D. Management Indicator Habitats (MIH)

This resource area monitors and evaluates habitat trends of designated Management Indicator Habitats (MIH). Given the wide array of wildlife species that occur on the Forests, MIHs were identified to provide a simplified, practical and reasonable approach to monitoring a broad spectrum of species at the landscape level. A key assumption in applying and evaluating MIHs is that ecological conditions are likely to provide for species viability and maintain well-distributed habitats if there is an adequate representation of the range of habitats that would have been present under the range of natural variability (FEIS p. 3.3.1-2).

This report focuses on the summary for terrestrial forested MIHs 1-9 and 11-13 (forest spatial patterns) and their progress towards meeting CNF Forest Plan objectives for habitats.

Key Points
- The Forest is meeting Forest Plan direction:
    To reduce the amount of forest edge created,
    To increase the amount of interior forest habitat, and
    For mature and older (50 + years) upland forest
        To maintain red and white pine forest (minimum of 40,000 acres)
        To maintain or increase the acres and number of patches greater than 300 acres
        To maintain a minimum of 19 patches of 1,000 acres or greater,
        To maintain at least 85,000 acres in patches 300 acres or greater.

- Conditions for wildlife species that require large, mature forest patches or interior forest, or those that are sensitive to edge, are gradually improving.

- In the upland deciduous forest, MIH objectives to decrease amounts of young are consistent across LEs and are being met. For mature and older forest, some forests are increasing when the objective is to decrease.

- In the upland coniferous forest, Forest Plan objectives to increase young red, white, and jack pine conifer are not being met. This would be achieved through conversions of over abundant forest types. For mature and older, the standard to maintain at least 40,000 acres in mature white/red pine is currently exceeded and is trending in the right direction to meet the predicted amount for end of decade 2 (2024). Care should be taken not to reverse these trends.

- Mature and older jack pine and spruce-fir forests are declining rather than maintaining or increasing. The Forest has not met the standard to maintain at least 5,300 acres of mature or older jack pine forest in the first 10 years of implementation.

- In lowland conifer forests, objectives to increase young conifer are not being met. In the mature and older forest, most of the objectives are to decrease the mature and increase the oldest (120+ years) habitats. These objectives are being met in most LEs.

Monitoring Question

To what extent is Forest management providing ecological conditions to maintain viable populations of native and desired non-native species.

Background

Management indicator habitats are based on groupings of forest types in different age classes. The age groupings are surrogates for ecological, successional or vegetation growth stages that reflect a variety of habitat conditions and situations.

Table 4.4. Management Indicator Habitats – Description and Forest Types

Management Indicator Habitat	Description and Forest Types
Upland forest	All upland forest types: jack pine; red pine; white pine; balsam fir-aspen-birch; spruce-fir; black spruce-jack pine; northern hardwoods, including oak and maple; aspen; paper birch; bigtooth aspen; balsam poplar; aspen-spruce-fir.
Upland deciduous forest	All upland deciduous and deciduous-dominated mixed forest types.
Northern hardwood and oak forest	All northern hardwood and oak forest types.
Aspen-birch & mixed aspen-conifer forest	All aspen, birch, and aspen-dominated aspen-birch-conifer mixed forest types.
Upland conifer forest	All upland conifer and conifer-dominated mixed forest types.
Upland spruce-fir forest	All spruce-fir and spruce-fir-dominated mixed forest types.
Red and white pine forest	Both red and white pine forest types.
Jack pine forest	Jack pine forest type.
Lowland black spruce-tamarack forest	All lowland conifer and lowland mixed conifer types dominated by black spruce or tamarack.

Table 4.5. MIH 1-9 Age grouping for forest types.

Management Indicator Habitat 1-9: Age groupings for forest types.					
Forest Types and (codes)	Young (Seedling-open)	Sapling/pole	Mature/Old	Old/Old Growth	Old Growth Multi-aged
Jack pine	0-9	10-39	40-59	60-79	80+
Red pine	0-9	10-49	50-119	120-149	150+
White pine	0-9	10-49	50-119	120-149	150+
Lowland black spruce-tamarack dominated conifers	0-19	20-59	60-119	120-149	150+
White cedar	0-19	20-59	60-119	120-149	150+
Spruce/fir	0-9	10-49	50-89	90-149	150+
Upland northern hardwoods	0-9	10-59	60-119	120-149	150+
Oak	0-9	10-59	60-99	100-149	150+
Lowland northern hardwoods	0-19	20-59	60-119	120-149	150+
Aspen-birch and aspen-birch-conifer	0-9	10-49	50-79	80+	80+

All MIHs are compatible with and complementary to Landscape Ecosystem objectives. By moving toward Decade 1 and 2 objectives for these resources the CNF will move toward long-term desired conditions for desired amounts, quality and distribution of management indicator habitats and their associated species.

Results
a. Landscape Ecosystem Level Monitoring Summary
The Forest Plan has tables for each LE that identifies MIH objectives along with age class and species composition objectives. Comparisons were made at the LE level to determine if the MIH trends were on track to meet the stated objectives for the first two decades of Forest Plan implementation (CNF Forest Plan, pages 2-53 thru 2-80). A detailed report is part of the project file and is available upon request. What follows is a summary of the highlights of LE MIH opportunities.

Upland Deciduous Forest
➢ About 76% (66,116/86,521 acres) of the mature and older aspen-birch on the Forest occurs within the DMP, DMPO, and BHC LE's.
  ➢ The largest amount (28,226 acres) of this exists within the DMPO LE. Some regeneration of aspen-birch from mature and older forest to young forest could occur within the LE, and still meet MIH objectives. Conversions into less represented forest types from these forest types should also be considered.
    ➢ Acres of old/old growth multi-aged aspen-birch MIH are currently increasing within the DMPO LE, rather than decreasing according to the objective. A surplus of at least 8,660 acres currently exists.
  ➢ There is also some opportunity within the DMP and BHC LE's to regenerate aspen-birch from mature and older forests to young forest, and still meet MIH objectives.

Upland Coniferous Forest
➢ Although young jack pine forests are lacking in the DP and DMPO LE's, Forest Plan Standard S-WL-10 is currently not being met (see Forest-wide Interpretations and Conclusions). This suggests an issue with regeneration harvests of mature and older jack pine to young jack pine through 2014.
  ➢ The majority of over-abundant mature and older forests are deciduous, particularly the aspen forest type. Conversion from other forest types to jack pine is a Forest Plan expectation.
  ➢ Mature and older red and white pine forest beyond the minimum required to meet LE MIH objectives and Forest Plan Standard S-WL-9 (maintain at least 40,000 acares…) are dispersed in relatively small amounts in 6 LE's (DP, DMP, DMPO, BHC, MNH, TS). If these forest stands are viewed as a good source of regeneration activities to either create young red and white pine forest or young jack pine forest, care should be taken not to overharvest and reverse successful LE MIH trends.

Lowland Coniferous Forest
➢ About 85% (45,150/53,027 acres) of the mature and older lowland black spruce-tamarack MIH on the Forest occurs within the DMPO, BHC, and TS LE's.

> ➤ These LE's are all currently lacking in the young (0-19 years old) age class and increasing in mature+ age classes. Some regeneration in especially the mature age class to create young forest could occur within each of these LE's, and still meet MIH objectives.

b. Forest Spatial Patterns

MIH's 11 (Upland Edge Habitat), 12 (Upland Interior Forest), and 13 (Large Patches of Upland Mature Forest) were used during Forest Plan Revision to assess the size, shape, and arrangement of forest types, habitats, and vegetation communities resulting from disturbance. A part of the landscape coarse filter, some wildlife species require or benefit from specific spatial arrangements, including large patches of contiguous habitat, linkages of habitat patches, or juxtaposition of patches (FEIS p. 3.2-50).

Within the context of the largely forested landscape matrix of the Chippewa National Forest, habitat fragmentation relates primarily to changes in the forest stand size, species composition and age of stands. Limits on harvest size for even-aged management in the 1986 Forest Plan tended to reduce stand sizes and increase fragmentation effects. At the time of Forest Plan Revision, clear-cut harvests accounted for more than 90% of forest acres managed on the Chippewa. This type of management tends to increase edge and favor occurrence of popular wildlife game species such as deer. Conversely, it tends to act against species requiring larger areas of continuous forest. A number of wildlife and plant species have been shown to be associated with conditions existing in the interior of relatively large patches of mature vegetation, or to be adversely affected by the proximity of early seral stage vegetation and associated edge. (FEIS p. 3.2.52)

MIH 11: Upland Edge Habitat (management-induced)

MIH 11 provides a measure of habitat fragmentation resulting from forest management intensity. It measures edge density (mile/square mile) of young forest (age 0-9) for uplands and lowlands. The perimeter of young forest stands created by management (i.e. even-aged regeneration timber harvest) was measured, and a density amount calculated for uplands and lowlands forest. MIH 11 allows evaluation of species of management concern that are benefitted or adversely impacted by edge habitat, such as white-tailed deer, olive-sided flycatcher, American woodcock, and brown-headed cowbird (FEIS Table WLD-11 p. 3.3.2-1).

Table 4.6. Management induced edge density (miles/square mile) for CNF

Year	Uplands mi/sq mi	Lowlands mi/sq mi
2004	2.8	0.3
2011	1.3	0.2
2016	1.6	0.3
Decade 2*	1.7	0.37

The 2016 data include all planned but not yet implemented timber harvests from vegetation management projects to date. The 2016 data have been aged out for 5 years, by which time it is anticipated that most of these projects will have been implemented.

Management-induced upland edge density is a reflection of harvest intensity, i.e. even-aged regeneration harvest. The 2004 Forest Plan brought in a much more mixed set of harvest types than were used previously. Less even-aged regeneration harvesting (e.g. clearcut, shelterwood, seedtree) results in a lower edge density. Larger harvest unit sizes would also decrease edge density. The predicted edge density calculations for 2016 are similar to those that were forecast in the FEIS for the end of decade 2*(FEIS Table FSP-5 p. 3.2-72).

The following Forest Plan Objective has been met:
> O-WL-36 Reduce amount of forest edge created through vegetation management activities, while still retaining a range of small patches and edge habitat.

MIH 12: Upland Interior Forest Habitat
MIH 12 provides a measure of the amount of forest interior habitat, which is used as an indication of habitat quality and the extent of large forest patches in a landscape. This indicator allows evaluation of species of management concern that are known or thought to benefit from environmental conditions associated with interior forest conditions.

Table 4.7. Acres of forest interior.

Year	Acres
2004	38,690
2011	39,794
2016	42,522

Since 2004, there has been a steady increase in acres of forest interior. In 2011, acres of interior forest have increased by about 2%. This is predicted to rise to 10% in 2016, based on all planned but not yet implemented timber harvests and forest aging.

The following Forest Plan Guideline has been met:
> O-VG-21 Increase amount of interior forest habitat.

MIH 13: Large Patches of Upland Mature Forest
MIH 13 is the size and amount of large (>300 acres) mature and older (age 50 or older) upland forest patches.

Indicators 12 and 13 allow evaluation of species of management concern that are known or thought to benefit from environmental conditions such as interior forest, connected habitats, and patterns that emulate natural disturbances (FEIS p. 3.3.2-1), such as northern goshawk, black-throated blue warbler, goblin fern, bay-breasted warbler, spruce grouse, black-backed woodpecker, Connecticut warbler, red-shouldered hawk, four-toed salamander, northern bog lemming, Canada lynx, goblin fern, triangle grapefern, Goldie's woodfern, ram's-head lady's slipper, fairy slipper, and Canada yew (FEIS Table WLD-12/13). These species are all currently listed as Regional Forester's Sensitive Species, or are federally listed as Threatened.

The table below provides number and acres of large, mature upland forest patches for 2004, 2011 and 2016. The 2004 Forest Plan numbers are not directly comparable to those provided in the FEIS. Since the FEIS was written, changes in forest stand delineation have caused the need to develop a new GIS script to calculate patches so as to allow direct comparisons of similar forest conditions between years, and a new "baseline" was generated to represent 2004 conditions. This technique was used to calculate acres and numbers of large, mature upland forest patches, as well as acres of forest interior.

Table 4.7. Large, mature upland forest patches on Chippewa National Forest

Acres	2004 Forest Plan		2011		2016	
	No.	Acres in size class	No.	Acres in size class	No.	Acres in size class
301-500	46	17325	51	19804	57	22473
501-1000	31	20897	29	20710	35	25221
1001-2500	14	20844	14	21319	14	21131
2501-5000	2	6072	2	6082	3	8809
5001-10000	5	31521	5	32300	5	32870
Total > 300 ac	98	96659	101	100215	114	110504
Total > 1000 ac	21	58437	21	59701	22	62810

There has been a gradual and steady increase in the number and acres of large, mature upland forest patches since the inception of the current Forest Plan in 2004. In 2011, acres of large, mature upland patches have increased by about 2%. This is predicted to increase to about 11% by 2016, based on all planned but not yet implemented timber harvests and forest aging.

The following Forest Plan Objectives, Guidelines, and Standards have been met:
- ➤ O-VG-19 Maintain or increase the acres and number of patches of mature or older upland forest in patches 300 acres or greater.
- ➤ G-VG-1 Maintain a minimum of 19 patches of mature or older upland forest in patches of 1,000 acres or greater.
- ➤ S-VG-1 Maintain a minimum of 85,000 acres of mature or older forest in patches 300 acres or greater.

The combined results for MIH's 11, 12 and 13 suggest that conditions for wildlife species that require large mature forest patches or interior forest, or those that are sensitive to edge, are gradually improving.

c. LE-MIH Forest-wide Interpretations and Conclusions

Forest-wide acreage totals are provided in the following tables to provide an overall sense of current abundance and context regarding upland wildlife habitats on the Chippewa National Forest.

Table 4.8. Amount (percent) of MIHs in Uplands

MIH	% of Uplands in this MIH 2004	% of Uplands in this MIH 2011	Forest-wide Vegetation Composition Objectives FP Table DLP-2 (p. 2-57)	
			Decade 1	Decade 2
Northern hardwoods	15	18	15	16
Aspen-birch	58	56	53	49
Upland spruce-fir	6	5	7	8
Jack Pine	3	3	5	6
Red and white pine	17	18	19	20

Table 4.9. Percentage of uplands by age groupings in 2004, 2011 and 2016

Vegetation Growth Stage (age class)	2004 Percentage (FP Table DLP-3)	2011 Percentage	2016 Percentage	Forest-wide Age Class Objectives FP Table DLP-3 (p. 2-58)	
				Decade 1	Decade 2
0-9 years old	8	4	5	8	8
10-49 years old	42	43	43	49	48
50-99 years old	42	40	38	33	29
100-149 years old	7	12	13	9	13
150+ years old	0	1	1	1	1

Relatively small changes in amounts and ages of MIH's have occurred since 2004. Forests on Chippewa National Forest are relatively young, but the oldest age groups are slowly increasing. About 74% of the Chippewa's upland forests are deciduous; 26% are coniferous. The most prevalent upland MIH is aspen-birch, comprising 56% of the Chippewa's upland forests. Jack pine and spruce-fir are the least prevalent upland MIH's.

At least 220,000 – 240,000 acres of ruffed grouse habitat (all age groupings) are predicted to occur during the first two decades of Forest Plan implementation, which is an amount estimated to be roughly 3 – 5 times the amount that would occur in RNV (FEIS Tables WRG-1 and 2, pp. 3.3.6-38 - 3.3.6-39). Minnesota had the highest ruffed grouse population of any state in the country in 2001 (FEIS pp. 3.3.6.34 – 3.3.6.35).

Overall, what this means for wildlife is that habitats are abundant for early successional- and young forest-associated species, such as white-tailed deer and ruffed grouse. A reflection of widespread current habitat conditions, these species are generally quite common in the modern landscape. Species more typical of upland conifers and mature forests have far less available habitats, and as a result, are less common.

At least 70,000 – 100,000 acres of high quality deer foraging habitat (all age groupings) are predicted to occur during the first two decades of Forest Plan implementation, which is an amount estimated to be about 2 -5 times the amount that would occur under RNV (FEIS Figure WTD-3, p. 3.3.6-33). White-tailed deer populations are currently at historic highs, with at least 1 million deer in Minnesota state-wide (FEIS p. 3.3.6-27). In the past few years, 'round tables' reflecting diverse citizen interests, have resulted in reductions in MDNR deer population goals for deer management areas both on the Chippewa NF and elsewhere in Minnesota.

Forest Plan Objectives for MIH's 1-9 in the Forest Plan are specific to each Landscape Ecosystem. To provide a broader perspective, the acres were totaled for each MIH at the forest-wide scale. Because the Forest Plan identifies trends (maintain, decrease, or increase) and does not identify a projected range of acres, acres are evaluated in terms of their relationship to the high and low ends of the range of natural variability for that forest type and age grouping (CNF FEIS, Appendix D, page 2-10). It is not the goal of the Forest Plan for vegetation conditions to fall within RNV. In fact, some vegetative objectives clearly rest outside of RNV. The FEIS recognizes and addresses major departures for the selected alternative in forest composition and forest age when compared to RNV (FEIS, p. 3.2-27). For example, the northern hardwood type is projected to be 30% less than the RNV value; the aspen type is projected to be 26% greater than the RNV value. The analysis also recognized 6 major departures in forest age. That said, RNV provides some perspective and context for evaluating overall current forest conditions relative to coarse filter management for wildlife. The tables provided below display the acreage amounts for when the current (2004) Forest Plan was initiated and in 2011 and 2016, and the low and high ends of RNV for the amount of young and mature and older by MIH.

Table 4.10. Acres of Young MIH in FY 2004, 2011, and 2016 compared to RNV.

Acres of Young (0-9 years) Management Indicator Habitats						
#	Management Indicator Habitat	2004 Forest Plan	2011	2016	Estimated low end of RNV	Estimated high end of RNV
1	Upland forest	51900	16868	20446	18200	32900
2	Upland deciduous	40600	13329	17051	10700	13100
3	Northern hardwoods	1500	1671	779	0	800
4	Aspen-birch	38600	11657	16273	10700	11800
5	Upland conifer	11100	3540	3394	7500	19800
6	Upland spruce-fir	2500	738	958	400	3400
7	Red and white pine	3800	1444	1323	2000	9400
8	Jack pine	5100	1357	1113	5100	7000
9	Lowland black Spruce-tamarack	2000	1064	1176	4500	6200

Table 4.11. Acres of Mature and Older MIH in FY 2004, 2011, and 2016 compared to RNV.

	Acres of Mature and Older Management Indicator Habitats					
#	Management Indicator Habitat	2004 Forest Plan	2011	2016	Estimated low end of RNV	Estimated high end of RNV
1	Upland forest	217000	230218	232777	300100	350300
2	Upland deciduous	156400	169550	166191	142900	162400
3	Northern hardwoods	55000	79004	79670	133000	141100
4	Aspen-birch	92900	90545	86521	Unknown	19900
5	Upland conifer	60500	60669	66589	157200	187900
6	Upland spruce-fir	12000	10168	10933	67700	78200
7	Red and white pine	40800	45389	51003	79400	99000
8	Jack pine	7700	5113	4653	10200	10800
9	Lowland black Spruce-tamarack	54900	53027	53133	49800	53000

Upland Deciduous Forest

Young (0-9 years):
  ➢ The amount of young upland deciduous forest has decreased substantially since 2004, and is comprised primarily (95%) of young aspen-birch habitat. MIH objectives are currently being met for young upland deciduous forest and young aspen-birch forest in all Landscape Ecosystems. The Forest Plan objective for these MIH's is consistent across LE's, and is to provide decreasing amounts of this habitat.
  ➢ Wildlife species associated with young upland deciduous forest include white-tailed deer, ruffed grouse, American woodcock, and others (FEIS Table WLD1a p. 3.3.1-5). Although the amount of very young (0-9 years) habitat is declining in comparison to 2004, it remains above the amount that was expected to occur under RNV, and within the amount modeled by the FEIS as needed to maintain viable populations of associated wildlife species and well-distributed habitats.

Mature and Older:
  ➢ About 70% of mature and older upland forests on the Chippewa are deciduous forests. The amount of mature and older upland deciduous forest has increased somewhat since 2004. Mature and older northern hardwoods have increased somewhat. They are considerably below the amount that was expected to occur under RNV. Mature and older aspen/birch forest has decreased somewhat and remains considerably above RNV.
    ➢ MIH objectives for mature and older upland deciduous forest, northern hardwoods, and aspen/birch forest vary by Landscape Ecosystem. Not all of these habitat components are currently trending in the direction of Forest Plan objectives, with some mature/older forests increasing when an objective is to decrease.
    ➢ Wildlife species associated with mature and older upland deciduous forest include Northern goshawk, red-shouldered hawk, four-toed salamander, goblin fern, and others (FEIS Table WLD-2b p. 3.3.1-7). Current amounts of mature and older

upland deciduous forest, northern hardwoods, and aspen/birch forest are within the amounts modeled by the FEIS as needed to maintain viable populations of associated wildlife species and well-distributed habitats.

Upland Coniferous Forest

Young (0-9 years):
➢ The amount of young upland coniferous forest has decreased since 2004, and is below RNV. The largest declines in these young forests are in jack pine and red and white pine forests. More often than not, Forest Plan objectives to increase young upland conifer are not being met in the LE's. This is particularly evident in the DMPO LE, a very large LE.
  ➢ Current amounts of young red/white pine forest and upland coniferous forest are not within amounts modeled in the FEIS analysis for decades 1 and 2. Wildlife species associated with young upland conifer forests are not unique to these MIH's (e.g. Canada lynx, song sparrow, dark-eyed junco, and others (FEIS Tables WLD-5a, 6a, 7a pp. 3.3.1-10-12), so it is not expected that a lack of these young habitats would cause concern for viability of these species.
  ➢ The lack of these young red/white pine forests and jack pine forest types reflect less conversion from overabundant forest habitats to the underabundant upland conifer habitats than is recommended by the Forest Plan. Young upland conifer forests will eventually become mature upland conifer forests, with all of their associated wildlife species (e.g. black-backed woodpecker, blackburnian warbler, pine warbler, eastern wood peewee, scarlet tanager, brown creeper, Canada warbler, and others [FEIS Tables WLD-8b, 7b, 6b pp. 3.3.1-10-13]).

Mature and Older:
➢ Coniferous forests (especially red and white pine) comprise roughly 29% of mature and older Chippewa upland forests, which is substantially below RNV. FEIS modeling (FEIS pp. 3.3.1-57 – 3.3.1-60) for mature and older upland conifer forest habitats predicted that although these habitats would be well below RNV, by decade 2 there would be increases in habitat amounts compared to 2004. It was because of this prediction for increasing habitat amounts compared to existing conditions, that it was determined habitat amounts would be sufficient to support at least minimally viable population levels of species associated with these mature/old forest habitats (upland conifer, spruce-fir, jack pine, and red/white pine forests), despite being well below RNV (FEIS pp. 3.3.1-36 – 3.3.1-37).
  ➢ Compared to 2004, there are currently (2011) 0.3% more acres of mature and older upland conifers forest-wide. This increase comes from red and white pine forests (11%), off-set by declines in spruce-fir and jack pine forests. Habitat amounts for mature/older upland conifers, spruce-fir, and red/white pine MIH's in 2016 are below those predicted for decade 2, which ends in 2024.
  ➢ **Forest Plan Standard** S-WL-9: "Maintain at least 40,000 acres in mature or older red and white pine forest types during the implementation period of the forest plan." In 2011 there are 45,389 acres of mature and older red and white pine forest, hence, S-WL-9 is currently being met.
    ➢ Forest Plan Standards are "required limits to actions" (Forest Plan p. 1-8). As such S-WL-9 should be viewed as a minimum acreage to achieve. The

FEIS model predicted about 60,000 acres of mature/older red/white pine forest habitat by 2024 (Figure WLD 7b, p. 3.3.1-59).

➢ MIH objectives for mature/older red/white pine forest for most LE's are to increase acres by 2024. Most LE's are currently trending in the desired condition.

➢ Quantities of this habitat type beyond the minimum required by Standard S-WL-9 are dispersed in relatively small amounts in 6 LE's. Care should be taken not to reverse these successful MIH trends.

➢ Mature and older jack pine and spruce-fir forests are declining. They remain considerably below RNV.

➢ MIH objectives for mature/older spruce/fir forest for all LE's are either to increase or maintain acres by 2024.

➢ Low levels of mature/older jack pine forests in decade 2 were a concern in the Forest Plan for species associated with this MIH, particularly because they represent a 70% decrease from 2004 levels (FEIS p. 3.3.1-37). This "pinch point" led to the development of a Forest Plan Standard, designed to ensure adequate habitats to maintain viability of associated wildlife species.

➢ **Forest Plan Standard** S-WL-10: "Maintain at least 5,300 acres in mature or older jack pine forest types during the first 10 years of plan implementation." In 2011 there are 5,113 acres of mature and older jack pine forest, hence, S-WL-10 is currently not being met. The first 10 years of plan implementation end in 2014.

➢ Wildlife species associated with mature and older upland conifer forests include black-backed woodpecker, bay-breasted warbler, spruce grouse, Canada lynx, and others (FEIS Table WLD-5b p. 3.3.1-10). It will be important to thoughtfully plan future vegetation projects to ensure that the increasing levels of mature/older conifer MIH's upon which FEIS population viability determinations were based are achieved.

Lowland Coniferous Forest

Young (0-19 years):

➢ The current amounts of young lowland coniferous forest are below RNV and declining. More often than not, Forest Plan objectives to increase young upland conifer are not being met in the LE's.

➢ Wildlife species associated with this MIH include olive-sided flycatcher, palm warbler, dark-eyed junco, and others (FEIS Table WLD-9a p. 3.3.1-14). Wildlife species associated with young lowland coniferous forests also occur in other MIH's, so it is not expected that a lack of these young habitats would cause concern for viability of these species (FEIS 3.3.1-23).

<u>Mature and Older:</u>
 - ➢ The current amounts of mature and older lowland coniferous forest have declined slightly and are at the upper end of amounts expected to have occurred under RNV. Forest Plan objectives for this MIH are generally to decrease the mature (60-119 years old) and increase the oldest (120+ years) habitats. These objectives are being met in most LE's, with enough acres available that some regeneration especially in the mature age class to create young forest could occur and still meet MIH mature/older objectives.
   - ➢ Wildlife species associated with this MIH include northern bog lemming, four-toed salamander, black-backed woodpecker, great grey owl, olive-sided flycatcher, parula warbler, golden-crowned kinglet, and others (FEIS Table WL9-9b p. 3.3.1-14).

New Issues

Climate change

The 2004 Forest Plan was silent on the issue of climate change. A number of models are now available to predict likely changes to forest landscapes under different climate change scenarios. These models predict which tree species are likely to increase, and which are likely to decrease, as conditions continue to change in northern Minnesota. It is recognized that these modeling predictions do not represent an exact science.

At some point, personnel on the Chippewa should begin to carefully consider what this may mean in terms of forest composition objectives, as well as implementation techniques. The RNV concepts that guided analysis of Forest Plan revision alternatives may eventually need some modification in light of likelihood of long-term success with some tree species. It is conceivable that it may become more important to focus more on facilitating the continuation of a long-term forested condition (with its accompanying wildlife habitats), than on attempting to bring about shifts in species composition to tree species that may not have a high likelihood of making it into the next century. From this perspective, encouraging conversion from one type of older coniferous forest (red and white pine), a relatively rare habitat component in the modern landscape, to another type of rare coniferous forest (jack pine) may not serve conifer-dependent wildlife species very well.

Recommendations

 - Restoration of conifers to the Chippewa's forests is a slow process, requiring substantial commitments of personnel and finances. Increasing conifer presence on the landscape, including both the actions of increasing conifers as within-stand diversity features, and through conversion of forest types, is a primary benefit to numerous wildlife species. It remains one of the more important coarse-filter MIH objectives with respect to maintaining viable populations of wildlife species, as a number of conifer-associated species are not common on the modern landscape.

 - With respect to Forest Service activities, wildlife habitats on the Chippewa National Forest are currently primarily affected by implementation of vegetation management direction from the Forest Plan. The application of Forest Plan LE vegetation composition, age class, and MIH objectives is a complex process, the monitoring of which is equally challenging. Large scale vegetation management projects are simultaneously developed

by multiple planning units on the Forest. It is recommended that implementation of these objectives be monitored at least every 2-3 years, including the MIH portion. From a wildlife habitat perspective, it is important to pay particular attention to the older and conifer MIH's. They are the most lacking on the modern landscape, and are not readily replaced.

References
USDA Forest Service. 2004. Final environmental impact statement. Chippewa and Superior National Forests: Forest Plan Revision. Vol. 1.

___. 2004. Final environmental impact statement. Chippewa and Superior National Forests: Forest Plan Revision. Vol. 2 Appendices. Appendix D management indicator habitats.

___. 2004. Chippewa National Forest: Land and resource management plan.

___. 2009. Chippewa National Forest. Land and resource management plan FY 2008 Monitoring and Evaluation Report.

___. 2010. Chippewa National Forest. Land and resource management plan FY 2009 Monitoring and Evaluation Report.