

Successional Development

Succession, as defined by Odum (1971), is an orderly process of community development that involves changes in species structure and community processes with time; it is reasonably directional and, therefore, predictable.

Successional development generally proceeds through a number of distinct stages (e.g. early, middle, late) that replace one another in a predictable sequence and which culminates in a relatively stable and self-perpetuating community condition called a climax. Climax communities are not static, but are subject to gradual long-term renewal, maintaining themselves (more or less) until stand-level disturbance causes a return to an earlier successional stage.

A climatic (or zonal) climax results when a forest community reflects regional climate norms and is not unduly affected by local extremes in site conditions. Although Nova Scotia is divided into nine climate-based ecoregions (Neily et al. 2005), for FEC purposes the province can be effectively represented by two ELC groups, referred to as Acadian and Maritime Boreal (See *Forest Ecosystem Classification for Nova Scotia: Part III Ecosites (2010)* for more details).

In the Acadian group, zonal climax forests are dominated by species such as hemlock, red spruce, sugar maple and beech. In the Maritime Boreal group, climax species include white spruce, balsam fir, red maple and white birch.

An edaphic climax results when a forest community cannot progress to the climatic climax due to local extremes in site conditions (e.g. low nutrient sites, dry sites, wet sites and floodplain sites). Species associated with these sites include black spruce, tamarack, red maple, pine and white ash.

Figures 3 to 7 summarize possible successional links between VTs in the Spruce Hemlock (SH), Spruce Pine (SP), Tolerant Hardwood (TH), Intolerant Hardwood (IH) and Mixedwood (MW) forest groups – the main forest groups found in the province.

Information contained in Figures 3 to 7 can be used to aid forest management planning; however, users are reminded that many variables can (and do) affect stand successional dynamics including: (i) the type and size of disturbance, (ii) the frequency and severity of disturbance, (iii) age class and structure at time of disturbance, (iv) presence / absence of advanced regeneration, and (v) presence / absence of seed sources, etc. As a result, the successional links shown in Figures 3 to 7 should be considered a guide to what is possible, not a hard and fast rule or prescription.

Figure 3. Spruce Hemlock (SH) Forest Group – Successional Links

	Early	Middle	Late
SH1	IH3, IH4, IH6, MW4, MW5	MW2, SH5, SH6, SH8	MW3, SH1 , SH2, SH3
SH2	IH4, IH6, MW4, MW5	MW2, SH5, SH6, SH8	SH1, SH2 , SH3
SH3	IH3, IH4, IH5, IH6, MW4, MW5	MW2, SH5, SH6, SH7, SH8	SH1, SH2, SH3
SH4	IH1, IH2, IH4, IH6, MW4, MW5	MW2, SH5, SH8, SH9	SH4
SH5	IH3, IH4, IH5, IH6, MW4, MW5	MW2, SH5 , SH7, SH8	MW1, MW3, SH1, SH2, SH3, SH4
SH6	IH3, IH4, IH5, IH6, MW4, MW5	MW2, SH6 , SH7, SH8	MW1, MW3, SH1, SH2, SH3
SH7	IH3, IH4, IH5, IH6, MW4	MW2, SH5, SH6, SH7 , SH8	MW1, MW3, SH3
SH8	IH3, IH4, IH5, IH6, MW5	SH5, SH6, SH7, SH8 , SH10	MW1, MW3, SH1, SH2, SH3, SH4
SH9	IH4, IH6	SH9 , SP4	SH4, SP5
SH10	IH4, IH6, MW4, MW5	SH8, SH10 , TH7	MW1, MW3, TH8

Figure 4. Spruce Pine (SP) Forest Group – Successional Links

	Early	Middle	Late
SP1	SP1	SP2, SP3, SP4	SP5
SP2	SP1, SP2	SP3, SP4	SP5
SP3	SP1, SP2	SP3 , SP4	SP5
SP4	SH9, SP1, SP2, SP8, SP9, SP10	IH2, SP3, SP4 , SP6	SP5
SP5	SH9, SP1, SP2, SP8, SP10	SP3, SP4, SP6	SP5
SP6	IH1, SP8, SP10	SP4, SP6	SP5
SP7	SP7	SP7	SP7
SP8	SP8	SP4, SP6	SP5, SP9
SP9	IH1, SP8	IH2, SP4	SP9
SP10	SP10	SP4, SP6	SP5

Figure 5. Intolerant Hardwood (IH) Forest Group – Successional Links

	Early	Middle	Late
IH1	IH1 , IH2	SP6	SH4, SP9
IH2	IH1, IH2	SP4	SH4, SP9
IH3	IH3 , IH4, IH5, IH6	IH7, MW2, SH5, SH6, SH7, SH8	MW1, MW3, SH1, SH3, TH1, TH2, TH3, TH4, TH6, TH8
IH4	IH4	IH7, MW2, MW4, SH5, SH6, SH7, SH8, SH9, SH10	MW1, MW3, SH1, SH2, SH3, SH4, TH6, TH8
IH5	IH5 , MW5	IH7, MW4, SH5, SH6, SH7, SH8	MW1, MW3, SH3, TH1, TH2, TH3, TH4, TH8
IH6	IH6	IH7, MW2, SH5, SH6, SH7, SH8, SH9, SH10	MW1, MW3, SH1, SH2, SH3, SH4, TH1, TH2, TH6, TH8
IH7	IH3, IH4, IH5, IH6	IH7 , TH7	MW1, TH1, TH2, TH3, TH6, TH8

Figure 6. Tolerant Hardwood (TH) Forest Group – Successional Links

	Early	Middle	Late
TH1	IH3, IH5, IH6	IH7, TH6, TH7	TH1 , TH8
TH2	IH3, IH5, IH6	IH7, TH6, TH7	TH2 , TH8
TH3	IH3, IH5	IH7	TH3
TH4	IH3, IH5		TH4
TH5		IH7	TH1, TH2, TH5
TH6	IH3, IH4, IH6	IH7	TH1, TH2, TH6
TH7	MW4, MW5	IH7, SH10, TH7	MW1, MW3, TH1, TH2
TH8	IH3, IH4, IH5, IH6	IH7, SH10	TH1, TH2, TH8

Figure 7. Mixedwood (MW) Forest Group – Successional Links

	Early	Middle	Late
MW1	IH3, IH4, IH5, IH6, MW4, MW5, SH8	IH7, MW2, SH5, SH6, SH7, SH10, TH7	MW1 , MW3
MW2	IH3, IH4, IH6, MW4, MW5	MW2 , SH5, SH6, SH7	MW1, MW3, SH1, SH2, SH3, SH4
MW3	IH3, IH4, IH5, IH6, MW4, MW5, SH8	MW2, SH5, SH6, SH7, SH10, TH7	MW1, MW3 , SH1
MW4	IH4, IH5	MW2, MW4 , SH5, SH6, SH7, SH10, TH7	MW1, MW3, SH1, SH2, SH3, SH4
MW5	IH5, MW5	MW2, SH5, SH6, SH8, SH10, TH7	MW1, MW3, SH1, SH2, SH3, SH4