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# BAYFIELD COUNTY FORESTRY & PARKS DEPARTMENT ANNUAL WORK PLAN

January 1 through December 31, 2020

The Bayfield County Forestry and Parks Department Work Plan for calendar year 2020 gives direction and meaning to the Forestry and Parks budget, further defines and supplements the Comprehensive Fifteen Year Land Use Plan, and emphasizes current goals and needs of the County Forest, Parks and Trails Programs. This plan also complies with Chapter NR47 Wisconsin Administrative Rules for the administration of the County Forest Administrator Grant Program.

## SUSTAINABLE TIMBER HARVEST

One of the primary missions of the Bayfield County Forestry and Parks Department (hereafter "Department") is to manage, conserve, and protect the natural resources of the county forest. Multiple use and sustainable forest management practices will be utilized to provide a wide variety of forest products and amenities for current and future generations. Sustainable forest management is commonly defined as meeting the forest resource needs and values of the present without compromising the similar necessities of future generations.

Wisconsin's county forests are governed under County Forest Law (s. 28.11) and were created to become working forests, with an emphasis on optimizing the production of forest products and maximizing public benefits. Below is the purpose statement as found in s. 28.11(1):

> *The purpose of this section is to provide the basis for a permanent program of county forests and to enable and encourage the planned development and management of the county forests for optimum production of forest products, together with recreational opportunities, wildlife, watershed protection and stabilization of stream flow, giving full recognition to the concept of multiple-use to assure maximum public benefits; to protect the public rights, interests and investments in such lands; and to compensate the counties for the public uses, benefits and privileges these lands provide; all in a manner which will provide a reasonable revenue to the towns in which such lands lie.*

**Partnership with the DNR**

In accordance with s. 28.11 (County Forest Law), the DNR oversees the county forest program. As per that partnership, the DNR provides an abundance of professional, technical and financial assistance to counties having lands entered in the county forest program. As part of the technical assistance, the DNR allocates a total of 46,000 hours, statewide, to counties having lands enrolled in the county forest program.

The amount of technical assistance (termed "time standards") dedicated to each county is determined through a fairly complex formula. Past, present and future workloads are incorporated into the formula to determine the general scope of a county forest program and, subsequently, the level of assistance required by each county. Timber sale establishment, reforestation, regeneration monitoring, reconnaissance, timber sale administration, road and trail maintenance, as well as time associated with certification, work planning, various meetings, other professional services, and all associated paperwork (and more) are all part of the calculation. If the total request from all counties exceeds the 46,000 hour annual threshold, a general proration is adopted to equally adjust the final figure accordingly.

Time standards were assessed in Fiscal Year 2019 and then adjusted in FY 2020 (an additional proration of 0.87885 was applied throughout the standard to accommodate all county forest programs). On the Bayfield County Forest, the annual time commitment allocated by the DNR to the county, after the pro-rate is applied, has been calculated at 3,640 hours. The new hours will apply from FY 2020 through 2022.

This is an increase from the previous standard (3,395 hours), but a decrease in the initial new hours that were calculated last year (3,916). The significant increase in hours (when compared to the previous five years) is a direct reflection of the growth in various forest management programs that has occurred over the past five+ years, including, but not limited to: timber sale establishment, timber sale administration, reforestation, regeneration monitoring (including FRM), forest reconnaissance (compartment and stand inventory), invasive species control, etc.

As part of the 3,640 hour time commitment, the DNR provides assistance in a variety of areas, including, but not limited to:

1. Establishment of timber sales. Roughly 20% to 25% of the annual sustainable harvest goal is accomplished by DNR foresters.
2. Forest reconnaissance (both compartment and stand updates).
3. Forest stand data entry (WisFIRS, see below) and maintenance.
4. Continuous Forest Inventory (CFI) plot sampling/data collection.
5. Regeneration monitoring, both artificial and natural.
6. Timber stand improvements (TSI).
7. Timber sale administration.
8. Mechanical site preparation for natural regeneration.
9. Mechanical site preparation for artificial regeneration.
10. County forest road and trail construction and maintenance.
11. Road right of way and wildlife (game) opening mowing/maintenance.
12. Support from professional forest management specialists, including forest hydrologists, wildlife biologists, forest ecologists, forest health specialists, GIS specialists, etc.

13. Support, manage and administer the county forest group certifications, for both SFI and FSC (both forest certificates are administered by the DNR through a group format).
14. Assistance in the development and maintenance of the comprehensive land use and annual work plans.
15. Function as a catalyst for the transfer of technology and professional or scientific information, as well as providing opportunities for training or enhancement.
16. Financial support through various grants, aids and loans.

## Forest Certification

The Bayfield County Forest is dual, third party certified (as part of the Wisconsin County Forest Program group certificates, which are managed by the DNR). For the past decade plus, the Department has maintained forest certificates with both SFI (Sustainable Forestry Initiative) and FSC (Forest Stewardship Council). The DNR maintains all aspects (administratively and financially) of both the SFI and FSC group certificates.

The standards, principles and/or strategic direction of each non-profit, independent forest certifying body are developed by their respective board members and staff, which include representation from conservation organizations, academia, tribal entities, family forest owners, private forest landowners, public forest landowners and the forest products industry. Each certifying organization is further structured into three sectors (SFI) or chambers (FSC), incorporating environmental, social and economic components. This diversity reflects the wide variety of interests in the forest management community.

As part of certification, the county forest management program is audited annually against the strict standards, guidelines and principles of each independent organization. Every five years, each certifying body performs a full re-certification audit. Re-certification audits are far more intense and in depth than annual compliance audits and, as such, require far more resources to complete. In August 2019, Bayfield County was one of four counties selected for a full re-certification audit (Douglas, Ashland and Barron were the other three counties).

The results of the audit were nearly perfect. Both SFI and FSC issued zero corrective actions (neither major nor minor) and reported zero opportunities for improvement. The county forest program received numerous accolades and commendations. All of which is extremely rare in a full re-certification audit and a reflection of a high quality forest management program administered by Bayfield County.

Maintaining forest certification isn't a mandate. The Department invites each certifying entity to analyze and scrutinize our management of the forest. We ask them to subject our forest management practices, plans and principles to their strict, rigid and dynamic internal standards, principles and guidelines. Maintaining one certificate, let alone two, is a significant commitment and demonstrates the county's desire to ensure the public that we have some of the best managed forests in the country. The Department will continue working with each independent certifying body, as well as the DNR.

The results of the audit help to solidify and to reaffirm that the county forest is sustainably managed, not only to the standards and expectations of those auditing and overseeing the program,

but also to the professional principles and values exhibited and demanded by all staff members within the Department.

## Sustainable Harvest Goals

The Bayfield County Forest totals 175,750 acres, making it the third largest county forest in the state. Optimizing the production of forest products was the primary reason the county forest program was developed. Timber harvests are important for the economic well-being of Bayfield County, as well as for the health and vigor of the forest.

One of the major objectives of timber management is to produce a perpetual sustained yield of forest products. In part, this is realized through the analysis and scheduling of forest stands for management and, ultimately, the development of sustainable annual and long term harvest goals. Implementation of sound, professionally recognized forest management and harvesting techniques is an essential part of the process.

Numerous criteria are analyzed when developing short and long term sustainable forest management goals. Existing reconnaissance data (as entered and compiled in WisFIRS, short for Wisconsin Forest Inventory and Reporting System, a data management application developed and maintained by the WDNR), along with thorough field inspections conducted by professional Department and DNR foresters, will be used to determine which stands are ready for treatment. More recently (implemented in 2018), the adoption of an extensive Continuous Forest Inventory (CFI) program will yield additional information on the growth and development of the forest. This information will also be used to assist in the development of short and long term goals. See page 29 for more information on the CFI program.

Short or long term adjustments to the management approaches or philosophies of specific forest types may also be incorporated in the goal development process. Such modifications may be needed as a means to address numerous challenges that eventually (or inevitably) arise over the course of managing a vast and diverse forested resource. Some of which include: addressing unbalanced age class distributions; the management direction of timber types where a large percentage of the acreage base is either at or approaching maturity; unpredicted or unexpected responses to previous silvicultural treatments; response to insect or disease outbreaks or other natural disasters (i.e. wind storms, Emerald Ash Borer, gypsy moth defoliation); challenges regarding natural or artificial regeneration (i.e. deer browse or other forms of herbivory, invasive species control, competition from undesirable vegetation, etc); and responses to research or other professional recommendations regarding the management approaches of specific forest types or communities.

In addition, the long term monitoring of stands that have previously received treatment is crucial in determining the success of past management practices. The results of previous management will also aid in the development and implementation of future prescriptions.

- The estimated 2020 sustainable timber harvest goal for the Bayfield County Forest is 5,262 acres. This represents an increase of 350 acres (roughly 7%) when compared to the harvest

goal for 2019 (4,912 acres) and an increase of 600 acres (roughly 13%) when compared to the goal for 2018 (4,662 acres).

Sustainable harvest goals are generated for every major timber type on the forest. In general, data is analyzed internally and goals are established, by the Department, for each primary management type/method (i.e. uneven-aged management and even-aged management).

In addition, whenever possible, each management goal is further summarized by Integrated Management Unit (IRMU). Establishing a goal per IRMU ensures that management is equally distributed throughout the forest (to the extent feasible) and that minor nuances inherently found within each unit are addressed independently (with adjustments made to the goal accordingly, and as needed).

As previously stated, numerous factors have the potential to influence the harvest goal for any given year. Below is a brief summary regarding the 2020 management approaches, issues, philosophies, and/or direction for the major timber types on the forest:

Jack Pine (and Barnes Barrens Management Area):

At nearly 12,000 acres, jack pine is the fifth largest timber type on the county forest. It's also a very young type, with over 55% of the acreage base established within the past 20 years and another 25% between 21 and 30 years ago (nearly 80% of the acreage base is less than 30 years old).

Jack pine exists in basically two areas on the forest, all within the Northwest Sands Ecological landscape. Roughly 2,500 acres occurs on sandy soils in the northern parts of the county (mostly east of Valhalla – on the northeastern most fringe of the NW Sands) and 10,000 acres in the barrens areas located between Iron River and Barnes.

Most of the jack pine stands located in the barrens north of Barnes are part of the Barnes Barrens Management Area (currently at roughly 7,000 acres of jack pine within the Area). This special management area was formally designated in 2012 with the goal of developing and maintaining critically important Pine Barrens habitat through the simultaneous management of jack pine and open/early successional barrens. Among other things, the Barrens Management plan defines operational parameters and guidelines that must be followed to achieve the desired future condition.

A few important objectives of the Barnes Barrens Management Plan are as follows (for detailed information on the Plan, please visit our website at https://www.bayfieldcounty.org/243/Plans):

- Delineate approximately 11,500 acres as a special management area on the Bayfield County Forest for the simultaneous management of timber products and the development and maintenance of early successional Open and Brush Prairie Pine Barrens habitat.
- Identify, delineate and maintain a "core" area and four management zones within the special management area. Prescribed fire and/or chemical treatments will be utilized to maintain the permanent core area in an open condition.
    - Approximately 128 acres of the core are scheduled for treatment (via burning) in 2020.

- Each management zone surrounds a roughly 1,000 acre, permanently open core area and ranges in size from roughly 2,500 to over 2,900 acres. The management zones are assigned a 12 year harvest interval (each zone is completely harvested over a period of 12 years). During the harvest interval, whenever possible, all stands within each zone will be harvested and seeded or planted exclusively to jack pine (though seeding is preferred). From the time of harvest until the point when the jack pine regeneration is approximately 10 feet in height, stand characteristics will meet the criteria for Brush Prairie Barrens. Typically, suitable Brush Prairie habitat will exist for 10 to 15 years after harvest. The habitat created during this 10 to 15 year window will serve as temporary or "surrogate barrens". Combined with the permanently open core, when fully established, between 3,500 to nearly 4,000 acres of prime barrens habitat will exist within this special management area.
- Develop a timetable for the systematic harvest and regeneration of timber within each designated management zone. When fully regulated, jack pine stands will be managed on roughly a 48 year rotation (as stated above, it will take about 12 years to manage each zone).
- Designate approximately 200 contiguous acres within each zone as Kirtland's Warbler Habitat Areas (KWHA). Reforest these areas to jack pine at densities that are conducive to creating suitable Kirtland's Warbler habitat. Currently, suitable habitat contains at least 1,200 stems per acre, combined with 1 to 5 unforested openings per acre. Openings should total approximately 25% of the stand and be evenly distributed.
    - The first confirmed nesting and successful fledging of Kirtland's Warblers in Bayfield County occurred in the Barnes Barrens Management Area in 2016. All five nestlings successfully fledged. Birds were also observed and banded in 2017, however, no documented nesting activities occurred. In 2018, a pair successfully nested, with five nestlings fledged (one of the pair was banded from the 2016 nesting period). In 2019, one previously banded male was observed, but no females were located. Monitoring will continue in 2020.
- Some aspen, red pine and scrub oak will also exist within the Barrens, but the goal will be to regenerate jack pine whenever possible.
- Development of the Barrens will take some time, as the Department is still managing the results of previous management (with a diversity of species and age classes). However, the core area is on target to be fully established by at least 2035 (and probably much sooner). Once all stands are addressed and ready for management, the Department will begin the harvest of Zone 1, thus marking the beginning of the floating barrens.
- In the meantime, the Department will continue to monitor the effectiveness of the plan. As with any plan, amendments, alterations or modifications are expected. The Department will also continue to work with the DNR regarding the technical aspects of barrens development and maintenance.
- Zone 4 contains a significant amount of red pine plantations, more than any other zone within the barrens. Once the formal barrens management process begins and zones are managed as scheduled, stands in zone 4 will be regenerated from around 2071 through 2082. To achieve that goal, most of the red pine stands in zone 4 will need to be converted to jack pine by the end of 2035. Doing so would give them enough time to reach maturity by the time management begins in zone 4.

In the jack pine type, for the past decade, the Department has attempted to carry mature stands on the landscape for as long as possible. This was done primarily to provide a relative even flow of

annual harvest, as well as to maintain a level of mature jack pine on the forest (i.e. structural diversity).

However, currently, many mature stands are experiencing significant mortality, at levels equal to or exceeding 30%. The Department can no longer carry these mature stands without experiencing even greater losses of volume. A higher percentage of dead and dying trees also increases the risk of insect and/or disease outbreaks (as well as heavier fuel loads), which would potentially have a negative impact on other stands in the area.

As a result, the short term objective was to manage all stands experiencing 30% mortality or greater within a three to four year period (or longer, if at all possible). That process started in 2016, continued in 2017, 2018 and 2019, and will continue in 2020.

In 2016, the focus was managing the targeted stands within the Barnes Barrens Management Area. In 2017, the focus was on stands located outside the Barrens. A few of the remaining stands located outside of the Barrens was managed in 2018, however, the accelerated harvests of 2016 and 2017 have already addressed the stands with the highest levels of mortality. A few stands located inside, as well as outside of the Barrens were managed in 2019. A mix of inside and outside of the barrens, as well as one stand in the core, will be targeted in 2020.

Once the management of the over mature stands is completed (by the end of 2021), it is anticipated that the vast majority of remaining mature jack pine will be managed within the next five to ten years (again, with an emphasis on carrying mature stands for as long as possible). Afterwards, it is anticipated that there will be a narrow window where significantly less jack pine will be managed, at least until the next larger age classes begin to reach maturity (generally between 50 to 60 years of age).

- The 2020 goal for jack pine is 171 acres and is broken into four parts:
    - 111 acres located within the Barnes Barrens, but outside of the core area;
    - 0 acres located inside the core area within the Barnes Barrens;
    - 30 acres located outside of the Barrens in IRMU 5, and;
    - 30 acres located outside of the Barrens in IRMU 3.

This represents a decrease of 36 acres (about 17%) when compared to the total goal for 2019 (207 acres) and a decrease of 21 acres when compared to the goal for 2018 (192 acres). The significant fluctuations in acreage is primarily due to the variability of harvests associated with high risk stands (higher levels of mortality) and preparations made in each zone and/or core area within the barrens. If the Department determines that other stands are rapidly deteriorating or otherwise need to be managed immediately, the goal for 2020 may be adjusted accordingly.

The Department will also continue to manage stands located within the Barnes Barrens Management Area as outlined in the Barnes Barrens Management plan. Modifications to the plan may be necessary, depending on a stands response to treatment, response to unforeseen circumstances (i.e. insect and/or disease outbreaks), results of data analysis, or the development of better direction, and will be addressed on a case by case basis.

More Barrens Habitat Development

The Department has been collaborating with the DNR regarding the development of a secondary barrens area on county forest land located about 3 miles north of the Barnes Barrens, just south of Highway 2, in the Town of Hughes. Creating habitat corridors (as per the DNR Northwest Sands Habitat Corridor Plan), or stepping stones, from one suitable barrens habitat to the next, is viewed as an important part of the overall goal of providing optimal habitat for barrens dependent wildlife species. Spacing each barrens habitat area about 3 miles apart has been identified as the preferred distance (refer to the NW Sands Habitat Corridor Plan more for information on the stepping stone concept).

The secondary barrens management area would encompass about 4,000 acres total, with roughly 1,000 to 1,500 acres as a "core" and the remainder as floating/surrogate barrens. The layout would be very similar to the Barnes Barrens in scope, but at a much smaller scale. Stands located within the 2,500 to 3,000 acre "floating" area would be managed about the same as previously prescribed, but with a goal of providing more structured or systematic connection to the open core. The roughly 1,000 to 1,500 acre core would be managed to maintain an open, grassy landscape, similar to the core of the Barnes Barrens. Once established, the core would be primarily maintained via prescribed fire.

The targeted core area (roughly 1,300 acres) is comprised of about 46% upland forest types and 54% lowland. Of the lowland areas, most are already composed of lowland grasses and/or shrubs/alder or contain unproductive (from a timber management perspective) stands of timber. While most of the upland acres contain merchantable, though relatively poor quality, timber (some of which is currently part of an active timber sale). Also, a small portion of the upland acres are already maintained as open (via wildlife openings).

If approved, within the core area, most of the upland acres would be managed (via timber sale) over the next few years. All stands within the core would then be converted from forested types to open grassy habitats. The lowland areas would also be managed, but since most areas are currently in some form of "open" condition, additional inputs are expected to be less significant. It is estimated that about 40% to 45% of the area currently located within the core (essentially those that are classified as productive upland forest) will be converted to an open, grassy habitat.

As stated above, the stands located within the "floating" area would essentially be managed as previously prescribed. Timber sale design and timing of harvest may be modified to ensure and maintain connectivity to the permanent core. However, unlike the jack pine emphasis within the Barnes Barrens, the reforestation of these stands will be varied, with a focus on natural regeneration and/or the perpetuation of current timber types.

- In 2020, the Department will develop a plan for the establishment of a new secondary barrens area, as described above. The Department will collaborate with the DNR regarding the development of said plan and present the final draft to the Forestry and Parks Committee for approval. If approved, the general expectation is to start development of the new secondary barrens in 2021.

Red Pine:

Red pine is the second largest timber type (by area) on the county forest, comprising a total of over 18,000 acres. Most of the acreage base is composed of plantations, but about 1,000 acres of natural stands exist. Natural stands tend to be much smaller in size (acreage) and widely scattered throughout the forest.

The general model for red pine management is fairly simple. Most of the management centers around stands of artificial origin (plantations). In plantations, once stands reach the stage in which they can be managed (typically around 30 years old), a timber sale is established. That harvest cycle is then repeated about every 10 years. Once a stand has been thinned about three times, harvest intervals tend to slow a bit, primarily contingent upon the growth response from previous treatments. At this point, harvest intervals can still be on a 10 year cycle, but more typically end up closer to every 12 to 15 years.

Depending on a variety of factors, including responses to previous treatments, presence of insects and/or disease, general management direction for the timber type, forest product development and markets, etc., the stand can be rotated anywhere between 70 and 120 years of age (a little earlier or later depending on the above mentioned factors). Another goal for 2019 will be to take a closer look at the rotation age for red pine, in an attempt to determine the optimal time to regenerate most stands of artificial origin (plantations).

Rotation typically involves prescribing a clearcut or similar even-aged treatment, in which all trees are removed (especially critical if re-establishing a red pine plantation, as older trees can be vectors for future insect or disease infestations). Natural stands are managed as well, with a focus on stands of higher density or those that have enough acreage for harvest. However, roughly 95% of the harvest goal is derived from the management of plantations.

As stated in the Jack Pine section (page 6), in zone 4 of the Barnes Barrens, existing stands of red pine will be converted to jack pine (as per the Barnes Barrens Management Plan). Work will begin in 2020 to convert most of the existing red pine stands to jack pine by the end of 2035. As a result, additional stands will be treated to achieve the desired objective.

- The 2020 goal for red pine is: 1,030 acres (roughly 920 acres prescribed for thinning and 110 as regeneration) and is summarized as follows:
    - Outside of the Barrens: 695 acres will be thinned and 0 acres will be regenerated;
    - Inside the Barrens, not including IRMU 5, Zone 4: 95 acres will be thinned and 0 acres will be regenerated;
    - Within IRMU 5, Zone 4: 130 acres will be thinned and 110 acres will be regenerated.

The total goal represents an increase of 70 acres (or about 7%) when compared to the goal for 2019 (960 acres) and an increase of 80 acres when compared to the goal for 2018 (930 acres).

Red pine stands located within zone 4 (IRMU 5) of the Barnes Barrens Area will also be re-analyzed in 2020. The goal will be to establish/prioritize a thinning and regeneration schedule for each stand (through 2035). During that process, short or long-term adjustments may be necessary to assure compliance with the goals of the Barrens Management plan. Within the Barrens, it is critical

that stands are regenerated (or on a feasible path for future rotation) at designated time periods established for each zone. Every few years it is necessary to re-analyze stand data and determine if modifications are required to achieve optimal results.

Northern Hardwood:

The county forest contains a little over 17,000 acres of northern hardwoods, making this the third largest cover type on the forest (aspen being the largest). The Department is in the process of re-evaluating the management approach on all stands of northern hardwood, especially those developing on medium to medium poor quality sites. In general, the Department is finding that more intensive or less traditional methods of management on these poorer quality sites, that utilize larger canopy gaps, groups or patches, or even aged practices, generally yield more favorable results.

In the northern hardwood type, prescription goals for existing stands have repeatedly conflicted with field observations. Previously, the standard prescription given to nearly all northern hardwood stands was un-even aged (or all-aged) management or a thinning, regardless of stand or site quality. Consequently, over the past 20+ years, many stands have been managed with un-even aged prescriptions (i.e. relatively light selective harvests which incorporate small gaps to facilitate new regeneration).

Preliminary results from forest regeneration monitoring efforts have found that northern hardwood stands, developing on drier (or wetter) sites of medium to medium-poor quality, are generally not responding well (or as desired) to the traditional methods of management (or traditional thinking). Growth of residual trees has also been relatively poor, desired regeneration has been sporadic and slow to develop, and competition from undesirable regeneration has been, at times, very aggressive (primarily ironwood).

Through routine and regular regeneration monitoring, the Department is also discovering that regeneration gaps (associated with traditional un-even aged management practices) are oftentimes dominated by ironwood, while the preferred species that do regenerate (i.e. maple, basswood, yellow birch, oak) are low in number, slow to develop/grow and/or are repeatedly browsed by deer (which allows them to get quickly overtopped by undesirable species). Growth and development on the remaining stems is also largely poor and slow, with stands, in general, just not responding to the traditional practices.

Additionally, it was discovered that previous treatments oftentimes didn't incorporate an adequate amount of regeneration gaps, in both size and total number (something the Department has remedied through the establishment of a systematic approach to gap design and placement). All factors listed above are serious concerns, that have the potential to negatively impact most primary objectives associated with the long term management of this type.

One goal for 2018 was to complete the re-inventory of the northern hardwood type, with a focus on stand and site quality (both existing and potential), responses to previous management (if applicable), and the development of new prescriptions.

As expected, upon completion of the re-inventory process, there was a general increase in stands that will be managed with more intensive un-even aged or even-aged treatments, especially those developing on poor to medium-poor quality sites. Whenever feasible and/or practical, stands on medium quality or better sites will continue to be managed with more traditional un-even aged prescriptions, though intensity may vary depending on many factors and/or concerns previously listed.

Whether traditional or more intensive, regeneration gaps or groups associated with all uneven-aged treatments will continue to be designed and applied systematically. The systematic approach to gap/group placement ensures that all are of the appropriate size classes are evenly distributed throughout the stand. Systematic application also helps to ensure that prescribed stand level regeneration gap targets are met (i.e. a typical prescription may have a goal of 10% to 20%, sometimes more, of the stand in regeneration gaps or groups).

Knowing the general gap size and total number installed also makes it easier to determine stand level accomplishments. Flexibility is also part of the design, as regeneration gaps can be moved slightly or excluded altogether, depending on the overall goals of the prescription. Systematically installed gaps are also easy to re-locate, which is critical when performing routine monitoring or when needing to address issues/concerns regarding regeneration (i.e. site preparation, competition control or supplemental planting).

When utilizing un-even aged management methods on the poorer quality sites, whenever practical, larger gaps (or groups) will be incorporated with lighter thinning as an attempt to maintain structural integrity within the stand, develop a new age class (regeneration), increase species diversity (regeneration) and improve quality on the remaining/residual trees. In general, it's understood that growth and development on poorer quality stands will be significantly less than similar treatments on better sites. It is also anticipated that the amount of time between thinnings (or thinning intervals) will also increase (in stands developing on poorer quality sites).

Traditional approaches/instructions pertaining to northern hardwoods management indicate that re-entry should be attainable every 10 to 20 years (depending on growth and response to previous treatment). However, as previously stated, northern hardwood growth and development is typically much slower on sites of lesser quality. As a result, re-entry may only be feasible every 20 to 30 years. As with all plans, goals and direction may be modified based, in part, upon measured responses to previous treatments.

- The 2020 goal for northern hardwoods is divided into two categories: un-even aged management (and/or thinning) and even-aged management.
    - The goal for un-even aged management is: 425 acres. This represents an increase of 15 acres (about 4%) when compare to the goal for 2019 (410 acres), but a decrease of 55 acres from 2018 (480 acres). For reference, the goal for 2017 was 555 acres.
    - The goal for even aged management is further divided into two categories: even-aged management (i.e. even-aged thinning, shelterwood, seed tree, clear-cut, etc.) and overstory removals (final phase of a previous shelterwood harvest). Because a shelterwood oftentimes contains two distinct phases/stages (and sometimes more) to complete the regeneration process (within a relatively short period of time - i.e. 5 to 8 years), it is important to develop a goal that will target the final treatment

(overstory removal). CY 2019 marked the first time that overstory removals were tracked as a separate goal in the northern hardwood type.

- The goal for even-aged management is: 248 acres. This represents an increase of 63 acres (roughly 34%) when compared to the goal for 2019 (185 acres) and an increase of 8 acres when compared to 2018 (240 acres). For further comparison, the goal for 2017 was 335 acres.
- The goal for overstory removals is: 145 acres. This represents a decrease of 40 acres (roughly 22%) when compared to the goal for 2019 (185 acres). As previously stated, 2019 was the first year that a goal for overstory removals was adopted. It should be noted that overstory removals are only prescribed if adequate levels of desired regeneration have been achieved in a stand.
    - All stands currently scheduled for an overstory removal will be surveyed for adequate levels of desired regeneration. If the desired level has been achieved, the treatment will be prescribed. If not, the Department will re-analyze the stand and determine the next appropriate course of action.

- The overall northern hardwood management goal for 2020 is: 818 acres. This represents an increase of 38 acres (roughly 5%) when compared to the goal for 2019 (780 acres) and an increase of 98 acres when compared to 2018 (720 acres). For further comparison, the total goal for 2017 was 890 acres.

Based on the updated recon information (and readiness of overstory removals), the total harvest goal for northern hardwoods is expected to continue to hover around 750 to 800 acres per year (+/- 50 acres). Also, starting in 2019, red maple will continue to be accounted for as a separate goal (prior to 2019, it was included as part of the goal for northern hardwoods).

In general, the total amount of northern hardwood acres thinned (un-even aged management and/or even-aged thinning) have decreased slightly, while the amount of acres regenerated (even-aged management) have increased. However, since more trees per acre are removed during regeneration harvests (when compared to lighter thinnings), the total amount of northern hardwood volume should remain about the same every year.

Red Oak:

The Department also recently completed the complete re-inventory of all mature stands of red oak on the forest (completed in late 2017). The re-inventory was required to better define the red oak resource, assess management needs and prioritize future treatments. As expected, the updating process has revealed a significant decrease in acres ready for, or otherwise in need of, a thinning.

There is nearly 15,000 acres of the red oak type on the forest. Of that, nearly 90% is older than 75 years (nearly 13,500 acres). To drill down further, nearly 65% is 90 years of age or older (approximately 10,000 acres). In essence, the vast majority of red oak on the forest is either at or rapidly approaching maturity.

The rotation age for red oak is generally around 100 years (up to 120 years on higher quality sites and a little lower on poorer quality sites). At current conditions, the Department is faced with the potential task of addressing (regenerating) a large acreage base of mature red oak, basically all at

the same time. That's neither practical, nor feasible. This is a prime example of where management goals sometimes need to be adjusted in order to more effectively manage a resource.

The general management direction for red oak is to maintain the type (dominance), where practical, and spread out or evenly distribute the regeneration phase as much as possible. It will vary by location, but, generally speaking, and barring any natural influences i.e. insects, disease, wind, drought, etc., the regeneration phase can be extended equally over the next 15 to 25 years. The process has already begun, as this issue was identified years ago (hence one of the reasons to update the type).

Considering the current condition of red oak on the forest, the average age of mature stands, and the long term management potential of the type, the overall goal for regeneration will be around 350 to 400 acres per year over the next 20 years. This will provide better regulation of the red oak resource, yield a more uniform flow of forest products, generate a more even distribution of age classes over the landscape (which will also maintain structural diversity and produce more diverse wildlife habitat), and create a more balanced work load, both short and long term.

As part of the update process, stands were/are prioritized based on age, quality, species diversity (whether there was a significant component of over mature aspen or birch), previous management (if any), etc. Furthermore, stands were/are ranked based on the potential or likelihood of maintaining (regenerating) the red oak component, as well as the presence and density of overmature aspen and/or paper birch.

For a variety of reasons, red oak can be one of the most challenging timber types to regenerate (further described below). Understanding how these current stands were established (the stands we are managing today) can reveal some of the challenges we face today.

Most of the red oak stands we are managing today originated during the period of the last big cutover (early 1900's). Back then, stands were basically clearcut, with little (if any) regard to resource damage, best management practices for water quality (or anything for that matter) or slash control. Soil scarification was extensive, as was logging debris. Then the fires came. The result: extensively scarified sites, exposing a large percentage of bare mineral soil, with little to no competing vegetation, no mature overstory trees, and very little impact from animals that love to nibble on acorns or freshly regenerating seedlings i.e. deer or hare.

Red oak, being a fire tolerant species, is built for this exact scenario. It needs relatively bare mineral soil, a good amount of sunlight, little competition from other tree species, and minimal predation or browse pressure. While the intensive fires killed much of the competing vegetation, it only temporarily impacted the red oak. Carbs stored in the root system afforded it the luxury of rapidly developing after the fire. Newly germinating acorns were established under ideal growing conditions. Many new red oak seedlings rapidly and aggressively attained dominance, well before other tree species were able to re-establish. The result: a dense stand of red oak, oftentimes with only minor components of paper birch, aspen, red maple, white pine, red pine and, on better sites, sugar maple.

Fast forward to today. Much emphasis is placed on the suppression of wildfires with the goal of reducing or eliminating its potentially devastating impacts. While prescribed fire is still commonly used today as a management tool to facilitate the regeneration of oak, the scale and intensity of

previous (historical) stand initiating fires will never be duplicated (and results of prescribed fires are oftentimes unreliable and difficult to predict).

Deer densities (and other seedling or acorn predators), by design, are currently much larger than 100 years ago and have the potential to completely wipe out any red oak regeneration attempt. Stands of oak are generally all the same age (either mature, between 90 to 100 years of age, or approaching maturity), meaning most stands originated during a period when deer densities were low and oak sprouting potential and acorn viability (both critically important in the development of new oak stands) will only continue to decrease (with age). To further complicate the process, current harvesting methods and management practices result in a lighter footprint on the landscape, meaning scarification isn't as intensive and mineral soil is less exposed.

Methods of regeneration have also evolved over time. All are geared towards manipulating light and competition. Red oak is classified as intermediate in shade tolerance. Generally speaking, this means that the intensity of sunlight is a critical factor influencing initial seedling survival, as well as subsequent annual growth and development. Silvicultural techniques such as shelterwood, seed tree and clearcut are all used in attempts to regenerate new stands of red oak (in part, with the goal of manipulating levels of sunlight able to reach the forest floor).

Some methods, like the shelterwood, leave a few more trees, equally distributed, on the landscape, with the goal of establishing and tending the new crop of trees before eventually removing most of the overstory (to release the advanced regeneration). Other methods, like the seed tree, leave fewer trees, still equally distributed on the landscape, with the goal of providing even more light and resources available for new seedlings.

Seed tree methods also typically leave the remaining mature trees in place (meaning we don't come back in to remove them), thus reducing damage to newly developing and recruiting seedlings, which would inevitably occur during the removal of the overstory. Clearcut methods are the most intensive, often removing most of the overstory and heavily relying on the subsequent flush of regeneration to establish the next stand. Each method has its pros and cons and all are used on the forest when attempting to regenerate red oak. At present, the Department is currently experiencing greater success with more intensive even-aged harvests.

Regardless of the regeneration method, other components required to successfully develop a new stand of red oak still need to be considered i.e. competition control, soil scarification, herbivory control, acorn dispersal and viability, site potential, and sprouting potential, etc. If competing vegetation is a concern, some stands are scarified with a dozer and straight blade in an attempt to knock back undesirable tree species and expose mineral soil.

Anchor chains, salmon blades or other implements are also used as a means to scarify soil and reduce competing vegetation. Prescribed fire can also be used to control unwanted vegetation. Timing of acorn dispersal and quantity (and quality) of acorn production are also critical, but much more difficult to predict and control.

When determining where to invest additional inputs in the management of red oak, all of the above mentioned factors need to be considered, as does site quality and location. Some stands on higher quality sites will receive intense pressure from red and sugar maple (and ironwood), which, inherently, makes it more difficult to establish a new stand of red oak. They also tend to occur on

rugged locales, making it difficult to stage and maneuver heavy equipment or administer a prescribed fire.

Many of these stands may be better suited as moderate quality northern hardwoods, with a minor component of red oak (i.e. more maple and less oak). The general management direction in this scenario may be to lightly thin, incorporate large gaps or groups and allow the stand to naturally convert to northern hardwood, again, with a lesser component of oak.

On the other end of the spectrum, red oak stands growing on lower quality sites tend to be associated with heavier components of aspen, birch and pine. Competition from red and sugar maple (and ironwood) are also often less intensive, thus providing a more favorable environment for red oak regeneration. However, these sites are generally less productive, resulting in growth and development that tends to be on the lower end of the range. Managing these stands with a goal of increasing the component of aspen, birch or pine may be seriously considered.

In general, maintaining as much red oak as possible is a priority for the Department. However, a considerable amount of emphasis will be placed on sites of medium quality, where oak production and quality (or potential) is good, competition from other tree seedlings is lower, and additional inputs from the Department, if needed, are the most effective.

- The goal in 2020 will be divided into three distinct categories: thinning (even-aged); even-aged management (i.e. shelterwood, seed tree, clearcut); and overstory removal (to release established regeneration that has developed after a previously prescribed shelterwood):
    - The goal for even-aged thinning is: 146 acres. This represents a decrease of 54 acres when compared to the thinning goal for 2019 (200 acres) and 14 acres when compared to 2018 (160 acres).
    - The goal for even-aged regeneration is: 385 acres. This represents an increase of 35 acres when compared to the 2019 goal (345 acres) and a decrease of 10 acres when compared to 2018 (395 acres). For further comparison, the regeneration goal for 2017 was 400. As previously stated, whenever possible (or practical), an emphasis will be placed on maintaining stands as red oak.
    - The goal for overstory removals is: 140 acres. This represents a decrease of 15 acres when compared to the 2019 goal (155 acres) and a decrease of 100 acres when compared to 2018 (240 acres). An overstory removal is only prescribed if an adequate amount of desired regeneration has been attained throughout the stand. If the stand has not successfully regenerated with an adequate amount of desirable tree species, the Department will delay harvest, re-analyze the stand and determine the next appropriate course of action.
    - The total management goal for red oak is: 671 acres. This represents a decrease of 29 acres (roughly 4%) when compared to the goal for 2019 (700 acres) and a decrease of 124 acres when compared to 2018 (795 acres).

Aspen:

At nearly 78,000 acres, aspen is, by far, the largest single cover type on the county forest (roughly 45% of the entire forest). Similar to the issue with red oak, a significant portion of the aspen type

occurs within a relatively narrow age class window. Nearly 55% of the aspen type is between 25 and 45 years of age, with an additional 20% greater than 45 years old. Ultimately, to address the relatively large wave of aspen soon to reach maturity, the Department needs to make minor adjustments to the management approach for this type.

The management and regulation of the aspen type is relatively straight forward. Under ideal conditions, and assuming an equal distribution of age classes, the sustainable harvest goal for aspen is calculated by dividing the total acreage by the rotation age. The rotation for aspen varies by location and site quality, but generally is between 50 and 55 years of age (sometimes longer on the highest quality sites or shorter on poorer sites). When considering just the raw numbers, if the average rotation age were around 52 years (and it is), the optimal sustainable harvest goal for aspen would be approximately 1,500 acres per year.

When calculating the long and short term sustainable management goals for the aspen type (as is done with all other forest types), all data is analyzed by location (IRMU – Integrated Resource Management Unit). Each unit (IRMU) represents a general area of the forest. Each area contains slightly different growing conditions and influences.

Within each IRMU, current age class distributions, site quality, previous management (or stands excluded from management), recommended forester prescriptions, etc., are all weighted and analyzed to determine the harvest goal per unit. Current age class distributions are charted against desired distributions to determine if additional adjustments to the management strategies are needed. In some cases, like those we are experiencing now, the Department needs to enter stands a little sooner (i.e. as early as 40 years old), to better distribute age classes on the landscape and avoid similar problems in the future.

These adjustments will produce similar benefits as addressed in the red oak section, including a more regulated distribution of aspen on the landscape. When fully regulated (and when all stands excluded from future management are removed from consideration), the sustainable harvest goal for aspen will be about 1,450 to 1,500 acres per year.

Starting in 2020, the Department will begin to address the disproportionate distribution of age classes in the aspen type. In general, if the rotation age for aspen is between 50 and 55 years, each 5 year age class (0 to 4, 5 to 9, 10 to 14, etc) should contain about 9 to 10% of the total acreage for that type (one goal of management is to create an even distribution of age classes over the landscape, whenever practical).

The current age class distributions in each IRMU are slightly different, but, in general, are heavily clustered in 25 to 44 year old categories. For example, in IRMU's 1 and 2, the 25 to 44 year old age class contains 70% of the total aspen acreage in each unit (when the type is closer to being fully regulated, it should be in the 35% to 40% range, each); in IRMU 4, the 45 to 54 year old age classes contains 47% of the total acreage (should be closer to 20%); and in IRMU 8, the 30 to 49 year old age class contains nearly 60% of the acreage (should be around 35%).

To address the discrepancies in age classes, the Department will attempt to more evenly distribute the aspen harvests over the next 30 to 40 years (in the IRMU's that are exhibiting significant irregularities). Each IRMU will be addressed differently, depending on the level of variability, average age (or proximity to rotation) and overall health of the stands. In general, the goal will be

to increase (or spread out) the current age class groupings two-fold. For example, if the current distributions are clustered in the 25 to 44 year old classes (or a grouping of 20 years), the goal will be to equally disperse the acreage, contained within that grouping, over the next 40 years.

- The 2020 sustainable harvest goal for aspen is: 1,615 acres. This represents an increase of 200 acres when compared to the goal for 2109 (1,415 acres) and an increase of 195 acres when compared to the 2018 goal (1,420 acres). Again, the small fluctuations in goals are generally due to the Department addressing the large acreage band of relatively narrow age class distributions looming on the not so distant horizon.

It's worth noting that the aspen type, particularly trembling aspen, is predicted to be one of the more negatively impacted forested communities, when modelled against a potentially warming climate. With roughly 45% of the ownership comprised of the aspen type, that is a concern.

At greatest potential risk would be stands currently developing on sites of poor quality (where nutrients and/or moisture are most limited and trees are inherently stressed). Aspen developing on dry to very dry sites or sites that are overly wet, would be the most at risk. Another goal for 2019, as time allows, will be to develop a process or direction to analyze stands most susceptible, if climate change models are correct, and flesh out future management strategies and goals.

Since predicted warming climate related impacts are expected to be decades away, any modifications to management would most likely occur well into the future (when the youngest stands approach maturity). Still, having the discussion now will allow us to be better prepared, especially if predictions hold true.

Recently, as part of routine stand inventory and the establishment of CFI plots, the Department has noted the presence of hypoxylon cankers in numerous stands of aspen. Hypoxylon is a fungus that infects the trunk and branches of aspen. Quaking aspen is most susceptible, but it can infect bigtooth as well. Once a tree is infected, the fungus spreads until the tree is effectively girdled. Once a tree is infected with hypoxylon, it can die within 3 to 8 years. The fungus survives from year to year in the canker on infected trees.

The Department is in the process of examining stands that have the potential to be infected with hypoxylon. Using LiDAR, various elevation models, and growth charts for aspen, the Department has developed a model that can isolate stands (digitally) that appear to be underperforming (shorter in height than what is expected). A subset of these stands will be field inspected to determine if hypoxylon is present and, if so, the next course of action. The subset will also help to determine if additional surveys are necessary. If significant levels of hypoxylon are discovered, the harvest goal and/or stands prioritized for treatment, may be adjusted accordingly.

Swamp Hardwoods:

The swamp hardwood type is generally dominated by black ash. There is currently about 3,500 acres of swamp hardwoods on the county forest, with about 2,000 acres of which occurring in the southern Barnes block (IRMU 6), north of the boundary with Sawyer County. Red maple, aspen, balsam fir, black spruce and tamarack are common associates. Aspen and red maple generally increase in density in areas with better drainage (higher and drier), while black spruce and tamarack

show up in areas of poorer drainage (low and wet). Yellow birch and sugar maple may also be present, but primarily in locations with better drainage. But, in general, swamp hardwood stands are primarily comprised of black ash (again, densities and quality often vary based upon location and drainage).

The Department established a regular management goal for the swamp types (hardwood and conifer) starting in 2011. Prior to 2011, swamp types were typically only managed as time allowed (a new forester was added in 2011 thus creating more opportunities for regular management) or whenever a sale was established adjacent to a stand.

Because of the location of these stands (i.e. swamps), accessibility is often very poor, making these types more difficult to establish. As a result, marketability is usually more difficult, as harvesting is most often restricted to periods of frozen ground and timber products derived from the swamp types are typically in lower demand. The combination of difficult access, unpredictable and irregular winters, and poor marketability, make the swamp types some of the most challenging to sell (as timber sales). If the Department has difficulty selling a swamp hardwood timber sale, then long term goals for the type will also be impacted.

The presence of the Emerald Ash Borer (EAB) has forced land managers to change the way they traditionally approached the management of ash dominated stands. Once established in an area, EAB has the potential to kill nearly every ash tree in a stand, all within a few short years (once established). In 2018, EAB was confirmed at two locations in northern Douglas County (to our west) and one location in central Sawyer County (to our south). The natural rate of spread is thought to be about ½ mile per year, but human assisted distribution (i.e. firewood, vehicles, etc) will produce a more rapid and unpredictable rate of dispersal. In short, it has been located in adjacent counties and will eventually be confirmed in Bayfield County.

Depending on the density of ash in a stand and proximity to the closest known confirmed location of EAB, there are some, albeit limited, management options available. The WDNR has developed general guidelines for managing ash dominated stands, where EAB will eventually become a threat (and are in the process of revising those guidelines). Guidelines are generally divided into two categories: if EAB is present (or in close proximity) or if not (as well as the amount of ash located within a stand/area). In general, the Department will utilize those guidelines when determining the best approach for managing ash dominated stands.

In addition to determining which silvicultural treatment to prescribe on any given ash dominated stand, the Department will need to address short and long term management strategies, with an emphasis on the short term. More specifically, how many acres should/can be managed, before the inevitable arrival of EAB and subsequent rapid mortality of all ash trees, to best achieve/salvage longer term, sustainable silvicultural objectives. Accelerating the management of ash dominated stands (pre-salvage – before all of the ash trees are dead) will provide a better foundation for achieving successful regeneration and ensure the perpetuation of a productive stand of desirable tree species.

To help in the decision making process, the Department will need to re-inventory all swamp hardwood stands. The re-inventory process will target variables like: percentage of ash, percentage of other tree species, condition and quality of the trees/stand, soil type and topography,

accessibility, ability or likelihood of regenerating to other desirable timber types, recommended silvicultural activity, etc.

The goal is to prioritize the management of stands, with an emphasis on those that can be successfully regenerated to other desirable timber types (i.e. stands with pockets of aspen will be encouraged to regenerate to aspen; stands with more red maple will be encouraged to regenerate to maple; etc.). Ash will also regenerate, but, with EAB, will no longer be a primary component of the stand (nor a secondary component).

In short, wherever practical and feasible, the goal is to locate those stands that can be readily managed and converted to other desired timber types before the onset of EAB. Beginning/accelerating management strategies for EAB sooner, rather than later, will increase treatment and reforestation options, maximize economic value, and reduce future EAB impacts. Once the presence of EAB is confirmed, management options become very limited.

As stated in the draft revision of the WDNR Emerald Ash Borer Silvicultural Guidelines, at a county level, a significant increase in ash mortality can generally be expected to begin around 6 to 7 years after EAB is first detected. Once ash mortality begins in a stand, it will continue until most ash trees are killed. Studies have also found that, at the stand level, more than 99% of all ash trees were killed within six years of the first observed infestation.

To date, EAB has not yet been discovered in Bayfield County. However, as previously stated, it has been confirmed in Douglas and Sawyer counties. Though difficult to predict when it will arrive, the presence of EAB in Bayfield County is inevitable. In 2019, the Department installed purple traps at 9 different locations in 2019, as a means to monitor for EAB. Fortunately, all 9 traps came back negative. Purple traps will be installed again in 2020.

Based on the relative rapid movement of EAB northward through the state, it is likely that EAB will be confirmed in Bayfield County within the next 10 years, and potentially much sooner (i.e. within the next 5 years).

Using the latter as a base, if EAB is roughly 5 years away and, once established, can completely ravage a stand of ash within a period of 6 years, it is logical to assume we have approximately 10 years to complete all management activities. Within the next 10 years, the management of all ash dominated stands located on the forest should be completed, which includes all harvesting activities (as well as target ash for removal on all future sales where ash is a secondary or minor component).

Timber sale contracts are awarded for a period of two years, with the potential for multiple extensions. Most ash stands are located on wet soils, making harvesting and accessibility very challenging. Contractors often require multiple timber sale extensions to complete sales that contain a significant component of frozen ground only harvesting requirements (like those that contain significant components of black ash).

If a timber sale will require 3 to 4 years (and possibly longer) to complete, and we have a 10 year window of operation before the onset of EAB, then treatment of all ash dominated stands should be completed within the next 5 to 6 years (which stared, in earnest, in 2019).

- The 2020 goal for Swamp Hardwoods is: 425 acres. This represents an increase of 40 acres when compared to the goal for 2019 (385 acres). As stated, the reason for the increase is an acceleration of the treatment of all ash dominated stands in preparation for future EAB infestation. All ash dominated stands will be managed over a period of 4 to 5 years (starting in 2019). The goal of management would be to regenerate a fully stocked stand of desirable species in trees other than ash.

**Total Sustainable Harvest Goal:**

Table 1 displays the sustainable timber harvest goal (acres) per primary timber type for 2020 The goals for 2017, 2018 and 2019 are also included for comparison:

**Table 1: Sustainable Timber Harvest Goal (acres)**

| Timber Type | 2017 | 2018 | 2019 | 2020 |
|---|---|---|---|---|
| Aspen | 1,375 | 1,420 | 1,415 | 1,615 |
| Northern Hardwood | 890 | 720 | 780 | 818 |
| Red Maple | 0 | 0 | 50 | 89 |
| Red Oak | 900 | 795 | 700 | 671 |
| Paper Birch | 30 | 25 | 25 | 0 |
| Scrub Oak | 215 | 255 | 210 | 235 |
| Red Pine | 915 | 930 | 960 | 1,030 |
| Jack Pine | 345 | 192 | 207 | 171 |
| White Pine | 90 | 80 | 75 | 108 |
| Swamp Conifer | 140 | 100 | 75 | 60 |
| Swamp Hardwood | 100 | 120 | 385 | 425 |
| Fir/Spruce | 30 | 25 | 30 | 40 |
| Total | 5,030 | 4,662 | 4,912 | 5,262 |

As previously stated, one of the primary objectives in managing the forest is to strive for a regulated, even flow of harvests, equally distributed over the landscape. However, sustainable harvest goals typically fluctuate slightly from year to year. Most fluctuations are explained by the natural irregular distribution of age classes over the entire forest and, subsequently, when they are ready for management.

Among other things, fluctuations are also a result of a change in management direction for individual timber types, responses to natural disturbances or other unforeseen natural events, a relatively poor response in growth from previous management, modifications in response to accomplishments from the previous year or land acquisition.

During the season, the harvest goal may be adjusted for a variety of reasons, i.e. response to an unanticipated natural event; significant changes in stand data; or per other examples as stated above.

On the Bayfield County Forest, the primary annual differences in sustainable harvest goals are a result of a variety of factors, some of which include: improved reconnaissance information, a significant increase in the number of stands reaching management age (particularly in the aspen, red oak and red pine types), the inclusion of harvest goals for the swamp hardwood and swamp conifer timber types (types that were excluded from consideration in the past), adjustments in the management approaches of the aspen, red oak and northern hardwood timber types, implementation of directives in the Barnes Barrens Management Area, and general modifications as a result of stand level responses to previous treatments.

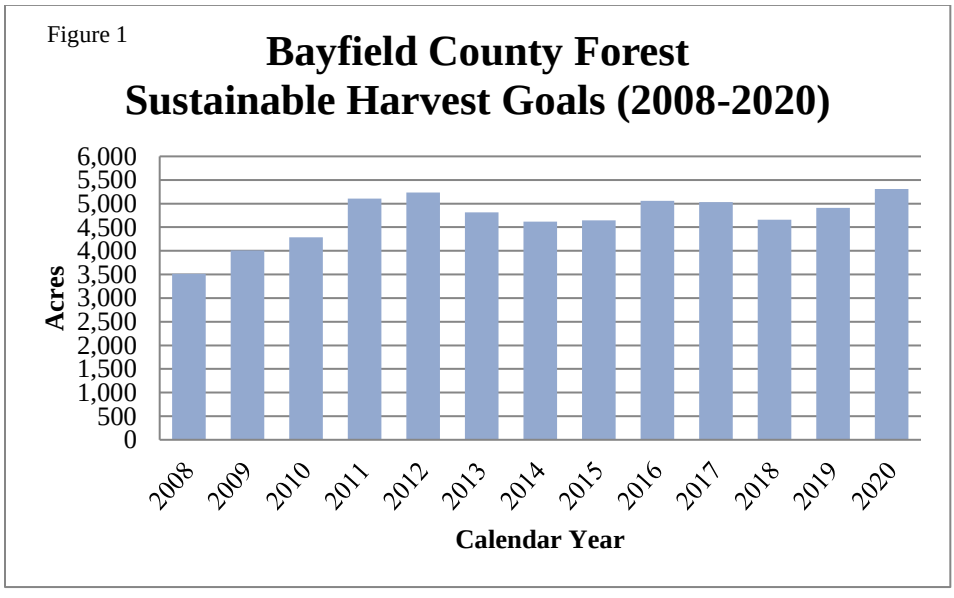
In 2015, the county purchased 1,855 acres of industrial forest lands with the assistance of the Knowles Nelson Stewardship grant. The county also included 747 acres of county owned, non-county forest lands, as a match. In total, 2,602 acres were added to the county forest program. These acres will naturally provide an increase in harvest levels, particularly in the red pine type.

In 2016 (actually completed in 2017), the county purchased another 200 acres of land previously owned by the Wisconsin DNR. Over the past two years, the county has added about 2,800 acres to the county forest. Much of this land has immediate management potential and will have a modest impact on short and long term sustainable harvest goals.

And in 2019, an additional 510 acres of industrial forest lands were purchased with the assistance of a Knowles Nelson Stewardship grant. In this project, the county included 181.25 acres as a match. A total of 691.25 acres was added to the county forest. Also, independent of this project, the county enrolled all 3,040 acres of the county owned portions of the Bibon Swamp into County Forest Law. These lands were designated as special use, but are still considered part of the county forest and will be managed as such. In 2019, a total of 3,731.25 acres were added to the county forest program.

Figure 1 displays the total sustainable harvest goals from 2008 through 2020.

Figure 1




Since 2006, the sustainable harvest goal has increased by nearly 68%; from 3,134 acres to 5,262 acres in 2020. The sustainable harvest goal for 2020 is the largest to date.

Over the past decade, the sustainable harvest goal has changed significantly. Prior to 2020, the peak harvest goal was in 2012, with a target of 5,238 acres. This was primarily due to the addition of numerous older, backlogged stands. Most of the backlog has been managed, but the pre-salvage work in swamp hardwood stands, implementation of the Barnes Barrens Management Plan, and need to address the uneven age class distributions in aspen have driven the harvest goal even higher.

When considering the various influences on the harvest goal, the annual sustainable harvest goal should hover between roughly 4,500 and 5,250 acres per year.

Maximizing the sustainable management of the county forest was a primary goal heading into calendar year 2011. As displayed in Figure 1, the average sustainable harvest goal from 2011 through 2017 increased by over 1,250 acres per year, when compared to the average goals from 2006 through 2010.

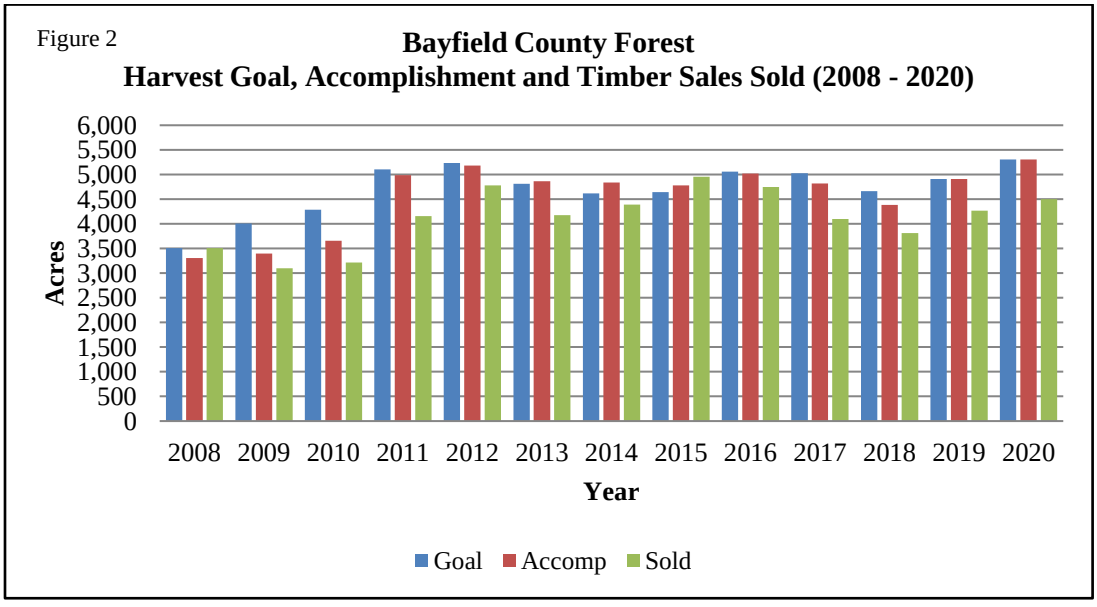
The significant increase in the sustainable timber harvest targets created a substantial increase in the amount of time required to successfully accomplish the goal. In addition, numerous other forest management responsibilities increased over the same time period creating a significant deficit in time required to accomplish both annual and long term goals.

To address the deficit, one full time forester position was added to the staff in early 2011. The impact of the additional forester was immediate (see Figures 2 and 3 below). In addition, a recreation forester position was created in 2013. Initially, roughly 20% of this position's workload was dedicated towards various forestry related activities.

However, as the recreational footprint of the Department and subsequent responsibilities have increased significantly over the past few years, the amount of time the rec forester position has to dedicate towards forestry activities is almost nil.

Figure 2 displays the annual sustainable harvest goal, accomplishment and sold timber sales from 2008 through 2020 (2019 and 2020 are estimates):

Figure 2



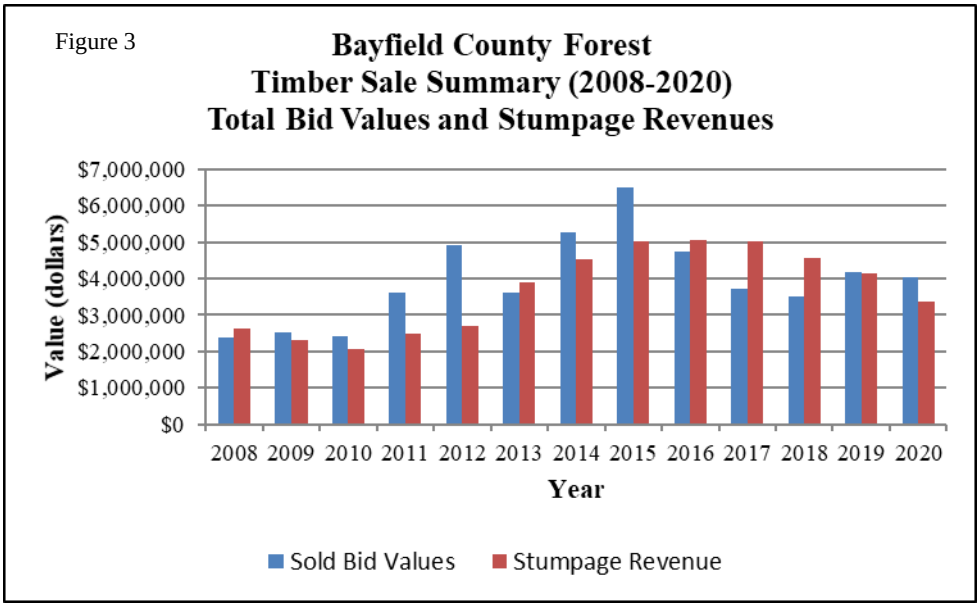
Prior to 2011, the Department averaged 45 timber sales, covering 3,044 acres per year. The average total winning bid value for those sales was approximately $2.36 million. Since 2011, the Department has averaged 57 sales, covering just over 4,600 acres.

During that time, the average total winning bid values have basically doubled, to nearly $4.60 million. The total winning bid values peaked in 2015, at just over $6.5 million!

Since the peak in 2015, the total value of sales sold began to decrease, to a low of $3.51 million in 2018. However, total bid values increased in 2019, to nearly $4.2 million (an increase of nearly 20% when compared to 2018). Total output (new timber sales) has remained relatively constant during that same time period, but the markets have recessed considerably. A slight improvement may be in the forecast for 2020, but the overall prediction is for a continuation of poor market conditions.

Figure 3 displays the total sold value of timber sales and actual revenues from stumpage (harvested timber) from 2008 through 2020 (2019 and 2020 are estimated):

Figure 3




Bayfield County generated roughly $5.0 million in total stumpage revenue in 2015, 2016 and 2017, while reaching a little over $4.5 million in 2014 and 2018. The total amount received in 2019 is estimated to be $4.19 million.

While the total amounts received have been down over the past three years, it is still a stark contrast when compared to the average collected between 2007 and 2010 ($2.285 million). The higher amounts received in 2015 through 2018 were driven primarily by strong markets in 2014, 2015 and 2016.

However, as seen in Figure 3, the total sold bid values on all new sales has steadily declined each year from 2016 through 2018. There was however a slight increase in 2019. Poor/weak markets conditions are expected to continue in 2020. As a result, revenues received from stumpage in 2020 are expected to remain relatively stable, but could decrease slightly when compared to 2019.

Table 1a displays the summary of timber sale offerings since 2008, including the total number of sales sold per year, total acres, the total value of the winning high bids, the average bid value per acre and total revenues received from the sale of timber during each calendar year (total timber revenue for 2019 and all 2020 figures are estimates).

**Table 1a: Bayfield County Forest Timber Sale Summary (2007-2020)**

| Calendar Year | Sales Offered | Acres Offered | Sales Sold | Acres Sold | Acres Not Sold | Timber Sale Bid Values | Bid Value per Acre | Timber Revenues |
|---|---|---|---|---|---|---|---|---|
| 2007 | 59 | 3,771 | 45 | 3,157 | 614 | $2,140,897 | $678 | $2,167,156 |
| 2008 | 58 | 3,546 | 55 | 3,507 | 39 | $2,381,513 | $679 | $2,621,308 |
| 2009 | 45 | 3,297 | 42 | 3,100 | 197 | $2,510,601 | $810 | $2,305,259 |
| 2010 | 40 | 3,218 | 40 | 3,218 | 0 | $2,404,178 | $747 | $2,047,663 |
| 2011 | 54 | 4,156 | 54 | 4,156 | 0 | $3,629,330 | $873 | $2,477,066 |
| 2012 | 53 | 4,782 | 53 | 4,782 | 0 | $4,900,194 | $1,025 | $2,696,756 |
| 2013 | 54 | 4,275 | 53 | 4,177 | 98 | $3,614,091 | $865 | $3,904,104 |
| 2014 | 61 | 4,388 | 61 | 4,388 | 0 | $5,252,530 | $1,197 | $4,537,661 |
| 2015 | 57 | 5,215 | 54 | 4,958 | 257 | $6,507,887 | $1,313 | $5,006,565 |
| 2016 | 65 | 4,750 | 65 | 4,750 | 0 | $4,745,850 | $999 | $5,057,393 |
| 2017 | 53 | 4,272 | 50 | 4,101 | 171 | $3,719,320 | $907 | $5,009,892 |
| 2018 | 56 | 4,568 | 49 | 3,813 | 755 | $3,509,971 | $921 | $4,562,243 |
| 2019 | 59 | 5,031 | 52 | 4,267 | 764 | $4,163,432 | $976 | *$4,150,000* |
| *2020* | *55* | *5,000* | *52* | *4,500* | *500* | *$4,050,000* | *$900* | *$3,355,000* |
| Average | 55 | 4,305 | 52 | 4,062 | 223 | $3,806,138 | $937 | $3,564,148 |

**2016 included 3 wind blown salvage sales, covering 113 acres.*

The average total value of all new timber sales sold was roughly $5.5 million between 2014 through 2016. However, the average total sold value over the past two years was approximately $3.8 million, a decrease of around $1.7 million (or roughly 31%). Sustainable harvest levels and accomplishments have remained relatively constant over the same time period, but markets have shifted dramatically.

Timber Sale Revenue – General Information

When analyzing timber sale revenues and the results from previous timber sale offerings, general patterns develop that allow the Department to estimate when to expect proceeds from existing contracts.

Contracts are awarded for a period of two years. One-year extensions are often granted to contractors unable to complete the sale within the initial two year period. Multiple extensions may be required before all terms of the contract are met. It's not uncommon for two to three, one-year extensions to be awarded on a contract, meaning it can take four or five years to fully complete some contracts.

In general, based on historical outputs, roughly 40% of the revenue generated during any calendar year comes from contracts sold during the previous year. Approximately 20% is derived from those sold during the current year, 25% from two years prior, 10% from three years prior and the rest beyond that.

For example, based on the above model, the general expectation is the 20% of the revenue generated in 2020 will come from sales sold in 2020 (which is an unknown); 40% will come from sales that were sold in 2019; 25% from sales sold in 2018; 10% from sales sold in 2017 and the rest from 2016 and 2015. In essence, markets and weather conditions are primary drivers of timber sale activity, both of which are extremely difficult to predict.

Referring to Figure 3 and Table 1a, the banner stumpage revenues received by the Department in calendar years 2015, 2016 and 2017 were, in part, a result of very strong markets from the year's prior (timber sale bid values were at an all-time high in 2015).

CY 2017 was a poor market comparatively, as was 2018. Markets in 2019 improved slightly, but would still be considered poor. As a result, and assuming an average market in 2020, the general prediction is a fairly significant decrease in sale of wood revenues for CY 2020, by as much as 15 to 20%, when compared to what was received in 2019.

Township Payments

Ten percent of the total stumpage revenues generated from the county forest are distributed to Townships that contain county forest land. Distribution is prorated and based solely upon the total amount (percentage) of acres located within each Town. In 2019, that total amount is predicted to be around $415,000 (based on a stumpage revenue stream of approximately $4.15 million). Prior to 2013, towns received an average annual total payment of roughly $220,000. In addition to the mandated 10% stumpage payment, towns also receive an annual PILT payment (payment in lieu of taxes) from the state, at a rate of $0.30 per acre.

For 2020, the budgeted 10% payment to the Town is set at $335,500 (based on a stumpage revenue budget of $3.355 million).

- Town Road Aids: In 2010, Bayfield County developed the Town Road Aid Fund. This fund was created to help improve problem areas on Town Roads that provide critical access to the County Forest. Town Road Aids were initially funded at 1% of total annual timber sale revenues (enacted once actual revenues exceed the budgeted amount). Starting in CY 2014, Bayfield County increased the funding level to 2%, with a cap of $80,000. As a result, $80,000 has been available for eligible Town Road projects in each of the last five years (2014-2018).

  As part of the 2020 budget development process, the Forestry and Parks Committee voted to remove the cap and increase the funding level up to 3% of actual net timber sale revenue. As a result, $90,000 will be available in 2020 for eligible town road projects. All projects are submitted to the Department and ultimately approved by the Forestry and Parks Committee. The Department works closely with each Town in the development and administration of each potential project.

Maximizing the sustainable harvest of the forest has numerous benefits. Not only does it have the potential to significantly increase revenues (at both the county and town levels), but it also supports numerous local jobs, fosters new job growth, provides additional recreational opportunities, provides exceptionally well managed products to local wood industries, improves forest health and productivity, protects water quality and creates/maintains a diversity of wildlife habitat.

More Sustainable Harvest Information and Green Tree Retention

During the timber sale establishment process, scheduled stands are examined to determine if they are indeed ready for management. Traditionally, some aren't, leading to approximately 5 to 10% of the sustainable harvest goal being removed from management consideration (for that year).

In general, some stands either aren't ready for management, are typed incorrectly or are removed from future management consideration for another reason i.e. riparian/wetland protection, steep or inoperable slopes, special, rare or unique features, etc. Stands that simply aren't ready for treatment are re-scheduled for future management. Stands that are used to protect wetlands and other riparian, sensitive, unique, or special features are permanently removed from future harvest consideration.

- After removing approximately 5 to 10% from harvest consideration, the long term net sustainable harvest goal (actual timber sale establishment) will range between roughly 4,000 to 5,000 acres per year. Based on the sustainable harvest goal for 2020 (5,308 acres), the expectation is that approximately 4,750 to 5,050 acres will be ready for management, which equates to about 2.8% of the forest. Over the long term, when only considering the net sustainable harvest goal, management (in the form of a timber sale) will occur on roughly 2.4% to 2.8% of the forest per year.

Additionally, as part of the timber sale process, a representative portion of most stands are purposely left unmanaged, termed green tree retention (also called legacy tree, reserve tree, etc). This can be accomplished by leaving individual trees or small patches (remnants) of the previous stand or a combination of the two. Green tree retention can also be incorporated as part of other reasons to leave stands unmanaged i.e. BMP's for water quality, unique/special features or aesthetic considerations.

- The goal for green tree retention is to reserve roughly 3 to 10%, of the original stand area, as unmanaged, scattered individual trees or remnant small patches, on each timber sale.

However, due to the nature of some stands or forested communities, green tree retention is not always considered or feasible. For example, jack pine stands/barrens require intensive management to maintain. Remnants of older trees provide vectors for insect or disease outbreaks that can be devastating to newly developing stands. For that reason, green tree retention is not applied wherever threats to young regenerating stands exist (primarily jack or red pine) or when the regeneration of target species would otherwise be compromised.

The retention of reserve trees (or green tree) can provide numerous benefits, all of which ultimately contribute to the conservation of biological diversity. Among other benefits, these structures facilitate the perpetuation of some biota (plant and animal species and genotypes) on site. They can maintain landscape connectivity by enabling the movement of some organisms. Reserve trees also

influence reorganization and recovery processes after a timber sale, as well as help to sustain functional roles and modify the post disturbance environment.

Green tree retention in stands that required significant amounts of riparian protection can add up to be substantially greater than the upper threshold of 10%. It's fairly common to see retention levels at 25% or greater in stands with heavy riparian protection measures.

Green tree retention generally only applies to stands that are managed with more intensive even aged practices i.e. clearcutting, seed tree harvesting, etc. Stands that are thinned, already leave behind more trees than those that are harvested. Of the 2.4% to 2.8% of the forest that is managed over the course of a year, roughly 55% is managed with more intensive even aged harvests.

It's worth noting that a substantial portion of the forest has already been removed from future timber management consideration. Roughly 11,000 acres, or about 6% of the forest, have been designated and removed from the scheduling process.

The reasons for removal are numerous, many of which having been previously mentioned, and primarily include: riparian/wetland protection; conservation of rare or unique landscapes (i.e. Glacial Kettles and Shultz Swamp); and protection of sensitive slopes (primarily in the clay plain).

It should also be noted that, regardless of market conditions or budget shortcomings (or anything for that matter), the sustainable harvest goals have never been, nor ever will be, artificially inflated or adjusted. Quite simply, it is what it is, all based on sound data and science.

## Timber Sale Administration

Since 2011, the Department has sold an average of 57 new sales every year (covering about 4,600 acres per year). This number has ranged from a low of 53 sales in 2012 and 2017 (though still covering an average of 4,500 acres) to a high of 64 sales in 2016 (which covered nearly 4,800 acres). Timber sales are sold on a two-year contract. Extensions may also be granted, which can extend a contract up to a period of four years (and, in some cases, longer).

Depending on the sale restrictions of the contract, markets, seasonal conditions, etc., a contractor can choose to go active on a timber sale at virtually any time throughout a given year. Once a timber sale goes active (actually slightly before), the Department immediately begins the administration process.

Timber sale administration is a critically important facet of any forest management program, as it serves to ensure field operations are in compliance with the contract and accomplishing the goals of the sale. On a routine and regular basis (from the start of the contract to the end), Department staff work directly with timber harvesting contractors on all facets of the sale, including, but not limiting to: timber sale contract review, harvesting parameters and restrictions, goals of the timber sale, road and skid trail layout, recreational concerns (if any present), Best Management Practices for Water Quality, monitoring of sale progress, tracking and scaling of harvested timber, etc. As part of the process, if any issues or concerns arise, they are dealt with promptly, as per the contract.

A total of 88 timber sales were active in 2019 (down slightly from the 92 that were active in 2018). Activity can be highly variable and may include, but not limited to: timber harvesting, forwarding, scaling, hauling, summarizing mill slips/scales, making stumpage payments or timber sale close-out actions (i.e. road work, final inspections, final payments, site repairs, etc).
Table 2 describes annual timber sale activity from 2009 through 2019.

**Table 2: Summary of Annual Timber Sale Activity[1]**

| Year | Offered | Sold | Active[2] | Completed[3,4] |
|---|---|---|---|---|
| 2009 | 45 | 42 | 63 | 75 |
| 2010 | 40 | 40 | 66 | 70 |
| 2011 | 54 | 54 | 66 | 52 |
| 2012 | 53 | 53 | 64 | 41 |
| 2013 | 54 | 53 | 89 | 43 |
| 2014 | 61 | 61 | 97 | 64 |
| 2015 | 57 | 54 | 89 | 62 |
| 2016 | 65 | 65 | 93 | 41 |
| 2017 | 53 | 50 | 94 | 58 |
| 2018 | 56 | 49 | 92 | 56 |
| 2019 | 59 | 52 | 88 | 47 |
| Average | 54 | 52 | 82 | 55 |

[1] *Total number per activity per year.*

[2] *Includes active harvesting, hauling, scaling, payments, close-out activities, etc.*

[3] *Once all contract obligations have been met, a timber sale is officially closed.*

[4] *in late 2009/early 2010, a large backlog of completed sales were all closed-out at once.*

Timber sale activity can last anywhere from a period of a few weeks to a few months to most of a year, depending on the size of the sale, harvesting restrictions, operating conditions and the general goals of the contractor.

As of the end of CY 2019, the Department has 109 timber sales under contract, with 34 different contractors and a total contract value of nearly $10.0 million. During any point in the year, anywhere from around 10 to upwards of 20, or more, timber sales can be active at one time.

The Assistant Administrator assumes the lead role in the administration of all active timber sales. When activity ramps up, Department foresters and the DNR will provide some assistance.

## FOREST INVENTORY

Correct, up-to-date stand information is imperative in the development of accurate short and long term sustainable harvest goals. There is a direct correlation between the quality and accuracy of the reconnaissance data and the ability for forest managers to confidently develop precise short and long term sustainable harvest goals. The accuracy of any sustainable harvest goal is only as good as

the data from which it was derived. Therefore, it is important to update a certain level of stand information on an annual basis.

Table 3 summarizes the inventory goal (compartment and stands) and actual accomplishments since 2008 (accomplishments for 2019 and 2020 are estimated):

**Table 3: Bayfield County Forest Inventory (acres)**

| Year | Goal | Accomplishment |
|---|---|---|
| 2008 | 17,000 | 9,807 |
| 2009 | 10,000 | 2,872 |
| 2010 | 10,000 | 4,079 |
| 2011 | 10,000 | 9,728 |
| 2012 | 10,000 | 8,135 |
| 2013 | 10,000 | 9,316 |
| 2014 | 10,000 | 8,552 |
| 2015 | 12,500 | 16,868 |
| 2016 | 12,500 | 8,367 |
| 2017 | 12,500 | 9,906 |
| 2018 | 12,500 | 10,000 |
| 2019 | 13,000 | 13,000 |
| 2020 | 14,000 | 14,000 |
| Average | 11,846 | 9,587 |

In 2001, the Department began the process of updating stand information on a compartment level basis. Compartments are a collection of stands contained within more well defined boundaries. Compartment boundaries could be roads, trails, section lines, rivers or other prominent natural features that provide a way to better categorize a large and expansive forest.

Compartments can be as small as few hundred acres in size, to as large as a few thousand. The goal of compartment updates was to complete a full re-inventory of the forest over a period of 15 to 20 years.

In 2018, the final compartments were assigned for inventory. By the end of 2019, all 204 compartments were re-inventoried. Ideally, it is best to keep stand level information as current as possible. The general goal is to minimize the number of stands with data that is 20 years old or older. Maintaining a compartment re-inventory program of 15 to 20 years is one way of ensuring stand level data is accurate and current.

Starting in 2014, the Department began an emphasis on updating select individual cover types that supplemented compartment level reviews. In 2014, the two major cover types targeted for update were mature stands of red oak and mature stands of jack pine. One primary goal of re-inventory was to develop a system to better prioritize the future management of these two types.

In 2015 and 2016, the target species were the remaining stands of mature red oak and developing strategies/plans for northern hardwood, for similar reasons. In total, approximately 2,600 acres of

mature jack pine was re-inventoried in 2014 and approximately 9,000 acres of red oak (all mature stands) were re-inventoried between late 2014 and early 2016.

In 2017 and 2018, the emphasis was placed on stands of northern hardwood. Site quality, and, subsequently, stand quality are highly variable within the northern hardwood type. As previously stated, the prescription applied to nearly every stand of northern hardwoods, by default, has been all-aged management (individual tree selection). While this prescription was often applied across much of the cover type, it is arguably not sustainable on many of the low-moderate, and nearly all of the poor quality sites.

The overall goal of re-inventory is to better capture site and stand quality as part of the silvicultural prescription. Accurate data that, in part, incorporates site/habitat quality, growth potential and responses to previous management is an essential part of the prescription development process.

As expected, now that the mature northern hardwood stands have been re-inventoried, the total acreage slated for all-aged management decreased slightly, while stands assigned for even-aged management (especially on the poor to moderately poor quality sites) increased slightly.

The use of group selection and/or larger gap sizes, as an alternative to the traditional individual tree selection method, will still be applied (as will traditional management) on moderate to poor quality sites. This will maintain a more uneven-aged structure and allow mature stands to perpetuate on the landscape (and maintain structural diversity).

In 2019, the re-inventory of the swamp hardwood type was completed. Roughly 3,500 acres are currently typed as swamp hardwood. In Bayfield County, swamp hardwood primarily contains a mixture of black ash and red maple as the dominant types, with the former being the most prevalent.

One primary objective of re-inventory in swamp hardwoods will be to locate stands of high priority (for management). In part, these would be stands that contain significant levels of mature or over-mature aspen; those that have been previously un-managed and in need of treatment; or those exhibiting higher levels of mortality, crown die-back or disease. Another objective will be to determine the overall density of the ash component.

As previously stated, with the threat of Emerald Ash Borer looming, it's extremely important to locate all stands that have a significant ash component (particularly important in preparation for impending EAB infestations) and, subsequently, to develop short and long term plans/objectives for management.

In 2019, the decision was made to take a one year break from the compartment level re-inventory process. Instead, an emphasis was placed on finishing up the few compartments that remained from the first round of inventory, as well as targeting stand level priorities like swamp hardwood and aspen (analyzing the potentially higher risk aspen stands, see the hypoxylon discussion in the aspen section, page 16). Compartment level reconnaissance will resume in 2020.

- The inventory goal for 2020 will be divided into two distinct categories/levels: compartment and stand.

- The compartment inventory goal for 2020 is: 10,000 acres. This will be accomplished by resuming data collection at the compartment level. The long-term goal will be to re-inventory all 204 compartments over a period of 15 to 20 years. At 10,000 acres per year, the entire forest should be re-inventoried in 17 to 18 years.
- The stand level inventory goal for 2020 is: 4,000 acres. This will be accomplished as follows:
    - Aspen: roughly 2,700 acres. Targeting more stands of at risk aspen due to the potential presence of the hypoxylon fungus. Stands that have been flagged as high risk will be evaluated to determine if modifications to management are necessary;
    - Red pine: roughly 800 acres. All stands of red pine located in Zone 4, IRMU 5, in the Barnes Barrens will be re-evaluated. These stands are scheduled to be regenerated as part of the barrens plan. The new information will be used to help determine a harvest schedule and reforestation plan over the next 14 year period;
    - Jack pine: roughly 500 acres. All stands aged 40 years and older, not located within the Barnes Barrens, will be re-inventoried. The information will be used to help determine a harvest schedule and reforestation plan over the next 15 year period;
    - Other timber types may also be included as part of the inventory goal, if necessary. If other stand level priorities are identified, the compartment level goal will be reduced accordingly.
- The total inventory goal for 2020 is: 14,000 acres.

When updating entire compartments, priorities will be placed on those that contain a larger percentage of old data (≥20 years old), as well as those that contain a larger percentage of stands prescribed for management in the near future.

Continuous Forest Inventory (CFI) and Forest Regeneration Metric (FRM) Programs

In 2018, the Department began the development and implementation of a new long term forest monitoring program, termed continuous forest inventory (CFI). As part of the program, a total of 670 permanent plots will be randomly located throughout the forest.

The plots will be established throughout all cover types on the forest and will conform with Wisconsin DNR CFI protocols. The Wisconsin DNR will be providing some assistance in the establishment of the program, particularly in the early stages.

Establishing 670 permanent plots, county forest wide, will provide a sampling error not to exceed 5% across all timber types and 10% within each two-inch size class, up to 17 inches in diameter. Establishing CFI plots at this level of intensity equates to about 1 plot for every 260 acres of forest land.

The primary purpose of implementing a permanent and continuous forest inventory is to collect statistically sound stand information that will be used to report on the status and trends of the forest.

The multitude of data that will be collected as part of every plot will be used to track variables like, but not limited to: forest extent, forest cover (by type), volume, growth, quality, mortality, removals, regeneration, habitat, health (both at the stand level and forest wide), carbon sequestration, invasive species, soils, down woody debris, biomass, insects and disease, herbivory, and more.

Current reconnaissance (compartment and stand level) and other forest monitoring efforts provide a stable foundation, but information gleaned from CFI will take it to the next level. In addition, CFI will not replace the need to continue monitoring the forest on a stand or compartment level basis.

However, CFI will cover a broader depth of forest attributes; will provide significantly greater analysis and reporting capabilities; and will supplement information obtained through annual and routine reconnaissance.

Forest regeneration sub-plots will also be incorporated as part of the CFI. The Department is currently in the process of implementing/fine tuning a system of forest regeneration monitoring, utilizing the WDNR Forest Regeneration Metric (FRM), on all stands that have received management, where regeneration is a primary goal (also in the process of developing a sub-sample for the aspen type). Regeneration data obtained from CFI will be used to supplement the already exhaustive FRM information that will be collected, by the Department, at the stand level.

Continuous forest inventory will also produce a wealth of information to assist in the planning and decision making processes (both short and long term). Factors and/or questions like annual volume growth per cover type, product and/or quality development, responses to forest management, extent of invasive species, impacts of insects and/or disease, impacts of climate change, etc., will all be attainable with the statistically sound information gleaned from CFI.

The goal is/was to establish all 670 plots over a three-year period (roughly 223 plots in 2018, 2019 and 2020). However, after one and a half years of implementation (starting in the spring of 2018 through 2019), a total of 246 plots have been established (or about 37% of the goal).

CFI plot establishment and data collection employ fairly complex processes, so a few bumps were expected in the first year, as we became more accustomed to the new system/programs. Some data analysis will begin in the winter of 2019/2020, which will start yet another new learning process.

Realistically, it will probably take four solid years (and probably a portion of the fifth) to establish all 670 plots, collect the first round of tree/veg/site information and develop a process for data analysis (roughly 140 to 167 plots per year).

After all CFI plots have been established, a five-year re-measurement schedule would be adopted (roughly 134 plots per year). Also, once the plots have been fully established, the re-measurement process will become more efficient (the physical establishment of each plot absorbs about 1/3 of the time invested at each location).

- The CFI plot establishment and data collection goal for 2020 is: 140 plots. Plots will be established internally, with some assistance from professional contractors and the DNR. In addition to data collection, analysis of previously collected CFI information will also

commence in late 2019/early 2020. The Department with work closely with the WDNR with regards to the most effective and efficient means to analyze, summarize and report CFI data/information.

- In order to achieve the desired objectives for the CFI program, a portion of the total goal for initial plot establishment and data collection will be contracted out in 2020. It is estimated that 45 to 50 plots will be contracted.
- The DNR has provided assistance during the initial round of plot establishment. That assistance will continue in 2020. A total of roughly 20 plots will be established by the DNR.
- In addition, a significant portion of the costs associated with the establishment phase of the CFI plots (both those contracted, as well as established internally) will be reimbursed from the previously awarded Sustainable Forestry Grant.
- With nearly two years of establishment work now complete, the Department will also re-analyze the CFI program to determine if any adjustments or modifications are required.

A new position was created within the Department to, among other things, manage both the CFI and FRM programs. The position started around the first of February 2018 and was titled Inventory and Analysis Forester. In addition to managing the CFI and FRM programs, this position is also tasked with performing various analyses of the data; the management of various databases; the development of various summaries and reports; and numerous other field forestry related tasks.

## REFORESTATION

Reforestation, be it natural or artificial, is a core building block of forest sustainability and a fundamental component of any forest management program.

Table 4 summarizes the reforestation efforts since 2008 (2019 and 2020 are estimated):

**Table 4: Bayfield County Forest Reforestation Program Summary (acres)**

| Year | Planting | | | | Seeding | Site Preparation | | | | Maintenance | | | | Monitoring |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Red Pine | Jack Pine | White Pine | Other[1] | Jack Pine | Trench | Fire Plow | Scarify | Spray | Fire | Spray | Bud Cap | TSI[2] | Regen |
| 2008 | 378 | 207 | 24 | 0 | 0 | 796 | 88 | 0 | 442 | 0 | 0 | 0 | 0 | 1,683 |
| 2009 | 487 | 415 | 0 | 0 | 0 | 726 | 72 | 0 | 348 | 40 | 0 | 0 | 0 | 2,652 |
| 2010 | 367 | 196 | 0 | 0 | 0 | 363 | 118 | 0 | 420 | 42 | 305 | 0 | 0 | 2,183 |
| 2011 | 319 | 153 | 35 | 68 | 0 | 900 | 88 | 0 | 186 | 21 | 324 | 0 | 0 | 1,424 |
| 2012 | 295 | 107 | 274 | 0 | 0 | 0 | 177 | 120 | 727 | 32 | 609 | 0 | 0 | 2,736 |
| 2013 | 281 | 174 | 92 | 0 | 558 | 264 | 0 | 40 | 0 | 0 | 449 | 239 | 0 | 2,522 |
| 2014 | 0 | 0 | 0 | 0 | 0 | 503 | 20 | 115 | 264 | 0 | 273 | 239 | 0 | 2,929 |
| 2015 | 62 | 0 | 129 | 0 | 202 | 717 | 0 | 99 | 634 | 0 | 0 | 239 | 1 | 2,337 |
| 2016 | 203 | 39 | 0 | 0 | 393 | 570 | 0 | 102 | 492 | 0 | 0 | 239 | 0 | 2,580 |
| 2017 | 36 | 2 | 0 | 0 | 460 | 279 | 0 | 115 | 585 | 0 | 0 | 71 | 46 | 2,931 |
| 2018 | 134 | 0 | 0 | 0 | 563 | 257 | 14 | 154 | 296 | 0 | 0 | 38 | 0 | 5,408 |
| 2019 | 88 | 0 | 0 | 0 | 216 | 287 | 10 | 125 | 323 | 0 | 0 | 8 | 50 | 6,804 |
| 2020 | 104 | 0 | 0 | 0 | 499 | 435 | 0 | 150 | 493 | 0 | 0 | 8 | 50 | 6,334 |
| Avg. | 212 | 99 | 43 | 5 | 222 | 469 | 45 | 78 | 401 | 10 | 151 | 83 | 11 | 3,271 |

[1] *In 2011, tamarack and white spruce.*

[2] *Timber Stand Improvement - Hand release of established regeneration*

A successful reforestation program provides numerous benefits, some of which include: the restoration of forest productivity, fertility and environmental function; the assurance of a perpetual, sustainable supply of forest resources and amenities for future generations; the protection of soil and water quality; and the establishment and development of quality wildlife habitat.

Spring Planting

The planting program has changed significantly since 2013. Between 2008 and 2013, an average of 350 acres of red pine, 210 acres of jack pine and 70 acres of white pine were planted every year. Since 2013, the average has been about 90 acres of red pine, 10 acres of jack pine and 20 acres of white pine. In addition, prior to 2013, 0 acres of jack pine were artificially seeded. From 2013 through what is planned for 2020, an average of nearly 350 acres of jack pine has been seeded per year.

The primary reasons for the changes in the reforestation program (planting and seeding) are as follows: 1) re-planting of the old fuel break areas has been completed. The last remaining stand scheduled to be reforested (144 acres) was seeded to jack pine in 2016; 2) a general lack of previously open areas, which, in the past, were planted to red pine; 3) a lack of mature red pine stands that are ready for regeneration; 4) movement towards primarily jack pine regeneration in the Barnes Barrens Management Area; 5) an emphasis on seeding when attempting to regenerate jack pine; and 6) much of the acreage planted during the early 2000's was in direct response to severe defoliation and subsequent mortality related to an outbreak of jack pine bud worm.

As mentioned above, one direction over the past decade plus was to reforest some of the previously established fuel breaks. The breaks were/are located in the barrens area, south of Iron River and north of Barnes. These breaks were approximately ¼ mile wide by a few miles long and were maintained as primarily open grasses. In theory, the breaks would provide a first level of defense if an intensive wild fire were to occur. Portions of the break still exist near the Potawatomi sub-division, but a majority of the breaks have now been reforested.

In total, roughly 1,300 acres of old fuel break have been reforested, primarily to red pine, but also some to jack pine. Approximately 350 acres still exist near the sub-division. As part of the local wildfire mitigation plan, the Department now incorporates wider harvest corridors along road rights of way in an attempt to increase the defensible space (the goal is to maintain a grass or fuel free zone at least 50 feet in width on each side of a town road corridor). Also, an additional fuel break road (averaging 100 feet in width) was established between Barnes and Weldon roads, to provide another level of defense in an area where some private development exists.

In 2019, 88 acres were planted with red pine. These sites were all be planted with containerized stock at rates of approximately 800 per acre (total of about 71,000 seedlings).

- The 2020 reforestation goal for planting is: 104 acres. There will be two different planting categories:
    - New planting sites: Two stands, totaling 42 acres. These sites will be planted with containerized stock at a rate of 800 trees per acre (total of about 34,000 seedlings).
    - Failed jack pine seeding site: One stand, totaling 62 acres. An older jack pine seed

site was determined to be a failure and will require re-stocking. Since the site is no longer suitable for seed, it will be planted. This site will be planted with containerized stock at a rate of 600 trees per acre (totaling about 34,000 seedlings).

In the future, the general expectation is that red pine plantings will hover between 100 and 200 acres or less per year; white pine under plantings will vary, depending on the availability of suitable sites; and jack pine will be planted when it's determined to be more advantageous to do so (typically on sites of relatively small acreage, where seeding is more difficult, on sites that require more intensive site preparation due to excessive competition, where prior seeding attempts failed or produced only marginal success, or other similar situations).

As stated in the Swamp Hardwood section, if/when EAB arrives, nearly all of the ash trees will quickly die. Because black ash will no longer be looked upon as a viable tree to regenerate the stand, the Department must find alternative species capable of establishing and developing in these wetter environments.

The natural regeneration of red maple, aspen, and other northern hardwood species will be a target in many swamp hardwood stands. However, natural regeneration may not always be feasible or result in an acceptable density of desirable growing stock. In these situations, planting may be necessary. The Department will continue collaborate with the DNR to explore/consider various reforestation alternatives in swamp hardwood stands.

The Department will also continue to analyze red pine to determine if there is a need to begin regeneration harvests sooner, in an attempt to evenly distribute age classes over the landscape. If so, annual harvests, and subsequent reforestation levels, would be adjusted accordingly.

Spring Seeding

The seeding program also changed significantly over the past few years. Before 2013, all reforestation activities were centered around planting. Artificial seeding was seldom used. Starting in 2013, the Department began implementing objectives that were developed as part of the Barnes Barrens Management Plan. Among other things, the plan identifies a preference to regenerate a jack pine dominated landscape (within the Barrens area), with artificial seeding as the preferred reforestation method. Seeding is preferred primarily because of the potential to create a more naturally regenerating landscape (that incorporates higher levels of variability and diversity).

Before a site is seeded it needs to be mechanically prepped and usually sprayed. This provides a better seedbed for the delicate jack pine seed to germinate and develop. Also, adequate acreage needs to be available before local contractors are interested in the work. Many of the acres that were trenched in 2018 were also sprayed in 2019. These sites would then be seeded in 2020.

The timing of timber harvests also has a direct impact on how many acres will be available for reforestation. As previously stated, timber sales are sold under two year contracts. The contractor can request up to two - one year extensions (meaning it can take up to four years to complete the sale).

In 2019, jack pine was seeded on a total of 216 acres (on 4 sites). All sites were seeded at a rate of

4 ounces per acre and all seeding was accomplished aerially, in coordination with WDNR pilots and aircraft. A total of roughly 54 pounds of jack pine seed was used in 2019.

- The 2020 reforestation goal for seeding is: 499 acres and is divided into two parts.
    - Jack pine seeding: 389 acres. A total of seven different stands will be seeded at 3 ounces per acre, all via DNR airplane. Six sites are located in the Barnes Barrens and one site is located in the northern block (compartments 65/70).
        - Starting in 2020, all jack pine seeding sites will be seeded twice (in successive years). Instead of seeding a site once at 4 ounces per acre, it will be seeded twice at 3 ounces per acre, each time. This will provide better coverage/distribution of seed and significantly reduce the potential for failure.
    - White pine seeding: 110 acres. One site, located east of Highway C (compartment 60) will be seeded with white pine, also via DNR aircraft. This will be a supplemental seeding of a site that is expected to regeneration naturally (to scrub oak, aspen and mixed conifer). Adding white pine seed, on a site that was whole tree harvested, is a cost effective way of increasing species and landscape diversity. This site will be seeded at a rate of 4 ounces per acre.
    - Again, all seeding will be accomplished with assistance from the WDNR (pilot and airplane). As per routine practice, all sites will be monitored regularly to determine success.

Site Preparation

Nearly all stands that are scheduled to be planted or seeded require some form of site preparation. In general, site preparation reduces competition, exposes mineral soil and provides the optimal environment for the desired tree seedling to become established and develop.

Site preparation methods can vary, the most common forms include (but are not limited to): power/disc trenching; fire plowing (also a form of trenching); blade scarification (primarily applied to pre-sale type site preparation activities); and spraying.

Site preparation goals generally reflect the amount of known sales that have been completed within the previous year (and are in need of site prep). Occasionally, a few more timber sales are completed in time for addition to site prep goals. When that happens, the goal is adjusted accordingly, as budgets allow.

In 2019, 287 acres were power trenched, roughly 125 acres were treated with a straight blade (pre-sale scarification), and 323 acres were treated with chemical.

- The 2020 reforestation goal for site preparation is divided into four distinct categories:
    - Power/Disc Trenching: 435 acres. This form will prepare sites for future seeding and planting activities.
    - Straight Blade Scarification: 150 acres. This form will of scarification is generally preformed prior to a timber harvest (pre-sale) in stands of red oak, paper birch and/or northern hardwoods. Scarification will facilitate the natural regeneration of red oak

and paper birch, as well as reduce competition from non-desirable species, such as ironwood and, in some stands, red maple. This work is generally accomplished by DNR staff, with DNR equipment.

- Spraying: 493 acres total and divided into two distinct categories.
    - Site Preparation for Reforestation: 287 acres. Applied a year after trenching to produce a site free of initial undesirable tree species. This creates an environment that allows the seedlings to germinate, establish and develop in a relative free-to-grow condition.
    - Barrens Management – Core Area: 206 acres. This particular site was burned in 2018 in an initial attempt to establish the grassy core. However, the burn did not produce as anticipated. Due to the presence of a significant component of advanced woody vegetation (and an elimination of fuels from the previous burn) it is necessary to apply a round of chemical to prepare the site. Afterwards, the core area will be maintained with prescribed fire, whenever possible.
- Fire Plow: 0 acres. If fire plow sites become available in 2020, there may be some additional acres treated, again, as budgets allow. All fireplow sites are accomplished by the DNR. Also, the potential exists to replace some areas scheduled to be prepped via trenching with fire plowing. The Department will coordinate with the DNR to determine if one or more fire plow sites would be feasible in 2020. If so, the trenching acres would be adjusted accordingly.

As previously stated, additional sites, not already planned for as part of the 2020 goals, may be discovered in 2020. If/when previously unplanned stands are found, the goals are adjusted accordingly, as time and budgets allow. However, if newly discovered stands do not need immediate attention, they will be addressed in the following year.

Release

On occasion, young regenerating stands, whether reforested naturally or with artificial means, need a little assistance. During the regeneration process, competition from other trees or vegetation can significantly reduce growth rates, negatively impact species density and diversity, and, in some cases, if not treated, result in partial or complete failure of the reforestation activity.

As part of the routine and regular monitoring program, stands are examined to determine if additional inputs by the Department are needed to help with the development of a stand (if needed, the activity is generally termed release).

In general, the Department has used three different forms of competition control, or release, to help achieve desired stand objectives: spraying (use of chemicals), timber stand improvement (or TSI), which uses hand held power tools (i.e. brush saws, chainsaws, etc.) or prescribed fire.

Spraying is most common when treating plantations, generally red pine, and is prescribed on an as needed basis. Occasionally, young plantations need treatment in order to release seedlings from undesirable vegetative competition. This release can significantly increase seedling growth and improve the rate of survival. Spraying as part of the initial site preparation treatment process

(before the site is planted or seeded), generally significantly reduces the need to also release. Spraying to release existing plantations hasn't been necessary since 2014.

The prescribed burn program, for the regeneration and/or maintenance of specific timber types (typically red oak), is still under review to gauge the effectiveness of fire. Prescribed fire hasn't been actively employed since 2012, though the DNR still maintains portions of the fuel break via prescribed fire.

Currently, roughly 128 acres of existing fuel break, in the core area of the Barnes Barrens, is scheduled for maintenance via prescribed fire. This work is accomplished by the DNR with DNR staff and equipment. Department staff may provide some assistance with prescribed burning.

Timber stand improvement may also be prescribed on regenerating stands in need of maintenance. In 2017, 46 acres of northern hardwood stands were treated with brush saws to release desirable regeneration. This marked the first time the Department used contract crews to treat a regenerating stand.

In the treated stands of northern hardwoods, undesirable species (primarily ironwood) were severed to release the more desirable maple, red oak and birch. Failure to do so has the potential to significantly decrease species diversity, reduce the growth and development of desirable tree species, and negatively impact the future production of the stand.

In the future, it is anticipated that TSI will become more routine and will be required to improve the growth potential and survival of desired regeneration in many previously managed hardwood stands i.e. northern hardwoods, red oak, birch, etc., as well as some conifer stands (primarily white pine under plantings).

Other forms of mechanical release are also constantly being explored (i.e. mowing, dozer and straight blade, etc.) and may be prescribed if deemed feasible, as budgets allow. CFI and FRM will help to reveal the extent to which TSI will be required, as well as to monitor the impacts/results of previous treatments.

- In 2020, the reforestation release goal will be divided into three distinct sections:
    - Spraying: 0 acres. However, through routine and regular monitoring, a few stands may be determined to require release. If so, these stands will be treated as budgets allow.
    - TSI: 50 acres. Even though 2017 has, to date, been the only year where TSI has been accomplished, there will eventually be a need for future treatments. Regeneration is monitored on a routine and regular basis. It is anticipated that the results of regeneration surveys will reveal additional stands in need of treatment. If so, these stands will be treated, as time and budgets allow.
    - Prescribed Fire: 0 acres. The Department will continue to work with the WDNR to determine if future stands would benefit from a prescribed burn. If so, these stands will be managed as time and budgets allow.
        - As previously stated, 128 acres located within the core area of the Barnes Barrens is scheduled for a burn in 2020.

Seedling Protection

Starting in 2013, the Department used bud caps to protect young jack pine seedlings from browsing by white tailed deer. In total, 239 acres were bud capped. This literally involves stapling a 3"x 3" piece of copy paper over the terminal bud/leader of each planted seedling. The reason: plantation monitoring in this area has shown signs of excessive deer browsing.

Failure to protect the seedlings could lead to plantation failure. Bud capping would need to be repeated every year until the seedlings are beyond the reach of the deer, which typically takes 3 or 4 years. Currently, the focus is on stands that are planted with containerized jack pine (as these seedlings are a little more nutrient rich when compared to bare root stock or natural regeneration).

These same stands were capped in 2014, 2015 and 2016. A few stands reached the desired height and were removed from capping in 2017. As a result, only 71 acres were capped in 2017, 38 acres in 2018 and 8 acres in 2019. A similar amount of acreage will be capped in 2020.

- The bud capping goal for 2020 is: 8 acres. The total number of acres capped may be adjusted based on impacts of browsing (or lack thereof) observed during routine monitoring.

Because most of the jack pine in the future will be regenerated via seed, bud capping will most likely only be used when absolutely necessary, and mostly on jack pine stands that were planted with containerized stock.

However, regeneration is monitored on a routine and regular basis. If plantations of red pine or underplantings of white pine or other similar reforestation attempts are experiencing similar browsing issues/pressures, these stands may also be bud capped, as budgets allow.

The Department also maintains two large scale deer exclusion fences on the forest. Both were constructed with eight foot tall, high tensile woven wire. A 29 acre exclusion is located south of Oulu and was installed during the spring of 2007. While a 50 acre exclusion is located south of Cable and was installed during the fall of 2008. Both fences were constructed on stands being actively managed for red oak. Both locations are routinely monitored to study the growth and development of regeneration and to better understand the potential influences of browsing by deer.

Both fence locations have also been recently harvested, where the overstory was removed to allow established regeneration to recruit. Each site will continue to be monitored to evaluate the effectiveness of the fence. The fences will also be maintained throughout this process, with the goal of eventual removal once seedlings have established and attainted dominance.

A few smaller scale fences (less than ¼ acre in size, made from high density plastic) have also been constructed on the forest. These are much smaller in size, but still intended to monitor the impacts of excessive browsing by white tailed deer.

As we monitor regeneration in stands of northern hardwoods (and red oak), small exclusion fencing may also be installed around canopy gaps as a way to monitor regeneration and potential browsing impacts. This effort will to occur in 2020, as time and budgets allow.

Natural Regeneration

The majority of stands managed by the Department regenerate naturally i.e. they do not require site preparation, planting or seeding in the reforestation process. In 2020, thousands of acres, across a variety of forest types, will be naturally regenerated. The exact amount is solely dependent on the total number of acres previously harvested.

Forest types such as northern hardwoods and aspen regenerate naturally via seed, stump sprouting and/or coppicing (vegetative sprouting from existing root system) and require very little additional input from the Department. However, the natural regeneration of hardwood forest types such as red oak and paper birch often require additional maintenance efforts/inputs by the Department.

As previously stated, reforestation can be accomplished by either natural or artificial means. Table 4 above tracks annual reforestation accomplishments, but primarily as they pertain to artificial regeneration or when additional inputs were required by the Department (i.e. site preparation, release, bud capping, etc.).

Subsequently, most of the monitoring listed in Table 4 is centered around stands that were reforested artificially, those that also received additional inputs from the Department, or when the establishment of adequate and/or desirable regeneration is a concern i.e. excessive deer browse issues, most oak harvests, most white birch harvests, and some northern hardwood gaps (primarily where site quality is marginal and/or competition from ironwood is excessive).

Examples of additional inputs to aid in the natural regeneration process include: pre or post sale site scarification to prepare a favorable seed bed and reduce competition, pre or post sale burning, TSI to reduce competition from undesirable tree seedlings and/or prepare favorable seedbeds, and deer browse protection i.e. fencing, repellents, etc. to improve the tree seedlings chance of survival. These additional inputs occur when issues or opportunities arise and are treated on a case by case basis, as time and/or budgets allow.

Every stand managed by the Department is ultimately reforested with an adequate stocking of desirable trees. However, not all treatments are regeneration harvests. Some stands are thinned, where a small portion of the trees are removed, typically with the goal of improving development on the higher quality stems left behind. Termed even-aged thinnings (also improvement or intermediate harvests), these treatments generally target the removal of the poorest quality trees; those that exhibit poor form and/or vigor; and undesirable, diseased or otherwise unhealthy individuals.

During the thinning process, trees are also removed to improve the development of adjacent higher quality stems, that are also competing for the same limited resources i.e. light, nutrients, water, etc. Stands that are managed with even-aged thinning practices are ultimately regenerated, but only when approaching the designated rotation age for that species.

Natural regeneration (either from seed or vegetatively via root suckers or stump sprouts) is the preferred method of reforestation in all hardwood types (i.e. aspen, birch, northern hardwood, oak), as well as some stands of conifer (primarily swamp conifer i.e. tamarack and black spruce, as well as some stands of white pine).

Hardwood types such as red oak and paper birch are reforested primarily with even-aged treatments (i.e. shelterwood, seed tree and/or clearcut) and typically require additional inputs from the Department to facilitate the natural regeneration process. Site preparation, competition control, the manipulation of light, timing of seed dispersal, etc all need to be addressed when regenerating red oak and white birch. As a result, these stands are monitored more intensively, as regeneration can be highly variable and the Department may need to act quickly if the stand is not responding to the treatment.

Hardwood types such as northern hardwood (typically dominated by sugar maple and basswood, and sometimes with components of yellow birch, red maple and white ash) can be managed with even or un-even aged techniques. Maple isn't as unpredictable as red oak and typically doesn't require additional inputs from the Department to encourage adequate regeneration. However, when implementing un-even aged treatments (i.e. when gaps or small groups are incorporated to initiate a new cohort or age class), the Department is discovering some issues with the process of natural regeneration.

On moderate or poorer quality northern hardwood sites, competition from ironwood has been a growing concern. Deer exacerbate this problem, as repeated browsing slows growth (and can eventually kill the tree) and allows less desirable or undesirable (i.e. ironwood) species to attain and maintain dominance.

Gaps or groups (for regeneration) comprise a relatively small percentage of the stand (typically 10 to 25%), so it doesn't take a large population of deer to eventually locate and browse the seedlings. All of which can have a negative impact on overall stand growth and development, as well as influence how and when stands are managed in the future.

Poor/slow growth rates on the residual trees, and inadequate recruitment of regeneration into the overstory, are also significant concerns on these lower quality sites. As a result, most northern hardwood stands that are treated with regeneration gaps or groups are monitored intensively. Additional inputs may be required to facilitate the natural regeneration of desirable hardwood seedlings (i.e. site preparation or TSI).

Other hardwood types, such as aspen, regenerate prolifically after harvest and rarely require additional inputs or follow-up from the Department. However, these stands are regularly monitored as part of the Department's reconnaissance and FRM programs. Due to concerns with the potential impacts of a warming climate, the Department is also in the process of establishing a more intensive monitoring program for regenerating stands of aspen.

Quaking aspen has been identified as one of many timbers type that could be negatively impacted due to changes in the climate. Stands developing on marginal sites are more inherently stressed and could be most at risk (i.e. sites that are nutrient poor). In addition, the presence of hypoxylon could have a significant impact on stand health and development.

Monitoring in aspen will cover a cross section of habitat types, but will prioritize stands developing on sites classified, by the Department, as marginal or nutrient poor. However, a subset of aspen sites, developing throughout all habitat types (poor to high), will also be part of the regeneration monitoring process.

For every stand, when a management prescription is developed, goals/plans for reforestation or regeneration are included as well. How a stand will regenerate is a critical facet of the process (more precisely, a mandatory part of the process).

As part of the forest management prescription, reforestation is basically categorized or classified in one of three ways: 1) with natural regeneration as the reforestation goal; 2) with artificial regeneration as the reforestation goal; or 3) as an even aged thinning (or intermediate treatment), where reforestation will come at a later date.

Table 4a summarizes the general management or reforestation goals for every completed (closed out) sale from 2011 through 2019 (total sales sold are also included; 2019 and 2020 are estimated). An important distinction between Tables 4 and 4a: Table 4 summarizes the actual reforestation activity that was physically accomplished per year; while Table 4a summarizes the planned reforestation activity that will occur in the future, once a timber sale has been closed out (which may take multiple years to fully realize).

**Table 4a: Summary of Treatments and Reforestation Activities on Completed Timber Sales (acres)**

| Year | Natural Reforestation[1] | Artificial Reforestation[2] | Thinnings[3] | Total Completed Sales | Total Sales Sold |
|---|---|---|---|---|---|
| 2011 | 1,889 | 1,135 | 619 | 3,643 | 4,156 |
| 2012 | 1,528 | 824 | 824 | 3,176 | 4,782 |
| 2013 | 1,215 | 830 | 866 | 2,912 | 4,177 |
| 2014 | 3,032 | 1,113 | 1,075 | 5,219 | 4,388 |
| 2015 | 3,127 | 1,053 | 586 | 4,766 | 4,958 |
| 2016 | 1,570 | 830 | 492 | 2,892 | 4,750 |
| 2017 | 2,176 | 1,044 | 872 | 4,092 | 4,101 |
| 2018 | 2,493 | 1,183 | 571 | 4,247 | 3,813 |
| 2019 | 2,144 | 455 | 723 | 3,322 | 4,267 |
| 2020 | 2,130 | 941 | 736 | 3,868 | 4,500 |
| Average | 2,130 | 941 | 736 | 3,868 | 4,389 |

[1] *Natural reforestation refers to stands that will regenerate via seed located naturally on site, or vegetatively via coppicing or stump sprouts.*

[2] *Artificial reforestation refers to stands that will be physically planted or seeded by the Department.*

[3] *Thinnings encompase stands that were treated with even aged prescriptions (or intermediate harvests). These stands are eventually reforested (either naturally or artificially), at a later date, as per the designated rotation age for that particular timber type.*

A timber sale is considered completed when every component of the contract has been met, to the satisfaction of the Department. This includes harvesting, hauling and stumpage payments, as well as all road maintenance and/or closure or other similar requirements.

Timber sales are sold under two year contracts and can be extended for another two to three years (and sometimes more). At any point during the contract period, a timber sale can go active. Once active, it is common for a contractor to harvest a portion of the sale and then move off, leaving more to harvest at a later date. It's also common for activity to carry over into another calendar year. A timber sale can still be classified as active even if all harvesting, hauling and stumpage payments have been met, but other contractual obligations are still outstanding i.e. road work or other similar requirements.

It is also important to note that sales are tracked by the date they are entered into the database (WisFIRS). In some situations, work to complete the sale was actually performed in the year prior

to when the data was actually entered into the system. This explains one of the reasons why the total acreage for sales completed and total acreage for all reforestation activities do not match in any given year. Also, as previously stated, Table 4a summarizes activities that are prescribed when a harvest is completed, while Table 4 summarizes the actual reforestation treatment.

In Table 4a, the acres of completed sales are highly variable, ranging from a low of 2,892 in 2016 to a high of 5,219 in 2014. Of the completed sales, since 2011, a vast majority are regenerated naturally, with an average of 2,130 acres per year. An average of 941 acres are scheduled to be reforested artificially and 736 acres are treated with even-aged thinnings (or intermediate treatments).

Aspen, northern hardwoods and red oak are the three most prominent types that will regenerate naturally (though red oak often requires more input from the Department to foster the regeneration process); red pine and jack pine are most often prescribed to regenerate artificially (planted or seeded); and red pine and red oak are the two most prominent timber types that receive intermediate treatments (thinnings, but no direct regeneration activities).

Seedling Counts (including the Forest Regeneration Metric)

All planted and seeded sites and many areas that were regenerated naturally require survival or regeneration counts. Monitoring the development of newly regenerating stands is an integral part of the reforestation process.

Data collected from the counts are used to assess the development of the stand in a variety of ways, some of which include: determine stocking levels of desired tree species; survival and quality of regenerating seedlings; degree/intensity of undesirable competition; existence of insects and/or disease, and, if present, extent of threats/impacts to the stand; impact of herbivory, if present; and anything else of note. All of which provides valuable information when determining the effectiveness of the reforestation activity, if any additional inputs by the Department will be required to achieve the desired future condition and the next management prescription for the stand.

Seedling counts are generally administered at one, two, three, five and/or ten years, or some combination thereof, after the regeneration activity on most planted and seeded sites. Seedling counts on naturally regenerating hardwood stands are typically administered two to four years after harvest (depending on the forest type) and also include one to two additional surveys to determine success. Some stands may receive additional monitoring after 10 years of age, especially if issues are discovered or if stands aren't responding to treatment.

Over the past few years, the Department has work closely with the WDNR in the development of a Forest Regeneration Metric (FRM), primarily for the assessment of sites regenerating naturally (primarily hardwoods). The metric was established, in part, to develop general survey methodology designed to assess natural regeneration by seedling and sapling size classes, thus providing a better, more scientific way to quantify results and discover/address potential issues.

Not unique to Bayfield County, the WDNR created the metric to be utilized by all foresters as an additional measure during routine stand assessments. This type of metric can be used to characterize and quantify stand-level regeneration or be used in multiple stands to distinguish

reforestation efforts by cover type on a county, regional, or statewide scale. If adopted by multiple agencies, it will also provide an opportunity to analyze regional trends, across ownerships, by providing a framework that allows for direct comparisons of data.

Another primary responsibility of the newly created Inventory and Analysis Forester will be to develop, establish and implement a forest wide regeneration monitoring program utilizing the FRM methodology. Work has already begun on stands of northern hardwood, red oak, and paper birch, but the goal will be to expand monitoring to all stands, throughout all forest types.

In addition to northern hardwoods, red oak, and birch, this will include monitoring aspen, scrub oak, swamp hardwoods, swamp conifer, and any other stand that will be regenerated naturally. Sampling protocols for aspen are still in the process of being established.

Table 5 displays the total reforestation/regeneration monitoring goal for 2020. The goal (acres) is summarized by major forest type per reforestation category (natural or artificial) and treatment (planted, seeded, or natural), and also includes the total number of stands.

**Table 5: Bayfield County Forest Reforestation (Regeneration) Monitoring Goal (CY 2020)**

| Species | Artificial Reforestation | | | | Natural Reforestation | |
|---|---|---|---|---|---|---|
| | Planted | | Seeded | | Natural | |
| | Acres | # of Stands | Acres | # of Stands | Acres | # of Stands |
| **Red Pine** | 675 | 20 | 0 | 0 | 2 | 1 |
| **Jack Pine** | 0 | 0 | 394 | 6 | 0 | 0 |
| **Bald Cypress** | 0 | 0 | 0 | 0 | 0 | 0 |
| **White Pine/Spruce** | 0 | 0 | 0 | 0 | 33 | 1 |
| **Aspen** | 0 | 0 | 0 | 0 | 1,930 | 38 |
| **Northern Hardwoods** | 0 | 0 | 0 | 0 | 1,681 | 40 |
| **Red Oak** | 0 | 0 | 0 | 0 | 1,162 | 28 |
| **Red Maple** | 0 | 0 | 0 | 0 | 305 | 9 |
| **Scrub Oak** | 0 | 0 | 0 | 0 | 137 | 3 |
| **Swamp Hardwoods** | 0 | 0 | 0 | 0 | 23 | 1 |
| **Swamp Conifer** | 0 | 0 | 0 | 0 | 0 | 0 |
| **Total** | 675 | 20 | 394 | 6 | 5,273 | 121 |

- As per Table 5, the total reforestation monitoring goal for 2020 is divided into two distinct categories: artificial (planting and seeding) and natural.
    - Artificial Reforestation Monitoring: which includes stands that were planted or seeded.
        - Planted: 675 acres, all red pine, covering 20 different stands.
        - Seeded: 394 acres, all jack pine, covering 6 different stands.
    - Natural Regeneration Monitoring: 5,273 acres, covering 121 different stands. Because the natural regeneration monitoring program is still in the process of being re-developed and expanded, utilizing FRM, the goal may fluctuate accordingly.
        - Due to time constraints, the FRM goal for naturally regenerating stands is further divided into three priority categories (high, medium

and low). The high and medium categories will be prioritized in 2020. The low priority category will be addressed as time allows.
    - High Priority: most stands of northern hardwoods, swamp hardwoods and red oak.
    - Medium Priority: all stands of red maple, scrub oak, and white pine.
    - Low Priority: all stands of aspen and smaller stands (less than 5 acres in size) of northern hardwoods, red maple, red oak, swamp hardwoods and red pine.
- Also in 2020, continue working closely with the WDNR on the development of a process/program for the analysis and summary of FRM data.

- The total regeneration monitoring goal for 2020 is: <u>6,342 acres, covering 147 stands.</u>

At 6,342 total acres, covering 147 different stands, the monitoring goal for 2020 is enormous (similar to the goal for 2019). Time may very well be a limiting factor this year as the Department strives to accomplish all goals across all programs. If so, it may be necessary to make adjustments to the goal or further prioritize stands that will be monitored in 2020.

All stands of artificial origin, as well as all stands of red oak and northern hardwoods will be of highest priority. While a subset of stands may be selected from forest types that traditionally have had no issues with regeneration, like aspen (see above).

The regeneration monitoring goal for 2020 (6,342 acres) is slightly less than the goal for 2019 (6,804 acres), but about 25% larger than 2018 and nearly 3 times larger than the average from 2011 through 2017.

In addition to determining the general success of the reforestation activity, other specific goals of regeneration monitoring will include, but not be limited to: identifying stands that may require additional inputs i.e. mechanical scarification, TSI, prescribed fire, etc.; more intensive observation on cover types that are typically difficult to regenerate i.e. red oak, paper birch, as well as stands where competition from undesirable species has traditionally been more prevalent i.e. ironwood in stands of northern hardwood; and quantifying the presence and intensity/level of deer browse, especially important in cover types that have a history of being over browsed i.e. red oak, paper birch (as well as gaps within northern hardwood stands).

FRM will be a component of the continuous forest inventory and incorporated as part of that program (which, as previously described, was implemented in 2018 and will continue in the establishment phase for another three years). Between FRM and CFI, Bayfield County will have a myriad of stand and landscape level information that will be used in all future forest management planning processes.

<u>Prescribed Fire</u>

Prescribed fire has traditionally been used to maintain portions of the fuel breaks located in the Township of Barnes, as well as to facilitate natural red oak reproduction in stands located throughout the county forest.

In 2020, 0 acres of forested stands will be treated with prescribed fire, where the goal is to facilitate the regeneration of certain tree species i.e. red oak. However, portions of the existing fuel breaks may be treated with fire, if conditions allow. Fuel break burns are coordinated by the DNR.

In 2020, roughly 128 acres within the core of the Barnes Barrens Management Area will be burned. County staff has always been invited to assist in the process and generally do, if time allows.

## WILDLIFE PROJECTS

A number of wildlife projects will again be undertaken in 2020. The majority of wildlife habitat improvement work conducted on county forest land will be accomplished utilizing funding from Wisconsin DNR grant programs, specifically, the County Conservation Aids and Nickel-an-Acre programs.

The Nickel-an-Acre program reflects a change from the previous Dime-an-Acre funding. As indicated in the name, the program funding was cut in half starting in 2010 and will continue to be funded at a nickel an acre into the foreseeable future. The County Conservation Aid grant requires a 50% county match on eligible projects.

The Conservation Aids project for 2020 have yet to be determined. There traditionally has been approximately $3,993 available for eligible projects. Additional monies may also be available, as determined by the total amount of unallocated funds. If additional funds are available, the Department may apply for more assistance.

The Nickel-an-Acre grant totals roughly $8,467. In addition to the annual allotment, Bayfield County is required to spend accumulated wildlife grant dollars. In 2020, the Department will continue to work with the DNR to identify suitable wildlife projects to spend down accumulate funds. This grant has been used to fund a variety of County Forest wildlife projects in the past.

Potential projects for 2020 could include, but are not limited to:

- Site prep for and seeding of jack pine in the Barnes Barrens Management Area.
- Potential development of supplemental barrens sites i.e. stepping stones.
- Mechanical and/or chemical treatments for wildlife opening maintenance (currently roughly 100 acres combined per year).
- Wildlife habitat development/improvement throughout the forest.
- Mechanical site prep for natural white birch, red oak or northern hardwood regeneration.
- Prescribed burning of wildlife openings and oak regeneration areas.
- Fish habitat projects.
- Habitat projects on old homesteads.
- Wildlife monitoring.
    - Sharp-tailed grouse banding and monitoring.
- Breeding bird surveys.
- Summary of breeding bird survey data, including the development an application and/or program utilizing said data.

- Land acquisition.
- Trail development and renovation (primarily for hunting access).
- Trail mowing and/or game opening maintenance.
- Equipment purchase (where the equipment would have a specific benefit wildlife habitat).
- Invasive species control and eradication.
- Deer exclosures for red oak regeneration (fencing).
- Seedling protection (bud capping, spraying, etc.).

The Department is also in the process of taking inventory on areas of the forest that have traditionally harbored healthy populations of beaver. Current aerial imagery and drones will be used to map and categorize the level of damage to the forest (created by the expansion of existing or the creation of new beaver ponds). Damage to the forest resource can be significant and data collected over the course of the next few years will help to determine if the Department needs to employ supplemental measures of control.

- In 2018, the Department was awarded a Wisconsin Habitat Partnership grant (funds provided from the Federal Wildlife Restoration Program) for continued work in the Barnes Barrens Management Area. The total grant award was a little over $51,000. As part of the approved project, in 2019, funds will be used to complete infrastructure development within the core area, as well as continue the control of invasive species (primarily spotted knapweed) located throughout the Barrens area. The grant was awarded over a period of two years and will be used to fund some of the planned work in 2019 and 2020.
- Similar wildlife projects may be developed in 2020 if additional funding sources become available.
- Applications for grants or similar funding sources will be treated on a case by case basis and presented to the Committee for pre-approval.
- The Department is currently collaborating with the DNR and USFS on the banding and monitoring of sharp-tailed grouse within barrens habitats. The goal of the potential project would be to better understand use of, and movements within (and between), barren landscapes, as well as the importance of habitat corridors (or stepping stones).
    - If approved, a significant portion of accumulated wildlife habitat dollars may be allocated towards this project.

Any of the above listed projects, or those of a similar nature, could be implemented in 2020, generally as conditions and funding allow.

## ACCESS MANAGEMENT

The revised Access Management Plan (Chapter 700) was finalized and approved in 2013. Implementation of the Plan began in 2014. Revisions to this plan will be further addressed in the development of the new 15 year comprehensive land use plan (see page 48 for more information on the 15 year plan revision).

In 2020, much of the field work/priorities will center around the placement of road and trail markers, informational signage, minor repairs of existing roads and trails, evaluation of and potential changes to current use designations, and the installation or removal of restrictive features

(i.e. berms, gates, etc.) to manage motorized access.

Also, the Department will monitor existing road and trail infrastructure to determine future use status or need. All new roads created as part of a timber sale will also need to be reviewed to determine the future use status. Motorized and non-motorized uses are consistently increasing. The Department will continue to address recreational needs and requests on a case by case basis.

Repair and maintenance of the infrastructure will occur on an as needed basis, as funding allows. Road building projects may also be developed, especially on those that receive high levels of use, are located in more sensitive areas in need of minor attention, and/or provide access into current or future timber sales and have the potential to increase future stumpage prices. Road projects can be performed by Department staff, DNR staff or general contractors.

The Department will continue to maintain roughly 45 miles of Primary Forest roads, for which we receive DOT County Forest Road Aids (currently $336/mile). The Department will also continue to identify, plan and/or develop additional forest roads and trails, as the need arises, for later entry into the County Forest Road program.

The Department also maintains an abundance of private temporary access permits. These permits authorize a landowner the right of ingress and egress to privately owned land, through the county forest. Permits are temporary, generally good for a period of ten years, and must be renewed upon expiration (or sale of the property). If approved, the permitted landowner must maintain the approved access road as outlined in the agreement. Every year, the Department approves anywhere between 6 to 10 temporary access permits. Permitted access roads are generally monitored

Another primary goal heading into 2020 will be the development of a more effective plan for monitoring the extensive road and trail infrastructure. More specifically:

- Create and test methods to efficiently collect and compile information on new and existing trails throughout the forest (using tablets and/or data recorders).
- Rebuild and/or finetune the existing access management database to better facilitate data collection, analysis and reporting.
- Use current aerial imagery to find potential new trail construction (near timber sales since 2012) across the entire forest. Prioritize field examination (ground truthing) and collection of data on all new trails, and incorporate into the access management database.
- Develop a realistic and achievable long-term access management monitoring program. Currently, there is a total of roughly 1,400 miles of inventoried roads and trails on the forest. This number will likely increase once all newly constructed roads have been inventoried (created as part of the timber management process).
    - Revisit, inspect and collect updated information on roughly 280 to 350 miles, with the goal of complete re-inventory every 4 to 5 years.

## BAYFIELD COUNTY FOREST PLAN

The existing County Forest Comprehensive Land Use Plan is valid from CY 2006 through 2020. Starting in early 2020, revisions for the new 15 year plan will begin. It is expected that the revision

process will take most of CY 2020 to complete. Individual chapters/sections of the plan will be presented to and addressed by the Forestry and Parks Committee during most monthly meetings throughout much of CY 2020. All chapters/sections of the plan will be revised.

Stakeholders and the general public will also be solicited for comment and invited to participate in the plan revision process. Once a draft plan has been approved by the Forestry and Parks Committee, it will be presented to and addressed by the full County Board. Once approved by the Board, and finally by the DNR, the new 15 year comprehensive land use plan will be valid from CY 2021 through 2035.

## RECREATION (on County Forest Lands)

The Department will continue to work with the County Tourism Department and interested user groups regarding recreational activities occurring on the county forest. The demand for recreational use on county forest land has steadily increased over the past decade, a trend that is expected to continue into the foreseeable future.

Over the past few years, the Forestry and Parks Committee has approved numerous re-routes of snowmobile and ATV trails, the construction of new, and re-routes of existing, mountain bike, hiking and cross country ski trail networks, numerous improvements to existing hiking, mountain bike and cross country ski trails and an expansion of the shooting range off North Boundary Road to include a trap component.

Requests to host events on trails located within the forest continues to increase as well. Some of the more notable events that utilize portions of trails located on the forest include: the American Birkebeiner Cross Country Ski Race, the Chequamegon Fat Tire Mountain Bike Race, the Cable Area Off-Road Classic Mountain Bike Race and the Apostle Islands Sled Dog Race. Over the past few years, the Department (Committee) approves an average of approximately twenty (20) organized events per year that utilize trails located on the county forest.

The Department also maintains land or recreational use agreements or leases with a variety of organizations, some of which include: the American Birkebeiner Association, CAMBA, North Country Trail Association, North End Ski Club, Ashwabay Outdoor Education Foundation, National Fish Hatchery, Town of Barnes, ABC Sportsmen's Club and more.

In general, the use agreements highlight specific areas or trails within the forest and outline management or use requirements expected from each organization. Use requests are treated on a case by case basis and require approval from the Committee.

Requests for new or improvements to existing motorized and non-motorized trail systems are expected to continue in 2020 and beyond. Requests for additional trails will be treated on a case by case basis, as per the Access Management Plan.

Trail counters have been installed in a variety of settings to determine actual use of certain trails and/or areas. Data received from these counters will provide the county with valuable information needed to determine future direction. Additional counters have been purchased and will continue to be installed throughout the forest to monitor usage in 2020.

- A goal for 2020 is to develop and implement a process to more effectively analyze and report trail use information.

Throughout any given year, the Department will explore additional opportunities to enhance and improve the recreational use of the forest. Existing networks are routinely analyzed and areas are explored for new or improved recreational potential. Some planned and/or potential projects for 2020 include:

1. Lost Creek Falls Trail.
    a. Due to an abundance of trail use, the Department will investigate the need for a temporary portable restroom at the Lost Creek Falls trail head. If a bathroom facility is determined to be necessary, the Department may also explore various grants for the potential placement of a permanent concrete vault type restroom facility.
    b. In 2019, an $11,000 Recreational Trails Program (RTP) grant was awarded for various trail construction/rehab work on the Lost Creek Falls trail. These are federal funds administered through the DNR. A 50% project match is required (which has been budgeted in 2020). A project will be developed and contract awarded in 2020 to address a few wet areas on the trail, as well as steps/stairs, or similar access features, to the river. Work is expected to be completed by fall 2020.
    c. Over the past few years, this trail has received significant upgrades by the Department. Since the upgrades, use of the trail has increased substantially. Counters installed on the trail before and after the upgrades have verified the increase in use: from an average of about 2 users per day (before upgrades), to an average of around 20 users per day (after upgrades), with a peak use of over 80 users per day (around 4th of July weekend). Due to the consistent use, additional minor repair work will likely be required to maintain the trail and/or infrastructure.
2. Yurts. Continue routine maintenance of the three yurts on county forest land. During the summer of 2016, one yurt was constructed in the Cable area and one near Mt. Ashwabay (named Evergreen – it's green in color). In late summer of 2018, a third yurt was constructed, a little north of the first one located near Mt. Ashwabay (named Terra Cotta – reddish clay in color). Some of the more significant projects may include (all as time and budgets allow):
    a. New entry door at the Evergreen yurt.
    b. Replace the indoor picnic tables at the Evergreen and Cable yurts (with a separate table and chairs, similar to what was placed in Terra Cotta).
    c. Assess the condition of the floors at all three locations. Re-paint if necessary.
    d. Assess the condition of the privys at all three locations. Re-paint if necessary.
    e. Expand the woodsheds at both the Cable and Evergreen locations.
    f. Assess the condition of the decks at both the Cable and Evergreen locations. Consider staining them if determined necessary.
    g. Consider improving the under deck seating area at the Terra Cotta location.
    h. Locate existing or create new trails at the Bayfield locations to provide additional designated hiking opportunities, and reduce the impact to groomed ski trail networks.
    i. Maintain the grounds immediately surrounding the Evergreen and Cable yurts to address encroaching vegetation.
    j. Clean-out the stove pipes at all locations and consider treatments to the exterior fabrics (washing the outside of the yurts).
    k. Update the maps at the trailheads/parking areas of each location. Update the

information located within each yurt as well.

l. Monitor for mice at all three yurts, particularly the Evergreen and Cable locations. Address as necessary.

3. Jolly Trail. Continue to re-evaluate the Jolly trail network. As part of the process, determine existing uses and future direction. Also re-explore partnerships with the Ashwabay Outdoor Education Foundation, as well as the Town of Bayfield, regarding future maintenance and/or grooming of the trails. Some upgrades to the parking area and portions of the trail were completed in 2018 and 2019. As part of the continued assessment, upgrades to other existing features, including the trail, kiosk and various signs may be required, as time and budgets allow.
    a. A specific goal for 2020 will be the development of a management plan for the property. The plan would identify short and long term goals for the property, including timelines.
4. Explore the potential of creating new, or improvements to existing, multi-use, non-motorized trails at numerous locations including: the Glacial Kettles area, Spring Creek area, the Perch Lake area, the Menard Road area and/or other locations throughout the Forest where the potential for strong use exists. If a potential location is discovered, and is approved by the Forestry and Parks Committee to develop, there most likely would be a need to apply for funding. If so, applications to one or more grants may be submitted. Pursue as time and funding allows.
5. Explore the potential of improving or expanding the existing motorized trail networks on public and private lands (both state funded and non-funded). This may require collaborating with other public land managers i.e. USFS, DNR, etc., the Red Cliff Tribe, interested user groups and the general public. It may also require submitting applications to one or more grants, to assist in any requirements related to planning, development or construction. Pursue as time and funding allows.
6. Explore the potential of creating dispersed rustic camping sites on other portions of the county forest. Pursue as time and funding allows.
7. Develop and implement strategies for advertising and/or promoting recreation on the county forest. This may include collaborating with the Tourism Department, as well as other agencies or local businesses where tourism is a primary objective. Pursue as time and funding allows.
8. Create a recreational trail development and maintenance strategy, with an emphasis on identifying critical trail connections and areas for new construction or enhancement. The plan would/could include strategies for both motorized and non-motorized recreation, as well as the development of incentives or other appreciation type programs for private landowners when trails are located on private land.
9. Continue working with existing user groups on the management of approved trails located within (or otherwise connected to trails located on) the forest. This could include assistance, both financially and/or physically, associated with the construction, maintenance or development of new or existing trails and trail heads. Also includes consultation and collaboration regarding potential re-routes and/or other issues pertaining to the management of the trails.
10. Continue working with the ABC Sportsmen's Club with regards to the newly revised shooting range lease. The Club operates and maintains a shooting range, on county forest land, off North Boundary Road in the Town of Bell. As part of the new lease agreement, the Club will be required to submit annual reports to the Department summarizing range use, soil testing and lead reclamation activities (if any). Also, in 2018, the Club may begin

construction of a trap range, assuming all applicable permits have been acquired, located adjacent to the shooting range.

a. Construction of the new trap area began in 2019. Completion of the trap expansion project is expected in 2020.

11. Update the GIS database to accurately reflect the location and relevant information regarding all currently approved motorized and non-motorized trails, trail heads, recreational structures, access routes and other similar features/uses on the forest.
12. Continue to pursue the development and installation of ownership signs/markers, interpretive signs/maps and/or informational kiosks along popular or well used trails or use areas. The goal of the signs would be to convey information regarding any timber management that did or will occur in the general proximity of the recreational trail or area. The signs would be fairly general in nature and intended to provide baseline information regarding forest management. Pursue as time and funding allows.
    a. Currently collaborating with Northwest Regional Planning Commission regarding the development of interpretive signing. Funds have been allocated in 2020 for sign development. Continue to pursue in 2020.
13. Continue to explore the potential of other recreational opportunities on the county forest, including improving access to lakes.
    a. In 2019, a County Conservation Aid grant was awarded to Bayfield County to help improve access to Perch Lake (located in the Town of Bell, west of County Highway C). Work will commence in 2020 to improve an existing access/woods road and create a small parking area near the lake. This would significantly improve public access to the lake.
    b. Other opportunities may exist to create similar improvements to other lakes on county forest land. Pursue as time and budgets allow.

## OTHER ACTIVITIES

Insects and Disease:

The DNR and Department are continuing to monitor the effects of forest insects and diseases, including, but not limited to: jack pine budworm, two-lined chestnut borer, emerald ash borer (though not currently located on the forest, but both Douglas and Sawyer counties are under quarantine), gypsy moth, oak wilt (officially located on county forest land in 2018), annosum root rot (now called Heterobasidion root disease or HRD for short) and more. If sites containing a significant amount of insect infestation or disease are discovered, they will be monitored for damage and/or mortality. Depending on the level of damage, prompt management may be required. As new threats are encountered, the Department may need to alter management plans accordingly. Below are updates on a few of the more prominent and destructive insects and diseases:

- Gypsy Moth. Gypsy moth numbers, and subsequent defoliation, previously had been observed in very high numbers in the Bayfield Peninsula. The greatest numbers were initially discovered along higher elevations located in the general vicinity of Jammer Hill and Echo Valley Roads. Red oak and aspen are their preferred primary food sources and are the most susceptible to potential mortality, especially the suppressed and over mature individuals (red oak being of most concern). Significant defoliation of red oak and aspen

occurred in these areas during the summer of 2012.

Egg mass numbers declined dramatically in 2013 and remained low in 2014 and 2015, and relatively low in 2016, 2017, 2018 and 2019, indicating that defoliation may only be minor in 2020 and beyond.

If gypsy moth numbers significantly increase in 2020, oak management, in the areas impacted the most, may be adjusted accordingly. If oak management is reduced in specific units, the sustainable goal in all other units may also be adjusted accordingly.

In 2020, the Department will continue to work with the DNR regarding gypsy moth monitoring and management recommendations (if significant defoliation is predicted).

- Oak Wilt Disease. In 2017/2018, oak wilt was confirmed outside of Seeley (in Sawyer County), near the Bayfield County line (less than 8 miles away from the county forest block in Cable).

  In 2018, three cases of oak wilt were confirmed on the Bayfield County Forest. Two of the detections were made by the Wisconsin DNR during their yearly oak wilt flight in Cable (as requested by the Department). The other was located by a Department forester. Samples of suspected oak wilt trees were then collected by Department staff and/or DNR employees and sent to the lab to confirm the presence of the disease. In 2019, additional positive sites were also located (again in the Cable block).

  From a management perspective, the presence of oak wilt will add new restrictions to some timber sales, primarily those with a significant component of red oak (or where red oak management is a primary objective) and located within a six mile radius of the last known infected tree.

  If oak is a significant component of the stand and the sale is located within six miles of a known infected tree, then the recommendation is no timber harvesting from around spring break-up through the middle of July. That is when the sap feeding beetle is most active (and a freshly cut stump or damaged branches on adjacent trees are sources for infection). Any cutting of trees during this time period can create a potential point of infection (unless the wound is immediately covered with some sort of dressing, which generally isn't realistic).

  Additionally, since it can take multiple years for a timber sale to be completed, we will need to add qualifiers (restrictions) on all future timber sales (with similar oak components) in case oak wilt is discovered in the area after the contract is awarded.

  In 2020, the Department will continue collaboration with the WDNR (especially the local Forest Health Specialist) with regards to the management of stands with oak wilt and the treatment of infected trees. The Department will also review and apply management recommendations listed within various publications, including the document "Oak Harvesting Guidelines to Reduce the Risk of Introduction and Spread of Oak Wilt" (produced by the DNR).

Prevention of spread is the best way to manage for oak wilt. Overland spread is primarily accomplished via a sap feeding beetle. It's attracted to the fungal mats of an already diseased tree, picks up a few spores, and then flies around looking for other sources of food.

Being a sap feeding beetle, any oak tree with a fresh wound is fair game. Once it finds a wound, it feeds on the sap, thus depositing the spore. Once the spore is in the tree, it immediately goes to work on the vascular system. Essentially, the disease completely blocks the trees ability to move water and nutrients. Unable to move water or nutrients, in a matter of just a few short months, the tree is dead. Rapid browning of the leaves (and subsequent leave drop) are primary indicators of oak wilt.

Oak wilt is also transferred underground via root grafting. Once an infected tree is discovered, the infected tree and surrounded oak become part of the treatment area. A formula is used to determine the radius of the treatment area (and includes the size of the tree, type of soils, and topography), but every oak tree in that radius is treated. A combination of cutting, girdling and herbicide are used to treat the infected area. Burying stumps and infected material and burning have also been used.

There are also recommendations on how to address firewood. Fortunately, we are currently only dealing with just one infected tree, and a few surrounding oaks. When dealing with a larger area, treatments will become far more challenging, time consuming and expensive.

After an oak wilt infected tree or pocket is located and confirmed, guidelines/protocols are adopted that help to determine how the trees/areas will/should be treated. Models or charts that estimate the number of trees located within potential root grafting distance of a known infection source are applied. Once the perimeter is established all oak trees within it are double (or single) girdled and herbicide is applied to kill the trees, generally starting at the outside (of the perimeter) and working toward the center.

Once the trees are killed, the oak wilt infected tree(s) are treated. When all the trees are confirmed to be dead the uninfected trees may be harvested. The infected trees will be dealt with on a case by case basis.

All oak wilt treatment areas will be tracked using GIS. The database will include, but not be limited to: discovery date, detection status, confirmation date, oak species, soil type, number of infected trees, treatment status, treatment date, disposal type, disposal date, and last follow-up. Potential oak wilt sites will be monitored on an annual basis, by Department and/or DNR staff, using a combination of visual inspections and drone flights. The Department will also continue to collaborate with the DNR to organize annual flights with DNR aircraft (generally in areas deemed to have a high probability of a new oak wilt Infestations).

- It is anticipated that additional positive oak wilt infected trees will be discovered in 2020. Depending on the number of sites and total amount of trees that require treatment, it may be necessary to contract some or all of the work. If confirmed to be oak wilt, each location will be addressed on a case by case basis, as time and budgets allow.

- Emerald Ash Borer. Emerald ash borer (EAB) was discovered in Douglas County and, most recently, in Sawyer County, our neighbors to the west and south. As a result, those counties have been quarantined, meaning, in general, that there are now restrictions on the movement of wood. To date, EAB has not been discovered in Bayfield County. However, based on current locations, discovery in Bayfield County is inevitable. In general, ash contributes less than 0.5% of annual stumpage revenues and is present, as a dominant forest type, on less than 1.0% of the county forest.

  The large purple traps often seen along major roadways, intended to help monitor for and locate the presence of EAB, are no longer being placed or maintained by DATCP or APHIS. Since the threat of EAB is looming, it may be feasible to purchase, place and monitor these traps at the Department level.

  In 2019, nine purple traps were installed by the Department at various locations on the county forest were ash is a significant component. All traps were negative for EAB.

  - In 2020, nine more purple traps will be installed by the Department. The traps will be monitored at regular intervals throughout the summer for the presence of EAB. If detected, the Department will work with the DNR to determine the next course of action. See the Swamp Hardwood section for additional information on EAB.

Invasive Species:

The Department routinely inspects roads and timber sales for the presence of invasive species. If located, a plan for treatment is developed. The presence of invasive species (both native and non-native) is still relatively rare on the forest, though observations and associated treatment efforts have steadily increased over the past decade. The Department typically treats a few small patches of land per year.

The most common non-native invasive species treated on the county forest are buckthorn (in the forest) and spotted knapweed (on roads and trails). Black locust has been the most common native invasive to be treated on the forest, typically occurring in small isolated patches in the vicinity of old, abandoned homesteads. A one-acre patch of multiflora rose was also found on the county forest in 2018.

Currently there are around 72 acres of known buckthorn infestations on the country forest. Infestations are generally small in size and widely scattered across the impacted area (i.e. not 72 acres of solid buckthorn!). All treatments will continue in 2020, as time and budgets allow.

There is roughly 8 acres of known black locust infestations on the county forest. Similar to buckthorn, these infestations occur primarily in small patches and are widely scattered throughout the impacted area. Black locust treatments will continue in 2020, as time and budgets allow.

- In addition to the continued treatment of known infestations, a more robust invasive species monitoring and mapping program is being developed and implemented in 2020. This will help with future planning and monitoring efforts, including prioritizing workloads and

evaluating the most effective means of treatment (i.e. accomplished by Department staff or contractors).

In the past, treatments have traditionally been performed by Department staff, usually involving chemicals. In general, the Department treats less than 10 acres of invasive species per year, primarily due to time constraints.

In 2020, that number is expected to be as high as 72 acres of buckthorn, 8 acres of black locust, the small patches of multiflora rose and a small patch of known honeysuckle. Consequently, it may become necessary to incorporate the use of contractors, on a more routine and regular basis, in order to accomplish overall goals. Generally speaking, all confirmed occurrences are managed on a case by case basis, as time and funding allows.

In 2014, the Department received a Sustainable Forestry Grant for the treatment of spotted knapweed on 50 miles of forest roads in the Barnes Barrens Management Area. The project was completed in 2015. However, spotted knapweed maintains a persistent and viable seedbed for around 7 years, meaning multiple successive treatments are required to reduce the population.

Roughly the same 50+ miles of road were treated in 2016 through 2019. A similar amount of road will be treated again in 2020. The long-term goal is to use herbicide to manage and eventually eliminate (or significantly reduce) knapweed in the area and, hopefully, prevent any further spread into the barrens. In 2018, the Department received a Wisconsin Habitat Partnership grant, where a portion of funds will be used to help cover the costs associated with knapweed treatment. See page 46 for more information of the grant.

To date, the treatment has been a success, as knapweed has already been significantly reduced. In addition, the amount of chemical used to treat the same 50+ miles of road has significantly declined with each treatment. The project primarily targets existing roads that are the most heavily infested, but more access corridors may also require future treatment to limit/reduce the overall rate of spread. More assessments will be completed in 2020 to determine if and/or when additional treatments will be required to control the spread of knapweed in the Barrens.

Biological Controls: In addition to the control of knapweed via chemical means, two types of biological control agents (insects) have been used on the forest. Cyphocleonus Achates is a root mining weevil and Larinus spp. are seedhead weevils, and within the last decade, both have been released, by the DNR, on the forest to assist with the control of spotted knapweed.

The use of biological control methods was concentrated within the Barnes Barrens area. C. Achates were released in 2008 and 2012, while Larinus spp. were released in 2008, 2010 and 2012. Dispersal rates for each weevil are highly variable, but the Larinus spp. have been known to travel at distances up to seven miles away from the site of initial release, though the dispersal rates for C. Achates are thought to be significantly less.

Biological control agents will not eliminate, nor significantly reduce the presence of spotted knapweed. However, a healthy resident population of insects has the potential ability to help maintain a modest balance and provide an opportunity for native plants to effectively compete. The DNR will continue to monitor for the presence of the insects, as well as their general effectiveness.

The Department will also continue to work with the DNR on similar opportunities to incorporate alternate means of invasive species control on the forest, and will pursue as time and funding allow.

Permits and Agreements:

Every year, the Department reviews numerous requests to utilize portions of the Forest. Requests vary, but the most common include: providing access to private lands; providing access to land or trails for hosting organized recreational events; collecting balsam boughs; and collecting firewood. All requests are treated on a case by case basis and are typically addressed with a use permit.

Table 6 summarizes the total permits and approvals issued by the Department from 2008-2019:

**Table 6: Bayfield County Forest Summary of Issued Permits and Approvals**

| Year | Fire Wood | Balsam Boughs | Cones* | Christmas Trees | Access | Events | Disabled Hunting | Storage |
|---|---|---|---|---|---|---|---|---|
| 2008 | 360 | 8 | 0 | 1 | 2 | 9 | 3 | 1 |
| 2009 | 423 | 5 | 1 | 1 | 0 | 10 | 3 | 1 |
| 2010 | 436 | 5 | 1 | 1 | 3 | 10 | 3 | 2 |
| 2011 | 503 | 7 | 1 | 6 | 9 | 10 | 10 | 2 |
| 2012 | 441 | 6 | 1 | 7 | 8 | 12 | 7 | 2 |
| 2013 | 406 | 16 | 13 | 3 | 6 | 17 | 6 | 2 |
| 2014 | 486 | 9 | 6 | 4 | 7 | 21 | 5 | 2 |
| 2015 | 394 | 8 | 5 | 5 | 10 | 18 | 9 | 1 |
| 2016 | 331 | 10 | 3 | 4 | 6 | 17 | 10 | 1 |
| 2017 | 285 | 19 | 1 | 4 | 7 | 19 | 6 | 1 |
| 2018 | 250 | 12 | 2 | 6 | 11 | 23 | 9 | 1 |
| 2019 | 284 | 10 | 2 | 5 | 4 | 24 | 4 | 2 |
| Avg. | 383 | 10 | 3 | 4 | 6 | 16 | 6 | 2 |

** specifically advertised for jack pine cones in 2013*

For 2020, the requests for permits are expected to remain fairly constant and consistent (similar to what has been requested over the past few years).

In 2018, the Department approved a request by the Red Cliff Band of Lake Superior Chippewa and Bayfield School District to tap trees on the forest for the collection of sap (eventual production of maple syrup and associated products). Red Cliff, in collaboration with the Bayfield School District, was awarded a USDA Farm to School grant for the production of maple syrup. The project involves student participation during every facet of the process (with the end product being used by the School).

The site selected for taping contains relatively poor quality sugar maple (and red maple), with low sawlog potential. Since these trees are being managed primarily for fiber production, there is little to no concern with regards to impacts on quality. The permitted use will cover a period of two years (spring of 2019 and 2020).

The Department is also in the process of exploring the potential of establishing a maple sugaring permit system, where low/poor quality hardwood stands could be tapped for maple syrup production. This type of use is not restricted as part of County Forest Law, nor is it restricted as part of the current Comprehensive Land Use Plan.

- In 2020, the Department will continue to explore the potential and feasibility of developing a permit system for the collection of sap (for personal use).
- Additionally, many of the permit templates and processes are relatively old and/or outdated. The Department will periodically review existing permits, including permit fees, or identify the need for new ones and bring all recommendations to the Committee for review.

Land Transactions (Acquisition and Sale):

The Department will continue efforts to acquire private properties on a willing seller, willing buyer basis, when advantageous to the long term goals of Bayfield County. A priority will be given to land located within the existing county forest blocking.

In December 2014, the Department received preliminarily approval for two Knowles-Nelson Stewardship Land Acquisition Grants. The grants were officially awarded in June 2015. As a result, Bayfield County purchased 1,392 acres from Meteor Timber and 463 acres from Lyme Timber. Additionally, the county provided a match of 747 acres of county owned, non-county forest land. In total, 2,602 acres of land was added to the county forest. In late fall 2016, the county purchased another 200 acres of land previously owned by the Wisconsin DNR. Combined, these two acquisitions have added over 2,800 acres to the county forest.

By using the appraised value of county owned land as the required match, the Department can tailor projects that significantly reduce (or eliminate) out of pocket expenses. The Meteor Timber and Lyme Timber acquisition projects totaled roughly $2.616 million (including the cost of land, appraisals and other associated fees). The county received approximately $2.265 million from the Stewardship grant (primarily from the appraised value of matched lands). As a result, the county spent roughly $350,000, out of pocket, to purchase over $2.6 million in productive forest land.

The county still maintains ownership of approximately 245 acres of non-county forest lands that could be used as a match in future Stewardship projects. These properties were recently appraised at $423,000, meaning they would have roughly $211,500 worth of buying (match) power (as per the Grant, properties owned for more than one year are valued at ½ of the appraised assessment). In addition, the county also owns over 3,000 acres in the Bibon Swamp. These properties may also be used as a match and enrolled in county forest law as special use lands.

In February 2019, another Stewardship project for land acquisition was approved. The acquisition was completed in March 2019. In total, 510 acres of land was purchased from Ceres Timber for $630,000. To cover the applicant's share of the project, the county contributed the appraised value of 181.25 acres of county owned land and $153,250 in cash (proceeds from two 80 acre parcels previously sold to the Red Cliff Band of Lake Superior Chippewa).

As part of the approved project, Bayfield County was required to enroll the county owned parcels located within the Bibon Swamp in County Forest Law. The county owns 3,040 acres of land within the Bibon. Unlike other county owned parcels that were included in previously approved Stewardship grants, the county did not receive match value for the Bibon parcels (enrolling was a contingency of approval by the Joint Committee on Finance).

In 2019, a total of 691.25 acres of land was enrolled in CFL, in addition to the 3,040 acres of the Bibon Swamp (the swamp was enrolled as county forest - special use). After subtracting the 160 acres sold to Red Cliff (which were removed from CFL) a net grand total of 3,571.25 acres was added to County Forest Law in 2019.

As part of any future Stewardship grant application process, the county forest blocking boundaries may also need to be modified (all properties included as part of the grant, either as a match or a purchase, must be located within the County Board approved county forest boundary).

For reference, Table 7 summarizes the total amount of acquisitions and subtractions from County Forest Law since 2004:

**Table 7: County Forest Law (CFL) Entries and Withdrawals**

| Year | Entries[1] | Withdrawals[2] | Net Change |
|---|---|---|---|
| 2004 | 278.00 | 40.00 | 238.00 |
| 2005 | 160.00 | 0.00 | 160.00 |
| 2006 | 80.00 | 0.00 | 80.00 |
| 2007 | 0.00 | 0.00 | 0.00 |
| 2008 | 320.00 | 161.08 | 158.92 |
| 2009 | 0.00 | 4.20 | -4.20 |
| 2010 | 0.00 | 0.00 | 0.00 |
| 2011 | 0.00 | 0.23 | -0.23 |
| 2012 | 0.00 | 0.00 | 0.00 |
| 2013 | 40.00 | 4.25 | 35.75 |
| 2014 | 40.00 | 0.00 | 40.00 |
| 2015 | 2,601.80 | 0.09 | 2,601.71 |
| 2016 | 0.00 | 3.36 | -3.36 |
| 2017 | 200.00 | 90.20 | 109.80 |
| 2018 | 0.00 | 82.71 | -82.71 |
| 2019 | 3,731.25 | 0.00 | 3,731.25 |
| Total | 7,451.05 | 386.12 | 7,064.93 |
| Average | 465.69 | 24.13 | 441.56 |

[1] *Land added to the county forest, typically via purchase, donation, trade or tax delinquency.*

[2] *Land removed from the county forest, typically via sale or trade.*

The primary goals of land acquisition are to further improve the efficiency of county forest management by consolidating (or blocking) lands within established county forest blocking and to provide additional public benefits through the purchase of forest land or special and/or unique areas. County forest blocking boundaries were traditionally arbitrarily placed, based primarily on the

current location of county forest lands. If a parcel of interest (to purchase) or match property is located outside the current boundary, the blocking will be adjusted accordingly.

The County will also continue to engage with Red Cliff regarding the future sale of county forest land to the Tribe, as per the Tribal/County MOU. Such transactions will be treated on a case by case basis. All proceeds from the sale of county forest land will be re-invested in land, and enrolled in county forest law.

Other requests to purchase county forest land will also be addressed on a case by case basis. As per County Forest Law, any sale of county forest land would ultimately need to be approved by the Forestry and Parks Committee, County Board and DNR.

- In 2020, the Department will explore other opportunities for the development of land acquisition projects. A Stewardship grant and/or other similar funding sources would be considered as part of any land acquisition project. All projects would be pursued as time and funding allow and presented to the Forestry and Parks Committee for approval.

Forestry and Parks Department Garage and Equipment

Periodic and general maintenance will be required on the newly constructed Forestry and Parks Department garage (construction finished in the fall 2014), including minor work on the grounds and landscaping. Solar panels were added to the south facing side of the building in 2018/2019 and will offset some of the electrical use.

The Department maintains a sizeable fleet of vehicles, implements and equipment, including, but not limited to:

1. Nine (9) 4x4 pickup trucks.
2. Five (5) ATV's.
3. One (1) UTV.
4. Four (4) snowmobiles.
5. One (1) bat wing field mower and one (1) trail mower.
6. One (1) 2002 115 hp New Holland TM115 tractor, with end loader.
7. One (1) 2006 John Deere 450J bulldozer.
8. Two (2) light weight trailers.
9. Numerous site prep implements including Brackee seeders, anchor chains, and various plows.
10. Numerous power tools, saws and trimmers.

The repair and maintenance on any of the above listed items could occur at any time during CY 2020. All repairs are treated on a case by case basis, as budgets allow. Major repairs (or replacements) may require funding that would exceeded budgeted amounts. If that occurs, additional requests for funding will be brought to the Committee and full Board.

The Department also manages and maintains multiple sand and gravel pits located on county forest land (located in the Towns of Bayfield and Russell). These pits are primarily used by local

municipalities, as well as the Red Cliff Tribe, for the maintenance of local infrastructure. In 2020, these pits will continue to be maintained on an as needed basis, to ensure compliance with state and local laws.

Management of Other Bayfield County Owned Lands:

Currently, Bayfield County owns approximately 1,000 acres of county tax title lands, not including lots and other small parcels, in addition to the above listed county forests lands.

On occasion, the Department will assess these parcels for land and/or timber sales, monitor for potential trespass issues, negotiate road, utility and recreational easements or permits and explore for sand and gravel potential. As new parcels are acquired, typically through tax delinquency, the Department will commonly inspect for timber management potential and/or for potential retention and enrollment into county forest law.

- In June 2018, severe storms caused significant damage to numerous sections of motorized recreational trails that are managed and maintained by the Department. All trails were repaired by the end of 2018. In addition to trail impacts, the County sustained significant damage to the old Delta Landfill, with the Department assuming the responsibility of planning for and administering all repair work.
    - FEMA approved the Delta Landfill project in 2019. The Department is currently in the process of collaborating with the Bayfield County Land Conservation Department, as well as DATCP and Wisconsin Waste Management engineers regarding the development of plans for repair. Once the plans are developed and finalized, the project will be let for bids and a contract awarded. It is anticipated that the repairs will be completed by fall 2020. The Department has assumed responsibility for the project.

Good Neighbor Authority:

The US Forest Service has been authorized to enter into cooperative agreements with states to carry out approved forest, rangeland and watershed restoration services, including timber sales, on federal land, as per the Good Neighbor Authority (GNA). Under a cooperative agreement between the US Forest Service and the DNR, the DNR may conduct forest management activities on federal lands. Further, the DNR may contract with a county for the purposes of conducting forest management activities on federal lands, as outlined under the GNA agreement.

Recently (fall 2015), the DNR and the Chequamegon-Nicolet National Forest (CNNF) signed a ten year GNA Agreement, which will be reviewed annually to update the scope of work, as well as to identify additional timber and restoration treatments. The partnership enables the CNNF to more fully implement their forest plan and increase the amount of timber offered for sale. The goal for the CNNF in FY 2018 is to again reach 100 million board feet in timber sales. Through the GNA, the DNR has a goal of assisting the CNNF in accomplishing approximately 25 million board feet (roughly 5,500 acres) of additional timber sales in FY 2018 (that may not have been established otherwise).

The DNR anticipates 15 to 20% of the timber sale work identified under the Agreement to be accomplished by interested counties. If interested, a county can decide their level of involvement, which could include the use of existing staff or hiring part time employees. Counties would be reimbursed for all expenses, including salary, fringe, supplies and service costs, and overhead.

If interested, each county was required to adopt a resolution, which approved entering into an MOU with the DNR. As per the MOU, each county would be required to enter into a GNA program contract with the State, which describes the level of involvement and project budget (i.e. rates of reimbursement).

In spring 2016, Bayfield County entered into a GNA MOU with the DNR. As part of the MOU, the county agreed to become a contractor of the state, with the ultimate goal of assisting in the establishment of timber sales on federal land. Program contracts are established with the state on an annual basis and subject to a mutually agreed upon scope of work. The Department will continue to work with the state on the development of annual GNA program contracts.

The scope of work defines the level of involvement the Department is willing to provide, outlines general goals and expected accomplishments and establishes an estimated budget. All salary, fringe, supplies, services and overhead costs, contributed by the county as per the GNA program contract, are reimbursed by the state.

All work provided by Department staff related to GNA will come as overtime, as the Department has no time to spare during normal business hours. The scope of work is subject to annual revisions and Department involvement will be highly dependent on opportunities located within the Washburn Ranger District.

In 2017, the Department entered into a program contract with the DNR to manage approximately 675 acres of red pine (20 stands) on the Chequamegon-Nicolet National Forest (Washburn District). It was estimated that 971 hours would be required to establish the timber sales.

In 2018, the Department entered into a program contract with the DNR to manage approximately 889 acres of red pine (17 stands) on the Washburn Ranger District of the Chequamegon-Nicolet National Forest. In addition to prescription development and timber sale establishment, the Department also committed to the administration of two timber sales (that were established by the Department as part of the contract). It was estimated that roughly 1,325 hours would be required to accomplish all goals associated with the contract.

In 2019, another GNA program contract was ratified. The contract included the traditional management of 31 red pine stands, covering 1,047 acres (prescription development and timber sale establishment), as well as the administration of active timber sales that were established through previous agreements. Also, the 2019 contract included the development of prescriptions for an additional 21 stands of red pine, covering 638 acres. The additional work was for the development of prescriptions only and did not include the establishment of timbers sales or administration.

- In 2020, it is estimated that the Department will allocate another 500 to 750 hours of time towards prescription development, timber sale establishment and timber sale administration

on the Chequamegon-Nicolet National Forest located within the Washburn Ranger District. Work would be accomplished on stands of red pine and including prescription development, timber sale establishment and administration.

- As per December 2019, a total of 17 new stands of red pine, covering 520 acres is anticipated for 2020. In addition to the new stands, red pine from the previous contract (in 2019) are still in the process of being established for a timber sale.
  - For 2020, the total volume of GNA work is expected to include: red pine remaining from the 2019 contract; the new red pine stands for 2020; timber sale administration of sales currently under contract; potential reconnaissance and/or prescription writing, if available.
- As per the program contract, all wages, fringe, equipment use, materials purchased (i.e. marking paint) and overhead would be reimbursed by the DNR. All work allocated by Department staff on anything related to GNA will occur after hours and will not be accomplished as part of the normal 40 hour work week (whenever possible). As a result, all wages would be compensated as overtime (and totally dependent upon interest from Department staff), which would be identified and reimbursed as such under any GNA program contract signed with the DNR.

Table 7a describes the total levels of GNA activity since 2016 (the figures for 2020 are estimates):

**Table 7a: Summary of GNA Activities (2016-2020)**

| Calendar Year | Fiscal Year | No. of Stands [1] | Total Acres [1] | Total Hours | Expenses | Revenues [2] |
|---|---|---|---|---|---|---|
| 2016 | 2017 | 15 | 381 | 326 | $21,033.35 | $0.00 |
| 2017 | 2018 | 20 | 675 | 371.5 | $23,960.56 | $39,627.93 |
| 2018 | 2019 | 17 | 889 | 333.75 | $24,164.40 | $9,393.10 |
| 2019 [3] | 2020 | 52 | 1,685 | 533.95 | $37,821.28 | $41,515.62 |
| 2020 | 2021 | 17 | 520 | 500 | $35,000.00 | $52,000.00 |
| Total | | 121 | 3,630 | 2,065.20 | $141,979.59 | $142,536.65 |

[1] *Total work assigned per calendar year per GNA contract.*

[2] *A portion of the revenues are generally received the year after work has been completed.*

[3] *Of the total stands/acres, 17 stands and 634 acres were prescription writing only.*

## PARKS

The management of all Bayfield County parks and campgrounds was assigned to the Forestry Department in September 2010. The four parks and campgrounds include:

1. Twin Bear Campground
2. Delta Lake Campground
3. Big Rock Campground
4. Atkins Lake Park

Since 2010, numerous changes and upgrades have been made to many of the campgrounds. Some of the more significant improvements include:

1. Twin Bear Campground
    a. Complete electrical rebuild and upgrade throughout entire campground.
    b. Repair of all major outbuildings and cabin.
    c. New fishing pier near the beach area.
    d. New ADA ramp construction near beach area.
    e. Creation of new tent camping site.
    f. Re-establishment of sand beach.
    g. Re-establishment of the parking area near the beach, including the installation of a french drain to better control runoff.
    h. New stairs that connect to the fishing pier near the beach area.
    i. New individual gas water heaters for each of the three showers.
    j. New playground equipment near the beach area.
    k. Re-surfacing of walking path near Puig's Point.
    l. New wireless high speed internet access throughout the entire campground.
    m. New locks/keysets on all outbuildings (all keyed the same).
    n. Added canoe and kayak rentals (though temporarily discontinued in 2017).
    o. New seasonal mooring dock.
    p. New transient mooring dock located near the seasonal docks.
    q. New overflow parking area located near the dump station.
    r. Installed new fencing and gravel pad next to the garage (for outdoor storage).
    s. Expanded parking area near lower pumphouse.
    t. Installed new well pump in lower well (near boat launch).
    u. Expanded parking area near the dump station.
2. Delta Lake Campground
    a. Complete re-grade on nearly all existing campsites.
    b. New playground equipment near beach area.
    c. Two new fishing piers.
    d. Repair of all major outbuildings.
    e. New electric added to remaining campsites.
    f. New wireless high speed internet access throughout the entire campground.
    g. Installation of new mooring dock and small picnic area.
    h. Modifications to the ADA ramp/path.
    i. New locks/keysets on all outbuildings (all keyed the same).
    j. Added canoe and kayak rentals (though temporarily discontinued in 2017).
    k. Repair of walking path near the playground.
    l. Repair of beach area.
    m. Installed a new storage shed.
3. Atkins Lake Park
    a. New boat launch ramp installed in 2017.
    b. New entrance sign installed in 2019.

All parks and campgrounds undergo routine cleanup of brush and downed trees on a regular basis. Parks and campgrounds are also regularly inspected for hazard trees and branches, which are

removed as needed. The removal of hazard trees or branches typically occurs when camping is inactive, usually in the late fall or early spring. Most of the trees are cut up and left on site to be used as firewood. Every year, there will be some removal of hazard trees and/or branches.

Some anticipated projects or minor repairs needed to the parks and campgrounds in 2020 include:

1. Twin Bear Campground
    a. Consider expansion of a parking area east of Hart Lake Road. Proceed as time and funding allows.
    b. Install new fishing dock off Puig's Point (already included in 2020 budget). This dock would be for fishing only (no mooring).
    c. Repair/improve the area in front of the cabin to address the significant ponding issue. Proceed as time and funding allows.
    d. Consider replacing the entrance sign, currently located adjacent to Highway H. Replace as funding allows.
    e. Inspection of retaining walls on a few campsites for future repair.
    f. Re-grade on a few existing campsites and road surfaces.
    g. Explore the need to add gutters on the cabin store to divert water away from the entrance to the building.
    h. Explore the potential for two new tent campsites on the hill behind shower building. Clear area and remove hazard trees. Develop as time and funding allows.
    i. Assist campground manager in some routine maintenance of the grounds, as time and funding allows.
    j. Install/re-establish speed bumps at multiple locations.
    k. Assess potential to improve ventilation in the shower building. Mold and mildew buildup are constant issues and current overhead venting may be inadequate. Proceed as funding allows.
    l. Continue routine replacement of numerous old picnic tables, as needed.
    m. Inventory and replace older fire rings. As budgets allow.
    n. Draft and implement a management plan for the property, including vegetation management (i.e. trees, brush, weeds and invasive species control) and an inventory of all infrastructures.
    o. Continue monitoring existing infrastructure, repair as needed and as budgets allow.
2. Delta Lake Campground
    a. Install new rules and regulations sign located at the entrance to the campground (the old one had deteriorated and was removed in 2019).
    b. Consider replacing the entrance sign, currently located adjacent to Scenic Drive. Replace as funding allows.
    c. Add parking up the hill near the boat launch. More people are using the beach which is putting pressure on parking. Pursue as time and budgets allow.
    d. Fix the constant washout issue on the access road to the boat launch.
    e. Consider potential fishing dock on the west side of the play ground.
    f. Evaluate the condition of all primitive toilets in the campground. Replace as necessary and as budgets allow.
    g. Explore the potential for tent camping on county owned island.

h. Re-grade a few existing campsites and road surfaces.
i. Assess potential to improve ventilation in the shower building. Mold and mildew buildup are constant issues and current overhead venting may be inadequate. Proceed as funding allows.
j. Continue routine replacement of old picnic tables, as needed.
k. Inventory and replace older fire rings. As budgets allow.
l. Draft and implement a management plan for the property, including vegetation management (i.e. trees, brush, weeds and invasive species control) and an inventory of all infrastructures.
m. Continue monitoring existing infrastructure, repair as needed and as budgets allow.

3. Big Rock Campground

Some repairs to existing campsites and regrading of the access roads and parking lot occurred in 2018 and 2019. Some of the priorities for 2020 will include:

a. A new entrance sign was installed in 2019. A new rules and regulation sign (and kiosk) will be installed in 2020.
b. Additional minor repairs on portions of the access roads and the primary parking lot may still be necessary.
c. Minor repairs to sections of the primary access trails to the river. Some portions may require relocation. These are old fisherman trails that were established by use, over a long period of time. Many are currently unsustainable and in need of maintenance. Pursue as time and funding allows.
d. Continue to explore the potential for rec trail development within the 40 acre county owned parcel. Pursue as funding allows. Also collaborate with the DNR regarding the potential to extend rec trails onto adjacent state owned properties.
e. Replacement of numerous picnic tables and fire rings, if necessary.
f. Repair and/or replacement of many campsite markers.
g. Draft and implement a management plan for the property, including vegetation management (i.e. trees, brush, weeds and invasive species control) and an inventory of all infrastructures.
h. Continue to collaborate with the DNR on the development of a long term use agreement regarding the strip of state owned land on the eastern most portion of the property.
i. Possible replacement of a door on one of the bathrooms.

4. Atkins Lake Park

a. Brush encroaching trees and vegetation along primary access road into the park.
b. Draft and implement a management plan for the property, including vegetation management (i.e. trees, brush, weeds and invasive species control) and an inventory of all infrastructures.
c. Remove old fee tube.
d. Install new rules and regulations sign.

In addition to all of the items listed above, the Department will also explore the potential of establishing a process to accept payments via credit card. If established, credit cards could be accepted to pay for various camping and boat launch related fees. The potential to pay via credit

card would apply to Twin Bear and Delta Lake campgrounds. Since the system would be managed within the Department, it could also be used to receive payment for other various permit fees (i.e. balsam boughs, access, etc.).

If a process for credit card payments has been adopted, a cancellation policy will also be developed. As part of every advanced reservation, a credit card will be requested to secure deposit. Last minute cancellations have been an increasing problem at both Twin Bear and Delta.

Siskiwit River Falls

In 2018, with much assistance from the Bayfield Regional Conservancy (now Landmark Conservancy), Bayfield County acquired roughly 101 acres of land in the Town of Bell, adjacent to the Siskiwit River. The property was purchased with a NOAA CELCP grant (administered by Wisconsin Coastal Management) and matching funds from donations and landowner bargain sales (all secured by the Conservancy).

Bayfield County ultimately agreed to accept ownership of the property (the Siskiwit River Estuary Protection project, as titled in the grant) for primarily two reasons: 1) in recognition of the unique and exceptional natural resource values contained throughout the parcels, including numerous waterfalls on the Siskiwit River, as well as ecologically significant forests and wetlands, and agreed that these values should be protected and conserved; and 2) in recognition of the current public use values and future potential of the property, as individuals and families have enjoyed recreating on these parcels for generations.

As part of the acquisition, the county also agreed to receive and administer the NOAA CELCP grant. The overall goal of the grant was to provide permanent protection and conservation of the ecological, recreational, historical and aesthetic resources of this unique site.

By accepting these funds, the county was mandated, by the terms of the grant, to manage the property in a manner that will preserve the qualities of these values. In addition, eventually a conservation easement with the Conservancy will be recorded on this property. This easement will further require the county to ensure the protection and conservation of these various important resources. The entire property was re-zoned to W Conservancy in 2018.

Some of the primary goals accomplished in 2019 included:

- Primary Parking Lot Development. Located on the east side of the river. This area will serve as the primary trail head/entry to the property.
- Secondary Parking Lot Development. Located on the west side of the river. This area is intended to serve as the primary access point to the falls located across the road. Having two parking areas should reduce the amount of foot traffic on Siskiwit Falls Road.

Primary goals for 2020 include:

1. Existing Hiking Trail Improvement.
    a. Purpose: the existing hiking trail will provide primary access to the Siskiwit River. The trail was created by locals for general access to the river. As such, stretches of

the trail are in poor condition and will not accommodate sustained heavy use. In addition to improvements to the tread, the trail will also require the installation of boardwalk or similar structures with the goal of providing safe and sustainable access to the river.

b. Location 1: will connect to the primary parking area/trail head on the east side of the river and north of the road.
c. Location 2: a small stub trail exists on the south side of Siskiwit Falls Road for access to the southern portion of the river. Little improvement is needed on the stub trail. The goal is to angle the crosswalk from the secondary parking area towards a primary point of access to this portion of the river.

2. Signage.
    a. Type(s): signs for the property will include: directional signs along Highway C; a property sign at the primary parking area; a similar (albeit smaller) sign at the secondary parking area; an informational kiosk (at the primary parking area) that will contain maps, general information (including rules and regulations), and history of the property (including how it was acquired); rules and regulations at the secondary parking area; markers along the trails; and markers indicating private property. Caution pedestrian signs should also be placed along Siskiwit Falls Road (along with the crosswalk). It may also be recommended to reduce the speed limit on that section of road.
        i. Private Property Markers: it is anticipated that the private properties located along the southern portion of the project boundary and east side of the Siskiwit River would have the potential to receive the greatest amount of public use pressure. As such, private property markers will be placed at select locations to reinforce ownership boundaries.
3. Work Plan.
    a. Finalize a work plan for the property including the development of short and long term goals and objectives, as well as a schedule for maintenance. A draft plan was developed as part of the initial process, but still needs some fine tuning. As part of the work plan, rules and regulations for the property should also be established. It will also be important to engage with the Town of Bell as part of plan development.
4. Additional Work.
    a. Invasive Species Control: work will continue in each of the next few years to reduce existing populations of buckthorn and honeysuckle. The property will be routinely monitored for invasives and treated as necessary.
    b. Hay Field: as per the NOAA grant, we are required to address the old field. A portion or all of it could be reforested with a mix of native conifers. Another portion could be maintained as native prairie. A combination of the two options may be preferred. The Department will continue to collaborate with Landmark Conservancy, Wisconsin Coastal Management and the DNR regarding viable management options for the old field. Establishing a mowed walking path through this portion of the property is also an option.
        i. Addressing the old field is not a high priority (we have about 9 years to complete the task). The goal will be to revisit the field once all higher priority items have been accomplished.
    c. Additional Trails: in 2020, the primary goal will be to improve the existing trails located along the river. Afterwards, use of the property will be monitored to

determine if additional trails are necessary. If so, the county will explore options in collaboration with Landmark Conservancy and Wisconsin Coastal Management.

d. Additional Parking Areas/Trail Heads: currently, no new parking areas or property access areas are being considered. This includes access off Elm St. While the public has the right to recreate on the property from Elm St., the county currently has no plans to develop or promote access from this location.
e. Bathrooms and Trash Bins: currently the county does not plan to install bathrooms or garbage bins on the property. If users need to use the restroom or dispose of garbage, the goal is to provide directions to public facilities in Cornucopia. The property will be monitored on a routine and regular basis. A restroom facility and/or garbage bins may be considered if deemed necessary by the county.
f. Apple Orchard: an overgrown apple orchard exists in the eastern most portion of the property (along the eastern border with Siskiwit Falls Road). There is an opportunity to potentially partner with the Town of Bell and/or a local friends group in an attempt to restore this orchard. Explore in 2020 as time and budgets allow.
g. Additional Infrastructure: the potential also exists to construct a pavilion or similar structure on the property. This option is also not a high priority, but will continue to be considered as a potential future project.

In 2019, two $30,000.00 grants, an Acquisition and Development of Local Parks (ADLP) Knowles-Nelson Stewardship grant and a Wisconsin Coastal Management grant (NOAA), were awarded to the Department. Funds from each grant will be used to repair and improve the existing fisherman/hiking trails located adjacent to or near the Siskiwit River. The funds will also be used to purchase signs and informational kiosk materials.

A proposal for all trail work will be developed in late winter 2020 and let for bids shortly thereafter. Once a contract has been awarded, it is expected that all work will be completed by late summer to early fall 2020.

Fire Hill Preserve

In October 2018, the Department once again partnered with Landmark Conservancy on another potential land acquisition project. The Fire Hill Preserve Project is located in the Town of Bayfield and contains approximately 104 contiguous acres of forested land. To purchase the property, the Conservancy and Department collaborated on the development and submission of a Wisconsin Coastal Management land acquisition grant application (Landmark also submitted a Stewardship grant application).

If awarded, the grant would cover 40% of the cost of acquisition, with the applicant required to pay the remaining 60%. As part of required applicant match, the Conservancy has secured funds through donations and other grants (Stewardship), as well as a bargain sale from the current landowner, to cover the entire amount. The total project was estimated to cost nearly $226,000, with little to no out of pocket expense from the county.

In December 2019, the county was awarded the Wisconsin Coastal Management grant. On December 27, 2019, the project officially closed. In early 2020, ownership of the Fire Hill property will be conveyed to Bayfield County. Throughout 2020, the Department will begin the process of

developing short and long term goals and objectives for the property (while collaborating with the Conservancy and Wisconsin Coastal Management, as well as the Town of Bayfield).

In general, the property will be managed as part of the county parks program. Most likely as a day use facility, with excellent potential for non-motorized recreational opportunities. The property is extensive, is located in an area that is frequented by a lot of people (situated in the middle of orchard/berry farm country within the Bayfield Peninsula) and contains an excellent existing road network for primary accessibility (most of which is paved).

New non-motorized trail development and other forms of compatible recreation will be considered as part of plan development. If recreational trail construction or other forms of enhancement are determined to be a priority, the Department will also pursue additional funding sources to assist in the development of the property, as time and budgets allow.

Numerous unknown issues or projects will undoubtedly surface throughout 2020, as we become more familiar with the property. All unknown issues will be addressed based on significance and/or importance, as time and budgets allow.

In 2020, a primary goal for all parks and recreational properties will be the development of short/long term comprehensive management plans. Among other things, the plans would summarize each park, while fleshing out short and long term goals, visioning, objectives, priorities and maintenance schedules. Based on time constraints and other priorities, it will be impossible to address them all, but the process will start in 2020.

## MOTORIZED TRAILS AND RECREATION (Emphasis on State Funded Trails)

The management of county recreational trails was assigned to the Forestry and Parks Department in July 2013. Primarily, this involves the management/oversight of all state funded motorized trails located on county and private land (also groom snowmobile trails on federal land). To help accomplish this task, Bayfield County maintains agreements with the Bayfield County Snowmobile Alliance and local ATV clubs (and USFS).

Table 8 displays the total miles and annual maintenance funds received from the State of Wisconsin per trail type:

**Table 8: Mileage and Funding For Trails Managed by Bayfield County**

| Trail Type | Miles | Rate/Mile | Total |
|---|---|---|---|
| Snowmobile | 454.41 | $300 | $136,323 |
| ATV Summer | 86.75 | $600 | $52,050 |
| ATV Winter | 177.15 | $100 | $17,715 |
| UTV | 86.75 | $100 | $8,675 |
| Total | | | $214,763 |

In addition to the routine maintenance performed on these trails by the Alliance and local clubs,

below is a listing of anticipated Trails projects or issues that may be addressed in 2020:

1. Continue to pursue the creation of a recreational trail development and maintenance strategy, with an emphasis on identifying critical connections and areas for new construction or enhancement. This may require input from existing partners and user groups, as well as the general public. Pursue as time allows.
2. Pursue the installation of a new bridge on Trail 31S. The trail was moved to avoid a traditionally difficult stream crossing. The new crossing is easier to approach and maintain. Will require an application to the DNR for funding.
3. Continue to re-establish roles and responsibilities and foster relationships with the BCSA, snowmobile clubs and ATV clubs.
4. Update contracts with the BCSA and other motorized clubs.
5. Continue to address landowner disputes and/or concerns regarding land ownership and/or trail location, on a case by case basis.
6. Continue to work, along with the County Tourism Department, on building a supportive network of local chambers, business owners and community members that will help in the financial and/or logistical support of the Bayfield County trail networks
7. Continue the maintenance of a database identifying each club and officers, as well as location and mileage maintained for snowmobile and ATV trails.
8. Develop and maintain a database identifying the location and condition of all bridges, culverts, gates and outbuildings on snowmobile and ATV trails.
9. Creating a maintenance/inspection schedule for #7.
10. Develop and maintain a database for all existing permits or easements that allow snowmobile and ATV trails to occur on private land.
11. Develop and maintain a database that categorizes the importance of each trail to the overall network/community i.e. high, medium, low. The database would help ascertain the importance of future repair work. For example, a major repair on a trail designated as low importance might not be a high priority.
12. Combine #'s 9 and 10 to determine where to focus obtaining future easements or access permits.
13. Continue to pursue the concept of compensation to private landowners who allow recreational trails on their land.
14. Continue to explore the potential to install trail counters at strategic locations throughout both networks (ATV and snowmobile) in an attempt to gain a better of how each system is used (quantify use). Understanding the level of use will provide a wealth of information for both short and long term planning efforts.
15. Complete repair work on Trail 1 off Klemik Road (previously awarded DNR Snowmobile grant).
16. Assess Trail 31, the portion on county forest land, for potential application of a DNR snowmobile trail rehabilitation grant. Much of the trail is very wet and in need rehab, including, but not limited to: beaver mitigation, trail surface improvements, potential trail widening and/or reestablishment in sections, water management, and treatment of encroaching brush. Proceed as need and funding allows.
17. Continue coordination with the Snowmobile Alliance and DNR on the implementation of the newly established Snowmobile Electronic Reports System (SNARS), recently developed by the state.
18. Complete the construction of a covered picnic shelter on the ATV trail off Flag Road. This was a previously award motorized trail grant. Work will be completed in 2020.

19. Compile a list of beaver dam issues impacting trail infrastructure. Coordinate with local trappers and/or the USDA APHIS Animal Control Services to remove the problem animals and destroy associated dam structures.

The above listed items are known issues or projects that need attention in 2020. All or most of the projects that will require significant repair work or new construction/installation will be submitted to the State for potential funding.

Numerous unknown issues or projects will undoubtedly surface throughout the year. A good example is the repair of the Drummond Connector in 2018. This popular multi-use trail (ATV and snowmobile trail) located on federal land was damaged as part of the June 2018 storms (same location that was damaged from the 2016 storms). Bayfield County partnered with the USFS and DNR to complete the repair work (the USFS provide some funding, the DNR provided the rest, and the County coordinated and administered the repair work). Without the partnership, the trail would not have been repaired in time and would have otherwise remained closed.

All unknown issues, not already listed in the workplan, will be addressed based on significance and/or importance, as time and budgets allow.

## Meet the Staff

The information listed above describes the general Departmental goals and objectives for CY 2020. Below is a brief background history of Department and DNR staff employed to accomplish those goals.

Administrator: Jason Bodine.

a. Experience: Forester with Bayfield County from 2000 to 2009. Administrator from 2009 to present.
b. Highest Level of Education: Master of Science in Forestry from Michigan Technological University.
c. Primary Role: administers and manages all aspects of the forestry, parks and recreation programs. Directs day to day operations and all planning efforts. Supervises all employees working within the Department.

Assistant Administrator: Steve Probst.

a. Experience: Forester with Bayfield County from 1999 to 2000. Assistant Administrator from 2000 to present.
b. Highest Level of Education: Bachelor of Science in Forest Management from UW Stevens Point.
c. Primary Role: assist the administrator in all facets of the forest management program. Provides lead field role in all aspects of timber sale administration.

Forester: Mike Amman.

a. Experience: Forester with Bayfield County from 2003 to present.
b. Highest Level of Education: Bachelor of Science in Natural Resources from UW Madison.
c. Primary Role(s): timber sale establishment, forest reconnaissance, reforestation and regeneration monitoring and database management (GIS and WisFIRS). Assist in other

aspects of the forest management program.

Forester: Andrew O'Krueg.

a. Experience: Forester with Bayfield County from 2010 to present.
b. Highest Level of Education: Bachelor of Science in Forest Management from UW Stevens Point.
c. Primary Roles(s): timber sale establishment, forest reconnaissance, reforestation and regeneration monitoring and database management (GIS and WisFIRS). Assist in other aspects of the forest management program.

Forester: Jeremiah Neitzel.

a. Experience: Forester with Bayfield County from 2011 to present.
b. Highest Level of Education: Bachelor of Science in Forest Management from UW Stevens Point.
c. Primary Roles(s): timber sale establishment, forest reconnaissance, reforestation and regeneration monitoring and database management (GIS and WisFIRS). Assist in other aspects of the forest management program.

Forester: Caleb Brown.

a. Experience: Forester with Bayfield County since 2018.
b. Highest Level of Education: Master of Science in Forest Biology from Purdue University.
c. Primary Role(s): timber sale establishment, forest reconnaissance, reforestation and regeneration monitoring and database management (GIS and WisFIRS). Assist in other aspects of the forest management program.

Inventory and Analysis Forester: Jason Holmes.

a. Experience: Forester with Bayfield County from 2012 to 2018; Inventory and Analysis Forester from 2018 to present.
b. Highest Level of Education: Master of Science in Forestry from Michigan Technological University.
c. Primary Roles(s): develop and manage the CFI and FRM programs, including data analysis and reporting; provide a lead role in the management of the access management program; play a lead role in the management of various GIS databases; assist in other field forestry related tasks including timber sale establishment, inventory, and reforestation.

Recreation Forester: Jenifer Bratsch.

a. Experience: Recreation Forester with Bayfield County from 2016 to present.
b. Highest Level of Education: Master of Science in Physical Geography from the University of Calgary.
c. Primary Roles(s): assist in the management of state funded ATV and snowmobile programs, all recreation related activities on county forest lands, including all designated non-motorized trails and yurts, and county owned campgrounds and day use parks.

Forest Technician: John Mesko.

a. Experience: Forest Technician with Bayfield County from 2001 to present.
b. Highest Level of Education: employed in the general field of forest management for over 30 years.
c. Primary Roles(s): heavy equipment operation, road and trail maintenance, repair and construction, parks maintenance, assist in the timber sale program, assist in the reforestation

program.

Office Manager: Lindley Mattson.

a. Experience: Office manager with the Forestry and Parks Department since February 2019.
b. Highest Level of Education: Bachelor of Science in Business Management from UW River Falls.
c. Primary Roles(s): maintains accounts receivable and payable, prepares vouchers for all expenditures, manages all accounts and paperwork associated with the timber sale program, manages and prepares all financial records, statements and reports, provides customer service.

WDNR – County Forest Liaison Forester: Joseph LeBouton.

a. Experience: WDNR - County Forest Liaison Forester from 2011 to present.
b. Highest Level of Education: PhD candidate in the Department of Forestry at Michigan State University for five years where he studied links between forest landscape composition, white-tailed deer densities and northern hardwood forests.
c. Primary Roles(s): coordinating the DNR's contribution to Bayfield County Forest management activities. The DNR provides the county with enough forest management assistance annually to set up 25% of the sustainable harvest, perform roughly 50% of the required forest reconnaissance updates, as well as contribute to road maintenance, forest improvement activities, prescribed fire, and wildlife habitat improvement projects.

*Submitted by Jason Bodine, Forestry & Parks Administrator, December 31, 2019.*