

**SURVEY OF LARGE WOOD IN THE LOWER CARMEN
BYPASS STUDY REACH - UPPER MCKENZIE RIVER**

Submitted by:

Dr. Stanley Gregory

Randall Wildman

Department of Fisheries and Wildlife

Oregon State University

Corvallis, OR 97331

March, 2009

Under a Cost-Reimbursable Agreement between the USDA Forest Service (Willamette National Forest) and the Department of Fisheries and Wildlife at Oregon State University, annual monitoring of instream wood within the Lower Carmen Bypass study reach was conducted in the summer of 2008. This document summarizes the information obtained in this 2008 wood survey.

WOOD SURVEY METHODS AND PROTOCOLS

All wood present within the wetted and active channel, and greater than 25 ft in length, was surveyed in August, 2008. Measurements taken for each piece of wood consisted of:

- channel unit type and location
- length
- maximum and minimum diameter
- presence or absence of root-wad
- relationship of piece relative to other pieces
- zonation of each piece within the river channel
- channel orientation.

Each piece of wood greater than 25 ft in length was tagged with two numbered aluminum tags. Tags were placed approximately 6 ft from the end of the log on one side and 6 ft from the other end of the log on the opposite side, whenever possible.

Location of wood within the river channel was determined using a 4-zone system developed by Dr. Robert Beschta, Oregon State University. Zone 1 comprises that portion of wood that is presently under the water's surface at the time of the survey. Zone 2 comprises that portion of the wood that would be inundated during typical high

winter discharge (1.6-yr flood level). Zone 3 comprises that portion of the river channel that is above the wetted channel during winter discharge. Zone 4 comprises that portion of the wood that lies either within the floodplain or on the hillslope.

The relationship of wood relative to other pieces of wood was recorded as one of three categories in a “clump type” designation. Isolated pieces of wood that do not touch any other piece of wood >25 ft in length were recorded as “Single” (S). Pieces of wood that were associated or touching other pieces of wood in a group of 2 to 10 pieces of wood were recorded with a clump type designation of “Accumulation” (A). Wood touching or associated with greater than 10 pieces of wood were recorded with a clump designation of “Jam” (J).

WOOD SURVEY RESULTS

A total of 59 pieces of wood (length >25 ft) were surveyed and tagged in the Lower Carmen Bypass study reach on the upper McKenzie River in 2001. Wood tagged in 2001 was located predominantly in Zones 1 and 2 of the channel. In 2004, an additional 104 pieces of wood were tagged and measured in the study reach. This additional wood consisted of pieces located in Zones 1 through 4 of the channel. In 2005, a total of 83 pieces of wood were introduced into the study reach; 56 via helicopter, 23 via tree tipping and 4 from upstream sources.

On December 14th, 2006 an intense localized wind storm (micro-burst) struck the Lower Carmen Bypass study reach. Ninety new pieces of wood were blown into the reach, with the majority of the pieces deposited in the middle of the reach (NSO #9-15).

The number of pieces of wood (>25 ft in length) within the Lower Carmen Bypass study reach, 2004 to 2008, is summarized in Table 1.

Table 1. Number of pieces of wood within the lower Carmen Bypass reach on the upper McKenzie River, before project implementation (2004), post project implementation (2005), one year after project implementation (2006), after blow-down event (2007), and with natural retention (2008).

2004 Pre-project implementation	2005 Post-project implementation	2006 with natural retention	2007 with blow-down wood	2008 with natural retention
163	246	251	341	346

A total of five new pieces of wood were retained within the study reach in 2007/2008. The five pieces were all in the “small” USFS size class, with none of the pieces having an intact root-wad. The largest piece was 34.1 feet in length and 1.3 feet in diameter. The average length of this newly recruited wood was 28.1 feet and the average diameter was 1.2 feet. Total volume of new wood was 147.9 cubic feet. Four of the five new pieces of wood were retained upon existing wood accumulations with 47% of their volume occurring within Zone 2 of the channel. Pieces were retained in the middle and upper sections of the survey with one piece each being retained in NSO# 9, 10, 11, 12, and 13 respectively.

There was minimal movement of existing wood within the study reach in 2007/2008 with 6 pieces moving to a new downstream NSO unit location. All pieces that did move were in the “small” USFS size class, with none of the pieces having an intact root-wad. The largest piece was 76 feet in length and had a diameter of 1.3 feet. All 6

pieces were retained upon existing wood accumulations. Average length of wood that moved was 39.1 feet and the average maximum diameter was 1.3 feet. Total volume of the wood that moved was 224.1 cubic feet. The furthest distance that the wood moved was 525 feet, from NSO#12 to NSO#9.

Wood dimensions, clump type, presence of a root wad, location within the channel and zonation of all tagged wood since 2001 (n=346) can be found in Appendix A. A total of 146 pieces of wood (42.2%) have a root-wad attached to the bole of the log. Ninety-four pieces (27.2%) are considered to be single pieces (S), 195 pieces (56.4%) are incorporated in wood accumulations (A) and 56 pieces (16.2%) are located in large wood jams (J). Of the total of 346 pieces of wood, 134 of the pieces occur on the left side of the river, 108 pieces are located on the right side of the river, and 58 pieces are distributed in the center of the channel. In addition, a total of 46 pieces are considered to be full channel spanners.

The total volume of wood (pieces >25 ft in length) within the study reach in 2008 is 45,333.1 cubic feet. The total volume of wood that is wetted (Zone 1) is currently 5,706.8 cubic feet (12.6%). The volume of wood within the active channel (Zone 2) is 13,122.5 (28.9%). The volume of wood elevated above the active channel (Zone 3) is 15,768.3 cubic feet (34.8%). The volume of wood on the hillslope of the river or on the floodplain (Zone 4) is 10,735.5 cubic feet (23.7%).

Since wood surveys were initiated in 2001, the concentration of wood within the study reach has been higher in the middle and upper sections and lower near the Trail Bridge Reservoir confluence. After the large input of wood from the winter 2006 micro-burst storm, the density of wood in the middle section of the study reach (NSO#5-12) has

further increased. The density of wood in the lower section of the study reach (NSO#1-4) has not changed since the survey in 2006.

The large input of wind-thrown trees into the study reach did result in some wood breakage of older existing pieces of wood in the channel. Thirteen pieces of existing wood were broken into either two or three pieces when the wind thrown trees entered the reach. Many of the wind thrown trees were deposited upon older existing wood accumulations making it difficult to locate some older existing wood in high density areas.

APPENDIX A

Figure A1. Relative location and physical characteristics of all wood >25 feet in length at the lower Carmen Bypass study reach on the upper McKenzie Restoration River, September 2008. NSO# = Natural Sequence Order unit where log is located. Log length, maximum and minimum diameter in feet. Root Wad: indicates if piece has root-wad attached. Clump Type: indicates if log is either S = single, A = accumulation, J = jam. Zone 1-4: percentage of log located in each of the four Beschta type zones. Tag#: numbered tag applied to log. Year: year that log was tagged. Location: LEFT indicates left side of the river looking downstream, RIGHT indicates right side of the river looking downstream. Input Source: O = original wood, H = helicopter, T = tipped, N = new retain wood, BD = blow down wood.

NSO #	Log Length (feet)	Max. Dia. (feet)	Min. Dia. (feet)	Root Wad	Clump Type	Location in Channel(%)				Tag #	Year Tagged	Location	Input Source
						Zone1	Zone2	Zone3	Zone4				
1	34.9	0.7	0.2	NO	S	40	5	35	20	2101	2001	CENTER	O
1	25.7	0.9	0.6	NO	S	75	10	15	0	2102	2004	LEFT	O
2	35.8	1.0	0.4	NO	S	0	0	0	100	2103	2004	LEFT	O
2	35.9	1.0	0.1	NO	S	30	5	5	60	2104	2004	LEFT	O
3	94.0	3.9	2.7	NO	S	0	10	90	0	2001	2001	CENTER	O
3	57.9	2.0	1.6	NO	S	0	5	95	0	2002	2001	CENTER	O
3	49.6	0.8	0.2	NO	A	0	0	80	20	2107	2004	LEFT	O
3	31.8	0.9	0.2	YES	A	10	5	50	35	2105	2004	LEFT	O
3	39.2	1.6	1.3	NO	S	10	20	20	50	2163	2004	RIGHT	O
4	64.8	1.5	1.1	NO	A	10	5	75	10	2003	2001	LEFT	O
4	26.1	1.1	0.9	NO	A	100	0	0	0	2006	2001	LEFT	O
4	58.0	2.5	1.0	YES	A	5	15	75	5	2005	2001	RIGHT	O
4	77.0	1.0	0.5	YES	S	10	0	80	10	2004	2001	RIGHT	O
4	95.0	2.5	1.2	NO	A	5	10	80	5	2108	2004	CENTER	O
4	45.0	4.3	2.8	NO	A	10	10	45	35	2164	2004	RIGHT	O
4	38.4	2.8	1.4	YES	S	10	20	60	10	2165	2004	RIGHT	O
4	28.2	0.7	0.2	NO	A	40	60	0	0	2373	2005	CENTER	N
4	33.8	0.6	0.2	NO	A	50	40	10	0	2374	2005	CENTER	N
4	95.1	2.3	1.3	YES	S	30	60	10	0	2241	2005	CENTER	H
4	95.1	1.5	0.5	YES	S	60	35	5	0	2242	2005	CENTER	H
5	74.8	1.3	1.0	YES	A	15	55	20	10	2007	2001	LEFT	O
5	75.0	2.0	1.2	YES	S	5	0	10	85	2009	2001	LEFT	O
5	90.0	3.8	2.2	YES	A	5	10	85	0	2008	2001	RIGHT	O
5	76.3	1.1	0.5	NO	A	5	5	65	25	2109	2004	LEFT	O
5	40.6	1.0	0.8	NO	A	0	0	95	5	2166	2004	RIGHT	O
5	50.0	3.4	1.3	NO	A	0	10	60	30	2168	2004	RIGHT	O
5	46.0	1.6	0.5	YES	S	20	25	45	10	2167	2004	RIGHT	O
5	88.6	2.5	1.8	YES	A	10	80	10	0	2243	2005	CENTER	H

5	78.7	1.7	0.6	YES	A	40	40	20	0	2244	2005	CENTER	H
6	31.1	0.7	0.6	NO	A	100	0	0	0	2111	2004	LEFT	O
6	61.6	1.4	0.7	NO	A	15	5	65	15	2112	2004	LEFT	O
6	62.0	2.3	1.8	YES	A	0	0	70	30	2113	2004	LEFT	O
6	30.2	1.5	1.0	NO	A	30	50	20	0	2245	2005	CENTER	H
6	38.4	1.4	1.1	NO	A	60	40	0	0	2246	2005	CENTER	H
6	34.8	1.2	0.9	NO	A	90	10	0	0	2247	2005	CENTER	H
7	49.1	1.3	0.8	NO	A	1	2	10	87	2016	2001	LEFT	O
7	121.0	1.5	0.7	YES	A	10	10	30	50	2010	2001	LEFT	O
7	60.6	2.0	1.2	YES	A	5	5	5	85	2011	2001	LEFT	O
7	55.0	2.0	0.9	YES	A	1	5	5	89	2012	2001	LEFT	O
7	19.0	2.0	1.6	NO	A	5	55	40	0	2013	2001	LEFT	O
7	40.0	1.4	1.1	NO	A	0	0	90	10	2014	2001	LEFT	O
7	43.0	1.3	0.8	NO	A	0	20	80	0	2015	2001	RIGHT	O
7	58.7	0.7	0.3	NO	A	0	0	100	0	2114	2004	LEFT	O
7	53.2	1.8	0.8	NO	A	0	0	97	3	2115	2004	LEFT	O
7	37.8	1.3	0.8	NO	A	0	10	90	0	2118	2004	LEFT	O
7	52.0	1.8	1.5	NO	J	0	0	30	70	2116	2004	LEFT	O
7	42.0	0.7	0.3	NO	A	50	50	0	0	2171	2004	RIGHT	O
7	48.5	1.0	0.7	NO	A	0	20	40	40	2172	2004	RIGHT	O
7	25.0	1.0	0.8	NO	S	0	5	25	70	2170	2004	RIGHT	O
7	29.0	1.8	1.5	YES	S	0	50	50	0	2169	2004	RIGHT	O
7	40.0	1.4	1.0	NO	A	60	40	0	0	2250	2005	CENTER	H
7	91.9	1.1	0.5	YES	A	0	0	100	0	2248	2005	CENTER	H
7	68.9	1.5	1.0	YES	A	0	10	90	0	2249	2005	CENTER	H
7	34.1	1.8	1.1	NO	A	60	40	0	0	2251	2005	LEFT	H
7	114.8	2.5	1.6	YES	S	30	20	30	20	2218	2005	LEFT	T
7	62.3	2.6	1.8	YES	S	5	20	40	35	2220	2005	LEFT	T
7	50.9	2.7	1.8	NO	S	60	40	0	0	2252	2005	RIGHT	H
7	26.6	1.1	0.6	NO	A	5	15	50	30	2216	2005	SPANNER	T
7	98.4	2.3	1.1	YES	A	30	40	10	20	2214	2005	SPANNER	T
7	101.7	2.1	1.4	YES	A	25	25	30	20	2215	2005	SPANNER	T
7	52.2	1.9	1.5	NO	S	30	70	0	0	2219	2005	SPANNER	T
7	30.8	1.5	0.9	NO	A	20	60	5	15	2217	2005		T
7	107.9	1.6	0.5	NO	A	0	20	60	20	2378	2006	LEFT	N
7	28.6	1.3	0.3	NO	A	60	40	0	0	2026	2006		O
8	87.0	1.3	0.4	NO	A	80	20	0	0	2021	2001	LEFT	O
8	29.5	2.0	1.4	NO	A	2	1	97	0	2017	2001	LEFT	O
8	46.8	1.7	0.8	NO	A	2	4	89	5	2018	2001	LEFT	O
8	50.3	1.7	1.0	NO	A	0	0	96	4	2019	2001	LEFT	O
8	112.0	3.0	1.5	YES	A	20	60	10	10	2020	2001	RIGHT	O
8	27.0	1.3	0.2	NO	A	25	10	65	0	2120	2004	LEFT	O
8	70.0	1.0	0.3	YES	A	0	0	90	10	2174	2004	RIGHT	O
8	98.0	2.0	0.4	YES	S	10	30	60	0	2173	2004	RIGHT	O
8	88.6	1.5	0.8	NO	A	5	85	10	0	2253	2005	CENTER	H
8	25.6	3.3	3.1	NO	S	20	80	0	0	2254	2005	CENTER	H
8	33.5	1.3	0.9	NO	S	80	20	0	0	2256	2005	CENTER	H

8	85.3	2.8	1.6	YES	S	25	65	10	0	2221	2005	CENTER	T
8	114.8	2.5	1.1	YES	S	20	40	30	10	2224	2005	CENTER	T
8	40.7	1.2	1.0	NO	S	40	60	0	0	2255	2005	LEFT	H
8	37.1	1.4	1.0	NO	S	5	30	20	45	2222	2005	LEFT	T
8	31.8	1.1	0.9	NO	S	0	10	40	50	2223	2005	LEFT	T
8	31.8	0.8	0.5	NO	A	30	40	30	0	2227	2006	CENTER	N
8	72.2	2.6	0.6	NO	A	0	10	30	60	2379	2007	LEFT	BD
8	28.5	1.0	0.7	NO	A	80	20	0	0	2388	2007	CENTER	BD
8	59.7	1.8	1.1	YES	A	10	20	30	40	2380	2007	LEFT	BD
9	65.3	1.3	0.5	NO	A	15	10	75	0	2035	2001	LEFT	O
9	124.9	1.8	0.7	YES	A	25	50	25	0	2033	2001	LEFT	O
9	82.5	1.3	0.7	NO	S	2	3	30	65	2025	2001	LEFT	O
9	58.0	1.0	0.6	NO	A	5	25	70	0	2023	2001	RIGHT	O
9	89.0	2.0	1.3	YES	A	5	10	75	10	2022	2001	RIGHT	O
9	73.0	2.1	1.5	YES	A	10	15	55	20	2024	2001	RIGHT	O
9	112.0	2.3	0.5	YES	J	0	50	50	0	2027	2001	RIGHT	O
9	38.0	1.7	1.7	YES	J	0	50	50	0	2028	2001	RIGHT	O
9	78.1	1.4	0.2	NO	A	15	2	8	75	2121	2004	CENTER	O
9	57.8	2.0	1.0	NO	A	0	50	50	0	2122	2004	LEFT	O
9	57.2	1.4	0.6	NO	A	0	45	55	0	2123	2004	LEFT	O
9	39.1	0.7	0.3	NO	A	2	60	38	0	2124	2004	LEFT	O
9	59.1	1.5	0.6	NO	A	0	0	20	80	2126	2004	LEFT	O
9	37.9	1.0	0.9	YES	S	0	0	10	90	2125	2004	LEFT	O
9	44.0	1.3	0.6	NO	A	5	20	35	40	2175	2004	RIGHT	O
9	92.0	1.3	0.6	NO	A	5	15	15	65	2176	2004	RIGHT	O
9	45.0	0.8	0.3	YES	A	0	0	20	80	2179	2004	RIGHT	O
9	80.0	1.9	0.3	YES	A	0	40	60	0	2183	2004	RIGHT	O
9	40.0	0.6	0.5	NO	J	50	50	0	0	2181	2004	RIGHT	O
9	37.0	1.5	1.1	NO	J	50	50	0	0	2182	2004	RIGHT	O
9	31.5	0.7	0.5	NO	S	5	10	85	0	2178	2004	RIGHT	O
9	77.0	1.5	0.7	NO	S	5	5	15	75	2180	2004	RIGHT	O
9	65.0	1.0	0.3	YES	S	10	15	25	50	2177	2004	RIGHT	O
9	29.2	3.8	2.4	NO	A	10	30	50	10	2258	2005	CENTER	H
9	43.3	2.6	2.4	NO	A	30	60	10	0	2259	2005	CENTER	H
9	29.9	1.4	0.7	NO	A	95	5	0	0	2271	2005	CENTER	H
9	49.9	2.7	2.2	NO	S	30	70	0	0	2263	2005	CENTER	H
9	22.6	2.3	1.6	YES	S	60	40	0	0	2260	2005	CENTER	H
9	48.9	1.2	0.3	YES	S	30	70	0	0	2264	2005	CENTER	H
9	98.4	1.4	1.0	NO	A	30	50	20	0	2226	2005	LEFT	T
9	52.5	2.1	1.1	NO	A	15	85	0	0	2257	2005	SPANNER	H
9	108.3	2.7	1.2	YES	A	10	40	25	25	2225	2005	SPANNER	T
9	150.9	2.6	1.1	YES	A	5	20	35	40	2228	2005	SPANNER	T
9	78.7	1.5	0.7	YES	S	40	55	5	0	2261	2005	SPANNER	H
9	105.0	3.0	1.2	YES	S	10	30	30	30	2262	2005	SPANNER	H
9	118.1	2.7	1.0	YES	S	0	80	10	10	2229	2005	SPANNER	T
9	52.0	1.5	1.0	NO	J	5	15	80	0	2026	2006	RIGHT	O
9	30.2	1.0	0.1	NO	A	0	60	40	0	2385	2007	LEFT	BD
9	60.4	1.1	0.2	NO	A	10	30	10	50	2383	2007	LEFT	BD
9	40.7	1.0	0.4	NO	A	30	40	30	0	2391	2007	CENTER	BD

9	99.7	1.8	0.4	YES	J	30	30	20	20	2398	2007	SPANNER	BD
9	29.5	1.0	0.7	YES	J	10	60	30	0	2396	2007	CENTER	BD
9	42.3	1.7	0.9	NO	J	10	80	10	0	2399	2007	CENTER	BD
9	37.1	1.2	1.0	NO	J	20	80	0	0	2384	2007	CENTER	BD
9	30.5	1.3	1.0	NO	J	5	15	80	0	2381	2007	CENTER	BD
9	52.8	1.4	1.0	NO	A	5	95	0	0	2402	2007	CENTER	BD
9	98.8	2.1	1.0	YES	A	5	15	20	60	2392	2007	RIGHT	BD
9	29.2	1.2	1.1	NO	J	5	25	70	0	2382	2007	CENTER	BD
9	28.5	1.3	1.1	NO	A	20	50	10	20	2390	2007	RIGHT	BD
9	100.7	1.9	1.2	NO	A	15	65	10	10	2405	2007	SPANNER	BD
9	32.5	1.3	1.2	NO	J	10	90	0	0	2394	2007	RIGHT	BD
9	37.1	1.3	1.3	NO	S	0	100	0	0	2400	2007	CENTER	BD
9	31.2	1.5	1.3	NO	A	5	85	10	0	2404	2007	RIGHT	BD
9	50.9	2.0	1.3	YES	A	10	10	10	70	2389	2007	RIGHT	BD
9	94.2	2.5	1.3	YES	A	5	55	20	20	2386	2007	SPANNER	BD
9	55.1	2.1	1.4	YES	A	5	15	60	20	2403	2007	RIGHT	BD
9	81.0	2.8	1.5	YES	J	5	10	20	65	2395	2007	RIGHT	BD
9	66.6	2.0	1.5	YES	A	5	5	10	80	2393	2007	RIGHT	BD
9	99.4	2.4	1.6	YES	J	15	5	30	50	2397	2007	RIGHT	BD
9	97.1	3.4	1.7	NO	A	5	85	10	0	2387	2007	SPANNER	BD
9	68.2	2.2	1.7	NO	J	5	5	70	20	2406	2007	RIGHT	BD
9	80.4	2.5	2.1	YES	S	5	10	60	25	2401	2007	RIGHT	BD
9	34.1	1.10	0.80	NO	J	20	80	0	0	2351	2008	CENTER	N
10	62.0	3.8	3.0	YES	A	10	20	40	30	2032	2001	RIGHT	O
10	43.0	2.0	2.0	NO	J	15	60	25	0	2030	2001	RIGHT	O
10	57.8	1.0	0.4	NO	A	0	5	80	15	2127	2004	LEFT	O
10	63.7	0.6	0.1	NO	A	0	0	85	15	2128	2004	LEFT	O
10	105.0	1.6	0.5	YES	S	10	5	15	70	2129	2004	LEFT	O
10	53.4	0.7	0.6	NO	J	20	80	0	0	2185	2004	RIGHT	O
10	116.0	2.2	1.1	YES	J	5	10	55	30	2184	2004	RIGHT	O
10	100.0	2.0	1.3	YES	J	5	10	10	75	2186	2004	RIGHT	O
10	31.3	1.0	0.4	NO	S	0	20	20	60	2187	2004	RIGHT	O
10	31.2	1.8	1.5	NO	A	50	50	0	0	2266	2005	CENTER	H
10	44.0	1.2	0.8	NO	A	5	10	10	75	2372	2005	LEFT	N
10	68.9	1.5	0.9	YES	S	40	60	0	0	2265	2005	LEFT	H
10	34.8	1.6	1.1	NO	A	75	25	0	0	2270	2005	CENTER	H
10	56.4	2.2	1.4	NO	A	40	60	0	0	2267	2005	RIGHT	H
10	85.6	1.5	0.7	NO	A	60	40	0	0	2407	2007	SPANNER	BD
10	29.2	1.4	1.3	NO	A	0	50	50	0	2408	2007	RIGHT	BD
10	31.5	1.40	0.90	NO	J	0	5	65	30	2240	2008	RIGHT	N
11	58.3	1.1	0.2	NO	S	5	2	5	88	2130	2004	LEFT	O
11	31.3	1.0	1.0	NO	S	100	0	0	0	2131	2004	LEFT	O
11	37.9	0.8	0.2	NO	S	30	5	35	30	2132	2004	LEFT	O
11	40.2	0.8	0.4	NO	S	50	5	45	0	2133	2004	LEFT	O
11	27.0	2.7	1.8	YES	A	10	90	0	0	2188	2004	RIGHT	O
11	36.1	2.8	2.1	YES	S	30	70	0	0	2268	2005	RIGHT	H
11	51.8	1.0	0.2	YES	A	5	20	55	20	2439	2007	LEFT	BD
11	57.1	1.0	0.3	NO	A	30	30	30	10	2438	2007	LEFT	BD

11	79.7	1.1	0.3	NO	A	60	20	10	10	2415	2007	SPANNER	BD
11	46.3	1.2	0.3	NO	A	10	10	60	20	2414	2007	RIGHT	BD
11	63.3	1.4	0.3	NO	J	5	15	70	10	2410	2007	SPANNER	BD
11	77.1	2.0	1.4	NO	J	10	20	60	10	2411	2007	RIGHT	BD
11	59.4	1.9	1.5	NO	J	20	60	20	0	2409	2007	CENTER	BD
11	76.4	3.6	2.3	YES	J	10	10	30	50	2413	2007	RIGHT	BD
11	91.2	3.4	2.3	YES	J	5	5	30	60	2412	2007	RIGHT	BD
11	25.0	1.20	1.00	NO	J	10	50	40	0	2239	2008	CENTER	N
12	157.0	1.9	0.5	NO	A	30	25	35	10	2034	2001	LEFT	O
12	75.3	1.4	0.9	NO	A	5	15	80	0	2036	2001	LEFT	O
12	30.1	1.3	1.1	YES	S	2	1	7	90	2041	2001	LEFT	O
12	67.0	1.9	1.8	NO	A	0	10	90	0	2039	2001	RIGHT	O
12	63.0	1.3	1.2	NO	A	5	15	20	60	2040	2001	RIGHT	O
12	100.0	2.8	1.6	YES	A	10	20	10	60	2038	2001	RIGHT	O
12	62.0	2.5	2.0	YES	A	5	5	10	80	2042	2001	RIGHT	O
12	38.9	1.3	0.2	NO	A	40	5	55	0	2136	2004	LEFT	O
12	31.9	1.0	0.8	NO	S	0	0	85	15	2134	2004	LEFT	O
12	66.1	1.3	0.5	NO	S	8	2	10	80	2135	2004	LEFT	O
12	56.0	1.9	1.9	NO	A	0	5	10	85	2192	2004	RIGHT	O
12	28.0	0.8	0.6	NO	A	0	0	80	20	2193	2004	RIGHT	O
12	52.0	3.6	3.1	YES	A	0	5	5	90	2190	2004	RIGHT	O
12	52.0	1.4	0.7	YES	A	0	5	5	90	2191	2004	RIGHT	O
12	85.0	2.3	1.6	YES	A	5	5	10	80	2194	2004	RIGHT	O
12	73.5	2.3	1.6	NO	S	15	35	50	0	2189	2004	RIGHT	O
12	46.3	1.0	0.5	NO	S	10	5	40	45	2269	2005	LEFT	H
12	95.1	3.0	1.3	YES	A	0	75	25	0	2273	2005	SPANNER	H
12	114.8	2.5	1.5	YES	A	5	25	30	40	2231	2005	SPANNER	T
12	85.3	1.5	0.9	YES	A	0	95	5	0	2232	2005	SPANNER	T
12	131.2	1.9	1.0	YES	A	0	0	95	5	2233	2005	SPANNER	T
12	111.6	2.7	1.2	YES	S	0	0	0	100	2272	2005	SPANNER	H
12	114.8	2.3	0.9	YES	S	0	0	40	60	2230	2005	SPANNER	T
12	28.4	1.0	0.7	NO	A	70	30	0	0	2377	2006	CENTER	N
12	47.6	1.0	0.1	YES	A	5	15	70	10	2440	2007	LEFT	BD
12	39.4	1.0	0.2	NO	A	10	10	80	0	2445	2007	LEFT	BD
12	35.8	1.0	0.3	NO	A	10	20	60	10	2443	2007	LEFT	BD
12	43.0	1.0	0.3	NO	A	40	40	20	0	2417	2007	CENTER	BD
12	97.4	1.7	0.3	NO	J	0	20	70	10	2419	2007	SPANNER	BD
12	62.3	1.0	0.4	YES	A	0	0	20	80	2447	2007	LEFT	BD
12	27.2	1.0	0.8	NO	J	10	20	70	0	2422	2007	CENTER	BD
12	94.8	1.4	0.8	YES	A	0	0	50	50	2446	2007	LEFT	BD
12	101.0	1.6	0.9	NO	A	0	10	80	10	2418	2007	SPANNER	BD
12	102.0	2.5	1.0	YES	J	5	5	70	20	2421	2007	LEFT	BD
12	66.3	1.8	1.2	YES	J	0	0	70	30	2420	2007	RIGHT	BD
12	105.0	1.4	1.2	YES	A	10	10	40	40	2442	2007	LEFT	BD
12	24.3	1.3	1.3	NO	A	40	40	20	0	2416	2007	CENTER	BD
12	51.5	2.3	1.4	YES	A	15	15	50	20	2441	2007	LEFT	BD
12	121.4	2.6	1.5	YES	A	0	5	60	35	2444	2007	LEFT	BD
12	12.2	1.0	0.8	NO	J	50	50	0	0	2150	2004	CENTER	O
12	25.0	1.00	0.70	NO	S	0	20	20	60	2238	2008	RIGHT	N

13	35.0	2.0	1.9	NO	A	0	10	70	20	2044	2001	RIGHT	O
13	26.0	0.8	0.6	NO	A	50	50	0	0	2045	2001	RIGHT	O
13	88.6	1.9	0.8	NO	A	10	25	40	25	2045	2001	RIGHT	O
13	25.0	1.9	1.0	NO	A	5	25	70	0	2046	2001	RIGHT	O
13	109.0	3.2	1.5	NO	S	0	10	90	0	2043	2001	RIGHT	O
13	55.0	0.8	0.2	NO	S	5	90	5	0	2137	2004	LEFT	O
13	42.4	0.9	0.4	NO	S	10	2	88	0	2138	2004	LEFT	O
13	60.0	0.8	0.3	NO	S	75	25	0	0	2154	2004	CENTER	O
13	32.5	0.9	0.3	NO	A	5	75	20	0	2196	2004	RIGHT	O
13	90.0	2.0	1.0	NO	A	0	5	25	70	2197	2004	RIGHT	O
13	27.0	1.6	1.3	NO	A	0	20	80	0	2198	2004	RIGHT	O
13	27.0	1.2	0.6	YES	S	0	30	30	40	2195	2004	RIGHT	O
13	34.5	2.0	1.5	NO	A	25	75	0	0	2275	2005	LEFT	H
13	35.8	1.2	0.8	NO	A	40	60	0	0	2276	2005	LEFT	H
13	82.0	2.5	1.3	YES	S	5	10	35	50	2234	2005	LEFT	T
13	34.8	1.8	1.4	NO	A	60	40	0	0	2286	2005	CENTER	H
13	63.3	1.4	1.0	NO	S	60	40	0	0	2278	2005	SPANNER	H
13	124.7	2.8	1.4	NO	S	30	70	0	0	2279	2005	SPANNER	H
13	53.2	2.7	2.0	YES	S	5	95	0	0	2274	2005	SPANNER	H
13	63.7	2.5	1.0	YES	S	30	70	0	0	2277	2005	SPANNER	H
13	54.5	1.3	0.1	NO	J	0	0	80	20	2459	2007	LEFT	BD
13	66.6	1.0	0.2	YES	A	0	0	30	70	2448	2007	LEFT	BD
13	38.7	1.0	0.3	YES	J	0	20	30	50	2456	2007	LEFT	BD
13	36.1	1.0	0.3	YES	J	30	60	10	0	2457	2007	LEFT	BD
13	88.6	1.6	0.3	YES	A	10	15	45	30	2452	2007	LEFT	BD
13	52.5	1.0	0.4	NO	J	5	5	60	30	2468	2007	LEFT	BD
13	139.4	2.4	0.4	YES	J	30	30	10	30	2460	2007	LEFT	BD
13	115.5	1.5	0.4	YES	J	25	25	25	25	2458	2007	LEFT	BD
13	63.6	1.3	0.5	YES	A	5	25	15	55	2455	2007	LEFT	BD
13	125.3	1.5	0.5	YES	A	0	0	30	70	2449	2007	LEFT	BD
13	80.1	2.0	0.5	YES	J	0	0	80	20	2425	2007	SPANNER	BD
13	71.5	2.3	0.6	NO	J	25	70	0	5	2431	2007	SPANNER	BD
13	41.7	1.0	0.6	NO	J	10	90	0	0	2423	2007	CENTER	BD
13	138.4	2.1	0.6	YES	J	60	30	5	5	2428	2007	SPANNER	BD
13	133.2	2.8	0.7	YES	J	10	10	50	30	2463	2007	LEFT	BD
13	94.5	1.3	0.7	NO	A	10	50	40	0	2451	2007	CENTER	BD
13	131.9	1.7	0.7	YES	J	30	20	40	10	2427	2007	SPANNER	BD
13	111.2	1.7	0.9	YES	J	0	20	60	20	2426	2007	SPANNER	BD
13	120.7	3.3	0.9	YES	J	30	50	10	10	2429	2007	SPANNER	BD
13	94.5	2.1	0.9	YES	A	20	10	30	40	2450	2007	LEFT	BD
13	26.9	1.1	1.0	NO	S	0	10	10	80	2464	2007	LEFT	BD
13	52.2	1.2	1.0	YES	J	0	0	20	80	2467	2007	LEFT	BD
13	105.0	2.3	1.0	YES	J	60	30	10	0	2430	2007	SPANNER	BD
13	44.0	1.9	1.1	NO	J	10	30	50	10	2424	2007	RIGHT	BD
13	44.9	1.2	1.1	NO	A	5	10	70	15	2454	2007	LEFT	BD
13	113.2	1.7	1.2	YES	J	0	0	30	70	2469	2007	LEFT	BD
13	72.5	1.9	1.5	YES	J	0	10	80	10	2462	2007	LEFT	BD
13	102.0	3.6	1.5	YES	A	10	10	40	40	2453	2007	LEFT	BD
13	66.9	2.2	1.6	YES	J	5	5	40	50	2461	2007	LEFT	BD

13	34.8	1.7	1.1	NO	A	5	20	50	25	2282	2005	CENTER	H
13	25.0	1.60	1.60	NO	A	20	80	0	0	2237	2008	CENTER	N
14	64.0	1.1	0.7	YES	A	42	43	15	0	2047	2001	LEFT	O
14	53.9	0.8	0.4	YES	A	20	5	75	0	2140	2004	LEFT	O
14	54.4	1.5	0.3	YES	A	15	70	15	0	2141	2004	LEFT	O
14	75.6	0.9	0.1	YES	S	25	5	45	25	2139	2004	LEFT	O
14	27.0	0.8	0.7	NO	A	30	70	0	0	2200	2004	RIGHT	O
14	45.0	1.4	0.6	YES	A	0	10	20	70	2199	2004	RIGHT	O
14	108.3	2.6	1.3	YES	S	20	80	0	0	2280	2005	CENTER	H
14	53.2	1.2	0.7	NO	A	0	20	40	40	2376	2006	LEFT	N
14	46.3	1.0	0.2	YES	A	0	10	60	30	2436	2007	RIGHT	BD
14	44.0	1.0	0.2	NO	A	20	30	10	40	2437	2007	RIGHT	BD
14	68.2	2.1	0.7	YES	A	0	0	80	20	2434	2007	RIGHT	BD
14	25.9	1.5	1.0	NO	A	40	60	0	0	2433	2007	CENTER	BD
14	138.1	3.2	1.3	YES	A	20	20	30	30	2465	2007	LEFT	BD
14	147.6	3.8	1.9	YES	A	0	20	40	40	2435	2007	RIGHT	BD
15	58.3	3.3	1.3	NO	A	0	0	100	0	2050	2001	LEFT	O
15	58.3	1.4	0.3	YES	A	0	95	5	0	2049	2001	LEFT	O
15	63.0	2.5	1.0	NO	S	5	10	30	55	2048	2001	RIGHT	O
15	26.0	0.8	0.6	NO	A	0	0	40	60	2142	2004	LEFT	O
15	30.8	2.7	2.6	NO	A	0	0	90	10	2143	2004	LEFT	O
15	32.8	0.9	0.8	NO	A	0	0	85	15	2144	2004	LEFT	O
15	46.0	0.8	0.3	NO	A	70	25	5	0	2145	2004	LEFT	O
15	46.9	0.9	0.6	NO	S	0	5	85	15	2146	2004	LEFT	O
15	61.0	1.1	0.4	NO	A	15	10	30	45	2201	2004	RIGHT	O
15	35.0	1.1	0.9	NO	A	0	10	20	70	2202	2004	RIGHT	O
15	54.0	0.7	0.5	NO	A	5	50	45	0	2203	2004	RIGHT	O
15	44.0	0.8	0.5	NO	A	15	10	25	50	2204	2004	RIGHT	O
15	47.6	1.1	0.3	NO	A	5	15	20	60	2207	2004	RIGHT	O
15	65.0	1.4	0.8	NO	A	0	10	80	10	2208	2004	RIGHT	O
15	53.0	3.7	2.8	YES	A	0	10	90	0	2205	2004	RIGHT	O
15	42.0	1.4	0.8	YES	A	5	95	0	0	2206	2004	RIGHT	O
15	42.0	1.3	0.7	NO	S	10	10	30	50	2209	2004	RIGHT	O
15	79.4	2.8	1.7	YES	A	0	30	60	10	2281	2005	SPANNER	H
15	61.4	1.2	1.0	NO	S	10	80	10	0	2283	2005	SPANNER	H
15	108.3	2.5	1.1	YES	S	0	80	20	0	2284	2005	SPANNER	H
16	93.1	2.2	1.3	YES	A	0	95	5	0	2051	2001	RIGHT	O
16	64.3	2.8	1.8	YES	S	48	5	47	0	2052	2001	RIGHT	O
16	34.3	1.6	1.4	NO	A	0	0	30	70	2148	2004	LEFT	O
16	77.5	0.8	0.2	YES	A	0	5	80	15	2151	2004	LEFT	O
16	33.6	0.8	0.5	NO	S	0	0	70	30	2147	2004	LEFT	O
16	66.9	1.7	1.0	NO	S	0	2	53	45	2149	2004	LEFT	O
16	34.8	2.7	1.8	NO	S	15	75	10	0	2295	2005	INFO	H
16	114.8	2.9	1.0	YES	A	20	40	30	10	2235	2005	SPANNER	T
16	147.6	3.2	1.0	YES	A	30	10	20	40	2236	2005	SPANNER	T
16	50.5	1.0	0.1	NO	A	0	0	100	0	2466	2007	LEFT	BD

17	32.0	1.2	1.0	NO	A	10	20	30	40	2053	2001	RIGHT	O
17	50.0	1.9	1.5	NO	A	0	20	50	30	2054	2001	RIGHT	O
17	51.5	2.6	1.3	NO	S	5	15	60	20	2055	2001	RIGHT	O
17	67.0	2.0	1.0	YES	S	5	30	65	0	2056	2001	RIGHT	O
17	89.1	1.2	0.8	YES	A	0	0	25	75	2155	2004	LEFT	O
17	44.0	1.3	0.2	YES	A	40	35	25	0	2158	2004	LEFT	O
17	46.6	1.4	1.0	YES	A	1	2	5	92	2159	2004	LEFT	O
17	49.6	0.9	0.1	NO	S	5	5	5	85	2152	2004	LEFT	O
17	34.0	0.8	0.4	NO	S	5	45	45	5	2156	2004	LEFT	O
17	66.5	1.2	0.3	NO	S	1	85	14	0	2157	2004	LEFT	O
17	66.0	1.5	0.4	YES	S	10	10	80	0	2210	2004	RIGHT	O
17	62.0	1.0	0.3	YES	S	50	20	30	0	2211	2004	RIGHT	O
17	29.9	1.0	0.6	NO	A	50	50	0	0	2289	2005	CENTER	H
17	53.2	2.0	0.8	YES	S	0	20	80	0	2371	2005	LEFT	N
17	34.5	2.7	1.5	NO	A	50	50	0	0	2287	2005	RIGHT	H
17	118.1	2.2	0.7	YES	A	40	60	0	0	2285	2005	SPANNER	H
17	101.7	2.8	1.2	YES	A	0	90	10	0	2288	2005	SPANNER	H
17	95.1	1.9	1.1	YES	S	10	40	30	20	2290	2005	SPANNER	H
17	37.1	0.7	0.3	NO	A	5	15	80	0	2375	2006	LEFT	N
18	41.0	2.3	1.4	NO	S	0	20	80	0	2057	2001	RIGHT	O
18	134.3	2.2	0.1	NO	A	5	5	10	80	2161	2004	LEFT	O
18	35.4	0.8	0.7	YES	A	30	10	40	20	2162	2004	LEFT	O
18	74.1	0.8	0.1	YES	S	2	3	5	90	2160	2004	LEFT	O
18	34.0	0.8	0.3	NO	S	0	30	40	30	2212	2004	RIGHT	O
18	45.5	2.5	1.2	NO	S	10	40	50	0	2213	2004	RIGHT	O
18	59.4	1.9	0.6	YES	A	40	60	0	0	2292	2005	CENTER	H
18	31.2	2.3	1.6	NO	S	10	90	0	0	2296	2005	CENTER	H
18	101.7	1.7	1.0	YES	A	20	70	10	0	2291	2005	SPANNER	H
18	91.9	2.3	1.2	YES	S	0	20	60	20	2293	2005	SPANNER	H
18	105.0	2.6	1.3	YES	S	20	40	20	20	2294	2005	SPANNER	H