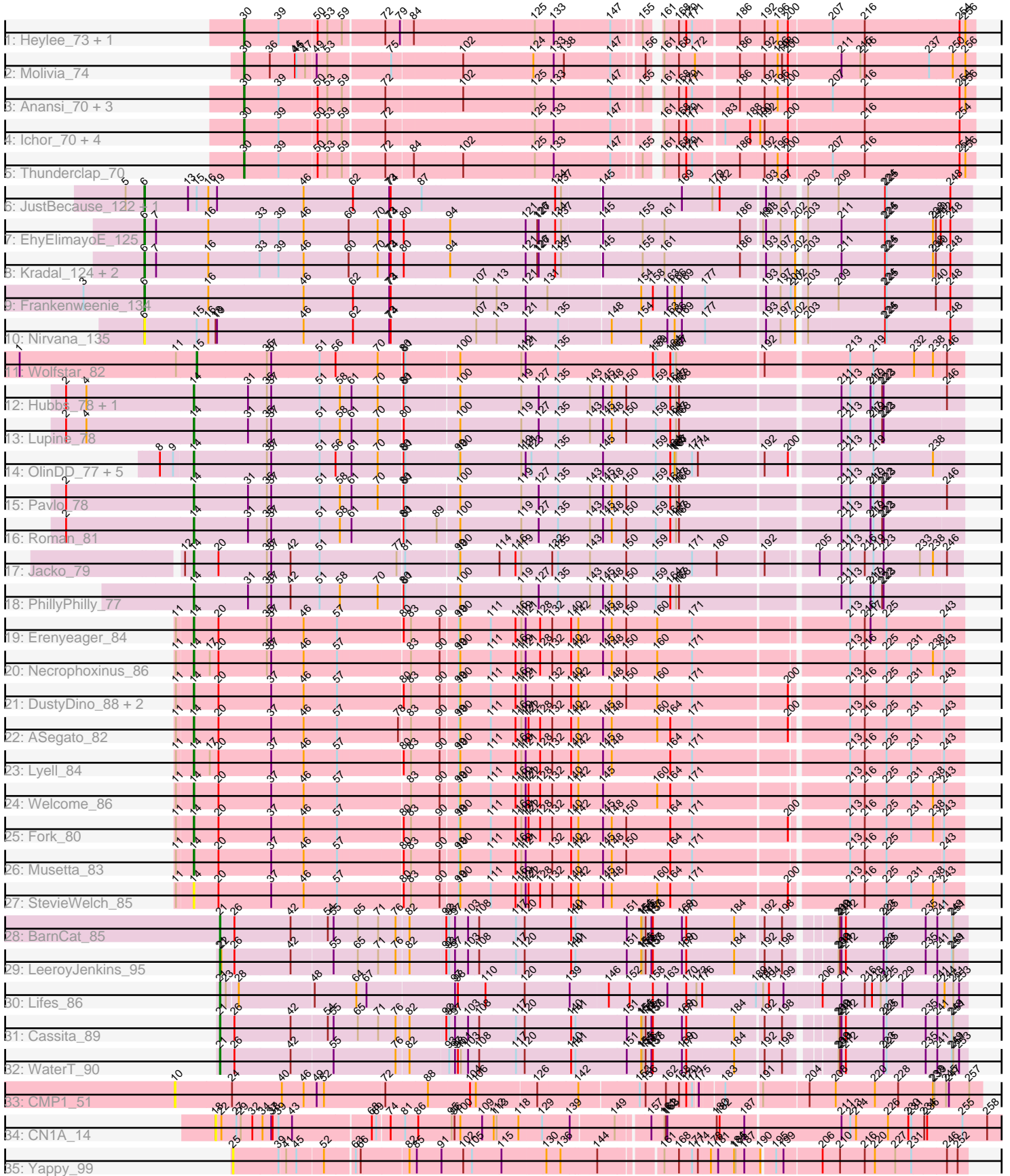


Pham 196583



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 196583 Report

This analysis was run 12/09/24 on database version 580.

WARNING: Pham size does not match number of genes in report. Either unphamerated genes have been added (by you) or starterator has removed genes due to invalid start codon.

Pham number 196583 has 54 members, 5 are drafts.

Phages represented in each track:

- Track 1 : Heylee\_73, Amavida\_72
- Track 2 : Molivia\_74
- Track 3 : Anansi\_70, SorJuana\_70, Rings\_71, Gorgeous\_70
- Track 4 : Ichor\_70, Jaek\_70, Yeezus\_70, Amigo\_71, Boersma\_73
- Track 5 : Thunderclap\_70
- Track 6 : JustBecause\_122, Kela\_123
- Track 7 : EhyElimayoE\_125
- Track 8 : Kradal\_124, Satis\_124, Quantum\_123
- Track 9 : Frankenweenie\_134
- Track 10 : Nirvana\_135
- Track 11 : Wolfstar\_82
- Track 12 : Hubbs\_78, DejaVu\_80
- Track 13 : Lupine\_78
- Track 14 : OlinDD\_77, Hortus1\_77, Pioneer3\_77, Tandem\_77, Alleb\_76, Platte\_76
- Track 15 : Pavlo\_78
- Track 16 : Roman\_81
- Track 17 : Jacko\_79
- Track 18 : PhillyPhilly\_77
- Track 19 : Erenyeager\_84
- Track 20 : Necrophoxinus\_86
- Track 21 : DustyDino\_88, Yuma\_83, RunningBrook\_86
- Track 22 : ASegato\_82
- Track 23 : Lyell\_84
- Track 24 : Welcome\_86
- Track 25 : Fork\_80
- Track 26 : Musetta\_83
- Track 27 : StevieWelch\_85
- Track 28 : BarnCat\_85
- Track 29 : LeeroyJenkins\_95
- Track 30 : Lifes\_86
- Track 31 : Cassita\_89
- Track 32 : WaterT\_90
- Track 33 : CMP1\_51

- Track 34 : CN1A\_14
- Track 35 : Yappy\_99

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

The start number called the most often in the published annotations is 14, it was called in 23 of the 49 non-draft genes in the pham.

Genes that call this "Most Annotated" start:

- ASegato\_82, Alleb\_76, DejaVu\_80, DustyDino\_88, Erenyeager\_84, Fork\_80, Hortus1\_77, Hubbs\_78, Jacko\_79, Lupine\_78, Lyell\_84, Musetta\_83, Necrophoxinus\_86, OlinDD\_77, Pavlo\_78, PhillyPhilly\_77, Pioneer3\_77, Platte\_76, Roman\_81, RunningBrook\_86, StevieWelch\_85, Tandem\_77, Welcome\_86, Yuma\_83,

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

- 

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

- Amavida\_72, Amigo\_71, Anansi\_70, BarnCat\_85, Boersma\_73, CMP1\_51, CN1A\_14, Cassita\_89, EhyElimayoE\_125, Frankenweenie\_134, Gorgeous\_70, Heylee\_73, Ichor\_70, Jaek\_70, JustBecause\_122, Kela\_123, Kradal\_124, LeeroyJenkins\_95, Lifes\_86, Molivia\_74, Nirvana\_135, Quantum\_123, Rings\_71, Satis\_124, SorJuana\_70, Thunderclap\_70, WaterT\_90, Wolfstar\_82, Yappy\_99, Yeezus\_70,

**Summary by start number:**

Start 6:

- Found in 8 of 54 ( 14.8% ) of genes in pham
- Manual Annotations of this start: 7 of 49
- Called 100.0% of time when present
- Phage (with cluster) where this start called: EhyElimayoE\_125 (BM), Frankenweenie\_134 (BM), JustBecause\_122 (BM), Kela\_123 (BM), Kradal\_124 (BM), Nirvana\_135 (BM), Quantum\_123 (BM), Satis\_124 (BM),

Start 10:

- Found in 1 of 54 ( 1.9% ) of genes in pham
- No Manual Annotations of this start.
- Called 100.0% of time when present
- Phage (with cluster) where this start called: CMP1\_51 (singleton),

Start 14:

- Found in 24 of 54 ( 44.4% ) of genes in pham
- Manual Annotations of this start: 23 of 49
- Called 100.0% of time when present
- Phage (with cluster) where this start called: ASegato\_82 (ED2), Alleb\_76 (ED1), DejaVu\_80 (ED1), DustyDino\_88 (ED2), Erenyeager\_84 (ED2), Fork\_80 (ED2), Hortus1\_77 (ED1), Hubbs\_78 (ED1), Jacko\_79 (ED1), Lupine\_78 (ED1), Lyell\_84 (ED2), Musetta\_83 (ED2), Necrophoxinus\_86 (ED2), OlinDD\_77 (ED1), Pavlo\_78

(ED1), PhillyPhilly\_77 (ED1), Pioneer3\_77 (ED1), Platte\_76 (ED1), Roman\_81 (ED1), RunningBrook\_86 (ED2), StevieWelch\_85 (ED2), Tandem\_77 (ED1), Welcome\_86 (ED2), Yuma\_83 (ED2),

Start 15:

- Found in 4 of 54 ( 7.4% ) of genes in pham
- Manual Annotations of this start: 1 of 49
- Called 25.0% of time when present
- Phage (with cluster) where this start called: Wolfstar\_82 (ED),

Start 18:

- Found in 2 of 54 ( 3.7% ) of genes in pham
- No Manual Annotations of this start.
- Called 50.0% of time when present
- Phage (with cluster) where this start called: CN1A\_14 (singleton),

Start 21:

- Found in 5 of 54 ( 9.3% ) of genes in pham
- Manual Annotations of this start: 5 of 49
- Called 100.0% of time when present
- Phage (with cluster) where this start called: BarnCat\_85 (GB), Cassita\_89 (GB), LeeroyJenkins\_95 (GB), Lifes\_86 (GB), WaterT\_90 (GB),

Start 25:

- Found in 1 of 54 ( 1.9% ) of genes in pham
- No Manual Annotations of this start.
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Yappy\_99 (singleton),

Start 30:

- Found in 13 of 54 ( 24.1% ) of genes in pham
- Manual Annotations of this start: 13 of 49
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Amavida\_72 (AQ), Amigo\_71 (AQ), Anansi\_70 (AQ), Boersma\_73 (AQ), Gorgeous\_70 (AQ), Heylee\_73 (AQ), Ichor\_70 (AQ), Jaek\_70 (AQ), Molivia\_74 (AQ), Rings\_71 (AQ), SorJuana\_70 (AQ), Thunderclap\_70 (AQ), Yeezus\_70 (AQ),

### **Summary by clusters:**

There are 7 clusters represented in this pham: AQ, singleton, BM, ED2, ED1, GB, ED,

Info for manual annotations of cluster AQ:

- Start number 30 was manually annotated 13 times for cluster AQ.

Info for manual annotations of cluster BM:

- Start number 6 was manually annotated 7 times for cluster BM.

Info for manual annotations of cluster ED:

- Start number 15 was manually annotated 1 time for cluster ED.

Info for manual annotations of cluster ED1:

- Start number 14 was manually annotated 13 times for cluster ED1.

Info for manual annotations of cluster ED2:

- Start number 14 was manually annotated 10 times for cluster ED2.

Info for manual annotations of cluster GB:

- Start number 21 was manually annotated 5 times for cluster GB.

### **Gene Information:**

Gene: ASegato\_82 Start: 49650, Stop: 48130, Start Num: 14

Candidate Starts for ASegato\_82:

(11, 49683), (Start: 14 @49650 has 23 MA's), (20, 49599), (37, 49491), (46, 49425), (57, 49359), (78, 49242), (83, 49221), (90, 49164), (99, 49131), (100, 49128), (111, 49065), (116, 49014), (119, 49005), (121, 48996), (122, 48990), (128, 48966), (132, 48942), (140, 48903), (142, 48888), (145, 48837), (148, 48819), (160, 48726), (164, 48699), (171, 48654), (200, 48468), (213, 48360), (216, 48330), (225, 48285), (231, 48234), (243, 48171),

Gene: Alleb\_76 Start: 48902, Stop: 47379, Start Num: 14

Candidate Starts for Alleb\_76:

(8, 48968), (9, 48941), (Start: 14 @48902 has 23 MA's), (35, 48752), (37, 48743), (51, 48647), (56, 48614), (61, 48587), (70, 48533), (80, 48488), (81, 48485), (99, 48380), (100, 48377), (119, 48254), (121, 48245), (123, 48233), (135, 48179), (145, 48086), (159, 47978), (164, 47948), (165, 47942), (166, 47939), (167, 47936), (171, 47903), (174, 47891), (192, 47765), (200, 47717), (211, 47627), (213, 47609), (219, 47561), (238, 47438),

Gene: Amavida\_72 Start: 47198, Stop: 45804, Start Num: 30

Candidate Starts for Amavida\_72:

(Start: 30 @47198 has 13 MA's), (39, 47129), (50, 47054), (53, 47036), (59, 47006), (72, 46925), (79, 46895), (84, 46871), (125, 46631), (133, 46592), (147, 46478), (155, 46427), (161, 46406), (168, 46376), (170, 46361), (171, 46349), (186, 46268), (192, 46220), (196, 46193), (200, 46172), (207, 46088), (216, 46022), (254, 45833), (256, 45821),

Gene: Amigo\_71 Start: 47416, Stop: 46022, Start Num: 30

Candidate Starts for Amigo\_71:

(Start: 30 @47416 has 13 MA's), (39, 47347), (50, 47272), (53, 47254), (59, 47224), (72, 47143), (125, 46849), (133, 46810), (147, 46696), (161, 46624), (168, 46594), (170, 46579), (171, 46567), (183, 46516), (188, 46465), (190, 46447), (192, 46438), (200, 46390), (216, 46240), (254, 46051),

Gene: Anansi\_70 Start: 47020, Stop: 45626, Start Num: 30

Candidate Starts for Anansi\_70:

(Start: 30 @47020 has 13 MA's), (39, 46951), (50, 46876), (53, 46858), (59, 46828), (72, 46747), (102, 46597), (125, 46453), (133, 46414), (147, 46300), (155, 46249), (161, 46228), (168, 46198), (170, 46183), (171, 46171), (186, 46090), (192, 46042), (196, 46015), (200, 45994), (207, 45910), (216, 45844), (254, 45655), (256, 45643),

Gene: BarnCat\_85 Start: 49027, Stop: 47570, Start Num: 21

Candidate Starts for BarnCat\_85:

(Start: 21 @49027 has 5 MA's), (26, 48997), (42, 48883), (54, 48811), (55, 48799), (65, 48751), (71, 48709), (76, 48673), (82, 48649), (92, 48577), (93, 48571), (97, 48559), (103, 48532), (108, 48511), (117, 48436), (120, 48418), (140, 48322), (141, 48313), (151, 48208), (154, 48178), (155, 48175),

(156, 48169), (157, 48157), (158, 48154), (169, 48094), (170, 48085), (184, 47995), (192, 47941), (198, 47905), (209, 47824), (210, 47821), (211, 47818), (212, 47809), (223, 47731), (225, 47725), (235, 47647), (241, 47626), (249, 47599), (251, 47596),

Gene: Boersma\_73 Start: 47416, Stop: 46022, Start Num: 30

Candidate Starts for Boersma\_73:

(Start: 30 @47416 has 13 MA's), (39, 47347), (50, 47272), (53, 47254), (59, 47224), (72, 47143), (125, 46849), (133, 46810), (147, 46696), (161, 46624), (168, 46594), (170, 46579), (171, 46567), (183, 46516), (188, 46465), (190, 46447), (192, 46438), (200, 46390), (216, 46240), (254, 46051),

Gene: CMP1\_51 Start: 48836, Stop: 47235, Start Num: 10

Candidate Starts for CMP1\_51:

(10, 48836), (24, 48719), (40, 48617), (46, 48572), (49, 48548), (52, 48533), (72, 48410), (88, 48326), (104, 48242), (106, 48230), (126, 48110), (142, 48029), (153, 47909), (156, 47897), (162, 47855), (168, 47828), (170, 47813), (171, 47801), (175, 47792), (183, 47747), (191, 47681), (204, 47591), (208, 47537), (220, 47456), (228, 47408), (238, 47336), (239, 47333), (245, 47309), (247, 47303), (257, 47261),

Gene: CN1A\_14 Start: 6751, Stop: 8316, Start Num: 18

Candidate Starts for CN1A\_14:

(18, 6751), (22, 6763), (27, 6793), (29, 6802), (32, 6826), (34, 6844), (37, 6862), (38, 6865), (39, 6877), (43, 6904), (68, 7060), (69, 7069), (74, 7093), (81, 7120), (86, 7147), (95, 7216), (96, 7222), (100, 7234), (109, 7279), (112, 7303), (113, 7309), (118, 7354), (129, 7399), (139, 7456), (149, 7540), (157, 7600), (161, 7627), (162, 7630), (163, 7633), (180, 7735), (182, 7741), (187, 7792), (211, 7984), (213, 8002), (214, 8014), (226, 8080), (230, 8122), (231, 8128), (234, 8155), (236, 8161), (255, 8233), (258, 8284),

Gene: Cassita\_89 Start: 50170, Stop: 48713, Start Num: 21

Candidate Starts for Cassita\_89:

(Start: 21 @50170 has 5 MA's), (26, 50140), (42, 50026), (54, 49954), (55, 49942), (65, 49894), (71, 49852), (76, 49816), (82, 49792), (92, 49720), (93, 49714), (97, 49702), (103, 49675), (108, 49654), (117, 49579), (120, 49561), (140, 49465), (141, 49456), (151, 49351), (154, 49321), (155, 49318), (156, 49312), (157, 49300), (158, 49297), (169, 49237), (170, 49228), (184, 49138), (192, 49084), (198, 49048), (209, 48967), (210, 48964), (211, 48961), (212, 48952), (223, 48874), (225, 48868), (235, 48790), (241, 48769), (249, 48742), (251, 48739),

Gene: DejaVu\_80 Start: 49301, Stop: 47778, Start Num: 14

Candidate Starts for DejaVu\_80:

(2, 49562), (4, 49520), (Start: 14 @49301 has 23 MA's), (31, 49190), (35, 49151), (37, 49142), (51, 49046), (58, 49004), (61, 48986), (70, 48932), (80, 48887), (81, 48884), (100, 48782), (119, 48659), (127, 48623), (135, 48584), (143, 48518), (145, 48491), (148, 48473), (150, 48443), (159, 48383), (164, 48353), (167, 48341), (168, 48335), (211, 48026), (213, 48008), (217, 47966), (219, 47960), (222, 47942), (223, 47939), (246, 47813),

Gene: DustyDino\_88 Start: 50790, Stop: 49270, Start Num: 14

Candidate Starts for DustyDino\_88:

(11, 50823), (Start: 14 @50790 has 23 MA's), (20, 50739), (37, 50631), (46, 50565), (57, 50499), (80, 50376), (83, 50361), (90, 50304), (99, 50271), (100, 50268), (111, 50205), (116, 50154), (119, 50145), (121, 50136), (132, 50082), (140, 50043), (142, 50028), (148, 49959), (150, 49929), (160, 49866), (171, 49794), (200, 49608), (213, 49500), (216, 49470), (225, 49425), (231, 49374), (243, 49311),

Gene: EhyElimayoE\_125 Start: 82183, Stop: 80540, Start Num: 6

Candidate Starts for EhyElimayoE\_125:

(Start: 6 @82183 has 7 MA's), (7, 82159), (16, 82051), (33, 81946), (39, 81907), (46, 81856), (60, 81763), (70, 81703), (73, 81679), (74, 81676), (80, 81649), (94, 81556), (121, 81403), (126, 81379), (127, 81376), (134, 81343), (137, 81331), (145, 81259), (155, 81181), (161, 81136), (186, 80989), (191, 80950), (193, 80944), (197, 80914), (202, 80884), (203, 80872), (211, 80806), (224, 80716), (225, 80713), (238, 80617), (240, 80611), (242, 80602), (248, 80584),

Gene: Erenyeager\_84 Start: 49578, Stop: 48058, Start Num: 14

Candidate Starts for Erenyeager\_84:

(11, 49611), (Start: 14 @49578 has 23 MA's), (20, 49527), (35, 49428), (37, 49419), (46, 49353), (57, 49287), (80, 49164), (83, 49149), (90, 49092), (99, 49059), (100, 49056), (111, 48993), (116, 48942), (119, 48933), (121, 48924), (128, 48894), (132, 48870), (140, 48831), (142, 48816), (145, 48765), (148, 48747), (150, 48717), (160, 48654), (171, 48582), (213, 48288), (216, 48258), (217, 48246), (225, 48213), (243, 48099),

Gene: Fork\_80 Start: 49528, Stop: 48008, Start Num: 14

Candidate Starts for Fork\_80:

(11, 49561), (Start: 14 @49528 has 23 MA's), (20, 49477), (37, 49369), (46, 49303), (57, 49237), (80, 49114), (83, 49099), (90, 49042), (99, 49009), (100, 49006), (111, 48943), (116, 48892), (119, 48883), (121, 48874), (122, 48868), (128, 48844), (132, 48820), (140, 48781), (142, 48766), (145, 48715), (148, 48697), (150, 48667), (164, 48577), (171, 48532), (200, 48346), (213, 48238), (216, 48208), (225, 48163), (231, 48112), (238, 48067), (243, 48049),

Gene: Frankenweenie\_134 Start: 87252, Stop: 85606, Start Num: 6

Candidate Starts for Frankenweenie\_134:

(3, 87378), (Start: 6 @87252 has 7 MA's), (16, 87120), (46, 86925), (62, 86823), (73, 86748), (74, 86745), (107, 86571), (113, 86529), (121, 86472), (131, 86427), (154, 86253), (158, 86229), (163, 86199), (166, 86187), (169, 86172), (177, 86124), (193, 86010), (197, 85980), (201, 85959), (202, 85950), (203, 85938), (209, 85878), (224, 85782), (225, 85779), (240, 85677), (248, 85650),

Gene: Gorgeous\_70 Start: 47020, Stop: 45626, Start Num: 30

Candidate Starts for Gorgeous\_70:

(Start: 30 @47020 has 13 MA's), (39, 46951), (50, 46876), (53, 46858), (59, 46828), (72, 46747), (102, 46597), (125, 46453), (133, 46414), (147, 46300), (155, 46249), (161, 46228), (168, 46198), (170, 46183), (171, 46171), (186, 46090), (192, 46042), (196, 46015), (200, 45994), (207, 45910), (216, 45844), (254, 45655), (256, 45643),

Gene: Heylee\_73 Start: 47198, Stop: 45804, Start Num: 30

Candidate Starts for Heylee\_73:

(Start: 30 @47198 has 13 MA's), (39, 47129), (50, 47054), (53, 47036), (59, 47006), (72, 46925), (79, 46895), (84, 46871), (125, 46631), (133, 46592), (147, 46478), (155, 46427), (161, 46406), (168, 46376), (170, 46361), (171, 46349), (186, 46268), (192, 46220), (196, 46193), (200, 46172), (207, 46088), (216, 46022), (254, 45833), (256, 45821),

Gene: Hortus1\_77 Start: 49476, Stop: 47953, Start Num: 14

Candidate Starts for Hortus1\_77:

(8, 49542), (9, 49515), (Start: 14 @49476 has 23 MA's), (35, 49326), (37, 49317), (51, 49221), (56, 49188), (61, 49161), (70, 49107), (80, 49062), (81, 49059), (99, 48954), (100, 48951), (119, 48828), (121, 48819), (123, 48807), (135, 48753), (145, 48660), (159, 48552), (164, 48522), (165, 48516), (166, 48513), (167, 48510), (171, 48477), (174, 48465), (192, 48339), (200, 48291), (211, 48201), (213, 48183), (219, 48135), (238, 48012),

Gene: Hubbs\_78 Start: 49505, Stop: 47982, Start Num: 14

Candidate Starts for Hubbs\_78:

(2, 49766), (4, 49724), (Start: 14 @49505 has 23 MA's), (31, 49394), (35, 49355), (37, 49346), (51, 49250), (58, 49208), (61, 49190), (70, 49136), (80, 49091), (81, 49088), (100, 48986), (119, 48863), (127, 48827), (135, 48788), (143, 48722), (145, 48695), (148, 48677), (150, 48647), (159, 48587), (164, 48557), (167, 48545), (168, 48539), (211, 48230), (213, 48212), (217, 48170), (219, 48164), (222, 48146), (223, 48143), (246, 48017),

Gene: Ichor\_70 Start: 47416, Stop: 46022, Start Num: 30

Candidate Starts for Ichor\_70:

(Start: 30 @47416 has 13 MA's), (39, 47347), (50, 47272), (53, 47254), (59, 47224), (72, 47143), (125, 46849), (133, 46810), (147, 46696), (161, 46624), (168, 46594), (170, 46579), (171, 46567), (183, 46516), (188, 46465), (190, 46447), (192, 46438), (200, 46390), (216, 46240), (254, 46051),

Gene: Jacko\_79 Start: 48477, Stop: 46960, Start Num: 14

Candidate Starts for Jacko\_79:

(12, 48495), (Start: 14 @48477 has 23 MA's), (20, 48426), (35, 48327), (37, 48318), (42, 48279), (51, 48222), (77, 48072), (81, 48060), (99, 47958), (100, 47955), (114, 47874), (116, 47841), (119, 47832), (132, 47769), (135, 47757), (143, 47691), (150, 47616), (159, 47556), (171, 47481), (180, 47430), (192, 47343), (205, 47250), (211, 47205), (213, 47187), (216, 47157), (219, 47139), (223, 47118), (233, 47043), (238, 47016), (246, 46992),

Gene: Jaek\_70 Start: 47416, Stop: 46022, Start Num: 30

Candidate Starts for Jaek\_70:

(Start: 30 @47416 has 13 MA's), (39, 47347), (50, 47272), (53, 47254), (59, 47224), (72, 47143), (125, 46849), (133, 46810), (147, 46696), (161, 46624), (168, 46594), (170, 46579), (171, 46567), (183, 46516), (188, 46465), (190, 46447), (192, 46438), (200, 46390), (216, 46240), (254, 46051),

Gene: JustBecause\_122 Start: 81387, Stop: 79741, Start Num: 6

Candidate Starts for JustBecause\_122:

(5, 81426), (Start: 6 @81387 has 7 MA's), (13, 81297), (Start: 15 @81279 has 1 MA's), (16, 81255), (19, 81237), (46, 81060), (62, 80958), (73, 80883), (74, 80880), (87, 80817), (134, 80547), (137, 80535), (145, 80463), (169, 80307), (179, 80247), (182, 80232), (193, 80145), (197, 80115), (203, 80073), (209, 80013), (224, 79917), (225, 79914), (248, 79785),

Gene: Kela\_123 Start: 81267, Stop: 79621, Start Num: 6

Candidate Starts for Kela\_123:

(5, 81306), (Start: 6 @81267 has 7 MA's), (13, 81177), (Start: 15 @81159 has 1 MA's), (16, 81135), (19, 81117), (46, 80940), (62, 80838), (73, 80763), (74, 80760), (87, 80697), (134, 80427), (137, 80415), (145, 80343), (169, 80187), (179, 80127), (182, 80112), (193, 80025), (197, 79995), (203, 79953), (209, 79893), (224, 79797), (225, 79794), (248, 79665),

Gene: Kradal\_124 Start: 82180, Stop: 80537, Start Num: 6

Candidate Starts for Kradal\_124:

(Start: 6 @82180 has 7 MA's), (7, 82156), (16, 82048), (33, 81943), (39, 81904), (46, 81853), (60, 81760), (70, 81700), (73, 81676), (74, 81673), (80, 81646), (94, 81553), (121, 81400), (126, 81376), (127, 81373), (134, 81340), (137, 81328), (145, 81256), (155, 81178), (161, 81133), (186, 80986), (193, 80941), (197, 80911), (202, 80881), (203, 80869), (211, 80803), (224, 80713), (225, 80710), (238, 80614), (240, 80608), (248, 80581),

Gene: LeeroyJenkins\_95 Start: 51345, Stop: 49888, Start Num: 21

Candidate Starts for LeeroyJenkins\_95:

(Start: 21 @51345 has 5 MA's), (22, 51342), (26, 51315), (42, 51201), (55, 51117), (65, 51069), (71, 51027), (76, 50991), (82, 50967), (92, 50895), (93, 50889), (97, 50877), (103, 50850), (108, 50829), (117, 50754), (120, 50736), (140, 50640), (141, 50631), (151, 50526), (154, 50496), (155, 50493),



(156, 50487), (157, 50475), (158, 50472), (169, 50412), (170, 50403), (184, 50313), (192, 50259), (198, 50223), (209, 50142), (210, 50139), (211, 50136), (212, 50127), (223, 50049), (225, 50043), (235, 49965), (241, 49944), (249, 49917), (251, 49914),

Gene: Lifes\_86 Start: 48144, Stop: 46666, Start Num: 21

Candidate Starts for Lifes\_86:

(Start: 21 @48144 has 5 MA's), (23, 48135), (28, 48114), (48, 47964), (64, 47880), (67, 47859), (97, 47685), (98, 47679), (110, 47625), (120, 47547), (139, 47454), (146, 47379), (152, 47337), (158, 47289), (163, 47259), (170, 47220), (173, 47199), (176, 47187), (189, 47082), (191, 47067), (194, 47055), (199, 47025), (206, 46953), (211, 46917), (216, 46869), (218, 46854), (221, 46836), (225, 46824), (229, 46791), (241, 46725), (244, 46713), (251, 46695), (253, 46683),

Gene: Lupine\_78 Start: 49414, Stop: 47891, Start Num: 14

Candidate Starts for Lupine\_78:

(2, 49675), (4, 49633), (Start: 14 @49414 has 23 MA's), (31, 49303), (35, 49264), (37, 49255), (51, 49159), (58, 49117), (61, 49099), (70, 49045), (80, 49000), (100, 48895), (119, 48772), (127, 48736), (135, 48697), (143, 48631), (145, 48604), (148, 48586), (150, 48556), (159, 48496), (164, 48466), (167, 48454), (168, 48448), (211, 48139), (213, 48121), (217, 48079), (219, 48073), (222, 48055), (223, 48052),

Gene: Lyell\_84 Start: 49739, Stop: 48219, Start Num: 14

Candidate Starts for Lyell\_84:

(11, 49772), (Start: 14 @49739 has 23 MA's), (17, 49706), (20, 49688), (37, 49580), (46, 49514), (57, 49448), (80, 49325), (83, 49310), (90, 49253), (99, 49220), (100, 49217), (111, 49154), (116, 49103), (119, 49094), (121, 49085), (128, 49055), (132, 49031), (140, 48992), (142, 48977), (145, 48926), (148, 48908), (164, 48788), (171, 48743), (213, 48449), (216, 48419), (225, 48374), (231, 48323), (243, 48260),

Gene: Molivia\_74 Start: 46115, Stop: 44718, Start Num: 30

Candidate Starts for Molivia\_74:

(Start: 30 @46115 has 13 MA's), (36, 46064), (44, 46013), (45, 46010), (47, 45992), (49, 45974), (53, 45953), (75, 45830), (102, 45692), (124, 45551), (133, 45509), (138, 45488), (147, 45395), (156, 45338), (161, 45323), (168, 45293), (172, 45260), (186, 45185), (192, 45137), (196, 45110), (198, 45101), (200, 45089), (211, 44987), (215, 44948), (216, 44939), (237, 44807), (250, 44762), (256, 44738),

Gene: Musetta\_83 Start: 50079, Stop: 48559, Start Num: 14

Candidate Starts for Musetta\_83:

(11, 50112), (Start: 14 @50079 has 23 MA's), (20, 50028), (37, 49920), (46, 49854), (57, 49788), (80, 49665), (83, 49650), (90, 49593), (99, 49560), (100, 49557), (111, 49494), (116, 49443), (119, 49434), (121, 49425), (132, 49371), (140, 49332), (142, 49317), (145, 49266), (148, 49248), (150, 49218), (164, 49128), (171, 49083), (213, 48789), (216, 48759), (225, 48714), (243, 48600),

Gene: Necrophoxinus\_86 Start: 50425, Stop: 48905, Start Num: 14

Candidate Starts for Necrophoxinus\_86:

(11, 50458), (Start: 14 @50425 has 23 MA's), (17, 50392), (20, 50374), (35, 50275), (37, 50266), (46, 50200), (57, 50134), (83, 49996), (90, 49939), (99, 49906), (100, 49903), (111, 49840), (116, 49789), (119, 49780), (121, 49771), (128, 49741), (132, 49717), (140, 49678), (142, 49663), (145, 49612), (148, 49594), (150, 49564), (160, 49501), (171, 49429), (213, 49135), (216, 49105), (225, 49060), (231, 49009), (238, 48964), (243, 48946),

Gene: Nirvana\_135 Start: 85649, Stop: 84003, Start Num: 6

Candidate Starts for Nirvana\_135:

(Start: 6 @85649 has 7 MA's), (Start: 15 @85541 has 1 MA's), (16, 85517), (18, 85502), (19, 85499), (46, 85322), (62, 85220), (73, 85145), (74, 85142), (107, 84968), (113, 84926), (121, 84869), (135, 84803), (148, 84707), (154, 84650), (163, 84596), (166, 84584), (169, 84569), (177, 84521), (193, 84407), (197, 84377), (202, 84347), (203, 84335), (224, 84179), (225, 84176), (248, 84047),

Gene: OlinDD\_77 Start: 49475, Stop: 47952, Start Num: 14

Candidate Starts for OlinDD\_77:

(8, 49541), (9, 49514), (Start: 14 @49475 has 23 MA's), (35, 49325), (37, 49316), (51, 49220), (56, 49187), (61, 49160), (70, 49106), (80, 49061), (81, 49058), (99, 48953), (100, 48950), (119, 48827), (121, 48818), (123, 48806), (135, 48752), (145, 48659), (159, 48551), (164, 48521), (165, 48515), (166, 48512), (167, 48509), (171, 48476), (174, 48464), (192, 48338), (200, 48290), (211, 48200), (213, 48182), (219, 48134), (238, 48011),

Gene: Pavlo\_78 Start: 49360, Stop: 47837, Start Num: 14

Candidate Starts for Pavlo\_78:

(2, 49621), (Start: 14 @49360 has 23 MA's), (31, 49249), (35, 49210), (37, 49201), (51, 49105), (58, 49063), (61, 49045), (70, 48991), (80, 48946), (81, 48943), (100, 48841), (119, 48718), (127, 48682), (135, 48643), (143, 48577), (145, 48550), (148, 48532), (150, 48502), (159, 48442), (164, 48412), (167, 48400), (168, 48394), (211, 48085), (213, 48067), (217, 48025), (219, 48019), (222, 48001), (223, 47998), (246, 47872),

Gene: PhillyPhilly\_77 Start: 48897, Stop: 47374, Start Num: 14

Candidate Starts for PhillyPhilly\_77:

(Start: 14 @48897 has 23 MA's), (31, 48786), (35, 48747), (37, 48738), (42, 48699), (51, 48642), (58, 48600), (70, 48528), (80, 48483), (81, 48480), (100, 48378), (119, 48255), (127, 48219), (135, 48180), (143, 48114), (145, 48087), (148, 48069), (150, 48039), (159, 47979), (164, 47949), (167, 47937), (168, 47931), (211, 47622), (213, 47604), (217, 47562), (219, 47556), (222, 47538), (223, 47535),

Gene: Pioneer3\_77 Start: 49273, Stop: 47750, Start Num: 14

Candidate Starts for Pioneer3\_77:

(8, 49339), (9, 49312), (Start: 14 @49273 has 23 MA's), (35, 49123), (37, 49114), (51, 49018), (56, 48985), (61, 48958), (70, 48904), (80, 48859), (81, 48856), (99, 48751), (100, 48748), (119, 48625), (121, 48616), (123, 48604), (135, 48550), (145, 48457), (159, 48349), (164, 48319), (165, 48313), (166, 48310), (167, 48307), (171, 48274), (174, 48262), (192, 48136), (200, 48088), (211, 47998), (213, 47980), (219, 47932), (238, 47809),

Gene: Platte\_76 Start: 49041, Stop: 47518, Start Num: 14

Candidate Starts for Platte\_76:

(8, 49107), (9, 49080), (Start: 14 @49041 has 23 MA's), (35, 48891), (37, 48882), (51, 48786), (56, 48753), (61, 48726), (70, 48672), (80, 48627), (81, 48624), (99, 48519), (100, 48516), (119, 48393), (121, 48384), (123, 48372), (135, 48318), (145, 48225), (159, 48117), (164, 48087), (165, 48081), (166, 48078), (167, 48075), (171, 48042), (174, 48030), (192, 47904), (200, 47856), (211, 47766), (213, 47748), (219, 47700), (238, 47577),

Gene: Quantum\_123 Start: 82180, Stop: 80537, Start Num: 6

Candidate Starts for Quantum\_123:

(Start: 6 @82180 has 7 MA's), (7, 82156), (16, 82048), (33, 81943), (39, 81904), (46, 81853), (60, 81760), (70, 81700), (73, 81676), (74, 81673), (80, 81646), (94, 81553), (121, 81400), (126, 81376), (127, 81373), (134, 81340), (137, 81328), (145, 81256), (155, 81178), (161, 81133), (186, 80986), (193, 80941), (197, 80911), (202, 80881), (203, 80869), (211, 80803), (224, 80713), (225, 80710), (238, 80614), (240, 80608), (248, 80581),

Gene: Rings\_71 Start: 47461, Stop: 46067, Start Num: 30

Candidate Starts for Rings\_71:

(Start: 30 @47461 has 13 MA's), (39, 47392), (50, 47317), (53, 47299), (59, 47269), (72, 47188), (102, 47038), (125, 46894), (133, 46855), (147, 46741), (155, 46690), (161, 46669), (168, 46639), (170, 46624), (171, 46612), (186, 46531), (192, 46483), (196, 46456), (200, 46435), (207, 46351), (216, 46285), (254, 46096), (256, 46084),

Gene: Roman\_81 Start: 50015, Stop: 48492, Start Num: 14

Candidate Starts for Roman\_81:

(2, 50276), (Start: 14 @50015 has 23 MA's), (31, 49904), (35, 49865), (37, 49856), (51, 49760), (58, 49718), (61, 49700), (80, 49601), (81, 49598), (89, 49538), (100, 49496), (119, 49373), (127, 49337), (135, 49298), (143, 49232), (145, 49205), (148, 49187), (150, 49157), (159, 49097), (164, 49067), (167, 49055), (168, 49049), (211, 48740), (213, 48722), (217, 48680), (219, 48674), (222, 48656), (223, 48653),

Gene: RunningBrook\_86 Start: 50790, Stop: 49270, Start Num: 14

Candidate Starts for RunningBrook\_86:

(11, 50823), (Start: 14 @50790 has 23 MA's), (20, 50739), (37, 50631), (46, 50565), (57, 50499), (80, 50376), (83, 50361), (90, 50304), (99, 50271), (100, 50268), (111, 50205), (116, 50154), (119, 50145), (121, 50136), (132, 50082), (140, 50043), (142, 50028), (148, 49959), (150, 49929), (160, 49866), (171, 49794), (200, 49608), (213, 49500), (216, 49470), (225, 49425), (231, 49374), (243, 49311),

Gene: Satis\_124 Start: 82176, Stop: 80533, Start Num: 6

Candidate Starts for Satis\_124:

(Start: 6 @82176 has 7 MA's), (7, 82152), (16, 82044), (33, 81939), (39, 81900), (46, 81849), (60, 81756), (70, 81696), (73, 81672), (74, 81669), (80, 81642), (94, 81549), (121, 81396), (126, 81372), (127, 81369), (134, 81336), (137, 81324), (145, 81252), (155, 81174), (161, 81129), (186, 80982), (193, 80937), (197, 80907), (202, 80877), (203, 80865), (211, 80799), (224, 80709), (225, 80706), (238, 80610), (240, 80604), (248, 80577),

Gene: SorJuana\_70 Start: 47020, Stop: 45626, Start Num: 30

Candidate Starts for SorJuana\_70:

(Start: 30 @47020 has 13 MA's), (39, 46951), (50, 46876), (53, 46858), (59, 46828), (72, 46747), (102, 46597), (125, 46453), (133, 46414), (147, 46300), (155, 46249), (161, 46228), (168, 46198), (170, 46183), (171, 46171), (186, 46090), (192, 46042), (196, 46015), (200, 45994), (207, 45910), (216, 45844), (254, 45655), (256, 45643),

Gene: StevieWelch\_85 Start: 49882, Stop: 48362, Start Num: 14

Candidate Starts for StevieWelch\_85:

(11, 49915), (Start: 14 @49882 has 23 MA's), (20, 49831), (37, 49723), (46, 49657), (57, 49591), (80, 49468), (83, 49453), (90, 49396), (99, 49363), (100, 49360), (111, 49297), (116, 49246), (119, 49237), (121, 49228), (122, 49222), (128, 49198), (132, 49174), (140, 49135), (142, 49120), (145, 49069), (148, 49051), (160, 48958), (164, 48931), (171, 48886), (200, 48700), (213, 48592), (216, 48562), (225, 48517), (231, 48466), (238, 48421), (243, 48403),

Gene: Tandem\_77 Start: 49353, Stop: 47830, Start Num: 14

Candidate Starts for Tandem\_77:

(8, 49419), (9, 49392), (Start: 14 @49353 has 23 MA's), (35, 49203), (37, 49194), (51, 49098), (56, 49065), (61, 49038), (70, 48984), (80, 48939), (81, 48936), (99, 48831), (100, 48828), (119, 48705), (121, 48696), (123, 48684), (135, 48630), (145, 48537), (159, 48429), (164, 48399), (165, 48393), (166, 48390), (167, 48387), (171, 48354), (174, 48342), (192, 48216), (200, 48168), (211, 48078), (213, 48060), (219, 48012), (238, 47889),

Gene: Thunderclap\_70 Start: 47442, Stop: 46048, Start Num: 30

Candidate Starts for Thunderclap\_70:

(Start: 30 @47442 has 13 MA's), (39, 47373), (50, 47298), (53, 47280), (59, 47250), (72, 47169), (84, 47115), (102, 47019), (125, 46875), (133, 46836), (147, 46722), (155, 46671), (161, 46650), (168, 46620), (170, 46605), (171, 46593), (186, 46512), (192, 46464), (196, 46437), (200, 46416), (207, 46332), (216, 46266), (254, 46077), (256, 46065),

Gene: WaterT\_90 Start: 50077, Stop: 48617, Start Num: 21

Candidate Starts for WaterT\_90:

(Start: 21 @50077 has 5 MA's), (26, 50047), (42, 49933), (55, 49849), (76, 49723), (82, 49699), (93, 49621), (97, 49609), (98, 49603), (101, 49597), (103, 49582), (108, 49561), (117, 49486), (120, 49468), (140, 49372), (141, 49363), (151, 49258), (154, 49228), (155, 49225), (156, 49219), (157, 49207), (158, 49204), (169, 49144), (170, 49135), (184, 49045), (192, 48991), (198, 48955), (209, 48874), (210, 48871), (211, 48868), (212, 48859), (223, 48781), (225, 48775), (235, 48697), (241, 48676), (249, 48649), (251, 48646), (253, 48634),

Gene: Welcome\_86 Start: 50242, Stop: 48722, Start Num: 14

Candidate Starts for Welcome\_86:

(11, 50275), (Start: 14 @50242 has 23 MA's), (20, 50191), (37, 50083), (46, 50017), (57, 49951), (83, 49813), (90, 49756), (99, 49723), (100, 49720), (111, 49657), (116, 49606), (119, 49597), (121, 49588), (122, 49582), (128, 49558), (132, 49534), (140, 49495), (142, 49480), (145, 49429), (160, 49318), (164, 49291), (171, 49246), (213, 48952), (216, 48922), (225, 48877), (231, 48826), (238, 48781), (243, 48763),

Gene: Wolfstar\_82 Start: 50847, Stop: 49330, Start Num: 15

Candidate Starts for Wolfstar\_82:

(1, 51207), (11, 50889), (Start: 15 @50847 has 1 MA's), (35, 50703), (37, 50694), (51, 50598), (56, 50565), (70, 50484), (80, 50439), (81, 50436), (100, 50334), (119, 50211), (121, 50202), (135, 50136), (158, 49941), (159, 49935), (164, 49905), (165, 49899), (167, 49893), (192, 49722), (213, 49560), (219, 49512), (232, 49428), (238, 49389), (246, 49365),

Gene: Yappy\_99 Start: 49042, Stop: 47645, Start Num: 25

Candidate Starts for Yappy\_99:

(25, 49042), (39, 48952), (41, 48940), (45, 48919), (52, 48868), (63, 48811), (66, 48805), (82, 48712), (85, 48700), (91, 48649), (102, 48604), (105, 48586), (115, 48526), (130, 48439), (136, 48412), (144, 48346), (161, 48232), (168, 48202), (171, 48175), (174, 48166), (178, 48142), (181, 48130), (184, 48097), (185, 48094), (187, 48076), (190, 48046), (195, 48022), (199, 48007), (206, 47932), (210, 47899), (216, 47848), (220, 47827), (227, 47785), (231, 47752), (246, 47686), (252, 47665),

Gene: Yeezus\_70 Start: 47415, Stop: 46021, Start Num: 30

Candidate Starts for Yeezus\_70:

(Start: 30 @47415 has 13 MA's), (39, 47346), (50, 47271), (53, 47253), (59, 47223), (72, 47142), (125, 46848), (133, 46809), (147, 46695), (161, 46623), (168, 46593), (170, 46578), (171, 46566), (183, 46515), (188, 46464), (190, 46446), (192, 46437), (200, 46389), (216, 46239), (254, 46050),

Gene: Yuma\_83 Start: 49751, Stop: 48231, Start Num: 14

Candidate Starts for Yuma\_83:

(11, 49784), (Start: 14 @49751 has 23 MA's), (20, 49700), (37, 49592), (46, 49526), (57, 49460), (80, 49337), (83, 49322), (90, 49265), (99, 49232), (100, 49229), (111, 49166), (116, 49115), (119, 49106), (121, 49097), (132, 49043), (140, 49004), (142, 48989), (148, 48920), (150, 48890), (160, 48827), (171, 48755), (200, 48569), (213, 48461), (216, 48431), (225, 48386), (231, 48335), (243, 48272),