

MANAGEMENT-FOCUSED RESEARCH NEEDS OF MINNESOTA'S WILDLIFE MANAGERS – FOREST MANAGEMENT ACTIVITIES

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SUMMARY OF FINDINGS

Because Minnesota Department of Natural Resources (MNDNR) wildlife managers requested help with evaluating the effectiveness of habitat management techniques, MNDNR Habitat Evaluation Biologists sent 65 research-needs surveys to all area wildlife, assistant area wildlife, regional, and assistant regional managers from all MNDNR regions during January 2008. Of the 65, 33 respondents answered the forest management activities section, with 9, 14, 9, and 1 responses received from Regions 1, 2, 3, and 4, respectively. I asked respondents whether a series of forest management activities and associated practices needed evaluation. When I pooled all responses, 93.9%, 69.7%, 69.7%, 63.6%, and 42.4% respondents stated that forest stand improvements, forest stand burns, brush-openland management, brush-openland burns, and forest openings, respectively need evaluation. Within forest stand improvements, 83.9% of managers ranked regeneration as needing the most evaluation. Regional priorities differed slightly from the pooled results. Region 1 selected brush-openland management as the most important habitat management activity whereas Regions 2 and 3 indicated forest stand improvements need most evaluation. Although these 2 regions selected forest stand improvements, Region 2 and 3 differed in their practice ranking. Region 2 selected thermal cover whereas Region 3 selected regeneration as evaluation priority. Overall, pooled and regional responses indicate forest stand improvements need the most evaluation, specifically those practices that affect regeneration and thermal cover.

INTRODUCTION

The MNDNR Section of Wildlife created 3 half-time Habitat Evaluation Biologist positions tasked with evaluating and monitoring wildlife habitat across Minnesota. Each research group houses 1 Habitat Evaluation Biologist position: Molly A. Tranel (Farmland), J. Wesley Bailey (Forest), and David P. Rave (Wetland). Because MNDNR wildlife managers requested help with evaluating the effectiveness of habitat management techniques, MNDNR Habitat Evaluations Biologists designed and conducted a survey of management-focused research needs. Our chief objective of this survey was to determine habitat management activities that managers believed warranted evaluation.

METHODS

MNDNR Habitat Evaluation Biologists designed a survey to determine habitat evaluation priorities of wildlife managers across Minnesota. Recipients (n =65) of the survey included all area wildlife managers, assistant area wildlife managers, regional managers, and assistant regional managers from across MNDNR regions. Microsoft Word format allowed participants to type in their responses and return the completed survey as an e-mail attachment. M. Tranel attached the survey to an e-mail message on 15 January 2008 that briefly explained the purpose and survey completion procedure. After a 2-week period, survey recipients received a reminder e-mail message encouraging completion of the survey. Respondents answered questions individually or as a group (usually no more than 3 people); therefore, some surveys may reflect the opinion of an area office rather than one person. The survey contained 3 sections: forest management activity, prairie management activity, and wetland management activity (Appendix 1). I report forest management results in this summary.

The forest management activities section contained 5 broad habitat management activities. Each of these contained practices for managers to rank. I also included a write-in

practice (“other”) for each forest management activity so that managers could type in techniques they felt needed evaluation but that are not included in the list. First, managers determined whether each broad management activity required evaluation within their management area by typing either “Yes” or “No”. For management activities marked “Yes” managers then ranked the provided practices or ranked the practice they wrote in under “other” by using numbers with ‘1’ as the most important. The broad habitat management activities are those that the Section of Wildlife developed for use by operations staff as expenditure categories.

I asked respondents to rank each practice within a management activity and assigned each unranked (i.e., blank) practice the lowest rank. This ensured that the sum of ranks was the same for all observers. I then calculated a mean rank for each practice within a forest management activity by averaging the ranks across respondents.

I used a 2-step process to analyze responses in the write-in category (“other”). First, I calculated their mean rank and noted the written response by each observer. I then compared this score to the other practices within the associated forest management activity. If “other” ranked highest overall, I categorized the written responses into groups and ranked each according to the total number of times each response was provided. I considered the category with the most responses priority for evaluation. I first report the mean rank for “other”, which indicates how well the write-in responses as a whole compared to the other practices. I then report the most supported written category within “other” for the associated management activity.

I also calculated frequencies of responses to each management activity and practice. This frequency is the percentage of respondents that stated a given activity needs evaluation from the total number of respondents and represents the percentage of managers that responded to that activity; I calculated the same frequency for each practice within each forest management activity.

RESULTS

Of the 65 managers that received the survey, 67.7% (n = 44) responded. Of the 44, 75.0% (n = 33) answered questions in the forest management section. The majority (42.4%; n = 14) of responses came from Region 2, while Region 1 and 3 each sent in 9 surveys; only 1 respondent from Region 4 answered the forest management section. Because only 1 respondent answered forest questions from Region 4, I dropped these data from the analysis

Pooled Responses

When I pooled all responses, 93.9%, 69.7%, 69.7%, 63.6%, and 42.4% respondents stated that forest stand improvements, forest stand burns, brush-openland management, brush-openland burns, and forest openings, respectively need evaluation (Table 1, Figures 1 and 2). Within forest stand improvements, 83.9% of respondents ranked regeneration as priority for evaluation. Overall, regeneration scored higher than any of the practices within forest stand improvements with a mean score of 2.76 (Table 2). Timber harvest and thermal cover tied as second priority with a mean score of 3.61 each (Table 2). Vegetation response, mowing, and timing of burns ranked highest from the written responses in forest stand burns, brush-openland management, and brush-openland burns, respectively (Table 1 and 2). Overall, forest openings ranked last with 42.9% of respondents ranking this activity (Table 1), which indicates openings are not a priority for evaluation.

Regional Responses

Regional priorities differed slightly from the pooled results. Regions 2 and 3 indicated forest stand improvements need the most evaluation (Tables 1, Figures 1 and 2) with 100.0% and 88.9% of respondents respectively, ranking this category as priority. Although these 2

regions ranked forest stand improvements highest, Region 2 and 3 differed in their practice ranking. Region 2 selected thermal cover whereas Region 3 selected regeneration as priority activities of forest stand improvements (Tables 1 and 3). Region 1 ranked forest stand improvements second (Tables 1 and 3) with 75.0% of respondents ranking regeneration as in need of most evaluation.

All 9 respondents from Region 1 selected brush-openland management as the most important habitat management activity, with 77.8% of respondents ranking mowing and combined treatments (Tables 1 and 3) as top priority for evaluation. Region 2 and 3 ranked brush-openland management as fourth priority with the practice of shearing in need of the most evaluation (Table 1 and 3).

Region 2 and 3 selected brush-openland burning and forest stand burning, respectively as second priority, although both regions ranked timing and frequency of burns as in most need of evaluation (Table 3). All remaining forest management activities varied in ranking among regions although forest openings ranked last in Regions 2 and 3 (Tables 1 and 3).

DISCUSSION

Overall, forest stand improvements consistently ranked highest in evaluation need among regions. Almost 94.0% of managers from Regions 1, 2, and 3 agreed forest stand improvements need the most evaluation. Forest stand improvements include many interrelated habitat management practices that when implemented at multiple spatial and temporal scales, these activities likely affect a variety of wildlife species especially across the broad forested landscape. However, of the stand improvement techniques, managers believe regeneration needs the most evaluation. Tree cover regeneration is complicated because management objectives, including desired future conditions, prescriptions, site preparation, stand age, harvest treatments, and area affected, vary among cover-types and individual stands thus limiting our understanding of how to best improve wildlife habitat while meeting timber harvest goals. Subsection Forest Resource Management Plans (SFRMP) aid in developing long-term vegetation management plans on forest lands administered by the Division of Forestry and Section of Wildlife; however, the use of well-designed observational and manipulative experiments to evaluate factors affecting regeneration should help improve forest stand improvement information gaps.

Region 2 selected practices that influence thermal cover as needing the most evaluation. Tree cover-type and age-class may affect use of a stand as a thermal refuge. MNDNR and national forests in Minnesota plan to reduce aspen (*Populus* spp.) and convert these stands to conifer. How wildlife will respond is unclear, although white-tailed deer (*Odocoileus virginianus*) and moose (*Alces alces*) may benefit as these animals seek refuge from winter and summer temperatures respectively, within conifers.

The majority of MNDNR wildlife managers do not consider evaluation of brush-openland management a current priority; only Region 1 placed high priority on this activity. Although managers indicated that they have sufficient information regarding brush-openland management, studies of how brush-openland wildlife and plant species respond to various types of management treatments are lacking. Brush-openland management practices may warrant evaluation, especially given the increased interest in using brush as a source for bio-fuels.

ACKNOWLEDGMENTS

I thank all the area and assistant area managers that responded to this survey. I thank M. A. Tranel who initially developed the survey for the farmland region; she also managed outgoing and incoming surveys and distributed completed surveys to each respective research group. I am grateful to M. A. Larson who suggested an alternative approach to analyze these data.

Table 1. Forest management activities and practices that wildlife managers ranked as in most need of evaluation based on frequency of response during January 2008 from wildlife work areas across Minnesota, USA.

Respondents	Management activity	Needs evaluation	Highest ranked practice ^a	Mean score	Frequency scored	n scored
Pooled (n = 33)	Forest stand improvements	93.9	Regeneration	2.76	83.9	26
	Forest stand burns	69.7	Other (Vegetation response)	1.17	91.3	21
	Brush-openland management	69.7	Other (Mowing)	1.89	65.2	15
	Brush-openland burns	63.6	Other (Timing of burn)	1.12	95.2	21
	Forest openings	42.4	Maintenance	1.86	78.6	11
Region 1 (n = 9)	Brush-openland management	100.0	Other (Mowing & combined treatments)	1.56	77.8	7
	Forest stand improvements	88.9	Regeneration	2.19	75.0	6
	Brush-openland burns	66.7	Other (Compare to mechanical)	1.17	100.0	6
	Forest openings	66.7	Maintenance	2.17	66.7	6
	Forest stand burns	55.6	Other (Vegetation response)	1.30	80.0	4
Region 2 (n = 14)	Forest stand improvements	100.0	Thermal cover	2.19	71.4	10
	Brush-openland burns	71.4	Other (Frequency & timing)	1.10	90.0	9
	Forest stand burns	71.4	Other (Frequency & timing)	1.15	90.0	9
	Brush-openland management	64.3	Shearing and mowing	1.89	66.7	6
	Forest openings	42.9	Maintenance	1.50	100.0	6
Region 3 (n = 9)	Forest stand improvements	88.9	Regeneration	2.19	87.5	7
	Forest stand burns	77.8	Other (Frequency & timing)	1.14	100.0	7
	Brush-openland burns	55.6	Other (Frequency & timing)	1.00	100.0	5
	Brush-openland management	55.6	Shearing and dozing	2.10	55.6	5
	Forest openings	22.2	Maintenance	1.67	50.0	2

^a The write-in category 'Other' ranked highest within management activity; however, the practice in parenthesis ranked highest among the written responses within 'Other' and is considered priority for evaluation.

Table 2. Forest management activities and practices that wildlife managers ranked as in most need of evaluation based on pooled mean scores and frequencies during January 2008 from wildlife work areas across Minnesota, USA.

Management activity and practice	Mean score	Rank	n
Forest stand improvements			
Regeneration	2.76	1	26
Timber harvest	3.61	2	19
Thermal cover	3.61	2	19
Mast enhancement	3.97	3	18
Browse	4.11	4	19
Oak wilt	5.15	5	13
Other ^a	6.10	6	9
Categories within 'other' ^b			
	Frequency	Rank	n
Diversity and site preparation	22.2	1	2
Invasive exotic control	22.2	2	2
All of the above	11.1	3	1
Direct seeding	11.1	3	1
Fencing-enclosure use	11.1	3	1
Herbicide use	11.1	3	1
White-tailed deer impacts	11.1	3	1
Forest stand burns			
	Mean score	Rank	n
Other	1.17	1	21
Fire break development	2.20	2	11
Categories within 'other'			
	Frequency	Rank	n
Vegetation response	57.1	1	12
Timing and frequency	19.0	2	4
Forestry tool	9.5	3	2
Invasive exotic control	9.5	4	2
Compare to mechanical	4.8	5	1
Brush-openland management			
	Mean score	Rank	n
Other	1.89	1	15
Shearing	2.13	2	14
Dozing	2.65	3	11
Herbicide	3.33	4	2
Categories within 'other'			
	Frequency	Rank	n
Mowing-hydroaxe	33.3	1	5
Combination of treatments	20.0	2	3
Biomass harvest	13.3	3	2
Timing and frequency	13.3	3	2
Wildlife response	13.3	3	2
Grazing	6.7	4	1
Brush-openland burns			
	Mean score	Rank	n
Other 1	1.12	1	20
Fire break development	2.05	2	17

Table 2 continued.

Categories within 'other'	Frequency	Rank	n
Timing of burns	35.0	1	7
Control of regenerating brush	30.0	2	6
Compared to non-burn treatments	15.0	3	3
Combined treatments	5.0	4	1
Effects of fire on non fire-dependent plants	5.0	4	1
Invasive exotic control	5.0	4	1
Wildlife use of burned area	5.0	4	1
Forest openings	Mean score	Rank	n
Maintenance	1.86	1	11
Seeding	2.46	2	10
Slash clearing	2.68	3	10
Other	2.71	4	6
Categories within 'other'	Frequency	Rank	n
Wildlife value	14.3	1	2
Deer value/use	7.1	2	1
Necessity	7.1	2	1
Opening burns	7.1	2	1
Wildlife use	7.1	2	1

^a The write-in category ranked in comparison to practices within the management activity.

^b Categorized responses within the write-in category of 'Other' ranked by the total number of responses to each category.

Table 3. Forest management activities and practices that wildlife managers ranked as in most need of evaluation by region based on mean scores and frequencies during January 2008 from wildlife work areas across Minnesota, USA.

Response group	Management practice	Score	Rank	n
<u>Forest opening management</u>				
Region 1	Maintenance	2.17	1	4
	Slash clearing	2.17	1	4
	Seeding	2.67	2	4
	Other ^a	3.00	3	2
	Categories within 'other' ^b	Frequency	Rank	n
	Wildlife use	50.0	1	1
	Overall benefit	50.0	1	1
Region 2	Maintenance	1.50	1	6
	Seeding	2.40	2	5
	Other	2.50	3	3
	Slash clearing	3.42	4	5
	Categories within 'other'	Frequency	Rank	n
	Value and necessity	66.6	1	2
	Opening burns	33.3	2	1
Region 3	Maintenance	1.67	1	2
	Seeding	2.33	2	2
	Slash clearing	3.00	3	2
	Other	3.00	4	1
	Categories within 'other'	Frequency	Rank	n
	Value to deer	50.0	1	1
<u>Forest stand burns</u>				
Region 1	Management practice	Score	Rank	n
	Other	1.30	1	4
	Fire break development	2.10	2	2
	Categories within 'other'	Frequency	Rank	n
	Vegetation response	100.0	1	4
Region 2	Other	1.15	1	9
	Fire break development	2.10	2	6
	Categories within 'other'	Frequency	Rank	n
	Vegetation response	66.6	1	6
	Frequency and timing	16.6	2	1
	Evaluate burn	16.6	2	1
	Benefit as forestry tool	16.6	2	1
Region 3	Other	1.14	1	7

Table 3 continued.

	Fire break development	2.29	2	3
	Categories within 'other'	Frequency	Rank	n
	Vegetation response	57.1	1	4
	Frequency and timing	28.6	2	2
	Stand improvement	14.3	3	1
<u>Forest stand improvements</u>				
Region 1	Management practice	Score	Rank	n
	Regeneration	2.19	1	7
	Timber harvest	2.31	2	6
	Browse	3.44	3	5
	Thermal cover	4.13	4	5
	Mast enhancement	4.56	5	4
	Oak wilt	5.56	6	2
	Other	5.81	7	0
	Categories within 'other'	Frequency	Rank	n
	None suggested	0.0		0
Region 2	Thermal cover	2.19	1	10
	Regeneration	3.04	2	11
	Timber harvest	3.64	3	9
	Browse	4.07	4	10
	Mast enhancement	4.18	5	8
	Other	4.18	5	5
	Oak wilt	5.50	6	6
	Categories within 'other'	Frequency	Rank	n
	Site preparation effects	60.0	1	3
	Deer effects	20.0	2	1
	Fencing-enclosure use	20.0	2	1
Region 3	Regeneration	2.81	1	7
	Mast enhancement	3.38	2	5
	Oak wilt	3.88	3	4
	Other	3.88	3	3
	Thermal cover	4.13	4	3
	Browse	4.88	5	3
	Timber harvest	5.06	6	3
	Categories within 'other'	Frequency	Rank	n
	Invasive-exotic species control	66.6	1	2
	Evaluate all practices	33.3	2	1
<u>Brush-openland burns</u>				
Region 1	Management practice	Score	Rank	n
	Other	1.17	1	6

Table 3 continued.

	Fire break development	1.92	2	4
	Categories within 'other'	Frequency	Rank	n
	Frequency and timing	50.0	1	3
	Burning and mechanical combined	33.3	2	2
	Wildlife use post-burn	16.6	3	1
Region 2	Other	1.10	1	9
	Fire break development	1.90	2	8
	Categories within 'other'	Frequency	Rank	n
	Frequency and timing	44.4	1	4
	Evaluate burn	22.2	2	2
	Vegetation response	22.2	2	2
	Effect on non-fire dependent plants	11.1	3	1
Region 3	Other	1.00	1	5
	Fire break development	2.00	2	5
	Categories within 'other'	Frequency	Rank	n
	Frequency and timing	40.0	1	2
	Compare to not burning	20.0	2	1
	Invasive-exotic species control	20.0	2	1
	Brush control	20.0	2	1
<u>Brush-openland management</u>				
Region 1	Management practice	Score	Rank	n
	Other	1.56	1	7
	Shearing	2.39	2	4
	Dozing	2.72	3	4
	Herbicide	3.33	4	0
	Categories within 'other'	Frequency	Rank	n
	Brush mowing	28.6	1	2
	Combined treatments	28.6	1	2
	Biomass harvest	14.3	2	1
	Frequency and timing	14.3	2	1
	Wildlife response	14.3	2	1
Region 2	Shearing	1.89	1	7
	Other	1.89	1	6
	Dozing	2.89	2	4
	Herbicide	3.33	3	2
	Categories within 'other'	Frequency	Rank	n
	Brush mowing	50.0	1	3
	Biomass harvest	16.6	2	1
	Frequency and timing	16.6	2	1
	Wildlife response	16.6	2	1

Table 3 continued.

Region 3	Shearing	2.10	1	3
	Dozing	2.10	1	3
	Other	2.50	2	2
	Herbicide	3.30	3	0
	Categories within 'other'	Frequency	Rank	n
	Combined treatments	50.0	1	1
	Patch-burn grazing	50.0	1	1

^a The write-in category ranked in comparison to practices within the management activity.

^b Categorized responses within the write-in category of 'Other' ranked by the total number of responses to each category.

Appendix 1. Survey of management-focused research needs consisting of 3 management sections sent to Minnesota Department of Natural Resources wildlife managers across Minnesota, USA.

Does it Need Evaluation? (Yes / No)	Forest management activity	Rank (1 is Highest)
_____	Forest opening management (Developing, improving, and maintaining forest openings for wildlife, created during normal timber harvest management.) <ul style="list-style-type: none"> • Slash clearing • Seeding of log landings, logging roads, & trails to legumes for wildlife habitat • Periodic or regular maintenance to maintain openings, etc. • Other: _____ 	_____ _____ _____ _____
_____	Forest stand burns (Prescribed burning to enhance and restore forest communities and related wildlife habitat including openings.) <ul style="list-style-type: none"> • Firebreak development • Other: _____ 	_____ _____
_____	Forest stand improvement (All efforts relating to forest stand improvement.) <ul style="list-style-type: none"> • Timber harvest • Regeneration • Mast enhancement • Thermal cover establishment • Browse regeneration • Oak wilt control • Other: _____ 	_____ _____ _____ _____ _____ _____ _____
_____	Openland/brushland burns (The use of prescribed burning to enhance and restore brushland communities and related wildlife habitat.) <ul style="list-style-type: none"> • Firebreak development • Other: _____ 	_____ _____
_____	Openland/brushland management (The use of non-prescribed burn efforts relating to the restoration of brushland habitats and related complexes.) <ul style="list-style-type: none"> • Shearing • Dozing • Herbicide • Other: _____ 	_____ _____ _____
Does it Need Evaluation? (Yes / No)	Prairie management activity	Rank (1 is Highest)
_____	Prairie/grassland burns (Prescribed burning to enhance/restore native prairie and other grassland communities and related wildlife habitat.) <ul style="list-style-type: none"> • Firebreak development • Seasonal timing of burns (spring, summer, or fall) • Frequency of burns (how long between burns?) • Other: _____ 	_____ _____ _____ _____
_____	Prairie/grassland management (All efforts related to the initial planting of native prairie/cool season grasslands as well as efforts to improve existing stands of grass.) <ul style="list-style-type: none"> • Converting cool season stands to native grass • Species diversity (% grass/forbs) • Grazing • Patch-burn techniques • Exotic species removal and/or prevention • Other: _____ 	_____ _____ _____ _____ _____ _____
_____	Food plot establishment/maintenance (All efforts related to food plot establishment and maintenance.) <ul style="list-style-type: none"> • Providing seed to landowners • Food plot maintenance 	_____ _____

Appendix 1 continued.

- Necessity of plots _____
- Other: _____

_____ **Woody cover development** (All efforts to establish and maintain woody cover for the improvement of farmland wildlife habitat.)

- Planting techniques
- Effectiveness of plantings
- Other: _____

Does it Need Evaluation? (Yes / No)	Wetland management activity	Rank (1 is Highest)
_____	Wetland enhancement (All activities that enhance wetland habitats for wildlife.) <ul style="list-style-type: none"> • Management of Aquatic vegetation • Cattail/Exotic species management • Aquatic seeding • Bog removal at basin outlets • Removal of unwanted fish (i.e., carp, bullheads) • Other: _____ 	_____ _____ _____ _____ _____
_____	Wetland habitat maintenance (All efforts to maintain wetland wildlife habitat.) <ul style="list-style-type: none"> • Fish barrier maintenance • Water level management • Minor dike/structure maintenance • Other: _____ 	_____ _____ _____ _____
_____	Wetland impoundment development (The development of a new wetland where none historically existed by constructing a dike and water control structure in the appropriate topographic area.) <ul style="list-style-type: none"> • Dugouts/scrape outs • Other: _____ 	_____ _____
_____	Wetland restoration (The restoration of a drained wetland by the plugging of drainage ditches or removal of drain tiles. Note: may include the restoration of part of an original basin where full restoration is not possible.) <ul style="list-style-type: none"> • Historical vs. current ecological functions • Species diversity of restored wetlands • Other: _____ 	_____ _____ _____
_____	Wetland water controls (The addition or rehabilitation of water control structures, fish barriers, dikes and related inlets and outlets that enhance the value of existing wetland habitat.) <ul style="list-style-type: none"> • Impacts on aquatic wildlife • Impacts on non aquatic wildlife • Other: _____ 	_____ _____ _____

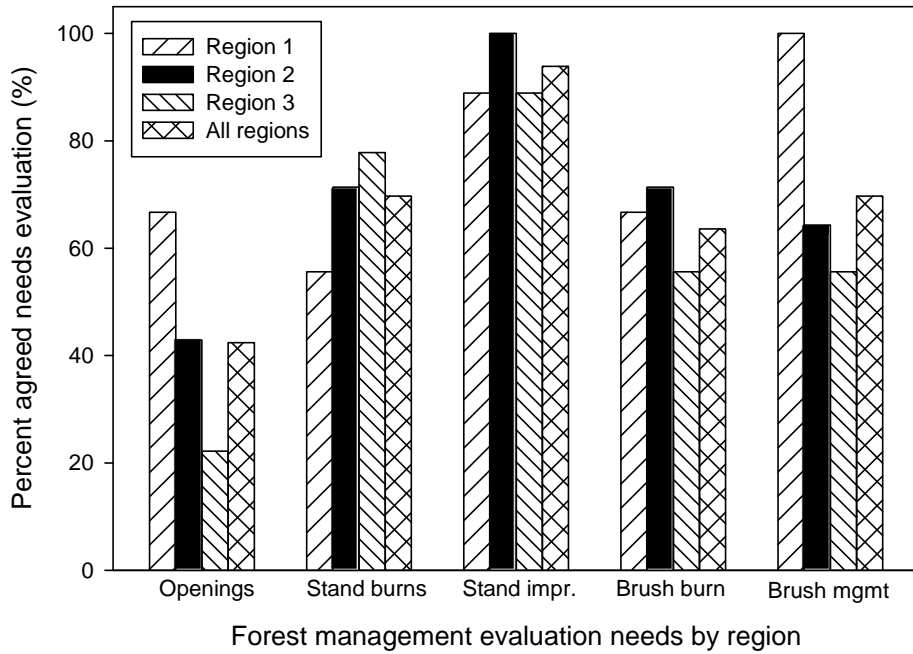


Figure 1. Percentage of wildlife managers that agreed each forest management activity needs evaluation based on frequency of response during January 2008 from wildlife work areas across Minnesota, USA.

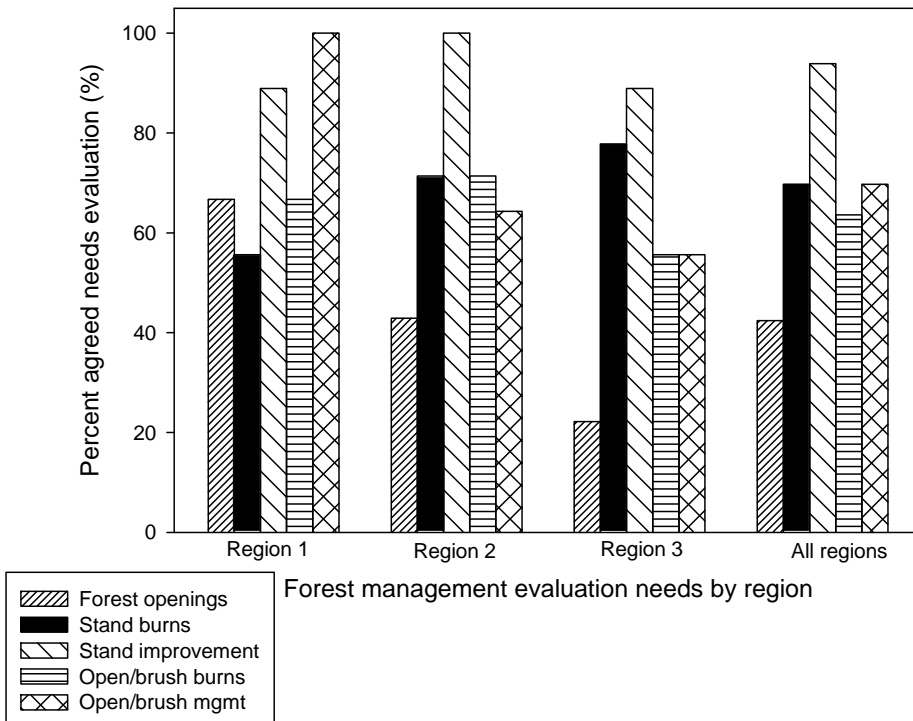


Figure 2. Percentage of wildlife managers within each region that agreed each forest management activity needs evaluation based on frequency of response during January 2008 from wildlife work areas across Minnesota, USA.