

Title: Progress Report for Southern Michigan DNR Lands Integrated Inventory Project: IFMAP Stage 1 Inventory (Year 1)

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Introduction

IFMAP Stage 1 inventory for eight management areas began in March 2010 and is ongoing through September 2011. Complete Stage 1 inventory is targeted for Allegan, Barry, Gratiot-Saginaw, Lapeer, Middleville, Muskegon, and Port Huron State Game Areas (SGA) and the eastern portion of the Holly Recreation Area, which is managed by the Wildlife Division. This report details the progress from March 1, 2010 to September 30, 2010 and includes projections of progress expected through November 15, 2010.

The primary goals of this project are to 1) hire, train, and supervise a team of seasonal field staff; 2) verify the accuracy of management game area boundaries and adjust the boundaries as necessary using the Wildlife Division's Master Database layer in ArcGIS; 3) delineate non-forested and forested stands in each management area using the most recent aerial photographs in ArcGIS; 4) refine and adjust stand boundaries in the field while recording specified inventory data for non-forested and forested stands; 5) transfer completed pre-inventory compartments to the Stage 1 non-forested and forested stand layers in the IFMAP GDSE; 6) make improvements in the protocol for future inventory work, especially concerning the logistics of geographically-dispersed personnel.

Methods

Office Procedures

Office preparation for field work closely followed that of IFMAP Stage 1 Inventory for Waterloo Recreation Area completed in 2009. However, due to the increased scale of the current inventory (i.e., involvement of many DNRE partners and management of personnel and data in multiple management areas), challenges were frequently encountered.

Of the eight management areas, Barry and Gratiot-Saginaw were given the highest priority for inventory by the DNRE. Secondary priority was dictated by the proximity of hired personnel to the other six management areas. Upon posting job descriptions, interviewing, and hiring (April – June), year 1 field inventory was planned for two staff at Barry, one at Gratiot-Saginaw, one at Holly, and one at Port Huron. Those assigned to Barry were also instructed to begin Stage 1 inventory in Middleville upon completion of the former.

The initial step of the Stage 1 process was to check the boundary accuracy for each management area. This process initially involved working directly with DNRE field staff to provide suggestions for adjusting management area boundaries. After approximately two months of making little progress using this method to adjust management areas boundaries, the DNRE made the decision to allow Jeff Lee, MNFI, to work directly with Marshall Strong to accomplish this task. Marshall Strong then provided with Jeff Lee access to the Master Database layer, which could be edited as necessary in ArcGIS. From that point forward, it took approximately 1-2 days to complete boundary modification for each management area with aid from DNRE field staff and plat maps (both online and as a GIS shapefile). An updated management area boundary with compartment designations was then sent to Brian Maki to be loaded into the GDSE Pre-Inventory layer. Delineation of non-forested and forested stands within the Pre-Inventory layer proceeded by following the rules stated in Chapter 2 of the IFMAP Manual. The most recent aerial images were used during the delineation process. However, it was not uncommon to use older imagery sets when leaf-off, leaf-on, infrared, or natural color views were deemed helpful. Though compartment acreage and complexity varies among and within game areas, approximately between 1.5 and 3 days was devoted to stand delineation in each compartment. Management areas located on flat glacial lake plains proved the most difficult to delineate. The subtle topographic changes at Gratiot-Saginaw, Port Huron, Allegan, and Muskegon result in dramatic shifts in species dominance that do not express themselves well on aerial imagery.

Following stand delineation in each compartment or all compartments within a management area, a central reviewer must inspect the stands for adherence to specific rules and also re-number the stands from the northwest to the southeast corners of the compartment. During the past year, Steve Chadwick served as a central reviewer for Barry, while Michael Donovan reviewed all other management areas. Once stands have been reviewed and adjusted, compartments are ready to be loaded onto the Nomad's SoloForest program for on-the-ground navigation and checked out in IFMAP DISCO for stand data collection. In general, only one compartment was checked out at a time by each field worker.

Nomad units were provided by Sarah Mayhew, and one was given to each field worker. All field workers used the Nomad for navigation, and most used it for data collection as well. Unfortunately, not all game areas are equipped with fast network connections or computers that contain the required software to synchronized IFMAP Mobile on the Nomad with IFMAP DISCO on the desktop computer. In Port Huron SGA, consequently, inventory data was completed on paper forms and will be later transferred to IFMAP DISCO manually. For those field workers with access to a field office (i.e., Barry SGA and Holly RA), it still required tremendous effort to procure a spare computer for data download and backup throughout the summer. Delays in acquiring State of Michigan IDs and IFMAP login IDs also proved to be unexpected obstacles.

Field Procedures

Data collection followed procedures outlined in chapters 3 and 4 for forested and non-forested inventory, respectively, in the IFMAP Manual. Inventory work at Port Huron began May 12; Barry on June 14; Holly on June 21; Gratiot-Saginaw on July 14; and Middleville on September 10. Field workers were trained primarily on field procedures but were also taught how to backup

data and edit stand boundaries in ArcGIS after ground-truthing the initial stand delineation from remote-sensing imagery. Furthermore, field workers logged GPS points when rare species occurrences or unique natural communities were found. Other features were also recorded at the discretion of the individual (e.g., large trees, hunting blinds, invasive species, etc.). Among all field workers, the number of stands completed per day generally ranged from 4 to 12.

The check-in process follows completion of Stage 1 Inventory for a compartment. The finalized stands are reviewed again for rules adherence by using the Symbol Picker function in the Central Review toolkit of ArcMap. IFMAP DISCO runs an internal check for congruence with the IFMAP GDSE Pre-Inventory layer, and all stands are transferred to the Stage 1 Non-Forested and Forested stand layers. After check in, the next compartment may be checked out. These procedures are outlined in chapters 6 and 7 in the IFMAP Manual and were strictly followed.

Results

As of this writing, boundaries have been checked and the Wildlife Division’s Master Database layer in ArcGIS has been updated for all compartments in Barry, Middleville, Gratiot-Saginaw, Port Huron, Lapeer, and Holly. Stand delineation has been completed for Barry, Middleville, Port Huron, and Holly. Stage 1 inventory has been completed for 6 compartments in Barry, 2 compartments in Gratiot-Saginaw, and 1 compartment in Holly (Table 1). However, it is likely that that all of Barry, Port Huron, and Holly will be completed by November 15, 2010. Also by likely by November 15, is that progress will have been made in collecting Stage 1 inventory data in Middleville and a third compartment in Gratiot-Saginaw. Among all field workers, the number of stands completed per day generally ranged from 4 to 12.

Table 1. IFMAP Stage 1 Progress as of September 30, 2010.

Management Area	Compartments Requiring Boundary Check	Compartments Requiring Initial Stand Delineation	Compartments Requiring Stage 1 Field Inventory ¹
Muskegon	2	2	3 (3)
Allegan	21	22	25 (26)
Barry	<i>Completed</i>	<i>Completed</i>	1 (7) ²
Middleville	<i>Completed</i>	<i>Completed</i>	1 (1)
Gratiot-Saginaw	<i>Completed</i>	4	6 (8)
Port Huron	<i>Completed</i>	<i>Completed</i>	3 (3) ²
Lapeer	<i>Completed</i>	2	5 (5)
Holly	<i>Completed</i>	<i>Completed</i>	2 (3) ²

¹Total compartments shown in parentheses

²Estimated completion of all compartments projected for 11/15/10

Table 2. IFMAP Stage 1 stands and acres estimated to be completed by the end of this field season on November 15, 2010. Note that the goal of this project is to complete IFMAP Stage 1 Inventory for approximately 105,606 acres. Therefore, we project that 28.6% of the total acreage will be completed by November 15, 2010.

Management Area	Stands	Acres
Barry	958	15,686
Gratiot-Saginaw	185	5,125
Port Huron	248	6,690
Holly	179	2,665
Total	1,570	30,166

Discussion and Conclusions

We have made reasonable progress towards completion of Stage 1 inventory in this first year given the complexity of the technology, involvement of multiple parties each with differing expertise in the IFMAP process, and coordination of geographically-dispersed, seasonal field staff. Managing data storage and access on remotely-located computers at field offices has been especially challenging.

When the technological components of IFMAP work smoothly (IFMAP GDSE, IFMAP DISCO, and IFMAP Mobile), Stage 1 inventory proceeds efficiently and without interruption. Unfortunately, there were three separate instances when IFMAP Mobile crashed, causing a significant impediment to data collection and one instance when data was crossed, and ultimately lost, in IFMAP DISCO. It was further discovered that IFMAP Mobile becomes easily mired in data when collecting information on both forested and non-forest stands. Consequently, its functionality ceases to expedite data collection over traditional paper forms. Jason Stephens and DIT staff are working to correct programming bugs in the software of IFMAP Mobile, which will hopefully resolve these issues by next field season. To prevent data crossing in IFMAP DISCO (a susceptible problem when two field workers with two separate login IDs share the same desktop computer for data backup), all field workers are now asked to backup data twice and to always logout when finished with data transfer.

IFMAP Stage 1 inventory is a good preliminary process for identifying high quality natural areas. It requires surveyors to conduct a complete and broad survey of a particular area. Data gathered during the inventory process can guide future, more detailed surveys. This practice was put forward in the game unit of Waterloo Recreation Area. IFMAP Stage 1 inventory conducted in 2009 prompted MNFI surveys of rare plants, animals, and communities in 2010. Because cover type designations in IFMAP are broader than the natural communities recognized by MNFI, all potential element occurrences must be noted in the comments section for each stand. For example, the IFMAP cover type, fen, may include fens that may not be recognized as such by MNFI. At present, a fen under IFMAP definition must have at least 60% total cover of shrubby cinquefoil, dogwood, willow, sedges, or sphagnum peat. However, no percentage is specified for each of these components. Thus, some fens that meet the IFMAP definition may be more appropriately classified as southern shrub-carr by MNFI.

During the 2010 field season, each field worker successfully gained an understanding of the IFMAP process, from stand delineation, compartment check out, field inventory methods, data transfer/backup, compartment check in, and final transfer from Pre-Inventory to Stage 1 non-

forested and forested stand layers in the IFMAP GDSE. Regardless of management area, it was common for all field workers to adjust existing stand boundaries through stand modification, creation, and merging. A general description of each management area and its associated challenges and rewards follows below.

Barry State Game Area

Barry is located on glacial outwash and coarse-textured end moraine. Its topography can be steep and the upland soil ranges from excessively drained sand to well-drained sandy clay loam. Oak-hickory forest is a common community type in the uplands. Numerous wetlands occur throughout the management area, and several prairie fens and bogs were noted during the Stage 1 inventory. Herpetiles, especially turtles, were frequently encountered. Challenging obstacles included occasional thick understories of invasive shrubs such as autumn olive and multiflora rose, deep-water expanses that required using a kayak, and steep terrain that made on-the-ground stand delineation difficult.

Gratiot-Saginaw State Game Area

Gratiot-Saginaw is located primarily on sand lake plain with sparse occurrences of sand-over-clay lake plain and fine-textured end moraine. Its topography is flat with slight relief caused by old beach ridges. Hydrological extremes typify the game area: areas inundated with 18 inches of water in the spring are often drought-stricken by late summer. Pin oak flats and young aspen-red maple communities are most common in these settings. Large fields dominated by willows, meadowsweet, goldenrods, and mixed grasses are abundant. Buttonbush-dominated wetlands (i.e., inundated shrub swamps) are also common in many of the impoundments. Challenging obstacles included young pin oak stands that made traversing the area difficult and a highly-dissected landscape caused by intensive land management and subtle ecological shifts in species composition due to microtopographic variation. For example, clearcuts on beach ridges generally resulted in bigtooth aspen or red maple regeneration, while clearcuts at a 12-inch elevation drop generally resulted in pin oak and trembling aspen regeneration. These community subtleties do not show up well on aerial photographs and must be painstakingly delineated on the ground.

Port Huron State Game Area

Port Huron is located on clay lake plain with sparse occurrences of fine- and coarse-textured end moraines and low sand dunes. The Black River traverses most of the game area and resides in a narrow outwash channel with a surrounding terraced floodplain ecosystem. Similar to Gratiot-Saginaw, much of the landscape experiences inundation during the spring, and small relief differences cause dramatic compositional shifts in species dominance. More northern species, such as eastern hemlock, are common in some areas, and numerous element occurrences (e.g., hooded warbler, red-shouldered hawk, osprey, and painted trillium), and a possible new county record of chinkapin oak were documented. On-the-ground stand delineation was the greatest challenge at Port Huron due to subtle topographic changes.

Holly Recreation Area

Holly is located in a highly-urbanized landscape on ice-contact terrain and medium-textured end moraine. Historically, much of the recreation area was cleared for agriculture. Young forests of mixed-mesophytic species are common, and a proximal urban interface makes invasive species proliferation especially problematic. Invasive plants such as autumn olive, Eurasian honeysuckle, buckthorn, multiflora rose, and black swallowwort form impenetrable thickets in some places, significantly hindering forward progress and vision. The most challenging obstacle was traversing through these non-native understories while simultaneously delineating new stands and collecting data. Oftentimes, the mix of non-native and native species made it difficult to assign an appropriate community classification to a stand.