

Map of the Terrestrial Ecosystems of Myanmar, Version 1.0

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Overview

This dataset was produced by first developing a training set of 63,124 point observations map classes that could be related to ecosystem types. The distribution of each map class was modelled using a random forest classifier and 89 covariate layers developed from data acquired in 2018. Each mappable unit was then compiled into a single map and a variety of expert rules were applied to split the map into ecosystem types defined by the IUCN Red List of Ecosystems of Myanmar ecosystem typology. Additional ecosystem types, including mudflats, aerobic caves, and glacial lakes were added from freely available published data. The final dataset thus depicts the modelled distribution of 52 terrestrial ecosystem types mapped at 90-m resolution.

Purpose

The aim of this project was to develop an ecosystem map of Myanmar suitable for an IUCN Red List of Ecosystems assessment. Refer to Keith et al. (2015), Rodríguez et al. (2015), Murray et al. (2018a) for further details about the role of mapping in ecosystem risk assessments. The primary use of the map was to develop distribution maps of each ecosystem type in Myanmar to support the IUCN Red List of Ecosystems assessment process (Bland et al. 2016, Murray et al. 2017, Keith et al. 2018).

Methods

This ecosystem map was produced by applying a random forest algorithm to earth observation data, followed by an expert-led class splitting to a thematic resolution that cross-walks to the ecosystem functional group level of the Global Ecosystem Typology (Keith et al. 2019).

The broad method follows the classification workflow developed for the *Remote Sensing Ecosystem Monitoring and Assessment Pipeline* (Murray et al. 2018b). Training data was developed from field work, reference to published papers, and high-resolution satellite imagery. The training data was used to develop probability maps for each mappable unit, and assembled into a single wall-to-wall map representing the distribution of 23 mappable units (Table 1).

Additional datasets included in the analysis include tidal flats (Murray et al. 2019) and a dataset of bat caves developed for the IUCN Red List of Threatened Species (Tizard, *pers. comm.*). Splitting of the classification results into ecosystem types suitable for the red list assessment was conducted with reference to publicly available datasets, including Global Surface Water (Pekel et al. 2016), global forest watch (Hansen et al. 2013), ecoregions (Dinerstein et al. 2017), topography (Farr et al. 2007), and floodplains (Nardi et al. 2019). Non-natural ecosystem types or those not within the scope of the red list project were removed (including rice-fields, permanent water). The final map represents the broad distribution of 57 ecosystem types (Figure 1; Table 2).

Further details of the mapping process are available in the IUCN Red List of Ecosystems of Myanmar report (Murray et al. 2020) and in an associated scientific paper (Duncan *et al.*, in prep).

Characteristics of dataset

Refer to metadata and (Murray et al. 2020) for detailed information on the characteristics of this dataset.

Note the value of 98 indicates other land cover types not considered for further analysis, as shown in Table 1 (Units 95-99). The IUCN Red List of Ecosystems assessment columns are labeled A – E with the final status of the ecosystem denoted.

Validation

Owing to a lack of validation data that could be used to assess map accuracy, the dataset was subject to qualitative expert review at a workshop held in Naypyidaw, Myanmar, in 2019. Refer to Murray et al (2020) for the details of the validation method.

Citation

The authors request both the report describing the study and the dataset itself are cited if using these data:

Murray, N.J., Keith, D.A., Tizard, R., Duncan, A., Htut, W.T., Hlaing, N., Oo, A.H., Ya, K.Z., Grantham, H. (2020) *Threatened Ecosystems of Myanmar: An IUCN Red List of Ecosystems of Myanmar. Version 1.0*. Wildlife Conservation Society. DOI: TBA

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Figure 1 Map coverage of the dataset, showing the Realm (top left), Biome (top right), and Ecosystem Functional Group (bottom left) thematic scales of the Myanmar ecosystem map dataset. Note: white areas in the map were not included in the IUCN Red List of Ecosystems assessment (Source: Murray et al. 2020), grey areas were removed from the shapefile dataset.

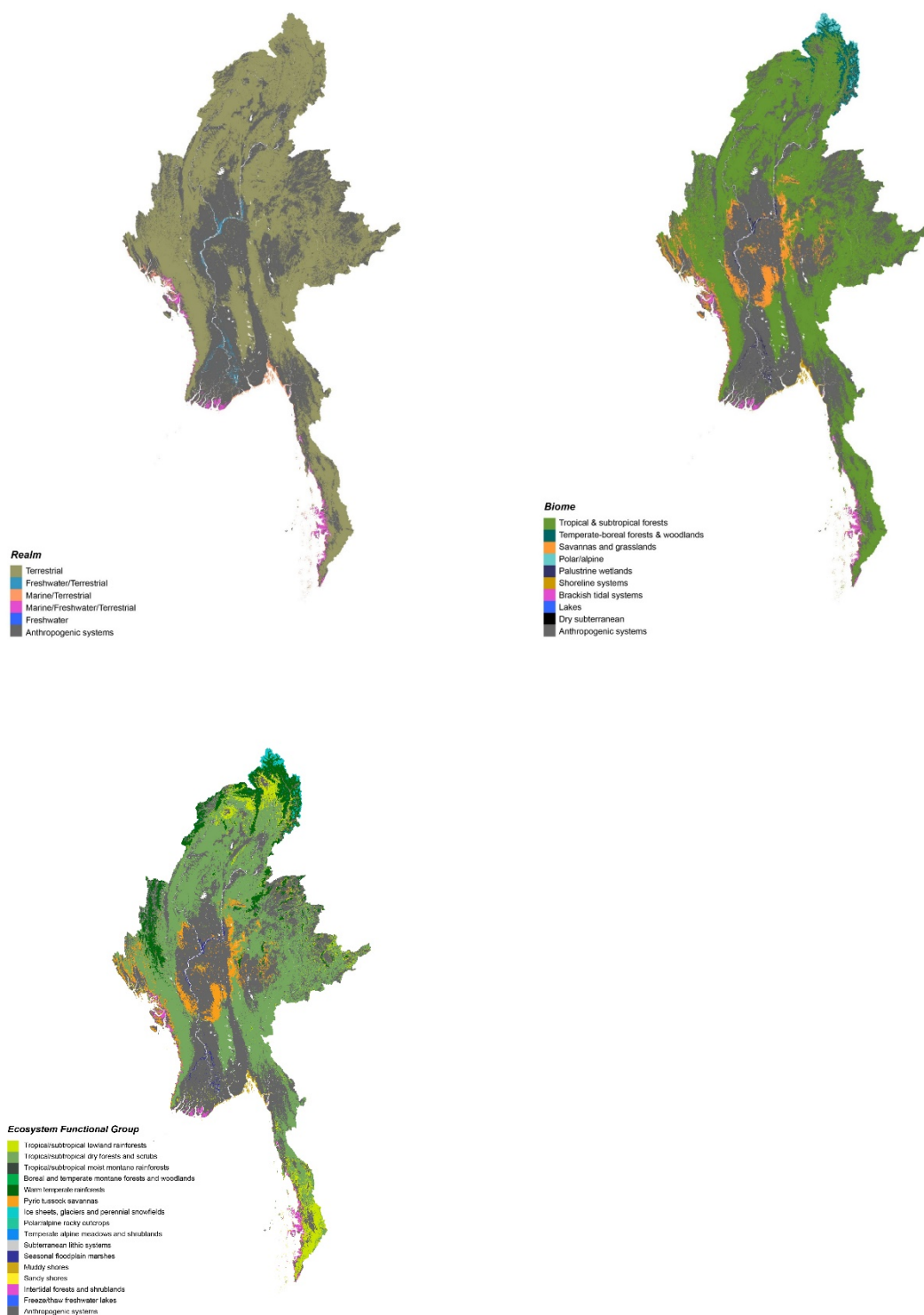


Table 1. Map classes used to develop the first stage classification from earth observation data (Source: Murray et al. 2020)

Unit	Map class description	Example ecosystem type
1	Evergreen rainforests	Tanintharyi island rainforests
2	Semi-evergreen forest (mixed forests)	Tanintharyi semi-evergreen forest
3	Dry forests and scrubs	Indaing forest
4	Cloud forests	Tanintharyi cloud forest
5	Bamboo breaks	Rhakine elephant range bamboo break
6	Montane forests and woodlands / mountain hardwood forest	Shan warm temperate rainforest
7	Montane conifer forests	Kachin mountain conifer forest
8	Dry scrub forests	Central Ayeyarwady Than-Dahat grassy forest
9	Sha-bamboo thickets	Shwe Settaw Sha-Bamboo thicket
10	Mountain pine savannas	Shan hills pine savanna
11	Polar/alpine rocky outcrops	Alpine cliffs and screes
12	High mountain scrubs	High mountain scrub
13	Alpine herbfields	Alpine herbfield
14	Snowfields	Kachin snowfields
15	Spiny scrubs	Dry zone foothills spiny scrub
16	Thorn scrubs	Sha thorny scrub
17	Sandy shores	Sandy shoreline
18	Mangroves	Tanintharyi mangrove forest
95	Urban areas	Not applicable
96	Croplands, sown pastures	Not applicable
97	Ricefields	Not applicable
98	Plantations	Not applicable
99	Permanent water	Not applicable

1 *Table 2. Ecosystem types of Myanmar (Source: Murray et al. 2020)*

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ID	Realm	Biome	Functional Group	Ecosystem type	Ecofull_code	pixel_value
52	Terrestrial	Tropical & subtropical forests	Tropical/subtropical lowland rainforests	Tanintharyi island rainforests	MMR-T1.1.1	52
54	Terrestrial	Tropical & subtropical forests	Tropical/subtropical lowland rainforests	Tanintharyi Sundaic lowland evergreen rainforest	MMR-T1.1.2	54
53	Terrestrial	Tropical & subtropical forests	Tropical/subtropical lowland rainforests	Tanintharyi limestone tropical evergreen forest	MMR-T1.1.3	53
55	Terrestrial	Tropical & subtropical forests	Tropical/subtropical lowland rainforests	Tanintharyi upland evergreen rainforest	MMR-T1.1.4	55
49	Terrestrial	Tropical & subtropical forests	Tropical/subtropical lowland rainforests	Kayin evergreen tropical rainforest	MMR-T1.1.5	49
51	Terrestrial	Tropical & subtropical forests	Tropical/subtropical lowland rainforests	Southern Rakhine evergreen rainforest	MMR-T1.1.6	51
50	Terrestrial	Tropical & subtropical forests	Tropical/subtropical lowland rainforests	Western Shan Plateau subtropical evergreen rainforest	MMR-T1.1.7	50
66	Terrestrial	Tropical & subtropical forests	Tropical/subtropical lowland rainforests	Kachin-Sagaing low elevation evergreen subtropical rainforest	MMR-T1.1.8	66
48	Terrestrial	Tropical & subtropical forests	Tropical/subtropical lowland rainforests	Kachin-Sagaing mid elevation subtropical rainforest	MMR-T1.1.9	48
57	Terrestrial	Tropical & subtropical forests	Tropical/subtropical lowland rainforests	Kachin Hills subtropical rainforest	MMR-T1.1.10	57
38	Terrestrial	Tropical & subtropical forests	Tropical/subtropical dry forests and scrubs	Tanintharyi semi-evergreen forest	MMR-T1.2.1	38
56	Terrestrial	Tropical & subtropical forests	Tropical/subtropical dry forests and scrubs	Mixed cane break	MMR-T1.2.3	56
37	Terrestrial	Tropical & subtropical forests	Tropical/subtropical dry forests and scrubs	Bago semi-evergreen forest	MMR-T1.2.4	37
45	Terrestrial	Tropical & subtropical forests	Tropical/subtropical dry forests and scrubs	Dry zone foothills spiny scrub	MMR-T1.2.5	45
44	Terrestrial	Tropical & subtropical forests	Tropical/subtropical dry forests and scrubs	Rakhine Elephant Range bamboo brake	MMR-T1.2.6	44
39	Terrestrial	Tropical & subtropical forests	Tropical/subtropical dry forests and scrubs	Elephant range semi-evergreen dry forest	MMR-T1.2.7	39
40	Terrestrial	Tropical & subtropical forests	Tropical/subtropical dry forests and scrubs	Magway dry cycad forest	MMR-T1.2.8	40
41	Terrestrial	Tropical & subtropical forests	Tropical/subtropical dry forests and scrubs	Magway semi-evergreen dry gully forest	MMR-T1.2.9	41
36	Terrestrial	Tropical & subtropical forests	Tropical/subtropical dry forests and scrubs	East Myanmar dry valley forest	MMR-T1.2.10	36
47	Terrestrial	Tropical & subtropical forests	Tropical/subtropical dry forests and scrubs	Eastern Shan semi-evergreen forest	MMR-T1.2.11	47
43	Terrestrial	Tropical & subtropical forests	Tropical/subtropical dry forests and scrubs	Western Shan semi-evergreen forest	MMR-T1.2.12	43
42	Terrestrial	Tropical & subtropical forests	Tropical/subtropical dry forests and scrubs	Indaing forest	MMR-T1.2.13	42
65	Terrestrial	Tropical & subtropical forests	Tropical/subtropical dry forests and scrubs	Northern semi-evergreen forest	MMR-T1.2.14	65
61	Terrestrial	Tropical & subtropical forests	Tropical/subtropical moist montane rainforests	Tanintharyi cloud forest	MMR-T1.3.1	61

2	Terrestrial	Temperate-boreal forests & woodlands	Boreal and temperate montane forests and woodlands	Kachin mountain conifer forest	MMR-T2.1.1	2
64	Terrestrial	Temperate-boreal forests & woodlands	Warm temperate rainforests	Shan warm temperate rainforest	MMR-T2.4.1	64
62	Terrestrial	Temperate-boreal forests & woodlands	Warm temperate rainforests	Chin Hills warm temperate rainforest	MMR-T2.4.2	62
59	Terrestrial	Temperate-boreal forests & woodlands	Warm temperate rainforests	Sagaing warm temperate rainforest	MMR-T2.4.3	59
63	Terrestrial	Temperate-boreal forests & woodlands	Warm temperate rainforests	Kachin warm temperate rainforest	MMR-T2.4.4	63
33	Terrestrial	Temperate-boreal forests & woodlands	Warm temperate rainforests	Kachin montane temperate broadleaf forest	MMR-T2.4.6	33
35	Terrestrial	Savannas and grasslands	Pyric tussock savannas	Rakhine coastal savanna	MMR-T4.2.1	35
17	Terrestrial	Savannas and grasslands	Pyric tussock savannas	Central Ayeyarwady Than-Dahat grassy forest	MMR-T4.2.2	17
20	Terrestrial	Savannas and grasslands	Pyric tussock savannas	Central Ayerawady Palm savanna	MMR-T4.2.3	20
19	Terrestrial	Savannas and grasslands	Pyric tussock savannas	Shwe Settaw Sha-Bamboo thicket	MMR-T4.2.4	19
18	Terrestrial	Savannas and grasslands	Pyric tussock savannas	Magway Than-Dahat dry grassy forest	MMR-T4.2.5	18
25	Terrestrial	Savannas and grasslands	Pyric tussock savannas	Sha thorny scrub	MMR-T4.2.6	25
16	Terrestrial	Savannas and grasslands	Pyric tussock savannas	Shan foothills Than-Dahat grassy forest	MMR-T4.2.7	16
24	Terrestrial	Savannas and grasslands	Pyric tussock savannas	Shan hills pine savanna	MMR-T4.2.8	24
21	Terrestrial	Savannas and grasslands	Pyric tussock savannas	Chin hills pine savanna	MMR-T4.2.9	21
23	Terrestrial	Savannas and grasslands	Pyric tussock savannas	Sagaing hills pine savanna	MMR-T4.2.10	23
22	Terrestrial	Savannas and grasslands	Pyric tussock savannas	Kachin pine savanna	MMR-T4.2.11	22
15	Terrestrial	Polar/alpine	Ice sheets, glaciers and perennial snowfields	Kachin snowfields	MMR-T6.1.1	15
14	Terrestrial	Polar/alpine	Polar/alpine rocky outcrops	Alpine cliffs and screes	MMR-T6.2.1	14
32	Terrestrial	Polar/alpine	Temperate alpine meadows and shrublands	High mountain scrub	MMR-T6.4.1	32
31	Terrestrial	Polar/alpine	Temperate alpine meadows and shrublands	Alpine herbfield	MMR-T6.4.2	31
1	Subterranean	Dry subterranean	Subterranean lithic systems	Aerobic Karst caves	MMR-S1.1.1	1
30	Freshwater/Terrestrial	Palustrine wetlands	Tropical flooded forests and peat forests	Central dry evergreen riparian forest	MMR-TF1.1.2	30
29	Freshwater/Terrestrial	Palustrine wetlands	Tropical flooded forests and peat forests	Mixed delta scrub	MMR-TF1.1.3	29
28	Freshwater/Terrestrial	Palustrine wetlands	Seasonal floodplain marshes	Ayeyarwady floodplain wetlands	MMR-TF1.4.1	28
27	Freshwater/Terrestrial	Palustrine wetlands	Seasonal floodplain marshes	Central Ayeyarwady floodplain grasslands	MMR-TF1.4.2	27
6	Freshwater	Lakes	Freeze-thaw freshwater lakes	Glacial lakes	MMR-F2.4.1	6

13	Marine/Terrestrial	Shoreline systems	Muddy shores	Coastal mudflats	MMR-MT1.2.1	13
26	Marine/Terrestrial	Shoreline systems	Sandy shores	Sandy shoreline	MMR-MT1.3.1	26
11	Marine/Freshwater/Terrestrial	Brackish tidal systems	Intertidal forests and shrublands	Tanintharyi mangrove forest	MMR-MFT1.2.1	11
8	Marine/Freshwater/Terrestrial	Brackish tidal systems	Intertidal forests and shrublands	Ayeyarwady delta mangrove forest	MMR-MFT1.2.2	8
9	Marine/Freshwater/Terrestrial	Brackish tidal systems	Intertidal forests and shrublands	Dwarf mangrove (shrubland) on shingle	MMR-MFT1.2.3	9
10	Marine/Freshwater/Terrestrial	Brackish tidal systems	Intertidal forests and shrublands	Rakhine mangrove forest on mud	MMR-MFT1.2.4	10
98	Anthropogenic Systems	NA	NA	NA	NA	98