area ID: USA−NMFS−PCOAST
(a)
Spawning Biomass
35000
30000
25000
20000
Recruits
2.5e+08
2.0e+08
1.5e+08
1.0e+08
1980
1990
2000
2010
Year
(b)
Ricker 0.216
BevHolt 0.784
Recruits
2e+08
1e+08
0e+00
0
10000
20000
30000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

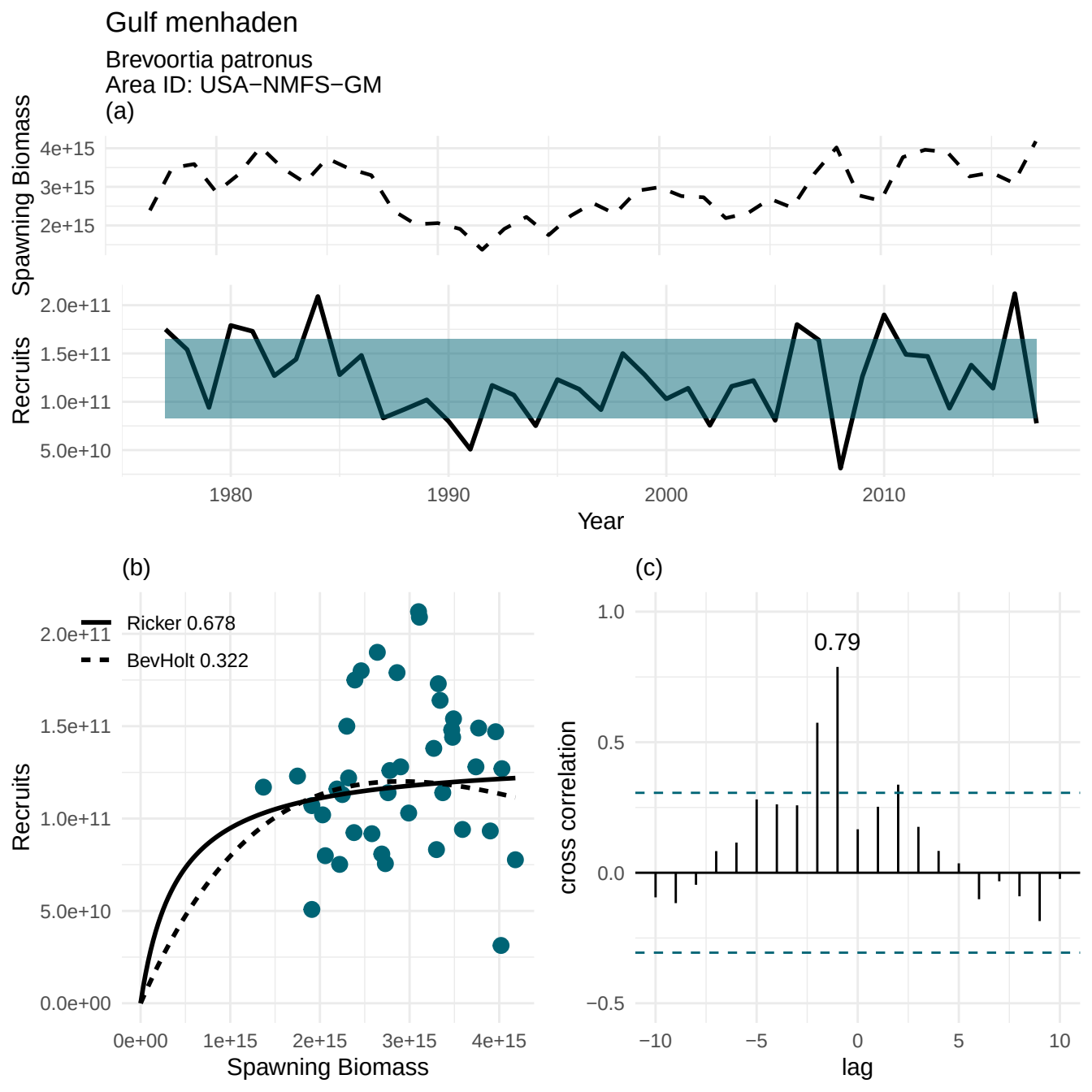

Atlantic mackerel
Scomber scombrus
Area ID: USA−NMFS−5YCHATT
(a)
Spawning Biomass
9e+05
6e+05
3e+05
0e+00
Recruits
3e+09
2e+09
1e+09
0e+00
1970
1980
1990
2000
2010
Year
(b)
Ricker 0.0363
BevHolt 0.964
Recruits
3e+09
2e+09
1e+09
0e+00
0e+00
3e+05
6e+05
9e+05
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.46
0.39
−10
−5
0
5
10
lag

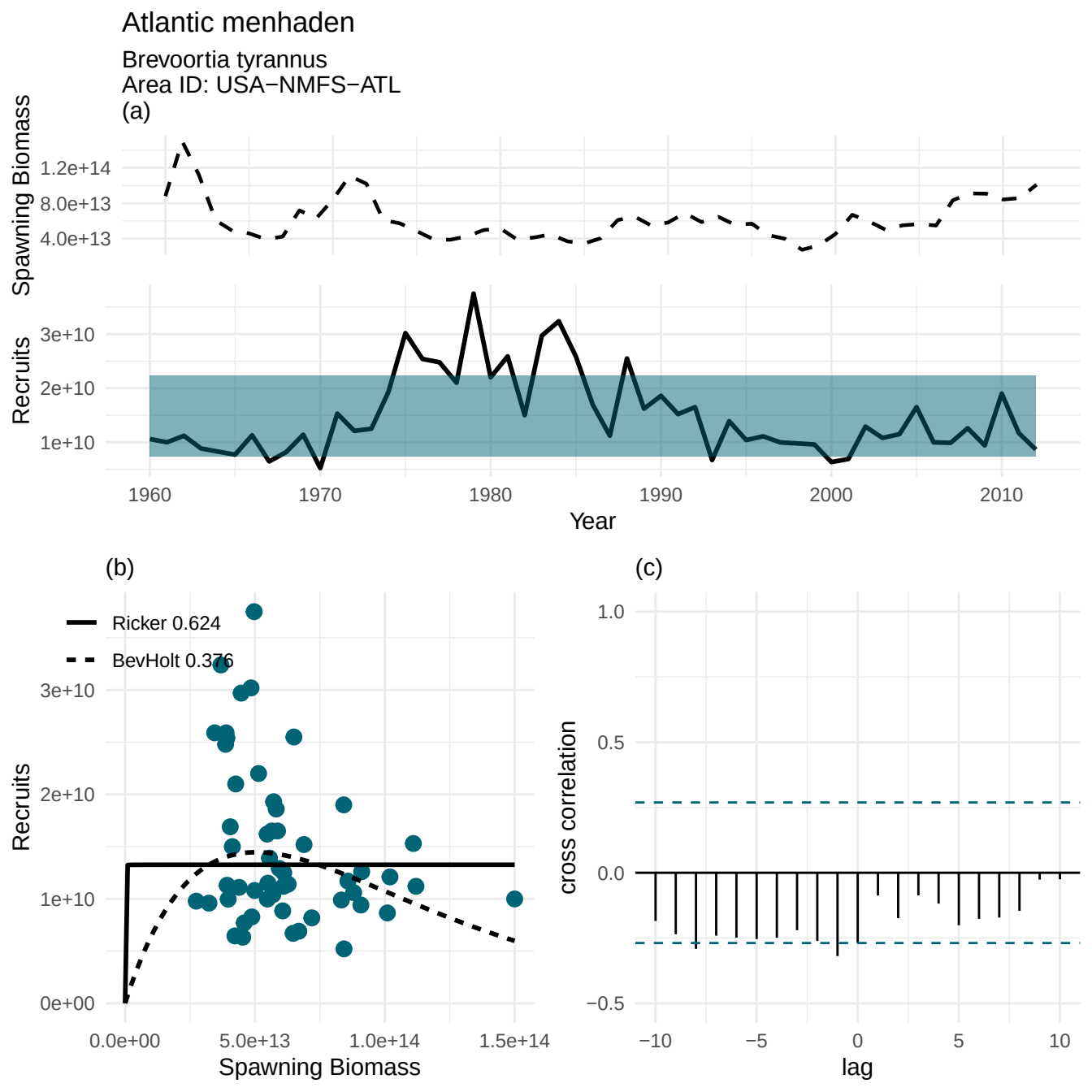

Mackerel
Scomber scombrus
Area ID: multinational−ICES−IIa−IIIabd−IV−Vb−VI−VII−VIIIabcde−XII−XIV−Ixa
(a)
Spawning Biomass
5e+06
4e+06
3e+06
2e+06
Recruits
8e+09
7e+09
6e+09
5e+09
4e+09
3e+09
1980
1990
2000
2010
2020
Year
(b)
Ricker 0.392
BevHolt 0.608
Recruits
8e+09
6e+09
4e+09
2e+09
0e+00
0e+00
1e+06
2e+06
3e+06
4e+06
5e+06
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.66
0.51
−10
−5
0
5
10
lag

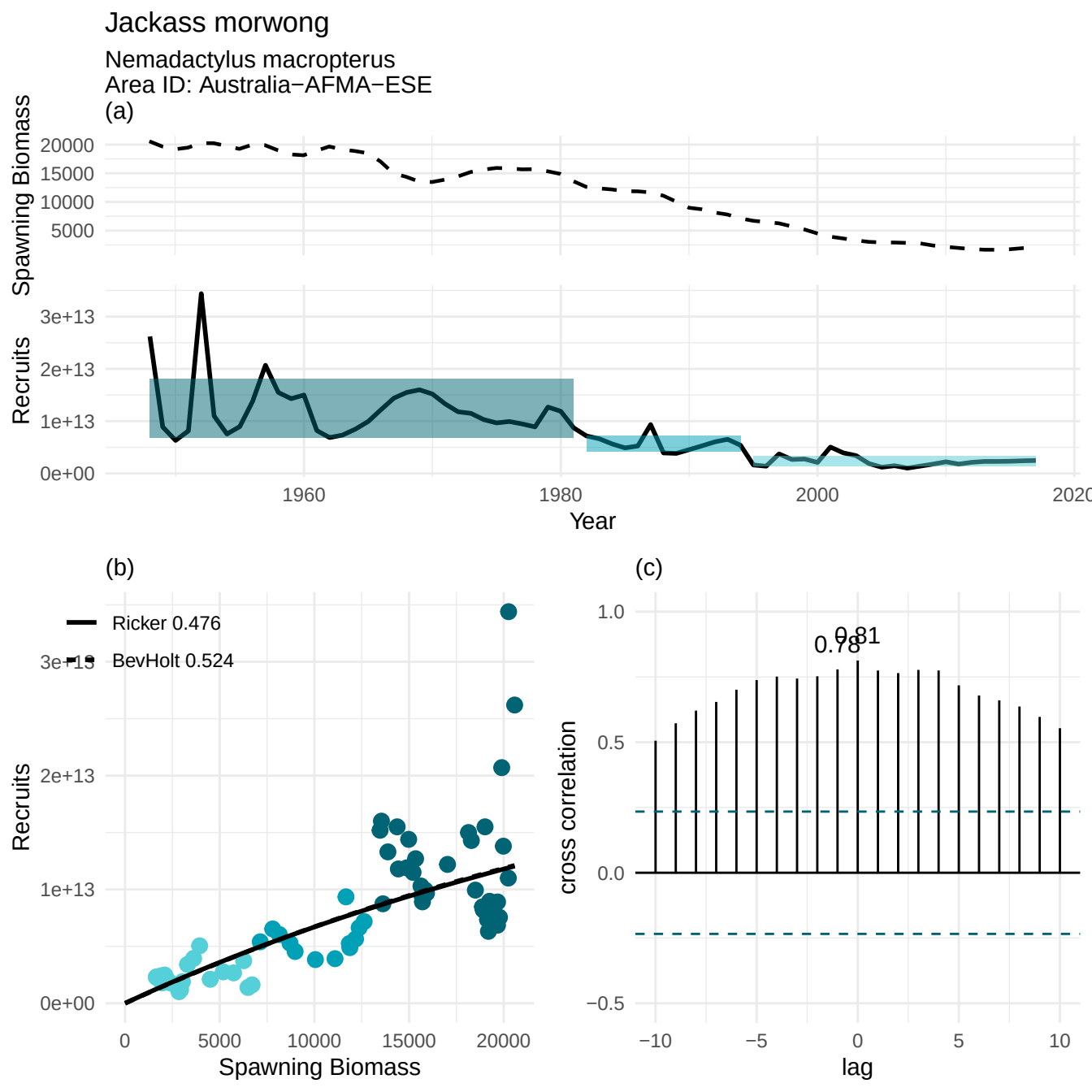

Mackerel
Scomber scombrus
Area ID: Canada−DFO−NWATLSA3−4
(a)
Spawning Biomass
4e+05
3e+05
2e+05
1e+05
Recruits
5e+05
4e+05
3e+05
2e+05
1e+05
1970
1980
1990
2000
2010
Year
(b)
Ricker 0.559
BevHolt 0.441
Recruits
Spawning Biomass
0e+00
1e+05
2e+05
3e+05
4e+05
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.37
0.3
−10
−5
0
5
10
lag

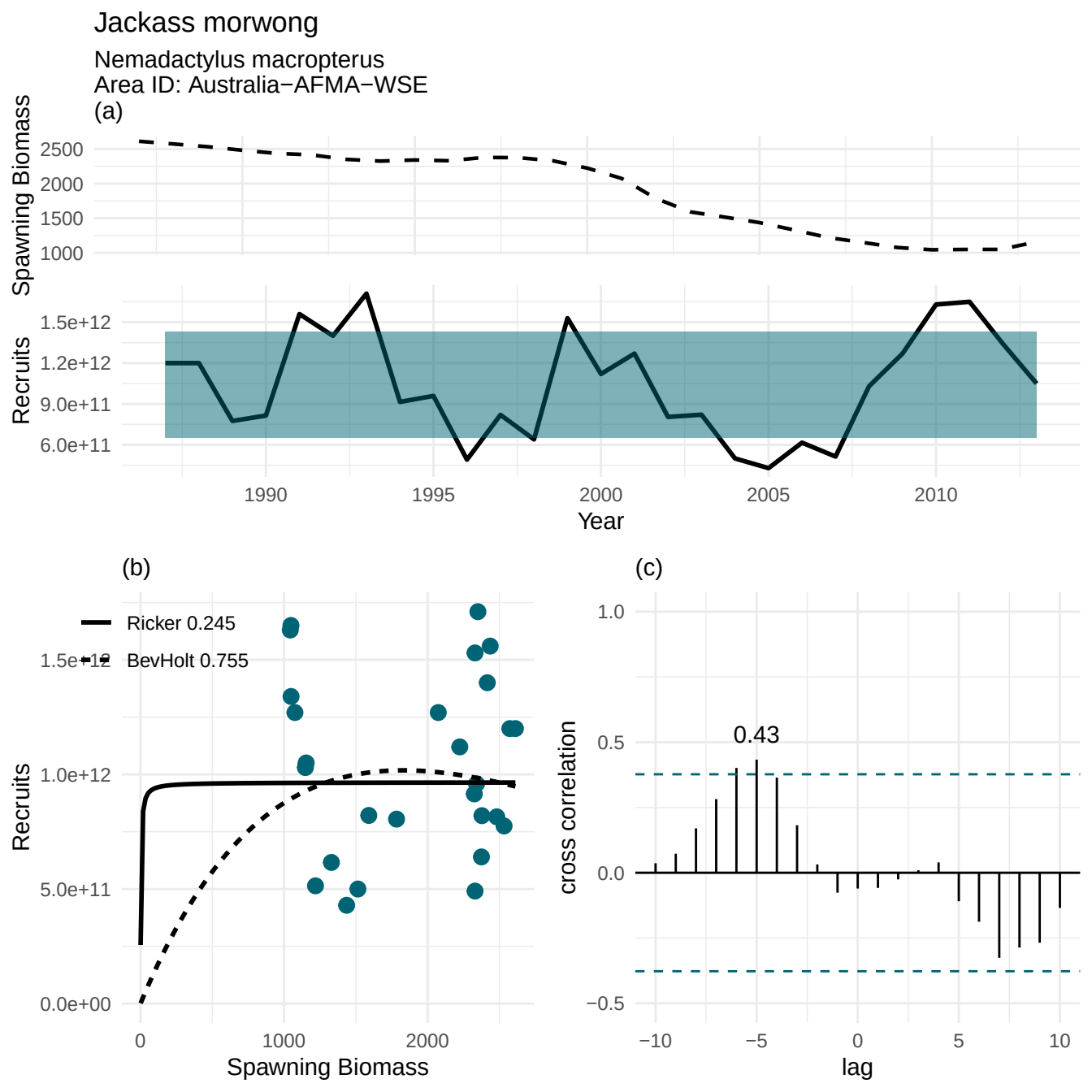

Megrim
Lepidorhombus whiffiagonis
Area ID: multinational−ICES−VIIIc−IXa
(a)
Spawning Biomass
2000
1500
1000
Recruits
1e+07
5e+06
1990
2000
2010
Year
(b)
Ricker 0.5
BevHolt 0.5
Recruits
1e+07
5e+06
0e+00
0
500
1000
1500
2000
Spawning Biomass
(c)
1.0
0.5
0.0
−0.5
0.81
0.52
cross correlation
−10
−5
0
5
10
lag

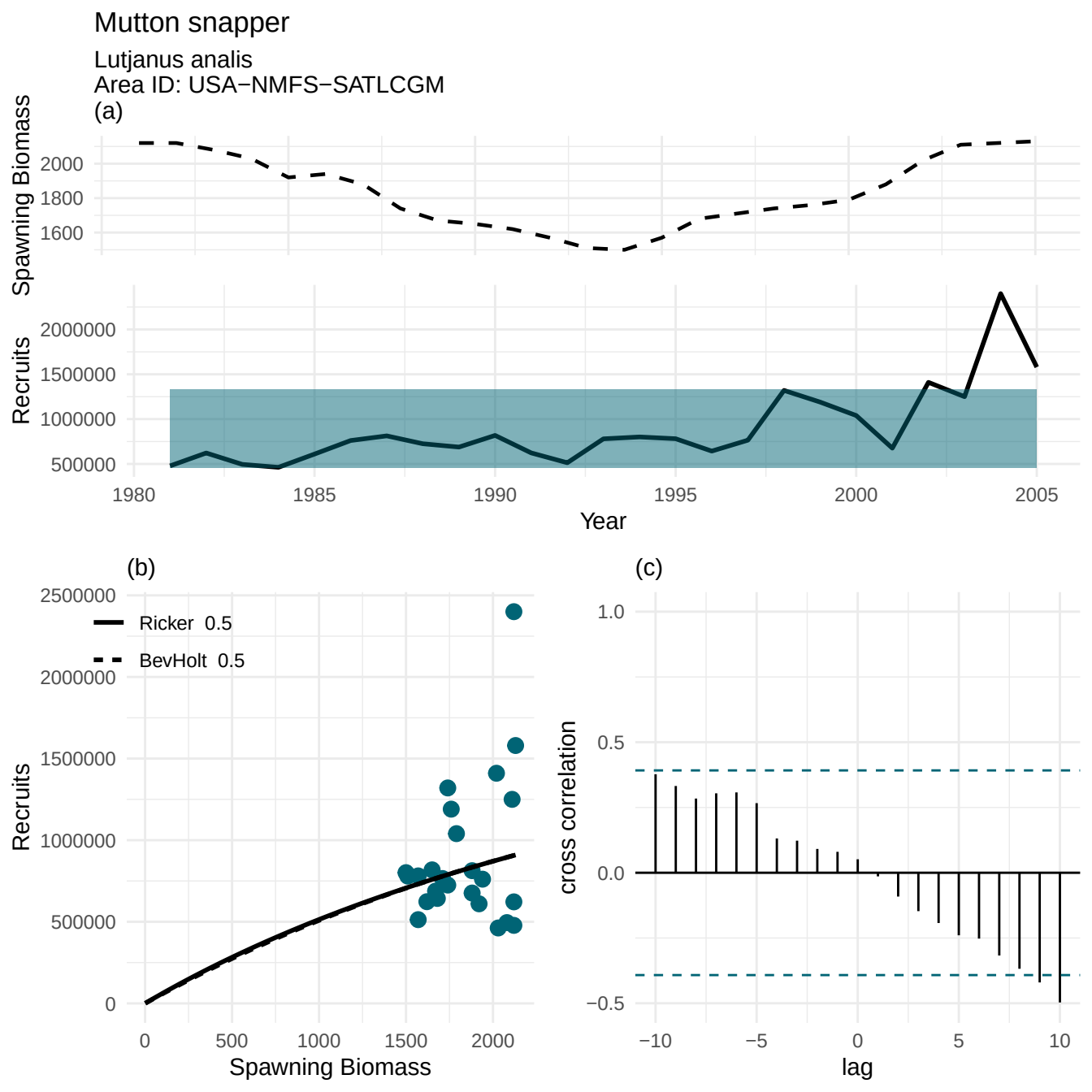

Megrim
Lepidorhombus whiffiagonis
Area ID: multinational−ICES−VII−VIIIabd
(a)
Spawning Biomass
80000
60000
40000
Recruits
3.5e+08
3.0e+08
2.5e+08
2.0e+08
1990
2000
2010
Year
(b)
Ricker 0.347
BevHolt 0.653
Recruits
3e+08
2e+08
1e+08
0e+00
0
25000
50000
75000
100000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

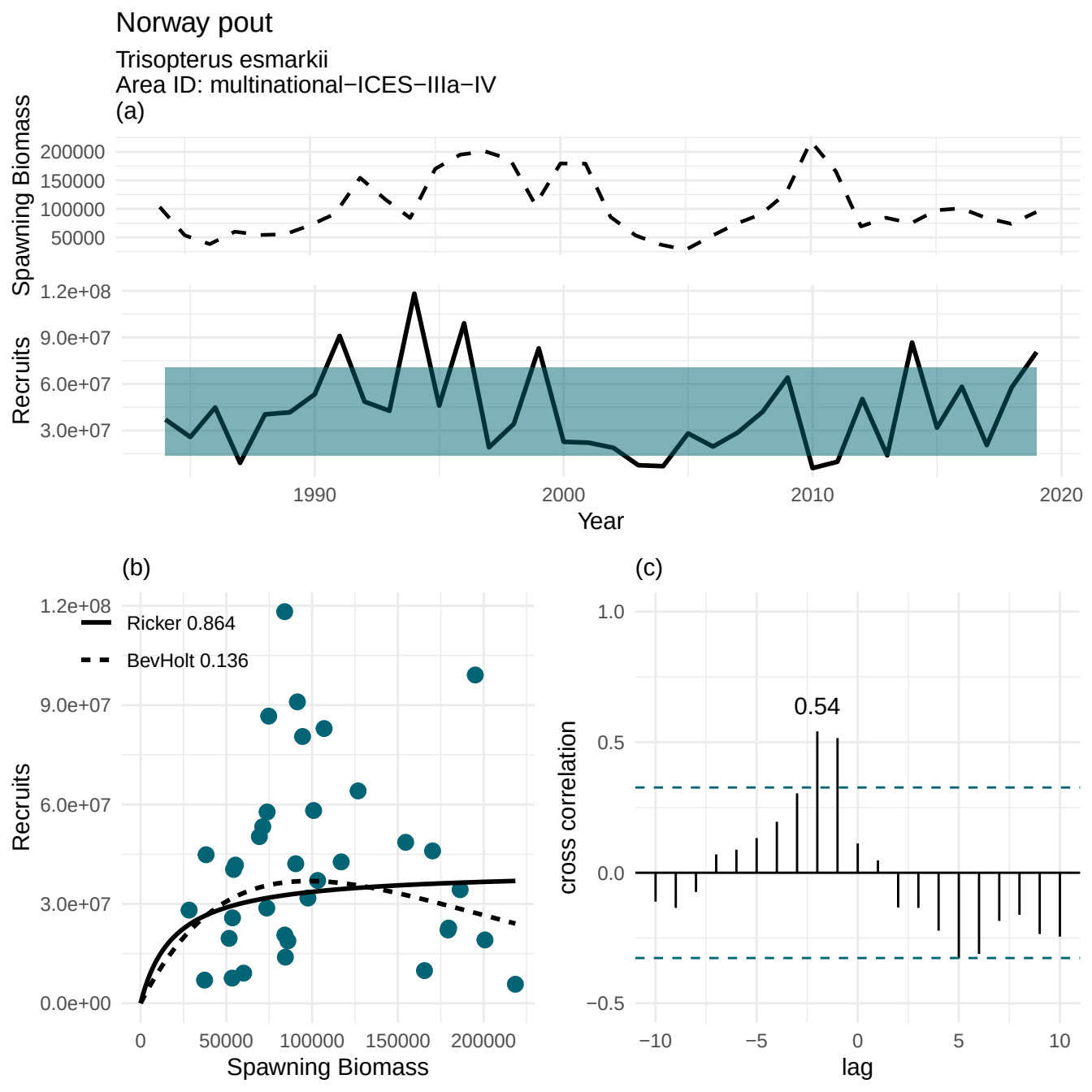

Gulf menhaden
Brevoortia patronus
Area ID: USA−NMFS−GM
(a)
Spawning Biomass
4e+15
3e+15
2e+15
Recruits
2.0e+11
1.5e+11
1.0e+11
5.0e+10
1980
1990
2000
2010
Year
(b)
Ricker 0.678
BevHolt 0.322
Recruits
2.0e+11
1.5e+11
1.0e+11
5.0e+10
0.0e+00
0e+00
1e+15
2e+15
3e+15
4e+15
Spawning Biomass
(c)
0.79
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

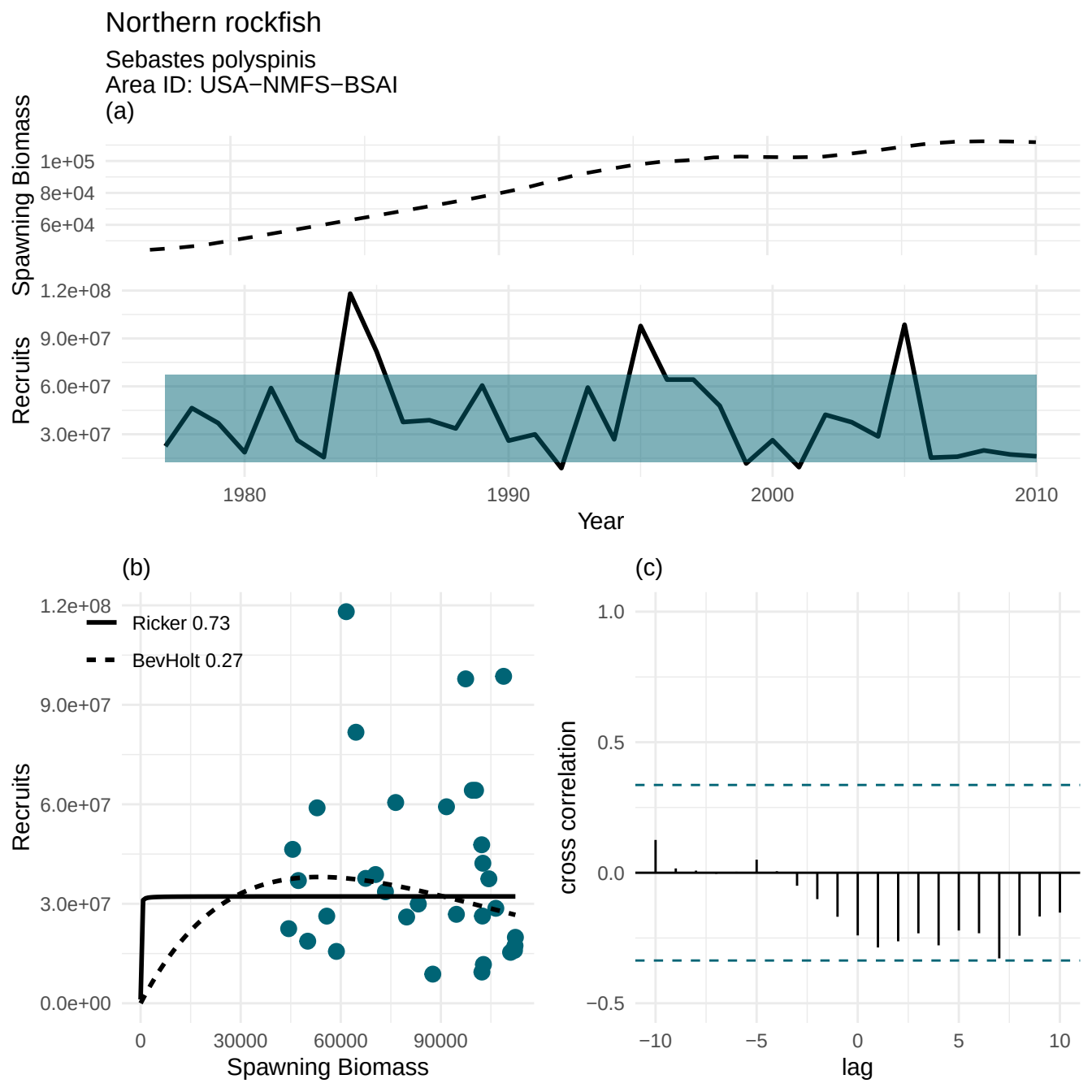

Atlantic menhaden
Brevoortia tyrannus
Area ID: USA−NMFS−ATL
(a)
Spawning Biomass
1.2e+14
8.0e+13
4.0e+13
Recruits
3e+10
2e+10
1e+10
1960
1970
1980
1990
2000
2010
Year
(b)
Ricker 0.624
BevHolt 0.376
Recruits
3e+10
2e+10
1e+10
0e+00
0.0e+00
5.0e+13
1.0e+14
1.5e+14
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

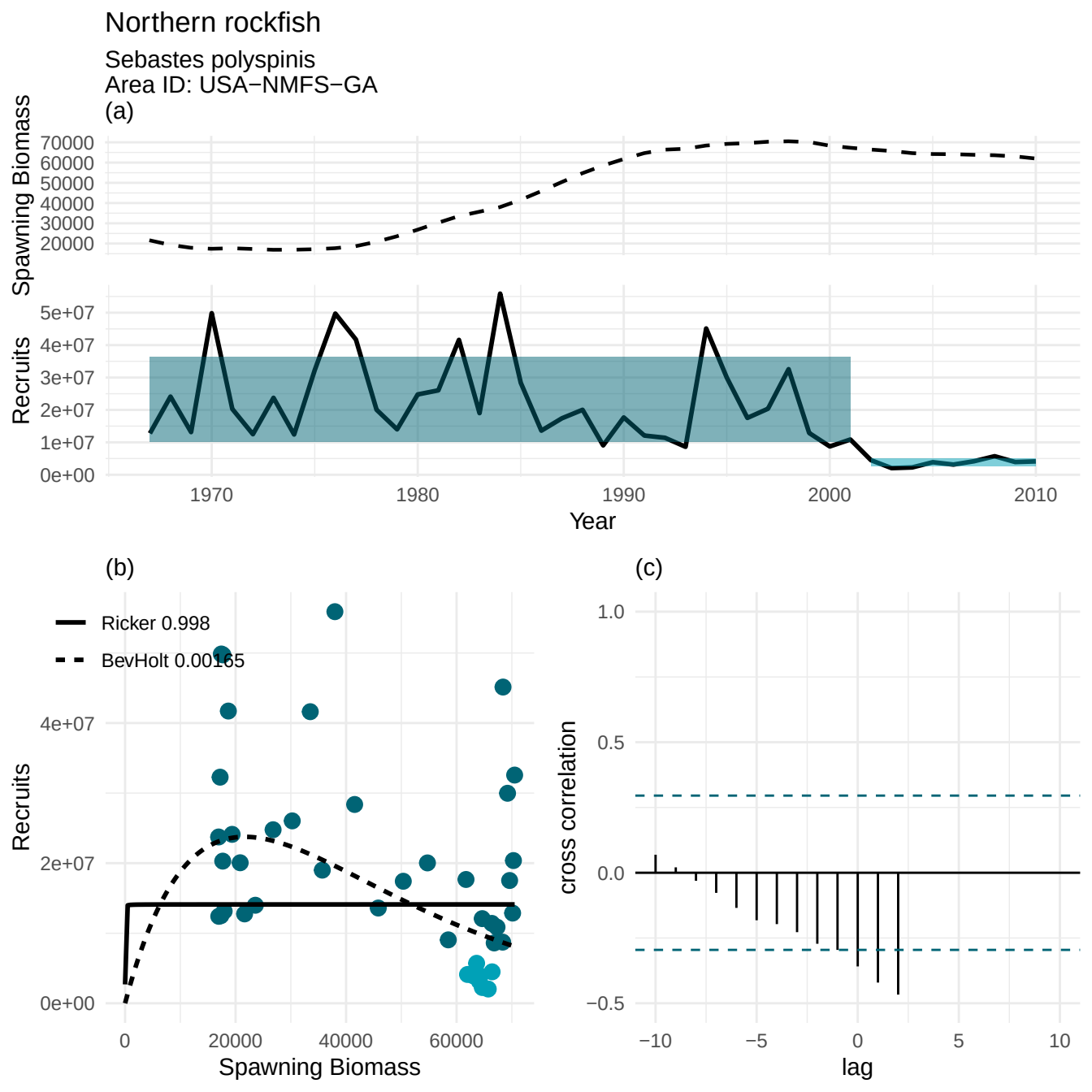

Jackass morwong
Nemadactylus macropterus
Area ID: Australia−AFMA−ESE
(a)
Spawning Biomass
20000
15000
10000
5000
Recruits
3e+13
2e+13
1e+13
0e+00
1960
1980
2000
2020
Year
(b)
Ricker 0.476
BevHolt 0.524
Recruits
3e+13
2e+13
1e+13
0e+00
0
5000
10000
15000
20000
Spawning Biomass
(c)
0.78
0.81
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

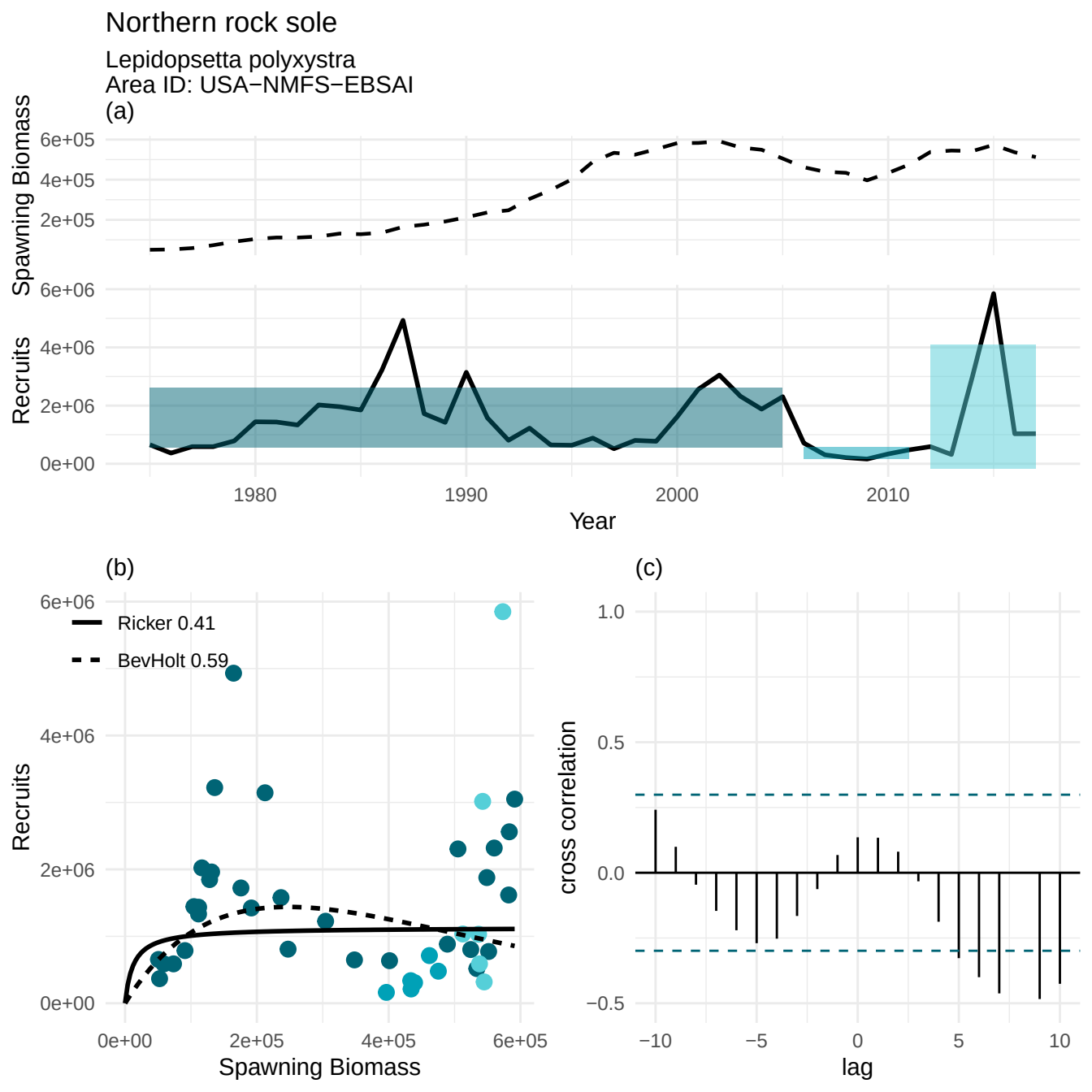

Jackass morwong
Nemadactylus macropterus
Area ID: Australia−AFMA−WSE
(a)
Spawning Biomass
2500
2000
1500
1000
Recruits
1.5e+12
1.2e+12
9.0e+11
6.0e+11
1990
1995
2000
2005
2010
Year
(b)
Ricker 0.245
BevHolt 0.755
Recruits
1.5e+12
1.0e+12
5.0e+11
0.0e+00
0
1000
2000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.43
−10
−5
0
5
10
lag

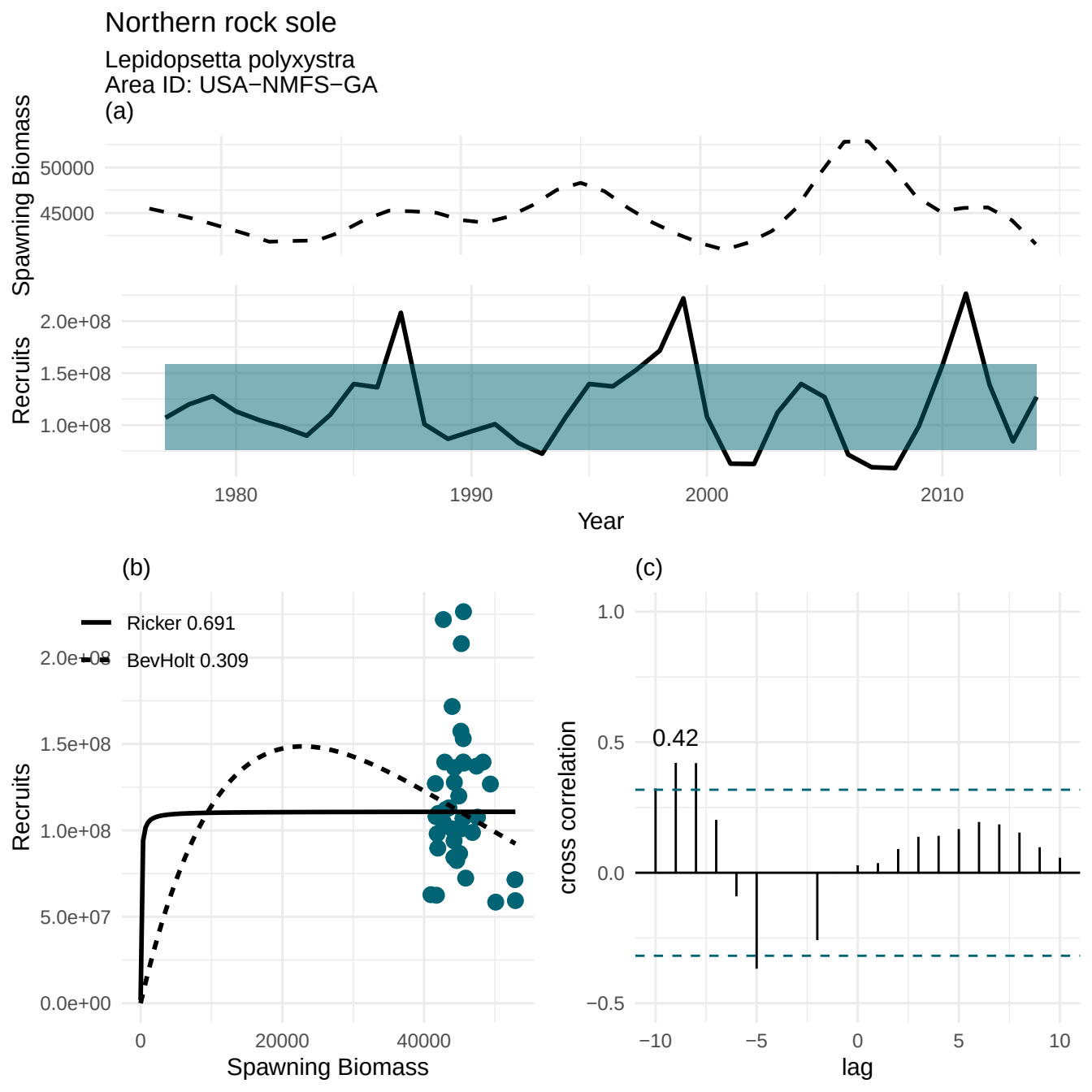

Mutton snapper
Lutjanus analis
Area ID: USA−NMFS−SATLCGM
(a)
Spawning Biomass
2000
1800
1600
Recruits
2000000
1500000
1000000
500000
1980
1985
1990
1995
2000
2005
Year
(b)
Ricker 0.5
BevHolt 0.5
Recruits
2500000
2000000
1500000
1000000
500000
0
0
500
1000
1500
2000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

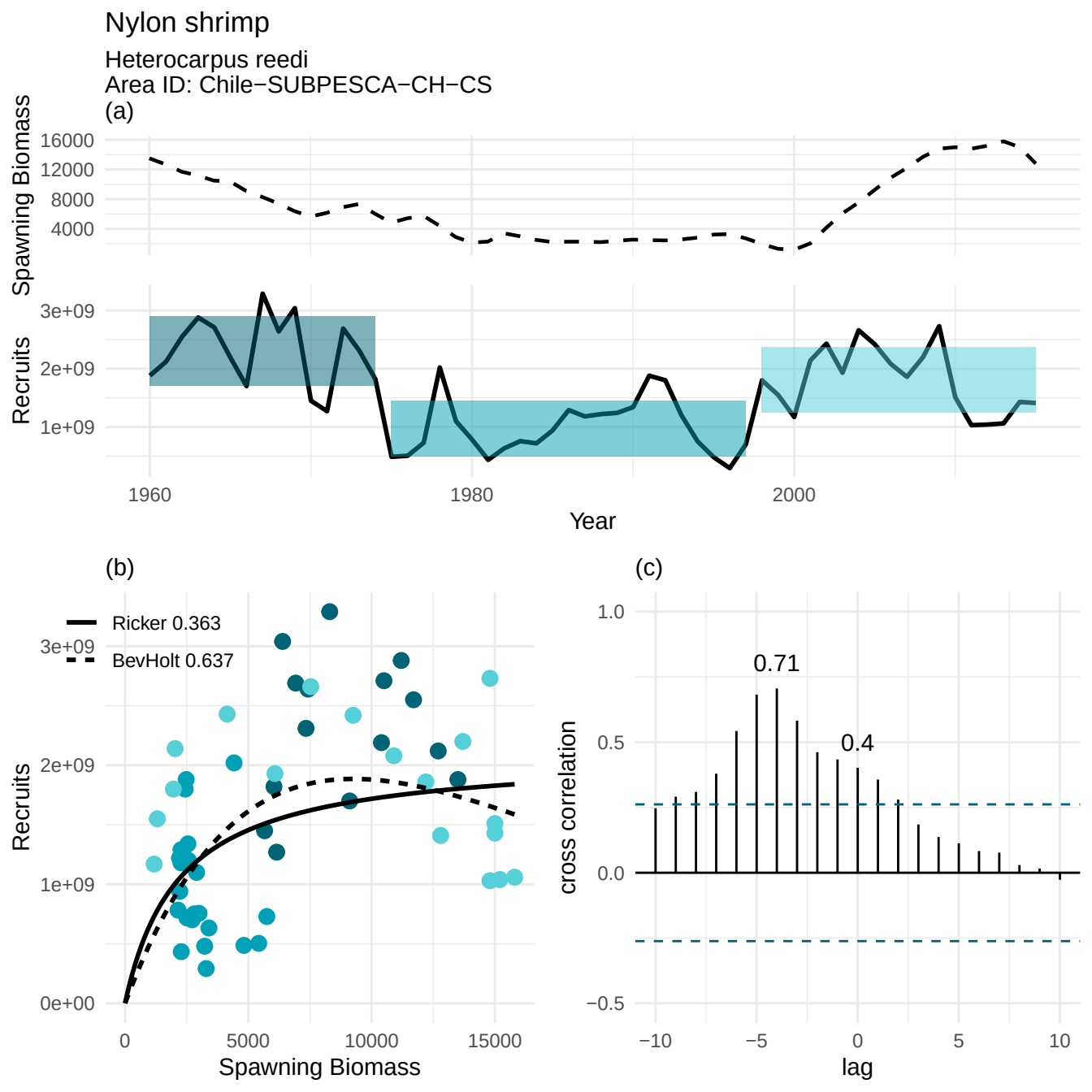

Norway pout
Trisopterus esmarkii
Area ID: multinational−ICES−IIIa−IV
(a)
Spawning Biomass
200000
150000
100000
50000
Recruits
1.2e+08
9.0e+07
6.0e+07
3.0e+07
1990
2000
2010
2020
Year
(b)
Ricker 0.864
BevHolt 0.136
Recruits
1.2e+08
9.0e+07
6.0e+07
3.0e+07
0.0e+00
0
50000
100000
150000
200000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.54
−10
−5
0
5
10
lag

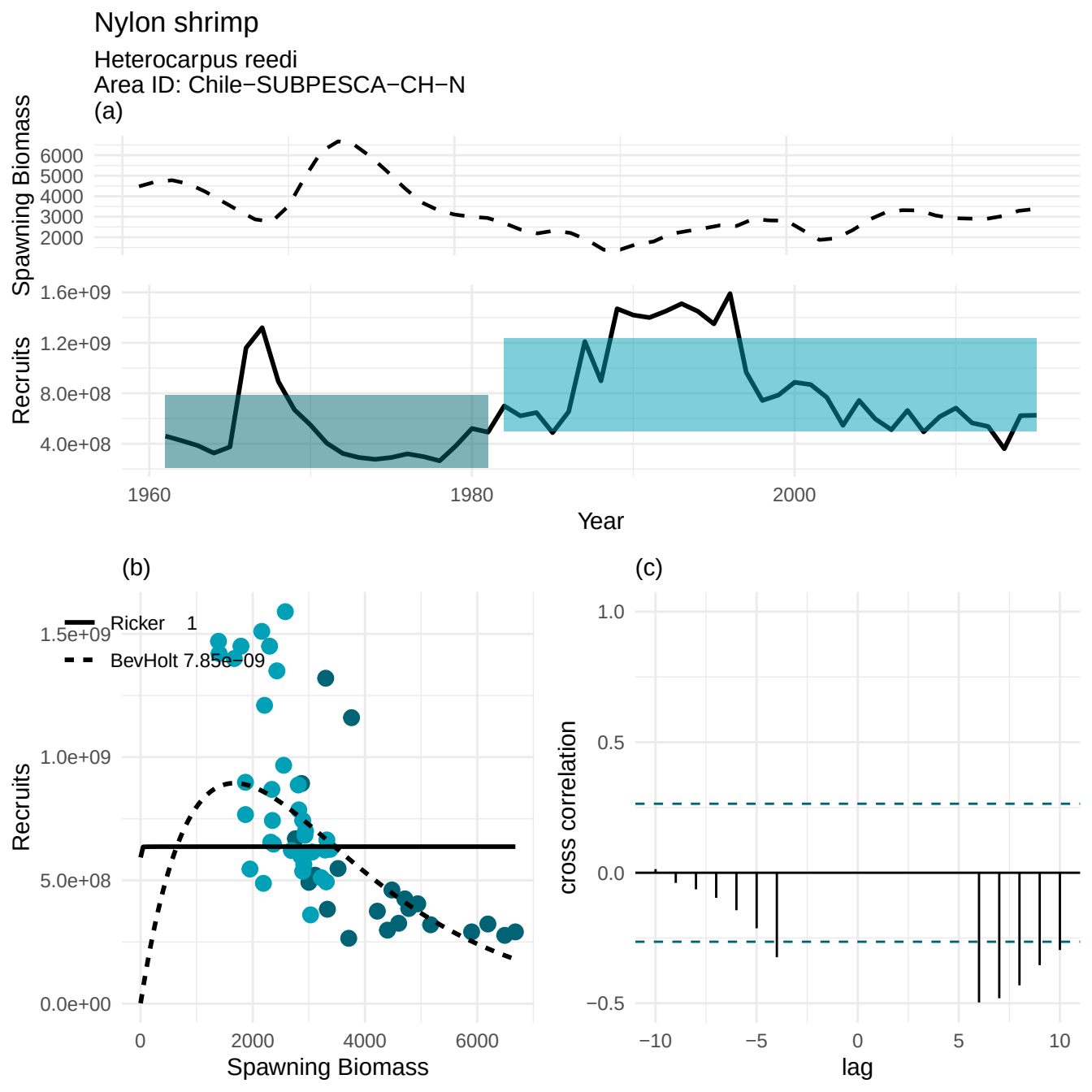

Northern rockfish
Sebastes polyspinis
Area ID: USA−NMFS−BSAI
(a)
Spawning Biomass
1e+05
8e+04
6e+04
Recruits
1.2e+08
9.0e+07
6.0e+07
3.0e+07
1980
1990
2000
2010
Year
(b)
Ricker 0.73
BevHolt 0.27
Recruits
1.2e+08
9.0e+07
6.0e+07
3.0e+07
0.0e+00
0
30000
60000
90000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

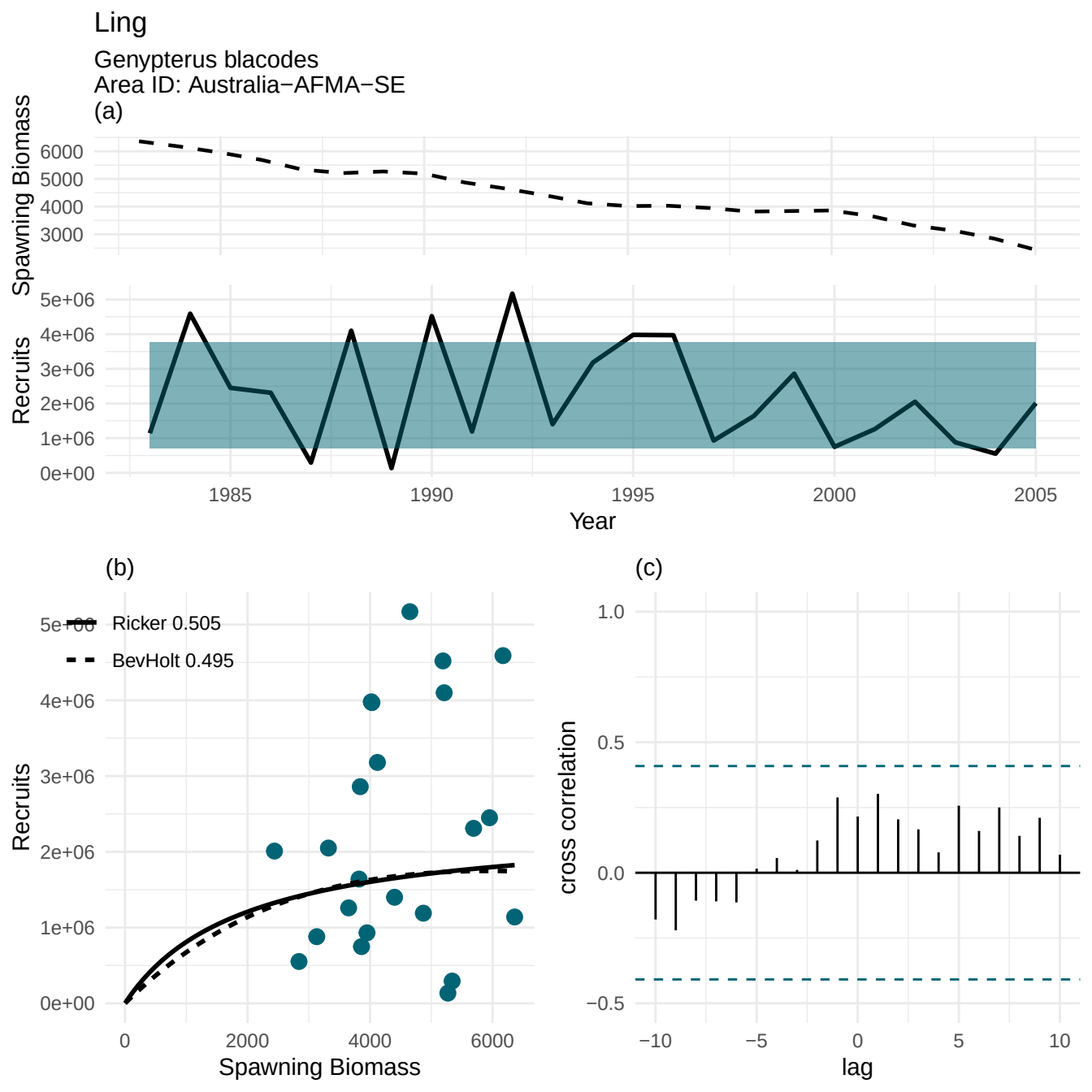

Northern rockfish
Sebastes polyspinis
Area ID: USA−NMFS−GA
(a)
Spawning Biomass
70000
60000
50000
40000
30000
20000
Recruits
5e+07
4e+07
3e+07
2e+07
1e+07
0e+00
1970
1980
1990
2000
2010
Year
(b)
Ricker 0.998
BevHolt 0.00165
Recruits
4e+07
2e+07
0e+00
0
20000
40000
60000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

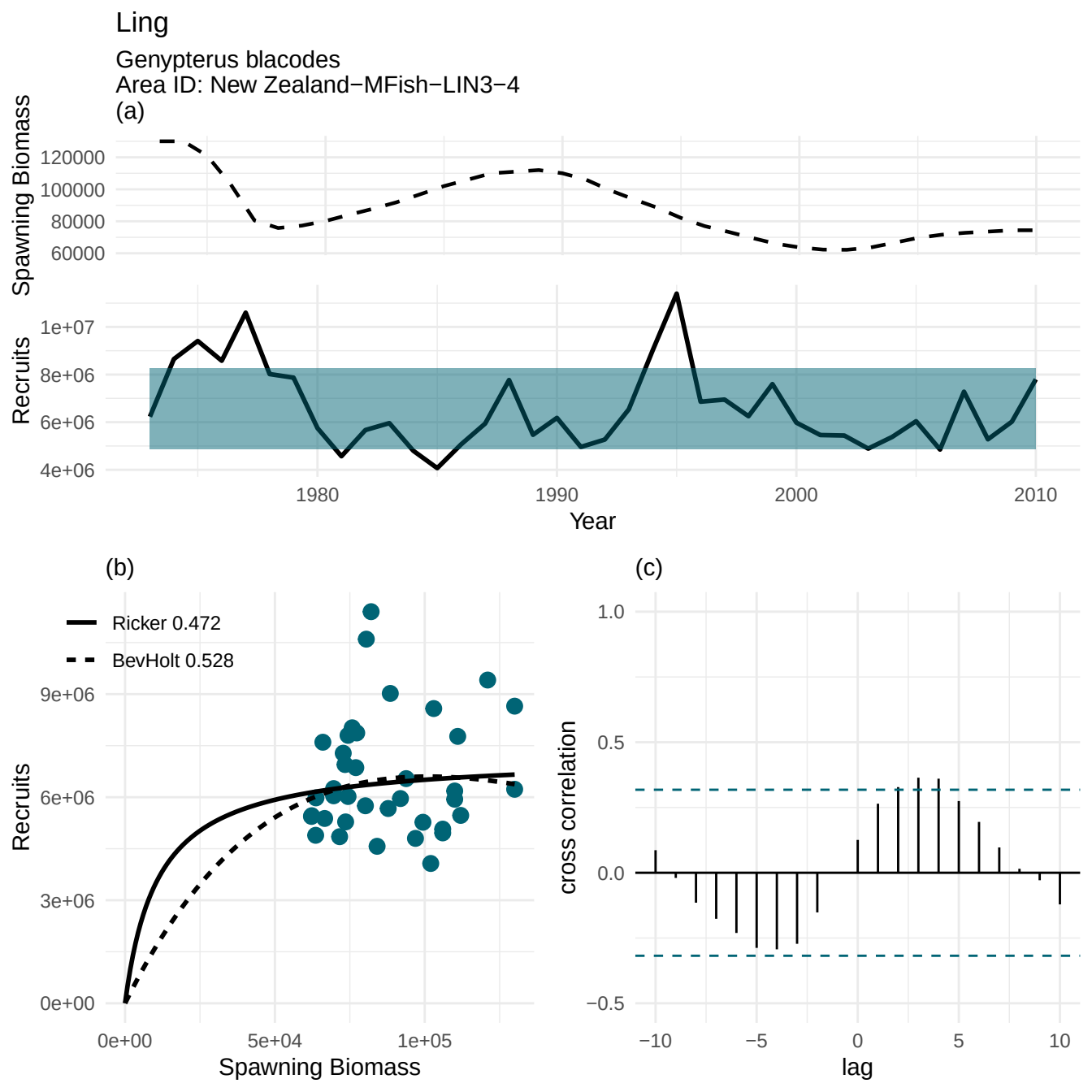

Northern rock sole
Lepidopsetta polyxystra
Area ID: USA−NMFS−EBSAI
(a)
Spawning Biomass
6e+05
4e+05
2e+05
Recruits
6e+06
4e+06
2e+06
0e+00
1980
1990
2000
2010
Year
(b)
Ricker 0.41
BevHolt 0.59
Recruits
6e+06
4e+06
2e+06
0e+00
0e+00
2e+05
4e+05
6e+05
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

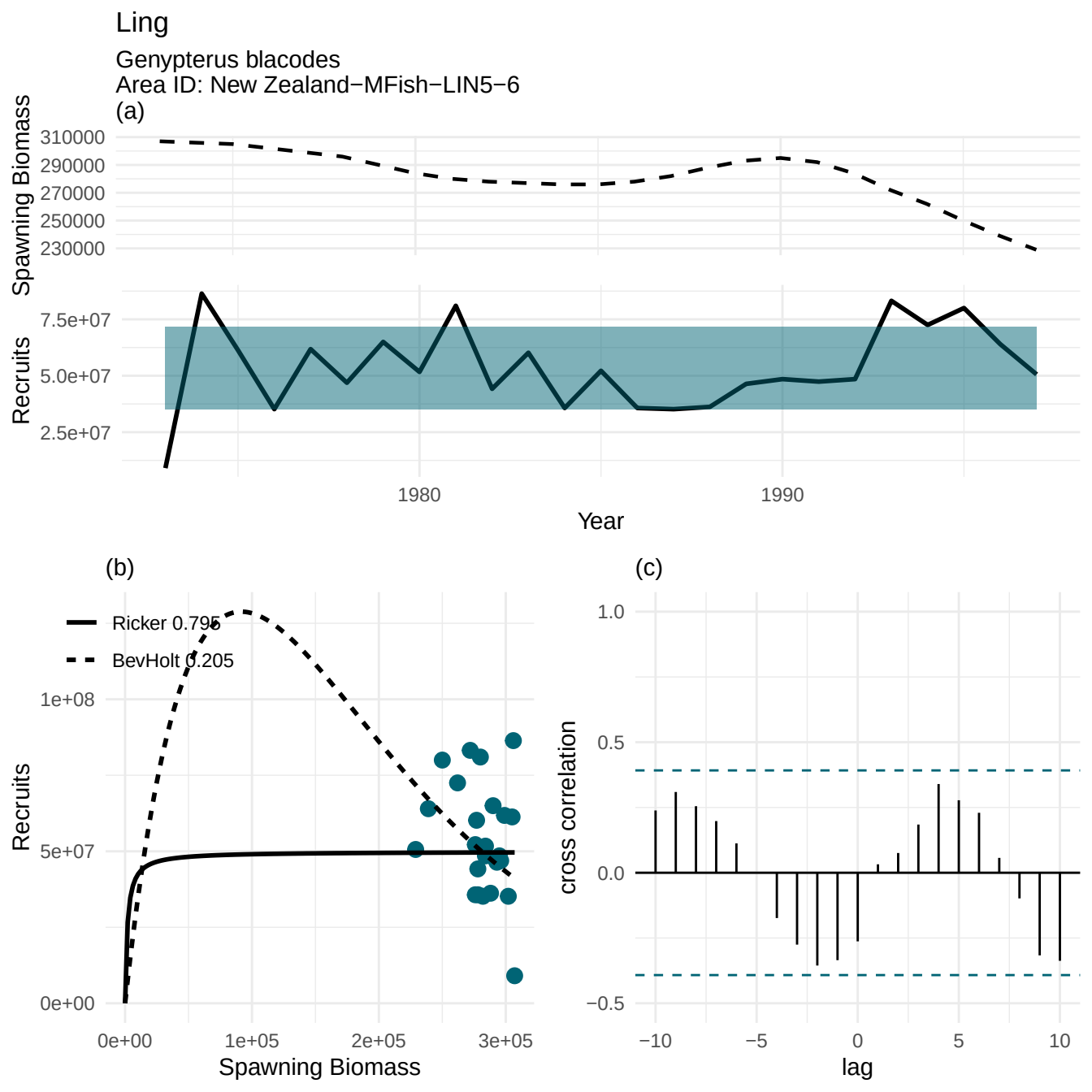

Northern rock sole
Lepidopsetta polyxystra
Area ID: USA−NMFS−GA
(a)
Spawning Biomass
50000
45000
Recruits
2.0e+08
1.5e+08
1.0e+08
1980
1990
2000
2010
Year
(b)
Ricker 0.691
BevHolt 0.309
Recruits
2.0e+08
1.5e+08
1.0e+08
5.0e+07
0.0e+00
0
20000
40000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.42
−10
−5
0
5
10
lag

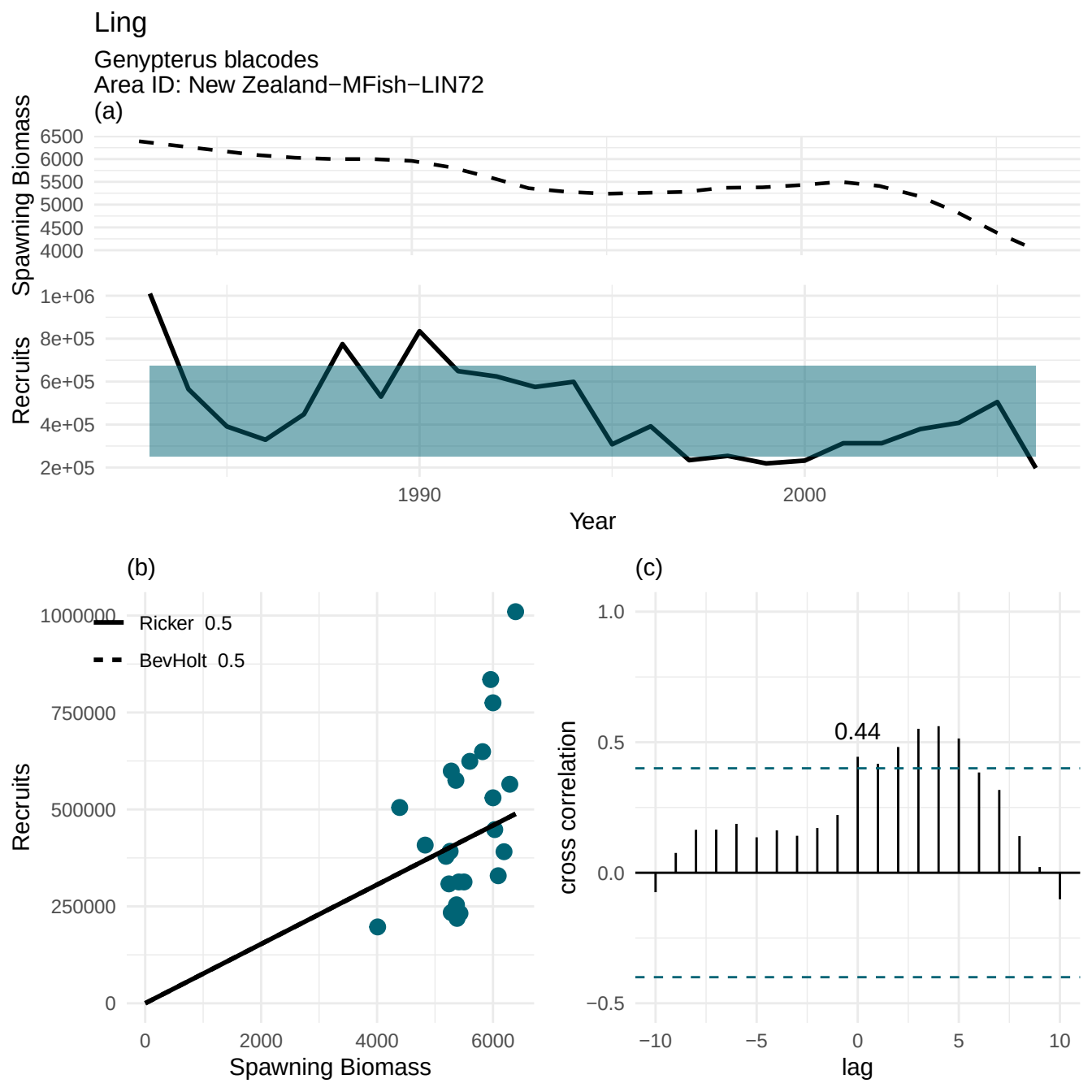

Nylon shrimp
Heterocarpus reedi
Area ID: Chile−SUBPESCA−CH−CS
(a)
Spawning Biomass
16000
12000
8000
4000
Recruits
3e+09
2e+09
1e+09
1960
1980
2000
Year
(b)
Ricker 0.363
BevHolt 0.637
Recruits
3e+09
2e+09
1e+09
0e+00
0
5000
10000
15000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.71
0.4
−10
−5
0
5
10
lag

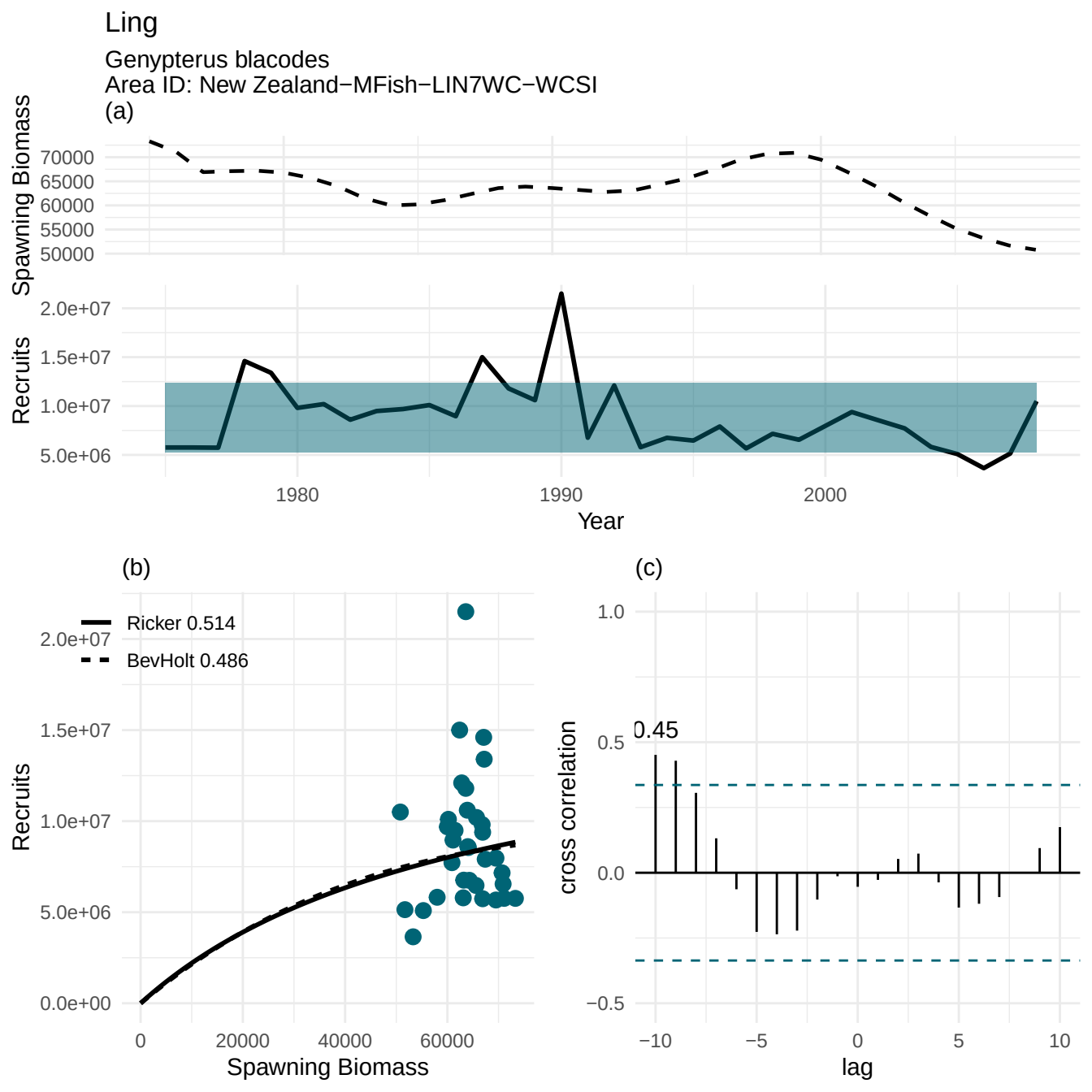

Nylon shrimp
Heterocarpus reedi
Area ID: Chile−SUBPESCA−CH−N
(a)
Spawning Biomass
6000
5000
4000
3000
2000
Recruits
1.6e+09
1.2e+09
8.0e+08
4.0e+08
1960
1980
2000
Year
(b)
Ricker 1
BevHolt 7.85e−09
Recruits
1.5e+09
1.0e+09
5.0e+08
0.0e+00
0
2000
4000
6000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

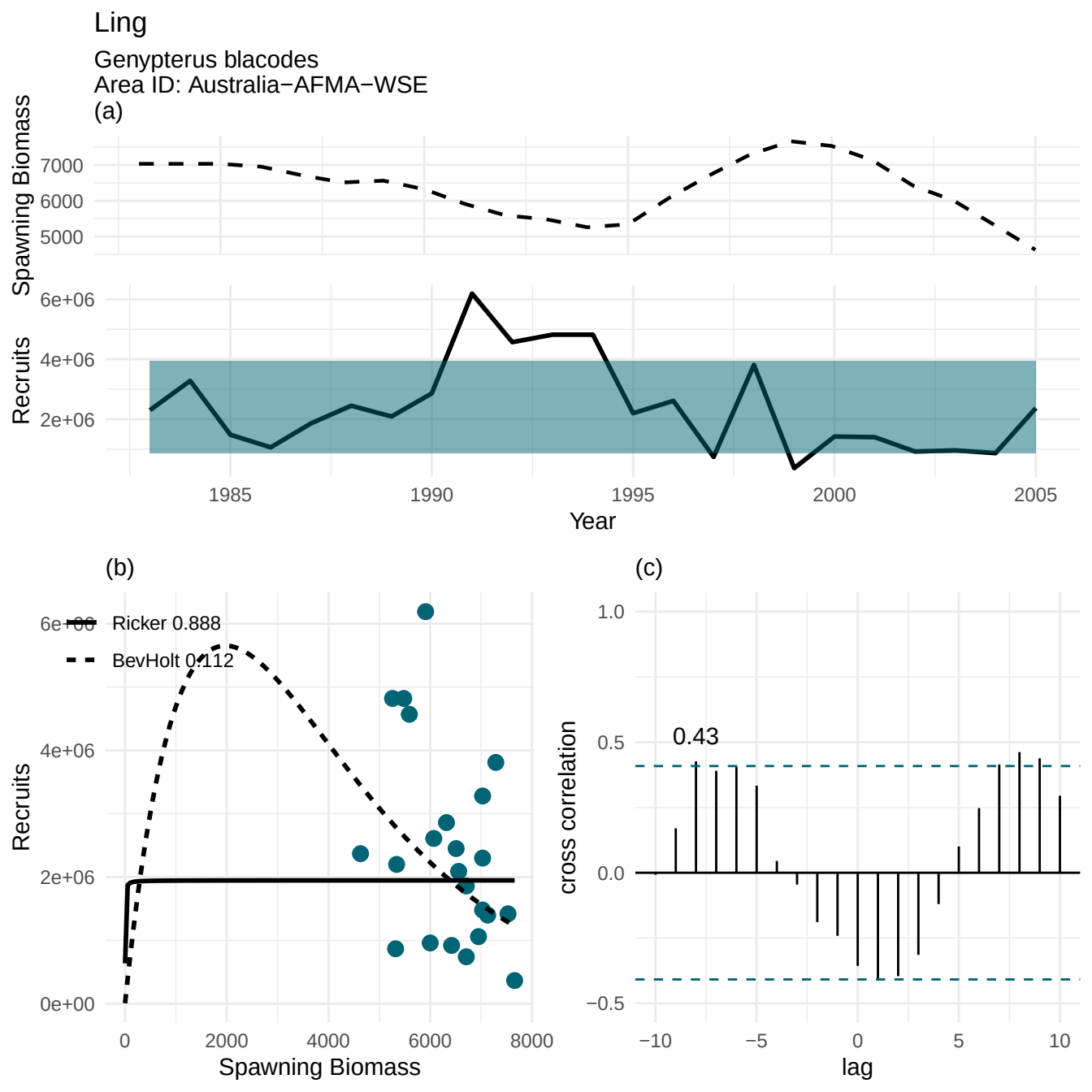

Ling
Genypterus blacodes
Area ID: Australia−AFMA−SE
(a)
Spawning Biomass
6000
5000
4000
3000
Recruits
5e+06
4e+06
3e+06
2e+06
1e+06
0e+00
1985
1990
1995
2000
2005
Year
(b)
Ricker 0.505
BevHolt 0.495
Recruits
Spawning Biomass
0
2000
4000
6000
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

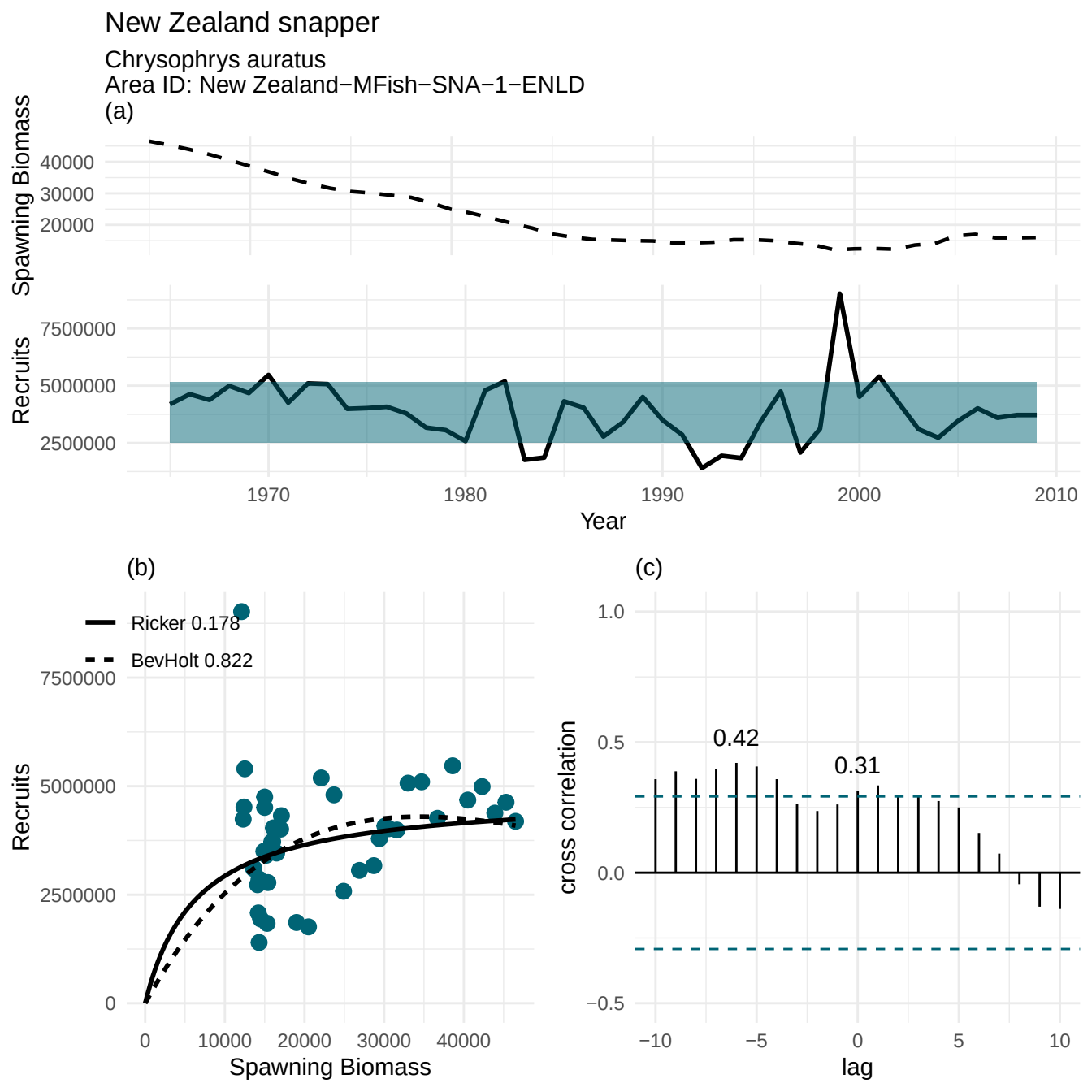

Ling
Genypterus blacodes
Area ID: New Zealand−MFish−LIN3−4
(a)
Spawning Biomass
120000
100000
80000
60000
Recruits
1e+07
8e+06
6e+06
4e+06
1980
1990
2000
2010
Year
(b)
Ricker 0.472
BevHolt 0.528
Recruits
9e+06
6e+06
3e+06
0e+00
0e+00
5e+04
1e+05
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

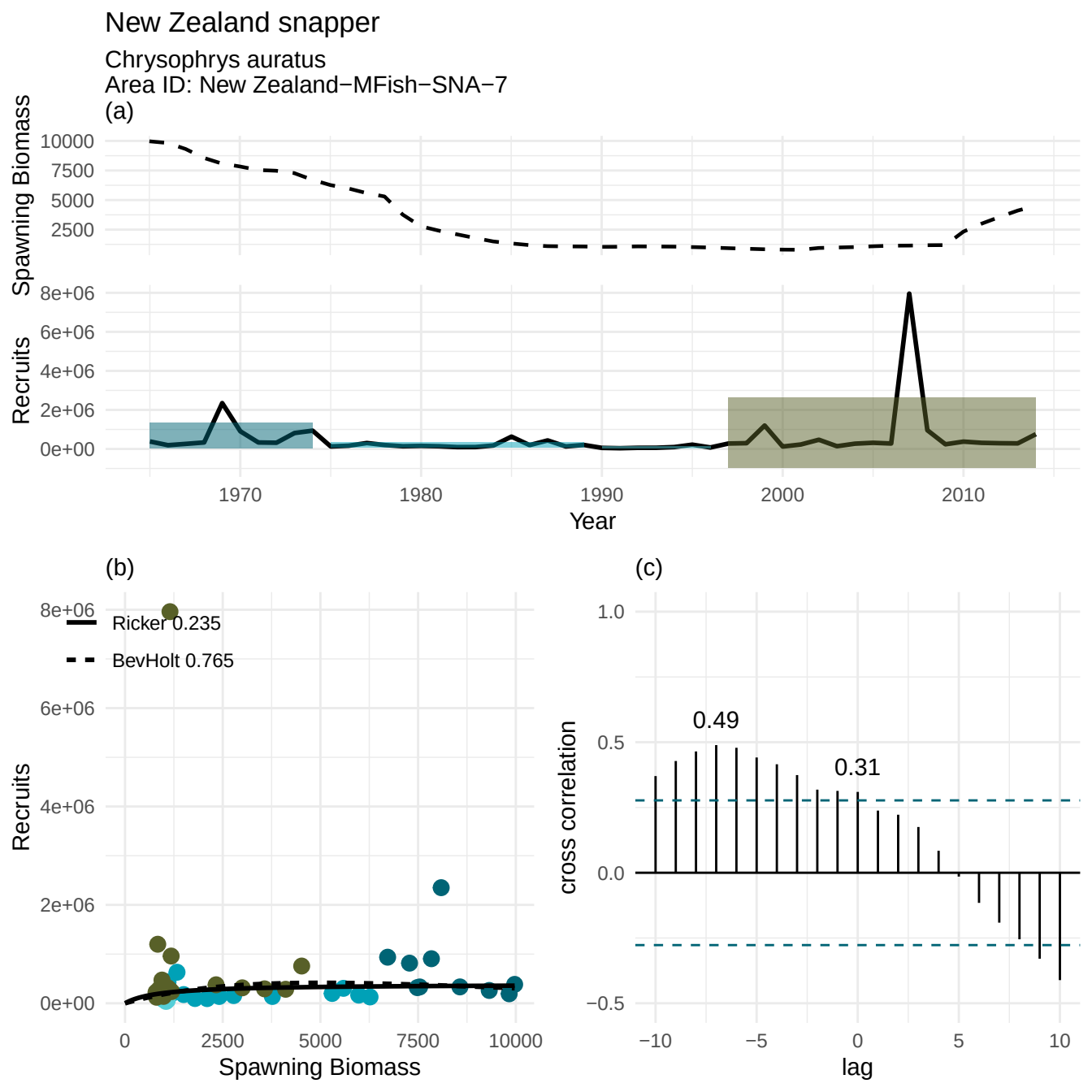

Ling
Genypterus blacodes
Area ID: New Zealand−MFish−LIN5−6
(a)
Spawning Biomass
310000
290000
270000
250000
230000
Recruits
7.5e+07
5.0e+07
2.5e+07
1980
1990
Year
(b)
Ricker 0.795
BevHolt 0.205
Recruits
1e+08
5e+07
0e+00
0e+00
1e+05
2e+05
3e+05
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

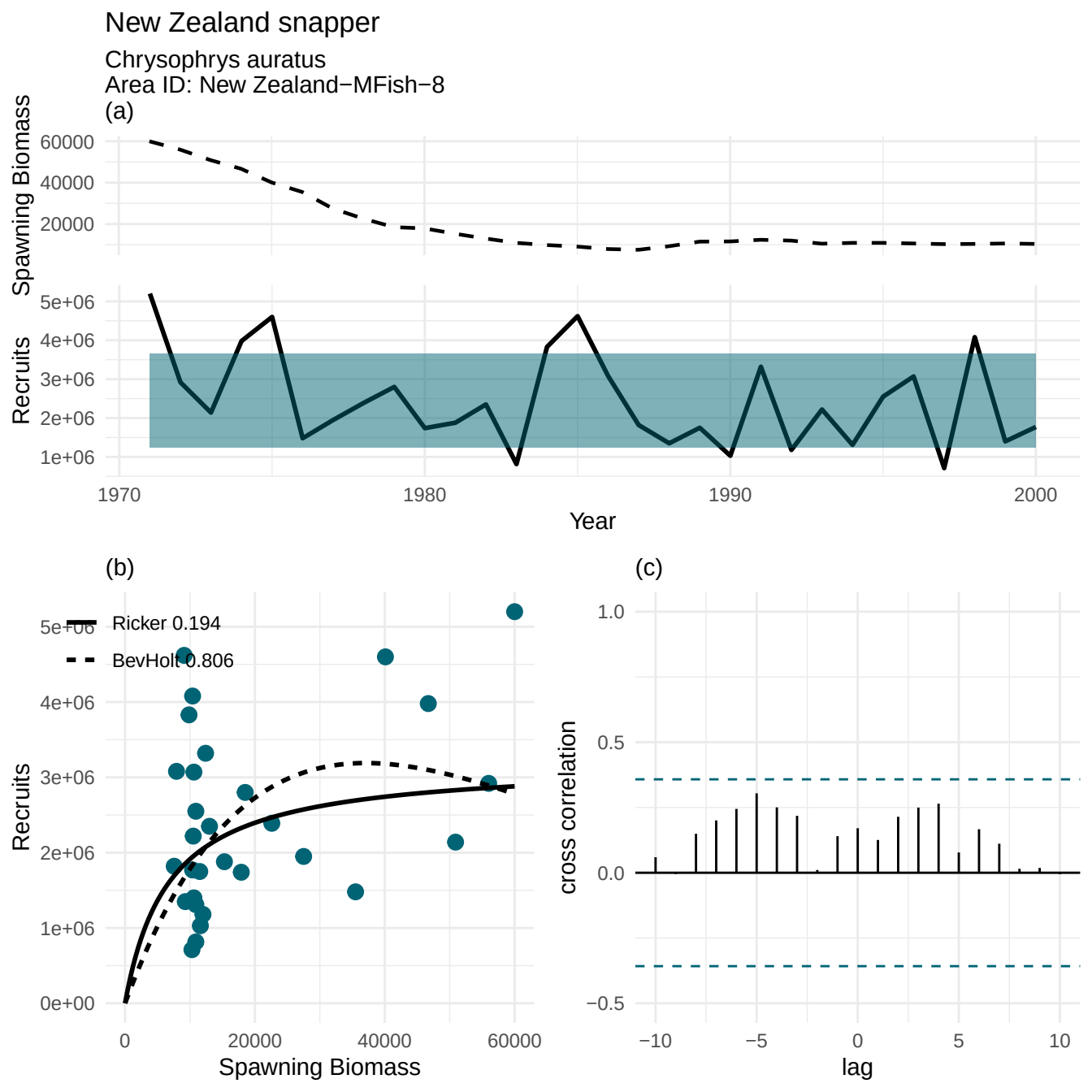

Ling
Genypterus blacodes
Area ID: New Zealand−MFish−LIN72
(a)
Spawning Biomass
6500
6000
5500
5000
4500
4000
Recruits
1e+06
8e+05
6e+05
4e+05
2e+05
1990
2000
Year
(b)
Ricker 0.5
BevHolt 0.5
Recruits
1000000
750000
500000
250000
0
0
2000
4000
6000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.44
−10
−5
0
5
10
lag

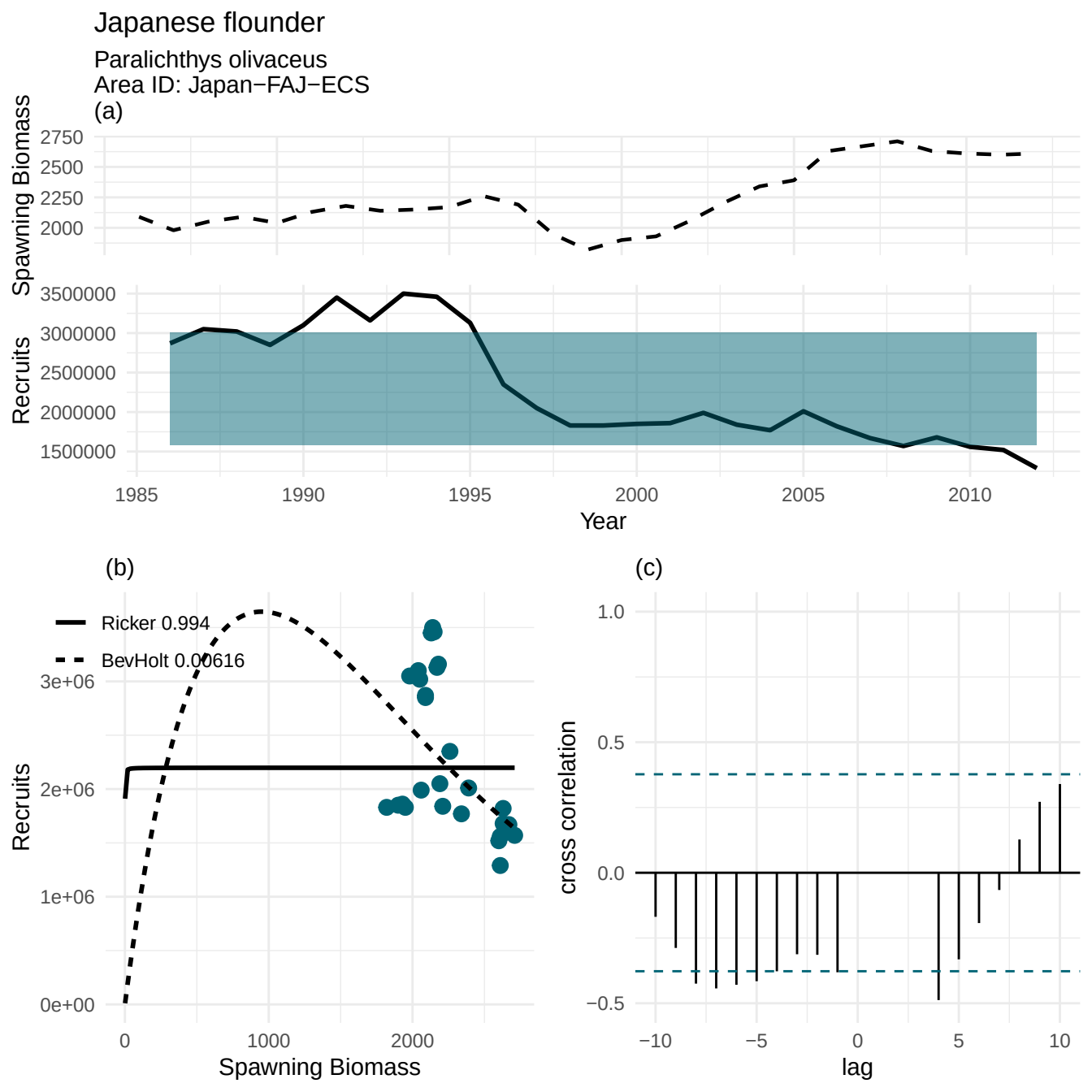

Ling
Genypterus blacodes
Area ID: New Zealand−MFish−LIN7WC−WCSI
(a)
Spawning Biomass
70000
65000
60000
55000
50000
Recruits
2.0e+07
1.5e+07
1.0e+07
5.0e+06
1980
1990
2000
Year
(b)
Ricker 0.514
BevHolt 0.486
Recruits
2.0e+07
1.5e+07
1.0e+07
5.0e+06
0.0e+00
0
20000
40000
60000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.45
−10
−5
0
5
10
lag

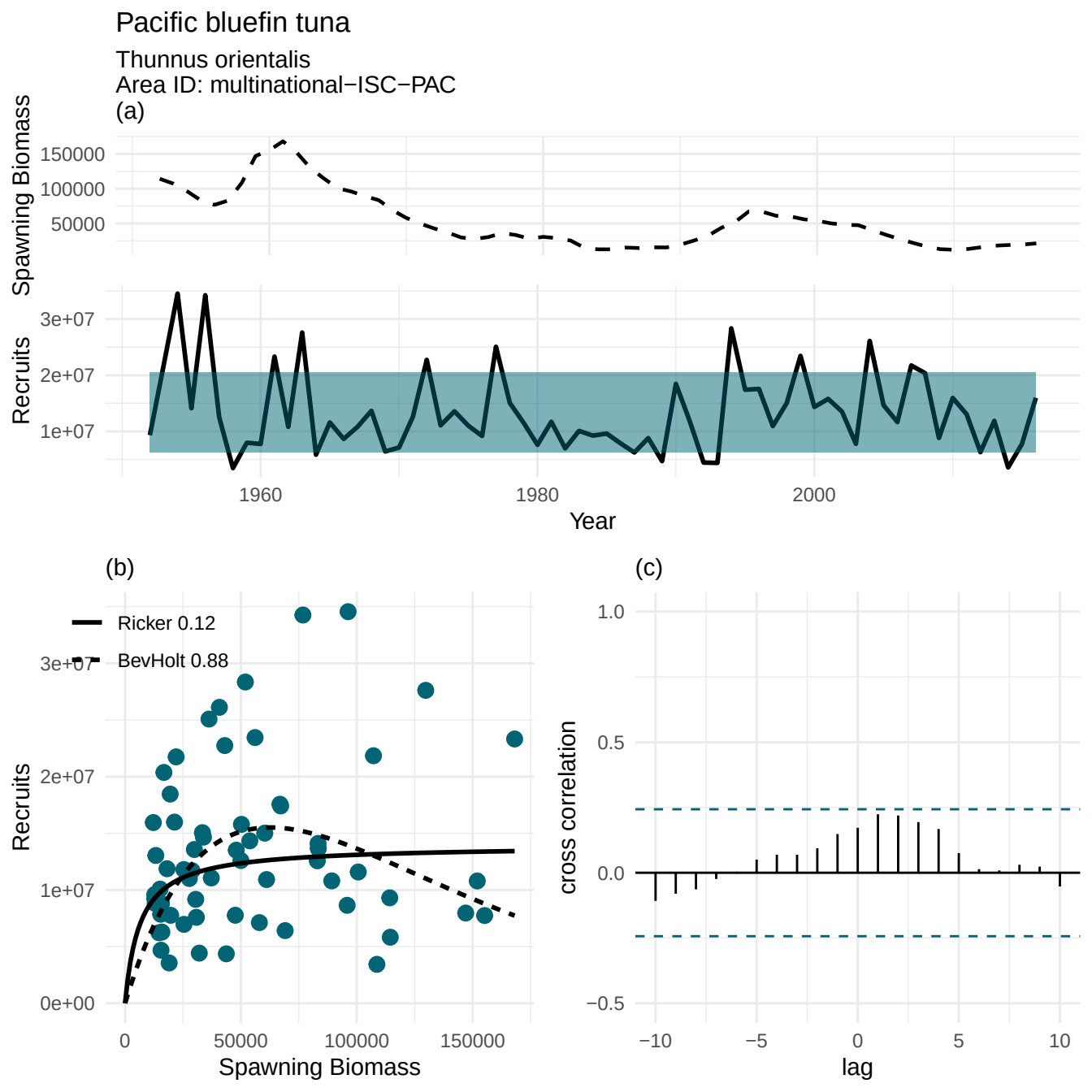

Ling
Genypterus blacodes
Area ID: Australia−AFMA−WSE
(a)
Spawning Biomass
7000
6000
5000
Recruits
6e+06
4e+06
2e+06
1985
1990
1995
2000
2005
Year
(b)
Ricker 0.888
BevHolt 0.112
Recruits
6e+06
4e+06
2e+06
0e+00
0
2000
4000
6000
8000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.43
−10
−5
0
5
10
lag

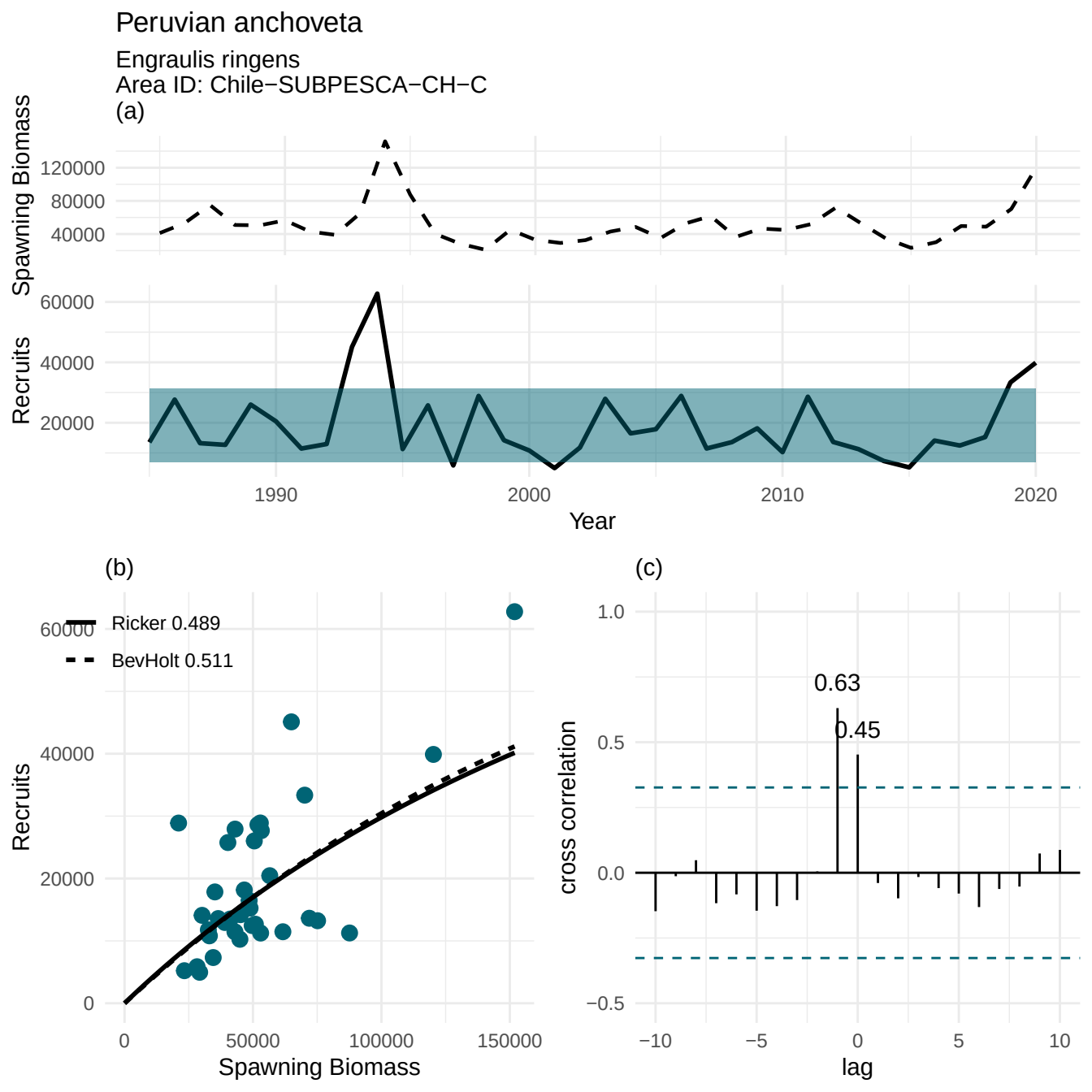

New Zealand snapper
Chrysophrys auratus
Area ID: New Zealand−MFish−SNA−1−ENLD
(a)
Spawning Biomass
40000
30000
20000
Recruits
7500000
5000000
2500000
1970
1980
1990
2000
2010
Year
(b)
Ricker 0.178
BevHolt 0.822
Recruits
7500000
5000000
2500000
0
0
10000
20000
30000
40000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.42
0.31
−10
−5
0
5
10
lag

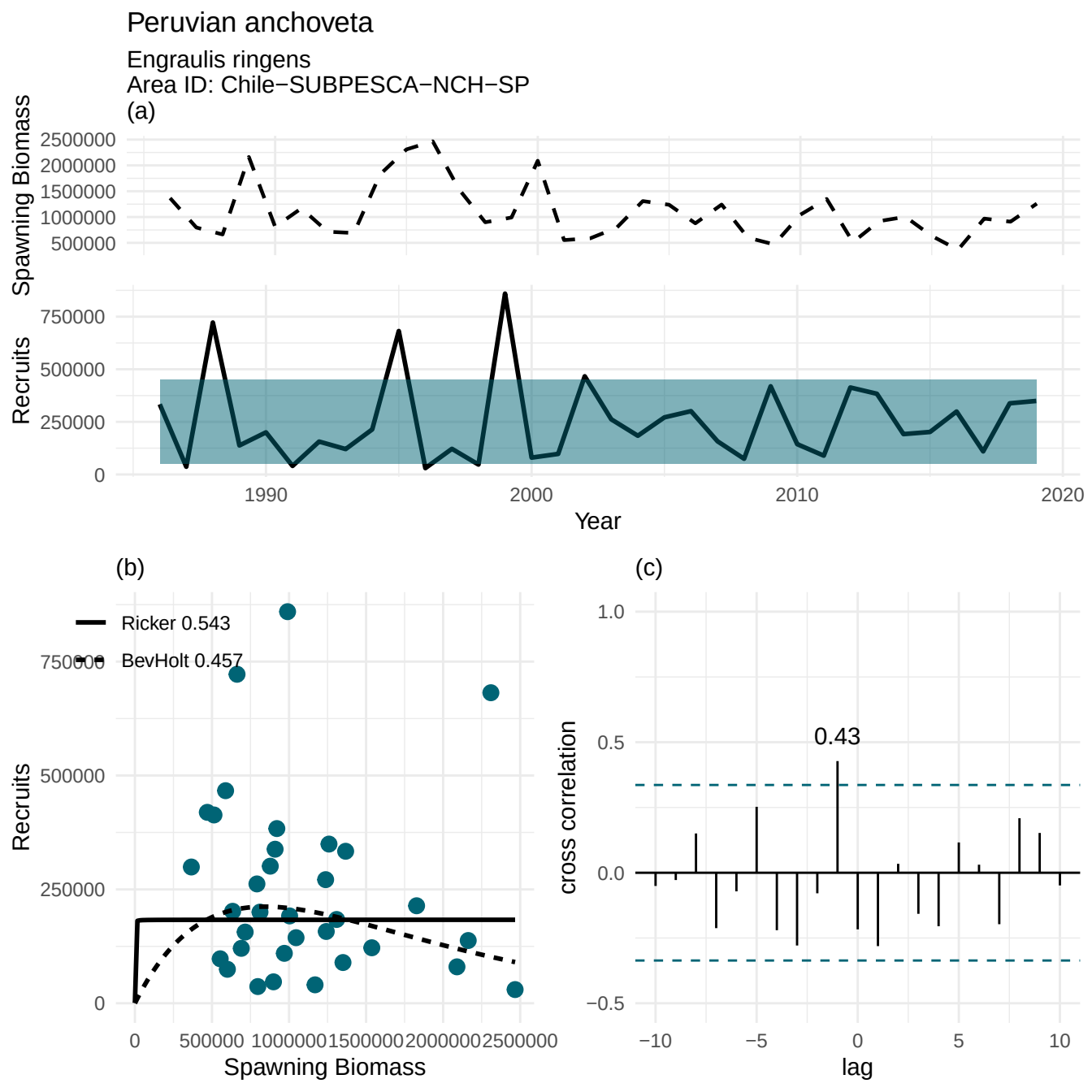

New Zealand snapper
Chrysophrys auratus
Area ID: New Zealand−MFish−SNA−7
(a)
Spawning Biomass
10000
7500
5000
2500
Recruits
8e+06
6e+06
4e+06
2e+06
0e+00
1970
1980
1990
2000
2010
Year
(b)
Ricker 0.235
BevHolt 0.765
Recruits
Spawning Biomass
0
2500
5000
7500
10000
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.49
0.31
−10
−5
0
5
10
lag

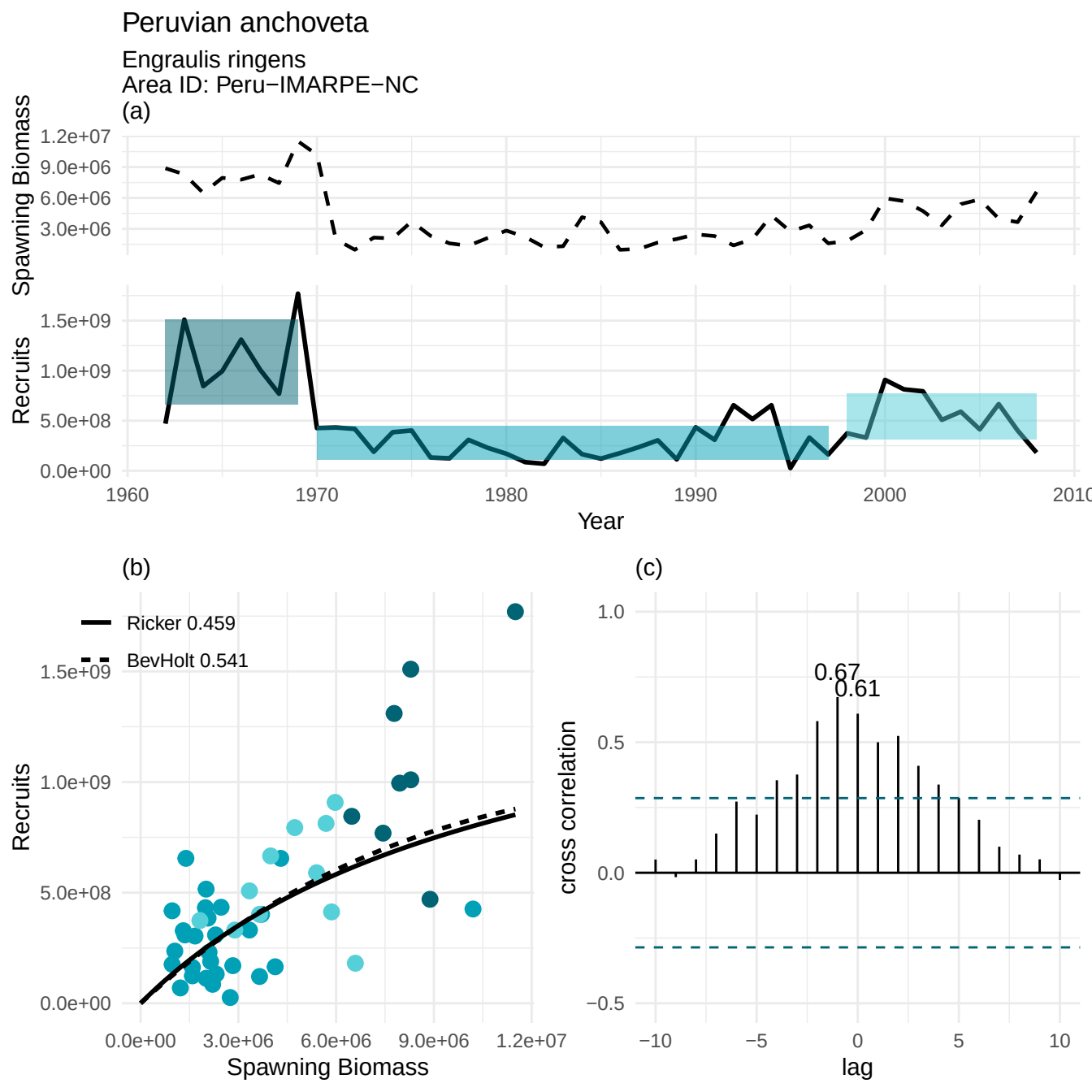

New Zealand snapper
Chrysophrys auratus
Area ID: New Zealand−MFish−8
(a)
Spawning Biomass
60000
40000
20000
Recruits
5e+06
4e+06
3e+06
2e+06
1e+06
1970
1980
1990
2000
Year
(b)
Ricker 0.194
BevHolt 0.806
Recruits
5e+06
4e+06
3e+06
2e+06
1e+06
0e+00
0
20000
40000
60000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

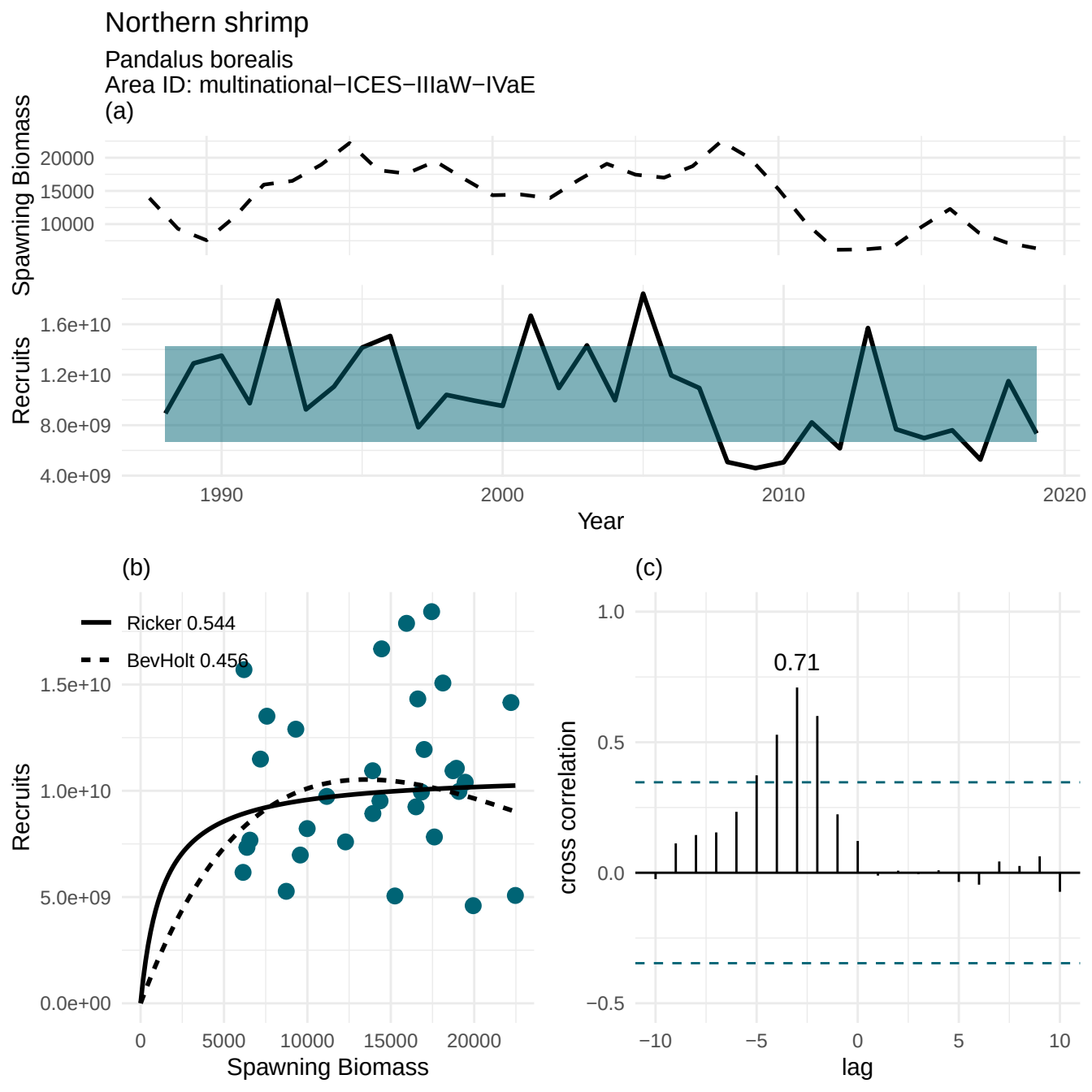

Japanese flounder
Paralichthys olivaceus
Area ID: Japan−FAJ−ECS
(a)
Spawning Biomass
2750
2500
2250
2000
Recruits
3500000
3000000
2500000
2000000
1500000
1985
1990
1995
2000
2005
2010
Year
(b)
Ricker 0.994
BevHolt 0.00616
Recruits
3e+06
2e+06
1e+06
0e+00
0
1000
2000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

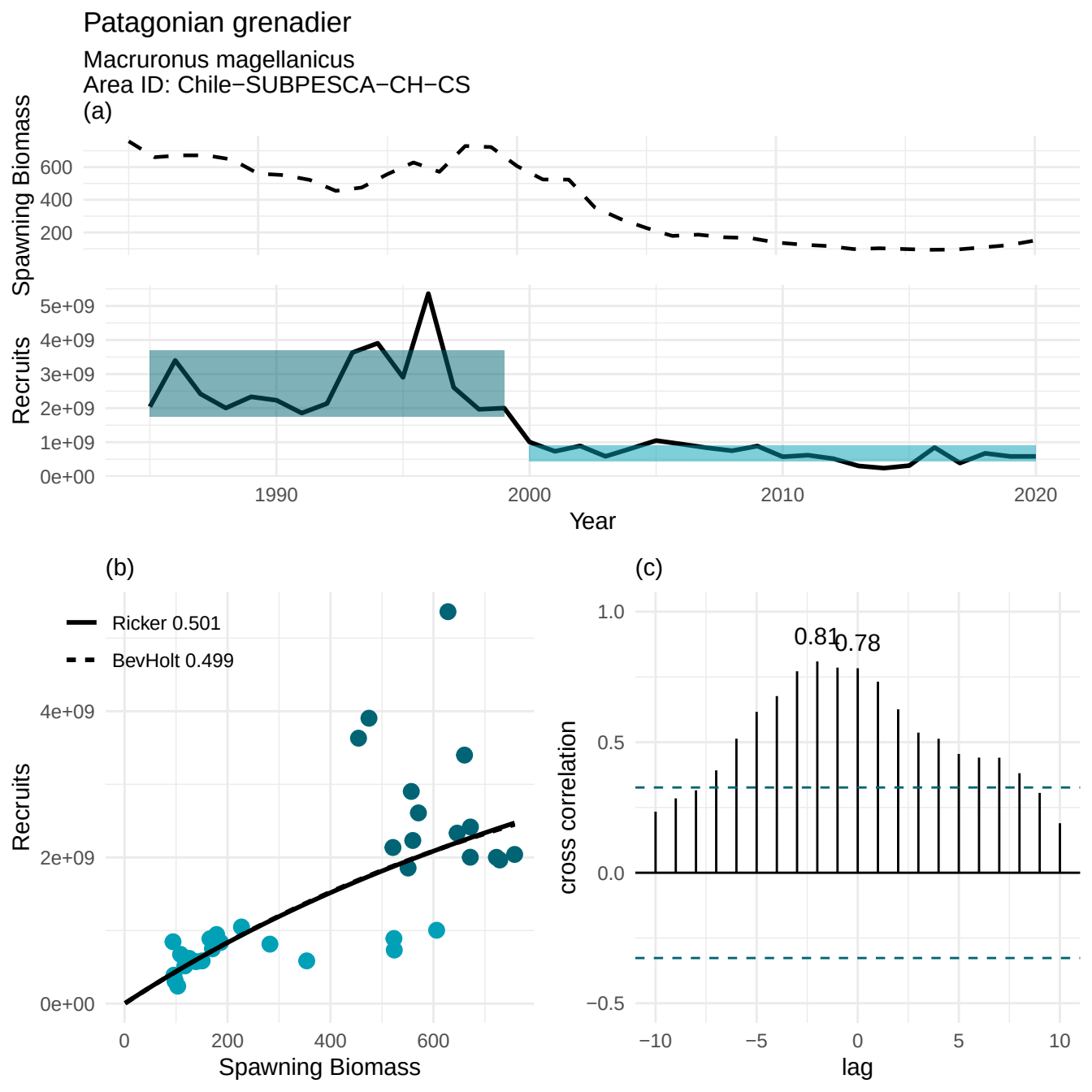

Pacific bluefin tuna
Thunnus orientalis
Area ID: multinational−ISC−PAC
(a)
Spawning Biomass
150000
100000
50000
Recruits
3e+07
2e+07
1e+07
1960
1980
2000
Year
(b)
Ricker 0.12
BevHolt 0.88
Recruits
3e+07
2e+07
1e+07
0e+00
0
50000
100000
150000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

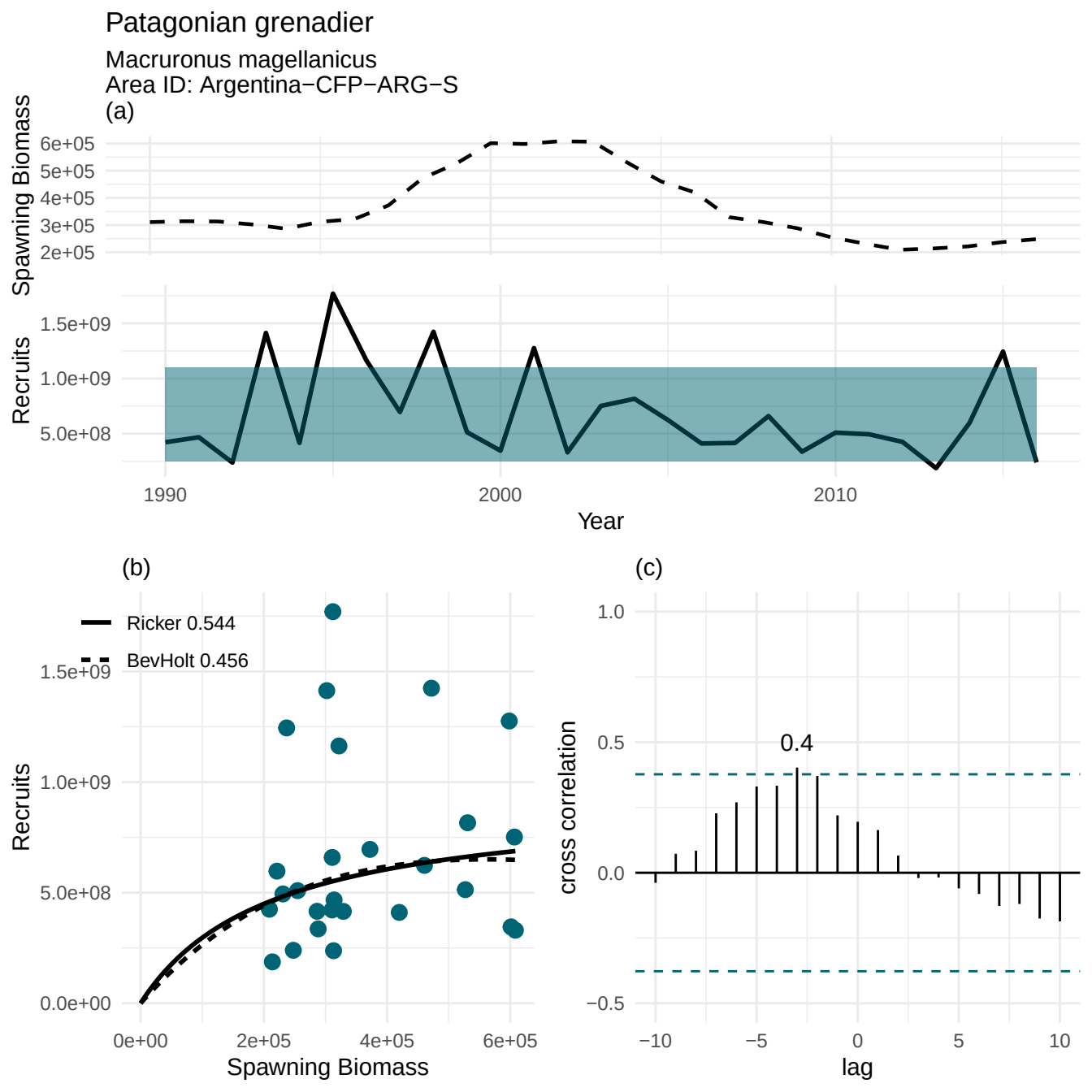

Peruvian anchoveta
Engraulis ringens
Area ID: Chile−SUBPESCA−CH−C
(a)
Spawning Biomass
120000
80000
40000
Recruits
60000
40000
20000
1990
2000
2010
2020
Year
(b)
Ricker 0.489
BevHolt 0.511
Recruits
60000
40000
20000
0
0
50000
100000
150000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.63
0.45
−10
−5
0
5
10
lag

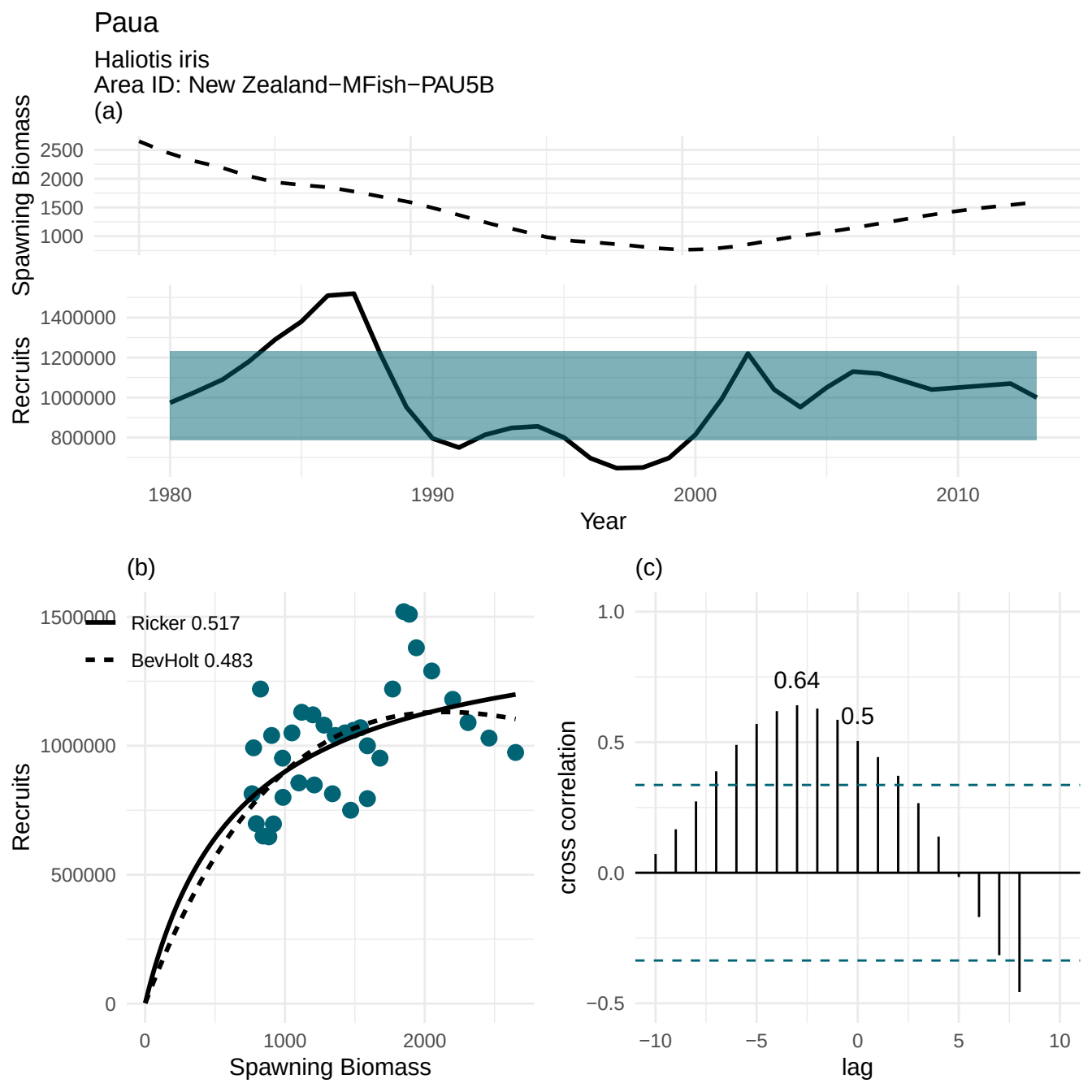

Peruvian anchoveta
Engraulis ringens
Area ID: Chile−SUBPESCA−NCH−SP
(a)
Spawning Biomass
2500000
2000000
1500000
1000000
500000
Recruits
750000
500000
250000
0
1990
2000
2010
2020
Year
(b)
Ricker 0.543
BevHolt 0.457
Recruits
500000
250000
0
0
500000
1000000
1500000
2000000
2500000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.43
−10
−5
0
5
10
lag

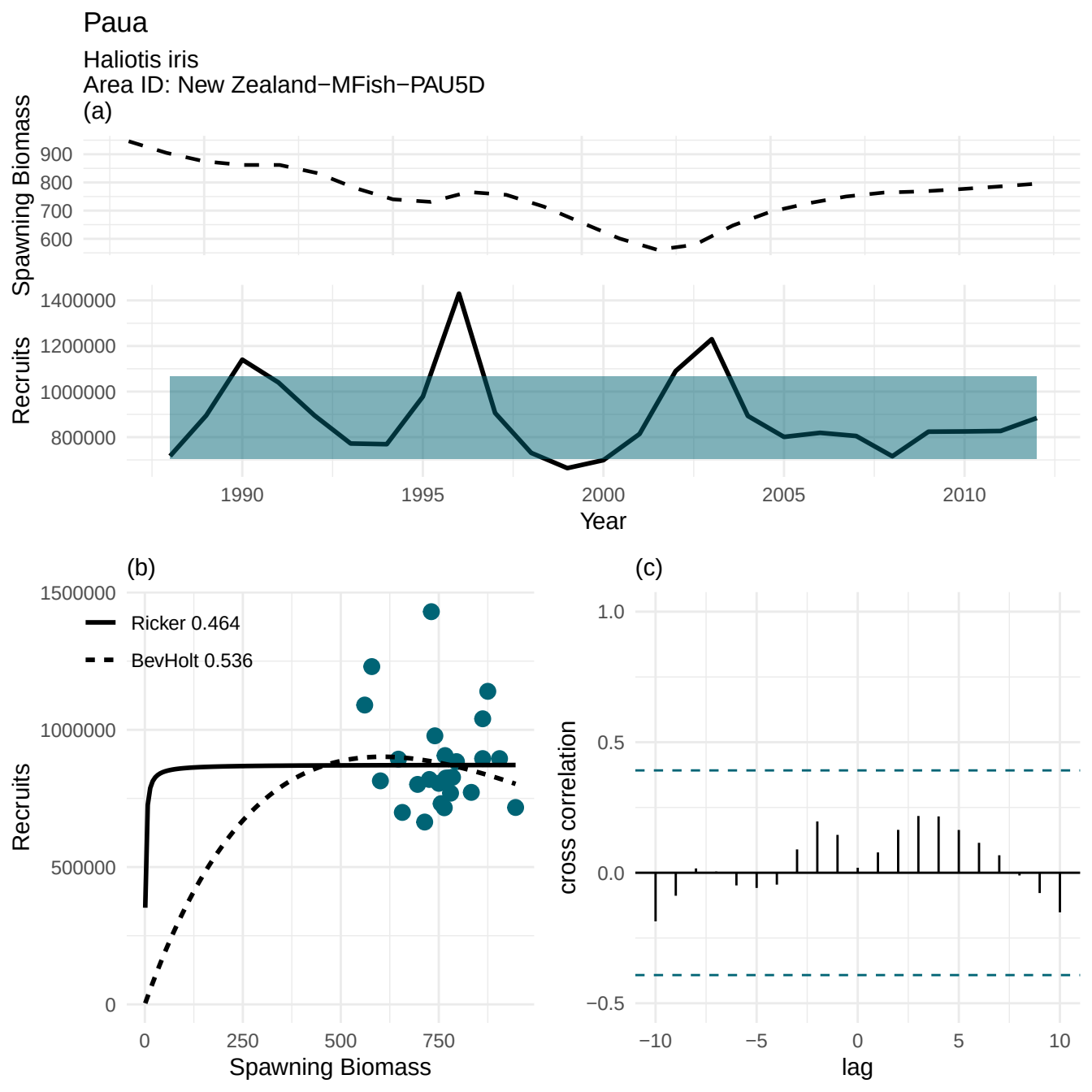

Peruvian anchoveta
Engraulis ringens
Area ID: Peru−IMARPE−NC
(a)
Spawning Biomass
1.2e+07
9.0e+06
6.0e+06
3.0e+06
Recruits
1.5e+09
1.0e+09
5.0e+08
0.0e+00
1960
1970
1980
1990
2000
2010
Year
(b)
Ricker 0.459
BevHolt 0.541
Recruits
1.5e+09
1.0e+09
5.0e+08
0.0e+00
0.0e+00
3.0e+06
6.0e+06
9.0e+06
1.2e+07
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.67
0.61
−10
−5
0
5
10
lag

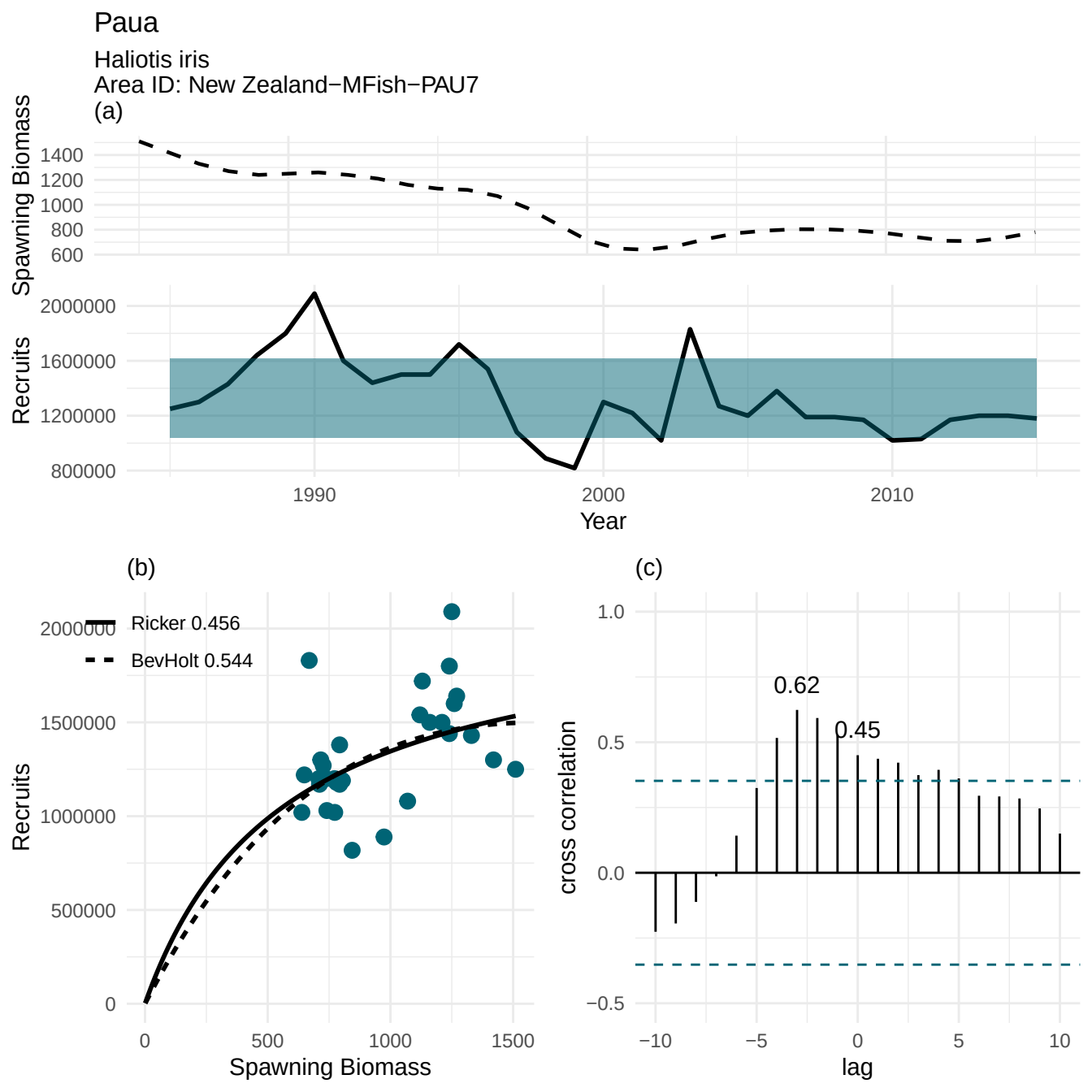

Northern shrimp
Pandalus borealis
Area ID: multinational−ICES−IIIaW−IVaE
(a)
Spawning Biomass
20000
15000
10000
Recruits
1.6e+10
1.2e+10
8.0e+09
4.0e+09
1990
2000
2010
2020
Year
(b)
Ricker 0.544
BevHolt 0.456
Recruits
1.5e+10
1.0e+10
5.0e+09
0.0e+00
0
5000
10000
15000
20000
Spawning Biomass
(c)
0.71
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

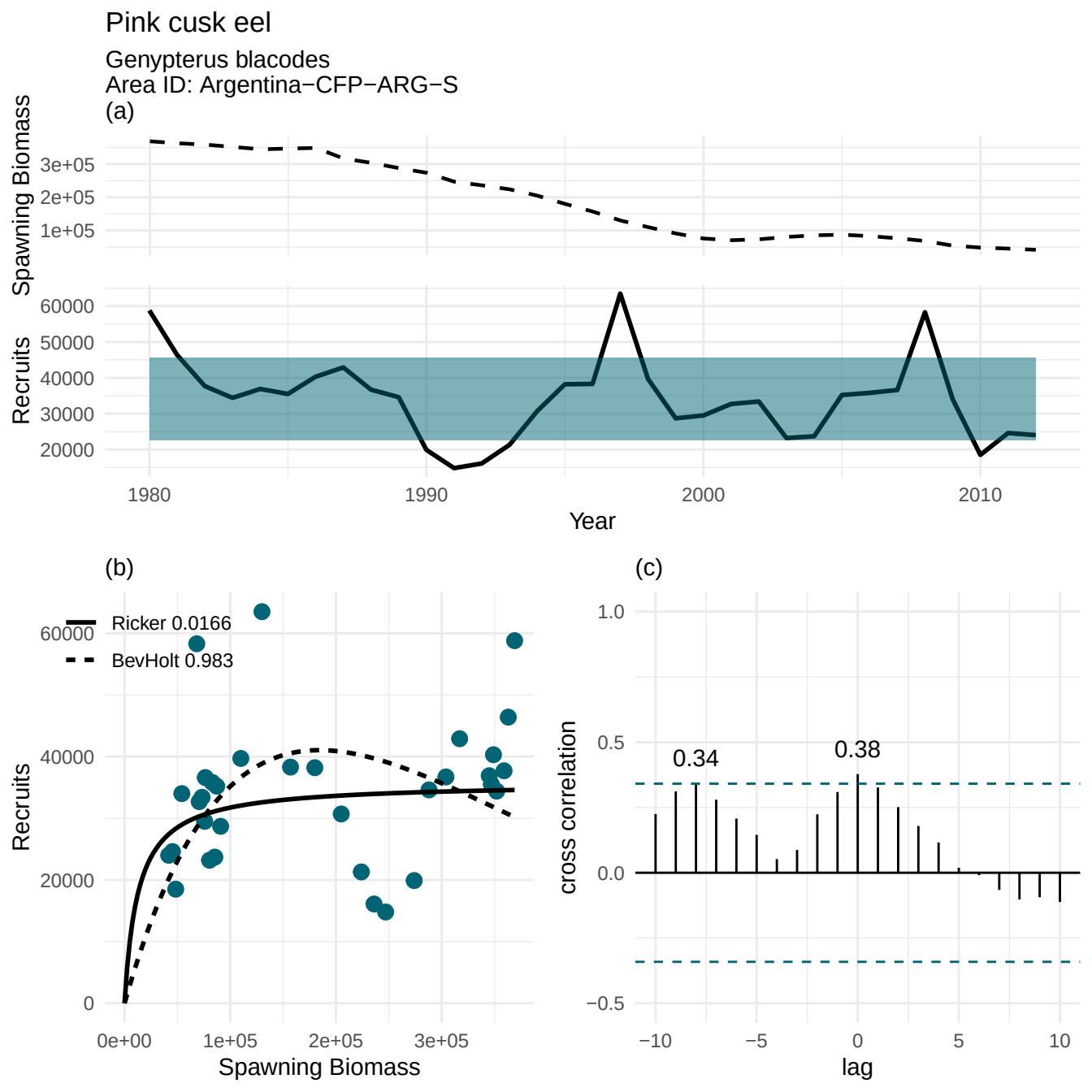

Patagonian grenadier
Macruronus magellanicus
Area ID: Chile−SUBPESCA−CH−CS
(a)
Spawning Biomass
600
400
200
Recruits
5e+09
4e+09
3e+09
2e+09
1e+09
0e+00
1990
2000
2010
2020
Year
(b)
Ricker 0.501
BevHolt 0.499
Recruits
4e+09
2e+09
0e+00
0
200
400
600
Spawning Biomass
(c)
0.81
0.78
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

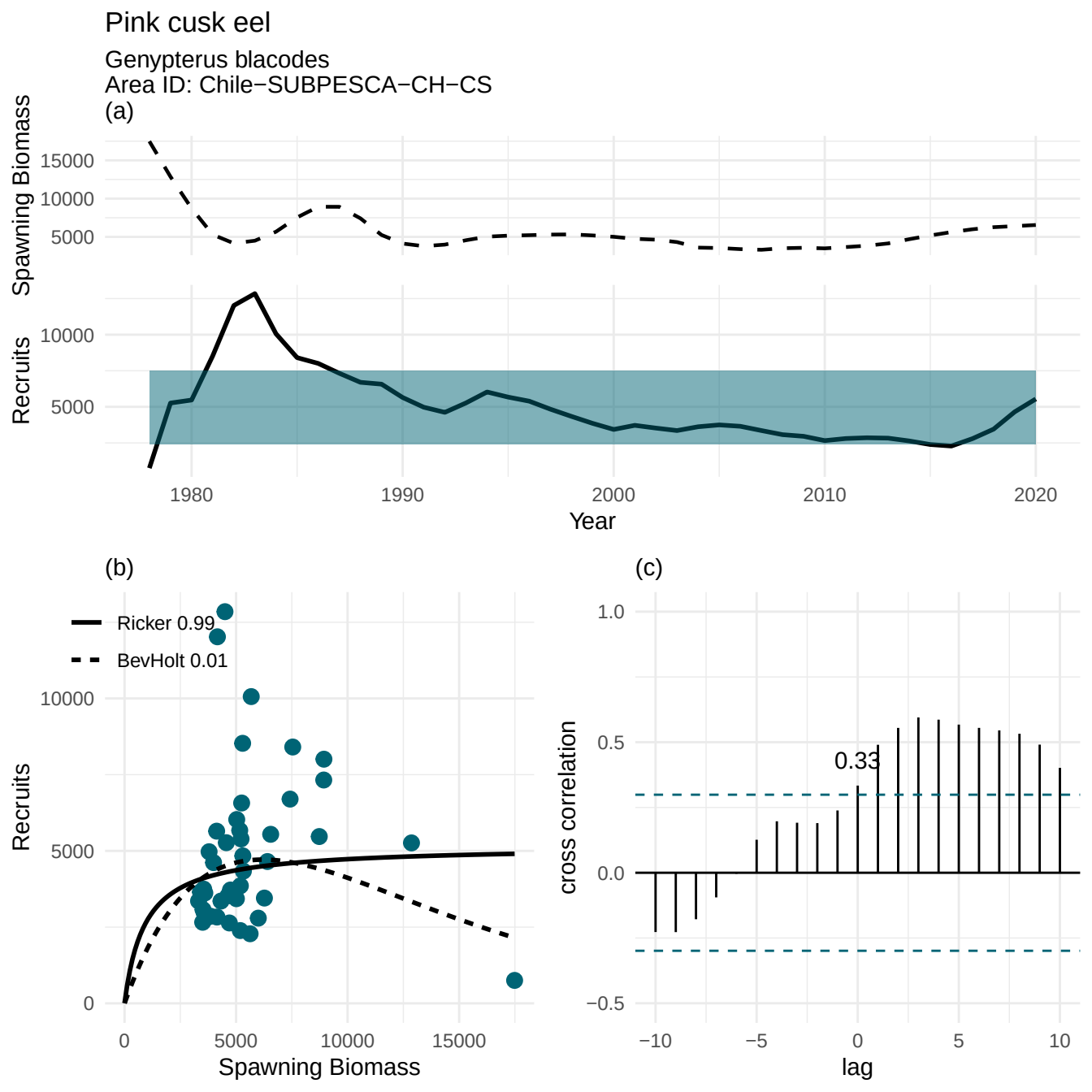

Patagonian grenadier
Macruronus magellanicus
Area ID: Argentina−CFP−ARG−S
(a)
Spawning Biomass
6e+05
5e+05
4e+05
3e+05
2e+05
Recruits
1.5e+09
1.0e+09
5.0e+08
1990
2000
2010
Year
(b)
Ricker 0.544
BevHolt 0.456
Recruits
1.5e+09
1.0e+09
5.0e+08
0.0e+00
0e+00
2e+05
4e+05
6e+05
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.4
−10
−5
0
5
10
lag

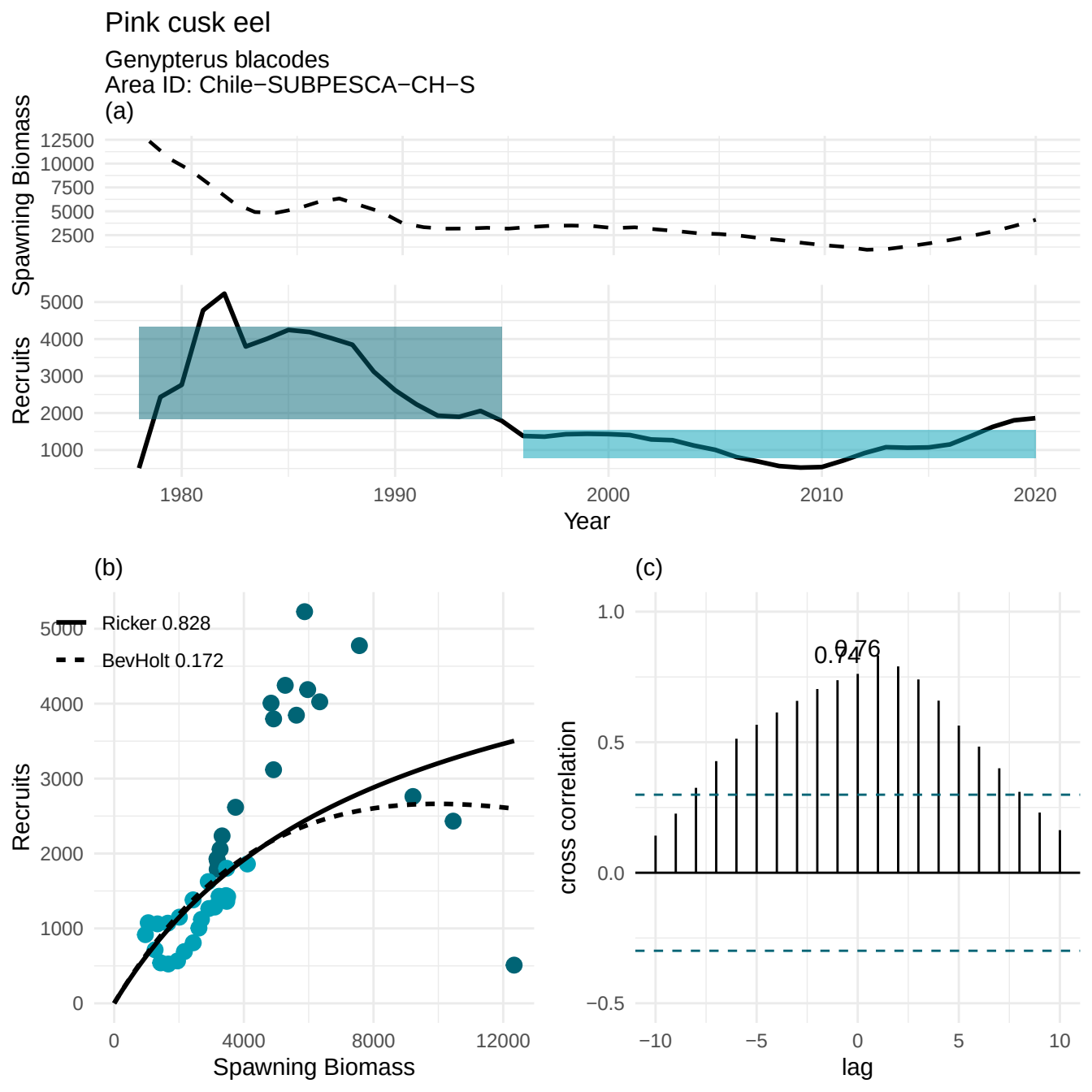

Paua
Haliotis iris
Area ID: New Zealand−MFish−PAU5B
(a)
Spawning Biomass
2500
2000
1500
1000
Recruits
1400000
1200000
1000000
800000
1980
1990
2000
2010
Year
(b)
Ricker 0.517
BevHolt 0.483
Recruits
1500000
1000000
500000
0
0
1000
2000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.64
0.5
−10
−5
0
5
10
lag

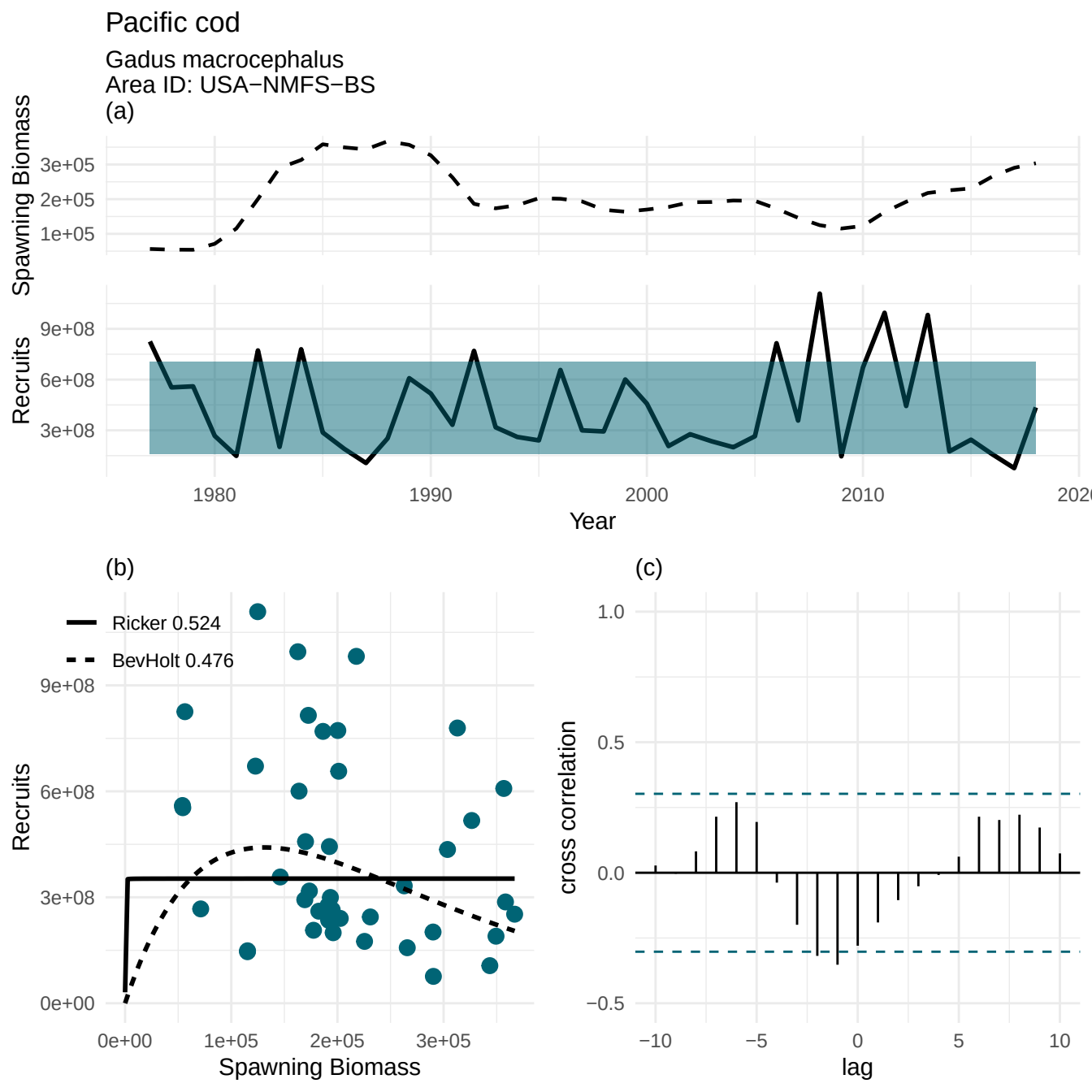

Paua
Haliotis iris
Area ID: New Zealand−MFish−PAU5D
(a)
Spawning Biomass
900
800
700
600
Recruits
1400000
1200000
1000000
800000
1990
1995
2000
2005
2010
Year
(b)
Ricker 0.464
BevHolt 0.536
Recruits
1500000
1000000
500000
0
0
250
500
750
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

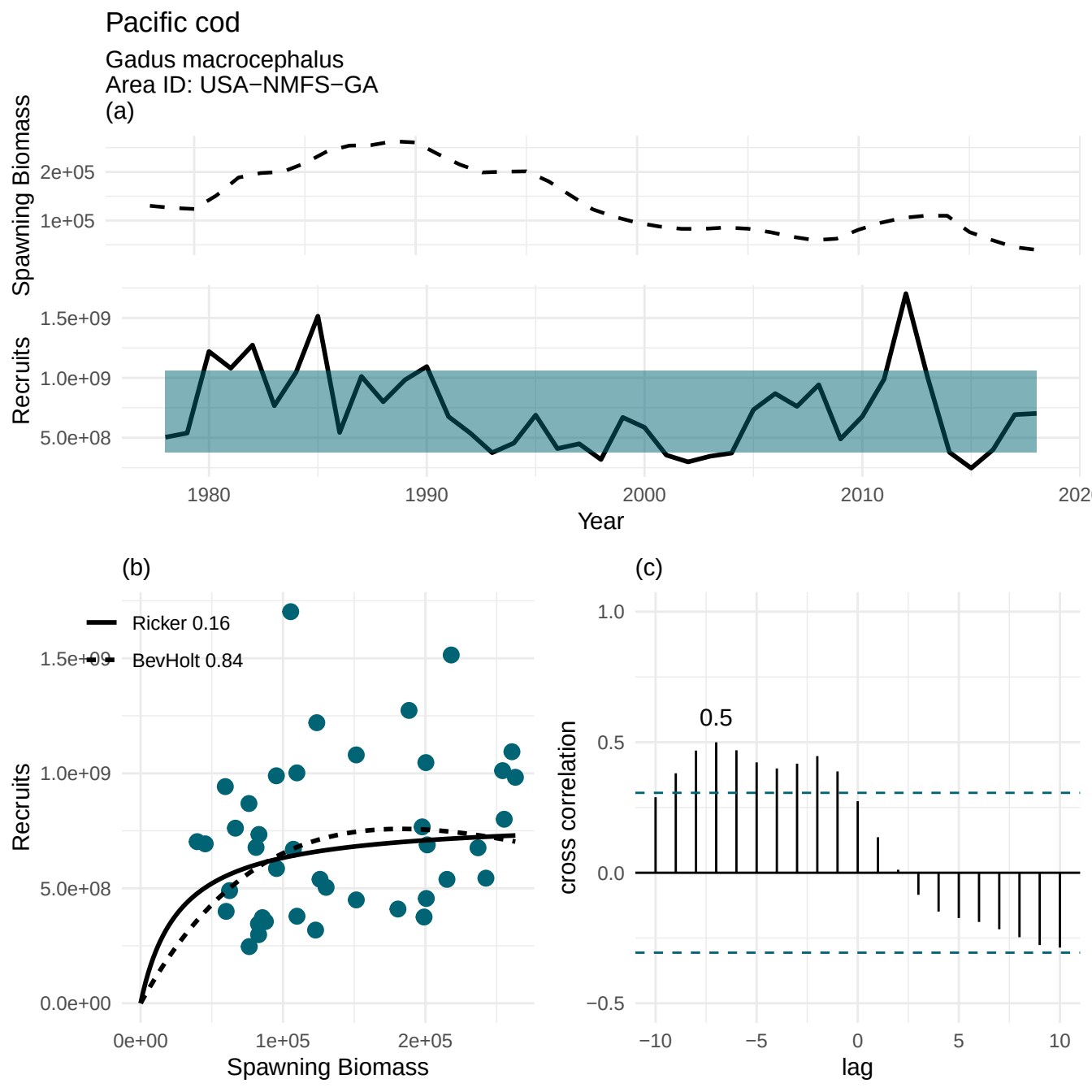

Paua
Haliotis iris
Area ID: New Zealand−MFish−PAU7
(a)
Spawning Biomass
1400
1200
1000
800
600
Recruits
2000000
1600000
1200000
800000
1990
2000
2010
Year
(b)
Ricker 0.456
BevHolt 0.544
Recruits
2000000
1500000
1000000
500000
0
0
500
1000
1500
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.62
0.45
−10
−5
0
5
10
lag

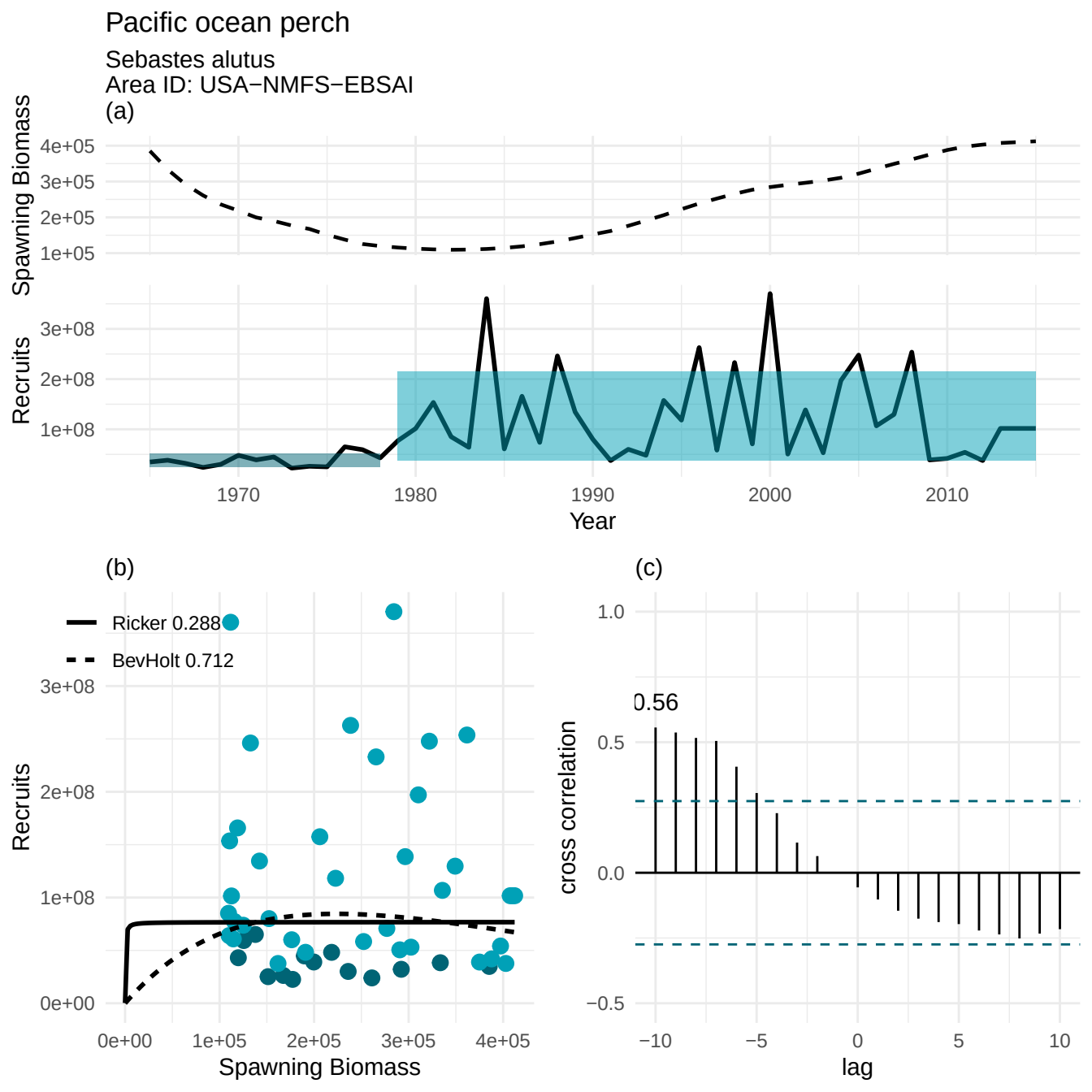

Pink cusk eel
Genypterus blacodes
Area ID: Argentina−CFP−ARG−S
(a)
Spawning Biomass
3e+05
2e+05
1e+05
Recruits
60000
50000
40000
30000
20000
1980
1990
2000
2010
Year
(b)
Ricker 0.0166
BevHolt 0.983
Recruits
60000
40000
20000
0
0e+00
1e+05
2e+05
3e+05
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.34
0.38
−10
−5
0
5
10
lag

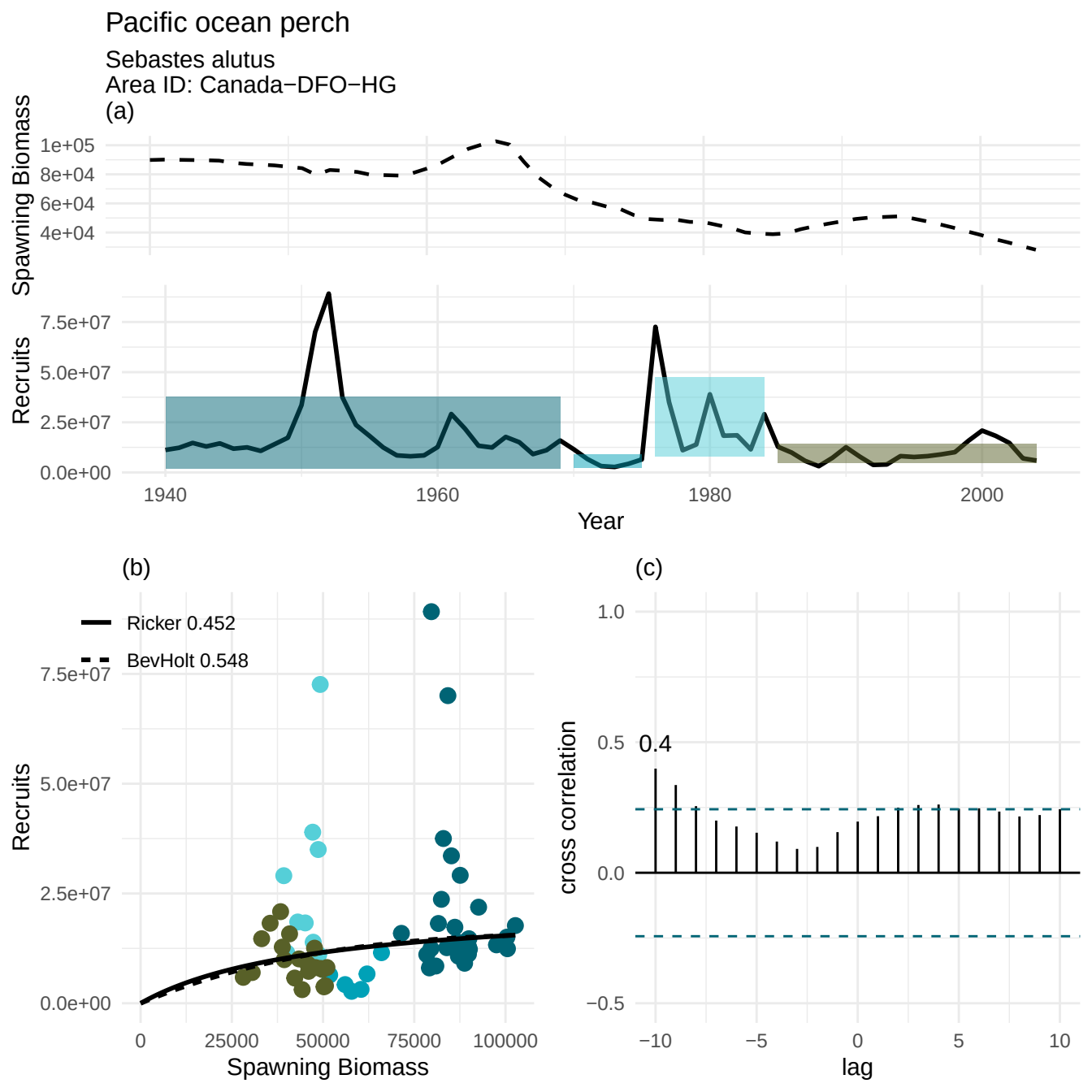

Pink cusk eel
Genypterus blacodes
Area ID: Chile−SUBPESCA−CH−CS
(a)
Spawning Biomass
15000
10000
5000
Recruits
10000
5000
1980
1990
2000
2010
2020
Year
(b)
Ricker 0.99
BevHolt 0.01
Recruits
10000
5000
0
0
5000
10000
15000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.33
−10
−5
0
5
10
lag

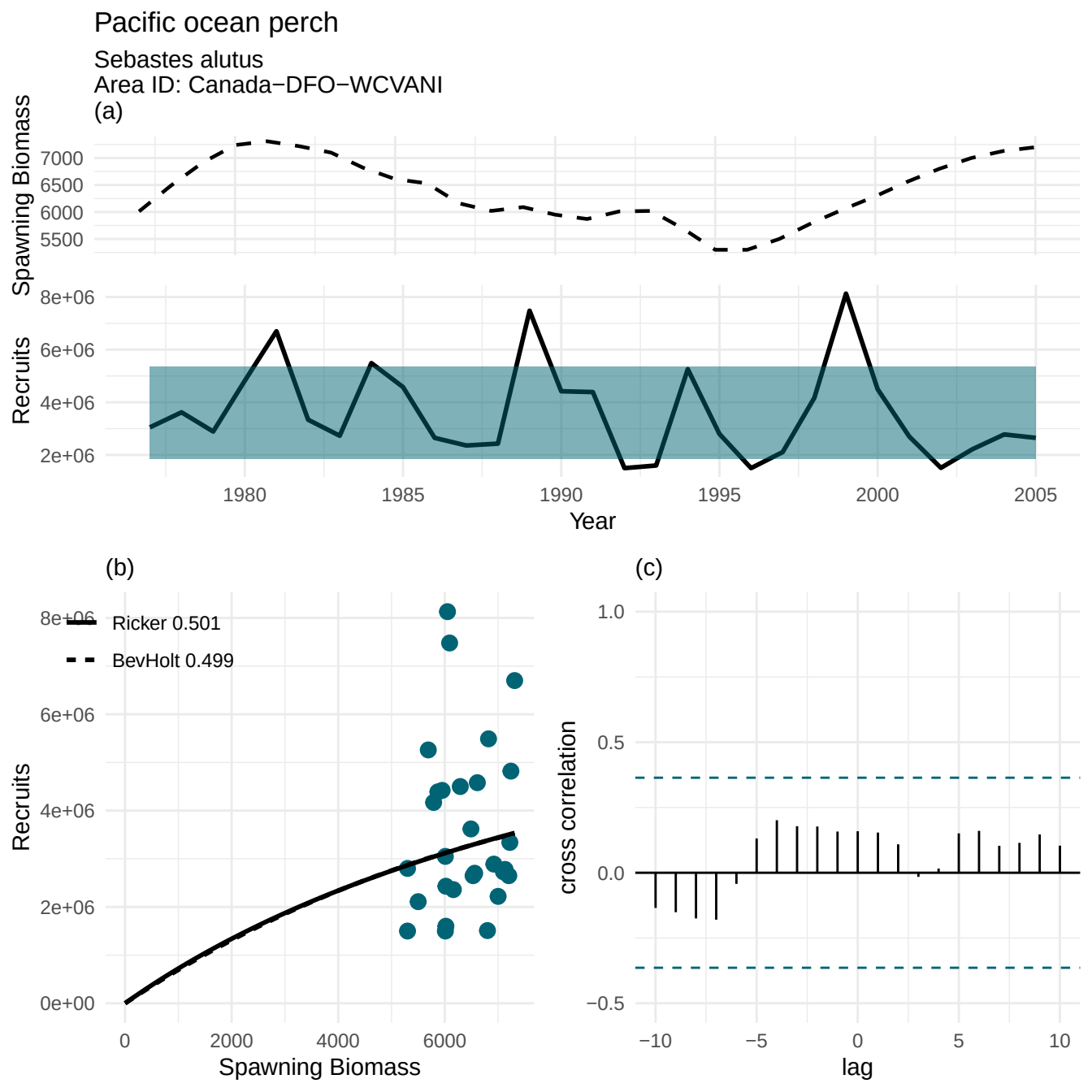

Pink cusk eel
Genypterus blacodes
Area ID: Chile−SUBPESCA−CH−S
(a)
Spawning Biomass
12500
10000
7500
5000
2500
Recruits
5000
4000
3000
2000
1000
1980
1990
2000
2010
2020
Year
(b)
Ricker 0.828
BevHolt 0.172
Recruits
5000
4000
3000
2000
1000
0
0
4000
8000
12000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.76
−10
−5
0
5
10
lag

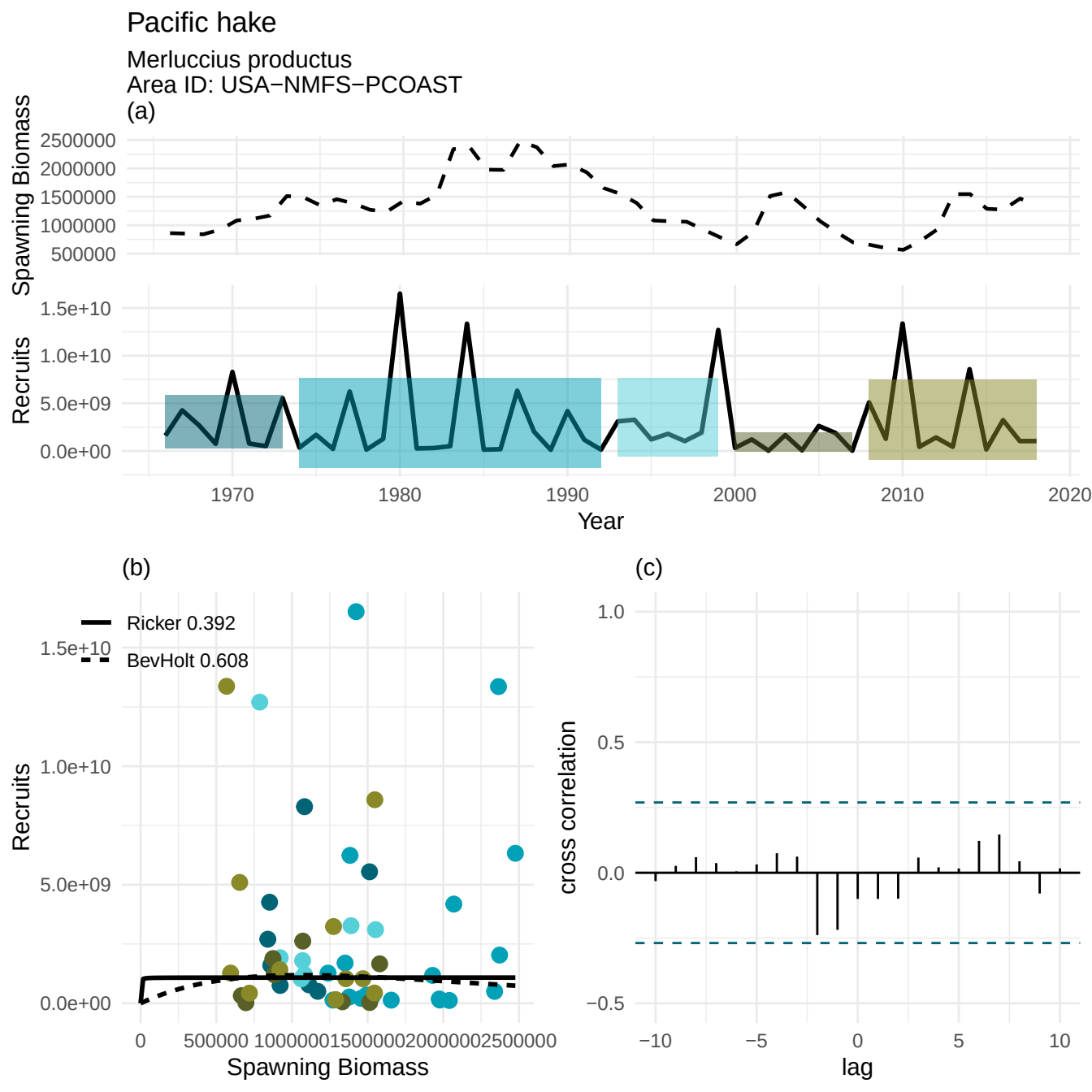

Pacific cod
Gadus macrocephalus
Area ID: USA−NMFS−BS
(a)
Spawning Biomass
3e+05
2e+05
1e+05
Recruits
9e+08
6e+08
3e+08
1980
1990
2000
2010
Year
(b)
Ricker 0.524
BevHolt 0.476
Recruits
9e+08
6e+08
3e+08
0e+00
0e+00
1e+05
2e+05
3e+05
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

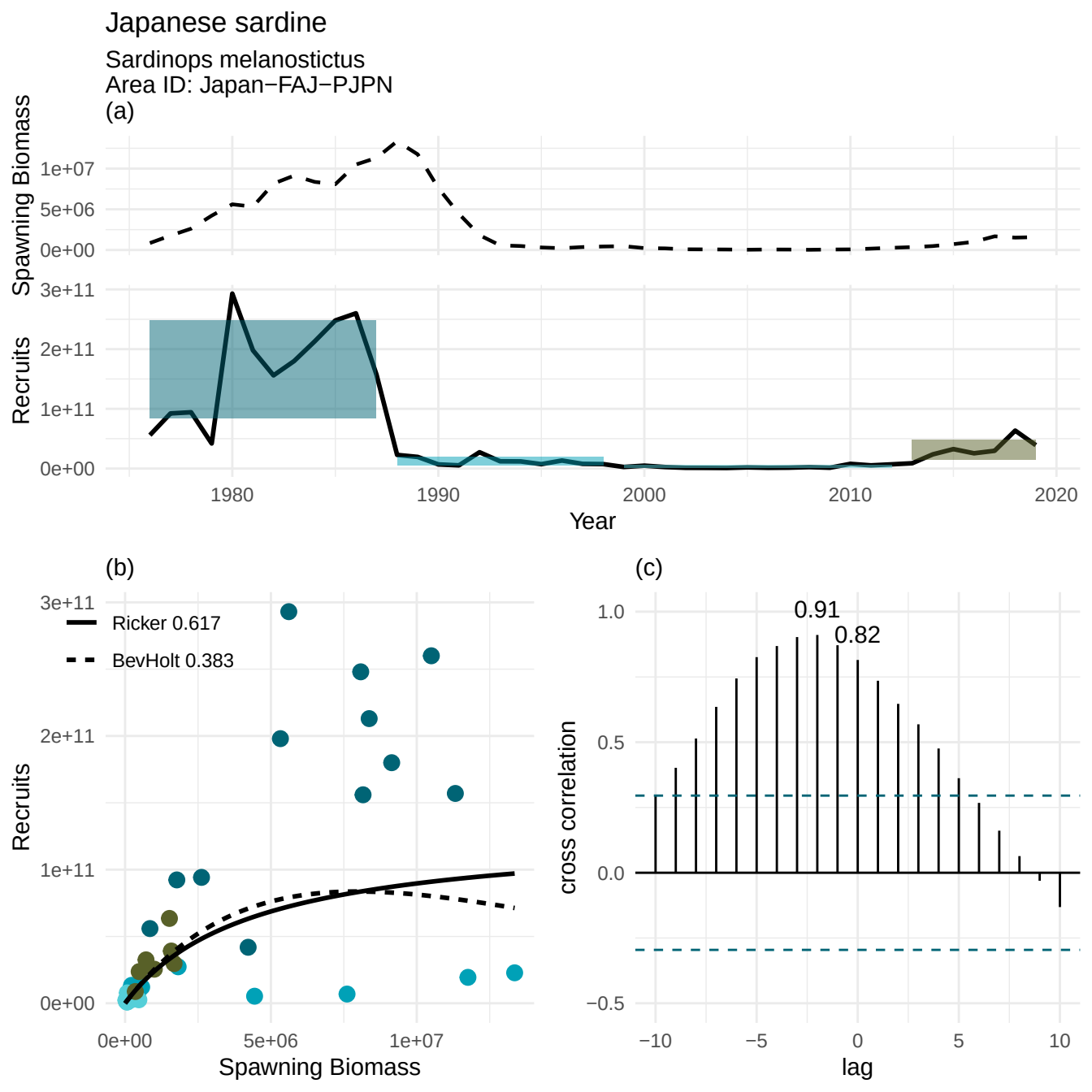

Pacific cod
Gadus macrocephalus
Area ID: USA−NMFS−GA
(a)
Spawning Biomass
2e+05
1e+05
Recruits
1.5e+09
1.0e+09
5.0e+08
1980
1990
2000
2010
202
Year
(b)
Ricker 0.16
BevHolt 0.84
Recruits
1.5e+09
1.0e+09
5.0e+08
0.0e+00
0e+00
1e+05
2e+05
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.5
−10
−5
0
5
10
lag

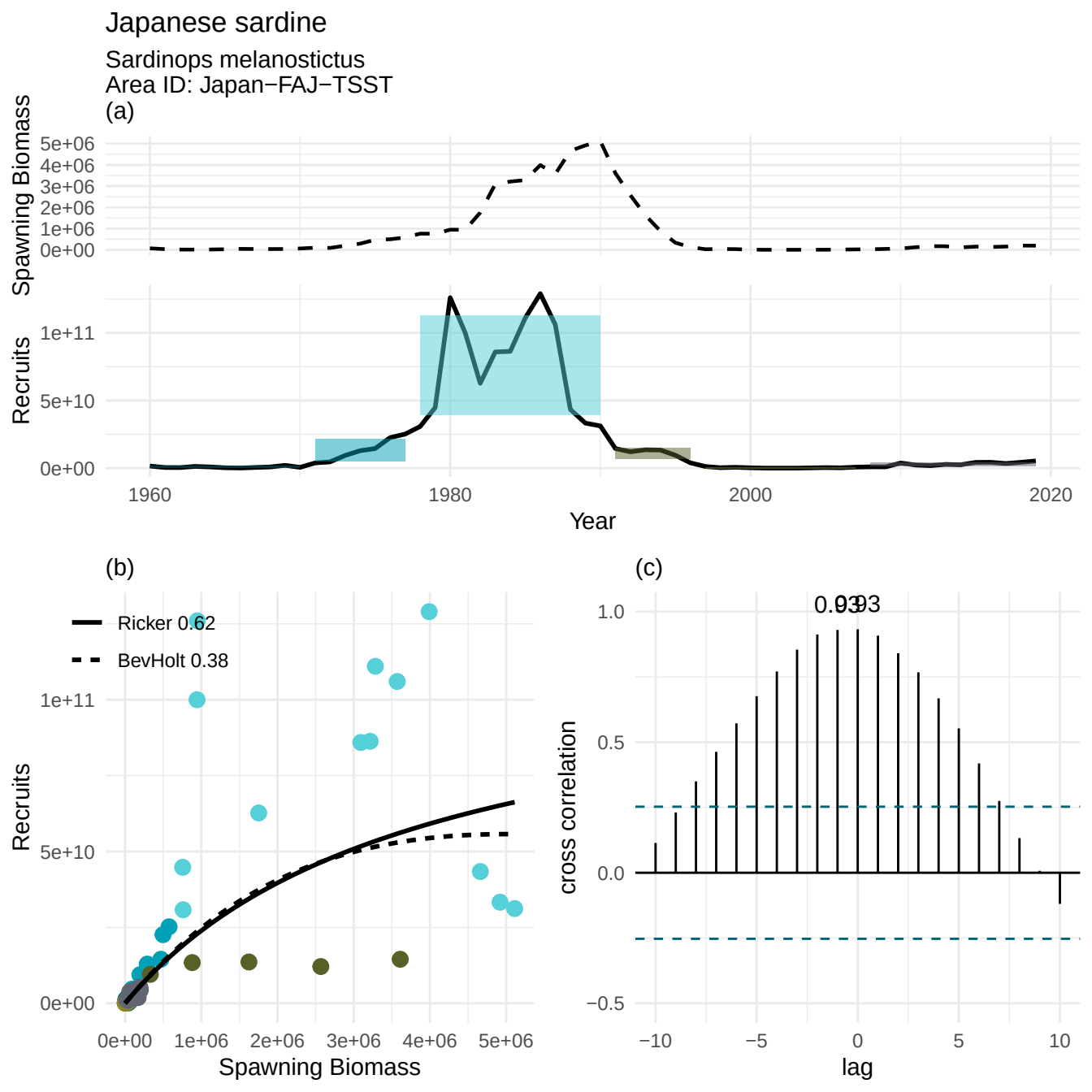

Pacific ocean perch
Sebastes alutus
Area ID: USA−NMFS−EBSAI
(a)
Spawning Biomass
4e+05
3e+05
2e+05
1e+05
Recruits
3e+08
2e+08
1e+08
1970
1980
1990
2000
2010
Year
(b)
Ricker 0.288
BevHolt 0.712
Recruits
3e+08
2e+08
1e+08
0e+00
0e+00
1e+05
2e+05
3e+05
4e+05
Spawning Biomass
(c)
1.0
0.56
0.5
0.0
−0.5
cross correlation
−10
−5
0
5
10
lag

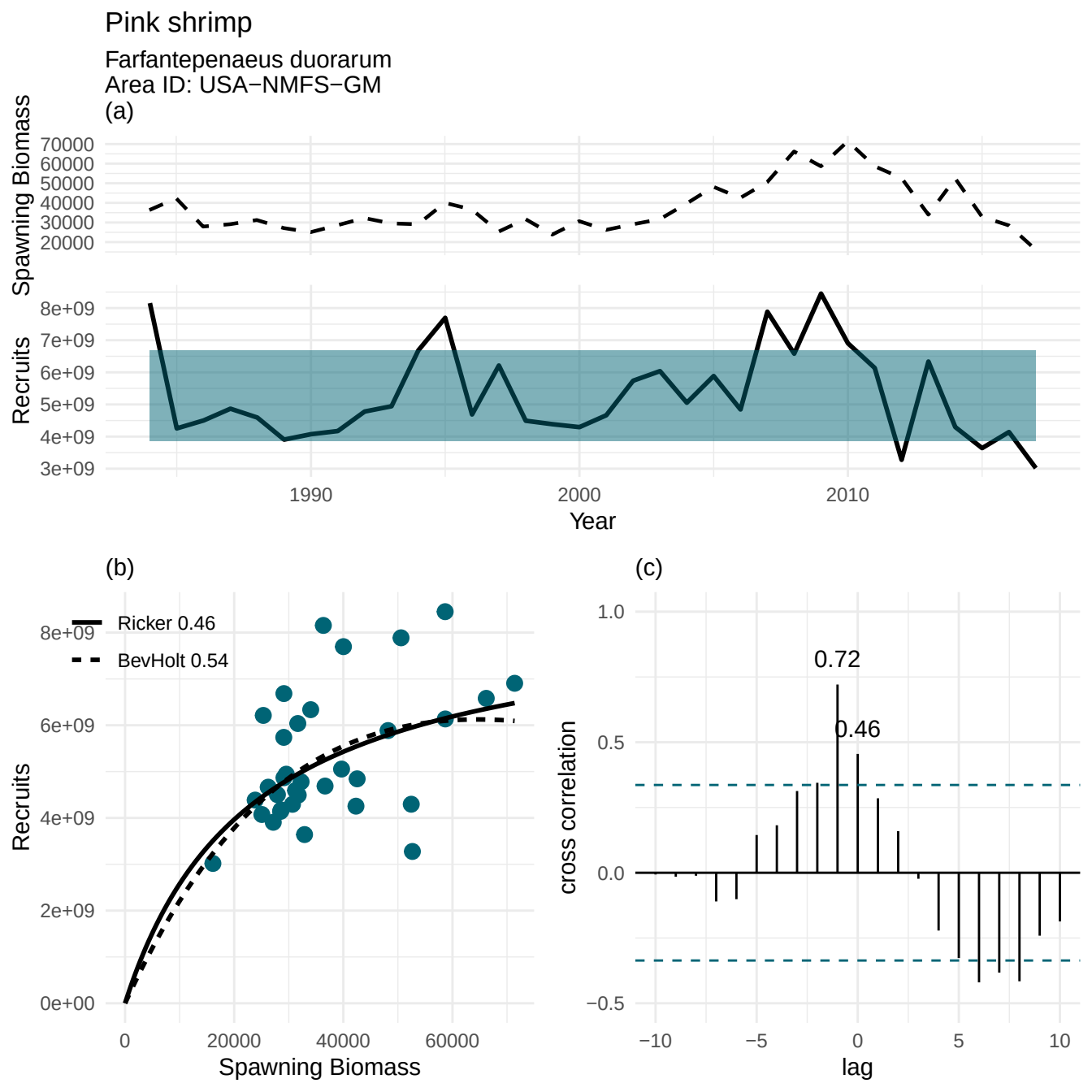

Pacific ocean perch
Sebastes alutus
Area ID: Canada−DFO−HG
(a)
Spawning Biomass
1e+05
8e+04
6e+04
4e+04
Recruits
7.5e+07
5.0e+07
2.5e+07
0.0e+00
1940
1960
1980
2000
Year
(b)
Ricker 0.452
BevHolt 0.548
Recruits
7.5e+07
5.0e+07
2.5e+07
0.0e+00
0
25000
50000
75000
100000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.4
−10
−5
0
5
10
lag

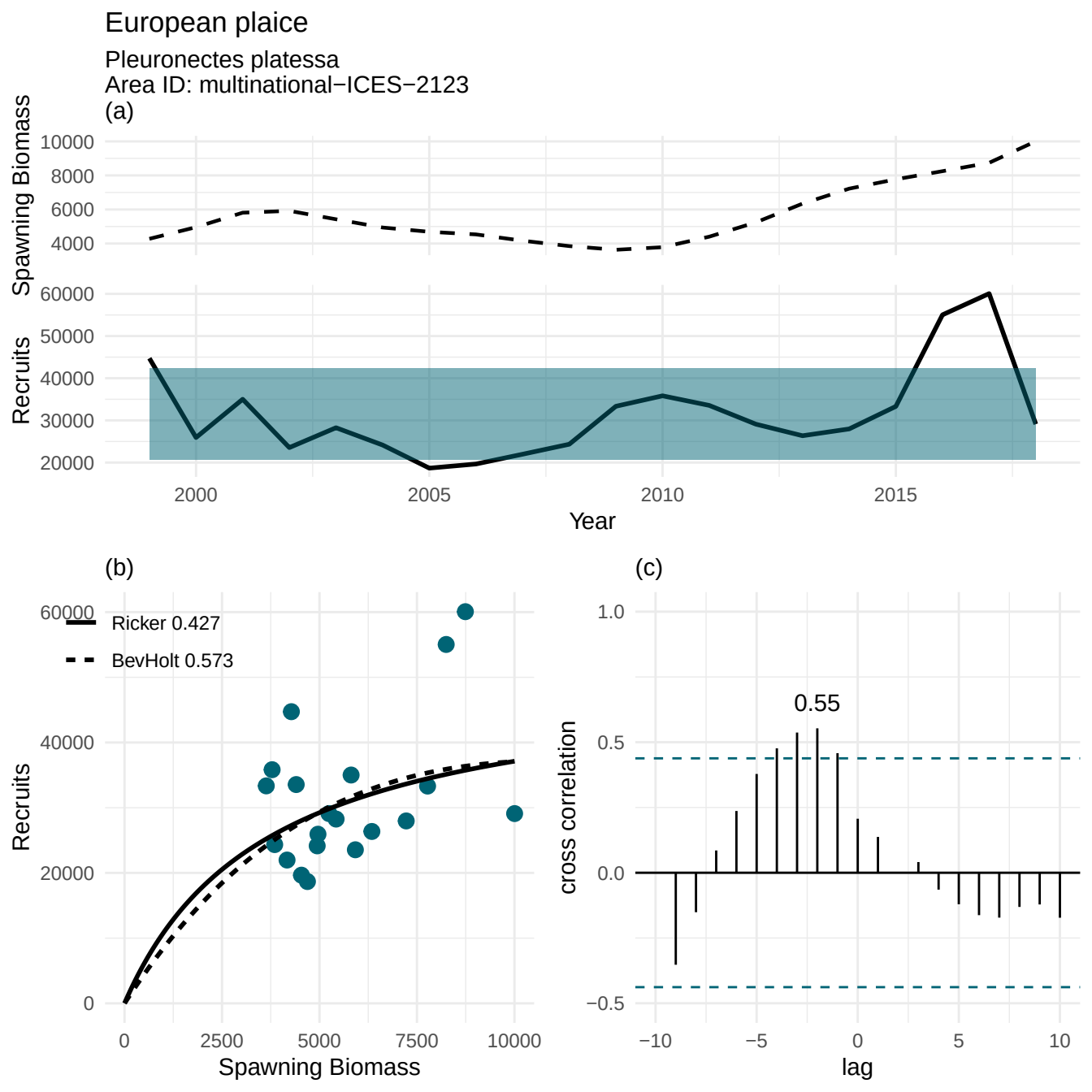

Pacific ocean perch
Sebastes alutus
Area ID: Canada−DFO−WCVANI
(a)
Spawning Biomass
7000
6500
6000
5500
Recruits
8e+06
6e+06
4e+06
2e+06
1980
1985
1990
1995
2000
2005
Year
(b)
Ricker 0.501
BevHolt 0.499
Recruits
8e+06
6e+06
4e+06
2e+06
0e+00
0
2000
4000
6000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

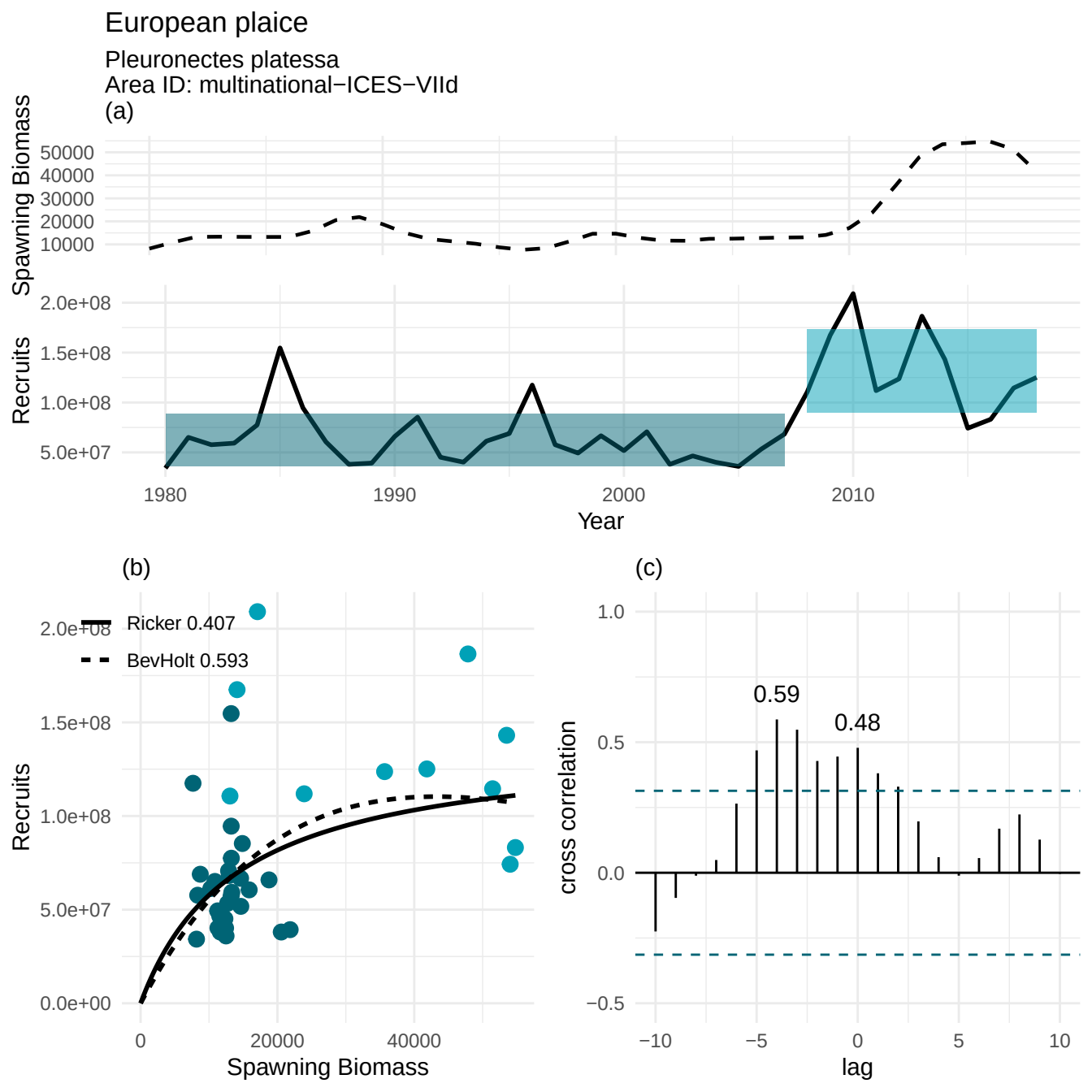

Pacific hake
Merluccius productus
Area ID: USA−NMFS−PCOAST
(a)
Spawning Biomass
2500000
2000000
1500000
1000000
500000
Recruits
1.5e+10
1.0e+10
5.0e+09
0.0e+00
1970
1980
1990
2000
2010
2020
Year
(b)
Ricker 0.392
BevHolt 0.608
Recruits
1.5e+10
1.0e+10
5.0e+09
0.0e+00
0
500000
1000000
1500000
2000000
2500000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

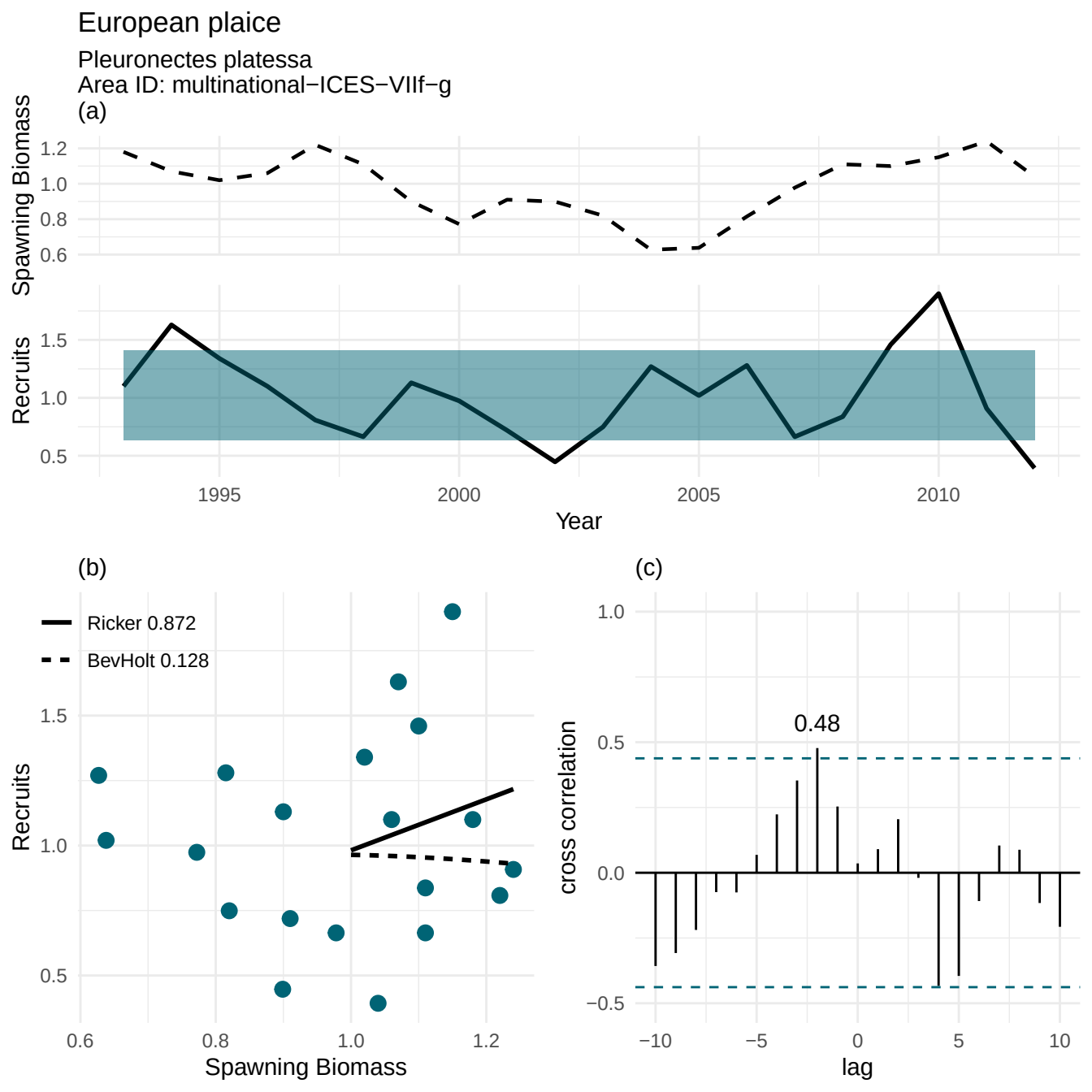

Japanese sardine
Sardinops melanostictus
Area ID: Japan−FAJ−PJPN
(a)
Spawning Biomass
1e+07
5e+06
0e+00
Recruits
3e+11
2e+11
1e+11
0e+00
1980
1990
2000
2010
2020
Year
(b)
Ricker 0.617
BevHolt 0.383
Recruits
3e+11
2e+11
1e+11
0e+00
0e+00
5e+06
1e+07
Spawning Biomass
(c)
0.91
0.82
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

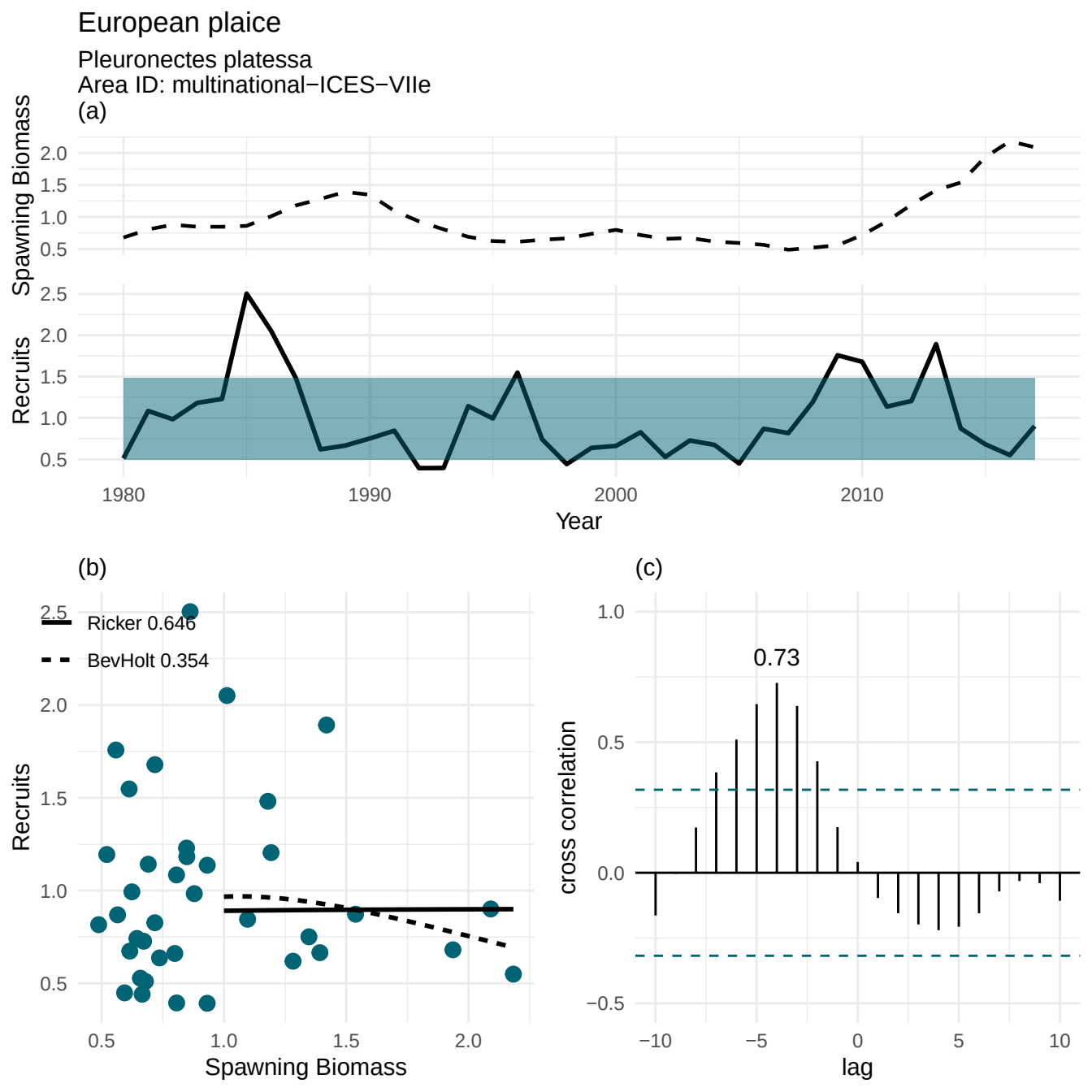

Japanese sardine
Sardinops melanostictus
Area ID: Japan−FAJ−TSST
(a)
Spawning Biomass
5e+06
4e+06
3e+06
2e+06
1e+06
0e+00
Recruits
1e+11
5e+10
0e+00
1960
1980
2000
2020
Year
(b)
Ricker 0.62
BevHolt 0.38
Recruits
1e+11
5e+10
0e+00
0e+00
1e+06
2e+06
3e+06
4e+06
5e+06
Spawning Biomass
(c)
0.93
1.0
0.5
0.0
−0.5
cross correlation
−10
−5
0
5
10
lag

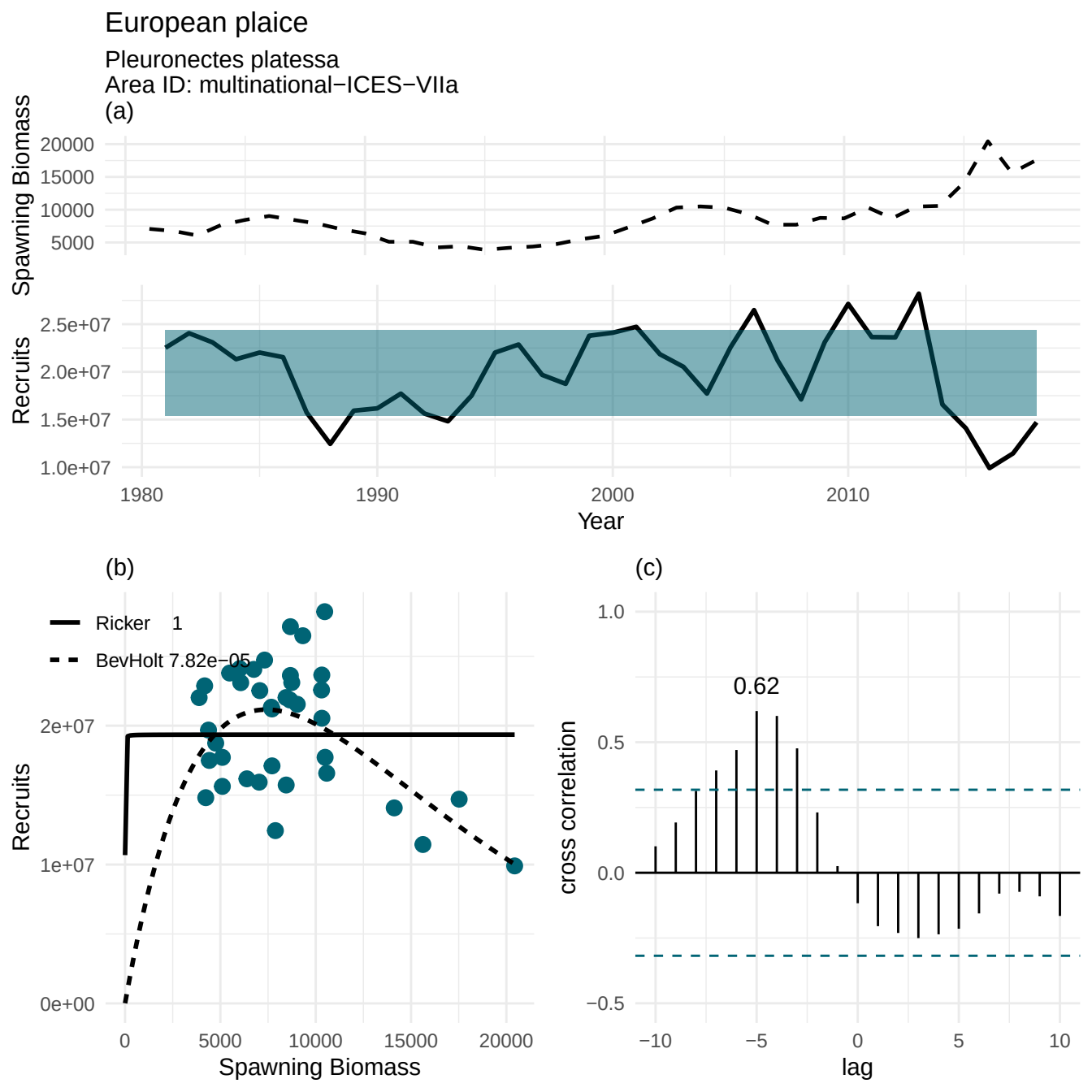

Pink shrimp
Farfantepenaeus duorarum
Area ID: USA−NMFS−GM
(a)
Spawning Biomass
70000
60000
50000
40000
30000
20000
Recruits
8e+09
7e+09
6e+09
5e+09
4e+09
3e+09
1990
2000
2010
Year
(b)
Ricker 0.46
BevHolt 0.54
Recruits
8e+09
6e+09
4e+09
2e+09
0e+00
0
20000
40000
60000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.72
0.46
−10
−5
0
5
10
lag

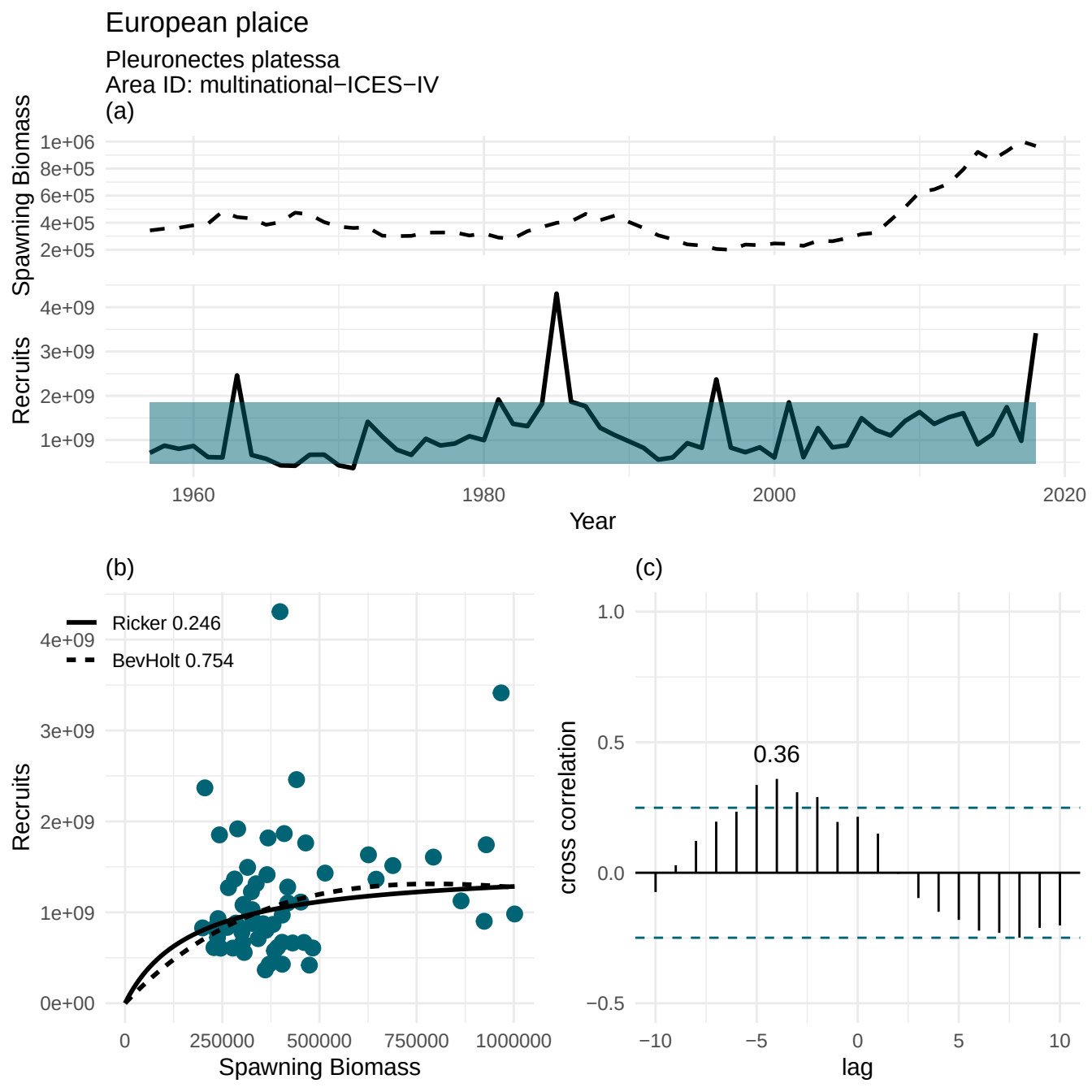

European plaice
Pleuronectes platessa
Area ID: multinational−ICES−2123
(a)
Spawning Biomass
10000
8000
6000
4000
Recruits
60000
50000
40000
30000
20000
2000
2005
2010
2015
Year
(b)
Ricker 0.427
BevHolt 0.573
Recruits
60000
40000
20000
0
0
2500
5000
7500
10000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.55
−10
−5
0
5
10
lag

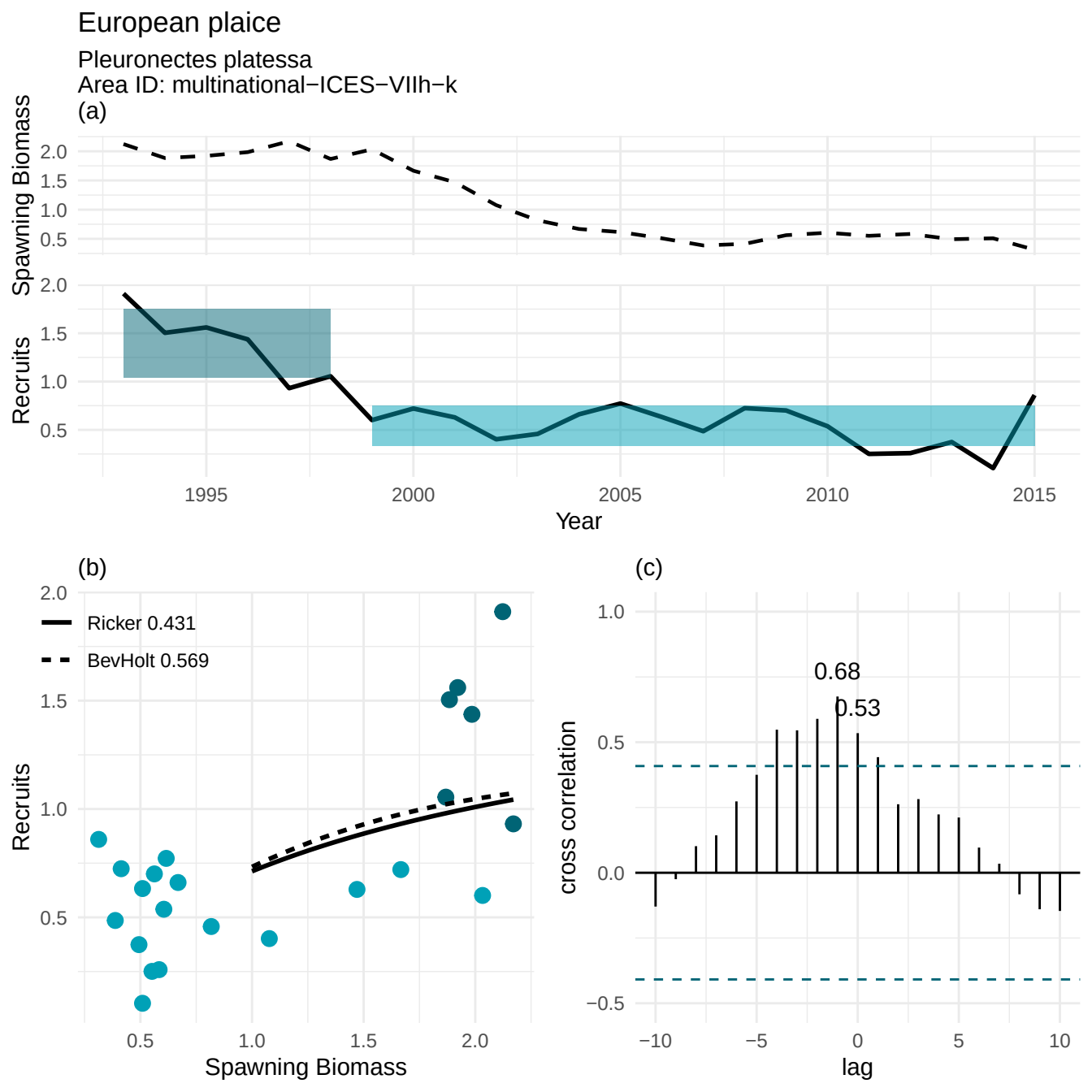

European plaice
Pleuronectes platessa
Area ID: multinational−ICES−VIId
(a)
Spawning Biomass
50000
40000
30000
20000
10000
Recruits
2.0e+08
1.5e+08
1.0e+08
5.0e+07
1980
1990
2000
2010
Year
(b)
Ricker 0.407
BevHolt 0.593
Recruits
2.0e+08
1.5e+08
1.0e+08
5.0e+07
0.0e+00
0
20000
40000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.59
0.48
−10
−5
0
5
10
lag

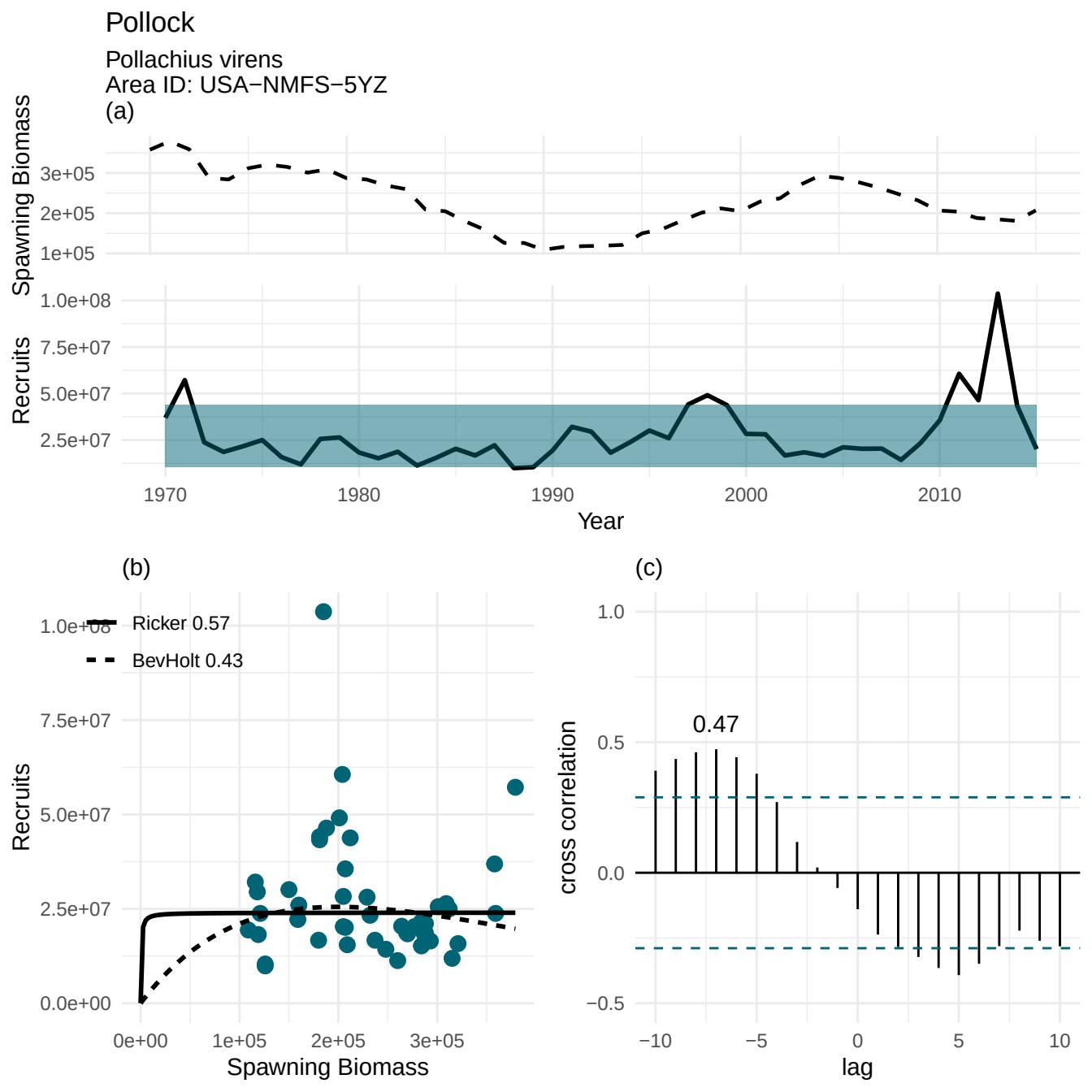

European plaice
Pleuronectes platessa
Area ID: multinational−ICES−VIIf−g
(a)
Spawning Biomass
1.2
1.0
0.8
0.6
Recruits
1.5
1.0
0.5
1995
2000
2005
2010
Year
(b)
Ricker 0.872
BevHolt 0.128
Recruits
1.5
1.0
0.5
0.6
0.8
1.0
1.2
Spawning Biomass
(c)
1.0
0.5
0.0
−0.5
0.48
cross correlation
−10
−5
0
5
10
lag

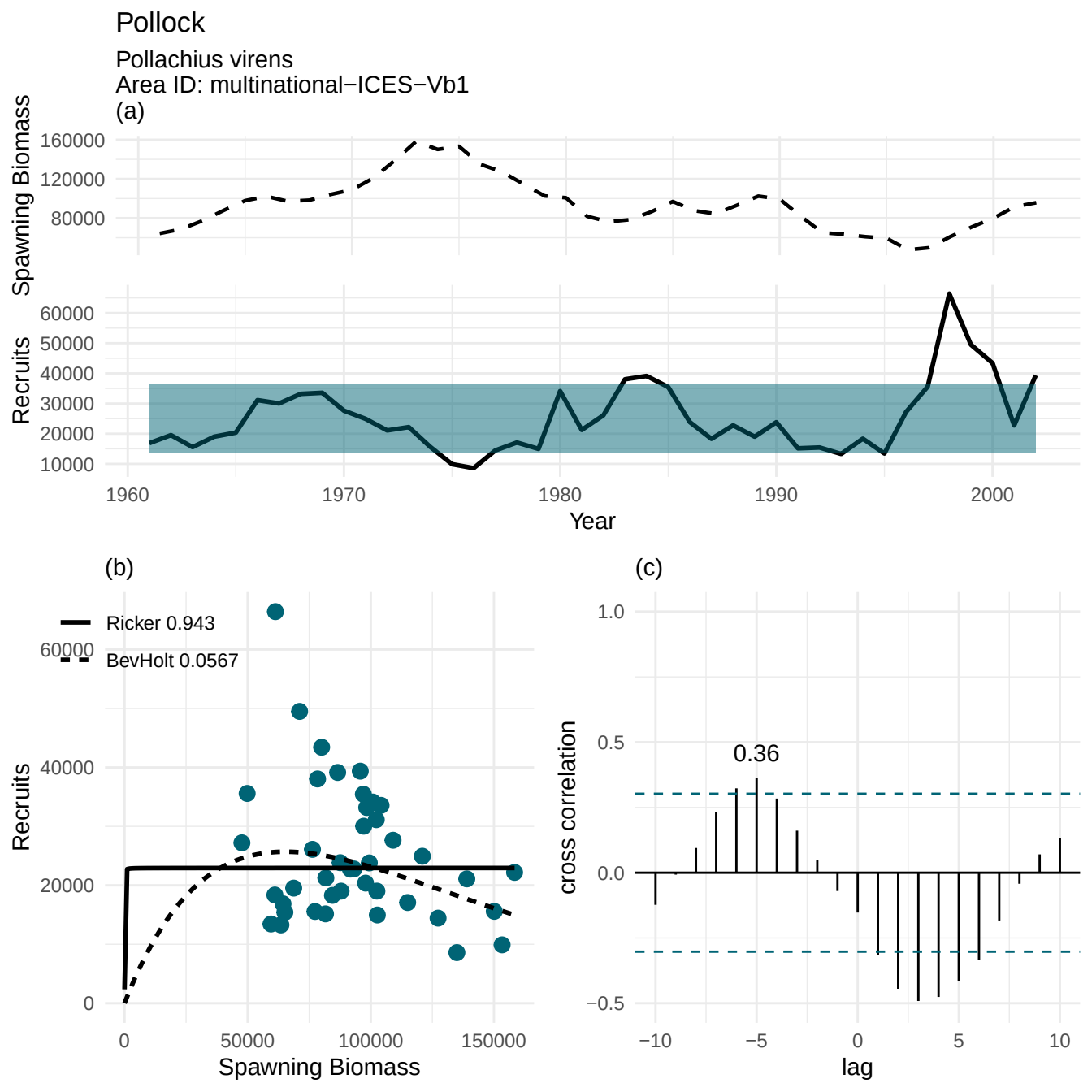

European plaice
Pleuronectes platessa
Area ID: multinational−ICES−VIIe
(a)
Spawning Biomass
2.0
1.5
1.0
0.5
Recruits
2.5
2.0
1.5
1.0
0.5
1980
1990
2000
2010
Year
(b)
Ricker 0.646
BevHolt 0.354
Recruits
2.5
2.0
1.5
1.0
0.5
0.5
1.0
1.5
2.0
Spawning Biomass
(c)
0.73
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

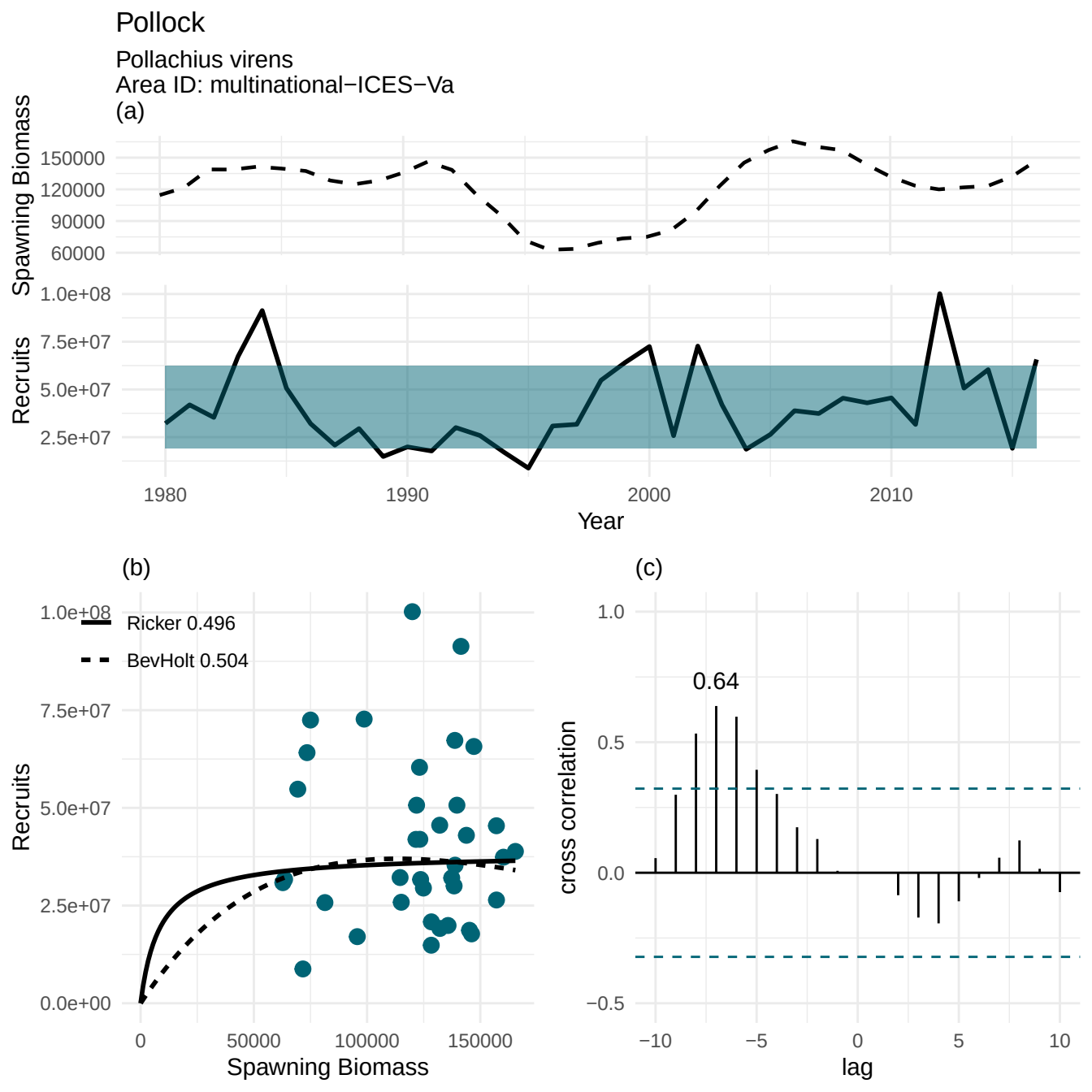

European plaice
Pleuronectes platessa
Area ID: multinational−ICES−VIIa
(a)
Spawning Biomass
20000
15000
10000
5000
Recruits
2.5e+07
2.0e+07
1.5e+07
1.0e+07
1980
1990
2000
2010
Year
(b)
Ricker 1
BevHolt 7.82e−05
Recruits
2e+07
1e+07
0e+00
0
5000
10000
15000
20000
Spawning Biomass
(c)
1.0
0.5
0.0
−0.5
0.62
cross correlation
−10
−5
0
5
10
lag

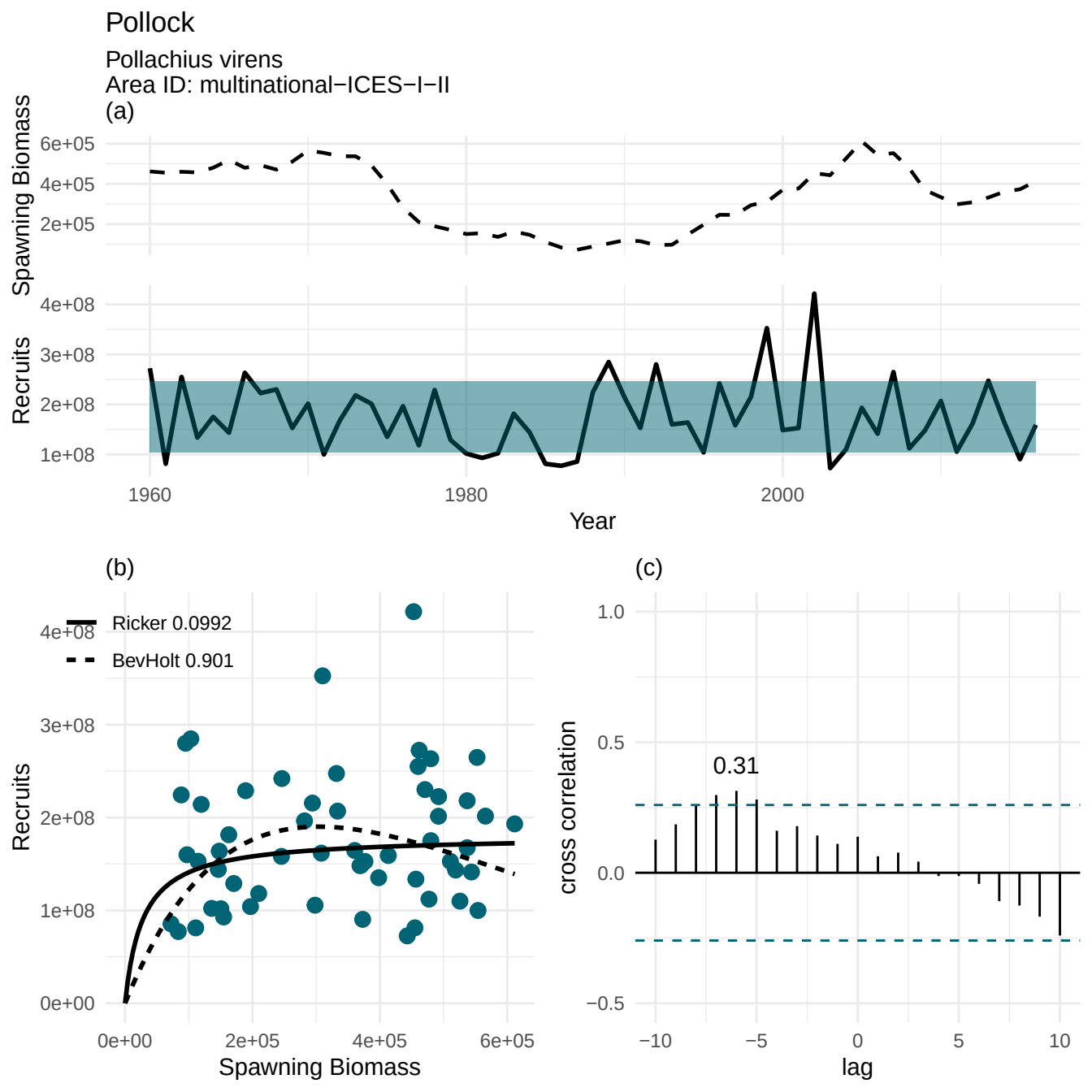

European plaice
Pleuronectes platessa
Area ID: multinational−ICES−IV
(a)
Spawning Biomass
1e+06
8e+05
6e+05
4e+05
2e+05
Recruits
4e+09
3e+09
2e+09
1e+09
1960
1980
2000
2020
Year
(b)
Ricker 0.246
BevHolt 0.754
Recruits
4e+09
3e+09
2e+09
1e+09
0e+00
0
250000
500000
750000
1000000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.36
−10
−5
0
5
10
lag

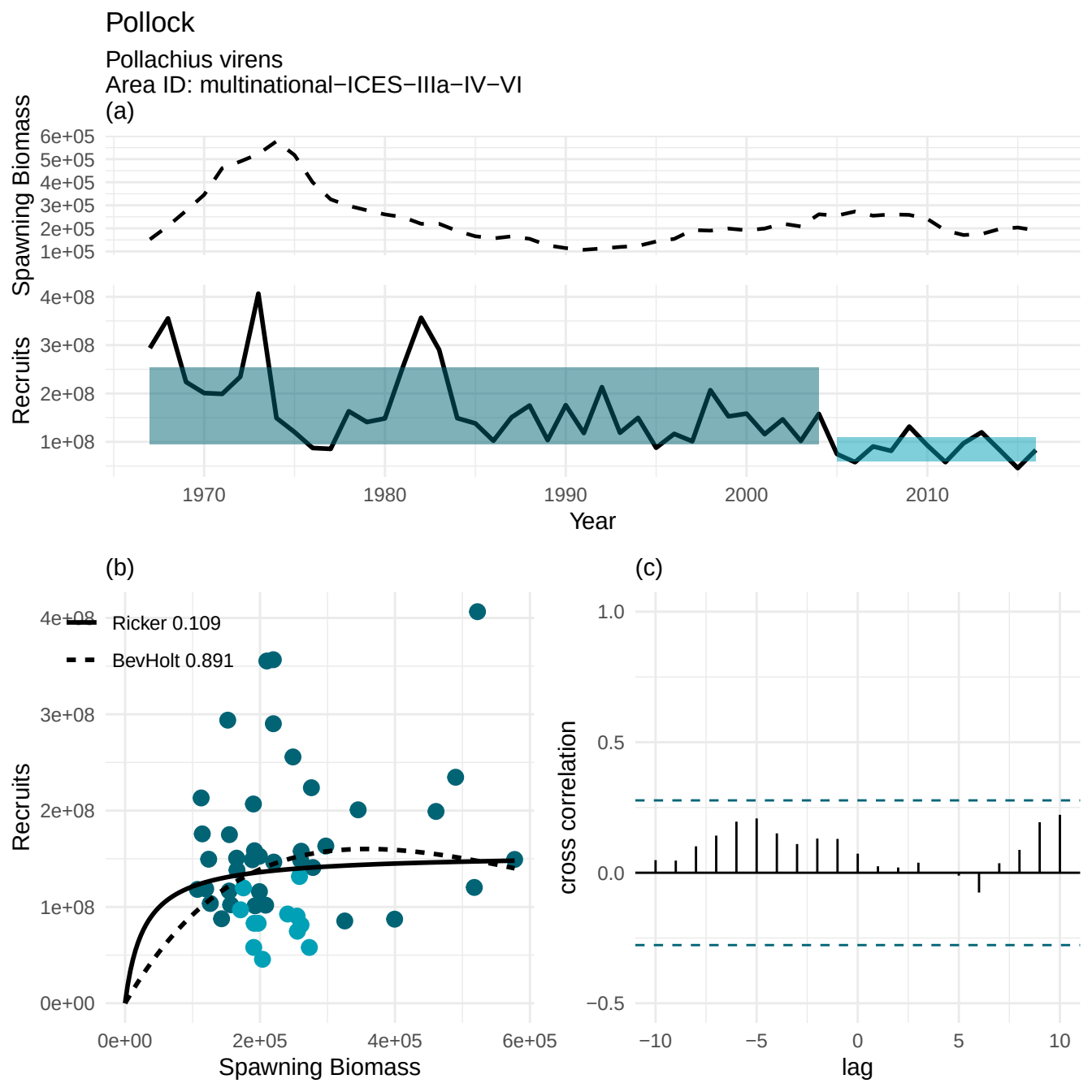

European plaice
Pleuronectes platessa
Area ID: multinational−ICES−VIIh−k
(a)
Spawning Biomass
Recruits
Year
(b)
Ricker 0.431
BevHolt 0.569
Recruits
Spawning Biomass
(c)
0.68
0.53
cross correlation
lag

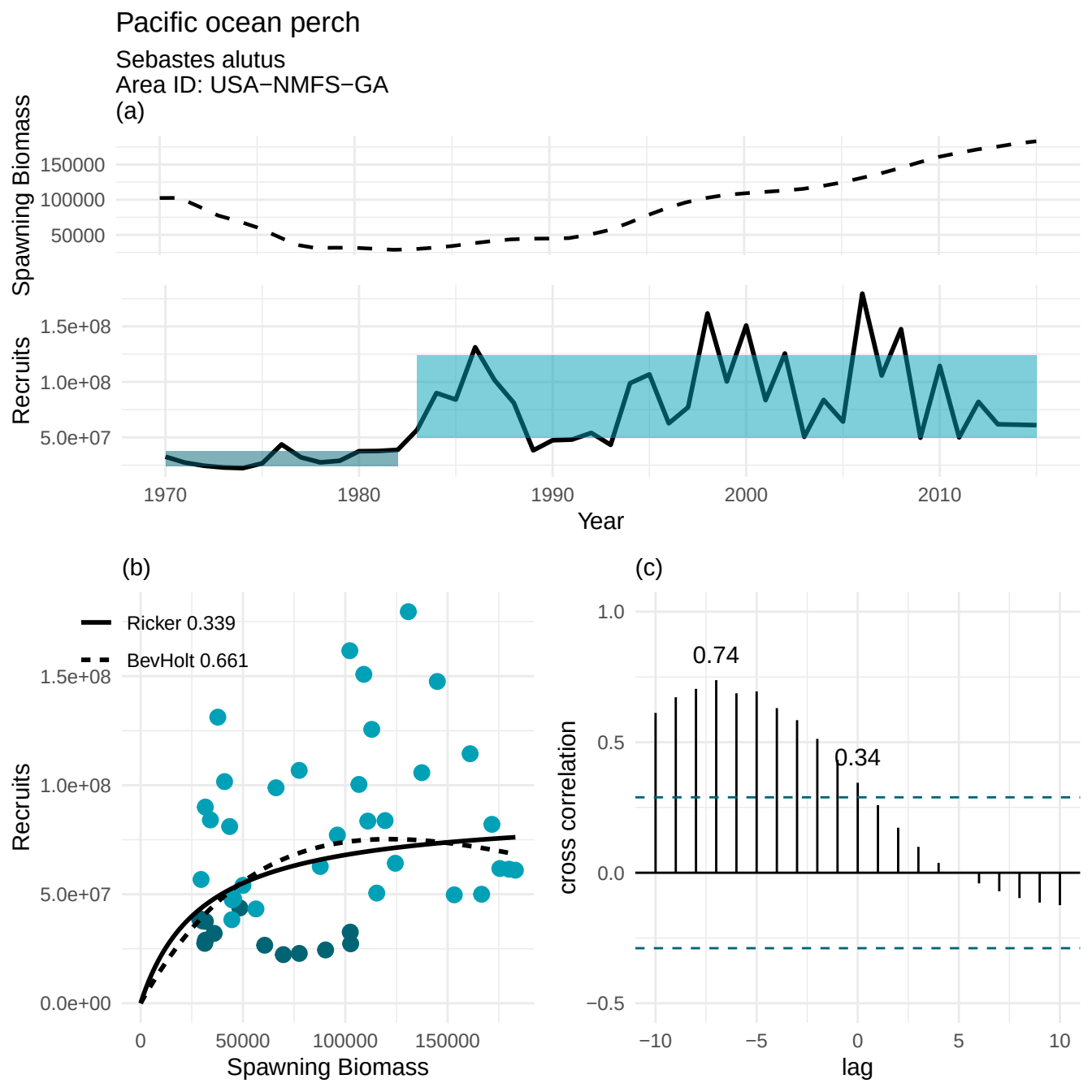

Pollock
Pollachius virens
Area ID: USA−NMFS−5YZ
(a)
Spawning Biomass
3e+05
2e+05
1e+05
Recruits
1.0e+08
7.5e+07
5.0e+07
2.5e+07
1970
1980
1990
2000
2010
Year
(b)
Ricker 0.57
BevHolt 0.43
Recruits
1.0e+08
7.5e+07
5.0e+07
2.5e+07
0.0e+00
0e+00
1e+05
2e+05
3e+05
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.47
−10
−5
0
5
10
lag

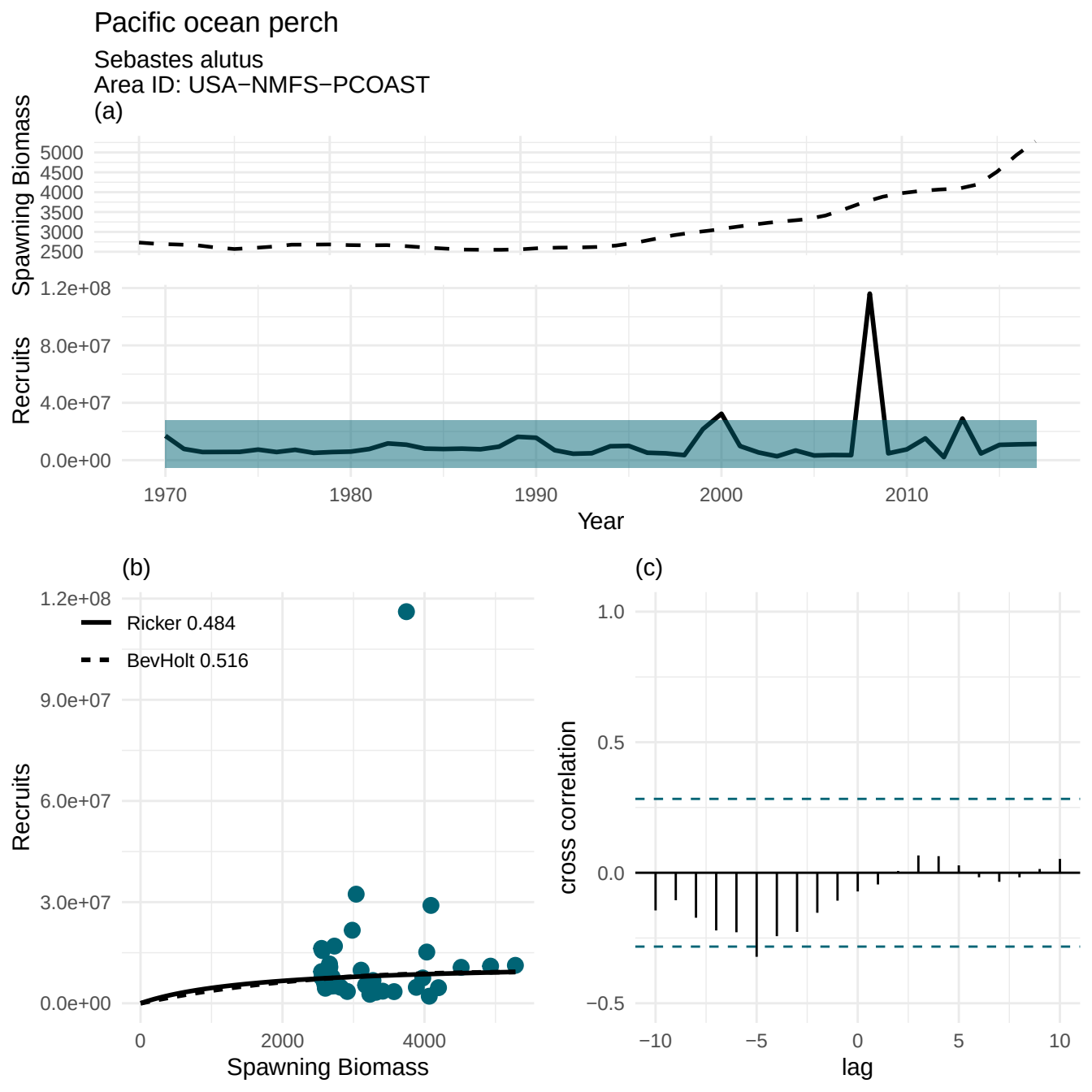

Pollock
Pollachius virens
Area ID: multinational−ICES−Vb1
(a)
Spawning Biomass
160000
120000
80000
Recruits
60000
50000
40000
30000
20000
10000
1960
1970
1980
1990
2000
Year
(b)
Ricker 0.943
BevHolt 0.0567
Recruits
60000
40000
20000
0
0
50000
100000
150000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.36
−10
−5
0
5
10
lag

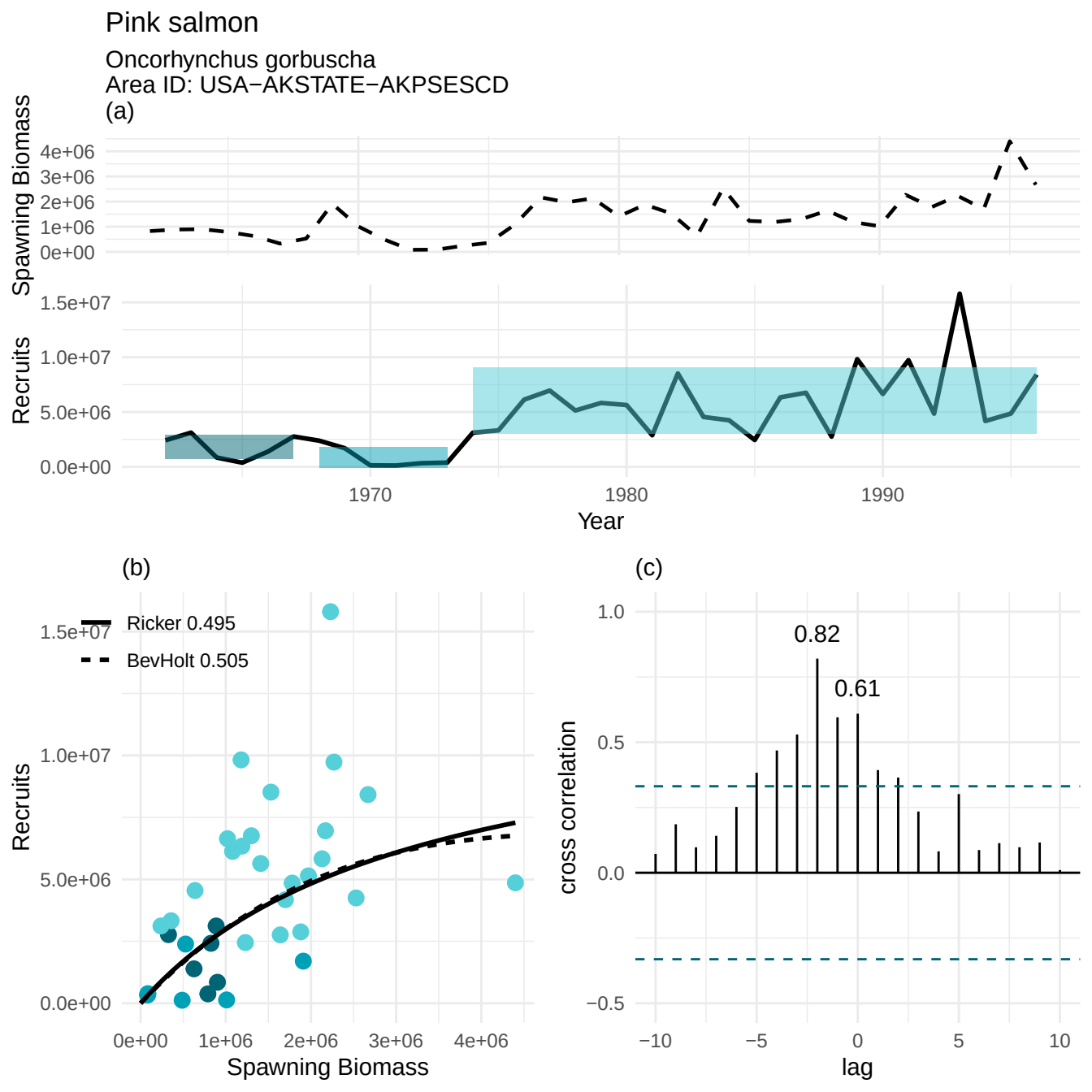

Pollock
Pollachius virens
Area ID: multinational−ICES−Va
(a)
Spawning Biomass
150000
120000
90000
60000
Recruits
1.0e+08
7.5e+07
5.0e+07
2.5e+07
1980
1990
2000
2010
Year
(b)
Ricker 0.496
BevHolt 0.504
Recruits
1.0e+08
7.5e+07
5.0e+07
2.5e+07
0.0e+00
0
50000
100000
150000
Spawning Biomass
(c)
0.64
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

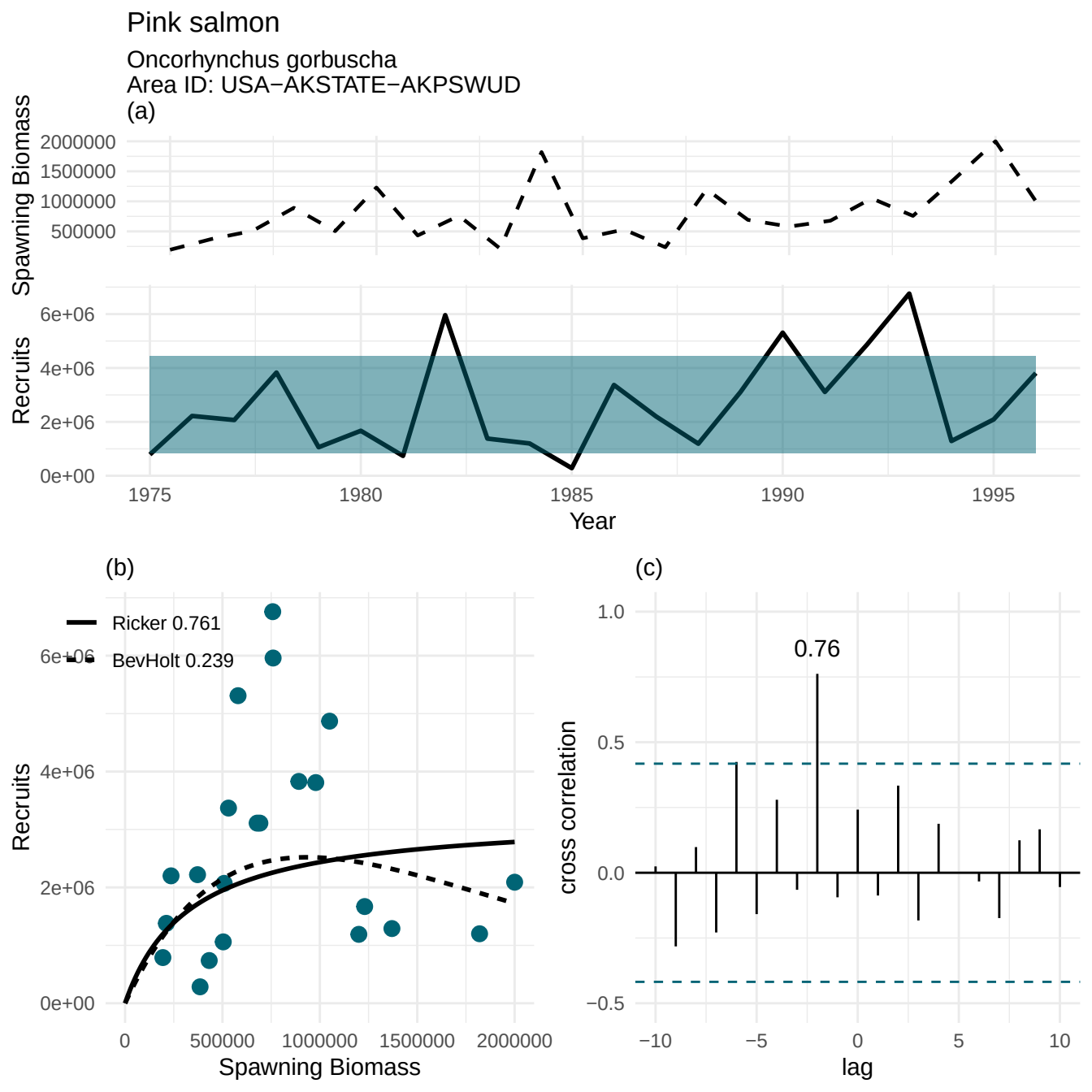

Pollock
Pollachius virens
Area ID: multinational−ICES−I−II
(a)
Spawning Biomass
6e+05
4e+05
2e+05
Recruits
4e+08
3e+08
2e+08
1e+08
1960
1980
2000
Year
(b)
Ricker 0.0992
BevHolt 0.901
Recruits
4e+08
3e+08
2e+08
1e+08
0e+00
0e+00
2e+05
4e+05
6e+05
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.31
−10
−5
0
5
10
lag

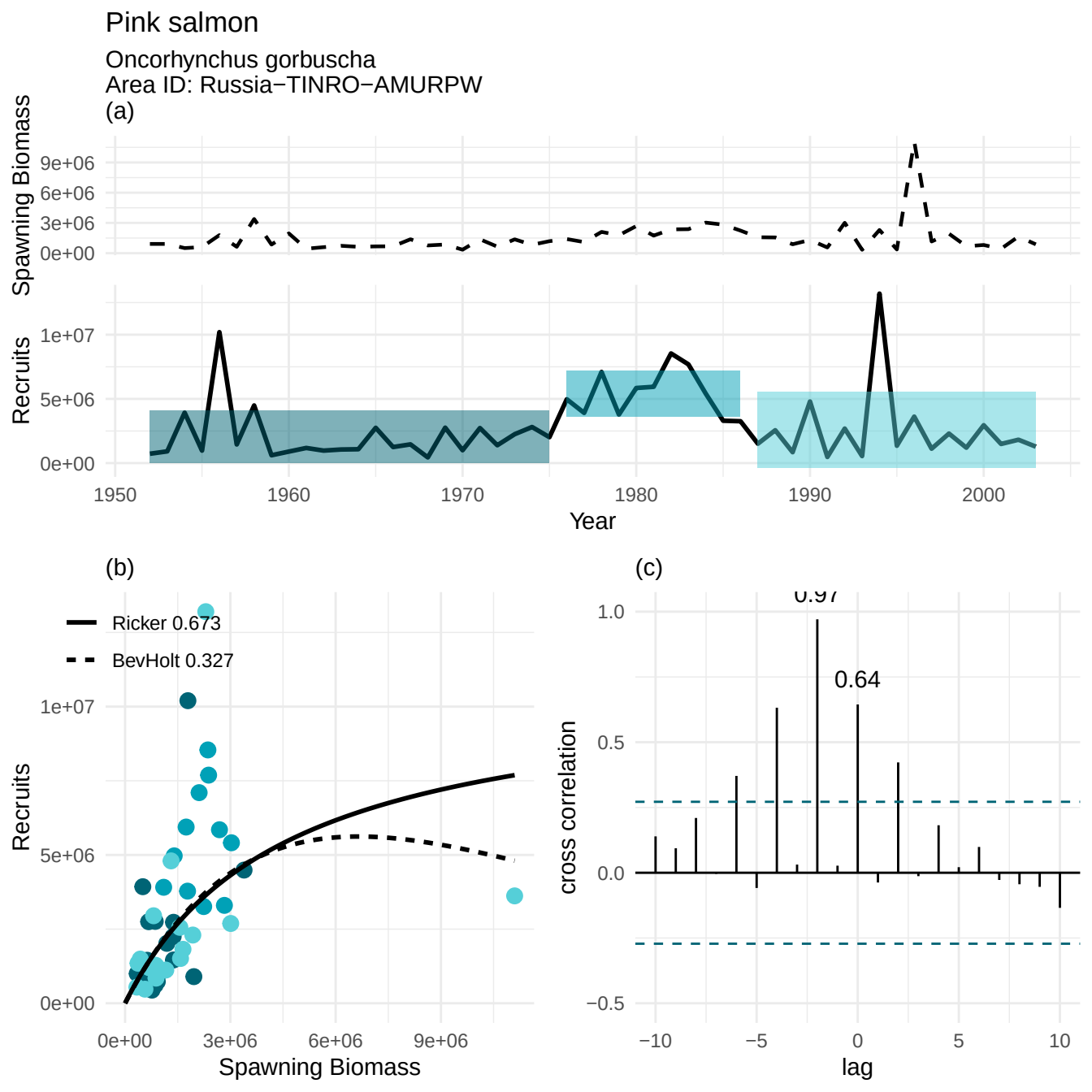

Pollock
Pollachius virens
Area ID: multinational−ICES−IIIa−IV−VI
(a)
Spawning Biomass
6e+05
5e+05
4e+05
3e+05
2e+05
1e+05
Recruits
4e+08
3e+08
2e+08
1e+08
1970
1980
1990
2000
2010
Year
(b)
Ricker 0.109
BevHolt 0.891
Recruits
4e+08
3e+08
2e+08
1e+08
0e+00
0e+00
2e+05
4e+05
6e+05
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

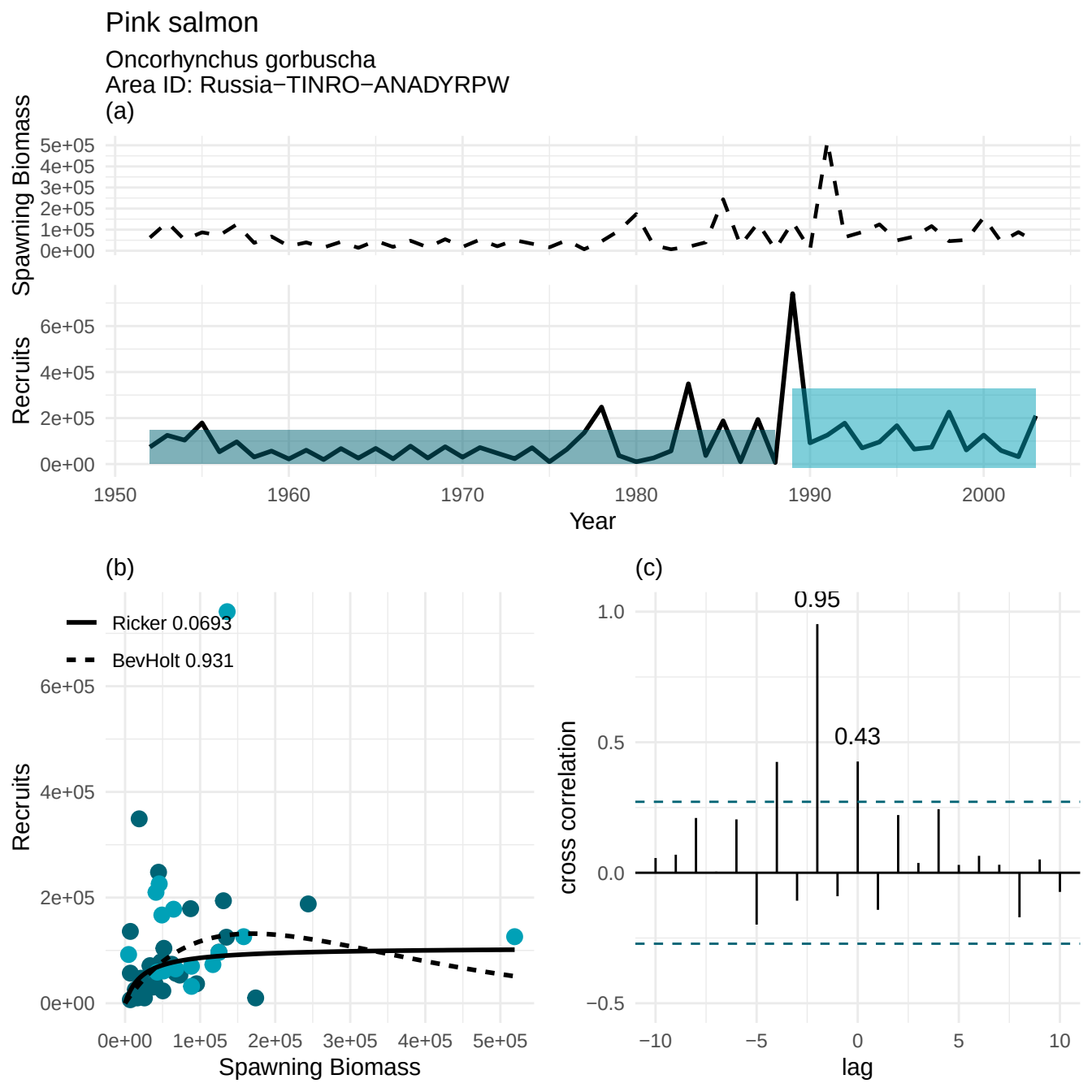

Pacific ocean perch
Sebastes alutus
Area ID: USA−NMFS−GA
(a)
Spawning Biomass
150000
100000
50000
Recruits
1.5e+08
1.0e+08
5.0e+07
1970
1980
1990
2000
2010
Year
(b)
Ricker 0.339
BevHolt 0.661
Recruits
1.5e+08
1.0e+08
5.0e+07
0.0e+00
0
50000
100000
150000
Spawning Biomass
(c)
1.0
0.5
0.0
−0.5
0.74
0.34
cross correlation
−10
−5
0
5
10
lag

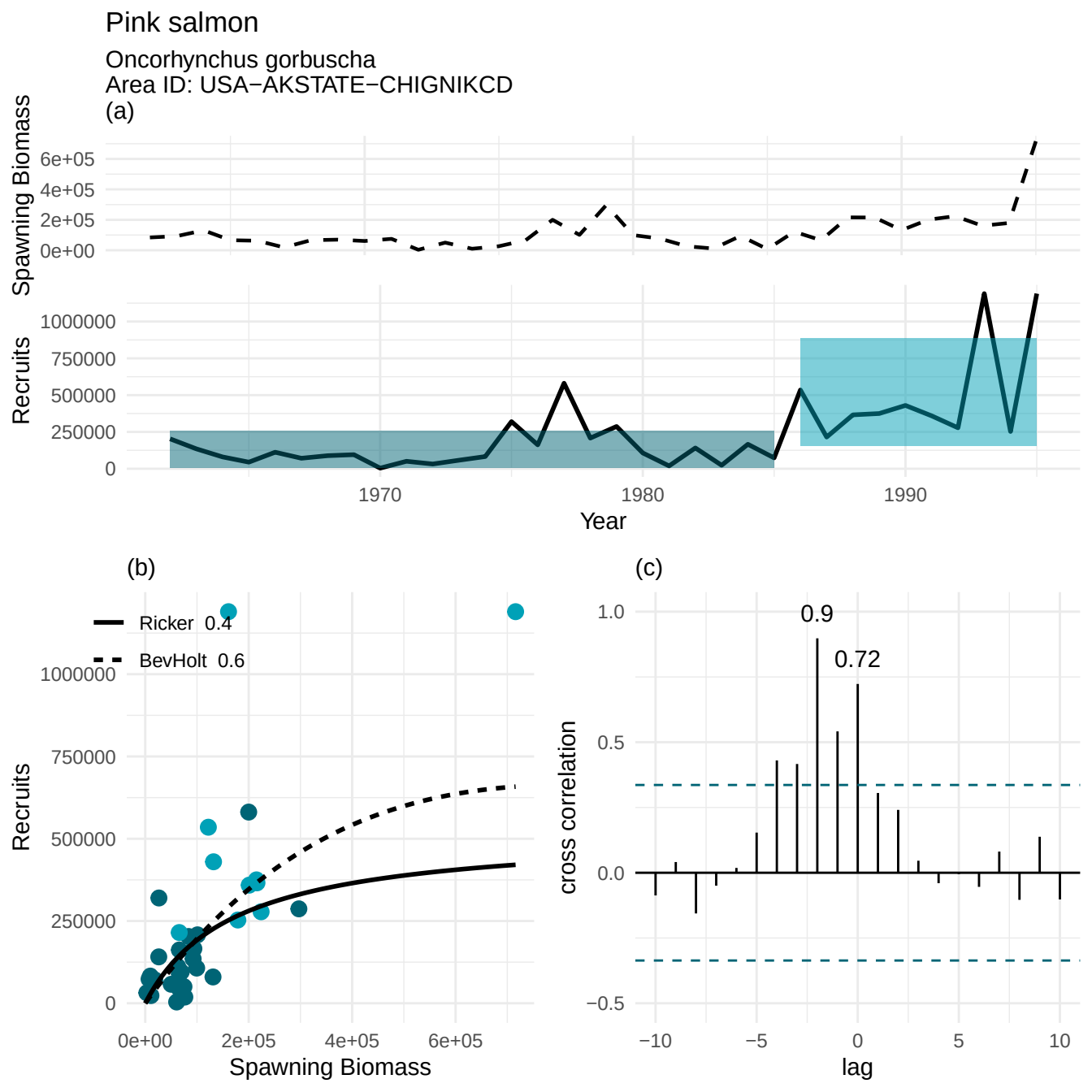

Pacific ocean perch
Sebastes alutus
Area ID: USA−NMFS−PCOAST
(a)
Spawning Biomass
5000
4500
4000
3500
3000
2500
Recruits
1.2e+08
8.0e+07
4.0e+07
0.0e+00
1970
1980
1990
2000
2010
Year
(b)
Ricker 0.484
BevHolt 0.516
Recruits
1.2e+08
9.0e+07
6.0e+07
3.0e+07
0.0e+00
0
2000
4000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

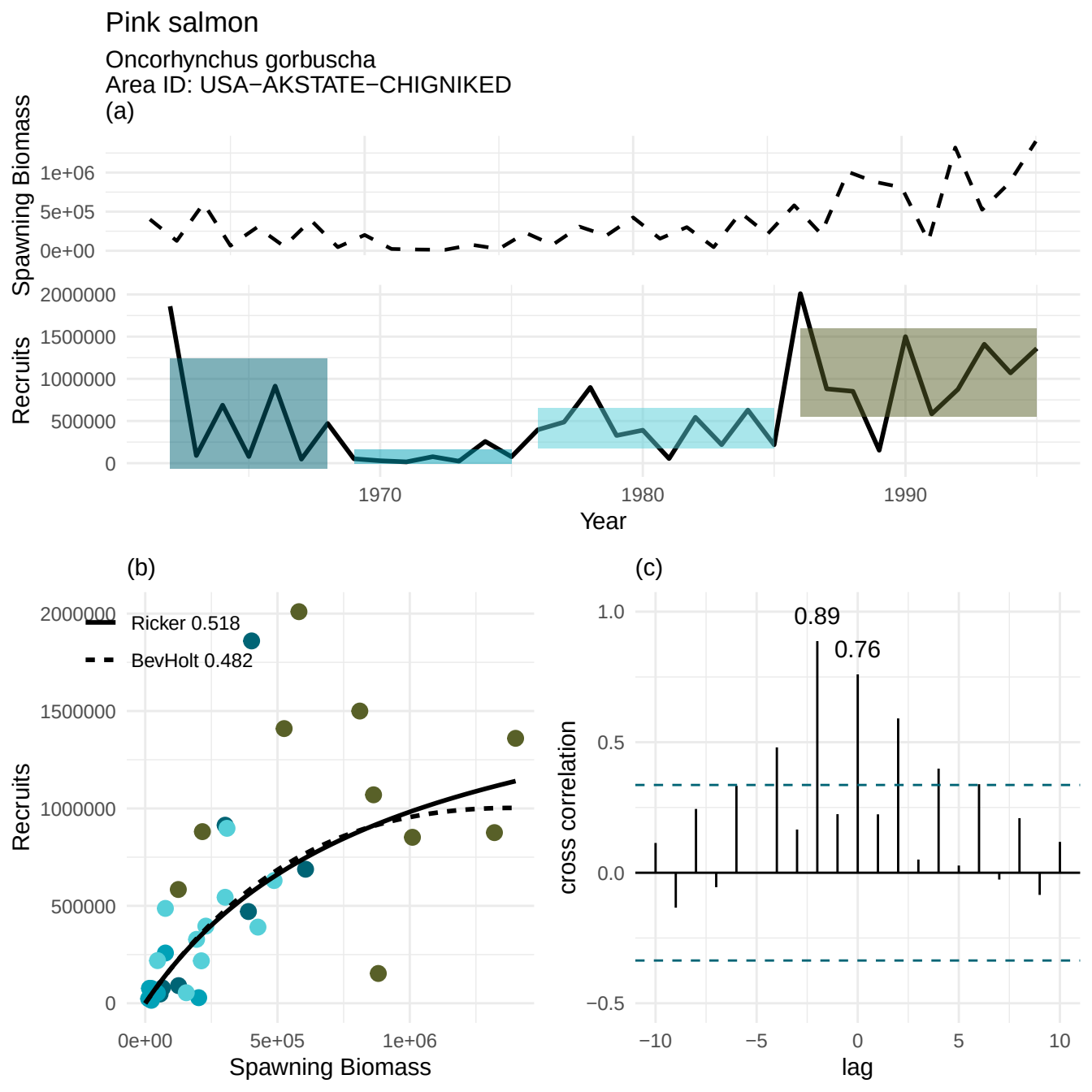

Pink salmon
Oncorhynchus gorbuscha
Area ID: USA−AKSTATE−AKPSESCD
(a)
Spawning Biomass
4e+06
3e+06
2e+06
1e+06
0e+00
Recruits
1.5e+07
1.0e+07
5.0e+06
0.0e+00
1970
1980
1990
Year
(b)
Ricker 0.495
BevHolt 0.505
Recruits
1.5e+07
1.0e+07
5.0e+06
0.0e+00
0e+00
1e+06
2e+06
3e+06
4e+06
Spawning Biomass
(c)
0.82
0.61
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

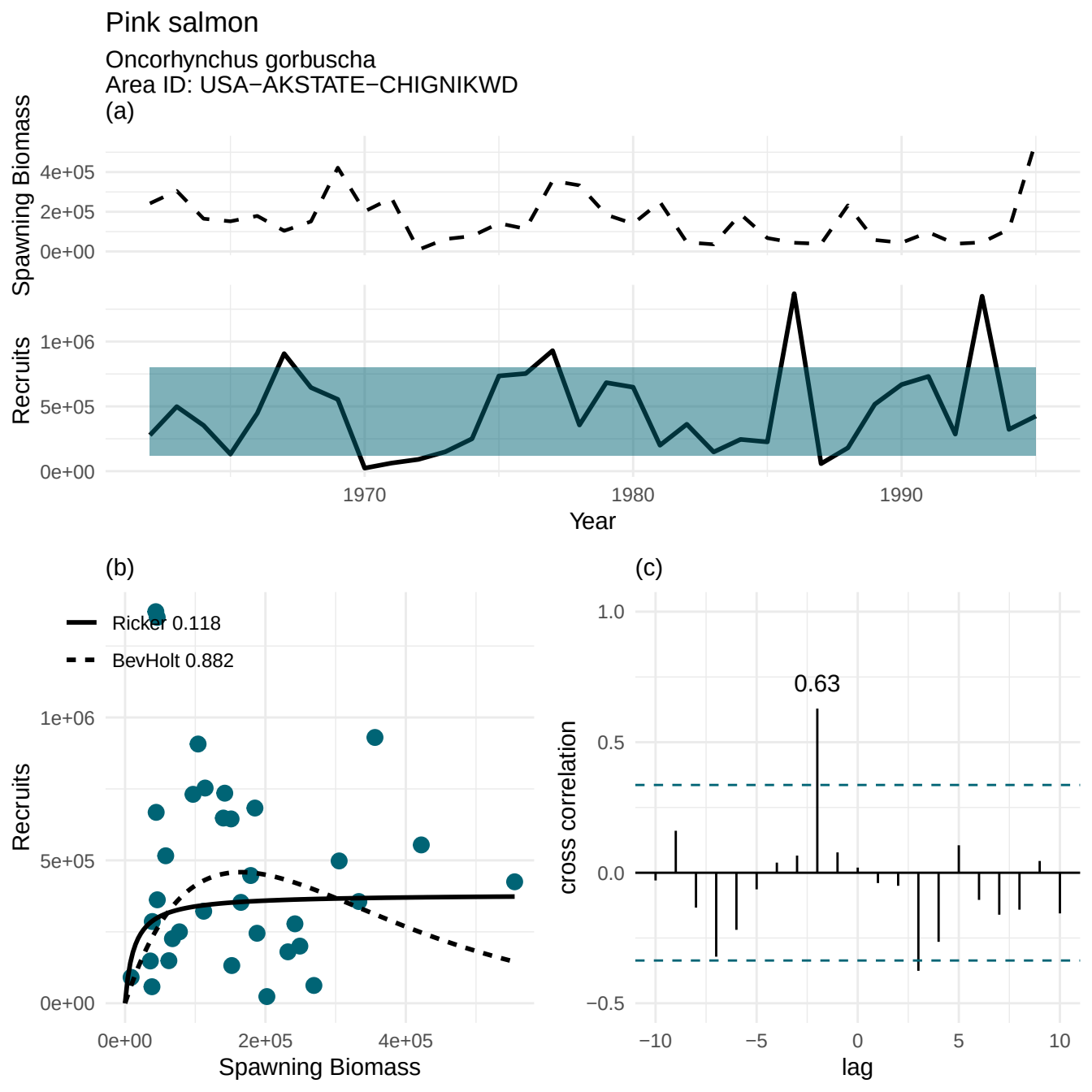

Pink salmon
Oncorhynchus gorbuscha
Area ID: USA−AKSTATE−AKPSWUD
(a)
Spawning Biomass
2000000
1500000
1000000
500000
Recruits
6e+06
4e+06
2e+06
0e+00
1975
1980
1985
1990
1995
Year
(b)
Ricker 0.761
BevHolt 0.239
Recruits
6e+06
4e+06
2e+06
0e+00
0
500000
1000000
1500000
2000000
Spawning Biomass
(c)
1.0
0.5
0.0
−0.5
0.76
cross correlation
−10
−5
0
5
10
lag

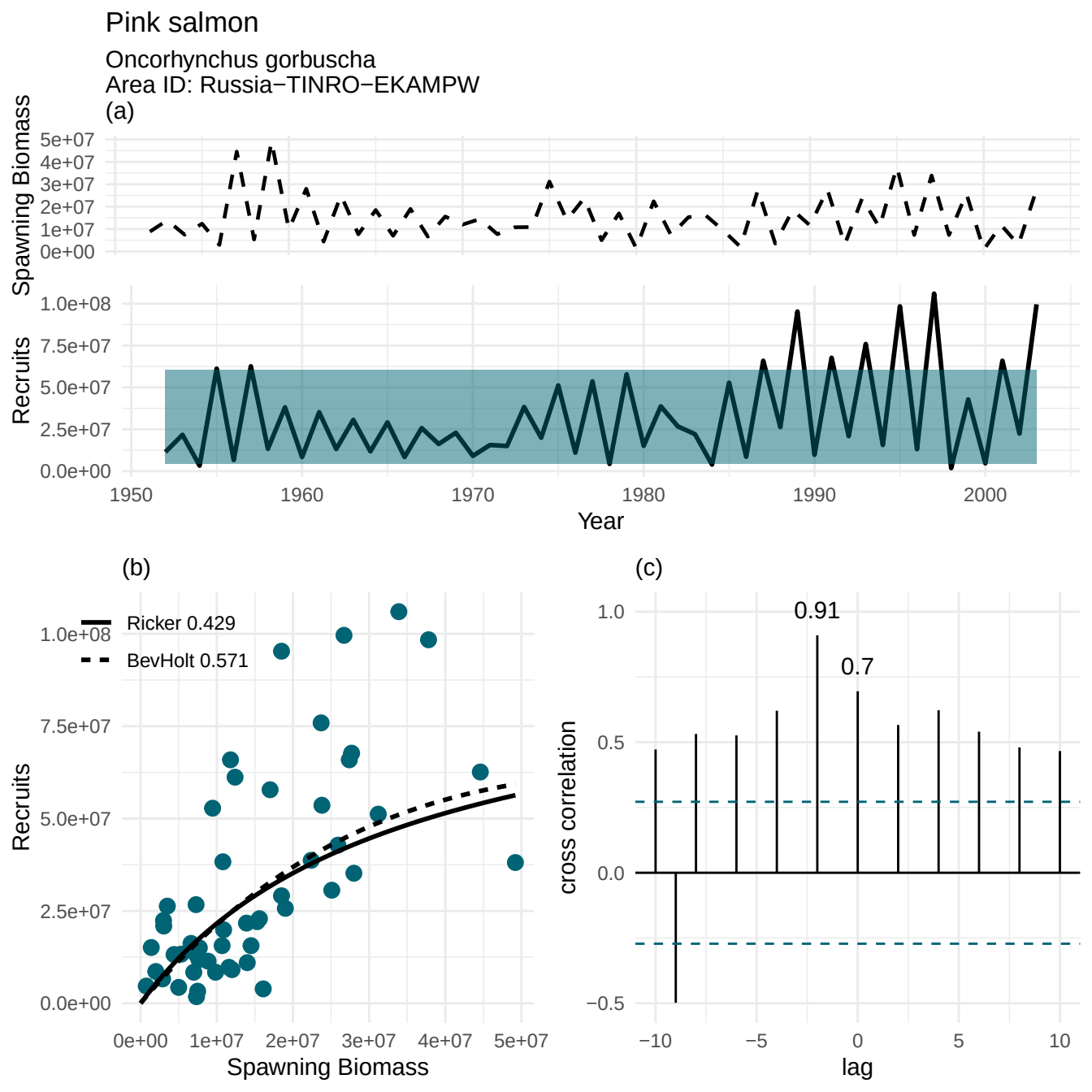

Pink salmon
Oncorhynchus gorbuscha
Area ID: Russia−TINRO−AMURPW
(a)
Spawning Biomass
9e+06
6e+06
3e+06
0e+00
Recruits
1e+07
5e+06
0e+00
1950
1960
1970
1980
1990
2000
Year
(b)
Ricker 0.673
BevHolt 0.327
Recruits
1e+07
5e+06
0e+00
0e+00
3e+06
6e+06
9e+06
Spawning Biomass
(c)
0.97
0.64
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

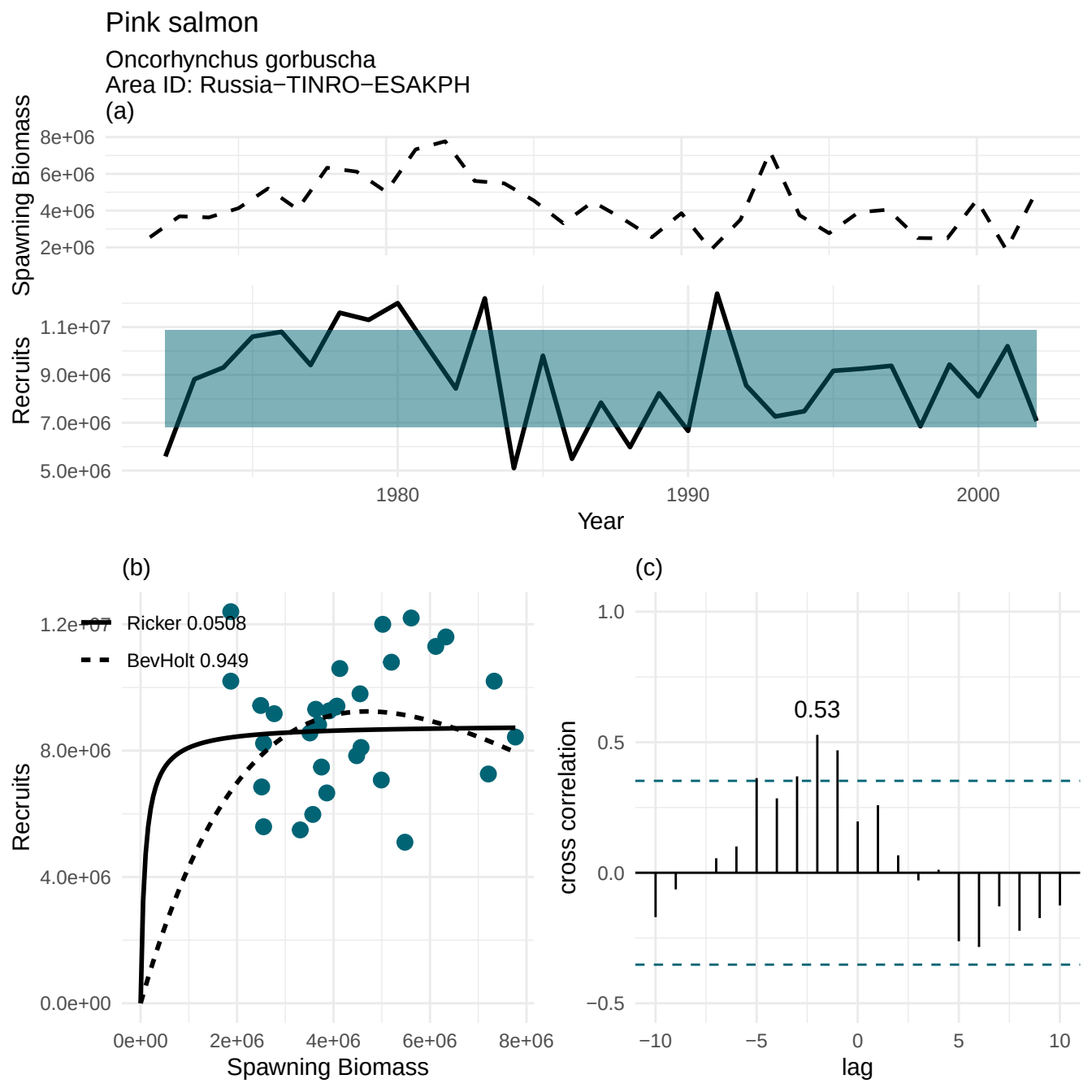

Pink salmon
Oncorhynchus gorbuscha
Area ID: Russia−TINRO−ANADYRPW
(a)
Spawning Biomass
5e+05
4e+05
3e+05
2e+05
1e+05
0e+00
Recruits
6e+05
4e+05
2e+05
0e+00
1950
1960
1970
1980
1990
2000
Year
(b)
Ricker 0.0693
BevHolt 0.931
Recruits
6e+05
4e+05
2e+05
0e+00
0e+00
1e+05
2e+05
3e+05
4e+05
5e+05
Spawning Biomass
(c)
0.95
0.43
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

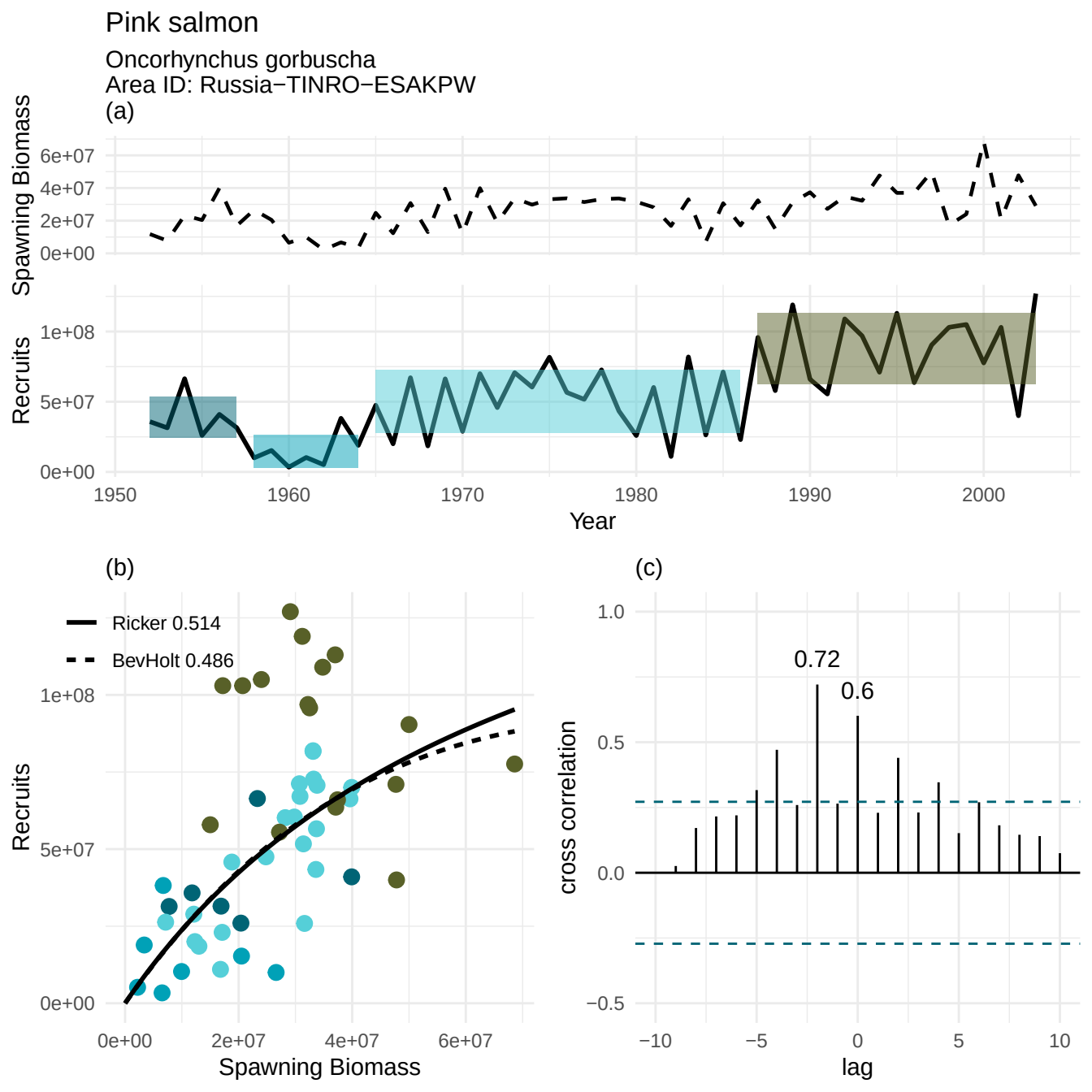

Pink salmon
Oncorhynchus gorbuscha
Area ID: USA−AKSTATE−CHIGNIKCD
(a)
Spawning Biomass
6e+05
4e+05
2e+05
0e+00
Recruits
1000000
750000
500000
250000
0
1970
1980
1990
Year
(b)
Ricker 0.4
BevHolt 0.6
Recruits
1000000
750000
500000
250000
0
0e+00
2e+05
4e+05
6e+05
Spawning Biomass
(c)
0.9
0.72
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

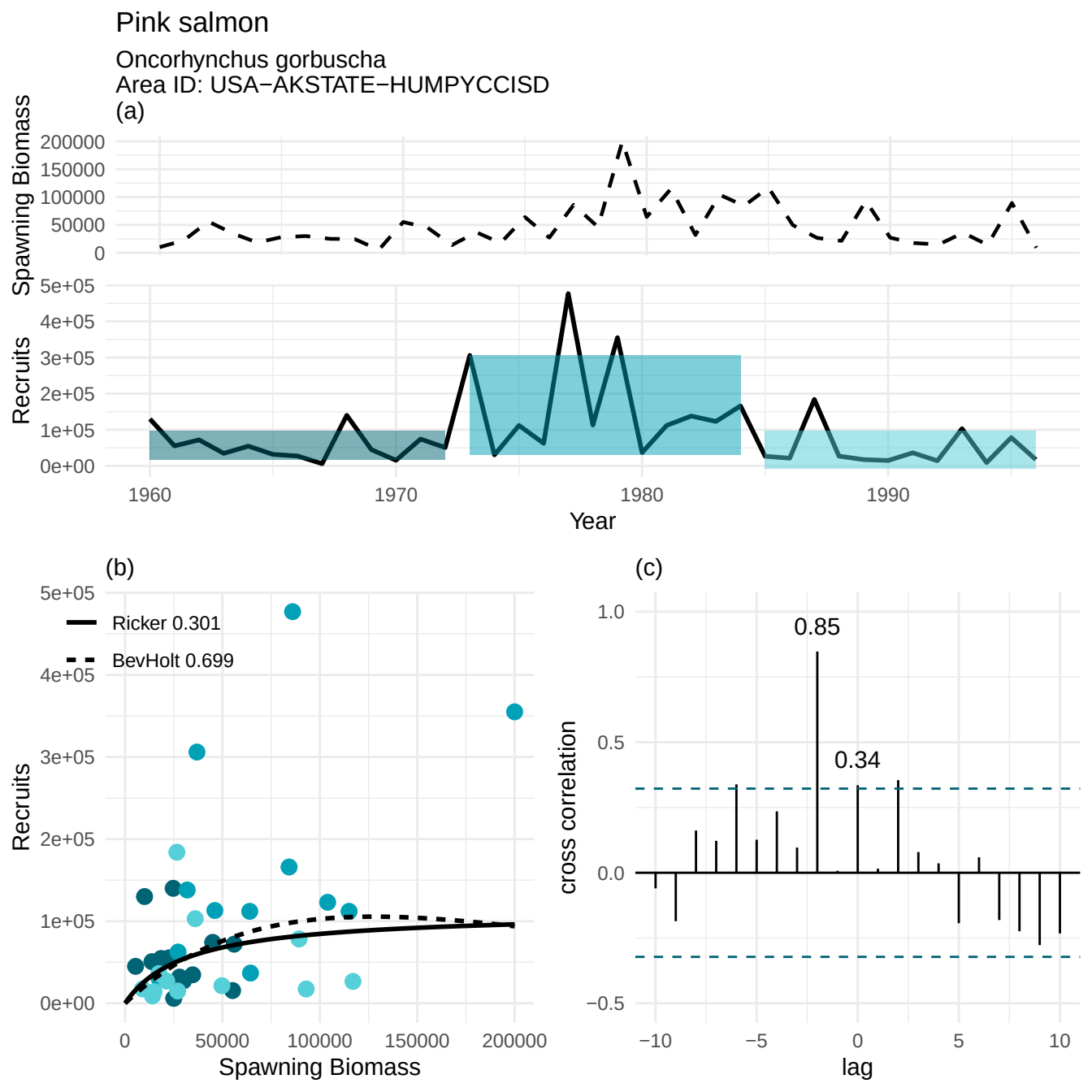

Pink salmon
Oncorhynchus gorbuscha
Area ID: USA−AKSTATE−CHIGNIKED
(a)
Spawning Biomass
1e+06
5e+05
0e+00
Recruits
2000000
1500000
1000000
500000
0
1970
1980
1990
Year
(b)
Ricker 0.518
BevHolt 0.482
Recruits
Spawning Biomass
0e+00
5e+05
1e+06
(c)
0.89
0.76
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

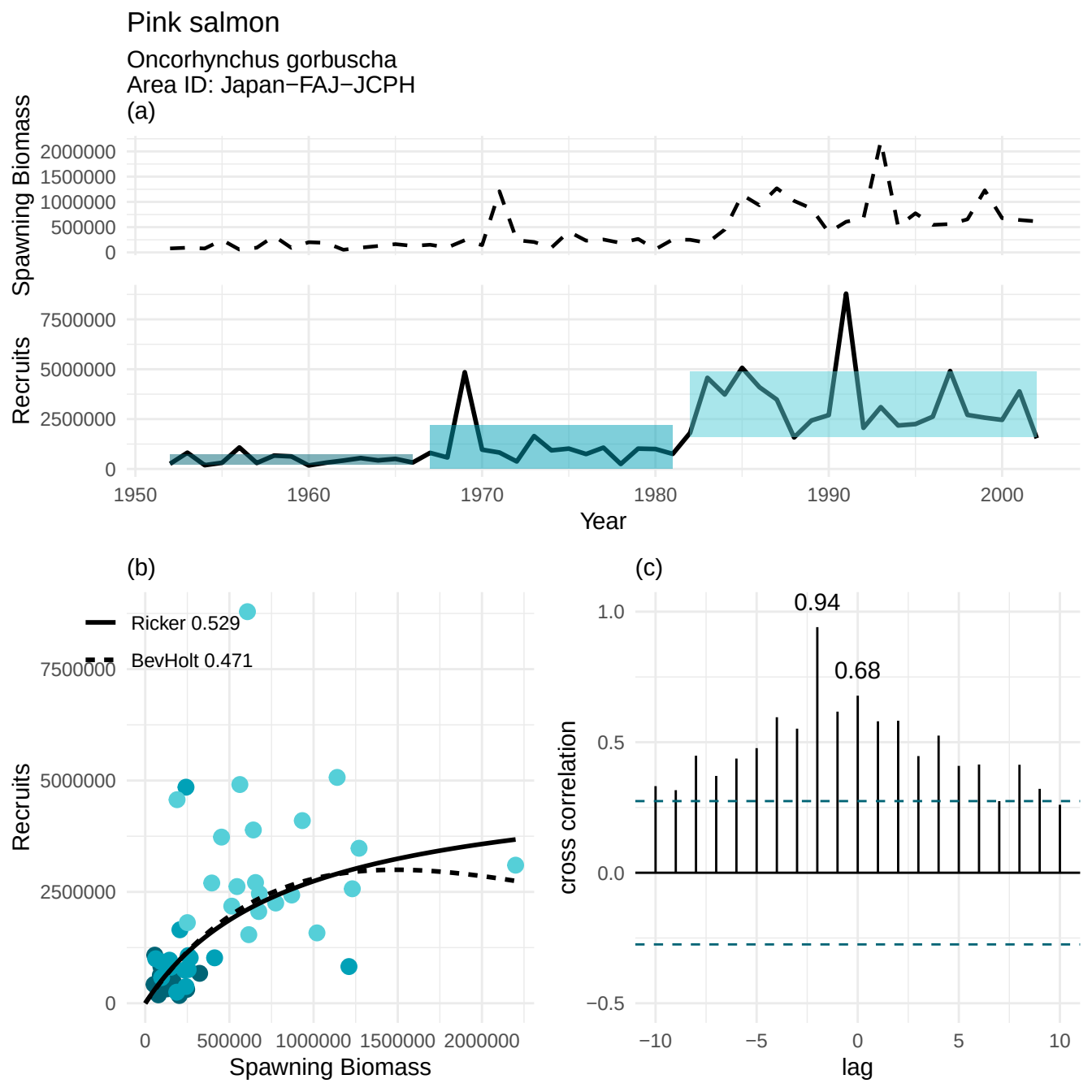

Pink salmon
Oncorhynchus gorbuscha
Area ID: USA−AKSTATE−CHIGNIKWD
(a)
Spawning Biomass
4e+05
2e+05
0e+00
Recruits
1e+06
5e+05
0e+00
1970
1980
1990
Year
(b)
Ricker 0.118
BevHolt 0.882
Recruits
1e+06
5e+05
0e+00
0e+00
2e+05
4e+05
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.63
−10
−5
0
5
10
lag

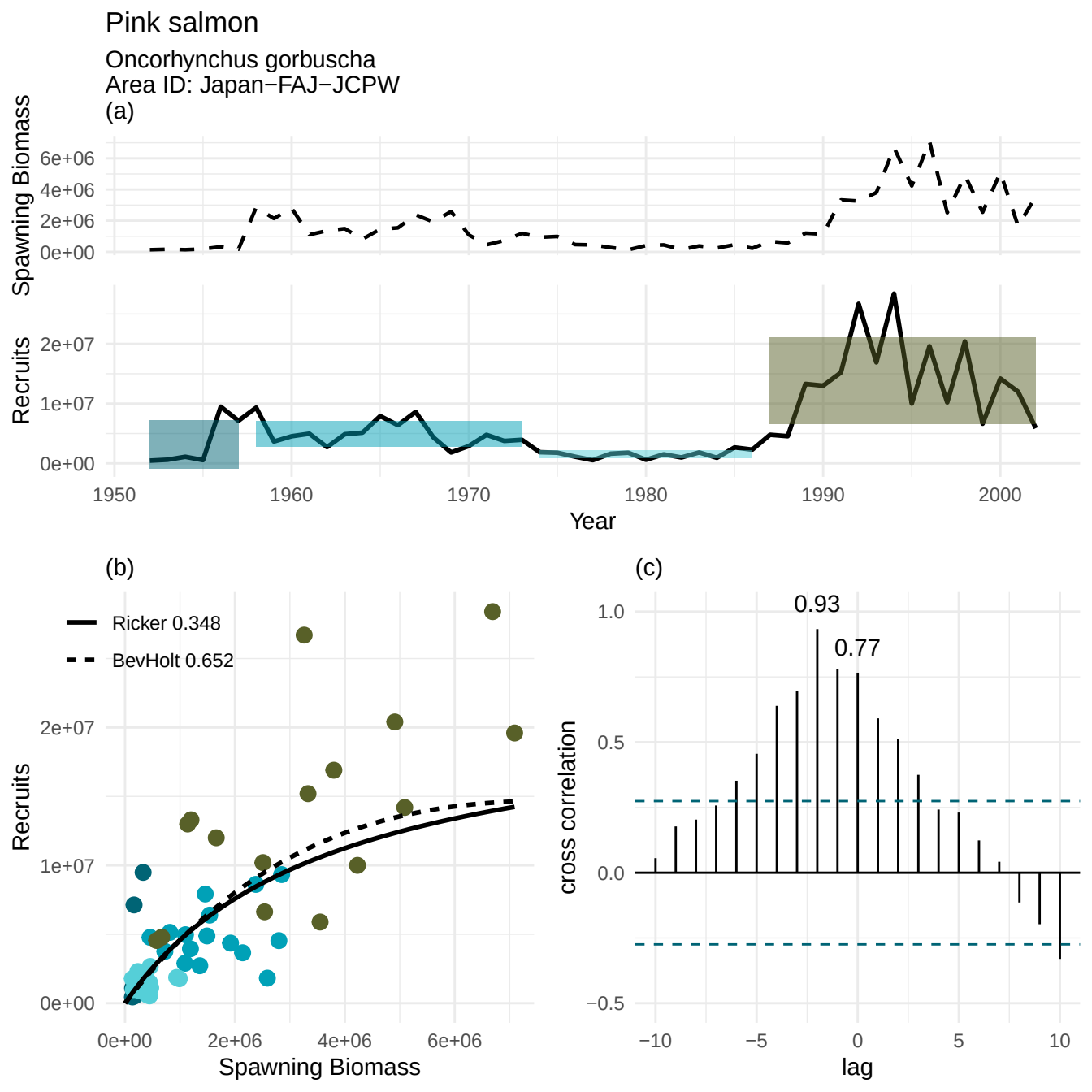

Pink salmon
Oncorhynchus gorbuscha
Area ID: Russia−TINRO−EKAMPW
(a)
Spawning Biomass
5e+07
4e+07
3e+07
2e+07
1e+07
0e+00
Recruits
1.0e+08
7.5e+07
5.0e+07
2.5e+07
0.0e+00
1950
1960
1970
1980
1990
2000
Year
(b)
Ricker 0.429
BevHolt 0.571
Recruits
Spawning Biomass
0e+00
1e+07
2e+07
3e+07
4e+07
5e+07
(c)
0.91
0.7
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

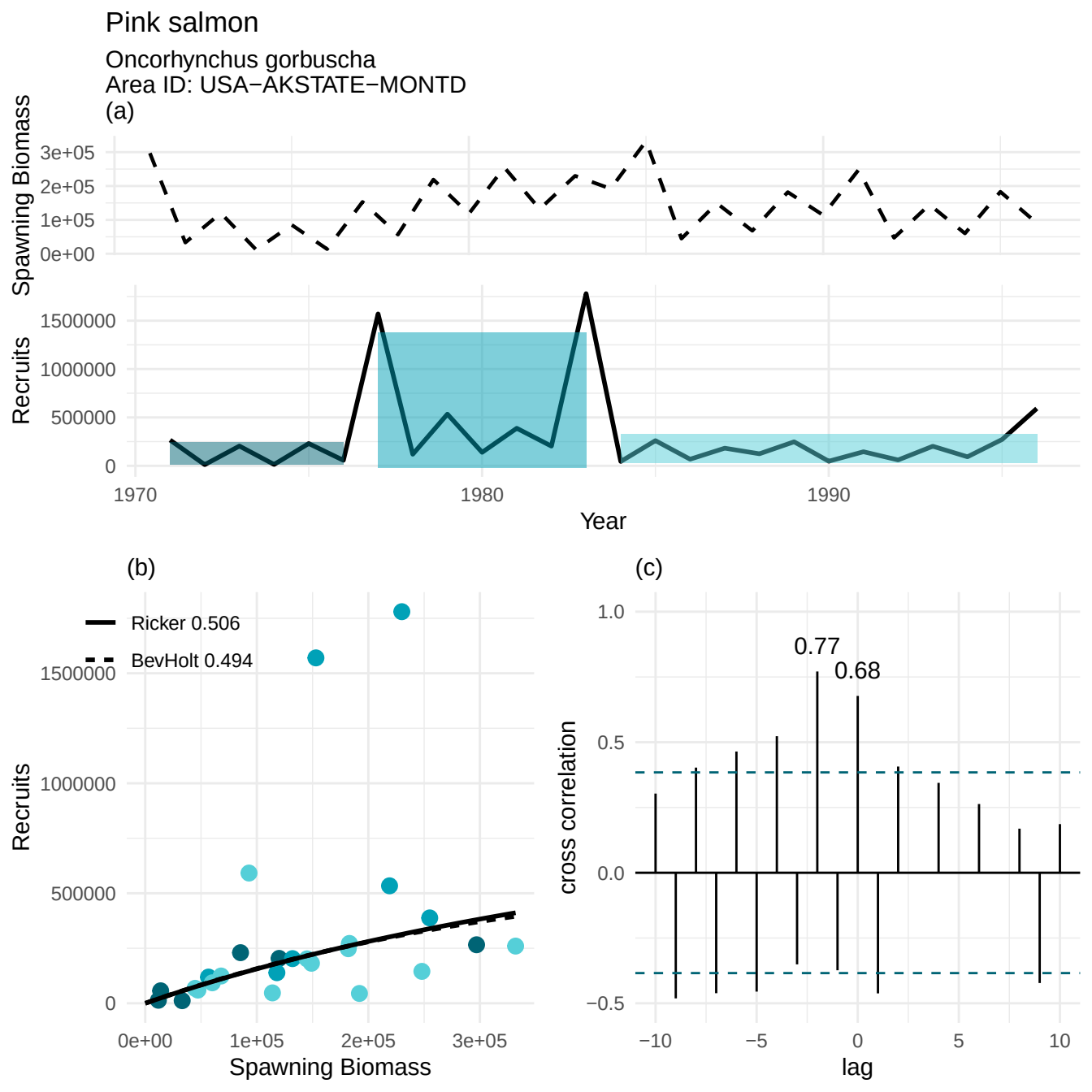

Pink salmon
Oncorhynchus gorbuscha
Area ID: Russia−TINRO−ESAKPH
(a)
Spawning Biomass
8e+06
6e+06
4e+06
2e+06
Recruits
1.1e+07
9.0e+06
7.0e+06
5.0e+06
1980
1990
2000
Year
(b)
Ricker 0.0508
BevHolt 0.949
1.2e+07
8.0e+06
4.0e+06
0.0e+00
Recruits
0e+00
2e+06
4e+06
6e+06
8e+06
Spawning Biomass
(c)
1.0
0.5
0.0
−0.5
0.53
cross correlation
−10
−5
0
5
10
lag

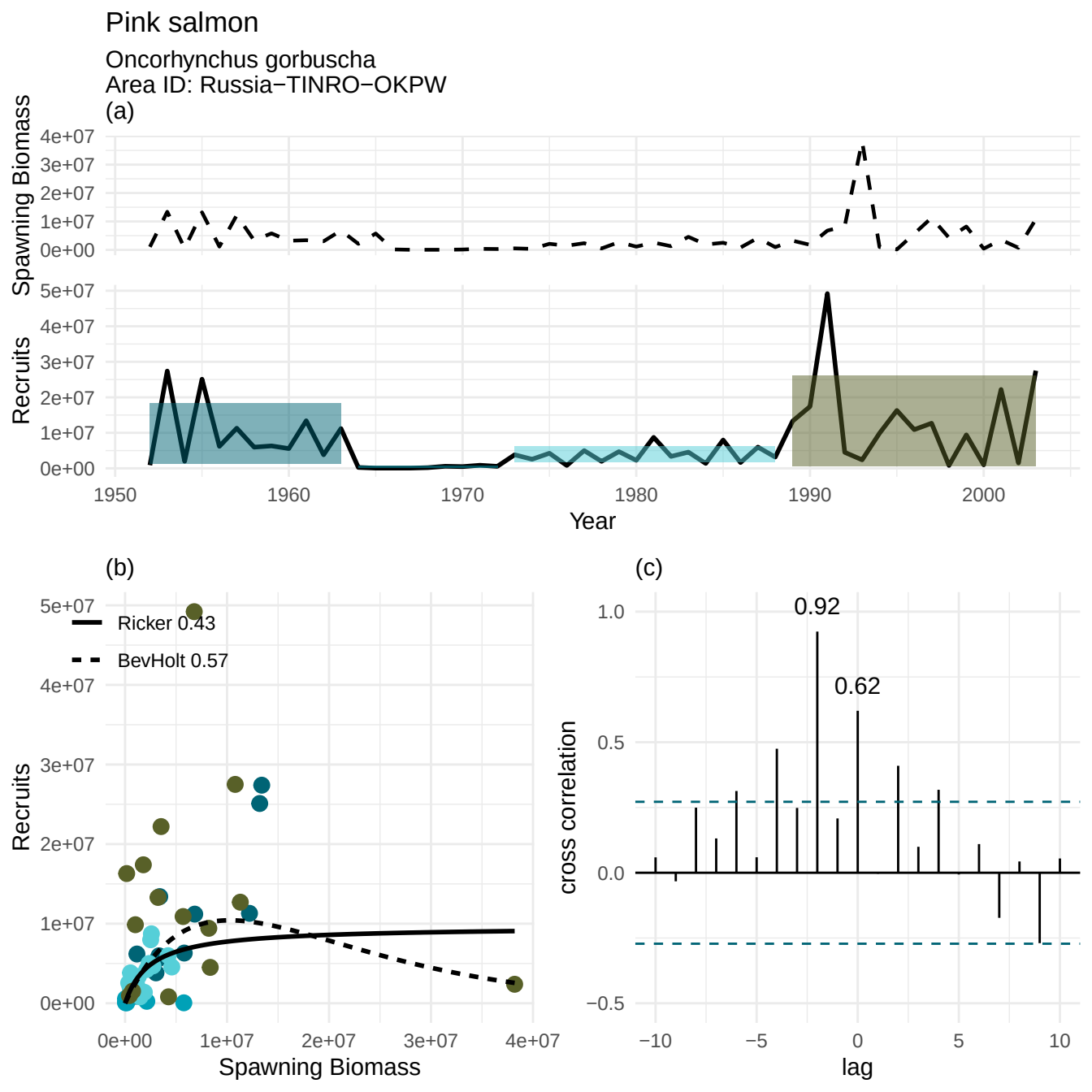

Pink salmon
Oncorhynchus gorbuscha
Area ID: Russia−TINRO−ESAKPW
(a)
Spawning Biomass
6e+07
4e+07
2e+07
0e+00
Recruits
1e+08
5e+07
0e+00
1950
1960
1970
1980
1990
2000
Year
(b)
Ricker 0.514
BevHolt 0.486
Recruits
1e+08
5e+07
0e+00
0e+00
2e+07
4e+07
6e+07
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.72
0.6
−10
−5
0
5
10
lag

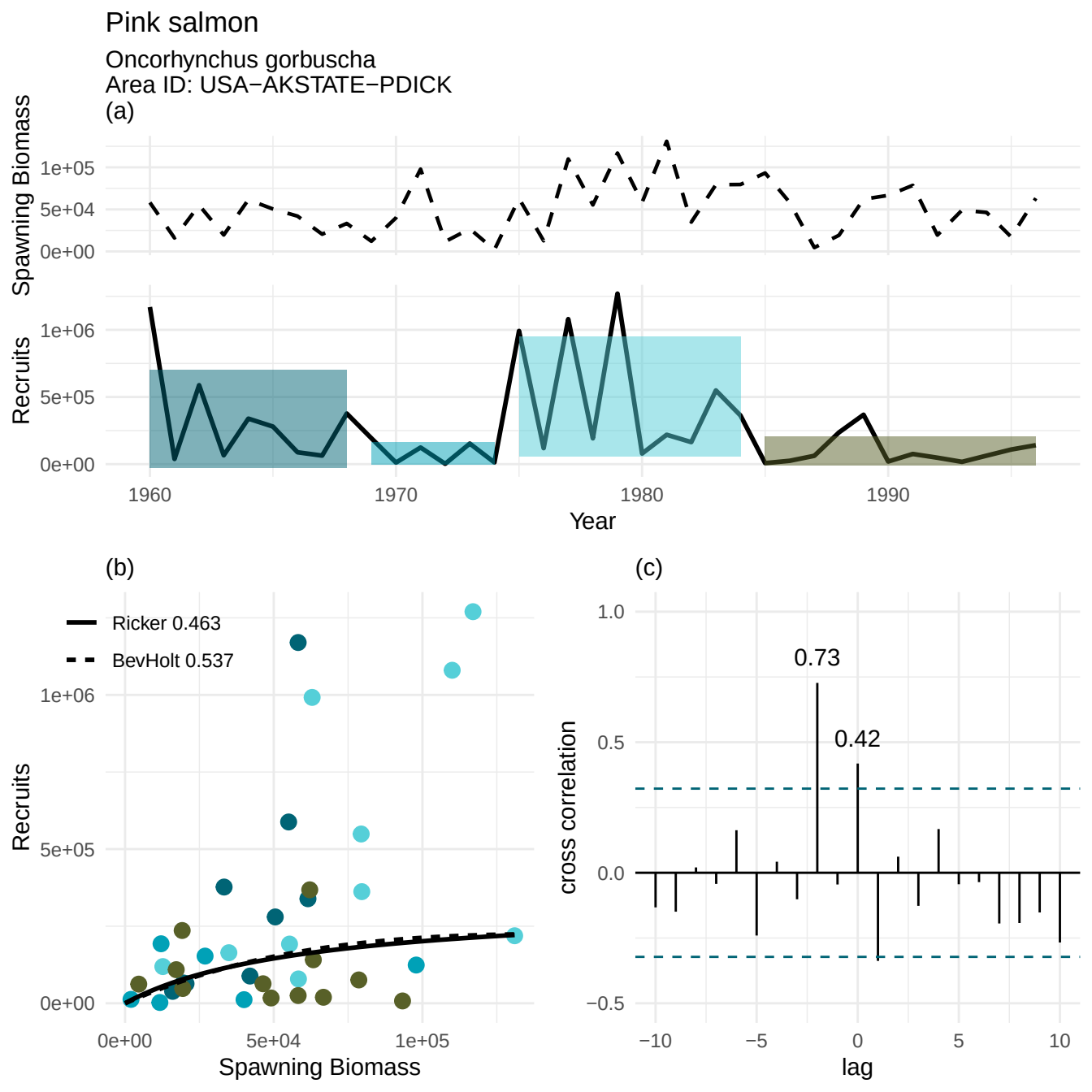

Pink salmon
Oncorhynchus gorbuscha
Area ID: USA−AKSTATE−HUMPYCCISD
(a)
Spawning Biomass
200000
150000
100000
50000
0
Recruits
5e+05
4e+05
3e+05
2e+05
1e+05
0e+00
1960
1970
1980
1990
Year
(b)
Ricker 0.301
BevHolt 0.699
Recruits
Spawning Biomass
(c)
0.85
0.34
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

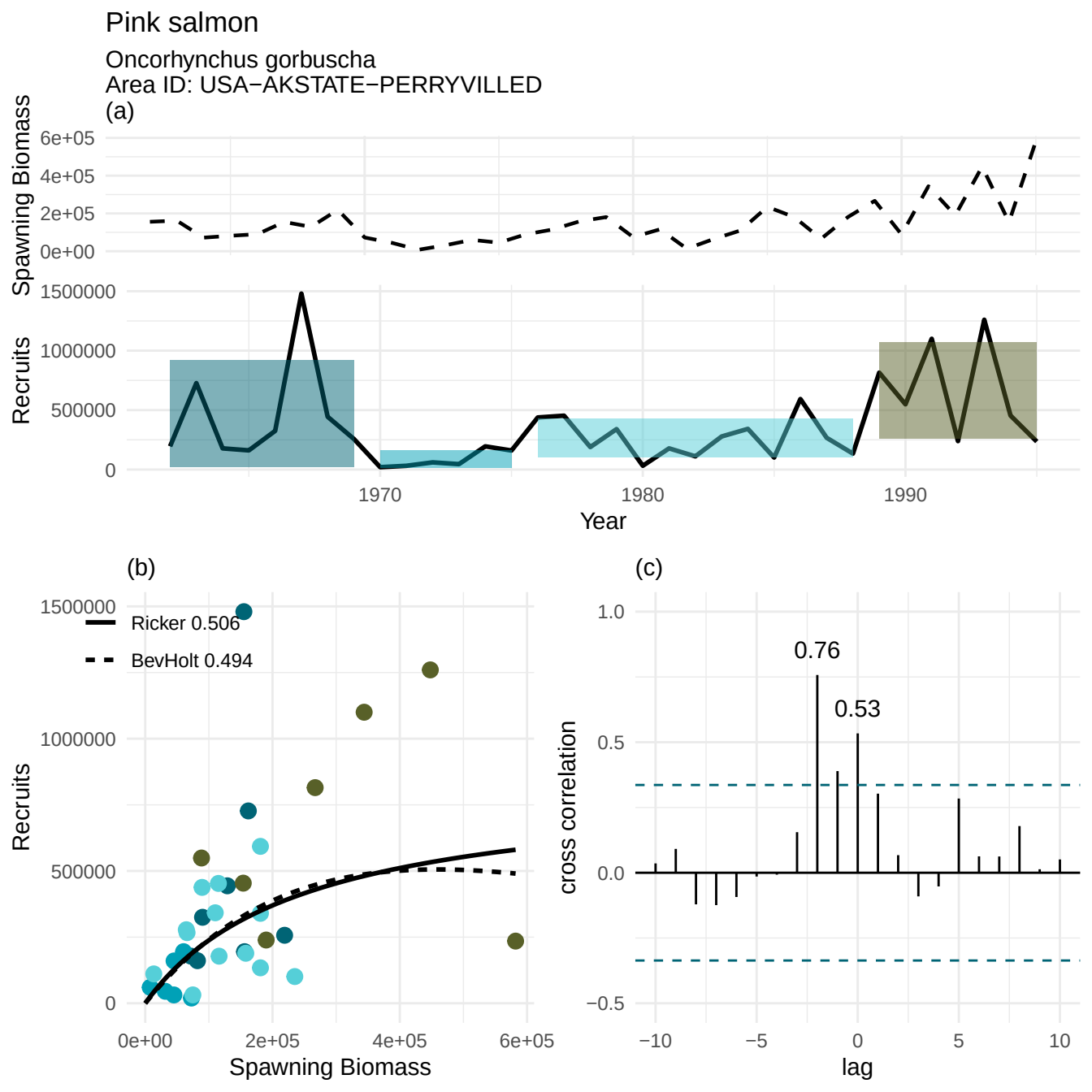

Pink salmon
Oncorhynchus gorbuscha
Area ID: Japan−FAJ−JCPH
(a)
Spawning Biomass
2000000
1500000
1000000
500000
0
Recruits
7500000
5000000
2500000
0
1950
1960
1970
1980
1990
2000
Year
(b)
Ricker 0.529
BevHolt 0.471
Recruits
7500000
5000000
2500000
0
0
500000
1000000
1500000
2000000
Spawning Biomass
(c)
0.94
0.68
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

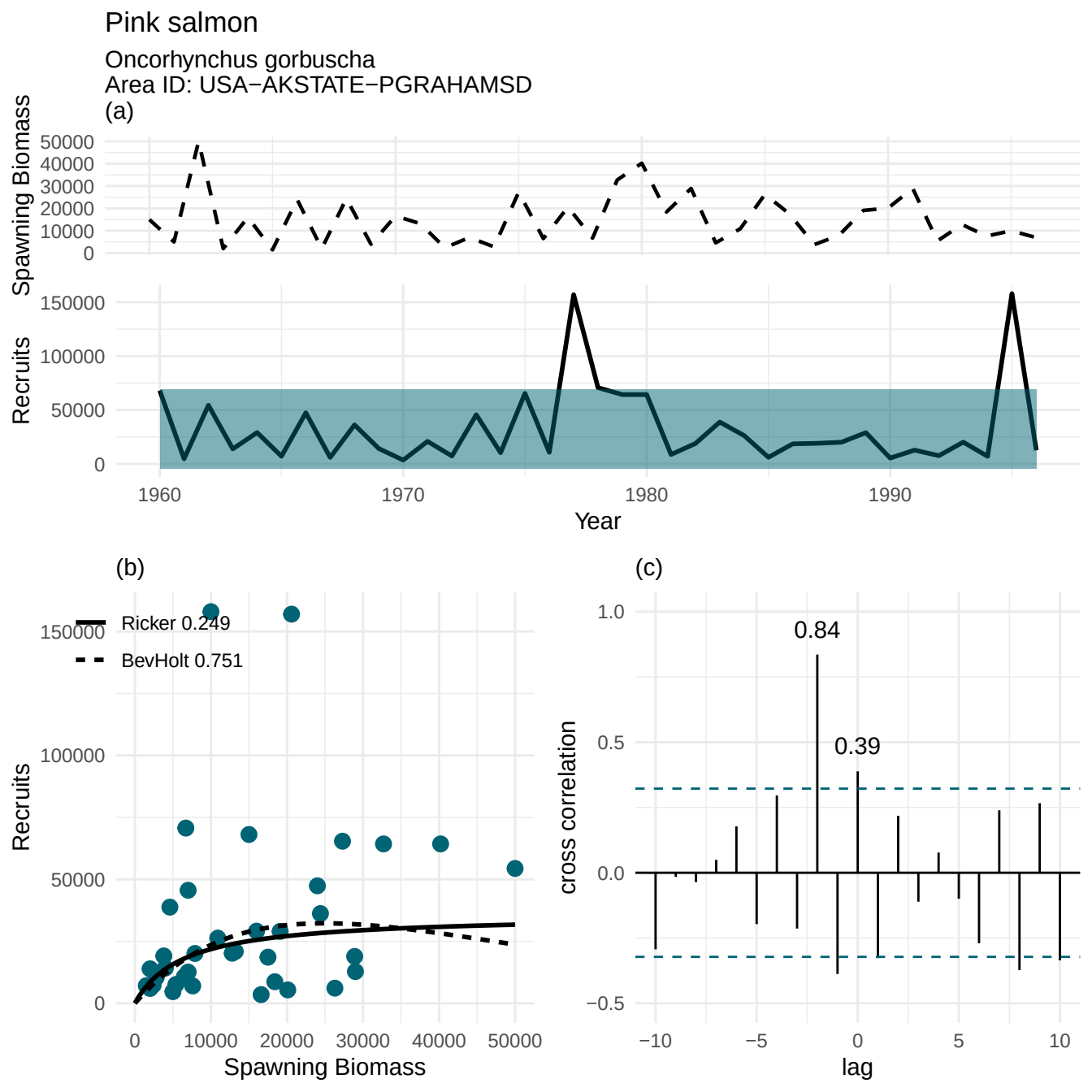

Pink salmon
Oncorhynchus gorbuscha
Area ID: Japan−FAJ−JCPW
(a)
Spawning Biomass
6e+06
4e+06
2e+06
0e+00
Recruits
2e+07
1e+07
0e+00
1950
1960
1970
1980
1990
2000
Year
(b)
Ricker 0.348
BevHolt 0.652
Recruits
2e+07
1e+07
0e+00
0e+00
2e+06
4e+06
6e+06
Spawning Biomass
(c)
0.93
0.77
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

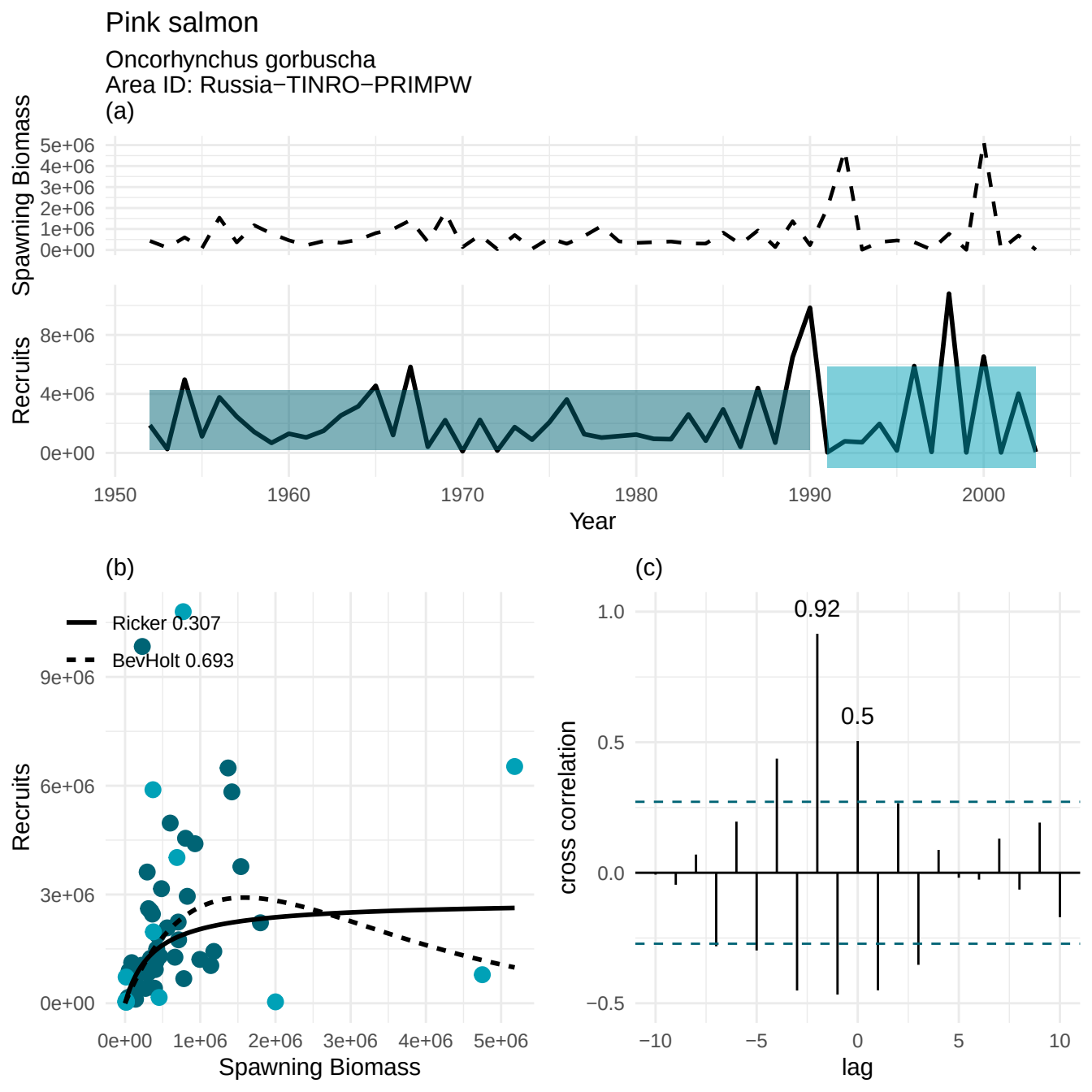

Pink salmon
Oncorhynchus gorbuscha
Area ID: USA−AKSTATE−MONTD
(a)
Spawning Biomass
3e+05
2e+05
1e+05
0e+00
Recruits
1500000
1000000
500000
0
1970
1980
1990
Year
(b)
Ricker 0.506
BevHolt 0.494
Recruits
1500000
1000000
500000
0
0e+00
1e+05
2e+05
3e+05
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.77
0.68
−10
−5
0
5
10
lag

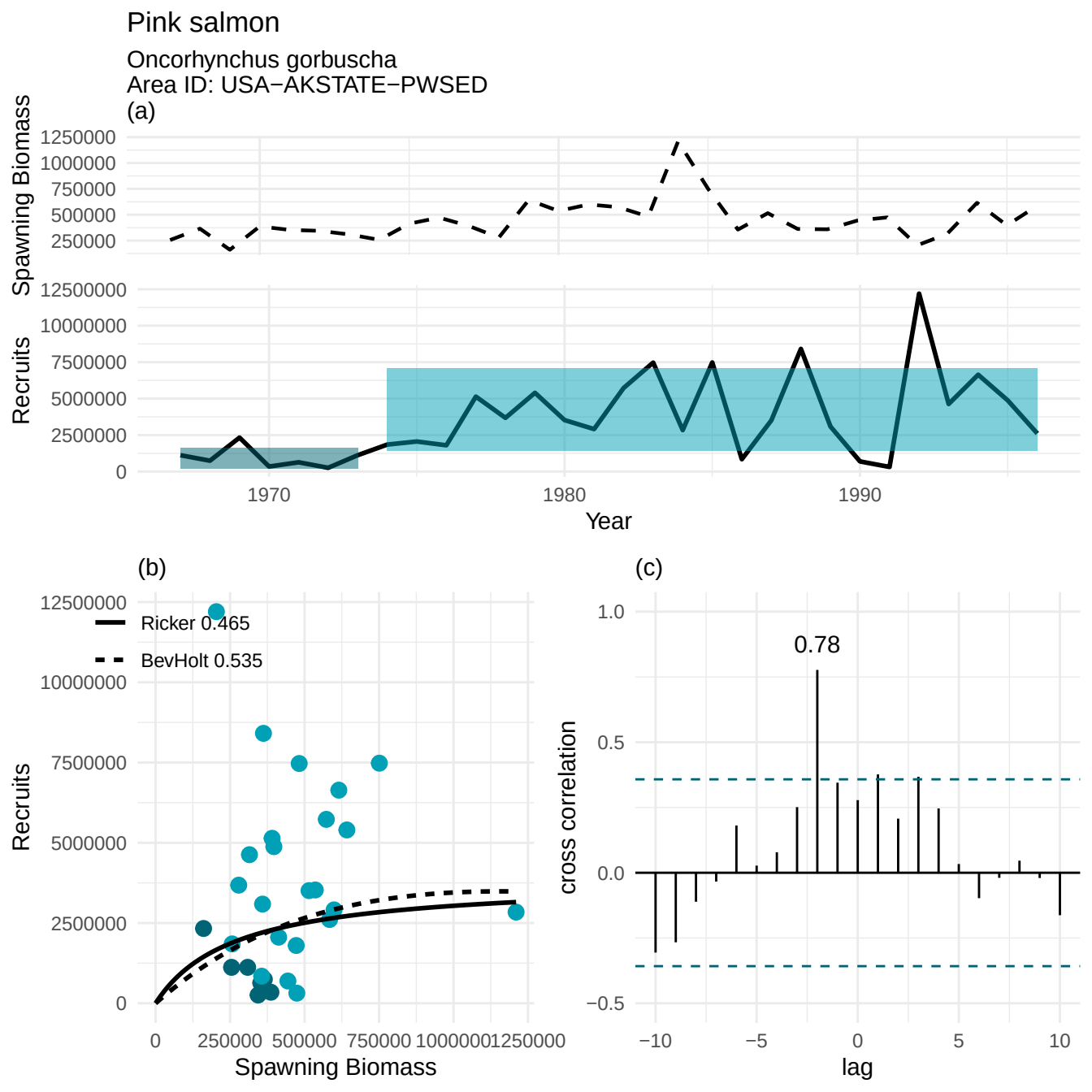

Pink salmon
Oncorhynchus gorbuscha
Area ID: Russia−TINRO−OKPW
(a)
Spawning Biomass
4e+07
3e+07
2e+07
1e+07
0e+00
Recruits
5e+07
4e+07
3e+07
2e+07
1e+07
0e+00
1950
1960
1970
1980
1990
2000
Year
(b)
Ricker 0.43
BevHolt 0.57
Recruits
Spawning Biomass
(c)
0.92
0.62
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

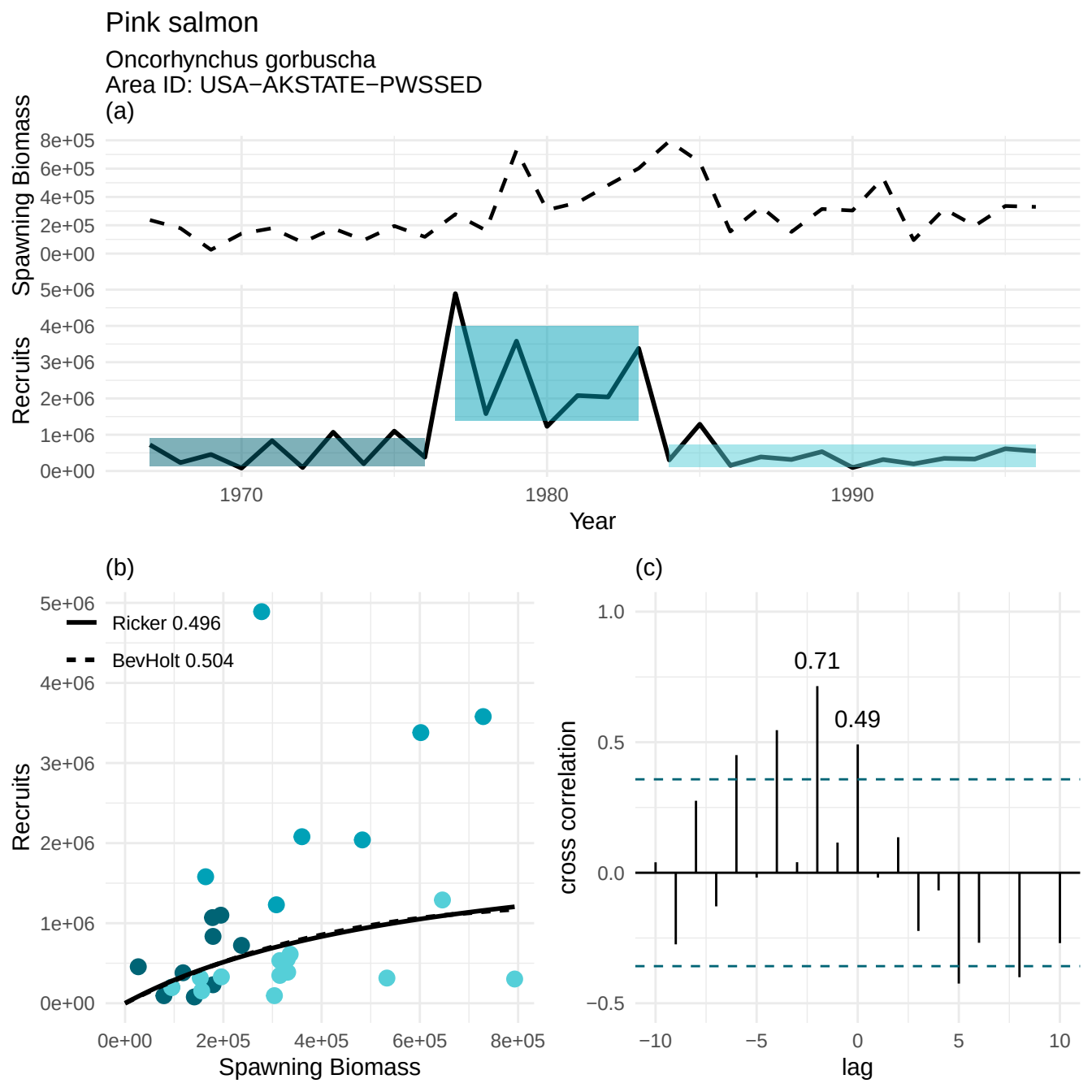

Pink salmon
Oncorhynchus gorbuscha
Area ID: USA−AKSTATE−PDICK
(a)
Spawning Biomass
1e+05
5e+04
0e+00
Recruits
1e+06
5e+05
0e+00
1960
1970
1980
1990
Year
(b)
Ricker 0.463
BevHolt 0.537
Recruits
1e+06
5e+05
0e+00
0e+00
5e+04
1e+05
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.73
0.42
−10
−5
0
5
10
lag

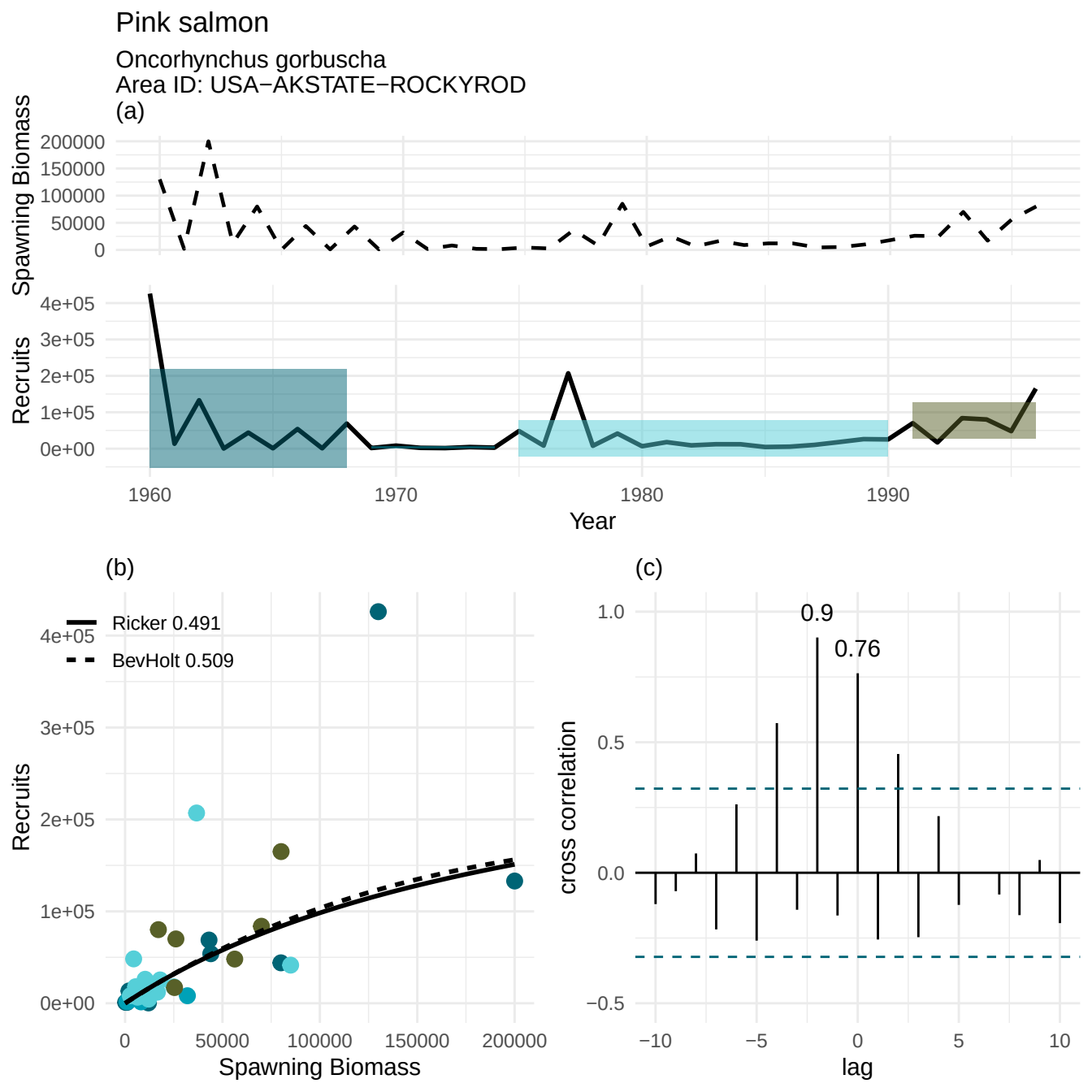

Pink salmon
Oncorhynchus gorbuscha
Area ID: USA−AKSTATE−PERRYVILLED
(a)
Spawning Biomass
6e+05
4e+05
2e+05
0e+00
Recruits
1500000
1000000
500000
0
1970
1980
1990
Year
(b)
Ricker 0.506
BevHolt 0.494
Recruits
1500000
1000000
500000
0
0e+00
2e+05
4e+05
6e+05
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.76
0.53
−10
−5
0
5
10
lag

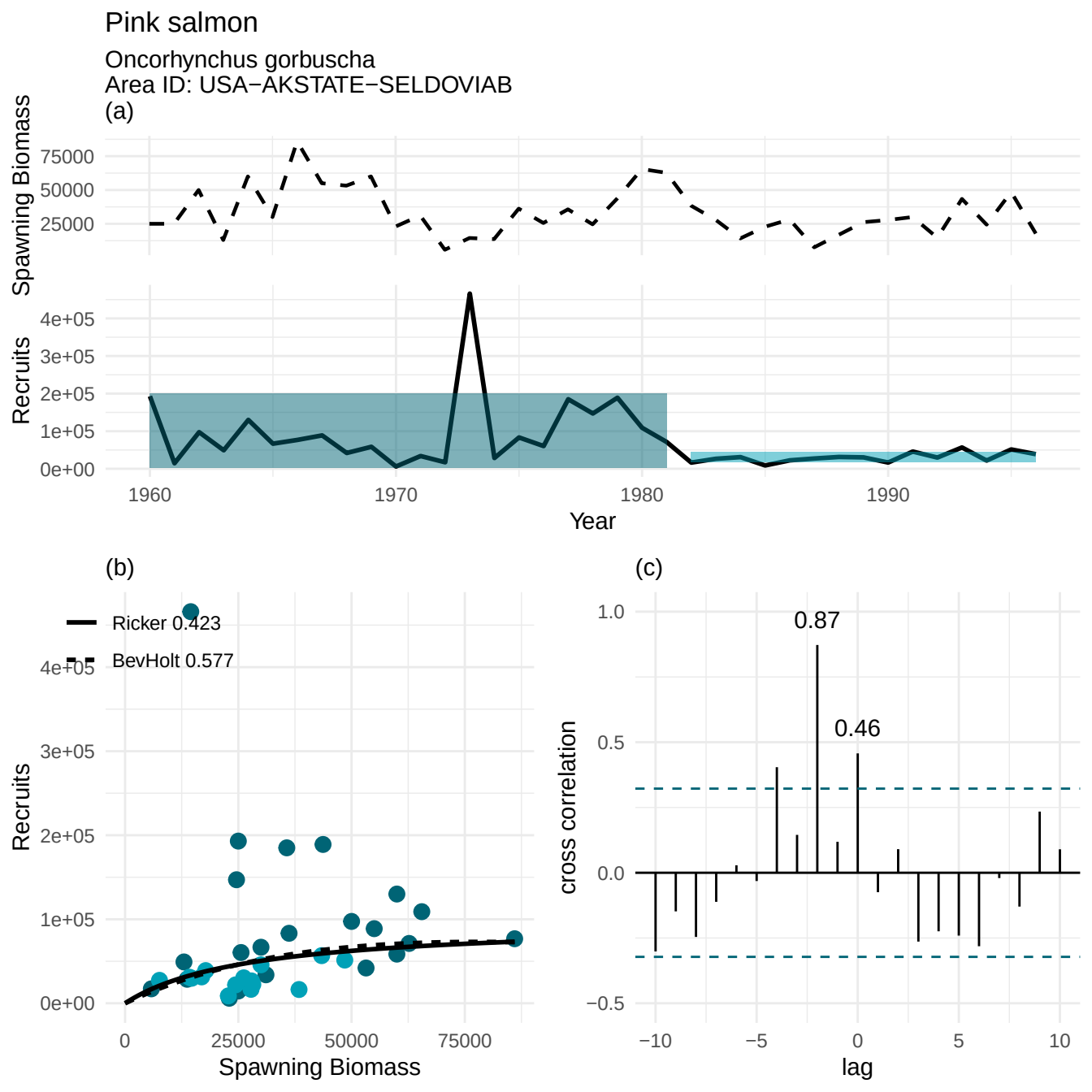

Pink salmon
Oncorhynchus gorbuscha
Area ID: USA−AKSTATE−PGRAHAMSD
(a)
Spawning Biomass
50000
40000
30000
20000
10000
0
Recruits
150000
100000
50000
0
1960
1970
1980
1990
Year
(b)
Ricker 0.249
BevHolt 0.751
Recruits
150000
100000
50000
0
0
10000
20000
30000
40000
50000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.84
0.39
−10
−5
0
5
10
lag

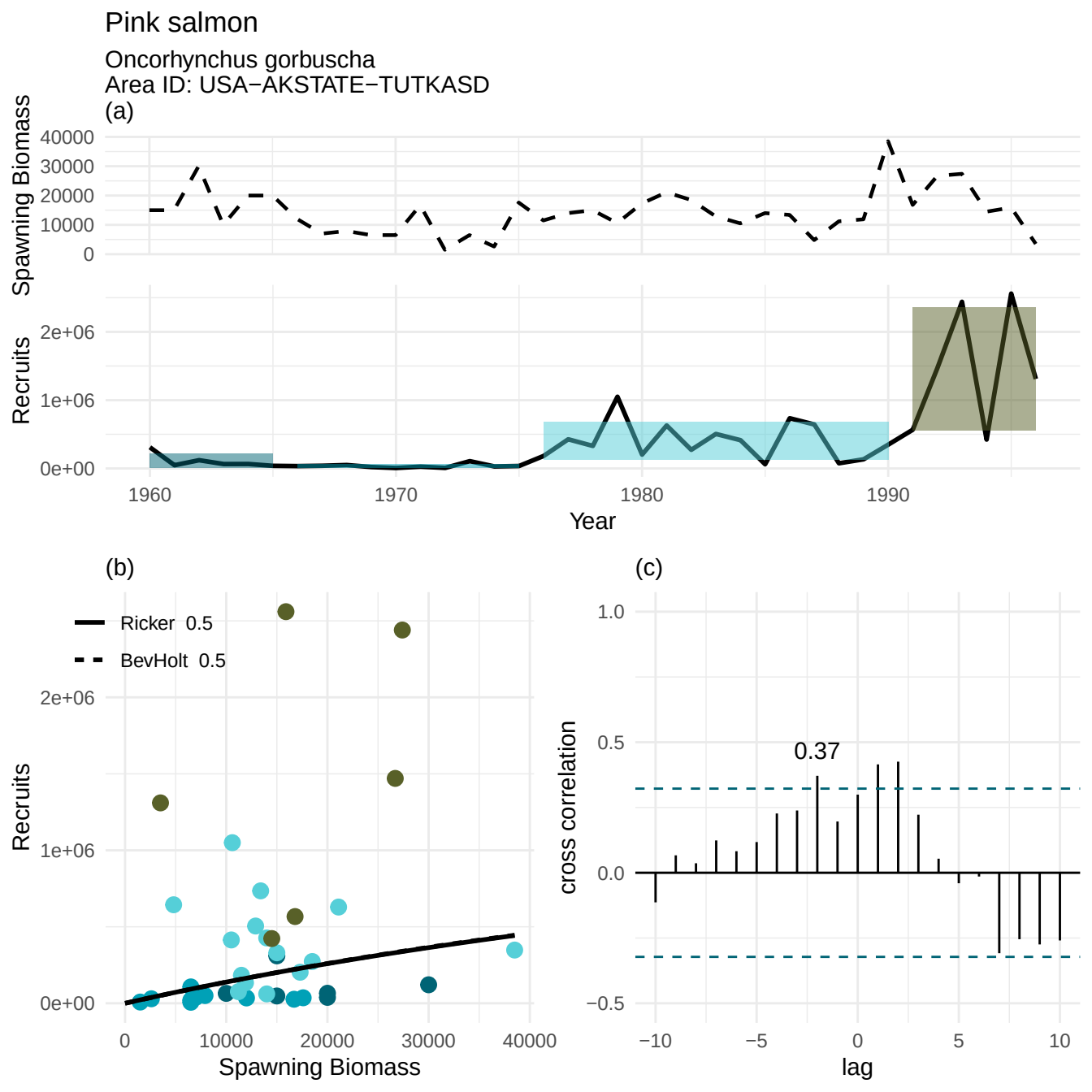

Pink salmon
Oncorhynchus gorbuscha
Area ID: Russia−TINRO−PRIMPW
(a)
Spawning Biomass
5e+06
4e+06
3e+06
2e+06
1e+06
0e+00
Recruits
8e+06
4e+06
0e+00
1950
1960
1970
1980
1990
2000
Year
(b)
Ricker 0.307
BevHolt 0.693
Recruits
9e+06
6e+06
3e+06
0e+00
0e+00
1e+06
2e+06
3e+06
4e+06
5e+06
Spawning Biomass
(c)
0.92
0.5
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

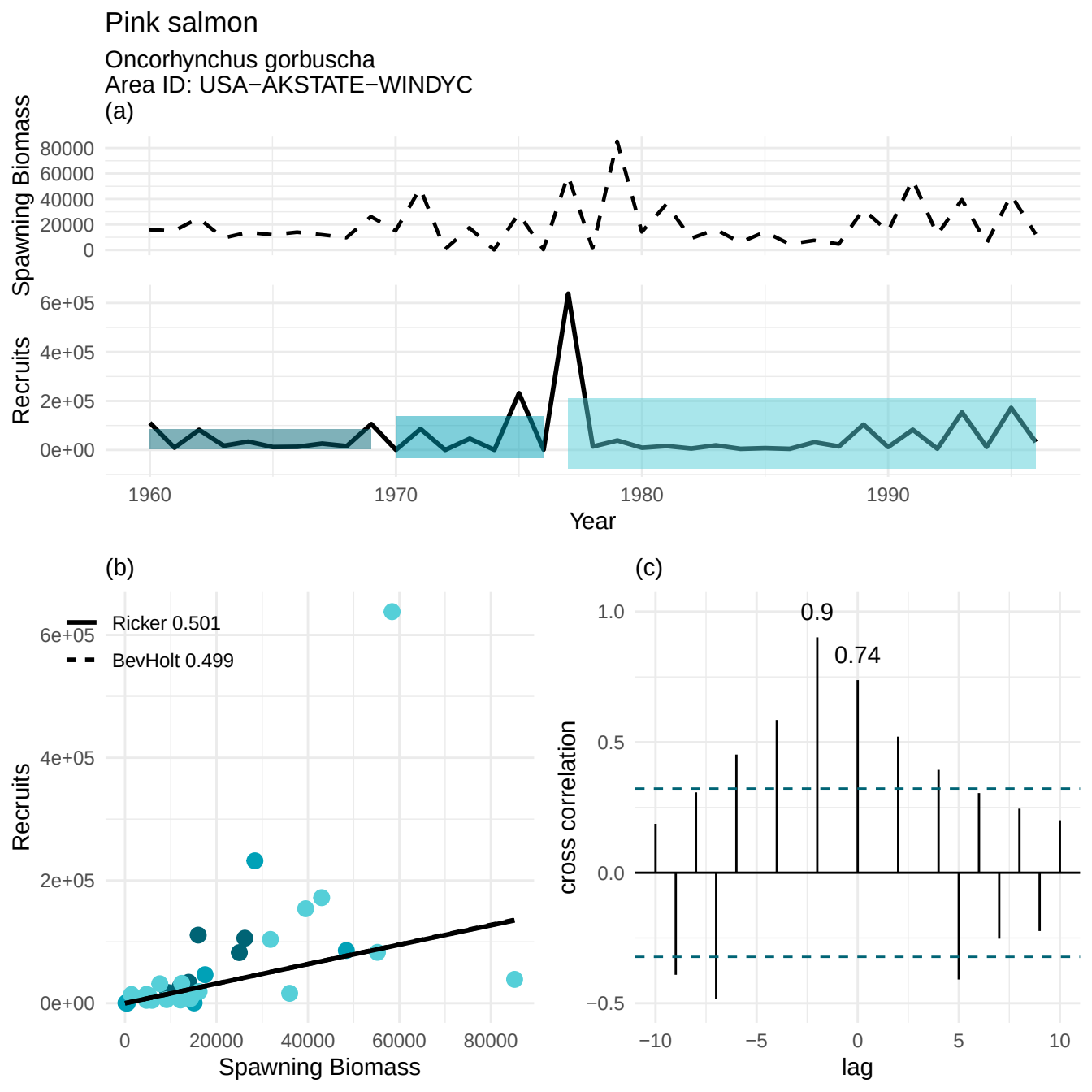

Pink salmon
Oncorhynchus gorbuscha
Area ID: USA−AKSTATE−PWSED
(a)
Spawning Biomass
1250000
1000000
750000
500000
250000
Recruits
12500000
10000000
7500000
5000000
2500000
0
1970
1980
1990
Year
(b)
Ricker 0.465
BevHolt 0.535
Recruits
Spawning Biomass
0
250000
500000
750000
1000000
1250000
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.78
−10
−5
0
5
10
lag

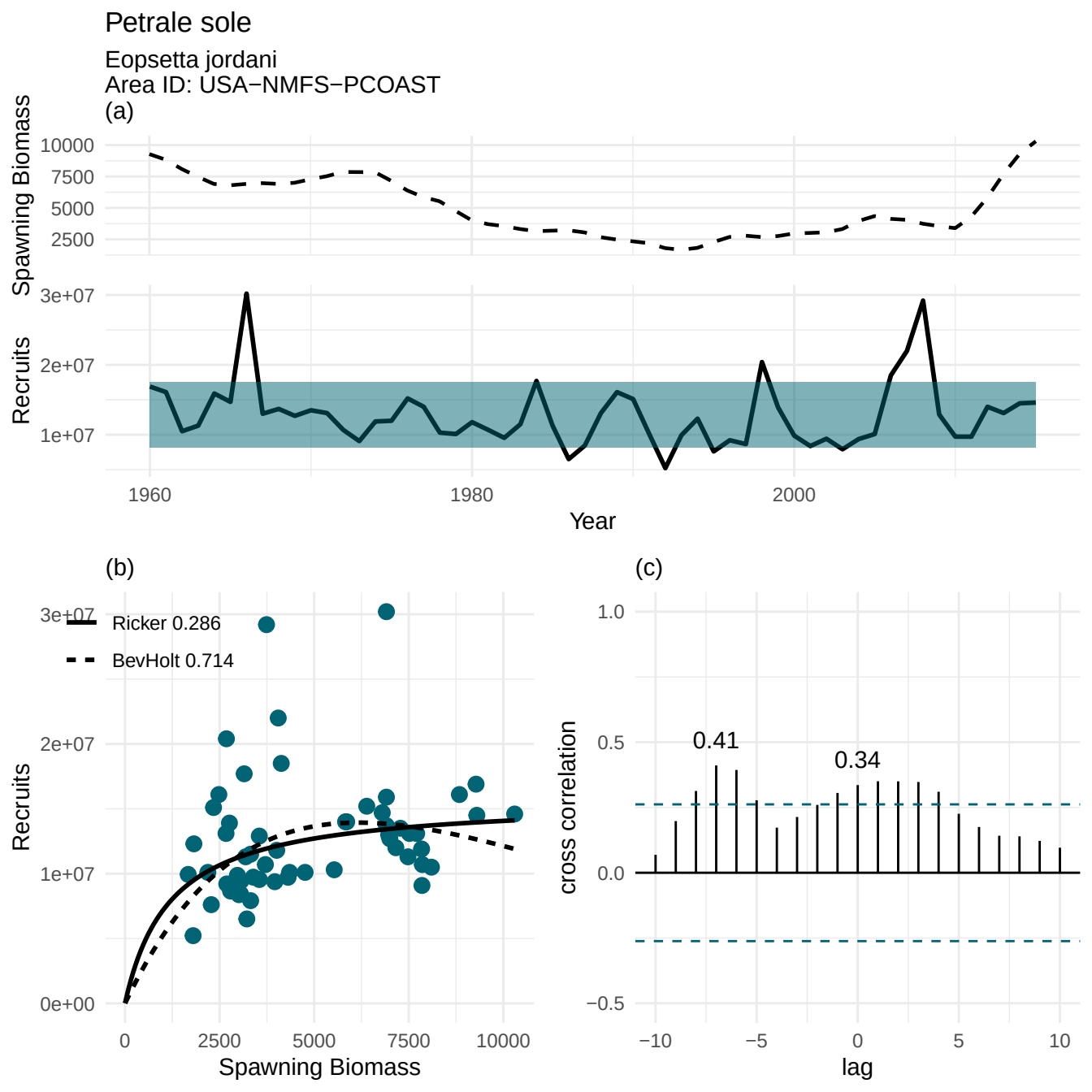

Pink salmon
Oncorhynchus gorbuscha
Area ID: USA−AKSTATE−PWSSED
(a)
Spawning Biomass
8e+05
6e+05
4e+05
2e+05
0e+00
Recruits
5e+06
4e+06
3e+06
2e+06
1e+06
0e+00
1970
1980
1990
Year
(b)
Ricker 0.496
BevHolt 0.504
Recruits
5e+06
4e+06
3e+06
2e+06
1e+06
0e+00
0e+00
2e+05
4e+05
6e+05
8e+05
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.71
0.49
−10
−5
0
5
10
lag

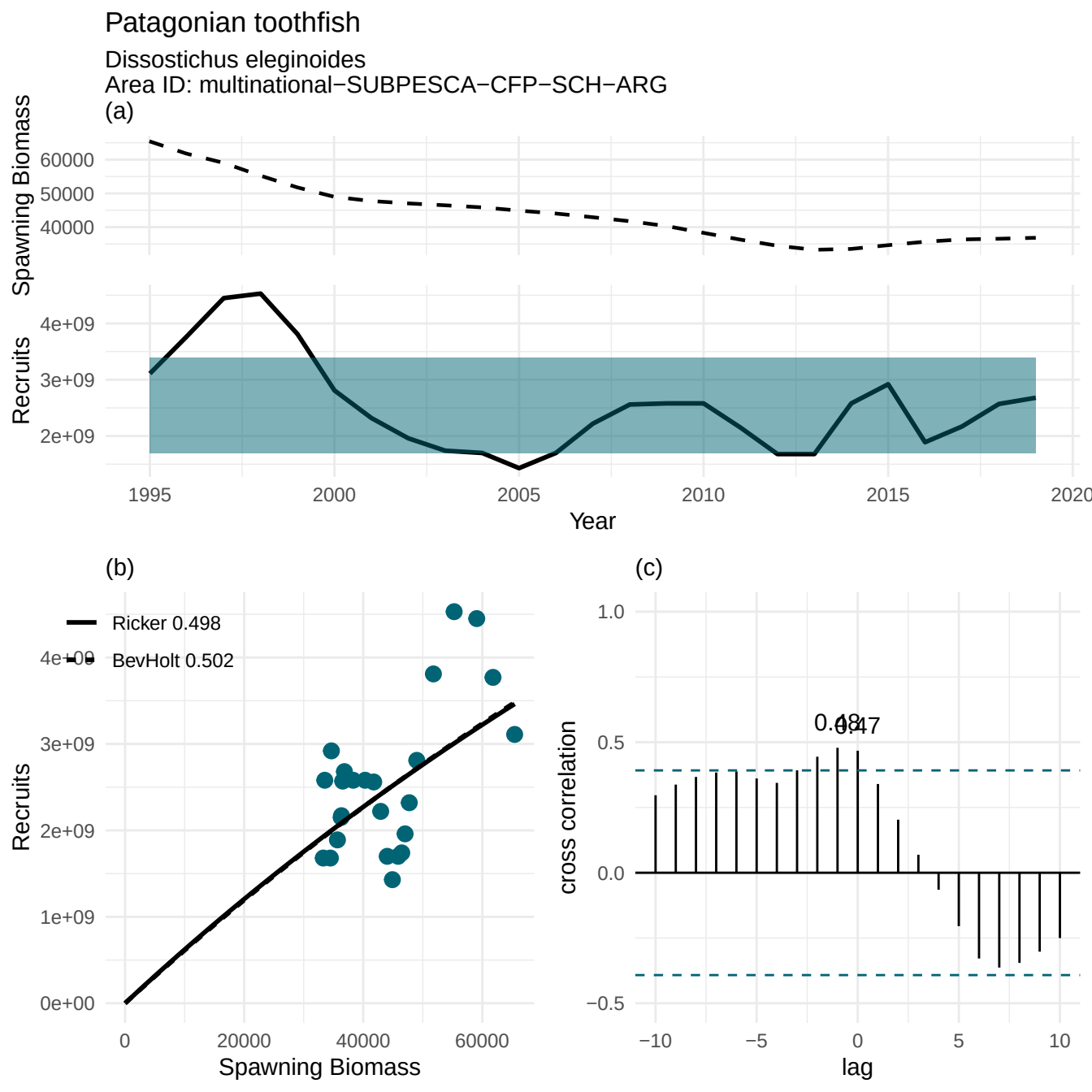

Pink salmon
Oncorhynchus gorbuscha
Area ID: USA−AKSTATE−ROCKYROD
(a)
Spawning Biomass
200000
150000
100000
50000
0
Recruits
4e+05
3e+05
2e+05
1e+05
0e+00
1960
1970
1980
1990
Year
(b)
Ricker 0.491
BevHolt 0.509
Recruits
4e+05
3e+05
2e+05
1e+05
0e+00
0
50000
100000
150000
200000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.9
0.76
−10
−5
0
5
10
lag

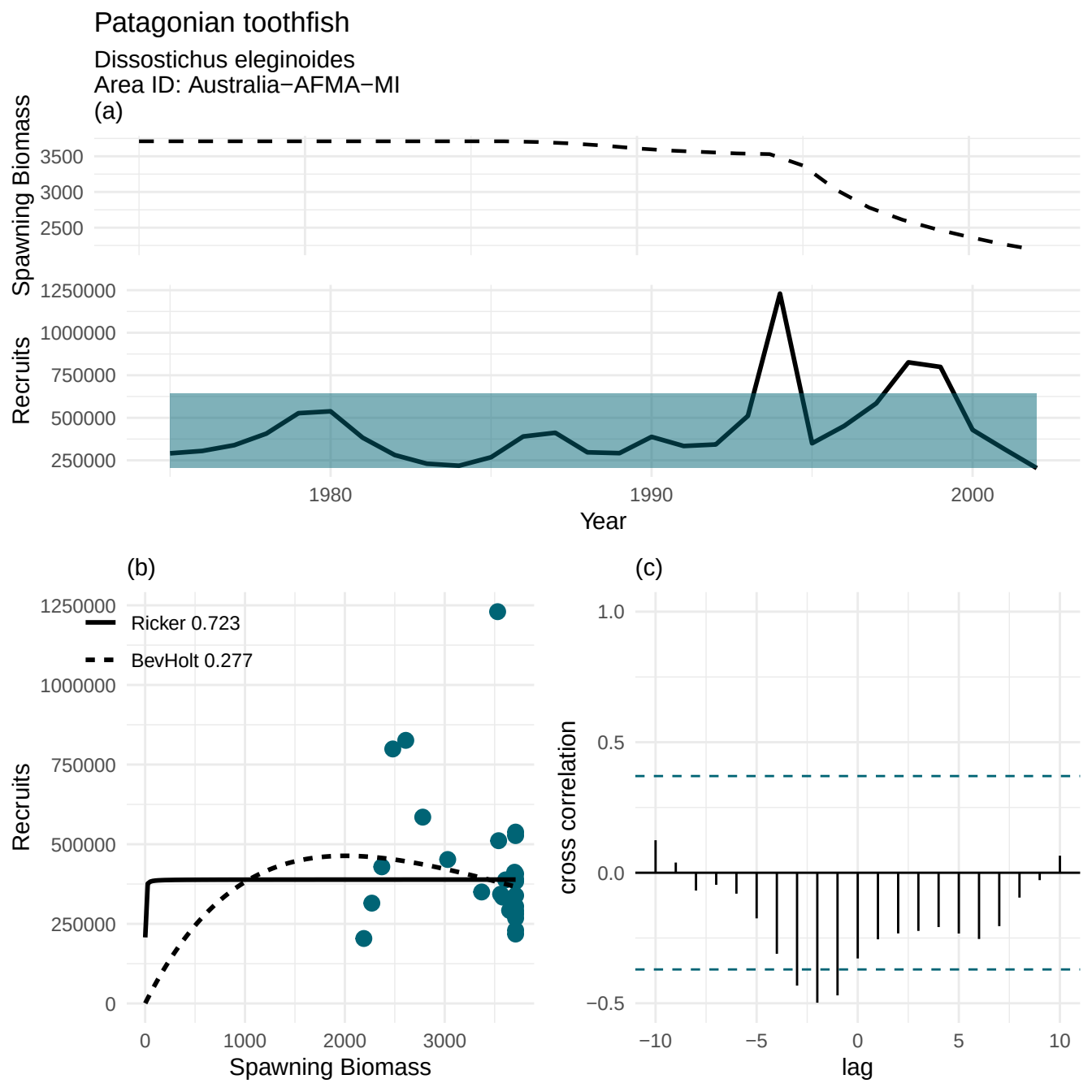

Pink salmon
Oncorhynchus gorbuscha
Area ID: USA−AKSTATE−SELDOVIAB
(a)
Spawning Biomass
75000
50000
25000
Recruits
4e+05
3e+05
2e+05
1e+05
0e+00
1960
1970
1980
1990
Year
(b)
Ricker 0.423
BevHolt 0.577
Recruits
Spawning Biomass
0
25000
50000
75000
(c)
0.87
0.46
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

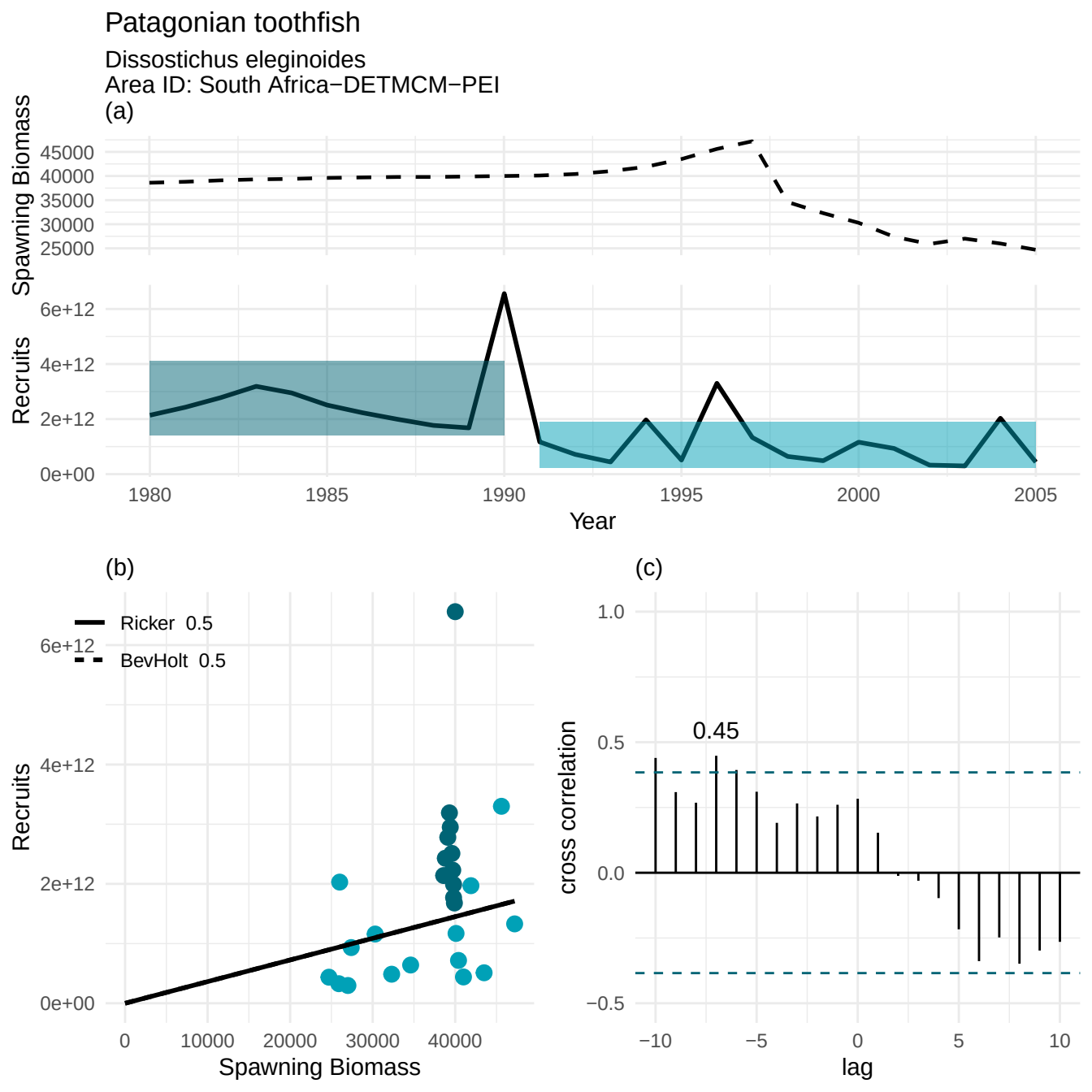

Pink salmon
Oncorhynchus gorbuscha
Area ID: USA−AKSTATE−TUTKASD
(a)
Spawning Biomass
40000
30000
20000
10000
0
Recruits
2e+06
1e+06
0e+00
1960
1970
1980
1990
Year
(b)
Ricker 0.5
BevHolt 0.5
Recruits
2e+06
1e+06
0e+00
0
10000
20000
30000
40000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.37
−10
−5
0
5
10
lag

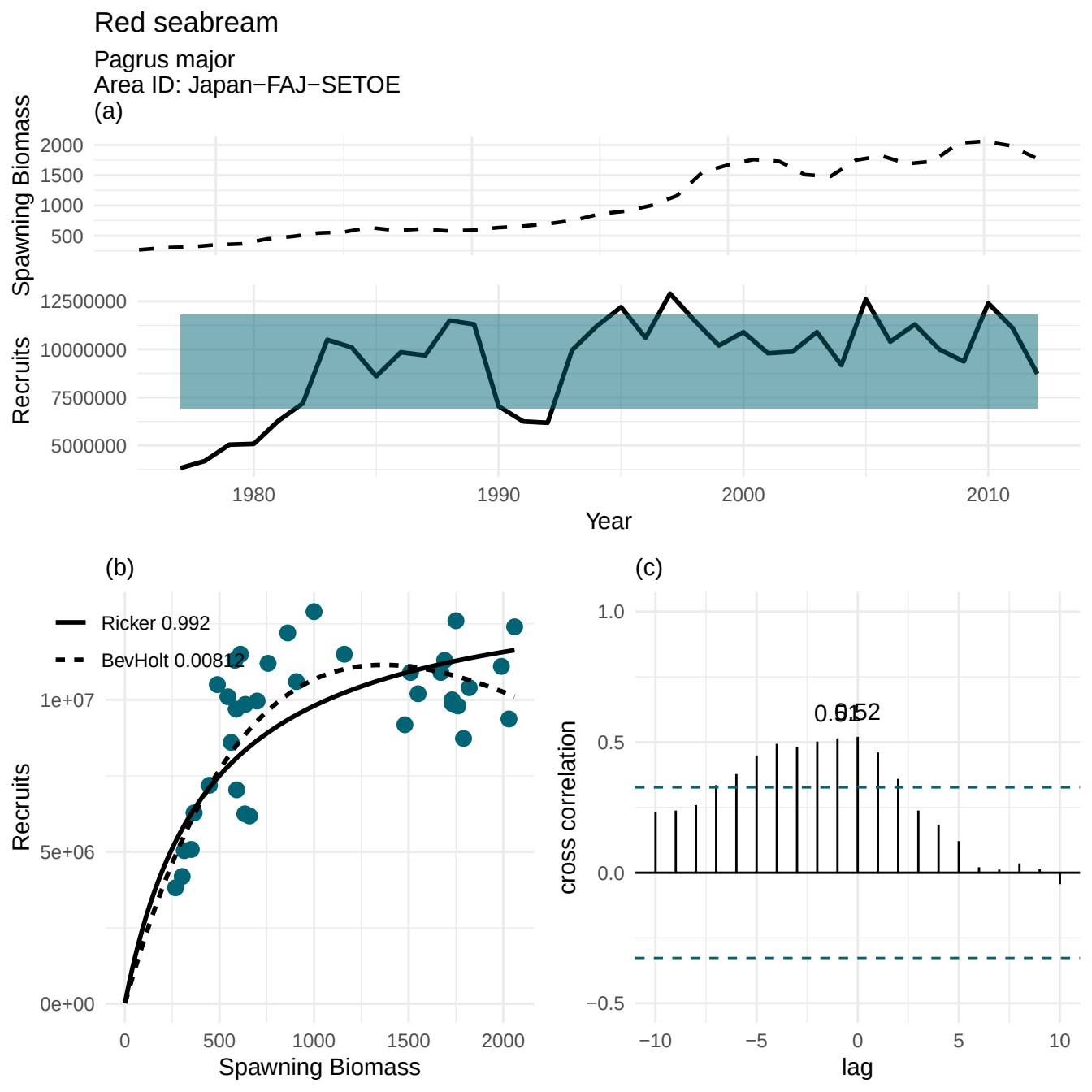

Pink salmon
Oncorhynchus gorbuscha
Area ID: USA−AKSTATE−WINDYC
(a)
Spawning Biomass
80000
60000
40000
20000
0
Recruits
6e+05
4e+05
2e+05
0e+00
1960
1970
1980
1990
Year
(b)
Ricker 0.501
BevHolt 0.499
Recruits
6e+05
4e+05
2e+05
0e+00
0
20000
40000
60000
80000
Spawning Biomass
(c)
1.0
0.5
0.0
−0.5
0.9
0.74
cross correlation
−10
−5
0
5
10
lag

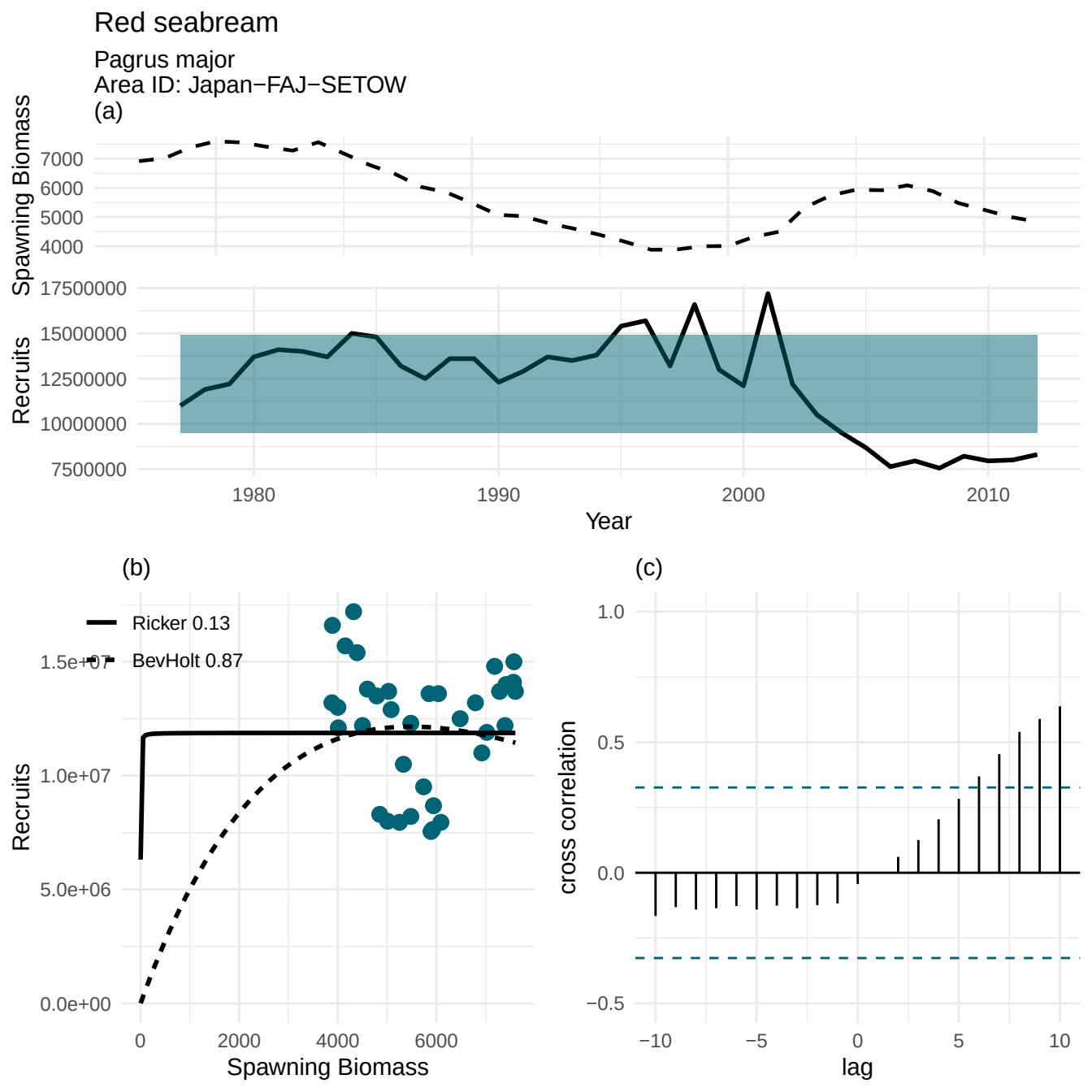

Petrale sole
Eopsetta jordani
Area ID: USA−NMFS−PCOAST
(a)
Spawning Biomass
10000
7500
5000
2500
Recruits
3e+07
2e+07
1e+07
1960
1980
2000
Year
(b)
Ricker 0.286
BevHolt 0.714
Recruits
3e+07
2e+07
1e+07
0e+00
0
2500
5000
7500
10000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.41
0.34
−10
−5
0
5
10
lag

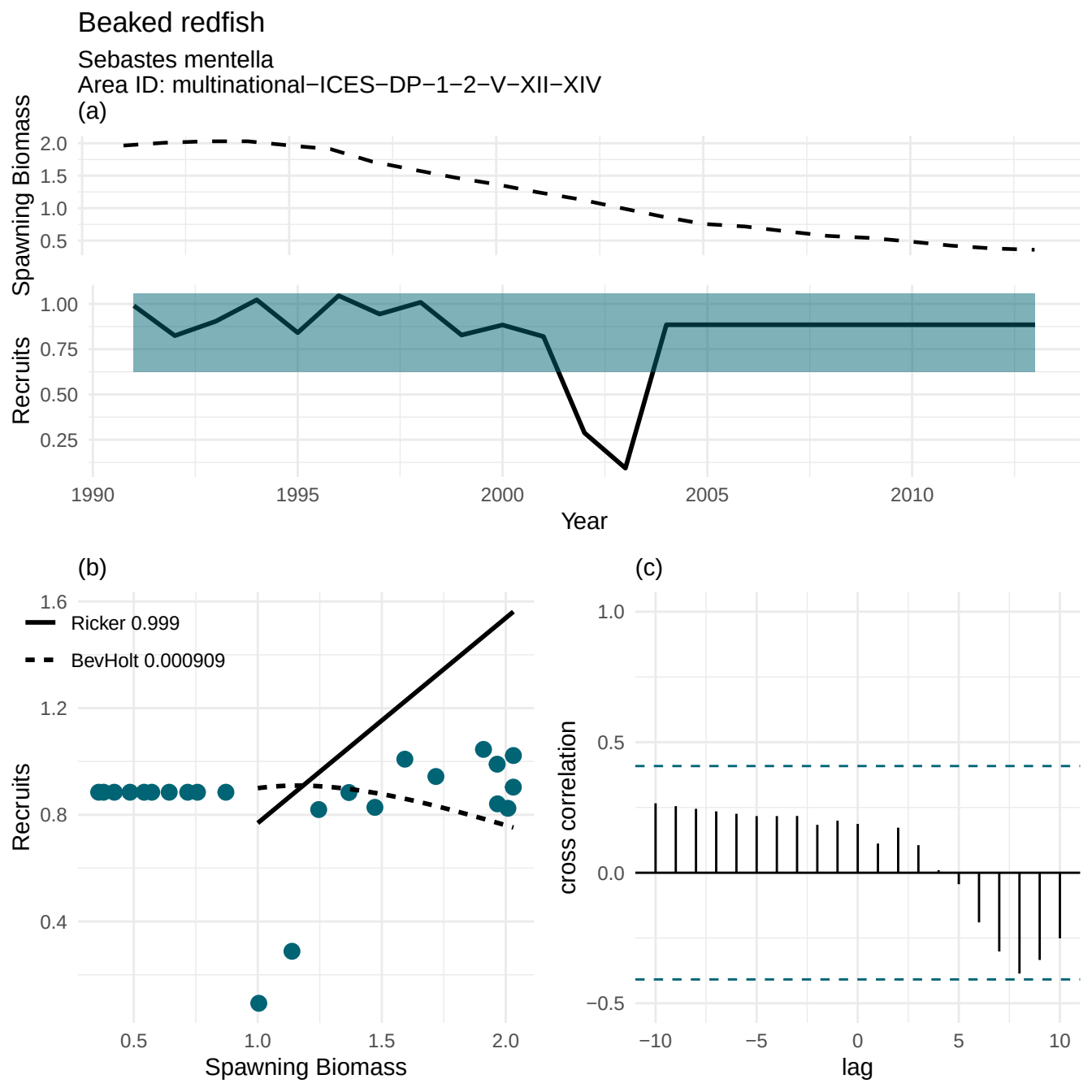

Patagonian toothfish
Dissostichus eleginoides
Area ID: multinational−SUBPESCA−CFP−SCH−ARG
(a)
Spawning Biomass
60000
50000
40000
Recruits
4e+09
3e+09
2e+09
1995
2000
2005
2010
2015
2020
Year
(b)
Ricker 0.498
BevHolt 0.502
Recruits
4e+09
3e+09
2e+09
1e+09
0e+00
0
20000
40000
60000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.48
0.47
−10
−5
0
5
10
lag

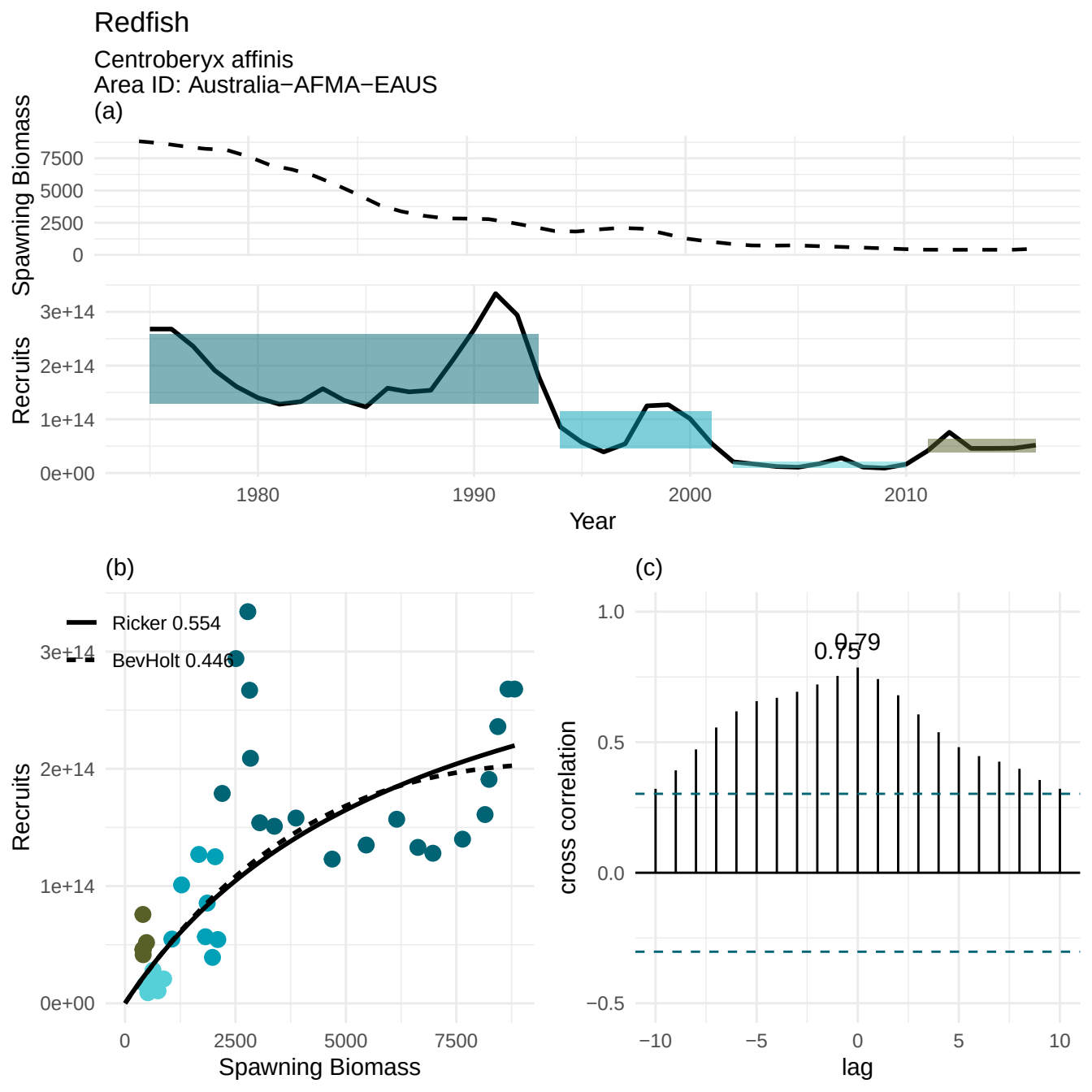

Patagonian toothfish
Dissostichus eleginoides
Area ID: Australia−AFMA−MI
(a)
Spawning Biomass
3500
3000
2500
Recruits
1250000
1000000
750000
500000
250000
1980
1990
2000
Year
(b)
Ricker 0.723
BevHolt 0.277
Recruits
1250000
1000000
750000
500000
250000
0
0
1000
2000
3000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

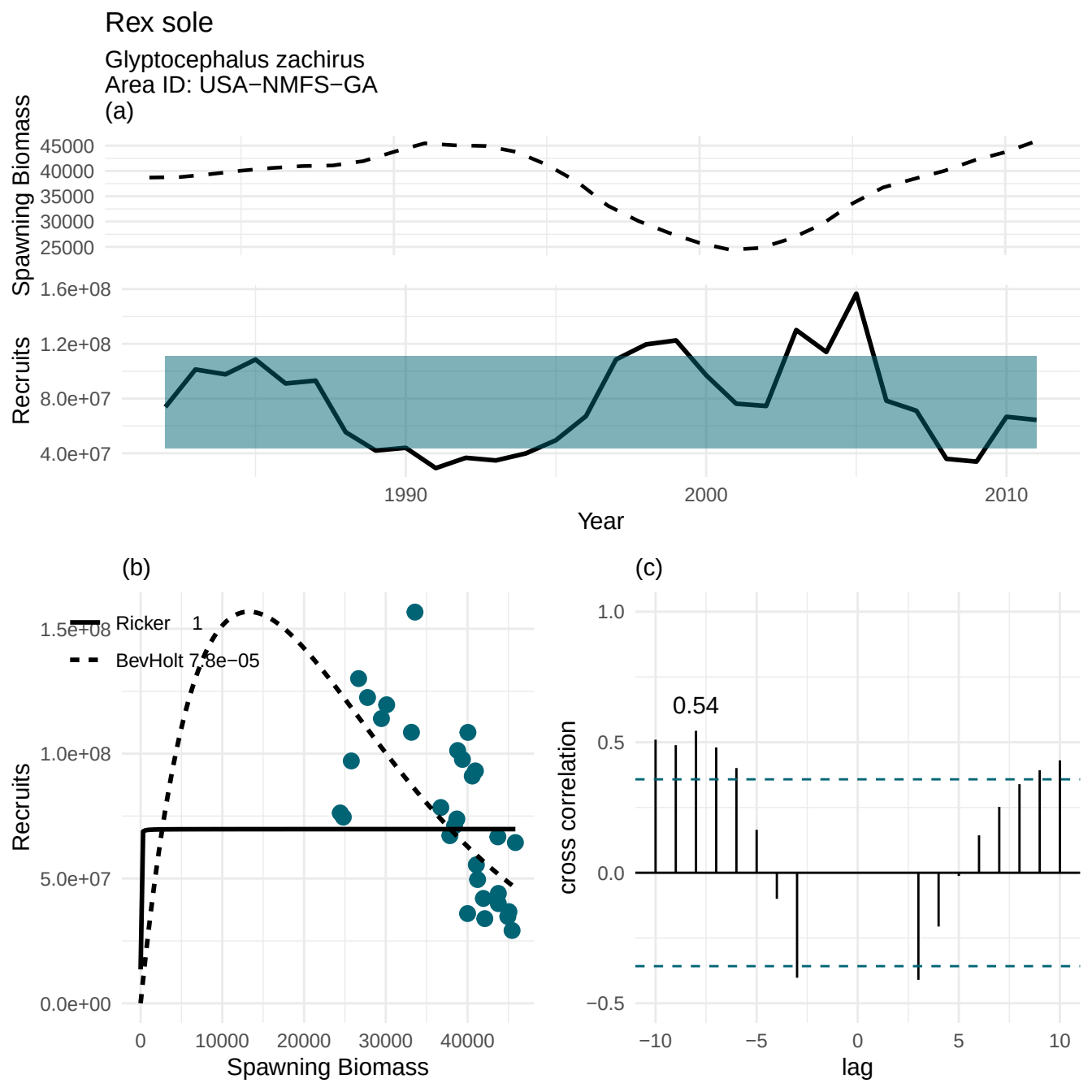

Patagonian toothfish
Dissostichus eleginoides
Area ID: South Africa−DETMCM−PEI
(a)
Spawning Biomass
45000
40000
35000
30000
25000
Recruits
6e+12
4e+12
2e+12
0e+00
1980
1985
1990
1995
2000
2005
Year
(b)
Ricker 0.5
BevHolt 0.5
Recruits
6e+12
4e+12
2e+12
0e+00
0
10000
20000
30000
40000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.45
−10
−5
0
5
10
lag

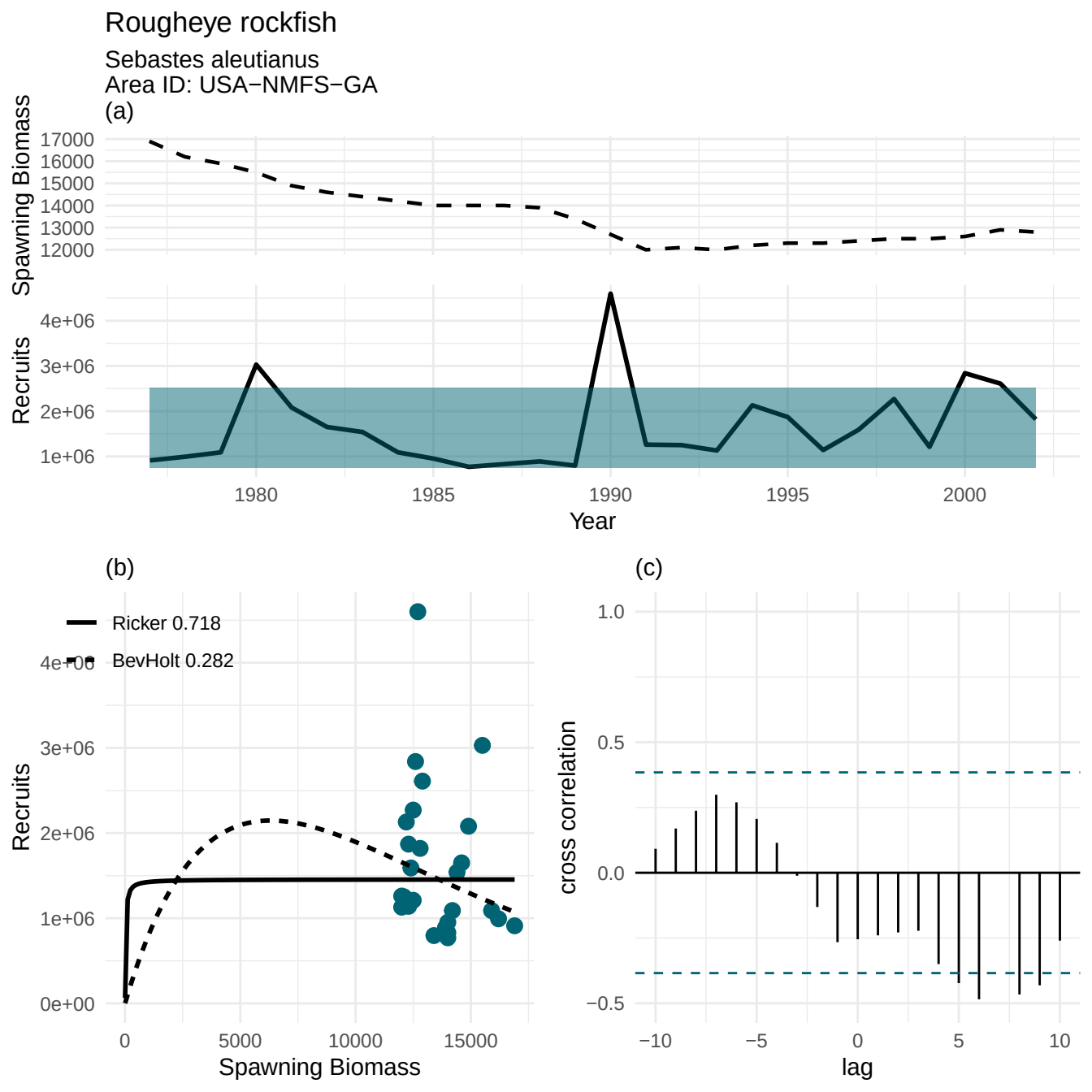

Red seabream
Pagrus major
Area ID: Japan−FAJ−SETOE
(a)
Spawning Biomass
2000
1500
1000
500
Recruits
12500000
10000000
7500000
5000000
1980
1990
2000
2010
Year
(b)
Ricker 0.992
BevHolt 0.00812
Recruits
1e+07
5e+06
0e+00
0
500
1000
1500
2000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.852
−10
−5
0
5
10
lag

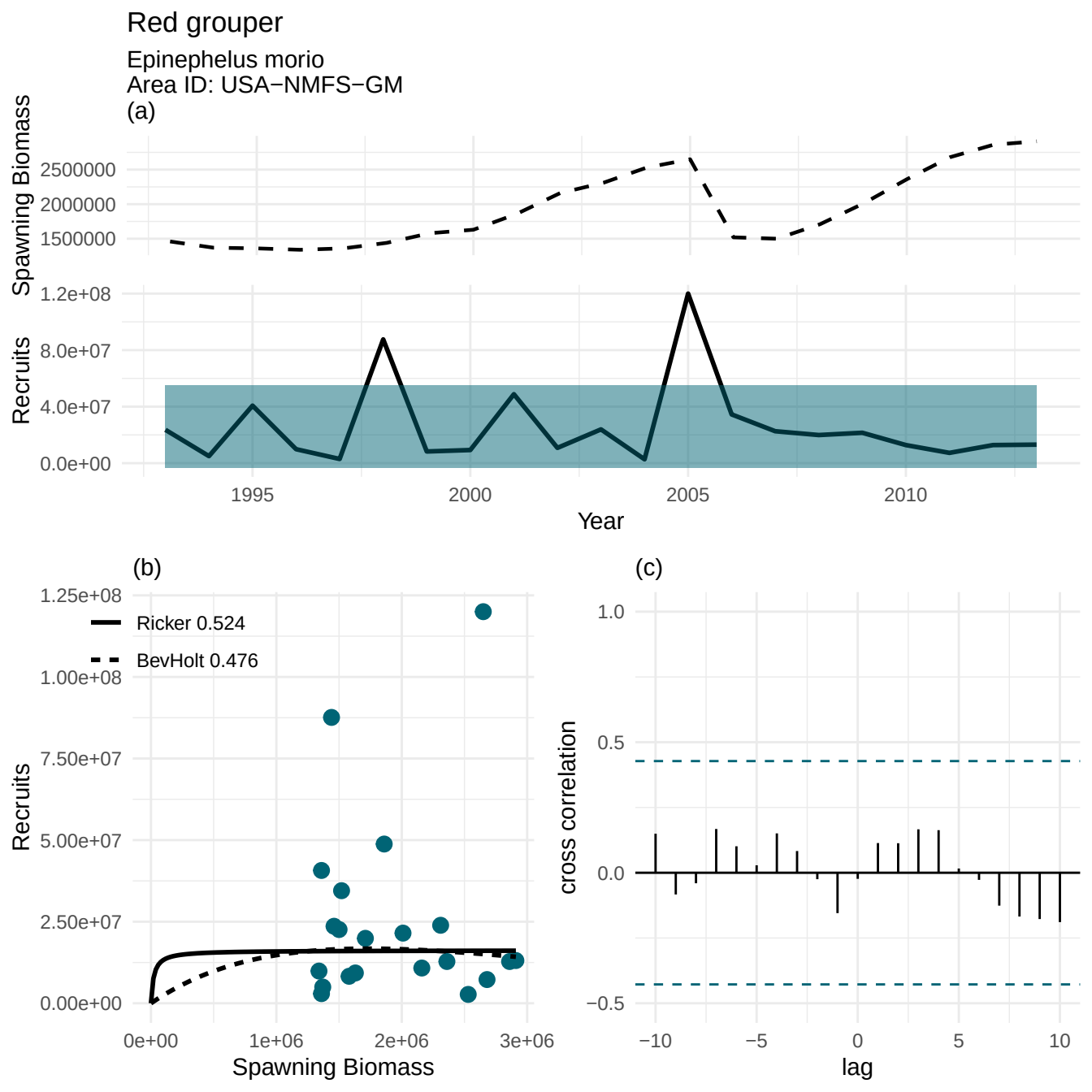

Red seabream
Pagrus major
Area ID: Japan−FAJ−SETOW
(a)
Spawning Biomass
7000
6000
5000
4000
Recruits
17500000
15000000
12500000
10000000
7500000
1980
1990
2000
2010
Year
(b)
Ricker 0.13
BevHolt 0.87
Recruits
1.5e+07
1.0e+07
5.0e+06
0.0e+00
0
2000
4000
6000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

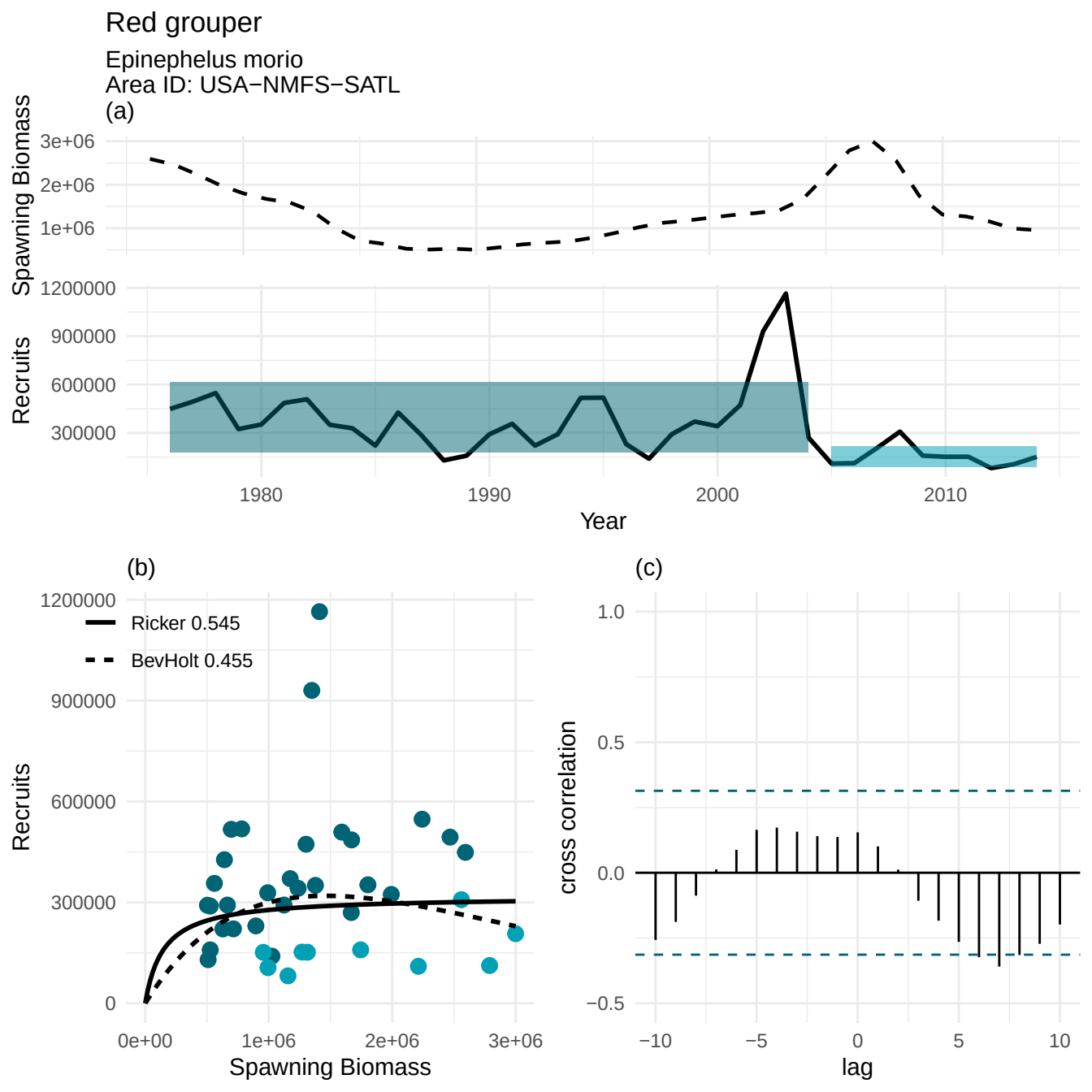

Beaked redfish
Sebastes mentella
Area ID: multinational−ICES−DP−1−2−V−XII−XIV
(a)
Spawning Biomass
2.0
1.5
1.0
0.5
Recruits
1.00
0.75
0.50
0.25
1990
1995
2000
2005
2010
Year
(b)
Ricker 0.999
BevHolt 0.000909
1.6
1.2
0.8
0.4
Recruits
0.5
1.0
1.5
2.0
Spawning Biomass
(c)
1.0
0.5
0.0
−0.5
cross correlation
−10
−5
0
5
10
lag

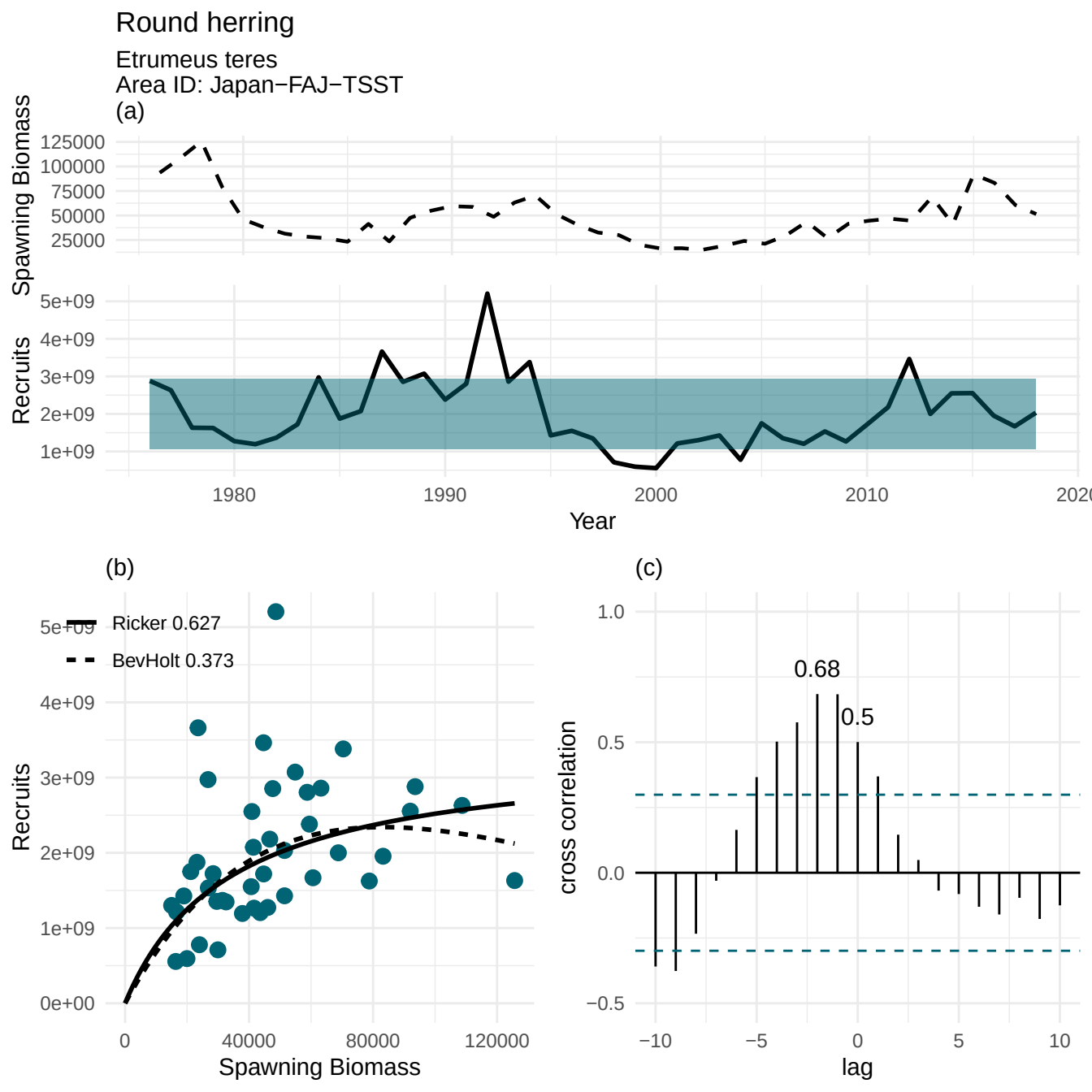

Redfish
Centroberyx affinis
Area ID: Australia−AFMA−EAUS
(a)
Spawning Biomass
7500
5000
2500
0
Recruits
3e+14
2e+14
1e+14
0e+00
1980
1990
2000
2010
Year
(b)
Ricker 0.554
BevHolt 0.446
Recruits
3e+14
2e+14
1e+14
0e+00
0
2500
5000
7500
Spawning Biomass
(c)
0.79
0.75
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

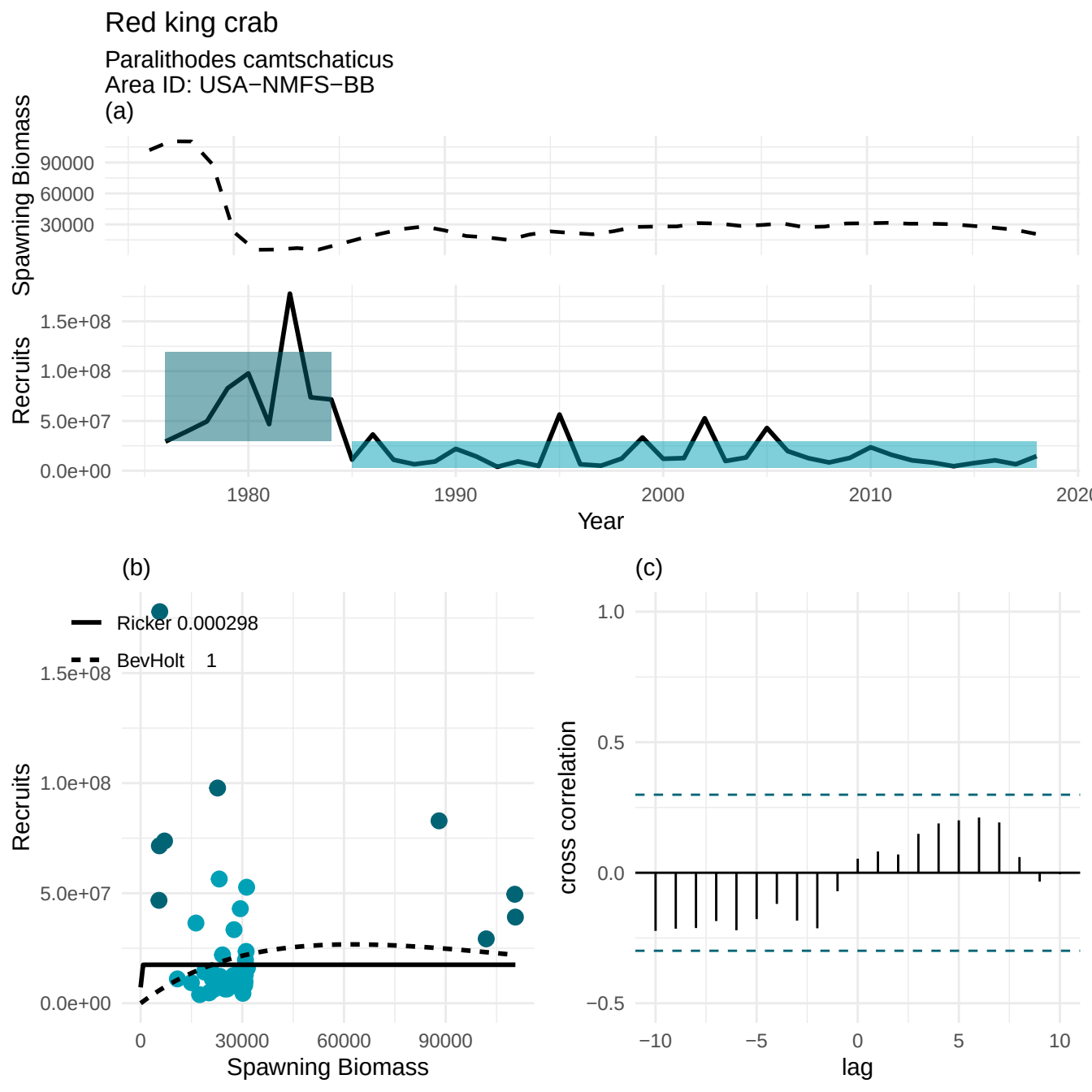

Rex sole
Glyptocephalus zachirus
Area ID: USA−NMFS−GA
(a)
Spawning Biomass
45000
40000
35000
30000
25000
Recruits
1.6e+08
1.2e+08
8.0e+07
4.0e+07
1990
2000
2010
Year
(b)
Ricker 1
BevHolt 7.8e−05
Recruits
1.5e+08
1.0e+08
5.0e+07
0.0e+00
0
10000
20000
30000
40000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.54
−10
−5
0
5
10
lag

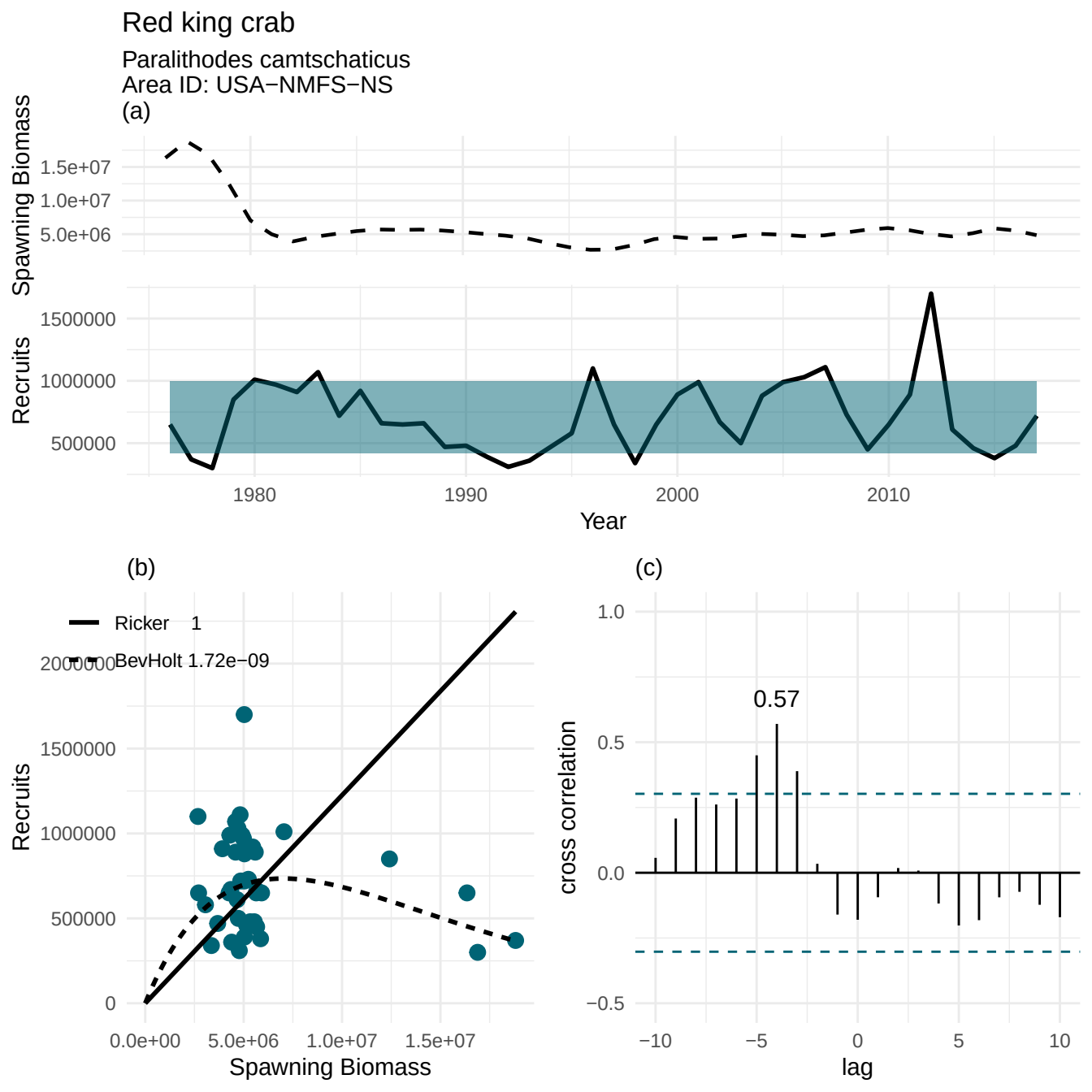

Rougheye rockfish
Sebastes aleutianus
Area ID: USA−NMFS−GA
(a)
Spawning Biomass
17000
16000
15000
14000
13000
12000
Recruits
4e+06
3e+06
2e+06
1e+06
1980
1985
1990
1995
2000
Year
(b)
Ricker 0.718
BevHolt 0.282
Recruits
4e+06
3e+06
2e+06
1e+06
0e+00
0
5000
10000
15000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

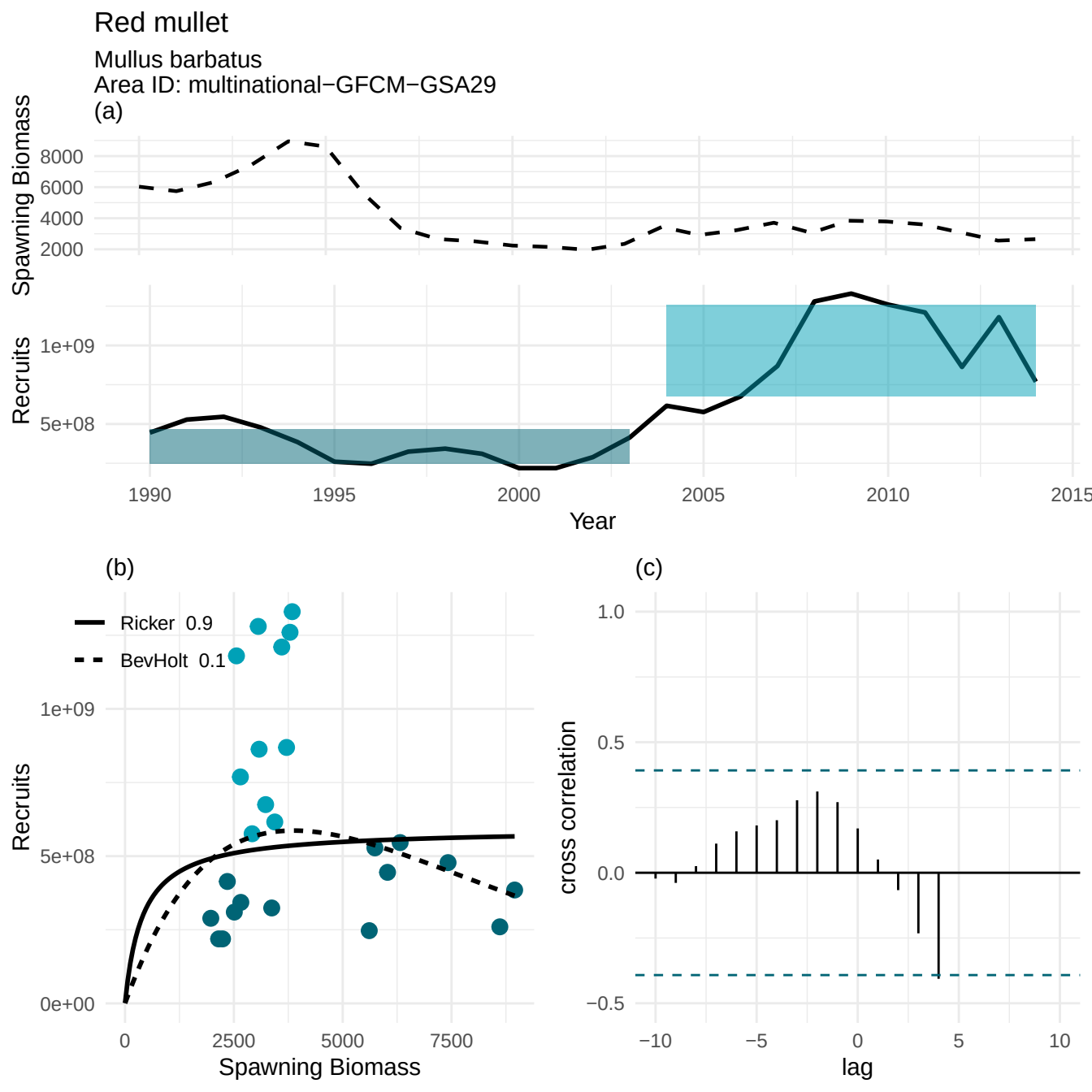

Red grouper
Epinephelus morio
Area ID: USA−NMFS−GM
(a)
Spawning Biomass
2500000
2000000
1500000
Recruits
1.2e+08
8.0e+07
4.0e+07
0.0e+00
1995
2000
2005
2010
Year
(b)
1.25e+08
1.00e+08
7.50e+07
5.00e+07
2.50e+07
0.00e+00
Recruits
Ricker 0.524
BevHolt 0.476
0e+00
1e+06
2e+06
3e+06
Spawning Biomass
(c)
1.0
0.5
0.0
−0.5
cross correlation
−10
−5
0
5
10
lag

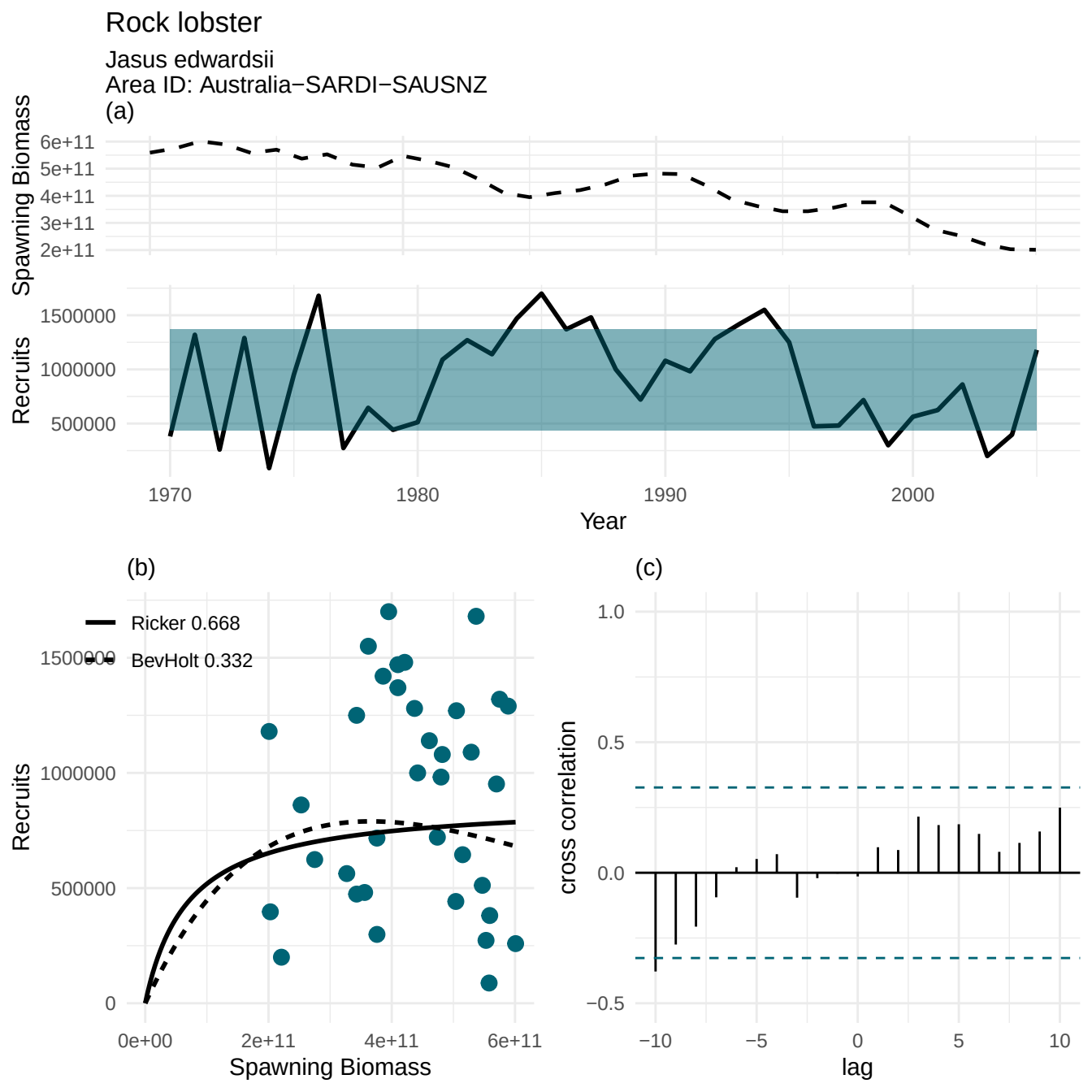

Red grouper
Epinephelus morio
Area ID: USA−NMFS−SATL
(a)
Spawning Biomass
3e+06
2e+06
1e+06
Recruits
1200000
900000
600000
300000
1980
1990
2000
2010
Year
(b)
Ricker 0.545
BevHolt 0.455
Recruits
1200000
900000
600000
300000
0
0e+00
1e+06
2e+06
3e+06
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

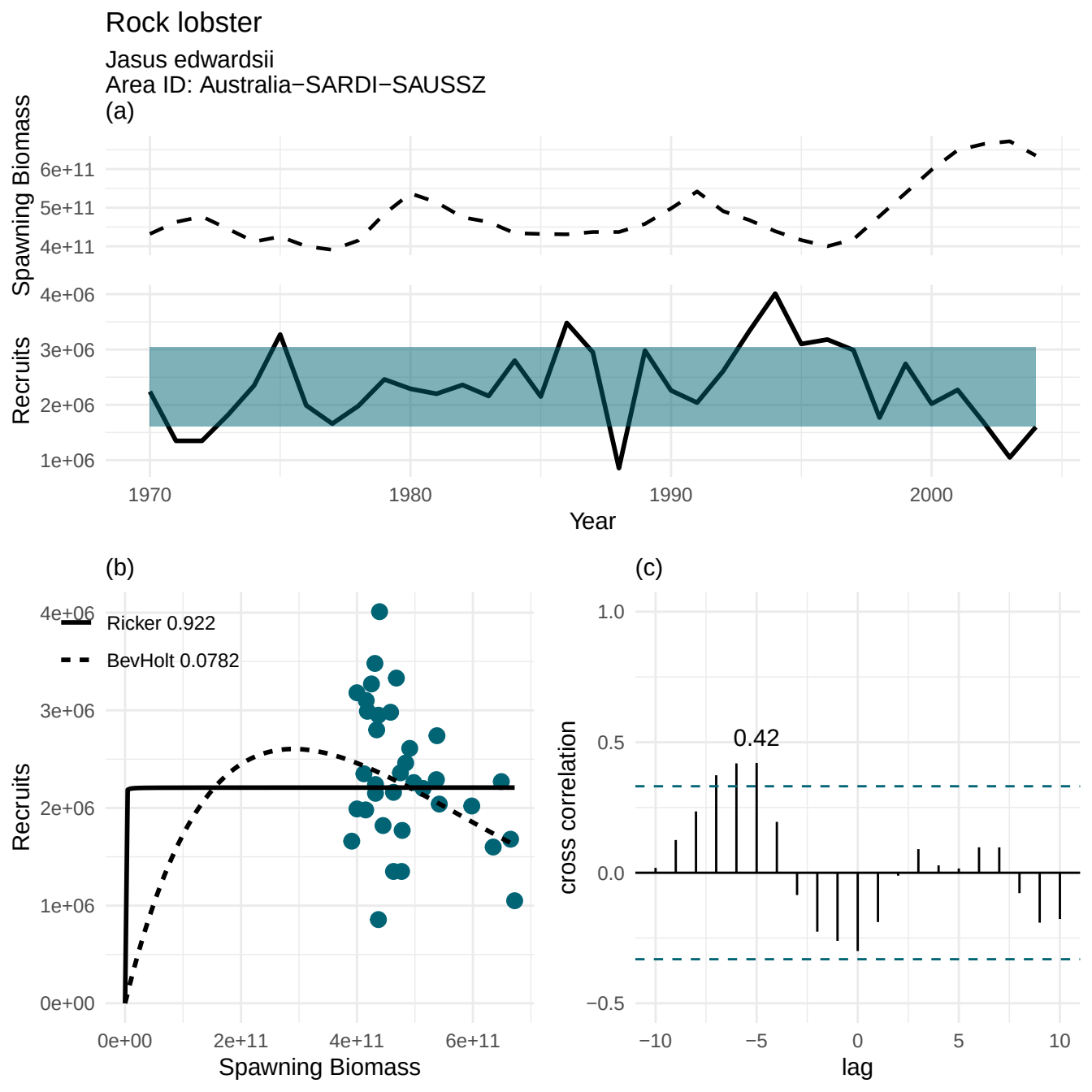

Round herring
Etrumeus teres
Area ID: Japan−FAJ−TSST
(a)
Spawning Biomass
125000
100000
75000
50000
25000
Recruits
5e+09
4e+09
3e+09
2e+09
1e+09
1980
1990
2000
2010
Year
(b)
Ricker 0.627
BevHolt 0.373
Recruits
0e+00
Spawning Biomass
0
40000
80000
120000
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.68
0.5
−10
−5
0
5
10
lag

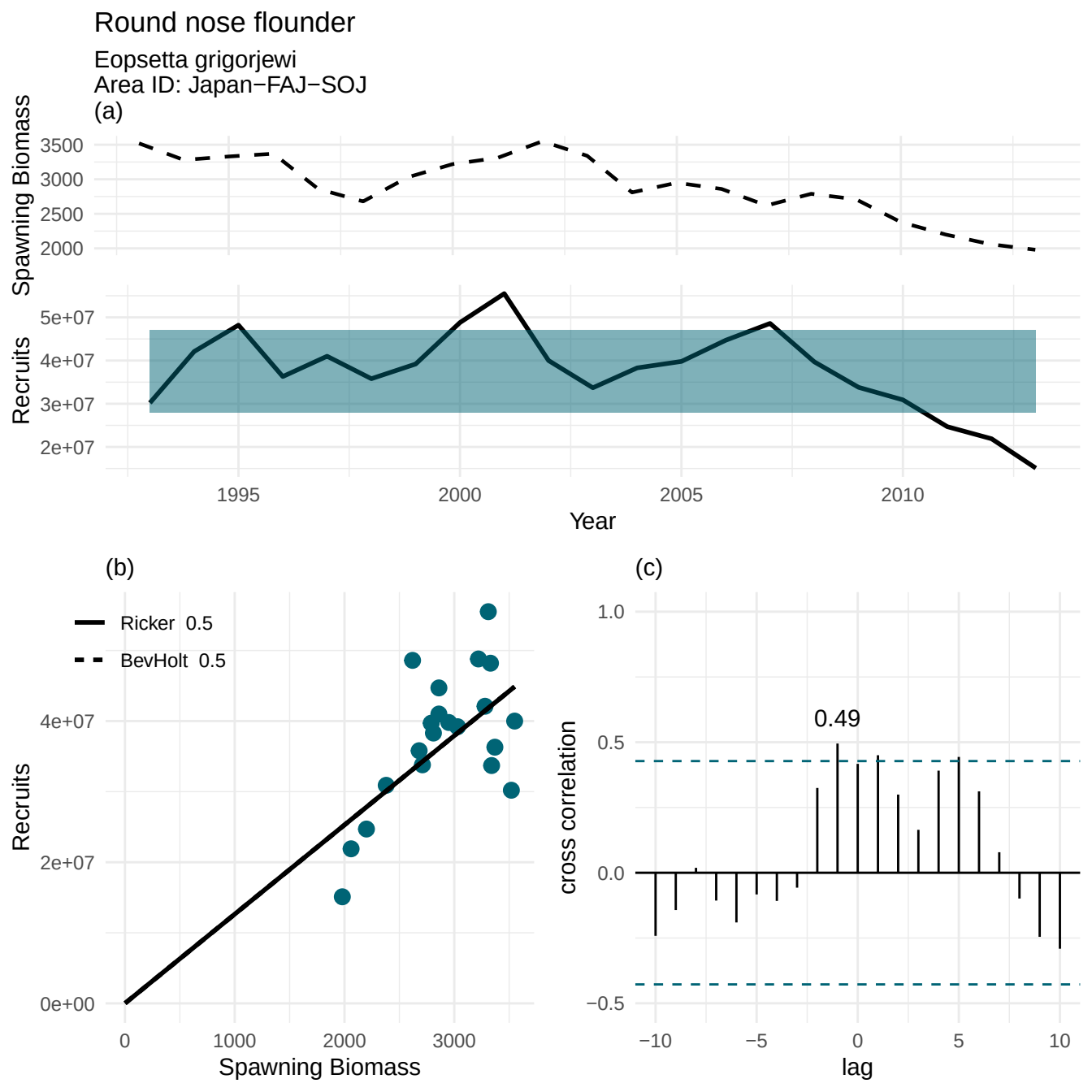

Red king crab
Paralithodes camtschaticus
Area ID: USA−NMFS−BB
(a)
Spawning Biomass
90000
60000
30000
Recruits
1.5e+08
1.0e+08
5.0e+07
0.0e+00
1980
1990
2000
2010
Year
(b)
Ricker 0.000298
BevHolt 1
Recruits
1.5e+08
1.0e+08
5.0e+07
0.0e+00
0
30000
60000
90000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

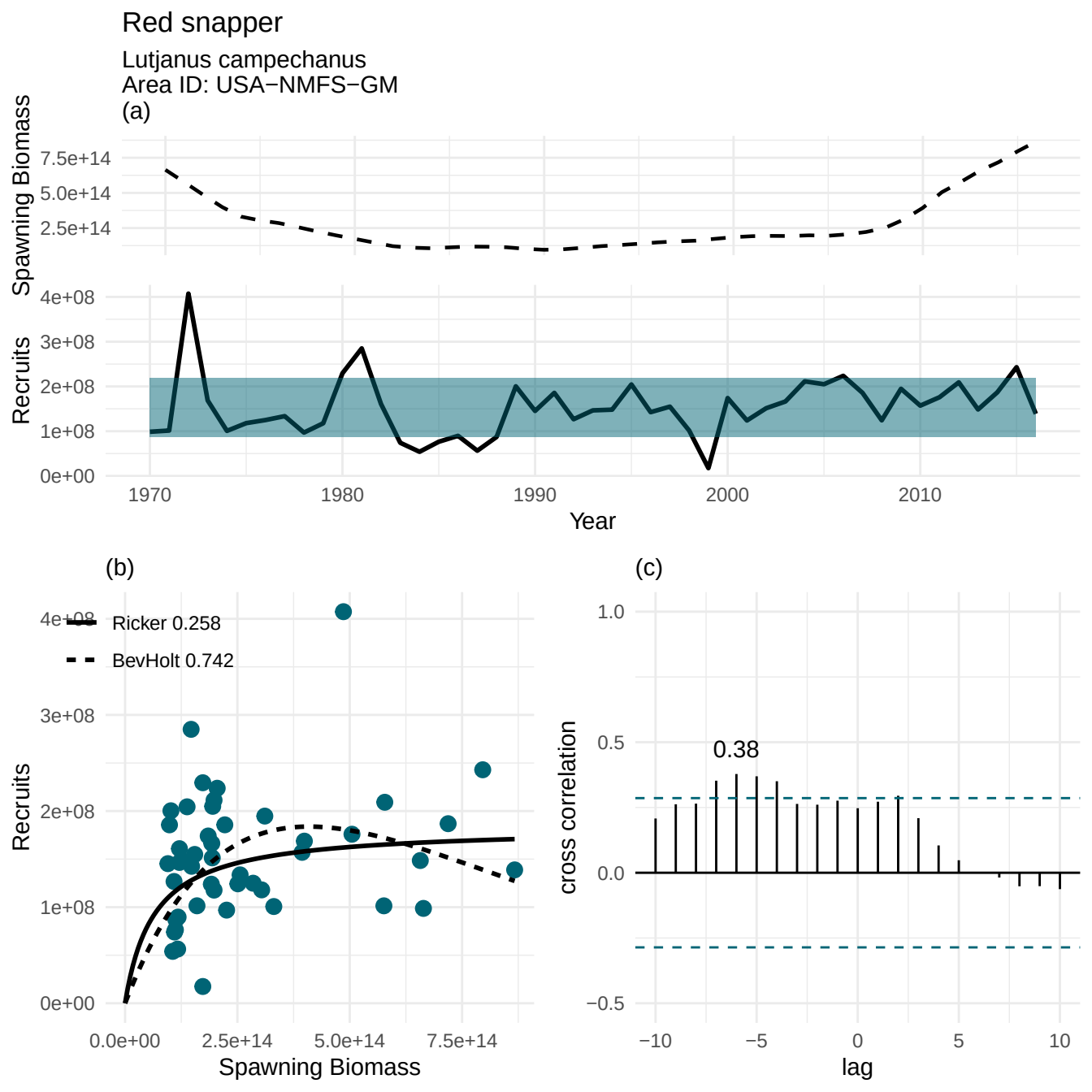

Red king crab
Paralithodes camtschaticus
Area ID: USA−NMFS−NS
(a)
Spawning Biomass
1.5e+07
1.0e+07
5.0e+06
Recruits
1500000
1000000
500000
1980
1990
2000
2010
Year
(b)
Ricker 1
BevHolt 1.72e−09
Recruits
2000000
1500000
1000000
500000
0
0.0e+00
5.0e+06
1.0e+07
1.5e+07
Spawning Biomass
(c)
0.57
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

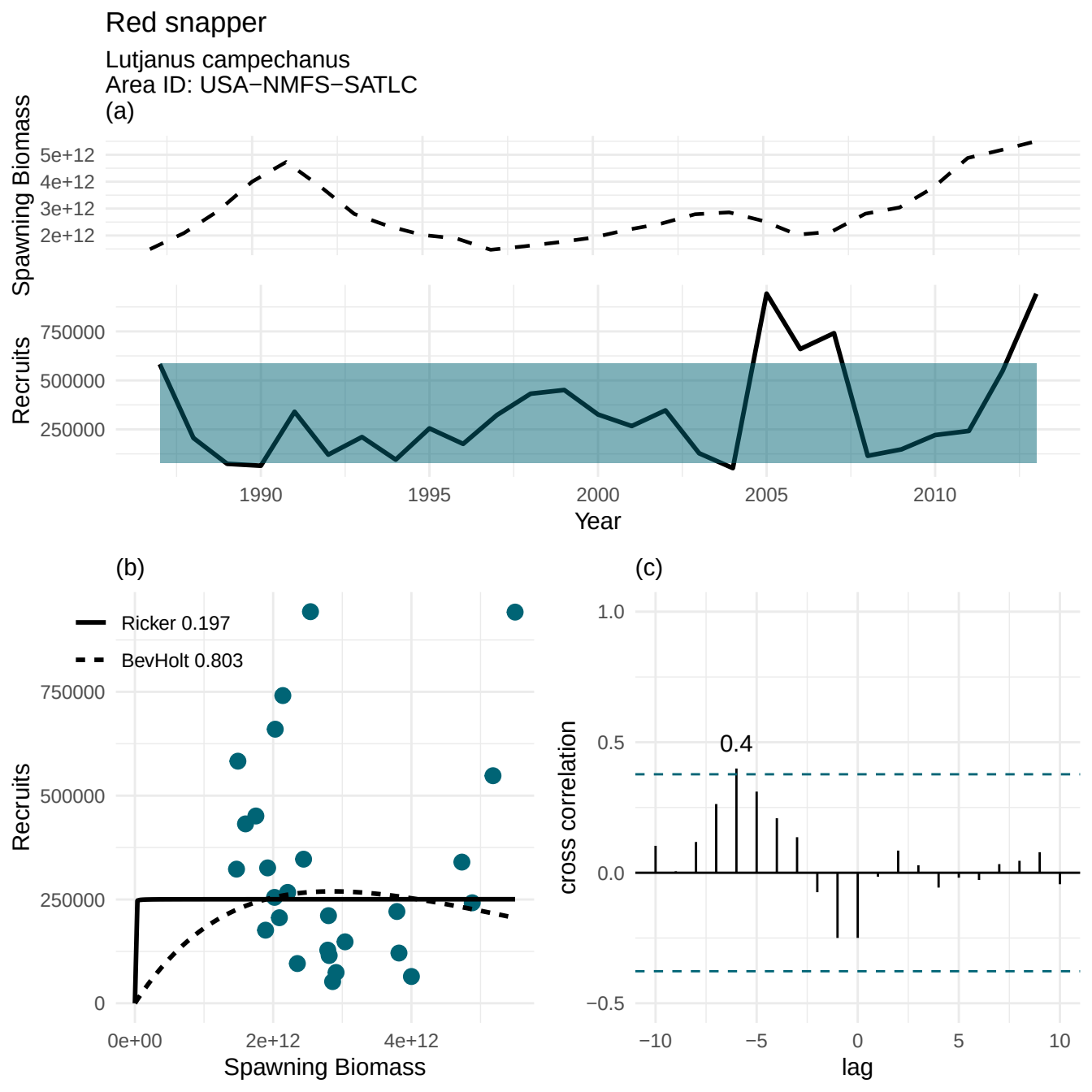

Red mullet
Mullus barbatus
Area ID: multinational−GFCM−GSA29
(a)
Spawning Biomass
8000
6000
4000
2000
Recruits
1e+09
5e+08
1990
1995
2000
2005
2010
2015
Year
(b)
Ricker 0.9
BevHolt 0.1
Recruits
1e+09
5e+08
0e+00
0
2500
5000
7500
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

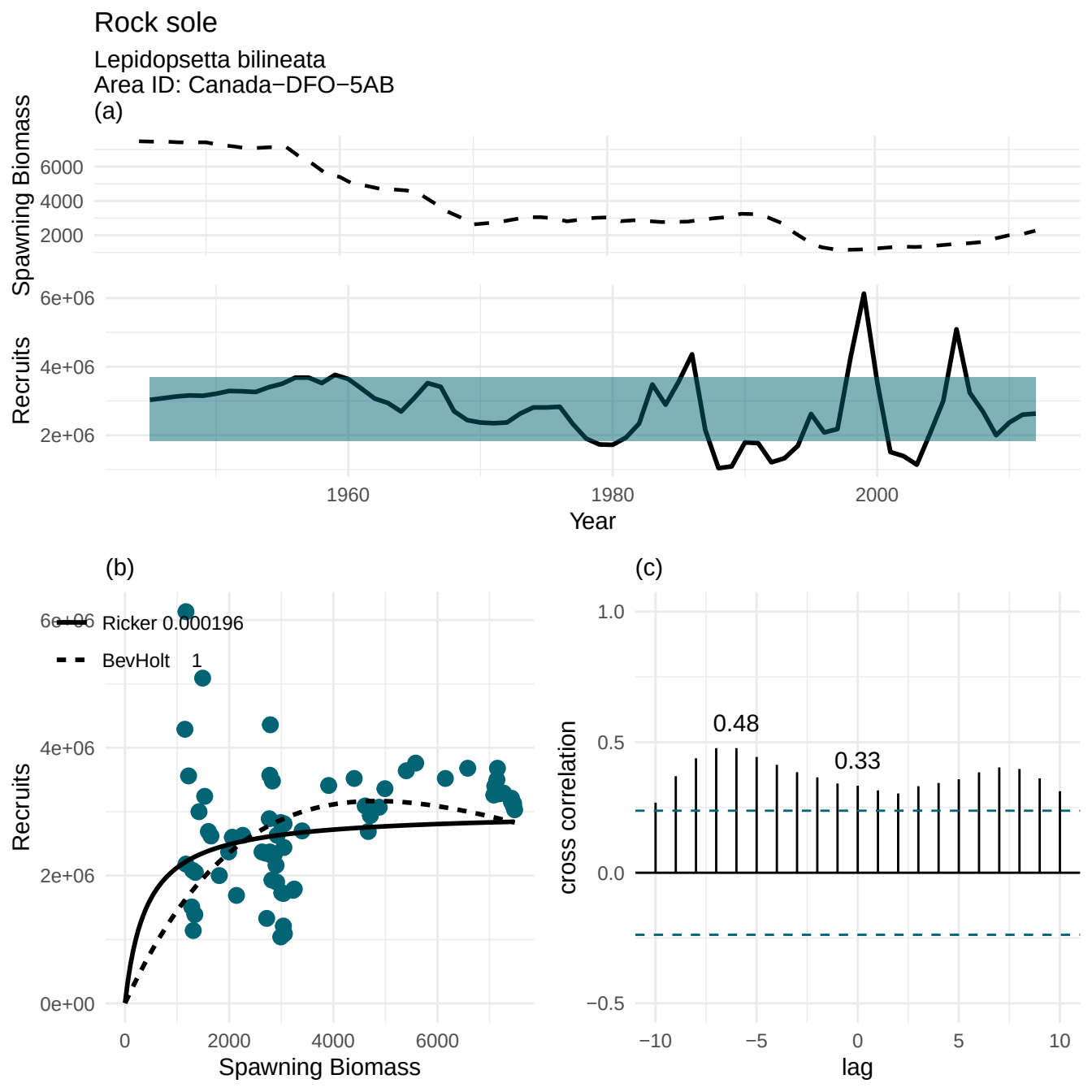

Rock lobster
Jasus edwardsii
Area ID: Australia−SARDI−SAUSNZ
(a)
Spawning Biomass
6e+11
5e+11
4e+11
3e+11
2e+11
Recruits
1500000
1000000
500000
1970
1980
1990
2000
Year
(b)
Ricker 0.668
BevHolt 0.332
Recruits
1500000
1000000
500000
0
0e+00
2e+11
4e+11
6e+11
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

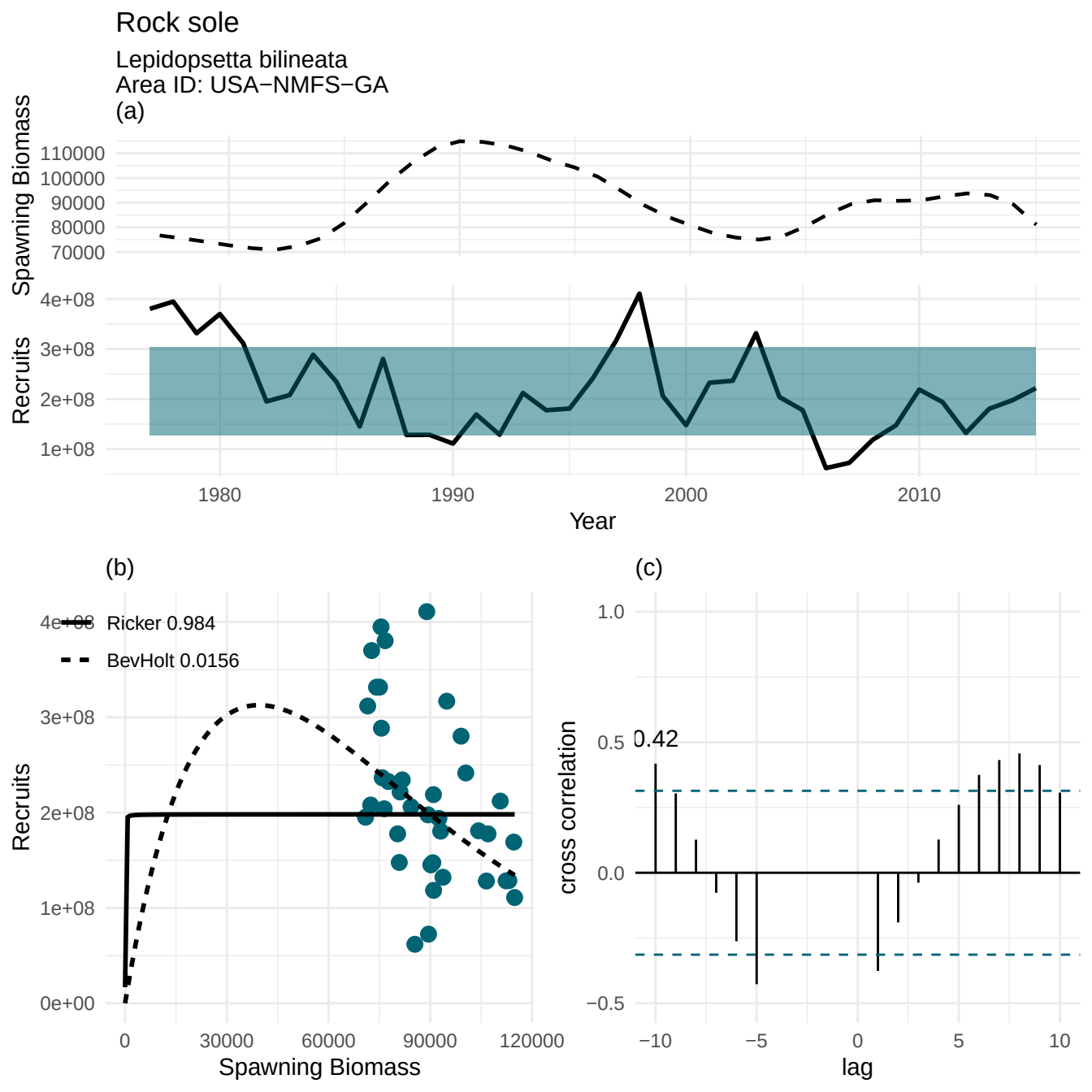

Rock lobster
Jasus edwardsii
Area ID: Australia−SARDI−SAUSSZ
(a)
Spawning Biomass
6e+11
5e+11
4e+11
Recruits
4e+06
3e+06
2e+06
1e+06
1970
1980
1990
2000
Year
(b)
Ricker 0.922
BevHolt 0.0782
Recruits
4e+06
3e+06
2e+06
1e+06
0e+00
0e+00
2e+11
4e+11
6e+11
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.42
−10
−5
0
5
10
lag

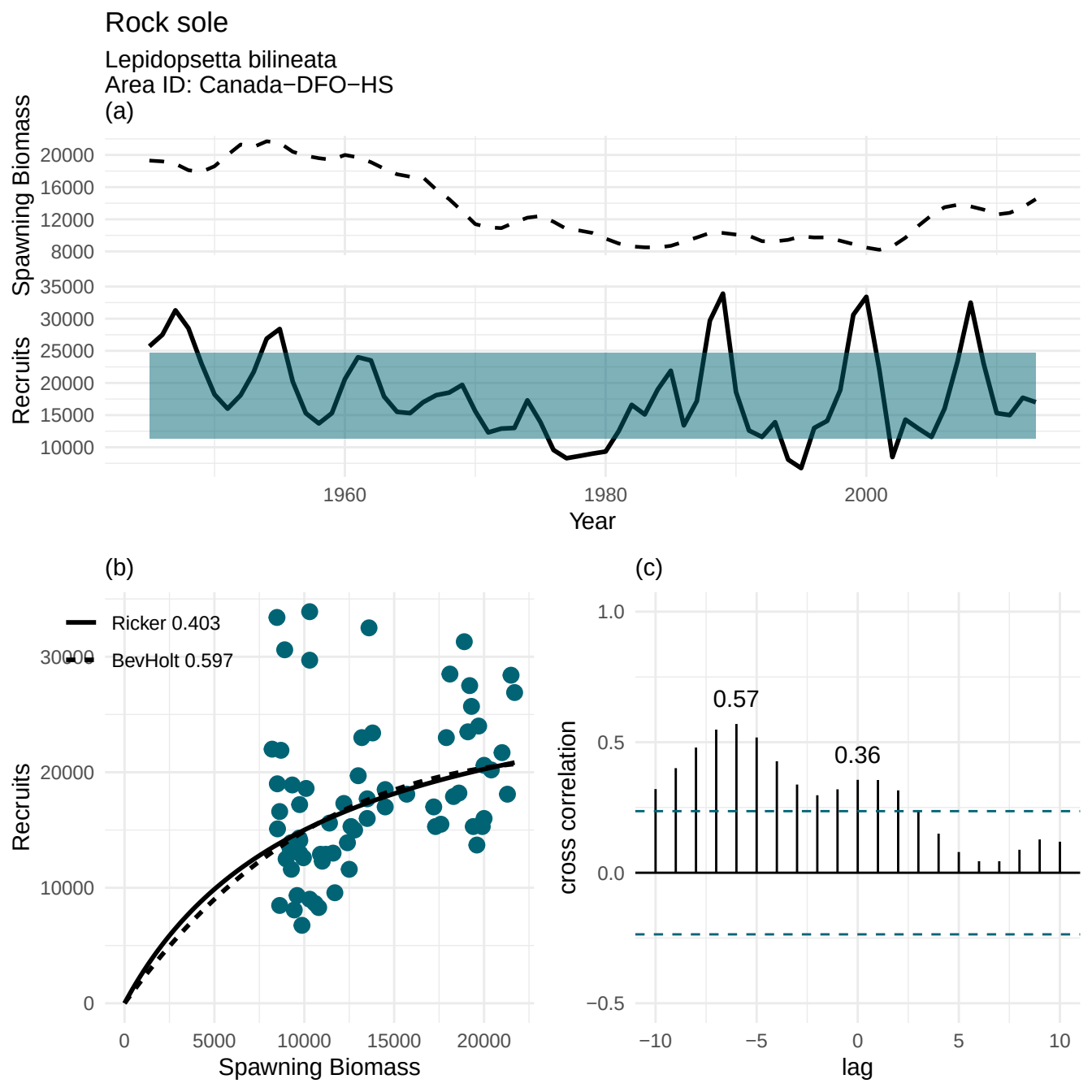

Round nose flounder
Eopsetta grigorjewi
Area ID: Japan−FAJ−SOJ
(a)
Spawning Biomass
3500
3000
2500
2000
Recruits
5e+07
4e+07
3e+07
2e+07
1995
2000
2005
2010
Year
(b)
Ricker 0.5
BevHolt 0.5
Recruits
4e+07
2e+07
0e+00
0
1000
2000
3000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.49
−10
−5
0
5
10
lag

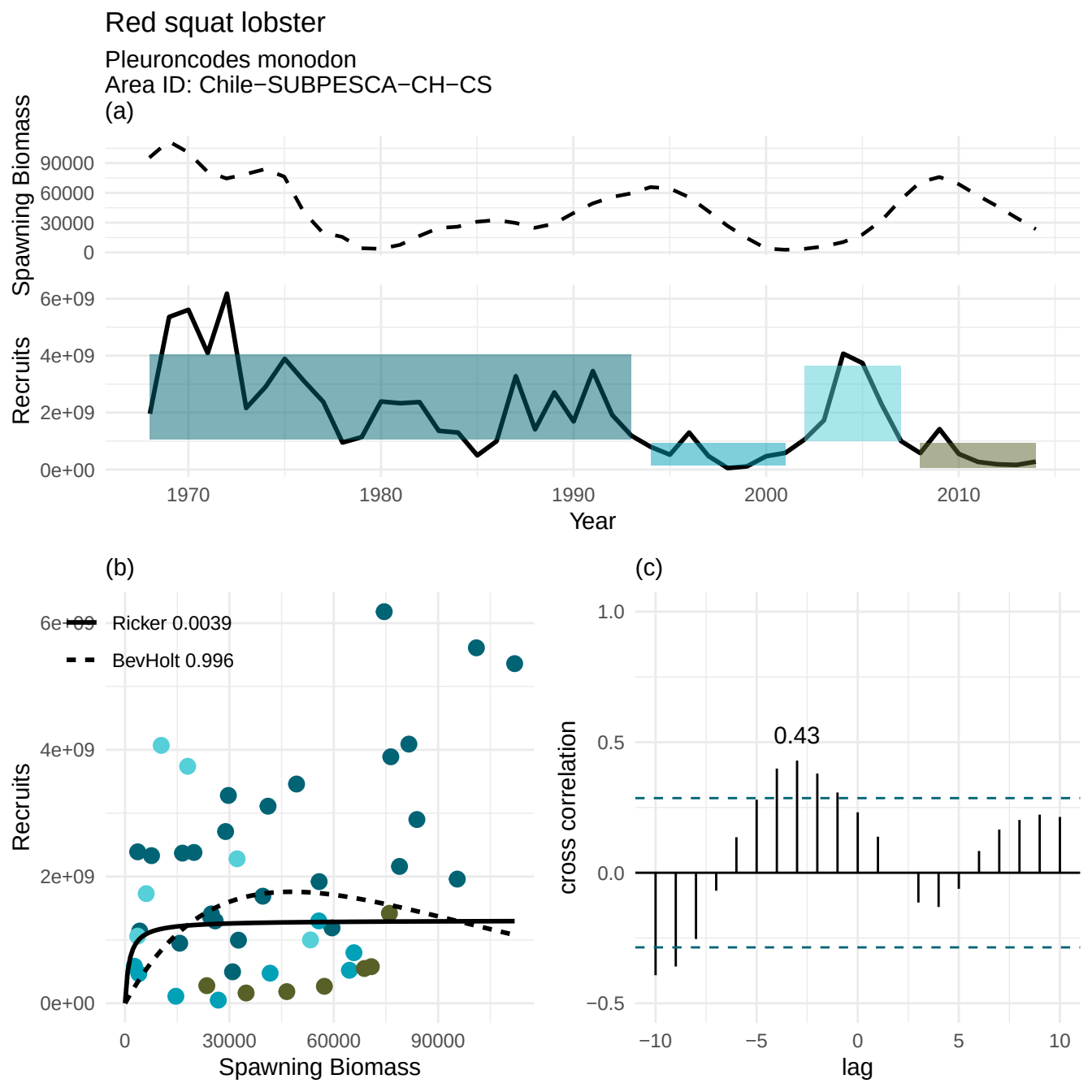

Red snapper
Lutjanus campechanus
Area ID: USA−NMFS−GM
(a)
Spawning Biomass
7.5e+14
5.0e+14
2.5e+14
Recruits
4e+08
3e+08
2e+08
1e+08
0e+00
1970
1980
1990
2000
2010
Year
(b)
Ricker 0.258
BevHolt 0.742
Recruits
Spawning Biomass
0.0e+00
2.5e+14
5.0e+14
7.5e+14
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.38
−10
−5
0
5
10
lag

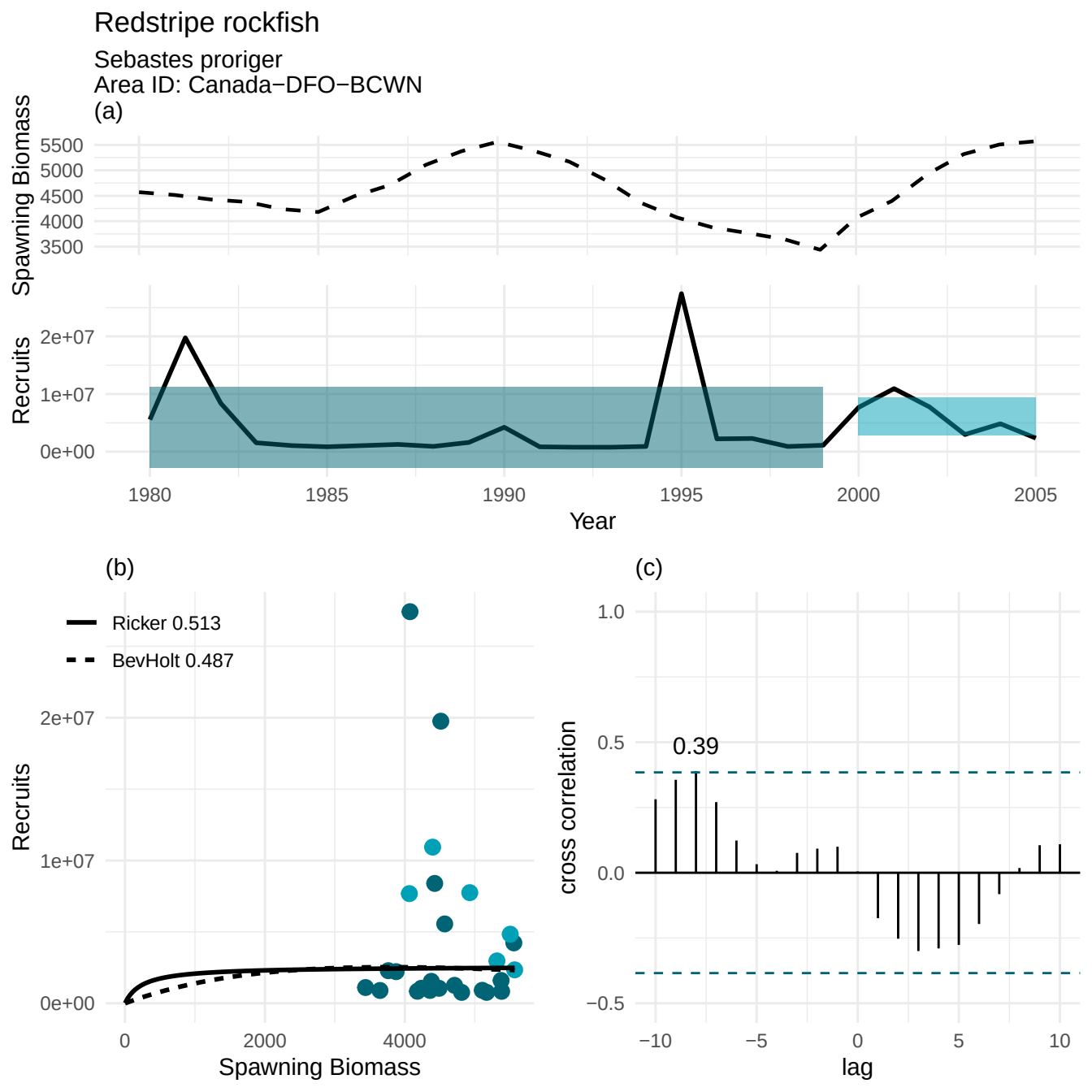

Red snapper
Lutjanus campechanus
Area ID: USA−NMFS−SATLC
(a)
Spawning Biomass
5e+12
4e+12
3e+12
2e+12
Recruits
750000
500000
250000
1990
1995
2000
2005
2010
Year
(b)
Ricker 0.197
BevHolt 0.803
Recruits
750000
500000
250000
0
0e+00
2e+12
4e+12
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.4
−10
−5
0
5
10
lag

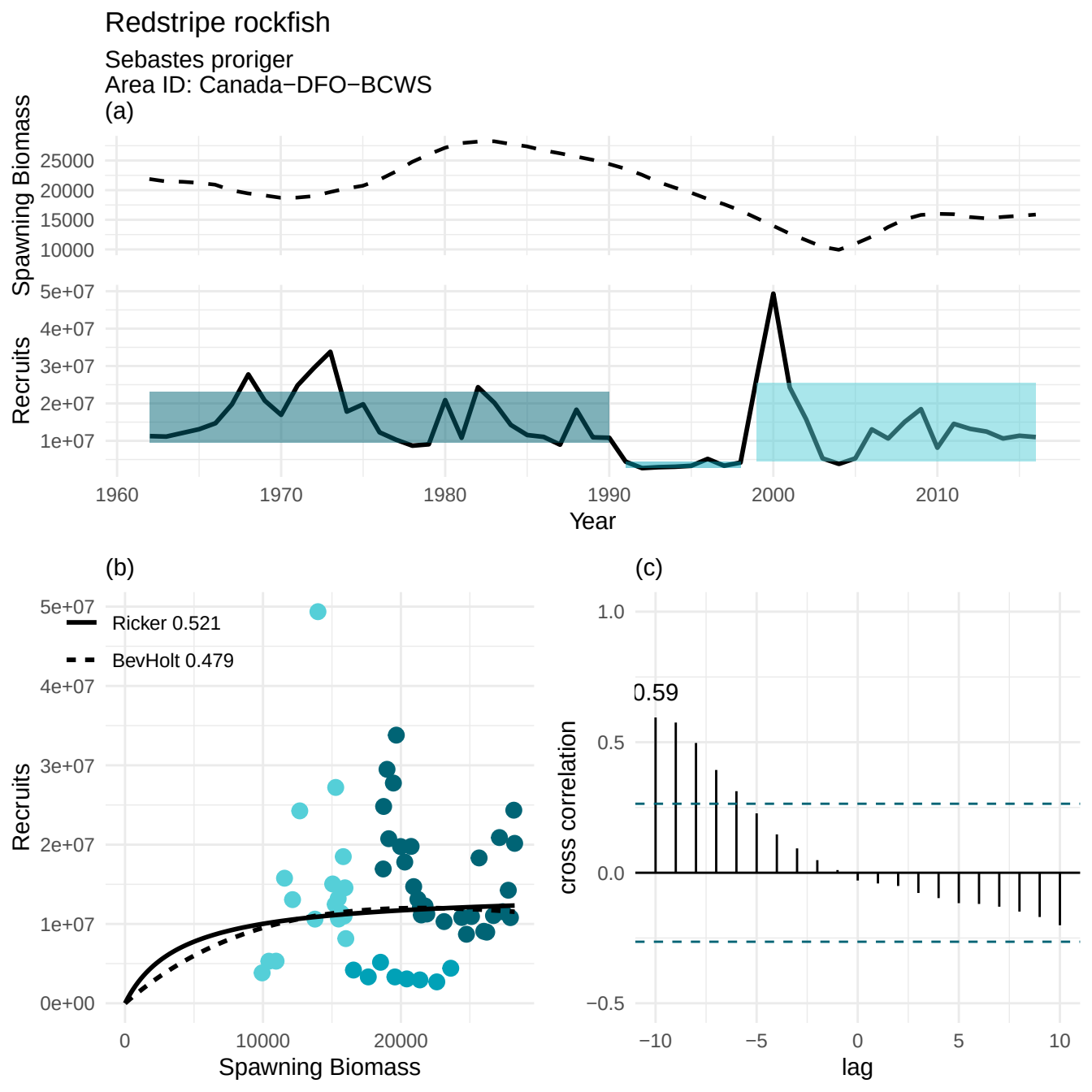

Rock sole
Lepidopsetta bilineata
Area ID: Canada−DFO−5AB
(a)
Spawning Biomass
6000
4000
2000
Recruits
6e+06
4e+06
2e+06
1960
1980
2000
Year
(b)
Ricker 0.000196
BevHolt 1
Recruits
4e+06
2e+06
0e+00
0
2000
4000
6000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.48
0.33
−10
−5
0
5
10
lag

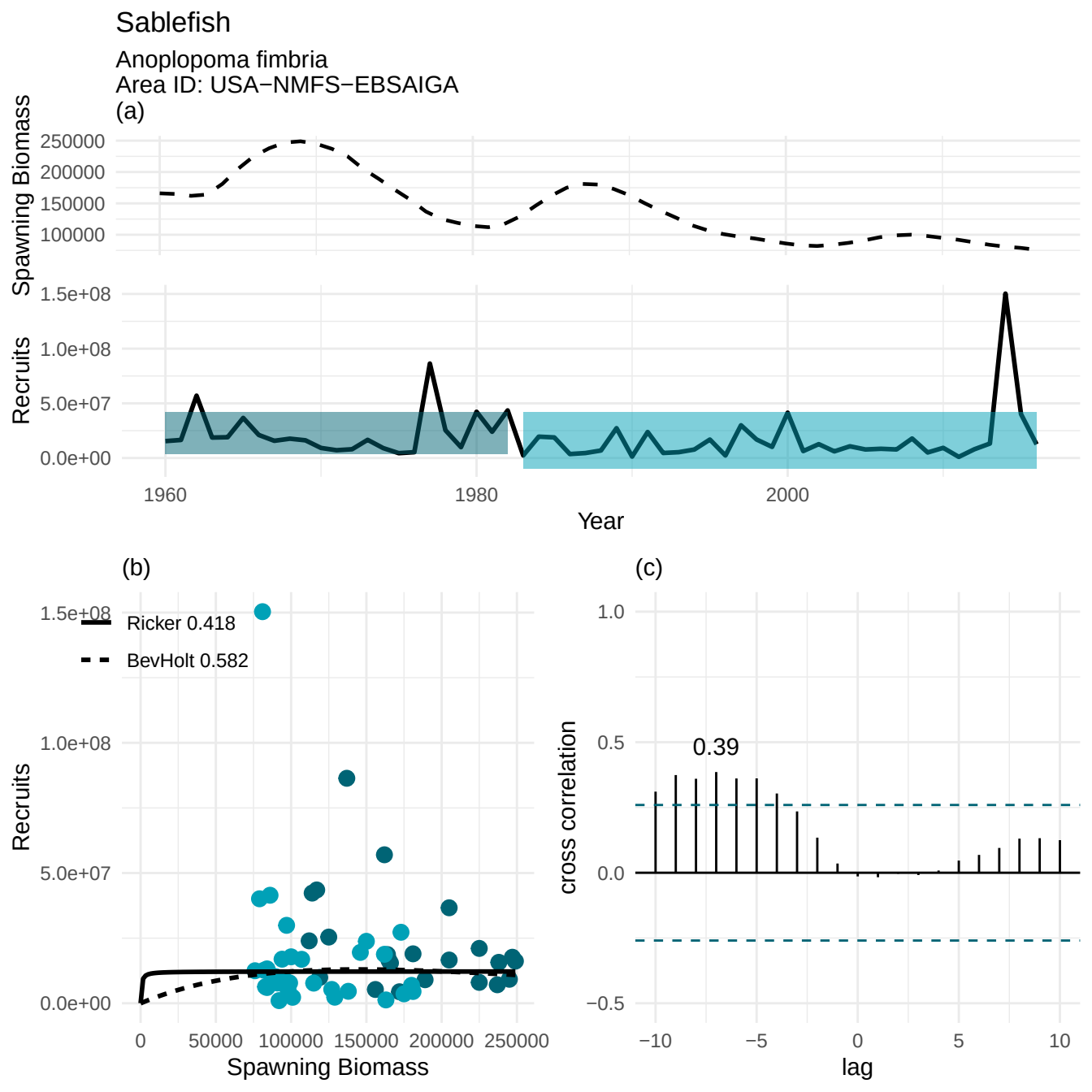

Rock sole
Lepidopsetta bilineata
Area ID: USA−NMFS−GA
(a)
Spawning Biomass
110000
100000
90000
80000
70000
Recruits
4e+08
3e+08
2e+08
1e+08
1980
1990
2000
2010
Year
(b)
Ricker 0.984
BevHolt 0.0156
Recruits
4e+08
3e+08
2e+08
1e+08
0e+00
0
30000
60000
90000
120000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.42
0.0
−0.5
−10
−5
0
5
10
lag

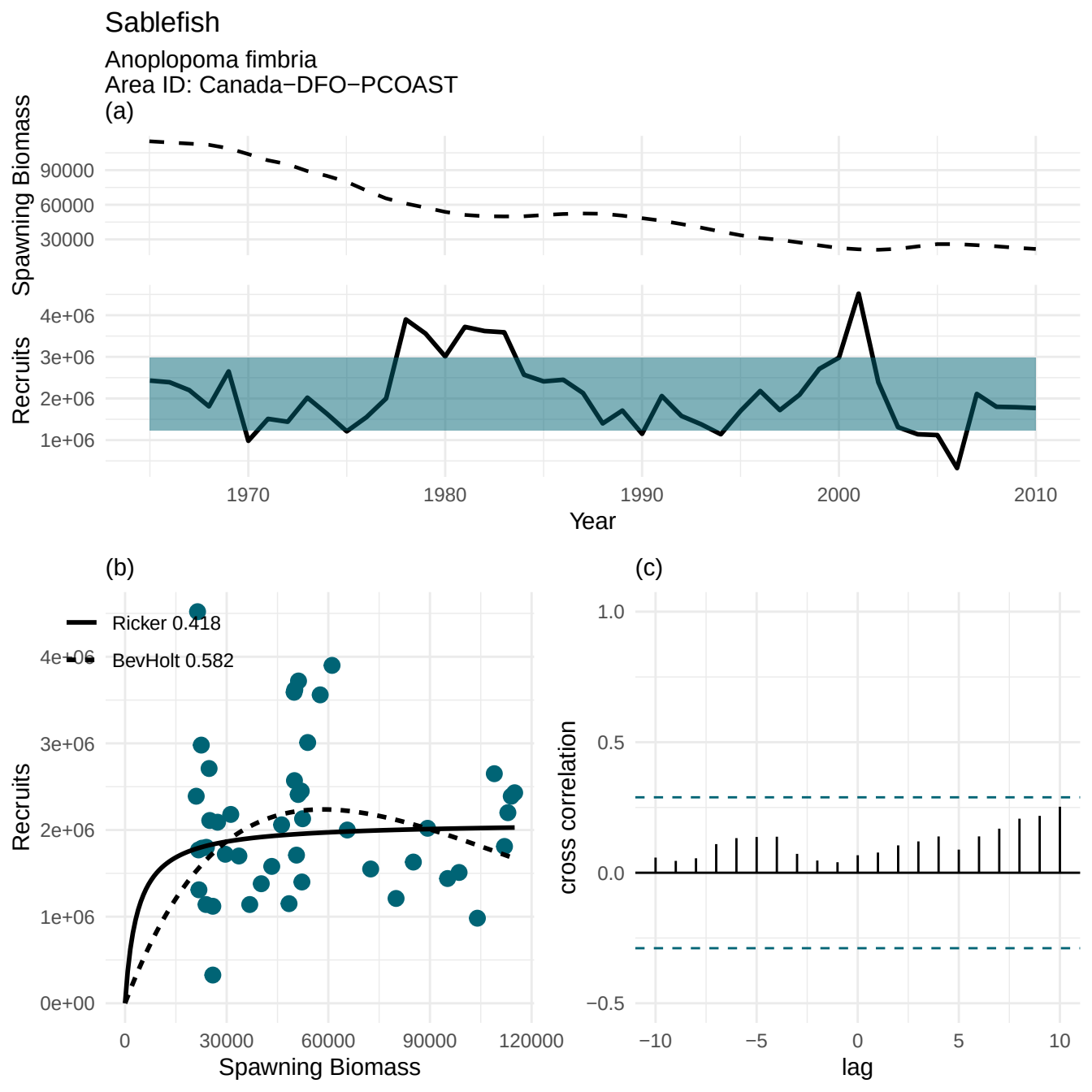

Rock sole
Lepidopsetta bilineata
Area ID: Canada−DFO−HS
(a)
Spawning Biomass
20000
16000
12000
8000
Recruits
35000
30000
25000
20000
15000
10000
1960
1980
2000
Year
(b)
Ricker 0.403
BevHolt 0.597
Recruits
30000
20000
10000
0
0
5000
10000
15000
20000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.57
0.36
−10
−5
0
5
10
lag

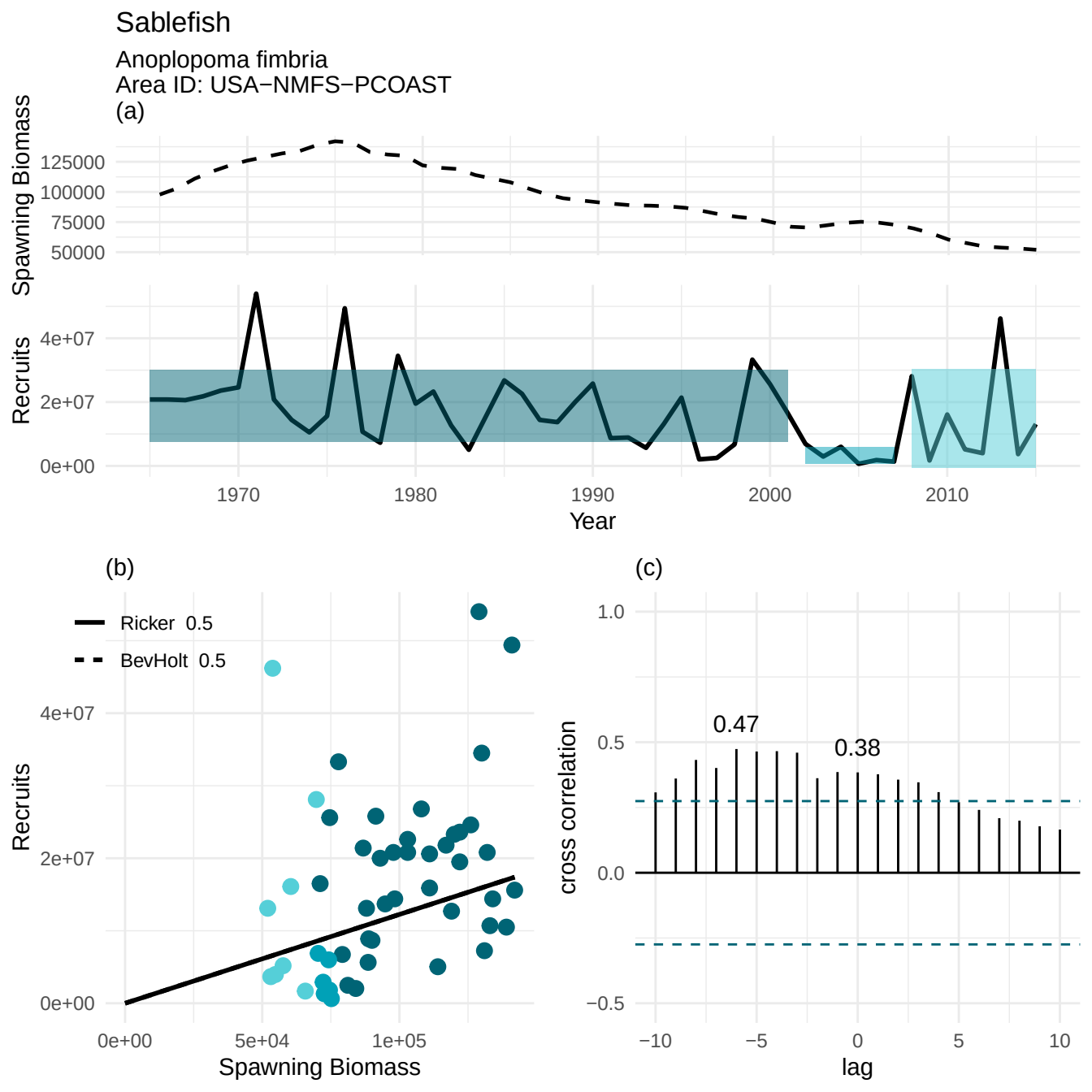

Red squat lobster
Pleuroncodes monodon
Area ID: Chile−SUBPESCA−CH−CS
(a)
Spawning Biomass
90000
60000
30000
0
Recruits
6e+09
4e+09
2e+09
0e+00
1970
1980
1990
2000
2010
Year
(b)
Ricker 0.0039
BevHolt 0.996
Recruits
4e+09
2e+09
0e+00
0
30000
60000
90000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.43
−10
−5
0
5
10
lag

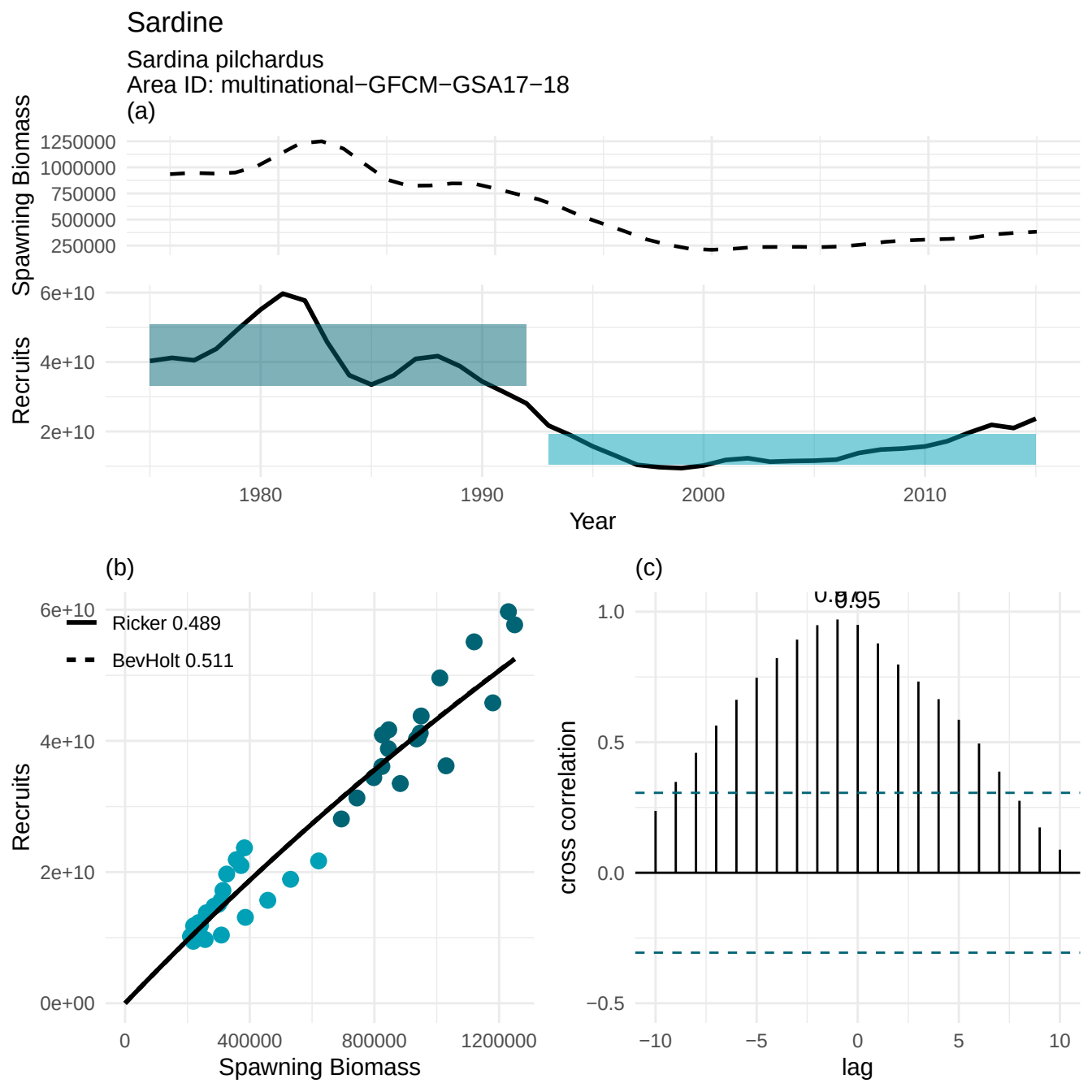

Redstripe rockfish
Sebastes proriger
Area ID: Canada−DFO−BCWN
(a)
Spawning Biomass
5500
5000
4500
4000
3500
Recruits
2e+07
1e+07
0e+00
1980
1985
1990
1995
2000
2005
Year
(b)
Ricker 0.513
BevHolt 0.487
Recruits
2e+07
1e+07
0e+00
0
2000
4000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.39
−10
−5
0
5
10
lag

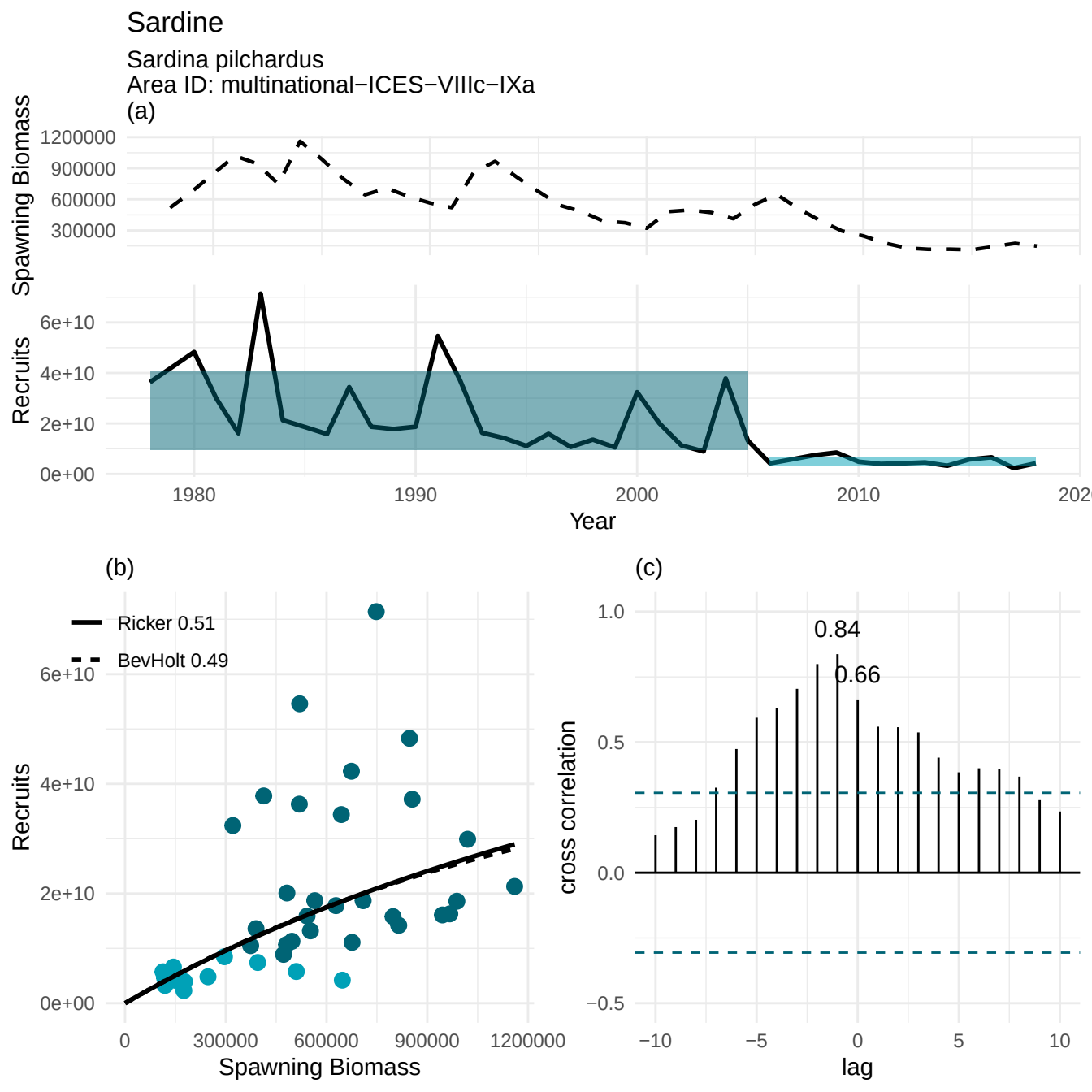

Redstripe rockfish
Sebastes proriger
Area ID: Canada−DFO−BCWS
(a)
Spawning Biomass
25000
20000
15000
10000
Recruits
5e+07
4e+07
3e+07
2e+07
1e+07
1960
1970
1980
1990
2000
2010
Year
(b)
Ricker 0.521
BevHolt 0.479
Recruits
5e+07
4e+07
3e+07
2e+07
1e+07
0e+00
0
10000
20000
Spawning Biomass
(c)
0.59
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

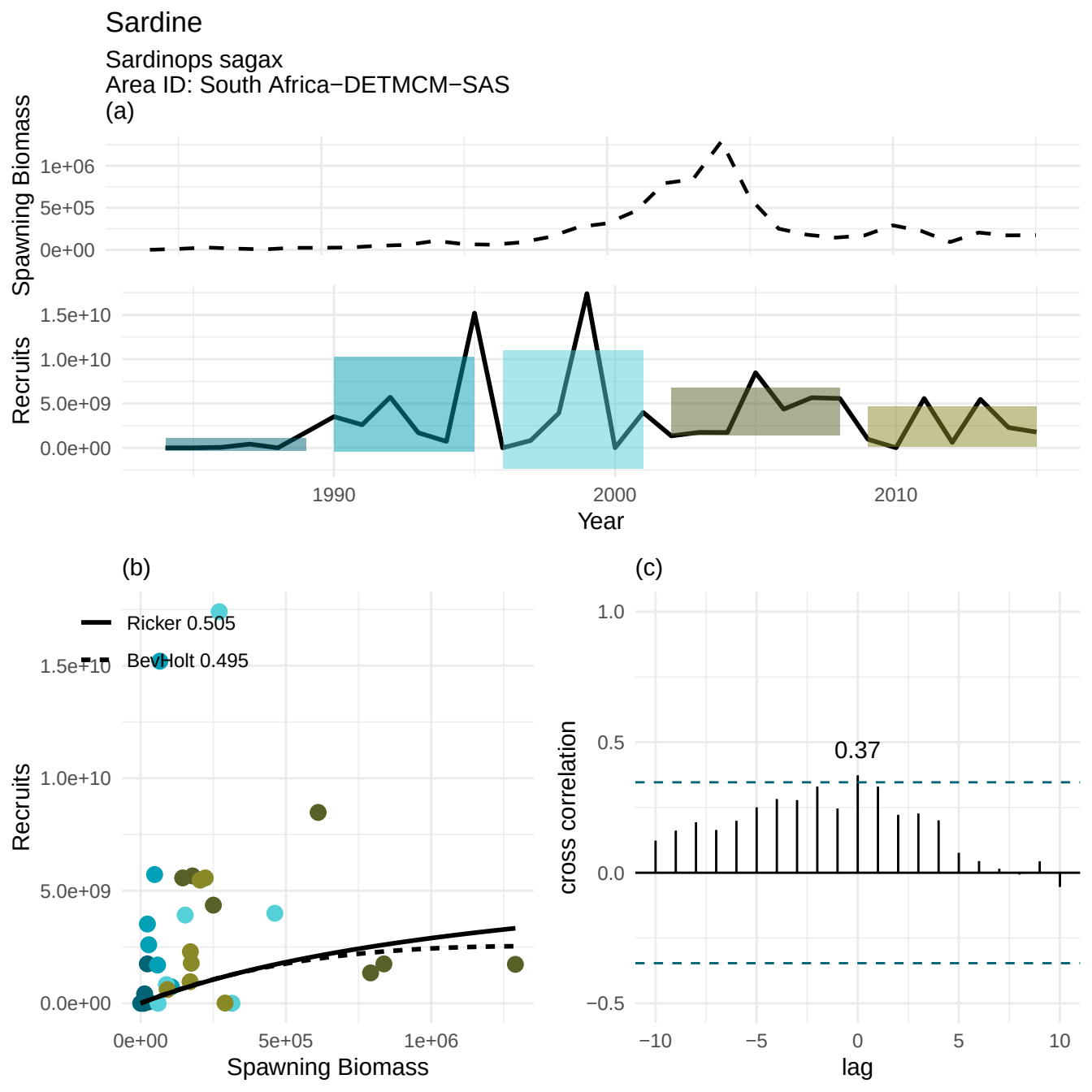

Sablefish
Anoplopoma fimbria
Area ID: USA−NMFS−EBSAIGA
(a)
Spawning Biomass
250000
200000
150000
100000
Recruits
1.5e+08
1.0e+08
5.0e+07
0.0e+00
1960
1980
2000
Year
(b)
Ricker 0.418
BevHolt 0.582
Recruits
1.5e+08
1.0e+08
5.0e+07
0.0e+00
0
50000
100000
150000
200000
250000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.39
−10
−5
0
5
10
lag

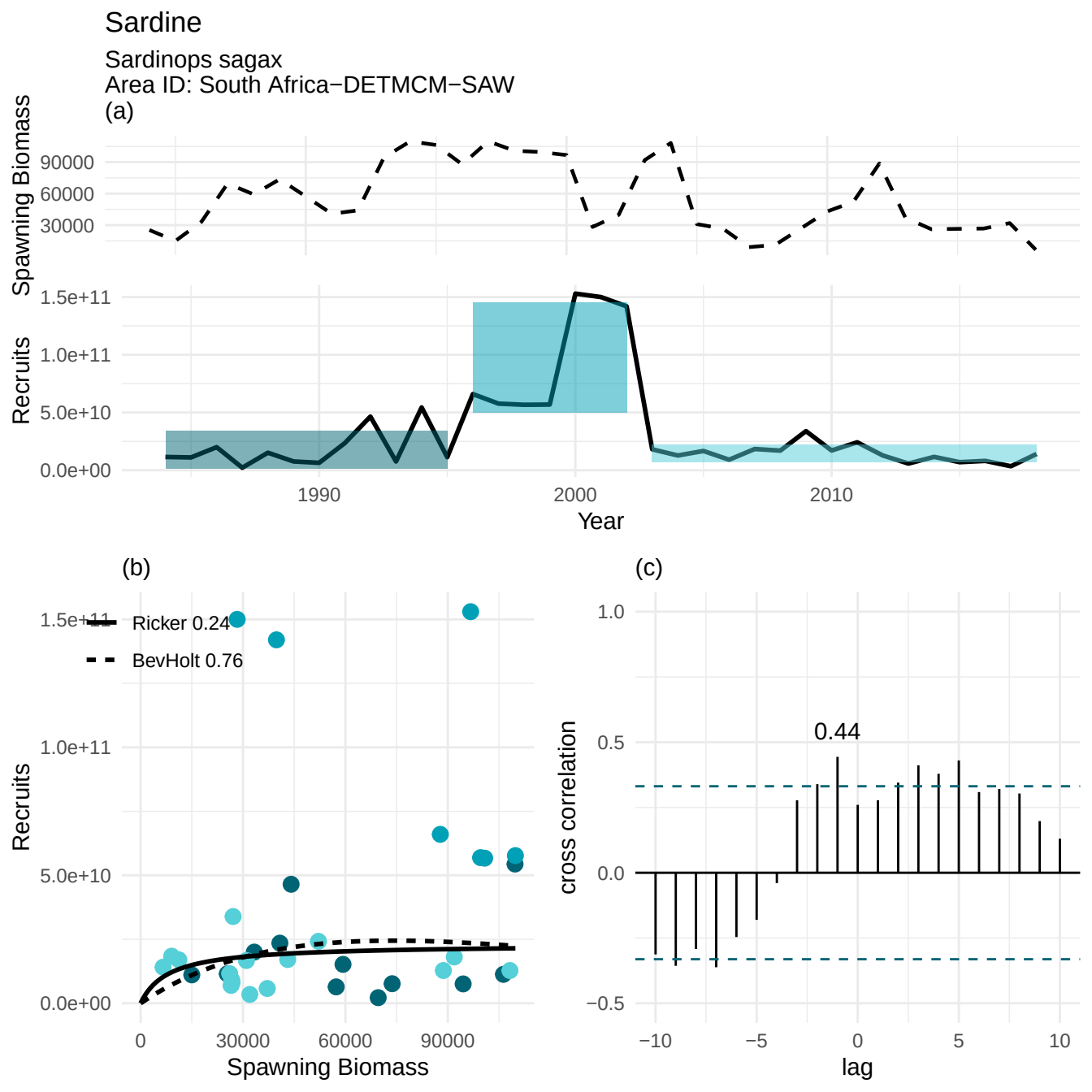

Sablefish
Anoplopoma fimbria
Area ID: Canada−DFO−PCOAST
(a)
Spawning Biomass
90000
60000
30000
Recruits
4e+06
3e+06
2e+06
1e+06
1970
1980
1990
2000
2010
Year
(b)
Ricker 0.418
BevHolt 0.582
Recruits
4e+06
3e+06
2e+06
1e+06
0e+00
0
30000
60000
90000
120000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

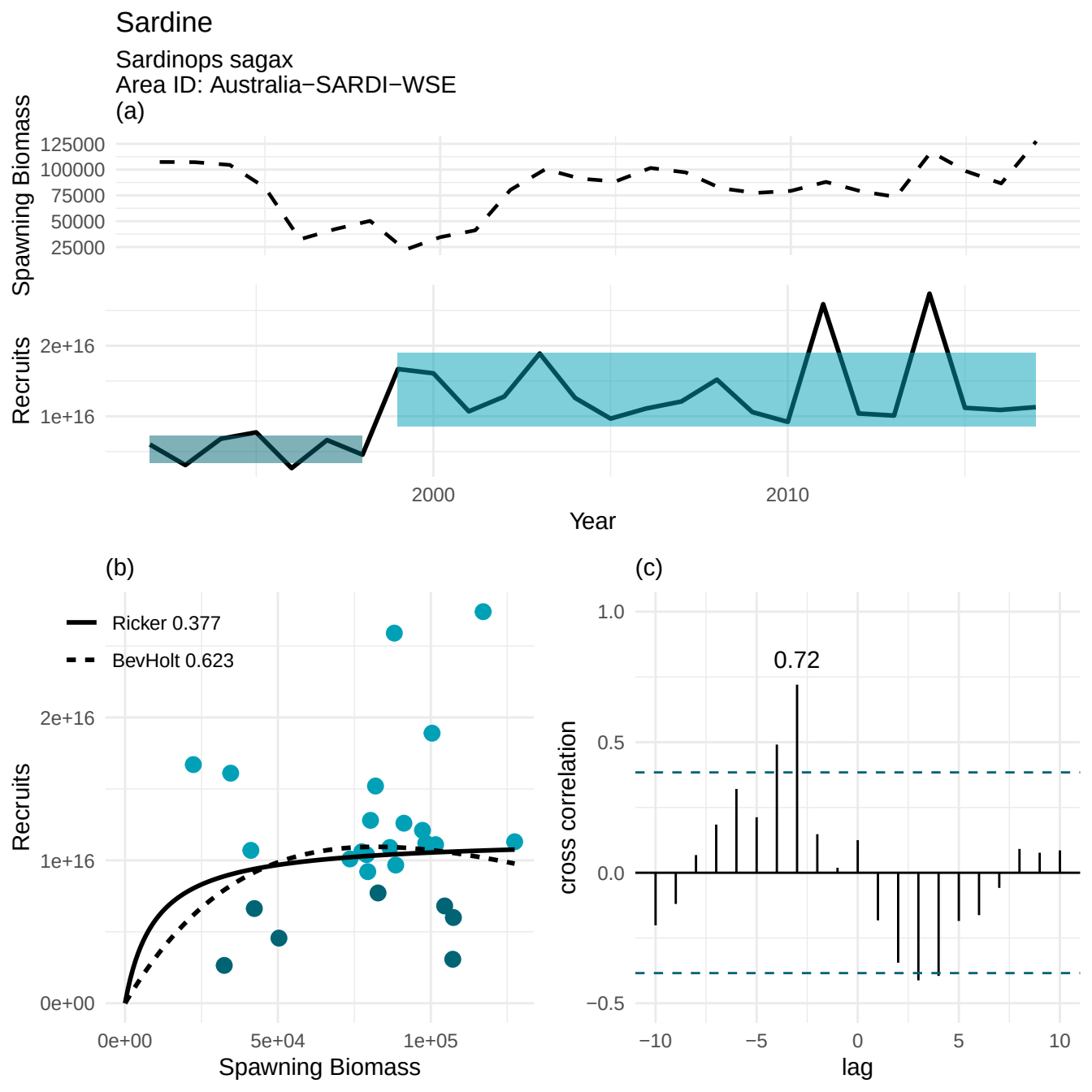

Sablefish
Anoplopoma fimbria
Area ID: USA−NMFS−PCOAST
(a)
Spawning Biomass
125000
100000
75000
50000
Recruits
4e+07
2e+07
0e+00
1970
1980
1990
2000
2010
Year
(b)
Ricker 0.5
BevHolt 0.5
Recruits
4e+07
2e+07
0e+00
0e+00
5e+04
1e+05
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.47
0.38
−10
−5
0
5
10
lag

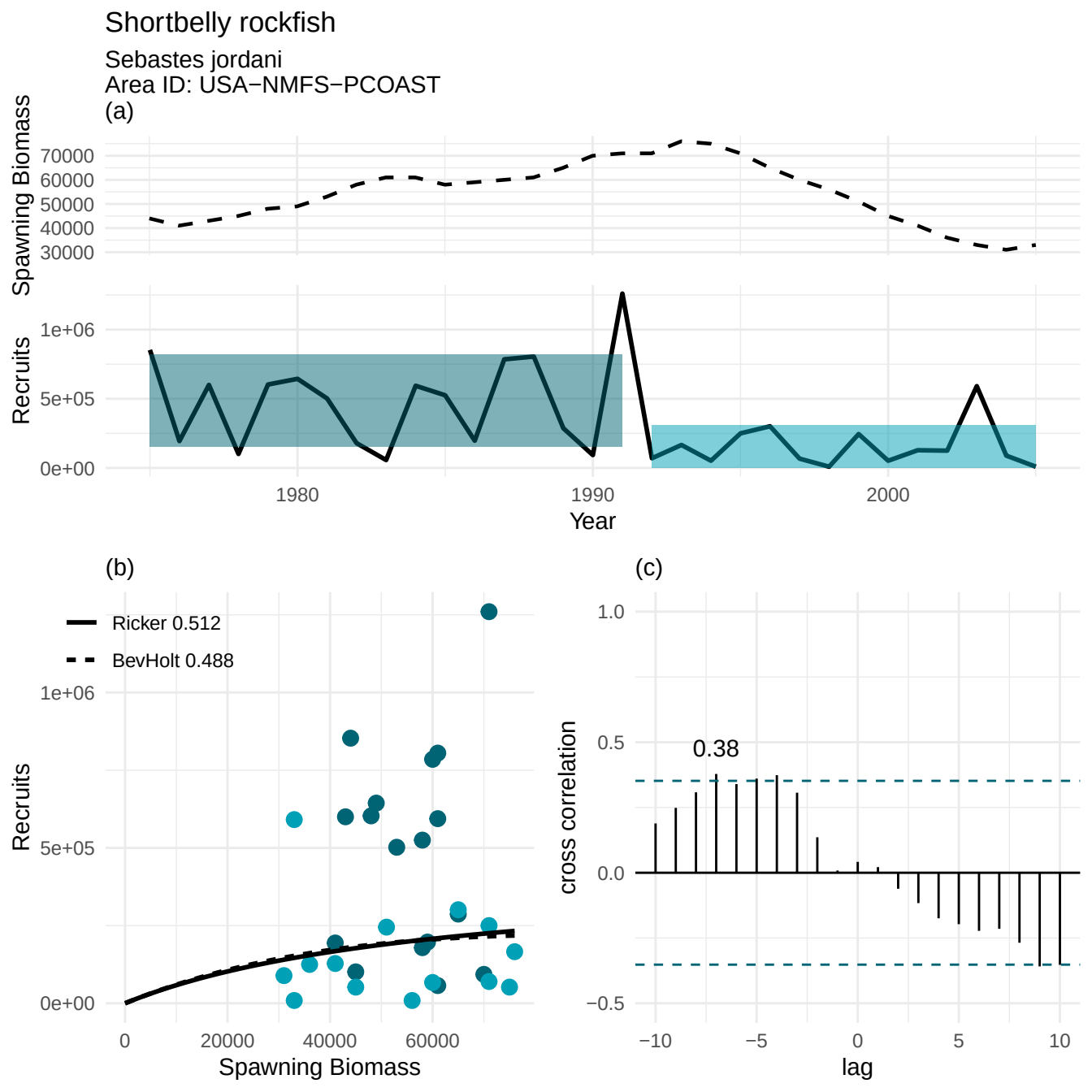

Sardine
Sardina pilchardus
Area ID: multinational−GFCM−GSA17−18
(a)
Spawning Biomass
1250000
1000000
750000
500000
250000
Recruits
6e+10
4e+10
2e+10
1980
1990
2000
2010
Year
(b)
Ricker 0.489
BevHolt 0.511
Recruits
6e+10
4e+10
2e+10
0e+00
0
400000
800000
1200000
Spawning Biomass
(c)
0.95
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

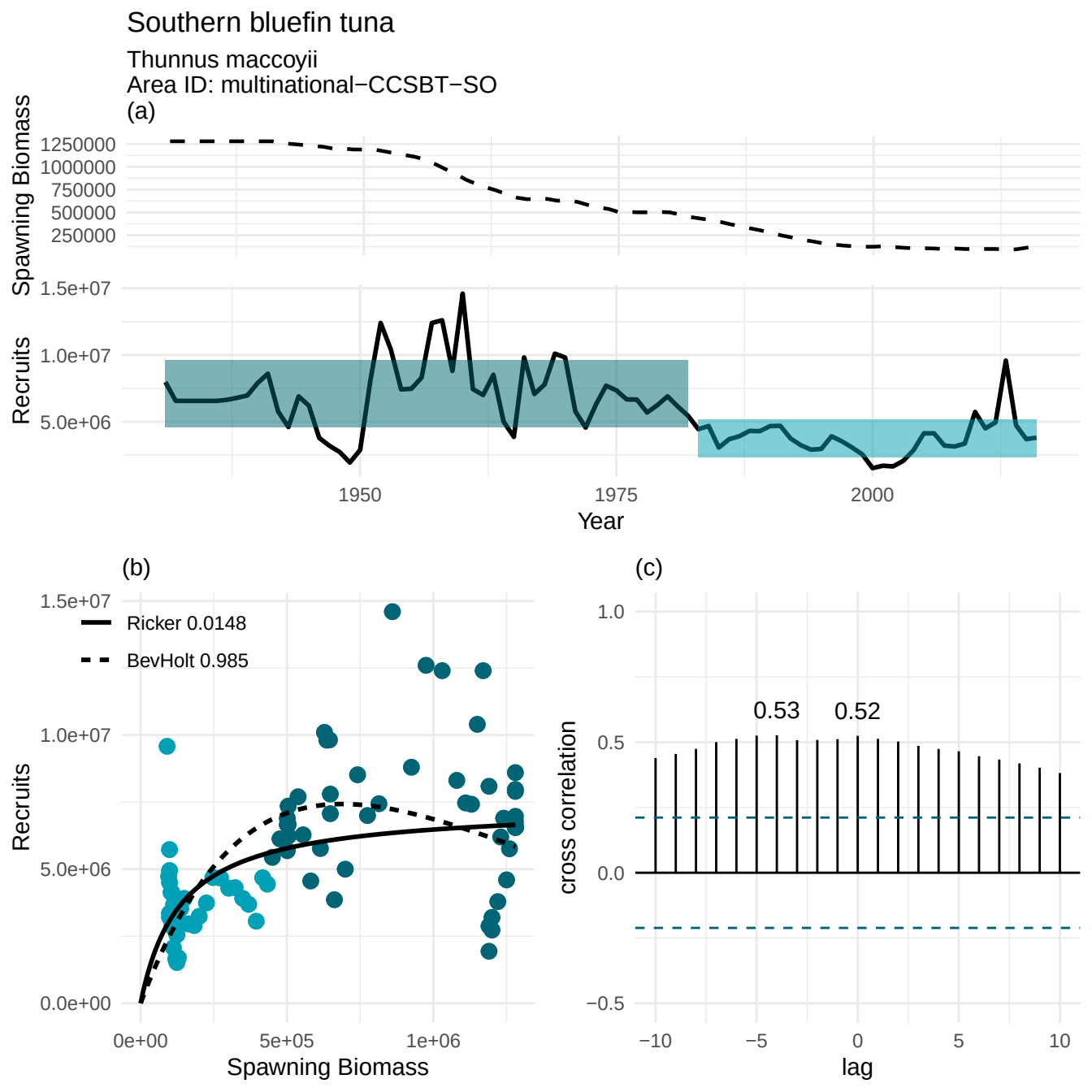

Sardine
Sardina pilchardus
Area ID: multinational−ICES−VIIIc−IXa
(a)
Spawning Biomass
1200000
900000
600000
300000
Recruits
6e+10
4e+10
2e+10
0e+00
1980
1990
2000
2010
Year
(b)
Ricker 0.51
BevHolt 0.49
Recruits
Spawning Biomass
(c)
cross correlation
0.84
0.66
lag

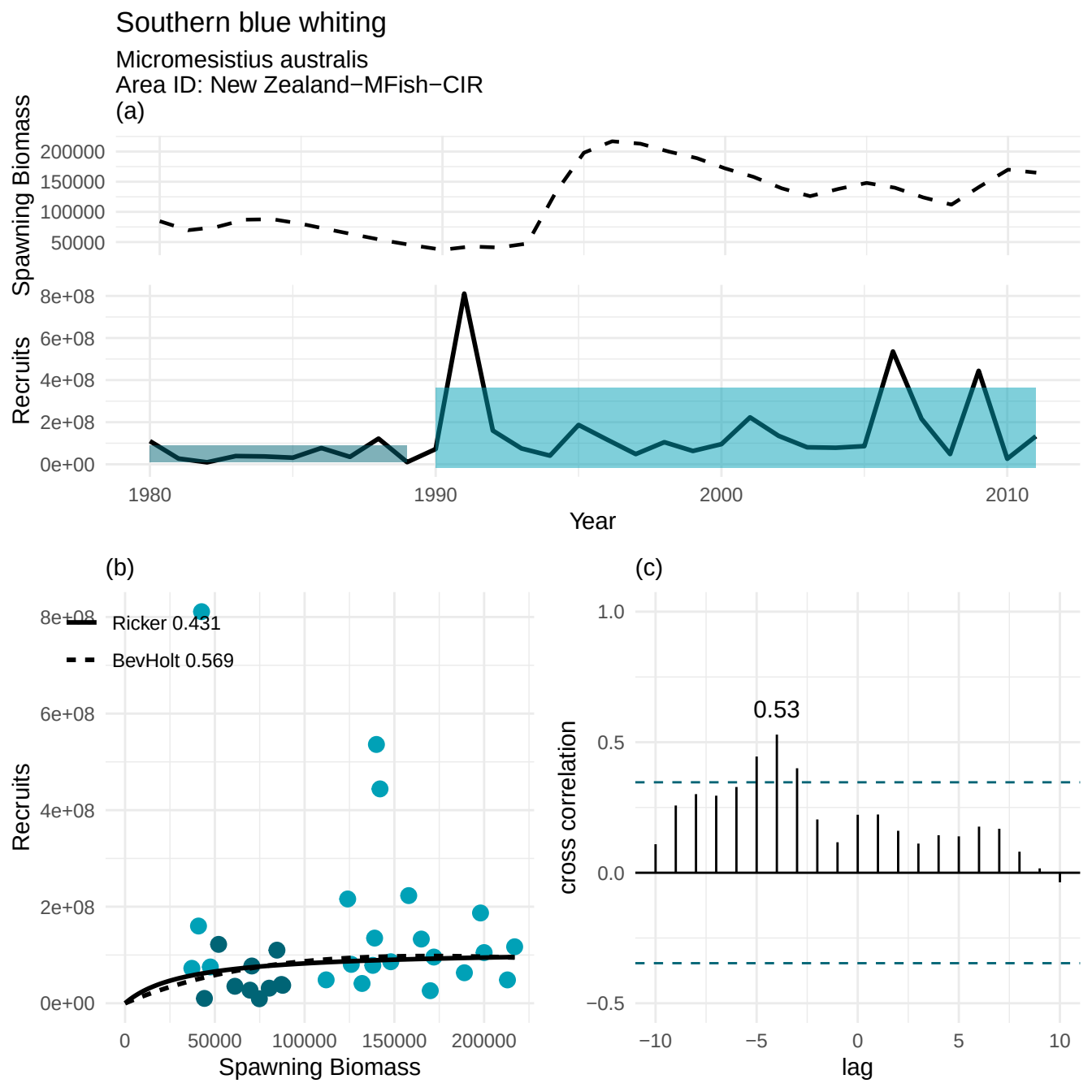

Sardine
Sardinops sagax
Area ID: South Africa−DETMCM−SAS
(a)
Spawning Biomass
1e+06
5e+05
0e+00
Recruits
1.5e+10
1.0e+10
5.0e+09
0.0e+00
1990
2000
2010
Year
(b)
Ricker 0.505
BevHolt 0.495
Recruits
1.5e+10
1.0e+10
5.0e+09
0.0e+00
0e+00
5e+05
1e+06
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.37
−10
−5
0
5
10
lag

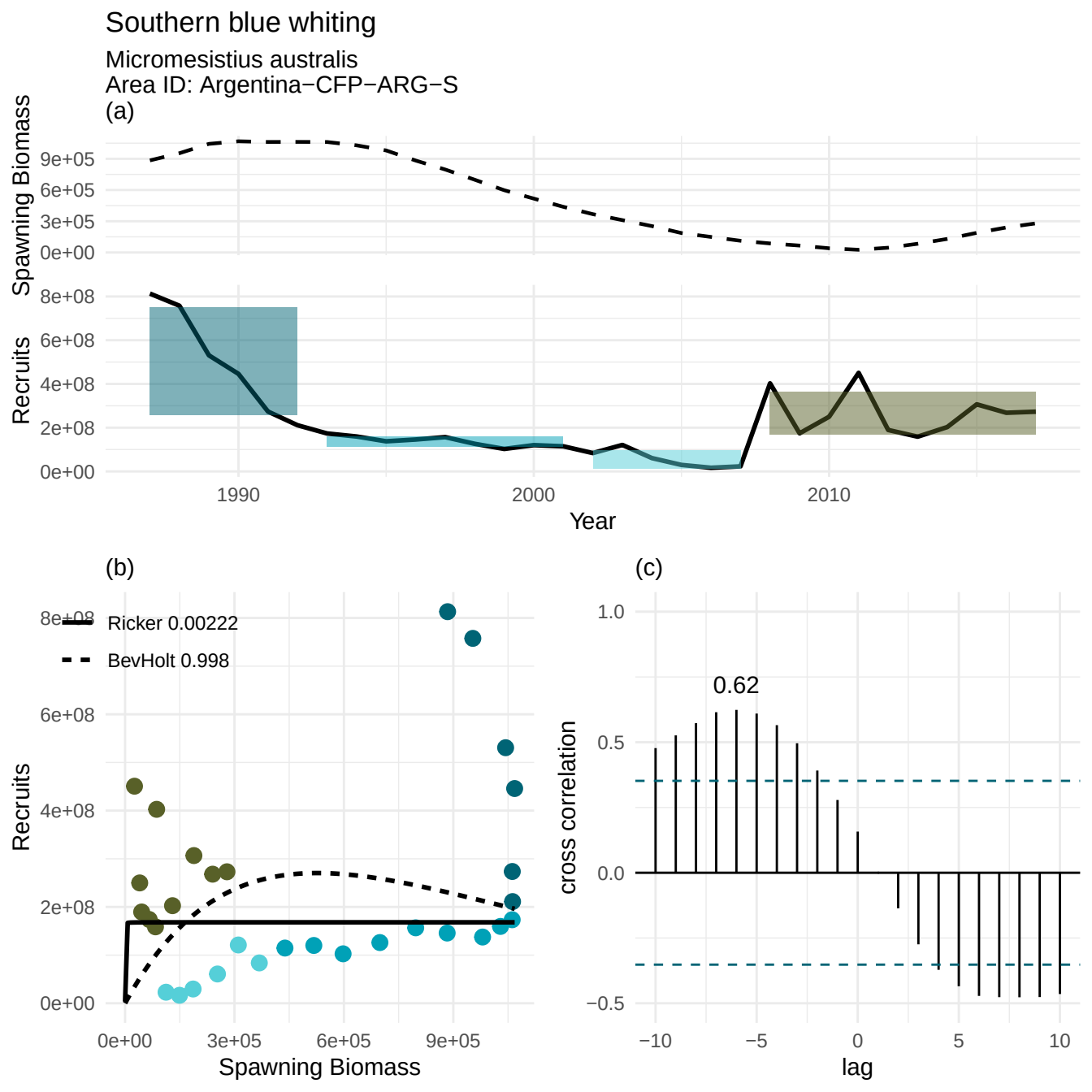

Sardine
Sardinops sagax
Area ID: South Africa−DETMCM−SAW
(a)
Spawning Biomass
90000
60000
30000
Recruits
1.5e+11
1.0e+11
5.0e+10
0.0e+00
1990
2000
2010
Year
(b)
Ricker 0.24
BevHolt 0.76
Recruits
1.5e+11
1.0e+11
5.0e+10
0.0e+00
0
30000
60000
90000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.44
−10
−5
0
5
10
lag

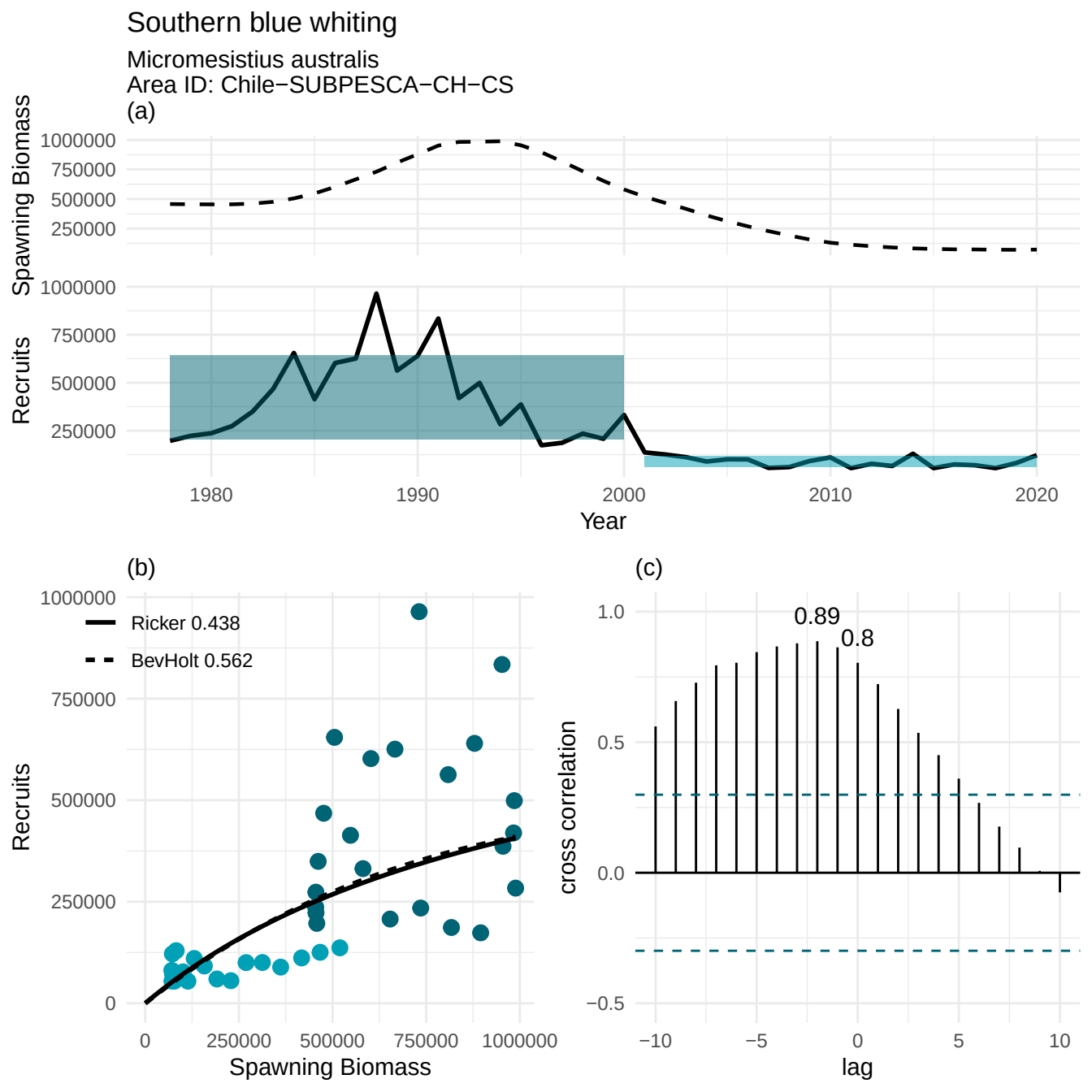

Sardine
Sardinops sagax
Area ID: Australia−SARDI−WSE
(a)
Spawning Biomass
125000
100000
75000
50000
25000
Recruits
2e+16
1e+16
2000
2010
Year
(b)
Ricker 0.377
BevHolt 0.623
Recruits
2e+16
1e+16
0e+00
0e+00
5e+04
1e+05
Spawning Biomass
(c)
1.0
0.5
0.0
−0.5
0.72
cross correlation
−10
−5
0
5
10
lag

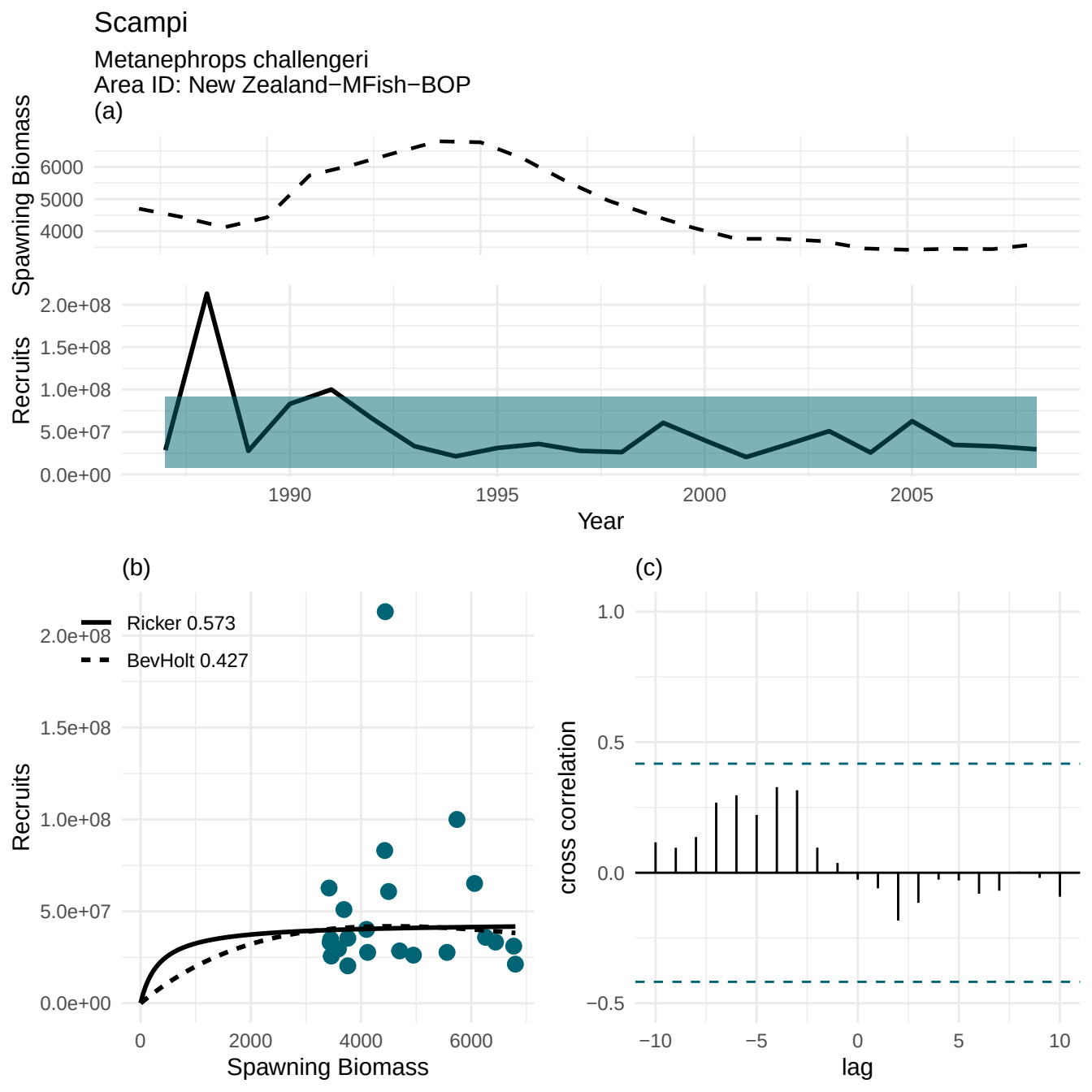

Shortbelly rockfish
Sebastes jordani
Area ID: USA−NMFS−PCOAST
(a)
Spawning Biomass
70000
60000
50000
40000
30000
Recruits
1e+06
5e+05
0e+00
1980
1990
2000
Year
(b)
Ricker 0.512
BevHolt 0.488
Recruits
1e+06
5e+05
0e+00
0
20000
40000
60000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.38
−10
−5
0
5
10
lag

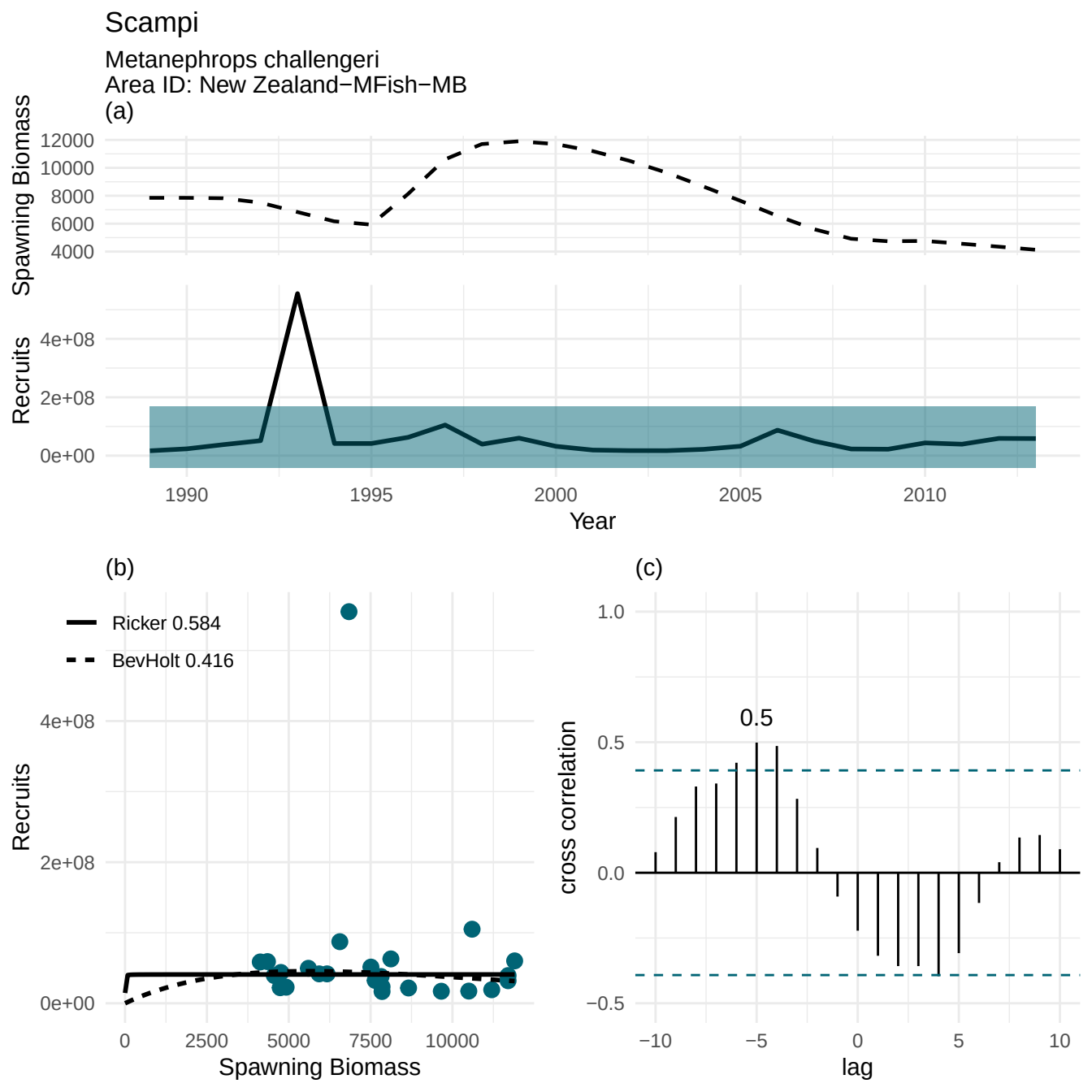

Southern bluefin tuna
Thunnus maccoyii
Area ID: multinational−CCSBT−SO
(a)
Spawning Biomass
1250000
1000000
750000
500000
250000
Recruits
1.5e+07
1.0e+07
5.0e+06
1950
1975
2000
Year
(b)
Ricker 0.0148
BevHolt 0.985
Recruits
1.5e+07
1.0e+07
5.0e+06
0.0e+00
0e+00
5e+05
1e+06
Spawning Biomass
(c)
0.53
0.52
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

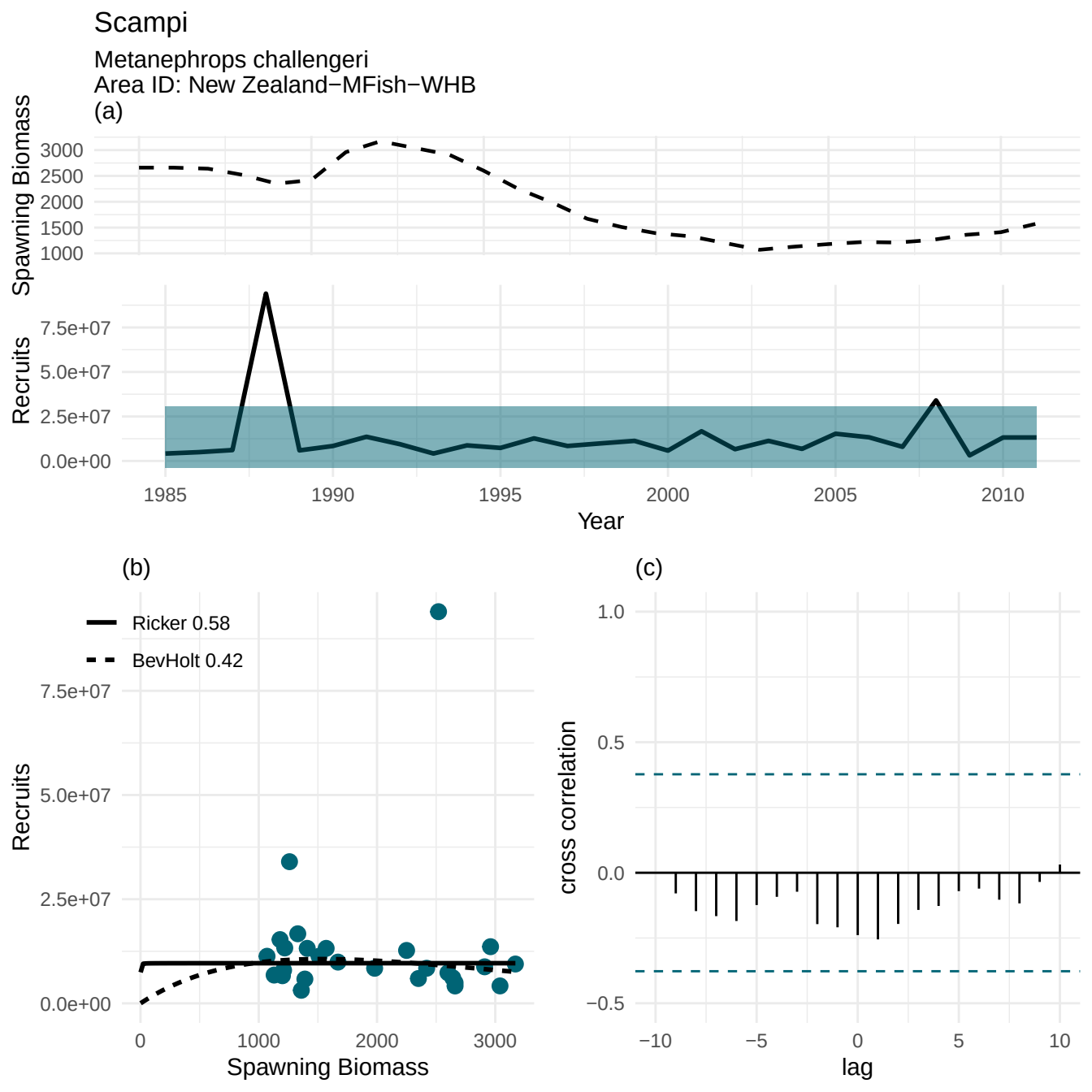

Southern blue whiting
Micromesistius australis
Area ID: New Zealand−MFish−CIR
(a)
Spawning Biomass
200000
150000
100000
50000
Recruits
8e+08
6e+08
4e+08
2e+08
0e+00
1980
1990
2000
2010
Year
(b)
Ricker 0.431
BevHolt 0.569
Recruits
8e+08
6e+08
4e+08
2e+08
0e+00
0
50000
100000
150000
200000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.53
−10
−5
0
5
10
lag

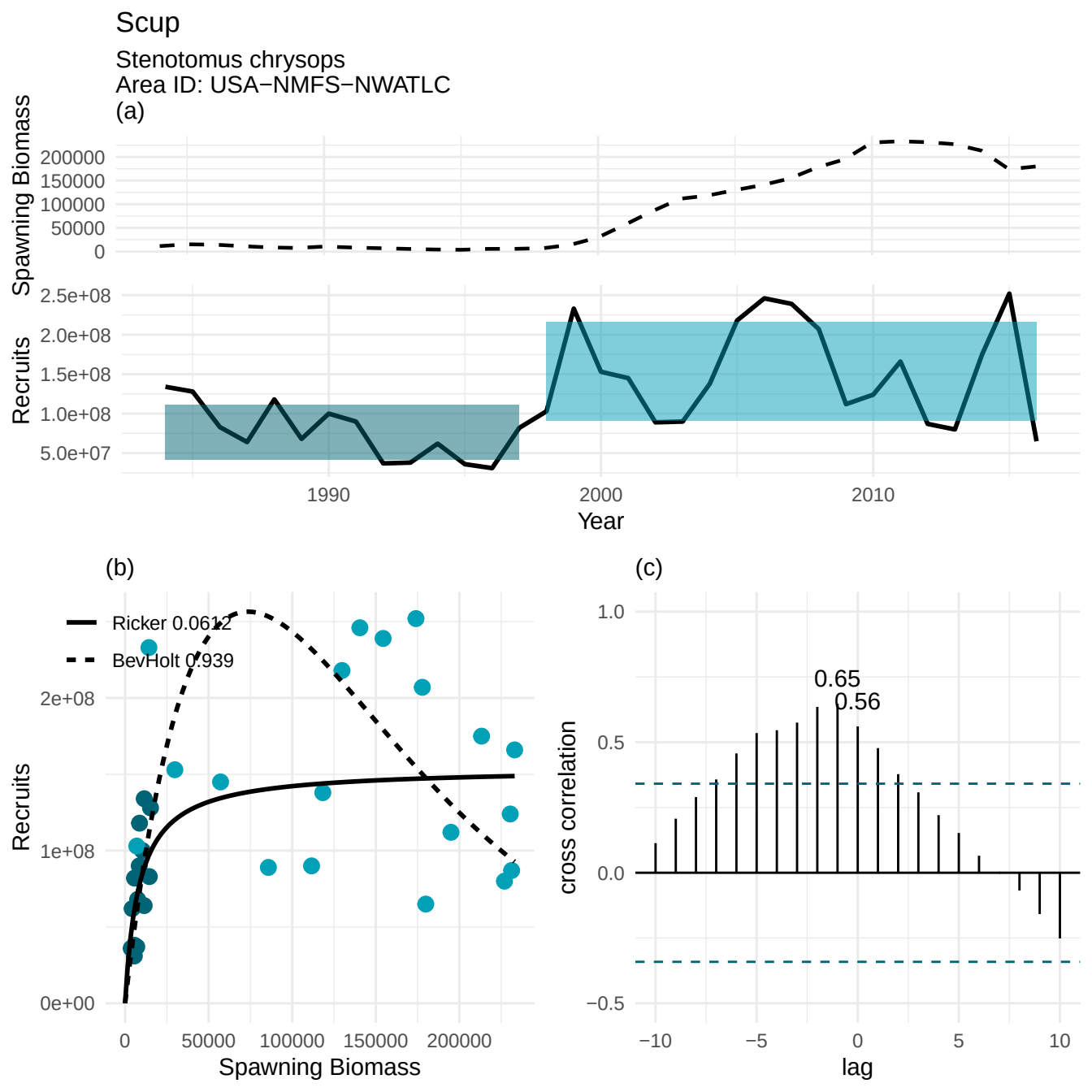

Southern blue whiting
Micromesistius australis
Area ID: Argentina−CFP−ARG−S
(a)
Spawning Biomass
9e+05
6e+05
3e+05
0e+00
Recruits
8e+08
6e+08
4e+08
2e+08
0e+00
1990
2000
2010
Year
(b)
Ricker 0.00222
BevHolt 0.998
Recruits
8e+08
6e+08
4e+08
2e+08
0e+00
0e+00
3e+05
6e+05
9e+05
Spawning Biomass
(c)
0.62
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

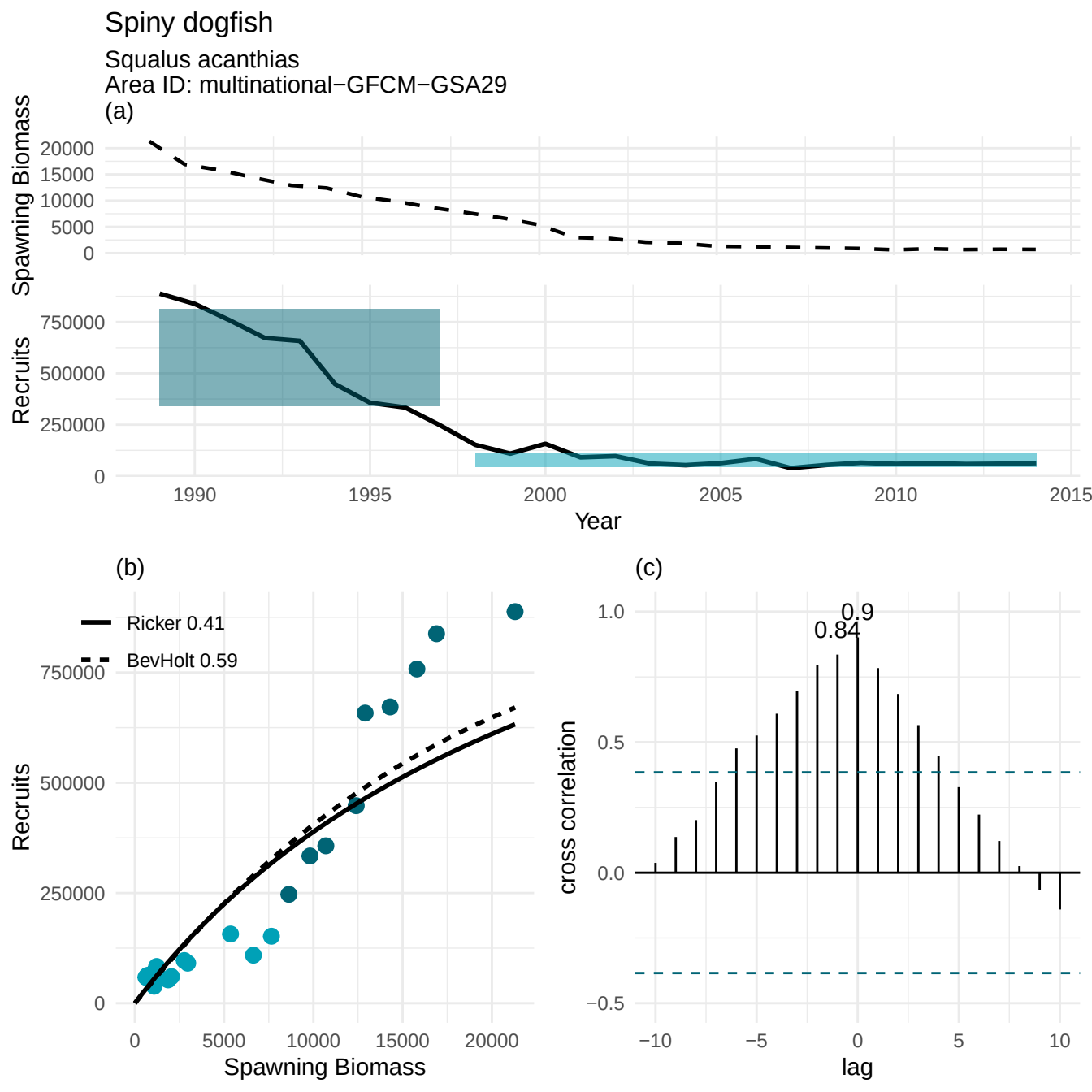

Southern blue whiting
Micromesistius australis
Area ID: Chile−SUBPESCA−CH−CS
(a)
Spawning Biomass
1000000
750000
500000
250000
Recruits
1000000
750000
500000
250000
1980
1990
2000
2010
2020
Year
(b)
Ricker 0.438
BevHolt 0.562
Recruits
1000000
750000
500000
250000
0
0
250000
500000
750000
1000000
Spawning Biomass
(c)
0.89
0.8
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

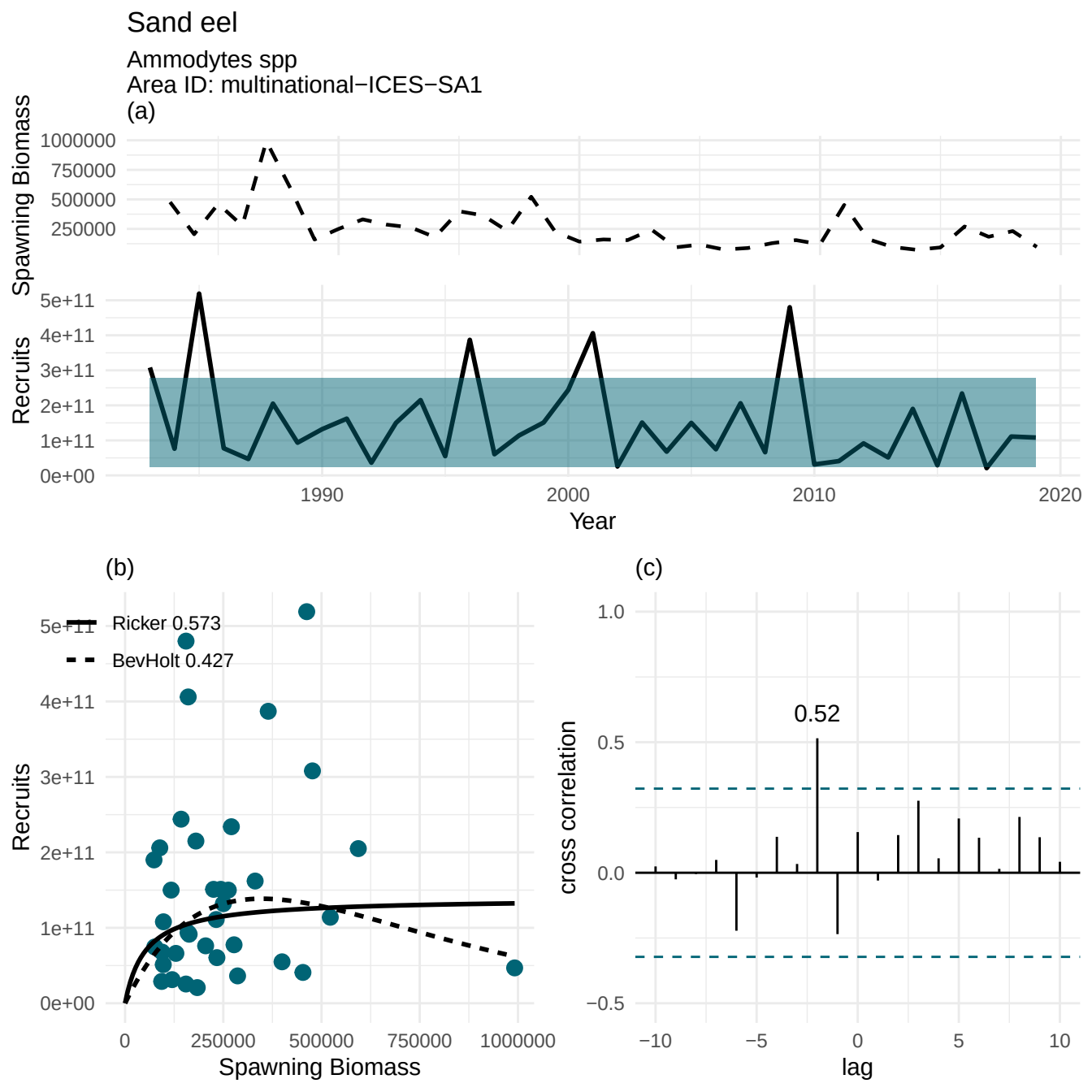

Scampi
Metanephrops challengeri
Area ID: New Zealand−MFish−BOP
(a)
Spawning Biomass
6000
5000
4000
Recruits
2.0e+08
1.5e+08
1.0e+08
5.0e+07
0.0e+00
1990
1995
2000
2005
Year
(b)
Ricker 0.573
BevHolt 0.427
Recruits
2.0e+08
1.5e+08
1.0e+08
5.0e+07
0.0e+00
0
2000
4000
6000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

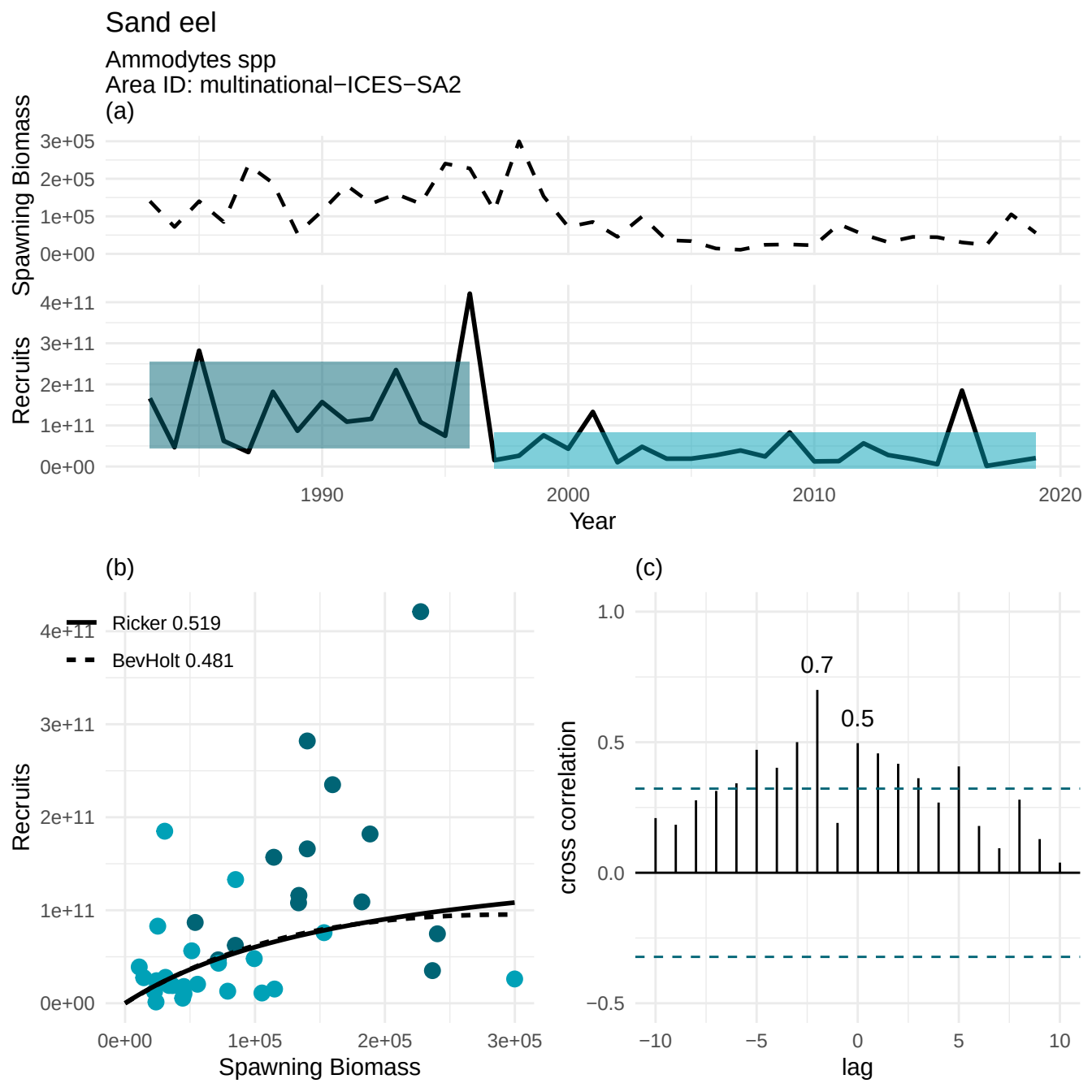

Scampi
Metanephrops challengeri
Area ID: New Zealand−MFish−MB
(a)
Spawning Biomass
12000
10000
8000
6000
4000
Recruits
4e+08
2e+08
0e+00
1990
1995
2000
2005
2010
Year
(b)
Ricker 0.584
BevHolt 0.416
Recruits
4e+08
2e+08
0e+00
0
2500
5000
7500
10000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.5
−10
−5
0
5
10
lag

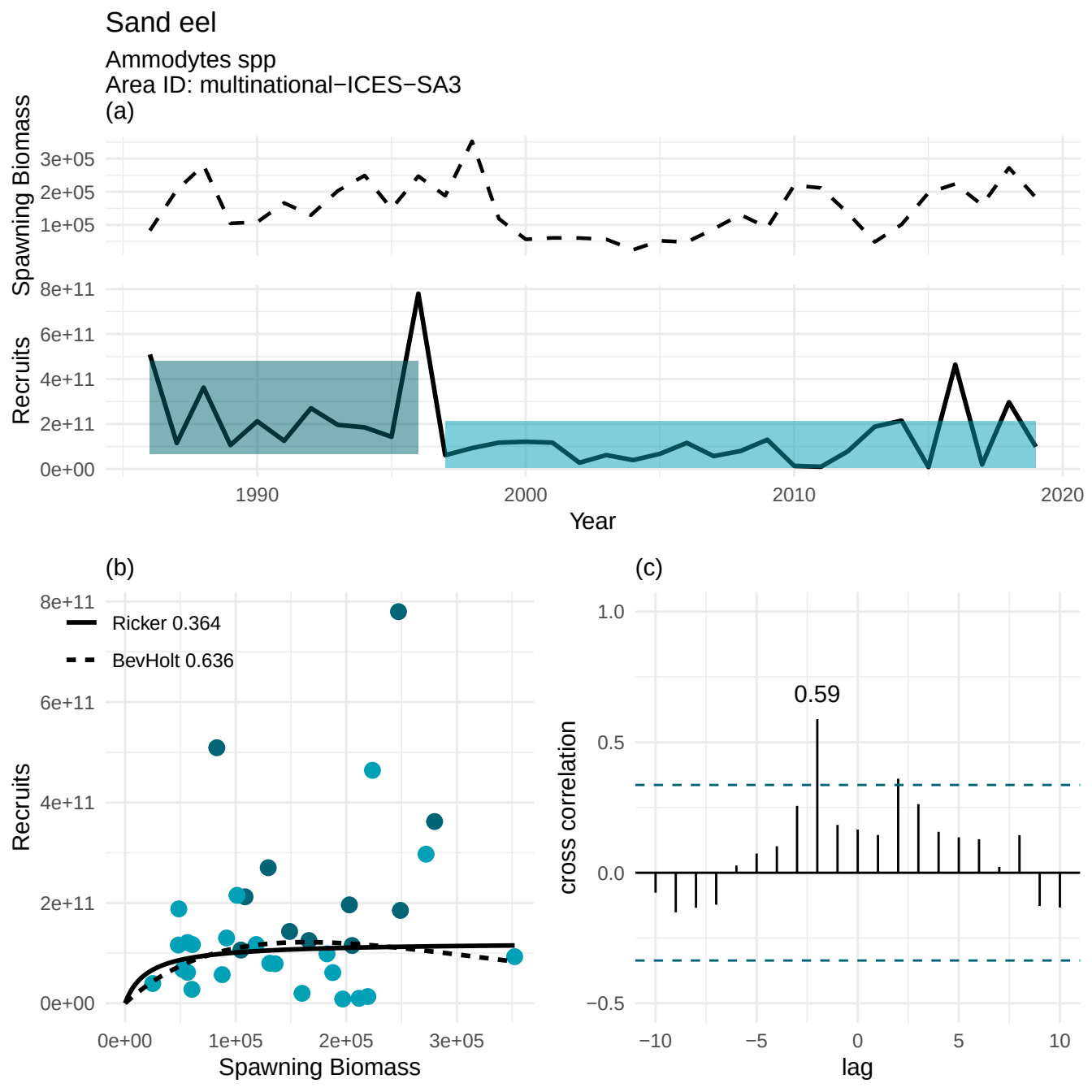

Scampi
Metanephrops challengeri
Area ID: New Zealand−MFish−WHB
(a)
Spawning Biomass
3000
2500
2000
1500
1000
Recruits
7.5e+07
5.0e+07
2.5e+07
0.0e+00
1985
1990
1995
2000
2005
2010
Year
(b)
Ricker 0.58
BevHolt 0.42
Recruits
7.5e+07
5.0e+07
2.5e+07
0.0e+00
0
1000
2000
3000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

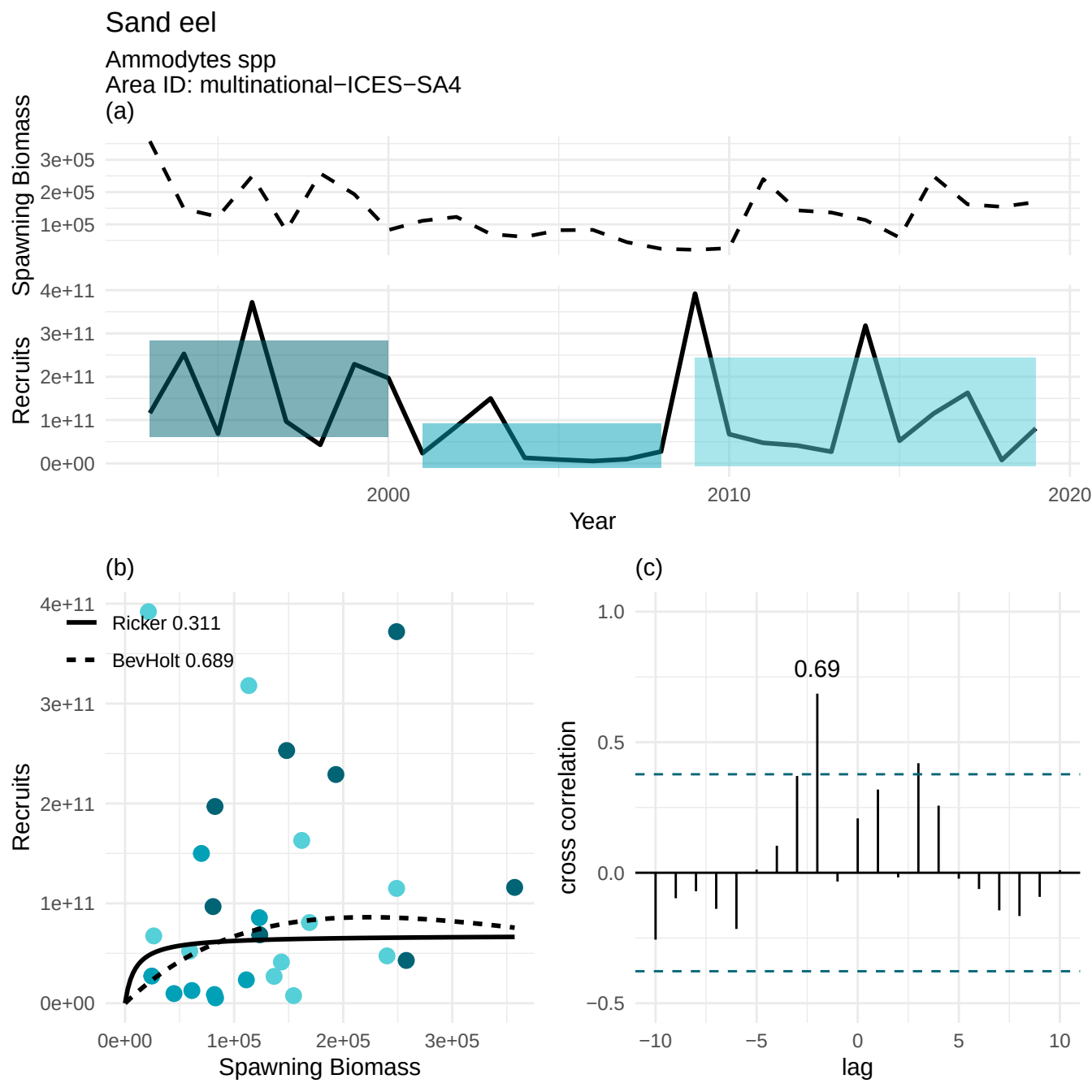

Scup
Stenotomus chrysops
Area ID: USA−NMFS−NWATLC
(a)
Spawning Biomass
200000
150000
100000
50000
0
Recruits
2.5e+08
2.0e+08
1.5e+08
1.0e+08
5.0e+07
1990
2000
2010
Year
(b)
Ricker 0.0612
BevHolt 0.939
Recruits
2e+08
1e+08
0e+00
0
50000
100000
150000
200000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.65
0.56
−10
−5
0
5
10
lag

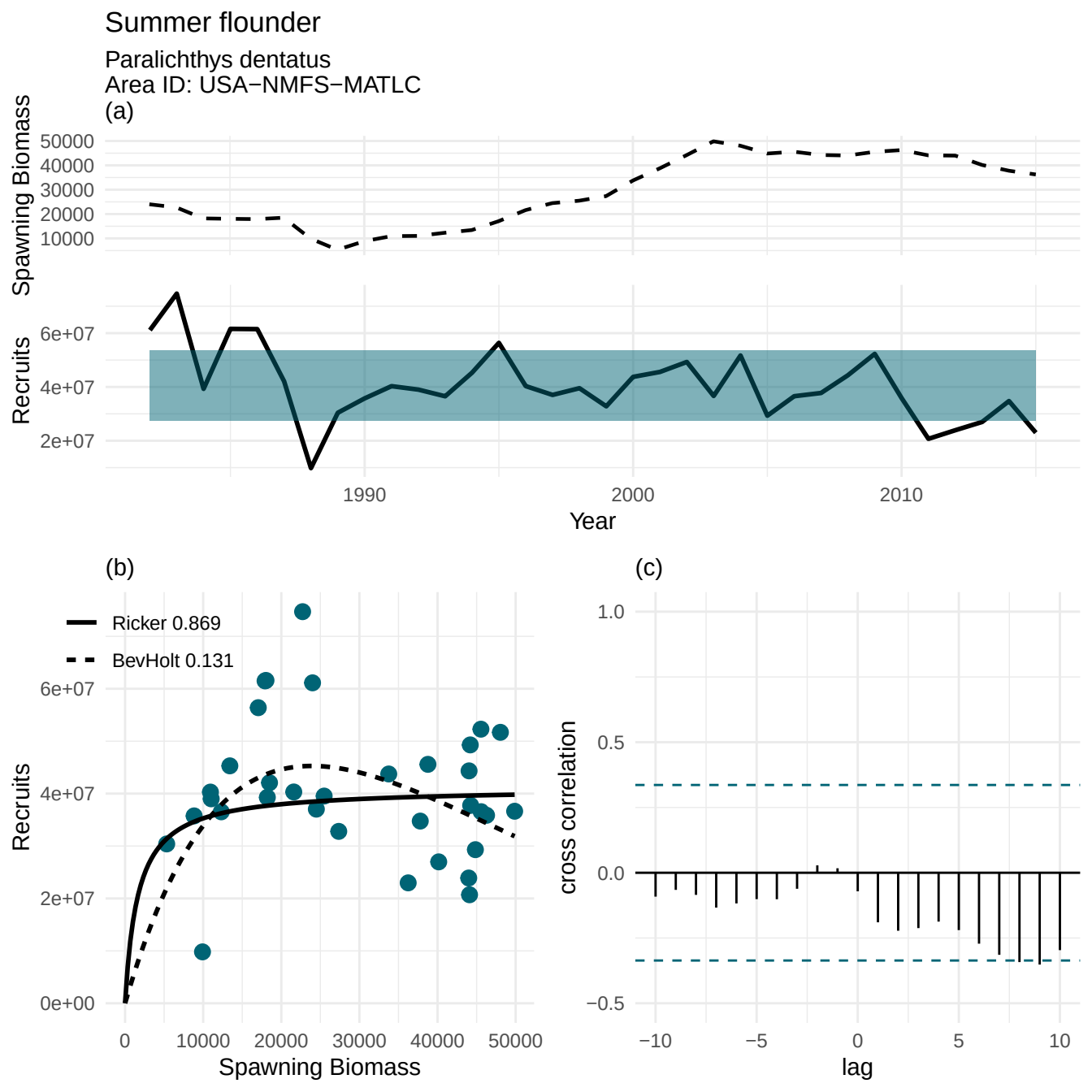

Spiny dogfish
Squalus acanthias
Area ID: multinational−GFCM−GSA29
(a)
Spawning Biomass
20000
15000
10000
5000
0
Recruits
750000
500000
250000
0
1990
1995
2000
2005
2010
2015
Year
(b)
Ricker 0.41
BevHolt 0.59
Recruits
750000
500000
250000
0
0
5000
10000
15000
20000
Spawning Biomass
(c)
0.9
0.84
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

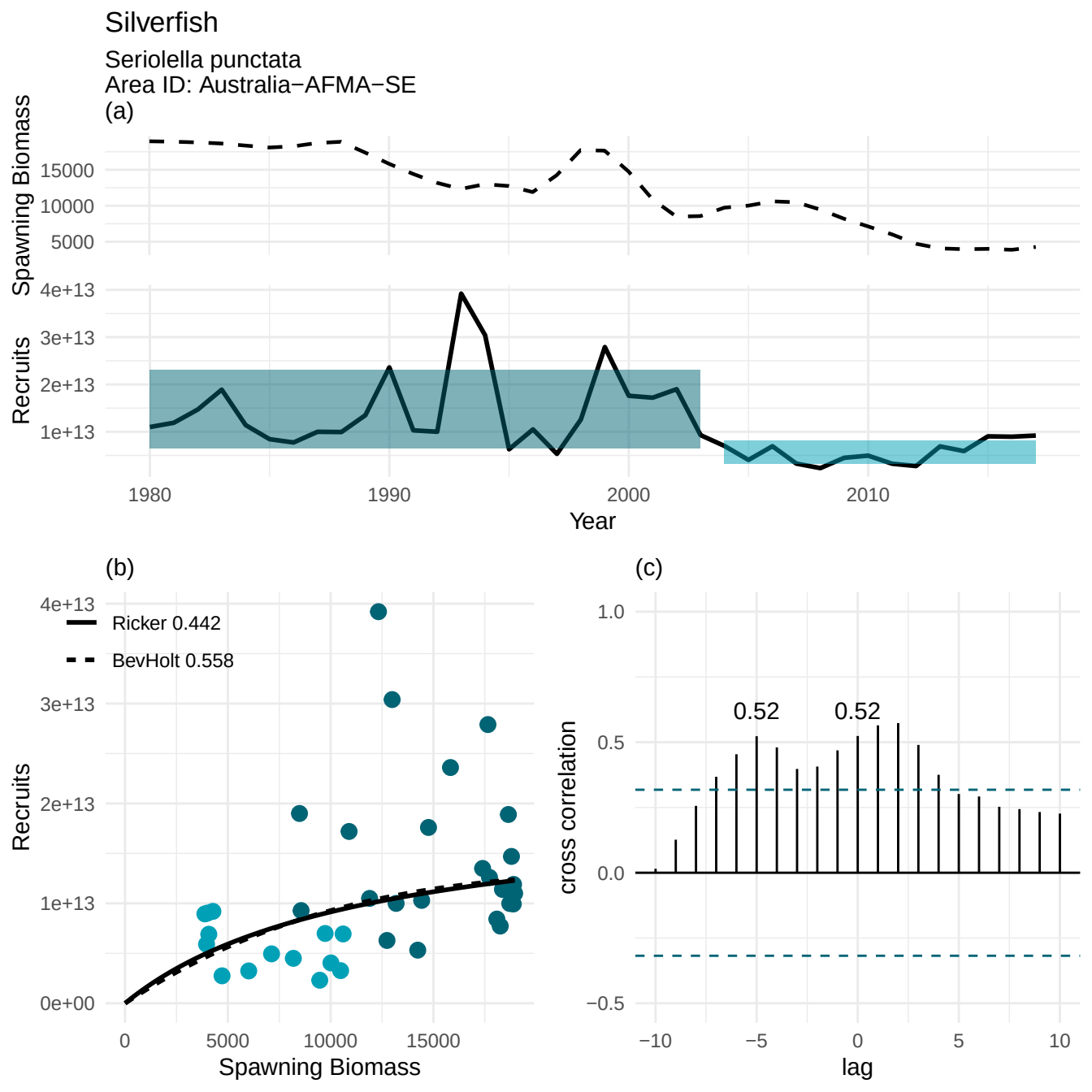

Sand eel
Ammodytes spp
Area ID: multinational−ICES−SA1
(a)
Spawning Biomass
1000000
750000
500000
250000
Recruits
5e+11
4e+11
3e+11
2e+11
1e+11
0e+00
1990
2000
2010
2020
Year
(b)
Ricker 0.573
BevHolt 0.427
Recruits
Spawning Biomass
0
250000
500000
750000
1000000
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.52
−10
−5
0
5
10
lag

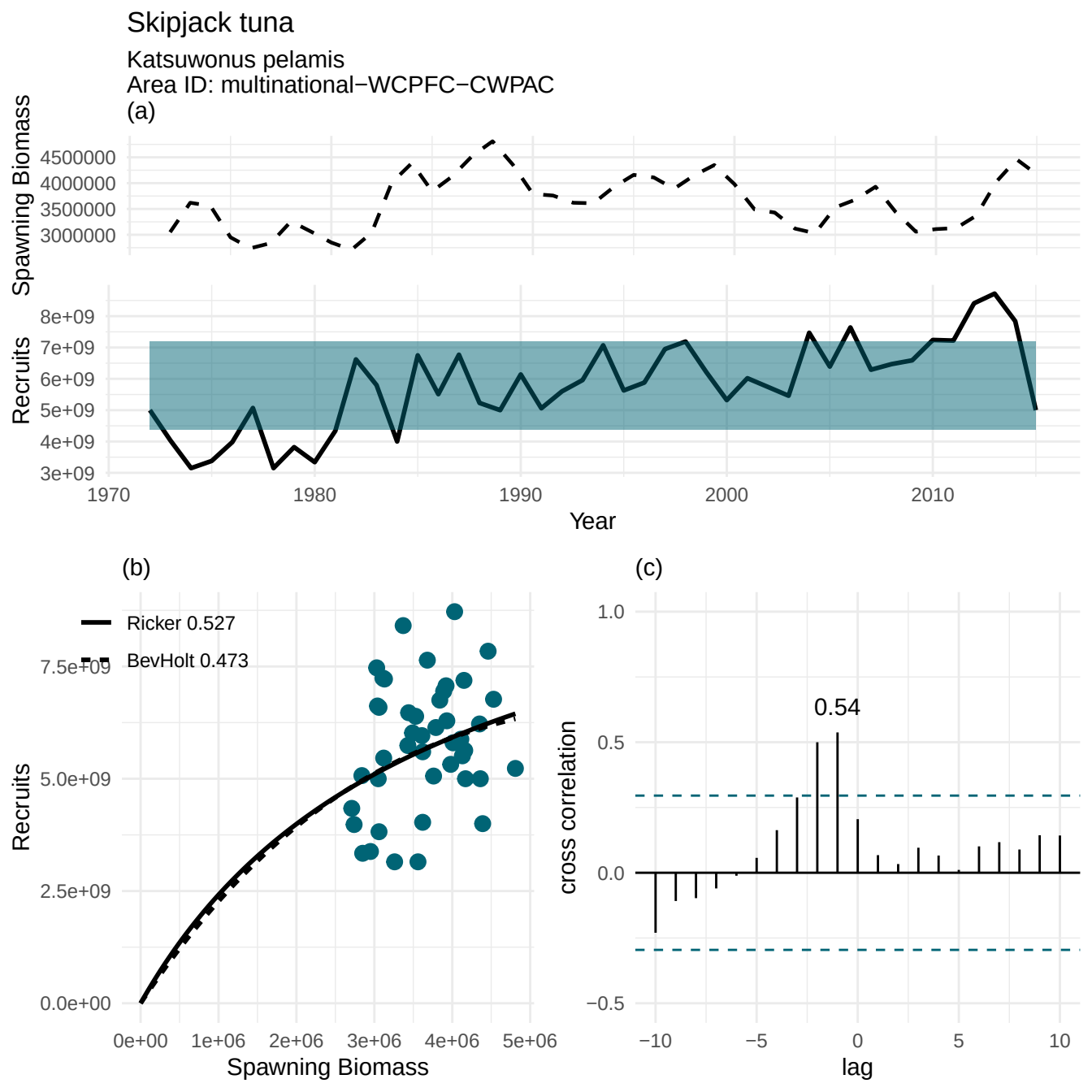

Sand eel
Ammodytes spp
Area ID: multinational−ICES−SA2
(a)
Spawning Biomass
3e+05
2e+05
1e+05
0e+00
Recruits
4e+11
3e+11
2e+11
1e+11
0e+00
1990
2000
2010
2020
Year
(b)
Ricker 0.519
BevHolt 0.481
Recruits
4e+11
3e+11
2e+11
1e+11
0e+00
0e+00
1e+05
2e+05
3e+05
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.7
0.5
−10
−5
0
5
10
lag

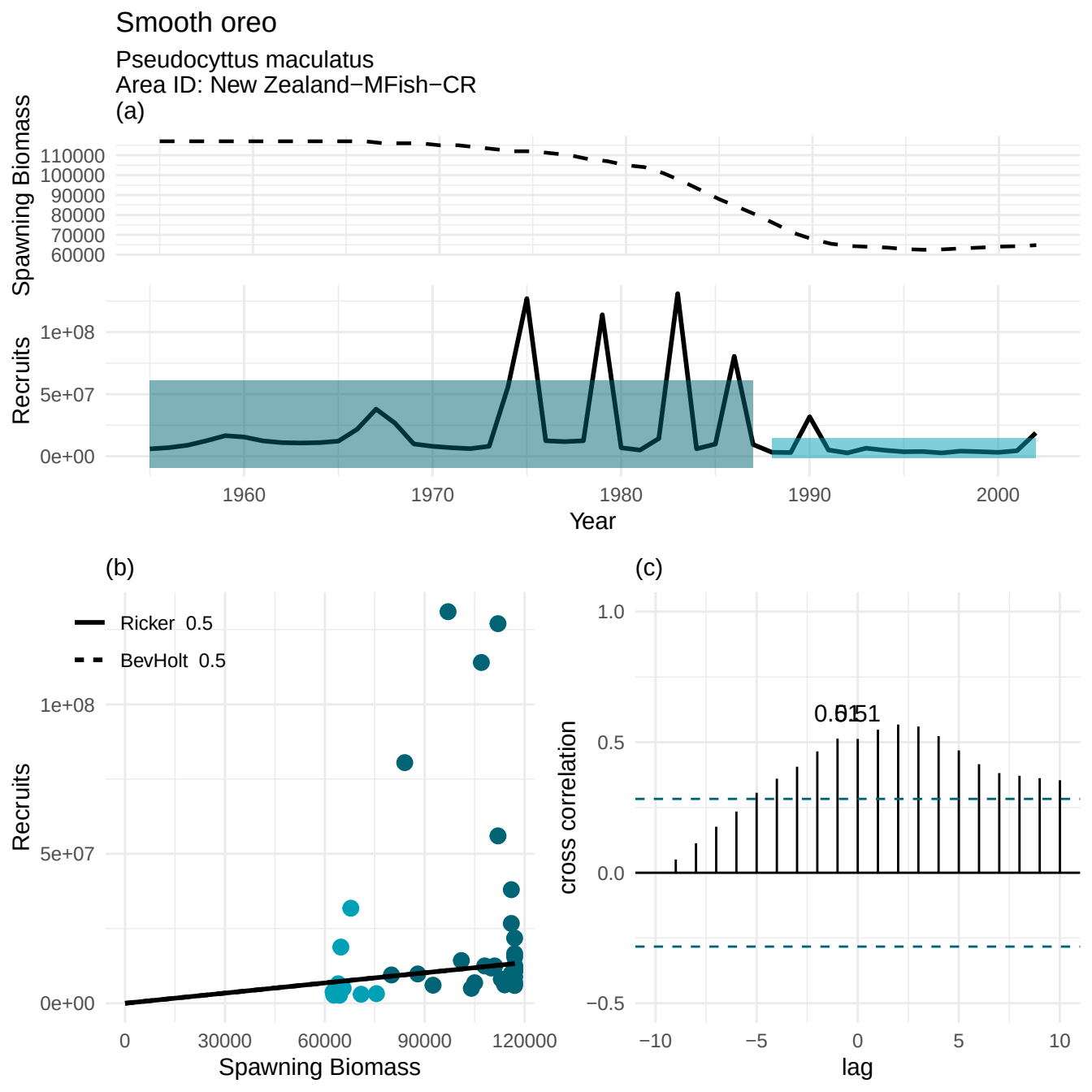

Sand eel
Ammodytes spp
Area ID: multinational−ICES−SA3
(a)
Spawning Biomass
3e+05
2e+05
1e+05
Recruits
8e+11
6e+11
4e+11
2e+11
0e+00
1990
2000
2010
2020
Year
(b)
Ricker 0.364
BevHolt 0.636
Recruits
Spawning Biomass
(c)
cross correlation
0.59
lag

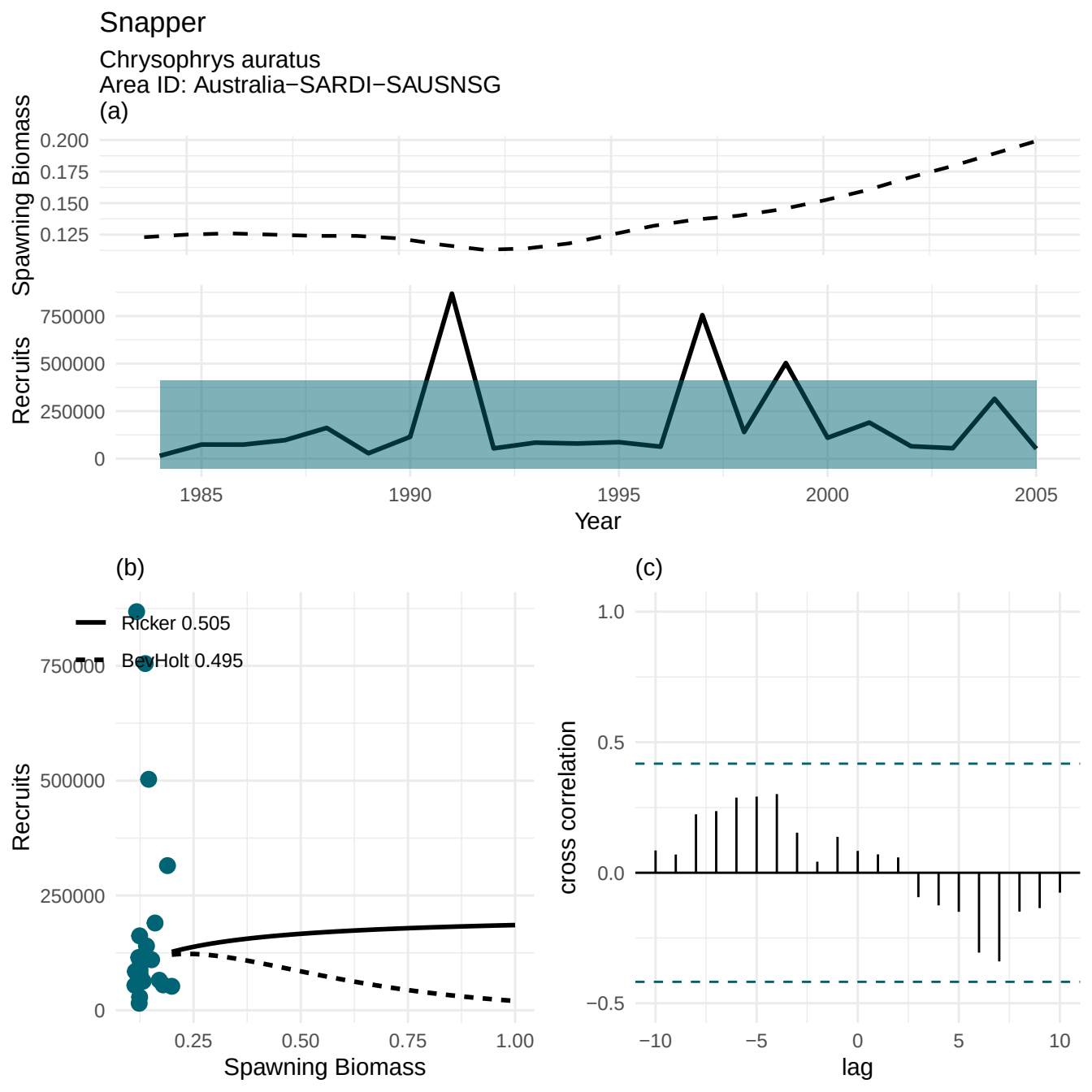

Sand eel
Ammodytes spp
Area ID: multinational−ICES−SA4
(a)
Spawning Biomass
3e+05
2e+05
1e+05
Recruits
4e+11
3e+11
2e+11
1e+11
0e+00
2000
2010
2020
Year
(b)
Ricker 0.311
BevHolt 0.689
Recruits
Spawning Biomass
(c)
0.69
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

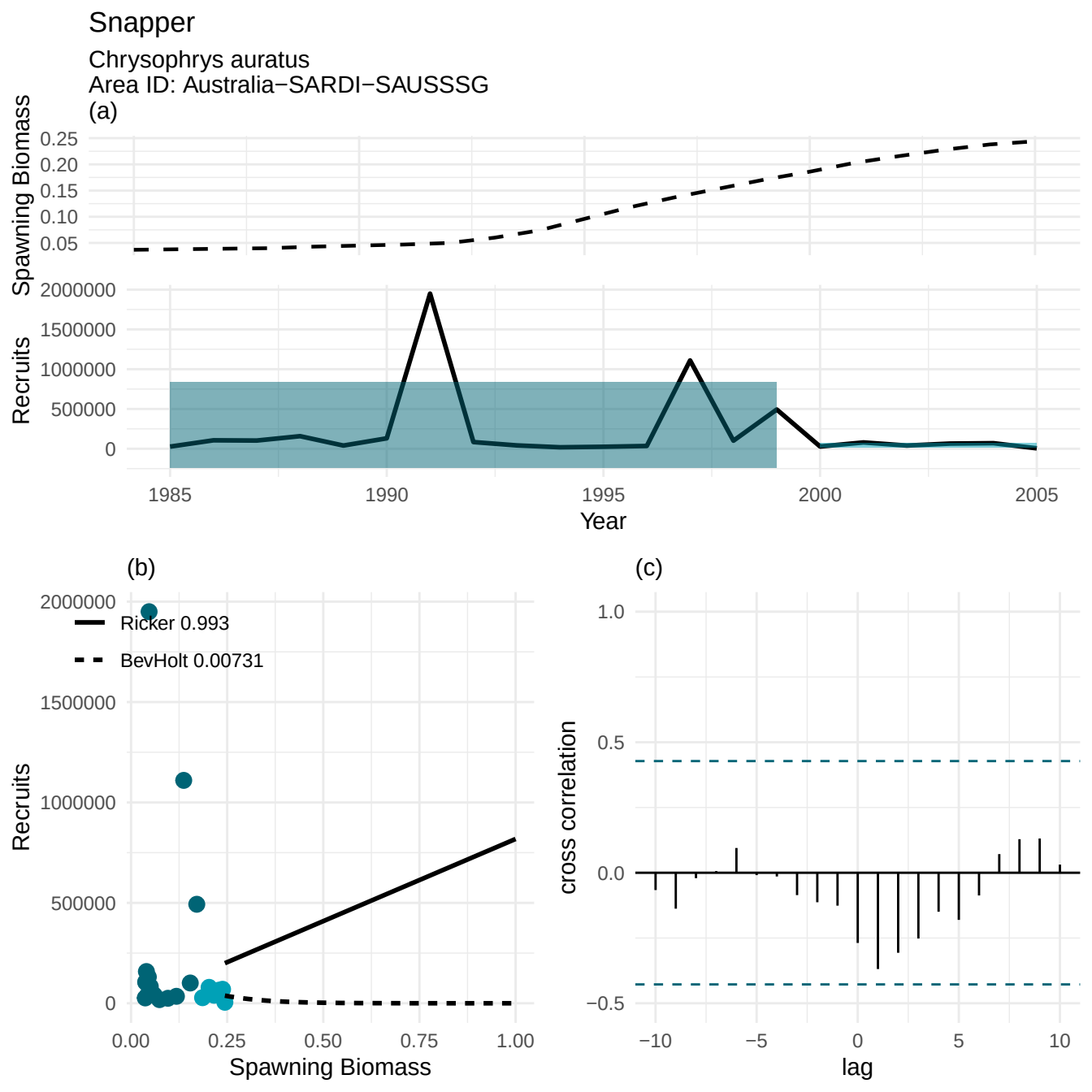

Summer flounder
Paralichthys dentatus
Area ID: USA−NMFS−MATLC
(a)
Spawning Biomass
50000
40000
30000
20000
10000
Recruits
6e+07
4e+07
2e+07
1990
2000
2010
Year
(b)
Ricker 0.869
BevHolt 0.131
Recruits
6e+07
4e+07
2e+07
0e+00
0
10000
20000
30000
40000
50000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

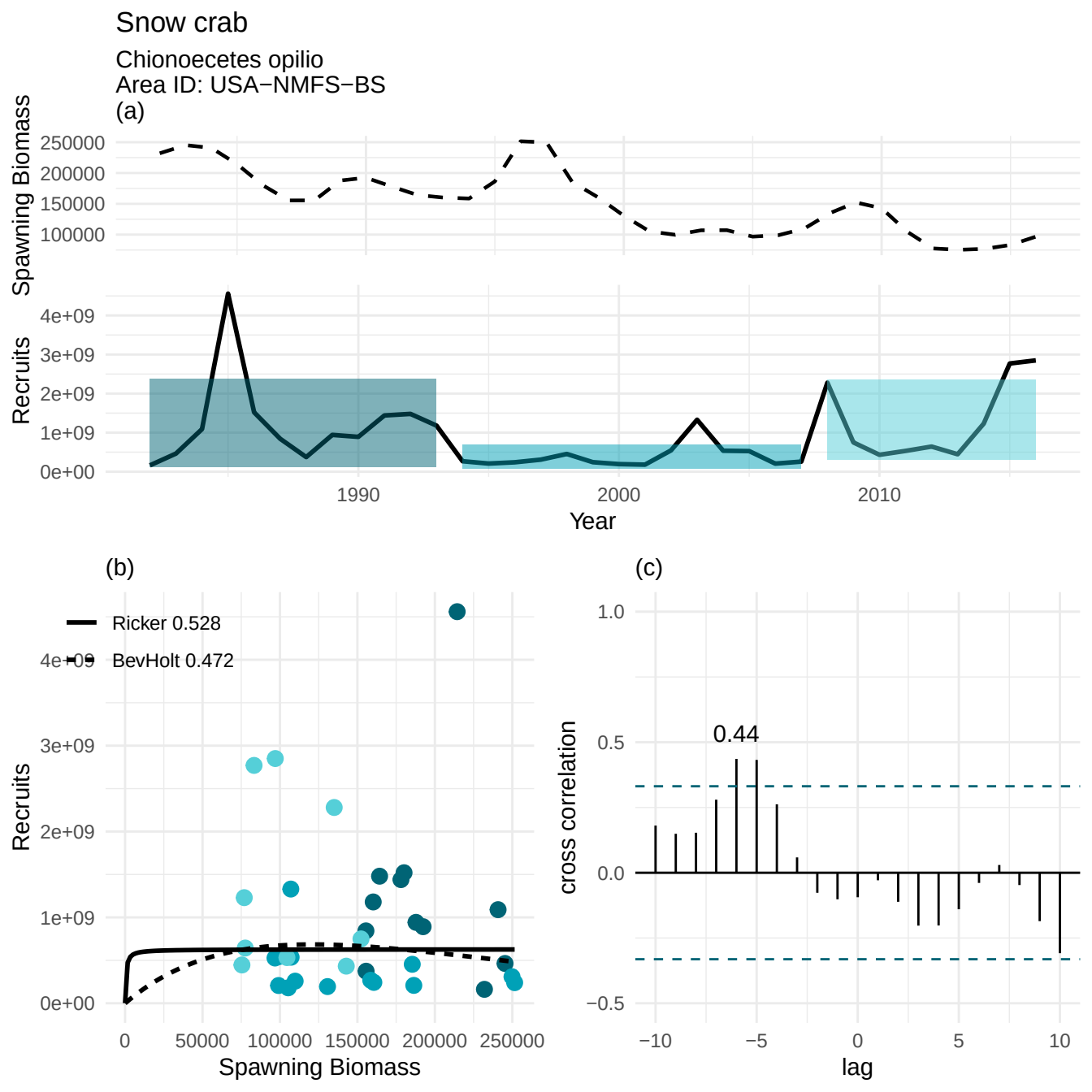

Silverfish
Seriolella punctata
Area ID: Australia−AFMA−SE
(a)
Spawning Biomass
15000
10000
5000
Recruits
4e+13
3e+13
2e+13
1e+13
1980
1990
2000
2010
Year
(b)
Ricker 0.442
BevHolt 0.558
Recruits
4e+13
3e+13
2e+13
1e+13
0e+00
0
5000
10000
15000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.52
0.52
−10
−5
0
5
10
lag

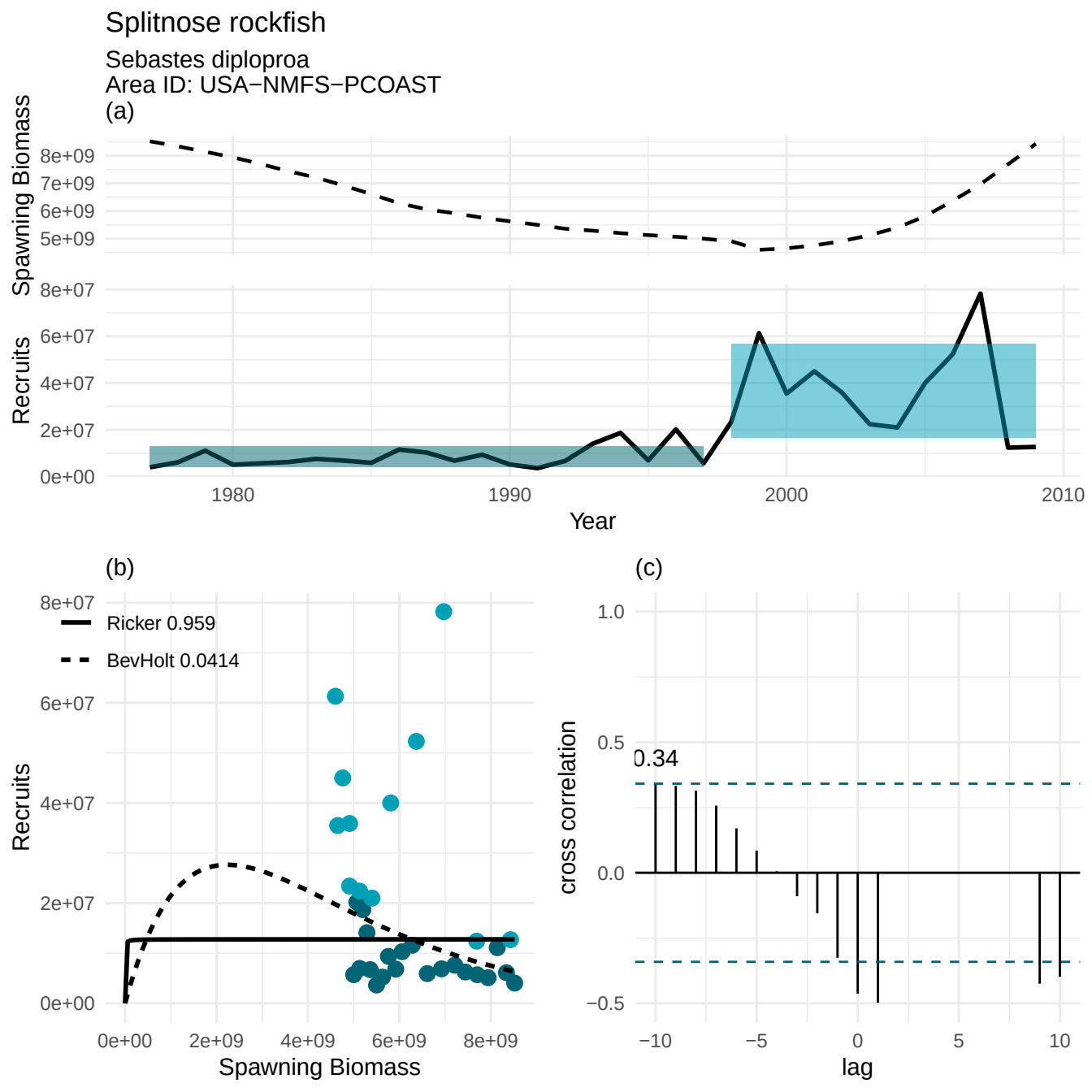

Skipjack tuna
Katsuwonus pelamis
Area ID: multinational−WCPFC−CWPAC
(a)
Spawning Biomass
4500000
4000000
3500000
3000000
Recruits
8e+09
7e+09
6e+09
5e+09
4e+09
3e+09
1970
1980
1990
2000
2010
Year
(b)
Ricker 0.527
BevHolt 0.473
Recruits
7.5e+09
5.0e+09
2.5e+09
0.0e+00
0e+00
1e+06
2e+06
3e+06
4e+06
5e+06
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.54
−10
−5
0
5
10
lag

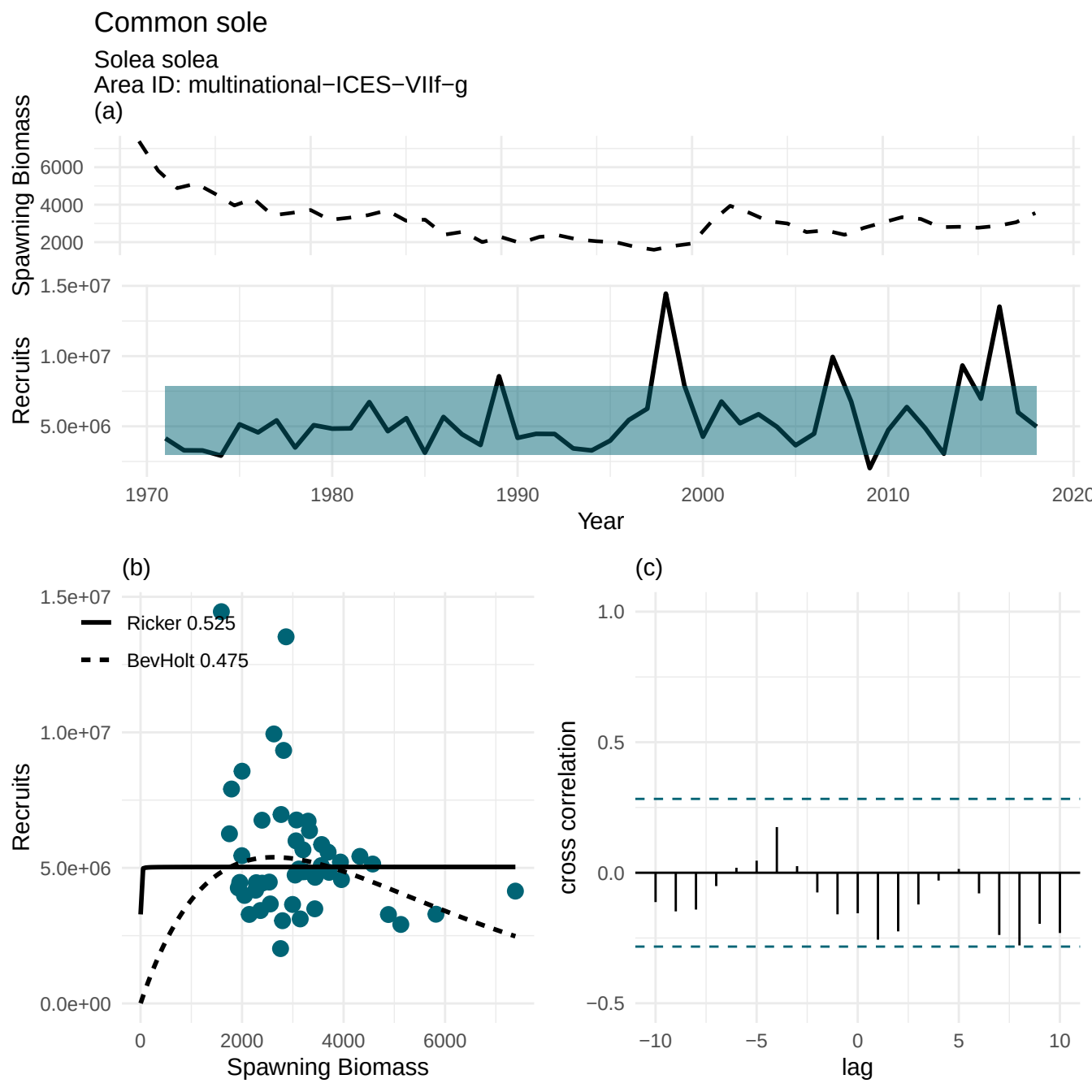

Smooth oreo
Pseudocyttus maculatus
Area ID: New Zealand−MFish−CR
(a)
Spawning Biomass
110000
100000
90000
80000
70000
60000
Recruits
1e+08
5e+07
0e+00
1960
1970
1980
1990
2000
Year
(b)
Ricker 0.5
BevHolt 0.5
Recruits
1e+08
5e+07
0e+00
0
30000
60000
90000
120000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

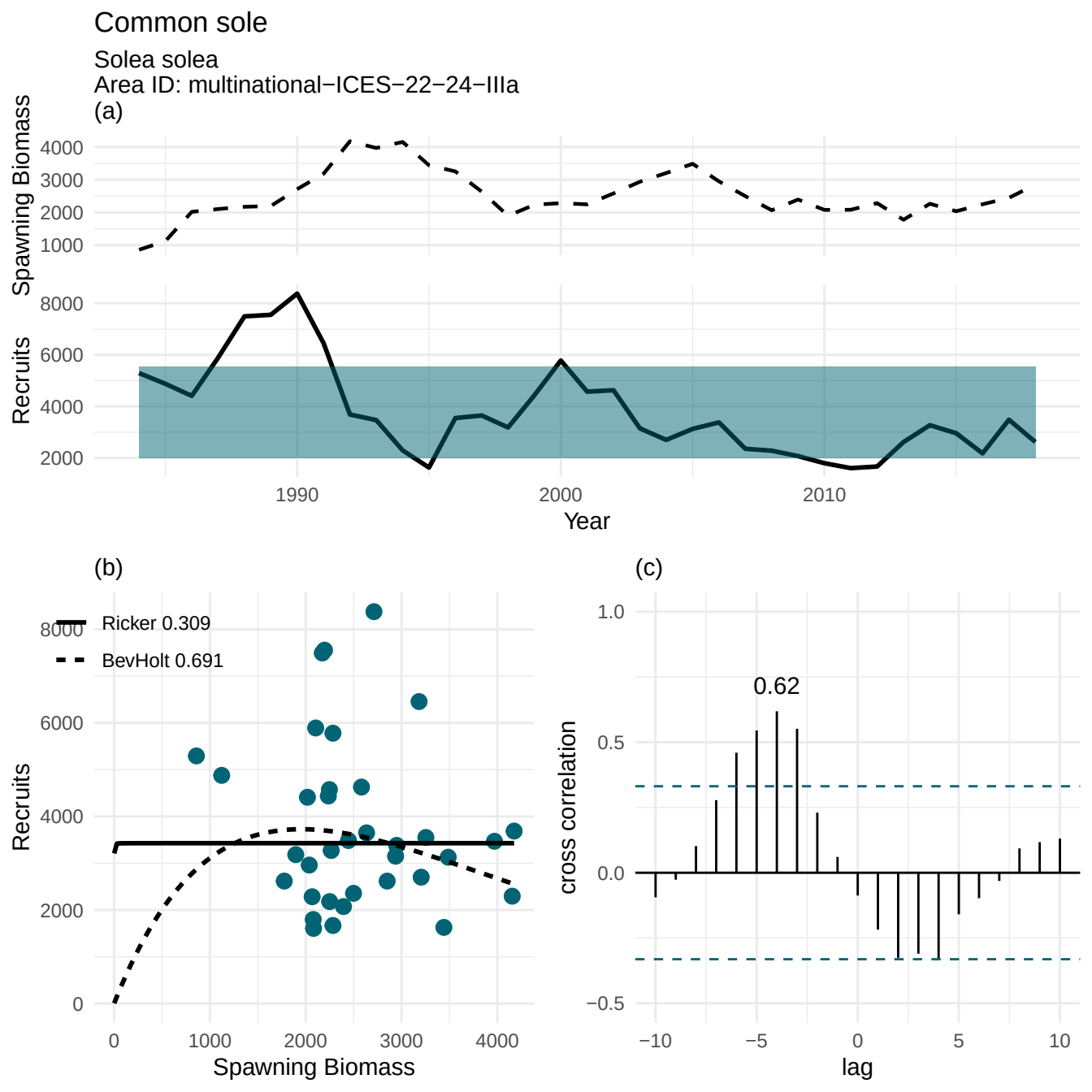

Snapper
Chrysophrys auratus
Area ID: Australia−SARDI−SAUSNSG
(a)
Spawning Biomass
0.200
0.175
0.150
0.125
Recruits
750000
500000
250000
0
1985
1990
1995
2000
2005
Year
(b)
Ricker 0.505
BevHolt 0.495
Recruits
750000
500000
250000
0
0.25
0.50
0.75
1.00
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

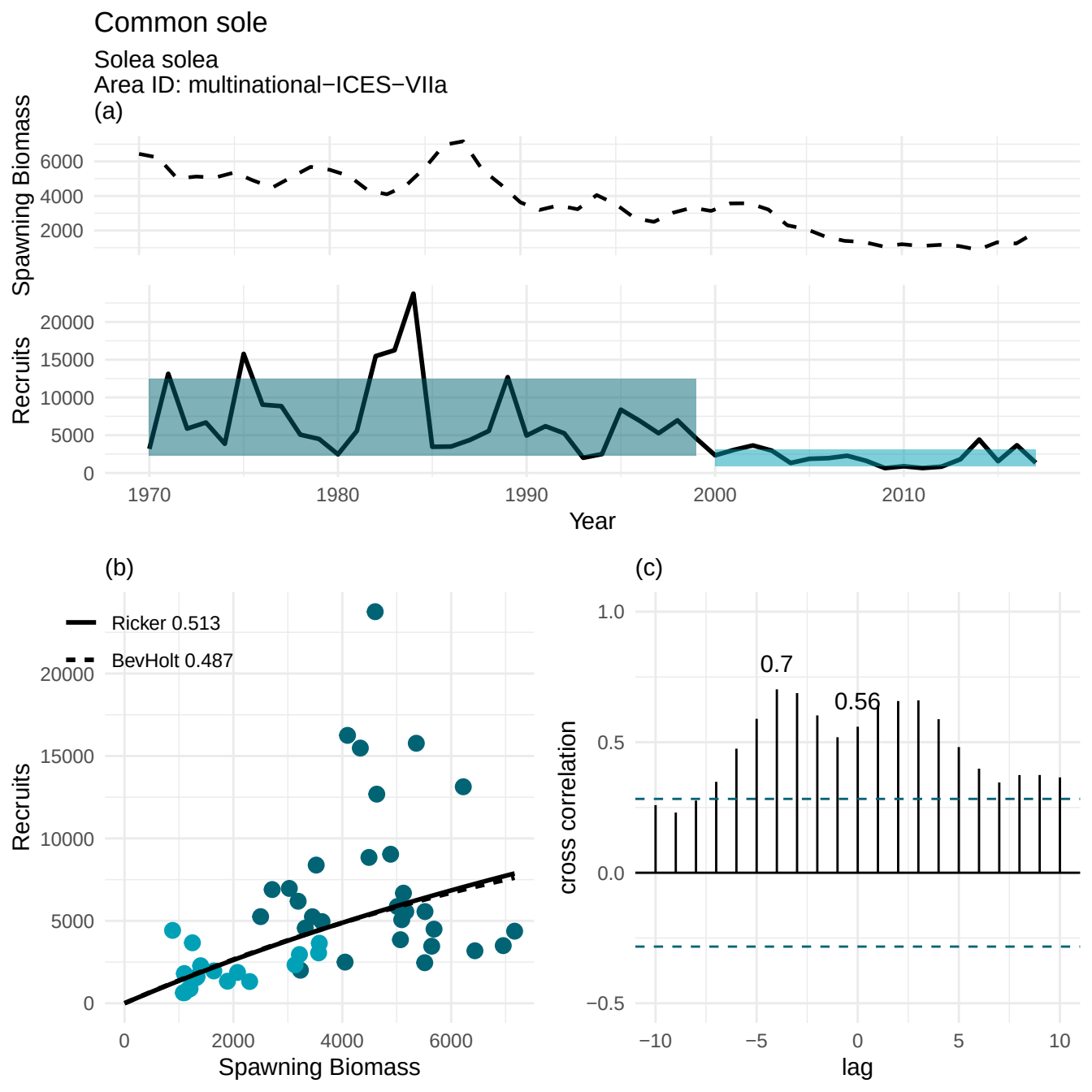

Snapper
Chrysophrys auratus
Area ID: Australia−SARDI−SAUSSSG
(a)
Spawning Biomass
0.25
0.20
0.15
0.10
0.05
Recruits
2000000
1500000
1000000
500000
0
1985
1990
1995
2000
2005
Year
(b)
Ricker 0.993
BevHolt 0.00731
Recruits
2000000
1500000
1000000
500000
0
0.00
0.25
0.50
0.75
1.00
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

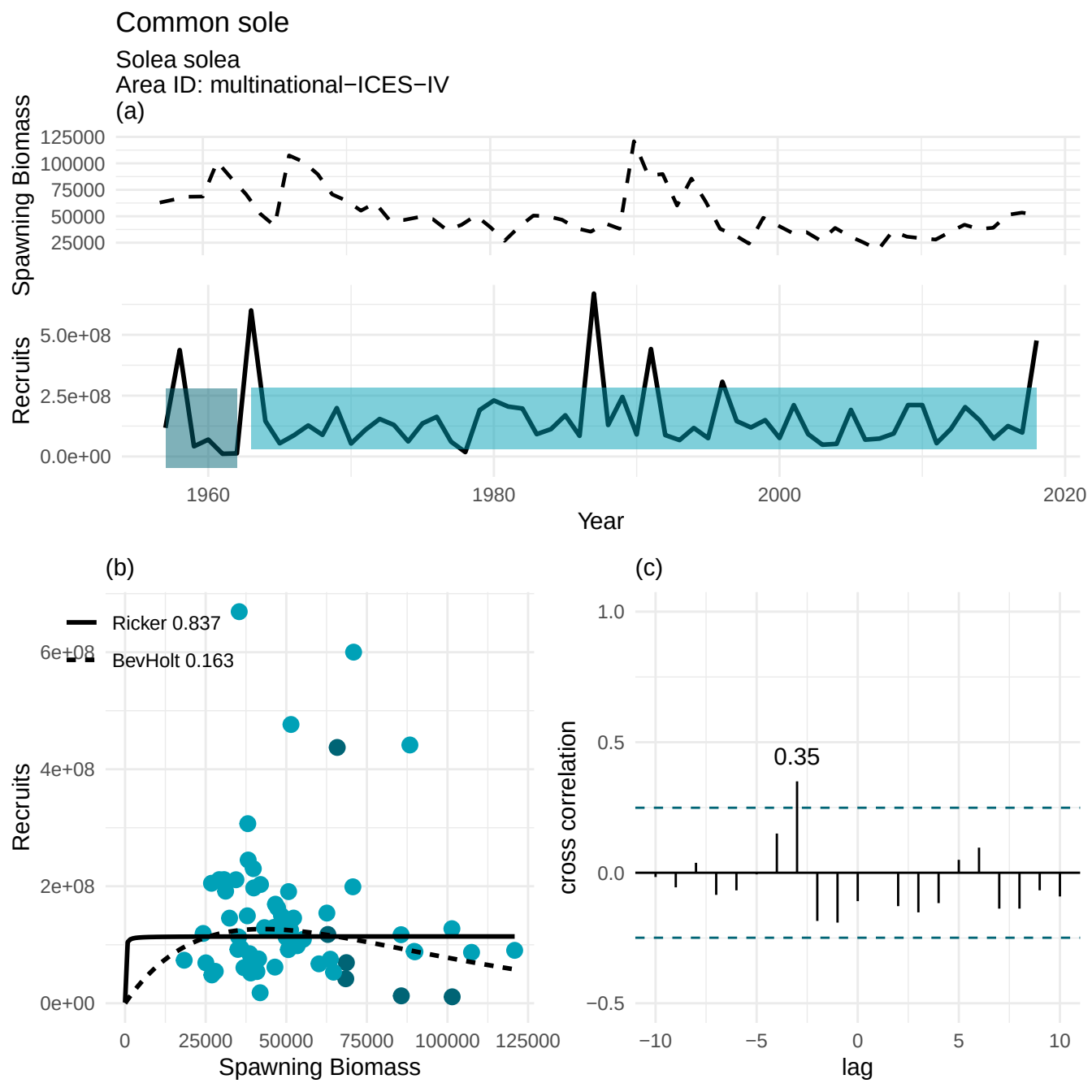

Snow crab
Chionoecetes opilio
Area ID: USA−NMFS−BS
(a)
Spawning Biomass
250000
200000
150000
100000
Recruits
4e+09
3e+09
2e+09
1e+09
0e+00
1990
2000
2010
Year
(b)
Ricker 0.528
BevHolt 0.472
Recruits
4e+09
3e+09
2e+09
1e+09
0e+00
0
50000
100000
150000
200000
250000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.44
−10
−5
0
5
10
lag

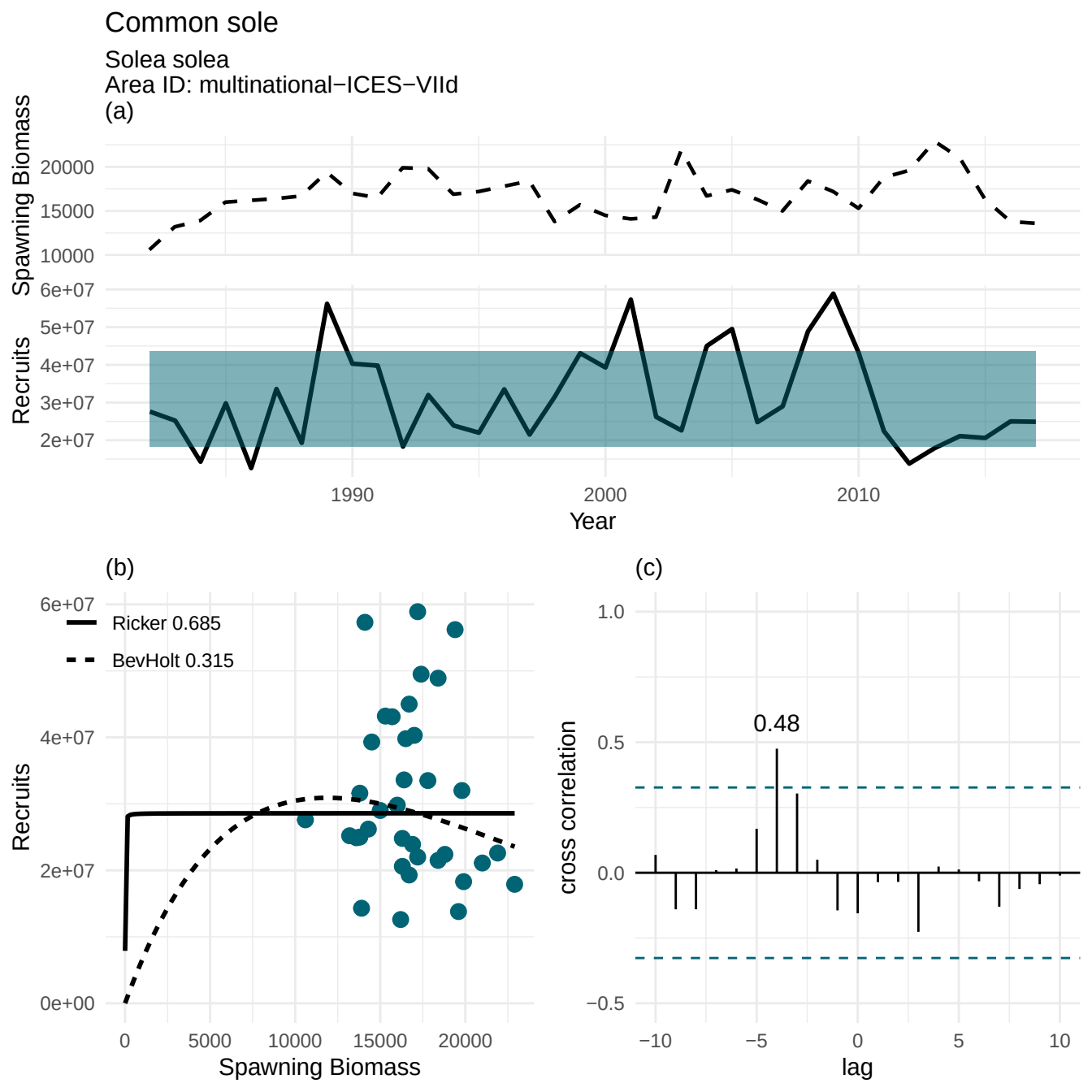

Splitnose rockfish
Sebastes diploproa
Area ID: USA−NMFS−PCOAST
(a)
Spawning Biomass
8e+09
7e+09
6e+09
5e+09
Recruits
8e+07
6e+07
4e+07
2e+07
0e+00
1980
1990
2000
2010
Year
(b)
Ricker 0.959
BevHolt 0.0414
Recruits
Spawning Biomass
0e+00
2e+09
4e+09
6e+09
8e+09
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.34
−10
−5
0
5
10
lag

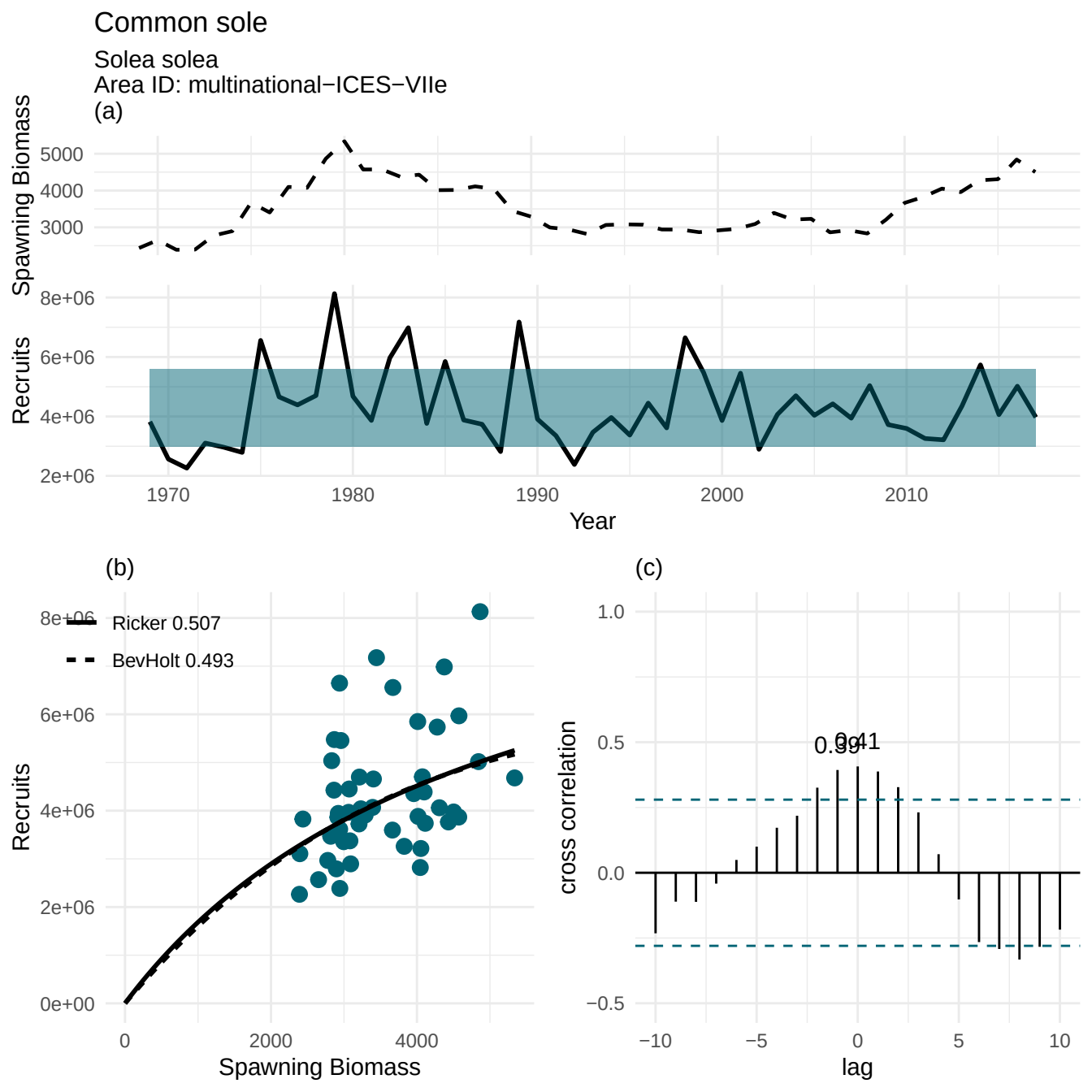

Common sole
Solea solea
Area ID: multinational−ICES−VIIf−g
(a)
Spawning Biomass
6000
4000
2000
Recruits
1.5e+07
1.0e+07
5.0e+06
1970
1980
1990
2000
2010
2020
Year
(b)
Ricker 0.525
BevHolt 0.475
Recruits
1.5e+07
1.0e+07
5.0e+06
0.0e+00
0
2000
4000
6000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

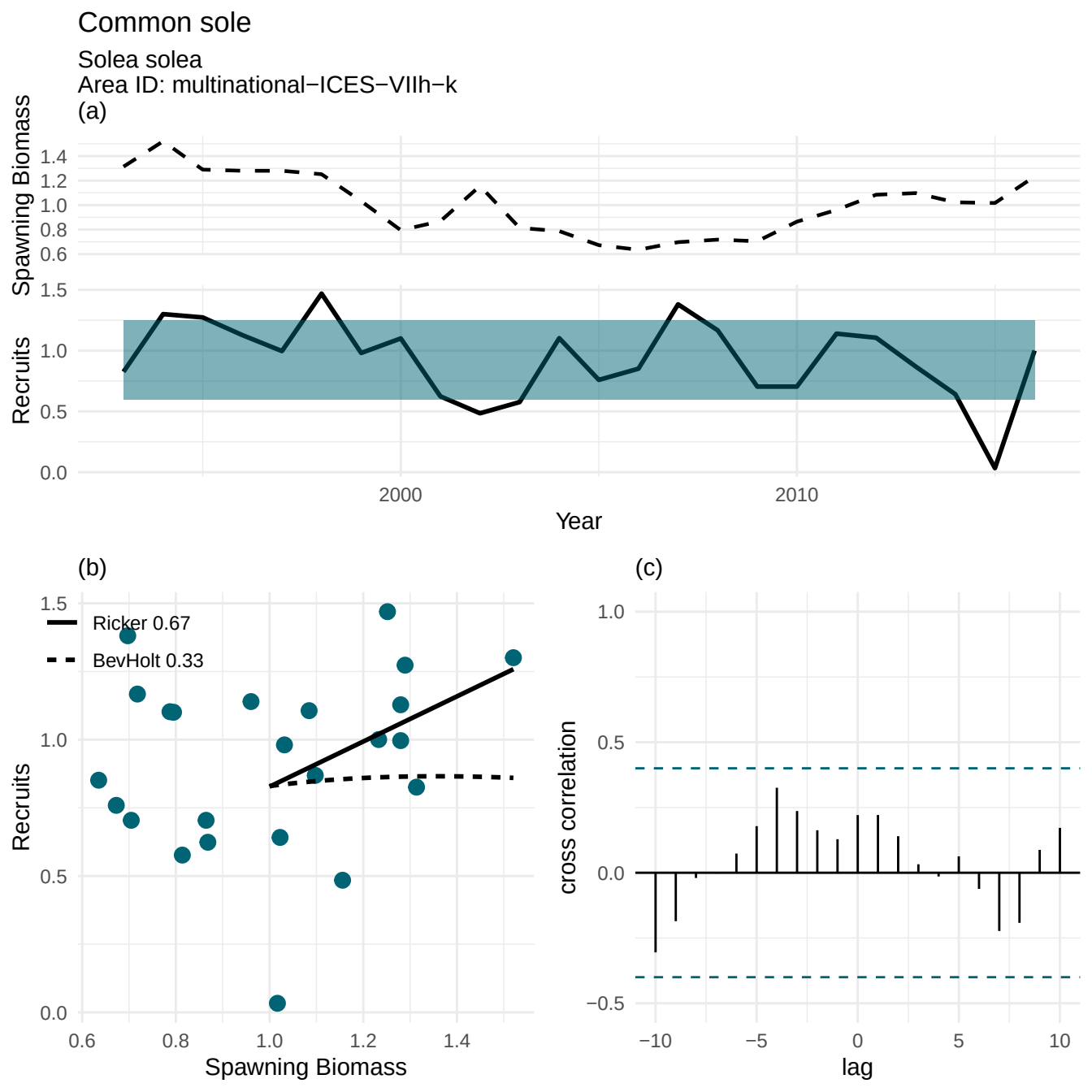

Common sole
Solea solea
Area ID: multinational−ICES−22−24−IIIa
(a)
Spawning Biomass
4000
3000
2000
1000
Recruits
8000
6000
4000
2000
1990
2000
2010
Year
(b)
Ricker 0.309
BevHolt 0.691
Recruits
8000
6000
4000
2000
0
0
1000
2000
3000
4000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.62
−10
−5
0
5
10
lag

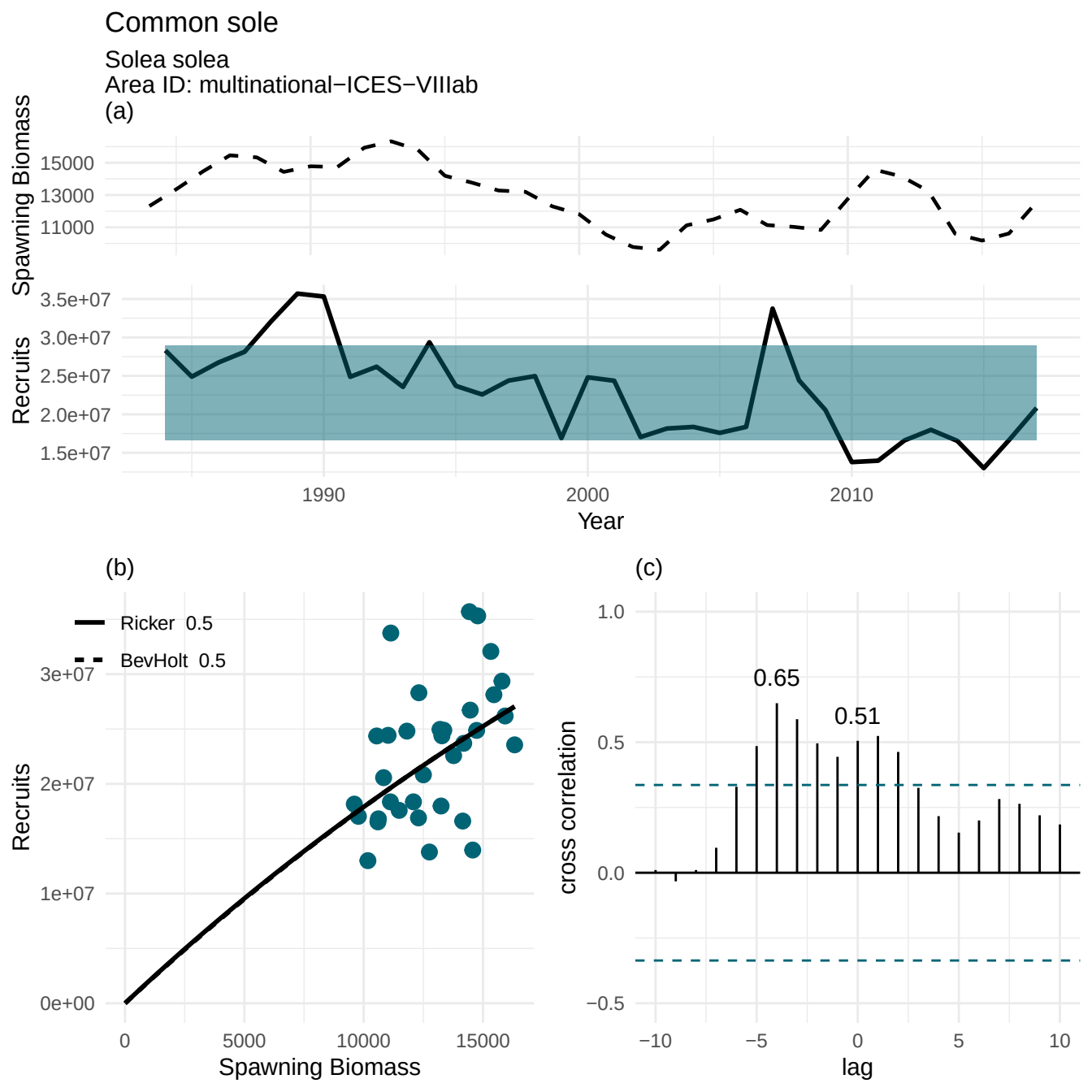

Common sole
Solea solea
Area ID: multinational−ICES−VIIa
(a)
Spawning Biomass
6000
4000
2000
Recruits
20000
15000
10000
5000
0
1970
1980
1990
2000
2010
Year
(b)
Ricker 0.513
BevHolt 0.487
Recruits
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.7
0.56
−10
−5
0
5
10
lag

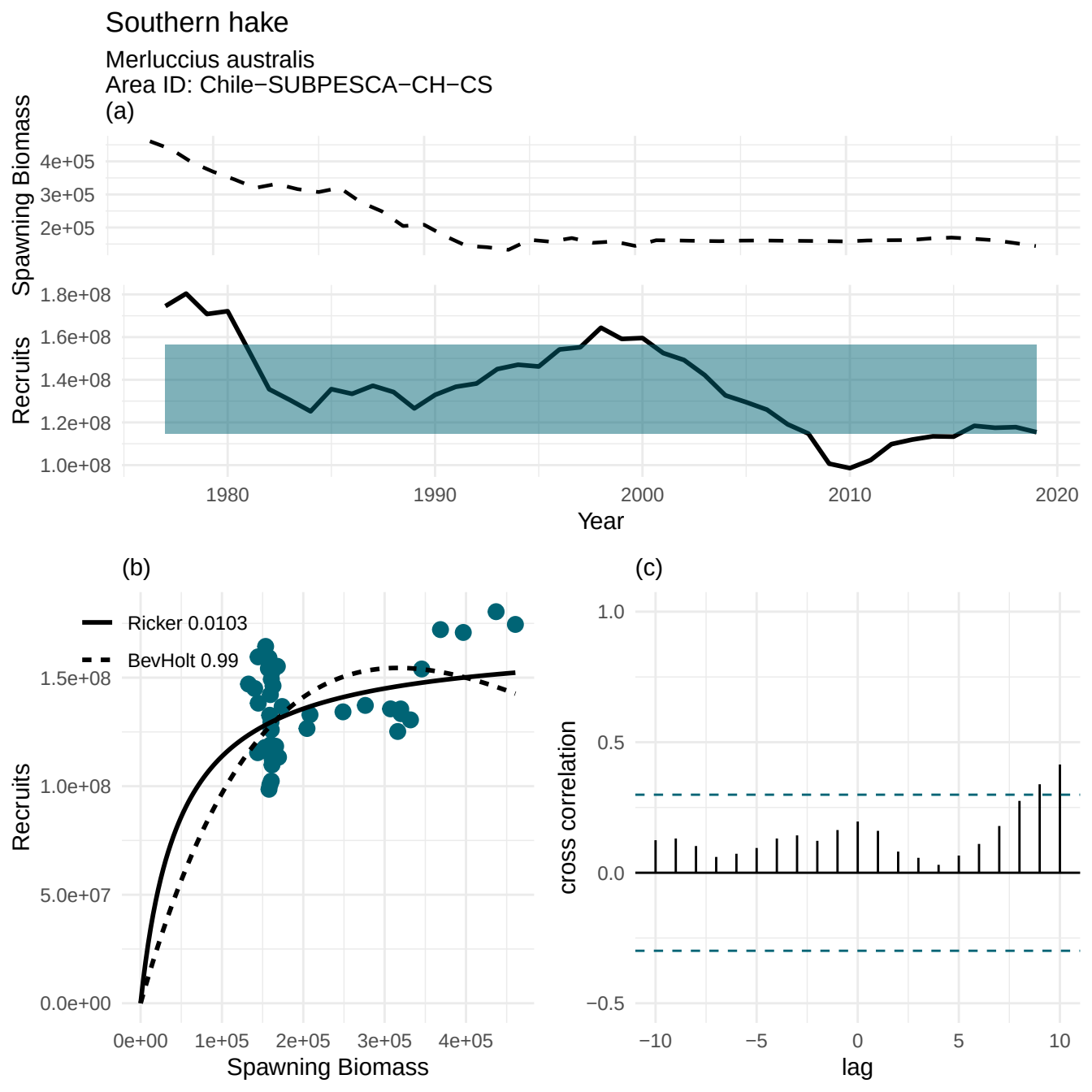

Common sole
Solea solea
Area ID: multinational−ICES−IV
(a)
Spawning Biomass
125000
100000
75000
50000
25000
Recruits
5.0e+08
2.5e+08
0.0e+00
1960
1980
2000
2020
Year
(b)
Ricker 0.837
BevHolt 0.163
6e+08
4e+08
2e+08
0e+00
Recruits
0
25000
50000
75000
100000
125000
Spawning Biomass
(c)
1.0
0.5
0.0
−0.5
cross correlation
0.35
−10
−5
0
5
10
lag

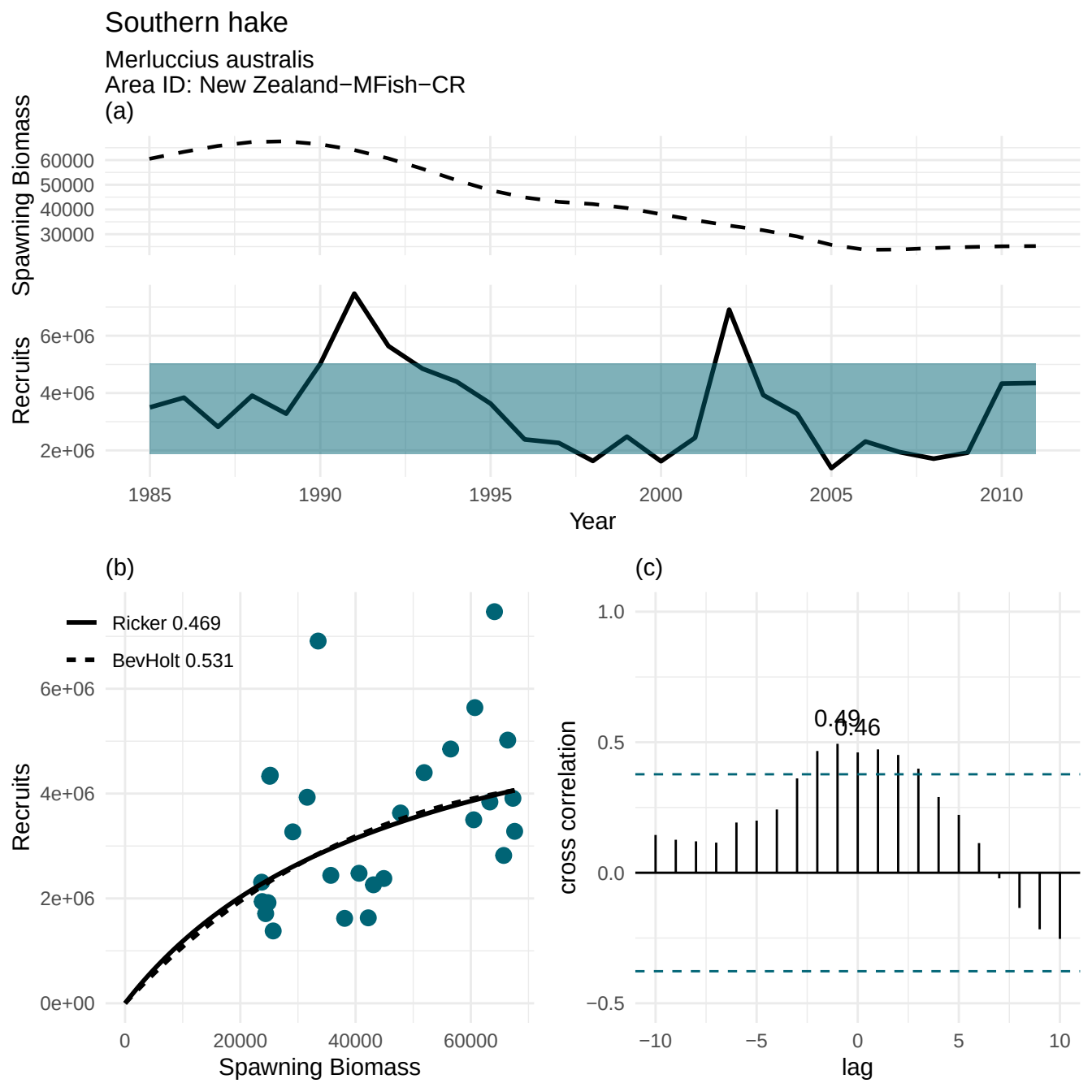

Common sole
Solea solea
Area ID: multinational−ICES−VIId
(a)
Spawning Biomass
20000
15000
10000
Recruits
6e+07
5e+07
4e+07
3e+07
2e+07
1990
2000
2010
Year
(b)
Ricker 0.685
BevHolt 0.315
Recruits
6e+07
4e+07
2e+07
0e+00
0
5000
10000
15000
20000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.48
−10
−5
0
5
10
lag

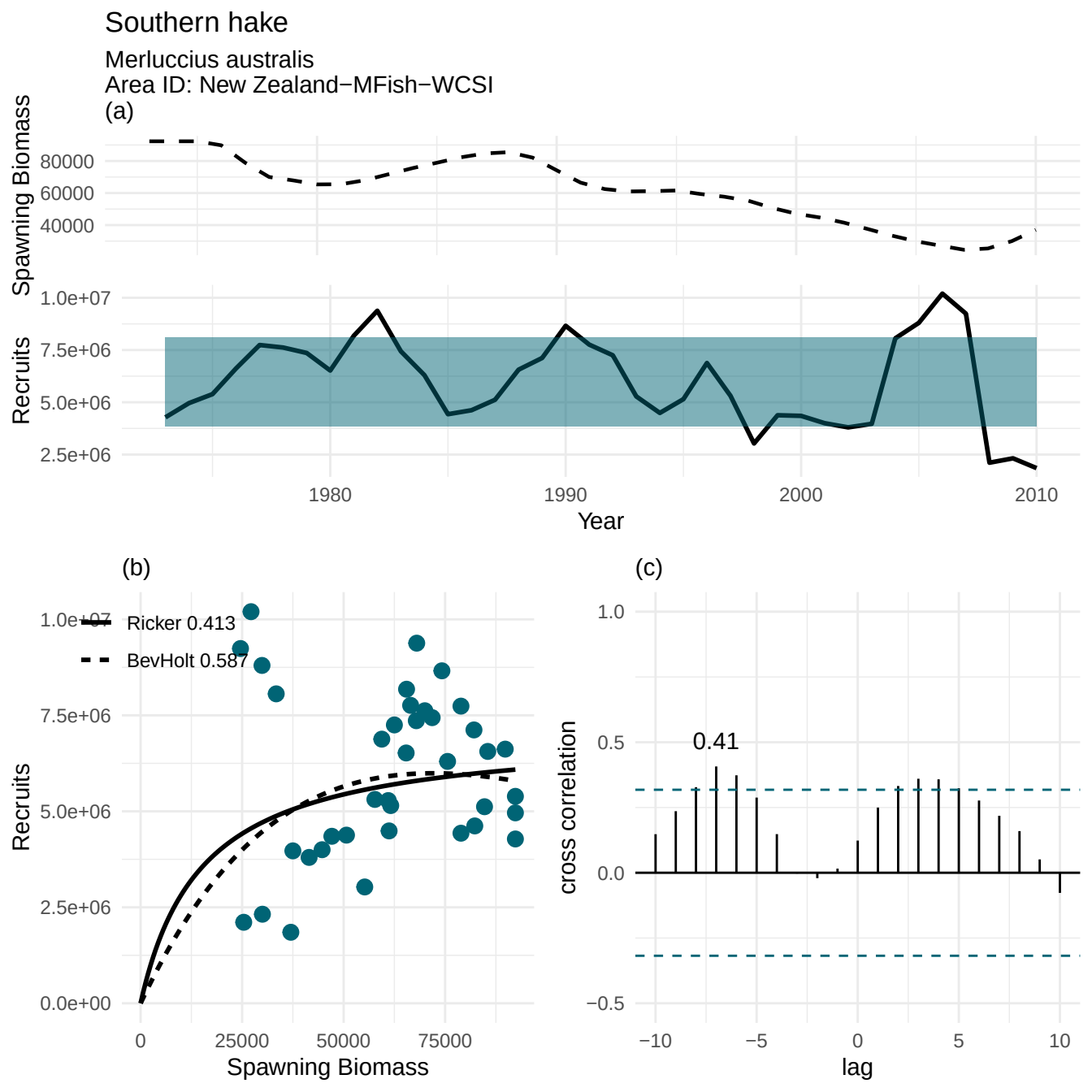

Common sole
Solea solea
Area ID: multinational−ICES−VIIe
(a)
Spawning Biomass
5000
4000
3000
Recruits
8e+06
6e+06
4e+06
2e+06
1970
1980
1990
2000
2010
Year
(b)
Ricker 0.507
BevHolt 0.493
Recruits
0e+00
2e+06
4e+06
6e+06
8e+06
0
2000
4000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.41
−10
−5
0
5
10
lag

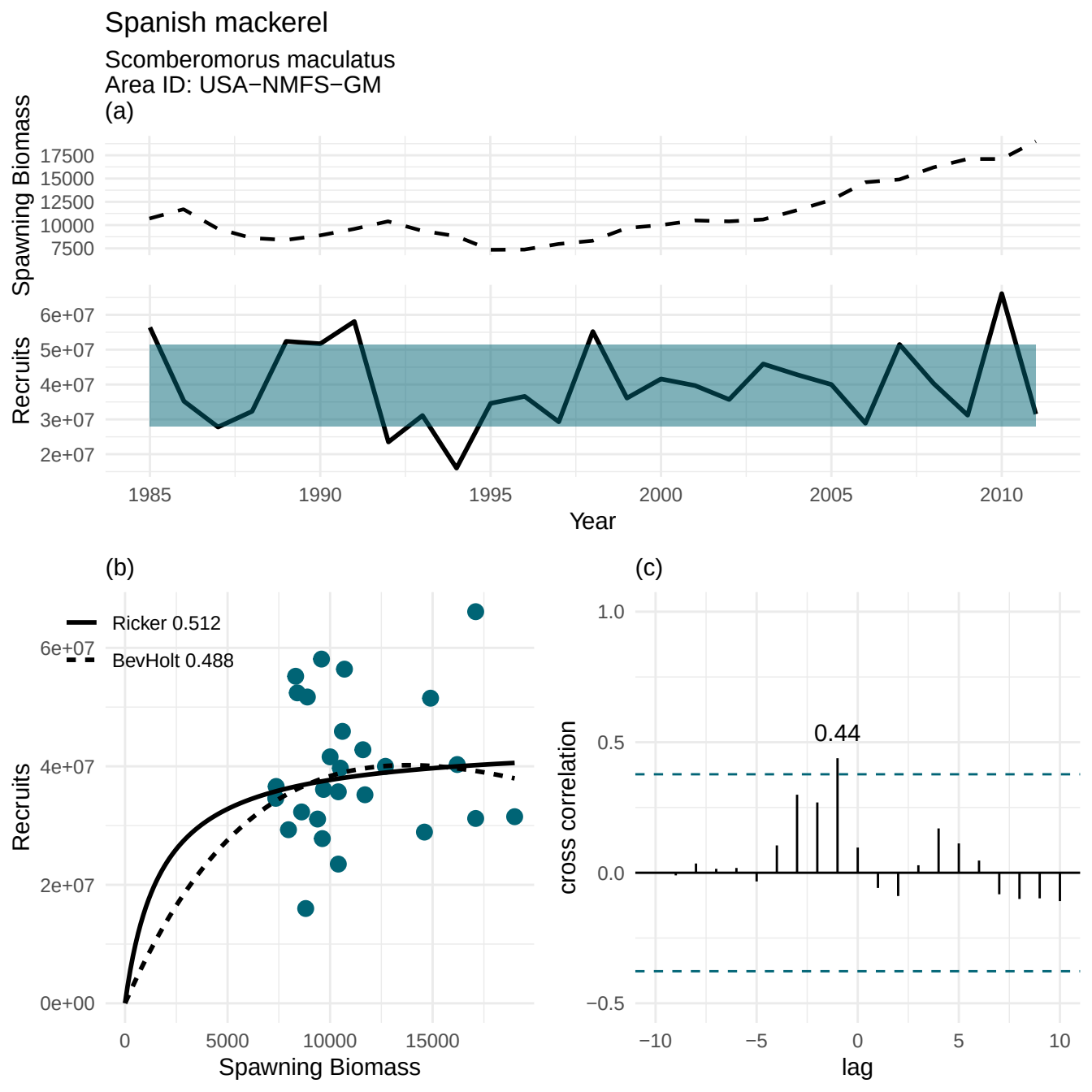

Common sole
Solea solea
Area ID: multinational−ICES−VIIh−k
(a)
Spawning Biomass
1.4
1.2
1.0
0.8
0.6
Recruits
1.5
1.0
0.5
0.0
2000
2010
Year
(b)
Ricker 0.67
BevHolt 0.33
Recruits
1.5
1.0
0.5
0.0
0.6
0.8
1.0
1.2
1.4
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

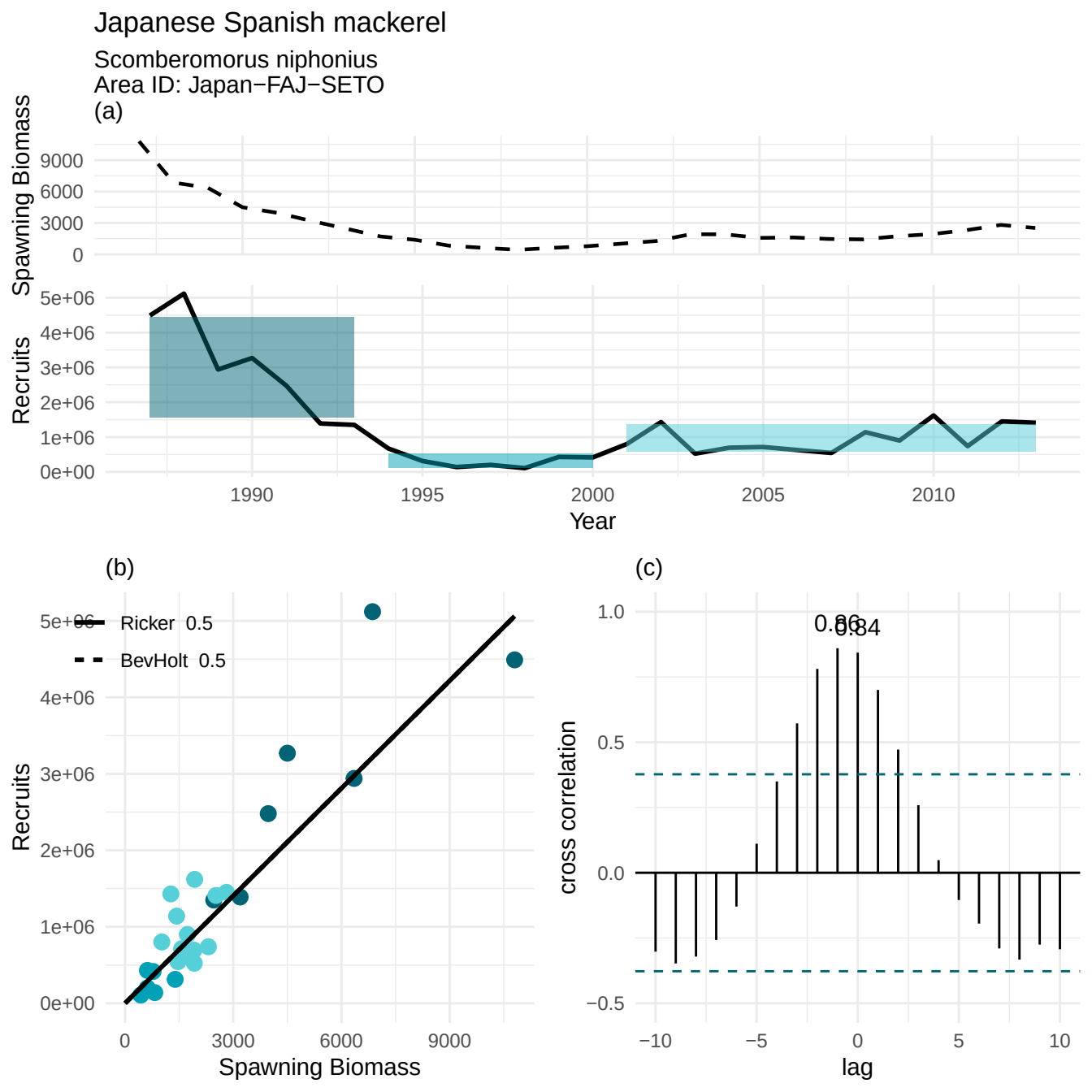

Common sole
Solea solea
Area ID: multinational−ICES−VIIIab
(a)
Spawning Biomass
15000
13000
11000
Recruits
3.5e+07
3.0e+07
2.5e+07
2.0e+07
1.5e+07
1990
2000
2010
Year
(b)
Ricker 0.5
BevHolt 0.5
Recruits
3e+07
2e+07
1e+07
0e+00
0
5000
10000
15000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.65
0.51
−10
−5
0
5
10
lag

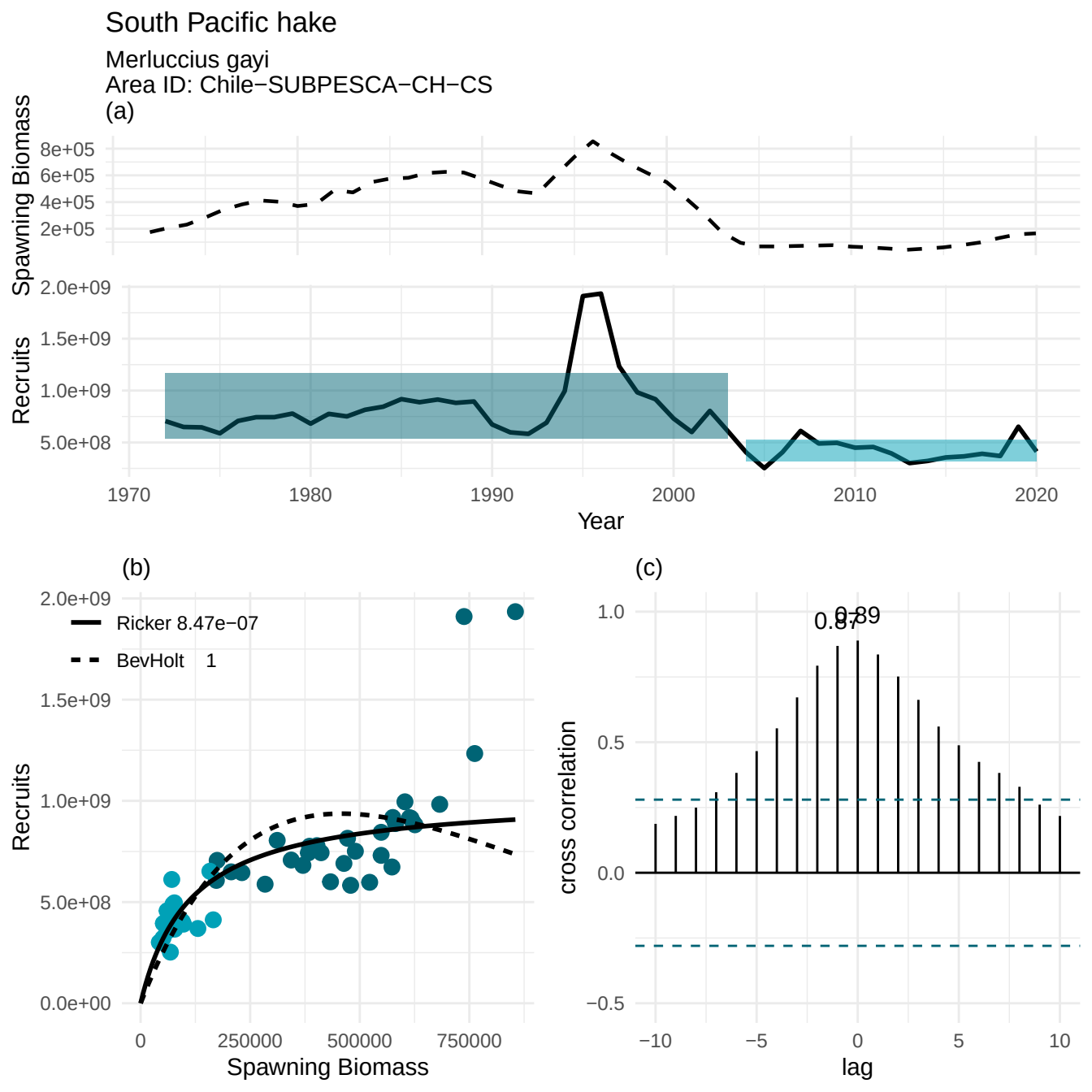

Southern hake
Merluccius australis
Area ID: Chile−SUBPESCA−CH−CS
(a)
Spawning Biomass
4e+05
3e+05
2e+05
Recruits
1.8e+08
1.6e+08
1.4e+08
1.2e+08
1.0e+08
1980
1990
2000
2010
2020
Year
(b)
Ricker 0.0103
BevHolt 0.99
Recruits
1.5e+08
1.0e+08
5.0e+07
0.0e+00
0e+00
1e+05
2e+05
3e+05
4e+05
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

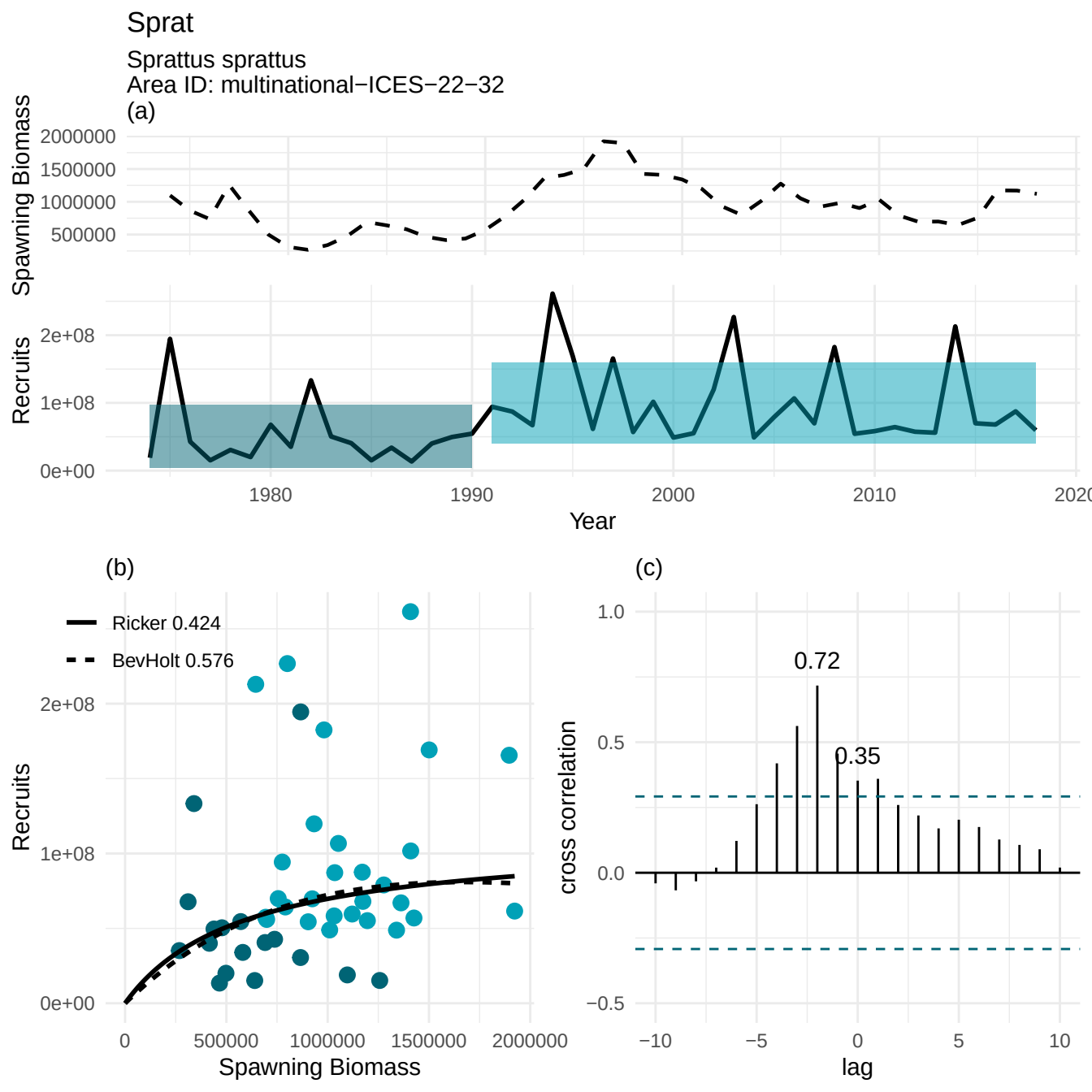

Southern hake
Merluccius australis
Area ID: New Zealand−MFish−CR
(a)
Spawning Biomass
60000
50000
40000
30000
Recruits
6e+06
4e+06
2e+06
1985
1990
1995
2000
2005
2010
Year
(b)
Ricker 0.469
BevHolt 0.531
Recruits
6e+06
4e+06
2e+06
0e+00
0
20000
40000
60000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.49
0.46
−10
−5
0
5
10
lag

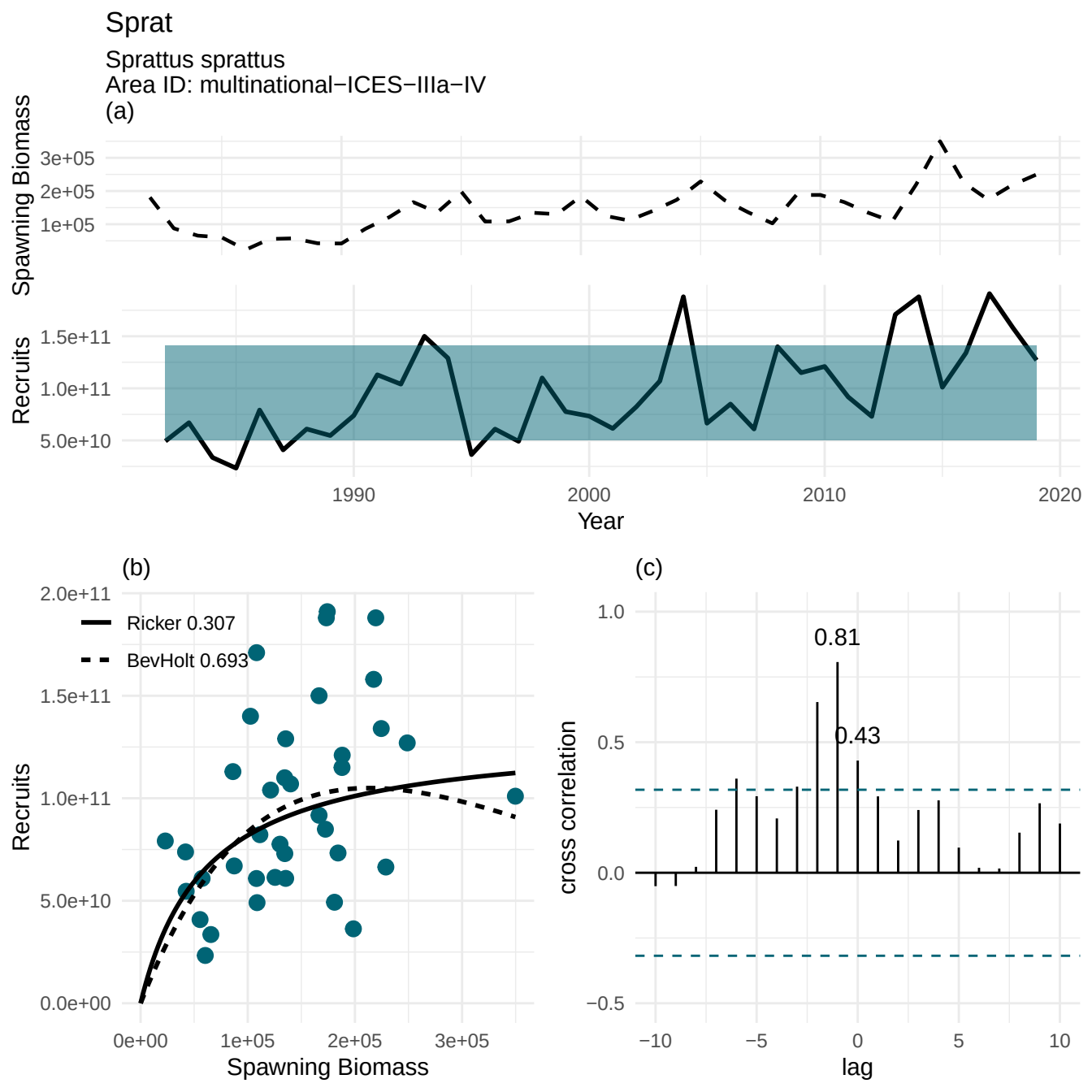

Southern hake
Merluccius australis
Area ID: New Zealand−MFish−WCSI
(a)
Spawning Biomass
80000
60000
40000
Recruits
1.0e+07
7.5e+06
5.0e+06
2.5e+06
1980
1990
2000
2010
Year
(b)
Ricker 0.413
BevHolt 0.587
Recruits
1.0e+07
7.5e+06
5.0e+06
2.5e+06
0.0e+00
0
25000
50000
75000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.41
−10
−5
0
5
10
lag

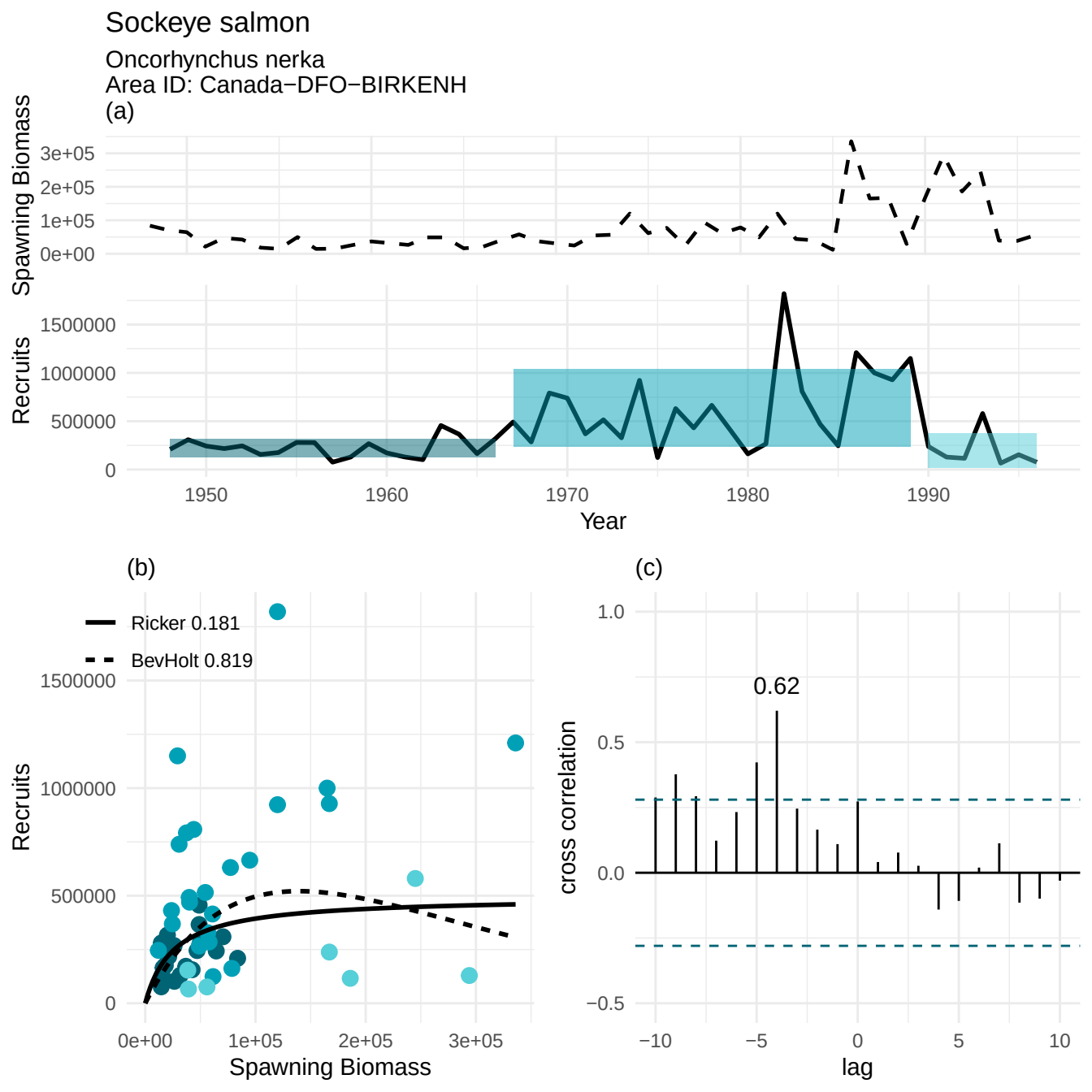

Spanish mackerel
Scomberomorus maculatus
Area ID: USA−NMFS−GM
(a)
Spawning Biomass
17500
15000
12500
10000
7500
Recruits
6e+07
5e+07
4e+07
3e+07
2e+07
1985
1990
1995
2000
2005
2010
Year
(b)
Ricker 0.512
BevHolt 0.488
Recruits
6e+07
4e+07
2e+07
0e+00
0
5000
10000
15000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.44
−10
−5
0
5
10
lag

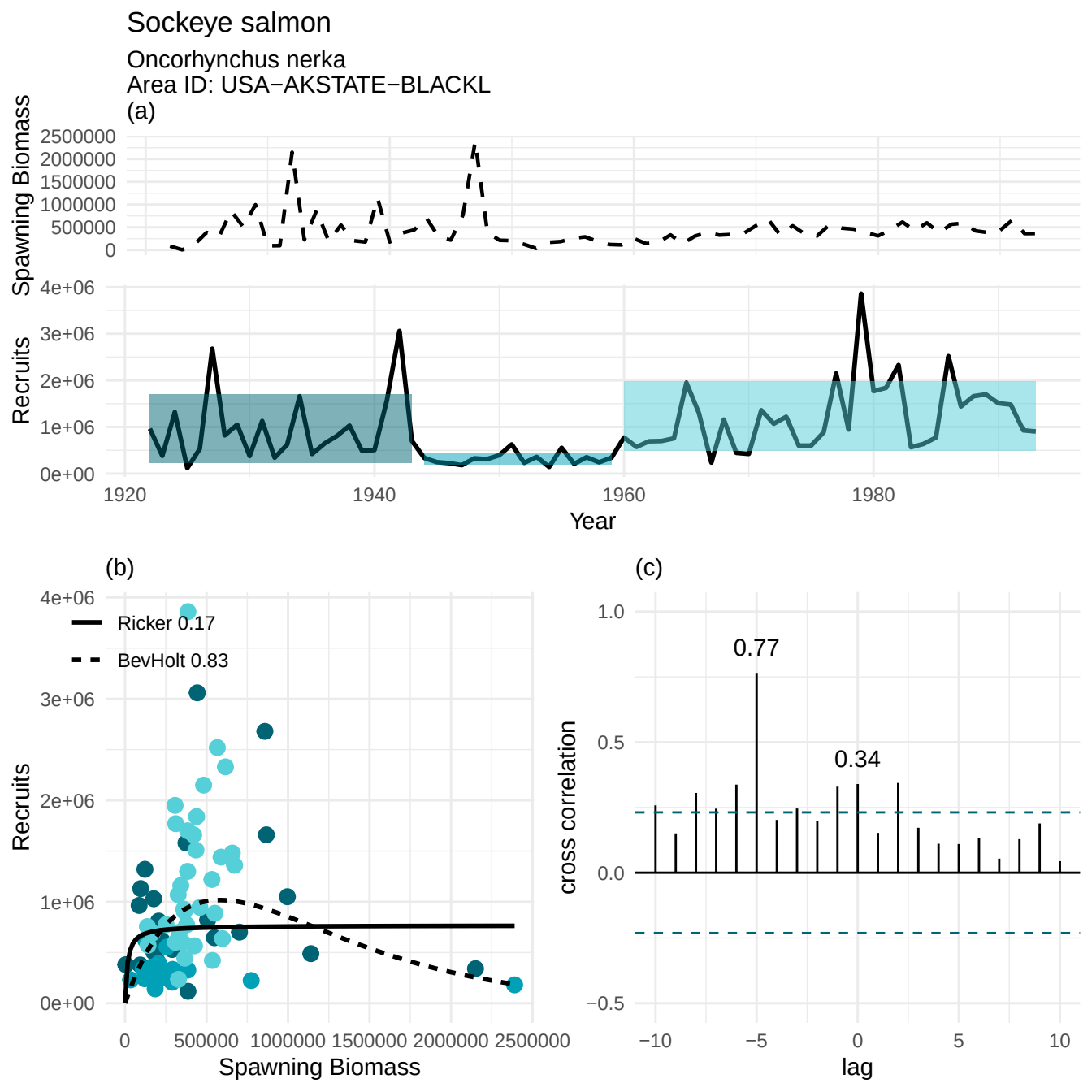

Japanese Spanish mackerel
Scomberomorus niphonius
Area ID: Japan−FAJ−SETO
(a)
Spawning Biomass
9000
6000
3000
0
Recruits
5e+06
4e+06
3e+06
2e+06
1e+06
0e+00
1990
1995
2000
2005
2010
Year
(b)
Ricker 0.5
BevHolt 0.5
Recruits
Spawning Biomass
(c)
0.86
0.84
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

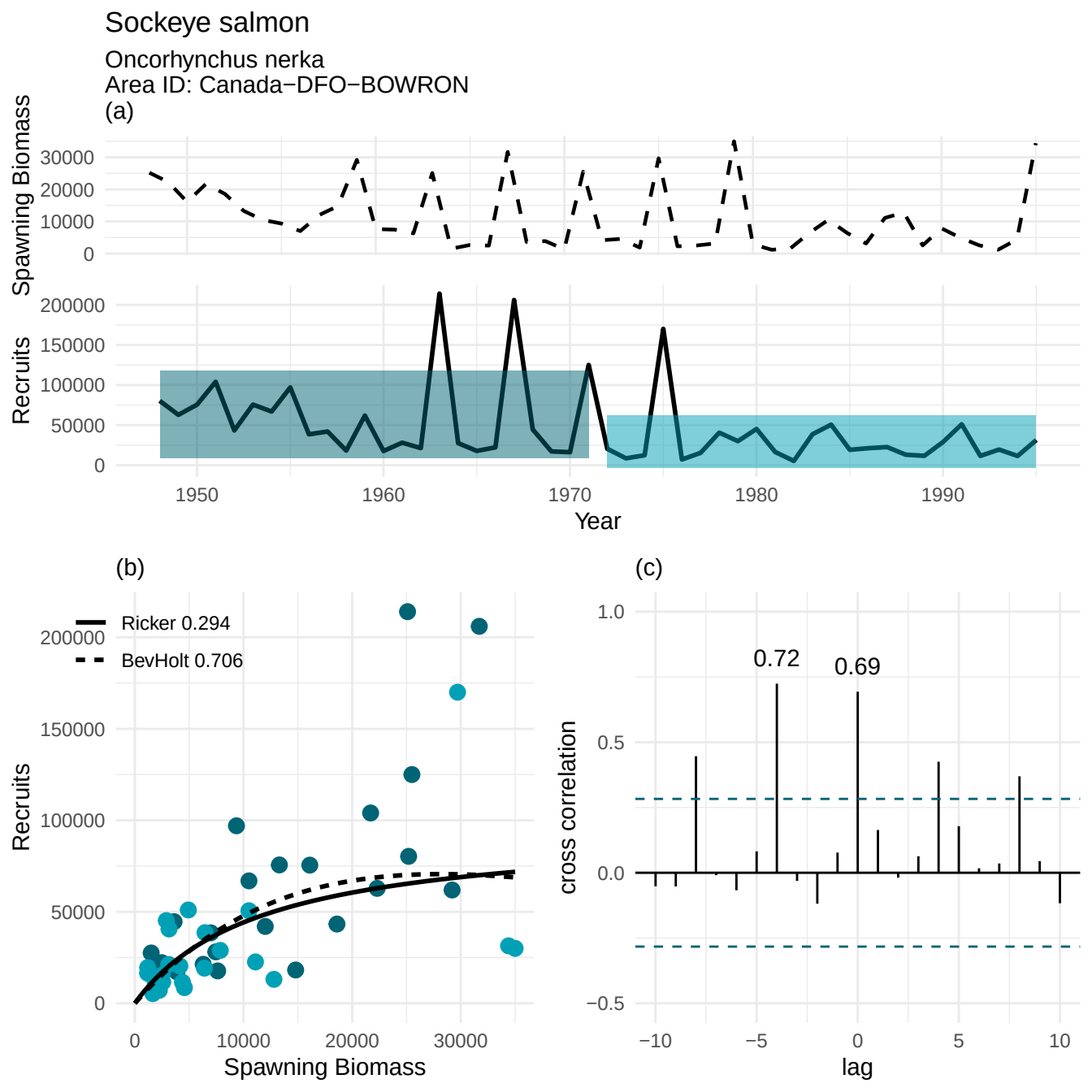

South Pacific hake
Merluccius gayi
Area ID: Chile−SUBPESCA−CH−CS
(a)
Spawning Biomass
8e+05
6e+05
4e+05
2e+05
Recruits
2.0e+09
1.5e+09
1.0e+09
5.0e+08
1970
1980
1990
2000
2010
2020
Year
(b)
Ricker 8.47e−07
BevHolt 1
Recruits
2.0e+09
1.5e+09
1.0e+09
5.0e+08
0.0e+00
0
250000
500000
750000
Spawning Biomass
(c)
0.89
0.87
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

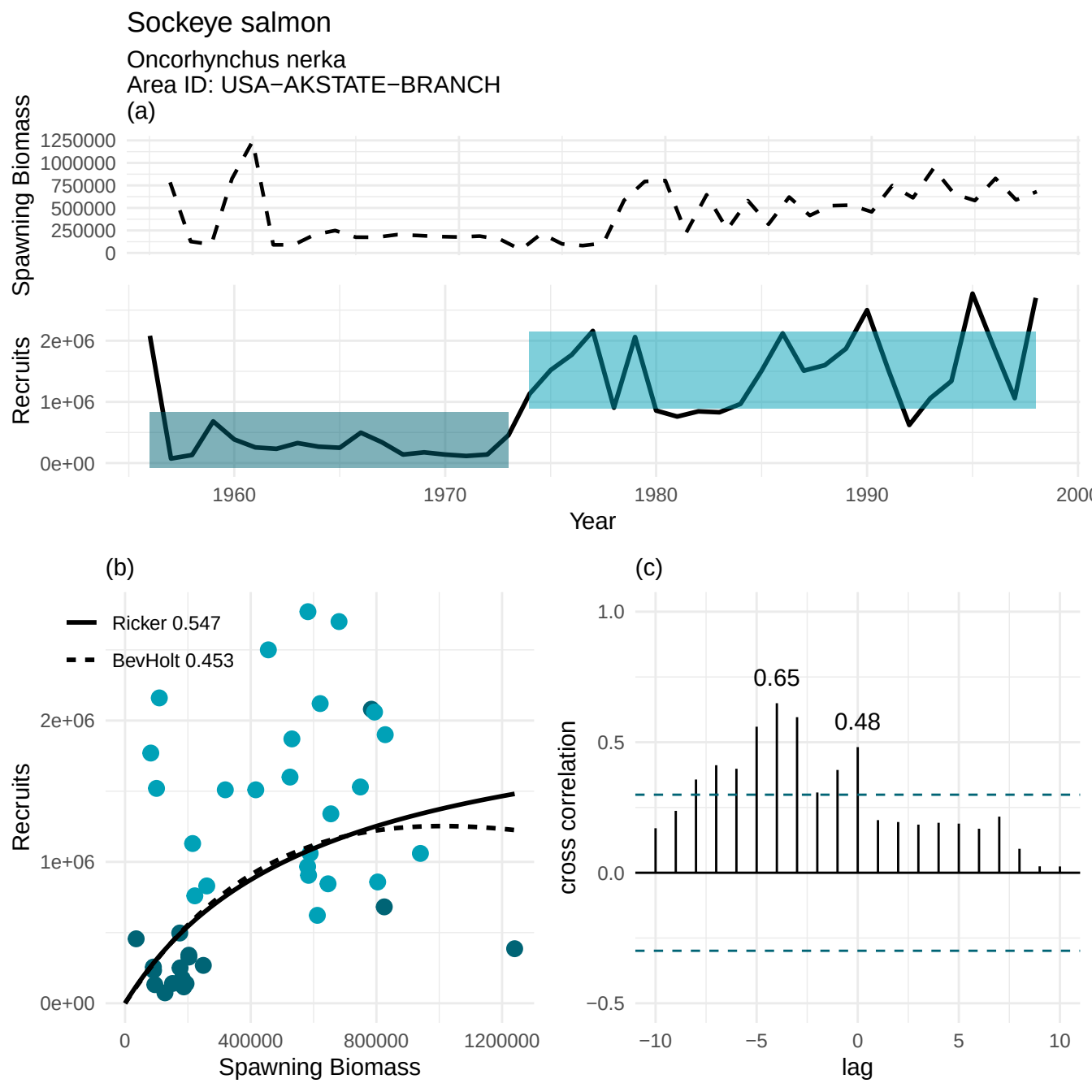

Sprat
Sprattus sprattus
Area ID: multinational−ICES−22−32
(a)
Spawning Biomass
2000000
1500000
1000000
500000
Recruits
2e+08
1e+08
0e+00
1980
1990
2000
2010
2020
Year
(b)
Ricker 0.424
BevHolt 0.576
Recruits
2e+08
1e+08
0e+00
0
500000
1000000
1500000
2000000
Spawning Biomass
(c)
1.0
0.5
0.0
−0.5
0.72
0.35
cross correlation
−10
−5
0
5
10
lag

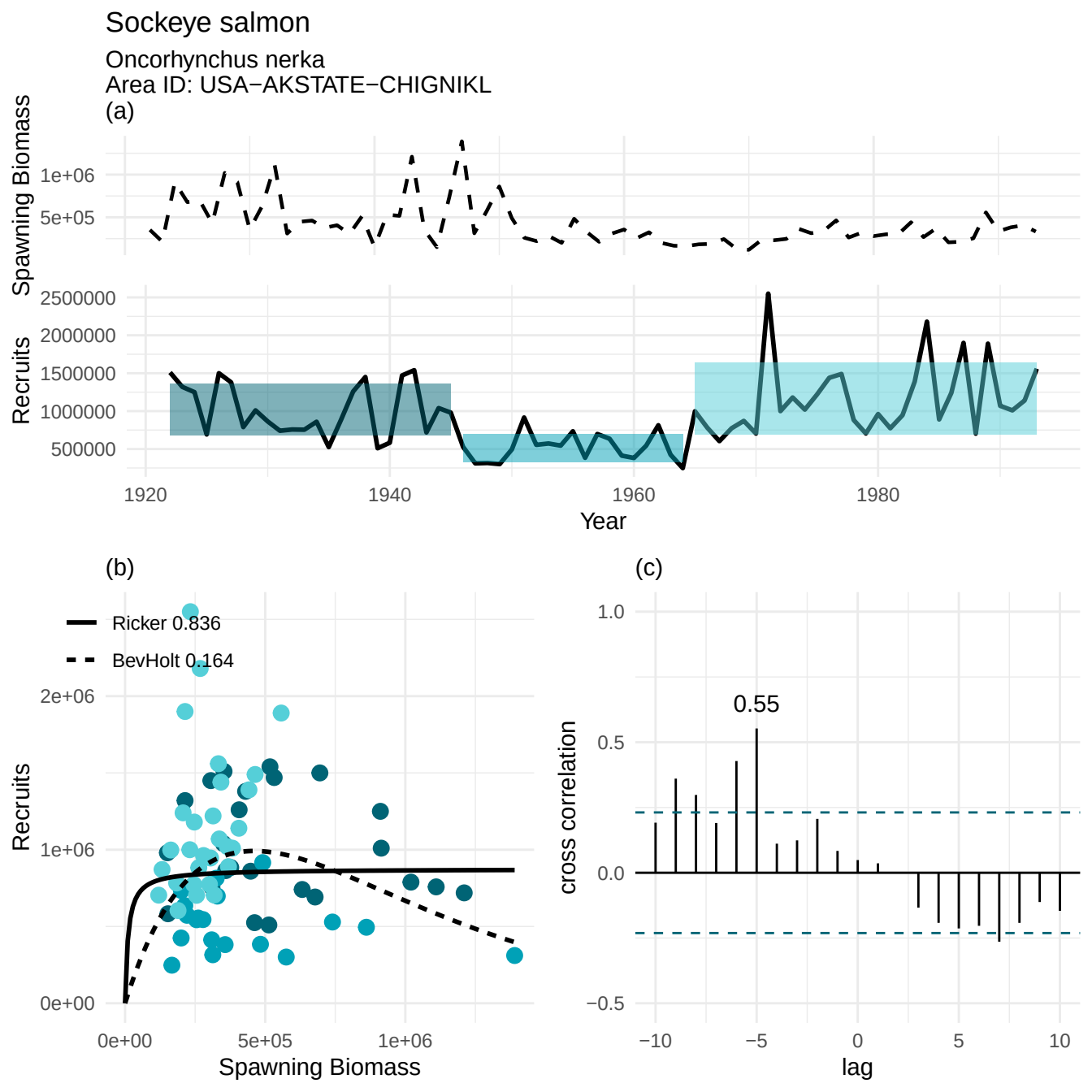

Sprat
Sprattus sprattus
Area ID: multinational−ICES−IIIa−IV
(a)
Spawning Biomass
3e+05
2e+05
1e+05
Recruits
1.5e+11
1.0e+11
5.0e+10
1990
2000
2010
2020
Year
(b)
2.0e+11
Ricker 0.307
BevHolt 0.693
1.5e+11
1.0e+11
5.0e+10
0.0e+00
Recruits
0e+00
1e+05
2e+05
3e+05
Spawning Biomass
(c)
1.0
0.81
0.5
0.43
0.0
−0.5
cross correlation
−10
−5
0
5
10
lag

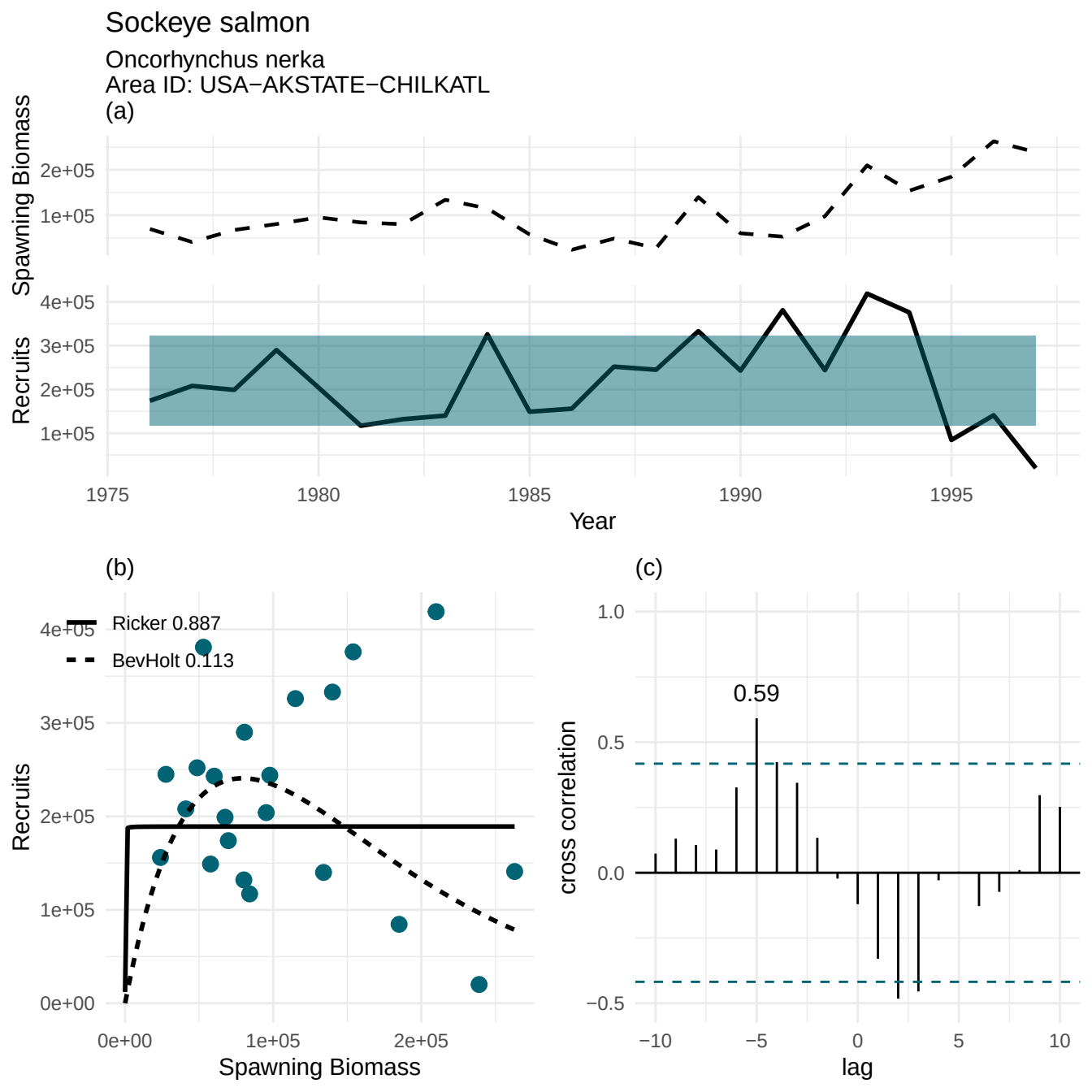

Sockeye salmon
Oncorhynchus nerka
Area ID: Canada−DFO−BIRKENH
(a)
Spawning Biomass
3e+05
2e+05
1e+05
0e+00
Recruits
1500000
1000000
500000
0
1950
1960
1970
1980
1990
Year
(b)
Ricker 0.181
BevHolt 0.819
Recruits
1500000
1000000
500000
0
0e+00
1e+05
2e+05
3e+05
Spawning Biomass
(c)
1.0
0.5
0.0
−0.5
0.62
cross correlation
−10
−5
0
5
10
lag

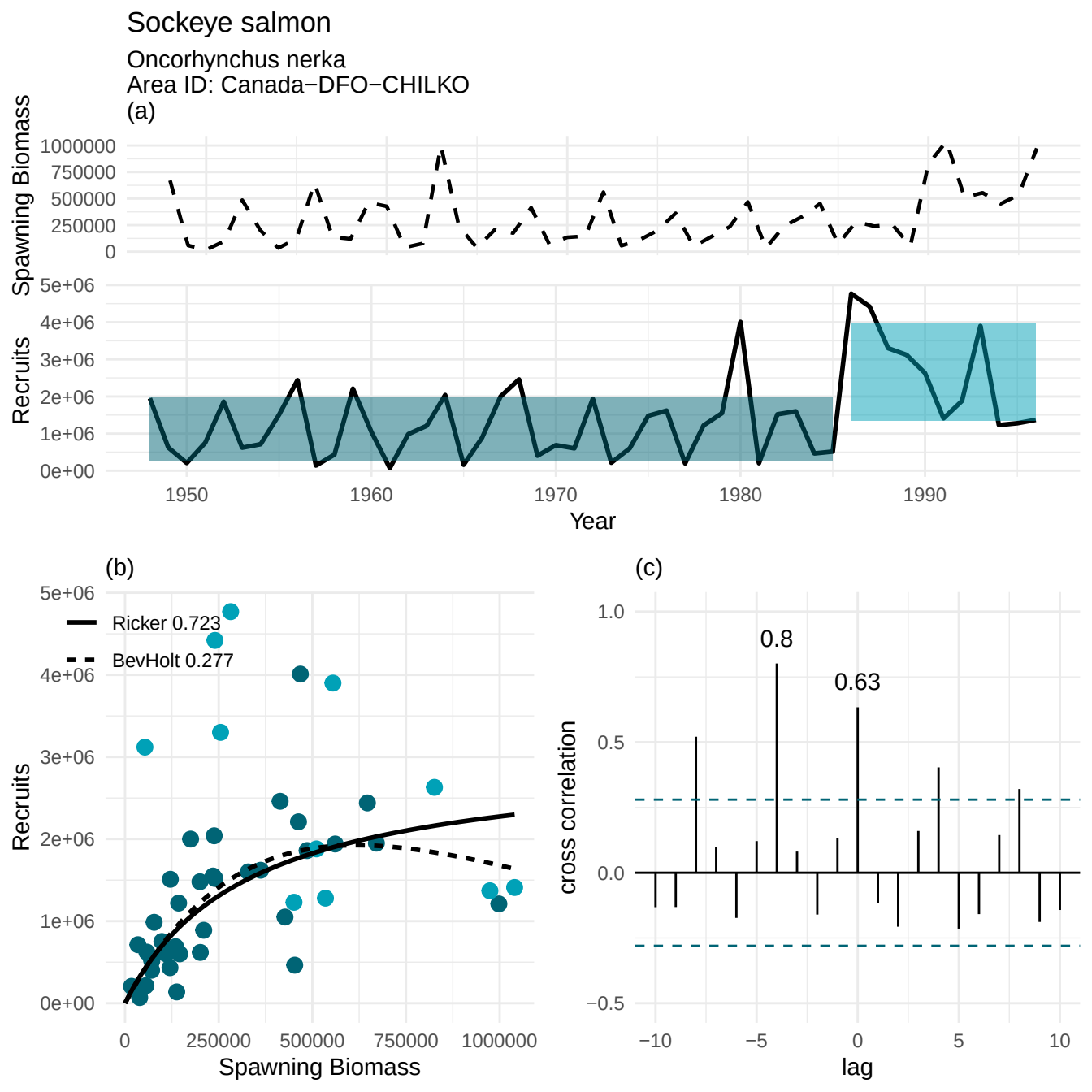

Sockeye salmon
Oncorhynchus nerka
Area ID: USA−AKSTATE−BLACKL
(a)
Spawning Biomass
2500000
2000000
1500000
1000000
500000
0
Recruits
4e+06
3e+06
2e+06
1e+06
0e+00
1920
1940
1960
1980
Year
(b)
Ricker 0.17
BevHolt 0.83
Recruits
Spawning Biomass
0
500000
1000000
1500000
2000000
2500000
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.77
0.34
−10
−5
0
5
10
lag

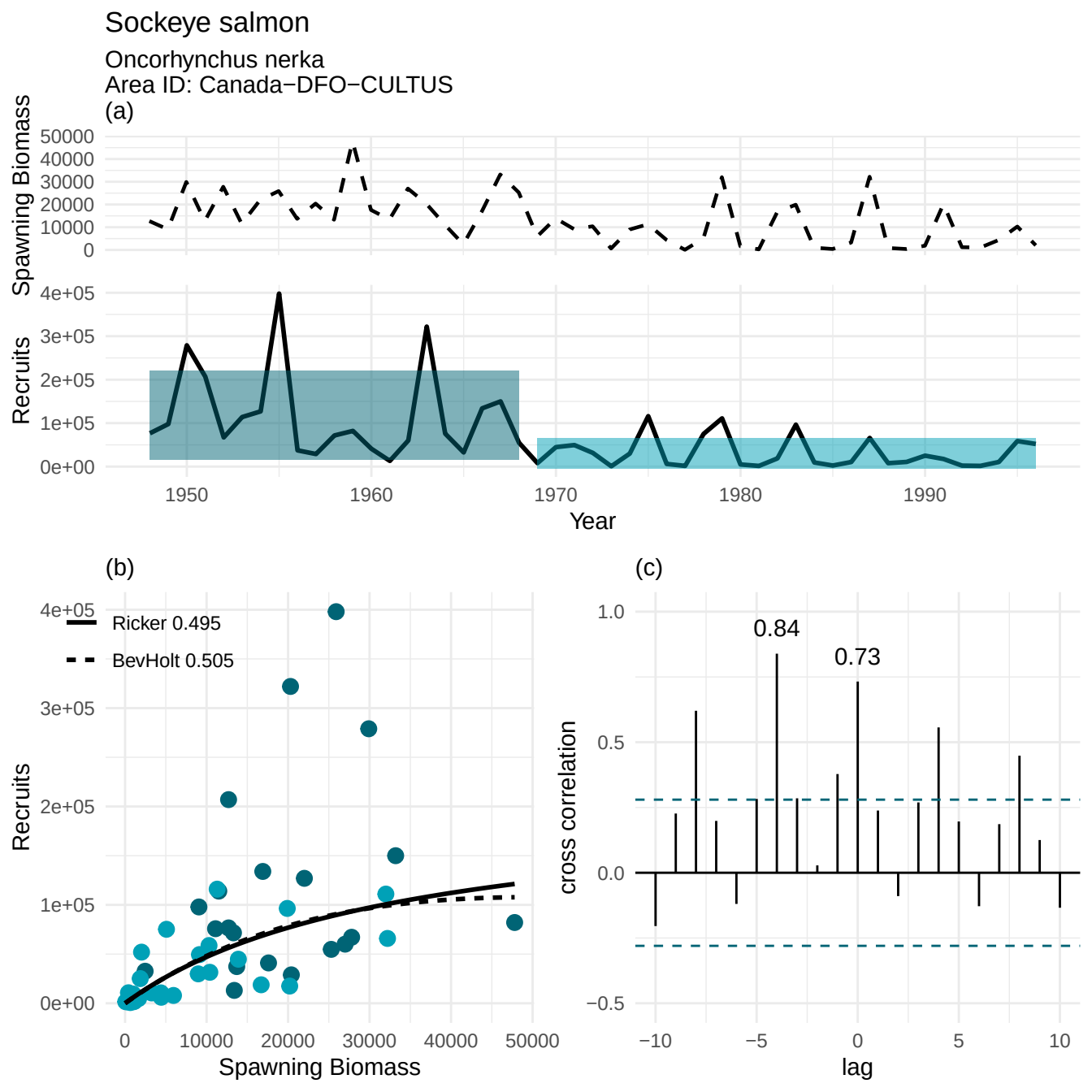

Sockeye salmon
Oncorhynchus nerka
Area ID: Canada−DFO−BOWRON
(a)
Spawning Biomass
30000
20000
10000
0
Recruits
200000
150000
100000
50000
0
1950
1960
1970
1980
1990
Year
(b)
Ricker 0.294
BevHolt 0.706
Recruits
200000
150000
100000
50000
0
0
10000
20000
30000
Spawning Biomass
(c)
1.0
0.5
0.0
−0.5
0.72
0.69
cross correlation
−10
−5
0
5
10
lag

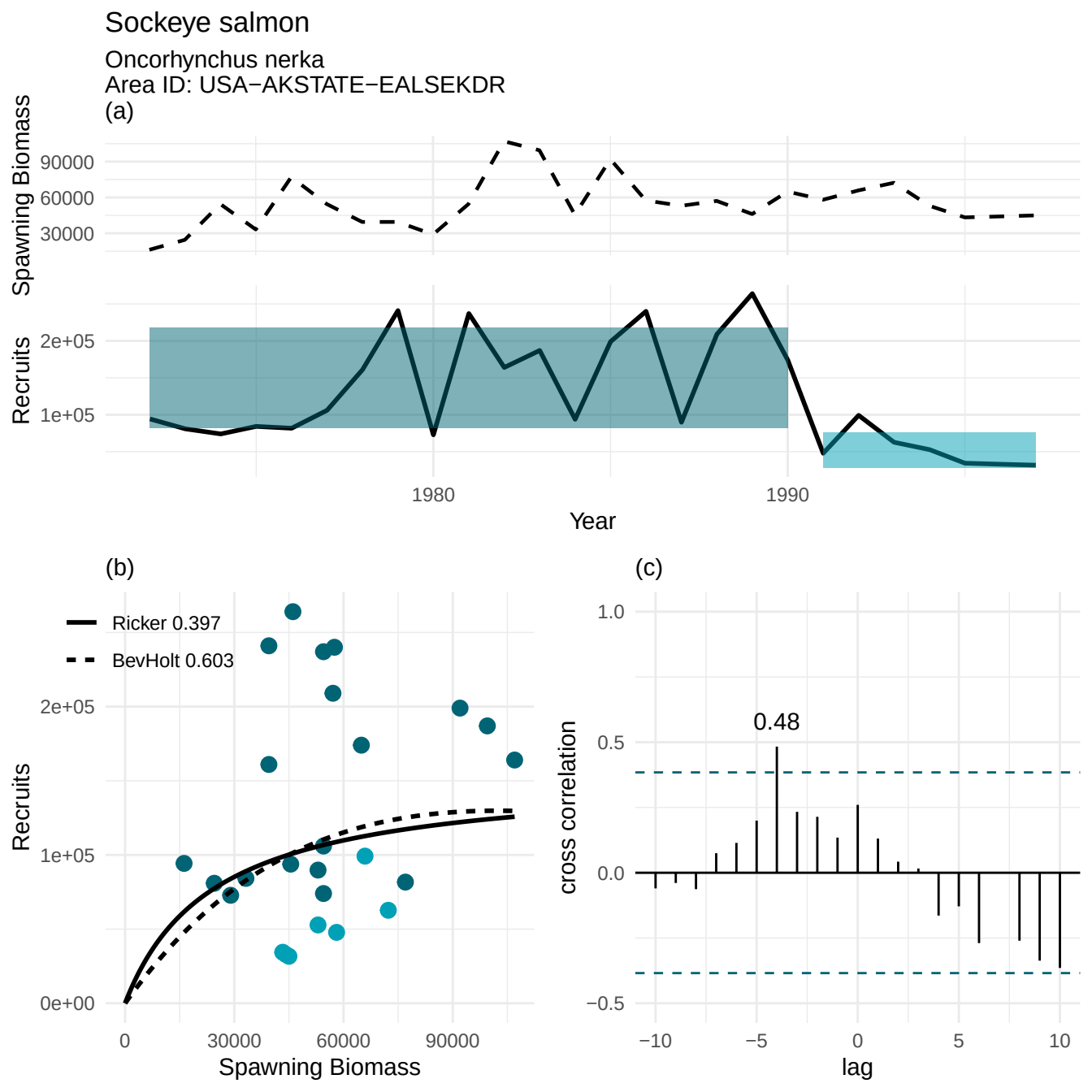

Sockeye salmon
Oncorhynchus nerka
Area ID: USA−AKSTATE−BRANCH
(a)
Spawning Biomass
1250000
1000000
750000
500000
250000
0
Recruits
2e+06
1e+06
0e+00
1960
1970
1980
1990
2000
Year
(b)
Ricker 0.547
BevHolt 0.453
Recruits
2e+06
1e+06
0e+00
0
400000
800000
1200000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.65
0.48
−10
−5
0
5
10
lag

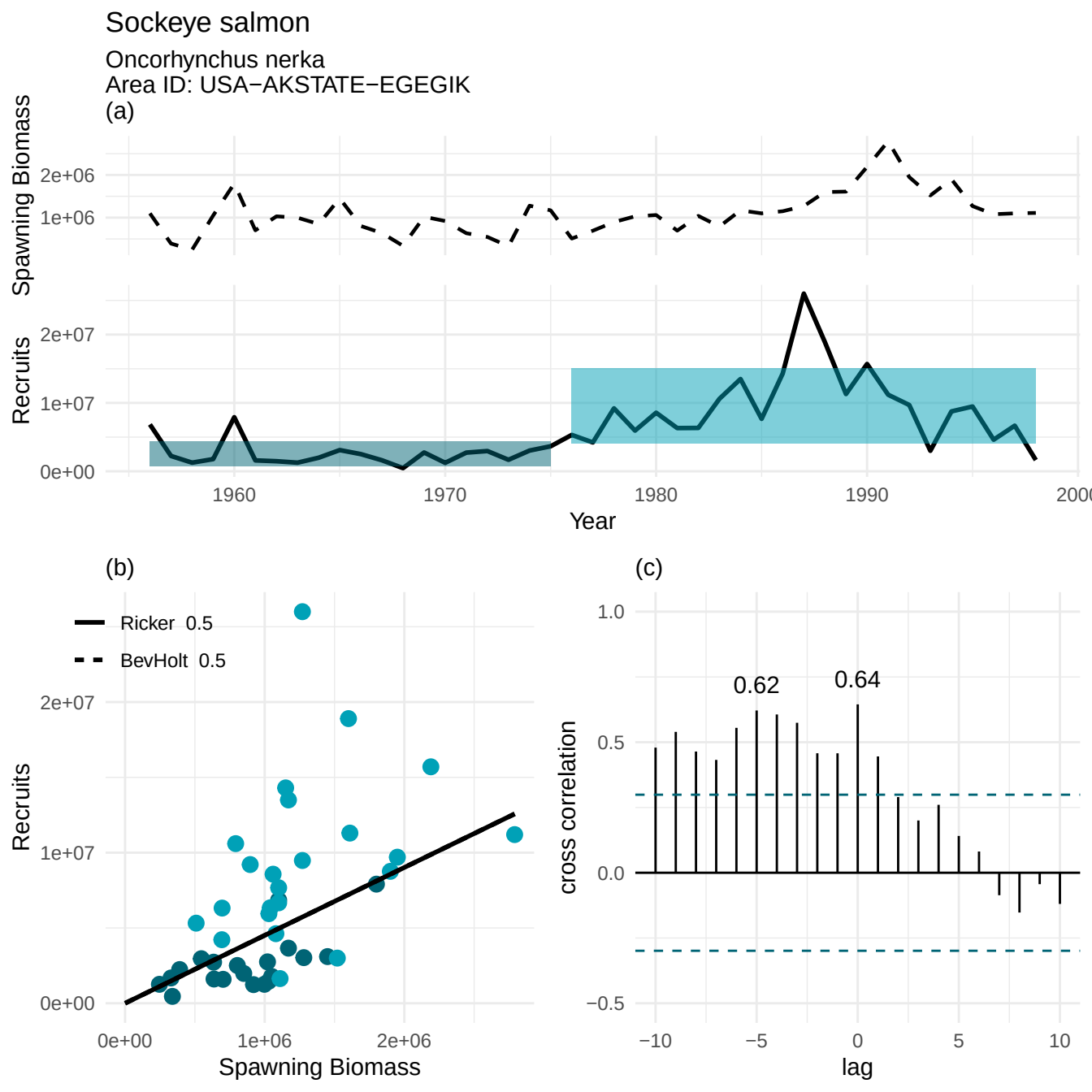

Sockeye salmon
Oncorhynchus nerka
Area ID: USA−AKSTATE−CHIGNIKL
(a)
Spawning Biomass
1e+06
5e+05
Recruits
2500000
2000000
1500000
1000000
500000
1920
1940
1960
1980
Year
(b)
Ricker 0.836
BevHolt 0.164
Recruits
2e+06
1e+06
0e+00
0e+00
5e+05
1e+06
Spawning Biomass
(c)
1.0
0.5
0.0
−0.5
0.55
cross correlation
−10
−5
0
5
10
lag

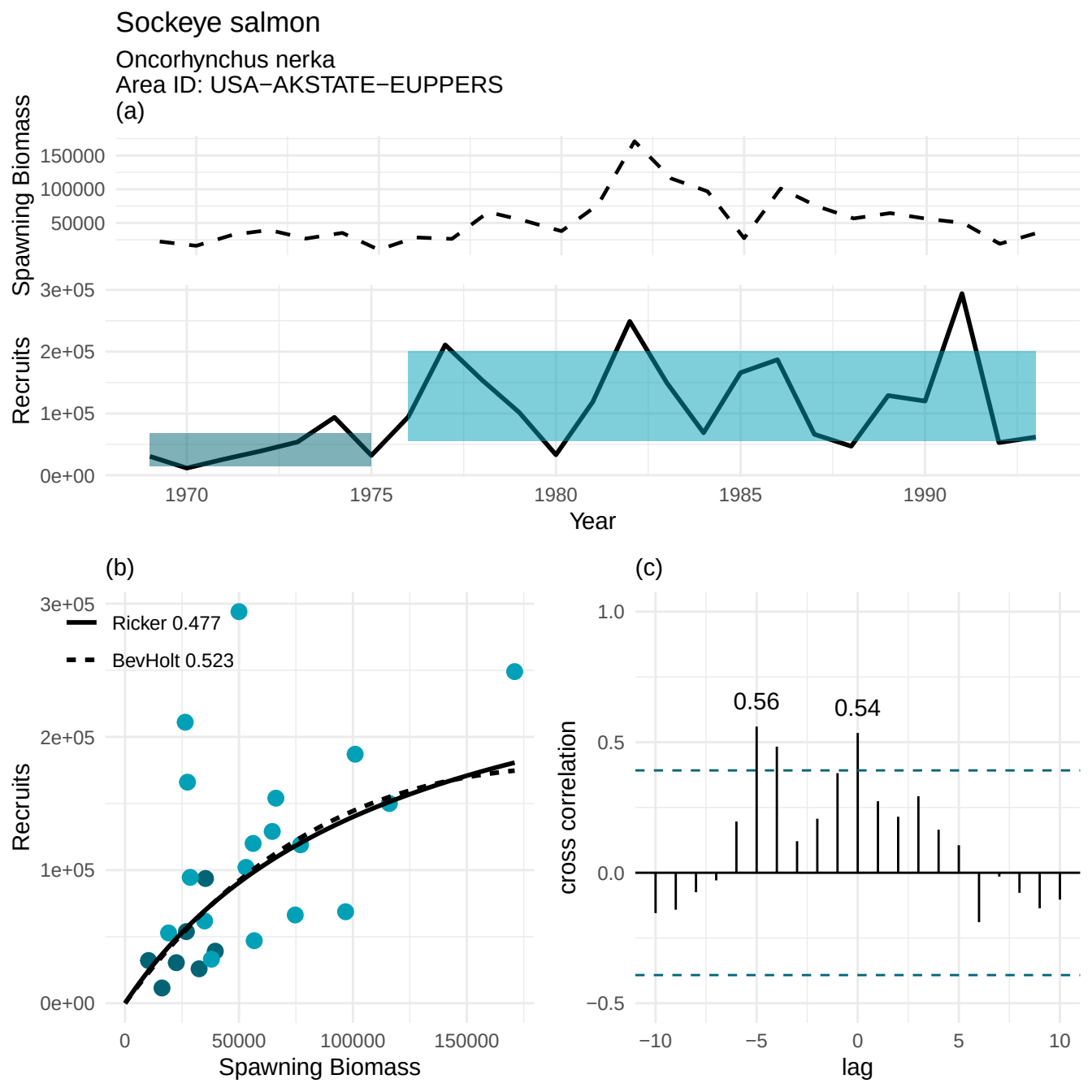

Sockeye salmon
Oncorhynchus nerka
Area ID: USA−AKSTATE−CHILKATL
(a)
Spawning Biomass
2e+05
1e+05
Recruits
4e+05
3e+05
2e+05
1e+05
1975
1980
1985
1990
1995
Year
(b)
Ricker 0.887
BevHolt 0.113
Recruits
4e+05
3e+05
2e+05
1e+05
0e+00
0e+00
1e+05
2e+05
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.59
−10
−5
0
5
10
lag

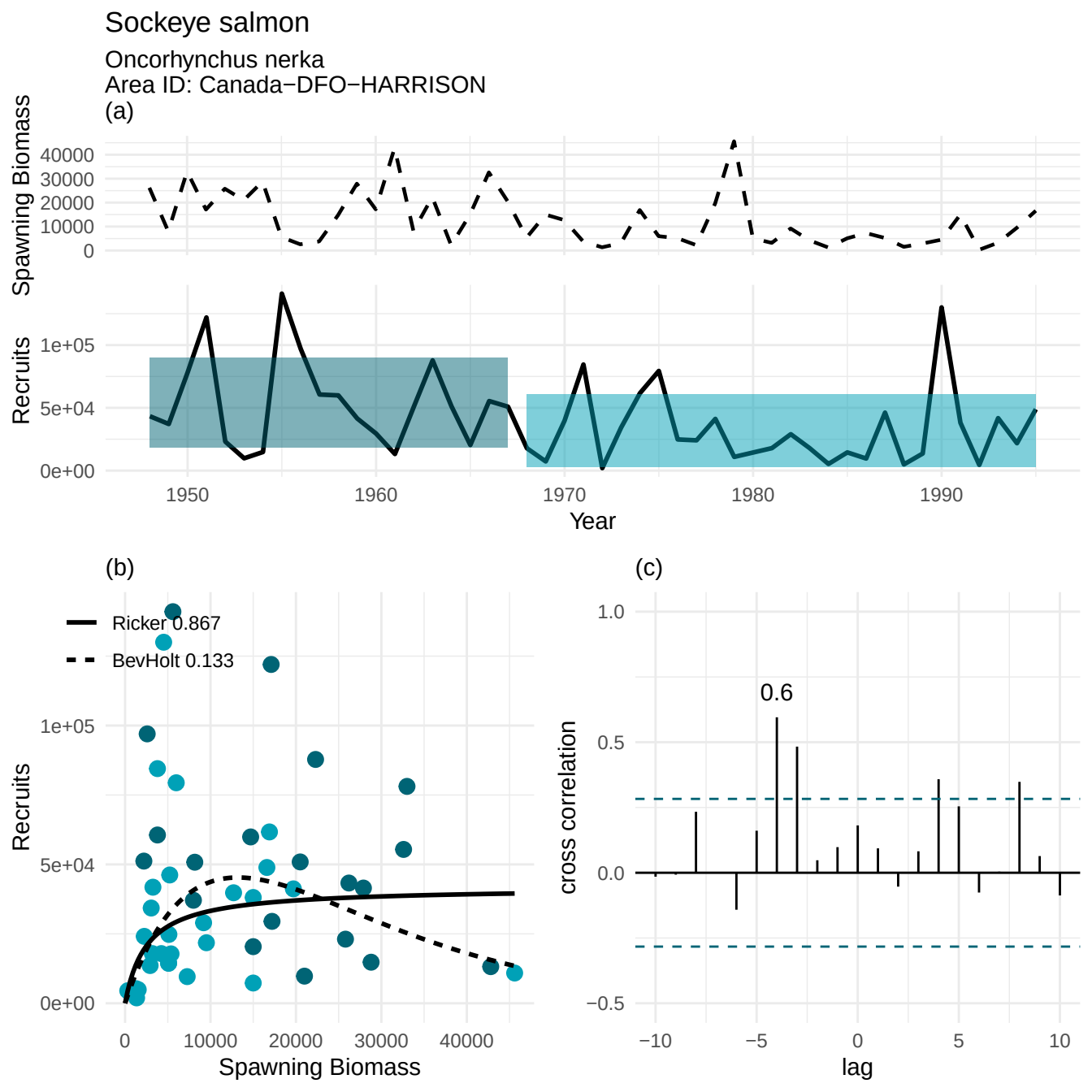

Sockeye salmon
Oncorhynchus nerka
Area ID: Canada−DFO−CHILKO
(a)
Spawning Biomass
1000000
750000
500000
250000
0
Recruits
5e+06
4e+06
3e+06
2e+06
1e+06
0e+00
1950
1960
1970
1980
1990
Year
(b)
Ricker 0.723
BevHolt 0.277
Recruits
Spawning Biomass
(c)
0.8
0.63
cross correlation
lag

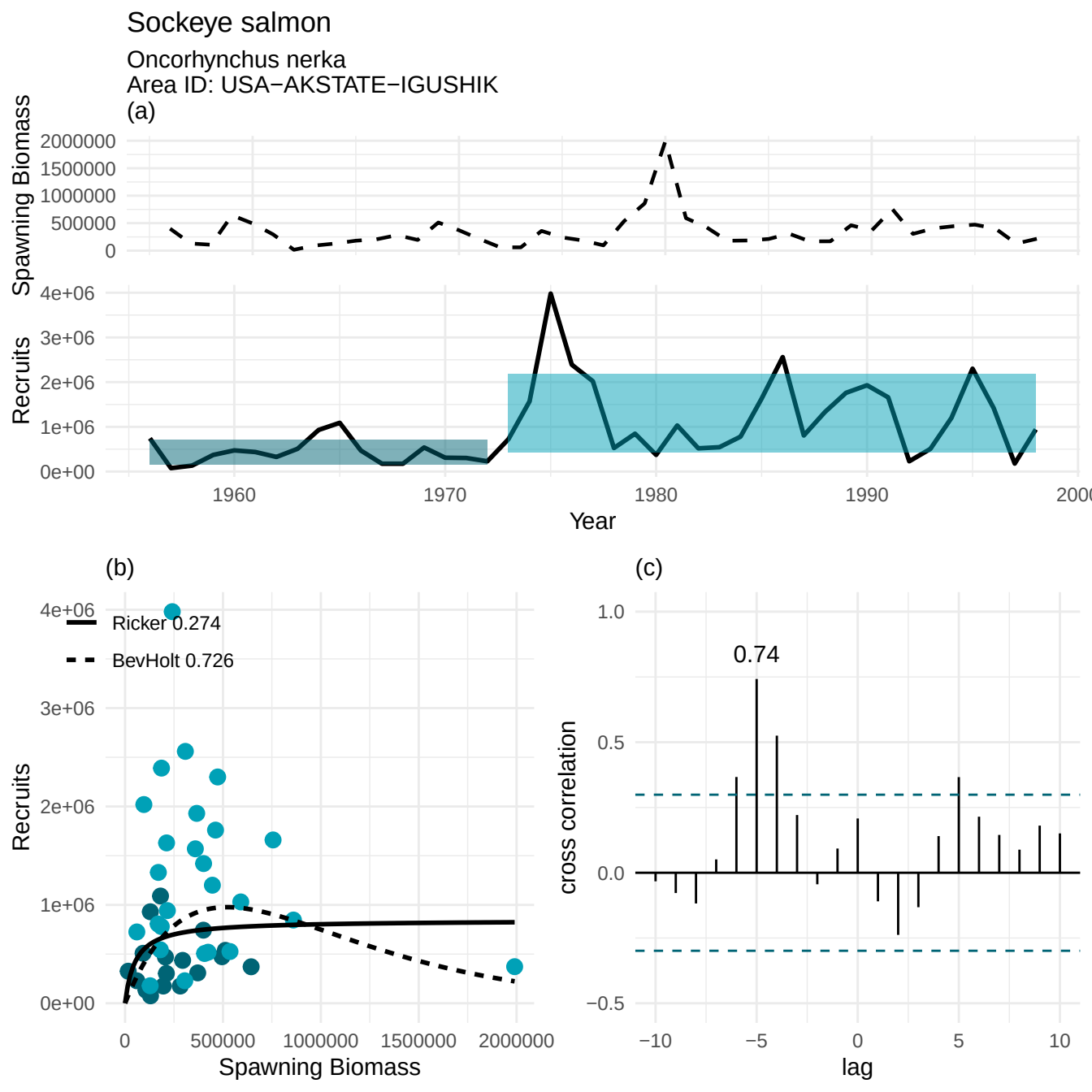

Sockeye salmon
Oncorhynchus nerka
Area ID: Canada−DFO−CULTUS
(a)
Spawning Biomass
50000
40000
30000
20000
10000
0
Recruits
4e+05
3e+05
2e+05
1e+05
0e+00
1950
1960
1970
1980
1990
Year
(b)
Ricker 0.495
BevHolt 0.505
Recruits
Spawning Biomass
(c)
0.84
0.73
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

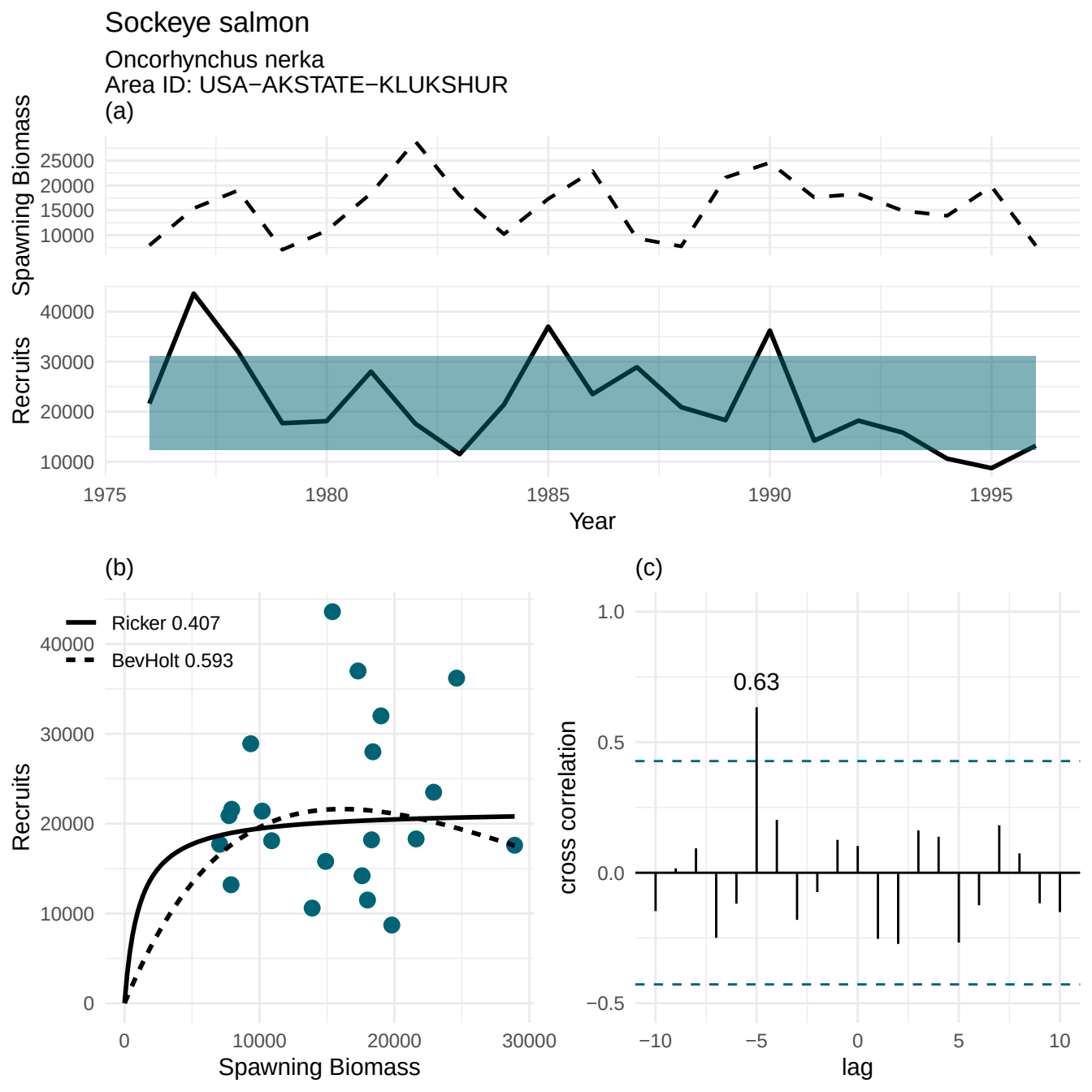

Sockeye salmon
Oncorhynchus nerka
Area ID: USA−AKSTATE−EALSEKDR
(a)
Spawning Biomass
90000
60000
30000
Recruits
2e+05
1e+05
1980
1990
Year
(b)
Ricker 0.397
BevHolt 0.603
Recruits
2e+05
1e+05
0e+00
0
30000
60000
90000
Spawning Biomass
(c)
1.0
0.5
0.0
−0.5
0.48
cross correlation
−10
−5
0
5
10
lag

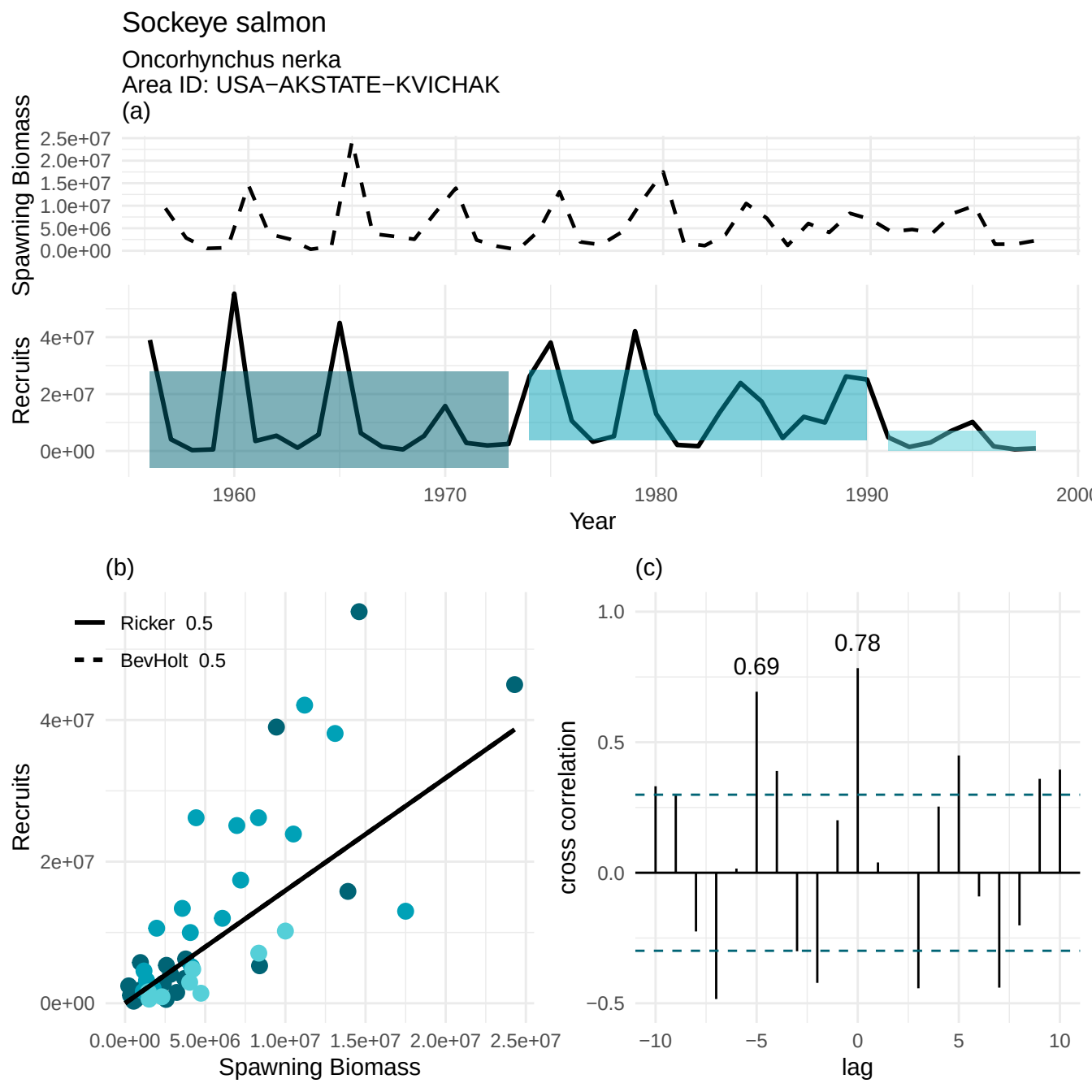

Sockeye salmon
Oncorhynchus nerka
Area ID: USA−AKSTATE−EGEGIK
(a)
Spawning Biomass
2e+06
1e+06
Recruits
2e+07
1e+07
0e+00
1960
1970
1980
1990
2000
Year
(b)
Ricker 0.5
BevHolt 0.5
Recruits
2e+07
1e+07
0e+00
0e+00
1e+06
2e+06
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.62
0.64
−10
−5
0
5
10
lag

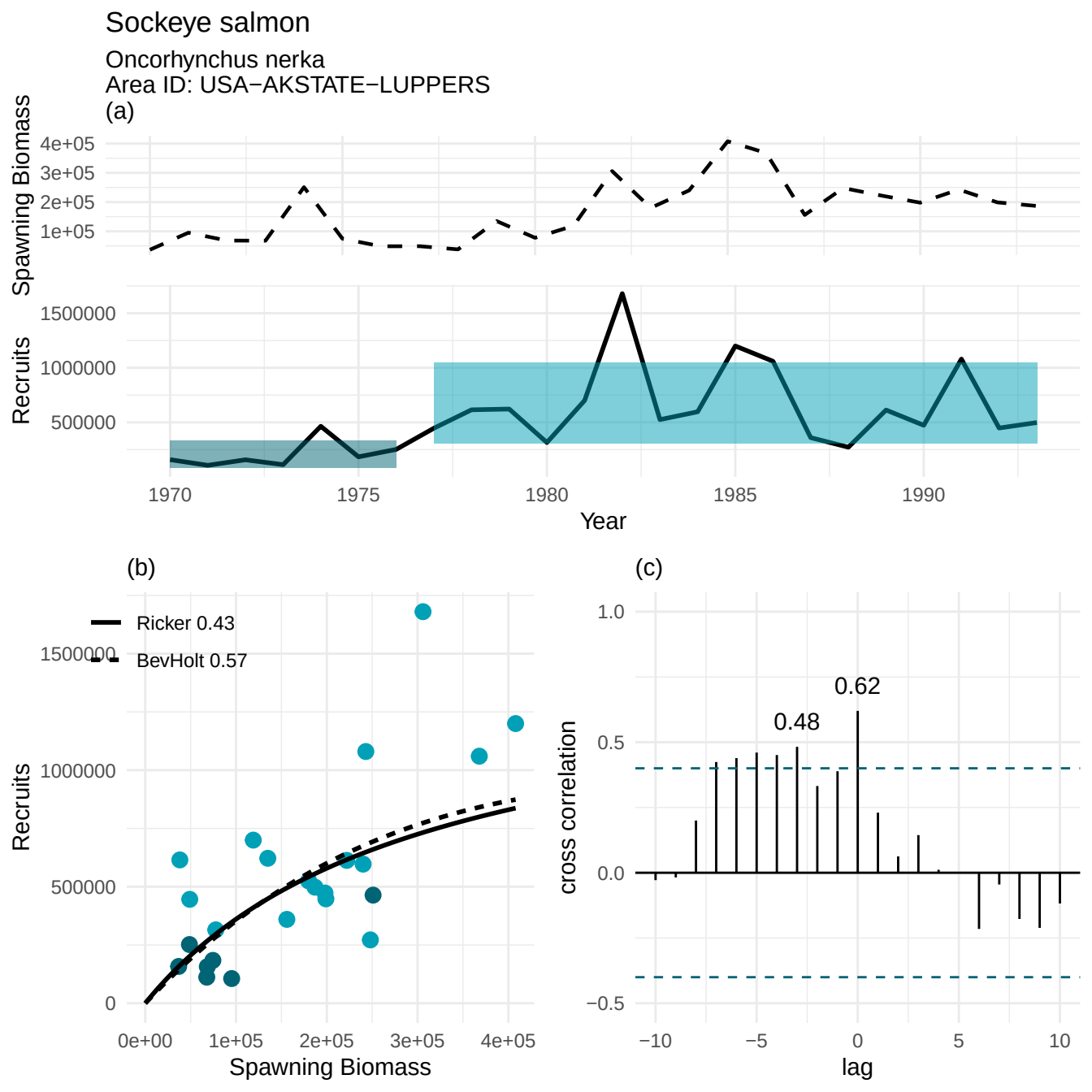

Sockeye salmon
Oncorhynchus nerka
Area ID: USA−AKSTATE−EUPPERS
(a)
Spawning Biomass
150000
100000
50000
Recruits
3e+05
2e+05
1e+05
0e+00
1970
1975
1980
1985
1990
Year
(b)
Ricker 0.477
BevHolt 0.523
Recruits
3e+05
2e+05
1e+05
0e+00
0
50000
100000
150000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.56
0.54
−10
−5
0
5
10
lag

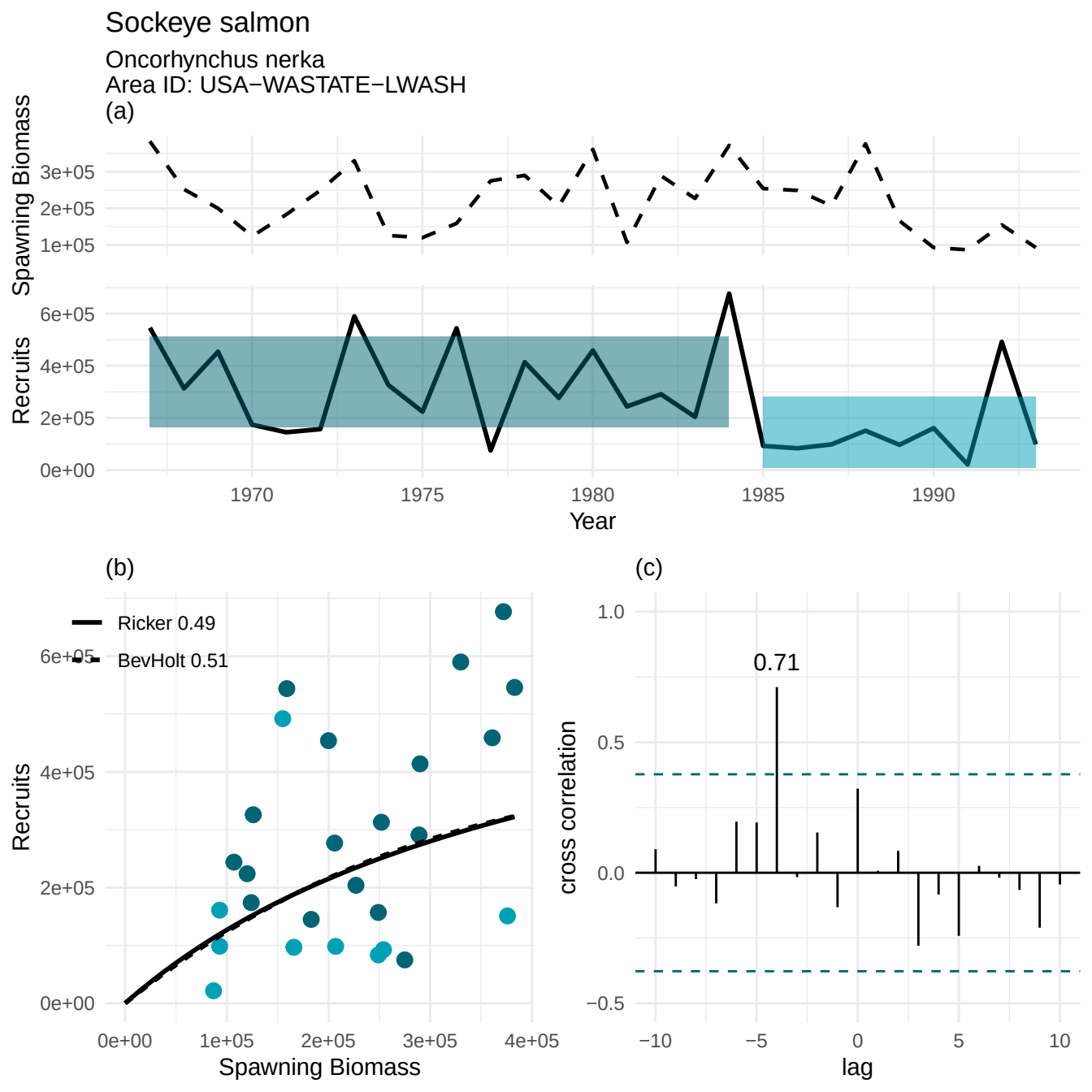

Sockeye salmon
Oncorhynchus nerka
Area ID: Canada−DFO−HARRISON
(a)
Spawning Biomass
40000
30000
20000
10000
0
Recruits
1e+05
5e+04
0e+00
1950
1960
1970
1980
1990
Year
(b)
Ricker 0.867
BevHolt 0.133
Recruits
1e+05
5e+04
0e+00
0
10000
20000
30000
40000
Spawning Biomass
(c)
1.0
0.5
0.0
−0.5
0.6
cross correlation
−10
−5
0
5
10
lag

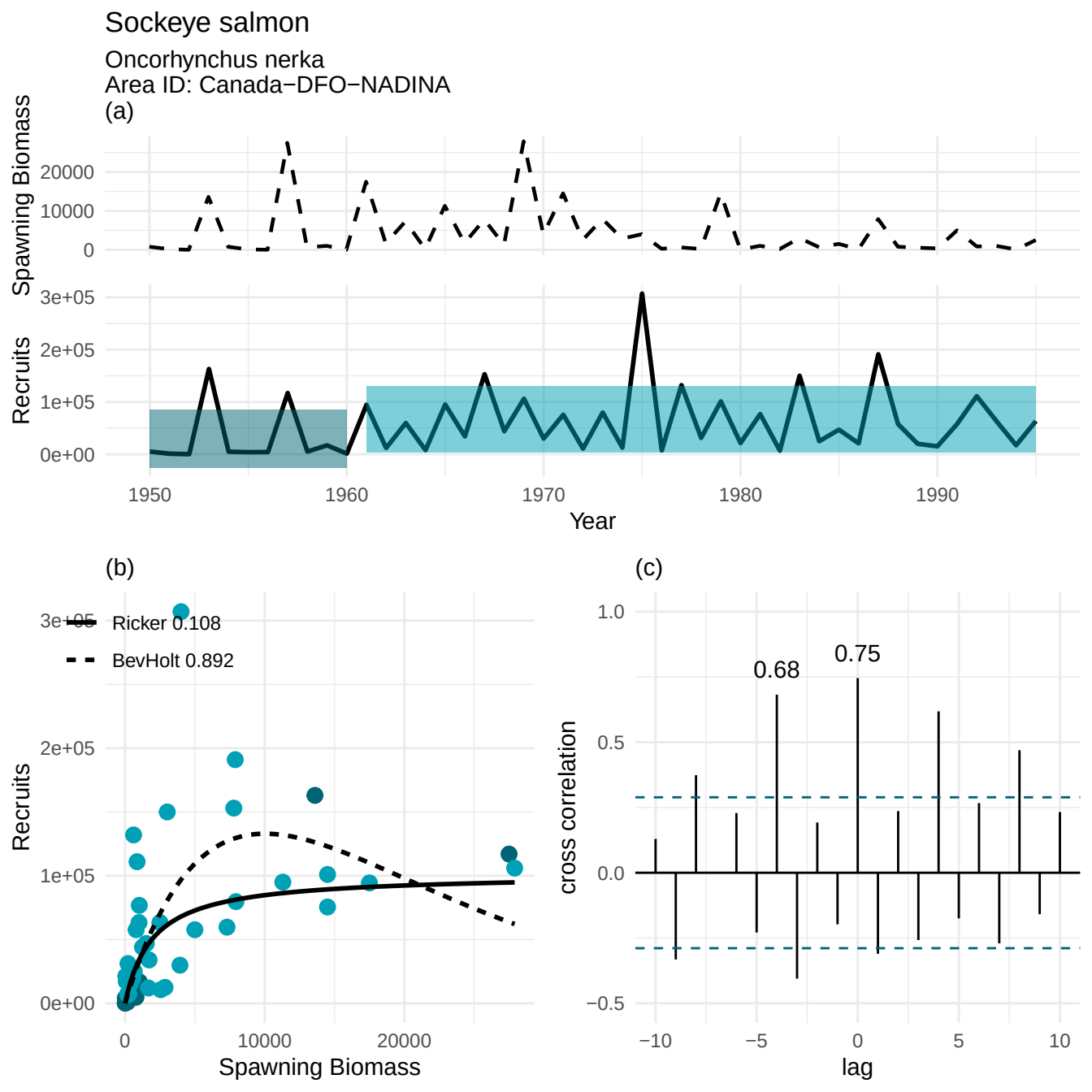

Sockeye salmon
Oncorhynchus nerka
Area ID: USA−AKSTATE−IGUSHIK
(a)
Spawning Biomass
2000000
1500000
1000000
500000
0
Recruits
4e+06
3e+06
2e+06
1e+06
0e+00
1960
1970
1980
1990
2000
Year
(b)
Ricker 0.274
BevHolt 0.726
Recruits
Spawning Biomass
(c)
0.74
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

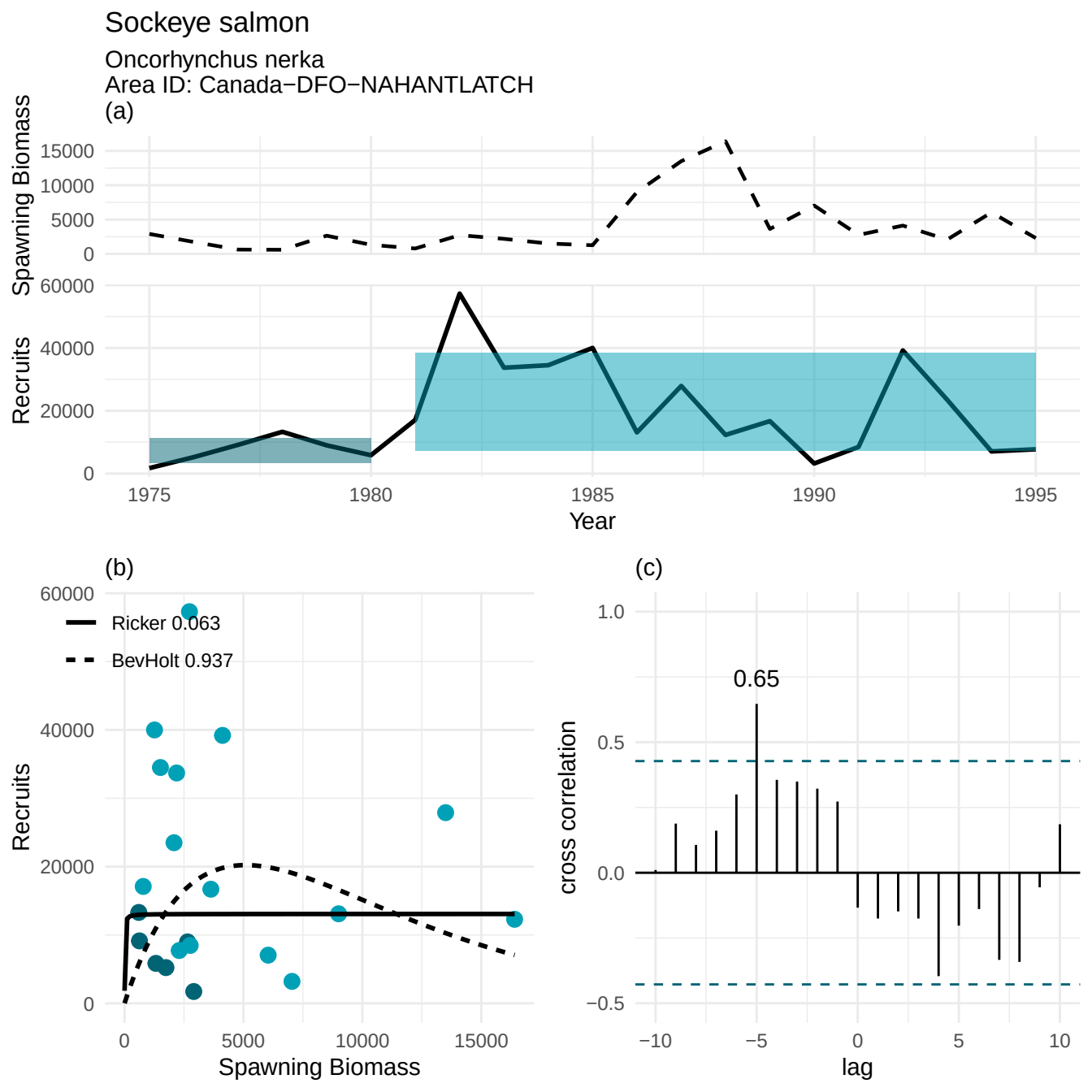

Sockeye salmon
Oncorhynchus nerka
Area ID: USA−AKSTATE−KLUKSHUR
(a)
Spawning Biomass
25000
20000
15000
10000
Recruits
40000
30000
20000
10000
1975
1980
1985
1990
1995
Year
(b)
Ricker 0.407
BevHolt 0.593
Recruits
40000
30000
20000
10000
0
0
10000
20000
30000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.63
−10
−5
0
5
10
lag

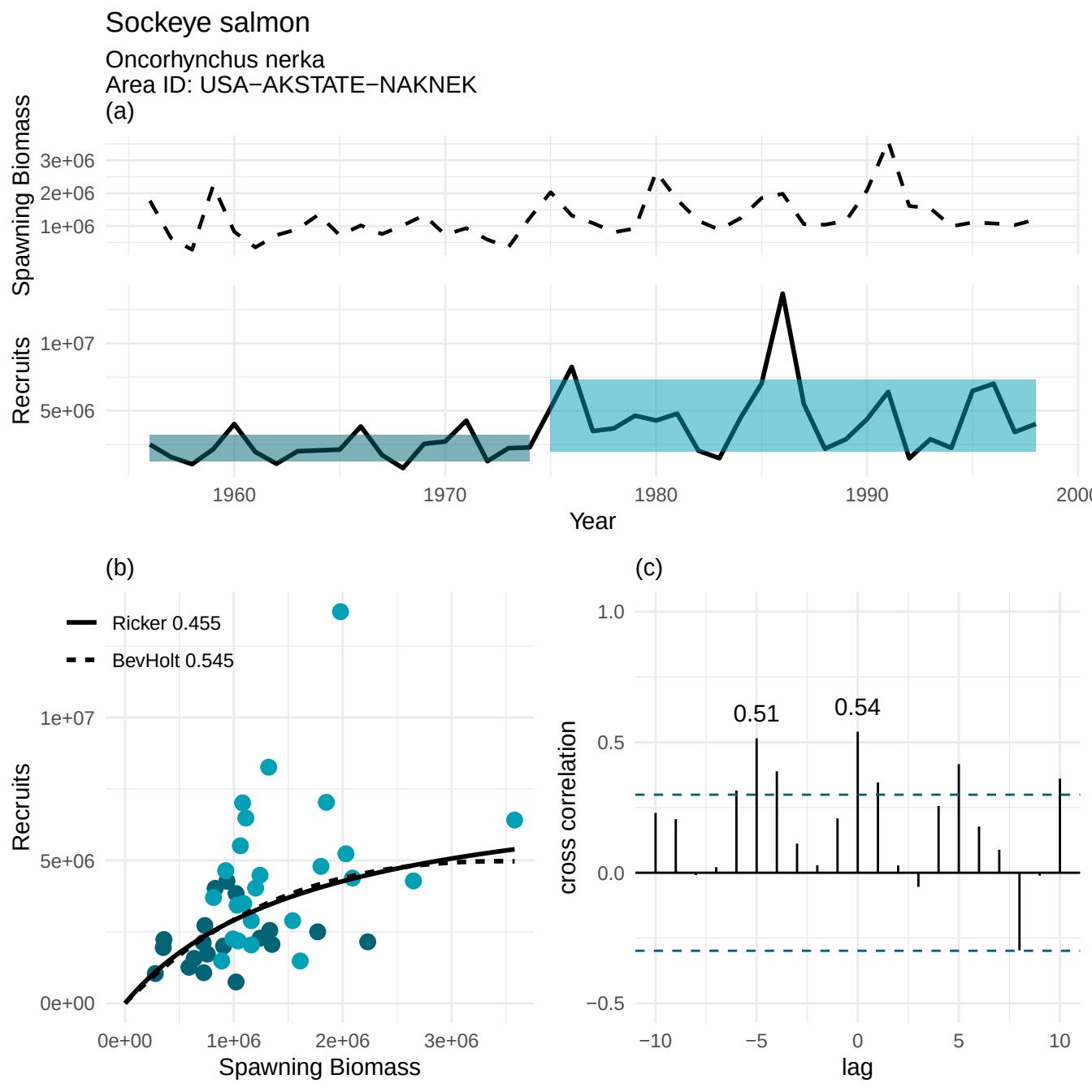

Sockeye salmon
Oncorhynchus nerka
Area ID: USA−AKSTATE−KVICHAK
(a)
Spawning Biomass
2.5e+07
2.0e+07
1.5e+07
1.0e+07
5.0e+06
0.0e+00
Recruits
4e+07
2e+07
0e+00
1960
1970
1980
1990
2000
Year
(b)
Ricker 0.5
BevHolt 0.5
Recruits
4e+07
2e+07
0e+00
0.0e+00
5.0e+06
1.0e+07
1.5e+07
2.0e+07
2.5e+07
Spawning Biomass
(c)
0.69
0.78
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

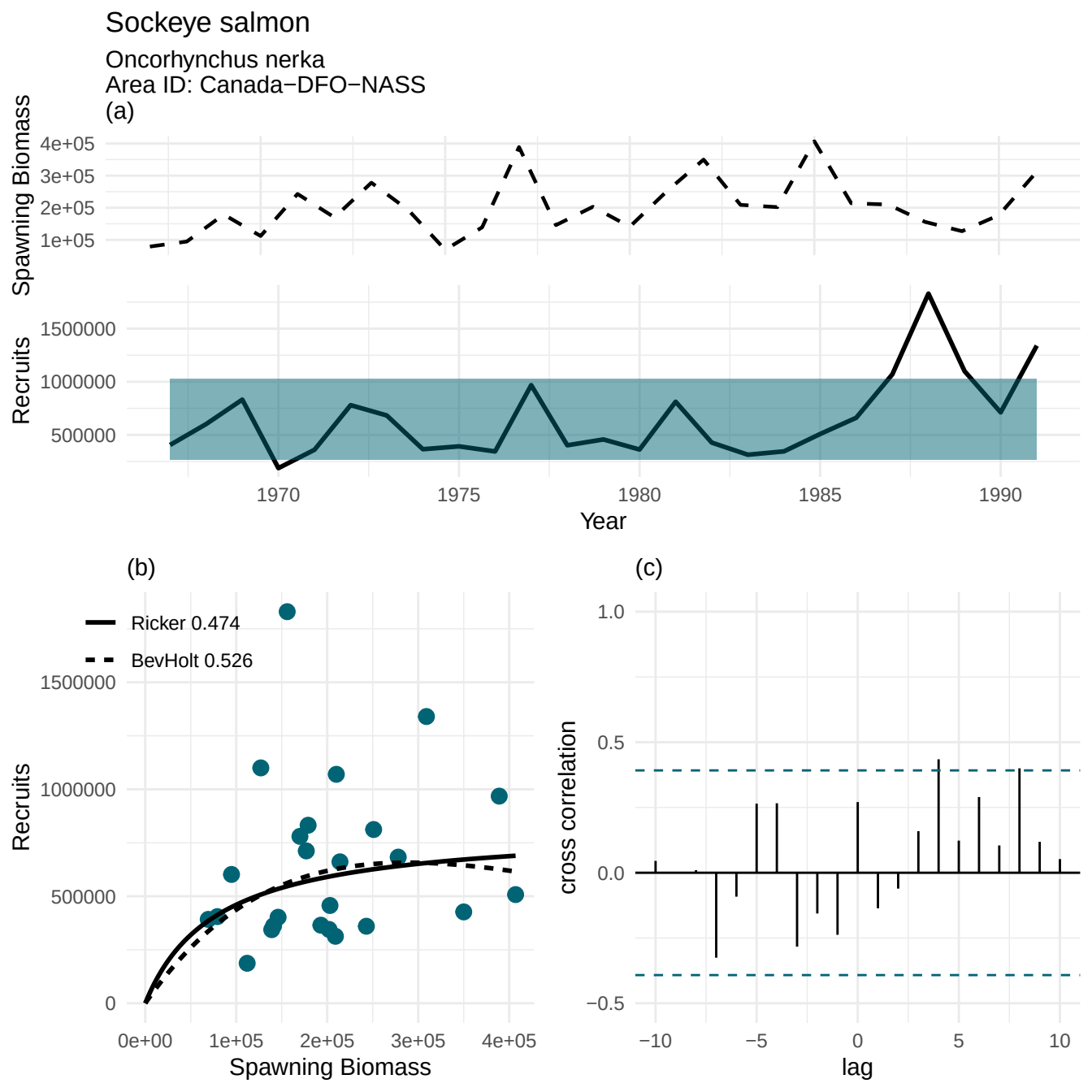

Sockeye salmon
Oncorhynchus nerka
Area ID: USA−AKSTATE−LUPPERS
(a)
Spawning Biomass
4e+05
3e+05
2e+05
1e+05
Recruits
1500000
1000000
500000
1970
1975
1980
1985
1990
Year
(b)
Ricker 0.43
BevHolt 0.57
Recruits
1500000
1000000
500000
0
0e+00
1e+05
2e+05
3e+05
4e+05
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.62
0.48
−10
−5
0
5
10
lag

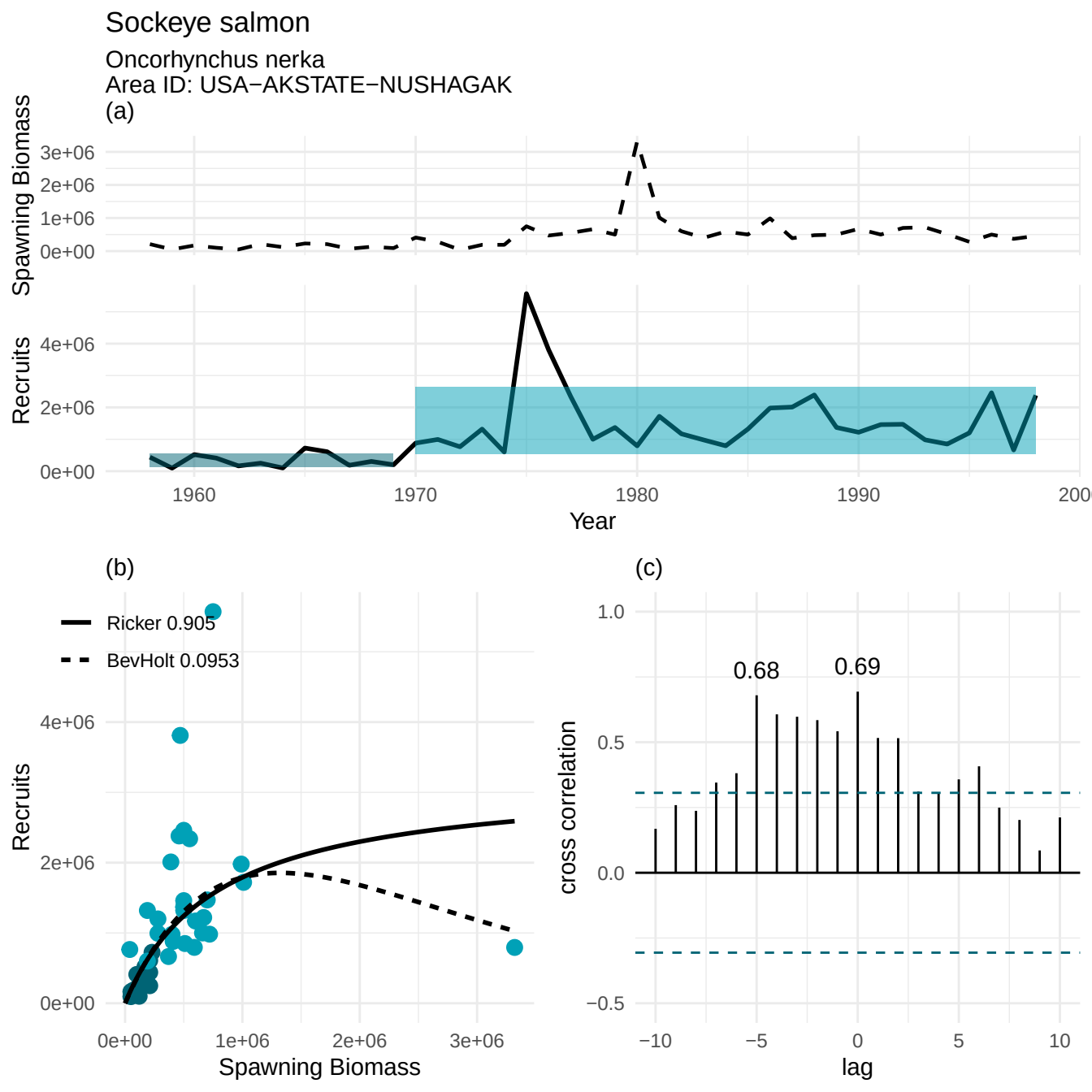

Sockeye salmon
Oncorhynchus nerka
Area ID: USA−WASTATE−LWASH
(a)
Spawning Biomass
3e+05
2e+05
1e+05
Recruits
6e+05
4e+05
2e+05
0e+00
1970
1975
1980
1985
1990
Year
(b)
Ricker 0.49
BevHolt 0.51
Recruits
6e+05
4e+05
2e+05
0e+00
0e+00
1e+05
2e+05
3e+05
4e+05
Spawning Biomass
(c)
1.0
0.5
0.0
−0.5
0.71
cross correlation
−10
−5
0
5
10
lag

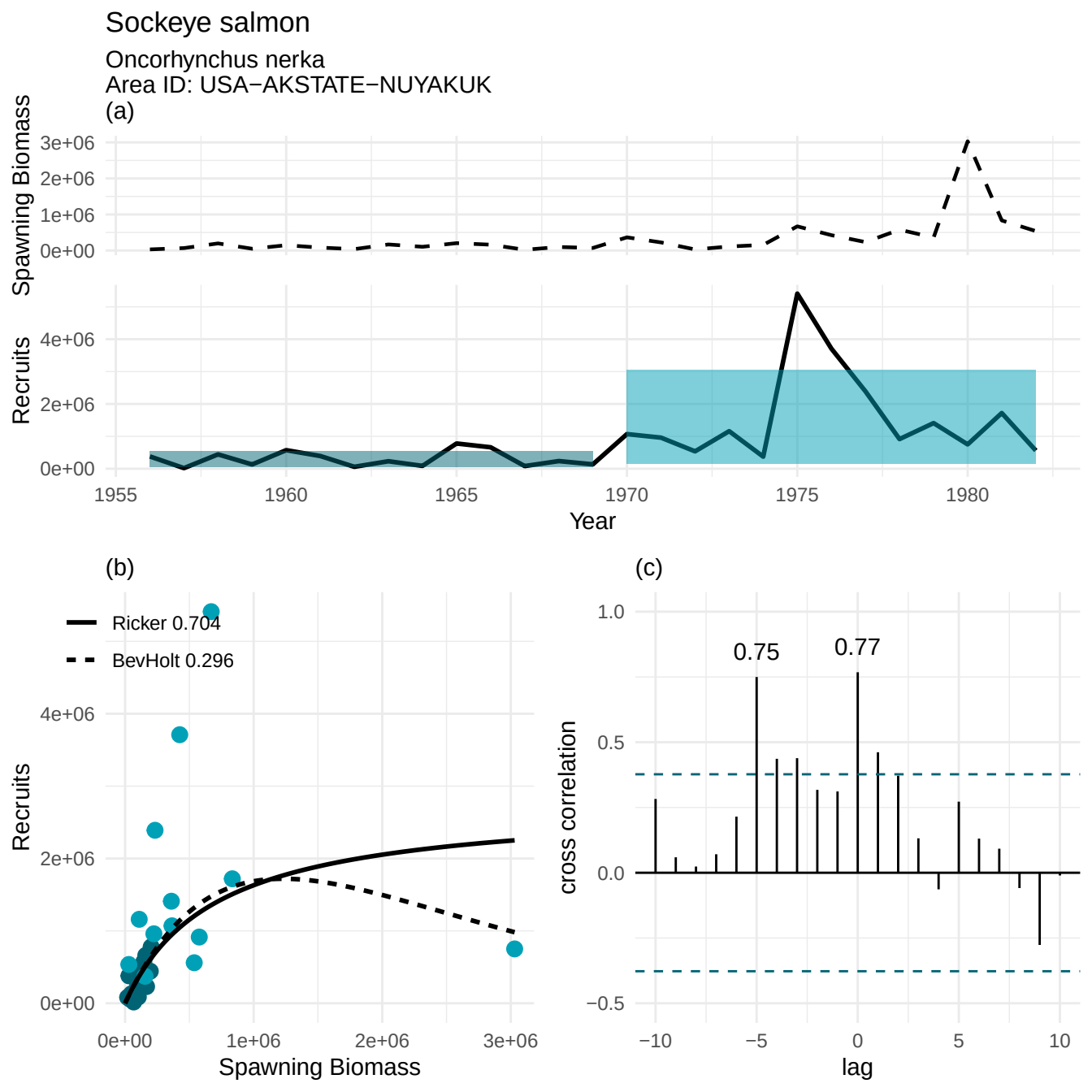

Sockeye salmon
Oncorhynchus nerka
Area ID: Canada−DFO−NADINA
(a)
Spawning Biomass
20000
10000
0
Recruits
3e+05
2e+05
1e+05
0e+00
1950
1960
1970
1980
1990
Year
(b)
Ricker 0.108
BevHolt 0.892
Recruits
3e+05
2e+05
1e+05
0e+00
0
10000
20000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.68
0.75
−10
−5
0
5
10
lag

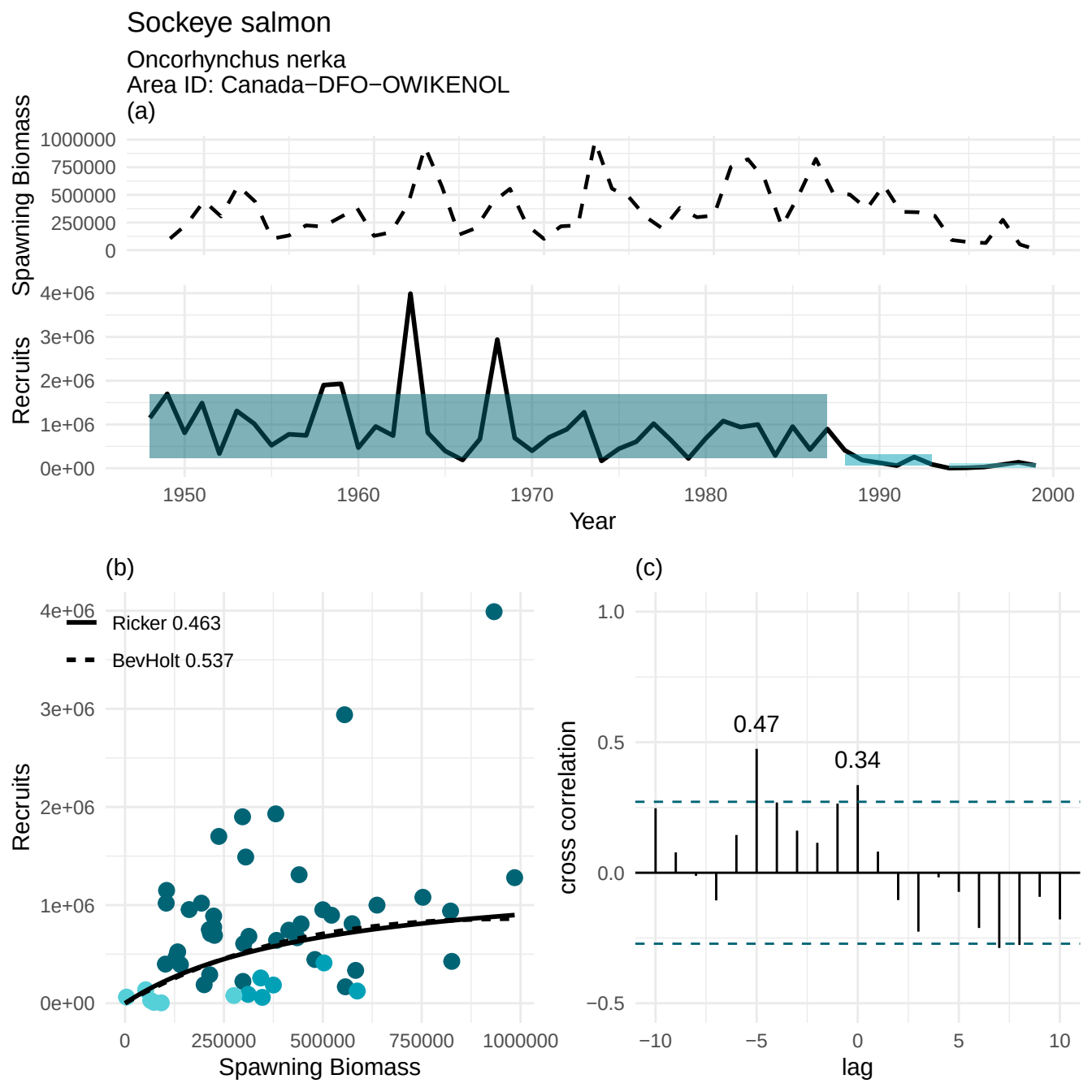

Sockeye salmon
Oncorhynchus nerka
Area ID: Canada−DFO−NAHANTLATCH
(a)
Spawning Biomass
15000
10000
5000
0
Recruits
60000
40000
20000
0
1975
1980
1985
1990
1995
Year
(b)
Ricker 0.063
BevHolt 0.937
Recruits
60000
40000
20000
0
0
5000
10000
15000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.65
−10
−5
0
5
10
lag

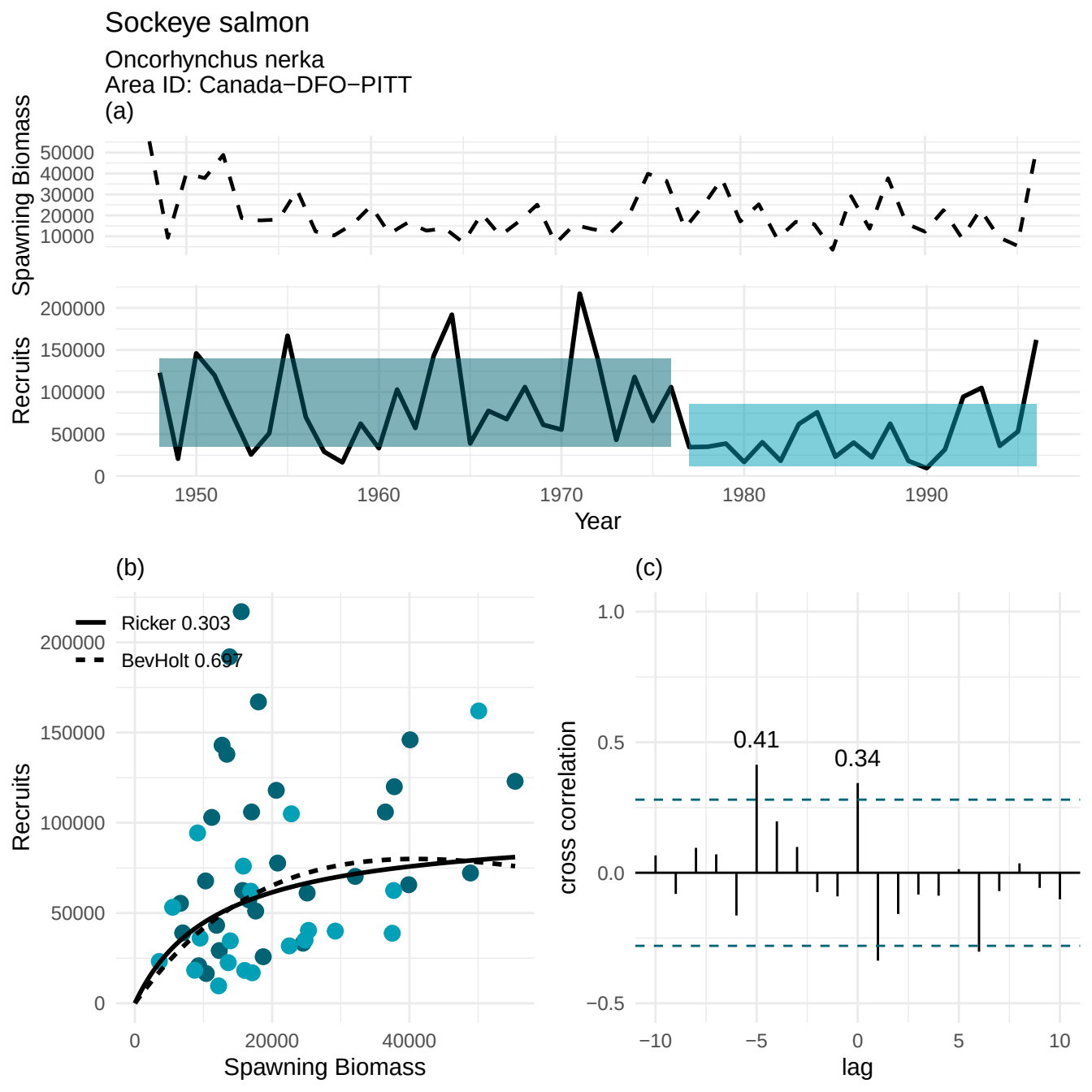

Sockeye salmon
Oncorhynchus nerka
Area ID: USA−AKSTATE−NAKNEK
(a)
Spawning Biomass
3e+06
2e+06
1e+06
Recruits
1e+07
5e+06
1960
1970
1980
1990
2000
Year
(b)
Ricker 0.455
BevHolt 0.545
Recruits
1e+07
5e+06
0e+00
0e+00
1e+06
2e+06
3e+06
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.51
0.54
−10
−5
0
5
10
lag

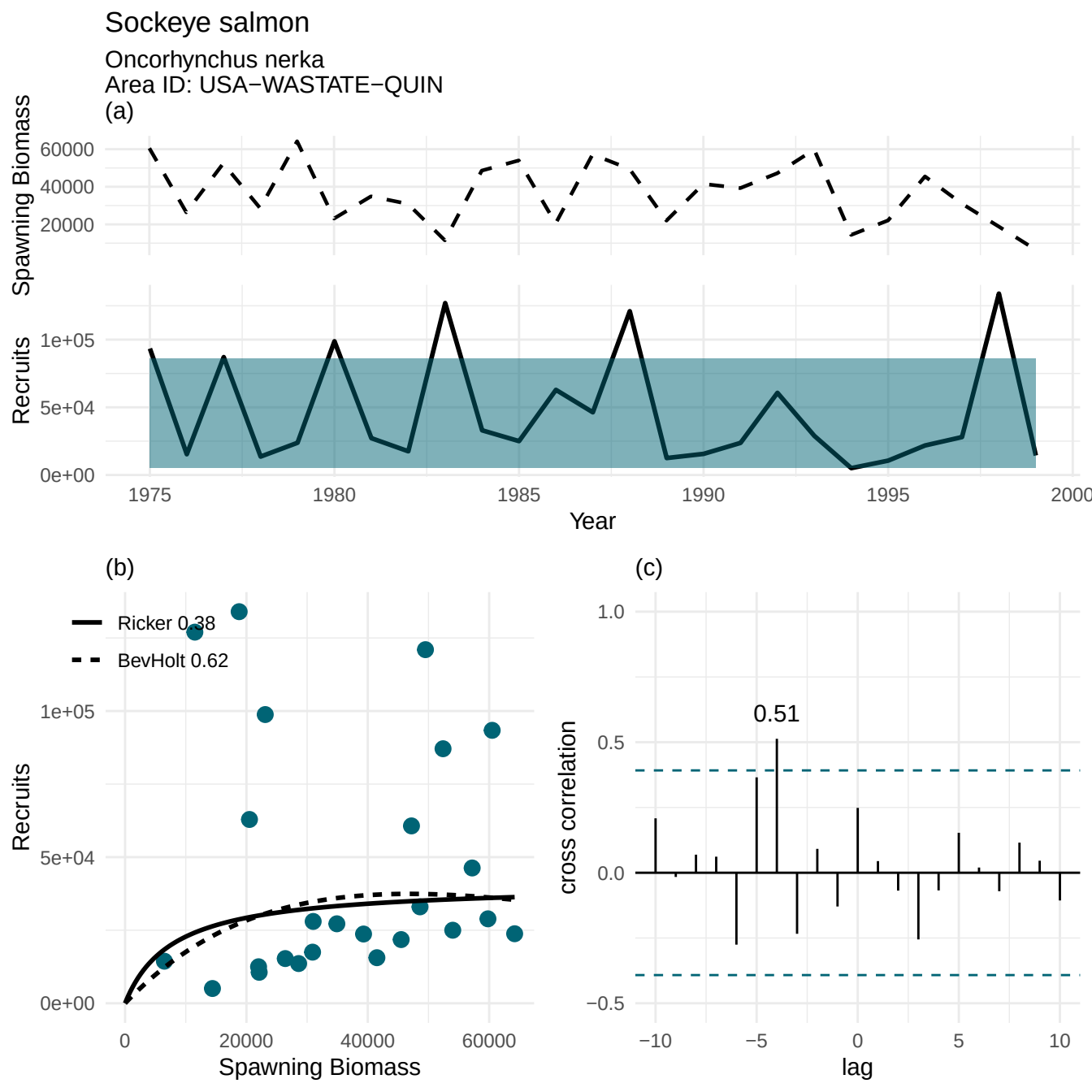

Sockeye salmon
Oncorhynchus nerka
Area ID: Canada−DFO−NASS
(a)
Spawning Biomass
4e+05
3e+05
2e+05
1e+05
Recruits
1500000
1000000
500000
1970
1975
1980
1985
1990
Year
(b)
Ricker 0.474
BevHolt 0.526
Recruits
1500000
1000000
500000
0
0e+00
1e+05
2e+05
3e+05
4e+05
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

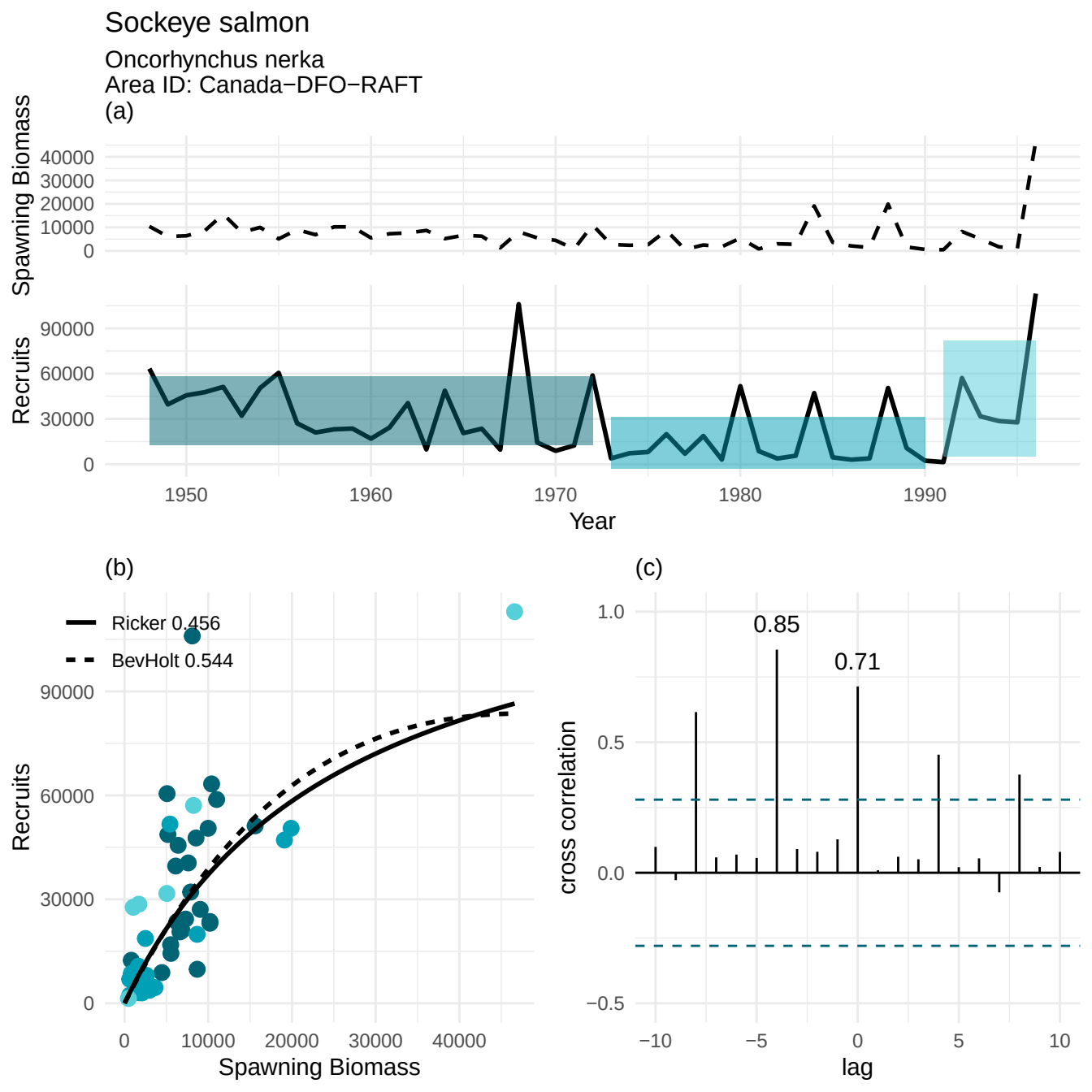

Sockeye salmon
Oncorhynchus nerka
Area ID: USA−AKSTATE−NUSHAGAK
(a)
Spawning Biomass
3e+06
2e+06
1e+06
0e+00
Recruits
4e+06
2e+06
0e+00
1960
1970
1980
1990
200
Year
(b)
Ricker 0.905
BevHolt 0.0953
Recruits
4e+06
2e+06
0e+00
0e+00
1e+06
2e+06
3e+06
Spawning Biomass
(c)
1.0
0.5
0.0
−0.5
0.68
0.69
cross correlation
−10
−5
0
5
10
lag

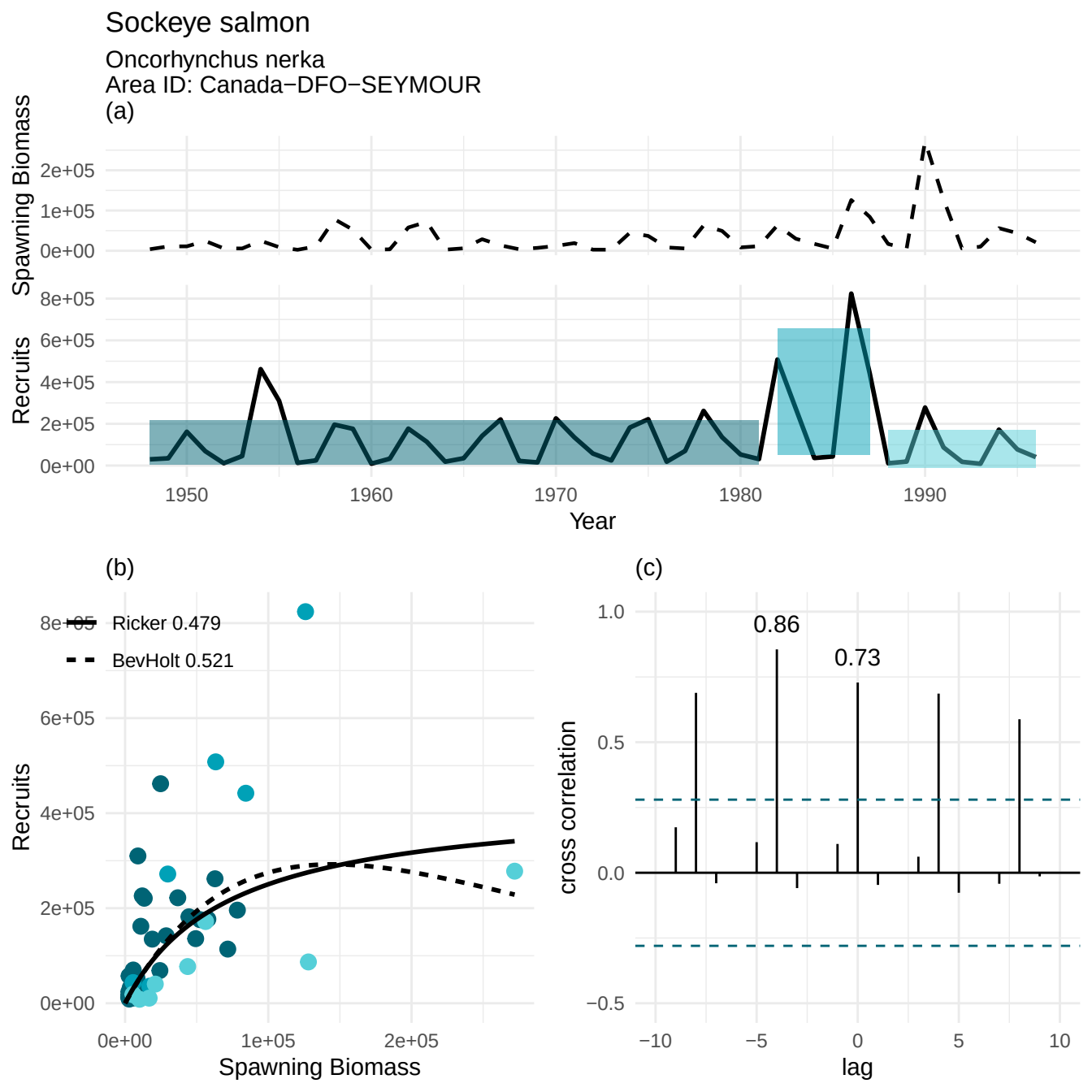

Sockeye salmon
Oncorhynchus nerka
Area ID: USA−AKSTATE−NUYAKUK
(a)
Spawning Biomass
3e+06
2e+06
1e+06
0e+00
Recruits
4e+06
2e+06
0e+00
1955
1960
1965
1970
1975
1980
Year
(b)
Ricker 0.704
BevHolt 0.296
Recruits
4e+06
2e+06
0e+00
0e+00
1e+06
2e+06
3e+06
Spawning Biomass
(c)
1.0
0.5
0.0
−0.5
0.75
0.77
cross correlation
−10
−5
0
5
10
lag

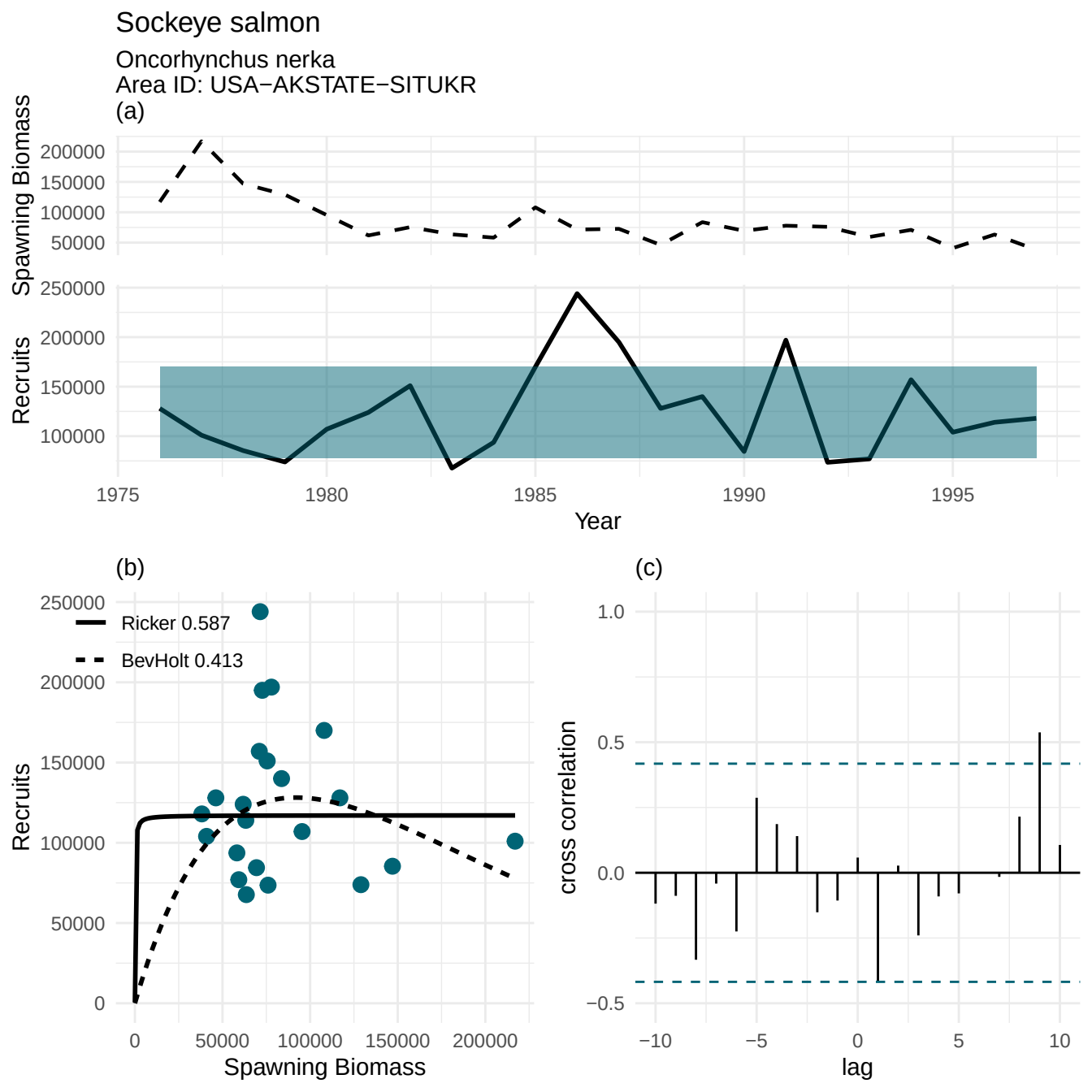

Sockeye salmon
Oncorhynchus nerka
Area ID: Canada−DFO−OWIKENOL
(a)
Spawning Biomass
1000000
750000
500000
250000
0
Recruits
4e+06
3e+06
2e+06
1e+06
0e+00
1950
1960
1970
1980
1990
2000
Year
(b)
Ricker 0.463
BevHolt 0.537
Recruits
Spawning Biomass
(c)
cross correlation
0.47
0.34
lag

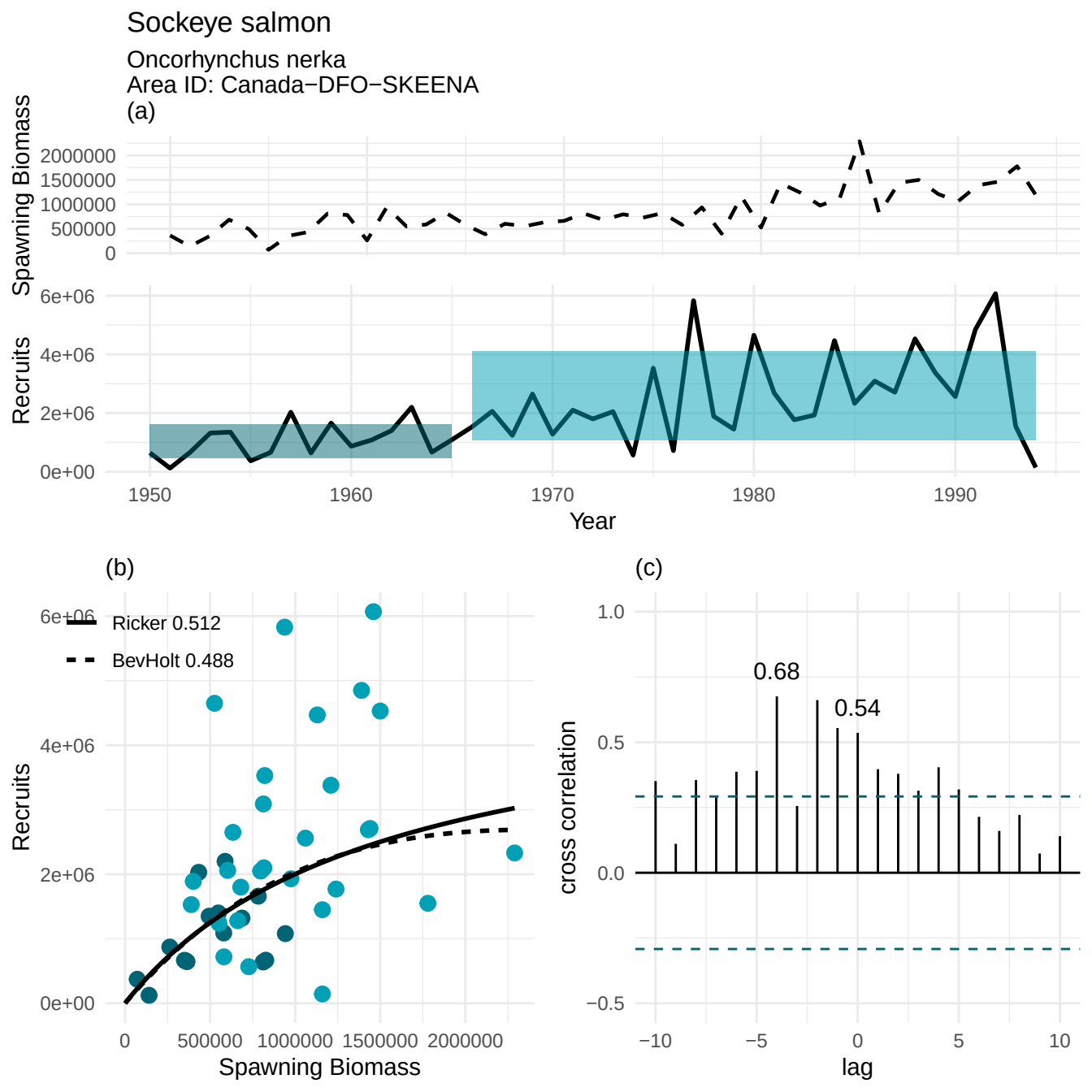

Sockeye salmon
Oncorhynchus nerka
Area ID: Canada−DFO−PITT
(a)
Spawning Biomass
50000
40000
30000
20000
10000
Recruits
200000
150000
100000
50000
0
1950
1960
1970
1980
1990
Year
(b)
Ricker 0.303
BevHolt 0.697
Recruits
200000
150000
100000
50000
0
0
20000
40000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.41
0.34
−10
−5
0
5
10
lag

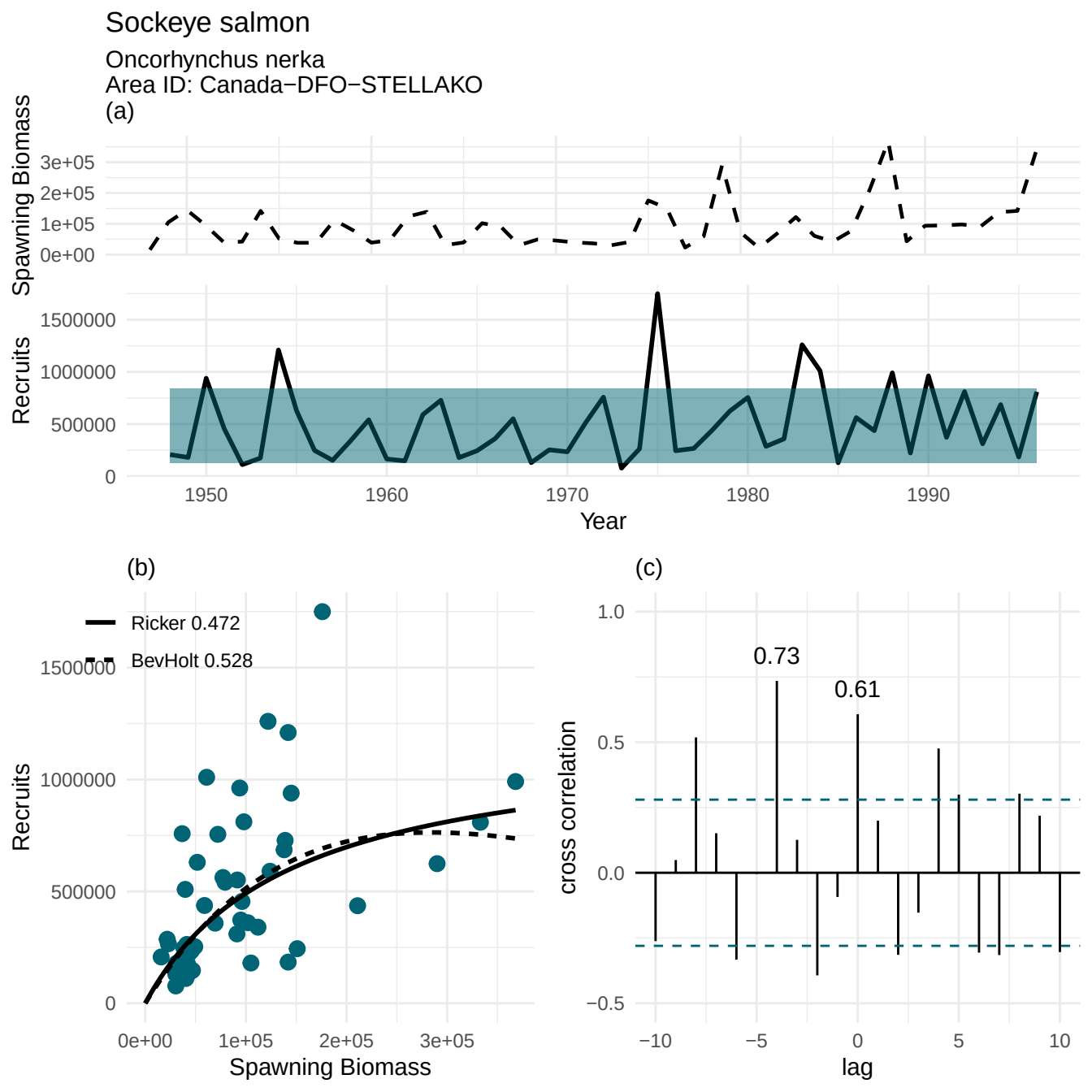

Sockeye salmon
Oncorhynchus nerka
Area ID: USA−WASTATE−QUIN
(a)
Spawning Biomass
60000
40000
20000
Recruits
1e+05
5e+04
0e+00
1975
1980
1985
1990
1995
2000
Year
(b)
Ricker 0.38
BevHolt 0.62
Recruits
1e+05
5e+04
0e+00
0
20000
40000
60000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.51
−10
−5
0
5
10
lag

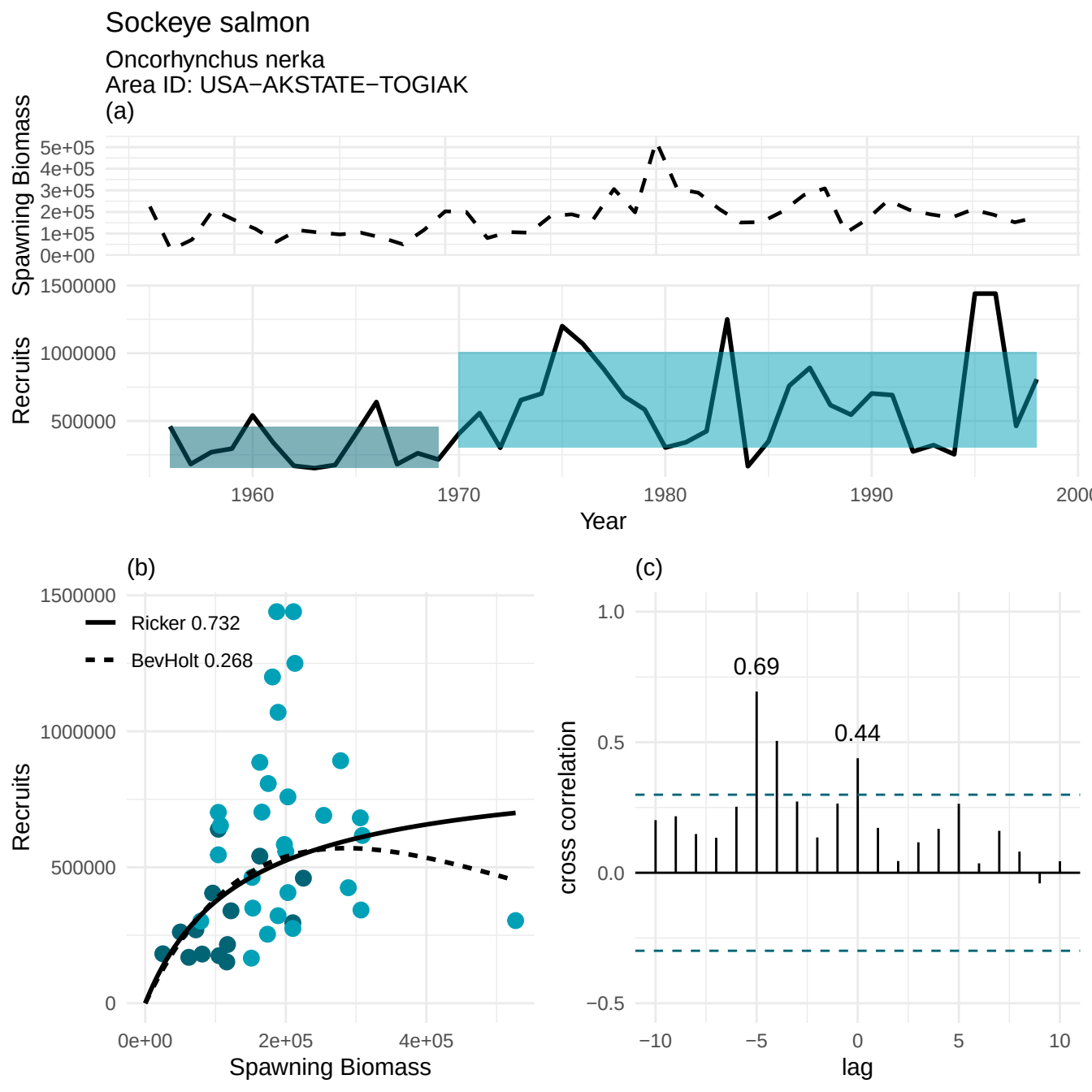

Sockeye salmon
Oncorhynchus nerka
Area ID: Canada−DFO−RAFT
(a)
Spawning Biomass
40000
30000
20000
10000
0
Recruits
90000
60000
30000
0
1950
1960
1970
1980
1990
Year
(b)
Ricker 0.456
BevHolt 0.544
Recruits
90000
60000
30000
0
0
10000
20000
30000
40000
Spawning Biomass
(c)
0.85
0.71
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

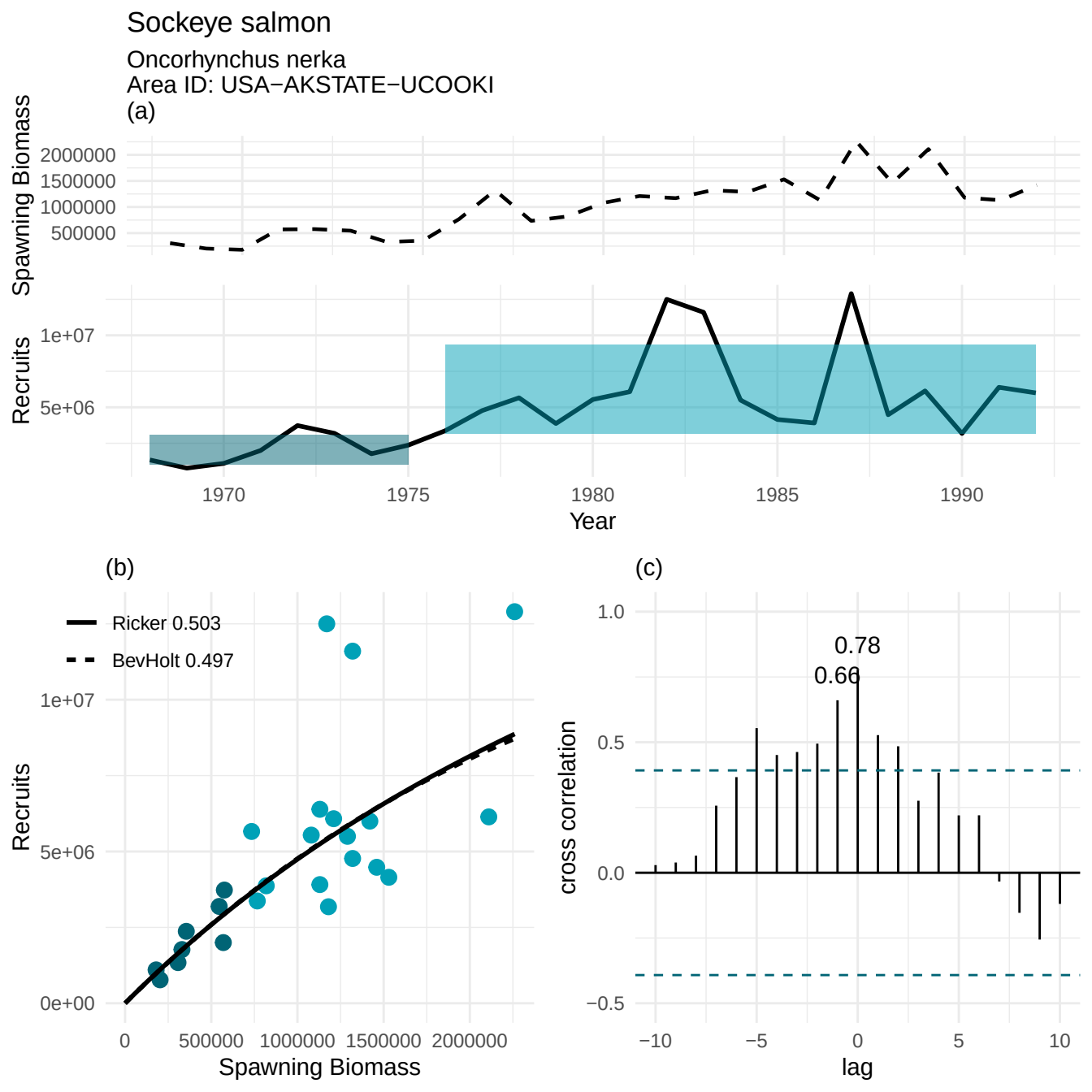

Sockeye salmon
Oncorhynchus nerka
Area ID: Canada−DFO−SEYMOUR
(a)
Spawning Biomass
2e+05
1e+05
0e+00
Recruits
8e+05
6e+05
4e+05
2e+05
0e+00
1950
1960
1970
1980
1990
Year
(b)
Ricker 0.479
BevHolt 0.521
Recruits
6e+05
4e+05
2e+05
0e+00
0e+00
1e+05
2e+05
Spawning Biomass
(c)
0.86
0.73
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

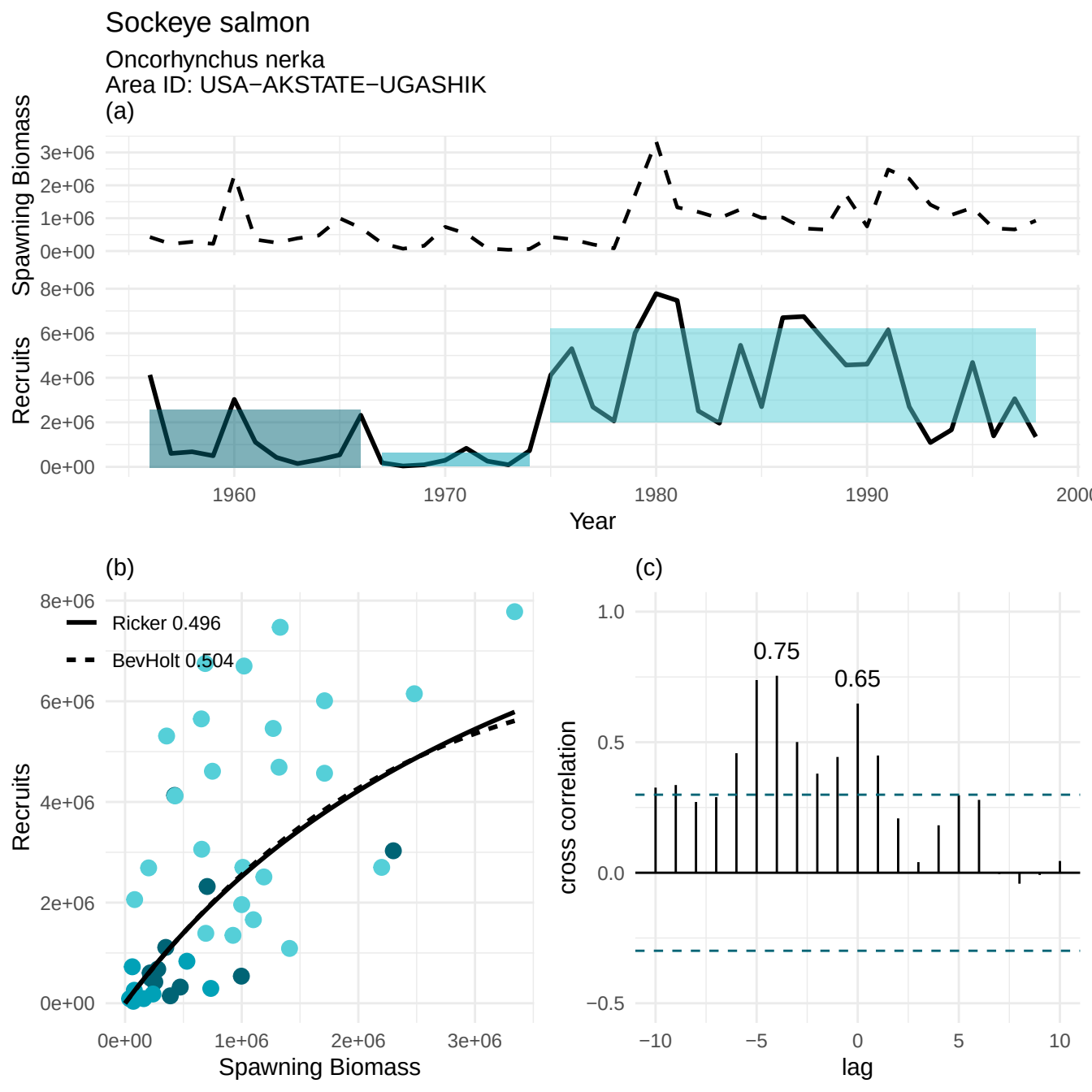

Sockeye salmon
Oncorhynchus nerka
Area ID: USA−AKSTATE−SITUKR
(a)
Spawning Biomass
200000
150000
100000
50000
Recruits
250000
200000
150000
100000
1975
1980
1985
1990
1995
Year
(b)
Recruits
250000
200000
150000
100000
50000
0
Ricker 0.587
BevHolt 0.413
0
50000
100000
150000
200000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

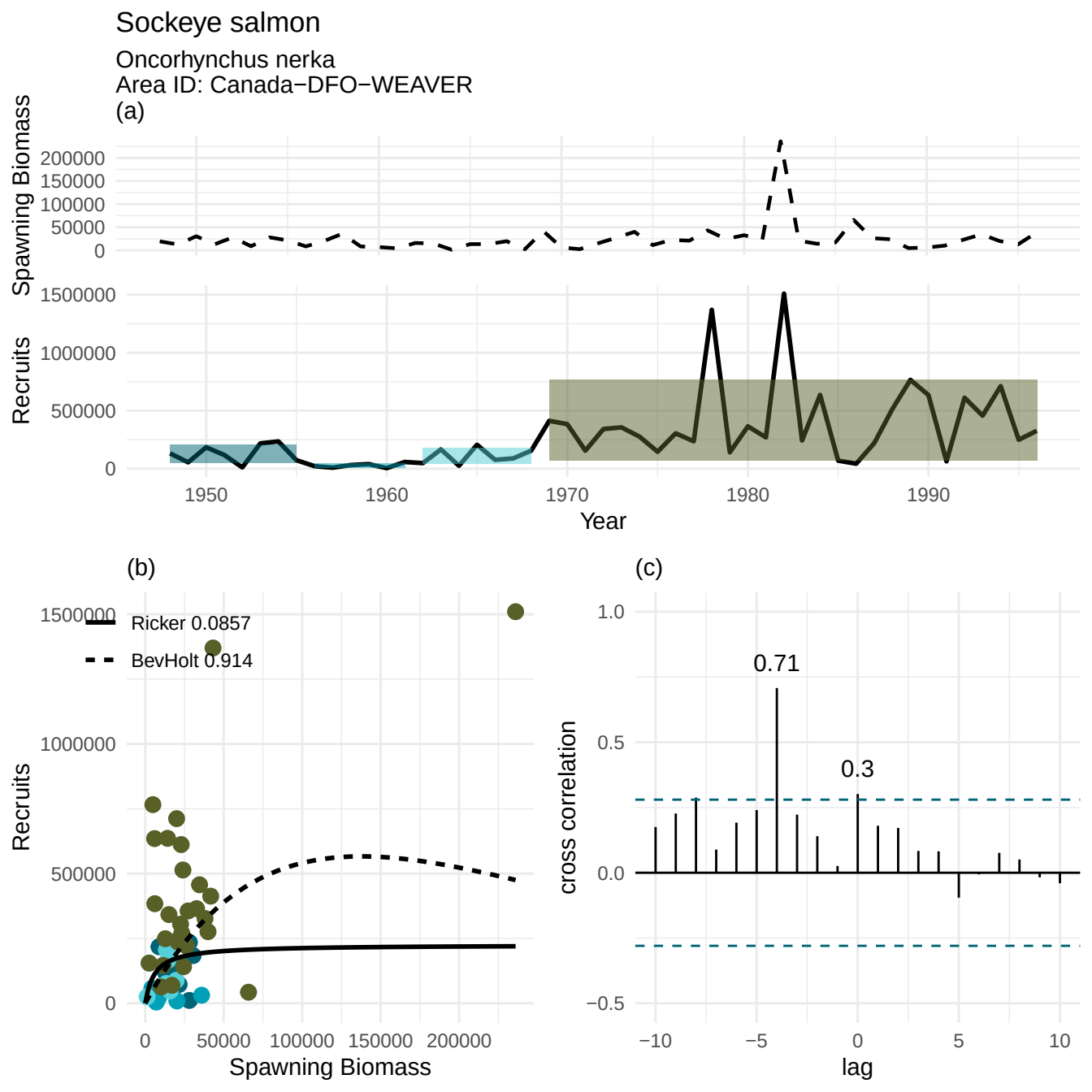

Sockeye salmon
Oncorhynchus nerka
Area ID: Canada−DFO−SKEENA
(a)
Spawning Biomass
2000000
1500000
1000000
500000
0
Recruits
6e+06
4e+06
2e+06
0e+00
1950
1960
1970
1980
1990
Year
(b)
Ricker 0.512
BevHolt 0.488
Recruits
6e+06
4e+06
2e+06
0e+00
0
500000
1000000
1500000
2000000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.68
0.54
−10
−5
0
5
10
lag

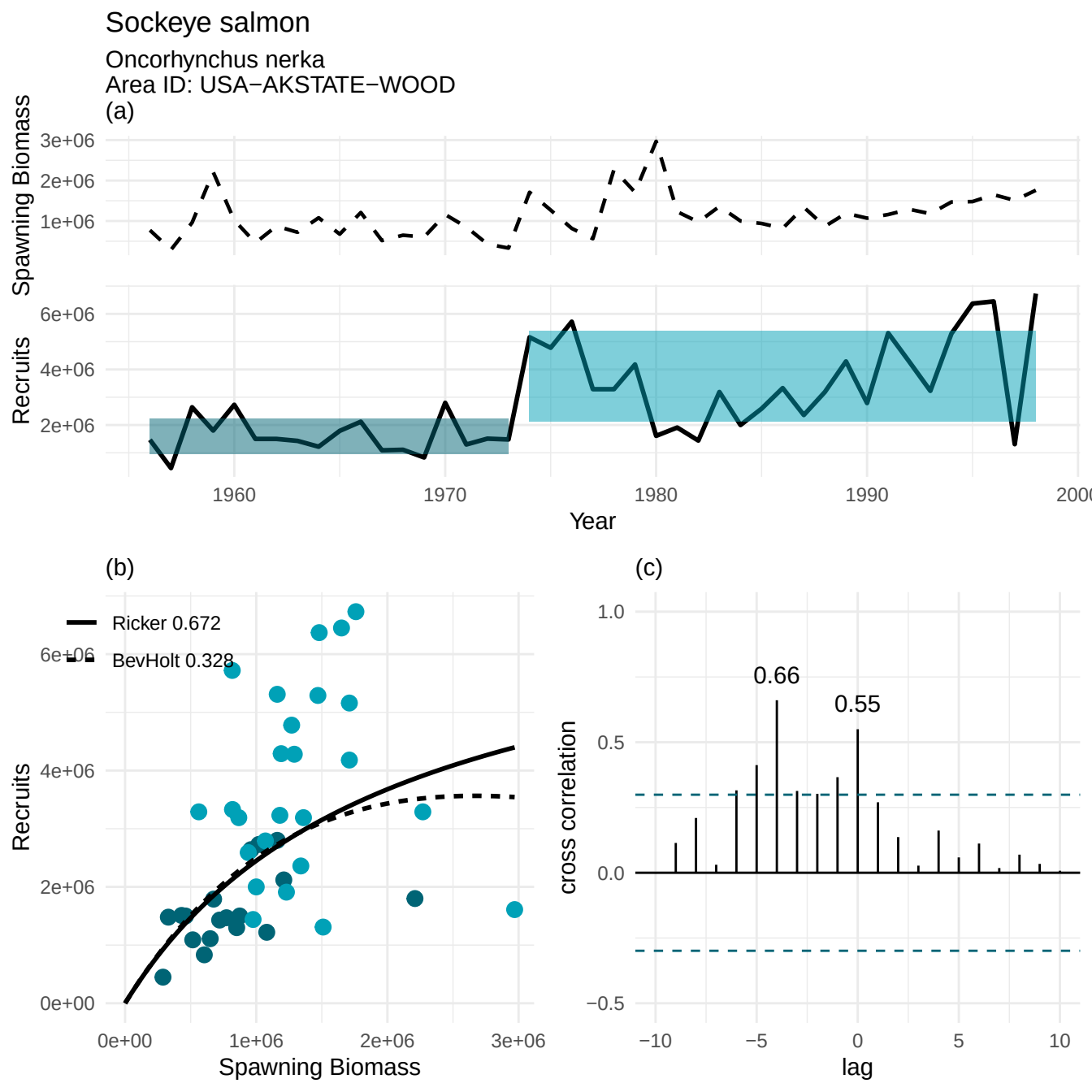

Sockeye salmon
Oncorhynchus nerka
Area ID: Canada−DFO−STELLAKO
(a)
Spawning Biomass
3e+05
2e+05
1e+05
0e+00
Recruits
1500000
1000000
500000
0
1950
1960
1970
1980
1990
Year
(b)
Ricker 0.472
BevHolt 0.528
Recruits
1500000
1000000
500000
0
0e+00
1e+05
2e+05
3e+05
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.73
0.61
−10
−5
0
5
10
lag

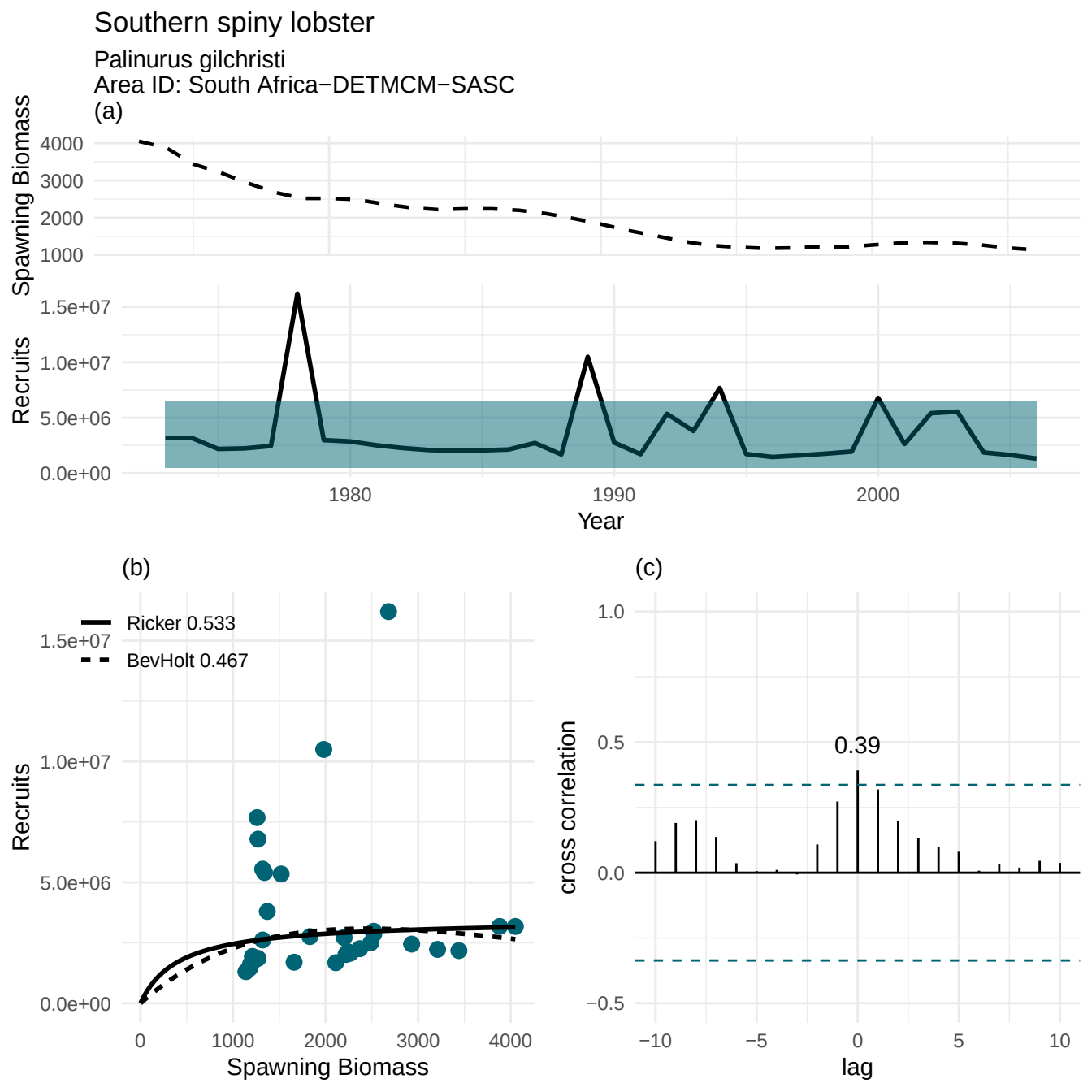

Sockeye salmon
Oncorhynchus nerka
Area ID: USA−AKSTATE−TOGIAK
(a)
Spawning Biomass
5e+05
4e+05
3e+05
2e+05
1e+05
0e+00
Recruits
1500000
1000000
500000
1960
1970
1980
1990
2000
Year
(b)
Ricker 0.732
BevHolt 0.268
Recruits
1500000
1000000
500000
0
0e+00
2e+05
4e+05
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.69
0.44
−10
−5
0
5
10
lag

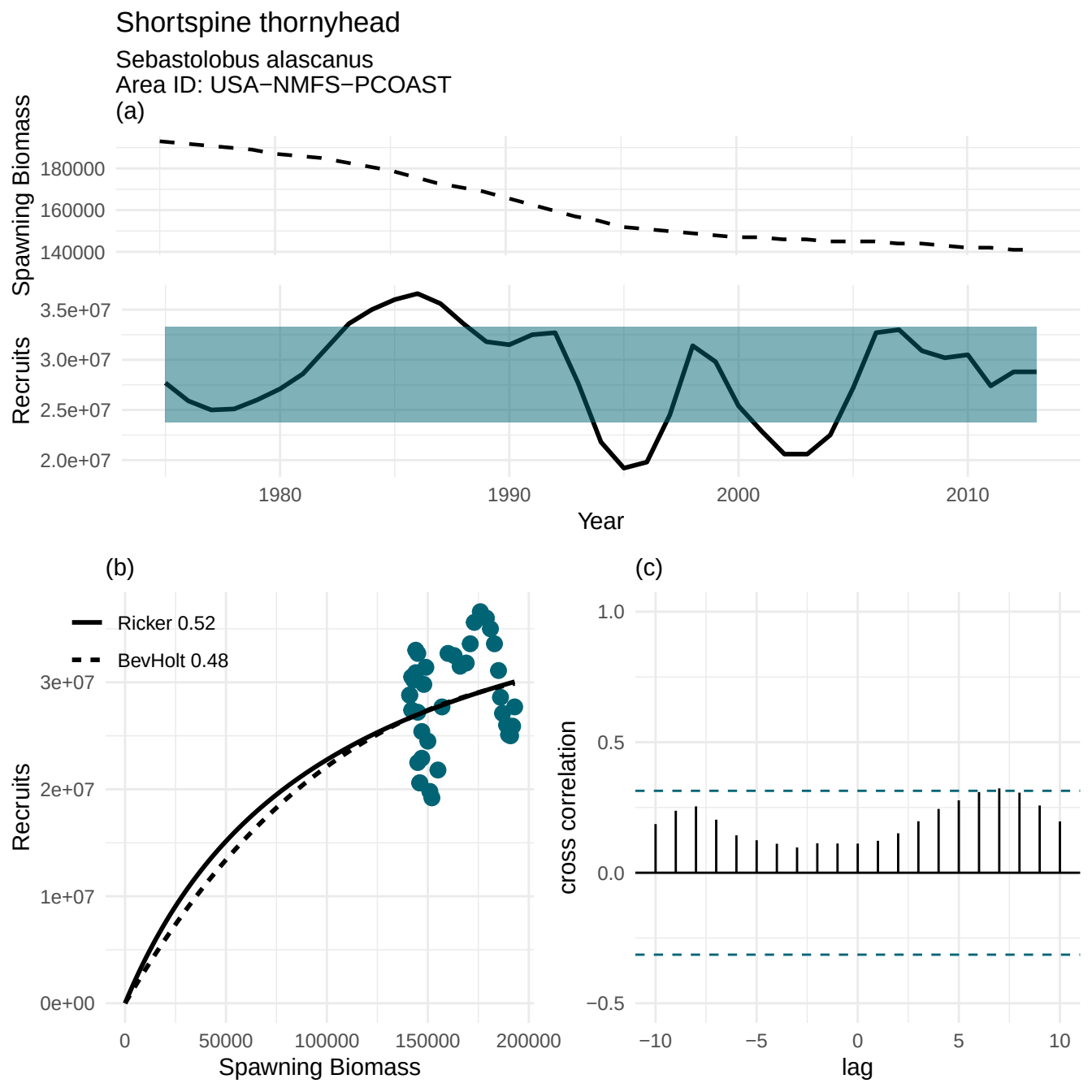

Sockeye salmon
Oncorhynchus nerka
Area ID: USA−AKSTATE−UCOOKI
(a)
Spawning Biomass
2000000
1500000
1000000
500000
Recruits
1e+07
5e+06
1970
1975
1980
1985
1990
Year
(b)
Ricker 0.503
BevHolt 0.497
Recruits
1e+07
5e+06
0e+00
0
500000
1000000
1500000
2000000
Spawning Biomass
(c)
0.78
0.66
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

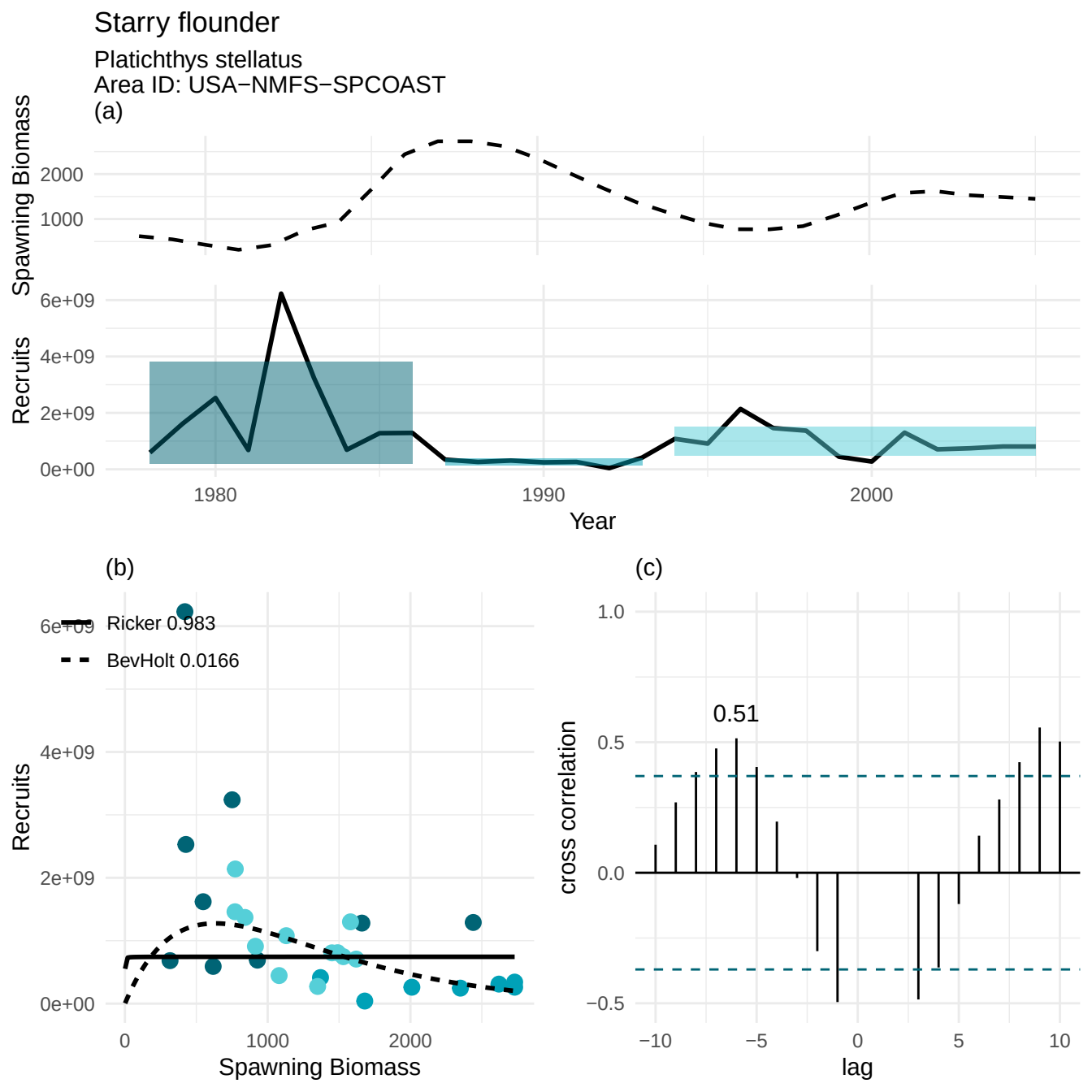

Sockeye salmon
Oncorhynchus nerka
Area ID: USA−AKSTATE−UGASHIK
(a)
Spawning Biomass
3e+06
2e+06
1e+06
0e+00
Recruits
8e+06
6e+06
4e+06
2e+06
0e+00
1960
1970
1980
1990
2000
Year
(b)
Ricker 0.496
BevHolt 0.504
Recruits
8e+06
6e+06
4e+06
2e+06
0e+00
0e+00
1e+06
2e+06
3e+06
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.75
0.65
−10
−5
0
5
10
lag

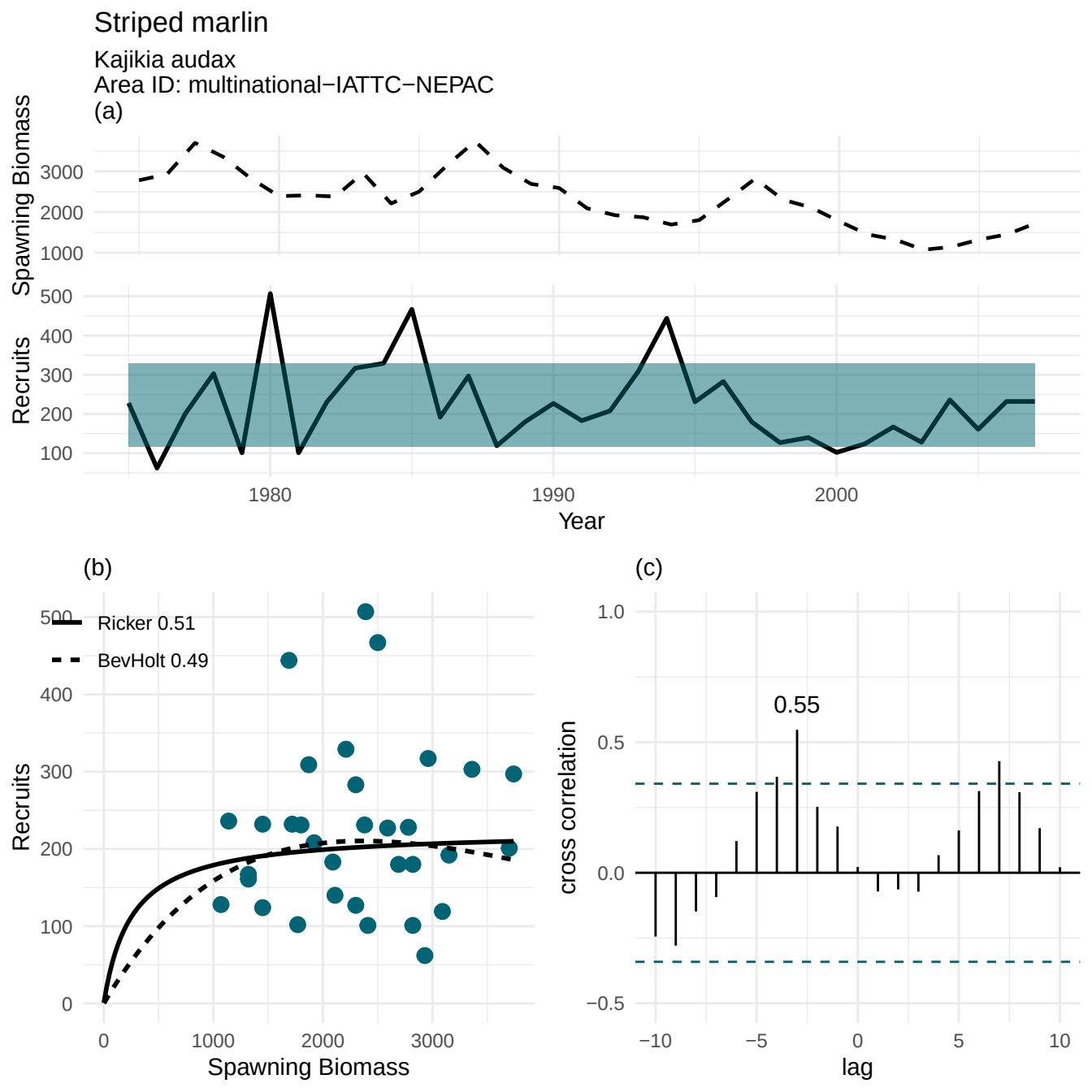

Sockeye salmon
Oncorhynchus nerka
Area ID: Canada−DFO−WEAVER
(a)
Spawning Biomass
200000
150000
100000
50000
0
Recruits
1500000
1000000
500000
0
1950
1960
1970
1980
1990
Year
(b)
Ricker 0.0857
BevHolt 0.914
Recruits
1500000
1000000
500000
0
0
50000
100000
150000
200000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.71
0.3
−10
−5
0
5
10
lag

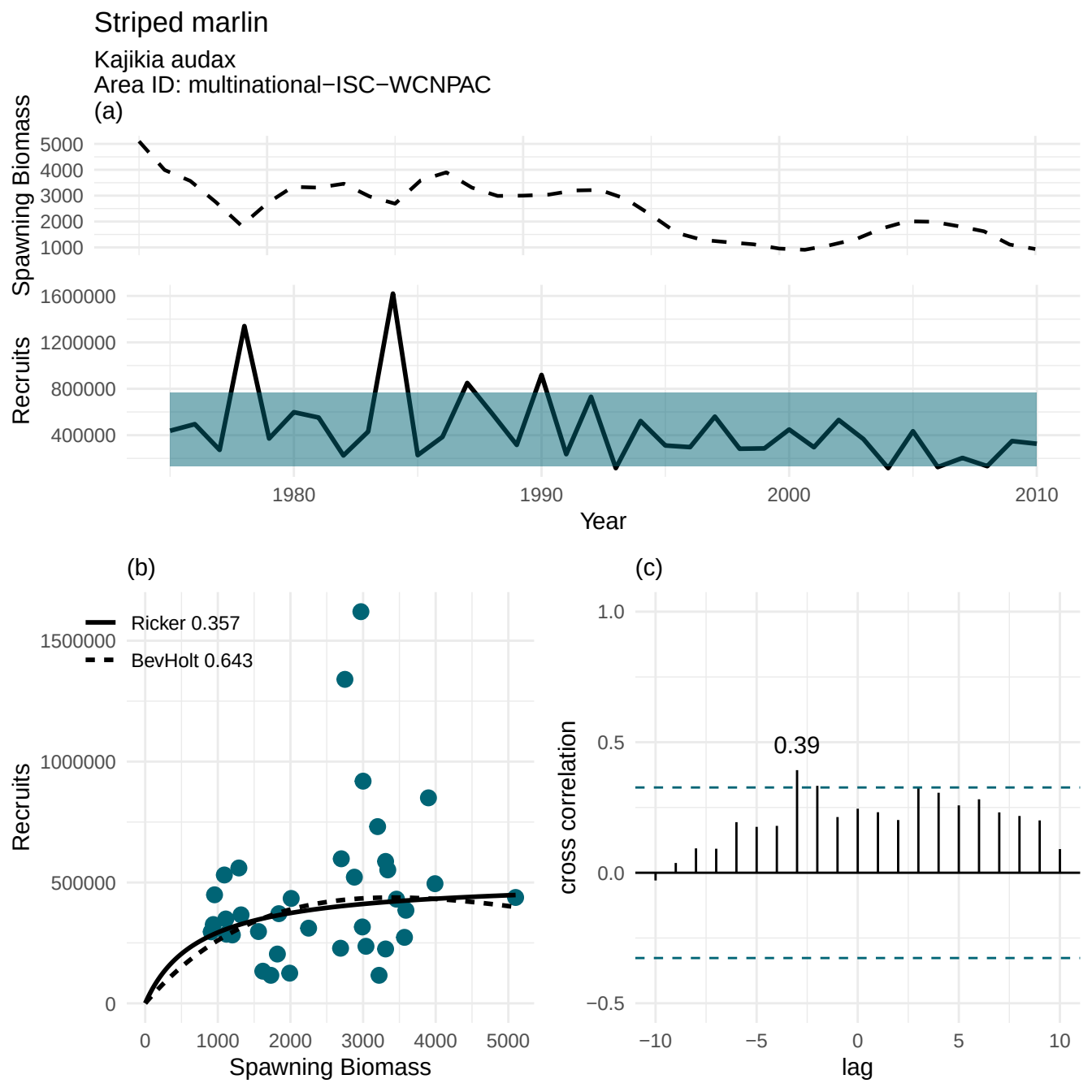

Sockeye salmon
Oncorhynchus nerka
Area ID: USA−AKSTATE−WOOD
(a)
Spawning Biomass
3e+06
2e+06
1e+06
Recruits
6e+06
4e+06
2e+06
1960
1970
1980
1990
2000
Year
(b)
Ricker 0.672
BevHolt 0.328
Recruits
6e+06
4e+06
2e+06
0e+00
0e+00
1e+06
2e+06
3e+06
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.66
0.55
−10
−5
0
5
10
lag

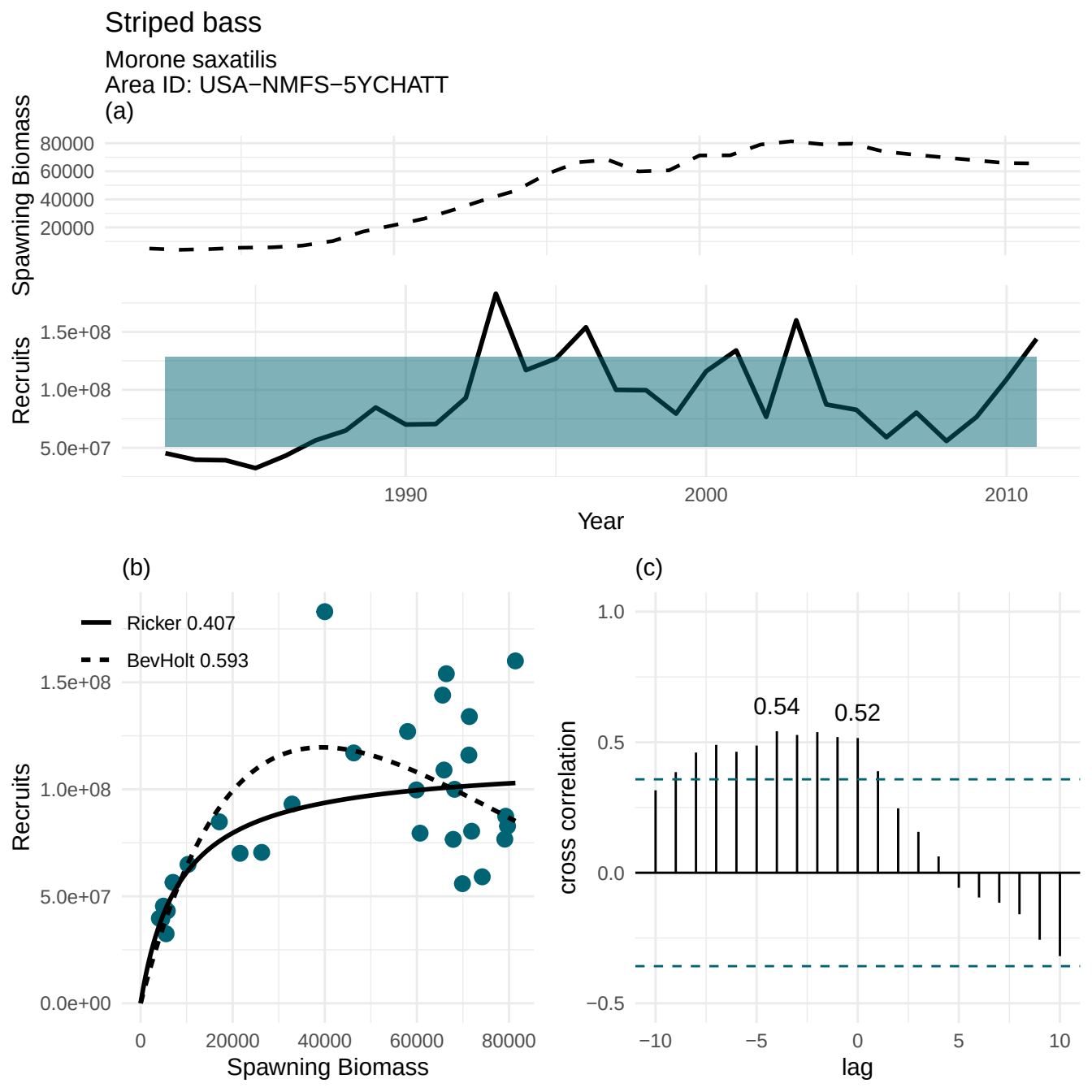

Southern spiny lobster
Palinurus gilchristi
Area ID: South Africa−DETMCM−SASC
(a)
Spawning Biomass
4000
3000
2000
1000
Recruits
1.5e+07
1.0e+07
5.0e+06
0.0e+00
1980
1990
2000
Year
(b)
Ricker 0.533
BevHolt 0.467
Recruits
1.5e+07
1.0e+07
5.0e+06
0.0e+00
0
1000
2000
3000
4000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.39
−10
−5
0
5
10
lag

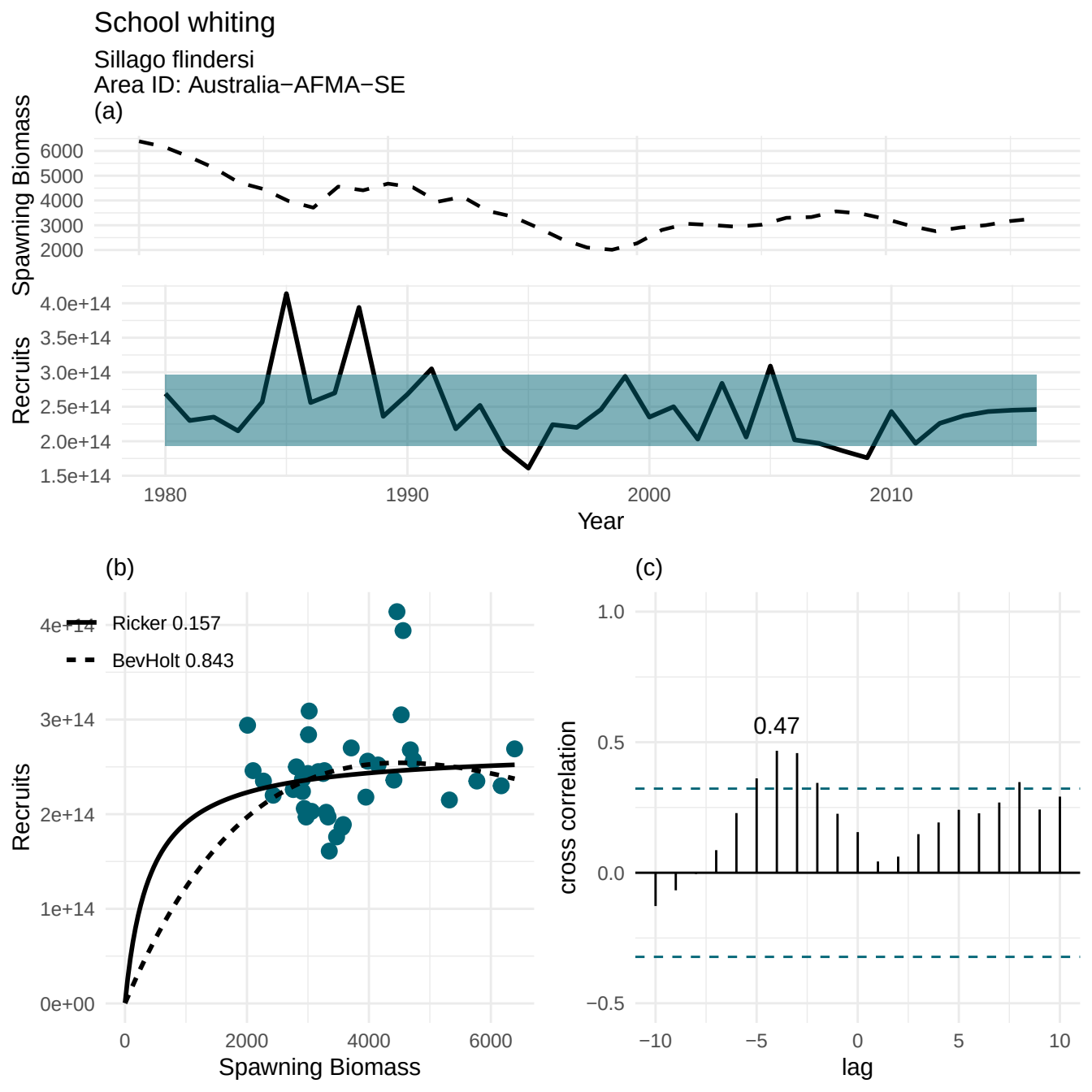

Shortspine thornyhead
Sebastolobus alascanus
Area ID: USA−NMFS−PCOAST
(a)
Spawning Biomass
180000
160000
140000
Recruits
3.5e+07
3.0e+07
2.5e+07
2.0e+07
1980
1990
2000
2010
Year
(b)
Ricker 0.52
BevHolt 0.48
Recruits
3e+07
2e+07
1e+07
0e+00
0
50000
100000
150000
200000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

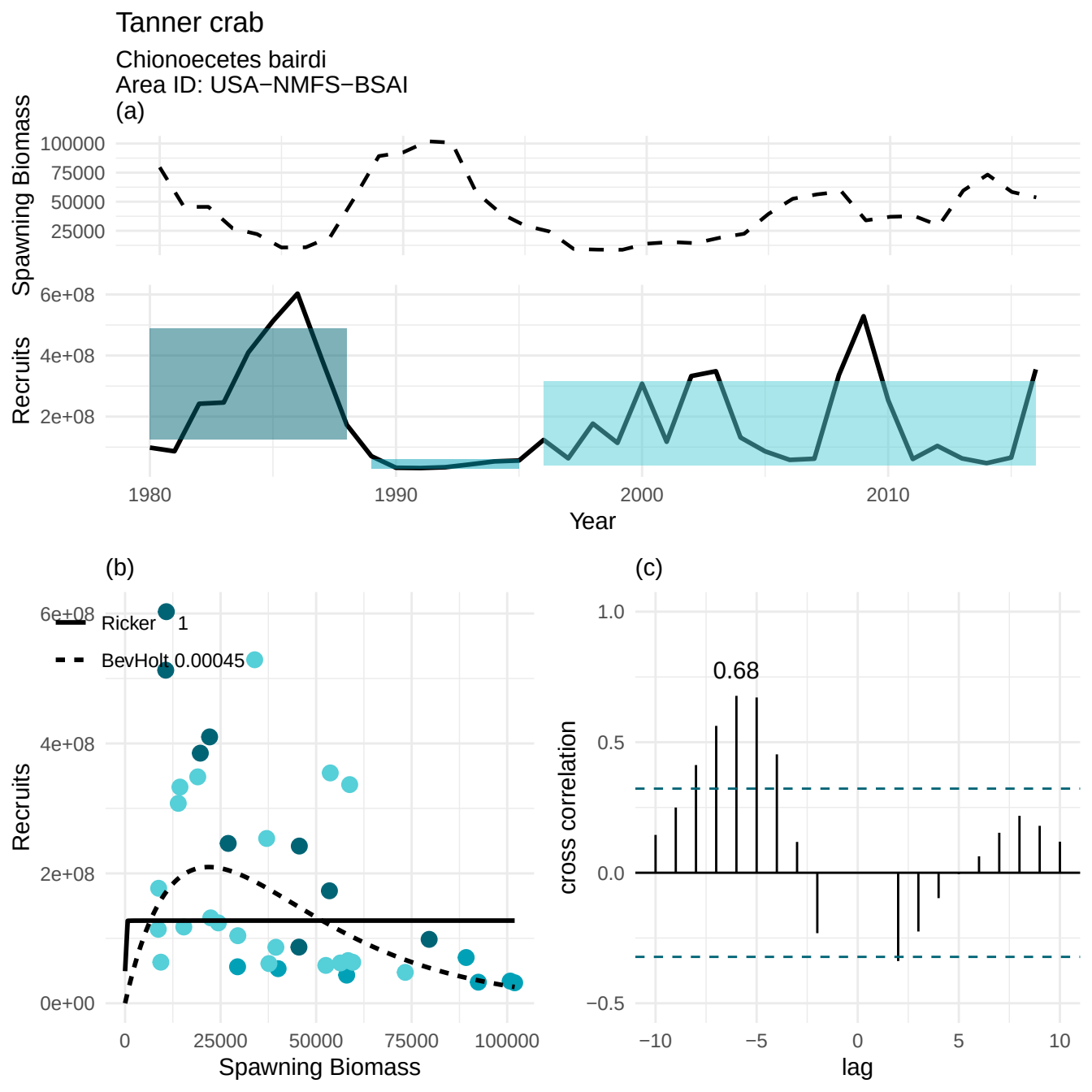

Starry flounder
Platichthys stellatus
Area ID: USA−NMFS−SPCOAST
(a)
Spawning Biomass
2000
1000
Recruits
6e+09
4e+09
2e+09
0e+00
1980
1990
2000
Year
(b)
Ricker 0.983
BevHolt 0.0166
Recruits
6e+09
4e+09
2e+09
0e+00
0
1000
2000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.51
−10
−5
0
5
10
lag

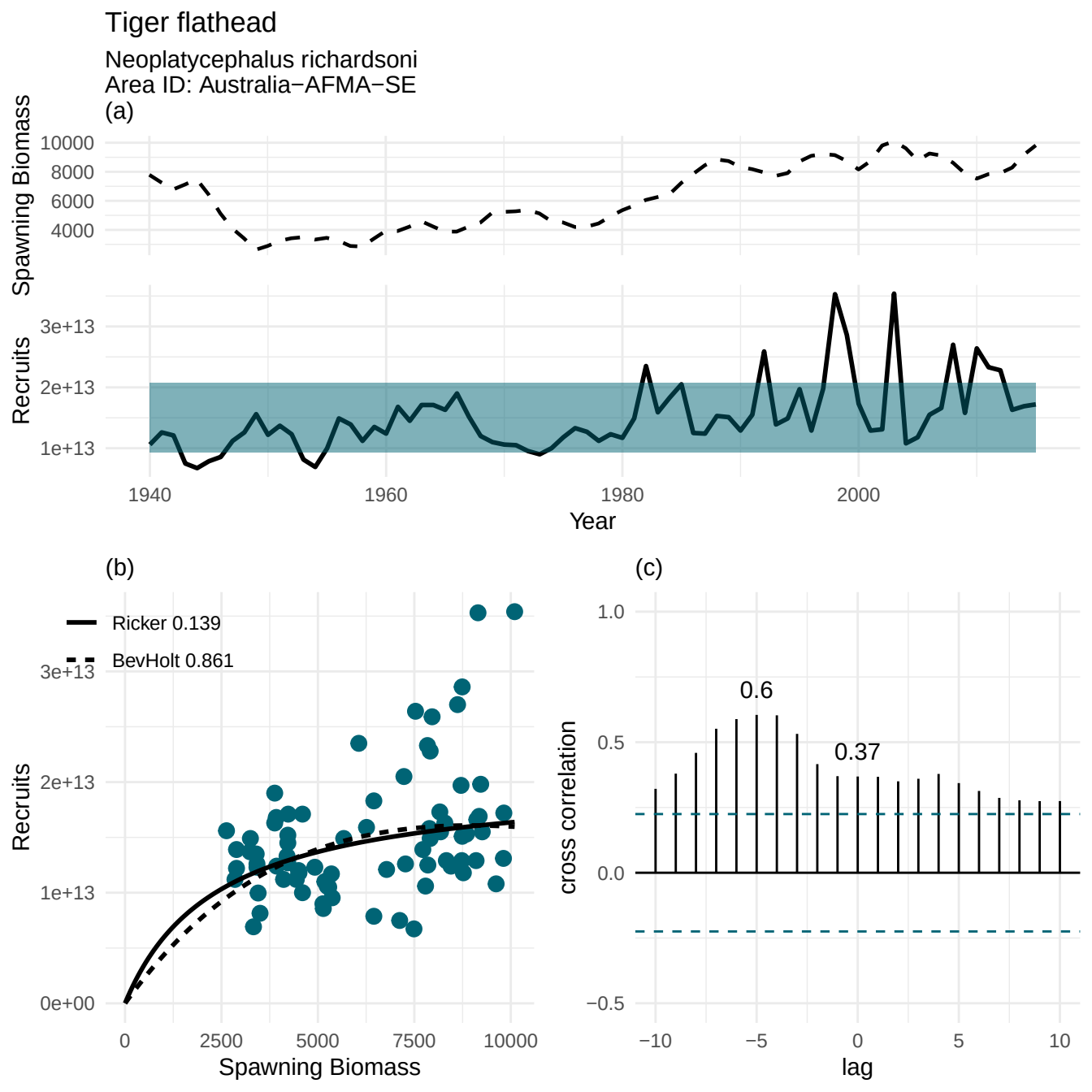

Striped marlin
Kajikia audax
Area ID: multinational−IATTC−NEPAC
(a)
Spawning Biomass
3000
2000
1000
Recruits
500
400
300
200
100
1980
1990
2000
Year
(b)
Ricker 0.51
BevHolt 0.49
Recruits
500
400
300
200
100
0
0
1000
2000
3000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.55
−10
−5
0
5
10
lag

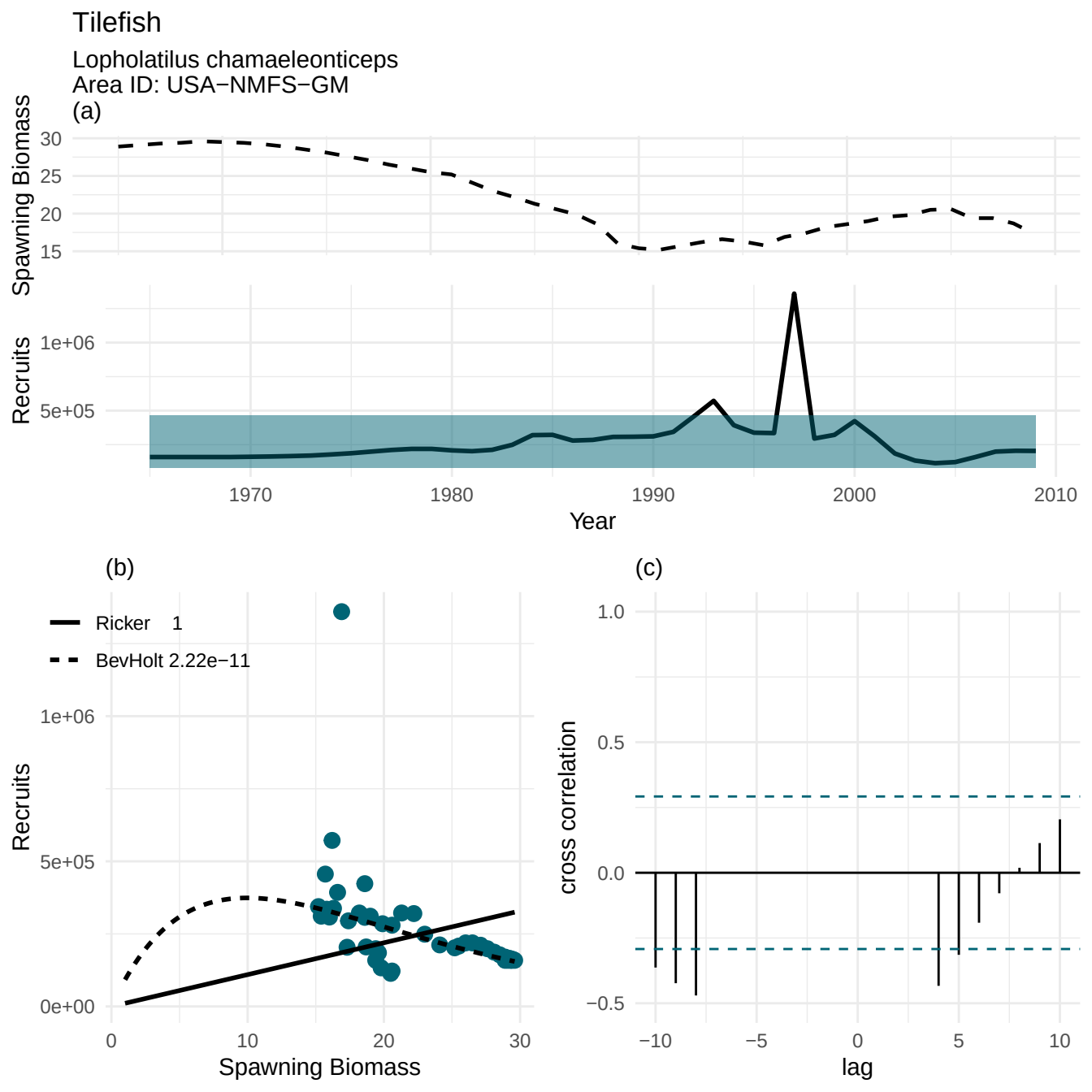

Striped marlin
Kajikia audax
Area ID: multinational−ISC−WCPAC
(a)
Spawning Biomass
5000
4000
3000
2000
1000
Recruits
1600000
1200000
800000
400000
1980
1990
2000
2010
Year
(b)
Ricker 0.357
BevHolt 0.643
Recruits
1500000
1000000
500000
0
0
1000
2000
3000
4000
5000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.39
−10
−5
0
5
10
lag

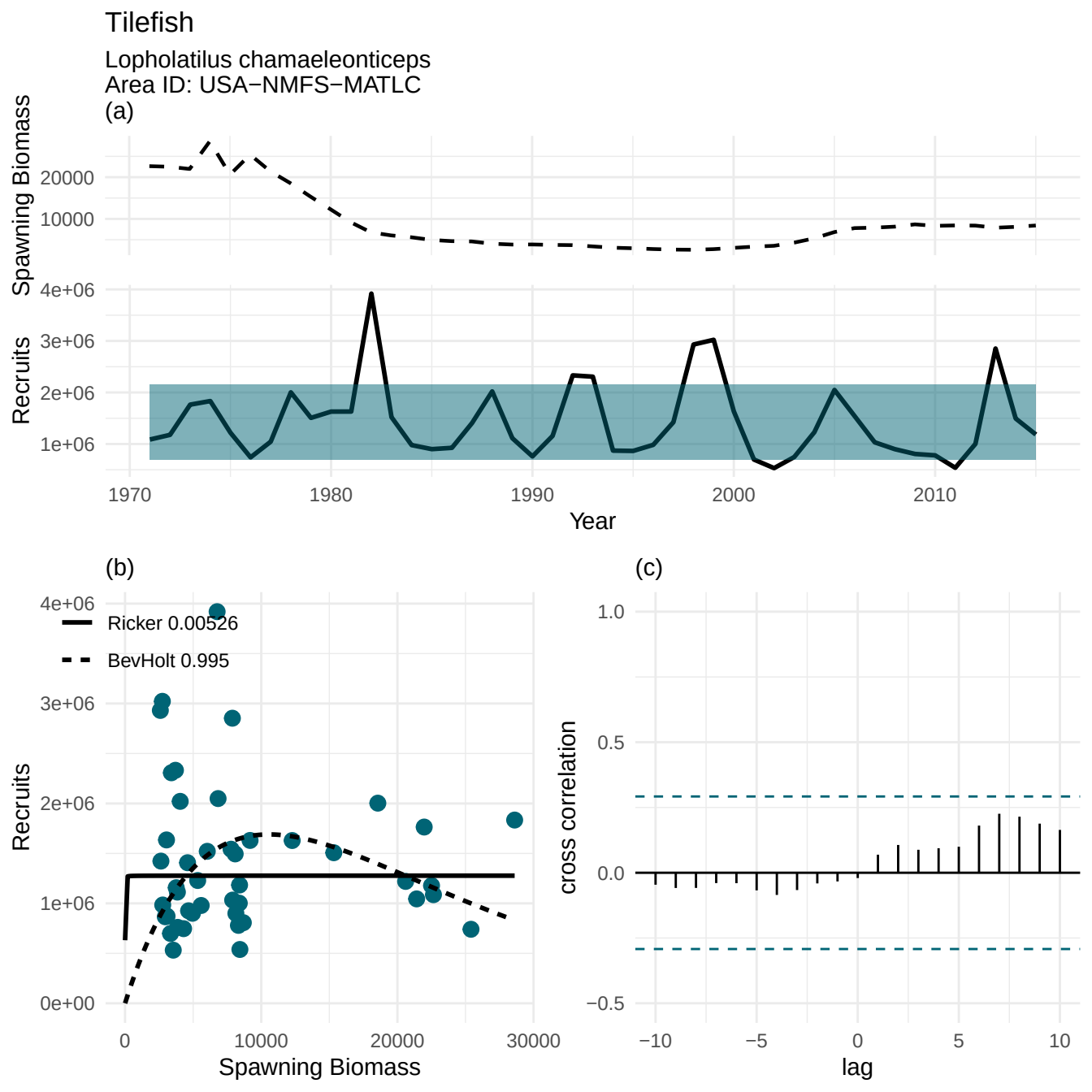

Striped bass
Morone saxatilis
Area ID: USA−NMFS−5YCHATT
(a)
Spawning Biomass
80000
60000
40000
20000
Recruits
1.5e+08
1.0e+08
5.0e+07
1990
2000
2010
Year
(b)
Ricker 0.407
BevHolt 0.593
Recruits
1.5e+08
1.0e+08
5.0e+07
0.0e+00
0
20000
40000
60000
80000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.54
0.52
−10
−5
0
5
10
lag

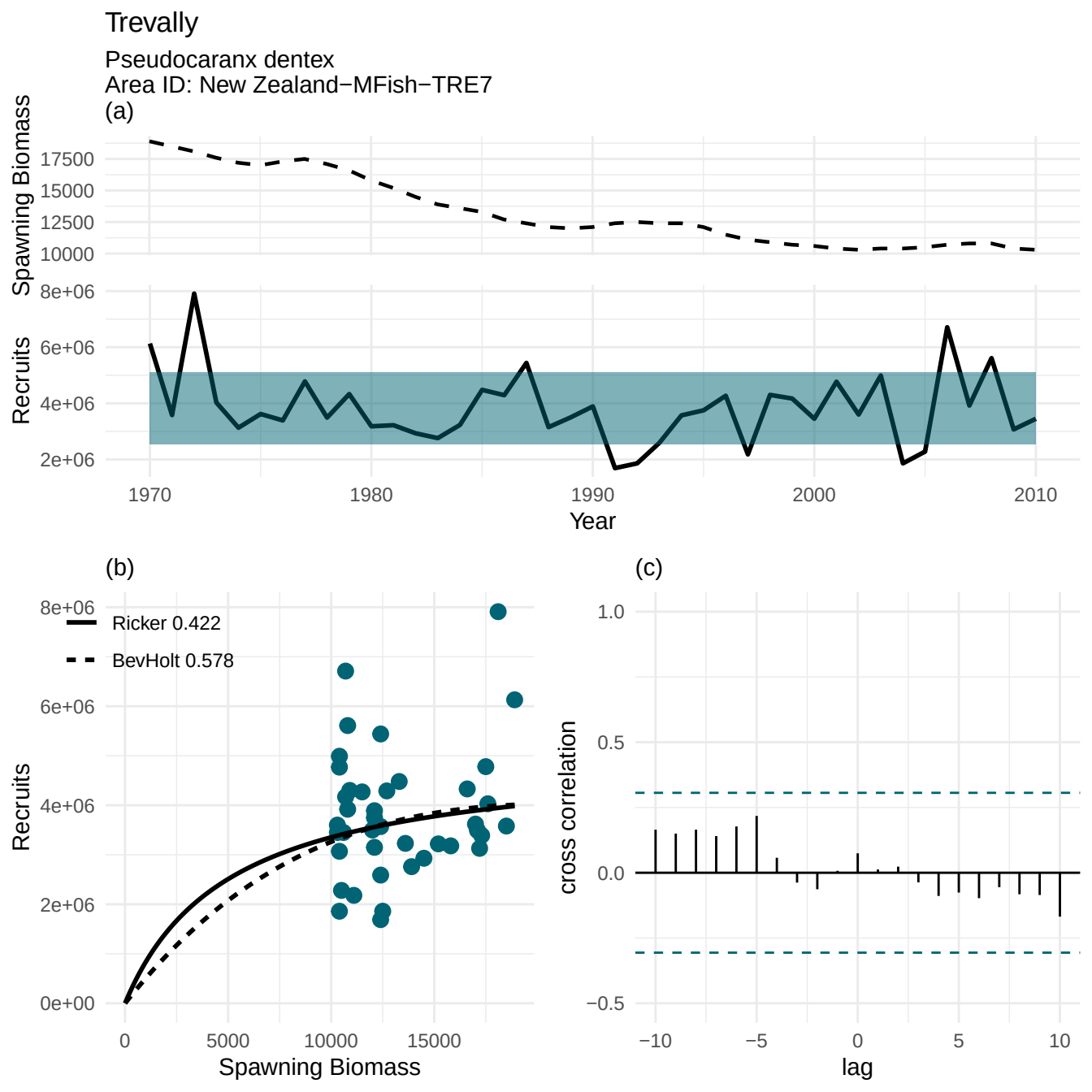

School whiting
Sillago flindersi
Area ID: Australia−AFMA−SE
(a)
Spawning Biomass
6000
5000
4000
3000
2000
Recruits
4.0e+14
3.5e+14
3.0e+14
2.5e+14
2.0e+14
1.5e+14
1980
1990
2000
2010
Year
(b)
Ricker 0.157
BevHolt 0.843
Recruits
4e+14
3e+14
2e+14
1e+14
0e+00
0
2000
4000
6000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.47
−10
−5
0
5
10
lag

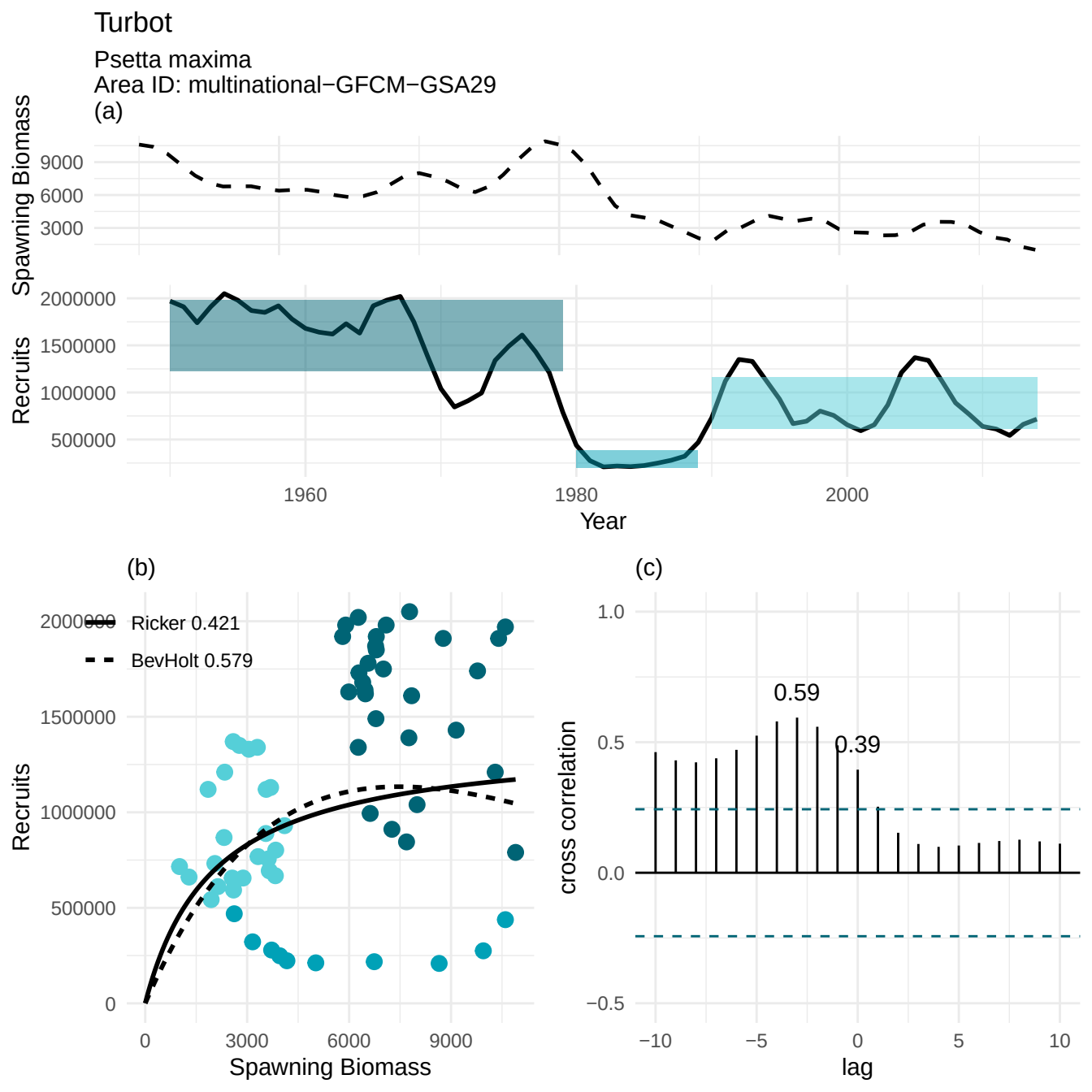

Tanner crab
Chionoecetes bairdi
Area ID: USA−NMFS−BSAI
(a)
Spawning Biomass
100000
75000
50000
25000
Recruits
6e+08
4e+08
2e+08
1980
1990
2000
2010
Year
(b)
Ricker 1
BevHolt 0.00045
Recruits
6e+08
4e+08
2e+08
0e+00
0
25000
50000
75000
100000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.68
−10
−5
0
5
10
lag

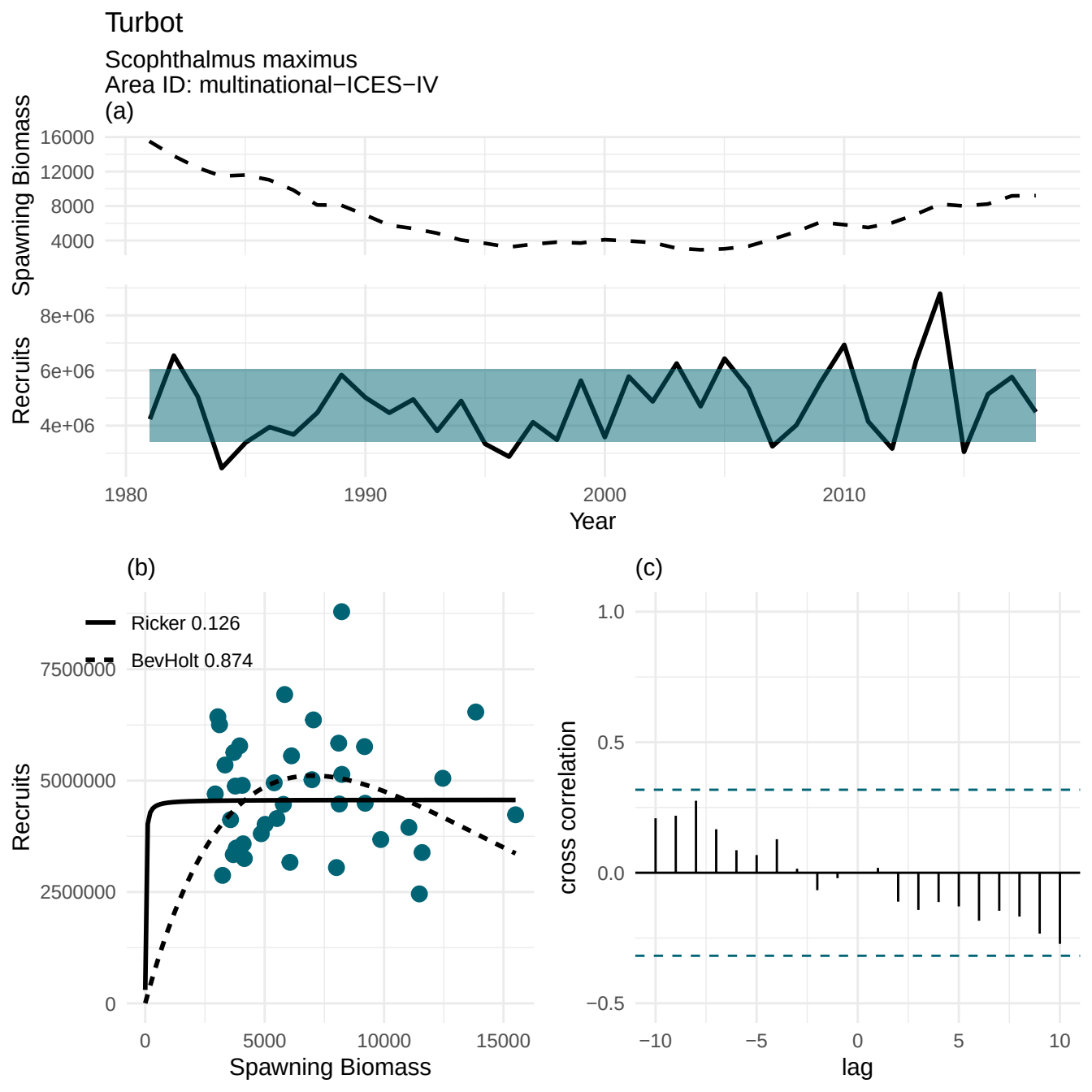

Tiger flathead
Neoplatycephalus richardsoni
Area ID: Australia−AFMA−SE
(a)
Spawning Biomass
10000
8000
6000
4000
Recruits
3e+13
2e+13
1e+13
1940
1960
1980
2000
Year
(b)
Ricker 0.139
BevHolt 0.861
Recruits
3e+13
2e+13
1e+13
0e+00
0
2500
5000
7500
10000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.6
0.37
−10
−5
0
5
10
lag

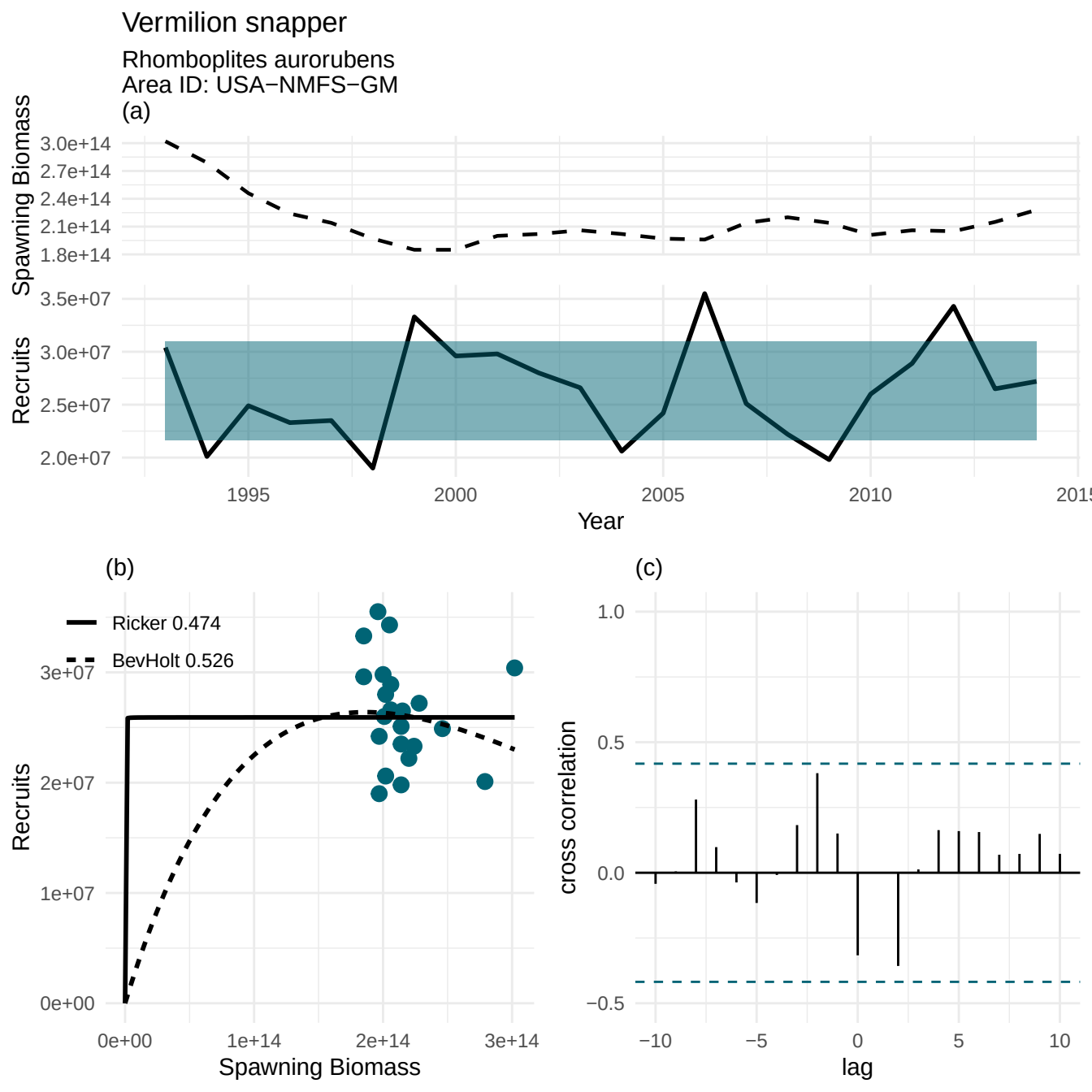

Tilefish
Lopholatilus chamaeleonticeps
Area ID: USA−NMFS−GM
(a)
Spawning Biomass
30
25
20
15
Recruits
1e+06
5e+05
1970
1980
1990
2000
2010
Year
(b)
Ricker 1
BevHolt 2.22e−11
Recruits
1e+06
5e+05
0e+00
0
10
20
30
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

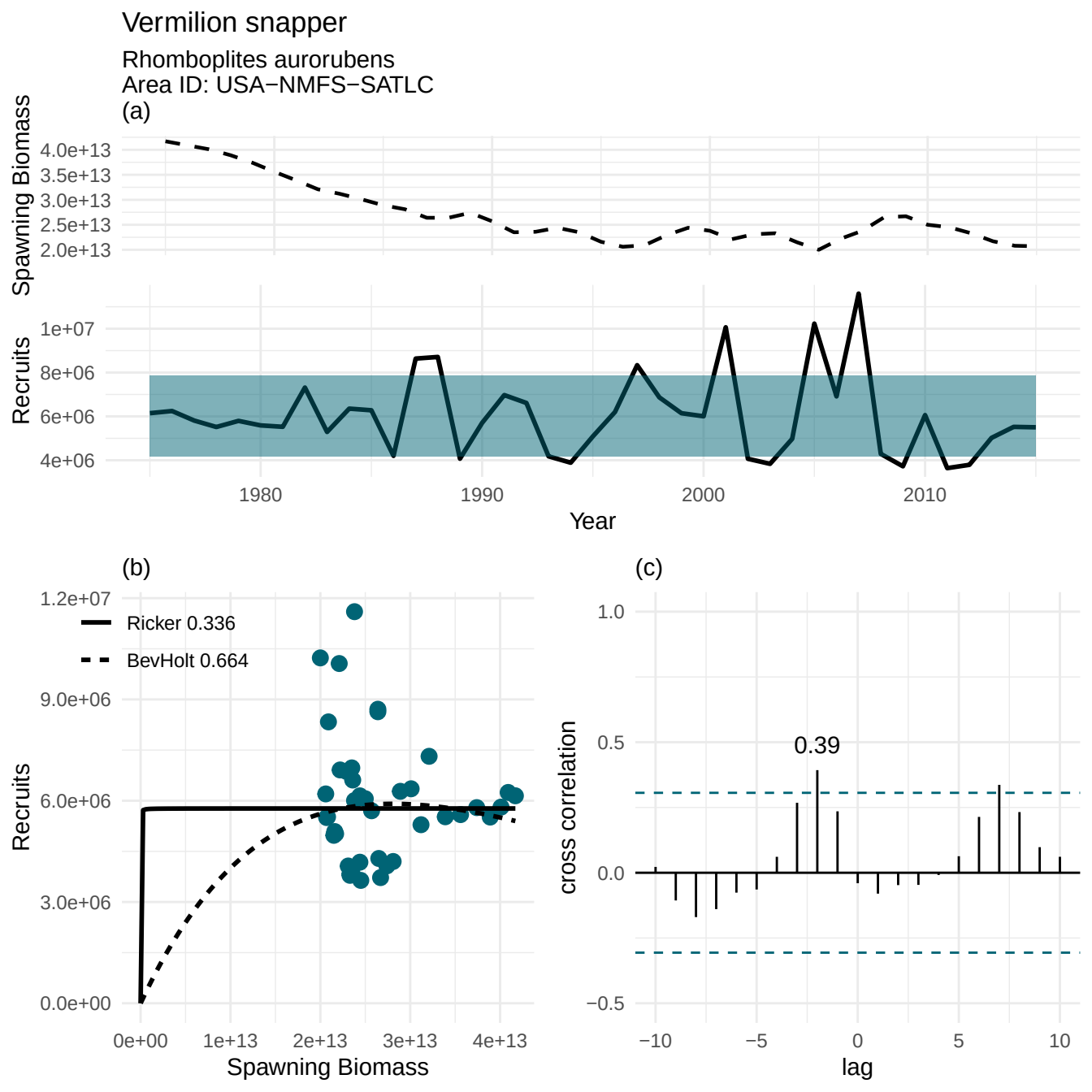

Tilefish
Lopholatilus chamaeleonticeps
Area ID: USA−NMFS−MATLC
(a)
Spawning Biomass
20000
10000
Recruits
4e+06
3e+06
2e+06
1e+06
1970
1980
1990
2000
2010
Year
(b)
Ricker 0.00526
BevHolt 0.995
Recruits
4e+06
3e+06
2e+06
1e+06
0e+00
0
10000
20000
30000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

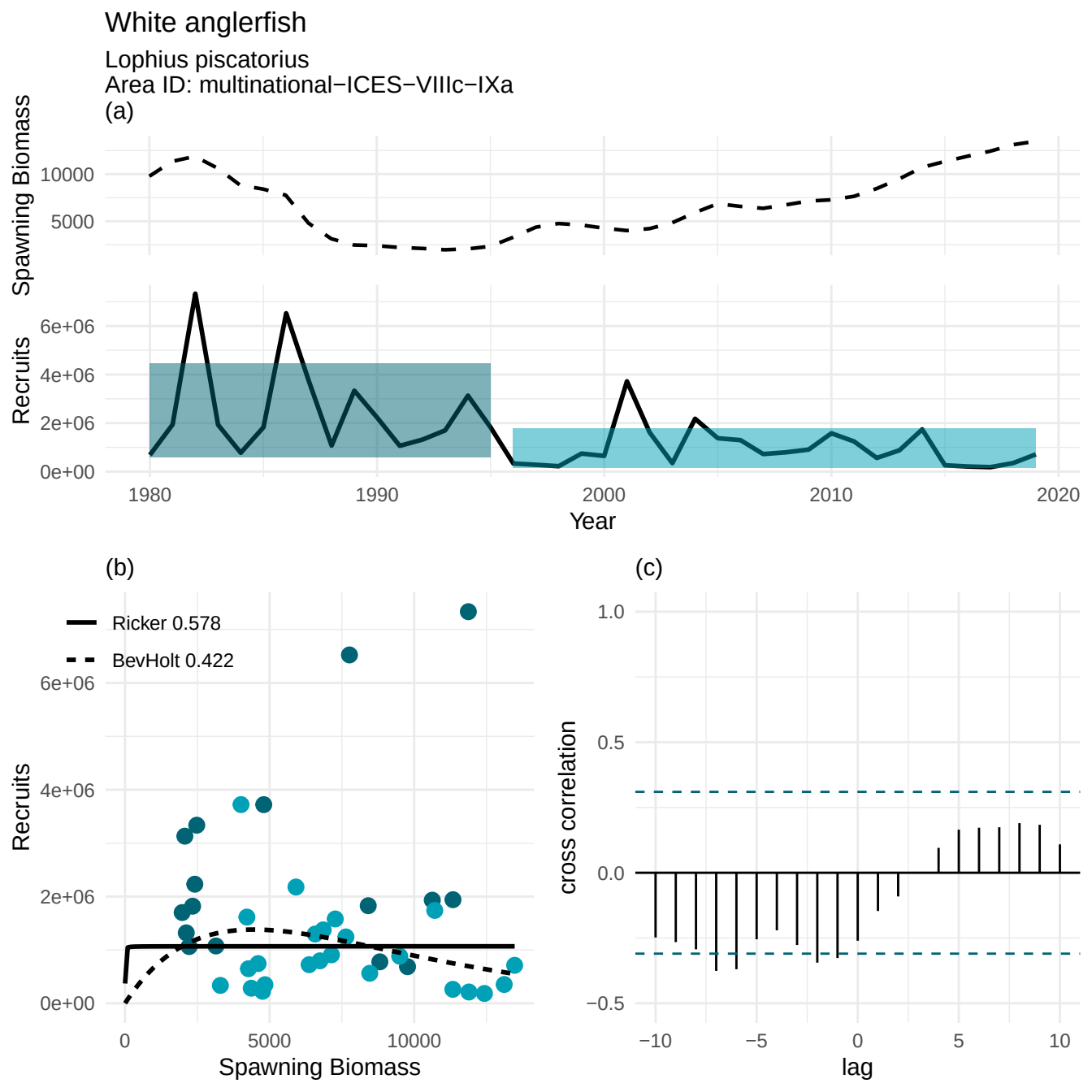

Trevally
Pseudocaranx dentex
Area ID: New Zealand−MFish−TRE7
(a)
Spawning Biomass
17500
15000
12500
10000
Recruits
8e+06
6e+06
4e+06
2e+06
1970
1980
1990
2000
2010
Year
(b)
Ricker 0.422
BevHolt 0.578
Recruits
8e+06
6e+06
4e+06
2e+06
0e+00
0
5000
10000
15000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

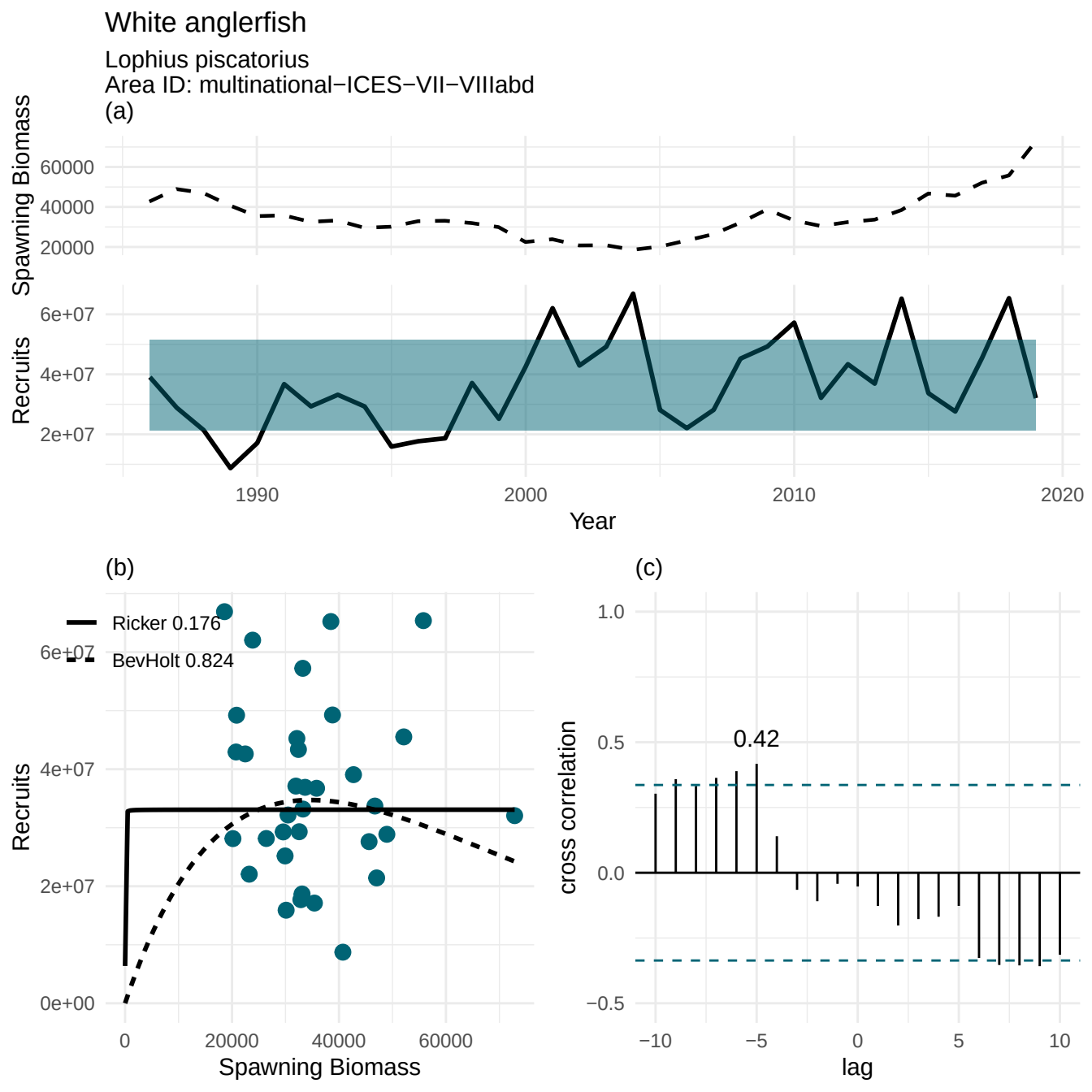

Turbot
Psetta maxima
Area ID: multinational−GFCM−GSA29
(a)
Spawning Biomass
9000
6000
3000
Recruits
2000000
1500000
1000000
500000
1960
1980
2000
Year
(b)
Ricker 0.421
BevHolt 0.579
Recruits
1500000
1000000
500000
0
0
3000
6000
9000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.59
0.39
−10
−5
0
5
10
lag

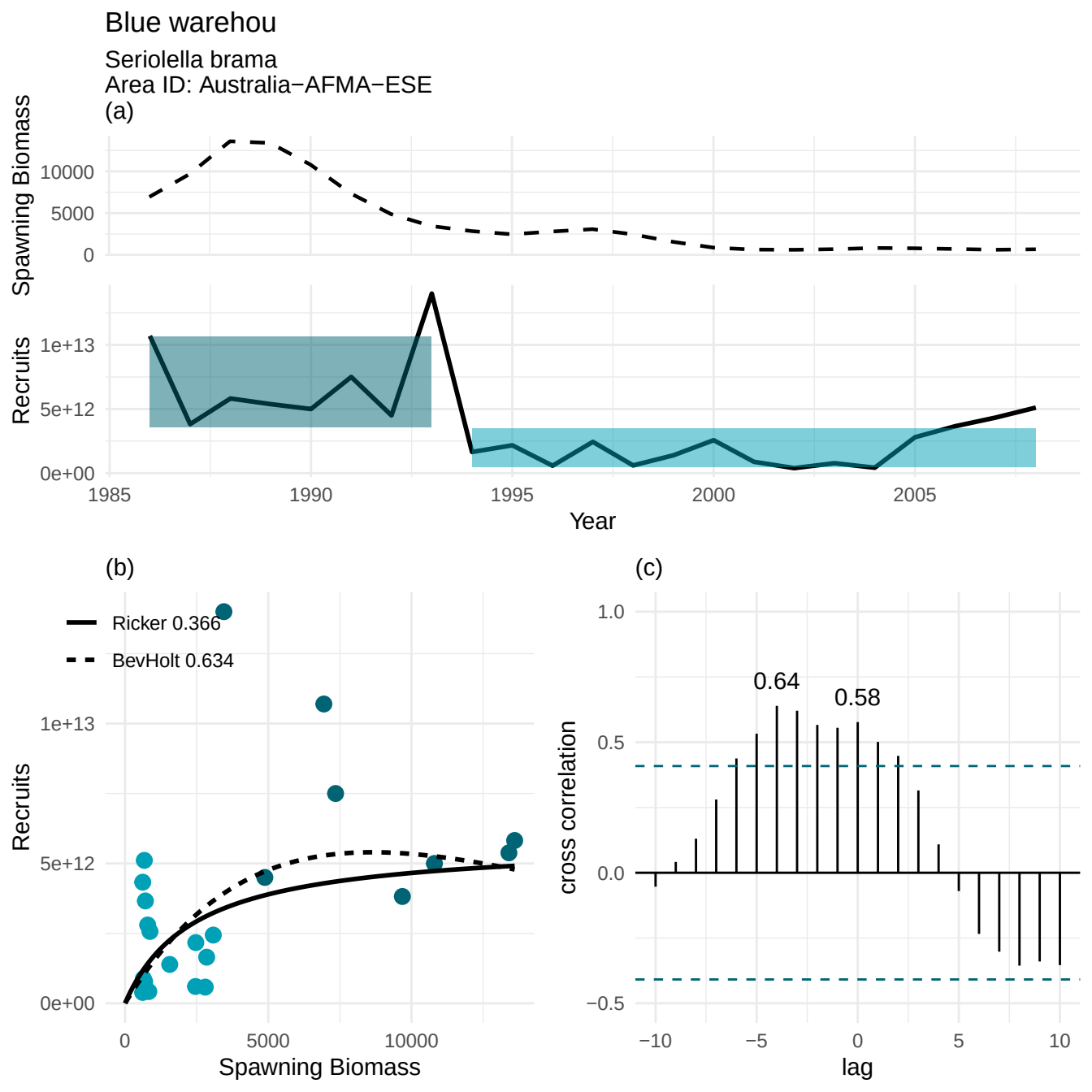

Turbot
Scophthalmus maximus
Area ID: multinational−ICES−IV
(a)
Spawning Biomass
16000
12000
8000
4000
Recruits
8e+06
6e+06
4e+06
1980
1990
2000
2010
Year
(b)
Ricker 0.126
BevHolt 0.874
Recruits
7500000
5000000
2500000
0
0
5000
10000
15000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

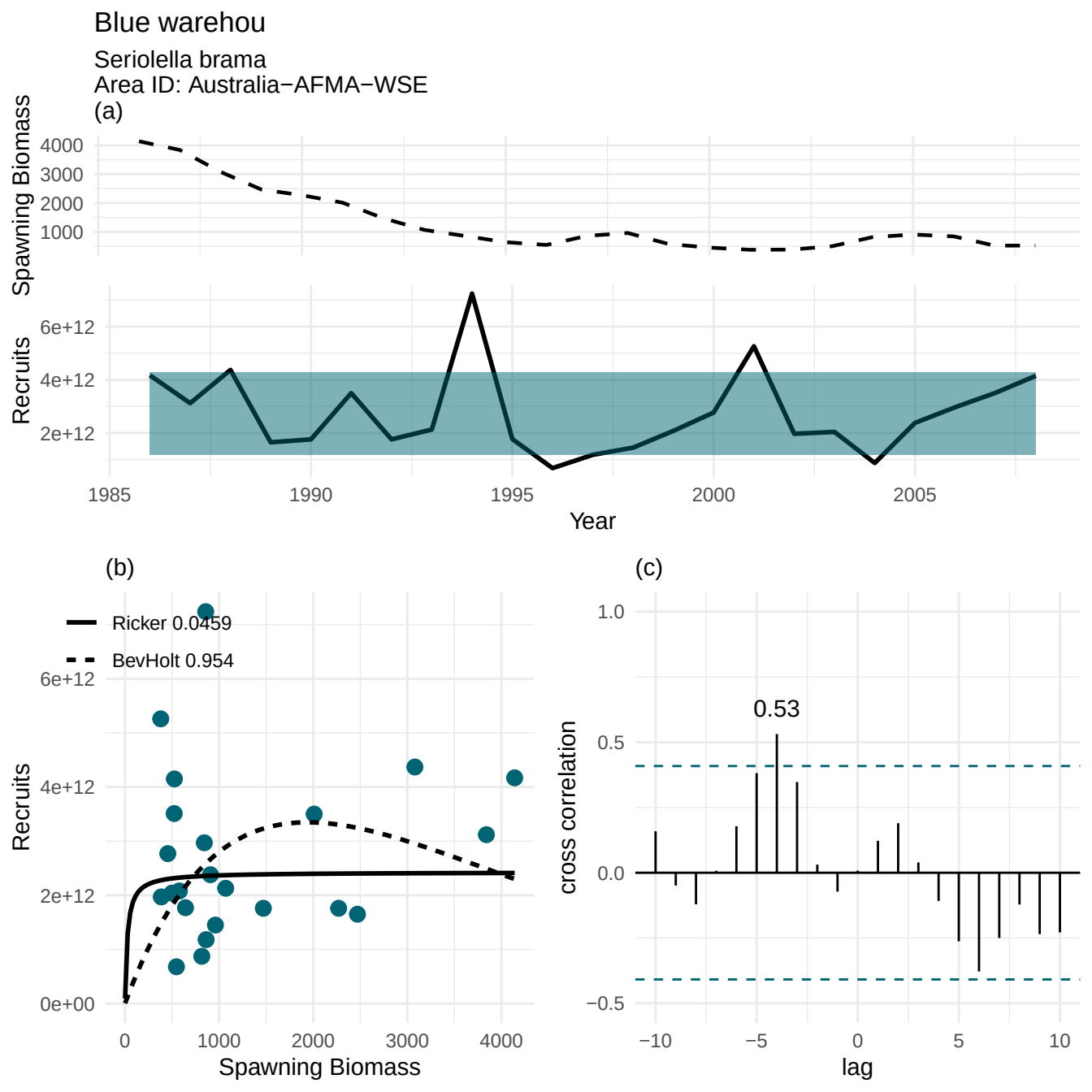

Vermilion snapper
Rhomboplites aurorubens
Area ID: USA−NMFS−GM
(a)
Spawning Biomass
3.0e+14
2.7e+14
2.4e+14
2.1e+14
1.8e+14
Recruits
3.5e+07
3.0e+07
2.5e+07
2.0e+07
1995
2000
2005
2010
Year
(b)
Ricker 0.474
BevHolt 0.526
Recruits
3e+07
2e+07
1e+07
0e+00
0e+00
1e+14
2e+14
3e+14
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

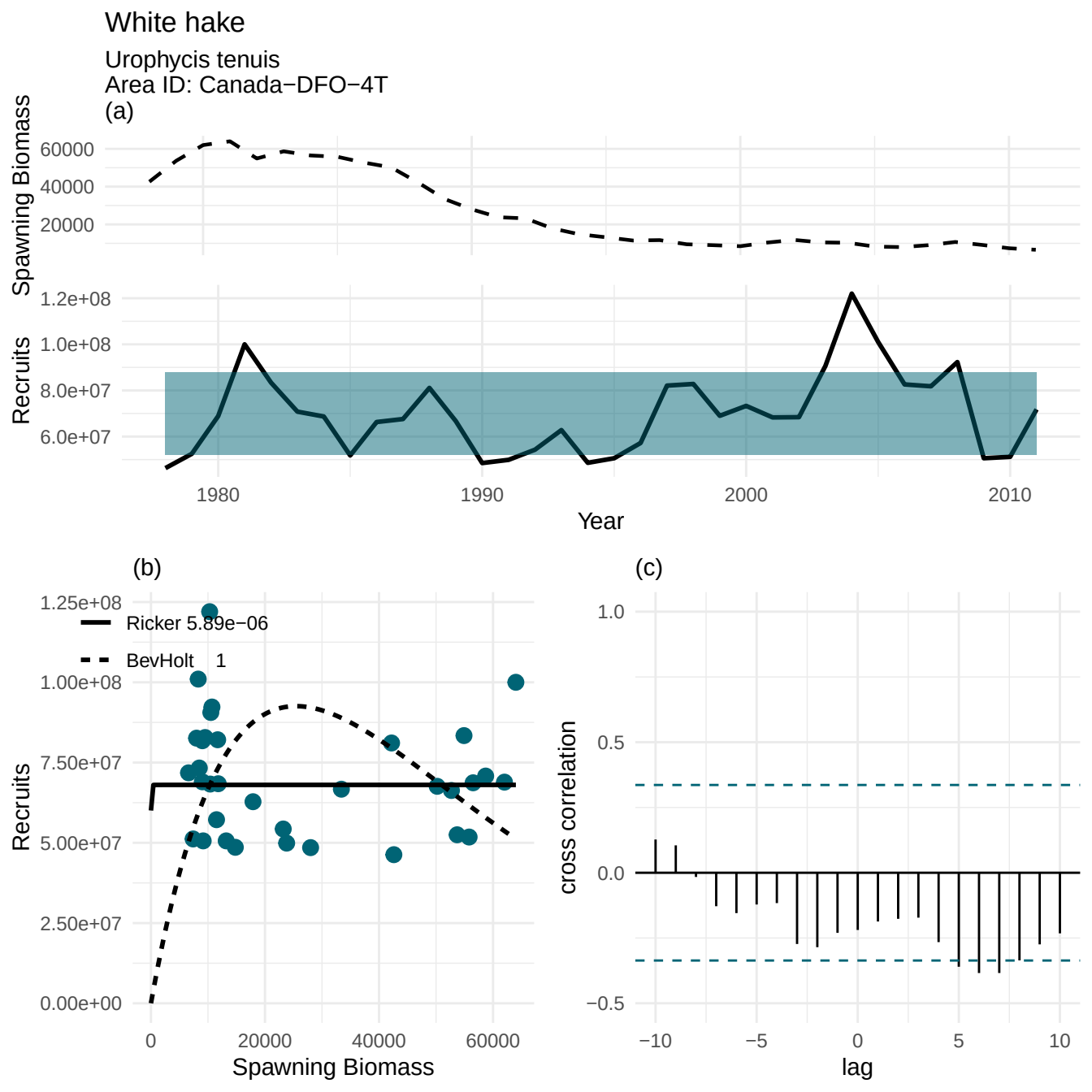

Vermilion snapper
Rhomboplites aurorubens
Area ID: USA−NMFS−SATLC
(a)
Spawning Biomass
4.0e+13
3.5e+13
3.0e+13
2.5e+13
2.0e+13
Recruits
1e+07
8e+06
6e+06
4e+06
1980
1990
2000
2010
Year
(b)
Ricker 0.336
BevHolt 0.664
Recruits
1.2e+07
9.0e+06
6.0e+06
3.0e+06
0.0e+00
0e+00
1e+13
2e+13
3e+13
4e+13
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.39
−10
−5
0
5
10
lag

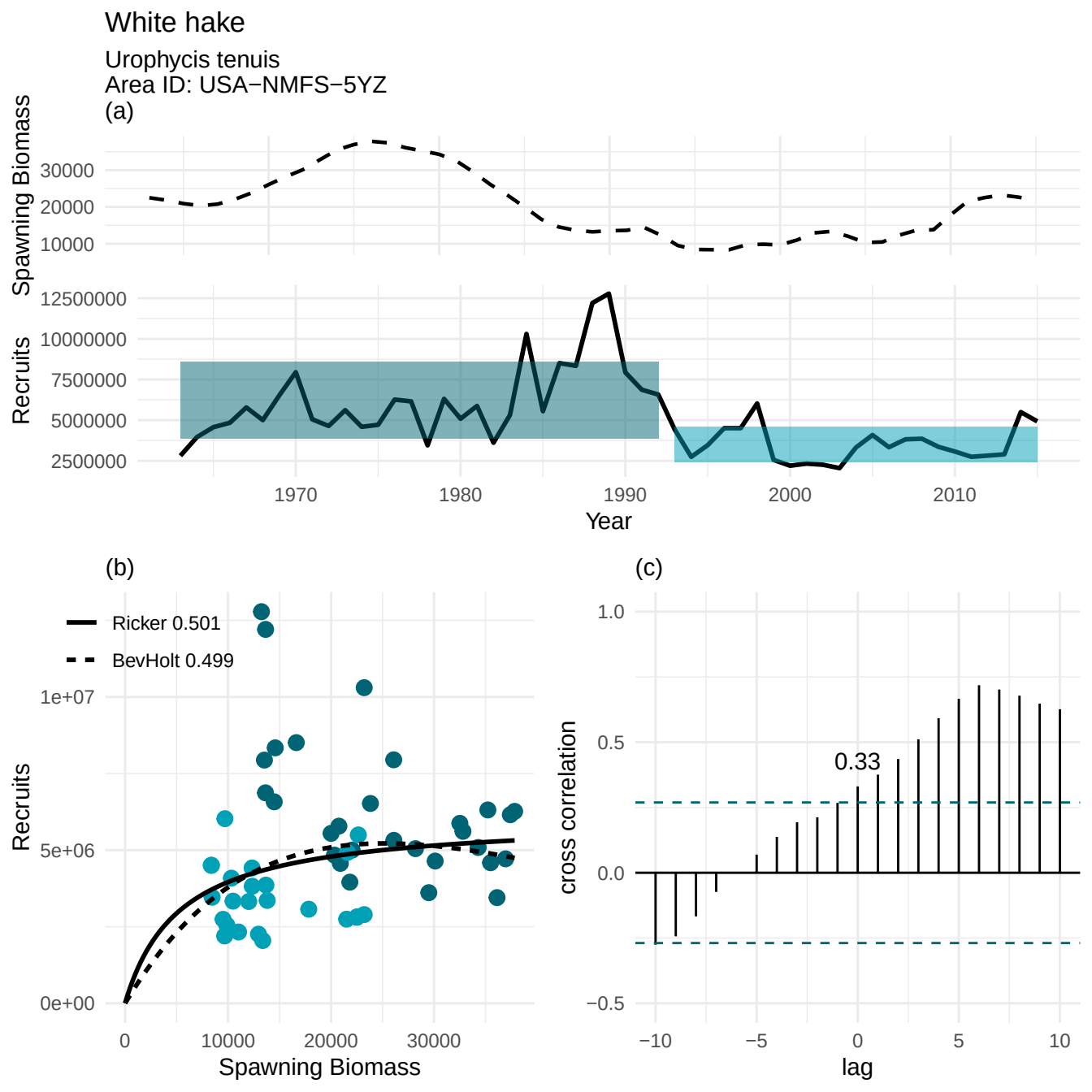

White anglerfish
Lophius piscatorius
Area ID: multinational−ICES−VIIIc−IXa
(a)
Spawning Biomass
10000
5000
Recruits
6e+06
4e+06
2e+06
0e+00
1980
1990
2000
2010
2020
Year
(b)
Ricker 0.578
BevHolt 0.422
Recruits
6e+06
4e+06
2e+06
0e+00
0
5000
10000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

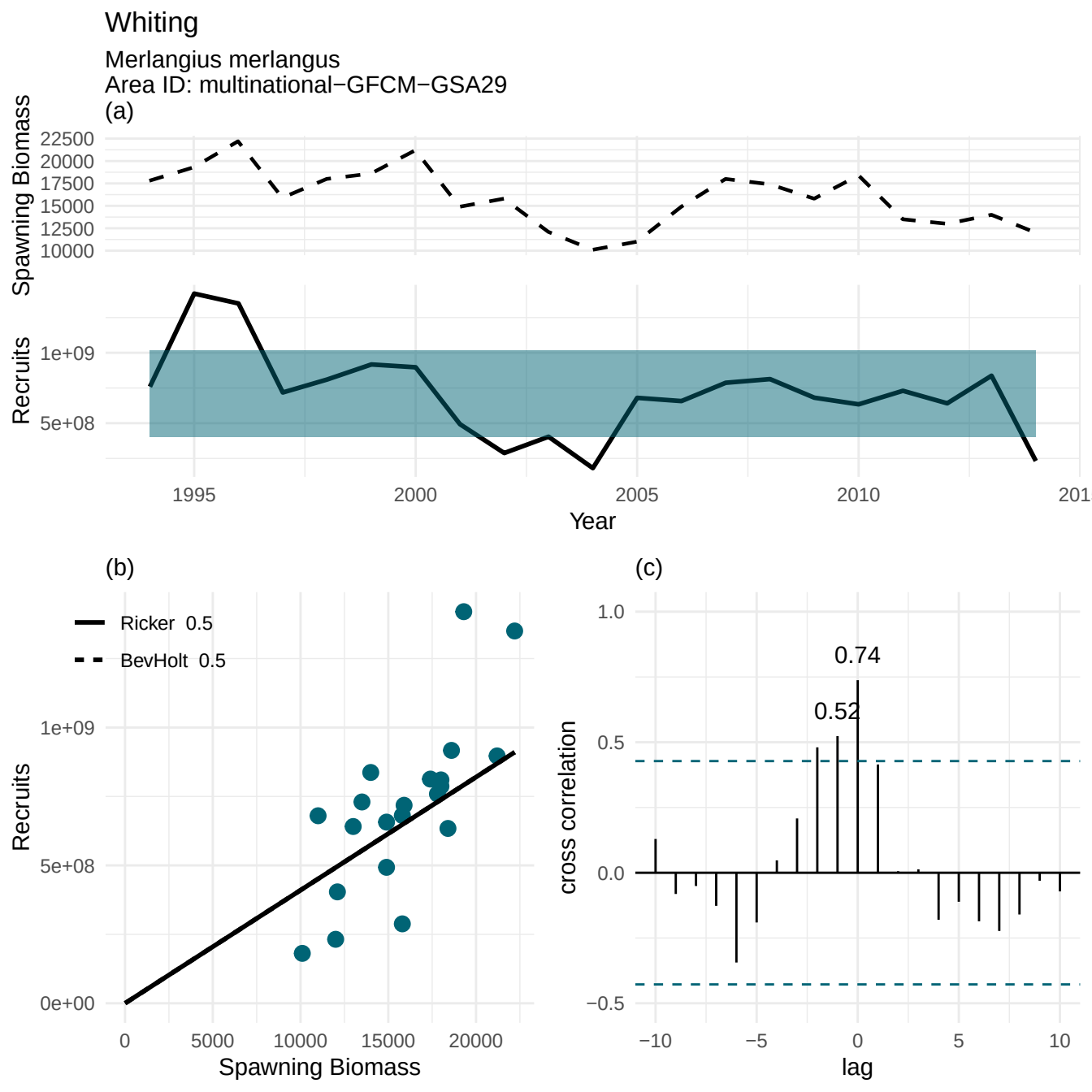

White anglerfish
Lophius piscatorius
Area ID: multinational−ICES−VII−VIIIabd
(a)
Spawning Biomass
60000
40000
20000
Recruits
6e+07
4e+07
2e+07
1990
2000
2010
2020
Year
(b)
Ricker 0.176
BevHolt 0.824
Recruits
6e+07
4e+07
2e+07
0e+00
0
20000
40000
60000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.42
−10
−5
0
5
10
lag

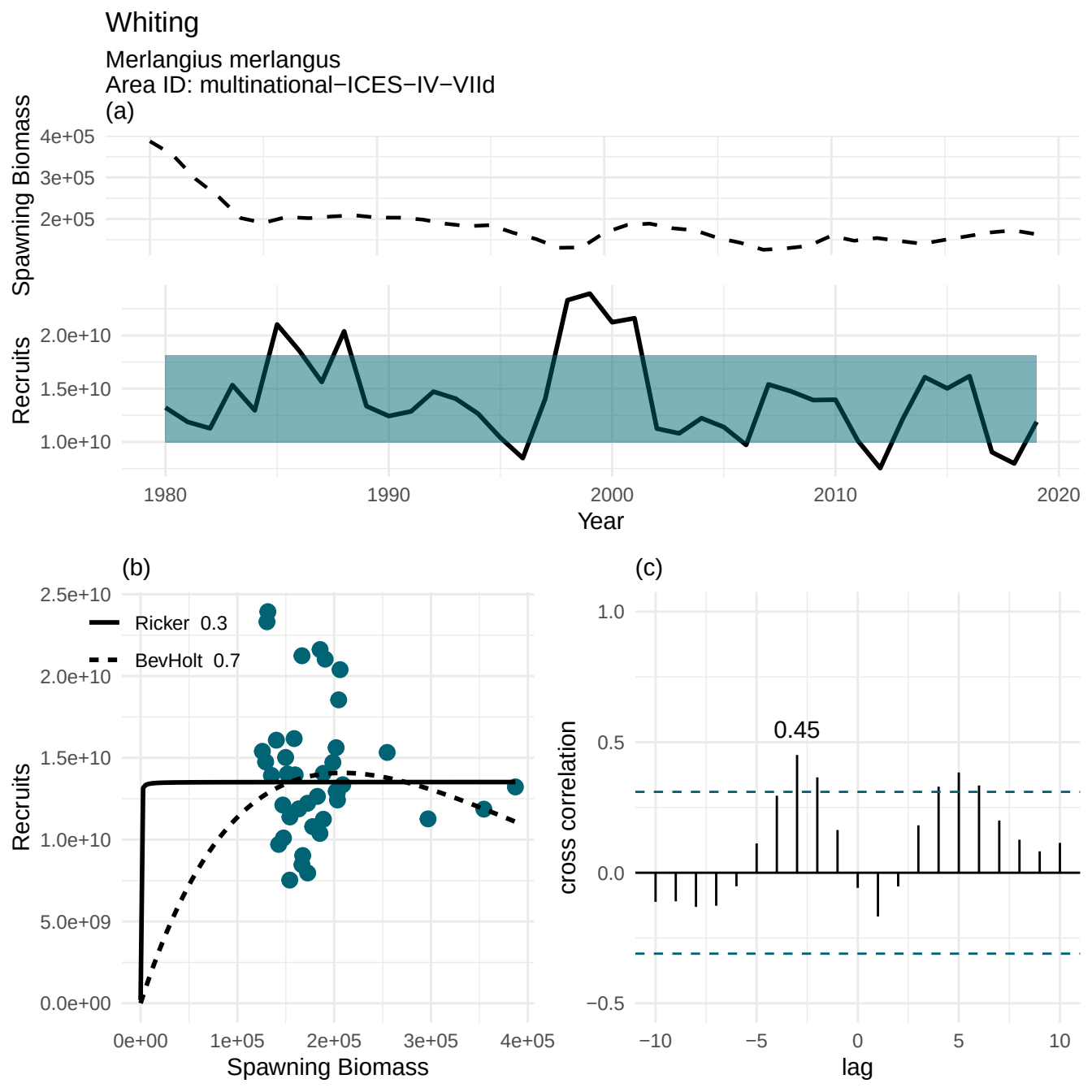

Blue warehou
Seriolella brama
Area ID: Australia−AFMA−ESE
(a)
Spawning Biomass
10000
5000
0
Recruits
1e+13
5e+12
0e+00
1985
1990
1995
2000
2005
Year
(b)
Ricker 0.366
BevHolt 0.634
Recruits
1e+13
5e+12
0e+00
0
5000
10000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.64
0.58
−10
−5
0
5
10
lag

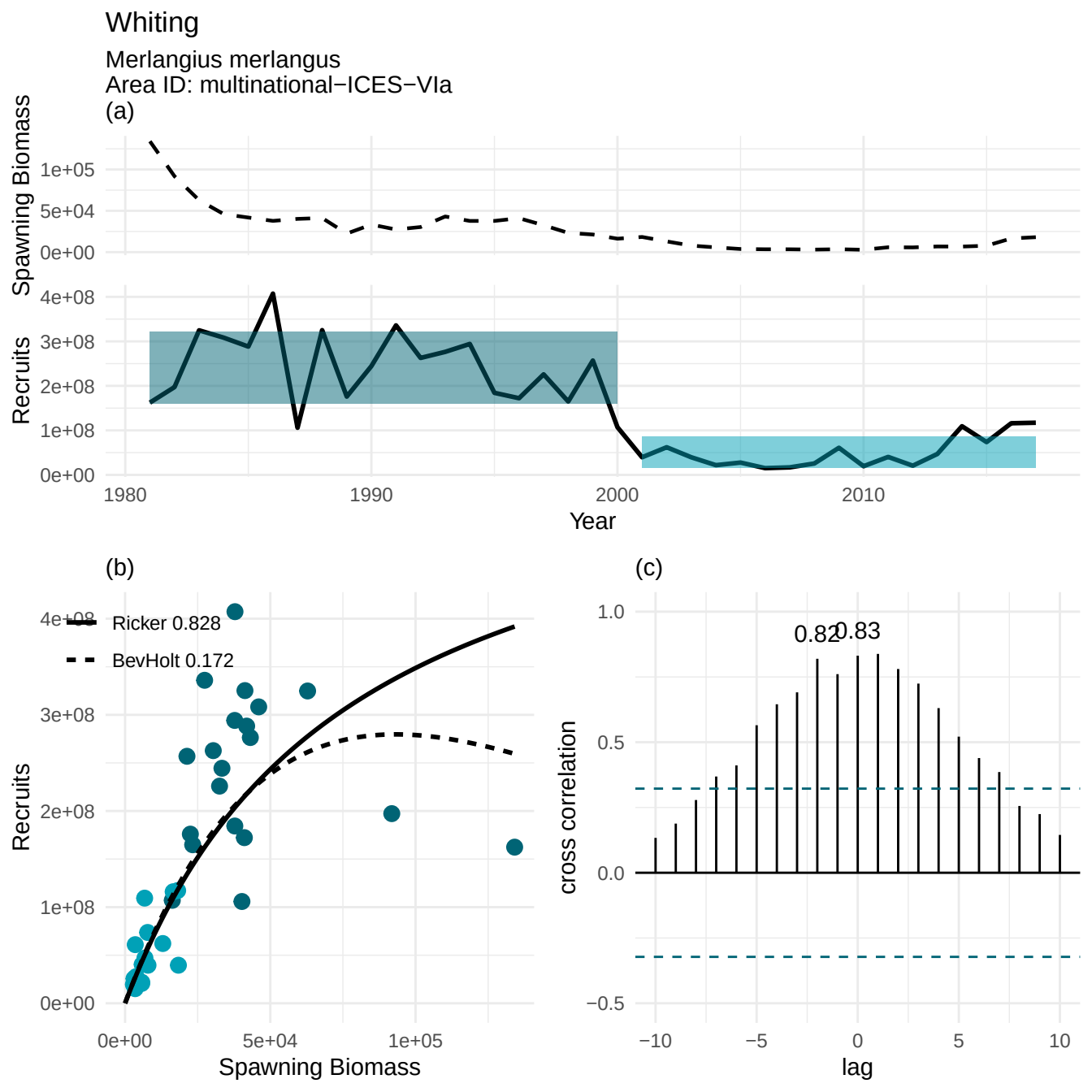

Blue warehou
Seriolella brama
Area ID: Australia−AFMA−WSE
(a)
Spawning Biomass
4000
3000
2000
1000
Recruits
6e+12
4e+12
2e+12
1985
1990
1995
2000
2005
Year
(b)
Ricker 0.0459
BevHolt 0.954
Recruits
6e+12
4e+12
2e+12
0e+00
0
1000
2000
3000
4000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.53
−10
−5
0
5
10
lag

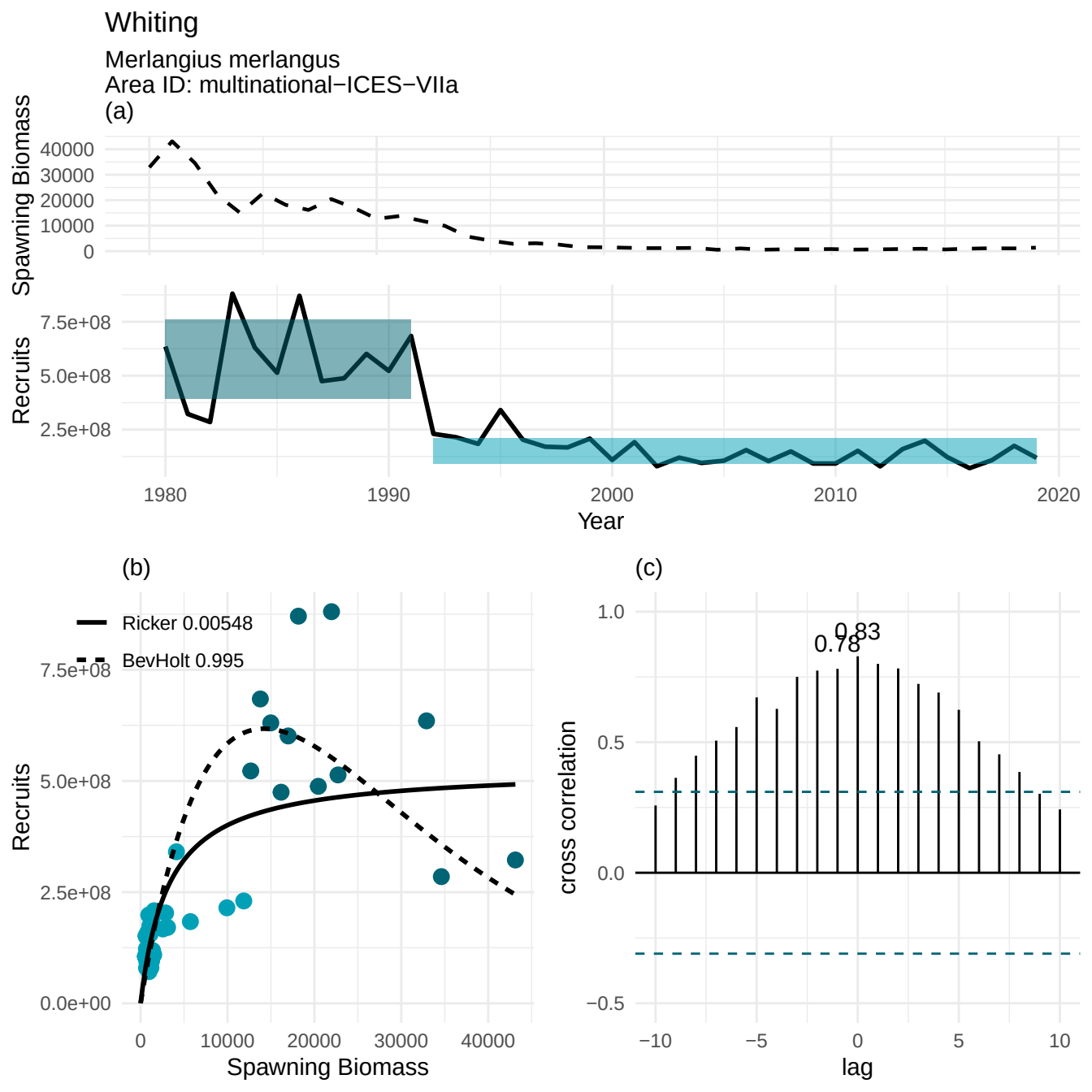

White hake
Urophycis tenuis
Area ID: Canada−DFO−4T
(a)
Spawning Biomass
60000
40000
20000
Recruits
1.2e+08
1.0e+08
8.0e+07
6.0e+07
1980
1990
2000
2010
Year
(b)
1.25e+08
Ricker 5.89e−06
BevHolt 1
1.00e+08
7.50e+07
5.00e+07
2.50e+07
0.00e+00
Recruits
0
20000
40000
60000
Spawning Biomass
(c)
1.0
0.5
0.0
−0.5
cross correlation
−10
−5
0
5
10
lag

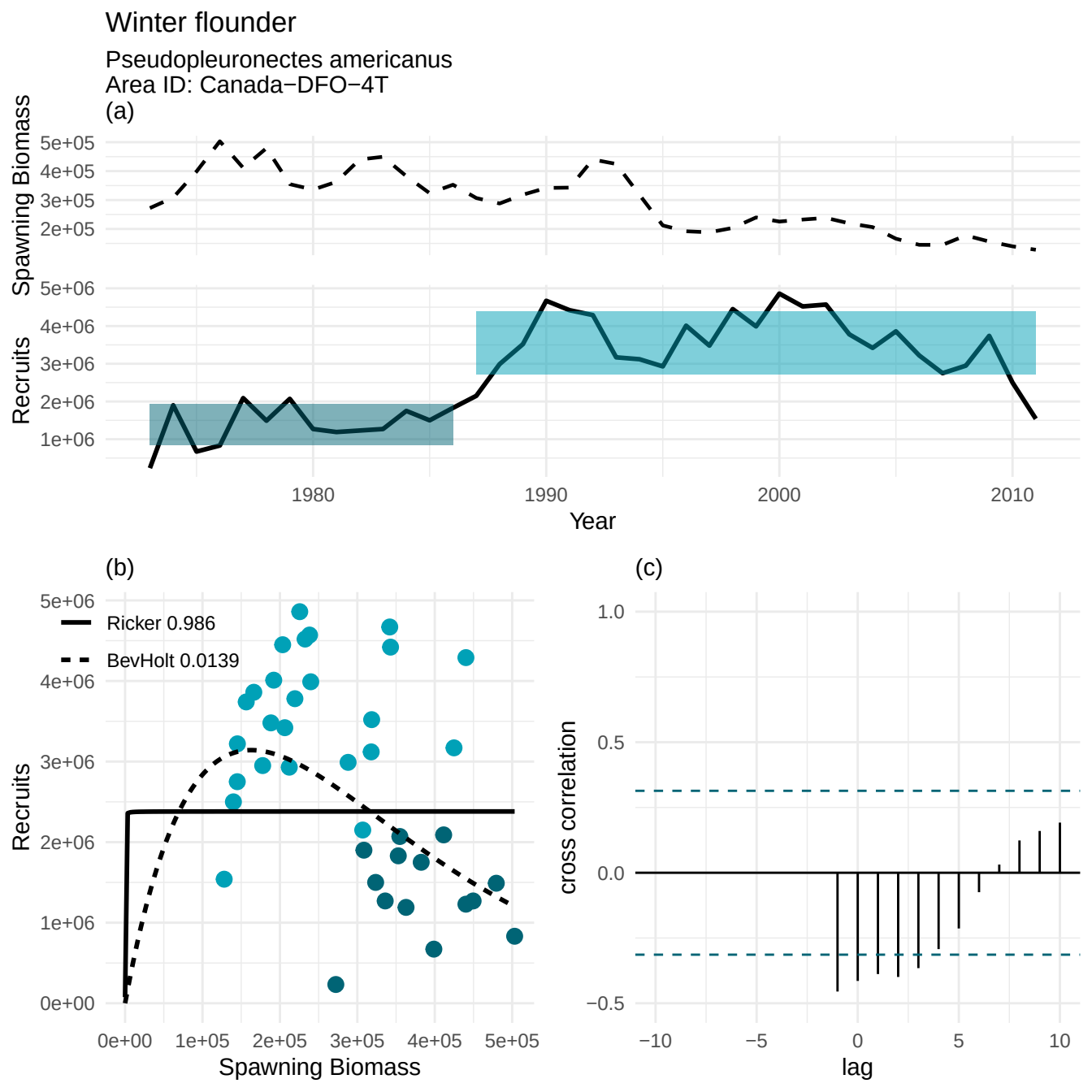

White hake
Urophycis tenuis
Area ID: USA−NMFS−5YZ
(a)
Spawning Biomass
30000
20000
10000
Recruits
12500000
10000000
7500000
5000000
2500000
1970
1980
1990
2000
2010
Year
(b)
Ricker 0.501
BevHolt 0.499
Recruits
1e+07
5e+06
0e+00
0
10000
20000
30000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.33
−10
−5
0
5
10
lag

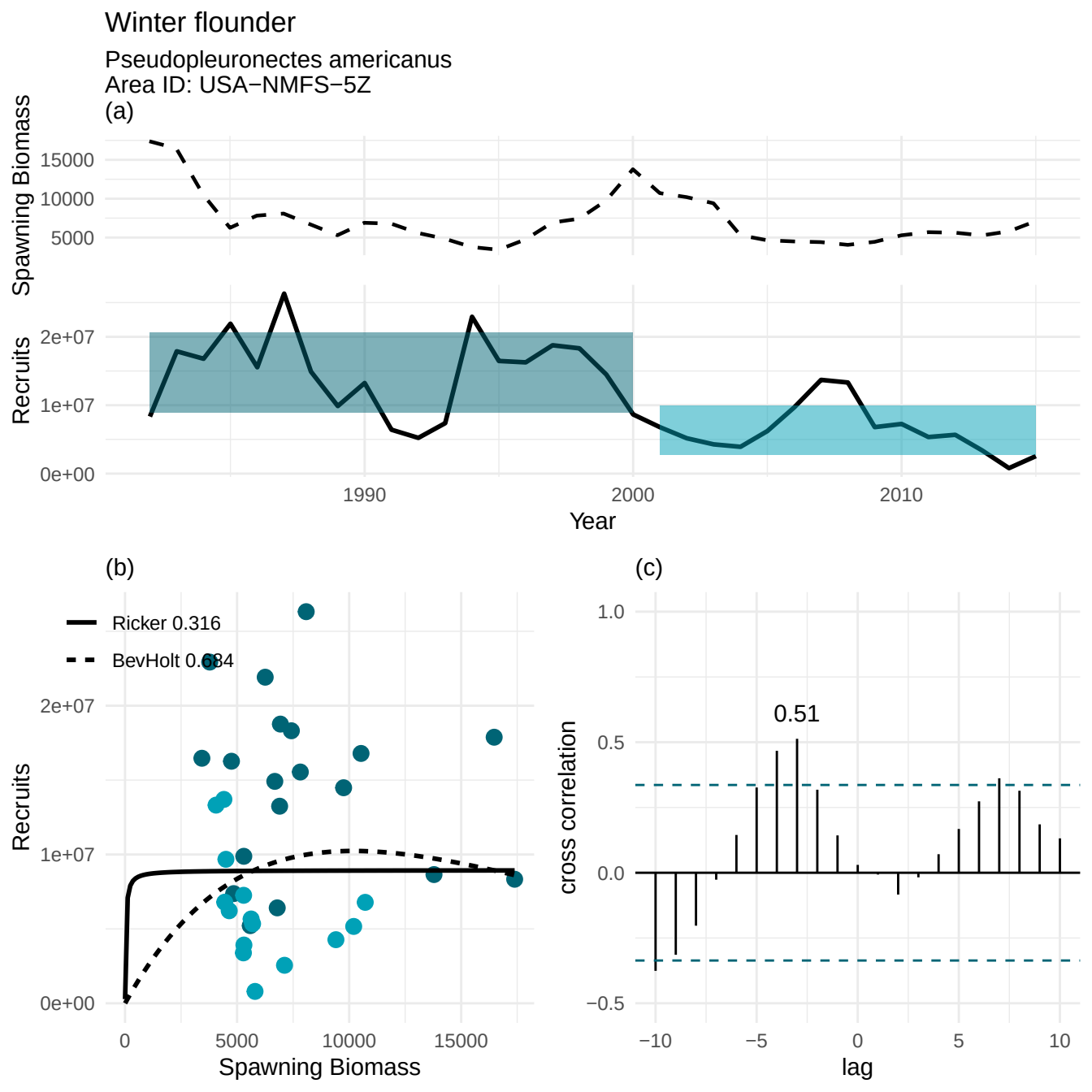

Whiting
Merlangius merlangus
Area ID: multinational−GFCM−GSA29
(a)
Spawning Biomass
22500
20000
17500
15000
12500
10000
Recruits
1e+09
5e+08
1995
2000
2005
2010
201
Year
(b)
Ricker 0.5
BevHolt 0.5
Recruits
1e+09
5e+08
0e+00
0
5000
10000
15000
20000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.74
0.52
−10
−5
0
5
10
lag

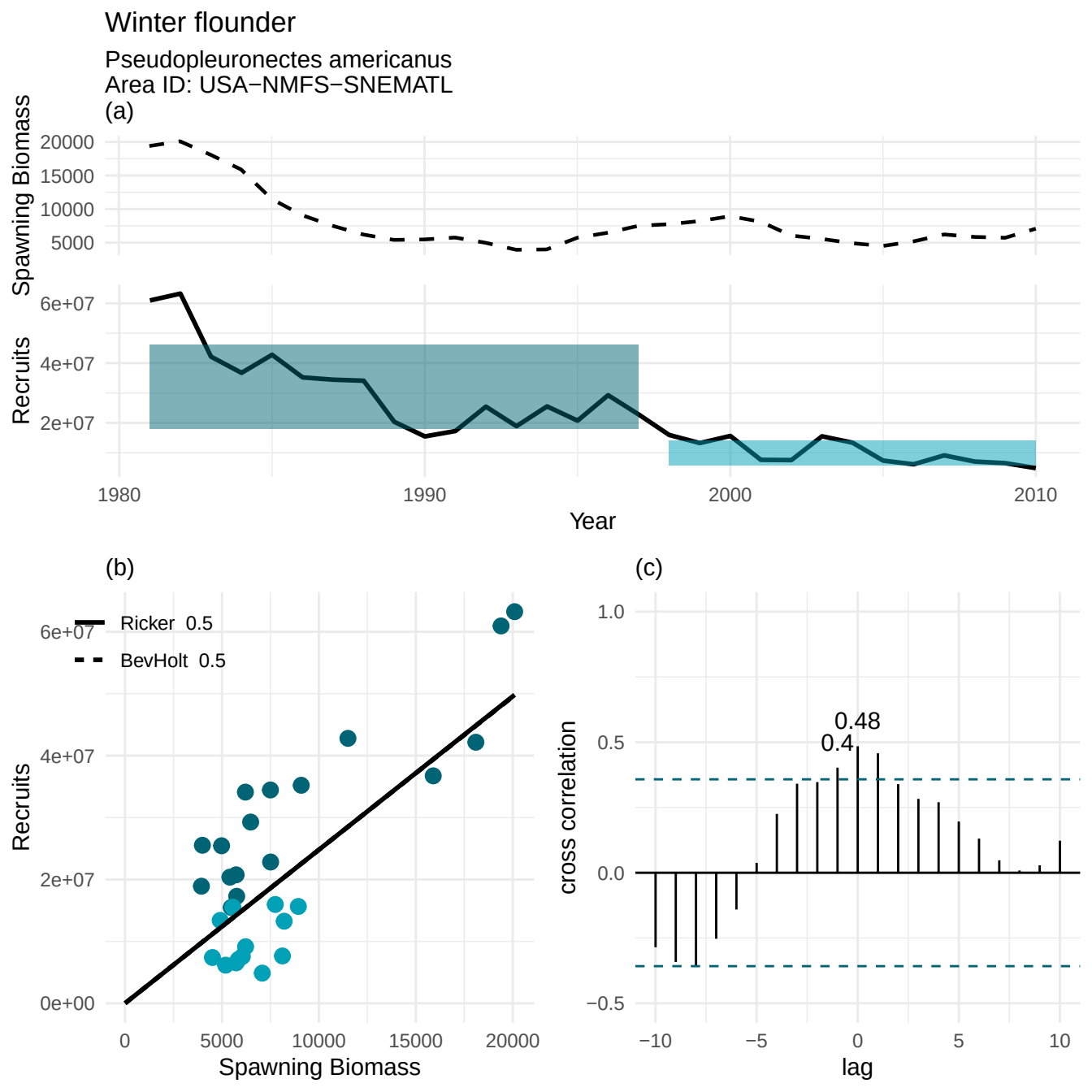

Whiting
Merlangius merlangus
Area ID: multinational−ICES−IV−VIId
(a)
Spawning Biomass
4e+05
3e+05
2e+05
Recruits
2.0e+10
1.5e+10
1.0e+10
1980
1990
2000
2010
2020
Year
(b)
Ricker 0.3
BevHolt 0.7
Recruits
2.5e+10
2.0e+10
1.5e+10
1.0e+10
5.0e+09
0.0e+00
0e+00
1e+05
2e+05
3e+05
4e+05
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.45
−10
−5
0
5
10
lag

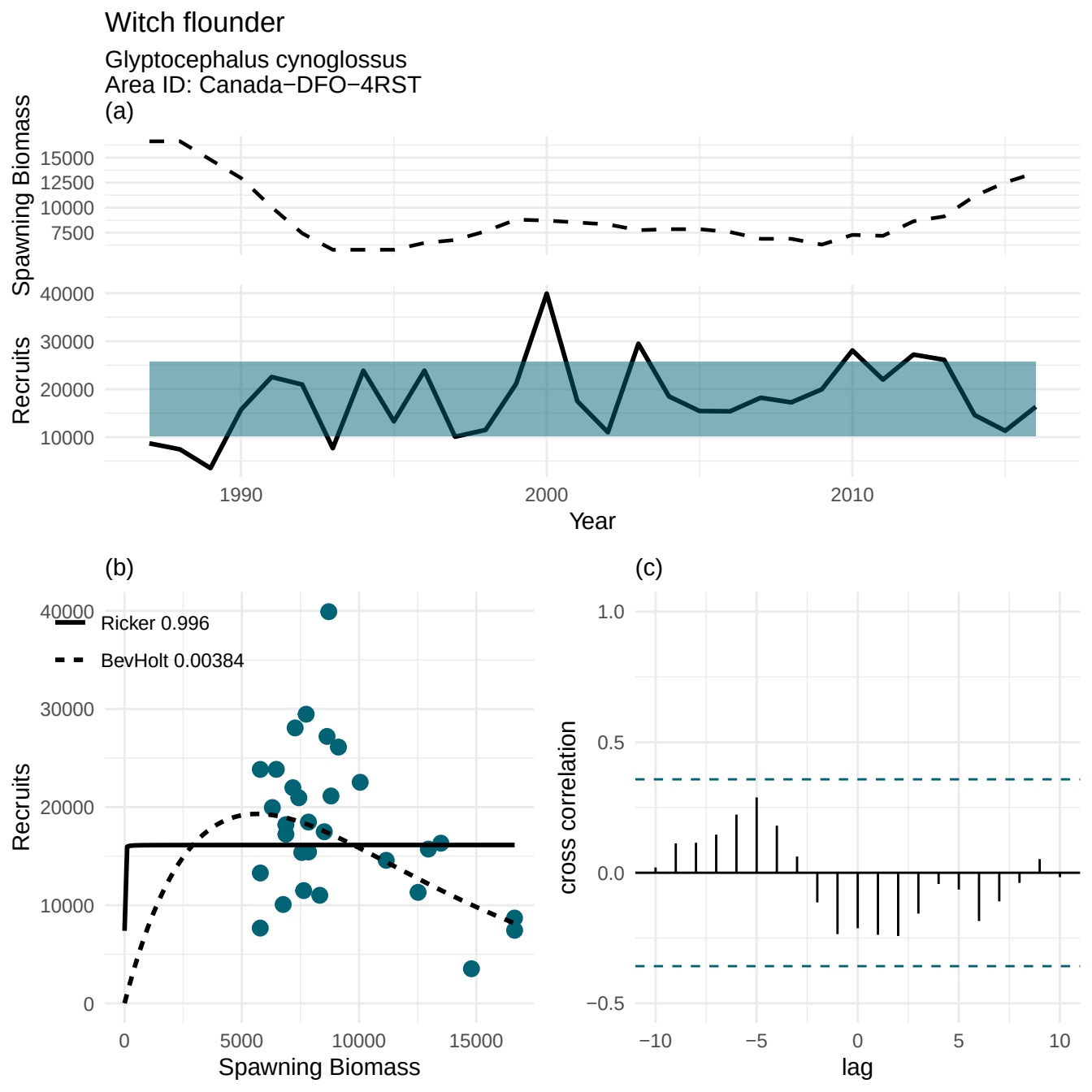

Whiting
Merlangius merlangus
Area ID: multinational−ICES−VIa
(a)
Spawning Biomass
1e+05
5e+04
0e+00
Recruits
4e+08
3e+08
2e+08
1e+08
0e+00
1980
1990
2000
2010
Year
(b)
Ricker 0.828
BevHolt 0.172
Recruits
3e+08
2e+08
1e+08
0e+00
0e+00
5e+04
1e+05
Spawning Biomass
(c)
0.82
0.83
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

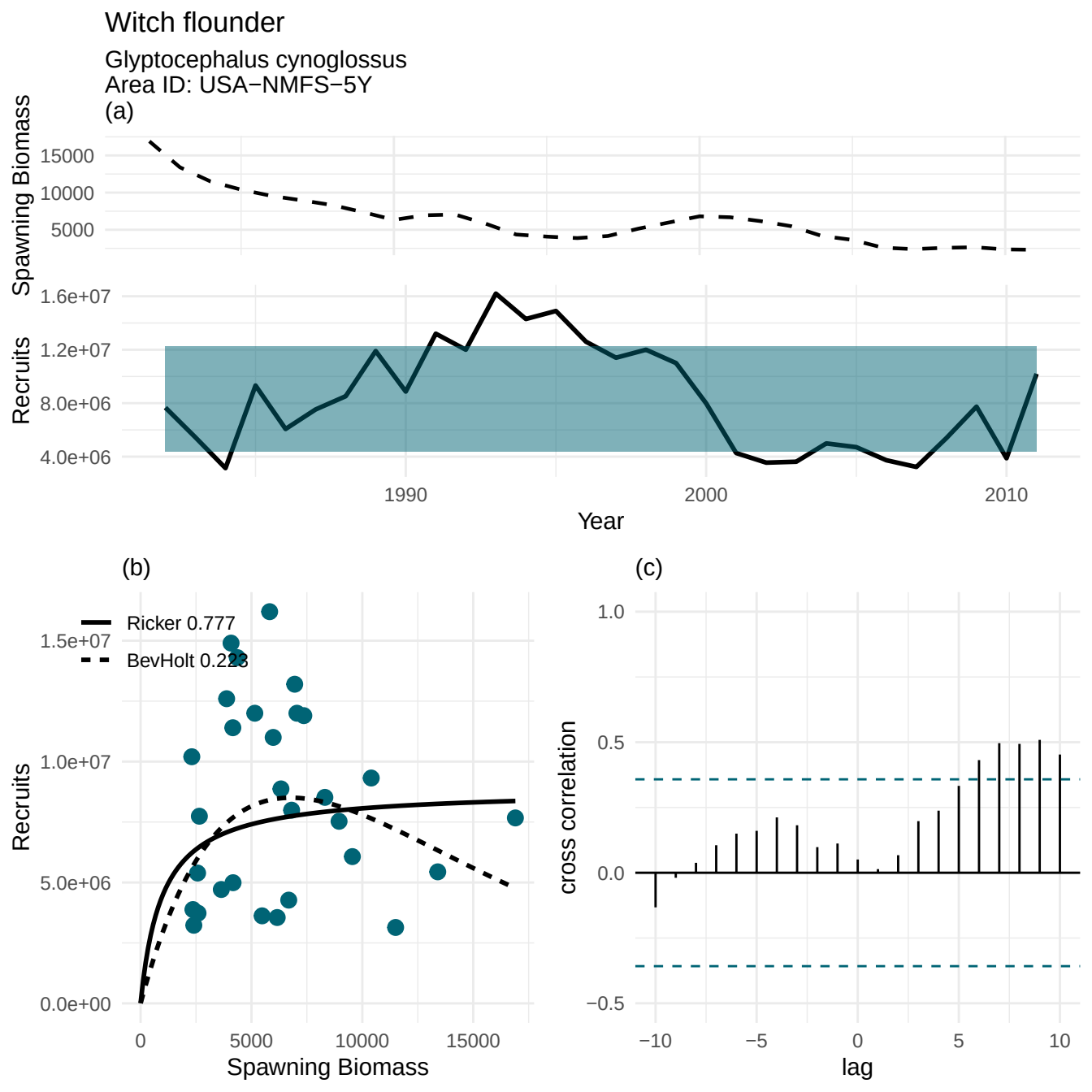

Whiting
Merlangius merlangus
Area ID: multinational−ICES−VIIa
(a)
Spawning Biomass
40000
30000
20000
10000
0
Recruits
7.5e+08
5.0e+08
2.5e+08
1980
1990
2000
2010
2020
Year
(b)
Ricker 0.00548
BevHolt 0.995
Recruits
7.5e+08
5.0e+08
2.5e+08
0.0e+00
0
10000
20000
30000
40000
Spawning Biomass
(c)
0.83
0.78
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

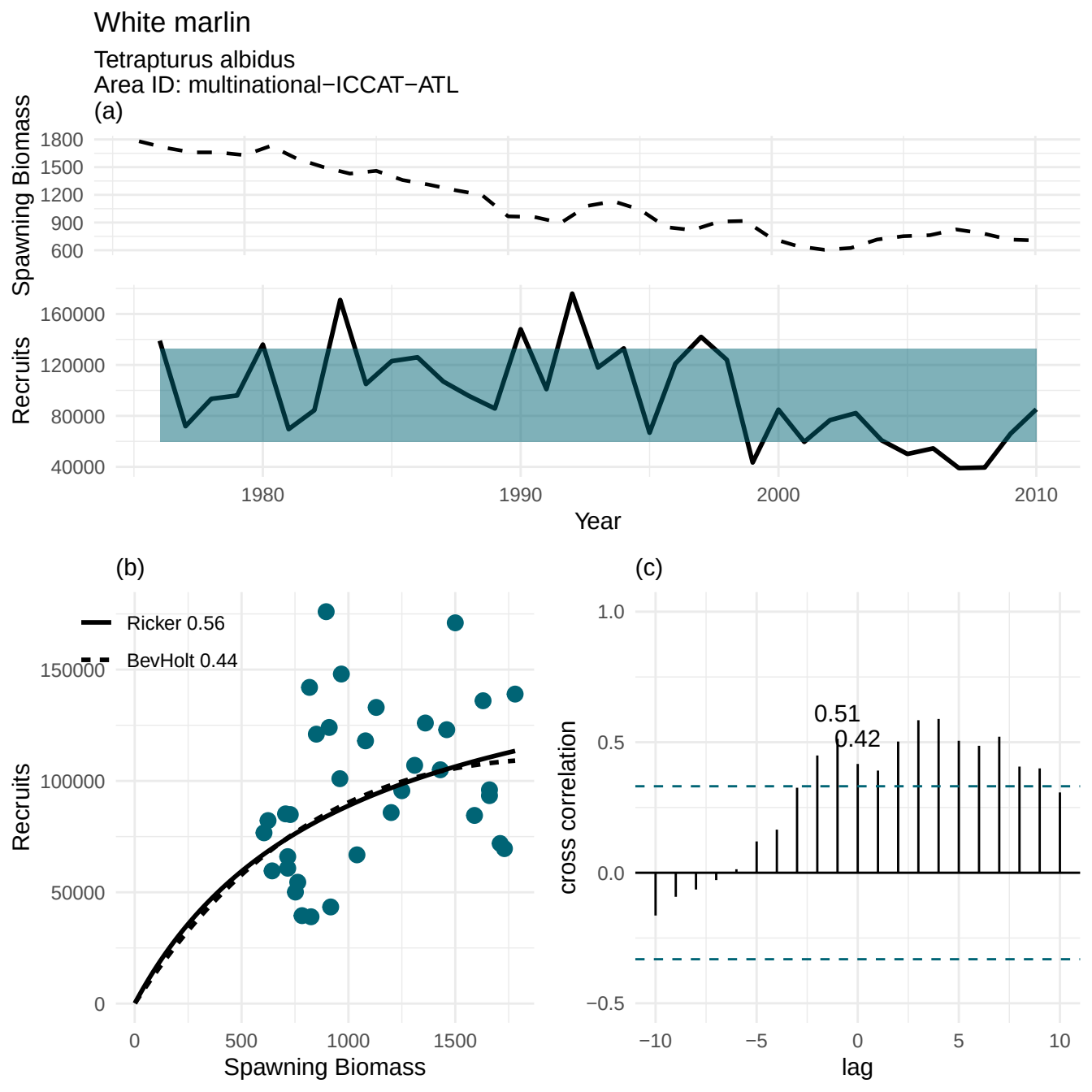

Winter flounder
Pseudopleuronectes americanus
Area ID: Canada−DFO−4T
(a)
Spawning Biomass
5e+05
4e+05
3e+05
2e+05
Recruits
5e+06
4e+06
3e+06
2e+06
1e+06
1980
1990
2000
2010
Year
(b)
Ricker 0.986
BevHolt 0.0139
Recruits
5e+06
4e+06
3e+06
2e+06
1e+06
0e+00
0e+00
1e+05
2e+05
3e+05
4e+05
5e+05
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

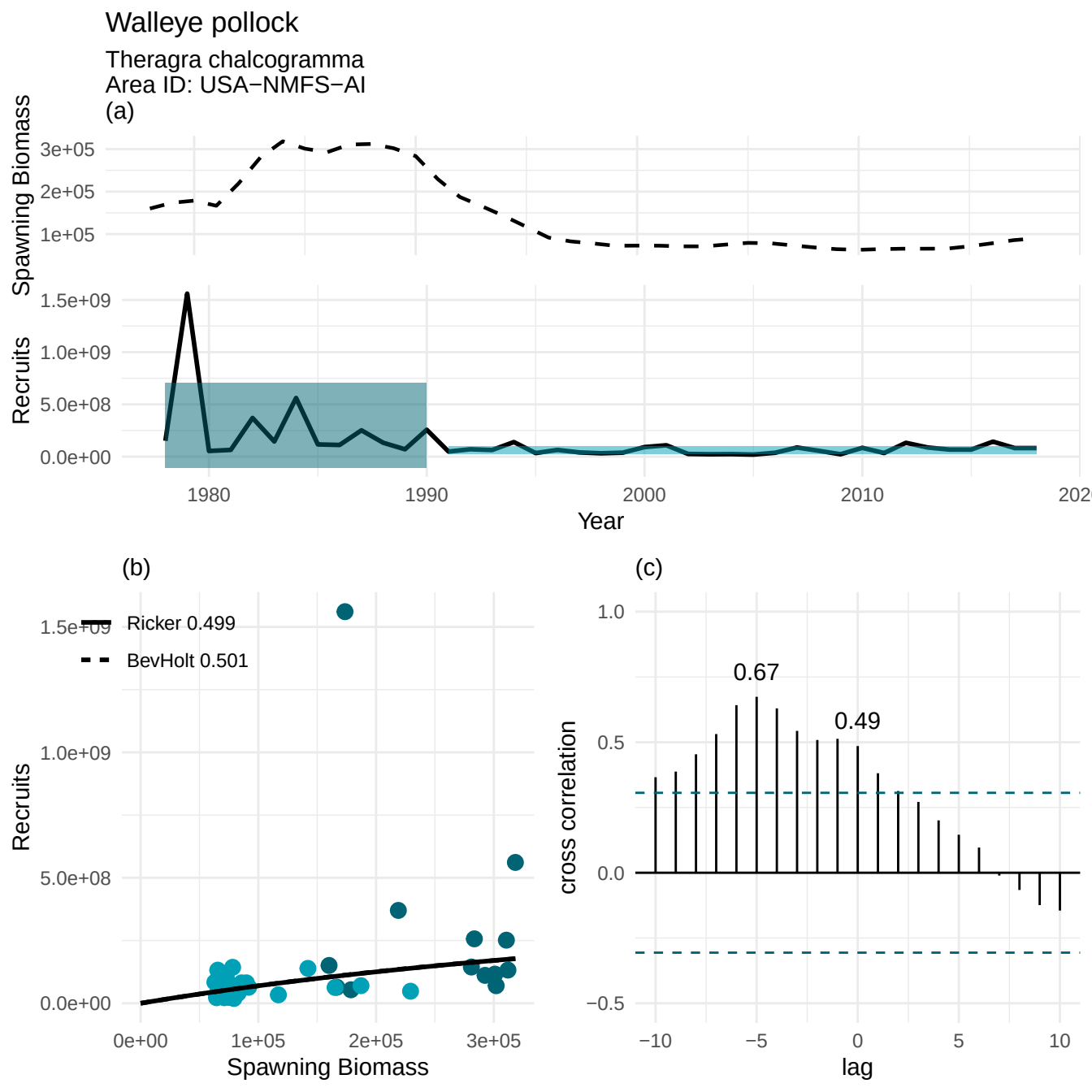

Winter flounder
Pseudopleuronectes americanus
Area ID: USA−NMFS−5Z
(a)
Spawning Biomass
15000
10000
5000
Recruits
2e+07
1e+07
0e+00
1990
2000
2010
Year
(b)
Ricker 0.316
BevHolt 0.684
Recruits
2e+07
1e+07
0e+00
0
5000
10000
15000
Spawning Biomass
(c)
1.0
0.5
0.0
−0.5
0.51
cross correlation
−10
−5
0
5
10
lag

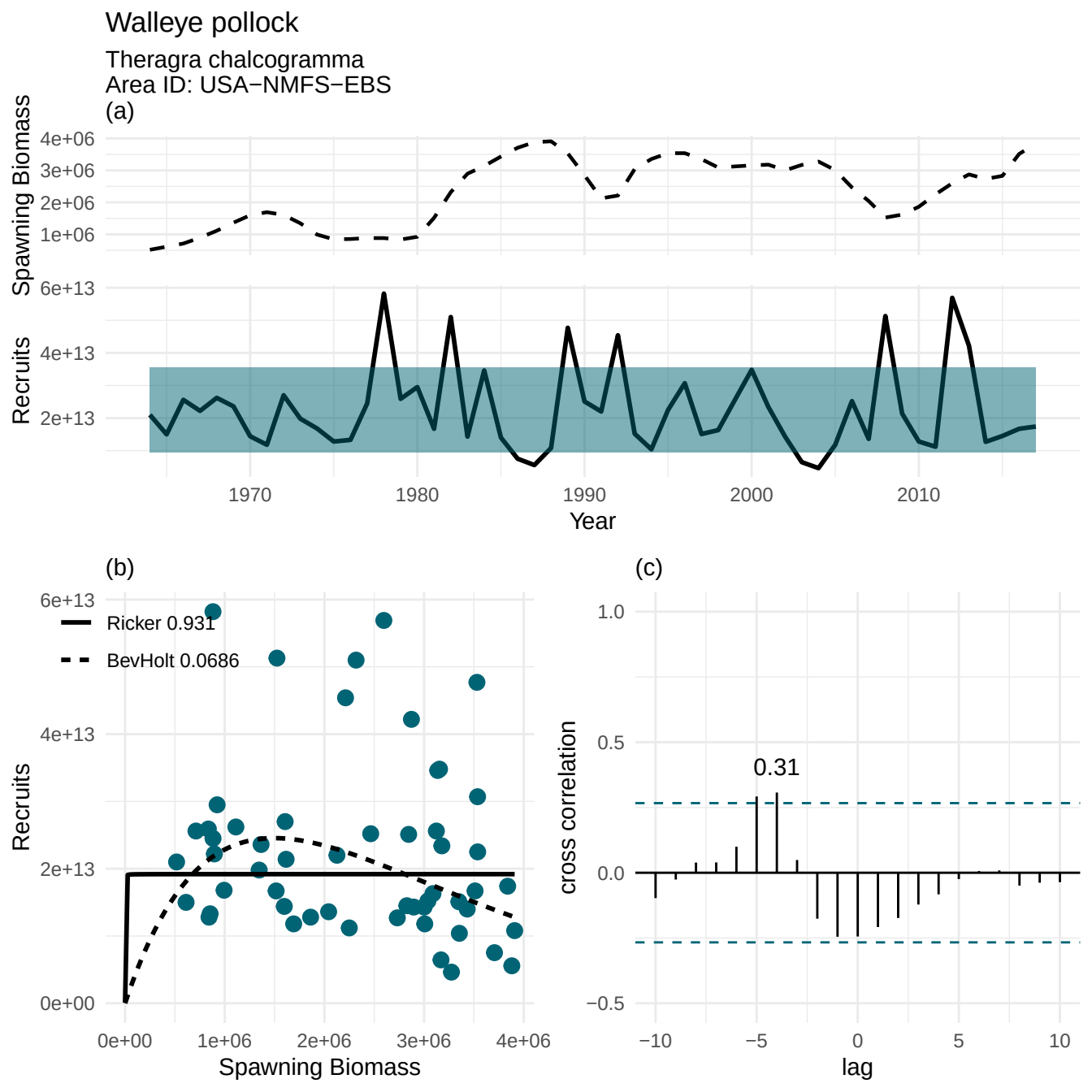

Winter flounder
Pseudopleuronectes americanus
Area ID: USA−NMFS−SNEMATL
(a)
Spawning Biomass
20000
15000
10000
5000
Recruits
6e+07
4e+07
2e+07
1980
1990
2000
2010
Year
(b)
Ricker 0.5
BevHolt 0.5
Recruits
6e+07
4e+07
2e+07
0e+00
0
5000
10000
15000
20000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.48
0.4
−10
−5
0
5
10
lag

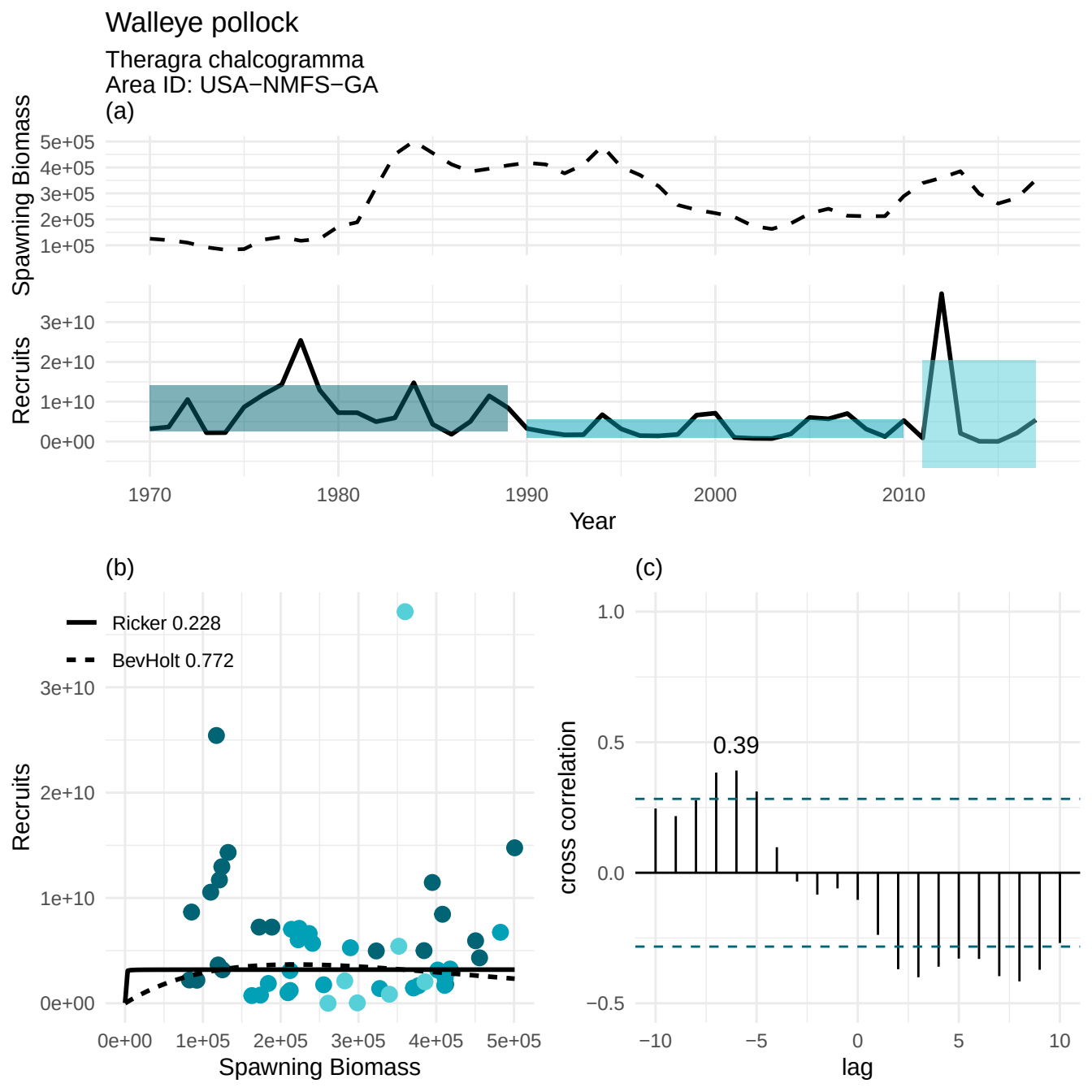

Witch flounder
Glyptocephalus cynoglossus
Area ID: Canada−DFO−4RST
(a)
Spawning Biomass
15000
12500
10000
7500
Recruits
40000
30000
20000
10000
1990
2000
2010
Year
(b)
Ricker 0.996
BevHolt 0.00384
Recruits
40000
30000
20000
10000
0
0
5000
10000
15000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

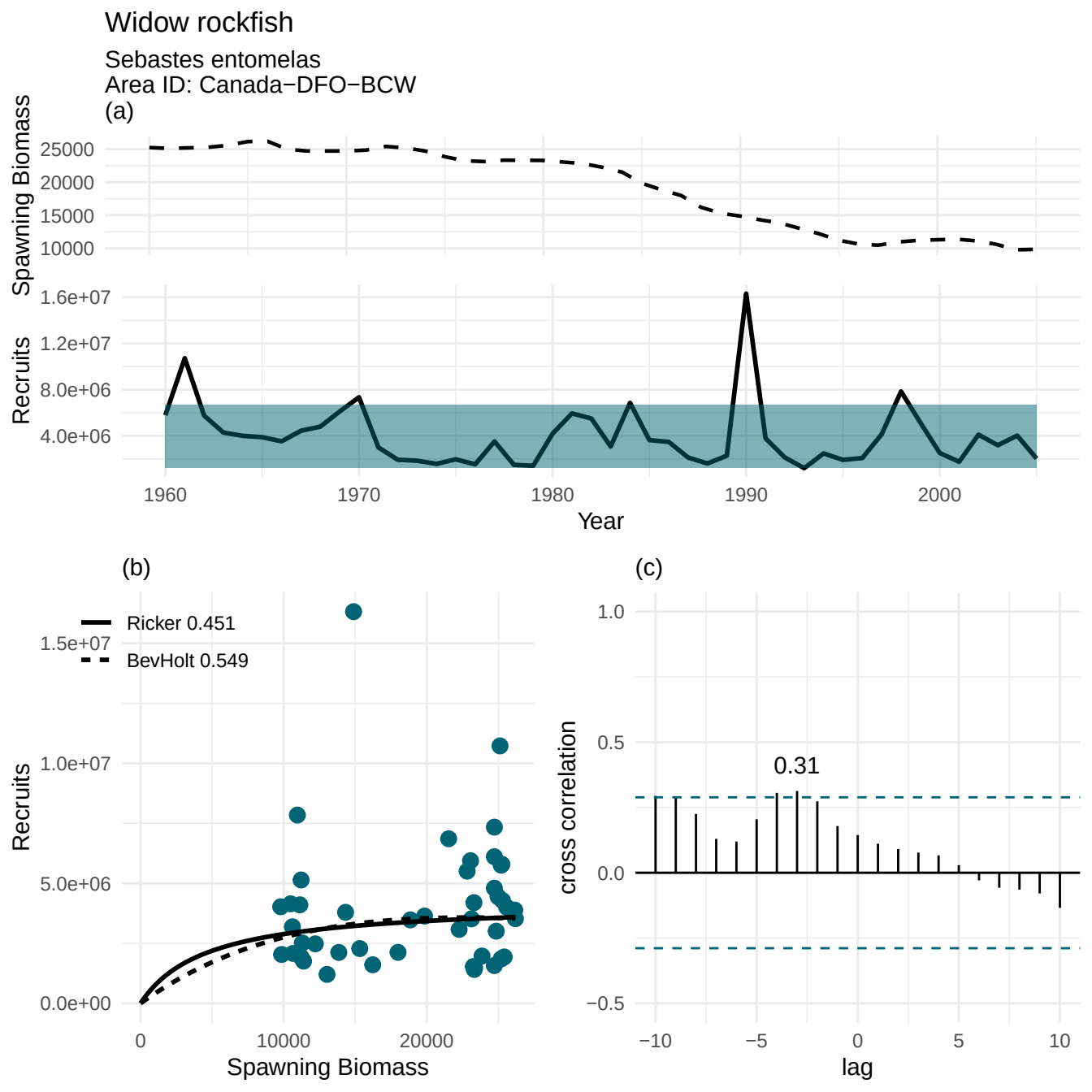

Witch flounder
Glyptocephalus cynoglossus
Area ID: USA−NMFS−5Y
(a)
Spawning Biomass
15000
10000
5000
Recruits
1.6e+07
1.2e+07
8.0e+06
4.0e+06
1990
2000
2010
Year
(b)
Ricker 0.777
BevHolt 0.223
Recruits
1.5e+07
1.0e+07
5.0e+06
0.0e+00
0
5000
10000
15000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

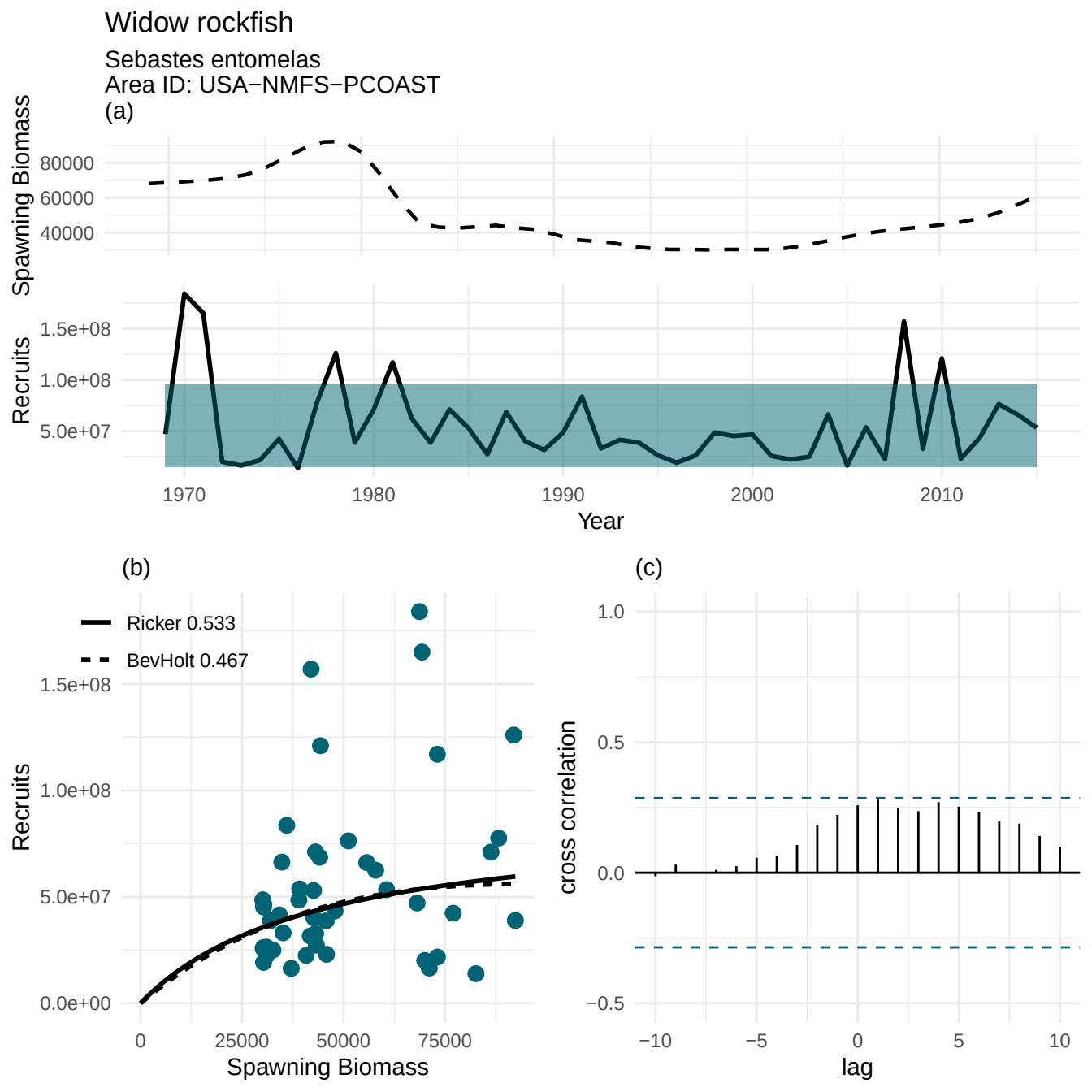

White marlin
Tetrapturus albidus
Area ID: multinational−ICCAT−ATL
(a)
Spawning Biomass
1800
1500
1200
900
600
Recruits
160000
120000
80000
40000
1980
1990
2000
2010
Year
(b)
Ricker 0.56
BevHolt 0.44
Recruits
150000
100000
50000
0
0
500
1000
1500
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.51
0.42
−10
−5
0
5
10
lag

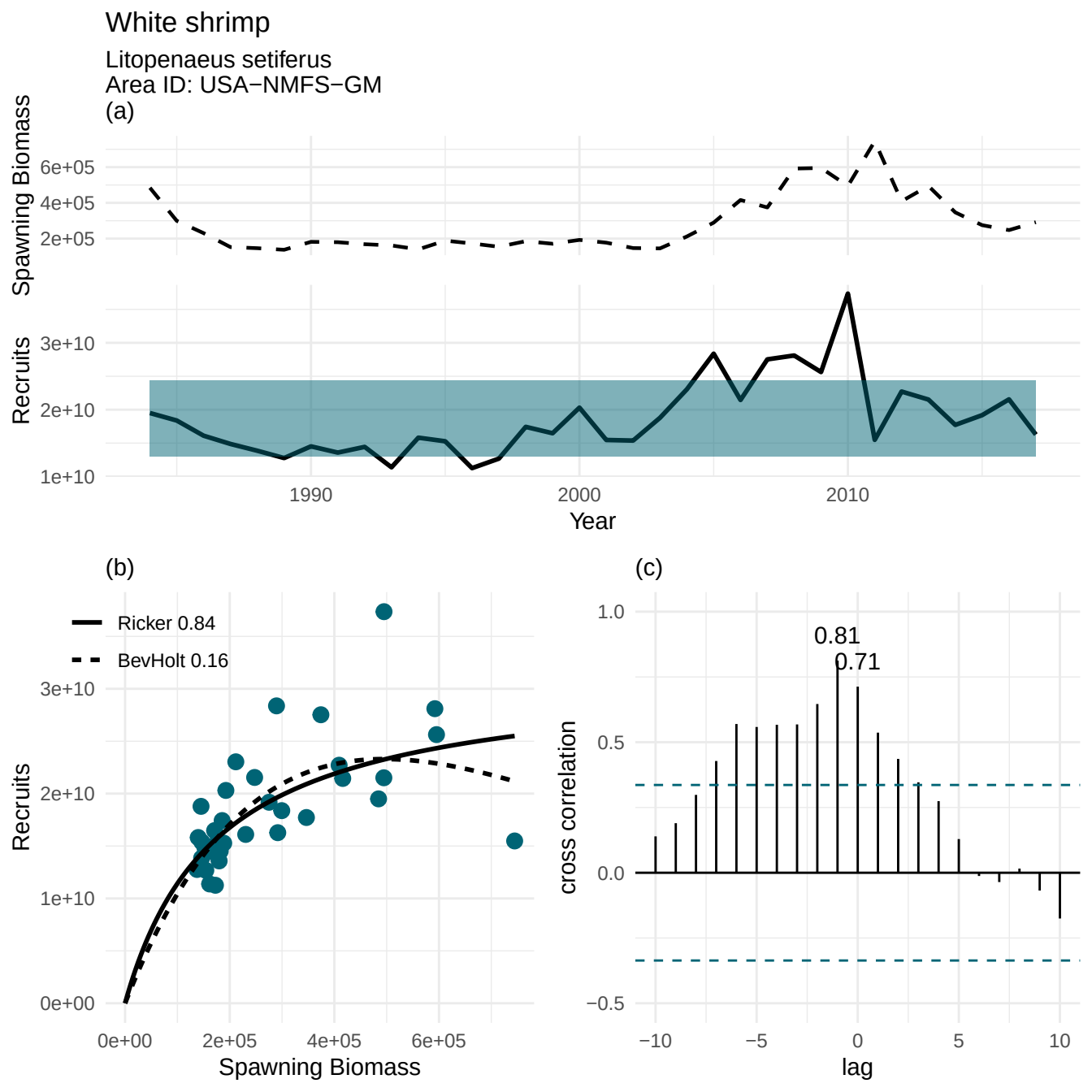

Walleye pollock
Theragra chalcogramma
Area ID: USA−NMFS−AI
(a)
Spawning Biomass
3e+05
2e+05
1e+05
Recruits
1.5e+09
1.0e+09
5.0e+08
0.0e+00
1980
1990
2000
2010
Year
(b)
Ricker 0.499
BevHolt 0.501
Recruits
1.5e+09
1.0e+09
5.0e+08
0.0e+00
0e+00
1e+05
2e+05
3e+05
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.67
0.49
−10
−5
0
5
10
lag

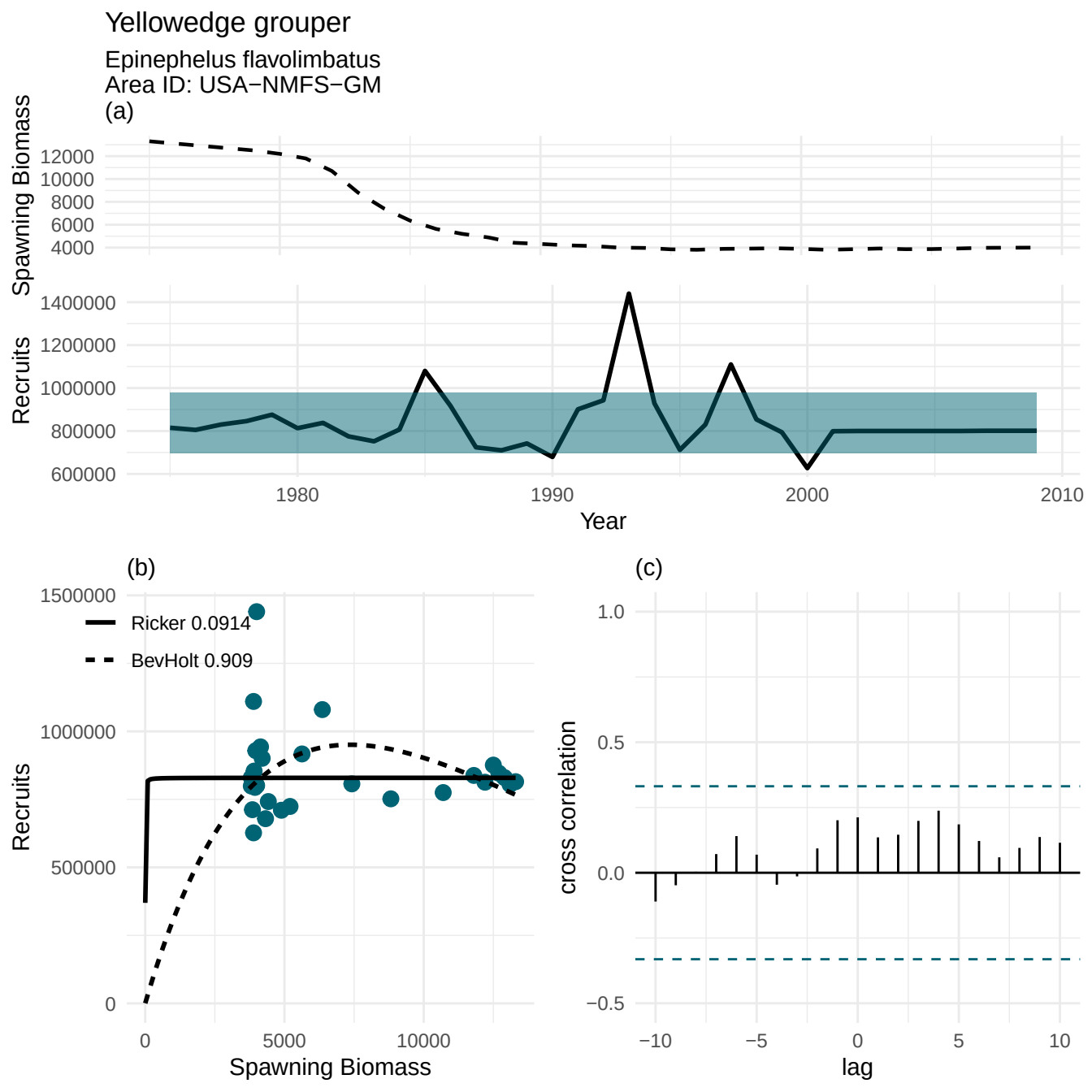

Walleye pollock
Theragra chalcogramma
Area ID: USA−NMFS−EBS
(a)
Spawning Biomass
4e+06
3e+06
2e+06
1e+06
Recruits
6e+13
4e+13
2e+13
1970
1980
1990
2000
2010
Year
(b)
Ricker 0.931
BevHolt 0.0686
Recruits
6e+13
4e+13
2e+13
0e+00
0e+00
1e+06
2e+06
3e+06
4e+06
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.31
−10
−5
0
5
10
lag

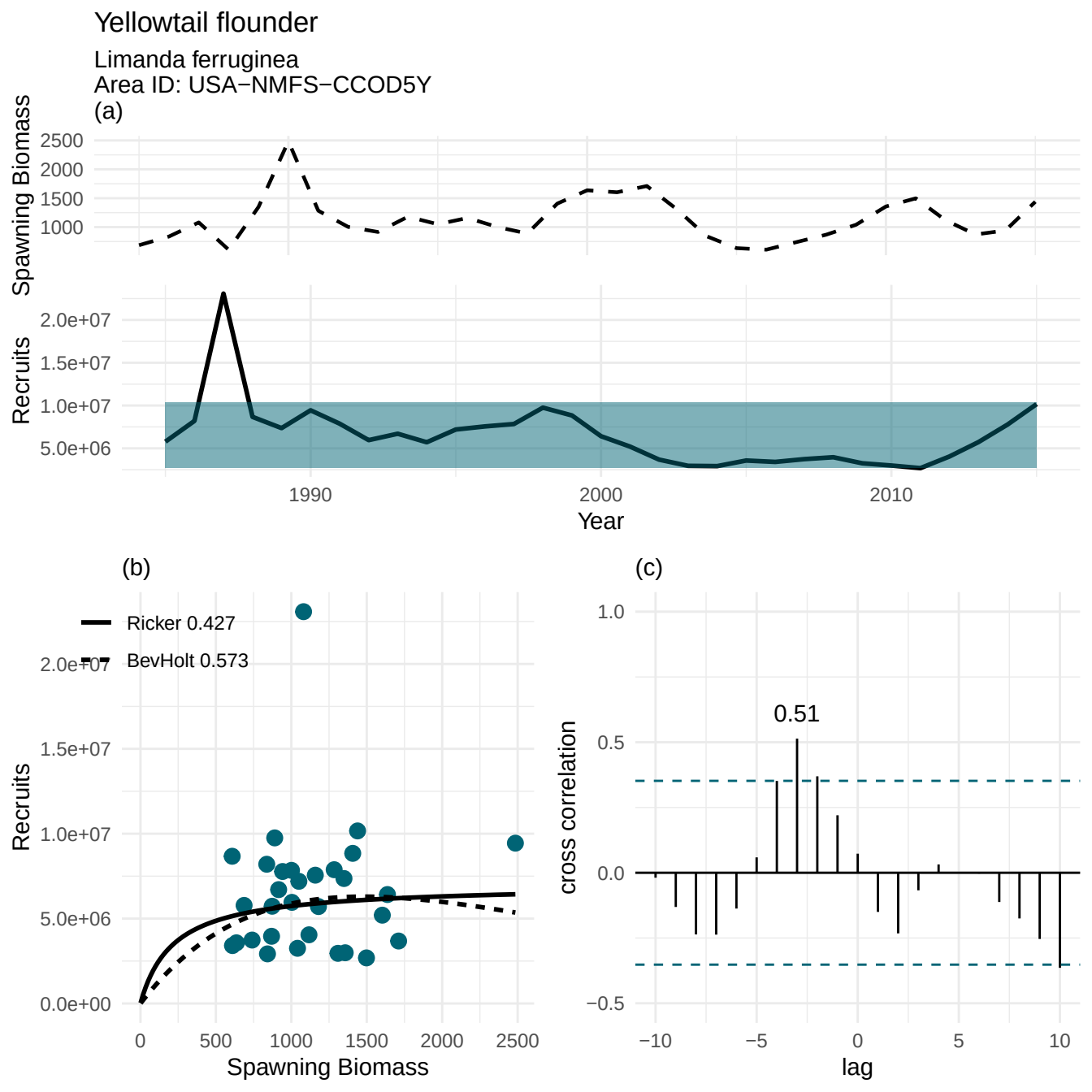

Walleye pollock
Theragra chalcogramma
Area ID: USA−NMFS−GA
(a)
Spawning Biomass
5e+05
4e+05
3e+05
2e+05
1e+05
Recruits
3e+10
2e+10
1e+10
0e+00
1970
1980
1990
2000
2010
Year
(b)
Ricker 0.228
BevHolt 0.772
Recruits
3e+10
2e+10
1e+10
0e+00
0e+00
1e+05
2e+05
3e+05
4e+05
5e+05
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.39
−10
−5
0
5
10
lag

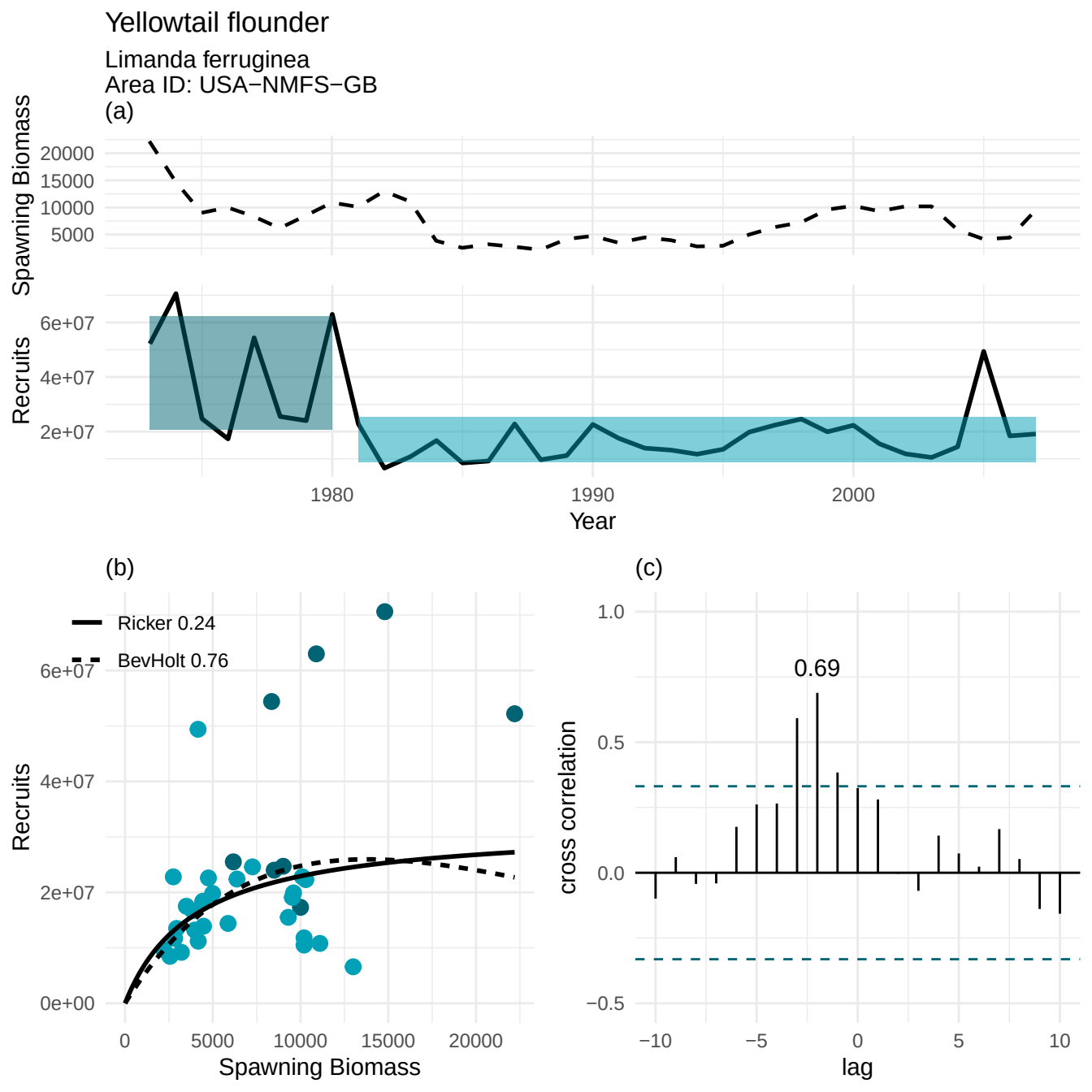

Widow rockfish
Sebastes entomelas
Area ID: Canada−DFO−BCW
(a)
Spawning Biomass
25000
20000
15000
10000
Recruits
1.6e+07
1.2e+07
8.0e+06
4.0e+06
1960
1970
1980
1990
2000
Year
(b)
Ricker 0.451
BevHolt 0.549
Recruits
1.5e+07
1.0e+07
5.0e+06
0.0e+00
0
10000
20000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.31
−10
−5
0
5
10
lag

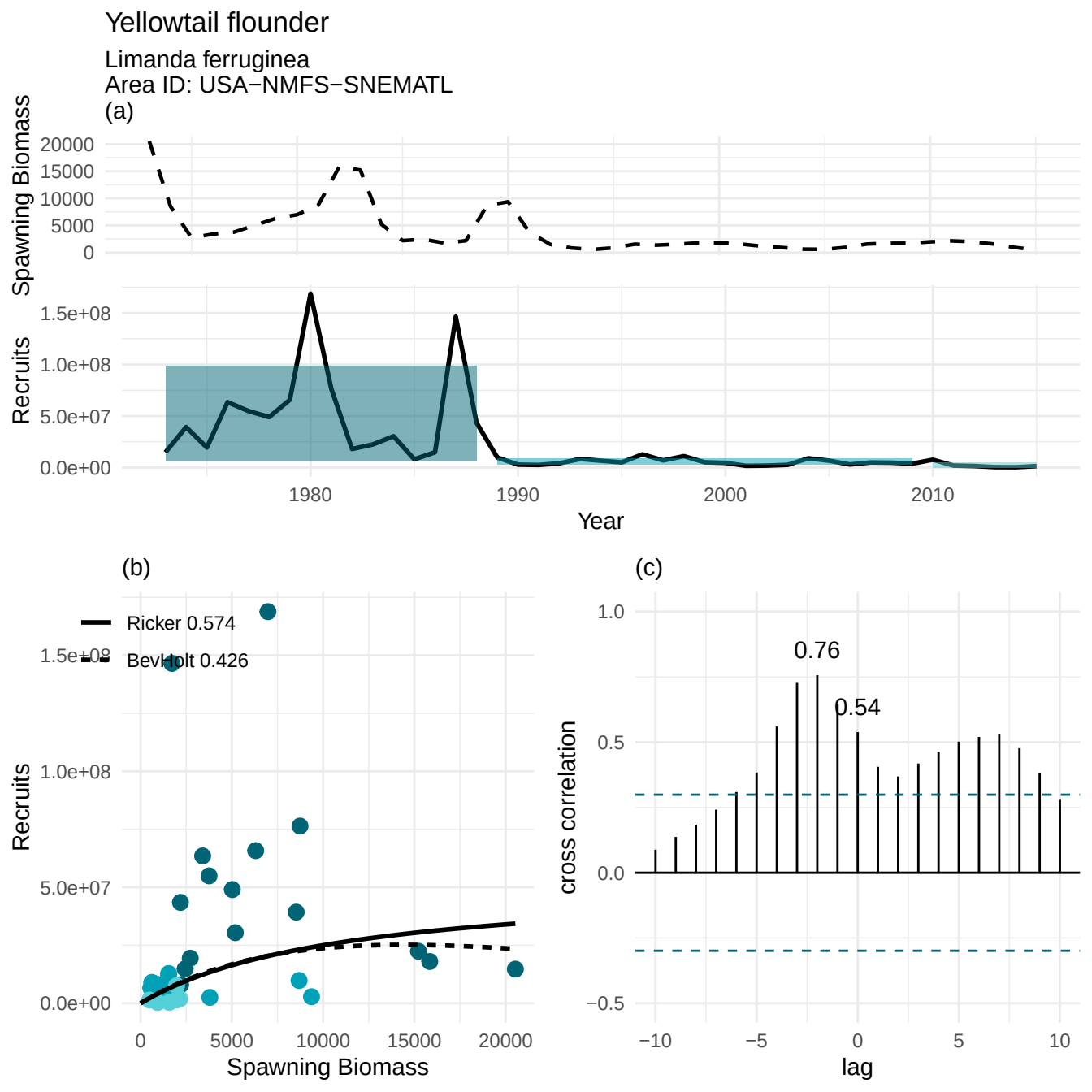

Widow rockfish
Sebastes entomelas
Area ID: USA−NMFS−PCOAST
(a)
Spawning Biomass
80000
60000
40000
Recruits
1.5e+08
1.0e+08
5.0e+07
1970
1980
1990
2000
2010
Year
(b)
Ricker 0.533
BevHolt 0.467
Recruits
1.5e+08
1.0e+08
5.0e+07
0.0e+00
0
25000
50000
75000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

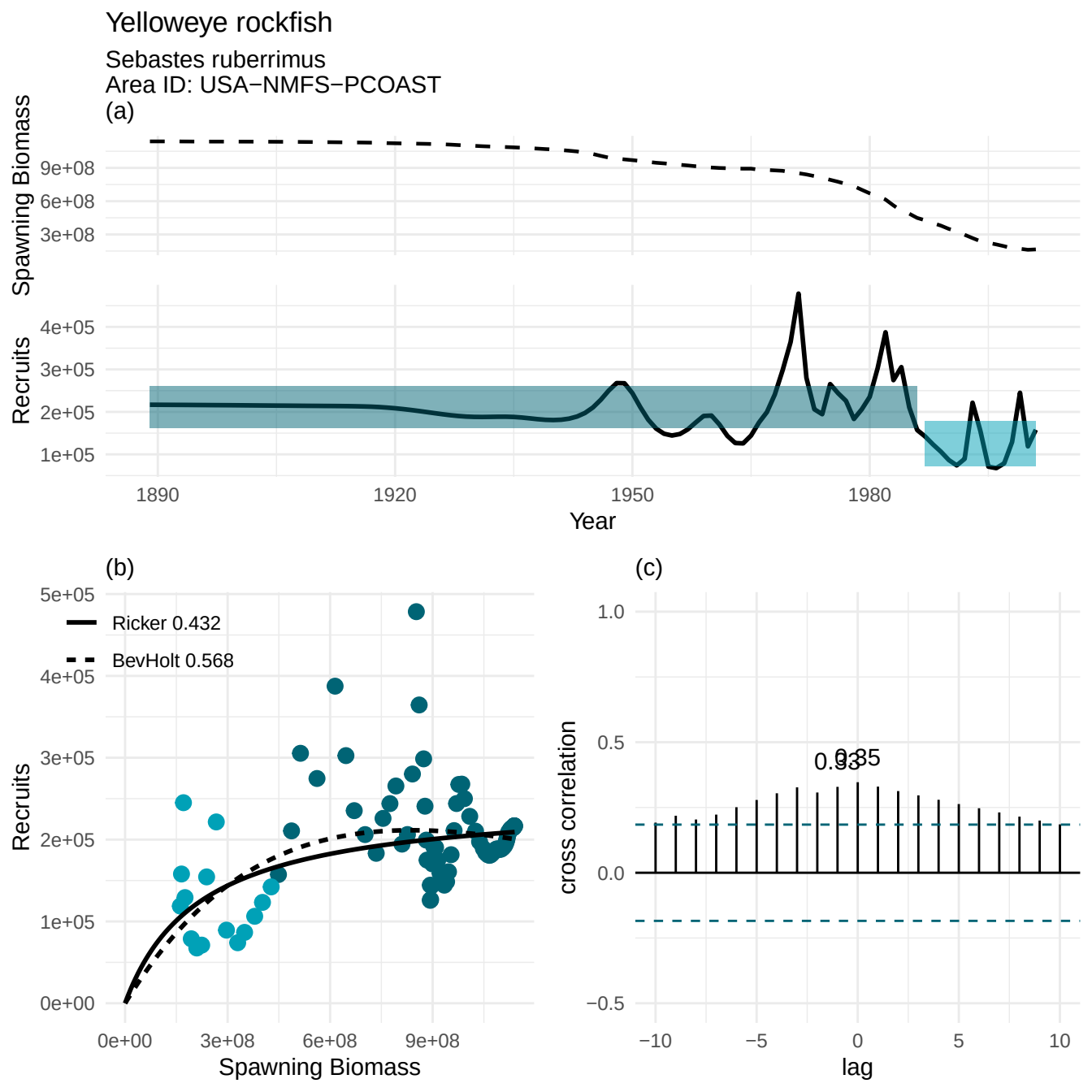

White shrimp
Litopenaeus setiferus
Area ID: USA−NMFS−GM
(a)
Spawning Biomass
6e+05
4e+05
2e+05
Recruits
3e+10
2e+10
1e+10
1990
2000
2010
Year
(b)
Ricker 0.84
BevHolt 0.16
Recruits
3e+10
2e+10
1e+10
0e+00
0e+00
2e+05
4e+05
6e+05
Spawning Biomass
(c)
0.81
0.71
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

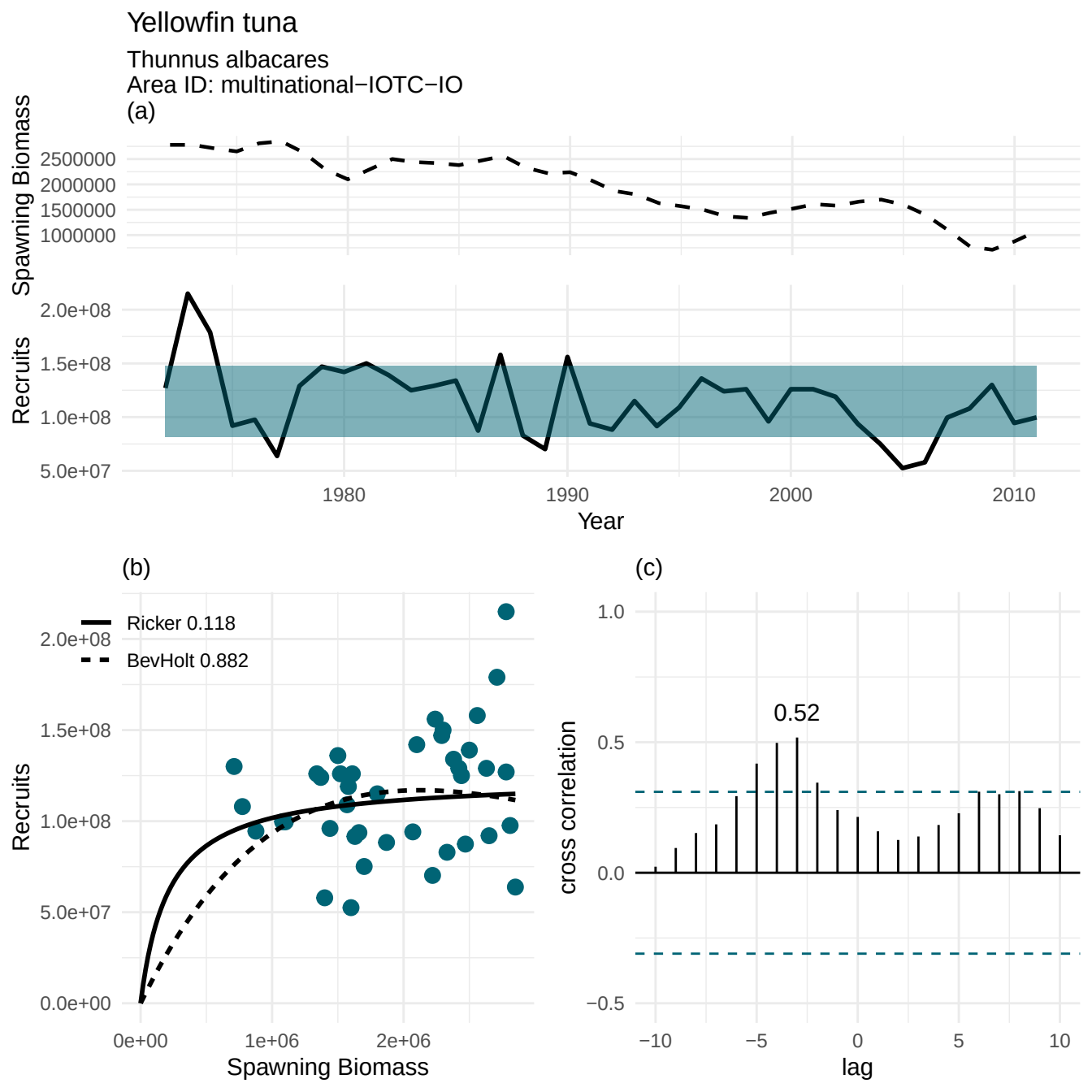

Yellowedge grouper
Epinephelus flavolimbatus
Area ID: USA−NMFS−GM
(a)
Spawning Biomass
12000
10000
8000
6000
4000
Recruits
1400000
1200000
1000000
800000
600000
1980
1990
2000
2010
Year
(b)
Ricker 0.0914
BevHolt 0.909
Recruits
1500000
1000000
500000
0
0
5000
10000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

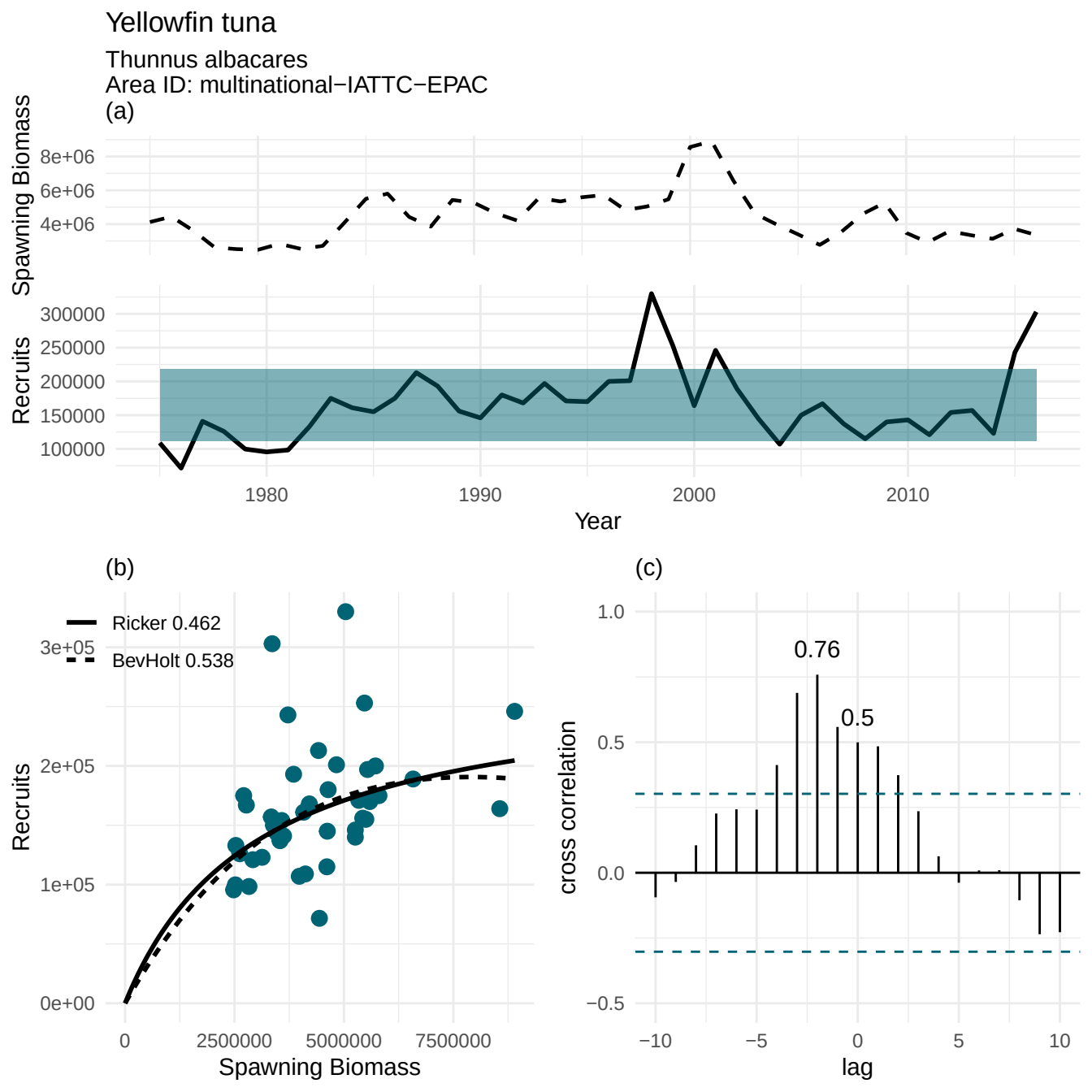

Yellowtail flounder
Limanda ferruginea
Area ID: USA−NMFS−CCOD5Y
(a)
Spawning Biomass
2500
2000
1500
1000
Recruits
2.0e+07
1.5e+07
1.0e+07
5.0e+06
1990
2000
2010
Year
(b)
Ricker 0.427
BevHolt 0.573
Recruits
2.0e+07
1.5e+07
1.0e+07
5.0e+06
0.0e+00
0
500
1000
1500
2000
2500
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.51
−10
−5
0
5
10
lag

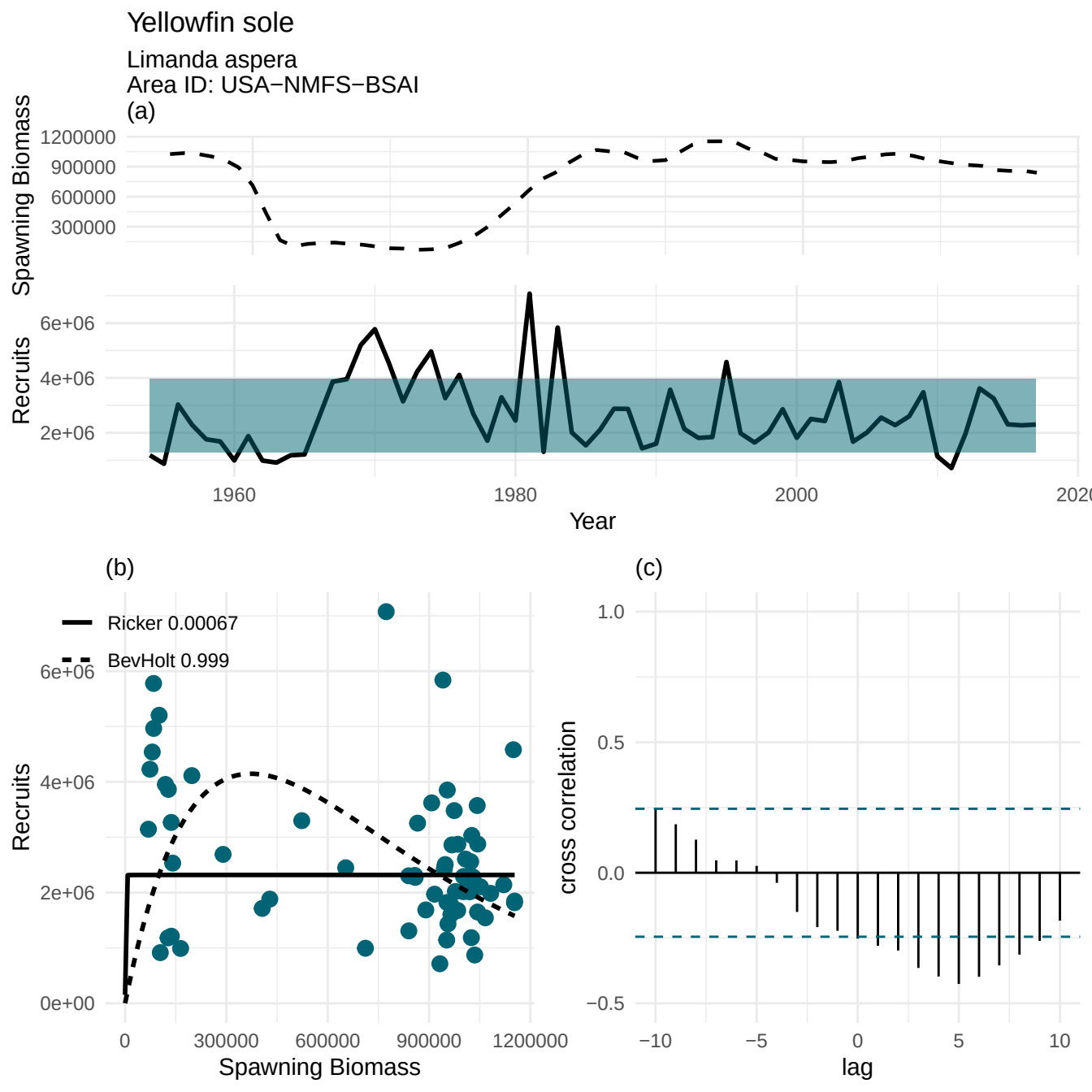

Yellowtail flounder
Limanda ferruginea
Area ID: USA−NMFS−GB
(a)
Spawning Biomass
20000
15000
10000
5000
Recruits
6e+07
4e+07
2e+07
1980
1990
2000
Year
(b)
Ricker 0.24
BevHolt 0.76
Recruits
6e+07
4e+07
2e+07
0e+00
0
5000
10000
15000
20000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.69
−10
−5
0
5
10
lag

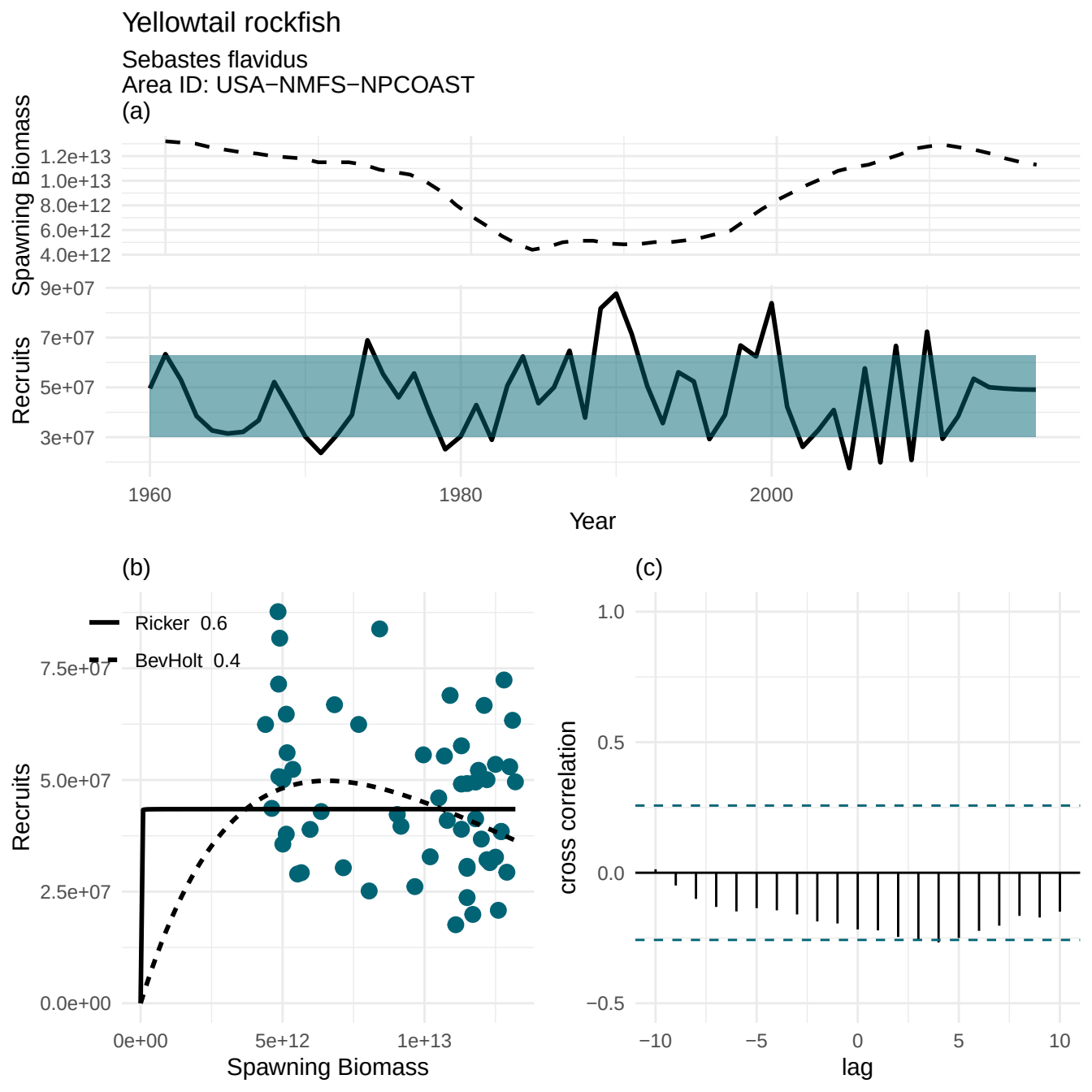

Yellowtail flounder
Limanda ferruginea
Area ID: USA−NMFS−SNEMATL
(a)
Spawning Biomass
20000
15000
10000
5000
0
Recruits
1.5e+08
1.0e+08
5.0e+07
0.0e+00
1980
1990
2000
2010
Year
(b)
Ricker 0.574
Beverholt 0.426
Recruits
1.5e+08
1.0e+08
5.0e+07
0.0e+00
0
5000
10000
15000
20000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.76
0.54
−10
−5
0
5
10
lag


Yelloweye rockfish
Sebastes ruberrimus
Area ID: USA−NMFS−PCOAST
(a)
Spawning Biomass
9e+08
6e+08
3e+08
Recruits
4e+05
3e+05
2e+05
1e+05
1890
1920
1950
1980
Year
(b)
Recruits
5e+05
4e+05
3e+05
2e+05
1e+05
0e+00
Ricker 0.432
BevHolt 0.568
0e+00
3e+08
6e+08
9e+08
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.93
0.35
−10
−5
0
5
10
lag

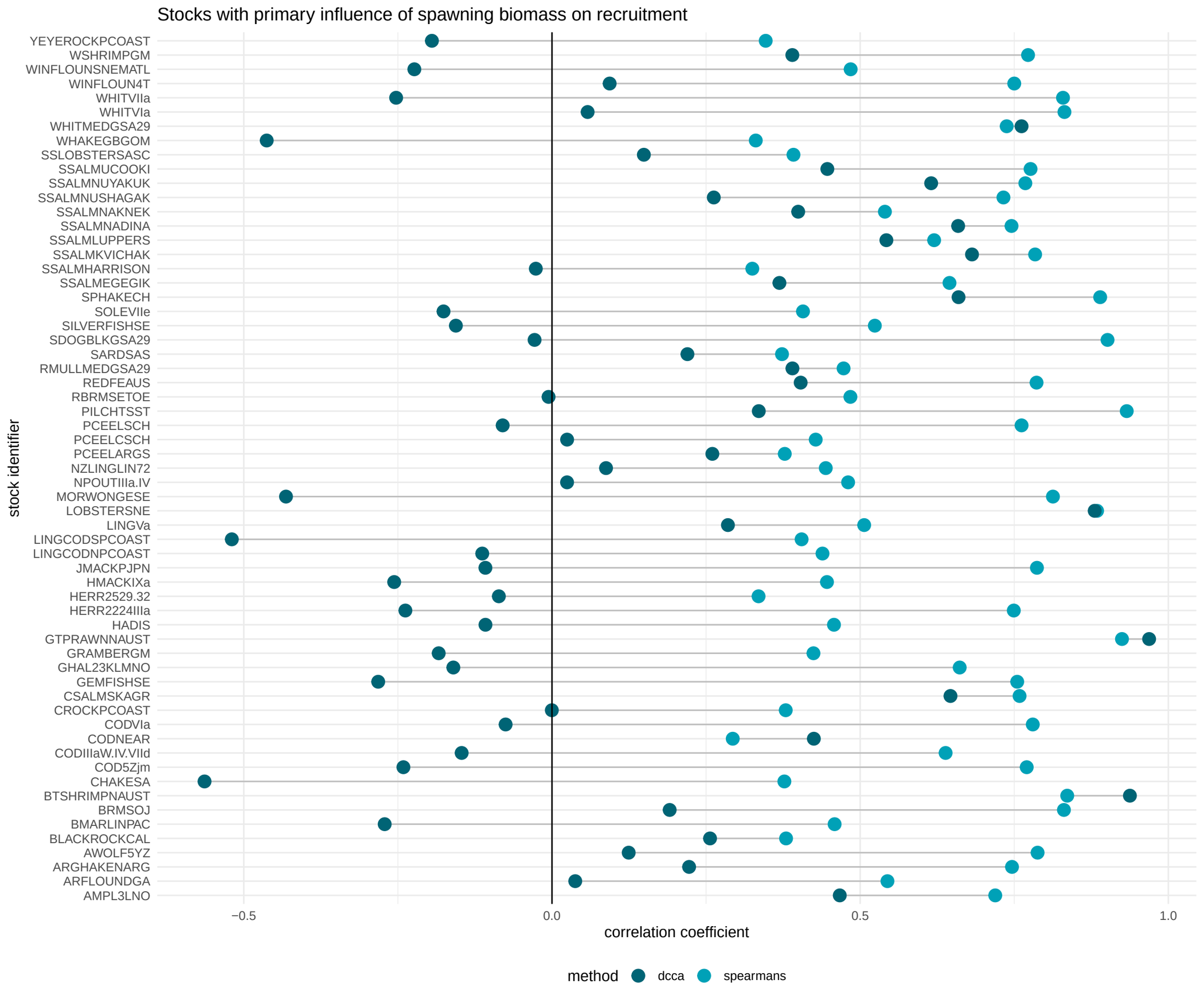

Yellowfin tuna
Thunnus albacares
Area ID: multinational−IOTC−IO
(a)
Spawning Biomass
2500000
2000000
1500000
1000000
Recruits
2.0e+08
1.5e+08
1.0e+08
5.0e+07
1980
1990
2000
2010
Year
(b)
Ricker 0.118
BevHolt 0.882
Recruits
2.0e+08
1.5e+08
1.0e+08
5.0e+07
0.0e+00
0e+00
1e+06
2e+06
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.52
−10
−5
0
5
10
lag


Yellowfin tuna
Thunnus albacares
Area ID: multinational−IATTC−EPAC
(a)
Spawning Biomass
8e+06
6e+06
4e+06
Recruits
300000
250000
200000
150000
100000
1980
1990
2000
2010
Year
(b)
Ricker 0.462
BevHolt 0.538
Recruits
3e+05
2e+05
1e+05
0e+00
0
2500000
5000000
7500000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
0.76
0.5
−10
−5
0
5
10
lag


Yellowfin sole
Limanda aspera
Area ID: USA−NMFS−BSAI
(a)
Spawning Biomass
1200000
900000
600000
300000
Recruits
6e+06
4e+06
2e+06
1960
1980
2000
Year
(b)
Ricker 0.00067
BevHolt 0.999
Recruits
6e+06
4e+06
2e+06
0e+00
0
300000
600000
900000
1200000
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag


Yellowtail rockfish
Sebastes flavidus
Area ID: USA−NMFS−NPCOAST
(a)
Spawning Biomass
1.2e+13
1.0e+13
8.0e+12
6.0e+12
4.0e+12
Recruits
9e+07
7e+07
5e+07
3e+07
1960
1980
2000
Year
(b)
Ricker 0.6
BevHolt 0.4
Recruits
7.5e+07
5.0e+07
2.5e+07
0.0e+00
0e+00
5e+12
1e+13
Spawning Biomass
(c)
cross correlation
1.0
0.5
0.0
−0.5
−10
−5
0
5
10
lag

Supplementary Appendix 5


Stocks with primary influence of spawning biomass on recruitment
YEYEROCKPCOAST
WSHRIMPGM
WINFLOUNSNEMATL
WINFLOUN4T
WHITVIIa
WHITVIa
WHITMEDGSA29
WHAKEGBGOM
SSLOBSTERSASC
SSALMUCOOKI
SSALMNUYAKUK
SSALMNUSHAGAK
SSALMNAKNEK
SSALMNADINA
SSALMLUPPERS
SSALMKVICHAK
SSALMHARRISON
SSALMEGEGIK
SPHAKECH
SOLEVIIe
SILVERFISHSE
SDOGBLKGSA29
SARDSAS
RMULLMEDGSA29
REDFEAUS
RBRMSETOE
PILCHTSST
PCEELSCH
PCEELCSCH
PCEELARGS
NZLINGLIN72
NPOUTIIIa.IV
MORWONGESE
LOBSTERSNE
LINGVa
LINGCODSPCOAST
LINGCODNPCOAST
JMACKPJPN
HMACKIXa
HERR2529.32
HERR2224IIIa
HADIS
GTPRAWNNAUST
GRAMBERGM
GHAL23KLMNO
GEMFISHSE
CSALMSKAGR
CROCKPCOAST
CODVIa
CODNEAR
CODIIIaW.IV.VIId
COD5Zjm
CHAKESA
BTSHRIMPNAUST
BRMSOJ
BMARLINPAC
BLACKROCKCAL
AWOLF5YZ
ARGHAKENARG
ARFLOUNDGA
AMPL3LNO
stock identifier
−0.5
0.0
0.5
1.0
correlation coefficient
method
dcca
spearmans

Edge case stocks

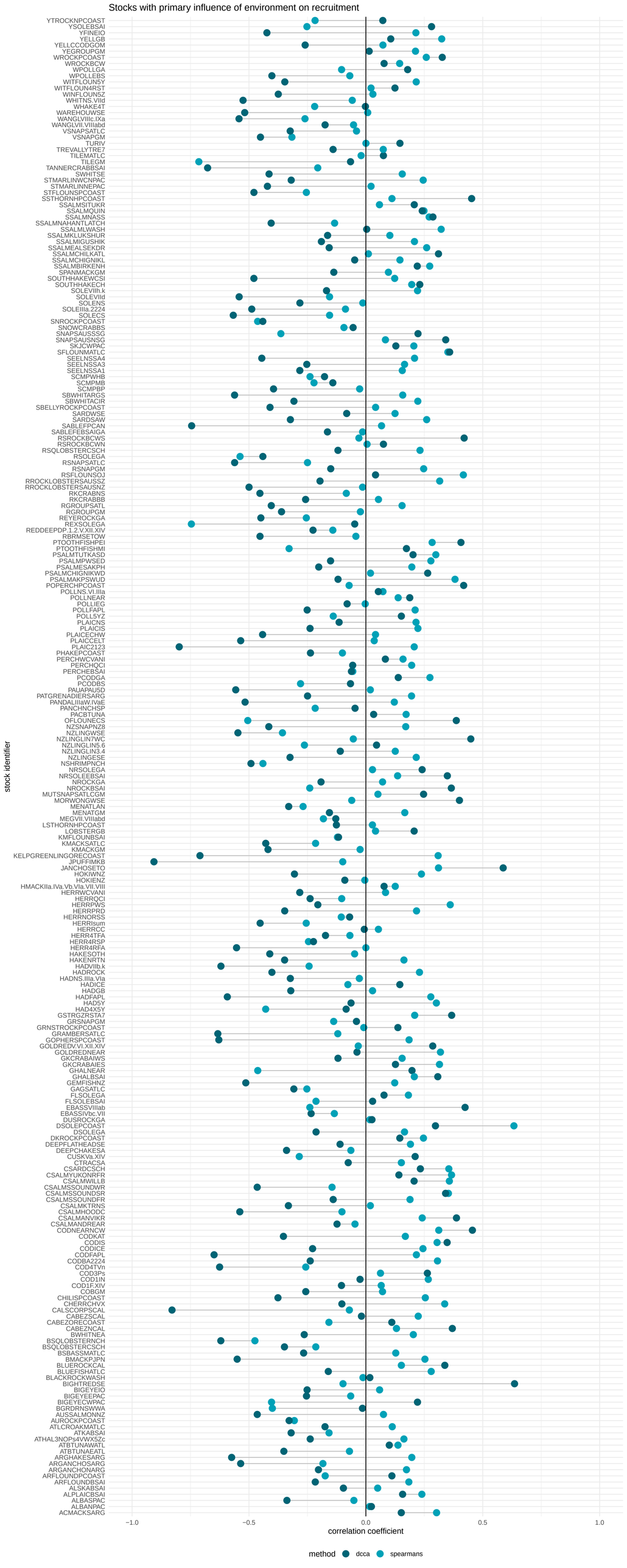
YFINEPAC
YELLSNEMATL
WPOLLAI
WMARLINATL
WAREHOUESE
TURBLKGSA29
TIGERFLATSE
STRIPEDBASSGOMCHATT
SSALMWOOD
SSALMWEAVER
SSALMUGASHIK
SSALMTOGIAK
SSALMSTELLAKO
SSALMSKEENA
SSALMSEYMOUR
SSALMRAFT
SSALMPITT
SSALMOWIKENOL
SSALMEUPPERS
SSALMCULTUS
SSALMCHILKO
SSALMBRANCH
SSALMBOWRON
SSALMBLACKL
SPRATIIIa.IV
SPRAT22.32
SPANMACKSETO
SOUTHHAKECR
SOLEVIIIab
SOLEIS
SMOOTHOREOCR
SEELNSSA2
SCUPNWATLC
SBWHITCH
SBT
SARDPVIIIc.IXa
SARDMEDGSA17.18
SABLEFPCOAST
RSOLEHSTR
RSOLE5AB
RHERRTSST
PTOOTHFISHCH
PSOLEPCOAST
PSALMWINDYC
PSALMSELDOVIAB
PSALMROCKYROD
PSALMPWSSED
PSALMPRIMPW
PSALMPGRAHAMSD
PSALMPERRYVILLED
PSALMPDICK
PSALMOKPW
PSALMMONTD
PSALMJCPW
PSALMJCPH
PSALMHUMPYCCISD
PSALMESAKPW
PSALMEKAMPW
PSALMCHIGNIKED
PSALMCHIGNIKCD
PSALMANADYRPW
PSALMAMURPW
PSALMAKPSESCD
POPERCHGA
PLAICVIIh.k
PLAIC7d
PINKSHRIMPGM
PILCHPJPN
PAUAPAU7
PAUAPAU5B
PATGRENADIERCH
PANCHPERUNC
PANCHCCH
NZSNAPNZ7
NZSNAPNZ1ENLD
NSHRIMPCSCH
MEG8c9a
MACKNWATLSA3.4
MACKNEICES
MACK5YCHATT
LOBSTERGOM
JMACKTSST
JANCHOTSST
JANCHOPJPN
HERRVIaVIIbc
HERRVIa
HERRSOG
HERRSITKA
HERRSIRS
HERRRIGA
HERRNWATLC
HERRNS.IIIa.VIId
HERRNIRS
HERR4TSP
HERR30.31
HAKESPPSAF
HADNEAR
GTRIGGM
FMEG8c9a
ESOLEPCOAST
DOYSFS
CSALMSSR
CSALMNSR
CSALMISCFPM
CODVIIek
CODGB
CODBA2532
COD3Pn4RS
COD3M
COD2J3KL
CMACKTSST
CMACKPJPN
CMACKPCOAST
CHTRACCH
CHSQUIDSA
CAPENOR
BUTTERGOMCHATT
BSBASSSATL
BRNSHRIMPGM
BOCACCSPCOAST
BMACKECS
APOLLNSJ
ANCHOSA
ANCHOBAYB
ANCHMEDGSA29
AMPL4T
ACADREDGOMGB

stock identifier

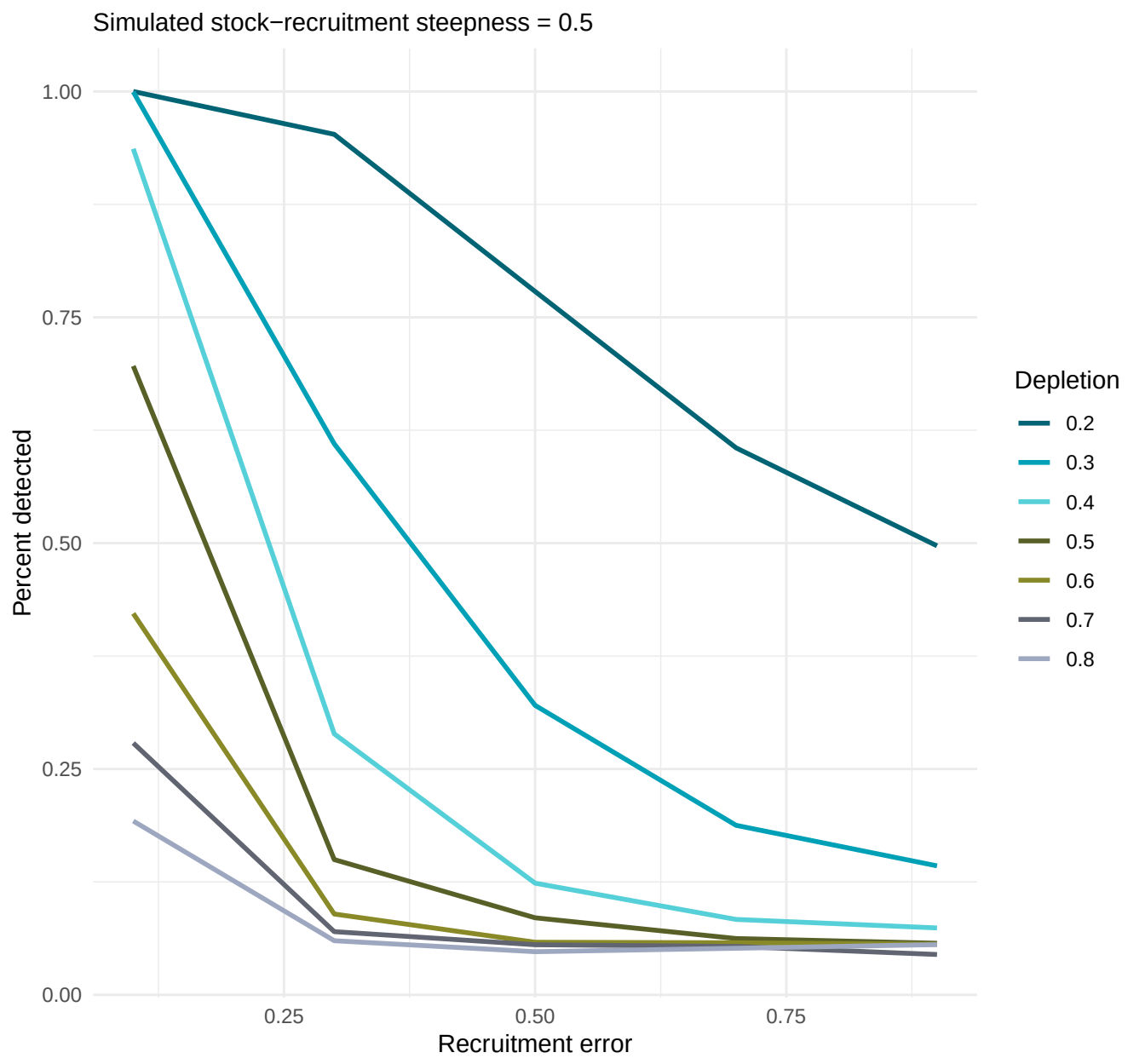
−1.0 −0.5 0.0 0.5 1.0

correlation coefficient

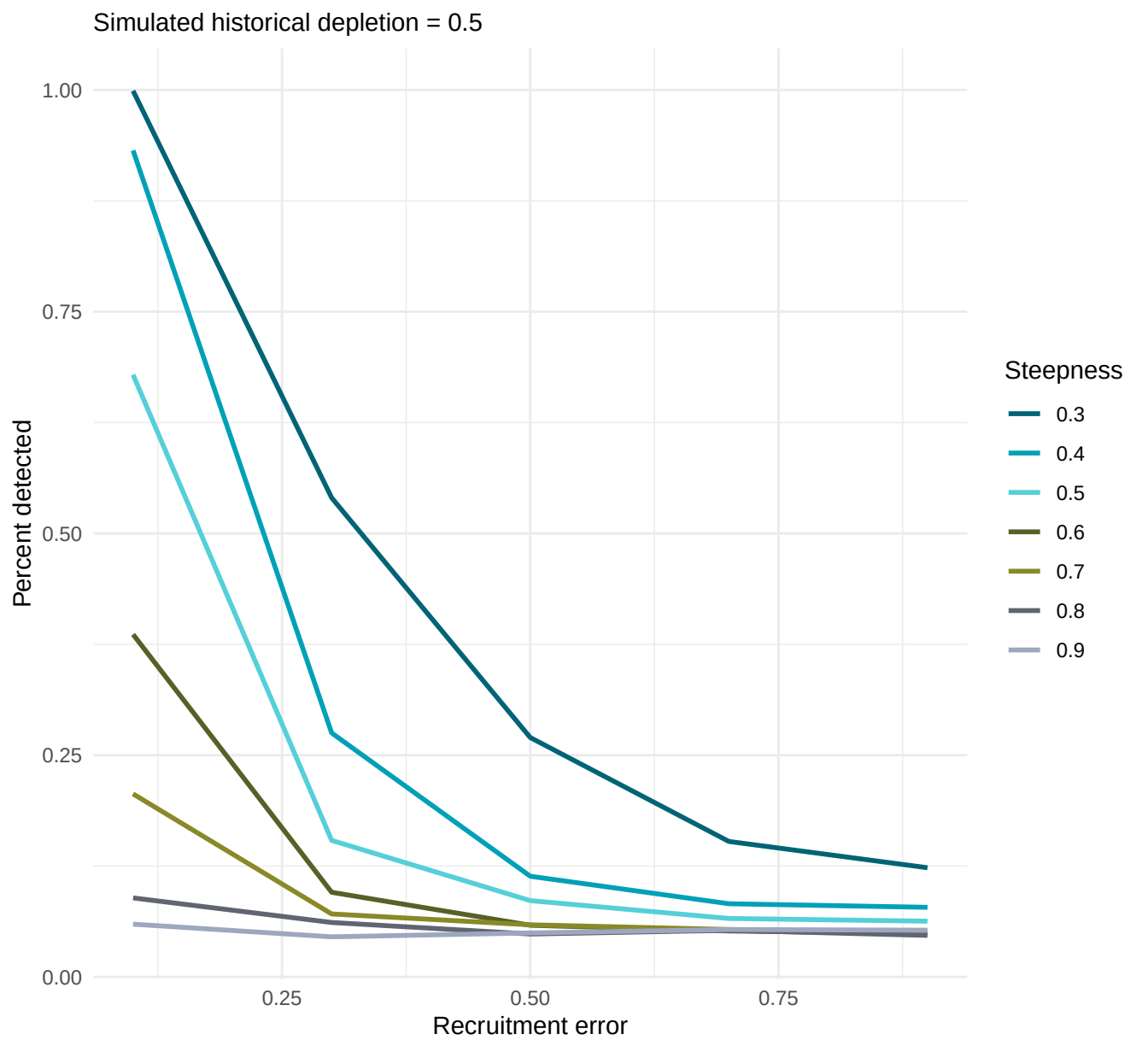
method dcca spearmans


Stocks with primary influence of environment on recruitment
stock identifier
YTROCKNPCOAST
YSOLEBSAI
YFINEIO
YELLGB
YELLCCODGOM
YEGROUPGM
WROCKPCOAST
WROCKBCW
WPOLLGA
WPOLLEBS
WITFLOUN5Y
WITFLOUN4RST
WINFLOUNSZ
WHITNS.VIId
WHAKE4T
WAREHOUWSE
WANGLVIIIc.IXa
WANGLVII.VIIIabd
VSNAPSATLC
VSNAPGM
TURIV
TREVALLYTRE7
TILEMATLC
TILEGM
TANNERCRABBSAI
SWHITSE
STMARLINWCNPAC
STMARLINNEPAC
STFLOUNSPCOAST
SSTHORNHPCOAST
SSALMSITUKR
SSALMQUIN
SSALMNASS
SSALMNAHANTLATCH
SSALMLWASH
SSALMKLUKSHUR
SSALMIGUSHIK
SSALMEALSEKDR
SSALMCHILKATL
SSALMCHIGNIKL
SSALMBIRKENH
SPANMACKGM
SOUTHHAKEWCSI
SOUTHHAKECH
SOLEVIIb.k
SOLEVIId
SOLENS
SOLEIIIa.2224
SOLECS
SNROCKPCOAST
SNOWCRABBS
SNAPSAUSSSG
SNAPSAUSNSG
SKJCWPAC
SFLOUNMATLC
SEELNSSA4
SEELNSSA3
SEELNSSA1
SCMPWHB
SCMPMB
SCMPBP
SBWHITARGS
SBWHITACIR
SBELLYROCKPCOAST
SARDWSE
SARDSAW
SABLEFPCAN
SABLEFEBSAIGA
RSROCKBCWS
RSROCKBCWN
RSQLOBSTERCSCH
RSOLEGA
RSNAPSATLC
RSNAPGM
RSFLOUNSOJ
RROCKLOBSTERSAUSSZ
RROCKLOBSTERSAUSNZ
RKCRABNS
RKCRABBB
RGROUPSATL
RGROUPGM
REYEROCKGA
REXSOLEGA
REDDEEPDP.1.2.V.XII.XIV
RBRMSETOW
PTOOTHFISHPEI
PTOOTHFISHMI
PSALMTUTKASD
PSALMPWSED
PSALMESAKPH
PSALMCHIGNIKWD
PSALMAKPSWUD
POPERCHPCOAST
POLLNS.VI.IIIa
POLLNEAR
POLLIEG
POLLFAPL
POLL5YZ
PLAICNS
PLAICIS
PLAICECHW
PLAICCELT
PLAIC2123
PHAKEPCOAST
PERCHWCVANI
PERCHQCI
PERCHEBSAI
PCODGA
PCODBS
PAUAPAU5D
PATGRENADIERSARG
PANDALIIIaW.IVaE
PANCHNCHSP
PACBTUNA
OFLOUNECS
NZSNAPNZ8
NZLINGWSE
NZLINGLIN7WC
NZLINGLIN5.6
NZLINGLIN3.4
NZLINGESE
NSHRIMPNCH
NRSOLEGA
NRSOLEEBSAI
NROCKGA
NROCKBSAI
MUTSNAPSATLCGM
MORWONGWSE
MENATLAN
MENATGM
MEGVII.VIIIabd
LSTHORNHPCOAST
LOBSTERGB
KMFLOUNBSAI
KMACKSATLC
KMACKGM
KELPGREENLINGORECOAST
JPUFFIMKB
JANCHOSETO
HOKIWNZ
HOKIENZ
HMACKIIa.IVa.Vb.VIa.VII.VIII
HERRWCVANI
HERRQCI
HERRPWS
HERRPRD
HERRNORSS
HERRIsum
HERRCC
HERR4TFA
HERR4RSP
HERR4RFA
HAKESOTH
HAKENRTN
HADVIIb.k
HADROCK
HADNS.IIIa.VIa
HADICE
HADGB
HADFAPL
HAD5Y
HAD4X5Y
GSTRGZRSTA7
GRSNAPGM
GRNSTROCKPCOAST
GRAMBERSATLC
GOPHERSPCOAST
GOLDREDV.VI.XII.XIV
GOLDREDNEAR
GKCRABAIWS
GKCRABAIES
GHALNEAR
GHALBSAI
GEMFISHNZ
GAGSATLC
FLSOLEGA
FLSOLEBSAI
EBASSVIIIab
EBASSIVbc.VII
DUSROCKGA
DSOLEPCOAST
DSOLEGA
DKROCKPCOAST
DEEPFLATHEADSE
DEEPCHAKESA
CUSKVa.XIV
CTRACSA
CSARDCSCH
CSALMYUKONRFR
CSALMWILLB
CSALMSSOUNDWR
CSALMSSOUNDSR
CSALMSSOUNDFR
CSALMKTRNS
CSALMHOODC
CSALMANVIKR
CSALMANDREAR
CODNEARNCW
CODKAT
CODIS
CODICE
CODFAPL
CODBA2224
COD4TVn
COD3Ps
COD1IN
COD1FXIV
COBGM
CHILISPCOAST
CHERRCHVX
CALSCORPSCAL
CABEZSCAL
CABEZORECOAST
CABEZNCAL
BWHITNEA
BSQLOBSTERNCH
BSQLOBSTERCSCH
BSBASSMATLC
BMACKPJPN
BLUEROCKCAL
BLUEFISHATLC
BLACKROCKWASH
BIGHTREDSE
BIGEYEIO
BIGEYEEPAC
BIGEYECWPAC
BGRDRNSWWA
AUSSALMONNZ
AUROCKPCOAST
ATLCROAKMATLC
ATKABSAI
ATHAL3NOPs4VWX5Zc
ATBTUNAWATL
ATBTUNAEATL
ARGHAKESARG
ARGANCHOSARG
ARGANCHONARG
ARFLOUNDPCOAST
ARFLOUNDBSAI
ALSKABSAI
ALPLAICBSAI
ALBASPAC
ALBANPAC
ACMACKSARG
−1.0
−0.5
0.0
0.5
1.0
correlation coefficient
method
dcca
spearmans

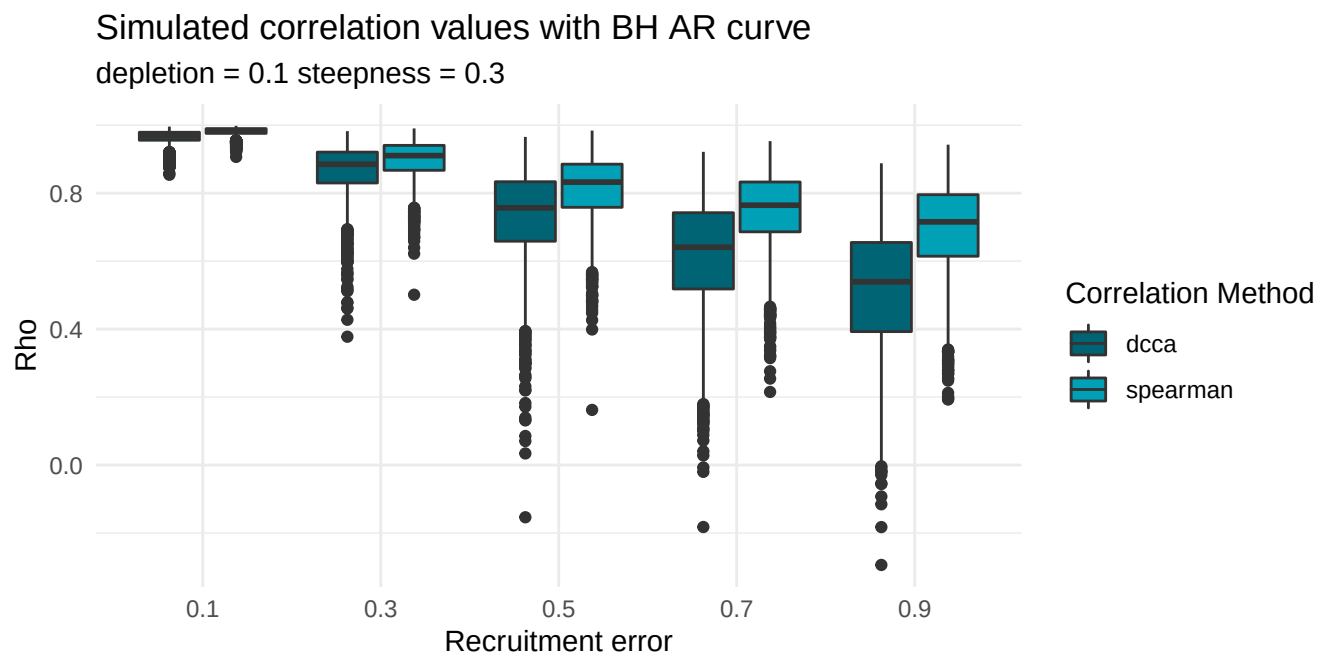
Supplementary Appendix 6

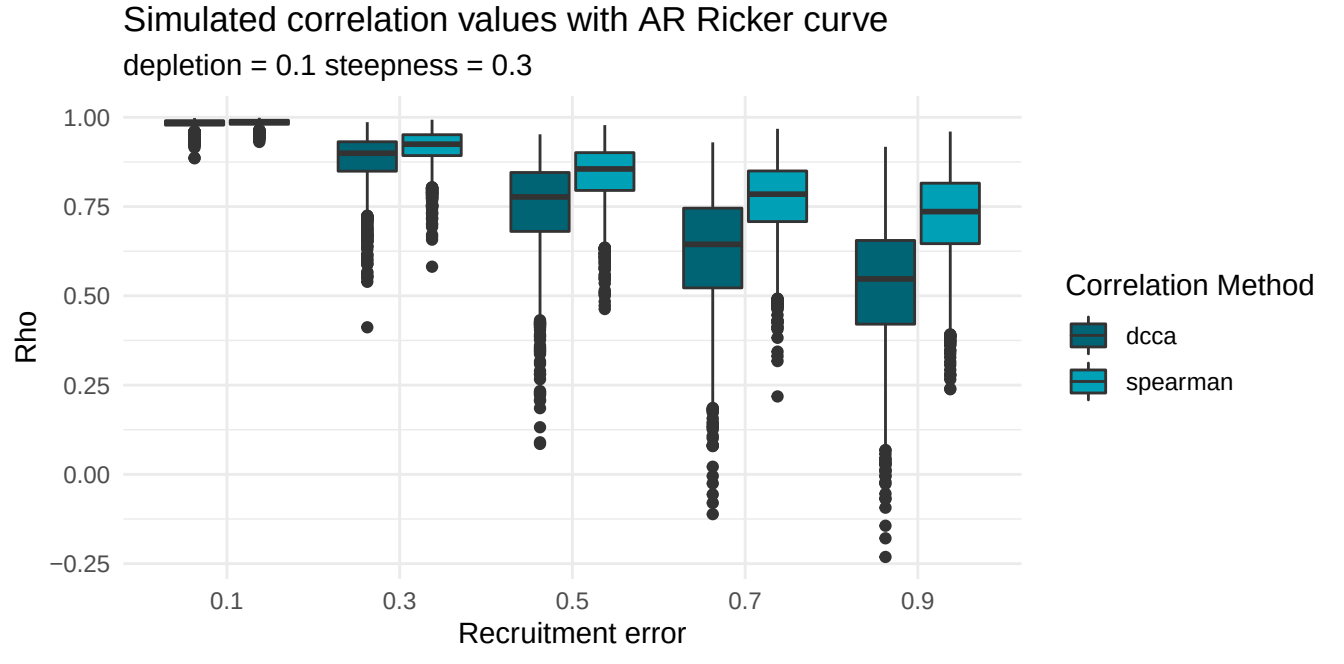


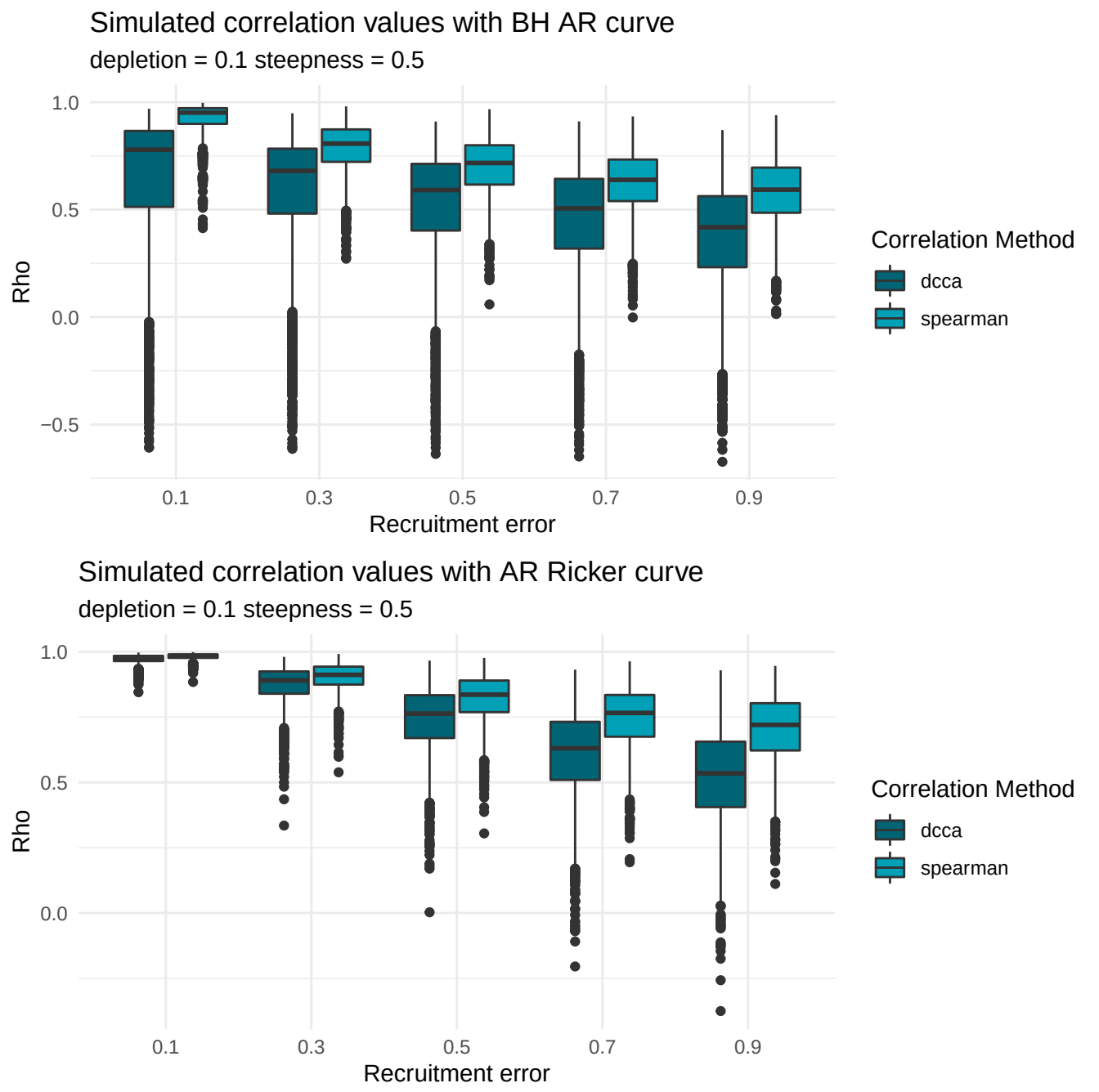
Percentage of simulations with a significant Spearman's correlation coefficient as a function of recruitment error. Lines represent the historical depletion of the stock biomass. The spawning biomass time series was generated using a AR(1) process with a autocorrelation coefficient of 0.7.

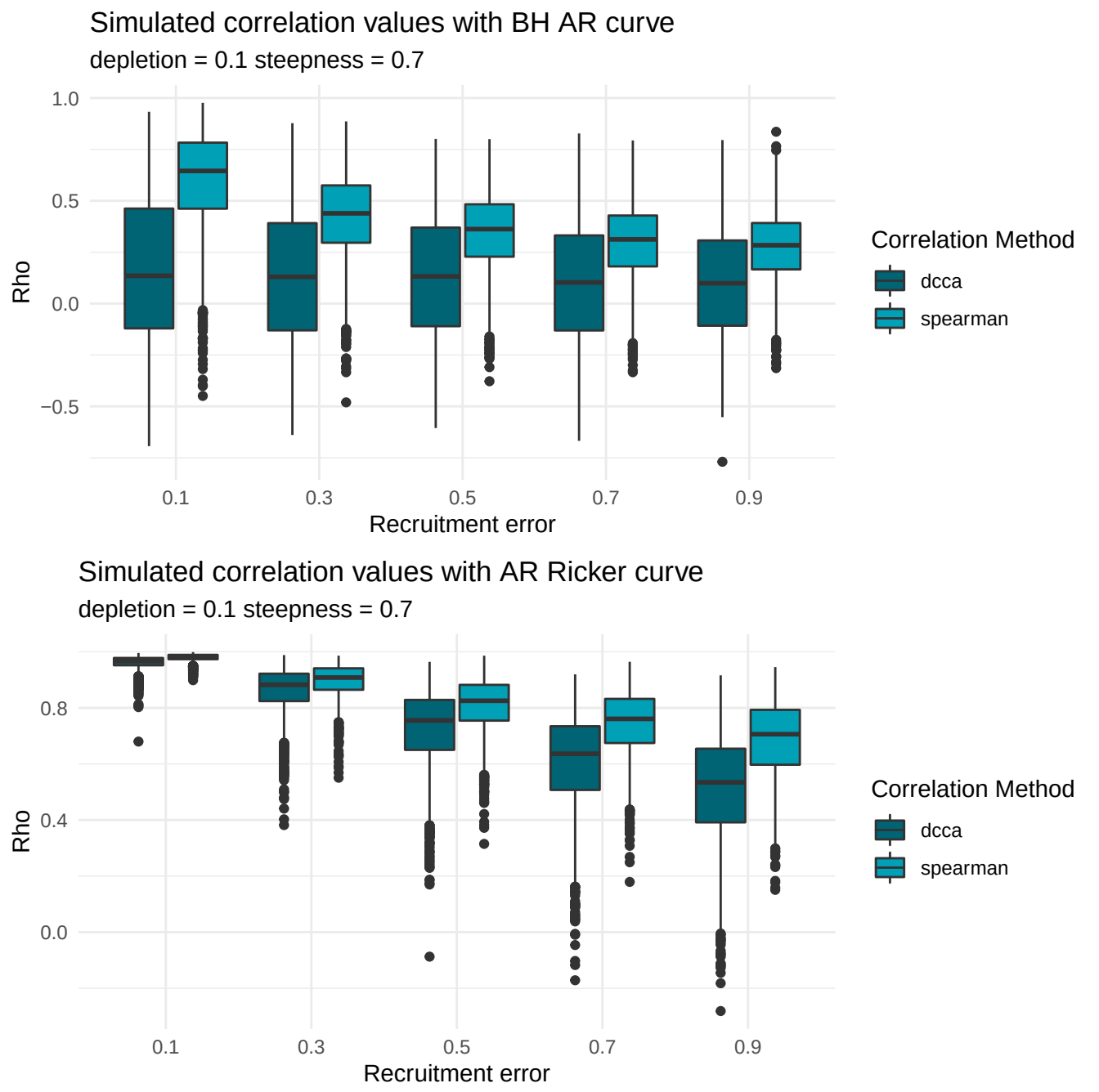


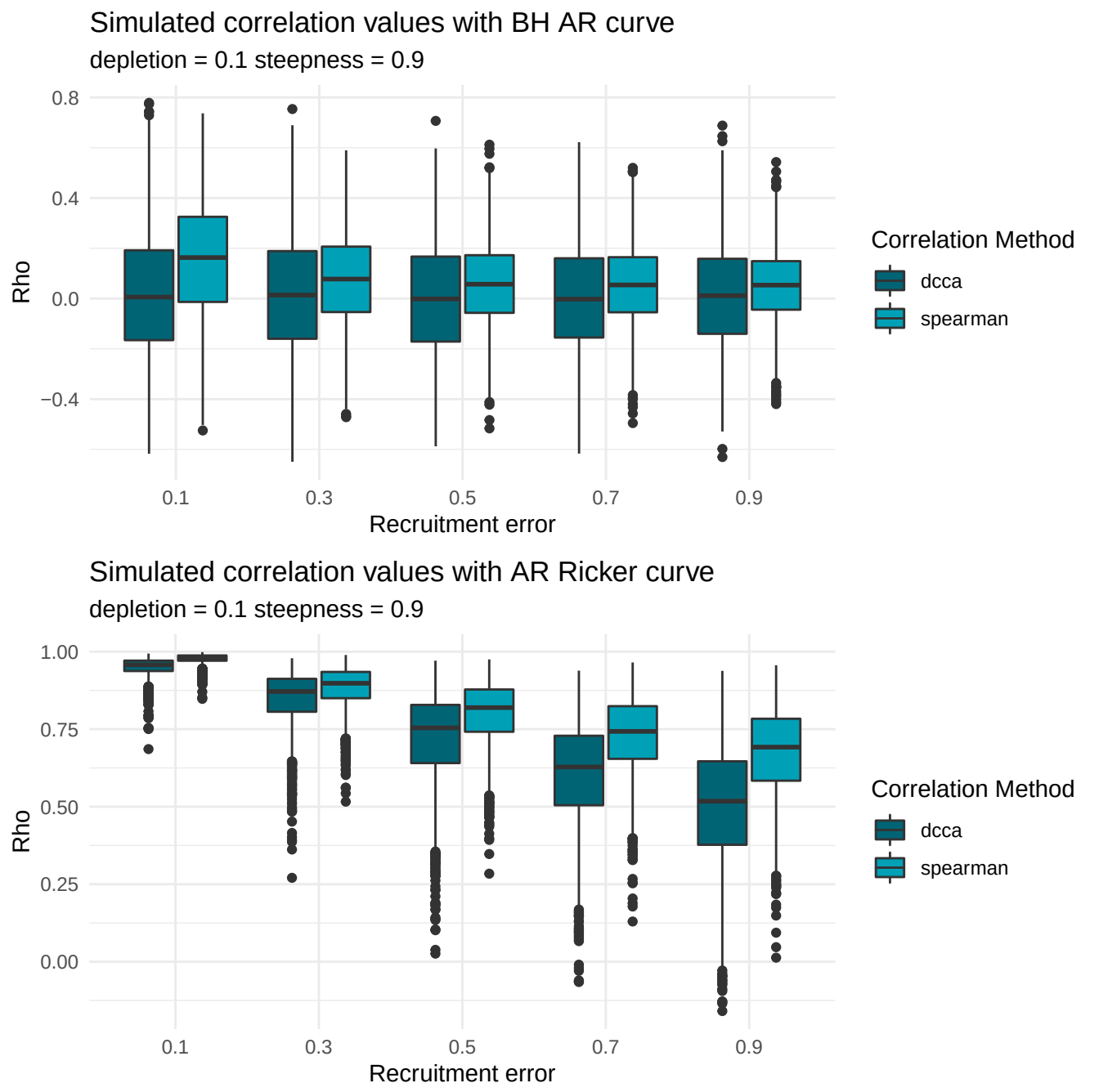
Percentage of simulations with a significant Spearman's correlation coefficient as a function of recruitment error. Lines represent the steepness parameter in the Beverton−Holt stock−recruitment relationship. The spawning biomass time series was generated using a AR(1) process with a autocorrelation coefficient of 0.7.


Simulated correlation values with BH AR curve
depletion = 0.1 steepness = 0.3
Rho
0.8
0.4
0.0
0.1
0.3
0.5
0.7
0.9
Recruitment error
Correlation Method
dcca
spearman


Simulated correlation values with AR Ricker curve
depletion = 0.1 steepness = 0.3
Rho
1.00
0.75
0.50
0.25
0.00
−0.25
0.1
0.3
0.5
0.7
0.9
Recruitment error
Correlation Method
dcca
spearman


Simulated correlation values with BH AR curve
depletion = 0.1 steepness = 0.5
Rho
1.0
0.5
0.0
−0.5
0.1
0.3
0.5
0.7
0.9
Recruitment error
Correlation Method
dcca
spearman
Simulated correlation values with AR Ricker curve
depletion = 0.1 steepness = 0.5
Rho
1.0
0.5
0.0
0.1
0.3
0.5
0.7
0.9
Recruitment error
Correlation Method
dcca
spearman


Simulated correlation values with BH AR curve
depletion = 0.1 steepness = 0.7
Rho
1.0
0.5
0.0
−0.5
0.1
0.3
0.5
0.7
0.9
Recruitment error
Correlation Method
dcca
spearman
Simulated correlation values with AR Ricker curve
depletion = 0.1 steepness = 0.7
Rho
0.8
0.4
0.0
0.1
0.3
0.5
0.7
0.9
Recruitment error
Correlation Method
dcca
spearman


Simulated correlation values with BH AR curve
depletion = 0.1 steepness = 0.9
Rho
0.8
0.4
0.0
−0.4
0.1
0.3
0.5
0.7
0.9
Recruitment error
Correlation Method
dcca
spearman
Simulated correlation values with AR Ricker curve
depletion = 0.1 steepness = 0.9
Rho
1.00
0.75
0.50
0.25
0.00
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0.3
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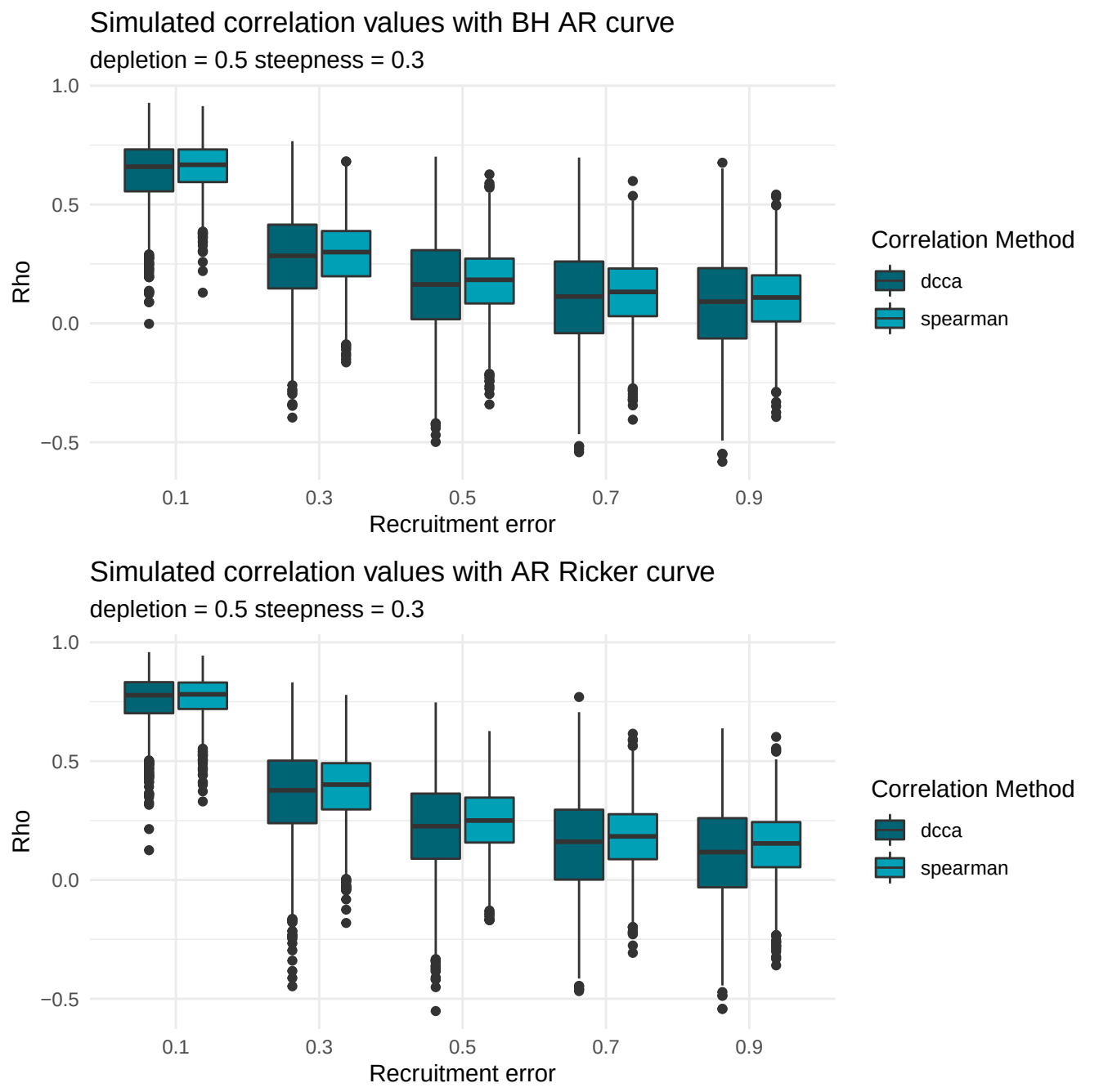
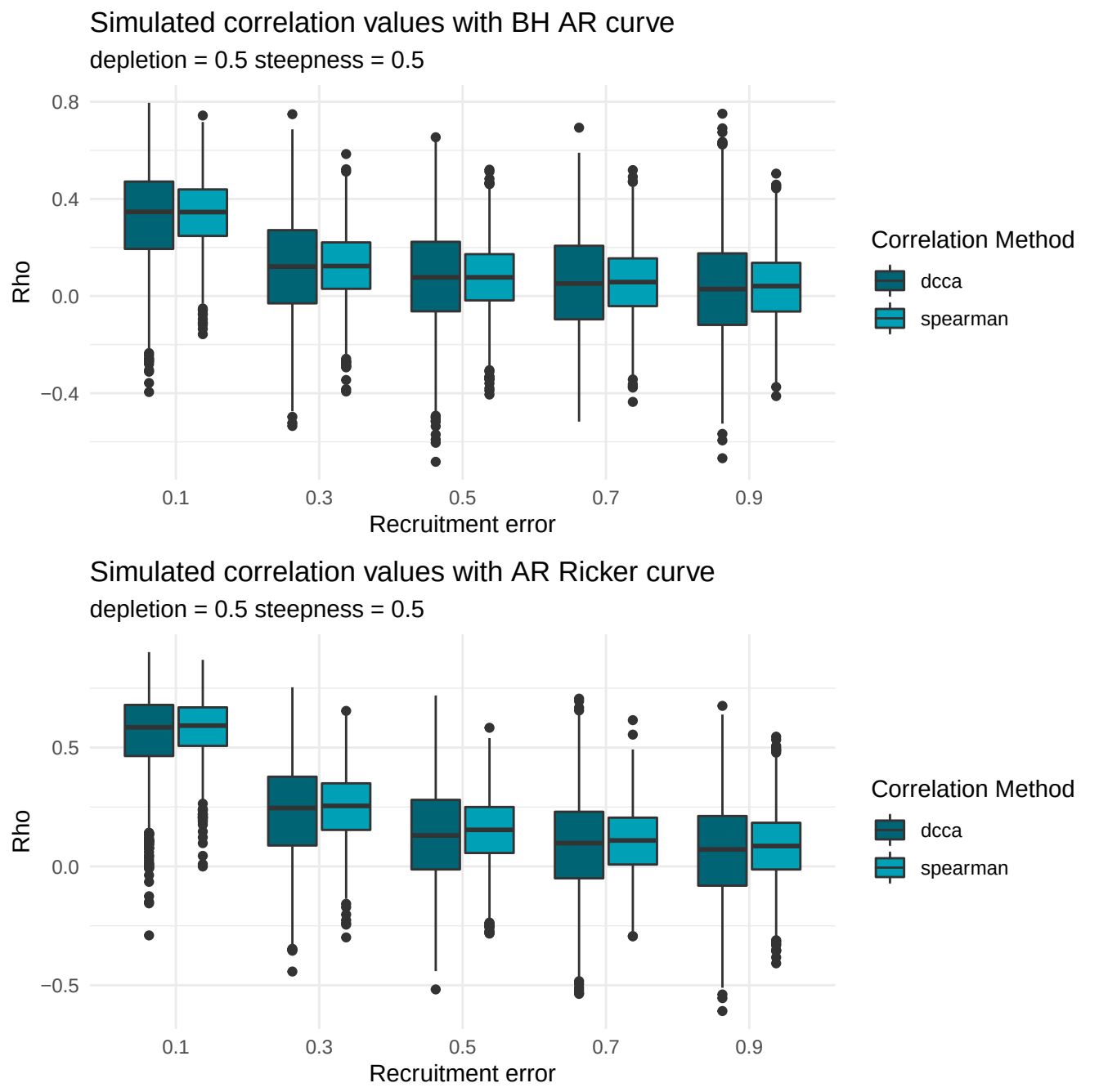
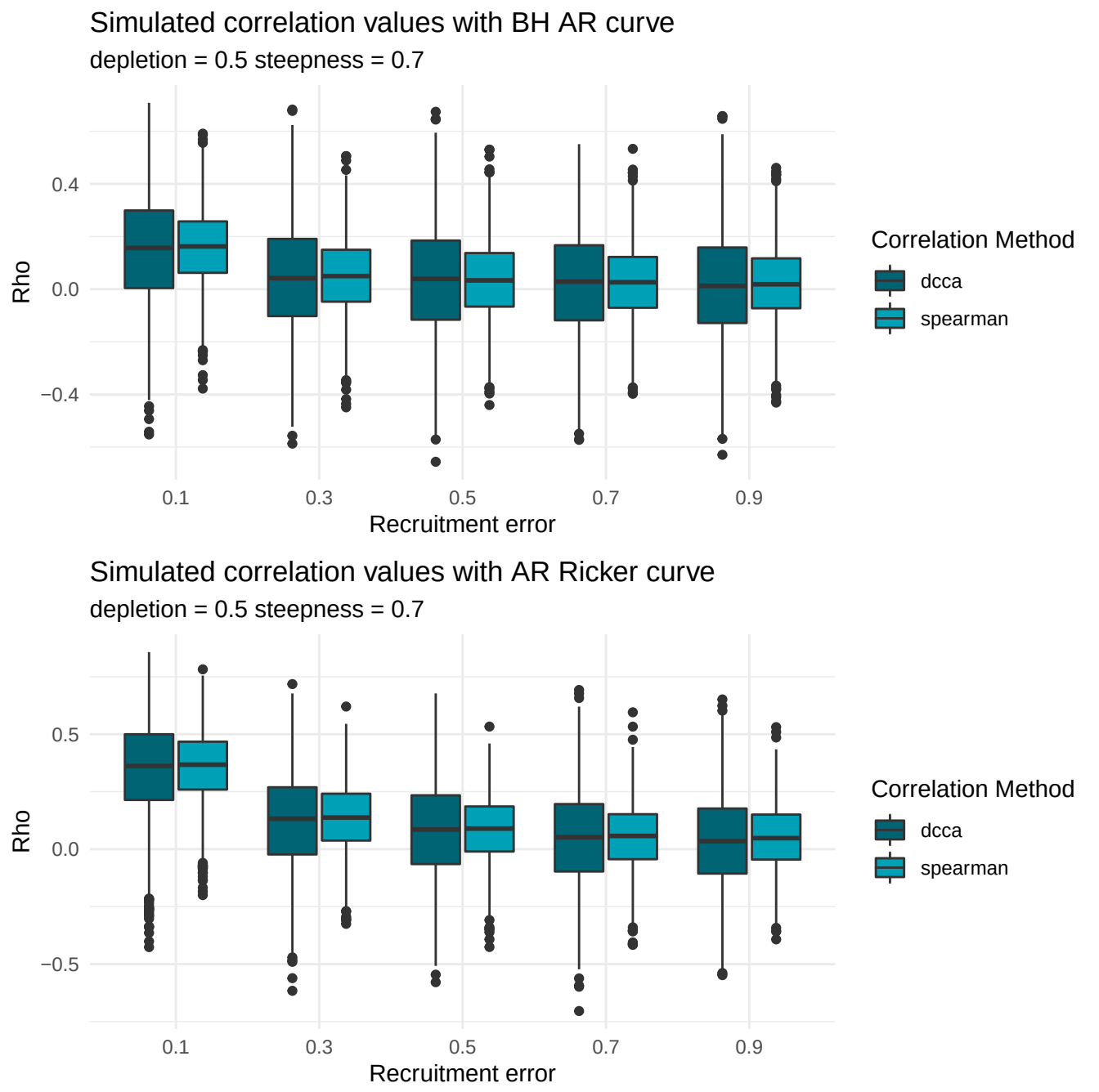
0.7
0.9
Recruitment error
Correlation Method
dcca
spearman


Simulated correlation values with BH AR curve
depletion = 0.5 steepness = 0.3
Rho
1.0
0.5
0.0
−0.5
0.1
0.3
0.5
0.7
0.9
Recruitment error
Correlation Method
dcca
spearman
Simulated correlation values with AR Ricker curve
depletion = 0.5 steepness = 0.3
Rho
1.0
0.5
0.0
−0.5
0.1
0.3
0.5
0.7
0.9
Recruitment error
Correlation Method
dcca
spearman


Simulated correlation values with BH AR curve
depletion = 0.5 steepness = 0.5
Rho
0.8
0.4
0.0
−0.4
0.1
0.3
0.5
0.7
0.9
Recruitment error
Correlation Method
dcca
spearman
Simulated correlation values with AR Ricker curve
depletion = 0.5 steepness = 0.5
Rho
0.5
0.0
−0.5
0.1
0.3
0.5
0.7
0.9
Recruitment error
Correlation Method
dcca
spearman


Simulated correlation values with BH AR curve
depletion = 0.5 steepness = 0.7
Rho
0.4
0.0
−0.4
0.1
0.3
0.5
0.7
0.9
Recruitment error
Correlation Method
dcca
spearman
Simulated correlation values with AR Ricker curve
depletion = 0.5 steepness = 0.7
Rho
0.5
0.0
−0.5
0.1
0.3
0.5
0.7
0.9
Recruitment error
Correlation Method
dcca
spearman

Simulated correlation values with BH AR curve
depletion = 0.5 steepness = 0.9
Rho
0.4
0.0
−0.4
0.1
0.3
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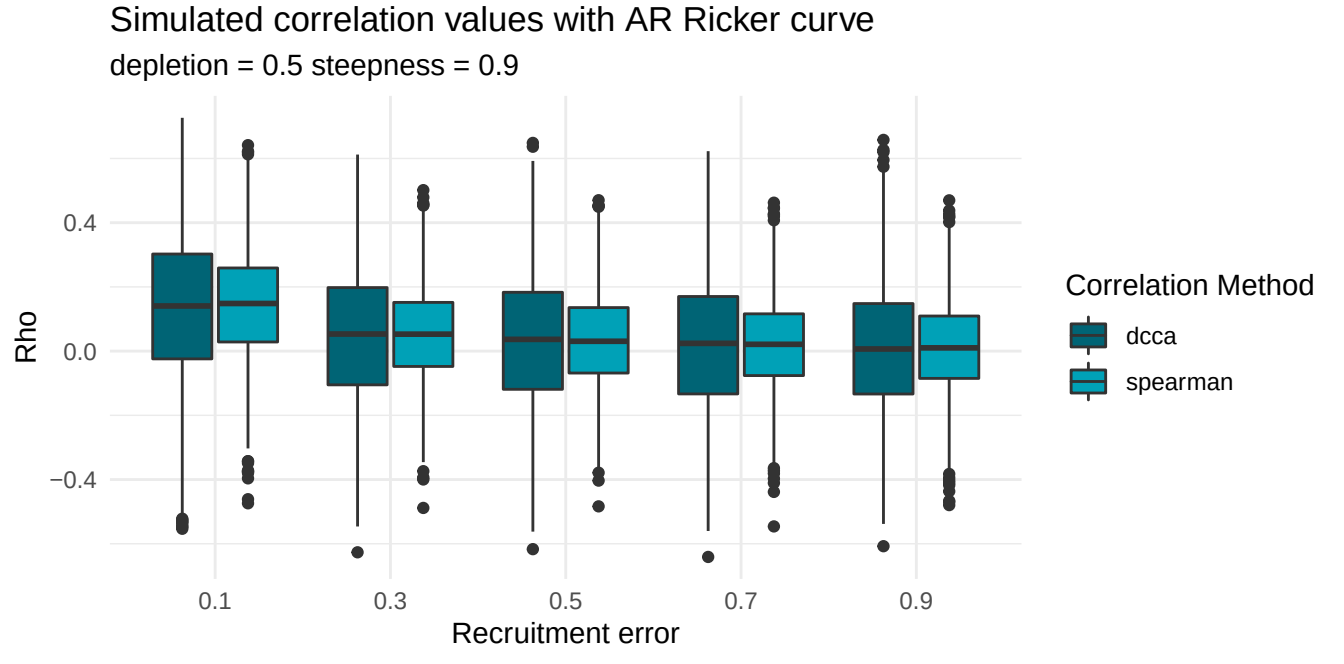
0.9
Recruitment error
Correlation Method
dcca
spearman


Simulated correlation values with AR Ricker curve
depletion = 0.5 steepness = 0.9
Rho
0.4
0.0
−0.4
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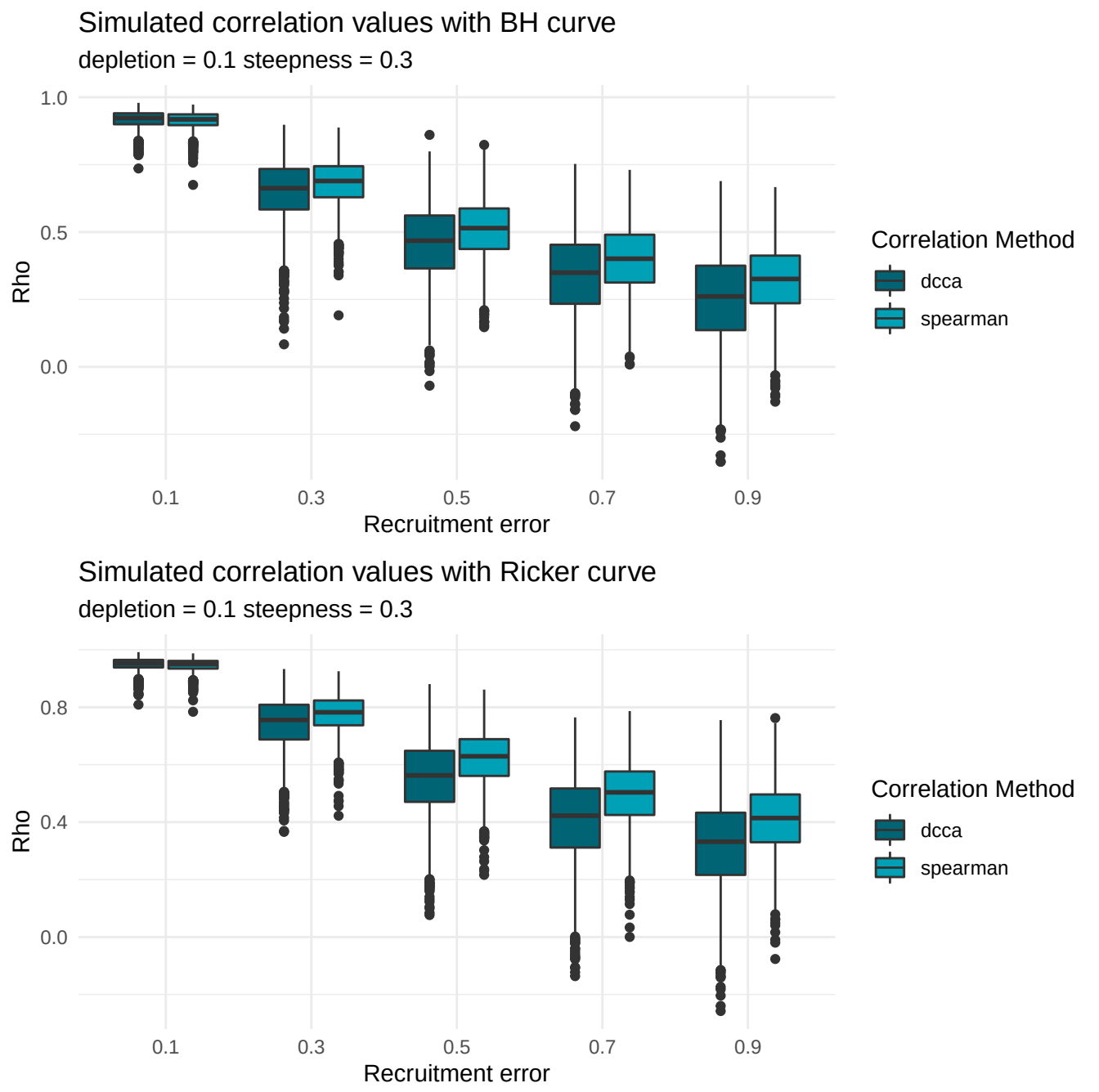
Recruitment error
Correlation Method
dcca
spearman


Simulated correlation values with BH curve
depletion = 0.1 steepness = 0.3
Rho
1.0
0.5
0.0
0.1
0.3
0.5
0.7
0.9
Recruitment error
Correlation Method
dcca
spearman
Simulated correlation values with Ricker curve
depletion = 0.1 steepness = 0.3
Rho
0.8
0.4
0.0
0.1
0.3
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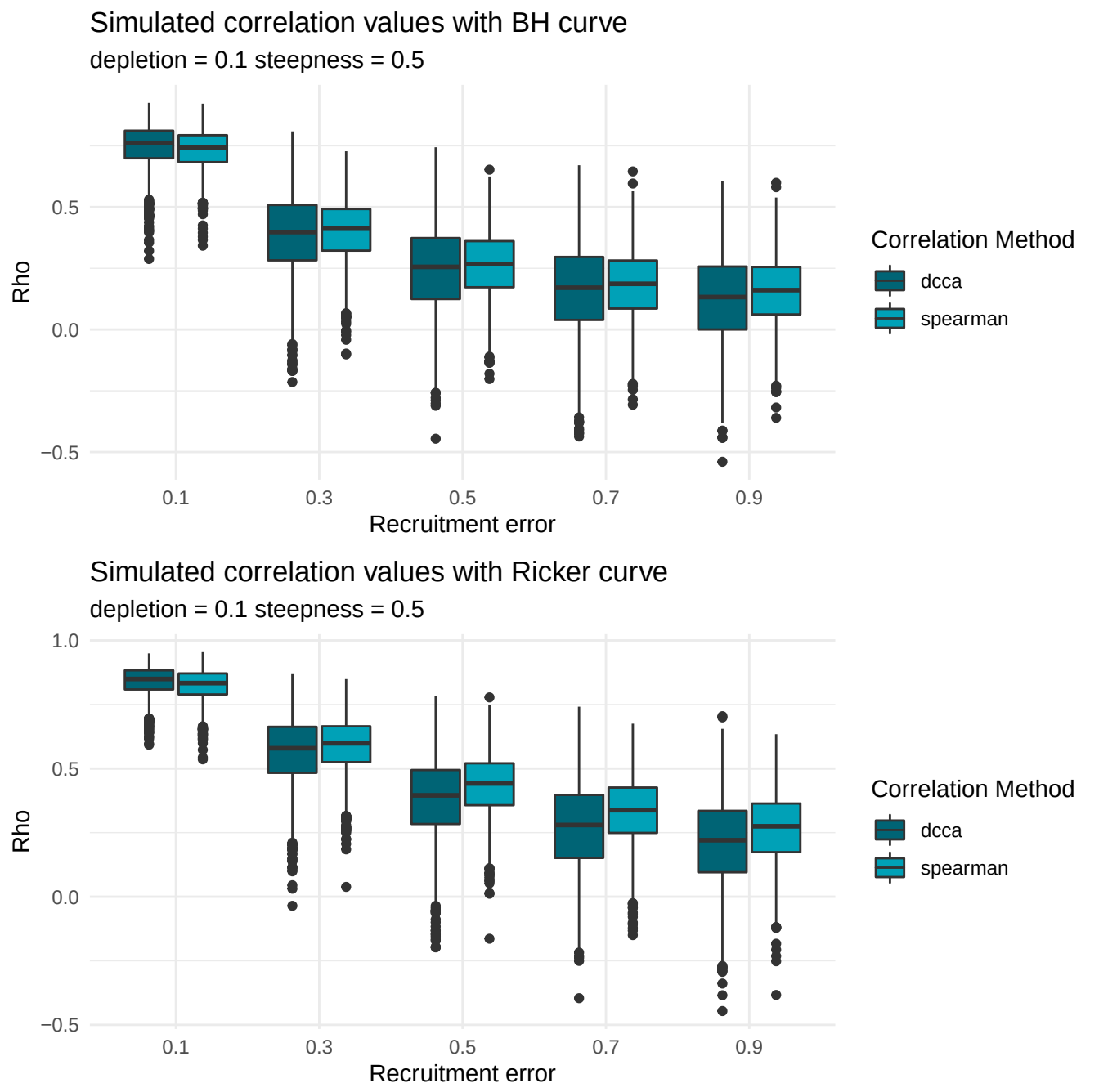
Recruitment error
Correlation Method
dcca
spearman


Simulated correlation values with BH curve
depletion = 0.1 steepness = 0.5
Rho
0.5
0.0
−0.5
0.1
0.3
0.5
0.7
0.9
Recruitment error
Correlation Method
dcca
spearman
Simulated correlation values with Ricker curve
depletion = 0.1 steepness = 0.5
Rho
1.0
0.5
0.0
−0.5
0.1
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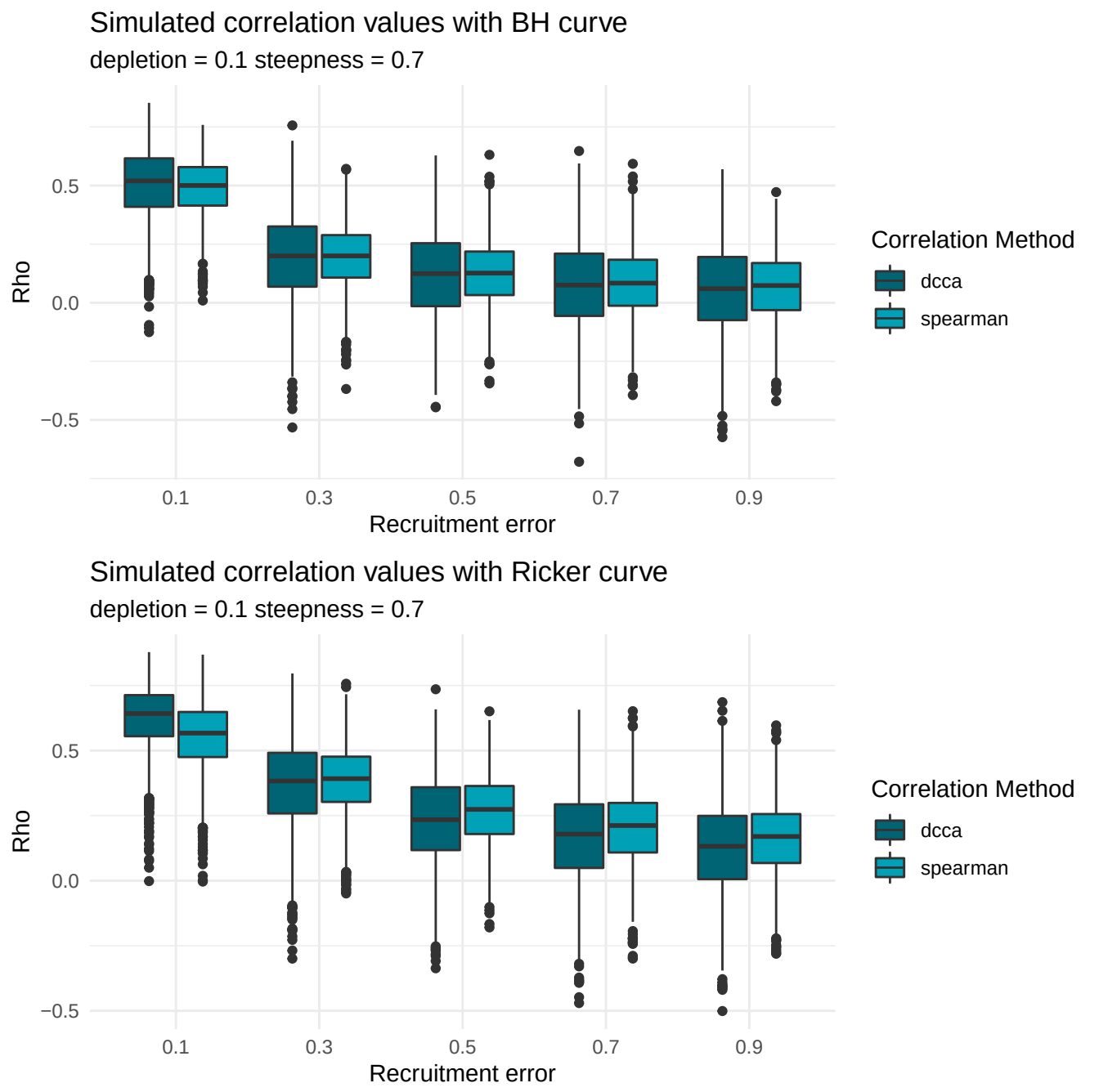
0.9
Recruitment error
Correlation Method
dcca
spearman


Simulated correlation values with BH curve
depletion = 0.1 steepness = 0.7
Rho
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0.0
−0.5
0.1
0.3
0.5
0.7
0.9
Recruitment error
Correlation Method
dcca
spearman
Simulated correlation values with Ricker curve
depletion = 0.1 steepness = 0.7
Rho
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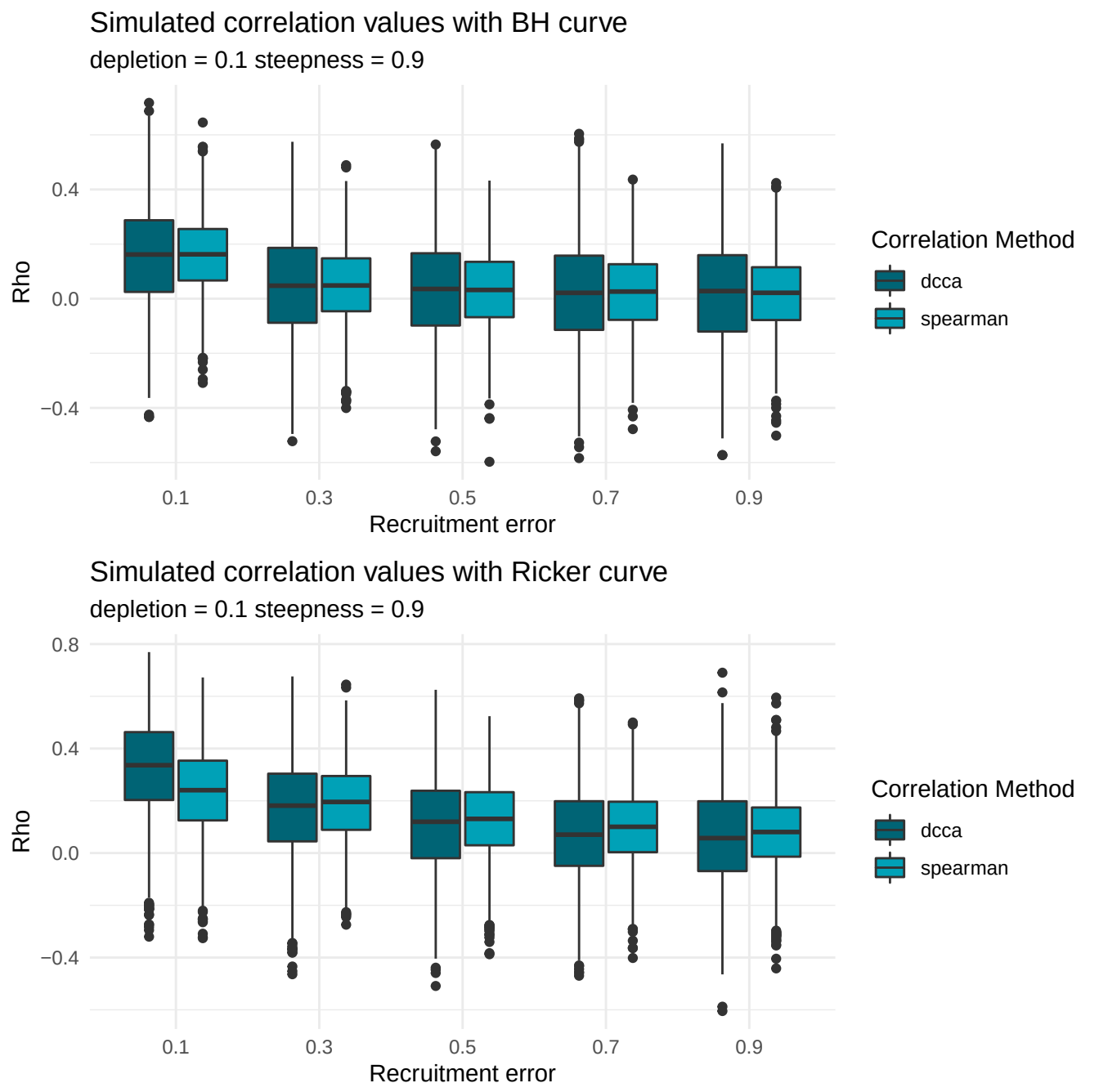
0.9
Recruitment error
Correlation Method
dcca
spearman


Simulated correlation values with BH curve
depletion = 0.1 steepness = 0.9
Rho
0.4
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−0.4
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Recruitment error
Correlation Method
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spearman
Simulated correlation values with Ricker curve
depletion = 0.1 steepness = 0.9
Rho
0.8
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Recruitment error
Correlation Method
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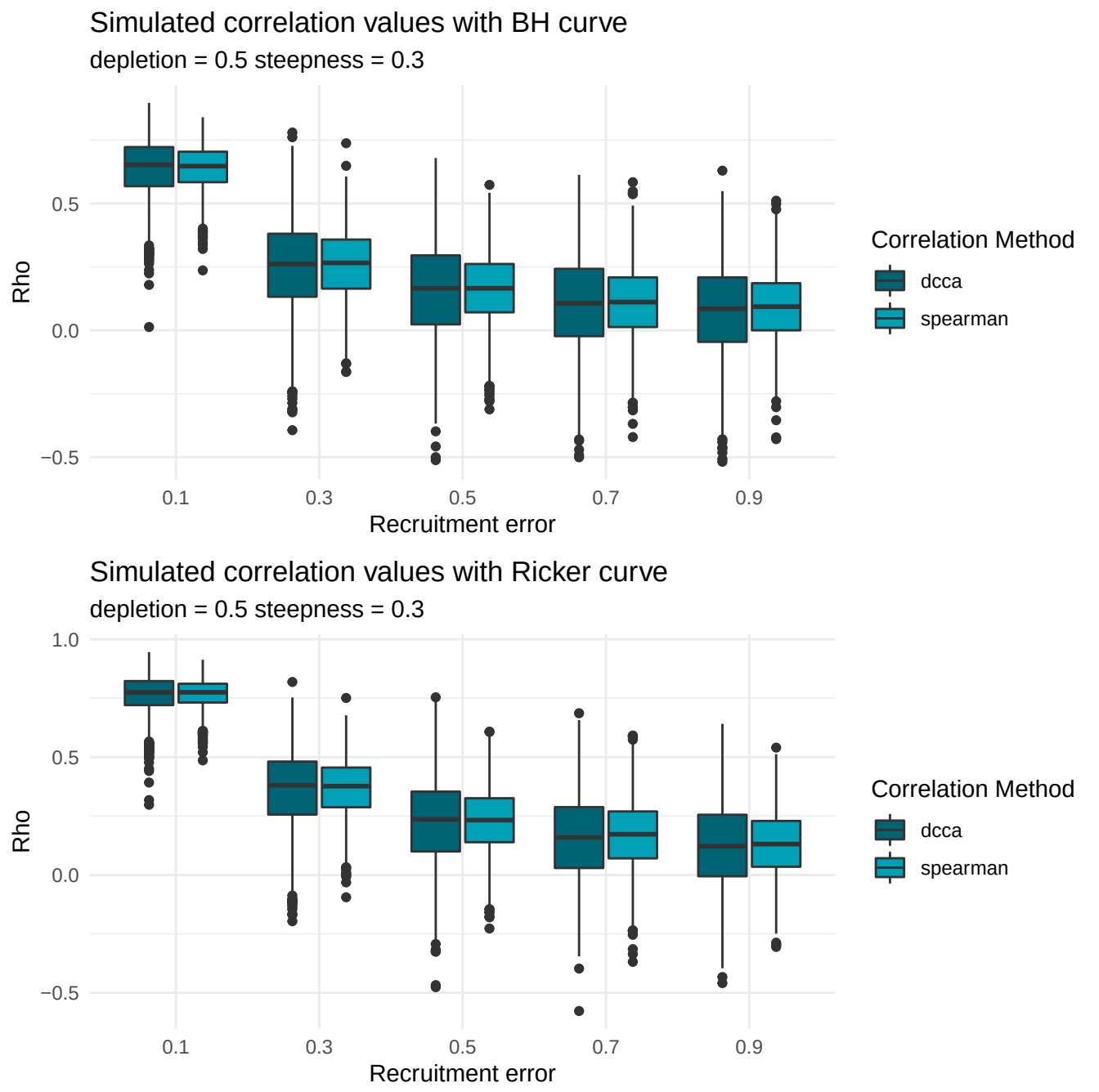
Simulated correlation values with BH curve
depletion = 0.5 steepness = 0.3
Rho
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Recruitment error
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Rho
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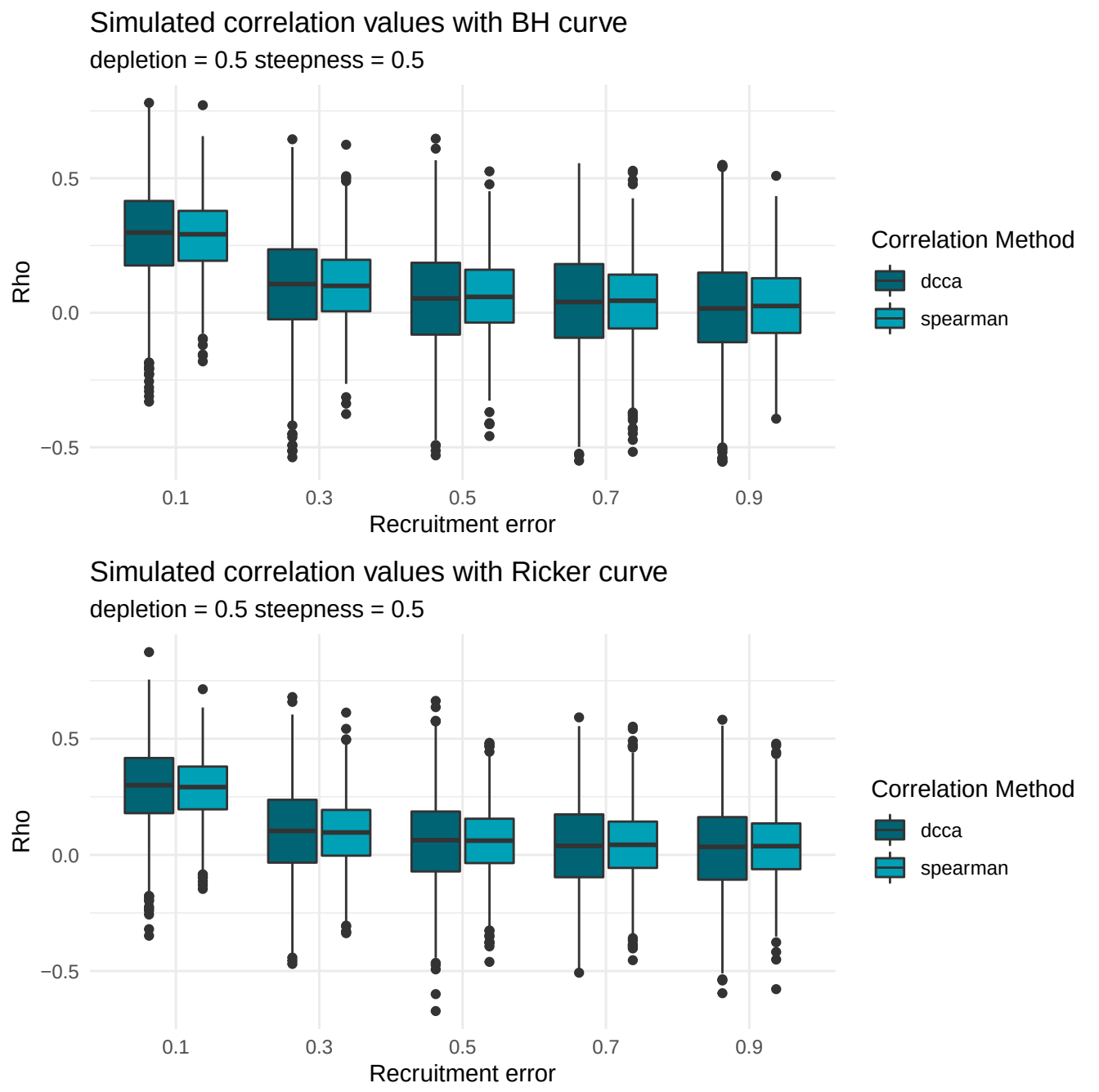
Simulated correlation values with BH curve
depletion = 0.5 steepness = 0.5
Rho
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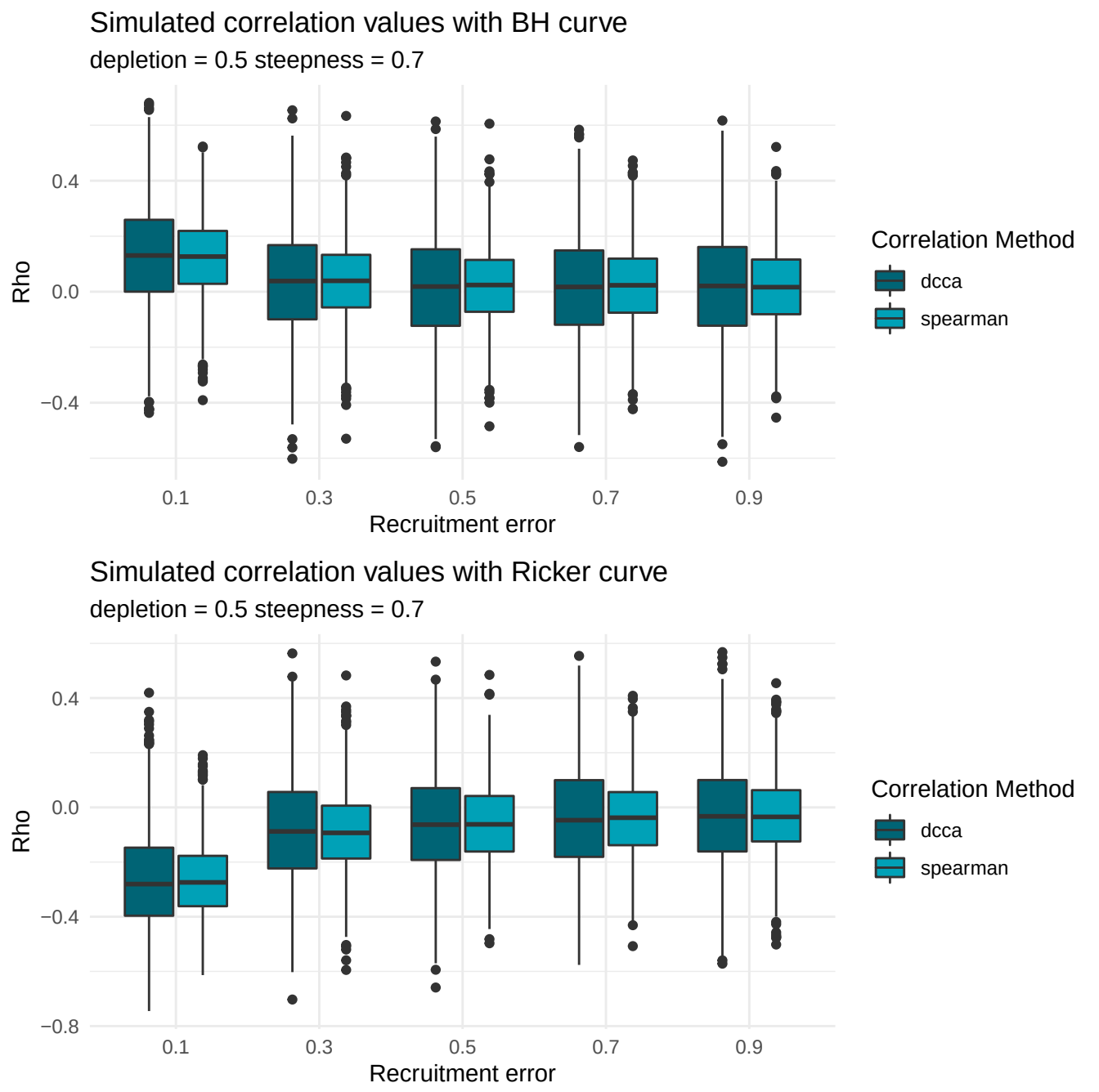
Simulated correlation values with BH curve
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Rho
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Recruitment error
Correlation Method
dcca
spearman
Simulated correlation values with Ricker curve
depletion = 0.5 steepness = 0.7
Rho
0.4
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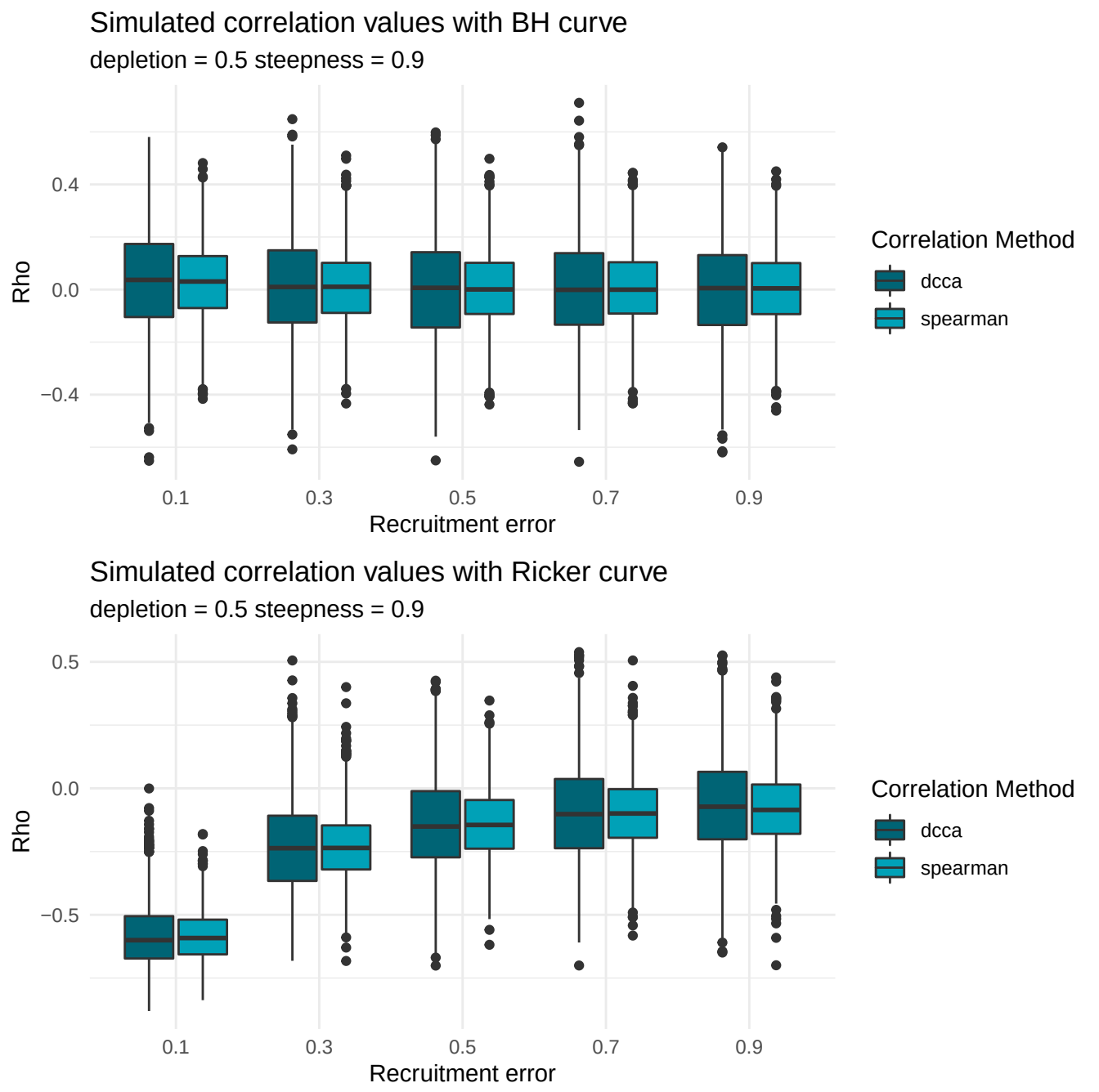
Simulated correlation values with BH curve
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