## Modified UNESCO Classification (MUC) Codes and Glossary

| UC CODE | MUC NAME | DESCRIPTION |
|---|---|---|
| 111 | Closed Forest, Mainly Evergreen, Tropical Wet (Rain), Lowland | Consists usually of numerous species of fast growing trees, many exceeding 50 meters tall, generally with smooth, often thin bark, some with buttresses. Emergent trees or at least a very uneven canopy often present. Undergrowth is sparse, composed mainly of tree seedlings. Palms and other tuft trees usually are rare. Crustose lichens and green algae are present, and climbing vines are usually only abundant in extremely humid regions (e.g., Sumatra, Atrato Valley, Columbia). |
| 112 | Closed Forest, Mainly Evergreen, Tropical Wet (Rain), Submontane | Emergent trees are largely absent and the canopy is relatively even. Forbs are common in the undergrowth. Vascular epiphytes and vines are abundant. E.g., Atlantic slopes of Costa Rica. |
| 113 | Closed Forest, Mainly Evergreen, Tropical Wet (Rain), Montane | Trees are less than 50 meters tall, have crowns that extend relatively far down the stem, and often have rough bark. Undergrowth abundant, often with ferns, herbs, mosses, and small palms. E.g., Sierra de Talamanca, Costa Rica. |
| 114 | Closed Forest, Mainly Evergreen, Tropical Wet (Rain), Subalpine | Occurs at elevations above montane forests, with characteristic vegetation, which is dependent on latitude. |
| 115 | Closed Forest, Mainly Evergreen, Tropical Wet (Rain), Cloud | Trees are gnarled, have rough bark and are rarely greater than 20 meters tall. Tree crowns, branches, and trunks are burdened with epiphytes, mainly chamaephytic bryophytes. Also, the ground is covered with hygromorphic chamaephytes such as Selaginella and ferns. E.g., Blue Mountains, Jamaica. |
| 121 | Closed Forest, Mainly Evergreen, Tropical and Subtropical Seasonal, Lowland | Consists of fast growing trees, many exceeding 50 meters tall and usually forming an uneven canopy. Undergrowth is sparse, lichen and green algae are present, and climbing vines are absent. |
| 122 | Closed Forest, Mainly Evergreen, Tropical and Subtropical Seasonal, Submontane | Trees form an even canopy. Forbs are common in the undergrowth. Vascular epiphytes and vines are abundant. |
| 123 | Closed Forest, Mainly Evergreen, Tropical and Subtropical Seasonal, Montane | Trees are less than 50 meters tall, have crowns that extend relatively far down the stem and have rough bark. There are no tree ferns; instead, evergreen shrubs are most common. |
| 124 | Closed Forest, Mainly Evergreen, Tropical and Subtropical Seasonal, Subalpine | This forest resembles the Winter-rain Evergreen Broad-leaved Sclerophyllous dry forest and usually occurs above the cloud forest. Trees are mostly evergreen sclerophyllous trees, smaller than 20 meters with little or no undergrowth, few climbing vines, and few epiphytes, except lichens. |
| 131 | Closed Forest, Mainly Evergreen, Tropical and Subtropical Semi-Deciduous, Lowland | The taller trees may be bottle trees (e.g., Ceiba). There are practically no epiphytes present. The undergrowth is composed of shrubs and seedlings. Succulents such as thin-stemmed caespitose cacti may be present. Vines occur occasionally. A sparse layer of herbaceous vegetation may also be present. |
| 133 | Closed Forest, Mainly Evergreen, Tropical and Subtropical Semi-Deciduous, Montane and Cloud | This forest is similar to a Semi-deciduous Lowland Forest, however, the canopy is lower and covered with xerophytic epiphytes such as Tillandsia usneoides. |
| 141 | Closed Forest, Mainly Evergreen, Subtropical Wet, Lowland | Consists usually of numerous species of fast growing trees, many exceeding 50 meters tall, generally with smooth, often thin bark, some with buttresses. Emergent trees or at least a very uneven canopy often present. Undergrowth is sparse, composed mainly of tree seedlings. Palms and other tuft trees usually are rare. Crustose lichens and green algae are present, and climbing vines are usually only abundant in extremely humid regions. |
| 142 | Closed Forest, Mainly Evergreen, Subtropical Wet, Submontane | Emergent trees are largely absent and the canopy is relatively even. Forbs are common in the undergrowth. Vascular epiphytes and vines are abundant. |
| 143 | Closed Forest, Mainly Evergreen, Subtropical Wet, Montane | Trees are less than 50 meters tall, have crowns that extend relatively far down the stem, and often have rough bark. Undergrowth abundant, often with ferns, herbs, mosses, and small palms. |
| 144 | Closed Forest, Mainly Evergreen, Subtropical Wet, Subalpine | Occurs at elevations above montane forests, with characteristic vegetation, which is dependent on latitude. |

## Modified UNESCO Classification (MUC) Codes and Glossary

| UC CODE | MUC NAME | DESCRIPTION |
|---|---|---|
| 145 | Closed Forest, Mainly Evergreen, Subtropical Wet, Cloud | Trees are gnarled, have rough bark and are rarely greater than 20 meters tall. Tree crowns, branches, and trunks are burdened with epiphytes, mainly chamaephytic bryophytes. Also, the ground is covered with hygromorphic chamaephytes (e.g., Selaginella and herbaceous ferns). |
| 151 | Closed Forest, Mainly Evergreen, Temperate or Subpolar Wet, Temperate | Trees are generally greater than 10 meters tall. Vascular epiphytes and vines may be present. |
| 152 | Closed Forest, Mainly Evergreen, Temperate or Subpolar Wet, Subpolar | Trees are generally less than 10 meters tall and often have reduced leaf size. There are few vascular epiphytes present. E.g., beech forests of New Zealand. |
| 161 | Closed Forest, Mainly Evergreen, Temperate with Broad-Leaved Deciduous, Lowland | Consists usually of numerous species of fast growing trees, many exceeding 50 meters tall, generally with smooth, often thin bark, some with buttresses. Emergent trees or at least a very uneven canopy often present. Undergrowth is sparse, composed mainly of tree seedlings. Palms and other tuft trees usually are rare. Crustose lichens and green algae are present, and climbing vines are usually only abundant in extremely humid regions. |
| 162 | Closed Forest, Mainly Evergreen, Temperate with Broad-Leaved Deciduous, Submontane | Emergent trees are largely absent and the canopy is relatively even. Forbs are common in the undergrowth. Vascular epiphytes and vines are abundant. |
| 163 | Closed Forest, Mainly Evergreen, Temperate with Broad-Leaved Deciduous, Montane | Trees are less than 50 meters tall, have crowns that extend relatively far down the stem, and often have rough bark. Undergrowth abundant, often with ferns, herbs, mosses, and small palms. |
| 164 | Closed Forest, Mainly Evergreen, Temperate with Broad-Leaved Deciduous, Subalpine | Occurs at elevations above montane forests, with characteristic vegetation, which is dependent on latitude. |
| 171 | Closed Forest, Mainly Evergreen, Winter-Rain Broad-Leaved Sclerophyllous, Lowland and Submontane >50m | Dominated by trees over 50 meters tall (at least 50% of the canopy) such as giant eucalyptus (e.g., Eucalyptus regnans in Victoria, Australia and E. diversicolor in Western Australia). |
| 172 | Closed Forest, Mainly Evergreen, Winter-Rain Broad-Leaved Sclerophyllous, Lowland and Submontane <50m | Dominated by trees less than 50 meters tall (more than 50% of the canopy). E.g., Californian live-oak forests. |
| 181 | Closed Forest, Mainly Evergreen, Tropical and Subtropical Needle-Leaved, Lowland and Submontane | E.g., the pine forests of Honduras and Nicaragua. |
| 182 | Closed Forest, Mainly Evergreen, Tropical and Subtropical Needle-Leaved, Montane and Subalpine | E.g., the pine forests of the Philippines and southern Mexico. |
| 191 | Closed Forest, Mainly Evergreen, Temperate and Subpolar Needle-Leaved, Giant (>50m) | Dominated by trees (at least 50% of the canopy) greater than 50 meters tall (e.g., Sequoia and Pseudo-tsuga forest in the Pacific West of North America). |
| 192 | Closed Forest, Mainly Evergreen, Temperate and Subpolar Needle-Leaved, Irregularly Rounded Crowns | Dominated by trees 45-50 meters tall (more than 50% of the canopy), with broad, irregularly rounded crowns (e.g., Pinus spp.). |
| 193 | Closed Forest, Mainly Evergreen, Temperate and Subpolar Needle-Leaved, Conical Crowns | Dominated by trees 45-50 meters tall (more than 50% of the canopy), with conical crowns (like most Picea and Abies). E.g., California red fir forests. |
| 194 | Closed Forest, Mainly Evergreen, Temperate and Subpolar Needle-Leaved, Cylindrical Crowns | Dominated by trees 45-50 meters tall (more than 50% of the canopy), with crowns with very short branches and therefore a narrow cylindrical shape. |
| 211 | Closed Forest, Mainly Deciduous, Tropical and Subtropical Drought-Deciduous, Broad-Leaved Lowland and Submontane | Practically no evergreen plants in stratum except some succulents. Woody and herbaceous vines and deciduous bottle-trees are present occasionally. Sparse herbaceous vegetation present in the undergrowth. E.g., the broad-leaved deciduous forests of northwestern Costa Rica. |
| 212 | Closed Forest, Mainly Deciduous, Tropical and Subtropical Drought-Deciduous, Montane and Cloud | Some evergreen species are present in the understory. Drought resistant epiphytes are present or abundant, often of the bearded form (e.g., Usnea or Tillandsia usneoides). This formation is not frequent, but well developed. E.g., in northern Peru. |
| 221 | Closed Forest, Mainly Deciduous, Cold-Deciduous with Evergreens, With Evergreen Broad-Leaved Trees and Climbers | Rich in epiphytes, including mosses. Vascular epiphytes may be present at the base of tree stems. Climbing vines may be common on flood plains. Ex. Ilex aquifolium and Hedera helix in western Europe and Magnolia spp. in North America. |
| 222 | Closed Forest, Mainly Deciduous, Cold-Deciduous with Evergreens, With Evergreen Needle-Leaved Trees | With evergreen needle-leaved trees such as hemlock (Tsuga) and pine (Pinus). E.g., the maple-hemlock or oak-pine forests of Northeastern, U.S.A. |

## Modified UNESCO Classification (MUC) Codes and Glossary

| UC CODE | MUC NAME | DESCRIPTION |
|---|---|---|
| 231 | Closed Forest, Mainly Deciduous, Cold-Deciduous without Evergreen Trees, Temperate Lowland and Submontane Broad-Leaved | Trees are up to 50 meters tall. Epiphytes are primarily algae and crustose lichens. E.g., the Mixed Mesophytic Forest of U.S.A. |
| 232 | Closed Forest, Mainly Deciduous, Cold-Deciduous without Evergreen Trees, Montane and Boreal | Trees may be up to 50 meters tall, but in montane or boreal forest normally not taller than 30 meters. Epiphytes are primarily lichens and bryophytes. This class includes lowland or submontane in topographic positions with high atmospheric humidity. |
| 233 | Closed Forest, Mainly Deciduous, Cold-Deciduous without Evergreen Trees, Subalpine and Subpolar | Trees are not taller than 20 meters and tree trunks are frequently gnarled. Epiphytes are lichens and bryophytes, and are more abundant than in the Montane or Boreal class (0232). This class often grades into woodland. |
| 31 | Closed Forest, Extremely Xeromorphic (Dry), Sclerophyllous-Dominated | There is a predominance of sclerophyllous trees, many of which have bulbous stem bases largely embedded in the soil. |
| 321 | Closed Forest, Extremely Xeromorphic (Dry), Thorn-Dominated, Mixed Deciduous-Evergreen | Both deciduous and evergreen thorn species are more than 25% of the tree canopy. See definitions of Mainly Evergreen Forest, class 01 and Deciduous, class 02. |
| 322 | Closed Forest, Extremely Xeromorphic (Dry), Thorn-Dominated, Purely Deciduous | Deciduous thorn species are absolutely dominant (more than 75% of the canopy). See definition of Deciduous Forest (MUC Class 02). |
| 33 | Closed Forest, Extremely Xeromorphic (Dry), Mainly Succulent | Tree-formed (scapose) and shrub-formed (caespitose) succulents are very frequent (more than 50% of the canopy), but other trees and shrubs adapted to dry conditions are usually present as well. |
| 111 | Woodland, Mainly Evergreen, Broad-Leaved | Mainly sclerophyllous broad-leaved trees and shrubs, with no epiphytes. |
| 1121 | Woodland, Mainly Evergreen, Needle-Leaved, Irregularly Rounded Crowns | Dominated by trees (more than 50% of the canopy) with broad, irregularly rounded crowns (e.g., Pinus). |
| 1122 | Woodland, Mainly Evergreen, Needle-Leaved, Conical Crowns | Dominated by trees (more than 50% of the canopy) with conical crowns. Mostly in subalpine areas. |
| 1123 | Woodland, Mainly Evergreen, Needle-Leaved, Cylindrical Crowns | Dominated by trees (more than 50% of the canopy) with crowns with very short branches and therefore a narrow cylindrical shape (e.g., Picea in the boreal regions). |
| 1211 | Woodland, Mainly Deciduous, Drought-Deciduous, Broad-Leaved Lowland and Submontane | Practically no evergreen plants in any stratum except some succulents. Woody and herbaceous vines and deciduous bottle-trees are present. Sparse herbaceous vegetation present in the undergrowth. |
| 1212 | Woodland, Mainly Deciduous, Drought-Deciduous, Montane and Cloud | Some evergreen species are present in the understory. Drought resistant epiphytes are present or abundant, often of the bearded form (e.g., Usnea or Tillandsia usneoides). This formation is not frequent, but well developed. E.g., in northern Peru. |
| 1221 | Woodland, Mainly Deciduous, Cold-Deciduous with Evergreens, With Evergreen Broad-Leaved Trees and Climbers | Rich in epiphytes, including mosses. Vascular epiphytes may be present at the base of tree stems. Climbing vines may be common on flood plains. Ilex aquifolium and Hedera helix in western Europe and Magnolia spp. in North America are examples of this class type. |
| 1222 | Woodland, Mainly Deciduous, Cold-Deciduous with Evergreens, With Evergreen Needle-Leaved Trees | With evergreen needle-leaved trees such as hemlock (Tsuga) and pine (Pinus). E.g., the maple-hemlock or oak-pine woodlands of Northeastern, U.S.A. |
| 1231 | Woodland, Mainly Deciduous, Cold-Deciduous without Evergreen Trees, Broad-Leaved | Broad-leaved deciduous species are absolutely dominant (more than 75% of the canopy). |
| 1232 | Woodland, Mainly Deciduous, Cold-Deciduous without Evergreen Trees, Needle-Leaved | Needle-leaved deciduous species are absolutely dominant (more than 75% of the canopy). |
| 1233 | Woodland, Mainly Deciduous, Cold-Deciduous without Evergreen Trees, Mixed | Both broad-leaved and needle leaved deciduous species provide more than 25% of the canopy. |
| 131 | Woodland, Extremely Xeromorphic (Dry), Sclerophyllous-Dominated | There is a predominance of sclerophyllous trees, many of which have bulbous stem bases largely embedded in the soil. |
| 1321 | Woodland, Extremely Xeromorphic (Dry), Thorn-Dominated, Mixed Deciduous-Evergreen | Both deciduous species and evergreen species are more than 25% of the tree canopy. See definitions of Mainly Evergreen Woodland, class 11 and Mainly Deciduous Woodland (MUC Class 12). |
| 1322 | Woodland, Extremely Xeromorphic (Dry), Thorn-Dominated, Purely Deciduous | Deciduous thorn species are absolutely dominant (more than 75% of the canopy). See definition of Mainly Deciduous Woodland (MUC Class 12). |
| 133 | Woodland, Extremely Xeromorphic (Dry), Mainly Succulent | Tree-formed (scapose) and shrub-formed (caespitose) succulents are very frequent (more than 50% of the canopy), but other trees and shrubs adapted to dry conditions are usually present as well. |
| 2111 | Shrubland or Thicket, Mainly Evergreen, Broad-Leaved, Low Bamboo | Bamboo species are dominant. (Lignified creeping graminoid nano- or microphanerophytes). |
| 2112 | Shrubland or Thicket, Mainly Evergreen, Broad-Leaved, Tuft-Tree | Composed of small trees and woody shrubs. E.g., Mediterranean dwarf palms shrubland or Hawaiian tree fern thicket or shrubland. |

## Modified UNESCO Classification (MUC) Codes and Glossary

| UC CODE | MUC NAME | DESCRIPTION |
|---|---|---|
| 2113 | Shrubland or Thicket, Mainly Evergreen, Broad-Leaved, Broad-Leaved Hemi-Sclerophyllous | Matted or clumped shrubs and plants with large soft leaves (caespitose, creeping or lodged nano- or microphanerophytes). E.g., subalpine Rhododendron thickets, or Hibiscus tiliaeceus matted thickets of Hawaii. |
| 2114 | Shrubland or Thicket, Mainly Evergreen, Broad-Leaved, Broad-Leaved Sclerophyllous | Dominated by broad-leaved sclerophyllous shrubs and immature trees (e.g., chapparal or macchia). May often merge with parkland, grassland or heath. |
| 2115 | Shrubland or Thicket, Mainly Evergreen, Broad-Leaved, Suffruticose | Stand of semi-lignified nanophanerophytes that in dry years may shed part of their shoot systems (e.g., Cistus heath). |
| 2121 | Shrubland or Thicket, Mainly Evergreen, Needle-Leaved or Microphyllous, Needle-Leaved | Composed of creeping or lodged needle-leaved shrubs (e.g., Pinus mughus, Krummholz). |
| 2122 | Shrubland or Thicket, Mainly Evergreen, Needle-Leaved or Microphyllous, Microphyllous | Evergreen species have small leaves, (e.g., desert plants) or leaves with a single unbranched vein. Mostly in tropical subalpine belts. |
| 221 | Shrubland or Thicket, Mainly Deciduous, Drought-Deciduous with Evergreen Woody Plants | Drought-deciduous shrubs are dominant (greater than 50% of the canopy) and are mixed with at least 25% evergreen woody plants. The unfavorable season is mainly characterized by drought. |
| 222 | Shrubland or Thicket, Mainly Deciduous, Drought-Deciduous without Evergreen Woody Plants | Drought-deciduous shrubs are absolutely dominant (more than 75% of the canopy). The unfavorable season is mainly characterized by drought. |
| 223 | Shrubland or Thicket, Mainly Deciduous, Cold-Deciduous | The unfavorable season is mainly characterized by winter frost. Deciduous shrubs are dominant (more than 50% of the canopy). |
| 2232 | Shrubland or Thicket, Mainly Deciduous, Cold-Deciduous, Subalpine and Subpolar | Composed of upright or lodged matted shrubs with great vegetative regeneration capacity and usually covered by snow for at least half a year. |
| 2311 | Shrubland or Thicket, Extremely Xeromorphic (Subdesert) Shrubland, Mainly Evergreen, Purely Evergreen | Composed of broad-leaved mostly sclerophyllous shrubs (e.g., mulga scrub in Australia) leafless green-stemmed plants (e.g. Retama retam) or succulents dominated by variously branched stem and leaf succulents. |
| 2312 | Shrubland or Thicket, Extremely Xeromorphic (Subdesert) Shrubland, Mainly Evergreen, Semi-Deciduous | May consist of either facultatively deciduous shrubs (e.g., Atriplex-Kochia saltbush in Australia and North America) or a combination of evergreen and deciduous shrubs (i.e. evergreen shrubs are dominant, deciduous shrubs cover more than 25%). |
| 2321 | Shrubland or Thicket, Extremely Xeromorphic (Subdesert) Shrubland, Mainly Deciduous, Without Succulents | Succulents cover less than 25% of the ground. |
| 2322 | Shrubland or Thicket, Extremely Xeromorphic (Subdesert) Shrubland, Mainly Deciduous, With Succulents | Succulents cover at least 25% of the ground. |
| 3111 | Dwarf-Shrubland or Dwarf-Thicket, Mainly Evergreen, Dwarf-Thicket, Caespitose | Shrub branches stand upright and are often occupied by lichens (foliose). Cushion-shaped mosses, lichens and other herbaceous plants are often found on the ground (e.g., Calluna heath). |
| 3112 | Dwarf-Shrubland or Dwarf-Thicket, Mainly Evergreen, Dwarf-Thicket, Creeping | Shrub branches creep along the ground. Variously combined with shrubs (e.g., thallochamaephytes) with branches that may be embedded (e.g., Loiseleuria heath). |
| 3121 | Dwarf-Shrubland or Dwarf-Thicket, Mainly Evergreen, Dwarf-Shrubland, Cushion | Shrubs are isolated in clumps forming dense cushions and are often thorny (e.g., Astragalus- and Acantholimon porcupine -- heath of the East Mediterranean mountains). |
| 3131 | Dwarf-Shrubland or Dwarf-Thicket, Mainly Evergreen, Mixed Evergreen and Herbaceous Dwarf-Shrubland, True Evergreen & Herbaceous Mixed | True Evergreen individuals do not seasonally shed parts of their shoot systems. E.g., Nardus Calluna-heath. |
| 3132 | Dwarf-Shrubland or Dwarf-Thicket, Mainly Evergreen, Mixed Evergreen and Herbaceous Dwarf-Shrubland, Partial Evergreen & Herbaceous Mixed | Many individuals shed parts of their shoot systems during the dry season (e.g., Phyrgana in Greece). |
| 321 | Dwarf-Shrubland or Dwarf-Thicket, Mainly Deciduous, Facultative Drought-Deciduous | Dwarf-shrubs shed their foliage only in extremely dry years. |
| 3221 | Dwarf-Shrubland or Dwarf-Thicket, Mainly Deciduous, Obligate Drought-Deciduous, Caespitose Dwarf-Thicket | Shrub branches stand upright and are often occupied by lichens (foliose). Cushion-shaped mosses, lichens and other herbaceous plants are often found on the ground (e.g., Calluna heath). |
| 3222 | Dwarf-Shrubland or Dwarf-Thicket, Mainly Deciduous, Obligate Drought-Deciduous, Creeping Dwarf-Thicket | Shrub branches creep along the ground. Variously combined with shrubs (i.e. thallochamaephytes) with branches that may be embedded (e.g., Loiseleuria heath). |
| 3223 | Dwarf-Shrubland or Dwarf-Thicket, Mainly Deciduous, Obligate Drought-Deciduous, Cushion Dwarf-Shrubland | Shrubs are isolated in clumps forming dense cushions and are often thorny. |

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| UC CODE | MUC NAME | DESCRIPTION |
|---|---|---|
| 3224 | Dwarf-Shrubland or Dwarf-Thicket, Mainly Deciduous, Obligate Drought-Deciduous, Mixed Dwarf-Shrubland | Deciduous and evergreen dwarf-shrubs, caespitose herbaceous plants, succulent perennial herbs, and other species intermixed. |
| 3231 | Dwarf-Shrubland or Dwarf-Thicket, Mainly Deciduous, Cold-Deciduous, Caespitose Dwarf-Thicket | Shrub branches stand upright and are often occupied by lichens (foliose). Cushion-shaped mosses, lichens and other herbaceous plants are often found on the ground. |
| 3232 | Dwarf-Shrubland or Dwarf-Thicket, Mainly Deciduous, Cold-Deciduous, Creeping Dwarf-Thicket | Shrub branches creep along the ground; combined with shrubs with branches that may be embedded. |
| 3233 | Dwarf-Shrubland or Dwarf-Thicket, Mainly Deciduous, Cold-Deciduous, Cushion Dwarf-Shrubland | Shrubs are isolated in clumps forming dense cushions and are often thorny. |
| 3234 | Dwarf-Shrubland or Dwarf-Thicket, Mainly Deciduous, Cold-Deciduous, Mixed Dwarf-Shrubland | Deciduous and evergreen dwarf-shrubs, caespitose herbaceous plants, succulent perennial herbs, and other species intermixed. |
| 3311 | Dwarf-Shrubland or Dwarf-Thicket, Extremely Xeromorphic (Subdesert) Dwarf-Shrubland, Mainly Evergreen, Purely Evergreen | Composed of broad-leaved mostly sclerophyllous shrubs, leafless green-stemmed plants, or succulents dominated by variously branched stem and leaf succulents. |
| 3312 | Dwarf-Shrubland or Dwarf-Thicket, Extremely Xeromorphic (Subdesert) Dwarf-Shrubland, Mainly Evergreen, Semi-Deciduous | May consist of either facultatively deciduous shrubs or a combination of evergreen and deciduous shrubs (i.e. evergreen shrubs are dominant, deciduous shrubs cover more than 25%). |
| 3321 | Dwarf-Shrubland or Dwarf-Thicket, Extremely Xeromorphic (Subdesert) Dwarf-Shrubland, Mainly Deciduous, Without Succulents | Succulents cover less than 25% of the ground. |
| 3322 | Dwarf-Shrubland or Dwarf-Thicket, Extremely Xeromorphic (Subdesert) Dwarf-Shrubland, Mainly Deciduous, With Succulents | Succulents cover at least 25% of the ground. |
| 3411 | Dwarf-Shrubland or Dwarf-Thicket, Tundra, Mainly Bryophyte, Caespitose | Clumped or clustered dwarf-shrubs are present. |
| 3412 | Dwarf-Shrubland or Dwarf-Thicket, Tundra, Mainly Bryophyte, Creeping | Creeping or matted dwarf-shrubs are present. |
| 342 | Dwarf-Shrubland or Dwarf-Thicket, Tundra, Mainly Lichen | Mats of fruticose lichens dominate (more than 50% of the vegetative cover), giving the formation a more or less pronounced gray aspect. Mostly evergreen, creeping or cushion-shaped dwarf-shrubs are present. |
| 4110 | Herbaceous Vegetation, Tall Graminoid, With Trees Covering 10-40 %, Trees: Needle-Leaved Evergreen | Needle-leaved evergreen species are greater than 50% of the tree canopy. |
| 4111 | Herbaceous Vegetation, Tall Graminoid, With Trees Covering 10-40 %, Trees: Broad-Leaved Evergreen | Broad-leaved evergreen species are greater than 50% of the tree canopy. |
| 4112 | Herbaceous Vegetation, Tall Graminoid, With Trees Covering 10-40 %, Trees: Broad-Leaved Semi-Evergreen | Trees present are at least 25% each of broad-leaved evergreen and broad-leaved deciduous trees. |
| 4113 | Herbaceous Vegetation, Tall Graminoid, With Trees Covering 10-40 %, Trees: Broad-Leaved Deciduous | Broad-leaved evergreen species are greater than 50% of the tree canopy. The area is seasonally flooded. E.g., Northeast Bolivia. |
| 4120 | Herbaceous Vegetation, Tall Graminoid, With Trees Covering < 10 %, Trees: Needle-Leaved Evergreen | Needle-leaved evergreen species are greater than 50% of the tree canopy. |
| 4121 | Herbaceous Vegetation, Tall Graminoid, With Trees Covering < 10 %, Trees: Broad-Leaved Evergreen | Broad-leaved evergreen species are greater than 50% of the tree canopy. |
| 4122 | Herbaceous Vegetation, Tall Graminoid, With Trees Covering < 10 %, Trees: Broad-Leaved Semi-Evergreen | Trees present are at least 25% each of broad-leaved evergreen and broad-leaved deciduous trees. |
| 4123 | Herbaceous Vegetation, Tall Graminoid, With Trees Covering < 10 %, Trees: Broad-Leaved Deciduous | Broad-leaved evergreen species are greater than 50% of the tree canopy. The area is seasonally flooded. |
| 4124 | Herbaceous Vegetation, Tall Graminoid, With Trees Covering < 10 %, Tropical and Subtropical with Trees and Shrubs in Tufts on Termite Nests | Tropical or subtropical tall grassland with trees and/or shrubs growing in tufts on termite nests. Also called termite savannah. |
| 4130 | Herbaceous Vegetation, Tall Graminoid, With Shrubs, Shrubs: Needle-Leaved Evergreen | Needle-leaved evergreen species are greater than 50% of the shrub canopy. |

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| UC CODE | MUC NAME | DESCRIPTION |
|---|---|---|
| 4131 | Herbaceous Vegetation, Tall Graminoid, With Shrubs, Shrubs: Broad-Leaved Evergreen | Broad-leaved evergreen species are greater than 50% of the shrub canopy. |
| 4132 | Herbaceous Vegetation, Tall Graminoid, With Shrubs, Shrubs: Broad-Leaved Semi-Evergreen | Shrubs present are at least 25% each of broad-leaved evergreen and broad-leaved deciduous. |
| 4133 | Herbaceous Vegetation, Tall Graminoid, With Shrubs, Shrubs: Broad-Leaved Deciduous | Broad-leaved evergreen species are greater than 50% of the shrub canopy. The area is seasonally flooded. |
| 4134 | Herbaceous Vegetation, Tall Graminoid, With Shrubs, Tropical and Subtropical with Trees and Shrubs in Tufts on Termite Nests | Tropical or subtropical tall grassland with trees and/or shrubs growing in tufts on termite nests. Also called termite savannah. |
| 4141 | Herbaceous Vegetation, Tall Graminoid, With Tuft Plants, Tropical with Palms | Tropical grasslands with palms. E.g., the palm savannas of Arocomia totai and Attalea princeps north of Santa Cruz de la Sierra, Bolivia. |
| 4151 | Herbaceous Vegetation, Tall Graminoid, Without Woody Synusia, Tropical | Tropical grassland as in various low-latitude regions of Africa. Often seasonally flooded (e.g., Compos de Varzea of the lower Amazon Valley), or wet-flooded most of the year (e.g., Papyrus swamps of the upper Nile Valley). |
| 4210 | Herbaceous Vegetation, Medium Tall Graminoid, With Trees Covering 10-40 %, Trees: Needle-Leaved Evergreen | Needle-leaved evergreen species are greater than 50% of the tree canopy. |
| 4211 | Herbaceous Vegetation, Medium Tall Graminoid, With Trees Covering 10-40 %, Trees: Broad-Leaved Evergreen | Broad-leaved evergreen species are greater than 50% of the tree canopy. |
| 4212 | Herbaceous Vegetation, Medium Tall Graminoid, With Trees Covering 10-40 %, Trees: Broad-Leaved Semi-Evergreen | Trees present are at least 25% each of broad-leaved evergreen and broad-leaved deciduous trees. |
| 4213 | Herbaceous Vegetation, Medium Tall Graminoid, With Trees Covering 10-40 %, Trees: Broad-Leaved Deciduous | Broad-leaved evergreen species are greater than 50% of the tree canopy. The area is seasonally flooded. |
| 4220 | Herbaceous Vegetation, Medium Tall Graminoid, With Trees Covering < 10 %, Trees: Needle-Leaved Evergreen | Needle-leaved evergreen species are greater than 50% of the tree canopy. |
| 4221 | Herbaceous Vegetation, Medium Tall Graminoid, With Trees Covering < 10 %, Trees: Broad-Leaved Evergreen | Broad-leaved evergreen species are greater than 50% of the tree canopy. |
| 4222 | Herbaceous Vegetation, Medium Tall Graminoid, With Trees Covering < 10 %, Trees: Broad-Leaved Semi-Evergreen | Trees present are at least 25% each of broad-leaved evergreen and broad-leaved deciduous trees. |
| 4223 | Herbaceous Vegetation, Medium Tall Graminoid, With Trees Covering < 10 %, Trees: Broad-Leaved Deciduous | Broad-leaved evergreen species are greater than 50% of the tree canopy. The area is seasonally flooded. |
| 4224 | Herbaceous Vegetation, Medium Tall Graminoid, With Trees Covering < 10 %, Tropical and Subtropical with Trees and Shrubs in Tufts on Termite Nests | Tropical or subtropical medium tall grassland with trees and/or shrubs growing in tufts on termite nests. Also called termite savannah. |
| 4230 | Herbaceous Vegetation, Medium Tall Graminoid, With Shrubs, Shrubs: Needle-Leaved Evergreen | Needle-leaved evergreen species are greater than 50% of the shrub canopy. |
| 4231 | Herbaceous Vegetation, Medium Tall Graminoid, With Shrubs, Shrubs: Broad-Leaved Evergreen | Broad-leaved evergreen species are greater than 50% of the shrub canopy. |
| 4232 | Herbaceous Vegetation, Medium Tall Graminoid, With Shrubs, Shrubs: Broad-Leaved Semi-Evergreen | Shrubs present are at least 25% each of broad-leaved evergreen and broad-leaved deciduous. |
| 4233 | Herbaceous Vegetation, Medium Tall Graminoid, With Shrubs, Shrubs: Broad-Leaved Deciduous | Broad-leaved evergreen species are greater than 50% of the shrub canopy. The area is seasonally flooded. |
| 4234 | Herbaceous Vegetation, Medium Tall Graminoid, With Shrubs, Tropical and Subtropical with Trees and Shrubs in Tufts on Termite Nests | Tropical or subtropical medium tall grassland with trees and/or shrubs growing in tufts on termite nests. Also called termite savannah. |
| 4235 | Herbaceous Vegetation, Medium Tall Graminoid, With Shrubs, Woody Synusia of Deciduous Thorny Shrubs | Consists of deciduous thorny shrubs covering at least 25% of the ground. E.g., the tropical thorn bush savannah of the Sahel region in Africa with Acacia tortilis, A. senegal and other species. |

## Modified UNESCO Classification (MUC) Codes and Glossary

| UC CODE | MUC NAME | DESCRIPTION |
|---|---|---|
| 4241 | Herbaceous Vegetation, Medium Tall Graminoid, Open Synusia of Tuft Plants, Subtropical with Open Palm Groves | Medium tall grassland with open groves of palms (e.g., Corrientes, Argentina). Some areas are seasonally flooded (e.g., Mauritia palm groves in the Colombian and Venezuelan Ilanos). |
| 4251 | Herbaceous Vegetation, Medium Tall Graminoid, Without Woody Synusia, Mainly Sod Grasses | Perennial, highly branched, creeping grass, which binds the sand or soils with its root system. E.g., St. Augustine grass (Stenotaphrum secundatum), the tall-grass prairie in eastern Kansas, or on sandy soil or dunes, such as the communities of Andropogon hallii in the Nebraska Sand Hills. In some locations the grassland is wet or flooded most of the year (e.g., Typha swamps). If that is the case classify as a wetland. See MUC class 6. |
| 4252 | Herbaceous Vegetation, Medium Tall Graminoid, Without Woody Synusia, Mainly Bunch Grasses | Grasses that chiefly grow in tufts forming an irregular textured surface. E.g., the hard tussock (Festuca novae-zelandiae) grasslands in New Zealand. |
| 4310 | Herbaceous Vegetation, Short Graminoid, With Trees Covering 10-40 %, Trees: Needle-Leaved Evergreen | Needle-leaved evergreen species are greater than 50% of the tree canopy. |
| 4311 | Herbaceous Vegetation, Short Graminoid, With Trees Covering 10-40 %, Trees: Broad-Leaved Evergreen | Broad-leaved evergreen species are greater than 50% of the tree canopy. |
| 4312 | Herbaceous Vegetation, Short Graminoid, With Trees Covering 10-40 %, Trees: Broad-Leaved Semi-Evergreen | Trees present are at least 25% each of broad-leaved evergreen and broad-leaved deciduous trees. |
| 4313 | Herbaceous Vegetation, Short Graminoid, With Trees Covering 10-40 %, Trees: Broad-Leaved Deciduous | Broad-leaved evergreen species are greater than 50% of the tree canopy. The area is seasonally flooded. |
| 4320 | Herbaceous Vegetation, Short Graminoid, With Trees Covering < 10 %, Trees: Needle-Leaved Evergreen | Needle-leaved evergreen species are greater than 50% of the tree canopy. |
| 4321 | Herbaceous Vegetation, Short Graminoid, With Trees Covering < 10 %, Trees: Broad-Leaved Evergreen | Broad-leaved evergreen species are greater than 50% of the tree canopy. |
| 4322 | Herbaceous Vegetation, Short Graminoid, With Trees Covering < 10 %, Trees: Broad-Leaved Semi-Evergreen | Trees present are at least 25% each of broad-leaved evergreen and broad-leaved deciduous trees. |
| 4323 | Herbaceous Vegetation, Short Graminoid, With Trees Covering < 10 %, Trees: Broad-Leaved Deciduous | Broad-leaved evergreen species are greater than 50% of the tree canopy. The area is seasonally flooded. |
| 4324 | Herbaceous Vegetation, Short Graminoid, With Trees Covering < 10 %, Tropical and Subtropical with Trees and Shrubs in Tufts on Termite Nests | Tropical or subtropical short grassland with trees and/or shrubs growing in tufts on termite nests. Also called termite savannah. |
| 4330 | Herbaceous Vegetation, Short Graminoid, With Shrubs, Shrubs: Needle-Leaved Evergreen | Needle-leaved evergreen species are greater than 50% of the shrub canopy. |
| 4331 | Herbaceous Vegetation, Short Graminoid, With Shrubs, Shrubs: Broad-Leaved Evergreen | Broad-leaved evergreen species are greater than 50% of the shrub canopy. |
| 4332 | Herbaceous Vegetation, Short Graminoid, With Shrubs, Shrubs: Broad-Leaved Semi-Evergreen | Shrubs present are at least 25% each of broad-leaved evergreen and broad-leaved deciduous. |
| 4333 | Herbaceous Vegetation, Short Graminoid, With Shrubs, Shrubs: Broad-Leaved Deciduous | Broad-leaved evergreen species are greater than 50% of the shrub canopy. The area is seasonally flooded. |
| 4334 | Herbaceous Vegetation, Short Graminoid, With Shrubs, Tropical and Subtropical with Trees and Shrubs in Tufts on Termite Nests | Tropical or subtropical short grassland with trees and/or shrubs growing in tufts on termite nests. Also called termite savannah. |
| 4335 | Herbaceous Vegetation, Short Graminoid, With Shrubs, Woody Synusia of Deciduous Thorny Shrubs | Consists of deciduous thorny shrubs covering at least 25% of the ground. |
| 4341 | Herbaceous Vegetation, Short Graminoid, Open Synusia of Tuft Plants, Subtropical with Open Palm Groves | Short grassland with open groves of palms. The canopy of palms must cover more than 25% of the ground. |

## Modified UNESCO Classification (MUC) Codes and Glossary

| UC CODE | MUC NAME | DESCRIPTION |
|---|---|---|
| 4351 | Herbaceous Vegetation, Short Graminoid, Mainly Bunch Grasses with Woody Synusia, Tropical Alpine with Tuft Plants | This grassland often contains Espeletia, Lobelia, Senecio, microphyllous dwarf-shrubs, and cushion plants (often with woolly leaves). Above the timberline in low latitudes. E.g., Paramo and related vegetation types without snow in the alpine regions of Kenya, Colombia, Venezuela, etc. |
| 4352 | Herbaceous Vegetation, Short Graminoid, Mainly Bunch Grasses with Woody Synusia, Tropical Alpine without Tuft Plants | Similar to Tropical Alpine with Tuft Plants (4351) but very open and without tuft plants. In these grasslands there is frequent nocturnal snowfall (though the snow is gone by 9 a.m.). E.g., the Super-Paramo (i.e. above Paramo) of J. Cuatrescasas. |
| 4353 | Herbaceous Vegetation, Short Graminoid, Mainly Bunch Grasses with Woody Synusia, Tropical and Subtropical Alpine with Open Stands of Evergreens | This grassland may also have deciduous shrubs and dwarf shrubs. E.g., Puna south of Oruro, Bolivia. |
| 4354 | Herbaceous Vegetation, Short Graminoid, Mainly Bunch Grasses with Woody Synusia, With Dwarf Shrubs | Consists of bunch grass with varying coverage of dwarf shrubs. Cushion plants may also grow in this grassland, and may be locally more important than the dwarf-shrubs. E.g., Puna south of Oruro, Bolivia. |
| 4361 | Herbaceous Vegetation, Short Graminoid, Without Woody Synusia, Short-Grass Communities | These communities may fluctuate in structure and floristic composition due to greatly fluctuating precipitation of the semi-arid climate. E.g., short-grass (Bouteloua gracilis and Buchloe dactyloides) prairie of eastern Colorado. |
| 4362 | Herbaceous Vegetation, Short Graminoid, Without Woody Synusia, Bunch-Grass Communities | E.g., blue tussock (Poa cloensoi) communities of New Zealand, and alpine dry Puna with Festuca orthophylla of northern Chile and southern Bolivia. |
| 4371 | Herbaceous Vegetation, Short Graminoid, Short to Medium Tall Mesophytic Communities, Sodgrass Communities | The grassland is often rich in forbs, and occurs in lower altitudes with a cool, humid climate in North America and Eurasia. Many plants may remain at least partly green during the winter, even below the snow in the higher latitudes. |
| 4372 | Herbaceous Vegetation, Short Graminoid, Short to Medium Tall Mesophytic Communities, Alpine and Subalpine Meadows | These grasslands are usually moist much of the summer due to snow melt water. May be rich in forbs (e.g., Olympic Peninsula, Washington); rich in dwarf-shrubs (e.g., the Rocky Mountains of Colorado); snow-bed communities rich in small forbs and/or forb-like dwarf-shrubs (e.g., Salix herbacea); or avalanche meadows, occurring as narrow strips of grassland between forests on steep slopes of high mountains where avalanches, descending annually in spring, prevent forest growth. |
| 4411 | Herbaceous Vegetation, Forb Vegetation, Tall Communities, Fern Thickets | Ferns occur sometimes in nearly pure stands, especially in humid climates (e.g., Pteridium aquilinum). |
| 4412 | Herbaceous Vegetation, Forb Vegetation, Tall Communities, Mainly Annual | Annual forbs, which germinate in the beginning and die at the end of each growing season, are the dominant form (greater than 50% of forb vegetation). |
| 4413 | Herbaceous Vegetation, Forb Vegetation, Tall Communities, Mainly Perennial Flowering Forbs and Ferns | Some part of the plant is alive all year round. |
| 4421 | Herbaceous Vegetation, Forb Vegetation, Low Communities, Mainly Perennial Flowering Forbs and Ferns | Some part of the plant is alive all year round. |
| 4422 | Herbaceous Vegetation, Forb Vegetation, Low Communities, Mainly Annual | Annual forbs, which germinate in the beginning and die at the end of each growing season, are the dominant form (greater than 50% of forb vegetation). There are several types of low annual forbs: Ephemeral forb communities in tropical and subtropical regions: Forbs grow with very little precipitation where, from autumn to spring, clouds moisten vegetation and soil. The dry season aspect is desert-like. E.g., the coastal hills of Peru and northern Chile Ephemeral or episodical forb communities of arid regions: The flowering desert consists of mostly fast growing forbs, sometimes concentrated in depressions where water can accumulate in shrub or dwarf shrub formations of arid regions. E.g., the Sonoran Desert. |
| 51 | Barren Land, Dry Salt Flats | Occur on flat floored bottoms of interior desert basins. High concentrations of salts are present due to extensive water evaporation. |
| 52 | Barren Land, Sandy Areas | Accumulations of sand/gravel (e.g., beaches or dunes). |
| 53 | Barren Land, Bare Rock | Exposed bedrock, desert pavement, scarps, talus slides, volcanic material, rock glaciers and other accumulations of rock without vegetative cover. |
| 54 | Barren Land, Perennial Snowfields | Accumulations of snow and ice that did not entirely melt during the previous summer, occurring where the daily average temperature is 0?C (32?F) in the warmest summer months. |
| 55 | Barren Land, Glaciers | Snow compacted into firn and finally to ice under weight of successive annual accumulations. Re-frozen melt water contributes to increasing density of the glacial ice mass. All glaciers exhibit evidence of present or past motions (moraines, crevasses, etc.). |
| 56 | Barren Land, Other | Dirt, gravel, other loose rock, etc. |

## Modified UNESCO Classification (MUC) Codes and Glossary

| UC CODE | MUC NAME | DESCRIPTION |
|---|---|---|
| 61 | Wetland, Riverine | Wetlands adjacent to a fresh water river channel (riparian wetlands). |
| 62 | Wetland, Palustrine | Wetlands dominated by trees, shrubs, persistent emergents (plants), mosses, lichens, etc. The wetlands surround water that is less than 1 hectare in size, has no active channel or tide, is less than 2 meters deep, and has low salinity. This water should be included as part of the wetland. |
| 63 | Wetland, Estuarine | Wetlands occurring adjacent to a tidal channel, or in and adjacent to the intertidal zone. An estuary is a water passage where the tide meets the current of a stream. Deepwater tidal habitats and adjacent tidal wetlands are usually semi-enclosed by land but have open, partially obstructed, or sporadic access to ocean water (at least occasionally diluted by freshwater runoff from the land). |
| 64 | Wetland, Lacustrine | Wetlands surrounding open water (e.g., ponds and lakes) that are greater than 1 hectare in size and greater than 2 meters deep. |
| 71 | Open Water, Freshwater | Lakes, ponds, and rivers with low salinity. |
| 72 | Open Water, Marine | Open ocean overlying the continental shelf or an actively flowing tidal channel. |
| 811 | Cultivated Land, Agriculture, Row Crop and Pasture | Examples include corn, wheat, cow pastures, fallow fields, cultivated cranberry bogs, and rice fields. |
| 812 | Cultivated Land, Agriculture, Orchard and Horticulture | Examples include apple orchards, vineyards, and tree nurseries. |
| 813 | Cultivated Land, Agriculture, Confined Livestock Feeding | These areas are found on large farms and are used for feeding beef cattle, dairy cows (with confined feedlots), hogs and poultry. |
| 814 | Cultivated Land, Agriculture, Other Agriculture | Examples include corrals and breeding and training facilities on horse farms. |
| 821 | Cultivated Land, Non-Agriculture, Parks and Athletic Fields | Examples include baseball diamonds, soccer fields, play grounds, and parks. |
| 822 | Cultivated Land, Non-Agriculture, Golf Courses | Golf Courses |
| 823 | Cultivated Land, Non-Agriculture, Cemeteries | Cemeteries |
| 824 | Cultivated Land, Non-Agriculture, Other Non-Agriculture | Any other non-agricultural cultivated areas that do not fit into classes 821, 822 or 823 (parks and playing fields, golf courses, or cemeteries). |
| 91 | Urban, Residential | Greater than 50% of the urban land cover consists of residential property (e.g., apartments, private dwellings) |
| 92 | Urban, Commercial and Industrial | Greater than 50% of the urban land cover consists of commercial or industrial property (e.g., businesses, factories, warehouses) |
| 93 | Urban, Transportation | Greater than 50% of the urban land cover consists of transportation routes (e.g., roads, highways, railroads, and airport runways). |
| 94 | Urban, Other | At least 50% of the urban land cover consists of developed areas that do not fit into residential, commercial, or transportation categories. |