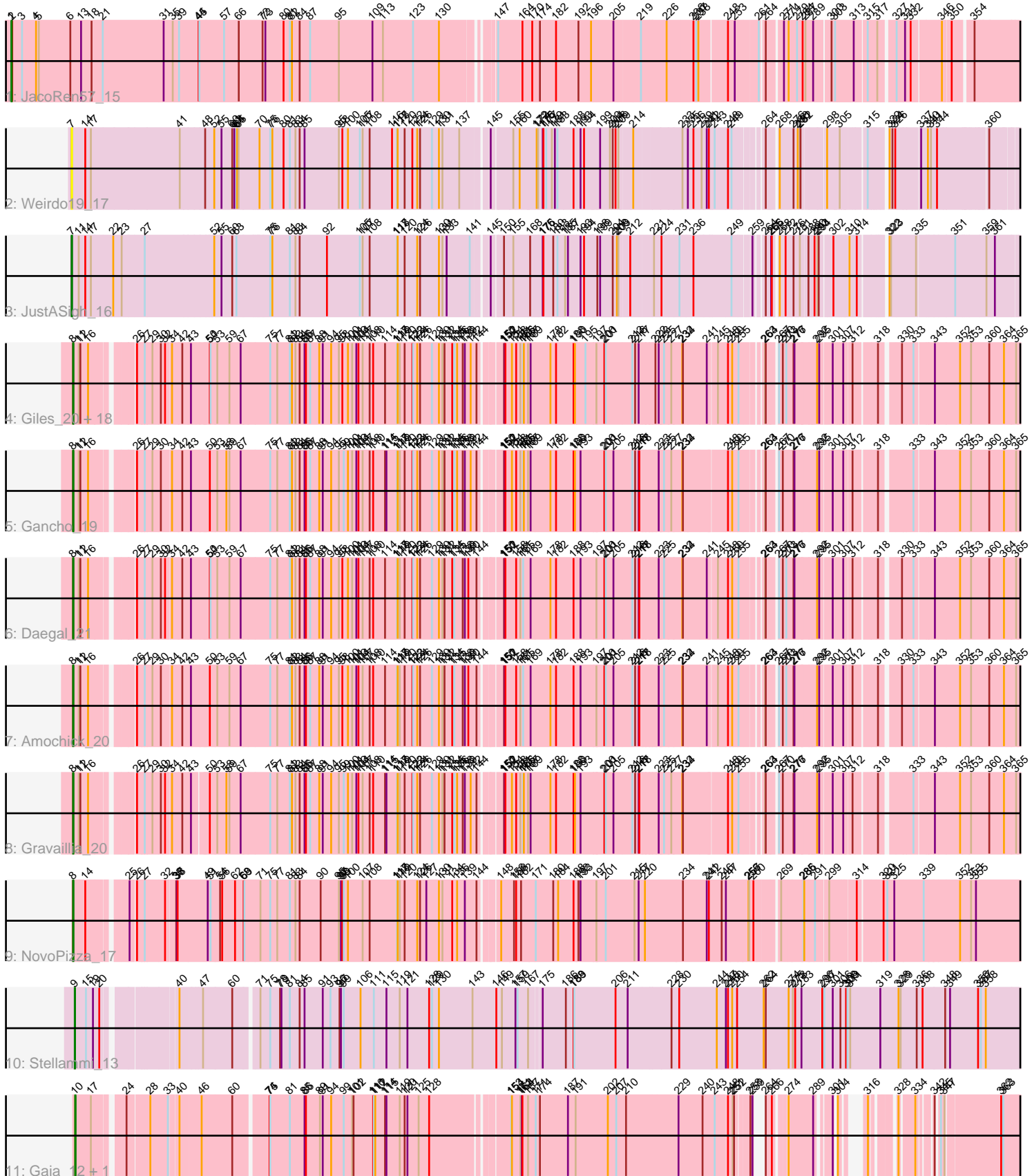


# Zoomed Pham 31881



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 311881 Report

This analysis was run 06/27/26 on database version 652.

Pham number 311881 has 30 members, 2 are drafts.

Phages represented in each track:

- Track 1 : JacoRen57\_15
- Track 2 : Weirdo19\_17
- Track 3 : JustASigh\_16
- Track 4 : Giles\_20, HH92\_20, Dewey\_20, Wishmaker\_20, Forge\_20, OBUpride\_20, Luke\_20, Ubuntu\_20, Luna22\_20, LilHazelNut\_20, Hail\_20, Kinbote\_20, BloominB\_20, Evanesce\_20, Hadrien\_20, DeepSoil15\_20, Webster2\_20, Amymech\_20, Ein37\_20
- Track 5 : Gancho\_19
- Track 6 : Daegal\_21
- Track 7 : Amochick\_20
- Track 8 : Gravaillia\_20
- Track 9 : NovoPizza\_17
- Track 10 : Stellammi\_13
- Track 11 : Gaia\_12, Nebkiss\_13

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

The start number called the most often in the published annotations is 8, it was called in 23 of the 28 non-draft genes in the pham.

Genes that call this "Most Annotated" start:

- Amochick\_20, Amymech\_20, BloominB\_20, Daegal\_21, DeepSoil15\_20, Dewey\_20, Ein37\_20, Evanesce\_20, Forge\_20, Gancho\_19, Giles\_20, Gravaillia\_20, HH92\_20, Hadrien\_20, Hail\_20, Kinbote\_20, LilHazelNut\_20, Luke\_20, Luna22\_20, NovoPizza\_17, OBUpride\_20, Ubuntu\_20, Webster2\_20, Wishmaker\_20,

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

- 

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

- Gaia\_12, JacoRen57\_15, JustASigh\_16, Nebkiss\_13, Stellammi\_13, Weirdo19\_17,

### **Summary by start number:**

Start 1:

- Found in 1 of 30 ( 3.3% ) of genes in pham
- Manual Annotations of this start: 1 of 28
- Called 100.0% of time when present
- Phage (with cluster) where this start called: JacoRen57\_15 (AB),

Start 7:

- Found in 2 of 30 ( 6.7% ) of genes in pham
- Manual Annotations of this start: 1 of 28
- Called 100.0% of time when present
- Phage (with cluster) where this start called: JustASigh\_16 (AH), Weirido19\_17 (AH),

Start 8:

- Found in 24 of 30 ( 80.0% ) of genes in pham
- Manual Annotations of this start: 23 of 28
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Amochick\_20 (Q), Amymech\_20 (Q), BloominB\_20 (Q), Daegal\_21 (Q), DeepSoil15\_20 (Q), Dewey\_20 (Q), Ein37\_20 (Q), Evanesce\_20 (Q), Forge\_20 (Q), Gancho\_19 (Q), Giles\_20 (Q), Gravaillia\_20 (Q), HH92\_20 (Q), Hadrien\_20 (Q), Hail\_20 (Q), Kinbote\_20 (Q), LilHazelNut\_20 (Q), Luke\_20 (Q), Luna22\_20 (Q), NovoPizza\_17 (Q), OBUpride\_20 (Q), Ubuntu\_20 (Q), Webster2\_20 (Q), Wishmaker\_20 (Q),

Start 9:

- Found in 1 of 30 ( 3.3% ) of genes in pham
- Manual Annotations of this start: 1 of 28
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Stellammi\_13 (UNK),

Start 10:

- Found in 2 of 30 ( 6.7% ) of genes in pham
- Manual Annotations of this start: 2 of 28
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Gaia\_12 (X), Nebkiss\_13 (X),

**Summary by clusters:**

There are 5 clusters represented in this pham: Q, AH, UNK, AB, X,

Info for manual annotations of cluster AB:

- Start number 1 was manually annotated 1 time for cluster AB.

Info for manual annotations of cluster AH:

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

Info for manual annotations of cluster Q:

- Start number 8 was manually annotated 23 times for cluster Q.

Info for manual annotations of cluster UNK:

- Start number 9 was manually annotated 1 time for cluster UNK.

Info for manual annotations of cluster X:

- Start number 10 was manually annotated 2 times for cluster X.

**Gene Information:**

Gene: Amochick\_20 Start: 12219, Stop: 16304, Start Num: 8

Candidate Starts for Amochick\_20:

(Start: 8 @12219 has 23 MA's), (11, 12243), (12, 12249), (16, 12282), (26, 12435), (27, 12465), (29, 12495), (30, 12525), (34, 12564), (42, 12606), (43, 12639), (50, 12708), (53, 12738), (59, 12783), (67, 12831), (75, 12948), (77, 12978), (81, 13032), (82, 13041), (83, 13056), (84, 13074), (85, 13095), (86, 13101), (87, 13119), (88, 13158), (91, 13173), (94, 13209), (95, 13242), (98, 13257), (100, 13281), (101, 13299), (103, 13317), (104, 13326), (107, 13344), (108, 13374), (110, 13389), (114, 13440), (117, 13491), (118, 13494), (119, 13503), (120, 13524), (122, 13557), (123, 13560), (124, 13578), (126, 13590), (129, 13641), (130, 13671), (131, 13686), (132, 13695), (134, 13728), (135, 13737), (138, 13773), (139, 13782), (140, 13797), (144, 13824), (150, 13902), (151, 13905), (152, 13908), (158, 13947), (161, 13965), (165, 13977), (169, 14007), (178, 14088), (182, 14112), (188, 14187), (193, 14214), (197, 14280), (200, 14313), (201, 14319), (205, 14352), (213, 14427), (216, 14439), (217, 14454), (218, 14457), (223, 14532), (225, 14553), (232, 14625), (234, 14628), (241, 14721), (245, 14754), (248, 14793), (250, 14805), (255, 14826), (263, 14895), (264, 14898), (267, 14934), (270, 14946), (273, 14961), (276, 14985), (277, 14988), (292, 15066), (295, 15075), (301, 15123), (307, 15156), (312, 15183), (318, 15264), (330, 15327), (333, 15369), (343, 15444), (352, 15543), (353, 15585), (360, 15663), (364, 15726), (365, 15768), (368, 15828), (370, 15846), (371, 15876), (373, 15885), (374, 15891), (376, 15906), (384, 16026), (387, 16044), (388, 16059), (390, 16062), (392, 16080), (396, 16128), (397, 16143), (400, 16176), (404, 16194), (410, 16233), (413, 16242), (414, 16254), (415, 16272), (417, 16296),

Gene: Amymech\_20 Start: 12222, Stop: 16301, Start Num: 8

Candidate Starts for Amymech\_20:

(Start: 8 @12222 has 23 MA's), (11, 12246), (12, 12252), (16, 12285), (26, 12438), (27, 12468), (29, 12498), (30, 12528), (32, 12546), (34, 12567), (42, 12609), (43, 12642), (50, 12708), (51, 12711), (53, 12738), (59, 12783), (67, 12831), (75, 12948), (77, 12978), (81, 13032), (82, 13041), (83, 13056), (84, 13074), (85, 13095), (86, 13101), (87, 13119), (88, 13158), (91, 13173), (94, 13209), (95, 13242), (98, 13257), (100, 13281), (101, 13299), (103, 13317), (104, 13326), (107, 13344), (108, 13374), (110, 13389), (114, 13440), (117, 13491), (118, 13494), (119, 13503), (120, 13524), (122, 13557), (123, 13560), (124, 13578), (126, 13590), (129, 13641), (130, 13671), (131, 13686), (132, 13695), (134, 13728), (135, 13737), (136, 13749), (138, 13773), (139, 13782), (142, 13806), (144, 13824), (150, 13902), (151, 13905), (152, 13908), (154, 13935), (158, 13947), (161, 13965), (165, 13977), (166, 13980), (167, 13998), (169, 14007), (178, 14088), (182, 14112), (188, 14187), (190, 14193), (195, 14235), (197, 14280), (200, 14313), (201, 14319), (213, 14427), (216, 14439), (217, 14454), (222, 14517), (223, 14529), (225, 14550), (227, 14580), (232, 14622), (234, 14625), (241, 14718), (245, 14751), (248, 14790), (250, 14802), (255, 14823), (263, 14892), (264, 14895), (267, 14931), (270, 14943), (273, 14958), (276, 14982), (277, 14985), (292, 15063), (295, 15072), (301, 15120), (307, 15153), (312, 15180), (318, 15261), (330, 15324), (333, 15366), (343, 15441), (352, 15540), (353, 15582), (360, 15660), (364, 15723), (365, 15765), (368, 15825), (370, 15843), (371, 15873), (373, 15882), (374, 15888), (376, 15903), (384, 16023), (387, 16041), (388, 16056), (390, 16059), (392, 16077), (396, 16125), (397, 16140), (400, 16173), (404, 16191), (410, 16230), (413, 16239), (414, 16251), (415, 16269), (417, 16293),

Gene: BloominB\_20 Start: 12222, Stop: 16301, Start Num: 8

Candidate Starts for BloominB\_20:

(Start: 8 @12222 has 23 MA's), (11, 12246), (12, 12252), (16, 12285), (26, 12438), (27, 12468), (29, 12498), (30, 12528), (32, 12546), (34, 12567), (42, 12609), (43, 12642), (50, 12708), (51, 12711), (53, 12738), (59, 12783), (67, 12831), (75, 12948), (77, 12978), (81, 13032), (82, 13041), (83, 13056), (84,

13074), (85, 13095), (86, 13101), (87, 13119), (88, 13158), (91, 13173), (94, 13209), (95, 13242), (98, 13257), (100, 13281), (101, 13299), (103, 13317), (104, 13326), (107, 13344), (108, 13374), (110, 13389), (114, 13440), (117, 13491), (118, 13494), (119, 13503), (120, 13524), (122, 13557), (123, 13560), (124, 13578), (126, 13590), (129, 13641), (130, 13671), (131, 13686), (132, 13695), (134, 13728), (135, 13737), (136, 13749), (138, 13773), (139, 13782), (142, 13806), (144, 13824), (150, 13902), (151, 13905), (152, 13908), (154, 13935), (158, 13947), (161, 13965), (165, 13977), (166, 13980), (167, 13998), (169, 14007), (178, 14088), (182, 14112), (188, 14187), (190, 14193), (195, 14235), (197, 14280), (200, 14313), (201, 14319), (213, 14427), (216, 14439), (217, 14454), (222, 14517), (223, 14529), (225, 14550), (227, 14580), (232, 14622), (234, 14625), (241, 14718), (245, 14751), (248, 14790), (250, 14802), (255, 14823), (263, 14892), (264, 14895), (267, 14931), (270, 14943), (273, 14958), (276, 14982), (277, 14985), (292, 15063), (295, 15072), (301, 15120), (307, 15153), (312, 15180), (318, 15261), (330, 15324), (333, 15366), (343, 15441), (352, 15540), (353, 15582), (360, 15660), (364, 15723), (365, 15765), (368, 15825), (370, 15843), (371, 15873), (373, 15882), (374, 15888), (376, 15903), (384, 16023), (387, 16041), (388, 16056), (390, 16059), (392, 16077), (396, 16125), (397, 16140), (400, 16173), (404, 16191), (410, 16230), (413, 16239), (414, 16251), (415, 16269), (417, 16293),

Gene: Daegal\_21 Start: 12510, Stop: 16592, Start Num: 8

Candidate Starts for Daegal\_21:

(Start: 8 @12510 has 23 MA's), (11, 12534), (12, 12540), (16, 12573), (26, 12726), (27, 12756), (29, 12786), (30, 12816), (32, 12834), (34, 12855), (42, 12897), (43, 12930), (50, 12996), (51, 12999), (53, 13026), (59, 13071), (67, 13119), (75, 13236), (77, 13266), (81, 13320), (82, 13329), (83, 13344), (84, 13362), (85, 13383), (86, 13389), (87, 13407), (88, 13446), (91, 13461), (94, 13497), (95, 13530), (98, 13545), (100, 13569), (101, 13587), (103, 13605), (104, 13614), (107, 13632), (108, 13662), (110, 13677), (114, 13728), (117, 13779), (118, 13782), (119, 13791), (120, 13812), (122, 13845), (123, 13848), (124, 13866), (126, 13878), (129, 13929), (130, 13959), (131, 13974), (132, 13983), (134, 14016), (135, 14025), (138, 14061), (139, 14070), (140, 14085), (144, 14112), (150, 14190), (151, 14193), (152, 14196), (158, 14235), (161, 14253), (165, 14265), (169, 14295), (178, 14376), (182, 14400), (188, 14475), (193, 14502), (197, 14568), (200, 14601), (201, 14607), (205, 14640), (213, 14715), (216, 14727), (217, 14742), (218, 14745), (223, 14820), (225, 14841), (232, 14913), (234, 14916), (241, 15009), (245, 15042), (248, 15081), (250, 15093), (255, 15114), (263, 15183), (264, 15186), (267, 15222), (270, 15234), (273, 15249), (276, 15273), (277, 15276), (292, 15354), (295, 15363), (301, 15411), (307, 15444), (312, 15471), (318, 15552), (330, 15615), (333, 15657), (343, 15732), (352, 15831), (353, 15873), (360, 15951), (364, 16014), (365, 16056), (368, 16116), (370, 16134), (371, 16164), (373, 16173), (374, 16179), (376, 16194), (384, 16314), (387, 16332), (388, 16347), (390, 16350), (392, 16368), (396, 16416), (397, 16431), (400, 16464), (404, 16482), (410, 16521), (413, 16530), (414, 16542), (415, 16560), (417, 16584),

Gene: DeepSoil15\_20 Start: 12222, Stop: 16301, Start Num: 8

Candidate Starts for DeepSoil15\_20:

(Start: 8 @12222 has 23 MA's), (11, 12246), (12, 12252), (16, 12285), (26, 12438), (27, 12468), (29, 12498), (30, 12528), (32, 12546), (34, 12567), (42, 12609), (43, 12642), (50, 12708), (51, 12711), (53, 12738), (59, 12783), (67, 12831), (75, 12948), (77, 12978), (81, 13032), (82, 13041), (83, 13056), (84, 13074), (85, 13095), (86, 13101), (87, 13119), (88, 13158), (91, 13173), (94, 13209), (95, 13242), (98, 13257), (100, 13281), (101, 13299), (103, 13317), (104, 13326), (107, 13344), (108, 13374), (110, 13389), (114, 13440), (117, 13491), (118, 13494), (119, 13503), (120, 13524), (122, 13557), (123, 13560), (124, 13578), (126, 13590), (129, 13641), (130, 13671), (131, 13686), (132, 13695), (134, 13728), (135, 13737), (136, 13749), (138, 13773), (139, 13782), (142, 13806), (144, 13824), (150, 13902), (151, 13905), (152, 13908), (154, 13935), (158, 13947), (161, 13965), (165, 13977), (166, 13980), (167, 13998), (169, 14007), (178, 14088), (182, 14112), (188, 14187), (190, 14193), (195, 14235), (197, 14280), (200, 14313), (201, 14319), (213, 14427), (216, 14439), (217, 14454), (222, 14517), (223, 14529), (225, 14550), (227, 14580), (232, 14622), (234, 14625), (241, 14718), (245, 14751), (248, 14790), (250, 14802), (255, 14823), (263, 14892), (264, 14895), (267, 14931), (270,

14943), (273, 14958), (276, 14982), (277, 14985), (292, 15063), (295, 15072), (301, 15120), (307, 15153), (312, 15180), (318, 15261), (330, 15324), (333, 15366), (343, 15441), (352, 15540), (353, 15582), (360, 15660), (364, 15723), (365, 15765), (368, 15825), (370, 15843), (371, 15873), (373, 15882), (374, 15888), (376, 15903), (384, 16023), (387, 16041), (388, 16056), (390, 16059), (392, 16077), (396, 16125), (397, 16140), (400, 16173), (404, 16191), (410, 16230), (413, 16239), (414, 16251), (415, 16269), (417, 16293),

Gene: Dewey\_20 Start: 12222, Stop: 16301, Start Num: 8

Candidate Starts for Dewey\_20:

(Start: 8 @12222 has 23 MA's), (11, 12246), (12, 12252), (16, 12285), (26, 12438), (27, 12468), (29, 12498), (30, 12528), (32, 12546), (34, 12567), (42, 12609), (43, 12642), (50, 12708), (51, 12711), (53, 12738), (59, 12783), (67, 12831), (75, 12948), (77, 12978), (81, 13032), (82, 13041), (83, 13056), (84, 13074), (85, 13095), (86, 13101), (87, 13119), (88, 13158), (91, 13173), (94, 13209), (95, 13242), (98, 13257), (100, 13281), (101, 13299), (103, 13317), (104, 13326), (107, 13344), (108, 13374), (110, 13389), (114, 13440), (117, 13491), (118, 13494), (119, 13503), (120, 13524), (122, 13557), (123, 13560), (124, 13578), (126, 13590), (129, 13641), (130, 13671), (131, 13686), (132, 13695), (134, 13728), (135, 13737), (136, 13749), (138, 13773), (139, 13782), (142, 13806), (144, 13824), (150, 13902), (151, 13905), (152, 13908), (154, 13935), (158, 13947), (161, 13965), (165, 13977), (166, 13980), (167, 13998), (169, 14007), (178, 14088), (182, 14112), (188, 14187), (190, 14193), (195, 14235), (197, 14280), (200, 14313), (201, 14319), (213, 14427), (216, 14439), (217, 14454), (222, 14517), (223, 14529), (225, 14550), (227, 14580), (232, 14622), (234, 14625), (241, 14718), (245, 14751), (248, 14790), (250, 14802), (255, 14823), (263, 14892), (264, 14895), (267, 14931), (270, 14943), (273, 14958), (276, 14982), (277, 14985), (292, 15063), (295, 15072), (301, 15120), (307, 15153), (312, 15180), (318, 15261), (330, 15324), (333, 15366), (343, 15441), (352, 15540), (353, 15582), (360, 15660), (364, 15723), (365, 15765), (368, 15825), (370, 15843), (371, 15873), (373, 15882), (374, 15888), (376, 15903), (384, 16023), (387, 16041), (388, 16056), (390, 16059), (392, 16077), (396, 16125), (397, 16140), (400, 16173), (404, 16191), (410, 16230), (413, 16239), (414, 16251), (415, 16269), (417, 16293),

Gene: Ein37\_20 Start: 12222, Stop: 16301, Start Num: 8

Candidate Starts for Ein37\_20:

(Start: 8 @12222 has 23 MA's), (11, 12246), (12, 12252), (16, 12285), (26, 12438), (27, 12468), (29, 12498), (30, 12528), (32, 12546), (34, 12567), (42, 12609), (43, 12642), (50, 12708), (51, 12711), (53, 12738), (59, 12783), (67, 12831), (75, 12948), (77, 12978), (81, 13032), (82, 13041), (83, 13056), (84, 13074), (85, 13095), (86, 13101), (87, 13119), (88, 13158), (91, 13173), (94, 13209), (95, 13242), (98, 13257), (100, 13281), (101, 13299), (103, 13317), (104, 13326), (107, 13344), (108, 13374), (110, 13389), (114, 13440), (117, 13491), (118, 13494), (119, 13503), (120, 13524), (122, 13557), (123, 13560), (124, 13578), (126, 13590), (129, 13641), (130, 13671), (131, 13686), (132, 13695), (134, 13728), (135, 13737), (136, 13749), (138, 13773), (139, 13782), (142, 13806), (144, 13824), (150, 13902), (151, 13905), (152, 13908), (154, 13935), (158, 13947), (161, 13965), (165, 13977), (166, 13980), (167, 13998), (169, 14007), (178, 14088), (182, 14112), (188, 14187), (190, 14193), (195, 14235), (197, 14280), (200, 14313), (201, 14319), (213, 14427), (216, 14439), (217, 14454), (222, 14517), (223, 14529), (225, 14550), (227, 14580), (232, 14622), (234, 14625), (241, 14718), (245, 14751), (248, 14790), (250, 14802), (255, 14823), (263, 14892), (264, 14895), (267, 14931), (270, 14943), (273, 14958), (276, 14982), (277, 14985), (292, 15063), (295, 15072), (301, 15120), (307, 15153), (312, 15180), (318, 15261), (330, 15324), (333, 15366), (343, 15441), (352, 15540), (353, 15582), (360, 15660), (364, 15723), (365, 15765), (368, 15825), (370, 15843), (371, 15873), (373, 15882), (374, 15888), (376, 15903), (384, 16023), (387, 16041), (388, 16056), (390, 16059), (392, 16077), (396, 16125), (397, 16140), (400, 16173), (404, 16191), (410, 16230), (413, 16239), (414, 16251), (415, 16269), (417, 16293),

Gene: Evanesce\_20 Start: 12222, Stop: 16301, Start Num: 8

Candidate Starts for Evanesce\_20:

(Start: 8 @12222 has 23 MA's), (11, 12246), (12, 12252), (16, 12285), (26, 12438), (27, 12468), (29, 12498), (30, 12528), (32, 12546), (34, 12567), (42, 12609), (43, 12642), (50, 12708), (51, 12711), (53, 12738), (59, 12783), (67, 12831), (75, 12948), (77, 12978), (81, 13032), (82, 13041), (83, 13056), (84, 13074), (85, 13095), (86, 13101), (87, 13119), (88, 13158), (91, 13173), (94, 13209), (95, 13242), (98, 13257), (100, 13281), (101, 13299), (103, 13317), (104, 13326), (107, 13344), (108, 13374), (110, 13389), (114, 13440), (117, 13491), (118, 13494), (119, 13503), (120, 13524), (122, 13557), (123, 13560), (124, 13578), (126, 13590), (129, 13641), (130, 13671), (131, 13686), (132, 13695), (134, 13728), (135, 13737), (136, 13749), (138, 13773), (139, 13782), (142, 13806), (144, 13824), (150, 13902), (151, 13905), (152, 13908), (154, 13935), (158, 13947), (161, 13965), (165, 13977), (166, 13980), (167, 13998), (169, 14007), (178, 14088), (182, 14112), (188, 14187), (190, 14193), (195, 14235), (197, 14280), (200, 14313), (201, 14319), (213, 14427), (216, 14439), (217, 14454), (222, 14517), (223, 14529), (225, 14550), (227, 14580), (232, 14622), (234, 14625), (241, 14718), (245, 14751), (248, 14790), (250, 14802), (255, 14823), (263, 14892), (264, 14895), (267, 14931), (270, 14943), (273, 14958), (276, 14982), (277, 14985), (292, 15063), (295, 15072), (301, 15120), (307, 15153), (312, 15180), (318, 15261), (330, 15324), (333, 15366), (343, 15441), (352, 15540), (353, 15582), (360, 15660), (364, 15723), (365, 15765), (368, 15825), (370, 15843), (371, 15873), (373, 15882), (374, 15888), (376, 15903), (384, 16023), (387, 16041), (388, 16056), (390, 16059), (392, 16077), (396, 16125), (397, 16140), (400, 16173), (404, 16191), (410, 16230), (413, 16239), (414, 16251), (415, 16269), (417, 16293),

Gene: Forge\_20 Start: 12222, Stop: 16301, Start Num: 8

Candidate Starts for Forge\_20:

(Start: 8 @12222 has 23 MA's), (11, 12246), (12, 12252), (16, 12285), (26, 12438), (27, 12468), (29, 12498), (30, 12528), (32, 12546), (34, 12567), (42, 12609), (43, 12642), (50, 12708), (51, 12711), (53, 12738), (59, 12783), (67, 12831), (75, 12948), (77, 12978), (81, 13032), (82, 13041), (83, 13056), (84, 13074), (85, 13095), (86, 13101), (87, 13119), (88, 13158), (91, 13173), (94, 13209), (95, 13242), (98, 13257), (100, 13281), (101, 13299), (103, 13317), (104, 13326), (107, 13344), (108, 13374), (110, 13389), (114, 13440), (117, 13491), (118, 13494), (119, 13503), (120, 13524), (122, 13557), (123, 13560), (124, 13578), (126, 13590), (129, 13641), (130, 13671), (131, 13686), (132, 13695), (134, 13728), (135, 13737), (136, 13749), (138, 13773), (139, 13782), (142, 13806), (144, 13824), (150, 13902), (151, 13905), (152, 13908), (154, 13935), (158, 13947), (161, 13965), (165, 13977), (166, 13980), (167, 13998), (169, 14007), (178, 14088), (182, 14112), (188, 14187), (190, 14193), (195, 14235), (197, 14280), (200, 14313), (201, 14319), (213, 14427), (216, 14439), (217, 14454), (222, 14517), (223, 14529), (225, 14550), (227, 14580), (232, 14622), (234, 14625), (241, 14718), (245, 14751), (248, 14790), (250, 14802), (255, 14823), (263, 14892), (264, 14895), (267, 14931), (270, 14943), (273, 14958), (276, 14982), (277, 14985), (292, 15063), (295, 15072), (301, 15120), (307, 15153), (312, 15180), (318, 15261), (330, 15324), (333, 15366), (343, 15441), (352, 15540), (353, 15582), (360, 15660), (364, 15723), (365, 15765), (368, 15825), (370, 15843), (371, 15873), (373, 15882), (374, 15888), (376, 15903), (384, 16023), (387, 16041), (388, 16056), (390, 16059), (392, 16077), (396, 16125), (397, 16140), (400, 16173), (404, 16191), (410, 16230), (413, 16239), (414, 16251), (415, 16269), (417, 16293),

Gene: Gaia\_12 Start: 9452, Stop: 13315, Start Num: 10

Candidate Starts for Gaia\_12:

(Start: 10 @9452 has 2 MA's), (17, 9518), (24, 9629), (28, 9713), (33, 9785), (40, 9815), (46, 9890), (60, 10010), (74, 10139), (75, 10142), (81, 10226), (85, 10289), (86, 10295), (89, 10355), (91, 10367), (94, 10403), (99, 10457), (101, 10493), (102, 10499), (110, 10583), (111, 10586), (112, 10592), (114, 10634), (115, 10640), (119, 10697), (120, 10718), (121, 10730), (125, 10778), (128, 10823), (153, 11114), (154, 11117), (161, 11153), (163, 11159), (164, 11162), (167, 11186), (171, 11219), (174, 11237), (187, 11357), (191, 11390), (202, 11525), (207, 11561), (210, 11594), (229, 11807), (240, 11906), (243, 11957), (248, 12005), (251, 12023), (252, 12029), (258, 12071), (259, 12080), (264, 12083), (266, 12107), (274, 12143), (289, 12233), (301, 12281), (304, 12284), (316, 12320), (328, 12386), (334, 12440), (342, 12479), (345, 12488), (347, 12503), (362, 12707), (363, 12716), (372,

12872), (379, 12944), (382, 12992), (383, 13016), (385, 13037), (386, 13040), (389, 13061), (405, 13202), (407, 13211), (408, 13217),

Gene: Gancho\_19 Start: 11937, Stop: 16022, Start Num: 8

Candidate Starts for Gancho\_19:

(Start: 8 @11937 has 23 MA's), (11, 11961), (12, 11967), (16, 12000), (26, 12153), (27, 12183), (29, 12213), (30, 12243), (34, 12282), (42, 12324), (43, 12357), (50, 12426), (53, 12456), (58, 12495), (59, 12501), (67, 12549), (75, 12666), (77, 12696), (81, 12750), (82, 12759), (83, 12774), (84, 12792), (85, 12813), (86, 12819), (87, 12837), (88, 12876), (91, 12891), (94, 12927), (95, 12960), (99, 12981), (100, 12999), (101, 13017), (103, 13035), (104, 13044), (107, 13062), (108, 13092), (110, 13107), (114, 13158), (115, 13164), (117, 13209), (118, 13212), (119, 13221), (120, 13242), (122, 13275), (123, 13278), (124, 13296), (126, 13308), (129, 13359), (130, 13389), (131, 13404), (132, 13413), (134, 13446), (135, 13455), (136, 13467), (138, 13491), (139, 13500), (142, 13524), (144, 13542), (150, 13620), (151, 13623), (152, 13626), (154, 13653), (158, 13665), (161, 13683), (165, 13695), (166, 13698), (167, 13716), (169, 13725), (178, 13806), (182, 13830), (188, 13905), (190, 13911), (193, 13932), (200, 14031), (201, 14037), (205, 14070), (213, 14145), (216, 14157), (217, 14172), (218, 14175), (223, 14250), (225, 14271), (227, 14301), (232, 14343), (234, 14346), (248, 14511), (250, 14523), (255, 14544), (263, 14613), (264, 14616), (267, 14652), (270, 14664), (276, 14703), (277, 14706), (292, 14784), (295, 14793), (301, 14841), (307, 14874), (312, 14901), (318, 14982), (333, 15087), (343, 15162), (352, 15261), (353, 15303), (360, 15381), (364, 15444), (365, 15486), (366, 15522), (368, 15546), (370, 15564), (371, 15594), (373, 15603), (374, 15609), (376, 15624), (384, 15744), (387, 15762), (388, 15777), (390, 15780), (392, 15798), (396, 15846), (397, 15861), (400, 15894), (404, 15912), (410, 15951), (413, 15960), (414, 15972), (415, 15990), (417, 16014),

Gene: Giles\_20 Start: 12222, Stop: 16301, Start Num: 8

Candidate Starts for Giles\_20:

(Start: 8 @12222 has 23 MA's), (11, 12246), (12, 12252), (16, 12285), (26, 12438), (27, 12468), (29, 12498), (30, 12528), (32, 12546), (34, 12567), (42, 12609), (43, 12642), (50, 12708), (51, 12711), (53, 12738), (59, 12783), (67, 12831), (75, 12948), (77, 12978), (81, 13032), (82, 13041), (83, 13056), (84, 13074), (85, 13095), (86, 13101), (87, 13119), (88, 13158), (91, 13173), (94, 13209), (95, 13242), (98, 13257), (100, 13281), (101, 13299), (103, 13317), (104, 13326), (107, 13344), (108, 13374), (110, 13389), (114, 13440), (117, 13491), (118, 13494), (119, 13503), (120, 13524), (122, 13557), (123, 13560), (124, 13578), (126, 13590), (129, 13641), (130, 13671), (131, 13686), (132, 13695), (134, 13728), (135, 13737), (136, 13749), (138, 13773), (139, 13782), (142, 13806), (144, 13824), (150, 13902), (151, 13905), (152, 13908), (154, 13935), (158, 13947), (161, 13965), (165, 13977), (166, 13980), (167, 13998), (169, 14007), (178, 14088), (182, 14112), (188, 14187), (190, 14193), (195, 14235), (197, 14280), (200, 14313), (201, 14319), (213, 14427), (216, 14439), (217, 14454), (222, 14517), (223, 14529), (225, 14550), (227, 14580), (232, 14622), (234, 14625), (241, 14718), (245, 14751), (248, 14790), (250, 14802), (255, 14823), (263, 14892), (264, 14895), (267, 14931), (270, 14943), (273, 14958), (276, 14982), (277, 14985), (292, 15063), (295, 15072), (301, 15120), (307, 15153), (312, 15180), (318, 15261), (330, 15324), (333, 15366), (343, 15441), (352, 15540), (353, 15582), (360, 15660), (364, 15723), (365, 15765), (368, 15825), (370, 15843), (371, 15873), (373, 15882), (374, 15888), (376, 15903), (384, 16023), (387, 16041), (388, 16056), (390, 16059), (392, 16077), (396, 16125), (397, 16140), (400, 16173), (404, 16191), (410, 16230), (413, 16239), (414, 16251), (415, 16269), (417, 16293),

Gene: Gravallia\_20 Start: 11955, Stop: 16028, Start Num: 8

Candidate Starts for Gravallia\_20:

(Start: 8 @11955 has 23 MA's), (11, 11979), (12, 11985), (16, 12018), (26, 12171), (27, 12201), (29, 12231), (30, 12261), (32, 12279), (34, 12300), (42, 12342), (43, 12375), (50, 12432), (53, 12462), (58, 12501), (59, 12507), (67, 12555), (75, 12672), (77, 12702), (81, 12756), (82, 12765), (83, 12780), (84, 12798), (85, 12819), (86, 12825), (87, 12843), (88, 12882), (91, 12897), (94, 12933), (95, 12966), (99, 12987), (100, 13005), (101, 13023), (103, 13041), (104, 13050), (107, 13068), (108, 13098), (110,

13113), (114, 13164), (115, 13170), (117, 13215), (118, 13218), (119, 13227), (120, 13248), (122, 13281), (123, 13284), (124, 13302), (126, 13314), (129, 13365), (130, 13395), (131, 13410), (132, 13419), (134, 13452), (135, 13461), (136, 13473), (138, 13497), (139, 13506), (142, 13530), (144, 13548), (150, 13626), (151, 13629), (152, 13632), (154, 13659), (158, 13671), (161, 13689), (165, 13701), (166, 13704), (167, 13722), (169, 13731), (178, 13812), (182, 13836), (188, 13911), (190, 13917), (193, 13938), (200, 14037), (201, 14043), (205, 14076), (213, 14151), (216, 14163), (217, 14178), (218, 14181), (223, 14256), (225, 14277), (227, 14307), (232, 14349), (234, 14352), (248, 14517), (250, 14529), (255, 14550), (263, 14619), (264, 14622), (267, 14658), (270, 14670), (276, 14709), (277, 14712), (292, 14790), (295, 14799), (301, 14847), (307, 14880), (312, 14907), (318, 14988), (333, 15093), (343, 15168), (352, 15267), (353, 15309), (360, 15387), (364, 15450), (365, 15492), (366, 15528), (368, 15552), (370, 15570), (371, 15600), (373, 15609), (374, 15615), (376, 15630), (384, 15750), (387, 15768), (388, 15783), (390, 15786), (392, 15804), (396, 15852), (397, 15867), (400, 15900), (404, 15918), (410, 15957), (413, 15966), (414, 15978), (415, 15996), (417, 16020),

Gene: HH92\_20 Start: 12222, Stop: 16301, Start Num: 8

Candidate Starts for HH92\_20:

(Start: 8 @12222 has 23 MA's), (11, 12246), (12, 12252), (16, 12285), (26, 12438), (27, 12468), (29, 12498), (30, 12528), (32, 12546), (34, 12567), (42, 12609), (43, 12642), (50, 12708), (51, 12711), (53, 12738), (59, 12783), (67, 12831), (75, 12948), (77, 12978), (81, 13032), (82, 13041), (83, 13056), (84, 13074), (85, 13095), (86, 13101), (87, 13119), (88, 13158), (91, 13173), (94, 13209), (95, 13242), (98, 13257), (100, 13281), (101, 13299), (103, 13317), (104, 13326), (107, 13344), (108, 13374), (110, 13389), (114, 13440), (117, 13491), (118, 13494), (119, 13503), (120, 13524), (122, 13557), (123, 13560), (124, 13578), (126, 13590), (129, 13641), (130, 13671), (131, 13686), (132, 13695), (134, 13728), (135, 13737), (136, 13749), (138, 13773), (139, 13782), (142, 13806), (144, 13824), (150, 13902), (151, 13905), (152, 13908), (154, 13935), (158, 13947), (161, 13965), (165, 13977), (166, 13980), (167, 13998), (169, 14007), (178, 14088), (182, 14112), (188, 14187), (190, 14193), (195, 14235), (197, 14280), (200, 14313), (201, 14319), (213, 14427), (216, 14439), (217, 14454), (222, 14517), (223, 14529), (225, 14550), (227, 14580), (232, 14622), (234, 14625), (241, 14718), (245, 14751), (248, 14790), (250, 14802), (255, 14823), (263, 14892), (264, 14895), (267, 14931), (270, 14943), (273, 14958), (276, 14982), (277, 14985), (292, 15063), (295, 15072), (301, 15120), (307, 15153), (312, 15180), (318, 15261), (330, 15324), (333, 15366), (343, 15441), (352, 15540), (353, 15582), (360, 15660), (364, 15723), (365, 15765), (368, 15825), (370, 15843), (371, 15873), (373, 15882), (374, 15888), (376, 15903), (384, 16023), (387, 16041), (388, 16056), (390, 16059), (392, 16077), (396, 16125), (397, 16140), (400, 16173), (404, 16191), (410, 16230), (413, 16239), (414, 16251), (415, 16269), (417, 16293),

Gene: Hadrien\_20 Start: 12222, Stop: 16301, Start Num: 8

Candidate Starts for Hadrien\_20:

(Start: 8 @12222 has 23 MA's), (11, 12246), (12, 12252), (16, 12285), (26, 12438), (27, 12468), (29, 12498), (30, 12528), (32, 12546), (34, 12567), (42, 12609), (43, 12642), (50, 12708), (51, 12711), (53, 12738), (59, 12783), (67, 12831), (75, 12948), (77, 12978), (81, 13032), (82, 13041), (83, 13056), (84, 13074), (85, 13095), (86, 13101), (87, 13119), (88, 13158), (91, 13173), (94, 13209), (95, 13242), (98, 13257), (100, 13281), (101, 13299), (103, 13317), (104, 13326), (107, 13344), (108, 13374), (110, 13389), (114, 13440), (117, 13491), (118, 13494), (119, 13503), (120, 13524), (122, 13557), (123, 13560), (124, 13578), (126, 13590), (129, 13641), (130, 13671), (131, 13686), (132, 13695), (134, 13728), (135, 13737), (136, 13749), (138, 13773), (139, 13782), (142, 13806), (144, 13824), (150, 13902), (151, 13905), (152, 13908), (154, 13935), (158, 13947), (161, 13965), (165, 13977), (166, 13980), (167, 13998), (169, 14007), (178, 14088), (182, 14112), (188, 14187), (190, 14193), (195, 14235), (197, 14280), (200, 14313), (201, 14319), (213, 14427), (216, 14439), (217, 14454), (222, 14517), (223, 14529), (225, 14550), (227, 14580), (232, 14622), (234, 14625), (241, 14718), (245, 14751), (248, 14790), (250, 14802), (255, 14823), (263, 14892), (264, 14895), (267, 14931), (270, 14943), (273, 14958), (276, 14982), (277, 14985), (292, 15063), (295, 15072), (301, 15120), (307, 15153), (312, 15180), (318, 15261), (330, 15324), (333, 15366), (343, 15441), (352, 15540), (353, 15582), (360, 15660), (364, 15723), (365, 15765), (368, 15825), (370, 15843), (371, 15873), (373, 15882), (374, 15888), (376, 15903), (384, 16023), (387, 16041), (388, 16056), (390, 16059), (392, 16077), (396, 16125), (397, 16140), (400, 16173), (404, 16191), (410, 16230), (413, 16239), (414, 16251), (415, 16269), (417, 16293),

15153), (312, 15180), (318, 15261), (330, 15324), (333, 15366), (343, 15441), (352, 15540), (353, 15582), (360, 15660), (364, 15723), (365, 15765), (368, 15825), (370, 15843), (371, 15873), (373, 15882), (374, 15888), (376, 15903), (384, 16023), (387, 16041), (388, 16056), (390, 16059), (392, 16077), (396, 16125), (397, 16140), (400, 16173), (404, 16191), (410, 16230), (413, 16239), (414, 16251), (415, 16269), (417, 16293),

Gene: Hail\_20 Start: 12222, Stop: 16301, Start Num: 8

Candidate Starts for Hail\_20:

(Start: 8 @12222 has 23 MA's), (11, 12246), (12, 12252), (16, 12285), (26, 12438), (27, 12468), (29, 12498), (30, 12528), (32, 12546), (34, 12567), (42, 12609), (43, 12642), (50, 12708), (51, 12711), (53, 12738), (59, 12783), (67, 12831), (75, 12948), (77, 12978), (81, 13032), (82, 13041), (83, 13056), (84, 13074), (85, 13095), (86, 13101), (87, 13119), (88, 13158), (91, 13173), (94, 13209), (95, 13242), (98, 13257), (100, 13281), (101, 13299), (103, 13317), (104, 13326), (107, 13344), (108, 13374), (110, 13389), (114, 13440), (117, 13491), (118, 13494), (119, 13503), (120, 13524), (122, 13557), (123, 13560), (124, 13578), (126, 13590), (129, 13641), (130, 13671), (131, 13686), (132, 13695), (134, 13728), (135, 13737), (136, 13749), (138, 13773), (139, 13782), (142, 13806), (144, 13824), (150, 13902), (151, 13905), (152, 13908), (154, 13935), (158, 13947), (161, 13965), (165, 13977), (166, 13980), (167, 13998), (169, 14007), (178, 14088), (182, 14112), (188, 14187), (190, 14193), (195, 14235), (197, 14280), (200, 14313), (201, 14319), (213, 14427), (216, 14439), (217, 14454), (222, 14517), (223, 14529), (225, 14550), (227, 14580), (232, 14622), (234, 14625), (241, 14718), (245, 14751), (248, 14790), (250, 14802), (255, 14823), (263, 14892), (264, 14895), (267, 14931), (270, 14943), (273, 14958), (276, 14982), (277, 14985), (292, 15063), (295, 15072), (301, 15120), (307, 15153), (312, 15180), (318, 15261), (330, 15324), (333, 15366), (343, 15441), (352, 15540), (353, 15582), (360, 15660), (364, 15723), (365, 15765), (368, 15825), (370, 15843), (371, 15873), (373, 15882), (374, 15888), (376, 15903), (384, 16023), (387, 16041), (388, 16056), (390, 16059), (392, 16077), (396, 16125), (397, 16140), (400, 16173), (404, 16191), (410, 16230), (413, 16239), (414, 16251), (415, 16269), (417, 16293),

Gene: JacoRen57\_15 Start: 9894, Stop: 14315, Start Num: 1

Candidate Starts for JacoRen57\_15:

(Start: 1 @9894 has 1 MA's), (2, 9897), (3, 9939), (4, 9999), (5, 10011), (6, 10146), (13, 10191), (18, 10236), (21, 10284), (31, 10542), (35, 10581), (39, 10608), (44, 10692), (45, 10695), (57, 10800), (66, 10863), (72, 10965), (73, 10977), (80, 11055), (81, 11082), (82, 11091), (84, 11124), (87, 11169), (95, 11292), (109, 11436), (113, 11481), (123, 11610), (130, 11718), (147, 11898), (164, 11991), (170, 12027), (174, 12060), (182, 12129), (192, 12225), (196, 12279), (205, 12372), (219, 12480), (226, 12582), (236, 12690), (237, 12702), (238, 12711), (248, 12822), (253, 12846), (261, 12927), (264, 12942), (271, 13002), (274, 13017), (279, 13053), (284, 13077), (287, 13089), (289, 13122), (300, 13182), (303, 13197), (313, 13269), (315, 13314), (317, 13350), (327, 13404), (331, 13437), (332, 13458), (346, 13572), (350, 13605), (354, 13677), (367, 13887), (369, 13914), (375, 13974), (380, 14049), (385, 14106), (398, 14229), (403, 14256), (406, 14265), (412, 14304),

Gene: JustASigh\_16 Start: 11096, Stop: 15256, Start Num: 7

Candidate Starts for JustASigh\_16:

(Start: 7 @11096 has 1 MA's), (11, 11126), (14, 11153), (17, 11177), (22, 11267), (23, 11300), (27, 11393), (52, 11678), (55, 11708), (60, 11747), (63, 11765), (75, 11900), (76, 11909), (81, 11984), (83, 12008), (84, 12026), (92, 12143), (105, 12284), (107, 12296), (108, 12326), (117, 12443), (118, 12446), (120, 12476), (124, 12530), (126, 12542), (130, 12620), (131, 12635), (133, 12653), (141, 12752), (145, 12809), (150, 12851), (155, 12890), (168, 12953), (175, 13001), (176, 13004), (180, 13046), (183, 13061), (185, 13091), (187, 13103), (193, 13154), (194, 13166), (198, 13220), (199, 13232), (204, 13286), (208, 13304), (209, 13310), (212, 13352), (221, 13436), (224, 13466), (231, 13541), (236, 13595), (249, 13739), (259, 13808), (264, 13838), (265, 13856), (266, 13859), (268, 13874), (272, 13895), (276, 13922), (281, 13949), (288, 13976), (290, 13994), (293, 14006), (294, 14012), (302, 14060), (310, 14114), (314, 14141), (322, 14234), (323, 14240), (335, 14345), (351,

14495), (359, 14612), (361, 14648), (375, 14864), (388, 15029), (392, 15050), (393, 15068), (401, 15131), (404, 15143), (416, 15242), (418, 15245),

Gene: Kinbote\_20 Start: 12222, Stop: 16301, Start Num: 8

Candidate Starts for Kinbote\_20:

(Start: 8 @12222 has 23 MA's), (11, 12246), (12, 12252), (16, 12285), (26, 12438), (27, 12468), (29, 12498), (30, 12528), (32, 12546), (34, 12567), (42, 12609), (43, 12642), (50, 12708), (51, 12711), (53, 12738), (59, 12783), (67, 12831), (75, 12948), (77, 12978), (81, 13032), (82, 13041), (83, 13056), (84, 13074), (85, 13095), (86, 13101), (87, 13119), (88, 13158), (91, 13173), (94, 13209), (95, 13242), (98, 13257), (100, 13281), (101, 13299), (103, 13317), (104, 13326), (107, 13344), (108, 13374), (110, 13389), (114, 13440), (117, 13491), (118, 13494), (119, 13503), (120, 13524), (122, 13557), (123, 13560), (124, 13578), (126, 13590), (129, 13641), (130, 13671), (131, 13686), (132, 13695), (134, 13728), (135, 13737), (136, 13749), (138, 13773), (139, 13782), (142, 13806), (144, 13824), (150, 13902), (151, 13905), (152, 13908), (154, 13935), (158, 13947), (161, 13965), (165, 13977), (166, 13980), (167, 13998), (169, 14007), (178, 14088), (182, 14112), (188, 14187), (190, 14193), (195, 14235), (197, 14280), (200, 14313), (201, 14319), (213, 14427), (216, 14439), (217, 14454), (222, 14517), (223, 14529), (225, 14550), (227, 14580), (232, 14622), (234, 14625), (241, 14718), (245, 14751), (248, 14790), (250, 14802), (255, 14823), (263, 14892), (264, 14895), (267, 14931), (270, 14943), (273, 14958), (276, 14982), (277, 14985), (292, 15063), (295, 15072), (301, 15120), (307, 15153), (312, 15180), (318, 15261), (330, 15324), (333, 15366), (343, 15441), (352, 15540), (353, 15582), (360, 15660), (364, 15723), (365, 15765), (368, 15825), (370, 15843), (371, 15873), (373, 15882), (374, 15888), (376, 15903), (384, 16023), (387, 16041), (388, 16056), (390, 16059), (392, 16077), (396, 16125), (397, 16140), (400, 16173), (404, 16191), (410, 16230), (413, 16239), (414, 16251), (415, 16269), (417, 16293),

Gene: LilHazelnut\_20 Start: 12222, Stop: 16301, Start Num: 8

Candidate Starts for LilHazelnut\_20:

(Start: 8 @12222 has 23 MA's), (11, 12246), (12, 12252), (16, 12285), (26, 12438), (27, 12468), (29, 12498), (30, 12528), (32, 12546), (34, 12567), (42, 12609), (43, 12642), (50, 12708), (51, 12711), (53, 12738), (59, 12783), (67, 12831), (75, 12948), (77, 12978), (81, 13032), (82, 13041), (83, 13056), (84, 13074), (85, 13095), (86, 13101), (87, 13119), (88, 13158), (91, 13173), (94, 13209), (95, 13242), (98, 13257), (100, 13281), (101, 13299), (103, 13317), (104, 13326), (107, 13344), (108, 13374), (110, 13389), (114, 13440), (117, 13491), (118, 13494), (119, 13503), (120, 13524), (122, 13557), (123, 13560), (124, 13578), (126, 13590), (129, 13641), (130, 13671), (131, 13686), (132, 13695), (134, 13728), (135, 13737), (136, 13749), (138, 13773), (139, 13782), (142, 13806), (144, 13824), (150, 13902), (151, 13905), (152, 13908), (154, 13935), (158, 13947), (161, 13965), (165, 13977), (166, 13980), (167, 13998), (169, 14007), (178, 14088), (182, 14112), (188, 14187), (190, 14193), (195, 14235), (197, 14280), (200, 14313), (201, 14319), (213, 14427), (216, 14439), (217, 14454), (222, 14517), (223, 14529), (225, 14550), (227, 14580), (232, 14622), (234, 14625), (241, 14718), (245, 14751), (248, 14790), (250, 14802), (255, 14823), (263, 14892), (264, 14895), (267, 14931), (270, 14943), (273, 14958), (276, 14982), (277, 14985), (292, 15063), (295, 15072), (301, 15120), (307, 15153), (312, 15180), (318, 15261), (330, 15324), (333, 15366), (343, 15441), (352, 15540), (353, 15582), (360, 15660), (364, 15723), (365, 15765), (368, 15825), (370, 15843), (371, 15873), (373, 15882), (374, 15888), (376, 15903), (384, 16023), (387, 16041), (388, 16056), (390, 16059), (392, 16077), (396, 16125), (397, 16140), (400, 16173), (404, 16191), (410, 16230), (413, 16239), (414, 16251), (415, 16269), (417, 16293),

Gene: Luke\_20 Start: 12222, Stop: 16301, Start Num: 8

Candidate Starts for Luke\_20:

(Start: 8 @12222 has 23 MA's), (11, 12246), (12, 12252), (16, 12285), (26, 12438), (27, 12468), (29, 12498), (30, 12528), (32, 12546), (34, 12567), (42, 12609), (43, 12642), (50, 12708), (51, 12711), (53, 12738), (59, 12783), (67, 12831), (75, 12948), (77, 12978), (81, 13032), (82, 13041), (83, 13056), (84, 13074), (85, 13095), (86, 13101), (87, 13119), (88, 13158), (91, 13173), (94, 13209), (95, 13242), (98,

13257), (100, 13281), (101, 13299), (103, 13317), (104, 13326), (107, 13344), (108, 13374), (110, 13389), (114, 13440), (117, 13491), (118, 13494), (119, 13503), (120, 13524), (122, 13557), (123, 13560), (124, 13578), (126, 13590), (129, 13641), (130, 13671), (131, 13686), (132, 13695), (134, 13728), (135, 13737), (136, 13749), (138, 13773), (139, 13782), (142, 13806), (144, 13824), (150, 13902), (151, 13905), (152, 13908), (154, 13935), (158, 13947), (161, 13965), (165, 13977), (166, 13980), (167, 13998), (169, 14007), (178, 14088), (182, 14112), (188, 14187), (190, 14193), (195, 14235), (197, 14280), (200, 14313), (201, 14319), (213, 14427), (216, 14439), (217, 14454), (222, 14517), (223, 14529), (225, 14550), (227, 14580), (232, 14622), (234, 14625), (241, 14718), (245, 14751), (248, 14790), (250, 14802), (255, 14823), (263, 14892), (264, 14895), (267, 14931), (270, 14943), (273, 14958), (276, 14982), (277, 14985), (292, 15063), (295, 15072), (301, 15120), (307, 15153), (312, 15180), (318, 15261), (330, 15324), (333, 15366), (343, 15441), (352, 15540), (353, 15582), (360, 15660), (364, 15723), (365, 15765), (368, 15825), (370, 15843), (371, 15873), (373, 15882), (374, 15888), (376, 15903), (384, 16023), (387, 16041), (388, 16056), (390, 16059), (392, 16077), (396, 16125), (397, 16140), (400, 16173), (404, 16191), (410, 16230), (413, 16239), (414, 16251), (415, 16269), (417, 16293),

Gene: Luna22\_20 Start: 12222, Stop: 16301, Start Num: 8

Candidate Starts for Luna22\_20:

(Start: 8 @12222 has 23 MA's), (11, 12246), (12, 12252), (16, 12285), (26, 12438), (27, 12468), (29, 12498), (30, 12528), (32, 12546), (34, 12567), (42, 12609), (43, 12642), (50, 12708), (51, 12711), (53, 12738), (59, 12783), (67, 12831), (75, 12948), (77, 12978), (81, 13032), (82, 13041), (83, 13056), (84, 13074), (85, 13095), (86, 13101), (87, 13119), (88, 13158), (91, 13173), (94, 13209), (95, 13242), (98, 13257), (100, 13281), (101, 13299), (103, 13317), (104, 13326), (107, 13344), (108, 13374), (110, 13389), (114, 13440), (117, 13491), (118, 13494), (119, 13503), (120, 13524), (122, 13557), (123, 13560), (124, 13578), (126, 13590), (129, 13641), (130, 13671), (131, 13686), (132, 13695), (134, 13728), (135, 13737), (136, 13749), (138, 13773), (139, 13782), (142, 13806), (144, 13824), (150, 13902), (151, 13905), (152, 13908), (154, 13935), (158, 13947), (161, 13965), (165, 13977), (166, 13980), (167, 13998), (169, 14007), (178, 14088), (182, 14112), (188, 14187), (190, 14193), (195, 14235), (197, 14280), (200, 14313), (201, 14319), (213, 14427), (216, 14439), (217, 14454), (222, 14517), (223, 14529), (225, 14550), (227, 14580), (232, 14622), (234, 14625), (241, 14718), (245, 14751), (248, 14790), (250, 14802), (255, 14823), (263, 14892), (264, 14895), (267, 14931), (270, 14943), (273, 14958), (276, 14982), (277, 14985), (292, 15063), (295, 15072), (301, 15120), (307, 15153), (312, 15180), (318, 15261), (330, 15324), (333, 15366), (343, 15441), (352, 15540), (353, 15582), (360, 15660), (364, 15723), (365, 15765), (368, 15825), (370, 15843), (371, 15873), (373, 15882), (374, 15888), (376, 15903), (384, 16023), (387, 16041), (388, 16056), (390, 16059), (392, 16077), (396, 16125), (397, 16140), (400, 16173), (404, 16191), (410, 16230), (413, 16239), (414, 16251), (415, 16269), (417, 16293),

Gene: Nebkiss\_13 Start: 9453, Stop: 13316, Start Num: 10

Candidate Starts for Nebkiss\_13:

(Start: 10 @9453 has 2 MA's), (17, 9519), (24, 9630), (28, 9714), (33, 9786), (40, 9816), (46, 9891), (60, 10011), (74, 10140), (75, 10143), (81, 10227), (85, 10290), (86, 10296), (89, 10356), (91, 10368), (94, 10404), (99, 10458), (101, 10494), (102, 10500), (110, 10584), (111, 10587), (112, 10593), (114, 10635), (115, 10641), (119, 10698), (120, 10719), (121, 10731), (125, 10779), (128, 10824), (153, 11115), (154, 11118), (161, 11154), (163, 11160), (164, 11163), (167, 11187), (171, 11220), (174, 11238), (187, 11358), (191, 11391), (202, 11526), (207, 11562), (210, 11595), (229, 11808), (240, 11907), (243, 11958), (248, 12006), (251, 12024), (252, 12030), (258, 12072), (259, 12081), (264, 12084), (266, 12108), (274, 12144), (289, 12234), (301, 12282), (304, 12285), (316, 12321), (328, 12387), (334, 12441), (342, 12480), (345, 12489), (347, 12504), (362, 12708), (363, 12717), (372, 12873), (379, 12945), (382, 12993), (383, 13017), (385, 13038), (386, 13041), (389, 13062), (405, 13203), (407, 13212), (408, 13218),

Gene: NovoPizza\_17 Start: 12303, Stop: 16601, Start Num: 8

Candidate Starts for NovoPizza\_17:

(Start: 8 @12303 has 23 MA's), (14, 12354), (25, 12498), (26, 12519), (27, 12549), (32, 12627), (36, 12666), (37, 12669), (38, 12672), (49, 12795), (51, 12807), (54, 12846), (56, 12855), (62, 12903), (68, 12939), (69, 12942), (71, 13002), (75, 13044), (77, 13074), (81, 13128), (83, 13152), (84, 13170), (90, 13260), (95, 13338), (97, 13347), (98, 13353), (99, 13359), (100, 13377), (107, 13440), (108, 13470), (117, 13587), (118, 13590), (119, 13599), (120, 13620), (124, 13674), (126, 13686), (127, 13713), (130, 13767), (131, 13782), (134, 13824), (136, 13845), (139, 13878), (144, 13920), (148, 13986), (156, 14040), (158, 14043), (162, 14064), (171, 14121), (180, 14196), (184, 14217), (188, 14283), (192, 14301), (193, 14310), (197, 14376), (201, 14415), (215, 14538), (217, 14556), (220, 14583), (234, 14745), (241, 14847), (242, 14856), (246, 14910), (247, 14925), (256, 15015), (257, 15018), (260, 15036), (269, 15123), (285, 15210), (286, 15213), (291, 15252), (299, 15303), (314, 15402), (320, 15495), (321, 15510), (325, 15540), (339, 15663), (352, 15810), (353, 15852), (355, 15873), (368, 16107), (375, 16182), (387, 16332), (388, 16347), (395, 16401), (396, 16413), (402, 16476), (404, 16491), (410, 16530),

Gene: OBUpride\_20 Start: 12216, Stop: 16295, Start Num: 8

Candidate Starts for OBUpride\_20:

(Start: 8 @12216 has 23 MA's), (11, 12240), (12, 12246), (16, 12279), (26, 12432), (27, 12462), (29, 12492), (30, 12522), (32, 12540), (34, 12561), (42, 12603), (43, 12636), (50, 12702), (51, 12705), (53, 12732), (59, 12777), (67, 12825), (75, 12942), (77, 12972), (81, 13026), (82, 13035), (83, 13050), (84, 13068), (85, 13089), (86, 13095), (87, 13113), (88, 13152), (91, 13167), (94, 13203), (95, 13236), (98, 13251), (100, 13275), (101, 13293), (103, 13311), (104, 13320), (107, 13338), (108, 13368), (110, 13383), (114, 13434), (117, 13485), (118, 13488), (119, 13497), (120, 13518), (122, 13551), (123, 13554), (124, 13572), (126, 13584), (129, 13635), (130, 13665), (131, 13680), (132, 13689), (134, 13722), (135, 13731), (136, 13743), (138, 13767), (139, 13776), (142, 13800), (144, 13818), (150, 13896), (151, 13899), (152, 13902), (154, 13929), (158, 13941), (161, 13959), (165, 13971), (166, 13974), (167, 13992), (169, 14001), (178, 14082), (182, 14106), (188, 14181), (190, 14187), (195, 14229), (197, 14274), (200, 14307), (201, 14313), (213, 14421), (216, 14433), (217, 14448), (222, 14511), (223, 14523), (225, 14544), (227, 14574), (232, 14616), (234, 14619), (241, 14712), (245, 14745), (248, 14784), (250, 14796), (255, 14817), (263, 14886), (264, 14889), (267, 14925), (270, 14937), (273, 14952), (276, 14976), (277, 14979), (292, 15057), (295, 15066), (301, 15114), (307, 15147), (312, 15174), (318, 15255), (330, 15318), (333, 15360), (343, 15435), (352, 15534), (353, 15576), (360, 15654), (364, 15717), (365, 15759), (368, 15819), (370, 15837), (371, 15867), (373, 15876), (374, 15882), (376, 15897), (384, 16017), (387, 16035), (388, 16050), (390, 16053), (392, 16071), (396, 16119), (397, 16134), (400, 16167), (404, 16185), (410, 16224), (413, 16233), (414, 16245), (415, 16263), (417, 16287),

Gene: Stellammi\_13 Start: 8345, Stop: 12694, Start Num: 9

Candidate Starts for Stellammi\_13:

(Start: 9 @8345 has 1 MA's), (15, 8393), (19, 8423), (20, 8450), (40, 8711), (47, 8789), (60, 8903), (71, 8993), (75, 9035), (78, 9077), (79, 9083), (81, 9119), (84, 9161), (85, 9182), (91, 9260), (93, 9293), (96, 9332), (97, 9338), (99, 9350), (106, 9422), (111, 9479), (115, 9533), (119, 9590), (121, 9623), (128, 9716), (129, 9728), (130, 9755), (143, 9899), (146, 10001), (149, 10025), (157, 10082), (159, 10091), (167, 10130), (175, 10172), (186, 10271), (188, 10304), (189, 10307), (206, 10481), (211, 10523), (228, 10700), (230, 10733), (244, 10889), (247, 10928), (248, 10937), (250, 10955), (254, 10976), (262, 11090), (264, 11099), (274, 11195), (275, 11213), (278, 11222), (283, 11249), (296, 11336), (297, 11345), (301, 11381), (306, 11414), (308, 11438), (309, 11444), (311, 11456), (319, 11585), (328, 11663), (329, 11672), (336, 11741), (338, 11765), (348, 11861), (349, 11882), (356, 12002), (357, 12014), (358, 12035), (377, 12320), (378, 12329), (379, 12341), (381, 12380), (389, 12458), (399, 12560), (409, 12605),

Gene: Ubuntu\_20 Start: 12222, Stop: 16301, Start Num: 8

Candidate Starts for Ubuntu\_20:

(Start: 8 @12222 has 23 MA's), (11, 12246), (12, 12252), (16, 12285), (26, 12438), (27, 12468), (29, 12498), (30, 12528), (32, 12546), (34, 12567), (42, 12609), (43, 12642), (50, 12708), (51, 12711), (53, 12738), (59, 12783), (67, 12831), (75, 12948), (77, 12978), (81, 13032), (82, 13041), (83, 13056), (84, 13074), (85, 13095), (86, 13101), (87, 13119), (88, 13158), (91, 13173), (94, 13209), (95, 13242), (98, 13257), (100, 13281), (101, 13299), (103, 13317), (104, 13326), (107, 13344), (108, 13374), (110, 13389), (114, 13440), (117, 13491), (118, 13494), (119, 13503), (120, 13524), (122, 13557), (123, 13560), (124, 13578), (126, 13590), (129, 13641), (130, 13671), (131, 13686), (132, 13695), (134, 13728), (135, 13737), (136, 13749), (138, 13773), (139, 13782), (142, 13806), (144, 13824), (150, 13902), (151, 13905), (152, 13908), (154, 13935), (158, 13947), (161, 13965), (165, 13977), (166, 13980), (167, 13998), (169, 14007), (178, 14088), (182, 14112), (188, 14187), (190, 14193), (195, 14235), (197, 14280), (200, 14313), (201, 14319), (213, 14427), (216, 14439), (217, 14454), (222, 14517), (223, 14529), (225, 14550), (227, 14580), (232, 14622), (234, 14625), (241, 14718), (245, 14751), (248, 14790), (250, 14802), (255, 14823), (263, 14892), (264, 14895), (267, 14931), (270, 14943), (273, 14958), (276, 14982), (277, 14985), (292, 15063), (295, 15072), (301, 15120), (307, 15153), (312, 15180), (318, 15261), (330, 15324), (333, 15366), (343, 15441), (352, 15540), (353, 15582), (360, 15660), (364, 15723), (365, 15765), (368, 15825), (370, 15843), (371, 15873), (373, 15882), (374, 15888), (376, 15903), (384, 16023), (387, 16041), (388, 16056), (390, 16059), (392, 16077), (396, 16125), (397, 16140), (400, 16173), (404, 16191), (410, 16230), (413, 16239), (414, 16251), (415, 16269), (417, 16293),

Gene: Webster2\_20 Start: 12222, Stop: 16301, Start Num: 8

Candidate Starts for Webster2\_20:

(Start: 8 @12222 has 23 MA's), (11, 12246), (12, 12252), (16, 12285), (26, 12438), (27, 12468), (29, 12498), (30, 12528), (32, 12546), (34, 12567), (42, 12609), (43, 12642), (50, 12708), (51, 12711), (53, 12738), (59, 12783), (67, 12831), (75, 12948), (77, 12978), (81, 13032), (82, 13041), (83, 13056), (84, 13074), (85, 13095), (86, 13101), (87, 13119), (88, 13158), (91, 13173), (94, 13209), (95, 13242), (98, 13257), (100, 13281), (101, 13299), (103, 13317), (104, 13326), (107, 13344), (108, 13374), (110, 13389), (114, 13440), (117, 13491), (118, 13494), (119, 13503), (120, 13524), (122, 13557), (123, 13560), (124, 13578), (126, 13590), (129, 13641), (130, 13671), (131, 13686), (132, 13695), (134, 13728), (135, 13737), (136, 13749), (138, 13773), (139, 13782), (142, 13806), (144, 13824), (150, 13902), (151, 13905), (152, 13908), (154, 13935), (158, 13947), (161, 13965), (165, 13977), (166, 13980), (167, 13998), (169, 14007), (178, 14088), (182, 14112), (188, 14187), (190, 14193), (195, 14235), (197, 14280), (200, 14313), (201, 14319), (213, 14427), (216, 14439), (217, 14454), (222, 14517), (223, 14529), (225, 14550), (227, 14580), (232, 14622), (234, 14625), (241, 14718), (245, 14751), (248, 14790), (250, 14802), (255, 14823), (263, 14892), (264, 14895), (267, 14931), (270, 14943), (273, 14958), (276, 14982), (277, 14985), (292, 15063), (295, 15072), (301, 15120), (307, 15153), (312, 15180), (318, 15261), (330, 15324), (333, 15366), (343, 15441), (352, 15540), (353, 15582), (360, 15660), (364, 15723), (365, 15765), (368, 15825), (370, 15843), (371, 15873), (373, 15882), (374, 15888), (376, 15903), (384, 16023), (387, 16041), (388, 16056), (390, 16059), (392, 16077), (396, 16125), (397, 16140), (400, 16173), (404, 16191), (410, 16230), (413, 16239), (414, 16251), (415, 16269), (417, 16293),

Gene: Weirido19\_17 Start: 10901, Stop: 14980, Start Num: 7

Candidate Starts for Weirido19\_17:

(Start: 7 @10901 has 1 MA's), (14, 10958), (17, 10982), (41, 11345), (48, 11447), (52, 11480), (55, 11510), (60, 11549), (61, 11558), (63, 11567), (64, 11570), (65, 11576), (70, 11657), (75, 11702), (76, 11711), (80, 11759), (81, 11786), (83, 11810), (84, 11828), (85, 11849), (95, 11996), (98, 12011), (100, 12035), (105, 12086), (107, 12098), (108, 12128), (116, 12224), (117, 12245), (118, 12248), (120, 12278), (122, 12311), (124, 12332), (126, 12344), (129, 12395), (130, 12422), (131, 12437), (137, 12509), (145, 12611), (155, 12692), (160, 12713), (172, 12779), (173, 12785), (175, 12803), (176, 12806), (177, 12818), (179, 12842), (181, 12854), (183, 12863), (188, 12929), (193, 12956), (194, 12968), (199, 13034), (203, 13076), (204, 13088), (206, 13100), (209, 13112), (214, 13166), (233, 13352), (235, 13373), (236, 13397), (239, 13421), (241, 13442), (242, 13451), (243, 13472), (248,

13526), (249, 13541), (264, 13640), (268, 13676), (276, 13724), (280, 13742), (281, 13751), (282, 13754), (298, 13844), (305, 13892), (315, 13973), (322, 14030), (324, 14042), (326, 14054), (337, 14147), (340, 14174), (341, 14186), (344, 14210), (360, 14387), (375, 14609), (390, 14756), (391, 14765), (392, 14774), (394, 14795), (395, 14798), (411, 14903), (413, 14909), (416, 14966), (418, 14969),

Gene: Wishmaker\_20 Start: 12222, Stop: 16301, Start Num: 8

Candidate Starts for Wishmaker\_20:

(Start: 8 @12222 has 23 MA's), (11, 12246), (12, 12252), (16, 12285), (26, 12438), (27, 12468), (29, 12498), (30, 12528), (32, 12546), (34, 12567), (42, 12609), (43, 12642), (50, 12708), (51, 12711), (53, 12738), (59, 12783), (67, 12831), (75, 12948), (77, 12978), (81, 13032), (82, 13041), (83, 13056), (84, 13074), (85, 13095), (86, 13101), (87, 13119), (88, 13158), (91, 13173), (94, 13209), (95, 13242), (98, 13257), (100, 13281), (101, 13299), (103, 13317), (104, 13326), (107, 13344), (108, 13374), (110, 13389), (114, 13440), (117, 13491), (118, 13494), (119, 13503), (120, 13524), (122, 13557), (123, 13560), (124, 13578), (126, 13590), (129, 13641), (130, 13671), (131, 13686), (132, 13695), (134, 13728), (135, 13737), (136, 13749), (138, 13773), (139, 13782), (142, 13806), (144, 13824), (150, 13902), (151, 13905), (152, 13908), (154, 13935), (158, 13947), (161, 13965), (165, 13977), (166, 13980), (167, 13998), (169, 14007), (178, 14088), (182, 14112), (188, 14187), (190, 14193), (195, 14235), (197, 14280), (200, 14313), (201, 14319), (213, 14427), (216, 14439), (217, 14454), (222, 14517), (223, 14529), (225, 14550), (227, 14580), (232, 14622), (234, 14625), (241, 14718), (245, 14751), (248, 14790), (250, 14802), (255, 14823), (263, 14892), (264, 14895), (267, 14931), (270, 14943), (273, 14958), (276, 14982), (277, 14985), (292, 15063), (295, 15072), (301, 15120), (307, 15153), (312, 15180), (318, 15261), (330, 15324), (333, 15366), (343, 15441), (352, 15540), (353, 15582), (360, 15660), (364, 15723), (365, 15765), (368, 15825), (370, 15843), (371, 15873), (373, 15882), (374, 15888), (376, 15903), (384, 16023), (387, 16041), (388, 16056), (390, 16059), (392, 16077), (396, 16125), (397, 16140), (400, 16173), (404, 16191), (410, 16230), (413, 16239), (414, 16251), (415, 16269), (417, 16293),