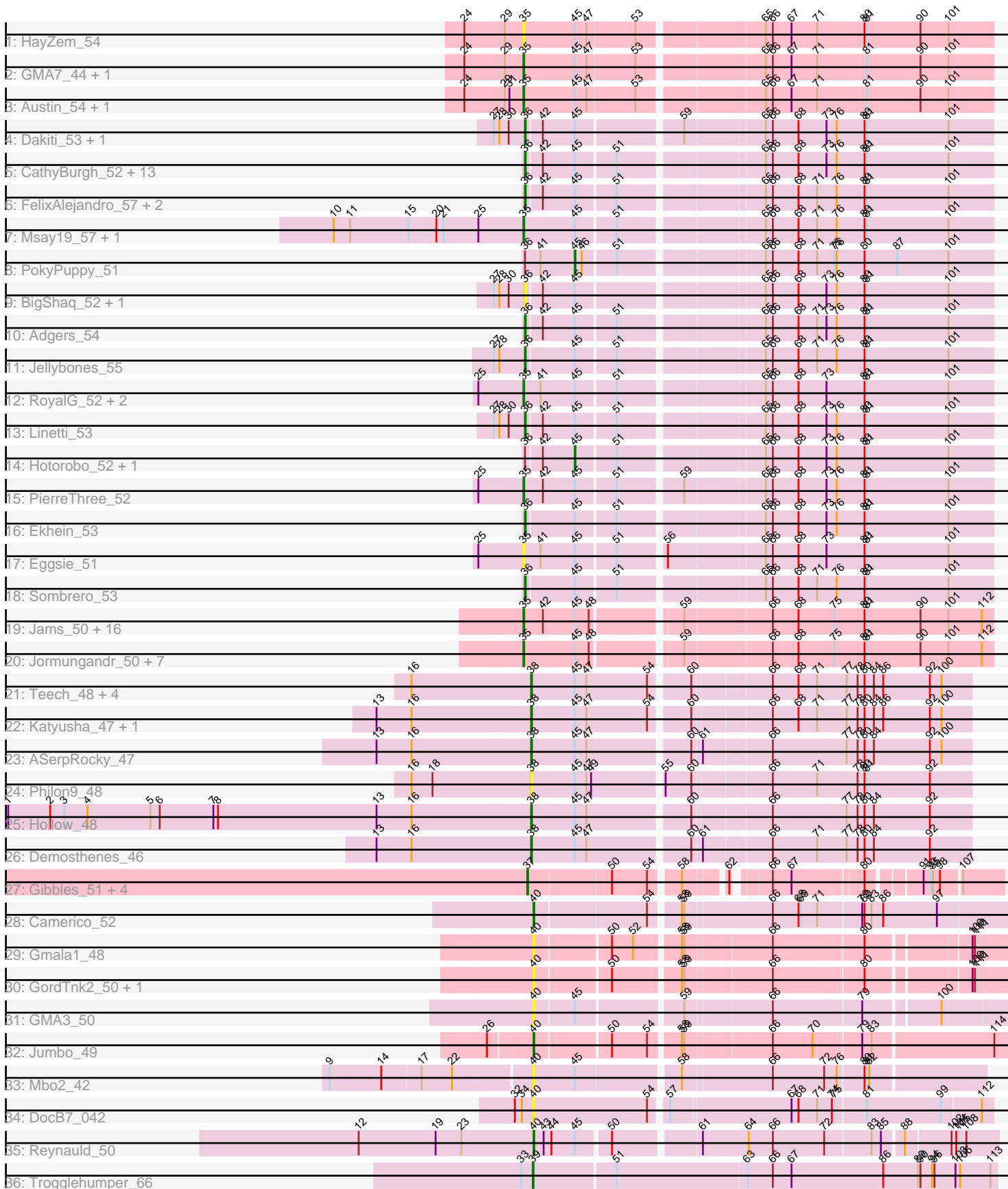


# Pham 157775



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 157775 Report

This analysis was run 04/13/24 on database version 558.

Pham number 157775 has 92 members, 22 are drafts.

Phages represented in each track:

- Track 1 : HayZem\_54
- Track 2 : GMA7\_44, Amore2\_55
- Track 3 : Austin\_54, GTE7\_43
- Track 4 : Dakiti\_53, Chelms\_52
- Track 5 : CathyBurgh\_52, Squibbles\_52, John316\_56, Sam12\_52, GourdThymes\_52, RemRem\_53, Monty\_51, Barbochs\_53, BirksAndSocks\_57, Flakey\_52, Gorko\_52, Lizzo\_52, Exiguo\_52, Beaver\_56
- Track 6 : FelixAlejandro\_57, Butterball\_56, Boneham\_56
- Track 7 : Msay19\_57, Poland\_59
- Track 8 : PokyPuppy\_51
- Track 9 : BigShaq\_52, BenoitCattle\_54
- Track 10 : Adgers\_54
- Track 11 : Jellybones\_55
- Track 12 : RoyalG\_52, Diabla\_55, SteveFrench\_51
- Track 13 : Linetti\_53
- Track 14 : Hotorobo\_52, Breezic\_52
- Track 15 : PierreThree\_52
- Track 16 : Ekhein\_53
- Track 17 : Eggsie\_51
- Track 18 : Sombrero\_53
- Track 19 : Jams\_50, Charianelly\_49, Luker\_51, Shelley\_50, MrWormie\_50, Anamika\_50, Kaseim\_50, Sticker17\_50, Newt\_51, Hello\_50, Berries\_50, Damp\_48, Hail2Pitt\_49, Woes\_50, Lidong\_50, Bianmat\_50, Minos\_51
- Track 20 : Jormungandr\_50, Harambe\_50, GalacticEye\_50, Nimi13\_50, Teal\_50, Lahirium\_50, Neevie\_50, Guillaume\_50
- Track 21 : Teech\_48, Tredge\_48, Niagara\_47, Kvothe\_47, Teatealatte\_48
- Track 22 : Katyusha\_47, Benczkowski14\_47
- Track 23 : ASerpRocky\_47
- Track 24 : Philon9\_48
- Track 25 : Hollow\_48
- Track 26 : Demosthenes\_46
- Track 27 : Gibbles\_51, RobinSparkles\_56, Orchid\_52, Kampe\_53, PatrickStar\_53
- Track 28 : Camerico\_52
- Track 29 : Gmala1\_48
- Track 30 : GordTnk2\_50, GordDuk1\_49
- Track 31 : GMA3\_50
- Track 32 : Jumbo\_49

- Track 33 : Mbo2\_42
- Track 34 : DocB7\_042
- Track 35 : Reynauld\_50
- Track 36 : Trogglehumper\_66

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

The start number called the most often in the published annotations is 35, it was called in 28 of the 70 non-draft genes in the pham.

Genes that call this "Most Annotated" start:

- Amore2\_55, Anamika\_50, Austin\_54, Berries\_50, Bianmat\_50, Charianelly\_49, Damp\_48, Diabla\_55, Eggsie\_51, GMA7\_44, GTE7\_43, GalacticEye\_50, Guillaume\_50, Hail2Pitt\_49, Harambe\_50, HayZem\_54, Hello\_50, Jams\_50, Jormungandr\_50, Kaseim\_50, Lahirium\_50, Lidong\_50, Luker\_51, Minos\_51, MrWormie\_50, Msay19\_57, Neoevie\_50, Newt\_51, Nimi13\_50, PierreThree\_52, Poland\_59, RoyalG\_52, Shelley\_50, SteveFrench\_51, Sticker17\_50, Teal\_50, Woes\_50,

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

- 

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

- ASerpRocky\_47, Adgers\_54, Barbochs\_53, Beaver\_56, Benczkowski14\_47, BenoitCattle\_54, BigShaq\_52, BirksAndSocks\_57, Boneham\_56, Breezic\_52, Butterball\_56, Camerico\_52, CathyBurgh\_52, Chelms\_52, Dakiti\_53, Demosthenes\_46, DocB7\_042, Ekhein\_53, Exiguo\_52, FelixAlejandro\_57, Flakey\_52, GMA3\_50, Gibbles\_51, Gmala1\_48, GordDuk1\_49, GordTnk2\_50, Gorko\_52, GourdThymes\_52, Hollow\_48, Hotorobo\_52, Jellybones\_55, John316\_56, Jumbo\_49, Kampe\_53, Katyusha\_47, Kvothe\_47, Linetti\_53, Lizzo\_52, Mbo2\_42, Monty\_51, Niagara\_47, Orchid\_52, PatrickStar\_53, Philon9\_48, PokyPuppy\_51, RemRem\_53, Reynauld\_50, RobinSparkles\_56, Sam12\_52, Sombrero\_53, Squibbles\_52, Teatealatte\_48, Teech\_48, Tredge\_48, Trogglehumper\_66,

**Summary by start number:**

Start 35:

- Found in 37 of 92 ( 40.2% ) of genes in pham
- Manual Annotations of this start: 28 of 70
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Amore2\_55 (CS1), Anamika\_50 (CS3), Austin\_54 (CS1), Berries\_50 (CS3), Bianmat\_50 (CS3), Charianelly\_49 (CS3), Damp\_48 (CS3), Diabla\_55 (CS2), Eggsie\_51 (CS2), GMA7\_44 (CS1), GTE7\_43 (CS1), GalacticEye\_50 (CS3), Guillaume\_50 (CS3), Hail2Pitt\_49 (CS3), Harambe\_50 (CS3), HayZem\_54 (CS1), Hello\_50 (CS3), Jams\_50 (CS3), Jormungandr\_50 (CS3), Kaseim\_50 (CS3), Lahirium\_50 (CS3), Lidong\_50 (CS3), Luker\_51 (CS3), Minos\_51 (CS3), MrWormie\_50 (CS3), Msay19\_57 (CS2), Neoevie\_50 (CS3), Newt\_51 (CS3), Nimi13\_50 (CS3), PierreThree\_52 (CS2), Poland\_59 (CS2), RoyalG\_52 (CS2), Shelley\_50 (CS3), SteveFrench\_51 (CS2), Sticker17\_50 (CS3), Teal\_50 (CS3), Woes\_50 (CS3),

Start 36:

- Found in 29 of 92 ( 31.5% ) of genes in pham
- Manual Annotations of this start: 21 of 70
- Called 89.7% of time when present
- Phage (with cluster) where this start called: Adgers\_54 (CS2), Barbochs\_53 (CS2), Beaver\_56 (CS2), BenoitCattle\_54 (CS2), BigShaq\_52 (CS2), BirksAndSocks\_57 (CS2), Boneham\_56 (CS2), Butterball\_56 (CS2), CathyBurgh\_52 (CS2), Chelms\_52 (CS2), Dakiti\_53 (CS2), Ekhein\_53 (CS2), Exiguo\_52 (CS2), FelixAlejandro\_57 (CS2), Flakey\_52 (CS2), Gorko\_52 (CS2), GourdThymes\_52 (CS2), Jellybones\_55 (CS2), John316\_56 (CS2), Linetti\_53 (CS2), Lizzo\_52 (CS2), Monty\_51 (CS2), RemRem\_53 (CS2), Sam12\_52 (CS2), Sombrero\_53 (CS2), Squibbles\_52 (CS2),

Start 37:

- Found in 5 of 92 ( 5.4% ) of genes in pham
- Manual Annotations of this start: 5 of 70
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Gibbles\_51 (CX), Kampe\_53 (CX), Orchid\_52 (CX), PatrickStar\_53 (CX), RobinSparkles\_56 (CX),

Start 38:

- Found in 11 of 92 ( 12.0% ) of genes in pham
- Manual Annotations of this start: 9 of 70
- Called 100.0% of time when present
- Phage (with cluster) where this start called: ASerpRocky\_47 (CS4), Benczkowski14\_47 (CS4), Demosthenes\_46 (CS4), Hollow\_48 (CS4), Katyusha\_47 (CS4), Kvothe\_47 (CS4), Niagara\_47 (CS4), Philon9\_48 (CS4), Teatealatte\_48 (CS4), Teech\_48 (CS4), Tredge\_48 (CS4),

Start 39:

- Found in 1 of 92 ( 1.1% ) of genes in pham
- Manual Annotations of this start: 1 of 70
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Trogglehumper\_66 (singleton),

Start 40:

- Found in 9 of 92 ( 9.8% ) of genes in pham
- Manual Annotations of this start: 3 of 70
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Camerico\_52 (DF), DocB7\_042 (singleton), GMA3\_50 (DF2), Gmala1\_48 (DF1), GordDuk1\_49 (DF1), GordTnk2\_50 (DF1), Jumbo\_49 (DF3), Mbo2\_42 (singleton), Reynauld\_50 (singleton),

Start 45:

- Found in 80 of 92 ( 87.0% ) of genes in pham
- Manual Annotations of this start: 3 of 70
- Called 3.8% of time when present
- Phage (with cluster) where this start called: Breezic\_52 (CS2), Hotorobo\_52 (CS2), PokyPuppy\_51 (CS2),

**Summary by clusters:**

There are 10 clusters represented in this pham: singleton, DF, DF1, DF3, DF2, CX, CS4, CS1, CS3, CS2,

Info for manual annotations of cluster CS1:

- Start number 35 was manually annotated 2 times for cluster CS1.

Info for manual annotations of cluster CS2:

- Start number 35 was manually annotated 5 times for cluster CS2.
- Start number 36 was manually annotated 21 times for cluster CS2.
- Start number 45 was manually annotated 3 times for cluster CS2.

Info for manual annotations of cluster CS3:

- Start number 35 was manually annotated 21 times for cluster CS3.

Info for manual annotations of cluster CS4:

- Start number 38 was manually annotated 9 times for cluster CS4.

Info for manual annotations of cluster CX:

- Start number 37 was manually annotated 5 times for cluster CX.

Info for manual annotations of cluster DF:

- Start number 40 was manually annotated 1 time for cluster DF.

Info for manual annotations of cluster DF3:

- Start number 40 was manually annotated 1 time for cluster DF3.

### ***Gene Information:***

Gene: ASerpRocky\_47 Start: 47956, Stop: 47420, Start Num: 38

Candidate Starts for ASerpRocky\_47:

(13, 48154), (16, 48109), (Start: 38 @47956 has 9 MA's), (Start: 45 @47902 has 3 MA's), (47, 47887), (60, 47764), (61, 47755), (66, 47671), (77, 47578), (78, 47566), (80, 47557), (84, 47545), (92, 47473), (100, 47458),

Gene: Adgers\_54 Start: 47499, Stop: 46936, Start Num: 36

Candidate Starts for Adgers\_54:

(Start: 36 @47499 has 21 MA's), (42, 47481), (Start: 45 @47442 has 3 MA's), (51, 47394), (65, 47223), (66, 47214), (68, 47181), (71, 47157), (73, 47145), (76, 47133), (80, 47100), (81, 47097), (101, 46992),

Gene: Amore2\_55 Start: 47896, Stop: 47321, Start Num: 35

Candidate Starts for Amore2\_55:

(24, 47971), (29, 47920), (Start: 35 @47896 has 28 MA's), (Start: 45 @47833 has 3 MA's), (47, 47818), (53, 47758), (65, 47608), (66, 47599), (67, 47575), (71, 47542), (81, 47482), (90, 47413), (101, 47377),

Gene: Anamika\_50 Start: 48401, Stop: 47832, Start Num: 35

Candidate Starts for Anamika\_50:

(Start: 35 @48401 has 28 MA's), (42, 48377), (Start: 45 @48338 has 3 MA's), (48, 48320), (59, 48218), (66, 48110), (68, 48077), (75, 48032), (80, 47996), (81, 47993), (90, 47924), (101, 47888), (112, 47846),

Gene: Austin\_54 Start: 47894, Stop: 47319, Start Num: 35

Candidate Starts for Austin\_54:

(24, 47969), (29, 47918), (31, 47912), (Start: 35 @47894 has 28 MA's), (Start: 45 @47831 has 3 MA's), (47, 47816), (53, 47756), (65, 47606), (66, 47597), (67, 47573), (71, 47540), (81, 47480), (90, 47411), (101, 47375),

Gene: Barbochs\_53 Start: 47243, Stop: 46680, Start Num: 36

Candidate Starts for Barbochs\_53:

(Start: 36 @47243 has 21 MA's), (42, 47225), (Start: 45 @47186 has 3 MA's), (51, 47138), (65, 46967), (66, 46958), (68, 46925), (73, 46889), (76, 46877), (80, 46844), (81, 46841), (101, 46736),

Gene: Beaver\_56 Start: 49013, Stop: 48450, Start Num: 36

Candidate Starts for Beaver\_56:

(Start: 36 @49013 has 21 MA's), (42, 48995), (Start: 45 @48956 has 3 MA's), (51, 48908), (65, 48737), (66, 48728), (68, 48695), (73, 48659), (76, 48647), (80, 48614), (81, 48611), (101, 48506),

Gene: Benczkowski14\_47 Start: 48227, Stop: 47691, Start Num: 38

Candidate Starts for Benczkowski14\_47:

(13, 48425), (16, 48380), (Start: 38 @48227 has 9 MA's), (Start: 45 @48173 has 3 MA's), (47, 48158), (54, 48080), (60, 48035), (66, 47942), (68, 47909), (71, 47885), (77, 47849), (78, 47837), (80, 47828), (84, 47816), (86, 47804), (92, 47744), (100, 47729),

Gene: BenoitCattle\_54 Start: 47606, Stop: 47043, Start Num: 36

Candidate Starts for BenoitCattle\_54:

(27, 47645), (28, 47639), (30, 47627), (Start: 36 @47606 has 21 MA's), (42, 47588), (Start: 45 @47549 has 3 MA's), (65, 47330), (66, 47321), (68, 47288), (73, 47252), (76, 47240), (80, 47207), (81, 47204), (101, 47099),

Gene: Berries\_50 Start: 48373, Stop: 47804, Start Num: 35

Candidate Starts for Berries\_50:

(Start: 35 @48373 has 28 MA's), (42, 48349), (Start: 45 @48310 has 3 MA's), (48, 48292), (59, 48190), (66, 48082), (68, 48049), (75, 48004), (80, 47968), (81, 47965), (90, 47896), (101, 47860), (112, 47818),

Gene: Bianmat\_50 Start: 48413, Stop: 47844, Start Num: 35

Candidate Starts for Bianmat\_50:

(Start: 35 @48413 has 28 MA's), (42, 48389), (Start: 45 @48350 has 3 MA's), (48, 48332), (59, 48230), (66, 48122), (68, 48089), (75, 48044), (80, 48008), (81, 48005), (90, 47936), (101, 47900), (112, 47858),

Gene: BigShaq\_52 Start: 47611, Stop: 47048, Start Num: 36

Candidate Starts for BigShaq\_52:

(27, 47650), (28, 47644), (30, 47632), (Start: 36 @47611 has 21 MA's), (42, 47593), (Start: 45 @47554 has 3 MA's), (65, 47335), (66, 47326), (68, 47293), (73, 47257), (76, 47245), (80, 47212), (81, 47209), (101, 47104),

Gene: BirksAndSocks\_57 Start: 49363, Stop: 48800, Start Num: 36

Candidate Starts for BirksAndSocks\_57:

(Start: 36 @49363 has 21 MA's), (42, 49345), (Start: 45 @49306 has 3 MA's), (51, 49258), (65, 49087), (66, 49078), (68, 49045), (73, 49009), (76, 48997), (80, 48964), (81, 48961), (101, 48856),

Gene: Boneham\_56 Start: 49264, Stop: 48701, Start Num: 36

Candidate Starts for Boneham\_56:

(Start: 36 @49264 has 21 MA's), (42, 49246), (Start: 45 @49207 has 3 MA's), (51, 49159), (65, 48988), (66, 48979), (68, 48946), (71, 48922), (76, 48898), (80, 48865), (81, 48862), (101, 48757),

Gene: Breezic\_52 Start: 47199, Stop: 46693, Start Num: 45

Candidate Starts for Breezic\_52:

(Start: 36 @47256 has 21 MA's), (42, 47238), (Start: 45 @47199 has 3 MA's), (51, 47151), (65, 46980), (66, 46971), (68, 46938), (73, 46902), (76, 46890), (80, 46857), (81, 46854), (101, 46749),

Gene: Butterball\_56 Start: 49269, Stop: 48706, Start Num: 36

Candidate Starts for Butterball\_56:

(Start: 36 @49269 has 21 MA's), (42, 49251), (Start: 45 @49212 has 3 MA's), (51, 49164), (65, 48993), (66, 48984), (68, 48951), (71, 48927), (76, 48903), (80, 48870), (81, 48867), (101, 48762),

Gene: Camerico\_52 Start: 49576, Stop: 49001, Start Num: 40

Candidate Starts for Camerico\_52:

(Start: 40 @49576 has 3 MA's), (54, 49438), (58, 49405), (59, 49402), (66, 49294), (68, 49261), (69, 49258), (71, 49237), (79, 49186), (80, 49183), (83, 49174), (86, 49159), (97, 49093),

Gene: CathyBurgh\_52 Start: 47833, Stop: 47270, Start Num: 36

Candidate Starts for CathyBurgh\_52:

(Start: 36 @47833 has 21 MA's), (42, 47815), (Start: 45 @47776 has 3 MA's), (51, 47728), (65, 47557), (66, 47548), (68, 47515), (73, 47479), (76, 47467), (80, 47434), (81, 47431), (101, 47326),

Gene: Charianelly\_49 Start: 48123, Stop: 47554, Start Num: 35

Candidate Starts for Charianelly\_49:

(Start: 35 @48123 has 28 MA's), (42, 48099), (Start: 45 @48060 has 3 MA's), (48, 48042), (59, 47940), (66, 47832), (68, 47799), (75, 47754), (80, 47718), (81, 47715), (90, 47646), (101, 47610), (112, 47568),

Gene: Chelms\_52 Start: 47599, Stop: 47036, Start Num: 36

Candidate Starts for Chelms\_52:

(27, 47638), (28, 47632), (30, 47620), (Start: 36 @47599 has 21 MA's), (42, 47581), (Start: 45 @47542 has 3 MA's), (59, 47419), (65, 47323), (66, 47314), (68, 47281), (73, 47245), (76, 47233), (80, 47200), (81, 47197), (101, 47092),

Gene: Dakiti\_53 Start: 48467, Stop: 47904, Start Num: 36

Candidate Starts for Dakiti\_53:

(27, 48506), (28, 48500), (30, 48488), (Start: 36 @48467 has 21 MA's), (42, 48449), (Start: 45 @48410 has 3 MA's), (59, 48287), (65, 48191), (66, 48182), (68, 48149), (73, 48113), (76, 48101), (80, 48068), (81, 48065), (101, 47960),

Gene: Damp\_48 Start: 47287, Stop: 46718, Start Num: 35

Candidate Starts for Damp\_48:

(Start: 35 @47287 has 28 MA's), (42, 47263), (Start: 45 @47224 has 3 MA's), (48, 47206), (59, 47104), (66, 46996), (68, 46963), (75, 46918), (80, 46882), (81, 46879), (90, 46810), (101, 46774), (112, 46732),

Gene: Demosthenes\_46 Start: 47932, Stop: 47396, Start Num: 38

Candidate Starts for Demosthenes\_46:

(13, 48130), (16, 48085), (Start: 38 @47932 has 9 MA's), (Start: 45 @47878 has 3 MA's), (47, 47863), (60, 47740), (61, 47731), (66, 47647), (71, 47590), (77, 47554), (78, 47542), (80, 47533), (84, 47521), (92, 47449),

Gene: Diabla\_55 Start: 49046, Stop: 48477, Start Num: 35

Candidate Starts for Diabla\_55:

(25, 49103), (Start: 35 @49046 has 28 MA's), (41, 49025), (Start: 45 @48983 has 3 MA's), (51, 48935), (65, 48764), (66, 48755), (68, 48722), (73, 48686), (80, 48641), (81, 48638), (101, 48533),

Gene: DocB7\_042 Start: 39836, Stop: 39279, Start Num: 40

Candidate Starts for DocB7\_042:

(32, 39860), (34, 39851), (Start: 40 @39836 has 3 MA's), (54, 39692), (57, 39674), (67, 39524), (68, 39515), (71, 39491), (74, 39473), (75, 39470), (81, 39434), (99, 39341), (112, 39293),

Gene: Eggsie\_51 Start: 47008, Stop: 46439, Start Num: 35

Candidate Starts for Eggsie\_51:

(25, 47065), (Start: 35 @47008 has 28 MA's), (41, 46987), (Start: 45 @46945 has 3 MA's), (51, 46897), (56, 46843), (65, 46726), (66, 46717), (68, 46684), (73, 46648), (80, 46603), (81, 46600), (101, 46495),

Gene: Ekhein\_53 Start: 46961, Stop: 46398, Start Num: 36

Candidate Starts for Ekhein\_53:

(Start: 36 @46961 has 21 MA's), (Start: 45 @46904 has 3 MA's), (51, 46856), (65, 46685), (66, 46676), (68, 46643), (73, 46607), (76, 46595), (80, 46562), (81, 46559), (101, 46454),

Gene: Exiguo\_52 Start: 46973, Stop: 46410, Start Num: 36

Candidate Starts for Exiguo\_52:

(Start: 36 @46973 has 21 MA's), (42, 46955), (Start: 45 @46916 has 3 MA's), (51, 46868), (65, 46697), (66, 46688), (68, 46655), (73, 46619), (76, 46607), (80, 46574), (81, 46571), (101, 46466),

Gene: FelixAlejandro\_57 Start: 49467, Stop: 48904, Start Num: 36

Candidate Starts for FelixAlejandro\_57:

(Start: 36 @49467 has 21 MA's), (42, 49449), (Start: 45 @49410 has 3 MA's), (51, 49362), (65, 49191), (66, 49182), (68, 49149), (71, 49125), (76, 49101), (80, 49068), (81, 49065), (101, 48960),

Gene: Flakey\_52 Start: 47837, Stop: 47274, Start Num: 36

Candidate Starts for Flakey\_52:

(Start: 36 @47837 has 21 MA's), (42, 47819), (Start: 45 @47780 has 3 MA's), (51, 47732), (65, 47561), (66, 47552), (68, 47519), (73, 47483), (76, 47471), (80, 47438), (81, 47435), (101, 47330),

Gene: GMA3\_50 Start: 46070, Stop: 45516, Start Num: 40

Candidate Starts for GMA3\_50:

(Start: 40 @46070 has 3 MA's), (Start: 45 @46022 has 3 MA's), (59, 45899), (66, 45794), (79, 45686), (100, 45599),

Gene: GMA7\_44 Start: 42110, Stop: 41535, Start Num: 35

Candidate Starts for GMA7\_44:

(24, 42185), (29, 42134), (Start: 35 @42110 has 28 MA's), (Start: 45 @42047 has 3 MA's), (47, 42032), (53, 41972), (65, 41822), (66, 41813), (67, 41789), (71, 41756), (81, 41696), (90, 41627), (101, 41591),

Gene: GTE7\_43 Start: 42141, Stop: 41566, Start Num: 35



Candidate Starts for GTE7\_43:

(24, 42216), (29, 42165), (31, 42159), (Start: 35 @42141 has 28 MA's), (Start: 45 @42078 has 3 MA's), (47, 42063), (53, 42003), (65, 41853), (66, 41844), (67, 41820), (71, 41787), (81, 41727), (90, 41658), (101, 41622),

Gene: GalacticEye\_50 Start: 48084, Stop: 47515, Start Num: 35

Candidate Starts for GalacticEye\_50:

(Start: 35 @48084 has 28 MA's), (Start: 45 @48021 has 3 MA's), (48, 48003), (59, 47901), (66, 47793), (68, 47760), (75, 47715), (80, 47679), (81, 47676), (90, 47607), (101, 47571), (112, 47529),

Gene: Gibbles\_51 Start: 46643, Stop: 46122, Start Num: 37

Candidate Starts for Gibbles\_51:

(Start: 37 @46643 has 5 MA's), (50, 46541), (54, 46496), (58, 46463), (62, 46418), (66, 46382), (67, 46358), (80, 46274), (91, 46217), (93, 46208), (95, 46205), (98, 46196), (107, 46172),

Gene: Gmala1\_48 Start: 44268, Stop: 43714, Start Num: 40

Candidate Starts for Gmala1\_48:

(Start: 40 @44268 has 3 MA's), (50, 44178), (52, 44151), (58, 44100), (59, 44097), (66, 43992), (80, 43881), (109, 43764), (110, 43761), (111, 43758),

Gene: GordDuk1\_49 Start: 44419, Stop: 43865, Start Num: 40

Candidate Starts for GordDuk1\_49:

(Start: 40 @44419 has 3 MA's), (50, 44329), (58, 44251), (59, 44248), (66, 44143), (80, 44032), (109, 43915), (110, 43912), (111, 43909),

Gene: GordTnk2\_50 Start: 44573, Stop: 44019, Start Num: 40

Candidate Starts for GordTnk2\_50:

(Start: 40 @44573 has 3 MA's), (50, 44483), (58, 44405), (59, 44402), (66, 44297), (80, 44186), (109, 44069), (110, 44066), (111, 44063),

Gene: Gorko\_52 Start: 46965, Stop: 46402, Start Num: 36

Candidate Starts for Gorko\_52:

(Start: 36 @46965 has 21 MA's), (42, 46947), (Start: 45 @46908 has 3 MA's), (51, 46860), (65, 46689), (66, 46680), (68, 46647), (73, 46611), (76, 46599), (80, 46566), (81, 46563), (101, 46458),

Gene: GourdThymes\_52 Start: 47839, Stop: 47276, Start Num: 36

Candidate Starts for GourdThymes\_52:

(Start: 36 @47839 has 21 MA's), (42, 47821), (Start: 45 @47782 has 3 MA's), (51, 47734), (65, 47563), (66, 47554), (68, 47521), (73, 47485), (76, 47473), (80, 47440), (81, 47437), (101, 47332),

Gene: Guillaume\_50 Start: 48134, Stop: 47565, Start Num: 35

Candidate Starts for Guillaume\_50:

(Start: 35 @48134 has 28 MA's), (Start: 45 @48071 has 3 MA's), (48, 48053), (59, 47951), (66, 47843), (68, 47810), (75, 47765), (80, 47729), (81, 47726), (90, 47657), (101, 47621), (112, 47579),

Gene: Hail2Pitt\_49 Start: 48610, Stop: 48041, Start Num: 35

Candidate Starts for Hail2Pitt\_49:

(Start: 35 @48610 has 28 MA's), (42, 48586), (Start: 45 @48547 has 3 MA's), (48, 48529), (59, 48427), (66, 48319), (68, 48286), (75, 48241), (80, 48205), (81, 48202), (90, 48133), (101, 48097), (112, 48055),

Gene: Harambe\_50 Start: 48401, Stop: 47832, Start Num: 35

Candidate Starts for Harambe\_50:

(Start: 35 @48401 has 28 MA's), (Start: 45 @48338 has 3 MA's), (48, 48320), (59, 48218), (66, 48110), (68, 48077), (75, 48032), (80, 47996), (81, 47993), (90, 47924), (101, 47888), (112, 47846),

Gene: HayZem\_54 Start: 47893, Stop: 47318, Start Num: 35

Candidate Starts for HayZem\_54:

(24, 47968), (29, 47917), (Start: 35 @47893 has 28 MA's), (Start: 45 @47830 has 3 MA's), (47, 47815), (53, 47755), (65, 47605), (66, 47596), (67, 47572), (71, 47539), (80, 47482), (81, 47479), (90, 47410), (101, 47374),

Gene: Hello\_50 Start: 48363, Stop: 47794, Start Num: 35

Candidate Starts for Hello\_50:

(Start: 35 @48363 has 28 MA's), (42, 48339), (Start: 45 @48300 has 3 MA's), (48, 48282), (59, 48180), (66, 48072), (68, 48039), (75, 47994), (80, 47958), (81, 47955), (90, 47886), (101, 47850), (112, 47808),

Gene: Hollow\_48 Start: 48563, Stop: 48027, Start Num: 38

Candidate Starts for Hollow\_48:

(1, 49235), (2, 49181), (3, 49163), (4, 49133), (5, 49052), (6, 49040), (7, 48971), (8, 48965), (13, 48761), (16, 48716), (Start: 38 @48563 has 9 MA's), (Start: 45 @48509 has 3 MA's), (47, 48494), (60, 48371), (66, 48278), (77, 48185), (78, 48173), (80, 48164), (84, 48152), (92, 48080),

Gene: Hotorobo\_52 Start: 47787, Stop: 47281, Start Num: 45

Candidate Starts for Hotorobo\_52:

(Start: 36 @47844 has 21 MA's), (42, 47826), (Start: 45 @47787 has 3 MA's), (51, 47739), (65, 47568), (66, 47559), (68, 47526), (73, 47490), (76, 47478), (80, 47445), (81, 47442), (101, 47337),

Gene: Jams\_50 Start: 47573, Stop: 47004, Start Num: 35

Candidate Starts for Jams\_50:

(Start: 35 @47573 has 28 MA's), (42, 47549), (Start: 45 @47510 has 3 MA's), (48, 47492), (59, 47390), (66, 47282), (68, 47249), (75, 47204), (80, 47168), (81, 47165), (90, 47096), (101, 47060), (112, 47018),

Gene: Jellybones\_55 Start: 48945, Stop: 48382, Start Num: 36

Candidate Starts for Jellybones\_55:

(27, 48984), (28, 48978), (Start: 36 @48945 has 21 MA's), (Start: 45 @48888 has 3 MA's), (51, 48840), (65, 48669), (66, 48660), (68, 48627), (71, 48603), (76, 48579), (80, 48546), (81, 48543), (101, 48438),

Gene: John316\_56 Start: 49002, Stop: 48439, Start Num: 36

Candidate Starts for John316\_56:

(Start: 36 @49002 has 21 MA's), (42, 48984), (Start: 45 @48945 has 3 MA's), (51, 48897), (65, 48726), (66, 48717), (68, 48684), (73, 48648), (76, 48636), (80, 48603), (81, 48600), (101, 48495),

Gene: Jormungandr\_50 Start: 48116, Stop: 47547, Start Num: 35

Candidate Starts for Jormungandr\_50:

(Start: 35 @48116 has 28 MA's), (Start: 45 @48053 has 3 MA's), (48, 48035), (59, 47933), (66, 47825), (68, 47792), (75, 47747), (80, 47711), (81, 47708), (90, 47639), (101, 47603), (112, 47561),

Gene: Jumbo\_49 Start: 48952, Stop: 48386, Start Num: 40

Candidate Starts for Jumbo\_49:

(26, 49006), (Start: 40 @48952 has 3 MA's), (50, 48862), (54, 48817), (58, 48784), (59, 48781), (66, 48676), (70, 48625), (79, 48568), (83, 48556), (114, 48409),

Gene: Kampe\_53 Start: 46621, Stop: 46100, Start Num: 37

Candidate Starts for Kampe\_53:

(Start: 37 @46621 has 5 MA's), (50, 46519), (54, 46474), (58, 46441), (62, 46396), (66, 46360), (67, 46336), (80, 46252), (91, 46195), (93, 46186), (95, 46183), (98, 46174), (107, 46150),

Gene: Kaseim\_50 Start: 47558, Stop: 46989, Start Num: 35

Candidate Starts for Kaseim\_50:

(Start: 35 @47558 has 28 MA's), (42, 47534), (Start: 45 @47495 has 3 MA's), (48, 47477), (59, 47375), (66, 47267), (68, 47234), (75, 47189), (80, 47153), (81, 47150), (90, 47081), (101, 47045), (112, 47003),

Gene: Katyusha\_47 Start: 48227, Stop: 47691, Start Num: 38

Candidate Starts for Katyusha\_47:

(13, 48425), (16, 48380), (Start: 38 @48227 has 9 MA's), (Start: 45 @48173 has 3 MA's), (47, 48158), (54, 48080), (60, 48035), (66, 47942), (68, 47909), (71, 47885), (77, 47849), (78, 47837), (80, 47828), (84, 47816), (86, 47804), (92, 47744), (100, 47729),

Gene: Kvothe\_47 Start: 48126, Stop: 47590, Start Num: 38

Candidate Starts for Kvothe\_47:

(16, 48279), (Start: 38 @48126 has 9 MA's), (Start: 45 @48072 has 3 MA's), (47, 48057), (54, 47979), (60, 47934), (66, 47841), (68, 47808), (71, 47784), (77, 47748), (78, 47736), (80, 47727), (84, 47715), (86, 47703), (92, 47643), (100, 47628),

Gene: Lahirium\_50 Start: 48638, Stop: 48069, Start Num: 35

Candidate Starts for Lahirium\_50:

(Start: 35 @48638 has 28 MA's), (Start: 45 @48575 has 3 MA's), (48, 48557), (59, 48455), (66, 48347), (68, 48314), (75, 48269), (80, 48233), (81, 48230), (90, 48161), (101, 48125), (112, 48083),

Gene: Lidong\_50 Start: 48373, Stop: 47804, Start Num: 35

Candidate Starts for Lidong\_50:

(Start: 35 @48373 has 28 MA's), (42, 48349), (Start: 45 @48310 has 3 MA's), (48, 48292), (59, 48190), (66, 48082), (68, 48049), (75, 48004), (80, 47968), (81, 47965), (90, 47896), (101, 47860), (112, 47818),

Gene: Linetti\_53 Start: 48608, Stop: 48045, Start Num: 36

Candidate Starts for Linetti\_53:

(27, 48647), (28, 48641), (30, 48629), (Start: 36 @48608 has 21 MA's), (42, 48590), (Start: 45 @48551 has 3 MA's), (51, 48503), (65, 48332), (66, 48323), (68, 48290), (73, 48254), (76, 48242), (80, 48209), (81, 48206), (101, 48101),

Gene: Lizzo\_52 Start: 47833, Stop: 47270, Start Num: 36

Candidate Starts for Lizzo\_52:

(Start: 36 @47833 has 21 MA's), (42, 47815), (Start: 45 @47776 has 3 MA's), (51, 47728), (65, 47557), (66, 47548), (68, 47515), (73, 47479), (76, 47467), (80, 47434), (81, 47431), (101, 47326),

Gene: Luker\_51 Start: 48591, Stop: 48022, Start Num: 35

Candidate Starts for Luker\_51:

(Start: 35 @48591 has 28 MA's), (42, 48567), (Start: 45 @48528 has 3 MA's), (48, 48510), (59, 48408), (66, 48300), (68, 48267), (75, 48222), (80, 48186), (81, 48183), (90, 48114), (101, 48078), (112, 48036),

Gene: Mbo2\_42 Start: 37548, Stop: 37012, Start Num: 40

Candidate Starts for Mbo2\_42:

(9, 37794), (14, 37731), (17, 37683), (22, 37644), (Start: 40 @37548 has 3 MA's), (Start: 45 @37497 has 3 MA's), (58, 37377), (66, 37269), (72, 37203), (76, 37188), (80, 37158), (81, 37155), (82, 37152),

Gene: Minos\_51 Start: 48115, Stop: 47546, Start Num: 35

Candidate Starts for Minos\_51:

(Start: 35 @48115 has 28 MA's), (42, 48091), (Start: 45 @48052 has 3 MA's), (48, 48034), (59, 47932), (66, 47824), (68, 47791), (75, 47746), (80, 47710), (81, 47707), (90, 47638), (101, 47602), (112, 47560),

Gene: Monty\_51 Start: 46983, Stop: 46420, Start Num: 36

Candidate Starts for Monty\_51:

(Start: 36 @46983 has 21 MA's), (42, 46965), (Start: 45 @46926 has 3 MA's), (51, 46878), (65, 46707), (66, 46698), (68, 46665), (73, 46629), (76, 46617), (80, 46584), (81, 46581), (101, 46476),

Gene: MrWormie\_50 Start: 47276, Stop: 46707, Start Num: 35

Candidate Starts for MrWormie\_50:

(Start: 35 @47276 has 28 MA's), (42, 47252), (Start: 45 @47213 has 3 MA's), (48, 47195), (59, 47093), (66, 46985), (68, 46952), (75, 46907), (80, 46871), (81, 46868), (90, 46799), (101, 46763), (112, 46721),

Gene: Msay19\_57 Start: 49462, Stop: 48893, Start Num: 35

Candidate Starts for Msay19\_57:

(10, 49705), (11, 49684), (15, 49609), (20, 49573), (21, 49564), (25, 49519), (Start: 35 @49462 has 28 MA's), (Start: 45 @49399 has 3 MA's), (51, 49351), (65, 49180), (66, 49171), (68, 49138), (71, 49114), (76, 49090), (80, 49057), (81, 49054), (101, 48949),

Gene: Neoevie\_50 Start: 48377, Stop: 47808, Start Num: 35

Candidate Starts for Neoevie\_50:

(Start: 35 @48377 has 28 MA's), (Start: 45 @48314 has 3 MA's), (48, 48296), (59, 48194), (66, 48086), (68, 48053), (75, 48008), (80, 47972), (81, 47969), (90, 47900), (101, 47864), (112, 47822),

Gene: Newt\_51 Start: 48605, Stop: 48036, Start Num: 35

Candidate Starts for Newt\_51:

(Start: 35 @48605 has 28 MA's), (42, 48581), (Start: 45 @48542 has 3 MA's), (48, 48524), (59, 48422), (66, 48314), (68, 48281), (75, 48236), (80, 48200), (81, 48197), (90, 48128), (101, 48092), (112, 48050),

Gene: Niagara\_47 Start: 48217, Stop: 47681, Start Num: 38

Candidate Starts for Niagara\_47:

(16, 48370), (Start: 38 @48217 has 9 MA's), (Start: 45 @48163 has 3 MA's), (47, 48148), (54, 48070), (60, 48025), (66, 47932), (68, 47899), (71, 47875), (77, 47839), (78, 47827), (80, 47818), (84, 47806), (86, 47794), (92, 47734), (100, 47719),

Gene: Nimi13\_50 Start: 48124, Stop: 47555, Start Num: 35

Candidate Starts for Nimi13\_50:

(Start: 35 @48124 has 28 MA's), (Start: 45 @48061 has 3 MA's), (48, 48043), (59, 47941), (66, 47833), (68, 47800), (75, 47755), (80, 47719), (81, 47716), (90, 47647), (101, 47611), (112, 47569),

Gene: Orchid\_52 Start: 46622, Stop: 46101, Start Num: 37

Candidate Starts for Orchid\_52:

(Start: 37 @46622 has 5 MA's), (50, 46520), (54, 46475), (58, 46442), (62, 46397), (66, 46361), (67, 46337), (80, 46253), (91, 46196), (93, 46187), (95, 46184), (98, 46175), (107, 46151),

Gene: PatrickStar\_53 Start: 46621, Stop: 46100, Start Num: 37

Candidate Starts for PatrickStar\_53:

(Start: 37 @46621 has 5 MA's), (50, 46519), (54, 46474), (58, 46441), (62, 46396), (66, 46360), (67, 46336), (80, 46252), (91, 46195), (93, 46186), (95, 46183), (98, 46174), (107, 46150),

Gene: Philon9\_48 Start: 49248, Stop: 48712, Start Num: 38

Candidate Starts for Philon9\_48:

(16, 49401), (18, 49374), (Start: 38 @49248 has 9 MA's), (Start: 45 @49194 has 3 MA's), (47, 49179), (49, 49173), (55, 49089), (60, 49056), (66, 48963), (71, 48906), (78, 48858), (80, 48849), (81, 48846), (92, 48765),

Gene: PierreThree\_52 Start: 48363, Stop: 47794, Start Num: 35

Candidate Starts for PierreThree\_52:

(25, 48420), (Start: 35 @48363 has 28 MA's), (42, 48339), (Start: 45 @48300 has 3 MA's), (51, 48252), (59, 48177), (65, 48081), (66, 48072), (68, 48039), (73, 48003), (76, 47991), (80, 47958), (81, 47955), (101, 47850),

Gene: PokyPuppy\_51 Start: 48234, Stop: 47728, Start Num: 45

Candidate Starts for PokyPuppy\_51:

(Start: 36 @48294 has 21 MA's), (41, 48276), (Start: 45 @48234 has 3 MA's), (46, 48225), (51, 48186), (65, 48015), (66, 48006), (68, 47973), (71, 47949), (75, 47928), (76, 47925), (80, 47892), (87, 47850), (101, 47784),

Gene: Poland\_59 Start: 49441, Stop: 48872, Start Num: 35

Candidate Starts for Poland\_59:

(10, 49684), (11, 49663), (15, 49588), (20, 49552), (21, 49543), (25, 49498), (Start: 35 @49441 has 28 MA's), (Start: 45 @49378 has 3 MA's), (51, 49330), (65, 49159), (66, 49150), (68, 49117), (71, 49093), (76, 49069), (80, 49036), (81, 49033), (101, 48928),

Gene: RemRem\_53 Start: 46973, Stop: 46410, Start Num: 36

Candidate Starts for RemRem\_53:

(Start: 36 @46973 has 21 MA's), (42, 46955), (Start: 45 @46916 has 3 MA's), (51, 46868), (65, 46697), (66, 46688), (68, 46655), (73, 46619), (76, 46607), (80, 46574), (81, 46571), (101, 46466),

Gene: Reynauld\_50 Start: 46430, Stop: 45882, Start Num: 40

Candidate Starts for Reynauld\_50:

(12, 46655), (19, 46556), (23, 46523), (Start: 40 @46430 has 3 MA's), (43, 46418), (44, 46409), (Start: 45 @46379 has 3 MA's), (50, 46340), (61, 46238), (64, 46181), (66, 46151), (72, 46085), (83, 46031), (85, 46019), (88, 45995), (102, 45941), (104, 45935), (105, 45932), (108, 45923),

Gene: RobinSparkles\_56 Start: 47174, Stop: 46653, Start Num: 37

Candidate Starts for RobinSparkles\_56:

(Start: 37 @47174 has 5 MA's), (50, 47072), (54, 47027), (58, 46994), (62, 46949), (66, 46913), (67, 46889), (80, 46805), (91, 46748), (93, 46739), (95, 46736), (98, 46727), (107, 46703),

Gene: RoyalG\_52 Start: 47657, Stop: 47088, Start Num: 35

Candidate Starts for RoyalG\_52:

(25, 47714), (Start: 35 @47657 has 28 MA's), (41, 47636), (Start: 45 @47594 has 3 MA's), (51, 47546), (65, 47375), (66, 47366), (68, 47333), (73, 47297), (80, 47252), (81, 47249), (101, 47144),

Gene: Sam12\_52 Start: 46973, Stop: 46410, Start Num: 36

Candidate Starts for Sam12\_52:

(Start: 36 @46973 has 21 MA's), (42, 46955), (Start: 45 @46916 has 3 MA's), (51, 46868), (65, 46697), (66, 46688), (68, 46655), (73, 46619), (76, 46607), (80, 46574), (81, 46571), (101, 46466),

Gene: Shelley\_50 Start: 47600, Stop: 47031, Start Num: 35

Candidate Starts for Shelley\_50:

(Start: 35 @47600 has 28 MA's), (42, 47576), (Start: 45 @47537 has 3 MA's), (48, 47519), (59, 47417), (66, 47309), (68, 47276), (75, 47231), (80, 47195), (81, 47192), (90, 47123), (101, 47087), (112, 47045),

Gene: Sombrero\_53 Start: 47346, Stop: 46783, Start Num: 36

Candidate Starts for Sombrero\_53:

(Start: 36 @47346 has 21 MA's), (Start: 45 @47289 has 3 MA's), (51, 47241), (65, 47070), (66, 47061), (68, 47028), (71, 47004), (76, 46980), (80, 46947), (81, 46944), (101, 46839),

Gene: Squibbles\_52 Start: 47836, Stop: 47273, Start Num: 36

Candidate Starts for Squibbles\_52:

(Start: 36 @47836 has 21 MA's), (42, 47818), (Start: 45 @47779 has 3 MA's), (51, 47731), (65, 47560), (66, 47551), (68, 47518), (73, 47482), (76, 47470), (80, 47437), (81, 47434), (101, 47329),

Gene: SteveFrench\_51 Start: 47897, Stop: 47328, Start Num: 35

Candidate Starts for SteveFrench\_51:

(25, 47954), (Start: 35 @47897 has 28 MA's), (41, 47876), (Start: 45 @47834 has 3 MA's), (51, 47786), (65, 47615), (66, 47606), (68, 47573), (73, 47537), (80, 47492), (81, 47489), (101, 47384),

Gene: Sticker17\_50 Start: 48115, Stop: 47546, Start Num: 35

Candidate Starts for Sticker17\_50:

(Start: 35 @48115 has 28 MA's), (42, 48091), (Start: 45 @48052 has 3 MA's), (48, 48034), (59, 47932), (66, 47824), (68, 47791), (75, 47746), (80, 47710), (81, 47707), (90, 47638), (101, 47602), (112, 47560),

Gene: Teal\_50 Start: 48582, Stop: 48013, Start Num: 35

Candidate Starts for Teal\_50:

(Start: 35 @48582 has 28 MA's), (Start: 45 @48519 has 3 MA's), (48, 48501), (59, 48399), (66, 48291), (68, 48258), (75, 48213), (80, 48177), (81, 48174), (90, 48105), (101, 48069), (112, 48027),

Gene: Teatealatte\_48 Start: 48129, Stop: 47593, Start Num: 38

Candidate Starts for Teatealatte\_48:

(16, 48282), (Start: 38 @48129 has 9 MA's), (Start: 45 @48075 has 3 MA's), (47, 48060), (54, 47982), (60, 47937), (66, 47844), (68, 47811), (71, 47787), (77, 47751), (78, 47739), (80, 47730), (84, 47718), (86, 47706), (92, 47646), (100, 47631),

Gene: Teech\_48 Start: 47930, Stop: 47394, Start Num: 38

Candidate Starts for Teech\_48:

(16, 48083), (Start: 38 @47930 has 9 MA's), (Start: 45 @47876 has 3 MA's), (47, 47861), (54, 47783), (60, 47738), (66, 47645), (68, 47612), (71, 47588), (77, 47552), (78, 47540), (80, 47531), (84, 47519), (86, 47507), (92, 47447), (100, 47432),

Gene: Tredge\_48 Start: 48129, Stop: 47593, Start Num: 38

Candidate Starts for Tredge\_48:

(16, 48282), (Start: 38 @48129 has 9 MA's), (Start: 45 @48075 has 3 MA's), (47, 48060), (54, 47982), (60, 47937), (66, 47844), (68, 47811), (71, 47787), (77, 47751), (78, 47739), (80, 47730), (84, 47718), (86, 47706), (92, 47646), (100, 47631),

Gene: Trogglehumper\_66 Start: 54761, Stop: 54177, Start Num: 39

Candidate Starts for Trogglehumper\_66:

(33, 54776), (Start: 39 @54761 has 1 MA's), (51, 54659), (63, 54497), (66, 54464), (67, 54440), (86, 54323), (89, 54278), (90, 54275), (94, 54260), (96, 54257), (103, 54230), (106, 54224), (113, 54185),

Gene: Woes\_50 Start: 48633, Stop: 48064, Start Num: 35

Candidate Starts for Woes\_50:

(Start: 35 @48633 has 28 MA's), (42, 48609), (Start: 45 @48570 has 3 MA's), (48, 48552), (59, 48450), (66, 48342), (68, 48309), (75, 48264), (80, 48228), (81, 48225), (90, 48156), (101, 48120), (112, 48078),