



California Timberlands Division

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Murray Road Joint Timber Management Plan

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A handwritten signature in blue ink that reads 'Craig A. Compton'.

Craig A. Compton

1/28/2022

Date

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Timber Management Guide

1. Current Property Owner

Green Diamond Resource Company
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2. Project Description

California Government Code Section 51119.5 specifies that parcels zoned as Timber Production Zone (TPZ) may not be divided into parcels containing less than 160 acres unless the original owner prepares a Joint Timber Management Plan (JTMP) prepared or approved as to content by a Registered Professional Forester (RPF) for the parcels to be created. Per California Government Code Section 511014(i) "Parcel" means that portion of an Assessor's parcel that is timberland, as defined.

The Murray Road JTMP is being prepared by Green Diamond Resource Company (GDRCo) in conjunction with the submittal of a Lot Line Adjustment (LLA) involving three Assessor parcels, APN 511-111-056, 511-161-005, 510-011-016. The Assessor Parcels are not coincident with the underlying legal parcels (see Figure 1 and Figure 2). A Determination of Status was submitted December 2018 for all legal parcels associated with the LLA, the results of which will be substantiated in Certificates of Subdivision Compliance as follows:

| Certificate of Subdivision Compliance | Assessor Parcel Number | Acreage |
|---------------------------------------|--|---------------|
| TBD | 511-111-056; 511-161-005 (ptn). | 80.26 |
| TBD | 511-161-005 (ptn.); 510-011-016 (ptn.) | 104.2 |
| TBD | 511-161-005 (ptn.) | 80.22 |
| TBD | 510-011-016 (ptn.) | 121.15 |
| Total | | 385.84 |

The affected Assessor Parcels are predominantly zoned TPZ except for an approximately 25.04 acre portion of Assessor parcel 510-011-016 which is zoned Agricultural Exclusive (AE) (Figure 3). The LLA will reconfigure four existing legal parcels, all of which will be divided and contain less than 160 acres of TPZ. The boundaries of the LLA are intended to generally follow and coincide with Murray Road to facilitate access and timber management. The LLA will result in the reconfiguration of four legal parcels, or Management Units, (Figures 4 & 5). The Management Units and corresponding acreage are as follows:

| Management Unit | Acres (TPZ) | Acres (AG) | Total (Acres) |
|-----------------|-------------|------------|---------------|
| 1 | 144.67 | 0 | 144.67 |
| 2 | 65.43 | 0 | 65.43 |
| 3 | 100.35 | 19.87 | 120.22 |
| 4 | 50.34 | 5.17 | 55.52 |
| Total | | | 385.84 |

In accordance with the applicable California Government Code Sections, This JTMP is being submitted to demonstrate it will be possible to manage the resulting substandard TPZ Assessor Parcels, which are being divided and will contain less than 160 acres for ongoing timber production. The core requirements that must be demonstrated are that the parcel be adequately stocked with commercial timber, have road access to the timber stands and that there is a feasible logging system that could be employed to harvest the timber. The components of the JTMP which document the viability of management include the "Timber Management Guide" and the "Timber Management Plan." The Timber Management Guide provides a description of the land and its timber management potential. The Timber Management Plan identifies the access to the parcel and the minimum stocking requirements described in the Forest Practice Rules.

This JTMP assumes that the County Assessor, subsequent to approval of the LLA, will assign Assessor Parcel Numbers (APNs) based upon the County's traditional book and page numbering system, which may or may not coincide with legal parcels due to parcels overlapping Sections and/or Tax Rate Areas.

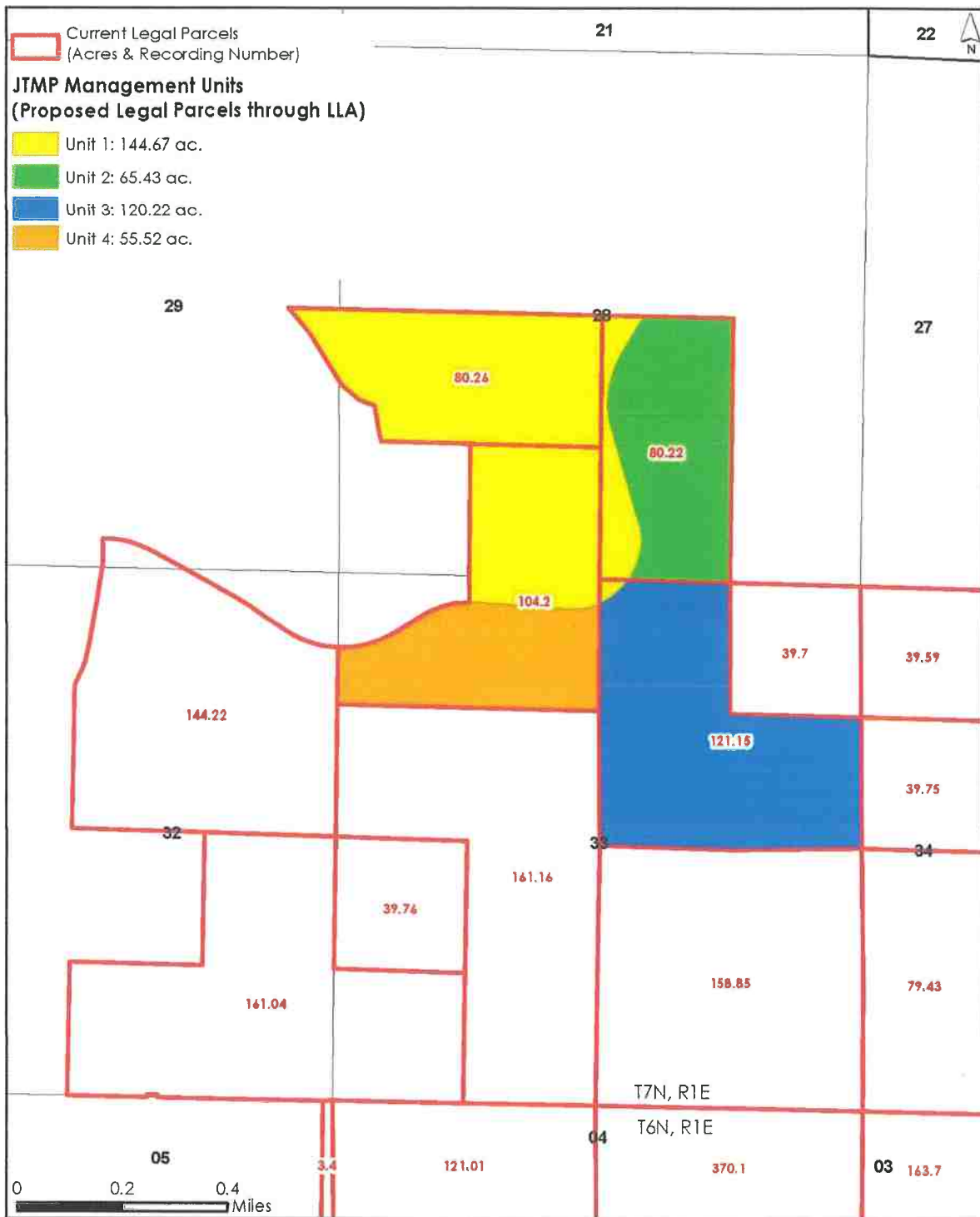
3. Management Objectives

The timber management objectives are to achieve a Maximum Sustained Production of high quality timber products while retaining aesthetic, recreational, watershed, wildlife and fisheries resources. The JTMP area is stocked with conifers and hardwoods and will be managed using a combination of intermediate, uneven-aged, or even-aged regeneration methods. The retention of aesthetic, recreational, watershed, wildlife and fisheries resources shall be accomplished in compliance with the California Forest Practice Rules and Act and other applicable state and federal regulations. The long-term goal for the JTMP is to balance growth and harvest over time to obtain a sustainable periodic return.

Figure 1. Existing Legal Parcels within JTMP



Murray Road JTMP: Legal Parcels & Management Units



Murray Road JTMP

Figure 2. Portion of lands subject to JTMP requirements.

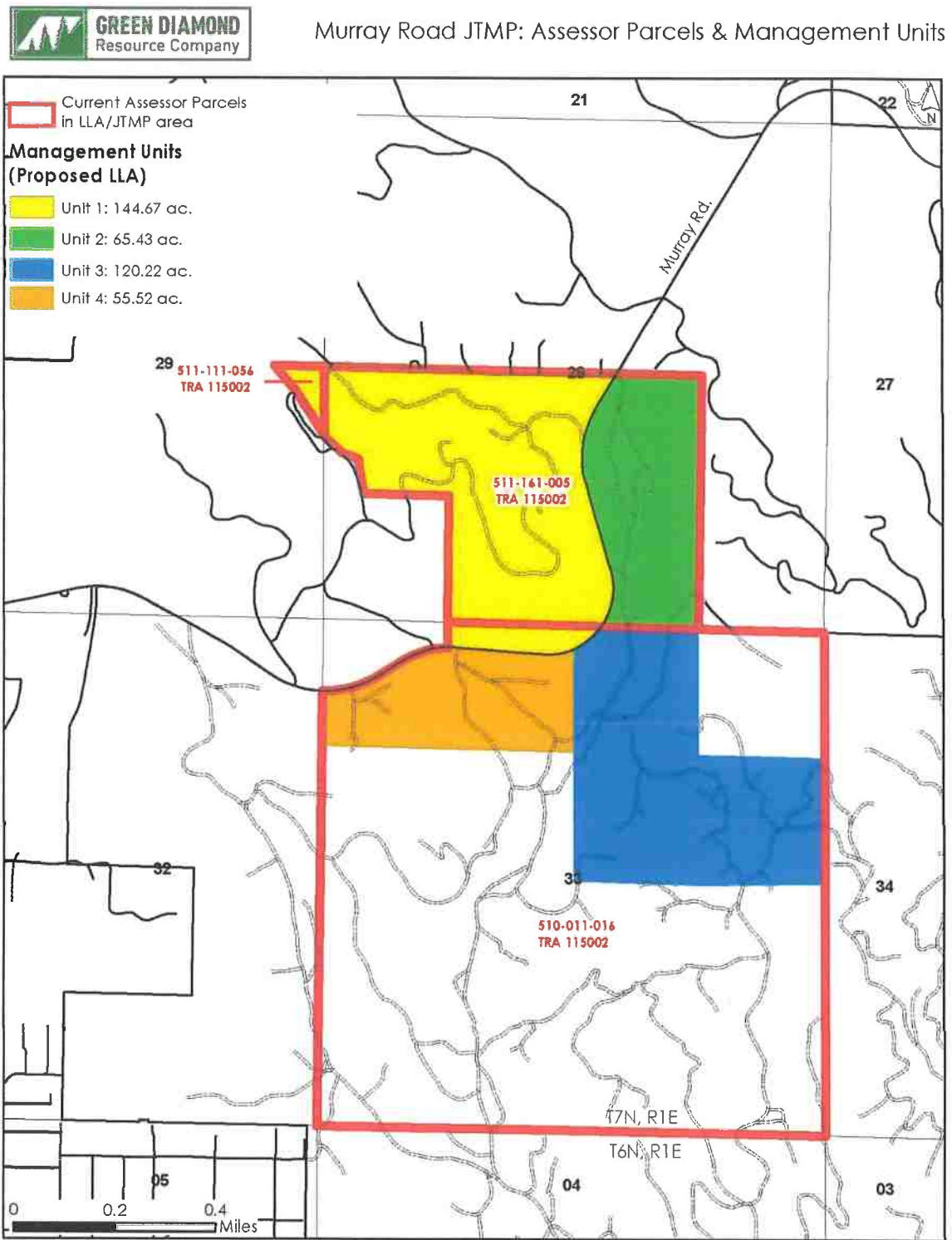
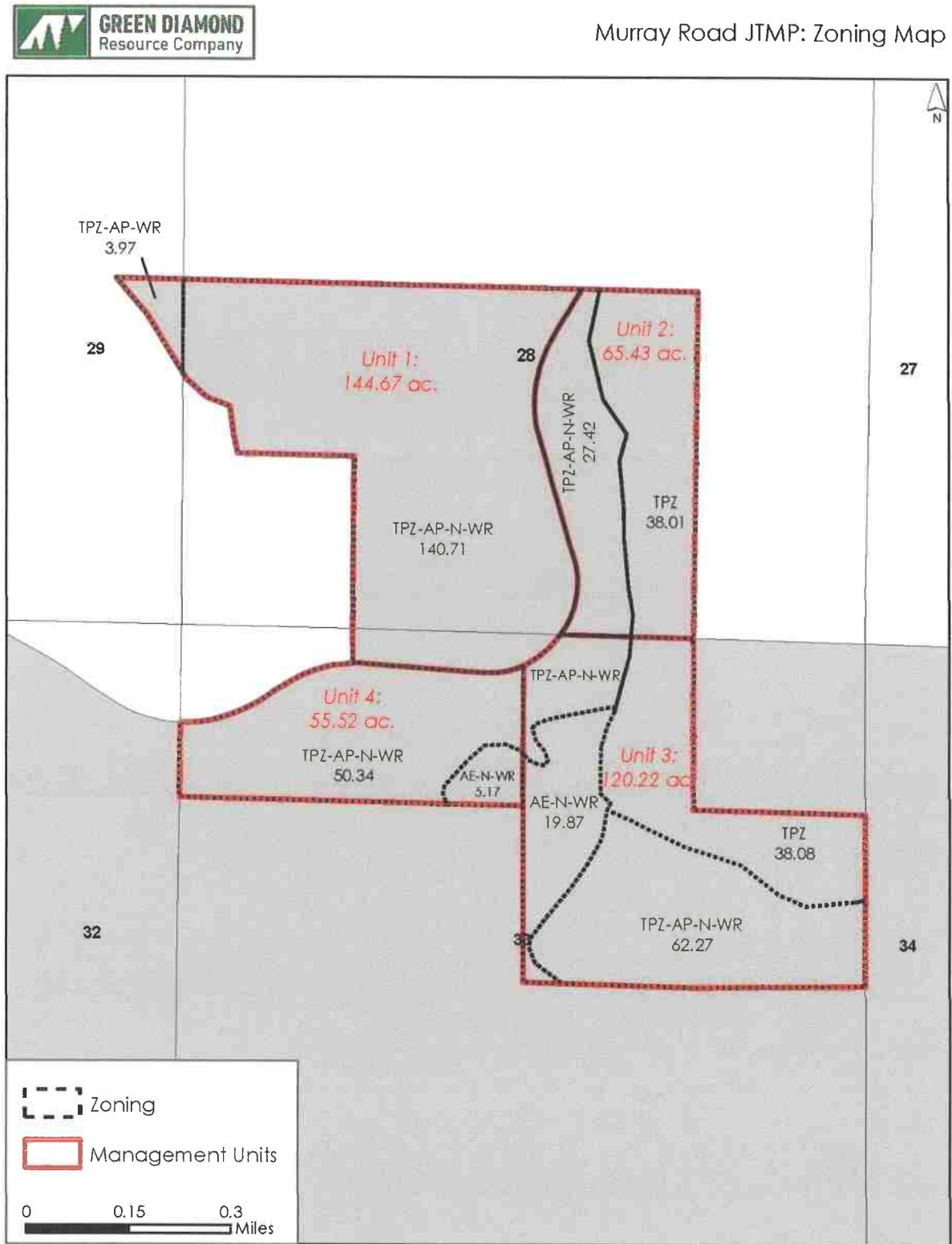
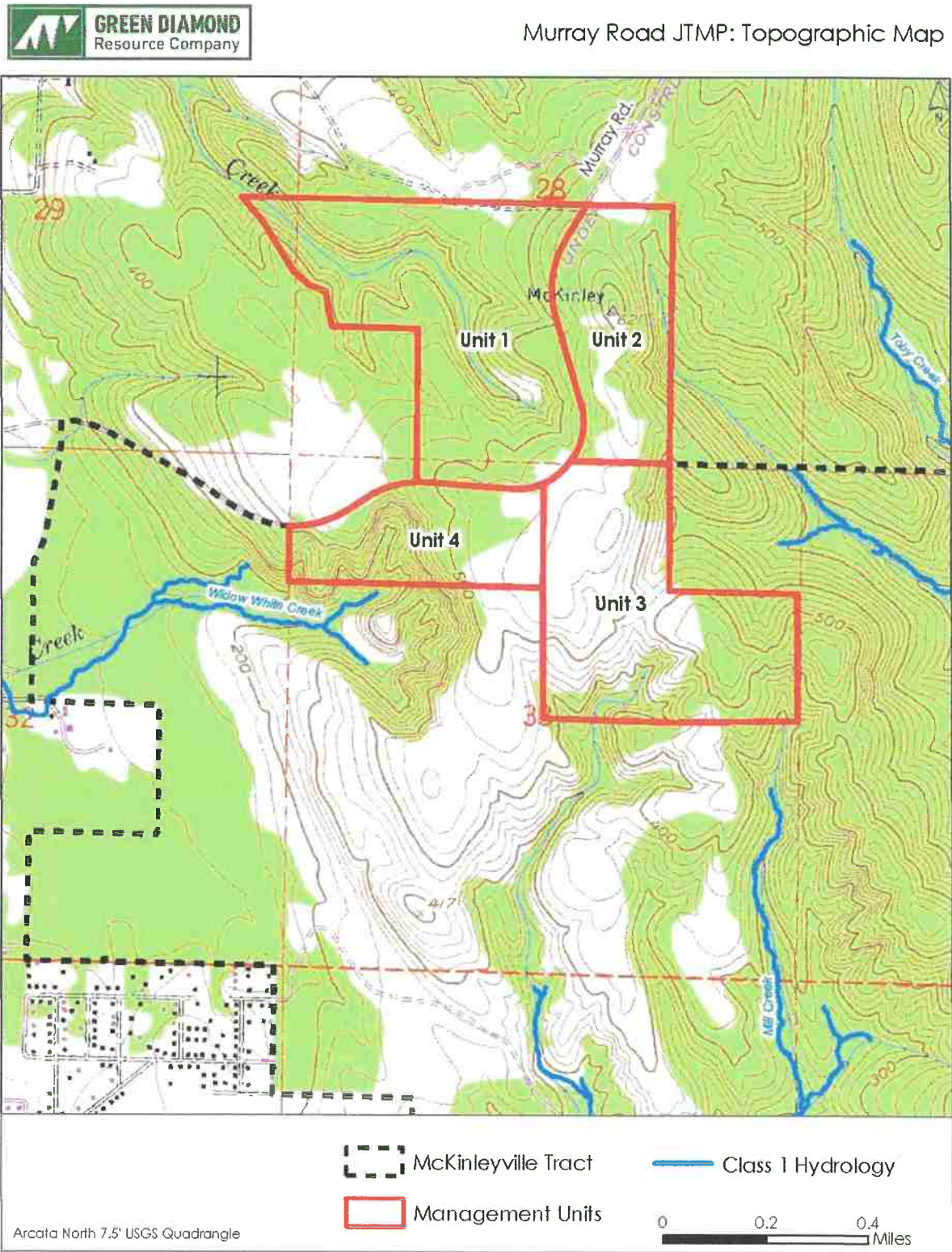


Figure 3. Zoning in JTMP area.



Murray Road JTMP

Figure 4. Topographic map of JTMP area.

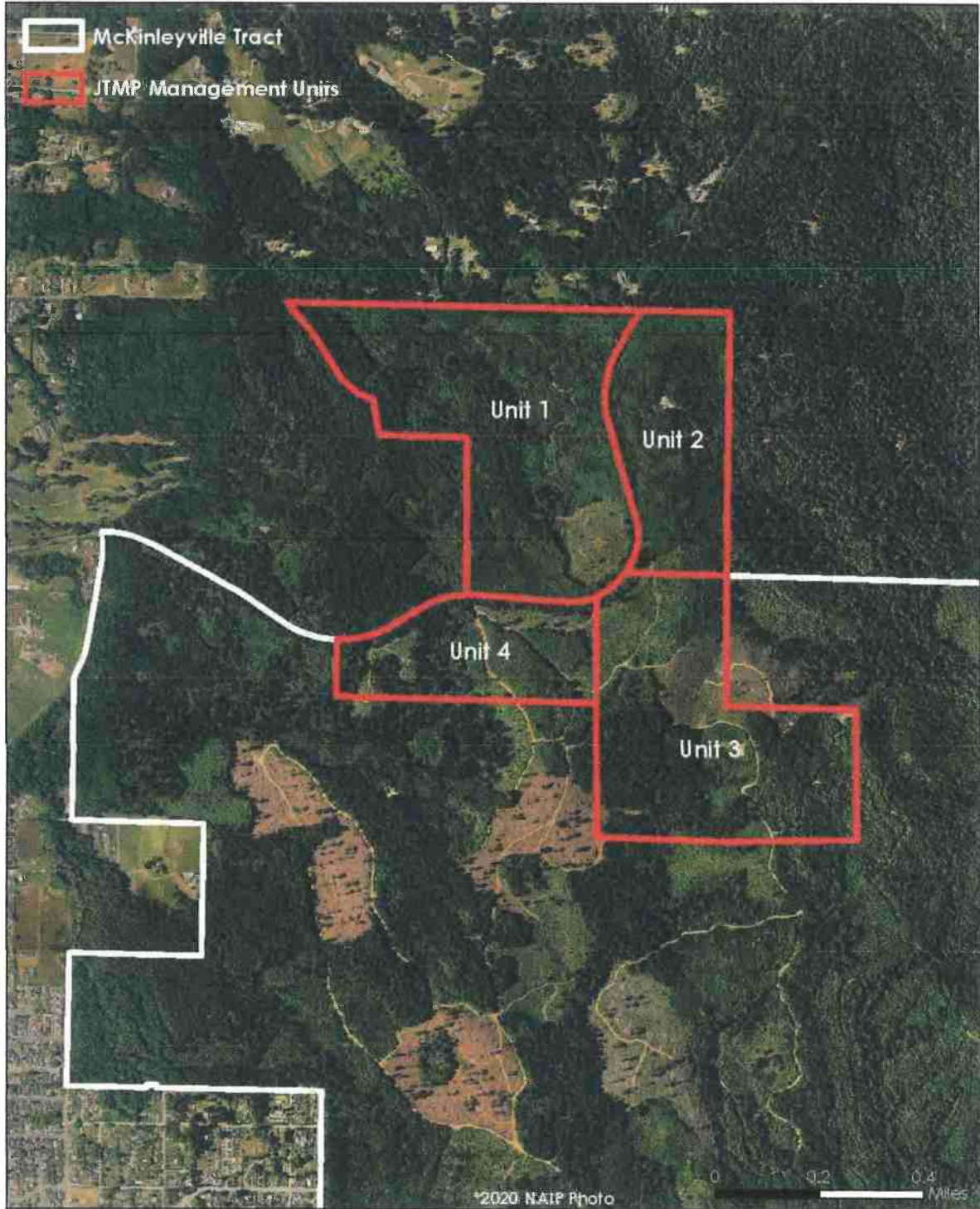


Murray Road JTMP

Figure 5. Aerial Photo of JTMP



Murray Road JTMP: Aerial Photo



4. Legal Description

A detailed legal description developed by a licensed surveyor will be provided following preparation of the final map of the parcels.

5. Location and Access

The JTMP is located between the communities of McKinleyville (to the west) and Fieldbrook (to the east). Access to Management Unit 1, 2, and 4 is from Murray Road, a paved public road, maintained by the County of Humboldt (Figure 6). Access for Management Unit 3 is reliant on access over Management Unit 4 via the M-2000 to the M-2300 Road. The M-2000 & M-2300 Roads are both dirt roads which will require minor upgrades to be used. Any major road upgrades or new road construction should be permitted under a THP/NTMP or will be subject to the Grading Ordinance of Humboldt County. A separate permit must be obtained from the California Department of Fish and Wildlife under their 1600 program for any project that disturbs the bed or banks of a watercourse such as installing/upgrading stream crossings. Completion of the LLA will not change or limit access for ingress and egress or for timber harvesting within any of the JTMP Units.

6. Physical Description

The JTMP is located within the Mad River watershed and contains tributaries to Mad River. Table 6.1 provides a summary of physical characteristics associated with the proposed plan area by Management Unit.

| Management Unit | Slopes | Predominant Aspect | Elevation |
|-----------------|--|--------------------|--------------|
| 1 | predominantly 0-50% | NW | 309-560 feet |
| 2 | predominantly 0-50% | E | 382-627 feet |
| 3 | predominantly 0-50% w/ some areas 51-75% | SE/NW | 327-596 feet |
| 4 | eastern half 0-50% and western half 51-75% | SW | 241-567 feet |

Soils within the JTMP include the Arcata and Candymountain, Lepoil-Candymountain and Lepoil-Espa-Candymountain complexes (Figure 7). The above soil series are developed from sedimentary rocks. The estimated suitability of these soil series for timber production ranges from high to extremely high. Table 6.2 provides a summary of characteristics of soils present within the JTMP (NRCS Web Soil Survey).

Table 6.2

| Soil Series Symbol | Soil Series Name | Depth Range (inches) | Texture of Surface/Subsoil | General Drainage |
|--------------------|-----------------------------------|----------------------|---|------------------|
| 226 | Arcata and Candymountain | 80+ | Loam / sandy loam and fine sandy loam to loamy very fine sand | Well |
| 257 | Lepoil-Candymountain complex | 80+ | Loam to fine sand and fine sandy loam to very fine sand | Well |
| 258 | Lepoil-Espa-Candymountain complex | 80+ | Loam to clay loam and loam to fine sandy loam | Well |

There are two geologic units within the JTMP area (Figure 8). The geology units are described as follows:

Qods – Older dune sands (Late Pleistocene): unconsolidated deposits of fine to coarse-grained sand; generally well vegetated (Kelley, 1984)

QTfa – Falor Formation (Pleistocene and Late Pliocene): Mainly shallow marine sandstone and conglomerate, but upper part may be continental; locally as much as 2460 ft thick and contains abundant molluscan fauna (Manning and Ogle, 1950); contains Huckleberry Ridge ash bed dated at about 2.0 Ma (Sarna-Wojcicki and others, 1991); age range of formation approximately 0.7-2 Ma (Kelsey and Trexler, 1989).

Figure 6. Roads and easements within JTMP area.



Murray Road JTMP: Management Units

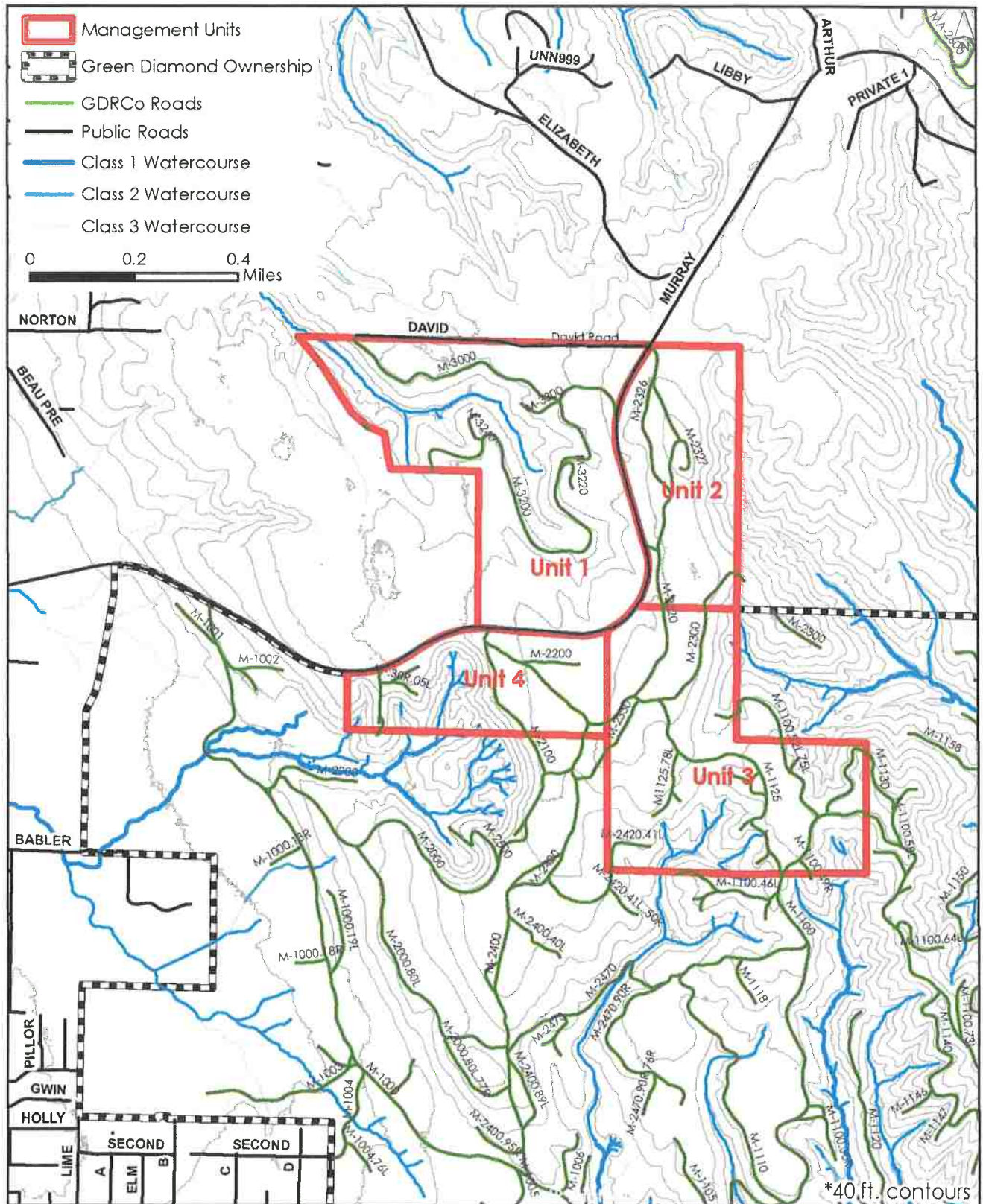


Figure 7. Soil types in the JTMP area (NRCS Web Soil Survey).



Murray Road JTMP: Soils Map

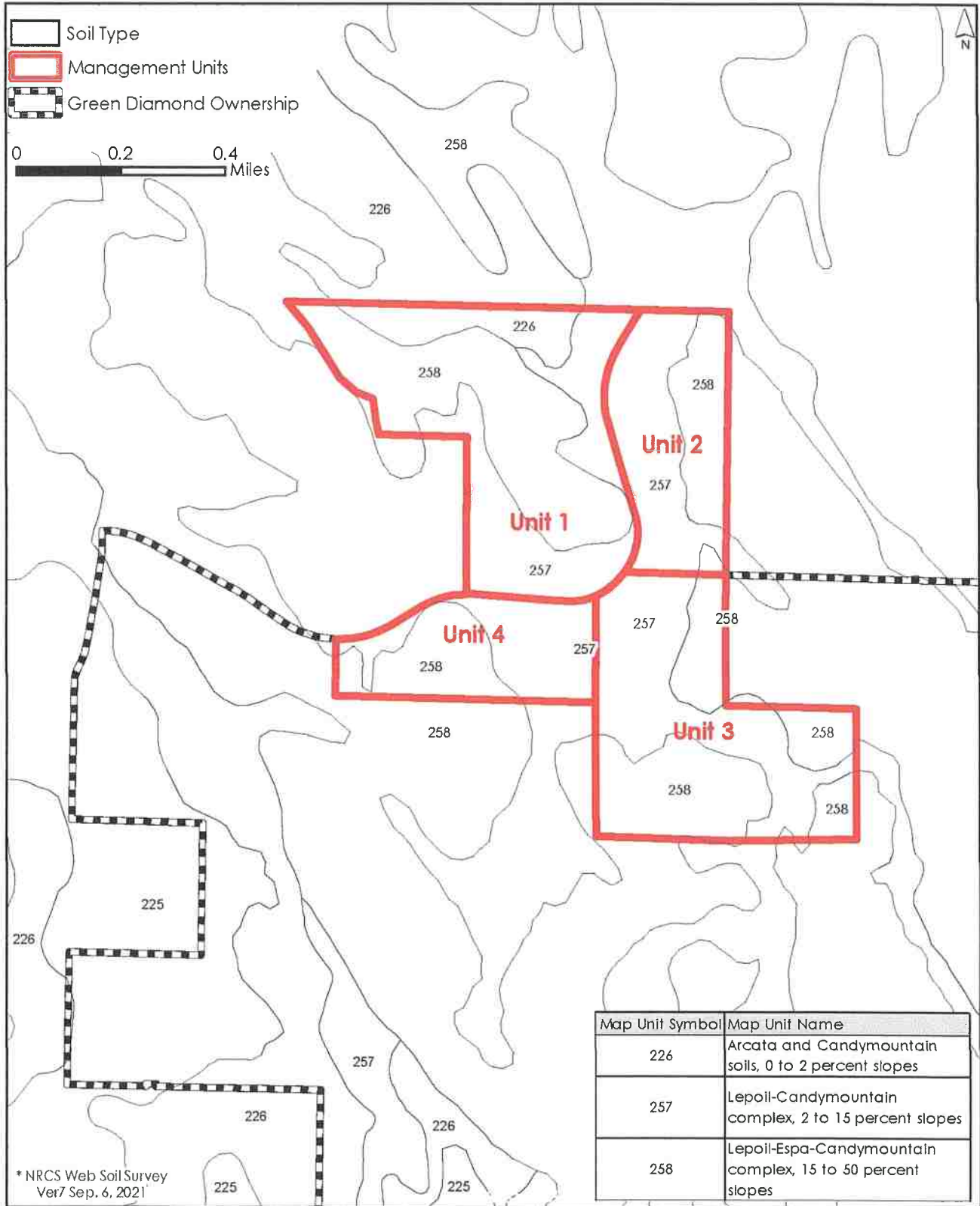
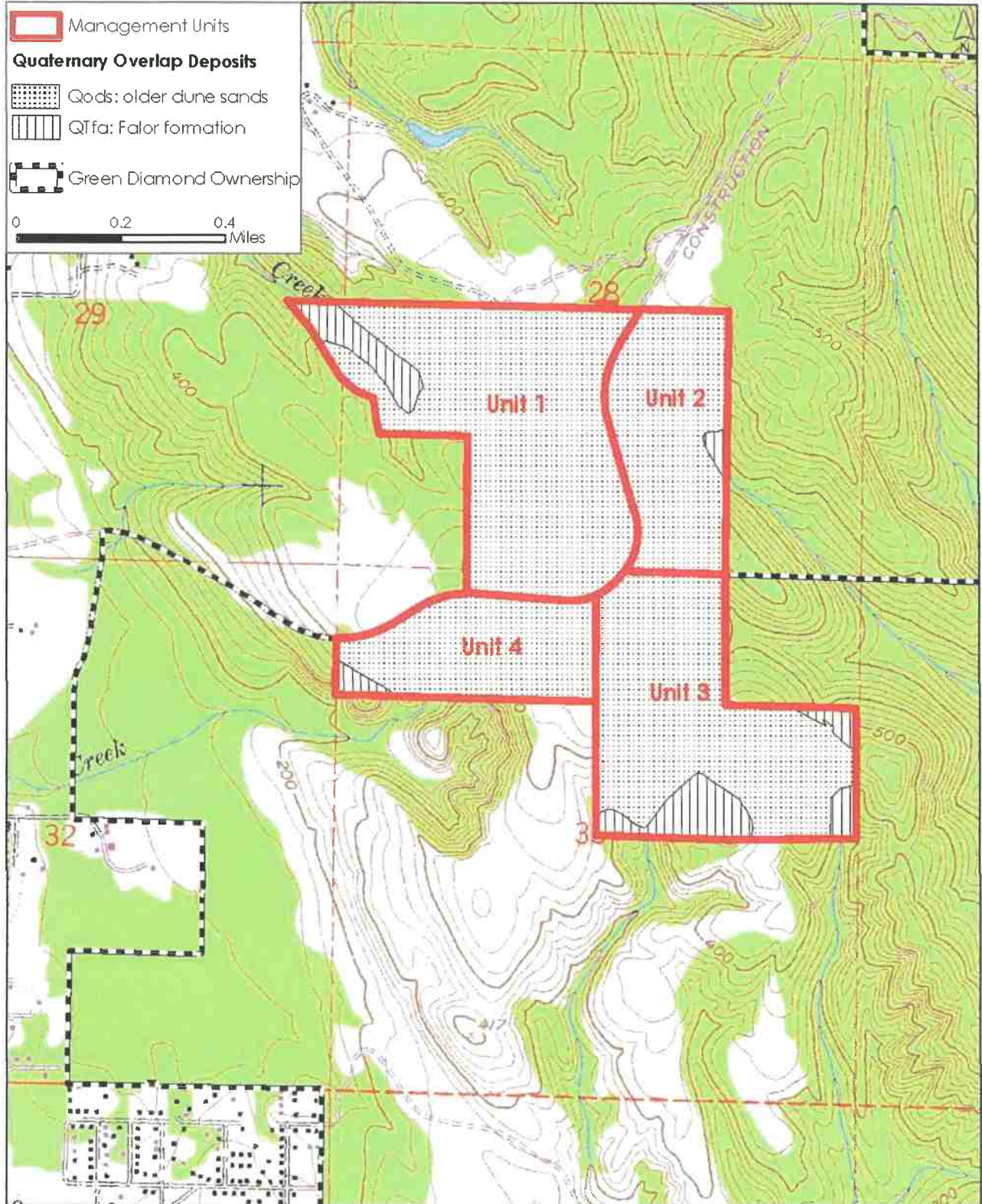


Figure 8. Geologic units in the JTMP area from Kelley (1984).

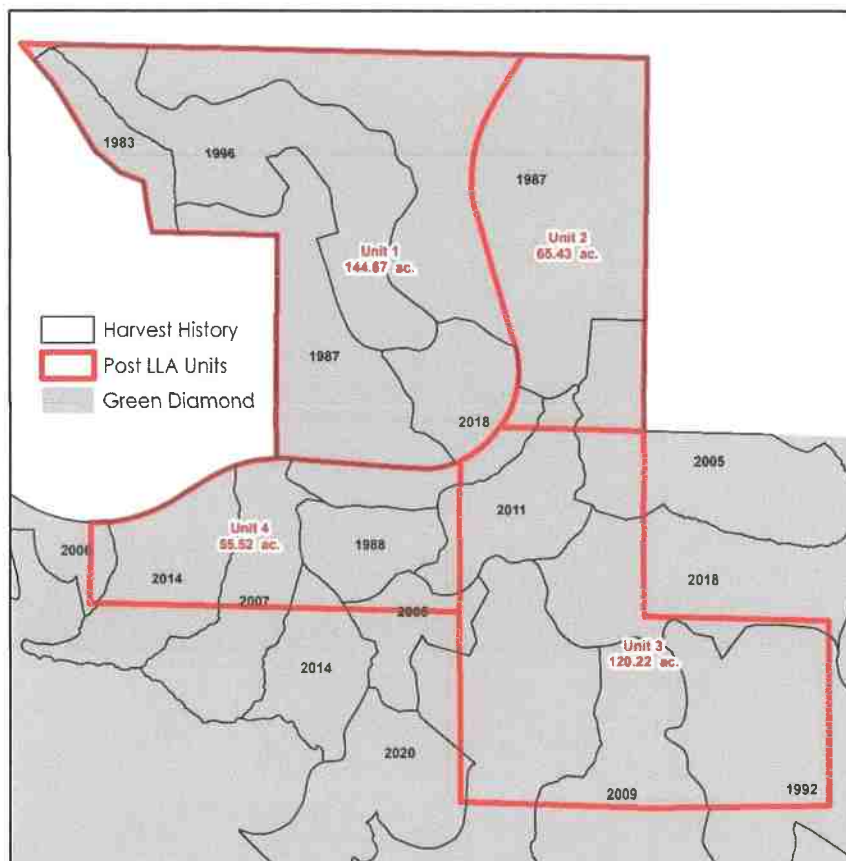


Murray Road JTMP: Geologic Map



7. Timber Harvest History

The majority of the area was originally harvested in the late 1920's and 30's using steam donkeys and through the 1940's using tractor logging methods. Some areas of second-growth timber were clearcut in the late 1980's-mid 90's. More recent harvesting dates provided below.



8. Inventory Cruise Methodology

GDRCo inventory cruising consists of establishing sample plots to measure individual tree parameters such as diameter and height. Plots are generally set on a square grid to ensure proper coverage across a stand. Cruise plot intensity varies depending primarily on stand size and averages approximately one plot per 3 acres. Tree measurements taken on the plot include species, diameter, total height, merchantability, log quality and form. The target number of trees measured per plot is 4 to 8 to ensure a representative sample. The statistical sampling objective is to estimate stand volume to a standard error of 10%.

9. Inventory Volume Calculations and Stand Description

This report relies on data developed by GDRCo as to the current stand conditions for the JTMP area. GDRCo utilizes the Forest Projection and Planning System (FPS), version 7.4.4 from the Forest Biometrics Research Institute (FBRI). Forest Projection and Planning System (FPS) a forest stand-based relational database actively linked to a forest-wide GIS mapping system, developed by the Forest Biometrics Research Institute (FBRI). All parameters for tree volume, weight, biomass and carbon content are provided in a separate, stand-alone, proprietary digital database library.

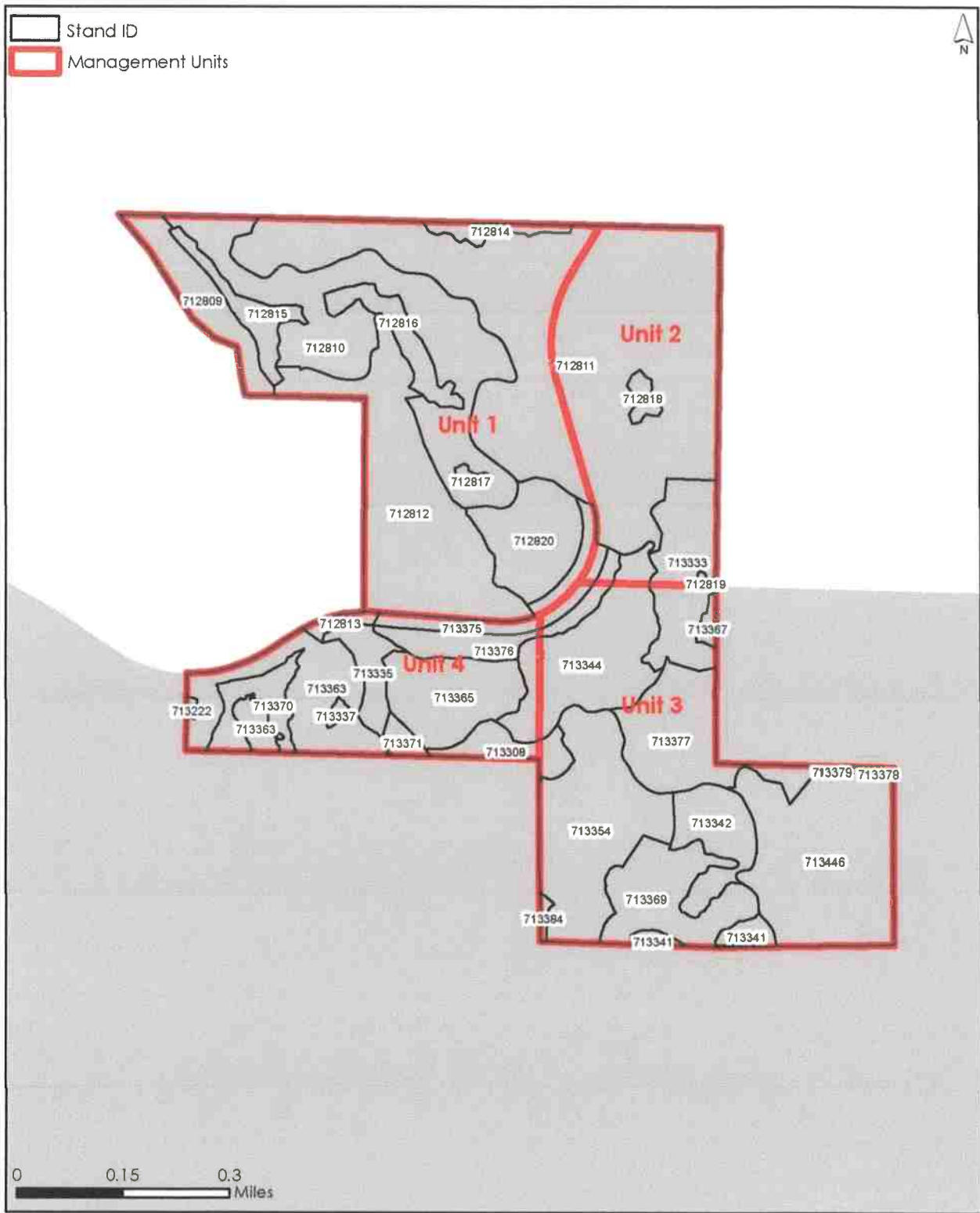
The stand-based inventory provided for Management Units 1-4 were derived from variable radius plots installed in 2015 and then grown forward to January 1, 2021 utilizing FPS. All board foot volumes are reported as net Scribner short log scale. All conifer volumes are reported based on heights from a one-foot stump to a 6-inch diameter inside bark (dib.) Hardwood volumes are based on heights from a one-foot stump to an 8-inch dib top for Alder and 10-inch dib top for other hardwoods. Nominal log length in FPS is 18 feet for redwood and 20 feet for Douglas-fir and other whitewoods to reflect actual utilization standards. Minimum log length is 12 feet.

The JTMP area is 385.84 acres, comprised of 4 Management Units. Management Unit 1 is 144.67 acres and is entirely zoned TPZ. Management Unit 2 is 65.43 acres and is entirely zoned TPZ. Management Unit 3 is 120.22 acres, of which 100.35 acres are zoned TPZ and 19.87 acres are zoned AE. Management Unit 4 is 55.52 acres, of which 50.34 acres is zoned TPZ and 5.17 acres are zoned AE. Regardless of current zoning, Management Units 1-4 are comprised entirely of timberland as defined by the Z'Berg Nejdley Forest Practice Act (PRC 4526) and the California Timberland Productivity Act of 1982 (GCS 51104). As such, the timber stand descriptions and volume summaries are provided for the entirety of Management Units 1-4 (Figure 9).

Figure 9. Stands in the JTMP area



Murray Road JTMP: Stand ID



Management Unit 1

| Stand ID | Avg conifer diameter (inches) QMD | Avg hardwood diameter (inches) QMD | Average conifer ba/acre (sq ft) | Average hardwood ba/acre (sq ft) | Conifer volume/acre (BF) | Hardwood volume/acre (BF) | Total Avg BA | Total Avg TPA | Total acres |
|----------|-----------------------------------|------------------------------------|---------------------------------|----------------------------------|--------------------------|---------------------------|--------------|---------------|-------------|
| 712809 | 9.66 | 10.05 | 234.69 | 26.87 | 27,794.54 | 737.18 | 261.55 | 509.50 | 8.34 |
| 712810 | 8.64 | 5.45 | 136.79 | 39.61 | 9,474.05 | 737.27 | 176.40 | 580.15 | 35.08 |
| 712811 | 8.05 | 9.23 | 161.39 | 96.08 | 11,907.95 | 3,679.58 | 257.47 | 663.48 | 40.87 |
| 712812 | 12.95 | 9.30 | 175.63 | 66.25 | 19,656.01 | 4,041.95 | 241.89 | 332.26 | 33.52 |
| 712814 | 14.11 | 9.05 | 323.34 | 7.59 | 40,201.44 | 0.00 | 330.93 | 314.77 | 2.19 |
| 712815 | 20.03 | 11.97 | 234.26 | 30.51 | 55,853.43 | 2,766.31 | 264.78 | 146.09 | 4.77 |
| 712816 | 20.03 | 11.97 | 234.26 | 30.51 | 55,853.43 | 2,766.31 | 264.78 | 146.09 | 5.30 |
| 712817 | 20.03 | 11.97 | 234.26 | 30.51 | 55,853.43 | 2,766.31 | 264.78 | 146.09 | 0.55 |
| 712820 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 11.72 |
| 713375 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.34 |

144.67

Management Unit 2

| Stand ID | Avg conifer diameter (inches) QMD | Avg hardwood diameter (inches) QMD | Average conifer ba/acre (sq ft) | Average hardwood ba/acre (sq ft) | Conifer volume/acre (BF) | Hardwood volume/acre (BF) | Total Avg BA | Total Avg TPA | Total acres |
|----------|-----------------------------------|------------------------------------|---------------------------------|----------------------------------|--------------------------|---------------------------|--------------|---------------|-------------|
| 712811 | 8.05 | 9.23 | 161.39 | 96.08 | 11,907.95 | 3,679.58 | 257.47 | 663.48 | 53.29 |
| 712818 | 14.11 | 9.05 | 323.34 | 7.59 | 40,201.44 | 0.00 | 330.93 | 314.77 | 1.29 |
| 712819 | 20.03 | 11.97 | 234.26 | 30.51 | 55,853.43 | 2,766.31 | 264.78 | 146.09 | 0.23 |
| 713333 | 4.40 | 0.00 | 22.30 | 0.00 | 0.00 | 0.00 | 22.30 | 210.94 | 7.78 |
| 713344 | 2.29 | 0.00 | 12.06 | 0.00 | 0.00 | 0.00 | 12.06 | 421.60 | 1.47 |
| 713375 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.72 |
| 713376 | 20.05 | 12.07 | 198.48 | 30.99 | 47,392.20 | 2,818.23 | 229.47 | 129.52 | 0.65 |

65.43

Management Unit 3

| Stand ID | Avg conifer diameter (inches) QMD | Avg hardwood diameter (inches) QMD | Average conifer ba/acre (sq ft) | Average hardwood ba/acre (sq ft) | Conifer volume/acre (BF) | Hardwood volume/acre (BF) | Total Avg BA | Total Avg TPA | Total acres |
|----------|-----------------------------------|------------------------------------|---------------------------------|----------------------------------|--------------------------|---------------------------|--------------|---------------|-------------|
| 712819 | 20.03 | 11.97 | 234.26 | 30.51 | 55,853.43 | 2,766.31 | 264.78 | 146.09 | 0.01 |
| 713308 | 3.95 | 5.54 | 17.19 | 4.69 | 0.00 | 0.00 | 21.88 | 230.47 | 1.61 |
| 713333 | 4.40 | 0.00 | 22.30 | 0.00 | 0.00 | 0.00 | 22.30 | 210.94 | 5.66 |
| 713341 | 4.05 | 0.00 | 41.17 | 0.00 | 0.00 | 0.00 | 41.17 | 460.52 | 2.39 |
| 713342 | 4.05 | 0.00 | 41.17 | 0.00 | 0.00 | 0.00 | 41.17 | 460.52 | 8.53 |
| 713344 | 2.29 | 0.00 | 12.06 | 0.00 | 0.00 | 0.00 | 12.06 | 421.60 | 14.99 |
| 713354 | 17.01 | 11.23 | 158.73 | 31.15 | 22,669.83 | 2,635.64 | 189.89 | 145.92 | 24.09 |
| 713367 | 16.28 | 13.13 | 168.19 | 23.15 | 36,289.39 | 1,673.01 | 191.34 | 140.95 | 0.90 |
| 713369 | 24.52 | 14.73 | 199.74 | 34.04 | 49,696.02 | 3,046.75 | 233.78 | 89.69 | 13.47 |
| 713375 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.08 |
| 713376 | 20.05 | 12.07 | 198.48 | 30.99 | 47,392.20 | 2,818.23 | 229.47 | 129.52 | 1.50 |
| 713377 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 15.23 |
| 713378 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.35 |
| 713379 | 16.31 | 13.16 | 142.19 | 23.25 | 30,777.41 | 1,667.39 | 165.44 | 122.67 | 0.17 |
| 713384 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.47 |
| 713446 | 10.32 | 5.47 | 302.20 | 6.97 | 19,706.05 | 0.00 | 309.17 | 563.07 | 29.77 |

120.22**Management Unit 4**

| Stand ID | Avg conifer diameter (inches) QMD | Avg hardwood diameter (inches) QMD | Average conifer ba/acre (sq ft) | Average hardwood ba/acre (sq ft) | Conifer volume/acre (BF) | Hardwood volume/acre (BF) | Total Avg BA | Total Avg TPA | Total acres |
|----------|-----------------------------------|------------------------------------|---------------------------------|----------------------------------|--------------------------|---------------------------|--------------|---------------|-------------|
| 712812 | 12.95 | 9.30 | 175.63 | 66.25 | 19,656.01 | 4,041.95 | 241.89 | 332.26 | 0.00 |
| 712813 | 20.03 | 11.97 | 234.26 | 30.51 | 55,853.43 | 2,766.31 | 264.78 | 146.09 | 1.20 |
| 713222 | 3.67 | 0.00 | 30.29 | 0.00 | 0.00 | 0.00 | 30.29 | 412.22 | 0.27 |
| 713308 | 3.95 | 5.54 | 17.19 | 4.69 | 0.00 | 0.00 | 21.88 | 230.47 | 2.93 |
| 713335 | 4.14 | 0.00 | 16.42 | 0.00 | 0.00 | 0.00 | 16.42 | 175.53 | 4.42 |
| 713337 | 4.20 | 0.00 | 16.80 | 0.00 | 0.00 | 0.00 | 16.80 | 174.94 | 0.46 |
| 713344 | 2.29 | 0.00 | 12.06 | 0.00 | 0.00 | 0.00 | 12.06 | 421.60 | 2.93 |
| 713363 | 19.63 | 8.51 | 159.99 | 52.94 | 29,329.56 | 5,466.65 | 212.93 | 210.13 | 16.78 |
| 713365 | 5.52 | 9.28 | 76.58 | 208.64 | 2,311.43 | 10,741.80 | 285.22 | 904.84 | 12.48 |
| 713370 | 1.79 | 0.00 | 9.44 | 0.00 | 0.00 | 0.00 | 9.44 | 539.77 | 5.33 |
| 713371 | 1.97 | 0.00 | 14.52 | 0.00 | 0.00 | 0.00 | 14.52 | 689.56 | 1.36 |
| 713375 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.86 |
| 713376 | 20.05 | 12.07 | 198.48 | 30.99 | 47,392.20 | 2,818.23 | 229.47 | 129.52 | 4.51 |

55.52

Species composition for Management Units 1, 2, 3 & 4 are as follows:

Management Unit 1

| Stand ID | % Species Composition | | | |
|----------|-----------------------|--------|----------|--------|
| | DF | HWD | Other WW | RW |
| 712809 | 2.662 | 10.272 | 87.066 | 0 |
| 712810 | 39.605 | 22.454 | 37.941 | 0 |
| 712811 | 10.486 | 37.317 | 39.771 | 12.426 |
| 712812 | 3.07 | 27.39 | 60.801 | 8.739 |
| 712814 | 3.245 | 2.293 | 94.462 | 0 |
| 712815 | 30.741 | 11.524 | 57.735 | 0 |
| 712816 | 30.741 | 11.524 | 57.735 | 0 |
| 712817 | 30.741 | 11.524 | 57.735 | 0 |
| 712820 | 0 | 0 | 0 | 0 |
| 713375 | 0 | 0 | 0 | 0 |

Management Unit 2

| Stand ID | % Species Composition | | | |
|----------|-----------------------|--------|----------|--------|
| | DF | HWD | Other WW | RW |
| 712811 | 10.486 | 37.317 | 39.771 | 12.426 |
| 712818 | 3.245 | 2.293 | 94.462 | 0 |
| 712819 | 30.741 | 11.524 | 57.735 | 0 |
| 713333 | 11.313 | 0 | 7.921 | 80.766 |
| 713344 | 26.521 | 0 | 5.637 | 67.843 |
| 713375 | 0 | 0 | 0 | 0 |
| 713376 | 30.074 | 13.505 | 56.421 | 0 |

Management Unit 3

| Stand ID | % Species Composition | | | |
|----------|-----------------------|--------|----------|--------|
| | DF | HWD | Other WW | RW |
| 712819 | 30.741 | 11.524 | 57.735 | 0 |
| 713308 | 27.005 | 21.443 | 4.532 | 47.02 |
| 713333 | 11.313 | 0 | 7.921 | 80.766 |
| 713341 | 0 | 0 | 22.884 | 77.116 |
| 713342 | 0 | 0 | 22.884 | 77.116 |
| 713344 | 26.521 | 0 | 5.637 | 67.843 |
| 713354 | 50.491 | 16.407 | 16.439 | 16.663 |
| 713367 | 8.616 | 12.099 | 57.212 | 22.074 |
| 713369 | 33.587 | 14.562 | 51.852 | 0 |
| 713375 | 0 | 0 | 0 | 0 |
| 713376 | 30.074 | 13.505 | 56.421 | 0 |
| 713377 | 0 | 0 | 0 | 0 |
| 713378 | 0 | 0 | 0 | 0 |
| 713379 | 8.432 | 14.052 | 55.89 | 21.626 |
| 713384 | 0 | 0 | 0 | 0 |
| 713446 | 18.877 | 2.255 | 3.993 | 74.876 |

Management Unit 4

| Stand ID | % Species Composition | | | |
|----------|-----------------------|--------|----------|--------|
| | DF | HWD | Other WW | RW |
| 712812 | 3.07 | 27.39 | 60.801 | 8.739 |
| 712813 | 30.741 | 11.524 | 57.735 | 0 |
| 713222 | 16.025 | 0 | 12.204 | 71.77 |
| 713308 | 27.005 | 21.443 | 4.532 | 47.02 |
| 713335 | 28.065 | 0 | 0 | 71.935 |
| 713337 | 28.274 | 0 | 0 | 71.726 |
| 713344 | 26.521 | 0 | 5.637 | 67.843 |
| 713363 | 39.271 | 24.862 | 30.236 | 5.631 |
| 713365 | 2.149 | 73.151 | 24.701 | 0 |
| 713370 | 0 | 0 | 0 | 100 |
| 713371 | 0 | 0 | 0 | 100 |
| 713375 | 0 | 0 | 0 | 0 |
| 713376 | 30.074 | 13.505 | 56.421 | 0 |

10. Growth and Yield

Growth is projected with the Forest Projection System (FPS 7.4.4, FBRI) using a proprietary Northern California Library. For all stand polygons for which there is inventory cruise data the volume is computed by the Forest Projection System (FPS 7.4.4, FBRI) and grown to the current year. Volumes provided are for conifers > 12" dbh to a 6 inch top.

Management Unit 1

| Year | CoverID | Total MBF Volume | BF Vol/Acre | Acres |
|------|---------|------------------|-------------|-------|
| 2022 | 712809 | 196.17 | 23521.36 | 8.34 |
| | 712810 | 190.70 | 5435.56 | 35.08 |
| | 712811 | 483.43 | 11829.10 | 40.87 |
| | 712812 | 739.30 | 22056.47 | 33.52 |
| | 712814 | 80.45 | 36801.65 | 2.19 |
| | 712815 | 284.41 | 59651.62 | 4.77 |
| | 712816 | 316.17 | 59651.62 | 5.30 |
| | 712817 | 32.71 | 59651.62 | 0.55 |
| | 712820 | 0.00 | 0.00 | 11.72 |
| | 713375 | 0.00 | 0.00 | 2.34 |
| 2032 | 712809 | 268.13 | 32150.11 | 8.34 |
| | 712810 | 550.85 | 15700.64 | 35.08 |
| | 712811 | 1109.21 | 27141.59 | 40.87 |
| | 712812 | 1594.68 | 47575.91 | 33.52 |
| | 712814 | 93.85 | 42932.59 | 2.19 |
| | 712815 | 318.84 | 66873.46 | 4.77 |
| | 712816 | 354.45 | 66873.46 | 5.30 |
| | 712817 | 36.67 | 66873.46 | 0.55 |
| | 712820 | 0 | 0 | 11.72 |
| | 713375 | 0 | 0 | 2.34 |
| 2042 | 712809 | 345.65 | 41445.16 | 8.34 |
| | 712810 | 887.19 | 25287.21 | 35.08 |
| | 712811 | 1831.78 | 44822.19 | 40.87 |
| | 712812 | 2261.24 | 67462.14 | 33.52 |
| | 712814 | 108.92 | 49825.38 | 2.19 |
| | 712815 | 376.61 | 78989.59 | 4.77 |
| | 712816 | 418.67 | 78989.59 | 5.30 |
| | 712817 | 43.31 | 78989.59 | 0.55 |
| | 712820 | 0 | 0 | 11.72 |
| | 713375 | 0 | 0 | 2.34 |
| 2052 | 712809 | 432.94 | 51911.58 | 8.34 |
| | 712810 | 1233.97 | 35171.34 | 35.08 |
| | 712811 | 2333.29 | 57093.79 | 40.87 |
| | 712812 | 2871.35 | 85664.34 | 33.52 |
| | 712814 | 125.03 | 57196.66 | 2.19 |
| | 712815 | 449.44 | 94265.36 | 4.77 |
| | 712816 | 499.64 | 94265.36 | 5.30 |
| | 712817 | 51.68 | 94265.36 | 0.55 |
| | 712820 | 0 | 0 | 11.72 |
| | 713375 | 0 | 0 | 2.34 |

Management Unit 2

| Year | CoverID | Total MBF Volume | BF Vol/Acre | Acres |
|--------|---------|------------------|-------------|-------|
| 2022 | 712811 | 630.33 | 11829.1 | 53.29 |
| | 712818 | 47.46 | 36801.65 | 1.29 |
| | 712819 | 13.68 | 59651.62 | 0.23 |
| | 713333 | 0 | 0 | 7.78 |
| | 713344 | 0 | 0 | 1.47 |
| | 713375 | 0 | 0 | 0.72 |
| | 713376 | 33.44 | 51148.52 | 0.65 |
| 2032 | 712811 | 1446.28 | 27141.59 | 53.29 |
| | 712818 | 55.37 | 42932.59 | 1.29 |
| | 712819 | 15.33 | 66873.46 | 0.23 |
| | 713333 | 0 | 0 | 7.78 |
| | 713344 | 0 | 0 | 1.47 |
| | 713375 | 0 | 0 | 0.72 |
| | 713376 | 38.73 | 59232.89 | 0.65 |
| 2042 | 712811 | 2388.41 | 44822.19 | 53.29 |
| | 712818 | 64.26 | 49825.38 | 1.29 |
| | 712819 | 18.11 | 78989.59 | 0.23 |
| | 713333 | 0.59 | 75.39 | 7.78 |
| | 713344 | 20.49 | 13895.16 | 1.47 |
| | 713375 | 0 | 0 | 0.72 |
| 2052 | 712811 | 3042.32 | 57093.79 | 53.29 |
| | 712818 | 73.76 | 57196.66 | 1.29 |
| | 712819 | 21.61 | 94265.36 | 0.23 |
| | 713333 | 48.44 | 6226.3 | 7.78 |
| | 713344 | 58.44 | 39620.5 | 1.47 |
| | 713375 | 0 | 0 | 0.72 |
| 713376 | 54.46 | 83303.95 | 0.65 | |

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Management Unit 3

| Year | CoverID | Total MBF Volume | BF Vol/Acre | Acres |
|------|---------|------------------|-------------|-------|
| 2022 | 712819 | 0.44 | 59651.62 | 0.01 |
| | 713308 | 0 | 0 | 1.61 |
| | 713333 | 0 | 0 | 5.66 |
| | 713341 | 0 | 0 | 2.39 |
| | 713342 | 0 | 0 | 8.53 |
| | 713344 | 0 | 0 | 14.99 |
| | 713354 | 609.13 | 25283.6 | 24.09 |
| | 713367 | 34.68 | 38513.46 | 0.90 |
| | 713369 | 713.62 | 52959.91 | 13.47 |
| | 713375 | 0 | 0 | 1.08 |
| | 713376 | 76.77 | 51148.52 | 1.50 |
| | 713377 | 0 | 0 | 15.23 |
| | 713378 | 0 | 0 | 0.35 |
| | 713379 | 5.63 | 32836.52 | 0.17 |
| | 713384 | 0 | 0 | 0.47 |
| | 713446 | 530.6 | 17823.99 | 29.77 |
| 2032 | 712819 | 0.5 | 66873.46 | 0.01 |
| | 713308 | 0 | 0 | 1.61 |
| | 713333 | 0 | 0 | 5.66 |
| | 713341 | 0 | 0 | 2.39 |
| | 713342 | 0 | 0 | 8.53 |
| | 713344 | 0 | 0 | 14.99 |
| | 713354 | 953.29 | 39569.09 | 24.09 |
| | 713367 | 39.2 | 43531.16 | 0.90 |
| | 713369 | 800.84 | 59433.15 | 13.47 |
| | 713375 | 0 | 0 | 1.08 |
| | 713376 | 88.9 | 59232.89 | 1.50 |
| | 713377 | 0 | 0 | 15.23 |
| | 713378 | 0 | 0 | 0.35 |
| | 713379 | 6.41 | 37382.42 | 0.17 |
| | 713384 | 0 | 0 | 0.47 |
| | 713446 | 933.86 | 31370.46 | 29.77 |
| 2042 | 712819 | 0.59 | 78989.59 | 0.01 |
| | 713308 | 22.96 | 14270.63 | 1.61 |
| | 713333 | 0.43 | 75.39 | 5.66 |
| | 713341 | 53.38 | 22312.32 | 2.39 |
| | 713342 | 190.27 | 22312.32 | 8.53 |
| | 713344 | 208.24 | 13895.16 | 14.99 |
| | 713354 | 1226.11 | 50893.34 | 24.09 |
| | 713367 | 44.18 | 49062.39 | 0.90 |
| | 713369 | 891.55 | 66165.31 | 13.47 |
| | 713375 | 0 | 0 | 1.08 |
| | 713376 | 106.93 | 71245.23 | 1.50 |
| | 713377 | 0 | 0 | 15.23 |
| | 713378 | 0 | 0 | 0.35 |
| | 713379 | 7.19 | 41958.14 | 0.17 |
| | 713384 | 0 | 0 | 0.47 |
| | 713446 | 1236.09 | 41523.08 | 29.77 |
| 2052 | 712819 | 0.7 | 94265.36 | 0.01 |
| | 713308 | 50.83 | 31594.38 | 1.61 |
| | 713333 | 35.26 | 6226.3 | 5.66 |
| | 713341 | 91.25 | 38139.51 | 2.39 |
| | 713342 | 325.24 | 38139.51 | 8.53 |
| | 713344 | 593.78 | 39620.5 | 14.99 |
| | 713354 | 1456.92 | 60473.67 | 24.09 |
| | 713367 | 50.87 | 56491.22 | 0.90 |
| | 713369 | 975.88 | 72423.56 | 13.47 |
| | 713375 | 0 | 0 | 1.08 |
| | 713376 | 125.03 | 83303.95 | 1.50 |
| | 713377 | 0 | 0 | 15.23 |
| | 713378 | 0 | 0 | 0.35 |
| | 713379 | 8.36 | 48766.33 | 0.17 |
| | 713384 | 0 | 0 | 0.47 |
| | 713446 | 1558.91 | 52367.2 | 29.77 |

Management Unit 4

| Year | CoverID | Total MBF Volume | BF Vol/Acre | Acres |
|--------|---------|------------------|-------------|-------|
| 2022 | 712812 | 0.01 | 22056.47 | 0.00 |
| | 712813 | 71.31 | 59651.62 | 1.20 |
| | 713222 | 0 | 0 | 0.27 |
| | 713308 | 0 | 0 | 2.93 |
| | 713335 | 0 | 0 | 4.42 |
| | 713337 | 0 | 0 | 0.46 |
| | 713344 | 0 | 0 | 2.93 |
| | 713363 | 590.27 | 35175.4 | 16.78 |
| | 713365 | 126.53 | 10137.29 | 12.48 |
| | 713370 | 0 | 0 | 5.33 |
| | 713371 | 0 | 0 | 1.36 |
| | 713375 | 0 | 0 | 2.86 |
| 2032 | 712812 | 0.01 | 47575.91 | 0.00 |
| | 712813 | 79.94 | 66873.46 | 1.20 |
| | 713222 | 0.36 | 1352.89 | 0.27 |
| | 713308 | 0 | 0 | 2.93 |
| | 713335 | 0 | 0 | 4.42 |
| | 713337 | 0 | 0 | 0.46 |
| | 713344 | 0 | 0 | 2.93 |
| | 713363 | 864.28 | 51504.35 | 16.78 |
| | 713365 | 317.8 | 25460.87 | 12.48 |
| | 713370 | 0 | 0 | 5.33 |
| | 713371 | 0 | 0 | 1.36 |
| | 713375 | 0 | 0 | 2.86 |
| 2042 | 712812 | 0.02 | 67462.14 | 0.00 |
| | 712813 | 94.43 | 78989.59 | 1.20 |
| | 713222 | 2.99 | 11227.15 | 0.27 |
| | 713308 | 41.81 | 14270.63 | 2.93 |
| | 713335 | 73.17 | 16565.35 | 4.42 |
| | 713337 | 8.06 | 17681.72 | 0.46 |
| | 713344 | 40.64 | 13895.16 | 2.93 |
| | 713363 | 1111.33 | 66226.89 | 16.78 |
| | 713365 | 443.56 | 35536.07 | 12.48 |
| | 713370 | 0 | 0 | 5.33 |
| | 713371 | 0 | 0 | 1.36 |
| | 713375 | 0 | 0 | 2.86 |
| 2052 | 712812 | 0.02 | 85664.34 | 0.00 |
| | 712813 | 112.69 | 94265.36 | 1.20 |
| | 713222 | 5.96 | 22407.83 | 0.27 |
| | 713308 | 92.57 | 31594.38 | 2.93 |
| | 713335 | 137.22 | 31067.13 | 4.42 |
| | 713337 | 13.3 | 29173.69 | 0.46 |
| | 713344 | 115.89 | 39620.5 | 2.93 |
| | 713363 | 1358.92 | 80981.07 | 16.78 |
| | 713365 | 572.68 | 45880.09 | 12.48 |
| | 713370 | 0 | 0 | 5.33 |
| | 713371 | 0 | 0 | 1.36 |
| | 713375 | 0 | 0 | 2.86 |
| 713376 | 375.97 | 83303.95 | 4.51 | |

11. Harvest Methods

Management Unit 1, 2, 3 and 4 may be harvested using a combination of ground-based tractor and cable logging systems. The area was previously tractor logged and the existing network of skid trails may be re-used to the extent allowable under the current Forest Practice Rules.

12. Silvicultural Recommendations

A system of silviculture will need to be developed which meets the landowner's management objectives, is compatible with adjacent land uses and is legal under the Forest Practice Rules. There are two basic types of silvicultural systems; even-aged and uneven-aged. Even-aged systems rely on a growing a single cohort of trees up to a final "regeneration" harvest at some point (usually 50-80 years of age) when most trees are removed and a new cohort of trees is planted. Uneven-aged systems rely on repeated entries where a portion of the trees are removed and new cohorts of trees are recruited at each entry such that the stands have trees of many different age classes.

13. Conservation and Protection Measures

Erosion Control

The JTMP area is within the Mill Creek, Mother Creek, and two unnamed planning watersheds. Named tributaries that the JTMP area drains into include Strawberry Creek, Norton Creek, Widow White Creek, Mill Creek, and Toby Creek. All of these creeks with the exception of Strawberry Creek are tributaries to the Mad River. The North Coast Regional Water Quality Control Board (NCRWQCB) and the U.S Environmental Protection Agency (EPA) have listed the Mad River Hydrologic Unit (HU) as impaired under section 303(d) of the Federal Clean Water Act due to sedimentation/siltation, water temperature and turbidity. The Mad River HU is also listed for aluminum but the listing only applies to the mainstem Mad River water body which is downstream of the JTMP area. Norton Creek of the Mad River HU is also listed as impaired under section 303(d) due to indicator bacteria; however, the listing applies only to the mainstem of Widow White Creek which is also downstream of the JTMP area. The U.S. EPA developed and established the Mad River Total Maximum Daily Loads (TMDL) for sedimentation/siltation and turbidity in 2007. The development of the Mad River TMDLs for temperature and aluminum are scheduled for 2031. The development of the Norton Creek TMDL for indicator bacteria is also scheduled for 2031. In order to harvest timber in a TMDL listed watershed a "waste discharge requirement" (WDR) or a "waiver" of WDR must be submitted to the NCRWQCB prior to timber harvest. This is essentially a permit identifying sediment sources, proposed treatments and a timeline for implementing the treatments.

The state Forest Practice Rules and the RWQCB regulations are largely intended to protect water quality. Resource protection is an integral part of any long-term management scenario because of the potential impacts that timber harvest and heavy equipment operation can have on site productivity and the downstream beneficial uses of water. The main beneficial uses of water in the area include: domestic and agricultural water supplies, fish migration, spawning and rearing, and other wildlife habitat. The crux of resource conservation is to keep soil in the forest for long-term site productivity and prevent it from being transported downhill into the aquatic system. Since the primary continuing source of sediment transport is known to be roads and skid trails, they need to be properly maintained if in use or abandoned if no longer in use. Proper road design and maintenance are keys to watershed protection. Through careful planning and management, it is possible to minimize environmental risks.

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It does not appear that many new roads will need to be constructed due to the density of existing roads and skid trails. Most skid trails that will need to be used for management access in the upslope areas already exist from previous harvesting.

CAL FIRE has strict authority to enforce the Forest Practice Rules in relation to management activities involving the removal of forest products including road use and reconstruction. The California Department of Fish & Wildlife has regulations and permitting requirements pertaining to any work on watercourse crossings – even if not part of a timber harvesting plan. The North Coast Regional Water Quality Control Board will regulate waste discharge (i.e. sediment) into the aquatic system.

The landowners should continue to improve upon and maintain existing erosion control features on all roads, trails, and landings, including waterbars, culverted crossings, cross drains, and inside ditches. Monitoring and maintenance during the winter period is essential. All erosion control structures should be checked each year before the beginning of the rainy season and periodically throughout the winter, in particular before and after storm events.

General erosion control guidelines for the continued maintenance and improvement of the road system are as follows:

- Outslope roads wherever feasible in order to reduce longterm maintenance and improve the quality of runoff water.
- Grade and install rocked, rolling dips on low gradient sections of main haul roads.
- Place rocked, rolling dips downhill from all existing and newly installed culverts whenever feasible.
- Do not operate heavy equipment off of roads and trails or near springs or watercourses.
- Abandon skid trails and prohibit vehicular use after forestry operations are complete.

Fish & Wildlife

The species which have received the most attention recently due to their declining populations are the northern spotted owl, marbled murrelet, and anadromous fish in general. There are certainly other terrestrial and aquatic species as well which have suffered more quietly from a reduction in habitat. Some of the elements to consider when assessing the habitat value for these species include: the presence of snags, dens, and nest trees; levels of large woody debris in the forest and in creek zones; the amount of sediment input to streams; the size and depth of pools and riffles for fish spawning and rearing; and water temperature in fish bearing streams and tributaries.

Even though most of the species that utilize the land either now or in the future will never be seen or measured, that does not mean they are not there. It is not practical to carry out species specific surveys in most cases, but by implementing management which retains important habitat features and protects sensitive areas such as stream zones, it may be assumed that the needs of most wildlife species will be met.

To achieve these goals the following management practices should be used:

- Retain all snags unless marked as a hazard by the RPF or his supervised designee.
- Mark Legacy or Wildlife trees for snag recruitment and to eventually become downed woody debris; on average 2-4 dominant trees per acre.

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- Existing downed logs and cull logs produced during timber operations should be left in the woods for coarse woody debris recruitment wherever possible, except when utilized for firewood or building. Some fuel modification will be necessary to reduce fire hazard.
- All logs in stream zones should be retained. Management will provide for a continuous supply of coniferous coarse woody material to improve, maintain and restore vital stream functions, including salmonid habitat structure and bank stability.
- Retain all nest trees.
- Near-stream vegetation in tributaries should be maintained at a high level as determined by the RPF.
- No operation of heavy equipment within any stream zones except at prepared truck or tractor road crossings, in order to further safeguard against sediment and mass wasting effects on aquatic habitat.
- Log and rock hauling and skidding operations should cease before turbid water may flow across the road surface or in a roadside ditch which has the ability to enter a watercourse.
- Rock watercourse crossings whenever possible.

Northwest coastal redwood forests can support a high abundance of wildlife species. Fish include coho salmon, Chinook salmon, coastal cutthroat trout and steelhead trout. Bird species typical of this habitat include northern spotted owl, marbled murrelet, great blue heron, great egret, osprey, Cooper's hawk, sharp shinned hawk, yellow breasted chat, black capped chickadee, vaux's swift and yellow warbler. Amphibians and reptiles that show a strong association to the coastal redwood habitat include southern torrent salamander, Del Norte salamander, tailed frog, northern red legged frog and western pond turtles. Mammals include fisher, Townsend's western big eared bat, Sonoma tree vole and white footed vole (Mayer & Laudenslayer et. al. 1988).

When it comes to determining which wildlife species actually use the property, there is no substitute for landowner observation. Keeping records of any animal sightings along with when and where seen can prove to be invaluable in the future. Even if their identity is uncertain, a description can help with later analysis. A tremendous amount of information on wildlife in the JTMP area is available from THPs submitted by the GDRCo in the local area.

For more general wildlife information, there are a number of resources available to find out whether any species listed as Threatened or Endangered or as a Species of Special Concern might be found in the plan vicinity. Updated plant, animal, and communities lists can be obtained from the California Department of Fish and Wildlife (CDF&W) website. The CDF&W also maintains the Natural Diversity Database (NDDDB) to record location-specific sightings of listed species.

Further analysis of the potential impacts to significant wildlife species will be required when an NTMP/THP is developed. This will include surveying for northern spotted owls and possibly other species as well.

Fire Protection

Decades of fire suppression and logging have created a situation where the forests of the region are not able to withstand the effects of wildfires. Fire is an integral part of this forest ecosystem, but heavy concentrations of suppressed trees that would have been cleared by repeated light ground fires have now become dangerous accumulations of ladder fuels capable of carrying a ground fire into the crowns

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of healthy trees. Forest conditions are at a point where high fuel loads and ladder fuels make it impossible to allow natural fire to be returned to most of this forest for the foreseeable future.

Therefore, it is important to institute a thorough and workable program for reducing the threat of catastrophic wildfire. Since the long term reduction of the wildfire threat will require the prudent reintroduction of prescribed fire, a fuels management regime should initially focus on breaking up the fire ladder and properly treating excessive fuels buildup associated with any commercial harvests or stand improvement projects. This work should focus on the currently used roads first where traffic makes the likelihood of ignition high and the fire hazard is most severe.

Logging operations have the potential to increase the risk of fire due to slash accumulations and presence of heavy equipment. The JTMP area is near residential areas, therefore treatment of slash within 200 feet of residences and 100 feet of public roads is required by the Forest Practice Rules. All slash from harvesting and pruning should be lopped within 24" of the ground, and locally heavy accumulations of slash in logging areas should be piled and burned during wet fall or winter weather. Burning of piles will require a permit from Cal Fire and the Regional Air Quality Management District as well as notification of nearby fire stations.

The main access road to the JTMP area is Murray Road. Murray Road is County Maintained Road compatible with access by firefighting equipment.

General fire safety recommendations are:

- Do not operate machinery or chainsaws when conditions such as wind, humidity and air temperature combine to make for "extreme" hazard.
- Ensure that in any type of logging operation during the fire season all workers conform to regulations pertaining to smoking, fire tool requirements, lunch and warming fires, posting of fire rules, care in welding, prohibiting uncovered glass containers, caution in using chainsaws and other spark emitting equipment, and daily inspections prior to shutting down operations.
- Keep a water truck or other water source on site when burning large piles of slash.
- Maintain a cache of fire tools such as shovels, axes, McLeods, portable backpack water tank, etc. on site and accessible.
- Keep a list of emergency phone numbers that identifies local fire response agencies, both public and volunteer.
- Create defensible fuel breaks around structures by clearing all brush and small trees for a minimum of 30'.
- Develop extra water storage facilities from springs or other sources.
- Fit all storage containers with appropriate size valves for firefighting.

Once management activities begin, the following should be provided to the Trinidad CAL FIRE Fire Station each year before April 1st:

- A copy of the property map with access routes delineated.
- The name, address, and emergency 24-hour phone number(s) of an individual and an alternate who has authority to respond to CAL FIRE requests for resources to suppress fires.
- The number of individuals available for firefighting duty and their skills.
- A list of available firefighting equipment.
- Keys or combinations to any locked gates along emergency access routes.

Insects & Diseases

Every forest ecosystem has biological agents (animals, insects, and diseases) and physical forces (fire, wind, snow, and ice) which are destructive to living vegetation but which are integral to the functioning of that ecosystem. These agents become a "problem" only when they adversely affect vegetation, which is of particular value to the landowner or society. While an endemic level of insects and disease in a forest is natural, if these levels become epidemic, loss of timber value and increased fire hazard may result. In a forest being managed to meet landowner's goals, human intervention is often called for to improve productivity or protect the investment.

The subject property presently does not exhibit any serious pest problems, but there are a few local and regional concerns that should be noted. Conk rot (*Phellinus pini*) is a commonly found pathogen in many large residual Douglas-fir. It has been found on some fir on the property, and care should be taken when operating equipment around Douglas-fir trees as they can be sensitive to compaction, which may decrease tree vigor making them more susceptible to pests. Conk rot, or Red Ring Rot, can infect the heartwood of most conifers but is primarily found in Douglas-fir. It favors cooler, moister environments and is spread by airborne spores produced by sporophores (conks) on infected trees, which enter healthy trees through dead branch stubs or open wounds. It can seriously degrade the quality and/or merchantability of a tree over its lifetime, especially if the tree is infected when young. The only practical cure for this problem is to remove infected trees from the stand to reduce spore production.

If insects or disease do become a significant problem, specific measures will be taken. Infestation zones may be cut to remove epidemic levels of pathogens. Chemical insecticides and herbicides, or broadly accepted biological controls may be used in conformance with the desires of the landowner and RPF and depending on the intensity and threat of any outbreak.

The best preventative treatment for the aforementioned insect and disease problems is to maintain a healthy, vigorous stand through timely thinning and harvesting. A healthy tree is less likely to be infested with insects or disease, or to succumb to these destructive agents if infested, than an unhealthy tree. It is expected that through the management actions prescribed in this plan, a healthier, more vigorous forest will develop, and hence be more resistant to pest outbreaks. The RPF or landowner may wish to contact the County Agricultural Commissioner or UC Extension Advisor for additional information on pests and disease outbreaks.

It is also beneficial to encourage species of birds which prey on insects that are destructive to conifers, especially bark beetles. For example, many of the birds desired for insect control require cavities in snags for nesting. This habitat need will be supplied by designating Legacy Trees for continued snag recruitment throughout the plan area and especially near riparian areas.

Sudden Oak Death

S.O.D. (*Phytophthora ramorum*), as it is commonly known, is known to occur in Humboldt County, and this epidemic is serious enough to warrant a special section of this plan. An extensive amount of information is available and updated regularly on the CALFIRE website and University of California sponsored website suddenoakdeath.org, which is the source of the bulk of the information presented here.

There is currently a dramatic and sudden dieback of tanoaks, coast live oak, and black oak trees in several areas of coastal California with tanoak being the most affected. Since 1995, trees from these

species have been reported dying in large numbers in several coastal Counties. The extent of the problem is not fully known, and the problem is expected to become more extensive in upcoming years, affecting urban and wildland tanoak, coast live, black oak, as well as numerous shrub species. Such a massive dieback of tanoaks and other oaks has never been reported in California and, if it continues, there are going to be several environmental changes: (a) the loss of these highly valued trees from gardens and forests, (b) alterations to forest ecology, with unknown and possibly dramatic implications for wildlife habitat and food chain provision, and (c) serious fire hazard risk from the resulting buildup of dry fuel.

Tanoak is a very resilient tree, and yet trees of all ages are developing symptoms quickly, and dying rapidly. From a distance, the first prominent symptoms in tanoak are drooped (wilted) shoots. Shoot wilting is spontaneous and occurs throughout the crown. Older leaves become pale green. Approximately two to three weeks later the foliage turns brown but remains clinging to branches, visibly announcing the death of tanoak. Chisel cuts into the inner bark and sapwood at breast height of affected trees, reveal saturated tissue that drops burgundy-red sap. In the summer, the bark splits and breaks as a result of drying. Gum often exudes from these splits, which may develop prominent clusters of black fruiting bodies. Long striations of a different tan to pinkish discoloration become visible on the bark surface. Roots of tanoaks exhibiting above ground symptoms often have a pungent alcoholic odor, but appear sound. The following year after the tree dies, suckers sprout near the base. Soon their tips bend, become chlorotic and die. A very noticeable feature of the dead tanoaks is massive infestation of the whole stem with ambrosia beetles in mid-summer.

Pathologists have isolated an important causal agent - a new species of *Phytophthora* - and beetles, other fungi, and weather may be additional factors. *P. ramorum* is a fungus that appears to enter through the bark on tree trunks and limbs, possibly after they are splashed there by raindrops. Once the trees have gone through the progressive stages of the symptoms, their vigor rapidly declines and they become vulnerable to secondary insect pests such as bark and ambrosia beetles.

No evidence of SOD has been found on the property and there are few, if any, tanoaks within the JTMP area. The closest confirmed location of SOD to the McKinleyville Tract is the Redwood Creek Valley, northeast of the property. Regardless, bole-host species (tanoak, black oak and laurel) cannot be transported into non infected counties (Del Norte and Trinity); and, Douglas-fir and redwood logs must have all branches with needles removed.

14. Management Plan Updates

It is highly advised that the Joint Timber Management Guide be updated on a periodic basis, to revise growth predictions and adjust to landowner goals. Updates could include recommendations to improve stand conditions such as pre-commercial thinning and brush control. The landowners are advised to retain professional guidance concerning forest management decisions to take advantage of the best information on current regulations and markets. Meeting the objectives of the landowners is a necessary function of these updates and their participation is encouraged.

15. Management Cost

Costs that will be incurred for management activities could include but are not necessarily limited to the following: harvest plan development & application fees, road maintenance, road construction,

surveying, tree planting, timber stand improvement, logging costs, and wildlife surveys. These costs could range from \$20,000 to \$35,000 initially and will be ongoing after that. Landowners should be prepared for these costs that are necessary to maintain a productive, healthy forest ecosystem, which is capable of producing some economic return for the landowner.

16. Legal Requirements

The landowners should be aware timber harvest activities are subject to permitting requirements from numerous state and federal agencies. The primary permit needed is a Timber Harvesting Plan (THP), Non-Industrial Timber Management Plan (NTMP) or other plan/exemptions described in the regulations of the Forest Practice Act and the current Forest Practice Rules administered by the California Department of Forestry and Fire Protection (CALFIRE). Any projects affecting the bed or banks of a watercourse will require a Stream and Lakebed Alteration Agreement from the Department of Fish and Wildlife. All projects which include the potential for discharge of sediment into watercourses require a Waste Discharge Permit from the Regional Water Quality Control Board. Both the stream crossing permit and waste discharge requirement permits can be issued in conjunction with the THP or NTMP. Any project with the potential to harm federally listed endangered or threatened species (Northern Spotted Owls and Marbled Murrelets) will require a consultation with the US Fish and Wildlife Service and the State Department of Fish and Wildlife.

17. References

- Mayer, Kenneth E. and William F. Laudenslayer Jr. et. al., 1988. A Guide to Wildlife Habitats of California.
- Kelley, F.R., 1984, Geology and geomorphic features related to landsliding, Arcata North 7.5' Quadrangle, Humboldt County California, California Division of Mines and Geology Open-File Report 84-38, 1 sheet, scale 1:24,000
- Kelsey, H.M., and Trexler, J.H., Jr., 1989, Pleistocene deformation of a portion of the southern Cascadia forearc: Prairie Creek Formation, northern California: *Journal of Geophysical Research*, v. 94, no. B10, p. 14,027-14,039.
- Manning, G.A. and B.A. Ogle. 1950. Geology of the Blue Lake Quadrangle, California. California Division of Mines and Geology Bulletin, 148, 35 p.
- Sarna-Wojcicki, A. M., Lajoie, K. R., Meyer, C. E., Adam, D. P., and Rieck, H. J., 1991, Tephrochronologic correlation of upper Neogene sediments along the Pacific margin, conterminous United States, in Morrison, R. B., ed., *Quaternary nonglacial geology; Conterminous U.S.: Geological Society of America, The geology of North America*, v. K2, Chapp. 6, p. 117-140.

Timber Management Plan

1. Current Property Owner

Green Diamond Resource Company
 California Timberlands Division
 P.O. Box 68
 Korbey, CA 95550
 (707) 668-4400

2. Timber Management Plan Contents

The Timber Management Plan is the portion of the JTMP that identifies legal access, rights-of-way and minimum stocking standards as prescribed by the Forest Practice Rules.

3. Project Description

California Government Code Section 51119.5 specifies that parcels zoned as Timber Production Zone (TPZ) may not be divided into parcels containing less than 160 acres unless the original owner prepares a Joint Timber Management Plan (JTMP) prepared or approved as to content by a Registered Professional Forester (RPF) for the parcels to be created. Per California Government Code Section 511014(i) "Parcel" means that portion of an Assessor's parcel that is timberland, as defined.

The Murray Road JTMP is being prepared by Green Diamond Resource Company (GDRCo) in conjunction with the submittal of a Lot Line Adjustment (LLA) involving three Assessor parcels, APN 511-111-056, 511-161-005, 510-011-016. The Assessor Parcels are not coincident with the underlying legal parcels (see Figure 1 and Figure 2). A Determination of Status was submitted December 2018 for all legal parcels associated with the LLA, the results of which will be substantiated in Certificates of Subdivision Compliance as follows:

| Certificate of Subdivision Compliance | Assessor Parcel Number | Acreage |
|---------------------------------------|--|---------------|
| TBD | 511-111-056; 511-161-005 (ptn). | 80.26 |
| TBD | 511-161-005 (ptn.); 510-011-016 (ptn.) | 104.2 |
| TBD | 511-161-005 (ptn.) | 80.22 |
| TBD | 510-011-016 (ptn.) | 121.15 |
| Total | | 385.84 |

The affected Assessor parcels are predominantly zoned TPZ except for an approximately 25.04 acre portion of Assessor parcel 510-011-016 which is zoned Agricultural Exclusive (AE). The LLA will reconfigure four existing legal parcels, all of which will be divided and contain less than 160 acres of TPZ.

Murray Road JTMP

The boundaries of the LLA are intended to generally follow and coincide with Murray Road to facilitate access and timber management. The LLA will result in the reconfiguration of four legal parcels, or Management Units. The Management Units and corresponding acreage are as follows:

| Management Unit | Acres (TPZ) | Acres (AG) | Total (Acres) |
|-----------------|-------------|------------|---------------|
| 1 | 144.67 | 0 | 144.67 |
| 2 | 65.43 | 0 | 65.43 |
| 3 | 100.35 | 19.87 | 120.22 |
| 4 | 50.34 | 5.17 | 55.52 |
| Total | | | 385.84 |

In accordance with the applicable California Government Code Sections, This JTMP is being submitted to demonstrate it will be possible to manage the resulting substandard TPZ Assessor parcels, which are being divided and will contain less than 160 acres for ongoing timber production. The core requirements that must be demonstrated are that the parcel be adequately stocked with commercial timber, have road access to the timber stands and that there is a feasible logging system that could be employed to harvest the timber. The components of the JTMP which document the viability of management include the "Timber Management Guide" and the "Timber Management Plan." The Timber Management Guide provides a description of the land and its timber management potential. The Timber Management Plan identifies the access to the parcel and the minimum stocking requirements described in the Forest Practice Rules.

4. Access, Roads and Boundary Management Areas for JTMP Management Units

Access to Management Units 1, 2 & 4 is from Murray Road, a paved public road, maintained by the County of Humboldt. Access for Management Unit 3 is reliant on access over Management Unit 2 or Management Unit 4, via the M-2320 Road, for ingress and egress as shown on the JTMP Map.

In the event that Management Unit 3 is sold as a separate parcel, access for ingress and egress shall be reserved over Management Unit 4 benefitting Management Unit 3. The location of the reserved access easement should be generally in the form as shown in Appendix 1.

In the event that Management Unit 3 and Management Unit 4 are conveyed together to a common owner, no easement shall be required between Management Unit 3 and Management Unit 4. However, for so long as the JTMP remains in full force and effect, Management Unit 3 and Management Unit 4 would be subject to the easement described above if either Management Unit 3 or Management Unit 4 is separately conveyed.

5. Minimum Stocking Standards

912.7, 932.7, 952.7 Resource Conservation Standards for Minimum Stocking [All Districts, note (b)(1)(D)]

The following resource conservation standards constitute minimum acceptable stocking in the Coast [Northern, Southern] Forest District after timber operations have been completed.

(a) Rock outcroppings, meadows, wet areas, or other areas not normally bearing commercial species shall not be considered as requiring stocking and are exempt from such provisions.

(b) An area on which timber operations have taken place shall be classified as acceptably stocked if either of the standards set forth in (1) or (2) below are met within five (5) years after completion of timber operations unless otherwise specified in the rules.

(1) An area contains an average point count of 300 per acre on Site I, II and III lands or 150 on site IV and V lands to be computed as follows:

(A) Each countable tree [Ref. PRC § 4528(b)] which is not more than 4 inches d.b.h. counts 1 point.

(B) Each countable tree over 4 inches and not more than 12 inches d.b.h. counts 3 points.

(C) Each countable tree over 12 inches d.b.h. counts as 6 points.

(D) [Coast] Root crown sprouts will be counted using the average stump diameter 12 inches above average ground level of the original stump from which the sprouts originate, counting one sprout for each foot of stump diameter to a maximum of 6 per stump.

(D) [Northern] Sprouts over 1 foot in height will be counted, counting one sprout for each 6 inches or part thereof of stump diameter to a maximum of 4 per stump.

(D) [Southern] Root crown sprouts over 1 foot in height will be counted, using the average stump diameter at 1 foot above the average ground level of the original stump, counting 1 sprout for each foot of stump diameter to a maximum of 6 per stump.

(2) The average residual basal area measured in stems 1 inch or larger in diameter, is at least 85 square ft. per acre on Site I lands, and 50 square ft. per acre on lands of Site II classification or lower. Site classification shall be determined by the RPF who prepared the plan.

(3) To the extent basal area standards are specified in the rules in excess of 14 CCR § 912.7(b)(2) [932.7(b)(2), 952.7(b)(2)], up to 15 square feet of basal area of those standards higher than the minimum may be met by counting snags, and decadent or deformed trees of value to wildlife in the following sizes:

(A) 30 inches or greater dbh and 50 feet or greater in height on site I and II lands;

(B) 24 inches or greater dbh and 30 feet or greater in height on site III lands; and

(C) 20 inches or greater dbh and 20 feet or greater in height on site IV and V lands.

(c) The substitution provided for in 14 CCR § 912.7(b)(3) [932.7(b)(2), 952.7(b)(2)] may only be done when the potential spread of insects and diseases will not have a significantly adverse impact on long term productivity or forest health.

(d) The resource conservation standards of the rules may be met with Group A and/or B commercial species. The percentage of the stocking requirements met with Group A species shall be no less than the percentage of the stand basal area they comprised before harvesting. The site occupancy provided by Group A species shall not be reduced relative to Group B species. When considering site occupancy, the Director shall consider the potential long term effects of relative site occupancy of Group A species versus Group B species as a result of harvest. If Group A species will likely recapture the site after harvest, Group B species do not need to be reduced. The time frames for recapturing the site shall be consistent with achieving MSP. The Director may prohibit the use of Group A and/or B commercial species which are non-indigenous or are not physiologically suited to the area involved. Exceptions may be approved by the Director if the THP provides the following information and those exceptions are agreed to by the timberland owner:

(1) Explain and justify with clear and convincing evidence how using Group A nonindigenous, or Group B species to meet the resource conservation standards will meet the intent of the Forest Practice Act as described in PRC § 4513. The discussion shall include at least:

(A) The management objectives of the post-harvest stand;

(B) A description of the current stand, including species composition and current stocking levels within the area of Group B species. The percentage can be measured by using point-count, basal area, stocked plot, or other method agreed to by the Director.

(C) The percentage of the post-harvest stocking to be met with Group B species. Post harvest percentages will be determined on the basis of stocked plots. Only the methods provided by 14 CCR §§ 1070-1075 shall be used in determining if the standards of PRC § 4561 have been met.

(D) A description of what will constitute a countable tree, as defined by PRC § 4528 for a Group B species and how such a tree will meet the management objectives of the post-harvest stand.

The Director, after an initial inspection pursuant to PRC § 4604, shall approve use of Group B species, as exceptions to the pre-harvest basal area percentage standard, if in his judgment the intent of the Act will be met, and there will not be an immediate significant and long-term harm to the natural resources of the state.

912.8 Progeny, Clonal, or Provenance Testing Stocking Standard Exemption [Coast only]

Pursuant to PRC 4561.7, the following standards shall apply to the request for an exemption from the stocking standards of the Act for Progeny, clonal, or provenance testing.

(a) Any THP submitted pursuant to Sec. 4561.7 of the PRC shall include the following information, in addition to other requirements of the rules of the Board:

(1) A specific request for an exemption from stocking standards; and

(2) A description of the testing to be conducted on the site.

(b) The exemption from stocking shall become effective upon the Director's determination that the timber harvesting plan is in conformance with the rules and regulations of the Board.

Appendix 1



Murray Road JTMP: Appendix 1

