Appendix H: Data Gaps

Reference	Item & Description
Indicator 1	**Data for passively managed forests** Need better statewide estimations of acres, distribution, and type of passively managed forest lands, those managed to achieve native community habitat goals and older forests. It is difficult to judge the biodiversity that these types of forests provide when limited data is available for them statewide.
	Map of private forest land by legal and administrative definition A map of private lands delineated by legal and administrative definition is needed to judge how lands are protected and for how long under different legal parameters such as contracts, easements, trusts, purchased development rights, etc.
	Urban Forest Assessment Need a continuation of the Urban Forest Inventory pilot study conducted by FIA and WI DNR. This is the only statewide data source for urban forests.
Indicator 2	**Tree Species Models** Need better models to assess size and age class, and successional stage for individual tree species; better hardware/software to complete this.
	Stand Structure Models Need models that analyze stand structure. A model specifically for old growth is needed. This can be linked to biodiversity if monitoring changes over time, investigating why things are changing and how that is affecting forest biodiversity.
	Statewide Estimations Consistent statewide estimations of acres, distribution, and types of older forests are needed as well as better statewide estimations of acres and distribution of passively managed forest lands and those adaptively managed to achieve native community habitat goals are needed.
Indicators 2 and 12	**LIDAR (optical remote sensing technology)** An increased frequency of LIDAR can increase the statistical reliability of some forest cover type species like hemlock; could also provide better information on biomass by species.
Indicators 2, 3, and 10	**WISCLAND** An increased frequency of WISCLAND could provide better data to forest cover type groups reported by species (Indicator 2); This data could be used in place of NLCD data for fragmentation (I3); this could provide information on the area of forest land adjacent to surface water and the amount of forest land by watershed (I10).
Indicator 3	**Forest Fragmentation** Ensure the updating of NLCD every 10 years at minimum to provide data needed to assess forest fragmentation. Actual extent and impacts of identified conditions and concerns.
Indicator 4	**Natural Heritage Inventory (NHI)** Implement systematic monitoring specific to NHI. Need assessment directly related to forest and woodland communities and forest associated species of concern. WDNR-ER does this inventory, but they are not funded adequately to ensure a monitoring system that will show trends over time
	Native American species of concern Native American Tribes have species they are specifically concerned about that are not necessarily on the NHI list. These should be represented and recognized. A comprehensive list from all the tribes should be compiled

	Amphibians Create a monitoring system for forest-related amphibian species of concern. Amphibians can be excellent indicators of ecosystem health. Choosing a few species of concern and monitoring populations over time can be an indicator of forest health.
	Improved statewide inventory and monitoring of: Species of greatest conservation need, community type (e.g. old-growth pine forest) representation, composition, and structure; forest based species life histories, habitat requirements, and population ecology; Indirect and cumulative effects (e.g. unintended consequences) of changes in biodiversity, habitat, and environment; Management regimes and impacts on community composition and structure.
	Sustaining native biological diversity Our knowledge of most plant and animal species' life history traits, habitat associations, population sizes, distributions, trends, and response to disturbance or environmental change is significantly lacking. There are not enough available data to evaluate whether or not Wisconsin's forests are sustaining native biological diversity.
Indicator 6	**Non-Timber Forest Products** Need database created on removals of non-timber forest products
	Timber Product Output (TPO) Report Increase TPO to an annual survey and expand it to include non-forest industry wood fiber consumers and producers (bio-energy). The TPO is an excellent way to track the amount and type of removals. By increasing the frequency and expanding to bio-energy, it will be a much better source of data than FIA.
Criterion 3 Indicator 7	**Invasive Plants** A lack of consistent and accurate invasive plant data and the methods used to collect the data, makes analyzing the extent and condition of invasives extremely difficult and unreliable. Need to create a common database for organizations to share for tracking invasive plants. This would then be used in combination with FIA surveys that report on invasive woody and shrub data.
	Animal Damage (deer browse) Need analysis that links browse surveys to deer management units and population to understand animal damage to the forest
	Herbaceous Plant Survey A mid- and under-story herbaceous plant survey would be an ideal compliment to animal damage data. Need a habitat classification type with mid- and under-story herbaceous plant survey. Changes in the understory could be seen more quickly than tracking tree data.
	Catastrophic events monitoring Data on the impact of flooding and wind events on Wisconsin's forests has not been consistently collected. Methodology for capturing the impact of catastrophic events on Wisconsin's forests should be developed and implemented.
Indicator 8	**FIA - Damage Type** Expansion of FIA plots for damage type (P3 plots). Essentially this is looking at crown dieback and transparency as a proxy for forest health. Tracked over time, natural mortality vs. mortality from damaging agents can be seen.
	Intensify ozone FIA and Forest Health Management plots Currently forest damage data due to ozone is collected on 31 plots in the state. Quadrupling the intensity would increase the chances of finding problems early. It would also increase the validation on a statewide scale.

Indicator 9	**Cooperative forest protection areas data** Forest fire suppression on non-federally owned lands in Wisconsin is shared between the WDNR and local fire departments. There is a significant data gap in fire occurrence information for parts of the state (cooperative areas) that are primarily protected by fire departments.
	Controlled burn data Additional research on the timing, intensity, and effectiveness of different types of controlled burn activities
Criterion 4 Indicator 10	**Index of Biological Integrity (IBI)** Increase the monitoring intensity of IBI in forested settings. Currently information on IBI is collected on different streams across the state depending on funding and priorities.
Criterion 5 Indicator 12	**Global Carbon Cycling** Need better metrics to measure the contribution of forest products to the global carbon cycle. A few of the larger private companies are tracking this information already, but is it not available on a larger statewide scale.
	Biomass Need better metrics for remote sensing tree volumes (biomass) by species. This would ensure information on forest ecosystem biomass that is currently lacking. Use LIDAR as a source of data.
Criterion 6	**Environmental Services** Essentially provide a list of the environmental services that forests provide.
Indicator 13	**Bioenergy Report** Consistent statewide analysis of energy production and consumption needs to be completed and the implications analyzed.
	Non-Timber Forest Products Need database created on the value of non-timber forest products.
Indicator 14	**Forest Recreation Survey** More intensive recreational survey needed that focuses specifically on forest lands that spans social, ecological, and economic effects of recreation.
	Mapping Forest Recreation Trails Map of trails on forest land (motorized and non-motorized, all uses). Need more data collection and then multiple partners' data sets combined into GIS.
	Recreation User Satisfaction/Conflict Need data on recreation user satisfaction/conflict regarding multiple use on forest land.
Indicator 15	**Education Scholarships** Need basic evaluation of what scholarships are being provided over time.
	Research program Establish a research program that cooperates across agencies and focus on some priorities; get a program with UW and DNR going
Criterion 7 Indicator 19	**Forest Planning** Need evaluation to determine if forest plans are being carried through to effectively meet the goals stated.
	Legal and institutional standards evaluation A review and evaluation of key standards needs to occur in order to understand their efficacy.