

Zoomed Pham 224647

1: CookieBear	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
2: Sashimi_20	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
3: Globfish_19	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
4: Shukran_19	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
5: MaterMagnus_19+	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
6: Hestia_19	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
7: Windest_20	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
8: Tiff81_20	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
9: ThayneTheZag	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
10: Anekin_18	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
11: Hillester_19	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
12: Phrank15_18	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
13: BlueShadow_20	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
14: BillyIP_19	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
15: EvePickles	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
16: Raphaela_19	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
17: Seahorse_20	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
18: SpicyFrank_19	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
19: Isolde_19	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
20: Faja_19	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
21: Bhageatrice_19	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
22: Persistence_19	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
23: YoungHarlee_19	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
24: MidnightRain_19	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
25: BenchScrape_19	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
26: PeggyLeg03_18	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
27: KayMoney_18+1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
28: Eileen_18+	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
29: GlobiWarming_18	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
30: Karkhanas_18	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
31: Constance_18	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
32: FosterFrank_18	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
33: Judy_19	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
34: HotPotato_18	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
35: Pucara_18	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
36: Bridges_18	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
37: G.P.Pink_18	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
38: ImpleJ_18	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
39: Kukla_17	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32

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 224647 Report

This analysis was run 03/28/25 on database version 593.

Pham number 224647 has 52 members, 23 are drafts.

Phages represented in each track:

- Track 1 : CookieBear\_20, AdaS\_19, Vopal\_20, MUWow\_18, Sakai\_19, Richie\_19, JellyBread\_19, Auxilium\_19, Gorpy\_19
- Track 2 : Sashimi\_20
- Track 3 : Globfish\_19
- Track 4 : Shukran\_19
- Track 5 : MaterMagnus\_19, Aikyam\_19
- Track 6 : Hestia\_19
- Track 7 : Windest\_20
- Track 8 : Tiff81\_20
- Track 9 : ThayneTheZag\_19
- Track 10 : Anekin\_18
- Track 11 : Hillester\_19, RadFad\_19
- Track 12 : Phrank15\_18
- Track 13 : BlueShadow\_20
- Track 14 : BillyTP\_19, Lawnathon\_19
- Track 15 : EvePickles\_19
- Track 16 : Raphaella\_19
- Track 17 : Seahorse\_20
- Track 18 : SpicyFrank\_19
- Track 19 : Isolde\_19
- Track 20 : Faja\_19
- Track 21 : Bhageatrice\_21
- Track 22 : Persistence\_18
- Track 23 : YoungHarleezy\_19
- Track 24 : MidnightRain\_19
- Track 25 : BenchScraper\_19
- Track 26 : PeggyLeg03\_18
- Track 27 : KayMoney\_18, ChuckDuck\_18
- Track 28 : Eileen\_18, Peas\_18
- Track 29 : GlobiWarming\_18
- Track 30 : Karkharias\_18
- Track 31 : Constance\_18
- Track 32 : FosterFrank\_18
- Track 33 : Judy\_19
- Track 34 : HotPotato\_18
- Track 35 : Pucara\_18
- Track 36 : Bridgette\_18

- Track 37 : GUPitcher\_17
- Track 38 : TripleJ\_18
- Track 39 : Kukla\_17

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

The start number called the most often in the published annotations is 21, it was called in 25 of the 29 non-draft genes in the pham.

Genes that call this "Most Annotated" start:

- AdaS\_19, Aikyam\_19, Anekin\_18, Auxilium\_19, BenchScraper\_19, Bhageatrice\_21, BillyTP\_19, BlueShadow\_20, Bridgette\_18, ChuckDuck\_18, Constance\_18, CookieBear\_20, Eileen\_18, FosterFrank\_18, Globfish\_19, GlobiWarming\_18, Gorpy\_19, Hestia\_19, Hillester\_19, HotPotato\_18, Isolde\_19, JellyBread\_19, Judy\_19, Karkharias\_18, KayMoney\_18, Lawnathon\_19, MUWow\_18, MaterMagnus\_19, MidnightRain\_19, Peas\_18, PeggyLeg03\_18, Persistence\_18, Phrank15\_18, Pucara\_18, RadFad\_19, Raphaella\_19, Richie\_19, Sakai\_19, Seahorse\_20, Shukran\_19, SpicyFrank\_19, ThayneTheZag\_19, Tiff81\_20, Vopal\_20, Windest\_20, YoungHarleezy\_19,

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

- 

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

- EvePickles\_19, Faja\_19, GUPitcher\_17, Kukla\_17, Sashimi\_20, TripleJ\_18,

**Summary by start number:**

Start 7:

- Found in 2 of 52 ( 3.8% ) of genes in pham
- Manual Annotations of this start: 1 of 29
- Called 100.0% of time when present
- Phage (with cluster) where this start called: GUPitcher\_17 (FJ), TripleJ\_18 (FJ),

Start 17:

- Found in 4 of 52 ( 7.7% ) of genes in pham
- Manual Annotations of this start: 3 of 29
- Called 100.0% of time when present
- Phage (with cluster) where this start called: EvePickles\_19 (AY), Faja\_19 (AY), Kukla\_17 (FJ), Sashimi\_20 (AY),

Start 21:

- Found in 46 of 52 ( 88.5% ) of genes in pham
- Manual Annotations of this start: 25 of 29
- Called 100.0% of time when present
- Phage (with cluster) where this start called: AdaS\_19 (AY), Aikyam\_19 (AY), Anekin\_18 (AY), Auxilium\_19 (AY), BenchScraper\_19 (AY), Bhageatrice\_21 (AY), BillyTP\_19 (AY), BlueShadow\_20 (AY), Bridgette\_18 (FA), ChuckDuck\_18 (FA), Constance\_18 (FA), CookieBear\_20 (AY), Eileen\_18 (FA), FosterFrank\_18 (FA), Globfish\_19 (AY), GlobiWarming\_18 (FA), Gorpy\_19 (AY), Hestia\_19 (AY),

Hillester\_19 (AY), HotPotato\_18 (FA), Isolde\_19 (AY), JellyBread\_19 (AY), Judy\_19 (FA), Karkharias\_18 (FA), KayMoney\_18 (FA), Lawnathon\_19 (AY), MUWow\_18 (AY), MaterMagnus\_19 (AY), MidnightRain\_19 (AY), Peas\_18 (FA), PeggyLeg03\_18 (FA), Persistence\_18 (AY), Phrank15\_18 (AY), Pucara\_18 (FA), RadFad\_19 (AY), Raphaella\_19 (AY), Richie\_19 (AY), Sakai\_19 (AY), Seahorse\_20 (AY), Shukran\_19 (AY), SpicyFrank\_19 (AY), ThayneTheZag\_19 (AY), Tiff81\_20 (AY), Vopal\_20 (AY), Windest\_20 (AY), YoungHarleezy\_19 (AY),

### **Summary by clusters:**

There are 3 clusters represented in this pham: AY, FA, FJ,

Info for manual annotations of cluster AY:

- Start number 17 was manually annotated 2 times for cluster AY.
- Start number 21 was manually annotated 16 times for cluster AY.

Info for manual annotations of cluster FA:

- Start number 21 was manually annotated 9 times for cluster FA.

Info for manual annotations of cluster FJ:

- Start number 7 was manually annotated 1 time for cluster FJ.
- Start number 17 was manually annotated 1 time for cluster FJ.

### **Gene Information:**

Gene: AdaS\_19 Start: 10843, Stop: 14784, Start Num: 21

Candidate Starts for AdaS\_19:

(Start: 21 @10843 has 25 MA's), (23, 10882), (27, 10945), (29, 10978), (31, 11002), (33, 11008), (34, 11020), (39, 11044), (40, 11056), (41, 11074), (43, 11116), (51, 11281), (66, 11548), (68, 11554), (72, 11593), (82, 11686), (93, 11854), (97, 11899), (107, 11995), (120, 12070), (124, 12100), (130, 12187), (132, 12199), (138, 12268), (140, 12304), (142, 12334), (147, 12370), (152, 12418), (153, 12430), (158, 12460), (166, 12517), (167, 12526), (169, 12571), (170, 12574), (172, 12619), (174, 12628), (181, 12712), (182, 12721), (185, 12733), (189, 12754), (194, 12793), (196, 12805), (201, 12880), (204, 12904), (213, 13012), (215, 13051), (228, 13141), (229, 13156), (244, 13258), (247, 13288), (252, 13339), (253, 13360), (258, 13408), (259, 13411), (268, 13495), (269, 13498), (275, 13576), (283, 13651), (284, 13660), (288, 13675), (302, 13795), (307, 13834), (309, 13852), (315, 13951), (319, 14044), (324, 14158), (325, 14176), (329, 14215), (330, 14257), (335, 14320), (336, 14332), (339, 14368), (341, 14410), (344, 14431), (350, 14527), (357, 14581), (373, 14734),

Gene: Aikyam\_19 Start: 10844, Stop: 14785, Start Num: 21

Candidate Starts for Aikyam\_19:

(Start: 21 @10844 has 25 MA's), (23, 10883), (27, 10946), (29, 10979), (31, 11003), (33, 11009), (34, 11021), (39, 11045), (40, 11057), (41, 11075), (43, 11117), (51, 11282), (66, 11549), (68, 11555), (72, 11594), (82, 11687), (93, 11855), (97, 11900), (107, 11996), (120, 12071), (124, 12101), (130, 12188), (132, 12200), (138, 12269), (140, 12305), (142, 12335), (147, 12371), (152, 12419), (153, 12431), (158, 12461), (166, 12518), (167, 12527), (169, 12572), (170, 12575), (174, 12629), (181, 12713), (182, 12722), (185, 12734), (189, 12755), (196, 12806), (204, 12905), (213, 13013), (215, 13052), (228, 13142), (229, 13157), (244, 13259), (247, 13289), (252, 13340), (253, 13361), (258, 13409), (259, 13412), (268, 13496), (269, 13499), (275, 13577), (283, 13652), (284, 13661), (288, 13676), (302, 13796), (307, 13835), (309, 13853), (315, 13952), (319, 14045), (324, 14159), (325, 14177), (329, 14216), (330, 14258), (335, 14321), (336, 14333), (339, 14369), (341, 14411), (344, 14432),

(350, 14528), (357, 14582), (365, 14672), (373, 14735),

Gene: Anekin\_18 Start: 10911, Stop: 14747, Start Num: 21

Candidate Starts for Anekin\_18:

(Start: 21 @10911 has 25 MA's), (25, 10971), (29, 11046), (31, 11070), (33, 11076), (38, 11106), (39, 11112), (41, 11142), (43, 11184), (53, 11388), (56, 11439), (66, 11616), (67, 11619), (70, 11628), (72, 11661), (93, 11922), (103, 12012), (105, 12033), (106, 12042), (108, 12066), (114, 12108), (119, 12129), (122, 12150), (131, 12261), (134, 12279), (137, 12327), (140, 12372), (141, 12381), (146, 12429), (151, 12474), (166, 12582), (174, 12693), (177, 12741), (181, 12777), (185, 12798), (196, 12870), (216, 13017), (220, 13050), (229, 13116), (230, 13122), (231, 13125), (237, 13176), (248, 13260), (252, 13299), (253, 13320), (275, 13539), (276, 13560), (280, 13587), (282, 13605), (283, 13614), (321, 14040), (322, 14070), (324, 14121), (329, 14178), (330, 14220), (335, 14283), (336, 14295), (341, 14373), (344, 14394), (348, 14478), (355, 14532), (357, 14544), (363, 14628), (365, 14634),

Gene: Auxilium\_19 Start: 10843, Stop: 14784, Start Num: 21

Candidate Starts for Auxilium\_19:

(Start: 21 @10843 has 25 MA's), (23, 10882), (27, 10945), (29, 10978), (31, 11002), (33, 11008), (34, 11020), (39, 11044), (40, 11056), (41, 11074), (43, 11116), (51, 11281), (66, 11548), (68, 11554), (72, 11593), (82, 11686), (93, 11854), (97, 11899), (107, 11995), (120, 12070), (124, 12100), (130, 12187), (132, 12199), (138, 12268), (140, 12304), (142, 12334), (147, 12370), (152, 12418), (153, 12430), (158, 12460), (166, 12517), (167, 12526), (169, 12571), (170, 12574), (172, 12619), (174, 12628), (181, 12712), (182, 12721), (185, 12733), (189, 12754), (194, 12793), (196, 12805), (201, 12880), (204, 12904), (213, 13012), (215, 13051), (228, 13141), (229, 13156), (244, 13258), (247, 13288), (252, 13339), (253, 13360), (258, 13408), (259, 13411), (268, 13495), (269, 13498), (275, 13576), (283, 13651), (284, 13660), (288, 13675), (302, 13795), (307, 13834), (309, 13852), (315, 13951), (319, 14044), (324, 14158), (325, 14176), (329, 14215), (330, 14257), (335, 14320), (336, 14332), (339, 14368), (341, 14410), (344, 14431), (350, 14527), (357, 14581), (373, 14734),

Gene: BenchScraper\_19 Start: 10858, Stop: 14799, Start Num: 21

Candidate Starts for BenchScraper\_19:

(Start: 21 @10858 has 25 MA's), (23, 10897), (27, 10960), (29, 10993), (31, 11017), (33, 11023), (34, 11035), (39, 11059), (40, 11071), (41, 11089), (43, 11131), (51, 11296), (66, 11563), (68, 11569), (72, 11608), (82, 11701), (93, 11869), (97, 11914), (107, 12010), (120, 12085), (130, 12202), (132, 12214), (138, 12283), (140, 12319), (142, 12349), (147, 12385), (152, 12433), (153, 12445), (158, 12475), (166, 12532), (167, 12541), (169, 12586), (170, 12589), (174, 12643), (181, 12727), (182, 12736), (185, 12748), (189, 12769), (196, 12820), (204, 12919), (213, 13027), (215, 13066), (228, 13156), (229, 13171), (244, 13273), (247, 13303), (252, 13354), (253, 13375), (258, 13423), (259, 13426), (268, 13510), (269, 13513), (275, 13591), (283, 13666), (284, 13675), (288, 13690), (302, 13810), (307, 13849), (309, 13867), (315, 13966), (319, 14059), (324, 14173), (325, 14191), (329, 14230), (330, 14272), (335, 14335), (336, 14347), (339, 14383), (341, 14425), (344, 14446), (350, 14542), (357, 14596), (365, 14686), (373, 14749),

Gene: Bhageatrice\_21 Start: 12043, Stop: 16074, Start Num: 21

Candidate Starts for Bhageatrice\_21:

(Start: 21 @12043 has 25 MA's), (29, 12178), (41, 12274), (43, 12316), (47, 12415), (50, 12463), (55, 12559), (56, 12571), (61, 12643), (66, 12748), (71, 12790), (72, 12793), (77, 12865), (89, 12955), (99, 13120), (105, 13165), (107, 13195), (115, 13243), (129, 13393), (131, 13426), (139, 13543), (144, 13606), (150, 13663), (153, 13714), (160, 13771), (165, 13825), (171, 13909), (195, 14098), (203, 14200), (224, 14374), (227, 14392), (233, 14437), (235, 14455), (243, 14512), (267, 14770), (275, 14866), (282, 14932), (283, 14941), (289, 14968), (298, 15028), (309, 15142), (315, 15241), (319, 15334), (324, 15448), (325, 15466), (329, 15505), (330, 15547), (335, 15610), (336, 15622), (339, 15658), (341, 15700), (343, 15715), (344, 15721), (348, 15805), (350, 15817), (357, 15871), (365,

15961), (373, 16024),

Gene: BillyTP\_19 Start: 10765, Stop: 14568, Start Num: 21

Candidate Starts for BillyTP\_19:

(Start: 21 @10765 has 25 MA's), (29, 10900), (31, 10924), (33, 10930), (39, 10966), (40, 10978), (41, 10996), (42, 11005), (43, 11038), (44, 11044), (46, 11122), (51, 11203), (53, 11242), (57, 11326), (58, 11335), (59, 11341), (61, 11365), (62, 11374), (67, 11473), (69, 11479), (75, 11566), (80, 11599), (85, 11635), (96, 11818), (101, 11854), (103, 11866), (107, 11917), (122, 12004), (127, 12091), (140, 12232), (148, 12301), (149, 12310), (153, 12358), (156, 12379), (157, 12382), (168, 12454), (172, 12517), (186, 12601), (188, 12616), (194, 12655), (199, 12712), (222, 12907), (230, 12952), (239, 13015), (252, 13117), (253, 13138), (275, 13360), (282, 13426), (283, 13435), (294, 13501), (306, 13597), (309, 13636), (313, 13702), (319, 13828), (324, 13942), (325, 13960), (328, 13990), (329, 13999), (330, 14041), (335, 14104), (336, 14116), (339, 14152), (341, 14194), (344, 14215), (345, 14227), (355, 14353), (357, 14365), (363, 14449), (365, 14455), (374, 14548),

Gene: BlueShadow\_20 Start: 10843, Stop: 14784, Start Num: 21

Candidate Starts for BlueShadow\_20:

(Start: 21 @10843 has 25 MA's), (23, 10882), (27, 10945), (29, 10978), (31, 11002), (33, 11008), (34, 11020), (39, 11044), (40, 11056), (41, 11074), (43, 11116), (51, 11281), (66, 11548), (68, 11554), (72, 11593), (82, 11686), (93, 11854), (97, 11899), (107, 11995), (120, 12070), (124, 12100), (130, 12187), (132, 12199), (138, 12268), (140, 12304), (142, 12334), (147, 12370), (152, 12418), (153, 12430), (158, 12460), (166, 12517), (167, 12526), (169, 12571), (170, 12574), (172, 12619), (174, 12628), (181, 12712), (182, 12721), (185, 12733), (189, 12754), (194, 12793), (196, 12805), (201, 12880), (204, 12904), (213, 13012), (215, 13051), (228, 13141), (229, 13156), (244, 13258), (247, 13288), (252, 13339), (253, 13360), (258, 13408), (259, 13411), (268, 13495), (269, 13498), (275, 13576), (283, 13651), (284, 13660), (288, 13675), (307, 13834), (309, 13852), (315, 13951), (319, 14044), (324, 14158), (325, 14176), (329, 14215), (330, 14257), (335, 14320), (336, 14332), (339, 14368), (341, 14410), (344, 14431), (350, 14527), (357, 14581), (365, 14671), (373, 14734),

Gene: Bridgette\_18 Start: 10928, Stop: 14845, Start Num: 21

Candidate Starts for Bridgette\_18:

(Start: 21 @10928 has 25 MA's), (29, 11063), (31, 11087), (33, 11093), (39, 11129), (40, 11141), (41, 11159), (42, 11168), (43, 11201), (44, 11207), (46, 11285), (51, 11366), (53, 11405), (57, 11489), (59, 11504), (61, 11528), (62, 11537), (69, 11642), (74, 11723), (75, 11729), (77, 11750), (83, 11792), (86, 11819), (90, 11909), (96, 12002), (103, 12050), (122, 12188), (127, 12275), (129, 12284), (148, 12485), (149, 12494), (153, 12542), (156, 12563), (157, 12566), (168, 12638), (172, 12701), (196, 12851), (206, 12977), (228, 13115), (236, 13166), (237, 13178), (239, 13199), (251, 13289), (264, 13424), (268, 13463), (272, 13499), (275, 13541), (276, 13562), (277, 13580), (283, 13616), (284, 13625), (288, 13640), (304, 13853), (314, 14003), (315, 14009), (319, 14102), (324, 14216), (325, 14234), (328, 14264), (329, 14273), (330, 14315), (335, 14378), (336, 14390), (341, 14468), (344, 14489), (345, 14501), (355, 14627), (357, 14639), (364, 14726), (367, 14744),

Gene: ChuckDuck\_18 Start: 10884, Stop: 14687, Start Num: 21

Candidate Starts for ChuckDuck\_18:

(Start: 21 @10884 has 25 MA's), (29, 11019), (31, 11043), (32, 11046), (33, 11049), (39, 11085), (40, 11097), (41, 11115), (42, 11124), (43, 11157), (44, 11163), (46, 11241), (51, 11322), (53, 11361), (57, 11445), (58, 11454), (59, 11460), (61, 11484), (62, 11493), (67, 11592), (69, 11598), (75, 11685), (80, 11718), (85, 11754), (96, 11937), (101, 11973), (103, 11985), (107, 12036), (122, 12123), (127, 12210), (129, 12219), (140, 12351), (148, 12420), (149, 12429), (153, 12477), (156, 12498), (157, 12501), (168, 12573), (172, 12636), (186, 12720), (188, 12735), (194, 12774), (199, 12831), (202, 12864), (222, 13026), (230, 13071), (239, 13134), (252, 13236), (253, 13257), (275, 13479), (283, 13554), (294, 13620), (306, 13716), (309, 13755), (313, 13821), (319, 13947), (324, 14061), (325, 14079), (328, 14109), (329, 14118), (330, 14160), (335, 14223), (336, 14235), (339, 14271), (341,

14313), (344, 14334), (353, 14451), (357, 14484), (358, 14493), (363, 14568), (365, 14574),

Gene: Constance\_18 Start: 10931, Stop: 14827, Start Num: 21

Candidate Starts for Constance\_18:

(Start: 21 @10931 has 25 MA's), (29, 11066), (31, 11090), (33, 11096), (39, 11132), (40, 11144), (41, 11162), (42, 11171), (43, 11204), (44, 11210), (46, 11288), (51, 11369), (53, 11408), (57, 11492), (61, 11531), (62, 11540), (69, 11645), (74, 11726), (75, 11732), (80, 11765), (85, 11801), (103, 12032), (122, 12170), (129, 12266), (148, 12467), (149, 12476), (153, 12524), (156, 12545), (157, 12548), (168, 12620), (188, 12782), (196, 12833), (206, 12959), (228, 13097), (237, 13160), (239, 13181), (251, 13271), (264, 13406), (268, 13445), (272, 13481), (275, 13523), (277, 13562), (281, 13586), (283, 13598), (284, 13607), (288, 13622), (303, 13826), (304, 13835), (313, 13958), (314, 13985), (315, 13991), (316, 14012), (319, 14084), (324, 14198), (328, 14246), (329, 14255), (330, 14297), (335, 14360), (336, 14372), (339, 14408), (341, 14450), (344, 14471), (345, 14483), (350, 14567), (357, 14621), (362, 14702), (364, 14708), (366, 14723), (367, 14726), (371, 14762),

Gene: CookieBear\_20 Start: 10843, Stop: 14784, Start Num: 21

Candidate Starts for CookieBear\_20:

(Start: 21 @10843 has 25 MA's), (23, 10882), (27, 10945), (29, 10978), (31, 11002), (33, 11008), (34, 11020), (39, 11044), (40, 11056), (41, 11074), (43, 11116), (51, 11281), (66, 11548), (68, 11554), (72, 11593), (82, 11686), (93, 11854), (97, 11899), (107, 11995), (120, 12070), (124, 12100), (130, 12187), (132, 12199), (138, 12268), (140, 12304), (142, 12334), (147, 12370), (152, 12418), (153, 12430), (158, 12460), (166, 12517), (167, 12526), (169, 12571), (170, 12574), (172, 12619), (174, 12628), (181, 12712), (182, 12721), (185, 12733), (189, 12754), (194, 12793), (196, 12805), (201, 12880), (204, 12904), (213, 13012), (215, 13051), (228, 13141), (229, 13156), (244, 13258), (247, 13288), (252, 13339), (253, 13360), (258, 13408), (259, 13411), (268, 13495), (269, 13498), (275, 13576), (283, 13651), (284, 13660), (288, 13675), (302, 13795), (307, 13834), (309, 13852), (315, 13951), (319, 14044), (324, 14158), (325, 14176), (329, 14215), (330, 14257), (335, 14320), (336, 14332), (339, 14368), (341, 14410), (344, 14431), (350, 14527), (357, 14581), (373, 14734),

Gene: Eileen\_18 Start: 10892, Stop: 14788, Start Num: 21

Candidate Starts for Eileen\_18:

(Start: 21 @10892 has 25 MA's), (29, 11027), (31, 11051), (33, 11057), (39, 11093), (40, 11105), (41, 11123), (42, 11132), (43, 11165), (44, 11171), (46, 11249), (51, 11330), (53, 11369), (57, 11453), (59, 11468), (62, 11501), (69, 11606), (75, 11693), (80, 11726), (85, 11762), (96, 11945), (103, 11993), (107, 12044), (108, 12047), (112, 12083), (113, 12086), (122, 12131), (127, 12218), (140, 12359), (148, 12428), (149, 12437), (153, 12485), (156, 12506), (157, 12509), (168, 12581), (172, 12644), (188, 12743), (196, 12794), (206, 12920), (228, 13058), (236, 13109), (237, 13121), (239, 13142), (251, 13232), (264, 13367), (268, 13406), (272, 13442), (275, 13484), (276, 13505), (277, 13523), (281, 13547), (283, 13559), (284, 13568), (288, 13583), (304, 13796), (314, 13946), (315, 13952), (319, 14045), (324, 14159), (325, 14177), (328, 14207), (329, 14216), (330, 14258), (335, 14321), (336, 14333), (339, 14369), (341, 14411), (344, 14432), (345, 14444), (355, 14570), (357, 14582), (364, 14669), (367, 14687),

Gene: EvePickles\_19 Start: 11006, Stop: 15145, Start Num: 17

Candidate Starts for EvePickles\_19:

(16, 10994), (Start: 17 @11006 has 3 MA's), (18, 11024), (22, 11066), (27, 11150), (41, 11279), (43, 11321), (47, 11420), (51, 11486), (54, 11555), (55, 11564), (58, 11618), (61, 11648), (65, 11693), (66, 11753), (67, 11756), (72, 11798), (80, 11882), (85, 11918), (105, 12170), (109, 12221), (111, 12233), (122, 12287), (129, 12383), (130, 12392), (136, 12458), (143, 12545), (152, 12617), (161, 12659), (167, 12710), (176, 12851), (181, 12896), (191, 12953), (204, 13088), (205, 13094), (207, 13136), (208, 13148), (211, 13187), (215, 13235), (228, 13325), (229, 13340), (234, 13373), (244, 13442), (247, 13472), (249, 13487), (252, 13523), (253, 13544), (255, 13568), (260, 13601), (262, 13637), (263, 13640), (270, 13694), (277, 13808), (280, 13817), (282, 13835), (290, 13898), (298, 14054),

(299, 14060), (309, 14168), (318, 14330), (321, 14393), (323, 14435), (327, 14513), (330, 14573), (331, 14582), (333, 14594), (334, 14618), (337, 14663), (339, 14684), (341, 14726), (344, 14747), (347, 14810), (349, 14843), (357, 14900), (360, 14939), (361, 14969), (368, 15014), (375, 15113), (376, 15131),

Gene: Faja\_19 Start: 10995, Stop: 15041, Start Num: 17

Candidate Starts for Faja\_19:

(Start: 17 @10995 has 3 MA's), (22, 11055), (26, 11130), (28, 11142), (30, 11193), (34, 11214), (35, 11217), (37, 11226), (41, 11268), (43, 11310), (45, 11319), (47, 11409), (50, 11457), (51, 11475), (52, 11481), (53, 11514), (55, 11553), (58, 11607), (59, 11613), (64, 11670), (66, 11742), (72, 11787), (73, 11796), (78, 11865), (80, 11871), (82, 11880), (85, 11907), (89, 11949), (91, 12003), (102, 12135), (103, 12138), (105, 12159), (107, 12189), (109, 12210), (111, 12222), (122, 12276), (126, 12345), (134, 12405), (138, 12462), (141, 12507), (147, 12564), (149, 12585), (166, 12711), (168, 12723), (173, 12819), (174, 12822), (177, 12870), (185, 12927), (199, 13044), (204, 13098), (208, 13158), (213, 13206), (215, 13245), (218, 13257), (229, 13350), (235, 13389), (238, 13413), (239, 13431), (240, 13434), (244, 13452), (248, 13494), (252, 13533), (253, 13554), (255, 13578), (266, 13668), (276, 13794), (277, 13812), (285, 13860), (286, 13863), (296, 13920), (299, 13962), (309, 14070), (311, 14103), (321, 14295), (323, 14337), (327, 14415), (330, 14475), (333, 14496), (339, 14586), (341, 14628), (344, 14649), (347, 14712), (354, 14775), (359, 14820), (368, 14910), (375, 15009), (376, 15027),

Gene: FosterFrank\_18 Start: 10889, Stop: 14785, Start Num: 21

Candidate Starts for FosterFrank\_18:

(Start: 21 @10889 has 25 MA's), (29, 11024), (31, 11048), (33, 11054), (39, 11090), (40, 11102), (41, 11120), (42, 11129), (43, 11162), (44, 11168), (46, 11246), (51, 11327), (53, 11366), (57, 11450), (61, 11489), (62, 11498), (69, 11603), (74, 11684), (75, 11690), (80, 11723), (85, 11759), (103, 11990), (113, 12083), (122, 12128), (129, 12224), (148, 12425), (149, 12434), (153, 12482), (156, 12503), (157, 12506), (168, 12578), (188, 12740), (206, 12917), (228, 13055), (237, 13118), (239, 13139), (251, 13229), (264, 13364), (268, 13403), (272, 13439), (275, 13481), (277, 13520), (281, 13544), (283, 13556), (284, 13565), (288, 13580), (304, 13793), (313, 13916), (314, 13943), (315, 13949), (319, 14042), (324, 14156), (328, 14204), (329, 14213), (330, 14255), (335, 14318), (336, 14330), (339, 14366), (341, 14408), (344, 14429), (345, 14441), (346, 14483), (350, 14525), (357, 14579), (362, 14660), (364, 14666), (366, 14681), (367, 14684), (371, 14720),

Gene: GUPitcher\_17 Start: 10438, Stop: 14796, Start Num: 7

Candidate Starts for GUPitcher\_17:

(6, 10426), (Start: 7 @10438 has 1 MA's), (8, 10456), (9, 10498), (10, 10540), (12, 10573), (19, 10708), (27, 10834), (28, 10837), (30, 10888), (34, 10909), (36, 10915), (37, 10921), (41, 10963), (42, 10972), (43, 11005), (54, 11239), (55, 11248), (58, 11302), (59, 11308), (66, 11437), (72, 11482), (80, 11566), (85, 11602), (88, 11629), (96, 11785), (111, 11917), (126, 12040), (129, 12067), (136, 12142), (143, 12229), (167, 12394), (168, 12397), (196, 12673), (204, 12772), (211, 12871), (215, 12919), (225, 12988), (229, 13024), (234, 13057), (244, 13126), (248, 13168), (249, 13171), (252, 13207), (253, 13228), (261, 13312), (263, 13321), (265, 13336), (276, 13462), (277, 13480), (280, 13489), (286, 13531), (297, 13702), (299, 13711), (309, 13819), (321, 14044), (323, 14086), (326, 14146), (330, 14224), (333, 14245), (337, 14314), (339, 14335), (341, 14377), (344, 14398), (347, 14461), (351, 14500), (357, 14551), (368, 14665), (375, 14764), (376, 14782),

Gene: Globfish\_19 Start: 10916, Stop: 14857, Start Num: 21

Candidate Starts for Globfish\_19:

(Start: 21 @10916 has 25 MA's), (23, 10955), (27, 11018), (29, 11051), (31, 11075), (33, 11081), (39, 11117), (40, 11129), (41, 11147), (43, 11189), (51, 11354), (52, 11360), (65, 11561), (66, 11621), (72, 11666), (82, 11759), (93, 11927), (97, 11972), (117, 12128), (120, 12143), (130, 12260), (132, 12272), (137, 12332), (138, 12341), (142, 12407), (147, 12443), (152, 12491), (153, 12503), (158, 12533),



(163, 12557), (166, 12590), (170, 12647), (174, 12701), (181, 12785), (182, 12794), (185, 12806), (192, 12857), (196, 12878), (204, 12977), (213, 13085), (215, 13124), (228, 13214), (229, 13229), (244, 13331), (247, 13361), (248, 13373), (252, 13412), (253, 13433), (258, 13481), (259, 13484), (268, 13568), (269, 13571), (275, 13649), (283, 13724), (284, 13733), (288, 13748), (309, 13925), (319, 14117), (324, 14231), (325, 14249), (329, 14288), (330, 14330), (335, 14393), (336, 14405), (339, 14441), (341, 14483), (344, 14504), (357, 14654), (361, 14720), (365, 14744), (371, 14792), (373, 14807),

Gene: GlobiWarming\_18 Start: 10885, Stop: 14781, Start Num: 21

Candidate Starts for GlobiWarming\_18:

(1, 10477), (2, 10486), (3, 10507), (5, 10558), (Start: 21 @10885 has 25 MA's), (29, 11020), (31, 11044), (33, 11050), (39, 11086), (40, 11098), (41, 11116), (42, 11125), (43, 11158), (44, 11164), (46, 11242), (51, 11323), (53, 11362), (57, 11446), (59, 11461), (62, 11494), (69, 11599), (75, 11686), (77, 11707), (80, 11719), (85, 11755), (96, 11938), (103, 11986), (107, 12037), (122, 12124), (127, 12211), (129, 12220), (148, 12421), (149, 12430), (153, 12478), (156, 12499), (157, 12502), (168, 12574), (172, 12637), (188, 12736), (196, 12787), (206, 12913), (228, 13051), (236, 13102), (237, 13114), (239, 13135), (251, 13225), (264, 13360), (268, 13399), (272, 13435), (275, 13477), (276, 13498), (277, 13516), (281, 13540), (283, 13552), (284, 13561), (288, 13576), (304, 13789), (314, 13939), (315, 13945), (319, 14038), (324, 14152), (325, 14170), (328, 14200), (329, 14209), (330, 14251), (335, 14314), (336, 14326), (339, 14362), (341, 14404), (344, 14425), (345, 14437), (355, 14563), (357, 14575), (364, 14662), (367, 14680),

Gene: Gorpy\_19 Start: 10852, Stop: 14793, Start Num: 21

Candidate Starts for Gorpy\_19:

(Start: 21 @10852 has 25 MA's), (23, 10891), (27, 10954), (29, 10987), (31, 11011), (33, 11017), (34, 11029), (39, 11053), (40, 11065), (41, 11083), (43, 11125), (51, 11290), (66, 11557), (68, 11563), (72, 11602), (82, 11695), (93, 11863), (97, 11908), (107, 12004), (120, 12079), (124, 12109), (130, 12196), (132, 12208), (138, 12277), (140, 12313), (142, 12343), (147, 12379), (152, 12427), (153, 12439), (158, 12469), (166, 12526), (167, 12535), (169, 12580), (170, 12583), (172, 12628), (174, 12637), (181, 12721), (182, 12730), (185, 12742), (189, 12763), (194, 12802), (196, 12814), (201, 12889), (204, 12913), (213, 13021), (215, 13060), (228, 13150), (229, 13165), (244, 13267), (247, 13297), (252, 13348), (253, 13369), (258, 13417), (259, 13420), (268, 13504), (269, 13507), (275, 13585), (283, 13660), (284, 13669), (288, 13684), (302, 13804), (307, 13843), (309, 13861), (315, 13960), (319, 14053), (324, 14167), (325, 14185), (329, 14224), (330, 14266), (335, 14329), (336, 14341), (339, 14377), (341, 14419), (344, 14440), (350, 14536), (357, 14590), (373, 14743),

Gene: Hestia\_19 Start: 10985, Stop: 14962, Start Num: 21

Candidate Starts for Hestia\_19:

(Start: 21 @10985 has 25 MA's), (29, 11120), (31, 11144), (33, 11150), (37, 11174), (41, 11216), (43, 11258), (48, 11372), (66, 11690), (71, 11732), (72, 11735), (103, 12086), (105, 12107), (108, 12140), (121, 12221), (122, 12224), (124, 12242), (127, 12311), (128, 12317), (133, 12350), (157, 12590), (166, 12653), (174, 12764), (177, 12812), (178, 12815), (181, 12848), (182, 12857), (185, 12869), (189, 12890), (196, 12941), (202, 13019), (219, 13127), (226, 13181), (232, 13226), (247, 13340), (252, 13391), (253, 13412), (268, 13553), (275, 13631), (281, 13694), (283, 13706), (288, 13730), (291, 13802), (300, 13934), (301, 13961), (303, 13964), (304, 13973), (306, 13991), (309, 14030), (315, 14129), (319, 14222), (324, 14336), (325, 14354), (329, 14393), (330, 14435), (335, 14498), (336, 14510), (338, 14543), (339, 14546), (341, 14588), (343, 14603), (344, 14609), (350, 14705), (357, 14759), (358, 14768), (365, 14849), (373, 14912),

Gene: Hillester\_19 Start: 10843, Stop: 14784, Start Num: 21

Candidate Starts for Hillester\_19:

(Start: 21 @10843 has 25 MA's), (23, 10882), (27, 10945), (29, 10978), (31, 11002), (33, 11008), (34, 11020), (39, 11044), (40, 11056), (41, 11074), (43, 11116), (51, 11281), (66, 11548), (68, 11554), (72,

11593), (82, 11686), (93, 11854), (97, 11899), (107, 11995), (120, 12070), (124, 12100), (130, 12187), (132, 12199), (138, 12268), (140, 12304), (142, 12334), (147, 12370), (152, 12418), (153, 12430), (158, 12460), (166, 12517), (167, 12526), (169, 12571), (170, 12574), (174, 12628), (181, 12712), (182, 12721), (185, 12733), (189, 12754), (196, 12805), (198, 12832), (204, 12904), (213, 13012), (215, 13051), (228, 13141), (229, 13156), (244, 13258), (247, 13288), (252, 13339), (253, 13360), (258, 13408), (259, 13411), (268, 13495), (269, 13498), (275, 13576), (283, 13651), (284, 13660), (288, 13675), (307, 13834), (309, 13852), (315, 13951), (319, 14044), (324, 14158), (325, 14176), (329, 14215), (330, 14257), (335, 14320), (336, 14332), (339, 14368), (341, 14410), (344, 14431), (350, 14527), (357, 14581), (365, 14671), (373, 14734),

Gene: HotPotato\_18 Start: 10893, Stop: 14789, Start Num: 21

Candidate Starts for HotPotato\_18:

(Start: 21 @10893 has 25 MA's), (29, 11028), (31, 11052), (33, 11058), (39, 11094), (40, 11106), (41, 11124), (42, 11133), (43, 11166), (44, 11172), (46, 11250), (51, 11331), (53, 11370), (57, 11454), (59, 11469), (61, 11493), (62, 11502), (69, 11607), (75, 11694), (77, 11715), (80, 11727), (85, 11763), (96, 11946), (103, 11994), (107, 12045), (108, 12048), (113, 12087), (122, 12132), (127, 12219), (129, 12228), (131, 12240), (148, 12429), (149, 12438), (153, 12486), (156, 12507), (157, 12510), (168, 12582), (188, 12744), (196, 12795), (206, 12921), (228, 13059), (236, 13110), (237, 13122), (239, 13143), (251, 13233), (264, 13368), (268, 13407), (272, 13443), (275, 13485), (276, 13506), (277, 13524), (283, 13560), (284, 13569), (288, 13584), (304, 13797), (314, 13947), (315, 13953), (319, 14046), (324, 14160), (325, 14178), (328, 14208), (329, 14217), (330, 14259), (335, 14322), (336, 14334), (341, 14412), (344, 14433), (345, 14445), (355, 14571), (357, 14583), (364, 14670), (367, 14688),

Gene: Isolde\_19 Start: 10834, Stop: 14619, Start Num: 21

Candidate Starts for Isolde\_19:

(Start: 21 @10834 has 25 MA's), (29, 10969), (31, 10993), (33, 10999), (39, 11035), (40, 11047), (41, 11065), (43, 11107), (54, 11341), (57, 11395), (58, 11404), (59, 11410), (60, 11416), (62, 11443), (66, 11539), (72, 11584), (79, 11668), (85, 11704), (87, 11710), (95, 11881), (98, 11896), (100, 11923), (110, 12019), (113, 12031), (116, 12040), (118, 12052), (123, 12085), (138, 12262), (149, 12382), (153, 12430), (154, 12448), (162, 12472), (168, 12526), (186, 12673), (188, 12688), (201, 12814), (205, 12844), (209, 12886), (221, 12970), (228, 13003), (237, 13066), (250, 13171), (260, 13270), (271, 13369), (276, 13444), (280, 13471), (288, 13522), (289, 13525), (309, 13687), (315, 13786), (319, 13879), (324, 13993), (325, 14011), (328, 14041), (329, 14050), (330, 14092), (335, 14155), (336, 14167), (339, 14203), (341, 14245), (344, 14266), (348, 14350), (350, 14362), (357, 14416), (363, 14500), (365, 14506),

Gene: JellyBread\_19 Start: 10836, Stop: 14777, Start Num: 21

Candidate Starts for JellyBread\_19:

(Start: 21 @10836 has 25 MA's), (23, 10875), (27, 10938), (29, 10971), (31, 10995), (33, 11001), (34, 11013), (39, 11037), (40, 11049), (41, 11067), (43, 11109), (51, 11274), (66, 11541), (68, 11547), (72, 11586), (82, 11679), (93, 11847), (97, 11892), (107, 11988), (120, 12063), (124, 12093), (130, 12180), (132, 12192), (138, 12261), (140, 12297), (142, 12327), (147, 12363), (152, 12411), (153, 12423), (158, 12453), (166, 12510), (167, 12519), (169, 12564), (170, 12567), (172, 12612), (174, 12621), (181, 12705), (182, 12714), (185, 12726), (189, 12747), (194, 12786), (196, 12798), (201, 12873), (204, 12897), (213, 13005), (215, 13044), (228, 13134), (229, 13149), (244, 13251), (247, 13281), (252, 13332), (253, 13353), (258, 13401), (259, 13404), (268, 13488), (269, 13491), (275, 13569), (283, 13644), (284, 13653), (288, 13668), (302, 13788), (307, 13827), (309, 13845), (315, 13944), (319, 14037), (324, 14151), (325, 14169), (329, 14208), (330, 14250), (335, 14313), (336, 14325), (339, 14361), (341, 14403), (344, 14424), (350, 14520), (357, 14574), (373, 14727),

Gene: Judy\_19 Start: 11202, Stop: 15098, Start Num: 21

Candidate Starts for Judy\_19:

(Start: 21 @11202 has 25 MA's), (29, 11337), (31, 11361), (33, 11367), (39, 11403), (40, 11415), (41, 11433), (42, 11442), (43, 11475), (44, 11481), (46, 11559), (51, 11640), (53, 11679), (57, 11763), (61, 11802), (62, 11811), (69, 11916), (74, 11997), (75, 12003), (80, 12036), (85, 12072), (103, 12303), (113, 12396), (122, 12441), (129, 12537), (148, 12738), (149, 12747), (153, 12795), (156, 12816), (157, 12819), (168, 12891), (188, 13053), (196, 13104), (206, 13230), (228, 13368), (237, 13431), (239, 13452), (251, 13542), (264, 13677), (268, 13716), (272, 13752), (275, 13794), (277, 13833), (281, 13857), (283, 13869), (284, 13878), (288, 13893), (303, 14097), (304, 14106), (313, 14229), (314, 14256), (315, 14262), (316, 14283), (319, 14355), (324, 14469), (328, 14517), (329, 14526), (330, 14568), (335, 14631), (336, 14643), (339, 14679), (341, 14721), (344, 14742), (345, 14754), (350, 14838), (357, 14892), (362, 14973), (364, 14979), (366, 14994), (367, 14997), (371, 15033),

Gene: Karkharias\_18 Start: 10889, Stop: 14785, Start Num: 21

Candidate Starts for Karkharias\_18:

(Start: 21 @10889 has 25 MA's), (29, 11024), (31, 11048), (33, 11054), (39, 11090), (40, 11102), (41, 11120), (42, 11129), (43, 11162), (44, 11168), (46, 11246), (51, 11327), (53, 11366), (57, 11450), (59, 11465), (62, 11498), (69, 11603), (75, 11690), (80, 11723), (85, 11759), (96, 11942), (103, 11990), (107, 12041), (108, 12044), (122, 12128), (127, 12215), (129, 12224), (148, 12425), (149, 12434), (153, 12482), (156, 12503), (157, 12506), (168, 12578), (172, 12641), (196, 12791), (206, 12917), (228, 13055), (236, 13106), (237, 13118), (239, 13139), (251, 13229), (264, 13364), (268, 13403), (272, 13439), (275, 13481), (276, 13502), (277, 13520), (283, 13556), (288, 13580), (304, 13793), (314, 13943), (315, 13949), (319, 14042), (324, 14156), (325, 14174), (328, 14204), (329, 14213), (330, 14255), (335, 14318), (336, 14330), (341, 14408), (344, 14429), (345, 14441), (355, 14567), (357, 14579), (364, 14666), (367, 14684),

Gene: KayMoney\_18 Start: 10886, Stop: 14689, Start Num: 21

Candidate Starts for KayMoney\_18:

(Start: 21 @10886 has 25 MA's), (29, 11021), (31, 11045), (32, 11048), (33, 11051), (39, 11087), (40, 11099), (41, 11117), (42, 11126), (43, 11159), (44, 11165), (46, 11243), (51, 11324), (53, 11363), (57, 11447), (58, 11456), (59, 11462), (61, 11486), (62, 11495), (67, 11594), (69, 11600), (75, 11687), (80, 11720), (85, 11756), (96, 11939), (101, 11975), (103, 11987), (107, 12038), (122, 12125), (127, 12212), (129, 12221), (140, 12353), (148, 12422), (149, 12431), (153, 12479), (156, 12500), (157, 12503), (168, 12575), (172, 12638), (186, 12722), (188, 12737), (194, 12776), (199, 12833), (202, 12866), (222, 13028), (230, 13073), (239, 13136), (252, 13238), (253, 13259), (275, 13481), (283, 13556), (294, 13622), (306, 13718), (309, 13757), (313, 13823), (319, 13949), (324, 14063), (325, 14081), (328, 14111), (329, 14120), (330, 14162), (335, 14225), (336, 14237), (339, 14273), (341, 14315), (344, 14336), (353, 14453), (357, 14486), (358, 14495), (363, 14570), (365, 14576),

Gene: Kukla\_17 Start: 10473, Stop: 14528, Start Num: 17

Candidate Starts for Kukla\_17:

(14, 10419), (16, 10461), (Start: 17 @10473 has 3 MA's), (18, 10491), (22, 10533), (24, 10563), (28, 10620), (34, 10692), (36, 10698), (37, 10704), (41, 10746), (43, 10788), (46, 10872), (51, 10953), (54, 11022), (55, 11031), (59, 11091), (63, 11127), (66, 11220), (70, 11232), (72, 11265), (76, 11325), (81, 11352), (85, 11385), (100, 11601), (104, 11634), (109, 11688), (111, 11700), (126, 11823), (136, 11925), (143, 12012), (167, 12177), (193, 12438), (201, 12531), (204, 12555), (232, 12762), (242, 12840), (245, 12852), (247, 12876), (250, 12909), (253, 12948), (273, 13173), (280, 13230), (286, 13272), (296, 13410), (298, 13446), (299, 13452), (309, 13560), (321, 13785), (323, 13827), (327, 13905), (330, 13965), (333, 13986), (339, 14076), (341, 14118), (344, 14139), (347, 14202), (354, 14265), (356, 14283), (357, 14292), (359, 14310), (368, 14400), (375, 14496), (376, 14514),

Gene: Lawnathon\_19 Start: 10910, Stop: 14713, Start Num: 21

Candidate Starts for Lawnathon\_19:

(Start: 21 @10910 has 25 MA's), (29, 11045), (31, 11069), (33, 11075), (39, 11111), (40, 11123), (41, 11141), (42, 11150), (43, 11183), (44, 11189), (46, 11267), (51, 11348), (53, 11387), (57, 11471), (58,

11480), (59, 11486), (61, 11510), (62, 11519), (67, 11618), (69, 11624), (75, 11711), (80, 11744), (85, 11780), (96, 11963), (101, 11999), (103, 12011), (107, 12062), (122, 12149), (127, 12236), (140, 12377), (148, 12446), (149, 12455), (153, 12503), (156, 12524), (157, 12527), (168, 12599), (172, 12662), (186, 12746), (188, 12761), (194, 12800), (199, 12857), (222, 13052), (230, 13097), (239, 13160), (252, 13262), (253, 13283), (275, 13505), (282, 13571), (283, 13580), (294, 13646), (306, 13742), (309, 13781), (313, 13847), (319, 13973), (324, 14087), (325, 14105), (328, 14135), (329, 14144), (330, 14186), (335, 14249), (336, 14261), (339, 14297), (341, 14339), (344, 14360), (345, 14372), (355, 14498), (357, 14510), (363, 14594), (365, 14600), (374, 14693),

Gene: MUWow\_18 Start: 10936, Stop: 14877, Start Num: 21

Candidate Starts for MUWow\_18:

(Start: 21 @10936 has 25 MA's), (23, 10975), (27, 11038), (29, 11071), (31, 11095), (33, 11101), (34, 11113), (39, 11137), (40, 11149), (41, 11167), (43, 11209), (51, 11374), (66, 11641), (68, 11647), (72, 11686), (82, 11779), (93, 11947), (97, 11992), (107, 12088), (120, 12163), (124, 12193), (130, 12280), (132, 12292), (138, 12361), (140, 12397), (142, 12427), (147, 12463), (152, 12511), (153, 12523), (158, 12553), (166, 12610), (167, 12619), (169, 12664), (170, 12667), (172, 12712), (174, 12721), (181, 12805), (182, 12814), (185, 12826), (189, 12847), (194, 12886), (196, 12898), (201, 12973), (204, 12997), (213, 13105), (215, 13144), (228, 13234), (229, 13249), (244, 13351), (247, 13381), (252, 13432), (253, 13453), (258, 13501), (259, 13504), (268, 13588), (269, 13591), (275, 13669), (283, 13744), (284, 13753), (288, 13768), (302, 13888), (307, 13927), (309, 13945), (315, 14044), (319, 14137), (324, 14251), (325, 14269), (329, 14308), (330, 14350), (335, 14413), (336, 14425), (339, 14461), (341, 14503), (344, 14524), (350, 14620), (357, 14674), (373, 14827),

Gene: MaterMagnus\_19 Start: 10844, Stop: 14785, Start Num: 21

Candidate Starts for MaterMagnus\_19:

(Start: 21 @10844 has 25 MA's), (23, 10883), (27, 10946), (29, 10979), (31, 11003), (33, 11009), (34, 11021), (39, 11045), (40, 11057), (41, 11075), (43, 11117), (51, 11282), (66, 11549), (68, 11555), (72, 11594), (82, 11687), (93, 11855), (97, 11900), (107, 11996), (120, 12071), (124, 12101), (130, 12188), (132, 12200), (138, 12269), (140, 12305), (142, 12335), (147, 12371), (152, 12419), (153, 12431), (158, 12461), (166, 12518), (167, 12527), (169, 12572), (170, 12575), (174, 12629), (181, 12713), (182, 12722), (185, 12734), (189, 12755), (196, 12806), (204, 12905), (213, 13013), (215, 13052), (228, 13142), (229, 13157), (244, 13259), (247, 13289), (252, 13340), (253, 13361), (258, 13409), (259, 13412), (268, 13496), (269, 13499), (275, 13577), (283, 13652), (284, 13661), (288, 13676), (302, 13796), (307, 13835), (309, 13853), (315, 13952), (319, 14045), (324, 14159), (325, 14177), (329, 14216), (330, 14258), (335, 14321), (336, 14333), (339, 14369), (341, 14411), (344, 14432), (350, 14528), (357, 14582), (365, 14672), (373, 14735),

Gene: MidnightRain\_19 Start: 10842, Stop: 14783, Start Num: 21

Candidate Starts for MidnightRain\_19:

(Start: 21 @10842 has 25 MA's), (23, 10881), (27, 10944), (29, 10977), (31, 11001), (33, 11007), (34, 11019), (39, 11043), (40, 11055), (41, 11073), (43, 11115), (51, 11280), (66, 11547), (68, 11553), (72, 11592), (82, 11685), (93, 11853), (97, 11898), (107, 11994), (120, 12069), (124, 12099), (130, 12186), (132, 12198), (138, 12267), (140, 12303), (142, 12333), (147, 12369), (152, 12417), (153, 12429), (158, 12459), (166, 12516), (167, 12525), (169, 12570), (170, 12573), (172, 12618), (174, 12627), (181, 12711), (182, 12720), (185, 12732), (189, 12753), (194, 12792), (196, 12804), (201, 12879), (204, 12903), (213, 13011), (215, 13050), (228, 13140), (229, 13155), (244, 13257), (247, 13287), (252, 13338), (253, 13359), (258, 13407), (259, 13410), (268, 13494), (269, 13497), (275, 13575), (283, 13650), (284, 13659), (288, 13674), (307, 13833), (309, 13851), (315, 13950), (319, 14043), (324, 14157), (325, 14175), (329, 14214), (330, 14256), (335, 14319), (336, 14331), (339, 14367), (341, 14409), (344, 14430), (350, 14526), (357, 14580), (365, 14670), (373, 14733),

Gene: Peas\_18 Start: 10892, Stop: 14788, Start Num: 21

Candidate Starts for Peas\_18:

(Start: 21 @10892 has 25 MA's), (29, 11027), (31, 11051), (33, 11057), (39, 11093), (40, 11105), (41, 11123), (42, 11132), (43, 11165), (44, 11171), (46, 11249), (51, 11330), (53, 11369), (57, 11453), (59, 11468), (62, 11501), (69, 11606), (75, 11693), (80, 11726), (85, 11762), (96, 11945), (103, 11993), (107, 12044), (108, 12047), (112, 12083), (113, 12086), (122, 12131), (127, 12218), (140, 12359), (148, 12428), (149, 12437), (153, 12485), (156, 12506), (157, 12509), (168, 12581), (172, 12644), (188, 12743), (196, 12794), (206, 12920), (228, 13058), (236, 13109), (237, 13121), (239, 13142), (251, 13232), (264, 13367), (268, 13406), (272, 13442), (275, 13484), (276, 13505), (277, 13523), (281, 13547), (283, 13559), (284, 13568), (288, 13583), (304, 13796), (314, 13946), (315, 13952), (319, 14045), (324, 14159), (325, 14177), (328, 14207), (329, 14216), (330, 14258), (335, 14321), (336, 14333), (339, 14369), (341, 14411), (344, 14432), (345, 14444), (355, 14570), (357, 14582), (364, 14669), (367, 14687),

Gene: PeggyLeg03\_18 Start: 10931, Stop: 14827, Start Num: 21

Candidate Starts for PeggyLeg03\_18:

(Start: 21 @10931 has 25 MA's), (29, 11066), (31, 11090), (33, 11096), (39, 11132), (40, 11144), (41, 11162), (42, 11171), (43, 11204), (44, 11210), (46, 11288), (51, 11369), (53, 11408), (57, 11492), (61, 11531), (62, 11540), (69, 11645), (74, 11726), (75, 11732), (80, 11765), (85, 11801), (103, 12032), (122, 12170), (129, 12266), (148, 12467), (149, 12476), (153, 12524), (156, 12545), (157, 12548), (168, 12620), (183, 12761), (188, 12782), (196, 12833), (206, 12959), (228, 13097), (237, 13160), (239, 13181), (251, 13271), (264, 13406), (268, 13445), (272, 13481), (275, 13523), (277, 13562), (281, 13586), (282, 13589), (283, 13598), (284, 13607), (288, 13622), (303, 13826), (304, 13835), (313, 13958), (314, 13985), (315, 13991), (316, 14012), (319, 14084), (324, 14198), (328, 14246), (329, 14255), (330, 14297), (335, 14360), (336, 14372), (339, 14408), (341, 14450), (344, 14471), (345, 14483), (350, 14567), (357, 14621), (362, 14702), (364, 14708), (366, 14723), (367, 14726), (371, 14762),

Gene: Persistence\_18 Start: 10866, Stop: 14705, Start Num: 21

Candidate Starts for Persistence\_18:

(Start: 21 @10866 has 25 MA's), (29, 11001), (31, 11025), (33, 11031), (38, 11061), (39, 11067), (41, 11097), (43, 11139), (53, 11343), (55, 11382), (56, 11394), (59, 11442), (66, 11571), (70, 11583), (72, 11616), (85, 11736), (93, 11877), (97, 11922), (103, 11967), (105, 11988), (106, 11997), (108, 12021), (114, 12063), (120, 12093), (122, 12105), (126, 12174), (131, 12216), (140, 12327), (141, 12336), (146, 12384), (151, 12429), (157, 12474), (166, 12537), (174, 12648), (177, 12696), (185, 12753), (196, 12825), (201, 12900), (203, 12915), (216, 12972), (220, 13005), (230, 13077), (231, 13080), (248, 13215), (252, 13254), (253, 13275), (262, 13368), (268, 13422), (274, 13491), (275, 13497), (280, 13545), (283, 13572), (284, 13581), (319, 13965), (320, 13992), (321, 13998), (322, 14028), (324, 14079), (329, 14136), (330, 14178), (335, 14241), (336, 14253), (340, 14298), (341, 14331), (344, 14352), (350, 14448), (357, 14502), (370, 14634),

Gene: Phrank15\_18 Start: 10912, Stop: 14718, Start Num: 21

Candidate Starts for Phrank15\_18:

(15, 10822), (Start: 21 @10912 has 25 MA's), (23, 10951), (29, 11047), (31, 11071), (33, 11077), (34, 11089), (35, 11092), (37, 11101), (39, 11113), (40, 11125), (41, 11143), (42, 11152), (43, 11185), (44, 11191), (46, 11269), (51, 11350), (53, 11389), (58, 11482), (59, 11488), (62, 11521), (69, 11626), (75, 11713), (80, 11746), (85, 11782), (92, 11908), (93, 11923), (96, 11965), (112, 12103), (122, 12151), (135, 12307), (140, 12379), (148, 12448), (149, 12457), (153, 12505), (156, 12526), (157, 12529), (159, 12535), (168, 12601), (172, 12664), (188, 12763), (190, 12772), (196, 12814), (200, 12868), (206, 12940), (212, 12994), (228, 13078), (236, 13129), (237, 13141), (239, 13162), (250, 13246), (254, 13297), (268, 13423), (275, 13501), (277, 13540), (282, 13567), (283, 13576), (288, 13600), (289, 13603), (309, 13777), (319, 13969), (321, 14002), (324, 14083), (325, 14101), (329, 14140), (330, 14182), (335, 14245), (336, 14257), (339, 14293), (341, 14335), (344, 14356), (345, 14368), (350, 14452), (357, 14506), (362, 14581), (364, 14587), (366, 14602), (367, 14605),

Gene: Pucara\_18 Start: 10892, Stop: 14788, Start Num: 21

Candidate Starts for Pucara\_18:

(Start: 21 @10892 has 25 MA's), (25, 10952), (29, 11027), (31, 11051), (33, 11057), (39, 11093), (40, 11105), (41, 11123), (42, 11132), (43, 11165), (44, 11171), (46, 11249), (51, 11330), (53, 11369), (57, 11453), (59, 11468), (61, 11492), (62, 11501), (69, 11606), (75, 11693), (80, 11726), (85, 11762), (96, 11945), (103, 11993), (107, 12044), (108, 12047), (113, 12086), (122, 12131), (127, 12218), (129, 12227), (148, 12428), (149, 12437), (153, 12485), (156, 12506), (157, 12509), (168, 12581), (172, 12644), (196, 12794), (206, 12920), (228, 13058), (236, 13109), (237, 13121), (239, 13142), (251, 13232), (264, 13367), (268, 13406), (272, 13442), (275, 13484), (276, 13505), (277, 13523), (283, 13559), (288, 13583), (304, 13796), (314, 13946), (315, 13952), (319, 14045), (324, 14159), (325, 14177), (328, 14207), (329, 14216), (330, 14258), (335, 14321), (336, 14333), (341, 14411), (344, 14432), (345, 14444), (353, 14549), (355, 14570), (357, 14582), (364, 14669), (367, 14687),

Gene: RadFad\_19 Start: 10843, Stop: 14784, Start Num: 21

Candidate Starts for RadFad\_19:

(Start: 21 @10843 has 25 MA's), (23, 10882), (27, 10945), (29, 10978), (31, 11002), (33, 11008), (34, 11020), (39, 11044), (40, 11056), (41, 11074), (43, 11116), (51, 11281), (66, 11548), (68, 11554), (72, 11593), (82, 11686), (93, 11854), (97, 11899), (107, 11995), (120, 12070), (124, 12100), (130, 12187), (132, 12199), (138, 12268), (140, 12304), (142, 12334), (147, 12370), (152, 12418), (153, 12430), (158, 12460), (166, 12517), (167, 12526), (169, 12571), (170, 12574), (174, 12628), (181, 12712), (182, 12721), (185, 12733), (189, 12754), (196, 12805), (198, 12832), (204, 12904), (213, 13012), (215, 13051), (228, 13141), (229, 13156), (244, 13258), (247, 13288), (252, 13339), (253, 13360), (258, 13408), (259, 13411), (268, 13495), (269, 13498), (275, 13576), (283, 13651), (284, 13660), (288, 13675), (307, 13834), (309, 13852), (315, 13951), (319, 14044), (324, 14158), (325, 14176), (329, 14215), (330, 14257), (335, 14320), (336, 14332), (339, 14368), (341, 14410), (344, 14431), (350, 14527), (357, 14581), (365, 14671), (373, 14734),

Gene: Raphaella\_19 Start: 10843, Stop: 14784, Start Num: 21

Candidate Starts for Raphaella\_19:

(Start: 21 @10843 has 25 MA's), (23, 10882), (27, 10945), (29, 10978), (31, 11002), (33, 11008), (34, 11020), (39, 11044), (40, 11056), (41, 11074), (43, 11116), (51, 11281), (66, 11548), (68, 11554), (72, 11593), (82, 11686), (93, 11854), (97, 11899), (107, 11995), (120, 12070), (124, 12100), (130, 12187), (132, 12199), (138, 12268), (140, 12304), (142, 12334), (147, 12370), (152, 12418), (153, 12430), (158, 12460), (166, 12517), (167, 12526), (169, 12571), (170, 12574), (172, 12619), (174, 12628), (181, 12712), (182, 12721), (185, 12733), (189, 12754), (194, 12793), (196, 12805), (201, 12880), (204, 12904), (213, 13012), (215, 13051), (228, 13141), (229, 13156), (244, 13258), (247, 13288), (252, 13339), (253, 13360), (258, 13408), (259, 13411), (268, 13495), (269, 13498), (275, 13576), (283, 13651), (284, 13660), (288, 13675), (307, 13834), (309, 13852), (315, 13951), (319, 14044), (324, 14158), (325, 14176), (329, 14215), (330, 14257), (335, 14320), (336, 14332), (339, 14368), (341, 14410), (344, 14431), (350, 14527), (357, 14581), (373, 14734),

Gene: Richie\_19 Start: 10858, Stop: 14799, Start Num: 21

Candidate Starts for Richie\_19:

(Start: 21 @10858 has 25 MA's), (23, 10897), (27, 10960), (29, 10993), (31, 11017), (33, 11023), (34, 11035), (39, 11059), (40, 11071), (41, 11089), (43, 11131), (51, 11296), (66, 11563), (68, 11569), (72, 11608), (82, 11701), (93, 11869), (97, 11914), (107, 12010), (120, 12085), (124, 12115), (130, 12202), (132, 12214), (138, 12283), (140, 12319), (142, 12349), (147, 12385), (152, 12433), (153, 12445), (158, 12475), (166, 12532), (167, 12541), (169, 12586), (170, 12589), (172, 12634), (174, 12643), (181, 12727), (182, 12736), (185, 12748), (189, 12769), (194, 12808), (196, 12820), (201, 12895), (204, 12919), (213, 13027), (215, 13066), (228, 13156), (229, 13171), (244, 13273), (247, 13303), (252, 13354), (253, 13375), (258, 13423), (259, 13426), (268, 13510), (269, 13513), (275, 13591), (283, 13666), (284, 13675), (288, 13690), (302, 13810), (307, 13849), (309, 13867), (315, 13966), (319, 14059), (324, 14173), (325, 14191), (329, 14230), (330, 14272), (335, 14335), (336, 14347),

(339, 14383), (341, 14425), (344, 14446), (350, 14542), (357, 14596), (373, 14749),

Gene: Sakai\_19 Start: 10852, Stop: 14793, Start Num: 21

Candidate Starts for Sakai\_19:

(Start: 21 @10852 has 25 MA's), (23, 10891), (27, 10954), (29, 10987), (31, 11011), (33, 11017), (34, 11029), (39, 11053), (40, 11065), (41, 11083), (43, 11125), (51, 11290), (66, 11557), (68, 11563), (72, 11602), (82, 11695), (93, 11863), (97, 11908), (107, 12004), (120, 12079), (124, 12109), (130, 12196), (132, 12208), (138, 12277), (140, 12313), (142, 12343), (147, 12379), (152, 12427), (153, 12439), (158, 12469), (166, 12526), (167, 12535), (169, 12580), (170, 12583), (172, 12628), (174, 12637), (181, 12721), (182, 12730), (185, 12742), (189, 12763), (194, 12802), (196, 12814), (201, 12889), (204, 12913), (213, 13021), (215, 13060), (228, 13150), (229, 13165), (244, 13267), (247, 13297), (252, 13348), (253, 13369), (258, 13417), (259, 13420), (268, 13504), (269, 13507), (275, 13585), (283, 13660), (284, 13669), (288, 13684), (302, 13804), (307, 13843), (309, 13861), (315, 13960), (319, 14053), (324, 14167), (325, 14185), (329, 14224), (330, 14266), (335, 14329), (336, 14341), (339, 14377), (341, 14419), (344, 14440), (350, 14536), (357, 14590), (373, 14743),

Gene: Sashimi\_20 Start: 11112, Stop: 15146, Start Num: 17

Candidate Starts for Sashimi\_20:

(Start: 17 @11112 has 3 MA's), (22, 11172), (26, 11247), (28, 11259), (30, 11310), (34, 11331), (35, 11334), (37, 11343), (41, 11385), (43, 11427), (47, 11526), (51, 11592), (52, 11598), (53, 11631), (55, 11670), (58, 11724), (59, 11730), (64, 11787), (66, 11859), (72, 11904), (73, 11913), (78, 11982), (80, 11988), (82, 11997), (85, 12024), (89, 12066), (91, 12120), (100, 12240), (103, 12255), (109, 12327), (116, 12357), (122, 12393), (134, 12522), (138, 12579), (141, 12624), (147, 12681), (149, 12702), (155, 12762), (166, 12828), (168, 12840), (169, 12882), (173, 12936), (174, 12939), (177, 12987), (185, 13044), (187, 13056), (199, 13161), (204, 13215), (208, 13275), (210, 13296), (213, 13323), (215, 13362), (229, 13467), (235, 13506), (238, 13530), (240, 13551), (244, 13569), (248, 13611), (252, 13650), (253, 13671), (255, 13695), (266, 13785), (276, 13911), (277, 13929), (280, 13938), (284, 13974), (304, 14118), (309, 14175), (321, 14400), (323, 14442), (330, 14580), (333, 14601), (339, 14691), (341, 14733), (344, 14754), (347, 14817), (354, 14880), (359, 14925), (368, 15015), (375, 15114), (376, 15132),

Gene: Seahorse\_20 Start: 11096, Stop: 15148, Start Num: 21

Candidate Starts for Seahorse\_20:

(Start: 21 @11096 has 25 MA's), (29, 11231), (41, 11327), (43, 11369), (46, 11453), (55, 11612), (56, 11624), (61, 11696), (66, 11801), (71, 11843), (72, 11846), (89, 12008), (94, 12119), (99, 12173), (105, 12218), (107, 12248), (115, 12296), (125, 12362), (129, 12446), (131, 12479), (139, 12596), (144, 12659), (150, 12716), (153, 12767), (160, 12824), (165, 12878), (171, 12962), (203, 13253), (223, 13424), (224, 13427), (227, 13445), (243, 13565), (246, 13589), (257, 13751), (269, 13853), (275, 13931), (282, 13997), (283, 14006), (284, 14015), (301, 14138), (309, 14207), (315, 14306), (318, 14369), (319, 14399), (322, 14462), (324, 14513), (325, 14531), (329, 14570), (330, 14612), (335, 14675), (336, 14687), (339, 14723), (341, 14765), (342, 14768), (344, 14786), (357, 14936), (369, 15050), (371, 15083),

Gene: Shukran\_19 Start: 10758, Stop: 14705, Start Num: 21

Candidate Starts for Shukran\_19:

(Start: 21 @10758 has 25 MA's), (23, 10797), (25, 10818), (29, 10893), (31, 10917), (33, 10923), (35, 10938), (37, 10947), (41, 10989), (42, 10998), (43, 11031), (53, 11235), (56, 11286), (57, 11319), (66, 11463), (70, 11475), (72, 11508), (93, 11769), (94, 11781), (106, 11889), (108, 11913), (114, 11955), (119, 11976), (122, 11997), (131, 12108), (134, 12126), (141, 12228), (146, 12276), (166, 12429), (178, 12591), (181, 12624), (182, 12633), (185, 12645), (196, 12717), (197, 12738), (201, 12792), (220, 12897), (230, 12969), (231, 12972), (248, 13107), (252, 13146), (253, 13167), (275, 13386), (278, 13428), (279, 13431), (280, 13434), (284, 13470), (287, 13479), (292, 13593), (295, 13623), (306, 13734), (315, 13872), (319, 13965), (324, 14079), (325, 14097), (329, 14136), (330, 14178),

(332, 14196), (336, 14253), (339, 14289), (341, 14331), (344, 14352), (345, 14364), (357, 14502), (363, 14586), (365, 14592), (371, 14640), (372, 14652),

Gene: SpicyFrank\_19 Start: 10920, Stop: 14861, Start Num: 21

Candidate Starts for SpicyFrank\_19:

(Start: 21 @10920 has 25 MA's), (23, 10959), (27, 11022), (29, 11055), (31, 11079), (33, 11085), (39, 11121), (40, 11133), (41, 11151), (43, 11193), (49, 11322), (66, 11625), (72, 11670), (82, 11763), (93, 11931), (97, 11976), (120, 12147), (130, 12264), (132, 12276), (137, 12336), (138, 12345), (142, 12411), (147, 12447), (152, 12495), (153, 12507), (158, 12537), (166, 12594), (170, 12651), (174, 12705), (175, 12726), (181, 12789), (182, 12798), (185, 12810), (192, 12861), (196, 12882), (204, 12981), (213, 13089), (215, 13128), (228, 13218), (229, 13233), (244, 13335), (247, 13365), (252, 13416), (253, 13437), (258, 13485), (259, 13488), (268, 13572), (269, 13575), (275, 13653), (283, 13728), (288, 13752), (309, 13929), (315, 14028), (319, 14121), (324, 14235), (325, 14253), (329, 14292), (330, 14334), (335, 14397), (336, 14409), (339, 14445), (341, 14487), (343, 14502), (344, 14508), (357, 14658), (365, 14748), (371, 14796), (373, 14811),

Gene: ThayneTheZag\_19 Start: 10917, Stop: 14951, Start Num: 21

Candidate Starts for ThayneTheZag\_19:

(Start: 21 @10917 has 25 MA's), (23, 10956), (27, 11019), (29, 11052), (31, 11076), (33, 11082), (37, 11106), (40, 11130), (41, 11148), (43, 11190), (51, 11355), (52, 11361), (66, 11622), (72, 11667), (89, 11829), (93, 11928), (102, 12015), (120, 12144), (130, 12261), (132, 12273), (137, 12333), (142, 12408), (147, 12444), (152, 12492), (153, 12504), (158, 12534), (166, 12591), (170, 12648), (174, 12702), (181, 12786), (182, 12795), (185, 12807), (192, 12858), (196, 12879), (204, 12978), (214, 13110), (215, 13125), (228, 13215), (229, 13230), (240, 13314), (241, 13323), (244, 13332), (252, 13413), (253, 13434), (256, 13476), (262, 13527), (263, 13530), (267, 13557), (280, 13707), (282, 13725), (284, 13743), (287, 13752), (293, 13833), (305, 13926), (308, 13959), (310, 14010), (312, 14076), (316, 14139), (317, 14157), (319, 14211), (321, 14244), (324, 14325), (325, 14343), (329, 14382), (330, 14424), (335, 14487), (336, 14499), (341, 14577), (344, 14598), (348, 14682), (352, 14712), (353, 14715), (357, 14748), (358, 14757), (363, 14832), (365, 14838),

Gene: Tiff81\_20 Start: 10986, Stop: 14879, Start Num: 21

Candidate Starts for Tiff81\_20:

(15, 10893), (Start: 21 @10986 has 25 MA's), (29, 11121), (31, 11145), (34, 11163), (39, 11187), (40, 11199), (41, 11217), (42, 11226), (43, 11259), (44, 11265), (46, 11343), (51, 11424), (53, 11463), (57, 11547), (59, 11562), (62, 11595), (69, 11700), (75, 11787), (80, 11820), (85, 11856), (96, 12039), (103, 12087), (107, 12138), (108, 12141), (122, 12225), (127, 12312), (129, 12321), (148, 12522), (149, 12531), (153, 12579), (156, 12600), (157, 12603), (168, 12675), (180, 12795), (188, 12837), (196, 12888), (206, 13014), (228, 13152), (237, 13215), (239, 13236), (251, 13326), (264, 13461), (268, 13500), (272, 13536), (275, 13578), (276, 13599), (277, 13617), (281, 13641), (283, 13653), (284, 13662), (288, 13677), (303, 13881), (304, 13890), (313, 14013), (314, 14040), (315, 14046), (319, 14139), (324, 14253), (328, 14301), (329, 14310), (330, 14352), (335, 14415), (336, 14427), (339, 14463), (341, 14505), (343, 14520), (344, 14526), (345, 14538), (350, 14622), (357, 14676), (358, 14685), (365, 14766), (373, 14829),

Gene: TripleJ\_18 Start: 11061, Stop: 15446, Start Num: 7

Candidate Starts for TripleJ\_18:

(4, 10983), (Start: 7 @11061 has 1 MA's), (9, 11121), (11, 11184), (12, 11196), (13, 11238), (20, 11331), (26, 11448), (41, 11586), (42, 11595), (43, 11628), (47, 11727), (51, 11793), (53, 11832), (55, 11871), (57, 11916), (58, 11925), (59, 11931), (61, 11955), (66, 12060), (72, 12105), (75, 12156), (84, 12216), (88, 12252), (89, 12267), (91, 12321), (105, 12477), (109, 12528), (122, 12594), (140, 12816), (141, 12825), (145, 12864), (147, 12882), (148, 12894), (149, 12903), (155, 12963), (164, 13017), (166, 13029), (167, 13038), (174, 13140), (179, 13209), (184, 13242), (185, 13245), (208, 13476), (215, 13563), (217, 13569), (218, 13575), (229, 13668), (234, 13701), (244, 13770), (249, 13815),



(252, 13851), (253, 13872), (266, 13986), (273, 14082), (276, 14112), (277, 14130), (280, 14139),  
(286, 14181), (297, 14352), (299, 14361), (307, 14451), (309, 14469), (321, 14694), (323, 14736),  
(326, 14796), (330, 14874), (333, 14895), (337, 14964), (339, 14985), (341, 15027), (344, 15048),  
(347, 15111), (351, 15150), (357, 15201), (360, 15240), (368, 15315), (375, 15414), (376, 15432),

Gene: Vopal\_20 Start: 10915, Stop: 14856, Start Num: 21

Candidate Starts for Vopal\_20:

(Start: 21 @10915 has 25 MA's), (23, 10954), (27, 11017), (29, 11050), (31, 11074), (33, 11080), (34, 11092), (39, 11116), (40, 11128), (41, 11146), (43, 11188), (51, 11353), (66, 11620), (68, 11626), (72, 11665), (82, 11758), (93, 11926), (97, 11971), (107, 12067), (120, 12142), (124, 12172), (130, 12259), (132, 12271), (138, 12340), (140, 12376), (142, 12406), (147, 12442), (152, 12490), (153, 12502), (158, 12532), (166, 12589), (167, 12598), (169, 12643), (170, 12646), (172, 12691), (174, 12700), (181, 12784), (182, 12793), (185, 12805), (189, 12826), (194, 12865), (196, 12877), (201, 12952), (204, 12976), (213, 13084), (215, 13123), (228, 13213), (229, 13228), (244, 13330), (247, 13360), (252, 13411), (253, 13432), (258, 13480), (259, 13483), (268, 13567), (269, 13570), (275, 13648), (283, 13723), (284, 13732), (288, 13747), (302, 13867), (307, 13906), (309, 13924), (315, 14023), (319, 14116), (324, 14230), (325, 14248), (329, 14287), (330, 14329), (335, 14392), (336, 14404), (339, 14440), (341, 14482), (344, 14503), (350, 14599), (357, 14653), (373, 14806),

Gene: Windest\_20 Start: 10899, Stop: 14840, Start Num: 21

Candidate Starts for Windest\_20:

(Start: 21 @10899 has 25 MA's), (23, 10938), (27, 11001), (29, 11034), (31, 11058), (33, 11064), (34, 11076), (39, 11100), (40, 11112), (41, 11130), (43, 11172), (51, 11337), (66, 11604), (68, 11610), (72, 11649), (82, 11742), (93, 11910), (97, 11955), (107, 12051), (120, 12126), (124, 12156), (130, 12243), (132, 12255), (138, 12324), (140, 12360), (142, 12390), (147, 12426), (152, 12474), (153, 12486), (158, 12516), (166, 12573), (167, 12582), (169, 12627), (170, 12630), (172, 12675), (174, 12684), (181, 12768), (182, 12777), (185, 12789), (189, 12810), (194, 12849), (196, 12861), (201, 12936), (204, 12960), (213, 13068), (215, 13107), (228, 13197), (229, 13212), (244, 13314), (247, 13344), (252, 13395), (253, 13416), (258, 13464), (259, 13467), (268, 13551), (269, 13554), (275, 13632), (283, 13707), (284, 13716), (288, 13731), (302, 13851), (307, 13890), (309, 13908), (315, 14007), (319, 14100), (324, 14214), (325, 14232), (329, 14271), (330, 14313), (335, 14376), (336, 14388), (339, 14424), (341, 14466), (344, 14487), (350, 14583), (357, 14637), (365, 14727), (373, 14790),

Gene: YoungHarleezy\_19 Start: 10856, Stop: 14797, Start Num: 21

Candidate Starts for YoungHarleezy\_19:

(Start: 21 @10856 has 25 MA's), (23, 10895), (25, 10916), (27, 10958), (29, 10991), (31, 11015), (33, 11021), (34, 11033), (40, 11069), (41, 11087), (43, 11129), (51, 11294), (66, 11561), (68, 11567), (72, 11606), (82, 11699), (93, 11867), (97, 11912), (107, 12008), (120, 12083), (124, 12113), (130, 12200), (132, 12212), (138, 12281), (140, 12317), (142, 12347), (147, 12383), (152, 12431), (153, 12443), (158, 12473), (166, 12530), (167, 12539), (169, 12584), (170, 12587), (172, 12632), (174, 12641), (181, 12725), (182, 12734), (185, 12746), (189, 12767), (194, 12806), (196, 12818), (201, 12893), (204, 12917), (213, 13025), (215, 13064), (228, 13154), (229, 13169), (244, 13271), (247, 13301), (252, 13352), (253, 13373), (258, 13421), (259, 13424), (268, 13508), (269, 13511), (275, 13589), (283, 13664), (284, 13673), (288, 13688), (302, 13808), (307, 13847), (309, 13865), (315, 13964), (319, 14057), (324, 14171), (325, 14189), (329, 14228), (330, 14270), (335, 14333), (336, 14345), (339, 14381), (341, 14423), (344, 14444), (350, 14540), (357, 14594), (373, 14747),