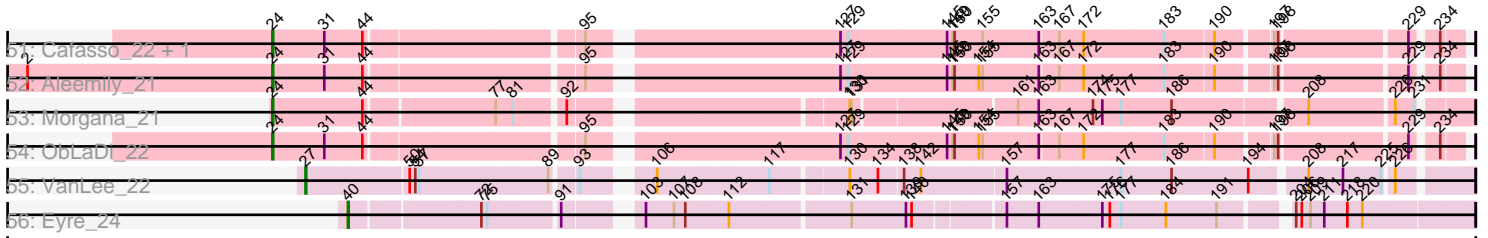




Pham 163560



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 163560 Report

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

Pham number 163560 has 76 members, 6 are drafts.

Phages represented in each track:

- Track 1 : Azula\_30, Blueberry\_30, Gambino\_30, MissRona\_30
- Track 2 : Fenry\_27, Mellie\_27
- Track 3 : PhrostedPhlake\_30, Delian\_29, CaptainKirk2\_28
- Track 4 : Obliviate\_28
- Track 5 : Jalammah\_30
- Track 6 : CarolAnn\_29, Blino\_29
- Track 7 : Walrus\_30
- Track 8 : Malachai\_29, Begonia\_29
- Track 9 : Melba\_28, Barco\_28, MintFen\_28
- Track 10 : Archis\_29
- Track 11 : BlingBling\_28
- Track 12 : Hitter\_28, Samba\_28
- Track 13 : JuJu\_29
- Track 14 : Pipp\_28, Utz\_28
- Track 15 : UmaThurman\_28
- Track 16 : Zarbodnamra\_28
- Track 17 : ZiggyZoo\_28
- Track 18 : Wisp\_27
- Track 19 : Guacamole\_28, JasperJr\_28
- Track 20 : Lysidious\_29
- Track 21 : Frokostdame\_28
- Track 22 : LonelyBoi\_28
- Track 23 : BeeGee\_27
- Track 24 : Jablanski\_29, Pytheas\_29
- Track 25 : Cashline\_27
- Track 26 : Posh\_29, Wrigley\_29
- Track 27 : Confidence\_27
- Track 28 : BackstagePass\_27
- Track 29 : Dmitri\_28
- Track 30 : BBQValindra\_27
- Track 31 : RayTheFireFly\_28
- Track 32 : Eyes\_27
- Track 33 : Opie\_27
- Track 34 : DirtyBoi\_29
- Track 35 : MagicMan\_27, Schnabeltier\_27
- Track 36 : HannahD\_27, GEazy\_27
- Track 37 : Coriander\_28

- Track 38 : Bunker\_27
- Track 39 : Bowser\_27
- Track 40 : ZAYM\_28, TaronosaurusRx\_27
- Track 41 : Hedwig\_29
- Track 42 : Bantam\_37
- Track 43 : DatBoi\_38
- Track 44 : Mollymur\_38
- Track 45 : SpeedDemon\_390
- Track 46 : Yago84\_27, AnClar\_28
- Track 47 : LittleMunchkin\_29
- Track 48 : Sisko\_27
- Track 49 : Octobien14\_30
- Track 50 : Ruthy\_22
- Track 51 : Cafasso\_22, ModicumRichard\_22
- Track 52 : Aleemily\_21
- Track 53 : Morgana\_21
- Track 54 : ObLaDi\_22
- Track 55 : VanLee\_22
- Track 56 : Eyre\_24

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

The start number called the most often in the published annotations is 49, it was called in 33 of the 70 non-draft genes in the pham.

Genes that call this "Most Annotated" start:

- Archis\_29, Azula\_30, Barco\_28, Begonia\_29, BlingBling\_28, Blino\_29, Blueberry\_30, CaptainKirk2\_28, CarolAnn\_29, Delian\_29, Fenry\_27, Frokostdame\_28, Gambino\_30, Guacamole\_28, Hitter\_28, Jalammah\_30, JasperJr\_28, JuJu\_29, Lysidious\_29, Malachai\_29, Melba\_28, Mellie\_27, MintFen\_28, MissRona\_30, Obliviate\_28, PhrostedPhlake\_30, Pipp\_28, Samba\_28, UmaThurman\_28, Utz\_28, Walrus\_30, Wisp\_27, Zarbodnamra\_28, ZiggyZoo\_28,

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

- 

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

- Aleemily\_21, AnClar\_28, BBQValindra\_27, BackstagePass\_27, Bantam\_37, BeeGee\_27, Bowser\_27, Bunker\_27, Cafasso\_22, Cashline\_27, Confidence\_27, Coriander\_28, DatBoi\_38, DirtyBoi\_29, Dmitri\_28, Eyes\_27, Eyre\_24, GEazy\_27, HannahD\_27, Hedwig\_29, Jablanski\_29, LittleMunchkin\_29, LonelyBoi\_28, MagicMan\_27, ModicumRichard\_22, Mollymur\_38, Morgana\_21, ObLaDi\_22, Octobien14\_30, Opie\_27, Posh\_29, Pytheas\_29, RayTheFireFly\_28, Ruthy\_22, Schnabeltier\_27, Sisko\_27, SpeedDemon\_390, TaronosaurusRx\_27, VanLee\_22, Wrigley\_29, Yago84\_27, ZAYM\_28,

**Summary by start number:**

Start 16:

- Found in 8 of 76 ( 10.5% ) of genes in pham

- Manual Annotations of this start: 8 of 70
- Called 100.0% of time when present
- Phage (with cluster) where this start called: BeeGee\_27 (CY), Cashline\_27 (CY), Confidence\_27 (CY1), Jablanski\_29 (CY), LonelyBoi\_28 (CY), Posh\_29 (CY), Pytheas\_29 (CY), Wrigley\_29 (CY),

#### Start 18:

- Found in 1 of 76 ( 1.3% ) of genes in pham
- Manual Annotations of this start: 1 of 70
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Bunker\_27 (DB),

#### Start 19:

- Found in 11 of 76 ( 14.5% ) of genes in pham
- Manual Annotations of this start: 8 of 70
- Called 100.0% of time when present
- Phage (with cluster) where this start called: BBQValindra\_27 (DB), BackstagePass\_27 (DB), Bowser\_27 (DB), Eyes\_27 (DB), GEazy\_27 (DB), HannahD\_27 (DB), MagicMan\_27 (DB), Opie\_27 (DB), Schnabeltier\_27 (DB), TaronosaurusRx\_27 (DB), ZAYM\_28 (DB),

#### Start 20:

- Found in 5 of 76 ( 6.6% ) of genes in pham
- Manual Annotations of this start: 4 of 70
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Coriander\_28 (DB), DirtyBoi\_29 (DB), Dmitri\_28 (DB), Hedwig\_29 (DB), RayTheFireFly\_28 (DB),

#### Start 21:

- Found in 1 of 76 ( 1.3% ) of genes in pham
- Manual Annotations of this start: 1 of 70
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Ruthy\_22 (DW),

#### Start 24:

- Found in 5 of 76 ( 6.6% ) of genes in pham
- Manual Annotations of this start: 4 of 70
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Aleemily\_21 (DZ), Cafasso\_22 (DZ), ModicumRichard\_22 (DZ), Morgana\_21 (DZ), ObLaDi\_22 (DZ),

#### Start 26:

- Found in 4 of 76 ( 5.3% ) of genes in pham
- Manual Annotations of this start: 4 of 70
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Bantam\_37 (DL), DatBoi\_38 (DL), Mollymur\_38 (DL), SpeedDemon\_390 (DL),

#### Start 27:

- Found in 1 of 76 ( 1.3% ) of genes in pham
- Manual Annotations of this start: 1 of 70
- Called 100.0% of time when present
- Phage (with cluster) where this start called: VanLee\_22 (singleton),

Start 40:

- Found in 1 of 76 ( 1.3% ) of genes in pham
- Manual Annotations of this start: 1 of 70
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Eyre\_24 (singleton),

Start 41:

- Found in 4 of 76 ( 5.3% ) of genes in pham
- Manual Annotations of this start: 4 of 70
- Called 100.0% of time when present
- Phage (with cluster) where this start called: AnClar\_28 (DR), LittleMunchkin\_29 (DR), Sisko\_27 (DR), Yago84\_27 (DR),

Start 49:

- Found in 34 of 76 ( 44.7% ) of genes in pham
- Manual Annotations of this start: 33 of 70
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Archis\_29 (CV), Azula\_30 (CV), Barco\_28 (CV), Begonia\_29 (CV), BlingBling\_28 (CV), Blino\_29 (CV), Blueberry\_30 (CV), CaptainKirk2\_28 (CV), CarolAnn\_29 (CV), Delian\_29 (CV), Ferry\_27 (CV), Frokostdame\_28 (CV), Gambino\_30 (CV), Guacamole\_28 (CV), Hitter\_28 (CV), Jalammah\_30 (CV), JasperJr\_28 (CV), JuJu\_29 (CV), Lysidious\_29 (CV), Malachai\_29 (CV), Melba\_28 (CV), Mellie\_27 (CV), MintFen\_28 (CV), MissRona\_30 (CV), Obliviate\_28 (CV), PhrostedPhlake\_30 (CV), Pipp\_28 (CV), Samba\_28 (CV), UmaThurman\_28 (CV), Utz\_28 (CV), Walrus\_30 (CV), Wisp\_27 (CV), Zarbodnamra\_28 (CV), ZiggyZoo\_28 (CV),

Start 55:

- Found in 1 of 76 ( 1.3% ) of genes in pham
- Manual Annotations of this start: 1 of 70
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Octobien14\_30 (DU1),

**Summary by clusters:**

There are 10 clusters represented in this pham: CY1, DL, DB, singleton, CY, DZ, DW, DU1, DR, CV,

Info for manual annotations of cluster CV:

- Start number 49 was manually annotated 33 times for cluster CV.

Info for manual annotations of cluster CY:

- Start number 16 was manually annotated 7 times for cluster CY.

Info for manual annotations of cluster CY1:

- Start number 16 was manually annotated 1 time for cluster CY1.

Info for manual annotations of cluster DB:

- Start number 18 was manually annotated 1 time for cluster DB.
- Start number 19 was manually annotated 8 times for cluster DB.
- Start number 20 was manually annotated 4 times for cluster DB.

Info for manual annotations of cluster DL:

- Start number 26 was manually annotated 4 times for cluster DL.

Info for manual annotations of cluster DR:

- Start number 41 was manually annotated 4 times for cluster DR.

Info for manual annotations of cluster DU1:

- Start number 55 was manually annotated 1 time for cluster DU1.

Info for manual annotations of cluster DW:

- Start number 21 was manually annotated 1 time for cluster DW.

Info for manual annotations of cluster DZ:

- Start number 24 was manually annotated 4 times for cluster DZ.

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

Gene: Aleemily\_21 Start: 19129, Stop: 20868, Start Num: 24

Candidate Starts for Aleemily\_21:

(2, 18736), (Start: 24 @19129 has 4 MA's), (31, 19210), (44, 19270), (95, 19588), (127, 19954), (129, 19966), (145, 20122), (149, 20131), (150, 20134), (154, 20173), (155, 20179), (163, 20269), (167, 20296), (172, 20332), (183, 20458), (190, 20533), (197, 20611), (198, 20617), (229, 20803), (234, 20836),

Gene: AnClar\_28 Start: 28557, Stop: 30143, Start Num: 41

Candidate Starts for AnClar\_28:

(Start: 41 @28557 has 4 MA's), (46, 28614), (48, 28626), (58, 28671), (67, 28725), (82, 28812), (96, 28899), (103, 28941), (119, 29148), (120, 29160), (129, 29226), (157, 29454), (162, 29478), (163, 29505), (165, 29520), (177, 29637), (178, 29658), (182, 29694), (205, 29901), (208, 29913), (212, 29940), (226, 30039), (231, 30069), (235, 30117), (236, 30135),

Gene: Archis\_29 Start: 23597, Stop: 25114, Start Num: 49

Candidate Starts for Archis\_29:

(43, 23537), (Start: 49 @23597 has 33 MA's), (73, 23711), (78, 23738), (95, 23849), (107, 23948), (108, 23966), (110, 23993), (140, 24299), (157, 24425), (175, 24575), (177, 24605), (179, 24638), (182, 24662), (186, 24686), (189, 24740), (208, 24878), (218, 24938), (221, 24968), (235, 25088),

Gene: Azula\_30 Start: 23695, Stop: 25212, Start Num: 49

Candidate Starts for Azula\_30:

(43, 23635), (Start: 49 @23695 has 33 MA's), (66, 23776), (73, 23809), (78, 23836), (79, 23842), (84, 23887), (85, 23893), (98, 23977), (102, 23989), (107, 24046), (108, 24064), (110, 24091), (139, 24388), (157, 24523), (161, 24541), (175, 24673), (177, 24703), (179, 24736), (182, 24760), (186, 24784), (189, 24838), (208, 24976), (218, 25036), (221, 25066), (235, 25186),

Gene: BBQValindra\_27 Start: 22145, Stop: 23977, Start Num: 19

Candidate Starts for BBQValindra\_27:

(13, 22013), (14, 22016), (Start: 19 @22145 has 8 MA's), (39, 22346), (66, 22526), (80, 22598), (95, 22706), (96, 22718), (130, 23054), (138, 23135), (152, 23222), (169, 23390), (175, 23435), (177, 23465), (180, 23510), (181, 23516), (186, 23546), (187, 23588), (218, 23798), (222, 23834), (224, 23846),

Gene: BackstagePass\_27 Start: 22271, Stop: 24103, Start Num: 19

Candidate Starts for BackstagePass\_27:

(5, 22046), (8, 22082), (13, 22139), (14, 22142), (Start: 19 @22271 has 8 MA's), (30, 22433), (65, 22649), (66, 22652), (80, 22724), (86, 22775), (91, 22799), (95, 22832), (109, 22958), (138, 23261), (151, 23342), (163, 23462), (171, 23525), (175, 23561), (177, 23591), (186, 23672), (218, 23924), (221, 23954), (225, 23978), (235, 24074),

Gene: Bantam\_37 Start: 32917, Stop: 34665, Start Num: 26

Candidate Starts for Bantam\_37:

(Start: 26 @32917 has 4 MA's), (28, 32947), (32, 32974), (68, 33163), (74, 33190), (81, 33235), (101, 33424), (125, 33721), (126, 33730), (128, 33757), (141, 33865), (145, 33919), (149, 33928), (155, 33976), (156, 33991), (159, 34021), (163, 34066), (167, 34093), (199, 34417), (202, 34423), (231, 34609), (234, 34633),

Gene: Barco\_28 Start: 23386, Stop: 24900, Start Num: 49

Candidate Starts for Barco\_28:

(43, 23326), (Start: 49 @23386 has 33 MA's), (73, 23500), (78, 23527), (102, 23680), (107, 23737), (108, 23755), (110, 23782), (139, 24079), (140, 24088), (157, 24214), (175, 24364), (177, 24394), (180, 24439), (186, 24475), (187, 24517), (200, 24643), (214, 24712), (216, 24721), (222, 24769),

Gene: BeeGee\_27 Start: 22408, Stop: 24279, Start Num: 16

Candidate Starts for BeeGee\_27:

(3, 22162), (10, 22270), (11, 22273), (12, 22297), (14, 22303), (Start: 16 @22408 has 8 MA's), (25, 22549), (30, 22609), (51, 22753), (61, 22783), (62, 22786), (65, 22825), (71, 22858), (80, 22900), (91, 22975), (103, 23062), (134, 23401), (136, 23407), (138, 23437), (151, 23518), (163, 23638), (175, 23737), (177, 23767), (186, 23848), (187, 23890), (218, 24100), (221, 24130), (222, 24136), (235, 24250),

Gene: Begonia\_29 Start: 23867, Stop: 25366, Start Num: 49

Candidate Starts for Begonia\_29:

(43, 23807), (Start: 49 @23867 has 33 MA's), (66, 23948), (69, 23957), (73, 23981), (78, 24008), (102, 24161), (107, 24218), (108, 24236), (110, 24263), (124, 24425), (139, 24560), (140, 24569), (175, 24845), (176, 24857), (177, 24875), (182, 24932), (184, 24947), (191, 25028), (204, 25109), (206, 25118), (209, 25127), (211, 25148), (218, 25178), (220, 25202),

Gene: BlingBling\_28 Start: 23386, Stop: 24945, Start Num: 49

Candidate Starts for BlingBling\_28:

(43, 23326), (Start: 49 @23386 has 33 MA's), (66, 23467), (69, 23476), (73, 23500), (78, 23527), (98, 23668), (99, 23671), (102, 23680), (107, 23737), (108, 23755), (110, 23782), (139, 24079), (157, 24214), (175, 24364), (177, 24394), (180, 24439), (186, 24475), (187, 24517), (193, 24592), (207, 24685), (220, 24775), (232, 24865), (233, 24868),

Gene: Blino\_29 Start: 23477, Stop: 24994, Start Num: 49

Candidate Starts for Blino\_29:

(43, 23417), (Start: 49 @23477 has 33 MA's), (66, 23558), (69, 23567), (73, 23591), (78, 23618), (102, 23771), (107, 23828), (108, 23846), (110, 23873), (139, 24170), (157, 24305), (175, 24455), (177, 24485), (179, 24518), (181, 24536), (182, 24542), (186, 24566), (189, 24620), (208, 24758), (218, 24818), (221, 24848), (235, 24968),

Gene: Blueberry\_30 Start: 23695, Stop: 25212, Start Num: 49

Candidate Starts for Blueberry\_30:

(43, 23635), (Start: 49 @23695 has 33 MA's), (66, 23776), (73, 23809), (78, 23836), (79, 23842), (84, 23887), (85, 23893), (98, 23977), (102, 23989), (107, 24046), (108, 24064), (110, 24091), (139,



24388), (157, 24523), (161, 24541), (175, 24673), (177, 24703), (179, 24736), (182, 24760), (186, 24784), (189, 24838), (208, 24976), (218, 25036), (221, 25066), (235, 25186),

Gene: Bowser\_27 Start: 22050, Stop: 23882, Start Num: 19

Candidate Starts for Bowser\_27:

(13, 21918), (14, 21921), (Start: 19 @22050 has 8 MA's), (39, 22251), (65, 22428), (66, 22431), (80, 22503), (95, 22611), (103, 22665), (134, 23004), (136, 23010), (163, 23241), (175, 23340), (177, 23370), (186, 23451), (218, 23703), (221, 23733), (222, 23739), (235, 23853),

Gene: Bunker\_27 Start: 22258, Stop: 24084, Start Num: 18

Candidate Starts for Bunker\_27:

(7, 22063), (13, 22126), (14, 22129), (Start: 18 @22258 has 1 MA's), (37, 22459), (66, 22639), (80, 22711), (95, 22819), (107, 22918), (108, 22936), (140, 23272), (157, 23398), (163, 23449), (175, 23548), (177, 23578), (186, 23659), (203, 23827), (208, 23854), (213, 23890), (214, 23893), (218, 23914), (222, 23950), (223, 23953), (236, 24076),

Gene: Cafasso\_22 Start: 19701, Stop: 21440, Start Num: 24

Candidate Starts for Cafasso\_22:

(Start: 24 @19701 has 4 MA's), (31, 19782), (44, 19842), (95, 20160), (127, 20526), (129, 20538), (145, 20694), (149, 20703), (150, 20706), (155, 20751), (163, 20841), (167, 20868), (172, 20904), (183, 21030), (190, 21105), (197, 21183), (198, 21189), (229, 21375), (234, 21408),

Gene: CaptainKirk2\_28 Start: 23407, Stop: 24924, Start Num: 49

Candidate Starts for CaptainKirk2\_28:

(43, 23347), (Start: 49 @23407 has 33 MA's), (73, 23521), (78, 23548), (102, 23701), (107, 23758), (108, 23776), (110, 23803), (139, 24100), (157, 24235), (175, 24385), (177, 24415), (179, 24448), (182, 24472), (186, 24496), (189, 24550), (208, 24688), (218, 24748), (221, 24778), (235, 24898),

Gene: CarolAnn\_29 Start: 23476, Stop: 24993, Start Num: 49

Candidate Starts for CarolAnn\_29:

(43, 23416), (Start: 49 @23476 has 33 MA's), (66, 23557), (69, 23566), (73, 23590), (78, 23617), (102, 23770), (107, 23827), (108, 23845), (110, 23872), (139, 24169), (157, 24304), (175, 24454), (177, 24484), (179, 24517), (181, 24535), (182, 24541), (186, 24565), (189, 24619), (208, 24757), (218, 24817), (221, 24847), (235, 24967),

Gene: Cashline\_27 Start: 22275, Stop: 24146, Start Num: 16

Candidate Starts for Cashline\_27:

(3, 22029), (10, 22137), (11, 22140), (12, 22164), (14, 22170), (Start: 16 @22275 has 8 MA's), (25, 22416), (30, 22476), (51, 22620), (56, 22629), (61, 22650), (62, 22653), (65, 22692), (71, 22725), (80, 22767), (91, 22842), (95, 22875), (130, 23223), (138, 23304), (165, 23520), (175, 23604), (177, 23634), (186, 23715), (218, 23967), (221, 23997), (222, 24003), (225, 24021), (235, 24117),

Gene: Confidence\_27 Start: 22438, Stop: 24309, Start Num: 16

Candidate Starts for Confidence\_27:

(3, 22192), (10, 22300), (11, 22303), (12, 22327), (14, 22333), (Start: 16 @22438 has 8 MA's), (25, 22579), (30, 22639), (51, 22783), (61, 22813), (62, 22816), (65, 22855), (71, 22888), (80, 22930), (91, 23005), (103, 23092), (134, 23431), (136, 23437), (138, 23467), (163, 23668), (175, 23767), (177, 23797), (186, 23878), (187, 23920), (191, 23947), (218, 24130), (221, 24160), (222, 24166), (235, 24280),

Gene: Coriander\_28 Start: 23232, Stop: 25115, Start Num: 20

Candidate Starts for Coriander\_28:

(1, 22944), (4, 23001), (6, 23016), (13, 23097), (14, 23100), (Start: 20 @23232 has 4 MA's), (23, 23316), (33, 23409), (35, 23418), (37, 23430), (42, 23448), (65, 23619), (66, 23622), (80, 23694), (89, 23757), (95, 23802), (103, 23856), (107, 23901), (115, 24006), (116, 24036), (139, 24246), (142, 24270), (153, 24330), (157, 24381), (162, 24405), (163, 24432), (175, 24531), (177, 24561), (180, 24606), (186, 24642), (187, 24684), (193, 24759), (207, 24855), (220, 24945), (224, 24969), (233, 25038),

Gene: DatBoi\_38 Start: 33647, Stop: 35323, Start Num: 26

Candidate Starts for DatBoi\_38:

(Start: 26 @33647 has 4 MA's), (28, 33677), (47, 33788), (74, 33920), (95, 34061), (102, 34103), (119, 34343), (121, 34358), (123, 34367), (129, 34424), (141, 34526), (145, 34580), (149, 34589), (150, 34592), (155, 34637), (163, 34727), (167, 34754), (172, 34790), (173, 34793), (183, 34916), (190, 34991), (202, 35084), (231, 35267), (234, 35291),

Gene: Delian\_29 Start: 23405, Stop: 24922, Start Num: 49

Candidate Starts for Delian\_29:

(43, 23345), (Start: 49 @23405 has 33 MA's), (73, 23519), (78, 23546), (102, 23699), (107, 23756), (108, 23774), (110, 23801), (139, 24098), (157, 24233), (175, 24383), (177, 24413), (179, 24446), (182, 24470), (186, 24494), (189, 24548), (208, 24686), (218, 24746), (221, 24776), (235, 24896),

Gene: DirtyBoi\_29 Start: 23139, Stop: 24968, Start Num: 20

Candidate Starts for DirtyBoi\_29:

(4, 22908), (6, 22923), (14, 23007), (Start: 20 @23139 has 4 MA's), (23, 23223), (33, 23316), (35, 23325), (37, 23337), (42, 23355), (45, 23403), (65, 23526), (66, 23529), (80, 23601), (86, 23652), (96, 23709), (104, 23760), (107, 23796), (130, 24045), (138, 24126), (142, 24153), (151, 24207), (163, 24327), (175, 24426), (177, 24456), (181, 24507), (185, 24534), (186, 24537), (191, 24606), (218, 24789), (221, 24819), (222, 24825), (225, 24843), (235, 24939),

Gene: Dmitri\_28 Start: 23288, Stop: 25117, Start Num: 20

Candidate Starts for Dmitri\_28:

(4, 23057), (6, 23072), (14, 23156), (Start: 20 @23288 has 4 MA's), (22, 23345), (33, 23465), (35, 23474), (37, 23486), (42, 23504), (65, 23675), (66, 23678), (76, 23729), (80, 23750), (96, 23858), (104, 23909), (107, 23945), (117, 24086), (136, 24242), (137, 24260), (148, 24347), (152, 24359), (175, 24575), (177, 24605), (181, 24656), (185, 24683), (194, 24800), (208, 24884), (211, 24908), (214, 24923), (216, 24932), (217, 24938), (229, 25040),

Gene: Eyes\_27 Start: 22143, Stop: 23975, Start Num: 19

Candidate Starts for Eyes\_27:

(8, 21954), (13, 22011), (14, 22014), (Start: 19 @22143 has 8 MA's), (39, 22344), (65, 22521), (80, 22596), (86, 22647), (91, 22671), (95, 22704), (109, 22830), (134, 23097), (136, 23103), (138, 23133), (163, 23334), (175, 23433), (177, 23463), (186, 23544), (218, 23796), (222, 23832), (225, 23850), (235, 23946),

Gene: Eyre\_24 Start: 20262, Stop: 21836, Start Num: 40

Candidate Starts for Eyre\_24:

(Start: 40 @20262 has 1 MA's), (72, 20442), (75, 20451), (91, 20553), (103, 20640), (107, 20685), (108, 20703), (112, 20763), (131, 20943), (139, 21030), (140, 21039), (157, 21165), (163, 21216), (175, 21315), (176, 21327), (177, 21345), (184, 21417), (191, 21498), (204, 21579), (206, 21588), (209, 21597), (211, 21618), (218, 21648), (220, 21672),

Gene: Fenry\_27 Start: 23105, Stop: 24622, Start Num: 49

Candidate Starts for Fenry\_27:

(43, 23045), (Start: 49 @23105 has 33 MA's), (66, 23186), (69, 23195), (73, 23219), (78, 23246), (102, 23399), (107, 23456), (108, 23474), (139, 23798), (157, 23933), (175, 24083), (177, 24113), (179, 24146), (182, 24170), (186, 24194), (189, 24248), (208, 24386), (218, 24446), (221, 24476), (235, 24596),

Gene: Frokostdame\_28 Start: 23349, Stop: 24866, Start Num: 49

Candidate Starts for Frokostdame\_28:

(43, 23289), (Start: 49 @23349 has 33 MA's), (66, 23430), (69, 23439), (73, 23463), (78, 23490), (79, 23496), (84, 23541), (102, 23643), (107, 23700), (108, 23718), (110, 23745), (139, 24042), (157, 24177), (161, 24195), (175, 24327), (177, 24357), (179, 24390), (182, 24414), (186, 24438), (189, 24492), (208, 24630), (218, 24690), (221, 24720), (235, 24840),

Gene: GEazy\_27 Start: 22164, Stop: 23993, Start Num: 19

Candidate Starts for GEazy\_27:

(13, 22032), (14, 22035), (Start: 19 @22164 has 8 MA's), (23, 22242), (39, 22365), (80, 22617), (95, 22725), (96, 22737), (130, 23073), (138, 23154), (152, 23241), (163, 23355), (175, 23451), (177, 23481), (179, 23514), (186, 23562), (187, 23604), (216, 23802), (218, 23814), (222, 23850), (225, 23868), (235, 23964),

Gene: Gambino\_30 Start: 23695, Stop: 25212, Start Num: 49

Candidate Starts for Gambino\_30:

(43, 23635), (Start: 49 @23695 has 33 MA's), (66, 23776), (73, 23809), (78, 23836), (79, 23842), (84, 23887), (85, 23893), (98, 23977), (102, 23989), (107, 24046), (108, 24064), (110, 24091), (139, 24388), (157, 24523), (161, 24541), (175, 24673), (177, 24703), (179, 24736), (182, 24760), (186, 24784), (189, 24838), (208, 24976), (218, 25036), (221, 25066), (235, 25186),

Gene: Guacamole\_28 Start: 23390, Stop: 24949, Start Num: 49

Candidate Starts for Guacamole\_28:

(43, 23330), (Start: 49 @23390 has 33 MA's), (73, 23504), (78, 23531), (87, 23597), (98, 23672), (107, 23741), (117, 23879), (124, 23948), (139, 24083), (140, 24092), (157, 24218), (175, 24368), (177, 24398), (180, 24443), (186, 24479), (187, 24521), (193, 24596), (207, 24689), (220, 24779), (233, 24872),

Gene: HannahD\_27 Start: 22164, Stop: 23993, Start Num: 19

Candidate Starts for HannahD\_27:

(13, 22032), (14, 22035), (Start: 19 @22164 has 8 MA's), (23, 22242), (39, 22365), (80, 22617), (95, 22725), (96, 22737), (130, 23073), (138, 23154), (152, 23241), (163, 23355), (175, 23451), (177, 23481), (179, 23514), (186, 23562), (187, 23604), (216, 23802), (218, 23814), (222, 23850), (225, 23868), (235, 23964),

Gene: Hedwig\_29 Start: 23135, Stop: 25012, Start Num: 20

Candidate Starts for Hedwig\_29:

(4, 22904), (6, 22919), (9, 22955), (13, 23000), (14, 23003), (Start: 20 @23135 has 4 MA's), (23, 23219), (33, 23312), (37, 23333), (42, 23351), (66, 23525), (80, 23597), (89, 23660), (95, 23705), (103, 23759), (107, 23804), (108, 23822), (157, 24281), (163, 24332), (175, 24431), (177, 24461), (180, 24506), (186, 24542), (187, 24584), (193, 24659), (207, 24752), (220, 24842), (225, 24872), (233, 24935),

Gene: Hitter\_28 Start: 23386, Stop: 24903, Start Num: 49

Candidate Starts for Hitter\_28:

(43, 23326), (Start: 49 @23386 has 33 MA's), (73, 23500), (78, 23527), (95, 23638), (107, 23737), (140, 24088), (157, 24214), (175, 24364), (177, 24394), (179, 24427), (182, 24451), (186, 24475), (189, 24529), (208, 24667), (218, 24727), (221, 24757), (235, 24877),

Gene: Jablanski\_29 Start: 23520, Stop: 25391, Start Num: 16

Candidate Starts for Jablanski\_29:

(10, 23382), (11, 23385), (12, 23409), (14, 23415), (Start: 16 @23520 has 8 MA's), (17, 23535), (25, 23661), (30, 23721), (51, 23865), (61, 23895), (62, 23898), (65, 23937), (71, 23970), (80, 24012), (91, 24087), (95, 24120), (103, 24174), (134, 24513), (136, 24519), (138, 24549), (151, 24630), (163, 24750), (175, 24849), (177, 24879), (179, 24912), (182, 24936), (186, 24960), (187, 25002), (208, 25152), (218, 25212), (221, 25242), (222, 25248), (224, 25260), (235, 25362),

Gene: Jalammah\_30 Start: 24180, Stop: 25697, Start Num: 49

Candidate Starts for Jalammah\_30:

(43, 24120), (Start: 49 @24180 has 33 MA's), (66, 24261), (73, 24294), (78, 24321), (95, 24432), (107, 24531), (110, 24576), (139, 24873), (157, 25008), (175, 25158), (177, 25188), (179, 25221), (182, 25245), (186, 25269), (189, 25323), (208, 25461), (218, 25521), (221, 25551), (235, 25671),

Gene: JasperJr\_28 Start: 23390, Stop: 24949, Start Num: 49

Candidate Starts for JasperJr\_28:

(43, 23330), (Start: 49 @23390 has 33 MA's), (73, 23504), (78, 23531), (87, 23597), (98, 23672), (107, 23741), (117, 23879), (124, 23948), (139, 24083), (140, 24092), (157, 24218), (175, 24368), (177, 24398), (180, 24443), (186, 24479), (187, 24521), (193, 24596), (207, 24689), (220, 24779), (233, 24872),

Gene: JuJu\_29 Start: 23449, Stop: 24948, Start Num: 49

Candidate Starts for JuJu\_29:

(15, 23119), (43, 23389), (Start: 49 @23449 has 33 MA's), (66, 23530), (73, 23563), (78, 23590), (85, 23647), (107, 23782), (130, 24037), (136, 24088), (146, 24181), (157, 24256), (161, 24274), (163, 24307), (170, 24367), (175, 24406), (177, 24436), (178, 24457), (182, 24493), (186, 24517), (187, 24559), (216, 24757), (218, 24769), (222, 24805), (235, 24919), (236, 24937),

Gene: LittleMunchkin\_29 Start: 29134, Stop: 30714, Start Num: 41

Candidate Starts for LittleMunchkin\_29:

(Start: 41 @29134 has 4 MA's), (46, 29191), (48, 29203), (53, 29236), (58, 29248), (59, 29251), (63, 29269), (67, 29302), (71, 29326), (82, 29386), (84, 29407), (95, 29461), (96, 29473), (99, 29494), (103, 29515), (115, 29656), (128, 29794), (129, 29800), (162, 30052), (177, 30211), (178, 30232), (182, 30268), (184, 30283), (188, 30340), (196, 30436), (205, 30475), (208, 30487), (212, 30514), (217, 30541), (226, 30613), (230, 30634), (231, 30640), (235, 30688), (236, 30706),

Gene: LonelyBoi\_28 Start: 23140, Stop: 25011, Start Num: 16

Candidate Starts for LonelyBoi\_28:

(10, 23002), (11, 23005), (12, 23029), (14, 23035), (Start: 16 @23140 has 8 MA's), (25, 23281), (30, 23341), (51, 23485), (61, 23515), (62, 23518), (65, 23557), (71, 23590), (80, 23632), (91, 23707), (103, 23794), (134, 24133), (136, 24139), (138, 24169), (163, 24370), (175, 24469), (177, 24499), (186, 24580), (191, 24649), (218, 24832), (221, 24862), (222, 24868), (235, 24982),

Gene: Lysidious\_29 Start: 23907, Stop: 25466, Start Num: 49

Candidate Starts for Lysidious\_29:

(43, 23847), (Start: 49 @23907 has 33 MA's), (66, 23988), (73, 24021), (78, 24048), (98, 24189), (99, 24192), (102, 24201), (104, 24222), (107, 24258), (108, 24276), (110, 24303), (139, 24600), (140, 24609), (157, 24735), (175, 24885), (177, 24915), (180, 24960), (186, 24996), (187, 25038), (193, 25113), (207, 25206), (220, 25296), (233, 25389),

Gene: MagicMan\_27 Start: 22464, Stop: 24296, Start Num: 19

Candidate Starts for MagicMan\_27:

(13, 22332), (14, 22335), (Start: 19 @22464 has 8 MA's), (66, 22845), (80, 22917), (86, 22968), (91, 22992), (95, 23025), (109, 23151), (134, 23418), (136, 23424), (138, 23454), (163, 23655), (175, 23754), (177, 23784), (185, 23862), (186, 23865), (187, 23907), (218, 24117), (222, 24153), (225, 24171), (235, 24267),

Gene: Malachai\_29 Start: 23867, Stop: 25366, Start Num: 49

Candidate Starts for Malachai\_29:

(43, 23807), (Start: 49 @23867 has 33 MA's), (66, 23948), (69, 23957), (73, 23981), (78, 24008), (102, 24161), (107, 24218), (108, 24236), (110, 24263), (124, 24425), (139, 24560), (140, 24569), (175, 24845), (176, 24857), (177, 24875), (182, 24932), (184, 24947), (191, 25028), (204, 25109), (206, 25118), (209, 25127), (211, 25148), (218, 25178), (220, 25202),

Gene: Melba\_28 Start: 23386, Stop: 24900, Start Num: 49

Candidate Starts for Melba\_28:

(43, 23326), (Start: 49 @23386 has 33 MA's), (73, 23500), (78, 23527), (102, 23680), (107, 23737), (108, 23755), (110, 23782), (139, 24079), (140, 24088), (157, 24214), (175, 24364), (177, 24394), (180, 24439), (186, 24475), (187, 24517), (200, 24643), (214, 24712), (216, 24721), (222, 24769),

Gene: Mellie\_27 Start: 23147, Stop: 24664, Start Num: 49

Candidate Starts for Mellie\_27:

(43, 23087), (Start: 49 @23147 has 33 MA's), (66, 23228), (69, 23237), (73, 23261), (78, 23288), (102, 23441), (107, 23498), (108, 23516), (139, 23840), (157, 23975), (175, 24125), (177, 24155), (179, 24188), (182, 24212), (186, 24236), (189, 24290), (208, 24428), (218, 24488), (221, 24518), (235, 24638),

Gene: MintFen\_28 Start: 23386, Stop: 24900, Start Num: 49

Candidate Starts for MintFen\_28:

(43, 23326), (Start: 49 @23386 has 33 MA's), (73, 23500), (78, 23527), (102, 23680), (107, 23737), (108, 23755), (110, 23782), (139, 24079), (140, 24088), (157, 24214), (175, 24364), (177, 24394), (180, 24439), (186, 24475), (187, 24517), (200, 24643), (214, 24712), (216, 24721), (222, 24769),

Gene: MissRona\_30 Start: 23695, Stop: 25212, Start Num: 49

Candidate Starts for MissRona\_30:

(43, 23635), (Start: 49 @23695 has 33 MA's), (66, 23776), (73, 23809), (78, 23836), (79, 23842), (84, 23887), (85, 23893), (98, 23977), (102, 23989), (107, 24046), (108, 24064), (110, 24091), (139, 24388), (157, 24523), (161, 24541), (175, 24673), (177, 24703), (179, 24736), (182, 24760), (186, 24784), (189, 24838), (208, 24976), (218, 25036), (221, 25066), (235, 25186),

Gene: ModicumRichard\_22 Start: 19702, Stop: 21441, Start Num: 24

Candidate Starts for ModicumRichard\_22:

(Start: 24 @19702 has 4 MA's), (31, 19783), (44, 19843), (95, 20161), (127, 20527), (129, 20539), (145, 20695), (149, 20704), (150, 20707), (155, 20752), (163, 20842), (167, 20869), (172, 20905), (183, 21031), (190, 21106), (197, 21184), (198, 21190), (229, 21376), (234, 21409),

Gene: Mollymur\_38 Start: 34128, Stop: 35807, Start Num: 26

Candidate Starts for Mollymur\_38:

(Start: 26 @34128 has 4 MA's), (29, 34158), (33, 34185), (47, 34269), (64, 34359), (74, 34401), (103, 34599), (107, 34644), (134, 34932), (161, 35136), (163, 35169), (165, 35184), (166, 35199), (175, 35271), (177, 35301), (185, 35379), (186, 35382), (188, 35430), (218, 35637), (224, 35685), (226, 35703), (231, 35733),

Gene: Morgana\_21 Start: 19123, Stop: 20847, Start Num: 24

Candidate Starts for Morgana\_21:

(Start: 24 @19123 has 4 MA's), (44, 19264), (77, 19459), (81, 19486), (92, 19558), (130, 19936), (131, 19939), (161, 20176), (163, 20209), (174, 20296), (175, 20311), (177, 20341), (186, 20422), (208, 20617), (226, 20743), (231, 20773),

Gene: ObLaDi\_22 Start: 19681, Stop: 21420, Start Num: 24

Candidate Starts for ObLaDi\_22:

(Start: 24 @19681 has 4 MA's), (31, 19762), (44, 19822), (95, 20140), (127, 20506), (129, 20518), (145, 20674), (149, 20683), (150, 20686), (154, 20725), (155, 20731), (163, 20821), (167, 20848), (172, 20884), (183, 21010), (190, 21085), (197, 21163), (198, 21169), (229, 21355), (234, 21388),

Gene: Obliviate\_28 Start: 23302, Stop: 24801, Start Num: 49

Candidate Starts for Obliviate\_28:

(43, 23242), (Start: 49 @23302 has 33 MA's), (66, 23383), (73, 23416), (78, 23443), (85, 23500), (102, 23578), (107, 23635), (130, 23890), (146, 24034), (157, 24109), (160, 24124), (161, 24127), (175, 24259), (177, 24289), (185, 24367), (194, 24484), (208, 24568), (211, 24592), (213, 24604), (214, 24607), (216, 24616), (217, 24622), (218, 24628),

Gene: Octobien14\_30 Start: 24971, Stop: 26458, Start Num: 55

Candidate Starts for Octobien14\_30:

(38, 24869), (50, 24959), (52, 24965), (Start: 55 @24971 has 1 MA's), (60, 24986), (70, 25043), (88, 25148), (90, 25157), (94, 25184), (97, 25205), (100, 25217), (105, 25253), (107, 25283), (111, 25352), (112, 25367), (113, 25379), (114, 25382), (117, 25430), (118, 25433), (122, 25484), (128, 25532), (129, 25538), (132, 25556), (134, 25586), (137, 25610), (138, 25622), (143, 25655), (144, 25661), (157, 25772), (158, 25775), (159, 25778), (164, 25835), (168, 25865), (174, 25907), (175, 25922), (177, 25952), (182, 26009), (186, 26033), (189, 26087), (191, 26102), (214, 26267), (220, 26312), (236, 26453),

Gene: Opie\_27 Start: 22488, Stop: 24320, Start Num: 19

Candidate Starts for Opie\_27:

(5, 22263), (8, 22299), (13, 22356), (14, 22359), (Start: 19 @22488 has 8 MA's), (65, 22866), (66, 22869), (80, 22941), (86, 22992), (91, 23016), (95, 23049), (109, 23175), (134, 23442), (135, 23445), (136, 23448), (138, 23478), (147, 23550), (163, 23679), (175, 23778), (177, 23808), (185, 23886), (186, 23889), (187, 23931), (218, 24141), (222, 24177), (225, 24195), (235, 24291),

Gene: PhrostedPhlake\_30 Start: 24079, Stop: 25596, Start Num: 49

Candidate Starts for PhrostedPhlake\_30:

(43, 24019), (Start: 49 @24079 has 33 MA's), (73, 24193), (78, 24220), (102, 24373), (107, 24430), (108, 24448), (110, 24475), (139, 24772), (157, 24907), (175, 25057), (177, 25087), (179, 25120), (182, 25144), (186, 25168), (189, 25222), (208, 25360), (218, 25420), (221, 25450), (235, 25570),

Gene: Pipp\_28 Start: 23377, Stop: 24876, Start Num: 49

Candidate Starts for Pipp\_28:

(43, 23317), (Start: 49 @23377 has 33 MA's), (66, 23458), (73, 23491), (78, 23518), (85, 23575), (102, 23653), (107, 23710), (130, 23965), (136, 24016), (146, 24109), (160, 24199), (161, 24202), (163, 24235), (175, 24334), (177, 24364), (185, 24442), (194, 24559), (208, 24643), (211, 24667), (213, 24679), (214, 24682), (216, 24691), (217, 24697), (218, 24703),

Gene: Posh\_29 Start: 23373, Stop: 25244, Start Num: 16

Candidate Starts for Posh\_29:

(10, 23235), (11, 23238), (12, 23262), (14, 23268), (Start: 16 @23373 has 8 MA's), (17, 23388), (25, 23514), (30, 23574), (51, 23718), (61, 23748), (62, 23751), (65, 23790), (71, 23823), (80, 23865), (91, 23940), (95, 23973), (103, 24027), (134, 24366), (136, 24372), (138, 24402), (163, 24603), (175, 24702), (177, 24732), (179, 24765), (182, 24789), (186, 24813), (187, 24855), (208, 25005), (218,

25065), (222, 25101), (224, 25113), (235, 25215),

Gene: Pytheas\_29 Start: 23519, Stop: 25390, Start Num: 16

Candidate Starts for Pytheas\_29:

(10, 23381), (11, 23384), (12, 23408), (14, 23414), (Start: 16 @23519 has 8 MA's), (17, 23534), (25, 23660), (30, 23720), (51, 23864), (61, 23894), (62, 23897), (65, 23936), (71, 23969), (80, 24011), (91, 24086), (95, 24119), (103, 24173), (134, 24512), (136, 24518), (138, 24548), (151, 24629), (163, 24749), (175, 24848), (177, 24878), (179, 24911), (182, 24935), (186, 24959), (187, 25001), (208, 25151), (218, 25211), (221, 25241), (222, 25247), (224, 25259), (235, 25361),

Gene: RayTheFireFly\_28 Start: 23264, Stop: 25141, Start Num: 20

Candidate Starts for RayTheFireFly\_28:

(14, 23132), (Start: 20 @23264 has 4 MA's), (23, 23348), (33, 23441), (37, 23462), (42, 23480), (66, 23654), (80, 23726), (89, 23789), (103, 23888), (107, 23933), (108, 23951), (157, 24410), (163, 24461), (175, 24560), (177, 24590), (180, 24635), (186, 24671), (187, 24713), (207, 24881), (220, 24971), (225, 25001), (233, 25064),

Gene: Ruthy\_22 Start: 19584, Stop: 21350, Start Num: 21

Candidate Starts for Ruthy\_22:

(Start: 21 @19584 has 1 MA's), (34, 19731), (36, 19740), (76, 19968), (80, 19989), (89, 20052), (95, 20097), (96, 20109), (98, 20127), (103, 20151), (107, 20196), (115, 20301), (130, 20445), (133, 20478), (134, 20490), (135, 20493), (136, 20496), (138, 20526), (142, 20553), (157, 20676), (175, 20826), (177, 20856), (182, 20913), (186, 20937), (187, 20979), (191, 21009), (192, 21039), (195, 21060), (201, 21090), (204, 21099), (206, 21108), (210, 21141), (211, 21144), (215, 21162), (219, 21183), (227, 21252), (228, 21258), (231, 21276),

Gene: Samba\_28 Start: 23464, Stop: 24981, Start Num: 49

Candidate Starts for Samba\_28:

(43, 23404), (Start: 49 @23464 has 33 MA's), (73, 23578), (78, 23605), (95, 23716), (107, 23815), (140, 24166), (157, 24292), (175, 24442), (177, 24472), (179, 24505), (182, 24529), (186, 24553), (189, 24607), (208, 24745), (218, 24805), (221, 24835), (235, 24955),

Gene: Schnabeltier\_27 Start: 22465, Stop: 24297, Start Num: 19

Candidate Starts for Schnabeltier\_27:

(13, 22333), (14, 22336), (Start: 19 @22465 has 8 MA's), (66, 22846), (80, 22918), (86, 22969), (91, 22993), (95, 23026), (109, 23152), (134, 23419), (136, 23425), (138, 23455), (163, 23656), (175, 23755), (177, 23785), (185, 23863), (186, 23866), (187, 23908), (218, 24118), (222, 24154), (225, 24172), (235, 24268),

Gene: Sisko\_27 Start: 26564, Stop: 28150, Start Num: 41

Candidate Starts for Sisko\_27:

(Start: 41 @26564 has 4 MA's), (46, 26621), (48, 26633), (58, 26678), (67, 26732), (82, 26819), (96, 26906), (103, 26948), (119, 27155), (120, 27167), (129, 27233), (157, 27461), (162, 27485), (163, 27512), (165, 27527), (177, 27644), (178, 27665), (182, 27701), (188, 27773), (205, 27908), (208, 27920), (212, 27947), (226, 28046), (231, 28076), (235, 28124), (236, 28142),

Gene: SpeedDemon\_390 Start: 34766, Stop: 36442, Start Num: 26

Candidate Starts for SpeedDemon\_390:

(Start: 26 @34766 has 4 MA's), (28, 34796), (32, 34823), (47, 34907), (74, 35039), (102, 35222), (119, 35462), (123, 35486), (129, 35543), (145, 35699), (149, 35708), (150, 35711), (155, 35756), (163, 35846), (167, 35873), (172, 35909), (173, 35912), (183, 36035), (190, 36110), (202, 36203), (231, 36386), (234, 36410),

Gene: TaronosaurusRx\_27 Start: 22496, Stop: 24328, Start Num: 19

Candidate Starts for TaronosaurusRx\_27:

(13, 22364), (14, 22367), (Start: 19 @22496 has 8 MA's), (65, 22874), (66, 22877), (80, 22949), (95, 23057), (103, 23111), (134, 23450), (136, 23456), (138, 23486), (142, 23513), (163, 23687), (175, 23786), (177, 23816), (186, 23897), (191, 23966), (218, 24149), (221, 24179), (222, 24185), (235, 24299),

Gene: UmaThurman\_28 Start: 23511, Stop: 25025, Start Num: 49

Candidate Starts for UmaThurman\_28:

(43, 23451), (Start: 49 @23511 has 33 MA's), (66, 23592), (73, 23625), (78, 23652), (84, 23703), (95, 23763), (98, 23793), (107, 23862), (139, 24207), (157, 24342), (163, 24393), (175, 24492), (177, 24522), (182, 24579), (186, 24603), (203, 24771), (213, 24834), (214, 24837), (216, 24846), (217, 24852), (222, 24894), (223, 24897),

Gene: Utz\_28 Start: 23378, Stop: 24877, Start Num: 49

Candidate Starts for Utz\_28:

(43, 23318), (Start: 49 @23378 has 33 MA's), (66, 23459), (73, 23492), (78, 23519), (85, 23576), (102, 23654), (107, 23711), (130, 23966), (136, 24017), (146, 24110), (160, 24200), (161, 24203), (163, 24236), (175, 24335), (177, 24365), (185, 24443), (194, 24560), (208, 24644), (211, 24668), (213, 24680), (214, 24683), (216, 24692), (217, 24698), (218, 24704),

Gene: VanLee\_22 Start: 18690, Stop: 20378, Start Num: 27

Candidate Starts for VanLee\_22:

(Start: 27 @18690 has 1 MA's), (50, 18843), (54, 18852), (57, 18858), (89, 19059), (93, 19092), (106, 19173), (117, 19341), (130, 19452), (134, 19494), (138, 19530), (142, 19557), (157, 19683), (177, 19866), (186, 19947), (194, 20070), (208, 20145), (217, 20199), (225, 20259), (226, 20271),

Gene: Walrus\_30 Start: 23926, Stop: 25488, Start Num: 49

Candidate Starts for Walrus\_30:

(43, 23866), (Start: 49 @23926 has 33 MA's), (66, 24007), (73, 24040), (78, 24067), (83, 24106), (87, 24133), (102, 24220), (107, 24277), (108, 24295), (110, 24322), (140, 24628), (157, 24754), (175, 24904), (177, 24934), (186, 25015), (193, 25132), (202, 25204), (207, 25228), (208, 25234), (211, 25258), (220, 25318), (224, 25342), (225, 25348), (233, 25411),

Gene: Wisp\_27 Start: 23096, Stop: 24655, Start Num: 49

Candidate Starts for Wisp\_27:

(43, 23036), (Start: 49 @23096 has 33 MA's), (73, 23210), (78, 23237), (102, 23390), (107, 23447), (108, 23465), (110, 23492), (139, 23789), (140, 23798), (157, 23924), (175, 24074), (177, 24104), (180, 24149), (186, 24185), (187, 24227), (193, 24302), (207, 24395), (220, 24485), (232, 24575), (233, 24578),

Gene: Wrigley\_29 Start: 23270, Stop: 25141, Start Num: 16

Candidate Starts for Wrigley\_29:

(10, 23132), (11, 23135), (12, 23159), (14, 23165), (Start: 16 @23270 has 8 MA's), (17, 23285), (25, 23411), (30, 23471), (51, 23615), (61, 23645), (62, 23648), (65, 23687), (71, 23720), (80, 23762), (91, 23837), (95, 23870), (103, 23924), (134, 24263), (136, 24269), (138, 24299), (163, 24500), (175, 24599), (177, 24629), (179, 24662), (182, 24686), (186, 24710), (187, 24752), (208, 24902), (218, 24962), (222, 24998), (224, 25010), (235, 25112),

Gene: Yago84\_27 Start: 26638, Stop: 28224, Start Num: 41

Candidate Starts for Yago84\_27:

(Start: 41 @26638 has 4 MA's), (46, 26695), (48, 26707), (58, 26752), (67, 26806), (82, 26893), (96, 26980), (103, 27022), (119, 27229), (120, 27241), (129, 27307), (157, 27535), (162, 27559), (163,



27586), (165, 27601), (177, 27718), (178, 27739), (182, 27775), (205, 27982), (208, 27994), (212, 28021), (226, 28120), (231, 28150), (235, 28198), (236, 28216),

Gene: ZAYM\_28 Start: 22965, Stop: 24797, Start Num: 19

Candidate Starts for ZAYM\_28:

(13, 22833), (14, 22836), (Start: 19 @22965 has 8 MA's), (65, 23343), (66, 23346), (80, 23418), (95, 23526), (103, 23580), (134, 23919), (136, 23925), (138, 23955), (142, 23982), (163, 24156), (175, 24255), (177, 24285), (186, 24366), (191, 24435), (218, 24618), (221, 24648), (222, 24654), (235, 24768),

Gene: Zarbodnamra\_28 Start: 23385, Stop: 24944, Start Num: 49

Candidate Starts for Zarbodnamra\_28:

(43, 23325), (Start: 49 @23385 has 33 MA's), (66, 23466), (73, 23499), (78, 23526), (98, 23667), (99, 23670), (102, 23679), (104, 23700), (107, 23736), (108, 23754), (139, 24078), (140, 24087), (157, 24213), (175, 24363), (177, 24393), (180, 24438), (186, 24474), (187, 24516), (193, 24591), (207, 24684), (220, 24774), (232, 24864), (233, 24867),

Gene: ZiggyZoo\_28 Start: 23302, Stop: 24819, Start Num: 49

Candidate Starts for ZiggyZoo\_28:

(43, 23242), (Start: 49 @23302 has 33 MA's), (66, 23383), (69, 23392), (73, 23416), (78, 23443), (87, 23509), (102, 23596), (107, 23653), (108, 23671), (110, 23698), (157, 24130), (175, 24280), (177, 24310), (179, 24343), (182, 24367), (186, 24391), (189, 24445), (208, 24583), (218, 24643), (221, 24673), (235, 24793),