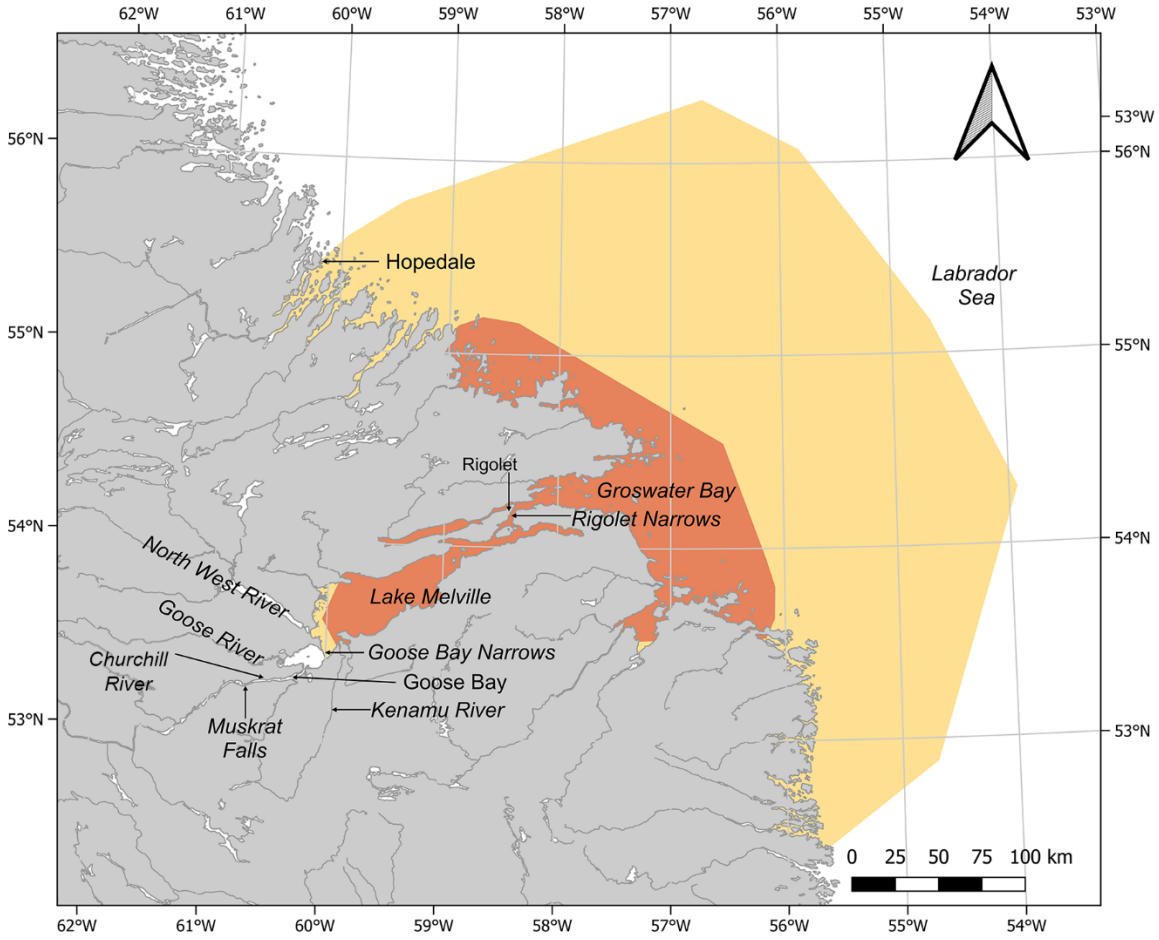


Figure S1. Utilization distribution maps for Lake Melville ringed seals. Home ranges (95%) derived from Minimal Convex Polygons models are defined by yellow for all ringed seals tagged with satellite transmitters and deployed in Lake Melville. Core area (70%) is defined as the contour intervals delineated by the orange.

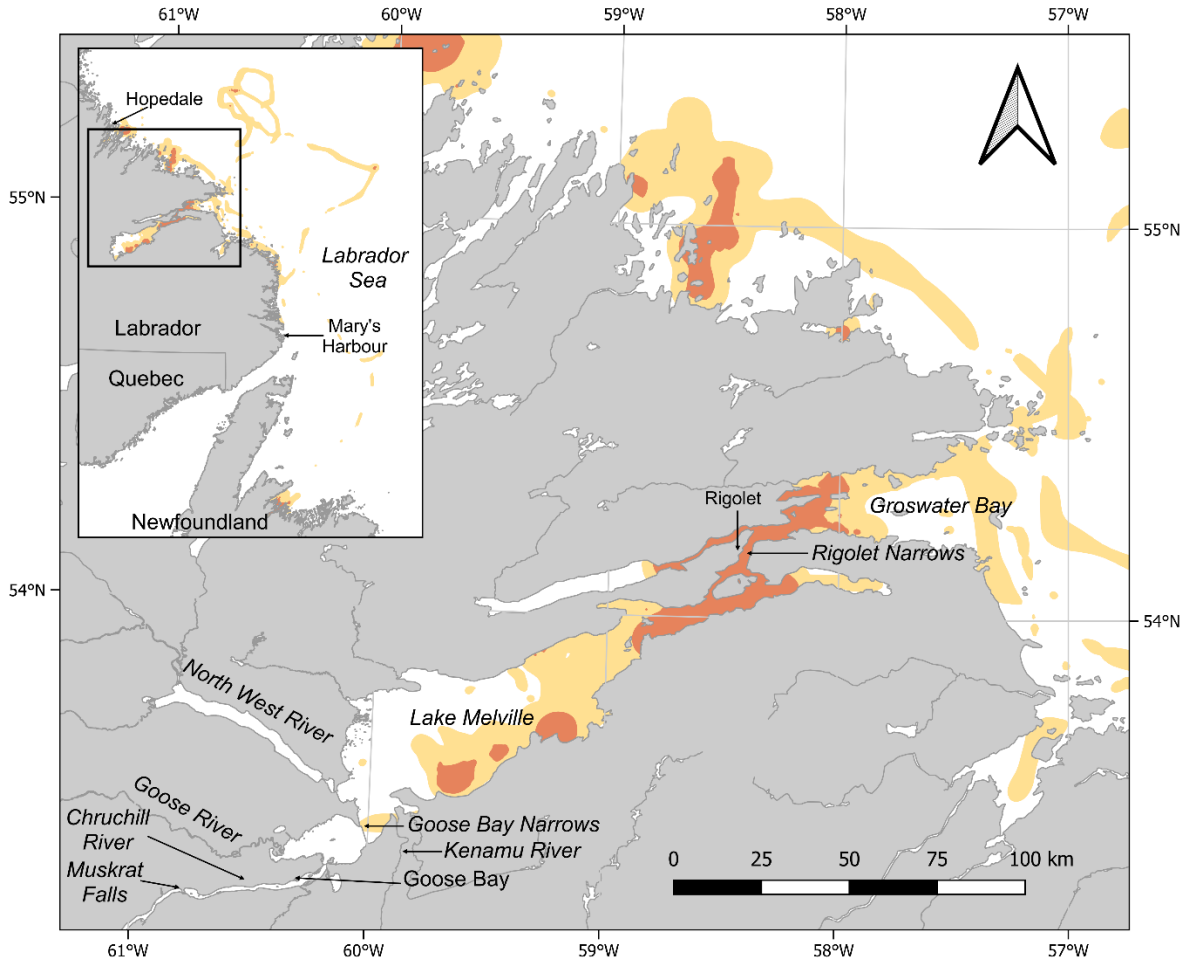


Figure S2. Utilization distribution maps for Lake Melville ringed seals. Home ranges (95%) derived from Brownian bridge kernels models are defined by yellow for all ringed seals tagged with satellite transmitters and deployed in Lake Melville. Core area (70%) is defined as the contour intervals delineated by the orange.

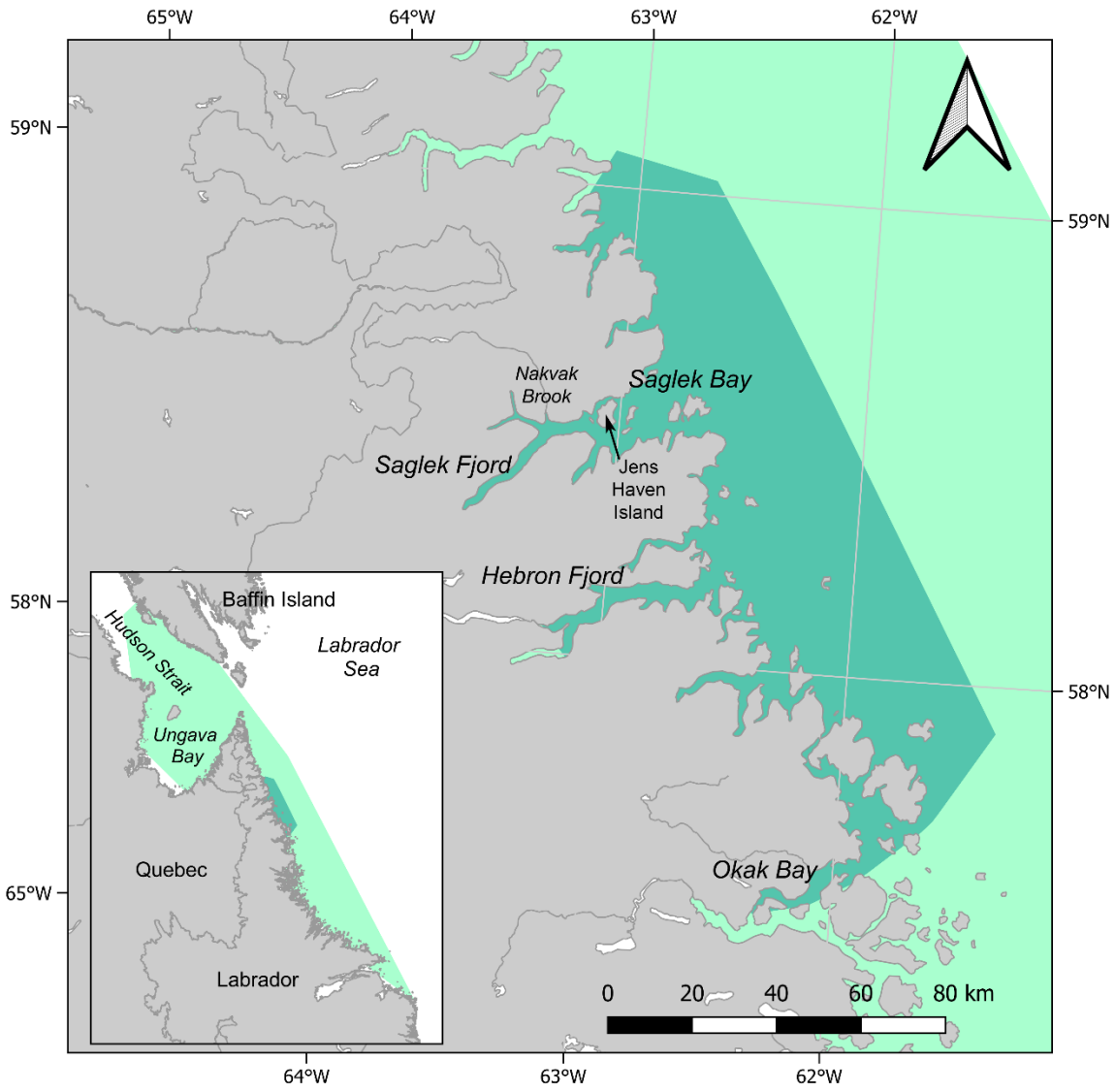


Figure S3. Utilization distribution maps for Saglek ringed seals. Home ranges (95%) derived from Minimal Convex Polygons models are defined by light green for all ringed seals tagged with satellite transmitters and deployed in Saglek Fjord. Core area (70%) is defined as the contour intervals delineated by the dark green.

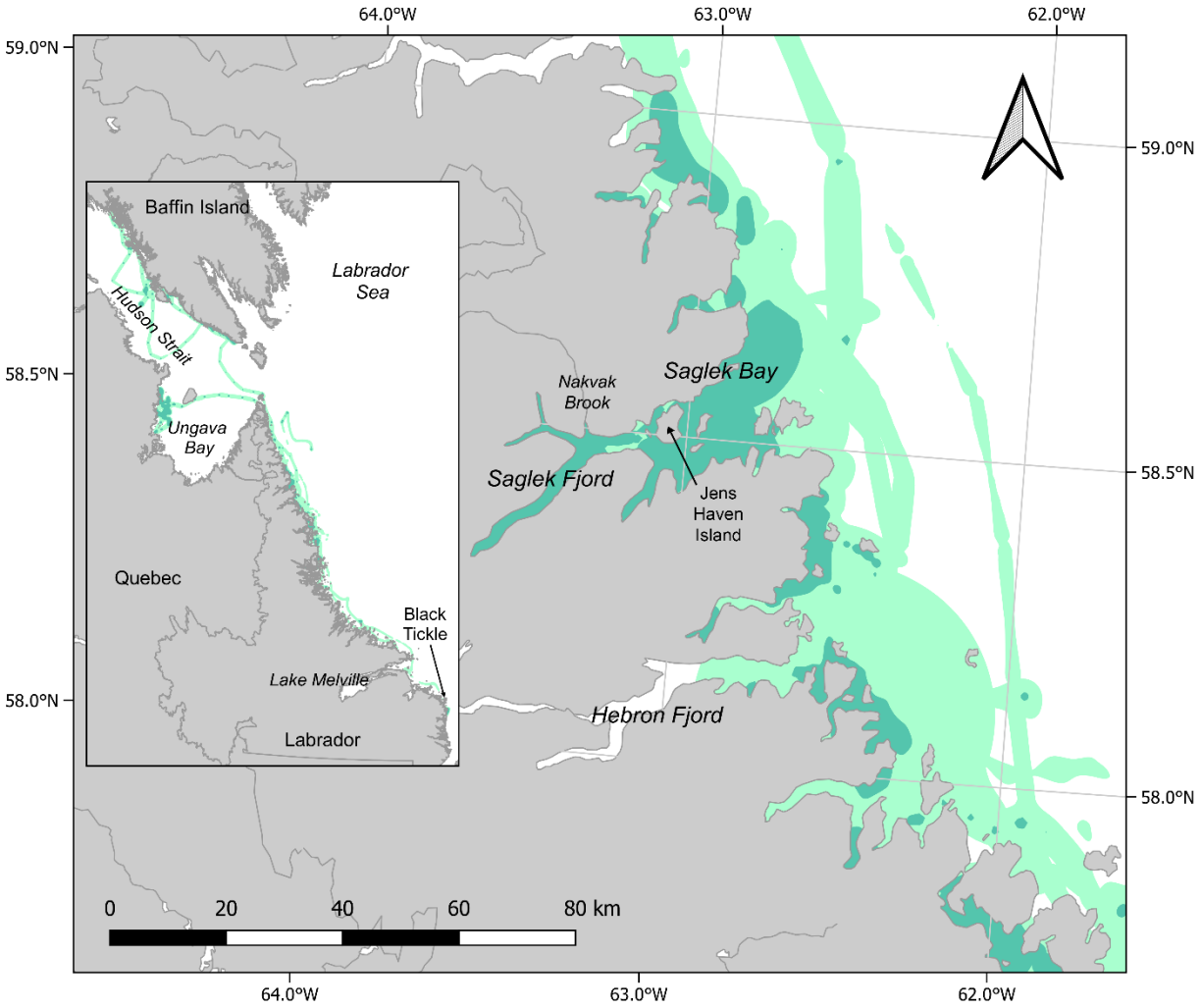
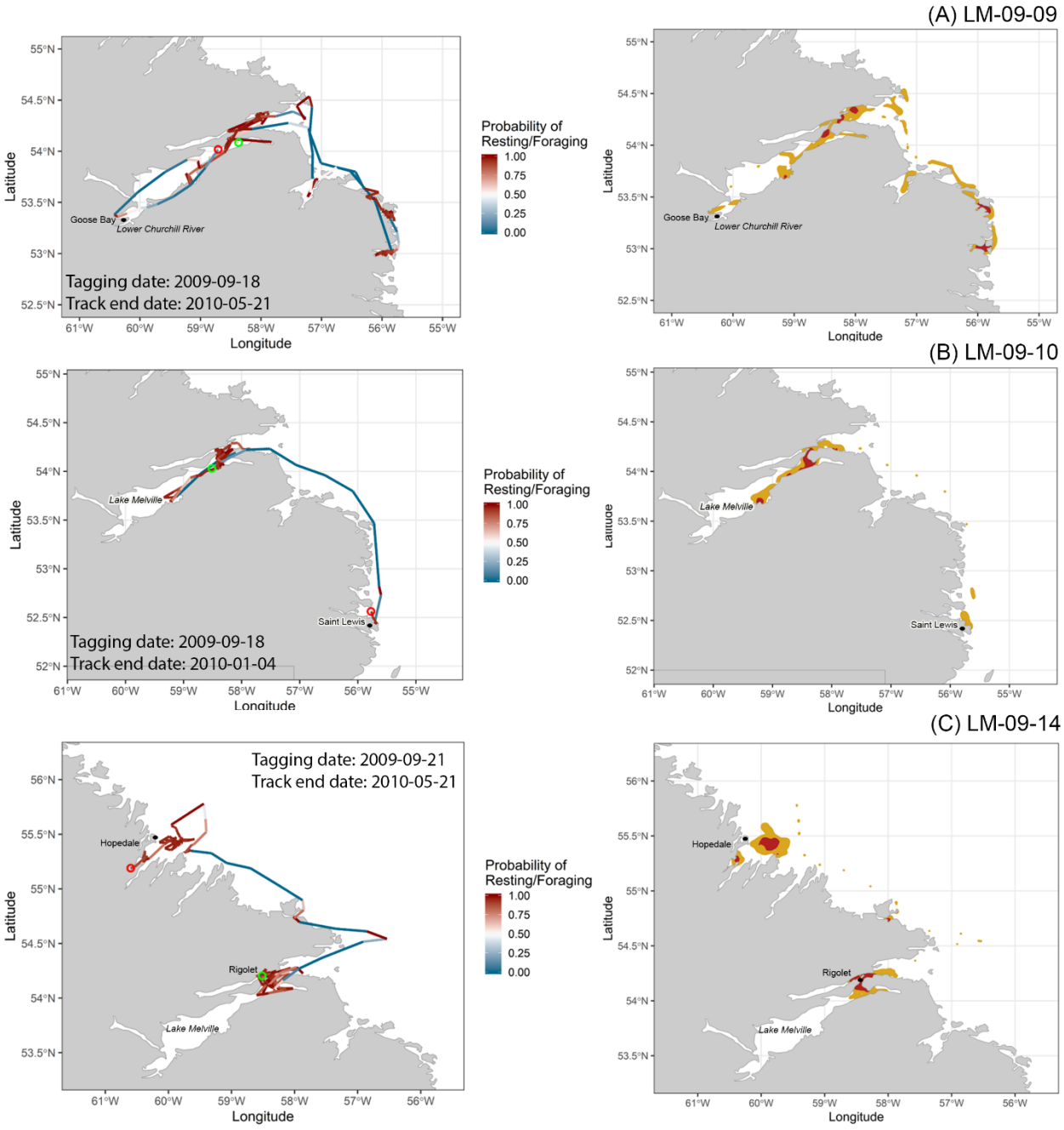
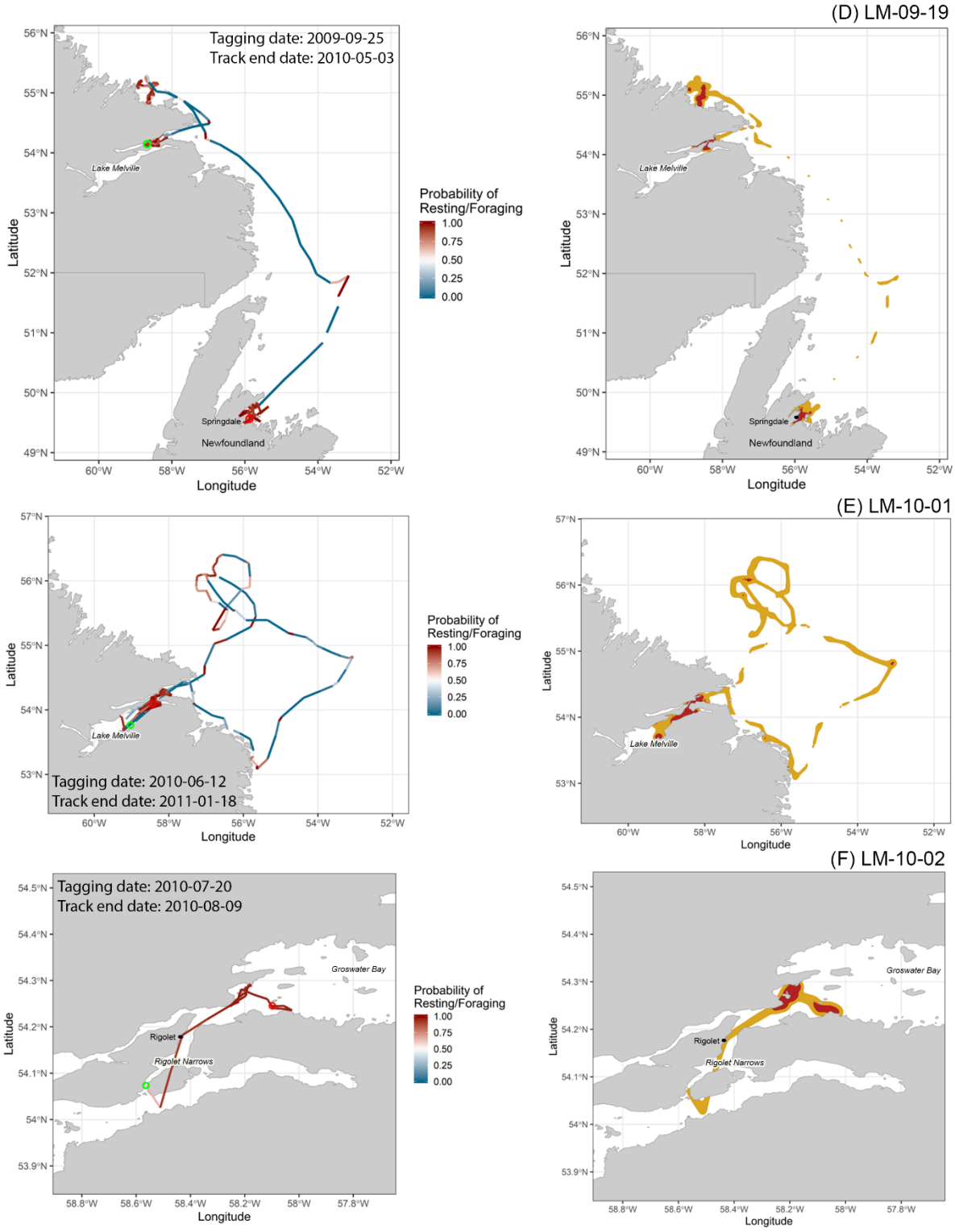


Figure S4. Utilization distribution maps for Saglek ringed seals. Home ranges (95%) derived from Brownian bridge kernels models are defined by light green for all ringed seals tagged with satellite transmitters and deployed in Saglek Fjord. Core area (70%) is defined as the contour intervals delineated by the dark green.


(A) LM-09-09
Tagging date: 2009-09-18
Track end date: 2010-05-21
Goose Bay
Lower Churchill River
Probability of Resting/Foraging
1.00
0.75
0.50
0.25
0.00
Latitude
Longitude
(B) LM-09-10
Tagging date: 2009-09-18
Track end date: 2010-01-04
Lake Melville
Saint Lewis
(C) LM-09-14
Tagging date: 2009-09-21
Track end date: 2010-05-21
Hopedale
Rigolet
Lake Melville


(D) LM-09-19
Tagging date: 2009-09-25
Track end date: 2010-05-03
Lake Melville
Springdale
Newfoundland
Latitude
Longitude
Probability of Resting/Foraging
1.00
0.75
0.50
0.25
0.00
(E) LM-10-01
Tagging date: 2010-06-12
Track end date: 2011-01-18
(F) LM-10-02
Tagging date: 2010-07-20
Track end date: 2010-08-09
Groswater Bay
Rigolet
Rigolet Narrows

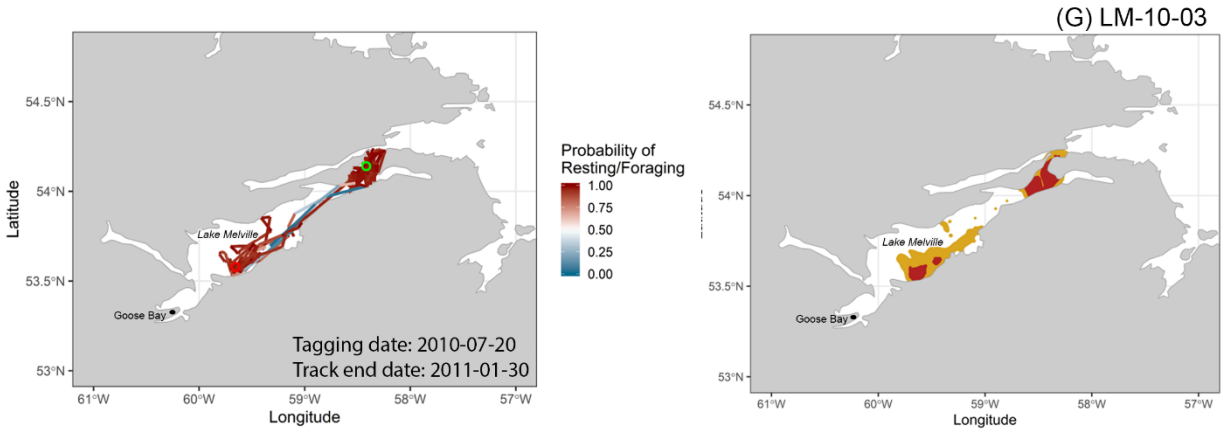
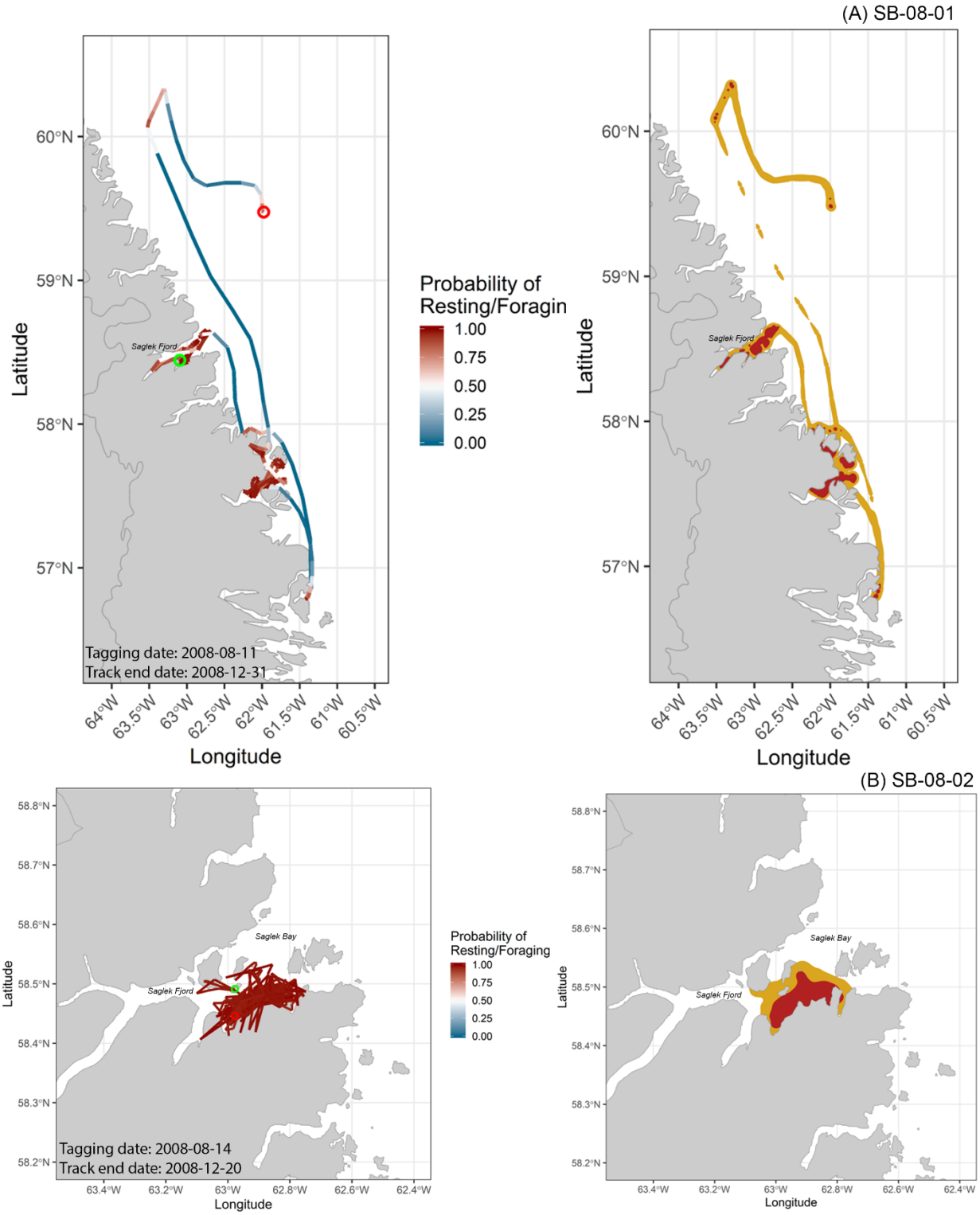
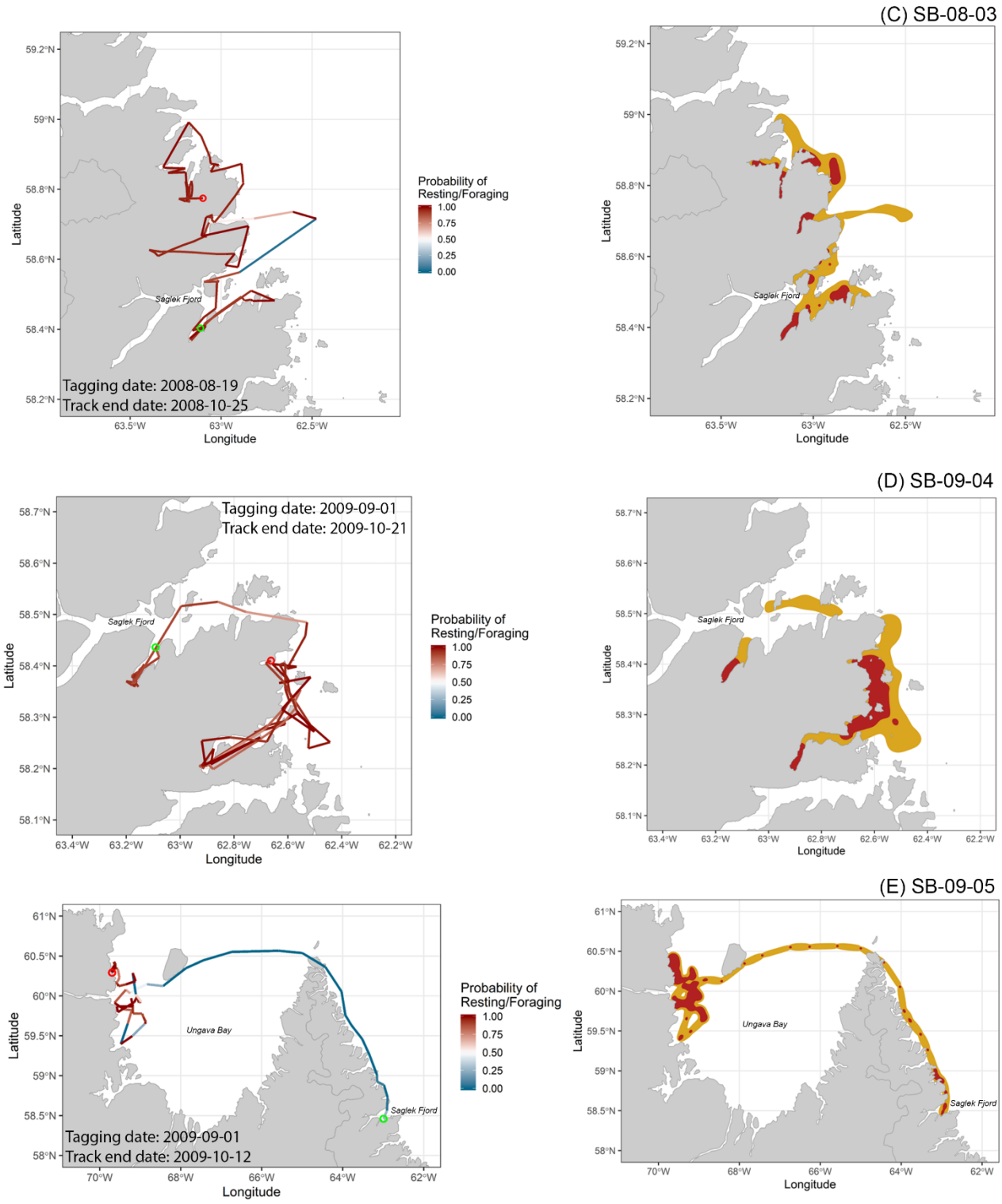
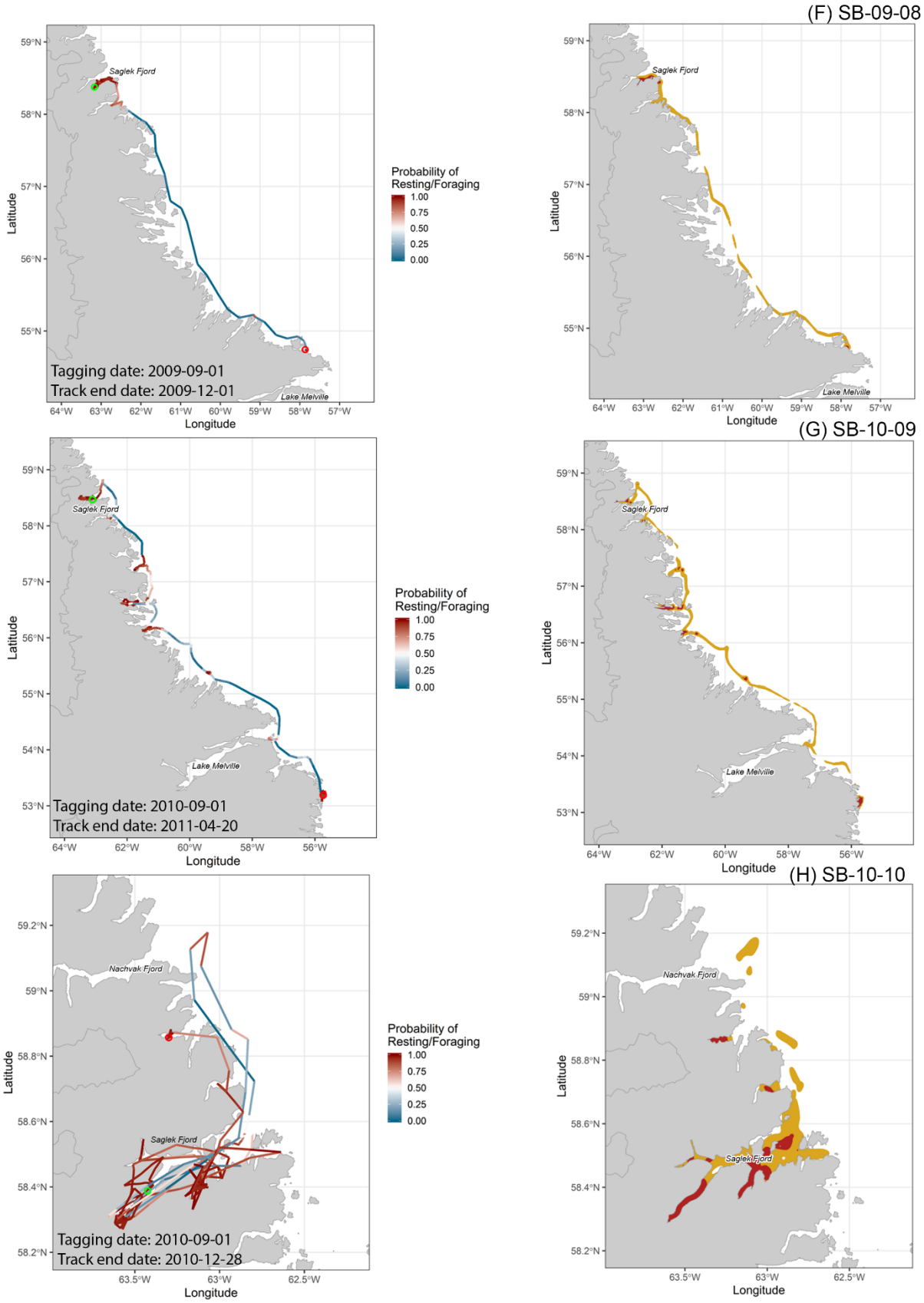
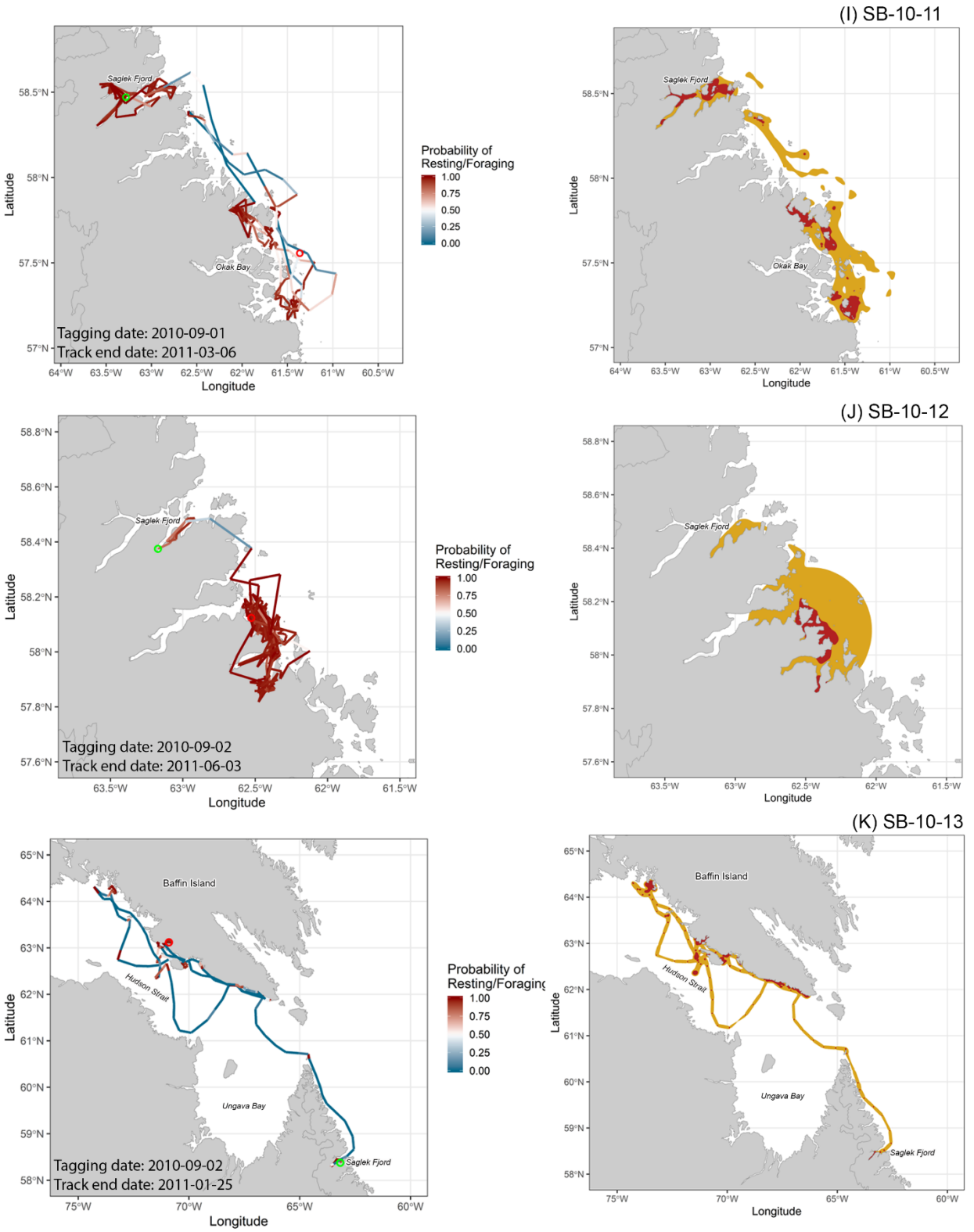


Figure S5. Movement tracks (left) colored by behavioural state and utilization distribution maps (right) for Lake Melville ringed seals. The tagging location and the track end location are denoted by the green and red open circles, respectively. Home ranges (95%) derived from Brownian Bridge models are defined by yellow for each ringed seal tagged with satellite transmitters and deployed in Lake Melville. Core area (70%) is defined as the contour intervals delineated by the red.


(A) SB-08-01
Probability of Resting/Foragin
1.00
0.75
0.50
0.25
0.00
Saglek Fjord
Tagging date: 2008-08-11
Track end date: 2008-12-31
Latitude
Longitude
60°N
59°N
58°N
57°N
64°W
63.5°W
63°W
62.5°W
62°W
61.5°W
61°W
60.5°W
(B) SB-08-02
Probability of Resting/Foraging
Saglek Bay
Saglek Fjord
Tagging date: 2008-08-14
Track end date: 2008-12-20
58.8°N
58.7°N
58.6°N
58.5°N
58.4°N
58.3°N
58.2°N
63.4°W
63.2°W
63°W
62.8°W
62.6°W
62.4°W


(C) SB-08-03
Tagging date: 2008-08-19
Track end date: 2008-10-25
Saglek Fjord
Probability of Resting/Foraging
1.00
0.75
0.50
0.25
0.00
Latitude
Longitude
(D) SB-09-04
Tagging date: 2009-09-01
Track end date: 2009-10-21
Saglek Fjord
(E) SB-09-05
Tagging date: 2009-09-01
Track end date: 2009-10-12
Ungava Bay
Saglek Fjord


(F) SB-09-08
(G) SB-10-09
(H) SB-10-10
Saglek Fjord
Lake Melville
Nachvak Fjord
Tagging date: 2009-09-01
Track end date: 2009-12-01
Tagging date: 2010-09-01
Track end date: 2011-04-20
Tagging date: 2010-09-01
Track end date: 2010-12-28
Probability of Resting/Foraging
1.00
0.75
0.50
0.25
0.00
Latitude
Longitude


(I) SB-10-11
Saglek Fjord
Okak Bay
Tagging date: 2010-09-01
Track end date: 2011-03-06
Probability of Resting/Foraging
1.00
0.75
0.50
0.25
0.00
Latitude
Longitude
(J) SB-10-12
Saglek Fjord
Tagging date: 2010-09-02
Track end date: 2011-06-03
(K) SB-10-13
Baffin Island
Hudson Strait
Ungava Bay
Saglek Fjord
Tagging date: 2010-09-02
Track end date: 2011-01-25

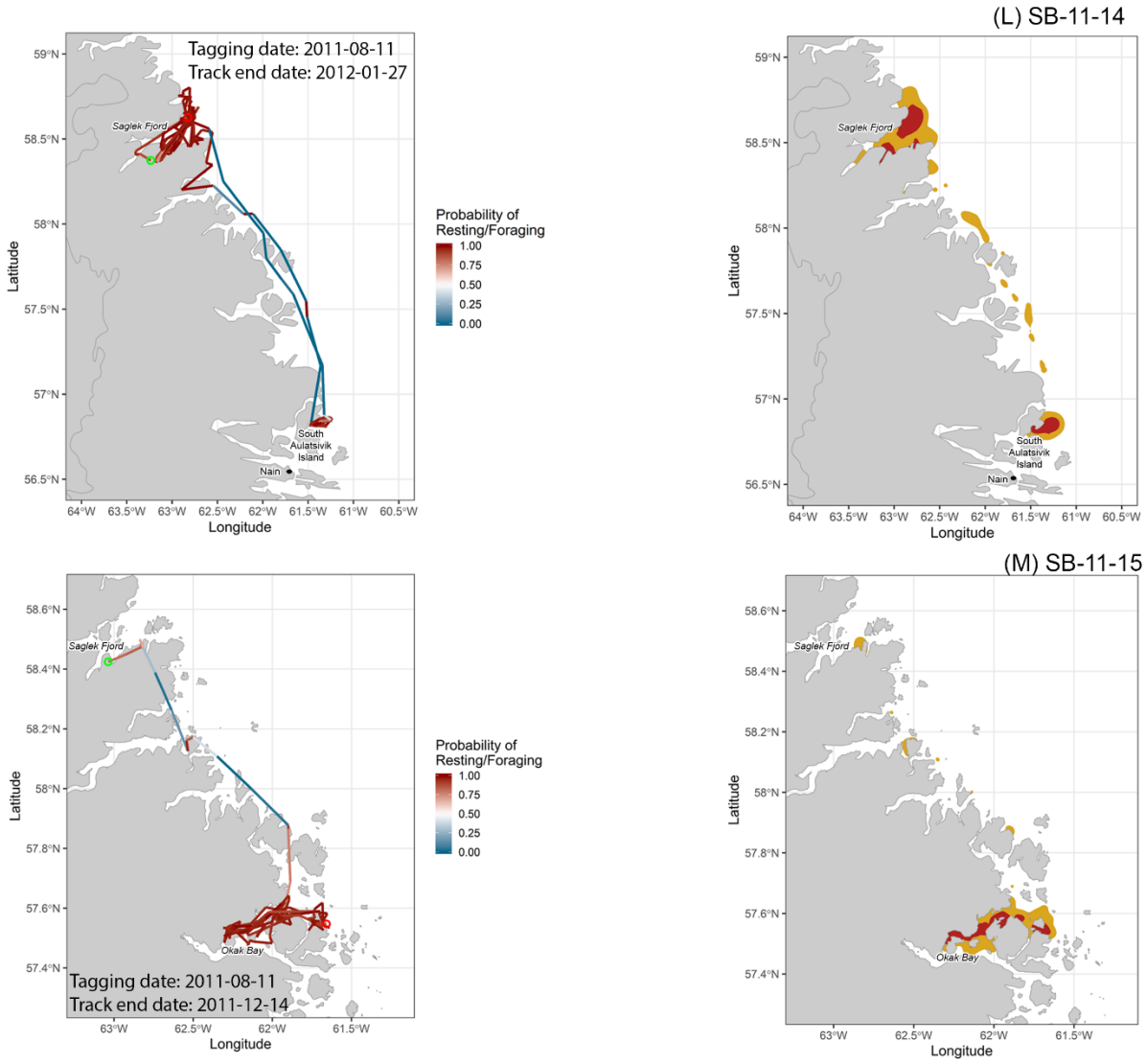


Figure S6. Movement tracks (left) colored by behavioural state and utilization distribution maps (right) for Saglek Fjord ringed seals. The tagging location and the track end location are denoted by the green and red open circles, respectively. Home ranges (95%) derived from Brownian Bridge models are defined by yellow for each ringed seal tagged with satellite transmitters and deployed in Saglek Fjord. Core area (70%) is defined as the contour intervals delineated by the red.

Table S1. Candidate generalized linear mixed model outputs examining the effects of sea ice concentration, bathymetry, distance to shore, age, and sex on the behavioural states of ringed seals (n = 7) tagged in Lake Melville, Labrador, Canada in 2009 and 2010. Individual seal ID was included as a random effect. Significant predictors are indicated by bold text.

Parameter	Value	Std.Error	DF	t-value	p-value
(Intercept)	2.823	1.045	369	2.701	0.007
Ice Concentration	**0.483**	**0.204**	**369**	**2.375**	**0.018**
Bathymetry	-0.043	0.096	369	-0.448	0.654
Sex (Male)	0.113	0.554	3	0.204	0.852
Age (Subadult)	-0.546	1.110	3	-0.492	0.656
Dist. To Shore	**-1.13×10^{-5}**	**5.10×10^{-6}**	**369**	**-2.206**	**0.028**
Random Effects					
	Variance	StdDev			
ID Intercept	1.61×10^{-8}	1.30×10^{-4}			
Residual	0.940	0.969			

Theoretical $R^2_C = 0.15$

Parameter	Value	Std.Error	DF	t-value	p-value
(Intercept)	2.824	1.041	369	2.714	0.007
Ice Concentration	**0.477**	**0.200**	**369**	**2.381**	**0.018**
Bathymetry	-0.044	0.094	369	-0.468	0.640
Age (Subadult)	-0.503	1.085	4	-0.464	0.667
Dist. To Shore	**-1.10×10^{-5}**	**4.80×10^{-6}**	**369**	**-2.283**	**0.023**
Random Effects					
	Variance	StdDev			
ID Intercept	1.56×10^{-8}	1.20×10^{-4}			
Residual	9.36×10^{-1}	0.957			

Theoretical $R^2_C = 0.15$

Parameter	Value	Std.Error	DF	t-value	p-value
(Intercept)	2.368	1.041	369	2.714	0.007
Ice Concentration	**0.496**	**0.200**	**369**	**2.381**	**0.018**
Bathymetry	-0.045	0.094	369	-0.468	0.640
Dist. To Shore	**-1.10×10^{-5}**	**4.80×10^{-6}**	**369**	**-2.310**	**0.021**
Random Effects					
	Variance	StdDev			
ID Intercept	1.52×10^{-8}	1.20×10^{-4}			
Residual	9.36×10^{-1}	0.957			

Theoretical $R^2_C = 0.14$

Parameter	Value	Std.Error	DF	t-value	p-value

(Intercept)	2.363	0.269	370	8.785	0
Ice Concentration	**0.450**	**0.194**	**370**	**2.471**	**0.014**
Dist. To Shore	**-1.02×10^{-5}**	**4.30×10^{-6}**	**370**	**-2.350**	**0.019**
Random Effects					
	Variance	StdDev			
ID Intercept	2.58×10^{-8}	1.60×10^{-4}			
Residual	9.25×10^{-1}	0.962			

Theoretical $R^2_C = 0.14$.

Table S2. Candidate generalized linear mixed model outputs examining the effects of sea ice concentration, bathymetry, distance to shore, age, and sex on the behavioural states of ringed seals (n = 13) tagged in Saglek Fjord, Labrador, Canada between 2008 and 2011. Individual seal ID was included as a random effect. Significant predictors are indicated by bold text.

Parameter	Value	Std.Error	DF	t-value	p-value
(Intercept)	3.734	1.029	689	3.629	0.0003
Ice Concentration	0.090	0.139	689	0.638	0.524
Bathymetry	0.065	0.079	689	0.824	0.410
Sex (Male)	-0.152	0.502	10	-0.303	0.768
Age (Subadult)	-1.870	0.9649	10	-1.938	0.081
Dist. To Shore	1.50×10^{-5}	1.30×10^{-5}	689	-1.237	0.217
Random Effects					
	Variance	StdDev			
ID Intercept	3.65×10^{-7}	6.00×10^{-4}			
Residual	0.965	0.982			

Theoretical $R^2_C = 0.17$

Parameter	Value	Std.Error	DF	t-value	p-value
(Intercept)	3.585	0.895	689	4.005	0.0001
Ice Concentration	0.092	0.138	689	0.666	0.506
Bathymetry	0.066	0.078	689	0.847	0.397
Age (Subadult)	-1.795	0.929	11	-1.932	0.080
Dist. To Shore	-1.60×10^{-5}	1.20×10^{-5}	689	-1.304	0.193
Random Effects					
	Variance	StdDev			
ID Intercept	3.79×10^{-7}	6.20×10^{-4}			
Residual	9.63×10^{-1}	0.982			

Theoretical $R^2_C = 0.17$

Parameter	Value	Std.Error	DF	t-value	p-value
(Intercept)	3.585	0.818	1182	4.383	0
Bathymetry	0.139	0.074	1182	1.881	0.060
Age (Subadult)	-1.143	0.874	11	-1.307	0.218
Dist. To Shore	**-4.70×10^{-5}**	**1.40×10^{-5}**	**1182**	**-3.335**	**9.00×10^{-4}**
Random Effects					
	Variance	StdDev			
ID Intercept	0.6111	0.7817			
Residual	0.7784	0.8823			

Theoretical $R^2_C = 0.23$

Parameter	Value	Std.Error	DF	t-value	p-value
(Intercept)	2.637	0.313	1182	8.425	0
Bathymetry	0.134	0.073	1182	1.834	0.067

Dist. To Shore	**-4.90×10^{-5}**	**1.40×10^{-5}**	**1182**	**-3.431**	**6.00×10^{-4}**
Random Effects					
	Variance	StdDev			
ID Intercept	0.7626	0.8732			
Residual	0.7625	0.8732			

Theoretical $R^2_C = 0.23$

Parameter	Value	Std.Error	DF	t-value	p-value
(Intercept)	2.632	0.307	1183	8.578	0
Dist. To Shore	**-5.60×10^{-5}**	**1.30×10^{-5}**	**1183**	**-4.211**	**0**
Random Effects					
	Variance	StdDev			
ID Intercept	0.7228	0.8502			
Residual	0.7570	0.8701			

Theoretical $R^2_C = 0.21$

Table S3. Summary statistics of sea ice concentration, bathymetry, and distance to shore at each ringed seal location, denoted as mean ± SD (n). Mean sea ice concentration is calculated for the entire study period as well as during ice-covered conditions (sea ice concentration ≥ 50%). Ringed seals were tagged in Lake Melville (n = 7; 2009 – 2010) and Saglek Fjord (n = 13; 2008 – 2011), Labrador, Canada.

		Sea ice concentration (%)			
ID	Location	Whole season	Ice-covered conditions	Bathymetry (m)	Distance to shore (km)
LM-10-01	Lake Melville	19.25 ± 29.06 (72)	68.41 ± 3.83 (18)	204.02 ± 537.42 (173)	23.72 ± 53.6 (173)
LM-09-09	Lake Melville	52.36 ± 30.19 (75)	71.15 ± 10.32 (51)	1.33 ± 5.51 (184)	0.83 ± 1.81 (184)
LM-09-19	Lake Melville	65.23 ± 25.20 (78)	74.41 ± 12.62 (65)	15.33 ± 51.09 (163)	4.61 ± 18.27 (163)
LM-09-14	Lake Melville	77.12 ± 18.19 (94)	81.78 ± 9.98 (85)	3.08 ± 17.28 (172)	1.65 ± 2.76 (172)
LM-09-10	Lake Melville	39.93 ± 34.72 (18)	72.09 ± 3.47 (9)	4.81 ± 19.32 (79)	1.14 ± 2.29 (79)
LM-10-03	Lake Melville	73.79 ± 7.90 (41)	73.79 ± 7.90 (41)	9.31 ± 27.02 (148)	1.92 ± 2.62 (148)
All	Lake Melville	56.6 ± 32.34 (378)	75.55 ± 10.97 (269)	43.88 ± 246.5 (919)	6.17 ± 25.96 (919)
SB-11-14	Saglek Fjord	16.81 ± 30.24 (103)	78.9 ± 6.15 (18)	41.29 ± 50.27 (128)	2.50 ± 1.90 (128)
SB-11-15	Saglek Fjord	2.70 ± 9.77 (54)	52.94 ± NA (1)	0.18 ± 2.87 (96)	0.60 ± 0.49 (96)
SB-10-10	Saglek Fjord	35.15 ± 36.87 (20)	73.37 ± 5.89 (9)	6.63 ± 23.63 (78)	1.15 ± 1.34 (78)
SB-09-05	Saglek Fjord	0.66 ± 1.39 (22)	NA (0)	24.14 ± 23.29 (22)	11.14 ± 10.21 (22)
SB-08-02	Saglek Fjord	12.27 ± 22.94 (87)	58.18 ± 4.36 (14)	10.26 ± 19.18 (97)	1.14 ± 0.91 (97)
SB-10-13	Saglek Fjord	7.49 ± 19.28 (30)	60.83 ± 7.48 (3)	31.49 ± 83.41 (104)	4.77 ± 13.42 (104)
SB-09-08	Saglek Fjord	1.23 ± 5.85 (56)	NA (0)	1.75 ± 5.1 (64)	0.64 ± 0.73 (64)
SB-09-04	Saglek Fjord	0 ± 0 (17)	NA (0)	3.27 ± 6.33 (30)	1.13 ± 1.43 (30)
SB-08-03	Saglek Fjord	0 ± 0 (17)	NA (0)	8.45 ± 17.94 (47)	1.35 ± 2.19 (47)
SB-10-12	Saglek Fjord	17.68 ± 24.07 (50)	57.41 ± 6.37 (9)	0.6 ± 4.06 (117)	0.7 ± 0.97 (117)
SB-10-11	Saglek Fjord	29.51 ± 32.45 (67)	68.44 ± 9.78 (25)	14.8 ± 29.97 (134)	1.99 ± 3.51 (134)
SB-10-09	Saglek Fjord	43.89 ± 29.04 (118)	65.83 ± 8.48 (67)	3.52 ± 12.12 (168)	1.65 ± 2.97 (168)
SB-08-01	Saglek Fjord	11.97 ± 21.12 (64)	57.45 ± 6.13 (5)	34.87 ± 59.93 (112)	7.00 ± 17.26 (112)
All	Saglek Fjord	18.1 ± 28.08 (705)	66.6 ± 9.84 (151)	14.85 ± 40.33 (1197)	2.4 ± 7.32 (1197)

NOTE: Seal LM-10-02 was excluded from analyses due to its short track length and lack of environmental data availability.

Table S4. Generalized linear mixed model output examining the effects of sea ice concentration, bathymetry, distance to shore, age, and sex on the behavioural states of ringed seals tagged in Saglek Fjord (n = 13, 2008 – 2011) and Lake Melville (n = 7, 2009 – 2010), Labrador, Canada. Individual seal ID and tagging location were included as a random effect. Significant predictors are indicated by bold text.

Parameter	Value	Std.Error	DF	t-value	p-value
(Intercept)	3.539	0.755	1061	4.685	0
Ice Concentration	0.270	0.130	1061	2.074	0.038
Bathymetry	-0.015	0.052	1061	-0.295	0.768
Sex (Male)	-0.013	0.364	16	-0.034	0.973
Age (Subadult)	**-1.634**	**0.726**	**16**	**-2.251**	**0.039**
Distance to Shore	**-1.30×10^{-5}**	**4.90×10^{-6}**	**1061**	**-2.698**	**0.007**
Random Effects					
	Variance	StdDev			
ID Intercept	0.271	0.520			
Location Intercept	0.271	0.520			
Residual	0.857	0.926			

Theoretical $R^2_C = 0.26$

Table S5. Candidate generalized linear mixed model outputs examining the effects of sea ice concentration, bathymetry, distance to shore, age, and sex on the behavioural states of subadult ringed seals tagged in Saglek Fjord (n = 11, 2008 – 2011) and Lake Melville (n = 5, 2009 – 2010), Labrador, Canada. Individual seal ID and tagging location were included as a random effect. Significant predictors are indicated by bold text.

Parameter	Value	Std.Error	DF	t-value	p-value
(Intercept)	1.943	0.292	833	6.662	0
Ice concentration	**0.294**	**0.136**	**833**	**2.167**	**0.031**
Bathymetry	-0.021	0.057	833	-0.371	0.711
Sex (Male)	-0.060	0.414	14	-0.145	0.887
Distance to Shore	**-1.30×10^{-5}**	**4.80×10^{-6}**	**833**	**-2.790**	**0.005**
Random Effects					
	Variance	StdDev			
ID Intercept	0.092	0.304			
Location Intercept	0.092	0.204			
Residual	0.896	0.947			

Theoretical $R^2_C = 0.11$

Parameter	Value	Std.Error	DF	t-value	p-value
(Intercept)	1.914	0.213	833	8.979	0
Ice Concentration	**0.296**	**0.135**	**833**	**2.193**	**0.029**
Bathymetry	-0.021	0.058	833	-0.368	0.713
Distance to Shore	**-1.30×10^{-5}**	**4.70×10^{-6}**	**833**	**-2.844**	**0.005**
Random Effects					
	Variance	StdDev			
ID Intercept	0.090	0.299			
Location Intercept	0.090	0.299			
Residual	0.899	0.948			

Theoretical $R^2_C = 0.11$

Parameter	Value	Std.Error	DF	t-value	p-value
(Intercept)	1.910	0.213	834	8.971	0
Ice Concentration	**0.288**	**0.133**	**834**	**2.158**	**0.031**
Distance to Shore	**-1.30×10^{-5}**	**4.40×10^{-6}**	**834**	**-2.911**	**0.004**
Random Effects					
	Variance	StdDev			
ID Intercept	0.091	0.301			
Location Intercept	0.091	0.301			
Residual	0.899	0.946			

Theoretical $R^2_C = 0.11$

Table S6. Generalized linear mixed model output examining the effects of sea ice concentration, bathymetry, distance to shore, age, and sex on the behavioural states of adult ringed seals tagged in Saglek Fjord (n = 2, 2008 – 2011) and Lake Melville (n = 2, 2009 – 2010), Labrador, Canada. Individual seal ID and tagging location were included as a random effect. Significant predictors are indicated by bold text.

Parameter	Value	Std.Error	DF	t-value	p-value
(Intercept)	4.335	2.053	225	2.112	0.036
Ice Concentration	-0.130	0.612	225	-0.212	0.832
Bathymetry	0.032	0.274	225	0.117	0.907
Sex (Male)	-0.443	1.954	1	-0.227	0.858
Distance to Shore	-1.90×10^{-4}	1.54×10^{-4}	225	-1.239	0.217
Random Effects					
	Variance	StdDev			
ID Intercept	4.75×10^{-8}	< 0.001			
Location Intercept	4.75×10^{-8}	< 0.001			
Residual	0.978	0.989			

Theoretical $R^2_C = 0.06$

Parameter	Value	Std.Error	DF	t-value	p-value
(Intercept)	4.354	2.037	226	2.137	0.034
Ice Concentration	-0.111	0.601	226	-0.182	0.856
Sex (Male)	-0.446	1.939	1	-0.23	0.856
Distance to Shore	-2.00×10^{-4}	1.43×10^{-4}	226	-1.401	0.163
Random Effects					
	Variance	StdDev			
ID Intercept	6.04×10^{-8}	-2.46×10^{-4}			
Location Intercept	4.75×10^{-8}	-2.00×10^{-4}			
Residual	0.964	0.982			

Theoretical R^2_C=0.05

Parameter	Value	Std.Error	DF	t-value	p-value
(Intercept)	3.955	0.910	226	4.344	0
Ice Concentration	-0.046	0.523	226	-0.088	0.930
Distance to Shore	-1.90×10^{-4}	1.22×10^{-4}	226	-1.546	0.124
Random Effects					
	Variance	StdDev			
ID Intercept	6.40×10^{-8}	-2.53×10^{-4}			
Location Intercept	6.40×10^{-8}	-2.53×10^{-4}			
Residual	0.955	0.977			

Theoretical R^2_C=0.06

Parameter	Value	Std.Error	DF	t-value	p-value
(Intercept)	4.013	0.632	369	6.349	0
Distance to Shore	**-2.50×10^{-4}**	**9.81×10^{-5}**	**369**	**-2.498**	**0.013**

Random Effects		
	Variance	StdDev
ID Intercept	1.93×10^{-7}	-4.39×10^{-4}
Location Intercept	1.93×10^{-7}	-4.39×10^{-4}
Residual	0.916	0.957

Theoretical R^2_C=0.07