

**2011 VERMONT
AGENCY OF AGRICULTURE, FOOD AND MARKETS
NATIONAL EMERALD ASH BORER PURPLE TRAP SURVEY
FINAL REPORT
11-8250-0646-CA**



Jon Turmel, VT SPRO/ROAR

Mark Michaelis, VT/NH SPHD

A. Survey Methodology-

The objective of this survey was to determine the presence or absence of *Agrilus planipennis* in Vermont.

Due to proximity to the EAB infestation in New York and Quebec, the EAB program science panel recommended that Vermont be considered a very ‘high-risk-state’ for the 2011 national survey. 13 of the 14 Vermont counties (Grand Isle, Franklin, Chittenden, Addison, Orleans, Washington, Lamoille, Caledonia, Rutland, Windsor, Windham, Bennington and Orange) fell within the proposed “grid” survey and traps were set at a density of 1 trap per 2 square miles to the best extent possible. The Vermont Agency of Agriculture was responsible for two and a half counties in the state (Grand Isle, Chittenden and half of Washington) working with USDA-APHIS-PPQ for the setting of traps at the proposed grid survey density. Surveying for EAB in Vermont complimented adjacent states’ survey efforts and provided a contiguous surveyed region.

Two hundred and twenty EAB traps were set in 3 counties in Vermont by The Vermont Agency of Agriculture during the months of May and June, 2011 and taken down in September and October, 2011 (Map 1, Table 1 & 2). Traps were each baited with a manuka oil lure and a Z-3-Hexanol lure provided by USDA-APHIS-PPQ. Each trap was visited once during late July-early August for maintenance and screening purposes and then taken down in September and October.

B. Rationale underlying Survey-

The emerald ash borer (EAB), *Agrilus planipennis* Fairmaire, is a non-native invasive pest of ash (*Fraxinus* spp.) trees in the United States. It was first found in North America in the summer of 2002 in southeast Michigan and an adjacent area in Ontario, Canada. It is thought to have been introduced seven to ten years prior to its detection. Emerald ash borer is also established in Windsor, Ontario, was found in Ohio in 2003, northern Indiana in 2004, northern Illinois and Maryland in 2006, western Pennsylvania and West Virginia in 2007, Wisconsin, Missouri and Virginia in summer 2008, Minnesota, New York, Kentucky in the spring of 2009, Iowa in spring of 2010, and Tennessee in the summer of 2010. USDA Animal and Plant Health Inspection Service (APHIS) and the USDA Forest Service are working with state cooperators to detect, contain, and manage the pest.

EAB poses a significant threat to North America’s ash resources and has no effective natural enemies in North America. Control tactics are extremely limited with tree removal being the principal option. If left unchecked, the pest will continue to infest and destroy native and landscape ash trees, resulting in the loss of millions of dollars to the forest products and nursery industries. Since its discovery in North America, Emerald Ash Borer has killed millions of ash trees in Michigan, Ohio and Indiana; caused regulatory agencies to enforce quarantines (Michigan, Illinois, Indiana, Iowa,

Maryland, Minnesota, Missouri, Ohio, New York, Ontario, Pennsylvania, Tennessee, Virginia, West Virginia, Wisconsin, and Kentucky) and fines to prevent potentially infested ash trees, logs or hardwood firewood from moving out of areas where EAB occurs; cost municipalities, property owners, nursery operators and forest products industries tens of millions of dollars.

In the eastern United States, nursery, landscaping, timber, recreation, and tourism industries are economically important. Nearly 114 million board feet of ash saw timber with a value of \$25.1 billion is grown in the eastern United States. There are over 100 million ash trees in Vermont and they are well-distributed within the state. Most of this is white ash, with a smaller component of black and green ash. Ash is an important component of our hardwood forests. White, black, and green ash are widespread in the forests of the eastern United States and Canada, comprising over 7 percent of hardwood species and 5.5 percent of all species. In Vermont, ash represents over 6.3 percent of the hardwood growing stock trees (5.0 inches in diameter and up) and 3.4 percent of all species. The wood is used for a variety of applications including tool handles, baseball bats, furniture, cabinetry, solid wood products, packing materials, pulp, and paper.

Ash is an extremely popular landscape tree because of its tolerance to poor site conditions. Ash species are currently the most commonly planted tree in shopping centers, industrial parks, and urban developments. It was planted widely in many states to replace elms lost to Dutch elm disease. Common in parks, other public spaces, and neighborhoods across the United States, ash is a prolific seeder and readily establishes along fence rows, right-of-ways, and riparian areas. The spread of EAB could have an enormous impact on the U.S. nursery industry, municipal governments, individual homeowners and the natural ecosystem. Preliminary findings by USDA estimate that the potential impact of the emerald ash borer to the national urban landscape would be a loss of 0.5 to 2 percent of the total leaf area (30-90 million trees) with a value of \$20 to \$60 billion. As many as 300 million landscape ash trees have been planted in Michigan alone, with approximately 28 million in the infested area. The estimated cost of replacing ash trees in nine selected U.S. cities would be \$565 million. Nationwide, the nursery industry produces an estimated 2 million ash trees each year. With median approximate values ranging from \$50 to \$70 per tree, the ash nursery stock crop is worth between \$100 and \$140 million annually.

State agencies within Vermont have adopted a proactive program of Early Detection and Rapid Response. The Vermont Agency of Agriculture continued its early detection efforts for emerald ash borer by participating in the 2011 national EAB survey. The national survey's objective was to determine whether additional pockets of infestation may exist undetected outside known infested areas and to create a more accurate distribution map of EAB in North America.

C. Survey Dates-

Traps were set in May-June, 2011 and were removed during the months of September and October, 2011.

D. Taxonomic services-

All suspect specimens were brought back to the Agency of Laboratory and analyzed as potential targets. Per the Vermont CAPS agreement, all suspect samples were to be sent to Dr. James Zablotny of USDA-APHIS-PPQ in Michigan. While buprestids and several *Agrilus sp.* were collected from traps during the 2011 field season, no suspect *Agrilus planipennis* were identified.

E. Benefits and results of survey-

State agencies within Vermont have adopted a proactive program of Early Detection and Rapid Response. The national survey aimed to determine whether additional pockets of infestation may exist undetected outside known infested areas and to create a more accurate distribution map of EAB in North America. Surveying for this pest in Vermont complimented adjacent states' survey efforts and provided a contiguous surveyed region. Vigorous trapping efforts during the 2011 field season in Vermont did not indicate that Emerald Ash Borer is present in the State yet.

The recent positive find in Quebec, Canada places the proximity of EAB right at Vermont's doorstep. The current distance from Vermont's border to the nearest EAB infestation site is less than 50 miles. By actively surveying for this pest and determining that EAB is not yet known to occur in the state allows the state to focus on further developing an emergency action plan should EAB be detected in the future and to plan for future detection surveys. The baseline negative data gathered from this survey allows the State to aim for an early detection in the future, should the pest arrive.

The survey also encouraged continued inter-agency communication and cooperation between the Vermont Agency of Agriculture, Food and Markets the Vermont Department of Natural Resources, Division of Forests and Parks and USDA-APHIS-PPQ. Educational out-reach and direct access to State parks are two direct results from this survey. Vermont Forests and Parks were willing to work with the Agency of Agriculture in distributing educational material and also integrated EAB education into their Field Naturalist programs. The high-profile purple prism traps encouraged the public to find out more about the survey and the cooperation and enthusiasm demonstrated by Vermont Park staff enhanced the survey's public outreach aspect considerably.

Media coverage was also a benefit obtained through this survey. Numerous local news agencies and newspaper's covered the story regarding the EAB survey and provided educational access to a larger audience throughout Vermont.

- F. **Compare actual accomplishments to objectives established for the period. When the output of the project can be quantified, a computation of cost per unit of output is required when useful.***

All objectives stated in the 2011 National Emerald Ash Borer survey work plan were met.

- G. **If appropriate, explain why objectives were not met**

All objectives were met.

- H. **Where appropriate, explain any cost overruns-**

There were no cost overruns.

- I. **NAPIS database submissions-**

All data was entered into IPHIS and NAPIS.

Map 1-Map of all Vermont EAB trap locations set in 2011

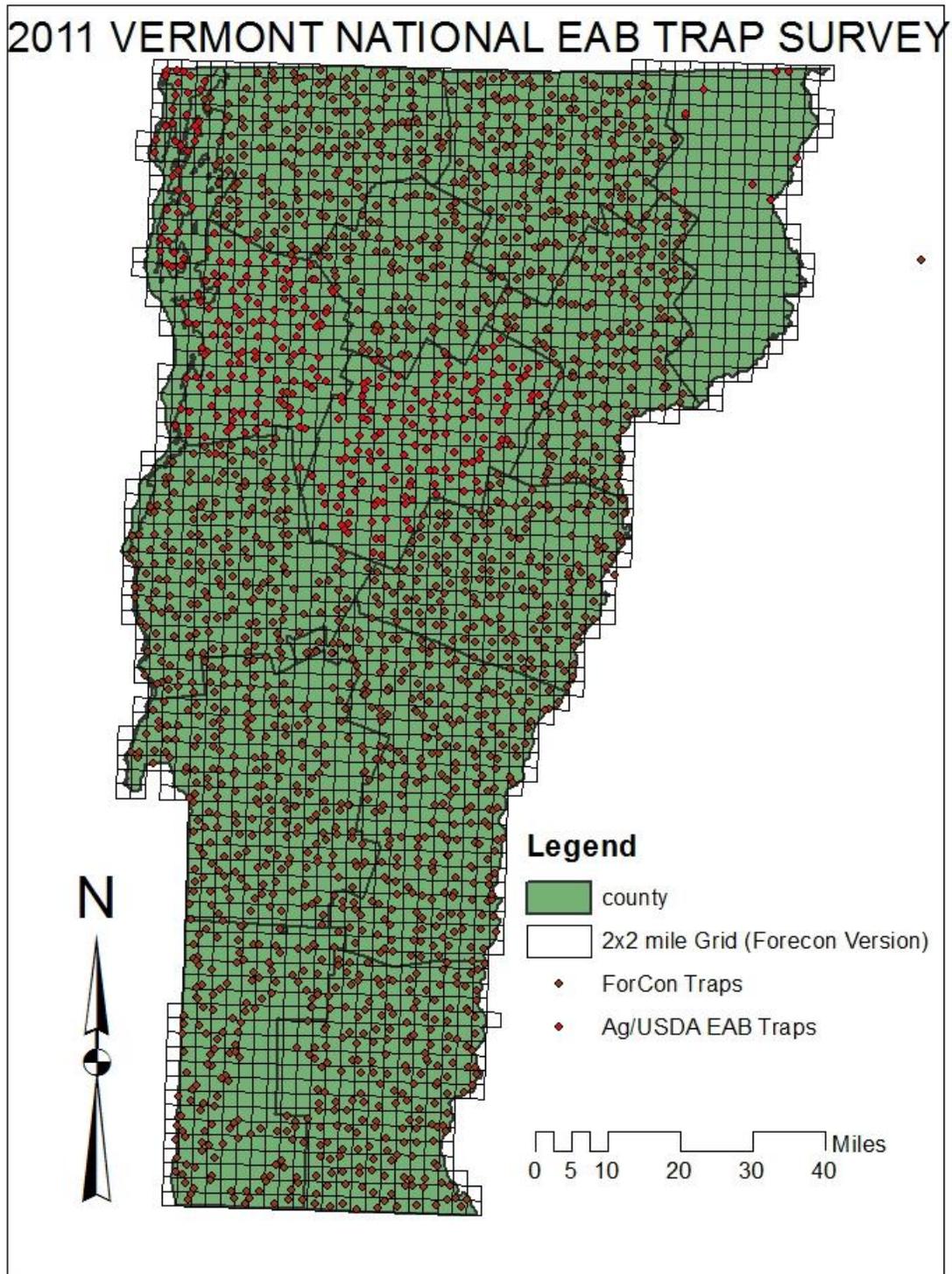


Table 2- Summary of VT Agency of Agriculture trap data for the 2011 Vermont Emerald Ash Borer survey

County	Reporting Agency	# Traps in Workplan	# Traps Actual
Chittenden	State	126	126
Grand Isle	State	40	40
Washington (1/2 of county)	State	54	54
	Total # State Traps	220	220

Table 3- Individual Trap info for VT Agency of Agriculture 2011 EAB traps

	RecordName	DBH	County	Latitude	Longitude
1	CH-001	6-10	Chittenden	44.45829	-72.99838
2	CH-002	6-10	Chittenden	44.47569	-73.01917
3	CH-003	6-10	Chittenden	44.50673	-73.02032
4	CH-004	6-10	Chittenden	44.51425	73.0583741
5	CH-005	6-10	Chittenden	44.48034	73.0691639
6	CH-006	11-15	Chittenden	44.49434	-73.119516
7	CH-007	6-10	Chittenden	44.50277	73.1529253
8	CH-008	6-10	Chittenden	44.52359	73.1189975
9	CH-009	6-10	Chittenden	44.53929	73.1312869
10	CH-010	6-10	Chittenden	44.57082	73.1413399
11	CH-011	11-15	Chittenden	44.59898	73.1639637
12	CH-012	6-10	Chittenden	44.60497	73.1894415
13	CH-013	11-15	Chittenden	44.58456	-73.181462
14	CH-014	6-10	Chittenden	44.53577	73.2058104
15	CH-015	6-10	Chittenden	44.48338	73.1597577
16	CH-016	11-15	Chittenden	44.46243	-73.154462
17	CH-017	11-15	Chittenden	44.44384	-73.121201
18	CH-018	11-15	Chittenden	44.45031	73.0750195
19	CH-019	6-10	Chittenden	44.44974	73.2087488

20	CH-020	6-10	Chittenden	44.45593	73.2227888
21	CH-021	6-10	Chittenden	44.48132	73.1924284
22	CH-022	11-15	Chittenden	44.51007	73.1797121
23	CH-023	11-15	Chittenden	44.55045	73.2297291
24	CH-024	11-15	Chittenden	44.56385	73.2385501
25	CH-025	11-15	Chittenden	44.54435	73.2754499
26	CH-026	11-15	Chittenden	44.50632	73.2647202
27	CH-027	6-10	Chittenden	44.50491	73.2410897
28	CH-028	6-10	Chittenden	44.53354	73.0241173
29	CH-029	11-15	Chittenden	44.57529	72.9961937
30	CH-030	11-15	Chittenden	44.58582	72.9807485
31	CH-031	11-15	Chittenden	44.59388	72.9983437
32	CH-032	6-10	Chittenden	44.63	72.9694179
33	CH-033	6-10	Chittenden	44.61377	72.9865172
34	CH-034	11-15	Chittenden	44.62917	73.0192154
35	CH-035	6-10	Chittenden	44.63939	73.0550782
36	CH-036	6-10	Chittenden	44.60769	73.0499003
37	CH-037	6-10	Chittenden	44.58022	73.0568411
38	CH-038	6-10	Chittenden	44.54818	73.0709315
39	CH-039	6-10	Chittenden	44.58597	73.1172144
40	CH-040	11-15	Chittenden	44.55489	73.0965594
41	CH-041	6-10	Chittenden	44.60036	73.1003917
42	CH-042	6-10	Chittenden	44.62663	-73.098949
43	CH-043	6-10	Chittenden	44.67108	73.0988941
44	CH-044	6-10	Chittenden	44.66401	-73.153424
45	CH-045	6-10	Chittenden	44.62859	-73.143473
46	CH-046	6-10	Chittenden	44.6314	73.1746238
47	CH-047	6-10	Chittenden	44.65213	73.2059145

48	CH-048	6-10	Chittenden	44.68454	73.1909736
49	CH-049	6-10	Chittenden	44.59187	73.2156274
50	CH-050	6-10	Chittenden	44.49921	72.9540427
51	CH-051	6-10	Chittenden	44.54055	72.9384563
52	CH-052	11-15	Chittenden	44.57153	72.9412243
53	CH-053	11-15	Chittenden	44.59607	72.9188781
54	CH-054	6-10	Chittenden	44.59508	72.9118475
55	CH-055	6-10	Chittenden	44.62318	72.9199986
56	CH-056	11-15	Chittenden	44.53742	72.8732195
57	CH-057	6-10	Chittenden	44.5757	-72.863404
58	CH-058	6-10	Chittenden	44.56973	72.8577428
59	CH-059	6-10	Chittenden	44.52773	72.8780801
60	CH-060	6-10	Chittenden	44.55381	72.9676257
61	CH-061	11-15	Chittenden	44.52755	72.9699932
62	CH-062	6-10	Chittenden	44.50895	-73.078756
63	CH-063	6-10	Chittenden	44.45015	73.1107077
64	CH-064	6-10	Chittenden	44.43627	73.0777099
65	CH-065	16-20	Chittenden	44.39086	-72.96616
66	CH-066	11-15	Chittenden	44.40039	-73.10536
67	CH-067	11-15	Chittenden	44.36898	-72.99962
68	CH-068	11-15	Chittenden	44.39499	-73.01411
69	CH-069	21+	Chittenden	44.34650	-73.06597
70	CH-070	6-10	Chittenden	44.35137	-73.00716
71	CH-071	16-20	Chittenden	44.40858	-73.05626
72	CH-072	6-10	Chittenden	44.37158	-73.06510
73	CH-073	11-15	Chittenden	44.43820	-73.07335
74	CH-074	11-15	Chittenden	44.42699	-73.11874
75	CH-075	6-10	Chittenden	44.32918	-73.11130
76	Ch-076	6-10	Chittenden	44.32916	-73.13248
77	CH-077	1-5	Chittenden	44.50011	-72.90695
78	CH-078	1-5	Chittenden	44.49993	-72.90661
79	CH-080	1-5	Chittenden	44.21967	-72.94859
80	CH-081	6-10	Chittenden	44.40280	-73.19888
81	CH-082	16-20	Chittenden	44.37848	-73.22740

82	CH-083	6-10	Chittenden	44.39487	-73.26529
83	CH-085	11-15	Chittenden	44.36729	-72.96923
84	CH-086	11-15	Chittenden	44.38743	-72.93373
85	CH-087	1-5	Chittenden	44.41796	-72.9153
86	CH-088	6-10	Chittenden	44.43829	-72.89567
87	CH-089	6-10	Chittenden	44.39923	-72.90237
88	CH-090	6-10	Chittenden	44.39303	-72.87643
89	CH-091	6-10	Chittenden	44.36206	-72.83342
90	Ch-092	6-10	Chittenden	44.37734	-72.91632
91	CH-093	11-15	Chittenden	44.29923	-72.94872
92	CH-094	16-20	Chittenden	44.33135	-72.94612
93	CH-095	11-15	Chittenden	44.29622	-72.93465
94	CH-096	6-10	Chittenden	44.44414	-72.96606
95	CH-097	6-10	Chittenden	44.45326	-72.94303
96	CH-098	11-15	Chittenden	44.45237	-72.94298
97	CH-099	6-10	Chittenden	44.48099	-72.96
98	CH-100	6-10	Chittenden	44.52242	-72.91308
99	CH-101	6-10	Chittenden	44.5092	-72.89326
100	CH-102	11-15	Chittenden	44.50258	-72.89088
101	CH-103	11-15	Chittenden	44.40149	-73.1408
102	CH-104	6-10	Chittenden	44.37275	-73.15129
103	CH-105	1-5	Chittenden	44.44252	-73.21478
104	CH-106	6-10	Chittenden	44.42825	-73.14535
105	CH-107	6-10	Chittenden	44.37176	-73.18017
106	CH-108	6-10	Chittenden	44.39985	-73.23743
107	CH-109	6-10	Chittenden	44.32104	-73.07304
108	CH-110	11-15	Chittenden	44.28921	-73.1505
109	CH-111	11-15	Chittenden	44.29234	-73.07157
110	CH-112	11-15	Chittenden	44.32529	-73.10942
111	CH-113	11-15	Chittenden	44.28802	-73.10062
112	CH-114	16-20	Chittenden	44.30879	-73.04272
113	CH-115	11-15	Chittenden	44.33829	-72.97957
114	CH-116	6-10	Chittenden	44.32063	-72.97749
115	CH-117	6-10	Chittenden	44.31252	-73.13642
116	CH-118	6-10	Chittenden	44.29822	-73.14156
117	CH-119	16-20	Chittenden	44.30146	-73.29528
118	CH-120	6-10	Chittenden	44.32083	-73.18076
119	CH-121	21+	Chittenden	44.32980	-73.25561
120	CH-122	11-15	Chittenden	44.33373	-73.28146
121	CH-123	16-20	Chittenden	44.28347	-73.26255
122	CH-124	16-20	Chittenden	44.29528	-73.25636

123	Ch-125	6-10	Chittenden	44.24604	-73.18111
124	CH-126	1-5	Chittenden	44.27796	-73.21533
125	CH-127	11-15	Chittenden	44.43458	-73.03605
126	CH-128	11-15	Chittenden	44.34013	-73.19383
127	GI-01	6-10	Grand Isle	44.63555	-73.27803
128	GI-02	16-20	Grand Isle	44.62035	-73.282853
129	GI-03	6-10	Grand Isle	44.64788	-73.342748
130	GI-04	20+	Grand Isle	44.618	-73.307238
131	GI-05	6-10	Grand Isle	44.64524	-73.305862
132	GI-06	11-15	Grand Isle	44.66797	-73.320514
133	GI-07	11-15	Grand Isle	44.69512	-73.330786
134	GI-08	16-20	Grand Isle	44.67381	-73.33878
135	GI-09	6-10	Grand Isle	44.68707	-73.291772
136	GI-10	6-10	Grand Isle	44.7258	-73.291911
137	GI-11	6-10	Grand Isle	44.7317	-73.324575
138	GI-12	20+	Grand Isle	44.7552	-73.272367
139	GI-13	16-20	Grand Isle	44.77159	-73.294983
140	GI-14	11-15	Grand Isle	44.79824	-73.31111
141	GI-15	6-10	Grand Isle	44.80974	-73.296167
142	GI-16	20+	Grand Isle	44.86976	-73.25065
143	GI-17	16-20	Grand Isle	44.90854	-73.23662
144	GI-18	16-20	Grand Isle	44.89983	-73.250053
145	GI-19	6-10	Grand Isle	44.88896	-73.242525
146	GI-20	6-10	Grand Isle	44.86905	-73.302395
147	GI-21	6-10	Grand Isle	44.90452	-73.313116
148	GI-22	6-10	Grand Isle	44.90011	-73.332759
149	GI-23	6-10	Grand Isle	44.87141	-73.358721
150	GI-24	11-15	Grand Isle	44.84484	-73.36182
151	GI-25	6-10	Grand Isle	44.9604	-73.30553
152	GI-26	6-10	Grand Isle	44.93412	-73.311868
153	GI-27	6-10	Grand Isle	44.92077	-73.273988
154	GI-28	6-10	Grand Isle	44.96771	-73.269125
155	GI-29	6-10	Grand Isle	44.97258	-73.232812
156	GI-30	20+	Grand Isle	44.98866	-73.224582
157	GI-31	6-10	Grand Isle	45.00018	-73.261933
158	GI-32	15-20	Grand Isle	44.98612	-73.295975
159	GI-33	6-10	Grand Isle	44.99871	-73.331588
160	GI-34	6-10	Grand Isle	45.01088	-73.330076
161	GI-35	6-10	Grand Isle	45.01146	-73.30057
162	GI-36	6-10	Grand Isle	45.00933	-73.280405
163	GI-37	6-10	Grand Isle	44.86124	-73.288028

164	GI-38	6-10	Grand Isle	44.84833	-73.268303
165	GI-39	6-10	Grand Isle	44.73845	-73.255261
166	GI-40	6-10	Grand Isle	44.62229	-73.322601
167	WA-001	21+	Washington	44.33408	-72.75446
168	WA-002	6-10	Washington	44.25682	-72.59921
169	WA-003	16-20	Washington	44.19589	-72.68536
170	WA-004	11-15	Washington	44.17752	-72.71618
171	WA-005	6-10	Washington	44.14672	-72.88054
172	WA-006	6-10	Washington	44.17167	-72.88899
173	WA-007	21+	Washington	44.18533	-72.83475
174	WA-008	16-20	Washington	44.20635	-72.80483
175	WA-009	6-10	Washington	44.23397	-72.83891
176	WA-010	6-10	Washington	44.23878	-72.82328
177	WA-011	6-10	Washington	44.23301	-72.8006
178	WA-012	11-15	Washington	44.26932	-72.81963
179	WA-013	1-5	Washington	44.2847	-72.78207
180	WA-014	6-10	Washington	44.25156	-72.78550
181	WA-015	6-10	Washington	44.32014	-72.77795
182	WA-016	6-10	Washington	44.31497	-72.76192
183	WA-017	21+	Washington	44.35127	-72.83121
184	WA-018	11-15	Washington	44.31578	-72.84114
185	WA-020	6-10	Washington	44.16771	-72.57024
186	WA-021	21+	Washington	44.14934	-72.71904
187	WA-022	6-10	Washington	44.15230	-72.73200
188	WA-023	6-10	Washington	44.14455	-72.73929
189	WA-024	11-15	Washington	44.11126	-72.74766
190	WA-025	6-10	Washington	44.11697	-72.70841
191	WA-026	11-15	Washington	44.07802	-72.73813
192	WA-027	11-15	Washington	44.07872	-72.72115
193	WA-028	6-10	Washington	44.09822	-72.64484
194	WA-029	6-10	Washington	44.20281	-72.91633
195	WA-030	1-5	Washington	44.17909	-72.88707
196	WA-031	1-5	Washington	44.31596	-72.70491
197	WA-032	6-10	Washington	44.34422	-72.77378
198	WA-033	6-10	Washington	44.19064	-72.63926
199	WA-034	11-15	Washington	44.16106	-72.65597
200	WA-035	11-15	Washington	44.11273	-72.65177
201	WA-036	6-10	Washington	44.15560	-72.63737
202	WA-037	6-10	Washington	44.14865	-72.65655
203	WA-038	6-10	Washington	44.18351	-72.64437
204	WA-039	6-10	Washington	44.18737	-72.57586

205	WA-040	1-5	Washington	44.21314	-72.58976
206	WA-053	6-10	Washington	44.16447	-72.83290
207	WA-054	6-10	Washington	44.14122	-72.84435
208	WA-055	11-15	Washington	44.12955	-72.81027
209	WA-056	6-10	Washington	44.10743	-72.81262
210	WA-057	21+	Washington	44.09571	-72.82665
211	WA-058	16-20	Washington	44.10499	-72.83327
212	WA-059	16-20	Washington	44.10236	-72.88276
213	WA-060	6-10	Washington	44.39296	-72.76218
214	WA-091	6-10	Washington	44.19692	-72.53266
215	WA11-064	6-10	Washington	44.17144	-72.79609
216	WA11-065	6-10	Washington	44.19257	-72.77501
217	WA11-066	11-15	Washington	44.21708	-72.64549
218	WA11-067	6-10	Washington	44.08761	-72.81197
219	WA11-068	11-15	Washington	44.04855	-72.74315
220	WA11-069	11-15	Washington	44.04283	-72.71949