Ecohydrology

Here are some generic parameters for modeling plant evaporation potential using the crop coefficient method. We assume 5 development stages:

I = slow development stage (early spring / recently planted)
II = rapid growth stage
III = fully developed canopy
IV = Senescence
V = dormancy or winter.

Some Useful Plant Properties

	T_b (°C)	GDD$_{max}$ (°C)	K_{cmin}	K_{cmax}	Z_{rmin} (mm)	Z_{rmax} (mm)
Deciduous, mixed forest,	1	2500	0.25	1	1500	1500
shurbland	1	2500	0.2	1	750	750
Conifer forest	o	2500	0.9	0.9	1500	1500
Natural grassland	-1	3000	0.2	1	600	600
Hay, fallow, alfalfa, pasture	-1	3000	0.2	1	600	600
Row crops, small grains	5	2000	0.1	1	75	750
Recreational grasslands	10	2500	0.4	1	75	300

T_b is the base temperature for calculating growing degree days (GDD)
K_c is the crop coefficient for adjusting PET to reflect the crop capacity to transpire
Z_r is the root depth

Percent of GDD$_{max}$ at which each stage begins

	I	II	III	IV	V
Deciduous, mixed forest,	0	10	22.5	90	100
shurbland	0	7.5	12.5	95	100
Conifer forest	0	5	10	95	100
Natural grassland	0	5	10	95	100
Hay, fallow, alfalfa, pasture	0	15	40	90	100
Row crops, small grains	0	7.5	17.5	85	100

Growth factor for each stage

$$\alpha_I = \frac{GDD}{GDD_{IV}}$$

$$\alpha_{II} = 1 + \frac{(GDD - GDD_{II})}{GDD_{IV}} \frac{(GDD_{IV} - GDD_{II})}{(GDD_{III} - GDD_{II})}$$

$$\alpha_{III} = 1$$

$$\alpha_{IV} = 1 - 0.6 \frac{(GDD - GDD_{IV})}{(GDD_{Max} - GDD_{IV})}$$

$$\alpha_V = 0$$

Calculating K_c and Z_r

$$K_{c,i} = K_{cmin} + \alpha_i (K_{cmax} - K_{cmin})$$
$$Z_{r,i} = Z_{rmin} + \alpha_i (Z_{rmax} - Z_{rmin})$$