Implementation Guide
for
Scenery Management
under the
Kootenai National Forest
2015 Land Management Plan
May 2015

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INTRODUCTION

The Scenery Management System (SMS) provides a systematic approach to inventory, analyze, and monitor scenic resources on national forest system lands. The 2015 Kootenai National Forest Plan revision process resulted in changing from the Visual Management System (VMS) to SMS. As part of the plan revision process, the forest completed a SMS inventory, integrated scenic values with other resource considerations, and included Scenic Integrity Objectives (SIOs) and other direction and guidance in the final 2015 Forest Plan. This guidance paper is intended to assist the forest in implementing the 2015 Forest Plan, as well as ensuring consistency with National policy and direction (Forest Service Manual 2380, and The Landscape Aesthetics Handbook for Scenery Management – Agricultural Handbook Number 701).

GENERAL SMS CONCEPTS

The SMS recognizes that landscapes are not static. Instead of basing objectives for scenery on one landscape condition at one point in time, objectives for scenery are grounded by naturally changing and evolving conditions that are described in the landscape (scenic) character. We know that landscapes change over time naturally. Forests burn; natural succession transforms open meadows to forests; insects and disease change the composition, structure and mosaic of vegetation; etc. The landscape character discusses the types of vegetation and other attributes found within the landscape while also describing disturbance regimes that are part of that landscape. This context ensures that objectives for scenery are linked to ecological changes rather than managing for a specific condition into perpetuity.

Examples: Burned landscapes under the VMS were typically deemed unattractive, especially in foreground areas. Under the SMS, burned trees are considered part of a naturally evolving, healthy and resilient landscape. SMS looks beyond one vegetation condition at one point in time. The effects of prescribed fire are often disclosed in both the short term (burned landscape with no understory vegetation), and longer term (lush understory, diversity of: species, structure, age classes and mosaics). Longer term, effects may be positive and critical to the sustainability of both ecological conditions and the scenic character of the area.

Mechanical treatments can also be assessed to disclose short term and long term effects. Immediately upon project completion, the effects may be negative (stumps, slash, disturbed soil and understory vegetation, etc.). Longer term, some treatments (when designed appropriately) may create a more sustainable mosaic of vegetation that contains diversity in the vegetation (patterns, species, composition, age classes, and structure) and that is more resilient to predicted catastrophic (outside the natural range) disturbances.

Ecological concepts are integrated with the SMS by including ecological processes and disturbance patterns in the Landscape (scenic) character descriptions. Natural disturbances such as fire, insects, and disease play an important role in how landscapes change over time and how the resulting scenery also changes. These disturbance regimes are evaluated as part of an evolving Landscape and can create positive changes to the scenic integrity of a landscape. A more diverse mosaic of vegetation, increased species diversity, and diversity of age classes are all potential results
of natural disturbance processes that relate back to positive attributes defined in desired landscape
caracter. The SMS also recognizes that without these disturbance processes, the likelihood of
catastrophic events is increased and the resulting landscape will likely not meet established desired
conditions for vegetation, scenery, or other resource values. This interdependency of scenery and
disturbance regimes allows managers the flexibility to select tools such as prescribed fire and/or
mechanical treatments at scales necessary to meet desired conditions for the ecosystem as a whole.

**Example:** The purpose and need for a proposed mechanical treatment is to manage the existing
vegetation toward desired (healthy and resilient) vegetation conditions. With appropriate
design, the action would increase the diversity in species and size classes and create a mosaic
that reflects historic fire regimes. These desired vegetation conditions are also referenced in
the desired landscape character description. Rather than being in conflict with each other, the
objectives for scenery and the objectives for restoration are striving for the same end result.

Using prescribed burning as the example, immediately after a fire, there are short term effects
such as: red needles, burned trunks, snags, and possibly little or no understory vegetation.
Depending on the intensity of the fires, these effects are often short term. As the landscape
recovers, the short term effects diminish and long term changes such as: a mosaic of openings
that mimic patterns created by historic fire regimes; increased diversity of specifies and age
classes; snags punctuating the new growth canopies; and increased variety in colors and
textures characteristic to the landscape. These changes add interest and diversity to the
landscape and the effects to the scenic resources are considered positive.

Equally important is the need to assess impacts of the No Action alternative. Sometimes a no
action scenario results in conditions that deviate even further from desired conditions (further
outside the historic or natural range of variation) due to the likelihood of a high intensity, stand
replacing fire, or epidemic levels of insects and disease. Although fire and other disturbances
are natural to the Region’s landscapes, proposed actions may reduce the risk of these
disturbances reaching epidemic proportions. The risks and vulnerabilities of landscapes loosing
valued components (landscape attributes) need to be considered and disclosed in all
alternatives, including the no action alternative.

**SMS recognizes that some constructed features add to, rather than detract from, the scenery.**
This is a change from the Visual Management System (VMS) where man-made features were
considered a negative impact to the natural appearing ladscape. SMS recognizes that some man-
made features add to the aesthetics of specific landscapes and contribute to the sense of place.
Examples of positive cultural features are typically historic and include such structures as: old barns,
historic log cabins, fire look-outs, buck-and-rail fences, ghost towns, remnant ccc facilities, historic
dams and bridges, etc.

**Scenery Integrity Objectives (SIOs) do not dictate whether management activities can occur or
prescribe what tools and treatments are, or are not, appropriate.** The SIO is simply the desired
outcome for the scenic resources upon completion of an action. Project planning, design, and
implementation, are sometimes crucial in meeting the assigned SIO. How the management tool is
used and what is left behind, as opposed to which tool is used and what is taken becomes the focus.
For example: Timber harvest is proposed to reduce fuel loading in a Wildland Urban Interface (WUI). The assigned SIO is “high” due its visibility from adjacent residents (Concern Level 1) and the unique combination of landscape attributes (Scenic Attractiveness rating A). This type of scenario will require extra sensitivity in how the fuel reduction is designed and implemented but does NOT eliminate the option of performing vegetation treatments (mechanical or fire use). It simply means that the resulting landscape (post-treatment) meets the project objective (reducing fuel loading) while also meeting the assigned SIO. Mitigation measures may include: leaving stumps no higher than 6” in foreground areas, leaving no slash piles (also reducing fuel loading), creating openings that mimic meadows characteristic to the landscape, and using native seed mixes to establish/re-establish forbs and grasses indigenous to the area.

As described earlier, the analysis will consider natural disturbance regimes and long term effects when determining whether the SIO will be achieved. If the treatment is designed to mimic natural disturbance regimes, achievement of a high SIO may be feasible. It also bears repeating that the proposed action will always be analyzed alongside the no action alternative. Reference the Purpose and Need for action to ascertain what the effect(s) of no action. Where catastrophic are predicted, there may be negative short term and long term effects to the multiple resource values, including scenery.
SCENERY DIRECTION IN THE 2015 KOOTENAI PLAN

Forest-wide Direction:

FW-GOAL-SES-01. Contribute to the social and economic well-being of local communities by promoting sustainable use of renewable natural resources. Provide timber for commercial harvest, forage for livestock grazing, opportunities for gathering firewood and other special forest products, and settings for recreation consistent with goals for watershed health, sustainable ecosystems, biodiversity, and scenic/recreation opportunities.

FW-DC-AR-02. The scenic resources of the KNF complement the recreation settings and experiences while reflecting healthy and sustainable ecosystem conditions.

FW-DC-TBR-03. Timber cutting on other than suitable lands for timber production lands occurs for such purposes as salvage, fuels management, insect and disease mitigation, protection or enhancement of biodiversity or wildlife habitat, or to perform research or administrative studies, or recreation and scenic resource management consistent with other management direction.

FW-GDL-AR-01. Management activities should be consistent with the mapped scenic integrity objective, see Plan set of documents. The scenic integrity objective is High to Very High for scenic travel routes, including Pacific Northwest National Scenic Trail, designated Scenic Byways, and National Recreation Trails.

FW-GDL-TBR-01. Timber harvest on other than suitable lands may occur for such purposes as salvage, fuels management, insect and disease mitigation, protection or enhancement of biodiversity or wildlife habitat, or to perform research or administrative studies, or recreation and scenic resource management consistent with other management direction.

Consistency with the Forest Plan (Chapter 1, page 3-4):

Guidelines: A project or activity must be consistent with all guidelines applicable to the type of project or activity and its location in the Plan area. A project or activity is consistent with a guideline in either of two ways:

1. The project or activity is designed in accordance with the guideline, or;
2. A project or activity design varies from the guideline but is as effective in meeting the intent or achieving the purpose of that guideline.

The project documentation will describe how the project is consistent with the relevant guideline(s). When the project design varies from the exact wording of a guideline, project documentation must specifically explain how the project design is as effective in contributing to the maintenance or attainment of the guideline. Under this circumstance, a plan amendment to the Forest Plan is not required. However, if a project or activity is not designed to comply with the intent or purpose of a guideline, an amendment to the Forest Plan is required.
Additional related Forest-wide Goal and DCs relating to Scenery:

**FW-GOAL-VEG-01.** Plant communities are trending towards the desired conditions for composition, structure, patterns and processes. The ecological integrity of the communities is high and they exhibit resistance and resiliency to natural and man-caused disturbances and stressors, including climate change.

**FW DC-VEG-05.** The patterns of forest conditions across the landscape consist of a range of patch sizes that have a diversity of successional stages, densities, and compositions. Formerly extensive homogenous patches of forest that are dominated by species and size classes that are very susceptible to disturbance agents have been diversified. Generally, this is an increase in the size of forest patches dominated by trees in the seedling/sapling size class, as well as in the large size class. This is a decrease in the size of the patches that are dominated by trees in the small to medium size classes.

**FW DC-VEG-11.** The desired forest composition, structure, and pattern for each biophysical setting are described (page 14-18)

**MA-specific Forest Plan Direction:**

Each Management Area (MA) also includes guideline(s) indicating which Scenic Integrity Objective(s) are to be managed for. In many cases, an MA indicates multiple SIOs to show that not all acres of a specific MA have the same SIO. This is due to variations in the both the landscape composition and the visibility of those landscapes. It will be important to refer to the forest–wide SIO map to determine which SIO applies where within a specific MA (*FW-GDL-AR-01*).

<table>
<thead>
<tr>
<th>MA</th>
<th>SIO(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MA 1a-c</td>
<td>Wilderness/Recommended Wilderness/WSAs</td>
</tr>
<tr>
<td>MA 2</td>
<td>Eligible W &amp; S Rivers: Wild</td>
</tr>
<tr>
<td></td>
<td>Scenic</td>
</tr>
<tr>
<td></td>
<td>Recreational</td>
</tr>
<tr>
<td>MA 3</td>
<td>Special Areas: Northwest Peak, Ten Lakes, Ross Creek Cedars, and Wood Creek Larch Scenic Areas Libby Gold Panning Area</td>
</tr>
<tr>
<td>MA 3</td>
<td>Special Areas: All others</td>
</tr>
<tr>
<td>MA 4</td>
<td>Research Natural Areas</td>
</tr>
<tr>
<td>MA 5a-c</td>
<td>Backcountry</td>
</tr>
<tr>
<td>MA 6</td>
<td>General Forest</td>
</tr>
<tr>
<td>MA 7</td>
<td>Primary Recreation Areas</td>
</tr>
<tr>
<td></td>
<td>M – Lake Koocanusa area</td>
</tr>
</tbody>
</table>

**Note:**
- No GA-specific direction pertaining to scenery is contained in the Kootenai NF Plan
- No scenery related monitoring requirements are contained in the Kootenai NF Plan.
<table>
<thead>
<tr>
<th>SIO</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very High</td>
<td>Landscape is intact with only minor changes from the valued landscape character associated with significant scenic landscapes. This SIO is typically (but not exclusively) associated with specially designated areas such as wilderness or other designations that imply the landscape is natural appearing.</td>
</tr>
<tr>
<td>High</td>
<td>Management activities are unnoticed and the landscape character <em>appears</em> unaltered.</td>
</tr>
<tr>
<td>Moderate</td>
<td>Management activities are noticeable but are subordinate to the landscape character. The landscape appears slightly altered</td>
</tr>
<tr>
<td>Low</td>
<td>The landscape appears altered. Management activities are evident and sometimes dominate the landscape character but are designed to blend with surroundings by repeating form, line, color, and texture of attributes described in the landscape character.</td>
</tr>
<tr>
<td>Very Low</td>
<td>Management activities create a “heavily altered landscape”. Changes may strongly dominate the landscape. Note: This SIO is not a goal or objective.</td>
</tr>
</tbody>
</table>
At the project scale, the mapped Forest Plan SIOs serve as the minimum level of scenic integrity (degree of intactness) a management activity can result in. SIOs do not prohibit or allow specific types of management activities, they simply convey the desired outcomes to the scenic resources. Placement and design techniques are often used to ensure compliance with the mapped SIO. The following section describes a step-by-step process to use when developing, designing, and then assessing proposed management activities.

**PROJECT INITIATION**

It is critical to consider the scenic resources early in the planning process. Incorporating scenic values at the front end of project development and design will ensure the scenic resources of the KNF complement the recreation settings and experiences while reflecting healthy and sustainable ecosystems conditions (FW-DC-AR-02).

1. Review the Forest Plan SIO map to determine which SIOs apply within the general project area – including adjacent areas.
2. Review the Forest Plan for any additional direction or guidance specific to the scenic resources (Forest-wide, MA-specific, and SIO map).
3. Verify that the SIOs are correct. Since the SIO is largely dependent on the landscapes visibility, it is important to verify mapped distance zones and concern levels. Keep in mind that changed conditions (land exchanges, new roads/trails, new development adjacent to the Forest, etc.) may have occurred since the Forest Plan SIO map was developed. Some changes may warrant a change/correction to the Forest Plan SIO map. Any changes should be included in the project file and analysis. Reference Appendix E to document changes to the Forest Plan SIO map.
4. Review, and if necessary refine the forest-wide Existing Scenic Integrity (ESI) map and compare ratings with the Scenic Integrity Objective (SIO) map. This will help identify potential areas of improvement needed to move existing conditions (ESI) to desired conditions (SIO). (FW-DC-AR-02)
5. Integrate scenic resource information with other resource values (IDT) to develop the purpose and need, project area boundary, proposed action and associated design considerations.

**NEPA**

As each step (identified below) is completed, it may be necessary to refine and expand upon inventory information (developed at the forest scale) to provide the sufficient level of detail necessary in describing both the affected environment (landscape character, existing scenic integrity, scenic attractiveness, and concern level(s)) and environmental effects (whether the project will achieve forest plan direction - mapped SIOs).
For projects in which potential impacts to scenery can be addressed by incorporating design features, it may only be necessary to **complete the steps with asterisks “**”**. For more complex projects where scenery is identified as an “issue”, or where there are anticipated effects to the scenic resources, follow the process as outline below.

**Affected Environment:**

1. **Summarize how the scenery of the project area contributes to any socio-economic benefits.**
   Examples may include: critical to the area’s recreation setting(s) and visitor experience (link to Forest Plan ROS class and recreation section of the affected environment); serves as a backdrop to local communities and adjacent residences (contributing to the sense of place and quality of life); draws visitors to the area and is an important aspect of the area’s tourism industry; etc.

2. **Identify the geographic scope (analysis area) and temporal scope (duration of effects) for the analysis.** It may be important to identify more than one temporal scale since project implementation may produce short term effects that are different from long term effects.

3. **Reference relevant forest plan direction and guidance.**

4. **Identify references, tools, and method(s) used in the analysis (i.e. FSM 2380 and AHB 701, field analysis, review of aerial photos, establishment of photo points, google earth and GIS analysis, visual simulations, R1 Mitigation Menu, implementation guidance – this document, etc.).**

5. **Describe the Landscape (scenic) character**

   Landscape (scenic) Character is defined as the combination of the physical, biological, and cultural images that gives an area its scenic identity and contributes to its sense of place. Scenic character provides a frame of reference from which to determine scenic attractiveness and to measure scenic integrity.

   *It is important to note that only the positive attributes (not the visible impacts from current and past management activities) are included in the Landscape character description. Human caused deviations are described in the next step - existing scenic integrity.*

   Ecological units are often used as a starting point for describing the physical and biological attributes of the landscape. The following links contain ecological descriptions:

   - [http://www.epa.gov/wed/pages/ecoregions/mt_eco.htm](http://www.epa.gov/wed/pages/ecoregions/mt_eco.htm)
     This reference contains ecoregion mapping and descriptions for the state of Montana.
   - [http://www.fs.fed.us/land/ecosysmgmt/colorimagemap/ecoreg1_provinces.html](http://www.fs.fed.us/land/ecosysmgmt/colorimagemap/ecoreg1_provinces.html)
     This reference contains Bailey’s ecoregions and provinces.

   The GA descriptions of the Forest Plan may also provide information relevant to the landscape character. Broader information is also contained in Chapter 1 (page 7-9) that describes the Forest as a whole and some of the distinctive features and contributions.

   In addition to describing the landscape’s bio-physical attributes (geology, vegetation, soils, water features, disturbance regimes, and topography); note any positive cultural features within the
project area. These are typically historic (fire lookouts, cabins, ghost towns, CCC structures), or features that contribute to the area’s sense of place (rolling hay fields, reservoirs, etc.).

Recent examples of Landscape (Scenic) Character descriptions can be found in Appendix C of the Lewis & Clark/Helena Plan Revision Assessment. 
http://www.fs.usda.gov/goto/hlc/forestplanrevision. Although these landscape character descriptions were developed for plan revision, they represent the scale and context appropriate for landscape character descriptions and can be used as context for project level planning and analysis.

6. **Determine the existing scenic integrity:**
Existing scenic integrity (ESI) is defined as the degree to which landscape attributes (described in the Landscape character) are intact. This is where past management activities are described such as past timber management, mining activities, utility corridors, and other constructed features (buildings, roads, trails, etc.)

There is a modeling process to help establish a preliminary assessment of existing conditions (existing scenic integrity). The model uses corporate GIS layers such as: roads, mining, past vegetation treatments, existing ROS settings, oil and gas activities, etc. An ESI layer was developed for the Region using Regional GIS information. The process and ESI maps are housed in the R1 Geospatial Library:
http://www.fs.usda.gov/detailfull/r1/landmanagement/gis/?cid=stelprdb5360066&width=full

To refine the ESI map developed at the Regional scale, it may be helpful to review and refine the regional polygons with information available at the forest, district, and/or project level. Sources of information may include: landscape and/or watershed assessments, MVUMs, monitoring reports, updated GIS layers, FACTS information, and recent NEPA decisions for mining, utility corridors, etc. The objective is to identify past management activities that remain visible. Other tools such as aerial photographs, google earth, and photographs taken of the project area can also help convey Existing Scenic Integrity.

**Scenic Inconsistencies**
At the project scale, existing deviations will be described as part of the existing scenic integrity. Where feasible and appropriate, management actions may be included in one or more alternatives to improve these conditions. For example, there may be evidence of previous timber harvest in which the shape, size, and pattern created by existing units are not characteristic to the landscape. In these situations, techniques such as feathering to soften the units edges, treating areas between existing units to create larger openings (more consistent with what fire would create), or rehabilitating roads and skid trails may be proposed.

It is important to recognize that, in some cases, existing deviations are likely to remain on the landscape. SIO’s were developed at a broad (forest-wide) scale. Within many of the SIO polygons, landscapes may contain features or landscape modifications (power lines, roads, mines, vegetation treatments, etc.) that are inconsistent with the assigned SIO. Typically, constructed features such as: roads, power lines, recreation facilities, and pipelines are maintained as long term deviations to the landscape character. Other modifications, such as
past vegetation treatments and abandoned mines, may present opportunities for improving the scenic integrity through design and rehabilitation.

7. Select critical view points from which effects will be analyzed. In addition to the sensitive viewing areas identified in the Plan, a more thorough analysis will be necessary during NEPA to determine if additional sensitive corridors and/or vantage points offer views to the project area. Identify key visual routes and points (viewing platforms) within the analysis area. Keep in mind that some of the viewing opportunities may be outside the project area (or even forest boundary) such as: adjacent highways, roads, private lands, and communities. As a starting point, use the forest-wide Concern Level mapping T:\FS\Reference\GIS\r01_knf\LayerFile\ArcGIS10_1\Scenery

Photos points should be established at each of the selected critical viewpoints. Critical viewpoints are selected based on: where people are likely to view the area; and where the proposed activities and anticipated impacts will be the most prominent. Photos should be taken and accompanied with narratives describing the existing scenic conditions (ESI). These same photographs will be used later, in disclosing the effects of the various alternatives.

8. Develop design considerations / mitigation measures. These can be developed to be common to all alternatives, one or more alternatives, treatments types, and/or specific treatment unit(s). Reference Appendix B for a menu of regionally developed and approved mitigation measures pertaining to vegetation treatments. Additional references are available and listed in Appendix D.

Environmental Effects:
1. **Describe the effects** (or indicate there are no effects) of implementing each alternative. Where mitigation measures have been developed, base the effects with them in mind. In addition to a narrative describing the anticipated visual changes to the landscape, visual simulations may be necessary to further convey anticipated results of proposed activities. Utilize the critical viewpoints established earlier in the process for these simulations.

   **It is important to clearly articulate the effects of no action!**

Include all potential activities that may cause a visual change to the landscape. Typical project elements include: new or reconstructed roads and trails, created openings, yarding and landing areas, skylines, skid trails, etc. The effects should not focus on temporary structures and trees that are removed, but rather, on what is left behind. Focus the effects discussion on the resulting vegetation (species diversity, age classes, size and shape of openings, pattern/mosaic) and intactness of other attributes (described in the landscape character). Where appropriate, reference conclusions presented in the vegetation, soils, watershed, fire, and other relevant resource narratives.

Where there are distinct temporal differences in anticipated effects, the timeframes for those effects should be defined and discussed separately. For example, where vegetation treatments are intended (Purpose and Need) and designed (proposed action) to move toward improved ecological integrity (FW-GOAL-VEG-01, FW-DC-VEG-05, FW-DC-VEG-11), the immediate or short term (typically from project completion to 3-5 years) effects of proposed treatments may dominate the landscape.
(achieving the SIO of LOW). These short term effects may be due to visible tree stumps, disturbed soils, visible scars created by temporary roads, etc. Longer term (after the first 3-5 years), these impacts may diminish, resulting in a more diverse and resilient mix of vegetation and a mosaic of openings and forests that better mimic what natural disturbance regimes would create. These longer term effects may meet the SIO of Moderate or possibly High. Timeframes of differing effects should be based on site specific conditions and should reference, and be consistent with, anticipated effects described in other resource sections (vegetation, fire, soils, watershed, etc.).

See EDLV, Pilgrim, MWF projects in O:\NFS\Kootenai\Program\2300Recreation\2380LandscapeMgmt Additional examples can be found @ http://fsweb.r1.fs.fed.us/rmlhw/scenery_mgmt/scenery.htm

2. **Disclose whether each alternative is consistent with Forest Plan direction.** Based on the action(s) proposed, and any associated mitigation measures, determine whether the Forest Plan SIO and other relevant Plan direction will be met. IF YES, state how. IF NOT, describe and document why not.

Ensure the temporal scale(s) of the effects to the scenic resources is defined. Where there are distinct differences between short and longer term effects, discuss the effects within each of the defined time frames.

For example, both prescribed burns and mechanical treatments can have negative impacts (stumps, slash, disturbed soil and understory vegetation, etc.) immediately upon project completion and, depending on site conditions, for the first few years. Longer term, these effects may diminish and (when properly designed) result in positive effects such as: a natural appearing mosaic of vegetation; diversity in the species, composition, age classes, and structure of vegetation; and a landscape that is more resilient to predicted catastrophic (outside the natural range) disturbances.

The timeframe(s) should be based on: the type(s) of effects being disclosed; site-specific conditions (often influencing the longevity of predicted effects); and whether there are differences between short and longer term effects.

Disclose the extent and magnitude of direct and indirect effects of project implementation. Describe anticipated effects of project implementation to the landscape character attributes described earlier. Utilize viewpoints established in the affected environment section. Determine if the changes meet the Forest Plan SIO(s).

It is important to reference the predicted effects described in the vegetation, watershed, and fire sections of the document. In addition to being consistent with these sections of the analysis, the information will help inform and describe the impacts (positive and negative) to scenery.

Analyze the cumulative spatial and temporal Scenic Integrity effects of the project. Include past, present, and reasonably foreseeable future actions. Predict ‘what’ and ‘where’ the Scenic Integrity will be after implementation. Compare these predictions to the LMP’s Scenic Integrity Objectives.
It is important to recognize that the Kootenai Forest Plan SIOs are “guidelines”. To be consistent with guidelines, the forest plan *(Chapter 1, page 3-4)* states:

**Guidelines:** A project or activity must be consistent with all guidelines applicable to the type of project or activity and its location in the Plan area. A project or activity is consistent with a guideline in either of two ways:

a) The project or activity is designed in accordance with the guideline, or;

b) A project or activity design varies from the guideline but is as effective in meeting the intent or achieving the purpose of that guideline.

The project documentation will describe how the project is consistent with the relevant guideline(s). When the project design varies from the exact wording of a guideline, project documentation must specifically explain how the project design is as effective in contributing to the maintenance or attainment of the guideline. Under this circumstance, a plan amendment to the Forest Plan is not required. However, if a project or activity is not designed to comply with the intent or purpose of a guideline, an amendment to the Forest Plan is required.

The analysis should conclude with whether project implementation will meet Forest Plan direction. When predicted impacts to the scenic resources are negative in the short term (as defined in the NEPA document) but positive in the long term (as defined in the NEPA document), it can be concluded that the project meets Forest Plan direction by meeting the intent of the Forest Plan guideline (SIO). Where predicted impacts will not meet Forest Plan SIO(s) within the defined timeframe(s), the analysis should disclose noncompliance with the Forest Plan Guideline (SIO). The line officer will then decide whether to:

a) Alter the project to be in compliance with the Forest Plan SIO, or;

b) Prepare a site-specific Plan amendment to change the SIO.
GLOSSARY

Concern Level – a measure of the degree of public importance placed on landscaped from travel ways and use areas. Concern levels are sometimes used in combination with distance zones to describe landscape visibility. Concern levels are divided into three categories:

1 = High
2 = Moderate
3 = Low

Distance Zones – Classification of landscapes by the distance from the observer(s). Used as a frame of reference to discuss landscape attributes or the effects of proposed management activities. Distance zones can be used independently or in combination with concern levels to describe Landscape Visibility.

Foreground = up to ½ mile from viewer
Middleground = ½ mile – 4 miles from viewer
Background = > 4 miles from viewer

Existing Scenic Integrity - The existing condition (degree of intactness) of attributes described in the Landscape (scenic) character.

Very High  Landscape is intact with only minor changes from the valued landscape character associated with significant scenic landscapes.

High       Management activities are unnoticed and the landscape character appears unaltered.

Moderate   Management activities are noticeable but are subordinate to the landscape character. The landscape appears slightly altered.

Low        The landscape appears altered. Management activities are evident and sometimes dominate the landscape character but are designed to blend with surroundings by repeating form, line, color, and texture of attributes described in the landscape character.

Very Low   Management activities create a “heavily altered landscape”. Changes strongly dominate the landscape. Although this may be an existing condition, it is not used as an SIO or desired scenic integrity.

Landscape (Scenic) Character – A combination of the physical, biological, and cultural images that gives an area its scenic identity ad contributes to its sense of place. Scenic character provides a frame of reference from which to determine scenic attractiveness and to measure scenic integrity.

Landscape Visibility – Addresses the relative importance and sensitivity of what is seen and perceived in the landscape. It includes: the context of the viewers; the duration of the view; the degree of discernible detail; seasonal variations; and the number of viewers.
Scenic Attractiveness - measures the scenic importance of a landscape based upon human perceptions of the intrinsic beauty of landform, rock form, vegetative patterns, water characteristics and cultural land use. Attributes described in the Landscape character serve as the frame of reference. Attractiveness is divided into 3 categories:

A = distinctive or unique
B = typical or common
C = indistinctive

Scenic Classes (SC) – used at a Forest scale to spatially convey the relative value of scenery across the Forest’s landscapes. They essentially serve as a Draft SIO layer during plan development to integrate scenery with other resource values and management emphasis. Through integration, the scenic classes are translated into the Plan’s Scenic Integrity Objectives (SIOs). Generally and KNF Forest Plan (see appendix A) Scenic Classes are:

<table>
<thead>
<tr>
<th>General SC</th>
<th>KNF FP SC</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - 2 = High public value</td>
<td>1 = High public value</td>
</tr>
<tr>
<td>3 – 5= Moderate value</td>
<td>2-3 = Moderate value</td>
</tr>
<tr>
<td>6 – 7= Low value</td>
<td>4-7 = Low value</td>
</tr>
</tbody>
</table>

Scenic Integrity Objective - The desired condition (degree of intactness) of attributes described in the Landscape (scenic) character.

Very High  
Landscape is intact with only minor changes from the valued landscape character associated with significant scenic landscapes.

High  
Management activities are unnoticed and the landscape character appears unaltered.

Moderate  
Management activities are noticeable but are subordinate to the landscape character. The landscape appears slightly altered

Low  
The landscape appears altered. Management activities are evident and sometimes dominate the landscape character but are designed to blend with surroundings by repeating form, line, color, and texture of attributes described in the landscape character.
APPENDICES:

A. Kootenai National Forest Plan SIO Development documentation

B. Northern Region Scenic Resource Mitigation Menu & Design Considerations For Vegetation Treatments

C. VQO – SIO Crosswalk

D. Tools and References

E. Change to Scenic Integrity Objective Form

F. Google Earth 3D Visual Overlay Modeling
APPENDIX A

KOOTENAI NF PLAN SIO DEVELOPMENT DOCUMENTATION

The development of the SIOs was done primarily using existing GIS layers (roads, trails, topography, water features) and modeling techniques to determine visibility and other derived layers that are used in establishing SIOs.

Landscape (Scenic) Character is the combination of physical, biological, and cultural images that gives an area its scenic identity and contributes to its sense of place. Landscape character provides a frame of reference from which to determine scenic attractiveness and to measure scenic integrity.

Scenic Attractiveness (SA) measures the scenic importance of a landscape based upon human perceptions of the intrinsic beauty of landform, rock form, vegetative patterns, water characteristics and cultural land use. Attributes described in the Landscape character and the forest’s Variety Class maps (1987 Forest Plan, Visual Management System) were used in assigning Scenic Attractiveness. Scenic Attractiveness is divided into three categories:
- A – Distinctive
- B – Typical
- C – Indistinctive

Existing Scenic Integrity (ESI) is the degree to which the valued attributes described in the Landscape Character are intact. It conveys current conditions. Although it is not used to map the SIOs (the desired degree of intactness), it serves as an important benchmark for project-level design, mitigation, and monitoring. GIS layers such as ROS, roads, trails, timber sales, mining layers, and other information were used to determine the ESI across the Forest. As with all mapping related to SMS, ESI was mapped at the forest scale and should be reviewed and refined at the project level.

Visibility Distance Zones and Concern Levels data is used to create a Visibility map. Landscape visibility is a combination of a seen area in relation to the context and types of viewers viewing it. The interconnected elements of landscape visibility include: context of viewers, duration of view, degree of discernable detail, seasonal variation, and number of viewers. Visibility labels are a combination of distance zone and concern level (e.g. FG2 – foreground with moderate concern level).

Distance Zones are assigned according to specified distances of land areas from an observer. They are divided into 3 categories:
- Fg – Foreground (within ½ mile distance)
- Mg – middle ground (¼ to 4 miles distance)
- Bg – background (4 miles to horizon)
Concern Levels measure the degree of public importance placed on scenery. Concern Levels are divided into three degrees of public importance:

1 – high
2 – moderate
3 - low

Definitions from Landscape Aesthetics – A Handbook for Scenery Management (pages 4-8 and 4-9) were used to determine Concern Levels. Primary traveways such as Highway 2, 37, 200, 56, and 508 were mapped as Concern level 1 (high).

Secondary travel routes such as FSR154 Vermillion, FSR152 Big Beaver and FSR215 White Pine (county portions only) were mapped as Concern level 2 (Moderate). Recreation sites and important vista sites were also mapped such as Sex Peak Lookout as concern level 2.

Visibility mapping was undertaken using ArcInfo AMLs developed on the KNF in 1997 and modified in subsequent years. This was the process used to generate the Visibility and Scenic Class maps for the 2015 Forest Plan.

Scenic Class assignments are the final product of the inventory phase, and are determined using Scenic Attractiveness data with Landscape Visibility (Distance Zones and Concern Levels). Scenic Classes define the relative value of scenery on FS lands and are used to integrate scenic resources with other resource values and Management Area direction.

Scenic Classes from the SMS inventory ranged from 1 (highest) to 7 (lowest) as shown in the table below. Landscapes that exhibit little scenic variety and are not of high concern or seldom seen were assigned Scenic classes of 6-7. Landscape containing diverse landscapes and are of high concern were rated as Scenic Class 1-2. Remaining landscapes were assigned scenic classes 3-5. These rankings were later lumped by the Forest to derive the Forest’s SIOs (High, Moderate, or Low). The correlation between Scenic Class ratings and the Forest’s SIOs are: SC 1 = high, SC 2-3 = moderate, and SC 4-7 = low.

<table>
<thead>
<tr>
<th>Distance zone/Concern Level</th>
<th>Fg1</th>
<th>Mg1</th>
<th>Bg1</th>
<th>Fg2</th>
<th>Mg2</th>
<th>Bg2</th>
<th>Fg3</th>
<th>Mg3</th>
<th>Bg3</th>
</tr>
</thead>
<tbody>
<tr>
<td>A - Distinctive</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>B - typical</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>C - indistinctive</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>

Appendix
Scenic Integrity

The highest scenic integrity ratings were given to those landscapes where the valued landscape attributes appear complete and little or no visible deviations are evident or desired. Scenic Integrity is used to describe both existing (Existing Scenic Integrity) and desired (Scenic Integrity Objective) conditions. (Landscape Aesthetics, A Handbook for Scenery Management, USDA, FS HB 701, page 2-1)

Scenic Integrity Objectives (SIOs) were developed utilizing direction contained in the Landscape Aesthetics Handbook and utilizing inventory information previously described in this appendix. An SIO of High was designated where landscapes exhibit outstanding, often unique attributes (Scenic Attractiveness A) and where the use and concern for the aesthetics are high (Concern Level 1). Landscapes with little variety and are not commonly seen were assigned a Low SIO. Remaining landscapes were assigned the SIO of Moderate.

The SIO map was then compared with the Kootenai National Forest’s MA map to ensure SIOs complemented other resource values prescribed under each of the MAs. The following table displays the correlation between the Forest’s MAs and SIOs.

<table>
<thead>
<tr>
<th>MA</th>
<th>SIO(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MA 1a-c</td>
<td>Wilderness/Recommended Wilderness/WSAs</td>
</tr>
<tr>
<td>MA 2</td>
<td>Eligible W &amp; S Rivers: Wild</td>
</tr>
<tr>
<td></td>
<td>Scenic</td>
</tr>
<tr>
<td></td>
<td>Recreational</td>
</tr>
<tr>
<td>MA 3</td>
<td>Special Areas: Northwest Peak, Ten Lakes, Ross Creek Cedars, and Wood Creek Larch Scenic Areas Libby Gold Panning Area</td>
</tr>
<tr>
<td>MA 3</td>
<td>Special Areas: All others</td>
</tr>
<tr>
<td>MA 4</td>
<td>Research Natural Areas</td>
</tr>
<tr>
<td>MA 5a-c</td>
<td>Backcountry</td>
</tr>
<tr>
<td>MA 6</td>
<td>General Forest</td>
</tr>
<tr>
<td>MA 7</td>
<td>Primary Recreation Areas</td>
</tr>
<tr>
<td></td>
<td>(M – Lake Koocanusa area)</td>
</tr>
</tbody>
</table>

MAs: 2, 3, 5, 6, and 7 identify a range of compatible SIOs. When projects occur in one or more of these MAs, the Forest Plan SIO map must be referenced to discern which SIOs applies where. The final Forest Plan SIO layer (and corrections) is referenced in Forest-wide Guideline: FW-GDL-AR-01 and is part of the Plan set of documents. SIOs describe the maximum allowable visible contrast to the Landscape Character and are to be achieved as soon as practicable, during or after project completion, to provide optimal and timely Scenic Integrity.

The Forest Plan SMS layers are located at: T:\FS\Reference\GIS\r01_knf\LayerFile\ArcGIS10_1\Scenery

A KML file (for use in Google Earth) of the Forest SIOs can be found in: T:\FS\Reference\GIS\r01_knf\Data\KML
APPENDIX B

NORTHERN REGION
Scenic Resource Mitigation Menu & Design Considerations
For Vegetation Treatments

March 1, 2011
**Introduction**

The objective of the Scenic Resource Mitigation Menu is to provide a variety of techniques to minimize impacts to the scenic resources and meet Land and Resource Management Plan direction. The menu is not all-inclusive, nor is it to be used as a cookie cutter for automatic inclusion into NEPA documents and timber contracts. Each project will have unique conditions (biophysical and/or social) and specific vegetation management objectives that must be met.

Contents borrow heavily from work done in Region 8. Since landscapes across the Northern Region are extremely diverse, ranging from grasslands to old growth forests, techniques are not associated with specific silvicultural prescriptions or designated objectives for scenery. Instead, design considerations are categorized by specific goals associated with treatment activities. The techniques listed can be applied under multiple silvicultural prescriptions and under the full range of scenic integrity objectives. The valued attributes of the specific landscape and the ability of that landscape to absorb proposed management changes will determine which design techniques to employ.

This menu is dynamic and will evolve as managers continue to learn from the results of applying these techniques. In addition, new technology and practices may emerge requiring adjustments or additions to this document. References used in developing listed design considerations and mitigation techniques are listed at the end of this document.

**Need for Guidance**

Translating objectives for scenery into practical on-the-ground actions has typically been the role of landscape architects in the forest service. As the Region continues to downsize, it is not always feasible to involve a landscape architect in every project. Although general concepts and techniques to mitigate impacts to scenery were developed in the 70s and are outlined in a series of landscape management handbooks, there is now a need for a more condensed and accessible reference.

This menu provides general guidance to the field on what types of design considerations are available and should be discussed in an IDT context. The menu includes commonly practiced techniques that have proven to be effective when appropriately applied. As stated in the introduction, this is simply a menu of techniques. Landscape attributes, resource values, and vegetation management objectives will drive which techniques are best suited for the specific landscape and treatment being proposed. The intent is for IDTs, regardless of the mix of specialized skills, to consider landscape management techniques in the planning, design, implementation and monitoring of vegetation treatments in the Region.
Menu of Design Considerations and Mitigation Measures

SHAPE OF INDIVIDUAL UNITS
The goal is natural appearing opening(s) when viewed individually and a natural appearing mosaic when viewed within the broader landscape.

1. Created openings and treatment units should not be symmetrical in shape.
2. Straight lines and right angles should be avoided.
3. Created openings should resemble the size and shape of those found in the surrounding natural landscape.
4. Treatments should follow natural topographic breaks and changes in vegetation.
5. Where small landforms exist, consider treating the entire landform rather than creating artificial lines and patterns.
6. Along roadways, vary unit sizes, widths, shapes and distance from the center line.

EDGES OF INDIVIDUAL UNITS
The goal is a natural appearing transition between treated and untreated vegetation.

7. Utilize natural breaks in topography and vegetation type to delineate treatment edges.
8. Edges will be shaped and/or feathered to avoid a shadowing effect in the cut unit.
9. Where the unit is adjacent to denser forest, the percent of thinning within the transition zone will be progressively reduced toward the outside edge of the unit. In addition, vary the width of the transition zone.
10. Where the unit interfaces with an opening, the percent of thinning within the transition zone will be progressively increased toward the outside edge of the unit. In addition, vary the width of the transition zone.
11. Soften edges by thinning adjacent to existing unit boundaries, removing taller, older trees and favoring younger ones. This will reduce a vertical wall effect.
12. Treatment boundaries should extend up and over ridgelines to eliminate the linear strip of trees above the treatment area. This is especially important along ridgelines silhouetted against the sky.
13. Avoid widely spaced trees that are silhouetted along the skyline.
14. Consider leaving single trees and/or groups of trees to visually connect with the unit’s edges.

PATTERN CREATED BY MULTIPLE UNITS
The goal is a natural appearing mosaic of vegetation across the landscape.

15. Where multiple clear cuts are planned, vary the size and spacing across the project area.
16. Interlock individual openings to prevent a “floating” appearance.
COMPOSITION OF VEGETATION
The goal is to maximize diversity of species and age class that are within the landscape's natural range of variation/Forest Plan Desired Condition.

17. Where feasible, leave a diversity of species and age classes.
18. Leave healthy, wind throw resistant trees and groups of trees to add variety and interest.
19. A range of stem diameters should be left where compatible with project objectives.

ROAD, SKID TRAIL, and LANDING CONSTRUCTION
The goal is to minimize long-term visual impacts of access roads, skid trails, and landings.

20. Where feasible, locate and orient roads to minimize cut and fill.
21. Side cast topsoil during the construction of temporary roads and use for later obliteration and recontouring.
22. Where new access roads and skid trails meet a primary travel route, they should intersect at a right angle and, where feasible, curve after the junction to minimize the length of route seen from the primary travel route.
23. Where feasible, retain screening trees one tree-height below roads and landings (including cable landings) when viewed from below. Avoid creating a straight edge of trees by saving clumps of trees and single trees with varied spacing.
24. When viewed from above, retain, screening trees one tree-height above roads and landings and/or prescribe a higher leave basal area. Avoid creating a straight edge of trees by saving clumps of trees and single trees with varied spacing.
25. Log landings, roads, gravel pits, borrow areas, and bladed skid trails should be minimized within sensitive view sheds.
26. Cut and fill banks will be sloped to accommodate natural revegetation.
27. Cut and fill slopes will be revegetated with native species where ever possible.

SLASH TREATMENT
The goal is to minimize slash piles and residue that appears man-made.

28. Ensure slash is abated near landings by scattering, chipping, or other techniques.
29. In sensitive foreground areas, stumps should be cut to 8 inches or less in height.
30. Slash, root wads, and other debris will be removed, buried, burned, chipped or lopped to a height of 2 feet or less in sensitive view sheds. If slash is buried, locate in previously disturbed areas where possible.

SKYLINE TREATMENTS
The goal is to minimize the long term visual impacts of skyline operations.

31. Minimize the number of skyline corridors in visually sensitive areas.
32. Select skyline systems with lateral yarding capabilities.

**UNIT MARKING**
The goal is to minimize the visibility of tree markings post treatment.

33. Use *cut tree* (as opposed to *leave tree*) marking in visually sensitive areas.

34. Utilize species designation where appropriate to minimize the amount of necessary marking.

35. Unit boundaries will be marked with water based paint.

36. Additional mitigation techniques (i.e. signing and/or alterations to marking standards) to marking sale boundaries may be feasible in visually sensitive areas. Deviations from 9/10/2010 Regional marking standards (2409.12_70) must undergo formal RO review and approval. *(reference Procedures For Requesting Non-Recurring Special Provisions For Division C(T) In Region 1)*

**RELATED RECREATION AND TRAIL MITIGATION**
The goal is to minimize both short term and long term impacts to recreation infrastructure and use.

37. Coordinate treatment timing to minimize conflicts with recreation use.

38. Temporary road and/or skid trail crossings across designated forest trails will be kept to a minimum.

39. Any crossings will be perpendicular to designated forest trails.

40. Minimize overlaying skid trails/haul roads on non-motorized system trails.

41. If trails are used as skid trails/haul roads, trail cleanup/rehabilitation will be included in the contract.

42. Trail width should not be increased.

43. Character trees and trees that define the trail corridor should be retained where ever feasible.

44. Changes to trail alignment and surfacing will be minimized; the trail will not be straightened nor its surface be changed with an alternate material unless such actions are needed to enhance the trail and protect resources.

45. Warning signs will be placed on all trail access points and along the trail where activities are occurring.

46. When activities are occurring along open trails, slash will be treated within 100’ of the corridor within specified timeframes (check with recreation specialist).

47. If trails are temporarily closed due to harvesting, trail tread will be cleared of all slash.
The 1987 Forest Plan prescribed Visual Quality Objectives for Management Areas. Below is a cross walk between the 1987 VQOs and 2015 Forest Plan SIOs. The cross walk is not intended as a one-to-one correlation between SIOs and VQOs, but rather, displays the hierarchy of ratings between the two systems and how they relate to the level of landscape character “intactness”.

<table>
<thead>
<tr>
<th>Scenic Integrity Objective</th>
<th>Definition</th>
<th>Visual Quality Objectives (VQOs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very High</td>
<td>Positive attributes defined in the Landscape Character description are intact</td>
<td>Preservation</td>
</tr>
<tr>
<td>High</td>
<td>Positive attributes appear intact.</td>
<td>Retention</td>
</tr>
<tr>
<td>Moderate</td>
<td>There are slight deviations to the landscape; deviations are subordinate to the landscape character.</td>
<td>Partial Retention</td>
</tr>
<tr>
<td>Low</td>
<td>Deviations begin to dominate the landscape character</td>
<td>Modification</td>
</tr>
<tr>
<td>Very Low</td>
<td>Heavily altered landscape, deviations strongly dominate the landscape</td>
<td>Maximum Modification</td>
</tr>
</tbody>
</table>

Appendix A of the SMS Handbook (AH-701)
APPENDIX D - TOOLS AND REFERENCES

Forest Service Policy and Direction pertaining to the management of scenic resources:

- Forest Service **Manual 2380** [http://www.fs.fed.us/cgi-bin/Directives/get_dirs/fsm?2300]


BLM reference pertaining to Oil and Gas:

Regional GIS layers and metadata:
http://www.fs.usda.gov/detailfull/r1/landmanagement/gis/?cid=stelprdb5360066&width=full

Regional Intranet site with Scenery Management references, tools, and examples
http://fsweb.r1.fs.fed.us/rmlhw/scenery_mgmt/scenery.htm
2015 FP Scenic Integrity Objectives, Plan set of documents
Change to Scenery Integrity Objective Form

Forestwide Scenery Spatial Data
The Kootenai NF’s official record of scenery is the spatial data housed in the forest’s GIS reference library. The name of the feature class is ‘scenery’ and it is filed in the reference library (T:\FS\Reference\GIS\r01_knf\LayerFile\ArcGIS10_1\Scenery). This data was developed, and is monitored and maintained to inform the management direction for the 2015 Forest Plan. This spatial data is used for tracking, management effects analyses, and sharing forestwide conditions with the public.

Process for Making Changes to the Scenery Spatial Data
Any changes to Scenic Integrity Objective (SIO) designation or boundaries should be consistent with Forest Service policy and direction (FSM 2380 and AHB 701). The Forest planning GIS specialist will update the forest GIS library with the forestwide SIO spatial data annually, or as needed to reflect project validation information.

Documentation of all changes will be filed on the O drive at O:\NFS\Kootenai\Program\1900Planning\1940InventoryMonitoringAssessment\SceneryChanges
A copy of the form and this direction is also found at this location, under the folder “Direction.”

<table>
<thead>
<tr>
<th>District</th>
<th>Forest Wide</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Name</td>
<td>Revised FP, Final ROD and MA updates to SIO’s</td>
</tr>
<tr>
<td>Vicinity</td>
<td>5 locations, see attached</td>
</tr>
</tbody>
</table>

Describe changes in SIO; attach all supporting documentation.

The FROD for the FP changed the MA allocation for the several areas. These changes in MA allocation were not reflected in the 2014 SIO map. There MA changes (5 total) which impacted the 2014 Mapped SIO’s were analyzed using direction contained in AHB 701 and the Implementation Guide for Scenery Management under the Kootenai National Forest 2015 Land Management Plan (May 2015). See attached documentation for SIO changes.

<table>
<thead>
<tr>
<th>Signature/ position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Submitted by (district)</td>
</tr>
<tr>
<td>Approved by (Forest)</td>
</tr>
<tr>
<td>GIS library updated by</td>
</tr>
</tbody>
</table>

Map: Attach a map showing the areas with SIO changes.
APPENDIX F

3-D VISUAL OVERLAY MODELING USING GOOGLE EARTH, ARCMAP AND PHOTOSHOP SOFTWARE.
3-D VISUAL OVERLAY MODELING USING GOOGLE EARTH, ArcMap AND PHOTOSHOP SOFTWARE.

The purpose of the guideline is to demonstrate an easy, fast, and inexpensive 3D modeling process that can be effective in helping to visualize impacts from vegetation treatments (primarily in assessing potential form, shape, and edge effects of treatment units). This process will show you how to convert KML files from ArcMap, how to use Google Earth to create 3D viewpoints, and a Photoshop technique to scale Google Earth images.

Step 1: Convert ArcMap layer to a Google .kml file in ArcMap.

First: Open up ArcMap and add your project data including proposed roads and vegetation treatment units (I’m using GL_PA_units_Aug11_AR.shp and GL_PA_TempRoads_Final_01.shp as an example).

Next: Adjust the Layer Properties (right click over your layer) and using categories/unique values color your vegetation units (depending on the project I will usually distinguish between all or portions of similar unit prescriptions i.e. regeneration harvests & thinning or between logging systems i.e. skyline and ground). Repeat this process for your roads layer where you can distinguish between the types of roads. FYI-You can also adjust the colors later in Google Earth and in Photoshop.
Next: Click on the Arc ToolBox icon and then click on the Conversion Tools from the drop down items, and then Click on the To KML. A Layer To KML window will then open.

Next: After your Layer To KML window is open, find your vegetation units layer that you would like to export in the first text field labeled Layer. Then in the next text field Output File, find the location where you would like to save the new .kml file and then place a value of “1” in the last Layer Output Scale text field. Hit OK and repeat the process for your project roads file. After you are done with that you should have two KML files ready for Google Earth. If you were not successful in creating a .kml file you could always ask a GIS gooroo to e-mail you your project vegetation treatments and roads as a KLM file.
Step 2: Viewing Google .kml file in Google Earth and creating viewpoint Google jpegs.

First: Open up Google Earth (under Tools, Options... adjust to high resolution and make sure the Show terrain is on) and then click File, Open and add the vegetation units and roads KLM files. Notice the location of the files under Places folder on the left of the screen. Also notice the new files are located in the Temporary Places folder. You will need to move the files from the Temporary Places to the Places by dragging and dropping or save them when you are prompted as you Exit Google Earth.

Option: Notice that the color selections are the same for the units as they were in ArcMap. If needed, you can adjust the colors and border by expanding the file folders (on the left side of the screen) by right-clicking over individual unit and selecting Properties, and then Style/Color.
Next: Zoom in on any unit. You can adjust the transparency of the vegetation units by clicking on the transparency icon (located at the bottom of the Places to the left on the screen) and adjusting the sliding bar (make sure you have the units layer selected when you adjust the bar).
Next: Take a look at your units in 3D by using your mouse to pan while holding down the center scroll button to navigate in 3D. Using your mouse and the Google Earth navigation tools (upper right corner of screen), identify your viewpoints and adjust your viewing position to approximately 5-feet above the ground looking toward the treatments. (You may lock into the ground-level view mode... to exit this mode click the Exit ground-level view icon on the top right corner of the screen.) Tip- You can also find your viewpoint location if you enter GPS coordinates in the Fly to menu.

You can use existing photographs you have taken in the field to help get the correct viewing angle. After you have identified the correct viewing angle, create at Google Earth viewpoint. Click on the Add Placemark icon and name your viewpoint. Using your mouse and the Google Earth navigation tools you can zoom back out and that viewing angle is saved (don’t forget to move your Viewpoint from the Temporary Places folder). Repeat this for all of the viewpoint locations that you plan on creating an overlay model.

Tip- Be consistent with any zooming when you take viewpoint photographs. Why zoom? Typical 50mm digital cameras may offer a wider (more distant) view than is representational relative to the size of smaller media formats (i.e. report vs. posters).
Next: After you have created your viewpoint Placemark then create a jpeg image in Google Earth by selecting File, Save, Save Image. Repeat this for all of the viewpoint locations that would benefit from a 3D model. Some examples of viewpoint locations that would not benefit could include immediate foreground viewpoints on very flat terrain and/or that are screened heavily by vegetation.

These Google Earth viewpoint images can be used to help identify potential visual impacts primarily by helping to determine potential contrast in edge, line, form and shape from sensitive views. **Note: A portion of unit(s) will be screened by vegetation, which will reduce the see unit area in these Google images.** The wide-angle scale of the view from Google Earth should also be taken in to consideration if these images are used to discuss impacts (i.e. the Google Earth image appears very far away relative to the real life viewing distance). However these raw Google Earth images are very useful in the preliminary phase (i.e. NIFMA, development of Proposed Actions) but also could be used to help accurately describe visual impacts within the context of missing vegetation screening. Whenever possible, existing photographs should be used in comparison of the Google Earth images.
Step 3: Using Photoshop to crop Google Earth viewpoint to compare against existing condition photo.

First: Open up both viewpoint photograph and Google Earth viewpoint image in Photoshop. Select the approximate area relative to your viewpoint photograph and Copy (Familiarity with Photoshop software would be needed to complete this step).

Next: Create a new layer and Paste your Google Earth image. Then adjust the Opacity to between 30 to 60%.
Next: Edit the cropped Google Earth viewpoint image using the *Free Transform* command under *Edit*. Rotate, scale, stretch, and skew to adjust the image. Scale and align the skyline first and then use water edge, rock outcrops, existing vegetation treatments and terrain to scale the image properly. The closer the treatment is within the photo view the greater distortion relative to the Google Earth viewpoint image and in turn vertical stretching edits will need to occur (i.e. Photos with treatments within ¼ mile will have a lot more distortion than treatments 4 miles away). Note also that the skyline edge is true when there is exposed rock but will need to be adjusted below the horizon to compensate for the tree line height, which will need to be scaled accordingly (For example look at the tree line height difference in the background vs. foreground in the image below). This process is never exact but you should get the overlay very close.

Finally: Crop both images to the same size. This is very useful for comparing potential impacts with existing conditions. The scale of both images is the same. Note that the vegetation screening would still need to be factored in when considering potential impacts.

Byron Stringham - Bitterroot, Helena, Flathead National Forests Landscape Architect
March 2012
Option: Using Photoshop you can create a more accurate representation of the impacted areas by overlaying the Google Earth viewpoint image cropped to the unit areas. Additionally, the existing roads and temporary road are highlighted. Vegetation screening is also factored in and reduces the seen area of the units, which is scaled to the appropriate height.

With additional editing, the units and roads can be highlighted and labeled to produce an image that helps convey potential impact. Note that the contrasting elements including form, shape, and edge effects of treatment units are defined within the image. However, the texture and color contrasting elements are not shown.

A full simulation would need to be created to demonstrate all of these impacts.
Option: If there is very high concern for vegetation treatments, visual simulation might be warranted. These should be created by persons trained in software and with an adequate understanding of vegetation treatment effects.