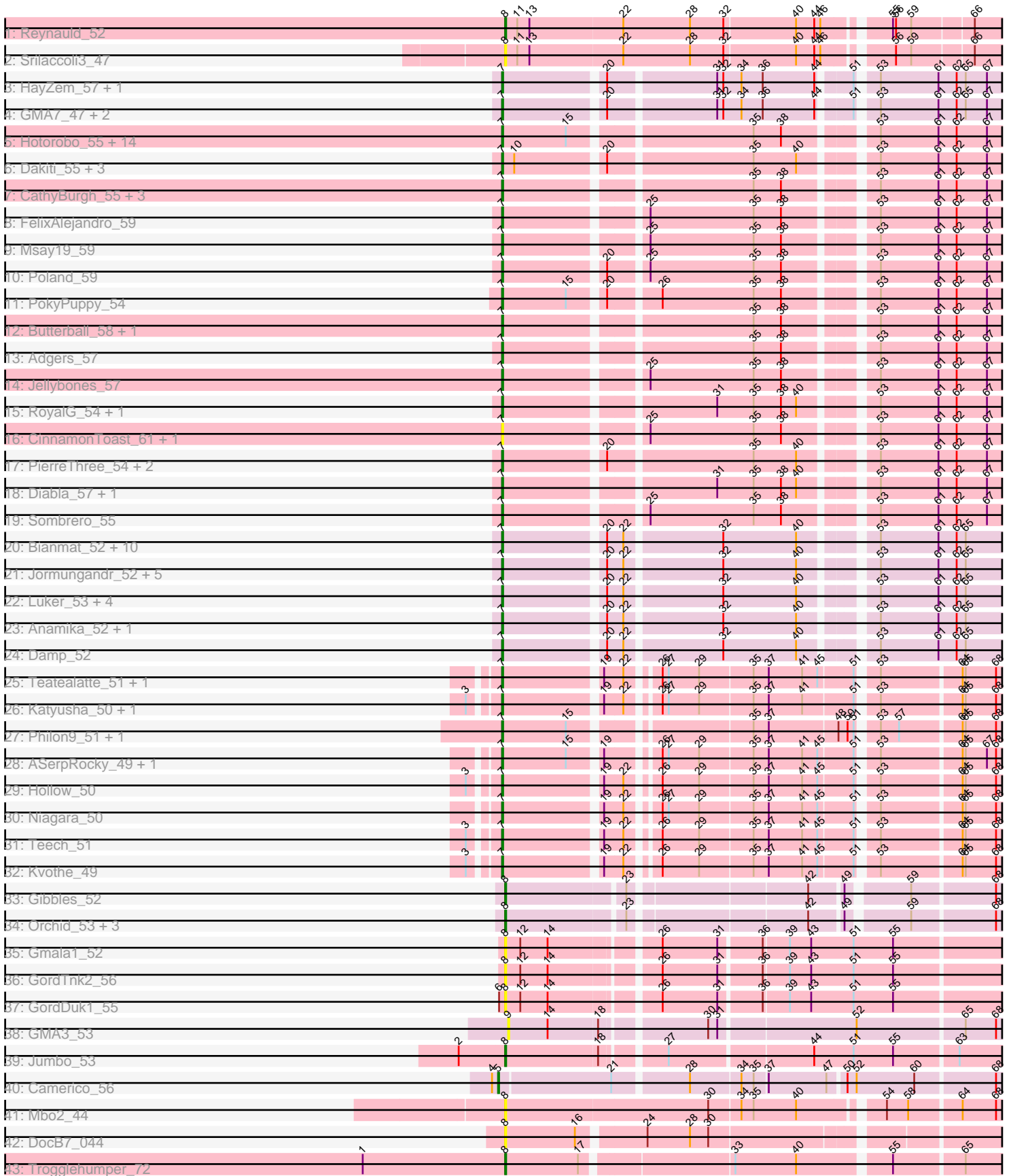


# Zoomed Pham 311434



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 311434 Report

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

Pham number 311434 has 99 members, 14 are drafts.

Phages represented in each track:

- Track 1 : Reynauld\_52
- Track 2 : Srilaccoli3\_47
- Track 3 : HayZem\_57, GTE7\_46
- Track 4 : GMA7\_47, Austin\_57, Amore2\_58
- Track 5 : Hotorobo\_55, Squibbles\_54, John316\_58, Sam12\_54, Kelzog\_57, Breezic\_55, Worcestershire\_55, Monty\_54, Barbochs\_53, Flakey\_54, BirksAndSocks\_60, Gorko\_54, Ekhein\_55, Exiguo\_54, Beaver\_58
- Track 6 : Dakiti\_55, BigShaq\_55, Chelms\_54, Crete\_56
- Track 7 : CathyBurgh\_55, RemRem\_56, Lizzo\_55, GourdThymes\_55
- Track 8 : FelixAlejandro\_59
- Track 9 : Msay19\_59
- Track 10 : Poland\_59
- Track 11 : PokyPuppy\_54
- Track 12 : Butterball\_58, Boneham\_59
- Track 13 : Adgers\_57
- Track 14 : Jellybones\_57
- Track 15 : RoyalG\_54, SteveFrench\_53
- Track 16 : CinnamonToast\_61, BillyBobJr\_61
- Track 17 : PierreThree\_54, BenoitCattle\_55, Linetti\_55
- Track 18 : Diabla\_57, Eggsie\_52
- Track 19 : Sombrero\_55
- Track 20 : Bianmat\_52, GalacticEye\_52, Charianelly\_52, Shelley\_52, MrWormie\_52, Kaseim\_52, Lidong\_52, Berries\_52, Sticker17\_52, Jams\_52, Minos\_53
- Track 21 : Jormungandr\_52, Nimi13\_52, Harambe\_52, Lahirium\_52, Hello\_52, Guillaume\_52
- Track 22 : Luker\_53, Newt\_53, Neoevie\_52, Teal\_52, Woes\_52
- Track 23 : Anamika\_52, Hail2Pitt\_51
- Track 24 : Damp\_52
- Track 25 : Teatealatte\_51, Tredge\_51
- Track 26 : Katyusha\_50, Benczkowski14\_50
- Track 27 : Philon9\_51, Vitaenoi\_51
- Track 28 : ASerpRocky\_49, Demosthenes\_49
- Track 29 : Hollow\_50
- Track 30 : Niagara\_50
- Track 31 : Teech\_51
- Track 32 : Kvothe\_49
- Track 33 : Gibbles\_52

- Track 34 : Orchid\_53, PatrickStar\_54, Kampe\_54, RobinSparkles\_57
- Track 35 : Gmala1\_52
- Track 36 : GordTnk2\_56
- Track 37 : GordDuk1\_55
- Track 38 : GMA3\_53
- Track 39 : Jumbo\_53
- Track 40 : Camerico\_56
- Track 41 : Mbo2\_44
- Track 42 : DocB7\_044
- Track 43 : Trogglehumper\_72

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

The start number called the most often in the published annotations is 7, it was called in 76 of the 85 non-draft genes in the pham.

Genes that call this "Most Annotated" start:

- ASerpRocky\_49, Adgers\_57, Amore2\_58, Anamika\_52, Austin\_57, Barbochs\_53, Beaver\_58, Benczkowski14\_50, BenoitCattle\_55, Berries\_52, Bianmat\_52, BigShaq\_55, BillyBobJr\_61, BirksAndSocks\_60, Boneham\_59, Breezic\_55, Butterball\_58, CathyBurgh\_55, Charianelly\_52, Chelms\_54, CinnamonToast\_61, Crete\_56, Dakiti\_55, Damp\_52, Demosthenes\_49, Diabla\_57, Eggsie\_52, Ekhein\_55, Exiguo\_54, FelixAlejandro\_59, Flakey\_54, GMA7\_47, GTE7\_46, GalacticEye\_52, Gorko\_54, GourdThymes\_55, Guillaume\_52, Hail2Pitt\_51, Harambe\_52, HayZem\_57, Hello\_52, Hollow\_50, Hotorobo\_55, Jams\_52, Jellybones\_57, John316\_58, Jormungandr\_52, Kaseim\_52, Katyusha\_50, Kelzog\_57, Kvothe\_49, Lahirium\_52, Lidong\_52, Linetti\_55, Lizzo\_55, Luker\_53, Minos\_53, Monty\_54, MrWormie\_52, Msay19\_59, Neoevie\_52, Newt\_53, Niagara\_50, Nimi13\_52, Philon9\_51, PierreThree\_54, PokyPuppy\_54, Poland\_59, RemRem\_56, RoyalG\_54, Sam12\_54, Shelley\_52, Sombrero\_55, Squibbles\_54, SteveFrench\_53, Sticker17\_52, Teal\_52, Teatealatte\_51, Teech\_51, Tredge\_51, Vitaenoi\_51, Woes\_52, Worcestershire\_55,

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

- 

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

- Camerico\_56, DocB7\_044, GMA3\_53, Gibbles\_52, Gmala1\_52, GordDuk1\_55, GordTnk2\_56, Jumbo\_53, Kampe\_54, Mbo2\_44, Orchid\_53, PatrickStar\_54, Reynauld\_52, RobinSparkles\_57, Srilaccoli3\_47, Trogglehumper\_72,

**Summary by start number:**

Start 5:

- Found in 1 of 99 ( 1.0% ) of genes in pham
- Manual Annotations of this start: 1 of 85
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Camerico\_56 (DF4),

Start 7:

- Found in 83 of 99 ( 83.8% ) of genes in pham
- Manual Annotations of this start: 76 of 85
- Called 100.0% of time when present
- Phage (with cluster) where this start called: ASerpRocky\_49 (CS4), Adgers\_57 (CS2), Amore2\_58 (CS1), Anamika\_52 (CS3), Austin\_57 (CS1), Barbochs\_53 (CS2), Beaver\_58 (CS2), Benczkowski14\_50 (CS4), BenoitCattle\_55 (CS2), Berries\_52 (CS3), Bianmat\_52 (CS3), BigShaq\_55 (CS2), BillyBobJr\_61 (CS2), BirksAndSocks\_60 (CS2), Boneham\_59 (CS2), Breezic\_55 (CS2), Butterball\_58 (CS2), CathyBurgh\_55 (CS2), Charianelly\_52 (CS3), Chelms\_54 (CS2), CinnamonToast\_61 (CS2), Crete\_56 (CS2), Dakiti\_55 (CS2), Damp\_52 (CS3), Demosthenes\_49 (CS4), Diabla\_57 (CS2), Eggsie\_52 (CS2), Ekhein\_55 (CS2), Exiguo\_54 (CS2), FelixAlejandro\_59 (CS2), Flakey\_54 (CS2), GMA7\_47 (CS1), GTE7\_46 (CS1), GalacticEye\_52 (CS3), Gorko\_54 (CS2), GourdThymes\_55 (CS2), Guillaume\_52 (CS3), Hail2Pitt\_51 (CS3), Harambe\_52 (CS3), HayZem\_57 (CS1), Hello\_52 (CS3), Hollow\_50 (CS4), Hotorobo\_55 (CS2), Jams\_52 (CS3), Jellybones\_57 (CS2), John316\_58 (CS2), Jormungandr\_52 (CS3), Kaseim\_52 (CS3), Katyusha\_50 (CS4), Kelzog\_57 (CS2), Kvothe\_49 (CS4), Lahirium\_52 (CS3), Lidong\_52 (CS3), Linetti\_55 (CS2), Lizzo\_55 (CS2), Luker\_53 (CS3), Minos\_53 (CS3), Monty\_54 (CS2), MrWormie\_52 (CS3), Msay19\_59 (CS2), Neoevie\_52 (CS3), Newt\_53 (CS3), Niagara\_50 (CS4), Nimi13\_52 (CS3), Philon9\_51 (CS4), PierreThree\_54 (CS2), PokyPuppy\_54 (CS2), Poland\_59 (CS2), RemRem\_56 (CS2), RoyalG\_54 (CS2), Sam12\_54 (CS2), Shelley\_52 (CS3), Sombrero\_55 (CS2), Squibbles\_54 (CS2), SteveFrench\_53 (CS2), Sticker17\_52 (CS3), Teal\_52 (CS3), Teatealatte\_51 (CS4), Teech\_51 (CS4), Tredge\_51 (CS4), Vitaenoi\_51 (CS4), Woes\_52 (CS3), Worcestershire\_55 (CS2),

#### Start 8:

- Found in 14 of 99 ( 14.1% ) of genes in pham
- Manual Annotations of this start: 8 of 85
- Called 100.0% of time when present
- Phage (with cluster) where this start called: DocB7\_044 (singleton), Gibbles\_52 (CX), Gmala1\_52 (DF1), GordDuk1\_55 (DF1), GordTnk2\_56 (DF1), Jumbo\_53 (DF3), Kampe\_54 (CX), Mbo2\_44 (singleton), Orchid\_53 (CX), PatrickStar\_54 (CX), Reynauld\_52 (CH), RobinSparkles\_57 (CX), Srilaccoli3\_47 (CH), Trogglehumper\_72 (singleton),

#### Start 9:

- Found in 1 of 99 ( 1.0% ) of genes in pham
- No Manual Annotations of this start.
- Called 100.0% of time when present
- Phage (with cluster) where this start called: GMA3\_53 (DF2),

### Summary by clusters:

There are 11 clusters represented in this pham: singleton, CH, DF4, DF1, DF3, DF2, CX, CS4, CS1, CS3, CS2,

Info for manual annotations of cluster CH:

- Start number 8 was manually annotated 1 time for cluster CH.

Info for manual annotations of cluster CS1:

- Start number 7 was manually annotated 3 times for cluster CS1.

Info for manual annotations of cluster CS2:

- Start number 7 was manually annotated 36 times for cluster CS2.

Info for manual annotations of cluster CS3:

- Start number 7 was manually annotated 25 times for cluster CS3.

Info for manual annotations of cluster CS4:

- Start number 7 was manually annotated 12 times for cluster CS4.

Info for manual annotations of cluster CX:

- Start number 8 was manually annotated 5 times for cluster CX.

Info for manual annotations of cluster DF3:

- Start number 8 was manually annotated 1 time for cluster DF3.

Info for manual annotations of cluster DF4:

- Start number 5 was manually annotated 1 time for cluster DF4.

### **Gene Information:**

Gene: ASerpRocky\_49 Start: 49585, Stop: 48473, Start Num: 7

Candidate Starts for ASerpRocky\_49:

(Start: 7 @49585 has 76 MA's), (15, 49522), (19, 49495), (26, 49453), (27, 49447), (29, 49417), (35, 49366), (37, 49351), (41, 49318), (45, 49303), (51, 49270), (53, 49255), (64, 49180), (65, 49177), (67, 49156), (68, 49147), (73, 49102), (81, 49048), (86, 49003), (87, 49000), (91, 48976), (95, 48949), (100, 48904), (109, 48853), (115, 48799), (117, 48790), (118, 48781), (124, 48745), (129, 48721), (134, 48679), (137, 48661), (138, 48658), (148, 48595), (151, 48565), (158, 48493),

Gene: Adgers\_57 Start: 49096, Stop: 47963, Start Num: 7

Candidate Starts for Adgers\_57:

(Start: 7 @49096 has 76 MA's), (35, 48868), (38, 48841), (53, 48766), (61, 48709), (62, 48691), (67, 48661), (69, 48640), (75, 48601), (79, 48559), (81, 48553), (86, 48511), (96, 48451), (103, 48394), (109, 48361), (110, 48358), (118, 48292), (125, 48250), (129, 48232), (136, 48175), (142, 48145), (155, 48046), (158, 48004),

Gene: Amore2\_58 Start: 49549, Stop: 48410, Start Num: 7

Candidate Starts for Amore2\_58:

(Start: 7 @49549 has 76 MA's), (20, 49456), (31, 49357), (32, 49351), (34, 49333), (36, 49312), (44, 49261), (51, 49234), (53, 49219), (61, 49162), (62, 49144), (65, 49135), (67, 49114), (70, 49078), (75, 49054), (81, 49006), (90, 48946), (95, 48910), (96, 48904), (99, 48883), (103, 48847), (106, 48823), (110, 48811), (125, 48703), (128, 48694), (129, 48685), (130, 48682), (151, 48526), (158, 48454), (161, 48439),

Gene: Anamika\_52 Start: 49892, Stop: 48759, Start Num: 7

Candidate Starts for Anamika\_52:

(Start: 7 @49892 has 76 MA's), (20, 49799), (22, 49784), (32, 49694), (40, 49622), (53, 49562), (61, 49505), (62, 49487), (65, 49478), (69, 49436), (73, 49403), (75, 49397), (81, 49349), (85, 49310), (86, 49307), (87, 49304), (106, 49166), (109, 49157), (110, 49154), (115, 49106), (118, 49088), (129, 49028), (130, 49025), (136, 48971), (141, 48941), (151, 48869), (152, 48866), (155, 48839), (156,

48836), (158, 48797),

Gene: Austin\_57 Start: 49547, Stop: 48408, Start Num: 7

Candidate Starts for Austin\_57:

(Start: 7 @49547 has 76 MA's), (20, 49454), (31, 49355), (32, 49349), (34, 49331), (36, 49310), (44, 49259), (51, 49232), (53, 49217), (61, 49160), (62, 49142), (65, 49133), (67, 49112), (70, 49076), (75, 49052), (81, 49004), (90, 48944), (95, 48908), (96, 48902), (99, 48881), (103, 48845), (106, 48821), (110, 48809), (125, 48701), (128, 48692), (129, 48683), (130, 48680), (151, 48524), (158, 48452), (161, 48437),

Gene: Barbochs\_53 Start: 48840, Stop: 47707, Start Num: 7

Candidate Starts for Barbochs\_53:

(Start: 7 @48840 has 76 MA's), (15, 48777), (35, 48612), (38, 48585), (53, 48510), (61, 48453), (62, 48435), (67, 48405), (69, 48384), (75, 48345), (79, 48303), (81, 48297), (86, 48255), (96, 48195), (103, 48138), (109, 48105), (110, 48102), (118, 48036), (125, 47994), (129, 47976), (136, 47919), (142, 47889), (155, 47790), (158, 47748),

Gene: Beaver\_58 Start: 50610, Stop: 49477, Start Num: 7

Candidate Starts for Beaver\_58:

(Start: 7 @50610 has 76 MA's), (15, 50547), (35, 50382), (38, 50355), (53, 50280), (61, 50223), (62, 50205), (67, 50175), (69, 50154), (75, 50115), (79, 50073), (81, 50067), (86, 50025), (96, 49965), (103, 49908), (109, 49875), (110, 49872), (118, 49806), (125, 49764), (129, 49746), (136, 49689), (142, 49659), (155, 49560), (158, 49518),

Gene: Benczkowski14\_50 Start: 49856, Stop: 48744, Start Num: 7

Candidate Starts for Benczkowski14\_50:

(3, 49880), (Start: 7 @49856 has 76 MA's), (19, 49766), (22, 49748), (26, 49724), (27, 49718), (29, 49688), (35, 49637), (37, 49622), (41, 49589), (51, 49541), (53, 49526), (64, 49451), (65, 49448), (68, 49418), (73, 49373), (81, 49319), (86, 49274), (87, 49271), (89, 49259), (91, 49247), (95, 49220), (100, 49175), (102, 49160), (109, 49124), (115, 49070), (117, 49061), (118, 49052), (124, 49016), (129, 48992), (134, 48950), (137, 48932), (138, 48929), (148, 48866), (151, 48836), (158, 48764),

Gene: BenoitCattle\_55 Start: 49203, Stop: 48070, Start Num: 7

Candidate Starts for BenoitCattle\_55:

(Start: 7 @49203 has 76 MA's), (20, 49110), (35, 48975), (40, 48933), (53, 48873), (61, 48816), (62, 48798), (67, 48768), (69, 48747), (73, 48714), (75, 48708), (79, 48666), (81, 48660), (85, 48621), (86, 48618), (91, 48591), (103, 48501), (106, 48477), (109, 48468), (110, 48465), (118, 48399), (125, 48357), (129, 48339), (130, 48336), (135, 48285), (136, 48282), (142, 48252), (151, 48183), (155, 48153), (158, 48111), (160, 48102),

Gene: Berries\_52 Start: 49864, Stop: 48731, Start Num: 7

Candidate Starts for Berries\_52:

(Start: 7 @49864 has 76 MA's), (20, 49771), (22, 49756), (32, 49666), (40, 49594), (53, 49534), (61, 49477), (62, 49459), (65, 49450), (69, 49408), (73, 49375), (75, 49369), (81, 49321), (85, 49282), (86, 49279), (87, 49276), (96, 49219), (106, 49138), (109, 49129), (110, 49126), (115, 49078), (118, 49060), (129, 49000), (130, 48997), (136, 48943), (141, 48913), (148, 48871), (151, 48841), (152, 48838), (155, 48811), (156, 48808), (158, 48769),

Gene: Bianmat\_52 Start: 49904, Stop: 48771, Start Num: 7

Candidate Starts for Bianmat\_52:

(Start: 7 @49904 has 76 MA's), (20, 49811), (22, 49796), (32, 49706), (40, 49634), (53, 49574), (61, 49517), (62, 49499), (65, 49490), (69, 49448), (73, 49415), (75, 49409), (81, 49361), (85, 49322), (86, 49319), (87, 49316), (96, 49259), (106, 49178), (109, 49169), (110, 49166), (115, 49118), (118,

49100), (129, 49040), (130, 49037), (136, 48983), (141, 48953), (148, 48911), (151, 48881), (152, 48878), (155, 48851), (156, 48848), (158, 48809),

Gene: BigShaq\_55 Start: 49208, Stop: 48075, Start Num: 7

Candidate Starts for BigShaq\_55:

(Start: 7 @49208 has 76 MA's), (10, 49196), (20, 49115), (35, 48980), (40, 48938), (53, 48878), (61, 48821), (62, 48803), (67, 48773), (69, 48752), (75, 48713), (79, 48671), (81, 48665), (85, 48626), (86, 48623), (91, 48596), (103, 48506), (106, 48482), (109, 48473), (110, 48470), (118, 48404), (125, 48362), (129, 48344), (130, 48341), (135, 48290), (136, 48287), (142, 48257), (151, 48188), (155, 48158), (158, 48116), (160, 48107),

Gene: BillyBobJr\_61 Start: 50920, Stop: 49787, Start Num: 7

Candidate Starts for BillyBobJr\_61:

(Start: 7 @50920 has 76 MA's), (25, 50794), (35, 50692), (38, 50665), (53, 50590), (61, 50533), (62, 50515), (67, 50485), (69, 50464), (75, 50425), (79, 50383), (81, 50377), (85, 50338), (86, 50335), (96, 50275), (109, 50185), (110, 50182), (118, 50116), (125, 50074), (129, 50056), (136, 49999), (142, 49969), (151, 49900), (155, 49870), (158, 49828),

Gene: BirksAndSocks\_60 Start: 50960, Stop: 49827, Start Num: 7

Candidate Starts for BirksAndSocks\_60:

(Start: 7 @50960 has 76 MA's), (15, 50897), (35, 50732), (38, 50705), (53, 50630), (61, 50573), (62, 50555), (67, 50525), (69, 50504), (75, 50465), (79, 50423), (81, 50417), (86, 50375), (96, 50315), (103, 50258), (109, 50225), (110, 50222), (118, 50156), (125, 50114), (129, 50096), (136, 50039), (142, 50009), (155, 49910), (158, 49868),

Gene: Boneham\_59 Start: 50861, Stop: 49728, Start Num: 7

Candidate Starts for Boneham\_59:

(Start: 7 @50861 has 76 MA's), (35, 50633), (38, 50606), (53, 50531), (61, 50474), (62, 50456), (67, 50426), (69, 50405), (75, 50366), (79, 50324), (81, 50318), (86, 50276), (96, 50216), (109, 50126), (110, 50123), (118, 50057), (125, 50015), (129, 49997), (136, 49940), (142, 49910), (151, 49841), (155, 49811), (158, 49769),

Gene: Breezic\_55 Start: 48853, Stop: 47720, Start Num: 7

Candidate Starts for Breezic\_55:

(Start: 7 @48853 has 76 MA's), (15, 48790), (35, 48625), (38, 48598), (53, 48523), (61, 48466), (62, 48448), (67, 48418), (69, 48397), (75, 48358), (79, 48316), (81, 48310), (86, 48268), (96, 48208), (103, 48151), (109, 48118), (110, 48115), (118, 48049), (125, 48007), (129, 47989), (136, 47932), (142, 47902), (155, 47803), (158, 47761),

Gene: Butterball\_58 Start: 50866, Stop: 49733, Start Num: 7

Candidate Starts for Butterball\_58:

(Start: 7 @50866 has 76 MA's), (35, 50638), (38, 50611), (53, 50536), (61, 50479), (62, 50461), (67, 50431), (69, 50410), (75, 50371), (79, 50329), (81, 50323), (86, 50281), (96, 50221), (109, 50131), (110, 50128), (118, 50062), (125, 50020), (129, 50002), (136, 49945), (142, 49915), (151, 49846), (155, 49816), (158, 49774),

Gene: Camerico\_56 Start: 51455, Stop: 50304, Start Num: 5

Candidate Starts for Camerico\_56:

(4, 51461), (Start: 5 @51455 has 1 MA's), (21, 51347), (28, 51278), (34, 51230), (35, 51218), (37, 51206), (47, 51149), (50, 51134), (52, 51125), (60, 51068), (68, 50993), (72, 50954), (77, 50903), (84, 50867), (88, 50843), (90, 50834), (106, 50708), (111, 50666), (126, 50579), (130, 50561), (131, 50549), (133, 50537), (143, 50477), (157, 50366),

Gene: CathyBurgh\_55 Start: 49430, Stop: 48297, Start Num: 7

Candidate Starts for CathyBurgh\_55:

(Start: 7 @49430 has 76 MA's), (35, 49202), (38, 49175), (53, 49100), (61, 49043), (62, 49025), (67, 48995), (69, 48974), (75, 48935), (79, 48893), (81, 48887), (86, 48845), (96, 48785), (103, 48728), (109, 48695), (110, 48692), (118, 48626), (125, 48584), (129, 48566), (136, 48509), (142, 48479), (155, 48380), (158, 48338),

Gene: Charianelly\_52 Start: 49614, Stop: 48481, Start Num: 7

Candidate Starts for Charianelly\_52:

(Start: 7 @49614 has 76 MA's), (20, 49521), (22, 49506), (32, 49416), (40, 49344), (53, 49284), (61, 49227), (62, 49209), (65, 49200), (69, 49158), (73, 49125), (75, 49119), (81, 49071), (85, 49032), (86, 49029), (87, 49026), (96, 48969), (106, 48888), (109, 48879), (110, 48876), (115, 48828), (118, 48810), (129, 48750), (130, 48747), (136, 48693), (141, 48663), (148, 48621), (151, 48591), (152, 48588), (155, 48561), (156, 48558), (158, 48519),

Gene: Chelms\_54 Start: 49196, Stop: 48063, Start Num: 7

Candidate Starts for Chelms\_54:

(Start: 7 @49196 has 76 MA's), (10, 49184), (20, 49103), (35, 48968), (40, 48926), (53, 48866), (61, 48809), (62, 48791), (67, 48761), (69, 48740), (75, 48701), (79, 48659), (81, 48653), (85, 48614), (86, 48611), (91, 48584), (103, 48494), (106, 48470), (109, 48461), (110, 48458), (118, 48392), (125, 48350), (129, 48332), (130, 48329), (135, 48278), (136, 48275), (142, 48245), (151, 48176), (155, 48146), (158, 48104), (160, 48095),

Gene: CinnamonToast\_61 Start: 50920, Stop: 49787, Start Num: 7

Candidate Starts for CinnamonToast\_61:

(Start: 7 @50920 has 76 MA's), (25, 50794), (35, 50692), (38, 50665), (53, 50590), (61, 50533), (62, 50515), (67, 50485), (69, 50464), (75, 50425), (79, 50383), (81, 50377), (85, 50338), (86, 50335), (96, 50275), (109, 50185), (110, 50182), (118, 50116), (125, 50074), (129, 50056), (136, 49999), (142, 49969), (151, 49900), (155, 49870), (158, 49828),

Gene: Crete\_56 Start: 49474, Stop: 48341, Start Num: 7

Candidate Starts for Crete\_56:

(Start: 7 @49474 has 76 MA's), (10, 49462), (20, 49381), (35, 49246), (40, 49204), (53, 49144), (61, 49087), (62, 49069), (67, 49039), (69, 49018), (75, 48979), (79, 48937), (81, 48931), (85, 48892), (86, 48889), (91, 48862), (103, 48772), (106, 48748), (109, 48739), (110, 48736), (118, 48670), (125, 48628), (129, 48610), (130, 48607), (135, 48556), (136, 48553), (142, 48523), (151, 48454), (155, 48424), (158, 48382), (160, 48373),

Gene: Dakiti\_55 Start: 50064, Stop: 48931, Start Num: 7

Candidate Starts for Dakiti\_55:

(Start: 7 @50064 has 76 MA's), (10, 50052), (20, 49971), (35, 49836), (40, 49794), (53, 49734), (61, 49677), (62, 49659), (67, 49629), (69, 49608), (75, 49569), (79, 49527), (81, 49521), (85, 49482), (86, 49479), (91, 49452), (103, 49362), (106, 49338), (109, 49329), (110, 49326), (118, 49260), (125, 49218), (129, 49200), (130, 49197), (135, 49146), (136, 49143), (142, 49113), (151, 49044), (155, 49014), (158, 48972), (160, 48963),

Gene: Damp\_52 Start: 48778, Stop: 47645, Start Num: 7

Candidate Starts for Damp\_52:

(Start: 7 @48778 has 76 MA's), (20, 48685), (22, 48670), (32, 48580), (40, 48508), (53, 48448), (61, 48391), (62, 48373), (65, 48364), (69, 48322), (73, 48289), (75, 48283), (81, 48235), (85, 48196), (86, 48193), (87, 48190), (106, 48052), (109, 48043), (110, 48040), (118, 47974), (129, 47914), (130, 47911), (136, 47857), (141, 47827), (148, 47785), (151, 47755), (152, 47752), (155, 47725), (156, 47722), (158, 47683),

Gene: Demosthenes\_49 Start: 49561, Stop: 48449, Start Num: 7

Candidate Starts for Demosthenes\_49:

(Start: 7 @49561 has 76 MA's), (15, 49498), (19, 49471), (26, 49429), (27, 49423), (29, 49393), (35, 49342), (37, 49327), (41, 49294), (45, 49279), (51, 49246), (53, 49231), (64, 49156), (65, 49153), (67, 49132), (68, 49123), (73, 49078), (81, 49024), (86, 48979), (87, 48976), (91, 48952), (95, 48925), (100, 48880), (109, 48829), (115, 48775), (117, 48766), (118, 48757), (124, 48721), (129, 48697), (134, 48655), (137, 48637), (138, 48634), (148, 48571), (151, 48541), (158, 48469),

Gene: Diabla\_57 Start: 50534, Stop: 49401, Start Num: 7

Candidate Starts for Diabla\_57:

(Start: 7 @50534 has 76 MA's), (31, 50342), (35, 50306), (38, 50279), (40, 50264), (53, 50204), (61, 50147), (62, 50129), (67, 50099), (75, 50039), (79, 49997), (81, 49991), (85, 49952), (86, 49949), (95, 49895), (103, 49832), (109, 49799), (110, 49796), (118, 49730), (129, 49670), (130, 49667), (136, 49613), (139, 49604), (142, 49583), (151, 49514), (155, 49484), (158, 49442),

Gene: DocB7\_044 Start: 41300, Stop: 40185, Start Num: 8

Candidate Starts for DocB7\_044:

(Start: 8 @41300 has 8 MA's), (16, 41231), (24, 41171), (28, 41129), (30, 41111), (76, 40787), (83, 40739), (88, 40712), (89, 40706), (91, 40694), (92, 40682), (114, 40523), (119, 40499), (135, 40388), (137, 40382), (147, 40325), (150, 40295),

Gene: Eggsie\_52 Start: 48496, Stop: 47363, Start Num: 7

Candidate Starts for Eggsie\_52:

(Start: 7 @48496 has 76 MA's), (31, 48304), (35, 48268), (38, 48241), (40, 48226), (53, 48166), (61, 48109), (62, 48091), (67, 48061), (75, 48001), (79, 47959), (81, 47953), (85, 47914), (86, 47911), (95, 47857), (103, 47794), (109, 47761), (110, 47758), (118, 47692), (129, 47632), (130, 47629), (136, 47575), (139, 47566), (142, 47545), (151, 47476), (155, 47446), (158, 47404),

Gene: Ekhein\_55 Start: 48558, Stop: 47425, Start Num: 7

Candidate Starts for Ekhein\_55:

(Start: 7 @48558 has 76 MA's), (15, 48495), (35, 48330), (38, 48303), (53, 48228), (61, 48171), (62, 48153), (67, 48123), (69, 48102), (75, 48063), (79, 48021), (81, 48015), (86, 47973), (96, 47913), (103, 47856), (109, 47823), (110, 47820), (118, 47754), (125, 47712), (129, 47694), (136, 47637), (142, 47607), (155, 47508), (158, 47466),

Gene: Exiguo\_54 Start: 48570, Stop: 47437, Start Num: 7

Candidate Starts for Exiguo\_54:

(Start: 7 @48570 has 76 MA's), (15, 48507), (35, 48342), (38, 48315), (53, 48240), (61, 48183), (62, 48165), (67, 48135), (69, 48114), (75, 48075), (79, 48033), (81, 48027), (86, 47985), (96, 47925), (103, 47868), (109, 47835), (110, 47832), (118, 47766), (125, 47724), (129, 47706), (136, 47649), (142, 47619), (155, 47520), (158, 47478),

Gene: FelixAlejandro\_59 Start: 51064, Stop: 49931, Start Num: 7

Candidate Starts for FelixAlejandro\_59:

(Start: 7 @51064 has 76 MA's), (25, 50938), (35, 50836), (38, 50809), (53, 50734), (61, 50677), (62, 50659), (67, 50629), (69, 50608), (75, 50569), (79, 50527), (81, 50521), (86, 50479), (96, 50419), (103, 50362), (109, 50329), (110, 50326), (118, 50260), (125, 50218), (129, 50200), (136, 50143), (142, 50113), (151, 50044), (155, 50014), (158, 49972),

Gene: Flakey\_54 Start: 49434, Stop: 48301, Start Num: 7

Candidate Starts for Flakey\_54:

(Start: 7 @49434 has 76 MA's), (15, 49371), (35, 49206), (38, 49179), (53, 49104), (61, 49047), (62, 49029), (67, 48999), (69, 48978), (75, 48939), (79, 48897), (81, 48891), (86, 48849), (96, 48789), (103, 48732), (109, 48699), (110, 48696), (118, 48630), (125, 48588), (129, 48570), (136, 48513), (142, 48483), (155, 48384), (158, 48342),

Gene: GMA3\_53 Start: 47669, Stop: 46542, Start Num: 9

Candidate Starts for GMA3\_53:

(9, 47669), (14, 47630), (18, 47582), (30, 47489), (31, 47480), (52, 47351), (65, 47249), (68, 47219), (75, 47165), (76, 47147), (82, 47108), (84, 47093), (94, 47027), (107, 46922), (124, 46814), (125, 46808), (146, 46688), (160, 46553),

Gene: GMA7\_47 Start: 43763, Stop: 42624, Start Num: 7

Candidate Starts for GMA7\_47:

(Start: 7 @43763 has 76 MA's), (20, 43670), (31, 43571), (32, 43565), (34, 43547), (36, 43526), (44, 43475), (51, 43448), (53, 43433), (61, 43376), (62, 43358), (65, 43349), (67, 43328), (70, 43292), (75, 43268), (81, 43220), (90, 43160), (95, 43124), (96, 43118), (99, 43097), (103, 43061), (106, 43037), (110, 43025), (125, 42917), (128, 42908), (129, 42899), (130, 42896), (151, 42740), (158, 42668), (161, 42653),

Gene: GTE7\_46 Start: 43794, Stop: 42655, Start Num: 7

Candidate Starts for GTE7\_46:

(Start: 7 @43794 has 76 MA's), (20, 43701), (31, 43602), (32, 43596), (34, 43578), (36, 43557), (44, 43506), (51, 43479), (53, 43464), (61, 43407), (62, 43389), (65, 43380), (67, 43359), (70, 43323), (75, 43299), (78, 43260), (81, 43251), (90, 43191), (95, 43155), (96, 43149), (99, 43128), (103, 43092), (106, 43068), (110, 43056), (125, 42948), (128, 42939), (129, 42930), (130, 42927), (151, 42771), (158, 42699), (161, 42684),

Gene: GalacticEye\_52 Start: 49575, Stop: 48442, Start Num: 7

Candidate Starts for GalacticEye\_52:

(Start: 7 @49575 has 76 MA's), (20, 49482), (22, 49467), (32, 49377), (40, 49305), (53, 49245), (61, 49188), (62, 49170), (65, 49161), (69, 49119), (73, 49086), (75, 49080), (81, 49032), (85, 48993), (86, 48990), (87, 48987), (96, 48930), (106, 48849), (109, 48840), (110, 48837), (115, 48789), (118, 48771), (129, 48711), (130, 48708), (136, 48654), (141, 48624), (148, 48582), (151, 48552), (152, 48549), (155, 48522), (156, 48519), (158, 48480),

Gene: Gibbles\_52 Start: 47883, Stop: 46774, Start Num: 8

Candidate Starts for Gibbles\_52:

(Start: 8 @47883 has 8 MA's), (23, 47772), (42, 47610), (49, 47580), (59, 47526), (68, 47448), (69, 47430), (80, 47343), (91, 47274), (93, 47253), (95, 47247), (110, 47148), (114, 47103), (117, 47091), (118, 47082), (126, 47037), (127, 47034), (131, 47007),

Gene: Gmala1\_52 Start: 46138, Stop: 45002, Start Num: 8

Candidate Starts for Gmala1\_52:

(Start: 8 @46138 has 8 MA's), (12, 46123), (14, 46096), (26, 46000), (31, 45946), (36, 45907), (39, 45883), (43, 45862), (51, 45820), (55, 45781), (76, 45610), (81, 45580), (82, 45571), (85, 45544), (94, 45490), (97, 45466), (105, 45400), (112, 45349), (116, 45331), (125, 45277), (148, 45139),

Gene: GordDuk1\_55 Start: 46649, Stop: 45513, Start Num: 8

Candidate Starts for GordDuk1\_55:

(6, 46655), (Start: 8 @46649 has 8 MA's), (12, 46634), (14, 46607), (26, 46511), (31, 46457), (36, 46418), (39, 46394), (43, 46373), (51, 46331), (55, 46292), (76, 46121), (81, 46091), (82, 46082), (85, 46055), (94, 46001), (97, 45977), (112, 45860), (116, 45842), (125, 45788), (148, 45650),

Gene: GordTnk2\_56 Start: 46803, Stop: 45667, Start Num: 8

Candidate Starts for GordTnk2\_56:

(Start: 8 @46803 has 8 MA's), (12, 46788), (14, 46761), (26, 46665), (31, 46611), (36, 46572), (39, 46548), (43, 46527), (51, 46485), (55, 46446), (76, 46275), (81, 46245), (82, 46236), (85, 46209), (94, 46155), (97, 46131), (112, 46014), (116, 45996), (125, 45942), (148, 45804),

Gene: Gorko\_54 Start: 48562, Stop: 47429, Start Num: 7

Candidate Starts for Gorko\_54:

(Start: 7 @48562 has 76 MA's), (15, 48499), (35, 48334), (38, 48307), (53, 48232), (61, 48175), (62, 48157), (67, 48127), (69, 48106), (75, 48067), (79, 48025), (81, 48019), (86, 47977), (96, 47917), (103, 47860), (109, 47827), (110, 47824), (118, 47758), (125, 47716), (129, 47698), (136, 47641), (142, 47611), (155, 47512), (158, 47470),

Gene: GourdThymes\_55 Start: 49436, Stop: 48303, Start Num: 7

Candidate Starts for GourdThymes\_55:

(Start: 7 @49436 has 76 MA's), (35, 49208), (38, 49181), (53, 49106), (61, 49049), (62, 49031), (67, 49001), (69, 48980), (75, 48941), (79, 48899), (81, 48893), (86, 48851), (96, 48791), (103, 48734), (109, 48701), (110, 48698), (118, 48632), (125, 48590), (129, 48572), (136, 48515), (142, 48485), (155, 48386), (158, 48344),

Gene: Guillaume\_52 Start: 49625, Stop: 48492, Start Num: 7

Candidate Starts for Guillaume\_52:

(Start: 7 @49625 has 76 MA's), (20, 49532), (22, 49517), (32, 49427), (40, 49355), (53, 49295), (61, 49238), (62, 49220), (65, 49211), (69, 49169), (73, 49136), (75, 49130), (81, 49082), (85, 49043), (86, 49040), (87, 49037), (106, 48899), (109, 48890), (110, 48887), (118, 48821), (129, 48761), (130, 48758), (136, 48704), (141, 48674), (151, 48602), (152, 48599), (155, 48572), (156, 48569), (158, 48530),

Gene: Hail2Pitt\_51 Start: 50101, Stop: 48968, Start Num: 7

Candidate Starts for Hail2Pitt\_51:

(Start: 7 @50101 has 76 MA's), (20, 50008), (22, 49993), (32, 49903), (40, 49831), (53, 49771), (61, 49714), (62, 49696), (65, 49687), (69, 49645), (73, 49612), (75, 49606), (81, 49558), (85, 49519), (86, 49516), (87, 49513), (106, 49375), (109, 49366), (110, 49363), (115, 49315), (118, 49297), (129, 49237), (130, 49234), (136, 49180), (141, 49150), (151, 49078), (152, 49075), (155, 49048), (156, 49045), (158, 49006),

Gene: Harambe\_52 Start: 49892, Stop: 48759, Start Num: 7

Candidate Starts for Harambe\_52:

(Start: 7 @49892 has 76 MA's), (20, 49799), (22, 49784), (32, 49694), (40, 49622), (53, 49562), (61, 49505), (62, 49487), (65, 49478), (69, 49436), (73, 49403), (75, 49397), (81, 49349), (85, 49310), (86, 49307), (87, 49304), (106, 49166), (109, 49157), (110, 49154), (118, 49088), (129, 49028), (130, 49025), (136, 48971), (141, 48941), (151, 48869), (152, 48866), (155, 48839), (156, 48836), (158, 48797),

Gene: HayZem\_57 Start: 49546, Stop: 48407, Start Num: 7

Candidate Starts for HayZem\_57:

(Start: 7 @49546 has 76 MA's), (20, 49453), (31, 49354), (32, 49348), (34, 49330), (36, 49309), (44, 49258), (51, 49231), (53, 49216), (61, 49159), (62, 49141), (65, 49132), (67, 49111), (70, 49075), (75, 49051), (78, 49012), (81, 49003), (90, 48943), (95, 48907), (96, 48901), (99, 48880), (103, 48844), (106, 48820), (110, 48808), (125, 48700), (128, 48691), (129, 48682), (130, 48679), (151, 48523), (158, 48451), (161, 48436),

Gene: Hello\_52 Start: 49854, Stop: 48721, Start Num: 7

Candidate Starts for Hello\_52:

(Start: 7 @49854 has 76 MA's), (20, 49761), (22, 49746), (32, 49656), (40, 49584), (53, 49524), (61, 49467), (62, 49449), (65, 49440), (69, 49398), (73, 49365), (75, 49359), (81, 49311), (85, 49272), (86, 49269), (87, 49266), (106, 49128), (109, 49119), (110, 49116), (118, 49050), (129, 48990), (130, 48987), (136, 48933), (141, 48903), (151, 48831), (152, 48828), (155, 48801), (156, 48798), (158, 48759),

Gene: Hollow\_50 Start: 50037, Stop: 48925, Start Num: 7

Candidate Starts for Hollow\_50:

(3, 50061), (Start: 7 @50037 has 76 MA's), (19, 49947), (22, 49929), (26, 49905), (29, 49869), (35, 49818), (37, 49803), (41, 49770), (45, 49755), (51, 49722), (53, 49707), (64, 49632), (65, 49629), (68, 49599), (73, 49554), (81, 49500), (86, 49455), (87, 49452), (89, 49440), (91, 49428), (100, 49356), (102, 49341), (109, 49305), (115, 49251), (118, 49233), (124, 49197), (129, 49173), (134, 49131), (137, 49113), (138, 49110), (148, 49047), (151, 49017), (158, 48945),

Gene: Hotorobo\_55 Start: 49441, Stop: 48308, Start Num: 7

Candidate Starts for Hotorobo\_55:

(Start: 7 @49441 has 76 MA's), (15, 49378), (35, 49213), (38, 49186), (53, 49111), (61, 49054), (62, 49036), (67, 49006), (69, 48985), (75, 48946), (79, 48904), (81, 48898), (86, 48856), (96, 48796), (103, 48739), (109, 48706), (110, 48703), (118, 48637), (125, 48595), (129, 48577), (136, 48520), (142, 48490), (155, 48391), (158, 48349),

Gene: Jams\_52 Start: 49064, Stop: 47931, Start Num: 7

Candidate Starts for Jams\_52:

(Start: 7 @49064 has 76 MA's), (20, 48971), (22, 48956), (32, 48866), (40, 48794), (53, 48734), (61, 48677), (62, 48659), (65, 48650), (69, 48608), (73, 48575), (75, 48569), (81, 48521), (85, 48482), (86, 48479), (87, 48476), (96, 48419), (106, 48338), (109, 48329), (110, 48326), (115, 48278), (118, 48260), (129, 48200), (130, 48197), (136, 48143), (141, 48113), (148, 48071), (151, 48041), (152, 48038), (155, 48011), (156, 48008), (158, 47969),

Gene: Jellybones\_57 Start: 50536, Stop: 49403, Start Num: 7

Candidate Starts for Jellybones\_57:

(Start: 7 @50536 has 76 MA's), (25, 50410), (35, 50308), (38, 50281), (53, 50206), (61, 50149), (62, 50131), (67, 50101), (69, 50080), (75, 50041), (79, 49999), (81, 49993), (85, 49954), (86, 49951), (96, 49891), (103, 49834), (109, 49801), (110, 49798), (118, 49732), (125, 49690), (129, 49672), (136, 49615), (142, 49585), (151, 49516), (155, 49486), (158, 49444),

Gene: John316\_58 Start: 50599, Stop: 49466, Start Num: 7

Candidate Starts for John316\_58:

(Start: 7 @50599 has 76 MA's), (15, 50536), (35, 50371), (38, 50344), (53, 50269), (61, 50212), (62, 50194), (67, 50164), (69, 50143), (75, 50104), (79, 50062), (81, 50056), (86, 50014), (96, 49954), (103, 49897), (109, 49864), (110, 49861), (118, 49795), (125, 49753), (129, 49735), (136, 49678), (142, 49648), (155, 49549), (158, 49507),

Gene: Jormungandr\_52 Start: 49607, Stop: 48474, Start Num: 7

Candidate Starts for Jormungandr\_52:

(Start: 7 @49607 has 76 MA's), (20, 49514), (22, 49499), (32, 49409), (40, 49337), (53, 49277), (61, 49220), (62, 49202), (65, 49193), (69, 49151), (73, 49118), (75, 49112), (81, 49064), (85, 49025), (86, 49022), (87, 49019), (106, 48881), (109, 48872), (110, 48869), (118, 48803), (129, 48743), (130, 48740), (136, 48686), (141, 48656), (151, 48584), (152, 48581), (155, 48554), (156, 48551), (158, 48512),

Gene: Jumbo\_53 Start: 50756, Stop: 49626, Start Num: 8

Candidate Starts for Jumbo\_53:

(2, 50801), (Start: 8 @50756 has 8 MA's), (18, 50666), (27, 50612), (44, 50477), (51, 50438), (55, 50399), (63, 50339), (81, 50198), (85, 50162), (87, 50156), (88, 50150), (91, 50132), (94, 50108), (95, 50105), (101, 50048), (116, 49949), (121, 49925), (125, 49895), (131, 49862), (145, 49784), (148, 49757),

Gene: Kampe\_54 Start: 47861, Stop: 46752, Start Num: 8

Candidate Starts for Kampe\_54:

(Start: 8 @47861 has 8 MA's), (23, 47750), (42, 47588), (49, 47558), (59, 47504), (68, 47426), (69, 47408), (80, 47321), (91, 47252), (95, 47225), (110, 47126), (114, 47081), (117, 47069), (118, 47060), (126, 47015), (127, 47012), (131, 46985),

Gene: Kaseim\_52 Start: 49049, Stop: 47916, Start Num: 7

Candidate Starts for Kaseim\_52:

(Start: 7 @49049 has 76 MA's), (20, 48956), (22, 48941), (32, 48851), (40, 48779), (53, 48719), (61, 48662), (62, 48644), (65, 48635), (69, 48593), (73, 48560), (75, 48554), (81, 48506), (85, 48467), (86, 48464), (87, 48461), (96, 48404), (106, 48323), (109, 48314), (110, 48311), (115, 48263), (118, 48245), (129, 48185), (130, 48182), (136, 48128), (141, 48098), (148, 48056), (151, 48026), (152, 48023), (155, 47996), (156, 47993), (158, 47954),

Gene: Katyusha\_50 Start: 49856, Stop: 48744, Start Num: 7

Candidate Starts for Katyusha\_50:

(3, 49880), (Start: 7 @49856 has 76 MA's), (19, 49766), (22, 49748), (26, 49724), (27, 49718), (29, 49688), (35, 49637), (37, 49622), (41, 49589), (51, 49541), (53, 49526), (64, 49451), (65, 49448), (68, 49418), (73, 49373), (81, 49319), (86, 49274), (87, 49271), (89, 49259), (91, 49247), (95, 49220), (100, 49175), (102, 49160), (109, 49124), (115, 49070), (117, 49061), (118, 49052), (124, 49016), (129, 48992), (134, 48950), (137, 48932), (138, 48929), (148, 48866), (151, 48836), (158, 48764),

Gene: Kelzog\_57 Start: 49448, Stop: 48315, Start Num: 7

Candidate Starts for Kelzog\_57:

(Start: 7 @49448 has 76 MA's), (15, 49385), (35, 49220), (38, 49193), (53, 49118), (61, 49061), (62, 49043), (67, 49013), (69, 48992), (75, 48953), (79, 48911), (81, 48905), (86, 48863), (96, 48803), (103, 48746), (109, 48713), (110, 48710), (118, 48644), (125, 48602), (129, 48584), (136, 48527), (142, 48497), (155, 48398), (158, 48356),

Gene: Kvothe\_49 Start: 49755, Stop: 48643, Start Num: 7

Candidate Starts for Kvothe\_49:

(3, 49779), (Start: 7 @49755 has 76 MA's), (19, 49665), (22, 49647), (26, 49623), (29, 49587), (35, 49536), (37, 49521), (41, 49488), (45, 49473), (51, 49440), (53, 49425), (64, 49350), (65, 49347), (68, 49317), (73, 49272), (81, 49218), (86, 49173), (87, 49170), (89, 49158), (91, 49146), (95, 49119), (100, 49074), (102, 49059), (109, 49023), (115, 48969), (117, 48960), (118, 48951), (124, 48915), (129, 48891), (134, 48849), (137, 48831), (138, 48828), (148, 48765), (151, 48735), (158, 48663),

Gene: Lahirium\_52 Start: 50129, Stop: 48996, Start Num: 7

Candidate Starts for Lahirium\_52:

(Start: 7 @50129 has 76 MA's), (20, 50036), (22, 50021), (32, 49931), (40, 49859), (53, 49799), (61, 49742), (62, 49724), (65, 49715), (69, 49673), (73, 49640), (75, 49634), (81, 49586), (85, 49547), (86, 49544), (87, 49541), (106, 49403), (109, 49394), (110, 49391), (118, 49325), (129, 49265), (130, 49262), (136, 49208), (141, 49178), (151, 49106), (152, 49103), (155, 49076), (156, 49073), (158, 49034),

Gene: Lidong\_52 Start: 49864, Stop: 48731, Start Num: 7

Candidate Starts for Lidong\_52:

(Start: 7 @49864 has 76 MA's), (20, 49771), (22, 49756), (32, 49666), (40, 49594), (53, 49534), (61, 49477), (62, 49459), (65, 49450), (69, 49408), (73, 49375), (75, 49369), (81, 49321), (85, 49282), (86, 49279), (87, 49276), (96, 49219), (106, 49138), (109, 49129), (110, 49126), (115, 49078), (118, 49060), (129, 49000), (130, 48997), (136, 48943), (141, 48913), (148, 48871), (151, 48841), (152, 48838), (155, 48811), (156, 48808), (158, 48769),

Gene: Linetti\_55 Start: 50205, Stop: 49072, Start Num: 7

Candidate Starts for Linetti\_55:

(Start: 7 @50205 has 76 MA's), (20, 50112), (35, 49977), (40, 49935), (53, 49875), (61, 49818), (62, 49800), (67, 49770), (69, 49749), (73, 49716), (75, 49710), (79, 49668), (81, 49662), (85, 49623), (86, 49620), (91, 49593), (103, 49503), (106, 49479), (109, 49470), (110, 49467), (118, 49401), (125, 49359), (129, 49341), (130, 49338), (135, 49287), (136, 49284), (142, 49254), (151, 49185), (155, 49155), (158, 49113), (160, 49104),

Gene: Lizzo\_55 Start: 49430, Stop: 48297, Start Num: 7

Candidate Starts for Lizzo\_55:

(Start: 7 @49430 has 76 MA's), (35, 49202), (38, 49175), (53, 49100), (61, 49043), (62, 49025), (67, 48995), (69, 48974), (75, 48935), (79, 48893), (81, 48887), (86, 48845), (96, 48785), (103, 48728), (109, 48695), (110, 48692), (118, 48626), (125, 48584), (129, 48566), (136, 48509), (142, 48479), (155, 48380), (158, 48338),

Gene: Luker\_53 Start: 50082, Stop: 48949, Start Num: 7

Candidate Starts for Luker\_53:

(Start: 7 @50082 has 76 MA's), (20, 49989), (22, 49974), (32, 49884), (40, 49812), (53, 49752), (61, 49695), (62, 49677), (65, 49668), (69, 49626), (73, 49593), (75, 49587), (81, 49539), (85, 49500), (86, 49497), (87, 49494), (106, 49356), (109, 49347), (110, 49344), (115, 49296), (118, 49278), (129, 49218), (130, 49215), (136, 49161), (141, 49131), (148, 49089), (151, 49059), (152, 49056), (155, 49029), (156, 49026), (158, 48987),

Gene: Mbo2\_44 Start: 38967, Stop: 37825, Start Num: 8

Candidate Starts for Mbo2\_44:

(Start: 8 @38967 has 8 MA's), (30, 38769), (34, 38739), (35, 38727), (40, 38685), (54, 38613), (58, 38592), (64, 38544), (68, 38511), (71, 38481), (73, 38469), (76, 38445), (77, 38427), (80, 38418), (81, 38415), (87, 38376), (89, 38364), (91, 38352), (93, 38331), (96, 38319), (103, 38262), (108, 38232), (111, 38202), (113, 38184), (117, 38169), (120, 38151), (125, 38118), (130, 38097), (132, 38073), (135, 38046), (143, 38007), (160, 37866),

Gene: Minos\_53 Start: 49606, Stop: 48473, Start Num: 7

Candidate Starts for Minos\_53:

(Start: 7 @49606 has 76 MA's), (20, 49513), (22, 49498), (32, 49408), (40, 49336), (53, 49276), (61, 49219), (62, 49201), (65, 49192), (69, 49150), (73, 49117), (75, 49111), (81, 49063), (85, 49024), (86, 49021), (87, 49018), (96, 48961), (106, 48880), (109, 48871), (110, 48868), (115, 48820), (118, 48802), (129, 48742), (130, 48739), (136, 48685), (141, 48655), (148, 48613), (151, 48583), (152, 48580), (155, 48553), (156, 48550), (158, 48511),

Gene: Monty\_54 Start: 48580, Stop: 47447, Start Num: 7

Candidate Starts for Monty\_54:

(Start: 7 @48580 has 76 MA's), (15, 48517), (35, 48352), (38, 48325), (53, 48250), (61, 48193), (62, 48175), (67, 48145), (69, 48124), (75, 48085), (79, 48043), (81, 48037), (86, 47995), (96, 47935), (103, 47878), (109, 47845), (110, 47842), (118, 47776), (125, 47734), (129, 47716), (136, 47659), (142, 47629), (155, 47530), (158, 47488),

Gene: MrWormie\_52 Start: 48767, Stop: 47634, Start Num: 7

Candidate Starts for MrWormie\_52:

(Start: 7 @48767 has 76 MA's), (20, 48674), (22, 48659), (32, 48569), (40, 48497), (53, 48437), (61, 48380), (62, 48362), (65, 48353), (69, 48311), (73, 48278), (75, 48272), (81, 48224), (85, 48185), (86, 48182), (87, 48179), (96, 48122), (106, 48041), (109, 48032), (110, 48029), (115, 47981), (118, 47963), (129, 47903), (130, 47900), (136, 47846), (141, 47816), (148, 47774), (151, 47744), (152, 47741), (155, 47714), (156, 47711), (158, 47672),

Gene: Msay19\_59 Start: 50950, Stop: 49817, Start Num: 7

Candidate Starts for Msay19\_59:

(Start: 7 @50950 has 76 MA's), (25, 50824), (35, 50722), (38, 50695), (53, 50620), (61, 50563), (62, 50545), (67, 50515), (75, 50455), (79, 50413), (81, 50407), (86, 50365), (96, 50305), (103, 50248), (109, 50215), (110, 50212), (118, 50146), (125, 50104), (129, 50086), (136, 50029), (142, 49999), (151, 49930), (155, 49900), (158, 49858),

Gene: Neoevie\_52 Start: 49868, Stop: 48735, Start Num: 7

Candidate Starts for Neoevie\_52:

(Start: 7 @49868 has 76 MA's), (20, 49775), (22, 49760), (32, 49670), (40, 49598), (53, 49538), (61, 49481), (62, 49463), (65, 49454), (69, 49412), (73, 49379), (75, 49373), (81, 49325), (85, 49286), (86, 49283), (87, 49280), (106, 49142), (109, 49133), (110, 49130), (115, 49082), (118, 49064), (129, 49004), (130, 49001), (136, 48947), (141, 48917), (148, 48875), (151, 48845), (152, 48842), (155, 48815), (156, 48812), (158, 48773),

Gene: Newt\_53 Start: 50096, Stop: 48963, Start Num: 7

Candidate Starts for Newt\_53:

(Start: 7 @50096 has 76 MA's), (20, 50003), (22, 49988), (32, 49898), (40, 49826), (53, 49766), (61, 49709), (62, 49691), (65, 49682), (69, 49640), (73, 49607), (75, 49601), (81, 49553), (85, 49514), (86, 49511), (87, 49508), (106, 49370), (109, 49361), (110, 49358), (115, 49310), (118, 49292), (129, 49232), (130, 49229), (136, 49175), (141, 49145), (148, 49103), (151, 49073), (152, 49070), (155, 49043), (156, 49040), (158, 49001),

Gene: Niagara\_50 Start: 49846, Stop: 48734, Start Num: 7

Candidate Starts for Niagara\_50:

(Start: 7 @49846 has 76 MA's), (19, 49756), (22, 49738), (26, 49714), (27, 49708), (29, 49678), (35, 49627), (37, 49612), (41, 49579), (45, 49564), (51, 49531), (53, 49516), (64, 49441), (65, 49438), (68, 49408), (73, 49363), (81, 49309), (86, 49264), (87, 49261), (89, 49249), (91, 49237), (95, 49210), (100, 49165), (102, 49150), (109, 49114), (115, 49060), (117, 49051), (118, 49042), (124, 49006), (129, 48982), (134, 48940), (137, 48922), (138, 48919), (148, 48856), (151, 48826), (158, 48754),

Gene: Nimi13\_52 Start: 49615, Stop: 48482, Start Num: 7

Candidate Starts for Nimi13\_52:

(Start: 7 @49615 has 76 MA's), (20, 49522), (22, 49507), (32, 49417), (40, 49345), (53, 49285), (61, 49228), (62, 49210), (65, 49201), (69, 49159), (73, 49126), (75, 49120), (81, 49072), (85, 49033), (86, 49030), (87, 49027), (106, 48889), (109, 48880), (110, 48877), (118, 48811), (129, 48751), (130, 48748), (136, 48694), (141, 48664), (151, 48592), (152, 48589), (155, 48562), (156, 48559), (158, 48520),

Gene: Orchid\_53 Start: 47862, Stop: 46753, Start Num: 8

Candidate Starts for Orchid\_53:

(Start: 8 @47862 has 8 MA's), (23, 47751), (42, 47589), (49, 47559), (59, 47505), (68, 47427), (69, 47409), (80, 47322), (91, 47253), (95, 47226), (110, 47127), (114, 47082), (117, 47070), (118, 47061), (126, 47016), (127, 47013), (131, 46986),

Gene: PatrickStar\_54 Start: 47861, Stop: 46752, Start Num: 8

Candidate Starts for PatrickStar\_54:

(Start: 8 @47861 has 8 MA's), (23, 47750), (42, 47588), (49, 47558), (59, 47504), (68, 47426), (69, 47408), (80, 47321), (91, 47252), (95, 47225), (110, 47126), (114, 47081), (117, 47069), (118, 47060), (126, 47015), (127, 47012), (131, 46985),

Gene: Philon9\_51 Start: 50722, Stop: 49610, Start Num: 7

Candidate Starts for Philon9\_51:

(Start: 7 @50722 has 76 MA's), (15, 50659), (35, 50503), (37, 50488), (48, 50422), (50, 50413), (51, 50407), (53, 50392), (57, 50374), (64, 50317), (65, 50314), (68, 50284), (73, 50239), (75, 50233), (81, 50185), (86, 50140), (88, 50131), (91, 50113), (100, 50041), (104, 50005), (109, 49990), (111, 49963), (117, 49927), (122, 49888), (124, 49882), (129, 49858), (131, 49843), (134, 49816), (151, 49702), (154, 49675), (158, 49630),

Gene: PierreThree\_54 Start: 49851, Stop: 48718, Start Num: 7

Candidate Starts for PierreThree\_54:

(Start: 7 @49851 has 76 MA's), (20, 49758), (35, 49623), (40, 49581), (53, 49521), (61, 49464), (62, 49446), (67, 49416), (69, 49395), (73, 49362), (75, 49356), (79, 49314), (81, 49308), (85, 49269), (86, 49266), (91, 49239), (103, 49149), (106, 49125), (109, 49116), (110, 49113), (118, 49047), (125, 49005), (129, 48987), (130, 48984), (135, 48933), (136, 48930), (142, 48900), (151, 48831), (155, 48801), (158, 48759), (160, 48750),

Gene: PokyPuppy\_54 Start: 49888, Stop: 48755, Start Num: 7

Candidate Starts for PokyPuppy\_54:

(Start: 7 @49888 has 76 MA's), (15, 49825), (20, 49795), (26, 49750), (35, 49660), (38, 49633), (53, 49558), (61, 49501), (62, 49483), (67, 49453), (69, 49432), (75, 49393), (79, 49351), (81, 49345), (85, 49306), (86, 49303), (98, 49225), (106, 49162), (109, 49153), (110, 49150), (118, 49084), (125, 49042), (129, 49024), (130, 49021), (136, 48967), (142, 48937), (144, 48928), (151, 48868), (155, 48838), (158, 48796), (161, 48781),

Gene: Poland\_59 Start: 50929, Stop: 49796, Start Num: 7

Candidate Starts for Poland\_59:

(Start: 7 @50929 has 76 MA's), (20, 50836), (25, 50803), (35, 50701), (38, 50674), (53, 50599), (61, 50542), (62, 50524), (67, 50494), (75, 50434), (79, 50392), (81, 50386), (86, 50344), (96, 50284), (103, 50227), (109, 50194), (110, 50191), (118, 50125), (125, 50083), (129, 50065), (136, 50008), (142, 49978), (151, 49909), (155, 49879), (158, 49837),

Gene: RemRem\_56 Start: 48570, Stop: 47437, Start Num: 7

Candidate Starts for RemRem\_56:

(Start: 7 @48570 has 76 MA's), (35, 48342), (38, 48315), (53, 48240), (61, 48183), (62, 48165), (67, 48135), (69, 48114), (75, 48075), (79, 48033), (81, 48027), (86, 47985), (96, 47925), (103, 47868), (109, 47835), (110, 47832), (118, 47766), (125, 47724), (129, 47706), (136, 47649), (142, 47619), (155, 47520), (158, 47478),

Gene: Reynauld\_52 Start: 47820, Stop: 46675, Start Num: 8

Candidate Starts for Reynauld\_52:

(Start: 8 @47820 has 8 MA's), (11, 47808), (13, 47796), (22, 47706), (28, 47640), (32, 47607), (40, 47538), (44, 47520), (46, 47514), (55, 47460), (56, 47457), (59, 47442), (66, 47385), (70, 47340), (76, 47298), (80, 47271), (81, 47268), (87, 47229), (89, 47217), (91, 47205), (96, 47172), (103, 47115), (110, 47079), (111, 47055), (113, 47037), (118, 47013), (119, 47010), (123, 46980), (124, 46977), (125, 46968), (126, 46965), (130, 46947), (131, 46935), (140, 46875), (142, 46863), (149, 46815), (160, 46704),

Gene: RobinSparkles\_57 Start: 48414, Stop: 47305, Start Num: 8

Candidate Starts for RobinSparkles\_57:

(Start: 8 @48414 has 8 MA's), (23, 48303), (42, 48141), (49, 48111), (59, 48057), (68, 47979), (69, 47961), (80, 47874), (91, 47805), (95, 47778), (110, 47679), (114, 47634), (117, 47622), (118, 47613), (126, 47568), (127, 47565), (131, 47538),

Gene: RoyalG\_54 Start: 49145, Stop: 48012, Start Num: 7

Candidate Starts for RoyalG\_54:

(Start: 7 @49145 has 76 MA's), (31, 48953), (35, 48917), (38, 48890), (40, 48875), (53, 48815), (61, 48758), (62, 48740), (67, 48710), (75, 48650), (79, 48608), (81, 48602), (85, 48563), (86, 48560), (95, 48506), (103, 48443), (109, 48410), (110, 48407), (118, 48341), (125, 48299), (129, 48281), (130, 48278), (136, 48224), (139, 48215), (142, 48194), (151, 48125), (155, 48095), (158, 48053), (161, 48038),

Gene: Sam12\_54 Start: 48570, Stop: 47437, Start Num: 7

Candidate Starts for Sam12\_54:

(Start: 7 @48570 has 76 MA's), (15, 48507), (35, 48342), (38, 48315), (53, 48240), (61, 48183), (62, 48165), (67, 48135), (69, 48114), (75, 48075), (79, 48033), (81, 48027), (86, 47985), (96, 47925), (103, 47868), (109, 47835), (110, 47832), (118, 47766), (125, 47724), (129, 47706), (136, 47649), (142, 47619), (155, 47520), (158, 47478),

Gene: Shelley\_52 Start: 49091, Stop: 47958, Start Num: 7

Candidate Starts for Shelley\_52:

(Start: 7 @49091 has 76 MA's), (20, 48998), (22, 48983), (32, 48893), (40, 48821), (53, 48761), (61, 48704), (62, 48686), (65, 48677), (69, 48635), (73, 48602), (75, 48596), (81, 48548), (85, 48509), (86, 48506), (87, 48503), (96, 48446), (106, 48365), (109, 48356), (110, 48353), (115, 48305), (118, 48287), (129, 48227), (130, 48224), (136, 48170), (141, 48140), (148, 48098), (151, 48068), (152, 48065), (155, 48038), (156, 48035), (158, 47996),

Gene: Sombrero\_55 Start: 48937, Stop: 47804, Start Num: 7

Candidate Starts for Sombrero\_55:

(Start: 7 @48937 has 76 MA's), (25, 48811), (35, 48709), (38, 48682), (53, 48607), (61, 48550), (62, 48532), (67, 48502), (69, 48481), (75, 48442), (79, 48400), (81, 48394), (85, 48355), (86, 48352), (96, 48292), (109, 48202), (110, 48199), (118, 48133), (125, 48091), (129, 48073), (136, 48016), (142, 47986), (155, 47887), (158, 47845),

Gene: Squibbles\_54 Start: 49433, Stop: 48300, Start Num: 7

Candidate Starts for Squibbles\_54:

(Start: 7 @49433 has 76 MA's), (15, 49370), (35, 49205), (38, 49178), (53, 49103), (61, 49046), (62, 49028), (67, 48998), (69, 48977), (75, 48938), (79, 48896), (81, 48890), (86, 48848), (96, 48788), (103, 48731), (109, 48698), (110, 48695), (118, 48629), (125, 48587), (129, 48569), (136, 48512), (142, 48482), (155, 48383), (158, 48341),

Gene: Srilaccoli3\_47 Start: 46623, Stop: 45478, Start Num: 8

Candidate Starts for Srilaccoli3\_47:

(Start: 8 @46623 has 8 MA's), (11, 46611), (13, 46599), (22, 46509), (28, 46443), (32, 46410), (40, 46341), (44, 46323), (46, 46317), (56, 46260), (59, 46245), (66, 46188), (70, 46143), (76, 46101), (80, 46074), (81, 46071), (87, 46032), (89, 46020), (91, 46008), (96, 45975), (103, 45918), (110, 45882), (113, 45840), (118, 45816), (119, 45813), (123, 45783), (125, 45771), (126, 45768), (130, 45750), (131, 45738), (140, 45678), (142, 45666), (149, 45618), (156, 45564), (160, 45507),

Gene: SteveFrench\_53 Start: 49385, Stop: 48252, Start Num: 7

Candidate Starts for SteveFrench\_53:

(Start: 7 @49385 has 76 MA's), (31, 49193), (35, 49157), (38, 49130), (40, 49115), (53, 49055), (61, 48998), (62, 48980), (67, 48950), (75, 48890), (79, 48848), (81, 48842), (85, 48803), (86, 48800), (95, 48746), (103, 48683), (109, 48650), (110, 48647), (118, 48581), (125, 48539), (129, 48521), (130, 48518), (136, 48464), (139, 48455), (142, 48434), (151, 48365), (155, 48335), (158, 48293), (161, 48278),

Gene: Sticker17\_52 Start: 49606, Stop: 48473, Start Num: 7

Candidate Starts for Sticker17\_52:

(Start: 7 @49606 has 76 MA's), (20, 49513), (22, 49498), (32, 49408), (40, 49336), (53, 49276), (61, 49219), (62, 49201), (65, 49192), (69, 49150), (73, 49117), (75, 49111), (81, 49063), (85, 49024), (86, 49021), (87, 49018), (96, 48961), (106, 48880), (109, 48871), (110, 48868), (115, 48820), (118, 48802), (129, 48742), (130, 48739), (136, 48685), (141, 48655), (148, 48613), (151, 48583), (152, 48580), (155, 48553), (156, 48550), (158, 48511),

Gene: Teal\_52 Start: 50073, Stop: 48940, Start Num: 7

Candidate Starts for Teal\_52:

(Start: 7 @50073 has 76 MA's), (20, 49980), (22, 49965), (32, 49875), (40, 49803), (53, 49743), (61, 49686), (62, 49668), (65, 49659), (69, 49617), (73, 49584), (75, 49578), (81, 49530), (85, 49491), (86, 49488), (87, 49485), (106, 49347), (109, 49338), (110, 49335), (115, 49287), (118, 49269), (129, 49209), (130, 49206), (136, 49152), (141, 49122), (148, 49080), (151, 49050), (152, 49047), (155, 49020), (156, 49017), (158, 48978),

Gene: Teatealatte\_51 Start: 49758, Stop: 48646, Start Num: 7

Candidate Starts for Teatealatte\_51:

(Start: 7 @49758 has 76 MA's), (19, 49668), (22, 49650), (26, 49626), (27, 49620), (29, 49590), (35, 49539), (37, 49524), (41, 49491), (45, 49476), (51, 49443), (53, 49428), (64, 49353), (65, 49350), (68, 49320), (73, 49275), (81, 49221), (86, 49176), (87, 49173), (89, 49161), (91, 49149), (95, 49122), (100, 49077), (102, 49062), (109, 49026), (115, 48972), (117, 48963), (118, 48954), (124, 48918), (125, 48912), (129, 48894), (134, 48852), (137, 48834), (138, 48831), (148, 48768), (151, 48738), (158, 48666),

Gene: Teech\_51 Start: 49559, Stop: 48447, Start Num: 7

Candidate Starts for Teech\_51:

(3, 49583), (Start: 7 @49559 has 76 MA's), (19, 49469), (22, 49451), (26, 49427), (29, 49391), (35, 49340), (37, 49325), (41, 49292), (45, 49277), (51, 49244), (53, 49229), (64, 49154), (65, 49151), (68, 49121), (73, 49076), (81, 49022), (86, 48977), (87, 48974), (89, 48962), (91, 48950), (95, 48923), (100, 48878), (102, 48863), (109, 48827), (115, 48773), (117, 48764), (118, 48755), (124, 48719), (125, 48713), (129, 48695), (134, 48653), (137, 48635), (138, 48632), (148, 48569), (151, 48539), (158, 48467),

Gene: Tredge\_51 Start: 49758, Stop: 48646, Start Num: 7

Candidate Starts for Tredge\_51:

(Start: 7 @49758 has 76 MA's), (19, 49668), (22, 49650), (26, 49626), (27, 49620), (29, 49590), (35, 49539), (37, 49524), (41, 49491), (45, 49476), (51, 49443), (53, 49428), (64, 49353), (65, 49350), (68, 49320), (73, 49275), (81, 49221), (86, 49176), (87, 49173), (89, 49161), (91, 49149), (95, 49122), (100, 49077), (102, 49062), (109, 49026), (115, 48972), (117, 48963), (118, 48954), (124, 48918), (125, 48912), (129, 48894), (134, 48852), (137, 48834), (138, 48831), (148, 48768), (151, 48738), (158, 48666),

Gene: Trogglehumper\_72 Start: 57053, Stop: 55920, Start Num: 8

Candidate Starts for Trogglehumper\_72:

(1, 57194), (Start: 8 @57053 has 8 MA's), (17, 56981), (33, 56843), (40, 56783), (55, 56699), (65, 56633), (70, 56573), (73, 56555), (74, 56552), (78, 56510), (80, 56504), (81, 56501), (85, 56471), (86,

56468), (88, 56459), (96, 56408), (97, 56393), (109, 56318), (110, 56315), (124, 56213), (130, 56186), (131, 56174), (142, 56102), (143, 56096), (150, 56042), (153, 56012), (159, 55952),

Gene: Vitaenoi\_51 Start: 50721, Stop: 49609, Start Num: 7

Candidate Starts for Vitaenoi\_51:

(Start: 7 @50721 has 76 MA's), (15, 50658), (35, 50502), (37, 50487), (48, 50421), (50, 50412), (51, 50406), (53, 50391), (57, 50373), (64, 50316), (65, 50313), (68, 50283), (73, 50238), (75, 50232), (81, 50184), (86, 50139), (88, 50130), (91, 50112), (100, 50040), (104, 50004), (109, 49989), (111, 49962), (117, 49926), (122, 49887), (124, 49881), (129, 49857), (131, 49842), (134, 49815), (151, 49701), (154, 49674), (158, 49629),

Gene: Woes\_52 Start: 50124, Stop: 48991, Start Num: 7

Candidate Starts for Woes\_52:

(Start: 7 @50124 has 76 MA's), (20, 50031), (22, 50016), (32, 49926), (40, 49854), (53, 49794), (61, 49737), (62, 49719), (65, 49710), (69, 49668), (73, 49635), (75, 49629), (81, 49581), (85, 49542), (86, 49539), (87, 49536), (106, 49398), (109, 49389), (110, 49386), (115, 49338), (118, 49320), (129, 49260), (130, 49257), (136, 49203), (141, 49173), (148, 49131), (151, 49101), (152, 49098), (155, 49071), (156, 49068), (158, 49029),

Gene: Worcestershire\_55 Start: 48572, Stop: 47439, Start Num: 7

Candidate Starts for Worcestershire\_55:

(Start: 7 @48572 has 76 MA's), (15, 48509), (35, 48344), (38, 48317), (53, 48242), (61, 48185), (62, 48167), (67, 48137), (69, 48116), (75, 48077), (79, 48035), (81, 48029), (86, 47987), (96, 47927), (103, 47870), (109, 47837), (110, 47834), (118, 47768), (125, 47726), (129, 47708), (136, 47651), (142, 47621), (155, 47522), (158, 47480),