

2018 FWP ANNUAL SUSTAINABLE YIELD CALCULATION UPDATE



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Cover Photo: Log deck on the FWP Dreyer Boyd Timber Sale on the Blackfoot-Clearwater WMA in January 2018. Photo credit: Jason Parke.

INTRODUCTION

Montana Fish, Wildlife and Parks (FWP) is responsible to the public for ensuring sustainable populations of fish and wildlife and associated recreation, and for providing a vibrant state park system.

Contributing towards accomplishing this goal are approximately 441,000 acres of land in fee-title ownership that are managed by FWP. These lands are held in trust for the people of Montana and for the purposes provided by law. Three FWP Divisions; the Fisheries, Wildlife and Parks Divisions; are responsible for managing three major FWP site types including Fishing Access Sites (FAS), Wildlife Management Areas (WMA), and State Parks (SP).

FASs are administered by the Fisheries Division for the purpose of providing permanent public access to high-quality rivers, streams, and lakes and, when appropriate, other water-based recreation activities.

WMAs are administered by the Wildlife Division with the purpose of providing effective wildlife habitat and compatible recreational opportunities.

SPs are administered by the Parks Division and are managed for their statewide significance in representing the scenic, historic, cultural, scientific, and recreational legacy of Montana. SPs provide relevant programs and experiences that create lasting memories for Montana families, visitors, support our tourism economy and are accessible for all regardless of wealth, physical ability, or location in the state.

FWP's Forestry Program helps advance management objectives that are unique to each property. The basic philosophy for the program is to "manage for desired habitat conditions and public use opportunities while maintaining the ecological integrity of forests" (FWP Forest Management Plan 2018¹). This is conducted in accordance with [§ 87-1-201\(9\)\(a\)\(iv\), MCA](#)² to "address fire mitigation, pine beetle infestation, and wildlife habitat enhancement giving priority to forested lands in excess of 50 contiguous acres in any state park, fishing access site, or wildlife management area under the department's jurisdiction." Approximately 158,000 acres of commercial forest land³ occur on these sites and contribute immense ecological, recreational, and economic value to the State of Montana. Of the commercial forest land on FWP sites, 58,922 acres are potentially available for timber harvest. This report provides a summary of the potential annual sustainable yield of timber that can be harvested from these lands by FWP.

¹ FWP. 2018. Montana Fish, Wildlife & Parks Forest Management Plan. Montana Fish, Wildlife & Parks, Helena, MT. 107 pp.

² MCA – Montana Code Annotated

³ Commercial Forest Land – Timber land capable of growing commercial crops of trees, as defined by the Montana Department of Revenue: Land that can grow 20 cubic feet of timber volume per acre per year.

2018 ANNUAL SUSTAINABLE YIELD UPDATE

FWP’s annual sustainable yield in the short-term (<50 years) is calculated to be **4.2 million board feet per year** and **3.7 million board feet per year** in the long-term. This is an increase over the 2013 sustainable yield calculation by 91 MBF⁴ per year in the short-term and 58 MBF per year in the long-term annual sustainable yield.

Table 1 – Annual sustainable yield by Region

Region	Commercial Forested Available Acres	Short-term Sustainable Yield (MBF per year)	Long-term Sustainable Yield (MBF per year)
1	8,227	903.3	838.1
2	38,968	2,175.0	2,110.6
3	10,597	1,072.2	703.7
4	658	42.5	25.6
5	472	2.9	3.7
6	0	0.0	0.0
7	0	0.0	0.0
Total	58,922	4,195.9	3,681.7

Table 2 - Annual sustainable yield by FWP site type

Site Type	Commercial Forested Available Acres	Short-term Sustainable Yield (MBF per year)	Long-term Sustainable Yield (MBF per year)
FAS	519	32.2	35.2
WMA	52,282	3,768.4	3,026.3
SP	6,121	395.3	620.2
Total	58,922	4,195.9	3,681.7

⁴ MBF – thousand board feet

PURPOSE AND NEED

In 2011, Montana’s 62nd Legislature passed House Bill 619 (since codified in § 87-1-201 and § [87-1-622](#), MCA), which revised FWP’s forest management laws by requiring the calculation of an annual sustainable yield on FWP lands.

MCA § 87-1-201 and § 87-1-622 defines “annual sustainable yield” as:

“...the quantity of timber that can be harvested from forested department lands each year, taking into account the ability of forested lands to generate replacement tree growth and in accordance with

- a. the provisions of MCA 87-1-201 (9)(a)(iv);*
- b. state and federal laws, including but not limited to the laws pertaining to wildlife, recreation, and maintenance of watershed; and*
- c. water quality standards that protect fisheries and aquatic life and that are adopted under the provisions of Title 75, Chapter 5.”*

Mason, Bruce & Girard, Inc. (MB&G), under contract by FWP, completed the calculation of the first-ever annual sustainable yield from FWP lands on December 31, 2018. A report titled “[State of Montana Department of Fish, Wildlife & Parks 2013 Forest Inventory and Sustained Yield Calculation](#)” was prepared for FWP.

MCA § 87-1-622(4) states that “The commission and board shall review and redetermine the annual sustainable yield for lands under their jurisdiction at least once every 5 years.”

COMMERCIAL FOREST LAND AND ANNUAL SUSTAINABLE YIELD

Management units (sites) with a minimum of 50 acres of contiguous forest cover were included in this report. In 2013, MB&G calculated that across the entire state, 64 units met this criterion and made up 359,820 acres. Since MB&G’s 2013 calculation, FWP added 15,029 acres to existing management units which brings the total acres for management units under consideration for forest management to approximately 374,850 acres. FWP calculated the annual biological potential⁵ and sustainable yield of commercial forest land added (or subtracted) since 2013. **Table 3** summarizes the total acres that met the criterion in 2013 and the current total acres meeting the criterion. **Table 4** summarizes acreage changes since 2013 in the commercial forest land acreage, which is the basis for updates in FWP’s annual sustainable yield estimate for 2018. **Table 5** and **Table 6** show the biological potential and annual sustainable yield that was calculated for those specific changes in commercial forest land acres listed in **Table 4**.

⁵ The highest level of timber harvest that could be sustained, assuming all commercial timber land is available for harvest, and optimal management regimes could be implemented. This is a measure used to benchmark the productivity of a forest.

Table 3 – Acres that meet criterion to be included in the calculation by Region

Region	MB&G 2013		2018 Update	
	Total Unit Size (acres)	Commercial Forest (acres)	Total Unit Size (acres)	Commercial Forest (acres)
1	15,279	10,986	15,279	10,986
2	137,873	81,832	140,250	83,375
3	107,879	46,337	107,970	46,777
4	80,092	11,426	92,653	16,161
5	5,946	896	5,946	896
7	12,752	0	12,752	0
Total	359,820	151,477	374,850	158,195

Table 4 - Changes to commercial forest land by Unit

Region	Unit	Unit Type	Acreage Change	Non Forested (acres)	Commercial Forested (acres)	Commercial Forested Non Operable (acres)		Commercial Forested Operable (acres)	Commercial Forested Available (acres)
						Riparian	Slope		
2	Garrity Mountain	WMA	633	562	71	22	0	49	49
2	Fish Creek	WMA	743	142	601	197	55	349	349
2	Nevada Lake	WMA	762	83	679	77	2	600	600
2	Threemile	WMA	217	42	175	78	19	78	78
2	Blackfoot-Clearwater	WMA	22	5	17	0	0	17	17
3	Canyon Creek	WMA	735	30	705	33	8	664	634
3	Lewis & Clark Caverns	State Park	-644	-379	-265	-14	-43	-208	-208
4	Beartooth	WMA	8,189	3,923	4,266	646	16	3,604	0
4	Sun River	WMA	3,411	2,952	459	87	2	370	0
4	Blackleaf	WMA	961	951	10	0	0	10	0
Total			15,029	8,311	6,718	1,126	59	5,533	1,519

Table 5 – 2018 Short-term sustainable yield calculation volume summary on changes to forested land base since 2013

Short-term (<50 years)						
Region	Unit	Unit Type	Biological Potential (MBF/Year)			Sustainable Yield Commercial Forested Available (MBF/Year)
			Commercial Forested	Commercial Forested Operable	Commercial Forested Available	
2	Garrity Mountain	WMA	4.9	2.7	1.3	1.3
2	Fish Creek	WMA	49.1	23.9	23.0	12.2
2	Nevada Lake	WMA	88.0	77.9	78.5	54.5
2	Threemile	WMA	24.7	10.9	10.9	6.8
2	Blackfoot-Clearwater	WMA	2.1	2.1	2.1	1.1
3	Canyon Creek	WMA	54.4	48.2	46.0	29.3
3	Lewis & Clark Caverns	State Park	-24.9	-19.8	-19.2	-14.7
4	Beartooth	WMA	471.2	394.0	0.0	0.0
4	Sun River	WMA	61.1	49.2	0.0	0.0
4	Blackleaf	WMA	1.2	1.3	0.0	0.0
Total			731.8	590.2	142.6	90.4

Table 6 - 2018 Long-term sustainable yield calculation volume summary on changes to forested land base since 2013

Long-term (>50 years)						
Region	Unit	Unit Type	Biological Potential (MBF/Year)			Sustainable Yield Commercial Forested Available (MBF/Year)
			Commercial Forested	Commercial Forested Operable	Commercial Forested Available	
2	Garrity Mountain	WMA	5.7	4.2	5.7	5.4
2	Fish Creek	WMA	44.2	26.3	26.4	2.1
2	Nevada Lake	WMA	72.8	64.3	64.8	29.1
2	Threemile	WMA	20.9	9.2	9.2	5.6
2	Blackfoot-Clearwater	WMA	1.8	1.8	1.8	0.9
3	Canyon Creek	WMA	47.4	42.5	40.6	24.2
3	Lewis & Clark Caverns	State Park	-16.9	-13.5	-13.0	-8.5
4	Beartooth	WMA	393.9	329.2	0.0	0.0
4	Sun River	WMA	51.1	41.1	0.0	0.0
4	Blackleaf	WMA	1.1	1.1	0.0	0.0
Total			621.8	506.2	135.4	58.8

METHODOLOGY

FWP used the yield information provided by MB&G's 2013 calculation to extrapolate the potential annual sustainable yield for this 5-year update. MB&G calculated a short-term (<50 years) and long-term (>50 years) annual sustainable yield. The basis for this approach was that the vast majority of FWP's forested land had not been actively harvested prior to the study. Harvest opportunity in the short-term was found to be slightly greater than in the long-term due to a relatively greater abundance of stands available for timber harvest in the short-term.

The primary change in the annual sustainable yield is due to the addition (and subtraction) of commercial forested lands. FWP conducted a GIS⁶ analysis of spatial data maintained by the Department in order to determine changes to the lands eligible for this update and the sustainable yield resulting from that change to the eligible land base. The following is a list of steps taken to arrive at the sustainable yield for the 2018 update:

- 1) Compile a list of lands acquired since MB&G's 2013 calculation and create a GIS layer of newly acquired lands. FWP found an error in the 2013 data resulting a reduction in acres for the Lewis and Clark Caverns SP. One section of land (approximately 640 acres) administered by the Montana Department of Natural Resources and Conservation, Trust Lands Division was accidentally included by MB&G in their 2013 calculation. This was corrected and these acres and associated annual sustainable yield were removed for the 2018 update.
- 2) Overlay the newly acquired lands GIS layer with classified commercial forest lands (Montana Department of Revenue's 2015 Final Land Use Classification GIS layer was used for determining the classification). Photo interpretation of 2015 aerial imagery was used to verify the accuracy of the Department of Revenue's commercial forest land classification.
- 3) FWP calculated the change in commercial forest land since MB&G's 2013 calculation. This included both the addition of new lands and the subtraction from the Lewis and Clark Caverns SP.
- 4) Acres of operable commercial forest land were calculated by subtracting inoperable acres⁷ from the total acres of commercial forest land.
- 5) Acres of commercial available forest land was calculated by subtracting administrative withdrawals⁸ from the acres of commercial operable forest land.
- 6) FWP calculated the biological potential and annual sustainable yield of commercial, commercial operable, and commercial available forest land for the 2018 update by multiplying MB&G's 2013 calculated values by the acres added or subtracted since 2013. For example, the short-term

⁶ GIS – Geographic Information System

⁷ Inoperable acres – A 300-foot riparian buffer on either side of a stream or creek and slopes greater than 60%

⁸ Administrative withdrawals – FWP withdrew forest stands and entire units from potential harvest for a variety of reasons. These included: units that are dominated by streamside management zones, particularly common among Fishing Access Sites; forests that are in scattered patches within roadless settings such as mountain foothill big game winter ranges, which include forests along upper slopes of the unit; forests that provide key wildlife habitat values that would be negatively impacted by forest harvest such as drainage stringers, which are important for wildlife movement corridors; forests that are of low productivity or would be difficult to establish road access such as forested boulder fields; sound and view shed buffer zones for recreation areas; recreation sites that lack substantial tree cover; and areas where impacts and economic cost of harvest would substantially outweigh possible benefits.

sustainable yield from Nevada Lake WMA was estimated to be 90.1 board feet/acre/year in MB&G's 2013 calculation. FWP added 600 acres of commercial operable available forest to the Nevada Lake WMA since 2013. The updated 2018 short-term sustainable yield from these new acres is calculated to be 54.5 MBF per year.

- 7) The sum of the short- and long-term sustainable yield for 2018 were added (or subtracted) to the values from 2013, resulting in the 2018 updated short- and long-term annual sustainable yield.

DISCUSSION

It is critically important to note that MB&G's 2013 calculation of biological potential and annual sustainable yield were derived from a computer model. More information on the modeling process can be found in MB&G's 2013 report. FWP used the biological potential and annual sustainable yield values calculated by MB&G and extrapolated those values to changes in FWP's forested land base since 2013. The biological potential calculated by MB&G is the maximum volume (MBF) per year that could be harvested on commercial, commercial operable, and commercial available forested lands. The annual sustainable yield calculated by MB&G is an estimate of the volume (MBF) per year that could be harvested on commercial available forested lands after management constraints are applied to the model and on an even-flow (same amount of volume per year). The management constraints applied to the computer model are also described in detail in MB&G's 2013 report.

FWP felt the methodology used for this 2018 update was a reasonable approach since a) the change in acreage of commercial forest land since 2013 is minor relative to FWP's total commercial forest acreage b) FWP has been using timber harvest to manage commercial forest land since the 2013 report so extrapolating the sustainable yield, which is derived from a model that simulated timber harvesting, is appropriate and c) this approach was more efficient and cost-effective compared to collecting additional inventory data on the new lands and re-running the model.