Enhanced Forestry Resource Inventory (eFRI)
Individual Environmental Assessment Request for:
Friends of Temagami and Earthroots

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How an Individual Environmental Assessment address these concerns in a way that the Class Environmental Assessment does not?

We contend that although the raw data used in the eFRI process is better, the way in which it is being interpreted and the continued use of old models still applied in the implementation are fundamentally flawed. The Ministry of Natural Resources (MNRF) has failed to address these concerns repeated through the Temagami Management Unit (TMU) Forestry Management Planning (FMP) process, only stating the data was better. By using new data that is deemed better, while still relying on old and outdated modelling does not produce an overall better process or forest inventory.

The implications of using the MNRF eFRI are massively significant and far reaching for now and the future across the province of Ontario. It is this issue that we have tried repeatedly to address with the MNRF, without any success. It is our assertion that an Individual Environmental Assessment is required.

1. Introduction/Facts of the Case

1.a. The eFRI produces more accurate (and different) forest resources mapping for the Area of Understanding (AOU) in Ontario

1.b. 38,000 ha of old-growth forest has gone missing between the 2009 FMP and the 2019 FMP, and the cause of its loss has not been determined by the MNRF

1.c. The largest intact forest landscape in eastern Canada, south of the Boreal Forest is partially located in the Temagami Management Unit (TMU), as are the largest stands of old growth red and white pine forest in the world

1.d. Appendix A includes the relevant sections from Declaration Order MNR-75

2. Enhanced Forest Resource Inventory (eFRI)

2.a. The Importance of Forest Resource Inventory Mapping

In their book, *Sampling Techniques for Forest Resource Inventory*, Shiver and Borders (1996) emphasize the importance of accurate information to support effective decision making stating that,

> "Inventories serve as the source of information for decision making…"
>
> "Any forest landowner, including government agencies, private individuals, and corporations must decide how to manage that land. Their objectives may differ greatly, but to make rational decisions they must all have information."

Dau et al. (2015) have also addressed the value of forest resource inventories in their review paper published in the *International Journal of Forestry and Horticulture* stating the following:

> "An accurate assessment of forest and tree resources is needed and very essential for formulating sound forest management strategies and decision-making (sustainable management)."
>
> "Inventory is central to forest management and it helps to address forest degradation and deforestation while increasing indirect benefits to people and the environment…"
>
> "…without forest inventory, forest management would not be sustainable since there would not be sufficient information for planning and implementation."
>
> "The key role of forest inventory in sustainable forest management cannot be under-rated and includes provisions of information used to develop Predictive Equations (models) used for decision-making and sustainable forest management; provides information for site management, silviculture (thinning), fixing of rotation age, timber harvests; provides information for site quality assessment (site index), etc."

2.b. The Transition from Aerial Photographs (old FRI) to LiDAR (eFRI)

In 2011, the publication, *Enhancing Ontario's Forest Resources Inventory* (OMNR 2011) stated that FRI users require more current, timely and effective inventory data as applications become more demanding and complex. For example, using field data for validation, Pinto et al. (2007) found that less than 57% of the FRI stands in the Nipissing Forest Management Unit (contiguous to the TMU on the south side) were correctly identified and described (by tree species composition). They concluded that the low level of agreement between FRI and field data indicated a need for more extensive studies on FRI validation prior to its use for forest management planning.

In addition, Thompson et al. (2007) found that 83 of 129 forest stands near Ear Falls and Kapuskasing were incorrectly classified by species composition on FRI maps. Approximately 30% of stands were also misclassified by broad forest categories of conifer, mixed or deciduous, and common boreal species, including jack pine, black spruce and trembling aspen were incorrectly classified in about half of the cases. Researchers seeking specific stand types on FRI maps for field sampling should expect a 30 - 60% error rate.

Using point-count data for 22 forest bird species in Ontario's habitat suitability matrix, Holmes et al. (2007) found that many of the FRI-based species models performed relatively poorly in discriminating between occupied and unoccupied sites, primarily due to the high error of commission rates (false positive predictions). Results suggested that model parameters for at least nine of the species tested should be reviewed to improve the predictive capability of the models and to ensure appropriate consideration of the habitat needs of these species during forest management planning.

To address these weaknesses and the increasing demands on the FRI, the enhanced FRI Program was established in 2005 to change from aerial photos to LiDAR as the base imagery. The Program objectives included the following (OMNR 2011).

- Reducing the inventory cycle from 20 years to 10 years
- Use of high resolution, digital airborne imagery and image products to produce the FRI
- Use of technological advances in the geosciences, hardware, and software during inventory

production processes
- Introduction of new plot networks and an increased number of calibration plots
- Introduction of a new post production inventory assessment component, and
- Expansion of the area covered to include the southern portion of the Far North Planning Area,
  and national and large provincial parks

2.c. Forest Management Models and Decision-making Tools are Based on the Old FRI

Despite the documented problems associated with using FRI mapping for forest management decision-making in Ontario (section 2.b.), the old FRI maps were used by the *Landscape Guide* (OMNR 2010) to (1) produce estimates of landscape structure, composition and pattern, and (2) build the spatially-based modelling tools that have been and are currently being applied in forest management planning in Ontario.

As can be seen on Figure 1, the MNRF's process of developing forest management spatial modelling tools starts with FRI mapping and field data. In this case, the field data are songbird point counts, however, the field data could be any metric that describes any species that can be observed in the field. The results of this modelling are then combined with the results of two other modelling processes (Patchworks and LSL) that are both dependent on FRI mapping. Scenario analysis allows for the evaluation of management decisions on a range of forest values including fibre and old growth.

Figure 1. from Remple et al. (2007)

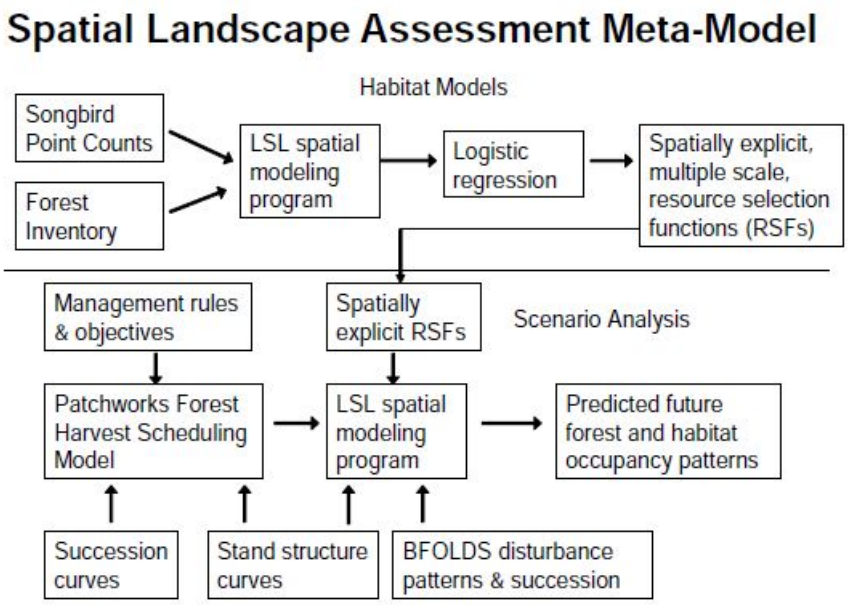

Figure 9. Schematic diagram (meta-model) of links between model components, flow of data, and model outputs. Upper figure describes habitat modeling components, and lower figure describes scenario analysis components.

The two supporting documents that describe the modelling that was done for the *Landscape Guide* are described below.

- *Science Package A: Simulations, Rationale and Inputs* - this document provides the rationale and methodology that was used to simulate ranges of natural variation. It provides a detailed description of all models and inputs (e.g. disturbance regimes, succession pathways, etc.).

- *Science Package B: Results and Tools for Forest Management Planning* - these documents include results and tools for *Landscape Guide* implementation in forest management planning.

2.d. New FRI with Old Models

To compound the problem of inaccurate old FRI, MNRF has used the eFRI (new) as the spatial information foundation of the FMP without recalibrating the models and tools used to make forest management decisions over the last 20 years or so. The unexplained loss of 38,000 ha of old-growth forest is just one symptom of this problem.

An excerpt from the *FOT TMU FMP Stage 4 (2019-2029) - Regional Director Issue Resolution Request:*

The eFRI as it pertains to the identification and inventory of Old Growth in the Temagami MU FMP (2019 - 2019) Draft Forestry Plan.

It became apparent early on in the TMU FMP process that there was a significant issue with the eFRI system. The new inventory does not account for the areas of Old Growth previously identified and very well documented in many ways including various maps, academic work, documentaries, etc… FOT sought to resolve this issue at all the stages of the TMU FMP, yet repeatedly were advised by the MNRF that the eFRI system was simply much better and more efficient at identifying the forest inventory.

FOT vehemently disagrees that the eFRI properly and appropriately identifies all Old Growth stands in the Temagami region. We do acknowledge that the eFRI is a better system, nonetheless it has this critical fault. From the District Manger's response to issue resolution the comparison chart clearly outlines the loss of identified Old Growth:

In 2009 TMU FMP there was 123 689 ha of Old Growth identified, in the 2019 TMU FMP there is only 85 586 ha identified. A loss of 38 103 ha, that amounts to over 30% of Old Growth that has been lost.

Refer to the attachment: *FOT TMU FMP Stage 4 (2019-2029) - Regional Director Issue Resolution Request - Documentation and Evidence* for much more details and evidence.

References

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Appendix A – Relevant Sections from Declaration Order MNR-75

Inventory, Information and Management Systems

47. MNRF shall ensure that information management systems necessary to support forest management planning, which enhance the capability to systematically collect, store, update and retrieve information, continue to be developed and utilized.
MNRF shall update and provide the most current, relevant information available on Values for use in forest management planning, as described in the Forest Management Planning Manual.

Ecological Land Classification Program

48. MNRF shall maintain and continue to develop a program known as the Ecological Land Classification Program through the following initiatives:
    d. ensuring interpretation manuals are available to assist in the use of Ecological Land Classification in forest management planning;
    e. continuing to improve inventory and mapping technologies; and
    f. continuing to provide for technology transfer and training programs.

Data Systems and Analytical Methodologies

52. MNRF shall maintain and continue to develop methodologies for use in forest management planning and reporting which:
    a. address social and economic considerations when making forest management decisions;
    b. investigate and address wildlife habitat supply, biological diversity and landscape management analyses across temporal and spatial scales;
    c. capture, store and provide access to spatial information using geographic information system technology;
    d. support the use of spatial modelling;
    e. continue to incorporate the use of geographic information system technology in the development of models and tools; and
    f. ensure staff are trained in the use and application of the methodologies and technologies that are developed.

Background Information

4. The Forest Management Planning Manual shall require that the following information be made available for a Management Unit for use in forest management planning:
    a. the planning inventory, which includes updated forest resource inventory data, in accordance with the requirements of the Forest Information Manual;
    b. a description of the historic forest condition;
    c. Values information, as specified in the Forest Information Manual;
    d. fish and wildlife inventory information;
    e. Species at Risk inventory information;

Management Unit Description

5. The Forest Management Planning Manual shall include the following requirements for a description of the Management Unit in a Forest Management Plan:
    a. a description of the forest, based on the planning inventory and landscape level information;
    b. a brief description of Species at Risk, based on Species at Risk inventory information and habitat information;
    c. a brief description of fish and wildlife resources, based on fish and wildlife inventory information and habitat information;

Long-Term Management Direction

11. The Forest Management Planning Manual shall include the following requirements for the establishment, documentation and amendment of the Long-Term Management Direction for a Management Unit.
    a. A Forest Management Plan shall include a description of the Long-Term Management Direction.
    b. A Forest Management Plan shall set out the following information describing how the Long-Term Management Direction was developed:
        i. the management objectives identified in accordance with the Forest Management Planning Manual;
        ii. those management objectives that have an implementation timeframe greater than 10 years;
        iii. the analysis developed using methodologies, models and tools regarding forest regulation, social and economic analysis, wildlife habitat supply and landscape management provided by MNRF;
        iv. the available Harvest area for each forest unit, determined by establishing the level of Harvest for the ten-year period of the Forest Management Plan using forest regulation methodologies provided by MNRF; and
        v. the levels of Renewal and tending activities, and associated expenditures required to achieve the objectives described in the Forest Management Plan, based in part on the conclusions and recommendations in the analysis of Renewal and tending activities documented in the applicable Management Unit Annual Reports in accordance with the requirements of Condition 39.

Identification of Areas of Operations and Planned Levels of Activities

14. The Forest Management Planning Manual shall include the following requirements for identifying and documenting areas of planned operations for the activities of Harvest, Renewal and Maintenance in a Forest Management Plan:
    a. For Harvest operations:
        i. Criteria shall be developed for use in the identification of areas that are eligible for Harvest during the ten-year period of the Forest Management Plan, consistent with the Long-Term Management Direction. In the development of the criteria, the following shall be considered:
            - the applicable MNRF Guides that address the conservation of biodiversity at the landscape scale; and
            - operability of an area (e.g., physical, topographical or economic constraints or considerations), maturity of forest stands, and Species at Risk habitat.
        ii. Identify the preferred areas for Harvest from the areas eligible for Harvest for the ten-year period of the Forest Management Plan up to the level of the available Harvest area for each forest unit. In the identification of the preferred areas for Harvest, the following shall be considered:
            - the applicable MNRF Guides that address the conservation of biodiversity at the landscape scale; and
            - operability, Species at Risk habitat, visual aesthetics, and opportunities for Harvesting fuelwood.

    The remaining areas eligible for Harvest shall be identified as the optional areas for Harvest.

a. For Renewal and Maintenance operations:
    i. Areas for Renewal and Maintenance operations shall include:
        - the planned areas for Harvest;

- areas Harvested under the current or previous Forest Management Plan(s) that have not yet been renewed;
- areas of natural disturbances that have not yet been renewed; and
- areas which may require tending.

ii. At the third stage of formal public consultation (i.e., review of proposed operations), the planned areas for Renewal and tending shall be available for review and comment.

b. The Forest Management Plan shall set out:
   i. An identification and portrayal of the planned areas for Harvest, the contingency areas, and the planned areas for Renewal and tending; and
   ii. The following information:
      - criteria used to identify the areas eligible for Harvest;
      - the rationale for the planned areas for Harvest, including a discussion of how the applicable MNRF Guides that address the conservation of biodiversity at the landscape and stand and site scales were considered;
      - planned levels of Harvest, Renewal and tending operations for the ten-year period of the Forest Management Plan;
      - the wood volumes expected from the planned areas for Harvest; and
      - planned expenditures for Renewal and tending operations for the ten-year period of the Forest Management Plan.

Area of Concern Prescriptions and Conditions on Access

16. The Forest Management Planning Manual shall include requirements for the development and documentation of Area of Concern prescriptions for Planned Operations for the activities of Harvest, Renewal and Maintenance and Area of Concern conditions on planned Access operations in a Forest Management Plan. Those requirements shall include the following:
    a. Areas of concern shall be established for identified Values, which include all lakes and streams, within:
       i. the planned areas for Harvest, Renewal and tending operations;
       ii. corridors for new Primary and Branch Roads; and
       iii. the areas within which new Operational Roads may be constructed;
    b. In the planning of operations, Area of Concern prescriptions, and Area of Concern conditions for an individual Area of Concern or a group of areas of concern with common Values shall be developed using the standards or guidelines contained in MNRF Guides, and those prescriptions and conditions and the rationale for those prescriptions and conditions, shall be documented and portrayed in the Forest Management Plan.
    c. Area of Concern prescriptions, and Area of Concern conditions shall be developed for individual areas of concern, or groups of areas of concern with common Values using the applicable MNRFGuides. Area of Concern prescriptions may include: reserves (i.e., prohibition of operations), or modified operations (i.e., specific conditions or restrictions on operations), or regular operations (i.e., in accordance with the Silvicultural Ground Rules).
    d. If another planning exercise (e.g., the development of a resource stewardship agreement) has resulted in a proposed Area of Concern prescription or Area of Concern condition, the proposed prescription or condition shall be available for review and comment at the third stage of formal public consultation (i.e., review of proposed operations). If the review results in an objection to the proposed prescription or condition, the requirements of clause (e) of this Condition shall apply. If the review results in no objection to the proposed prescription or condition, no further planning shall be required, and the rationale for the prescription or condition, including the consideration of comments received during consultation shall be documented in the Forest Management Plan.
    e. If an Area of Concern prescription or Area of Concern condition for an individual Area of Concern or a group of areas of concern with common Values must be developed in the absence of standards or guidelines in a guide, there shall be:

i. consideration and an environmental analysis of a reasonable range of practical alternative prescriptions or conditions; and
ii. discussions with Known Affected Persons.

Documentation of the consideration and environmental analysis of alternative operational prescriptions or conditions, the results of discussions with Known Affected Persons, and the rationale for the selected prescription or condition shall be provided in the supporting documents that accompany the Forest Management Plan.

f. If an Area of Concern prescription or Area of Concern condition is developed in accordance with the requirements of clause (e) of this Condition for an Area of Concern related to a cultural, tourism or recreation Value, there shall be consideration of visual aesthetics, which may include the use of viewscape analysis techniques, in the development of the prescription or condition.
g. If an Area of Concern prescription or Area of Concern condition is developed for an individual Area of Concern or a group of areas of concern with common Values, and the prescription or condition differs from the standards or guidelines in a MNRF Guide, the requirements of clause (e) of this condition shall apply. The prescription or condition shall be recorded as an exception in the Forest Management Plan, and the monitoring program for the Forest Management Plan shall describe the methods which shall be undertaken to monitor the effectiveness of the prescription or condition.

Wildlife Population Monitoring

38. MNRF shall continue to implement a Provincial Wildlife Population Monitoring Program within the Area of the Undertaking, and shall continue to investigate wildlife population monitoring methods. This program shall provide long-term trend data on the species listed in clause (a) of this Condition, and shall collect information to support testing of the effectiveness of MNRF Guides that address habitat for wildlife species.
    a. The species to be monitored shall include representative terrestrial vertebrate species:
        i. which benefit from forests managed for the purposes of maintaining early successional stages;
        ii. which benefit from forests managed for purposes of maintaining late successional stages; and
        iii. which utilize the following habitat types and features:
            - snags;
            - dead and downed woody material;
            - riparian areas;
            - mature or over-mature stands; and
            - large areas in a similar successional stage.
    b. MNRF shall maintain a program plan for the Provincial Wildlife Population Monitoring Program which outlines priorities, representative species to be monitored, and proposed activities and schedules for the Provincial Wildlife Population Monitoring Program. MNRF may update the program plan from time to time, and shall make the program plan available on a named, publicly accessible website. The program plan shall be updated no later than one year following the public release of each Five-Year EA Report.
    c. Updates on the Provincial Wildlife Population Monitoring Program shall be provided to the Provincial Forest Technical Committee to assist in the review and revision of MNRF Guides.

            - be proposed for incorporation into the next revision of the Forest Operations and Silviculture Manual;
            - describe the approach that will be used to monitor the effectiveness of the MNRFGuide or new guide; and
            - shall specify when any new requirements come into effect.

b. For greater certainty, this Condition does not apply to an amendment MNRF makes to a guide before the review required by clause (a) where MNRF considers such an amendment necessary to reflect a change in policy, legislation, or to clarify existing guidance and where MNRF considers the circumstances as requiring the amendment to take effect as soon as possible. MNRF shall consult on any such amendment in accordance with the steps set out in clause (iii). MNRF shall include any such amendment in the next guide review that is undertaken in accordance with this Condition.
c. MNRF shall make available on a named, publicly accessible website:
    i. all current versions of the MNRF Guides to be used in the planning and implementation of forest management activities;
    ii. an overview of each MNRF Guide; and
    iii. a status summary of current MNRF Guides.