An Analysis of Sustainable Harvest Levels

Achievable Under the

Jackson Demonstration State Forest Advisory Group February 2011 Recommendations

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Contents

Summary and Results

This report describes an analysis to estimate the sustainable harvest levels that can be achieved by implementing the Jackson Demonstration State Forest Advisory Group's recommendations (Jackson Demonstration State Forest Advisory Group 2011).

In this analysis, the Forest was divided into major vegetation and site class strata for the purpose of growth projection. These vegetation/site strata were then overlaid with management strata developed by the JAG, designating allowable silvicultural methods across the Forest. The resulting vegetation/site class/management strata will be referred to as land type strata. Using 2005 Forest inventory data, a set of possible 100-years growth and yield projections were developed for each land type stratum, consisting of all allowed silvicultural methods and treatment start times as specified by the JAG. A 100-years planning interval is necessary to ensure that projections go out long enough to capture the steady-state equilibrium of growth dynamics in a forested ecosystem.

Finally, a Forest-wide harvest schedule was developed for a 100-year planning interval, in which one silvicultural method and associated 100-years growth projection was selected for each acre on the Forest. This harvest schedule meets the forest-wide goals of achieving the highest possible sustainable harvest level in the first planning period and achieving

- non-declining harvest levels through the 100-years planning interval,
- an even flow of harvest volumes over the 100-years planning interval,
- harvest less than the long term sustained yield in all planning periods, and
- harvesting less than growth in all planning periods.

The results of the harvest schedule are shown in table 1. below. The estimated maximum annual sustainable harvest level in the next 5 years is 15.2 million board feet per year. The long term sustained yield, defined as the annual growth of managed stands on the Forest at the end of the 100-years planning interval, is 50 million board feet per year (all figures are for conifers):

Period	Elapsed Time, years	Conifer Inventory (mbf/acre)	Conifers Annual Growth (mbf/year)	Conifers Annual Harvest (mbf/year)
1	0-5	40,802	42,573	15,264
2	5-10	43,609	43,998	16,028
3	10-15	46,483	46,709	16,829
4	15-20	49,554	51,014	17,670
5	20-25	52,981	55,385	18,554
6	25-30	56,767	58,458	19,482
7	30-35	60,773	60,718	20,456
8	35-40	64,911	61,963	21,479
9	40-45	69,072	62,452	22,553
10	45-50	73,173	62,526	23,680
11	50-55	77,165	62,683	24,864
12	55-60	81,052	62,241	26,107
13	60-65	84,766	61,649	27,413
14	65-70	88,285	61,139	28,783
15	70-75	91,610	60,346	30,223
16	75-80	94,706	59,764	31,734
17	80-85	97,587	58,951	33,320
18	85-90	100,221	58,096	34,986
19	90-95	102,596	57,124	36,736
20	95-100	104,692	56,324	38,572

Introduction

The Jackson Demonstration State Forest Advisory Group (JAG) was formed in January 2008, as part of the Board of Forestry and Fire Protection's approval of the 2008 management plan for Jackson Demonstration State Forest (JDSF). The JAG was charged with delivering their recommendations for changes to the 2008 JDSF management plan by 2011. This analysis projects future sustainable harvest levels, growth and inventories on JDSF that can be achieved under these recommendations (Jackson Demonstration State Forest Advisory Group 2011).

Primary drivers of the growth and yield that can be expected on any acre of the Forest over time include:

1. Vegetation type.
2. Site quality.
3. The type of management and silviculture that is being applied.

The vegetation layer as used in this document refers to the 2004 vegetation type map of JDSF completed by JDSF staff. The site class layer was developed by JDSF staff.

Table 2 and figure 1 contain management strata from the 2008 JDSF management plan. These are areas on the Forest that have restrictions on the type of silviculture that can be practiced. The JAG management plan includes all the JDSF management categories, it introduces changes to some of the JDSF management categories, and it delineates a number of additional management categories (table 3 and figure 2).

Analysis Overview

Land types were the basic analysis units. Inventory data, growth projections and the harvest schedule were organized by land types. Land type strata consist of

1. The biological strata that define growth trajectories of forest stands. Biological strata consist of site class and vegetation strata (tables five through seven).

2. Management strata that describe land use restrictions imposed on the landscape. These are described in tables two and three. Examples of land use restrictions include old growth groves, pygmy reserves and late seral development areas. Table three also shows the silvicultural methods permitted in each of the management strata.

Forest inventory data summaries were developed for each land type stratum and used as input for 100-years projections of growth and yield for each stratum.

A suite of growth projections were developed that encompassed all possible allowed prescriptions and start times for management (timing choices) for each land type stratum.

The harvest schedule selected one of these growth projections for every acre on the Forest, in order to meet the goals and constraints for the Forest. This collective allocation of silvicultural prescriptions to all Forest acres became the harvest schedule - the estimate of sustainable harvests on the Forest over time.

Spatial (GIS) Analysis

The spatial analysis consisted of summarizing landscape data in order to create land type strata. The following steps were involved:

1. Overlay the vegetation coverage on the site class coverage to arrive at vegetation/site strata.

2. Aggregate vegetation/site class map labels to a level similar to that of the California Wildlife Habitat Relationships vegetation classification system (California Department of Fish and Game 1991).

3. Add the JAG management categories in table 3 to the JDSF management categories in table 2. In management categories labeled either

"Single Tree/Cluster/Group openings", or

"Single Tree/Cluster Selection", or

"Unevenaged, Variable Retention, Two-age Class, Single-age Class",

Change the map label to "Matrix".

4.Change all "OFSZ" labels to "OFDA".

5.Overlay the management strata on the vegetation/site class strata to arrive at the land type strata.

6. Overlay the vegetation/site class/management strata layer on the inventory plot layer.

Vegetation Types

The vegetation map used in this analysis is based upon field evaluation by trained staff in 2004. Tools available to the staff included aerial photographs, stand harvest history, and forest inventory plots. Criteria utilized to segregate the vegetation were established by staff, and include species composition, stand density and stand structure. The vegetation types were further aggregated for the purposes of this analysis.

Site Class

Soil survey maps for Mendocino County (NRCS, 1987) along with forest inventory plots formed the basis for estimates of site productivity on the Forest. The soil survey map units are soil series or a complex of several soil series. Site index estimates for redwood and Douglas-fir are given for each soil series. In cases where a soil mapping unit contained several soil series, the site index estimates for each species were weighted by the proportion of each soil series in the map unit. The averaged site index values for each species were then assigned to a FPR site class. The soil polygons were subsequently dissolved into a site class coverage with three site class strata as defined in the Forest Practice Rules.
For growth projection purposes, the site class coverage provided only the boundaries of the site productivity strata. Site index values for redwood and Douglas-fir were estimated from both permanent (CFI) and temporary (FRI) plot site tree measurements. This site tree data was then used to estimate the site index of each site class stratum by calculating the average site index by species of all plots that fell into the site class stratum. This site index value was then used for all growth projections for the site stratum.

Forest Inventory

Forest Resource Inventory

The forest resource inventory (FRI) represents a system of temporary variable radius plots established in 2005. The plots were located on a grid, with the grid located randomly over the Forest. The individual plots are spaced at five chain intervals along plot strips spaced twenty chains apart and oriented north-south. There are approximately 5,000 FRI plots. Within the plots, individual trees were tallied by species, and DBH was measured on each tree greater than 5 inches in diameter. Sample measurements of total tree height was made on each plot with suitable trees. A sub-plot was installed in order to tally small trees or regeneration.

Continuous Forest Inventory

The original continuous forest inventory (CFI) system consisted of 141 rectangular one-half acre permanent plots distributed on a square 3/4 mile systematic grid across the forest (sixty chains between plot centers). The plots were established and the first measurements obtained in 1959. Since then, the plots have been re-measured in 1964, 1969, 1974, 1979, 1984, 1989, 1999, and 2005. Due to periodic remeasurement, the CFI plot system provides an estimate of inventory and growth over time.

The original one-half acre CFI plots were fixed area rectangular plots, 2 chains by 2.5 chains. In addition to the main plot there were three subplots: a one-quarter acre subplot was put in at the time of the first measurement to measure tree heights in order to establish a height-diameter relationship. This subplot was only put in during the first measurement of the plots in 1959. A 1/25-acre subplot was used to measure trees 3.0 inches to 10.9 inches DBH. Finally, 40 one-thousandth acre subplots were used to record conifer reproduction less than 3.0 inches DBH.

General data measured at each CFI plot includes aspect, slope, age class (young growth/old growth), and whether the stand has been harvested in the past. Data measured on individual trees include species, DBH to the nearest 1/10 inch, merchantability class, crown class, vigor class, defect indicators, and sample regeneration status of the tree (re-measured, ingrowth, logged). Heights were measured on approximately half of the trees at the time of the first measurement in 1959. These data were used to estimate a height-diameter relationship which was used on subsequent measurements.

This original inventory design was used for five measurements of the plots: 1964, 1969, 1974, 1979, and 1984. Starting in 1989, permanent plots were circular one-fifth acre plots rather than rectangular one-half acre plots.

The 1989 permanent plots consisted of a one-fifth acre (52.7 feet radius) main plot on which all trees greater than 11.0 inches DBH were measured. All trees 7.0 inches DBH and larger were recorded on a one-twentieth acre subplot. Finally, all trees smaller than 7 inches DBH were tallied by 2-inch class on a one-hundredth acre subplot.

All current plot data (2005 measurements) from both FRI and CFI were used to develop the tree lists, site index estimates, and regeneration files used by FORSEE for growth projections.

Modeling Stand and Forest Development

Stand Level Analysis: Growth and Yield Projections

Projecting stand and forest growth consists of estimating the inventory, growth and harvest of trees that will materialize on a piece of land over time for a particular silvicultural prescription. The resulting growth projection represents the expected future conditions that will result from consistently applying one silvicultural prescription to a particular stand or land type stratum over time. The set of possible growth projections that were developed for each land type becomes the pool of candidate prescriptions in the harvest schedule. Growth and yield projections were developed for each of the silvicultural prescriptions allowed in each land type stratum (table three). A range of start times for management (timing choices) were also modeled, ranging from period one through 20.

In order to analyze the effects of successive generations of stands on the same site, it is necessary to project forest development out for a sufficiently long time to capture conditions likely to result from a given management direction applied consistently over time. One-hundred-year projections with 5-year growth periods were used in this analysis. All harvests were modeled at the beginning of each planning period.

Development of Stands and Tree Lists

FORSEE uses individual plots as the basis for all growth projections, but the plots are aggregated into stands for the purposes controlling and reporting on various growth projections. For this project a Geographical Information System (GIS) was used to create an overlay of the Site Class polygons and Vegetation Type polygons. All plots that fell into the same SiteClass/VegType stratum (e.g. RD4D/Site II) were aggregated as a stand. The plot-linked tree data was from each plot within the stand was uploaded to develop the stand tree lists.

Regeneration and small trees

All trees greater than five inches were imported as part of the tree list.

Starting Condition:

For trees less than 5 inches a regeneration file was created to be added at the start of any growth projection.

The data from both the CFI and IFI 100th acre subplot were used to develop a regeneration list for each of the major Vegetation Types (BD, RD, DR, NT, OR, PC, T). Trees in the 5-7 inches class from the CFI regeneration subplot were incorporated into the main tree list.

The following process was used: Plots from each major vegetation type were aggregated. All subplot data that had species with counts in excess of 500 trees per acre were truncated to a maximum of 500 trees per acre. Heights and live crown ratios were based on local data and professional judgment. Heights are the same as those used in the 2008 Option A plan. Live crown ratios were reduced from 70 percent to 50 percent to dampen the tendency for optimistic estimates of small tree growth. A summary of existing regeneration by species in the 2 inches and 4 inches classes for each type were then developed for each vegetation type.

Due to the tendency of the FORSEE growth model to model conservative small tree mortality, these starting condition small tree files were further modified to better simulate the expected competition-based mortality. This was accomplished by reducing the two-inch class to 25 percent of the original quantity and reducing the four-inch class to 50 percent of the original quantity. Subsequent model testing confirmed that this level provided the expected recruitment into the larger (greater than five inches DBH) diameter classes. Starting condition small tree lists varied from 145 to 222 trees per acre. These trees are added at time zero to all simulations.

Post-harvest:

Selection:

A post harvest regeneration file for each major vegetation type was created for small trees. Heights, live crown ratios, and diameter distribution were based on local data, professional judgment, and model sensitivity analysis. Heights are the same as in the 2008 JDSF Option A plan. Live crowns were reduced from 70 percent to 50 percent to dampen optimistic model estimates of small tree growth. The proportion of species is based on the existing stand percentages. Conifer species are added proportional to existing basal area of that species. All hardwood regeneration assumed to be tanoak. Trees in the 2 inches, 4 inches, and 6 inches class are included.

The uneven-aged regeneration files are used primarily to determine the relative weight of each species and size class. The regeneration is always added 20 years after harvest. Each harvest has a specific quantity of trees added based on the silviculture and the harvest level.

Selection with Group Openings:

A post-harvest even-age regeneration file for each major vegetation type was created. Heights, live crown ratios, and diameter distribution were based on local data, professional judgment, and model sensitivity analysis. Heights are the same as in the 2008 JDSF Option A plan. Live crown ratios are returned to 70 percent to better simulate the more open-grown conditions found in a group opening. The proportion of species is based primarily on the existing stand percentages – no stand conversion is assumed. Conifer species are added proportional to existing basal area of that species. All hardwood regeneration was assumed to be tanoak.

All selection with group openings harvests add 200 regeneration trees per acre (including hardwoods) 20 years after harvest. This avoids the need to model pre-commercially thinning the stand.

FORSEE Model Configuration and Project Initialization

The board foot volumes presented in this document are in terms of gross Scribner board feet in 16-foot logs with a minimum top diameter of 6 inches inside bark. Volume equations for conifers are from Wensel and Krumland (1983), calibrated to local conditions. Volume equations for hardwoods are from Pillsbury and Kirkley (1984). Minimum diameter at breast height (DBH) is 11 inches for board foot measure and 5 inches for cubic foot measure. Net board foot volume was estimated at four percent less than gross volume, based upon experience with defects on the Forest.

All growth projections used 5 year growth periods and all harvesting occurs at the start of the period. The growth rate for all old growth conifers was set to zero. All other growth rate calibration factors were left unchanged. As in the 2008 JDSF Option A plan, all plot data were grown to a common year of 2008 prior to the start of any growth projections.

The following silvicultural prescriptions were developed to model the JAG recommendations. All possible initial harvest entry timing choices (periods 0-20) were simulated for all silvicultural prescriptions:

Commercial Thinning

This silvicultural prescription is used for matrix areas. Specifications are as follows:

1) Re-entry interval is 30 years.

2) Minimum conifer residual basal area is 200 square feet/acre.

3) Harvest a maximum of 32.5 percent of pre-harvest conifer basal area from below in any harvest entry.

4) The minimum harvest volume for an economically feasible harvest is 7,000 board feet per acre.

5) There is no maximum DBH for trees to harvest.

6) Post-harvest regeneration is added 20 years after harvest. The quantity of trees added is equal to the harvest fraction[1] times 40 trees per acre.

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[1] The fraction of pre-harvest basal area that was harvested.

7) No harvest of old growth trees.

8) Hardwood basal area is harvested proportionally to the conifer basal area harvest levels.

Selection

This silvicultural prescription is used for matrix areas. Specifications are as follows:

1) Re-entry interval is 20 years.

2) The minimum conifer residual basal area is 200 square feet/acre.

3) Harvest is a maximum of 32.5 percent of pre-harvest basal area in any harvest entry. Use a diminution quotient value of 1.1 based on one-inch diameter classes. Compensate for deficit diameter classes by leaving more larger diameter trees in neighboring higher diameter classes than prescribed by the diminution quotient.

4) The minimum harvest volume for an economically feasible harvest is 7,000 board feet per acre.

5) The maximum DBH for trees to harvest is 60 inches.

6) Post-harvest regeneration is added 20 years after harvest. The quantity of trees added is equal to the harvest fraction * 40 trees per acre.

7) No harvest of old growth trees.

8) Hardwood basal area is harvested proportional to conifer basal area harvest levels.

Selection with Group Openings

This silvicultural prescription is used for matrix areas. It is designed to model improved regeneration levels created by using small group openings (less than two acres) that will allow sunlight to reach the forest floor.

This prescription is the same as Selection, but with double the post harvest regeneration level. The quantity of trees added is equal to the harvest fraction * 2 * 40 trees per acre.

Older Forest Development Area Selection

This silvicultural prescription is used for Older Forest Development areas.

1) Re-entry interval is 20 years.

2) Minimum residual basal area is 240 square feet/acre.

3) Harvest a maximum of 32.5 percent of pre-harvest conifer basal area in any harvest entry. Use a diminution quotient value of 1.1 based on one-inch diameter classes. Compensate for deficit diameter classes by leaving more larger diameter trees in neighboring higher diameter classes than prescribed by the diminution quotient. This was modeled as a selection harvest.

4) Ten to twenty percent of the post-harvest conifer basal area should be comprised of trees over 40 inches DBH. Where this condition cannot be met, (a) no trees over 40 inches should be removed, unless under special circumstances, and (b) no more than 50 percent of the stems over 30 inches dbh should be removed.

If this criterion is not met, a custom harvest is applied with the following basal area harvest percentage in each DBH class: 0-10 inches = 27.5 percent, 10-20 inches =22.5 percent, 20-30 inches = 17.5 percent, 30-40 inches =12.5 percent, 40-plus inches = no harvest. The custom harvest focuses on smaller trees, while leaving increasing proportions of pre-harvest basal area in the larger DBH classes.

5) Minimum harvest volume for an economically feasible harvest is 7,000 board feet per acre. All harvests that do not meet this minimum are not implemented.

6) There is no maximum DBH for harvested trees.

7) Post-harvest regeneration is added 20 years after harvest. The quantity of trees added is equal to the harvest fraction * 30 trees per acre.

8) No harvest of old growth trees.

9) Hardwood basal area is harvested proportional to conifer basal area harvest levels.

Older Forest Development Area Selection with Group Openings

This silvicultural prescription is used for Older Forest Development areas. It is designed to model improved regeneration levels created by using small group openings that will allow sunlight to reach the forest floor.

This prescription is the same as the OFDA prescription, but with double the post-harvest regeneration level. The quantity of trees added is equal to the harvest fraction times twice the trees per acre from the uneven-aged regeneration list for the respective vegetation type.

Late Seral Development Area

This prescription is for use in the Late Seral Development areas.

1) Re-entry interval is 25 years.

2) Harvest ceases at elapsed time 40 years.

3) The minimum pre-harvest basal area is 290 square feet/acre.

4) The minimum residual basal area is 240 square feet/acre.

5) Harvest a maximum of 30 percent of pre-harvest conifer basal area in any harvest entry. Use a diminution quotient value of 1.1 based on one-inch diameter classes. Compensate for deficit diameter classes by leaving more larger diameter trees in neighboring higher diameter classes than prescribed by the diminution quotient. This was modeled as a selection harvest.

6) Ten to twenty percent of the post-harvest conifer basal area should be comprised of trees over 40 inches DBH. Where this condition cannot be met, (a) no trees over 40 inches should be removed, unless under special circumstances, and (b) no more than 50 percent of the stems over 30 inches dbh should be removed.

If this criterion is not met, a custom harvest is applied with the following basal area harvest percentage in each DBH class: 0-10 inches = 25 percent, 10-20 inches =20 percent, 20-30 inches = 15 percent, 30-40 inches =10 percent, 40 inches+ = no harvest. The custom harvest focuses on smaller trees, while leaving increasing proportions of pre-harvest basal area in the larger DBH classes.

7) Minimum harvest volume for an economically feasible harvest is 7,000 board feet per acre.

8) Maximum diameter for harvested trees is 60 inches.

9) Post-harvest regeneration is added 20 years after harvest. The quantity of trees added is equal to the harvest fraction * 30 trees per acre.

10) No harvest of old growth trees.

11) Hardwood basal area is harvested proportionally to conifer basal area harvest levels.

Let Grow

No harvesting for the entire planning period.

Forest Level Analysis (Harvest Schedule)

The stand level analysis above developed a number of potential silvicultural prescriptions to apply to each acre on the Forest. A set of prescriptions was modeled for each stratum that represented start of operations (timing choice) in each of the planning periods through the planning interval. In the forest level analysis (the harvest schedule), decision variables are defined that measure acres assigned to each of the possible candidate silvicultural prescriptions in different land type strata. The solution to the harvest scheduling formulation contains the set of decision variables for all acres on the Forest that best meets the goals and constraints specified by the JAG and the forest practice rules (Kangas et al. 2010).

The planning interval for the harvest schedule was 100 years. The harvest schedule does not represent a 100-years management plan for the Forest. Rather, it is an estimate of sustainable near-term harvest levels for the next 5 to 10 years, tempered by the long-term stand dynamics of the Forest in order to ensure that near term harvest levels are perpetually sustainable. A 100-years planning interval is necessary to ensure that projections go out long enough to capture the steady-state equilibrium of growth dynamics in a forested ecosystem.

Planning periods were five years, reflecting the high level of specificity in the JAG's silvicultural guidance as well as re-entry intervals defined in terms of odd numbered years. A "Model I" type of harvest schedule formulation was used, in which every unique land type was assigned to one set of silvicultural prescriptions at the outset, and followed that set of silvicultural prescriptions for the duration of the planning interval (Davis et al 2006).

A Forest-wide harvest schedule was developed for a 100-year planning interval, in which one silvicultural method was assigned to each acre on the Forest, while meeting the forest-wide goal of achieving the highest possible sustainable harvest level in the first planning period, and meeting the following policy constraints:

1. Non-declining harvest levels through the 100-years planning interval, with a five percent increase in harvest levels between periods.

2. An even flow of harvest volumes over the 100-years planning interval, in which harvests do not increase more than 10 percent per decade.

3. Harvests must be less than the long term sustained yield in all planning periods. The long term sustained yield is defined in the forest practice rules as the average annual growth of managed stands on the Forest at the end of the 100-years planning interval, is 50 million board feet per year. This figure does not include growth on areas designated as no harvest.

4. Harvests must be less than growth in all planning periods.

The solution to the linear programming harvest schedule formulation was accomplished using the MPSIII mathematical programming software (Ketron Optimization 2006). The harvest schedule formulation was created in MPS format using the Microsoft Access 2003 database software. The results of the harvest schedule are shown in table one.

Area Constraints

Watercourse and Lake Protection Zones:

In order to maintain consistency with the 2008 JDSF management plan, WLPZ management was modeled using the same forest practice rules. Class I streams had a 150-feet outer buffer on each side of the stream in which only LSD silviculture is allowed, and a 25-feet no harvest inner buffer. Class II streams had a 100-feet outer buffer on each side of the stream in which only LSD silviculture is allowed, and a 25-feet no harvest inner buffer. This modeling approach is estimated to also meet or exceed the current forest practice rule requirements for WLPZ management.

Older Forest Development Area:

Two prescriptions are permitted in OFDA areas, OFDA selection and OFDA selection with group openings. Based on JAG recommendations and THP reviews, OFDA selection with group openings was assigned to five percent of OFDA areas. OFDA selection was assigned to the rest of the area.

Matrix:

Based on JAG recommendations and THP reviews, allowable silvicultural prescriptions in matrix areas were given the following relative area allocation:

Matrix selection – 75 percent, matrix selection with group openings – 5 percent, commercial thinning – 20 percent.

Research:

No special silvicultural prescription or land allocation was made to estimate areas that receive research treatments. Any such allocation or prescription would be speculative. JAG guidance directs that management of research projects generally should be commensurate with the management direction for the land type in which the project is located. Research projects are therefore likely to produce similar growth and yield of stands as stands outside the project area.

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Tables and Figures

Table 1. Inventory, growth, and harvest over time. All figures are for conifers.

Period	Elapsed Time, years	Inventory (mbf/acre)	Annual Growth (mbf/year)	Annual Harvest (mbf/year)
1	0-5	40,802	42,573	15,264
2	5-10	43,609	43,998	16,028
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10	45-50	73,173	62,526	23,680
11	50-55	77,165	62,683	24,864
12	55-60	81,052	62,241	26,107
13	60-65	84,766	61,649	27,413
14	65-70	88,285	61,139	28,783
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16	75-80	94,706	59,764	31,734
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18	85-90	100,221	58,096	34,986
19	90-95	102,596	57,124	36,736
20	95-100	104,692	56,324	38,572

Table 2. JDSF management strata.

1	Older Forest Structure Zone
2	Cypress groups
3	Pygmy forest
4	Jughandle Reserve
5	Eucalyptus infestation area
6	Inner gorges
7	Northern spotted owl nest areas
8	Osprey nest areas
9	Watercourse and lake protection zones (WLPZ)
10	Woodlands Special Treatment Area
11	Domestic water supplies
12	Buffers adjacent to non-timberland neighbors
13	Power line right-of-way
14	State Park Special Treatment Areas
15	Reserved old-growth groves
16	Late seral development areas
17	Campground buffers
18	Conservation camps
19	Road and trail corridors
20	Parlin Fork management area
21	Areas with a high relative landslide potential
22	Mushroom Corners Management Area
23	Caspar Creek research area
24	Helms study research area
25	Whiskey Springs research area
26	Stone research area
27	Marbled murrelet/late seral development
28	Single Tree/Cluster/Group Openings
29	Single Tree/Cluster Selection
30	Uneven-aged, Variable Retention, Two-age Class, Single-age Class

Table 3. JAG management strata and permitted silviculture.

Management Strata	Acres	Silvicultural Prescriptions Allowed
Campground buffer	23	Late seral development selection
Conservation camp	32	No harvest
Cypress	110	No harvest
Eucalyptus area	238	Matrix selection
Water supply	32	Late seral development selection
Jughandle	246	No harvest
Late seral development	1,437	Late seral development selection
Marbled murrelet	1,348	Late seral development selection
Matrix	23,065	Matrix selection, Matrix selection with group openings, Commercial thinning
Neighbor buffer	338	Late seral development selection
Older forest development area (OFDA)	6,579	OFDA Selection, OFDA Selection with group openings
Old growth grove	447	No harvest
Parlin Fork Camp	220	Matrix selection
Powerline right of way	83	No harvest
Pygmy	382	No harvest
Reserve	1,732	No harvest
Research	2,191	Matrix selection
Road and trail corridor	1,135	Late seral development selection
Watercourse and lake protection zone	7,115	Late seral development selection, No harvest
Woodland late seral	1,894	Late seral development selection
Total	48,648	

Table 4. JAG management polygons.

	JAG ID	Name	jag_class	Acres
1	5	W of Waterfall Grove	LSD	33
2	5	W of Waterfall Grove	LSD	14
3	4	Road 1000	LSD	1
4	4	Road 1000	LSD	11
5	12	Brandon Gulch THP	LSD	350
6	12	Brandon Gulch THP	LSD	166
7	9	North of NF SF Noyo LSD	OFDA	504
8	2	Dresser Grove	LSD	13
9	2	Dresser Grove	LSD	57
10	2	Dresser Grove	LSD	16
11	17	Noyo to Big River link	OFDA	841
12	18	Caspar Creek study: SF Caspar Xray	R	59
13	18	Caspar Creek study: SF Caspar	R	94
14	18	Caspar Creek study: SF Caspar	R	42
15	19	Jughandle Expansion	R	1156
16	13	Camp 3 north block	LSD	53
17	13	Camp3 east block	LSD	160
18	14	Camp 3 no management block	R	160
19	21	Camp 3 out area	LSD	66
20	10	Volcano east thumb	OFDA	177
21	22	Balance of Volcano	OFDA	386
22	0	Camp 6 Brandon headwaters	OFDA	202
23	8	Bob Woods Meadow	R	8
24	6	South of Waterfall Grove / west of W Chamberlain Creek	OFDA	120
25	7	Indian Fire Reserve	R	213
26	1	Hyy 20 East	OFDA	89
27	1	Hyy 20 East	OFDA	3
28	1	Hyw 20 East	OFDA	138

Table 5. Vegetation/site class strata acreages.

Vegetation/ Site Class Strata	Vegetation Strata			Site Class Strata	Acres
	Type	Size Class	Canopy Density Class		
BD4M3	Bishop Pine-Douglas-fir	4	M	3	533
DR4D2	Douglas-fir-redwood	4	D	2	2,793
DR4D3	Douglas-fir-redwood	4	D	3	1,830
DR4D4	Douglas-fir-redwood	4	D	4	811
DR4M2	Douglas-fir-redwood	4	M	2	746
DR4M3	Douglas-fir-redwood	4	M	3	922
DR4P3	Douglas-fir-redwood	4	P	3	1,009
DR5D3	Douglas-fir-redwood	5	D	3	356
DR5M2	Douglas-fir-redwood	5	M	2	1,212
DRT4M2	Douglas-fir-redwood-tanoak	4	M	2	1,345
DRT4M3	Douglas-fir-redwood-tanoak	4	M	3	1,681
DRT4M4	Douglas-fir-redwood-tanoak	4	M	4	607
DRT4P3	Douglas-fir-redwood-tanoak	4	P	3	1,028
DRT4P4	Douglas-fir-redwood-tanoak	4	P	4	807
DRT4S3	Douglas-fir-redwood-tanoak	4	S	3	445
DRT4S4	Douglas-fir-redwood-tanoak	4	S	4	561
NT	Non-timbered				229
ORD5M3	Old growth redwood-Douglas-fir	5	M	3	438
PC	Pygmy cypress				669
RD2D2	Redwood-Douglas-fir	2	D	2	892
RD2M2	Redwood-Douglas-fir	2	M	2	867
RD3D2	Redwood-Douglas-fir	3	D	2	373
RD3M2	Redwood-Douglas-fir	3	M	2	877
RD4D2	Redwood-Douglas-fir	4	D	2	5,411
RD4D3	Redwood-Douglas-fir	4	D	3	1,592
RD4D4	Redwood-Douglas-fir	4	D	4	346
RD4M2	Redwood-Douglas-fir	4	M	2	1,649
RD4M3	Redwood-Douglas-fir	4	M	3	1,050
RD4M4	Redwood-Douglas-fir	4	M	4	1,217
RD4P3	Redwood-Douglas-fir	4	P	3	1,257
RD5D2	Redwood-Douglas-fir	5	D	2	1,510
RD5M2	Redwood-Douglas-fir	5	M	2	2,625
RD5M3	Redwood-Douglas-fir	5	M	3	907
RD5S2	Redwood-Douglas-fir	5	S	2	1,557
RDT4M2	Redwood-Douglas-fir-tanoak	4	M	2	2,336
RDT4M3	Redwood-Douglas-fir-tanoak	4	M	3	642
RDT4P2	Redwood-Douglas-fir-tanoak	4	P	2	1,162
RDT4P3	Redwood-Douglas-fir-tanoak	4	P	3	238
RDT5M2	Redwood-Douglas-fir-tanoak	5	M	2	664
T4M3	Tanoak-Douglas-fir	4	M	3	1,272
T4M4	Tanoak-Douglas-fir	4	M	4	2,182
Total					48,648

Table 6. Summary of the JDSF vegetation classification system size and density categories..

Density Class		Size Class	
D	Dense	1	< 2
M	Medium	2	2-6
P	Open	3	6-11
S	Sparse	4	12-24
		5	24+

Table 7. Acres by redwood site class.

Site Class	Acres
2	25,978
3	15,246
4	7,424
Total	48,648

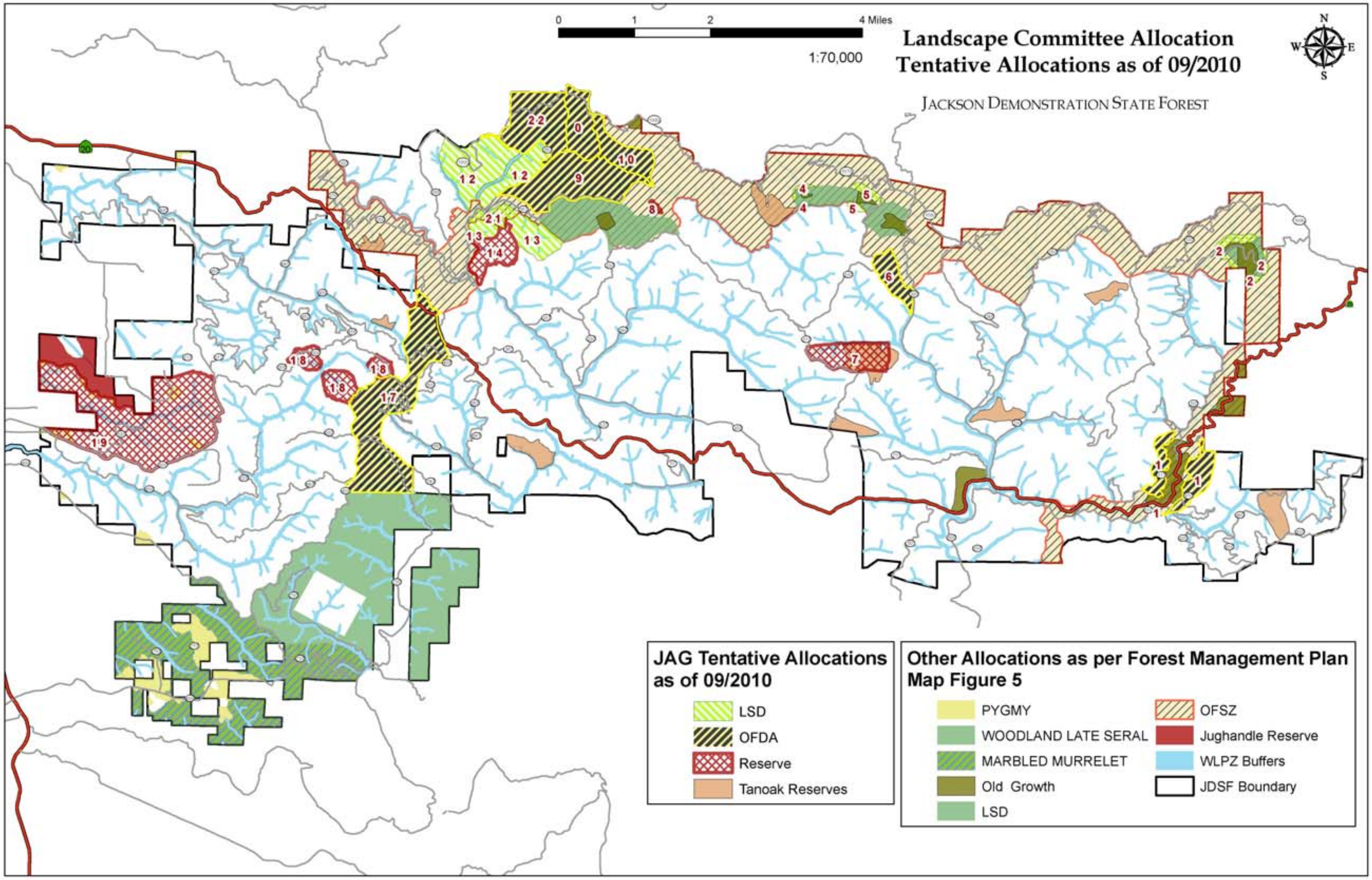

Figure 1. JAG management categories.

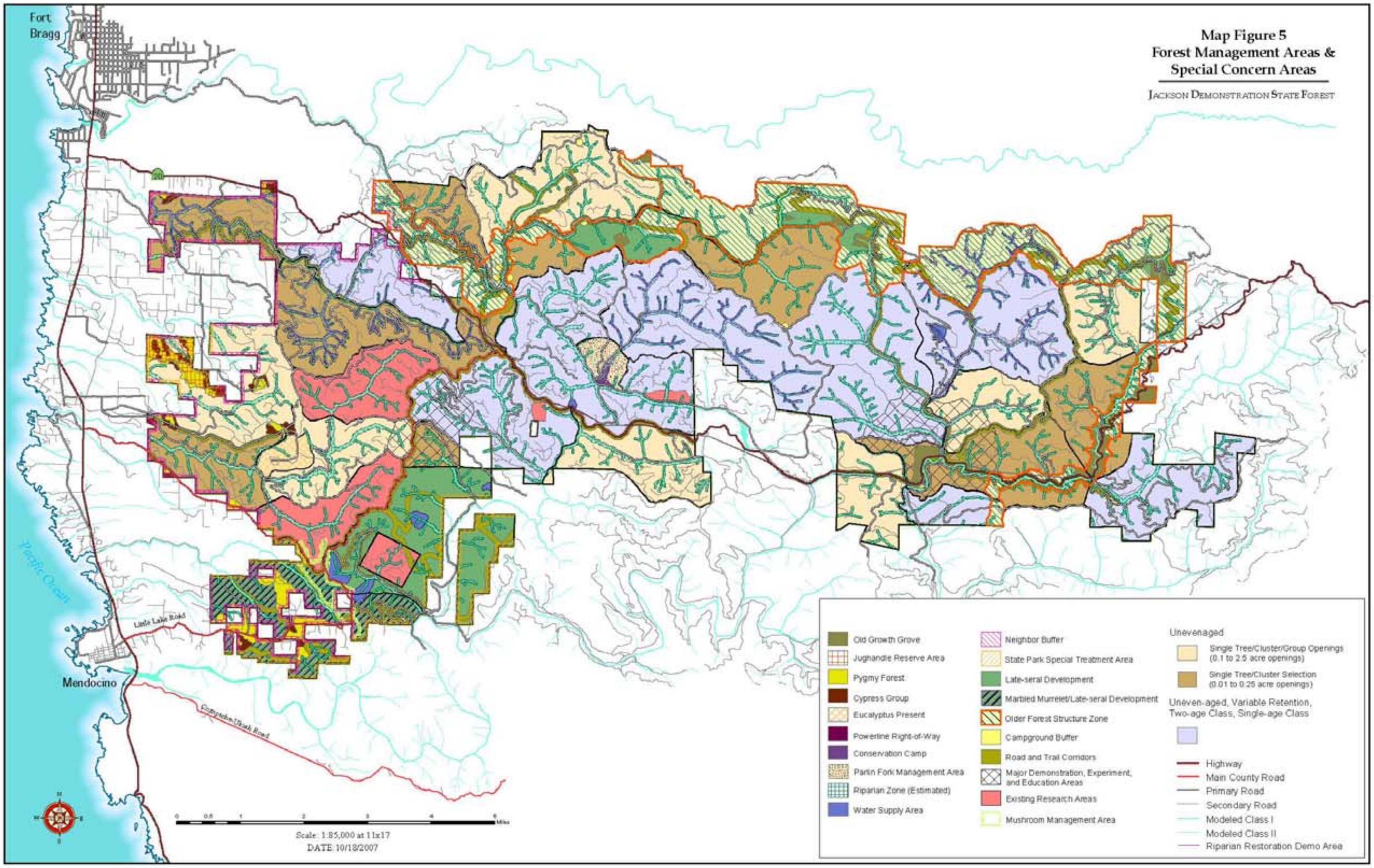

Figure 2. JDSF management categories.

Appendix 1. Acreages by Land Type Strata

Management Category	Vegetation/Site	Acres
CAMPGROUND BUFFER	DR4D2	0.31
CAMPGROUND BUFFER	DR4D3	1.34
CAMPGROUND BUFFER	DRT4M3	0.29
CAMPGROUND BUFFER	RD3M2	6.50
CAMPGROUND BUFFER	RD4D2	1.47
CAMPGROUND BUFFER	RD4D3	5.22
CAMPGROUND BUFFER	RD5D2	4.40
CAMPGROUND BUFFER	RD5M3	3.75
CONSERVATION CAMP	DRT4M2	3.01
CONSERVATION CAMP	NT	17.06
CONSERVATION CAMP	RD4D2	3.84
CONSERVATION CAMP	RD5M2	0.62
CONSERVATION CAMP	RD5S2	1.38
CONSERVATION CAMP	RDT4M2	5.81
CYPRESS	BD4M3	35.28
CYPRESS	DR4D4	3.53
CYPRESS	DR4M2	0.09
CYPRESS	DR4M3	1.10
CYPRESS	NT	6.55
CYPRESS	PC	46.17
CYPRESS	RD4D4	10.33
CYPRESS	RD4M3	0.02
CYPRESS	RD4M4	2.47
CYPRESS	RD5M3	4.37
EUC	DR4D2	3.37
EUC	DR4D3	121.01
EUC	DRT4M2	19.45
EUC	DRT4M3	6.84
EUC	RD2M2	19.05
EUC	RD3D2	27.61
EUC	RD4D3	3.52
EUC	RD4D4	0.00
EUC	RD5D2	0.68
EUC	RD5M2	3.88
EUC	RD5M3	32.94
EUC	RDT4M2	0.03
H2O SUPPLY	DR4D2	7.07
H2O SUPPLY	DRT4M3	22.40
H2O SUPPLY	DRT4M4	0.62
H2O SUPPLY	NT	1.82
H2O SUPPLY	RDT4M2	0.02
H2O SUPPLY	RDT4P2	0.02
JUGHANDLE	BD4M3	12.12
JUGHANDLE	DR4D2	0.01
JUGHANDLE	DR4D4	0.99
JUGHANDLE	PC	224.62

JUGHANDLE	RD4D3	7.65
JUGHANDLE	RD4D4	1.03
JUGHANDLE	RD5D2	0.03
LATE SERAL DEVELOPME	DR4D2	45.85
LATE SERAL DEVELOPME	DR4D3	59.72
LATE SERAL DEVELOPME	DR4D4	12.04
LATE SERAL DEVELOPME	DR4M2	6.06
LATE SERAL DEVELOPME	DR4M3	12.52
LATE SERAL DEVELOPME	DR5M2	43.33
LATE SERAL DEVELOPME	DRT4M3	13.41
LATE SERAL DEVELOPME	DRT4M4	0.45
LATE SERAL DEVELOPME	DRT4P3	18.77
LATE SERAL DEVELOPME	DRT4P4	8.73
LATE SERAL DEVELOPME	DRT4S3	34.67
LATE SERAL DEVELOPME	DRT4S4	2.54
LATE SERAL DEVELOPME	ORD5M3	15.51
LATE SERAL DEVELOPME	RD2M2	0.01
LATE SERAL DEVELOPME	RD4D2	770.82
LATE SERAL DEVELOPME	RD4D3	77.77
LATE SERAL DEVELOPME	RD5D2	58.10
LATE SERAL DEVELOPME	RD5M2	14.78
LATE SERAL DEVELOPME	RD5M3	0.03
LATE SERAL DEVELOPME	RD5S2	56.11
LATE SERAL DEVELOPME	RDT4M2	3.33
LATE SERAL DEVELOPME	RDT4M3	75.24
LATE SERAL DEVELOPME	RDT5M2	7.42
LATE SERAL DEVELOPME	T4M3	58.40
LATE SERAL DEVELOPME	T4M4	41.60
MARBLED MURRELET	BD4M3	118.72
MARBLED MURRELET	DR4D2	15.79
MARBLED MURRELET	DR4D3	293.88
MARBLED MURRELET	DR4D4	7.93
MARBLED MURRELET	DR4M3	40.48
MARBLED MURRELET	DR4P3	17.51
MARBLED MURRELET	DR5D3	4.20
MARBLED MURRELET	DR5M2	27.59
MARBLED MURRELET	DRT4M2	5.60
MARBLED MURRELET	DRT4M3	0.01
MARBLED MURRELET	DRT4P3	5.69
MARBLED MURRELET	DRT4P4	4.22
MARBLED MURRELET	NT	2.00
MARBLED MURRELET	PC	48.46
MARBLED MURRELET	RD4D2	125.14
MARBLED MURRELET	RD4D3	154.78
MARBLED MURRELET	RD4D4	1.22
MARBLED MURRELET	RD4M3	251.28
MARBLED MURRELET	RD4M4	28.55
MARBLED MURRELET	RD5D2	32.75
MARBLED MURRELET	RD5M3	39.72
MARBLED MURRELET	RD5S2	7.18
MARBLED MURRELET	RDT4M3	2.92
MARBLED MURRELET	RDT4P2	112.79
MATRIX	BD4M3	14.77
MATRIX	DR4D2	1,374.02

MATRIX	DR4D3	532.99
MATRIX	DR4D4	376.06
MATRIX	DR4M2	598.22
MATRIX	DR4M3	310.04
MATRIX	DR4P3	792.76
MATRIX	DR5D3	1.26
MATRIX	DR5M2	656.53
MATRIX	DRT4M2	925.52
MATRIX	DRT4M3	1,281.81
MATRIX	DRT4M4	378.14
MATRIX	DRT4P3	652.53
MATRIX	DRT4P4	649.78
MATRIX	DRT4S3	307.16
MATRIX	DRT4S4	366.94
MATRIX	NT	91.34
MATRIX	ORD5M3	12.09
MATRIX	PC	13.47
MATRIX	RD2D2	502.75
MATRIX	RD2M2	441.21
MATRIX	RD3D2	159.19
MATRIX	RD3M2	683.09
MATRIX	RD4D2	1,962.37
MATRIX	RD4D3	654.01
MATRIX	RD4D4	120.76
MATRIX	RD4M2	512.00
MATRIX	RD4M3	381.11
MATRIX	RD4M4	729.22
MATRIX	RD4P3	714.98
MATRIX	RD5D2	510.96
MATRIX	RD5M2	1,561.48
MATRIX	RD5M3	261.58
MATRIX	RD5S2	1,073.30
MATRIX	RDT4M2	669.52
MATRIX	RDT4M3	184.17
MATRIX	RDT4P2	588.95
MATRIX	RDT4P3	176.80
MATRIX	RDT5M2	559.86
MATRIX	T4M3	157.66
MATRIX	T4M4	1,124.51
NEIGHBOR BUFFER	BD4M3	7.17
NEIGHBOR BUFFER	DR4D2	3.65
NEIGHBOR BUFFER	DR4D3	35.50
NEIGHBOR BUFFER	DR4D4	2.47
NEIGHBOR BUFFER	DR4M2	4.88
NEIGHBOR BUFFER	DR4M3	36.63
NEIGHBOR BUFFER	DR4P3	10.45
NEIGHBOR BUFFER	DR5M2	33.86
NEIGHBOR BUFFER	NT	0.72
NEIGHBOR BUFFER	PC	1.63
NEIGHBOR BUFFER	RD2M2	4.58
NEIGHBOR BUFFER	RD3D2	0.36
NEIGHBOR BUFFER	RD3M2	1.72
NEIGHBOR BUFFER	RD4D2	24.30
NEIGHBOR BUFFER	RD4D3	40.00

NEIGHBOR BUFFER	RD4D4	24.87
NEIGHBOR BUFFER	RD4M2	6.52
NEIGHBOR BUFFER	RD4M3	20.00
NEIGHBOR BUFFER	RD4M4	0.11
NEIGHBOR BUFFER	RD5M2	3.66
NEIGHBOR BUFFER	RD5M3	12.34
NEIGHBOR BUFFER	RD5S2	45.90
NEIGHBOR BUFFER	RDT4M2	12.47
NEIGHBOR BUFFER	RDT4M3	3.98
OFDA	DR4D2	257.84
OFDA	DR4D3	254.49
OFDA	DR4D4	198.25
OFDA	DR4M2	40.79
OFDA	DR4M3	44.48
OFDA	DR4P3	54.02
OFDA	DR5D3	46.19
OFDA	DR5M2	73.97
OFDA	DRT4M2	28.48
OFDA	DRT4M3	67.82
OFDA	DRT4M4	65.79
OFDA	DRT4P3	197.24
OFDA	DRT4S3	82.59
OFDA	DRT4S4	61.46
OFDA	NT	2.34
OFDA	ORD5M3	42.89
OFDA	RD2D2	116.92
OFDA	RD2M2	153.38
OFDA	RD3D2	16.00
OFDA	RD3M2	45.64
OFDA	RD4D2	648.83
OFDA	RD4D3	62.20
OFDA	RD4D4	46.31
OFDA	RD4M2	369.84
OFDA	RD4M3	107.65
OFDA	RD4M4	195.09
OFDA	RD4P3	251.41
OFDA	RD5D2	238.41
OFDA	RD5M2	455.32
OFDA	RD5M3	280.93
OFDA	RD5S2	50.80
OFDA	RDT4M2	297.71
OFDA	RDT4M3	213.12
OFDA	RDT4P2	118.77
OFDA	RDT4P3	20.79
OFDA	RDT5M2	0.07
OFDA	T4M3	855.09
OFDA	T4M4	515.74
OLD GROWTH GROVE	DR4D2	2.74
OLD GROWTH GROVE	DR4D3	5.72
OLD GROWTH GROVE	DR4D4	0.37
OLD GROWTH GROVE	DR5D3	1.70
OLD GROWTH GROVE	DR5M2	4.78
OLD GROWTH GROVE	DRT4M2	0.95
OLD GROWTH GROVE	DRT4M3	2.50

OLD GROWTH GROVE	DRT4P3	1.11
OLD GROWTH GROVE	DRT4P4	2.78
OLD GROWTH GROVE	DRT4S3	0.63
OLD GROWTH GROVE	NT	0.75
OLD GROWTH GROVE	ORD5M3	345.40
OLD GROWTH GROVE	RD4D2	43.59
OLD GROWTH GROVE	RD4D3	0.14
OLD GROWTH GROVE	RD4M3	0.83
OLD GROWTH GROVE	RD4P3	11.99
OLD GROWTH GROVE	RD5D2	0.05
OLD GROWTH GROVE	RD5S2	0.08
OLD GROWTH GROVE	RDT4M3	0.64
OLD GROWTH GROVE	RDT5M2	0.28
OLD GROWTH GROVE	T4M3	6.72
OLD GROWTH GROVE	T4M4	13.11
PF SINGLE/CLUSTER	NT	11.77
PF SINGLE/CLUSTER	RD4D2	4.10
PF SINGLE/CLUSTER	RD4M2	42.95
PF SINGLE/CLUSTER	RD5D2	4.09
PF SINGLE/CLUSTER	RD5M2	55.31
PF SINGLE/CLUSTER	RD5S2	84.52
PF SINGLE/CLUSTER	RDT4M2	17.66
POW ROW	DR4D2	1.33
POW ROW	DR5M2	0.63
POW ROW	DRT4M2	4.06
POW ROW	DRT4M3	4.75
POW ROW	NT	24.09
POW ROW	ORD5M3	11.56
POW ROW	RD2D2	1.36
POW ROW	RD4D2	13.27
POW ROW	RD4D3	0.37
POW ROW	RD4M2	4.97
POW ROW	RD4M4	1.77
POW ROW	RD4P3	4.72
POW ROW	RD5D2	5.44
POW ROW	RD5M2	0.58
POW ROW	RD5S2	0.44
POW ROW	RDT4M2	3.20
POW ROW	T4M3	0.48
POW ROW	T4M4	0.40
PYGMY	BD4M3	88.66
PYGMY	DR4D3	0.73
PYGMY	DR4D4	2.42
PYGMY	DR4M2	0.29
PYGMY	DR4M3	1.40
PYGMY	DRT4P4	4.22
PYGMY	NT	16.11
PYGMY	PC	246.05
PYGMY	RD4D3	0.57
PYGMY	RD4D4	2.29
PYGMY	RD4M3	6.71
PYGMY	RD4M4	10.12
PYGMY	RD5M3	1.94
RESERVE	BD4M3	248.07

RESERVE	DR4D2	194.63
RESERVE	DR4D3	146.07
RESERVE	DR4D4	25.17
RESERVE	DR4M3	296.17
RESERVE	DR5M2	0.19
RESERVE	DRT4M2	75.64
RESERVE	DRT4M4	52.99
RESERVE	NT	4.63
RESERVE	PC	87.55
RESERVE	RD2D2	0.40
RESERVE	RD2M2	0.83
RESERVE	RD3D2	0.89
RESERVE	RD4D2	168.52
RESERVE	RD4D3	202.76
RESERVE	RD4D4	9.30
RESERVE	RD4M2	5.03
RESERVE	RD4M3	0.03
RESERVE	RD5D2	108.62
RESERVE	RD5M2	2.42
RESERVE	RD5M3	2.24
RESERVE	RD5S2	0.48
RESERVE	RDT4M2	0.67
RESERVE	RDT4M3	12.60
RESERVE	RDT5M2	0.96
RESERVE	T4M3	85.05
RESEARCH	BD4M3	0.94
RESEARCH	DR4D2	119.59
RESEARCH	DR4D3	2.61
RESEARCH	DR4M2	1.73
RESEARCH	DR4M3	0.18
RESEARCH	DR5D3	193.06
RESEARCH	DR5M2	274.25
RESEARCH	DRT4M2	0.27
RESEARCH	NT	0.84
RESEARCH	RD2D2	185.84
RESEARCH	RD2M2	198.22
RESEARCH	RD3D2	128.92
RESEARCH	RD3M2	14.89
RESEARCH	RD4D2	224.91
RESEARCH	RD4D3	39.55
RESEARCH	RD4M2	164.20
RESEARCH	RD4M3	16.35
RESEARCH	RD5D2	76.92
RESEARCH	RD5M2	125.75
RESEARCH	RD5M3	108.99
RESEARCH	RD5S2	16.69
RESEARCH	RDT4M2	252.70
RESEARCH	RDT4M3	16.50
RESEARCH	RDT4P2	26.68
RT CORRIDOR	BD4M3	1.73
RT CORRIDOR	DR4D2	57.86
RT CORRIDOR	DR4D3	37.37
RT CORRIDOR	DR4D4	21.03
RT CORRIDOR	DR4M3	57.73

RT CORRIDOR	DR4P3	48.65
RT CORRIDOR	DR5D3	0.00
RT CORRIDOR	DR5M2	10.26
RT CORRIDOR	DRT4M2	16.60
RT CORRIDOR	DRT4M3	71.18
RT CORRIDOR	DRT4M4	15.85
RT CORRIDOR	DRT4P3	42.31
RT CORRIDOR	DRT4P4	42.95
RT CORRIDOR	DRT4S3	6.42
RT CORRIDOR	DRT4S4	31.60
RT CORRIDOR	NT	14.13
RT CORRIDOR	RD2D2	4.82
RT CORRIDOR	RD2M2	5.17
RT CORRIDOR	RD3D2	0.25
RT CORRIDOR	RD3M2	38.37
RT CORRIDOR	RD4D2	111.51
RT CORRIDOR	RD4D3	24.52
RT CORRIDOR	RD4D4	9.10
RT CORRIDOR	RD4M2	68.09
RT CORRIDOR	RD4M3	69.14
RT CORRIDOR	RD4M4	5.33
RT CORRIDOR	RD4P3	51.23
RT CORRIDOR	RD5D2	39.28
RT CORRIDOR	RD5M2	28.42
RT CORRIDOR	RD5M3	20.08
RT CORRIDOR	RD5S2	25.87
RT CORRIDOR	RDT4M2	57.66
RT CORRIDOR	RDT4M3	4.05
RT CORRIDOR	RDT4P2	2.55
RT CORRIDOR	RDT4P3	0.01
RT CORRIDOR	T4M3	29.59
RT CORRIDOR	T4M4	64.76
WLPZ	BD4M3	5.42
WLPZ	DR4D2	466.71
WLPZ	DR4D3	334.02
WLPZ	DR4D4	160.95
WLPZ	DR4M2	87.39
WLPZ	DR4M3	121.55
WLPZ	DR4P3	82.63
WLPZ	DR5D3	109.88
WLPZ	DR5M2	85.23
WLPZ	DRT4M2	117.84
WLPZ	DRT4M3	208.37
WLPZ	DRT4M4	93.13
WLPZ	DRT4P3	110.78
WLPZ	DRT4P4	94.31
WLPZ	DRT4S3	13.54
WLPZ	DRT4S4	98.11
WLPZ	NT	24.14
WLPZ	ORD5M3	10.79
WLPZ	PC	1.08
WLPZ	RD2D2	79.86
WLPZ	RD2M2	44.93
WLPZ	RD3D2	39.48

WLPZ	RD3M2	86.33
WLPZ	RD4D2	985.47
WLPZ	RD4D3	318.65
WLPZ	RD4D4	120.53
WLPZ	RD4M2	267.44
WLPZ	RD4M3	194.12
WLPZ	RD4M4	243.87
WLPZ	RD4P3	223.12
WLPZ	RD5D2	423.43
WLPZ	RD5M2	347.86
WLPZ	RD5M3	138.28
WLPZ	RD5S2	168.32
WLPZ	RDT4M2	292.89
WLPZ	RDT4M3	97.90
WLPZ	RDT4P2	180.14
WLPZ	RDT4P3	40.34
WLPZ	RDT5M2	95.30
WLPZ	T4M3	79.33
WLPZ	T4M4	421.49
WOODLAND LATE SERAL	DR4D2	242.66
WOODLAND LATE SERAL	DR4D3	5.02
WOODLAND LATE SERAL	DR4M2	7.03
WOODLAND LATE SERAL	DR4P3	2.54
WOODLAND LATE SERAL	DR5D3	0.01
WOODLAND LATE SERAL	DR5M2	1.80
WOODLAND LATE SERAL	DRT4M2	147.50
WOODLAND LATE SERAL	DRT4M3	1.50
WOODLAND LATE SERAL	NT	10.28
WOODLAND LATE SERAL	RD4D2	322.53
WOODLAND LATE SERAL	RD4D3	0.04
WOODLAND LATE SERAL	RD4M2	207.98
WOODLAND LATE SERAL	RD4M3	2.75
WOODLAND LATE SERAL	RD5D2	6.64
WOODLAND LATE SERAL	RD5M2	25.07
WOODLAND LATE SERAL	RD5S2	26.10
WOODLAND LATE SERAL	RDT4M2	722.17
WOODLAND LATE SERAL	RDT4M3	30.83
WOODLAND LATE SERAL	RDT4P2	131.77
Total		48,647.97