DEPARTMENT OF NATURAL RESOURCES

Minnesota's School Trust Lands Valuation Report

Progress as of December 31, 2016

Contents

About This Report

The Minnesota Department of Natural Resources (MNDNR) adopted Operational Order 121 in February 2012 to ensure that the department meets the fiduciary obligations set forth when the State accepted the School Trust lands, as they accepted the terms and conditions of the grant and took on the role of trustee for the lands for the benefit of the public schools. This trustee relationship extends to all who make decisions affecting the School Trust lands. As part of this policy, an inventory of all school trust lands was undertaken and a highest and best use classification system was developed to categorize school trust sites by current and future economic potential. Operational Order 121 also examined school trust lands where policies and designations prohibit or restrict long term revenue generation: native prairie, rare species, old growth forests, wildlife habitat, recreational sites (public water access sites, parks, and trails), and Peatland Scientific and Natural Areas (Peatland SNAs created by Minnesota Statutes), and called for compensation to the school trust fund for the potential loss of foregone revenue. As part of the inventory analysis MNDNR identified over 17,800 acres of old growth forest designations, approximately 7,000 acres of native prairie, 207 public water access sites, and over 16,000 acres with high and outstanding biodiversity, eligible for compensation.

This compensation would come through a combination of actions including condemnation, land exchanges, real estate contracts, and modifications to current DNR management practices. As an initial estimate, $50 to $100 million would be necessary to compensate the Permanent School Fund (PSF) for past actions that have prohibited revenue. As per the request in the compensation report, in 2016 the State Legislature appropriated a one-time $200,000 for developing a valuation process, representative sample valuations, and actual valuations for the land types eligible for compensation.

Minnesota Laws of 2016, Chapter 189, Article 3, Section 3, Subd. 2., states *"200,000 the second year is to initiate, in consultation with the school trust lands director, a valuation process and representative valuations for the compensation of school trust lands required by Minnesota Statutes, section 84.027, subdivision 18, paragraph (b). By January 15, 2017, the commissioner must submit a report to the chairs and ranking minority members of the house of representatives and senate committees and divisions with jurisdiction over environment and natural resources and education policy and finance on the Department of Natural Resources' progress in developing a valuation process, a description of the process to identify representative sample valuations, and the results of the representative valuations of school trust lands identified for compensation. This is a onetime appropriation."*

For an overview of the history of Minnesota's school trust lands, trust land grants, information on the historic management of school trust lands, and maps for reference see MNDNR's School Trust Lands webpage.

For an overview of the compensation plan made part of Minnesota's School Trust Lands: Biennial Report for Fiscal Years 2012 – 2013 (07.01.2011 – 06.30.2013) submitted to the MN State Legislature and the Legislative Permanent School Fund Commission see MNDNR's School Trust Lands Reports (1998-2015) webpage.

Report Preparation Costs

This report provides information on the valuation methodology, sampling and actual valuations carried out by the MNDNR, to compensate for the prohibition or restriction of revenue generation in four types of natural resource designations on Minnesota's School Trust Lands. The cost reported below is an estimated cost to prepare this report.

The report was completed by means of a Service Level Agreement between the Operations Services Division and the Lands and Minerals Division. The total cost to prepare this report is $12,220 for 20 hours of service per week for a portion of FY 2017, for a total of 520 hours.

Executive Summary

The 2016 Legislature appropriated $200,000[1] for the Minnesota Department of Natural Resources to develop, in consultation with the school trust lands director, a valuation process and representative valuations for the compensation of school trust lands. By January 15, 2017, the commissioner must submit a report to the chairs and ranking minority members of the house of representatives and senate committees and divisions with jurisdiction over environment and natural resources and education policy and finance on the Department of Natural Resources' progress in developing a valuation process, a description of the process to identify representative sample valuations, and the results of the representative valuations of school trust lands identified for compensation. This is a onetime appropriation.

This report includes the required information for the Commissioner's submission on progress of this project.

For the purposes of this report, MNDNR began to analyze and sample data pertaining to four types of natural resource designations on Minnesota's School Trust Lands: Water Access Sites, Old Growth Forests, Peatland SNAs, and Native Prairie in the MN Prairie Plans cores, corridors, and complexes to arrive at valuations for compensation of these lands to the Permanent School Fund.

MNDNR determined that 10% of each type of land will be sampled for developing representative sample valuations. The proposed valuation methodology used for the water access sites, the peatland SNAs, and the native prairies was fair market valuation. The valuation methodology used for old growth forests was gross present value per acre of timber for individual species, supported by data on percentage occupancy of individual species in northern Minnesota.

Table 1 below summarizes the total acres to be compensated for each designation and the total amount of compensation, derived by our sample valuations, if available.

[1] Laws of 2016, Chapter 189, Article 3, Section 3, Subd. 2

Table 1. Summary of Valuations for Compensated Areas

	Total Acres	Compensation
Public Water Access Sites	1,100	In process
Old Growth Forests	17,335	$19,970,166
Peatland Scientific and Natural Areas	53,150	In process
Native Prairie Sites	7,000	To be determined
Total	**78,985**	**To be determined**

As of this date, the compensation for Old Growth Forests encumbering school trust lands has been determined at $19,970,166. The compensation values for Water Access Sites and Peatland SNAs are in process. The compensation plan for the Native Prairie Sites, have yet to be determined.

Confidence Intervals and Analysis Software

For the purposes of this report, MNDNR observed sampled data using a 10% sample proportion (sample rule) with 80%, 90% and 95% confidence interval estimates. The sample proportion and level of confidence used in this report are standard and used by statisticians, engineers and scientists for many types of data. Confidence intervals act as good estimates of an unknown population parameter in statistics. The range of the confidence interval is defined by the sample statistic +/- margin of error where the confidence level represents the uncertainty. When we say, "we are 95% confident" we are saying that when we use the sample rule (i.e. 10% of the population) that 95 out of a 100 samples will be accurate estimates.

The software that was used to analyze the observed sampled data and present statistical estimations is called R (© 2016 by The R Foundation).[2] This software is a free, open-source programming language and software environment for statistical computing, bioinformatics, and graphics.[3] Companies as diverse as Google, Pfizer, Merck, Bank of America, the InterContinental Hotels Group and Shell use it.[4]

Public Water Access Sites

Public water access sites give the public the opportunity to access and enjoy the state's lakes and rivers. The Minnesota legislature created the public water access program in 1947 and included it in the 1975 Outdoor Recreation Act to provide and maintain a statewide system to ensure public access to high-quality recreation opportunities and to permit public use where access is necessary.[5] The DNR administers roughly 1,600 water access sites on Minnesota waters, with approximately 207 of these water access sites located on school trust land. The 207 school trust public water access sites encumber approximately

[2] https://www.r-project.org/
[3] https://www.quora.com/Who-even-uses-R-language
[4] http://www.nytimes.com/2009/01/07/technology/business-computing/07program.html?pagewanted=all&_r=0
[5] Minn. Stat., sec. 86A.05 subd. 9

41,000 lineal front feet on Minnesota water bodies, with the entire water access site facilities (access routes, parking lots, and boat launch) impacting approximately 1,100 acres of school trust land.

By DNR Operational Order 121, compensation to the school trust is required when management decisions prohibit or restrict revenue. This law includes the 207 public water access sites located on 1,100 acres of school trust lands, which are therefore eligible for compensation to the Permanent School Fund.

By constructing public water access sites on school trust lands bordering Minnesota waters, the DNR provides outdoor recreation opportunities to Minnesotans and visitors alike. The structures, however, limit the ability of the school trust to generate revenue from valuable lakeshore. In order to maintain these accesses, the DNR may consider to enter into a master lease agreement for the 207 public water access sites located on school trust land. The DNR has the authority to enter into certain leases for a twenty-one year term as permitted by Minnesota law.[6] The DNR would remit an annual lease payment for the 207 water access sites at a lease rate calculated as a percentage of the fair market value. This lease model demonstrates the DNR's commitment to generate short-term revenues while maintaining the long-term revenue options through future increases in land values.

Overview

We started with an initial dataset of 207 water access sites on School Trust lands but only 195 of these were able to be matched with spatial data maintained by MNDNR. These sites were ranked according to the popularity of the sites, measured in terms of the number of trailer parking spots present per site. This ranking classified the sites into Rank 1 (Trailer launches with ≥ 10 trailer parking spots), Rank 2 (Boat launches with < 10 trailer parking spots), Rank 3 (Carry-ins), and Rank 4 (Not DNR administered), where Ranks 1, 2, and 3 are to be included in the School Trust Lands compensation plan. Sites in Rank 4 need to be identified for further research because MNDNRs Land Records System identifies these sites as administered by entities other than the DNR, such as the Forest Service, which is problematic by existing School Trust Land policies. There are 18 sites that are ranked 4, so in total 177 water access sites are eligible for compensation for the purpose of this report.

Representative Sampling

By the 10% sample rule, 18 water access sites (10% of 177) were sampled for developing representative sample valuations. Using the optimum sample size calculator, our sample size of 18 water access sites will return results with 80% confidence on the population of 177 sites, with a 15% margin of error.[7] We used proportional random sampling without replacement, distributed among the three included ranks to sample 18 out of 177 sites. The statistical analysis software  was used to generate the samples.

Valuation Methodology and Results

Sampled sites are to be valued by a Certified General appraiser. The estimated market value per acre will be determined using the hypothetical condition that each sample site is accessible in the same manner as the

[6] Minn. Stat., sec. 92.50 subd. (c)
[7] https://www.surveymonkey.com/mp/sample-size-calculator/

larger ownership it is a part of. The valuations were based on the foot print of the waterfront site or a most similar sized typical building site. The acreage of individual sites that were not sampled could be calculated through spatial analysis. Once the acreage of all sites are known, the estimated per acre values for the 18 sampled sites will be applied to all 177 water access sites based on their rank/tier and acreage so that valuation of all water access sites can be determined. If acreage of individual sites cannot be determined, we will have to approximate the acreage of sites belonging to each tier based on total acreage (1,100 acres), and the proportion occupied by ranks 1, 2 and 3 in the total acres occupied by the 18 sampled sites. Now using the average per acre and average per front foot values of each tier in the sample, we can develop ratios to value each tier in the population of 177 sites. Determining individual values within each tier would mean dividing total tier value by number of sites in a tier i.e. making the assumption that value per site is distributed equally within each tier. This assumption may not be realistic and therefore a caveat in this analysis.

The sampled sites were sent to the Appraisal Unit, who used the hypothetical condition of accessibility to value the sites as fair market real estate parcels. The sample results were due December 31, 2016 and results of this work will be completed in 2017 and submitted in a subsequent report.

Old Growth Forests

The DNR's work to establish old growth forest complexes arose during the Minnesota forest-wide generic environmental impact statement (GEIS) in 1994 that established strategies to protect Minnesota's old growth forests. Three strategies to protect old growth were identified: inventory and reserve old growth; manage 20 percent of the Minnesota's forests on an extended rotation forest model; and create corridors that link old growth complexes with other natural areas. The trust inventory identified over 42,500 acres of old growth forest complexes on school trust land, which includes special management zones surrounding core old growth stands. Of this total, 17,800 acres is actual designated old growth with the 24,700 acre balance consisting of special management buffer zones and undesignated timber stands.

By DNR Operational Order 121, compensation to the school trust is required when management decisions prohibit or restrict revenue. This includes the 1,105 old growth forest sites located on 17,800 acres of school trust lands, which are therefore eligible for compensation to the Permanent School Fund.

The DNR identified 17,800 acres of school trust land with Old Growth Forest designations. The DNR proposes to initiate an eminent domain action to condemn the Permanent School Fund's interest in Old Growth Forest complexes located on school trust lands that were not inventoried with a highest and best use as mineral estate lands. The DNR estimates that it would condemn 500 acres of school trust land to preserve Old Growth Forest complexes under this plan. The value of the school trust lands would be determined during the condemnation action as set forth in Minnesota law, and consider the impact on value of the remainder site. The estimated compensation costs, including transaction costs and legal fees, totals $550,000 for the 500 acres not inventoried with a highest and best use as mineral estate.

The remaining 17,300 acres of Old Growth Forest complexes were classified with a highest and best use as mineral estate lands. The DNR proposes to undertake an economic analysis to determine the net present value of the forest products resource within the old growth forest complexes. DNR's resource assessment experts would determine the volume of forest products in each specific old growth complex based on cover

type and density. The net present value then could be determined based on current per cord values with a discounted rate. The DNR would engage its forest economist in order to establish the per cord value based on the tree species in each old growth complex. No value estimate is currently available as DNR has not initiated this economic analysis. Once the net present value is established and funding received, the DNR would remit payment to the Permanent School Fund in an amount equal to the net present value. Additionally, the DNR would schedule periodic reviews of the old growth characteristics for each complex as well as the net present value based on the economic rotation age of the tree species within each old growth complex.

Overview

The Minnesota DNR completed an inventory of School Trust old growth sites in 2013 and identified a total of 1,105 sites with 17,833 acres eligible for compensation. The spatial data used matched 1,100 sites totaling 17,335 acres. As the valuation process involved assessing timber value based on cover type, we examined the 2013 old growth dataset to study the cover types at the site level. We found that the school trust old growth sites are located mainly in the Laurentian Mixed Forest (LMF) province ecological section of Minnesota[8] as shown by Figure 1. These sites constitute 25 cover types comprising nine individual species spread over 17 counties.

Representative Sampling

By the 10% sample rule, 110 old growth sites (10% of 1,100) were sampled for developing representative sample valuations. Using the optimum sample size calculator, our sample size of 110 old growth sites will return results with 95% confidence on the population of 1,100 sites, with a 9% margin of error. To facilitate representativeness, we re-classified the cover types into 15. Then we used proportional random sampling without replacement, distributed among these 15 cover types to sample 110 out of 1,100 sites. The statistical analysis software  was used to generate the samples.

Valuation Methodology and Results

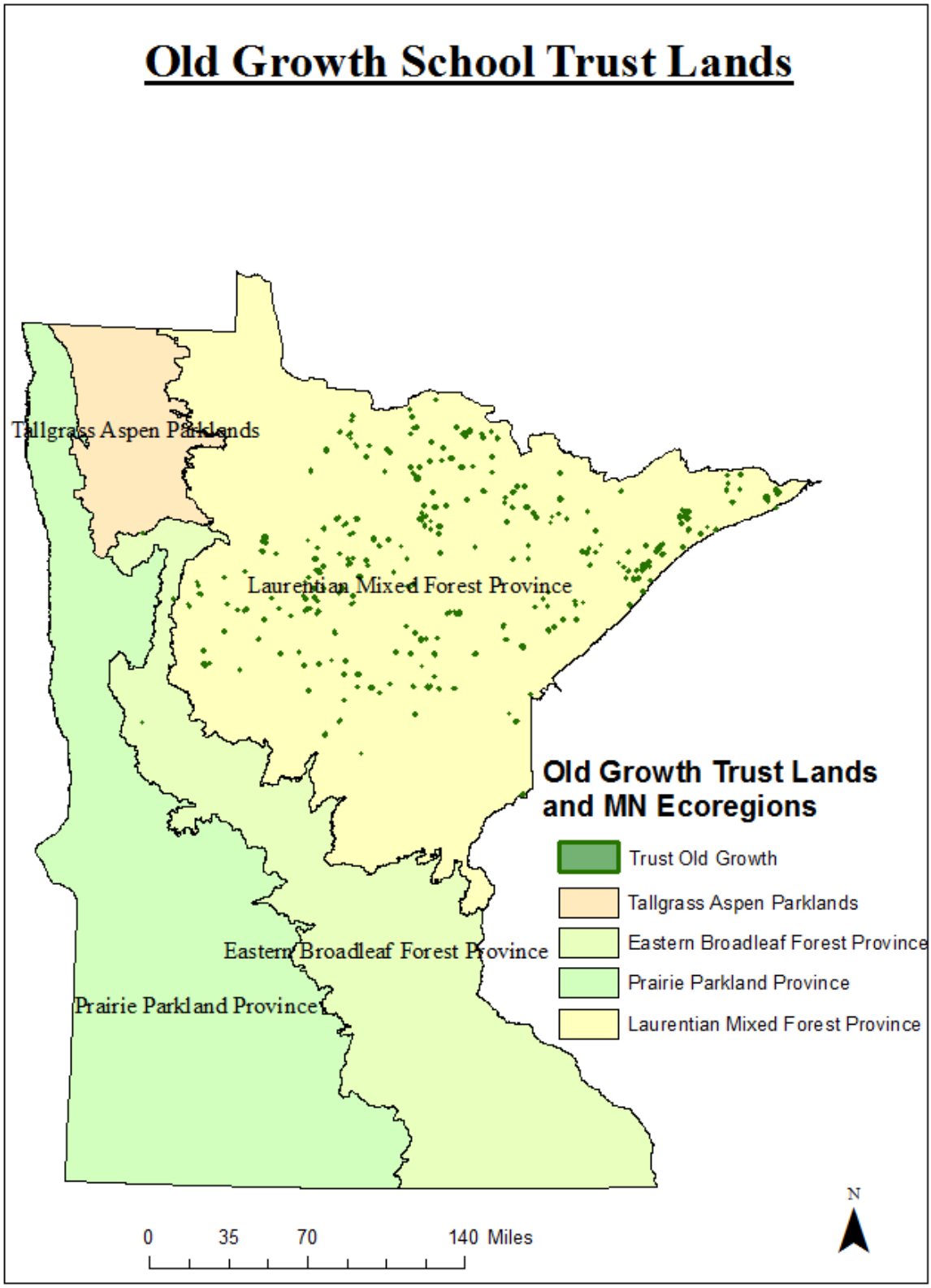
Sampled sites were valued using the gross present value method based on a stream of timber revenue generated in perpetuity for individual species, using a real discount rate of 3%. Gross present value per acre estimates in 2015 dollars for the nine individual species were provided by the Minnesota DNR Forest Economist. Owing to unpredictability of price trend in one year, the constant 2015 dollar estimates were not inflation-adjusted. These per acre values were applied to the total acres to be compensated for each old growth site to obtain valuation at the site level, which were aggregated for valuation of the entire old growth acreage. There were 16 cover types with a mix of two or three individual species, for which more information was needed for valuation. Per communication with the Forest Economist, reasonable assumptions about 6 of these cover types could be made so that available gross present values per acre could be applied to these mixed stands for reasonable results. For the remaining 10 mixed cover types available assumptions were insufficient for valuation as the acreage occupied by specific individual species in the mixed stands could not be determined. Since the school trust old growth sites are located almost

[8] http://www.dnr.state.mn.us/ecs/212/index.html

entirely in the Laurentian Mixed Forest province of Minnesota (see Figure 1), to value the undetermined mixed cover types, we relied on information on percentage occupancy of individual species in the LMF province based on Forest Inventory and Analysis plot data provided by the Forestry Division. Assuming that an average mixed stand in the LMF province will have similar distributions of individual species, we used the percentage occupancy figures to derive relative occupancy of species in mixed stands for our dataset. Using this information, we applied available gross present values per acre for individual species to all sites and cover types to complete valuation of the entire old growth forest acreage.

The value of our 110 sampled old growth sites determined by gross present value per acre, is $2,192,902 i.e. approximately $2 million for a total of 1,700 acres. The value of all 1,100 sites using the same valuation method is $19,970,166 i.e. approximately $20 million for a total of 17,335 acres.

Figure 1. Old Growth on School Trust Lands in Minnesota



Peatland Scientific and Natural Areas

In 1991, approximately 51,000 acres of school trust lands were statutorily designated as Peatland Scientific and Natural Areas (SNA).[9] The Peatland Protection Act clearly restricts management of the surface and mineral estate for revenue generating purposes. These 51,000 acres make up the largest block of school trust lands prohibited from revenue generation. Minnesota Statutes, section 84.035, subd. 9 provides the direction that the commissioner shall acquire the surface interests, including the peat resources, in these school trust lands by exchange or eminent domain. To-date, funding has not been provided for such acquisition.

By DNR Operational Order 121, compensation to the school trust is required when management decisions prohibit or restrict revenue. This law includes peatland SNA sites located on 51,000 acres of school trust lands, which are therefore eligible for compensation to the Permanent School Fund.

Unless specifically directed to do so by the legislature, the DNR does not plan to exercise its eminent domain powers to condemn the Permanent School Fund's interest in the statutorily created Peatland Scientific and Natural Areas.[10] The legislature could authorize a special appropriation to compensate the Permanent School Fund for this prohibition. Doing so would preserve 51,000 acres of peatland complexes on school trust lands. The DNR has estimated the fair market value of the Peatland Scientific and Natural Areas at $25.5 million.

Overview

A total of 1342 peatland SNA sites were able to be matched with spatial data. Each of these sites are approximately 40 acre lots and the total acreage for all 1,342 sites is 53,150 acres.

Representative Sampling

By the 10% sample rule, 134 peatland SNA sites (10% of 1342) were sampled for developing representative sample valuations. Using the optimum sample size calculator, our sample size of 134 peatland SNA sites will return results with 90% confidence on the population of 1342 sites, with a 7% margin of error. We used random sampling without replacement to sample 134 out of 1,342 sites. The statistical analysis software  was used to generate the samples.

Valuation Methodology and Results

Sampled sites are to be valued by a state licensed appraiser. The estimated market value per acre will be determined using the minimal valuation technique. Valuations were based on the hypothetical condition that each peatland SNA sample site is accessible in the same manner as the larger ownership it is a part of and as if the SNA program restrictions do not exist. Individual site inspections and comparable inspections are not required provided sufficient data exists to provide a credible estimate of value without inspection.

[9] Minn. Stat., sec. 84.035
[10] Minn. Stat., sec. 84.036

The estimated per acre values for the 134 sampled sites will be applied to all 1342 sites based on their acreage so that valuation of all sites can be determined.

The sampled sites were sent to the Appraisal Unit, who used the hypothetical condition of accessibility to value the sites as fair market real estate parcels. Per the Appraisal Unit, the results are due March 31, 2017. The results of this work will be completed in 2017 and submitted in a subsequent report.

Native Prairie Sites

The state's recent Minnesota Prairie Conservation Plan[11] (developed by a partnership including the DNR) identifies core areas, corridors, and corridor complexes in western Minnesota's core prairie areas. The Prairie Conservation Plan impacts approximately 7,000 acres of school trust land. The Prairie Conservation Plan's stated objectives are to permanently protect, restore and enhance prairies, grasslands and wetland habitats and incorporate a working lands conservation model to promote a symbiotic relationship between conservation and agriculture. It is unknown at this time if these objectives will prohibit revenue generation, restrict revenue generation, or provide new revenue sources from otherwise non-income producing school trust lands.

By DNR Operational Order 121, compensation to the school trust is required when management decisions prohibit or restrict revenue. This may include 1,262[12] native prairie core and corridor sites located on 7,000 acres of school trust lands, which may be eligible for compensation to the PSF.

The DNR along with non-profit conservation partners developed a twenty-five year strategic plan (the Minnesota Prairie Conservation Plan) regarding Minnesota's 204,000 acres of remnant native prairie. The plan sets forth three approaches to conserve this natural resource through permanent protection, restoration activities and enhancement through active management. Approximately 7,000 acres of school trust lands intersect with the Plan's core native prairie areas and native prairie corridors. The modification to DNR management of these school trust acres is detailed in the Prairie Conservation Plan as enhanced management strategies.

The new management approach on school trust lands would entail prescribed burning, conservation grazing, and haying to enhance the native prairie resource. An enhanced resource serves the trust's long-term interests in three ways. Short-term revenue could be generated through agricultural leasing for grazing and haying. Short-term and long-term revenue potential may be enhanced by leasing for prairie seed harvest and sale that utilize prescribed burning as a management tool. Retaining the school trust lands also provides a base for long-term revenue as the value of raw land continues to rise.

Overview

The Minnesota Prairie Conservation Plan identified three types of native prairie lands that intersect with school trust lands based on their location: native prairie cores (1,216 sites), corridors (24 sites), and corridor complexes (22 sites). While it is known that 7,000 acres of native prairie lands may be eligible for

[11] http://files.dnr.state.mn.us/eco/mcbs/mn_prairie_conservation_plan.pdf
[12] See map: School Trust Lands in Minnesota Prairie Conservation Plan

compensation, currently the Minnesota DNR is in the process of identifying the actual sites that make up these acres thereby identifying a native prairie dataset to work from. Once a suitable dataset is identified, samples will be drawn from this dataset and the valuation process will be set in motion.

Representative Sampling

After the school trust land native prairie dataset is identified, 10% of these sites (126 of 1,262) will be drawn by proportional random sampling based on their location (native prairie cores, corridors and corridor complexes).

Valuation Methodology and Results

Sampled sites may be valued in multiple ways. They can be valued based on the timber value of the sites or they can be valued based on the ecosystem services they sustain such as water quality, carbon sequestration, recreation opportunities, and wildlife habitat. They can also be valued based on estimated market values. The estimated per acre values for the sampled sites will be applied to all native prairie sites based on their acreage so that valuation of all sites can be determined.

As the data for native prairie sites is in process, the valuation process cannot be implemented at this time. Once the dataset is accessible, required sampling and valuation will be performed for the native prairie sites. This work may be completed in 2017 if a suitable dataset is identified and, if so, submitted in a subsequent report.

Disclaimer

Minnesota Department of Natural Resources

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