

# Developing Wisconsin's Forestland Woody Biomass Harvesting Guidelines

Wisconsin Council on Forestry  
Wisconsin DNR, Division of Forestry

# Overview of Presentation

- ▶ Brief overview of guidelines
- ▶ Development & scope
- ▶ Challenges & keys to success
- ▶ Research needs
- ▶ Current research



# What is a Biomass Harvest?

- Standard definitions of “woody biomass” refer to any part of a tree or other woody plant.
- In common usage in the Lake States, “biomass harvest” refers to the harvest of additional woody material (small diameter) beyond traditional bolewood harvests, to produce energy.
  - Whole tree harvest for chipping
  - Collection of tops and slash after traditional bolewood harvest
  - Harvest of traditionally “non-merchantable” timber, including shrubs and trees of small diameter and poor form





# Impetus for the Guidelines

- ▶ Wisconsin Council on Forestry initiated the effort to develop biomass harvesting guidelines because of:
  - Projected demand
  - Other states processes
  - Governor's initiatives
  - FSC Corrective Action Request for retention guidelines
  - Concerns about potential environmental impacts of increased removal of woody biomass
  - Wisconsin's policy to sustainably manage forests, protecting soil, water and biological diversity

# Guideline Structure

- ▶ **General exception:** Guidelines may be modified for certain site conditions, operational issues, or management objectives
  - tree regeneration operations, control of invasive species, fuel reduction, restoration, prescribed fire
- ▶ **General Guidelines**
  - Generally applicable to any site
- ▶ **Site-Specific Guidelines**
  - Applicable under certain conditions
  - Not applicable to all sites

**There are 8 guidelines: 3 general and 5 site-specific.**

# **Applicability of Guidelines**

- **BHGs apply to timber sales where fine woody material (FWM, < 4" diameter) is being harvested. BHGs are in addition to all existing timber sale requirements**
- **BHGs do not apply to bole-only harvests**
- **Application of the BHGs is voluntary, but certified lands require guidelines for biomass harvests (not necessarily these)**
- **Lands enrolled in MFL must follow BHGs starting January 1, 2011.**

# Guidelines Summarized

- ▶ 1.A – Retain CWD already present
- ▶ 2.A - Retain FWD already present, incidental FWD breakage, and 10% of tops and limbs
- ▶ 3.A – Do not remove litter layer, stumps, roots
- ▶ 1.B – Do not harvest FWM where endangered or threatened species are present
- ▶ 2.B – **For complete salvage operations, retain  $\geq 5\%$  of the area in unsalvaged patches**
- ▶ 3.B, 4.B, & 5.B – Do not harvest FWM on shallow soils, dry nutrient-poor sands, or dysic Histosols
- ▶ **Reminder to follow Silviculture Handbook guidelines for tree and snag retention**

# Process

## ► **September 2007**

- Council initiated the effort to develop biomass harvesting guidelines for Wisconsin's forestlands
- Staff work to be done by Division of Forestry
- Timeline for completion - December 2008

## ► **November 2007**

- DNR Technical Team formed; uses MN's guidelines as basis for WI
  - ▶ Literature review
  - ▶ Draft scope document

# Scope Document

- Developed by Technical Team at the start of the guideline development process
- Scope of Guidelines and topics not addressed
- Identified teams and laid out responsibilities and relationships
- Defined process by which the Guidelines would be approved
- Scope was agreed to by the Advisory Committee and the WI Council on Forestry early in the process



# Scope of Guidelines

- ▶ Focus on sustainable harvest of woody biomass from forested areas within the context of generally accepted forestry practices
- ▶ Applicable at stand and site level
- ▶ Goal to protect soil, water and biodiversity that characterize sustainable forest ecosystems
- ▶ Apply precautionary principle; when there is scientific uncertainty, be conservative in protecting resources

# Topics not addressed

- ▶ A number of important topics were beyond the scope of the current project, including:
  - woody biomass resource availability
  - economics and energy balances for harvesting, transporting, and processing woody biomass for energy
  - potential effects on carbon storage and climate change
  - short rotation intensive culture of woody biomass plantations
  - landscape planning and management
  - monitoring strategies
- ▶ The need to develop initial guidelines targeted at the most significant current activity did not allow for addressing these additional topics at the same time.



## **Technical Team**

Gather relevant information, draft guidelines, receive comments from expert reviewers, Advisory Committee members, and the public, draft revisions based on comments and discussions. Work with expert reviewers and Advisory Committee members to provide relevant background information, address concerns, and develop detailed guidelines for review and refinement.

## **Advisory Committee**

The Advisory Committee was selected by the Wisconsin Council on Forestry to represent affected stakeholder groups, including industry, government, landowners, conservation organizations, and non-profit groups. The Advisory Committee reviews the draft guidelines and revisions. Advisory Committee comments are used by the technical team for further refinement of the guidelines. Upon approval by the Advisory Committee, the guidelines were forwarded to the Wisconsin Council on Forestry for final approval.

# Members of the Advisory Committee

- ▶ Jane Severt, WCFA
- ▶ Geoff Chandler, USDA Forest Service
- ▶ Marshall Pecore, MTE
- ▶ Jeff Barkley, WDNR
- ▶ Stacey Olson, Olson Bros. Enterprises
- ▶ Mark Fries, NewPage
- ▶ Earl Gustafson, WI Paper Council
- ▶ Matt Dallman, TNC
- ▶ Neil Paisley, WDNR Wildlife
- ▶ Ed Moberg, WWOA
- ▶ Dave Hvizdak, NRCS
- ▶ Don Peterson, WI Consulting Foresters Assoc.
- ▶ Gary Wyckoff, Plum Creek
- ▶ David Mladenoff, UW-Madison

## Expert Review

Experts were selected with input from the Advisory Committee to provide comments on the technical and scientific aspects of the guidelines to the technical team. Experts are not intended to represent particular interest groups. The technical team was responsible for reviewing expert comments and making decisions regarding revisions to the draft guidelines.

## **Subject Areas for Expert Reviews:**

Wildlife ecology and management

Endangered resources

Silviculture

Forest management

Forest economics

Harvest systems

Wood utilization

Forest health

Forest hydrology

Forest soils

Microbiology

Fire management



# Process, cont.

## ► April 2008

- First draft of rationale and proposed guidelines completed; sent to experts for technical and scientific review

## ► May 2008

- Guidelines revised based on experts' comments



# Process, cont.

## ▶ **June – July 2008**

- 2nd draft guidelines reviewed by Advisory Committee
- Soils subcommittee needed

## ▶ **July 2008**

- Subcommittee of forest soils experts developed recommendations for nutrient-poor soils

# Soils Subcommittee

Adaptation to the process made by the AC to address proposed limitations for harvest of FWD on nutrient poor soils

Advisory Committee charge to the subcommittee:

- Develop a list of soil series that would have some limitations and soils that are borderline for nutrient concerns
- Mapping soils with limitations
  - Total area restricted by soil nutrient concerns
  - Mechanism to query restricted soils in specific areas using NRCS Web Soil Survey, reference list of soil map units by county (app D)
- Review guideline language and flexibility and whether current data supports the level of restrictiveness

# Soils Subcommittee

Soils subcommittee met in July 2008:

- Developed criteria for identifying dry nutrient-poor sandy soils

- ✓ Nutrient balances for variety of species, atmospheric input and mineral weathering scenarios and rotations

- ✓ Jack Pine exception

- Identified borderline and restricted soil map units by county

- ✓ Dry nutrient-poor sands

- ✓ Dysic histosols

- ✓ Shallow soils ( $\leq 20''$  to bedrock)



- Developed query mechanism using NRCS websoil survey

**Soils guidelines would limit or partially limit harvest of FWM on about 2.2 million acres (14% of the 15.8 million forested acres in Wisconsin). Traditional (bole wood) harvest is not limited on the 2.2 million acres & jack pine FWM harvest is not limited.**

<b>Aboveground live biomass on all timberland (million dry tons)</b>	<b>Estimated biomass in tree crowns on land affected by draft biomass guidelines (million dry tons)</b>	<b>Aboveground biomass on land not affected by draft biomass guidelines (million dry tons)</b>	<b>Area of jack pine forest from various estimates (thousand acres)</b>
<b>602</b>	<b>~20</b>	<b>582</b>	<b>200 to 400</b>

# Process, cont.

## ▶ **August 2008**

- 3rd draft presented to Advisory Committee

## ▶ **September 2008**

- 3rd draft presented to Council; minor revisions for clarification
- Council requests public review period

# Process, cont.

## ► **October – November 2008**

- 4th draft posted for public review; public listening sessions held
  - Oct. 27 – Spooner
  - Oct. 28 – Rhinelander
  - Nov. 3 – Madison
  - Nov. 5 – Stevens Point

## ► **December 2008**

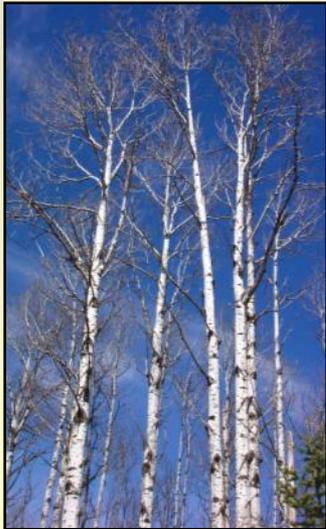
- Advisory Committee conducted final review
- 5<sup>th</sup> draft approved by Council
- Technical team directed to develop implementation plan



# Challenges

- Scientific Uncertainty

- Precautionary principle
- Best available science – Rationale
- Guideline 2.A was the most controversial and the most scientifically uncertain



# **Guideline 2.A – Retain fine woody debris (FWD) on site following harvest.**

- ▶ Retain FWD already present, except on skid trails and landings
- ▶ Retain FWD resulting from incidental breakage of tops and limbs
- ▶ Retain and scatter tops and limbs (<4" diameter) from 10% of average-sized trees
- ▶ FWD retained on site following harvest is a combination of pre-existing FWD, along with wood that was broken or cut during harvest and left on the ground



# Scientific Background for 2.A

- ▶ Scientific literature supports importance of CWD for wildlife & biological diversity; there is little information about FWD
- ▶ FWD may be important in nutrient cycling; support for wildlife and biological diversity
- ▶ No information on a threshold amount of FWD needed for sustainability
- ▶ Average forest in Wisconsin has 3 ODT/acre FWD (<3" material, FIA data)



Photo – M. Woodford

# **Process for Guideline 2.A**

- ▶ **Guideline 2.A was modified several times during the process**
- ▶ **MN guideline calls for leaving 20% of tops plus incidental breakage**
- ▶ **Leaving a percentage of tops does not allow for site differences (i.e., some sites are deficient in woody debris)**
- ▶ **One iteration of the guidelines called for a total of 5 dry tons of FWD per acre post-harvest**
- ▶ **10% tops + 10-15% incidental breakage = total 20-25% of tops left. MN guideline is 30-35%.**
- ▶ **An acceptable tradeoff for restricting FWD harvest on sensitive sites?**



# Other Challenges

- Focus on Biomass Specific Issues
  - Issues forwarded to Water Quality BMP AC
  - Reminder to follow Silvicultural Handbook
- Operational Concerns & Flexibility
  - Identifying restricted soils
  - Retention of FWD - % vs. tons/acre
  - General exception
- Monitoring
  - Effectiveness
- Timeline Constraints



# Keys to Success

Development of clear scope:

- Everyone understood roles and responsibilities of the various teams from the beginning
- Defined decision making process agreed to by all parties early in the process

Consensus model for AC decision making:

- Agreement but necessarily complete agreement
- Unanimity not required

Efficient document sharing/stakeholder preparation

Well planned and facilitated meetings

# Research Needs

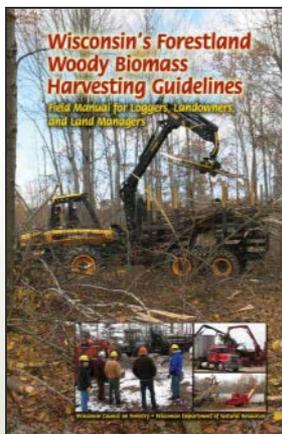
- ▶ Coarse and fine woody debris:
  - Variation by forest and site types, age
  - Deposition and decomposition rates
  - Effects of retention levels and patterns on habitat and biodiversity; soil nutrient cycling
- ▶ Tree and snag retention:
  - Effects on biodiversity, regeneration, stand growth and yield
- ▶ Better information on nutrients removed by different harvesting systems, forest types, seasons, and sites
- ▶ More information on soil nutrient capital
- ▶ Biomass harvesting life cycle analysis - different harvesting options, biodiversity factors, carbon, & nutrients
- ▶ Refine measurement protocols for amounts of down woody debris
- ▶ Long-term monitoring: soil nutrients, presence/abundance of selected animal & plant species

# Research in Progress

- ▶ Impacts on nutrient cycling and community assemblages in northern hardwoods – Donner et al.
- ▶ Environmental and economic assessment of forest biomass harvesting - Martin & Van Deelen
- ▶ Biomass resource assessment - Demchik
- ▶ Impacts on carbon and nutrient cycling in northern hardwoods - Mladenoff & Forrester
- ▶ Trade-offs between biomass production and biological diversity – Webster et al.
- ▶ Impacts on saproxylic communities, nutrient availability, and productivity in aspen - D'Amato et al.
- ▶ Role of fine-woody detritus in biogeochemical cycling - Bockheim

# Additional Activities

- Review and update guidelines in 3 years
  - New research
  - Operational issues
- Initiate research (RFP from WDNR Science Services)
  - Impacts of fine woody debris (FWD) on ecosystem sustainability.
  - Research on the dry nutrient-poor sandy soils to ascertain better information on the impacts of harvesting
  - Threshold amount of woody debris needed to maintain productivity
- Develop effectiveness monitoring system
- Implement robust training & education



# Questions?

Wisconsin's Biomass Harvesting Guidelines and other documents related to their development and implementation are available online at:

<http://council.wisconsinforestry.org/biomass/>

Sarah Herrick – WDNR Division of Forestry

[Sarah.Herrick@wisconsin.gov](mailto:Sarah.Herrick@wisconsin.gov)