4.0 VISUAL LANDSCAPE DESIGN APPLICATIONS

In this part of the training manual, the principles described in Section 2 are applied to the range of activities carried out in the forest, including logging of one sort or another, forest health and silviculture, forest roads and trails, utilities and views along travel corridors.

This section deals primarily with the visual implications of forest operations. It is possible to implement any of the solutions or ideas presented here only as long as the practicalities and costs are considered at the same time. Units designed to look good with no thought as to whether they can actually be harvested will soon be discredited. Conversely, sub-standard results are obtained if, for example, clear cuts are planned solely with practicalities in mind and have to be substantially modified in order to blend with the landscape. All factors should be considered together as part of an integrated design process.

The snow shows up the shapes in this landscape. The clear cuts stand out very obviously because of their geometry amongst the wide variety of natural, organic shapes.

4.1 DESIGN OF HARVESTING UNITS

Generally, it is not desirable to design one pass of cutting only without considering the implications on future options. However, given that there are circumstances where this is unavoidable, it is important to ensure that best practice is achieved.

The general location for the units will have probably been identified already, using the timber inventory and considering the engineering possibilities so that some of the physical constraints and opportunities and their costs will have been taken into account. A landform and land feature analysis should be carried out although it will be for a relatively limited area and possibly in a fairly simple form. A Digital Terrain Model (DTM) can assist in more complex areas.

Working on overlays on photographs, the general locations for the proposed units are sketched in as outlines or hatched areas. They are tested to see if their position and scale fit the landscape. The analysis will help to see if this is the case. Once these have been resolved the shapes are designed. This is the most important stage. The cues presented by landform and vegetation are used to suggest the type of shape most appropriate for the particular landscape.

The shape of units should reflect the quality of those found in the landscape: rounded, curvilinear shapes in rounded landforms, spiky, jagged shapes in more rugged terrain. The shape may vary within a landscape where the lower slopes of a mountainside are smooth and the upper slopes rough.

Units should therefore be irregular in shape and generally diagonal to the contour. They should reflect the shape of the ground by rising uphill in hollows and extending downhill on convex slopes. The extent of these inflexions should increase with the size and prominence of the hollow or convexity.
It is as important to avoid mistakes as it is to follow principles. Bad design can be reduced by eliminating:
- right angles;
- straight edges cutting at or near right angles to the contour;
- edges following contours;
- parallel sided shapes;
- symmetrical shapes;
- long, straight edges.

It is most difficult to design in landscapes with low visual absorption capability. Units can seem to float as figures on the background of the landscape. Reducing their size does not always help. If there are relatively conspicuous knolls or obvious valleys or hollows, then the units can occupy these more naturally. The more interlocked the shape the better.

If there is more diversity the task is much easier. Natural openings can be emulated and other features used to anchor the shape in the landscape. In addition to the shape, the detail of the treatment of the edges of the unit can help, such as grading them, but only when the best shape has been designed.

Where the landscape includes agricultural land along the lower edge of the forest the units can look like extensions of this open ground. Shapes can be more geometric in these circumstances, although they should still respond to landform.

A landscape of rounded landforms, mainly convex but with some useful valleys. Older logging varies between poorly designed and acceptable. Any logging should avoid the upper slopes where the hilltop caps should be retained at a sufficient scale (2/3 of the depth). The main valley may need to be retained for riparian protection purposes. Vancouver Island, Vancouver Forest Region.

The following examples demonstrate how units can be fitted into a range of different landscapes using sketches and photographs.

Landform and land feature analysis.

Two clear cuts are proposed and shown as their basic shapes, which are designed to reflect those in the landform - flowing and curvilinear. They are positioned asymmetrically, one bigger than the other. Implicit in their design is the possibility of further units and unfelled areas. To reduce the contrast, the edges should be thinned and stable trees left within the units toward the edges.
A landscape with a moderately strong landform and a forest cover with plenty of breaks, bare patches and textural variation. The bare patches are associated with knolls while the hollows offer places to build connections with the open ground in the valley bottom.

Landform and land feature analysis.

Logging units can be located in hollows on the lower slopes, shaped to reflect the broken topography. Their edges should be graded to imitate the texture and density pattern. Other units could be fitted on some of the convexities to imitate the bare areas in shape and position. Scale problems can occur unless small units are near enough to other openings to be read as part of a group.

An example of two clear cuts which make an attempt to fit into the landscape. The lower one is located on a knoll or convexity while the upper one has an irregular shape with some interlock. The main problems are the scale of the main cap to the mountain which is not felled but similar in proportion to the clear fell. The cap should be bigger to reflect the hierarchy of scale. The unit should have been more interlocked and leave more space between it and its fellows.

Slocan Valley, Nelson Forest Region.

This option shows how the units could have been designed to improve their fit in the landscape. They are more visually separated, more irregular in shape and interlock better.
A clear cut unit which is out of scale, being too big for this landscape, parallel and following the contour in shape, cutting across what landform there is. However, its position is acceptable at the foot of the steepest slope with plenty of untouched mountain left above. Skeena River, Prince Rupert Forest Region.

Landform and land feature analysis.

In this solution two asymmetrically sized units are designed. The shapes are spiky so as to respond to the character of the landform, where the smooth slope is dissected with deep gullies and avalanche slides. The eye can follow the major spike of the bigger unit into the avalanche slide and up to the summit of the mountain. The shapes also interlock strongly with the rest of the forest, and rhythm is introduced to give stronger unity.
An irregular, diagonal shaped clear cut. It is generally too symmetrical. Its position across a convex landform contradicts a major ridge line of force. The peak in the upper edge causes visual tension. Shuswap Lake, Kamloops Forest Region.

Landform and land feature analysis.

This option produces a more interlocked, curvilinear shape which responds to landform better. It still appears to float somewhat uncomfortably because of its position 1/2 way up the mountainside. If an additional unit could be located further down (timber and land ownership permitting) this would help.
Some openings which interlock strongly and could even be natural if it were not for their too-clean appearance. They do not follow landform completely but go a long way towards unity with the landscape. Kamloops Forest Region.

In this gentle landscape rectilinear unit shapes look awkward. Quesnel Forest District, Cariboo Forest Region.

A more rounded, irregular (yet generally horizontal) shape would fit better.
In flatter topography, clear cut units are mostly seen from within. Geometry nevertheless can be registered and scale, determined by the degree of enclosure, is important at a human level. Irregular, interlocking shapes will seem smaller and be more interesting to pass through. Retained groups or clumps of trees also help to break up the apparent scale. If there are high points which overlook a flatter landscape, then irregular, interlocking shapes described above will fit in better, resembling natural openings, perhaps wind or fire damage. Grading the edges is also valuable as is good practice on the logging operation (see below).

A rectangular clear cut in a flatter landscape: the eye moves about restlessly seeking interest which is not present.

An organic, interlocking shape provides a degree of enclosure and this helps reduce the apparent scale as well as making the area more mysterious.

A retained group in the space and near the observer helps provide focal points, depth and break down the scale still further.
4.2 DESIGN OF CLEARCUT UNITS

Much can be done to reduce the contrast of harvesting units by edge treatment and by leaving trees within the units, where possible, on windfirmness or worker safety grounds. In addition to contributing to visual benefits, this practice is also valuable from a biodiversity point of view.

TREATMENT OF EDGES

Instead of logging to an edge which is left brown because of bare tree trunks which are visually hard and intrusive, it is better to thin into it at the time of logging. Edges may be prone to wind damage and the thinning operation can also be used to reduce this risk. This factor influences the choice of trees to remove and how and where it is done.

Natural edges in forests are not evenly graded from dense to open but have quite a strong spatial structure, often responding to site or topographic conditions. There may be denser patches, outlying groups on better soil or locally sheltered areas. In natural fires some patches of trees of certain type and location may get left unburnt. These structures should be reflected in the way the edges are developed.

A unit in a strongly textured landscape stands out because of its crisp outline while its shape is acceptable. It would have looked better if its edges had been thinned and if stable trees had been left within it. Shuswap Lake, Kamloops Forest Region.

This opening is a natural one due to fire or some other effect. It is characterized by an irregularly shaped outline with groups of trees of varying sizes left within it. As a result it blends into the landscape very well. If this result could be achieved during logging then the much more natural effect would blend into the landscape. It would also provide stand-level biodiversity value. Smithers, Prince Rupert Forest Region.

If a clear cut unit is properly shaped to follow landform, its boundary will extend down ridges and up hollows.

The edge should be designed to reflect this as follows:

1. Thin more heavily where upper edges rise in hollows and lower edges descend on ridges.
2. Leave more groups as outliers where upper edges descend on spurs and lower edges rise in hollows.
3. Remove the tallest trees of the least wind firm species, treating the outlying groups on drier sheltered slopes in areas with wet climates and on shadier slopes in areas with dry climates.
4. Reduce the general density of thinning into the edge over distance, eventually taking only a few of the tallest trees.
5. Within the unit leave some small groups and single trees positioned so that they are visually connected with the main edges.
6. Avoid thinly spaced or sheltered trees of poor form in places where they will form a broken skyline. These look especially weak and are in any case prone to wind damage.
7. Take care during operations not to damage any trees which are to be left standing.
The design of retained trees and thinned areas within a unit should respond to landform. The unit layout with the landform marked on.

0 = Trees left in the unit.
+ = Thinned areas around the edge of the unit.
--- = Edge of the solid canopy forest.

Retaining trees within a unit can help to break it up and be valuable for biodiversity. The denser group works well and will be better in the summer when in leaf. The thinner groups or individual trees as shown in this picture, especially when viewed with the sky as a backdrop are less successful and should be removed, leaving the denser coalescing groups standing. Hvy 16, Prince George Forest Region.

An even scatter of retained trees within a unit, too sparse to close canopy result in an unnatural appearance.

Grouping trees towards the edges in denser patches restores structure and unity as well as naturalness.

Thinning the edges in irregular patches of varying density ties the retained groups even further causing the unit to resemble a natural opening.
4.3 ALTERNATIVE HARVESTING SYSTEMS

Apart from the clear cutting system described previously, there are other silvicultural systems that may create less visual impact and be more suitable in many landscapes, silviculture and other factors permitting. It is not always clear whether partial cutting using silvicultural systems such as shelterwood, strip shelterwood, selection, or group selection is seen as a logging method or a silvicultural prescription aimed at regenerating the forest. Whatever the ultimate objective, it is necessary to consider the design implications.

- Partial or selective cutting means taking a percentage of the trees off an area instead of clear cutting. This may barely alter the texture of the forest canopy in the lightest case or may create patches of much coarser texture. The heaviest cuts may resemble clear cuts where a greater number of trees than usual have been left behind. Because the impact on the landscape is generally lower, this has often been taken to mean the size of area which can be cut is greater. This is generally the case and in fact can solve scale problems where smaller clear cuts would not be appropriate. Larger units on knolls, for example, or higher up on slopes where the scale of the landscape is larger can be resolved this way.

- Although the impact of selective logging is lower, the shape of the unit still has to be designed. Textural changes may become evident, especially during the winter when snow lies on the ground or a selectively logged area may be subject to a major windthrow requiring complete removal of the residual trees. The logging shape is designed in the same way as for clear cut units including the locations of skyline crossings.

- Group selection is another method. Several passes of small-scale logging are undertaken within an area. Eventually, these coalesce together to create a larger shape but because of the slower rate of cut the landscape change over time is much less. Once again it is better if a general shape is designed using the principles described above within which groups are felled over a period of time to merge gradually and reveal the main shape.

- A final method is felling by progressive strips. This can be used to reduce the impact and to permit natural regeneration. If not used carefully, a pattern of vertical lines may appear. This can be overcome by logging to a final shape in a series of curving strips of varying width.

In all these systems, a higher density network of roads is needed, which have to be permanently maintained. The impact of the roads may be high once the logging has progressed some way unless adequate green up is reached to obscure them.

An example of selective logging close to the skyline. The eye is drawn to the change in texture. This is acceptable as long as sufficient trees are retained to maintain canopy coalescence and where the changed texture occurs for a whole sub unit of the skyline such as between two saddle points. Kamloops Forest Region.

Strips have been removed. While a proportion of the canopy is retained, the striped appearance is unnatural and intrusive. Clearwater Forest District, Kamloops Forest Region.
A large, selectively felled area. While the texture remains that of a forest, the shape stands out as geometric, with a thin parallel sliver close to the skyline and a boundary perpendicular to the contours. Kelowna, Kamloops Forest Region.

A solution based on a better shape.

The ridge in the foreground of this scene has been selectively felled very well. The whole convex landform has been treated and the remaining trees are dense enough to retain a forest impression. There is some variability in the interval and diversity of the trees which make for a more natural appearance. Vernon, Kamloops Forest Region.

This mountainside is one where logging either by group or selective cutting is possible. Units are first designed and then harvested by either method within these shapes. The groups gradually coalesce and the large shape becomes more obvious as time proceeds. Shuswap Lake, Kamloops Forest Region.
Landform and land feature analysis.

Two unit outlines, fitting landform and asymmetric in shape, size and position.

Phase 1. One area has been selectively logged while groups have been felled in the other.

Phase 2. Further selection and more groups are felled which begin to coalesce.

Phase 3. By the time the remaining trees are felled (apart from retained clumps near edges) and the regeneration growing well, the designed shapes stand out.