



United States Department of Agriculture

Forest Service

# **Huron-Manistee National Forests**

## **2014 Monitoring Report**

The FY 2014 Monitoring and Evaluation Report for the Huron-Manistee National Forests. The 2006 Forest Plan was implemented on June 26, 2006. This Monitoring and Evaluation Report evaluates these results. This report meets the intent of both the Forest Plan and the regulations contained in 36 CFR 219 National Forest Management Act.

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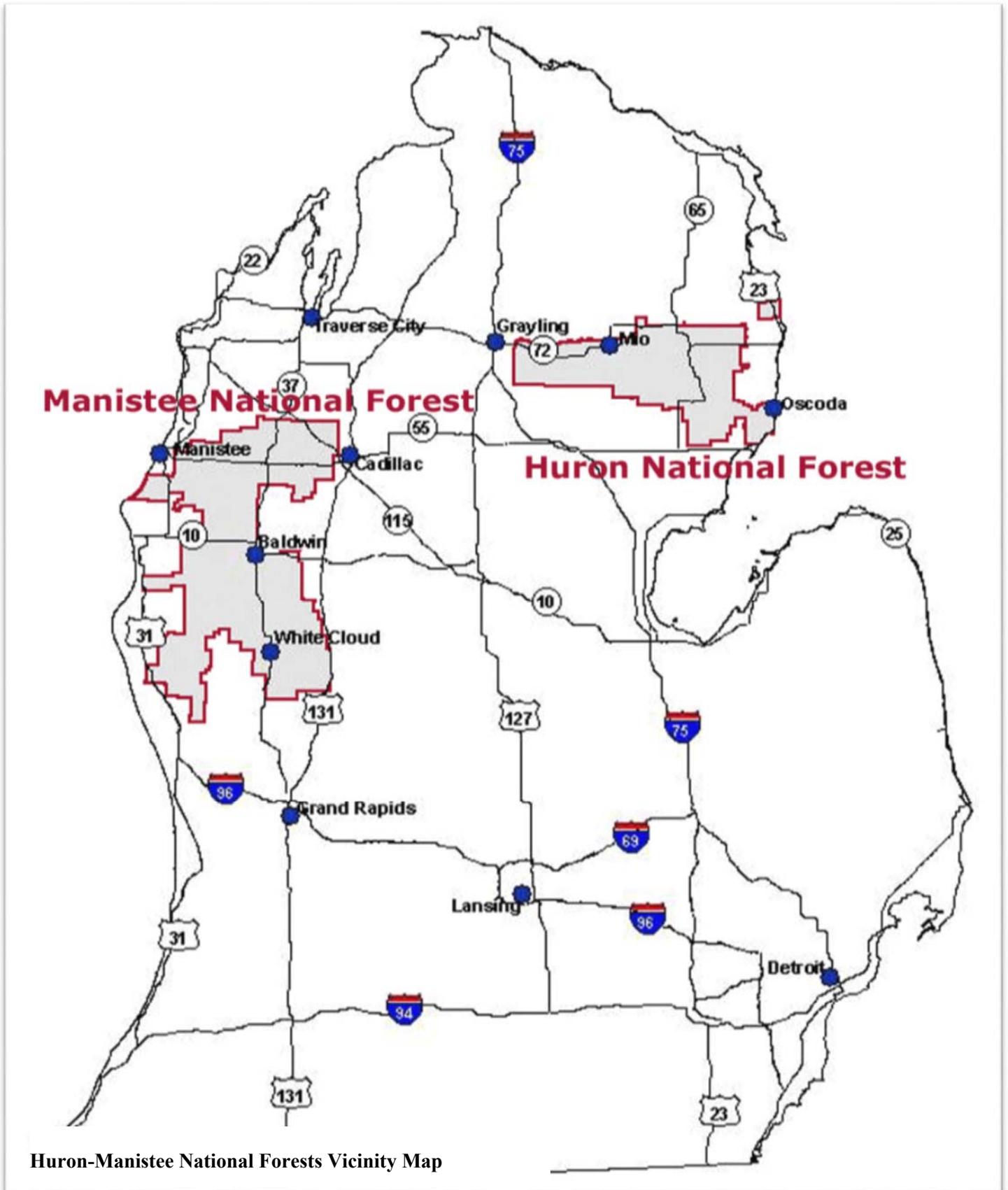
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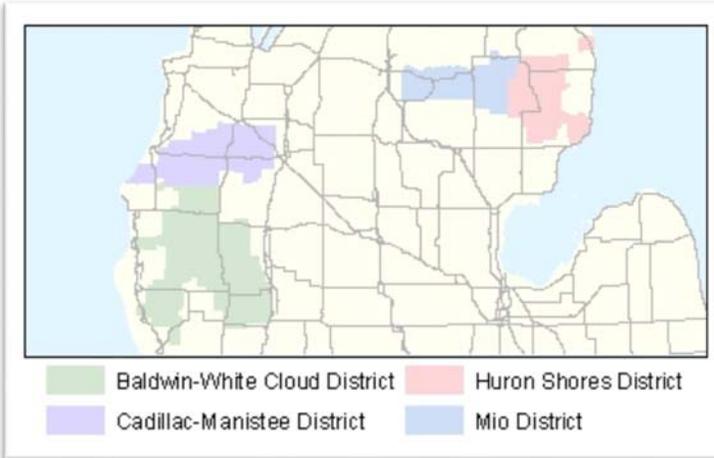
Huron-Manistee National Forests Vicinity Map

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# INTRODUCTION

## Forest Plan Overview



### Ranger Districts on the Huron-Manistee National Forests

Mecosta, Montcalm, Muskegon, Newaygo, Oceana and Wexford. The Forests have four ranger stations - Cadillac-Manistee, Baldwin-White Cloud, Huron Shores and Mio.

The Huron-Manistee National Forests are located between the shores of Lake Michigan and Lake Huron in the northern half of the Lower Peninsula of Michigan. The approximately one-million-acre Huron-Manistee National Forests are located in a transition zone between forested lands to the north and agricultural lands to the south. The Huron-Manistee National Forests are located within fourteen Michigan Counties - Alcona, Crawford, Iosco, Ogemaw, Oscoda, Lake, Manistee, Mason,

The Huron-Manistee National Forests released the Land and Resource Management Plan (Forest Plan) on March 20, 2006 with the signing of the Record of Decision. This was a revision of the Forest Plan that was completed in 1986. The 2006 Forest Plan provides guidance for all resource management activities occurring on the Huron-Manistee National Forests. The Forest Plan identifies management direction for the Huron-Manistee National Forests in the form of goals, objectives, desired future conditions and standards and guidelines, all of which are based on underlying assumptions (policy, theory, data and technology). To determine the usefulness of a Forest Plan, the National Forest Management Act (NFMA) regulations (36 CFR 219) have required regularly scheduled monitoring and evaluation.

## Purpose and Scope of the Monitoring & Evaluation Report

The information gained from the Monitoring and Evaluation Report is an indicator of how well the goals, objectives and desired future conditions of the 2006 Forest Plan have been met. Implementation of the 2006 Forest Plan, at this juncture, is showing some trends, patterns and results. Patterns and conclusions leading to changes in the Forest Plan are identified in this report. The Monitoring Report is not a decision document, but includes information that will be used to inform future decisions.

### The Monitoring and Evaluation Report serves several purposes, including:

- Documenting, monitoring and evaluating accomplishments,
- Providing an accountability tool for monitoring and evaluation of expenditures,
- Providing an assessment of the current state of the Huron-Manistee National Forests,

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- Providing adaptive management feedback to the Forest Supervisor of any needed changes to the 2006 Forest Plan or adjustments to management actions,
- Describing to the public how their public lands are being managed.

The following sections summarize results from the FY 2014 monitoring items. Each resource area includes the monitoring question(s) with findings, evaluations, and conclusions.



**General Forest Area**

## CHAPTER 1

### Required monitoring

#### Comparison of Projected and Actual Outputs and Services

*How close are projected outputs and services to actual? How do actual outputs compare to those projected in the 2006 Forest Plan, Appendix D, Proposed and Probable Practices, Goods Produced, and Other Information?*

Comparison of projected and actual outputs concentrates on vegetation management. A brief presentation of other 2006 Forest Plan proposed resource management activities occurs at the end of this section.

Moving ecological conditions on the Huron-Manistee National Forests in the direction of desired future conditions as outlined in the Forest Plan necessitates managing vegetation through appropriate treatments. During Forest Plan revision, vegetative treatments were projected which would achieve desired species composition, age class distribution, Forest wide goals and objectives, and desired future conditions.

#### Monitoring Methods

The varieties of silvicultural methods implemented were retrieved from the Forest Activity Tracking System (FACTS) and Timber Information Manager (TIM) databases which track timber acreage and volume accomplishments, respectively.

Table 1 shows 2006 Forest Plan projected timber sale acres compared with actual acreage sold since implementation of the 2006 Forest Plan.

The 2006 Forest Plan timber projection acres, Decade 1, contributing to allowable sale quantity (ASQ) from land suitable for timber production, is 128,677 acres.<sup>1</sup> Timber production from lands not suitable for timber production amount to 29,318 acres.<sup>2</sup> Timber projections for the decade, including ASQ, barrens, and fuelbreak

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<sup>1</sup> Table D-4, Appendix D, 2006 Forest Plan, page D-4.

<sup>2</sup> Table D-5, Appendix D, 2006 Forest Plan, page D-5. Barrens and fuelbreak creation, as shown in Table D-5, are the major contributors to the acres from non-suitable land. Hazardous fuel reduction acres are primarily prescribed burns.

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acres, total 156,402 acres, Table 1. Acres treated since implementation of the Forest Plan are approximately 48,672 acres, or 31% of the 156,402 acres projected.

**Table 1 2006 Forest Plan Decade 1 Proposed and Probable Silvicultural Method Compared to Actual Sold Acres from Suitable and Not Suitable Forest Land, FYs 2006-2014.**

	<b>Thin</b>		<b>Clearcut</b>		<b>Shelterwood</b>		<b>Selection</b>		<b>Total</b>	
<i>Forest Plan Projection: ASQ, PLUS Barrens and Fuelbreaks;</i>										
	<i>Acres</i>	<i>% of Average Annual Projection</i>	<i>Acres</i>	<i>% of Average Annual Projection</i>	<i>Acres</i>	<i>% of Average Annual Projection</i>	<i>Acres</i>	<i>% of Average Annual Projection</i>	<i>Acres</i>	<i>% of Average Annual Projection</i>
<b>Decade 1</b>	59,457	38%	88,684	57%	8,261	5%	0	0%	156,402	100%
<i>Acres Accomplished</i>										
	<i>Acres</i>	<i>% of Thin</i>	<i>Acres</i>	<i>% of Clearcut</i>	<i>Acres</i>	<i>% of Shelterwood</i>	<i>Acres</i>	<i>% of Selection</i>	<i>Acres</i>	<i>% of Total Forest Plan Projection</i>
<b>2006</b>	3,498	59%	3,230	36%	636	77%	0	-	7,364	47%
<b>2007</b>	4,036	68%	3,269	37%	694	84%	0	-	7,999	51%
<b>2008</b>	3,074	52%	1,737	20%	384	46%	27	-	5,222	33%
<b>2009</b>	2,998	50%	3,083	35%	194	23%	10	-	6,285	40%
<b>2010</b>	2,244	38%	3,178	36%	638	77%	0	-	6,060	39%
<b>2011</b>	896	15%	1,917	22%	494	60%	0	-	3,307	21%
<b>2012</b>	2,348	39%	2,009	23%	218	26%	206	-	4,781	31%
<b>2013</b>	1,894	32%	2,126	24%	128	15%	0	-	4,148	27%
<b>2014</b>	1,740	29%	1,320	15%	365	44%	81	-	3,506	22%
<i>Average Annual Acres Sold, 2006-2014</i>										
	2,525	42%	2,430	27%	417	50%	36	-	5,408	35%
<i>Total Accomplished, 2006- 2014</i>										
	22,728	42%	21,869	26%	3,751	51%	324	-	48,672	31%

Source: NRM Staff - FACTS User View Query.

## **Monitoring Results and Evaluation**

As was the case in previous years, timber outputs for 2014 are below the 2006 Forest Plan projected ASQ (chargeable) and non-chargeable acre and volume. At this point of the 2006 Forest Plan, the Forests have prepared to sell about 48,672 acres, or 31 percent of the total 156,402 acres projected, Table 1.

The Forests sell the amount of volume that is funded and budget allocations are not sufficient to provide the capacity for the Forests to offer more timber sales. Allocations are based on national priorities and our capability to complete project environmental analyses and prepare and award timber sale contracts is based on this funding. Markets for forest products should be relatively stable or may improve modestly in the near future.

## **Forest Plan Proposed Practices**

**Error! Not a valid bookmark self-reference.** (below) contains a comparison of the projected outcomes anticipated in the 2006 Forest Plan and the actual outcomes for fiscal years 2006 through 2014. Information in this section is specific to the estimated amount of an activity or practice listed in the 2006 Forest Plan, Appendix D, Table D-6, Proposed Practices (Forest-wide). Several programs have exceeded planned expectation: terrestrial habitat management, lake habitat management, maintaining and improving watershed condition, and decommissioning classified and unclassified roads.

Several programs have continued to be implemented at a level below planned levels: noxious weeds, improvement of forest vegetation, improvement of trails, management of stream habitat, and the establishment of forest vegetation. Lack of funding for noxious weed treatment and trails maintenance has limited work in those areas. Timber harvest has been at a lower than planned level. The need to establish vegetation or treat stands for improvement has declined, as there is less need to replant and improve conditions for regeneration.

**Outputs Compared to Actual Outputs for Fiscal Years 2006-2014.**

Projected Average Annual Amount in the First Decade	FY 2006 Actual	FY 2007 Actual	FY 2008 Actual	FY2009 Actual	FY 2010 Actual	FY 2011 Actual	FY 2012 Actual	FY 2013 Actual	FY 2014 Actual	FY 2006 – 2014 Total	% per 2006 - 2014
<i>Wildlife and Fish</i>											
1,000	1,306	1,988	1,030	1,376	2,730	18,730	13,760	14,702	16,191	71,813	114%
121	57	36	35	33	68	96	77	78	38	518	46%
240	364	450	804	154	506	314	199	198	282	3,271	151%
<i>Nonnative Plant Species</i>											
1,000	173	210	392	656	950	637	1,413	1,355	1,023	6,809	19%
<i>Range</i>											
312	5	5	5	Range Program Discontinued					15	5%	
<i>Fuels</i>											
10,000	4,546	4,804	8,050	12,042	17,117	7,044	8,643	9,756	9,808	81,810	91%
<i>Watershed</i>											
100	26	17	16	98	104	59	729	610	624	2,283	253%

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Management Activity or Practice	Unit of Measure	Projected Average Annual Amount in the First Decade	FY 2006 Actual	FY 2007 Actual	FY 2008 Actual	FY2009 Actual	FY 2010 Actual	FY 2011 Actual	FY 2012 Actual	FY 2013 Actual	FY 2014 Actual	FY 2006 – 2014 Total	% per 2006 - 2014
<i>Facilities</i>													
Decommission Classified and Unclassified Roads	Miles	20	10.2	3.1	.01	54.8	60.3	24.3	36.4	38.4	57	247.51	137%
Improve Transportation System – Roads	Miles	6	.5	9.8	8.3	9.8	.1	.4	.4	12.8	10	48.1	88%
Improve Transportation System – Trails	Miles	38	8	8	7	4	33	35	1	1.4	3	100.4	29%
<i>Vegetation</i>													
Establish Forest Vegetation	Acres	5,990	4,300	1,840	2,280	2,180	2,183	2,339	1,740	5,838	2,466	25,166	47%
Improve Forest Vegetation	Acres	935	0	401	129	786	27	82	153	46	-	1,624	19%

Source: accomplishment reporting for 2014

## Recommendations

Table 1 indicates that clearcutting, presumably aspen<sup>3</sup> clearcutting, continues to lag behind other silvicultural methods, as was illustrated in the 2012-2013 M&E Report. Probable reasons include other management emphases, e.g., conifer management, fuelbreak creation, and barrens restoration. Aspen management is important to woodcock and ruffed grouse habitat (see Population Trends of Management Indicator Species (MIS – Ruffed Grouse, Monitoring Results and Recommendations, page 44 and page 47, respectively).

The continued lack of emphasis on aspen is also illustrated in Table 3 the Timber Product Mix, Timber Resource Sale Schedule section below, which indicates lower aspen volume output compared to other vegetation classes for sold timber sales. The total combination of short and long-lived conifer and low and high-site oak volumes indicate more emphasis is being placed on fuelbreak and barrens restoration projects and less on aspen management. It is suggested that a more balanced approach to aspen management, fuel breaks, and barrens restoration efforts be considered.

Regarding the proposed practices and management activities shown in Tables 1, 2 and 3, the Forests will continue to explore options to accomplish the objectives indicated.

### ***Timber Product Mix, Timber Resource Sale Schedule***

*Is the timber product mix and timber output at, or below, levels defined in the Timber Resource Sale Schedule?*

## Monitoring Methods

Timber volumes accomplished were retrieved from the US Forest Service (USFS) Timber Information Manager (TIM) database.

## Monitoring Results and Evaluation

The mix of species and the amount of sawtimber and pulpwood within a timber sale depends on the timber stand conditions prior to treatment. Treatment prescriptions are designed to meet standards and guidelines (Forest Plan objectives). The amount of timber sold is a result of the treatment prescription and conditions encountered in the field.

Table 3 contrasts timber volume projections by vegetation class as shown in the 2006 Forest Plan. The table depicts a continued emphasis on short and long-lived conifers. Total volume sold since 2006 is 423.3 million board feet, or 37 percent of the projected 1,161 million board feet.

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<sup>3</sup> Acres of method of silvicultural treatment by vegetation class are not available from agency databases.

Table 4 shows sold timber volumes for total chargeable and non-chargeable timber. Chargeable timber is the Allowable Sale Quantity (ASQ). Nonchargeable timber origin volume includes restoration projects and fuel treatments and is not counted against ASQ. In FY 2014, the Huron-Manistee National Forests sold approximately 46.5 million board feet of timber (approximately 75.3 thousand cubic feet), or 51 percent of the 91 MMBF average annual ASQ projected in the 2006 Forest Plan.

Table 4 Table 4 shows the average annual allowable sale quantity (AASQ) of sold timber volume to-date (2006-2014) is about 41.8 MMBF per year, or 46 percent of AASQ (91 MMBF). Average annual non-chargeable timber volume is about 5.5 MMBF, or 22 percent of projected. Total chargeable and non-chargeable volume sold from 2006-2014 is 419.8 MMBF, or 40 percent of total volume projected for the decade, 1,160 MMBF. As noted in Table 3 Table 3 and Table 4 the total timber volumes do not exactly equal each other. This is because of variations in the particular USFS databases used.

In FY 2014, sawtimber accounted for approximately 29 percent of the total Forests' timber output and pulpwood accounted for 71 percent (timber from suitable and not suitable land).

The 2006 Forest Plan projected approximately 55 percent sawtimber and 45 percent pulpwood, respectively. The projections do not equal actual output. Probable reasons include an emphasis on barrens restoration, Kirtland's warbler and Karner blue butterfly habitat development, and fuels reduction projects (which typically remove pulpwood size material).

The Forests have not varied the mix of timber products since 2000. Ninety-five percent of sales are sold under the pulpwood index, which is the predominant timber product that sales are comprised of.<sup>4</sup>

## **Recommendations**

The Forests' objective is to increase timber volume outputs to more closely meet the 2006 Forest Plan projections. This is dependent on an increased demand for pulpwood and in an increase in funding.

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<sup>4</sup> The three timber product indices are: softwood sawtimber, hardwood sawtimber, and pulpwood.

**Table 3 2006 Forest Plan Average Annual Timber Volume Projection - Decade 1, from Lands Suitable and Not Suitable for Timber Production by Vegetation Class.**

	Aspen / Birch	% A/B	Short-Lived Conifer	% SLC	Long-Lived Conifer	% LLC	Low Site / High Site Oak	% LSO / HSO	Northern Hardwood	% NH	Total Million Board Feet	Total %
<i>2006 Forest Plan Projection, Decade 1 (MMBF)</i>												
	271	23%	130	11%	475	41%	285	25%	0	0%	1,161	100%
	Aspen / Birch	% of Average Annual Projection	Short-Lived Conifer	% of Average Annual Projection	Long-Lived Conifer	% of Average Annual Projection	Low Site / High Site Oak	% of Average Annual Projection	Northern Hardwood	% of Average Annual Projection	Total Million Board Feet	% of Total
<i>Accomplished - Sold Timber Volume, 2006-2014 (MMBF)</i>												
<b>2006</b>	5.1	19%	7.8	60%	16.8	35%	0.8	3%	9.4		39.9	34%
<b>2007</b>	4.0	15%	6.1	47%	24.0	51%	3.0	11%	11.0		48.1	41%
<b>2008</b>	2.8	10%	7.3	56%	15.3	32%	2.4	8%	6.9		37.4	32%
<b>2009</b>	5.0	18%	10.4	80%	24.3	51%	4.8	17%	11.8		56.3	48%
<b>2010</b>	6.5	24%	8.1	62%	24.9	52%	4.3	15%	8.7		52.5	45%
<b>2011</b>	5.7	21%	8.6	66%	25.4	53%	1.3	5%	12.6		53.6	46%
<b>2012</b>	8.1	30%	3.5	27%	24.8	52%	1.6	6%	10.2		48.2	42%
<b>2013</b>	5.3	20%	6.3	48%	18.4	39%	2.6	9%	9.9		42.5	37%
<b>2014</b>	10.0	37%	6.8	52%	14.5	31%	3.6	13%	10.3		47.5	41%
<i>Average Annual Volume Sold</i>												
	5.8	21%	7.2	56%	20.9	44%	2.7	10%	10.3		47.5	41%
<i>Total Volume Sold, 2006-2014</i>												
	52.5	19%	64.9	50%	188.4	40%	24.4	8%	93.1		423	37%
<i>% of Total Volume Sold, 2006-2014</i>												
		12%		15%		45%		6%				100%

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*Source: I-Web, CUTS203F report. Timber volumes in Tables 3 and 4 differ slightly due to rounding and variation in the available source data reports.*

**Table 4 Sale Volume on Lands Suitable (Average Annual Allowable Sale Quantity / Chargeable) and Not Suitable (Nonchargeable) FYs 2006-2014 (MMBF).**

	<b>AASQ (Chargeable Volume)</b>	<b>% of Chargeable Volume</b>	<b>Nonchargeable Volume</b>	<b>% of Nonchargeable Volume</b>	<b>Total Volume</b>	<b>% of Total Volume</b>
<i>2006 Forest Plan Projected Average Annual Allowable Sale Quantity and Nonchargeable timber, Decade 1</i>						
	91	78%	25	22%	<b>116</b>	<b>100%</b>
<i>Sale Volume</i>						
<b>FY 2006</b>	30.6	34%	9.7	39%	<b>40.3</b>	<b>35%</b>
<b>FY 2007</b>	39.6	44%	8.5	34%	<b>48.1</b>	<b>41%</b>
<b>FY 2008</b>	30.2	33%	7.3	29%	<b>37.5</b>	<b>32%</b>
<b>FY 2009</b>	47.1	52%	9.3	37%	<b>56.4</b>	<b>49%</b>
<b>FY 2010</b>	37.9	42%	7.9	32%	<b>45.8</b>	<b>39%</b>
<b>FY 2011</b>	52.7	58%	1.1	4%	<b>53.8</b>	<b>46%</b>
<b>FY 2012</b>	48.3	53%	0.0	0%	<b>48.3</b>	<b>42%</b>
<b>FY 2013</b>	43.1	47%	0.0	0%	<b>43.1</b>	<b>37%</b>
<b>FY2014</b>	46.5	51%	0.0	0%	<b>46.5</b>	<b>40%</b>
<i>Average Annual Sold Volume, 2006-2014</i>						
	41.8	46%	4.9	22%	<b>46.6</b>	<b>40%</b>
<i>Total Sold Volume 2006-2014 Compared to Decadal Projection</i>						
	376.0	46%	43.8	22%	<b>419.8</b>	<b>40%</b>

Source: I-Web, PTSAR (Sale Details) – PTSR201F, FY Awarded. Timber volumes in Table 3 and Table 4 differ slightly due to rounding and variation in each source data reports.

## Comparison of Actual and Estimated Costs

*How close are projected costs with actual costs?*

This item focuses on the budget funding projected to accomplish the FY 2014 annual program of work, and how close the Forests actually came to expending the funding toward Forest Plan implementation.

### Monitoring Methods

Contrary to what this monitoring item suggests, management costs are not enumerated in the 2006 Forest Plan, nor is there any specific direction for costs. Implementation of the Forest Plan is calculated annually because variability of budget, personnel, materials, supplies, vehicular use, inflation, etc. The 2006 Final Environmental Impact Statement analyzed key resource-related costs for 2006 Forest Plan implementation, but it did not approach the level of detail necessary to consider all costs involved in managing and administering the Forests' annual program of work. The best way to demonstrate operating costs is to examine the annual budget allocations and expenditures for the Forests.

Costs are estimated annually before each fiscal year begins. Table 5 portrays estimated versus actual costs for FY 2014. The program areas shown in the first column cover most of the Forests' annual operations. These operations relate to specific management goals and objectives in the 2006 Forest Plan.

The table depicts budget allocations and expenditures for the program area funding areas that were used on the HMNF in FY 2014. These program areas cover most of the annual operations on the HMNF, and most of these operations are related to specific management goals and objectives in the Forest Plan.

Although the tables do not account for the entire budget, e.g., project-specific funding and administrative costs, it does address most of the resource-related work that was done to help accomplish or support implementation of the Forest Plan.

### Monitoring Results and Evaluation

Overall, the Forests spent about 97 percent of the budget allocations in FY 2014.

### Recommendations

The Forests' objective is to efficiently and effectively spend the allocated budget to meet the needs of Forest Plan implementation.

**Table 5 Estimated Budgeted Costs Compared with Actual Costs.**

Program	FY 2013	FY 2014			
	<i>Allocation</i>	<i>Budget Allocation</i>	<i>Total Expended</i>	<i>Remaining Balance</i>	<i>% Expended</i>
Inventory & Monitoring	\$508,000	\$440,000	\$479,200	-\$39,200	109%
Land Management	\$459,248	\$320,000	\$307,400	\$12,600	96%
Minerals & Geology	\$432,000	\$329,000	\$312,600	\$16,400	95%
Forest Products/Timber Sale Management	\$2,694,560	\$3,008,200	\$2,939,400	\$68,800	98%
Forest Planning	\$258,000	\$54,000	\$42,100	\$11,900	78%
Vegetation & Watershed	\$420,700	\$684,800	\$674,600	\$10,200	99%
Recreation, Heritage, Wilderness	\$972,700	\$905,400	\$905,200	\$200	100%
Wildlife & Fisheries Habitat Management	\$1,093,293	\$1,179,600	\$1,193,400	-\$13,800	101%
<b>Subtotal – National Forest System</b>	<b>\$6,838,501</b>	<b>\$6,921,000</b>	<b>\$6,853,900</b>	<b>\$67,100</b>	<b>99%</b>
Fire Preparedness	\$2,017,650	\$2,184,800	\$2,210,600	-\$25,800	101%
Hazardous Fuels Reduction	\$1,399,307	\$1,210,800	\$1,214,100	-\$3,300	100%
<b>Subtotal – Wildland Fire Management</b>	<b>\$3,416,957</b>	<b>\$3,395,600</b>	<b>\$3,424,700</b>	<b>-\$29,100</b>	<b>101%</b>
Facilities Capital Improvement & Maintenance	\$184,042	\$176,300	\$152,788	\$31,254	83%
Facilities BWC Office	-	\$2,246,100	\$2,227,800	\$18,300	99%
Facilities BWC Site	-	\$410,600	\$408,500	\$2,100	100%
Legacy Roads & Trails	\$48,000	\$437,000	\$437,000	\$0	100%
Roads Capital Improvement & Maintenance	\$558,937	\$692,900	\$679,400	\$13,500	98%
Trails Capital Improvement & Maintenance	\$339,772	\$325,300	\$322,200	\$3,100	99%
<b>Subtotal – Capital Improvement &amp; Maintenance</b>	<b>\$1,130,751</b>	<b>\$4,288,200</b>	<b>\$4,248,400</b>	<b>\$68,254</b>	<b>99%</b>
Land Acquisition Fund	\$43,000	\$37,000	\$39,200	-\$2,200	106%

FY 2014 Monitoring & Evaluation Report

Program	FY 2013	FY 2014			
	<i>Allocation</i>	<i>Budget Allocation</i>	<i>Total Expended</i>	<i>Remaining Balance</i>	<i>% Expended</i>
State & Private Forestry	-	34,000	34,000	\$0	100%
<b>Subtotal – LWC, FH, S&amp;PF Funds</b>		<b>\$71,000</b>	<b>\$73,200</b>	<b>-\$2,200</b>	<b>103%</b>
K-V Regular	\$1,348,000	\$521,800	\$229,200	\$292,600	44%
K-V Special (KV2)	\$11,000	\$82,700	\$99,600	-\$16,900	120%
Reforestation Trust	\$9,000	\$16,000	\$10,200	\$5,800	64%
<b>Subtotal – Trust Funds</b>		<b>\$620,500</b>	<b>\$339,000</b>	<b>\$281,500</b>	<b>55%</b>
Recreation Enhancement Act	\$400,000	\$234,900	\$146,300	\$88,600	62%
SRS	\$266,000	\$65,700	\$68,200	-\$2,500	104%
Reforestation	-	\$16,000	\$10,200	\$5,800	64%
Salvage Sale Funds	\$80,000	54,100	\$37,900	\$16,200	70%
<b>Subtotal – Trust Funds</b>		<b>\$370,700</b>	<b>\$262,600</b>	<b>\$108,100</b>	<b>71%</b>
<b>Total</b>		<b>15,667,000</b>	<b>15,201,800</b>		<b>97%</b>

Source: WorkPlan, Report ID Trk2a, Resource Tracking Summary by Work Code, 03/22/2010.

## Effects of Forest Management on Land, Resources, and Communities Adjacent to or Near the National Forests

*What are the effects of forest management being planned on land, resources, and communities adjacent to or near the Huron-Manistee National Forests?*

The federal government makes payments to states to cover some of the cost of local government services on tax-exempt National Forest System lands and, subsequently, states pass those payments on to the counties in which National Forests are located.

Payments from Federal Lands can represent a significant portion of county budgets. This report shows the payments that county governments receive from federal sources, including Payments in Lieu of Taxes (PILT), the 25 Percent Fund, and the Secure Rural Schools and Community Self-Determination Act (SRS).

Table 6 shows the breakdown of 25 Percent Funds and SRS (estimated), and PILT payments for FY 2014.

**Table 6 Payments to Counties, FY 2014.**

County	Acres	25% Fund	SRS	Acres - PILT	PILT
Alcona	113,716	\$115,487	\$0.00	51,520	\$101,699
Crawford	38,105	\$0.00	\$64,405	32,801	\$60,804
Iosco	114,539	\$115,335	\$0.00	60,624	\$125,344
Lake	111,937	\$52,330	\$0.00	74,114	\$174,566
Manistee	87,361	\$0.00	\$131,629	59,413	\$116,357
Mason	60,580	\$28,266	\$0.00	45,221	\$107,664
Mecosta	3,445	\$0.00	\$5,797	1,621	\$2,586
Montcalm	1,775	\$0.00	\$3,766	1,773	\$3,530
Muskegon	12,434	\$5,833	\$0.00	11,656	\$28,206
Newaygo	111,593	\$0.00	\$182,882	67,786	\$123,167
Oceana	53,206	\$24,835	\$0.00	32,916	\$77,026
Ogemaw	20,105	\$0.00	\$28,707	5,913	\$2,127
Oscoda	153,599	\$0.00	\$246,969	76,160	\$115,763
Wexford	96,456	\$0.00	\$141,772	55,946	\$103,825
<b>TOTAL</b>	<b>978,851</b>	<b>\$342,086</b>	<b>\$805,927</b>	<b>577,464</b>	<b>\$1,142,664</b>

Source: W.S. Department of Interior, *Payments in Lieu of Taxes (PILT) County Payments and Acres*;  
Website <http://www.doi.gov/pilt/county-payments.cfm>  
USFS, *Draft Payment Detail Report PNF, All Services Receipts*  
(ASR-10-02) – 25% Fund and SRS <http://www.fs.usda.gov/main/pts/securepayments/projectedpayments>

## Lands are Adequately Stocked

*Are harvested lands adequately restocked after five years?*

National Forest Management Act regulations require cutover lands to be adequately restocked five years following final harvest. This regulation applies where the objectives, expressed in the 2006 Forest Plan, indicate the need to reforest areas that have been cut-over or otherwise denuded or deforested. This monitoring item measures to what extent the National Forests' are sustainably growing trees following harvest treatments that remove mature trees. Restocking occurs naturally in most aspen, oak or other hardwood forest types and by planting or seeding in the pine and oak types, or a combination of these methods. Stands with stocking below the desired density prescribed for the stand are planted to ensure adequate regeneration within five years following the final harvest.

### Monitoring Methods

Stocking surveys measure the amount of tree regeneration between the first and fifth growing seasons after a regeneration harvest is completed; survival surveys measure seedling survival during the first and third growing seasons following planting. Stands meeting or exceeding the minimum number, distribution, and size of desired stems per acre are considered successfully regenerated (but usually not before the third growing season). Surveys are performed using the protocols established in agency manuals and handbooks.

Stocking surveys were conducted on 3,542 acres and survival surveys on 2,218 acres during FY 2014 (see Table 7 below). Areas that do not have adequate stocking by the third year will be re-examined and a determination made as to what type of additional treatment is necessary to reforest. (Source: FACTS Query Activity Data View, Web Report: Activity Code 4341, Stocking Surveys).

**Table 7 Acres of Land surveyed for Stocking.**

Type of Regeneration Survey	2014
4341 – Stocking Surveys, Natural Regeneration	3,542
4382 – Survival Surveys, Planted Seedlings	2,218
<i>Total</i>	<i>5,760</i>

Source: FACTS Query Activity Data View, Web Report: Completed Activities 4341, 4342 (stocking or plantation survival surveys, First and Third year surveys) FY 2014.

## Monitoring Results and Conclusions

In FY 2014, 1,878 acres were certified as satisfactorily stocked. Table 8 displays the types of certifications and the amount completed in each category.

**Table 8 Acres of Land Certified as Satisfactorily Stocked 2014.**

<b>Certifications by Type of Regeneration</b>	<b>2014</b>
<b>4381 – Natural Regeneration with Site Preparation</b>	539
<b>4382 – Natural Regeneration without Site Prep</b>	105
<b>4383 – Planted Areas</b>	1,234
<b>4384 – Seeded Areas</b>	0
<b>Total</b>	<b>1,878</b>

Source: FACT ACTV 160 VW from FACTS database for activities 4482-4484 for FY 2014.

Table 9 shows the acres of harvested lands existing in FY2014 that are progressing toward certification. They will be certified in fiscal years 2015 to 2019.

**Table 9 Acres of Land Progressing Towards Satisfactorily Stocked in 2014**

<b>Type of Regeneration</b>	<b>2015-2019</b>
<b>Natural Regeneration with Site Preparation</b>	2,628
<b>Natural Regeneration without Site Preparation</b>	524
<b>Planted Areas</b>	4,824
<b>Seeded Areas</b>	0
<b>Total</b>	<b>7,977</b>

Source: FACTS Query Activity Data View, Web Report: Planned Activities 4381, 4382, 4383, 4384 (certification of natural regeneration, planted, or seeded areas) FY's 2015 – 2019.

Table 10 shows the amount of qualifying cutover lands (regeneration harvests: clearcuts, removal, and selection cuts ) during FY2011, and certification of restocking for these same locations during the period 2014. This three year period represents the minimum time period in which cutover lands harvested between 2011 could be certified as restocked by 2014. The percentage of satisfactorily stocked stands during this period demonstrates that current management practices are successful at initiating restocking of cutover lands.

**Table 10 Acres of Regeneration Harvest by Method FY 2011 and Certification of Reforestation FY 2014.**

<b>Fiscal Year Harvest</b>	<b>Regen Harvest, Clearcut</b>	<b>Regen Harvest, Removal</b>	<b>Regen Harvest Selection</b>	<b>Total Regen Harvest</b>	<b>Certified Acres Of Cut</b>	<b>% Certified as Satisfactorily Stocked</b>	<b>Fiscal Year Certified</b>
<b>2011</b>	1,020	97	12	1,215	1,878	100	2014

*Source: FACTS Query Activity Data View, Web Report: Completed Cut Activities 4100 (all) for FY 2014. Certified acres are from Table 10 for 4381, 4382, and 4383.*

The Forests’ restocking and certification of cut-over land accomplishments are consistent with the National Forest Management Act. In addition, the 2006 Forest Plan’s Standards and Guidelines provide adequate direction to identify those site-specific, project-level decisions that effectively implement Management Area Direction.

Results are consistent with the assumptions in the 2006 FEIS regarding long-term sustained yield and non-declining yield constraints; forest regrowth is consistent with yield tables used to develop Spectrum model inputs.

### **Recommendations**

Project-level interdisciplinary teams should continue to fully incorporate the length of time and costs necessary to re-stock and certify cut-over lands in vegetation management decisions. The emerging trend in silvicultural practices, especially in regeneration harvesting, will result in a short term shift from young to older age vegetation classes, especially in aspen, long-lived conifers and low and high-site oaks. Monitoring methods are sufficient and no changes are recommended to current Forests’ procedures.



**Planted Trees**

## Soils

*Are the effects of forest management, including prescriptions, resulting in significant changes to productivity of the land?*

## Monitoring Methods

The 2006 Forest Plan provides several Guidelines to sustain soil productivity, which is defined as the potential to produce vegetation that depends on the interaction of physical, chemical, and climatic characteristics of sites where management activities occur. This monitoring item measures to what extent the National Forests' are sustaining the capacity of soils to produce a variety of flora impacted by vegetation treatments, wildfire and prescribed fires, and mineral extraction. In addition, sustainable Soil and Water Quality Practices on Forest Land, a Michigan Department of Natural Resources (MI-DNR) publication (2009) provides Best Management Practices (BMP) specific to timber harvesting and associated activities pertinent to this monitoring question.

In 2014 the Huron-Manistee National Forests were independently audited for implementation of BMPs for timber harvest by the Michigan Sustainable Forestry Initiative Implementation Committee (MI SIC). The BMPs were found to be implemented and effective.

## Monitoring Results: Commercial Timber Sales

The Long-term Soil Productivity Study of Aspen Ecosystems of the Northern Great Lakes Region (NRS-17) is used as a baseline to evaluate soil productivity on the Forests because: 1) one of the research sites is located on the Huron National Forest; and 2) the associated harvest scenarios are representative of the soil resources and commercial harvest methods commonly utilized on the HMNF. The 10-year results of this study suggest that soil productivity on three soils types examined (loamy sand, silt loam, and clay loam textures) will be retained without significant reductions in total woody or aspen biomass production if: 1) compaction is limited to that due to mechanical harvesting; and 2) either main bole or whole stem harvest of aspen forests is used.

Commercial timber sales on the Forests' restrict wood removal to main bole only or whole stem harvest. In addition, harvest operations are restricted to periods when rutting or excessive compaction are not likely to occur. The Forests' harvest inspection and reforestation personnel monitor and verify these, and similar standards, that are part of forest vegetation prescriptions.

In 2014, the HMNF were independently audited by the Michigan Sustainable Forestry Initiative Implementation Committee (MI SIC) to determine if BMPs were being implemented effectively to protect soil and water resources. The MI SIC has been a catalyst in promoting Michigan statewide BMP monitoring of soil integrity and water quality in relation to forestry operations. This ambitious effort began in 2011 when the MI SIC organized and implemented a statewide SFI Program Participant BMP audit and report. This was the first public BMP monitoring process in Michigan implemented since 1997. The 2014 audit team was comprised of members from Forest industry, MI-DNR forestry and fisheries departments, Michigan Department of Environmental Quality (MDEQ), and the USFS, Huron-Manistee. The results of this monitoring effort demonstrated that there were no deficiencies in BMP implementation (MI SIC, 2014).

### **Monitoring Results: Wildfire and Prescribed Fire**

These events affect soil productivity by killing vegetation and reducing surface soil organic matter. Depending on the severity of the fire, mineral soil may become exposed and subject to other adverse effects such as erosion and decline of soil organisms. Direct ground disturbance occurs by use of mechanical equipment to construct temporary control lines, which require rehabilitation to maintain soil productivity.

The severity levels of small wild fires are typically low to moderate, as these events usually occur early in the growing season when soil and surface organic layer moisture levels minimize duff consumption and prevent mineral soil exposure. Evaluations of wild fire effects are conducted individually when indicators of erosion or delayed vegetation re-growth occur. The effects of large wildfires are assessed using the protocols of Burned Area Emergency Response (BAER) teams; the BAER team includes a soils specialist report. There were no BAER assignments during 2014.

Prescribed fires on the Forests' are conducted using individual prescribed burn plans, which include monitoring of the effects on the soils and rehabilitation of constructed control lines. The severity level of prescribed fires are typically low to moderate, as this level is sufficient to provide for attaining the objectives and minimizing the risk of fire spread beyond the control lines. In all prescribed fire areas, instances of erosion were small and isolated and soil exposure met the goals of the fire, e.g. seed bed requirements for direct seeding of grasses and forbs.

Evaluations of prescribed and wild fire effects on the soil resource include an assessment of the amount of exposed mineral soil and rehabilitation of constructed control lines. Usually, there is little impact to soil productivity, primarily because fire severity does not delay natural or prescribed re-vegetation of burned areas, and constructed control lines are rehabilitated, and seeded when necessary. Overall, implementation of Forest Plan guidelines and BMPs appeared adequate across all fire areas monitored. Prescribed and wild fire activities appeared to have little impact on soil productivity as a result.

## **Monitoring Results: Mineral Extraction**

Monitoring of mineral extraction on the Forests' included five sites for oil/gas exploration and development sites; common variety minerals, such as sand and gravel, have not been produced over the period 2014-2015. Stipulations for surface occupancy of oil and gas leases include construction and reclamation conditions to minimize impacts to soil resources. These stipulations are intended to ensure the conservation of topsoil while the site is under construction, as well as measures that promote re-vegetation of disturbed areas when the site is in either the production or abandonment stage. Evaluation of these five sites shows satisfactory compliance with these soil conservation stipulations. Overall, implementation of Forest Plan guidelines and BMPs appeared adequate for all oil/gas exploration and development sites. Mineral extraction monitoring activities appear to have had a positive impact on soil productivity.

## **Monitoring Results and Evaluation: Soil Productivity**

The Forests' FEIS discussed the effects of biomass removals and soil disturbance as the two most important elements influencing soil productivity, especially regarding cumulative effects. The findings presented in the FEIS concerning biomass removals suggested a possible short-term loss in soil productivity but that, under all Alternatives, long-term site productivity would be maintained in accordance with federal regulations and 2006 Forest Plan Standards and Guidelines.

Sites most likely to suffer impaired soil productivity are soils naturally low in nutrients (e.g. Grayling Sands) where rotation length is less than 50 years and above ground whole tree harvesting occurs. Loss of organic matter through burning may also reduce site productivity, but is not significant unless there is little or no recovery of vegetation between burn events.

Soil disturbances discussed in the FEIS are those related to commercial harvests (compaction), reforestation (scarification, burning), and road/trail uses (erosion, stream crossings). The findings presented in the FEIS concerning this can be summarized as having minimal cumulative increase in soil disturbance and a negligible effect on soil productivity; however, under all Alternatives, long-term site productivity would be maintained in accordance with federal regulations and 2006 Forest Plan Standards and Guidelines.

Atmospheric deposition of nitrogen and sulfur dioxides, and regional ozone concentrations, are known to have impacts on soil productivity and vegetation growth. As these influences are not specifically addressed in the 2006 Forest Plan and FEIS, there is an unknown degree of risk and uncertainty surrounding how these affect long-term soil productivity. The MDEQ and the USFS Forest Inventory and Analysis perform some monitoring of these influences, but data collection is not usually sufficient to assess Forest-wide impacts.

## **Recommendations**

Established protocols for soil surface disturbance monitoring, as described in the Soil-Disturbance Field Guide (US Forest Service, 2009), should be implemented by independent experts to quantitatively assess soil surface disturbance associated with Forest Management activities. Adaptive management should be applied based on findings (if necessary).

Established national protocols for monitoring BMP implementation, as described in National Best Management Practices for Water Quality Management on National Forest System Lands (US Forest Service, 2012), should be implemented by independent experts to quantitatively assess BMP implementation and effectiveness associated with Forest Management activities. Adaptive management should be applied based on findings (if necessary).

If funding is available, it is recommended that maintenance of site productivity on poor quality soils where whole tree timber harvest rotation length is less than 50 years be quantitatively evaluated by the scientific community.

## Population Trends of Aquatic Management Indicator Species

### *(MIS)- Brook Trout and Mottled Sculpin*

What are the population trends of management indicator species? What are the relationships of the population trends to habitat changes? Are minimum viable populations of appropriate native and desirable non-native species being maintained within the planning area?

### Monitoring Methods

There a number of approaches being used for monitoring of management indicator species (MIS): (1) representative streams within watersheds that are predominately Huron-Manistee National Forests (HMNFs) ownership, (2) Michigan DNR (MI-DNR)-Fisheries Division Stream Status and Trends Program (SSTP; Wills et al. 2008) and (3) sites that are part of Tribal or other partner studies. A qualitative determination of trend was made where two or more years were sampled in a stream system.

### Monitoring Results and Evaluation

Arquilla Creek, Hinton Creek and Pine Creek were sampled in 2014. Boswell Creek was sampled to determine fish species present. A short description of streams sampled, results and trend (if any) is provided for each species below. It should be noted that two species of sculpin are known to occur in streams of the HMNF, mottled sculpin (*Cottus bairdii*) and slimy sculpin (*C. cognatus*). Field identification to species demands the ability to count pectoral fin rays; hence, traditional sampling has lumped these two species simply as sculpin. In the Manistee River basin, recent tribal and university studies, in addition to molecular testing of tissue samples have determined that mottled sculpin occur exclusively downstream of Tippy Dam, and that sculpin sampled upstream of this barrier are slimy sculpin. Further testing is needed to determine spatial distributions of these two species across the HMNF.

**Table 11. Streams on the Huron-Manistee National Forests that have been sampled and are being used for MIS monitoring.**

Stream	Location		
	<i>National Forest</i>	<i>Watershed, County</i>	<i>Type of Site</i>
<b>Arquilla Creek</b>	Manistee	Manistee River, Manistee/Wexford	USFS, LRBOI, MTU
<b>Bigelow Creek</b>	Manistee	Muskegon River, Newaygo	SSTP Long-Term, USFS
<b>Browns Creek</b>	Manistee	Pentwater River, Oceana	USFS
<b>Cedar Creek</b>	Manistee	Muskegon River, Oceana	USFS
<b>Eddington Creek</b>	Manistee	Manistee River, Manistee	USFS
<b>Fairchild Creek</b>	Manistee	Pine River, Wexford	USFS
<b>Hinton Creek</b>	Manistee	Manistee River, Manistee/Wexford	USFS, LRBOI, UND
<b>Martin Creek</b>	Manistee	S Branch White River, Oceana	SSTP General Survey
<b>Mena Creek</b>	Manistee	White River, Oceana	USFS
<b>Peterson Creek</b>	Manistee	Manistee River, Manistee/Wexford	USFS, LRBOI, MTU
<b>Pine Creek</b>	Manistee	Manistee River, Manistee	USFS, LRBOI, UND
<b>Poplar Creek</b>	Manistee	Pine River, Wexford	USFS
<b>Sickle Creek</b>	Manistee	Manistee River, Manistee	LRBOI
<b>Slagle Creek</b>	Manistee	Manistee River, Manistee	LRBOI
<b>Sweetwater Creek</b>	Manistee	Pere Marquette River, Lake	USFS
<b>Syers Creek</b>	Manistee	Little Manistee River, Lake	USFS
<b>Woodpecker Crk</b>	Manistee	Manistee River, Manistee	LRBOI

Little River Band of Ottawa Indians (LRBOI), Michigan Technological University (MTU), MI-DNR Stream Status and Trends Program (SSTP), University of Notre Dame (UND), U.S. Forest Service (USFS).

**Arquilla Creek**

Arquilla Creek was sampled by USFS staff in 1997 near its confluence with the Manistee River and was found to support natural reproduction of brook trout (up to 241 mm) and brown trout. Slimy sculpin were noted as present but not counted. In 2012, LRBOI staff and Michigan Technological University (MTU) students sampled Arquilla Creek at three locations as part of a collaborative study on tributaries of the Manistee River between Hodenpyl Dam and Tippy Dam. In 2014, USFS staff again performed electrofishing surveys to collect tissue samples for effectiveness monitoring of culvert replacement at Coates Highway. Surveys upstream and downstream of this culvert detected natural reproduction of brook trout (up to 221 mm), slimy sculpin (up to 109 mm), and brown trout. Brook trout density was greater upstream of the barrier culvert than downstream, and this pattern was the opposite for brown trout.

**Hinton and Pine Creeks**

These creeks were sampled by University of Notre Dame staff and students in 2014 as part of effectiveness monitoring of the replacement of barrier culverts with stream simulation structures.

**Boswell Creek**

Boswell Creek was sampled by USFS staff in 2014 in a 50 meter reach immediately downstream of the Brewer Road barrier culvert to confirm fish species present and found to support a naturally reproducing population of brook trout up to 221 mm. No sculpin were found in this sampling.

**Table 12. HMNF Brook Trout Populations**

Stream name	Years sampled	Brook Trout Trend	Sculpin Trend
Arquilla Creek +	1997, 2012, 2014	Stable *	Stable
Bigelow Creek	2003, 2013	Unknown	Unknown
Browns Creek	2011, 2012, 2013	Stable	Stable
Cedar Creek (Muskegon)	1925, 1975, 1985, 2003, 2008	Stable	Stable
Cooper Creek	1995	Unknown	Unknown
Eddington Creek +	2005, 2013	Stable	Stable
Fairchild Creek	1980, '81, '98, 2007, '08, '09, '10	Stable	Stable
Held Creek	2006		Unknown
Hinton Creek +	1980, '81, '82, '95, 2011, '12, '14		Decline
Martin Creek	Unknown	Unknown	Unknown

<b>Mena Creek</b>	1976, 2002	Stable	Unknown
<b>Peterson Creek</b>	1995, 2002, '03, '04, '05, '07, '10, '11, '13	Stable *	Stable
<b>Pine Creek</b>	1995, 2007, '08, '09, '11, '12, '14	Stable	Stable
<b>Poplar Creek</b>	1980, '81, '82, 2007, '08, '10, '12	Decline	Stable
<b>Sickle Creek</b>	2002	Unknown	Unknown
<b>Slagle Creek +</b>	1995	Unknown	Unknown
<b>Smail Creek +</b>	1997	Unknown	
<b>Sweetwater Creek</b>	1989, 2010	Stable	Stable
<b>Woodpecker Creek +</b>	2011	Unknown	Unknown

\* Possible spatial decline

+ Confirmed as slimy sculpin (*Cottus cognatus*), or based on geographic location.

## Recommendations

Continued population monitoring would be helpful to better understanding population trends into the future.

Existing stream fish population data from the HMNFs should be compiled into an organized data set for comparative baseline purposes. In addition, data collected by other agencies, universities, and the Tribes should continue to be incorporated into MIS monitoring. The MI-DNR SSTEP program should be fully utilized for monitoring purposes, both in terms of MIS species monitoring and a stream habitat perspective. Other data collected by the MI-DNR from streams on the HMNFs such as Fisheries Surveys or Status of the Fishery Reports should be incorporated into the MIS monitoring program wherever possible (e.g., Peterson Creek Status of the Fishery Report; Tonello 2012).

It is recommended that additional streams from the HMNF be incorporated into long-term MIS monitoring. The following are streams that were previously identified as suitable candidates for this purpose are shown in Table 13.

**Table 13. Streams on the Huron National Forest that are Suitable Brook Trout and Mottled Sculpin Management Indicator Species (MIS) Locations.**

Stream	Location	
	Watershed	County
Douglas Creek	Au Sable River	Crawford
Blockhouse Creek	Au Sable River	Oscoda
Ninemile Creek	Au Sable River	Oscoda
Hoppy Creek	Au Sable River	Alcona/Iosco
McDonald Creek	Au Sable River	Alcona
Roy Creek	Au Sable River	Alcona
Loud Creek	Au Sable River (PRVEL)	Alcona
Buck Creek	Tawas River	Iosco
Gordon Creek	Tawas River	Iosco
Loud Creek	Tawas River	Iosco
Indian Creek	Tawas River	Iosco
Vaughn Creek	Au Gres River	Iosco

## Population Trends of Terrestrial Management Indicator Species

### *(MIS) Ruffed Grouse*

*What are the population trends of management indicator species? What are the relationships of the population trends to habitat changes? Are minimum viable populations of appropriate native and desirable non-native species being maintained within the planning area?*

The 2006 Forest Plan identified four terrestrial wildlife species to serve as Management Indicator Species (MIS), including bald eagle, ruffed grouse, Kirtland's warbler and Karner blue butterfly. These species were selected because they represent particular environmental conditions for a variety of species needing similar habitat conditions. Monitoring the quantity and quality of habitat and population trends for Management Indicator Species should help assess how well we are maintaining habitat and viability of all species.

## Monitoring Methods

For MIS, populations are estimated from drumming surveys, aerial surveys, track surveys, breeding bird surveys, nest counts, mark-recapture techniques or other survey methods. The Forests have collected monitoring data for a variety of habitat conditions and population trends for a few MIS. However, the Forests have inadequate staff or funding to effectively track or monitor all MIS, or relate their status to forest management.

## Monitoring Results and Evaluation

This section will address monitoring of ruffed grouse and their habitat. Karner blue butterfly and Kirtland's warbler monitoring results are reported under Endangered or Threatened species. Bald eagle monitoring results are reported under Regional Forester Sensitive Species. In addition, we have worked with the MI-DNR, the Little River Band of Ottawa Indians, universities and other groups to monitor and evaluate American marten, American woodcock, black bear, eastern pipistrelle, northern goshawk, and red-shouldered hawk, eastern box turtle, wood turtle and sensitive plant species.

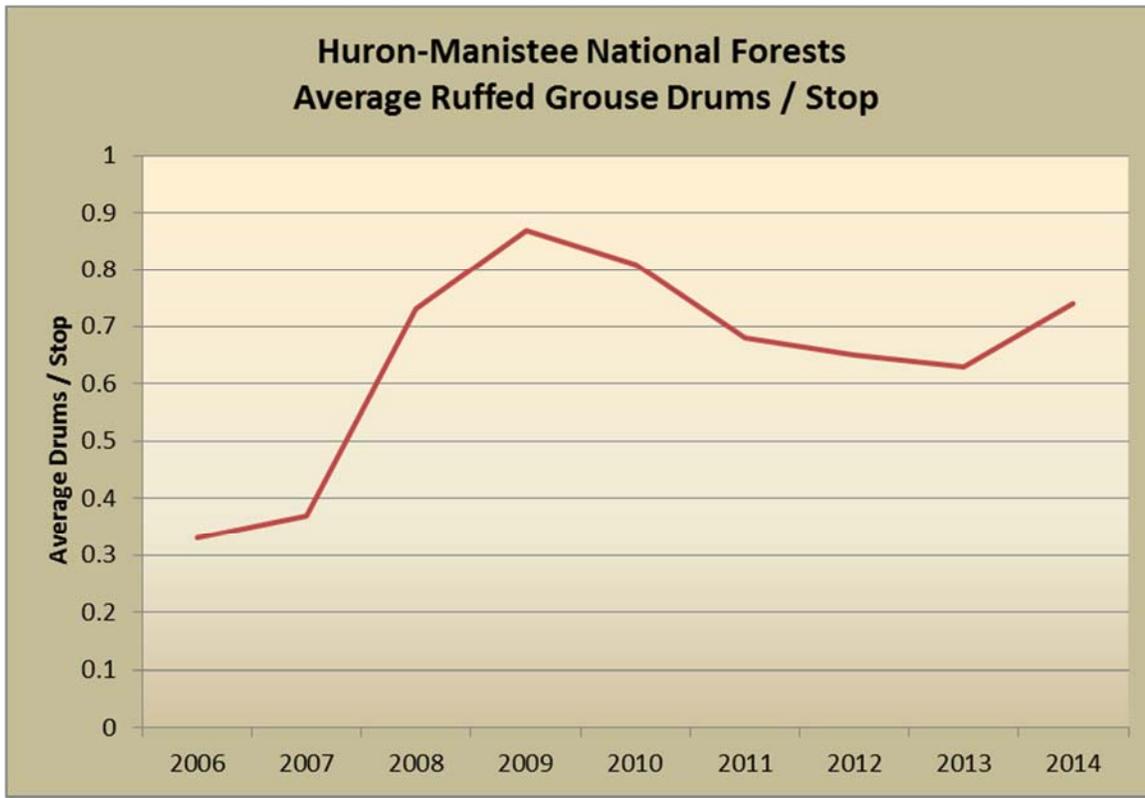
Ruffed grouse are monitored by spring drumming count surveys, by Forest staff, volunteers, and Tribal participants. Each route of 10 to 20 stops is run three times between mid-April and late May. The surveyor listens for drumming grouse at each stop, and records the number of drums heard. "Drums per stop" is the index of grouse drumming activity compared from route-to-route and year-to-year. HMNFs staff and volunteers monitor grouse drumming on nine routes (Table 14).

In 2014, grouse drumming per stop averaged 0.74, which is up from 2013.

**Table 7 Ruffed Grouse Drumming Count Results, 2014.**

Route	Huron NF				Manistee NF					HMNF
	<i>Maltby Hills</i>	<i>Randall Meridian</i>	<i>Buhl</i>	<i>N. Black River</i>	<i>Grant Twp</i>	<i>Kellog Tower</i>	<i>Marilla</i>	<i>Pine River</i>	<i>Wagon Wheel</i>	<i>Overall</i>
<b>Drums Heard</b>	25	7	97	55	19	13	65	42	11	334
<b>Stops</b>	59	54	45	60	40	51	60	51	30	450
<b>Drums / Stop</b>	0.42	0.13	2.16	0.92	0.48	0.25	1.08	0.82	0.37	0.74

Figure 1 Average Ruffed Grouse Drums per Stop.

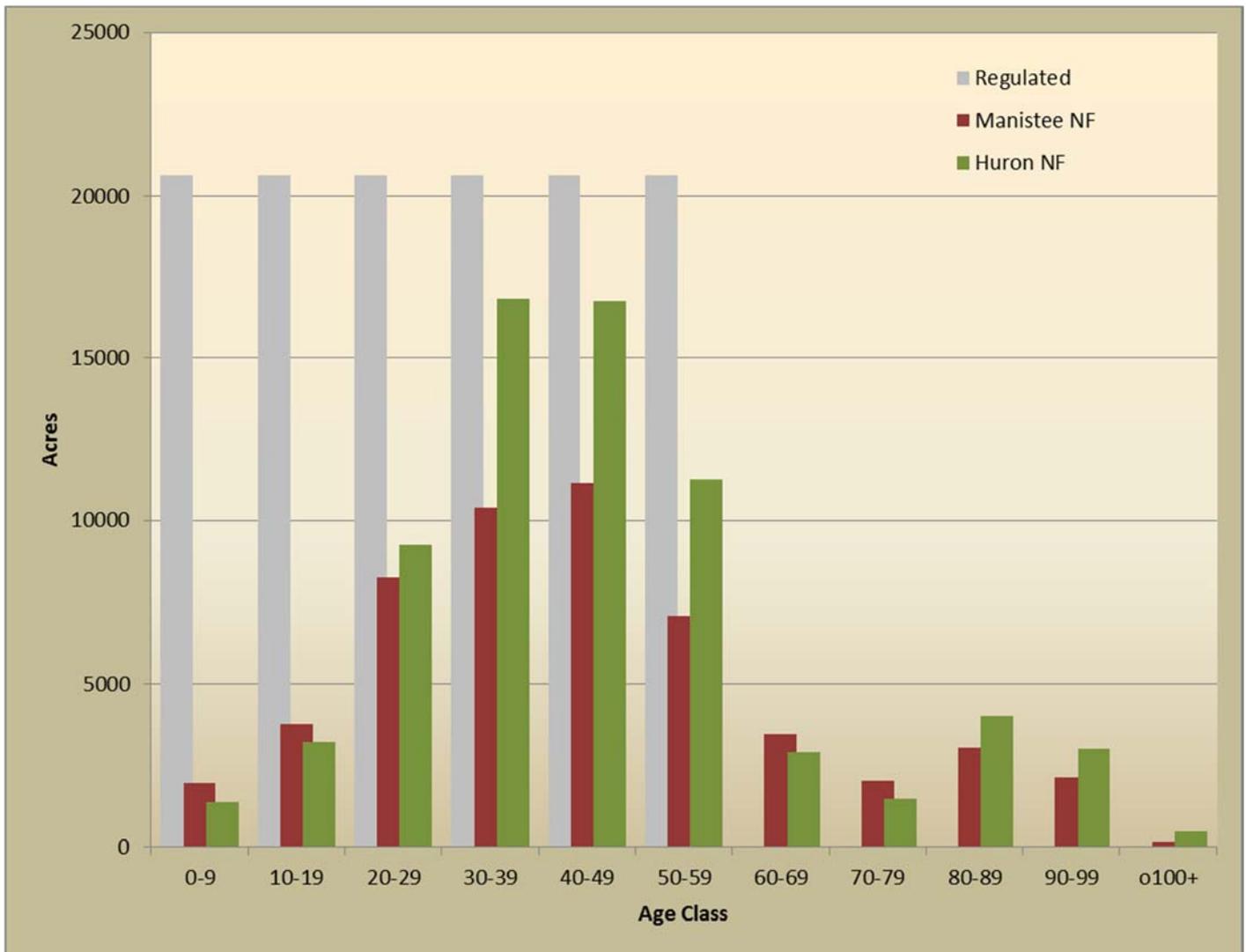


Variations in numbers of grouse drums heard, between areas and years, may be due to the well-known “ten-year cycle” in ruffed grouse numbers. Figure 1 Average Ruffed Grouse Drums per Stop. Figure illustrates the average number of ruffed grouse drums per stop for the period 2006 to 2014. The graph suggests that the ruffed grouse population may be trending upward from the low in 2006 toward the high phase of the ten-year cycle. A total of 334 ruffed grouse drums were heard on all routes in 2014. This data suggests that the ruffed grouse population continues to be viable and healthy on the HMNFs.

Habitat and population objectives in the Forest Plan are to “maintain a minimum of 750 breeding pairs on the Huron National Forest and 1,000 breeding pairs on the Manistee National Forest. Two and one-half acres of zero to nine year old aspen adjacent to mature aspen will be maintained per breeding pair for a total of 1,875 acres on the Huron National Forest and 2,500 acres on the Manistee National Forest,” or a total of 4,375 for the HMNFs.

The age class distribution of aspen on the Huron and Manistee National Forests is displayed in **Error! Not a valid bookmark self-reference.** Current vegetation data indicates that 3,309 acres exist in the 0-9 year old age class for aspen on all lands suitable for timber production on the HMNFs. This is 76% of the minimum habitat objective for ruffed grouse, and is up from the 56% reported for 2013.

**Figure 2 Current Age Class Distribution of Aspen on the HMNFs (Lands Suited for Timber Production, LSC 500).**



Many opportunities exist to increase management for early-successional habitats to benefit ruffed grouse, woodcock, golden-winged warblers and other associated species. Figure 2 displays the need exists to better regulate the age class distribution of aspen on the HMNFs, and the recommendations below describe actions that could improve aspen management.

### Recommendations

Increase management for early-successional habitats across the HMNFs to benefit ruffed grouse, woodcock, golden-winged warblers and other associated species.

Develop aspen management objectives for each district based on Forest Plan objectives and how the aspen resource is distributed across the HMNFs.

Emphasize regulated harvest of aspen to maintain a more even distribution of habitat in age classes 0-59, particularly in Grouse Management Areas.

Identify opportunities for aspen management outside of Grouse Management Areas. Identify “aspen management areas” to allow for age-class regulation and better identify aspen management objectives (acres per decade).

Continue to monitor ruffed grouse by conducting drumming surveys on the routes established on each district.

## CHAPTER 2

### Objectives, goals, standards & guidelines, & desired future conditions monitoring



Electro-shocking Fish

## Implementation of Standards and Guidelines – Fisheries Management

*Are Standards and Guidelines, Goals, or Objectives being met?*

### Forestwide Standard

Forest management activities will not degrade long-term stream water quality below State standards.

The MDEQ Surface Water Assessment Section develops standards for the protection of water quality and monitors water, sediments and aquatic life to ensure: 1) the viability of our aquatic ecosystems; 2) that water quality standards are being met; and 3) that surface waters meet designated uses.

The MDEQ conducts surface water assessments on a statewide basis (by watershed) on a five-year schedule using the Great Lakes Environmental Assessment “Procedure 51” (Michigan Department of Environmental Quality Water Bureau, 2005). The focus is on water quality (habitat) and macro-invertebrate populations. In 2014, Procedure 51 assessments were done on the Manistee River Watershed (MDEQ Monitoring Year 1 Watersheds). This watershed overlaps lands managed by the HMNF. At the time of this report, results from this assessment were not yet available. Previous surface water assessments in the Manistee River Watershed indicated habitat ratings of good to excellent at all stations within the HMNF (Michigan Department of Natural Resources and Environment, 2010).

### Monitoring Results and Evaluation

Results of surface water assessment are published on the MDEQ Michigan Surface Water Information Management System (MiSWIM; <http://www.mcgi.state.mi.us/miswims/>)

It is recommended that the USFS continue to use the MDEQ surface water assessments for monitoring of water quality.

## Forestwide Goal – Manage Oligotrophic Lakes

Manage oligotrophic<sup>5</sup> lakes with 100 percent of National Forest System ownership so as not to change the trophic status; allow no more than a 10-percent decline in trophic status in other oligotrophic lakes and lakes with a mesotrophic status; lakes with a eutrophic status will maintain fishable and swimmable waters.

### Monitoring Methods

#### Lakes

There is not a well-documented cause and effect relationship from USFS land management actions and changes in fish populations in lakes on the National Forests. Thus, a Management Indicator Habitat (MIH) approach is being employed for warm water lakes (the vast majority of the lakes on the HMNFs) to monitor the health of these lentic ecosystems.

Warm water lakes MIH – the trophic status of the lake will be maintained. It is proposed to use the trophic status guidelines listed under 2500 Watershed – Water Quality to serve as an indicator for maintaining the habitat quality for warm water mesotrophic and eutrophic lakes.

#### These are:

- Mesotrophic lakes - No more than a 10 % decline in the Carlson trophic state index will be permitted for all lakes with National Forest ownership.
- Eutrophic lakes with National Forest ownership will meet “fishable and swimmable” criteria contained in the Clean Water Act.

Lake water quality is a continuum progressing from very good to very poor conditions. A more precise method of describing the productivity of a lake is to use a numerical index which can be calculated directly from water quality data. A variety of indexes are available with Carlson’s (1977) *Trophic State Index*, or TSI, being the most widely used.

As with streams, representative lakes are being sampled. Ideally, these lakes have 100 percent National Forest ownership of the shoreline and be located in watersheds with predominantly National Forest System ownership (again, to reduce the variation in sources that could contribute to any changes in the trophic status). The monitoring of these lakes is part of an ongoing statewide lake water quality assessment (LWQA) program being jointly conducted by the MDEQ and the USGS (<http://mi.water.usgs.gov/splan1/sp00301/cmiinland.php>).

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<sup>5</sup> Oligotrophic – A water body that is lacking in plant nutrients and having a large amount of dissolved oxygen throughout.

Table 15 is a list of the lakes on the HMNFs that are incorporated into this overall statewide monitoring program.

**Table 85 Lakes on the HMNFs used for Management Indicator Habitat through the State-wide USGS-MI-DNR Lake Water Quality Assessment Program. The Data Represents the "Baseline" for Trophic Status for Forest Plan Monitoring.**

Lake	National Forest	Watershed	County	Year	Carlson's TI Average <sup>1</sup>	Trophic Status <sup>2</sup>
Island Lake	Huron	Au Sable	Oscoda	2004	36.406	Oligotrophic
Loon Lake	Huron	Au Sable	Oscoda	2004	34.931	Oligotrophic
Little Au Sable Lake	Huron	Au Sable	Ogemaw	2004	37.483	Oligotrophic
Sand Lake	Huron	Au Gres-Rifle	Iosco	2001, 2004	45.687	Mesotrophic
Mack Lake	Huron	Au Sable	Oscoda	2003	42.163	Mesotrophic
Sprinkler Lake	Huron	Au Sable	Alcona	2004	35.699	Oligotrophic
Wagner Lake	Huron	Au Sable	Oscoda	2004	36.937	Oligotrophic
Jewell Lake	Huron	Au Sable	Alcona	2002, 2003	41.928	Mesotrophic
Amaung Lake	Manistee	Pere Marquette	Newaygo	2003	34.752	Oligotrophic
Benton Lake	Manistee	White	Newaygo	2003	40.889	Mesotrophic
Hoags Lake	Manistee	Pere Marquette	Mason	2003	36.263	Oligotrophic
Nichols Lake	Manistee	White	Newaygo	2003	43.814	Mesotrophic
Round Lake	Manistee	Muskegon River	Mecosta	2006	46.511	Mesotrophic
Twinwood Lake	Manistee	Muskegon	Newaygo	2003	45.041	Mesotrophic
Pine Lake	Manistee	Manistee	Manistee	2004	48.164	Mesotrophic
Sand Lake	Manistee	Manistee	Manistee	2004	32.622	Oligotrophic

<sup>1</sup>TI = Trophic Index, a measure of the nutrient level of lakes as developed by Carlson (1977).

<sup>2</sup> Trophic Index values < 40 = Oligotrophic, 40-50 = Mesotrophic, > 50 = Eutrophic (very productive) states

In addition to the joint MDEQ – USGS statewide lake water quality monitoring, the MDEQ also coordinates statewide citizen-based monitoring as part of their lake water quality assessment program. This program has been ongoing since late 1998 and reports are issued annually (<http://www.micorps.net/datareports.html>). Four lakes on the HMNFs that have some National Forest System ownership are part of this program and were reported on in the last HMNF Monitoring Report: Harper Lake, Bills Lakes 1 and 2, and Jewell Lake.

**Table 16. Cooperative Lakes Monitoring Program - Trophic Status of Lakes on HMNFs (MDEQ Annual Summary Reports).<sup>1</sup>**

Year	Harper Lake Lake Co.; Manistee NF	Bills Lake 1 Newaygo Co.; Manistee NF	Bills Lake 2 Newaygo Co.; Manistee NF	Jewell Alcona Co.; Huron NF
1998	39			
1999	41			
2000	40			
2001	38	45	46	
2002	37	41	40	44
2003	40	43	45	44
2004		43	41	47
2005	37	43	46	45
2006	35	42	39	46
2007	35	46	41	
2008	37	34	--	46
2009	36	40	--	--
2014	--	38	--	--
<b>2006- 2009 Average</b>	<b>35.75</b>	<b>40.5</b>	<b>40</b>	<b>46</b>

*ITI = Trophic Index, a measure of the nutrient level of lakes as developed by Carlson (1977).*

## Evaluation and Conclusions

In 2014, only one lake previously reported on was again sampled; Bills Lake 1 in Newaygo (see Table 16). The trophic status of this lake, 38, was below the 2006-2009 average (Michigan Clean Water Corps 2014 - 1). No other lakes with high National Forest System land (NFS) shoreline were sampled in 2014 as part of the state-wide USGS-MDEQ lake water quality assessment. The trophic index of this lake has trended from mesotrophic to oligotrophic since first reported sampling in 2001. This is generally considered to be a positive indication of improved upland nutrient management (e.g. nitrogen and phosphorous from upland sources such as fertilizer).

Four additional lakes, not previously reported on, that have a very small portion of shoreline managed by the HMNF were reported on in 2014: Little Island Lake, Long Lake, Chain Lake (all in Iosco County) and Pleasant Lake in Wexford County (Michigan Clean Water Corps 2014 – 2 through 5). The trophic index of these lakes increased or decreased slightly compared to past sampling events but the trophic index did not change by 10% for any of them.

## Recommendations

The MDEQ statewide lakes water quality assessment program is adequate to monitor the trophic status of lakes on the National Forests and it is recommend continuing its use.

## Forestwide Guideline – Natural in-stream or Added Wood

*Natural in-stream or added wood shall be left undisturbed unless it constitutes a navigational hazard. If watercraft cannot go over, under or around wood, it constitutes a navigational hazard and may be cut only to the extent necessary for navigation.*

Historical records and photographs suggest that large wood in streams played an important role in the structure and function of aquatic ecosystems of the watersheds of the HMNFs. This wood plays an important role in channel morphology, being one of the channel-forming agents. It provides habitat diversity, cover for fish, habitat for invertebrates, reptiles and other components of the aquatic food chain. Wood also adds nutrients to the aquatic system and protects stream banks during high flow events. Current-day levels of large wood in aquatic ecosystems on the HMNFs are much lower than historic levels due to: (1) historic, wholesale removal to facilitate log transport (log drives); (2) cutting of the pre-Euro-American forest (removal of the source for future recruitment); (3) reduced levels of recruitment from second growth riparian forests; and (4) cutting to facilitate passage of recreational watercraft.

One of the challenges in river maintenance and riparian corridor management is how we look at large wood and logjams in our rivers. In the recent past, logjams were thought to be a significant problem and were completely removed from stream channels. As stated above, logjams help reduce erosion, provide habitat for fish and wildlife and are an important part of the natural processes of a river system. Now it is recommended to leave most logjams in place. Large wood management is the process of: 1) determining what to do about wood in the river (i.e. remove it, leave it in place, or move it to a different location); and 2) how best to do that work.

## Monitoring Methods

Monitoring is conducted by annual spring float trips with primary river users (liveries and commercial outfitter guides) to cooperatively remove large wood such that a balance among navigational clearing and aquatic habitat maintenance is achieved.

## Monitoring Results and Evaluation

Implementation of Forest Plan guidelines for large wood clearing in navigable streams has improved since the Forest Service and the primary river users (liveries and guides) began cooperatively clearing those log jams that are true navigation hazards in 2006.

## Recommendations

Continuation of this effort helps to mitigate the potential cumulative effects of long-term clearing.

## Fisheries Management

*What are the amounts, distribution, and types of available habitats? Are minimum viable populations of appropriate native and desirable non-native species being maintained within the planning area?*

### Forest-wide Goal – Wildlife and Fisheries Habitats and Plant Communities

Wildlife and fisheries habitats and plant communities shall be managed to maintain viable populations of existing native and desired non-native species.

### Monitoring Methods

Management of streams focused on improving habitat for resident and potomodromous coldwater species, including MIS brook trout and mottled sculpin, as well as the sensitive species found on the HMNFs (lake sturgeon, greater redhorse, channel darter and the black sandshell, slipershell, and creek heelsplitter mussels). Stream habitat work included streambank stabilization, instream cover structure construction and repair, improvement of road-stream crossings, and large wood enhancement. Partnerships continued to be the foundation of the implementation of our fisheries and watershed restoration programs during 2014.

Notable partnership projects within the major respective watersheds on the HMNFs over 2014-15 included:

- Great Lakes Restoration Initiative – replacement of culverts that were impeding aquatic organism passage (North Branch Au Sable River Watershed, White River Watershed, Pere Marquette Watershed, Manistee River Watershed).
- Brayton Creek Crossing at Cleveland Road- removal of two undersized perched culverts with a wooden bridge enabling fish passage and restoring flow and temperature to the creek. This project was performed with partnerships with Coca Cola, Oceana County and the National Forest Foundation ,
- Manistee River lake sturgeon restoration (Little River Band of Ottawa Indians)

### Evaluation and Conclusions

Implementation of Forest Plan objectives for fish habitat and watershed restoration is being met.

## Forest Plan Desired Future Condition – Stream Restoration

*Stream restoration of large wood to meet the desired future conditions (54 – 108 pieces per mile in large streams, 108 – 160 pieces per mile in smaller streams).*

## Monitoring Methods

Monitoring of large wood abundance in streams on the HMNFs was not conducted in 2014.

## Monitoring Results and Evaluation

Numerical counts of large wood abundance should be undertaken on representative streams on the National Forests to determine baseline conditions in these streams as part of large wood restoration proposals. Since the HMNFs have not been able to implement this monitoring protocol due to budgetary restrictions; other methods for large wood abundance assessment, such as LiDAR, should be evaluated during the subsequent monitoring period.



Picture - American Pine Marten

## Implementation of Standards and Guidelines – Regional Forester Sensitive Species (RFSS)

*Are management Standards and Guidelines being implemented for RFSS or their habitats?*

The HMNFs implement vegetation management projects and structural habitat improvements that benefit Regional Forester Sensitive Species (RFSS). The HMNFs also prescribe and implement site-specific protection measures for RFSS when they are known or expected to occur within project areas.

Standards and Guidelines for Regional Forester’s Sensitive Species can be found on pages II-29 to II-31 of the Forest Plan.

### Common Loon

Common loons have historically bred on a number of lakes on the HMNFs. Table displays the water bodies where loons were observed in 2014.

Table 9 Lakes where common loons have been observed.

Waterbody	District	# Pairs	Young Fledged
Nichols Lake	Baldwin-White Cloud	UNK	UNK
Brooks Lake	Baldwin-White Cloud	UNK	UNK
Pettit Lake	Baldwin-White Cloud	UNK	UNK
Gooseneck Lake	Baldwin-White Cloud	1	UNK

<b>Waterbody</b>	<b>District</b>	<b># Pairs</b>	<b>Young Fledged</b>
<b>Olga Lake</b>	Cadillac-Manistee	1	0
<b>Gun Lake</b>	Cadillac-Manistee	1	1
<b>Wakeley Lake</b>	Mio	1	2
<b>Island Lake</b>	Mio	1	UNK
<b>Loon Lake</b>	Mio	0	0
<b>O'Brien Lake</b>	Mio	1	UNK
<b>Sprinkler Lake</b>	Huron Shores	1	1
<b>Cooke Pond</b>	Huron Shores	2	1
<b>Loud Pond</b>	Huron Shores	1	0
<b>Bliss Lake</b>	Huron Shores	UNK	UNK

*UNK = unknown*

Biologists manage lakes with known loon populations by ensuring high quality habitat is available and using Forest Supervisor's closure orders to protect nesting loons. Loon nesting success is generally monitored annually and the data entered into the NRIS Wildlife database.

The population trend of common loons on the HMNFs is unknown. Better annual monitoring is needed to determine population trends, potential impacts, and management needs

### ***Eastern Massasauga***

The eastern massasauga rattlesnake is a Federal candidate species. Candidate species are those species for which the U.S. Fish and Wildlife Service has sufficient information on their biological status and threats to propose them as endangered or threatened.

The Forest Plan includes a guideline to implement the Management Recommendations for the Eastern Massasauga Rattlesnake on the HMNFs (also known as the Massasauga Conservation Approach). A *Conservation Approach for Eastern Massasauga* was completed for the HMNFs in 2002. This document compiled the published and unpublished information for the eastern massasauga, identifies eastern massasauga management units and provides specific recommendations for managing eastern massasaugas and their habitat on the HMNFs (pages 25-31).

Despite a number of search efforts in recent years, the eastern massasauga is seldom documented on the HMNFs, partly because it is difficult to detect and it is likely that it is not as common as it once was due to changes in habitat and human persecution.

One massasauga survey was recorded in 2014 in the NRIS Wildlife database for 2014. No massasaugas were observed. No other massasauga observations were documented in 2014.

### ***Northern Goshawk and Red-shouldered Hawk***

The HMNFs routinely implement the *Management Recommendations for the Northern Goshawk on the Huron-Manistee National Forests* (US Forest Service, 1993). These recommendations are intended to help protect northern goshawks, red-shouldered hawks and manage their breeding habitats. In 2013, the HMNFs established an interdisciplinary team to review and revise these recommendations, incorporating the most recent information related to northern goshawks. The team anticipates completing this task early in FY2015.

Pre-NEPA surveys for northern goshawks are conducted every year. These surveys follow an established protocol and identify goshawk breeding areas so that mitigation measures can be incorporated into project designs. In addition, known goshawk nest sites are monitored annually.

In 2014, 36 surveys were recorded in the NRIS Wildlife database. 14 northern goshawk and 11 red-shouldered hawk occurrences were documented.

Overall, northern goshawk and red-shouldered hawk populations appear to be stable. Improved data stewardship is likely to help verify population trends over the long term.

### ***American Marten***

American marten have only been documented on the Manistee National Forest. These animals are present due to a reintroduction that occurred in 1986. Marten surveys have been conducted on the Huron National Forest, but none have been found. Overall, the population of American martens on the Manistee National Forest appears to be stable.

The HMNFs have partnered with the Little River Band of the Ottawa Indians (LRBOI) and Grand Valley State University (GVSU) to conduct a radio telemetry study to determine marten habitat use. To date, the study has generated data that has and will be useful for managing marten habitat. LRBOI and GVSU have shared preliminary data with the HMNFs, allowing the Forests to create an interim marten habitat map that will assist in habitat management decisions.

Projects on the Manistee National Forests routinely incorporate mitigation measures to provide for quality American marten habitat. The American Marten Conservation Strategy for the Huron-Manistee National Forests (1996) provides habitat management guidance. This document is planned to be revised in 2016 or 2017, and will incorporate the most recent species information.

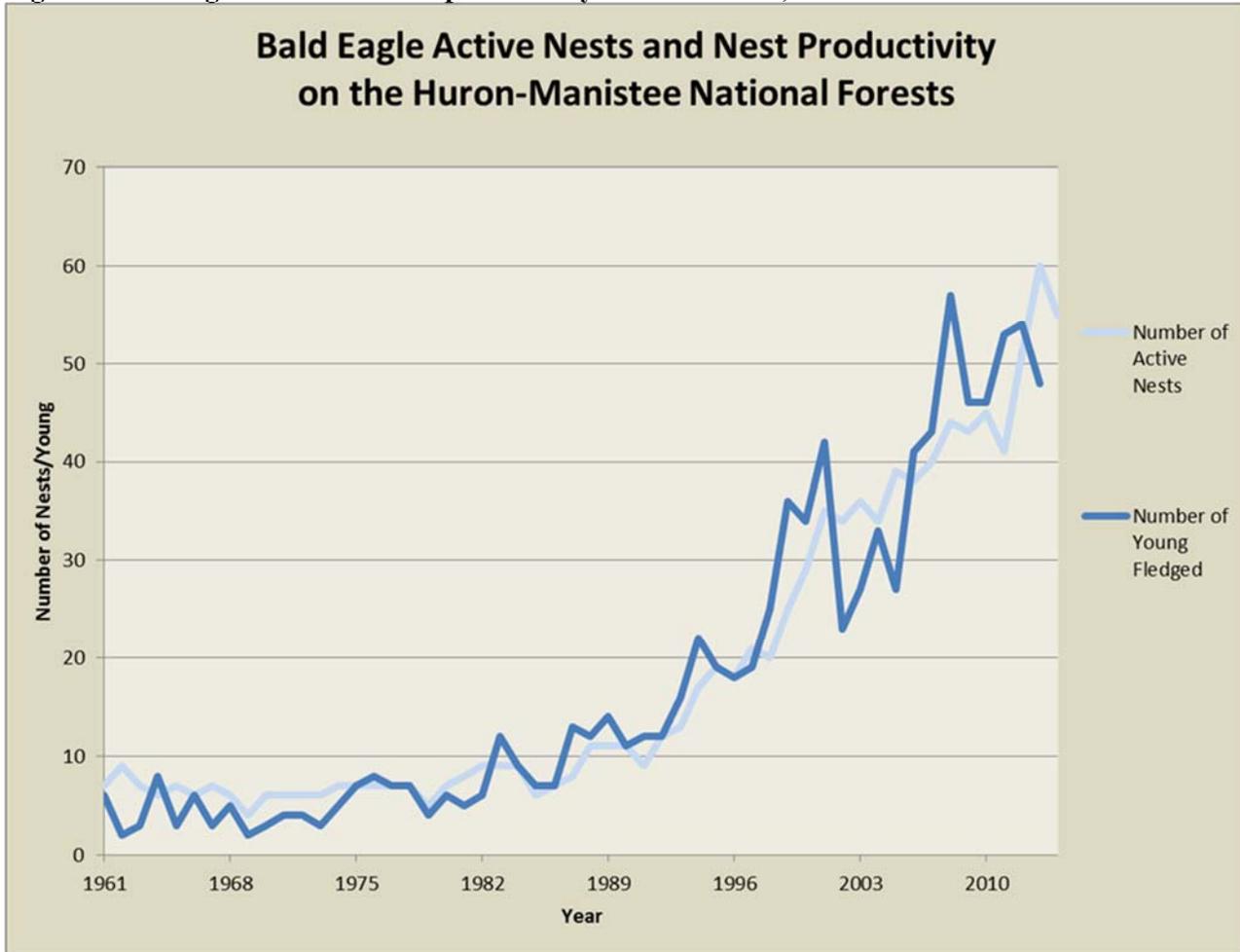
### ***Bald Eagle***

Since the Forest Plan was revised in 2006, the bald eagle has been removed from the federal list of threatened species. The bald eagle is now a Regional Forester's Sensitive Species, and is still federally protected by The Bald and Golden Eagle Protection Act (16 U.S.C. 668-668c), enacted in 1940. Forest Service biologists determine impact of projects on bald eagles by consulting the USFWS's [Eagle Permits](#) website. Mitigation measures are routinely incorporated into project design, and typically follow the recommendations in the HMNFs' Bald Eagle Management Plan.

Bald eagle nesting territories are typically closed to human entry under a Forest Supervisor's closure order during the breeding season, February 1 to July 15.

Bald eagle nests and productivity are monitored annually by the MI-DNR. Survey results from recent years show a fluctuating but steadily growing population on the HMNFs (Figure 3). This is consistent with bald eagle trends throughout the northern Lower Peninsula of Michigan.

**Figure 3 Bald eagle active nests and productivity on the HMNFs, 1961 to 2014.**



### **RFSS Plants**

The HMNFs are following the standards and guidelines for ternate grape fern, American ginseng, northern wild comfrey, yellow- ladies’ tresses and pine drops.

#### ***Ternate Grapefern (Botrychium rugulosum)***

There are over 100 documented occurrences of ternate grape fern on the Cadillac-Manistee Ranger District. These occurrences are not being monitored due to lack of funding, personnel, and time. Multiple locations of ternate Grapefern occur on the Baldwin-White Cloud Ranger District. Only one population, at Loda Lake, has been monitored. This population has been doing well. No new occurrences were discovered in 2014.

#### ***American Ginseng (Panax quinquefolius)***

There are very few occurrences on the HMNFs. If ginseng is found within or adjacent to stands proposed for treatment, the stands are typically not treated to avoid adverse impacts to the species. No new occurrences were discovered in 2014.

### ***Northern Wild Comfrey (Cynoglossum virginianum var. boreale)***

Relatively few occurrences on the HMNFs, but the species occurs on both the Huron and Manistee National Forests. No new occurrences were discovered in 2014.

### ***Yellow Ladies' Tresses (Spiranthes ochroleuca)***

Very few occurrences of this species have been documented on the HMNFs. One population was found in 2008 in a proposed treatment area that was subsequently dropped from treatment. This population has not been monitored. Another population was discovered in 2002, but has not been monitored. No new occurrences were documented in 2014.

### ***Pine drops (Pterospora andromedea)***

Very few occurrences of this species have been documented on the HMNFs. No new occurrences were documented in 2014.

## **Recommendations**

Common Loon - Ensure local lakes are monitored annually for common loon presence and nesting success. Enter the survey and observation data into the NRIS Wildlife database, even if no loons are observed.

Eastern Massasauga – Continue to survey for eastern massasaugas in proposed project areas and historic locations as noted in the Conservation Approach. Current distribution information is needed to ensure conservation of this species and its habitat. Record survey efforts and observations in the NRIS Wildlife database. Ensure conservation measures are incorporated into project design.

Northern Goshawk and Red-shouldered Hawk – Continue to survey for northern goshawks and red-shouldered hawks in proposed project areas. Ensure current conservation measures are incorporated into project design. Monitor active nesting areas annually. Complete the revision of the northern goshawk guidelines to incorporate new information.

American Marten – Continue to partner with LRBOI and GVSU to monitor marten habitat use. Incorporate new information into conservation measure for proposed projects. Search for martens outside known habitats using remote cameras and track surveys; update the marten habitat map as necessary. Revise the 1996 Marten Conservation Strategy for the HMNF to incorporate new information and conservation measures.

Bald Eagle – Continue to protect bald eagle nest sites during the breeding season according to the HMNF's Bald Eagle Management Plan, or in accordance with the USFWS eagle permit website. Continue to incorporate conservation measures into project design. Continue to cooperate with the MI-DNR to survey for bald eagle nests and monitor productivity on the HMNFs.

RFSS Plants – Continue to incorporate conservation measures for RFSS into proposed projects where possible. Develop a schedule to monitor occurrences of less common RFSS plant species at least every five to ten years.

## Population Trends of Regional Forester Sensitive Species (RFSS)

### **Lake Sturgeon, Greater Redhorse, and Channel Darter, Creek Heelsplitter, Slippershell, and Black Sandshell**

*To what extent are habitat conditions for RFSS aquatic species being maintained or improved? RFSS include seven fish, two mussels, and one insect.*

### **Monitoring Methods**

Monitoring will determine the change in RFSS populations over time. Monitoring processes include: 1) obtaining population and habitat data from MI-DNR, USFWS, Tribes, MNFI, and USFS sources, 2) calculating population and habitat trends for species, and 3) defining suitable habitat for each species through the Species Viability Evaluation (SVE) process.

### **Lake Sturgeon (State-threatened, RFSS)**

The Manistee River historically supported a large population of lake sturgeon (*Acipenser fulvescens*). Because of habitat fragmentation (dams) and over-exploitation, this population has declined dramatically. Baseline population metrics were identified during 2000-2005. Lake sturgeon telemetry studies (Yeomans, 2002) identified spawning areas. Sturgeon appeared to use two different spawning sites. Peterson et al. (2002) and Lallaman et al. (2008) found that Manistee River spawning population ranged from 21 to 66. Successful reproduction and recruitment was documented by Chiotti et al. (2008).

Lake sturgeon monitoring on the Manistee River over the period 2006-2011 was a cooperative effort led by the LRBOI Natural Resources Department. Other cooperators in the Manistee River lake sturgeon recovery efforts include the USFWS, MI-DNR, USFS, Central Michigan University and Michigan Technological University. Monitoring focused on larval sturgeon drift and young-of-the-year recruitment. The LRBOI captured between 36 and 542 larvae each year for the period 2002-2008.

In addition, the Little River Band operates a streamside rearing facility at Rainbow Bend Recreation Area on the Manistee River (Holtgren et al. 2007). Larval wild sturgeon are captured from the Manistee River and placed in the rearing facility. In the fall, these fish are released back into the stream. Over the period 2012-13, approximately 350 juvenile sturgeon in the 6-8-inch range were released. It is believed that this life stage is one of the most critical in the lake sturgeon life cycle. The streamside rearing unit allows for juveniles to reach a larger size more quickly than would be attained in the river alone, thus enhancing their chances for survival.

The Muskegon River, another Lake Michigan tributary that adjoins the southern part of the Manistee National Forest, also supports a remnant lake sturgeon population (O'Neal 1997; Peterson and Vecsei 2004). Cooperative monitoring by Grand Valley State University and the MI-DNR in 2008-2011 captured 57 adult and 44 juvenile in this river system. Spawning was also observed spawning. Larval lake sturgeon were also encountered, documenting successful reproduction and recruitment. This research suggests that successful spawning by lake sturgeon occurs in the Muskegon River and that juvenile lake sturgeon utilize Muskegon Lake

as a nursery habitat before entering Lake Michigan (Altenritter et al. 2010; Comben et al. 2011; Wieten et al. 2011).

### **Greater Redhorse (State-threatened, RFSS)**

The greater redhorse sucker, *Moxostoma valenciennesi*, has been documented to occur in the Pere Marquette, White, Muskegon and Au Sable Rivers within the HMNFs (MI-DNR Fish Atlas spatial library; Lansing, MI). The USFWS operated an electrical sea lamprey barrier with a fish ladder on the Pere Marquette River in cooperation with the MI-DNR from 2003-2009. This fish ladder provided an opportunity to monitor fish passage. USFS personnel sampled fish passage through the ladder in 2008 and 2009. A total of 684 and 980 redhorse suckers were passed through the fish ladder, respectively, during these years, with the majority being golden and silver redhorse suckers. Twenty-one (21) greater redhorse suckers were encountered in 2009. The weir and fish ladder ceased operation in 2010 and no sampling of this system has occurred since.

One other occurrence of the greater redhorse sucker within the boundaries of the HMNFs was documented in 2011. Greater redhorse were captured in Tippy Dam hydro-electric impoundment on the Manistee River during a MI-DNR fisheries survey (Tonello 2012). Twenty five (25) individuals were captured during the survey, 5 % of the total catch.

### **Channel Darter (State-endangered; RFSS)**

The channel darter, *Percina copelandi*, has been documented to occur in the Au Sable River and Pine River – Van Etten Lake systems on the Huron National Forest (MI-DNR Fish Atlas spatial library; Lansing, MI). A survey by Schultz (1986) re-confirmed its occurrence in the Pine River – Van Etten Lake system. Follow-up surveys in 2000-2001 verified its continued presence (Thompson et al. 2001). The most recent monitoring was done in 2007. Channel darters are still present in the Pine River system; however, only at one of the three sites where found in 2000 (Schnurer and Stuber 2007).

### **Creek Heelsplitter, Slippershell, and Black Sandshell Mussels**

The creek heelsplitter, *Lasmigona compressa*, is a freshwater mussel that occurs in the Pere Marquette River system (Badra 2004). It was also found in the Au Sable River in 2012-13 (Chambers 2013). Chambers (2013) also found the slippershell mussel, *Alasmidonta viridis*, another sensitive mussel species in the 2012-13 surveys of the Au Sable River.

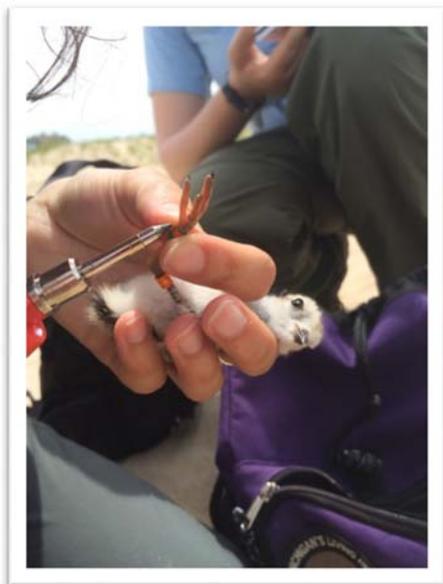
## **Monitoring Results and Recommendations**

The lake sturgeon population in both the Manistee and Muskegon Rivers remain low but some natural reproduction and recruitment is occurring. This is encouraging, especially when viewed from a statewide perspective. Although lake sturgeon are still widely distributed across Michigan, it is apparent that lake sturgeon abundance is far below historical levels and that some populations have been extirpated from rivers that historically supported spawning. There is little evidence of natural reproduction from most existing populations (Baker 2006). Thus, the natural reproduction and recruitment of lake sturgeon in both of these rivers are a significant part of the overall restoration program. Monitoring relative recruitment indices and spawning habitat will aide cooperators in the continued restoration of the Manistee and Muskegon River sturgeon population.

Greater redhorse suckers are still presumed to be present in the Pere Marquette River system given their documented occurrences while the lamprey weir and fish way was being operated from 2006-2010. However, with this system no longer being operational, another mechanism will need to be employed to monitor redhorse suckers in this river system. Monitoring of populations in the Au Sable River and Manistee River should also be undertaken given its documented occurrences in recent years. Utilization of the MI-DNR periodic survey data (e.g., “Status of the Fishery Reports”) is recommended.

Monitoring of channel darter populations in the Pine River – Van Etten Lake watershed should be undertaken in the future.

Monitoring for the black sandshell, slippershell and creek heelsplitter mussels needs to be undertaken in the future. Sampling as described by Badra (2014) should be continued.



## Endangered and Threatened Species – Conservation Strategies / Population Trends Piping Plover, Indiana Bat, Karner Blue Butterfly, Pitcher’s Thistle and Kirtland’s Warbler

*To what extent are established recovery or conservation strategies for species listed under the Endangered Species Act being implemented? What are the population trends for piping plover, Pitcher's thistle, Kirtland's warbler, Karner blue butterfly and Indiana bat?*

### **Hatchling Piping Plover**

The Forest Plan provides management guidance for implementing recovery and conservation strategies for species listed under the Endangered Species Act. The HMNFs prepared a programmatic biological assessment and consulted with the U.S. Fish & Wildlife Service (USFWS) during the Forest Plan revision process. The USFWS prepared the Programmatic Biological Opinion for the Revised HMNFs Forest Plan (USFWS, 2006). This document discusses the effects of the Forest Plan on the Great Lakes piping plover (*Charadrius melodus*), Indiana bat (*Myotis sodalis*), Karner blue butterfly (*Lycæides Melissa samuelis*), Pitcher's thistle (*Cirsium pitcheri*), bald eagle (*Haliaeetus leucocephalus*) and Kirtland's warbler (*Setophaga kirtlandii*). Conservation strategies for these species are incorporated into the Forest Plan’s standard and guidelines (Table 19).

**Table 10 Endangered, Threatened, and Sensitive Species (ETS) and Conservation Strategies.**

<b>ETS</b>	<b>Recovery or Conservation Strategy</b>
<b>Piping Plover</b>	The Recovery Plan for the Great Lakes Piping Plover (USFWS 2003)
<b>Indiana Bat</b>	The Indiana Bat Recovery Plan (USFWS, 1983) and an updated agency (USFWS) draft plan (1999)
<b>Karner Blue Butterfly</b>	The Karner Blue Butterfly Recovery Plan (USFWS, 2003)
<b>Pitcher’s Thistle</b>	Pitcher’s Thistle Recovery Plan - draft (USFWS, 1993)
<b>Kirtland’s Warbler</b>	The Kirtland’s Warbler Recovery Plan (USFWS, 1976, updated 1985), Strategy for Kirtland’s Warbler Habitat Management in Michigan (Huber et al, 2001), and Kirtland’s Warbler Census Protocol (Huber & Sjogren 2014)

Below is a discussion of how recovery and conservation strategies are being implemented for these species.

### **Conservation Strategies**

#### **Piping Plover**

The 2014 Great Lakes Piping Plover Monitoring Report summarizes the Forests’ activities, accomplishments and findings for this species.

HMNF personnel participated in USFWS coordination and training meetings, assisted City of Manistee personnel with nest monitoring, and conducted visitor regulation enforcement within Critical Habitat.

The Forest monitors compliance with area closures and requirements for leashed pets to comply with USFWS requirements. Heavy recreational use is likely to impact piping plover breeding activities, but actual effects are unknown. Unleashed pets are a rising concern, and the mere presence of pets (leashed or unleashed) in potential nesting areas may have a negative impact on plover nesting. Wilderness Forest Protection Officers estimate one in ten groups visiting the Wilderness Area has dogs, and these dogs are rarely leashed. Areas immediate to the LMRA Campground are more accessible, and see considerably more use with dogs commonly seen on the beach. Educating visitors regarding leash policy and biology of the plovers has been the major form of enforcement when unleashed pets are encountered. This approach is considered mildly effective, and law enforcement officials contact dog owners whenever possible to warn them about leash rules and potential threats to sensitive shoreline species.

The 2014 survey seasons documented typical recreation use. Dog use in these years remained similar to previous years. Verbal warnings were given to achieve compliance, but no tickets or written warnings were issued in 2014 (Table 19).

**Table 19 Recreational use over time during piping plover surveys by HMNF Forest employees in Nordhouse Dunes Wilderness and LMRA.**

	People	Dogs		
		Leashed	Unleashed	Tickets Issued
2006	319	19	16	1
2007	232	28	21	0
2008	371	16	6	0
2009	162	20	7	0
2010**	888	67	39	0
2011	196	8	11	0
2012	414	24	29	0
2013	340	23	9	0
2014	264	27	11	0

*n/a = data not available*

*\*\* June 28, 2010 initiated daily nest monitoring (weather permitting) instead of typical biweekly surveys.*

Potential avian predators include the observation of gulls, bald eagles, corvids and merlins. Mammalian predator tracks such as coyote and otter were also noted.

Fluctuation in amounts of cobble bed along the shoreline is also a concern, but is largely influenced by factors out of agency control, such as Lake Michigan water levels and weather.

### **Indiana Bat**

The Forests complied with all Terms and Conditions set forth for Indiana bat in the Biological Opinion, including enforcing timing restrictions and smoke dispersal requirements within the Tippy Dam Management Zone. The Forests maintained optimal summer maternity habitat for Indiana bat under all vegetative treatments, including prescribed burning. Prescribed burns, conducted within potential Indiana bat range outside restricted Indiana bat timeframes, are not considered to be within or affecting optimal Indiana bat habitat. Potential and existing bat roost trees and watering areas were protected as required by the Forest Plan.

All USFS employees, contractors, and volunteers working within Indiana bat habitat were educated to recognize and avoid potential Indiana bat roost trees.

### **Karner Blue Butterfly (KBB)**

The 2014 Karner Blue Butterfly Monitoring Report summarizes the Forests' activities, accomplishments and findings for this species.

The HMNFs identified approximately 7,332 acres of habitat restoration in metapopulations and essential KBB savanna and barrens habitat during the first decade, or an average of 733 acres per year. The Forest has

recognized the need for the development of a Conservation Strategy and will be identifying a working group to initiate this effort in FY16.

In 2014, the HMNFs conducted treatments on 1,310 acres. Treatments included:

- Planting nectar plugs on 18 acres,
- Weeding 110 acres of nectar plant plug plots and seed plots,
- Reducing overstory and understory woody cover using a combination of manual and mechanical treatments on 185 acres,
- Harvesting timber on 299 acres,
- Using a combination of site prep, tilling and seeding to enhance native grasses and forbs on 58 acres,
- Reducing overstory
- Understory woody cover on 125 acres via growing season burns, and
- Protecting 515 acres of Karner blue butterfly habitat.

The objective of these treatments is to reduce tree and shrub density, protect savanna remnants, and promote growth of native grasses and wildflowers, including wild lupine – the sole food for the Karner blue butterfly caterpillar.

### ***Pitcher's Thistle***

In 2014, no monitoring was conducted for the pitcher's thistle. This species is monitored every five years. The next planned monitoring effort is in 2015.

### ***Kirtland's Warbler (KW)***

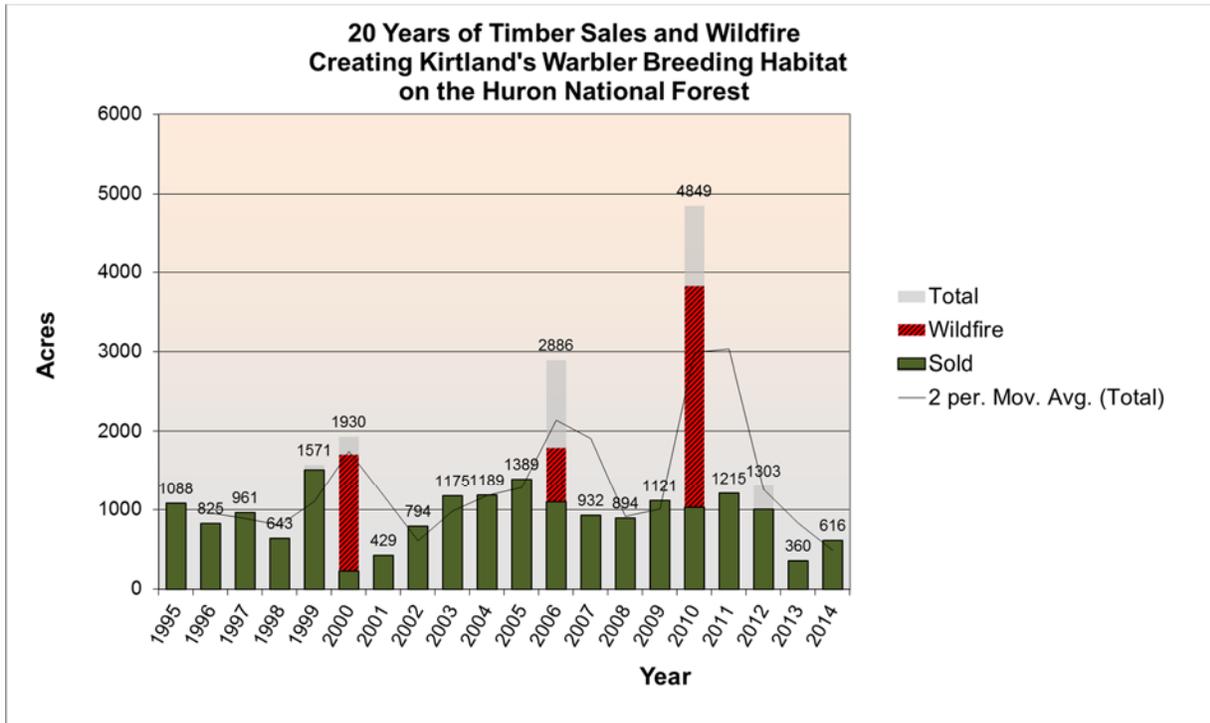
The Forest Plan objective is to create approximately 1,600 acres of essential breeding habitat each year, and implement direction in the Strategy for Kirtland's Warbler Habitat Management (2001) and Kirtland's Warbler Recover Plan (1985). Habitat development is typically accomplished through harvest and reforestation of large blocks of jack pine. However, wildfire often creates breeding habitat and these acres are tracked as well.

In 2014, the HMNFs sold 616 acres of jack pine, 39% of the annual objective (Figure 6). 1,364 acres of essential habitat were counted as reforested to jack pine (85% of the annual objective). All Kirtland's warbler timber sales offered by the Forest Service were sold. No large wildfires occurred within or outside of essential habitat that would produce breeding habitat. The Maple Ridge Prescribed Burn was accomplished in an attempt to create breeding habitat.

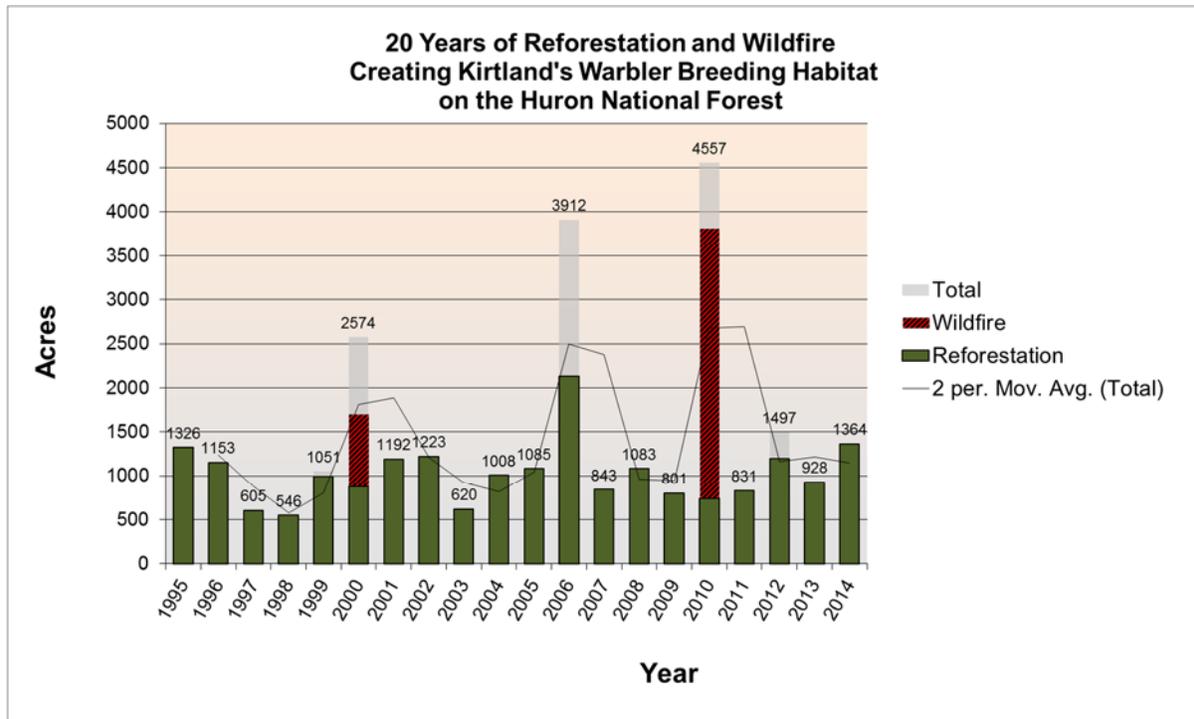
Since 2010, habitat created by timber sale and wildfire has trended steeply downward (**Error! Reference source not found.**) and is likely to markedly limit the amount of breeding habitat available after 2025. The

effects of habitat development on the Kirtland’s warbler population are not realized for 10 to 20 years after a timber sale is sold.

**Figure 4 Acres of timber sales sold and wildfire that create Kirtland’s warbler breeding habitat on the HMNFs over a 20-year period.**



**Figure 5 Acres of reforestation and wildfire that create Kirtland’s warbler breeding habitat on the HMNFs over a 20-year period.**



In 2014, the HMNFs worked with the Michigan Department of Natural Resource (MI-DNR) and USFWS to finalize a draft of the Kirtland’s Warbler Breeding Range Conservation Plan. The primary purpose of the Plan is to provide strategic guidance to the MI-DNR, USFS, and the USFWS to sustain the Kirtland’s warbler across its breeding range within an ecosystem management framework. The Plan is expected to be published in 2015.

## Population Trends

### Piping Plover

The 2014 Great Lakes Piping Plover Monitoring Reports summarizes the findings for this species. During the 2014 breeding season, 70 unique pairs and 111 fledged chicks were documented for the Great Lakes piping plover population over its entire range. The species will be reclassified from endangered to threatened when:

1. the population has increased to at least 150 pairs (300 individuals), for at least 5 consecutive years, with at least 100 breeding pairs (200 individuals) in Michigan and 50 breeding pairs (100 individuals) distributed among sites in other Great Lakes states.
2. five-year average fecundity is within the range of 1.5-2.0 fledglings per pair, per year, across the breeding distribution, and ten-year population projections indicate the population is stable or continuing to grow above the recovery goal,
3. ensure protection and long-term maintenance of essential breeding and wintering habitat, sufficient in quantity, quality, and distribution to support the recovery goal of 150 pairs (300 individuals), and
4. genetic diversity within the population is deemed adequate for population persistence and can be maintained over the long-term.

Delisting would occur when the above criteria are met, plus:

5. agreements and funding mechanisms are in place for long-term protection and management activities in essential breeding and wintering habitat.

In 2014, HMNF monitoring efforts for the piping plover focused on the 4.6 miles of Lake Michigan shoreline on NFSL that meets the critical habitat designations delineated in 2001 by the USFWS. Six individual plovers were observed on the HMNF; no nests were discovered.

### **Indiana Bat**

No specific Indiana bat surveys were conducted in 2014. Forest staff conducted repeated acoustical surveys of five transects during June and July in Lake, Manistee, Newaygo and Wexford counties, and special surveys of the Tippy Dam (hibernaculum) area during fall swarming. The recordings will be analyzed to determine if Indiana bats were among the species detected. These surveys are intended to provide baseline population indices and to monitor the potential effects of White-nose Syndrome on the relative number of bats on the HMNFs.

### **Karner Blue Butterfly (KBB)**

The 2014 Karner Blue Butterfly Monitoring Report contains detailed information on population trends.

The species will be reclassified from endangered to threatened when a minimum of 27 metapopulations [19 viable metapopulations (supporting 3,000 butterflies each), and 8 large viable metapopulations (supporting 6,000 butterflies each)] are established within at least 13 recovery units across the butterfly’s range and are being managed consistent with the recovery objectives outlined in this plan. Delisting will be considered when a minimum of 29 metapopulations (13 viable and 16 large viable metapopulations) have been established within at least 13 recovery units and are being managed consistent with the plan.

The HMNFs have two KBB recovery units within its boundaries on the Manistee National Forest, the Newago and Muskegon Recovery Units. Within those recovery units, the HMNFs manage five metapopulations and the recovery objectives are as follows:

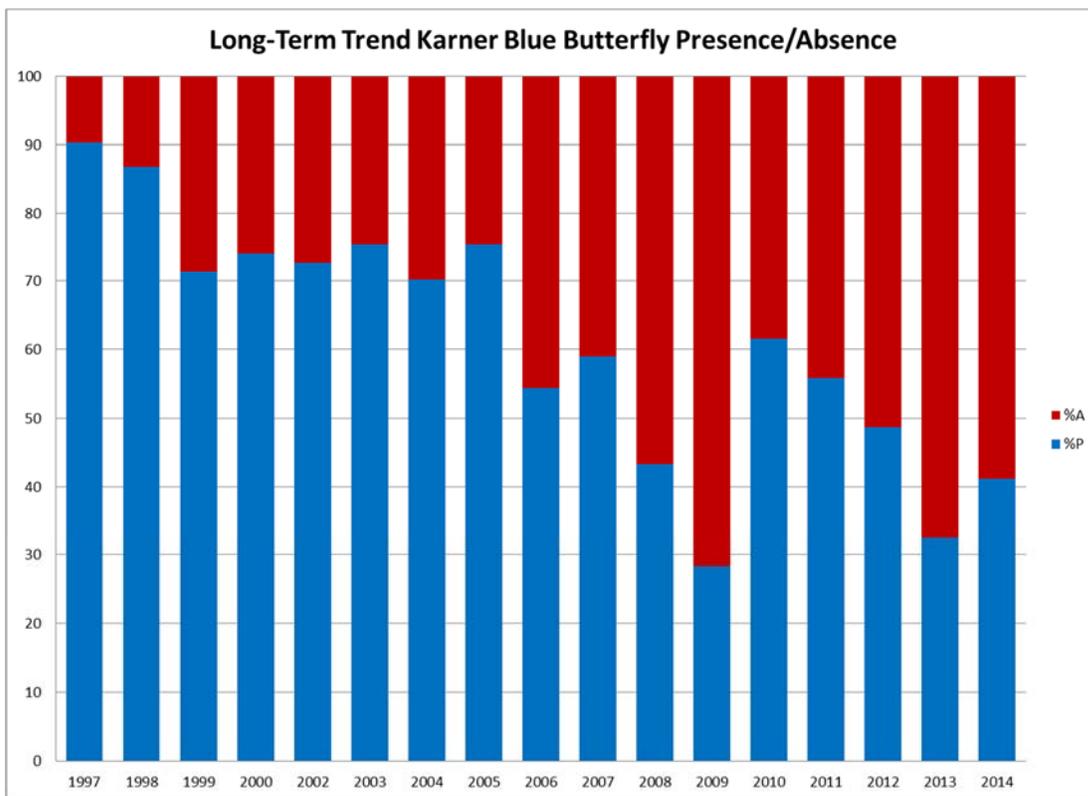
Recovery Unit	Recovery Goals		Metapopulations
	Reclassification	Delisting	
Muskegon	2VPs	2LPs	Otto, White River
Newaygo	2VPs	1VP + 1LP	Brohman, Hayes, Bigelow

VP = viable metapopulation, LP = large viable metapopulation

No occupied KBB subpopulations are known to occur within the Brohman metapopulation area. Because KBB may be extirpated from the Brohman metapopulation area, a new management area was designated around the Hayes subpopulation. Two viable KBB metapopulations are planned to be developed within the Bigelow and Hayes metapopulation areas to meet the recovery goals for the Newaygo Recovery Unit.

In 2014, 1,115 acres of Karner blue butterfly habitat was monitored. Thirty-six out of the 66 Karner blue butterfly subpopulations monitored were occupied. During Distance sampling surveys, 1,041 Karner blue butterflies were observed within these subpopulations. From the survey data it is estimated minimum Karner blue butterfly abundance within the HMNFs in 2014 was between 8,861 and 12,405.

**Figure 6 Long term trend in Karner blue butterfly presence/absence between 1997 and 2014 on National Forest System land on the HMNFs.**



Overall, the KBB population on the HMNFs has been trending downward since 1997 likely due to loss of habitat and unfavorable weather conditions (Figure 6). However, 2014 shows a slight increase over previous year, and is likely due to improved habitat and more favorable weather conditions. This trend is expected to continue as new habitat becomes available.

### **Pitcher’s Thistle**

No Pitcher’s thistle monitoring was conducted in 2014. The Forests monitor populations of Pitcher’s thistle on National Forest System lands every five years, unless threats indicate the need for more frequent monitoring. Pitcher’s thistle monitoring was conducted in 2011 to track long-term trends in the population of this federally threatened species along the Lake Michigan shoreline and dune system within the HMNFs. Eight monitoring

sites were established in 1993 and then sampled during the summers of 1993, 1996, 2001, 2006 and 2011. While Pitcher's thistle numbers have fluctuated up and down over the years, the population appears to be stable.

### ***Kirtland's Warbler (KW)***

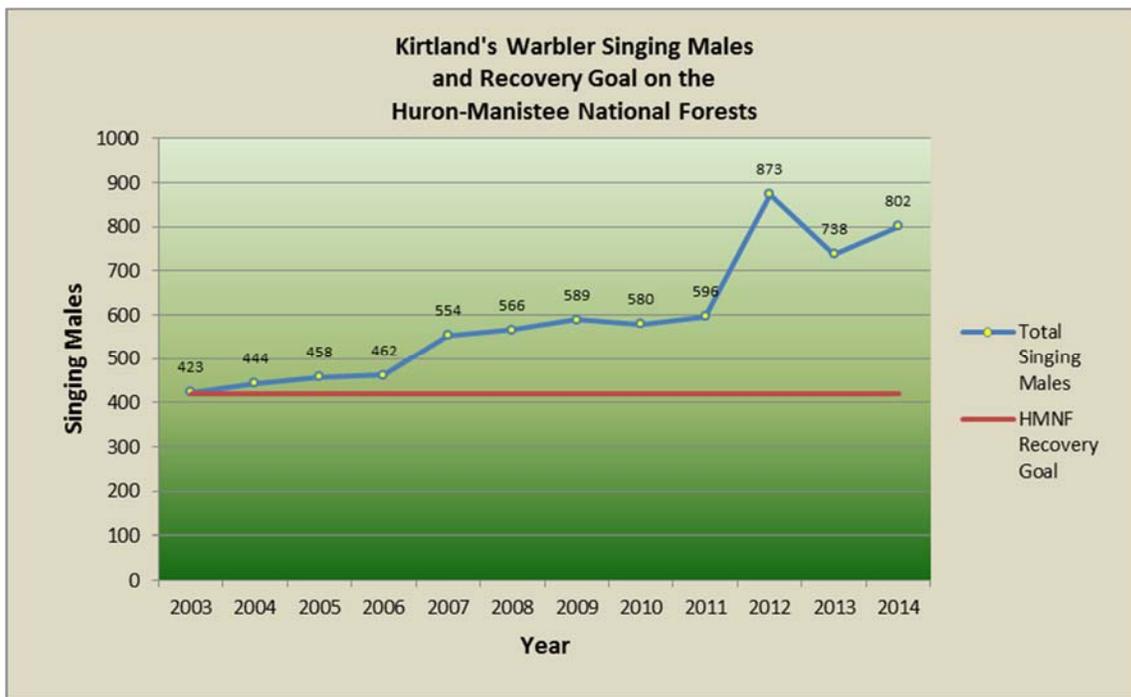
The 2014 Kirtland's Warbler Census Reports contains detailed information on Kirtland's warbler population trends.

The portion of the 2014 census coordinated by the Huron-Manistee National Forests covered approximately 16,235 acres of National Forest System (NFS) lands on the Huron National Forest. The MI-DNR did not conduct a census in 2014, typically HMNF personnel and volunteers assist the MI-DNR with census routes on the Au Sable State Forest.

In 2014, the HMNFs met the objective of providing habitat for a minimum of 420 singing males for the 12<sup>th</sup> consecutive year. The count of 802 singing males is 91% above the Forest Plan goal of a minimum of 420 singing males. Approximately 13,770 acres were occupied by Kirtland's warblers in 2014.

The success from 2003 to 2014 can be attributed to a combination of the Forests' efforts to develop plantation habitat and the large wildfires that have created natural habitat. In 2014, approximately 17 percent of the singing males were located in habitat that resulted from wildfire habitat.

**Figure 7 Kirtland's warbler singing males on the HMNFs.**



## **Recommendations**

### ***Piping Plover***

Seasonal monitoring personnel (technicians/volunteers) should be trained by the beginning of May if possible. This would allow daily monitoring if a nest is discovered.

In addition to primary habitat areas, occasional monitoring of secondary habitat and potential nesting areas behind the foredune should continue.

Predator exclosures and other conservation measures should be established when a nest is found on NFS lands.

The current pet leash regulation should be kept in effect, enforcement patrols should be increased along with educational efforts. An increased emphasis for issuing violation notices for unleashed dogs is recommended.

### ***Indiana Bat***

Surveys are limited by precautions to prevent introduction of White-nose Syndrome into Tippy Dam, the only known hibernaculum on the HMNFs. Continue to communicate with Dr. Allen Kurta from Eastern Michigan University to determine the status of Indiana bats within the hibernaculum.

Continue to implement Forest Plan guidelines to protect Indiana bats on the western half of the Manistee National Forest. Discuss potential modification of the guidelines with the USFWS to incorporate any new information on the species.

### ***Karner Blue Butterfly***

Assemble a KBB workgroup that meets semi-annually to discuss all aspects of the HMNF KBB management program.

Continue management efforts to maintain and expand occupied KBB sites. Explore other management technique and less expensive alternatives to promote native nectar sources (scalping, discing, Rx burning, herbicide, etc.).

Complete a KBB Management Strategy to define KBB essential habitat, management techniques and display a long-term plan for habitat management. The strategy should include schedules for 10-years of timber harvest, post-harvest habitat development, occupied habitat maintenance and prescribed burning.

Consider finalizing data collection on demonstration plots. Shift program focus and field work from data collection to habitat improvement.

Attempt to simplify and minimize the number of harvest restrictions on KBB timber sales. Formally consult with the USFWS when incidental take is necessary to complete KBB habitat improvement projects.

Implement the recommendations in the 2012 KBB Program Review; or assemble a small team to review the recommendations and update the KBB program direction. This direction could then be incorporated into the KBB Management Strategy.

Develop a table and graph for future monitoring reports that displays KBB restoration acres completed by year.

Continue to monitor the population response to management actions.

### ***Pitcher's Thistle***

Plan for semi-decadal surveys and assessment of Pitcher's thistle populations and habitat in 2015.

Monitor plants for new threats, particularly two biocontrol weevils (*Larinus planus* and *Rhinocyllus conicus*) that are having serious impacts on species fecundity.

### ***Kirtland's Warbler***

Support the Kirtland's Warbler Initiative and work with partners toward the goal of delisting.

Develop a landscape stewardship proposal for managing Kirtland's warbler habitat on the Huron National Forest.

Explore opportunities to use prescribed fire and other pre-commercial treatments to supplement the acres harvested and reforested to develop breeding habitat for Kirtland's warbler, and meet the 1,600 acre per year objective.

Explore opportunities to increase the acres harvested and reforested to reverse the trend of declining habitat, and move closer to meeting the 1,600 acre per year objective.

Update the habitat development schedule for habitat treatments through 2024. Incorporate the recent wildfires (2006, 2010 and 2012) and planned prescribed burns into habitat planning.

Continue to work with the MI-DNR and USFWS to publish the Kirtland's Warbler Breeding Range Conservation Plan.

Continue the annual census and monitor the population response to management actions. Work with the MI-DNR to develop other options for population monitoring.

## **Fire Prevention and Fire Suppression**

*What activities have been done to promote safe fire prevention and fire suppression?*

The Forests had 85 fires in 2014 that required a USFS response. Responses ranged from one fire engine responding to the scene, to multiple engines, dozers and aircraft responding. The Incident Commander for each fire determines suppression tactics, with the safety of employees and public the first objective of every wildfire response. Smaller fires are fairly common on the Forests, organized responses frequently minimize their severity. Fire suppression response is commensurate with the hazards and risk, minimum impact suppression tactics such as water and hand tools are sufficient on some fires, whereas a dozer plow line and aerial resources may be necessary on another fire.

The HMNFs have a history of large, catastrophic wildfires, particularly in the areas that are predominately jack pine. The Forests manage a large part of the largest contiguous area of jack pine forest in the United States. Jack pine generates very high fire danger in April and May, with the highest fire danger occurring before and during the new pine needle growth, and to a lesser extent through the summer/fall. Larger fires (>1,000 acres) occur every 3-4 years, on average, in the jack pine fuel type.

The Forests has an active fire prevention program. Local media, including television and radio, are provided with up to date fire danger information. Programs, such as FireSafe are provided to the public to promote involvement in activities that reduce fire risk around homes and cabins.

## **Monitoring Methods**

### ***Wildland Fire***

On-site review of wildland fires is completed by line officers. After action reviews (AARs) cover an array of topics, including safety concerns and rate how well objectives for fire management were met.

### ***Prescribed Fire***

Prescribed burn plans and project implementation are reviewed by line officers and fire staff.

Aerial ignition is being used to accomplish landscape scale burning. Detailed briefings prior to implementation and after action reviews are completed on all burns, both to acknowledge success and assess possible actions to improve burn management.

## **Recommendations**

Fire suppression activities should continue as directed by the Forest Plan and the Forest's Fire Management Plan. Continue to provide a safe work environment through pre-work briefings, reviewing the specific Job Hazard Analysis, and personal attention to performing activities safely.

Work towards providing Forest-wide radio communications.

Continue to Coordinate and cooperate with the MI-DNR, other federal land management agencies, Law Enforcement and Local Fire Departments to deliver a safe and effective fire program. With the State of Michigan, continue to provide an annually updated Operations Plan and meet face-to-face to coordinate fire suppression efforts.

Realizing the potential for large wildfires, such as the 8,600 acre Meridian fire in 2010, there is a continued need for aerial suppression resources capable of effective initial attack and proper aerial supervision, including air tanker and/or heavy helicopter resources. The Forests should continue to work with Region 9 and the Great Lakes Forest Fire Compact to improve availability of aerial suppression resources during spring fire season.

## **Distribution of Fire Condition Class**

*What is the distribution of National Forest System acres by fire condition class? How many acres have been treated that result in an improvement of at least one fire condition class? What are the number and size of wildfires? Are wildfires being suppressed using appropriate response? Are analyses being performed on prevention, presuppression, and suppression?*

Forest fuels planners are determining class change by percentage based on condition change from the fuel reduction and vegetation management activities. Generally, vegetation management activities lower the tons-per-acre of burnable fuel available in the treatment area. Condition class change is being recorded in FACTS as projects are completed.

Wildfires are being suppressed with appropriate suppression responses. Minimum impact suppression tactics are used where conditions allow. Rehabilitation of ground disturbing activities done during suppression is completed on all fire areas as recommended by resource advisors.

The Forests had 86 fires in 2014 that burned 103 acres. The number of fires was below the average occurrence rate (120) as well as the average acres burned (1,500).

**Table 11 HMNFs FY 2014 Statistical Wildfire Causes.**

Cause	Fires	Percent	Acres	Percent
Lightning	1	1%	<.01	<1%
Equipment	7	8%	3	3%
Smoking	1	1%	1	1%
Campfire	12	14%	29	28%
Debris	17	20%	26	25%
Arson	1	1%	10	10%
Miscellaneous	26	30%	24	23%
Powerlines	21	25%	10	10%
<b>Total</b>	<b>86</b>	<b>100%</b>	<b>103</b>	<b>100%</b>

Appropriate management response in suppression of fires include using natural fuel breaks for control lines, wet line or hand line in place of dozer plow line where appropriate, and the use of aviation resources. Firefighter and public safety are always the first consideration of the fire suppression response.

## Monitoring

The Forest accomplished 5,426 acres of prescribed burning in FY 2014.

Vegetation Management, mostly timber harvesting, was completed on approximately 3,198 acres in 2014, which lessened fire danger and improved condition class (mainly thinning in red pine). See Table 21.

**Table 12 Prescribed Fire / Mechanical Fuels Treatment, FY 2014.**

Acres	Mechanical	Fire	Total
Hazardous fuels	3,198	5,426	8,624
Condition class change by vegetation management	3,198	5,426	8,642

<b>Total</b>	<b>3,198</b>	<b>5,426</b>	<b>8,642</b>
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Annual Preparedness reviews are conducted on the Forests by fire staff and line officers. These include a review of prevention, pre-suppression, and suppression activities on the Districts.

## Evaluation and Conclusions

Condition class change was accomplished on these project areas that moved them toward a fire regime that is within a historical range defined in terms of departure from the historic fire return interval. Cumulative effects as larger areas are treated each year add to beneficial landscape level changes across the Forests.

Annual Fire Preparedness reviews show that District personnel are performing at a satisfactory or better level in their fire management programs. Concerns are addressed and corrected in a timely manner.

## Recommendations

A quick suppression response to wildfires in the conifer fuel types on the Forests makes the difference between a small fire and a large destructive fire.

Continue on current course with activities that improve condition class, document those change determinations, input them into databases, and continue to suppress wildfires with minimum impacts to the landscape. At the same time, activities will continue to be assessed and carried out to provide for firefighter and public safety.

## Fire Hazard Rating

*What is the distribution of National Forest System acres by fire hazard rating? How many acres in fire dependent ecosystems and at-risk urban-rural interface and intermix areas have been reduced by at least one hazard rating class?*

The priority for fuel reduction activities are high fire hazard areas around homes and cabins. Most of these areas are private property. Because of the preponderance of private land in-holdings across the Forests there are many private land improvements that have a high risk of damage or destruction from a wildland fire. These areas are identified in the NEPA process for priority treatment.

## Monitoring Methods

Hazard rating reduction takes place through vegetation management fuels treatments. In FY 2014 the Forests accomplished activities on over 8,500 acres that lowered fire hazard rating. Monitoring through contract administration, and line officer involvement ensure objectives are being met. Prescribed burning, timber sales, mechanical treatments and other vegetation management have combined to reduced wildfire hazard on the Forests and lessen the risk to Forests employees and public. Vegetation Management projects that reduced fire hazard are entered into the FACTS database.

## Evaluation and Conclusions

The Forests are not measuring hazard ratings per se, though fuel hazard reduction activities reduce the tons of fuel available to burn in wildfires.

After nine years of Forest Plan implementation, the Forests have accomplished to date 100 percent of the hazardous fuel reduction that was planned, but only about half the fuel breaks that were planned. Table 22 shows the Forest's progress towards meeting accomplishment goals that were outlined in the Forest Plan.

**Table 22 Fuelbreak and Hazardous Fuel Accomplishment Acres, Totals 2006-2014.**

	<i>FY 2014</i>	<i>2006 Plan Projections per decade</i>
Fuelbreaks	<b>899</b>	<b>20,000</b>
Hazardous Fuel Reduction	<b>8,909</b>	<b>80,000</b>
<i>Accomplished FY 2006-FY 2014</i>		
Fuelbreaks		<b>9,184</b>
% Accomplished		<b>51%</b>
Hazardous Fuel Reduction		<b>72,626</b>
% Accomplished		<b>100%</b>

## Recommendations

Continue to construct and maintain fuelbreaks, especially in the jack pine fuel type, to mitigate the potential for large wildfires.

Monitor prescribed burns, including photo points, for fuel loading reduction, crown scorch, tree mortality and ladder fuel reduction. Continue to record fuel treatment effectiveness in treatment areas and document the effects of hazard reduction treatments when wildfires burn into areas that have had fuel reduction activities.

In order to track, monitor, and plan fuels treatment, the Forests should implement the use of LANDFIRE (also known as Landscape Fire and Resource Management Planning Tools). LANDFIRE is an interagency vegetation, fire and fuel characteristics mapping program sponsored by the United States Department of the Interior (DOI) and the USFS.

Continue to focus fuel reduction activities in fire dependent ecosystems and urban interface areas that are at risk from wildland fires. Monitoring of prescribed fire events and hazard reduction activities should continue in the same manner that is currently being conducted.

It is recommended that the Forests expand the use of aerial fire application as contrasted with hand firing techniques which often extend burn periods, achieve varying burn prescription results, increase safety risk to personnel and increase costs. Also, relying on hand firing techniques typically limits the size of burn units which impacts the Forests' capacity to expand future prescribed fire requirements.

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