

# Zoomed Pham 196675

1: Pytheas_18	12	298	8831	104670	106185	107186	104280	256	267	282	303	324	353	366
2: Posh_18	12	298	8831	104670	106185	107186	104280	256	267	282	303	324	353	366
3: Wrigley_18	12	298	8831	104670	106185	107186	104280	256	267	282	303	324	353	366
4: BeeGes_18	12	298	8831	104670	106185	107186	104280	256	267	282	303	324	353	366
5: LonelyBj_18	12	298	8831	104670	106185	107186	104280	256	267	282	303	324	353	366
6: Jablanski_18	12	298	8831	104670	106185	107186	104280	256	267	282	303	324	353	366
7: Cashline_18	12	298	8831	104670	106185	107186	104280	256	267	282	303	324	353	366
8: Angelique_18	12	298	8831	104670	106185	107186	104280	256	267	282	303	324	353	366
9: EnalisNailo_13 + 1	12	298	8831	104670	106185	107186	104280	256	267	282	303	324	353	366
10: Confidence_13	12	298	8831	104670	106185	107186	104280	256	267	282	303	324	353	366
11: Bradissa_18	12	298	8831	104670	106185	107186	104280	256	267	282	303	324	353	366
12: BritBrit_18 + 1	12	298	8831	104670	106185	107186	104280	256	267	282	303	324	353	366
13: Coriander_12	12	298	8831	104670	106185	107186	104280	256	267	282	303	324	353	366
14: Dmitri_17	12	298	8831	104670	106185	107186	104280	256	267	282	303	324	353	366
15: RayTheFirefly_12	12	298	8831	104670	106185	107186	104280	256	267	282	303	324	353	366
16: Dogbs_16	12	298	8831	104670	106185	107186	104280	256	267	282	303	324	353	366
17: Lucky10_16	12	298	8831	104670	106185	107186	104280	256	267	282	303	324	353	366
18: Morkie_16 + 1	12	298	8831	104670	106185	107186	104280	256	267	282	303	324	353	366
19: Birdsong_17	12	298	8831	104670	106185	107186	104280	256	267	282	303	324	353	366
20: BearBQ_17	12	298	8831	104670	106185	107186	104280	256	267	282	303	324	353	366
21: Ecliptus_22	12	298	8831	104670	106185	107186	104280	256	267	282	303	324	353	366
22: MortyNRick_17	12	298	8831	104670	106185	107186	104280	256	267	282	303	324	353	366
23: ODay_22	12	298	8831	104670	106185	107186	104280	256	267	282	303	324	353	366
24: Crater_16 + 1	12	298	8831	104670	106185	107186	104280	256	267	282	303	324	353	366
25: Kuwabara_17	12	298	8831	104670	106185	107186	104280	256	267	282	303	324	353	366
26: Keelan_49	12	298	8831	104670	106185	107186	104280	256	267	282	303	324	353	366
27: Volt_53 + 2	12	298	8831	104670	106185	107186	104280	256	267	282	303	324	353	366
28: Guey18_56	12	298	8831	104670	106185	107186	104280	256	267	282	303	324	353	366
29: Fryberger_51	12	298	8831	104670	106185	107186	104280	256	267	282	303	324	353	366

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 196675 Report

This analysis was run 12/09/24 on database version 580.

Pham number 196675 has 38 members, 2 are drafts.

Phages represented in each track:

- Track 1 : Pytheas\_18
- Track 2 : Posh\_18
- Track 3 : Wrigley\_18
- Track 4 : BeeGee\_18
- Track 5 : LonelyBoi\_18
- Track 6 : Jablanski\_18
- Track 7 : Cashline\_18
- Track 8 : Angelique\_18
- Track 9 : EnalisNailo\_18, Lilas\_18
- Track 10 : Confidence\_18
- Track 11 : Bradissa\_18
- Track 12 : BritBrat\_18, Floral\_18, EMSquaredA\_18, Marteena\_18, Pollux\_18
- Track 13 : Coriander\_17
- Track 14 : Dmitri\_17
- Track 15 : RayTheFireFly\_17
- Track 16 : Doggs\_16
- Track 17 : Lucky10\_16
- Track 18 : Morkie\_16, PhorbesPhlower\_16
- Track 19 : Birdsong\_17
- Track 20 : BearBQ\_17
- Track 21 : Ecliptus\_22
- Track 22 : MortyNRick\_17
- Track 23 : ODay\_22
- Track 24 : Crater\_16, Apricot\_17
- Track 25 : Kuwabara\_17
- Track 26 : Keelan\_49
- Track 27 : Volt\_53, Ronaldo\_54, Ziko\_54
- Track 28 : Guey18\_56
- Track 29 : Fryberger\_51

### ***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 17 of the 36 non-draft genes in the pham.

Genes that call this "Most Annotated" start:

- Angelique\_18, BeeGee\_18, Bradissa\_18, BritBrat\_18, Cashline\_18, Confidence\_18, EMSquaredA\_18, EnalisNailo\_18, Floral\_18, Jablanski\_18, Lilas\_18, LonelyBoi\_18, Marteena\_18, Pollux\_18, Posh\_18, Pytheas\_18, Wrigley\_18,

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

- 

Genes that do not have the "Most Annotated" start:

- Apricot\_17, BearBQ\_17, Birdsong\_17, Coriander\_17, Crater\_16, Dmitri\_17, Doggs\_16, Ecliptus\_22, Fryberger\_51, Guey18\_56, Keelan\_49, Kuwabara\_17, Lucky10\_16, Morkie\_16, MortyNRick\_17, ODay\_22, PhorbesPhlower\_16, RayTheFireFly\_17, Ronaldo\_54, Volt\_53, Ziko\_54,

### Summary by start number:

Start 1:

- Found in 4 of 38 ( 10.5% ) of genes in pham
- Manual Annotations of this start: 3 of 36
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Coriander\_17 (DB), Dmitri\_17 (DB), Doggs\_16 (DB), RayTheFireFly\_17 (DB),

Start 10:

- Found in 17 of 38 ( 44.7% ) of genes in pham
- Manual Annotations of this start: 17 of 36
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Angelique\_18 (CY1), BeeGee\_18 (CY), Bradissa\_18 (CY1), BritBrat\_18 (CY2), Cashline\_18 (CY), Confidence\_18 (CY1), EMSquaredA\_18 (CY1), EnalisNailo\_18 (CY1), Floral\_18 (CY1), Jablanski\_18 (CY), Lilas\_18 (CY1), LonelyBoi\_18 (CY), Marteena\_18 (CY1), Pollux\_18 (CY1), Posh\_18 (CY), Pytheas\_18 (CY), Wrigley\_18 (CY),

Start 16:

- Found in 3 of 38 ( 7.9% ) of genes in pham
- Manual Annotations of this start: 2 of 36
- Called 66.7% of time when present
- Phage (with cluster) where this start called: BearBQ\_17 (DN), Birdsong\_17 (DN),

Start 17:

- Found in 2 of 38 ( 5.3% ) of genes in pham
- Manual Annotations of this start: 2 of 36
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Ecliptus\_22 (DN), ODay\_22 (DN),

Start 19:

- Found in 27 of 38 ( 71.1% ) of genes in pham
- Manual Annotations of this start: 1 of 36
- Called 3.7% of time when present
- Phage (with cluster) where this start called: Lucky10\_16 (DH),

Start 20:

- Found in 14 of 38 ( 36.8% ) of genes in pham
- Manual Annotations of this start: 11 of 36
- Called 78.6% of time when present
- Phage (with cluster) where this start called: Apricot\_17 (DN3), Crater\_16 (DN3), Fryberger\_51 (DP), Guey18\_56 (DP), Keelan\_49 (DP), Kuwabara\_17 (DN4), Morkie\_16 (DH), PhorbesPhlower\_16 (DH), Ronaldo\_54 (DP), Volt\_53 (DP), Ziko\_54 (DP),

Start 21:

- Found in 24 of 38 ( 63.2% ) of genes in pham
- No Manual Annotations of this start.
- Called 4.2% of time when present
- Phage (with cluster) where this start called: MortyNRick\_17 (DN),

### **Summary by clusters:**

There are 9 clusters represented in this pham: DN, CY2, CY1, DH, DB, DN4, CY, DN3, DP,

Info for manual annotations of cluster CY:

- Start number 10 was manually annotated 7 times for cluster CY.

Info for manual annotations of cluster CY1:

- Start number 10 was manually annotated 9 times for cluster CY1.

Info for manual annotations of cluster CY2:

- Start number 10 was manually annotated 1 time for cluster CY2.

Info for manual annotations of cluster DB:

- Start number 1 was manually annotated 3 times for cluster DB.

Info for manual annotations of cluster DH:

- Start number 19 was manually annotated 1 time for cluster DH.
- Start number 20 was manually annotated 2 times for cluster DH.

Info for manual annotations of cluster DN:

- Start number 16 was manually annotated 2 times for cluster DN.
- Start number 17 was manually annotated 2 times for cluster DN.

Info for manual annotations of cluster DN3:

- Start number 20 was manually annotated 2 times for cluster DN3.

Info for manual annotations of cluster DN4:

- Start number 20 was manually annotated 1 time for cluster DN4.

Info for manual annotations of cluster DP:

- Start number 20 was manually annotated 6 times for cluster DP.

### **Gene Information:**

Gene: Angelique\_18 Start: 11177, Stop: 16801, Start Num: 10

Candidate Starts for Angelique\_18:

(Start: 10 @11177 has 17 MA's), (12, 11210), (14, 11390), (15, 11402), (18, 11441), (Start: 19 @11450 has 1 MA's), (21, 11474), (26, 11558), (28, 11600), (48, 11831), (49, 11858), (58, 11954), (59, 11957), (63, 11978), (70, 12050), (74, 12104), (76, 12155), (77, 12167), (79, 12194), (80, 12209), (89, 12314), (90, 12326), (97, 12398), (98, 12419), (101, 12473), (105, 12512), (107, 12533), (109, 12548), (113, 12581), (116, 12593), (119, 12623), (123, 12656), (130, 12698), (139, 12791), (142, 12824), (143, 12827), (144, 12833), (147, 12842), (148, 12845), (152, 12908), (155, 12941), (160, 12980), (166, 13010), (177, 13094), (185, 13151), (195, 13259), (198, 13298), (200, 13310), (220, 13472), (222, 13490), (223, 13505), (226, 13532), (232, 13583), (233, 13598), (235, 13625), (236, 13631), (245, 13709), (248, 13763), (249, 13772), (250, 13802), (267, 13976), (269, 14006), (289, 14237), (291, 14249), (302, 14339), (308, 14387), (313, 14423), (316, 14447), (320, 14498), (322, 14504), (327, 14549), (331, 14570), (340, 14681), (353, 14873), (366, 15008), (403, 15248), (407, 15314), (410, 15335), (411, 15344), (413, 15371), (417, 15449), (418, 15473), (424, 15614), (433, 15749), (436, 15776), (440, 15842), (441, 15896), (445, 15998), (449, 16097), (458, 16232), (481, 16421), (488, 16547), (490, 16577), (498, 16613), (499, 16616), (508, 16691),

Gene: Apricot\_17 Start: 9635, Stop: 15046, Start Num: 20

Candidate Starts for Apricot\_17:

(Start: 19 @9629 has 1 MA's), (Start: 20 @9635 has 11 MA's), (25, 9713), (27, 9755), (28, 9767), (39, 9908), (40, 9914), (45, 9950), (49, 10010), (52, 10028), (53, 10046), (57, 10067), (60, 10118), (61, 10121), (62, 10124), (65, 10148), (66, 10151), (72, 10217), (74, 10247), (78, 10325), (83, 10370), (85, 10394), (88, 10448), (91, 10469), (100, 10607), (104, 10643), (106, 10670), (109, 10691), (112, 10706), (117, 10745), (118, 10757), (120, 10769), (127, 10829), (130, 10841), (141, 10892), (158, 10967), (161, 10988), (169, 11036), (171, 11054), (186, 11123), (190, 11147), (194, 11204), (196, 11234), (198, 11267), (211, 11384), (220, 11441), (222, 11459), (223, 11474), (232, 11552), (242, 11657), (243, 11669), (244, 11675), (251, 11789), (252, 11792), (257, 11876), (260, 11906), (262, 11918), (267, 11969), (270, 12002), (273, 12071), (275, 12086), (279, 12128), (285, 12182), (287, 12197), (290, 12236), (291, 12242), (293, 12266), (301, 12326), (302, 12332), (303, 12335), (310, 12404), (320, 12491), (322, 12497), (323, 12506), (327, 12542), (332, 12566), (344, 12677), (346, 12689), (359, 12896), (364, 12959), (365, 12968), (368, 13001), (374, 13058), (376, 13085), (381, 13151), (382, 13169), (384, 13181), (403, 13208), (405, 13238), (407, 13274), (410, 13295), (412, 13307), (413, 13331), (417, 13409), (418, 13433), (419, 13448), (423, 13538), (429, 13658), (430, 13673), (432, 13694), (433, 13703), (439, 13790), (448, 14033), (454, 14123), (464, 14273), (466, 14297), (468, 14306), (470, 14333), (475, 14381), (476, 14399), (478, 14417), (481, 14441), (485, 14501), (494, 14624), (503, 14675), (506, 14702), (517, 14801), (518, 14813), (527, 14909), (530, 14927), (531, 14939), (534, 15029),

Gene: BearBQ\_17 Start: 9908, Stop: 16477, Start Num: 16

Candidate Starts for BearBQ\_17:

(Start: 16 @9908 has 2 MA's), (21, 9965), (23, 9983), (27, 10067), (28, 10079), (30, 10091), (32, 10115), (34, 10145), (38, 10190), (39, 10220), (40, 10226), (48, 10295), (49, 10322), (52, 10340), (53, 10358), (56, 10370), (57, 10379), (60, 10430), (61, 10433), (62, 10436), (65, 10460), (66, 10463), (73, 10550), (74, 10559), (78, 10637), (83, 10682), (85, 10706), (86, 10739), (87, 10742), (95, 10829), (96, 10850), (104, 10955), (106, 10982), (111, 11009), (113, 11036), (114, 11039), (120, 11081), (121, 11099), (122, 11102), (133, 11174), (140, 11216), (145, 11237), (150, 11264), (153, 11273), (157, 11288), (159, 11306), (166, 11339), (169, 11372), (175, 11405), (176, 11414), (177, 11423), (179, 11444), (182, 11468), (186, 11483), (189, 11504), (190, 11507), (194, 11564), (196, 11594), (198, 11627), (217, 11765), (220, 11801), (223, 11834), (226, 11861), (228, 11888), (231, 11906), (237, 11966), (240, 12008), (243, 12029), (247, 12080), (249, 12101), (251, 12149), (252, 12152), (265, 12290), (267, 12329), (271, 12371), (273, 12431), (277, 12458), (278, 12479), (284, 12536), (287, 12557), (293, 12629), (296, 12671), (297, 12674), (304, 12707), (306, 12731), (308, 12743), (316, 12803), (320, 12854), (322, 12860), (323, 12869), (328, 12911), (332, 12929), (333, 12959), (357, 13157), (363, 13238), (365, 13256), (368, 13289), (369, 13301), (373, 13337), (376, 13373), (378,

13397), (379, 13400), (380, 13421), (382, 13457), (384, 13469), (385, 13508), (386, 13535), (387, 13562), (388, 13634), (389, 13664), (390, 13700), (391, 13868), (392, 13946), (393, 13997), (394, 14150), (395, 14285), (396, 14294), (397, 14315), (398, 14318), (399, 14327), (400, 14345), (401, 14375), (402, 14408), (403, 14612), (404, 14630), (405, 14642), (407, 14678), (410, 14699), (415, 14789), (417, 14813), (418, 14837), (423, 14945), (428, 15068), (430, 15092), (432, 15113), (433, 15122), (434, 15125), (437, 15152), (439, 15212), (448, 15455), (452, 15536), (453, 15539), (454, 15545), (464, 15704), (466, 15728), (468, 15737), (472, 15782), (473, 15794), (476, 15827), (478, 15845), (485, 15938), (492, 16043), (496, 16064), (505, 16118), (508, 16157), (516, 16229), (521, 16259), (524, 16298), (526, 16331), (530, 16370), (532, 16418), (533, 16451), (535, 16463),

Gene: BeeGee\_18 Start: 10997, Stop: 16621, Start Num: 10

Candidate Starts for BeeGee\_18:

(9, 10982), (Start: 10 @10997 has 17 MA's), (12, 11030), (14, 11210), (15, 11222), (18, 11261), (Start: 19 @11270 has 1 MA's), (21, 11294), (22, 11303), (26, 11378), (28, 11420), (43, 11609), (46, 11627), (48, 11651), (50, 11681), (58, 11774), (59, 11777), (67, 11828), (70, 11870), (74, 11924), (76, 11975), (77, 11987), (80, 12029), (89, 12134), (93, 12161), (97, 12218), (101, 12293), (105, 12332), (107, 12353), (109, 12368), (119, 12443), (129, 12515), (130, 12518), (131, 12527), (134, 12560), (139, 12611), (142, 12644), (143, 12647), (144, 12653), (147, 12662), (148, 12665), (151, 12710), (152, 12728), (154, 12737), (162, 12812), (163, 12818), (164, 12821), (166, 12830), (172, 12884), (176, 12905), (179, 12935), (185, 12971), (194, 13055), (198, 13118), (216, 13250), (220, 13292), (223, 13325), (226, 13352), (232, 13403), (234, 13436), (235, 13445), (238, 13460), (245, 13529), (248, 13583), (249, 13592), (250, 13622), (259, 13742), (261, 13754), (267, 13796), (287, 14024), (288, 14048), (289, 14057), (291, 14069), (301, 14153), (302, 14159), (304, 14171), (308, 14207), (316, 14267), (320, 14318), (322, 14324), (327, 14369), (353, 14693), (366, 14828), (403, 15068), (407, 15134), (410, 15155), (411, 15164), (413, 15191), (417, 15269), (418, 15293), (422, 15386), (423, 15410), (424, 15434), (430, 15539), (433, 15569), (440, 15662), (441, 15716), (445, 15818), (449, 15917), (481, 16241), (488, 16367), (490, 16397), (498, 16433), (499, 16436), (508, 16511), (519, 16607),

Gene: Birdsong\_17 Start: 9908, Stop: 15370, Start Num: 16

Candidate Starts for Birdsong\_17:

(Start: 16 @9908 has 2 MA's), (21, 9965), (23, 9983), (27, 10067), (28, 10079), (30, 10091), (32, 10115), (34, 10145), (38, 10190), (39, 10220), (40, 10226), (48, 10295), (49, 10322), (52, 10340), (53, 10358), (56, 10370), (57, 10379), (60, 10430), (61, 10433), (62, 10436), (65, 10460), (66, 10463), (73, 10550), (74, 10559), (78, 10637), (83, 10682), (85, 10706), (86, 10739), (87, 10742), (95, 10829), (96, 10850), (104, 10955), (106, 10982), (111, 11009), (113, 11036), (114, 11039), (120, 11081), (121, 11099), (122, 11102), (133, 11174), (140, 11216), (145, 11237), (150, 11264), (153, 11273), (157, 11288), (159, 11306), (166, 11339), (169, 11372), (175, 11405), (176, 11414), (177, 11423), (179, 11444), (182, 11468), (186, 11483), (189, 11504), (190, 11507), (194, 11564), (196, 11594), (198, 11627), (220, 11801), (223, 11834), (226, 11861), (228, 11888), (231, 11906), (237, 11966), (240, 12008), (243, 12029), (247, 12080), (249, 12101), (251, 12149), (252, 12152), (265, 12290), (267, 12329), (271, 12371), (273, 12431), (277, 12458), (278, 12479), (284, 12536), (287, 12557), (293, 12629), (296, 12671), (297, 12674), (304, 12707), (308, 12743), (316, 12803), (320, 12854), (322, 12860), (323, 12869), (324, 12878), (328, 12911), (332, 12929), (333, 12959), (356, 13154), (357, 13157), (363, 13238), (365, 13256), (368, 13289), (369, 13301), (373, 13337), (376, 13373), (378, 13397), (379, 13400), (380, 13421), (382, 13457), (384, 13469), (403, 13496), (404, 13514), (405, 13526), (407, 13562), (410, 13583), (415, 13673), (417, 13697), (418, 13721), (423, 13829), (428, 13952), (430, 13976), (433, 14006), (434, 14009), (437, 14036), (448, 14339), (452, 14420), (453, 14423), (454, 14429), (465, 14594), (466, 14612), (468, 14621), (472, 14666), (473, 14678), (476, 14714), (478, 14732), (485, 14831), (492, 14936), (496, 14957), (505, 15011), (508, 15050), (516, 15122), (521, 15152), (524, 15191), (526, 15224), (530, 15263), (532, 15311), (533, 15344), (535, 15356),

Gene: Bradissa\_18 Start: 11180, Stop: 16804, Start Num: 10

Candidate Starts for Bradissa\_18:

(Start: 10 @11180 has 17 MA's), (12, 11213), (14, 11393), (15, 11405), (18, 11444), (Start: 19 @11453 has 1 MA's), (21, 11477), (26, 11561), (27, 11591), (28, 11603), (48, 11834), (49, 11861), (58, 11957), (59, 11960), (63, 11981), (66, 12005), (70, 12053), (74, 12107), (76, 12158), (77, 12170), (79, 12197), (80, 12212), (89, 12317), (97, 12401), (98, 12422), (101, 12476), (107, 12536), (113, 12584), (116, 12596), (119, 12626), (123, 12659), (130, 12701), (134, 12743), (137, 12764), (139, 12794), (142, 12827), (143, 12830), (144, 12836), (147, 12845), (148, 12848), (152, 12911), (155, 12944), (160, 12983), (166, 13013), (177, 13097), (185, 13154), (195, 13262), (198, 13301), (200, 13313), (220, 13475), (222, 13493), (223, 13508), (226, 13535), (232, 13586), (233, 13601), (235, 13628), (245, 13712), (248, 13766), (249, 13775), (250, 13805), (267, 13979), (269, 14009), (275, 14096), (289, 14240), (291, 14252), (302, 14342), (308, 14390), (316, 14450), (320, 14501), (322, 14507), (327, 14552), (340, 14684), (366, 15011), (376, 15116), (403, 15251), (405, 15281), (407, 15317), (410, 15338), (411, 15347), (413, 15374), (417, 15452), (418, 15476), (424, 15617), (430, 15722), (433, 15752), (434, 15755), (440, 15845), (441, 15899), (445, 16001), (458, 16235), (479, 16403), (481, 16424), (488, 16550), (490, 16580), (498, 16616), (499, 16619),

Gene: BritBrat\_18 Start: 11003, Stop: 16657, Start Num: 10

Candidate Starts for BritBrat\_18:

(Start: 10 @11003 has 17 MA's), (12, 11036), (14, 11216), (15, 11228), (18, 11267), (Start: 19 @11276 has 1 MA's), (21, 11300), (22, 11309), (26, 11384), (28, 11426), (43, 11615), (46, 11633), (48, 11657), (50, 11687), (58, 11780), (59, 11783), (66, 11828), (67, 11834), (70, 11876), (74, 11930), (76, 11981), (77, 11993), (80, 12035), (89, 12140), (93, 12167), (97, 12224), (101, 12299), (105, 12338), (107, 12359), (109, 12374), (113, 12407), (119, 12449), (129, 12521), (130, 12524), (131, 12533), (139, 12617), (142, 12650), (143, 12653), (144, 12659), (147, 12668), (148, 12671), (151, 12716), (152, 12734), (154, 12743), (163, 12824), (164, 12827), (166, 12836), (172, 12890), (176, 12911), (185, 12977), (194, 13061), (198, 13124), (200, 13136), (219, 13274), (220, 13298), (222, 13316), (223, 13331), (226, 13358), (232, 13409), (234, 13442), (235, 13451), (238, 13466), (244, 13532), (245, 13535), (248, 13589), (249, 13598), (250, 13628), (267, 13802), (268, 13811), (272, 13850), (282, 13991), (289, 14063), (291, 14075), (297, 14144), (301, 14159), (302, 14165), (308, 14213), (311, 14240), (313, 14249), (320, 14324), (322, 14330), (324, 14348), (327, 14375), (353, 14699), (360, 14792), (363, 14834), (365, 14852), (403, 15104), (407, 15170), (410, 15191), (411, 15200), (413, 15227), (417, 15305), (418, 15329), (422, 15422), (423, 15446), (424, 15470), (430, 15575), (433, 15605), (440, 15698), (441, 15752), (445, 15854), (449, 15953), (479, 16256), (488, 16403), (490, 16433), (498, 16469), (499, 16472), (508, 16547), (519, 16643),

Gene: Cashline\_18 Start: 10857, Stop: 16481, Start Num: 10

Candidate Starts for Cashline\_18:

(Start: 10 @10857 has 17 MA's), (12, 10890), (14, 11070), (15, 11082), (18, 11121), (Start: 19 @11130 has 1 MA's), (21, 11154), (22, 11163), (26, 11238), (28, 11280), (43, 11469), (46, 11487), (48, 11511), (50, 11541), (58, 11634), (59, 11637), (67, 11688), (70, 11730), (74, 11784), (76, 11835), (77, 11847), (80, 11889), (89, 11994), (93, 12021), (97, 12078), (101, 12153), (105, 12192), (107, 12213), (109, 12228), (113, 12261), (119, 12303), (129, 12375), (130, 12378), (131, 12387), (139, 12471), (142, 12504), (143, 12507), (144, 12513), (147, 12522), (148, 12525), (151, 12570), (154, 12597), (162, 12672), (163, 12678), (164, 12681), (166, 12690), (172, 12744), (176, 12765), (179, 12795), (185, 12831), (194, 12915), (198, 12978), (200, 12990), (219, 13128), (220, 13152), (222, 13170), (223, 13185), (226, 13212), (232, 13263), (234, 13296), (235, 13305), (238, 13320), (244, 13386), (245, 13389), (248, 13443), (249, 13452), (250, 13482), (267, 13656), (268, 13665), (272, 13704), (282, 13845), (289, 13917), (291, 13929), (297, 13998), (301, 14013), (302, 14019), (308, 14067), (322, 14184), (324, 14202), (327, 14229), (353, 14553), (366, 14688), (403, 14928), (407, 14994), (410, 15015), (411, 15024), (413, 15051), (417, 15129), (418, 15153), (422, 15246), (423, 15270), (424, 15294), (430, 15399), (433, 15429), (440, 15522), (441, 15576), (445, 15678), (449, 15777), (481, 16101), (488, 16227), (490, 16257), (498, 16293), (499, 16296), (508, 16371), (519,

16467),

Gene: Confidence\_18 Start: 10997, Stop: 16651, Start Num: 10

Candidate Starts for Confidence\_18:

(Start: 10 @10997 has 17 MA's), (12, 11030), (14, 11210), (15, 11222), (18, 11261), (Start: 19 @11270 has 1 MA's), (21, 11294), (22, 11303), (26, 11378), (28, 11420), (43, 11609), (48, 11651), (50, 11681), (55, 11723), (58, 11774), (59, 11777), (67, 11828), (70, 11870), (74, 11924), (76, 11975), (77, 11987), (80, 12029), (89, 12134), (93, 12161), (97, 12218), (101, 12293), (105, 12332), (107, 12353), (109, 12368), (113, 12401), (119, 12443), (129, 12515), (130, 12518), (131, 12527), (139, 12611), (142, 12644), (143, 12647), (144, 12653), (147, 12662), (148, 12665), (151, 12710), (152, 12728), (154, 12737), (162, 12812), (163, 12818), (164, 12821), (166, 12830), (172, 12884), (176, 12905), (179, 12935), (185, 12971), (194, 13055), (198, 13118), (200, 13130), (219, 13268), (220, 13292), (222, 13310), (223, 13325), (226, 13352), (232, 13403), (234, 13436), (235, 13445), (238, 13460), (244, 13526), (245, 13529), (248, 13583), (249, 13592), (250, 13622), (267, 13796), (268, 13805), (272, 13844), (282, 13985), (289, 14057), (291, 14069), (297, 14138), (301, 14153), (302, 14159), (308, 14207), (322, 14324), (324, 14342), (327, 14369), (353, 14693), (360, 14786), (363, 14828), (365, 14846), (403, 15098), (407, 15164), (410, 15185), (411, 15194), (413, 15221), (417, 15299), (418, 15323), (422, 15416), (424, 15464), (430, 15569), (433, 15599), (440, 15692), (441, 15746), (445, 15848), (449, 15947), (479, 16250), (481, 16271), (488, 16397), (490, 16427), (498, 16463), (499, 16466), (508, 16541), (519, 16637),

Gene: Coriander\_17 Start: 10886, Stop: 16564, Start Num: 1

Candidate Starts for Coriander\_17:

(Start: 1 @10886 has 3 MA's), (2, 10916), (3, 10928), (5, 11021), (7, 11141), (8, 11177), (14, 11414), (15, 11426), (18, 11465), (21, 11498), (26, 11582), (28, 11624), (33, 11690), (36, 11708), (46, 11831), (48, 11855), (49, 11882), (59, 11981), (70, 12074), (74, 12128), (76, 12179), (77, 12191), (80, 12233), (102, 12506), (112, 12587), (120, 12650), (121, 12668), (122, 12671), (130, 12722), (133, 12743), (140, 12785), (149, 12833), (152, 12848), (160, 12878), (163, 12896), (166, 12908), (190, 13076), (191, 13079), (204, 13229), (209, 13298), (220, 13358), (223, 13391), (226, 13418), (235, 13511), (239, 13553), (240, 13565), (245, 13595), (246, 13610), (248, 13649), (250, 13688), (253, 13718), (256, 13778), (267, 13862), (269, 13892), (289, 14123), (294, 14168), (304, 14231), (307, 14255), (311, 14288), (314, 14300), (318, 14339), (321, 14366), (326, 14399), (330, 14429), (342, 14534), (345, 14543), (349, 14564), (352, 14663), (367, 14843), (368, 14846), (369, 14858), (371, 14879), (375, 14906), (406, 15101), (408, 15122), (409, 15125), (411, 15143), (420, 15278), (429, 15446), (433, 15491), (437, 15521), (441, 15629), (445, 15731), (449, 15830), (457, 15926), (460, 15986), (467, 16040), (486, 16298), (487, 16304), (490, 16337), (491, 16340), (493, 16361), (501, 16403), (502, 16406), (507, 16442), (512, 16517), (514, 16523), (515, 16526), (519, 16553),

Gene: Crater\_16 Start: 9635, Stop: 15046, Start Num: 20

Candidate Starts for Crater\_16:

(Start: 19 @9629 has 1 MA's), (Start: 20 @9635 has 11 MA's), (25, 9713), (27, 9755), (28, 9767), (39, 9908), (40, 9914), (45, 9950), (49, 10010), (52, 10028), (53, 10046), (57, 10067), (60, 10118), (61, 10121), (62, 10124), (65, 10148), (66, 10151), (72, 10217), (74, 10247), (78, 10325), (83, 10370), (85, 10394), (88, 10448), (91, 10469), (100, 10607), (104, 10643), (106, 10670), (109, 10691), (112, 10706), (117, 10745), (118, 10757), (120, 10769), (127, 10829), (130, 10841), (141, 10892), (158, 10967), (161, 10988), (169, 11036), (171, 11054), (186, 11123), (190, 11147), (194, 11204), (196, 11234), (198, 11267), (211, 11384), (220, 11441), (222, 11459), (223, 11474), (232, 11552), (242, 11657), (243, 11669), (244, 11675), (251, 11789), (252, 11792), (257, 11876), (260, 11906), (262, 11918), (267, 11969), (270, 12002), (273, 12071), (275, 12086), (279, 12128), (285, 12182), (287, 12197), (290, 12236), (291, 12242), (293, 12266), (301, 12326), (302, 12332), (303, 12335), (310, 12404), (320, 12491), (322, 12497), (323, 12506), (327, 12542), (332, 12566), (344, 12677), (346, 12689), (359, 12896), (364, 12959), (365, 12968), (368, 13001), (374, 13058), (376, 13085), (381, 13151), (382, 13169), (384, 13181), (403, 13208), (405, 13238), (407, 13274), (410, 13295), (412,



13307), (413, 13331), (417, 13409), (418, 13433), (419, 13448), (423, 13538), (429, 13658), (430, 13673), (432, 13694), (433, 13703), (439, 13790), (448, 14033), (454, 14123), (464, 14273), (466, 14297), (468, 14306), (470, 14333), (475, 14381), (476, 14399), (478, 14417), (481, 14441), (485, 14501), (494, 14624), (503, 14675), (506, 14702), (517, 14801), (518, 14813), (527, 14909), (530, 14927), (531, 14939), (534, 15029),

Gene: Dmitri\_17 Start: 10871, Stop: 16561, Start Num: 1

Candidate Starts for Dmitri\_17:

(Start: 1 @10871 has 3 MA's), (2, 10901), (4, 10955), (5, 11006), (8, 11162), (11, 11204), (14, 11399), (15, 11411), (18, 11450), (Start: 19 @11459 has 1 MA's), (21, 11483), (26, 11567), (28, 11609), (48, 11840), (54, 11909), (59, 11966), (70, 12059), (74, 12113), (76, 12164), (77, 12176), (80, 12218), (92, 12347), (93, 12350), (102, 12491), (103, 12494), (115, 12599), (120, 12635), (121, 12653), (122, 12656), (130, 12707), (133, 12728), (140, 12770), (147, 12800), (148, 12803), (149, 12818), (152, 12833), (166, 12893), (180, 13007), (184, 13028), (189, 13058), (192, 13076), (202, 13199), (205, 13220), (227, 13424), (234, 13484), (235, 13493), (238, 13508), (239, 13535), (240, 13547), (245, 13577), (248, 13631), (250, 13670), (253, 13700), (256, 13760), (258, 13781), (267, 13844), (269, 13874), (280, 14012), (289, 14105), (294, 14150), (304, 14213), (307, 14237), (311, 14270), (312, 14273), (314, 14282), (321, 14348), (345, 14525), (347, 14534), (349, 14546), (352, 14645), (354, 14678), (367, 14825), (368, 14828), (369, 14840), (371, 14861), (375, 14888), (383, 15005), (406, 15083), (408, 15104), (411, 15125), (420, 15260), (433, 15476), (435, 15485), (437, 15506), (445, 15728), (446, 15746), (457, 15923), (460, 15983), (462, 15992), (467, 16037), (487, 16301), (490, 16334), (491, 16337), (493, 16358), (501, 16400), (502, 16403), (507, 16439), (512, 16514), (514, 16520), (515, 16523), (519, 16550), (520, 16553),

Gene: Doggs\_16 Start: 10586, Stop: 16264, Start Num: 1

Candidate Starts for Doggs\_16:

(Start: 1 @10586 has 3 MA's), (2, 10616), (3, 10628), (5, 10721), (7, 10841), (8, 10877), (14, 11114), (15, 11126), (18, 11165), (21, 11198), (26, 11282), (28, 11324), (33, 11390), (36, 11408), (46, 11531), (48, 11555), (49, 11582), (59, 11681), (70, 11774), (74, 11828), (76, 11879), (77, 11891), (80, 11933), (102, 12206), (110, 12275), (111, 12278), (112, 12287), (120, 12350), (121, 12368), (122, 12371), (130, 12422), (133, 12443), (140, 12485), (149, 12533), (152, 12548), (160, 12578), (163, 12596), (166, 12608), (190, 12776), (191, 12779), (204, 12929), (209, 12998), (220, 13058), (223, 13091), (226, 13118), (235, 13211), (239, 13253), (240, 13265), (245, 13295), (246, 13310), (248, 13349), (250, 13388), (253, 13418), (256, 13478), (267, 13562), (269, 13592), (289, 13823), (294, 13868), (304, 13931), (307, 13955), (311, 13988), (314, 14000), (318, 14039), (321, 14066), (326, 14099), (330, 14129), (342, 14234), (345, 14243), (349, 14264), (352, 14363), (354, 14396), (368, 14546), (369, 14558), (371, 14579), (375, 14606), (406, 14801), (408, 14822), (409, 14825), (411, 14843), (420, 14978), (429, 15146), (433, 15191), (437, 15221), (441, 15329), (443, 15401), (445, 15431), (449, 15530), (457, 15629), (460, 15689), (471, 15782), (482, 15890), (484, 15902), (486, 15998), (487, 16004), (490, 16037), (491, 16040), (501, 16103), (502, 16106), (512, 16217), (514, 16223), (515, 16226), (519, 16253), (520, 16256),

Gene: EMSquaredA\_18 Start: 11003, Stop: 16657, Start Num: 10

Candidate Starts for EMSquaredA\_18:

(Start: 10 @11003 has 17 MA's), (12, 11036), (14, 11216), (15, 11228), (18, 11267), (Start: 19 @11276 has 1 MA's), (21, 11300), (22, 11309), (26, 11384), (28, 11426), (43, 11615), (46, 11633), (48, 11657), (50, 11687), (58, 11780), (59, 11783), (66, 11828), (67, 11834), (70, 11876), (74, 11930), (76, 11981), (77, 11993), (80, 12035), (89, 12140), (93, 12167), (97, 12224), (101, 12299), (105, 12338), (107, 12359), (109, 12374), (113, 12407), (119, 12449), (129, 12521), (130, 12524), (131, 12533), (139, 12617), (142, 12650), (143, 12653), (144, 12659), (147, 12668), (148, 12671), (151, 12716), (152, 12734), (154, 12743), (163, 12824), (164, 12827), (166, 12836), (172, 12890), (176, 12911), (185, 12977), (194, 13061), (198, 13124), (200, 13136), (219, 13274), (220, 13298), (222, 13316), (223, 13331), (226, 13358), (232, 13409), (234, 13442), (235, 13451), (238, 13466), (244,

13532), (245, 13535), (248, 13589), (249, 13598), (250, 13628), (267, 13802), (268, 13811), (272, 13850), (282, 13991), (289, 14063), (291, 14075), (297, 14144), (301, 14159), (302, 14165), (308, 14213), (311, 14240), (313, 14249), (320, 14324), (322, 14330), (324, 14348), (327, 14375), (353, 14699), (360, 14792), (363, 14834), (365, 14852), (403, 15104), (407, 15170), (410, 15191), (411, 15200), (413, 15227), (417, 15305), (418, 15329), (422, 15422), (423, 15446), (424, 15470), (430, 15575), (433, 15605), (440, 15698), (441, 15752), (445, 15854), (449, 15953), (479, 16256), (488, 16403), (490, 16433), (498, 16469), (499, 16472), (508, 16547), (519, 16643),

Gene: Ecliptus\_22 Start: 11993, Stop: 17506, Start Num: 17

Candidate Starts for Ecliptus\_22:

(Start: 17 @11993 has 2 MA's), (Start: 19 @12026 has 1 MA's), (Start: 20 @12032 has 11 MA's), (27, 12152), (28, 12164), (34, 12230), (39, 12305), (49, 12407), (53, 12443), (57, 12464), (61, 12518), (62, 12521), (66, 12548), (71, 12599), (73, 12635), (74, 12644), (78, 12722), (83, 12767), (85, 12791), (86, 12824), (87, 12827), (96, 12935), (104, 13040), (106, 13067), (111, 13094), (112, 13103), (113, 13121), (114, 13124), (120, 13166), (121, 13184), (122, 13187), (133, 13259), (140, 13301), (145, 13322), (148, 13328), (150, 13349), (153, 13358), (157, 13373), (159, 13391), (166, 13424), (169, 13457), (175, 13490), (176, 13499), (177, 13508), (179, 13529), (182, 13553), (185, 13565), (186, 13568), (189, 13589), (190, 13592), (194, 13649), (196, 13679), (213, 13838), (214, 13841), (219, 13862), (220, 13886), (223, 13919), (228, 13973), (230, 13988), (240, 14093), (243, 14114), (245, 14123), (251, 14234), (252, 14237), (267, 14414), (271, 14456), (273, 14516), (274, 14525), (278, 14564), (282, 14603), (284, 14621), (287, 14642), (289, 14675), (293, 14714), (297, 14759), (304, 14792), (308, 14828), (316, 14888), (322, 14945), (329, 14999), (348, 15152), (355, 15305), (361, 15359), (364, 15404), (365, 15413), (368, 15446), (379, 15551), (382, 15608), (403, 15647), (407, 15713), (410, 15734), (416, 15842), (417, 15848), (418, 15872), (423, 15986), (424, 16010), (426, 16085), (430, 16121), (432, 16142), (433, 16151), (434, 16154), (437, 16181), (448, 16484), (452, 16565), (453, 16568), (454, 16574), (465, 16739), (466, 16757), (468, 16766), (472, 16811), (473, 16823), (476, 16856), (478, 16874), (485, 16967), (492, 17072), (496, 17093), (505, 17147), (508, 17186), (516, 17258), (521, 17288), (524, 17327), (526, 17360), (530, 17399), (532, 17447), (533, 17480), (535, 17492),

Gene: EnalisNailo\_18 Start: 11182, Stop: 16806, Start Num: 10

Candidate Starts for EnalisNailo\_18:

(Start: 10 @11182 has 17 MA's), (12, 11215), (14, 11395), (15, 11407), (18, 11446), (Start: 19 @11455 has 1 MA's), (21, 11479), (26, 11563), (27, 11593), (28, 11605), (48, 11836), (49, 11863), (58, 11959), (59, 11962), (63, 11983), (66, 12007), (70, 12055), (74, 12109), (76, 12160), (77, 12172), (79, 12199), (80, 12214), (89, 12319), (97, 12403), (98, 12424), (101, 12478), (105, 12517), (107, 12538), (113, 12586), (116, 12598), (119, 12628), (123, 12661), (130, 12703), (134, 12745), (137, 12766), (139, 12796), (142, 12829), (143, 12832), (144, 12838), (147, 12847), (148, 12850), (152, 12913), (155, 12946), (160, 12985), (166, 13015), (177, 13099), (185, 13156), (195, 13264), (198, 13303), (200, 13315), (220, 13477), (222, 13495), (223, 13510), (226, 13537), (232, 13588), (233, 13603), (235, 13630), (245, 13714), (248, 13768), (249, 13777), (250, 13807), (267, 13981), (269, 14011), (275, 14098), (289, 14242), (291, 14254), (302, 14344), (308, 14392), (316, 14452), (320, 14503), (322, 14509), (327, 14554), (340, 14686), (366, 15013), (376, 15118), (403, 15253), (405, 15283), (407, 15319), (410, 15340), (411, 15349), (413, 15376), (417, 15454), (418, 15478), (424, 15619), (430, 15724), (433, 15754), (434, 15757), (440, 15847), (441, 15901), (445, 16003), (458, 16237), (479, 16405), (481, 16426), (488, 16552), (490, 16582), (498, 16618), (499, 16621),

Gene: Floral\_18 Start: 11003, Stop: 16657, Start Num: 10

Candidate Starts for Floral\_18:

(Start: 10 @11003 has 17 MA's), (12, 11036), (14, 11216), (15, 11228), (18, 11267), (Start: 19 @11276 has 1 MA's), (21, 11300), (22, 11309), (26, 11384), (28, 11426), (43, 11615), (46, 11633), (48, 11657), (50, 11687), (58, 11780), (59, 11783), (66, 11828), (67, 11834), (70, 11876), (74, 11930), (76, 11981), (77, 11993), (80, 12035), (89, 12140), (93, 12167), (97, 12224), (101, 12299), (105,

12338), (107, 12359), (109, 12374), (113, 12407), (119, 12449), (129, 12521), (130, 12524), (131, 12533), (139, 12617), (142, 12650), (143, 12653), (144, 12659), (147, 12668), (148, 12671), (151, 12716), (152, 12734), (154, 12743), (163, 12824), (164, 12827), (166, 12836), (172, 12890), (176, 12911), (185, 12977), (194, 13061), (198, 13124), (200, 13136), (219, 13274), (220, 13298), (222, 13316), (223, 13331), (226, 13358), (232, 13409), (234, 13442), (235, 13451), (238, 13466), (244, 13532), (245, 13535), (248, 13589), (249, 13598), (250, 13628), (267, 13802), (268, 13811), (272, 13850), (282, 13991), (289, 14063), (291, 14075), (297, 14144), (301, 14159), (302, 14165), (308, 14213), (311, 14240), (313, 14249), (320, 14324), (322, 14330), (324, 14348), (327, 14375), (353, 14699), (360, 14792), (363, 14834), (365, 14852), (403, 15104), (407, 15170), (410, 15191), (411, 15200), (413, 15227), (417, 15305), (418, 15329), (422, 15422), (423, 15446), (424, 15470), (430, 15575), (433, 15605), (440, 15698), (441, 15752), (445, 15854), (449, 15953), (479, 16256), (488, 16403), (490, 16433), (498, 16469), (499, 16472), (508, 16547), (519, 16643),

Gene: Fryberger\_51 Start: 21435, Stop: 26990, Start Num: 20

Candidate Starts for Fryberger\_51:

(Start: 20 @21435 has 11 MA's), (24, 21501), (25, 21513), (29, 21585), (37, 21654), (39, 21714), (41, 21729), (42, 21747), (44, 21759), (47, 21789), (51, 21822), (60, 21924), (61, 21927), (68, 21969), (69, 21993), (73, 22044), (81, 22164), (82, 22167), (84, 22185), (85, 22200), (92, 22284), (94, 22290), (98, 22371), (99, 22395), (101, 22431), (103, 22443), (105, 22470), (108, 22497), (122, 22605), (128, 22650), (136, 22719), (138, 22731), (177, 23070), (179, 23100), (181, 23121), (183, 23127), (193, 23193), (197, 23259), (212, 23412), (218, 23442), (221, 23481), (222, 23484), (224, 23514), (229, 23556), (234, 23610), (239, 23661), (241, 23676), (242, 23682), (245, 23703), (248, 23757), (250, 23796), (253, 23826), (254, 23856), (255, 23880), (266, 23970), (267, 23979), (269, 24009), (271, 24021), (276, 24102), (282, 24168), (283, 24180), (298, 24333), (299, 24336), (305, 24381), (319, 24498), (332, 24588), (333, 24618), (335, 24657), (337, 24666), (338, 24681), (351, 24756), (376, 25035), (377, 25041), (403, 25173), (412, 25272), (417, 25368), (421, 25446), (430, 25653), (438, 25764), (443, 25929), (444, 25953), (447, 26010), (451, 26097), (459, 26235), (461, 26253), (463, 26274), (474, 26376), (477, 26421), (480, 26445), (488, 26595), (495, 26655), (500, 26685), (505, 26712), (506, 26727), (509, 26781), (511, 26796), (522, 26877), (523, 26892), (530, 26967),

Gene: Guey18\_56 Start: 22628, Stop: 28183, Start Num: 20

Candidate Starts for Guey18\_56:

(Start: 20 @22628 has 11 MA's), (24, 22694), (25, 22706), (29, 22778), (39, 22907), (41, 22922), (42, 22940), (44, 22952), (47, 22982), (51, 23015), (60, 23117), (61, 23120), (68, 23162), (69, 23186), (73, 23237), (81, 23357), (82, 23360), (84, 23378), (85, 23393), (92, 23477), (94, 23483), (98, 23564), (99, 23588), (101, 23624), (103, 23636), (105, 23663), (108, 23690), (122, 23798), (128, 23843), (136, 23912), (138, 23924), (177, 24263), (179, 24293), (181, 24314), (183, 24320), (193, 24386), (197, 24452), (212, 24605), (215, 24617), (218, 24635), (221, 24674), (222, 24677), (224, 24707), (229, 24749), (234, 24803), (239, 24854), (241, 24869), (242, 24875), (245, 24896), (248, 24950), (250, 24989), (253, 25019), (254, 25049), (266, 25163), (267, 25172), (269, 25202), (271, 25214), (276, 25295), (282, 25361), (283, 25373), (298, 25526), (299, 25529), (305, 25574), (319, 25691), (332, 25781), (333, 25811), (335, 25850), (337, 25859), (338, 25874), (351, 25949), (376, 26228), (377, 26234), (403, 26366), (412, 26465), (417, 26561), (421, 26639), (427, 26819), (430, 26846), (438, 26957), (443, 27122), (444, 27146), (447, 27203), (451, 27290), (459, 27428), (461, 27446), (463, 27467), (474, 27569), (480, 27638), (500, 27878), (505, 27905), (506, 27920), (509, 27974), (522, 28070), (523, 28085), (530, 28160),

Gene: Jablanski\_18 Start: 11132, Stop: 16768, Start Num: 10

Candidate Starts for Jablanski\_18:

(Start: 10 @11132 has 17 MA's), (12, 11165), (14, 11345), (15, 11357), (18, 11396), (Start: 19 @11405 has 1 MA's), (21, 11429), (22, 11438), (26, 11513), (28, 11555), (43, 11744), (46, 11762), (48, 11786), (50, 11816), (55, 11858), (58, 11909), (59, 11912), (67, 11963), (70, 12005), (74, 12059), (76, 12110), (77, 12122), (80, 12164), (89, 12269), (93, 12296), (97, 12353), (101, 12428), (105,

12467), (107, 12488), (109, 12503), (113, 12536), (119, 12578), (129, 12650), (130, 12653), (131, 12662), (139, 12746), (142, 12779), (143, 12782), (144, 12788), (147, 12797), (148, 12800), (151, 12845), (152, 12863), (154, 12872), (164, 12956), (166, 12965), (172, 13019), (176, 13040), (179, 13070), (185, 13106), (194, 13190), (198, 13253), (200, 13265), (219, 13403), (220, 13427), (222, 13445), (223, 13460), (225, 13478), (226, 13487), (232, 13538), (234, 13571), (235, 13580), (238, 13595), (244, 13661), (245, 13664), (248, 13718), (249, 13727), (250, 13757), (256, 13847), (267, 13931), (269, 13961), (282, 14120), (285, 14144), (288, 14183), (289, 14192), (291, 14204), (302, 14294), (308, 14342), (313, 14378), (316, 14402), (320, 14453), (322, 14459), (327, 14504), (334, 14567), (353, 14828), (366, 14963), (403, 15203), (407, 15269), (410, 15290), (411, 15299), (413, 15326), (417, 15404), (418, 15428), (422, 15521), (424, 15569), (430, 15674), (431, 15686), (433, 15704), (440, 15797), (441, 15851), (442, 15875), (445, 15953), (449, 16052), (458, 16199), (481, 16388), (488, 16514), (490, 16544), (498, 16580), (499, 16583), (519, 16754),

Gene: Keelan\_49 Start: 21419, Stop: 26977, Start Num: 20

Candidate Starts for Keelan\_49:

(13, 21353), (Start: 20 @21419 has 11 MA's), (25, 21497), (29, 21569), (31, 21584), (39, 21698), (42, 21731), (44, 21743), (47, 21773), (51, 21806), (60, 21908), (61, 21911), (64, 21920), (68, 21953), (72, 22007), (73, 22028), (81, 22148), (84, 22169), (85, 22184), (98, 22355), (112, 22505), (124, 22601), (130, 22640), (135, 22691), (136, 22703), (138, 22715), (165, 22937), (167, 22946), (183, 23099), (199, 23264), (201, 23276), (210, 23372), (212, 23384), (218, 23414), (222, 23456), (224, 23486), (229, 23528), (230, 23540), (234, 23582), (239, 23633), (242, 23654), (244, 23672), (245, 23675), (247, 23717), (248, 23729), (250, 23768), (254, 23828), (261, 23903), (267, 23951), (271, 23993), (276, 24074), (277, 24080), (281, 24128), (282, 24140), (295, 24296), (309, 24377), (315, 24425), (317, 24452), (319, 24470), (325, 24518), (328, 24542), (332, 24560), (341, 24671), (351, 24740), (358, 24815), (377, 25025), (403, 25157), (412, 25256), (417, 25352), (418, 25376), (421, 25430), (425, 25541), (430, 25643), (438, 25754), (443, 25919), (444, 25943), (450, 26075), (461, 26240), (463, 26261), (469, 26318), (474, 26363), (477, 26408), (480, 26432), (488, 26582), (497, 26654), (500, 26672), (504, 26693), (505, 26699), (509, 26768), (510, 26777), (513, 26801), (525, 26891), (530, 26954),

Gene: Kuwabara\_17 Start: 9635, Stop: 15067, Start Num: 20

Candidate Starts for Kuwabara\_17:

(Start: 19 @9629 has 1 MA's), (Start: 20 @9635 has 11 MA's), (25, 9713), (27, 9755), (28, 9767), (39, 9908), (40, 9914), (45, 9950), (49, 10010), (52, 10028), (53, 10046), (57, 10067), (60, 10118), (61, 10121), (62, 10124), (65, 10148), (66, 10151), (72, 10217), (74, 10247), (78, 10325), (83, 10370), (85, 10394), (88, 10448), (91, 10469), (100, 10607), (104, 10643), (106, 10670), (109, 10691), (112, 10706), (117, 10745), (118, 10757), (120, 10769), (127, 10829), (130, 10841), (141, 10892), (158, 10967), (161, 10988), (169, 11036), (171, 11054), (186, 11123), (190, 11147), (194, 11204), (196, 11234), (198, 11267), (211, 11384), (220, 11441), (222, 11459), (223, 11474), (232, 11552), (242, 11657), (243, 11669), (244, 11675), (251, 11789), (252, 11792), (257, 11876), (260, 11906), (262, 11918), (267, 11969), (270, 12002), (273, 12071), (275, 12086), (279, 12128), (285, 12182), (286, 12185), (287, 12197), (290, 12236), (291, 12242), (293, 12266), (301, 12326), (302, 12332), (303, 12335), (310, 12404), (320, 12491), (322, 12497), (323, 12506), (327, 12542), (332, 12566), (344, 12677), (346, 12689), (359, 12896), (362, 12941), (365, 12968), (368, 13001), (376, 13079), (378, 13103), (379, 13106), (382, 13163), (384, 13175), (403, 13202), (404, 13220), (407, 13268), (410, 13289), (415, 13379), (417, 13403), (418, 13427), (423, 13535), (428, 13658), (430, 13682), (432, 13703), (433, 13712), (434, 13715), (437, 13742), (439, 13802), (448, 14045), (452, 14126), (453, 14129), (454, 14135), (465, 14300), (466, 14318), (468, 14327), (472, 14372), (473, 14384), (476, 14417), (478, 14435), (485, 14528), (492, 14633), (496, 14654), (505, 14708), (508, 14747), (516, 14819), (521, 14849), (524, 14888), (526, 14921), (530, 14960), (532, 15008), (533, 15041), (535, 15053),

Gene: Lilas\_18 Start: 11182, Stop: 16806, Start Num: 10

Candidate Starts for Lilas\_18:

(Start: 10 @11182 has 17 MA's), (12, 11215), (14, 11395), (15, 11407), (18, 11446), (Start: 19 @11455 has 1 MA's), (21, 11479), (26, 11563), (27, 11593), (28, 11605), (48, 11836), (49, 11863), (58, 11959), (59, 11962), (63, 11983), (66, 12007), (70, 12055), (74, 12109), (76, 12160), (77, 12172), (79, 12199), (80, 12214), (89, 12319), (97, 12403), (98, 12424), (101, 12478), (105, 12517), (107, 12538), (113, 12586), (116, 12598), (119, 12628), (123, 12661), (130, 12703), (134, 12745), (137, 12766), (139, 12796), (142, 12829), (143, 12832), (144, 12838), (147, 12847), (148, 12850), (152, 12913), (155, 12946), (160, 12985), (166, 13015), (177, 13099), (185, 13156), (195, 13264), (198, 13303), (200, 13315), (220, 13477), (222, 13495), (223, 13510), (226, 13537), (232, 13588), (233, 13603), (235, 13630), (245, 13714), (248, 13768), (249, 13777), (250, 13807), (267, 13981), (269, 14011), (275, 14098), (289, 14242), (291, 14254), (302, 14344), (308, 14392), (316, 14452), (320, 14503), (322, 14509), (327, 14554), (340, 14686), (366, 15013), (376, 15118), (403, 15253), (405, 15283), (407, 15319), (410, 15340), (411, 15349), (413, 15376), (417, 15454), (418, 15478), (424, 15619), (430, 15724), (433, 15754), (434, 15757), (440, 15847), (441, 15901), (445, 16003), (458, 16237), (479, 16405), (481, 16426), (488, 16552), (490, 16582), (498, 16618), (499, 16621),

Gene: LonelyBoi\_18 Start: 11131, Stop: 16809, Start Num: 10

Candidate Starts for LonelyBoi\_18:

(Start: 10 @11131 has 17 MA's), (12, 11164), (14, 11344), (15, 11356), (18, 11395), (Start: 19 @11404 has 1 MA's), (21, 11428), (22, 11437), (26, 11512), (28, 11554), (43, 11743), (46, 11761), (48, 11785), (50, 11815), (55, 11857), (58, 11908), (59, 11911), (67, 11962), (70, 12004), (74, 12058), (76, 12109), (77, 12121), (80, 12163), (89, 12268), (93, 12295), (97, 12352), (101, 12427), (105, 12466), (107, 12487), (109, 12502), (113, 12535), (119, 12577), (130, 12652), (134, 12694), (139, 12745), (142, 12778), (143, 12781), (147, 12796), (152, 12862), (156, 12904), (160, 12934), (162, 12946), (166, 12964), (168, 13000), (170, 13018), (173, 13045), (174, 13048), (180, 13099), (185, 13126), (188, 13138), (194, 13210), (198, 13273), (200, 13285), (207, 13330), (220, 13447), (223, 13480), (226, 13507), (228, 13534), (235, 13600), (240, 13654), (243, 13675), (251, 13795), (252, 13798), (257, 13882), (262, 13924), (263, 13927), (264, 13933), (265, 13936), (267, 13975), (273, 14077), (277, 14104), (288, 14233), (293, 14281), (301, 14341), (302, 14347), (304, 14359), (306, 14383), (308, 14395), (316, 14455), (320, 14506), (322, 14512), (327, 14557), (340, 14689), (366, 15016), (403, 15256), (407, 15322), (410, 15343), (411, 15352), (413, 15379), (417, 15457), (418, 15481), (422, 15574), (423, 15598), (424, 15622), (430, 15727), (433, 15757), (440, 15850), (441, 15904), (445, 16006), (449, 16105), (479, 16408), (481, 16429), (488, 16555), (490, 16585), (498, 16621), (499, 16624), (508, 16699), (519, 16795),

Gene: Lucky10\_16 Start: 8884, Stop: 14280, Start Num: 19

Candidate Starts for Lucky10\_16:

(Start: 19 @8884 has 1 MA's), (Start: 20 @8890 has 11 MA's), (27, 9010), (28, 9022), (34, 9088), (39, 9163), (40, 9169), (53, 9301), (60, 9373), (61, 9376), (62, 9379), (66, 9406), (69, 9442), (73, 9493), (74, 9502), (75, 9538), (78, 9580), (83, 9625), (85, 9649), (88, 9703), (91, 9724), (104, 9898), (107, 9931), (112, 9961), (117, 10000), (118, 10012), (120, 10024), (126, 10069), (127, 10084), (130, 10096), (141, 10147), (158, 10222), (167, 10270), (169, 10291), (171, 10309), (178, 10339), (186, 10378), (190, 10402), (194, 10459), (196, 10489), (198, 10522), (208, 10618), (220, 10696), (222, 10714), (223, 10729), (232, 10807), (243, 10924), (244, 10930), (251, 11044), (252, 11047), (257, 11131), (262, 11173), (267, 11224), (270, 11257), (273, 11326), (279, 11383), (285, 11437), (286, 11440), (287, 11452), (290, 11491), (292, 11509), (293, 11521), (297, 11566), (301, 11581), (316, 11695), (320, 11746), (322, 11752), (324, 11770), (328, 11803), (332, 11821), (336, 11896), (344, 11932), (346, 11944), (350, 11965), (353, 12070), (354, 12076), (368, 12226), (369, 12238), (370, 12247), (375, 12286), (378, 12328), (382, 12388), (384, 12400), (403, 12427), (405, 12457), (407, 12493), (410, 12514), (417, 12628), (418, 12652), (430, 12895), (431, 12907), (433, 12925), (439, 13015), (448, 13258), (456, 13378), (468, 13540), (476, 13630), (478, 13648), (489, 13816), (496, 13867), (505, 13921), (506, 13936), (516, 14032), (521, 14062), (524, 14101), (526, 14134), (527, 14155), (528, 14167), (529, 14170), (532, 14221), (533, 14254), (535, 14266),

Gene: Marteena\_18 Start: 11003, Stop: 16657, Start Num: 10

Candidate Starts for Marteena\_18:

(Start: 10 @11003 has 17 MA's), (12, 11036), (14, 11216), (15, 11228), (18, 11267), (Start: 19 @11276 has 1 MA's), (21, 11300), (22, 11309), (26, 11384), (28, 11426), (43, 11615), (46, 11633), (48, 11657), (50, 11687), (58, 11780), (59, 11783), (66, 11828), (67, 11834), (70, 11876), (74, 11930), (76, 11981), (77, 11993), (80, 12035), (89, 12140), (93, 12167), (97, 12224), (101, 12299), (105, 12338), (107, 12359), (109, 12374), (113, 12407), (119, 12449), (129, 12521), (130, 12524), (131, 12533), (139, 12617), (142, 12650), (143, 12653), (144, 12659), (147, 12668), (148, 12671), (151, 12716), (152, 12734), (154, 12743), (163, 12824), (164, 12827), (166, 12836), (172, 12890), (176, 12911), (185, 12977), (194, 13061), (198, 13124), (200, 13136), (219, 13274), (220, 13298), (222, 13316), (223, 13331), (226, 13358), (232, 13409), (234, 13442), (235, 13451), (238, 13466), (244, 13532), (245, 13535), (248, 13589), (249, 13598), (250, 13628), (267, 13802), (268, 13811), (272, 13850), (282, 13991), (289, 14063), (291, 14075), (297, 14144), (301, 14159), (302, 14165), (308, 14213), (311, 14240), (313, 14249), (320, 14324), (322, 14330), (324, 14348), (327, 14375), (353, 14699), (360, 14792), (363, 14834), (365, 14852), (403, 15104), (407, 15170), (410, 15191), (411, 15200), (413, 15227), (417, 15305), (418, 15329), (422, 15422), (423, 15446), (424, 15470), (430, 15575), (433, 15605), (440, 15698), (441, 15752), (445, 15854), (449, 15953), (479, 16256), (488, 16403), (490, 16433), (498, 16469), (499, 16472), (508, 16547), (519, 16643),

Gene: Morkie\_16 Start: 8855, Stop: 14248, Start Num: 20

Candidate Starts for Morkie\_16:

(Start: 19 @8849 has 1 MA's), (Start: 20 @8855 has 11 MA's), (27, 8975), (28, 8987), (34, 9053), (35, 9056), (39, 9128), (40, 9134), (49, 9230), (52, 9248), (53, 9266), (60, 9338), (61, 9341), (62, 9344), (66, 9371), (69, 9407), (73, 9458), (74, 9467), (75, 9503), (78, 9545), (83, 9590), (85, 9614), (88, 9668), (91, 9689), (104, 9863), (107, 9896), (112, 9926), (113, 9944), (117, 9965), (118, 9977), (120, 9989), (125, 10028), (126, 10034), (127, 10049), (130, 10061), (141, 10112), (146, 10133), (158, 10187), (167, 10235), (169, 10256), (171, 10274), (178, 10304), (186, 10343), (190, 10367), (194, 10424), (196, 10454), (198, 10487), (220, 10661), (222, 10679), (223, 10694), (226, 10721), (232, 10772), (240, 10868), (242, 10877), (243, 10889), (251, 11009), (252, 11012), (257, 11096), (267, 11189), (270, 11222), (273, 11291), (285, 11402), (286, 11405), (287, 11417), (290, 11456), (291, 11462), (292, 11474), (293, 11486), (297, 11531), (301, 11546), (303, 11555), (316, 11660), (320, 11711), (322, 11717), (328, 11768), (332, 11786), (336, 11861), (344, 11897), (346, 11909), (350, 11930), (353, 12035), (354, 12041), (368, 12191), (369, 12203), (370, 12212), (372, 12236), (382, 12353), (384, 12365), (403, 12392), (405, 12422), (407, 12458), (410, 12479), (417, 12593), (418, 12617), (423, 12725), (430, 12863), (433, 12893), (437, 12923), (439, 12983), (448, 13226), (454, 13316), (468, 13508), (476, 13598), (478, 13616), (489, 13784), (496, 13835), (505, 13889), (506, 13904), (516, 14000), (521, 14030), (524, 14069), (526, 14102), (527, 14123), (528, 14135), (529, 14138), (533, 14222), (535, 14234),

Gene: MortyNRick\_17 Start: 9965, Stop: 15370, Start Num: 21

Candidate Starts for MortyNRick\_17:

(Start: 16 @9908 has 2 MA's), (21, 9965), (23, 9983), (27, 10067), (28, 10079), (30, 10091), (32, 10115), (34, 10145), (38, 10190), (39, 10220), (40, 10226), (48, 10295), (49, 10322), (52, 10340), (53, 10358), (56, 10370), (57, 10379), (60, 10430), (61, 10433), (62, 10436), (65, 10460), (66, 10463), (73, 10550), (74, 10559), (78, 10637), (83, 10682), (85, 10706), (86, 10739), (87, 10742), (95, 10829), (96, 10850), (104, 10955), (106, 10982), (111, 11009), (113, 11036), (114, 11039), (120, 11081), (121, 11099), (122, 11102), (133, 11174), (140, 11216), (145, 11237), (150, 11264), (153, 11273), (157, 11288), (159, 11306), (166, 11339), (169, 11372), (175, 11405), (176, 11414), (177, 11423), (179, 11444), (182, 11468), (186, 11483), (189, 11504), (190, 11507), (194, 11564), (196, 11594), (198, 11627), (220, 11801), (223, 11834), (226, 11861), (228, 11888), (231, 11906), (237, 11966), (240, 12008), (243, 12029), (247, 12080), (249, 12101), (251, 12149), (252, 12152), (265, 12290), (267, 12329), (271, 12371), (273, 12431), (277, 12458), (278, 12479), (284, 12536), (287, 12557), (293,

12629), (296, 12671), (297, 12674), (304, 12707), (308, 12743), (316, 12803), (320, 12854), (322, 12860), (323, 12869), (324, 12878), (328, 12911), (332, 12929), (333, 12959), (356, 13154), (357, 13157), (363, 13238), (365, 13256), (368, 13289), (369, 13301), (373, 13337), (376, 13373), (378, 13397), (379, 13400), (380, 13421), (382, 13457), (384, 13469), (403, 13496), (404, 13514), (405, 13526), (407, 13562), (410, 13583), (415, 13673), (417, 13697), (418, 13721), (423, 13829), (428, 13952), (430, 13976), (433, 14006), (434, 14009), (437, 14036), (448, 14339), (452, 14420), (453, 14423), (454, 14429), (465, 14594), (466, 14612), (468, 14621), (472, 14666), (473, 14678), (476, 14714), (478, 14732), (485, 14831), (492, 14936), (496, 14957), (505, 15011), (508, 15050), (516, 15122), (521, 15152), (524, 15191), (526, 15224), (530, 15263), (532, 15311), (533, 15344), (535, 15356),

Gene: ODay\_22 Start: 12098, Stop: 17611, Start Num: 17

Candidate Starts for ODay\_22:

(Start: 17 @12098 has 2 MA's), (Start: 19 @12131 has 1 MA's), (Start: 20 @12137 has 11 MA's), (27, 12257), (28, 12269), (34, 12335), (39, 12410), (48, 12485), (49, 12512), (52, 12530), (53, 12548), (56, 12560), (57, 12569), (61, 12623), (62, 12626), (65, 12650), (66, 12653), (73, 12740), (74, 12749), (78, 12827), (83, 12872), (85, 12896), (87, 12932), (95, 13019), (96, 13040), (100, 13109), (104, 13145), (106, 13172), (111, 13199), (113, 13226), (114, 13229), (120, 13271), (121, 13289), (122, 13292), (140, 13406), (145, 13427), (150, 13454), (153, 13463), (157, 13478), (166, 13529), (169, 13562), (175, 13595), (176, 13604), (177, 13613), (182, 13658), (185, 13670), (186, 13673), (189, 13694), (190, 13697), (194, 13754), (196, 13784), (213, 13943), (214, 13946), (219, 13967), (220, 13991), (223, 14024), (228, 14078), (230, 14093), (240, 14198), (243, 14219), (245, 14228), (251, 14339), (252, 14342), (267, 14519), (271, 14561), (273, 14621), (274, 14630), (278, 14669), (282, 14708), (284, 14726), (287, 14747), (289, 14780), (293, 14819), (304, 14897), (308, 14933), (316, 14993), (320, 15044), (322, 15050), (329, 15104), (343, 15230), (348, 15257), (361, 15464), (365, 15518), (370, 15572), (379, 15656), (382, 15713), (403, 15752), (407, 15818), (410, 15839), (413, 15875), (414, 15890), (417, 15953), (418, 15977), (422, 16067), (423, 16091), (424, 16115), (426, 16190), (428, 16202), (430, 16226), (432, 16247), (433, 16256), (437, 16286), (439, 16346), (448, 16589), (452, 16670), (453, 16673), (454, 16679), (465, 16844), (466, 16862), (468, 16871), (472, 16916), (473, 16928), (476, 16961), (478, 16979), (485, 17072), (492, 17177), (496, 17198), (505, 17252), (508, 17291), (516, 17363), (521, 17393), (524, 17432), (526, 17465), (530, 17504), (532, 17552), (533, 17585), (535, 17597),

Gene: PhorbesPhlower\_16 Start: 8855, Stop: 14248, Start Num: 20

Candidate Starts for PhorbesPhlower\_16:

(Start: 19 @8849 has 1 MA's), (Start: 20 @8855 has 11 MA's), (27, 8975), (28, 8987), (34, 9053), (35, 9056), (39, 9128), (40, 9134), (49, 9230), (52, 9248), (53, 9266), (60, 9338), (61, 9341), (62, 9344), (66, 9371), (69, 9407), (73, 9458), (74, 9467), (75, 9503), (78, 9545), (83, 9590), (85, 9614), (88, 9668), (91, 9689), (104, 9863), (107, 9896), (112, 9926), (113, 9944), (117, 9965), (118, 9977), (120, 9989), (125, 10028), (126, 10034), (127, 10049), (130, 10061), (141, 10112), (146, 10133), (158, 10187), (167, 10235), (169, 10256), (171, 10274), (178, 10304), (186, 10343), (190, 10367), (194, 10424), (196, 10454), (198, 10487), (220, 10661), (222, 10679), (223, 10694), (226, 10721), (232, 10772), (240, 10868), (242, 10877), (243, 10889), (251, 11009), (252, 11012), (257, 11096), (267, 11189), (270, 11222), (273, 11291), (285, 11402), (286, 11405), (287, 11417), (290, 11456), (291, 11462), (292, 11474), (293, 11486), (297, 11531), (301, 11546), (303, 11555), (316, 11660), (320, 11711), (322, 11717), (328, 11768), (332, 11786), (336, 11861), (344, 11897), (346, 11909), (350, 11930), (353, 12035), (354, 12041), (368, 12191), (369, 12203), (370, 12212), (372, 12236), (382, 12353), (384, 12365), (403, 12392), (405, 12422), (407, 12458), (410, 12479), (417, 12593), (418, 12617), (423, 12725), (430, 12863), (433, 12893), (437, 12923), (439, 12983), (448, 13226), (454, 13316), (468, 13508), (476, 13598), (478, 13616), (489, 13784), (496, 13835), (505, 13889), (506, 13904), (516, 14000), (521, 14030), (524, 14069), (526, 14102), (527, 14123), (528, 14135), (529, 14138), (533, 14222), (535, 14234),

Gene: Pollux\_18 Start: 11003, Stop: 16657, Start Num: 10

Candidate Starts for Pollux\_18:

(Start: 10 @11003 has 17 MA's), (12, 11036), (14, 11216), (15, 11228), (18, 11267), (Start: 19 @11276 has 1 MA's), (21, 11300), (22, 11309), (26, 11384), (28, 11426), (43, 11615), (46, 11633), (48, 11657), (50, 11687), (58, 11780), (59, 11783), (66, 11828), (67, 11834), (70, 11876), (74, 11930), (76, 11981), (77, 11993), (80, 12035), (89, 12140), (93, 12167), (97, 12224), (101, 12299), (105, 12338), (107, 12359), (109, 12374), (113, 12407), (119, 12449), (129, 12521), (130, 12524), (131, 12533), (139, 12617), (142, 12650), (143, 12653), (144, 12659), (147, 12668), (148, 12671), (151, 12716), (152, 12734), (154, 12743), (163, 12824), (164, 12827), (166, 12836), (172, 12890), (176, 12911), (185, 12977), (194, 13061), (198, 13124), (200, 13136), (219, 13274), (220, 13298), (222, 13316), (223, 13331), (226, 13358), (232, 13409), (234, 13442), (235, 13451), (238, 13466), (244, 13532), (245, 13535), (248, 13589), (249, 13598), (250, 13628), (267, 13802), (268, 13811), (272, 13850), (282, 13991), (289, 14063), (291, 14075), (297, 14144), (301, 14159), (302, 14165), (308, 14213), (311, 14240), (313, 14249), (320, 14324), (322, 14330), (324, 14348), (327, 14375), (353, 14699), (360, 14792), (363, 14834), (365, 14852), (403, 15104), (407, 15170), (410, 15191), (411, 15200), (413, 15227), (417, 15305), (418, 15329), (422, 15422), (423, 15446), (424, 15470), (430, 15575), (433, 15605), (440, 15698), (441, 15752), (445, 15854), (449, 15953), (479, 16256), (488, 16403), (490, 16433), (498, 16469), (499, 16472), (508, 16547), (519, 16643),

Gene: Posh\_18 Start: 11000, Stop: 16621, Start Num: 10

Candidate Starts for Posh\_18:

(6, 10904), (Start: 10 @11000 has 17 MA's), (12, 11033), (14, 11213), (15, 11225), (18, 11264), (Start: 19 @11273 has 1 MA's), (21, 11297), (22, 11306), (26, 11381), (28, 11423), (43, 11612), (46, 11630), (48, 11654), (50, 11684), (59, 11780), (67, 11831), (70, 11873), (74, 11927), (76, 11978), (77, 11990), (80, 12032), (89, 12137), (93, 12164), (97, 12221), (101, 12296), (105, 12335), (107, 12356), (109, 12371), (113, 12404), (119, 12446), (129, 12518), (130, 12521), (131, 12530), (134, 12563), (139, 12614), (142, 12647), (143, 12650), (144, 12656), (147, 12665), (148, 12668), (151, 12713), (152, 12731), (154, 12740), (163, 12821), (164, 12824), (166, 12833), (172, 12887), (176, 12908), (185, 12974), (194, 13058), (198, 13121), (200, 13133), (216, 13253), (220, 13295), (223, 13328), (226, 13355), (232, 13406), (234, 13439), (235, 13448), (238, 13463), (245, 13532), (248, 13586), (249, 13595), (250, 13625), (256, 13715), (267, 13799), (282, 13988), (285, 14012), (288, 14051), (289, 14060), (291, 14072), (302, 14162), (308, 14210), (316, 14270), (320, 14321), (322, 14327), (327, 14372), (334, 14435), (339, 14495), (340, 14501), (353, 14693), (366, 14828), (403, 15068), (407, 15134), (410, 15155), (411, 15164), (413, 15191), (417, 15269), (418, 15293), (422, 15386), (424, 15434), (430, 15539), (431, 15551), (433, 15569), (434, 15572), (440, 15662), (441, 15716), (442, 15740), (445, 15818), (449, 15917), (479, 16220), (481, 16241), (488, 16367), (490, 16397), (498, 16433), (499, 16436), (508, 16511), (519, 16607),

Gene: Pytheas\_18 Start: 11131, Stop: 16767, Start Num: 10

Candidate Starts for Pytheas\_18:

(Start: 10 @11131 has 17 MA's), (12, 11164), (14, 11344), (15, 11356), (18, 11395), (Start: 19 @11404 has 1 MA's), (21, 11428), (22, 11437), (26, 11512), (28, 11554), (43, 11743), (46, 11761), (48, 11785), (50, 11815), (55, 11857), (58, 11908), (59, 11911), (67, 11962), (70, 12004), (74, 12058), (76, 12109), (77, 12121), (80, 12163), (89, 12268), (93, 12295), (97, 12352), (101, 12427), (105, 12466), (107, 12487), (109, 12502), (113, 12535), (119, 12577), (129, 12649), (130, 12652), (131, 12661), (139, 12745), (142, 12778), (143, 12781), (144, 12787), (147, 12796), (148, 12799), (151, 12844), (152, 12862), (154, 12871), (164, 12955), (166, 12964), (172, 13018), (176, 13039), (179, 13069), (185, 13105), (194, 13189), (198, 13252), (200, 13264), (219, 13402), (220, 13426), (222, 13444), (223, 13459), (225, 13477), (226, 13486), (232, 13537), (234, 13570), (235, 13579), (238, 13594), (244, 13660), (245, 13663), (248, 13717), (249, 13726), (250, 13756), (256, 13846), (267, 13930), (269, 13960), (282, 14119), (285, 14143), (288, 14182), (289, 14191), (291, 14203), (302, 14293), (308, 14341), (313, 14377), (316, 14401), (320, 14452), (322, 14458), (327, 14503), (334, 14566), (353, 14827), (366, 14962), (403, 15202), (407, 15268), (410, 15289), (411, 15298), (413,



15325), (417, 15403), (418, 15427), (422, 15520), (424, 15568), (430, 15673), (431, 15685), (433, 15703), (440, 15796), (441, 15850), (442, 15874), (445, 15952), (449, 16051), (458, 16198), (481, 16387), (488, 16513), (490, 16543), (498, 16579), (499, 16582), (519, 16753),

Gene: RayTheFireFly\_17 Start: 10898, Stop: 16588, Start Num: 1

Candidate Starts for RayTheFireFly\_17:

(Start: 1 @10898 has 3 MA's), (2, 10928), (5, 11033), (7, 11153), (8, 11189), (14, 11426), (15, 11438), (18, 11477), (Start: 19 @11486 has 1 MA's), (21, 11510), (26, 11594), (28, 11636), (48, 11867), (54, 11936), (59, 11993), (70, 12086), (74, 12140), (76, 12191), (77, 12203), (80, 12245), (93, 12377), (102, 12518), (109, 12584), (111, 12590), (115, 12626), (119, 12659), (120, 12662), (127, 12722), (130, 12734), (132, 12746), (133, 12755), (140, 12797), (147, 12827), (149, 12845), (152, 12860), (166, 12920), (177, 13004), (180, 13034), (184, 13055), (187, 13070), (192, 13103), (202, 13226), (203, 13235), (205, 13247), (223, 13400), (232, 13478), (235, 13520), (239, 13562), (240, 13574), (245, 13604), (246, 13619), (248, 13658), (250, 13697), (253, 13727), (256, 13787), (267, 13871), (269, 13901), (276, 13994), (280, 14039), (289, 14132), (294, 14177), (300, 14219), (304, 14240), (307, 14264), (311, 14297), (314, 14309), (321, 14375), (326, 14408), (345, 14552), (349, 14573), (352, 14672), (354, 14705), (367, 14852), (368, 14855), (369, 14867), (371, 14888), (375, 14915), (383, 15032), (406, 15110), (408, 15131), (409, 15134), (429, 15458), (433, 15503), (445, 15755), (446, 15773), (455, 15920), (460, 16013), (471, 16106), (482, 16214), (483, 16220), (486, 16322), (487, 16328), (490, 16361), (491, 16364), (493, 16385), (501, 16427), (502, 16430), (507, 16466), (512, 16541), (514, 16547), (515, 16550), (519, 16577), (520, 16580),

Gene: Ronaldo\_54 Start: 22393, Stop: 27948, Start Num: 20

Candidate Starts for Ronaldo\_54:

(Start: 20 @22393 has 11 MA's), (24, 22459), (25, 22471), (29, 22543), (37, 22612), (39, 22672), (41, 22687), (42, 22705), (44, 22717), (47, 22747), (51, 22780), (60, 22882), (61, 22885), (68, 22927), (69, 22951), (73, 23002), (81, 23122), (82, 23125), (84, 23143), (85, 23158), (92, 23242), (94, 23248), (98, 23329), (99, 23353), (103, 23401), (105, 23428), (108, 23455), (122, 23563), (128, 23608), (136, 23677), (138, 23689), (177, 24028), (179, 24058), (181, 24079), (183, 24085), (197, 24217), (206, 24298), (212, 24370), (218, 24400), (221, 24439), (222, 24442), (224, 24472), (229, 24514), (234, 24568), (239, 24619), (241, 24634), (242, 24640), (245, 24661), (248, 24715), (250, 24754), (253, 24784), (254, 24814), (255, 24838), (266, 24928), (267, 24937), (269, 24967), (271, 24979), (276, 25060), (282, 25126), (283, 25138), (298, 25291), (299, 25294), (305, 25339), (319, 25456), (332, 25546), (333, 25576), (335, 25615), (337, 25624), (338, 25639), (351, 25714), (376, 25993), (377, 25999), (403, 26131), (412, 26230), (417, 26326), (421, 26404), (430, 26611), (438, 26722), (443, 26887), (444, 26911), (447, 26968), (451, 27055), (459, 27193), (461, 27211), (463, 27232), (474, 27334), (477, 27379), (480, 27403), (488, 27553), (495, 27613), (500, 27643), (505, 27670), (506, 27685), (509, 27739), (511, 27754), (522, 27835), (523, 27850), (530, 27925),

Gene: Volt\_53 Start: 22393, Stop: 27948, Start Num: 20

Candidate Starts for Volt\_53:

(Start: 20 @22393 has 11 MA's), (24, 22459), (25, 22471), (29, 22543), (37, 22612), (39, 22672), (41, 22687), (42, 22705), (44, 22717), (47, 22747), (51, 22780), (60, 22882), (61, 22885), (68, 22927), (69, 22951), (73, 23002), (81, 23122), (82, 23125), (84, 23143), (85, 23158), (92, 23242), (94, 23248), (98, 23329), (99, 23353), (103, 23401), (105, 23428), (108, 23455), (122, 23563), (128, 23608), (136, 23677), (138, 23689), (177, 24028), (179, 24058), (181, 24079), (183, 24085), (197, 24217), (206, 24298), (212, 24370), (218, 24400), (221, 24439), (222, 24442), (224, 24472), (229, 24514), (234, 24568), (239, 24619), (241, 24634), (242, 24640), (245, 24661), (248, 24715), (250, 24754), (253, 24784), (254, 24814), (255, 24838), (266, 24928), (267, 24937), (269, 24967), (271, 24979), (276, 25060), (282, 25126), (283, 25138), (298, 25291), (299, 25294), (305, 25339), (319, 25456), (332, 25546), (333, 25576), (335, 25615), (337, 25624), (338, 25639), (351, 25714), (376, 25993), (377, 25999), (403, 26131), (412, 26230), (417, 26326), (421, 26404), (430, 26611), (438, 26722), (443, 26887), (444, 26911), (447, 26968), (451, 27055), (459, 27193), (461, 27211), (463, 27232), (474,

27334), (477, 27379), (480, 27403), (488, 27553), (495, 27613), (500, 27643), (505, 27670), (506, 27685), (509, 27739), (511, 27754), (522, 27835), (523, 27850), (530, 27925),

Gene: Wrigley\_18 Start: 10897, Stop: 16518, Start Num: 10

Candidate Starts for Wrigley\_18:

(Start: 10 @10897 has 17 MA's), (12, 10930), (14, 11110), (15, 11122), (18, 11161), (Start: 19 @11170 has 1 MA's), (21, 11194), (22, 11203), (26, 11278), (28, 11320), (43, 11509), (46, 11527), (48, 11551), (50, 11581), (55, 11623), (59, 11677), (67, 11728), (70, 11770), (74, 11824), (76, 11875), (77, 11887), (80, 11929), (89, 12034), (93, 12061), (97, 12118), (101, 12193), (105, 12232), (107, 12253), (109, 12268), (113, 12301), (119, 12343), (129, 12415), (130, 12418), (131, 12427), (134, 12460), (139, 12511), (142, 12544), (143, 12547), (144, 12553), (147, 12562), (148, 12565), (151, 12610), (152, 12628), (154, 12637), (163, 12718), (164, 12721), (166, 12730), (172, 12784), (176, 12805), (185, 12871), (194, 12955), (198, 13018), (200, 13030), (216, 13150), (220, 13192), (223, 13225), (226, 13252), (232, 13303), (234, 13336), (235, 13345), (238, 13360), (245, 13429), (248, 13483), (249, 13492), (250, 13522), (256, 13612), (267, 13696), (282, 13885), (285, 13909), (288, 13948), (289, 13957), (291, 13969), (302, 14059), (308, 14107), (316, 14167), (320, 14218), (322, 14224), (327, 14269), (334, 14332), (339, 14392), (340, 14398), (353, 14590), (366, 14725), (403, 14965), (407, 15031), (410, 15052), (411, 15061), (413, 15088), (417, 15166), (418, 15190), (422, 15283), (424, 15331), (430, 15436), (431, 15448), (433, 15466), (440, 15559), (441, 15613), (442, 15637), (445, 15715), (449, 15814), (488, 16264), (490, 16294), (498, 16330), (499, 16333), (508, 16408), (519, 16504),

Gene: Ziko\_54 Start: 22333, Stop: 27888, Start Num: 20

Candidate Starts for Ziko\_54:

(Start: 20 @22333 has 11 MA's), (24, 22399), (25, 22411), (29, 22483), (37, 22552), (39, 22612), (41, 22627), (42, 22645), (44, 22657), (47, 22687), (51, 22720), (60, 22822), (61, 22825), (68, 22867), (69, 22891), (73, 22942), (81, 23062), (82, 23065), (84, 23083), (85, 23098), (92, 23182), (94, 23188), (98, 23269), (99, 23293), (103, 23341), (105, 23368), (108, 23395), (122, 23503), (128, 23548), (136, 23617), (138, 23629), (177, 23968), (179, 23998), (181, 24019), (183, 24025), (197, 24157), (206, 24238), (212, 24310), (218, 24340), (221, 24379), (222, 24382), (224, 24412), (229, 24454), (234, 24508), (239, 24559), (241, 24574), (242, 24580), (245, 24601), (248, 24655), (250, 24694), (253, 24724), (254, 24754), (255, 24778), (266, 24868), (267, 24877), (269, 24907), (271, 24919), (276, 25000), (282, 25066), (283, 25078), (298, 25231), (299, 25234), (305, 25279), (319, 25396), (332, 25486), (333, 25516), (335, 25555), (337, 25564), (338, 25579), (351, 25654), (376, 25933), (377, 25939), (403, 26071), (412, 26170), (417, 26266), (421, 26344), (430, 26551), (438, 26662), (443, 26827), (444, 26851), (447, 26908), (451, 26995), (459, 27133), (461, 27151), (463, 27172), (474, 27274), (477, 27319), (480, 27343), (488, 27493), (495, 27553), (500, 27583), (505, 27610), (506, 27625), (509, 27679), (511, 27694), (522, 27775), (523, 27790), (530, 27865),