

Appendix J: Method for Determining Principal Ecosystem Units

Detailed site series descriptions can be found in the draft Guide to *the Grassland Ecosystems of the Cariboo Forest Region* (Coupé, in progress). Note: Site series that do not occur in the Churn Creek Protected Area have not been included; the only forested site series included are forested riparian areas in the Lower and Middle Grasslands; and some small, infrequently occurring ecosystems such as bedrock outcrops and cliffs were not included.

Principal Ecosystem Unit	Physical Description	Equivalent Site Series*
LOWER GRASSLANDS (BGxh3)		
Talus	steep, rubbly slopes	/81
Gentle Slopes and Terraces – Sage dominated	Big sage dominated sites on glaciofluvial & glaciolacustrine terraces along the Fraser River & gently sloping & rolling areas of various materials	/01 – in part /80 – in part
Gentle Slopes and Terraces – Grass dominated	As above, but grass-dominated with little or no big sage	/01 – in part, /80 – in part, /84, /85
Moist Depressions and Swales	Swales, depressions and basins that collect snow or runoff; grass or shrub dominated	/51, /86, /88
Steep cool slopes – Grass Dominated	Steep cool slopes with vigorous & continuous grass cover	/87
Steep slopes – Sparsely Vegetated	Steep, actively eroding slopes, often with less than 10% vegetation; occur on all aspects but are most common on warm aspects	/01b (cool aspects) /82 (warm aspects) /83a (warm aspects)
Moderate to steep slopes – Sage dominated	Moderate to steep slopes dominated by big sage; occur on a variety of materials and aspects	/01 in part (cool aspects) /80 in part (rock outcrops) /83b (warm aspects)
Streamside riparian	Shrubby or treed riparian areas with permanent or intermittent water flow; includes gullies, creeks & floodplains	/03, /04, /05, /06, /52, /53
Lakeshore Riparian and Wetlands	Ponds, lakes & their associated shrubby or graminoid riparian vegetation; marshes & wet meadows	/30

MIDDLE GRASSLANDS (BG_{xw}2)		
Talus	Steep, rubbly slopes	/82
Gentle to Moderate Slopes and Terraces	Gently to moderately sloping & rolling areas of various materials on all aspects; also glaciolacustrine & glaciofluvial terraces	/01 in part /84, /85
Moist Depressions and Swales	Swales, depressions & basins that collect snow or runoff; may be grass or shrub dominated	/87, /88, /50 in part
Steep Cool Slopes	Steep cool slopes with vigorous & continuous grass cover	/86
Steep Warm Slopes	Steep warm slopes; often with some surface erosion; often have big sage	/83
Aspen Copses	Aspen dominated depressions within a grassland matrix	/06
Streamside Riparian	Shrubby or treed riparian areas with permanent or intermittent water flow; includes gullies, creeks & floodplains	/05, /07
Lakeshore Riparian and Wetlands	Ponds, lakes & their associated shrubby or graminoid riparian vegetation; marshes & wet meadows	/30, /31, /32, /33, /50 in part, /60, /61
UPPER GRASSLANDS (IDF_{xm}, IDF_{dk}4)		
Talus	Steep, rubbly slopes	
Gentle to Moderate Slopes and Terraces	Gently to moderately sloping & rolling areas of mostly morainal materials; all aspects	/82, /83, /84, /85 in part
Moist Depressions and Swales	Swales, depressions & basins that collect snow or runoff; grass &/or shrub dominated	/86, /87
Steep Cool Slopes	Steep cool slopes with vigorous & continuous grass cover	/85 in part
Steep Warm Slopes	Steep warm slopes; often some surface erosion	/81
Aspen Copses	Aspen dominated depressions within a grassland matrix	
Lakeshore Riparian and Wetlands	Ponds, lakes & their associated shrubby or graminoid riparian vegetation; marshes & wet meadows	/30, /31, /32, /33, /34, /35, /36, /60, /61, /62

The following slope classes were used:

Level and gentle: 0-15%
 Moderate: 16-30%
 Steep: > 30%

The following aspect classes were used:

Warm: 135 – 314 degrees
 Cool: 315 – 360 & 0 – 134 degrees

Appendix K: Current Condition of Principal Ecosystem Units by Biogeoclimatic subzone

Method for Assessing Current Condition of Grasslands

Assessment of the current condition of the grasslands began with a two-day calibration trip for the personnel performing the assessments.²¹ A wide variety of sites throughout the Churn Creek Protected Area were visually assessed as a group so team members would have a common approach to assessing seral stages and Potential Natural Community.

Each individual on the assessment team was assigned a Range Unit within the Protected Area. Assessments consisted of visual estimates of seral stages for all Principal Ecosystem Units in that range unit (see example table below). Team members were also asked to assess broad patterns of ungulate (sheep and deer) and cattle use as well as any noxious weeds that were encountered. Only riparian areas that occurred in grassland areas were assessed.

On average, team members spent one to three days of field time traversing each Range Unit (depending on unit size). Notes on seral stage were recorded on maps and/or airphotos. Where available, these maps and copies of the airphotos have been put on file with BC Parks for use as reference points in future seral stage assessments. These assessments represent estimates and have not been verified with detailed quantitative sampling.

Because it was not feasible to assess all ecosystems (site series), site series were grouped into Principal Ecosystem Units based on broad terrain features easily recognized in the landscape. Details on how site series were grouped into Principal Ecosystem Units can be found in *Appendix J: Method for Determining Principal Ecosystem Units*.

After each team member had assessed the seral condition of their assigned Range Unit, they entered their data into a table. The numbers in the table represent how much of a Principal Ecosystem Unit is in a particular seral stage condition:²²

- 0 = 0%
- 1 = 1-10%
- 2 = 11-35%
- 3 = 36-65%
- 4 = 66-84%
- 5 = ≥85%

²¹ Staff from the Research and Range sections of the Ministry of Forests and the Ministry of Environment, Lands, and Parks and a Grasslands Conservation Council volunteer.

²² Percentage classes were used because seral stage assessments were not detailed enough to actually determine exact percentages.

For example, in the sample below, assume there are approximately 100 hectares of Steep cool slopes in a given range unit and the assessment indicated approximately 20 hectares were in early seral condition. $20 \text{ hectares} \div 100 \text{ hectares} = 20\%$ in early seral, therefore the number 2 is entered in the early column.

Bolded numbers indicate that the seral stage target for that class has not been met. The table shows, at a glance, in which Principal Ecosystem Unit seral stage targets have been met and in which Principal Ecosystem Unit they have not been met.

(SAMPLE ONLY)
**Current Seral Condition of Principal Ecosystem Units
 in the Make-Believe Range Unit**

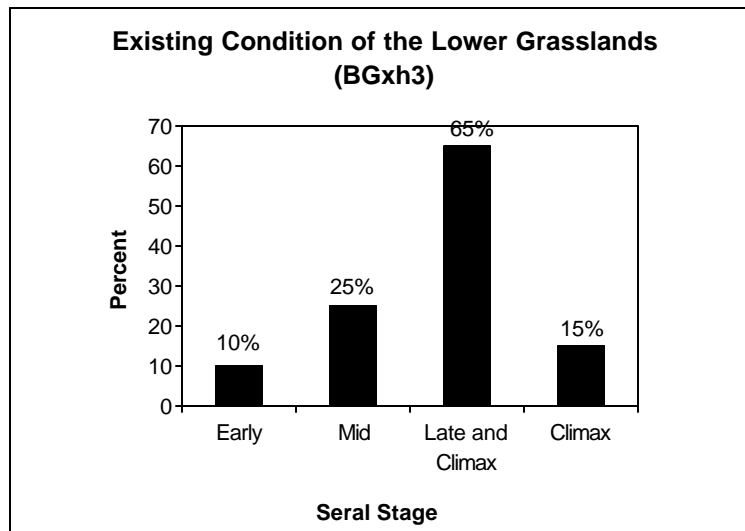
Principal Ecosystem Unit	Seral Stage Representation			
	Early	Mid	Late+Climax	Climax
Target	<1	-	5	=2
Lower Grasslands				
Talus	0	0	5	5
Gentle slopes and terraces – sage dominated	3	3	2	0
Moist depressions and swales	2	4	0	0
Steep cool slopes	2	4	1	0
Steep warm slopes	0	1	5	4

After all Range Units were assessed, the individuals who completed the assessments met as a group to compile and share information from each Range Unit. Based on this compilation, the assessment team then determined an overall seral stage assessment for each Principal Ecosystem Unit for each *biogeoclimatic subzone*. This information was then used to produce a summary table in the same format as above for each of the Upper, Middle and Lower Grasslands.

Since exact area in hectares and exact percentages of each Principal Ecosystem Unit were not available, this process was very approximate. However, for Principal Ecosystem Units with relatively uniform seral stages (i.e. Talus, Steep warm slopes and Steep cool slopes), it was very straightforward to determine overall seral stage distributions.

Current Condition of the Lower Grasslands

The current condition of the Lower Grasslands is estimated to be predominantly late seral stage. An estimated 65% is in combined late and climax, 15% in climax seral stage, 10% in early seral stage and mid seral estimated at 25% (see graph below).²³ It should be noted that considerable portions of the early and mid seral condition areas are caused by sheep and deer grazing, not domestic livestock.



Late seral condition areas occur predominantly on the steep grassy and eroded slopes that occupy a large part of the Lower Grassland landscape. Most of the early and mid seral areas occur on gentle and moderate sage and grass dominated slopes. The following specific areas are currently in early or mid seral stages:

- ◆ the majority of the lower terraces along the Fraser River (including McGhee Flats);
- ◆ the level and gently sloping sagebrush areas of the Coal Pit Pasture;
- ◆ the level and gently sloping sagebrush areas south of the Home Field and between Grinder and Higgenbottom Creeks; and,
- ◆ portions of the level and gently sloping, easily accessed areas in the northern portion of the Fraser North Range Unit.

The gentle slopes above the Fraser River are in early and mid seral stages almost exclusively as a result of the very heavy use by California Bighorn Sheep.

²³ Note that these figures do not add to 100%. The reason is that late and climax seral conditions are considered *together* for assessment purposes. For example, in this case, late and climax together comprise 65% of the lower grasslands, with 15% being in climax seral condition. This means that 50% would, by default, be in late seral stage. 10% early, 25% mid and 65% late and climax = 100%

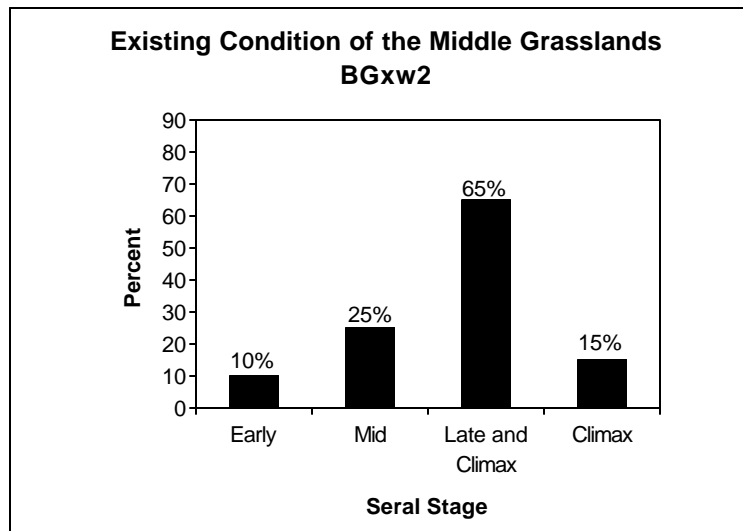
**Current Seral Condition of Principal Ecosystem Units
in the Lower Grasslands (BGxh)**

Principal Ecosystem Unit	Seral Stage Representation			
	Early	Mid	Late+Climax	Climax
Target	=1	-	5	=2
Lower Grasslands				
Talus	1	1	5	5
Gentle slopes and terraces – sage	2	3	2	1
Gentle slopes and terraces – grass	2	3	2	1
Moist depressions and swales	4	0	2	1
Steep slopes – sparsely vegetated	1	1	5	4
Steep cool slopes	0	2	5	2
Moderate to steep slopes –sage	1	4	2	1
Lakeshore riparian and wetlands	2	4	1	0
Streamside riparian	1	2	4	1

The Lower Grasslands have fewer riparian areas than other biogeoclimatic units in Churn Creek. As a result, lakeshore and wetland riparian areas have received significant use by both wildlife and cattle and have generally been heavily impacted. However, streamside riparian areas with limited water supply are mostly late seral.

Current Condition of the Middle Grasslands

Current condition of the Middle Grasslands is estimated to be predominantly late seral stage with significant areas in mid seral stage. Combined late and climax seral stages are estimated to cover 65% of the Middle Grasslands, with approximately 15% in climax stages. Early seral condition is estimated to be 10% with about 25% in mid seral stage (see graph below).



The Middle Grasslands encompass all the mid elevation slopes of the Fraser River valley as well as Churn Flats, Gooseberry Flats, Dry Lake and the cattle handling facilities and hayfields of the

Empire Valley Ranch. Impacts from California bighorn sheep and mule deer are much less significant here than in the Lower Grasslands.

**Current Seral Condition of Principal Ecosystem Units
in the Middle Grasslands (BGxw)**

Principal Ecosystem Unit	Serai Stage Representation			
	Early	Mid	Late+Climax	Climax
Target	=1	-	5	=2
Middle Grasslands				
Talus	1	1	5	5
Gentle slopes and terraces	1	2	3	1
Aspen copses	1	2	3	1
Moist depressions and swales	2	3	2	2
Steep warm slopes	1	1	5	3
Steep cool slopes	1	2	5	3
Lakeshore riparian and wetlands	3	3	1	1
Streamside riparian	1	2	4	1

The majority of late seral grasslands are concentrated in the following areas:

- ◆ Churn Flats;
- ◆ Sheep Point;
- ◆ eastern portions of Airport Flats;
- ◆ steep slopes;
- ◆ Gooseberry Range Unit; and,
- ◆ Table Mountain.

Most early and mid seral stage grasslands are located:

- ◆ south of the ranch headquarters;
- ◆ at Eagle Tree;
- ◆ in the western portions of Airport Flats;
- ◆ at Wycott Flats; and,
- ◆ in significant portions of Murdock and Hartmann pastures.

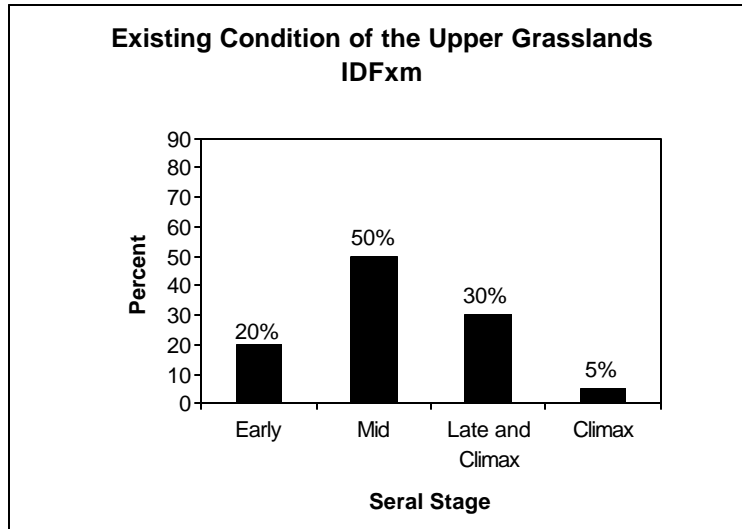
The Middle Grasslands have extensive road access throughout. Weeds are also more common here than in the Lower Grasslands, with hounds-tongue on moist sites, burdock on wet sites, cocklebur in some marshes, and local infestations of both knapweed and leafy spurge.

The Middle Grasslands have a diversity of riparian areas, including kettle lakes, the artificial wetlands and lakes of the Koster and Grinder systems, a number of natural stream systems and

numerous gullies with ephemeral streams. Many of these riparian areas are in early seral condition.

Current Condition of the Upper Grasslands

The Upper Grasslands throughout the Protected are estimated to be predominantly in mid seral condition. Mid seral is estimated at 50%, with early seral at 20% and 30% estimated to be in combined late and climax seral condition. Climax comprises approximately 5% of the Upper Grasslands.



A number of areas in the Upper Grasslands (Alkali Flats, Maytag Pasture, BC Pasture, Lease Pasture and Holding Pasture) were the private, fenced pastures of the Empire Valley Ranch. These “Specialty Pastures” were used for branding, breeding, de-burring, livestock handling and isolating cattle. Because of this focused use, these pastures have some of the largest concentration of early seral stage grasslands in the Protected Area.

Current Seral Condition of Principal Ecosystem Units in the Upper Grasslands (IDFXm)

Principal Ecosystem Unit	Seral Stage Representation			
	Early	Mid	Late+Climax	Climax
Target	=1	-	5	=2
Upper Grasslands				
Talus	1	1	5	1
Gentle slopes and terraces	2	3	2	1
Lakeshore riparian	2	3	2	1
Moist depressions and swales	2	4	2	0
Steep warm slopes	1	2	4	2
Steep cool slopes	1	2	5	4

Aspen copses

2

3

2

1

Most wetland and streamside riparian areas in the Upper Grasslands are in early to mid seral condition. Examples include Goose Lakes and Blackwater Lakes, Grouse Lake and Hog Lake.

Late seral grasslands can be found:

- ◆ on the steeper slopes within the Fraser South Range Unit;
- ◆ portions of the level and gently sloping grasslands on Clyde Mountain; and,
- ◆ on the moderate and steep slopes of Gooseberry and Churn Creek Range Units.

The Upper Grasslands also have a significant component of grassland/forest interface. Partially as the result of fire suppression and partially as a result of diminished fuel loading caused by continuous grazing, fire has been virtually eliminated from the natural functioning ecosystem in the grasslands. The effect is that Douglas-fir seedlings, which historically would have been killed by fire, have been “encroaching” onto the upper grasslands for many years.

Encroachment is discussed in more detail in *Section 4.4. Vegetation and Forest Health*, and a map of recent encroachment in the Protected Area can be found in *Appendix B – Encroachment*

Appendix L : Churn Creek Protected Area Order in Council

PROVINCE OF BRITISH COLUMBIA
ORDER OF THE LIEUTENANT GOVERNOR IN COUNCIL

Order in Council Number : **0151** , Approved and Ordered : **FEB 11 1998**

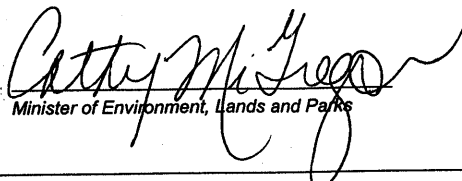



Lieutenant Governor

Executive Council Chambers, Victoria

On the recommendation of the undersigned, the Lieutenant Governor, by and with the advice and consent of the Executive Council, orders that, on the recommendation of the Environment and Land Use Committee,

- (a) Order in Council 177/96 is rescinded, and
- (b) the attached Churn Creek Protected Area Order is made.



Minister of Environment, Lands and Parks

Presiding Member of the Executive Council

(This part is for administrative purposes only and is not part of the Order)

Authority under which Order is made:

Act and section: *Environment and Land Use Act*, RSBC 1996, c.117, section 7 (1)

Other (specify): *Park Act*, RSBC 1996, c. 344, section 6; o.c. 177/96

January 15, 1998

59 /98/37/mgm