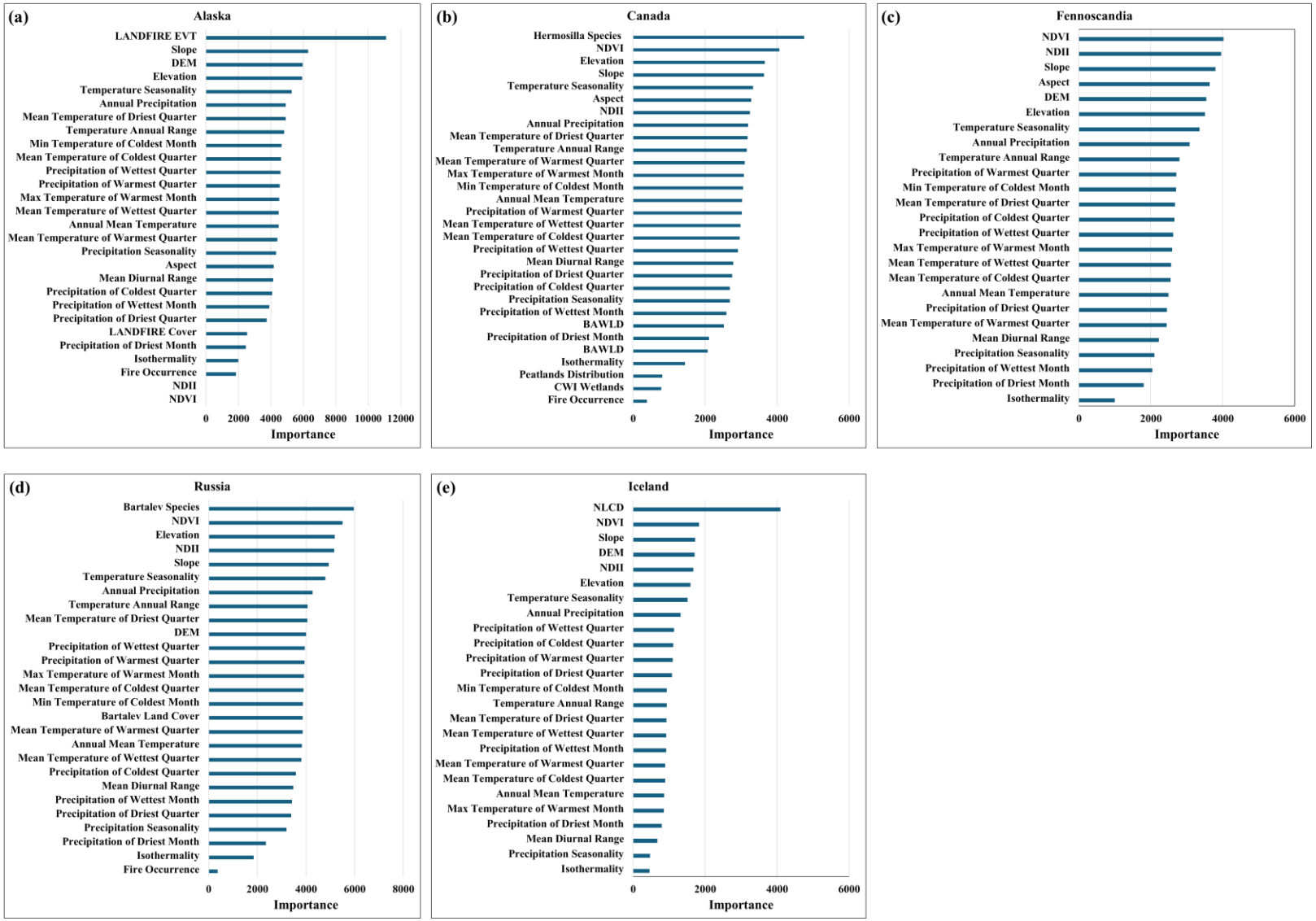
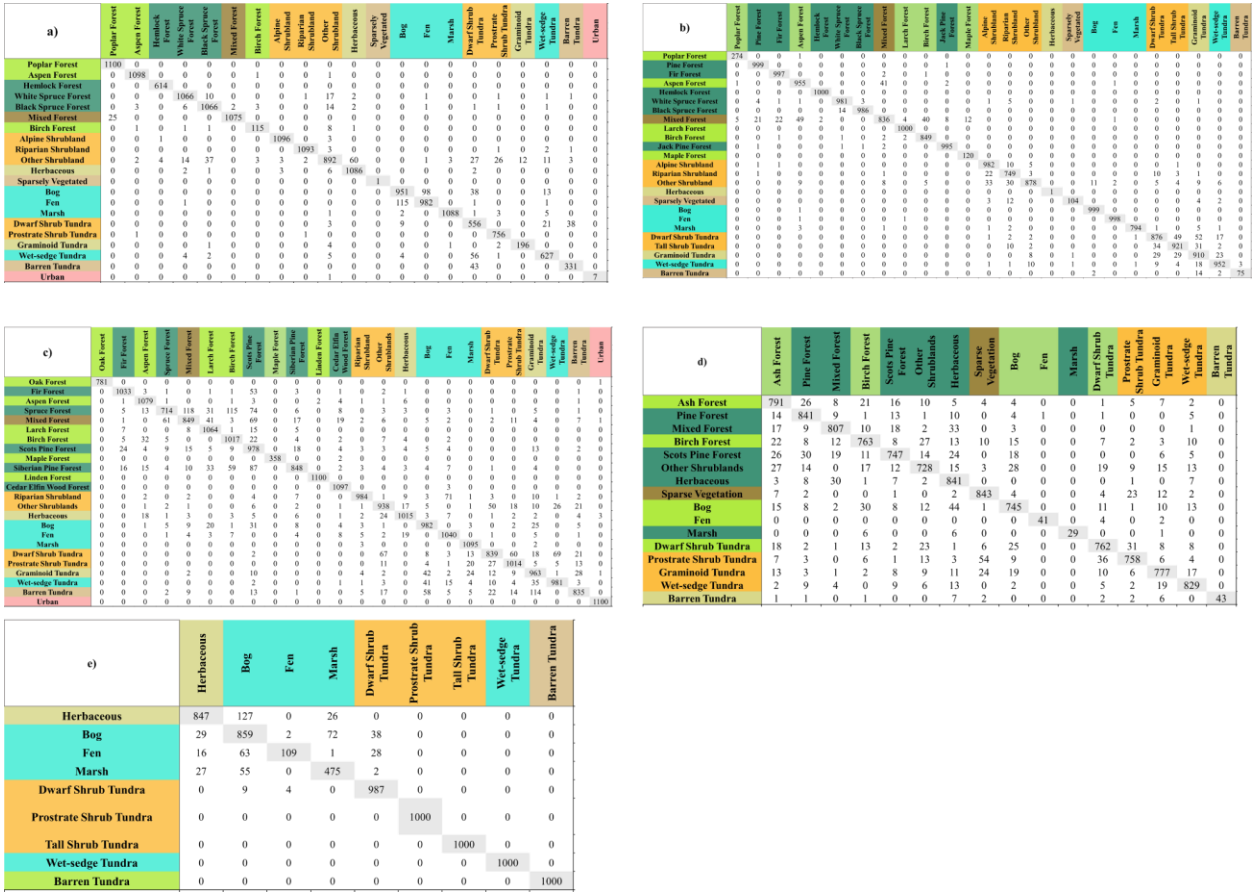


Figure S1: Variable importance in the Random Forest model used to classify pixels within the hybrid land cover map shown for each region (a) Alaska, (b) Canada, (c) Fennoscandia, (d) Russia, (e) Iceland..



a)

	Poplar Forest	Aspen Forest	Hemlock Forest	White Spruce Forest	Black Spruce Forest	Mixed Forest	Birch Forest	Alpine Shrubland	Riparian Shrubland	Other Shrubland	Herbaceous	Sparsely Vegetated	Bog	Fen	Marsh	Dwarf Shrub Tundra	Prostrate Shrub Tundra	Graminoid Tundra	Wet-sedge Tundra	Barren Tundra	Urban
Poplar Forest	1100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aspen Forest	0	1098	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Hemlock Forest	0	0	614	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
White Spruce Forest	0	0	0	1066	10	0	0	0	1	17	2	0	0	1	0	0	1	0	1	1	0
Black Spruce Forest	0	3	0	6	1066	2	3	0	0	14	2	0	0	1	0	1	1	0	1	0	0
Mixed Forest	25	0	0	0	0	1075	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Birch Forest	0	1	0	1	1	0	115	0	0	8	1	0	0	0	0	0	0	0	0	0	0
Alpine Shrubland	0	0	1	0	0	0	0	1096	0	3	0	0	0	0	0	0	0	0	0	0	0
Riparian Shrubland	0	0	0	0	0	0	0	0	1093	3	0	0	0	0	0	0	1	0	2	1	0
Other Shrubland	0	2	4	14	37	0	3	3	2	892	60	0	0	1	3	27	26	12	11	3	0
Herbaceous	0	0	0	2	1	0	0	3	0	6	1086	0	0	0	0	2	0	0	0	0	0
Sparsely Vegetated	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Bog	0	0	0	0	0	0	0	0	0	0	0	0	951	98	0	38	0	0	13	0	0
Fen	0	0	0	1	0	0	0	0	0	0	0	0	115	982	0	1	0	0	1	0	0
Marsh	1	0	0	0	0	0	0	0	0	1	0	0	2	0	1088	1	3	0	5	0	0
Dwarf Shrub Tundra	0	0	0	0	0	0	0	0	0	3	0	0	9	0	0	556	0	0	21	38	0
Prostrate Shrub Tundra	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	756	0	0	0	0
Graminoid Tundra	0	0	0	0	1	0	0	0	0	4	0	0	0	1	0	2	196	0	0	0	0
Wet-sedge Tundra	0	0	0	4	2	0	0	0	0	5	0	0	4	0	0	56	1	0	627	0	0
Barren Tundra	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	43	0	0	0	331	0
Urban	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	7

b)

	Poplar Forest	Pine Forest	Fir Forest	Aspen Forest	Hemlock Forest	White Spruce Forest	Black Spruce Forest	Mixed Forest	Larch Forest	Birch Forest	Jack Pine Forest	Maple Forest	Alpine Shrubland	Riparian Shrubland	Other Shrubland	Herbaceous	Sparsely Vegetated	Bog	Fen	Marsh	Dwarf Shrub Tundra	Tall Shrub Tundra	Graminoid Tundra	Wet-sedge Tundra	Barren Tundra
Poplar Forest	274	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pine Forest	0	999	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fir Forest	0	0	997	0	0	0	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aspen Forest	1	0	0	955	0	0	0	41	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hemlock Forest	0	0	0	0	1000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
White Spruce Forest	0	4	1	1	0	981	3	0	0	0	0	0	1	5	0	0	0	1	0	0	2	0	0	1	0
Black Spruce Forest	0	0	0	0	0	14	986	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mixed Forest	5	21	22	49	2	0	0	836	4	40	8	12	0	0	0	0	0	1	0	0	0	0	0	0	0
Larch Forest	0	0	0	0	0	0	0	0	1000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Birch Forest	0	0	1	0	0	1	0	2	2	849	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jack Pine Forest	0	1	0	0	0	1	1	2	0	0	995	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maple Forest	0	0	0	0	0	0	0	0	0	0	0	120	0	0	0	0	0	0	0	0	0	0	0	0	0
Alpine Shrubland	0	1	1	0	0	0	0	0	0	0	0	0	982	10	5	0	0	0	0	0	0	1	0	0	0
Riparian Shrubland	0	1	0	0	0	0	0	1	0	0	0	0	22	749	1	0	0	0	0	0	10	3	1	0	0
Other Shrubland	0	0	0	9	0	0	0	8	0	5	0	0	33	30	878	0	0	11	2	0	5	4	9	6	0
Herbaceous	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Sparsely Vegetated	0	0	0	0	0	0	0	0	0	0	0	0	3	12	0	0	104	0	0	0	0	4	2	0	0
Bog	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	999	0	0	0	0	0	0	0
Fen	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	998	0	0	0	0	0	0
Marsh	0	0	0	3	0	0	0	1	0	0	0	0	1	2	0	0	0	0	0	794	1	0	5	1	0
Dwarf Shrub Tundra	0	0	0	0	0	0	0	0	0	0	0	0	1	2	2	0	0	0	0	1	876	49	52	17	0
Tall Shrub Tundra	0	0	0	0	0	0	0	0	0	0	0	0	10	2	0	0	0	0	0	0	34	921	31	2	0
Graminoid Tundra	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	1	0	0	0	0	29	29	910	23	0
Wet-sedge Tundra	0	0	0	0	0	0	0	0	0	0	0	0	1	1	10	0	1	0	0	1	9	4	18	952	3
Barren Tundra	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	14	2	75		

c)

	Oak Forest	Fir Forest	Aspen Forest	Spruce Forest	Mixed Forest	Larch Forest	Birch Forest	Scots Pine Forest	Maple Forest	Siberian Pine Forest	Linden Forest	Cedar Elfin Wood Forest	Riparian Shrubland	Other Shrublands	Herbaceous	Bog	Fen	Marsh	Dwarf Shrub Tundra	Prostrate Shrub Tundra	Graminoid Tundra	Wet-sedge Tundra	Barren Tundra	Urban
Oak Forest	781	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Fir Forest	0	1033	3	1	0	1	53	0	3	1	0	2	1	0	0	0	0	0	0	0	0	0	1	0
Aspen Forest	0	1	1079	1	0	0	1	3	0	0	2	4	1	1	6	0	0	0	0	0	0	0	1	0
Spruce Forest	0	5	13	714	118	31	115	74	0	6	0	8	0	3	3	0	3	0	1	0	5	0	1	0
Mixed Forest	0	1	0	61	849	41	3	69	0	17	0	19	2	6	0	5	2	0	2	11	4	0	7	1
Larch Forest	0	7	0	0	8	1064	1	15	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Birch Forest	0	5	32	5	0	0	1017	22	0	4	0	2	0	7	4	0	2	0	0	0	0	0	0	0
Scots Pine Forest	0	24	4	9	15	5	9	978	0	18	0	4	3	3	4	5	4	0	0	0	13	0	2	0
Maple Forest	0	0	0	0	0	0	0	0	358	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0
Siberian Pine Forest	0	16	15	4	10	33	59	87	0	848	0	2	3	4	3	4	7	0	1	0	4	0	0	0
Linden Forest	0	0	0	0	0	0	0	0	0	0	1100	0	0	0	0	0	0	0	0	0	0	0	0	0
Cedar Elfin Wood Forest	0	0	0	0	0	0	0	0	0	0	0	1097	0	0	0	0	3	0	0	0	0	0	0	0
Riparian Shrubland	0	0	2	0	2	0	0	4	0	7	0	0	984	1	9	3	71	1	3	0	10	1	2	0
Other Shrublands	0	0	1	2	1	0	0	6	0	2	0	1	1	938	17	5	0	1	50	18	10	26	21	0
Herbaceous	0	0	18	1	3	0	3	5	0	6	0	1	2	24	1015	3	7	0	1	2	2	0	4	3
Bog	0	0	1	5	9	20	1	31	0	8	0	4	3	1	0	982	0	3	0	2	25	0	5	0
Fen	0	0	0	1	4	3	7	0	0	4	0	8	5	2	19	0	1040	0	1	0	5	0	1	0
Marsh	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	1095	0	0	2	0	0	0
Dwarf Shrub Tundra	0	0	0	0	0	0	0	2	0	0	0	0	0	67	0	8	3	13	839	60	18	69	21	0
Prostrate Shrub Tundra	0	0	0	0	0	0	0	0	0	0	0	0	0	11	0	4	1	20	27	1014	5	5	13	0
Graminoid Tundra	0	0	0	0	2	0	0	10	0	0	0	0	4	2	0	42	2	24	12	9	963	1	28	1
Wet-sedge Tundra	0	0	0	0	0	0	0	2	0	0	0	1	1	3	0	41	15	4	10	4	35	981	3	0
Barren Tundra	0	0	0	2	0	0	0	13	0	1	0	0	5	17	0	58	5	5	22	14	114	0	835	0
Urban	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1100

d)

	Ash Forest	Pine Forest	Mixed Forest	Birch Forest	Scots Pine Forest	Other Shrublands	Herbaceous	Sparse Vegetation	Bog	Fen	Marsh	Dwarf Shrub Tundra	Prostrate Shrub Tundra	Graminoid Tundra	Wet-sedge Tundra	Barren Tundra
Ash Forest	791	26	8	21	16	10	5	4	4	0	0	1	5	7	2	0
Pine Forest	14	841	9	1	13	1	10	0	4	1	0	1	0	0	5	0
Mixed Forest	17	9	807	10	18	2	33	0	3	0	0	0	0	0	1	0
Birch Forest	22	8	12	763	8	27	13	10	15	0	0	7	2	3	10	0
Scots Pine Forest	26	30	19	11	747	14	24	0	18	0	0	0	0	6	5	0
Other Shrublands	27	14	0	17	12	728	15	3	28	0	0	19	9	15	13	0
Herbaceous	3	8	30	1	7	2	841	0	0	0	0	0	1	0	7	0
Sparse Vegetation	7	2	0	0	1	0	2	843	4	0	0	4	23	12	2	0
Bog	15	8	2	30	8	12	44	1	745	0	0	11	1	10	13	0
Fen	0	0	0	0	0	0	0	0	41	0	0	4	0	2	0	0
Marsh	0	0	0	6	0	0	6	0	0	0	29	0	0	1	0	0
Dwarf Shrub Tundra	18	2	1	13	2	23	1	6	25	0	0	762	31	8	8	0
Prostrate Shrub Tundra	7	3	0	6	1	13	3	54	9	0	0	36	758	6	4	0
Graminoid Tundra	13	3	1	2	8	9	11	24	19	0	0	10	6	777	17	0
Wet-sedge Tundra	2	9	4	0	9	6	13	0	2	0	0	5	2	19	829	0
Barren Tundra	1	1	0	1	0	0	7	2	0	0	0	2	2	6	0	43

e)

	Herbaceous	Bog	Fen	Marsh	Dwarf Shrub Tundra	Prostrate Shrub Tundra	Tall Shrub Tundra	Wet-sedge Tundra	Barren Tundra
Herbaceous	847	127	0	26	0	0	0	0	0
Bog	29	859	2	72	38	0	0	0	0
Fen	16	63	109	1	28	0	0	0	0
Marsh	27	55	0	475	2	0	0	0	0
Dwarf Shrub Tundra	0	9	4	0	987	0	0	0	0
Prostrate Shrub Tundra	0	0	0	0	0	1000	0	0	0
Tall Shrub Tundra	0	0	0	0	0	0	1000	0	0
Wet-sedge Tundra	0	0	0	0	0	0	0	1000	0
Barren Tundra	0	0	0	0	0	0	0	0	1000

Figure S2: Confusion matrix for the Random Forest classifier used within Google Earth Engine for each major region Alaska (a), Canada(b), Russia (c), Fennoscandia (d), Iceland (e).

Table S1: Characteristics of the ancillary products used in the study.

Variable	Dataset	Spatial Resolution	Extent	Reference
Slope, Aspect, Elevation	Arctic DEM	1 km	Circumpolar	(Porter *et al* 2022)
	EarthEnv	1km	Global	(Amatulli *et al* 2018)
Historical Fire	Canadian National Fire Database (CNFDB)	-	Canada	Natural Resources Canada, 2017.
	MODIS Fire Burned Area	250m	Global	(Giglio *et al* 2021)
	Alaska Fire History Map	-	Alaska	Alaskan LFDB
Vegetation Cover	LANDFIRE Existing Vegetation Cover (EVC)	30 m	Alaska	LANDFIRE, 2020 (Rollins 2009)
	Vegetation Zone	-	Canada	(Baldwin 2020)
NDVI NDII	MODIS MOD13Q1	500m	Global	(Didan 2021)

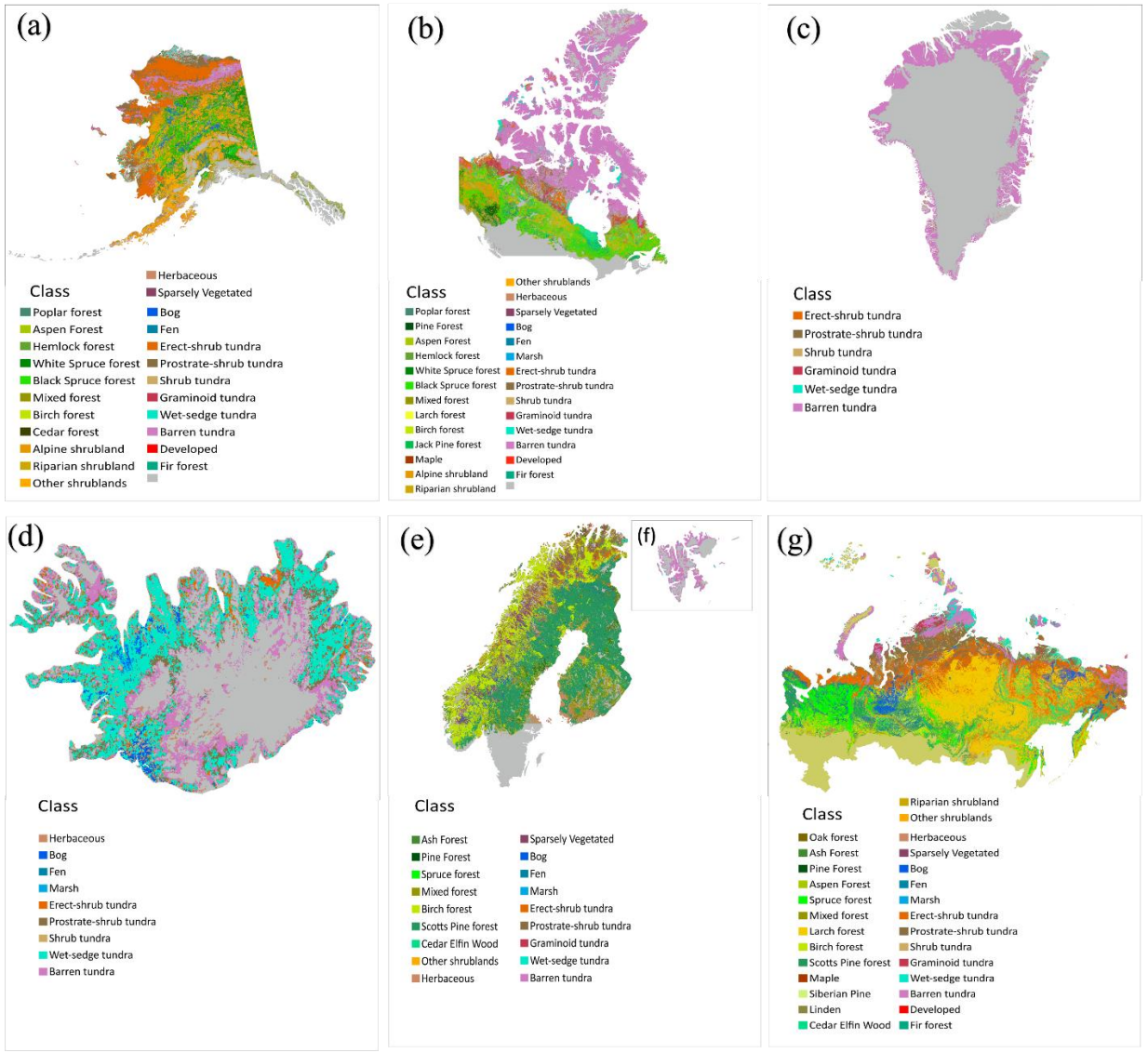


Figure S3: Final Hybrid map at 1 km resolution for each major region included within the study (A) Alaska, (B) Canada, (C) Greenland, (D) Iceland, (E) Fennoscandia including (F) Svalbard, (G) Russia, with the land cover classes present within each region.

Table S2: Full list of the European Space Agency Climate Change Initiative Land Cover Product (ESA-CCI-LC) classes (Lamarche et al 2017).

VALUE	LABEL
0	No Data
10	Cropland, rainfed
20	Cropland, irrigated or post-flooding
30	Mosaic cropland (>50%) / natural vegetation (tree, shrub, herbaceous cover) (<50%)
40	Mosaic natural vegetation (tree, shrub, herbaceous cover) (>50%) / cropland (<50%)
50	Tree cover, broadleaved, evergreen, closed to open (>15%)
60	Tree cover, broadleaved, deciduous, closed to open (>15%)
70	Tree cover, needleleaved, evergreen, closed to open (>15%)
80	Tree cover, needleleaved, deciduous, closed to open (>15%)
90	Tree cover, mixed leaf type (broadleaved and needleleaved)
100	Mosaic tree and shrub (>50%) / herbaceous cover (<50%)
110	Mosaic herbaceous cover (>50%) / tree and shrub (<50%)
120	Shrubland
130	Grassland
140	Lichens and mosses
150	Sparse vegetation (tree, shrub, herbaceous cover) (<15%)
160	Tree cover, flooded, fresh or brackish water
170	Tree cover, flooded, saline water
180	Shrub or herbaceous cover, flooded, fresh/saline/brackish water
190	Urban areas
200	Bare areas
210	Water bodies
220	Permanent snow and ice

Table S3: Complete list of land cover classes for the CircumArctic Land Cover Units (CALU) Product, (Bartsch et al 2024).

CALU	
1	Open water
2	Shallow water
3	Permanent wetland, aquatic, low to medium organic layer thickness, medium mineral volumetric content.
4	Wet to aquatic (seasonal wetland), abundant moss, low to medium organic layer thickness, low mineral volumetric content.
5	Moist to wet tundra, abundant moss, prostrate shrubs, low to medium organic layer thickness, medium mineral volumetric content.
6	Dry to moist tundra, partially barren, prostrate shrubs, medium organic layer thickness, high mineral volumetric content
7	Dry tundra, abundant lichen, prostrate shrubs, low to medium organic layer thickness, high mineral volumetric content.
8	Dry to aquatic tundra, dwarf shrubs (sparse tree cover along treeline, woodlands and open stands), medium organic layer thickness, medium mineral volumetric content.
9	Dry to moist tundra, prostrate to low shrubs, tussocks, low to medium organic layer thickness, medium mineral volumetric content.
10	Moist tundra, abundant moss, prostrate to low shrubs, tussocks, low organic layer thickness, medium mineral volumetric content.
11	Moist tundra, abundant moss, dwarf and low shrubs, tussocks, low organic layer thickness, medium mineral volumetric content.
12	Moist tundra, dense dwarf and low shrubs (sparse tree cover along treeline, woodlands with open stands), medium organic layer thickness, low mineral volumetric content.
13	Moist to wet tundra, dense dwarf and low shrubs (sparse tree cover along treeline, woodlands with open stands).
14	Moist tundra, low shrubs, medium organic layer thickness, medium mineral volumetric content.
15	Moist to wet tundra, abundant lichen, in some cases partially barren (disturbed).
16	Moist tundra, abundant forbs, dwarf to tall shrubs, medium organic layer thickness.
17	Recently burned or flooded, partially barren.
18	Forest (deciduous) with dwarf to tall shrubs.
19	Forest (mixed) with dwarf to tall shrubs.
20	Forest (needle leaf) with dwarf and low shrubs.
21	Partially barren, dry.
22	Snow/Ice
23	Other

Table S4: Full List of the LANDFIRE Existing Vegetation Types product with the classifications grouped by class type (Rollins 2009).

CLASS	**LANDFIRE EVT_NAME**

Dwarf Shrubland	Alaska Arctic Coastal Sedge-Dwarf-Shrubland North American Arctic Dwarf-Shrub Lichen Tundra North American Arctic Sparse Tundra Western North American Boreal Alpine Dwarf-shrubland
Herbaceous	Alaska Sub-boreal and Maritime Alpine Mesic Herbaceous Meadow Alaskan Pacific Maritime Mesic Herbaceous Meadow Aleutian Mesic Herbaceous Meadow North American Arctic Mesic Herbaceous Meadow Western North American Boreal Alpine Mesic Herbaceous Meadow Agriculture-Cultivated Crops and Irrigated Agriculture Alaskan Pacific Maritime Coastal Meadow and Slough-Levee Alaskan Pacific-Aleutian Coastal Dune Beach and Beach Meadow Alaskan Pacific-Aleutian Fen and Wet Meadow North American Arctic Dwarf-shrub-Sphagnum Peatland North American Arctic-Subarctic Coastal Dune & Beach Meadow North American Arctic-Subarctic Tussock Tundra Western North American Boreal Dry Grassland Western North American Boreal Mesic Bluejoint-Forb Meadow Western North American Boreal Wet Meadow North American Arctic Wet Sedge-Sphagnum Peatland North American Arctic Polygonal Ground Tussock Tundra Agriculture-Pasture and Hay
No Dominant Lifeform	Developed-Low Intensity Developed-Medium Intensity Developed-High Intensity Developed-Roads Developed-Open Space
Non-vegetated	Developed-Open Space Open Water North American Glacier and Ice Field Alaskan Pacific-Aleutian Rocky Coastline and Sea Cliff Aleutian Volcanic Rock and Talus North American Arctic Bedrock and Talus Western North American Boreal Montane-Alpine Talus and Bedrock Western North American Boreal Cliff Scree and Rock North American Arctic-Subarctic Coastal Dune & Beach North Pacific Montane Massive Bedrock-Cliff and Talus North Pacific Alpine and Subalpine Bedrock and Scree North American Glacial Outwash
Deciduous Tree Canopy	Western North American Boreal Treeline Hardwood-White Spruce Woodland Alaskan Pacific Floodplain Deciduous Forest Western North American Boreal Lowland Large River Floodplain Deciduous Forest

	Western North American Boreal Montane Floodplain Deciduous Forest Western North American Boreal Riparian Stringer Deciduous Forest Western North American Boreal Mesic Birch-Aspen Forest Alaskan Pacific Floodplain Shrubland (Deciduous Forest) Western North American Boreal Lowland Large River Floodplain Shrubland (Deciduous Forest) Western North American Boreal Montane Floodplain Shrubland (Deciduous Forest) Western North American Boreal Riparian Stringer Shrubland (Deciduous Forest)
Evergreen Tree Canopy	Alaskan Pacific Maritime Mountain Hemlock-Shore Pine Peatland Alaskan Pacific Poorly Drained Conifer Woodland Western North American Boreal Black Spruce Bog and Dwarf-Tree Peatland Western North American Boreal Wet Black Spruce-Tussock Woodland Alaskan Pacific Floodplain Conifer Forest Western North American Boreal Lowland Large River Floodplain Conifer Forest Western North American Boreal Montane Floodplain Conifer Forest Western North American Boreal Spruce-Lichen Woodland Western North American Boreal Treeline White Spruce Woodland Alaskan Pacific Floodplain Shrubland (Conifer Forest) Western North American Boreal Lowland Large River Floodplain Shrubland (Conifer Forest) Western North American Boreal Montane Floodplain Shrubland (Conifer Forest) Alaska Sub-boreal Mountain Hemlock-White Spruce Forest Alaska Sub-boreal White-Lutz Spruce Forest and Woodland Alaskan Pacific Maritime Western Hemlock Forest Alaskan Pacific Mesic Western Hemlock-Yellow-cedar Forest Alaskan Pacific Mountain Hemlock Forest and Subalpine Woodland Alaskan Pacific Sitka Spruce Forest and Beach Ridge Western North American Boreal Mesic White Spruce Forest Western North American Boreal Mesic-Wet Black Spruce Forest and Woodland Western North American Boreal Mesic-Wet Black Spruce-Hardwood Forest and Woodland
Mixed Tree Canopy	Western North American Boreal Black Spruce-Tamarack Fen Western North American Boreal Riparian Stringer Conifer Forest Alaskan Pacific Floodplain Mixed Forest Western North American Boreal Lowland Large River Floodplain Mixed Forest Western North American Boreal Montane Floodplain Mixed Forest Western North American Boreal Riparian Stringer Mixed Forest Western North American Boreal Riparian Stringer Shrubland (Conifer Forest) Alaskan Pacific Floodplain Shrubland (Mixed Forest) Western North American Boreal Lowland Large River Floodplain Shrubland (Mixed Forest) Western North American Boreal Montane Floodplain Shrubland (Mixed Forest) Western North American Boreal Riparian Stringer Shrubland (Mixed Forest) North Pacific Hypermaritime Western Red-cedar-Western Hemlock Forest Western North American Boreal Treeline White Spruce-Hardwood Woodland Western North American Boreal Mesic Hardwood-White Spruce Forest

	Western North American Boreal Mesic White Spruce-Hardwood Forest Alaska Sub-boreal Hardwood-White-Lutz Spruce Forest and Woodland Alaska Sub-boreal White-Lutz Spruce-Hardwood Forest and Woodland
Shrubland	Alaskan Pacific Acidic Shrub Peatland Alaskan Pacific Wet Low Shrubland & Floodplain Wetland North American Arctic Polygonal Ground Shrub-Tussock Tundra North American Arctic-Subarctic Shrub-Tussock Tundra Western North American Boreal Shrub Floodplain Western North American Boreal Shrub Swamp Alaskan Pacific Acidic Sedge Peatland Western North American Boreal Herbaceous Floodplain Alaska Arctic Floodplain Forest Alaska Arctic Large River Floodplain Forest Alaska Arctic Mesic Alder Shrubland Alaska Sub-boreal Mesic Subalpine Alder Shrubland Alaskan Pacific Maritime Avalanche Slope Shrubland Alaskan Pacific-Aleutian Alder-Salmonberry-Copperbush Shrubland Aleutian Mesic-Wet Willow Shrubland North American Arctic Mesic-Wet Low Willow Shrubland North American Arctic Scrub Birch-Ericaceous Shrubland Western North American Boreal Mesic Scrub Birch-Willow Shrubland Alaska Arctic Floodplain Shrubland Alaska Arctic Large River Floodplain Shrubland North Pacific Shrub Swamp Alaskan Pacific Alpine-Subalpine Dwarf-shrubland & Heath Aleutian Ericaceous Dwarf-shrubland Heath and Fell-field North American Arctic Dryas Tundra North American Arctic Mesic Sedge-Willow Tundra
Sparsely Vegetated	Western North American Boreal Dry Aspen-Steppe Bluff Western North American Boreal Lowland Large River Floodplain Sparse Vegetation Western North American Boreal Montane Floodplain Sparse Vegetation Alaskan Pacific Floodplain Sparse Vegetation Alaska Arctic Large River Floodplain Sparse Vegetation Alaskan Pacific Maritime Alpine Floodplain Shrubland Alaska Arctic Permafrost Plateau Dwarf-Shrub Lichen Tundra North American Arctic Lichen Tundra
Wetland	Western North American Boreal Shrub-Sedge Bog & Acidic Fen Western North American Boreal Black Spruce-Tamarack Fen Alaskan Pacific-Aleutian Fen and Wet Meadow Western North American Boreal Shrub-Sedge Rich and Alkaline Fen Western North American Boreal Herbaceous Rich and Alkaline Fen Alaskan Pacific Wet Low Shrubland & Floodplain Wetland

	North American Arctic Freshwater Marsh North American Arctic-Subarctic Tidal Salt and Brackish Marsh Western North American Boreal Freshwater Emergent Marsh Temperate Pacific Freshwater Emergent Marsh Temperate Pacific Tidal Salt and Brackish Marsh Western North American Boreal Shrub Swamp North Pacific Shrub Swamp Alaska Arctic Tidal Flat Temperate Pacific Intertidal Flat North American Arctic Wet Sedge Tundra and Polygonal Ground North American Arctic Wet Sedge-Sphagnum Peatland

Table S5: Full List of the Canada Virtual Land Cover Engine (VLCE) product classes with class and class description provided (Hermosilla et al 2018).

Class	Class Description
0	no change
20	water
31	snow and ice
32	rock and rubble
33	barren
40	bryoids
50	shrubs
80	wetland
81	wetland-treed
100	herbaceous
210	coniferous
220	broadleaf
230	mixedwood

Table S6: Full list of the land cover classes available within the Canada Tree Species Map (Hermosilla et al., 2022).

Value	Species Name	Common Name
0	Non treed	Non treed
1	ABIE.AMA	Amabilis fir
2	ABIE.BAL	Balsam fir
3	ABIE.LAS	Subalpine fir
4	ACER.MAC	Bigleaf maple
5	ACER.RUB	Red maple
6	ACER.SAH	Sugar maple
7	ALNU.INC	Gray alder
8	ALNU.RUB	Red alder
9	BETU.ALL	Yellow birch
10	BETU.PAP	White birch
11	CHAM.NOO	Yellow-cedar
12	FRAX.NIG	Black ash
13	LARI.LAR	Tamarack
14	LARI.OCC	Western larch
15	PICE.ABI	Norway spruce
16	PICE.ENG	Engelmann spruce
17	PICE.GLA	White spruce
18	PICE.MAR	Black spruce
19	PICE.RUB	Red spruce

Table S7: Full list of the land cover classes found within the CORINE Land Cover 2018 dataset (CORINE, 2018).

Value	CLASS
1	Continuous urban fabric
2	Discontinuous urban fabric
3	Industrial or commercial units
4	Road and rail networks and associated land
5	Port areas
6	Airports
7	Mineral extraction sites
8	Dump sites
9	Construction sites
10	Green urban areas
11	Sport and leisure facilities
12	Non-irrigated arable land
13	Permanently irrigated land
14	Rice fields
15	Vineyards
16	Fruit trees and berry plantations
17	Olive groves
18	Pastures
19	Annual crops associated with permanent crops
20	Complex cultivation patterns
21	Land principally occupied by agriculture, with significant areas of natural vegetation
22	Agro-forestry areas
23	Broad-leaved forest
24	Coniferous forest
25	Mixed forest
26	Natural grasslands
27	Moors and heathland
28	Sclerophyllous vegetation
29	Transitional woodland-shrub
30	Beaches, dunes, sands
31	Bare rocks
32	Sparsely vegetated areas
33	Burnt areas
34	Glaciers and perpetual snow
35	Inland marshes
36	Peat bogs
37	Salt marshes
38	Salines
39	Intertidal flats
40	Water courses
41	Water bodies
42	Coastal lagoons
43	Estuaries
44	Sea and ocean
48	NODATA

Table S8: Complete list of available classes found within the European Dominant Tree Species Product (Brus et al 2012).

	Class
1	Abies spp
2	Alnus spp
3	Betula spp
4	Carpinus spp
5	Castanea spp
6	Eucalyptus spp
7	Fagus spp
8	Fraxinus spp
9	Larix spp
10	Broadleaved misc
11	Conifers misc
12	Pinus misc
13	Quercus misc
14	Picea spp
15	Pinus pinaster
16	Pinus sylvestris
17	Populus spp
18	Pseudotsuga menziesii
19	Quercus robur & Quercus petraea
20	Robinia spp

Table S9: Full list of available land cover classes found within the Bartalev et al., land cover products (Bartalev et al 2003, 2016).

	Bartalev et al. 2003	Bartalev Tree Species
0	Unclassified	
1	Evergreen Needle-leaf Forest	Cedar Elfin Wood Pine Siberian Pine Fir Spruce
3	Deciduous Broadleaf Forest	Maple Linden Aspen Birch Betula ermanii Beech Oak
4	Needle-leaf/Broadleaf Forest	Larch, sparse Larch
5	Mixed Forest	
6	Broadleaf/Needle-leaf Forest	
7	Deciduous Needle-leaf Forest	Larch, sparse Larch
8	Broadleaf deciduous shrubs	
9	Needle-leaf evergreen shrubs	
10	Humid grasslands	
11	Steppe	
12	Bogs and marches	
13	Palsa bogs	
14	Riparian vegetation	
15	Barren tundra	
16	Prostrate shrub tundra	
17	Sedge tundra	
18	Shrub tundra	
19	Recent burns	
20	Croplands	
21	Forest - Natural Vegetation comp	
22	Forest - Cropland complexes	
23	Cropland - Grassland complexes	
24	Bare soil and rock	
25	Permanent snow/ice	
26	Water bodies	
27	Urban	
28	Salt-march	
29	Burns of year 2000	

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