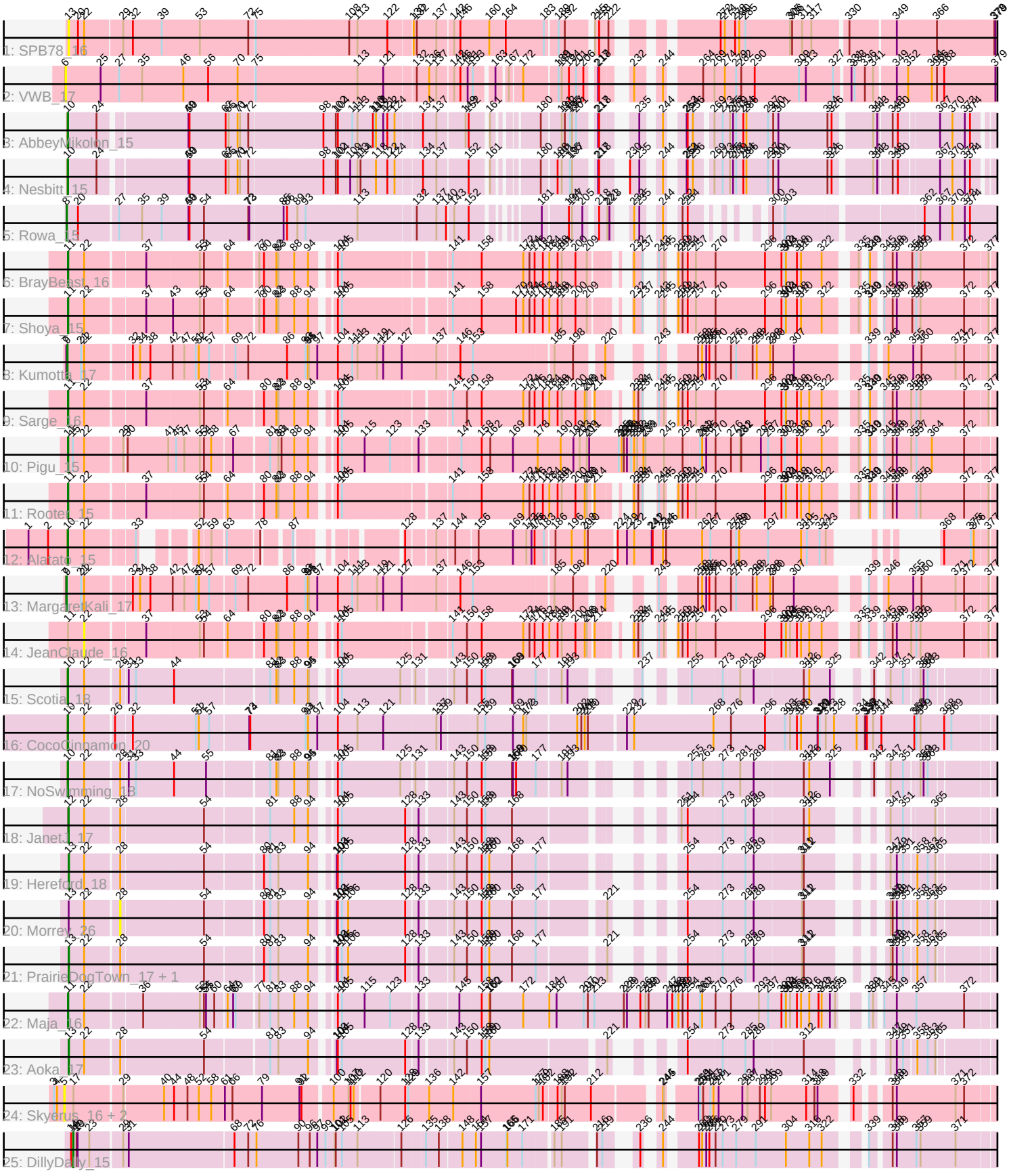
Zoomed Pham 347911



Note: Tracks are now grouped by subcluster and scaled. Switching in subcluster is indicated by changes in track color. Track scale is now set by default to display the region 30 bp upstream of start 1 to 30 bp downstream of the last possible start. If this default region is judged to be packed too tightly with annotated starts, the track will be further scaled to only show that region of the ORF with annotated starts. This action will be indicated by adding "Zoomed" to the title. For starts, yellow indicates the location of called starts comprised solely of Glimmer/GeneMark auto-annotations, green indicates the location of called starts with at least 1 manual gene annotation.

Pham 347911 Report

This analysis was run 11/14/26 on database version 672.

WARNING: Pham size does not match number of genes in report. Either unphamerated genes have been added (by you) or starterator has removed genes due to invalid start codon.

Pham number 347911 has 28 members, 7 are drafts.

Phages represented in each track:
- Track 1 : SPB78_16
- Track 2 : VWB_17
- Track 3 : AbbeyMikolon_15
- Track 4 : Nesbitt_15
- Track 5 : Rowa_15
- Track 6 : BrayBeast_16
- Track 7 : Shoya_15
- Track 8 : Kumotta_17
- Track 9 : Sarge_16
- Track 10 : Pigu_15
- Track 11 : Rooter_15
- Track 12 : Alatato_15
- Track 13 : MargaretKali_17
- Track 14 : JeanClaude_16
- Track 15 : Scotia_18
- Track 16 : CocoCinnamon_20
- Track 17 : NoSwimming_18
- Track 18 : JanetJ_17
- Track 19 : Hereford_18
- Track 20 : Morrey_26
- Track 21 : PrairieDogTown_17, EvenBluerMoon_17
- Track 22 : Maja_16
- Track 23 : Aoka_17
- Track 24 : Skyerus_16, Neroxid_16, Raya_16
- Track 25 : DillyDally_15

Summary of Final Annotations (See graph section above for start numbers):

The start number called the most often in the published annotations is 10, it was called in 6 of the 21 non-draft genes in the pham.

Genes that call this "Most Annotated" start:
• AbbeyMikolon_15, Alatato_15, CocoCinnamon_20, Nesbitt_15, NoSwimming_18, Scotia_18,

Genes that have the "Most Annotated" start but do not call it:
•

Genes that do not have the "Most Annotated" start:
• Aoka_17, BrayBeast_16, DillyDally_15, EvenBluerMoon_17, Hereford_18, JanetJ_17, JeanClaude_16, Kumotta_17, Maja_16, MargaretKali_17, Morrey_26, Neroxid_16, Pigu_15, PrairieDogTown_17, Raya_16, Rooter_15, Rowa_15, SPB78_16, Sarge_16, Shoya_15, Skyerus_16, VWB_17,

Summary by start number:

Start 5:
• Found in 3 of 28 (10.7%) of genes in pham
• No Manual Annotations of this start.
• Called 100.0% of time when present
• Phage (with cluster) where this start called: Neroxid_16 (FQ2), Raya_16 (FQ2), Skyerus_16 (FQ2),

Start 6:
• Found in 1 of 28 (3.6%) of genes in pham
• No Manual Annotations of this start.
• Called 100.0% of time when present
• Phage (with cluster) where this start called: VWB_17 (BA),

Start 7:
• Found in 2 of 28 (7.1%) of genes in pham
• Manual Annotations of this start: 1 of 21
• Called 50.0% of time when present
• Phage (with cluster) where this start called: MargaretKali_17 (FB),

Start 8:
• Found in 1 of 28 (3.6%) of genes in pham
• Manual Annotations of this start: 1 of 21
• Called 100.0% of time when present
• Phage (with cluster) where this start called: Rowa_15 (BL),

Start 9:
• Found in 2 of 28 (7.1%) of genes in pham
• Manual Annotations of this start: 1 of 21
• Called 50.0% of time when present
• Phage (with cluster) where this start called: Kumotta_17 (FB),

Start 10:
• Found in 6 of 28 (21.4%) of genes in pham
• Manual Annotations of this start: 6 of 21
• Called 100.0% of time when present
• Phage (with cluster) where this start called: AbbeyMikolon_15 (BL), Alatato_15 (FB), CocoCinnamon_20 (FO), Nesbitt_15 (BL), NoSwimming_18 (FO), Scotia_18 (FO),

Start 11:
• Found in 7 of 28 (25.0%) of genes in pham
• Manual Annotations of this start: 6 of 21
• Called 85.7% of time when present
• Phage (with cluster) where this start called: BrayBeast_16 (FB), Maja_16 (FO), Pigu_15 (FB), Rooter_15 (FB), Sarge_16 (FB), Shoya_15 (FB),

Start 12:
• Found in 1 of 28 (3.6%) of genes in pham
• Manual Annotations of this start: 1 of 21
• Called 100.0% of time when present
• Phage (with cluster) where this start called: JanetJ_17 (FO),

Start 13:
• Found in 6 of 28 (21.4%) of genes in pham
• Manual Annotations of this start: 4 of 21
• Called 83.3% of time when present
• Phage (with cluster) where this start called: Aoka_17 (FO), EvenBluerMoon_17 (FO), Hereford_18 (FO), PrairieDogTown_17 (FO), SPB78_16 (BA),

Start 16:
• Found in 1 of 28 (3.6%) of genes in pham
• Manual Annotations of this start: 1 of 21
• Called 100.0% of time when present
• Phage (with cluster) where this start called: DillyDally_15 (singleton),

Start 22:
• Found in 20 of 28 (71.4%) of genes in pham
• No Manual Annotations of this start.
• Called 5.0% of time when present
• Phage (with cluster) where this start called: JeanClaude_16 (FB),

Start 28:
• Found in 8 of 28 (28.6%) of genes in pham
• No Manual Annotations of this start.
• Called 12.5% of time when present
• Phage (with cluster) where this start called: Morrey_26 (FO),

Summary by clusters:

There are 6 clusters represented in this pham: singleton, BA, BL, FB, FQ2, FO,

Info for manual annotations of cluster BL:
•Start number 8 was manually annotated 1 time for cluster BL.
•Start number 10 was manually annotated 2 times for cluster BL.

Info for manual annotations of cluster FB:
•Start number 7 was manually annotated 1 time for cluster FB.
•Start number 9 was manually annotated 1 time for cluster FB.
•Start number 10 was manually annotated 1 time for cluster FB.
•Start number 11 was manually annotated 5 times for cluster FB.

Info for manual annotations of cluster FO:
•Start number 10 was manually annotated 3 times for cluster FO.
•Start number 11 was manually annotated 1 time for cluster FO.
•Start number 12 was manually annotated 1 time for cluster FO.
•Start number 13 was manually annotated 4 times for cluster FO.

Gene Information:

Gene: AbbeyMikolon_15 Start: 9493, Stop: 12630, Start Num: 10
Candidate Starts for AbbeyMikolon_15:
(Start: 10 @9493 has 6 MA's), (24, 9577), (49, 9805), (50, 9808), (62, 9913), (65, 9922), (70, 9946), (71, 9952), (72, 9976), (98, 10183), (102, 10219), (104, 10225), (111, 10264), (113, 10279), (116, 10324), (117, 10330), (118, 10333), (121, 10354), (122, 10366), (124, 10387), (134, 10456), (137, 10495), (149, 10567), (152, 10576), (161, 10615), (180, 10714), (191, 10765), (192, 10774), (195, 10789), (197, 10795), (201, 10807), (217, 10849), (218, 10852), (235, 10915), (244, 10951), (253, 10984), (254, 10987), (256, 11002), (269, 11044), (273, 11068), (275, 11089), (277, 11098), (279, 11107), (284, 11128), (286, 11137), (297, 11197), (300, 11209), (301, 11224), (324, 11356), (326, 11368), (341, 11464), (343, 11476), (348, 11512), (350, 11524), (367, 11623), (370, 11659), (373, 11695), (374, 11710), (382, 11791), (389, 11824), (422, 12088), (426, 12112), (438, 12184), (440, 12208), (451, 12295), (459, 12391), (463, 12439), (477, 12529), (482, 12559), (486, 12598),

Gene: Alatato_15 Start: 9384, Stop: 12482, Start Num: 10
Candidate Starts for Alatato_15:
(1, 9270), (2, 9327), (Start: 10 @9384 has 6 MA's), (22, 9429), (33, 9552), (52, 9639), (59, 9663), (63, 9696), (78, 9771), (87, 9831), (128, 10026), (137, 10098), (144, 10140), (156, 10191), (169, 10290), (173, 10329), (175, 10344), (176, 10353), (183, 10380), (186, 10404), (196, 10449), (208, 10485), (210, 10494), (224, 10566), (229, 10593), (232, 10614), (241, 10665), (242, 10668), (244, 10698), (246, 10707), (262, 10809), (267, 10833), (276, 10887), (279, 10899), (280, 10908), (297, 10989), (310, 11079), (315, 11094), (321, 11130), (323, 11148), (368, 11217), (375, 11289), (376, 11298), (377, 11334), (383, 11388), (384, 11397), (391, 11436), (398, 11481), (402, 11553), (404, 11571), (408, 11616), (417, 11661), (433, 11772), (445, 11883), (450, 11901), (457, 11973), (462, 12033), (466, 12084), (468, 12114), (470, 12123), (492, 12243), (494, 12264), (517, 12450), (519, 12468), (520, 12471),

Gene: Aoka_17 Start: 10956, Stop: 14201, Start Num: 13
Candidate Starts for Aoka_17:
(Start: 13 @10956 has 4 MA's), (22, 11001), (28, 11094), (54, 11316), (81, 11478), (83, 11502), (94, 11583), (103, 11625), (104, 11628), (105, 11637), (128, 11808), (133, 11838), (143, 11919), (150, 11955), (158, 11991), (159, 12000), (160, 12012), (221, 12306), (254, 12396), (273, 12474), (285, 12528), (289, 12552), (312, 12681), (347, 12813), (349, 12828), (351, 12846), (358, 12870), (363, 12900), (365, 12921), (385, 13113), (391, 13149), (444, 13593), (449, 13614), (462, 13749), (470, 13839), (496, 14001), (500, 14055), (510, 14145), (512, 14154),

Gene: BrayBeast_16 Start: 9776, Stop: 13165, Start Num: 11
Candidate Starts for BrayBeast_16:
(Start: 11 @9776 has 6 MA's), (22, 9821), (37, 9983), (53, 10124), (54, 10136), (64, 10196), (77, 10268), (80, 10280), (82, 10316), (83, 10322), (88, 10364), (94, 10403), (104, 10448), (105, 10457), (141, 10736), (158, 10811), (172, 10931), (174, 10949), (176, 10964), (182, 10988), (184, 11006), (188, 11030), (191, 11042), (200, 11078), (209, 11111), (232, 11168), (237, 11192), (243, 11198),

(245, 11213), (250, 11222), (252, 11234), (254, 11249), (257, 11267), (270, 11324), (296, 11459), (302, 11501), (303, 11510), (304, 11513), (308, 11543), (310, 11555), (322, 11612), (335, 11681), (339, 11687), (340, 11690), (345, 11711), (348, 11735), (349, 11747), (354, 11792), (357, 11804), (359, 11816), (372, 11942), (377, 12002), (383, 12056), (385, 12068), (407, 12287), (414, 12317), (417, 12344), (420, 12365), (433, 12455), (445, 12566), (457, 12656), (460, 12701), (462, 12716), (466, 12767), (476, 12839), (487, 12899), (492, 12926), (495, 12950), (502, 13052), (503, 13058), (505, 13079), (513, 13109), (517, 13133), (518, 13142), (519, 13151), (520, 13154),

Gene: CocoCinnamon_20 Start: 11134, Stop: 14817, Start Num: 10
Candidate Starts for CocoCinnamon_20:
(Start: 10 @11134 has 6 MA's), (22, 11179), (26, 11257), (32, 11302), (51, 11473), (52, 11482), (57, 11512), (73, 11611), (74, 11614), (93, 11770), (94, 11776), (97, 11803), (104, 11863), (113, 11917), (121, 11992), (137, 12142), (139, 12154), (155, 12244), (159, 12265), (169, 12346), (172, 12376), (173, 12385), (202, 12520), (204, 12532), (208, 12541), (210, 12550), (229, 12649), (232, 12670), (268, 12898), (276, 12943), (296, 13039), (303, 13090), (305, 13105), (308, 13123), (310, 13135), (319, 13180), (320, 13183), (321, 13186), (323, 13204), (328, 13228), (334, 13294), (336, 13318), (337, 13321), (338, 13324), (341, 13342), (344, 13366), (356, 13462), (357, 13468), (359, 13480), (368, 13549), (369, 13570), (380, 13696), (381, 13714), (383, 13720), (385, 13732), (387, 13741), (398, 13813), (402, 13885), (404, 13903), (410, 13954), (417, 13993), (419, 14011), (421, 14038), (433, 14104), (445, 14215), (457, 14305), (462, 14365), (466, 14416), (472, 14470), (480, 14503), (492, 14575), (494, 14596), (502, 14701), (504, 14719), (505, 14728), (517, 14782), (518, 14791), (519, 14800), (520, 14803), (521, 14806),

Gene: DillyDally_15 Start: 9981, Stop: 13370, Start Num: 16
Candidate Starts for DillyDally_15:
(14, 9975), (Start: 16 @9981 has 1 MA's), (18, 9990), (19, 9993), (23, 10026), (29, 10110), (31, 10122), (68, 10413), (72, 10452), (76, 10476), (90, 10593), (96, 10626), (97, 10644), (99, 10668), (101, 10689), (102, 10692), (105, 10710), (113, 10752), (126, 10857), (135, 10911), (138, 10944), (148, 11004), (154, 11043), (157, 11058), (165, 11130), (166, 11133), (171, 11172), (185, 11241), (191, 11262), (216, 11340), (219, 11355), (236, 11409), (244, 11433), (260, 11499), (262, 11508), (265, 11517), (266, 11526), (270, 11544), (273, 11562), (279, 11598), (291, 11655), (304, 11742), (316, 11805), (322, 11841), (339, 11916), (348, 11964), (349, 11976), (357, 12033), (359, 12045), (371, 12147), (383, 12285), (387, 12306), (402, 12450), (404, 12468), (412, 12522), (418, 12567), (429, 12645), (436, 12705), (450, 12798), (452, 12822), (457, 12870), (460, 12915), (462, 12930), (466, 12981), (469, 13017), (471, 13029), (481, 13077), (483, 13089), (488, 13128), (489, 13131), (500, 13236), (504, 13296), (509, 13320), (515, 13344),

Gene: EvenBluerMoon_17 Start: 10991, Stop: 14236, Start Num: 13
Candidate Starts for EvenBluerMoon_17:
(Start: 13 @10991 has 4 MA's), (22, 11036), (28, 11129), (54, 11351), (80, 11495), (81, 11513), (83, 11537), (94, 11618), (103, 11660), (104, 11663), (105, 11672), (106, 11687), (128, 11843), (133, 11873), (143, 11954), (150, 11990), (158, 12026), (159, 12035), (160, 12047), (168, 12113), (177, 12182), (221, 12341), (254, 12431), (273, 12509), (285, 12563), (289, 12587), (311, 12713), (312, 12716), (347, 12848), (348, 12854), (349, 12863), (351, 12881), (358, 12905), (363, 12935), (365, 12956), (385, 13148), (391, 13184), (444, 13628), (449, 13649), (462, 13784), (470, 13874), (496, 14036), (500, 14090), (510, 14180), (512, 14189),

Gene: Hereford_18 Start: 11115, Stop: 14360, Start Num: 13
Candidate Starts for Hereford_18:
(Start: 13 @11115 has 4 MA's), (22, 11160), (28, 11253), (54, 11475), (80, 11619), (81, 11637), (83, 11661), (94, 11742), (103, 11784), (104, 11787), (105, 11796), (128, 11967), (133, 11997), (143, 12078), (150, 12114), (158, 12150), (159, 12159), (160, 12171), (168, 12237), (177, 12306), (254, 12555), (273, 12633), (285, 12687), (289, 12711), (311, 12837), (312, 12840), (347, 12972), (349,

12987), (351, 13005), (358, 13029), (363, 13059), (365, 13080), (385, 13272), (391, 13308), (444, 13752), (449, 13773), (462, 13908), (470, 13998), (496, 14160), (500, 14214), (510, 14304), (512, 14313),

Gene: JanetJ_17 Start: 10770, Stop: 14018, Start Num: 12
Candidate Starts for JanetJ_17:
(Start: 12 @10770 has 1 MA's), (22, 10815), (28, 10908), (54, 11130), (81, 11292), (88, 11358), (94, 11397), (104, 11442), (105, 11451), (128, 11622), (133, 11652), (143, 11733), (150, 11769), (158, 11805), (159, 11814), (168, 11892), (251, 12192), (254, 12210), (273, 12288), (285, 12342), (289, 12366), (312, 12495), (316, 12510), (347, 12627), (351, 12660), (365, 12735), (391, 12963), (470, 13650), (496, 13812), (507, 13938), (510, 13950), (512, 13959),

Gene: JeanClaude_16 Start: 9728, Stop: 13072, Start Num: 22
Candidate Starts for JeanClaude_16:
(Start: 11 @9683 has 6 MA's), (22, 9728), (37, 9890), (53, 10031), (54, 10043), (64, 10103), (80, 10187), (82, 10223), (83, 10229), (88, 10271), (94, 10310), (104, 10355), (105, 10364), (141, 10643), (150, 10682), (158, 10718), (172, 10838), (174, 10856), (176, 10871), (182, 10895), (184, 10913), (188, 10937), (191, 10949), (200, 10985), (208, 11012), (209, 11018), (214, 11030), (232, 11075), (234, 11087), (237, 11099), (243, 11105), (245, 11120), (250, 11129), (252, 11141), (254, 11156), (257, 11174), (270, 11231), (296, 11366), (302, 11408), (303, 11417), (304, 11420), (305, 11432), (308, 11450), (310, 11462), (316, 11483), (322, 11519), (335, 11588), (339, 11594), (345, 11618), (348, 11642), (349, 11654), (353, 11696), (357, 11711), (359, 11723), (372, 11849), (377, 11909), (383, 11963), (385, 11975), (407, 12194), (414, 12224), (417, 12251), (420, 12272), (433, 12362), (436, 12398), (445, 12473), (457, 12563), (460, 12608), (462, 12623), (466, 12674), (476, 12746), (492, 12833), (495, 12857), (501, 12923), (502, 12959), (503, 12965), (505, 12986), (513, 13016), (517, 13040), (518, 13049), (519, 13058), (520, 13061),

Gene: Kumotta_17 Start: 10633, Stop: 14061, Start Num: 9
Candidate Starts for Kumotta_17:
(Start: 7 @10630 has 1 MA's), (Start: 9 @10633 has 1 MA's), (21, 10669), (22, 10678), (32, 10801), (34, 10822), (38, 10852), (42, 10906), (47, 10939), (51, 10972), (52, 10981), (57, 11011), (69, 11074), (72, 11110), (86, 11215), (93, 11269), (94, 11275), (95, 11278), (97, 11302), (104, 11362), (111, 11401), (113, 11416), (119, 11473), (121, 11491), (127, 11545), (137, 11641), (146, 11701), (153, 11731), (185, 11950), (198, 12004), (220, 12073), (243, 12127), (258, 12202), (262, 12214), (265, 12223), (266, 12232), (270, 12250), (276, 12292), (279, 12304), (288, 12352), (292, 12364), (298, 12403), (300, 12412), (307, 12469), (339, 12622), (346, 12658), (355, 12730), (360, 12754), (371, 12853), (372, 12877), (377, 12937), (383, 12991), (384, 13000), (385, 13003), (392, 13057), (399, 13090), (402, 13156), (404, 13174), (406, 13207), (409, 13216), (410, 13225), (414, 13237), (434, 13375), (441, 13441), (443, 13462), (445, 13477), (449, 13492), (450, 13495), (455, 13564), (457, 13567), (464, 13663), (469, 13711), (493, 13858), (495, 13867), (496, 13870), (504, 13987), (508, 14005), (516, 14038),

Gene: Maja_16 Start: 10263, Stop: 13793, Start Num: 11
Candidate Starts for Maja_16:
(Start: 11 @10263 has 6 MA's), (22, 10308), (36, 10461), (53, 10611), (54, 10623), (55, 10629), (60, 10653), (64, 10683), (67, 10698), (69, 10704), (77, 10755), (81, 10785), (83, 10809), (88, 10851), (94, 10890), (104, 10935), (105, 10944), (115, 11007), (123, 11076), (133, 11145), (145, 11241), (158, 11298), (160, 11319), (162, 11322), (172, 11418), (184, 11493), (187, 11514), (207, 11589), (210, 11601), (213, 11619), (228, 11703), (229, 11712), (236, 11751), (239, 11766), (240, 11775), (247, 11829), (248, 11844), (249, 11853), (250, 11862), (252, 11874), (254, 11889), (261, 11919), (262, 11925), (270, 11964), (276, 12003), (293, 12081), (297, 12105), (302, 12141), (303, 12150), (304, 12153), (305, 12165), (308, 12183), (310, 12195), (316, 12216), (320, 12243), (322, 12252), (325, 12276), (329, 12291), (339, 12327), (341, 12339), (345, 12351), (349, 12387), (357, 12444), (372,

12582), (387, 12717), (398, 12789), (402, 12861), (404, 12879), (410, 12930), (417, 12969), (419, 12987), (420, 12990), (429, 13056), (433, 13080), (445, 13191), (457, 13281), (462, 13341), (492, 13551), (494, 13572), (502, 13677), (504, 13695), (505, 13704), (517, 13758), (518, 13767), (519, 13776), (520, 13779), (521, 13782),

Gene: MargaretKali_17 Start: 10265, Stop: 13696, Start Num: 7
Candidate Starts for MargaretKali_17:
(Start: 7 @10265 has 1 MA's), (Start: 9 @10268 has 1 MA's), (21, 10304), (22, 10313), (32, 10436), (34, 10457), (38, 10487), (42, 10541), (47, 10574), (51, 10607), (52, 10616), (57, 10646), (69, 10709), (72, 10745), (86, 10850), (93, 10904), (94, 10910), (95, 10913), (97, 10937), (104, 10997), (111, 11036), (113, 11051), (119, 11108), (121, 11126), (127, 11180), (137, 11276), (146, 11336), (153, 11366), (185, 11585), (198, 11639), (220, 11708), (243, 11762), (258, 11837), (262, 11849), (265, 11858), (266, 11867), (270, 11885), (276, 11927), (279, 11939), (288, 11987), (292, 11999), (298, 12038), (300, 12047), (307, 12104), (339, 12257), (346, 12293), (355, 12365), (360, 12389), (371, 12488), (372, 12512), (377, 12572), (383, 12626), (384, 12635), (385, 12638), (392, 12692), (399, 12725), (402, 12791), (404, 12809), (406, 12842), (409, 12851), (410, 12860), (414, 12872), (434, 13010), (441, 13076), (443, 13097), (445, 13112), (449, 13127), (450, 13130), (455, 13199), (457, 13202), (464, 13298), (469, 13346), (493, 13493), (495, 13502), (496, 13505), (504, 13622), (508, 13640), (516, 13673),

Gene: Morrey_26 Start: 11131, Stop: 14238, Start Num: 28
Candidate Starts for Morrey_26:
(Start: 13 @10993 has 4 MA's), (22, 11038), (28, 11131), (54, 11353), (80, 11497), (81, 11515), (83, 11539), (94, 11620), (103, 11662), (104, 11665), (105, 11674), (106, 11689), (128, 11845), (133, 11875), (143, 11956), (150, 11992), (158, 12028), (159, 12037), (160, 12049), (168, 12115), (177, 12184), (221, 12343), (254, 12433), (273, 12511), (285, 12565), (289, 12589), (311, 12715), (312, 12718), (347, 12850), (348, 12856), (349, 12865), (351, 12883), (358, 12907), (363, 12937), (365, 12958), (385, 13150), (391, 13186), (444, 13630), (449, 13651), (462, 13786), (470, 13876), (496, 14038), (500, 14092), (510, 14182), (512, 14191),

Gene: Neroxid_16 Start: 8509, Stop: 12048, Start Num: 5
Candidate Starts for Neroxid_16:
(3, 8479), (4, 8488), (5, 8509), (17, 8536), (29, 8665), (40, 8773), (44, 8797), (48, 8836), (52, 8869), (58, 8905), (61, 8944), (66, 8965), (79, 9049), (91, 9154), (92, 9160), (100, 9232), (107, 9274), (110, 9280), (112, 9289), (120, 9355), (128, 9424), (129, 9433), (136, 9493), (142, 9562), (157, 9634), (177, 9793), (179, 9802), (182, 9814), (188, 9850), (191, 9862), (192, 9871), (212, 9946), (244, 10108), (245, 10111), (259, 10180), (261, 10183), (264, 10192), (267, 10213), (268, 10222), (271, 10237), (283, 10303), (287, 10318), (294, 10354), (296, 10369), (299, 10387), (314, 10486), (318, 10510), (319, 10519), (332, 10585), (348, 10654), (349, 10666), (371, 10834), (372, 10858), (383, 10972), (384, 10981), (393, 11041), (394, 11047), (402, 11137), (404, 11155), (414, 11218), (417, 11245), (418, 11254), (419, 11263), (425, 11320), (429, 11332), (436, 11392), (440, 11416), (445, 11470), (466, 11671), (492, 11833), (496, 11860), (498, 11890), (499, 11893), (500, 11917), (506, 11992),

Gene: Nesbitt_15 Start: 9565, Stop: 12702, Start Num: 10
Candidate Starts for Nesbitt_15:
(Start: 10 @9565 has 6 MA's), (24, 9649), (49, 9877), (50, 9880), (62, 9985), (65, 9994), (70, 10018), (71, 10024), (72, 10048), (98, 10255), (102, 10291), (104, 10297), (109, 10330), (113, 10351), (114, 10360), (118, 10405), (122, 10438), (124, 10459), (134, 10528), (137, 10567), (152, 10648), (161, 10687), (180, 10786), (188, 10825), (191, 10837), (195, 10861), (197, 10867), (217, 10921), (218, 10924), (230, 10960), (235, 10987), (244, 11023), (253, 11056), (254, 11059), (256, 11074), (269, 11116), (273, 11140), (275, 11161), (277, 11170), (279, 11179), (284, 11200), (286, 11209), (297, 11269), (300, 11281), (301, 11296), (324, 11428), (326, 11440), (341, 11536), (343, 11548), (348, 11584), (350, 11596), (367, 11695), (370, 11731), (373, 11767), (374, 11782), (382, 11863), (389,

11896), (422, 12160), (426, 12184), (440, 12280), (451, 12367), (459, 12463), (463, 12511), (477, 12601), (482, 12631), (485, 12667), (486, 12670),

Gene: NoSwimming_18 Start: 11925, Stop: 15167, Start Num: 10
Candidate Starts for NoSwimming_18:
(Start: 10 @11925 has 6 MA's), (22, 11970), (28, 12063), (31, 12081), (33, 12102), (44, 12201), (55, 12291), (81, 12447), (82, 12465), (83, 12471), (88, 12513), (94, 12552), (95, 12555), (104, 12597), (105, 12606), (125, 12768), (131, 12798), (143, 12888), (150, 12924), (158, 12960), (159, 12969), (168, 13047), (169, 13050), (170, 13059), (177, 13116), (191, 13182), (193, 13197), (255, 13371), (263, 13398), (273, 13443), (281, 13482), (289, 13521), (312, 13650), (316, 13665), (325, 13725), (342, 13764), (347, 13782), (351, 13815), (359, 13848), (361, 13857), (363, 13869), (381, 14064), (383, 14070), (385, 14082), (391, 14118), (429, 14430), (445, 14565), (457, 14655), (470, 14805), (493, 14955), (500, 15021), (507, 15093), (510, 15105),

Gene: Pigu_15 Start: 9334, Stop: 12879, Start Num: 11
Candidate Starts for Pigu_15:
(Start: 11 @9334 has 6 MA's), (15, 9346), (22, 9379), (29, 9481), (30, 9487), (41, 9598), (45, 9616), (47, 9640), (53, 9682), (54, 9694), (58, 9715), (67, 9769), (81, 9856), (83, 9880), (84, 9889), (88, 9922), (94, 9961), (104, 10006), (105, 10015), (115, 10078), (123, 10147), (133, 10216), (147, 10318), (158, 10369), (162, 10393), (169, 10459), (178, 10531), (190, 10597), (199, 10630), (203, 10648), (209, 10669), (211, 10675), (225, 10759), (226, 10768), (227, 10771), (228, 10774), (229, 10783), (231, 10795), (232, 10804), (233, 10813), (238, 10831), (239, 10837), (245, 10891), (252, 10945), (261, 10990), (262, 10996), (265, 11008), (270, 11035), (276, 11074), (281, 11098), (282, 11101), (295, 11158), (297, 11176), (302, 11212), (303, 11221), (308, 11254), (310, 11266), (322, 11323), (335, 11392), (339, 11398), (340, 11401), (345, 11422), (348, 11446), (349, 11458), (353, 11500), (357, 11515), (364, 11560), (372, 11653), (383, 11767), (385, 11779), (401, 11929), (402, 11932), (404, 11950), (407, 11998), (413, 12025), (414, 12028), (418, 12064), (421, 12100), (425, 12130), (429, 12142), (433, 12166), (436, 12202), (445, 12277), (457, 12367), (462, 12427), (494, 12658), (500, 12718), (502, 12763), (504, 12781), (505, 12790), (517, 12844), (518, 12853), (519, 12862), (520, 12865), (521, 12868),

Gene: PrairieDogTown_17 Start: 10993, Stop: 14238, Start Num: 13
Candidate Starts for PrairieDogTown_17:
(Start: 13 @10993 has 4 MA's), (22, 11038), (28, 11131), (54, 11353), (80, 11497), (81, 11515), (83, 11539), (94, 11620), (103, 11662), (104, 11665), (105, 11674), (106, 11689), (128, 11845), (133, 11875), (143, 11956), (150, 11992), (158, 12028), (159, 12037), (160, 12049), (168, 12115), (177, 12184), (221, 12343), (254, 12433), (273, 12511), (285, 12565), (289, 12589), (311, 12715), (312, 12718), (347, 12850), (348, 12856), (349, 12865), (351, 12883), (358, 12907), (363, 12937), (365, 12958), (385, 13150), (391, 13186), (444, 13630), (449, 13651), (462, 13786), (470, 13876), (496, 14038), (500, 14092), (510, 14182), (512, 14191),

Gene: Raya_16 Start: 8509, Stop: 12048, Start Num: 5
Candidate Starts for Raya_16:
(3, 8479), (4, 8488), (5, 8509), (17, 8536), (29, 8665), (40, 8773), (44, 8797), (48, 8836), (52, 8869), (58, 8905), (61, 8944), (66, 8965), (79, 9049), (91, 9154), (92, 9160), (100, 9232), (107, 9274), (110, 9280), (112, 9289), (120, 9355), (128, 9424), (129, 9433), (136, 9493), (142, 9562), (157, 9634), (177, 9793), (179, 9802), (182, 9814), (188, 9850), (191, 9862), (192, 9871), (212, 9946), (244, 10108), (245, 10111), (259, 10180), (261, 10183), (264, 10192), (267, 10213), (268, 10222), (271, 10237), (283, 10303), (287, 10318), (294, 10354), (296, 10369), (299, 10387), (314, 10486), (318, 10510), (319, 10519), (332, 10585), (348, 10654), (349, 10666), (371, 10834), (372, 10858), (383, 10972), (384, 10981), (393, 11041), (394, 11047), (402, 11137), (404, 11155), (414, 11218), (417, 11245), (418, 11254), (419, 11263), (425, 11320), (429, 11332), (436, 11392), (440, 11416), (445, 11470), (466, 11671), (492, 11833), (496, 11860), (498, 11890), (499, 11893), (500, 11917), (506, 11992),

Gene: Rooter_15 Start: 9320, Stop: 12709, Start Num: 11
Candidate Starts for Rooter_15:
(Start: 11 @9320 has 6 MA's), (22, 9365), (37, 9527), (53, 9668), (54, 9680), (64, 9740), (80, 9824), (82, 9860), (83, 9866), (88, 9908), (94, 9947), (104, 9992), (105, 10001), (141, 10280), (158, 10355), (172, 10475), (174, 10493), (176, 10508), (182, 10532), (184, 10550), (188, 10574), (191, 10586), (200, 10622), (208, 10649), (209, 10655), (214, 10667), (232, 10712), (234, 10724), (237, 10736), (243, 10742), (245, 10757), (250, 10766), (252, 10778), (254, 10793), (257, 10811), (270, 10868), (296, 11003), (302, 11045), (303, 11054), (304, 11057), (308, 11087), (310, 11099), (316, 11120), (322, 11156), (335, 11225), (339, 11231), (340, 11234), (345, 11255), (348, 11279), (349, 11291), (357, 11348), (359, 11360), (372, 11486), (377, 11546), (383, 11600), (385, 11612), (414, 11861), (417, 11888), (420, 11909), (433, 11999), (445, 12110), (460, 12245), (462, 12260), (466, 12311), (476, 12383), (487, 12443), (492, 12470), (495, 12494), (501, 12560), (502, 12596), (503, 12602), (505, 12623), (513, 12653), (517, 12677), (518, 12686), (519, 12695), (520, 12698),

Gene: Rowa_15 Start: 9318, Stop: 12419, Start Num: 8
Candidate Starts for Rowa_15:
(Start: 8 @9318 has 1 MA's), (20, 9351), (27, 9459), (35, 9525), (39, 9579), (49, 9657), (50, 9660), (54, 9702), (72, 9828), (73, 9831), (85, 9921), (86, 9930), (89, 9960), (93, 9984), (113, 10131), (132, 10290), (137, 10347), (140, 10374), (143, 10389), (152, 10428), (181, 10554), (194, 10620), (197, 10629), (205, 10659), (218, 10686), (221, 10704), (223, 10710), (232, 10734), (235, 10749), (244, 10785), (252, 10806), (254, 10821), (300, 10920), (303, 10941), (362, 11289), (367, 11328), (370, 11364), (373, 11400), (374, 11415), (395, 11613), (397, 11622), (400, 11664), (422, 11868), (424, 11886), (426, 11892), (430, 11916), (438, 11964), (439, 11973), (440, 11988), (442, 12012), (445, 12042), (447, 12048), (459, 12171), (461, 12186), (477, 12318),

Gene: SPB78_16 Start: 10072, Stop: 13644, Start Num: 13
Candidate Starts for SPB78_16:
(Start: 13 @10072 has 4 MA's), (20, 10099), (22, 10117), (29, 10219), (32, 10246), (39, 10327), (53, 10438), (72, 10576), (75, 10591), (108, 10855), (113, 10879), (122, 10966), (130, 11029), (132, 11038), (137, 11095), (143, 11137), (146, 11155), (160, 11233), (164, 11281), (183, 11392), (189, 11425), (192, 11443), (215, 11509), (218, 11521), (222, 11542), (272, 11752), (274, 11764), (278, 11794), (280, 11806), (285, 11824), (305, 11944), (306, 11950), (311, 11977), (317, 12001), (330, 12094), (349, 12220), (366, 12331), (378, 12496), (379, 12499), (380, 12517), (386, 12565), (388, 12583), (390, 12589), (400, 12694), (415, 12823), (416, 12835), (428, 12931), (431, 12949), (435, 12982), (437, 12994), (446, 13078), (448, 13084), (454, 13147), (456, 13168), (458, 13180), (475, 13348), (479, 13363), (511, 13630),

Gene: Sarge_16 Start: 9687, Stop: 13076, Start Num: 11
Candidate Starts for Sarge_16:
(Start: 11 @9687 has 6 MA's), (22, 9732), (37, 9894), (53, 10035), (54, 10047), (64, 10107), (80, 10191), (82, 10227), (83, 10233), (88, 10275), (94, 10314), (104, 10359), (105, 10368), (141, 10647), (150, 10686), (158, 10722), (172, 10842), (174, 10860), (176, 10875), (182, 10899), (184, 10917), (188, 10941), (191, 10953), (200, 10989), (208, 11016), (209, 11022), (214, 11034), (232, 11079), (234, 11091), (237, 11103), (243, 11109), (245, 11124), (250, 11133), (252, 11145), (254, 11160), (257, 11178), (270, 11235), (296, 11370), (302, 11412), (303, 11421), (304, 11424), (308, 11454), (310, 11466), (316, 11487), (322, 11523), (335, 11592), (339, 11598), (340, 11601), (345, 11622), (348, 11646), (349, 11658), (353, 11700), (357, 11715), (359, 11727), (372, 11853), (377, 11913), (383, 11967), (385, 11979), (396, 12051), (404, 12150), (407, 12198), (414, 12228), (417, 12255), (420, 12276), (433, 12366), (436, 12402), (445, 12477), (457, 12567), (462, 12627), (466, 12678), (476, 12750), (487, 12810), (492, 12837), (495, 12861), (501, 12927), (502, 12963), (503, 12969), (505, 12990), (513, 13020), (517, 13044), (518, 13053), (519, 13062), (520, 13065),

Gene: Scotia_18 Start: 11925, Stop: 15167, Start Num: 10
Candidate Starts for Scotia_18:
(Start: 10 @11925 has 6 MA's), (22, 11970), (28, 12063), (31, 12081), (33, 12102), (44, 12201), (81, 12447), (82, 12465), (83, 12471), (88, 12513), (94, 12552), (95, 12555), (104, 12597), (105, 12606), (125, 12768), (131, 12798), (143, 12888), (150, 12924), (158, 12960), (159, 12969), (168, 13047), (169, 13050), (177, 13116), (191, 13182), (193, 13197), (237, 13311), (255, 13371), (273, 13443), (281, 13482), (289, 13521), (312, 13650), (316, 13665), (325, 13725), (342, 13764), (347, 13782), (351, 13815), (359, 13848), (361, 13857), (363, 13869), (381, 14064), (383, 14070), (385, 14082), (391, 14118), (429, 14430), (445, 14565), (457, 14655), (470, 14805), (493, 14955), (500, 15021), (507, 15093), (510, 15105),

Gene: Shoya_15 Start: 9323, Stop: 12712, Start Num: 11
Candidate Starts for Shoya_15:
(Start: 11 @9323 has 6 MA's), (22, 9368), (37, 9530), (43, 9596), (53, 9671), (54, 9683), (64, 9743), (77, 9815), (80, 9827), (82, 9863), (83, 9869), (88, 9911), (94, 9950), (104, 9995), (105, 10004), (141, 10283), (158, 10358), (170, 10457), (172, 10478), (174, 10496), (176, 10511), (182, 10535), (184, 10553), (188, 10577), (191, 10589), (200, 10625), (209, 10658), (232, 10715), (237, 10739), (243, 10745), (245, 10760), (250, 10769), (252, 10781), (254, 10796), (257, 10814), (270, 10871), (296, 11006), (302, 11048), (303, 11057), (304, 11060), (308, 11090), (310, 11102), (322, 11159), (335, 11228), (339, 11234), (340, 11237), (345, 11258), (348, 11282), (349, 11294), (354, 11339), (357, 11351), (359, 11363), (372, 11489), (377, 11549), (383, 11603), (385, 11615), (407, 11834), (414, 11864), (417, 11891), (420, 11912), (433, 12002), (445, 12113), (457, 12203), (460, 12248), (462, 12263), (466, 12314), (476, 12386), (492, 12473), (495, 12497), (501, 12563), (502, 12599), (503, 12605), (505, 12626), (513, 12656), (517, 12680), (518, 12689), (519, 12698), (520, 12701),

Gene: Skyerus_16 Start: 8509, Stop: 12048, Start Num: 5
Candidate Starts for Skyerus_16:
(3, 8479), (4, 8488), (5, 8509), (17, 8536), (29, 8665), (40, 8773), (44, 8797), (48, 8836), (52, 8869), (58, 8905), (61, 8944), (66, 8965), (79, 9049), (91, 9154), (92, 9160), (100, 9232), (107, 9274), (110, 9280), (112, 9289), (120, 9355), (128, 9424), (129, 9433), (136, 9493), (142, 9562), (157, 9634), (177, 9793), (179, 9802), (182, 9814), (188, 9850), (191, 9862), (192, 9871), (212, 9946), (244, 10108), (245, 10111), (259, 10180), (261, 10183), (264, 10192), (267, 10213), (268, 10222), (271, 10237), (283, 10303), (287, 10318), (294, 10354), (296, 10369), (299, 10387), (314, 10486), (318, 10510), (319, 10519), (332, 10585), (348, 10654), (349, 10666), (371, 10834), (372, 10858), (383, 10972), (384, 10981), (393, 11041), (394, 11047), (402, 11137), (404, 11155), (414, 11218), (417, 11245), (418, 11254), (419, 11263), (425, 11320), (429, 11332), (436, 11392), (440, 11416), (445, 11470), (466, 11671), (492, 11833), (496, 11860), (498, 11890), (499, 11893), (500, 11917), (506, 11992),

Gene: VWB_17 Start: 10120, Stop: 14442, Start Num: 6
Candidate Starts for VWB_17:
(6, 10120), (25, 10222), (27, 10276), (35, 10342), (46, 10459), (56, 10531), (70, 10615), (75, 10660), (113, 10948), (121, 11023), (132, 11107), (136, 11143), (137, 11164), (143, 11206), (146, 11224), (151, 11242), (153, 11257), (163, 11302), (167, 11323), (172, 11356), (189, 11449), (191, 11458), (194, 11479), (201, 11500), (206, 11521), (217, 11542), (218, 11545), (232, 11593), (244, 11644), (264, 11725), (269, 11758), (274, 11788), (279, 11821), (282, 11836), (290, 11875), (309, 11995), (313, 12013), (327, 12091), (331, 12130), (333, 12139), (336, 12169), (341, 12193), (349, 12250), (352, 12283), (364, 12346), (366, 12361), (368, 12382), (379, 12529), (383, 12571), (390, 12619), (400, 12691), (403, 12727), (405, 12760), (411, 12796), (415, 12820), (423, 12910), (427, 12928), (431, 12949), (432, 12952), (437, 12994), (446, 13078), (448, 13084), (453, 13135), (456, 13168), (465, 13270), (467, 13294), (469, 13321), (473, 13342), (474, 13348), (478, 13363), (484, 13411), (490, 13447), (491, 13453), (497, 13504), (501, 13561), (514, 13651), (522, 13723), (523, 13765), (524, 13771), (525, 13792), (526, 13870), (527, 13897), (528, 13942), (529, 13987), (530, 13999), (531, 14077), (532, 14122), (533, 14230), (534, 14248), (535, 14260), (536, 14278), (537, 14347),

(538, 14407), (539, 14413),