Forest Biomass Harvesting BMPs for South Carolina

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SC Forestry Commission
What are BMPs?

- Recommendations to protect environmental quality.
- Focus on water quality, though include other issues.
- Non-regulatory approach for compliance.
- Highly successful and effective program.
Major Regulations Affecting Forestry

- Clean Water Act
- State Water Quality Laws
- Rivers and Harbors Act
- Resource Conservation and Recovery Act
- Endangered Species Act
Three Levels of Forestry BMPs

• Required by law or regulation.

• Necessary to comply with a law or regulation.

• Recommended practices.
Best Management Practices

Include Guidelines for:

- Streamside Management Zones
- Stream Crossings
- Forest Road Construction
- Timber Harvesting
- Site Preparation
- Reforestation
- Prescribed Burning
- Pesticides
- Fertilization
- Minor Drainage
- Endangered Species Act
- Wildlife Management
Basic Principles of BMPs

• Protect water bodies.
  • *Streamside Management Zones*

• Minimize soil disturbance.
  • *Exposed soil and compaction*

• Stabilize exposed soil.
  • *Roads, crossings, decks*

• Protect sensitive areas.
Forest Biomass Harvesting
Supplemental BMPs

Online at http://www.state.sc.us/forest/menvir.htm
Why Needed?

- Potential risks:
  - Water quality
  - Site productivity
  - Wildlife and biodiversity
- Address public concerns.
- Renewable energy policies and regulations developing.
- Resource for those considering biomass opportunities.
Defining Biomass

• Above-ground woody material often used for energy production.
• Biomass harvesting is an activity, not a product class.
How is Biomass Different?

- Some biomass harvesting will be indistinguishable from conventional logging.

- Biomass BMPs intended to address sites where intensity and frequency of removal is greater than normal.
Potential Impacts from Biomass Harvesting

- Water Quality
- Site Productivity
- Wildlife and Biological Diversity
Potential Impacts

Water Quality

- Less material/ground cover after harvest
- Greater exposed soil from more intense removals
- Risk from more frequent site entry
Potential Impacts

Site Productivity and Soil Nutrients

• Compaction from more intense operation
• Higher levels of nutrient removal
Potential Impacts

Wildlife and Biological Diversity

• Availability of coarse and fine woody debris and snags
• Organic material for soil input
Protect the SMZ

• Do not remove understory or other biomass from the primary SMZ on perennial or intermittent streams other than allowed under existing BMPs.
• Avoid piling or placement of chips or fine material in SMZs, and prevent such material from entering water bodies.
Water Quality - Harvesting

Minimize exposed soil and potential for erosion

- Use alternate methods of stabilization such as seed, mulch, hay bales, silt fence, or erosion control fabric where debris is not sufficient to prevent erosion.
- Avoid removal of stumps, roots, leaf litter, and forest floor for biomass.
Site Productivity and Soil Nutrition

Minimize nutrient depletion

• Limit removal on sites with shallow soils, very sandy soils, or low soil fertility.

• Leave leaf material on site to the degree possible.

• Identify vulnerable soils and adjust harvesting accordingly.
## Soil Limitations

<table>
<thead>
<tr>
<th>Soil/Site Property</th>
<th>Not Limited</th>
<th>Slightly/Moderately Limited</th>
<th>Very Limited</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Table Depth (cm)</td>
<td>&gt;60</td>
<td>30-60</td>
<td>&lt;30</td>
</tr>
<tr>
<td>Restriction Depth (cm)</td>
<td>&gt;100</td>
<td>50-100</td>
<td>&lt;50</td>
</tr>
<tr>
<td>Sand (%)</td>
<td>&lt;80</td>
<td>--</td>
<td>&gt;80</td>
</tr>
<tr>
<td>Available Water Capacity (cm)</td>
<td>&gt;18</td>
<td>14-18</td>
<td>&lt;14</td>
</tr>
<tr>
<td>Kw Factor</td>
<td>&lt;0.32</td>
<td>--</td>
<td>&gt;0.32</td>
</tr>
<tr>
<td>Cation Exchange Capacity (cmol/kg)</td>
<td>5-10</td>
<td>0-5 or 10-20</td>
<td>&gt;20</td>
</tr>
<tr>
<td>Organic Matter (%)</td>
<td>2-3</td>
<td>2-10</td>
<td>&lt;1 or &gt;10</td>
</tr>
</tbody>
</table>
Wildlife and Biodiversity

Protect biological diversity

• Avoid sensitive areas such as springs, seeps, and unique habitats.
• Retain sufficient leaves, limbs, and debris to provide organic input.
• Where appropriate, use biomass harvesting as a method of vegetation control to enhance habitat for rare, threatened, and endangered species.
Wildlife and Biodiversity

Maintain snags and woody debris

• Retain 3 snags/acre where available and compatible with OSHA requirements and safety.

• Leave down woody debris in a variety of size classes. It is recommended that at least 1 ton/acre of coarse woody debris be left.
Silvicultural Considerations

Development of markets for woody biomass has the potential to impact silvicultural decision making.

• Use of otherwise non-merchantable material?
• Timber Stand Improvement or Crop Tree Release?
• Earlier thinnings?
• Site prep costs?
• Fuel reduction?
• More silvicultural options?
“Forestry professionals and landowners will be faced with making the best choices to meet their objectives and goals for each site, and determining how biomass harvesting may be incorporated into their ongoing management decisions for long-term forest management.”