



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 163491 Report

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

Pham number 163491 has 100 members, 9 are drafts.

Phages represented in each track:

- Track 1 : Sejanus\_64
- Track 2 : Mao1\_67, Phayonce\_47
- Track 3 : Dori\_64, Mask\_64
- Track 4 : Sanjuju\_50, Fitzgerald\_50
- Track 5 : Ailee\_48, MoontowerMania\_51, Affeca\_49, Keitabear\_51, Shivanishola\_51, Love\_56
- Track 6 : Charming\_52, Tangent\_52, Rofo\_51
- Track 7 : Galadriel\_52, Paries\_55
- Track 8 : McKinley\_54
- Track 9 : Barsten\_52
- Track 10 : Thing3\_50, Kamashten\_50
- Track 11 : Brandonk123\_53
- Track 12 : Geodirt\_50
- Track 13 : Nordenberg\_47
- Track 14 : Stultus\_49
- Track 15 : Kewpiedoll\_52
- Track 16 : Jabberwocky\_49
- Track 17 : Sedona\_51
- Track 18 : BobBob\_50
- Track 19 : ChadMasterC\_52
- Track 20 : Angelicage\_49
- Track 21 : MelBins\_50
- Track 22 : Dextert\_48
- Track 23 : Zipp\_52, Delrey21\_51, DoctorFroggo\_51, Verity\_51
- Track 24 : Zitch\_54
- Track 25 : Tardus\_53
- Track 26 : Lilbeanie\_53
- Track 27 : Island3\_49, Brujita\_49
- Track 28 : HC\_46
- Track 29 : Xula\_43, QueenHazel\_44
- Track 30 : Babsiella\_48
- Track 31 : Sbash\_58
- Track 32 : Che9c\_61
- Track 33 : Rebel\_44, ShrimpFriedEgg\_52, Nenae\_52, Jamie19\_46, Purgamenstris\_52, Raymond7\_46, Panchino\_45, BabeRuth\_53, Redi\_52, Andies\_45, PhancyPhin\_52, SpongeBob\_46, Snekmaggon\_46, Phrann\_49
- Track 34 : Philonius\_48

- Track 35 : Rubeelu\_51, Kevin1\_50, Butters\_51
- Track 36 : Silvy\_48, Aggie\_46
- Track 37 : Bosection6\_48
- Track 38 : Shweta\_46
- Track 39 : MichelleMyBell\_48
- Track 40 : Jung\_45, Techage\_46, Malithi\_47, Phegasus\_47, Arib1\_47, Kari\_46, Charlie\_48, Vidya\_46, Polkaroo\_47, Zilizebeth\_47, Venti\_47, Jebeks\_48, Necropolis\_46, Fishburne\_46, Langerak\_47, Journey\_50, Mangethe\_47, Majeke\_47, Bartholomew\_46, Dynamo\_47, Donovan\_47
- Track 41 : FirstPlacePfu\_47
- Track 42 : Megiddo\_46
- Track 43 : Xavia\_54
- Track 44 : Nazo\_49, BigNuz\_48
- Track 45 : ThulaThula\_53
- Track 46 : Purky\_52

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

The start number called the most often in the published annotations is 19, it was called in 49 of the 91 non-draft genes in the pham.

Genes that call this "Most Annotated" start:

- Affeca\_49, Ailee\_48, Andies\_45, Angelicage\_49, BabeRuth\_53, Barsten\_52, Bosection6\_48, Brandonk123\_53, Brujita\_49, Butters\_51, ChadMasterC\_52, Delrey21\_51, Dextert\_48, DoctorFroggo\_51, Dori\_64, Fitzgerald\_50, Geodirt\_50, Island3\_49, Jabberwocky\_49, Jamie19\_46, Kamashten\_50, Keitabear\_51, Kevin1\_50, Kewpiedoll\_52, Lilbeanie\_53, Love\_56, Mask\_64, MelBins\_50, MoontowerMania\_51, Nенаe\_52, Panchino\_45, PhancyPhin\_52, Phrann\_49, Purgamenstris\_52, Raymond7\_46, Rebel\_44, Redi\_52, Rubeelu\_51, Sanjuju\_50, Sedona\_51, Shivanishola\_51, ShrimpFriedEgg\_52, Shweta\_46, Snekmaggedon\_46, SpongeBob\_46, Stultus\_49, Tardus\_53, Thing3\_50, ThulaThula\_53, Verity\_51, Zipp\_52, Zitch\_54,

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

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

- Aggie\_46, Arib1\_47, Babsiella\_48, Bartholomew\_46, BigNuz\_48, BobBob\_50, Charlie\_48, Charming\_52, Che9c\_61, Donovan\_47, Dynamo\_47, FirstPlacePfu\_47, Fishburne\_46, Galadriel\_52, HC\_46, Jebeks\_48, Journey\_50, Jung\_45, Kari\_46, Langerak\_47, Majeke\_47, Malithi\_47, Mangethe\_47, Mao1\_67, McKinley\_54, Megiddo\_46, MichelleMyBell\_48, Nazo\_49, Necropolis\_46, Nordenberg\_47, Paries\_55, Phayonce\_47, Phegasus\_47, Philonius\_48, Polkaroo\_47, Purky\_52, QueenHazel\_44, Rofo\_51, Sbash\_58, Sejanus\_64, Silvy\_48, Tangent\_52, Techage\_46, Venti\_47, Vidya\_46, Xavia\_54, Xula\_43, Zilizebeth\_47,

**Summary by start number:**

Start 17:

- Found in 8 of 100 ( 8.0% ) of genes in pham

- Manual Annotations of this start: 8 of 91
- Called 100.0% of time when present
- Phage (with cluster) where this start called: BobBob\_50 (DE1), Charming\_52 (DE1), Galadriel\_52 (DE1), McKinley\_54 (DE1), Nordenberg\_47 (DE1), Paries\_55 (DE1), Rofo\_51 (DE1), Tangent\_52 (DE1),

#### Start 19:

- Found in 52 of 100 ( 52.0% ) of genes in pham
- Manual Annotations of this start: 49 of 91
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Affeca\_49 (DE1), Ailee\_48 (DE1), Andies\_45 (N), Angelicage\_49 (DE1), BabeRuth\_53 (N), Barsten\_52 (DE1), Bosection6\_48 (N), Brandonk123\_53 (DE1), Brujita\_49 (I1), Butters\_51 (N), ChadMasterC\_52 (DE1), Delrey21\_51 (DE4), Dexdert\_48 (DE3), DoctorFroggo\_51 (DE4), Dori\_64 (AD), Fitzgerald\_50 (DE1), Geodirt\_50 (DE1), Island3\_49 (I1), Jabberwocky\_49 (DE1), Jamie19\_46 (N), Kamashten\_50 (DE1), Keitabear\_51 (DE1), Kevin1\_50 (N), Kewpiedoll\_52 (DE1), Lilbeanie\_53 (DE5), Love\_56 (DE1), Mask\_64 (AD), MelBins\_50 (DE2), MoontowerMania\_51 (DE1), Nenae\_52 (N), Panchino\_45 (N), PhancyPhin\_52 (N), Phrann\_49 (N), Purgamenstris\_52 (N), Raymond7\_46 (N), Rebel\_44 (N), Redi\_52 (N), Rubeelu\_51 (N), Sanjuju\_50 (DE1), Sedona\_51 (DE1), Shivanishola\_51 (DE1), ShrimpFriedEgg\_52 (N), Shweta\_46 (N), Snekmaggedon\_46 (N), SpongeBob\_46 (N), Stultus\_49 (DE1), Tardus\_53 (DE4), Thing3\_50 (DE1), ThulaThula\_53 (P5), Verity\_51 (DE4), Zipp\_52 (DE4), Zitch\_54 (DE4),

#### Start 22:

- Found in 38 of 100 ( 38.0% ) of genes in pham
- Manual Annotations of this start: 32 of 91
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Aggie\_46 (N), Arib1\_47 (P1), Babsiella\_48 (I1), Bartholomew\_46 (P1), BigNuz\_48 (P4), Charlie\_48 (N), Che9c\_61 (I2), Donovan\_47 (P1), Dynamo\_47 (P1), FirstPlacePfu\_47 (P1), Fishburne\_46 (P1), HC\_46 (I1), Jebeks\_48 (P1), Journey\_50 (N), Jung\_45 (P1), Kari\_46 (P1), Langerak\_47 (P1), Majeke\_47 (P1), Malithi\_47 (P1), Mangethe\_47 (P1), Mao1\_67 (AD), Megiddo\_46 (P1), Nazo\_49 (P4), Necropolis\_46 (P1), Phayonce\_47 (P5), Phegasus\_47 (P1), Philonius\_48 (N), Polkaroo\_47 (P1), Purky\_52 (P6), QueenHazel\_44 (I1), Sbash\_58 (I2), Sejanus\_64 (AD), Silvy\_48 (N), Techage\_46 (P1), Venti\_47 (P1), Vidya\_46 (P1), Xula\_43 (I1), Zilizebeth\_47 (P1),

#### Start 23:

- Found in 1 of 100 ( 1.0% ) of genes in pham
- Manual Annotations of this start: 1 of 91
- Called 100.0% of time when present
- Phage (with cluster) where this start called: MichelleMyBell\_48 (N),

#### Start 24:

- Found in 1 of 100 ( 1.0% ) of genes in pham
- Manual Annotations of this start: 1 of 91
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Xavia\_54 (P3),

### Summary by clusters:

There are 14 clusters represented in this pham: P3, P1, P6, AD, P4, P5, I1, DE1, DE2, DE3, DE4, DE5, N, I2,

Info for manual annotations of cluster AD:

- Start number 19 was manually annotated 2 times for cluster AD.
- Start number 22 was manually annotated 1 time for cluster AD.

Info for manual annotations of cluster DE1:

- Start number 17 was manually annotated 8 times for cluster DE1.
- Start number 19 was manually annotated 17 times for cluster DE1.

Info for manual annotations of cluster DE2:

- Start number 19 was manually annotated 1 time for cluster DE2.

Info for manual annotations of cluster DE3:

- Start number 19 was manually annotated 1 time for cluster DE3.

Info for manual annotations of cluster DE4:

- Start number 19 was manually annotated 6 times for cluster DE4.

Info for manual annotations of cluster DE5:

- Start number 19 was manually annotated 1 time for cluster DE5.

Info for manual annotations of cluster I1:

- Start number 19 was manually annotated 2 times for cluster I1.
- Start number 22 was manually annotated 4 times for cluster I1.

Info for manual annotations of cluster I2:

- Start number 22 was manually annotated 2 times for cluster I2.

Info for manual annotations of cluster N:

- Start number 19 was manually annotated 18 times for cluster N.
- Start number 22 was manually annotated 3 times for cluster N.
- Start number 23 was manually annotated 1 time for cluster N.

Info for manual annotations of cluster P1:

- Start number 22 was manually annotated 18 times for cluster P1.

Info for manual annotations of cluster P3:

- Start number 24 was manually annotated 1 time for cluster P3.

Info for manual annotations of cluster P4:

- Start number 22 was manually annotated 2 times for cluster P4.

Info for manual annotations of cluster P5:

- Start number 19 was manually annotated 1 time for cluster P5.
- Start number 22 was manually annotated 1 time for cluster P5.

Info for manual annotations of cluster P6:

- Start number 22 was manually annotated 1 time for cluster P6.

### **Gene Information:**

Gene: Affeca\_49 Start: 42918, Stop: 43916, Start Num: 19

Candidate Starts for Affeca\_49:

(4, 42675), (5, 42777), (15, 42864), (Start: 19 @42918 has 49 MA's), (25, 42954), (33, 43005), (35, 43011), (38, 43029), (42, 43059), (50, 43122), (53, 43137), (61, 43218), (65, 43233), (67, 43257), (70, 43281), (88, 43428), (92, 43461), (94, 43476), (101, 43545), (102, 43560), (112, 43617), (114, 43632), (139, 43809), (146, 43881),

Gene: Aggie\_46 Start: 32126, Stop: 33115, Start Num: 22

Candidate Starts for Aggie\_46:

(3, 31805), (6, 31973), (12, 32036), (Start: 22 @32126 has 32 MA's), (25, 32141), (33, 32189), (41, 32240), (54, 32336), (59, 32375), (79, 32510), (91, 32621), (92, 32624), (96, 32663), (100, 32687), (101, 32705), (108, 32750), (113, 32780), (114, 32792), (134, 32936), (143, 33035), (146, 33083),

Gene: Ailee\_48 Start: 42523, Stop: 43524, Start Num: 19

Candidate Starts for Ailee\_48:

(4, 42280), (5, 42382), (15, 42469), (Start: 19 @42523 has 49 MA's), (25, 42559), (33, 42610), (35, 42616), (38, 42634), (42, 42664), (50, 42727), (53, 42742), (61, 42823), (65, 42838), (67, 42862), (70, 42886), (88, 43033), (92, 43066), (94, 43081), (101, 43150), (102, 43165), (112, 43222), (114, 43237), (139, 43417), (146, 43489),

Gene: Andies\_45 Start: 32643, Stop: 33707, Start Num: 19

Candidate Starts for Andies\_45:

(9, 32529), (Start: 19 @32643 has 49 MA's), (21, 32655), (30, 32721), (31, 32724), (33, 32730), (38, 32754), (40, 32775), (41, 32781), (43, 32793), (44, 32796), (46, 32805), (50, 32847), (53, 32862), (75, 33054), (85, 33135), (87, 33147), (88, 33156), (92, 33189), (94, 33204), (97, 33231), (101, 33285), (102, 33300), (105, 33315), (107, 33324), (111, 33354), (114, 33372), (115, 33378), (120, 33429), (129, 33486), (132, 33522), (134, 33528), (142, 33618), (143, 33627), (146, 33675), (147, 33684),

Gene: Angelicage\_49 Start: 43336, Stop: 44331, Start Num: 19

Candidate Starts for Angelicage\_49:

(2, 42985), (4, 43093), (5, 43195), (15, 43282), (Start: 19 @43336 has 49 MA's), (25, 43372), (33, 43423), (35, 43429), (38, 43447), (42, 43477), (50, 43540), (53, 43555), (61, 43636), (65, 43651), (67, 43675), (70, 43699), (88, 43846), (92, 43879), (94, 43894), (101, 43963), (102, 43978), (112, 44035), (114, 44050), (139, 44224), (146, 44296),

Gene: Arib1\_47 Start: 32549, Stop: 33544, Start Num: 22

Candidate Starts for Arib1\_47:

(3, 32228), (6, 32396), (12, 32459), (Start: 22 @32549 has 32 MA's), (25, 32564), (33, 32612), (41, 32663), (54, 32759), (59, 32798), (79, 32933), (91, 33044), (92, 33047), (96, 33086), (100, 33110), (101, 33128), (108, 33173), (113, 33203), (114, 33215), (134, 33362), (143, 33461), (146, 33509), (148, 33533),

Gene: BabeRuth\_53 Start: 34364, Stop: 35428, Start Num: 19

Candidate Starts for BabeRuth\_53:

(9, 34250), (Start: 19 @34364 has 49 MA's), (21, 34376), (30, 34442), (31, 34445), (33, 34451), (38, 34475), (40, 34496), (41, 34502), (43, 34514), (44, 34517), (46, 34526), (50, 34568), (53, 34583), (75, 34775), (85, 34856), (87, 34868), (88, 34877), (92, 34910), (94, 34925), (97, 34952), (101, 35006), (102, 35021), (105, 35036), (107, 35045), (111, 35075), (114, 35093), (115, 35099), (120, 35150), (129, 35207), (132, 35243), (134, 35249), (142, 35339), (143, 35348), (146, 35396), (147, 35405),

Gene: Babsiella\_48 Start: 33402, Stop: 34397, Start Num: 22

Candidate Starts for Babsiella\_48:

(8, 33267), (Start: 22 @33402 has 32 MA's), (25, 33417), (33, 33465), (41, 33516), (46, 33540), (59, 33651), (79, 33786), (91, 33897), (92, 33900), (96, 33939), (100, 33963), (101, 33981), (108, 34026), (113, 34056), (114, 34068), (122, 34125), (134, 34215), (143, 34314), (146, 34362), (148, 34386),

Gene: Barsten\_52 Start: 43289, Stop: 44287, Start Num: 19

Candidate Starts for Barsten\_52:

(14, 43238), (Start: 19 @43289 has 49 MA's), (25, 43325), (33, 43376), (35, 43382), (38, 43400), (42, 43430), (50, 43493), (53, 43508), (61, 43589), (65, 43604), (67, 43628), (70, 43652), (88, 43799), (92, 43832), (94, 43847), (101, 43916), (102, 43931), (112, 43988), (114, 44003), (139, 44180), (146, 44252),

Gene: Bartholomew\_46 Start: 32543, Stop: 33535, Start Num: 22

Candidate Starts for Bartholomew\_46:

(3, 32222), (6, 32390), (12, 32453), (Start: 22 @32543 has 32 MA's), (25, 32558), (33, 32606), (41, 32657), (54, 32753), (59, 32792), (79, 32927), (91, 33038), (92, 33041), (96, 33080), (100, 33104), (101, 33122), (108, 33167), (113, 33197), (114, 33209), (134, 33353), (143, 33452), (146, 33500), (148, 33524),

Gene: BigNuz\_48 Start: 34451, Stop: 35503, Start Num: 22

Candidate Starts for BigNuz\_48:

(20, 34433), (Start: 22 @34451 has 32 MA's), (27, 34490), (34, 34526), (38, 34547), (39, 34559), (43, 34586), (59, 34739), (61, 34766), (67, 34805), (78, 34886), (79, 34892), (88, 34967), (91, 34994), (101, 35075), (104, 35102), (133, 35318), (134, 35324), (143, 35423), (146, 35471),

Gene: BobBob\_50 Start: 42507, Stop: 43514, Start Num: 17

Candidate Starts for BobBob\_50:

(Start: 17 @42507 has 8 MA's), (18, 42516), (25, 42552), (33, 42603), (35, 42609), (38, 42627), (42, 42657), (50, 42720), (53, 42735), (58, 42786), (69, 42864), (88, 43026), (92, 43059), (94, 43074), (101, 43143), (102, 43158), (112, 43215), (114, 43230), (139, 43407), (146, 43479),

Gene: Bosection6\_48 Start: 32109, Stop: 33173, Start Num: 19

Candidate Starts for Bosection6\_48:

(1, 31737), (9, 31995), (Start: 19 @32109 has 49 MA's), (21, 32121), (30, 32187), (31, 32190), (33, 32196), (38, 32220), (40, 32241), (41, 32247), (43, 32259), (44, 32262), (46, 32271), (50, 32313), (53, 32328), (75, 32520), (85, 32601), (87, 32613), (88, 32622), (92, 32655), (94, 32670), (97, 32697), (101, 32751), (102, 32766), (105, 32781), (107, 32790), (111, 32820), (114, 32838), (115, 32844), (120, 32895), (129, 32952), (132, 32988), (134, 32994), (142, 33084), (143, 33093), (146, 33141), (147, 33150),

Gene: Brandonk123\_53 Start: 43467, Stop: 44465, Start Num: 19

Candidate Starts for Brandonk123\_53:

(5, 43326), (15, 43413), (Start: 19 @43467 has 49 MA's), (25, 43503), (33, 43554), (35, 43560), (38, 43578), (42, 43608), (50, 43671), (53, 43686), (61, 43767), (65, 43782), (67, 43806), (70, 43830), (76, 43878), (88, 43977), (92, 44010), (94, 44025), (101, 44094), (102, 44109), (112, 44166), (114, 44181), (139, 44358), (146, 44430),

Gene: Brujita\_49 Start: 34787, Stop: 35854, Start Num: 19

Candidate Starts for Brujita\_49:

(Start: 19 @34787 has 49 MA's), (21, 34799), (30, 34865), (33, 34874), (38, 34898), (40, 34919), (41, 34925), (44, 34940), (46, 34949), (50, 34991), (53, 35006), (61, 35093), (87, 35291), (92, 35333), (94, 35348), (97, 35375), (99, 35396), (101, 35429), (102, 35444), (105, 35459), (107, 35468), (111, 35498), (114, 35516), (115, 35522), (118, 35555), (120, 35573), (133, 35666), (134, 35672), (143,

35771), (146, 35819), (148, 35843),

Gene: Butters\_51 Start: 34063, Stop: 35127, Start Num: 19

Candidate Starts for Butters\_51:

(Start: 19 @34063 has 49 MA's), (21, 34075), (30, 34141), (33, 34150), (38, 34174), (40, 34195), (41, 34201), (44, 34216), (46, 34225), (50, 34267), (53, 34282), (61, 34369), (87, 34567), (92, 34609), (94, 34624), (97, 34651), (99, 34672), (101, 34705), (102, 34720), (105, 34735), (107, 34744), (111, 34774), (114, 34792), (115, 34798), (118, 34831), (120, 34849), (133, 34942), (134, 34948), (142, 35038), (143, 35047), (146, 35095), (147, 35104),

Gene: ChadMasterC\_52 Start: 44688, Stop: 45686, Start Num: 19

Candidate Starts for ChadMasterC\_52:

(14, 44637), (Start: 19 @44688 has 49 MA's), (25, 44724), (33, 44775), (35, 44781), (38, 44799), (42, 44829), (50, 44892), (53, 44907), (61, 44988), (67, 45027), (70, 45051), (88, 45198), (92, 45231), (94, 45246), (101, 45315), (102, 45330), (112, 45387), (114, 45402), (139, 45579), (146, 45651),

Gene: Charlie\_48 Start: 31920, Stop: 32912, Start Num: 22

Candidate Starts for Charlie\_48:

(3, 31599), (6, 31767), (12, 31830), (Start: 22 @31920 has 32 MA's), (25, 31935), (33, 31983), (41, 32034), (54, 32130), (59, 32169), (79, 32304), (91, 32415), (92, 32418), (96, 32457), (100, 32481), (101, 32499), (108, 32544), (113, 32574), (114, 32586), (134, 32730), (143, 32829), (146, 32877), (148, 32901),

Gene: Charming\_52 Start: 42946, Stop: 43956, Start Num: 17

Candidate Starts for Charming\_52:

(Start: 17 @42946 has 8 MA's), (18, 42955), (25, 42991), (33, 43045), (35, 43051), (38, 43069), (42, 43099), (50, 43162), (53, 43177), (61, 43258), (70, 43321), (88, 43468), (92, 43501), (94, 43516), (101, 43585), (102, 43600), (112, 43657), (114, 43672), (138, 43837), (146, 43921),

Gene: Che9c\_61 Start: 43643, Stop: 44704, Start Num: 22

Candidate Starts for Che9c\_61:

(20, 43625), (Start: 22 @43643 has 32 MA's), (29, 43703), (32, 43712), (34, 43718), (38, 43739), (39, 43751), (43, 43778), (59, 43931), (61, 43958), (78, 44078), (81, 44105), (88, 44159), (91, 44186), (95, 44213), (101, 44267), (104, 44294), (133, 44519), (134, 44525), (147, 44681),

Gene: Delrey21\_51 Start: 44353, Stop: 45396, Start Num: 19

Candidate Starts for Delrey21\_51:

(Start: 19 @44353 has 49 MA's), (33, 44443), (38, 44467), (39, 44479), (53, 44575), (80, 44782), (88, 44848), (94, 44896), (101, 44968), (102, 44983), (106, 45004), (109, 45025), (110, 45028), (114, 45055), (122, 45133), (126, 45166), (130, 45178), (140, 45301), (144, 45328), (146, 45364),

Gene: Dextert\_48 Start: 39661, Stop: 40713, Start Num: 19

Candidate Starts for Dextert\_48:

(Start: 19 @39661 has 49 MA's), (33, 39748), (38, 39772), (42, 39802), (50, 39865), (53, 39880), (56, 39913), (70, 40024), (74, 40051), (80, 40105), (88, 40171), (89, 40192), (92, 40204), (94, 40219), (101, 40303), (103, 40321), (106, 40339), (114, 40390), (125, 40492), (138, 40600), (140, 40621), (146, 40684),

Gene: DoctorFroggo\_51 Start: 44353, Stop: 45396, Start Num: 19

Candidate Starts for DoctorFroggo\_51:

(Start: 19 @44353 has 49 MA's), (33, 44443), (38, 44467), (39, 44479), (53, 44575), (80, 44782), (88, 44848), (94, 44896), (101, 44968), (102, 44983), (106, 45004), (109, 45025), (110, 45028), (114, 45055), (122, 45133), (126, 45166), (130, 45178), (140, 45301), (144, 45328), (146, 45364),



Gene: Donovan\_47 Start: 32566, Stop: 33558, Start Num: 22

Candidate Starts for Donovan\_47:

(3, 32245), (6, 32413), (12, 32476), (Start: 22 @32566 has 32 MA's), (25, 32581), (33, 32629), (41, 32680), (54, 32776), (59, 32815), (79, 32950), (91, 33061), (92, 33064), (96, 33103), (100, 33127), (101, 33145), (108, 33190), (113, 33220), (114, 33232), (134, 33376), (143, 33475), (146, 33523), (148, 33547),

Gene: Dori\_64 Start: 50133, Stop: 51218, Start Num: 19

Candidate Starts for Dori\_64:

(Start: 19 @50133 has 49 MA's), (26, 50169), (30, 50208), (33, 50217), (38, 50241), (40, 50262), (44, 50283), (46, 50292), (48, 50310), (49, 50343), (53, 50364), (54, 50379), (55, 50385), (57, 50406), (65, 50466), (73, 50526), (74, 50541), (82, 50613), (83, 50616), (92, 50700), (94, 50715), (97, 50742), (101, 50799), (102, 50814), (103, 50817), (105, 50829), (106, 50835), (107, 50838), (111, 50868), (114, 50886), (115, 50892), (120, 50943), (123, 50967), (129, 51000), (130, 51003), (132, 51033), (134, 51039), (136, 51072), (143, 51138), (145, 51162), (147, 51195),

Gene: Dynamo\_47 Start: 33026, Stop: 34018, Start Num: 22

Candidate Starts for Dynamo\_47:

(3, 32705), (6, 32873), (12, 32936), (Start: 22 @33026 has 32 MA's), (25, 33041), (33, 33089), (41, 33140), (54, 33236), (59, 33275), (79, 33410), (91, 33521), (92, 33524), (96, 33563), (100, 33587), (101, 33605), (108, 33650), (113, 33680), (114, 33692), (134, 33836), (143, 33935), (146, 33983), (148, 34007),

Gene: FirstPlacePfu\_47 Start: 32575, Stop: 33567, Start Num: 22

Candidate Starts for FirstPlacePfu\_47:

(6, 32422), (12, 32485), (Start: 22 @32575 has 32 MA's), (25, 32590), (33, 32638), (41, 32689), (54, 32785), (59, 32824), (79, 32959), (91, 33070), (92, 33073), (96, 33112), (100, 33136), (101, 33154), (108, 33199), (113, 33229), (114, 33241), (134, 33385), (143, 33484), (146, 33532), (148, 33556),

Gene: Fishburne\_46 Start: 32543, Stop: 33535, Start Num: 22

Candidate Starts for Fishburne\_46:

(3, 32222), (6, 32390), (12, 32453), (Start: 22 @32543 has 32 MA's), (25, 32558), (33, 32606), (41, 32657), (54, 32753), (59, 32792), (79, 32927), (91, 33038), (92, 33041), (96, 33080), (100, 33104), (101, 33122), (108, 33167), (113, 33197), (114, 33209), (134, 33353), (143, 33452), (146, 33500), (148, 33524),

Gene: Fitzgerald\_50 Start: 43949, Stop: 44947, Start Num: 19

Candidate Starts for Fitzgerald\_50:

(10, 43865), (13, 43886), (Start: 19 @43949 has 49 MA's), (25, 43985), (33, 44036), (35, 44042), (38, 44060), (42, 44090), (50, 44153), (53, 44168), (70, 44312), (88, 44459), (92, 44492), (94, 44507), (101, 44576), (102, 44591), (112, 44648), (114, 44663), (139, 44840), (146, 44912),

Gene: Galadriel\_52 Start: 43406, Stop: 44413, Start Num: 17

Candidate Starts for Galadriel\_52:

(Start: 17 @43406 has 8 MA's), (18, 43415), (25, 43451), (33, 43502), (35, 43508), (38, 43526), (42, 43556), (50, 43619), (53, 43634), (70, 43778), (88, 43925), (92, 43958), (94, 43973), (101, 44042), (102, 44057), (112, 44114), (114, 44129), (146, 44378),

Gene: Geodirt\_50 Start: 44037, Stop: 45035, Start Num: 19

Candidate Starts for Geodirt\_50:

(10, 43953), (13, 43974), (Start: 19 @44037 has 49 MA's), (25, 44073), (33, 44124), (35, 44130), (38, 44148), (42, 44178), (50, 44241), (53, 44256), (61, 44337), (67, 44376), (70, 44400), (88, 44547), (92,

44580), (94, 44595), (101, 44664), (102, 44679), (112, 44736), (114, 44751), (139, 44928), (146, 45000),

Gene: HC\_46 Start: 32186, Stop: 33181, Start Num: 22

Candidate Starts for HC\_46:

(8, 32051), (Start: 22 @32186 has 32 MA's), (25, 32201), (33, 32249), (41, 32300), (46, 32324), (59, 32435), (79, 32570), (91, 32681), (92, 32684), (96, 32723), (100, 32747), (101, 32765), (108, 32810), (113, 32840), (114, 32852), (124, 32930), (134, 32999), (143, 33098), (146, 33146), (148, 33170),

Gene: Island3\_49 Start: 34787, Stop: 35854, Start Num: 19

Candidate Starts for Island3\_49:

(Start: 19 @34787 has 49 MA's), (21, 34799), (30, 34865), (33, 34874), (38, 34898), (40, 34919), (41, 34925), (44, 34940), (46, 34949), (50, 34991), (53, 35006), (61, 35093), (87, 35291), (92, 35333), (94, 35348), (97, 35375), (99, 35396), (101, 35429), (102, 35444), (105, 35459), (107, 35468), (111, 35498), (114, 35516), (115, 35522), (118, 35555), (120, 35573), (133, 35666), (134, 35672), (143, 35771), (146, 35819), (148, 35843),

Gene: Jabberwocky\_49 Start: 44097, Stop: 45095, Start Num: 19

Candidate Starts for Jabberwocky\_49:

(Start: 19 @44097 has 49 MA's), (25, 44133), (33, 44184), (35, 44190), (38, 44208), (42, 44238), (50, 44301), (53, 44316), (61, 44397), (65, 44412), (67, 44436), (70, 44460), (76, 44508), (88, 44607), (92, 44640), (94, 44655), (101, 44724), (102, 44739), (112, 44796), (114, 44811), (139, 44988), (146, 45060),

Gene: Jamie19\_46 Start: 32655, Stop: 33719, Start Num: 19

Candidate Starts for Jamie19\_46:

(9, 32541), (Start: 19 @32655 has 49 MA's), (21, 32667), (30, 32733), (31, 32736), (33, 32742), (38, 32766), (40, 32787), (41, 32793), (43, 32805), (44, 32808), (46, 32817), (50, 32859), (53, 32874), (75, 33066), (85, 33147), (87, 33159), (88, 33168), (92, 33201), (94, 33216), (97, 33243), (101, 33297), (102, 33312), (105, 33327), (107, 33336), (111, 33366), (114, 33384), (115, 33390), (120, 33441), (129, 33498), (132, 33534), (134, 33540), (142, 33630), (143, 33639), (146, 33687), (147, 33696),

Gene: Jebeks\_48 Start: 32603, Stop: 33595, Start Num: 22

Candidate Starts for Jebeks\_48:

(3, 32282), (6, 32450), (12, 32513), (Start: 22 @32603 has 32 MA's), (25, 32618), (33, 32666), (41, 32717), (54, 32813), (59, 32852), (79, 32987), (91, 33098), (92, 33101), (96, 33140), (100, 33164), (101, 33182), (108, 33227), (113, 33257), (114, 33269), (134, 33413), (143, 33512), (146, 33560), (148, 33584),

Gene: Journey\_50 Start: 31920, Stop: 32912, Start Num: 22

Candidate Starts for Journey\_50:

(3, 31599), (6, 31767), (12, 31830), (Start: 22 @31920 has 32 MA's), (25, 31935), (33, 31983), (41, 32034), (54, 32130), (59, 32169), (79, 32304), (91, 32415), (92, 32418), (96, 32457), (100, 32481), (101, 32499), (108, 32544), (113, 32574), (114, 32586), (134, 32730), (143, 32829), (146, 32877), (148, 32901),

Gene: Jung\_45 Start: 32501, Stop: 33496, Start Num: 22

Candidate Starts for Jung\_45:

(3, 32180), (6, 32348), (12, 32411), (Start: 22 @32501 has 32 MA's), (25, 32516), (33, 32564), (41, 32615), (54, 32711), (59, 32750), (79, 32885), (91, 32996), (92, 32999), (96, 33038), (100, 33062), (101, 33080), (108, 33125), (113, 33155), (114, 33167), (134, 33314), (143, 33413), (146, 33461), (148, 33485),

Gene: Kamashten\_50 Start: 42629, Stop: 43627, Start Num: 19

Candidate Starts for Kamashten\_50:

(4, 42386), (5, 42488), (15, 42575), (Start: 19 @42629 has 49 MA's), (25, 42665), (33, 42716), (35, 42722), (38, 42740), (42, 42770), (50, 42833), (53, 42848), (61, 42929), (67, 42968), (70, 42992), (88, 43139), (92, 43172), (94, 43187), (101, 43256), (102, 43271), (112, 43328), (114, 43343), (139, 43520), (146, 43592),

Gene: Kari\_46 Start: 32540, Stop: 33532, Start Num: 22

Candidate Starts for Kari\_46:

(3, 32219), (6, 32387), (12, 32450), (Start: 22 @32540 has 32 MA's), (25, 32555), (33, 32603), (41, 32654), (54, 32750), (59, 32789), (79, 32924), (91, 33035), (92, 33038), (96, 33077), (100, 33101), (101, 33119), (108, 33164), (113, 33194), (114, 33206), (134, 33350), (143, 33449), (146, 33497), (148, 33521),

Gene: Keitabear\_51 Start: 44151, Stop: 45146, Start Num: 19

Candidate Starts for Keitabear\_51:

(4, 43908), (5, 44010), (15, 44097), (Start: 19 @44151 has 49 MA's), (25, 44187), (33, 44238), (35, 44244), (38, 44262), (42, 44292), (50, 44355), (53, 44370), (61, 44451), (65, 44466), (67, 44490), (70, 44514), (88, 44661), (92, 44694), (94, 44709), (101, 44778), (102, 44793), (112, 44850), (114, 44865), (139, 45039), (146, 45111),

Gene: Kevin1\_50 Start: 33499, Stop: 34563, Start Num: 19

Candidate Starts for Kevin1\_50:

(Start: 19 @33499 has 49 MA's), (21, 33511), (30, 33577), (33, 33586), (38, 33610), (40, 33631), (41, 33637), (44, 33652), (46, 33661), (50, 33703), (53, 33718), (61, 33805), (87, 34003), (92, 34045), (94, 34060), (97, 34087), (99, 34108), (101, 34141), (102, 34156), (105, 34171), (107, 34180), (111, 34210), (114, 34228), (115, 34234), (118, 34267), (120, 34285), (133, 34378), (134, 34384), (142, 34474), (143, 34483), (146, 34531), (147, 34540),

Gene: Kewpiedoll\_52 Start: 43580, Stop: 44578, Start Num: 19

Candidate Starts for Kewpiedoll\_52:

(2, 43229), (4, 43337), (5, 43439), (15, 43526), (Start: 19 @43580 has 49 MA's), (25, 43616), (33, 43667), (35, 43673), (38, 43691), (42, 43721), (50, 43784), (53, 43799), (61, 43880), (65, 43895), (67, 43919), (70, 43943), (76, 43991), (88, 44090), (92, 44123), (94, 44138), (101, 44207), (102, 44222), (112, 44279), (114, 44294), (139, 44471), (146, 44543),

Gene: Langerak\_47 Start: 32559, Stop: 33551, Start Num: 22

Candidate Starts for Langerak\_47:

(3, 32238), (6, 32406), (12, 32469), (Start: 22 @32559 has 32 MA's), (25, 32574), (33, 32622), (41, 32673), (54, 32769), (59, 32808), (79, 32943), (91, 33054), (92, 33057), (96, 33096), (100, 33120), (101, 33138), (108, 33183), (113, 33213), (114, 33225), (134, 33369), (143, 33468), (146, 33516), (148, 33540),

Gene: Lilbeanie\_53 Start: 38965, Stop: 40047, Start Num: 19

Candidate Starts for Lilbeanie\_53:

(Start: 19 @38965 has 49 MA's), (33, 39055), (38, 39079), (39, 39091), (40, 39100), (47, 39136), (53, 39187), (60, 39247), (62, 39271), (72, 39340), (80, 39412), (84, 39451), (92, 39508), (94, 39523), (98, 39550), (101, 39604), (138, 39937), (139, 39949), (141, 39961), (146, 40018),

Gene: Love\_56 Start: 44855, Stop: 45853, Start Num: 19

Candidate Starts for Love\_56:

(4, 44612), (5, 44714), (15, 44801), (Start: 19 @44855 has 49 MA's), (25, 44891), (33, 44942), (35, 44948), (38, 44966), (42, 44996), (50, 45059), (53, 45074), (61, 45155), (65, 45170), (67, 45194), (70,

45218), (88, 45365), (92, 45398), (94, 45413), (101, 45482), (102, 45497), (112, 45554), (114, 45569), (139, 45746), (146, 45818),

Gene: Majeke\_47 Start: 32584, Stop: 33576, Start Num: 22

Candidate Starts for Majeke\_47:

(3, 32263), (6, 32431), (12, 32494), (Start: 22 @32584 has 32 MA's), (25, 32599), (33, 32647), (41, 32698), (54, 32794), (59, 32833), (79, 32968), (91, 33079), (92, 33082), (96, 33121), (100, 33145), (101, 33163), (108, 33208), (113, 33238), (114, 33250), (134, 33394), (143, 33493), (146, 33541), (148, 33565),

Gene: Malithi\_47 Start: 32459, Stop: 33451, Start Num: 22

Candidate Starts for Malithi\_47:

(3, 32138), (6, 32306), (12, 32369), (Start: 22 @32459 has 32 MA's), (25, 32474), (33, 32522), (41, 32573), (54, 32669), (59, 32708), (79, 32843), (91, 32954), (92, 32957), (96, 32996), (100, 33020), (101, 33038), (108, 33083), (113, 33113), (114, 33125), (134, 33269), (143, 33368), (146, 33416), (148, 33440),

Gene: Mangethe\_47 Start: 32584, Stop: 33576, Start Num: 22

Candidate Starts for Mangethe\_47:

(3, 32263), (6, 32431), (12, 32494), (Start: 22 @32584 has 32 MA's), (25, 32599), (33, 32647), (41, 32698), (54, 32794), (59, 32833), (79, 32968), (91, 33079), (92, 33082), (96, 33121), (100, 33145), (101, 33163), (108, 33208), (113, 33238), (114, 33250), (134, 33394), (143, 33493), (146, 33541), (148, 33565),

Gene: Mao1\_67 Start: 48471, Stop: 49460, Start Num: 22

Candidate Starts for Mao1\_67:

(11, 48357), (Start: 22 @48471 has 32 MA's), (28, 48516), (33, 48537), (39, 48573), (41, 48588), (53, 48669), (59, 48723), (64, 48741), (81, 48879), (86, 48915), (90, 48957), (91, 48960), (92, 48963), (100, 49026), (101, 49044), (103, 49062), (104, 49071), (107, 49083), (113, 49119), (114, 49131), (116, 49155), (117, 49164), (122, 49191), (127, 49227), (128, 49230), (131, 49251), (134, 49281), (143, 49380), (145, 49404), (147, 49437),

Gene: Mask\_64 Start: 50876, Stop: 51961, Start Num: 19

Candidate Starts for Mask\_64:

(Start: 19 @50876 has 49 MA's), (26, 50912), (30, 50951), (33, 50960), (38, 50984), (40, 51005), (44, 51026), (46, 51035), (48, 51053), (49, 51086), (53, 51107), (54, 51122), (55, 51128), (57, 51149), (65, 51209), (73, 51269), (74, 51284), (82, 51356), (83, 51359), (92, 51443), (94, 51458), (97, 51485), (101, 51542), (102, 51557), (103, 51560), (105, 51572), (106, 51578), (107, 51581), (111, 51611), (114, 51629), (115, 51635), (120, 51686), (123, 51710), (129, 51743), (130, 51746), (132, 51776), (134, 51782), (136, 51815), (143, 51881), (145, 51905), (147, 51938),

Gene: McKinley\_54 Start: 43977, Stop: 44984, Start Num: 17

Candidate Starts for McKinley\_54:

(Start: 17 @43977 has 8 MA's), (18, 43986), (25, 44022), (33, 44073), (35, 44079), (38, 44097), (42, 44127), (50, 44190), (53, 44205), (61, 44286), (65, 44301), (67, 44325), (70, 44349), (88, 44496), (92, 44529), (94, 44544), (101, 44613), (102, 44628), (112, 44685), (114, 44700), (139, 44877), (146, 44949),

Gene: Megiddo\_46 Start: 32800, Stop: 33774, Start Num: 22

Candidate Starts for Megiddo\_46:

(Start: 22 @32800 has 32 MA's), (25, 32818), (33, 32866), (41, 32917), (44, 32932), (46, 32941), (59, 33052), (79, 33187), (91, 33298), (92, 33301), (96, 33340), (100, 33364), (101, 33382), (108, 33427), (113, 33457), (114, 33469), (122, 33526), (134, 33595), (143, 33694), (146, 33742),

Gene: MelBins\_50 Start: 42252, Stop: 43313, Start Num: 19

Candidate Starts for MelBins\_50:

(Start: 19 @42252 has 49 MA's), (25, 42288), (33, 42339), (38, 42363), (40, 42384), (47, 42420), (50, 42456), (53, 42471), (56, 42504), (70, 42615), (88, 42762), (89, 42783), (92, 42795), (94, 42810), (101, 42891), (102, 42906), (109, 42948), (110, 42951), (119, 43020), (125, 43080), (137, 43176), (144, 43248), (146, 43284),

Gene: MichelleMyBell\_48 Start: 32199, Stop: 33182, Start Num: 23

Candidate Starts for MichelleMyBell\_48:

(Start: 23 @32199 has 1 MA's), (38, 32286), (39, 32298), (41, 32313), (44, 32328), (45, 32334), (53, 32394), (59, 32448), (64, 32466), (66, 32475), (71, 32523), (74, 32547), (81, 32604), (86, 32640), (90, 32682), (91, 32685), (92, 32688), (93, 32694), (94, 32703), (100, 32751), (101, 32769), (103, 32787), (107, 32808), (113, 32844), (114, 32856), (117, 32889), (128, 32949), (131, 32973), (134, 33003), (135, 33021), (143, 33102), (145, 33126), (147, 33159),

Gene: MoontowerMania\_51 Start: 43863, Stop: 44861, Start Num: 19

Candidate Starts for MoontowerMania\_51:

(4, 43620), (5, 43722), (15, 43809), (Start: 19 @43863 has 49 MA's), (25, 43899), (33, 43950), (35, 43956), (38, 43974), (42, 44004), (50, 44067), (53, 44082), (61, 44163), (65, 44178), (67, 44202), (70, 44226), (88, 44373), (92, 44406), (94, 44421), (101, 44490), (102, 44505), (112, 44562), (114, 44577), (139, 44754), (146, 44826),

Gene: Nazo\_49 Start: 34648, Stop: 35700, Start Num: 22

Candidate Starts for Nazo\_49:

(20, 34630), (Start: 22 @34648 has 32 MA's), (27, 34687), (34, 34723), (38, 34744), (39, 34756), (43, 34783), (59, 34936), (61, 34963), (67, 35002), (78, 35083), (79, 35089), (88, 35164), (91, 35191), (101, 35272), (104, 35299), (133, 35515), (134, 35521), (143, 35620), (146, 35668),

Gene: Necropolis\_46 Start: 32615, Stop: 33607, Start Num: 22

Candidate Starts for Necropolis\_46:

(3, 32294), (6, 32462), (12, 32525), (Start: 22 @32615 has 32 MA's), (25, 32630), (33, 32678), (41, 32729), (54, 32825), (59, 32864), (79, 32999), (91, 33110), (92, 33113), (96, 33152), (100, 33176), (101, 33194), (108, 33239), (113, 33269), (114, 33281), (134, 33425), (143, 33524), (146, 33572), (148, 33596),

Gene: Nenae\_52 Start: 34366, Stop: 35430, Start Num: 19

Candidate Starts for Nenae\_52:

(9, 34252), (Start: 19 @34366 has 49 MA's), (21, 34378), (30, 34444), (31, 34447), (33, 34453), (38, 34477), (40, 34498), (41, 34504), (43, 34516), (44, 34519), (46, 34528), (50, 34570), (53, 34585), (75, 34777), (85, 34858), (87, 34870), (88, 34879), (92, 34912), (94, 34927), (97, 34954), (101, 35008), (102, 35023), (105, 35038), (107, 35047), (111, 35077), (114, 35095), (115, 35101), (120, 35152), (129, 35209), (132, 35245), (134, 35251), (142, 35341), (143, 35350), (146, 35398), (147, 35407),

Gene: Nordenberg\_47 Start: 42762, Stop: 43769, Start Num: 17

Candidate Starts for Nordenberg\_47:

(Start: 17 @42762 has 8 MA's), (18, 42771), (25, 42807), (33, 42858), (35, 42864), (38, 42882), (42, 42912), (50, 42975), (53, 42990), (58, 43041), (69, 43119), (88, 43281), (92, 43314), (94, 43329), (101, 43398), (102, 43413), (112, 43470), (114, 43485), (146, 43734),

Gene: Panchino\_45 Start: 34001, Stop: 35065, Start Num: 19

Candidate Starts for Panchino\_45:

(9, 33887), (Start: 19 @34001 has 49 MA's), (21, 34013), (30, 34079), (31, 34082), (33, 34088), (38, 34112), (40, 34133), (41, 34139), (43, 34151), (44, 34154), (46, 34163), (50, 34205), (53, 34220), (75, 34412), (85, 34493), (87, 34505), (88, 34514), (92, 34547), (94, 34562), (97, 34589), (101, 34643), (102, 34658), (105, 34673), (107, 34682), (111, 34712), (114, 34730), (115, 34736), (120, 34787), (129, 34844), (132, 34880), (134, 34886), (142, 34976), (143, 34985), (146, 35033), (147, 35042),

Gene: Paries\_55 Start: 44233, Stop: 45240, Start Num: 17

Candidate Starts for Paries\_55:

(Start: 17 @44233 has 8 MA's), (18, 44242), (25, 44278), (33, 44329), (35, 44335), (38, 44353), (42, 44383), (50, 44446), (53, 44461), (70, 44605), (88, 44752), (92, 44785), (94, 44800), (101, 44869), (102, 44884), (112, 44941), (114, 44956), (146, 45205),

Gene: PhancyPhin\_52 Start: 34360, Stop: 35424, Start Num: 19

Candidate Starts for PhancyPhin\_52:

(9, 34246), (Start: 19 @34360 has 49 MA's), (21, 34372), (30, 34438), (31, 34441), (33, 34447), (38, 34471), (40, 34492), (41, 34498), (43, 34510), (44, 34513), (46, 34522), (50, 34564), (53, 34579), (75, 34771), (85, 34852), (87, 34864), (88, 34873), (92, 34906), (94, 34921), (97, 34948), (101, 35002), (102, 35017), (105, 35032), (107, 35041), (111, 35071), (114, 35089), (115, 35095), (120, 35146), (129, 35203), (132, 35239), (134, 35245), (142, 35335), (143, 35344), (146, 35392), (147, 35401),

Gene: Phayonce\_47 Start: 34633, Stop: 35622, Start Num: 22

Candidate Starts for Phayonce\_47:

(11, 34519), (Start: 22 @34633 has 32 MA's), (28, 34678), (33, 34699), (39, 34735), (41, 34750), (53, 34831), (59, 34885), (64, 34903), (81, 35041), (86, 35077), (90, 35119), (91, 35122), (92, 35125), (100, 35188), (101, 35206), (103, 35224), (104, 35233), (107, 35245), (113, 35281), (114, 35293), (116, 35317), (117, 35326), (122, 35353), (127, 35389), (128, 35392), (131, 35413), (134, 35443), (143, 35542), (145, 35566), (147, 35599),

Gene: Phegasus\_47 Start: 32551, Stop: 33543, Start Num: 22

Candidate Starts for Phegasus\_47:

(3, 32230), (6, 32398), (12, 32461), (Start: 22 @32551 has 32 MA's), (25, 32566), (33, 32614), (41, 32665), (54, 32761), (59, 32800), (79, 32935), (91, 33046), (92, 33049), (96, 33088), (100, 33112), (101, 33130), (108, 33175), (113, 33205), (114, 33217), (134, 33361), (143, 33460), (146, 33508), (148, 33532),

Gene: Philonius\_48 Start: 31652, Stop: 32644, Start Num: 22

Candidate Starts for Philonius\_48:

(Start: 22 @31652 has 32 MA's), (25, 31670), (33, 31718), (41, 31769), (44, 31784), (46, 31793), (59, 31904), (79, 32039), (91, 32150), (92, 32153), (96, 32192), (100, 32216), (101, 32234), (108, 32279), (113, 32309), (114, 32321), (134, 32465), (143, 32564), (146, 32612),

Gene: Phrann\_49 Start: 34643, Stop: 35707, Start Num: 19

Candidate Starts for Phrann\_49:

(9, 34529), (Start: 19 @34643 has 49 MA's), (21, 34655), (30, 34721), (31, 34724), (33, 34730), (38, 34754), (40, 34775), (41, 34781), (43, 34793), (44, 34796), (46, 34805), (50, 34847), (53, 34862), (75, 35054), (85, 35135), (87, 35147), (88, 35156), (92, 35189), (94, 35204), (97, 35231), (101, 35285), (102, 35300), (105, 35315), (107, 35324), (111, 35354), (114, 35372), (115, 35378), (120, 35429), (129, 35486), (132, 35522), (134, 35528), (142, 35618), (143, 35627), (146, 35675), (147, 35684),

Gene: Polkaroo\_47 Start: 32547, Stop: 33539, Start Num: 22

Candidate Starts for Polkaroo\_47:

(3, 32226), (6, 32394), (12, 32457), (Start: 22 @32547 has 32 MA's), (25, 32562), (33, 32610), (41, 32661), (54, 32757), (59, 32796), (79, 32931), (91, 33042), (92, 33045), (96, 33084), (100, 33108),

(101, 33126), (108, 33171), (113, 33201), (114, 33213), (134, 33357), (143, 33456), (146, 33504), (148, 33528),

Gene: Purgamenstris\_52 Start: 34364, Stop: 35428, Start Num: 19

Candidate Starts for Purgamenstris\_52:

(9, 34250), (Start: 19 @34364 has 49 MA's), (21, 34376), (30, 34442), (31, 34445), (33, 34451), (38, 34475), (40, 34496), (41, 34502), (43, 34514), (44, 34517), (46, 34526), (50, 34568), (53, 34583), (75, 34775), (85, 34856), (87, 34868), (88, 34877), (92, 34910), (94, 34925), (97, 34952), (101, 35006), (102, 35021), (105, 35036), (107, 35045), (111, 35075), (114, 35093), (115, 35099), (120, 35150), (129, 35207), (132, 35243), (134, 35249), (142, 35339), (143, 35348), (146, 35396), (147, 35405),

Gene: Purky\_52 Start: 35044, Stop: 36114, Start Num: 22

Candidate Starts for Purky\_52:

(20, 35026), (Start: 22 @35044 has 32 MA's), (29, 35104), (32, 35113), (34, 35119), (38, 35140), (39, 35152), (43, 35179), (59, 35332), (61, 35359), (78, 35479), (81, 35506), (88, 35560), (91, 35587), (95, 35614), (101, 35668), (104, 35695), (133, 35929), (134, 35935), (143, 36034), (146, 36082),

Gene: QueenHazel\_44 Start: 32701, Stop: 33696, Start Num: 22

Candidate Starts for QueenHazel\_44:

(8, 32566), (Start: 22 @32701 has 32 MA's), (25, 32716), (33, 32764), (41, 32815), (46, 32839), (59, 32950), (79, 33085), (91, 33196), (92, 33199), (96, 33238), (100, 33262), (101, 33280), (108, 33325), (113, 33355), (114, 33367), (122, 33424), (134, 33514), (143, 33613), (146, 33661), (148, 33685),

Gene: Raymond7\_46 Start: 34152, Stop: 35216, Start Num: 19

Candidate Starts for Raymond7\_46:

(9, 34038), (Start: 19 @34152 has 49 MA's), (21, 34164), (30, 34230), (31, 34233), (33, 34239), (38, 34263), (40, 34284), (41, 34290), (43, 34302), (44, 34305), (46, 34314), (50, 34356), (53, 34371), (75, 34563), (85, 34644), (87, 34656), (88, 34665), (92, 34698), (94, 34713), (97, 34740), (101, 34794), (102, 34809), (105, 34824), (107, 34833), (111, 34863), (114, 34881), (115, 34887), (120, 34938), (129, 34995), (132, 35031), (134, 35037), (142, 35127), (143, 35136), (146, 35184), (147, 35193),

Gene: Rebel\_44 Start: 30494, Stop: 31558, Start Num: 19

Candidate Starts for Rebel\_44:

(9, 30380), (Start: 19 @30494 has 49 MA's), (21, 30506), (30, 30572), (31, 30575), (33, 30581), (38, 30605), (40, 30626), (41, 30632), (43, 30644), (44, 30647), (46, 30656), (50, 30698), (53, 30713), (75, 30905), (85, 30986), (87, 30998), (88, 31007), (92, 31040), (94, 31055), (97, 31082), (101, 31136), (102, 31151), (105, 31166), (107, 31175), (111, 31205), (114, 31223), (115, 31229), (120, 31280), (129, 31337), (132, 31373), (134, 31379), (142, 31469), (143, 31478), (146, 31526), (147, 31535),

Gene: Redi\_52 Start: 34363, Stop: 35427, Start Num: 19

Candidate Starts for Redi\_52:

(9, 34249), (Start: 19 @34363 has 49 MA's), (21, 34375), (30, 34441), (31, 34444), (33, 34450), (38, 34474), (40, 34495), (41, 34501), (43, 34513), (44, 34516), (46, 34525), (50, 34567), (53, 34582), (75, 34774), (85, 34855), (87, 34867), (88, 34876), (92, 34909), (94, 34924), (97, 34951), (101, 35005), (102, 35020), (105, 35035), (107, 35044), (111, 35074), (114, 35092), (115, 35098), (120, 35149), (129, 35206), (132, 35242), (134, 35248), (142, 35338), (143, 35347), (146, 35395), (147, 35404),

Gene: Rofo\_51 Start: 43335, Stop: 44345, Start Num: 17

Candidate Starts for Rofo\_51:

(Start: 17 @43335 has 8 MA's), (18, 43344), (25, 43380), (33, 43434), (35, 43440), (38, 43458), (42, 43488), (50, 43551), (53, 43566), (61, 43647), (70, 43710), (88, 43857), (92, 43890), (94, 43905), (101, 43974), (102, 43989), (112, 44046), (114, 44061), (138, 44226), (146, 44310),

Gene: Rubeelu\_51 Start: 34063, Stop: 35127, Start Num: 19

Candidate Starts for Rubeelu\_51:

(Start: 19 @34063 has 49 MA's), (21, 34075), (30, 34141), (33, 34150), (38, 34174), (40, 34195), (41, 34201), (44, 34216), (46, 34225), (50, 34267), (53, 34282), (61, 34369), (87, 34567), (92, 34609), (94, 34624), (97, 34651), (99, 34672), (101, 34705), (102, 34720), (105, 34735), (107, 34744), (111, 34774), (114, 34792), (115, 34798), (118, 34831), (120, 34849), (133, 34942), (134, 34948), (142, 35038), (143, 35047), (146, 35095), (147, 35104),

Gene: Sanjuju\_50 Start: 44082, Stop: 45080, Start Num: 19

Candidate Starts for Sanjuju\_50:

(10, 43998), (13, 44019), (Start: 19 @44082 has 49 MA's), (25, 44118), (33, 44169), (35, 44175), (38, 44193), (42, 44223), (50, 44286), (53, 44301), (70, 44445), (88, 44592), (92, 44625), (94, 44640), (101, 44709), (102, 44724), (112, 44781), (114, 44796), (139, 44973), (146, 45045),

Gene: Sbash\_58 Start: 41406, Stop: 42380, Start Num: 22

Candidate Starts for Sbash\_58:

(Start: 22 @41406 has 32 MA's), (25, 41421), (33, 41469), (36, 41481), (41, 41520), (45, 41541), (46, 41544), (48, 41562), (68, 41709), (75, 41769), (77, 41778), (86, 41850), (87, 41859), (92, 41898), (96, 41937), (100, 41961), (101, 41979), (103, 41997), (107, 42018), (108, 42024), (113, 42054), (133, 42195), (134, 42201), (146, 42348),

Gene: Sedona\_51 Start: 43831, Stop: 44826, Start Num: 19

Candidate Starts for Sedona\_51:

(4, 43588), (5, 43690), (15, 43777), (Start: 19 @43831 has 49 MA's), (25, 43867), (33, 43918), (35, 43924), (38, 43942), (42, 43972), (50, 44035), (53, 44050), (61, 44131), (65, 44146), (67, 44170), (70, 44194), (88, 44341), (92, 44374), (94, 44389), (101, 44458), (102, 44473), (112, 44530), (114, 44545), (139, 44719), (146, 44791),

Gene: Sejanus\_64 Start: 49582, Stop: 50574, Start Num: 22

Candidate Starts for Sejanus\_64:

(11, 49468), (Start: 22 @49582 has 32 MA's), (28, 49627), (33, 49648), (38, 49672), (39, 49684), (41, 49699), (52, 49777), (53, 49780), (59, 49834), (64, 49852), (79, 49969), (81, 49990), (86, 50026), (90, 50068), (91, 50071), (92, 50074), (100, 50137), (101, 50155), (103, 50173), (107, 50194), (113, 50230), (114, 50242), (122, 50302), (127, 50338), (128, 50341), (131, 50365), (134, 50395), (135, 50413), (143, 50494), (145, 50518), (147, 50551),

Gene: Shivanishola\_51 Start: 42552, Stop: 43547, Start Num: 19

Candidate Starts for Shivanishola\_51:

(4, 42309), (5, 42411), (15, 42498), (Start: 19 @42552 has 49 MA's), (25, 42588), (33, 42639), (35, 42645), (38, 42663), (42, 42693), (50, 42756), (53, 42771), (61, 42852), (65, 42867), (67, 42891), (70, 42915), (88, 43062), (92, 43095), (94, 43110), (101, 43179), (102, 43194), (112, 43251), (114, 43266), (139, 43440), (146, 43512),

Gene: ShrimpFriedEgg\_52 Start: 34363, Stop: 35427, Start Num: 19

Candidate Starts for ShrimpFriedEgg\_52:

(9, 34249), (Start: 19 @34363 has 49 MA's), (21, 34375), (30, 34441), (31, 34444), (33, 34450), (38, 34474), (40, 34495), (41, 34501), (43, 34513), (44, 34516), (46, 34525), (50, 34567), (53, 34582), (75, 34774), (85, 34855), (87, 34867), (88, 34876), (92, 34909), (94, 34924), (97, 34951), (101, 35005), (102, 35020), (105, 35035), (107, 35044), (111, 35074), (114, 35092), (115, 35098), (120, 35149), (129, 35206), (132, 35242), (134, 35248), (142, 35338), (143, 35347), (146, 35395), (147, 35404),

Gene: Shweta\_46 Start: 32422, Stop: 33489, Start Num: 19

Candidate Starts for Shweta\_46:



(9, 32308), (Start: 19 @32422 has 49 MA's), (21, 32434), (30, 32500), (31, 32503), (33, 32509), (38, 32533), (40, 32554), (41, 32560), (43, 32572), (44, 32575), (46, 32584), (50, 32626), (53, 32641), (75, 32833), (85, 32914), (87, 32926), (88, 32935), (92, 32968), (94, 32983), (97, 33010), (101, 33064), (102, 33079), (105, 33094), (107, 33103), (111, 33133), (114, 33151), (115, 33157), (120, 33208), (129, 33265), (134, 33307), (143, 33406), (146, 33454), (148, 33478),

Gene: Silvy\_48 Start: 32126, Stop: 33115, Start Num: 22

Candidate Starts for Silvy\_48:

(3, 31805), (6, 31973), (12, 32036), (Start: 22 @32126 has 32 MA's), (25, 32141), (33, 32189), (41, 32240), (54, 32336), (59, 32375), (79, 32510), (91, 32621), (92, 32624), (96, 32663), (100, 32687), (101, 32705), (108, 32750), (113, 32780), (114, 32792), (134, 32936), (143, 33035), (146, 33083),

Gene: Snekmaggedon\_46 Start: 32655, Stop: 33719, Start Num: 19

Candidate Starts for Snekmaggedon\_46:

(9, 32541), (Start: 19 @32655 has 49 MA's), (21, 32667), (30, 32733), (31, 32736), (33, 32742), (38, 32766), (40, 32787), (41, 32793), (43, 32805), (44, 32808), (46, 32817), (50, 32859), (53, 32874), (75, 33066), (85, 33147), (87, 33159), (88, 33168), (92, 33201), (94, 33216), (97, 33243), (101, 33297), (102, 33312), (105, 33327), (107, 33336), (111, 33366), (114, 33384), (115, 33390), (120, 33441), (129, 33498), (132, 33534), (134, 33540), (142, 33630), (143, 33639), (146, 33687), (147, 33696),

Gene: SpongeBob\_46 Start: 32655, Stop: 33719, Start Num: 19

Candidate Starts for SpongeBob\_46:

(9, 32541), (Start: 19 @32655 has 49 MA's), (21, 32667), (30, 32733), (31, 32736), (33, 32742), (38, 32766), (40, 32787), (41, 32793), (43, 32805), (44, 32808), (46, 32817), (50, 32859), (53, 32874), (75, 33066), (85, 33147), (87, 33159), (88, 33168), (92, 33201), (94, 33216), (97, 33243), (101, 33297), (102, 33312), (105, 33327), (107, 33336), (111, 33366), (114, 33384), (115, 33390), (120, 33441), (129, 33498), (132, 33534), (134, 33540), (142, 33630), (143, 33639), (146, 33687), (147, 33696),

Gene: Stultus\_49 Start: 42729, Stop: 43727, Start Num: 19

Candidate Starts for Stultus\_49:

(Start: 19 @42729 has 49 MA's), (25, 42765), (33, 42816), (35, 42822), (38, 42840), (42, 42870), (50, 42933), (53, 42948), (61, 43029), (65, 43044), (67, 43068), (70, 43092), (88, 43239), (92, 43272), (94, 43287), (101, 43356), (102, 43371), (112, 43428), (114, 43443), (139, 43620), (146, 43692),

Gene: Tangent\_52 Start: 42958, Stop: 43968, Start Num: 17

Candidate Starts for Tangent\_52:

(Start: 17 @42958 has 8 MA's), (18, 42967), (25, 43003), (33, 43057), (35, 43063), (38, 43081), (42, 43111), (50, 43174), (53, 43189), (61, 43270), (70, 43333), (88, 43480), (92, 43513), (94, 43528), (101, 43597), (102, 43612), (112, 43669), (114, 43684), (138, 43849), (146, 43933),

Gene: Tardus\_53 Start: 43285, Stop: 44328, Start Num: 19

Candidate Starts for Tardus\_53:

(Start: 19 @43285 has 49 MA's), (33, 43375), (38, 43399), (39, 43411), (42, 43429), (53, 43507), (67, 43609), (80, 43714), (88, 43780), (94, 43828), (101, 43900), (102, 43915), (106, 43936), (109, 43957), (110, 43960), (122, 44065), (126, 44098), (130, 44110), (144, 44260), (146, 44296),

Gene: Techage\_46 Start: 32569, Stop: 33561, Start Num: 22

Candidate Starts for Techage\_46:

(3, 32248), (6, 32416), (12, 32479), (Start: 22 @32569 has 32 MA's), (25, 32584), (33, 32632), (41, 32683), (54, 32779), (59, 32818), (79, 32953), (91, 33064), (92, 33067), (96, 33106), (100, 33130), (101, 33148), (108, 33193), (113, 33223), (114, 33235), (134, 33379), (143, 33478), (146, 33526), (148, 33550),

Gene: Thing3\_50 Start: 42629, Stop: 43627, Start Num: 19

Candidate Starts for Thing3\_50:

(4, 42386), (5, 42488), (15, 42575), (Start: 19 @42629 has 49 MA's), (25, 42665), (33, 42716), (35, 42722), (38, 42740), (42, 42770), (50, 42833), (53, 42848), (61, 42929), (67, 42968), (70, 42992), (88, 43139), (92, 43172), (94, 43187), (101, 43256), (102, 43271), (112, 43328), (114, 43343), (139, 43520), (146, 43592),

Gene: ThulaThula\_53 Start: 37120, Stop: 38187, Start Num: 19

Candidate Starts for ThulaThula\_53:

(9, 37006), (Start: 19 @37120 has 49 MA's), (21, 37132), (33, 37207), (38, 37231), (40, 37252), (44, 37273), (46, 37282), (50, 37324), (53, 37339), (56, 37372), (75, 37531), (77, 37540), (87, 37624), (92, 37666), (94, 37681), (97, 37708), (99, 37729), (101, 37762), (102, 37777), (105, 37792), (107, 37801), (111, 37831), (114, 37849), (118, 37888), (120, 37906), (133, 38002), (134, 38008), (143, 38107),

Gene: Venti\_47 Start: 32543, Stop: 33535, Start Num: 22

Candidate Starts for Venti\_47:

(3, 32222), (6, 32390), (12, 32453), (Start: 22 @32543 has 32 MA's), (25, 32558), (33, 32606), (41, 32657), (54, 32753), (59, 32792), (79, 32927), (91, 33038), (92, 33041), (96, 33080), (100, 33104), (101, 33122), (108, 33167), (113, 33197), (114, 33209), (134, 33353), (143, 33452), (146, 33500), (148, 33524),

Gene: Verity\_51 Start: 44353, Stop: 45396, Start Num: 19

Candidate Starts for Verity\_51:

(Start: 19 @44353 has 49 MA's), (33, 44443), (38, 44467), (39, 44479), (53, 44575), (80, 44782), (88, 44848), (94, 44896), (101, 44968), (102, 44983), (106, 45004), (109, 45025), (110, 45028), (114, 45055), (122, 45133), (126, 45166), (130, 45178), (140, 45301), (144, 45328), (146, 45364),

Gene: Vidya\_46 Start: 32576, Stop: 33568, Start Num: 22

Candidate Starts for Vidya\_46:

(3, 32255), (6, 32423), (12, 32486), (Start: 22 @32576 has 32 MA's), (25, 32591), (33, 32639), (41, 32690), (54, 32786), (59, 32825), (79, 32960), (91, 33071), (92, 33074), (96, 33113), (100, 33137), (101, 33155), (108, 33200), (113, 33230), (114, 33242), (134, 33386), (143, 33485), (146, 33533), (148, 33557),

Gene: Xavia\_54 Start: 39834, Stop: 40823, Start Num: 24

Candidate Starts for Xavia\_54:

(7, 39696), (9, 39705), (14, 39759), (16, 39768), (Start: 24 @39834 has 1 MA's), (28, 39873), (33, 39894), (37, 39915), (39, 39930), (41, 39945), (45, 39966), (48, 39987), (51, 40014), (53, 40026), (55, 40047), (57, 40062), (59, 40083), (63, 40098), (71, 40158), (79, 40218), (86, 40284), (91, 40329), (92, 40332), (93, 40338), (94, 40347), (101, 40413), (111, 40482), (114, 40500), (117, 40530), (121, 40545), (128, 40590), (131, 40614), (134, 40644), (135, 40662), (143, 40743), (147, 40800),

Gene: Xula\_43 Start: 32303, Stop: 33298, Start Num: 22

Candidate Starts for Xula\_43:

(8, 32168), (Start: 22 @32303 has 32 MA's), (25, 32318), (33, 32366), (41, 32417), (46, 32441), (59, 32552), (79, 32687), (91, 32798), (92, 32801), (96, 32840), (100, 32864), (101, 32882), (108, 32927), (113, 32957), (114, 32969), (122, 33026), (134, 33116), (143, 33215), (146, 33263), (148, 33287),

Gene: Zilizebeth\_47 Start: 32575, Stop: 33567, Start Num: 22

Candidate Starts for Zilizebeth\_47:

(3, 32254), (6, 32422), (12, 32485), (Start: 22 @32575 has 32 MA's), (25, 32590), (33, 32638), (41, 32689), (54, 32785), (59, 32824), (79, 32959), (91, 33070), (92, 33073), (96, 33112), (100, 33136), (101, 33154), (108, 33199), (113, 33229), (114, 33241), (134, 33385), (143, 33484), (146, 33532),

(148, 33556),

Gene: Zipp\_52 Start: 44268, Stop: 45311, Start Num: 19

Candidate Starts for Zipp\_52:

(Start: 19 @44268 has 49 MA's), (33, 44358), (38, 44382), (39, 44394), (53, 44490), (80, 44697), (88, 44763), (94, 44811), (101, 44883), (102, 44898), (106, 44919), (109, 44940), (110, 44943), (114, 44970), (122, 45048), (126, 45081), (130, 45093), (140, 45216), (144, 45243), (146, 45279),

Gene: Zitch\_54 Start: 42394, Stop: 43437, Start Num: 19

Candidate Starts for Zitch\_54:

(Start: 19 @42394 has 49 MA's), (33, 42484), (38, 42508), (39, 42520), (42, 42538), (53, 42616), (56, 42649), (80, 42823), (88, 42889), (94, 42937), (101, 43009), (102, 43024), (106, 43045), (109, 43066), (110, 43069), (122, 43174), (126, 43207), (130, 43219), (144, 43369),