

4.14 TIMBER RESOURCES

4.14.1 Effects Analysis Indicators and Methodology of Analysis

The analysis of effects to timber resources includes the following issue and indicators:

Issue: The Stibnite Gold Project (SGP) may change the availability of timber resources, including sawtimber and special forest products.

Indicators:

- Volumes and acres of timber resources removed.
- Acres of timberland (including land suited for timber production) converted to other, non-productive land uses.

Timber resources were analyzed using Geographic Information System (GIS) spatial analyses, scientific literature reviews, U.S. Forest Service (Forest Service) handbooks and manuals, Forest Service land and resource management plans, and other information and analysis documented in reports prepared by and for Midas Gold Idaho, Inc. (Midas Gold).

4.14.1.1 Methodology

The assessment of potential effects related to the timber issue and its associated indicators are organized and analyzed for each alternative by the underlying timber management responsibility (either Forest Service or other federal, state, and private). Where appropriate, the analysis is further organized by merchantable sawtimber versus sub-merchantable timber that could be sold as special forest products (e.g., Christmas trees, post and poles, and live transplants).

Analysis of direct effects on timber resources is limited to the analysis area as defined in Section 3.14.1, Timber Resources Introduction and Scope of Analysis. A qualitative analysis of indirect effects on timberlands also is included. Timeframes (i.e., durations) used for analysis of effects relate to the period during which timber resources would be prevented from growing in the analysis area.

In addition to duration of effect, the analysis considers the following metrics to compare timber resources effects under each alternative:

- **Context.** This is defined as the conditions under which removal and recovery of timber resources are occurring.
- **Extent.** This is defined as the area experiencing timber removal and recovery (measured in acres).

- **Magnitude.** This is defined as the quantity of timber removed in volume of timber resources removed (measured in cubic feet [CF] or thousand board feet [MBF], as appropriate).

The methods used to estimate the quantity and extent of timber resources in the analysis area and the analysis of impacts on timber resources is summarized below and further detailed in Timber Resources Methodologies and Impact Analysis Report (AECOM 2020).

4.14.1.1.1 INFORMATION SOURCES

To map the extent of existing timber resources and acres impacted, the following data were used:

- Forest Service Vegetation Classification Mapping and Quantitative Inventory (VCMQ) existing vegetation mapping for the Payette National Forest (PNF) and Boise National Forest (BNF) (Forest Service 2016a, 2017a)
- Payette Vegetation Keys (Forest Service 2012)
- LANDFIRE Land Cover Map Unit Descriptions and GIS mapping (U.S. Geological Survey 2016, 2019)
- PNF and BNF Fire History data layers (Forest Service 2016b, 2017b)

To develop timber resource volume estimates and quantities impacted, the following sources were used:

- PNF 2001 Forest Inventory (Forest Service 2002)
- Local Volume Table Reports for “Meadow Slope 3” timber sale, Cruise #80302, and for “Rough Finn IRTC” timber sale, Cruise #15302 (Forest Service 2017c,d)
- PNF Strata (Forest Service 2004)

4.14.1.1.2 TIMBER VOLUME

Volume of timber was estimated in the analysis area by extracting sampled vegetation characteristics from the VCMQ mapping for the PNF and BNF, including timber dominance type, tree size, and canopy cover, from the GIS to create a set of unique stand conditions. The resulting 200 stand conditions represent all of the combinations of the eight timber types found in the analysis area, the five tree-size classes in the VCMQ (i.e., seedling, sapling, small, medium, and large); and the five canopy cover classes in the VCMQ (i.e., low, low-medium, medium, medium-high, and high). Only trees greater than 10 inches in diameter at breast height, which corresponds to medium and large trees, are considered merchantable sawtimber; seedling, sapling, and small trees are considered special forest products on the PNF and BNF.

To estimate average volume per acre for each of the 200 stand conditions, generalized forest strata data were combined with available Forest Service inventory data, which provided estimates of trees per acre in each stand type; and estimates of volume per tree, by species and size class (Forest Service 2017c,d). The resulting stand-volume table, containing volume-

per-acre estimates for all 200 unique stand conditions, was applied to mapped timberlands in the analysis area¹. Timber volumes presented in the discussions are distinguished between sawtimber and sub-merchantable trees; however, a breakdown by species is not provided.

4.14.1.1.3 ASSUMPTIONS

- All portions of the analysis area within the PNF and BNF boundaries were characterized by existing VCMQ vegetation dominance types, using spatial data developed by the PNF and BNF, with a minimum polygon size of 5 acres. These data were not developed to characterize timber resources, and therefore the conifer land form was used as a proxy for timberland but has associated limitations. Limitations include: 1) not all areas mapped as coniferous forest lifeform are productive timberlands; 2) many of the sparser conifer stands (10 to 30 percent canopy) may not have been mapped as coniferous forest lifeform, instead many of these fell into various shrubland categories or burned categories (Forest Service 2019); 3) the minimum mapping unit of 5 acres is not small enough to capture all developed roads and other narrow cleared corridors, and therefore the mapped extent of vegetation may extend across these developed, unvegetated areas; and 4) existing roaded areas fell below the minimum mapping unit and although they do not contain timber, some portions of mapped timber resource polygons include roaded areas devoid of trees.
- Beyond the limitations associated with VCMQ mapping accuracy on National Forest System (NFS) lands, these data were not available for portions of the SGP area on private, state, and other federal land. To characterize vegetation in these areas, publicly available vegetation community LANDFIRE data with a 30-square-meter minimum mapping unit were manually translated (“cross-walked”) to the closest corresponding NFS vegetation dominance type. LANDFIRE data are not ground-truthed; therefore, vegetation conditions on private, state, and other federal land may be less accurately represented than conditions on NFS lands.
- Although the Reclamation and Closure Plan, Stibnite Gold Project (RCP) (Tetra Tech 2019) indicates that some portion of forest resources in the analysis area would be used during mining operations, and some portion may be harvested for sale (as timber), Midas Gold does not provide an acreage estimate or indicate the location of forest resources intended for each use. In the absence of this information, all forested areas in the analysis area meeting the definition of timber resources were assumed to be harvested for sale during SGP construction and operations.

¹ Timber volume was estimated in cubic feet, which is a full-log volume measurement. The board foot is the unit of measure for wood intended for the finished wood product market, and the timber volume unit used in the Payette National Forest Land and Resource Management Plan (Payette Forest Plan) and Boise National Forest Land and Resource Management Plan (Boise Forest Plan). To compare estimates of timber volume to the PNF and BNF timber extraction goals, cubic feet of timber was converted to MBF using Cahill’s conversion factor for 16-inch log diameters. The factor is “5.24 cubic meters of wood per thousand board feet,” and is based on the Westside Scribner rule with log lengths up to 40 feet, and assumes no reduction in volume for defects (Spelter 2004).

- In the absence of timber cruises (i.e., a sample measurement of a stand used to estimate the amount of standing timber that the forest contains) for the SGP area, the volume and distribution of sawtimber and special forest products on the landscape can only be approximated from landscape-level vegetation mapping at a minimum mapping unit of 5 acres. Therefore, the data may indicate that some areas contain timber or special forest products, while a timber cruise of the area may reveal different conditions.

Additional analytical assumptions that were made in order to develop a consistent, repeatable analysis for the SGP are detailed in the *Timber Resources Methodology and Impact Analysis Report* (AECOM 2020).

4.14.2 Direct and Indirect Effects

The following Section presents a summary of the detailed analysis presented in *Timber Resources Methodologies and Impacts Analysis Report* (AECOM 2020).

The harvest and sale of timber is an intended use of NFS lands; however, to protect multiple uses and promote the sustained-yield of timber, the Forest Service provides detailed management direction for how and where harvesting on NFS lands is to occur. The effects of removing timber off NFS lands are examined in the context of how consistent the removal and regeneration methods are, as well as location and volume of timber removed, with NFS timber harvest rules and Forest Plan standards and guidelines. Timber removal from non-NFS lands in the analysis area are viewed in the context of state and local regulations governing removal and sale of wood products. Forest Service timber management guidelines do not apply on these lands.

Direct effects to timber resources on NFS-managed lands (“Forest Service timber”) would include timber removal volume, acreage, or practices that conflict with Forest Service direction. Specifically, direct impacts would include:

1. Removal of volume that exceeds annual harvest limits (Total Sale Program Quantity [TSPQ], Allowable Sale Quantity [ASQ], Wood Volume) set by each forest, as shown on **Table 3.14-5**.
2. Removal of timberland acreage from unsuited areas, or of a quantity that exceeds the acres suited for timber production designated in the Payette or Boise Forest Plans.
3. Regeneration of timber resources does not achieve adequate restocking within 5 years of final harvest (16 United States Code 1604(g)(3)(E)(ii)).

Direct effects to timber resources on other federal, state, and private lands may include timber harvest practices on commercial timberlands that conflict with the Idaho Forest Practices Act and associated guidelines. Specifically, direct effects would include:

1. Removal of timber from commercial timberlands in ways that conflict with standards for logging operations, soil protection, stream protection, and restocking of stands.
2. Timber harvest practices that generally do not maintain and enhance natural resources.

Indirect effects on timber resources could include delayed or prolonged growth and recovery of timber species because of removal of suitable soil, seed bank, and understory conditions during operations. Indirect impacts also could include development of unhealthy timber stands from the introduction of pathogens, including insects and disease; or the reintroduction of genetically unsuitable plantings or seed. Indirect effects would be a function of harvest method and reclamation strategy, which are anticipated to be the same across the entire SGP area. Therefore, indirect effects on timber resources are anticipated in all portions of the SGP area where timber removal would occur.

Direct and indirect effects associated with timber resources during construction and operations are based on management standards, which differ between the Forest Service and the State of Idaho or Valley County; the discussion below is organized to reflect those differences. Effective replanting and regeneration, and achievement of regeneration standards during closure and reclamation could decrease impacts to timber resources from operations and closure. However, inadequate efforts to return timberland to forested vegetation could increase the duration and extent of direct and indirect effects to the resource.

4.14.2.1 Summary of Effects to Timber Resources

4.14.2.1.1 CONSTRUCTION AND OPERATIONS

Vegetation clearing from the analysis area for the action alternatives would impact between 322 acres containing 330,974 CF of sawtimber and sub-merchantable product under Alternative 2, and 501 acres containing 524,023 CF of sawtimber and sub-merchantable product under Alternative 4. The analysis area under action alternatives 1, 2, and 3 contains 38 acres of land suited for timber production, which is associated with the existing transmission line upgrade (within BNF management prescription category [MPC] 5.1 and 4.2) and contains 212 MBF of sawtimber. Alternative 4 contains 85 acres of lands suited for timber production, which include the 38 acres associated with the transmission line upgrade (within BNF MPC 5.1 and 4.2) plus an additional 47 acres associated with the Yellow Pine Route (within BNF MPC 5.1). The suited timberlands under Alternative 4 contain 292 MBF of sawtimber. There is no suited timberland in the analysis area on the PNF under any action alternative.

Timber resources under the action alternatives would be removed during the construction phase, and the soil surface cleared and grubbed to accommodate roads and infrastructure. Timber resources would be largely prevented from reestablishing through the operations period due to the ongoing need for the underlying ground to accommodate structures, facilities, and access routes. Exceptions to this timeline would occur at two mine site components: West End Development Rock Storage Facility [DRSF] and Fiddle DRSF, where concurrent reclamation includes a limited area of conifer replanting; and along Burntlog Route (Under Alternatives 1, 2, and 3), which would remain in use throughout the closure and reclamation phase. Construction and operations under all action alternatives would have long-term effects on the availability and extent of timber resources in the analysis area. These effects would be long-term because timber resources would be removed at the start of the SGP, during the construction period, and the disturbed areas would remain largely unavailable for planting or regrowth for over 15 years.

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In addition, all action alternatives include permanent impacts on the availability and extent of timber resources through the permanent conversion of existing timber resources to other, non-timber uses, including the expanded right-of-way (ROW) for the existing transmission line under all action alternatives, the permanent, continued use of the new transmission line under Alternative 2, and the permanent, continued use of the upgraded Yellow Pine Route under Alternative 4.

Permanent loss of timber resources would occur on 89.4 acres under Alternatives 1 and 3. Under Alternative 2, permanent loss of timber resources would occur on 88.8 acres; despite the addition of 1.6 acres of permanent loss associated with retention of the new transmission line to the mine site. Under Alternative 4, approximately 192.1 acres of timber resources would be permanently lost with the additional retention of upgrades to the Yellow Pine Route. Under Alternatives 1, 2, and 3, approximately 38 acres of land suited to timber production would be cleared to accommodate construction and operations of the SGP, 34 acres of which would be permanently prevented from returning to timber vegetation following the SGP. Under Alternative 4, approximately 85 acres of land suited to timber production would be cleared during construction and operations of the SGP, 75 acres of which would be permanently prevented from returning to timber vegetation following the SGP. Under all action alternatives, approximately 38 percent of the permanent loss of timber resources occurs on lands suited to timber production.

The removal of timber resources from lands suited to timber production and unsuited lands, and the associated effect upon the PNF and BNF ASQ and TSPQ, are summarized in **Table 4.14-1**, which shows that Alternatives 1, 2, and 3 are almost indistinguishable in magnitude of effect to timber resources. Alternative 4 has the largest effect on the PNF TSPQ, but otherwise has an indistinguishable effect on the BNF ASQ and TSPQ from the other action alternatives, despite removing timber resources from an additional 47 acres of land suited to timber production.

Table 4.14-1 Comparison of Timber Resource Removal on Forest-Wide ASQ and TSPQ by Action Alternative

Harvest Metric	Alternative 1	Alternative 2	Alternative 3	Alternative 4
	Contribution Towards Annual Maximum (MBF), percentage			
PNF TSPQ	3,813 MBF (9%)	2,369 MBF (6%)	3,808 MBF (9%)	4,313 MBF (11%)
PNF ASQ	0 MBF (0%)	0 MBF (0%)	0 MBF (0%)	0 MBF (0%)
BNF TSPQ	647 MBF (2%)	648 MBF (2%)	648 MBF (2%)	671 MBF (2%)
BNF ASQ	212 MBF (1%)	213 MBF (1%)	213 MBF (1%)	292 MBF (1%)

Table Source: Compiled by AECOM in 2020 from Forest Service vegetation and fire data (Forest Service 2016a, b; 2017a, b), and Brown and Caldwell 2017

Table Notes:

MBF = thousand board feet; TSPQ = total sale program quantity; ASQ = allowable sale quantity

Timber resource removal geographic extent and magnitude is similar under Alternatives 1 and 3 (**Table 4.14-2a** and **Table 4.14-2b**). The main differences between these two alternatives (location of the Tailings Storage Facility [TSF] and alignment/location of the new transmission line into the mine site) are not reflected in the extent and magnitude of effects to timber resources due to the location of the timber resources. Both the TSF and new transmission line ROW are located largely outside the timber analysis area due to the extent of recent wildfire (i.e., wildfires reported and mapped by the PNF within the last 20 years).

The primary differences in the extent and magnitude of timber resource removal between the action alternatives relates to the removal of the West End DRSF and West End DRSF Diversion under Alternative 2, and the use of the Yellow Pine Route for mine site access under Alternative 4 instead of construction and use of the Burntlog Route. Alternative 2 and 4 also include additional small differences, such as the inclusion of public access roads through the mine site during mining. The elimination of the West End DRSF and West End DRSF Diversion under Alternative 2 accounts for approximately 70 acres of existing timber resources that are retained under that action. Under Alternative 4 the use of the Yellow Pine Route for construction, operations, and closure and reclamation and the development of a groomed over-snow vehicle route would increase the extent of timber resources removal by approximately 119 acres (most of which is on land managed by the Forest Service). The use and construction of the Burntlog Route under Alternatives 1, 2, and 3 would require removal of only 16 acres of timber resources. The larger magnitude of impact to timber resources from development of the Yellow Pine Route versus the Burntlog Route is partially explained by the extent of forest fire damage over the last 20 years, which severely limit the extent of the timber resources analysis area along the Burntlog Route, as shown on **Figure 3.14-1**.

Alternatives 2 and 4 also are differentiated from Alternatives 1 and 3 by the inclusion of public access roads through the mine site during construction, operations, and closure and reclamation. In addition, the Alternative 4 public access road also would serve as a mine delivery route. Timber resources removal associated with public access roads through the mine site is approximately 10 acres under Alternative 2 and approximately 13 acres under Alternative 4.

Tables 4.14-2a and **4.14b** show the area of timber resources and associated volume of wood removed during construction and operations under each of the action alternatives on NFS land as well as other public or private land.

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Table 4.14-2a Impacts to Timber Resources by Action Alternative: Volume of Timber Removed (cubic feet)

Land Management	SGP Component	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Forest Service	Access Roads	22,593	22,596	22,556	71,321
Forest Service	Mine Site	338,078	211,473	337,234	344,573
Forest Service	Off-site Facilities	470	470	470	3,323
Forest Service	Utilities	43,906	44,020	44,165	44,022
Forest Service	<i>All Components, Subtotal</i>	<i>405,047</i>	<i>278,559</i>	<i>404,425</i>	<i>463,238</i>
Other Federal, State and Private	Access Roads	0	22	0	4,031
Other Federal, State and Private	Mine Site	32,135	32,830	32,268	35,210
Other Federal, State and Private	Off-site Facilities	4,369	4,369	4,369	4,369
Other Federal, State and Private	Utilities	17,180	15,195	17,256	17,175
Other Federal, State and Private	<i>All Components, Subtotal</i>	<i>53,684</i>	<i>52,416</i>	<i>53,893</i>	<i>60,785</i>
All Lands	All SGP Components¹	458,730	330,974	458,318	524,023

Table Source: Compiled by AECOM in 2020 from Forest Service vegetation and fire data (2016a,b 2017a,b); Midas Gold Mine Claim spatial data (2017); and AECOM timber volume formulas

Table Notes:

- 1 All quantities have been rounded; therefore, column and row totals may not add up exactly due to rounding performed in source data.

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Table 4.14 2b Impacts to Timber Resources by Action Alternative: Area of Timber Removed (acres)

Land Management	SGP Component	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Forest Service	Access Roads	32	32	32	122
Forest Service	Mine Site	220	152	220	230
Forest Service	Off-site Facilities	3	3	3	4
Forest Service	Utilities	86	86	85	86
Forest Service	<i>All Components, Subtotal</i>	341	273	339	442
Other Federal, State and Private	Access Roads	0	<1.0	0	6
Other Federal, State and Private	Mine Site	23	22	24	25
Other Federal, State and Private	Off-site Facilities	5	5	5	5
Other Federal, State and Private	Utilities	22	22	22	22
Other Federal, State and Private	<i>All Components, Subtotal</i>	50	49	51	59
All Lands	All SGP Components¹	392	322	391	501

Table Source: Compiled by AECOM in 2020 from Forest Service vegetation and fire data (2016a,b 2017a,b); Midas Gold Mine Claim spatial data (2017); and AECOM timber volume formulas

Table Notes:

1 All quantities have been rounded; therefore, column and row totals may not add up exactly due to rounding performed in source data.

4.14.2.1.2 CLOSURE AND RECLAMATION

Reclamation of timber resources begins at the point when the analysis area can support the growth of timber species, the timing of which would vary spatially within the analysis area based on differing operations and closure timelines for different facilities and components. In areas where the ground surface would be cleared, grubbed, and graded during construction and operations, reclamation of timber resources would require the ground to be ripped, augmented with growth media (GM), and seeded/planted. In areas where minimal surface disturbance would be anticipated (i.e., the upgraded transmission line and associated tensioning/pulling areas), the removal of infrastructure would constitute the beginning of timber reestablishment. Activities under the action alternatives that could promote the re-growth of timber resources would start as early as Year 10, including concurrent reclamation of the West End and Fiddle DRSFs. Most reclamation would occur in Years 15 through 20, at which time replanting and site preparation at Yellow Pine pit, Hangar Flats DRSF, worker housing facility, and the new transmission line and associated infrastructure from Johnson Creek to the mine site would be initiated. As a result, timber resources would be absent from across the timber resources analysis area for more than 15 years until revegetation activities commence. Approximately 2 acres would be capable of natural regeneration from existing seedstock and seedlings (beneath the new transmission line) under Alternatives 1, 3, and 4 (under Alternative 2 the new transmission line would be retained and timber resources prevented from reestablishing permanently within its alignment), while the remaining acreage (390 acres under Alternative 1, 389 acres under Alternative 3, and 499 acres under Alternative 4) acres would require a combination of site preparation techniques to support forest resource re-growth due to the intensity of the disturbance to existing soil and vegetation. Although the West End and Fiddle DRSFs would be reclaimed concurrently during active mining operations, the RCP includes only limited timber resource planting in those footprints. Most disturbed areas planned for timber resource reclamation would not be prepared with GM or planted until operations are complete, including the Midnight Growth Media Stockpile area, haul roads, the Yellow Pine pit walls, and North Yellow Pine Growth Media Stockpile. The duration of impacts to timber resources, including lost timberland productivity, would be expected to persist for more than 15 years under all action alternatives.

To address losses of vegetation, 472 acres would be planted with conifer and other tree species. Areas identified for timber species replanting are entirely within the mine site, where lands would either be treated to regenerate forest conditions (planted at 81 trees per acre) or park-like conditions (planted at 170 trees per acre) under two conditions: cool aspect and general aspect. Planted timber species would include primarily Douglas-fir and lodgepole pine, with the inclusion of Engelmann spruce on the cool-aspect sites (Tetra Tech 2019).

To prepare disturbed sites for timber replanting, upland portions of the mine site would have 6 inches of stockpiled GM applied. Areas with a base of development rock or development rock and tailings (DRSF and TSF) would have 12 inches of GM applied. Timber productivity generally correlates with soil depth and quality, which implies that the shallow depth of GM (6 inches) applied in most uplands where timber replanting is planned at final reclamation would

likely limit native forest production. Productivity varies with other factors that are not equal across a site, such as moisture inputs, therefore an exact correlation between productivity and GM soil depth would not be expected. In addition, underlying “root zone material” influences productivity, because native forest trees may root several feet below the upper soil layers to exploit moisture and nutrients, and provide physical anchoring. In this case, the reclaimed sites over native soils or regolith material are therefore likely to be more productive than sites on DRSFs, despite the addition of 12 inches of GM on the DRSFs. Compared to native soils and regolith, mining substrates derived from deep in the earth present challenges to ecosystem reclamation (Cooke and Johnson 2002). These include physical characteristics of very coarse substrate in waste rock (development rock), and chemistry that is highly variable, but generally deficient in essential nutrients, and potentially high in other elements (metals) that may restrict plant growth. For more detail on the soil reclamation plan and resulting quality and content of reclaimed GM under the action alternatives, refer to Section 4.5.2, Soils, Direct and Indirect Effects: Quality and Suitability of Available RCM.

Of the approximately 472 acres planned for revegetation in conifer species, at most 78 acres fall within the timber resources analysis area (i.e., where existing timber resources are located as well as planned for removal). The remaining areas are on portions of the analysis area that support grasslands, shrublands, and hardwood forest; or that were burned in the past and currently do not support timber resources. **Table 4.14-3** presents the area of timber resources in the analysis area of each action alternative; the area that would be planted with timber species and other vegetation such as shrub or grassland species according to the RCP (Tetra Tech 2019); and the portion of each analysis area that would not be replanted (reclaimed). A minimum of 213 acres under Alternative 2, and as much as 320 acres under Alternative 4 would not be replanted under the SGP. The Alternative 4 timber analysis area would receive the largest replanting effort of all the action alternatives; however, it would involve the smallest timber resource reclamation effort, based upon reclamation area as a percent of disturbed area.

Given the existing disturbed quality of the ground surface in many areas, particularly at the mine site, timber regrowth would not be expected to occur for many years. The RCP does not include reclamation planting plans for disturbed portions of the utility corridor, at the off-site facilities, or along access roads; where 32 acres of timber resources in the analysis area under Alternatives 1, 2, and 3 would be removed. According to the RCP, the new road sections of Burntlog Route would be removed and ripped, while the upgraded portions would be narrowed to their current conditions, and the excess width would be reclaimed. However, due to the layout of the upgraded road sections (flatter grades and gentler curves), the post-mining condition would exceed the width of the existing condition, representing a small permanent loss of timber resources. Reclamation of new sections of Burntlog Route under Alternatives 1, 2, and 3 would not commence until all final closure/reclamation has been completed at the end of the post-closure phase. In the absence of planting and growth material placement, timberland regeneration along new sections of Burntlog Route would depend on natural seeding from adjacent forest and would likely take more than 20 years to establish.

Table 4.14-3 Existing Timber Resource Area and Planned Replanting in Analysis Area of the Action Alternatives

Action Alternative	Timber Resources in Analysis Area (acres)	Planted with Timber Species (acres)¹	Planted with Shrub or Grassland Species (acres)²	Timber Resources not Reclaimed (acres)	Percent of Analysis Area not reclaimed (acres)
Alternative 1	392	77	102	213	54%
Alternative 2	322	52	53	217	67%
Alternative 3	391	77	101	213	54%
Alternative 4	501	78	102	320	64%

Table Source: Compiled by AECOM in 2020 from Forest Service vegetation and fire data (Forest Service 2016a,b; 2017a,b), and Brown and Caldwell 2017, 2019

Table Notes:

- 1 The area reclaimed to timber resources is based on the overlap of the analysis area for timber resources and the location of Forested and Parkland planting areas presented in the RCP (Tetra Tech 2019).
- 2 The area reclaimed to shrubs or grassland is based on the overlap of the analysis area for timber resources and the location of Shrubland areas, as well as areas designated for seeding of grasses and herbaceous species presented in the RCP (Tetra Tech 2019).

Approximately 100 acres in the analysis area for the action alternatives would be ripped, and receive other site preparation such as GM placement, but would not be planted with timber species. These areas would not be prevented from supporting timber species; however, the anticipated GM depths and subsurface materials in these locations would potentially be restrictive, particularly at providing rooting depths required by mature trees. Based on planting maps, and GM characteristics and placement plans, it is anticipated that at best, only 20 percent of the analysis area for the action alternatives could be adequately restocked within 5 years after final harvest. In most locations where timber resources would be removed, timber vegetation is not part of the planting plan (80 percent of the analysis area), and vegetation conditions would resemble either grasslands or shrublands, or remain bare for an extended period following closure and reclamation.

4.14.3 Mitigation Measures

Mitigation measures required by the Forest Service and measures committed to by Midas Gold as part of design features of the SGP are described in **Appendix D**, Mitigation Measures and Environmental Commitments; see **Table D-1**, Preliminary Mitigation Measures Required by the Forest Service, and **Table D-2**, Mitigation Measures Proposed by Midas Gold as SGP Design Features, respectively. The preceding impact analysis has taken these mitigation measures into consideration, as well as measures routinely required through federal, state, or local laws, regulations or permitting, such that the identified potential impacts of the SGP are those that remain after their consideration.

Mitigation measures may be added, revised, or refined based on public comment, agency comment, or continued discussions with Midas Gold and will be finalized in the Final EIS.

4.14.4 Cumulative Effects

The cumulative effects analysis area for timber resources is the entire area of the PNF and BNF, as well as any commercial timberlands in Valley County. The analysis focuses on current and future projects on the PNF and BNF as those forests have established harvest volume limits and spatially designated lands suitable for timber production. Timber harvest projects occurring on commercial timberlands in the analysis area are unknown at this time and are therefore unavailable to consider in the analysis of cumulative effects to timber resources.

Cumulative effects associated with the SGP consider the range of existing and foreseeable activities and their potential effects with respect to timber resources. This includes past and present actions that have, or are currently, affecting timber resources and areas from which timber is harvested, as well as reasonably foreseeable future actions (RFFAs) that could cumulatively contribute to timber resource impacts in the analysis area. This list of projects includes timber harvest sales, as well as mineral exploration and mining activities, transportation projects, hazardous fuels and noxious weed control projects, and wildfires that could occur within the same timeframe as the impacts of SGP. Projects with a vegetation management component that includes incidental removal of conifer tree species would not be considered to cumulatively contribute to timber resource impacts in the analysis area unless the project included sale of the cut conifer trees. The potential for cumulative effects associated with each project type, and example projects in the cumulative effects analysis area, are described below.

Forest Management. None of the current and future forest management projects within the timber resources cumulative effects analysis area include a commercial timber sale component and are therefore not considered to contribute to cumulative impacts on timber resources.

Mineral exploration and mining activities. None of the currently planned or future mine development projects in the cumulative effects analysis area include sale of cut trees at this time and therefore were determined to not contribute to potential cumulative effects on timber resources.

Transportation projects. Road maintenance, improvement (widening) projects, and bridge replacements are likely to occur in the future in the timber resources cumulative effects analysis area. Roadway projects could impact timber resources through removal of productive timber along roadways. Maintenance of existing roadways would likely be short-term, while new roadways could have a larger effect by removing timberland from permanent production, depending upon the location of the project and its proximity to land suited for timber production. Projects with a road improvement or transportation element include the East Fork Salmon River Restoration and Access Management Plan on the PNF, the Granite Meadows project on the PNF, and the South Fork Restoration and Access Management Plan on PNF as well as BNF. Only the Granite Meadows project includes an explicit discussion of commercial timber sales

and therefore it is the only transportation project that could contribute to cumulative effects on timber resources.

Hazardous fuels reduction and noxious weed control projects. Wildfires have affected timber resources throughout the analysis area and will continue to do so in the future. Future wildfires may affect timber resources, in the event they occur on land suited for timber production, by applying hazardous fuels reduction treatments to the landscape. The damaging effect of wildfire may be mitigated and projects with this aim could contribute beneficially to the cumulative effect of timber removal in the analysis area. Similarly, control of invasive and noxious plant species is likely to benefit timber resources by improving stand productivity. Fuels management projects include Big Creek Fuels Reduction and the Granite Meadows Project. Both Big Creek Fuels Reduction and the Granite Meadows projects include explicit discussions of commercial timber sales associated with fuels reduction activities therefore they both could contribute to cumulative effects on timber resources.

Two known RFFAs (the Big Creek Fuels Reduction Project and Granite Meadows Project) could result in loss of timber resources. However, all projects (private or federal actions) would have to meet the requirements of either National Forest Management Act of 1975 or The State of Idaho and Valley County, which include appropriate planning and compliance to meet their standards for timber stand health and productivity (sustained yield). In addition, actions on NFS lands must meet the standards of the Forest Plan, which specifically addresses annual harvest limits for timber resources on suited and unsuited timberlands.

4.14.4.1 Alternative 1

Available information for RFFAs indicates timber harvest could occur on an additional 67,250 acres of the PNF with implementation of the Big Creek Hazardous Fuel Reduction Project and the Granite Meadows Project. It is unknown if any portions of these areas would occur on land suited for timber production, but if the entire acreage was on land suited for timber production, the combined harvest area would only represent 20 percent of the suited lands on the PNF. It also is not known what volume of timber resources these project areas support, but the projects are PNF-sponsored actions and therefore would be coordinated with the local silviculturalist on the PNF and designed to not exceed ASQ and TSPQ. In addition, these projects would not remove suited lands from production, rather they would, by their intent, maintain forest health and productivity. Implementation of activities proposed under Alternative 1, when combined with other potential activities associated with projects in the cumulative impact analysis area would not exceed harvest volume limits or contribute significantly to removal of timber from land suited for timber production in the cumulative effects analysis area. Therefore, these activities would not result in impacts that would be considered to contribute to cumulative effect on timber resources.

4.14.4.2 Alternative 2

As described in Section 4.14.4.1, available information for RFFAs within the cumulative effects analysis area indicates timber harvests could occur on additional land suited for timber production. However, the quantity and extent of harvest would not result in impacts that would

be considered to contribute a cumulative effect on timber resources. All RFFAs with a timber harvest component are planned and would be performed by the PNF on PNF lands, and therefore timber removal would adhere to approved harvest limits and occur on suited lands.

4.14.4.3 Alternative 3

As described in Section 4.14.4.1, available information for RFFAs within the cumulative effects analysis area indicates timber harvests could occur on additional land suited for timber production. However, the quantity and extent of harvest would not result in impacts that would be considered to contribute a cumulative effect on timber resources. All RFFAs with a timber harvest component are planned and would be performed by the PNF on PNF lands, and therefore timber removal would adhere to approved harvest limits and on suited lands.

4.14.4.4 Alternative 4

As described in Section 4.14.4.1, available information for RFFAs within the cumulative effects analysis area indicates timber harvests could occur on additional land suited for timber production. However, the quantity and extent of harvest would not result in impacts that would be considered to contribute a cumulative effect on timber resources. All RFFAs with a timber harvest component are planned and would be performed by the PNF on PNF lands, and therefore timber removal would adhere to approved harvest limits and on suited lands.

4.14.4.5 Alternative 5

Implementation of Alternative 5 would present no cumulative contribution to timber resources.

4.14.5 Irreversible and Irretrievable Commitments of Public Resources

4.14.5.1 Alternative 1

4.14.5.1.1 IRREVERSIBLE

An irreversible commitment of timber resources and land suited for timber production to other uses would occur in the expanded ROW associated with upgrades to the existing transmission line, which would not be returned to timberland at completion of the SGP. This permanent reduction of timberland would cover approximately 89 acres in the analysis area, approximately 74 acres of which are on NFS land and contain 34 acres of land suited for timber production in MPCs 5.1 and 4.2, with approximately 200 MBF of sawtimber.

Although most timber species are considered to be renewable, certain timber resources that would be impacted under Alternative 1 would be renewable only over long-time spans, including mature sawtimber. Growth of timber species in the analysis area would be affected and their growth particularly slowed, in highly disturbed portions of the mine site due to the loss of native soil resources and the long timespan required for replaced soil resources (GM) to recover productive capacity. In addition, some seedbanks and topsoil may have long recovery periods

following the disturbance associated with Alternative 1. In most disturbed portions of the analysis area, timber re-growth would be prohibited for the duration of the construction and operations but would be encouraged to resume during the reclamation phase. During this phase, all facilities, structures, new access roads, and other components, excluding the expanded ROW around the transmission line upgrades, would be removed. Limited areas of previously occupied timberland at the mine site would be replanted, while much of the previously occupied timberland would be left to naturally re-seed from adjacent plant sources. Reestablishment of high-value timber resources may require decades or longer to return timber vegetation to the extent of the analysis area from which timber resources would be removed.

4.14.5.1.2 IRRETRIEVABLE

The removal of timber resources is an irretrievable commitment because of the long timespan required for timber resources renewal, particularly sawtimber. SGP-related activities throughout the analysis area would remove timber resources for 15 years at a minimum, and likely for as many as 50 years in some places. The removal of sub-merchantable product from the analysis area is an irretrievable commitment, because special forest products derived from those sub-merchantable trees would be unavailable during operations and construction, and likely for an additional 5 or more years after replanting. In MPCs 5.1 and 4.2 in the BNF, Alternative 1 would prohibit (but not permanently prevent) timber production on 4 acres of land suited for timber production over approximately 20 years. Sawtimber and special forest product resources in these areas would be irretrievably affected.

4.14.5.2 Alternative 2

4.14.5.2.1 IRREVERSIBLE

An irreversible commitment of timber resources and land suited for timber production to other uses would occur under Alternative 2 in the expanded ROW associated with upgrades to the existing transmission line and in the new transmission line alignment, both of which would not be returned to timberland at completion of the SGP. This permanent reduction of timberland constitutes 89 acres in the analysis area, approximately 75 acres of which are on NFS land and contain 34 acres of land suited for timber production in MPCs 5.1 and 4.2, with approximately 570 MBF of sawtimber.

In addition, an irreversible commitment of sawtimber from highly disturbed portions of the analysis area at the mine site, along access roads, and off site also would occur, as described under Alternative 1.

4.14.5.2.2 IRRETRIEVABLE

Irretrievable commitments of timber resources under Alternative 2 are the same as those described under Alternative 1.

4.14.5.3 Alternative 3

4.14.5.3.1 IRREVERSIBLE

An irreversible commitment of timber resources and land suited for timber production to other uses would occur under Alternative 3 in the expanded ROW associated with upgrades to the existing transmission line, in the same manner as described under Alternative 1. An irreversible commitment of sawtimber from highly disturbed portions of the analysis area at the mine site, along access roads, and off site also would occur, as described under Alternative 1.

4.14.5.3.2 IRRETRIEVABLE

Irretrievable commitments of timber resources under Alternative 3 are the same as those described under Alternatives 1 and 2.

4.14.5.4 Alternative 4

4.14.5.4.1 IRREVERSIBLE

An irreversible commitment of timber resources, and land suited for timber production to other uses would occur under Alternative 4 in the expanded ROW associated with upgrades to the existing transmission line and along the upgraded portions of the Yellow Pine Route which would not be returned to timberland at completion of the SGP. This permanent reduction of timberland would cover approximately 192 acres in the analysis area, approximately 170 acres of which are on NFS land and contain 75 acres of land suited for timber production in MPCs 5.1 and 4.2, with approximately 278 MBF of sawtimber. An irreversible commitment of sawtimber from highly disturbed portions of the analysis area at the mine site, along access roads, and off site also would occur, as described under Alternative 1.

4.14.5.4.2 IRRETRIEVABLE

In MPCs 5.1 and 4.2 in the BNF, Alternative 4 would prohibit (but not permanently prevent) timber production on 10 acres of land suited for timber production over approximately 20 years. Irretrievable commitments of timber resources under Alternative 4 are otherwise the same as those described under Alternatives 1, 2, and 3.

4.14.5.5 Alternative 5

Under Alternative 5, the SGP would not be undertaken. Consequently, no change would occur in the current status of timber resource in the analysis area, and no irretrievable or irreversible commitments of timber resources would occur.

4.14.6 Short-term Uses versus Long-term Productivity

4.14.6.1 Alternative 1

Mine operations and connected actions would dominate land use, and predominantly prevent timber resources re-growth, on approximately 213 acres of land containing existing timber resources (as detailed in **Table 4.14-3**). After operations end, land uses affected by the mine, access roads, utilities, and off-site facilities would largely return to pre-SGP uses, except for the expanded ROW associated with the upgraded transmission line, which would be permanently removed from long-term timber productivity. The long-term productivity of most timberlands removed during construction and operations would therefore be temporarily reduced, but then would be facilitated through site preparation, seeding, and planting described in the RCP. The effectiveness of GM reclamation and planting mix, techniques, and maintenance, would determine the long-term productivity of disturbed timber resources in the Alternative 1 analysis area. Based on analyses presented in Section 4.5.2, Direct and Indirect Effects to Soils, the long-term productivity of timber resources would be closely tied to the success of soil and GM reclamation. Some portions of the analysis area containing existing timber resources, particularly those in the footprints of the TSF, DRSFs, and pits, would likely never return to their pre-SGP productive capacity due to limitation on rooting depth related to the depth of the GM and waste rock that would function as substrate for the foreseeable future.

4.14.6.2 Alternative 2

Mine operations and connected actions would dominate land use, and predominantly prevent timber resources re-growth, on approximately 217 acres of land containing existing timber resources (as detailed in **Table 4.14-3**). The type and intensity of impacts associated with short-term uses versus long-term productivity are the same as under Alternative 1. The extent of impacts is slightly larger, an additional 5 acres would be prevented from re-growing timber resources under Alternative 2, because of additional areas under Alternative 2 that fall outside of the planned replanting area presented in the RCP where SGP activities would permanently remove the land from long-term productivity (i.e. retention of the new transmission line and mine site access roads). The same short-term uses (sale and use of timber during the SGP) would occur. Long-term productivity is not anticipated to change under Alternative 2, because the same treatments and timelines used to re-initiate timber vegetation would be applied during closure and reclamation under all action alternatives.

4.14.6.3 Alternative 3

Mine operations and connected actions would dominate land use, and predominantly prevent timber resources re-growth, on approximately 213 acres of land containing existing timber resources (as detailed in **Table 4.14-3**). The type and intensity of impacts associated with short-term uses versus long-term productivity are the same as under Alternative 1. The same area of ROW associated with the existing transmission line upgrades would be permanently removed from long-term productivity, and the same short-term uses (sale and use of timber during the SGP) would occur. Long-term productivity is not anticipated to change under Alternative 3,

because the same treatments and timelines used to re-initiate timber vegetation would be applied during closure and reclamation under all action alternatives.

4.14.6.4 Alternative 4

Mine operations and connected actions would dominate land use, and predominantly prevent timber resources re-growth, on approximately 320 acres of land containing existing timber resources (as detailed in **Table 4.14-3**). The extent and volume of timber resource removal is larger under Alternative 4, as compared to the other action alternatives, because the type and intensity of impacts associated with long-term productivity are greater: under Alternative 4 the ROW associated with the existing transmission line upgrades would be permanently removed from long-term productivity as would additional acreage associated with upgrades to the Yellow Pine Route. The short-term uses (sale and use of timber during the SGP) described under Alternative 1 also would occur under Alternative 4. Per-acre long-term productivity is not anticipated to change under Alternative 4, because the same treatments and timelines used to re-initiate timber vegetation would be applied during closure and reclamation under all action alternatives.

4.14.6.5 Alternative 5

Under Alternative 5, SGP activities related to construction, operations, closure and reclamation of the mine site and associated infrastructure would not be undertaken. Consequently, no change would occur in the extent or volume of timber resources or special forest products in the analysis area, and no impacts to productivity would occur.

4.14.7 Summary

Table 4.14-4 presents a summary of impacts to timber resources by alternative, as described in Section 4.14.2.

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Table 4.14-4 Comparison of Impacts to Timber Resources by Alternative

Issue	Indicator	Baseline Conditions	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
The SGP may change the availability of timber resources, including sawtimber and special forest products.	Volumes of timber resources removed.	Not applicable for baseline conditions (Timber resources throughout the analysis area are currently not planned for removal).	458,730 CF (<i>total</i>) 405,047 CF (<i>Forest Service</i>) 53,684 CF (<i>Other Federal, State and Private Land</i>)	330,974 CF (<i>total</i>) 278,559 CF (<i>Forest Service</i>) 52,416 CF (<i>Other Federal, State and Private Land</i>)	458,318 CF (<i>total</i>) 404,425 CF (<i>Forest Service</i>) 53,893 CF (<i>Other Federal, State and Private Land</i>)	524,023 CF (<i>total</i>) 463,238 CF (<i>Forest Service</i>) 60,785 CF (<i>Other Federal, State and Private Land</i>)	0 CF (<i>total</i>)
	Acres from which timber resources removed.	Not applicable for baseline conditions (Timber resources throughout the analysis area are currently not planned for removal).	392 acres (<i>total</i>) 341 acres (<i>Forest Service</i>) 50 acres (<i>Other Federal, State and Private Timber</i>)	322 acres (<i>total</i>) 273 acres (<i>Forest Service</i>) 49 acres (<i>Other Federal, State and Private Timber</i>)	391 acres (<i>total</i>) 339 acres (<i>Forest Service</i>) 51 acres (<i>Other Federal, State and Private Timber</i>)	501 acres (<i>total</i>) 442 acres (<i>Forest Service</i>) 59 acres (<i>Other Federal, State and Private Timber</i>)	0 acres (<i>total</i>)
	Acres suited for timber production permanently converted to other, non-productive land uses.	Not applicable for baseline conditions (suited timberland is not currently planned for conversion to other, non-productive land uses).	34 acres (<i>BNF</i>) 0 acres (<i>PNF</i>)	34 acres (<i>BNF</i>) 0 acres (<i>PNF</i>)	34 acres (<i>BNF</i>) 0 acres (<i>PNF</i>)	75 acres (<i>BNF</i>) 0 acres (<i>PNF</i>)	0 acres (<i>total</i>)

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