Big Butte Springs Watershed
Forest Inventory Report

Prepared for:
Medford Water Commission

Prepared by:
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Big Butte Springs Watershed
Forest Inventory Report

1.0 Executive Summary

The Inventory and Biometrics Group (I&B) within Mason, Bruce & Girard (MB&G) was asked to design and execute a timber cruise on lands owned by the City of Medford and managed by the Medford Water Commission. The land base contributes to the city's municipal water supply and is referred to as the "Big Butte Springs Watershed." The purpose of this cruise was to establish a baseline forest inventory for forest management and long-term planning being conducted by MB&G foresters. MB&G handled the cruise design, layout, check cruising, and data management associated with the cruise. The cruise data collection was sub-contracted out to JM Forestry, of Etna, CA.

All commercial forest stands seen as having the potential for beneficial management activities over the next 5-10 years were cruised. The total net volume on all cruised stands is an estimated 38,781 thousand board feet (MBF), ±6.5% at the 95% confidence interval. This volume was calculated for net acres only, which excludes riparian management zones, and road buffers.

2.0 Cruise Overview

A total of 26 stands were selected for the cruise. In each stand, a systematic grid of plots with a random starting point was mapped within the net acres only. Net acres were calculated by buffering known streams and roads and removing those acres from the total gross acres of the stand. Road buffers range from 12-25' across the ownership, depending on road type and usage. All streams have a 100' buffer, regardless of fish presence.

A total of 422 plots were measured across the 26 cruise stands, covering approximately 2,310 acres. Three plots were not measured due to the plot location being outside of the cruise stand (this happens when mapped stands and actual forest cover do not perfectly align). Plots were assigned to stands based on the perceived degree of variation within each stand, using an assumed coefficient of variation and desired confidence interval. The total number of plots in some stands was then adjusted to achieve more reasonable plot spacing and consistency between stands. The average plot intensity across the entire cruise was approximately 1:5 (one plot per every five acres) but ranged from 1:1.5 to 1:9.5. A summary of plot intensity by stand is provided in Table 1., along with other stand details. Maps for each individual cruise stand can be found in Appendix A.

Each cruise plot consisted of a variable radius plot and nested fixed radius plot. Trees with diameter at breast height (DBH) of 4.6" and larger were cruised on the variable radius plot, using a basal area factor (BAF) selected by the cruiser based on overstory conditions and

current stocking levels observed in each stand. Trees with DBH of 4.5" and less were cruised on the fixed radius plot. A fixed plot with radius of 11.78' was used in every stand, which equates to a total plot area of 1/100th of an acre. Only trees taller than breast height were tallied.

A standard set of tree measurements was recorded for all trees on the cruise, with the purpose of developing statistically sound estimates of common stand metrics, including basal area per acre, trees per acre, and board foot volume per acre, among others. Site tree data was collected, along with current 5- and 10-year growth data. The complete set of cruise procedures can be found in Appendix B.

Table 1. Summary of cruise stands

Stand ID	Net Acres	Planned Cruise Plots	Plot Intensity (ac/plot)	BAF Used	Avg. Trees/Plot (var. radius)
101	98.7	16	6.2	27.78	4.8
102	156.0	17	9.2	33.61	5.2
103	81.9	15	5.5	27.78	6.5
104	23.4	15	1.6	33.61	4.9
105	56.7	12	4.7	33.61	5.4
106	54.3	12	4.5	20.00	5.1
107	46.1	13	3.5	20.00	4.9
108	61.2	15	4.1	40.00	4.5
109	46.1	15	3.1	33.61	3.9
112	52.0	15	3.5	33.61	5.5
113	32.3	12	2.7	27.78	4.5
114	61.3	18	3.4	27.78	5.3
115	99.5	15	6.6	27.78	5.3
116	104.2	14	7.4	27.78	5.4
117	49.4	15	3.3	33.61	3.9
118	217.6	23	9.5	27.78	4.9
119	385.8	40	9.6	33.61	3.5
120	75.4	20	3.8	20.00	3.6
201	110.4	15	7.4	33.61	5.1
202	22.0	9	2.4	27.78	5.2
401	174.7	23	7.6	33.61	5.7
402	97.0	15	6.5	20.00	5.6
405	93.4	19	4.9	33.61	5.4
406	60.2	15	4.0	33.61	6.1
501	35.5	15	2.4	33.61	3.6
503	24.1	12	2.0	33.61	4.9

3.0 Quality Assurance/Control

Quality assurance and control (QA/QC) measures are taken to ensure that a certain level of quality is maintained in both the data collection procedures, and the data itself. Two primary forms of QA/QC were employed on this cruise. First, checks are performed on all incoming data prior to any compilation. Checks on data involve looking for errant measurements, incomplete tree records, and proper use of codes. This is done through a combination of automated checks in an Access database, and manual checks by an inventory analyst and/or cruise manager. The second QA/QC process is to conduct plot audits, which is commonly referred to as "check cruising." While data checks are used to ensure that all incoming tree data is "clean," they do not necessarily tell the cruise manager whether data was collected properly, which is where check cruising becomes valuable. During a check cruise, the auditor will visit plots and attempt to re-create the cruiser's measurements. Tolerances are provided for most measurements on the cruise; if the cruiser's and auditor's measurements do not match up, these tolerances are used to determine the acceptability of the variance. Differences in measurements are common, but differences that are repeatedly found to be outside of a given tolerance indicate an issue with the cruising work that must be corrected. The check cruising procedures and tolerances used for this cruise are described in the cruise procedures manual found in Appendix B.

Approximately 5% of the plots on this cruise were audited, all by MB&G forester Mike Delegan. Cruisers were asked to re-work one stand with a smaller BAF, in order to collect more cruise trees, and some plots were re-visited for the purpose of collecting more site tree or growth data. In general, however, no significant issues with the cruising work were noted.

4.0 Cruise Data Analysis and Volumes

Cruise data was compiled using MBGTools version 20190211. A list of key stand-level metrics for all cruise stands is found in Table 2, and property-level roll-up of all volume can be found in Table 3. Volume was calculated using the following merchandizing specifications:

- Stump height of 1 foot
- Allowable Trim of 8 inches
- Nominal log length of 32 feet
- Minimum log length of 16 feet
- Minimum small end diameter (inside bark) of 6 inches
- Minimum merchantable DBH of 10 inches
- Hidden defect of 5%
- Scribner Long Log Board Foot Volume Rule
- SIS Taper Equations

Table 2. Cruise stands

Block	Stand ID	Net Acres	Trees per Acre	Basal Area (ft^2/ac)	Stand Density Index	Site Index	Net Vol/Ac (Bd. Ft.)	Total MBF
A	101	98.7	208	135.4	240	67	18,801	1,855.3
A	102	156.0	593	180.7	372	65	21,379	3,335.1
A	103	81.9	350	184.3	340	72	19,096	1,563.3
A	104	23.4	446	169.2	333	55	16,809	393.6
A	105	56.7	194	202.0	326	62	25,474	1,445.0
A	106	54.3	209	102.6	192	74	7,064	383.8
A	107	46.1	266	100.9	199	68	5,151	237.2
A	108	61.2	276	180.0	319	55	19,306	1,180.6
A	109	46.1	88	132.5	199	66	14,358	661.8
A	112	52.0	240	186.7	319	72	23,331	1,213.0
A	113	32.3	262	127.0	238	62	13,016	420.7
A	114	61.3	344	150.8	289	61	14,912	913.7
A	115	99.5	135	146.4	234	74	16,936	1,685.5
A	116	104.2	611	154.8	330	71	20,973	2,186.2
A	117	49.4	274	132.9	250	74	15,404	760.3
A	118	217.6	458	139.8	287	71	14,268	3,104.8
A	119	385.8	161	117.9	204	69	14,024	5,411.0
A	120	75.4	170	72.6	140	50	3,670	276.5
B	201	110.4	353	174.4	326	63	17,917	1,977.2
B	202	22.0	205	146.6	255	71	16,968	373.5
D	401	174.7	236	192.7	326	74	19,525	3,410.4
D	402	92.3	377	134.2	268	70	19,907	1,837.0
D	405	93.4	300	184.4	330	70	20,463	1,910.4
D	406	56.0	371	216.8	392	69	25,465	1,425.3
E	501	35.5	378	126.4	255	47	11,313	401.2
E	503	24.1	407	167.8	325	70	17,395	418.5

Table 3. Property-wide volume

DBH Class (in.)	Douglas-fir MBF	White fir MBF	Ponderosa pine MBF	Sugar pine MBF	Incense cedar MBF	Other spp. MBF	All Species MBF
10-16	2,901.7	589.0	839.8	-	185.8	18.3	4,534.6
16-22	5,272.1	805.9	2,120.4	15.9	387.6	70.4	8,672.3
22-28	6,135.7	990.1	3,823.6	42.8	348.7	39.1	11,379.9
28-34	3,941.0	599.4	3,604.1	13.7	253.5	-	8,411.7
34-40	1,551.3	90.9	1,818.3	124.0	108.7	-	3,693.1
>40	976.2	53.2	445.2	404.7	210.0	-	2,089.3
Total	**20,777.9**	**3,128.5**	**12,651.4**	**601.1**	**1,494.3**	**127.7**	**38,780.9**

Individual stand reports can be found in Appendix C.

5.0 Cruise Statistics

The forest inventory approach used here relies on sampling techniques to arrive at an *estimation* of the current stocking and volume at the stand level. As a result of the sampling techniques used, the presentation of stand level estimates must be accompanied by statements about the variability and uncertainty surrounding them. Stand level estimates are also aggregated at the cruise, or property level; we can calculate and report variability and uncertainty here, as well. Statistical statements related to inventory estimates are typically based on net volume.

As stated in the Executive Summary section of this report, we estimate that the Big Butte Springs Watershed currently has a total net volume of 38,781 MBF, +/-6.5%, at the 95% confidence interval. Our estimate of the average board foot volume per acre across the watershed is 16,788; this estimate ranges from 15,690 to 17,887 BdFt/ac, at the 95% confidence interval. Stand level estimates were calculated at the 80% confidence interval, and variability of board foot volume per acre ranges from +/-12% to +/-33%.

The degree of variability seen in an estimate of forest inventory is based on the sampling method or cruise design used, and the inherent variability of the stands being measured. In the case of the Big Butte Springs Watershed, variability within stands is perhaps the greatest contributor to the variability of the results presented here.

6.0 Site Index and Growth

The cruise design called for a minimum of five Site Index and growth sample trees to be measured in all cruise stands. This was not possible in every stand however, as current stand conditions posed challenges to finding good candidate site trees. We were able to collect a total of 106 site trees and 126 growth sample trees, providing us with site index estimates for 25 of the 26 total cruise stands, as well as incremental growth estimates for the entire property.

Site Index was calculated from site tree data using Dunning and Reineke's (1933) equations, simply referred to as "Dunning's Site Index." Dunning's Site Index provides us with a 50-year base age value and can be calculated across a mix of Douglas-fir, Ponderosa pine, and white fir, using tree height and breast height age. Table 4. provides a summary of the expressed site index observed across the watershed. Dunning's Site Index spans a range of values from a low of approximately 25 feet to a high value of approximately 110 feet. Most of the acres on the watershed fall in the middle-to-high end of the mid-range values, or what would commonly be considered "Site II" or "Site III." It is important to recognize that these expressed values are influenced by current stand conditions, and that carefully-planned management activities over time could effectively improve these values.

Table 4. Net Acres and Volume by Site Class

Site Index Group	Net Acres	Total MBF	DF	WF	PP	SP	IC	Other
<50	35	401	194	7	111	22	62	5
50-60	160	1,851	706	261	769	-	114	-
60-70	1,049	17,682	8,352	1,418	6,866	136	898	13
70-80	1,065	18,847	11,526	1,442	4,905	443	420	110
Total	**2,310**	**38,781**	**20,778**	**3,129**	**12,651**	**601**	**1,494**	**128**

Incremental growth was measured on all site trees. An additional 20 growth sample trees were measured that did not meet site tree requirements but were still sound enough for collecting growth data. For each growth sample tree, both 5- and 10-year growth was measured, to the 1/10th-inch. From the measurements taken, we estimate that annual diameter growth over the previous ten years (2008-2018), averaged approximately 0.17 in/year across the watershed, while growth over the past five years (2013-2018) averaged just over 0.16 in/year. The difference in these rates indicates a small, but noticeable slowing trend in diameter growth.

In addition to the growth calculations obtained from cruise data, we have also used the Inland California and Southern Cascades (CA) Variant of the USFS Forest Vegetation Simulator (FVS) to grow the inventory over a 100-year planning horizon. We have used the growth results from FVS to derive the annual growth rates shown in Table 5. Similar to what was observed with the diameter growth measured, FVS volume growth shows a slowing trend over time. When considering the growth rates presented in this table, it is important to keep in mind that the model is intended to mimic the behavior of the stands as they respond to natural processes only, using the current inventory as a baseline. No management activities are considered in this type of analysis. Management activities should, over time, result in an improvement in the average growth observed across the watershed. Obtaining a new forest inventory at some point in the future is the best means by which to observe and quantify this effect.

Over the next ten growth cycles, the average volume growth rate across the Big Butte Springs Watershed is projected to be approximately 1.5%. Individual stand growth rates across this same time period range from -0.3% to 6.5%, in any given year (negative rates occur when mortality exceeds growth during a single period).

Table 5. FVS-CA 100-year growth outlook

Year	MBF	PAI (bdft/ac)	% Growth
2018	38,781	*n/a*	*n/a*
2019	39,542	329	2.0%
2020	40,086	235	1.4%
2021	40,690	261	1.5%
2022	41,308	268	1.5%
2023	41,830	226	1.3%
2024	42,587	328	1.8%
2025	43,253	288	1.6%
2026	43,862	264	1.4%
2027	44,483	269	1.4%
2028	45,089	262	1.4%
2038	51,852	293	1.5%
2048	59,238	320	1.4%
2058	66,547	316	1.2%
2068	73,497	301	1.0%
2078	80,026	283	0.9%
2088	85,425	234	0.7%
2098	90,625	225	0.6%
2108	94,822	182	0.5%
2118	98,770	171	0.4%

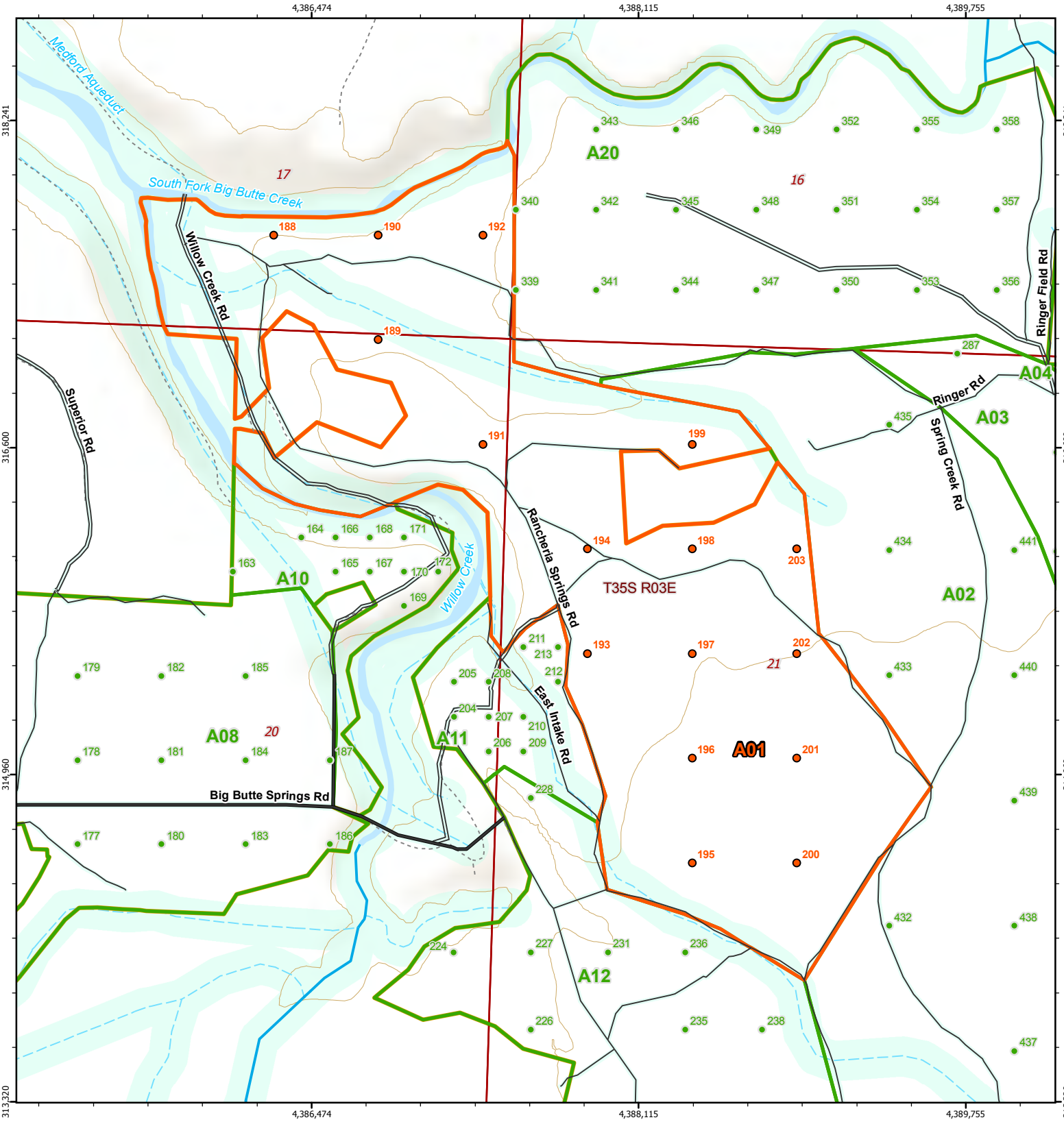
7.0 References

Dunning, Duncan, and Reineke, L.H. 1933. Preliminary Yield Tables for Second Growth Stands in the California Pine Region. U.S. Department of Agriculture, technical Bulletin No. 354. 23p.

Keyser, Chad E. comp. 2008 (revised May 9, 2012). Inland California and Southern Cascades (CA) Variant Overview – Forest Vegetation Simulator. Internal Rep. Fort Collins, CO: U. S. Department of Agriculture, Forest Service, Forest Management Service Center. 56p.

APPENDIX A

1. Topographic Cruise Maps
2. Aerial Cruise Maps



Medford Watershed Cruise 2019

- Cruise Plot
- Other Cruise Plot
- Cruise Stand
- Other Cruise Stand
- Other Stand
- Ownership
- Township
- Section
- 40ft Contour
- 200ft Contour
- Road/Stream Buffer
- Waterbody

Stream
- Large, Fish
- Medium, Fish
- Small, Fish
- Small, Nonfish/Unknown

City of Medford Road
- Paved Road
- Rock/Gravel Road
- Dirt Road

BLM Road
- Major
- Unknown

Stand ID:	A01	# of Plots:	16
Gross Acres:	133.05	Plot Spacing (ft):	525
Net Acres:	98.68	Plot Spacing (ch):	7.95
Cover Type:	DF/2/L		
Notes:			

MB&G
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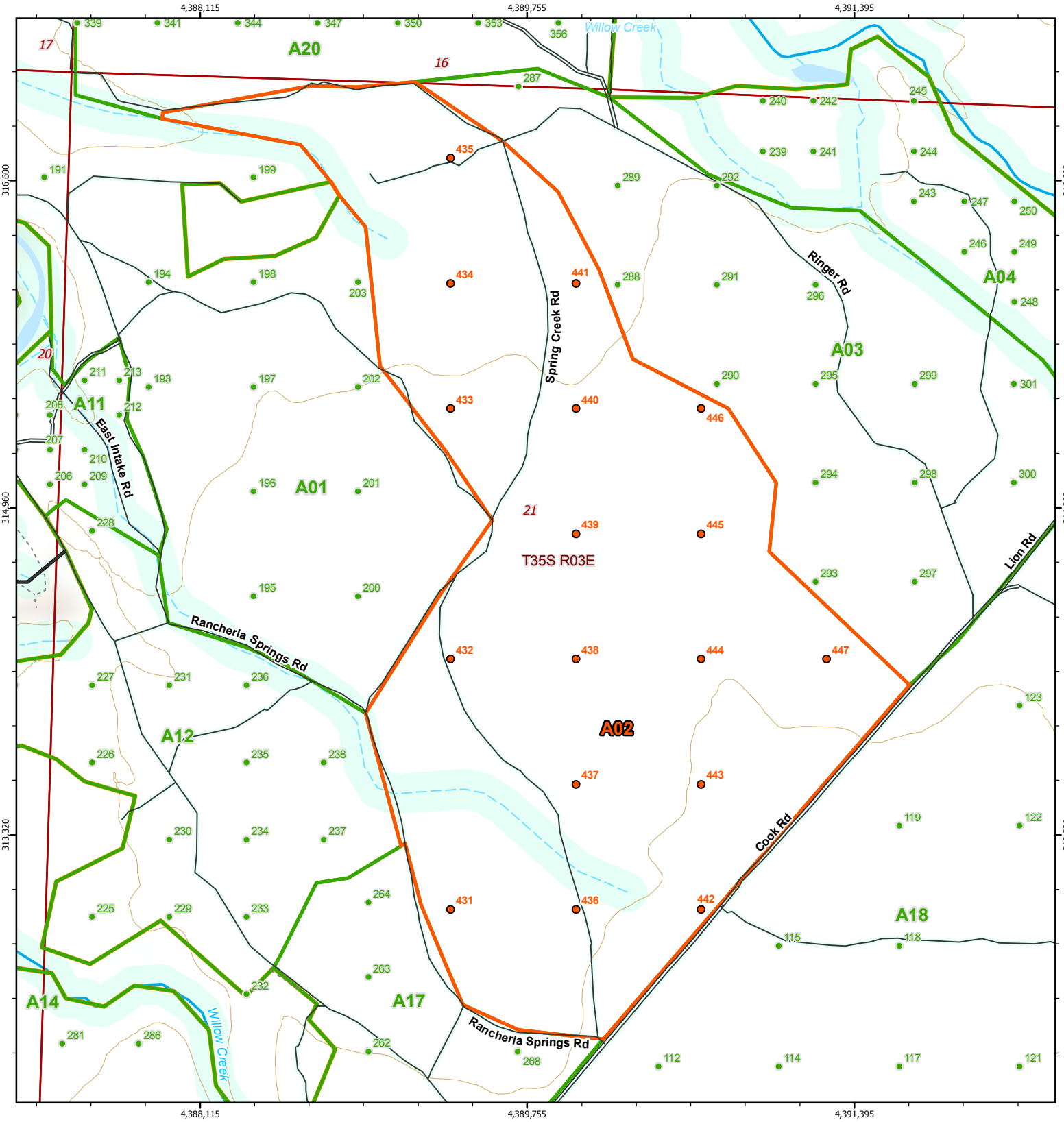
Natural Resource Consultants Since 1921

Scale = 1 chain
1:7,920
1 inch = 660 feet
0 250 500 feet

Stands current as of 01/11/2019. This product is for informational purposes only and may not be suitable for legal, engineering, or surveying purposes. Information is provided with the understanding that conclusions drawn are the responsibility of the user.
Basemap: Esri World Terrain
Coordinate System:
NAD_1983_StatePlane_Oregon_South_FIPS_3602_Feet
MWC_Cruise2019_contour.mxd 1/11/2019



Medford Watershed Cruise 2019

- Cruise Plot
- Other Cruise Plot
- Cruise Stand
- Other Cruise Stand
- Other Stand
- Ownership
- Township
- Section
- 40ft Contour
- 200ft Contour
- Road/Stream Buffer
- Waterbody
- Stream
  - Large, Fish
  - Medium, Fish
  - Small, Fish
  - Small, Nonfish/Unknown
- City of Medford Road
  - Paved Road
  - Rock/Gravel Road
  - Dirt Road
- BLM Road
  - Major
  - Unknown

Stand ID:	A02	# of Plots:	17
Gross Acres:	170.74	Plot Spacing (ft):	628
Net Acres:	156	Plot Spacing (ch):	9.52
Cover Type:	MX/1-2/L		
Notes:			

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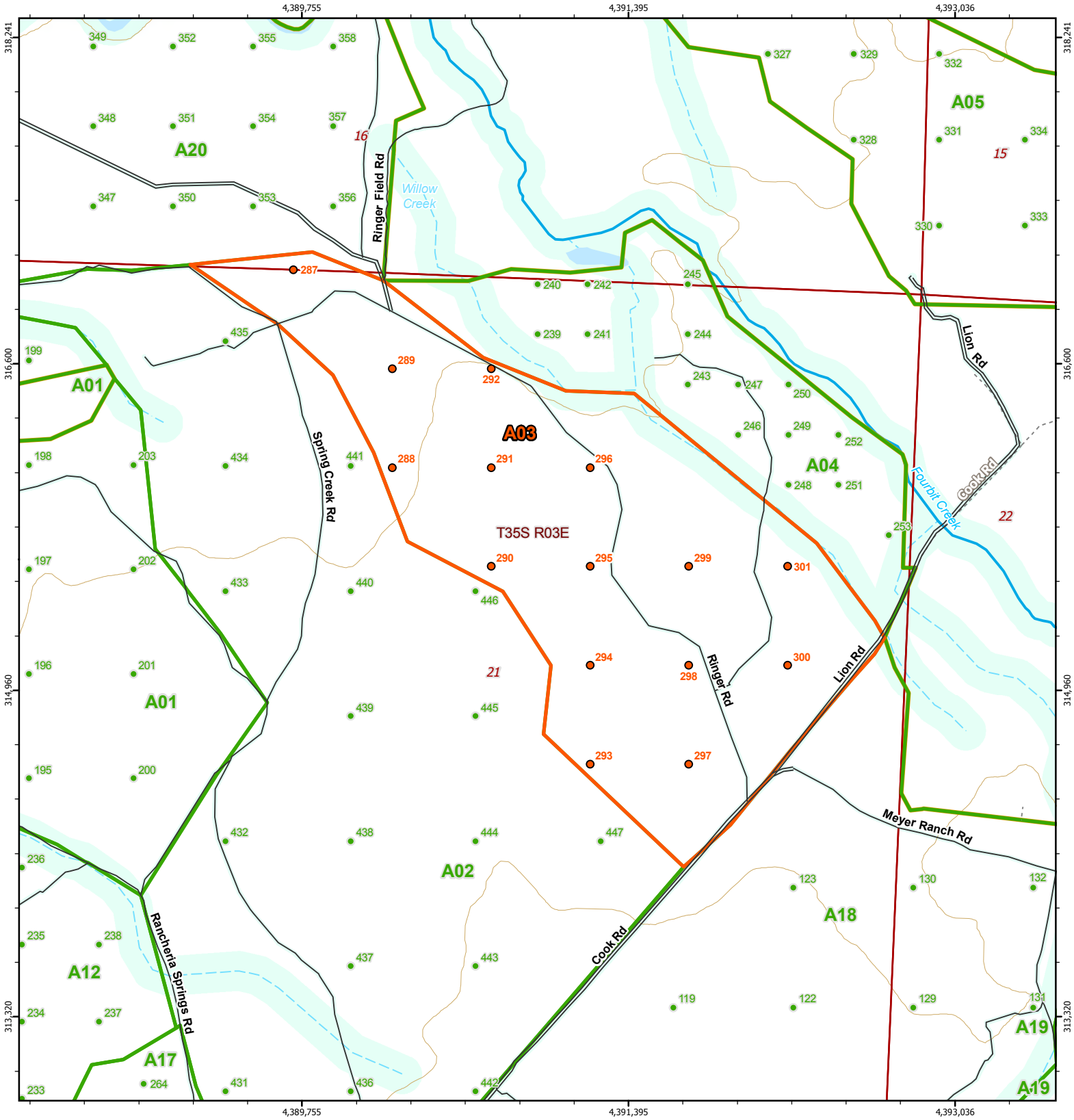

Medford Watershed Cruise 2019

- Cruise Plot
- Other Cruise Plot
- Cruise Stand
- Other Cruise Stand
- Other Stand
- Ownership
- Township
- Section
- 40ft Contour
- 200ft Contour
- Road/Stream Buffer
- Waterbody
- Stream
  - Large, Fish
  - Medium, Fish
  - Small, Fish
  - Small, Nonfish/Unknown
- City of Medford Road
  - Paved Road
  - Rock/Gravel Road
  - Dirt Road
- BLM Road
  - Major
  - Unknown

Stand ID:	A03	# of Plots:	15
Gross Acres:	90.92	Plot Spacing (ft):	497
Net Acres:	81.86	Plot Spacing (ch):	7.53
Cover Type:	PP-MX/2-3/M		
Notes:			

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1:7,920
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0 250 500 feet

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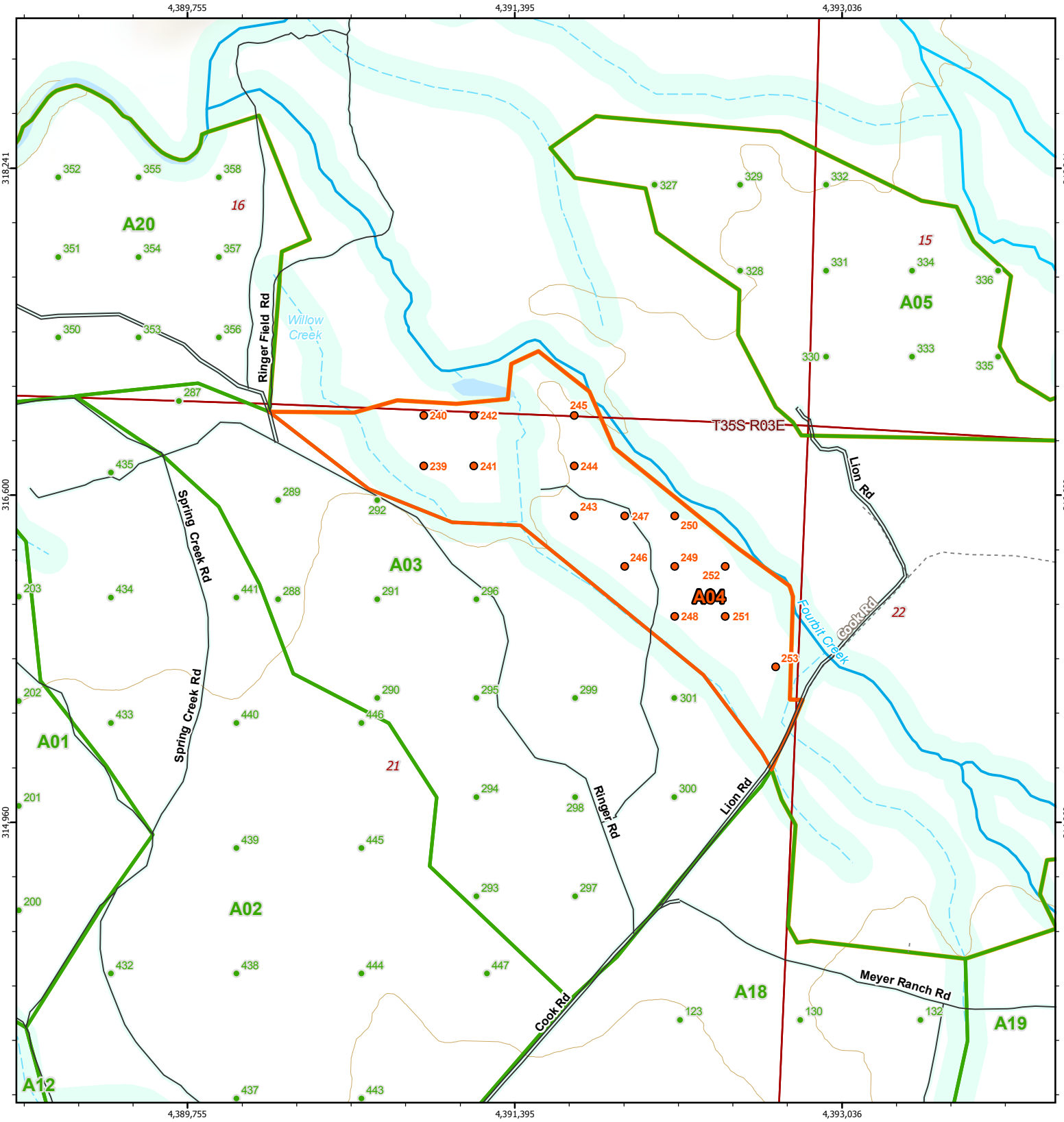

Medford Watershed Cruise 2019

- Cruise Plot
- Other Cruise Plot
- Cruise Stand
- Other Cruise Stand
- Other Stand
- Ownership
- Township
- Section
- 40ft Contour
- 200ft Contour
- Road/Stream Buffer
- Waterbody

Stream
- Large, Fish
- Medium, Fish
- Small, Fish
- Small, Nonfish/Unknown

City of Medford Road
- Paved Road
- Rock/Gravel Road
- Dirt Road

BLM Road
- Major
- Unknown

Stand ID:	A04	# of Plots:	15
Gross Acres:	38.86	Plot Spacing (ft):	252
Net Acres:	23.41	Plot Spacing (ch):	3.82
Cover Type:	MX/2/L		
Notes:			

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Scale = 1 chain
1:7,920
1 inch = 660 feet

0 250 500 feet

N

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Coordinate System:
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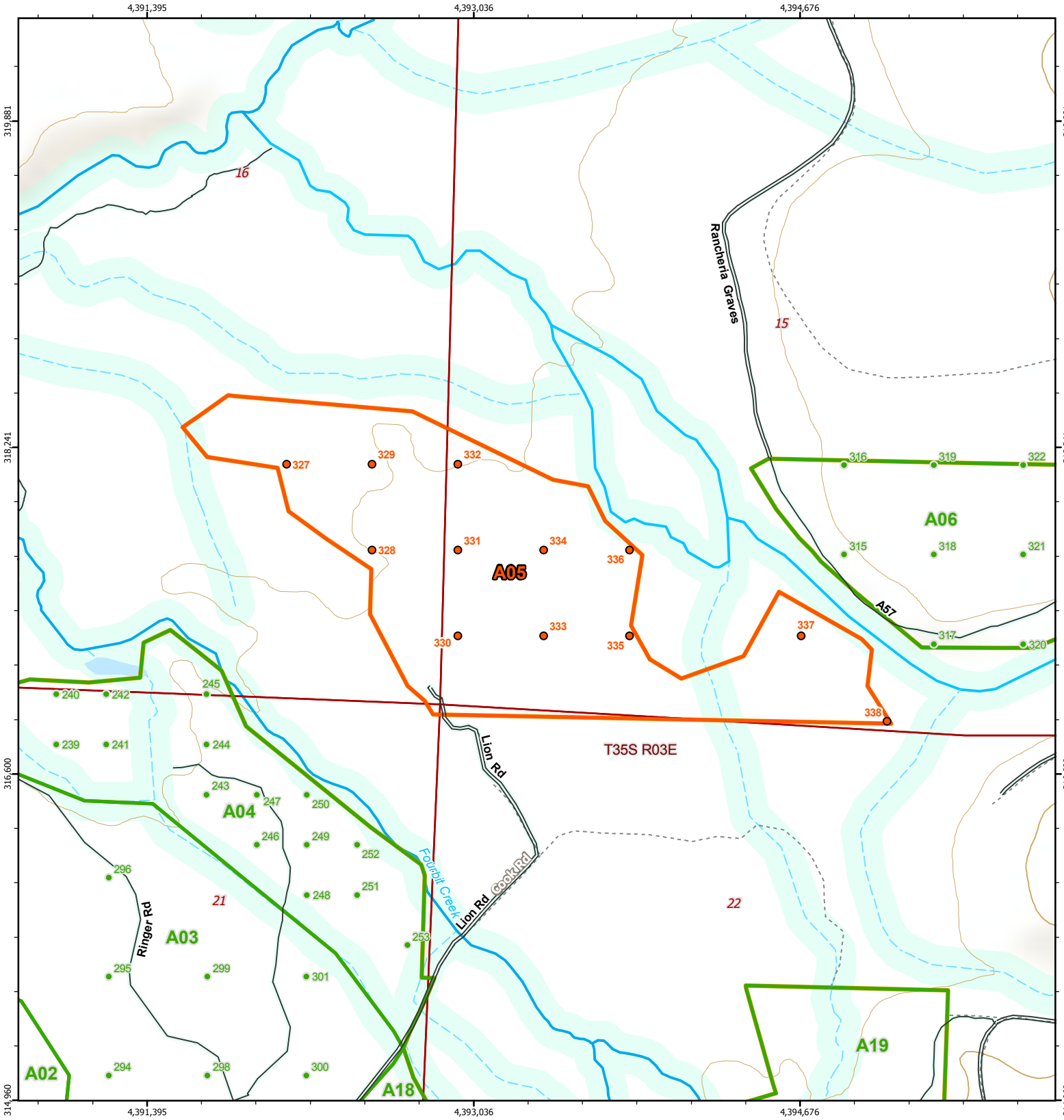
MWC_Cruise2019_contour.mxd 1/11/2019



Medford Watershed Cruise 2019

- Cruise Plot
- Other Cruise Plot
- Cruise Stand
- Other Cruise Stand
- Other Stand
- Ownership
- Township
- Section
- 40ft Contour
- 200ft Contour
- Road/Stream Buffer
- Waterbody

Stream
- Large, Fish
- Medium, Fish
- Small, Fish
- Small, Nonfish/Unknown

City of Medford Road
- Paved Road
- Rock/Gravel Road
- Dirt Road

BLM Road
- Major
- Unknown

Stand ID:	A05	# of Plots:	12
Gross Acres:	58.97	Plot Spacing (ft):	431
Net Acres:	56.72	Plot Spacing (ch):	6.53
Cover Type:	MX/2-3/L		
Notes:			

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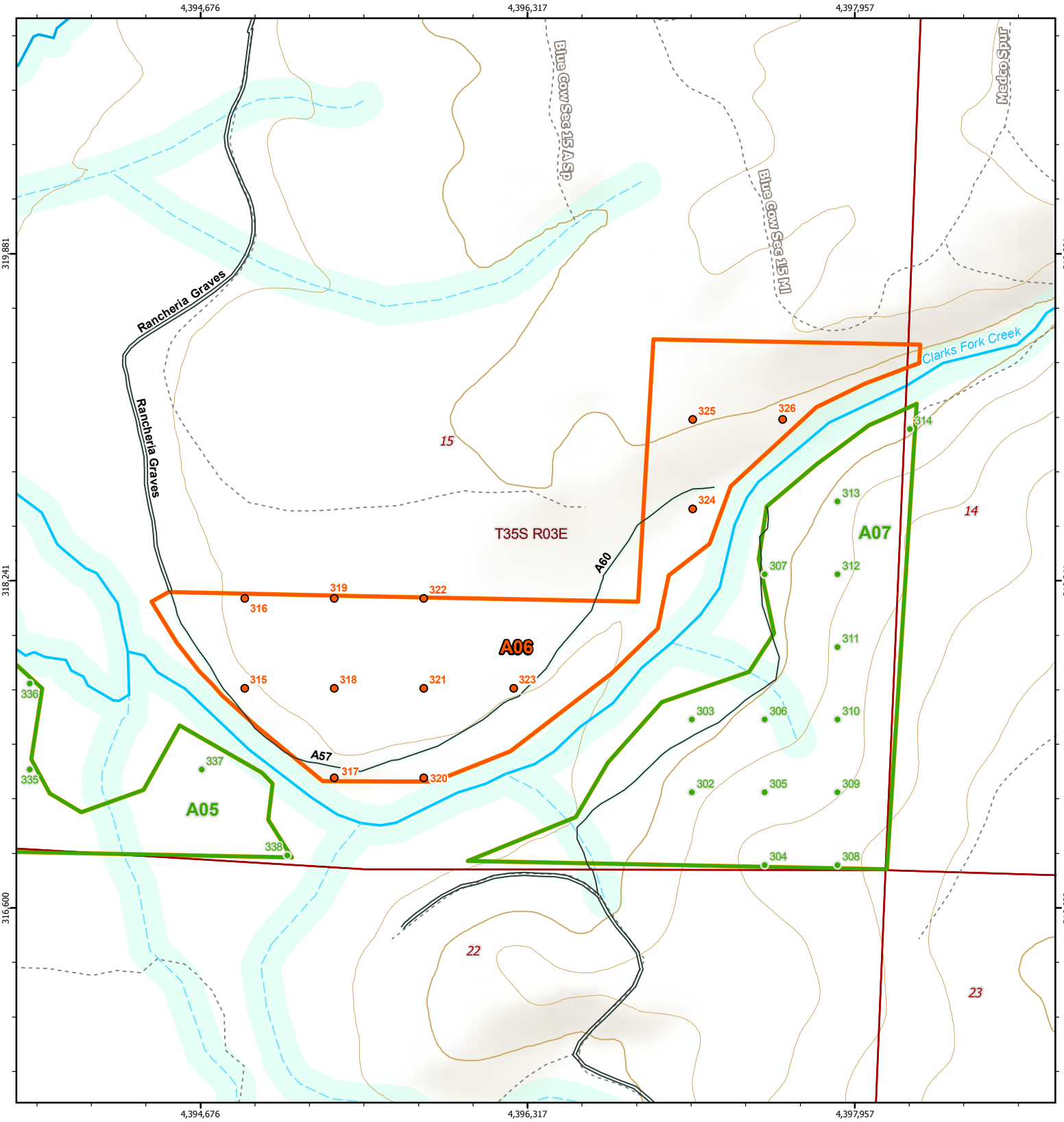

Medford Watershed Cruise 2019

- Cruise Plot
- Other Cruise Plot
- Cruise Stand
- Other Cruise Stand
- Other Stand
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- Township
- Section
- 40ft Contour
- 200ft Contour
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- Medium, Fish
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- Small, Nonfish/Unknown

City of Medford Road
- Paved Road
- Rock/Gravel Road
- Dirt Road

BLM Road
- Major
- Unknown

Stand ID:	A06	# of Plots:	12
Gross Acres:	56.41	Plot Spacing (ft):	450
Net Acres:	54.33	Plot Spacing (ch):	6.81
Cover Type:	MX/1-2/L		
Notes:			

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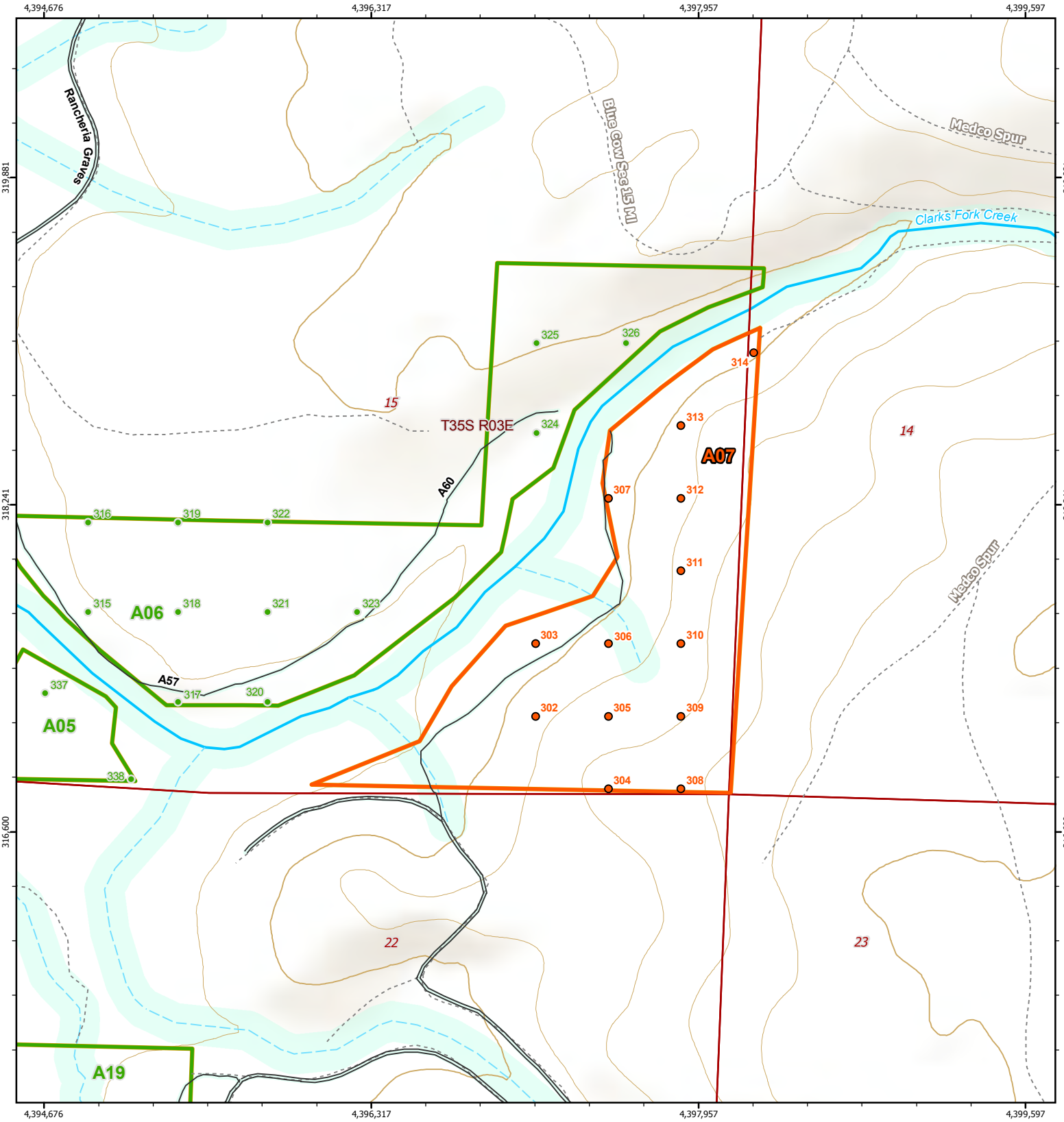

Medford Watershed Cruise 2019

- Cruise Plot
- Other Cruise Plot
- Cruise Stand
- Other Cruise Stand
- Other Stand
- Ownership
- Township
- Section
- 40ft Contour
- 200ft Contour
- Road/Stream Buffer
- Waterbody

Stream
- Large, Fish
- Medium, Fish
- Small, Fish
- Small, Nonfish/Unknown

City of Medford Road
- Paved Road
- Rock/Gravel Road
- Dirt Road

BLM Road
- Major
- Unknown

Stand ID:	A07	# of Plots:	13
Gross Acres:	50.45	Plot Spacing (ft):	364
Net Acres:	46.06	Plot Spacing (ch):	5.52
Cover Type:	MX/1-2/L		
Notes:			

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Natural Resource Consultants Since 1921

Scale = 1 chain
1:7,920
1 inch = 660 feet

0 250 500 feet

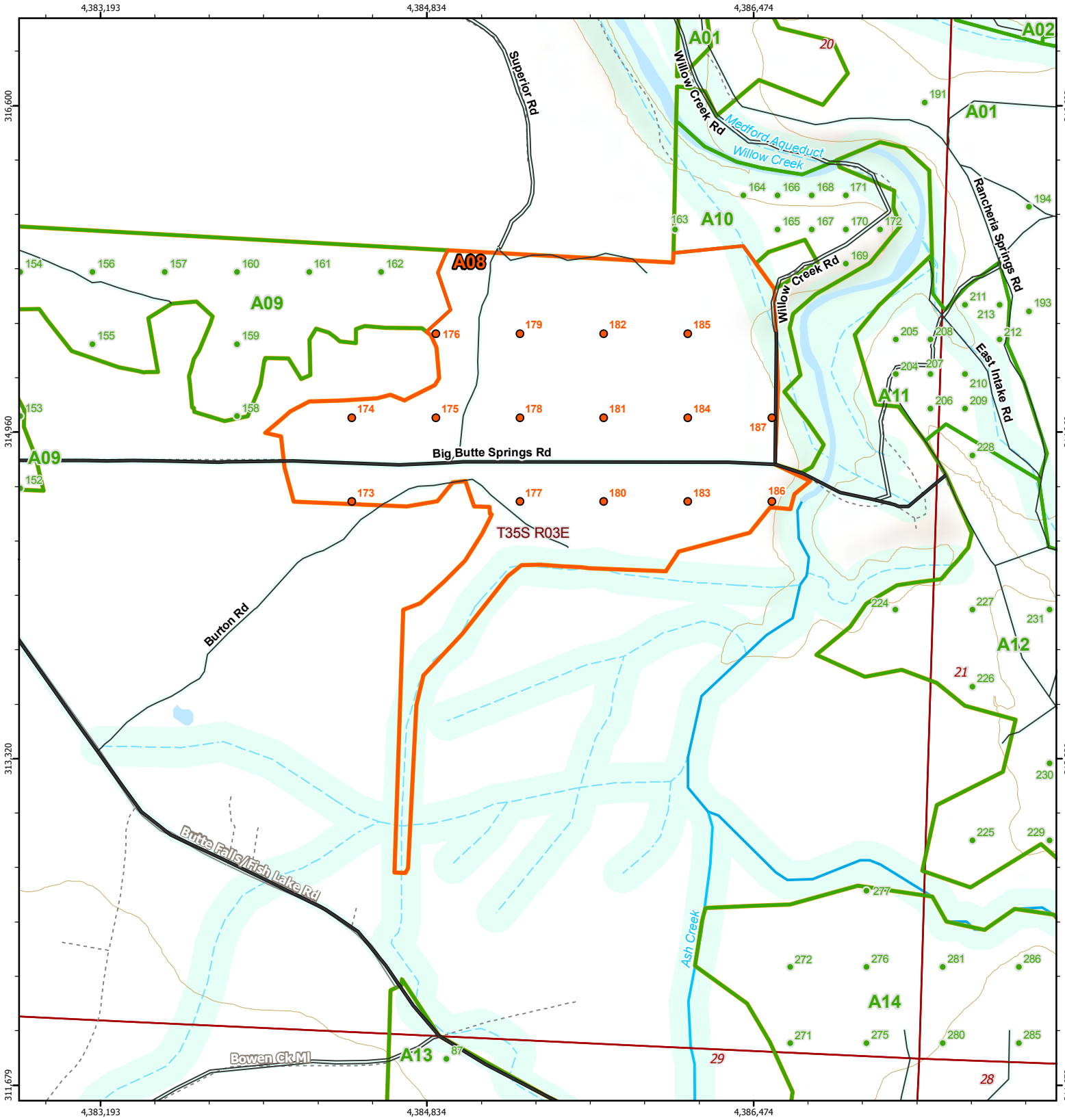
N

Stands current as of 01/11/2019. This product is for informational purposes only and may not be suitable for legal, engineering, or surveying purposes. Information is provided with the understanding that conclusions drawn are the responsibility of the user.

Basemap: Esri World Terrain

Coordinate System:
NAD_1983_StatePlane_Oregon_South_FIPS_3602_Feet

MWC_Cruise2019_contour.mxd 1/11/2019



Medford Watershed Cruise 2019

- Cruise Plot
- Other Cruise Plot
- Cruise Stand
- Other Cruise Stand
- Other Stand
- Ownership
- Township
- Section
- 40ft Contour
- 200ft Contour
- Road/Stream Buffer
- Waterbody

Stream
- Large, Fish
- Medium, Fish
- Small, Fish
- Small, Nonfish/Unknown

City of Medford Road
- Paved Road
- Rock/Gravel Road
- Dirt Road

BLM Road
- Major
- Unknown

Stand ID:	A08	# of Plots:	15
Gross Acres:	72.35	Plot Spacing (ft):	422
Net Acres:	61.15	Plot Spacing (ch):	6.39
Cover Type:	MX/2/M		
Notes:			

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Scale = 1 chain
1:7,920
1 inch = 660 feet
0 250 500 feet

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Basemap: Esri World Terrain
Coordinate System:
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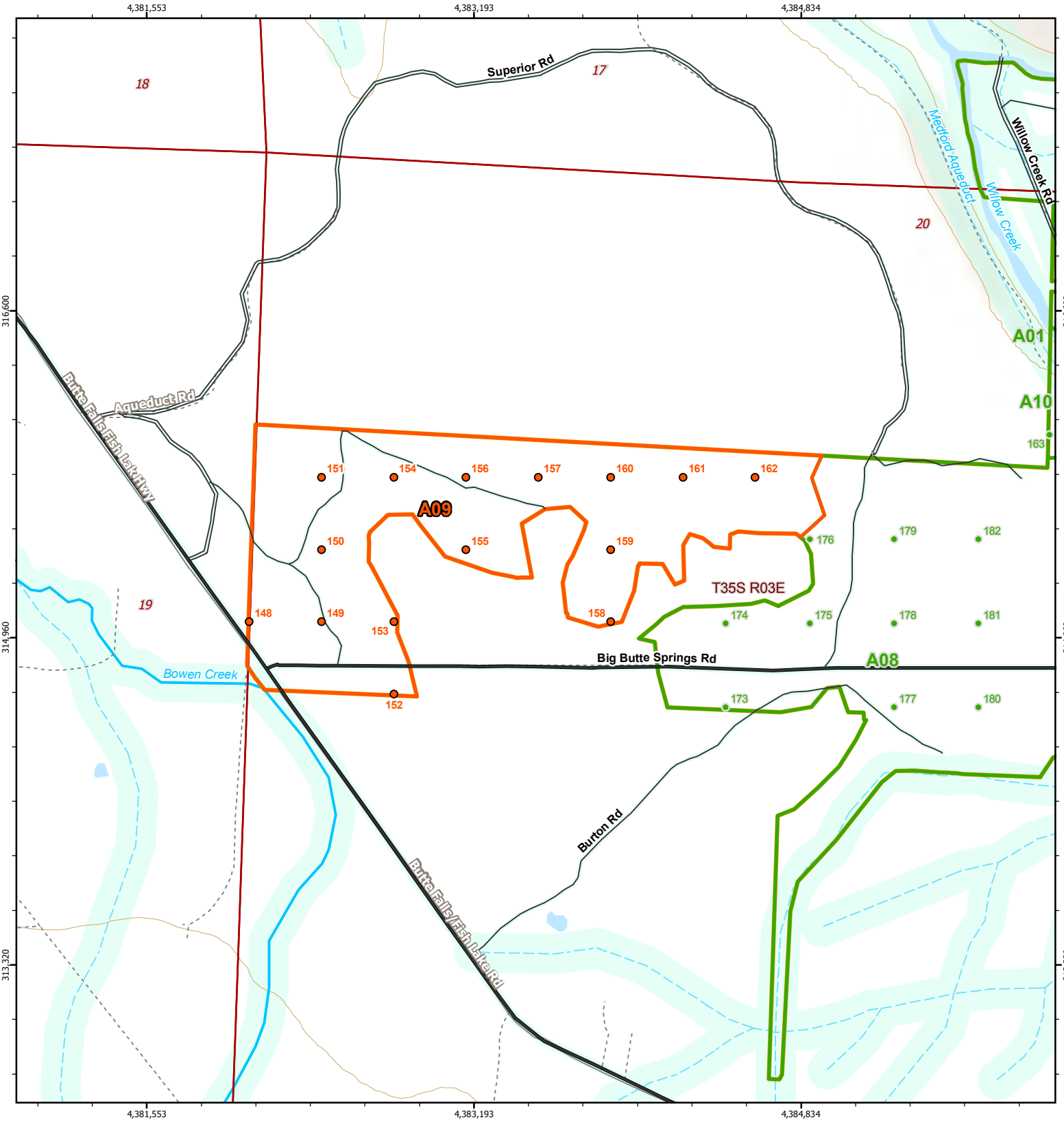
MWC_Cruise2019_contour.mxd 1/11/2019



Medford Watershed Cruise 2019

- Cruise Plot
- Other Cruise Plot
- Cruise Stand
- Other Cruise Stand
- Other Stand
- Ownership
- Township
- Section
- 40ft Contour
- 200ft Contour
- Road/Stream Buffer
- Waterbody

Stream
- Large, Fish
- Medium, Fish
- Small, Fish
- Small, Nonfish/Unknown

City of Medford Road
- Paved Road
- Rock/Gravel Road
- Dirt Road

BLM Road
- Major
- Unknown

Stand ID:	A09	# of Plots:	15
Gross Acres:	48.68	Plot Spacing (ft):	362
Net Acres:	46.09	Plot Spacing (ch):	5.49
Cover Type:	MX/2/L		
Notes:			

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Scale = 1 chain
1:7,920
1 inch = 660 feet
0 250 500 feet

Stands current as of 01/11/2019. This product is for informational purposes only and may not be suitable for legal, engineering, or surveying purposes. Information is provided with the understanding that conclusions drawn are the responsibility of the user.
Basemap: Esri World Terrain
Coordinate System:
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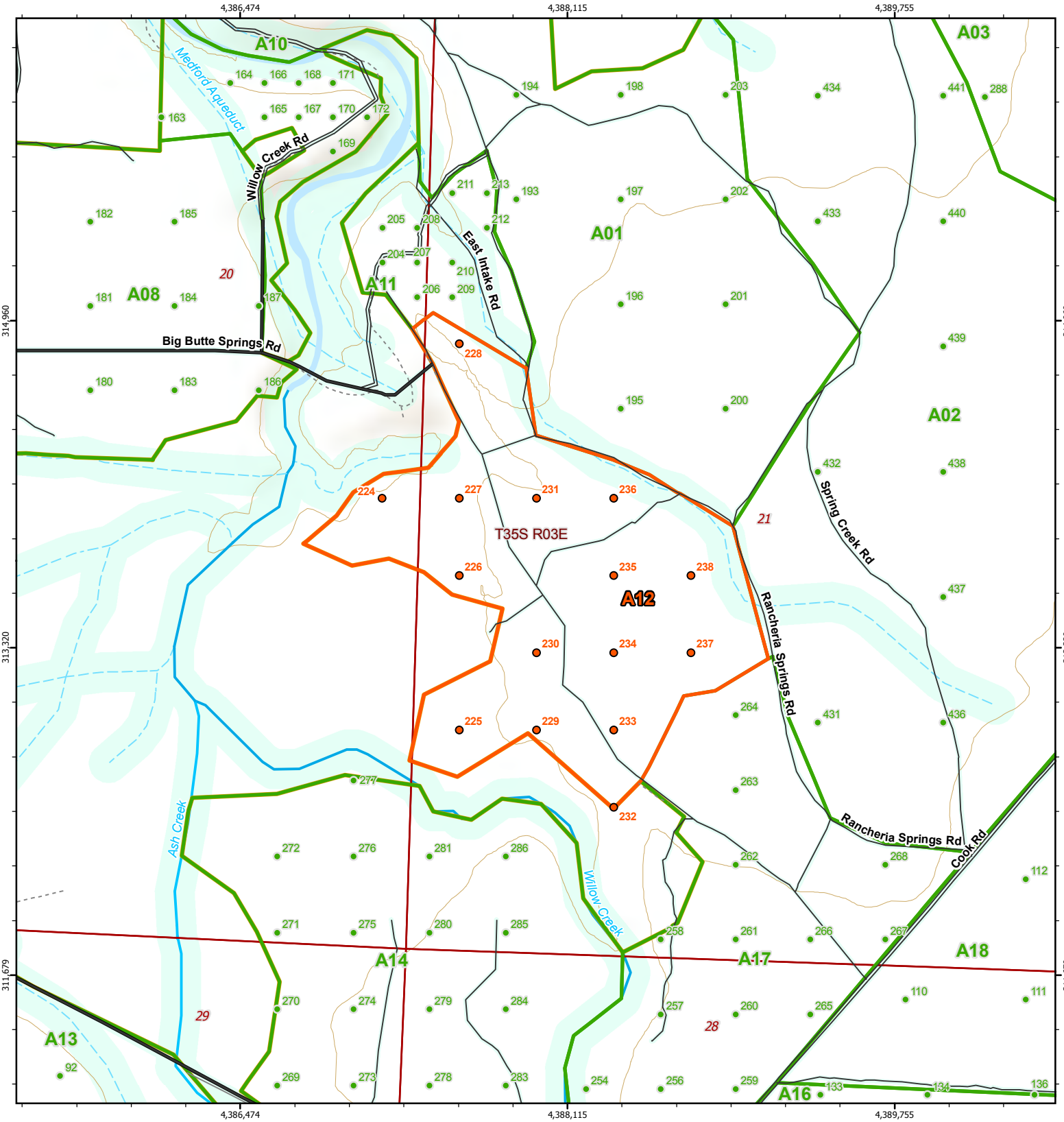
MWC_Cruise2019_contour.mxd 1/11/2019



Medford Watershed Cruise 2019

- Cruise Plot
- Other Cruise Plot
- Cruise Stand
- Other Cruise Stand
- Other Stand
- Ownership
- Township
- Section
- 40ft Contour
- 200ft Contour
- Road/Stream Buffer
- Waterbody

Stream
- Large, Fish
- Medium, Fish
- Small, Fish
- Small, Nonfish/Unknown

City of Medford Road
- Paved Road
- Rock/Gravel Road
- Dirt Road

BLM Road
- Major
- Unknown

Stand ID:	A12	# of Plots:	15
Gross Acres:	59.75	Plot Spacing (ft):	387
Net Acres:	51.99	Plot Spacing (ch):	5.87
Cover Type:	DF/3/L		
Notes:			

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Scale = 1 chain
1:7,920
1 inch = 660 feet
0 250 500 feet

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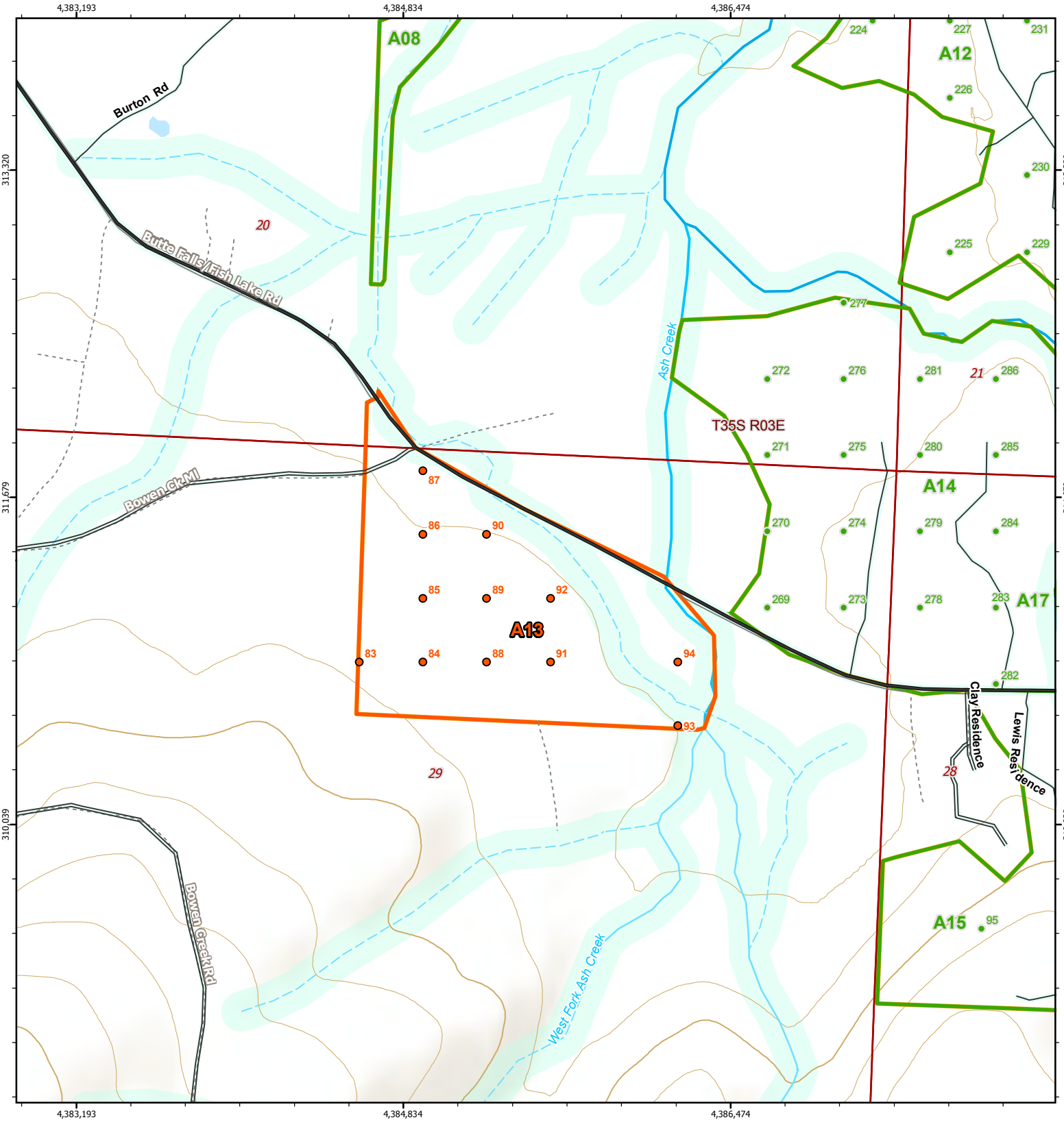
Basemap: Esri World Terrain
Coordinate System:
NAD_1983_StatePlane_Oregon_South_FIPS_3602_Feet
MWC_Cruise2019_contour.mxd 1/11/2019



Medford Watershed Cruise 2019

- Cruise Plot
- Other Cruise Plot
- Cruise Stand
- Other Cruise Stand
- Other Stand
- Ownership
- Township
- Section
- 40ft Contour
- 200ft Contour
- Road/Stream Buffer
- Waterbody

Stream
- Large, Fish
- Medium, Fish
- Small, Fish
- Small, Nonfish/Unknown

City of Medford Road
- Paved Road
- Rock/Gravel Road
- Dirt Road

BLM Road
- Major
- Unknown

Stand ID:	A13	# of Plots:	12
Gross Acres:	42.63	Plot Spacing (ft):	320
Net Acres:	32.32	Plot Spacing (ch):	4.84
Cover Type:	MX/3/L-mx1		
Notes:			

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Natural Resource Consultants Since 1921

Scale = 1 chain
1:7,920
1 inch = 660 feet
0 250 500 feet

N

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Basemap: Esri World Terrain
Coordinate System:
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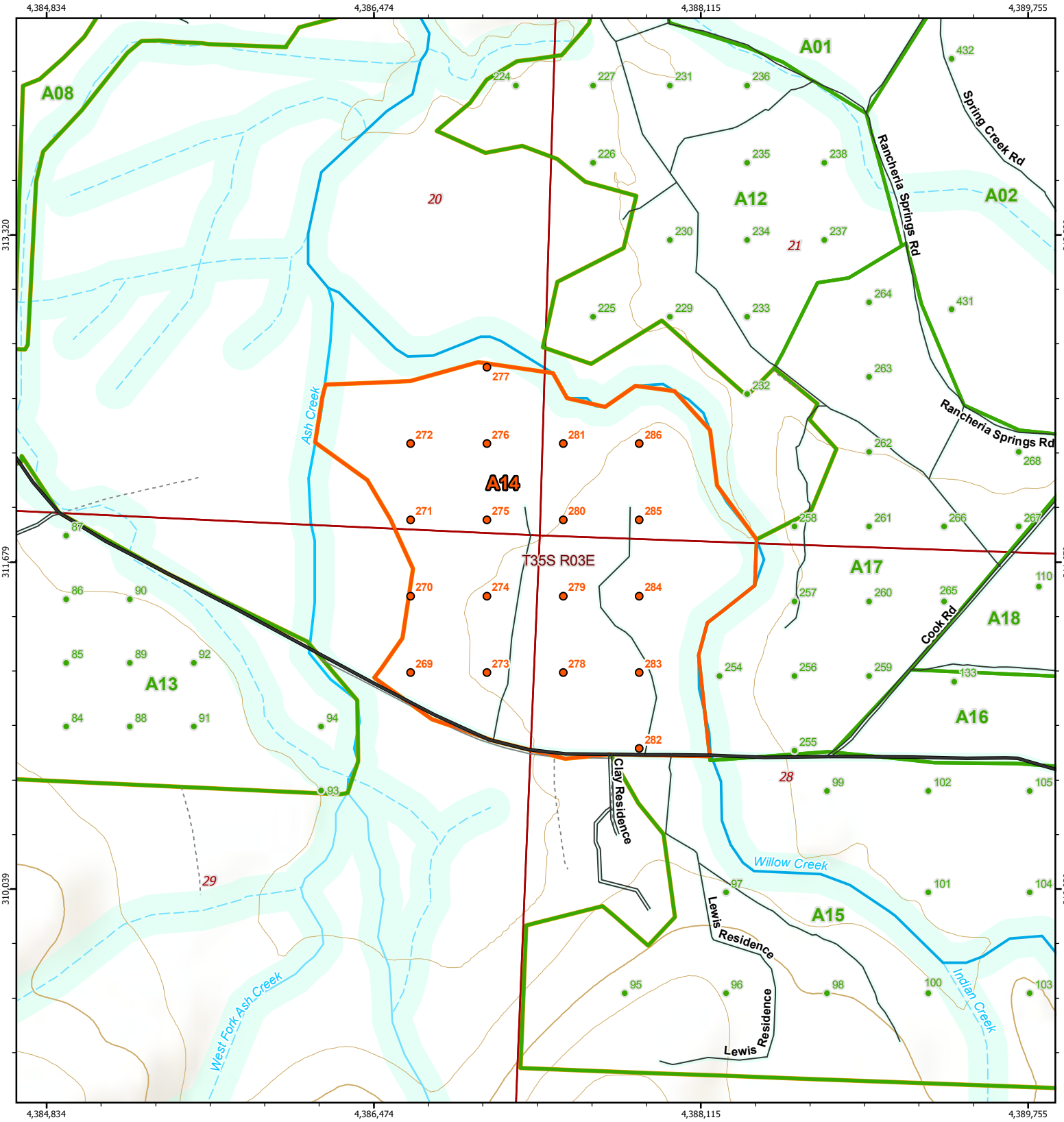

Medford Watershed Cruise 2019

- Cruise Plot
- Other Cruise Plot
- Cruise Stand
- Other Cruise Stand
- Other Stand
- Ownership
- Township
- Section
- 40ft Contour
- 200ft Contour
- Road/Stream Buffer
- Waterbody

Stream
- Large, Fish
- Medium, Fish
- Small, Fish
- Small, Nonfish/Unknown

City of Medford Road
- Paved Road
- Rock/Gravel Road
- Dirt Road

BLM Road
- Major
- Unknown

Stand ID:	A14	# of Plots:	18
Gross Acres:	71.09	Plot Spacing (ft):	382
Net Acres:	61.27	Plot Spacing (ch):	5.79
Cover Type:	DF-MX/2-3/M		
Notes:			

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Scale = 1 chain
1:7,920
1 inch = 660 feet
0 250 500 feet

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Basemap: Esri World Terrain
Coordinate System:
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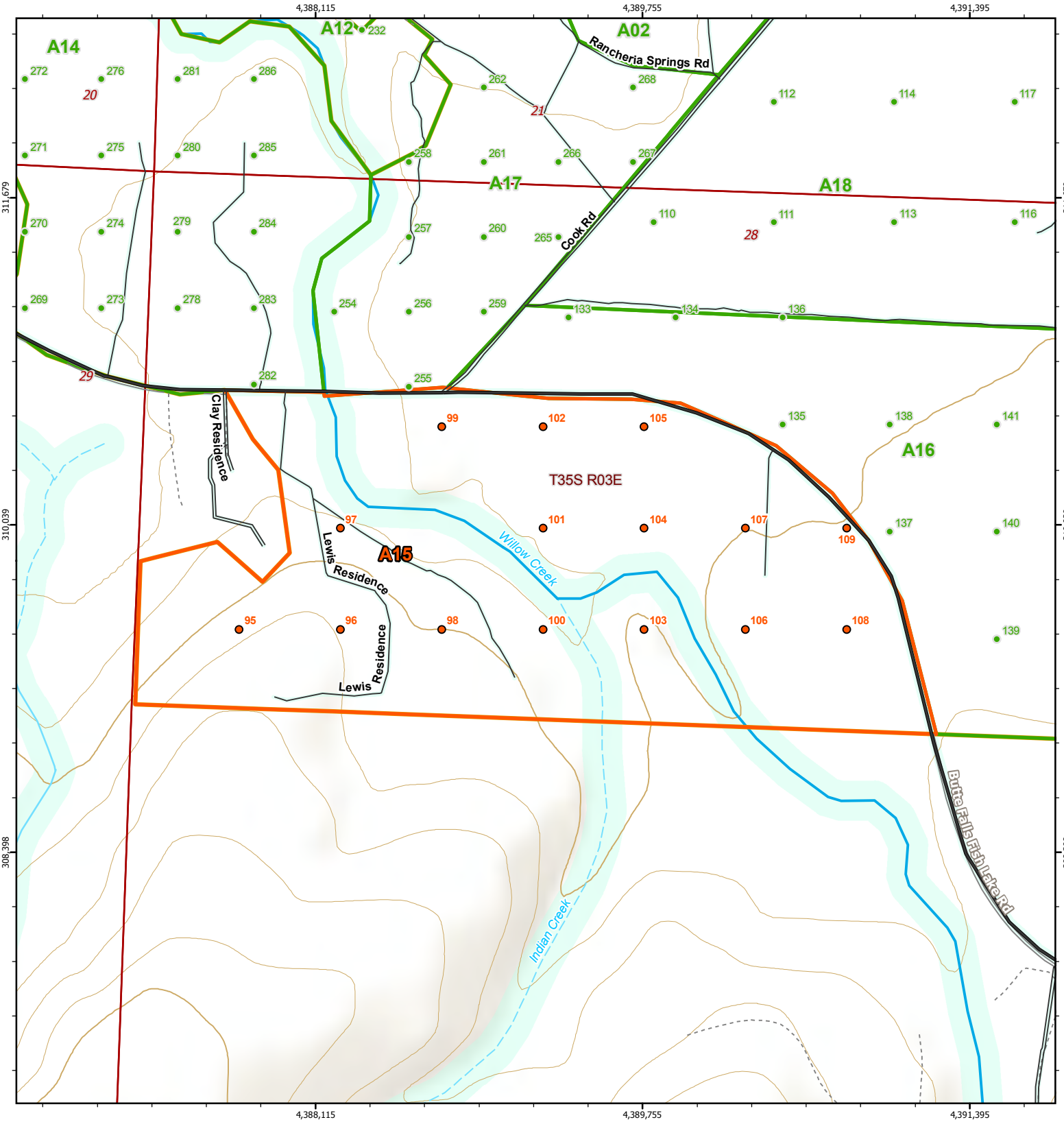
MWC_Cruise2019_contour.mxd 1/11/2019



Medford Watershed Cruise 2019

- Cruise Plot
- Other Cruise Plot
- Cruise Stand
- Other Cruise Stand
- Other Stand
- Ownership
- Township
- Section
- 40ft Contour
- 200ft Contour
- Road/Stream Buffer
- Waterbody

Stream
- Large, Fish
- Medium, Fish
- Small, Fish
- Small, Nonfish/Unknown

City of Medford Road
- Paved Road
- Rock/Gravel Road
- Dirt Road

BLM Road
- Major
- Unknown

Stand ID:	A15	# of Plots:	15
Gross Acres:	121.98	Plot Spacing (ft):	508
Net Acres:	99.52	Plot Spacing (ch):	7.69
Cover Type:	DF-MX/3/L		
Notes:			

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Natural Resource Consultants Since 1921

Scale = 1 chain
1:7,920
1 inch = 660 feet

0 250 500 feet

N

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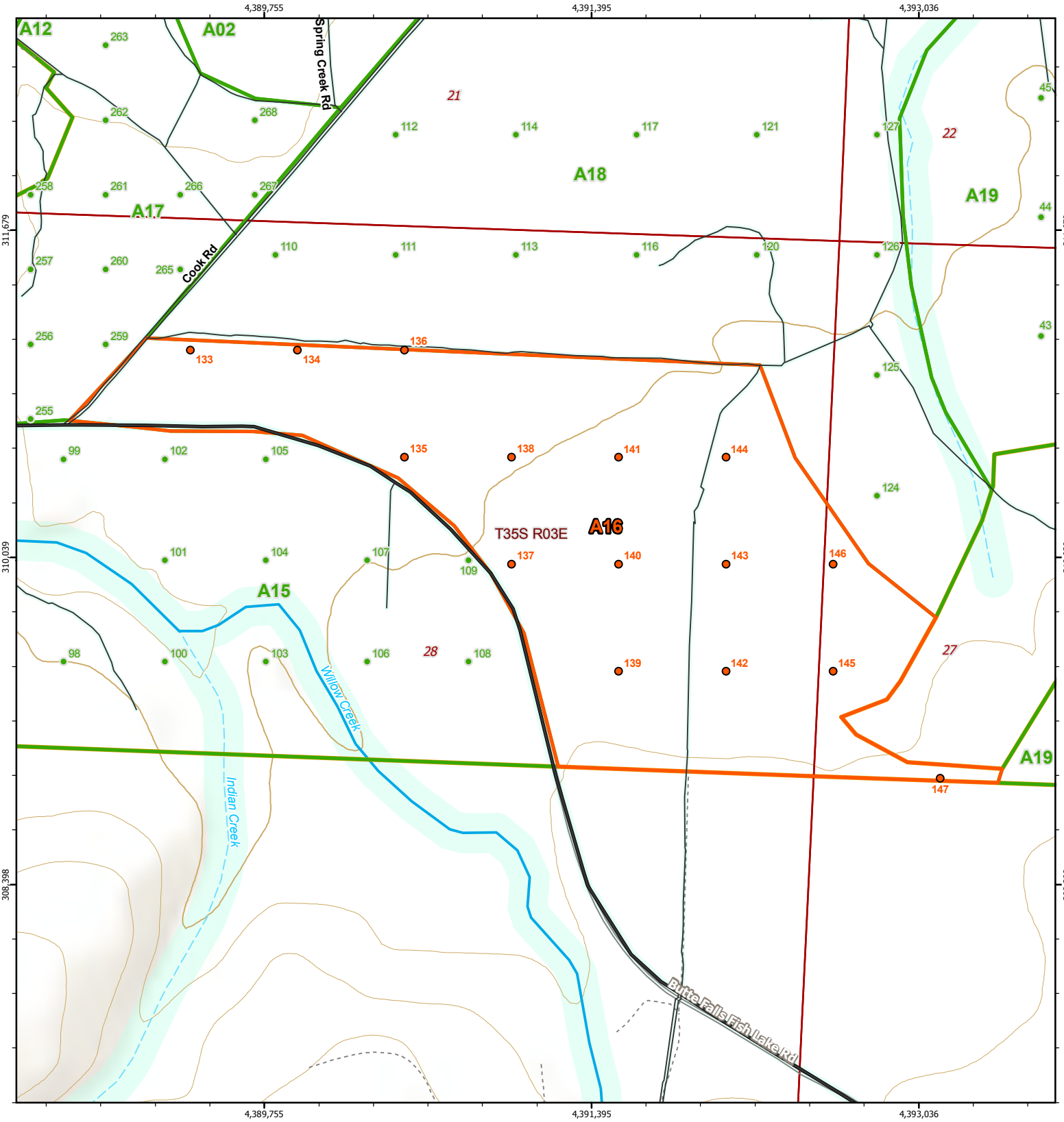
Basemap: Esri World Terrain

Coordinate System:
NAD_1983_StatePlane_Oregon_South_FIPS_3602_Feet

MWC_Cruise2019_contour.mxd 1/11/2019



Medford Watershed Cruise 2019

- Cruise Plot
- Other Cruise Plot
- Cruise Stand
- Other Cruise Stand
- Other Stand
- Ownership
- Township
- Section
- 40ft Contour
- 200ft Contour
- Road/Stream Buffer
- Waterbody

Stream
- Large, Fish
- Medium, Fish
- Small, Fish
- Small, Nonfish/Unknown

City of Medford Road
- Paved Road
- Rock/Gravel Road
- Dirt Road

BLM Road
- Major
- Unknown

Stand ID:	A16	# of Plots:	15
Gross Acres:	107.54	Plot Spacing (ft):	537
Net Acres:	104.24	Plot Spacing (ch):	8.14
Cover Type:	MX/3/M		
Notes:			

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Natural Resource Consultants Since 1921

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1:7,920
1 inch = 660 feet

0 250 500 feet

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Coordinate System:
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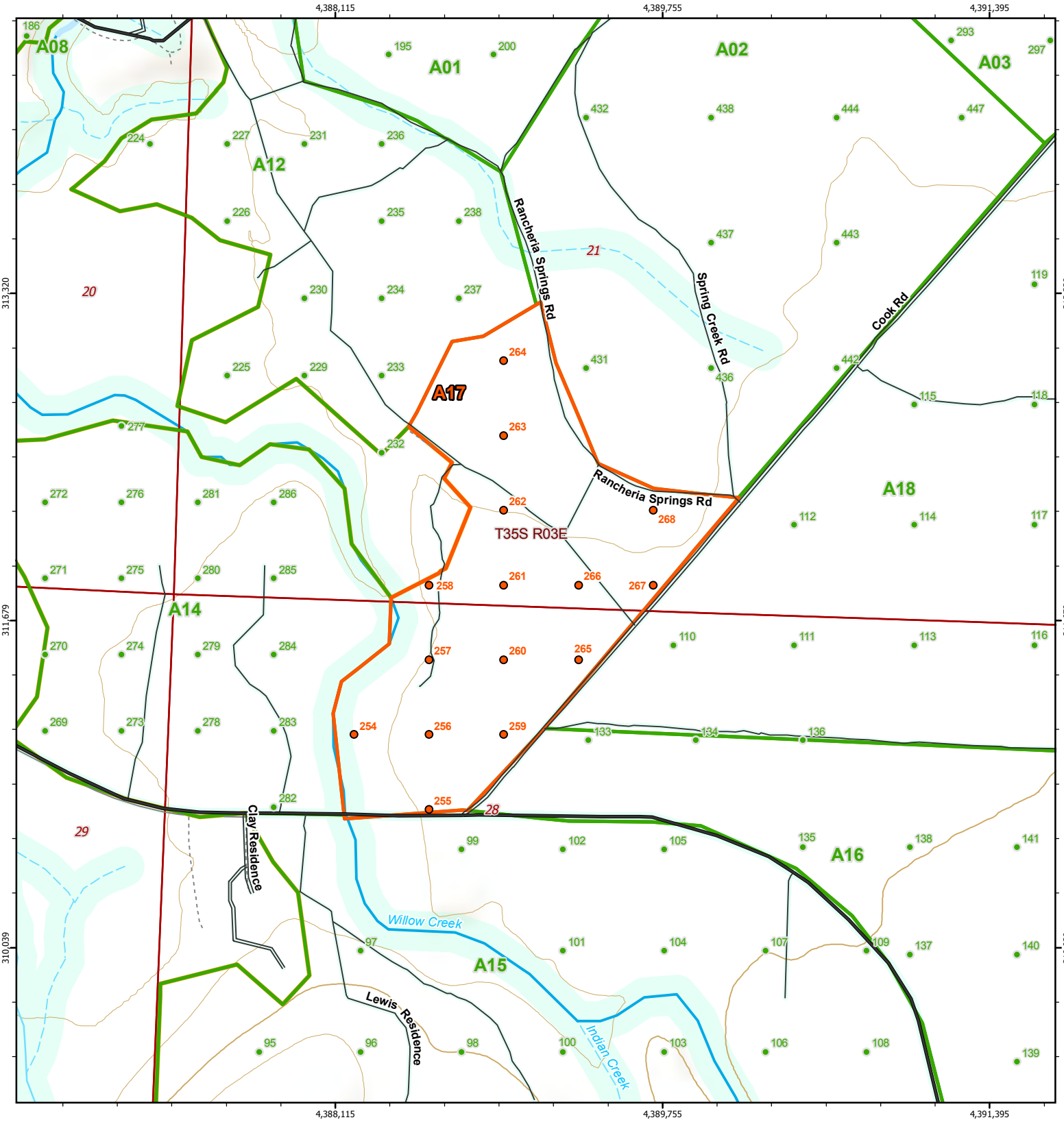
MWC_Cruise2019_contour.mxd 1/11/2019



Medford Watershed Cruise 2019

- Cruise Plot
- Other Cruise Plot
- Cruise Stand
- Other Cruise Stand
- Other Stand
- Ownership
- Township
- Section
- 40ft Contour
- 200ft Contour
- Road/Stream Buffer
- Waterbody

Stream
- Large, Fish
- Medium, Fish
- Small, Fish
- Small, Nonfish/Unknown

City of Medford Road
- Paved Road
- Rock/Gravel Road
- Dirt Road

BLM Road
- Major
- Unknown

Stand ID:	A17	# of Plots:	15
Gross Acres:	55.09	Plot Spacing (ft):	375
Net Acres:	49.35	Plot Spacing (ch):	5.68
Cover Type:	DF-MX/2/L		
Notes:			

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Natural Resource Consultants Since 1921

Scale = 1 chain
1:7,920
1 inch = 660 feet
0 250 500 feet

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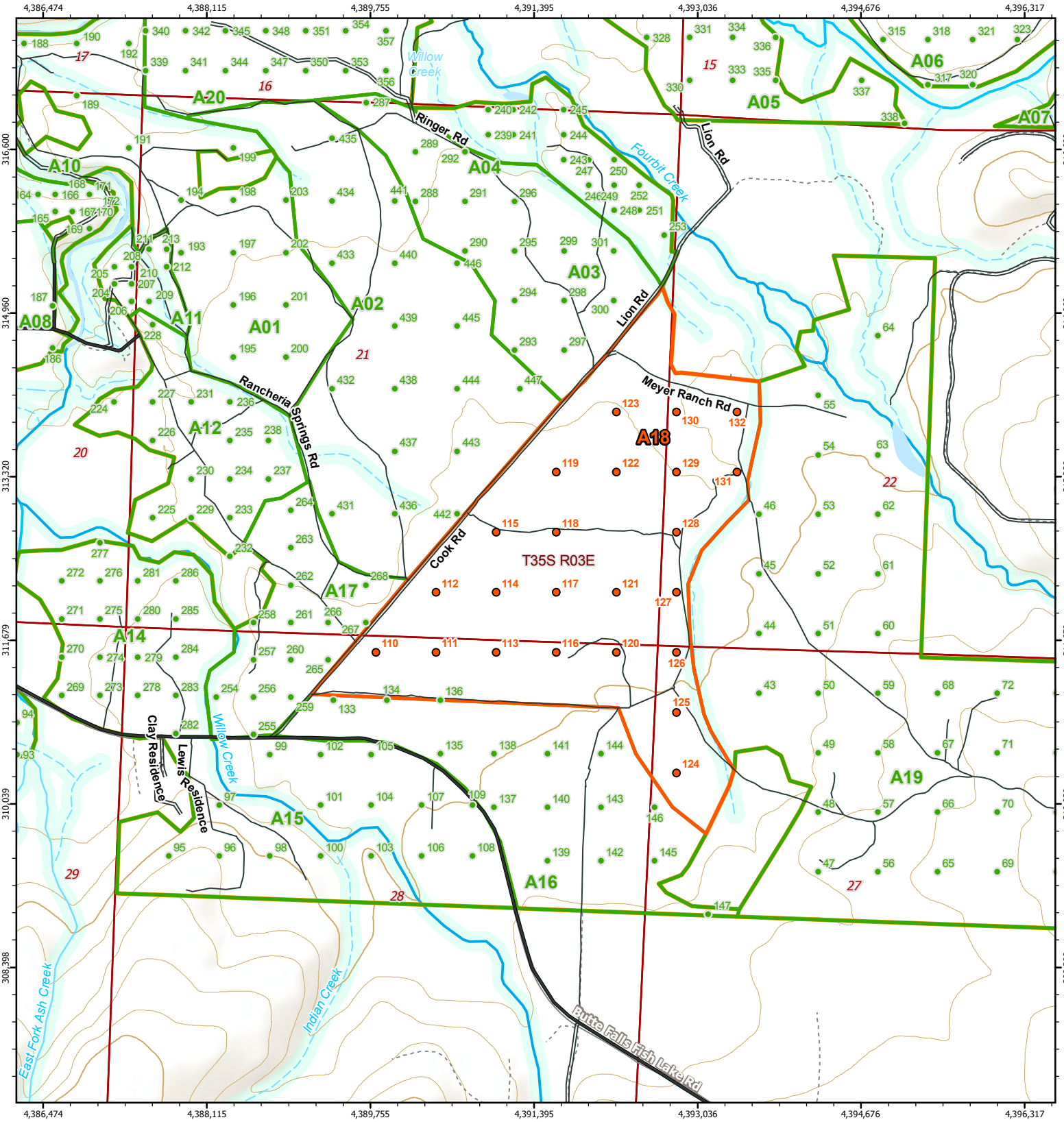
Basemap: Esri World Terrain
Coordinate System:
NAD_1983_StatePlane_Oregon_South_FIPS_3602_Feet
MWC_Cruise2019_contour.mxd 1/11/2019



Medford Watershed Cruise 2019

- Cruise Plot
- Other Cruise Plot
- Cruise Stand
- Other Cruise Stand
- Other Stand
- Ownership
- Township
- Section
- 40ft Contour
- 200ft Contour
- Road/Stream Buffer
- Waterbody

Stream
- Large, Fish
- Medium, Fish
- Small, Fish
- Small, Nonfish/Unknown

City of Medford Road
- Paved Road
- Rock/Gravel Road
- Dirt Road

BLM Road
- Major
- Unknown

Stand ID:	A18	# of Plots:	23
Gross Acres:	238.17	Plot Spacing (ft):	603
Net Acres:	217.61	Plot Spacing (ch):	9.14
Cover Type:	MX/1-2/L		
Notes:			

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Natural Resource Consultants Since 1921

Scale = 2 chains
1:15,840
1 inch = 1,320 feet
0 250 500 feet

Stands current as of 01/11/2019. This product is for informational purposes only and may not be suitable for legal, engineering, or surveying purposes. Information is provided with the understanding that conclusions drawn are the responsibility of the user.
Basemap: Esri World Terrain
Coordinate System:
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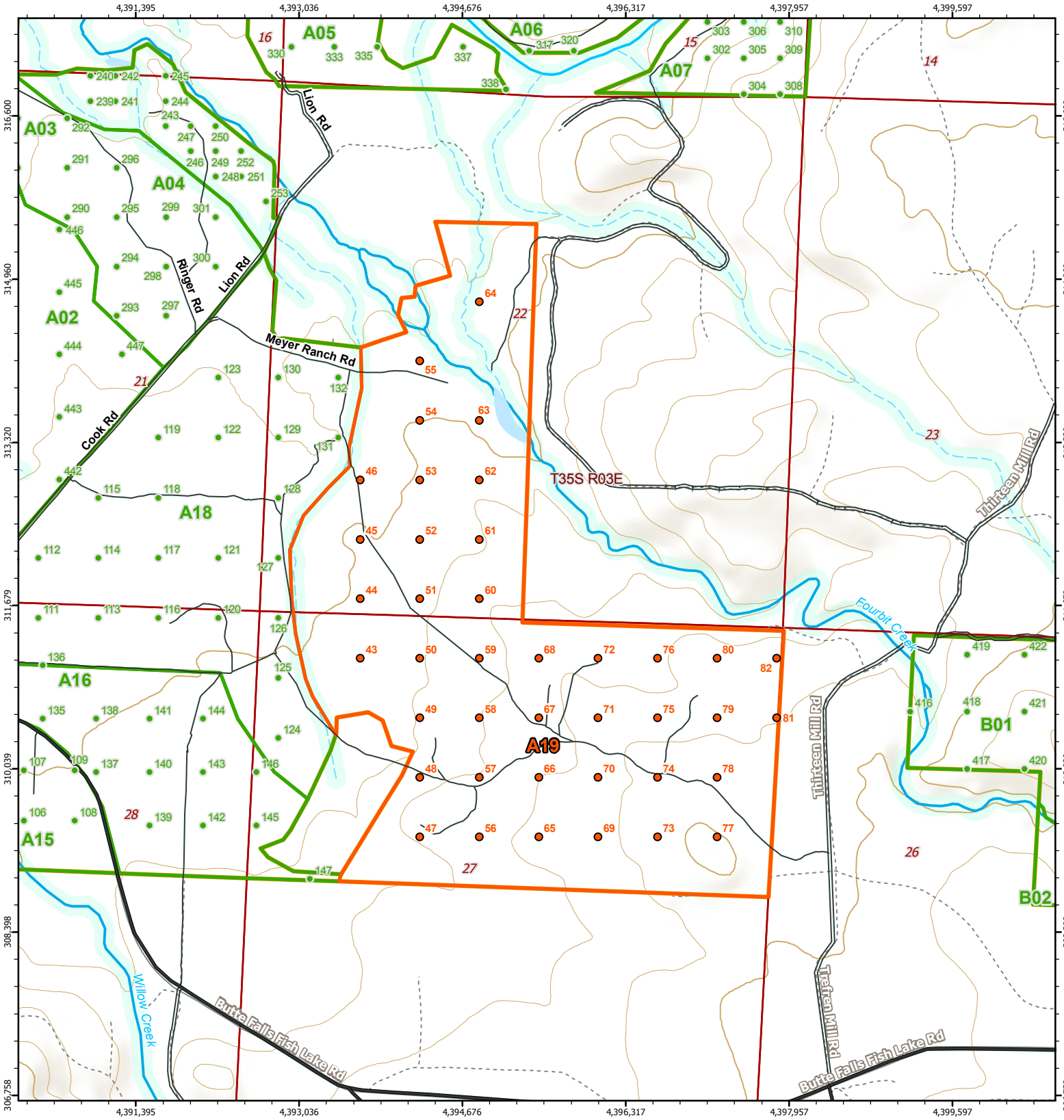
MWC_Cruise2019_contour.mxd 1/11/2019



Medford Watershed Cruise 2019

- Cruise Plot
- Other Cruise Plot
- Cruise Stand
- Other Cruise Stand
- Other Stand
- Ownership
- Township
- Section
- 40ft Contour
- 200ft Contour
- Road/Stream Buffer
- Waterbody

Stream
- Large, Fish
- Medium, Fish
- Small, Fish
- Small, Nonfish/Unknown

City of Medford Road
- Paved Road
- Rock/Gravel Road
- Dirt Road

BLM Road
- Major
- Unknown

Stand ID:	A19	# of Plots:	40
Gross Acres:	421.19	Plot Spacing (ft):	597
Net Acres:	385.84	Plot Spacing (ch):	9.05
Cover Type:	MX/2/M		
Notes:			

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1:15,840
1 inch = 1,320 feet
0 250 500 feet

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Coordinate System:
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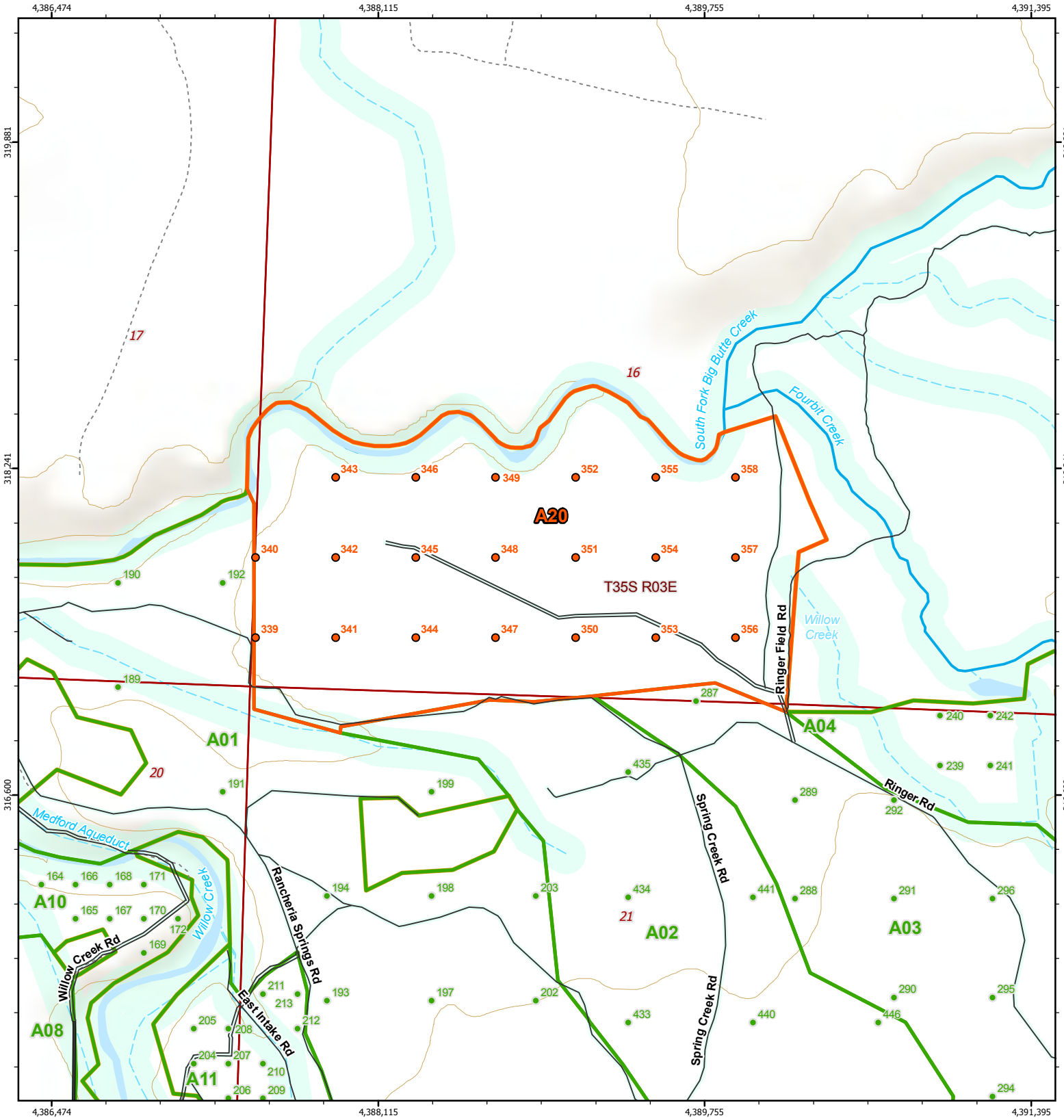

Medford Watershed Cruise 2019

- Cruise Plot
- Other Cruise Plot
- Cruise Stand
- Other Cruise Stand
- Other Stand
- Ownership
- Township
- Section
- 40ft Contour
- 200ft Contour
- Road/Stream Buffer
- Waterbody

Stream
- Large, Fish
- Medium, Fish
- Small, Fish
- Small, Nonfish/Unknown

City of Medford Road
- Paved Road
- Rock/Gravel Road
- Dirt Road

BLM Road
- Major
- Unknown

Stand ID:	A20	# of Plots:	20
Gross Acres:	88.24	Plot Spacing (ft):	402
Net Acres:	75.35	Plot Spacing (ch):	6.09
Cover Type:	MX/1/M		
Notes:			

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Natural Resource Consultants Since 1921

Scale = 1 chain
1:7,920
1 inch = 660 feet
0 250 500 feet

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Coordinate System:
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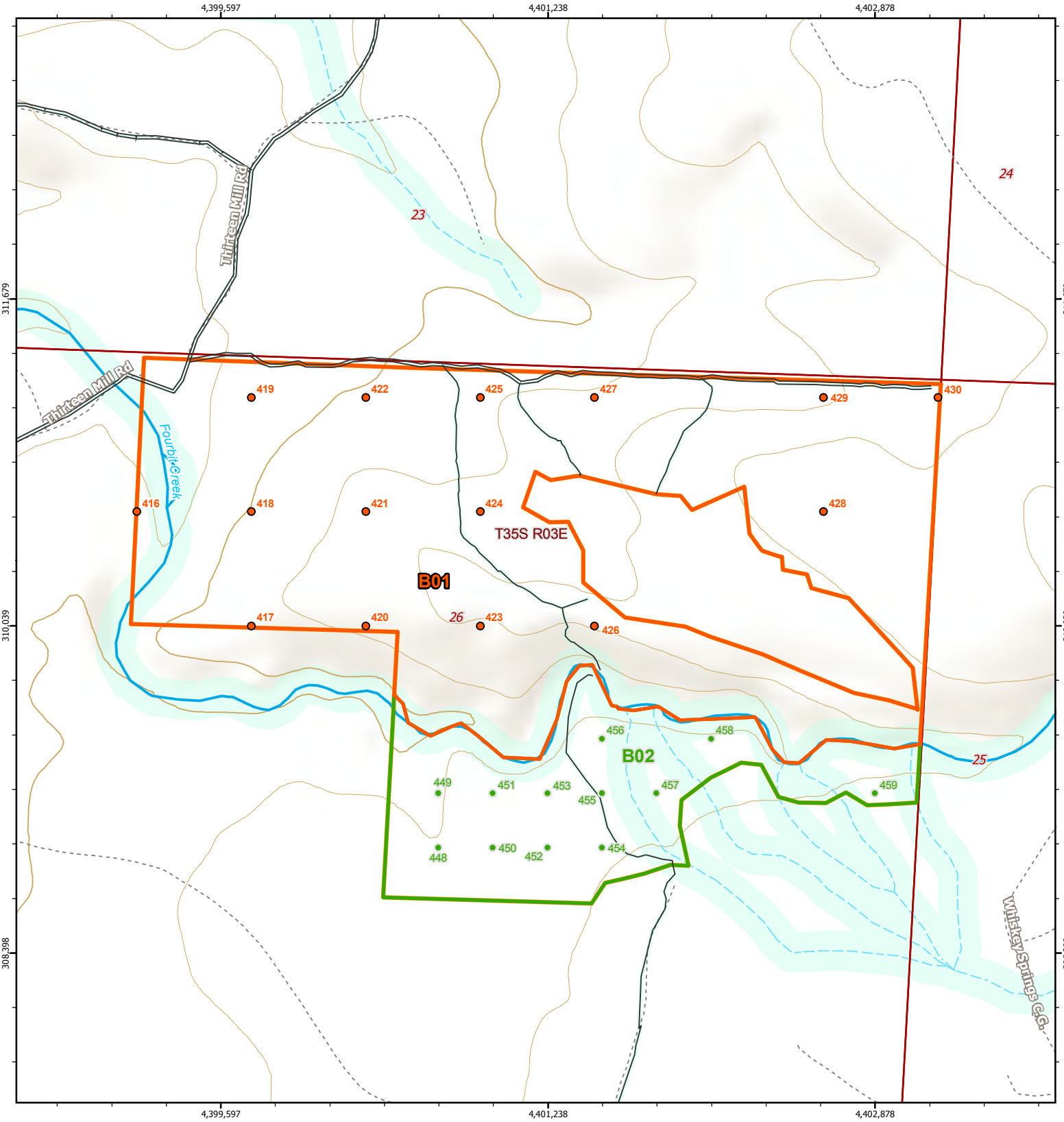
MWC_Cruise2019_contour.mxd 1/11/2019



Medford Watershed Cruise 2019

- Cruise Plot
- Other Cruise Plot
- Cruise Stand
- Other Cruise Stand
- Other Stand
- Ownership
- Township
- Section
- 40ft Contour
- 200ft Contour
- Road/Stream Buffer
- Waterbody

Stream
- Large, Fish
- Medium, Fish
- Small, Fish
- Small, Nonfish/Unknown

City of Medford Road
- Paved Road
- Rock/Gravel Road
- Dirt Road

BLM Road
- Major
- Unknown

Stand ID:	B01	# of Plots:	15
Gross Acres:	126.55	Plot Spacing (ft):	574
Net Acres:	110.35	Plot Spacing (ch):	8.69
Cover Type:	MX/2/M		
Notes:			

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Natural Resource Consultants Since 1921

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1:7,920
1 inch = 660 feet
0 250 500 feet

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Coordinate System:
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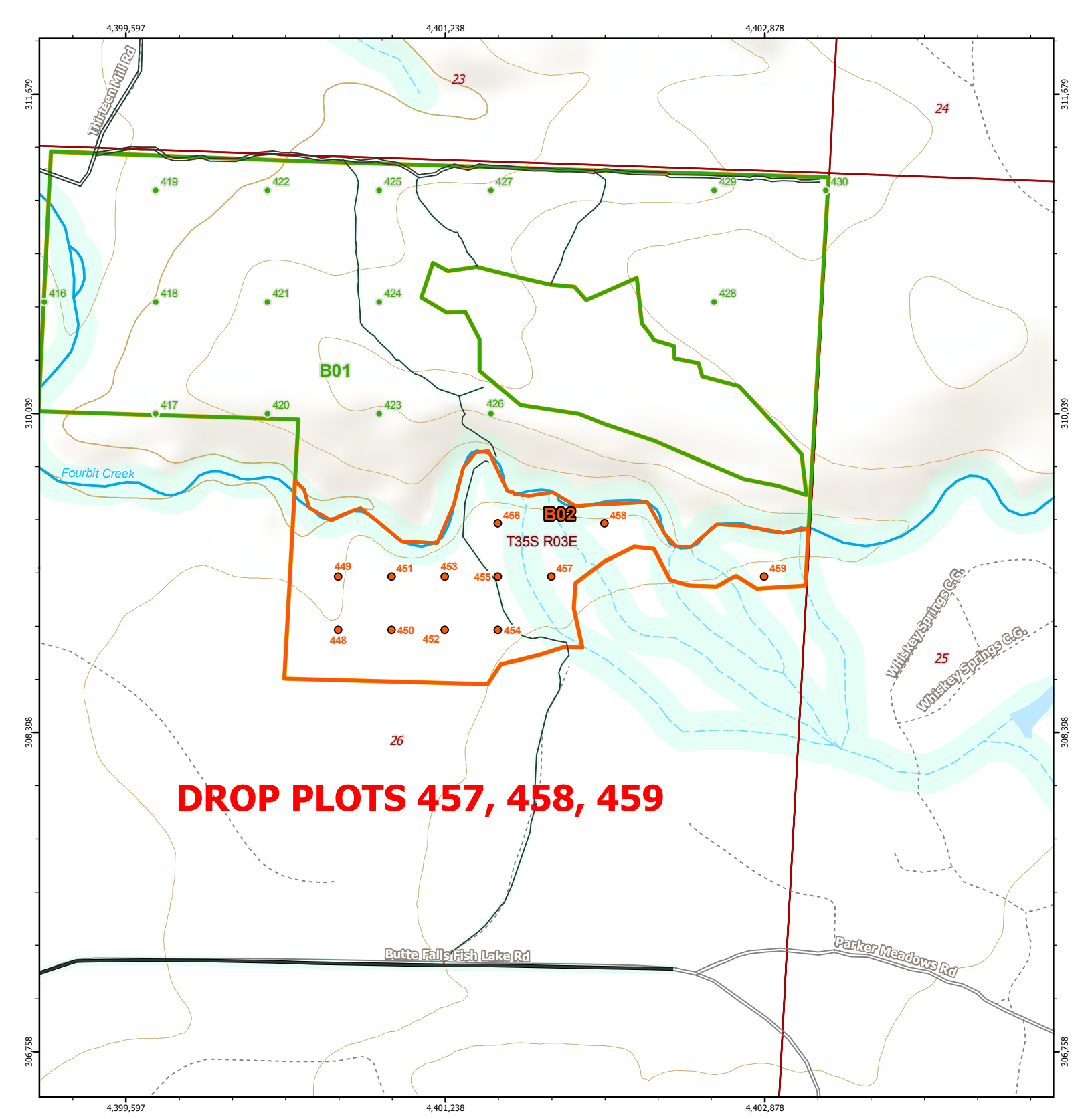

Medford Watershed Cruise 2019

- Cruise Plot
- Other Cruise Plot
- Cruise Stand
- Other Cruise Stand
- Other Stand
- Ownership
- Township
- Section
- 40ft Contour
- 200ft Contour
- Road/Stream Buffer
- Waterbody

Stream
- Large, Fish
- Medium, Fish
- Small, Fish
- Small, Nonfish/Unknown

City of Medford Road
- Paved Road
- Rock/Gravel Road
- Dirt Road

BLM Road
- Major
- Unknown

Stand ID:	B02	# of Plots:	12
Gross Acres:	36.68	Plot Spacing (ft):	274
Net Acres:	22.01	Plot Spacing (ch):	4.15
Cover Type:	MX/3/M		
Notes:			

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Natural Resource Consultants Since 1921

Scale = 1 chain
1:7,920
1 inch = 660 feet
0 250 500 feet

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Coordinate System:
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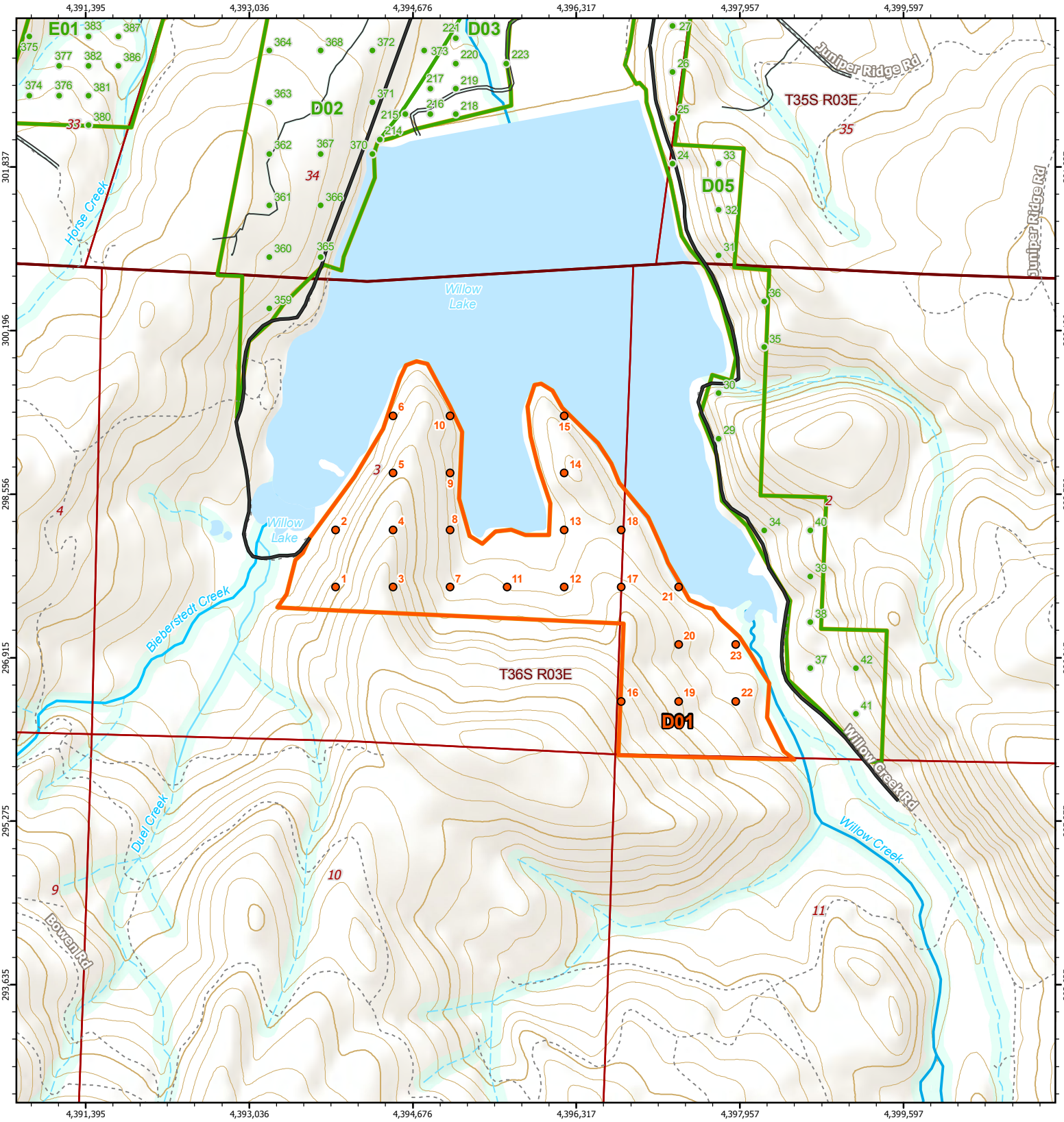
MWC_Cruise2019_contour.mxd 1/11/2019



Medford Watershed Cruise 2019

- Cruise Plot
- Other Cruise Plot
- Cruise Stand
- Other Cruise Stand
- Other Stand
- Ownership
- Township
- Section
- 40ft Contour
- 200ft Contour
- Road/Stream Buffer
- Waterbody

Stream
- Large, Fish
- Medium, Fish
- Small, Fish
- Small, Nonfish/Unknown

City of Medford Road
- Paved Road
- Rock/Gravel Road
- Dirt Road

BLM Road
- Major
- Unknown

Stand ID:	D01	# of Plots:	23
Gross Acres:	175.63	Plot Spacing (ft):	573
Net Acres:	174.67	Plot Spacing (ch):	8.68
Cover Type:	MX/3/H		
Notes:			

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Natural Resource Consultants Since 1921

Scale = 2 chains
1:15,840
1 inch = 1,320 feet
0 250 500 feet

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Coordinate System:
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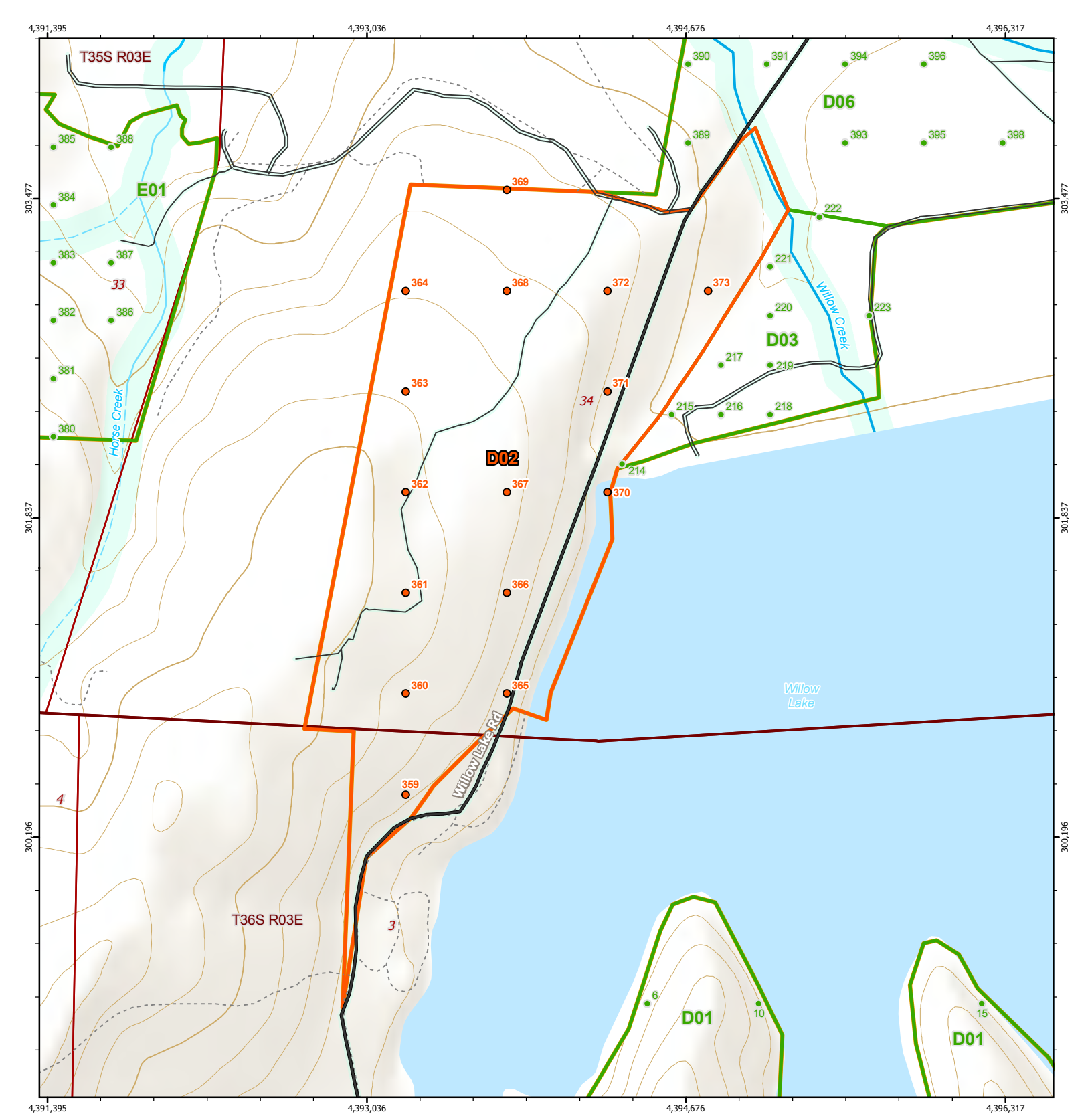
MWC_Cruise2019_contour.mxd 1/11/2019



Medford Watershed Cruise 2019

- Cruise Plot
- Other Cruise Plot
- Cruise Stand
- Other Cruise Stand
- Other Stand
- Ownership
- Township
- Section
- 40ft Contour
- 200ft Contour
- Road/Stream Buffer
- Waterbody

Stream
- Large, Fish
- Medium, Fish
- Small, Fish
- Small, Nonfish/Unknown

City of Medford Road
- Paved Road
- Rock/Gravel Road
- Dirt Road

BLM Road
- Major
- Unknown

Stand ID:	D02	# of Plots:	15
Gross Acres:	103.59	Plot Spacing (ft):	518
Net Acres:	97.02	Plot Spacing (ch):	7.84
Cover Type:	MX/3/H		
Notes:			

MB&G
MASON, BRUCE & GIRARD, INC.
Natural Resource Consultants Since 1921

Scale = 1 chain
1:7,920
1 inch = 660 feet

0 250 500 feet

N

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Coordinate System:
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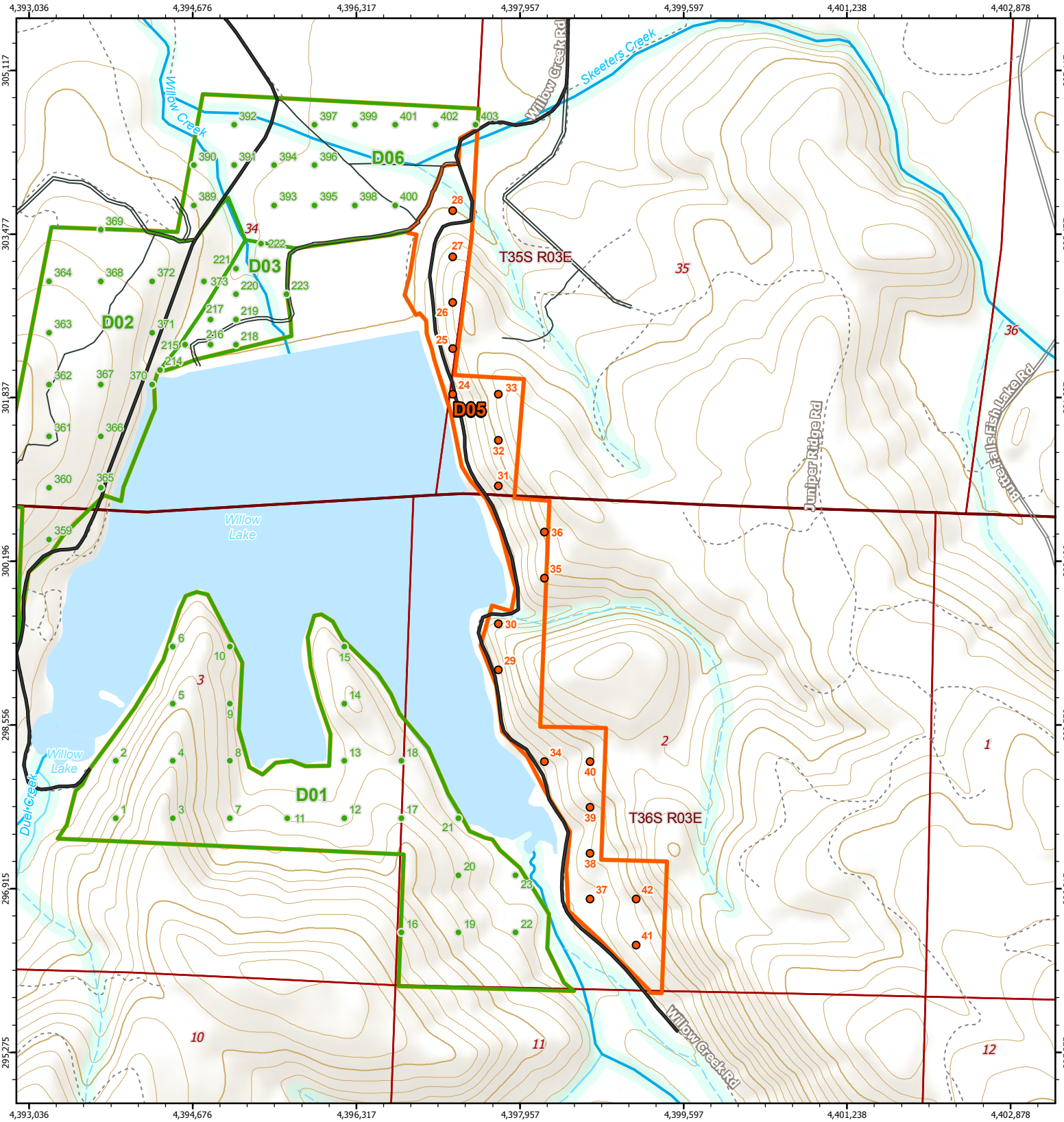


Medford Watershed Cruise 2019

- Cruise Plot
- Other Cruise Plot
- Cruise Stand
- Other Cruise Stand
- Other Stand
- Ownership
- Township
- Section
- 40ft Contour
- 200ft Contour
- Road/Stream Buffer
- Waterbody

Stream
- Large, Fish
- Medium, Fish
- Small, Fish
- Small, Nonfish/Unknown

City of Medford Road
- Paved Road
- Rock/Gravel Road
- Dirt Road

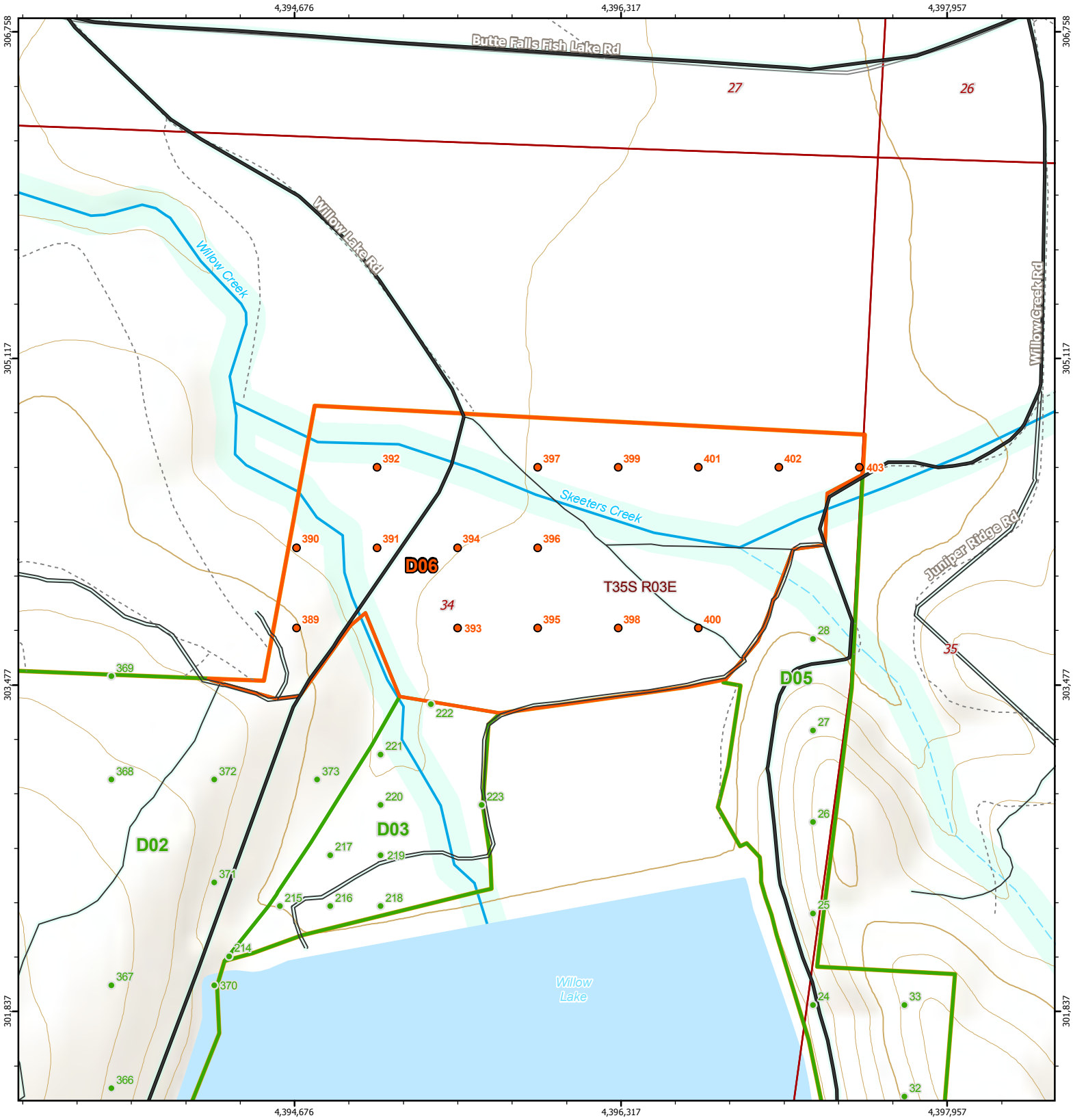
BLM Road
- Major
- Unknown

Stand ID:	D05	# of Plots:	19
Gross Acres:	104.54	Plot Spacing (ft):	460
Net Acres:	93.36	Plot Spacing (ch):	6.97
Cover Type:	MX/2/H		
Notes:			

MB&G
MASON, BRUCE & GIRARD, INC.
Natural Resource Consultants Since 1921

Scale = 2 chains
1:15,840
1 inch = 1,320 feet
0 250 500 feet

Stands current as of 01/11/2019. This product is for informational purposes only and may not be suitable for legal, engineering, or surveying purposes. Information is provided with the understanding that conclusions drawn are the responsibility of the user.
Basemap: Esri World Terrain
Coordinate System:
NAD_1983_StatePlane_Oregon_South_FIPS_3602_Feet
MWC_Cruise2019_contour.mxd 1/11/2019



Medford Watershed Cruise 2019

- Cruise Plot
- Other Cruise Plot
- Cruise Stand
- Other Cruise Stand
- Other Stand
- Ownership
- Township
- Section
- 40ft Contour
- 200ft Contour
- Road/Stream Buffer
- Waterbody

Stream
- Large, Fish
- Medium, Fish
- Small, Fish
- Small, Nonfish/Unknown

City of Medford Road
- Paved Road
- Rock/Gravel Road
- Dirt Road

BLM Road
- Major
- Unknown

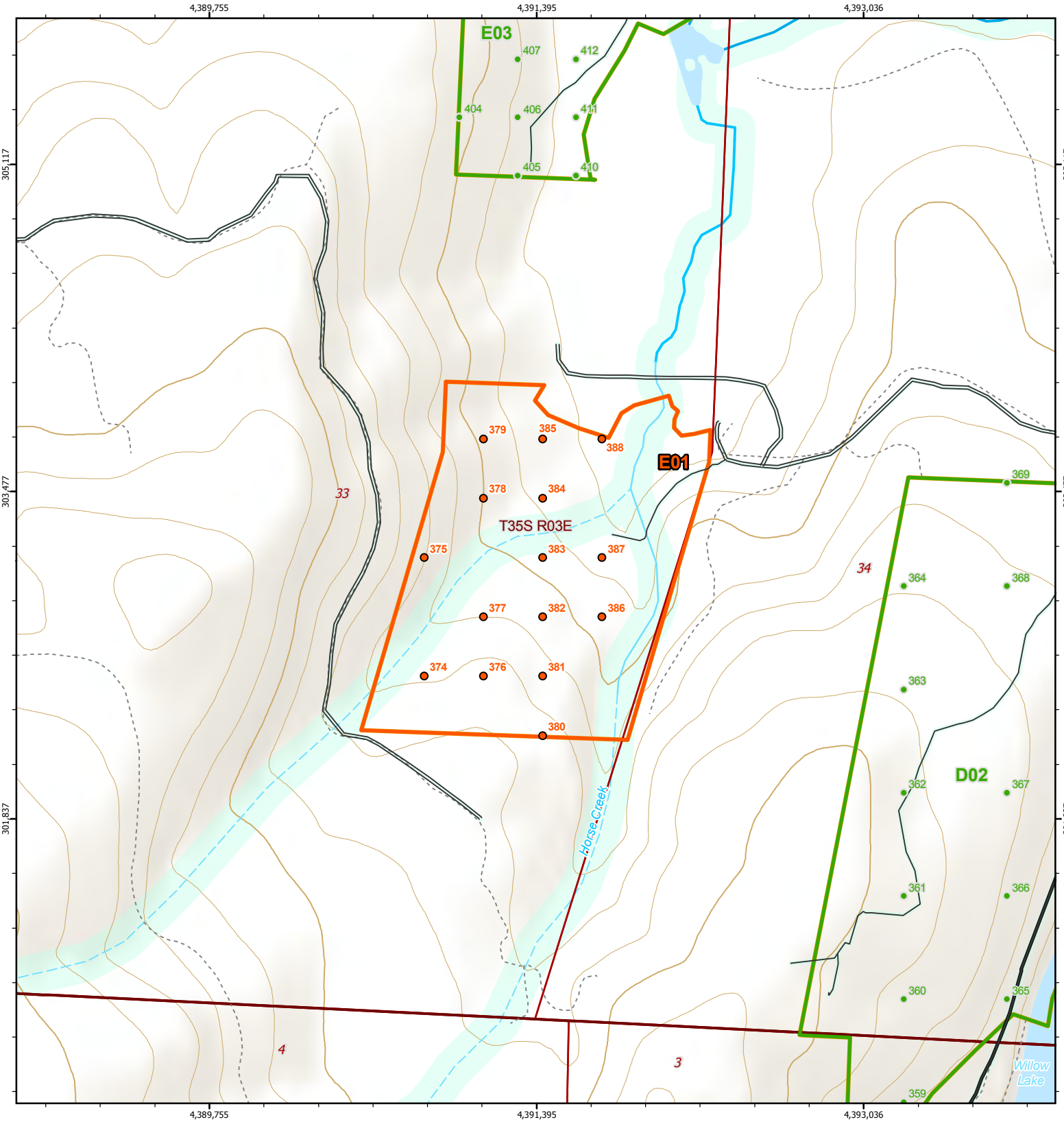
Stand ID:	D06	# of Plots:	15
Gross Acres:	80.54	Plot Spacing (ft):	404
Net Acres:	60.15	Plot Spacing (ch):	6.12
Cover Type:	MX/2-3/H		
Notes:			

MB&G
MASON, BRUCE & GIRARD, INC.
Natural Resource Consultants Since 1921

Scale = 1 chain
1:7,920
1 inch = 660 feet
0 250 500 feet

N

Stands current as of 01/11/2019. This product is for informational purposes only and may not be suitable for legal, engineering, or surveying purposes. Information is provided with the understanding that conclusions drawn are the responsibility of the user.
Basemap: Esri World Terrain
Coordinate System:
NAD_1983_StatePlane_Oregon_South_FIPS_3602_Feet
MWC_Cruise2019_contour.mxd 1/11/2019



Medford Watershed Cruise 2019

- Cruise Plot
- Other Cruise Plot
- Cruise Stand
- Other Cruise Stand
- Other Stand
- Ownership
- Township
- Section
- 40ft Contour
- 200ft Contour
- Road/Stream Buffer
- Waterbody

Stream
- Large, Fish
- Medium, Fish
- Small, Fish
- Small, Nonfish/Unknown

City of Medford Road
- Paved Road
- Rock/Gravel Road
- Dirt Road

BLM Road
- Major
- Unknown

Stand ID:	E01	# of Plots:	15
Gross Acres:	50.87	Plot Spacing (ft):	297
Net Acres:	35.46	Plot Spacing (ch):	4.51
Cover Type:	MX/2/M		
Notes:			

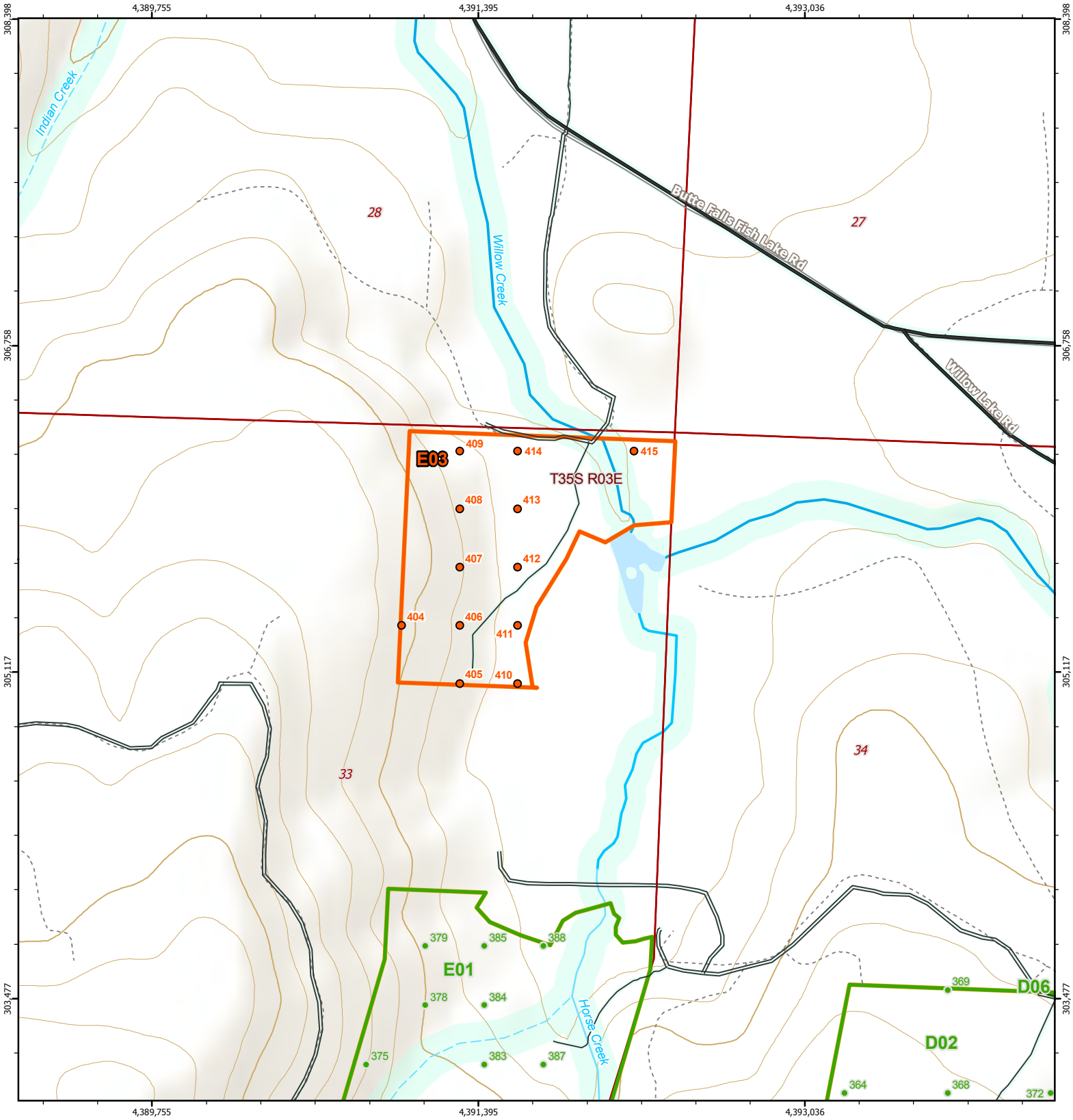
MB&G
MASON, BRUCE & GIRARD, INC.
Natural Resource Consultants Since 1921

Scale = 1 chain
1:7,920
1 inch = 660 feet

0 250 500 feet

Stands current as of 01/11/2019. This product is for informational purposes only and may not be suitable for legal, engineering, or surveying purposes. Information is provided with the understanding that conclusions drawn are the responsibility of the user.

Basemap: Esri World Terrain
Coordinate System:
NAD_1983_StatePlane_Oregon_South_FIPS_3602_Feet
MWC_Cruise2019_contour.mxd 1/11/2019



Medford Watershed Cruise 2019

- Cruise Plot
- Other Cruise Plot
- Cruise Stand
- Other Cruise Stand
- Other Stand
- Ownership
- Township
- Section
- 40ft Contour
- 200ft Contour
- Road/Stream Buffer
- Waterbody

Stream
- Large, Fish
- Medium, Fish
- Small, Fish
- Small, Nonfish/Unknown

City of Medford Road
- Paved Road
- Rock/Gravel Road
- Dirt Road

BLM Road
- Major
- Unknown

Stand ID:	E03	# of Plots:	12
Gross Acres:	27.35	Plot Spacing (ft):	292
Net Acres:	24.06	Plot Spacing (ch):	4.42
Cover Type:	MX-PP/2-3/H		
Notes:			

MB&G
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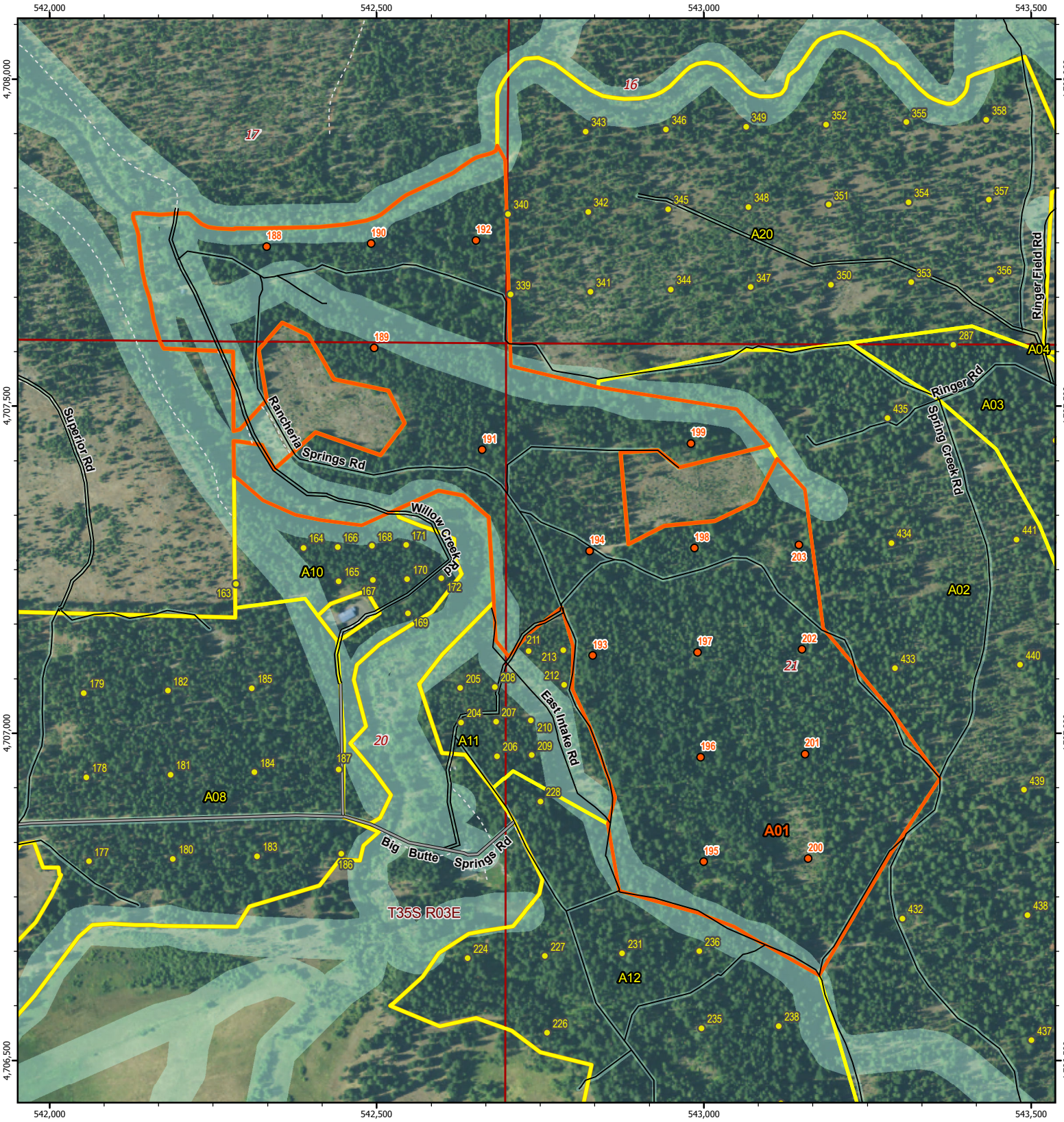
Natural Resource Consultants Since 1921

Scale = 1 chain
1:7,920
1 inch = 660 feet
0 250 500 feet

Stands current as of 01/11/2019. This product is for informational purposes only and may not be suitable for legal, engineering, or surveying purposes. Information is provided with the understanding that conclusions drawn are the responsibility of the user.
Basemap: Esri World Terrain
Coordinate System:
NAD_1983_StatePlane_Oregon_South_FIPS_3602_Feet
MWC_Cruise2019_contour.mxd 1/11/2019



Medford Watershed 2019 Cruise

- Cruise Plot
- Other Cruise Plot
- Cruise Stand
- Nearby Cruise Stand
- Other Stand
- Ownership
- Township
- Section
- Road/Stream Buffer

City of Medford Road

- Paved
- Rock/Gravel
- Dirt

BLM Road

- Major
- Unknown

Stand ID:	A01	# of Plots:	16
Gross Acres:	133.05	Plot Spacing (ft):	525
Net Acres:	98.68	Plot Spacing (ch):	7.95
Cover Type:	DF/2/L		
Notes:			

MB&G
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Natural Resource Consultants Since 1921

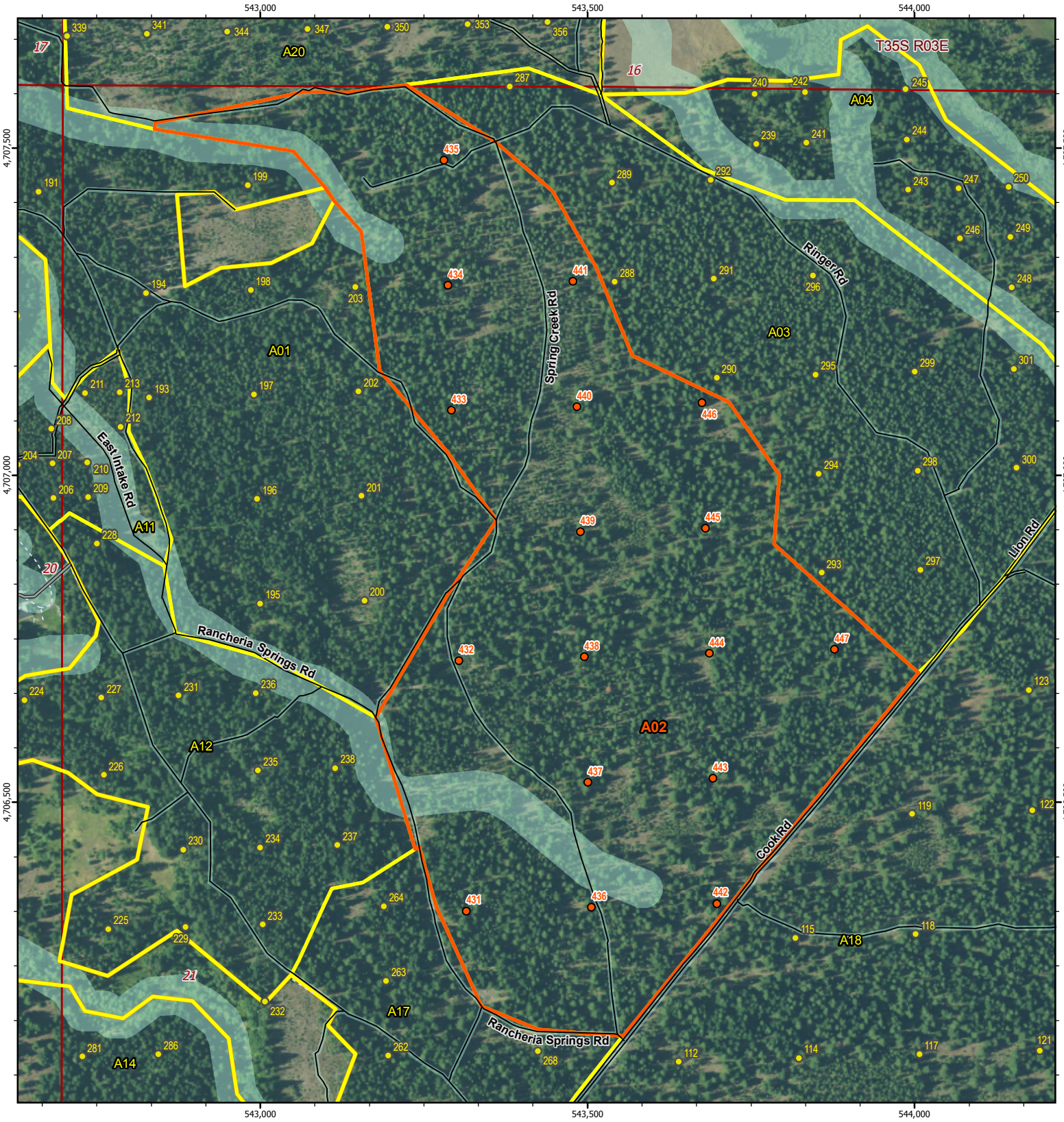
Scale = 1 chain
1:7,920
1 inch = 660 feet

0 330 660 feet

Stands current as of 01/11/2019. This product is for informational purposes only and may not be suitable for legal, engineering, or surveying purposes. Information is provided with the understanding that conclusions drawn are the responsibility of the user.

Imagery: NAIP 2016
Coordinate System:
NAD_1983_StatePlane_Oregon_South_FIPS_3602_Feet

MWC_Cruise2019_aerial.mxd 1/11/2019



Medford Watershed 2019 Cruise

- Cruise Plot
- Other Cruise Plot
- Cruise Stand
- Nearby Cruise Stand
- Other Stand
- Ownership
- Township
- Section
- Road/Stream Buffer

City of Medford Road

- Paved
- Rock/Gravel
- Dirt

BLM Road

- Major
- Unknown

Stand ID:	A02	# of Plots:	17
Gross Acres:	170.74	Plot Spacing (ft):	628
Net Acres:	156	Plot Spacing (ch):	9.52
Cover Type:	MX/1-2/L		
Notes:			

MB&G
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Natural Resource Consultants Since 1921

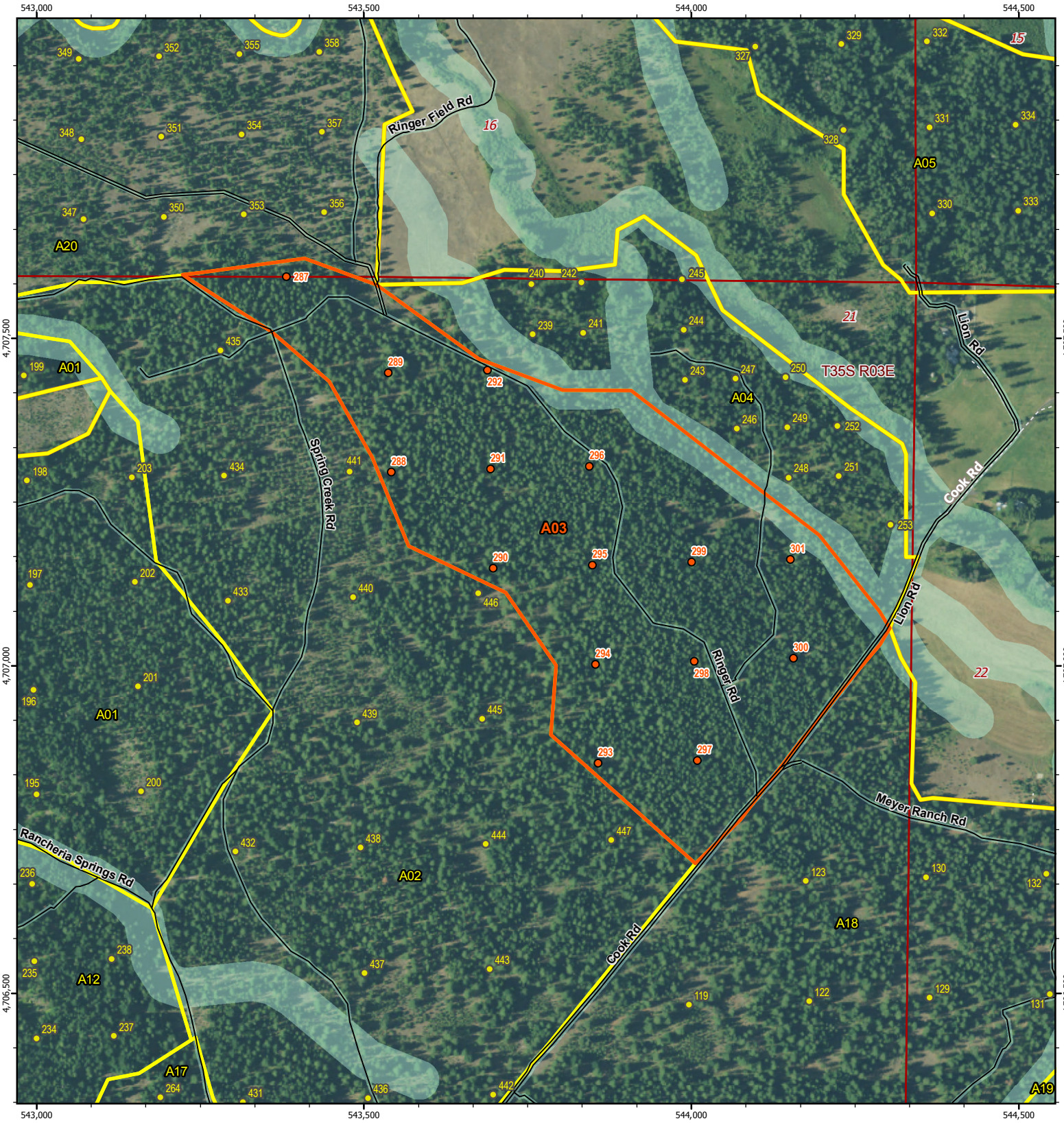
Scale = 1 chain
1:7,920
1 inch = 660 feet

0 330 660 feet

Stands current as of 01/11/2019. This product is for informational purposes only and may not be suitable for legal, engineering, or surveying purposes. Information is provided with the understanding that conclusions drawn are the responsibility of the user.

Imagery: NAIP 2016
Coordinate System:
NAD_1983_StatePlane_Oregon_South_FIPS_3602_Feet

MWC_Cruise2019_aerial.mxd 1/11/2019



Medford Watershed 2019 Cruise

- Cruise Plot
- Other Cruise Plot
- Cruise Stand
- Nearby Cruise Stand
- Other Stand
- Ownership
- Township
- Section
- Road/Stream Buffer

City of Medford Road

- Paved
- Rock/Gravel
- Dirt

BLM Road

- Major
- Unknown

Stand ID:	A03	# of Plots:	15
Gross Acres:	90.92	Plot Spacing (ft):	497
Net Acres:	81.86	Plot Spacing (ch):	7.53
Cover Type:	PP-MX/2-3/M		
Notes:			

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Natural Resource Consultants Since 1921

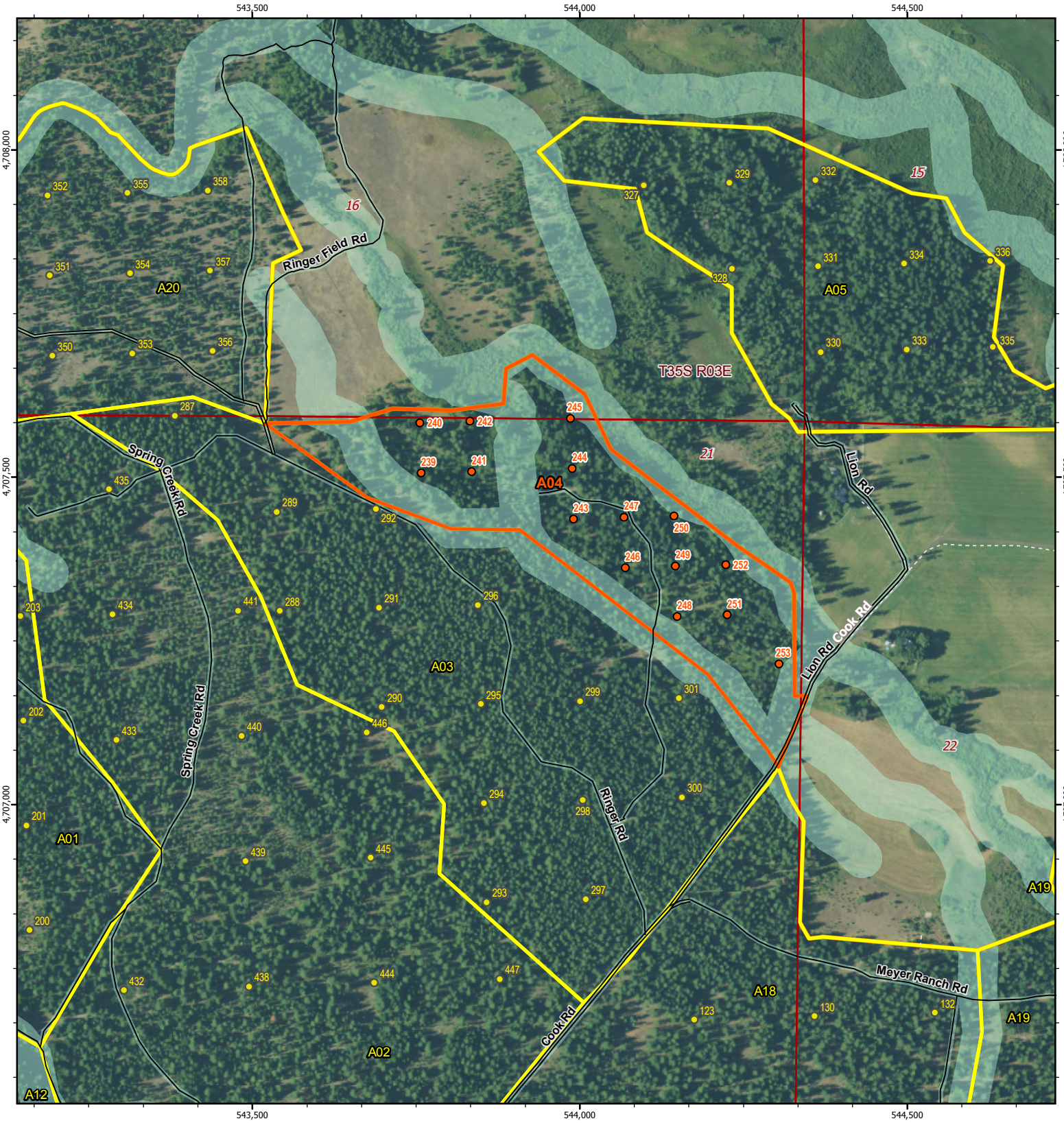
Scale = 1 chain
1:7,920
1 inch = 660 feet

0 330 660 feet

Stands current as of 01/11/2019. This product is for informational purposes only and may not be suitable for legal, engineering, or surveying purposes. Information is provided with the understanding that conclusions drawn are the responsibility of the user.

Imagery: NAIP 2016
Coordinate System:
NAD_1983_StatePlane_Oregon_South_FIPS_3602_Feet

MWC_Cruise2019_aerial.mxd 1/11/2019



Medford Watershed 2019 Cruise

- Cruise Plot
- Other Cruise Plot
- Cruise Stand
- Nearby Cruise Stand
- Other Stand
- Ownership
- Township
- Section
- Road/Stream Buffer

City of Medford Road

- Paved
- Rock/Gravel
- Dirt

BLM Road

- Major
- Unknown

Stand ID:	A04	# of Plots:	15
Gross Acres:	38.86	Plot Spacing (ft):	252
Net Acres:	23.41	Plot Spacing (ch):	3.82
Cover Type:	MX/2/L		
Notes:			

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Natural Resource Consultants Since 1921

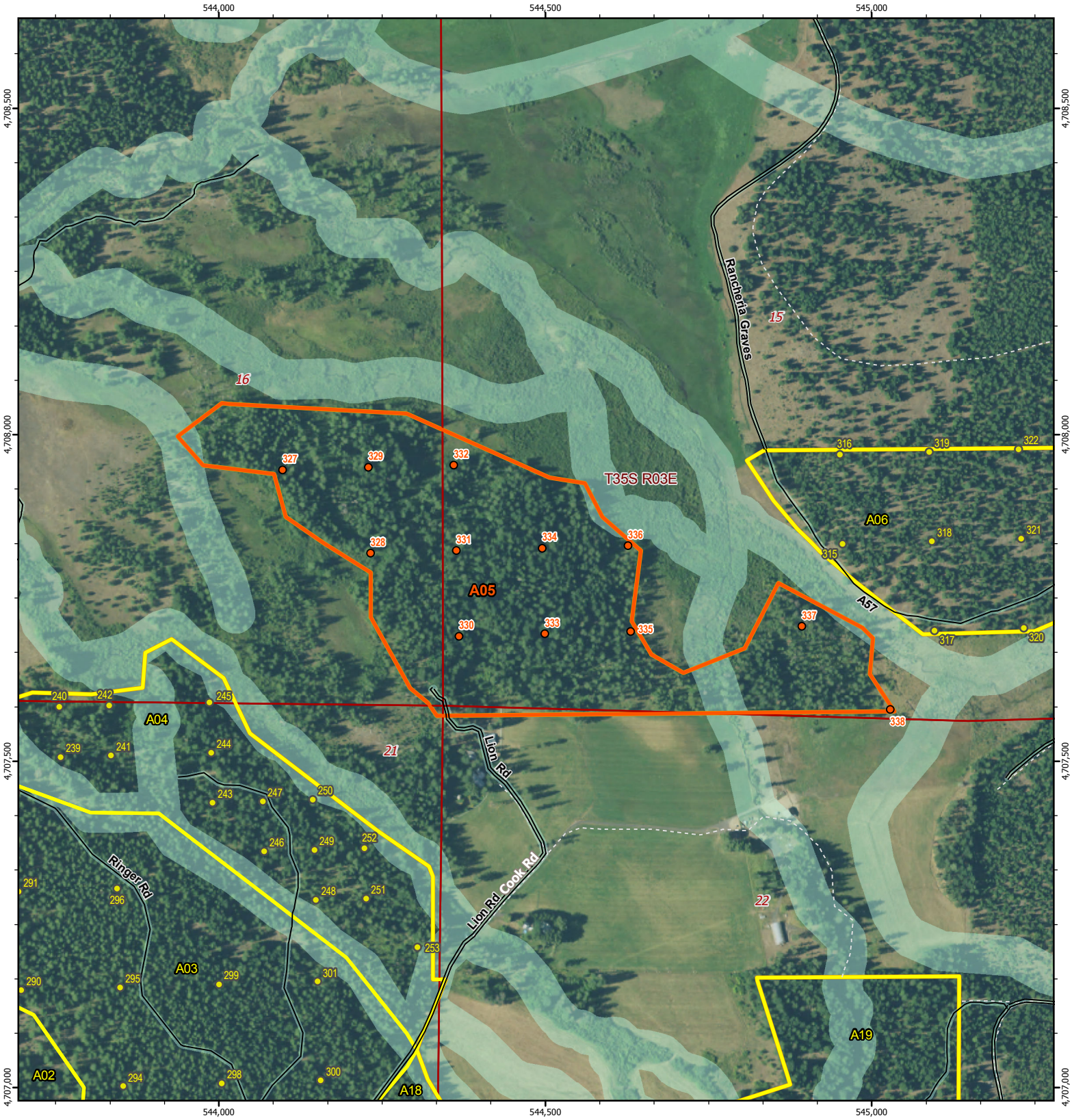
Scale = 1 chain
1:7,920
1 inch = 660 feet

0 330 660 feet

Stands current as of 01/11/2019. This product is for informational purposes only and may not be suitable for legal, engineering, or surveying purposes. Information is provided with the understanding that conclusions drawn are the responsibility of the user.

Imagery: NAIP 2016
Coordinate System:
NAD_1983_StatePlane_Oregon_South_FIPS_3602_Feet

MWC_Cruise2019_aerial.mxd 1/11/2019



Medford Watershed 2019 Cruise

- Cruise Plot
- Other Cruise Plot
- Cruise Stand
- Nearby Cruise Stand
- Other Stand
- Ownership
- Township
- Section
- Road/Stream Buffer

City of Medford Road

- Paved
- Rock/Gravel
- Dirt

BLM Road

- Major
- Unknown

Stand ID:	A05	# of Plots:	12
Gross Acres:	58.97	Plot Spacing (ft):	431
Net Acres:	56.72	Plot Spacing (ch):	6.53
Cover Type:	MX/2-3/L		
Notes:			

MB&G
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Natural Resource Consultants Since 1921

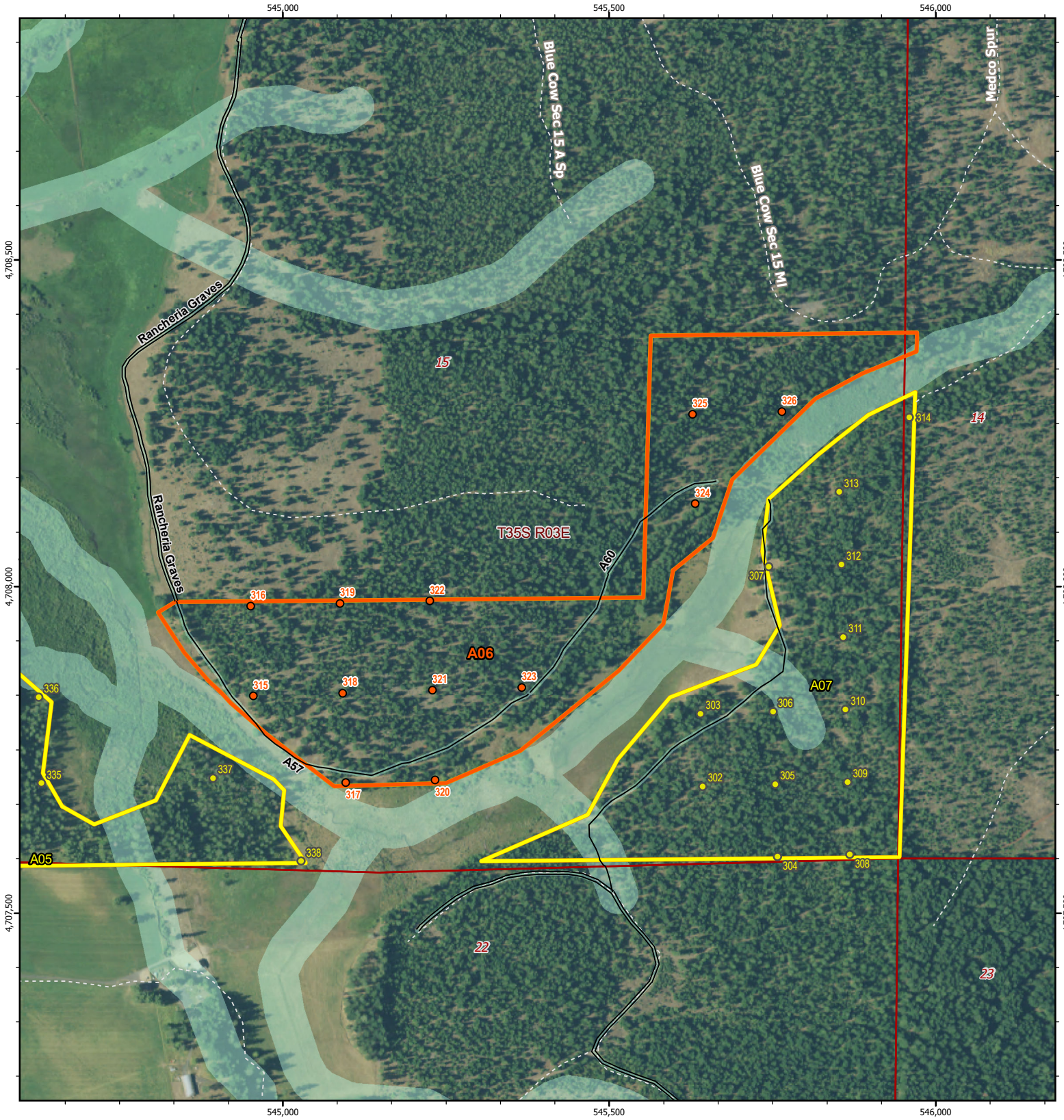
Scale = 1 chain
1:7,920
1 inch = 660 feet

0 330 660 feet

Stands current as of 01/11/2019. This product is for informational purposes only and may not be suitable for legal, engineering, or surveying purposes. Information is provided with the understanding that conclusions drawn are the responsibility of the user.

Imagery: NAIP 2016
Coordinate System:
NAD_1983_StatePlane_Oregon_South_FIPS_3602_Feet

MWC_Cruise2019_aerial.mxd 1/11/2019



Medford Watershed 2019 Cruise

- Cruise Plot
- Other Cruise Plot
- Cruise Stand
- Nearby Cruise Stand
- Other Stand
- Ownership
- Township
- Section
- Road/Stream Buffer

City of Medford Road

- Paved
- Rock/Gravel
- Dirt

BLM Road

- Major
- Unknown

Stand ID:	A06	# of Plots:	12
Gross Acres:	56.41	Plot Spacing (ft):	450
Net Acres:	54.33	Plot Spacing (ch):	6.81
Cover Type:	MX/1-2/L		
Notes:			

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Natural Resource Consultants Since 1921

Scale = 1 chain
1:7,920
1 inch = 660 feet

0 330 660 feet

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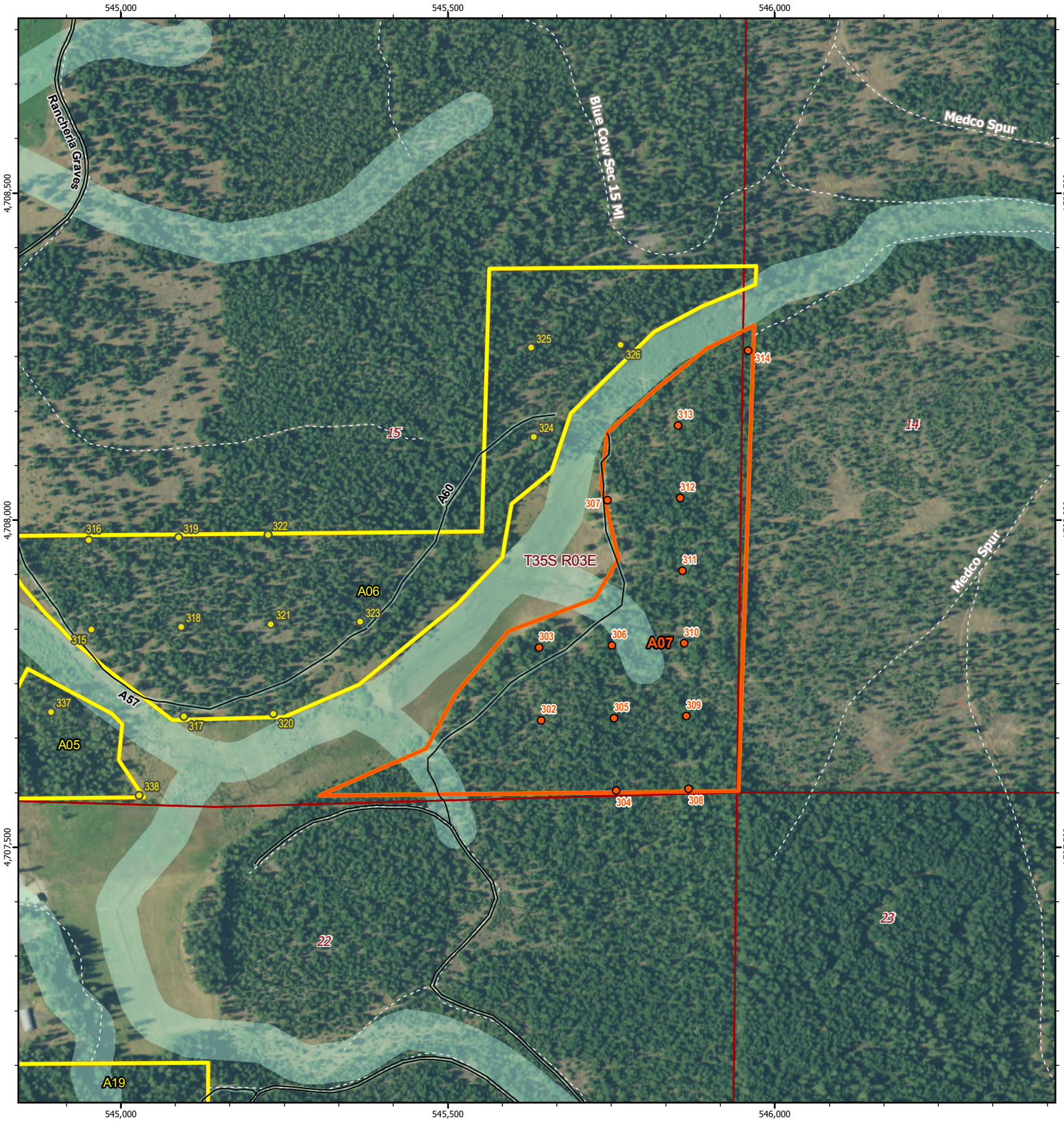
Imagery: NAIP 2016
Coordinate System:
NAD_1983_StatePlane_Oregon_South_FIPS_3602_Feet

MWC_Cruise2019_aerial.mxd 1/11/2019



Medford Watershed 2019 Cruise

- Cruise Plot
- Other Cruise Plot
- Cruise Stand
- Nearby Cruise Stand
- Other Stand
- Ownership
- Township
- Section
- Road/Stream Buffer

City of Medford Road

- Paved
- Rock/Gravel
- Dirt

BLM Road

- Major
- Unknown

Stand ID:	A07	# of Plots:	13
Gross Acres:	50.45	Plot Spacing (ft):	364
Net Acres:	46.06	Plot Spacing (ch):	5.52
Cover Type:	MX/1-2/L		
Notes:			

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Natural Resource Consultants Since 1921

Scale = 1 chain
1:7,920
1 inch = 660 feet

0 330 660 feet

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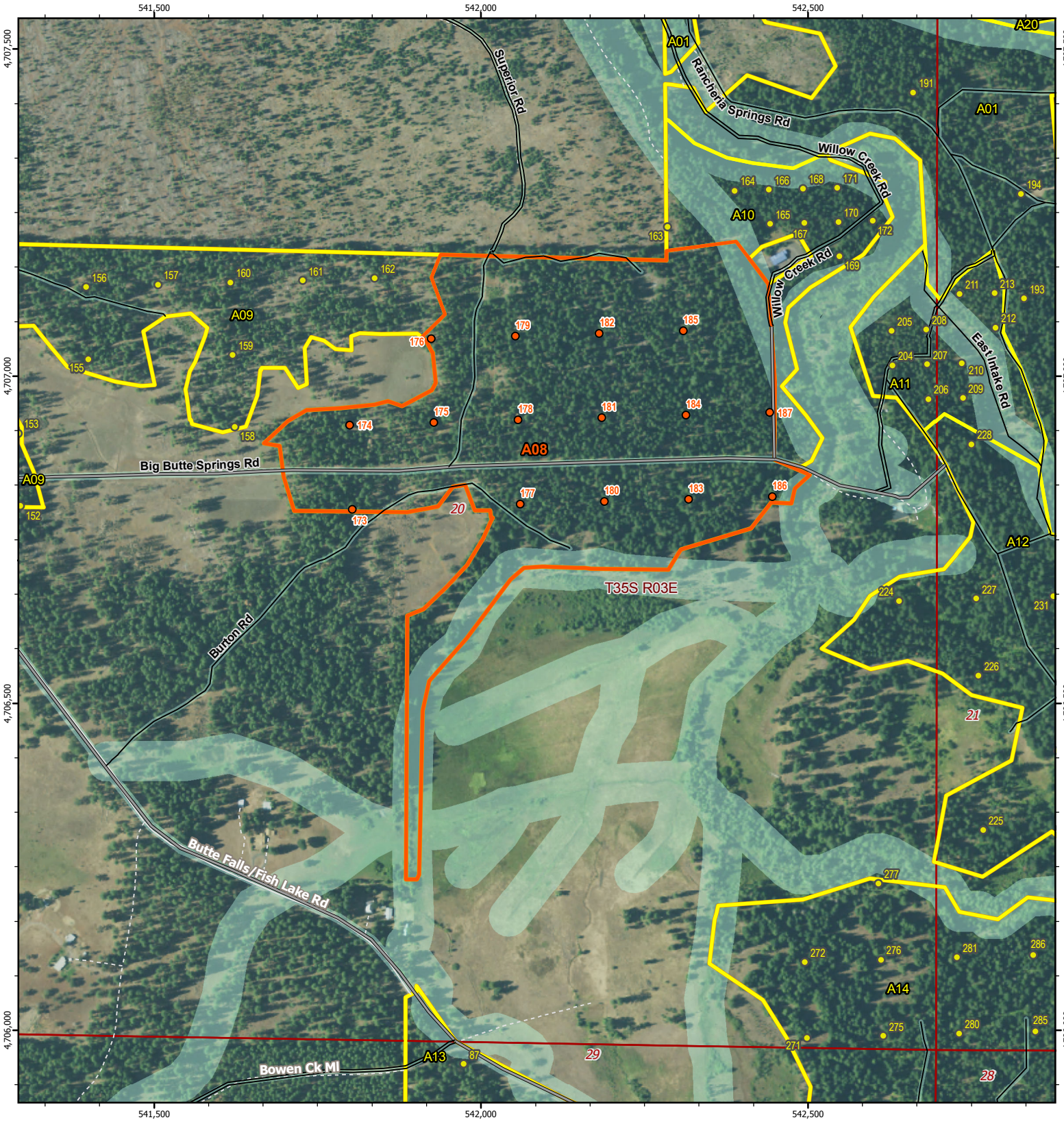
Imagery: NAIP 2016
Coordinate System:
NAD_1983_StatePlane_Oregon_South_FIPS_3602_Feet

MWC_Cruise2019_aerial.mxd 1/11/2019



Medford Watershed 2019 Cruise

- Cruise Plot
- Other Cruise Plot
- Cruise Stand
- Nearby Cruise Stand
- Other Stand
- Ownership
- Township
- Section
- Road/Stream Buffer

City of Medford Road

- Paved
- Rock/Gravel
- Dirt

BLM Road

- Major
- Unknown

Stand ID:	A08	# of Plots:	15
Gross Acres:	72.35	Plot Spacing (ft):	422
Net Acres:	61.15	Plot Spacing (ch):	6.39
Cover Type:	MX/2/M		
Notes:			

MB&G
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Natural Resource Consultants Since 1921

Scale = 1 chain
1:7,920
1 inch = 660 feet

0 330 660 feet

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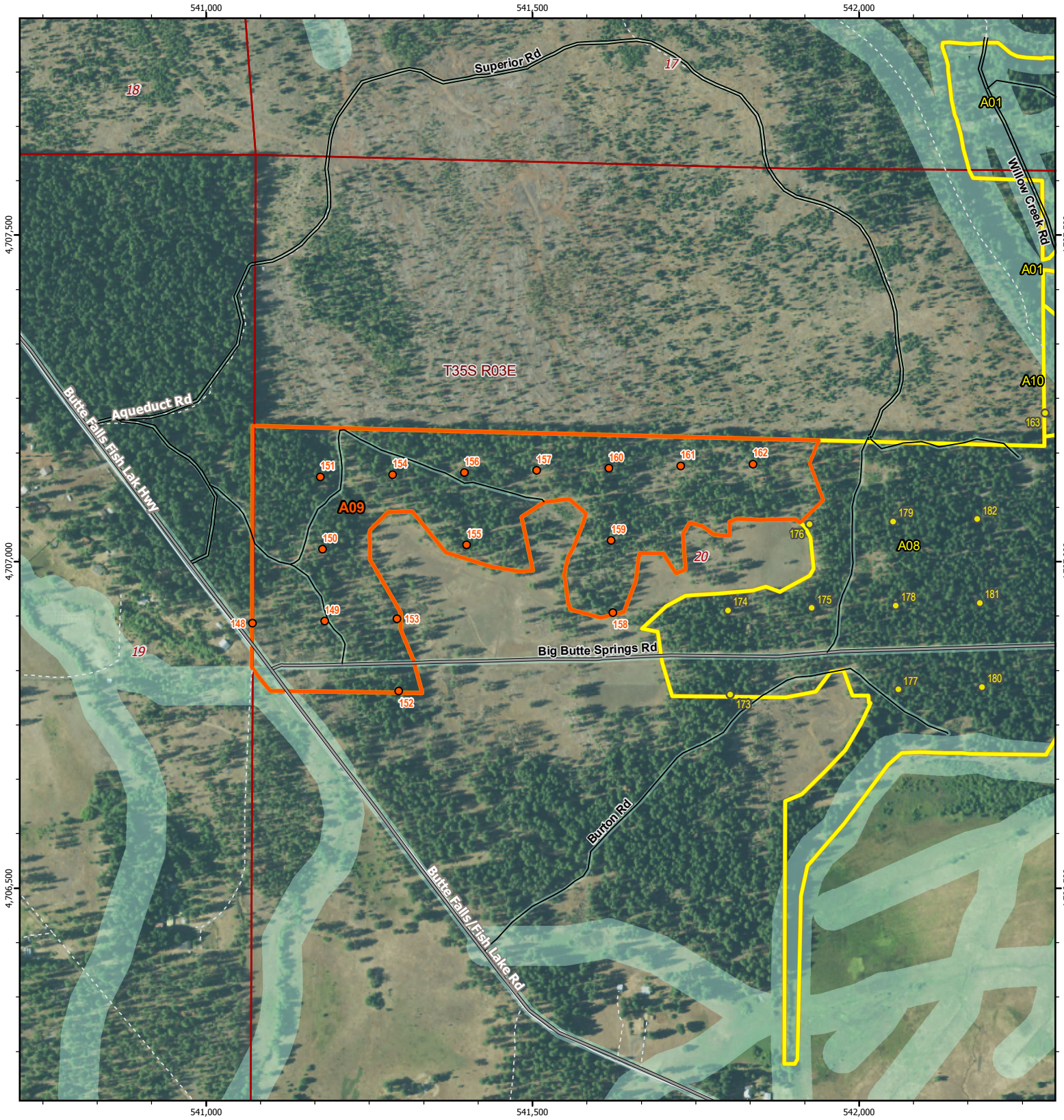
Imagery: NAIP 2016
Coordinate System:
NAD_1983_StatePlane_Oregon_South_FIPS_3602_Feet

MWC_Cruise2019_aerial.mxd 1/11/2019



Medford Watershed 2019 Cruise

- Cruise Plot
- Other Cruise Plot
- Cruise Stand
- Nearby Cruise Stand
- Other Stand
- Ownership
- Township
- Section
- Road/Stream Buffer

City of Medford Road

- Paved
- Rock/Gravel
- Dirt

BLM Road

- Major
- Unknown

Stand ID:	A09	# of Plots:	15
Gross Acres:	48.68	Plot Spacing (ft):	362
Net Acres:	46.09	Plot Spacing (ch):	5.49
Cover Type:	MX/2/L		
Notes:			

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MASON, BRUCE & GIRARD, INC.
Natural Resource Consultants Since 1921

Scale = 1 chain
1:7,920
1 inch = 660 feet

0 330 660 feet

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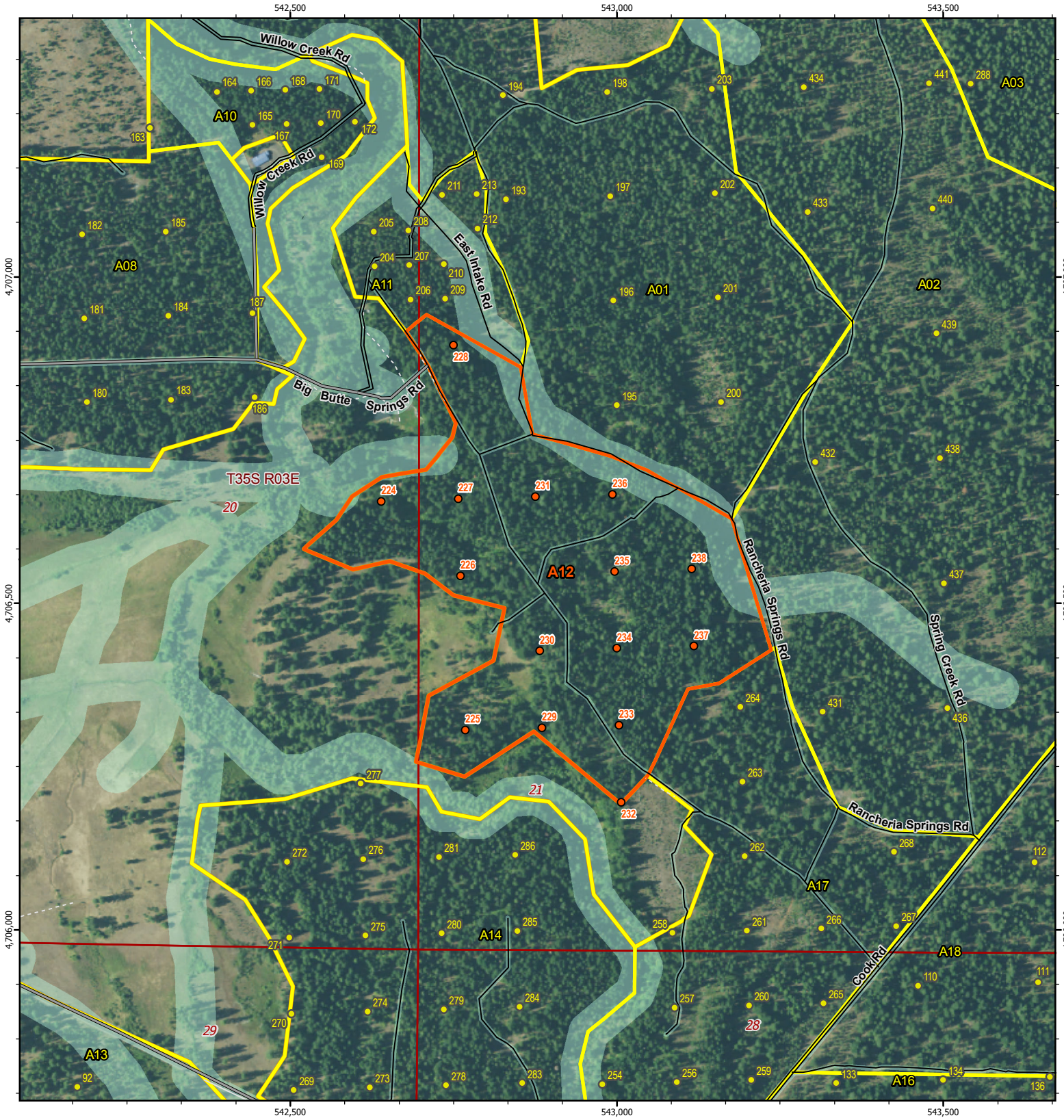
Imagery: NAIP 2016
Coordinate System:
NAD_1983_StatePlane_Oregon_South_FIPS_3602_Feet

MWC_Cruise2019_aerial.mxd 1/11/2019



Medford Watershed 2019 Cruise

- Cruise Plot
- Other Cruise Plot
- Cruise Stand
- Nearby Cruise Stand
- Other Stand
- Ownership
- Township
- Section
- Road/Stream Buffer

City of Medford Road

- Paved
- Rock/Gravel
- Dirt

BLM Road

- Major
- Unknown

Stand ID:	A12	# of Plots:	15
Gross Acres:	59.75	Plot Spacing (ft):	387
Net Acres:	51.99	Plot Spacing (ch):	5.87
Cover Type:	DF/3/L		
Notes:			

MB&G
MASON, BRUCE & GIRARD, INC.
Natural Resource Consultants Since 1921

Scale = 1 chain
1:7,920
1 inch = 660 feet

0 330 660 feet

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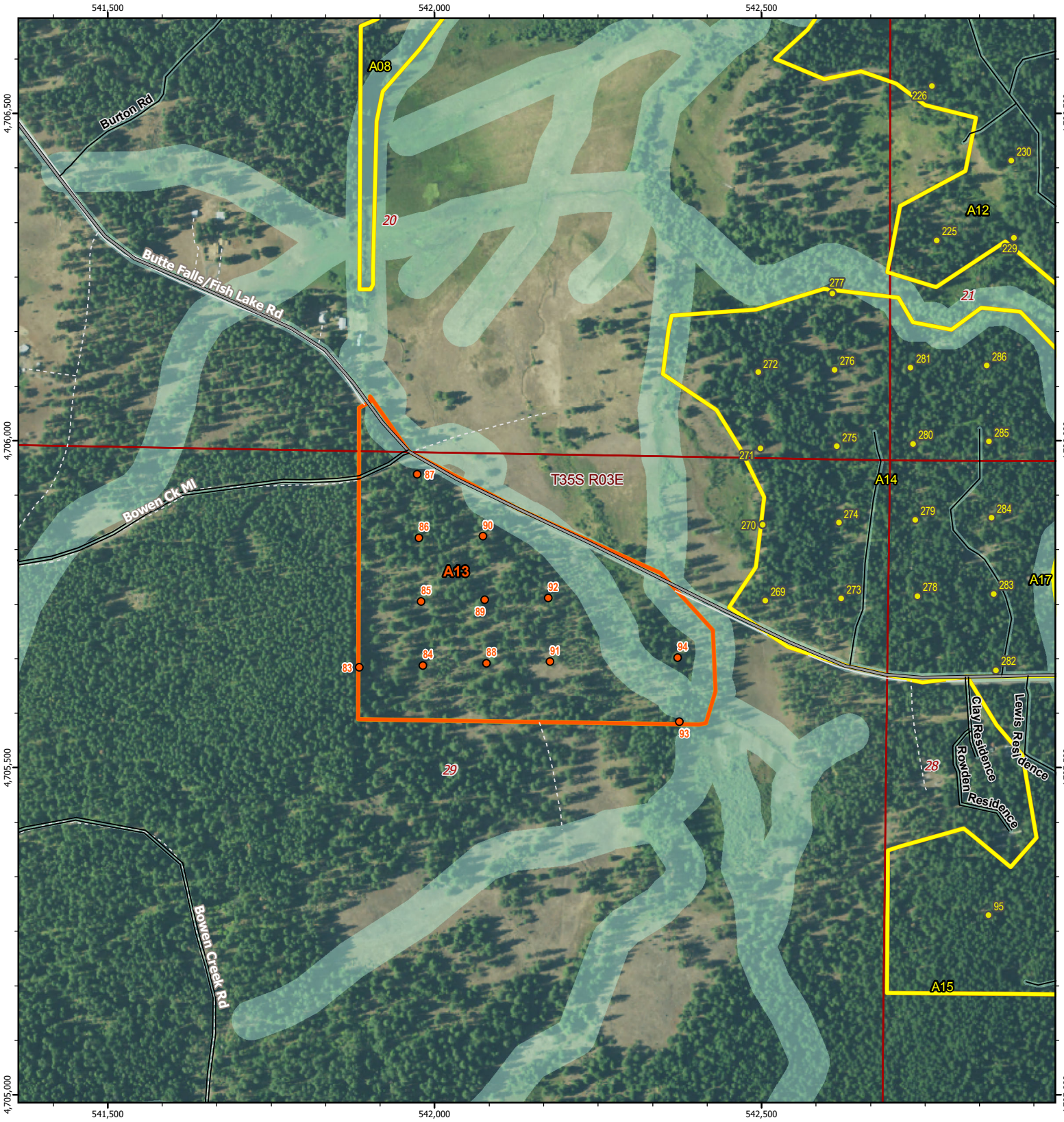
Imagery: NAIP 2016
Coordinate System:
NAD_1983_StatePlane_Oregon_South_FIPS_3602_Feet

MWC_Cruise2019_aerial.mxd 1/11/2019



Medford Watershed 2019 Cruise

- Cruise Plot
- Other Cruise Plot
- Cruise Stand
- Nearby Cruise Stand
- Other Stand
- Ownership
- Township
- Section
- Road/Stream Buffer

City of Medford Road

- Paved
- Rock/Gravel
- Dirt

BLM Road

- Major
- Unknown

Stand ID:	A13	# of Plots:	12
Gross Acres:	42.63	Plot Spacing (ft):	320
Net Acres:	32.32	Plot Spacing (ch):	4.84
Cover Type:	MX/3/L-mx1		
Notes:			

MB&G
MASON, BRUCE & GIRARD, INC.
Natural Resource Consultants Since 1921

Scale = 1 chain
1:7,920
1 inch = 660 feet

0 330 660 feet

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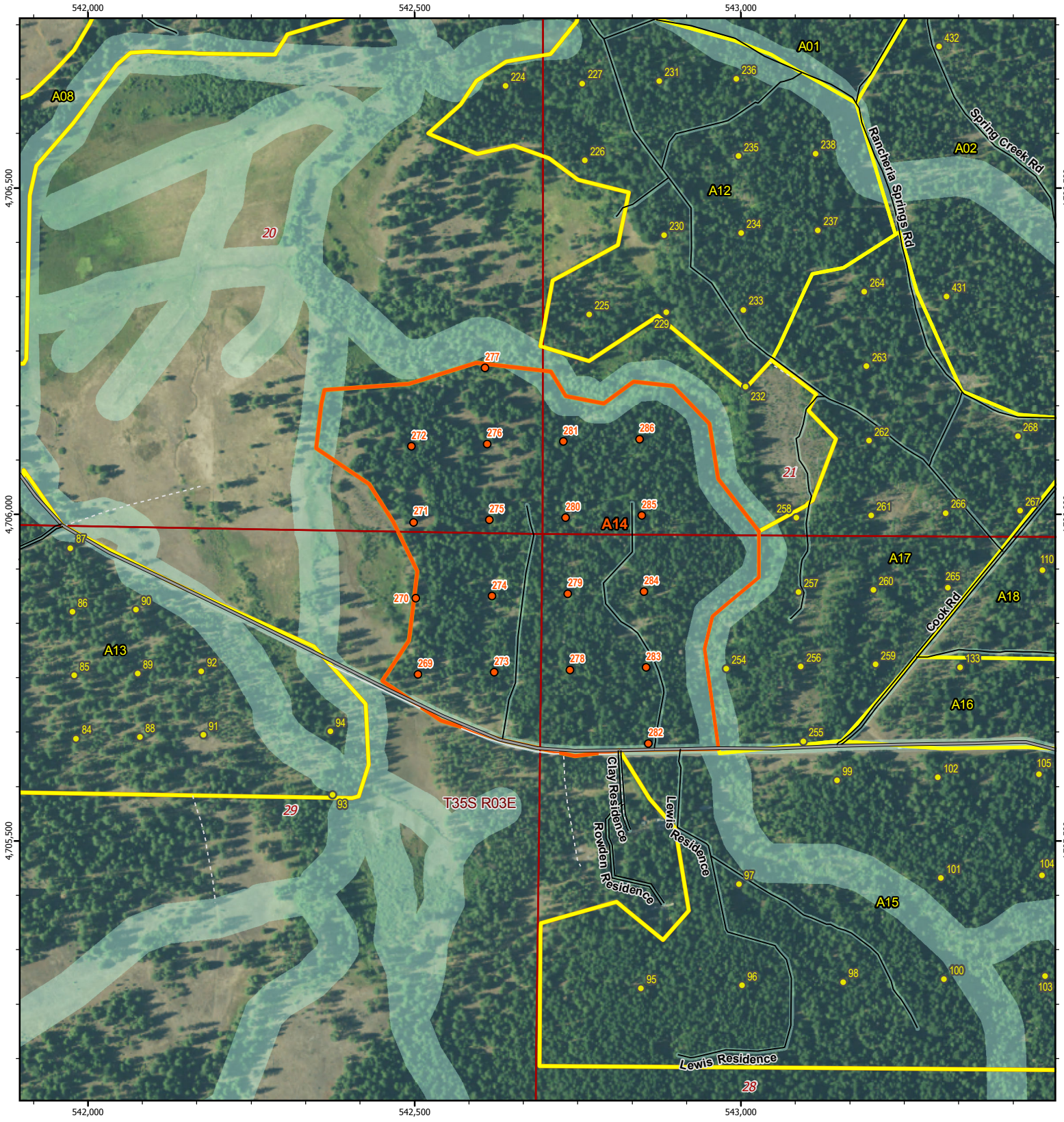
Imagery: NAIP 2016
Coordinate System:
NAD_1983_StatePlane_Oregon_South_FIPS_3602_Feet

MWC_Cruise2019_aerial.mxd 1/11/2019



Medford Watershed 2019 Cruise

- Cruise Plot
- Other Cruise Plot
- Cruise Stand
- Nearby Cruise Stand
- Other Stand
- Ownership
- Township
- Section
- Road/Stream Buffer

City of Medford Road

- Paved
- Rock/Gravel
- Dirt

BLM Road

- Major
- Unknown

Stand ID:	A14	# of Plots:	18
Gross Acres:	71.09	Plot Spacing (ft):	382
Net Acres:	61.27	Plot Spacing (ch):	5.79
Cover Type:	DF-MX/2-3/M		
Notes:			

MB&G
MASON, BRUCE & GIRARD, INC.
Natural Resource Consultants Since 1921

Scale = 1 chain
1:7,920
1 inch = 660 feet

0 330 660 feet

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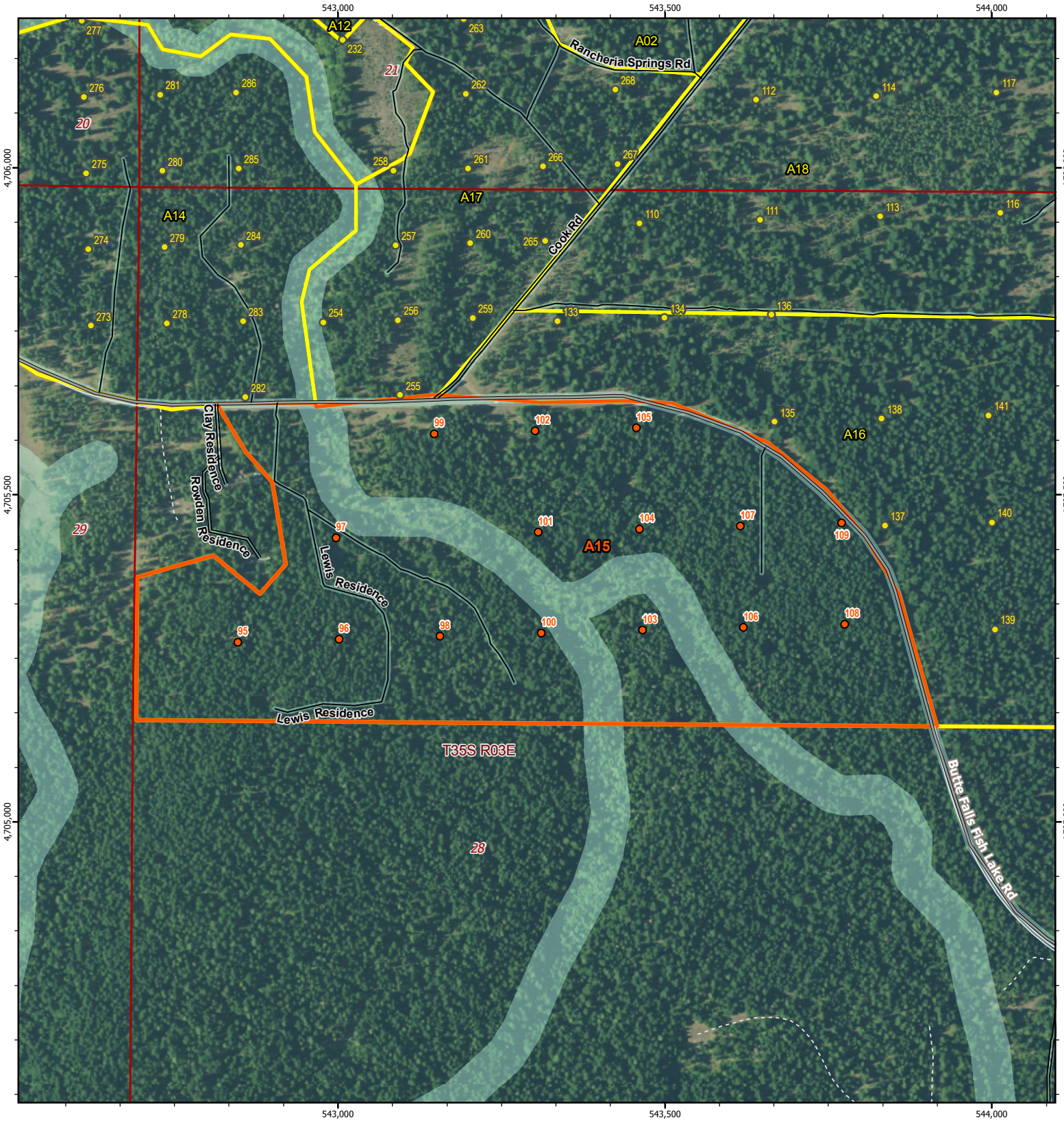
Imagery: NAIP 2016
Coordinate System:
NAD_1983_StatePlane_Oregon_South_FIPS_3602_Feet

MWC_Cruise2019_aerial.mxd 1/11/2019



Medford Watershed 2019 Cruise

- Cruise Plot
- Other Cruise Plot
- Cruise Stand
- Nearby Cruise Stand
- Other Stand
- Ownership
- Township
- Section
- Road/Stream Buffer

City of Medford Road

- Paved
- Rock/Gravel
- Dirt

BLM Road

- Major
- Unknown

Stand ID:	A15	# of Plots:	15
Gross Acres:	121.98	Plot Spacing (ft):	508
Net Acres:	99.52	Plot Spacing (ch):	7.69
Cover Type:	DF-MX/3/L		
Notes:			

MB&G
MASON, BRUCE & GIRARD, INC.
Natural Resource Consultants Since 1921

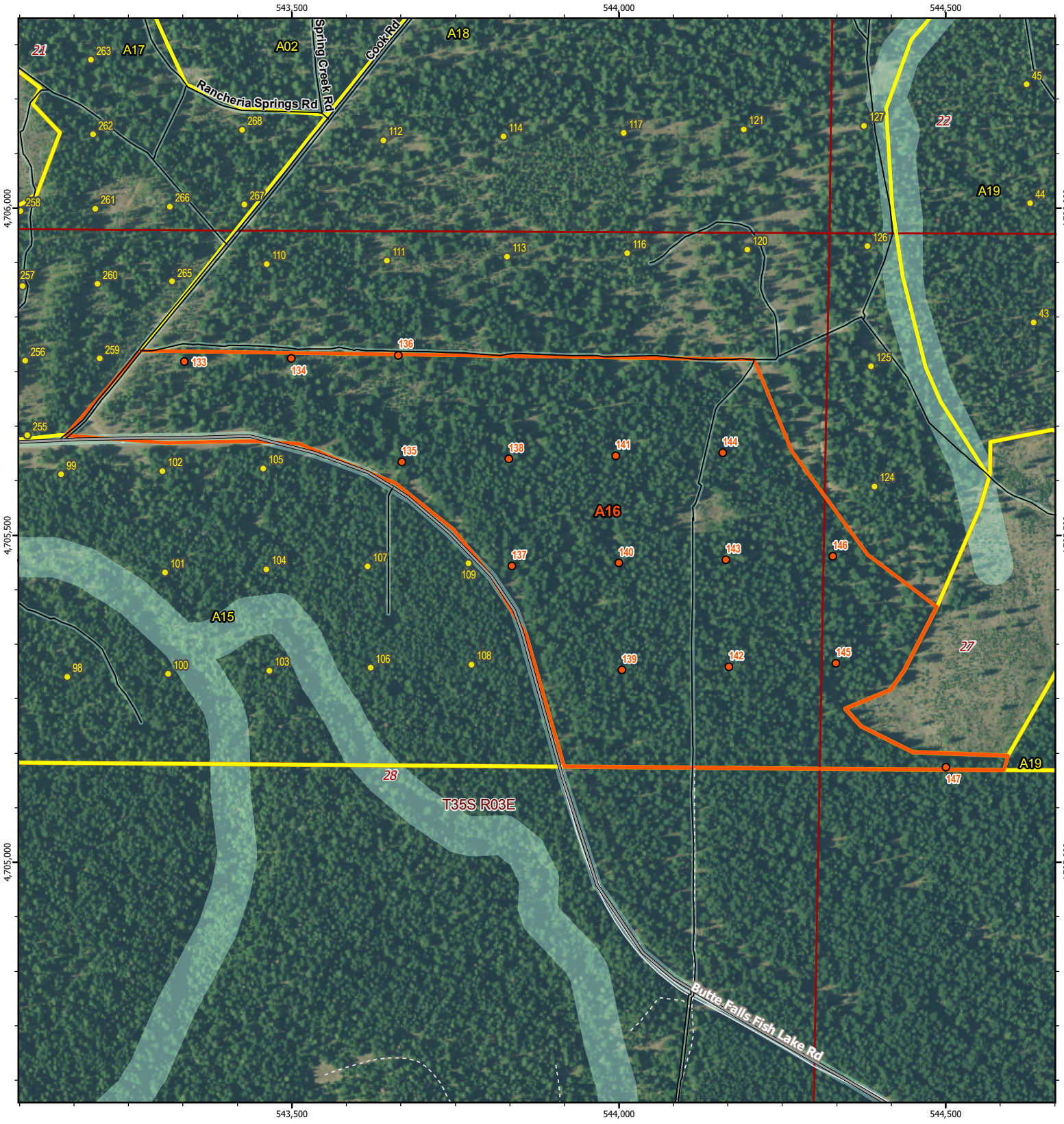
Scale = 1 chain
1:7,920
1 inch = 660 feet

0 330 660 feet

Stands current as of 01/11/2019. This product is for informational purposes only and may not be suitable for legal, engineering, or surveying purposes. Information is provided with the understanding that conclusions drawn are the responsibility of the user.

Imagery: NAIP 2016
Coordinate System:
NAD_1983_StatePlane_Oregon_South_FIPS_3602_Feet

MWC_Cruise2019_aerial.mxd 1/11/2019



Medford Watershed 2019 Cruise

- Cruise Plot
- Other Cruise Plot
- Cruise Stand
- Nearby Cruise Stand
- Other Stand
- Ownership
- Township
- Section
- Road/Stream Buffer

City of Medford Road

- Paved
- Rock/Gravel
- Dirt

BLM Road

- Major
- Unknown

Stand ID:	A16	# of Plots:	15
Gross Acres:	107.54	Plot Spacing (ft):	537
Net Acres:	104.24	Plot Spacing (ch):	8.14
Cover Type:	MX/3/M		
Notes:			

MB&G
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Natural Resource Consultants Since 1921

Scale = 1 chain
1:7,920
1 inch = 660 feet

0 330 660 feet

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Imagery: NAIP 2016
Coordinate System:
NAD_1983_StatePlane_Oregon_South_FIPS_3602_Feet

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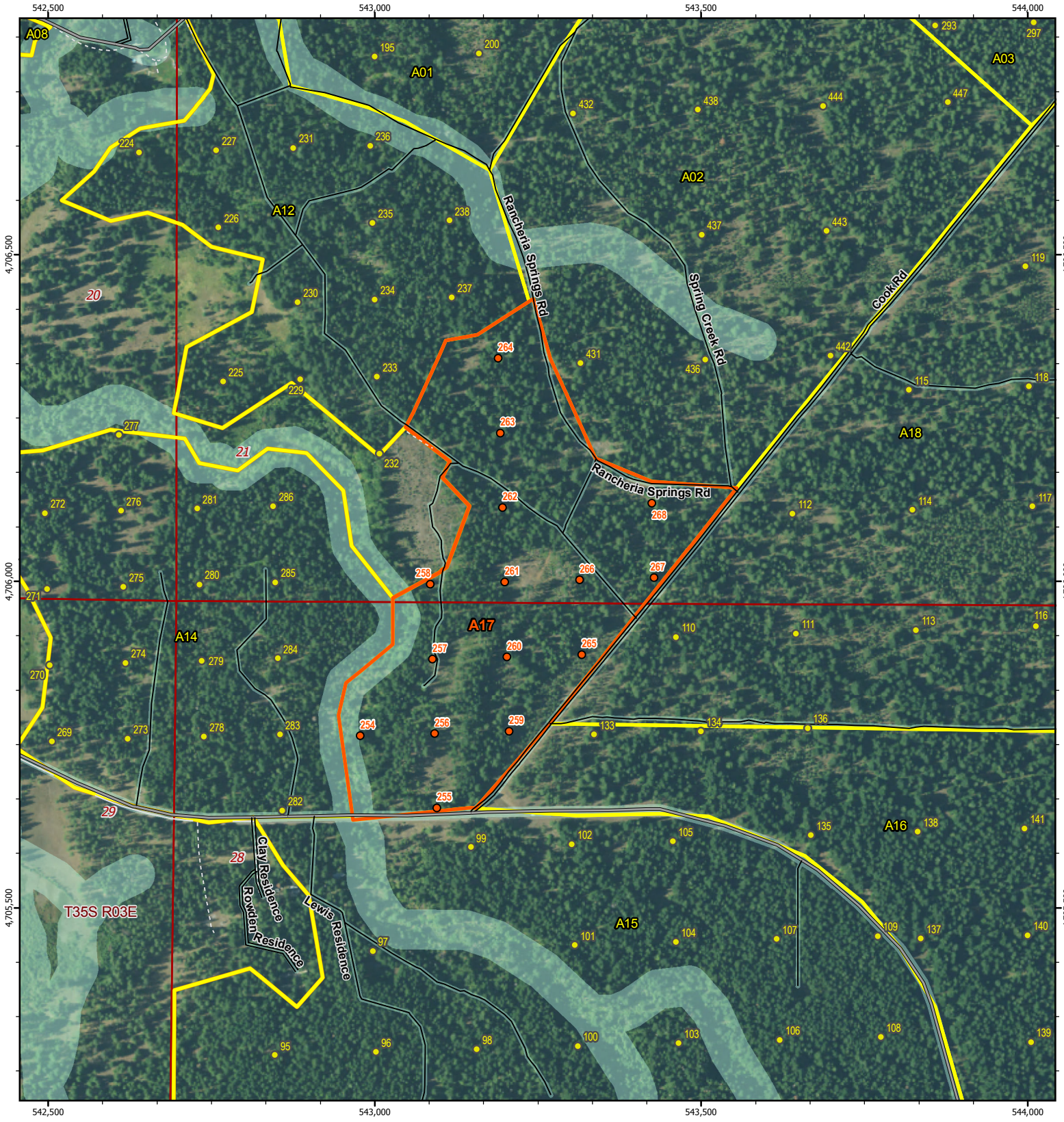

Medford Watershed 2019 Cruise

- Cruise Plot
- Other Cruise Plot
- Cruise Stand
- Nearby Cruise Stand
- Other Stand
- Ownership
- Township
- Section
- Road/Stream Buffer

City of Medford Road

- Paved
- Rock/Gravel
- Dirt

BLM Road

- Major
- Unknown

Stand ID:	A17	# of Plots:	15
Gross Acres:	55.09	Plot Spacing (ft):	375
Net Acres:	49.35	Plot Spacing (ch):	5.68
Cover Type:	DF-MX/2/L		
Notes:			

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1 inch = 660 feet

0 330 660 feet

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Coordinate System:
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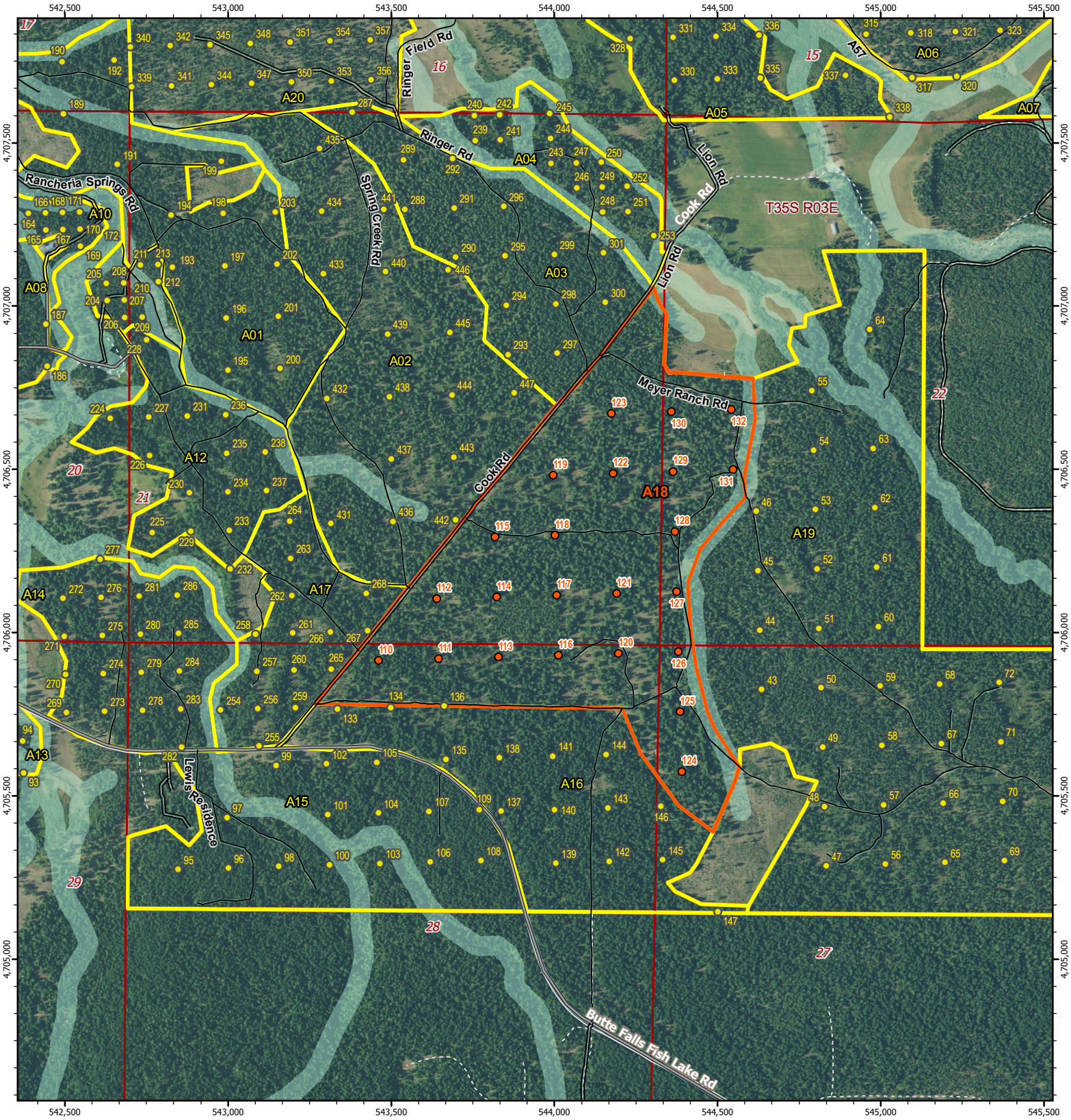

Medford Watershed 2019 Cruise

- Cruise Plot
- Other Cruise Plot
- Cruise Stand
- Nearby Cruise Stand
- Other Stand
- Ownership
- Township
- Section
- Road/Stream Buffer

City of Medford Road

- Paved
- Rock/Gravel
- Dirt

BLM Road

- Major
- Unknown

Stand ID:	A18	# of Plots:	23
Gross Acres:	238.17	Plot Spacing (ft):	603
Net Acres:	217.61	Plot Spacing (ch):	9.14
Cover Type:	MX/1-2/L		
Notes:			

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Scale = 2 chains
1:15,840
1 inch = 1,320 feet
0 330 660 feet

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Imagery: NAIP 2016
Coordinate System:
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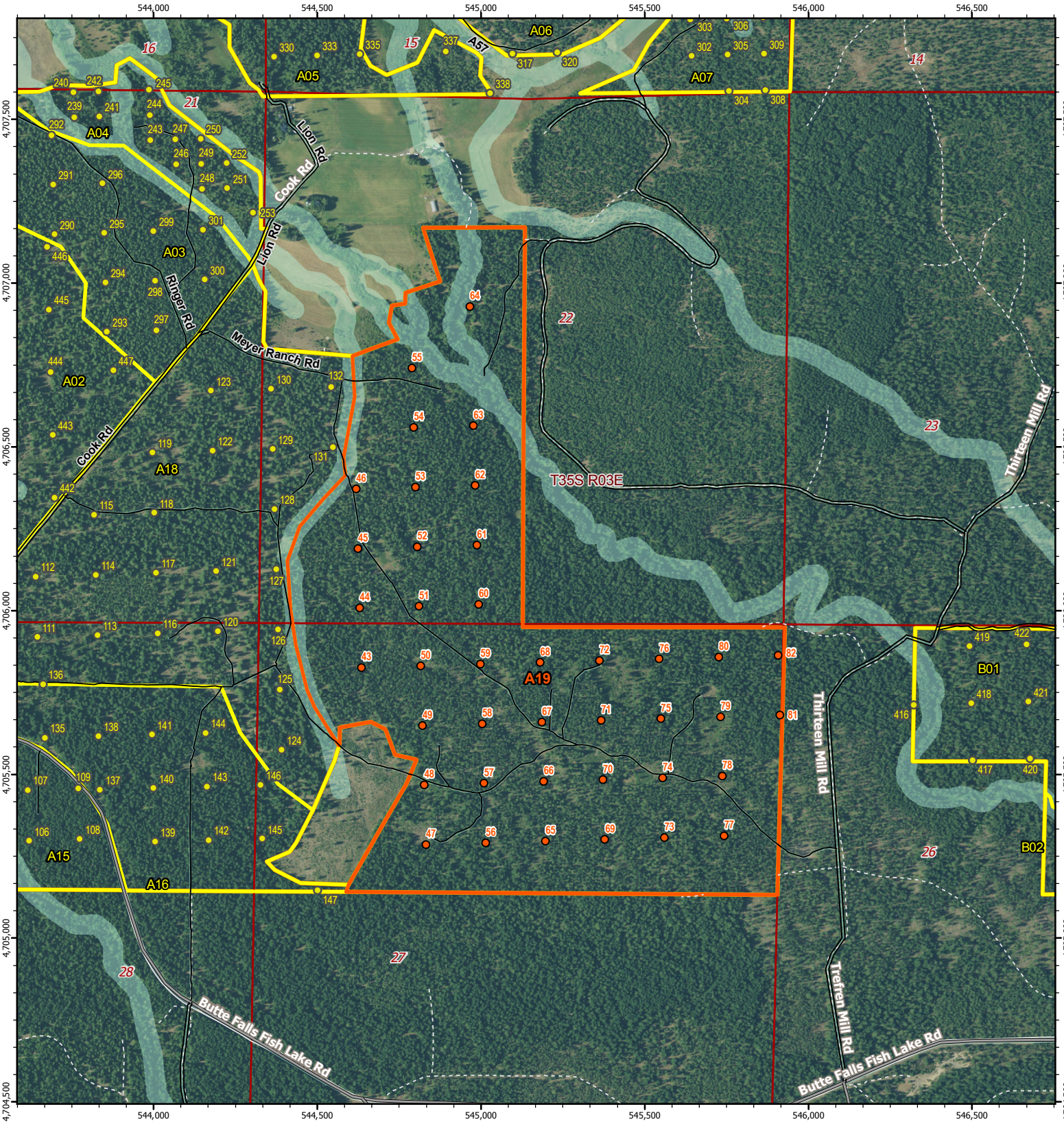

Medford Watershed 2019 Cruise

- Cruise Plot
- Other Cruise Plot
- Cruise Stand
- Nearby Cruise Stand
- Other Stand
- Ownership
- Township
- Section
- Road/Stream Buffer

City of Medford Road

- Paved
- Rock/Gravel
- Dirt

BLM Road

- Major
- Unknown

Stand ID:	A19	# of Plots:	40
Gross Acres:	421.19	Plot Spacing (ft):	597
Net Acres:	385.84	Plot Spacing (ch):	9.05
Cover Type:	MX/2/M		
Notes:			

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1:15,840
1 inch = 1,320 feet
0 330 660 feet

Stands current as of 01/11/2019. This product is for informational purposes only and may not be suitable for legal, engineering, or surveying purposes. Information is provided with the understanding that conclusions drawn are the responsibility of the user.
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Coordinate System:
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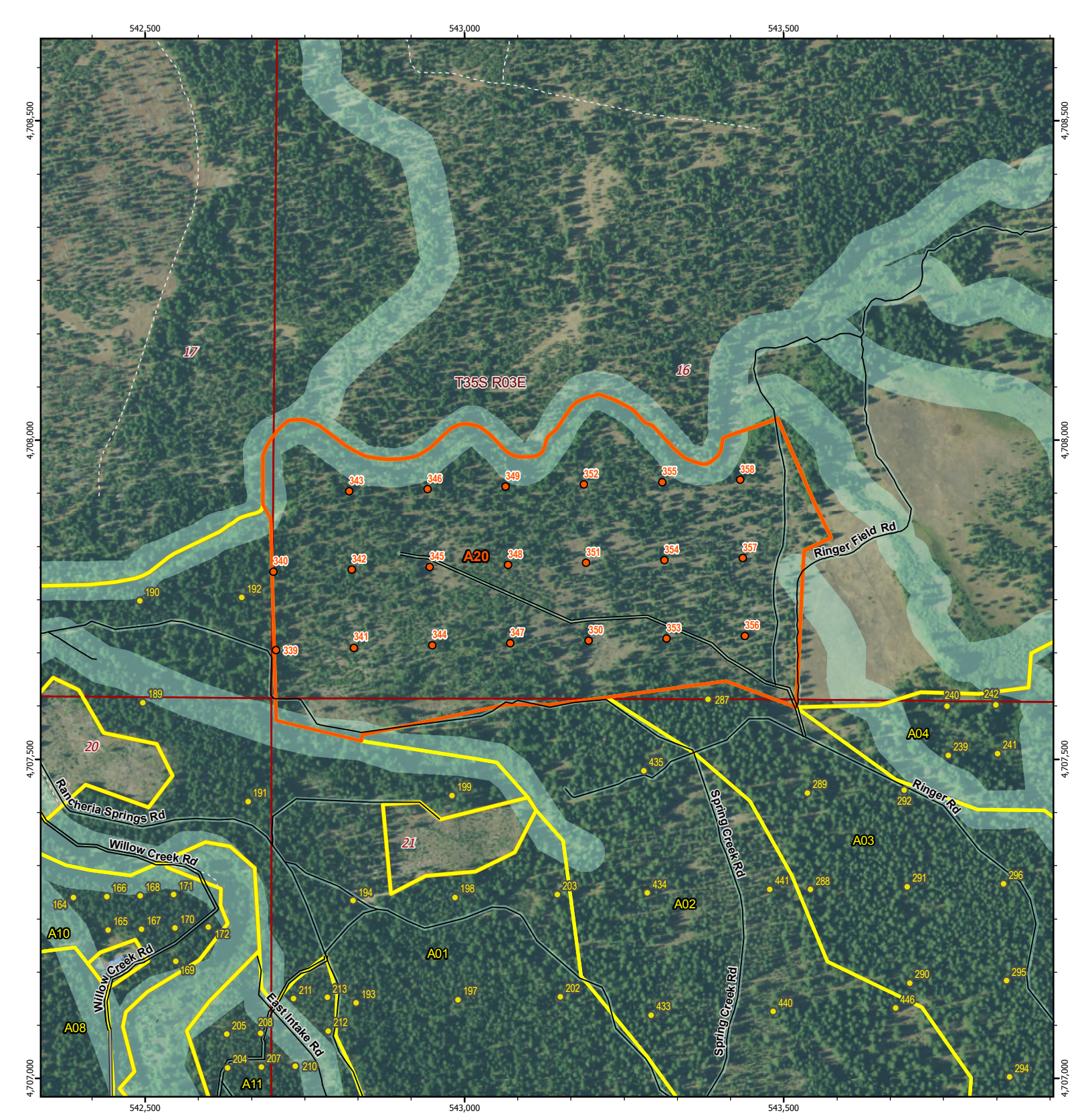

Medford Watershed 2019 Cruise

- Cruise Plot
- Other Cruise Plot
- Cruise Stand
- Nearby Cruise Stand
- Other Stand
- Ownership
- Township
- Section
- Road/Stream Buffer

City of Medford Road

- Paved
- Rock/Gravel
- Dirt

BLM Road

- Major
- Unknown

Stand ID:	A20	# of Plots:	20
Gross Acres:	88.24	Plot Spacing (ft):	402
Net Acres:	75.35	Plot Spacing (ch):	6.09
Cover Type:	MX/1/M		
Notes:			

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1:7,920
1 inch = 660 feet

0 330 660 feet

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Coordinate System:
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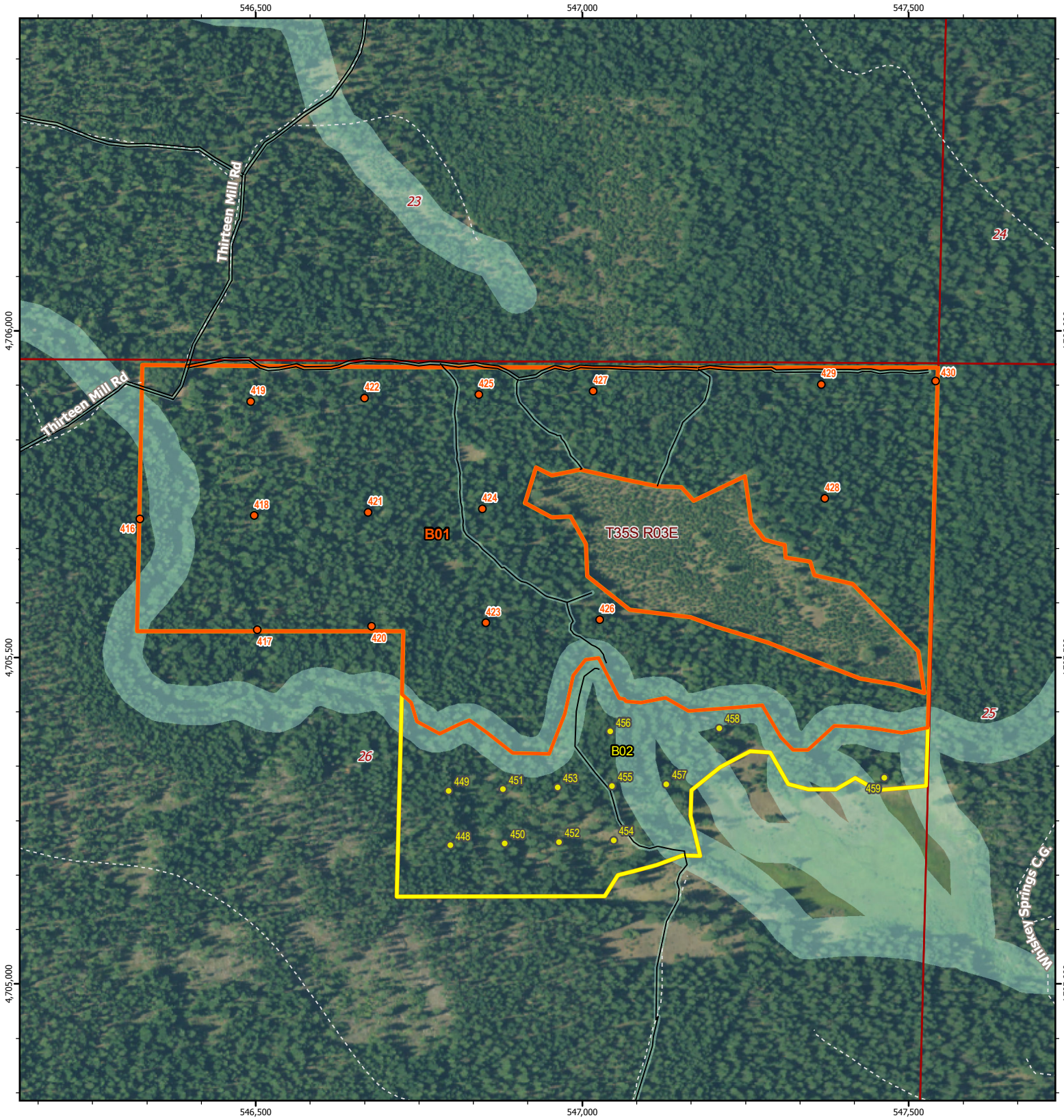

Medford Watershed 2019 Cruise

- Cruise Plot
- Other Cruise Plot
- Cruise Stand
- Nearby Cruise Stand
- Other Stand
- Ownership
- Township
- Section
- Road/Stream Buffer

City of Medford Road

- Paved
- Rock/Gravel
- Dirt

BLM Road

- Major
- Unknown

Stand ID:	B01	# of Plots:	15
Gross Acres:	126.55	Plot Spacing (ft):	574
Net Acres:	110.35	Plot Spacing (ch):	8.69
Cover Type:	MX/2/M		
Notes:			

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Scale = 1 chain
1:7,920
1 inch = 660 feet

0 330 660 feet

Stands current as of 01/11/2019. This product is for informational purposes only and may not be suitable for legal, engineering, or surveying purposes. Information is provided with the understanding that conclusions drawn are the responsibility of the user.

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Coordinate System:
NAD_1983_StatePlane_Oregon_South_FIPS_3602_Feet

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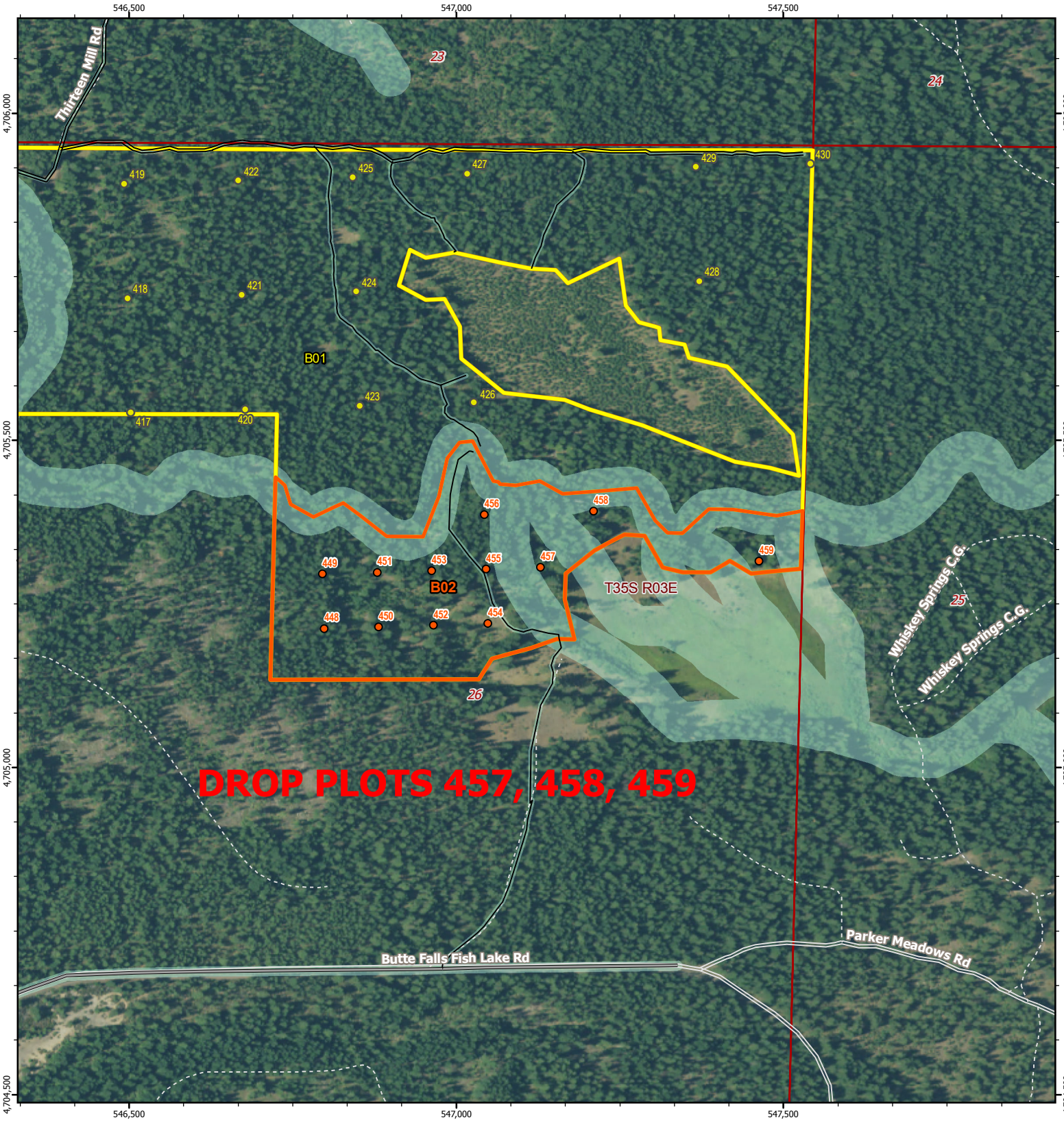

Medford Watershed 2019 Cruise

- Cruise Plot
- Other Cruise Plot
- Cruise Stand
- Nearby Cruise Stand
- Other Stand
- Ownership
- Township
- Section
- Road/Stream Buffer

City of Medford Road

- Paved
- Rock/Gravel
- Dirt

BLM Road

- Major
- Unknown

Stand ID:	B02	# of Plots:	12
Gross Acres:	36.68	Plot Spacing (ft):	274
Net Acres:	22.01	Plot Spacing (ch):	4.15
Cover Type:	MX/3/M		
Notes:			

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1:7,920
1 inch = 660 feet

0 330 660 feet

Stands current as of 01/11/2019. This product is for informational purposes only and may not be suitable for legal, engineering, or surveying purposes. Information is provided with the understanding that conclusions drawn are the responsibility of the user.

Imagery: NAIP 2016
Coordinate System:
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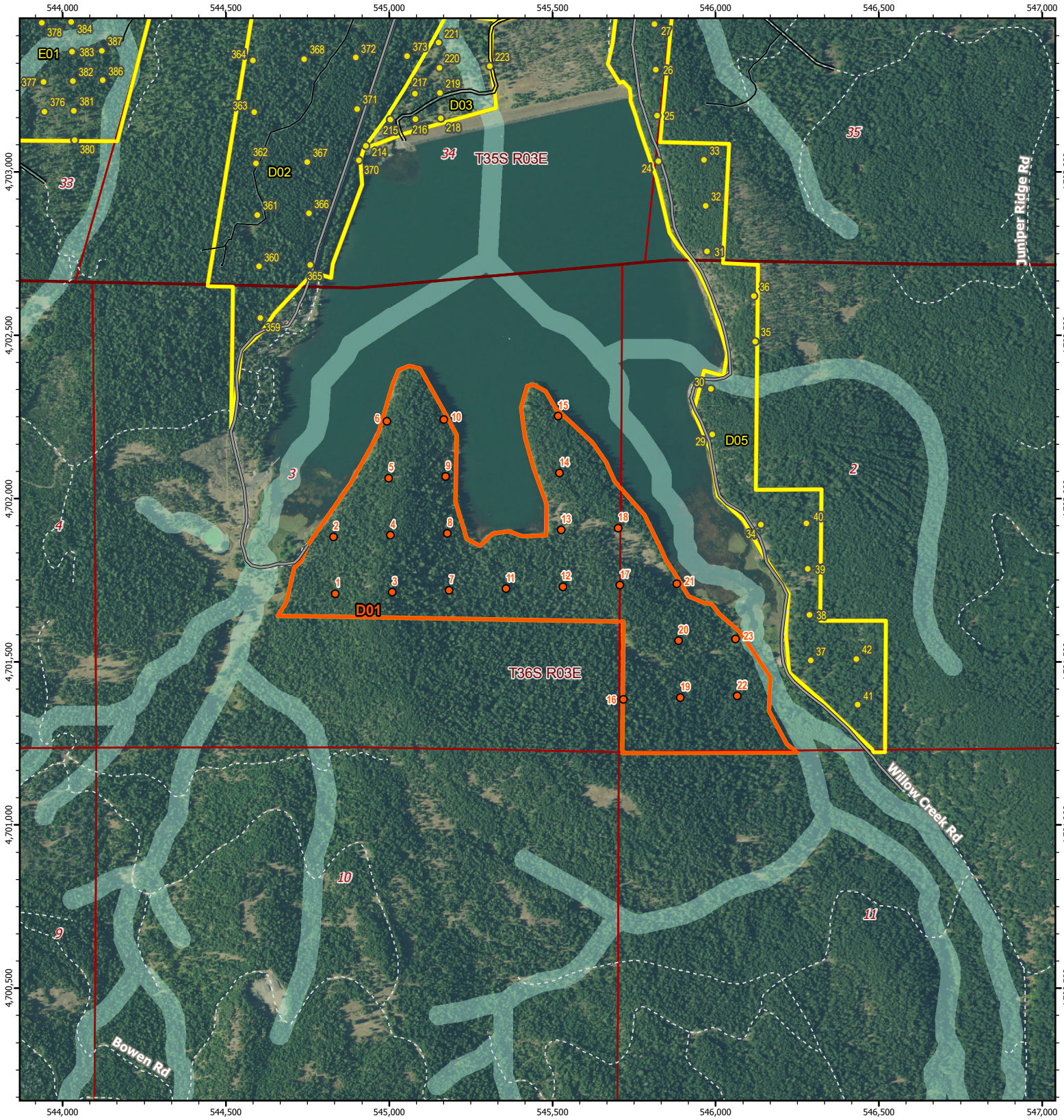

Medford Watershed 2019 Cruise

- Cruise Plot
- Other Cruise Plot
- Cruise Stand
- Nearby Cruise Stand
- Other Stand
- Ownership
- Township
- Section
- Road/Stream Buffer

City of Medford Road

- Paved
- Rock/Gravel
- Dirt

BLM Road

- Major
- Unknown

Stand ID:	D01	# of Plots:	23
Gross Acres:	175.63	Plot Spacing (ft):	573
Net Acres:	174.67	Plot Spacing (ch):	8.68
Cover Type:	MX/3/H		
Notes:			

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Scale = 2 chains
1:15,840
1 inch = 1,320 feet
0 330 660 feet

Stands current as of 01/11/2019. This product is for informational purposes only and may not be suitable for legal, engineering, or surveying purposes. Information is provided with the understanding that conclusions drawn are the responsibility of the user.

Imagery: NAIP 2016
Coordinate System:
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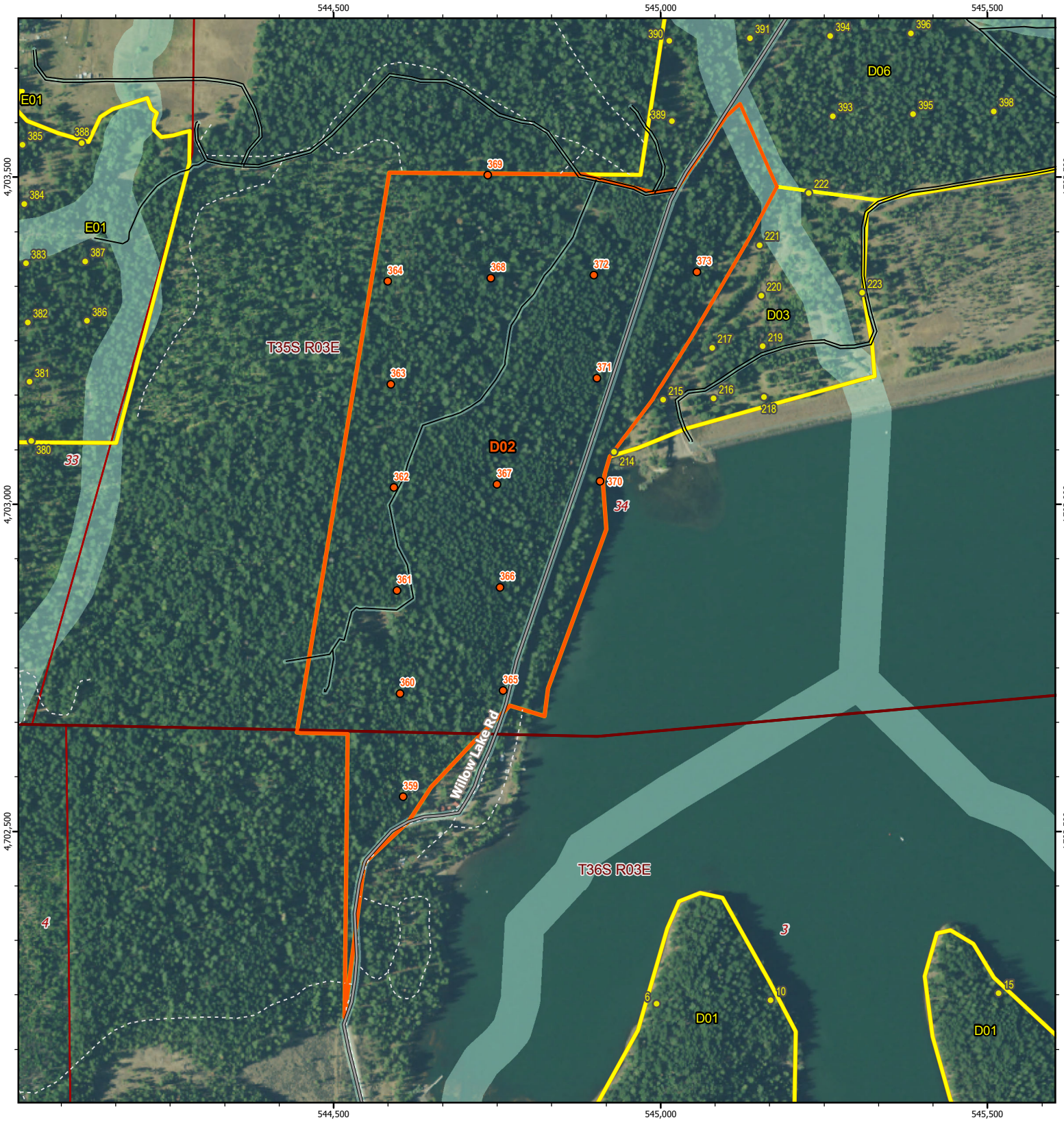

Medford Watershed 2019 Cruise

- Cruise Plot
- Other Cruise Plot
- Cruise Stand
- Nearby Cruise Stand
- Other Stand
- Ownership
- Township
- Section
- Road/Stream Buffer

City of Medford Road

- Paved
- Rock/Gravel
- Dirt

BLM Road

- Major
- Unknown

Stand ID:	D02	# of Plots:	15
Gross Acres:	103.59	Plot Spacing (ft):	518
Net Acres:	97.02	Plot Spacing (ch):	7.84
Cover Type:	MX/3/H		
Notes:			

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1:7,920
1 inch = 660 feet

0 330 660 feet

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Imagery: NAIP 2016
Coordinate System:
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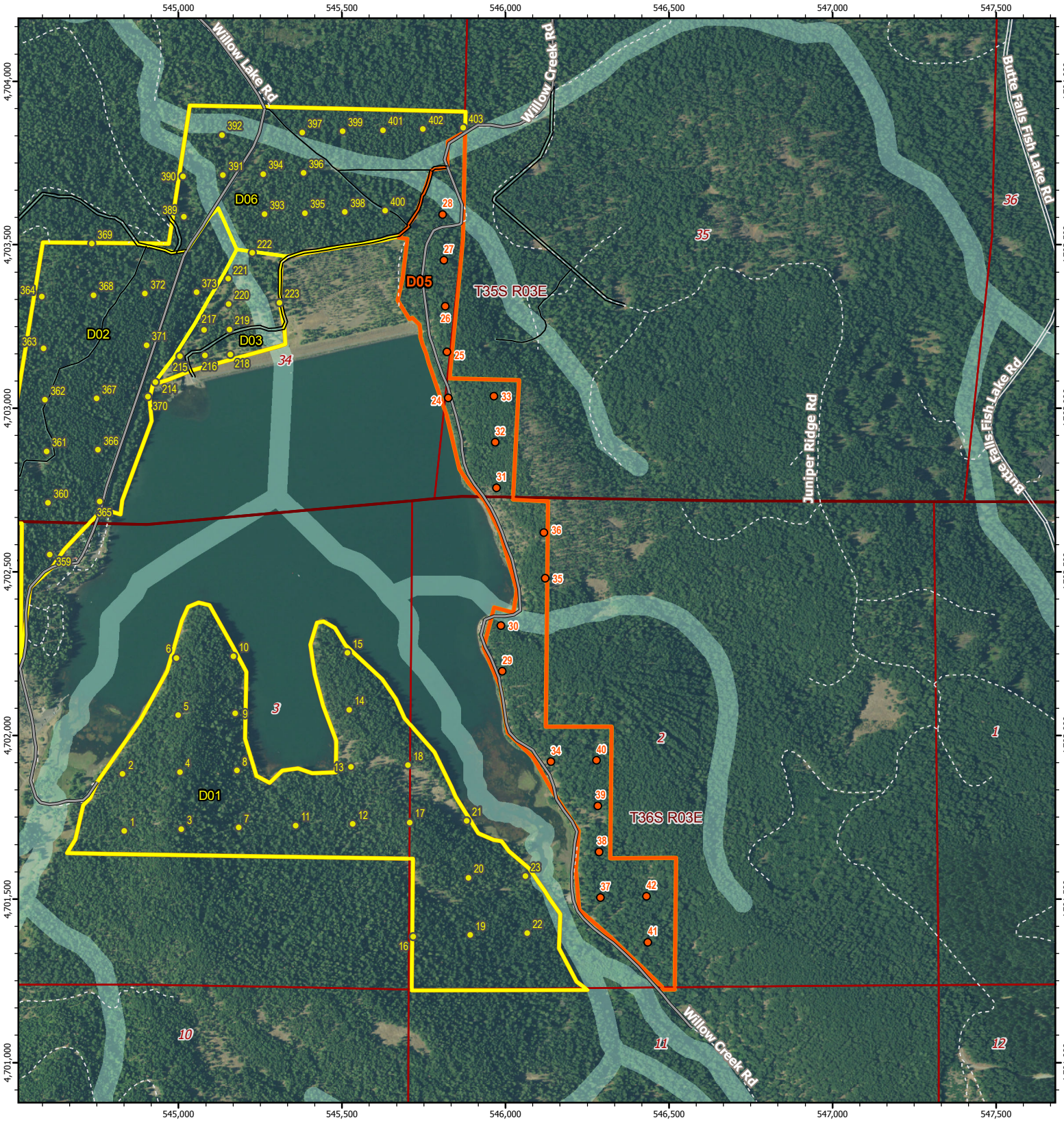

Medford Watershed 2019 Cruise

- Cruise Plot
- Other Cruise Plot
- Cruise Stand
- Nearby Cruise Stand
- Other Stand
- Ownership
- Township
- Section
- Road/Stream Buffer

City of Medford Road

- Paved
- Rock/Gravel
- Dirt

BLM Road

- Major
- Unknown

Stand ID:	D05	# of Plots:	19
Gross Acres:	104.54	Plot Spacing (ft):	460
Net Acres:	93.36	Plot Spacing (ch):	6.97
Cover Type:	MX/2/H		
Notes:			

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1:15,840
1 inch = 1,320 feet
0 330 660 feet

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Imagery: NAIP 2016
Coordinate System:
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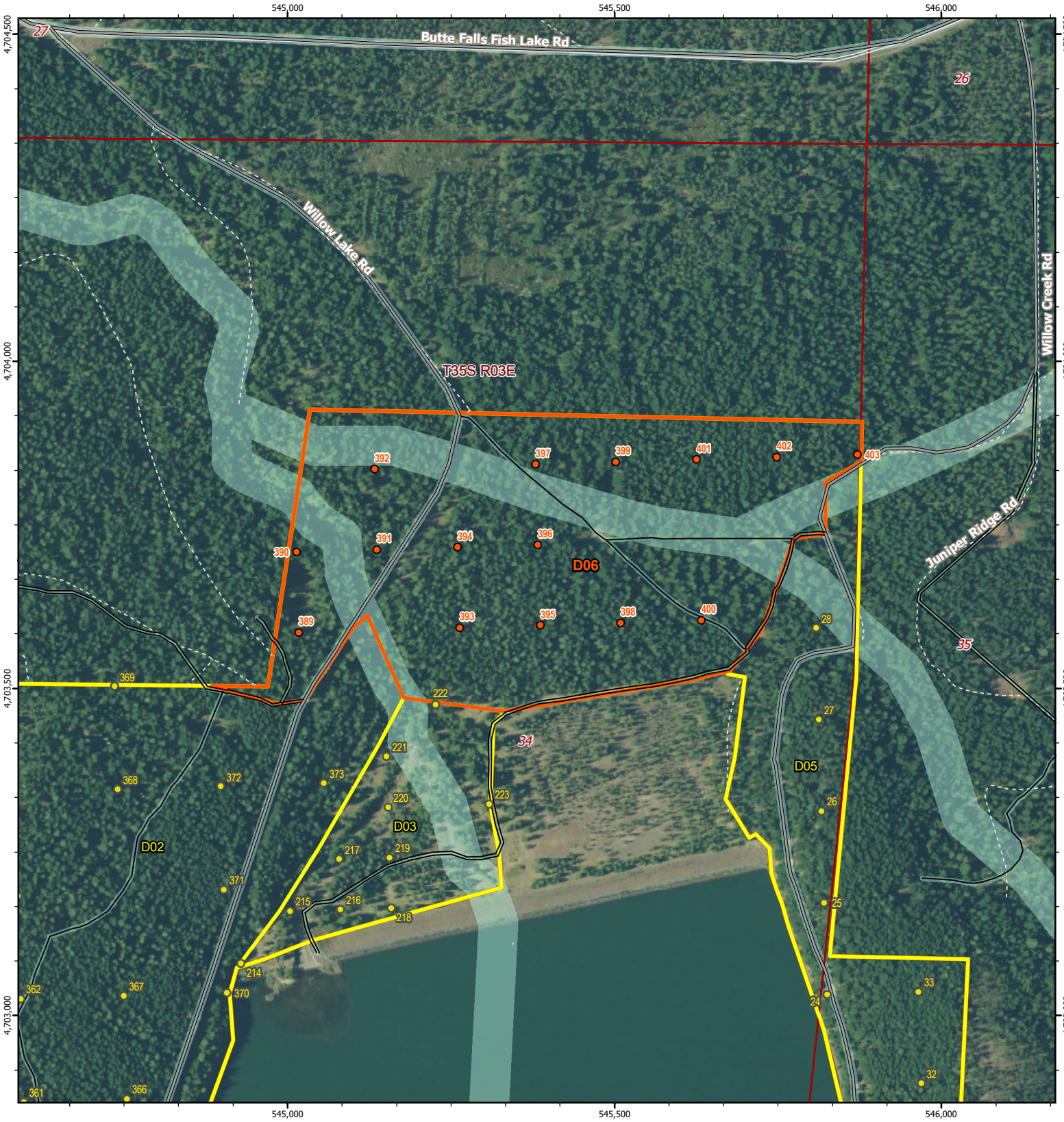

Medford Watershed 2019 Cruise

- Cruise Plot
- Other Cruise Plot
- Cruise Stand
- Nearby Cruise Stand
- Other Stand
- Ownership
- Township
- Section
- Road/Stream Buffer

City of Medford Road

- Paved
- Rock/Gravel
- Dirt

BLM Road

- Major
- Unknown

Stand ID:	D06	# of Plots:	15
Gross Acres:	80.54	Plot Spacing (ft):	404
Net Acres:	60.15	Plot Spacing (ch):	6.12
Cover Type:	MX/2-3/H		
Notes:			

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Scale = 1 chain
1:7,920
1 inch = 660 feet

0 330 660 feet

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Coordinate System:
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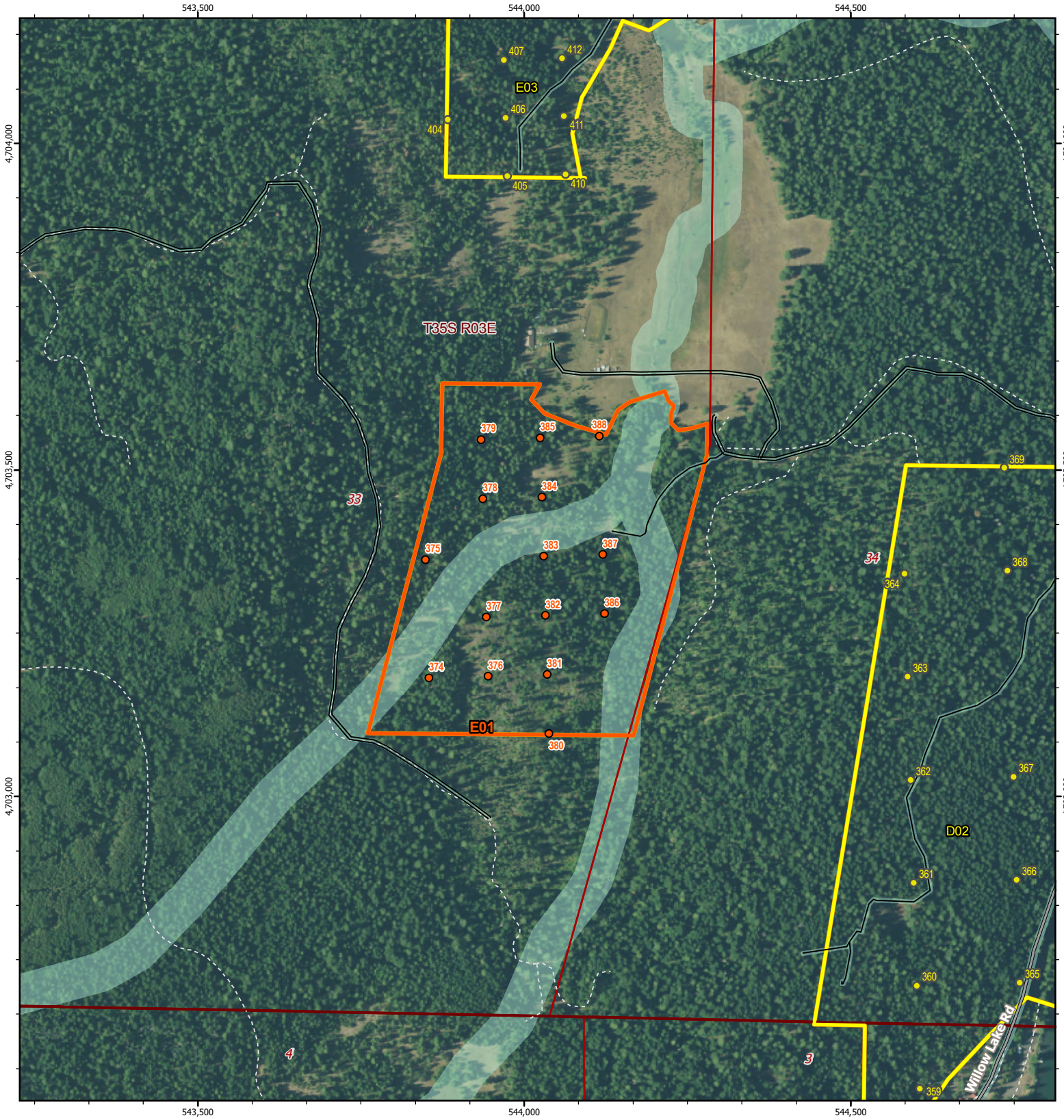

Medford Watershed 2019 Cruise

- Cruise Plot
- Other Cruise Plot
- Cruise Stand
- Nearby Cruise Stand
- Other Stand
- Ownership
- Township
- Section
- Road/Stream Buffer

City of Medford Road

- Paved
- Rock/Gravel
- Dirt

BLM Road

- Major
- Unknown

Stand ID:	E01	# of Plots:	15
Gross Acres:	50.87	Plot Spacing (ft):	297
Net Acres:	35.46	Plot Spacing (ch):	4.51
Cover Type:	MX/2/M		
Notes:			

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Scale = 1 chain
1:7,920
1 inch = 660 feet
0 330 660 feet

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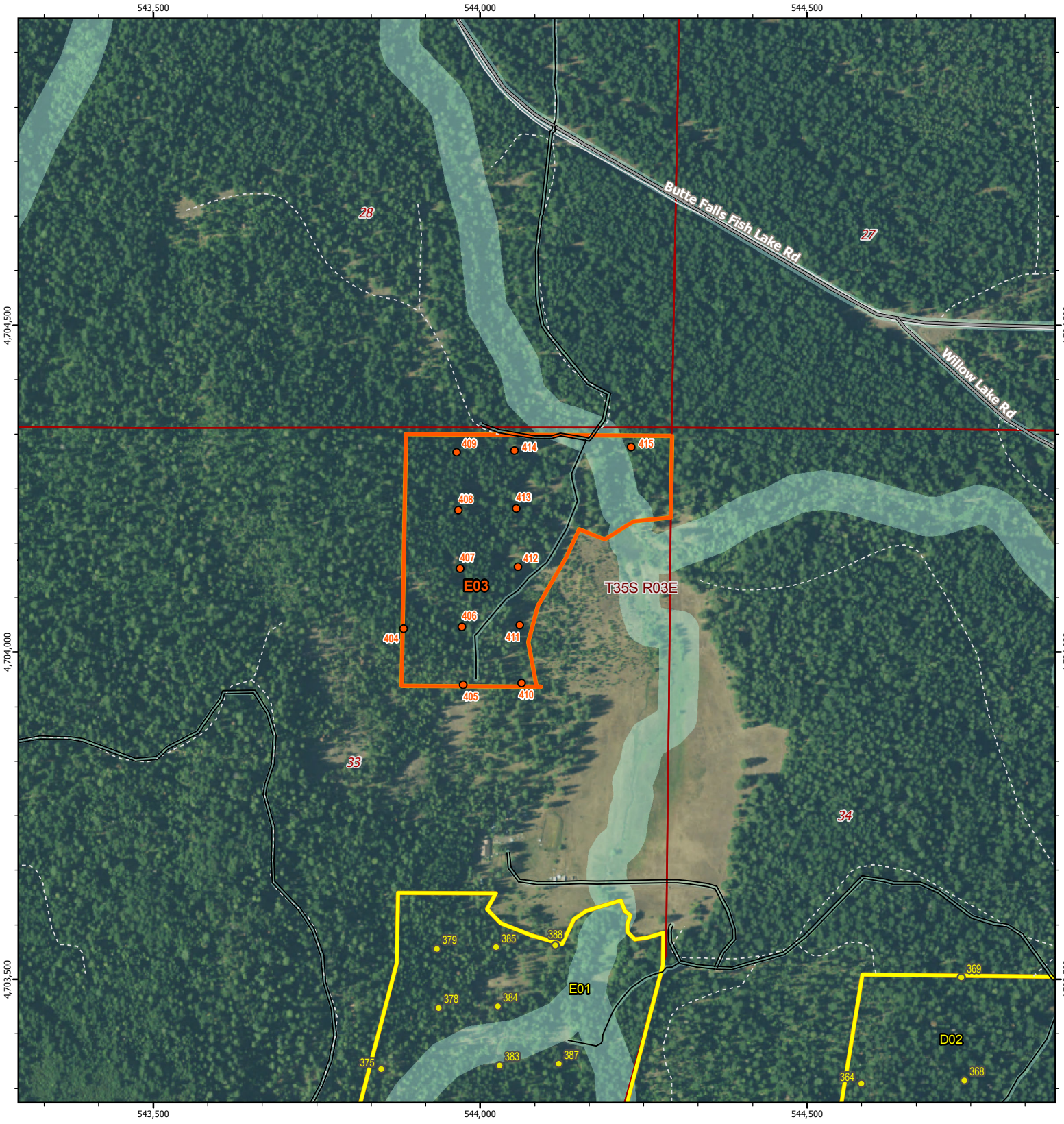

Medford Watershed 2019 Cruise

- Cruise Plot
- Other Cruise Plot
- Cruise Stand
- Nearby Cruise Stand
- Other Stand
- Ownership
- Township
- Section
- Road/Stream Buffer

City of Medford Road

- Paved
- Rock/Gravel
- Dirt

BLM Road

- Major
- Unknown

Stand ID:	E03	# of Plots:	12
Gross Acres:	27.35	Plot Spacing (ft):	292
Net Acres:	24.06	Plot Spacing (ch):	4.42
Cover Type:	MX-PP/2-3/H		
Notes:			

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Scale = 1 chain
1:7,920
1 inch = 660 feet

0 330 660 feet

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Coordinate System:
NAD_1983_StatePlane_Oregon_South_FIPS_3602_Feet

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APPENDIX B

Cruise Procedures Manual

BIG BUTTE SPRINGS WATERSHED
MEDFORD WATER COMMISSION

Inventory Cruise Instructions

Prepared by:

Mason, Bruce & Girard, Inc.
707 SW Washington, Suite 1300
Portland, OR 97205
503-224-3445
www.masonbruce.com

Big Butte Springs Watershed Cruise Manual

Table of Contents

SECTION I: Overview 3

Introduction 3

Section II. Cruise Administration and Preparation 3

Map Preparation 3

Plot Distribution and Sampling 3

Section III: Cruise Design, Plot Location and Procedure 3

Plot Location 3

Number of Plots 3

Field Maps 3

Determining if a Plot Location is Valid in Plot Establishment 4

Dealing with Cruise Plots on Stand Edges or Property Boundaries 4

Dealing with Plots in or Near a Stream 4

Dealing with Plots on Mapped and Unmapped Roads 4

Plot GPS 5

Plot Monumentation 5

Plot Design 5

Borderline Trees 5

Variable Radius Plots 5

Fixed Radius Plots 6

Section IV: Stand, Plot, and Tree Level Data Records 6

Stand Level Data 6

Plot Level Data 6

Tree Level Data 7

Section V: Deliverables 10

Cruise Data 10

Cruise Maps 10

Section VI: Quality Control – Check Cruising 10

Appendix A. Edge Plot Procedures 12

The Walkthrough Method 12

Appendix B. DBH Measurements 13

Proper Use of a Diameter Tape 13

Point of Measurement for DBH 14

Appendix C. Measuring Total Height 17

Appendix D. Live Crown Ratio 20

Appendix E. Slope Correction Tables 21

Fixed Radius Plot Corrections....21
General Slope Correction Factors....22
Appendix F: Age and Growth Measurement....23

List of Tables

Table 1. Summary of data to be collected at stand level....6
Table 2. Summary of data to be collected at the plot level....6
Table 3. Summary of data to be collected at the tree level on measure plots....7
Table 4. Tree species codes....8
Table 5. Tree group description....8
Table 6. Check cruise tolerances....10
Table 7. Example Check Cruising Analysis....11

SECTION I: Overview

Introduction

Mason, Bruce & Girard (MB&G) is conducting a timber cruise on the Big Butte Creek Watershed, for the City of Medford Water Commission. The purpose of this cruise is to establish a baseline inventory to be used in the generation of a long-term management plan. The cruise will cover approximately 2,700 acres of the watershed, and consist of a total of 459 plots, in 29 stands.

Section II. Cruise Administration and Preparation

Map Preparation

An essential step in the preparation for cruising is the development of maps to aid in logistical planning and travel to each cruise plot. The MB&G Portland office will provide vicinity maps for the property to aid in general location of the stands, as well as individual stand maps to show plot locations.

Plot Distribution and Sampling

A systematic grid of plots with a random starting point will be mapped within the net acres of each stand to be cruised. Plots should not be measured within stream buffers or mapped roads.

It is important to sample the entire net area of each stand, this means that springs, creeks, rock outcrops and other features which are not mapped are included within the net acres, and that cruise plots which may fall on or near these features are valid for obtaining estimates of average volume, basal area, and trees per acre.

Section III: Cruise Design, Plot Location and Procedure

Plot Location

Predetermined plot locations should be loaded into a handheld GPS unit. The cruiser will navigate to the GPS location with the handheld GPS until within 30 feet of the plot location. Once within 30 feet, the cruiser should stop and let the GPS gain a more precise location. If the direction and azimuth changes, the cruiser should follow the new direction and azimuth using compass and pacing rather than the GPS navigation, as the GPS direction and distance will vacillate quickly once close to the plot (within 30 feet).

In the event of a weak satellite signal or loss of battery power in the GPS unit, the plots should be located as close to the mapped location as possible using a compass and pacing or other means of measurement, and referring to the stand map.

Number of Plots

The minimum stand size to cruise will be 10.0 net acres. Number of plots per cruise stand have been allocated based on stand size and an estimate of stand variability. Plot allocations are shown, by stand, in the table below.

The total number of mapped inventory plots across the 29 stands to cruise will be 459. The average plot intensity within each stand ranges from 1.5 acres per plot to 10 acres per plot.

Field Maps

On the stand map, the cruiser will draw the direction of travel from the road to the first plot, and note the travel between plots. Keep note of any potential forest health issues and/or recent silvicultural activities that may have

impacts on the proportion of live timber at the time of harvest, site quality, and future planting stock and/or silvicultural plans. Examples of these notes should include, but are not limited to, any presence of root rot, blowdown, and/or observed stumps that are a result of any pre-commercial or commercial thinning harvest activities. Notes should be geographically referenced, as these details are most valuable when associated with a specific location.

Determining if a Plot Location is Valid in Plot Establishment

Dealing with Cruise Plots on Stand Edges or Property Boundaries

Cruisers should use best judgment based on the provided maps, and what is seen on the ground to determine whether the plot is on the edge of a stand line. The cruiser *should not* take steps to avoid sampling on or near the edge. Moving a plot location back along the line of travel to avoid the edge is not an acceptable practice. If a plot is determined to be on or near a stand edge or property boundary, the Walkthrough method should be used to determine which trees, if any, should be double-tallied. A full description of the proper application of the Walkthrough method is provided in Appendix A.

If a cruiser navigates to the plot location and finds that the plot falls outside of the timber type associated with the stand, they should again observe the surrounding stand, and consult the provided aerial map to determine which of the following actions to take:

- If the mapped location shows the plot landing in the adjacent timber type on the aerial map, the plot should be dropped and the cruiser should note why in the Plot Comments; the cruise map should also be annotated to indicate that a stand line edit is needed
- If the mapped location shows that the plot is within the stand and timber type that the cruiser is currently sampling, the cruiser should assess the accuracy of the GPS and establish the plot at a distance from the *observed* stand boundary that is consistent with the *mapped* stand boundary
- If it is evident from conditions on the ground that a recent harvest has taken place, and this is the cause of the difference in timber type (as opposed to a mapping error), the plot should be taken where it falls. A comment should be recorded with the plot, and the cruise map annotated to indicate the new stand boundary

Dealing with Plots in or Near a Stream

When creating stand maps, the acreage of buffers associated with certain streams are removed from the area being cruised, and cruise plots are not assigned in those areas. Due to occasional inaccuracy of mapped streams, a plot may fall within what should be a buffer area, or even the stream itself. Streams may also be miscategorized in the spatial data layer used for mapping, and a stream requiring a buffer does not actually get buffered. In the event that either one of these situations is encountered, the plot should be moved back into the stand, and the map annotated accordingly. When relocating plots due to mapping errors, assume a minimum distance of 30’ from the center of the stream channel.

Dealing with Plots on Mapped and Unmapped Roads

When creating stand maps, the acreage of roads and associated buffers are removed from the area being cruised, and plots are not assigned in those areas. Due to occasional inaccuracy of the spatial information used to generate the cruise map, a plot may fall on a mapped road or its’ associated buffer. Plots falling on *mapped* roads should be moved back into the stand at a distance equal to the approximate distance of the mapped plot location from the mapped centerline of the road. Any plots falling on *unmapped* roads or trails should be taken where they fall. In both situations, the cruise map should be annotated accordingly, and plot-level comments recorded in the data.

Plot GPS

If a plot is moved or offset from its intended location, a GPS point will be taken at plot center, and the coordinates and projection system should be noted on the stand map. MB&G does not anticipate any plots to be moved from the mapped location for this project. If a plot is moved by the cruiser, the cruiser will need to provide a detailed description for the cause of moving the plot.

Plot Monumentation

After navigating to the plot center location, the cruiser will monument the plot by firmly shoving a stick or pin flag into the ground at plot center. Appropriate color flagging should be secured to the stick, if used. Two long pieces of flagging should also be tied to a tree or branch at or above eye level near plot center. One length of flagging should have the **cruiser's initials**, **date**, and **plot number** printed on it in permanent ink.

Plot Design

A variable radius plot with nested fixed radius plot will be used for this inventory procedure. Each variable radius plot will be a full circle sweep, sighting trees at DBH. The "prism sweep" should proceed from due north in a clockwise manner and all "in" trees will be recorded in the order they are encountered. **Trees 4.6" DBH and larger** will be tallied on this plot; all live and dead trees will be recorded. The fixed radius plot will also involve a full circle sweep, using the distance from plot center *to the center of the tree at the point where it comes out of the ground*, to determine whether or not a tree is included in the plot tally. All trees 4.5" DBH and less will be included in this plot.

The Basal Area Factor (BAF) should be chosen for the stand by the cruiser such that an average of 5 to 8 trees will be tallied per plot. Due to the fact that there is no existing inventory for the stands being cruised, choice of the appropriate BAF will require a degree of aerial photo and on-the-ground recon, depending on the individual cruiser's experience level.

The same BAF is to be used for all plots in a stand. If the cruiser selects a BAF, tries it on a few plots and then decides to change the BAF, the first few plots must be redone with the new BAF.

One fixed radius plot size will be used for all nested plots on the cruise. Fixed radius plot size will be **1/100th acre**, which is equivalent to a circle with a radius of **11.78'**. Plot size must be adjusted accordingly on slopes greater than approximately 15%. A table of plot size adjustments by slope percent is provided as a reference in Appendix E.

Borderline Trees

Variable Radius Plots

If a tree is not obviously in or out of the plot, the cruiser will measure horizontal distance from plot center to the estimated center (pith) of the tree, or to the face. The limiting distance should be calculated using the appropriate plot radius factor (PRF) for the BAF used in the stand. A table of PRFs for measurements to the center and face of the tree for commonly-used BAFs, is provided in Appendix G.

Multiply the PRF by DBH to calculate the limiting distance. If the calculated limiting distance is greater than or equal to the distance from plot center to the center of the tree, then the tree is considered an "in" tree**.** Where slope percent between the tree and plot center exceeds approximately 15%, slope correction should be used. The simple math required to convert slope distance to horizontal distance is a far more reliable method for making a slope correction than attempting to hold the tape level. A table with slope correction factors is included in Appendix E.

Fixed Radius Plots

If a tree is not obviously in or out of the fixed radius plot, the cruiser will measure horizontal distance from plot center to the estimated center (pith) of the tree at the point at which it exits the ground.

Section IV: Stand, Plot, and Tree Level Data Records

Stand Level Data

Items to be collected at the stand level are summarized in Table 1., below.

TABLE 1. SUMMARY OF DATA TO BE COLLECTED AT STAND LEVEL

Item	Frequency	Comments
StandID	Every stand	Enter all digits as they appear on the map, do not shorten or abbreviate.
BAF	Every Stand	Enter the BAF used throughout the whole stand. Enter the number exactly as it appears on the above basal area factor table, table 1, do not round digits
Stand Comment	Every stand as needed	Brief notes about any stand level conditions.

Plot Level Data

A plot record should be entered for every assigned plot on the cruise. Items to be collected at the Plot level are summarized in Table 2., below. Further details for some items follow the table.

TABLE 2. SUMMARY OF DATA TO BE COLLECTED AT THE PLOT LEVEL

Item	Frequency	Notes
StandID	Every Plot	This should already be populated in the handheld.
PlotID	Every Plot	Unique Plot Number from cruise map
Cruise Date	Every Plot	Date the plot was completed.
Cruiser ID initials	Every Plot	Cruiser ID initials (3 characters)
Plot Status	Every Plot	Code used to indicate populated plots, blank plots, and dropped plots
Treatment	Every Plot	Code used to describe suggested treatment for area around plot
Plot Comment	Every Plot as needed	Brief notes about dropped plots, moved plots, or other unique plot conditions influencing data or location

Plot Number (PlotID)

Plots will be numbered 1-n, where n is the total number of plots in the project. Plot numbers will be unique

Plot Status (Status)

Plot Status codes in use on this cruise are as follows:

- **IP** – all plots with tree records
- **IB** – all installed plots with no tree records (“no-tally” plots)
- **DP** – use for any plot dropped from the cruise; *provide a brief comment indicating the reason for dropping the plot*

Treatment (Treat)

Treatment codes will be used to indicate the cruiser’s suggested silvicultural treatment for the area surrounding the plot. The following codes will be used on this cruise:

- **ITS** – individual tree selection
- **GTS** – group tree selection
- **THI** – commercial thinning
- **OVR** – overstory removal
- **PCT** – pre-commercial thinning
- **FUE** – fuels reduction (immediate)
- **NON** – no treatment for the foreseeable future

Tree Level Data

Items to be collected at the tree level on each plot, are listed in Table 3., below. Detailed descriptions of certain tree data fields follow the table.

TABLE 3. SUMMARY OF DATA TO BE COLLECTED AT THE TREE LEVEL ON MEASURE PLOTS

Item	Frequency	Notes
StandID	Every tree	This should already be populated in the handheld.
PlotID	Every tree	This should already be populated in the handheld.
Tree	Every tree	Automatic, consecutive numbering of trees on each plot
Species	Every tree	Code used to indicate tree species (see Table 4)
Tree Group	Every tree	Code used to indicate tree condition (see Table 5)
DBH	Every tree	Record DBH to nearest 0.1" on variable radius plot trees; record DBH in 1.0" classes for fixed radius plot trees
Total Height	Select variable radius plot trees; All fixed radius plot trees	Record total height to nearest 1.0' on variable radius plot conifers; record to nearest 5.0' on hardwoods and fixed radius plot trees
Taper Diameter	All height sample trees	Record an estimate of upper stem diameter to the nearest 1.0" at 32' for all trees with a height measurement
Crown Ratio	All variable-radius plot trees	Nearest 5 %
5- & 10-Year Growth	5 trees per stand, of the same species.	Record growth to nearest 0.1"
Age	(growth sample trees)	Record total breast height age
Defect	All variable-radius plot trees	Record to the nearest 10%, for each third

Species (Sp)

Species codes in use on this cruise can be found in Table 4., below. The code "XX" is reserved for no-tally, or "IB" plots. A single tree record with this species code must be entered for these plots.

TABLE 4. TREE SPECIES CODES

Code	Species	Code	Species
BM	Big leaf Maple	**PD**	Pacific Dogwood
CA	Cascara	**PM**	Pacific Madrone
CH	Cherry Species	**PO**	Port Orford Cedar
CQ	Chinquapin	**PP**	Ponderosa Pine
CW	Cottonwood Species	**PY**	Pacific Yew
DF	Douglas-Fir	**QA**	Quaking Aspen
ES	Engelmann Spruce	**RA**	Red Alder
GF	Grand Fir	**RC**	Western Red Cedar
IC	Incense Cedar	**RW**	Coastal Redwood
JP	Jeffrey Pine	**SF**	Silver Fir
KP	Knobcone Pine	**SP**	Sugar Pine
LP	Lodgepole Pine	**SS**	Sitka Spruce
MH	Mountain Hemlock	**TO**	Tanoak
MY	Oregon Myrtle	**WH**	Western Hemlock
NF	Noble Fir	**WI**	Willow
OA	Oregon Ash	**WO**	Oregon White Oak
OC	Miscellaneous Conifer	**WP**	Western White Pine
OH	Miscellaneous Hardwoods	**YC**	Alaska Yellow Cedar
OO	Oak species	**XX**	Unknown Species

Tree Group (Gp)

Tree Group codes are used to indicate certain conditions that might set the tree apart from others in the stand for the purpose of volume compilation and growth modeling. The default value is ".." which indicates a normal tree. Codes in use on this cruise are listed in Table 5., below.

TABLE 5. TREE GROUP DESCRIPTION

Tree Group	Description	Remarks
..	Typical Live Tree	Default value; any tree in the stand with no remarkable condition affecting growth
C.	Cull tree (at best)	Every log in the tree will be assigned to cull by the cruise compilation software, resulting in zero net volume.
BT	Broken Top Tree	Record height to point of breakage in the total height column.
SI	Site Index Tree	Use *only* for trees selected as Site Index trees based on the criteria provided
DE	Tree Defect stunts Height	Record total height and defect of tree for all trees where the defect impacts the total height. This is not necessarily all trees with defect. These trees will be excluded from the height regression to estimate total heights on non-measured tree heights.

Diameter at breast height (DBH)

Measure DBH at 4.5 feet above ground line on the uphill side of the tree, unless a bulge, swelling, or other deformity exists that would affect the diameter measurement. Refer to Appendix B for detailed guidelines on how to adjust DBH location for abnormalities. When measuring 4.5 feet above the ground, it is not necessary to remove litter, except in cases of excessive accumulation. In the event that coarse woody debris rests on or near the tree being measured such that it affects where the cruiser can stand to take a measurement, DBH is still considered to be 4.5 feet above the ground line, not above where the cruiser is standing.

Total tree height (TotalHeight)

On the variable radius plot, measure total height on *one tree, per species, per plot* (not including BT or DE trees). Height sample trees will be selected by the cruiser, and should represent the range of diameters for each species in the stand.

On the 1/100th acre fixed radius plot, a height should be provided for each individual tree or group of trees. Height estimates to the nearest 5.0' are adequate here.

Taper Diameter (Dia1)

For all height sample trees, record the diameter of the stem at 32' above ground level. This diameter will be recorded to the nearest 1.0".

Crown Ratio (CRN)

Visually balance the live crown and estimate the percent of the total tree height supporting a crown. Crown ration measurements should be recorded to the nearest 5%, based on the formula:

*Live Crown Ratio = Length of crown/total tree height*100*

See Appendix D for further instructions and illustrations on estimating Live Crown Ratio.

Growth Measurements (5YR, 10YR), and Breast Height Age (BHA)

Five trees should be selected within each stand for age and growth sampling. These trees will be considered as Site Index trees, and should also have a total height measurement. The growth sample/Site Index trees should be chosen from co-dominant and dominant trees in the stand, should be defect-free, and stand-grown (avoid open-grown trees). All trees selected within a given stand should be from the same species, and should be at least 10" DBH. For the purpose of this cruise, consider the following species priority list for site and growth tree selection:

1. Ponderosa pine
2. Douglas-fir
3. White fir

Breast height age will be obtained by coring the tree to the pith, and counting all rings. The 5- and 10-year growth measurements will be taken from the same core, and are acquired by measuring back from the cambium to the extent of the early wood on the 5th and 10th ring. These measurements are best taken with a small ruler having a 1/10^{ths} scale, and will be recorded in two separate columns in the data recorder. Details on proper procedures for measuring 5- and 10-year growth are included in Appendix F.

Defect (Def1, Def2, Def3)

Defect will be recorded in thirds, on each tree. Defect should be considered as the percent volume lost in any given segment, due to factors such as sweep, crook, forking, animal damage, disease, decay, and so on. To assess defect, visually break the entire length of the bole into thirds from the ground up, and estimate the volume loss to the nearest 5%.

Section V: Deliverables

Cruise Data

Cruise data will be turned into MB&G using a DataPlus Professional data application, as provided by MB&G. Cruise data may be submitted in ACII text format or Microsoft Access Database format.

Cruise Maps

Cruisers will return a copy of the cruise map for each completed stand to MB&G when cruise data for that stand is submitted. Cruise maps should annotated with direction of travel between plots, access points used, boundary or typing issues encountered, recent harvest activity observed, and any other notes that could help with proper compilation of cruise data or future stand management decisions.

Section VI: Quality Control – Check Cruising

Quality is best achieved through a comprehensive initial training session, and through continuous check cruising, to ensure that data are collected consistently and accurately throughout the duration of the project. Check cruising will be done early in the project to identify and remedy any training deficiencies before they become a problem, and will be conducted periodically throughout the remainder of the cruising project to ensure quality standards are always being met. Check cruising is to be used as a teaching tool to ensure that the cruise instructions, measurement standards and other protocols are understood and that work is consistent from cruiser to cruiser.

Cruisers are not told when their work will be checked, and understand that their work may be checked at any time. An independent check cruiser will visit a subset of plots measured by each cruiser, complete all measurements and compare his/her results with the data originally recorded. The following point deductions will apply for all "out of tolerance" measurements.

TABLE 6. CHECK CRUISE TOLERANCES

Measurement	Plot/Tree/Log Level	Tolerance (+/-)	Point Deduction
Missed/Added Tree*	Tree	None	5 points
Tree species	Tree	None	3 points
Tree Group	Tree	None	2 points
DBH (for trees up to 15.0")	Tree	+/- 0.2"	3 points
DBH (from 15.1" to 40.0")	Tree	+/- 0.5"	3 points
DBH (greater than 40.0")	Tree	+/- 1.0"	2 points
Total tree height (up to 50')	Tree	+/- 5%	2 points
Total tree height (51' to 150')	Tree	+/- 7%	2 points
Total tree height (> 150')	Tree	+/- 9%	2 points
Crown ratio	Tree	+/- 10%	1 point
Tree age at breast height	Tree	+/-3 years on trees < 20 years old; +/- 5 years on trees 20 to 50; +/- 10 years 51+	1 point
% Defect	Log	+/- 10%	1 point

**A missed or added tree will have a maximum deduction of 5 points; the penalty for all other measurements will not apply.*

Approximately 5% of plots will be check cruised for each cruiser on the tree farm. A single 3 plot batch will be check cruised in any given stand. If work is found to be consistently satisfactory, this may be reduced to a level that yields a final checked proportion of 3%.

The total point deduction will be calculated on each plot. Then, the simple average of the point deduction is calculated across a three-plot batch, which yields the total point deduction in the stand. If the average point deduction is < 14 points, then the stand passes. In the example below, three plots were checked and had a point deduction of 15, 18, and 7 points. The average point deduction in the stand = 13.3. Since 13.3 points is < 14.0 points, the cruiser passes

TABLE 7. EXAMPLE CHECK CRUISING ANALYSIS

Stand	Plot	Plot and Tree Penalties
1	1	15.0
1	2	18.0
1	3	7.0
Average Penalty		13.3

Check cruising is part of a larger quality control effort, which also includes sufficient training of all cruisers at the start of a project to ensure that the cruise instructions, measurement standards, log defecting, and other protocols are understood, and that work will be consistent from cruiser to cruiser.

Actions in the event of substandard work by any cruiser may include:

- Remedial training of cruisers.
- Return to cruised plots to redo all measurements.
- Removal of a cruiser from the project.

Work that is deemed unacceptable will require MB&G to decide how much of the cruiser's work must be discarded and redone. To minimize the likelihood of rejecting a large amount of work, check cruising will be done frequently, and results will be shared with the cruiser in a timely manner.

In addition to check cruising, a number of other quality control checks will be completed, including:

- Total height measurement distribution across species and DBH range.
- Total number of height trees recorded in each stand.
- Total number of site index trees recorded in each stand.

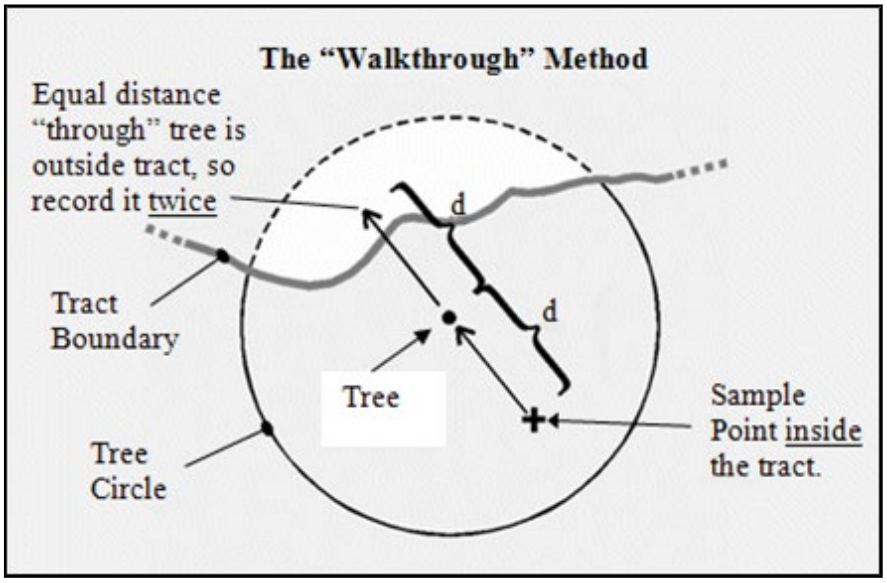
Please note that the pass/fail score calculated above is not the final determining factor in assessing a cruisers work. For example, a cruiser may receive a passing grade, but may be consistently measuring the DBH of trees incorrectly. This would be flagged and brought to the cruiser's attention.

Appendix A. Edge Plot Procedures

The Walkthrough Method

Establish the plot exactly where the plot center falls and measure and record all trees falling in the plot that are inside the stand boundary. For any "in" tree, measure the distance ("d" in Figure 1 below) from the sample point to the tree. Measure the distance, "d", on the other side of the tree towards the stand boundary.

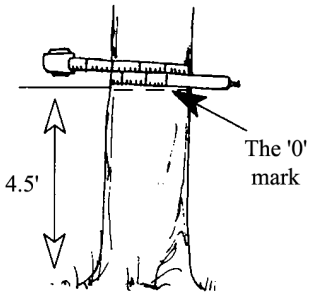
If you are outside the stand boundary at the end of this duplicated distance, record the tree twice. If you are inside the stand boundary at the end of this duplicated distance, record the tree once.



Appendix B. DBH Measurements

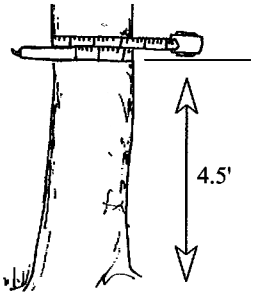
Proper Use of a Diameter Tape

Correct Method



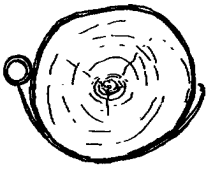
End of tape (with the '0' mark or hook) crossed under.

Optional method if left handed

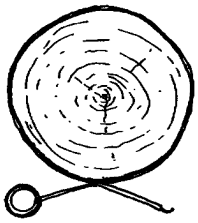


End of tape crossed under. (Be careful - reading will be made from upside down d-tape marks.)

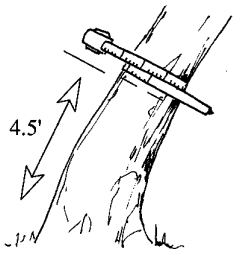
Press the tape firmly against the tree. Do not pull it out at a tangent to the tree at the point of measurement.



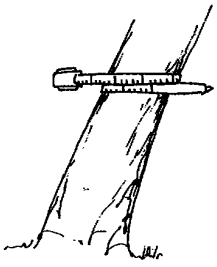
Correct



Incorrect

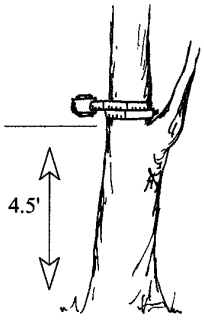


Correct

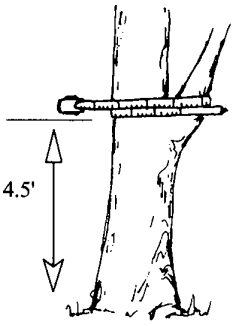


Incorrect

Tape must be at right angles to lean of tree.



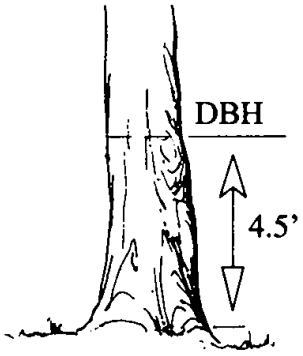
Correct



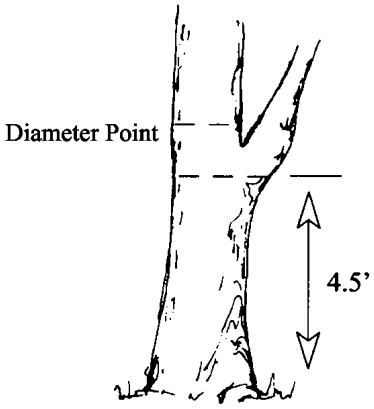
Incorrect

Do not place tape at abnormal location on bole of tree.

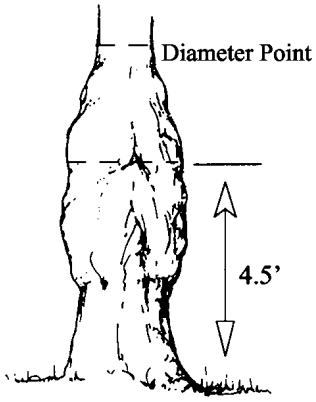
Point of Measurement for DBH



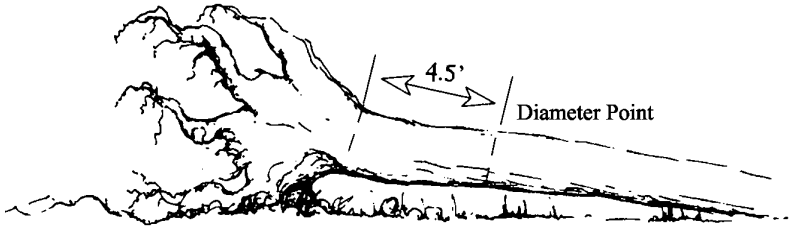
Tree on level ground



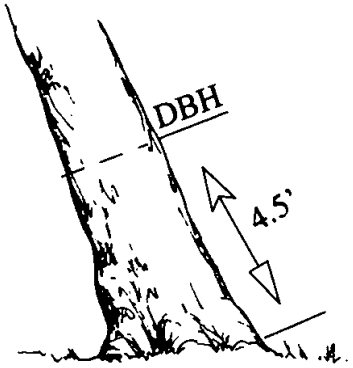
Tree with branch at 4.5 feet



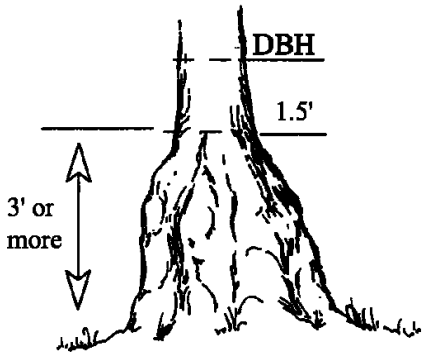
Tree deformed at DBH by swelling or crook. Take DBH above deformation.



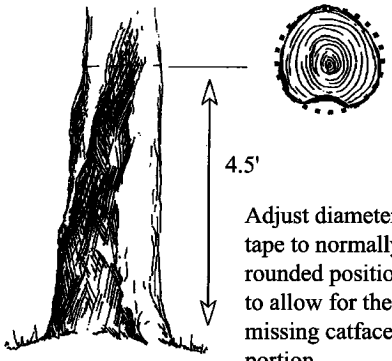
Windthrown tree



Leaning tree

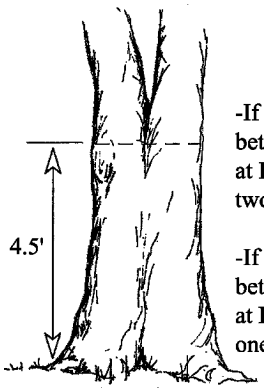


Bottleneck tree



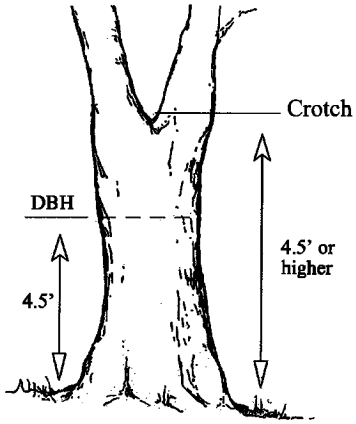
Adjust diameter tape to normally rounded position to allow for the missing catface portion.

Tree with a catface

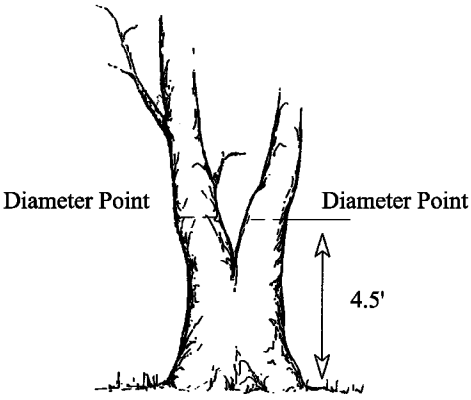


-If you can see light between the two stems, at DBH, measure as two separate trees.

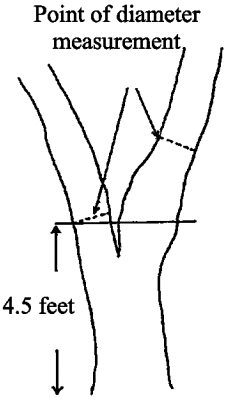
-If you cannot see light between the two stems, at DBH, measure as one tree.



Tree forked at 4.5 feet or higher. Record as one tree and consider only the main fork. Take DBH below the swell of the fork.

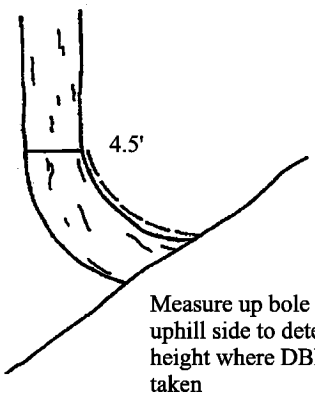


Tree forked below 4.5 feet. Record each fork that is "in" as a separate tree. Measure diameter at 4.5 feet.



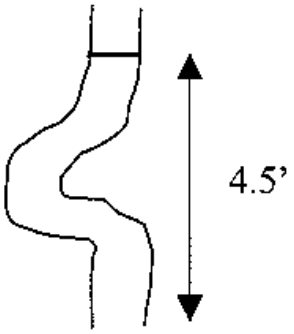
Measuring abnormal diameters on forked trees

Diameter on abnormal fork

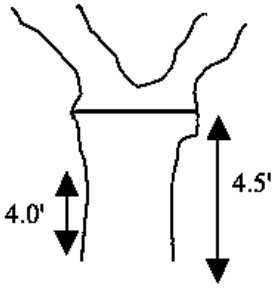


Measure up bole of tree on uphill side to determine height where DBH should be taken

Diameter on pistol butt tree



DBH measurement for a pistol butt shaped tree



Tree forked at DBH. Unable to get a DBH tape through crotch. Take DBH below the swell of the fork.

Appendix C. Measuring Total Height

Total tree height can be measured using several different angle measurement devices but is normally done with a Relaskop, Suunto Clinometer, or a laser while cruising. A simplified field procedure is outlined as follows:

1. Tape away from the center of the tree until the percent scale registers less than 100 when sighted at the top of the tree.

2. Determine the horizontal distance to the tree. If only the slope distance is known, horizontal distance can be calculated as follows:

Find the slope angle by shooting at eye level on the tree with the Suunto or Relaskop. Multiply the cosine of the angle (often on the back of a Suunto) by the slope distance to get the horizontal distance. For example, if the taped slope distance is 83.5' the slope and the angle is 26º,

Horizontal distance = 83.5 * COS 26º

= 83.5 * 0.90

= 75'

Horizontal distance calculation is available with the handheld data recorder.

3. Determine readings to the top of the tree and at the base and add the absolute value of each of the readings if they are opposite in sign; subtract them if they are both the same sign.

4. Determine total height by dividing the horizontal distance from the tree by 100 and multiplying the quotient by the sum of the readings for the tree. The same process is employed when using the chain scale except the horizontal distance from the tree is divided by 66, and then multiplied by the sum of the readings (chain scale readings.) Height calculations based on slope distance, slope, and height readings are available with the data recorders.

For example:

If horizontal distance to the tree = 75', and

Sum of the readings (chain scale) to the base and top of the tree = 82, then

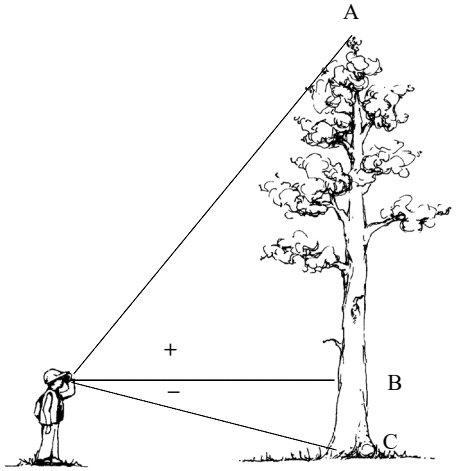
Total tree height = 75/66 * 82 = 93.18 = 93'

An obvious advantage can be realized by taking the readings at 100' or 50' (horizontal distance) when using a percent scale and at 66' or 33' (horizontal distance) when using a chain scale angle measurement.

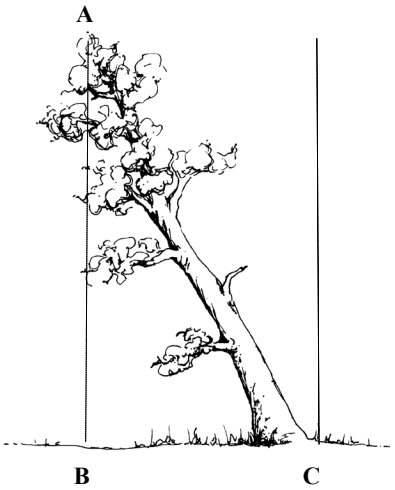
Readings to the top of a leaning tree should be made, to the best of the cruiser's judgment, to a point where the top of the tree would be if it was a straight standing tree. Also, care should be taken when shooting the top measurement on the tree. Focusing on an outside branch tip instead of the top leader will give an inaccurate height measurement.

Multiple topped trees should have an estimated top recorded as if the top had not become multiple topped or bole broken.

Total Tree Height - To determine total tree height, measure from the base of the tree on the high ground side to the tip of the tree leader. Measure the height from a point uphill or on the same contour line as the tree. Record the total tree height to the nearest foot.



Height for Leaning Trees - Trees leaning 25% (about 15°) or more from vertical require the following special height measuring technique.



Procedure: Locate point on ground directly under tip of leaning tree. Measure height **A B**. Measure horizontal distance **B C**. Determine actual tree height (**A C**) using either the Pythagorean theory for right triangles where:

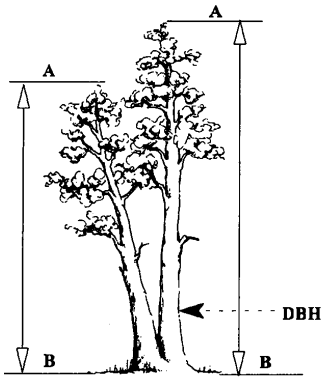
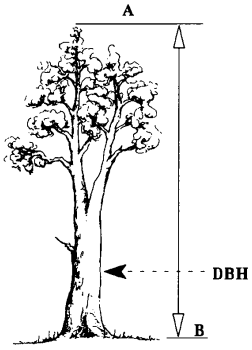
$$\text{Tree Height} = \sqrt{AB^2 + BC^2}$$

Example:

Measured height (AB) = 120'
Horizontal distance (BC) = 40'

Corrected tree height = $\sqrt{120^2 + 40^2}$ = 126.49 feet

Height for Trees with Forked Tops

If tree forks below DBH, treat as two trees and measure height of each stem from base of tree to tip of tree.	
If the fork crotch occurs at or above 4.5 feet on high ground side, the tree is treated as a single tree. Measure height of the tallest fork.	

Appendix D. Live Crown Ratio

Live crown ratio, in percent, is the length of the live crown divided by tree height. Live crown length is assessed from the uppermost live leader or branch to the lowest live branch. Visually adjust large openings in the crown or lopsided crowns by transferring lower branches to fill in the holes. Compressing the live crown length because the crown appears "sparse" or contains "unhealthy" foliage is not appropriate. Crown ratio is the portion of the tree bole supporting live, healthy foliage and is expressed as a percent of the actual tree height. The distance between A and B is the existing crown length.

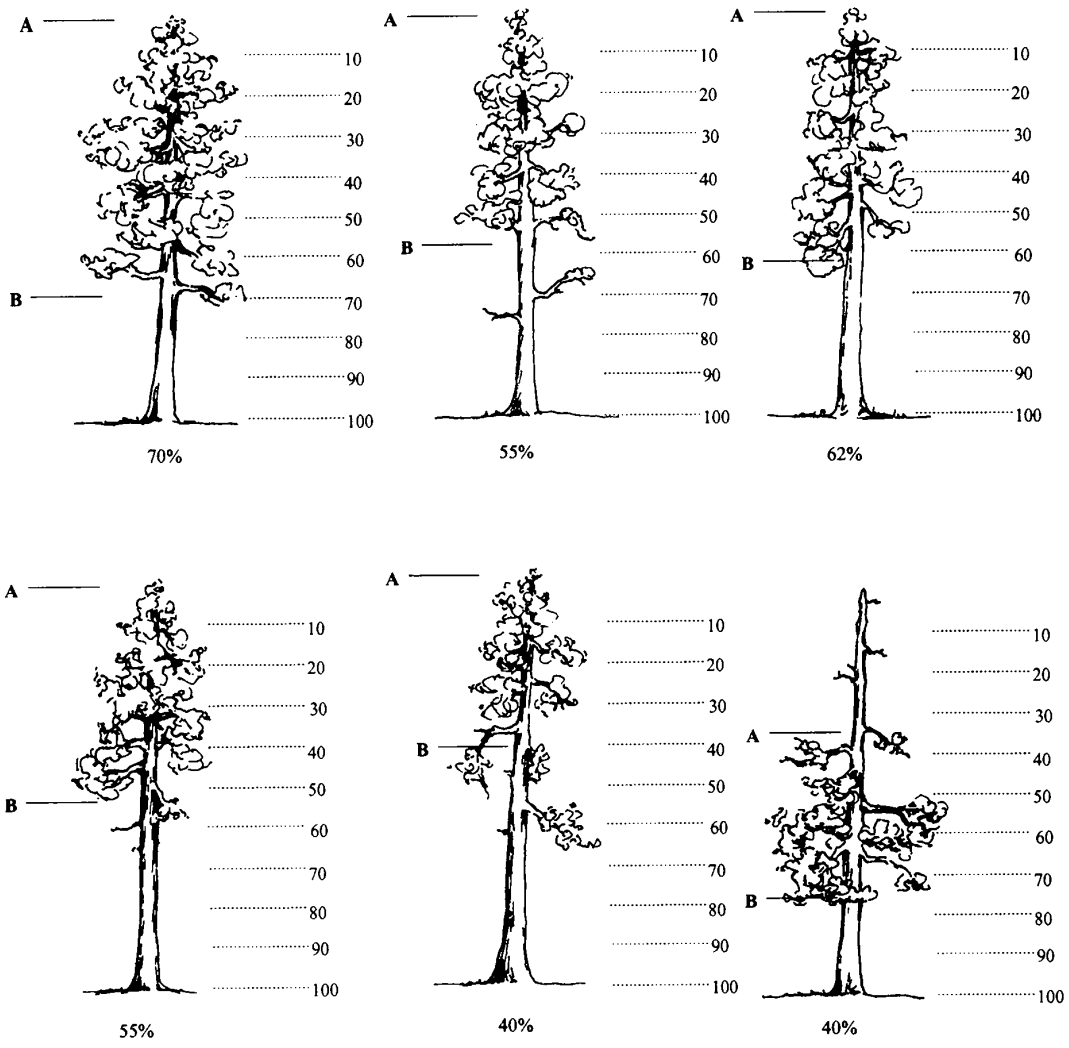


FIGURE D.1. ILLUSTRATIVE EXAMPLE OF CROWN RATIO ESTIMATES

Appendix E. Slope Correction Tables

Fixed Radius Plot Corrections

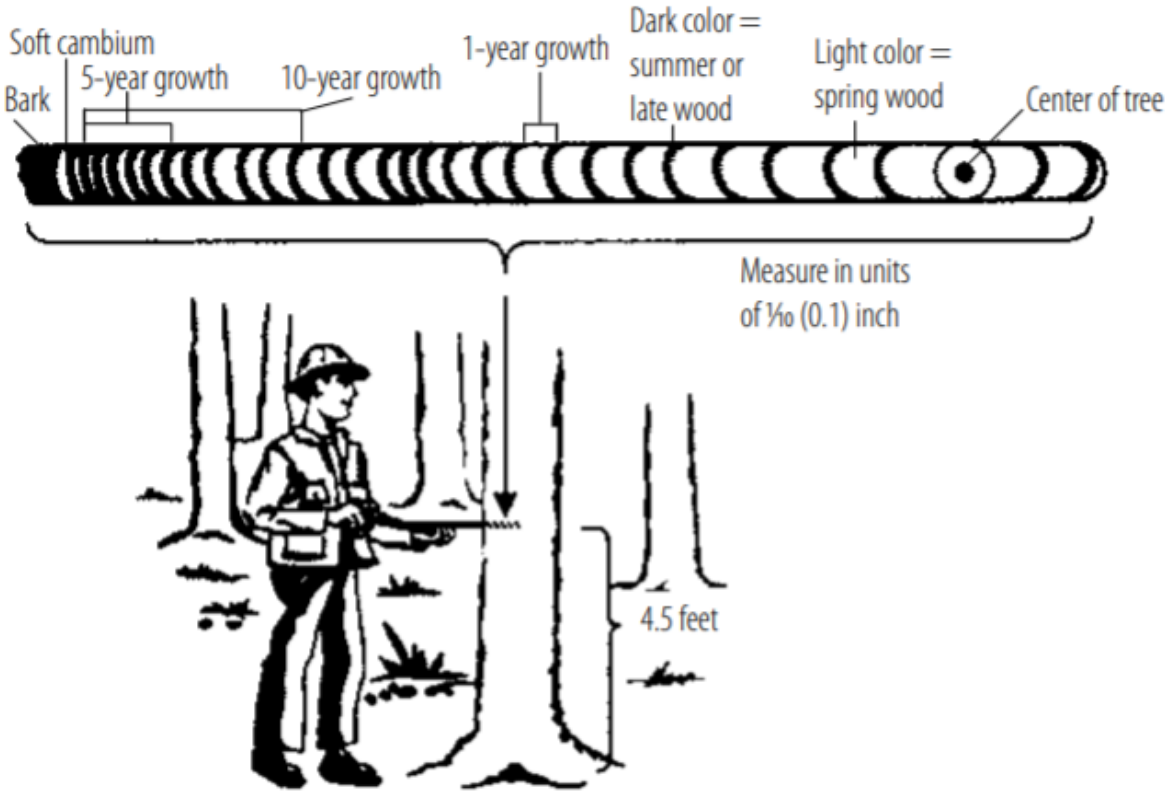
Adjusted Plot Size by Slope %	
Slope %	**1/100th Acre**
0-5%	11.78'
5-10%	11.81'
10-15%	11.87'
15-20%	11.96'
20-25%	12.08'
25-30%	12.22'
30-35%	12.39'
35-40%	12.58'
40-45%	12.80'
45-50%	13.04'
50-55%	13.31'
55-60%	13.59'
60-65%	13.89'
65-70%	14.21'
70-75%	14.55'
75-80%	14.90'
80-85%	15.27'
85-90%	15.65'
90-95%	16.05'
95-100%	16.45'
100-105%	16.87'
105-110%	17.30'
110-115%	17.73'
115-120%	18.18'
120-125%	18.63'
125-130%	19.09'

General Slope Correction Factors

% Slope	Correction Factor	% Slope	Correction Factor	% Slope	Correction Factor
5%	1.001	47%	1.105	89%	1.339
6%	1.002	48%	1.109	90%	1.345
7%	1.002	49%	1.114	91%	1.352
8%	1.003	50%	1.118	92%	1.359
9%	1.004	51%	1.123	93%	1.366
10%	1.005	52%	1.127	94%	1.372
11%	1.006	53%	1.132	95%	1.379
12%	1.007	54%	1.136	96%	1.386
13%	1.008	55%	1.141	97%	1.393
14%	1.010	56%	1.146	98%	1.400
15%	1.011	57%	1.151	99%	1.407
16%	1.013	58%	1.156	100%	1.414
17%	1.014	59%	1.161	101%	1.421
18%	1.016	60%	1.166	102%	1.428
19%	1.018	61%	1.171	103%	1.436
20%	1.020	62%	1.177	104%	1.443
21%	1.022	63%	1.182	105%	1.450
22%	1.024	64%	1.187	106%	1.457
23%	1.026	65%	1.193	107%	1.465
24%	1.028	66%	1.198	108%	1.472
25%	1.031	67%	1.204	109%	1.479
26%	1.033	68%	1.209	110%	1.487
27%	1.036	69%	1.215	111%	1.494
28%	1.038	70%	1.221	112%	1.501
29%	1.041	71%	1.226	113%	1.509
30%	1.044	72%	1.232	114%	1.516
31%	1.047	73%	1.238	115%	1.524
32%	1.050	74%	1.244	116%	1.532
33%	1.053	75%	1.250	117%	1.539
34%	1.056	76%	1.256	118%	1.547
35%	1.059	77%	1.262	119%	1.554
36%	1.063	78%	1.268	120%	1.562
37%	1.066	79%	1.274	121%	1.570
38%	1.070	80%	1.281	122%	1.577
39%	1.073	81%	1.287	123%	1.585
40%	1.077	82%	1.293	124%	1.593
41%	1.081	83%	1.300	125%	1.601
42%	1.085	84%	1.306	126%	1.609
43%	1.089	85%	1.312	127%	1.616
44%	1.093	86%	1.319	128%	1.624
45%	1.097	87%	1.325	129%	1.632
46%	1.101	88%	1.332	130%	1.640

Appendix F: Age and Growth Measurement

FIGURE F.1. INCREMENT CORE DIAGRAM



Appendix G: Basal Area Factors

Table G.1. Common Basal Area Factors and Associated Plot Radius Factors

BAF (round)	BAF (actual)	PRF (face)	PRF (side)
5	5.00	3.800	3.889
10	10.00	2.708	2.750
14	13.61	2.300	2.357
18	17.78	2.021	2.062
20	20.00	1.902	1.945
23	22.50	1.790	1.833
25	25.00	1.693	1.734
28	27.78	1.610	1.650
34	33.61	1.458	1.500
40	40.00	1.330	1.375
46	46.94	1.200	1.269
54	54.44	1.150	1.179
62	62.50		1.100

APPENDIX C

Stand Summaries

1. TPA, Basal Area, and SDI, by Species
2. Board Foot Volume per Acre and Total MBF, by Species

Stand	Net Acres	DBH Class (in)	DF		WF		PP		SP		IC		PM		Other		All Species	
			TPA	BA (ft^2/ac)	TPA	BA (ft^2/ac)	TPA	BA (ft^2/ac)	TPA	BA (ft^2/ac)	TPA	BA (ft^2/ac)	TPA	BA (ft^2/ac)	TPA	BA (ft^2/ac)	TPA	BA (ft^2/ac)
101	**98.7**																	
		0-6	87.2	2.4	37.5	0.7	18.8	0.2			6.3	0.1					149.7	3.4
		6-12	2.8	1.7	4.2	1.7											7.0	3.5
		12-18	12.6	13.9	8.6	10.4	2.5	3.5							1.0	1.7	24.7	29.5
		18-24	6.9	15.6	6.4	15.6	0.6	1.7			0.8	1.7					14.6	34.7
		24-30	4.7	19.1	1.4	5.2	1.8	6.9									8.0	31.3
		30-36	1.6	8.7			0.5	3.5									2.1	12.2
		36-42	1.3	10.4													1.3	10.4
		>42	0.7	8.7			0.1	1.7									0.8	10.4
		101 Total	*117.8*	*80.5*	*58.2*	*33.7*	*24.3*	*17.6*			*7.0*	*1.9*			*1.0*	*1.7*	*208.3*	*135.4*
102	**156.0**																	
		0-6	23.5	0.1	64.7	0.8	442.6	7.8									530.8	8.7
		6-12					7.9	5.9									7.9	5.9
		12-18	6.3	7.9			8.1	9.9			4.0	4.0					18.5	21.7
		18-24	1.9	4.0	0.9	2.0	10.7	27.7			0.6	2.0					14.1	35.6
		24-30	2.1	7.9	0.5	2.0	7.2	29.7			1.4	5.9					11.2	45.5
		30-36	0.4	2.0	0.4	2.0	6.8	37.6									7.6	41.5
		36-42			0.2	2.0	2.3	17.8									2.5	19.8
		>42					0.2	2.0									0.2	2.0
		102 Total	*34.3*	*21.9*	*66.7*	*8.7*	*485.8*	*138.3*			*6.1*	*11.9*					*592.7*	*180.7*
103	**81.9**																	
		0-6	109.8	3.3	86.7	0.6	26.7	0.8			10.1	1.9					233.2	6.5
		6-12	26.0	11.1	4.2	1.9	10.7	5.6			2.8	1.9					43.7	20.4
		12-18	19.0	22.2			17.0	24.1									36.1	46.3
		18-24	2.6	5.6			24.6	59.3									27.2	64.8
		24-30					7.0	27.8									7.0	27.8
		30-36					2.3	13.0			0.3	1.9					2.6	14.8
		36-42					0.4	3.7									0.4	3.7
		103 Total	*157.4*	*42.2*	*90.9*	*2.4*	*88.7*	*134.1*			*13.2*	*5.6*					*350.2*	*184.3*
104	**23.4**																	
		0-6	6.7	0.0	146.7	1.6	205.4	6.3									358.7	7.9
		6-12	6.4	4.5	9.2	2.2	7.0	4.5									22.6	11.2
		12-18	11.2	13.4			11.0	13.4									22.2	26.9
		18-24	13.6	29.1			13.5	29.1									27.1	58.3
		24-30	1.7	6.7			11.1	40.3									12.8	47.1
		30-36	0.4	2.2			1.1	6.7									1.6	9.0
		36-42	0.3	2.2			0.5	4.5			0.3	2.2					1.2	9.0
		104 Total	*40.3*	*58.3*	*155.8*	*3.8*	*249.7*	*104.9*			*0.3*	*2.2*					*446.1*	*169.2*
105	**56.7**																	
		0-6	18.2	1.2	54.5	1.7									27.3	0.4	100.0	3.4
		6-12	19.6	6.1			4.2	3.1									23.7	9.2
		12-18	19.4	21.4			9.7	12.2									29.2	33.6
		18-24	11.6	30.6			8.4	21.4									20.0	51.9
		24-30	4.9	18.3			9.4	36.7									14.4	55.0
		30-36	0.6	3.1			3.6	21.4									4.1	24.4
		36-42	1.2	9.2			0.8	6.1									2.0	15.3
		>42	0.7	9.2													0.7	9.2
		105 Total	*76.3*	*99.0*	*54.5*	*1.7*	*36.1*	*100.8*							*27.3*	*0.4*	*194.1*	*202.0*

Stand	Net Acres	DBH Class (in)	DF		WF		PP		SP		IC		PM		Other		All Species	
			TPA	BA (ft^2/ac)	TPA	BA (ft^2/ac)	TPA	BA (ft^2/ac)	TPA	BA (ft^2/ac)	TPA	BA (ft^2/ac)	TPA	BA (ft^2/ac)	TPA	BA (ft^2/ac)	TPA	BA (ft^2/ac)
106	**54.3**																	
		0-6	34.2	3.4	50.0	0.6	8.3	0.0	8.3	0.0	25.0	0.1					125.9	4.3
		6-12	12.8	8.3			20.8	13.3									33.6	21.7
		12-18	13.0	15.0	2.9	3.3	11.6	11.7			5.1	6.7					32.5	36.7
		18-24	3.4	8.3	2.5	5.0	7.6	16.7	0.6	1.7	2.4	5.0					16.5	36.7
		24-30					0.4	1.7									0.4	1.7
		30-36					0.3	1.7									0.3	1.7
		106 Total	*63.4*	*35.1*	*55.4*	*9.0*	*49.1*	*45.0*	*8.9*	*1.7*	*32.4*	*11.8*					*209.2*	*102.6*
107	**46.1**																	
		0-6	70.9	3.7	23.1	0.9	30.8	0.8			23.1	0.1					147.8	5.5
		6-12	11.9	7.7	8.2	3.1	46.1	15.4									66.2	26.2
		12-18	20.8	26.2	2.9	3.1	17.2	18.5			3.1	3.1					44.0	50.8
		18-24	3.2	6.2	0.9	1.5					1.3	3.1					5.4	10.8
		24-30	0.9	3.1			1.2	4.6									2.1	7.7
		107 Total	*107.6*	*46.8*	*35.1*	*8.6*	*95.2*	*39.3*			*27.5*	*6.3*					*265.5*	*100.9*
108	**61.2**																	
		0-6	34.0	2.9	113.3	1.1											147.4	4.0
		6-12	13.9	5.3	18.5	5.3					5.8	2.7					38.2	13.3
		12-18	30.9	37.3	10.3	10.7	21.5	24.0									62.7	72.0
		18-24	6.1	13.3			5.9	13.3			4.4	10.7					16.4	37.3
		24-30	2.6	10.7	1.5	5.3	3.2	13.3			0.6	2.7					8.0	32.0
		30-36	0.9	5.3	0.5	2.7	2.0	10.7									3.4	18.7
		>42									0.2	2.7					0.2	2.7
		108 Total	*88.4*	*74.9*	*144.1*	*25.1*	*32.7*	*61.3*			*11.0*	*18.7*					*276.2*	*180.0*
109	**46.1**																	
		0-6	13.3	0.3			6.7	0.0									20.0	0.3
		6-12					3.7	2.2	8.6	2.2							12.4	4.5
		12-18	9.2	11.2			17.7	22.4			1.4	2.2					28.2	35.8
		18-24	4.4	11.2	1.1	2.2	8.2	20.2							1.2	2.2	14.9	35.8
		24-30	1.2	4.5			8.0	31.4			1.1	4.5					10.4	40.3
		30-36					2.0	11.2									2.0	11.2
		36-42					0.6	4.5									0.6	4.5
		109 Total	*28.2*	*27.2*	*1.1*	*2.2*	*46.9*	*91.9*	*8.6*	*2.2*	*2.5*	*6.7*			*1.2*	*2.2*	*88.4*	*132.5*
112	**52.0**																	
		0-6	53.3	2.7	53.3	0.3											106.7	3.0
		6-12	54.2	31.4	16.8	6.7	4.2	2.2									75.2	40.3
		12-18	27.2	31.4													27.2	31.4
		18-24	14.4	33.6	3.0	6.7					2.0	4.5					19.4	44.8
		24-30	4.1	15.7	0.6	2.2											4.6	17.9
		30-36	4.3	24.6													4.3	24.6
		36-42	1.1	9.0													1.1	9.0
		>42	0.4	4.5					0.7	9.0	0.2	2.2					1.3	15.7
		112 Total	*158.8*	*152.8*	*73.7*	*16.0*	*4.2*	*2.2*	*0.7*	*9.0*	*2.2*	*6.7*					*239.7*	*186.7*

Stand	Net Acres	DBH Class (in)	DF		WF		PP		SP		IC		PM		Other		All Species	
			TPA	BA (ft^2/ac)	TPA	BA (ft^2/ac)	TPA	BA (ft^2/ac)	TPA	BA (ft^2/ac)	TPA	BA (ft^2/ac)	TPA	BA (ft^2/ac)	TPA	BA (ft^2/ac)	TPA	BA (ft^2/ac)
113	**32.3**																	
		0-6	50.0	0.4	8.3	0.0	107.4	3.8			8.3	0.0					174.0	4.3
		6-12					58.2	20.8									58.2	20.8
		12-18					4.1	4.6									4.1	4.6
		18-24					7.7	18.5									7.7	18.5
		24-30	1.2	4.6			9.2	34.7			2.5	9.3					12.8	48.6
		30-36	0.9	4.6			2.1	11.6									3.0	16.2
		36-42	0.3	2.3			0.9	6.9									1.2	9.3
		>42					0.4	4.6									0.4	4.6
		113 Total	*52.3*	*12.0*	*8.3*	*0.0*	*190.0*	*105.6*			*10.8*	*9.3*					*261.5*	*127.0*
114	**61.3**																	
		0-6	38.9	0.2	100.0	0.5	44.4	1.0			38.9	0.7	11.1	0.1	22.2	0.1	255.6	2.6
		6-12	5.4	3.1	8.3	4.6	2.1	1.5			8.6	3.1					24.3	12.3
		12-18	10.4	12.3	9.2	10.8	7.1	7.7			7.2	7.7					34.0	38.6
		18-24	9.0	21.6	2.3	6.2	6.6	15.4			3.7	9.3					21.7	52.5
		24-30	2.7	10.8	0.4	1.5	0.8	3.1			0.7	3.1					4.6	18.5
		30-36	0.8	4.6	0.3	1.5	0.8	4.6			1.0	6.2					2.9	17.0
		36-42	0.2	1.5					0.2	1.5	0.6	4.6					1.0	7.7
		>42									0.1	1.5					0.1	1.5
		114 Total	*67.3*	*54.2*	*120.5*	*25.2*	*61.8*	*33.4*	*0.2*	*1.5*	*60.9*	*36.2*	*11.1*	*0.1*	*22.2*	*0.1*	*344.1*	*150.8*
115	**99.5**																	
		0-6			20.0	0.1											20.0	0.1
		6-12	24.2	11.1	16.1	7.4	3.9	1.9			8.6	3.7					52.8	24.1
		12-18	34.3	38.9													34.3	38.9
		18-24	15.6	38.9	2.2	5.6	1.4	3.7									19.2	48.2
		24-30	7.0	25.9	0.5	1.9	0.5	1.9			0.5	1.9					8.4	31.5
		30-36	0.6	3.7													0.6	3.7
		115 Total	*81.7*	*118.5*	*38.7*	*14.9*	*5.8*	*7.4*			*9.1*	*5.6*					*135.3*	*146.4*
116	**104.2**																	
		0-6	128.6	0.7	350.0	2.6	53.5	4.7									532.1	8.0
		6-12	31.0	11.9			10.5	4.0									41.5	15.9
		12-18	6.0	6.0			1.2	2.0									7.2	7.9
		18-24	10.7	25.8	0.7	2.0											11.4	27.8
		24-30	7.6	29.8	1.5	6.0	1.0	4.0									10.1	39.7
		30-36	3.9	21.8	0.7	4.0	0.4	2.0									5.0	27.8
		36-42	2.2	17.9	0.3	2.0	0.8	6.0									3.3	25.8
		>42					0.2	2.0									0.2	2.0
		116 Total	*189.9*	*113.8*	*353.1*	*16.5*	*67.6*	*24.6*									*610.7*	*154.8*
117	**49.4**																	
		0-6	13.3	0.3	80.0	0.4	66.7	2.2	6.7	0.0	6.7	0.0					173.3	3.0
		6-12	30.9	9.0	9.4	2.2	18.8	6.7			3.7	2.2					62.9	20.2
		12-18	12.6	15.7													12.6	15.7
		18-24	6.2	15.7	2.5	6.7	2.6	6.7			0.8	2.2					12.0	31.4
		24-30	4.7	17.9	2.7	11.2	1.3	4.5			0.7	2.2					9.4	35.8
		30-36	1.9	11.2	0.4	2.2	1.2	6.7									3.5	20.2
		36-42			0.3	2.2	0.3	2.2									0.5	4.5
		>42	0.2	2.2													0.2	2.2
		117 Total	*69.9*	*72.0*	*95.3*	*25.1*	*90.8*	*29.1*	*6.7*	*0.0*	*11.9*	*6.8*					*274.5*	*132.9*

Stand	Net Acres	DBH Class (in)	DF		WF		PP		SP		IC		PM		Other		All Species	
			TPA	BA (ft^2/ac)	TPA	BA (ft^2/ac)	TPA	BA (ft^2/ac)	TPA	BA (ft^2/ac)	TPA	BA (ft^2/ac)	TPA	BA (ft^2/ac)	TPA	BA (ft^2/ac)	TPA	BA (ft^2/ac)
118	**217.6**																	
		0-6	69.6	0.5	60.9	0.4	235.7	3.1					13.0	0.5			379.2	4.5
		6-12	6.8	3.6			25.0	12.1									31.8	15.7
		12-18	7.9	9.7	1.1	1.2	12.2	15.7							1.5	1.2	22.7	27.8
		18-24	5.4	12.1	0.6	1.2	4.4	10.9									10.4	24.2
		24-30	3.2	12.1	0.6	2.4	4.3	16.9			0.3	1.2					8.5	32.6
		30-36	0.4	2.4			3.2	18.1									3.6	20.5
		36-42	0.3	2.4			1.4	10.9									1.6	13.3
		>42					0.1	1.2									0.1	1.2
		118 Total	*93.6*	*42.8*	*63.1*	*5.2*	*286.3*	*88.8*			*0.3*	*1.2*	*13.0*	*0.5*	*1.5*	*1.2*	*457.8*	*139.8*
119	**385.8**																	
		0-6	19.5	1.1	47.2	2.0	7.5	0.5	2.5	0.0	2.5	0.0	10.0	0.1			89.2	3.6
		6-12	16.1	6.7	15.5	5.9											31.6	12.6
		12-18	12.1	15.1	2.0	2.5	1.9	2.5			1.2	1.7					17.2	21.8
		18-24	6.8	16.8	1.4	3.4	2.9	6.7			1.2	2.5			0.4	0.8	12.6	30.2
		24-30	4.1	16.0	0.8	3.4	0.9	3.4			0.9	3.4					6.7	26.0
		30-36	1.7	9.2			1.2	7.6			0.2	0.8					3.0	17.6
		36-42	0.3	2.5							0.1	0.8					0.4	3.4
		>42					0.1	0.8	0.1	1.7							0.2	2.5
		119 Total	*60.5*	*67.4*	*67.0*	*17.1*	*14.5*	*21.5*	*2.6*	*1.7*	*6.0*	*9.3*	*10.0*	*0.1*	*0.4*	*0.8*	*161.0*	*117.9*
120	**75.4**																	
		0-6	10.0	0.1	15.0	0.1	45.8	1.5									70.8	1.6
		6-12	9.1	4.0	22.1	11.0	39.2	16.0									70.4	31.0
		12-18	5.3	6.0	11.5	13.0	7.3	8.0									24.1	27.0
		18-24	1.8	4.0	0.8	2.0	0.9	2.0			0.9	2.0					4.4	10.0
		24-30	0.2	1.0							0.2	1.0					0.4	2.0
		30-36	0.2	1.0													0.2	1.0
		120 Total	*26.6*	*16.1*	*49.4*	*26.1*	*93.2*	*27.5*			*1.1*	*3.0*					*170.3*	*72.6*
201	**110.4**																	
		0-6	126.7	0.9	80.0	0.7	13.3	0.1	13.3	0.1					26.7	0.1	260.0	1.9
		6-12	3.3	2.2							12.4	6.7					15.8	9.0
		12-18	20.6	24.6	1.6	2.2	5.8	9.0			9.2	11.2					37.1	47.1
		18-24	18.3	42.6			8.6	22.4			2.9	6.7					29.7	71.7
		24-30	4.1	15.7			3.6	13.4			0.5	2.2					8.2	31.4
		30-36	0.5	2.2			1.1	6.7			0.9	4.5					2.4	13.4
		201 Total	*173.3*	*88.3*	*81.6*	*2.9*	*32.4*	*51.6*	*13.3*	*0.1*	*25.9*	*31.4*			*26.7*	*0.1*	*353.3*	*174.4*
202	**22.0**																	
		0-6	11.1	0.1			100.0	1.5			11.1	0.1					122.2	1.6
		6-12	7.1	3.1			15.1	6.2			9.1	6.2					31.4	15.4
		12-18	8.5	12.3	2.8	3.1	3.3	3.1			2.4	3.1					17.0	21.6
		18-24	16.3	37.0			2.3	6.2			2.7	6.2					21.4	49.4
		24-30	1.5	6.2	0.8	3.1	2.9	12.3			2.7	9.3					8.0	30.9
		30-36	2.2	12.3			1.5	9.3									3.8	21.6
		36-42					0.8	6.2									0.8	6.2
		202 Total	*46.8*	*71.1*	*3.7*	*6.2*	*126.0*	*44.7*			*28.1*	*24.8*					*204.5*	*146.6*

Stand	Net Acres	DBH Class (in)	DF TPA	DF BA (ft²/ac)	WF TPA	WF BA (ft²/ac)	PP TPA	PP BA (ft²/ac)	SP TPA	SP BA (ft²/ac)	IC TPA	IC BA (ft²/ac)	PM TPA	PM BA (ft²/ac)	Other TPA	Other BA (ft²/ac)	All Species TPA	All Species BA (ft²/ac)
401	**174.7**																	
		0-6	17.4	0.3	39.1	0.6			4.3	0.0	13.0	0.3			4.3	0.1	78.3	1.2
		6-12	57.5	26.3	2.6	1.5					15.9	7.3	4.6	1.5			80.7	36.5
		12-18	34.9	42.4	5.0	5.8	4.8	5.8			1.3	1.5	2.3	2.9			48.3	58.5
		18-24	14.0	32.1	0.6	1.5	2.8	7.3									17.3	40.9
		24-30	5.1	20.5	0.3	1.5	2.0	7.3									7.4	29.2
		30-36	1.8	10.2			0.5	2.9									2.4	13.2
		36-42	0.2	1.5			0.2	1.5	0.2	1.5	0.2	1.5					0.7	5.8
		>42	0.5	5.8							0.0	1.5					0.6	7.3
		401 Total	*131.4*	*139.1*	*47.6*	*10.8*	*10.2*	*24.8*	*4.5*	*1.5*	*30.5*	*12.0*	*7.0*	*4.4*	*4.3*	*0.1*	*235.6*	*192.7*
402	**92.3**																	
		0-6	100.0	0.7	53.3	0.4	26.7	0.1			6.7	0.0	133.3	0.8			320.0	2.1
		6-12	7.3	4.0							4.3	1.3					11.7	5.3
		12-18	11.4	11.6					0.9	1.3	2.4	2.7	0.8	1.3			15.6	16.9
		18-24	11.1	26.7	0.8	2.2							1.8	4.0			13.7	32.9
		24-30	8.4	30.7			0.9	3.6	0.3	1.3			1.2	4.0			10.9	39.6
		30-36	2.8	15.6					0.6	4.0							3.4	19.6
		36-42					0.4	2.7	0.5	4.9							0.9	7.6
		>42	0.3	3.6					0.5	5.3	0.1	1.3					1.0	10.2
		402 Total	*141.4*	*92.8*	*54.1*	*2.6*	*28.0*	*6.4*	*2.9*	*16.9*	*13.6*	*5.4*	*137.2*	*10.2*			*377.2*	*134.2*
405	**93.4**																	
		0-6	31.6	0.8	52.6	0.6					42.1	1.8	47.4	0.3	5.3	0.5	178.9	3.9
		6-12	33.4	14.2	2.3	1.8	3.1	1.8					9.5	3.5	8.9	3.5	57.3	24.8
		12-18	22.8	30.1	2.0	3.5					1.0	1.8			1.1	1.8	26.9	37.1
		18-24	17.2	40.7	2.2	5.3	0.6	1.8			0.7	1.8	1.5	3.5	1.3	3.5	23.6	56.6
		24-30	5.6	21.2	1.9	7.1	0.5	1.8			1.0	3.5					9.0	33.6
		30-36	3.1	17.7	0.3	1.8					0.3	1.8					3.7	21.2
		36-42	0.7	5.3							0.2	1.8					0.9	7.1
		405 Total	*114.4*	*130.0*	*61.4*	*20.1*	*4.2*	*5.3*			*45.4*	*12.4*	*58.4*	*7.3*	*16.6*	*9.3*	*300.3*	*184.4*
406	**56.0**																	
		0-6	79.8	3.2	92.3	1.1	7.7	0.2					46.2	0.4	7.7	0.0	233.6	4.8
		6-12	27.0	12.9	5.9	2.6	6.3	2.6			7.2	5.2					46.3	23.3
		12-18	43.0	51.7			1.7	2.6									44.7	54.3
		18-24	26.4	59.5	1.0	2.6	1.4	2.6			2.9	7.8					31.7	72.4
		24-30	7.0	25.9	1.4	5.2	2.8	10.3									11.2	41.4
		30-36	2.7	15.5													2.7	15.5
		36-42	0.6	5.2													0.6	5.2
		406 Total	*186.5*	*173.8*	*100.5*	*11.4*	*19.9*	*18.3*			*10.1*	*12.9*	*46.2*	*0.4*	*7.7*	*0.0*	*370.8*	*216.8*
501	**35.5**																	
		0-6	100.9	6.2	33.3	0.2	113.3	2.6	6.7	0.0	33.3	0.8	6.7	0.0			294.3	9.9
		6-12	9.9	4.5			4.1	2.2			3.5	2.2	10.3	4.5			27.8	13.4
		12-18	21.0	24.6	1.9	2.2	1.9	2.2			5.0	6.7	2.9	2.2			32.6	38.1
		18-24	8.8	20.2			6.7	15.7			1.9	4.5	0.9	2.2			18.2	42.6
		24-30	1.2	4.5			1.9	6.7	0.7	2.2	0.5	2.2					4.3	15.7
		30-36							0.5	2.2	0.6	4.5					1.1	6.7
		501 Total	*141.8*	*60.0*	*35.3*	*2.4*	*127.9*	*29.5*	*7.8*	*4.5*	*44.8*	*21.0*	*20.7*	*9.0*			*378.2*	*126.4*

Stand	Net Acres	DBH Class (in)	DF		WF		PP		SP		IC		PM		Other		All Species	
			TPA	BA (ft^2/ac)	TPA	BA (ft^2/ac)	TPA	BA (ft^2/ac)	TPA	BA (ft^2/ac)	TPA	BA (ft^2/ac)	TPA	BA (ft^2/ac)	TPA	BA (ft^2/ac)	TPA	BA (ft^2/ac)
503	**24.1**																	
		0-6	41.7	0.2	108.3	0.6	60.7	3.9	16.7	0.4					58.3	0.3	285.7	5.4
		6-12	9.7	5.6			24.2	8.4			21.7	8.4					55.6	22.4
		12-18	22.4	30.8			6.1	8.4	1.7	2.8	1.9	2.8					32.2	44.8
		18-24	19.0	42.0	2.0	5.6	4.0	8.4			1.2	2.8					26.2	58.8
		24-30	2.9	11.2	1.5	5.6	1.3	5.6									5.7	22.4
		30-36	0.5	2.8			0.5	2.8									0.9	5.6
		36-42	0.4	2.8			0.3	2.8									0.7	5.6
		>42							0.2	2.8							0.2	2.8
		503 Total	*96.5*	*95.5*	*111.8*	*11.8*	*97.1*	*40.3*	*18.6*	*6.0*	*24.8*	*14.0*			*58.3*	*0.3*	*407.1*	*167.8*

Stand	Net Acres	DBH Class (in)	DF		WF		PP		SP		IC		Other		All Species	
			Bf/Acre	Total MBF	Bf/Acre	Total MBF	Bf/Acre	Total MBF	Bf/Acre	Total MBF	Bf/Acre	Total MBF	Bf/Acre	Total MBF	Bf/Acre	Total MBF
101	**98.7**															
		10-16	920	90.8	609	60.1	140	13.8							1,669	164.7
		16-22	1,672	165.0	1,923	189.8	167	16.5			41	4.0	29	3	3,832	378.1
		22-28	2,570	253.6	1,312	129.4	879	86.8							4,761	469.9
		28-34	2,899	286.1	253	25.0	688	67.9							3,841	379.0
		34-40	1,789	176.5			239	23.6							2,028	200.1
		>40	2,597	256.2			73	7.2							2,670	263.5
		101 Total	*12,448*	*1,228.4*	*4,097*	*404.3*	*2,187*	*215.8*			*41*	*4.0*	*29*	*3*	*18,801*	*1,855.3*
102	**156.0**															
		10-16	302	47.1			775	120.9			160	25.0			1,238	193.1
		16-22	463	72.2	253	39.5	1,253	195.5							1,969	307.2
		22-28	880	137.2	354	55.3	4,346	678.0			136	21.2			5,716	891.7
		28-34	688	107.3	409	63.9	7,270	1,134.1			153	23.9			8,520	1,329.2
		34-40					3,133	488.8							3,133	488.8
		>40			341	53.2	461	71.9							802	125.1
		102 Total	*2,332*	*363.8*	*1,358*	*211.9*	*17,239*	*2,689.3*			*449*	*70.1*			*21,379*	*3,335.1*
103	**81.9**															
		10-16	1,744	142.8			779	63.8			80	6.5			2,603	213.1
		16-22	940	76.9			5,462	447.2							6,402	524.1
		22-28					5,278	432.1							5,278	432.1
		28-34					3,534	289.3			269	22.0			3,803	311.3
		34-40					354	29.0							354	29.0
		>40					656	53.7							656	53.7
		103 Total	*2,683*	*219.7*			*16,064*	*1,315.1*			*349*	*28.5*			*19,096*	*1,563.3*
104	**23.4**															
		10-16	762	17.8			772	18.1							1,534	35.9
		16-22	3,755	87.9			2,828	66.2							6,583	154.1
		22-28	714	16.7			3,861	90.4							4,575	107.1
		28-34	704	16.5			1,511	35.4							2,215	51.9
		34-40	208	4.9			890	20.8			287	6.7			1,385	32.4
		>40					517	12.1							517	12.1
		104 Total	*6,143*	*143.8*			*10,378*	*243.0*			*287*	*6.7*			*16,809*	*393.6*
105	**56.7**															
		10-16	831	47.1			669	38.0							1,500	85.1
		16-22	2,067	117.3			1,731	98.2							3,798	215.5
		22-28	4,398	249.5			4,825	273.7							9,223	523.2
		28-34	418	23.7			4,319	245.0							4,737	268.7
		34-40	1,663	94.3			3,015	171.0							4,678	265.4
		>40	1,537	87.2											1,537	87.2
		105 Total	*10,914*	*619.1*			*14,560*	*825.9*							*25,474*	*1,445.0*

Stand	Net Acres	DBH Class (in)	DF		WF		PP		SP		IC		Other		All Species	
			Bf/Acre	Total MBF	Bf/Acre	Total MBF	Bf/Acre	Total MBF	Bf/Acre	Total MBF	Bf/Acre	Total MBF	Bf/Acre	Total MBF	Bf/Acre	Total MBF
106	**54.3**															
		10-16	902	49.0	120	6.5	1,337	72.6			144	7.8			2,503	136.0
		16-22	1,338	72.7	506	27.5	612	33.2			621	33.7			3,076	167.1
		22-28	101	5.5			543	29.5	250	13.6					894	48.6
		28-34					591	32.1							591	32.1
		106 Total	*2,341*	*127.2*	*626*	*34.0*	*3,082*	*167.5*	*250*	*13.6*	*765*	*41.6*			*7,064*	*383.8*
107	**46.1**															
		10-16	1,190	54.8	45	2.1	671	30.9			89	4.1			1,994	91.8
		16-22	1,349	62.1	184	8.5	605	27.9			115	5.3			2,253	103.7
		22-28	435	20.0			307	14.2							742	34.2
		28-34					162	7.4							162	7.4
		107 Total	*2,974*	*137.0*	*229*	*10.5*	*1,744*	*80.3*			*204*	*9.4*			*5,151*	*237.2*
108	**61.2**															
		10-16	2,217	135.6	1,380	84.4	1,071	65.5							4,668	285.4
		16-22	2,523	154.3			2,462	150.5			636	38.9			5,621	343.8
		22-28	2,066	126.3	481	29.4	1,874	114.6			144	8.8			4,565	279.2
		28-34	456	27.9	804	49.2	2,140	130.9			355	21.7			3,756	229.7
		34-40	412	25.2											412	25.2
		>40									284	17.4			284	17.4
		108 Total	*7,673*	*469.3*	*2,665*	*163.0*	*7,547*	*461.5*			*1,420*	*86.9*			*19,306*	*1,180.6*
109	**46.1**															
		10-16	922	42.5			639	29.5							1,562	72.0
		16-22	534	24.6	287	13.2	2,237	103.1			200	9.2	33	2	3,292	151.7
		22-28	1,514	69.8			4,269	196.8			100	4.6			5,882	271.1
		28-34					2,714	125.1			233	10.7			2,946	135.8
		34-40					676	31.2							676	31.2
		109 Total	*2,970*	*136.9*	*287*	*13.2*	*10,534*	*485.5*			*532*	*24.5*	*33*	*2*	*14,358*	*661.8*
112	**52.0**															
		10-16	3,529	183.5	474	24.7									4,003	208.1
		16-22	3,401	176.8	416	21.6					373	19.4			4,190	217.9
		22-28	3,609	187.6	648	33.7									4,257	221.4
		28-34	4,625	240.4											4,625	240.4
		34-40	2,420	125.8											2,420	125.8
		>40	1,603	83.3					1,893	98.4	340	17.7			3,836	199.4
		112 Total	*19,187*	*997.6*	*1,539*	*80.0*			*1,893*	*98.4*	*712*	*37.0*			*23,331*	*1,213.0*
113	**32.3**															
		10-16					324	10.5							324	10.5
		16-22					1,274	41.2							1,274	41.2
		22-28	347	11.2			4,042	130.6			667	21.6			5,057	163.4
		28-34	965	31.2			2,764	89.3							3,729	120.5
		34-40					1,591	51.4							1,591	51.4
		>40	259	8.4			782	25.3							1,041	33.6
		113 Total	*1,572*	*50.8*			*10,777*	*348.3*			*667*	*21.6*			*13,016*	*420.7*

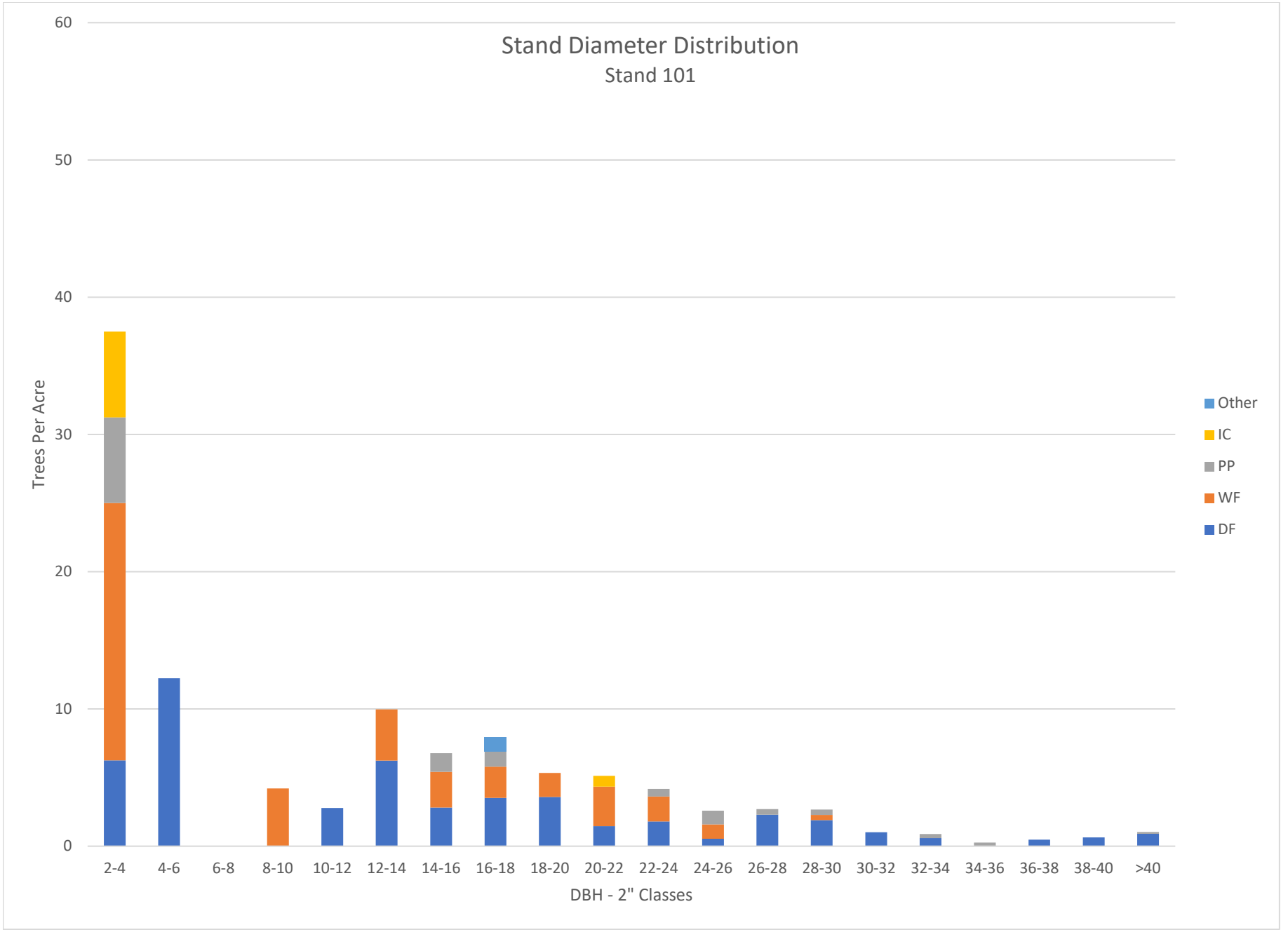
Stand	Net Acres	DBH Class (in)	DF		WF		PP		SP		IC		Other		All Species	
			Bf/Acre	Total MBF	Bf/Acre	Total MBF	Bf/Acre	Total MBF	Bf/Acre	Total MBF	Bf/Acre	Total MBF	Bf/Acre	Total MBF	Bf/Acre	Total MBF
114	**61.3**															
		10-16	927	56.8	1,036	63.5	491	30.1			310	19.0			2,763	169.3
		16-22	1,905	116.7	555	34.0	1,031	63.2			478	29.3			3,969	243.2
		22-28	1,654	101.4	520	31.9	1,237	75.8			335	20.5			3,746	229.5
		28-34	981	60.1	201	12.3	583	35.7			719	44.0			2,484	152.2
		34-40	588	36.1					312	19.1	871	53.4			1,771	108.5
		>40									179	11.0			179	11.0
		114 Total	*6,056*	*371.0*	*2,312*	*141.7*	*3,341*	*204.7*	*312*	*19.1*	*2,892*	*177.2*			*14,912*	*913.7*
115	**99.5**															
		10-16	3,327	331.1	117	11.6									3,445	342.8
		16-22	3,538	352.1	228	22.7	128	12.7							3,894	387.5
		22-28	6,258	622.8	910	90.6	552	54.9			308	30.6			8,028	798.9
		28-34	1,324	131.8											1,324	131.8
		34-40	246	24.4											246	24.4
		115 Total	*14,694*	*1,462.3*	*1,255*	*124.9*	*680*	*67.6*			*308*	*30.6*			*16,936*	*1,685.5*
116	**104.2**															
		10-16	875	91.2			66	6.9							942	98.2
		16-22	1,526	159.0			61	6.3							1,586	165.3
		22-28	3,960	412.8	829	86.4	531	55.4							5,321	554.6
		28-34	5,404	563.3	659	68.7	241	25.1							6,304	657.2
		34-40	3,837	399.9	702	73.2	1,079	112.5							5,618	585.6
		>40	904	94.2			298	31.0							1,202	125.3
		116 Total	*16,506*	*1,720.6*	*2,191*	*228.4*	*2,276*	*237.3*							*20,973*	*2,186.2*
117	**49.4**															
		10-16	749	37.0							106	5.2			855	42.2
		16-22	1,535	75.8	497	24.5	184	9.1							2,217	109.4
		22-28	3,825	188.8	1,441	71.1	1,052	51.9			268	13.2			6,586	325.0
		28-34	1,477	72.9	1,512	74.6	441	21.8							3,431	169.3
		34-40	550	27.1	358	17.7	578	28.5							1,486	73.3
		>40	363	17.9			467	23.1							830	41.0
		117 Total	*8,499*	*419.5*	*3,808*	*188.0*	*2,722*	*134.4*			*374*	*18.5*			*15,404*	*760.3*
118	**217.6**															
		10-16	418	91.0	113	24.6	822	178.8					28	6	1,381	300.4
		16-22	1,173	255.2	203	44.2	1,226	266.7							2,602	566.1
		22-28	1,974	429.6	159	34.5	1,778	386.9			39	8.4			3,950	859.4
		28-34	354	77.0	283	61.5	2,888	628.5							3,525	767.0
		34-40	188	40.9			1,877	408.4							2,064	449.2
		>40	156	33.9			591	128.7							747	162.6
		118 Total	*4,262*	*927.5*	*757*	*164.8*	*9,182*	*1,998.1*			*39*	*8.4*	*28*	*6*	*14,268*	*3,104.8*

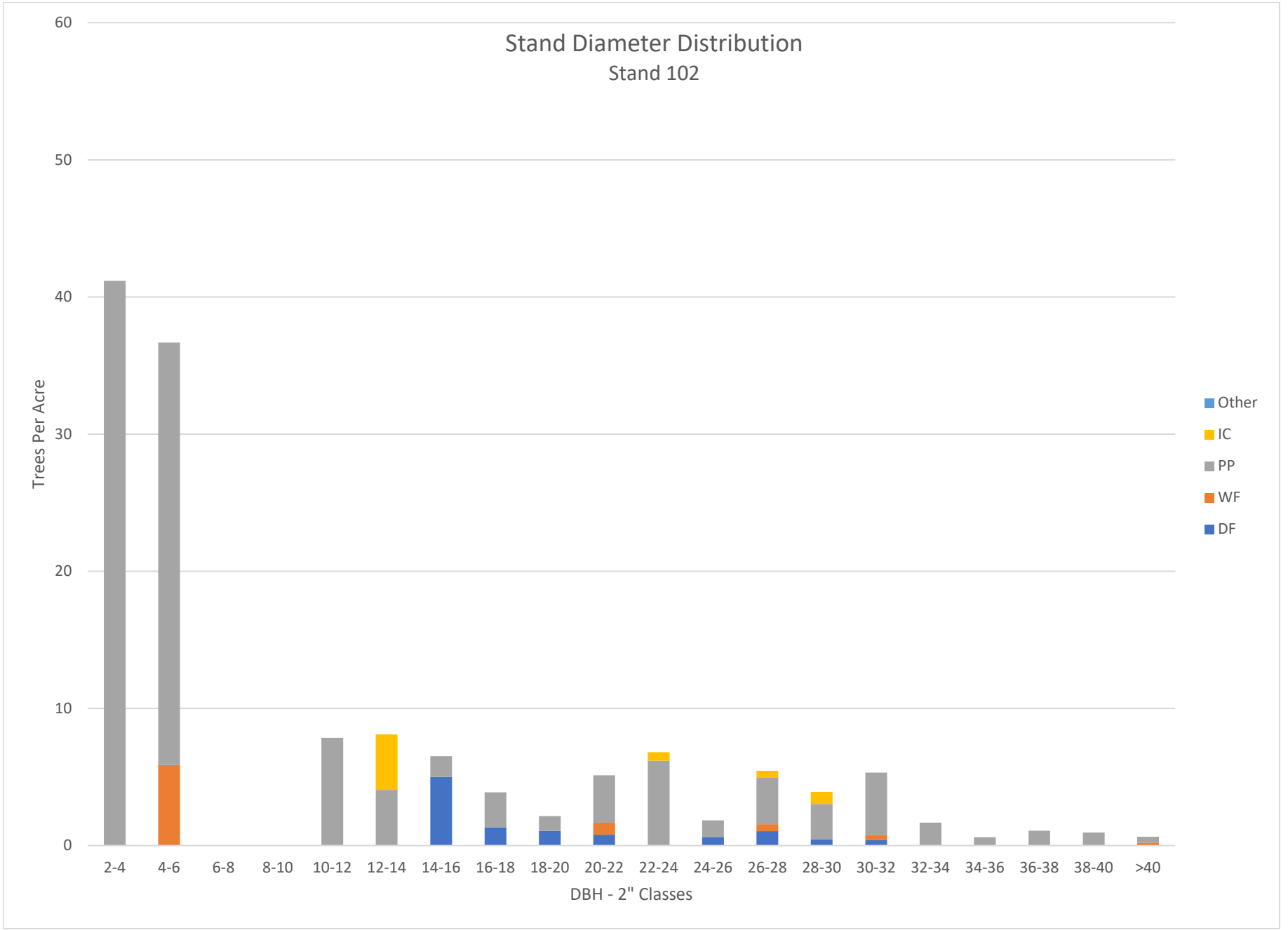
Stand	Net Acres	DBH Class (in)	DF		WF		PP		SP		IC		Other		All Species	
			Bf/Acre	Total MBF	Bf/Acre	Total MBF	Bf/Acre	Total MBF	Bf/Acre	Total MBF	Bf/Acre	Total MBF	Bf/Acre	Total MBF	Bf/Acre	Total MBF
119	**385.8**															
		10-16	887	342.3	297	114.7	65	25.2							1,250	482.2
		16-22	1,846	712.2	300	115.7	485	187.2			275	105.9	21	8	2,927	1,129.2
		22-28	2,440	941.4	348	134.3	777	299.6			251	97.0			3,816	1,472.4
		28-34	2,393	923.4	437	168.7	950	366.7			165	63.6			3,946	1,522.5
		34-40	478	184.3			693	267.3							1,171	451.6
		>40	187	72.3			225	86.8	302	116.7	200	77.2			915	353.0
		119 Total	*8,231*	*3,176.0*	*1,383*	*533.5*	*3,195*	*1,232.8*	*302*	*116.7*	*891*	*343.8*	*21*	*8*	*14,024*	*5,411.0*
120	**75.4**															
		10-16	445	33.6	924	69.6	435	32.8							1,804	136.0
		16-22	557	42.0	383	28.8	288	21.7			78	5.9			1,305	98.4
		22-28					132	10.0			72	5.5			205	15.4
		28-34	57	4.3							123	9.3			181	13.6
		34-40	175	13.2											175	13.2
		120 Total	*1,235*	*93.0*	*1,306*	*98.4*	*856*	*64.5*			*274*	*20.6*			*3,670*	*276.5*
201	**110.4**															
		10-16	1,607	177.4	172	19.0					525	58.0			2,305	254.3
		16-22	4,262	470.3			1,176	129.8			570	62.9			6,008	663.0
		22-28	2,436	268.8			3,286	362.6			311	34.4			6,033	665.7
		28-34	1,550	171.1			1,090	120.3			453	49.9			3,093	341.3
		34-40					479	52.8							479	52.8
		201 Total	*9,855*	*1,087.5*	*172*	*19.0*	*6,031*	*665.5*			*1,860*	*205.2*			*17,917*	*1,977.2*
202	**22.0**															
		10-16	596	13.1	433	9.5	188	4.1			505	11.1			1,721	37.9
		16-22	3,865	85.1			341	7.5			183	4.0			4,389	96.6
		22-28	1,588	35.0	294	6.5	893	19.7			1,421	31.3			4,197	92.4
		28-34	2,777	61.1			2,696	59.3							5,473	120.4
		34-40					942	20.7							942	20.7
		>40					247	5.4							247	5.4
		202 Total	*8,826*	*194.2*	*727*	*16.0*	*5,306*	*116.8*			*2,109*	*46.4*			*16,968*	*373.5*
401	**174.7**															
		10-16	2,546	444.7	454	79.3	427	74.6			88	15.4	59	10	3,575	624.4
		16-22	3,885	678.6	601	105.0	681	118.9					38	7	5,204	909.1
		22-28	3,406	595.0	383	66.8	1,385	241.9							5,174	903.7
		28-34	2,309	403.3			653	114.1							2,962	517.4
		34-40	573	100.1			255	44.5			157	27.4			985	172.0
		>40	1,201	209.7					145	25.4	279	48.7			1,625	283.9
		401 Total	*13,920*	*2,431.4*	*1,437*	*251.0*	*3,401*	*594.0*	*145*	*25.4*	*524*	*91.5*	*97*	*17*	*19,525*	*3,410.4*

Stand	Net Acres	DBH Class (in)	DF Bf/Acre	DF Total MBF	WF Bf/Acre	WF Total MBF	PP Bf/Acre	PP Total MBF	SP Bf/Acre	SP Total MBF	IC Bf/Acre	IC Total MBF	Other Bf/Acre	Other Total MBF	All Species Bf/Acre	All Species Total MBF
402	**92.3**															
		10-16	1,275	117.7							78	7.2			1,353	124.9
		16-22	1,825	168.4					166	15.3	52	4.8	355	33	2,399	221.4
		22-28	6,152	567.7	428	39.5	176	16.2	228	21.0			323	30	7,306	674.2
		28-34	3,433	316.8			582	53.7							4,015	370.6
		34-40	282	26.0			670	61.8	1,137	104.9					2,088	192.7
		>40	858	79.2					1,696	156.5	191	17.6			2,745	253.3
		402 Total	*13,825*	*1,275.8*	*428*	*39.5*	*1,428*	*131.8*	*3,227*	*297.8*	*321*	*29.6*	*678*	*63*	*19,907*	*1,837.0*
405	**93.4**															
		10-16	1,285	120.0	133	12.4	116	10.8							1,534	143.2
		16-22	4,724	441.1	1,239	115.7					230	21.5	166	15	6,359	593.7
		22-28	5,344	498.9	1,117	104.3	512	47.8			264	24.6	100	9	7,336	684.9
		28-34	2,817	263.0	420	39.2					89	8.3			3,326	310.5
		34-40	1,689	157.7											1,689	157.7
		>40									218	20.4			218	20.4
		405 Total	*15,860*	*1,480.6*	*2,909*	*271.6*	*628*	*58.7*			*801*	*74.8*	*265*	*25*	*20,463*	*1,910.4*
406	**56.0**															
		10-16	2,332	130.5							272	15.2			2,604	145.8
		16-22	8,587	480.6			780	43.7			180	10.1			9,548	534.4
		22-28	5,376	300.9	856	47.9	1,317	73.7			307	17.2			7,857	439.8
		28-34	2,424	135.7	647	36.2									3,071	171.9
		34-40	1,781	99.7											1,781	99.7
		>40	604	33.8											604	33.8
		406 Total	*21,104*	*1,181.2*	*1,503*	*84.1*	*2,098*	*117.4*			*760*	*42.6*			*25,465*	*1,425.3*
501	**35.5**															
		10-16	1,882	66.7	201	7.1	175	6.2			229	8.1	53	2	2,540	90.1
		16-22	2,094	74.3			982	34.8			632	22.4	82	3	3,789	134.4
		22-28	1,133	40.2			1,986	70.4	231	8.2	275	9.8			3,625	128.5
		28-34	371	13.2					388	13.7					759	26.9
		34-40									600	21.3			600	21.3
		501 Total	*5,480*	*194.3*	*201*	*7.1*	*3,142*	*111.4*	*619*	*21.9*	*1,736*	*61.6*	*135*	*5*	*11,313*	*401.2*
503	**24.1**															
		10-16	1,567	37.7			278	6.7			121	2.9			1,965	47.3
		16-22	6,268	150.8	633	15.2	1,642	39.5	23	0.6	421	10.1			8,987	216.2
		22-28	2,279	54.8	1,182	28.4	418	10.0							3,879	93.3
		28-34	455	10.9			923	22.2							1,377	33.1
		34-40	628	15.1			243	5.8							870	20.9
		>40							316	7.6					316	7.6
		503 Total	*11,196*	*269.4*	*1,815*	*43.7*	*3,502*	*84.3*	*340*	*8.2*	*542*	*13.0*			*17,395*	*418.5*

APPENDIX D

Diameter Distribution Charts


Stand Diameter Distribution
Stand 101
60
50
40
30
20
10
0
Trees Per Acre
2-4
4-6
6-8
8-10
10-12
12-14
14-16
16-18
18-20
20-22
22-24
24-26
26-28
28-30
30-32
32-34
34-36
36-38
38-40
>40
DBH - 2" Classes
Other
IC
PP
WF
DF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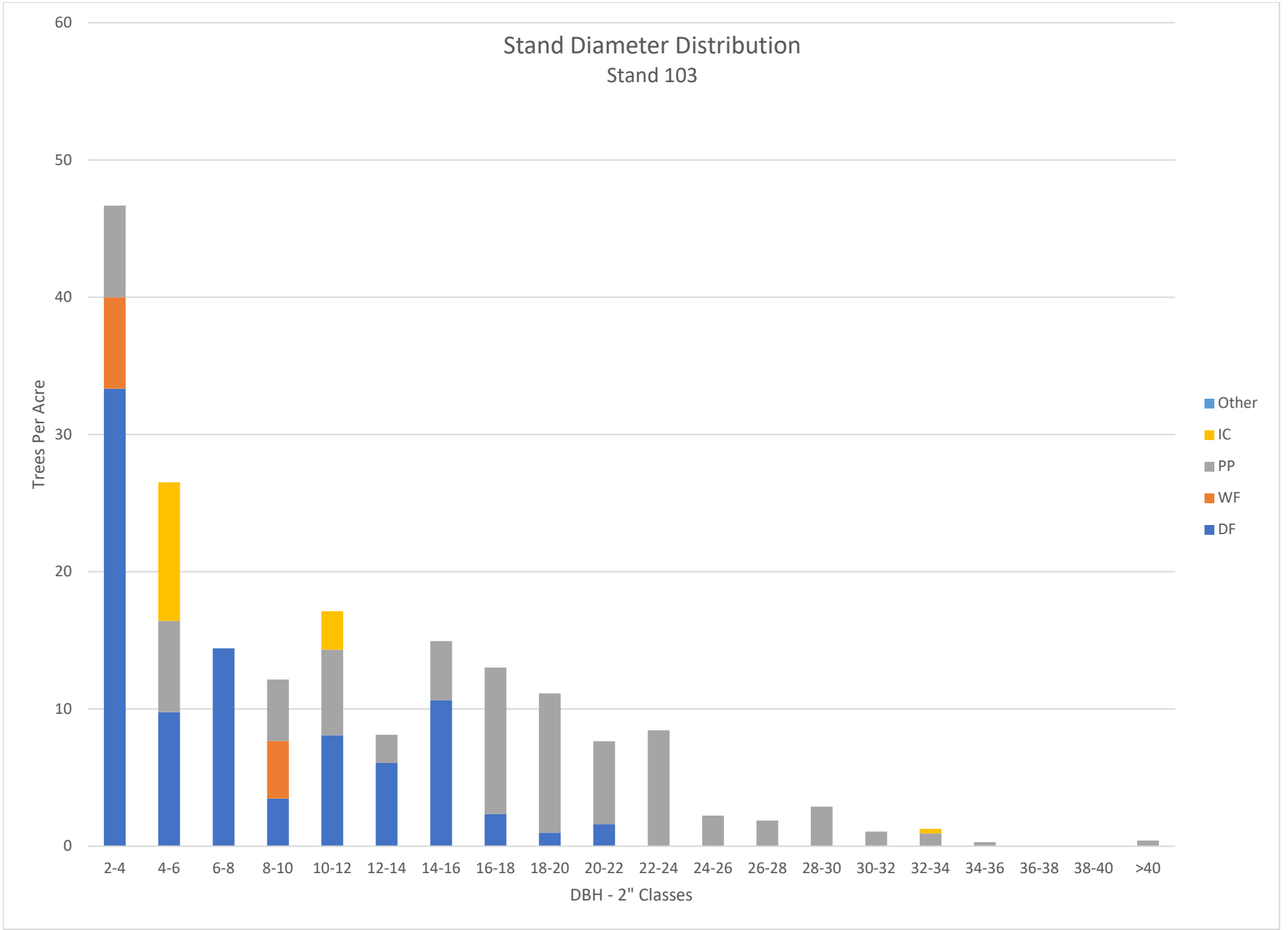
Stand 102
60
50
40
30
20
10
0
Trees Per Acre
2-4
4-6
6-8
8-10
10-12
12-14
14-16
16-18
18-20
20-22
22-24
24-26
26-28
28-30
30-32
32-34
34-36
36-38
38-40
>40
DBH - 2" Classes
Other
IC
PP
WF
DF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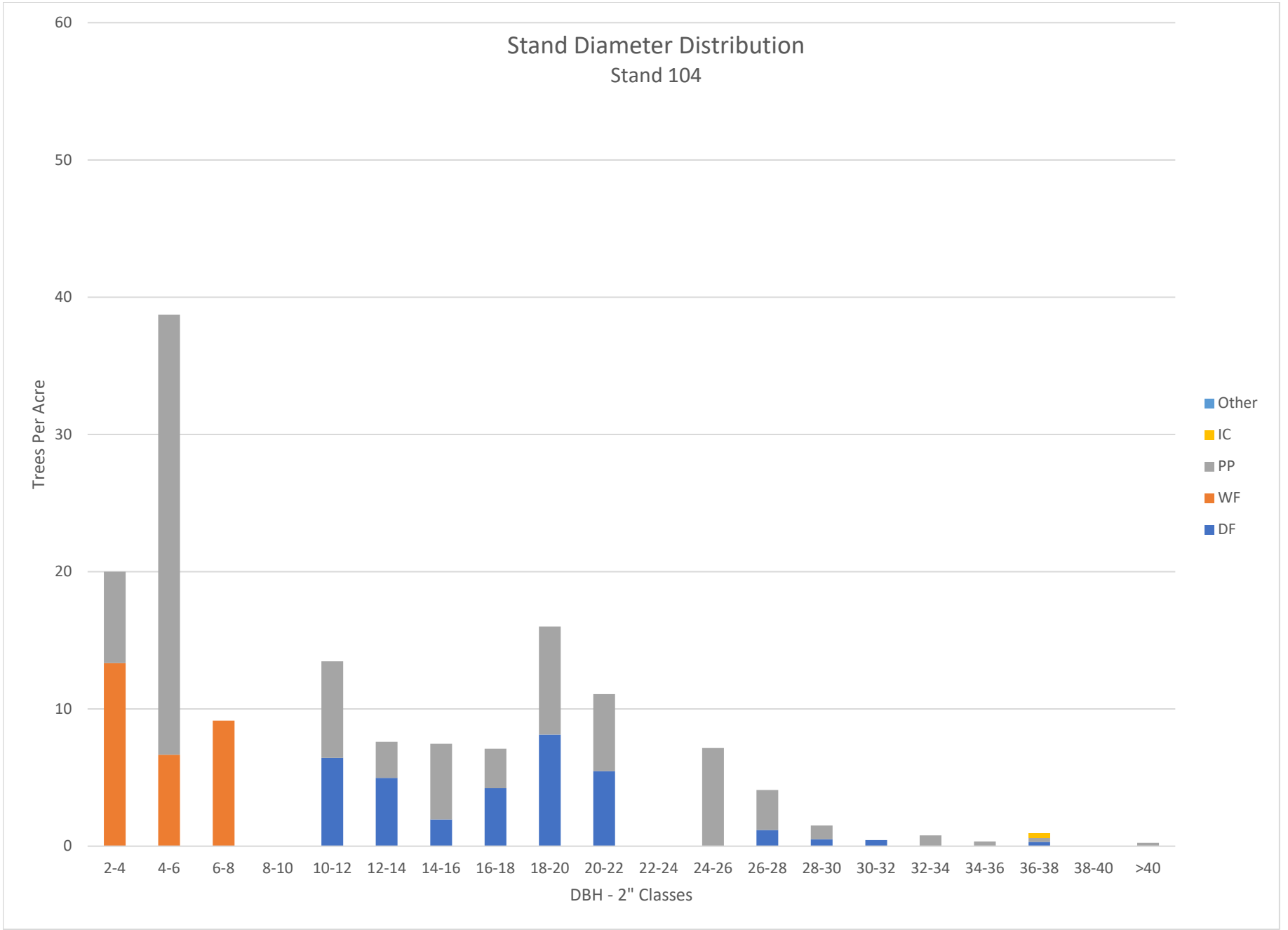
Stand 103
Trees Per Acre
60
50
40
30
20
10
0
2-4
4-6
6-8
8-10
10-12
12-14
14-16
16-18
18-20
20-22
22-24
24-26
26-28
28-30
30-32
32-34
34-36
36-38
38-40
>40
DBH - 2" Classes
Other
IC
PP
WF
DF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Stand 104
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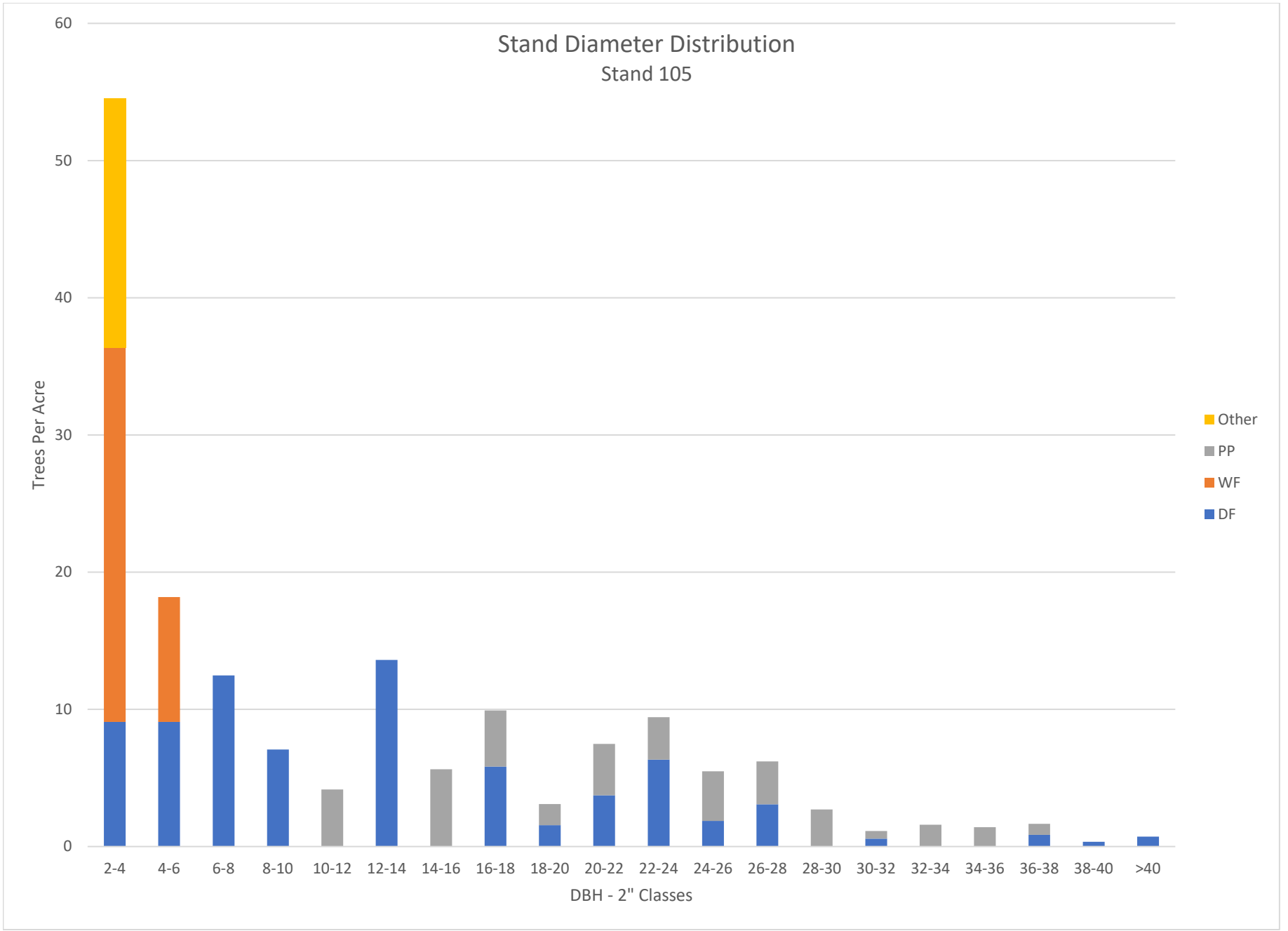
50
40
30
20
10
0
Trees Per Acre
2-4
4-6
6-8
8-10
10-12
12-14
14-16
16-18
18-20
20-22
22-24
24-26
26-28
28-30
30-32
32-34
34-36
36-38
38-40
>40
DBH - 2" Classes
Other
IC
PP
WF
DF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Stand 105
Trees Per Acre
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30
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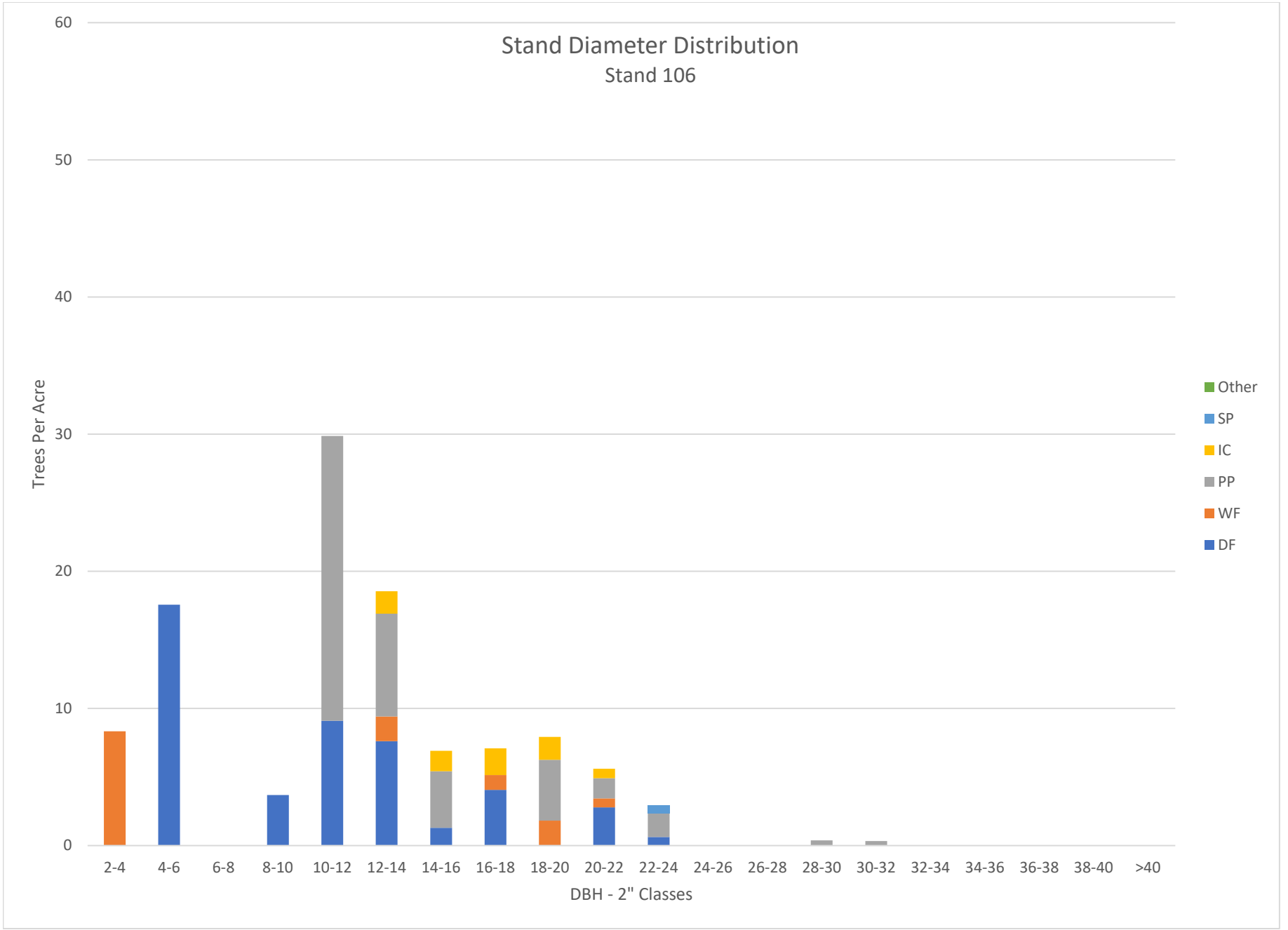
10
0
2-4
4-6
6-8
8-10
10-12
12-14
14-16
16-18
18-20
20-22
22-24
24-26
26-28
28-30
30-32
32-34
34-36
36-38
38-40
>40
DBH - 2" Classes
Other
PP
WF
DF


Stand Diameter Distribution
Stand 106
Trees Per Acre
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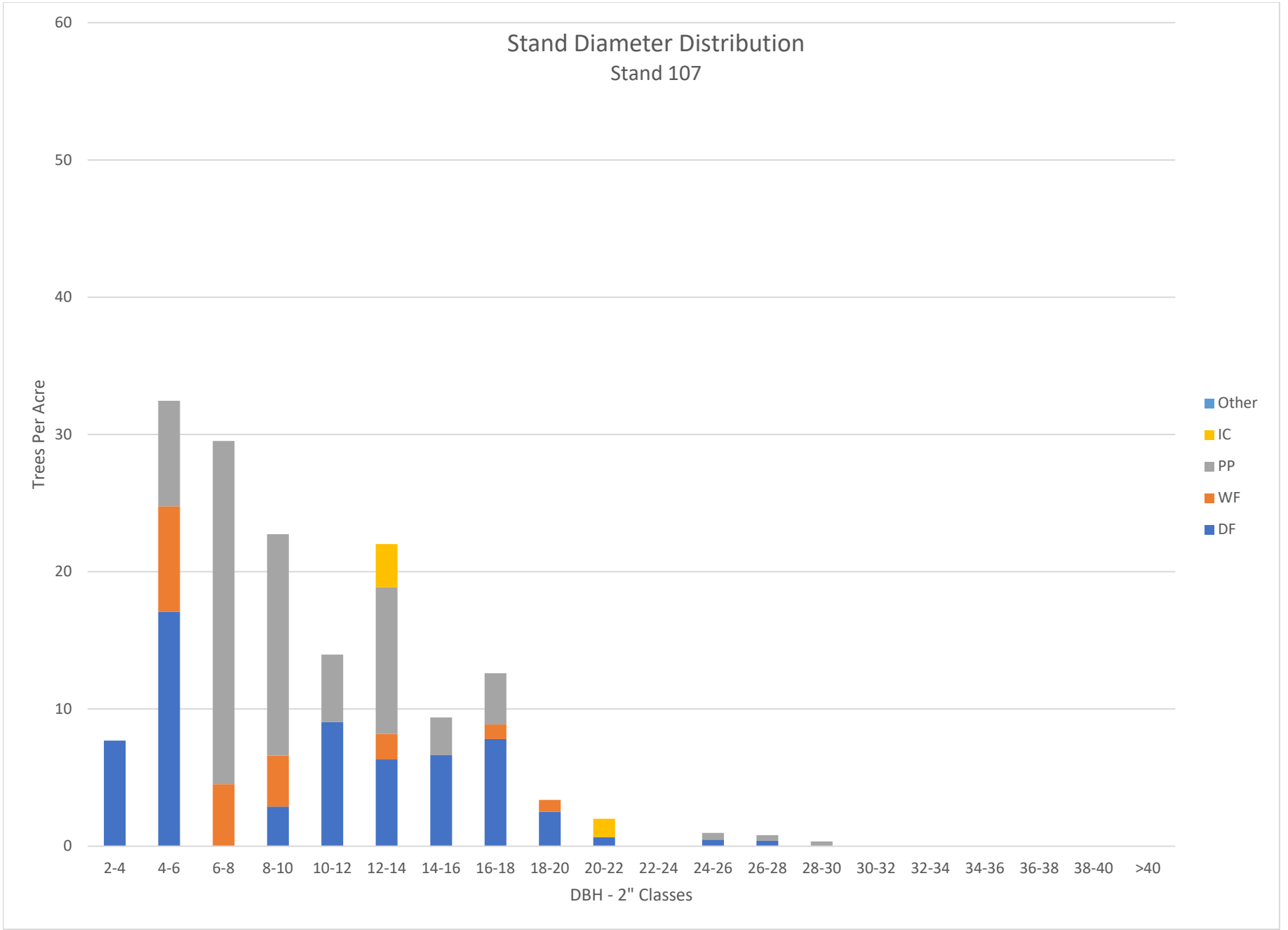
50
40
30
20
10
0
2-4
4-6
6-8
8-10
10-12
12-14
14-16
16-18
18-20
20-22
22-24
24-26
26-28
28-30
30-32
32-34
34-36
36-38
38-40
>40
DBH - 2" Classes
Other
SP
IC
PP
WF
DF


Stand Diameter Distribution
Stand 107
Trees Per Acre
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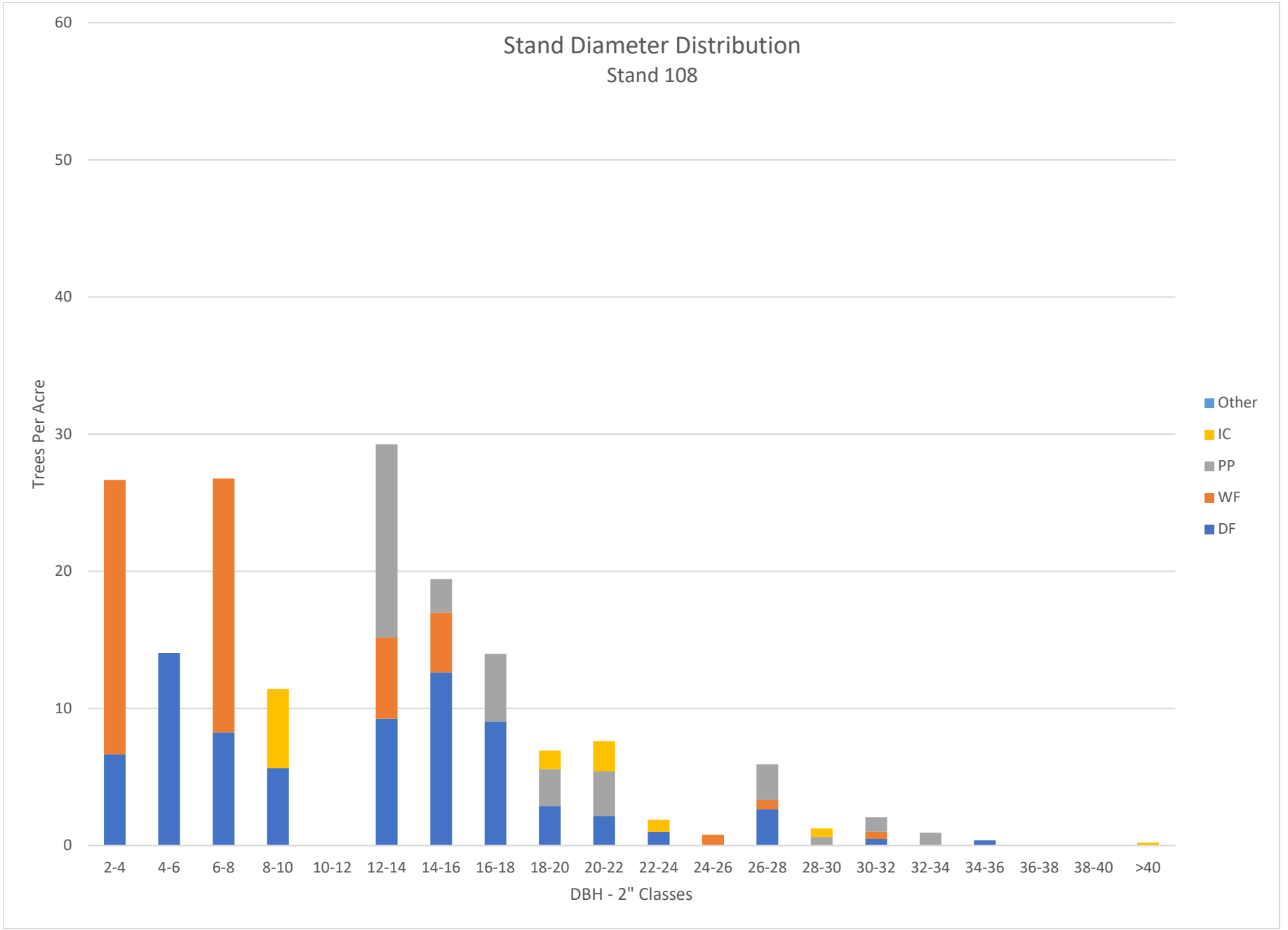
50
40
30
20
10
0
2-4
4-6
6-8
8-10
10-12
12-14
14-16
16-18
18-20
20-22
22-24
24-26
26-28
28-30
30-32
32-34
34-36
36-38
38-40
>40
DBH - 2" Classes
Other
IC
PP
WF
DF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Stand 108
Trees Per Acre
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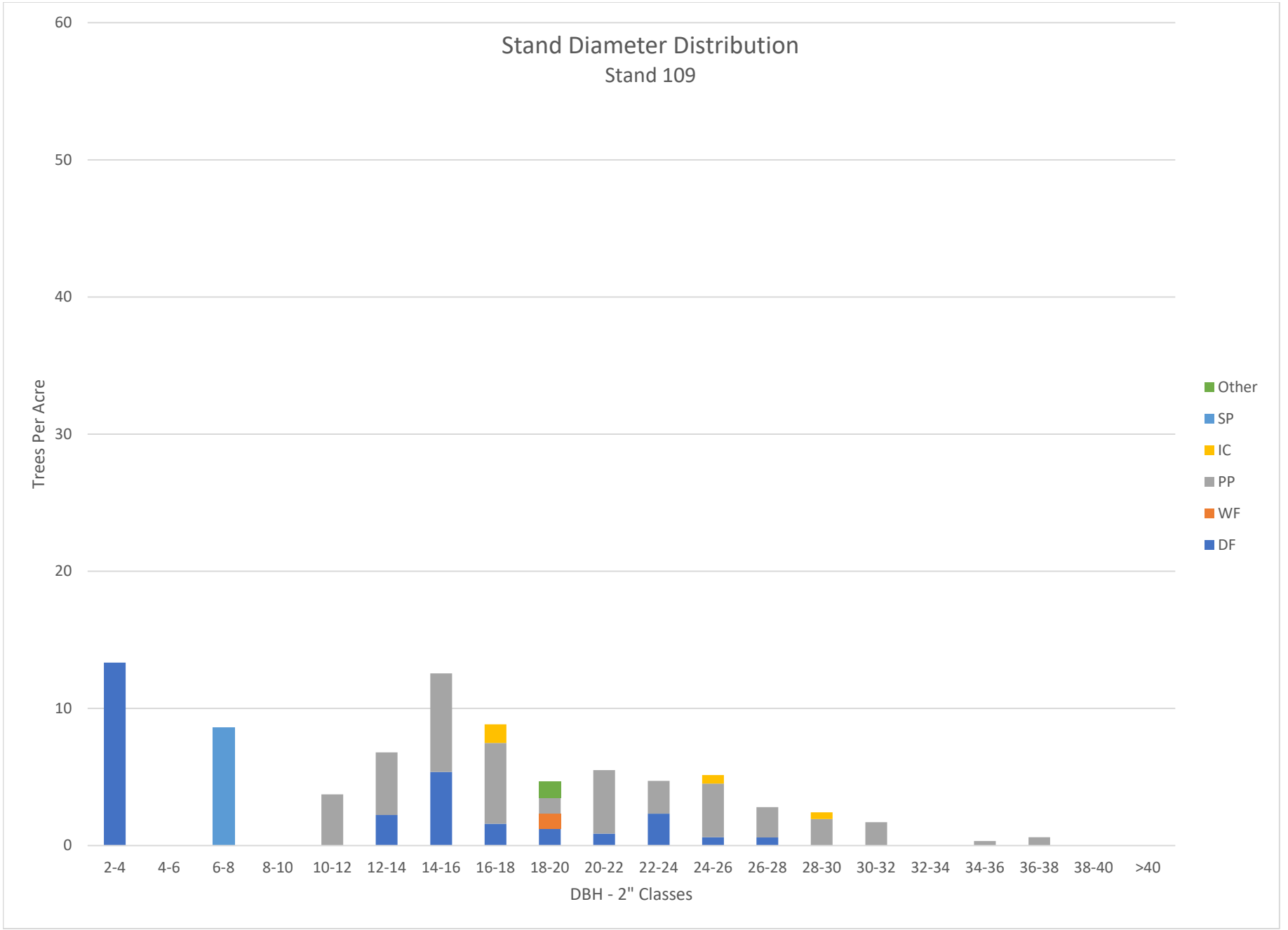
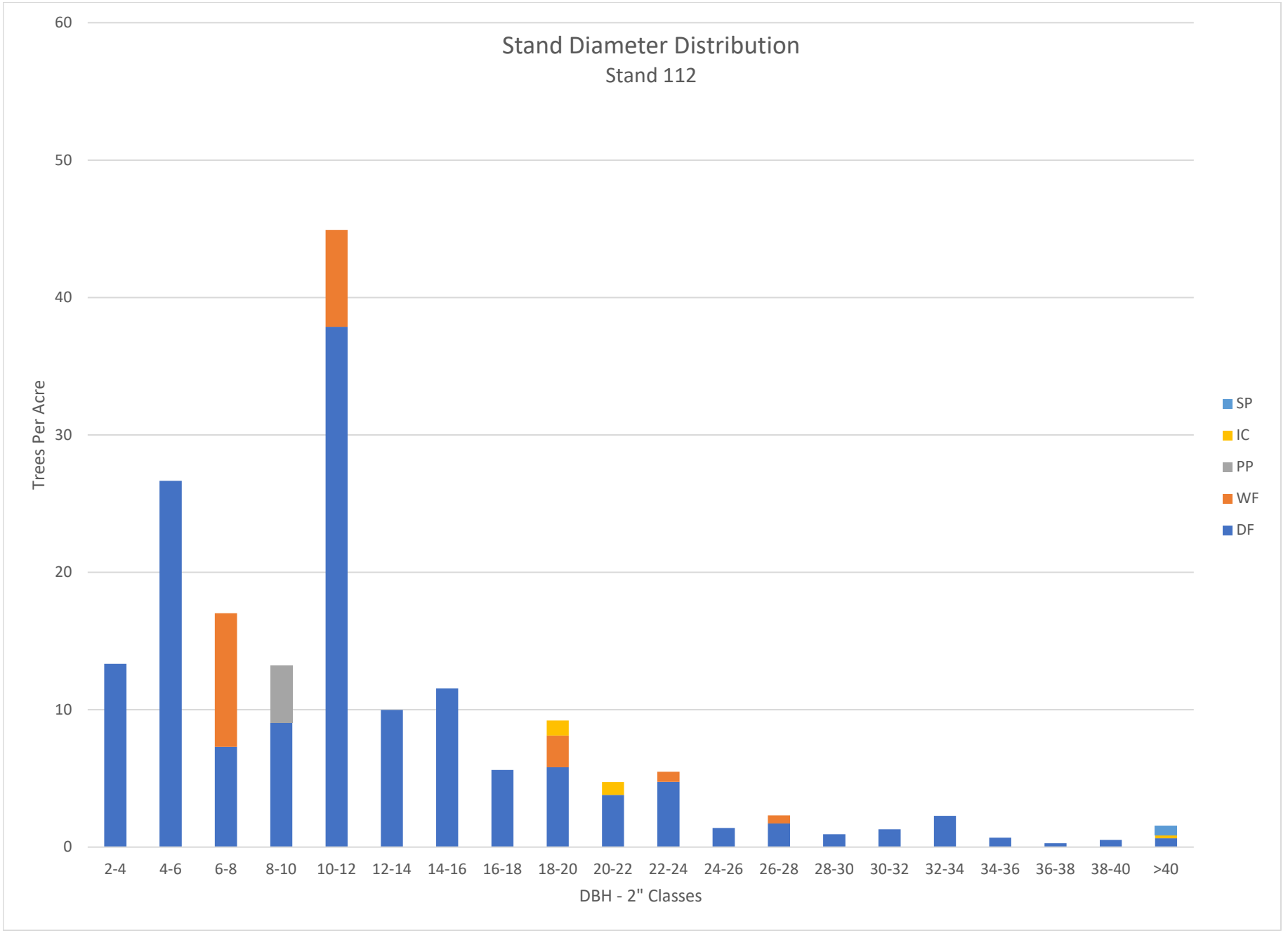
50
40
30
20
10
0
2-4
4-6
6-8
8-10
10-12
12-14
14-16
16-18
18-20
20-22
22-24
24-26
26-28
28-30
30-32
32-34
34-36
36-38
38-40
>40
DBH - 2" Classes
Other
IC
PP
WF
DF


Stand Diameter Distribution
Stand 109
Trees Per Acre
60
50
40
30
20
10
0
2-4
4-6
6-8
8-10
10-12
12-14
14-16
16-18
18-20
20-22
22-24
24-26
26-28
28-30
30-32
32-34
34-36
36-38
38-40
>40
DBH - 2" Classes
Other
SP
IC
PP
WF
DF


Stand Diameter Distribution
Stand 112
Trees Per Acre
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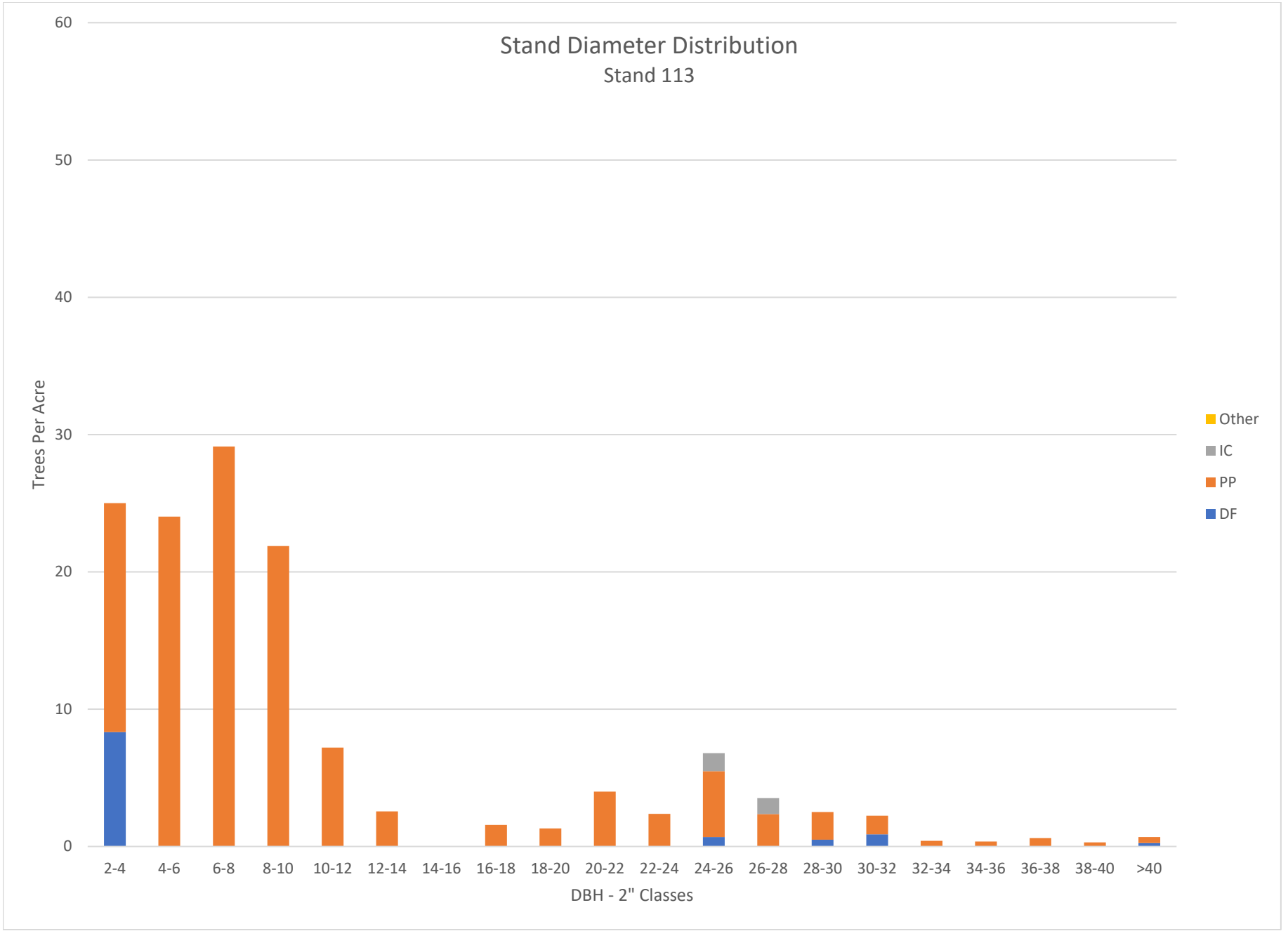
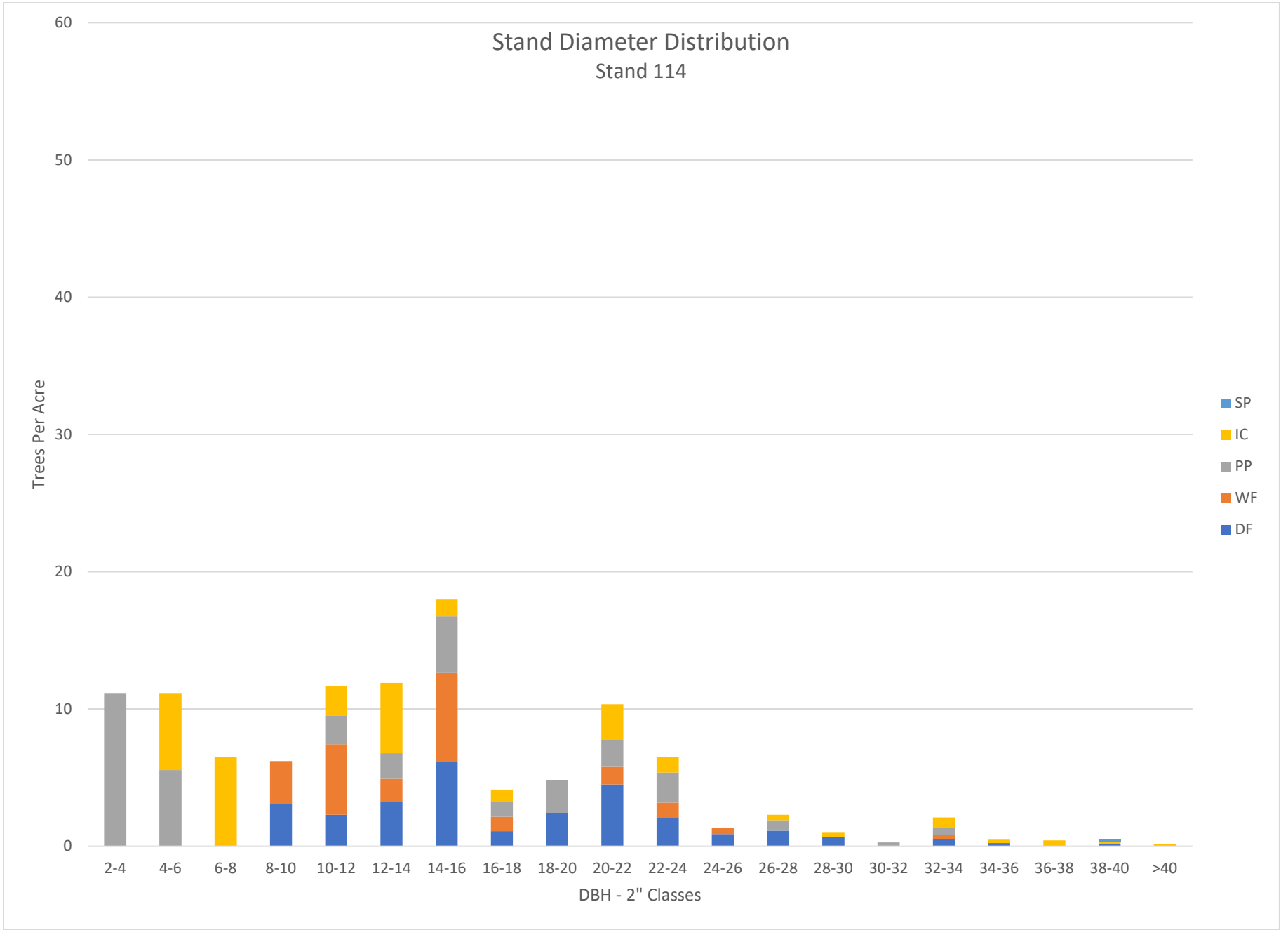
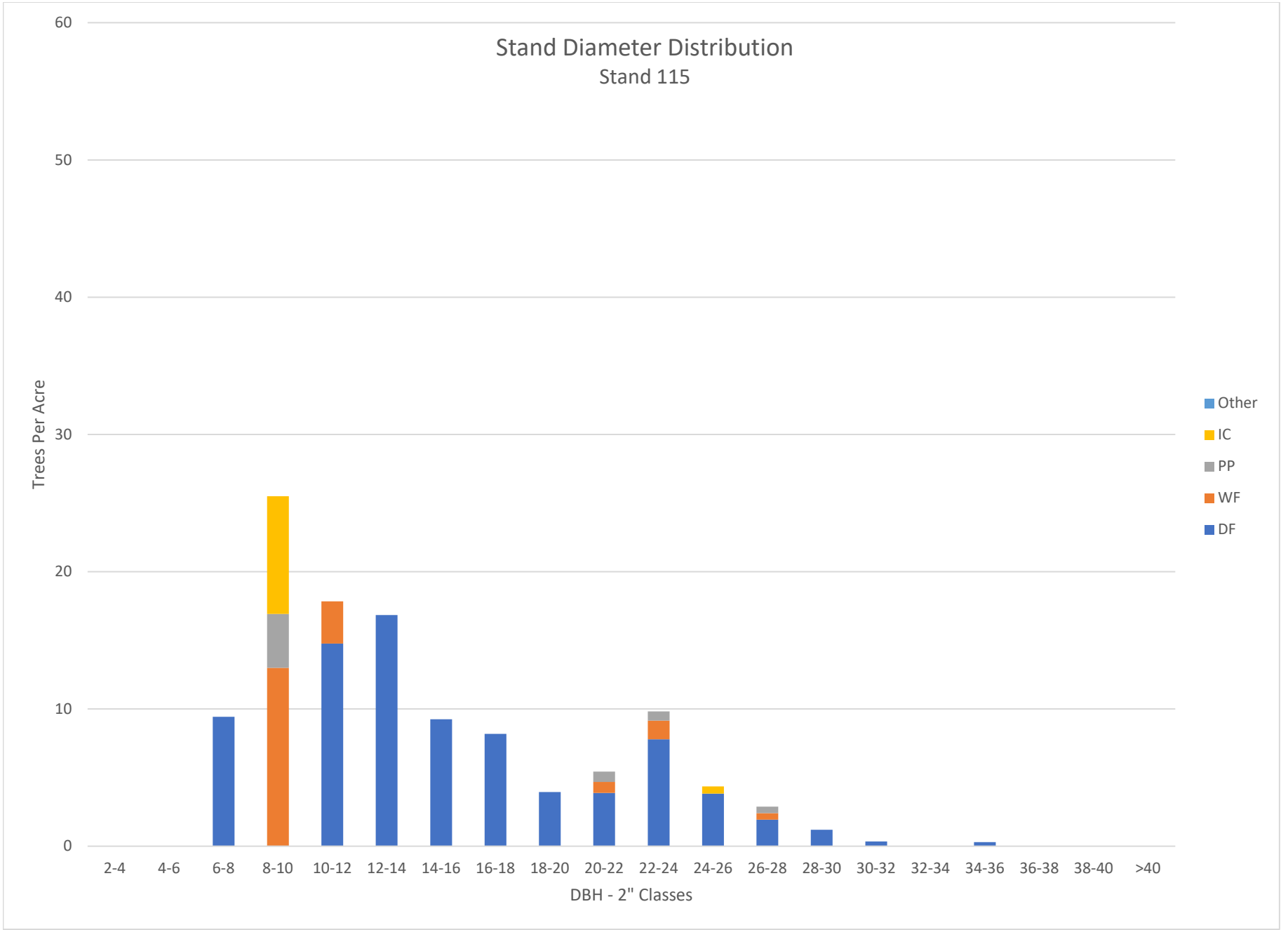
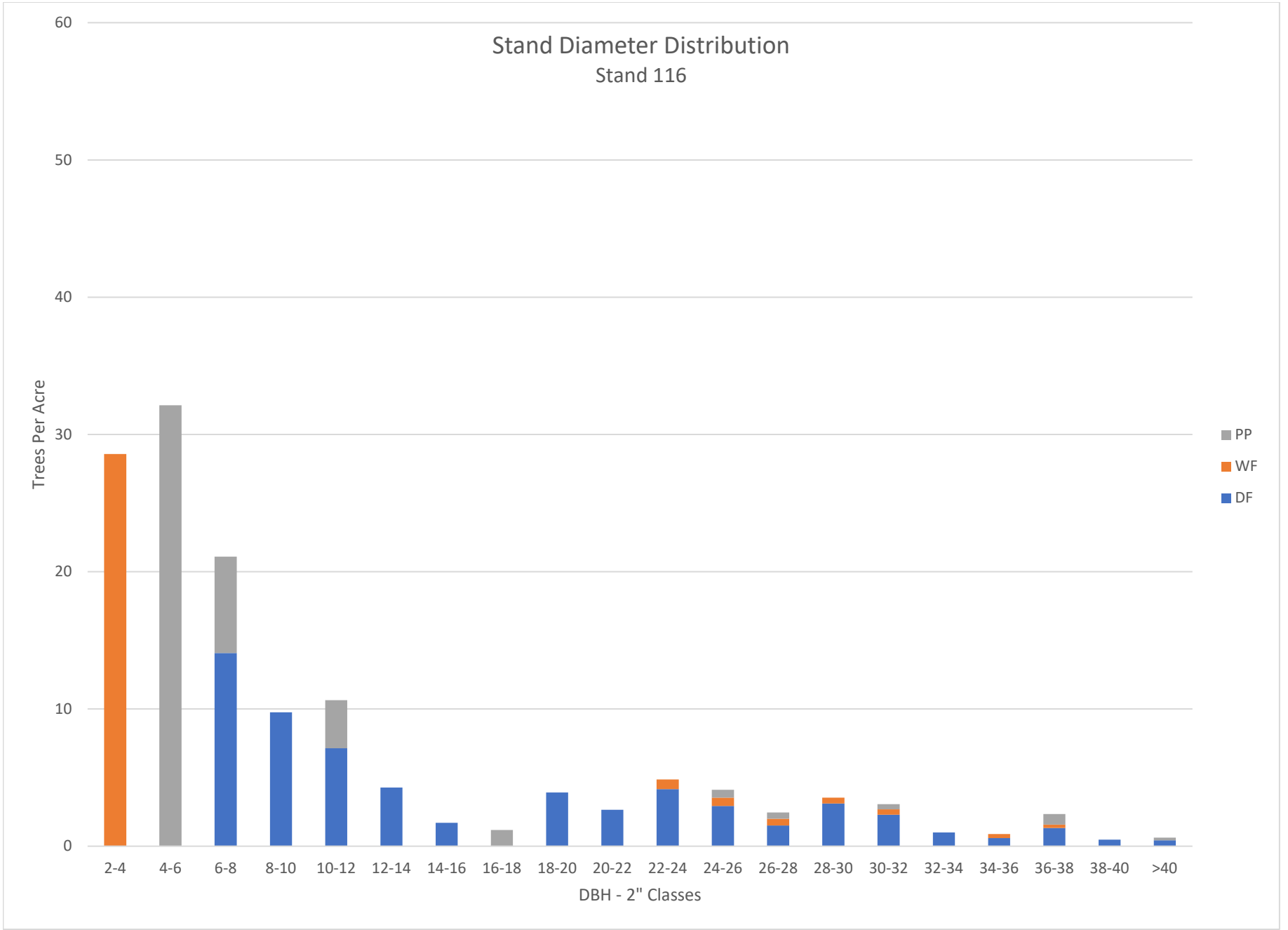
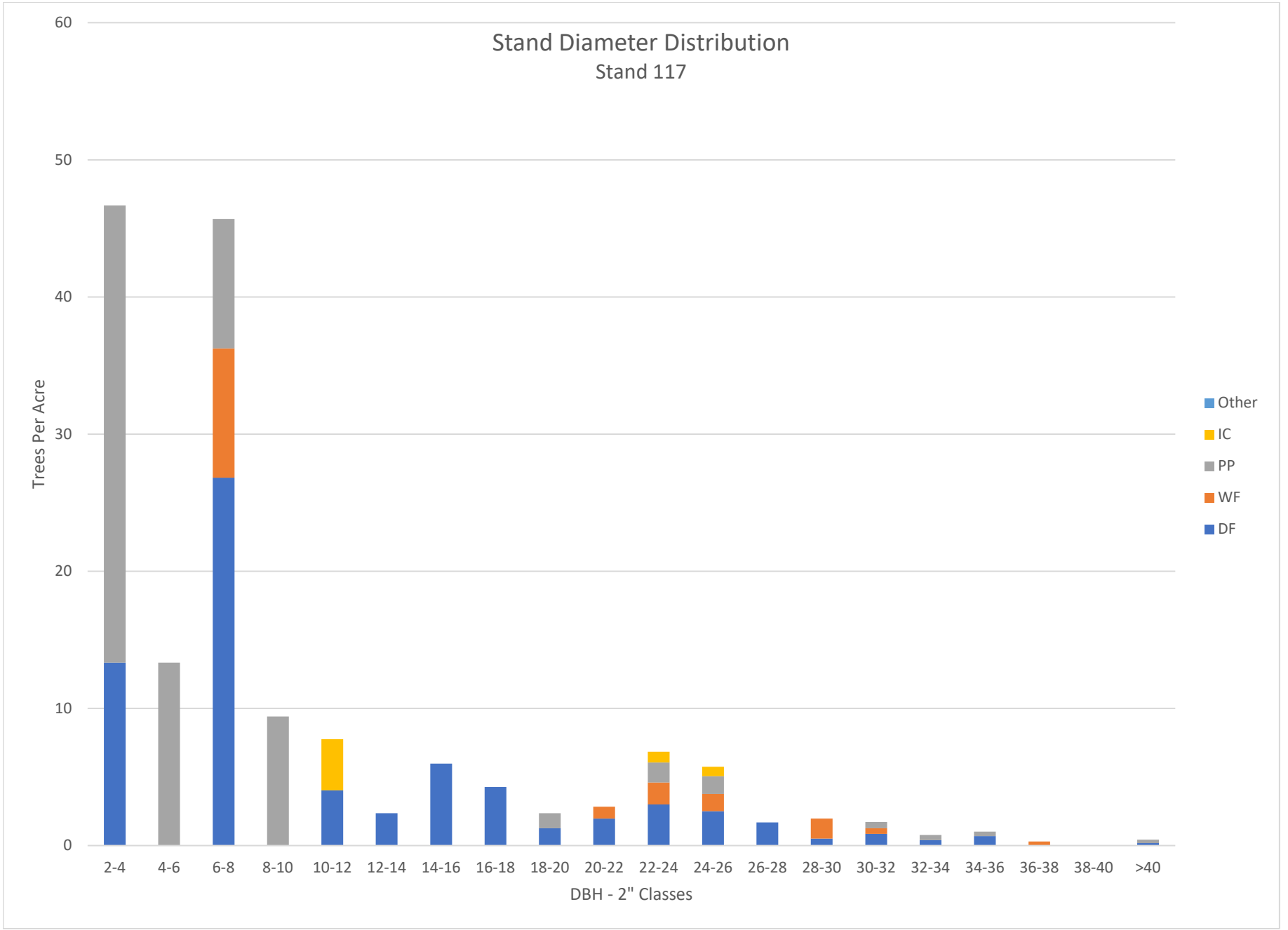
50
40
30
20
10
0
2-4
4-6
6-8
8-10
10-12
12-14
14-16
16-18
18-20
20-22
22-24
24-26
26-28
28-30
30-32
32-34
34-36
36-38
38-40
>40
DBH - 2" Classes
SP
IC
PP
WF
DF

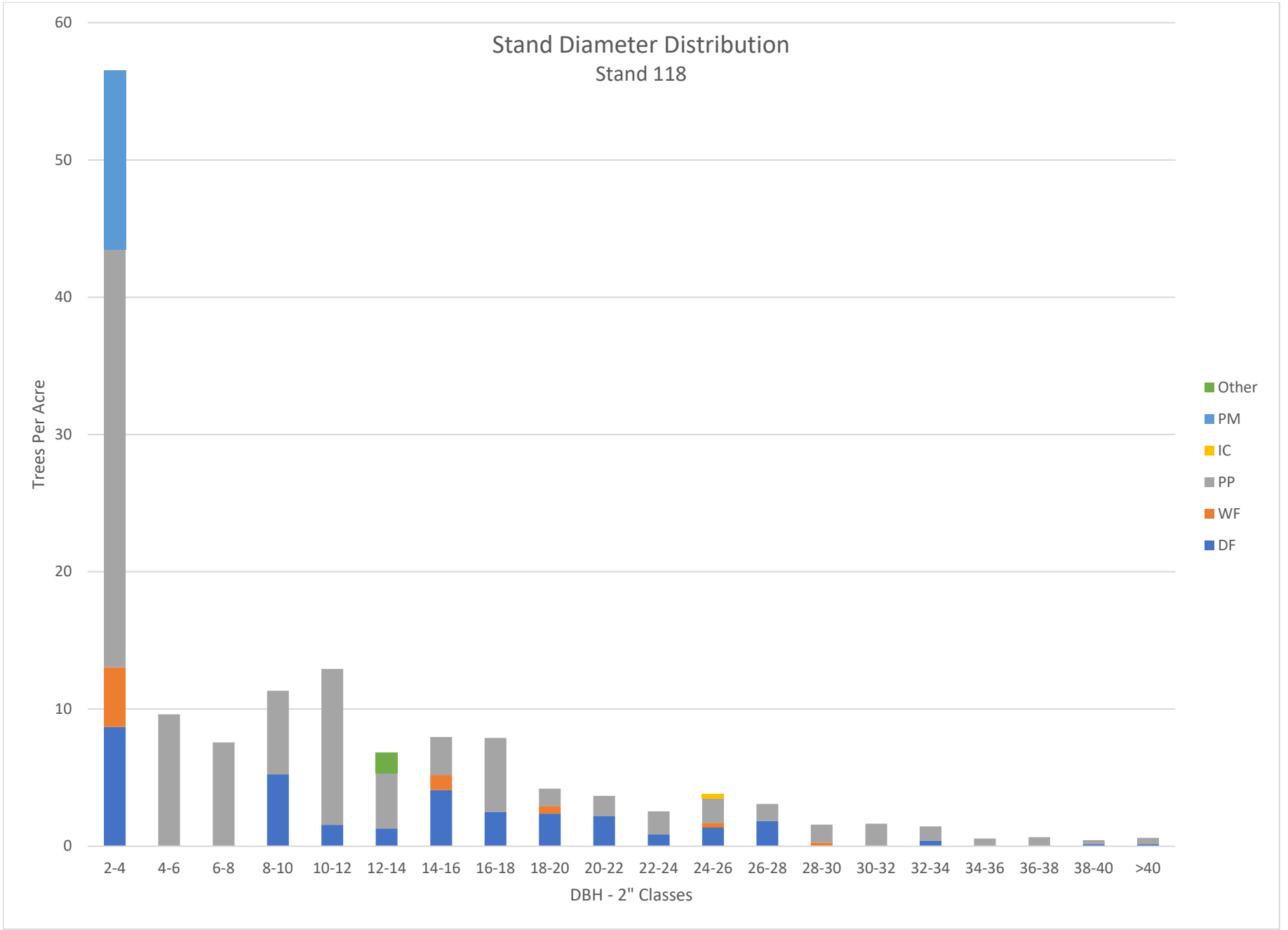

Stand Diameter Distribution
Stand 113
Trees Per Acre
60
50
40
30
20
10
0
2-4
4-6
6-8
8-10
10-12
12-14
14-16
16-18
18-20
20-22
22-24
24-26
26-28
28-30
30-32
32-34
34-36
36-38
38-40
>40
DBH - 2" Classes
Other
IC
PP
DF

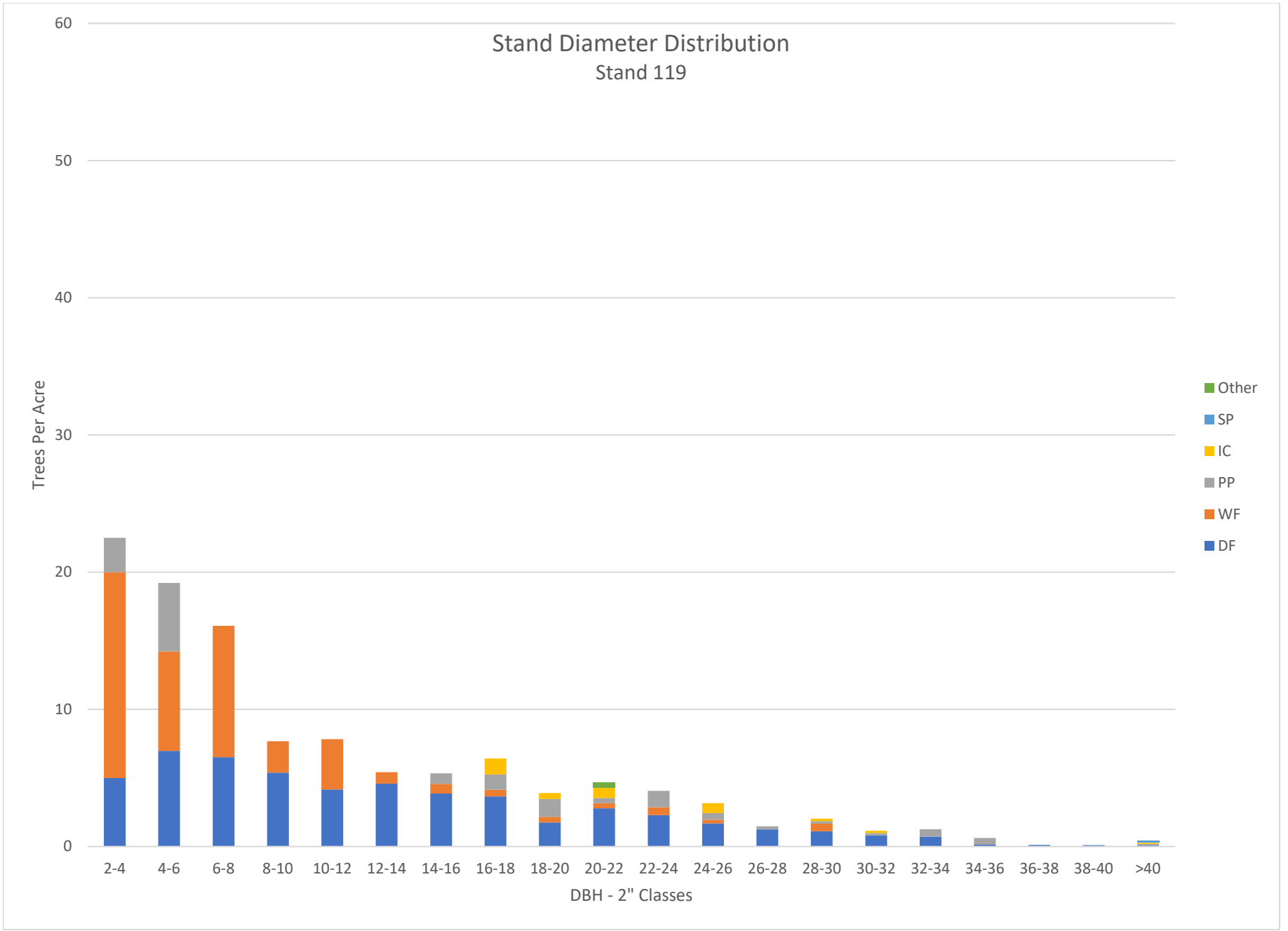

Stand Diameter Distribution
Stand 114
60
50
40
30
20
10
0
Trees Per Acre
2-4
4-6
6-8
8-10
10-12
12-14
14-16
16-18
18-20
20-22
22-24
24-26
26-28
28-30
30-32
32-34
34-36
36-38
38-40
>40
DBH - 2" Classes
SP
IC
PP
WF
DF

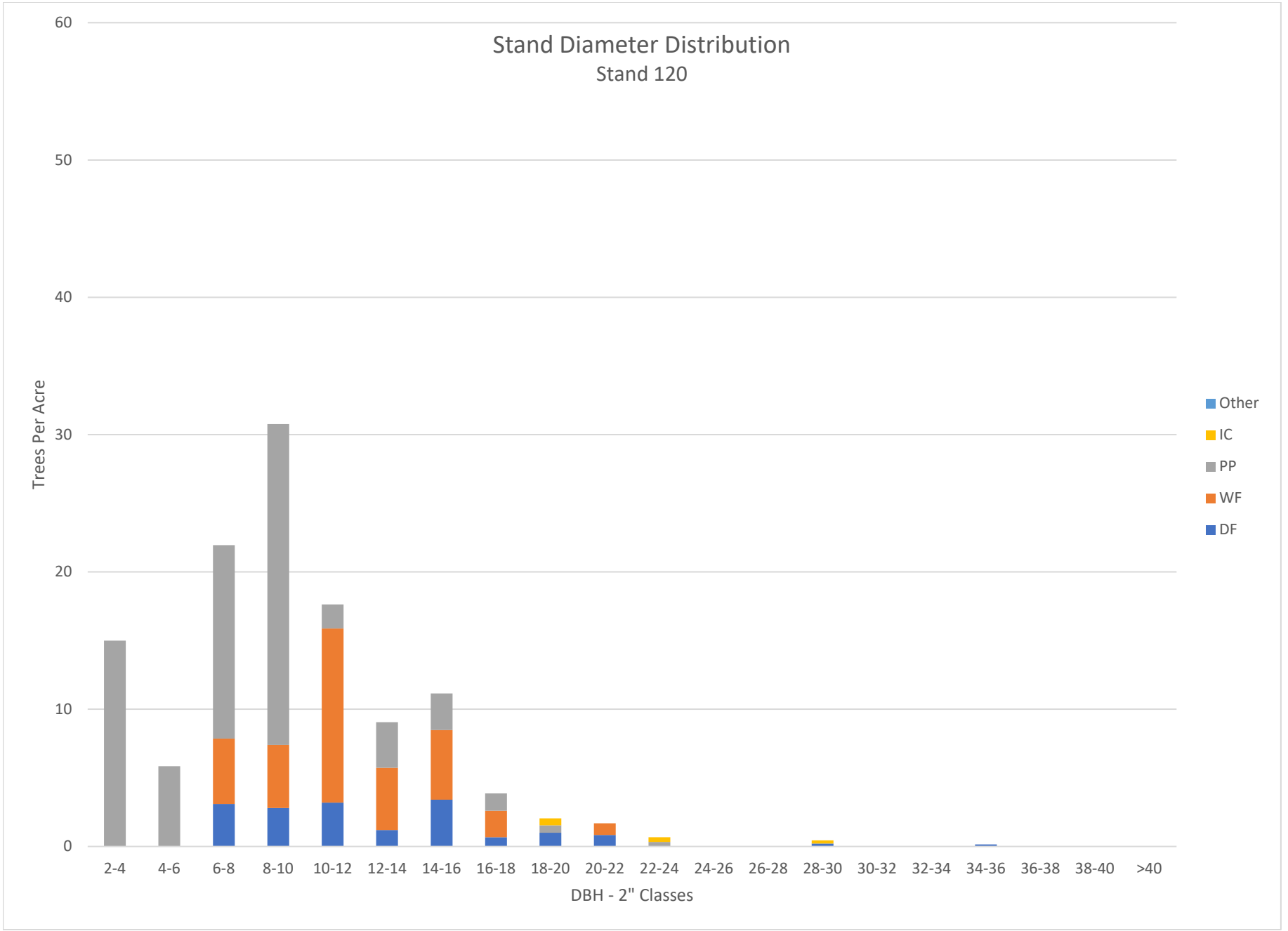

Stand Diameter Distribution
Stand 115
Trees Per Acre
60
50
40
30
20
10
0
2-4
4-6
6-8
8-10
10-12
12-14
14-16
16-18
18-20
20-22
22-24
24-26
26-28
28-30
30-32
32-34
34-36
36-38
38-40
>40
DBH - 2" Classes
Other
IC
PP
WF
DF

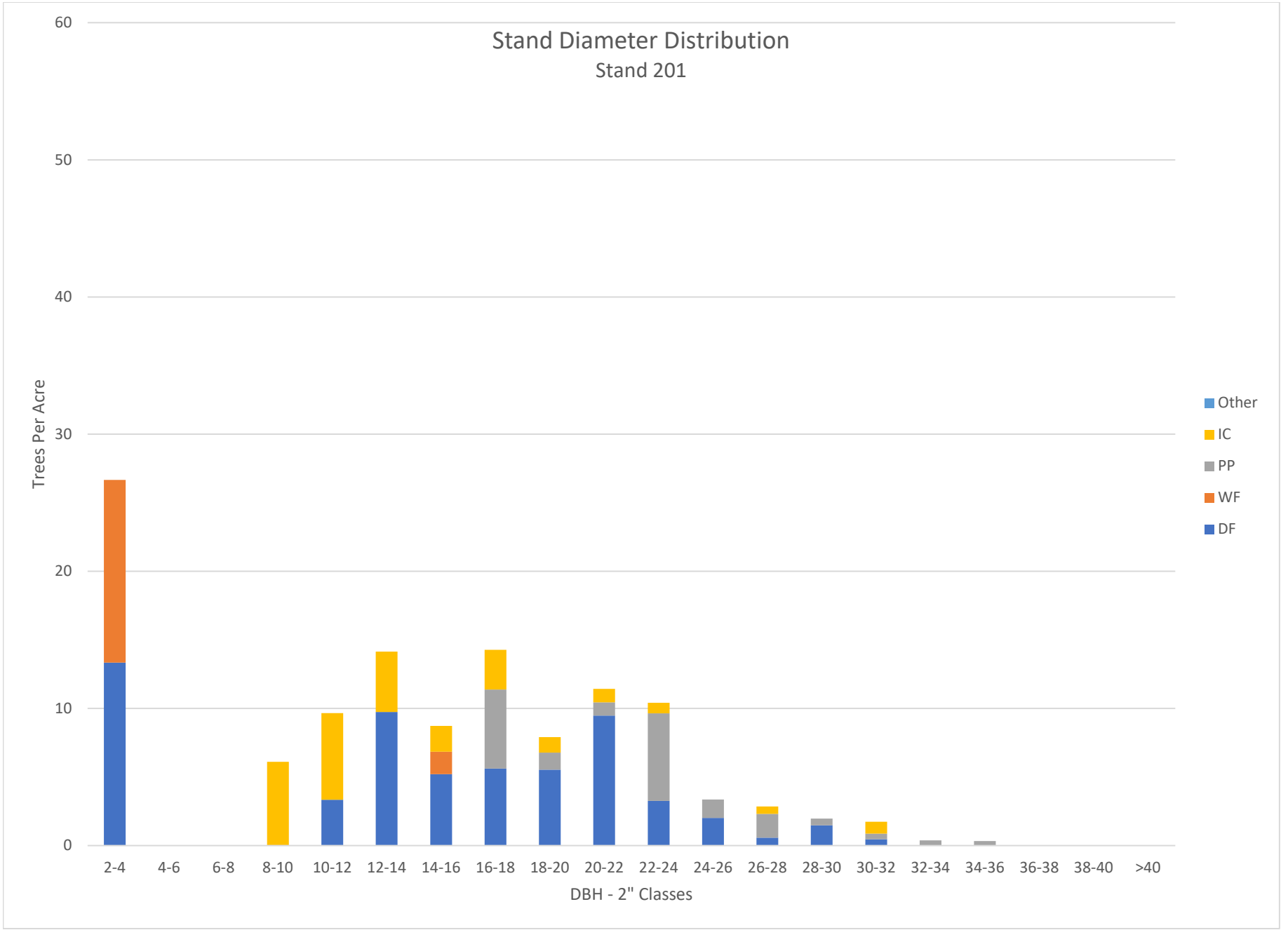

Stand Diameter Distribution
Stand 116
60
50
40
30
20
10
0
Trees Per Acre
2-4
4-6
6-8
8-10
10-12
12-14
14-16
16-18
18-20
20-22
22-24
24-26
26-28
28-30
30-32
32-34
34-36
36-38
38-40
>40
DBH - 2" Classes
PP
WF
DF

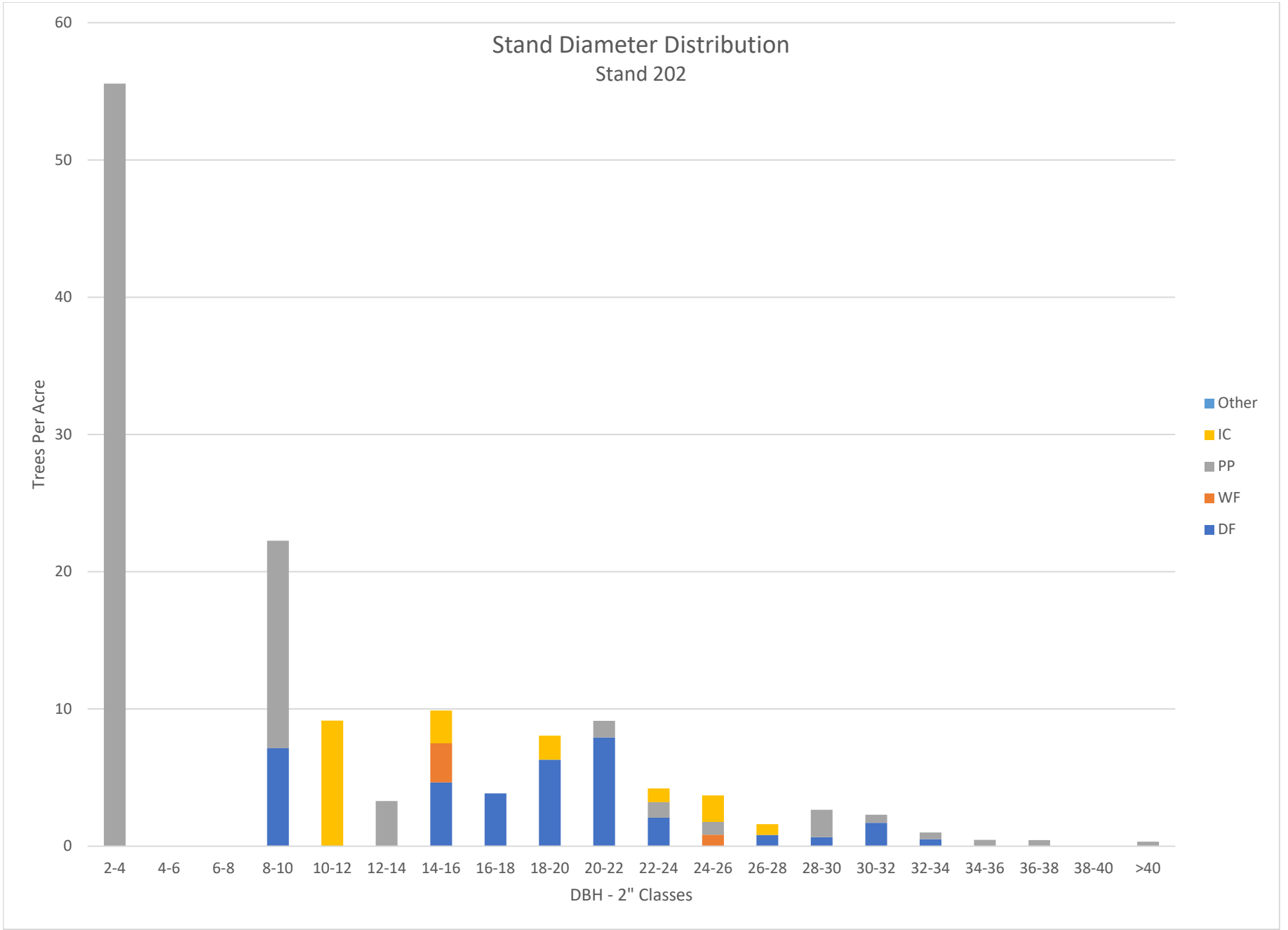

Stand Diameter Distribution
Stand 117
60
50
40
30
20
10
0
Trees Per Acre
2-4
4-6
6-8
8-10
10-12
12-14
14-16
16-18
18-20
20-22
22-24
24-26
26-28
28-30
30-32
32-34
34-36
36-38
38-40
>40
DBH - 2" Classes
Other
IC
PP
WF
DF

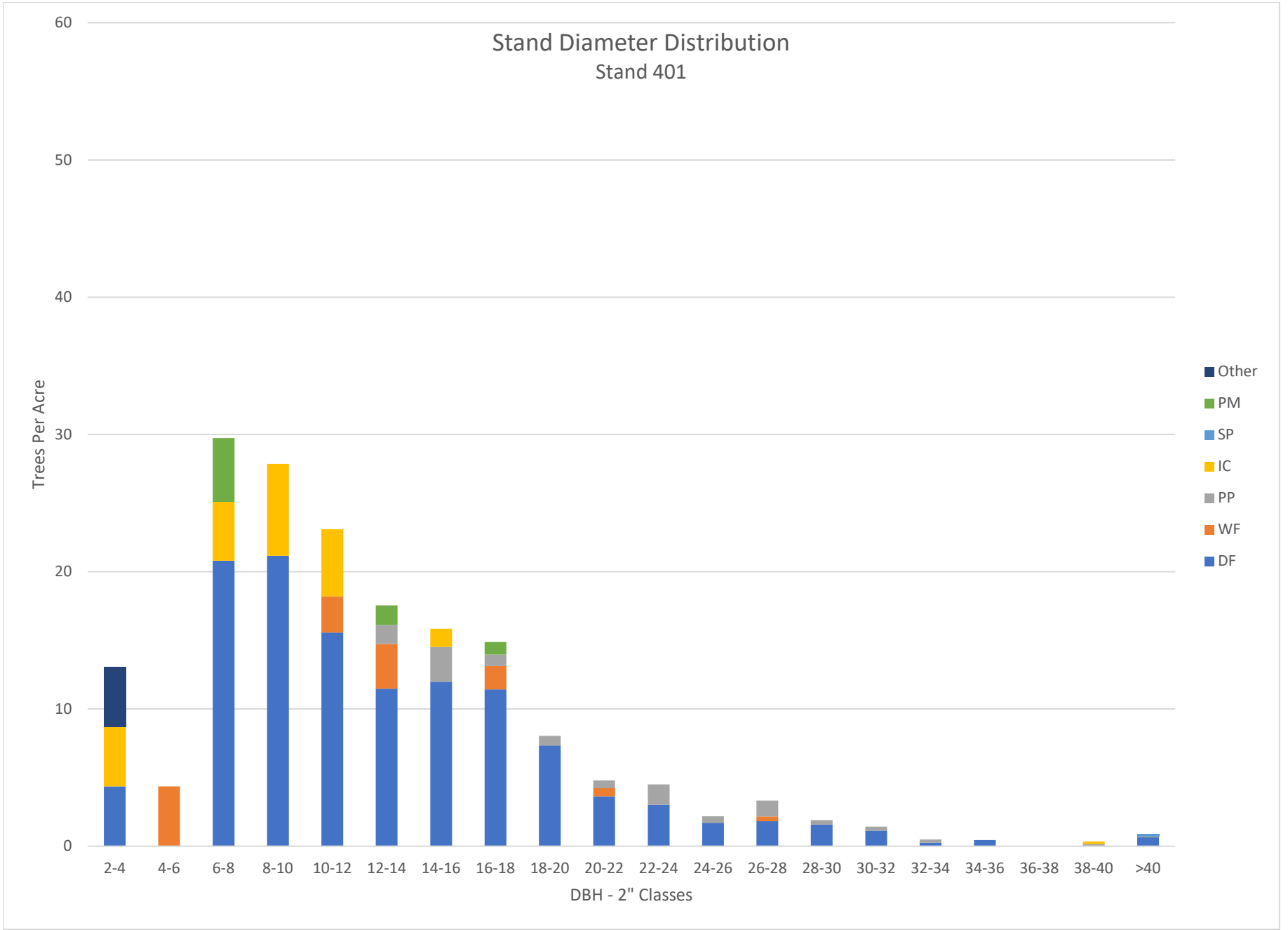

Stand Diameter Distribution
Stand 118
Trees Per Acre
60
50
40
30
20
10
0
2-4
4-6
6-8
8-10
10-12
12-14
14-16
16-18
18-20
20-22
22-24
24-26
26-28
28-30
30-32
32-34
34-36
36-38
38-40
>40
DBH - 2" Classes
Other
PM
IC
PP
WF
DF

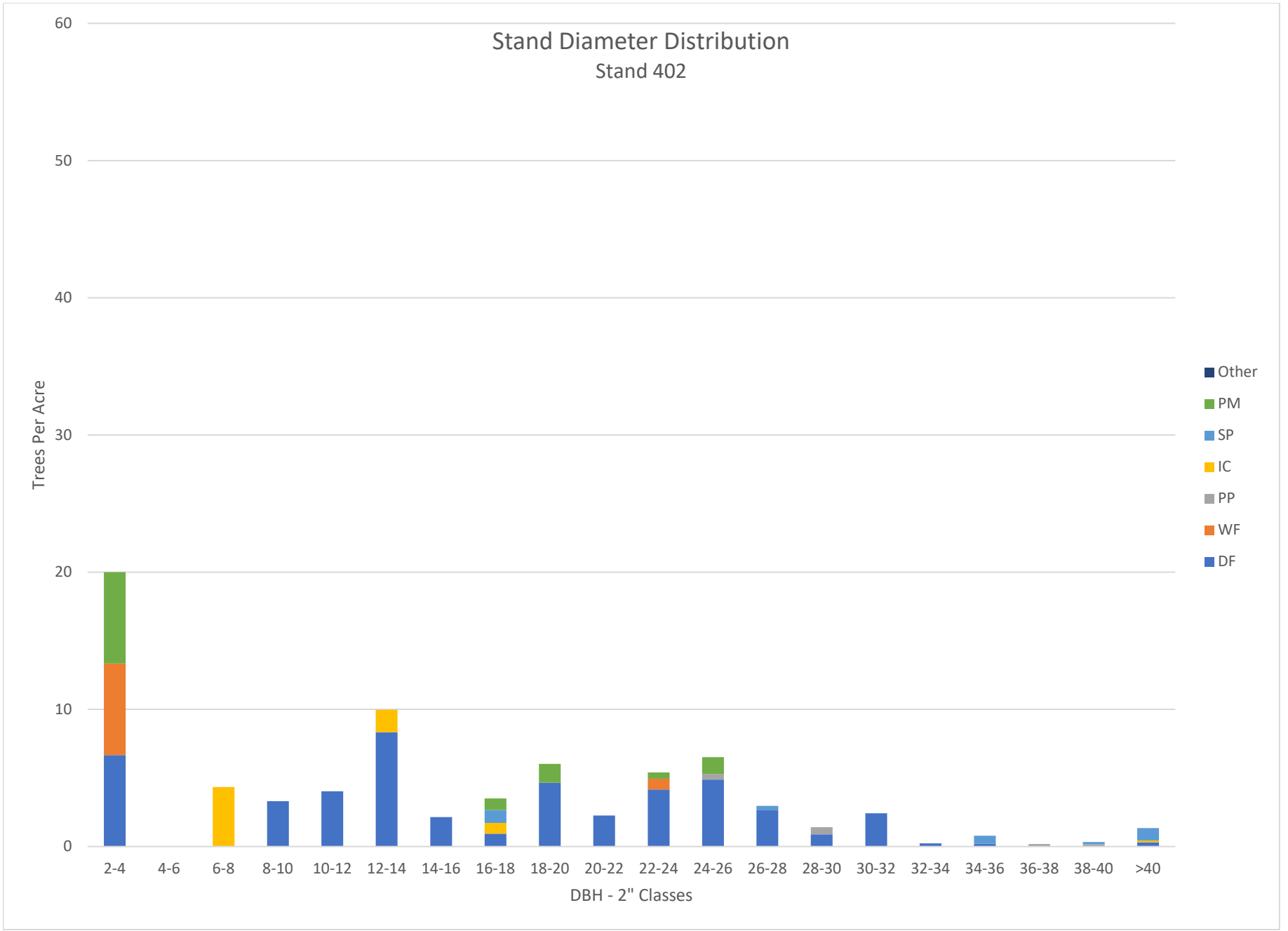

Stand Diameter Distribution
Stand 119
Trees Per Acre
60
50
40
30
20
10
0
2-4
4-6
6-8
8-10
10-12
12-14
14-16
16-18
18-20
20-22
22-24
24-26
26-28
28-30
30-32
32-34
34-36
36-38
38-40
>40
DBH - 2" Classes
Other
SP
IC
PP
WF
DF

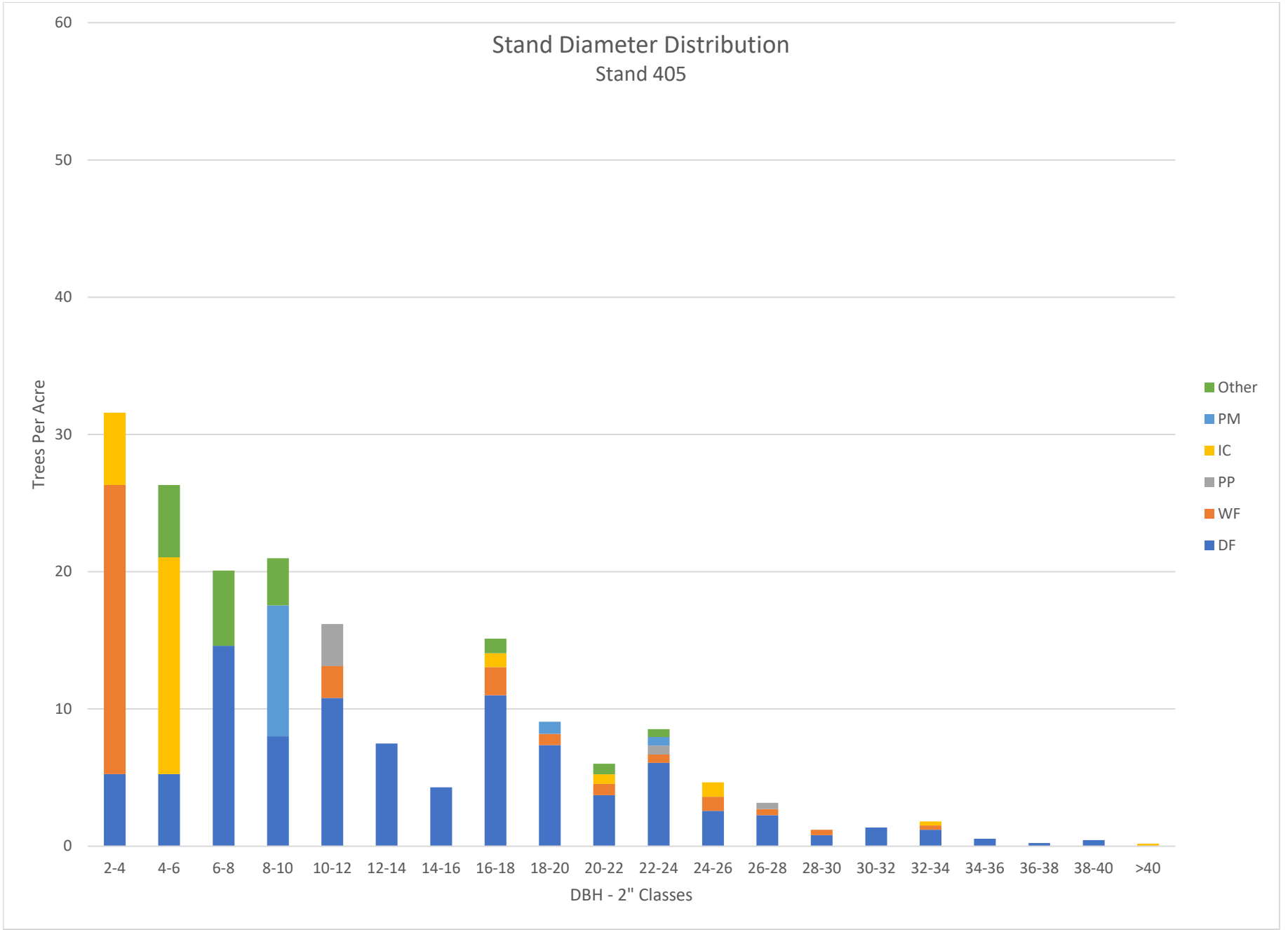

Stand Diameter Distribution
Stand 120
60
50
40
30
20
10
0
Trees Per Acre
2-4
4-6
6-8
8-10
10-12
12-14
14-16
16-18
18-20
20-22
22-24
24-26
26-28
28-30
30-32
32-34
34-36
36-38
38-40
>40
DBH - 2" Classes
Other
IC
PP
WF
DF

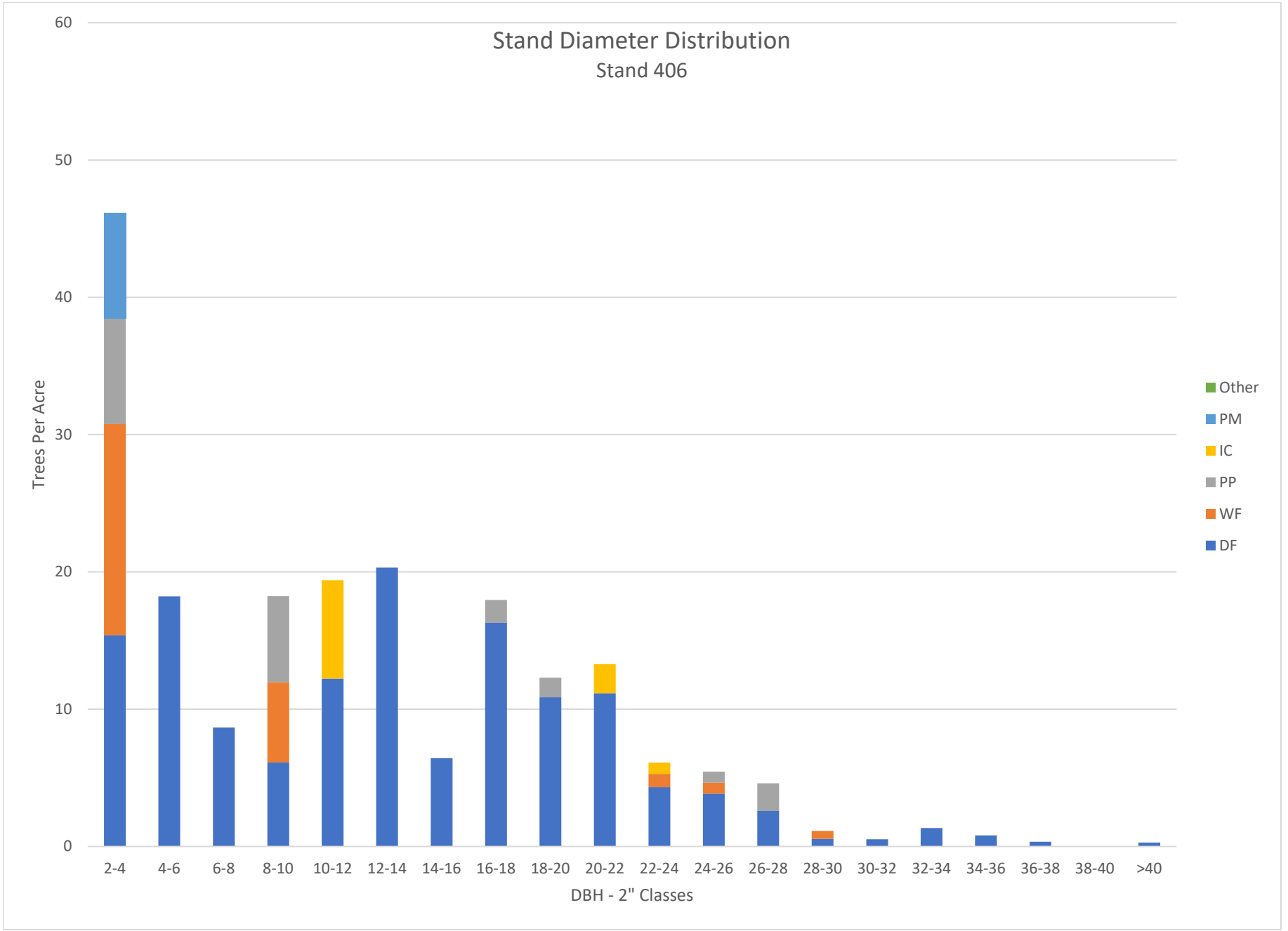

Stand Diameter Distribution
Stand 201
Trees Per Acre
60
50
40
30
20
10
0
2-4
4-6
6-8
8-10
10-12
12-14
14-16
16-18
18-20
20-22
22-24
24-26
26-28
28-30
30-32
32-34
34-36
36-38
38-40
>40
DBH - 2" Classes
Other
IC
PP
WF
DF

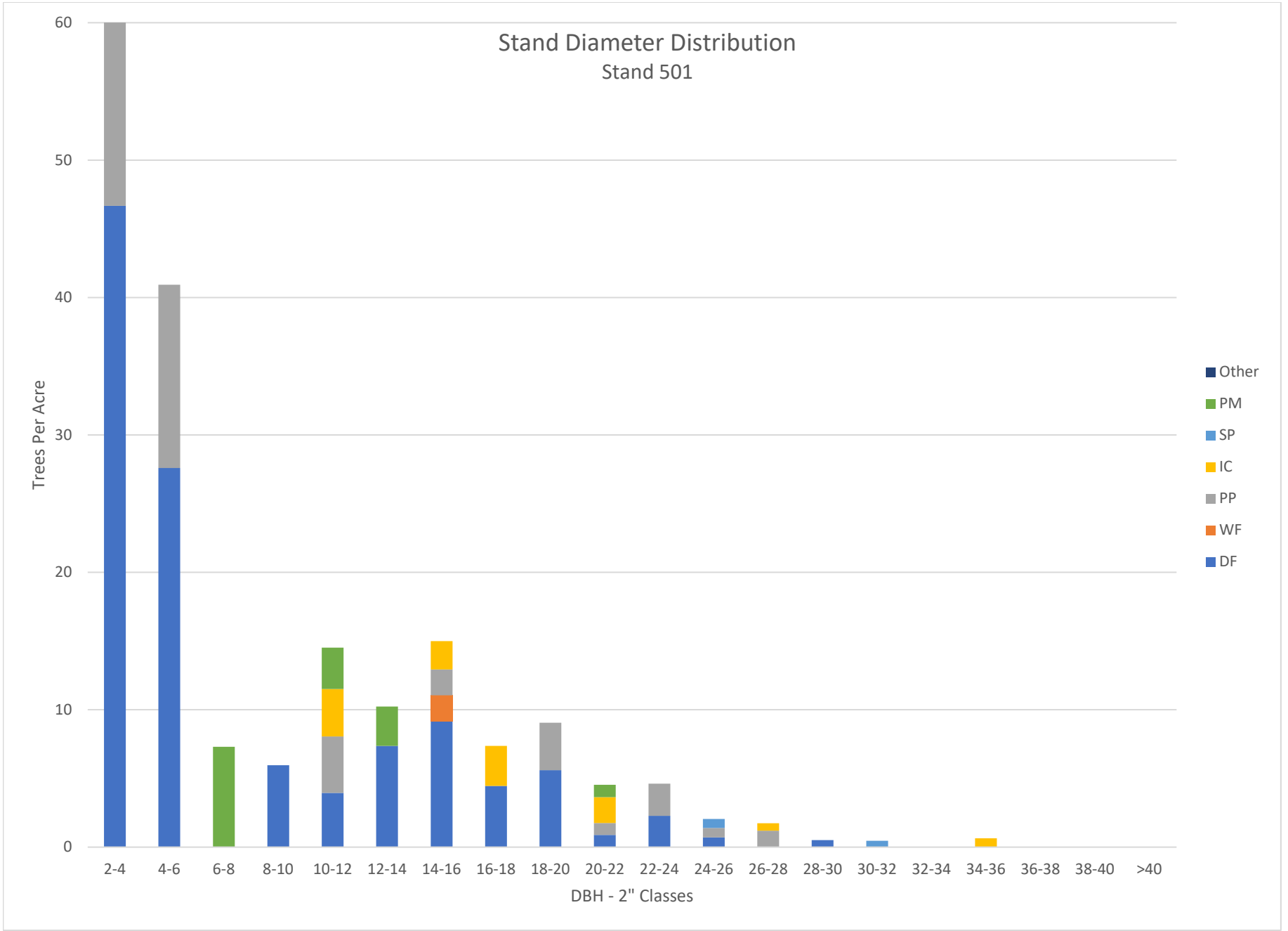

Stand Diameter Distribution
Stand 202
Trees Per Acre
60
50
40
30
20
10
0
2-4
4-6
6-8
8-10
10-12
12-14
14-16
16-18
18-20
20-22
22-24
24-26
26-28
28-30
30-32
32-34
34-36
36-38
38-40
>40
DBH - 2" Classes
Other
IC
PP
WF
DF

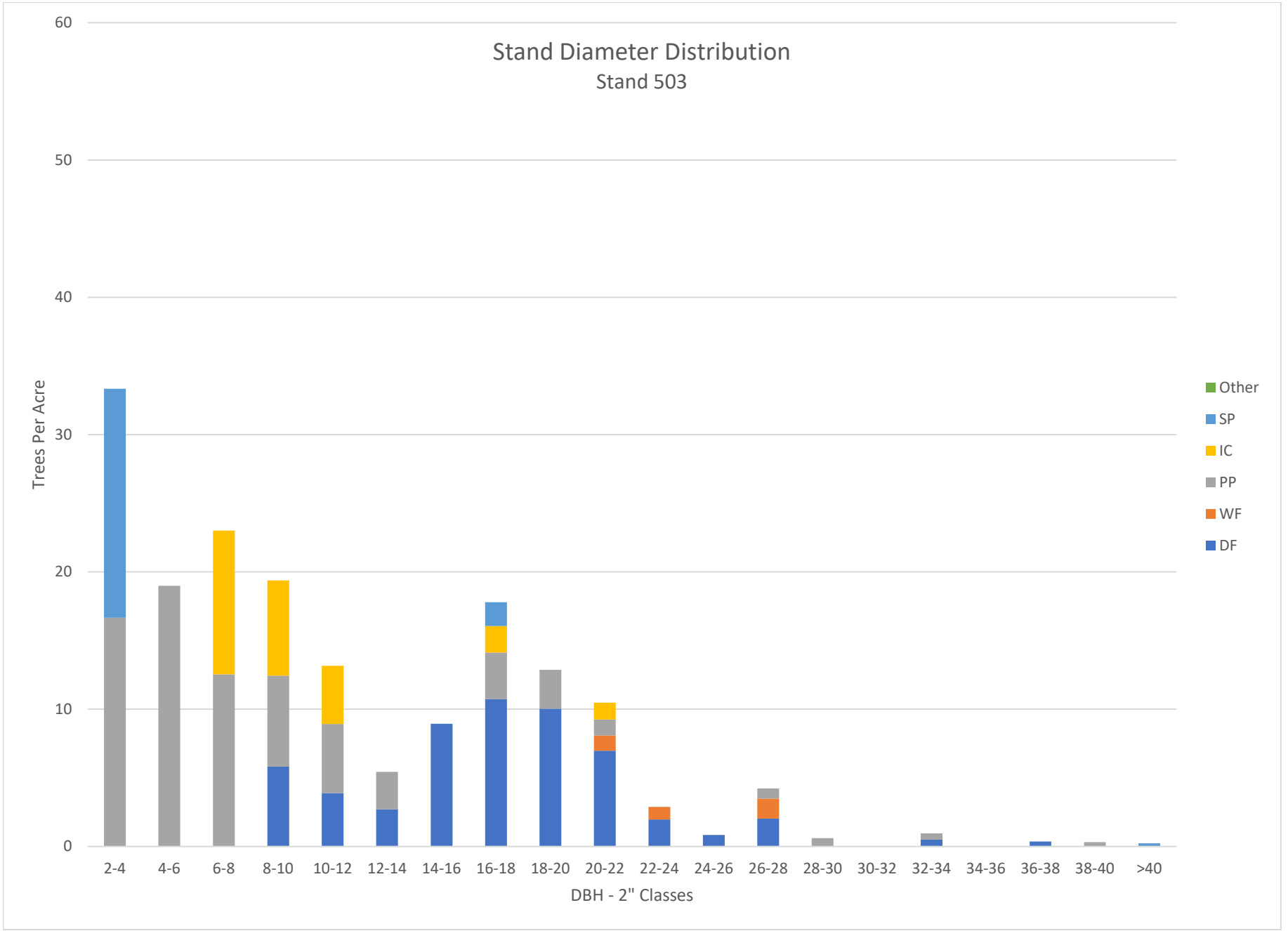

Stand Diameter Distribution
Stand 401
Trees Per Acre
60
50
40
30
20
10
0
2-4
4-6
6-8
8-10
10-12
12-14
14-16
16-18
18-20
20-22
22-24
24-26
26-28
28-30
30-32
32-34
34-36
36-38
38-40
>40
DBH - 2" Classes
Other
PM
SP
IC
PP
WF
DF


Stand Diameter Distribution
Stand 402
60
50
40
30
20
10
0
Trees Per Acre
2-4
4-6
6-8
8-10
10-12
12-14
14-16
16-18
18-20
20-22
22-24
24-26
26-28
28-30
30-32
32-34
34-36
36-38
38-40
>40
DBH - 2" Classes
Other
PM
SP
IC
PP
WF
DF


Stand Diameter Distribution
Stand 405
Trees Per Acre
60
50
40
30
20
10
0
2-4
4-6
6-8
8-10
10-12
12-14
14-16
16-18
18-20
20-22
22-24
24-26
26-28
28-30
30-32
32-34
34-36
36-38
38-40
>40
DBH - 2" Classes
Other
PM
IC
PP
WF
DF


Stand Diameter Distribution
Stand 406
Trees Per Acre
60
50
40
30
20
10
0
2-4
4-6
6-8
8-10
10-12
12-14
14-16
16-18
18-20
20-22
22-24
24-26
26-28
28-30
30-32
32-34
34-36
36-38
38-40
>40
DBH - 2" Classes
Other
PM
IC
PP
WF
DF


Stand Diameter Distribution
Stand 501
Trees Per Acre
60
50
40
30
20
10
0
2-4
4-6
6-8
8-10
10-12
12-14
14-16
16-18
18-20
20-22
22-24
24-26
26-28
28-30
30-32
32-34
34-36
36-38
38-40
>40
DBH - 2" Classes
Other
PM
SP
IC
PP
WF
DF


Stand Diameter Distribution
Stand 503
Trees Per Acre
60
50
40
30
20
10
0
2-4
4-6
6-8
8-10
10-12
12-14
14-16
16-18
18-20
20-22
22-24
24-26
26-28
28-30
30-32
32-34
34-36
36-38
38-40
>40
DBH - 2" Classes
Other
SP
IC
PP
WF
DF