

SUPPORTING INFORMATION

Table S1: Datasets used in the tidal marsh remote sensing classification model. The initial number of covariate layers derived from applying a range of reducers, and the final number of covariate layers retained in the classification model after analysis to remove highly collinear covariates. Retained covariates are highlighted in bold.

Input Data	Variables	Initial Number of Covariate Layers	Reducers Applied	Final Number of Covariate Layers
Sentinel-2 MSI: MultiSpectral Instrument, Level- 2A	NDVI	9	Median Standard deviation 10th percentile 25 th percentile 75 th percentile 90th percentile 5 th – 95 th interval means 10 th – 90 th interval means 25 th – 75 th interval means	4
	EVI	9	Median Standard deviation 10th percentile 25th percentile 75 th percentile 90th percentile	7

			5 th – 95 th interval means	
			10th – 90th interval means	
			25th – 75th interval means	
AWEI		9	Median	4
			Standard deviation	
			10 th percentile	
			25th percentile	
			75th percentile	
			90 th percentile	
			5 th – 95 th interval means	
			10 th – 90 th interval means	
			25 th – 75 th interval means	
NIR		9	Median	4
			Standard deviation	
			10th percentile	
			25 th percentile	
			75th percentile	
			90 th percentile	
			5 th – 95 th interval means	
			10 th – 90 th interval means	
			25 th – 75 th interval means	
Sentinel-1 SAR	VV	5	Median	5
GRD: C-band	VH			
Synthetic Aperture	Span			
Radar	Difference			

Ration				
Murray Global	Probability	1	N/A	1
Tidal Wetland	of			
Change v1.0	occurrence			
	of tidal			
	wetlands			
ETOPO1: Global 1	Elevation	1	N/A	1
Arc-Minute				
Elevation				
VIIRS Nighttime	Average	1	N/A	1
Day/Night Band	DNB			
Composites	radiance			
Version 1	values.			

Table S2: Realm level accuracy statistics for the 10-hectare minimum mapping unit version of the tidal marsh model. Omission and commission error statistics given for tidal marsh class only. The number of sample points (N) within each realm is the maximum number assessed (n = 200) minus those classified as unknown during the validation assessment.

Realm	Overall Accuracy	Kappa	Omission Error	Commission Error	N
Temperate Northern Atlantic	0.88	0.76	0.05	0.20	200
Temperate Northern Pacific	0.81	0.60	0.10	0.36	171
Tropical Atlantic	0.76	0.32	0.20	0.70	129
Western Indo-Pacific	0.60	0.06	0.29	0.92	151
Central Indo-Pacific	0.65	0.25	0.23	0.69	171
Eastern Indo-Pacific	0.55	0.06	0.14	0.93	190
Tropical Eastern Pacific	0.80	0.06	0.00	0.96	114
Temperate South America	0.78	0.54	0.10	0.40	188
Temperate Southern Africa	0.80	0.60	0.11	0.32	197
Temperate Australasia	0.85	0.71	0.08	0.22	197

Table S3: Realm level accuracy statistics for the 1-hectare minimum mapping unit version of the tidal marsh model. Omission and commission error statistics given for tidal marsh class only. The number of sample points (N) within each realm is the maximum number assessed (n = 230) minus those classified as unknown during the validation assessment.

Realm	Overall Accuracy	Kappa	Omission Error	Commission Error	N
Temperate Northern Atlantic	0.80	0.60	0.04	0.33	230
Temperate Northern Pacific	0.75	0.51	0.08	0.44	194
Tropical Atlantic	0.65	0.18	0.20	0.80	150
Western Indo-Pacific	0.55	0.07	0.22	0.91	169
Central Indo-Pacific	0.59	0.19	0.21	0.73	193
Eastern Indo-Pacific	0.48	0.04	0.12	0.94	220
Tropical Eastern Pacific	0.66	0.03	0.00	0.98	137
Temperate South America	0.72	0.46	0.09	0.46	217
Temperate Southern Africa	0.75	0.51	0.09	0.39	227
Temperate Australasia	0.79	0.59	0.07	0.31	227

Table S4: Accuracy assessment statistics for the final version of the global tidal marsh map, based on a validation sample of 1,708 points. We resampled (n = 1,000 iterations) the validation points, using the mean of the samples as our estimates of accuracy and the 0.025 and 0.975 percentiles to create the 95% confidence intervals.

Metric	Estimate	95% Confidence Interval	
		Lower	Upper
Overall accuracy	0.852	0.837	0.867
Other (Omission Error)	0.161	0.146	0.176
Other (Commission Error)	0.039	0.028	0.050
Tidal Marsh (Omission Error)	0.106	0.078	0.134
Tidal Marsh (Commission Error)	0.360	0.320	0.401

Table S5: Class accuracy results for the global tidal marsh map based on 1,708 validation sample points.

		Reference	
		Other	Tidal Marsh
Mapped	Other	1086	44
	Tidal Marsh	208	370

Table S6: The extent of tidal marsh by country or territory (Flanders Marine Institute, 2020) rounded to the nearest 10km². 95% confidence intervals created by resampling (n = 1,000) the validation points and using the 0.05 percentile of the commission and omission error estimates. The area and percentage of the country or territory's tidal marsh extent within the boundaries of a protected area. Only country or territory's with > 10 km² of tidal marsh reported. Note: this analysis was bounded to 60°N and 60°S.

Country or Territory	Extent of tidal marsh (km²)	95% Confidence Interval	Extent within Protected Areas (%)
United States	18,510	11,210 – 20,930	6,550 (35)
Canada	8,530	5,170 – 9,650	3,520 (41)
Russian Federation	5,140	3,110 – 5,810	1,670 (32)
Argentina	2,430	1,470 – 2,750	1,410 (58)
Australia	2,080	1,260 – 2,350	1,140 (55)
Mozambique	1,340	810 – 1,520	680 (50)
Mexico	1,190	720 – 1,350	880 (73)
China	1,170	710 – 1,320	270 (23)
Brazil	1,070	650 – 1,210	480 (45)
Ukraine	920	560 – 1,040	780 (85)
Cuba	780	470 - 890	540 (69)
France	680	410 - 770	650 (96)
Romania	670	400 - 750	670 (100)

Nicaragua	560	340 - 630	480 (86)
United Kingdom	540	320 - 610	470 (88)
Chile	460	280 - 520	230 (51)
Honduras	390	240 - 440	30 (8)
Germany	350	210 - 390	330 (97)
Spain	340	210 - 390	320 (94)
Uruguay	290	170 - 320	190 (65)
Estonia	270	160 - 300	220 (83)
Japan	270	160 - 300	110 (43)
Denmark	260	160 - 300	260 (97)
Turkey	250	150 - 290	110 (42)
New Zealand	240	150 - 280	100 (40)
Italy	230	140 - 260	200 (89)
Greece	210	130 - 240	210 (96)
Bangladesh	200	120 - 230	10 (5)
Netherlands	180	110 - 210	170 (94)
Korea, Republic of	180	110 - 200	20 (11)
Egypt	180	110 - 200	110 (62)
Indonesia	170	100 - 190	50 (29)
Venezuela, Bolivarian Republic of	170	100 - 190	110 (66)
Latvia	160	100 - 180	130 (80)
Poland	160	100 - 180	150 (91)
Portugal	160	100 - 180	150 (92)
Madagascar	150	90 - 170	20 (14)

Ireland	130	80 - 150	110 (81)
Myanmar	120	70 - 140	20 (13)
Sweden	120	70 - 130	50 (40)
Bahamas	120	70 - 130	40 (36)
South Africa	90	50 - 100	50 (53)
Korea, Democratic People's Republic of	80	50 - 90	<10 (0)
Albania	80	50 - 90	70 (84)
Guinea-Bissau	70	40 - 80	20 (26)
Georgia	70	40 - 70	40 (57)
Belize	60	40 - 70	10 (18)
Benin	50	30 - 60	0 (0)
Tunisia	50	30 - 60	10 (23)
Papua New Guinea	50	30 - 60	<10 (5)
Senegal	50	30 - 60	20 (46)
India	50	30 - 60	20 (33)
Croatia	50	30 - 60	50 (94)
Colombia	50	30 - 50	10 (15)
Morocco	40	30 - 50	40 (86)
Suriname	40	30 - 50	20 (57)
Gambia	40	20 - 50	10 (13)
Haiti	40	20 - 40	<10 (1)
Lithuania	40	20 - 40	30 (81)
Gabon	30	20 - 40	10 (32)

Guyana	30	20 - 40	10 (25)
Mauritania	30	20 - 30	10 (37)
Algeria	30	20 - 30	20 (93)
Montenegro	30	20 - 30	20 (72)
Nigeria	20	10 - 20	<10 (3)
Sierra Leone	20	10 - 20	10 (34)
Jamaica	20	10 - 20	20 (88)
Bulgaria	20	10 - 20	20 (97)
Thailand	20	10 - 20	<10 (2)
Dominican Republic	20	10 - 20	10 (52)
Angola	20	10 - 20	0 (0)
Ghana	20	10 - 20	10 (43)
Cambodia	20	10 - 20	10 (48)
Costa Rica	20	10 - 20	10 (94)
Viet Nam	10	10 - 10	<10 (38)
Guatemala	10	10 - 10	<10 (19)
Iran, Islamic Republic of	10	10 - 10	<10 (14)
Peru	10	10 - 10	<10 (1)

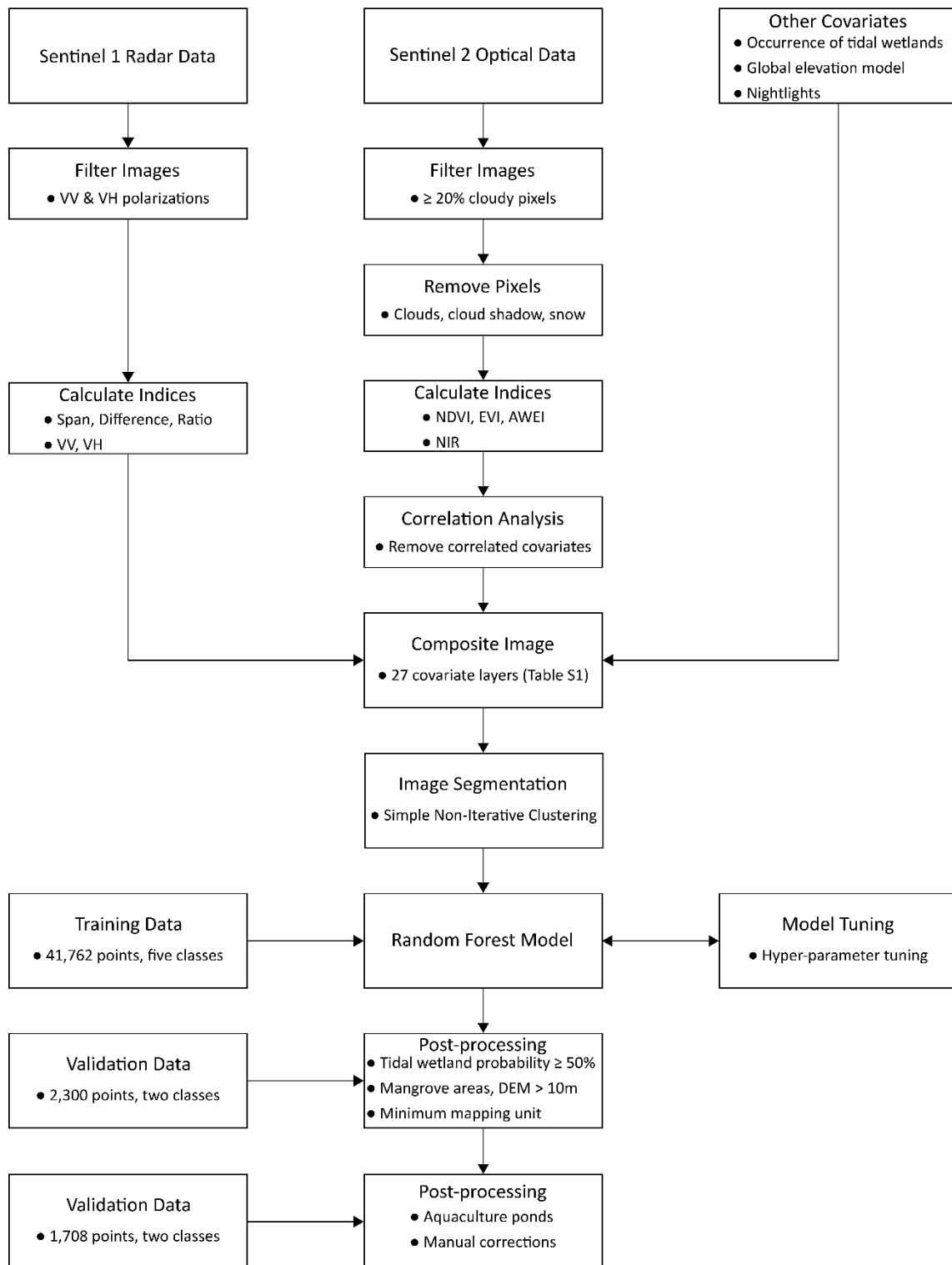


Figure S1: Schematic outlining the methodological steps undertaken to map the distribution of the world's tidal marshes.

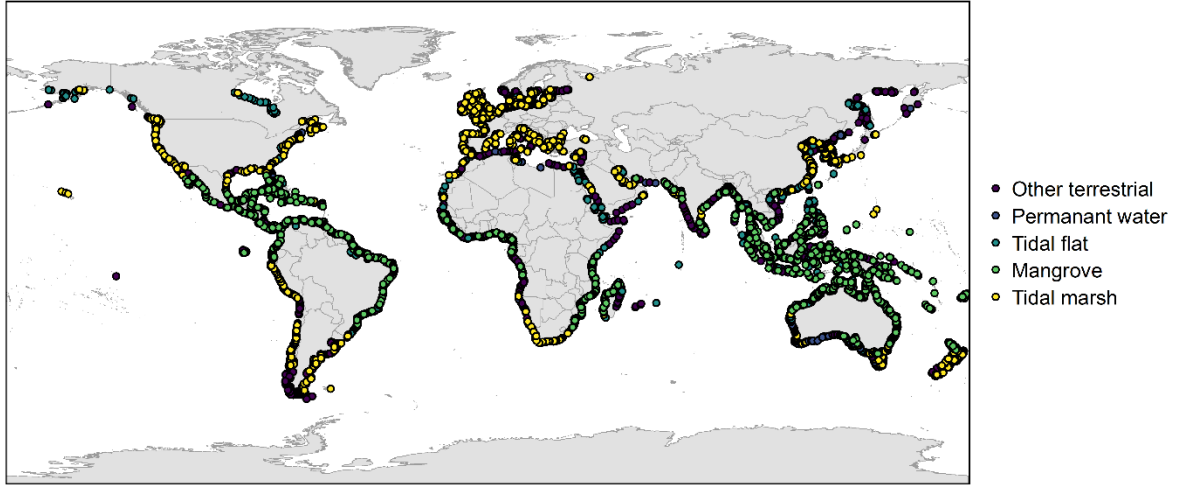


Figure S2: The distribution of the 41,762 points training points.