

Standard Operating Procedure 12

Recording Physical and Biotic Characteristics

Overview

This SOP contains instructions for recording physical and biotic characteristics of FPMRIS Sample Points. The *Physical and Biotic Characteristics Form* is to be completed each time a Sample Point is re-measured. An example form is shown in Appendix 12.1.

Glossary of definitions

Aspect: the direction that a slope faces. It identifies the steepest downslope direction at a location on a surface. It can be thought of as the compass direction a hill faces.

Sample Point: Nominal grid point, defined in a GIS, on a Victoria 2 km point grid.

Sample Point Location: Point established in the field using differential GPS, on or very close to the Sample Point.

Sample Point Location Plot: A circular plot estimated to have a radius of approximately 15 m with its centre at the Sample Point Location. It is used as a reference plot for recording physical and biotic characteristics of the Sample Point Location.

Sample Point Location Sketch Map: a hand drawn map of the site

Slope: The degree to which a surface tends upward or downward.

Topographic position: describes the location of a site in a landscape context according to slope position and elevation. It is very scale dependent so topographic position of a Sample Point is assigned with consideration given to the surrounding landscape at a larger scale. Categories used include: Ridge, Upper Slope, Middle Slope, Lower Slope, Gully and Plain (or Flat Slope).

Equipment list

Field computer containing Field Forms

Paper copy of *Physical and Biotic Characteristics Form*

Clinometer

Compass

Procedure

Topographic Features

Assessing and describing Topographic Features of the Sample Point: From the Sample Point Location, determine an approximate boundary of 15 metres radius (hereafter called the "Sample Point Location Plot") and conduct an evaluation of slope, aspect and topographic position.

Slope is determined by sighting the clinometer along a line parallel to the average incline (or decline). This angle is measured along the shortest pathway down slope before the drainage direction changes. To

measure slope, the Contractor Field Crew member should stand at the uphill edge of the Sample Point Location Plot and sight a second Contractor Field Crew member who stands at the downhill edge of the Sample Point Location Plot. Sight the second crew member at the same height as the eyelevel of the first crew member. Read the slope directly from the degrees scale of the clinometer.

If slope changes gradually across the Sample Point Location Plot, record an average slope. If slope changes across the Sample Point Location Plot but the slope is predominately of one direction, record the dominant slope degrees rather than the average. If the Sample Point Location Plot falls directly on or straddles a gully bottom or narrow ridge top, record the average slope of the side hill(s). If the Sample Point Location Plot falls on a gully bottom or on a narrow ridge top, but most of the area lies on one side hill, record the slope of the side hill where most of the area lies.

Aspect is determined along the downslope direction for land surfaces with at least 5 percent slope in a generally uniform direction. If slope is less than 5 percent, aspect will be recorded as N/A. Aspect is measured with a hand compass along the same direction used to determine slope.

If aspect changes gradually across the Sample Point Location Plot, record an average aspect. If aspect changes across the Sample Point Location Plot but the aspect is predominately of one direction, record the dominant direction rather than the average. If the Sample Point Location Plot falls on or straddles a gully bottom or narrow ridge top, record the aspect of the ridgeline or canyon bottom. If the Sample Point Location Plot falls on a gully bottom or on a narrow ridge top, but most of the area lies on one side hill, record the aspect of the side hill.

Topographic position describes the location of a site in a landscape context according to slope position and elevation. It is very scale dependent so for the purpose of this SOP, the topographic position of a Sample Point is assigned with consideration given to the surrounding landscape. The scale of this perspective is from the tops of the mountains to the main valley bottoms, usually 300 m in most mountainous regions. Refer to Appendix 12.2 for a description of topographic position categories.

Surface Water

Assess the presence of surface water at the Sample Point Location Plot. The Contractor Field Crew makes an assessment of the presence of surface water on the Sample Point Location Plot, noting the source which has the greatest impact on the Plot (refer to Table 12.1 for surface water descriptions). Table 12.1 follows a hierarchy, with sources listed in order from large permanent water to temporary water that does not qualify as a separate condition. This variable can be used for recreation, wildlife, hydrology, and timber availability studies.

Table 12.1: Surface Water source codes and descriptions

Code	Description
0	None – no water sources within the Sample Point Location Plot
1	Permanent streams or ponds
2	Permanent water in the form of deep swamps, bogs, marshes with or without standing trees present
3	Ditch/canal - human-made channels used as a means of moving water, such as irrigation channels or drains
4	Temporary streams
5	Flood zones - evidence of flooding when bodies of water exceed their natural banks
9	Other temporary water - specify in notes

Tree Disturbance

Assess the extent and type of Tree Disturbance at the Sample Point Location Plot. Disturbance may be described as a discreet force that has caused significant change in the structure and/or composition of a forest during the last 5 years (e.g. a change resulting in the normal growth pattern being significantly reduced). Disturbance can result from natural physical events such as fire, flood or wind throw; from mortality events caused by insect attacks or disease outbreaks; and, from human activity such as harvesting and thinning. Where disturbance is present in the plot the Contractor Field Crew should:

- Estimate the extent of tree disturbance as the proportion of forest on the Sample Point Location Plot that has been disturbed (expressed as either ground area, density or standing volume effected), and
- Identify the type or agent of disturbance.

Table 12.3 in Appendix 12.3 lists the disturbance types and agents. A plot may have been subjected to more than one disturbance event – all types, proportions and severities of disturbance should be recorded.

Sketch Map

Describing and Mapping the Site: Describe the site at the Sample Point Location Plot in terms of forest, partial forest, grass, road etc. The assessor is required to be diligent in noting the portion of the Sample Point Location Plot that is forested. Create a "Sample Point Location Sketch Map" of the plot. An example is shown in in Appendix 12.1.

Data and information recording

Complete the Identification section: at the top of the *Physical and Biotic Characteristics Form* the Contractor Field Crew Leader fills in the <Sample Point Identification Code>, <Bioregion>, <SOP version> number, <Date>, <Contractor Company> name and the names of each Contractor Field Crew member present. The Contractor Field Crew Leader should be the first name recorded in the Identification section of the form. The crew member who enters information on the form (i.e. the scribe) checks the box <Scribe> next to their name.

Complete the Topographic features section: Record the slope across the Location Plot to the nearest degree in the <slope> field. Record the aspect across the Location Plot, to the nearest 1-degree in the <aspect> field. Record the topographic position of the Location Plot in the <topographic position> field and note any comments in the <comments to clarify choices above> field.

Record information about surface water sources: In the water section, record the water source that has the greatest impact on the area within the Sample Point Location Plot. Record water source code(s) in the <water on plot> section of the *Physical and Biotic Characteristics Form*.

Complete the disturbance section: Record any disturbance at the Sample Point Location Plot that has occurred in the last five years is by checking the <disturbance present> box in the disturbance section. Under the field <disturbance> fill in type or agent of disturbance. For each type/agent of disturbance listed, fill in the proportion of the forested area affected (<25%, 25-50%, 50-75% and >75%) in the <extent> field and the method for estimating the extent of disturbance (density, standing volume, plot area). Table 12.3 in Appendix 12.3 contains a list of disturbance types and agents, as well as severity class definitions.

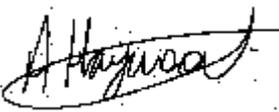
Complete the Site Description and Diagram: Standing at the Sample Point Location Plot centre, clearly and legibly map and describe an estimated 15 metre radius. Sketch the plot using the <sample point location sketch map> field ensuring all components are clearly labelled and a legend is

provided. Record any relevant comments in the <comments> field.

Complete the Field Form Check section at the bottom of the form: the Contractor Field Crew Leader initials the <Team Leader Initials> field, enters the date <Date checked> and writes down any comments about data verification in the <comments> field.

Complete the Data Entry Check section at the bottom of the form: the Field Crew member who enters the data into the Working Database writes their surname in the <Contractor Surname> field and the date data entry was completed for the form in <Date entered>.

Version (current)	Version (previous)	Author	Date	Summary of changes
0.0		KT22	04/02/2010	Initial
0.0	0.0	AH24	15/02/2010	Added form details. Created template of form in xls.
0.0	0.0	KT22	13/04/2010	Edits following team discussion (23/03/2010)
0.1	0.0	Nb29	30/04/2010	Further edits and insertion of topographic position categories
0.1	0.0	Nb29	10/05/2010	
0.1	0.0	Nb29	22/06/2010	Substantive changes made. Navigation and task sections removed as these were duplicated in SOP 11: Event Log Form. Added sections on surface water and disturbance from SOP11. Created a new term "Sample Point Location Plot" as an area of reference for assessments related to this SOP.
0.2	0.1		19/07/2010	Revisions made following review meeting
1.0	0.2		06/08/2010	Revisions accepted
1.1	1.0	mw0a	04/07/2011	Amendments made post field season 1

Endorsed			Date	18/02/2011
Name:	Andrew Haywood			
Position:	Manager, Knowledge Unit			
Division/Branch:	Forests and Parks Division / Management and Operations Branch			

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Example Physical and Biotic Characteristics Form – page 1

IDENTIFICATION			
Sample Point ID	PE2875N2430	SOP 12: Recording Physical and Biotic Characteristics	
Bioregion	SEC	SOP version	1.0
Date (DD/MM/YYYY)	15/06/2010	Contractor Company	Company Name Ltd.
Field Crew Member #	Contractor Field Crew Member Surname	Contractor Field Crew Member First Name	Scribe
1 (Team Leader)	Smith	Jo	<input checked="" type="checkbox"/>
2	Jones	Kim	<input type="checkbox"/>
3	Williams	Alex	<input type="checkbox"/>
4			<input type="checkbox"/>
5			<input type="checkbox"/>

TOPOGRAPHIC FEATURES	
Slope (degrees)	12
Aspect (magnetic)	284

Topographic Position	
Ridge	<input type="checkbox"/>
Upper Slope	<input checked="" type="checkbox"/>
Middle Slope	<input type="checkbox"/>
Lower Slope	<input type="checkbox"/>
Valley	<input type="checkbox"/>
Plain	<input type="checkbox"/>

Comments to Clarify Choices Above:

Sample point position is not quite on top of the ridge and also some distance from the gully. Slope is pre dominantly NW facing, dry with no surface water present.

SURFACE WATER	
Type	Present
None	<input checked="" type="checkbox"/>
Permanent streams or ponds	<input type="checkbox"/>
Permanent deep swamps, bogs, marshes	<input type="checkbox"/>
Ditch/Canal	<input type="checkbox"/>
Temporary Streams	<input type="checkbox"/>
Flooding	<input type="checkbox"/>
Other	<input type="checkbox"/> Other Type (specify)

TREE DISTURBANCE					
Disturbance Present					
None	<input type="checkbox"/>	Method for estimating extent of disturbance (select 1 for each disturbance agent/type listed)			
Yes	<input checked="" type="checkbox"/>				
Type/Agent of Disturbance	Extent Disturbed 1: <25%, 2: 25-50%, 3: 50-75%, 4: >75%	Basal Area	Stems per hectare	Volume	Area of forest
FI	4	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
WT	1	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HA	2	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Field Form Check			
Team Leader Initials	JS	Comments	
Date checked (DD/MM/YYYY)	15/06/2010		
Data Entry			
Date entered (DD/MM/YYYY)	21/06/2010	Contractor Surname	Williams

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Example Physical and Biotic Characteristics Form – page 2

SAMPLE POINT LOCATION SKETCH MAP

Features will be marked on this map during plot set up. In the office the sketch map will be scanned
A copy of each sketch map, marked during the previous visit will be updated in the field during subsequent sampling visits.

COMMENTS

The Sample Point Location has been partly harvested in the last 5 year.s. (possible thinning operation). There is also evidence of wildfire with trees charred up to 5 metres on trunk\$. A couple of Silvertop trees have been windthrown and are dead. The access road is overgrown with blackberry.

Field Form Check			
Team Leader Initials	JS	Comments	
Date checked (DD/MM/YYYY)	15/06/2010		
Data Entry			
Date entered (DD/MM/YYYY)	21/06/2010	Contractor Surname	Williams

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Appendix 12.2

Table 12.2: Topographic Position and description

Topographic Position	Description
Ridge	The uppermost portion of a mountain range.
Upper Slope	The upper portion of the mountain slope immediately below the ridge.
Middle Slope	The area of the mountain between the upper and lower slopes
Lower Slope	The area of the mountain between the middle slope and the valley
Valley	The lower part of the valley, bounded on both sides by mountain ranges
Plain	Areas that are have flat slope. Can occur at any elevation, e.g. plateaus are considered to be elevated plains

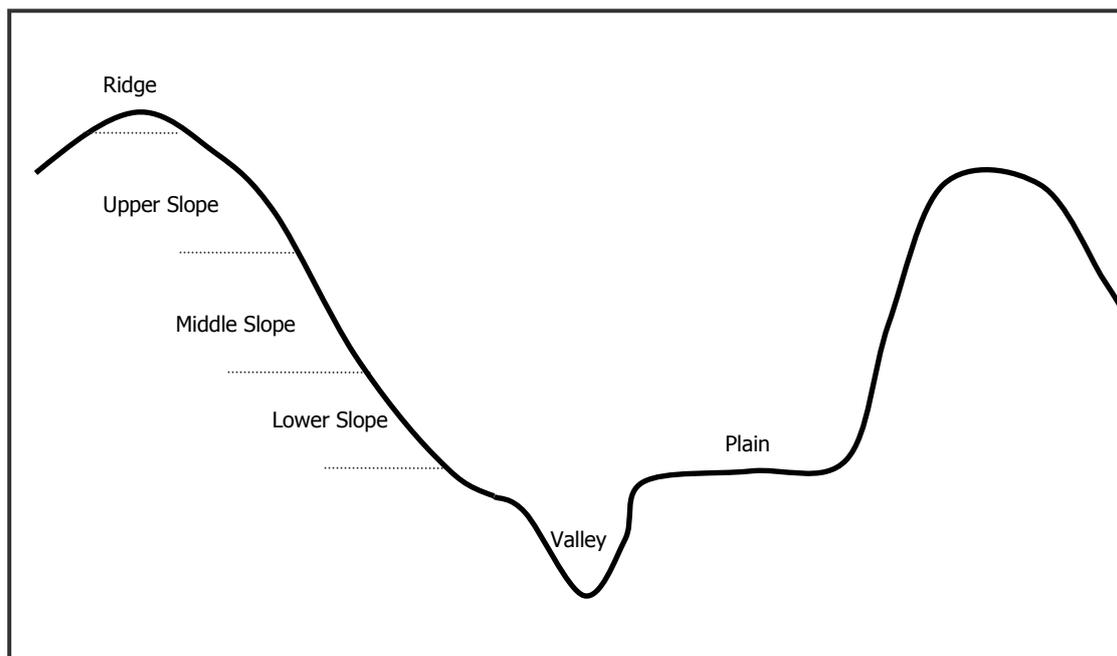


Figure 12.2: Cross-sectional landscape profile showing topographic position

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Appendix 12.3

Table 12.3: Tree disturbance types, agents, codes and descriptions.

Disturbance type/agent	CODE	EVIDENCE TO SUPPORT CLAIM
Drought	DR	Evidence of water-stress leading to partial or complete defoliation and tree dieback.
Insect attack	IA	Evidence of leaf damage including feeding tracks, folding, skeletonising and gall formation. Leaves and buds on growing shoots partly or completely eaten. Partial to complete defoliation.
Animal grazing	AG	Evidence of animal grazing include the partial or full browsing of trees canopies. If present in young regrowth, there may be evidence of branches and trunks being bent or snapped.
Windthrow	WT	Trees which have fallen over or have snapped because of severe wind exposure. Most common in cases where forest trees have experienced a drastic change in exposure due to the removal of vegetation through harvesting or catastrophic fire.
Storm (general)	ST	Evidence to suggest storm damage include broken branches and trees snapped off above ground. Lightning strike evidence includes blown off bark
Fire	FR	Evidence of fire disturbance includes charring and scorch.
Flooding	FL	Evidence of flooding include the presence of temporary surface water, watermarks on tree trunks and floating debris which has become hung up in vegetation at the height of inundation.
Landslide/slip	LS	A scar in the landscape created by ground movement. Landslides can include the movement of rocks, debris or earth down a slope.
Soil erosion	SE	Evidence of substantial soil transport due to wind, water, or ice; by down-slope creep of soil and other material under the force of gravity; or by living organisms, such as burrowing animals, in the case of bioerosion.
Pathogen	PA	Difficult to determine without expert advice because symptoms can mimic other disturbance agents like drought or insect attack. Evidence to support the claim of damage by a pathogen includes foliage wilt, branch dieback, leaf yellowing, leaf curling, fungal fruiting bodies (mushrooms) on tree and the presence of lesions.
Mechanical	ME	Physical damage resulting from a severe impact. Different types of mechanical damage to trees include broken branches, broken limbs, severe bark abrasion, snapped trunks, and tree collapse due to being pushed over. Agents of this type of damage could include falling trees, harvesting machinery, roading machinery etc.
Harvesting	HA	Evidence of harvesting includes the presence of stumps, snig tracks, slash piles and landings.