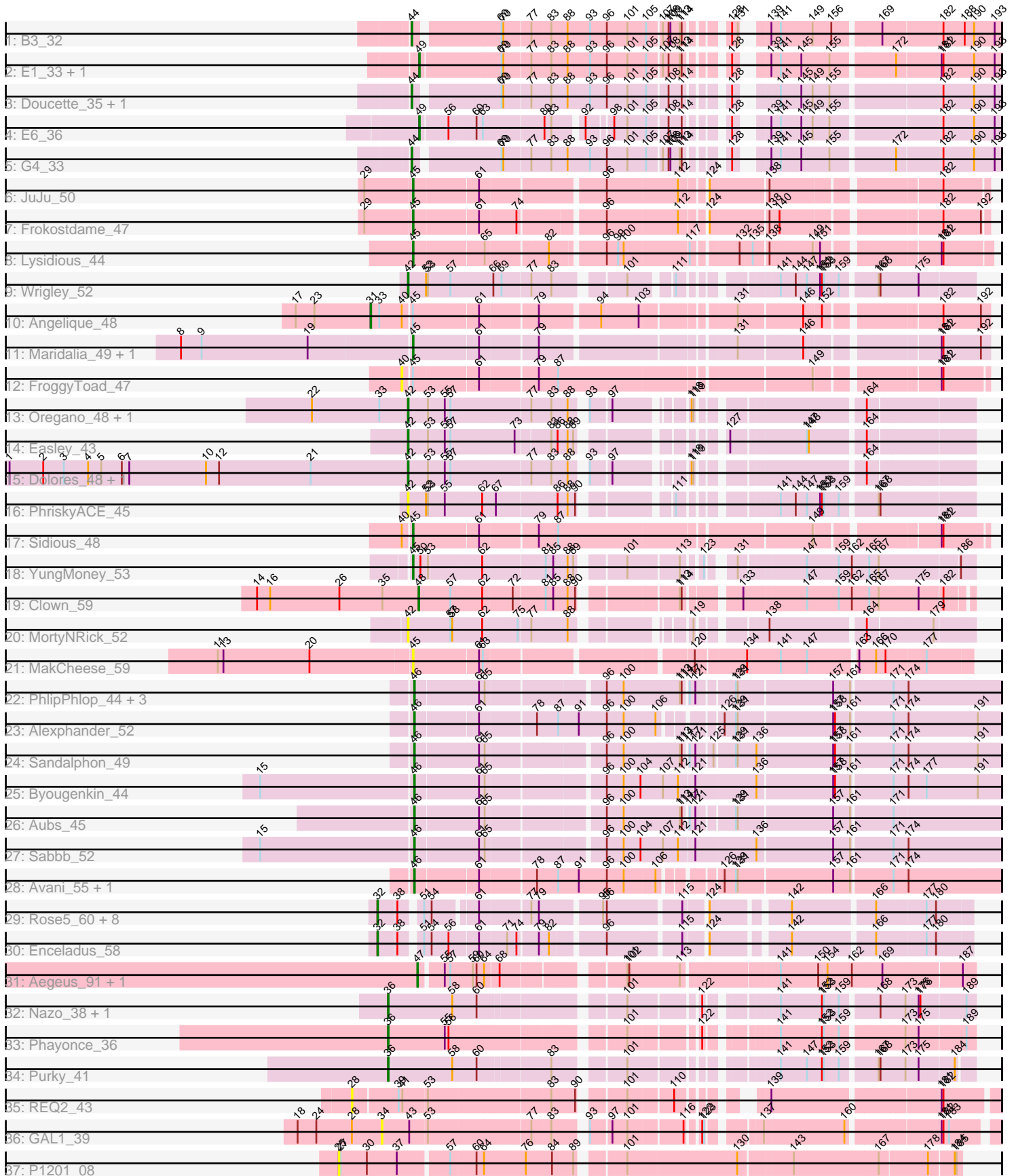


Pham 224624



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 224624 Report

This analysis was run 03/28/25 on database version 593.

Pham number 224624 has 56 members, 11 are drafts.

Phages represented in each track:

- Track 1 : B3\_32
- Track 2 : E1\_33, Anatole\_33
- Track 3 : Doucette\_35, B22\_33
- Track 4 : E6\_36
- Track 5 : G4\_33
- Track 6 : JuJu\_50
- Track 7 : Frokostdame\_47
- Track 8 : Lysidious\_44
- Track 9 : Wrigley\_52
- Track 10 : Angelique\_48
- Track 11 : Maridalia\_49, Bunnybear\_41
- Track 12 : FroggyToad\_47
- Track 13 : Oregano\_48, Annalisa\_45
- Track 14 : Easley\_43
- Track 15 : Dolores\_48, WinkNick\_49
- Track 16 : PhriskyACE\_45
- Track 17 : Sidious\_48
- Track 18 : YungMoney\_53
- Track 19 : Clown\_59
- Track 20 : MortyNRick\_52
- Track 21 : MakCheese\_59
- Track 22 : PhlipPhlop\_44, OwlsT2W\_45, Gandalph\_47, EmiMonkey\_44
- Track 23 : Alexphander\_52
- Track 24 : Sandalphon\_49
- Track 25 : Byougenkin\_44
- Track 26 : Aubs\_45
- Track 27 : Sabbb\_52
- Track 28 : Avani\_55, Tchotchke\_49
- Track 29 : Rose5\_60, CicholasNage\_59, JoeDirt\_59, Silverleaf\_60, AvadaKedavra\_60, Tyson\_60, Acquire49\_60, Wyatt2\_61, Poochiewood\_60
- Track 30 : Enceladus\_58
- Track 31 : Aegeus\_91, Baudelaire\_91
- Track 32 : Nazo\_38, BigNuz\_37
- Track 33 : Phayonce\_36
- Track 34 : Purky\_41
- Track 35 : REQ2\_43
- Track 36 : GAL1\_39

- Track 37 : P1201\_08

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

The start number called the most often in the published annotations is 32, it was called in 9 of the 45 non-draft genes in the pham.

Genes that call this "Most Annotated" start:

- Acquire49\_60, AvadaKedavra\_60, CicholasNage\_59, Enceladus\_58, JoeDirt\_59, Poochiewood\_60, Rose5\_60, Silverleaf\_60, Tyson\_60, Wyatt2\_61,

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

- 

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

- Aegeus\_91, Alexphander\_52, Anatole\_33, Angelique\_48, Annalisa\_45, Aubs\_45, Avani\_55, B22\_33, B3\_32, Baudelaire\_91, BigNuz\_37, Bunnybear\_41, Byougenkin\_44, Clown\_59, Dolores\_48, Doucette\_35, E1\_33, E6\_36, Easley\_43, EmiMonkey\_44, FroggyToad\_47, Frokostdame\_47, G4\_33, GAL1\_39, Gandolph\_47, JuJu\_50, Lysidious\_44, MakCheese\_59, Maridalia\_49, MortyNRick\_52, Nazo\_38, Oregano\_48, OwlsT2W\_45, P1201\_08, Phayonce\_36, PhilipPhlop\_44, PhriskyACE\_45, Purky\_41, REQ2\_43, Sabbb\_52, Sandalphon\_49, Sidious\_48, Tchotchke\_49, WinkNick\_49, Wrigley\_52, YungMoney\_53,

**Summary by start number:**

Start 25:

- Found in 1 of 56 ( 1.8% ) of genes in pham
- No Manual Annotations of this start.
- Called 100.0% of time when present
- Phage (with cluster) where this start called: P1201\_08 (singleton),

Start 28:

- Found in 2 of 56 ( 3.6% ) of genes in pham
- No Manual Annotations of this start.
- Called 50.0% of time when present
- Phage (with cluster) where this start called: REQ2\_43 (singleton),

Start 31:

- Found in 1 of 56 ( 1.8% ) of genes in pham
- Manual Annotations of this start: 1 of 45
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Angelique\_48 (CY1),

Start 32:

- Found in 10 of 56 ( 17.9% ) of genes in pham
- Manual Annotations of this start: 9 of 45
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Acquire49\_60 (L1), AvadaKedavra\_60 (L1), CicholasNage\_59 (L1), Enceladus\_58 (L1), JoeDirt\_59 (L1), Poochiewood\_60

(L1), Rose5\_60 (L1), Silverleaf\_60 (L1), Tyson\_60 (L1), Wyatt2\_61 (L1),

Start 34:

- Found in 1 of 56 ( 1.8% ) of genes in pham
- No Manual Annotations of this start.
- Called 100.0% of time when present
- Phage (with cluster) where this start called: GAL1\_39 (singleton),

Start 36:

- Found in 4 of 56 ( 7.1% ) of genes in pham
- Manual Annotations of this start: 4 of 45
- Called 100.0% of time when present
- Phage (with cluster) where this start called: BigNuz\_37 (P4), Nazo\_38 (P4), Phayonce\_36 (P5), Purky\_41 (P6),

Start 40:

- Found in 3 of 56 ( 5.4% ) of genes in pham
- No Manual Annotations of this start.
- Called 33.3% of time when present
- Phage (with cluster) where this start called: FroggyToad\_47 (CZ2),

Start 42:

- Found in 8 of 56 ( 14.3% ) of genes in pham
- Manual Annotations of this start: 6 of 45
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Annalisa\_45 (CZ4), Dolores\_48 (CZ4), Easley\_43 (CZ4), MortyNRick\_52 (DN), Oregano\_48 (CZ4), PhriskyACE\_45 (CZ4), WinkNick\_49 (CZ4), Wrigley\_52 (CY),

Start 44:

- Found in 4 of 56 ( 7.1% ) of genes in pham
- Manual Annotations of this start: 4 of 45
- Called 100.0% of time when present
- Phage (with cluster) where this start called: B22\_33 (BW), B3\_32 (BV), Doucette\_35 (BW), G4\_33 (BW),

Start 45:

- Found in 10 of 56 ( 17.9% ) of genes in pham
- Manual Annotations of this start: 7 of 45
- Called 80.0% of time when present
- Phage (with cluster) where this start called: Bunnybear\_41 (CZ), Frokostdame\_47 (CV), JuJu\_50 (CV), Lysidious\_44 (CV), MakCheese\_59 (DW), Maridalia\_49 (CZ1), Sidious\_48 (CZ7), YungMoney\_53 (DC1),

Start 46:

- Found in 11 of 56 ( 19.6% ) of genes in pham
- Manual Annotations of this start: 8 of 45
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Alexphander\_52 (F1), Aubs\_45 (F1), Avani\_55 (F2), Byougenkin\_44 (F1), EmiMonkey\_44 (F1), Gandalph\_47 (F1), OwlsT2W\_45 (F1), PhilipPhlop\_44 (F1), Sabbb\_52 (F1), Sandalphon\_49 (F1), Tchotchke\_49 (F1),

Start 47:

- Found in 2 of 56 ( 3.6% ) of genes in pham
- Manual Annotations of this start: 2 of 45
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Aegeus\_91 (L5), Baudelaire\_91 (L5),

Start 48:

- Found in 1 of 56 ( 1.8% ) of genes in pham
- Manual Annotations of this start: 1 of 45
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Clown\_59 (DC2),

Start 49:

- Found in 3 of 56 ( 5.4% ) of genes in pham
- Manual Annotations of this start: 3 of 45
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Anatole\_33 (BV), E1\_33 (BV), E6\_36 (BW),

**Summary by clusters:**

There are 22 clusters represented in this pham: DN, singleton, CZ2, CZ1, CZ7, CZ4, BV, BW, DW, CY1, P6, P4, P5, CZ, CY, L5, L1, DC2, CV, DC1, F1, F2,

Info for manual annotations of cluster BV:

- Start number 44 was manually annotated 1 time for cluster BV.
- Start number 49 was manually annotated 2 times for cluster BV.

Info for manual annotations of cluster BW:

- Start number 44 was manually annotated 3 times for cluster BW.
- Start number 49 was manually annotated 1 time for cluster BW.

Info for manual annotations of cluster CV:

- Start number 45 was manually annotated 3 times for cluster CV.

Info for manual annotations of cluster CY:

- Start number 42 was manually annotated 1 time for cluster CY.

Info for manual annotations of cluster CY1:

- Start number 31 was manually annotated 1 time for cluster CY1.

Info for manual annotations of cluster CZ:

- Start number 45 was manually annotated 1 time for cluster CZ.

Info for manual annotations of cluster CZ1:

- Start number 45 was manually annotated 1 time for cluster CZ1.

Info for manual annotations of cluster CZ4:

- Start number 42 was manually annotated 5 times for cluster CZ4.

Info for manual annotations of cluster CZ7:

- Start number 45 was manually annotated 1 time for cluster CZ7.

Info for manual annotations of cluster DC1:

- Start number 45 was manually annotated 1 time for cluster DC1.

Info for manual annotations of cluster DC2:

- Start number 48 was manually annotated 1 time for cluster DC2.

Info for manual annotations of cluster F1:

- Start number 46 was manually annotated 7 times for cluster F1.

Info for manual annotations of cluster F2:

- Start number 46 was manually annotated 1 time for cluster F2.

Info for manual annotations of cluster L1:

- Start number 32 was manually annotated 9 times for cluster L1.

Info for manual annotations of cluster L5:

- Start number 47 was manually annotated 2 times for cluster L5.

Info for manual annotations of cluster P4:

- Start number 36 was manually annotated 2 times for cluster P4.

Info for manual annotations of cluster P5:

- Start number 36 was manually annotated 1 time for cluster P5.

Info for manual annotations of cluster P6:

- Start number 36 was manually annotated 1 time for cluster P6.

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

Gene: Acquire49\_60 Start: 42360, Stop: 43178, Start Num: 32

Candidate Starts for Acquire49\_60:

(Start: 32 @42360 has 9 MA's), (38, 42387), (51, 42414), (54, 42426), (61, 42486), (77, 42561), (79, 42573), (95, 42663), (96, 42669), (115, 42774), (124, 42804), (142, 42909), (166, 43032), (177, 43107), (180, 43122),

Gene: Aegeus\_91 Start: 56094, Stop: 56897, Start Num: 47

Candidate Starts for Aegeus\_91:

(Start: 47 @56094 has 2 MA's), (55, 56127), (57, 56136), (59, 56169), (60, 56175), (64, 56187), (68, 56208), (101, 56373), (102, 56376), (113, 56457), (141, 56595), (150, 56655), (154, 56670), (162, 56709), (169, 56757), (187, 56877),

Gene: Alexphander\_52 Start: 35997, Stop: 36857, Start Num: 46

Candidate Starts for Alexphander\_52:

(Start: 46 @35997 has 8 MA's), (61, 36093), (78, 36177), (87, 36210), (91, 36243), (96, 36288), (100, 36315), (106, 36363), (126, 36435), (129, 36453), (131, 36456), (157, 36603), (158, 36606), (161, 36630), (171, 36693), (174, 36714), (191, 36822),

Gene: Anatole\_33 Start: 24569, Stop: 25372, Start Num: 49

Candidate Starts for Anatole\_33:

(Start: 49 @24569 has 3 MA's), (69, 24692), (70, 24695), (77, 24734), (83, 24761), (88, 24785), (93, 24821), (96, 24848), (101, 24881), (105, 24908), (107, 24929), (108, 24938), (113, 24956), (114, 24959), (128, 25001), (139, 25031), (141, 25043), (145, 25076), (155, 25121), (172, 25211), (181, 25277), (182, 25280), (190, 25328), (193, 25361),

Gene: Angelique\_48 Start: 37247, Stop: 38128, Start Num: 31

Candidate Starts for Angelique\_48:

(17, 37127), (23, 37157), (Start: 31 @37247 has 1 MA's), (33, 37259), (40, 37292), (Start: 45 @37304 has 7 MA's), (61, 37406), (79, 37493), (94, 37580), (103, 37640), (131, 37769), (146, 37865), (152, 37892), (182, 38054), (192, 38114),

Gene: Annalisa\_45 Start: 33306, Stop: 34055, Start Num: 42

Candidate Starts for Annalisa\_45:

(22, 33153), (33, 33261), (Start: 42 @33306 has 6 MA's), (53, 33336), (55, 33363), (57, 33372), (77, 33489), (83, 33516), (88, 33540), (93, 33555), (97, 33585), (118, 33675), (119, 33678), (164, 33900),

Gene: Aubs\_45 Start: 34886, Stop: 35752, Start Num: 46

Candidate Starts for Aubs\_45:

(Start: 46 @34886 has 8 MA's), (61, 34985), (65, 34994), (96, 35165), (100, 35192), (113, 35279), (114, 35282), (117, 35288), (121, 35297), (129, 35348), (131, 35351), (157, 35498), (161, 35525), (171, 35588),

Gene: AvadaKedavra\_60 Start: 42433, Stop: 43251, Start Num: 32

Candidate Starts for AvadaKedavra\_60:

(Start: 32 @42433 has 9 MA's), (38, 42460), (51, 42487), (54, 42499), (61, 42559), (77, 42634), (79, 42646), (95, 42736), (96, 42742), (115, 42847), (124, 42877), (142, 42982), (166, 43105), (177, 43180), (180, 43195),

Gene: Avani\_55 Start: 35200, Stop: 36060, Start Num: 46

Candidate Starts for Avani\_55:

(Start: 46 @35200 has 8 MA's), (61, 35296), (78, 35380), (87, 35413), (91, 35446), (96, 35491), (100, 35518), (106, 35566), (126, 35638), (129, 35656), (131, 35659), (157, 35806), (161, 35833), (171, 35896), (174, 35917),

Gene: B22\_33 Start: 23699, Stop: 24502, Start Num: 44

Candidate Starts for B22\_33:

(Start: 44 @23699 has 4 MA's), (69, 23822), (70, 23825), (77, 23864), (83, 23891), (88, 23915), (93, 23951), (96, 23978), (101, 24011), (105, 24038), (108, 24068), (114, 24089), (128, 24131), (141, 24173), (145, 24206), (149, 24224), (155, 24251), (182, 24410), (190, 24458), (193, 24491),

Gene: B3\_32 Start: 23829, Stop: 24632, Start Num: 44

Candidate Starts for B3\_32:

(Start: 44 @23829 has 4 MA's), (69, 23952), (70, 23955), (77, 23994), (83, 24021), (88, 24045), (93, 24081), (96, 24108), (101, 24141), (105, 24168), (107, 24189), (108, 24198), (109, 24201), (113, 24216), (114, 24219), (128, 24261), (131, 24270), (139, 24291), (141, 24303), (149, 24354), (156, 24384), (169, 24453), (182, 24540), (188, 24573), (190, 24588), (193, 24621),

Gene: Baudelaire\_91 Start: 56094, Stop: 56897, Start Num: 47

Candidate Starts for Baudelaire\_91:

(Start: 47 @56094 has 2 MA's), (55, 56127), (57, 56136), (59, 56169), (60, 56175), (64, 56187), (68, 56208), (101, 56373), (102, 56376), (113, 56457), (141, 56595), (150, 56655), (154, 56670), (162, 56709), (169, 56757), (187, 56877),

Gene: BigNuz\_37 Start: 30064, Stop: 30867, Start Num: 36

Candidate Starts for BigNuz\_37:

(Start: 36 @30064 has 4 MA's), (58, 30166), (60, 30202), (101, 30394), (122, 30490), (141, 30574), (152, 30640), (153, 30643), (159, 30667), (168, 30721), (173, 30760), (175, 30781), (176, 30784), (189, 30853),

Gene: Bunnybear\_41 Start: 33762, Stop: 34586, Start Num: 45

Candidate Starts for Bunnybear\_41:

(8, 33405), (9, 33438), (19, 33606), (Start: 45 @33762 has 7 MA's), (61, 33864), (79, 33951), (131, 34227), (146, 34323), (181, 34509), (182, 34512), (192, 34572),

Gene: Byougenkin\_44 Start: 34980, Stop: 35858, Start Num: 46

Candidate Starts for Byougenkin\_44:

(15, 34740), (Start: 46 @34980 has 8 MA's), (61, 35079), (65, 35088), (96, 35259), (100, 35286), (104, 35313), (107, 35346), (112, 35370), (121, 35394), (136, 35487), (157, 35604), (158, 35607), (161, 35631), (171, 35694), (174, 35715), (177, 35742), (191, 35823),

Gene: CicholasNage\_59 Start: 42396, Stop: 43214, Start Num: 32

Candidate Starts for CicholasNage\_59:

(Start: 32 @42396 has 9 MA's), (38, 42423), (51, 42450), (54, 42462), (61, 42522), (77, 42597), (79, 42609), (95, 42699), (96, 42705), (115, 42810), (124, 42840), (142, 42945), (166, 43068), (177, 43143), (180, 43158),

Gene: Clown\_59 Start: 43467, Stop: 44249, Start Num: 48

Candidate Starts for Clown\_59:

(14, 43209), (16, 43230), (26, 43341), (35, 43410), (Start: 48 @43467 has 1 MA's), (57, 43518), (62, 43566), (72, 43611), (81, 43656), (85, 43668), (88, 43689), (90, 43701), (113, 43833), (114, 43836), (133, 43908), (147, 44004), (159, 44055), (162, 44076), (165, 44103), (167, 44118), (175, 44178), (182, 44214),

Gene: Dolores\_48 Start: 34386, Stop: 35135, Start Num: 42

Candidate Starts for Dolores\_48:

(1, 33747), (2, 33801), (3, 33834), (4, 33873), (5, 33894), (6, 33927), (7, 33939), (10, 34062), (12, 34083), (21, 34230), (Start: 42 @34386 has 6 MA's), (53, 34416), (55, 34443), (57, 34452), (77, 34569), (83, 34596), (88, 34620), (93, 34635), (97, 34665), (118, 34755), (119, 34758), (164, 34980),

Gene: Doucette\_35 Start: 25113, Stop: 25916, Start Num: 44

Candidate Starts for Doucette\_35:

(Start: 44 @25113 has 4 MA's), (69, 25236), (70, 25239), (77, 25278), (83, 25305), (88, 25329), (93, 25365), (96, 25392), (101, 25425), (105, 25452), (108, 25482), (114, 25503), (128, 25545), (141, 25587), (145, 25620), (149, 25638), (155, 25665), (182, 25824), (190, 25872), (193, 25905),

Gene: E1\_33 Start: 24569, Stop: 25372, Start Num: 49

Candidate Starts for E1\_33:

(Start: 49 @24569 has 3 MA's), (69, 24692), (70, 24695), (77, 24734), (83, 24761), (88, 24785), (93, 24821), (96, 24848), (101, 24881), (105, 24908), (107, 24929), (108, 24938), (113, 24956), (114, 24959), (128, 25001), (139, 25031), (141, 25043), (145, 25076), (155, 25121), (172, 25211), (181, 25277), (182, 25280), (190, 25328), (193, 25361),

Gene: E6\_36 Start: 26500, Stop: 27273, Start Num: 49

Candidate Starts for E6\_36:



(Start: 49 @26500 has 3 MA's), (56, 26542), (60, 26584), (63, 26593), (80, 26680), (83, 26689), (92, 26728), (98, 26761), (101, 26782), (105, 26809), (108, 26839), (114, 26860), (128, 26902), (139, 26932), (141, 26944), (145, 26977), (149, 26995), (155, 27022), (182, 27181), (190, 27229), (193, 27262),

Gene: Easley\_43 Start: 32655, Stop: 33410, Start Num: 42

Candidate Starts for Easley\_43:

(Start: 42 @32655 has 6 MA's), (53, 32685), (55, 32712), (57, 32721), (73, 32820), (83, 32865), (86, 32874), (88, 32889), (89, 32898), (127, 33060), (147, 33171), (148, 33174), (164, 33255),

Gene: EmiMonkey\_44 Start: 36187, Stop: 37053, Start Num: 46

Candidate Starts for EmiMonkey\_44:

(Start: 46 @36187 has 8 MA's), (61, 36286), (65, 36295), (96, 36466), (100, 36493), (113, 36580), (114, 36583), (117, 36589), (121, 36598), (129, 36649), (131, 36652), (157, 36799), (161, 36826), (171, 36889), (174, 36910),

Gene: Enceladus\_58 Start: 42233, Stop: 43060, Start Num: 32

Candidate Starts for Enceladus\_58:

(Start: 32 @42233 has 9 MA's), (38, 42260), (51, 42287), (54, 42299), (56, 42326), (61, 42371), (71, 42413), (74, 42428), (79, 42458), (82, 42473), (96, 42551), (115, 42656), (124, 42686), (142, 42791), (166, 42914), (177, 42989), (180, 43004),

Gene: FroggyToad\_47 Start: 33512, Stop: 34357, Start Num: 40

Candidate Starts for FroggyToad\_47:

(40, 33512), (Start: 45 @33524 has 7 MA's), (61, 33623), (79, 33710), (87, 33740), (149, 34115), (181, 34286), (182, 34289),

Gene: Frokostdame\_47 Start: 34936, Stop: 35751, Start Num: 45

Candidate Starts for Frokostdame\_47:

(29, 34861), (Start: 45 @34936 has 7 MA's), (61, 35032), (74, 35089), (96, 35212), (112, 35323), (124, 35356), (138, 35443), (140, 35458), (182, 35683), (192, 35743),

Gene: G4\_33 Start: 24732, Stop: 25535, Start Num: 44

Candidate Starts for G4\_33:

(Start: 44 @24732 has 4 MA's), (69, 24855), (70, 24858), (77, 24897), (83, 24924), (88, 24948), (93, 24984), (96, 25011), (101, 25044), (105, 25071), (107, 25092), (108, 25101), (109, 25104), (113, 25119), (114, 25122), (128, 25164), (139, 25194), (141, 25206), (145, 25239), (155, 25284), (172, 25374), (182, 25443), (190, 25491), (193, 25524),

Gene: GAL1\_39 Start: 32334, Stop: 33173, Start Num: 34

Candidate Starts for GAL1\_39:

(18, 32199), (24, 32229), (28, 32286), (34, 32334), (43, 32376), (53, 32403), (77, 32556), (83, 32583), (93, 32622), (97, 32652), (101, 32676), (116, 32757), (122, 32772), (123, 32775), (137, 32838), (160, 32961), (181, 33096), (182, 33099), (183, 33108),

Gene: Gandalph\_47 Start: 34842, Stop: 35708, Start Num: 46

Candidate Starts for Gandalph\_47:

(Start: 46 @34842 has 8 MA's), (61, 34941), (65, 34950), (96, 35121), (100, 35148), (113, 35235), (114, 35238), (117, 35244), (121, 35253), (129, 35304), (131, 35307), (157, 35454), (161, 35481), (171, 35544), (174, 35565),

Gene: JoeDirt\_59 Start: 42675, Stop: 43493, Start Num: 32

Candidate Starts for JoeDirt\_59:

(Start: 32 @42675 has 9 MA's), (38, 42702), (51, 42729), (54, 42741), (61, 42801), (77, 42876), (79, 42888), (95, 42978), (96, 42984), (115, 43089), (124, 43119), (142, 43224), (166, 43347), (177, 43422), (180, 43437),

Gene: JuJu\_50 Start: 36277, Stop: 37092, Start Num: 45

Candidate Starts for JuJu\_50:

(29, 36202), (Start: 45 @36277 has 7 MA's), (61, 36373), (96, 36553), (112, 36664), (124, 36697), (138, 36784), (182, 37024),

Gene: Lysidious\_44 Start: 34244, Stop: 35065, Start Num: 45

Candidate Starts for Lysidious\_44:

(Start: 45 @34244 has 7 MA's), (65, 34352), (82, 34442), (96, 34520), (99, 34538), (100, 34547), (117, 34646), (132, 34709), (135, 34730), (138, 34751), (149, 34817), (151, 34826), (181, 34988), (182, 34991),

Gene: MakCheese\_59 Start: 40021, Stop: 40845, Start Num: 45

Candidate Starts for MakCheese\_59:

(11, 39715), (13, 39724), (20, 39862), (Start: 45 @40021 has 7 MA's), (61, 40123), (63, 40129), (120, 40429), (134, 40504), (141, 40558), (147, 40600), (163, 40672), (166, 40699), (170, 40714), (177, 40774),

Gene: Maridalia\_49 Start: 35508, Stop: 36332, Start Num: 45

Candidate Starts for Maridalia\_49:

(8, 35151), (9, 35184), (19, 35352), (Start: 45 @35508 has 7 MA's), (61, 35610), (79, 35697), (131, 35973), (146, 36069), (181, 36255), (182, 36258), (192, 36318),

Gene: MortyNRick\_52 Start: 37859, Stop: 38608, Start Num: 42

Candidate Starts for MortyNRick\_52:

(Start: 42 @37859 has 6 MA's), (57, 37925), (58, 37928), (62, 37973), (75, 38024), (77, 38042), (88, 38093), (119, 38231), (138, 38309), (164, 38453), (179, 38546),

Gene: Nazo\_38 Start: 30066, Stop: 30869, Start Num: 36

Candidate Starts for Nazo\_38:

(Start: 36 @30066 has 4 MA's), (58, 30168), (60, 30204), (101, 30396), (122, 30492), (141, 30576), (152, 30642), (153, 30645), (159, 30669), (168, 30723), (173, 30762), (175, 30783), (176, 30786), (189, 30855),

Gene: Oregano\_48 Start: 33939, Stop: 34688, Start Num: 42

Candidate Starts for Oregano\_48:

(22, 33786), (33, 33894), (Start: 42 @33939 has 6 MA's), (53, 33969), (55, 33996), (57, 34005), (77, 34122), (83, 34149), (88, 34173), (93, 34188), (97, 34218), (118, 34308), (119, 34311), (164, 34533),

Gene: OwlsT2W\_45 Start: 35172, Stop: 36038, Start Num: 46

Candidate Starts for OwlsT2W\_45:

(Start: 46 @35172 has 8 MA's), (61, 35271), (65, 35280), (96, 35451), (100, 35478), (113, 35565), (114, 35568), (117, 35574), (121, 35583), (129, 35634), (131, 35637), (157, 35784), (161, 35811), (171, 35874), (174, 35895),

Gene: P1201\_08 Start: 2597, Stop: 3520, Start Num: 25

Candidate Starts for P1201\_08:

(25, 2597), (27, 2600), (30, 2642), (37, 2690), (57, 2765), (60, 2804), (64, 2816), (76, 2882), (84, 2924), (89, 2957), (101, 3017), (130, 3185), (143, 3263), (167, 3398), (178, 3473), (184, 3509), (185, 3512),

Gene: Phayonce\_36 Start: 29962, Stop: 30771, Start Num: 36

Candidate Starts for Phayonce\_36:

(Start: 36 @29962 has 4 MA's), (55, 30052), (56, 30058), (101, 30298), (122, 30394), (141, 30478), (152, 30544), (153, 30547), (159, 30571), (173, 30664), (175, 30685), (189, 30757),

Gene: PhlipPhlop\_44 Start: 36187, Stop: 37053, Start Num: 46

Candidate Starts for PhlipPhlop\_44:

(Start: 46 @36187 has 8 MA's), (61, 36286), (65, 36295), (96, 36466), (100, 36493), (113, 36580), (114, 36583), (117, 36589), (121, 36598), (129, 36649), (131, 36652), (157, 36799), (161, 36826), (171, 36889), (174, 36910),

Gene: PhriskyACE\_45 Start: 34290, Stop: 35057, Start Num: 42

Candidate Starts for PhriskyACE\_45:

(Start: 42 @34290 has 6 MA's), (52, 34317), (53, 34320), (55, 34347), (62, 34404), (67, 34422), (86, 34512), (88, 34527), (90, 34539), (111, 34650), (141, 34764), (144, 34788), (147, 34806), (151, 34827), (152, 34830), (153, 34833), (159, 34857), (167, 34908), (168, 34911),

Gene: Pochiewood\_60 Start: 42683, Stop: 43501, Start Num: 32

Candidate Starts for Pochiewood\_60:

(Start: 32 @42683 has 9 MA's), (38, 42710), (51, 42737), (54, 42749), (61, 42809), (77, 42884), (79, 42896), (95, 42986), (96, 42992), (115, 43097), (124, 43127), (142, 43232), (166, 43355), (177, 43430), (180, 43445),

Gene: Purky\_41 Start: 30689, Stop: 31480, Start Num: 36

Candidate Starts for Purky\_41:

(Start: 36 @30689 has 4 MA's), (58, 30788), (60, 30824), (83, 30923), (101, 31016), (141, 31196), (147, 31238), (152, 31262), (153, 31265), (159, 31289), (167, 31340), (168, 31343), (173, 31382), (175, 31403), (184, 31454),

Gene: REQ2\_43 Start: 33255, Stop: 34112, Start Num: 28

Candidate Starts for REQ2\_43:

(28, 33255), (39, 33318), (41, 33324), (53, 33360), (83, 33540), (90, 33576), (101, 33633), (110, 33699), (139, 33783), (181, 34029), (182, 34032),

Gene: Rose5\_60 Start: 42695, Stop: 43513, Start Num: 32

Candidate Starts for Rose5\_60:

(Start: 32 @42695 has 9 MA's), (38, 42722), (51, 42749), (54, 42761), (61, 42821), (77, 42896), (79, 42908), (95, 42998), (96, 43004), (115, 43109), (124, 43139), (142, 43244), (166, 43367), (177, 43442), (180, 43457),

Gene: Sabbb\_52 Start: 36611, Stop: 37489, Start Num: 46

Candidate Starts for Sabbb\_52:

(15, 36371), (Start: 46 @36611 has 8 MA's), (61, 36710), (65, 36719), (96, 36890), (100, 36917), (104, 36944), (107, 36977), (112, 37001), (121, 37025), (136, 37118), (157, 37235), (161, 37262), (171, 37325), (174, 37346),

Gene: Sandalphon\_49 Start: 36106, Stop: 36972, Start Num: 46

Candidate Starts for Sandalphon\_49:

(Start: 46 @36106 has 8 MA's), (61, 36205), (65, 36214), (96, 36385), (100, 36412), (113, 36499), (114, 36502), (117, 36508), (121, 36517), (125, 36538), (129, 36568), (131, 36571), (136, 36601), (157, 36718), (158, 36721), (161, 36745), (171, 36808), (174, 36829), (191, 36937),

Gene: Sidious\_48 Start: 36674, Stop: 37510, Start Num: 45

Candidate Starts for Sidious\_48:

(40, 36662), (Start: 45 @36674 has 7 MA's), (61, 36776), (79, 36863), (87, 36893), (149, 37268), (181, 37439), (182, 37442),

Gene: Silverleaf\_60 Start: 42430, Stop: 43248, Start Num: 32

Candidate Starts for Silverleaf\_60:

(Start: 32 @42430 has 9 MA's), (38, 42457), (51, 42484), (54, 42496), (61, 42556), (77, 42631), (79, 42643), (95, 42733), (96, 42739), (115, 42844), (124, 42874), (142, 42979), (166, 43102), (177, 43177), (180, 43192),

Gene: Tchotchke\_49 Start: 34846, Stop: 35706, Start Num: 46

Candidate Starts for Tchotchke\_49:

(Start: 46 @34846 has 8 MA's), (61, 34942), (78, 35026), (87, 35059), (91, 35092), (96, 35137), (100, 35164), (106, 35212), (126, 35284), (129, 35302), (131, 35305), (157, 35452), (161, 35479), (171, 35542), (174, 35563),

Gene: Tyson\_60 Start: 42697, Stop: 43515, Start Num: 32

Candidate Starts for Tyson\_60:

(Start: 32 @42697 has 9 MA's), (38, 42724), (51, 42751), (54, 42763), (61, 42823), (77, 42898), (79, 42910), (95, 43000), (96, 43006), (115, 43111), (124, 43141), (142, 43246), (166, 43369), (177, 43444), (180, 43459),

Gene: WinkNick\_49 Start: 34309, Stop: 35058, Start Num: 42

Candidate Starts for WinkNick\_49:

(1, 33670), (2, 33724), (3, 33757), (4, 33796), (5, 33817), (6, 33850), (7, 33862), (10, 33985), (12, 34006), (21, 34153), (Start: 42 @34309 has 6 MA's), (53, 34339), (55, 34366), (57, 34375), (77, 34492), (83, 34519), (88, 34543), (93, 34558), (97, 34588), (118, 34678), (119, 34681), (164, 34903),

Gene: Wrigley\_52 Start: 36935, Stop: 37699, Start Num: 42

Candidate Starts for Wrigley\_52:

(Start: 42 @36935 has 6 MA's), (52, 36962), (53, 36965), (57, 37001), (66, 37064), (69, 37076), (77, 37118), (83, 37145), (101, 37238), (111, 37292), (141, 37406), (144, 37430), (147, 37448), (151, 37469), (152, 37472), (153, 37475), (159, 37499), (167, 37550), (168, 37553), (175, 37613),

Gene: Wyatt2\_61 Start: 42695, Stop: 43513, Start Num: 32

Candidate Starts for Wyatt2\_61:

(Start: 32 @42695 has 9 MA's), (38, 42722), (51, 42749), (54, 42761), (61, 42821), (77, 42896), (79, 42908), (95, 42998), (96, 43004), (115, 43109), (124, 43139), (142, 43244), (166, 43367), (177, 43442), (180, 43457),

Gene: YungMoney\_53 Start: 42952, Stop: 43722, Start Num: 45

Candidate Starts for YungMoney\_53:

(Start: 45 @42952 has 7 MA's), (50, 42964), (53, 42976), (62, 43057), (81, 43147), (85, 43159), (88, 43180), (89, 43189), (101, 43249), (113, 43321), (123, 43342), (131, 43369), (147, 43465), (159, 43516), (162, 43537), (165, 43564), (167, 43579), (186, 43699),