Biomass Working Group meeting: August 19, 2011

Agenda

- *Welcome, review agenda*
- *Field Tour Debrief*
- *Best Management Practices presentation*
- *Resource Considerations*
- *Discussion*
- *Wrap-up*

Purpose

- Defining "sustainability"
- Defining "forest biomass"
- Gain a deeper understanding of existing biomass harvest BMPs outside of Washington
- Identify information gaps and where BMPs are potentially needed sufficient to maintain ecological sustainability (preliminary)

Defining "Sustainability"

- How to interpret SSHB 2481?
  - The legislature finds that biomass utilization on state forest lands must be accomplished in a manner that retains organic components of the forest necessary to restore or sustain forest ecological functions.
  - The department must specify in each contract an annual volumetric limit of the total cubic volume or tons of forest biomass to be supplied from a specific unit, geographically delineated area, or region within a watershed or watersheds on an ecologically and operationally sustainable basis.

- Pennsylvania DCNR
  - Need for a reliable supply of biomass as a fuel source for energy generation
  - Any use of forest products must preserve the full range of benefits and functions the forest provides and its capacity to regenerate a healthy future forest
  - For biomass to be considered a renewable resource, the proportion of wood volume growing needs to be greater than the amount harvested in any given year. Vigorous regeneration is essential to maintain a sustainable supply of biomass.
  - FSC: "the rate of harvest of forest products shall not exceed levels which can be permanently sustained."
  - FSC: "The sustainability of harvest levels is based on documented data on growth and regeneration, site index models, and classification of soils, appropriate to the scale and intensity of the operation."
  - FSC: "Ecological functions and values shall be maintained intact, enhanced, or restored, including:
    - Forest regeneration and succession
    - Genetic, species, and ecosystem diversity
    - Natural cycles that affect the productivity of the forest ecosystem."

Defining "forest biomass"

- "The removal of forest biomass" is officially a forest practice
- A definition is needed to ensure protections afforded by the FP Rules are maintained
- Attempt made by DNR, deferred to us
- UW/DNR Supply Study
- Residual forest biomass: the slash that is produced when a forest operation takes place

Common Themes (Evans et al. 2010)

- Maine, Minnesota, Missouri, Michigan, Pennsylvania, and Wisconsin have already developed guidelines for woody biomass harvesting.
- Each state has requirements for the retention of logs and snags (of various sizes and decay classes), the forest floor, stumps, and pre-existing coarse woody and fine woody debris, and they suggest leaving between 15 to 33% of slash generated during harvest. (summarized in Stewart et al. 2010, Table 24)
- All states recommend the retention of biological legacies such as trees with cavities, pockets of understory vegetation, and green trees.
- All state guidelines suggest avoiding harvests within sensitive sites such as riparian zones, wetlands, meadows, old-growth forests, or sites supporting sensitive wildlife species.
- Biomass retention guidelines (percentages) from eastern states may not apply well to western states because Western forest types in the sample had roughly twice as much dead tree and dead and down woody biomass as the Eastern forests (Evans et al. 2010).
- European countries created a residue extraction suitability map, and acceptable extraction rates were produced based on these environmental criteria and the potential for soil erosion, compaction and nutrient depletion (Wiesenthal et al. 2006).
- The maximum extraction potential for forest residues (excluding foliage) from highly suitable sites was set at 75% (50% for moderately and 15% for marginally suitable sites, Wiesenthal et al. 2006).
- Harvests on state forests are required to follow Pennsylvania's guidelines. The guidelines also supply recommendations for private lands (Evans et al. 2010).
- New Brunswick's policy calls for biomass harvesting sustainability to be assessed over an 80-year time period, which is "equivalent to the life span of an average forest stand."(Evans et al. 2010).
- From 50 to 80 percent of slash is typically removed, depending on site conditions and economic constraints.[35] (Evans et al. 2010)… The guidelines also stipulate that at least 20 percent of all slash must be left on-site. Sweden
- WTH in Finland remove between 60 and 80 percent of the total site biomass.[57, 30, 50, 53, 64] Finnish biomass harvesting guidelines suggest that 30 percent of residue should remain and be distributed evenly over the site following clearcuts. (Evans et al. 2010).
- The Finnish approach to ensuring forest sustainability is to classify different sites according to the risks associated with biomass removals from these sites and to then apply different management recommendations based on these classifications. Site classifications include:

    - mesic uplands and sites with fertile soils,
    - sub-xeric and xeric sites,
    - barren upland sites with lichens,
    - peatland forest sites,
    - stands with rocky soils,
    - stands with low levels of available nutrients,
    - water conservation areas,
    - managed stands with more than 75 percent spruce, and
    - stands where biomass removals have previously been performed through WTH clearcutting systems.[56] (Evans et al. 2010).
- The UK's guidance classifies sites according to soil types as being of low, medium, or high risk and lists associated slash and stump removal management actions for each of these soil classifications. The assessment of site suitability for biomass harvests is to be based on the most sensitive soil type that covers greater than 20 percent of the site area. The guidelines suggest that site-specific risk assessments should be carried out before each harvest and should include a soil test. (Evans et al. 2010).
- FSC Indicator 6.3.f requires that "management maintains, enhances, or restores habitat components and associated stand structures, in abundance and distribution that could be expected from naturally occurring processes"; these habitat components include "live trees with decay or declining health, snags, and well-distributed coarse down and dead woody material." (Evans et al. 2010)…ecological forestry
- Wisconsin's guidelines recommend retaining all pre-harvest DWM and tops and limbs from 10 percent of the trees in the general harvest area, with a goal of at least 5 tons of FWM per acre. Wisconsin's guidelines also point out that "some forests lack woody debris because of past management," and that extra DWM should be left in those areas. (Evans et al. 2010)

Soil health and productivity

- Nutrients/productivity
    - Retain logging slash on site, especially on sites with nutrient-limited and coarse-textured soils (Page-Dumroese et al. 2010).
    - Maine's, Minnesota's, Missouri's, Michigan's, and Wisconsin's guidelines include recommendations based upon the soil types, with poor, shallow, sandy soils being classified as less suitable for biomass harvest (Evans et al. 2010).
- Soil compaction
    - Position limbs and tree tops on equipment travel corridors as a protective mat to reduce exposure and compaction of soil (Hartsough et al. 1994; Page-Dumroese 1993).
    - Use well-planned systems of designated equipment corridors to limit the total area disturbed during harvest (Moghaddas and Stephens 2008; Page-Dumroese et al. 2010).
    - Avoid biomass collection when soil moisture is high (Han et al. 2009).
    - Utilize historic/preexisting skid trails to help minimize cumulative soil disturbance from multiple harvest entries (Stewart et al. 2010).
    - Limit the areal coverage of equipment corridors (Stewart et al. 2010).

- Litter removal
  - *The forest floor, including roots, stumps and below-ground biomass, should always be off-limits to biomass harvesting. This material provides too many irreplaceable functions to sustaining a healthy forest, including nutrients essential for tree growth and maintaining biodiversity (PA DCNR).*
- Summarized in Stewart et al. 2010, Table 27

Silviculture/Roads

- Most states with biomass harvesting guidelines recognize the potential to use woody biomass harvests to achieve a variety of silvicultural goals including density control and growing space allocation during intermediate treatments, site preparation and regeneration, salvage operations, maintenance of forest health, and fuels reduction treatments (Evans et al. 2010).
- Planning
- Regeneration
- Residual stands
- Post-operations
- Re-entry
  - Minnesota, Missouri, and Pennsylvania recommend against re-entry into recently harvested stands for the purpose of removing biomass, especially after regeneration has been established (MFRC 2007a, Enyart 2008, PADCNR 2008).
- Roads
  - Pennsylvania's guidelines focus on water quality issues related to road design, function and placement (PADCNR 2009).
  - Pennsylvania and Minnesota address the impacts of roads and landings on soil productivity.
- Skid trail layouts
- Summarized in Stewart et al. 2010, Table 28

Disturbance

- Disturbance from fire, wind, ice storms, insect damage and other natural events can create biomass harvest opportunities that complement good silvicultural management that leads to healthy forest regeneration (PA DCNR).
- Pests
  - British Columbia focuses on utilizing forest residues and bark beetle-killed trees (Campbell et al. 2008).
  - Merrill and Ring example (spruce tip weevil): harvest to prevent the spread of pests and disease
  - Like other Nordic countries, Sweden prohibits in-stand drying of forest residues in late spring and early summer to manage risks associated with bark beetle infestations. (Evans et al. 2010)
  - Biomass removals can help deal with forest insect problems, but removing the biomass material from the site must be timed to avoid contributing to pest problems such as bark beetles. (Evans et al. 2010)

- FSC: “Whole-tree harvesting and the burning of slash and stumps are used only where it is ecologically justified, e.g., for pest control.”
- PA DCNR
  - In forests with pests or disease infestations, biomass removal should not take place if the pest or disease can be further disseminated by doing so
  - Consider increasing species diversity, changing species composition, or changing stand structure to minimize susceptibility to insect and disease attack.
  - Consider a biomass harvest to salvage dead and dying trees and to eliminate nuisance fuels.
- In Washington
  - Western Spruce Budworm
  - Western Pine Beetle
  - Douglas Fir Beetle
  - Mountain Pine Beetle
  - Blue Stain Fungus
  - Dwarf Mistletoe
- Overstocked forests can be thinned to renew tree health and improve stand vigor by reducing the fuel load and competition among trees.
- Removal or reduction of slash and fuels by prescribed broadcast or pile burning can improve forest health and reduce the incidence of fire.
- Forest management for resistance to insect outbreaks
  - Maintain appropriate diversity within stands and across forest landscapes
  - Limit the fir component to less than 50%
  - Shift stand structure toward evenness especially in host species dominated stands
  - Maintain proper stocking for site conditions with carefully applied thinning
  -

- Disease
  - Minimize residual tree and root injury during thinning to minimize mortality from root disease (Stewart et al. 2010).
  - Effects on conifer root diseases (ODF 2008).
    - Biomass treatments that increase root disease mortality rates are likely to increase the accumulation of woody debris.
      - Positive if wood is scarce or stand lacks structural complexity
      - Negative if wood is overly abundant
    - Avoid wounding trees during harvesting and removal to reduce future impacts on stand health.
    - Thinning treatments should also favor the species most tolerant to root disease and be timed to avoid problems with bark beetles.
- Fire/ Fuel reduction treatments
  - Effective fuel treatments reduce surface fuels, increase the height to the canopy, decrease canopy density, and retain large trees belonging to fire-resistant species (Agee and Skinner (2005).
  - Raymond and Peterson (2005) conclude that fuel treatments intended to minimize tree mortality will be most effective if both ladder and surface fuels are treated. (ODF 2008)

- Intensively treating most of the landscape may not be necessary (or feasible) but treating strategically located stands for fuel treatment or treating strips of fuels may be beneficial for reducing severe wildfire potential across a large area (Pollet and Omi 2002). ODF
- California FPR: Article 5 Site Preparation
  - 915.2, 935.2, 955.2 Treatment of Vegetative Matter [All Districts]
    - (a) Piling, burning, and other treatment of snags, slash and vegetative matter and protection of desirable residual trees during site preparation shall comply with 14 CCR 917 [937, 957] through 917.7 [937.7, 957.7].
    - (b) Broadcast burning shall not fully consume the larger organic debris which retains soil on slopes and stabilizes watercourse banks.
- California FPR: Article 7 Hazard Reduction
  - 917, 937, 957 Hazard Reduction [All Districts]
    - This article shall provide standards for the treatment of snags and logging slash in order to reduce fire and pest safety hazards in the logging area, to protect such area from potential insect and disease attack, and to prepare the area for natural or artificial reforestation while retaining wildlife habitat.
- To reduce wildfire fuels and wildfire risk around communities, especially regarding forest edge-communities to create openings by removing fuel around structures in forested communities. Exception: do not clear biomass from heavily cut areas or areas without much canopy cover as desiccation of the soil can be a greater fire risk factor. (PA DCNR).
- Maintain access roads to facilitate wildfire control. (PA DCNR).
- there is also a need to treat large numbers of small trees that will yield relatively little volume. The operational cost of treating the smallest trees may exceed the market value of any recovered fiber. The most cost-effective systems may be operations that leave processed material in the forest without attempting to utilize marginal volumes. (USFS 2005)
- Brown and others (2004) submit that forests with historically low-severity fire regimes- e.g. ponderosa pine, dry Douglas-fir, and dry grand-fir forests- should have the highest priority for active fuels reduction and biomass removal. Wet Douglas-fir, grand-fir and red-fir forests would have intermediate priority, while low priority would be assigned to sitka spruce, western hemlock, Pacific silver fir, mountain-fir and subalpine fir forests unless unusual situations require local treatment. (ODF)
- Other high priorities for active fuels reduction and biomass removal are productive dry mixed-conifer forests with abnormally high fuel loadings, old-growth ponderosa pine stands, and stands overstocked with dense understory trees (Brown et al. 2004).

- Invasive species
  - To remove invasive species which DO NOT readily propagate from cutting (PA DCNR).
- Forest conversion
  - Biomass plantations should not replace existing natural forest (PA DCNR).

Dead Wood, Slash Disposal, and Carbon Storage…*this is covered in most/all other sections (except carbon)*

- Course and fine woody material
- Snags left on site
- PA DCNR
    - Retain slash on areas treated by conventional timber operations.
    - Limit whole tree harvests.
    - If doing a whole tree harvest, retain slash on 10% of the site.
    - Retain 2-5 non-merchantable logs per acre on timber operations. Cull trees can be felled and left to accomplish this.
    - Retain an average of 5 trees with cavities per acre.
    - Retain 1 to 5 snags per acre.
    - In streamside buffer areas, retain dead and downed woody material. Reduce the amount of biomass available for removal by 5 to 20% from inventory data in order to retain an average basal area of 10-20 square feet over the entire treatment area.

Water Quality, Riparian Zones/Unstable Slopes, and Water Infiltration

- Erosion
    - Limit the areal coverage of equipment corridors (Stewart et al. 2010).
    - Maine, Minnesota, and Missouri recommend retaining dead and downed wood for erosion control and soil stabilization (Benjamin 2010, MFRC 2007a, Enyart 2009).
- Pollution
    - Retain logging slash after harvest to reduce the rate of sediment delivery to stream channels (Guy et al. 1993).
    - Maintain riparian buffers to mitigate the impacts of roads and landings on project-related sedimentation (Stewart et al. 2010).
    - When streamside vegetation is removed (i.e., Type N streams), logging slash retention can help mitigate the effects of harvest on stream temperature by providing shade (Jackson et al. 2001, Kibler 2007).
- Summarized in Stewart et al. 2010, Table 26

Wildlife, Biodiversity and Cultural Resources

- California Forest Practices Rules (Article 9) explicitly state that biomass harvests should not be allowed to reduce biological diversity within stands or across the landscape through the reduction of suitable wildlife habitat.
- Consider the landscape context of a woody biomass harvest and its impact on spatial heterogeneity (Stewart et al. 2010).
- Habitat structural complexity and spatial heterogeneity across the landscape can be increased by reducing the intensity of or excluding harvest from RMZs, WMZs, rare habitats, and nutrient deficient soils (Stewart et al. 2010).
- To manage for biodiversity, vary human disturbances in size and intensity in order to increase complexity and heterogeneity (Bunnell and Huggard 1999, Wilson and Puettmann 2007) or mimic natural disturbances as closely as possible (Stewart et al. 2010).

- The highest levels of biodiversity are typically associated with ecosystems subjected to intermediate frequencies, scales, and intensities of disturbance (Carnus et al. 2006, Kimmins 2004, Petraitis et al. 1989).
- To meet wildlife conservation goals, biomass harvests should retain vertical and horizontal complexity, understory vegetation, dead and downed wood, cavity trees, and a well-developed forest floor (McComb 2008, Hunter 1990, Bunnell et al. 1999, Hagar 2007, Carey and Harrington 2001).
- Promote vertical and horizontal structural complexity through the retention of biological legacies (Fischer et al. 2006, Lindenmayer et al. 2008, Lindenmayer et al. 2006, Franklin et al. 2002).
- Limit disturbance to snags and retain as many as possible during woody biomass harvests (Stewart et al. 2010).
- Provide for the replacement of snags and decomposing downed wood where necessary (Stewart et al. 2010).
- For wildlife and biodiversity conservation goals, Wisconsin's and Michigan's guidelines suggest leaving additional woody debris in stands with low levels of woody debris prior to biomass harvests (Herrick et al. 2009, MIDNRE 2010).
- Avoid biomass harvests more than once per rotation to prevent a decline in the quantity and quality of woody biomass pools over time (Stewart et al. 2010).
- Affects on prey species will extend through the food web to higher trophic levels
- FSC Indicator 6.5.c limits multiple rotations of whole tree harvesting to sites where soil productivity will not be harmed. (Evans et al. 2010)
- If stands are reentered for biomass harvest, erosion control measures should be reestablished and slash piles that demonstrate use by wildlife species should be avoided (MFRC 2007a, PADCNR 2008).
- Active management (thinning) in middle-aged, small diameter stands can diversify understory habitat and accelerate development of old forest characteristics, such as large diameter trees and patchy understories, that are currently lacking (Lehmkuhl et al. 2002). ODF
- Summarized in Stewart et al. 2010, Table 25
- New Hampshire (voluntary BMPs)
    - In areas under uneven-aged management, retain a minimum of 6 secure cavity and/or snag trees per acre, with one exceeding 18 inches DBH and 3 exceeding 12 inches DBH. In areas lacking such cavity trees, retain trees of these diameters with defects likely to lead to cavity formation.
    - In areas under even aged management, leave an uncut patch for every 10 acres harvested, with patches totaling 5 percent of the area. Patch size may vary from a minimum of 0.25 acre. Use cavity trees exceeding 18 inches DBH or active den trees as nuclei for uncut patches. Remember, the larger the tree, the more species that can use it. Riparian and other buffers can help to satisfy this goal.
    - Retain live trees with existing cavities.
    - Avoid damaging existing downed woody debris, especially large (18+ inches) hollow or rotten logs and rotten stumps during harvesting operations (including tree falling, skidding, and road and skid trail layout).

- Avoid disrupting upturned tree roots from May to July to protect nesting birds.
- California's forest practice rules require the retention of all snags except where specific safety, fire hazard, insect, or disease conditions require they be felled
- Regulations under British Columbia's Forest and Range Practices Act (FRPA) require the retention of at least 1.6 logs per acre (at least 16 feet in length and 12 inches in diameter on the coast and 6.5 feet in length and 3 inches in diameter in the interior; FRPA §68).
- Finland's recommendations include that large dead trees either standing or on the ground should not to be collected or damaged. Exceptions can be made for certain salvage harvests in the wake of a significant disturbance event, and protocols for this are explicit. (Evans et al. 2010).
- Maine, Minnesota, Pennsylvania, and Wisconsin suggest leaving all snags possible. Except for some hazard exceptions, California requires retention of all snags. Missouri provides an example of clear and specific recommendations by suggesting 6 per acre in upland forests and 12 per acre in riparian corridors. (Evans et al. 2010).
- Priority snags have a diameter at breast height of > 51 cm (20 in) in western Washington and > 30 cm (12 in) in eastern Washington, and are > 2 m (6.5 ft) in height. Priority logs are > 30 cm (12 in) in diameter at the largest end, and > 6 m (20 ft) long. (WDFW 2008).

- PA DCNR
  - A lower volume of biomass on the forest floor may reduce overall biodiversity and limit populations of small mammals and their predators (Carey and Johnson 1995).
  - The retention of fewer snags will eliminate habitat for primary and secondary cavity nesting and denning species and reduce the food available to wood-boring species.
  - Downed logs and slash piles provide over-wintering habitat and year-round cover for many forest generalist species and amphibians, as well as drumming sites for ruffed grouse.
  - Harvest of unmerchantable woody shrubs or trees can reduce the food (berries) available to wildlife and flowers available to pollinators.
  - In most cases, native shrubbery should not be harvested for biomass as it is necessary for wildlife forage and shelter, protection of the forest floor, and biodiversity. Native brush can also prevent a site from being overtaken by shade intolerant invasive species (PA DCNR).
  - Sensitive ecosystems, protected areas and those that support rare, threatened or endangered species of flora or fauna should be protected from biomass harvest.
  - Inventory habitat features on the property, and be aware of their relationship to surrounding lands.
  - Protect sensitive habitats such as spring seeps, vernal ponds, riparian zones, cliffs, caves, and rubble lands.
  - Develop missing special habitats, such as herbaceous openings for grouse and other species, through planting, cutting, or other manipulations.

- Protect cavity trees, snags, and food-producing shrubs and vines.
- Maintain overhead shade along cold-water streams.
- And most importantly: Leave up 15 to 30% of harvestable biomass as course woody debris. While harvesting as much biomass as possible increases profits and satisfies some management objectives, minimizing course woody debris might reduce habitat for small mammals, reptiles, amphibians, and beneficial insects.
- Keep in mind that plant habitats can be very small and specific. Learn to recognize these special micro sites.
- Develop specific management plans for unique areas and habitat with the help of a resource professional.

- Select silviculture treatments that provide a diversity of forest structure so a wider range of habitats for wildlife and understory plants can provide for overall biodiversity. (ODF)
- Species of concern that may be affected by biomass collection (PHS, and/or HCP)
  - Carnivorous mammals (gray wolf, grizzly bear, lynx, Cascade red fox, fisher, marten, and wolverine)
  - Small mammals (Merriam's shrew, Preble's shrew, Gray-tailed vole, Olympic marmot, Western gray squirrel, Northern flying squirrel, Mountain beaver, and Western pocket gopher)
  - Bats (Keen's Long-eared Bat, Townsend's Big-eared Bat, Long-legged myotis, Fringed myotis, Small-footed myotis, Long-eared myotis, Yuma myotis, and roosting concentrations of Big-brown Bat, Myotis bats (Myotis spp.), and Pallid bat)
  - Birds (Northern spotted owl, Northern goshawk, Ruffed grouse, Vaux's swift, Pileated woodpecker, Black-backed woodpecker, Lewis' woodpecker, White-headed woodpecker, Slender-billed White-breasted nuthatch,)
  - Reptiles (Pacific pond turtle, California mountain kingsnake, Sharptail snake)
  - Amphibians (Larch mountain salamander, Van Dyke's salamander, Northern red-legged frog, Western toad)
  - Invertebrates (detritivores, predators, forest herbivores, and pollinators)
- Across invertebrate groups and for diverse ecosystems, the provision of refugia (leaving untreated areas from which populations can recolonize) is widely recommended to minimize the effects of direct mortality and accelerate recovery. (Pilliod and others 2006.) ODF
- Pilliod and others (2006) suggest that managers should retain refugia of untreated stands and critical habitat elements, particularly slow to recover features such as large-diameter down wood and snags, to increase habitat heterogeneity and benefit the greatest number of species over time. ODF
- Hagar and others (2004) suggest using a variety of thinning intensities and patterns, from no thinning to very widely spaced residual trees, to maximize avian diversity at the landscape scale and structural diversity both within and among stands. ODF

- Until more complete information on many species becomes available, management activities that allow retention of critical habitat elements are warranted, particularly for slow to recover elements such as large-diameter down wood and snags (Pilliod et al. 2006). ODF
- We believe there is an adequate amount of literature informing the potential effects of woody biomass removal on forest species to warrant a precautionary approach to its management until further research can be conducted

Biomass Harvest Guideline Development (Evans et al. 2010)

- Develop guidelines that are based on the scientific literature and rigorous field based research.
- Define "woody biomass" and other important terms clearly.
- Woody biomass harvesting guidelines should be informed by the local ecology (climate, forest cover, natural disturbance regimes, etc). They should recognize state or local natural communities, disturbance regimes, and other ecological traits.
- Guidelines should be developed to include rules concerning water quality, soil productivity, wildlife habitat and biodiversity, dead and downed wood, and silvicultural applications. [region-specific]
- Make clear and specific recommendations for the retention of standing dead trees, existing CWM, CWM generated by the harvest, FWM, and forest floor and litter layer.
- Dead and downed wood (coarse woody debris, fine woody debris, logs, stumps, and snags) typically has more wildlife and biodiversity values than newly created harvest residues. Improved data on these relationships is necessary if specific retention targets for different categories of dead wood (existing and harvest generated CWD/FWD, forest floor, logs, stumps and snags) are to be developed.
- Nutrient levels may be temporarily reduced after each entry, but should return to adequate levels by the next cutting cycle.
- Woody biomass harvest guidelines must be operational and congruent with existing forest practice rules
- Periodic evaluations are necessary to assess the ecological effectiveness of retention targets
- Most guidelines try to draw from the most recent forest science.
- Minnesota, Missouri, and Wisconsin included public participation and a technical committee from the wider forestry community.
- Suitability mapping also permits the consideration of the landscape-scale impacts of biomass harvesting.
- Include wide stakeholder engagement in guideline development
- Make biomass guidelines practical and easy to follow. Where biomass guidelines supplement existing forestry rules and guidelines, the new guidelines should provide

clear references to the relevant sections of the existing rules and guidelines both for convenience and to increase the likelihood of implementation.

- Take advantage of the opportunity to create new forestry recommendations that encourage excellent forestry: forestry that goes beyond minimum BMPs and enhances the full suite of ecological values.
- SSHB 2481
    - The department shall develop utilization standards and operational methods in recognition of the variability of on-site conditions.