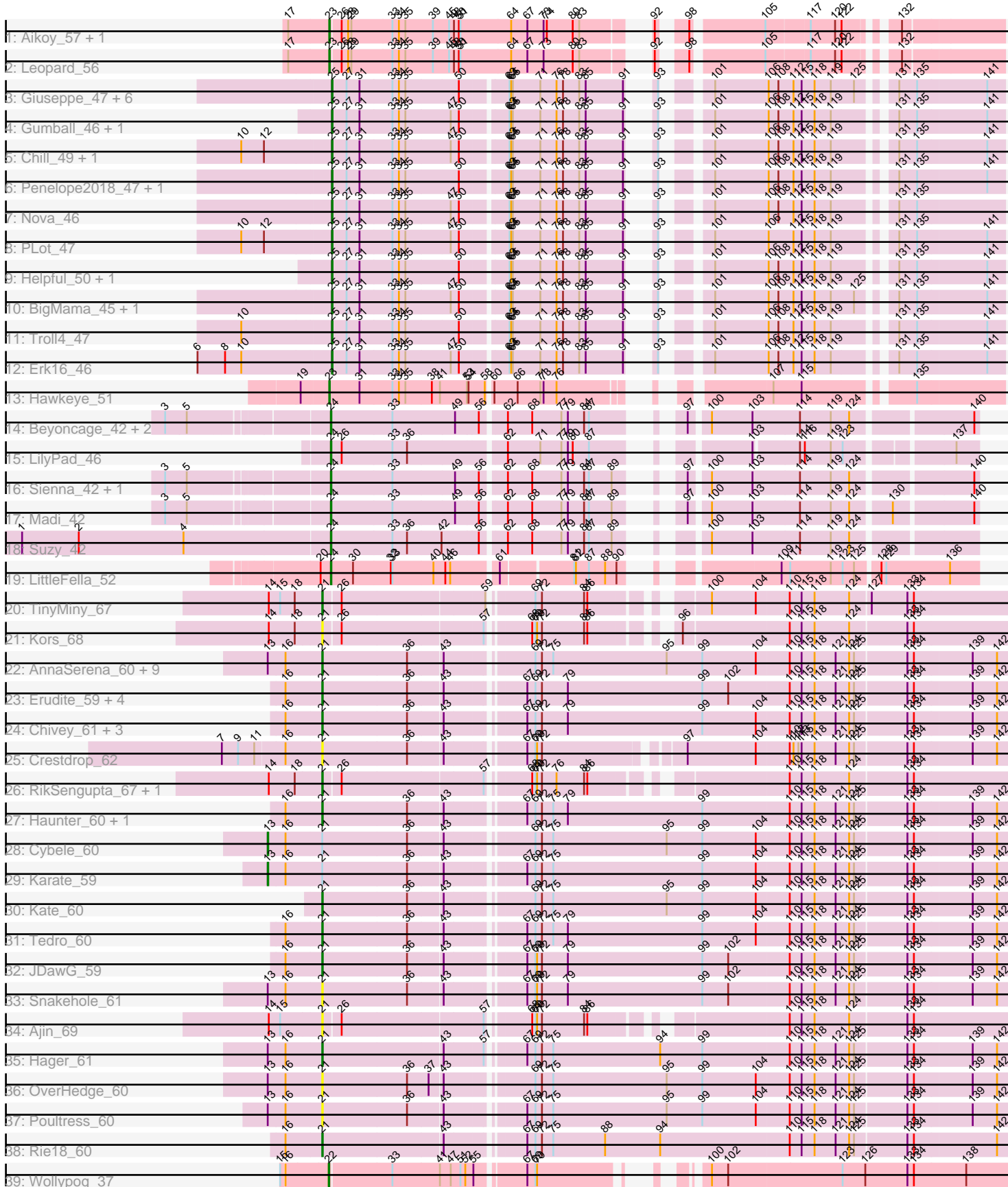


Pham 163575



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 163575 Report

This analysis was run 04/28/24 on database version 559.

Pham number 163575 has 72 members, 11 are drafts.

Phages represented in each track:

- Track 1 : Aikoy\_57, Onyinye\_57
- Track 2 : Leopard\_56
- Track 3 : Giuseppe\_47, Prager\_47, Visconti\_48, Butterscotch\_46, Adjutor\_47, Mopey\_48, PBI1\_45
- Track 4 : Gumball\_46, SirHarley\_48
- Track 5 : Chill\_49, WaldoWhy\_49
- Track 6 : Penelope2018\_47, KandZ\_46
- Track 7 : Nova\_46
- Track 8 : PLOT\_47
- Track 9 : Helpful\_50, Delton\_48
- Track 10 : BigMama\_45, Thoth\_47
- Track 11 : Troll4\_47
- Track 12 : Erk16\_46
- Track 13 : Hawkeye\_51
- Track 14 : Beyoncage\_42, Terapin\_43, Djokovic\_42
- Track 15 : LilyPad\_46
- Track 16 : Sienna\_42, BiteSize\_42
- Track 17 : Madi\_42
- Track 18 : Suzy\_42
- Track 19 : LittleFella\_52
- Track 20 : TinyMiny\_67
- Track 21 : Kors\_68
- Track 22 : AnnaSerena\_60, Krampus\_60, Anakin\_60, Gilda\_60, Rachella\_60, NarutoRun\_60, Pharpay\_59, Potty\_59, PhunaPhoke\_60, Neptune\_60
- Track 23 : Erudite\_59, MortySmith\_58, Dauntless\_60, JingleBells\_61, Aesir\_59
- Track 24 : Chivey\_61, DannyDe\_61, Hiddenleaf\_61, FreddieHg\_61
- Track 25 : Crestdrop\_62
- Track 26 : RikSengupta\_67, Sparcetus\_67
- Track 27 : Haunter\_60, CoolCookie\_65
- Track 28 : Cybele\_60
- Track 29 : Karate\_59
- Track 30 : Kate\_60
- Track 31 : Tedro\_60
- Track 32 : JDawG\_59
- Track 33 : Snakehole\_61
- Track 34 : Ajin\_69
- Track 35 : Hager\_61

- Track 36 : OverHedge\_60
- Track 37 : Poultruss\_60
- Track 38 : Rie18\_60
- Track 39 : Wollypog\_37

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

The start number called the most often in the published annotations is 21, it was called in 25 of the 61 non-draft genes in the pham.

Genes that call this "Most Annotated" start:

- Aesir\_59, Ajin\_69, Anakin\_60, AnnaSerena\_60, Chivey\_61, CoolCookie\_65, Crestdrop\_62, DannyDe\_61, Dauntless\_60, Erudite\_59, FreddieHg\_61, Gilda\_60, Hager\_61, Haunter\_60, Hiddenleaf\_61, JDawG\_59, JingleBells\_61, Kate\_60, Kors\_68, Krampus\_60, MortySmith\_58, NarutoRun\_60, Neptune\_60, OverHedge\_60, Pharpay\_59, PhunaPhoke\_60, Potty\_59, Poultruss\_60, Rachella\_60, Rie18\_60, RikSengupta\_67, Snakehole\_61, Sparcetus\_67, Tedro\_60, TinyMiny\_67,

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

- Cybele\_60, Karate\_59,

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

- Adjutor\_47, Aikoy\_57, Beyoncage\_42, BigMama\_45, BiteSize\_42, Butterscotch\_46, Chill\_49, Delton\_48, Djokovic\_42, Erk16\_46, Giuseppe\_47, Gumball\_46, Hawkeye\_51, Helpful\_50, KandZ\_46, Leopard\_56, LilyPad\_46, LittleFella\_52, Madi\_42, Mopey\_48, Nova\_46, Onyinye\_57, PBI1\_45, PLOT\_47, Penelope2018\_47, Prager\_47, Sienna\_42, SirHarley\_48, Suzy\_42, Terapin\_43, Thoth\_47, Troll4\_47, Visconti\_48, WaldoWhy\_49, Wollypog\_37,

**Summary by start number:**

Start 13:

- Found in 16 of 72 ( 22.2% ) of genes in pham
- Manual Annotations of this start: 2 of 61
- Called 12.5% of time when present
- Phage (with cluster) where this start called: Cybele\_60 (EF), Karate\_59 (EF),

Start 21:

- Found in 37 of 72 ( 51.4% ) of genes in pham
- Manual Annotations of this start: 25 of 61
- Called 94.6% of time when present
- Phage (with cluster) where this start called: Aesir\_59 (EF), Ajin\_69 (EF), Anakin\_60 (EF), AnnaSerena\_60 (EF), Chivey\_61 (EF), CoolCookie\_65 (EF), Crestdrop\_62 (EF), DannyDe\_61 (EF), Dauntless\_60 (EF), Erudite\_59 (EF), FreddieHg\_61 (EF), Gilda\_60 (EF), Hager\_61 (EF), Haunter\_60 (EF), Hiddenleaf\_61 (EF), JDawG\_59 (EF), JingleBells\_61 (EF), Kate\_60 (EF), Kors\_68 (EF), Krampus\_60 (EF), MortySmith\_58 (EF), NarutoRun\_60 (EF), Neptune\_60 (EF), OverHedge\_60 (EF), Pharpay\_59 (EF), PhunaPhoke\_60 (EF), Potty\_59 (EF), Poultruss\_60 (EF), Rachella\_60 (EF), Rie18\_60 (EF), RikSengupta\_67 (EF), Snakehole\_61 (EF), Sparcetus\_67 (EF), Tedro\_60 (EF), TinyMiny\_67 (EF),

Start 22:

- Found in 1 of 72 ( 1.4% ) of genes in pham
- Manual Annotations of this start: 1 of 61
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Wollypog\_37 (singleton),

Start 23:

- Found in 4 of 72 ( 5.6% ) of genes in pham
- Manual Annotations of this start: 4 of 61
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Aikoy\_57 (AE), Hawkeye\_51 (D2), Leopard\_56 (AE), Onyinye\_57 (AE),

Start 24:

- Found in 9 of 72 ( 12.5% ) of genes in pham
- Manual Annotations of this start: 9 of 61
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Beyoncage\_42 (DG1), BiteSize\_42 (DG1), Djokovic\_42 (DG1), LilyPad\_46 (DG1), LittleFella\_52 (DG2), Madi\_42 (DG1), Sienna\_42 (DG1), Suzy\_42 (DG1), Terapin\_43 (DG1),

Start 25:

- Found in 21 of 72 ( 29.2% ) of genes in pham
- Manual Annotations of this start: 20 of 61
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Adjutor\_47 (D1), BigMama\_45 (D1), Butterscotch\_46 (D1), Chill\_49 (D1), Delton\_48 (D1), Erk16\_46 (D1), Giuseppe\_47 (D1), Gumball\_46 (D1), Helpful\_50 (D1), KandZ\_46 (D1), Mopey\_48 (D1), Nova\_46 (D1), PBI1\_45 (D1), PLOT\_47 (D1), Penelope2018\_47 (D1), Prager\_47 (D1), SirHarley\_48 (D1), Thoth\_47 (D1), Troll4\_47 (D1), Visconti\_48 (D1), WaldoWhy\_49 (D1),

**Summary by clusters:**

There are 7 clusters represented in this pham: singleton, AE, EF, DG2, DG1, D2, D1,

Info for manual annotations of cluster AE:

- Start number 23 was manually annotated 3 times for cluster AE.

Info for manual annotations of cluster D1:

- Start number 25 was manually annotated 20 times for cluster D1.

Info for manual annotations of cluster D2:

- Start number 23 was manually annotated 1 time for cluster D2.

Info for manual annotations of cluster DG1:

- Start number 24 was manually annotated 8 times for cluster DG1.

Info for manual annotations of cluster DG2:

- Start number 24 was manually annotated 1 time for cluster DG2.

Info for manual annotations of cluster EF:

- Start number 13 was manually annotated 2 times for cluster EF.
- Start number 21 was manually annotated 25 times for cluster EF.

### **Gene Information:**

Gene: Adjutor\_47 Start: 37040, Stop: 38149, Start Num: 25

Candidate Starts for Adjutor\_47:

(Start: 25 @37040 has 20 MA's), (27, 37067), (31, 37091), (33, 37151), (34, 37163), (35, 37175), (50, 37271), (63, 37349), (64, 37352), (65, 37355), (71, 37406), (76, 37436), (78, 37448), (83, 37478), (85, 37490), (91, 37559), (93, 37571), (101, 37625), (106, 37721), (108, 37739), (112, 37766), (115, 37781), (118, 37805), (119, 37835), (125, 37877), (131, 37925), (135, 37958), (141, 38084),

Gene: Aesir\_59 Start: 45442, Stop: 46689, Start Num: 21

Candidate Starts for Aesir\_59:

(16, 45376), (Start: 21 @45442 has 25 MA's), (36, 45595), (43, 45655), (67, 45781), (69, 45796), (72, 45808), (79, 45856), (99, 46105), (102, 46153), (110, 46264), (115, 46285), (118, 46309), (121, 46348), (124, 46372), (125, 46381), (133, 46471), (134, 46483), (139, 46588), (142, 46633),

Gene: Aikoy\_57 Start: 41840, Stop: 42946, Start Num: 23

Candidate Starts for Aikoy\_57:

(17, 41768), (Start: 23 @41840 has 4 MA's), (26, 41858), (28, 41870), (29, 41876), (33, 41951), (34, 41963), (35, 41975), (39, 42026), (45, 42056), (48, 42065), (50, 42074), (51, 42077), (64, 42170), (67, 42200), (73, 42230), (74, 42236), (80, 42284), (83, 42296), (92, 42377), (98, 42410), (105, 42530), (117, 42605), (120, 42650), (122, 42662), (132, 42734),

Gene: Ajin\_69 Start: 46362, Stop: 47543, Start Num: 21

Candidate Starts for Ajin\_69:

(14, 46266), (15, 46287), (Start: 21 @46362 has 25 MA's), (26, 46392), (57, 46641), (68, 46707), (69, 46713), (70, 46716), (72, 46725), (84, 46803), (86, 46809), (110, 47115), (115, 47136), (118, 47160), (124, 47223), (133, 47322), (134, 47334),

Gene: Anakin\_60 Start: 45748, Stop: 46998, Start Num: 21

Candidate Starts for Anakin\_60:

(Start: 13 @45652 has 2 MA's), (16, 45682), (Start: 21 @45748 has 25 MA's), (36, 45904), (43, 45964), (69, 46105), (72, 46117), (75, 46138), (95, 46348), (99, 46414), (104, 46513), (110, 46573), (115, 46594), (118, 46618), (121, 46657), (124, 46681), (125, 46690), (133, 46780), (134, 46792), (139, 46897), (142, 46942),

Gene: AnnaSerena\_60 Start: 45782, Stop: 47032, Start Num: 21

Candidate Starts for AnnaSerena\_60:

(Start: 13 @45686 has 2 MA's), (16, 45716), (Start: 21 @45782 has 25 MA's), (36, 45938), (43, 45998), (69, 46139), (72, 46151), (75, 46172), (95, 46382), (99, 46448), (104, 46547), (110, 46607), (115, 46628), (118, 46652), (121, 46691), (124, 46715), (125, 46724), (133, 46814), (134, 46826), (139, 46931), (142, 46976),

Gene: Beyoncage\_42 Start: 33537, Stop: 34577, Start Num: 24

Candidate Starts for Beyoncage\_42:

(3, 33264), (5, 33303), (Start: 24 @33537 has 9 MA's), (33, 33648), (49, 33762), (56, 33804), (62, 33840), (68, 33885), (77, 33939), (79, 33951), (84, 33981), (87, 33990), (97, 34086), (100, 34116), (103, 34191), (114, 34278), (119, 34335), (124, 34368), (140, 34569),

Gene: BigMama\_45 Start: 37116, Stop: 38225, Start Num: 25

Candidate Starts for BigMama\_45:

(Start: 25 @37116 has 20 MA's), (27, 37143), (31, 37167), (33, 37227), (34, 37239), (35, 37251), (47, 37332), (50, 37347), (63, 37425), (64, 37428), (65, 37431), (71, 37482), (76, 37512), (78, 37524), (83, 37554), (85, 37566), (91, 37635), (93, 37647), (101, 37701), (106, 37797), (108, 37815), (112, 37842), (115, 37857), (118, 37881), (119, 37911), (125, 37953), (131, 38001), (135, 38034), (141, 38160),

Gene: BiteSize\_42 Start: 33623, Stop: 34663, Start Num: 24

Candidate Starts for BiteSize\_42:

(3, 33350), (5, 33389), (Start: 24 @33623 has 9 MA's), (33, 33734), (49, 33848), (56, 33890), (62, 33926), (68, 33971), (77, 34025), (79, 34037), (84, 34067), (87, 34076), (89, 34118), (97, 34172), (100, 34202), (103, 34277), (114, 34364), (119, 34421), (124, 34454), (140, 34655),

Gene: Butterscotch\_46 Start: 37100, Stop: 38209, Start Num: 25

Candidate Starts for Butterscotch\_46:

(Start: 25 @37100 has 20 MA's), (27, 37127), (31, 37151), (33, 37211), (34, 37223), (35, 37235), (50, 37331), (63, 37409), (64, 37412), (65, 37415), (71, 37466), (76, 37496), (78, 37508), (83, 37538), (85, 37550), (91, 37619), (93, 37631), (101, 37685), (106, 37781), (108, 37799), (112, 37826), (115, 37841), (118, 37865), (119, 37895), (125, 37937), (131, 37985), (135, 38018), (141, 38144),

Gene: Chill\_49 Start: 37111, Stop: 38220, Start Num: 25

Candidate Starts for Chill\_49:

(10, 36949), (12, 36991), (Start: 25 @37111 has 20 MA's), (27, 37138), (31, 37162), (33, 37222), (34, 37234), (35, 37246), (47, 37327), (50, 37342), (63, 37420), (64, 37423), (65, 37426), (71, 37477), (76, 37507), (78, 37519), (83, 37549), (85, 37561), (91, 37630), (93, 37642), (101, 37696), (106, 37792), (108, 37810), (112, 37837), (115, 37852), (118, 37876), (119, 37906), (131, 37996), (135, 38029), (141, 38155),

Gene: Chivey\_61 Start: 45245, Stop: 46492, Start Num: 21

Candidate Starts for Chivey\_61:

(16, 45179), (Start: 21 @45245 has 25 MA's), (36, 45398), (43, 45458), (67, 45584), (69, 45599), (72, 45611), (79, 45659), (99, 45908), (104, 46007), (110, 46067), (115, 46088), (118, 46112), (121, 46151), (124, 46175), (125, 46184), (133, 46274), (134, 46286), (139, 46391), (142, 46436),

Gene: CoolCookie\_65 Start: 45826, Stop: 47073, Start Num: 21

Candidate Starts for CoolCookie\_65:

(16, 45760), (Start: 21 @45826 has 25 MA's), (36, 45979), (43, 46039), (67, 46165), (69, 46180), (72, 46192), (75, 46213), (79, 46240), (99, 46489), (110, 46648), (115, 46669), (118, 46693), (121, 46732), (124, 46756), (125, 46765), (133, 46855), (134, 46867), (139, 46972), (142, 47017),

Gene: Crestdrop\_62 Start: 45511, Stop: 46716, Start Num: 21

Candidate Starts for Crestdrop\_62:

(7, 45334), (9, 45364), (11, 45394), (16, 45445), (Start: 21 @45511 has 25 MA's), (36, 45664), (43, 45724), (67, 45850), (69, 45865), (70, 45868), (72, 45877), (97, 46105), (104, 46231), (110, 46291), (112, 46297), (113, 46306), (115, 46312), (118, 46336), (121, 46375), (124, 46399), (125, 46408), (133, 46498), (134, 46510), (139, 46615), (142, 46660),

Gene: Cybele\_60 Start: 45682, Stop: 47028, Start Num: 13

Candidate Starts for Cybele\_60:

(Start: 13 @45682 has 2 MA's), (16, 45712), (Start: 21 @45778 has 25 MA's), (36, 45934), (43, 45994), (69, 46135), (72, 46147), (75, 46168), (95, 46378), (99, 46444), (104, 46543), (110, 46603), (115, 46624), (118, 46648), (121, 46687), (124, 46711), (125, 46720), (133, 46810), (134, 46822), (139, 46927), (142, 46972),

Gene: DannyDe\_61 Start: 45246, Stop: 46493, Start Num: 21

Candidate Starts for DannyDe\_61:

(16, 45180), (Start: 21 @45246 has 25 MA's), (36, 45399), (43, 45459), (67, 45585), (69, 45600), (72, 45612), (79, 45660), (99, 45909), (104, 46008), (110, 46068), (115, 46089), (118, 46113), (121, 46152), (124, 46176), (125, 46185), (133, 46275), (134, 46287), (139, 46392), (142, 46437),

Gene: Dauntless\_60 Start: 45377, Stop: 46624, Start Num: 21

Candidate Starts for Dauntless\_60:

(16, 45311), (Start: 21 @45377 has 25 MA's), (36, 45530), (43, 45590), (67, 45716), (69, 45731), (72, 45743), (79, 45791), (99, 46040), (102, 46088), (110, 46199), (115, 46220), (118, 46244), (121, 46283), (124, 46307), (125, 46316), (133, 46406), (134, 46418), (139, 46523), (142, 46568),

Gene: Delton\_48 Start: 37324, Stop: 38433, Start Num: 25

Candidate Starts for Delton\_48:

(Start: 25 @37324 has 20 MA's), (27, 37351), (31, 37375), (33, 37435), (34, 37447), (35, 37459), (50, 37555), (63, 37633), (64, 37636), (65, 37639), (71, 37690), (76, 37720), (78, 37732), (83, 37762), (85, 37774), (91, 37843), (93, 37855), (101, 37909), (106, 38005), (108, 38023), (112, 38050), (115, 38065), (118, 38089), (119, 38119), (131, 38209), (135, 38242), (141, 38368),

Gene: Djokovic\_42 Start: 33536, Stop: 34576, Start Num: 24

Candidate Starts for Djokovic\_42:

(3, 33263), (5, 33302), (Start: 24 @33536 has 9 MA's), (33, 33647), (49, 33761), (56, 33803), (62, 33839), (68, 33884), (77, 33938), (79, 33950), (84, 33980), (87, 33989), (97, 34085), (100, 34115), (103, 34190), (114, 34277), (119, 34334), (124, 34367), (140, 34568),

Gene: Erk16\_46 Start: 37105, Stop: 38214, Start Num: 25

Candidate Starts for Erk16\_46:

(6, 36862), (8, 36913), (10, 36943), (Start: 25 @37105 has 20 MA's), (27, 37132), (31, 37156), (33, 37216), (34, 37228), (35, 37240), (47, 37321), (50, 37336), (63, 37414), (64, 37417), (65, 37420), (71, 37471), (76, 37501), (78, 37513), (83, 37543), (85, 37555), (91, 37624), (93, 37636), (101, 37690), (106, 37786), (108, 37804), (112, 37831), (115, 37846), (118, 37870), (119, 37900), (131, 37990), (135, 38023), (141, 38149),

Gene: Erudite\_59 Start: 45377, Stop: 46624, Start Num: 21

Candidate Starts for Erudite\_59:

(16, 45311), (Start: 21 @45377 has 25 MA's), (36, 45530), (43, 45590), (67, 45716), (69, 45731), (72, 45743), (79, 45791), (99, 46040), (102, 46088), (110, 46199), (115, 46220), (118, 46244), (121, 46283), (124, 46307), (125, 46316), (133, 46406), (134, 46418), (139, 46523), (142, 46568),

Gene: FreddieHg\_61 Start: 45262, Stop: 46509, Start Num: 21

Candidate Starts for FreddieHg\_61:

(16, 45196), (Start: 21 @45262 has 25 MA's), (36, 45415), (43, 45475), (67, 45601), (69, 45616), (72, 45628), (79, 45676), (99, 45925), (104, 46024), (110, 46084), (115, 46105), (118, 46129), (121, 46168), (124, 46192), (125, 46201), (133, 46291), (134, 46303), (139, 46408), (142, 46453),

Gene: Gilda\_60 Start: 45770, Stop: 47020, Start Num: 21

Candidate Starts for Gilda\_60:

(Start: 13 @45674 has 2 MA's), (16, 45704), (Start: 21 @45770 has 25 MA's), (36, 45926), (43, 45986), (69, 46127), (72, 46139), (75, 46160), (95, 46370), (99, 46436), (104, 46535), (110, 46595), (115, 46616), (118, 46640), (121, 46679), (124, 46703), (125, 46712), (133, 46802), (134, 46814), (139, 46919), (142, 46964),

Gene: Giuseppe\_47 Start: 37089, Stop: 38198, Start Num: 25

Candidate Starts for Giuseppe\_47:

(Start: 25 @37089 has 20 MA's), (27, 37116), (31, 37140), (33, 37200), (34, 37212), (35, 37224), (50, 37320), (63, 37398), (64, 37401), (65, 37404), (71, 37455), (76, 37485), (78, 37497), (83, 37527), (85, 37539), (91, 37608), (93, 37620), (101, 37674), (106, 37770), (108, 37788), (112, 37815), (115, 37830), (118, 37854), (119, 37884), (125, 37926), (131, 37974), (135, 38007), (141, 38133),

Gene: Gumball\_46 Start: 37264, Stop: 38373, Start Num: 25

Candidate Starts for Gumball\_46:

(Start: 25 @37264 has 20 MA's), (27, 37291), (31, 37315), (33, 37375), (34, 37387), (35, 37399), (47, 37480), (50, 37495), (63, 37573), (64, 37576), (65, 37579), (71, 37630), (76, 37660), (78, 37672), (83, 37702), (85, 37714), (91, 37783), (93, 37795), (101, 37849), (106, 37945), (108, 37963), (112, 37990), (115, 38005), (118, 38029), (119, 38059), (131, 38149), (135, 38182), (141, 38308),

Gene: Hager\_61 Start: 45161, Stop: 46411, Start Num: 21

Candidate Starts for Hager\_61:

(Start: 13 @45065 has 2 MA's), (16, 45095), (Start: 21 @45161 has 25 MA's), (43, 45377), (57, 45446), (67, 45503), (69, 45518), (72, 45530), (75, 45551), (94, 45749), (99, 45827), (110, 45986), (115, 46007), (118, 46031), (121, 46070), (124, 46094), (125, 46103), (133, 46193), (134, 46205), (139, 46310), (142, 46355),

Gene: Haunter\_60 Start: 45015, Stop: 46262, Start Num: 21

Candidate Starts for Haunter\_60:

(16, 44949), (Start: 21 @45015 has 25 MA's), (36, 45168), (43, 45228), (67, 45354), (69, 45369), (72, 45381), (75, 45402), (79, 45429), (99, 45678), (110, 45837), (115, 45858), (118, 45882), (121, 45921), (124, 45945), (125, 45954), (133, 46044), (134, 46056), (139, 46161), (142, 46206),

Gene: Hawkeye\_51 Start: 37216, Stop: 38304, Start Num: 23

Candidate Starts for Hawkeye\_51:

(19, 37168), (Start: 23 @37216 has 4 MA's), (31, 37270), (33, 37330), (34, 37342), (35, 37354), (38, 37402), (41, 37417), (53, 37465), (54, 37468), (58, 37492), (60, 37498), (66, 37540), (71, 37582), (73, 37588), (76, 37612), (107, 37885), (115, 37936), (135, 38113),

Gene: Helpful\_50 Start: 37299, Stop: 38408, Start Num: 25

Candidate Starts for Helpful\_50:

(Start: 25 @37299 has 20 MA's), (27, 37326), (31, 37350), (33, 37410), (34, 37422), (35, 37434), (50, 37530), (63, 37608), (64, 37611), (65, 37614), (71, 37665), (76, 37695), (78, 37707), (83, 37737), (85, 37749), (91, 37818), (93, 37830), (101, 37884), (106, 37980), (108, 37998), (112, 38025), (115, 38040), (118, 38064), (119, 38094), (131, 38184), (135, 38217), (141, 38343),

Gene: Hiddenleaf\_61 Start: 45245, Stop: 46492, Start Num: 21

Candidate Starts for Hiddenleaf\_61:

(16, 45179), (Start: 21 @45245 has 25 MA's), (36, 45398), (43, 45458), (67, 45584), (69, 45599), (72, 45611), (79, 45659), (99, 45908), (104, 46007), (110, 46067), (115, 46088), (118, 46112), (121, 46151), (124, 46175), (125, 46184), (133, 46274), (134, 46286), (139, 46391), (142, 46436),

Gene: JDawG\_59 Start: 45437, Stop: 46684, Start Num: 21

Candidate Starts for JDawG\_59:

(16, 45371), (Start: 21 @45437 has 25 MA's), (36, 45590), (43, 45650), (67, 45776), (69, 45791), (70, 45794), (72, 45803), (79, 45851), (99, 46100), (102, 46148), (110, 46259), (115, 46280), (118, 46304), (121, 46343), (124, 46367), (125, 46376), (133, 46466), (134, 46478), (139, 46583), (142, 46628),

Gene: JingleBells\_61 Start: 45351, Stop: 46598, Start Num: 21



Candidate Starts for JingleBells\_61:

(16, 45285), (Start: 21 @45351 has 25 MA's), (36, 45504), (43, 45564), (67, 45690), (69, 45705), (72, 45717), (79, 45765), (99, 46014), (102, 46062), (110, 46173), (115, 46194), (118, 46218), (121, 46257), (124, 46281), (125, 46290), (133, 46380), (134, 46392), (139, 46497), (142, 46542),

Gene: KandZ\_46 Start: 37198, Stop: 38307, Start Num: 25

Candidate Starts for KandZ\_46:

(Start: 25 @37198 has 20 MA's), (27, 37225), (31, 37249), (33, 37309), (34, 37321), (35, 37333), (50, 37429), (63, 37507), (64, 37510), (65, 37513), (71, 37564), (76, 37594), (78, 37606), (83, 37636), (85, 37648), (91, 37717), (93, 37729), (101, 37783), (106, 37879), (108, 37897), (112, 37924), (115, 37939), (118, 37963), (119, 37993), (131, 38083), (135, 38116), (141, 38242),

Gene: Karate\_59 Start: 45490, Stop: 46836, Start Num: 13

Candidate Starts for Karate\_59:

(Start: 13 @45490 has 2 MA's), (16, 45520), (Start: 21 @45586 has 25 MA's), (36, 45742), (43, 45802), (67, 45928), (69, 45943), (72, 45955), (75, 45976), (99, 46252), (104, 46351), (110, 46411), (115, 46432), (118, 46456), (121, 46495), (124, 46519), (125, 46528), (133, 46618), (134, 46630), (139, 46735), (142, 46780),

Gene: Kate\_60 Start: 45687, Stop: 46937, Start Num: 21

Candidate Starts for Kate\_60:

(Start: 21 @45687 has 25 MA's), (36, 45843), (43, 45903), (69, 46044), (72, 46056), (75, 46077), (95, 46287), (99, 46353), (104, 46452), (110, 46512), (115, 46533), (118, 46557), (121, 46596), (124, 46620), (125, 46629), (133, 46719), (134, 46731), (139, 46836), (142, 46881),

Gene: Kors\_68 Start: 46449, Stop: 47630, Start Num: 21

Candidate Starts for Kors\_68:

(14, 46353), (18, 46401), (Start: 21 @46449 has 25 MA's), (26, 46479), (57, 46728), (68, 46794), (69, 46800), (70, 46803), (72, 46812), (84, 46890), (86, 46896), (96, 47013), (110, 47202), (115, 47223), (118, 47247), (124, 47310), (133, 47409), (134, 47421),

Gene: Krampus\_60 Start: 45783, Stop: 47033, Start Num: 21

Candidate Starts for Krampus\_60:

(Start: 13 @45687 has 2 MA's), (16, 45717), (Start: 21 @45783 has 25 MA's), (36, 45939), (43, 45999), (69, 46140), (72, 46152), (75, 46173), (95, 46383), (99, 46449), (104, 46548), (110, 46608), (115, 46629), (118, 46653), (121, 46692), (124, 46716), (125, 46725), (133, 46815), (134, 46827), (139, 46932), (142, 46977),

Gene: Leopard\_56 Start: 42125, Stop: 43231, Start Num: 23

Candidate Starts for Leopard\_56:

(17, 42053), (Start: 23 @42125 has 4 MA's), (26, 42143), (28, 42155), (29, 42161), (33, 42236), (34, 42248), (35, 42260), (39, 42311), (45, 42341), (48, 42350), (50, 42359), (51, 42362), (64, 42455), (67, 42485), (73, 42515), (80, 42569), (83, 42581), (92, 42662), (98, 42695), (105, 42815), (117, 42890), (120, 42935), (122, 42947), (132, 43019),

Gene: LilyPad\_46 Start: 35050, Stop: 36075, Start Num: 24

Candidate Starts for LilyPad\_46:

(Start: 24 @35050 has 9 MA's), (26, 35068), (33, 35161), (36, 35188), (62, 35353), (71, 35413), (77, 35452), (79, 35464), (80, 35473), (87, 35503), (103, 35704), (114, 35782), (116, 35791), (119, 35839), (123, 35860), (137, 36034),

Gene: LittleFella\_52 Start: 36883, Stop: 37914, Start Num: 24

Candidate Starts for LittleFella\_52:

(20, 36865), (Start: 24 @36883 has 9 MA's), (30, 36922), (32, 36991), (33, 36994), (40, 37069), (44, 37090), (46, 37099), (61, 37174), (81, 37291), (82, 37294), (87, 37318), (88, 37348), (90, 37369), (109, 37567), (111, 37582), (119, 37657), (123, 37678), (125, 37699), (128, 37735), (129, 37744), (136, 37861),

Gene: Madi\_42 Start: 33614, Stop: 34654, Start Num: 24

Candidate Starts for Madi\_42:

(3, 33341), (5, 33380), (Start: 24 @33614 has 9 MA's), (33, 33725), (49, 33839), (56, 33881), (62, 33917), (68, 33962), (77, 34016), (79, 34028), (84, 34058), (87, 34067), (89, 34109), (97, 34163), (100, 34193), (103, 34268), (114, 34355), (119, 34412), (124, 34445), (130, 34508), (140, 34646),

Gene: Mopey\_48 Start: 37100, Stop: 38209, Start Num: 25

Candidate Starts for Mopey\_48:

(Start: 25 @37100 has 20 MA's), (27, 37127), (31, 37151), (33, 37211), (34, 37223), (35, 37235), (50, 37331), (63, 37409), (64, 37412), (65, 37415), (71, 37466), (76, 37496), (78, 37508), (83, 37538), (85, 37550), (91, 37619), (93, 37631), (101, 37685), (106, 37781), (108, 37799), (112, 37826), (115, 37841), (118, 37865), (119, 37895), (125, 37937), (131, 37985), (135, 38018), (141, 38144),

Gene: MortySmith\_58 Start: 44851, Stop: 46098, Start Num: 21

Candidate Starts for MortySmith\_58:

(16, 44785), (Start: 21 @44851 has 25 MA's), (36, 45004), (43, 45064), (67, 45190), (69, 45205), (72, 45217), (79, 45265), (99, 45514), (102, 45562), (110, 45673), (115, 45694), (118, 45718), (121, 45757), (124, 45781), (125, 45790), (133, 45880), (134, 45892), (139, 45997), (142, 46042),

Gene: NarutoRun\_60 Start: 45748, Stop: 46998, Start Num: 21

Candidate Starts for NarutoRun\_60:

(Start: 13 @45652 has 2 MA's), (16, 45682), (Start: 21 @45748 has 25 MA's), (36, 45904), (43, 45964), (69, 46105), (72, 46117), (75, 46138), (95, 46348), (99, 46414), (104, 46513), (110, 46573), (115, 46594), (118, 46618), (121, 46657), (124, 46681), (125, 46690), (133, 46780), (134, 46792), (139, 46897), (142, 46942),

Gene: Neptune\_60 Start: 45778, Stop: 47028, Start Num: 21

Candidate Starts for Neptune\_60:

(Start: 13 @45682 has 2 MA's), (16, 45712), (Start: 21 @45778 has 25 MA's), (36, 45934), (43, 45994), (69, 46135), (72, 46147), (75, 46168), (95, 46378), (99, 46444), (104, 46543), (110, 46603), (115, 46624), (118, 46648), (121, 46687), (124, 46711), (125, 46720), (133, 46810), (134, 46822), (139, 46927), (142, 46972),

Gene: Nova\_46 Start: 37524, Stop: 38633, Start Num: 25

Candidate Starts for Nova\_46:

(Start: 25 @37524 has 20 MA's), (27, 37551), (31, 37575), (33, 37635), (34, 37647), (35, 37659), (47, 37740), (50, 37755), (63, 37833), (64, 37836), (65, 37839), (71, 37890), (76, 37920), (78, 37932), (83, 37962), (85, 37974), (91, 38043), (93, 38055), (101, 38109), (106, 38205), (108, 38223), (112, 38250), (115, 38265), (118, 38289), (119, 38319), (131, 38409), (135, 38442),

Gene: Onyinye\_57 Start: 42007, Stop: 43113, Start Num: 23

Candidate Starts for Onyinye\_57:

(17, 41935), (Start: 23 @42007 has 4 MA's), (26, 42025), (28, 42037), (29, 42043), (33, 42118), (34, 42130), (35, 42142), (39, 42193), (45, 42223), (48, 42232), (50, 42241), (51, 42244), (64, 42337), (67, 42367), (73, 42397), (74, 42403), (80, 42451), (83, 42463), (92, 42544), (98, 42577), (105, 42697), (117, 42772), (120, 42817), (122, 42829), (132, 42901),

Gene: OverHedge\_60 Start: 45644, Stop: 46894, Start Num: 21

Candidate Starts for OverHedge\_60:

(Start: 13 @45548 has 2 MA's), (16, 45578), (Start: 21 @45644 has 25 MA's), (36, 45800), (37, 45839), (43, 45860), (69, 46001), (72, 46013), (75, 46034), (95, 46244), (99, 46310), (104, 46409), (110, 46469), (115, 46490), (118, 46514), (121, 46553), (124, 46577), (125, 46586), (133, 46676), (134, 46688), (139, 46793), (142, 46838),

Gene: PBI1\_45 Start: 37031, Stop: 38140, Start Num: 25

Candidate Starts for PBI1\_45:

(Start: 25 @37031 has 20 MA's), (27, 37058), (31, 37082), (33, 37142), (34, 37154), (35, 37166), (50, 37262), (63, 37340), (64, 37343), (65, 37346), (71, 37397), (76, 37427), (78, 37439), (83, 37469), (85, 37481), (91, 37550), (93, 37562), (101, 37616), (106, 37712), (108, 37730), (112, 37757), (115, 37772), (118, 37796), (119, 37826), (125, 37868), (131, 37916), (135, 37949), (141, 38075),

Gene: PLOT\_47 Start: 37097, Stop: 38206, Start Num: 25

Candidate Starts for PLOT\_47:

(10, 36935), (12, 36977), (Start: 25 @37097 has 20 MA's), (27, 37124), (31, 37148), (33, 37208), (34, 37220), (35, 37232), (47, 37313), (50, 37328), (63, 37406), (64, 37409), (65, 37412), (71, 37463), (76, 37493), (78, 37505), (83, 37535), (85, 37547), (91, 37616), (93, 37628), (101, 37682), (106, 37778), (112, 37823), (115, 37838), (118, 37862), (119, 37892), (131, 37982), (135, 38015), (141, 38141),

Gene: Penelope2018\_47 Start: 37100, Stop: 38209, Start Num: 25

Candidate Starts for Penelope2018\_47:

(Start: 25 @37100 has 20 MA's), (27, 37127), (31, 37151), (33, 37211), (34, 37223), (35, 37235), (50, 37331), (63, 37409), (64, 37412), (65, 37415), (71, 37466), (76, 37496), (78, 37508), (83, 37538), (85, 37550), (91, 37619), (93, 37631), (101, 37685), (106, 37781), (108, 37799), (112, 37826), (115, 37841), (118, 37865), (119, 37895), (131, 37985), (135, 38018), (141, 38144),

Gene: Pharpay\_59 Start: 45793, Stop: 47043, Start Num: 21

Candidate Starts for Pharpay\_59:

(Start: 13 @45697 has 2 MA's), (16, 45727), (Start: 21 @45793 has 25 MA's), (36, 45949), (43, 46009), (69, 46150), (72, 46162), (75, 46183), (95, 46393), (99, 46459), (104, 46558), (110, 46618), (115, 46639), (118, 46663), (121, 46702), (124, 46726), (125, 46735), (133, 46825), (134, 46837), (139, 46942), (142, 46987),

Gene: PhunaPhoke\_60 Start: 45763, Stop: 47013, Start Num: 21

Candidate Starts for PhunaPhoke\_60:

(Start: 13 @45667 has 2 MA's), (16, 45697), (Start: 21 @45763 has 25 MA's), (36, 45919), (43, 45979), (69, 46120), (72, 46132), (75, 46153), (95, 46363), (99, 46429), (104, 46528), (110, 46588), (115, 46609), (118, 46633), (121, 46672), (124, 46696), (125, 46705), (133, 46795), (134, 46807), (139, 46912), (142, 46957),

Gene: Potty\_59 Start: 45693, Stop: 46943, Start Num: 21

Candidate Starts for Potty\_59:

(Start: 13 @45597 has 2 MA's), (16, 45627), (Start: 21 @45693 has 25 MA's), (36, 45849), (43, 45909), (69, 46050), (72, 46062), (75, 46083), (95, 46293), (99, 46359), (104, 46458), (110, 46518), (115, 46539), (118, 46563), (121, 46602), (124, 46626), (125, 46635), (133, 46725), (134, 46737), (139, 46842), (142, 46887),

Gene: Poultruss\_60 Start: 45990, Stop: 47240, Start Num: 21

Candidate Starts for Poultruss\_60:

(Start: 13 @45894 has 2 MA's), (16, 45924), (Start: 21 @45990 has 25 MA's), (36, 46146), (43, 46206), (67, 46332), (69, 46347), (72, 46359), (75, 46380), (95, 46590), (99, 46656), (104, 46755), (110, 46815), (115, 46836), (118, 46860), (121, 46899), (124, 46923), (125, 46932), (133, 47022),

(134, 47034), (139, 47139), (142, 47184),

Gene: Prager\_47 Start: 37120, Stop: 38229, Start Num: 25

Candidate Starts for Prager\_47:

(Start: 25 @37120 has 20 MA's), (27, 37147), (31, 37171), (33, 37231), (34, 37243), (35, 37255), (50, 37351), (63, 37429), (64, 37432), (65, 37435), (71, 37486), (76, 37516), (78, 37528), (83, 37558), (85, 37570), (91, 37639), (93, 37651), (101, 37705), (106, 37801), (108, 37819), (112, 37846), (115, 37861), (118, 37885), (119, 37915), (125, 37957), (131, 38005), (135, 38038), (141, 38164),

Gene: Rachella\_60 Start: 45774, Stop: 47024, Start Num: 21

Candidate Starts for Rachella\_60:

(Start: 13 @45678 has 2 MA's), (16, 45708), (Start: 21 @45774 has 25 MA's), (36, 45930), (43, 45990), (69, 46131), (72, 46143), (75, 46164), (95, 46374), (99, 46440), (104, 46539), (110, 46599), (115, 46620), (118, 46644), (121, 46683), (124, 46707), (125, 46716), (133, 46806), (134, 46818), (139, 46923), (142, 46968),

Gene: Rie18\_60 Start: 45575, Stop: 46825, Start Num: 21

Candidate Starts for Rie18\_60:

(16, 45509), (Start: 21 @45575 has 25 MA's), (43, 45791), (67, 45917), (69, 45932), (72, 45944), (75, 45965), (88, 46061), (94, 46163), (110, 46400), (115, 46421), (118, 46445), (121, 46484), (124, 46508), (125, 46517), (133, 46607), (134, 46619), (142, 46769),

Gene: RikSengupta\_67 Start: 46477, Stop: 47658, Start Num: 21

Candidate Starts for RikSengupta\_67:

(14, 46381), (18, 46429), (Start: 21 @46477 has 25 MA's), (26, 46507), (57, 46756), (68, 46822), (69, 46828), (70, 46831), (72, 46840), (76, 46867), (84, 46918), (86, 46924), (110, 47230), (115, 47251), (118, 47275), (124, 47338), (133, 47437), (134, 47449),

Gene: Sienna\_42 Start: 33614, Stop: 34654, Start Num: 24

Candidate Starts for Sienna\_42:

(3, 33341), (5, 33380), (Start: 24 @33614 has 9 MA's), (33, 33725), (49, 33839), (56, 33881), (62, 33917), (68, 33962), (77, 34016), (79, 34028), (84, 34058), (87, 34067), (89, 34109), (97, 34163), (100, 34193), (103, 34268), (114, 34355), (119, 34412), (124, 34445), (140, 34646),

Gene: SirHarley\_48 Start: 37246, Stop: 38355, Start Num: 25

Candidate Starts for SirHarley\_48:

(Start: 25 @37246 has 20 MA's), (27, 37273), (31, 37297), (33, 37357), (34, 37369), (35, 37381), (47, 37462), (50, 37477), (63, 37555), (64, 37558), (65, 37561), (71, 37612), (76, 37642), (78, 37654), (83, 37684), (85, 37696), (91, 37765), (93, 37777), (101, 37831), (106, 37927), (108, 37945), (112, 37972), (115, 37987), (118, 38011), (119, 38041), (131, 38131), (135, 38164), (141, 38290),

Gene: Snakehole\_61 Start: 45188, Stop: 46438, Start Num: 21

Candidate Starts for Snakehole\_61:

(Start: 13 @45092 has 2 MA's), (16, 45122), (Start: 21 @45188 has 25 MA's), (36, 45344), (43, 45404), (67, 45530), (69, 45545), (70, 45548), (72, 45557), (79, 45605), (99, 45854), (102, 45902), (110, 46013), (115, 46034), (118, 46058), (121, 46097), (124, 46121), (125, 46130), (133, 46220), (134, 46232), (139, 46337), (142, 46382),

Gene: Sparcetus\_67 Start: 46354, Stop: 47535, Start Num: 21

Candidate Starts for Sparcetus\_67:

(14, 46258), (18, 46306), (Start: 21 @46354 has 25 MA's), (26, 46384), (57, 46633), (68, 46699), (69, 46705), (70, 46708), (72, 46717), (76, 46744), (84, 46795), (86, 46801), (110, 47107), (115, 47128), (118, 47152), (124, 47215), (133, 47314), (134, 47326),

Gene: Suzy\_42 Start: 34129, Stop: 35169, Start Num: 24

Candidate Starts for Suzy\_42:

(1, 33565), (2, 33670), (4, 33862), (Start: 24 @34129 has 9 MA's), (33, 34240), (36, 34267), (42, 34330), (56, 34396), (62, 34432), (68, 34477), (77, 34531), (79, 34543), (84, 34573), (87, 34582), (89, 34624), (100, 34708), (103, 34783), (114, 34870), (119, 34927), (124, 34960),

Gene: Tedro\_60 Start: 45233, Stop: 46480, Start Num: 21

Candidate Starts for Tedro\_60:

(16, 45167), (Start: 21 @45233 has 25 MA's), (36, 45386), (43, 45446), (67, 45572), (69, 45587), (72, 45599), (75, 45620), (79, 45647), (99, 45896), (104, 45995), (110, 46055), (115, 46076), (118, 46100), (121, 46139), (124, 46163), (125, 46172), (133, 46262), (134, 46274), (139, 46379), (142, 46424),

Gene: Terapin\_43 Start: 33538, Stop: 34578, Start Num: 24

Candidate Starts for Terapin\_43:

(3, 33265), (5, 33304), (Start: 24 @33538 has 9 MA's), (33, 33649), (49, 33763), (56, 33805), (62, 33841), (68, 33886), (77, 33940), (79, 33952), (84, 33982), (87, 33991), (97, 34087), (100, 34117), (103, 34192), (114, 34279), (119, 34336), (124, 34369), (140, 34570),

Gene: Thoth\_47 Start: 37098, Stop: 38207, Start Num: 25

Candidate Starts for Thoth\_47:

(Start: 25 @37098 has 20 MA's), (27, 37125), (31, 37149), (33, 37209), (34, 37221), (35, 37233), (47, 37314), (50, 37329), (63, 37407), (64, 37410), (65, 37413), (71, 37464), (76, 37494), (78, 37506), (83, 37536), (85, 37548), (91, 37617), (93, 37629), (101, 37683), (106, 37779), (108, 37797), (112, 37824), (115, 37839), (118, 37863), (119, 37893), (125, 37935), (131, 37983), (135, 38016), (141, 38142),

Gene: TinyMiny\_67 Start: 46380, Stop: 47561, Start Num: 21

Candidate Starts for TinyMiny\_67:

(14, 46284), (15, 46305), (18, 46332), (Start: 21 @46380 has 25 MA's), (26, 46410), (59, 46662), (69, 46731), (72, 46743), (84, 46821), (86, 46827), (100, 46992), (104, 47073), (110, 47133), (115, 47154), (118, 47178), (124, 47241), (127, 47277), (133, 47340), (134, 47352),

Gene: Troll4\_47 Start: 37101, Stop: 38210, Start Num: 25

Candidate Starts for Troll4\_47:

(10, 36939), (Start: 25 @37101 has 20 MA's), (27, 37128), (31, 37152), (33, 37212), (34, 37224), (35, 37236), (50, 37332), (63, 37410), (64, 37413), (65, 37416), (71, 37467), (76, 37497), (78, 37509), (83, 37539), (85, 37551), (91, 37620), (93, 37632), (101, 37686), (106, 37782), (108, 37800), (112, 37827), (115, 37842), (118, 37866), (119, 37896), (131, 37986), (135, 38019), (141, 38145),

Gene: Visconti\_48 Start: 37110, Stop: 38219, Start Num: 25

Candidate Starts for Visconti\_48:

(Start: 25 @37110 has 20 MA's), (27, 37137), (31, 37161), (33, 37221), (34, 37233), (35, 37245), (50, 37341), (63, 37419), (64, 37422), (65, 37425), (71, 37476), (76, 37506), (78, 37518), (83, 37548), (85, 37560), (91, 37629), (93, 37641), (101, 37695), (106, 37791), (108, 37809), (112, 37836), (115, 37851), (118, 37875), (119, 37905), (125, 37947), (131, 37995), (135, 38028), (141, 38154),

Gene: WaldoWhy\_49 Start: 37111, Stop: 38220, Start Num: 25

Candidate Starts for WaldoWhy\_49:

(10, 36949), (12, 36991), (Start: 25 @37111 has 20 MA's), (27, 37138), (31, 37162), (33, 37222), (34, 37234), (35, 37246), (47, 37327), (50, 37342), (63, 37420), (64, 37423), (65, 37426), (71, 37477), (76, 37507), (78, 37519), (83, 37549), (85, 37561), (91, 37630), (93, 37642), (101, 37696), (106, 37792), (108, 37810), (112, 37837), (115, 37852), (118, 37876), (119, 37906), (131, 37996), (135, 38029), (141, 38155),

Gene: Wollypog\_37 Start: 28129, Stop: 29247, Start Num: 22

Candidate Starts for Wollypog\_37:

(15, 28045), (16, 28051), (Start: 22 @28129 has 1 MA's), (33, 28240), (41, 28327), (47, 28345), (51, 28363), (52, 28372), (55, 28384), (67, 28465), (69, 28480), (70, 28483), (100, 28669), (102, 28699), (123, 28906), (126, 28948), (133, 29026), (134, 29038), (138, 29134),