Forest Land Classification and Valuation Manual

2021 - 2026

PROPERTY
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DIVISION
MONTANA

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MONTANA

DEPARTMENT OF REVENUE

2021-2026

Forest Land Classification and Valuation Manual

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Compiled by

Property Assessment Division

Donovan Building

340 N. Last Chance Gulch

PO Box 8018

Helena, Montana 59601

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GENERAL INFORMATION

Introduction

In Montana, commercial forest land covers approximately 14.6 million acres. Most of this land is publicly owned. The Department of Revenue (department) classifies approximately 3.9 million privately owned acres as forest land. The classification and valuation of forest land for property tax purposes are the topics of this manual.

History

1957: In 1957, the legislature directed the State Board of Equalization to provide a general and uniform method of appraising timberlands. Two years later, the State Board of Equalization was directed to develop and transition to a standing inventory tax system. Each elected assessor had the option to classify the timber in their county or contract the work to the state Division of Forestry.

1971: The Executive Reorganization Act of 1971 created the department to implement taxation as found in the 1972 Constitution of the State of Montana. This made the department responsible for maintaining the standing inventory system and valuations for property taxation. The new constitution effectively terminated the Board of Equalization.

1991: The Forest Lands Tax Act, passed in 1991, replaced the standing inventory tax system with a forest land productivity tax. This law covers all aspects of the new system including classification and valuation. The department worked with the University of Montana, College of Forestry and Conservation to develop the system, which became effective January 1, 1994.

2009: The department implemented several changes for the 2009 reappraisal including using geographic information system (GIS) technology, converting from four productivity grades to using advanced productivity models, classification changes, and manually identifying forest boundaries on a map. The GIS data enhances the department's ability to maintain current and equalized appraisals on forest properties as it contains a variety of data including ownership, productivity, land use, classification, and aerial imagery.

2012: A forest lands taxation advisory committee (committee) was created to review and provide guidance to the department regarding valuation of forest properties beginning in 2012.

Through the years the legislature has moved the forest land classification from property class 3 to property class 10 and changed the taxable percentage rate

several times. The current taxable percentage rate is as provided in 15-6-143, MCA.

Legislative Authority

The laws related to forest land classification and valuation for taxation purposes are 15-44-101 through 15-44-106, Montana Code Annotated (MCA). The department adopted Administrative Rules of Montana (ARM) 42.20.701 through 42.20.745 to administer the law. These rules are periodically revised and updated.

Standing timber is exempt from property taxation as provided in 15-6-223, MCA. Only the bare land under the timber is eligible for assessment. If a landowner deeds his timber to another party, the landowner, not the timber owner, is responsible for the forest land property tax.

Forest Land Taxation Laws (MCA)

Specific criteria for forest land classification and the valuation formula are found in Montana Code Annotated (MCA) Title 15, Chapter 44. Below are the statutes that the department follows in appraising forest properties.

15-6-143	Class ten property – description – taxable percentage
15-6-223	Timber exemption
15-7-103	Classification and appraisal – General and uniform methods
15-8-201	General assessment day
15-44-101	Forest lands tax act – short title
15-44-102	Definitions
15-44-103	Legislative intent – value of forestlands – valuation zones
15-44-104	Reduction in valuation for forest lands for trees destroyed by natural disaster
15-44-105	Administration – rules
15-44-106	Tax on change of use of part of tract

Administrative Rules-Forest Land

42.20.156	Agricultural and forest land use change criteria
42.20.701	Definitions
42.20.705	Forest land classification
42.20.725	Forest land valuation

42.20.740 Natural disaster reduction – general principles

42.20.745 Forest land value change process

ELIGIBILITY

Land may be covered in trees, but it must meet specific eligibility criteria to receive forest land classification for taxation purposes. The parcels under one ownership must have 15 contiguous acres with a forest potential productivity of at least 25 cubic feet per acre per year as stated in 15-44-102, MCA and detailed in the following sections. Land that does not meet these requirements is considered non-forest land, nonproductive forest land or noncommercial forest land.

Ownerships

Eligibility for forest land classification is based on the parcel(s) under one ownership. As stated in ARM 42.20.701, under one ownership means when two or more parcels of land are titled under an owner's identical name, or when an owner has obtained department recognition of parcels under one ownership through the affidavit process described in ARM 42.20.705. The definition of under one ownership doesn't change as the size of the ownership changes.

The department determines that parcels are under one ownership when the following conditions are met.

1. The parcels are owned by the same party and titled identically in the party's name.
2. The party has received title in the parcels by a transferring instrument such as a deed, contract for deed, or judgement.
3. The party has the present right to possess and use the parcels.

Examples of parcels under one ownership:

1. John Doe owns parcel A and John Doe owns parcel B;
2. John Doe owns parcel A and William Smith, in-care-of John Doe, owns parcel B.

A party who owns two or more contiguous parcels of land titled in nonidentical names may file an affidavit with the department to prove a single ownership of the parcels.

Examples of owners with parcels titled in nonidentical names that may prove single ownership by filing an affidavit:

1. John Doe is the same person as John G. Doe;
2. James Cole Smith is the same person as James C. Smith.

Examples of owners with parcels titled in nonidentical names that cannot prove single ownership by filing an affidavit:

1. John Doe has title to one ownership and John and Mary Doe have title to a different ownership;
2. John Doe has title to one ownership and John Doe corporation has title to a different ownership;
3. John Doe has title to one ownership and John Doe trust has title to a different ownership.

Land Use

The department is required to classify all land according to its use, 15-7-103, MCA. Land that meets the requirements for forest land classification is considered in forest land use.

Tree Species

Forest land classification requires the land to be stocked with commercial softwood species. Not all trees meet this requirement. Tree species are divided into two categories, softwoods and hardwoods.

Softwood species, also known as conifers or pine trees, include trees that the department considers commercial trees and others considered noncommercial trees. In the Pacific Northwest, conifers have a major economic impact. Examples of commercial species recognized in Montana for property classification purposes include ponderosa pine, Douglas fir, lodgepole pine, alpine fir and Engelmann spruce. Other conifers such as the Rocky Mountain juniper, limber pine, and whitebark pine are considered noncommercial trees in Montana due to low site productivity and poor lumber utility.

Hardwood species, also known as deciduous trees or trees with leaves, do not produce wood in quantity or quality necessary for the commercial manufacturing of wood products. Montana hardwoods include cottonwood, aspen, alder, Rocky Mountain maple and birch. Because these have limited commercial use and have caused concerns regarding logging in riparian environments, hardwood trees are not considered commercial tree species in Montana. Land producing hardwoods is considered noncommercial forest land and cannot be classified as forest land by the department.

Naturally growing trees on forest land that are sheared, tapered and harvested as Christmas trees are eligible to meet the tree species requirement. These trees are typically scotch pine, spruce and grand fir trees located in non-cultivated mountainous regions of northwestern Montana.

Stocking Rate

The land must be stocked with at least 10 percent by crown cover of commercial softwood trees unless the trees have been removed by man through harvest, including clear-cuts, or by natural disaster. The stocking rate is a measure of the degree of an area covered with standing eligible trees. It can be described as either the number of stems per acre or the amount of crown closure per acre. Crown closure is the amount of land covered by the tree from an aerial viewpoint and can be estimated by extending an imaginary circle around the edge of the tree's crown to the ground. The area covered by tree crowns is then compared to the area not covered by tree crowns.

If trees were removed by timber harvest or natural disaster, the department classifies the land as forest land. If commercial trees don't regenerate within 10 years after the harvest operations or natural disaster, the land may be reclassified to non-forest land.

A property owner may convert non-forest land to forest land by planting a minimum of 300 commercial tree seedlings per acre. This planting rate is approximately equivalent to a spacing of 12 feet by 12 feet per seedling. Mortality reduces the stocking level and may cause the stocking level to drop below the requirement for forest classification. If landowners do not plant an adequate number of seedlings to cover mortality losses, the land may not meet the minimum-stocking requirement for forest land classification.

Productivity

Forest land classification is based on the potential productivity of the land, which is the maximum amount of wood the land can produce annually. Forest land classification requires the land's productivity to meet or exceed 25 cubic feet per acre which is 100 board feet per acre per year using the conversion factor of 4 provided in ARM 42.20.701 (3), at the climax of its growth cycle, known as the culmination of mean annual increment (CMAI).

Forest land productivity, both actual and potential, is influenced by the soil's fertility, climate, topography, slope, aspect, elevation and, length of the growing season. The potential productivity is inherent in the land, constant, and not influenced by natural disasters, overstocking or logging. In contrast, actual productivity is dynamic and constantly changing as influenced by climate, natural disaster, management, and logging. Potential productivity is not the same as actual productivity which is the annual growth of wood that has been produced or is currently being produced on the land.

The potential productivity for Montana's forest lands was determined by Dr. Kelsey Milner, former forestry professor of University of Montana, and Dr. Hans Zuuring, former

forest biometry professor of University of Montana. Their analysis included collecting site data, applying statistics and mathematical models, and estimating site quality and potential productivity.

The following example illustrates the difference between potential and actual productivity. One stand of trees is diseased with dead and dying timber, but an adjacent stand supports young, healthy trees. Their actual growth rates are quite different, but the underlying potential productivity could be quite similar. The same comparison can be made between a clear-cut and an old growth stand. Both sites may have the same underlying potential productivity even though the clear-cut contains no standing timber and has no actual board foot production.

Potential productivity is the annual per-acre net forest yield at the culmination of mean annual increment (CMAI). Mean annual increment (MAI) is a measure of the average yearly increase in volume growth produced in a tree or a stand of trees on one acre; MAI is calculated by dividing total tree or stand volume growth by the total growth interval. Mean annual growth varies throughout the growth cycle of a tree or stand of trees as it typically increases in the early developmental stages of the tree or the stand, attains a maximum growth increment in the tree's or stand's middle development and, then decreases as the tree or stand becomes more mature. The point in the tree or stand development that produces the maximum MAI is the culmination point referred to as CMAI or biological rotation age. The CMAI is the ideal harvest age in terms of most efficient net annual volume production.

The potential productivity is expressed in board feet per acre per year (bfa). A board foot is the measurement of volume contained in a block of wood one inch thick by 12 inches long by 12 inches wide. Potential productivity estimates are based on the volume of lumber a mill could produce from all trees on an acre of land that are at least 8 inches in diameter at breast height (DBH). The tree's shape and structure, trunk diameter, taper, and defects influence the amount of wood that can be harvested from a tree. Tree volume is calculated using the Scribner Decimal Log Rule based on measurements from a one-foot stump to a six-inch top (inside the bark), in 16-foot lengths and five percent hidden defect.

Small areas of the state have a very high potential forest productivity estimated at greater than 400 bfa.

Area Requirements

Forest land classification requires 15 contiguous acres or more under one ownership, capable of producing timber, and meeting all the requirements in this manual. Any acres

under a different use or classification, such as one acre under a residence, are not eligible to count towards the 15-acre requirement.

The one exception to the 15-acre requirement is found in 15-6-143(2), MCA as follows: "Any parcel of growing timber totaling less than 15 acres qualifies as class ten property if, in a prior year, the parcel totaled 15 acres or more and qualified as forest land but the number of acres was reduced to less than 15 acres for a public use described in 70-30-102, MCA by the federal government, the state, a county, or a municipality and, since that reduction in acres, the parcel has not been further divided."

Example

A 15-acre parcel was classified as forest land. Since the original classification 2 acres were taken due to improvement of a state highway. The parcel is now 13 acres and remains classified as forest land.

Contiguity

Another requirement for forest land classification is that the parcels under one ownership must have at least 15 acres of contiguous forest land. Different criteria are used to decide if the parcels under one ownership are contiguous **and** if the parcels under one ownership have contiguous forest land. Natural and man-made features that have no bearing on the determination of contiguous parcels may or may not have a bearing on the determination of contiguous forest land.

Contiguous parcels of land

The department considers multiple parcels of land under one ownership as contiguous if the parcels: share a common boundary or are physically touching; touch or share a common boundary but are separated by natural or man-made features such as rivers, streams, roads, utility lines and railroads; or, are separated by federal or state land leased by this property owner.

The distance separating two parcels of land under one ownership (because of physical features like rivers and streams, roads, utility lines and railroads) is not considered in the determination of contiguous parcels. For example, if a river between two parcels is 30 feet wide or 1 mile wide, and the parcels are under one ownership, the department considers the parcels to be contiguous.

Contiguous forest land

Contiguous forest land is forest land areas that physically touch or border each other and are not separated by non-forest land or land in another ownership. Non-forest land is five acres or more and at least 120 feet in width that does not meet the requirements of forest land classification.

Contiguous parcels may not meet the 15 acres of contiguous forest land requirement as the acres that are covered by commercial softwood species must be contiguous.

Example

A stream that is generally less than 120 feet wide passes through forest land. The forest land on each side of the stream is contiguous, provided that the forest land on both sides of the stream are in the same ownership. The streambed is classified as forest land.

Example

A road creates a 120-foot width of non-forest land through forest land. The forest land on either side of the road is noncontiguous. In this situation, the forested area on each side of the road must qualify as forest land on its own merit by meeting the eligibility requirements.

Accessibility

Land is not classified as forest land if it is incapable of yielding wood products due to adverse site conditions or physical inaccessibility. This determination is used only in very narrow terms as most forest land can be harvested with today's modern logging equipment. Logging does not have to be profitable for the parcel to be classified as forest land. Land is classified as non-forest if constructing a road to a forested area is virtually impossible such as forested land located beyond impassable physical obstacles. If helicopter logging is the only option for harvesting an area, the property is classified as non-forest land.

If a parcel is landlocked and the landowner is denied access to the property, the property is classified as non-forest. If the property is landlocked, but the landowner is allowed access by adjoining neighbors, the land remains in forest land classification. The productivity is not lowered because of access problems.

Ineligible Characteristics

Land not meeting the requirements for forest classification, is considered non-forest land, nonproductive forest land, or noncommercial forest land, as described in the sections below. It is classified according to ARM 42.20.156.

It is important to note that a parcel may have multiple land classifications, each portion of the parcel of land is classified according to its use. For example, a 20-acre parcel may have 15 acres of forest land with the other 5 acres classified as agricultural, nonqualified agricultural, or tract land.

Non-forest Land, Nonproductive Forest Land and Noncommercial Forest Land

Non-forest land is land that does not meet the requirements of ARM 42.20.705. It is at least 5 acres in size and 120 feet in width. Non-forest area requirements, however, are not tied to the ownership. The size of non-forest land is not tied to ownership, however, the minimum non-forest area that is aggregated into a single productivity designation is five acres. Non-forest land may include rivers, streams, roads, highways, power lines, railroads, or other land uses.

Noncommercial forest land and nonproductive forest land are types of non-forest land. Noncommercial forest land is land that does not meet the forest land requirements when stocked with noncommercial tree species. Nonproductive forest land is land that does not meet the minimum productivity requirement of 100 bfa.

Non-forest land is classified as property class three (agricultural or nonqualified agricultural land) or property tax class four (residential, commercial, or industrial land).

If a physical feature or area that does not meet the forest land classification requirements is surrounded by forest land, is less than 120 feet in width, and less than 5 acres in size, it not is not considered to break forest land contiguity. It is classified as forest land and valued using the underlying forest land productivity.

Land used to raise cultivated Christmas trees, ornamental trees or windbreaks is not eligible for classification as forest land because it is considered an agricultural land use.

Restrictions and Easements

Land that has restrictions to commercial logging or has a conservation easement that precludes commercial timber harvest is not classified as forest land. The restrictions must strictly prohibit commercial timber harvest.

Conservation easements that prohibit commercial timber harvesting are rare. The conservation easement is typically used to limit certain types of land development. In some cases, the objective conservation easement may be for protecting scenic areas or wildlife habitat.

Other Uses

Owners may use forest land for livestock grazing with the land producing both timber and livestock forage. In these cases, if the land meets the classification criteria, the forest land classification supersedes grazing land classification and the land is classified as forest land, including any clear-cut areas.

If land classified as forest land is dedicated to another use such as agricultural, residential, commercial, or industrial use, the land is classified as stated in ARM

42.20.156. When the timber is clear-cut and the stumps are removed, the department must reclassify the land based on the new use. For example, if the property owner converts the forest land to pasture or farmland, the land is reclassified to the appropriate agricultural use classification. The land is valued based on its agricultural productivity.

CLASSIFICATION

Any land meeting the requirements for forest land eligibility, as described in the preceding eligibility section, is classified as forest land. If the department determines that the land does not meet the requirements for forest land classification, the department will classify the land according to the land's use and the criteria in ARM 42.20.156.

A parcel may contain multiple land use classifications and subclassifications, but a parcel can never have both agricultural land and nonqualified agricultural land.

Date

The department's land classification of a property is based on: (1) the property's use on January 1 of the current year and (2) the property's ability to meet the forest land eligibility requirements, as provided in ARM 42.20.705. The following examples illustrate the relationship between the classification date and forest eligibility requirements for forest land classification.

1) A property owner owns a 10-acre parcel on January 1 of the current year that is classified as residential property. This property owner purchased a contiguous 10-acre parcel on May 1 of the current year that is also classified as residential property. The parcels were in different ownerships on January 1 and will remain in residential classification for the current year. The following year, the department reclassifies the land as provided in ARM 42.20.156. If it is not in a residential, commercial or industrial use the parcels are considered a 20-acre contiguous ownership and are classified either as forest land, non-qualified agricultural land or, agricultural land.
2) A forest property owner requests a review of the forest land productivity by appropriately filing a Request for Informal Classification and Review. If the department determines that a change in productivity is appropriate, the change is effective for the current year because the basis for the property's change in productivity existed on January 1 of the current year.

VALUATION

Forest land values are based on the productive capacity of the land, i.e., the ability of the land to produce income from commercial timber harvest and a secondary income from livestock grazing the land.

This valuation assumes an all-aged forest where, in any given year, some stands are harvested, some stands are thinned, and others are planted.

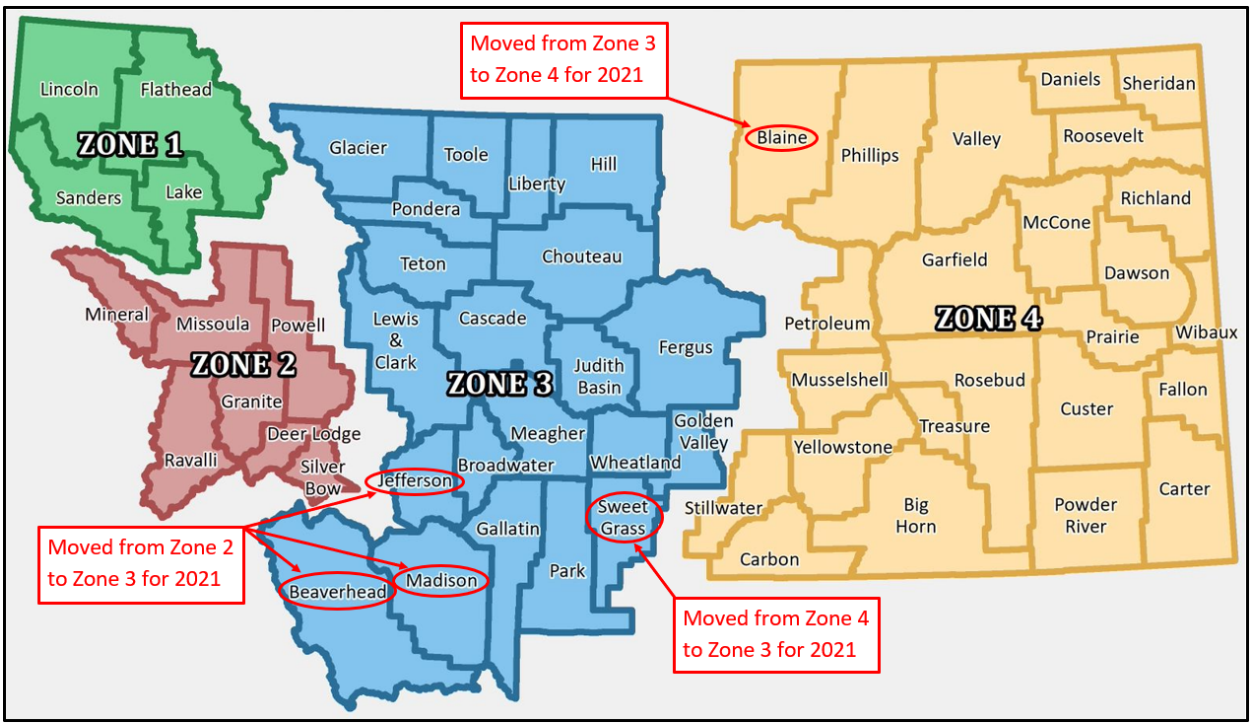
The valuation formula for forest land is stated in 15-44-103, MCA with the variable values dependent on the zone that the property is located in.

Zones

Montana has four forest land valuation zones as identified by Dr. David Jackson from the University of Montana. Each zone is comprised of counties grouped together based on uniqueness of marketing areas, timber types, growth rates, access, operability, and other pertinent factors. These zones are determined by identifying the major independent variables in state timber sales and analyzing their relationship to stumpage price. Some of the major independent variables are log flows to manufacturing centers and sale population.

Each valuation zone has the same valuation formula; however, the income and expense data are unique to its zone. The valuation data is applied to the average yield calculated by the GIS for each forest land polygon. The average yield is a weighted mean and varies from one forest polygon to the next. Therefore, there is an unlimited combination of forest land values that can occur. Valuation data is updated for the beginning of each reappraisal cycle and then frozen for the duration of the cycle.

Some counties shifted to new zones for the 2021 cycle. Zone 1 remained the same. Zone 2 decreased in size as Beaverhead, Jefferson and Madison Counties moved to Zone 3. Sweet Grass County moved to Zone 3 from Zone 4 while Blaine County moved from Zone 3 to Zone 4.



Formula

The department uses the income approach to value forest land as provided in 15-44-103, MCA. Net income, forest income plus grazing income minus cost, is estimated and capitalized to calculate the value. The income approach uses the formula of: forest land net income per acre (I), divided by capitalization rate (R), to equal value per acre. The formula is expressed as I/R = V.

The department calculates the forest land net income using a productivity-based formula. The formula is expressed as (M x SV) + AI – C = I where the variables are:

- mean annual net wood production (M)
- stumpage value (SV)
- agricultural-related income (AI)
- per unit cost of the forest product and agricultural product produced (C)

The department determines the values for these variables as explained in the following sections.

Mean Annual Net Wood Production

Forest income is calculated using the mean annual net wood production (productivity) of the land. The productivity, expressed in board feet per acre (bfa), represents the

average annual increase in wood produced on an acre of forest land. This determination is covered in more detail in the productivity section.

Stumpage Value

Forest income is calculated using the average stumpage value for each zone. The average stumpage value represents the price a willing buyer would pay for standing timber from a willing seller. Average stumpage values are derived from state timber sales using multiple regression models developed by University of Montana, College of Forestry.

Agricultural Related Income

Forest income is calculated using the agricultural related income for each zone. Agricultural related income of forest land is calculated using private grazing fees as livestock grazing is the primary agricultural activity occurring on forest lands. Montana's private grazing fees are gathered from statistics published by the United States Department of Agriculture (USDA), National Agricultural Statistics Service (NASS).

Net grazing income on forest land is low, as the carrying capacity under most forest canopies is poor. Timber stands with crown closures of 70 percent or greater generally have very little livestock carrying capacity.

Agricultural expenses are 25 percent of the private grazing fee. The agricultural net income calculation is identical to the valuation used for agricultural grazing lands.

Forest Costs

The department uses costs incurred by the Department of Natural Resources and Conservation (DNRC), Forestry Division (FD) and Trust Land Management Division (TLMD). These costs are highly dependent on the timber sale activity and budget considerations of the legislature. Forest costs include fire assessment fees, severance tax, slash disposal, forest management, timber sales, forest practices and administration.

Capitalization Rate

The department uses a capitalization rate to convert the estimated income stream of the forest property into an estimated property value. Although each forest zone may have a unique capitalization rate, Montana currently uses the capitalization rate set in statute at 8% for all zones. The capitalization rate is reviewed by the advisory committee, as provided in 15-44-103, MCA.

Natural Disaster Valuation Reductions

Property owners may receive a 50 percent reduction in the valuation of their forest land for 20 years if the standing timber is destroyed by a natural disaster as provided in 15-

44-104, MCA. Fire is the most common natural disaster, but high winds, insects, and disease may also cause destruction.

To receive this valuation reduction, the following criteria must be met.

1. The property owner must file a timely request for an informal classification and appraisal review, (Form AB26), with the department. The first year of eligibility for the natural disaster reduction is the year following the date of the event. The reduction runs until 20 years from the date of the event so if the application is filed 5 years after the event, the property value is eligible for reduction for the remaining 15 years.
2. The parcel must have been classified as forest land the year prior to the date of the disaster.
3. The impacted area must be at least 15 acres or larger.
4. This impacted area must have had at least 10 percent stocking before the natural disaster occurred. For example, areas with forest classification that were clear-cut harvested are not eligible for this reduction.
5. The surviving trees must not meet the 10 percent stocking rate. In other words, most of the live trees have been destroyed.

The department reduces the value of eligible forest land for 20 years from the date of the natural disaster. No modification is made to the forest classification or the forest productivity.

Valuation Phase-In

Forest land value increases are phased-in incrementally throughout the six-year reappraisal cycle resulting in the property reaching its full forest land reappraisal value in the sixth year. 15-7-111, MCA. The department determines the market value for each year by dividing the difference in value from the previous cycle by 6, and then adding the result to the previous year's value. Any decrease in forest land appraisal value from one reappraisal cycle to the next is fully implemented the first year of the new reappraisal cycle, as provided in ARM 42.20.745. Simply stated, the phase-in is calculated as follows:

1) Find the difference in valuation by subtracting the prior cycle's forest land reappraisal value (VBR) from the current cycle's forest land reappraisal value:

2021 Full Reappraisal Value		$100,000
2020 Full Reappraisal Value	-	$40,000
Difference in valuation		$60,000

2) Calculate the annual phase-in by dividing the difference in valuation by 6:

   $60,000/6=$10,000 annual phase-in

3) Calculate the phase-in value by adding the annual phase-in to the previous year's forest land phase-in value:

   $40,000 + $10,000 = $50,000 assessed value for 2021

Year	2020	2021	2022	2023	2024	2025	2026
Phase-In Value	$40,000	$50,000	$60,000	$70,000	$80,000	$90,000	$100,000

It is important to note that only the forest land value increases receive a phase-in.

Value Before Reappraisal (VBR)

The department's process to determine the phase-in of forest land value increases requires a standard method of identifying the forest land appraised value from the previous cycle, also known as the value before reappraisal (VBR), which is used in the phase-in calculation.

For a property with no changes in the forest acreage from the previous cycle, the VBR is the previous cycle's forest land reappraisal value. The department uses this VBR to determine the phase-in value for forest properties with no land classification changes, forest productivity-only changes, or changes resulting from the department's GIS agricultural and forest updates.

If a property has experienced a change in forest acreage due to a land classification change or land use change, the department must calculate the VBR because the acreage is not the same as it was in the previous cycle. The department calculates the VBR by using the current forest data, acres, and productivity from the previous cycle's forest valuation formula.

The following examples show how the department determines the VBR for a property:

1. A parcel is classified as forest land in both the previous and current cycle and has experienced no changes other than land value. The department uses the previous cycle reappraisal value as the current cycle VBR.
2. A parcel has both forest and agricultural acres. The acreages in the land classification change due to line shifts in the upload data. The department uses the previous cycle reappraisal value as the current cycle VBR.
3. Parcel A did not qualify for forest land classification because it had less than 15 contiguous acres of forest land. Parcel A is sold to the owner of Parcel B which borders Parcel A and has forest land that is contiguous to the Parcel A's timber.

The two parcels are under one ownership and meet the requirements for forest land classification. The forest acres on Parcel A, are newly classified as forest land; thus, the department must use a calculated VBR as there is no forest land value in the previous cycle.

4. A parcel has acreage classified as forest land in the previous cycle and is reclassified to include a forest homesite and forest acres for the present cycle. The previous cycle reappraisal value is for a different number of acres so the department must use a calculated VBR for the current forest acres.
5. A parcel has acreage classified as forest land in the previous cycle. A portion of the parcel is transferred to another ownership for the present cycle. The previous cycle reappraisal value on the original parcel was for the total forest acreage. The department must now use a calculated VBR for the current forest acres on both parcels after the transfer.
6. A property owner plants trees on an agricultural parcel and meets the requirements for forest classification. The property did not have a forest land value in the previous cycle. The department will now use a calculated VBR.
7. A property owner removes the timber and pulls out the stumps on some of the forest to transition the land to a non-forest use. There are other acres that remain in forest classification. The previous cycle reappraisal value is for a different number of acres. The department must now use a calculated VBR for the current forest acres.

IMPROVEMENTS ON FOREST LAND

The International Association of Assessing Officers (IAAO) glossary defines improvement as anything done to raw land with the intention of increasing its value. A structure erected on the property constitutes one very common type of improvement. The International Association of Assessing Officers (IAAO) glossary further defines improvements as: buildings, other structures, and attachments or annexations to land that are intended to remain so attached or annexed, such as sidewalks, trees, drives, tunnels, drains, and sewers.

On forest parcels, the department classifies the land under improvements based upon the improvement type. These classifications are described in the following subsections.

Homesites

When a residential improvement, residence, exists on an agricultural, nonqualified agricultural or forest parcel, the department identifies one acre under the improvement as a homesite for classification and valuation purposes. 15-6-133 and 15-6-134, MCA and ARM 42.20.655

A residence, A structure designed or occupied as the living quarters of one or more households; usually equipped with cooking, bathing, toilet, and heating facilities, where necessary. (Appraisal Institute Dictionary of Appraisal Terms, 7th edition)

A "dwelling" does not require a conventional kitchen or bathroom, utilities, septic, or plumbing. Under this definition many structure types may qualify as residences.

For purposes of identifying homesites, the term residence includes any structure that contains living area such as single family residences, outbuildings with living area, and dry cabins.

Classification

When a residence is located on a property, either agricultural, nonqualified agricultural, or forest land, a corresponding homesite must be designated. Each homesite consists of exactly one acre regardless of the size of the residence.

If a parcel is less than one acre in size and contains a residence, the entire parcel is classified as a homesite. No additional area shall be classified as a homesite on adjoining parcels for this residence. A homesite does not cross parcel boundaries. When a homesite crosses a parcel boundary with residences on both parcels, a separate one-acre homesite must be designated for each parcel.

A one-acre homesite may contain multiple residences if the residences are located within the same one-acre area. When a property has multiple residences that are not located within a single one-acre area, a one-acre homesite must be designated for each residence.

A one-acre homesite will not be designated for land that contains only a well and septic system without a residence. For example, a homesite is assigned to land that contains a well, septic system, and a manufactured home. The manufactured home is later removed from the site, leaving the land without a residence. The one-acre homesite will then be removed from the land's assessment. Land containing a manufactured home not permanently attached to a foundation, or not connected to water and/or septic improvements, will not be assigned a one-acre homesite.

When a parcel contains both forest and agricultural land, the homesite location is important. If the homesite is located within the forest portion of the parcel, the correct classification is a forest homesite. If the homesite is located outside of the forest portion, the correct classification is an agricultural homesite.

When an ownership contains less than 20 acres total with at least 15 acres of forest land, the remaining acres are non-forest land. If the non-forest land meets the agricultural eligibility requirements the land is classified agricultural but if it does not meet the agricultural eligibility requirements, the non-forest land is valued at market. If the residence on these parcels are surrounded by nonagricultural land, the land under the residence is not assigned a one-acre homesite. The non-forest land is classified as class 4 land and assessed at its market value. Residential tract land does not receive a one-acre homesite designation.

Valuation

The department values forest homesites using the market value developed for one-acre sites in that neighborhood. The forest homesite is valued based on the sales of comparable one-acre sites in that market area, not on the productivity value of the forest land.

LAND UNDER OTHER STRUCTURES

Garages, outbuildings, agricultural structures and any buildings used entirely for storage are not considered residential improvements. A homesite is not designated for these structures however, if one of these structures is in close proximately to a residence, the outbuilding may be located on land classified as a homesite.

Improvements such as barns, sheds, silos, cribs, and similar structures are considered agricultural improvements, not residential improvements. Land under agricultural improvements is classified as grazing land and valued according to the agricultural productivity of the land. 15-7-202 and 15-7-206, MCA. If these improvements are located on the one-acre homesite, no additional land classification is needed.
Land under commercial or industrial improvements, on either Class 3 or Class 10 property, is not assigned a one-acre homesite. The actual amount of land under the commercial or industrial improvements, and the land that supports those improvements, must be classified as class 4 land, commercial, or industrial.

An example of a commercial improvement on a parcel containing agricultural land is a riding arena that is used to produce nonagricultural income. An example of an industrial improvement on a parcel containing forest land is a wood products plant.

Associated with forest management

Land under structures that are associated with the management of the forest land is classified as forest land unless the structures are located on a homesite. In the scenario of the structures being located on a homesite, the homesite classification takes precedent.

Homesite Examples

Following are some homesite classification scenarios:

1. A forest property has a residence on the property. The parcel is assigned a one-acre homesite.

2. A forest property has a primary residence with an adjacent guesthouse, both located on the same 1 acre. The parcel is assigned a one-acre homesite, even though the parcel contains two residences.

3. A forest or agricultural property has several residences that are not located on the same acre, a one-acre homesite must be assigned to land under each residence.

4. A landowner owns contiguous agricultural parcels in the same ownership. The parcel with the residence is less than one acre in size. The entire parcel with the residence must be classified as an agricultural homesite.

5. Two houses are located within one acre but are on two different contiguous parcels in the same ownership. A one-acre homesite must be assigned to each parcel.

6. A summer home or cabin without a septic system and/or well is appraised as a residential structure and the land under the structure is classified as a homesite.

Classification of One Acre Homesites					
Situation	**Ag Homesite**	**NQ Homesite**	**Forest Homesite**	**Tract land**	**Remainder acres**
Forest parcel less than one acre in size with a residence*			1 Ac. Beneath Improvements (for dwlg on Forest Land) - entire parcel size		n/a
Forest parcel with a residence*			1 Ac. Beneath Improvements (for dwlg on Forest Land)		Enter remaining acres in appropriate land use item pages
Forest parcel with multiple residences* on one acre			1 Ac. Beneath Improvements (for dwlg on Forest Land)		Enter remaining acres in appropriate land use item pages
Forest parcel with multiple residences* on separate sites			1 Ac. Beneath Improvements (for dwlg on Forest Land) - for each site		Enter remaining acres in appropriate land use item pages
Forest parcel with multiple residences* in one location but don't fit on 1 acre			1 Ac. Beneath Improvements (for dwlg on Forest Land) - for each residence* as needed to fit on one acre sites		Enter remaining acres in appropriate land use item pages
Residential parcel with a residence*			Follow residential guidelines		
*residence applies to any building with habitable area					

FOREST LAND CLASSIFICATION AND VALUATION MANUAL ADDENDUM

Historical Information

The department provides this addendum as requested by the 2020 Forest Land Taxation Advisory Committee to ensure the historical and scientific background of Montana's forest land taxation from the previous manual is available with each future version of the manual.

History of forest taxation in Montana

Approximately 14.6 million acres are classified as commercial forest land in Montana. Of this total, about 4.1 million acres are classified as private forest land, with the remaining 10.5 million acres in public ownership.
1957: legislature passed a law directing the State Board of Equalization to provide for a "general and uniform method of appraising timberlands." Prior to 1957, forest land assessment was inconsistent throughout the state.

1959: the legislature provided funding for the Board of Equalization to develop a standing inventory tax system. Under this appraisal system, most of the private forest lands were classified and assessed in the early 1960s. Elected assessors had the choice of classifying the standing timber in their county or contracting the work to the state Division of Forestry.

1972: Constitution of the State of Montana created the Property Assessment Division of the Department of Revenue and eliminated the Board of Equalization. The department assumed the responsibility for maintaining the standing inventory system and creating cyclical valuation schedules.

1991: Legislature passed the "Forest Lands Tax Act." This bill eliminated the standing inventory tax system and replaced it with the forest land productivity tax. The department was granted three years to develop and implement the new system.

1994: On January 1, 1994, the forest land productivity tax became effective.

1997: In 1997, the legislature made several minor revisions to the law at the request of the department.

Since 1972, the legislature has placed forest lands in several different property tax classes.

1963 to 1982	Property tax Class 03
1982 to 1994	Property tax Class 13
1994 to present	Property tax Class 10

The legislature has also periodically adjusted the taxable percentage rate, most recently in 1999 when legislation phased down the taxable percentage annually over the remainder of the 1997 reappraisal cycle. The taxable percentage rate has ranged from less than one percent to 30 percent.

2009: In 2009, the department implemented GIS technology containing numerous layers of information, including the state's cadastral database, agricultural and forestland land use, building site locations and land productivity estimates. The 2009 reappraisal produced the most significant changes to the existing forest tax system since it was implemented in 1993. Forest productivity estimates were re-evaluated using advanced technology, data and modeling techniques. The forest productivity classification system went from four productivity grades based on cubic feet yield, to an estimated productive capacity, or the culmination of mean annual increment, expressed in board feet per acre. Forest/non-forest boundaries where manually re-digitized on private forest land using 2005 digital color photography, culminating in the merger of forest and agricultural land into a seamless statewide land use map. Using available technology to capture current uses and productivity information, and the ability to visually display the results on aerial imagery maps, provides the means to keep appraisals current and equalized using the same common data sources.

Currently, forest land reappraisal occurs on a six-year cycle. Any increase in assessed values is phased in at equal increments over the duration of the appraisal cycle. Any decrease in assessed values is implemented immediately in the first year of the new reappraisal cycle.

Forest land tax act

In 1991, the 52nd Legislature passed the Forest Lands Tax Act. Many physical and economic conditions for the classification system are defined, as well as the valuation formula and each component in the formula. The law also provides for forest valuation zones, with each zone designated to recognize the uniqueness of marketing areas, timber types, growth rates, access, operability and other factors important to the valuation of forest land in that geographic area. The technical design for the

productivity classification was delegated to the Department of Revenue and the University of Montana, College of Forestry and Conservation.

The bill is codified in 15-44-101 through 15-44-105, Montana Code Annotated (MCA). In 1993, the department adopted administrative rules to administer this law. These rules were described in ARM 42.20.701 through 42.20.750. These rules have since been periodically revised and updated.

Important forest land definitions are found in ARM 42.20.701. Other important definitions are found in ARM 42.20.705.

- (i) contiguous forested land of 15 acres or more . . . in the same ownership and is capable of producing timber that can be harvested in commercial quantity;
- (ii) land that is producing timber or land in which the trees have been removed by man through harvest, including clear-cuts or by natural disaster . . . .

Standing timber is exempt from property taxation, as provided in 15-6-223, MCA. Only the bare land under the timber is eligible for assessment. If a landowner deeds his timber to another party, the landowner, not the timber owner, is responsible for the forest land property tax.

Montana statute also allows for a 50 percent reduction in the appraised value for 20 years if standing timber is destroyed by natural disaster, as provided in 15-44-104, MCA.

Forest productivity

Land productivity is the basis for assessing forest land in Montana. Features that influence productivity on a forest site include soils, climate, slope, aspect, and elevation. The classification system measures potential, not actual, productivity. Potential and actual productivity are not synonymous. Potential productivity is constant, regardless of the standing inventory growing on the land. Insects and disease, overstocking, forest fires, or logging activities do not influence potential productivity. Actual productivity is the actual growth that has occurred or is occurring and is influenced by the above-mentioned activities. Actual productivity is dynamic and constantly changes.

Potential productivity can be expressed in volumetric terms by first estimating site quality and then inserting that information into a forest growth model. The volumetric output of the growth model is expressed as the maximum average annual growth of

wood that could be expected from a natural, fully-stocked stand of coniferous trees over the *biological* rotation age[1].

In Montana's forest productivity system, this growth is expressed in board feet of wood per acre per year (bf/ac/yr). A board foot is the volume of wood in a block 12 inches long, by 12 inches wide, by 1 inch high. Board foot estimates are based on the amount of lumber a mill could produce from a tree. Characteristics such as tree form, log diameter, taper, and defect influence the amount of board feet that can be produced by a tree. Board foot volume is estimated for all trees on an acre of land that are at least 8 inches in diameter at breast height (DBH). Tree volume is measured from a one-foot stump to a six-inch top (inside the bark). Board foot estimates are based on 16-foot nominal log lengths with five percent hidden defect.

The following example illustrates the difference between potential and actual productivity. One stand of trees is diseased with dead and dying timber, but an adjacent stand supports young, healthy trees. Their actual growth rates are quite different, but the underlying potential productivity could be quite similar. The same comparison can be made between a clear-cut and an old growth stand. Both sites may have the same underlying potential productivity even though the clear-cut contains no standing timber and has no actual board foot production.

Forest productivity is influenced by long growing seasons, plentiful sunlight, rainfall, and fertile soils. This potential is inherent to the land, even when trees have recently been harvested or destroyed by natural events. Generally, direct measurement of potential productivity is not possible. The forestry profession addresses this problem by identifying and measuring items which are strongly related to potential productivity. Forestry researchers have collected data, then applied statistics and mathematical models to estimate site quality and potential volume growth.

In conclusion, actual productivity will be equal to potential productivity under only rare conditions. As climate, soils and topography change from place to place, so does the

[1] The maximum average annual growth is reduced by average annual mortality as reflected in normal yield tables.

[2] Milner, Kelsey S. 1995. Forest Productivity Maps for Montana Forest Land. A primer on the development of the productivity maps used in the Montana Forest Land Tax System. University of Montana. School of forestry. 15 pp.

potential productivity. [2] This "potential" is the basis for the Montana forest land tax system.

Potential productivity classification system

Mapping potential productivity on the Montana forest landscape is an integration of several technologies that represent state-of-the art capabilities in natural resource management. The Geographic Information System (GIS) contains data on the climate, soils and topography for each acre of the state. The department uses GIS to conduct electronic field reviews of each forest property.

Computer models can be used to grow trees on each acre of forest land in the state, including clear-cuts. The first step is to estimate site quality using a rating index. Site index is a measure of a forest site's potential productivity. The index expresses the relationship between a site tree's age and height. Site index equations are developed using a base tree age of 50 or 100 years. Age is measured at either diameter at breast height (DBH) or the base of the stump (total tree age), depending on how the equations were developed.

Site index equations are often displayed as site curves on a graph with an age and height X - Y axis. If the equations use a base age of 50 years, then adjustments are made to site trees that are less than or greater than 50 years of age, to reflect an expression of height at 50 years of age.

Dr. Kelsey Milner, a former forestry professor at the University of Montana, developed the site index equations for western Montana during his working career with Champion Timberlands Inc. and as part of his Ph.D. work at the University of Montana. His site index equations use a base age of 50 and tree age at breast height (4.5 feet from the base of the tree). These site index equations are a part of the Montana forest tax system.

Site trees are trees used to estimate site index on a forest site. Different tree species grow at various rates on a given site. Therefore, the age to height relationship is different for each species used to calculate site indexes. The site index model incorporates four major tree species found in Montana -- ponderosa pine, western larch, lodgepole pine, and Douglas-fir. A ponderosa pine that is 50 years old at DBH and 64 feet in height has a site index of 64. A lodgepole pine that is 50 years old at DBH and 64 feet in height also has a site index of 64. However, a lodgepole pine site index of 64 is

[2]

not equivalent in site quality to a ponderosa pine site index of 64. They represent different levels of potential productivity.

Dr. Milner analyzed site tree indices on locations containing multiple site tree species. Ratios were calculated, and then applied to larch, lodgepole pine and ponderosa pine site indices to closely adapt them to the Douglas-fir site index for any given site. Site quality on all forested acres is converted to a Douglas-fir site index for application in a forest growth model. A site index is estimated for each 2.2-acre forest site. Site quality on the majority of Montana's commercial forest land falls between 44 and 55 feet of tree height for Douglas-fir site trees at 50 years of age.

The site index models, developed by Dr. Hans Zuuring and Dr. Milner, use actual site data obtained from 325 forest locations throughout the state from a multitude of elevations, slopes, and aspects. The one significant mountain range that is not represented in the sampling data is the Big Belt Mountains in and around White Sulphur Springs.
The accuracy of the site index estimates depends upon many factors: the resolution and quality of the GIS databases, the sensitivity of changes to model variables, the quantity, quality and distribution of site tree data and the verification of model outputs. The data represents averages, and any location may differ from average conditions. Forest sites also have large biological diversity. For example, a forest locale may have multiple soil types. However, the soil characteristics used in the site index model represent average figures for the entire soil-mapping unit. If this difference is large, the productivity estimate may be in error.

Based on the sampling data, Dr. Zuuring and Dr. Milner calculated a standard deviation of a plus or minus 7.26 feet for site index on any given site. This means that if the model predicts a Douglas-fir site index of 50 on a given quarter-acre site (30 x 30-meter pixel), the actual Douglas-fir site tree index for that site could vary between 42.74 and 57.26 feet.

Dr. Zuuring and Dr. Milner developed two forest biometric equations that utilize climatic, edaphic and soils information to predict site index. Douglas-fir Site Index (DFSI) Model 1 uses four soil components (PH, bareness, cat-ion exchange capacity (CEC), and available soil water content in the first 24 inches). The soil components are obtained from the Natural Resource and Conservation Service (NRCS) soil survey database. The equation in DFSI Model 1 assumes that the soil data is available.

The soils database contains the necessary soil characteristics for most of the soil-mapping units on private land. However, this critical soil data is missing on much of

Montana's national forests, national parks, federal wilderness areas, and tribal lands. While these ownership types are tax-exempt, there are private in-holdings that must be accurately assessed for property taxation.

When soil data is missing from the NRCS soil database, DFSI Model 1 produces erroneously high estimates. Therefore, Dr. Milner developed a second biometric equation (DFSI Model 2) to estimate site index for locations where soil data is missing from the NRCS database. This model is based only on topographic and climatic variables.

The equation in DFSI Model 2 is applied only to areas that lack soil data. The average mean and minimum/maximum readings for DFSI Model 2 on site lacking soil data is very similar to the DFSI Model 1 predictions for sites that do contain soil data. However, the DFSI Model 2 equation lacks the ability to recognize the productive variability across the landscape that DFSI Model 1 accomplishes using soil data.
Both models are run across the landscape and a masking procedure is applied to eliminate a model's results that do not apply to a particular location. The outputs from both models are then spliced together to form a seamless raster grid layer.

Once the site index is determined for each cell in the landscape grid layer, that figure is entered into the Forest Projection Growth System (FPS) model. The Forest Projection System is a national forest growth model, developed by Dr. Jim Arney. The FPS model coefficients have been modified to mimic forest conditions in western Montana and are driven by the site index and specific forest management assumptions made to the model.

The FPS Model is adapted to fit conditions in western Montana. However, the growth model must be applied to all counties in Montana with forested land. In central and eastern Montana, precipitation significantly affects the land's ability to fully stock certain sites. Dr. Milner concluded that on sites that experience less than 18 inches of annual precipitation, stockability is impaired. Therefore, stockability factors are applied to any site receiving more than 12 but less than 18 inches of precipitation per year. The stockability adjustment factor is variable depending on the amount of precipitation less than 18 inches. Stockability adjustments to the growth table may reduce volumetric yields by upwards of 68 percent on the driest sites. There is no stockability reduction for sites experiencing 18 inches or more annual precipitation.

The FPS model can predict volumetric yields in cubic feet or board feet.

Stumpage values used in the valuation process are expressed in board feet. Therefore, the forest land productivity system uses board feet as its method of measurement. There are theoretically 12 board feet in one cubic foot of wood. However, a board foot represents a block of wood 12 inches wide by 12 inches long by 1 inch high after it has been processed into lumber.

The milling process of a log into a square product produces approximately three to five board feet for every cubic foot. Logs with larger cross-sectional diameters produce more board feet per cubic foot than smaller diameter trees.

Furthermore, lumber cannot be produced from seedlings and saplings. Board foot yields are not produced until the tree becomes merchantable at eight inches in diameter at breast height (DBH). Trees less than eight inches in DBH are considered to be non-merchantable[3]. Tree volumes are measured from a one-foot stump (outside bark) to a six-inch top (inside bark). Board foot volumes are calculated using the Scribner Decimal Log Rule with 16-foot long nominal log lengths and a five percent defect rate.

Just as individual tree volumes are estimated using specific tree measurements (examples: one-foot stumps, diameter at breast height (DBH), and 6 inch inside the bark tops), growth and yield estimates must use specific growth measurements and time intervals. This provides valid and consistent comparisons between forest sites.

Potential productivity is the per-acre net annualized yield at the culmination of mean annual increment (CMAI). Mean annual increment (MAI) is a measure of the average yearly increase in volume growth produced in a tree or a stand of trees on one acre. This increment can be calculated by dividing total tree or stand volume growth by the total growth interval. Mean annual growth changes during different growth phases of a tree or stand of trees. MAI typically increases as the tree or the stand matures in the early developmental stages, attains a maximum growth increment in the tree's or stand's middle development, then decreases as the tree or stand becomes more mature. The point in the tree or stand development that produces the maximum MAI is the culmination point and is often referred to as the biological rotation age. The CMAI is the ideal harvest or rotation age in terms of most efficient net annual volume production. The culmination of MAI is inversely related to site quality.

[3] The terms merchantable and non-merchantable should not be confused with the terms commercial versus non-commercial.

The following example demonstrates how to calculate per acre board foot yield @ CMAI. Assuming the model estimates a net annualized yield of 200 board feet per acre per year @CMAI with CMAI occurring at a stand age of 100 years, 200 bf/ac/yr * 100 years = 20,000 bf/ac. Potential productivity is displayed spatially by aggregating the individual volumetric output from each grid cell in a forested area into larger polygons using map algebra. Each polygon is given a potential productivity based on map algebra which calculated the average bd/ft productivity for that specific area. The minimum nonforest area that is aggregated into a single productivity designation is five acres and the minimum size for commercial timber areas is 15 acres.

Essentially, productivity data across the continuous landscape is converted to discrete data. In order to provide landowners some quantitative idea of what productivity is like on a given piece of their property, a visual display of productivity classes is important. A map displaying productivity of the property provides a better concept of the land classification.

Conversely, showing productivity polygons may give the wrong impression that all forested land within a polygon is similar and forested land in an adjacent polygon with different productivity is dissimilar. Productivity polygons are man-made designations placed on a natural landscape. Stepping across the boundary produced by a change in productivity does not necessarily mean you have suddenly crossed into a vastly different site quality. You have simply moved to a location where the aggregate of data places this area in another productivity designation. Often the difference in volumetric yield on either side of a productivity boundary is a couple of board feet, a difference much too small to recognize visually on the ground.

The weighted mean average of each forest polygon is utilized by the GIS to calculate forest assessments and is stored in a GIS database for each polygon. Beginning in 2009, state law stipulates that the minimum potential volumetric yield for commercial forest land is 100 bd ft/ac/yr @ CMAI. If a forested site doesn't produce at least this minimum potential yield requirement, the land is not classified as Class 10 - forest land for property taxation.

The upper end of estimated potential productivity range in Montana is located in northwestern Montana. While there are small pockets in this area of state with very high potential productivity, only about two percent of the state has estimated yields greater than 400 bf/ac/yr @CMAI.