Appendix 5. Structural stages and codes[1]

From *Standards for Terrestrial Ecosystems Mapping in British Columbia*. 1998. Ecosystems Working Group of the Terrestrial Ecosystems Task Force, Resources Inventory Committee.

Structural stage	Description
Post-disturbance stages or environmentally induced structural development	
1 Sparse/bryoid[a]	Initial stages of primary and secondary succession; bryophytes and lichens often dominant, can be up to 100%; time since disturbance <20 years for normal forest succession, may be prolonged (50–100+ years) where there is little or no soil development (bedrock, boulder fields); total shrub and herb cover <20%; total tree layer cover <10%.
Substages	
1a Sparse[a]	<10% vegetation cover
1b Bryoid[a]	Bryophyte- and lichen-dominated communities (>½ of total vegetation cover).
Stand initiation stages or environmentally induced structural development	
2 Herb[a]	Early successional stage or herbaceous communities maintained by environmental conditions or disturbance (e.g., snow fields, avalanche tracks, wetlands, grasslands, **flooding**, intensive grazing, intense fire damage); dominated by herbs (forbs, graminoids, ferns); some invading or residual shrubs and trees may be present; tree layer cover <10%, shrub layer cover <or equal to 20% or <1/3 of total cover, herb-layer cover >20%, or >or equal to 1/3 of total cover; time since disturbance <20 years for normal forest succession; many herbaceous communities are perpetually maintained in this stage.
Substages	
2a Forb -dominated[a]	Herbaceous communities dominated (>½ of the total herb cover) by non-graminoid herbs, including ferns.
2b Graminoid -dominated[a]	Herbaceous communities dominated (>½ of the total herb cover) by grasses, sedges, reeds, and rushes.
2c Aquatic[a]	Herbaceous communities dominated (>½ of the total herb cover) by floating or submerged aquatic plants; does not include sedges growing in marshes with standing water (which are classed as 2b).
2d Dwarf shrub[a]	Communities dominated (>½ of the total herb cover) by dwarf woody species such as *Phyllodoce empetriformis, Cassiope mertensiana, Cassiope tetragona, Arctostaphylos arctica, Salix reticulata,* and *Rhododendron lapponicum*. (See list of dwarf shrubs assigned to the herb layer in the *Field Manual for Describing Terrestrial Ecosystems.)*
3 Shrub/Herb[b]	Early successional stage or shrub communities maintained by environmental conditions or disturbance (e.g., snow fields, avalanche tracks, wetlands, grasslands, **flooding**, intensive grazing, intense fire damage); dominated by shrubby vegetation; seedlings and advance regeneration may be abundant; tree layer cover <10%, shrub layer cover >20% or >or equal to 1/3 of total cover.
Substages	
3a Low shrub[b]	Communities dominated by shrub layer vegetation <2 m tall; may be perpetuated indefinitely by environmental conditions or repeated disturbance; seedlings and advance regeneration may be abundant; time since disturbance <20 years for normal forest succession.

1 In the assessment of structural stage, structural features and age criteria should be considered together. Broadleaf stands will generally be younger than coniferous stands belonging to the same structural stage.

Structural stage	Description
3b Tall shrub[b]	Communities dominated by shrub layer vegetation that are 2–10 m tall; may be perpetuated indefinitely by environmental conditions or repeated disturbance; seedlings and advance regeneration may be abundant; time since disturbance less than 40 years for normal forest succession.
	Stem exclusion stages
4 Pole/Sapling[c]	Trees >10 m tall, typically densely stocked, have overtopped shrub and herb layers; younger stands are vigorous (usually >10–15 years old); older stagnated stands (up to 100 years old) are also included; self-thinning and vertical structure not yet evident in the canopy – this often occurs by age 30 in vigorous broadleaf stands, which are generally younger than coniferous stands at the same structural stage; time since disturbance is usually <40 years for normal forest succession; up to 100+ years for dense (5000–15 000+ stems per hectare) stagnant stands.
5 Young Forest[c]	Self-thinning has become evident and the forest canopy has begun differentiation into distinct layers (dominant, main canopy, and overtopped); vigorous growth and a more open stand than in the pole/sapling stage; time since disturbance is generally 40–80 years but may begin as early as age 30, depending on tree species and ecological conditions.
	Understorey reinitiation stage
6 Mature Forest[c]	Trees established after the last disturbance have matured; a second cycle of shade tolerant trees may have become established; understories become well developed as the canopy opens up; time since disturbance is generally 80–140 years for biogeoclimatic group A[d] and 80–250 years for group B.[e]
	Old-growth stage
7 Old Forest[c]	Old, structurally complex stands composed mainly of shade-tolerant and regenerating tree species, although older seral and long-lived trees from a disturbance such as fire may still dominate the upper canopy; snags and **coarse woody debris** in all stages of decomposition typical, as are patchy understories; understories may include tree species uncommon in the canopy, due to inherent limitations of these species under the given conditions; time since disturbance generally >140 years for biogeoclimatic group A[d] and >250 years for group B.[e]

a Substages 1a, 1b, and 2a–d should be used if photo interpretation is possible, otherwise, stages 1 and 2 should be used.

b Substages 3a and 3b may, for example, include very old krummholz less than 2 m tall and very old, low productivity stands (e.g., bog woodlands) <10 m tall, respectively. Stage 3, without additional substages, should be used for regenerating forest communities that are herb- or shrub-dominated, including shrub layers consisting of only 10–20% tree species, and undergoing normal succession toward climax forest (e.g., recent cut-over areas or burned areas).

c Structural stages 4–7 will typically be estimated from a combination of attributes based on forest inventory maps and aerial photography. In addition to structural stage designation, actual age for forested units can be estimated and included as an attribute in the database, if required.

d Biogeoclimatic Group A includes BWBSdk, BWBSmw, BWBSwk, BWBSvk, ESSFdc, ESSFdk, ESSFdv, ESSFxc, ICHdk, ICHdw, ICHmk1, ICHmk2, ICHmw3, MS (all subzones), SBPS (all subzones), SBSdh, SBSdk, SBSdw, SBSmc, SBSmh, SBSmk, SBSmm, SBSmw, SBSwk1 (on plateau), and SBSwk3.

e Biogeoclimatic Group B includes all other biogeoclimatic units (see Appendix C).