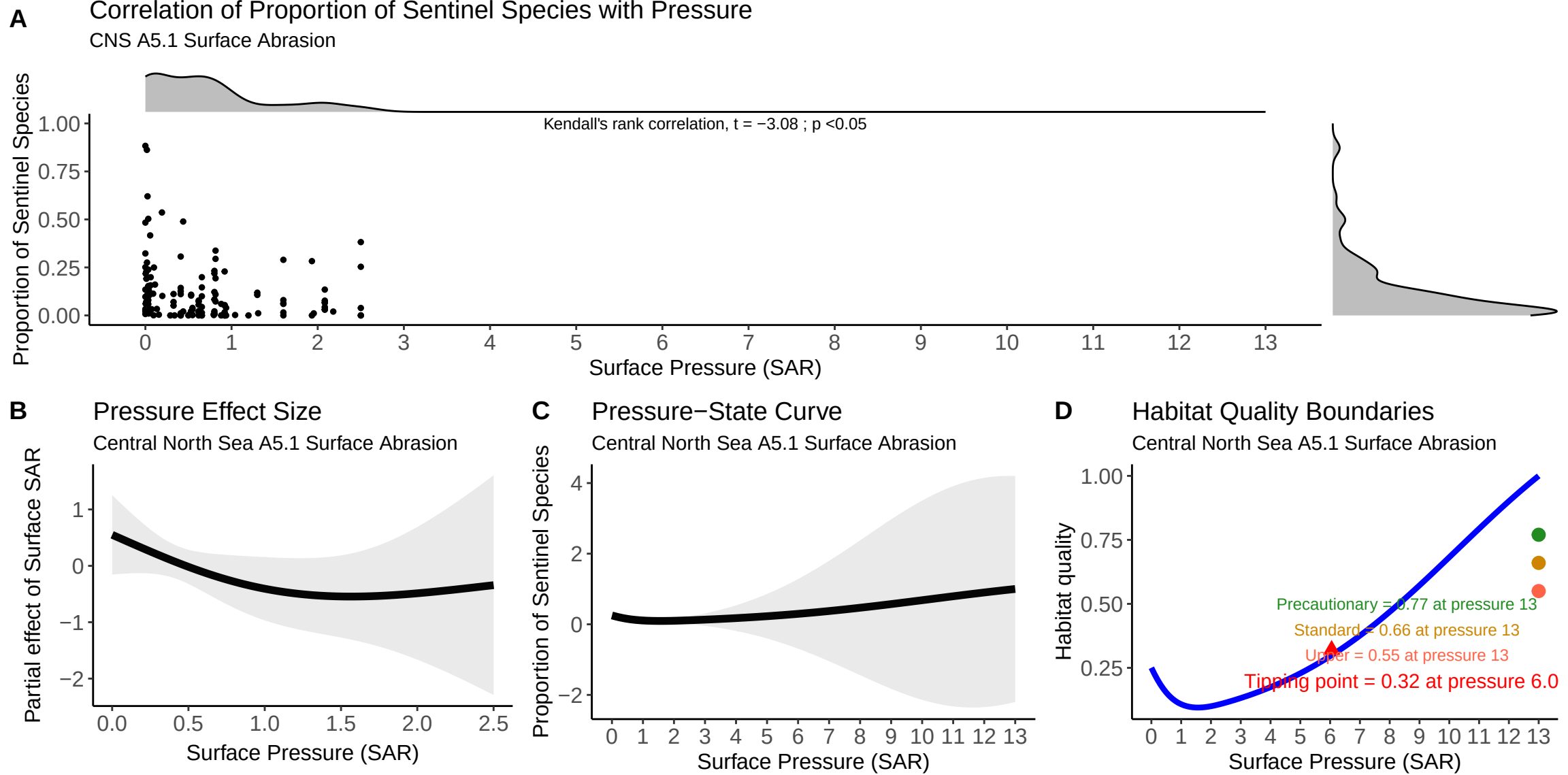
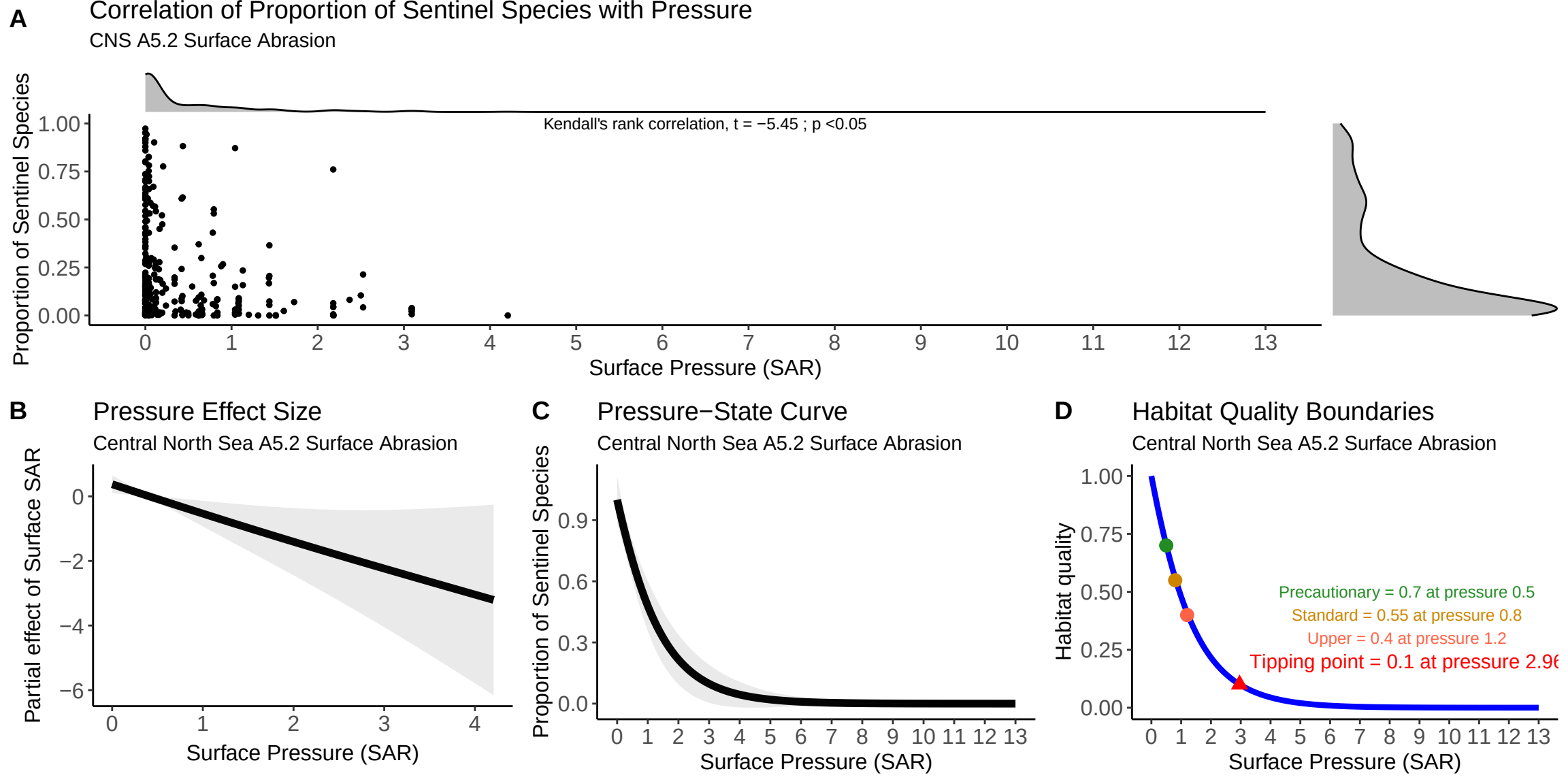
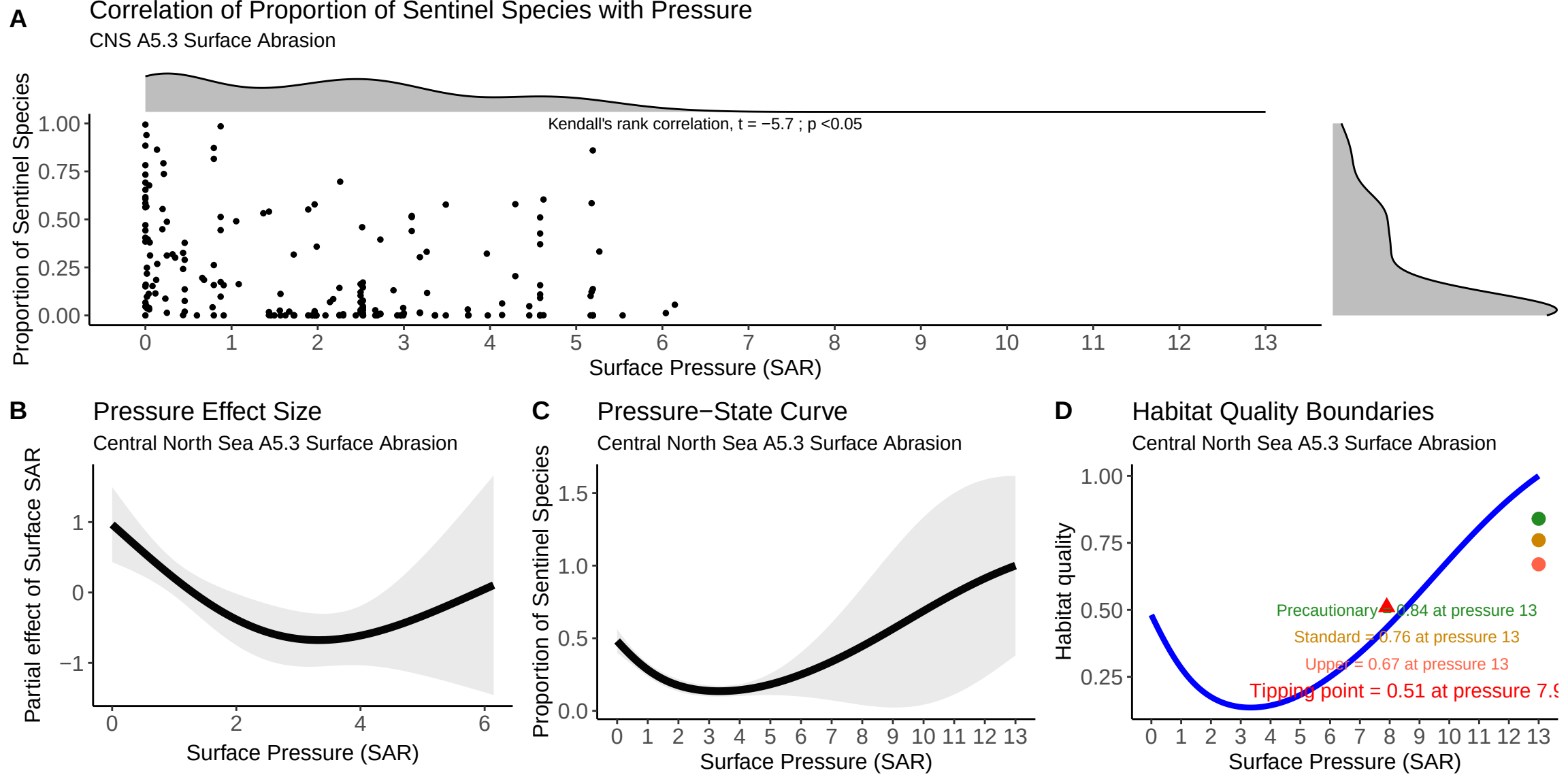
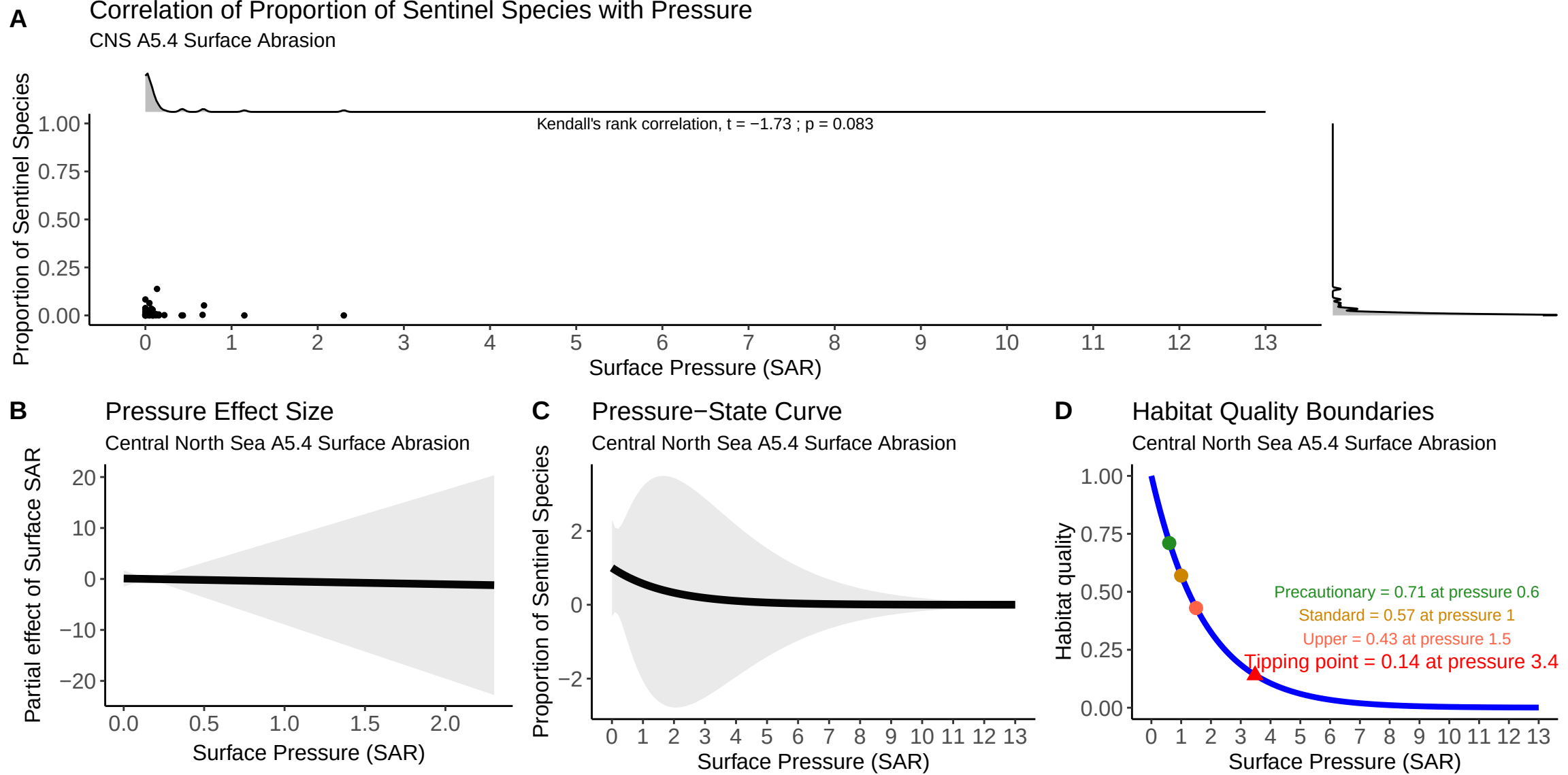
UK Marine Strategy Part 1 2024. Sentinels of The Seabed Indicator (BH1) Pilot Assessment in the Celtic Seas and Greater North Sea. Appendix 1: Detailed pressure−state relationships results

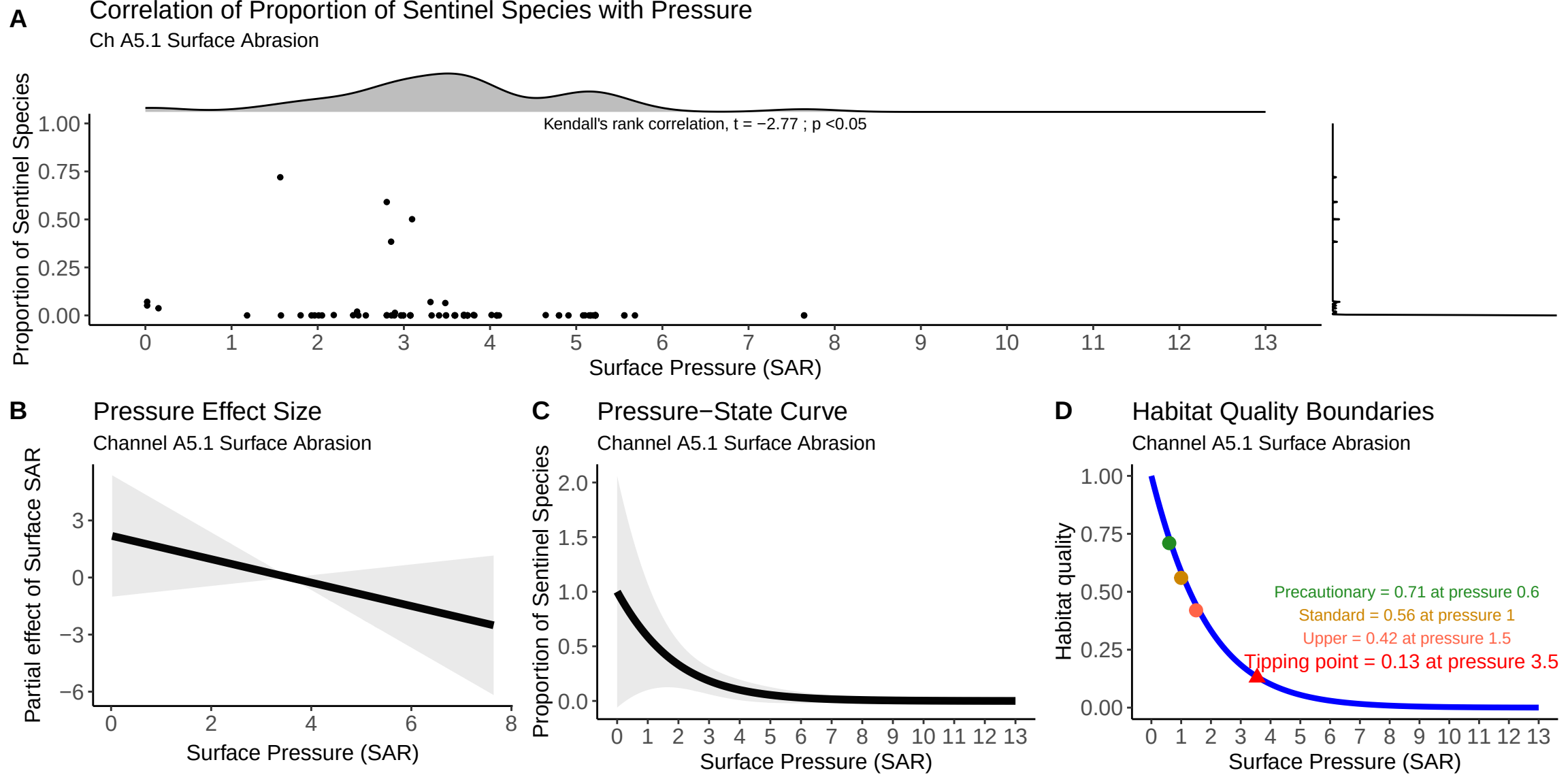
This document details the relationship between the proportion of sentinel species and trawling abrasion intensity observed for each assessment unit and habitat type combination. For each dataset, the following plots are provided: A) correlation between the proportion of sentinel species observed at sample level and trawling pressure intensity. Kernel density plots are reported to visualise the density of the data available along the x axis (sentinel species proportion) and y axis (swept area ratio level). Kendall's rank correlation results are also displayed to identify statistically significant correlations B) Pressure Effect Size. This plot shows the pressure effect size on the proportion of sentinel species. Negative effect values correspond to a reduction of SoS proportion with pressure, positive effect values correspond to an increase in SoS proportion. Grey area corresponds to standard deviation in the model. C) Pressure−State curve obtained from Generalised Linear Model, showing the relationship between the proportion of sentinel species and the pressure. Grey area corresponds to standard deviation in the model. D) Habitat quality boundaries and tipping point calculated from the model. Note, all plots are shown where sentinal species could be identified, irrespective of significant correlations or reliable model outputs.

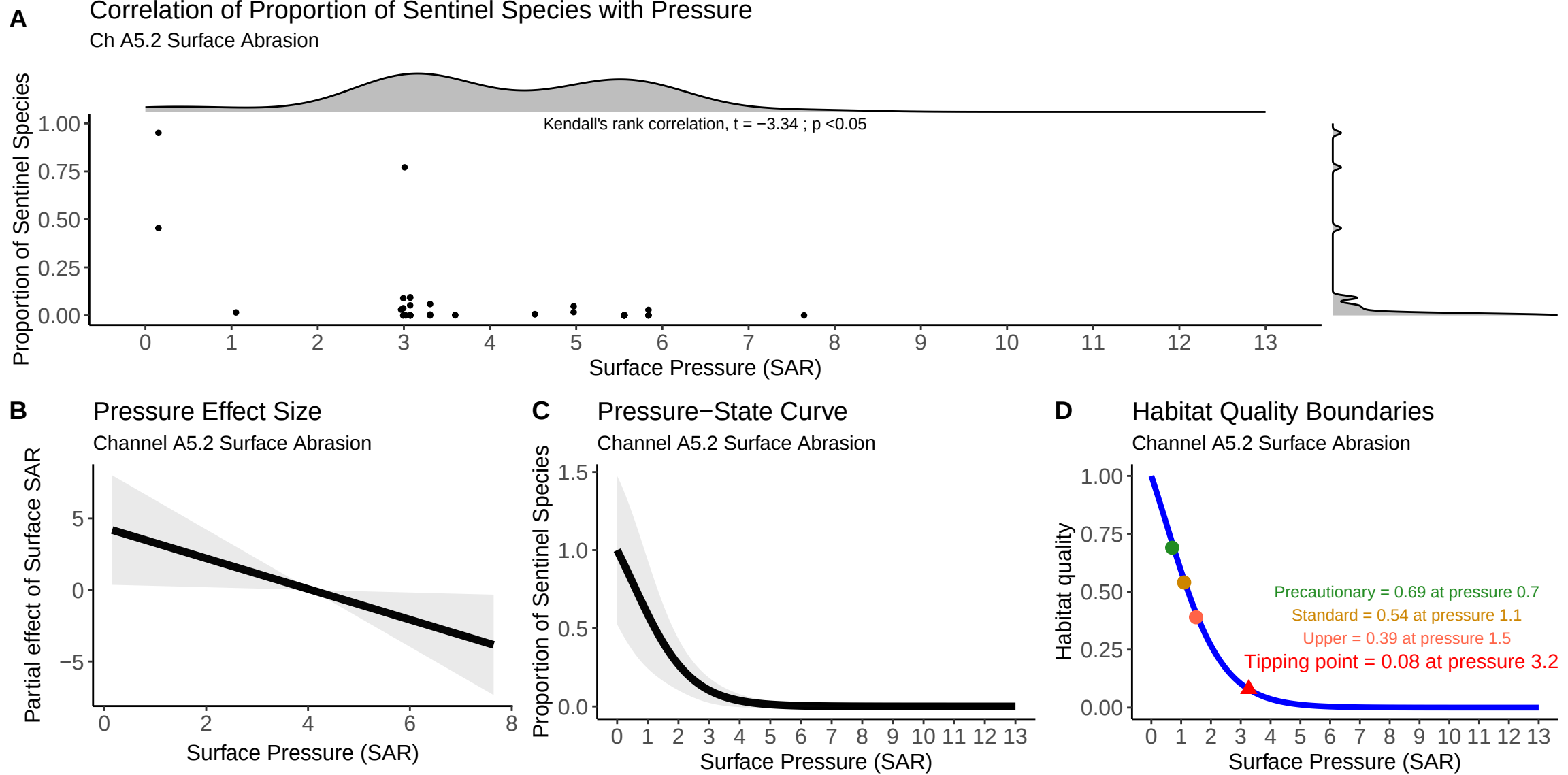

A
Correlation of Proportion of Sentinel Species with Pressure
CNS A5.1 Surface Abrasion
Kendall's rank correlation, t = −3.08 ; p <0.05
Proportion of Sentinel Species
1.00
0.75
0.50
0.25
0.00
0 1 2 3 4 5 6 7 8 9 10 11 12 13
Surface Pressure (SAR)
B
Pressure Effect Size
Central North Sea A5.1 Surface Abrasion
Partial effect of Surface SAR
1
0
−1
−2
0.0 0.5 1.0 1.5 2.0 2.5
Surface Pressure (SAR)
C
Pressure−State Curve
Central North Sea A5.1 Surface Abrasion
Proportion of Sentinel Species
4
2
0
−2
0 1 2 3 4 5 6 7 8 9 10 11 12 13
Surface Pressure (SAR)
D
Habitat Quality Boundaries
Central North Sea A5.1 Surface Abrasion
Habitat quality
1.00
0.75
0.50
0.25
Precautionary = 0.77 at pressure 13
Standard = 0.66 at pressure 13
Upper = 0.55 at pressure 13
Tipping point = 0.32 at pressure 6.0
0 1 2 3 4 5 6 7 8 9 10 11 12 13
Surface Pressure (SAR)

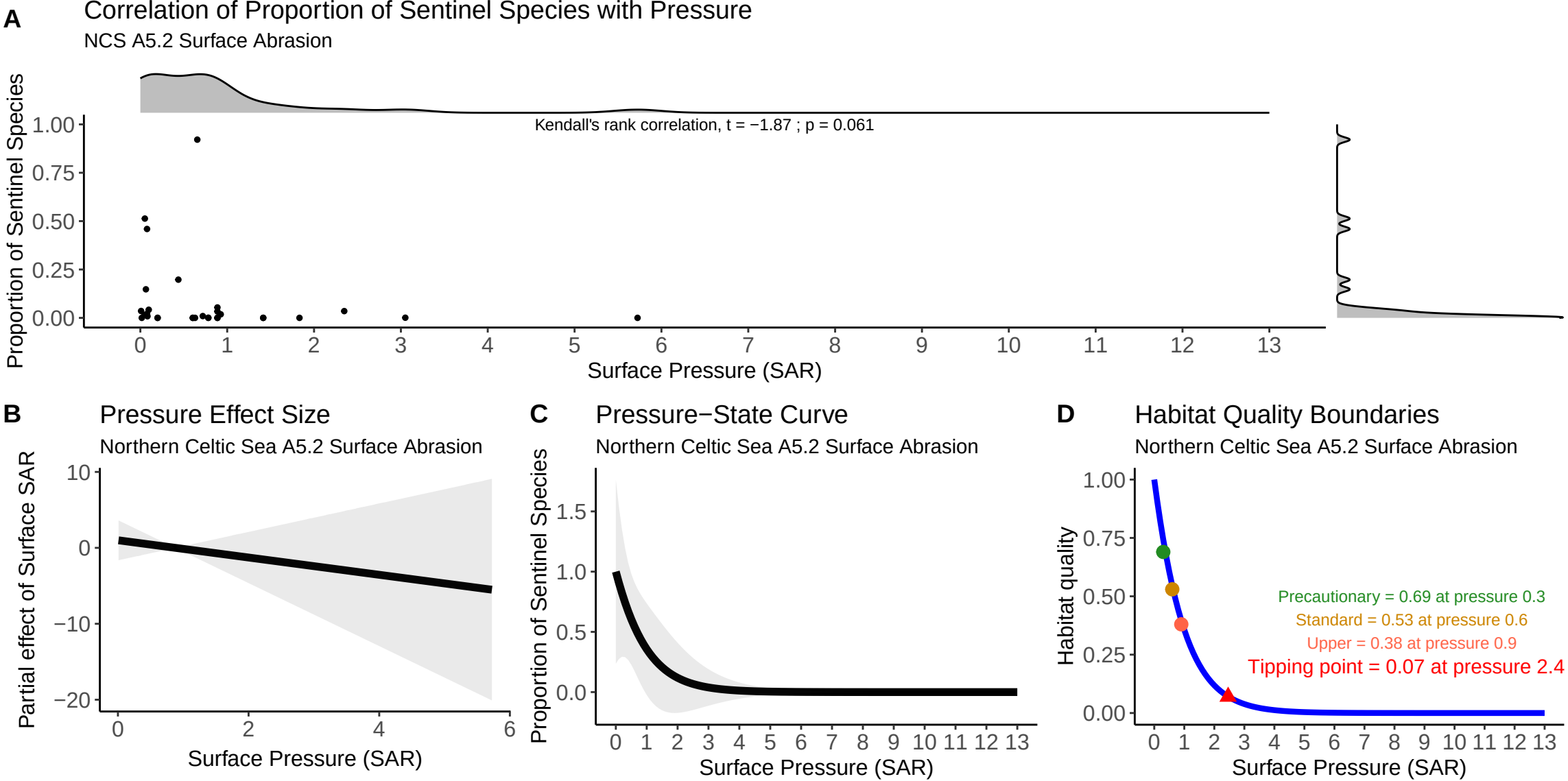

A
Correlation of Proportion of Sentinel Species with Pressure
CNS A5.2 Surface Abrasion
Kendall's rank correlation, t = −5.45 ; p <0.05
Proportion of Sentinel Species
1.00
0.75
0.50
0.25
0.00
0 1 2 3 4 5 6 7 8 9 10 11 12 13
Surface Pressure (SAR)
B
Pressure Effect Size
Central North Sea A5.2 Surface Abrasion
Partial effect of Surface SAR
0
−2
−4
−6
0 1 2 3 4
Surface Pressure (SAR)
C
Pressure−State Curve
Central North Sea A5.2 Surface Abrasion
Proportion of Sentinel Species
0.9
0.6
0.3
0.0
0 1 2 3 4 5 6 7 8 9 10 11 12 13
Surface Pressure (SAR)
D
Habitat Quality Boundaries
Central North Sea A5.2 Surface Abrasion
Habitat quality
1.00
0.75
0.50
0.25
0.00
Precautionary = 0.7 at pressure 0.5
Standard = 0.55 at pressure 0.8
Upper = 0.4 at pressure 1.2
Tipping point = 0.1 at pressure 2.96
0 1 2 3 4 5 6 7 8 9 10 11 12 13
Surface Pressure (SAR)

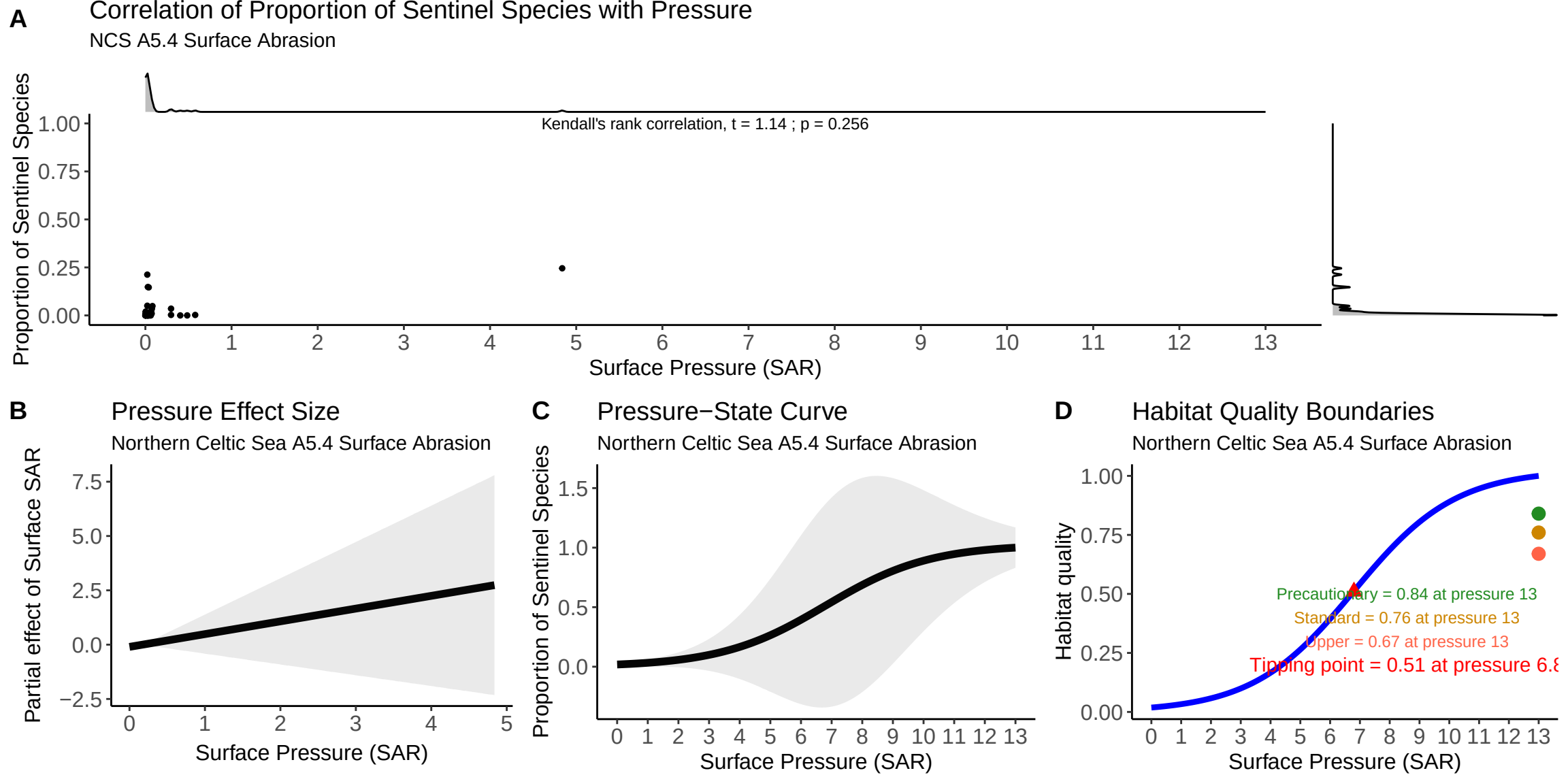

A
Correlation of Proportion of Sentinel Species with Pressure
CNS A5.3 Surface Abrasion
Kendall's rank correlation, t = −5.7 ; p <0.05
Proportion of Sentinel Species
1.00
0.75
0.50
0.25
0.00
0 1 2 3 4 5 6 7 8 9 10 11 12 13
Surface Pressure (SAR)
B
Pressure Effect Size
Central North Sea A5.3 Surface Abrasion
Partial effect of Surface SAR
1
0
−1
0 2 4 6
Surface Pressure (SAR)
C
Pressure−State Curve
Central North Sea A5.3 Surface Abrasion
Proportion of Sentinel Species
1.5
1.0
0.5
0.0
0 1 2 3 4 5 6 7 8 9 10 11 12 13
Surface Pressure (SAR)
D
Habitat Quality Boundaries
Central North Sea A5.3 Surface Abrasion
Habitat quality
1.00
0.75
0.50
0.25
Precautionary = 0.84 at pressure 13
Standard = 0.76 at pressure 13
Upper = 0.67 at pressure 13
Tipping point = 0.51 at pressure 7.9
0 1 2 3 4 5 6 7 8 9 10 11 12 13
Surface Pressure (SAR)

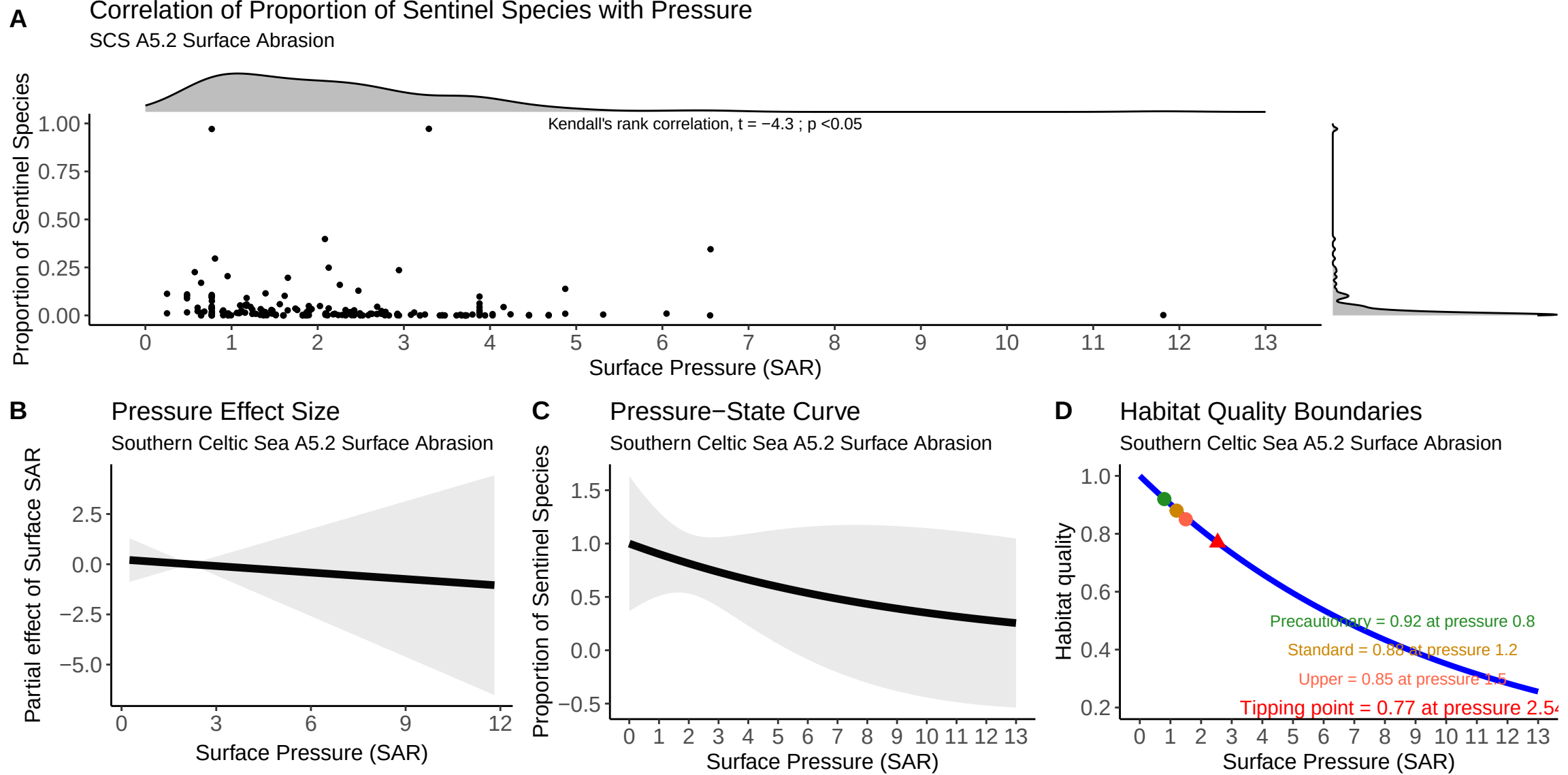

A
Correlation of Proportion of Sentinel Species with Pressure
CNS A5.4 Surface Abrasion
Kendall's rank correlation, t = −1.73 ; p = 0.083
Proportion of Sentinel Species
1.00
0.75
0.50
0.25
0.00
0 1 2 3 4 5 6 7 8 9 10 11 12 13
Surface Pressure (SAR)
B
Pressure Effect Size
Central North Sea A5.4 Surface Abrasion
Partial effect of Surface SAR
20
10
0
−10
−20
0.0 0.5 1.0 1.5 2.0
Surface Pressure (SAR)
C
Pressure−State Curve
Central North Sea A5.4 Surface Abrasion
Proportion of Sentinel Species
2
0
−2
0 1 2 3 4 5 6 7 8 9 10 11 12 13
Surface Pressure (SAR)
D
Habitat Quality Boundaries
Central North Sea A5.4 Surface Abrasion
Habitat quality
1.00
0.75
0.50
0.25
0.00
Precautionary = 0.71 at pressure 0.6
Standard = 0.57 at pressure 1
Upper = 0.43 at pressure 1.5
Tipping point = 0.14 at pressure 3.4
0 1 2 3 4 5 6 7 8 9 10 11 12 13
Surface Pressure (SAR)

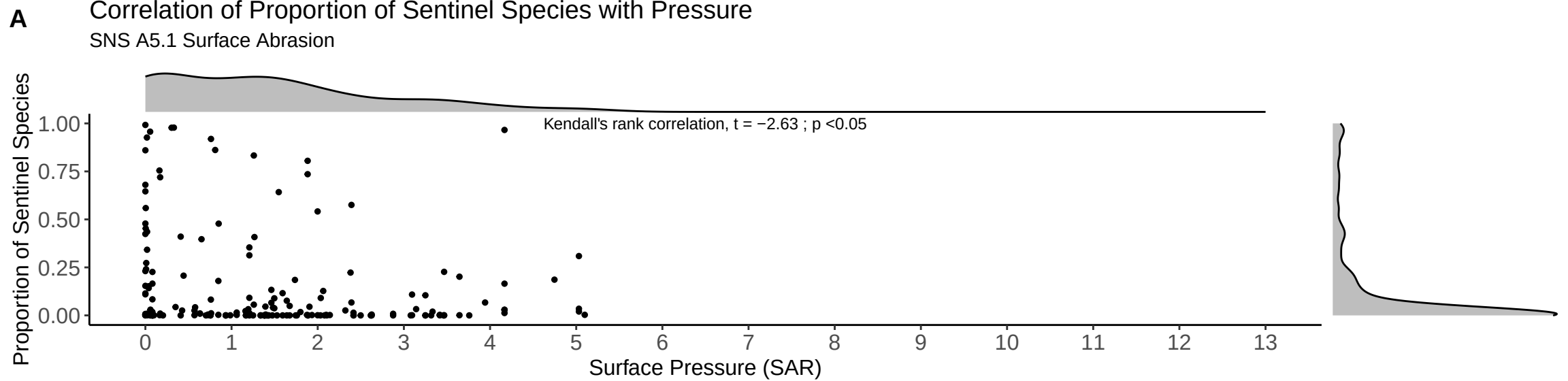

A
Correlation of Proportion of Sentinel Species with Pressure
Ch A5.1 Surface Abrasion
Kendall's rank correlation, t = −2.77 ; p <0.05
Proportion of Sentinel Species
1.00
0.75
0.50
0.25
0.00
0 1 2 3 4 5 6 7 8 9 10 11 12 13
Surface Pressure (SAR)
B
Pressure Effect Size
Channel A5.1 Surface Abrasion
Partial effect of Surface SAR
3
0
−3
−6
0 2 4 6 8
Surface Pressure (SAR)
C
Pressure−State Curve
Channel A5.1 Surface Abrasion
Proportion of Sentinel Species
2.0
1.5
1.0
0.5
0.0
0 1 2 3 4 5 6 7 8 9 10 11 12 13
Surface Pressure (SAR)
D
Habitat Quality Boundaries
Channel A5.1 Surface Abrasion
Habitat quality
1.00
0.75
0.50
0.25
0.00
Precautionary = 0.71 at pressure 0.6
Standard = 0.56 at pressure 1
Upper = 0.42 at pressure 1.5
Tipping point = 0.13 at pressure 3.5
0 1 2 3 4 5 6 7 8 9 10 11 12 13
Surface Pressure (SAR)

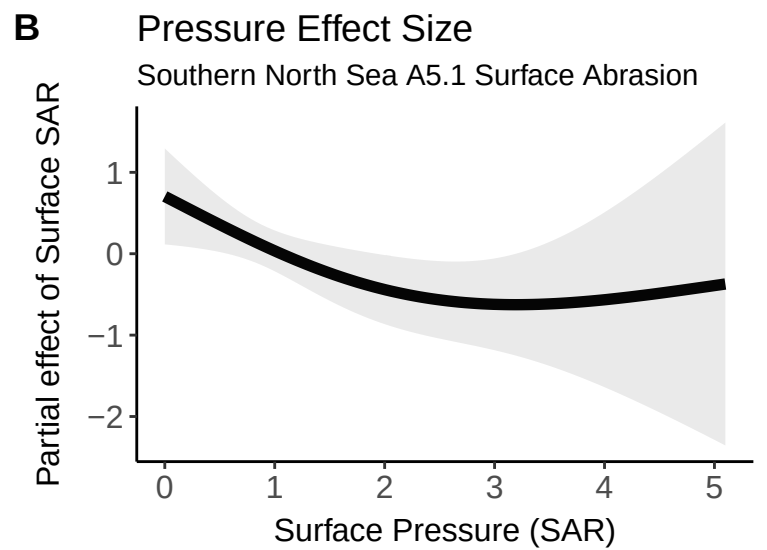

A
Correlation of Proportion of Sentinel Species with Pressure
Ch A5.2 Surface Abrasion
Kendall's rank correlation, t = −3.34 ; p <0.05
Proportion of Sentinel Species
1.00
0.75
0.50
0.25
0.00
0 1 2 3 4 5 6 7 8 9 10 11 12 13
Surface Pressure (SAR)
B
Pressure Effect Size
Channel A5.2 Surface Abrasion
Partial effect of Surface SAR
5
0
−5
0 2 4 6 8
Surface Pressure (SAR)
C
Pressure−State Curve
Channel A5.2 Surface Abrasion
Proportion of Sentinel Species
1.5
1.0
0.5
0.0
0 1 2 3 4 5 6 7 8 9 10 11 12 13
Surface Pressure (SAR)
D
Habitat Quality Boundaries
Channel A5.2 Surface Abrasion
Habitat quality
1.00
0.75
0.50
0.25
0.00
Precautionary = 0.69 at pressure 0.7
Standard = 0.54 at pressure 1.1
Upper = 0.39 at pressure 1.5
Tipping point = 0.08 at pressure 3.2
0 1 2 3 4 5 6 7 8 9 10 11 12 13
Surface Pressure (SAR)

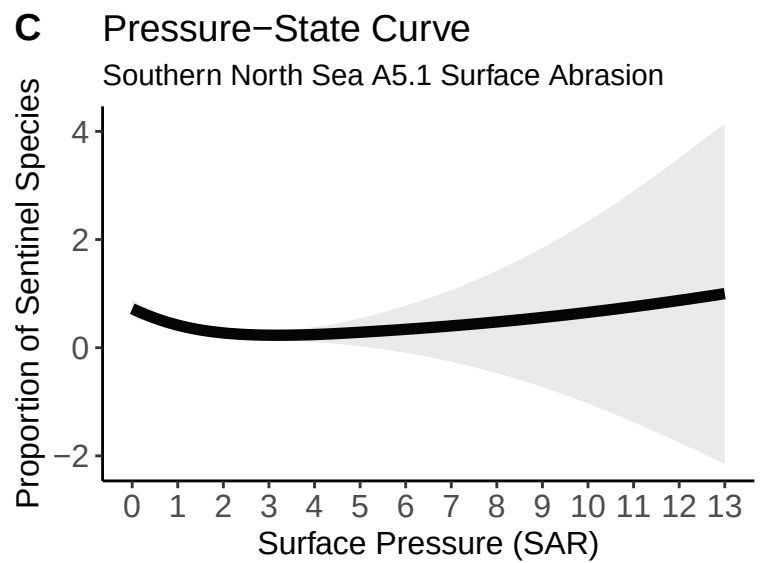

A
Correlation of Proportion of Sentinel Species with Pressure
NCS A5.2 Surface Abrasion
Kendall's rank correlation, t = −1.87 ; p = 0.061
Proportion of Sentinel Species
1.00
0.75
0.50
0.25
0.00
0 1 2 3 4 5 6 7 8 9 10 11 12 13
Surface Pressure (SAR)
B
Pressure Effect Size
Northern Celtic Sea A5.2 Surface Abrasion
Partial effect of Surface SAR
10
0
−10
−20
0 2 4 6
Surface Pressure (SAR)
C
Pressure−State Curve
Northern Celtic Sea A5.2 Surface Abrasion
Proportion of Sentinel Species
1.5
1.0
0.5
0.0
0 1 2 3 4 5 6 7 8 9 10 11 12 13
Surface Pressure (SAR)
D
Habitat Quality Boundaries
Northern Celtic Sea A5.2 Surface Abrasion
Habitat quality
1.00
0.75
0.50
0.25
0.00
Precautionary = 0.69 at pressure 0.3
Standard = 0.53 at pressure 0.6
Upper = 0.38 at pressure 0.9
Tipping point = 0.07 at pressure 2.4
0 1 2 3 4 5 6 7 8 9 10 11 12 13
Surface Pressure (SAR)

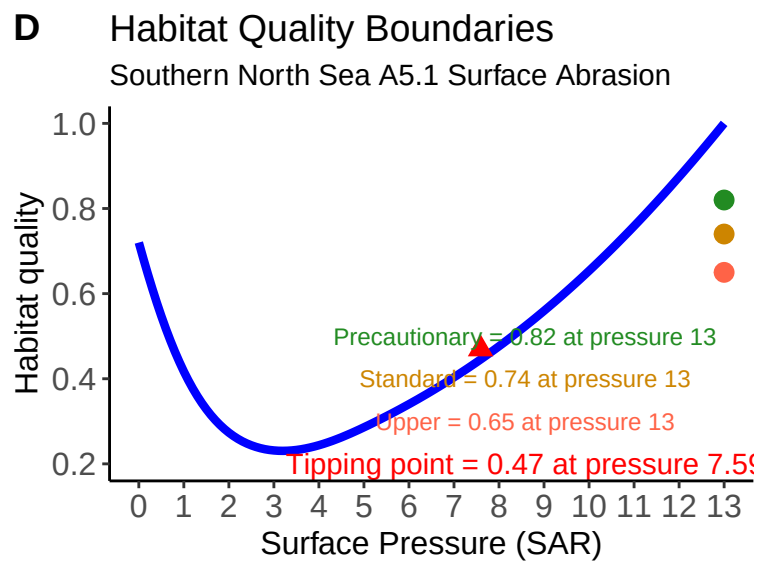

A
Correlation of Proportion of Sentinel Species with Pressure
NCS A5.4 Surface Abrasion
Kendall's rank correlation, t = 1.14 ; p = 0.256
Proportion of Sentinel Species
Surface Pressure (SAR)
B
Pressure Effect Size
Northern Celtic Sea A5.4 Surface Abrasion
Partial effect of Surface SAR
Surface Pressure (SAR)
C
Pressure−State Curve
Northern Celtic Sea A5.4 Surface Abrasion
Proportion of Sentinel Species
Surface Pressure (SAR)
D
Habitat Quality Boundaries
Northern Celtic Sea A5.4 Surface Abrasion
Habitat quality
Precautionary = 0.84 at pressure 13
Standard = 0.76 at pressure 13
Upper = 0.67 at pressure 13
Tipping point = 0.51 at pressure 6.8
Surface Pressure (SAR)

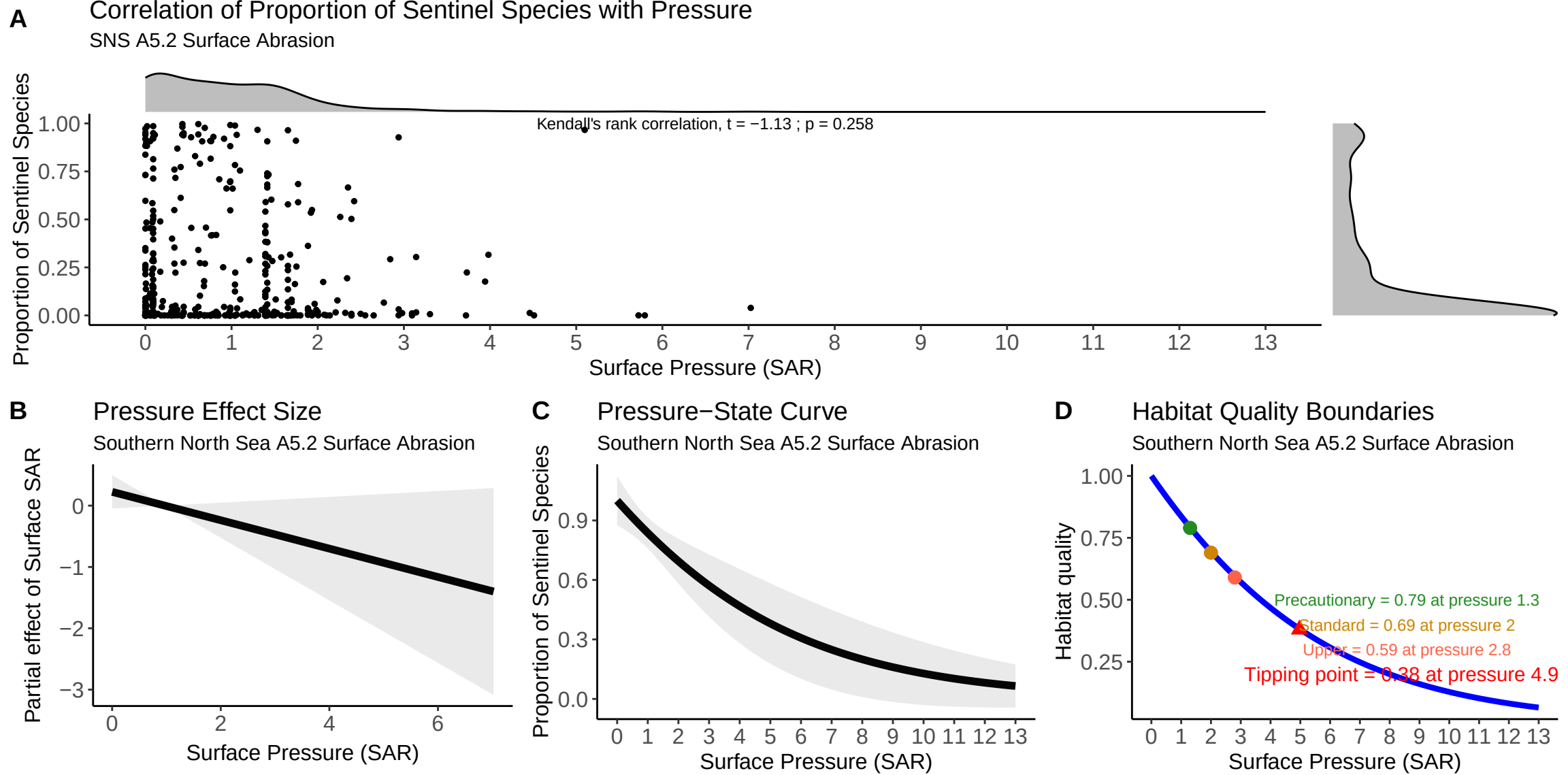

A
Correlation of Proportion of Sentinel Species with Pressure
SCS A5.2 Surface Abrasion
Kendall's rank correlation, t = −4.3 ; p <0.05
Proportion of Sentinel Species
Surface Pressure (SAR)
B
Pressure Effect Size
Southern Celtic Sea A5.2 Surface Abrasion
Partial effect of Surface SAR
Surface Pressure (SAR)
C
Pressure−State Curve
Southern Celtic Sea A5.2 Surface Abrasion
Proportion of Sentinel Species
Surface Pressure (SAR)
D
Habitat Quality Boundaries
Southern Celtic Sea A5.2 Surface Abrasion
Habitat quality
Precautionary = 0.92 at pressure 0.8
Standard = 0.88 at pressure 1.2
Upper = 0.85 at pressure 1.5
Tipping point = 0.77 at pressure 2.5
Surface Pressure (SAR)

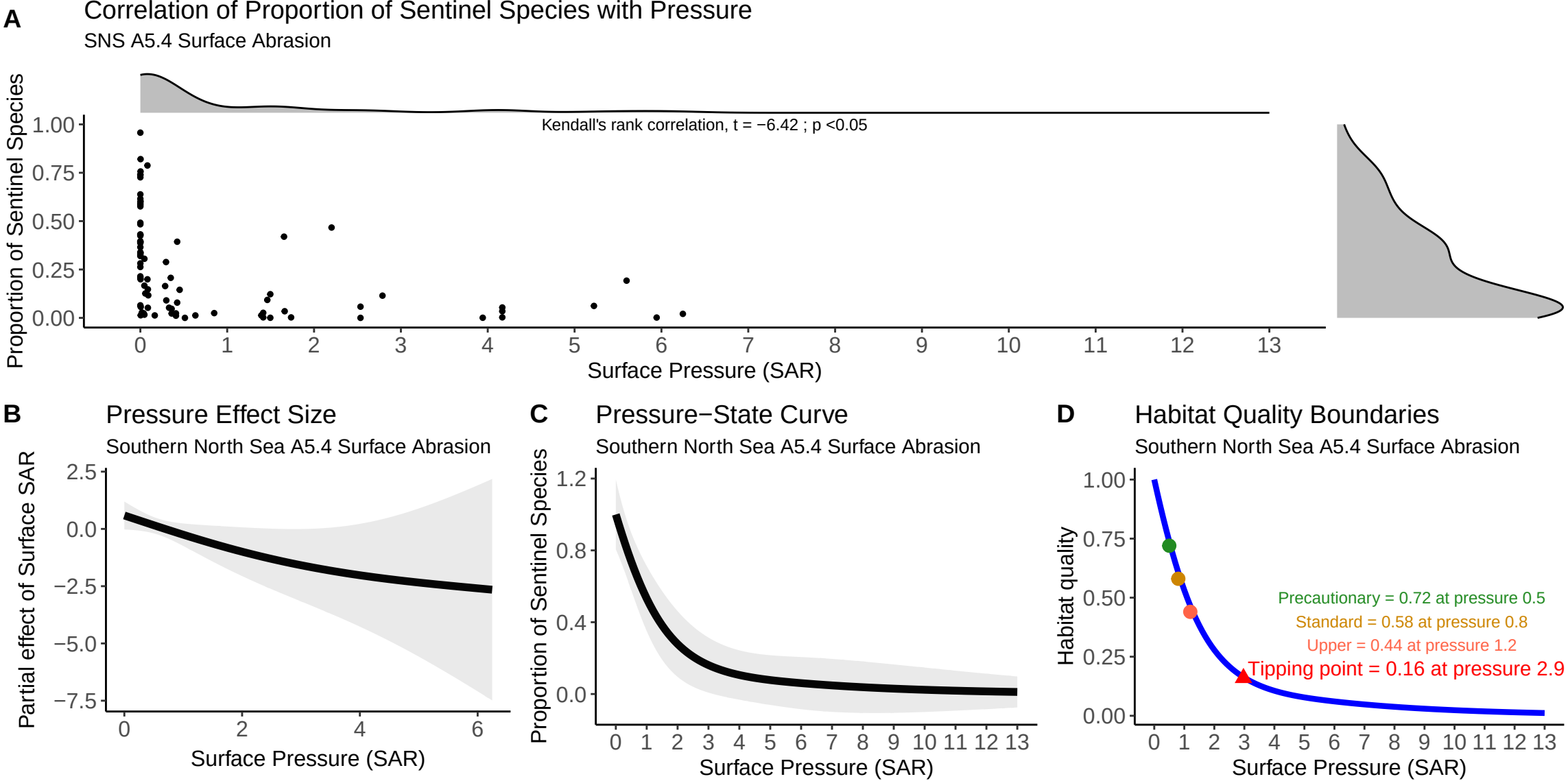

A
Correlation of Proportion of Sentinel Species with Pressure
SNS A5.1 Surface Abrasion
Kendall's rank correlation, t = −2.63 ; p <0.05
Proportion of Sentinel Species
1.00
0.75
0.50
0.25
0.00
0 1 2 3 4 5 6 7 8 9 10 11 12 13
Surface Pressure (SAR)

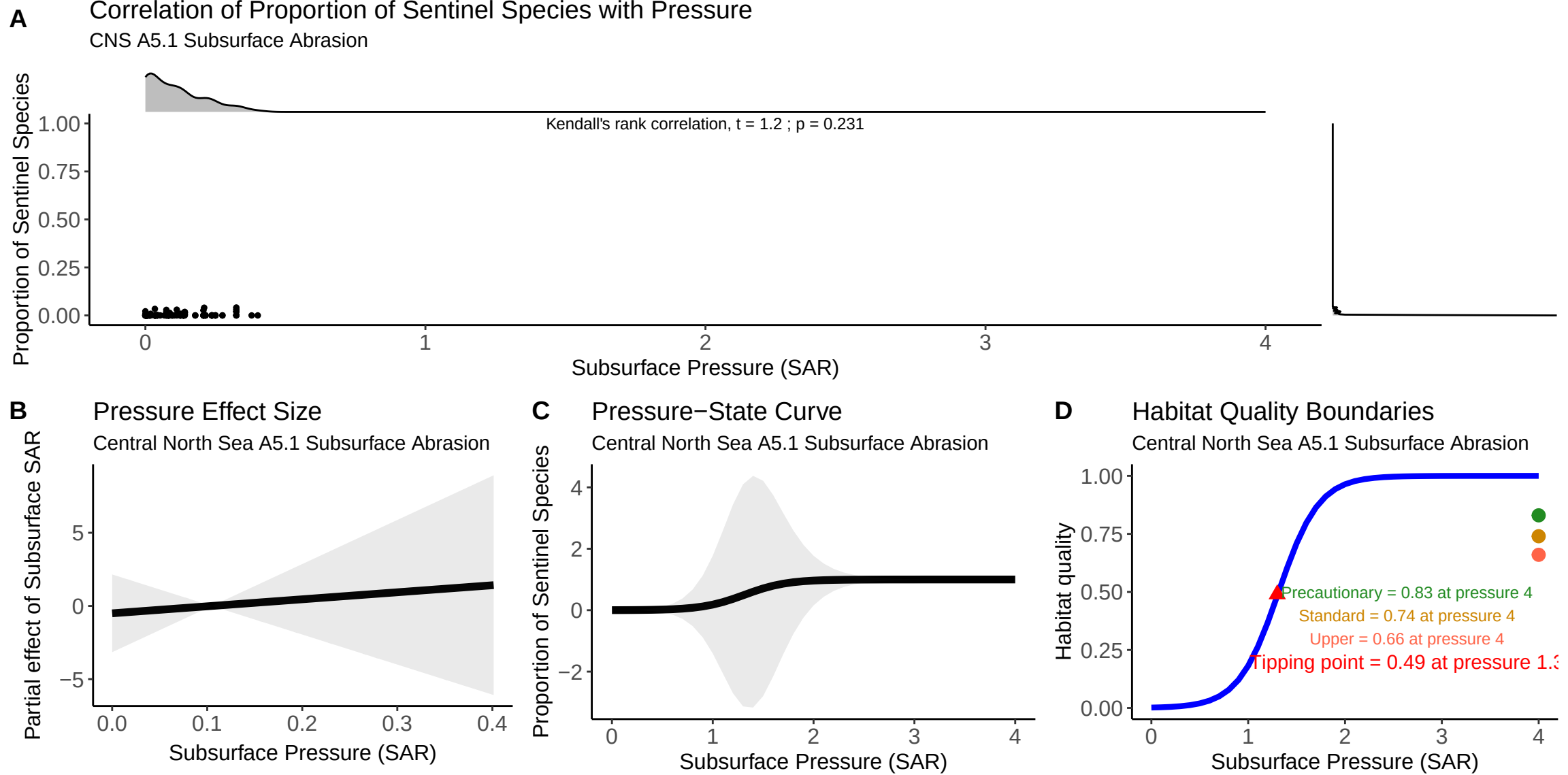

B
Pressure Effect Size
Southern North Sea A5.1 Surface Abrasion
Partial effect of Surface SAR
1
0
−1
−2
0 1 2 3 4 5
Surface Pressure (SAR)

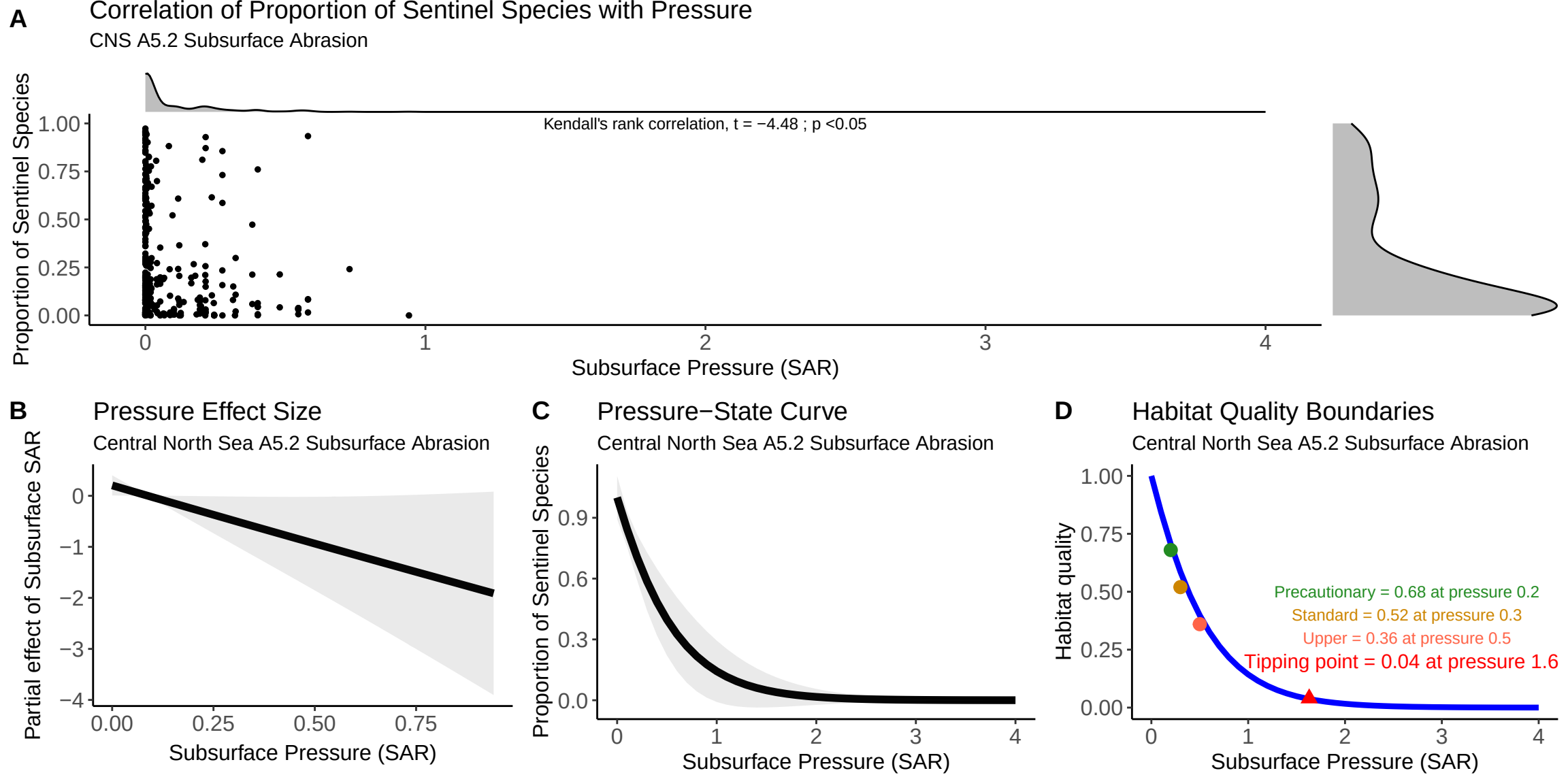

C
Pressure−State Curve
Southern North Sea A5.1 Surface Abrasion
Proportion of Sentinel Species
4
2
0
−2
0 1 2 3 4 5 6 7 8 9 10 11 12 13
Surface Pressure (SAR)

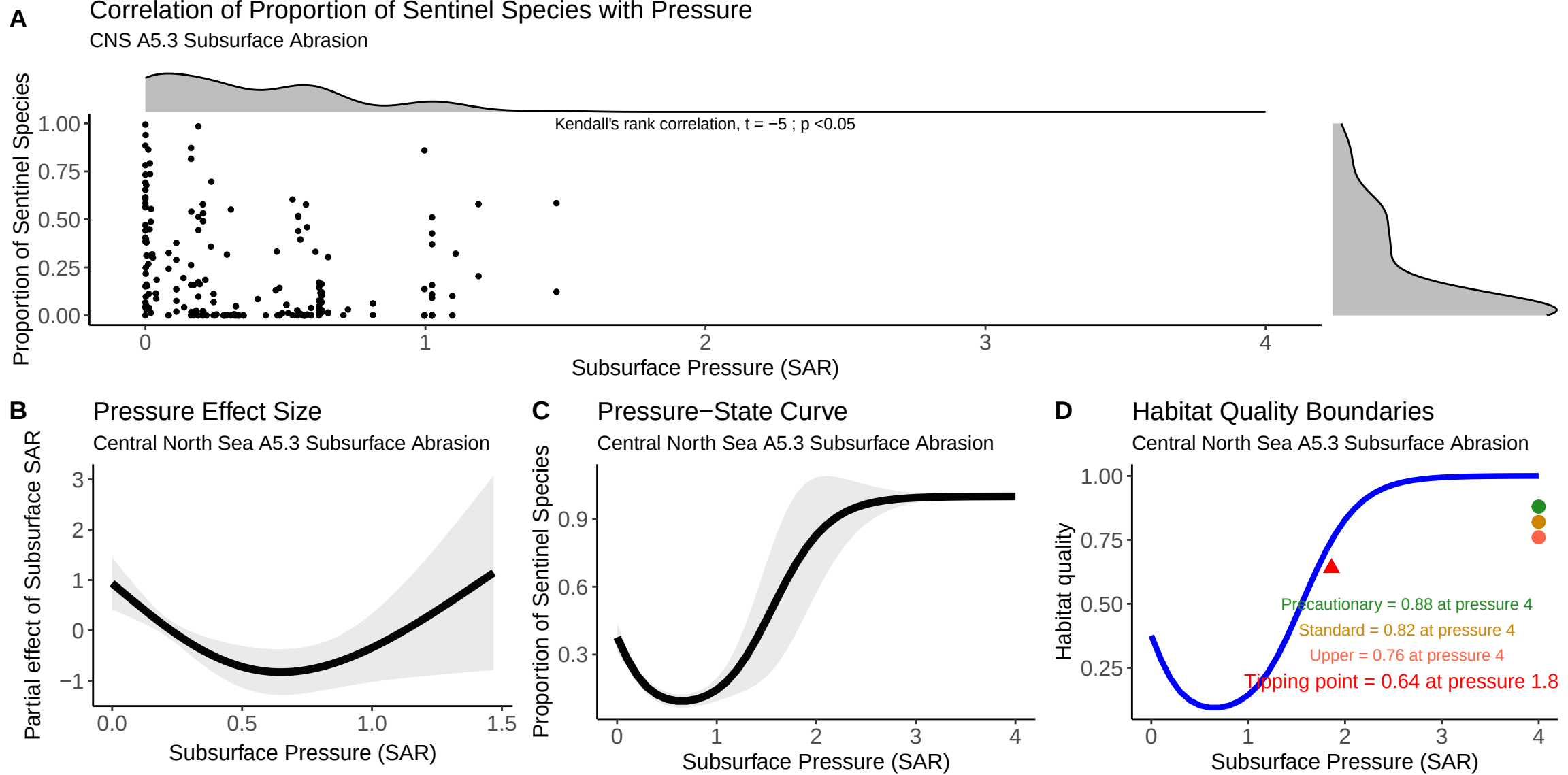

D
Habitat Quality Boundaries
Southern North Sea A5.1 Surface Abrasion
Habitat quality
1.0
0.8
0.6
0.4
0.2
Precautionary = 0.82 at pressure 13
Standard = 0.74 at pressure 13
Upper = 0.65 at pressure 13
Tipping point = 0.47 at pressure 7.5
0 1 2 3 4 5 6 7 8 9 10 11 12 13
Surface Pressure (SAR)

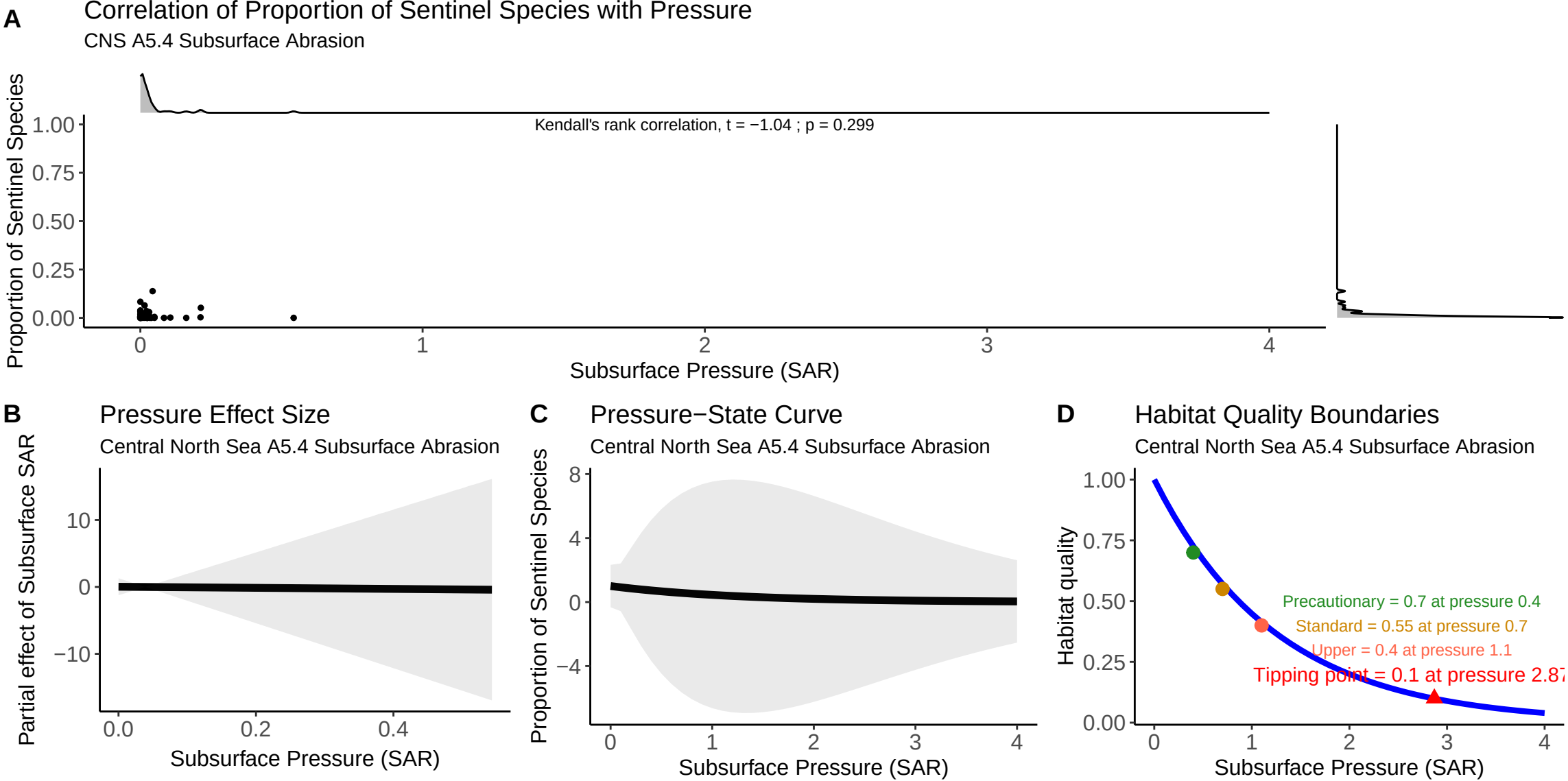

A
Correlation of Proportion of Sentinel Species with Pressure
SNS A5.2 Surface Abrasion
Kendall's rank correlation, t = −1.13 ; p = 0.258
Proportion of Sentinel Species
1.00
0.75
0.50
0.25
0.00
0 1 2 3 4 5 6 7 8 9 10 11 12 13
Surface Pressure (SAR)
B
Pressure Effect Size
Southern North Sea A5.2 Surface Abrasion
Partial effect of Surface SAR
0
−1
−2
−3
0 2 4 6
Surface Pressure (SAR)
C
Pressure−State Curve
Southern North Sea A5.2 Surface Abrasion
Proportion of Sentinel Species
0.9
0.6
0.3
0.0
0 1 2 3 4 5 6 7 8 9 10 11 12 13
Surface Pressure (SAR)
D
Habitat Quality Boundaries
Southern North Sea A5.2 Surface Abrasion
Habitat quality
1.00
0.75
0.50
0.25
Precautionary = 0.79 at pressure 1.3
Standard = 0.69 at pressure 2
Upper = 0.59 at pressure 2.8
Tipping point = 0.38 at pressure 4.9
0 1 2 3 4 5 6 7 8 9 10 11 12 13
Surface Pressure (SAR)

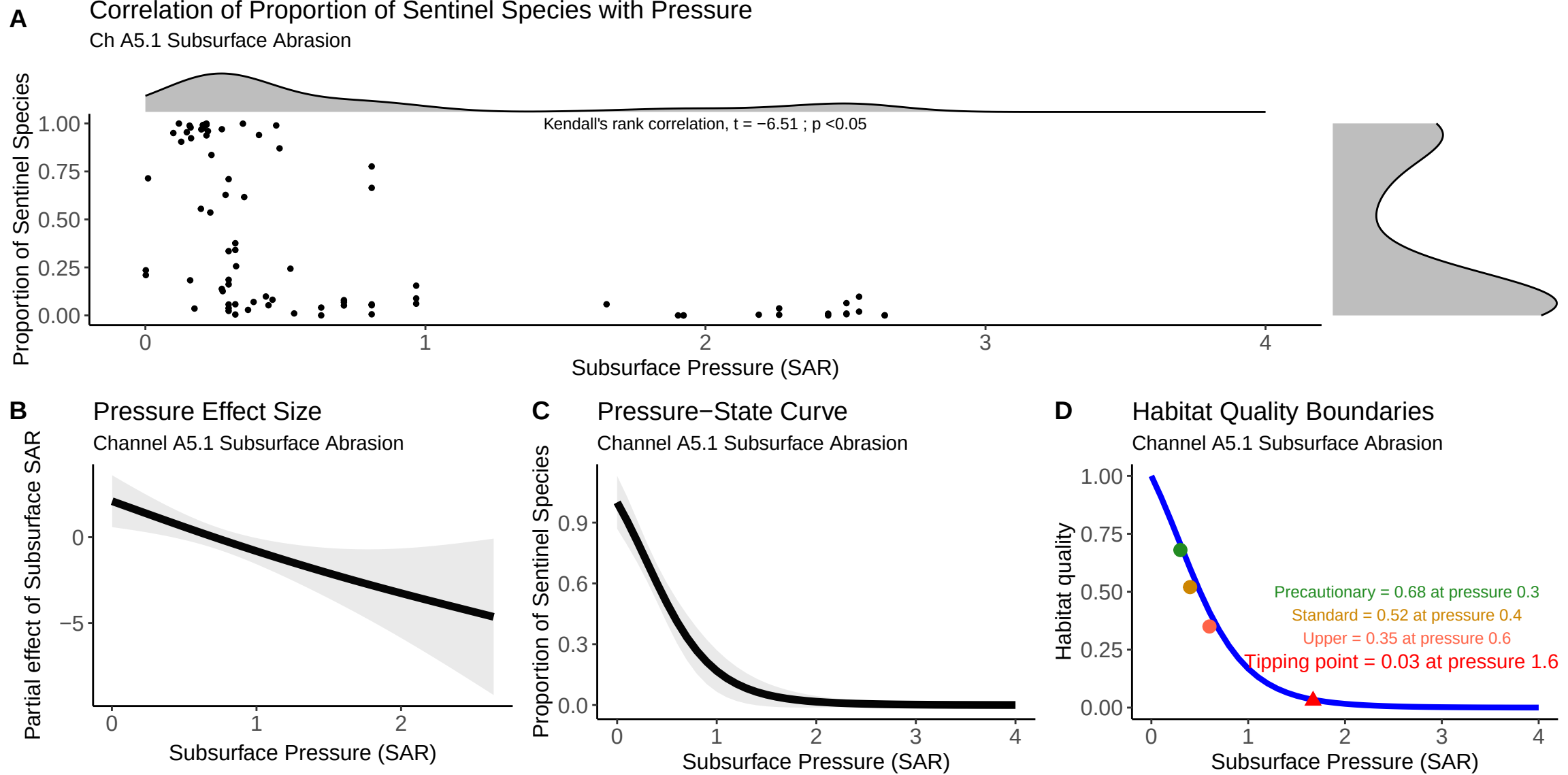

A
Correlation of Proportion of Sentinel Species with Pressure
SNS A5.4 Surface Abrasion
Kendall's rank correlation, t = −6.42 ; p <0.05
Proportion of Sentinel Species
1.00
0.75
0.50
0.25
0.00
0 1 2 3 4 5 6 7 8 9 10 11 12 13
Surface Pressure (SAR)
B
Pressure Effect Size
Southern North Sea A5.4 Surface Abrasion
Partial effect of Surface SAR
2.5
0.0
−2.5
−5.0
−7.5
0 2 4 6
Surface Pressure (SAR)
C
Pressure−State Curve
Southern North Sea A5.4 Surface Abrasion
Proportion of Sentinel Species
1.2
0.8
0.4
0.0
0 1 2 3 4 5 6 7 8 9 10 11 12 13
Surface Pressure (SAR)
D
Habitat Quality Boundaries
Southern North Sea A5.4 Surface Abrasion
Habitat quality
1.00
0.75
0.50
0.25
0.00
Precautionary = 0.72 at pressure 0.5
Standard = 0.58 at pressure 0.8
Upper = 0.44 at pressure 1.2
Tipping point = 0.16 at pressure 2.9
0 1 2 3 4 5 6 7 8 9 10 11 12 13
Surface Pressure (SAR)

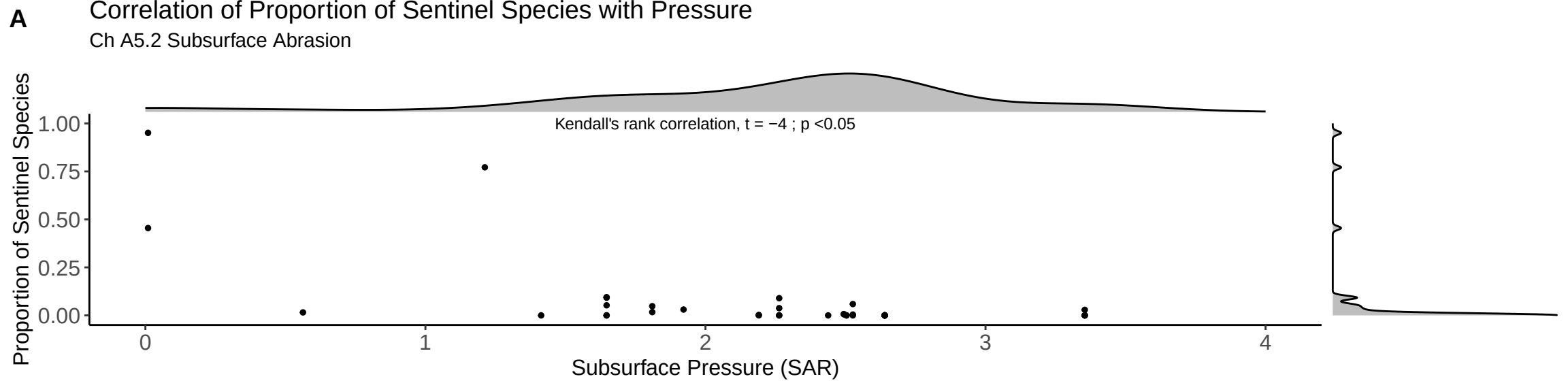

A
Correlation of Proportion of Sentinel Species with Pressure
CNS A5.1 Subsurface Abrasion
Kendall's rank correlation, t = 1.2 ; p = 0.231
Proportion of Sentinel Species
1.00
0.75
0.50
0.25
0.00
0
1
2
3
4
Subsurface Pressure (SAR)
B
Pressure Effect Size
Central North Sea A5.1 Subsurface Abrasion
Partial effect of Subsurface SAR
5
0
−5
0.0
0.1
0.2
0.3
0.4
Subsurface Pressure (SAR)
C
Pressure−State Curve
Central North Sea A5.1 Subsurface Abrasion
Proportion of Sentinel Species
4
2
0
−2
0
1
2
3
4
Subsurface Pressure (SAR)
D
Habitat Quality Boundaries
Central North Sea A5.1 Subsurface Abrasion
Habitat quality
1.00
0.75
0.50
0.25
0.00
Precautionary = 0.83 at pressure 4
Standard = 0.74 at pressure 4
Upper = 0.66 at pressure 4
Tipping point = 0.49 at pressure 1.3
0
1
2
3
4
Subsurface Pressure (SAR)

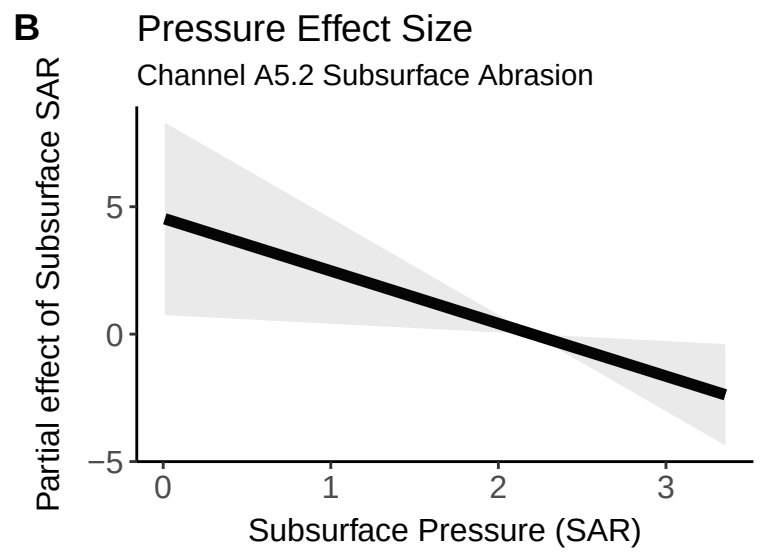

A
Correlation of Proportion of Sentinel Species with Pressure
CNS A5.2 Subsurface Abrasion
Kendall's rank correlation, t = −4.48 ; p <0.05
Proportion of Sentinel Species
1.00
0.75
0.50
0.25
0.00
0
1
2
3
4
Subsurface Pressure (SAR)
B
Pressure Effect Size
Central North Sea A5.2 Subsurface Abrasion
Partial effect of Subsurface SAR
0
−1
−2
−3
−4
0.00
0.25
0.50
0.75
Subsurface Pressure (SAR)
C
Pressure−State Curve
Central North Sea A5.2 Subsurface Abrasion
Proportion of Sentinel Species
0.9
0.6
0.3
0.0
0
1
2
3
4
Subsurface Pressure (SAR)
D
Habitat Quality Boundaries
Central North Sea A5.2 Subsurface Abrasion
Habitat quality
1.00
0.75
0.50
0.25
0.00
Precautionary = 0.68 at pressure 0.2
Standard = 0.52 at pressure 0.3
Upper = 0.36 at pressure 0.5
Tipping point = 0.04 at pressure 1.6
0
1
2
3
4
Subsurface Pressure (SAR)

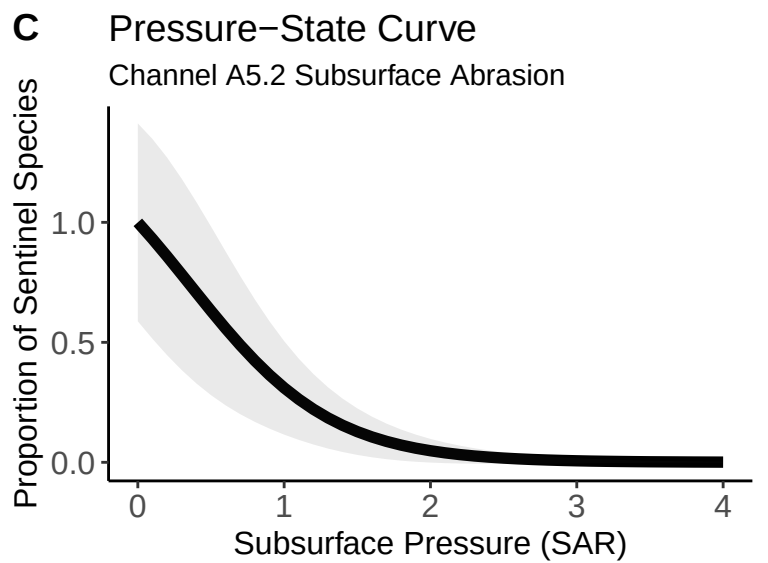

A
Correlation of Proportion of Sentinel Species with Pressure
CNS A5.3 Subsurface Abrasion
Kendall's rank correlation, t = −5 ; p <0.05
Proportion of Sentinel Species
1.00
0.75
0.50
0.25
0.00
0
1
2
3
4
Subsurface Pressure (SAR)
B
Pressure Effect Size
Central North Sea A5.3 Subsurface Abrasion
Partial effect of Subsurface SAR
3
2
1
0
−1
0.0
0.5
1.0
1.5
Subsurface Pressure (SAR)
C
Pressure−State Curve
Central North Sea A5.3 Subsurface Abrasion
Proportion of Sentinel Species
0.9
0.6
0.3
0
1
2
3
4
Subsurface Pressure (SAR)
D
Habitat Quality Boundaries
Central North Sea A5.3 Subsurface Abrasion
Habitat quality
1.00
0.75
0.50
0.25
Precautionary = 0.88 at pressure 4
Standard = 0.82 at pressure 4
Upper = 0.76 at pressure 4
Tipping point = 0.64 at pressure 1.8
0
1
2
3
4
Subsurface Pressure (SAR)

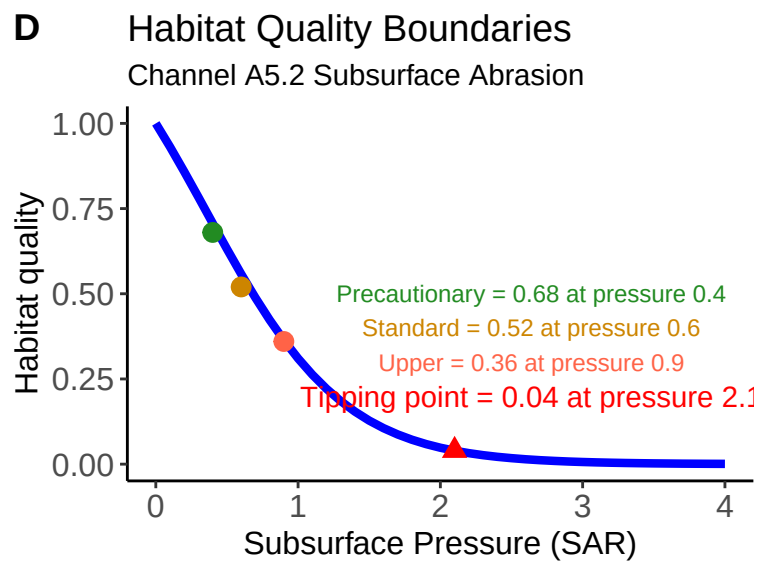

A
Correlation of Proportion of Sentinel Species with Pressure
CNS A5.4 Subsurface Abrasion
Kendall's rank correlation, t = −1.04 ; p = 0.299
Proportion of Sentinel Species
1.00
0.75
0.50
0.25
0.00
0
1
2
3
4
Subsurface Pressure (SAR)
B
Pressure Effect Size
Central North Sea A5.4 Subsurface Abrasion
Partial effect of Subsurface SAR
10
0
−10
0.0
0.2
0.4
Subsurface Pressure (SAR)
C
Pressure−State Curve
Central North Sea A5.4 Subsurface Abrasion
Proportion of Sentinel Species
8
4
0
−4
0
1
2
3
4
Subsurface Pressure (SAR)
D
Habitat Quality Boundaries
Central North Sea A5.4 Subsurface Abrasion
Habitat quality
1.00
0.75
0.50
0.25
0.00
Precautionary = 0.7 at pressure 0.4
Standard = 0.55 at pressure 0.7
Upper = 0.4 at pressure 1.1
Tipping point = 0.1 at pressure 2.87
0
1
2
3
4
Subsurface Pressure (SAR)

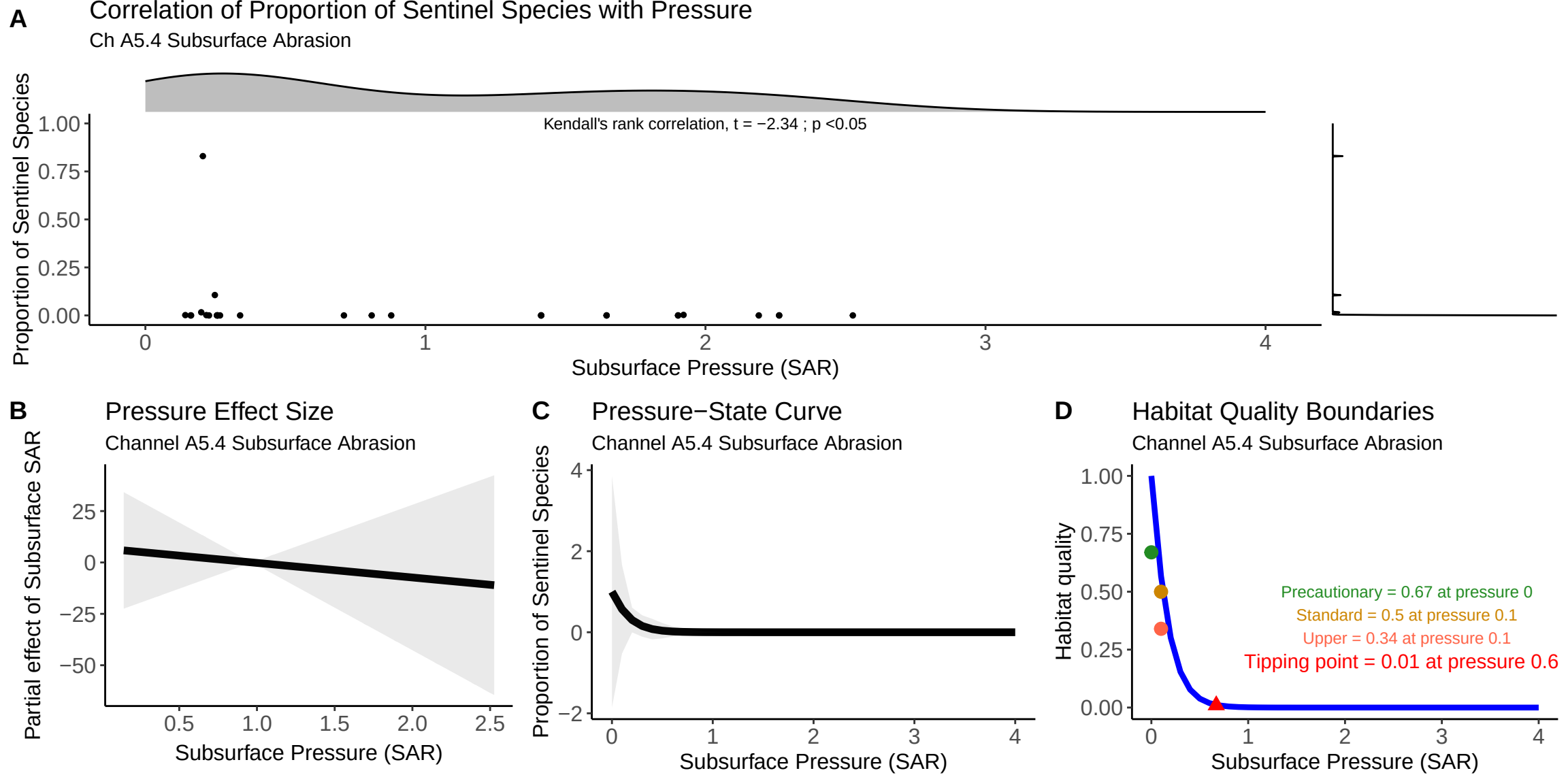

A
Correlation of Proportion of Sentinel Species with Pressure
Ch A5.1 Subsurface Abrasion
Kendall's rank correlation, t = −6.51 ; p <0.05
Proportion of Sentinel Species
1.00
0.75
0.50
0.25
0.00
0
1
2
3
4
Subsurface Pressure (SAR)
B
Pressure Effect Size
Channel A5.1 Subsurface Abrasion
Partial effect of Subsurface SAR
0
−5
0
1
2
Subsurface Pressure (SAR)
C
Pressure−State Curve
Channel A5.1 Subsurface Abrasion
Proportion of Sentinel Species
0.9
0.6
0.3
0.0
0
1
2
3
4
Subsurface Pressure (SAR)
D
Habitat Quality Boundaries
Channel A5.1 Subsurface Abrasion
Habitat quality
1.00
0.75
0.50
0.25
0.00
Precautionary = 0.68 at pressure 0.3
Standard = 0.52 at pressure 0.4
Upper = 0.35 at pressure 0.6
Tipping point = 0.03 at pressure 1.6
0
1
2
3
4
Subsurface Pressure (SAR)

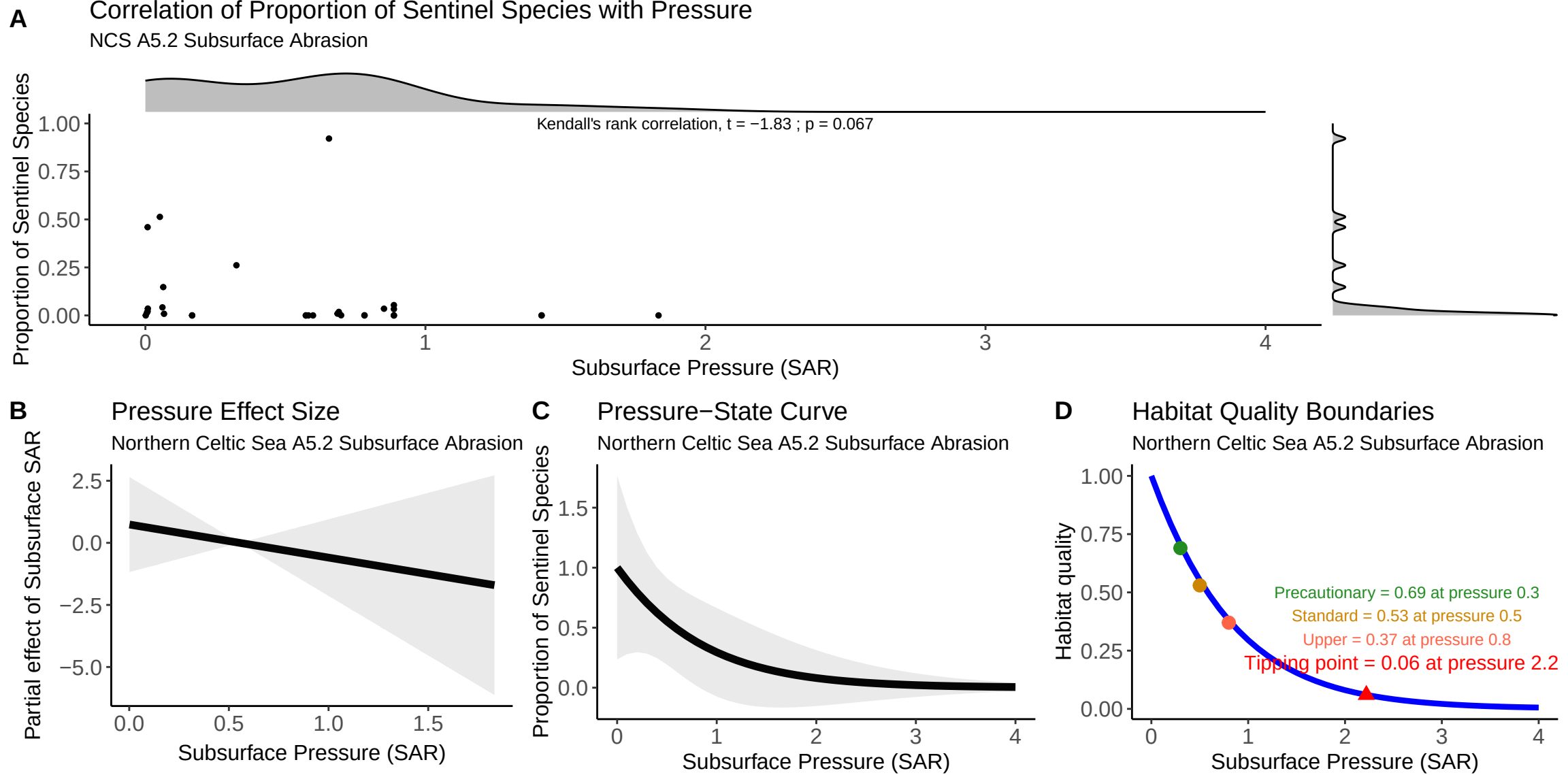

A
Correlation of Proportion of Sentinel Species with Pressure
Ch A5.2 Subsurface Abrasion
Kendall's rank correlation, t = −4 ; p <0.05
Proportion of Sentinel Species
1.00
0.75
0.50
0.25
0.00
0
1
2
3
4
Subsurface Pressure (SAR)

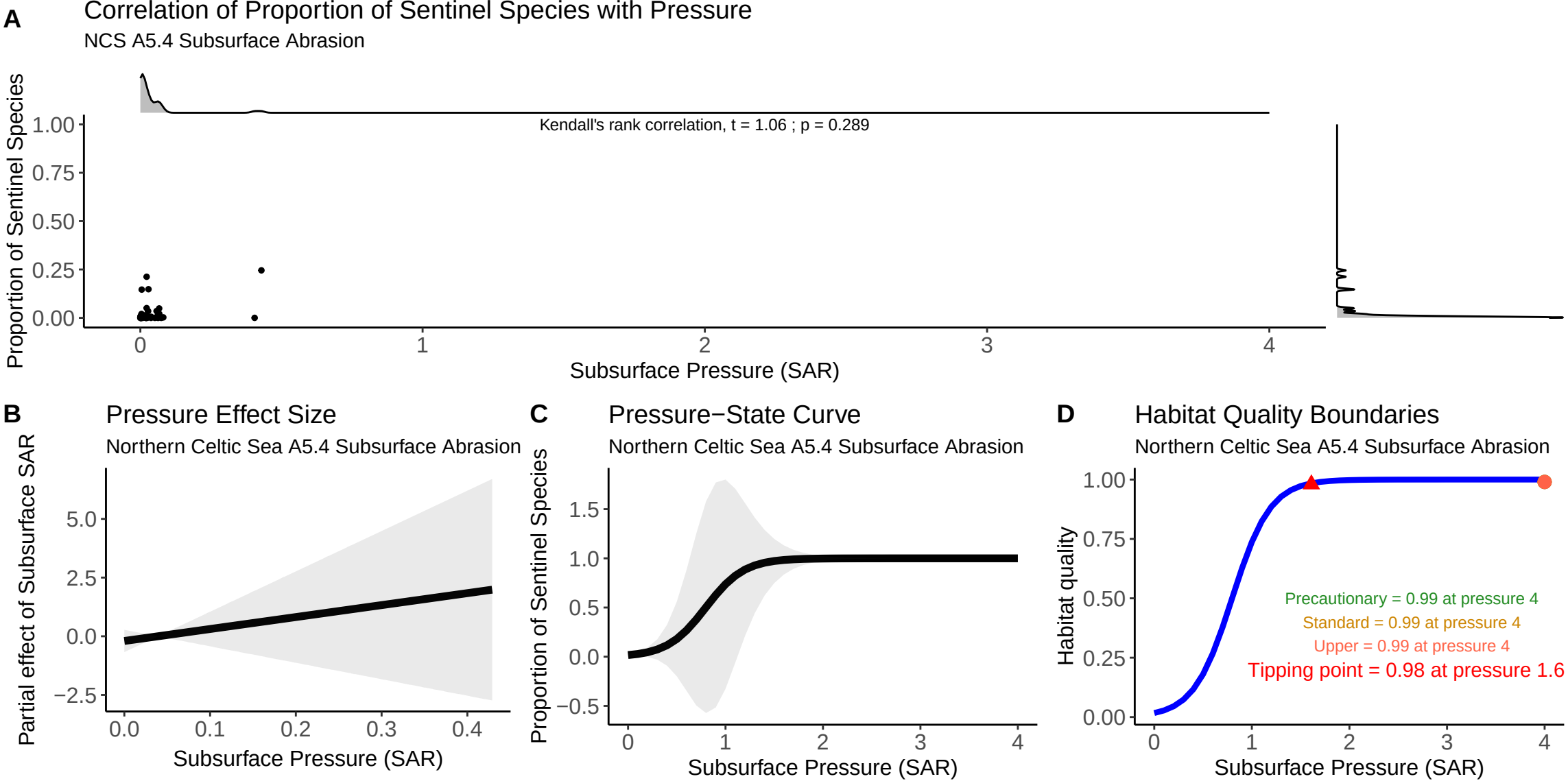

B
Pressure Effect Size
Channel A5.2 Subsurface Abrasion
Partial effect of Subsurface SAR
5
0
−5
0
1
2
3
Subsurface Pressure (SAR)

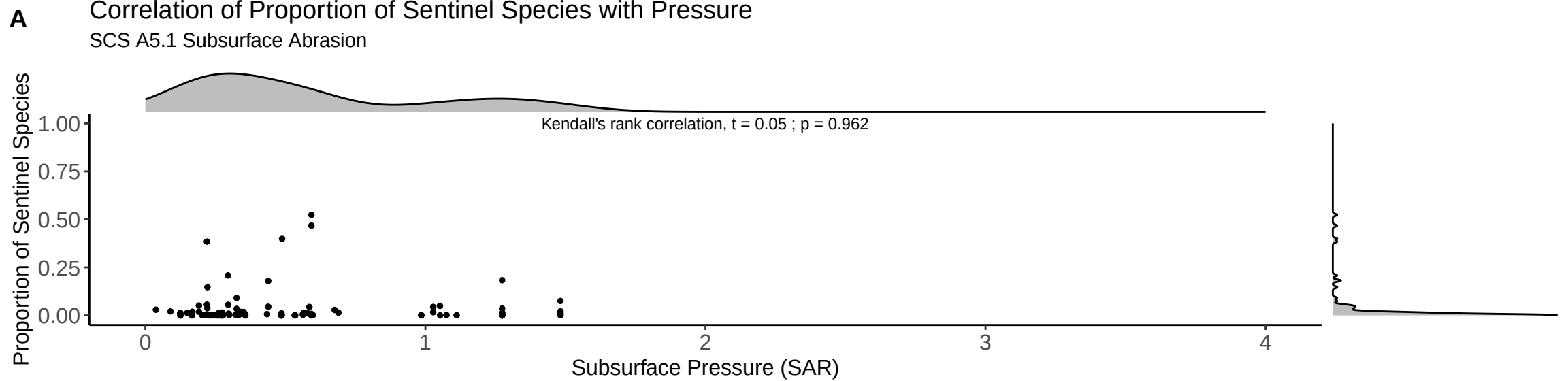

C
Pressure−State Curve
Channel A5.2 Subsurface Abrasion
Proportion of Sentinel Species
1.0
0.5
0.0
0
1
2
3
4
Subsurface Pressure (SAR)

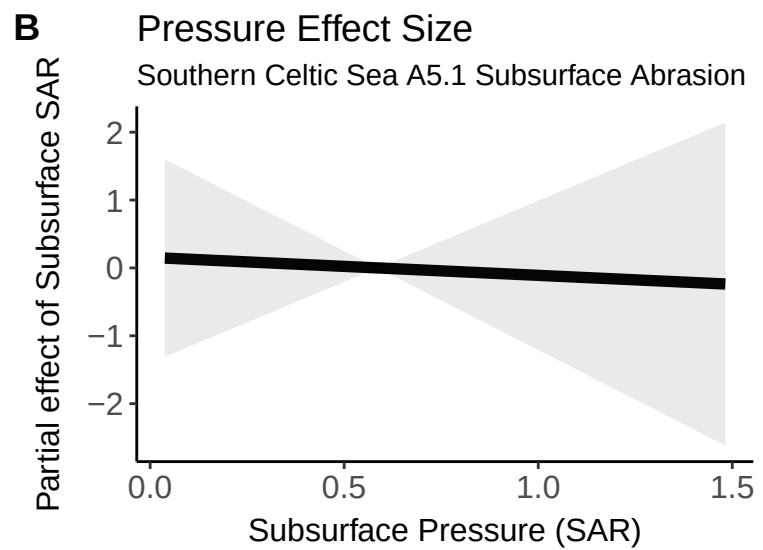

D
Habitat Quality Boundaries
Channel A5.2 Subsurface Abrasion
Habitat quality
1.00
0.75
0.50
0.25
0.00
Precautionary = 0.68 at pressure 0.4
Standard = 0.52 at pressure 0.6
Upper = 0.36 at pressure 0.9
Tipping point = 0.04 at pressure 2.1
0
1
2
3
4
Subsurface Pressure (SAR)

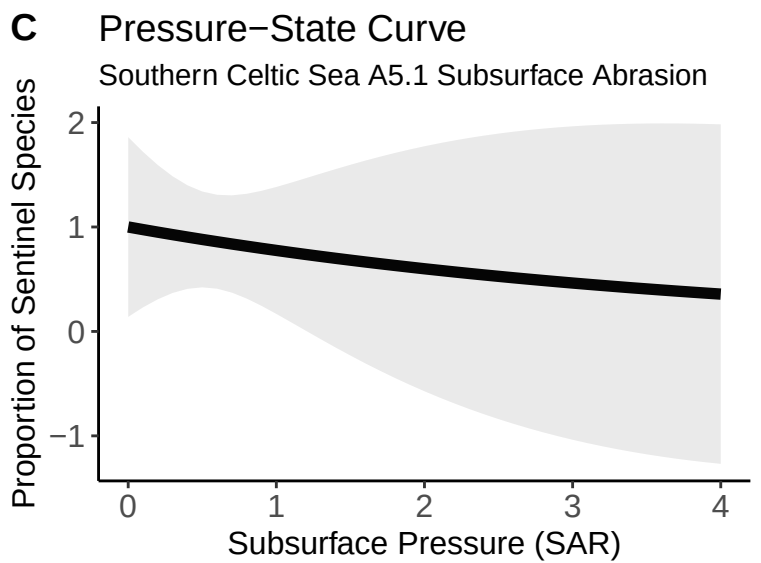

A
Correlation of Proportion of Sentinel Species with Pressure
Ch A5.4 Subsurface Abrasion
Kendall's rank correlation, t = −2.34 ; p <0.05
Proportion of Sentinel Species
1.00
0.75
0.50
0.25
0.00
0
1
2
3
4
Subsurface Pressure (SAR)
B
Pressure Effect Size
Channel A5.4 Subsurface Abrasion
Partial effect of Subsurface SAR
25
0
−25
−50
0.5
1.0
1.5
2.0
2.5
Subsurface Pressure (SAR)
C
Pressure−State Curve
Channel A5.4 Subsurface Abrasion
Proportion of Sentinel Species
4
2
0
−2
0
1
2
3
4
Subsurface Pressure (SAR)
D
Habitat Quality Boundaries
Channel A5.4 Subsurface Abrasion
Habitat quality
1.00
0.75
0.50
0.25
0.00
Precautionary = 0.67 at pressure 0
Standard = 0.5 at pressure 0.1
Upper = 0.34 at pressure 0.1
Tipping point = 0.01 at pressure 0.6
0
1
2
3
4
Subsurface Pressure (SAR)

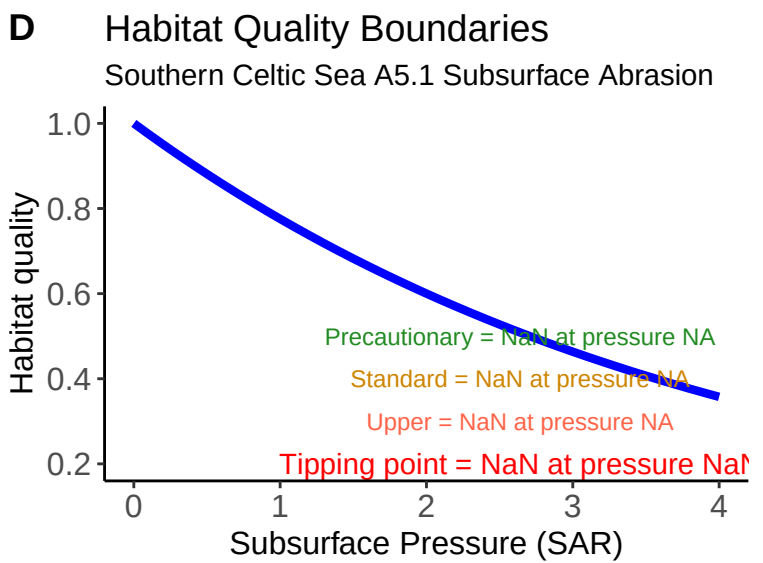

A
Correlation of Proportion of Sentinel Species with Pressure
NCS A5.2 Subsurface Abrasion
Kendall's rank correlation, t = −1.83 ; p = 0.067
Proportion of Sentinel Species
1.00
0.75
0.50
0.25
0.00
0
1
2
3
4
Subsurface Pressure (SAR)
B
Pressure Effect Size
Northern Celtic Sea A5.2 Subsurface Abrasion
Partial effect of Subsurface SAR
2.5
0.0
−2.5
−5.0
0.0
0.5
1.0
1.5
Subsurface Pressure (SAR)
C
Pressure−State Curve
Northern Celtic Sea A5.2 Subsurface Abrasion
Proportion of Sentinel Species
1.5
1.0
0.5
0.0
0
1
2
3
4
Subsurface Pressure (SAR)
D
Habitat Quality Boundaries
Northern Celtic Sea A5.2 Subsurface Abrasion
Habitat quality
1.00
0.75
0.50
0.25
0.00
Precautionary = 0.69 at pressure 0.3
Standard = 0.53 at pressure 0.5
Upper = 0.37 at pressure 0.8
Tipping point = 0.06 at pressure 2.2
0
1
2
3
4
Subsurface Pressure (SAR)

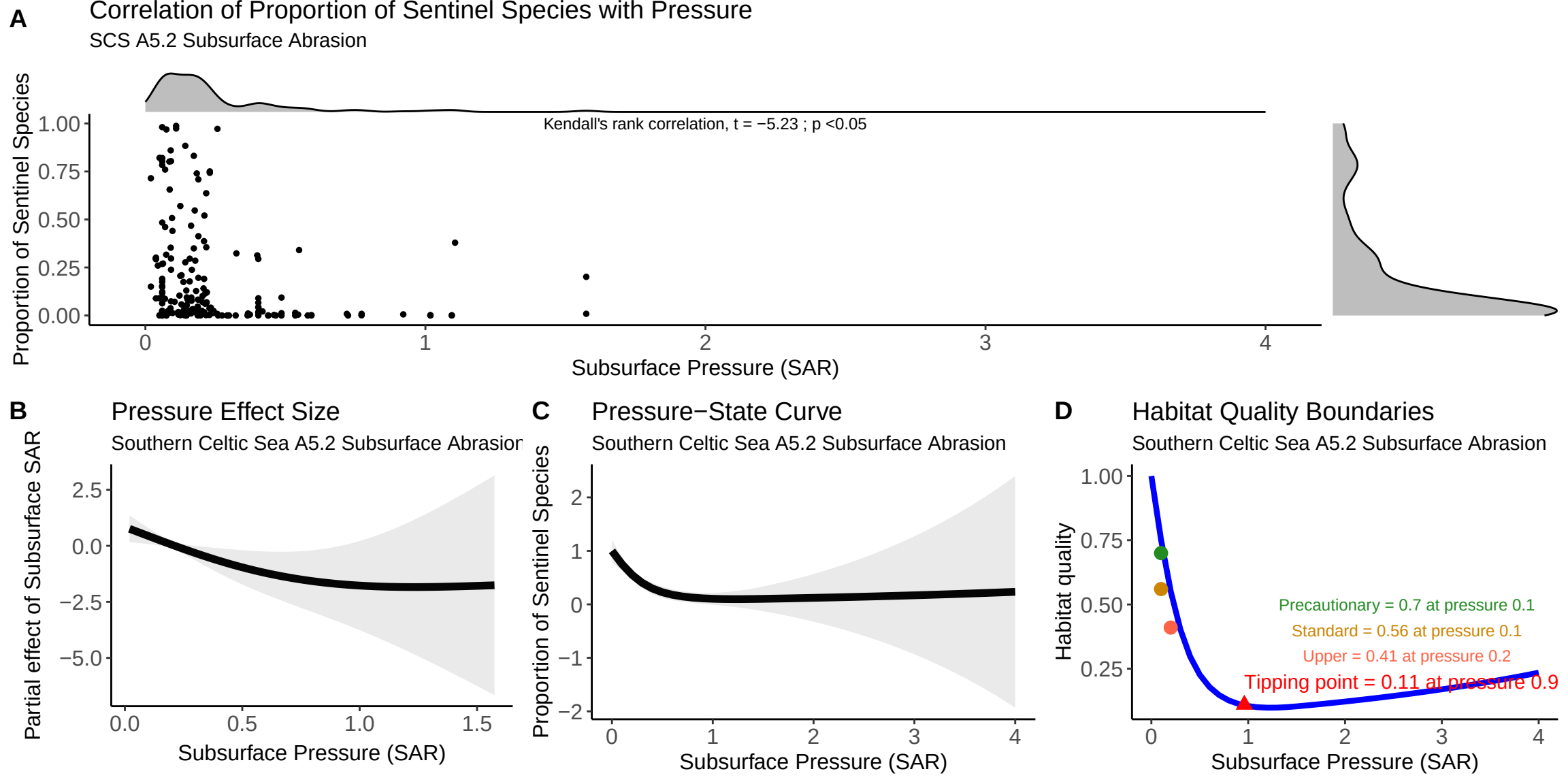

A
Correlation of Proportion of Sentinel Species with Pressure
NCS A5.4 Subsurface Abrasion
Kendall's rank correlation, t = 1.06 ; p = 0.289
Proportion of Sentinel Species
1.00
0.75
0.50
0.25
0.00
0
1
2
3
4
Subsurface Pressure (SAR)
B
Pressure Effect Size
Northern Celtic Sea A5.4 Subsurface Abrasion
Partial effect of Subsurface SAR
5.0
2.5
0.0
−2.5
0.0
0.1
0.2
0.3
0.4
Subsurface Pressure (SAR)
C
Pressure−State Curve
Northern Celtic Sea A5.4 Subsurface Abrasion
Proportion of Sentinel Species
1.5
1.0
0.5
0.0
−0.5
0
1
2
3
4
Subsurface Pressure (SAR)
D
Habitat Quality Boundaries
Northern Celtic Sea A5.4 Subsurface Abrasion
Habitat quality
1.00
0.75
0.50
0.25
0.00
Precautionary = 0.99 at pressure 4
Standard = 0.99 at pressure 4
Upper = 0.99 at pressure 4
Tipping point = 0.98 at pressure 1.6
0
1
2
3
4
Subsurface Pressure (SAR)

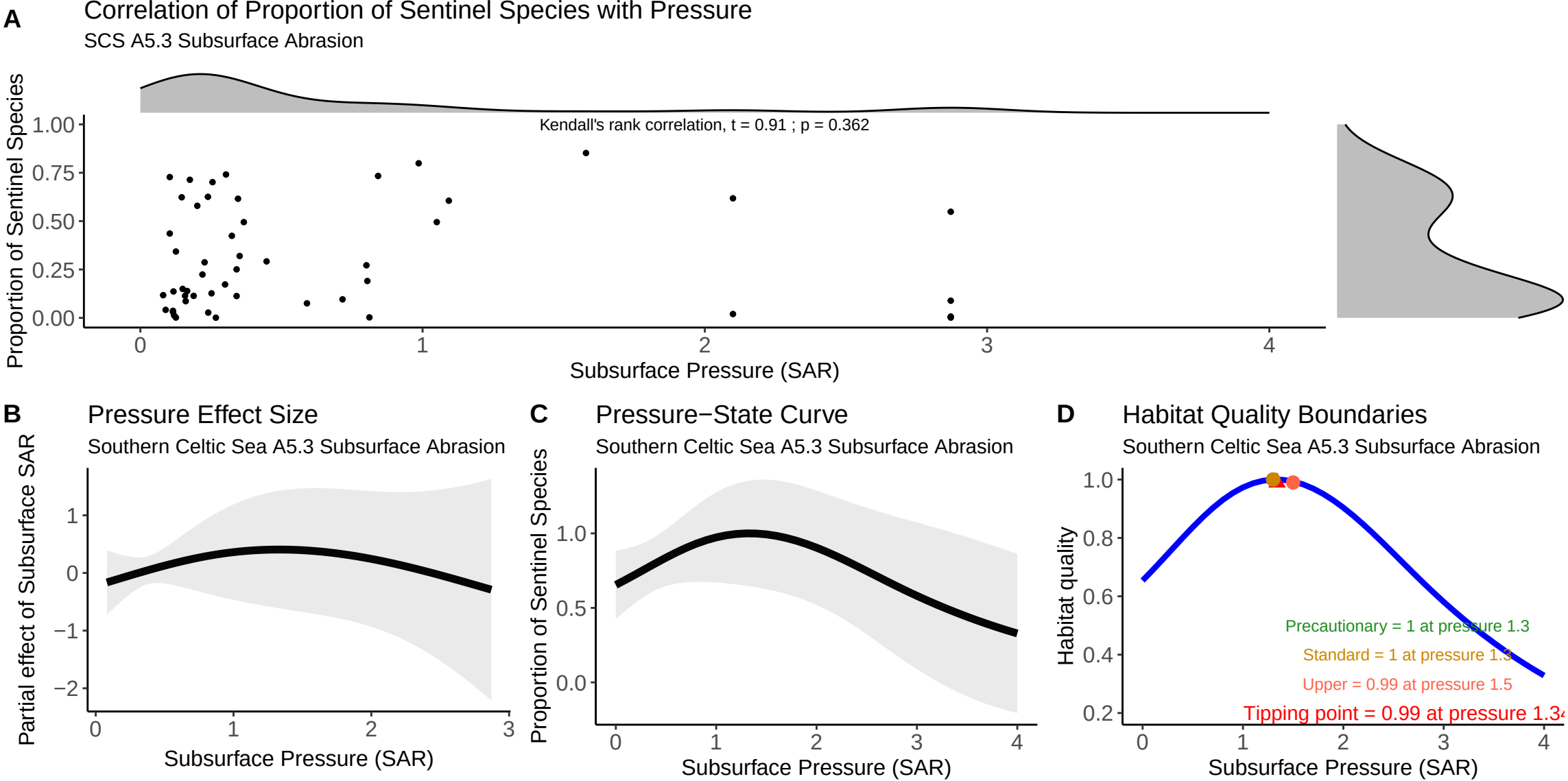

A
Correlation of Proportion of Sentinel Species with Pressure
SCS A5.1 Subsurface Abrasion
Kendall's rank correlation, t = 0.05 ; p = 0.962
Proportion of Sentinel Species
1.00
0.75
0.50
0.25
0.00
0
1
2
3
4
Subsurface Pressure (SAR)

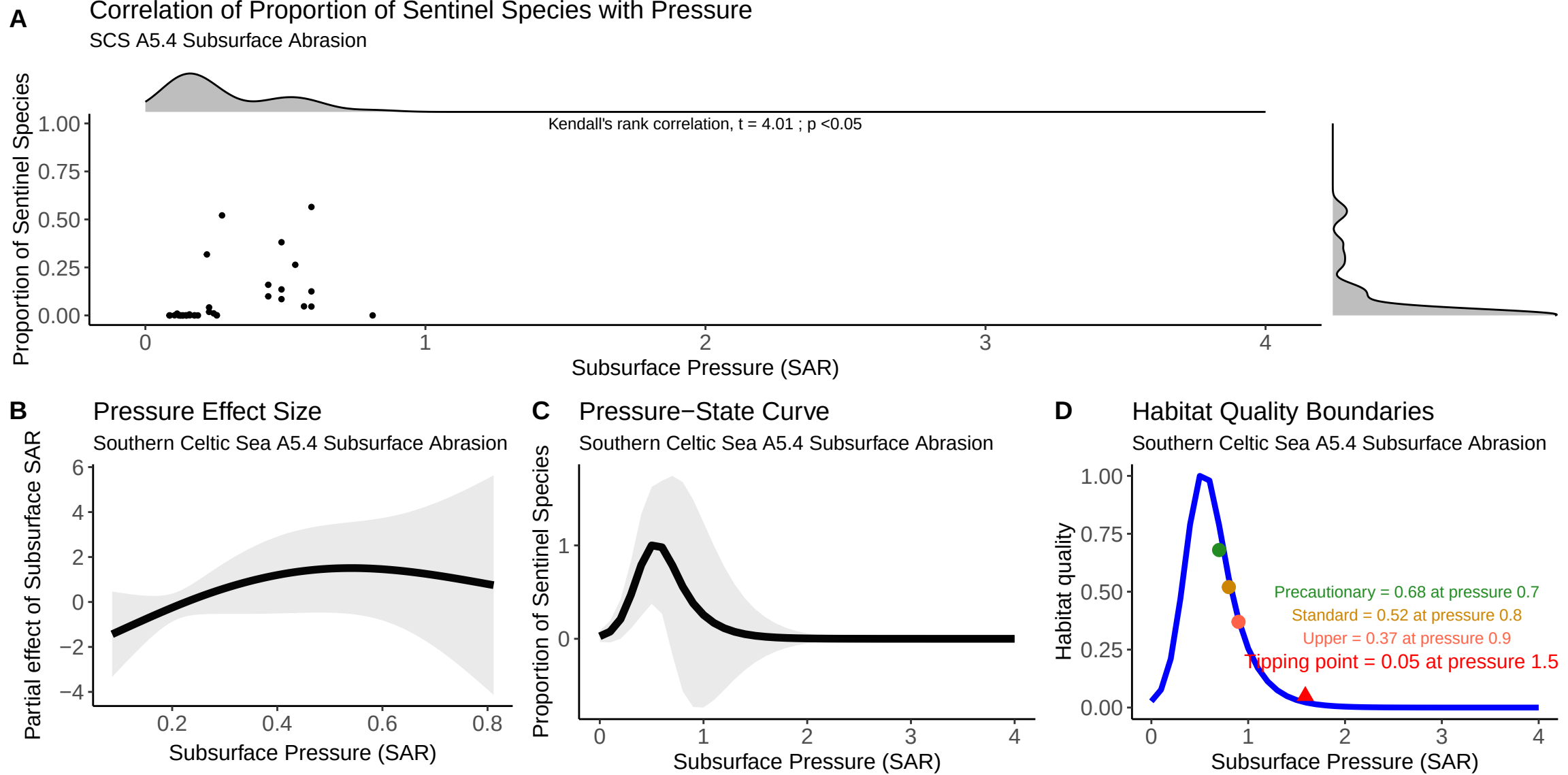

B
Pressure Effect Size
Southern Celtic Sea A5.1 Subsurface Abrasion
Partial effect of Subsurface SAR
2
1
0
−1
−2
0.0
0.5
1.0
1.5
Subsurface Pressure (SAR)

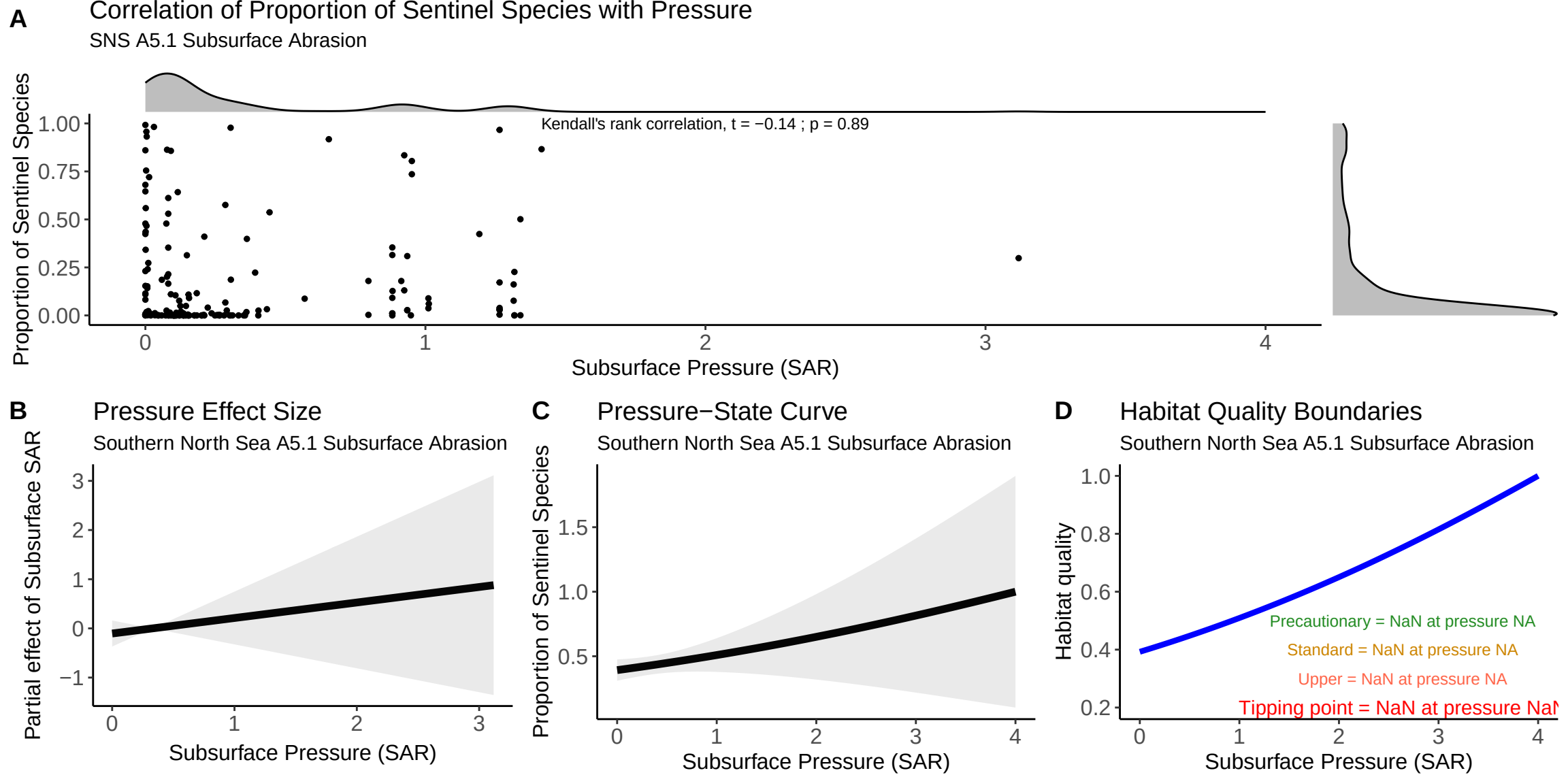

C
Pressure−State Curve
Southern Celtic Sea A5.1 Subsurface Abrasion
Proportion of Sentinel Species
2
1
0
−1
0
1
2
3
4
Subsurface Pressure (SAR)

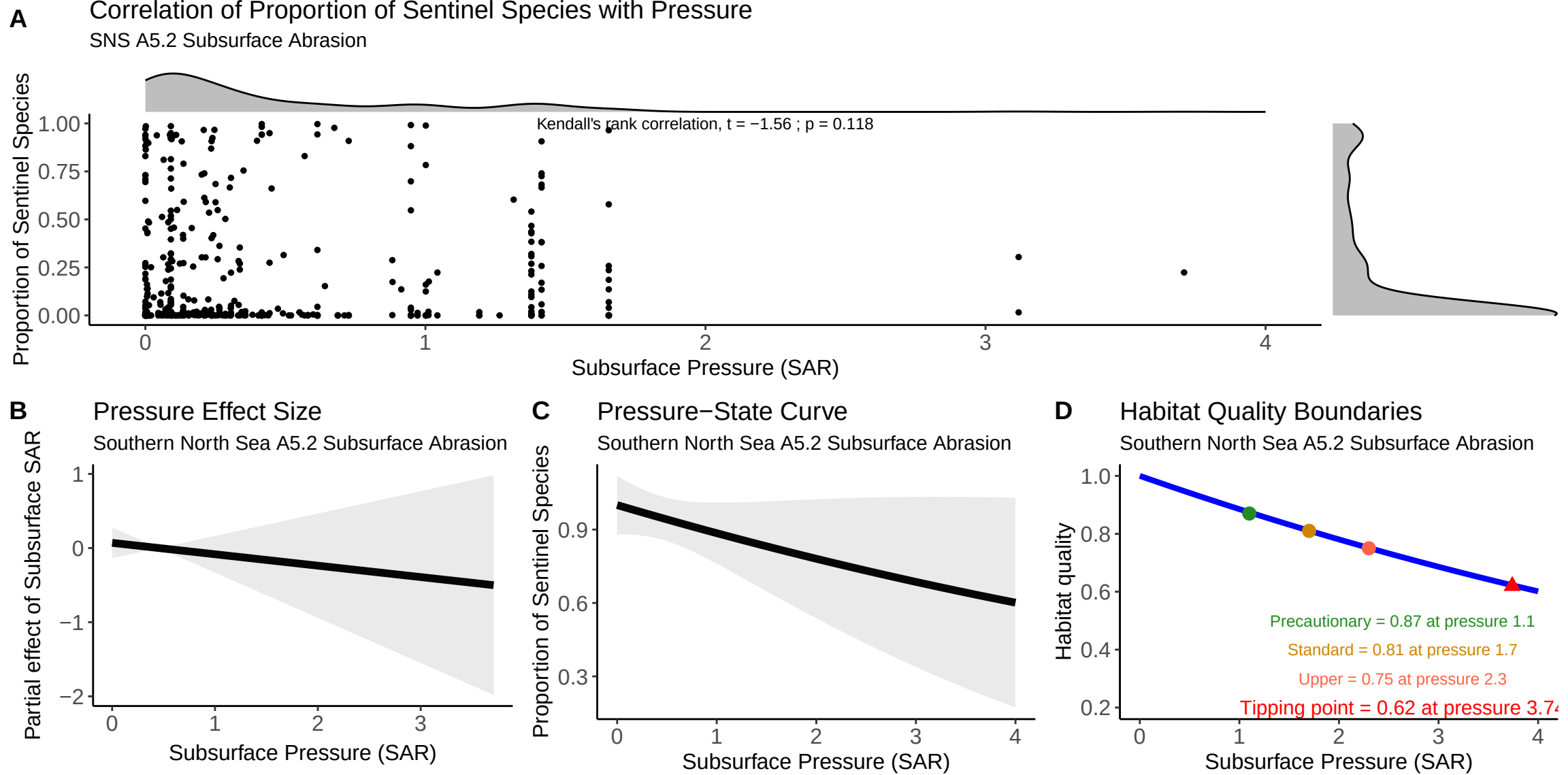

D
Habitat Quality Boundaries
Southern Celtic Sea A5.1 Subsurface Abrasion
Habitat quality
1.0
0.8
0.6
0.4
0.2
Precautionary = NaN at pressure NA
Standard = NaN at pressure NA
Upper = NaN at pressure NA
Tipping point = NaN at pressure NaN
0
1
2
3
4
Subsurface Pressure (SAR)

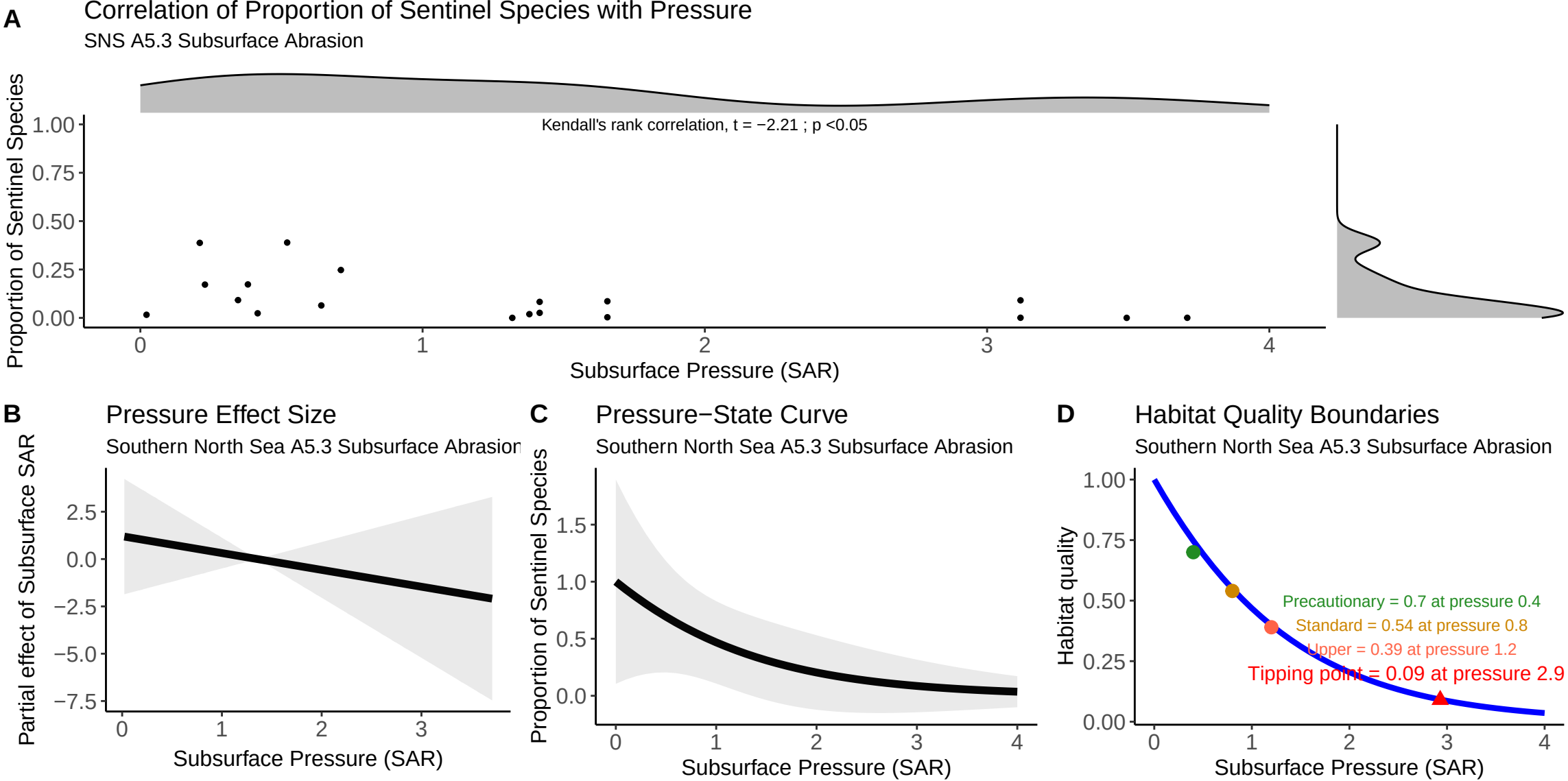

A
Correlation of Proportion of Sentinel Species with Pressure
SCS A5.2 Subsurface Abrasion
Kendall's rank correlation, t = −5.23 ; p <0.05
Proportion of Sentinel Species
1.00
0.75
0.50
0.25
0.00
0
1
2
3
4
Subsurface Pressure (SAR)
B
Pressure Effect Size
Southern Celtic Sea A5.2 Subsurface Abrasion
Partial effect of Subsurface SAR
2.5
0.0
−2.5
−5.0
0.0
0.5
1.0
1.5
Subsurface Pressure (SAR)
C
Pressure−State Curve
Southern Celtic Sea A5.2 Subsurface Abrasion
Proportion of Sentinel Species
2
1
0
−1
−2
0
1
2
3
4
Subsurface Pressure (SAR)
D
Habitat Quality Boundaries
Southern Celtic Sea A5.2 Subsurface Abrasion
Habitat quality
1.00
0.75
0.50
0.25
Precautionary = 0.7 at pressure 0.1
Standard = 0.56 at pressure 0.1
Upper = 0.41 at pressure 0.2
Tipping point = 0.11 at pressure 0.9
0
1
2
3
4
Subsurface Pressure (SAR)

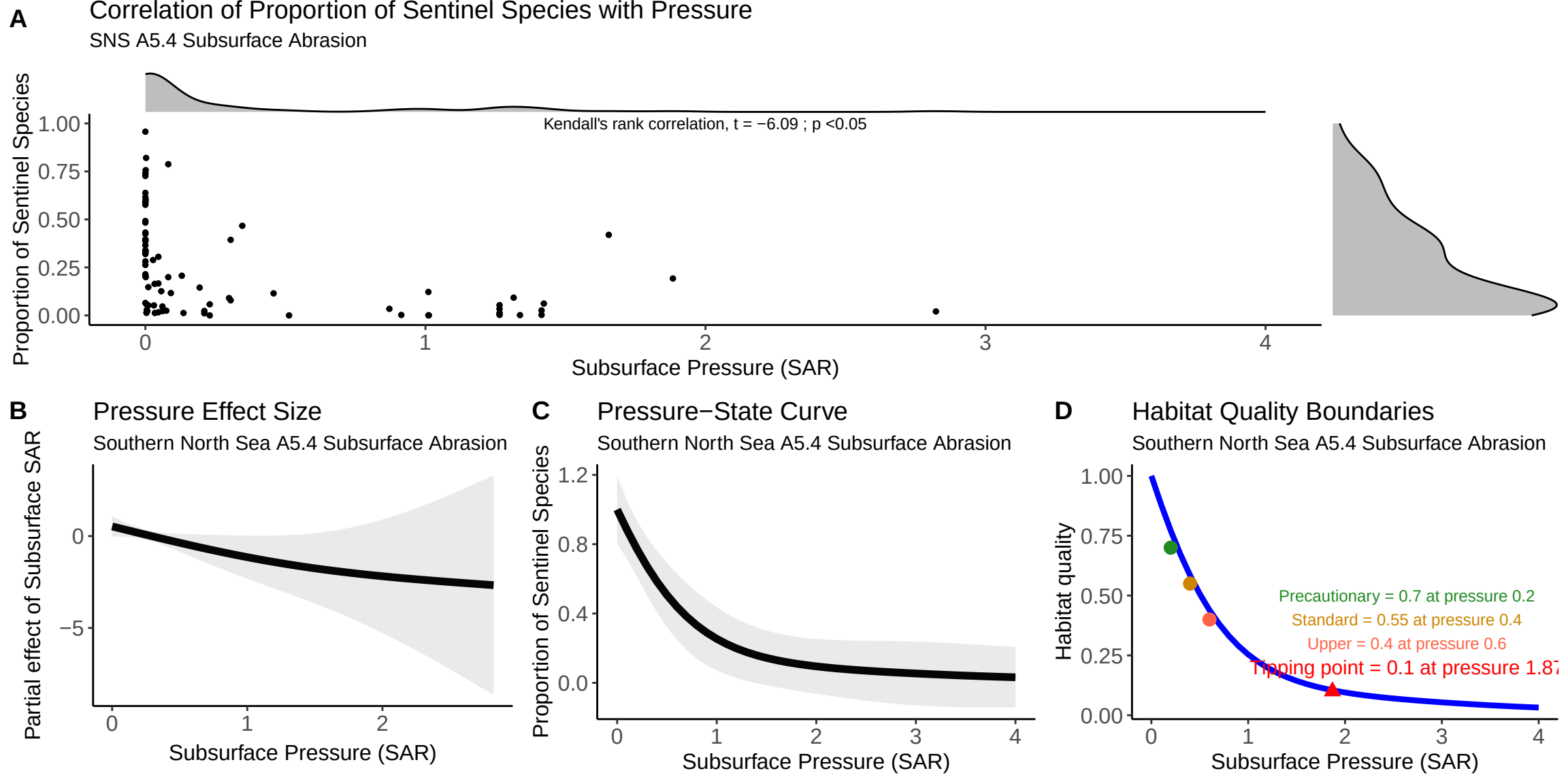

A
Correlation of Proportion of Sentinel Species with Pressure
SCS A5.3 Subsurface Abrasion
Kendall's rank correlation, t = 0.91 ; p = 0.362
Proportion of Sentinel Species
1.00
0.75
0.50
0.25
0.00
0
1
2
3
4
Subsurface Pressure (SAR)
B
Pressure Effect Size
Southern Celtic Sea A5.3 Subsurface Abrasion
Partial effect of Subsurface SAR
1
0
−1
−2
0
1
2
3
Subsurface Pressure (SAR)
C
Pressure−State Curve
Southern Celtic Sea A5.3 Subsurface Abrasion
Proportion of Sentinel Species
1.0
0.5
0.0
0
1
2
3
4
Subsurface Pressure (SAR)
D
Habitat Quality Boundaries
Southern Celtic Sea A5.3 Subsurface Abrasion
Habitat quality
1.0
0.8
0.6
0.4
0.2
Precautionary = 1 at pressure 1.3
Standard = 1 at pressure 1.3
Upper = 0.99 at pressure 1.5
Tipping point = 0.99 at pressure 1.34
0
1
2
3
4
Subsurface Pressure (SAR)


A
Correlation of Proportion of Sentinel Species with Pressure
SCS A5.4 Subsurface Abrasion
Kendall's rank correlation, t = 4.01 ; p <0.05
Proportion of Sentinel Species
1.00
0.75
0.50
0.25
0.00
0
1
2
3
4
Subsurface Pressure (SAR)
B
Pressure Effect Size
Southern Celtic Sea A5.4 Subsurface Abrasion
Partial effect of Subsurface SAR
6
4
2
0
−2
−4
0.2
0.4
0.6
0.8
Subsurface Pressure (SAR)
C
Pressure−State Curve
Southern Celtic Sea A5.4 Subsurface Abrasion
Proportion of Sentinel Species
1
0
0
1
2
3
4
Subsurface Pressure (SAR)
D
Habitat Quality Boundaries
Southern Celtic Sea A5.4 Subsurface Abrasion
Habitat quality
1.00
0.75
0.50
0.25
0.00
Precautionary = 0.68 at pressure 0.7
Standard = 0.52 at pressure 0.8
Upper = 0.37 at pressure 0.9
Tipping point = 0.05 at pressure 1.5
0
1
2
3
4
Subsurface Pressure (SAR)


A
Correlation of Proportion of Sentinel Species with Pressure
SNS A5.1 Subsurface Abrasion
Kendall's rank correlation, t = −0.14 ; p = 0.89
Proportion of Sentinel Species
1.00
0.75
0.50
0.25
0.00
0
1
2
3
4
Subsurface Pressure (SAR)
B
Pressure Effect Size
Southern North Sea A5.1 Subsurface Abrasion
Partial effect of Subsurface SAR
3
2
1
0
−1
0
1
2
3
Subsurface Pressure (SAR)
C
Pressure−State Curve
Southern North Sea A5.1 Subsurface Abrasion
Proportion of Sentinel Species
1.5
1.0
0.5
0
1
2
3
4
Subsurface Pressure (SAR)
D
Habitat Quality Boundaries
Southern North Sea A5.1 Subsurface Abrasion
Habitat quality
1.0
0.8
0.6
0.4
0.2
Precautionary = NaN at pressure NA
Standard = NaN at pressure NA
Upper = NaN at pressure NA
Tipping point = NaN at pressure NaN
0
1
2
3
4
Subsurface Pressure (SAR)


A
Correlation of Proportion of Sentinel Species with Pressure
SNS A5.2 Subsurface Abrasion
Kendall's rank correlation, t = −1.56 ; p = 0.118
Proportion of Sentinel Species
1.00
0.75
0.50
0.25
0.00
0
1
2
3
4
Subsurface Pressure (SAR)
B
Pressure Effect Size
Southern North Sea A5.2 Subsurface Abrasion
Partial effect of Subsurface SAR
1
0
−1
−2
0
1
2
3
Subsurface Pressure (SAR)
C
Pressure−State Curve
Southern North Sea A5.2 Subsurface Abrasion
Proportion of Sentinel Species
0.9
0.6
0.3
0
1
2
3
4
Subsurface Pressure (SAR)
D
Habitat Quality Boundaries
Southern North Sea A5.2 Subsurface Abrasion
Habitat quality
1.0
0.8
0.6
0.4
0.2
Precautionary = 0.87 at pressure 1.1
Standard = 0.81 at pressure 1.7
Upper = 0.75 at pressure 2.3
Tipping point = 0.62 at pressure 3.7
0
1
2
3
4
Subsurface Pressure (SAR)


A
Correlation of Proportion of Sentinel Species with Pressure
SNS A5.3 Subsurface Abrasion
Kendall's rank correlation, t = −2.21 ; p <0.05
Proportion of Sentinel Species
1.00
0.75
0.50
0.25
0.00
0
1
2
3
4
Subsurface Pressure (SAR)
B
Pressure Effect Size
Southern North Sea A5.3 Subsurface Abrasion
Partial effect of Subsurface SAR
2.5
0.0
−2.5
−5.0
−7.5
0
1
2
3
Subsurface Pressure (SAR)
C
Pressure−State Curve
Southern North Sea A5.3 Subsurface Abrasion
Proportion of Sentinel Species
1.5
1.0
0.5
0.0
0
1
2
3
4
Subsurface Pressure (SAR)
D
Habitat Quality Boundaries
Southern North Sea A5.3 Subsurface Abrasion
Habitat quality
1.00
0.75
0.50
0.25
0.00
Precautionary = 0.7 at pressure 0.4
Standard = 0.54 at pressure 0.8
Upper = 0.39 at pressure 1.2
Tipping point = 0.09 at pressure 2.9
0
1
2
3
4
Subsurface Pressure (SAR)


A
Correlation of Proportion of Sentinel Species with Pressure
SNS A5.4 Subsurface Abrasion
Kendall's rank correlation, t = −6.09 ; p <0.05
Proportion of Sentinel Species
1.00
0.75
0.50
0.25
0.00
0
1
2
3
4
Subsurface Pressure (SAR)
B
Pressure Effect Size
Southern North Sea A5.4 Subsurface Abrasion
Partial effect of Subsurface SAR
0
−5
0
1
2
Subsurface Pressure (SAR)
C
Pressure−State Curve
Southern North Sea A5.4 Subsurface Abrasion
Proportion of Sentinel Species
1.2
0.8
0.4
0.0
0
1
2
3
4
Subsurface Pressure (SAR)
D
Habitat Quality Boundaries
Southern North Sea A5.4 Subsurface Abrasion
Habitat quality
1.00
0.75
0.50
0.25
0.00
Precautionary = 0.7 at pressure 0.2
Standard = 0.55 at pressure 0.4
Upper = 0.4 at pressure 0.6
Tipping point = 0.1 at pressure 1.87
0
1
2
3
4
Subsurface Pressure (SAR)