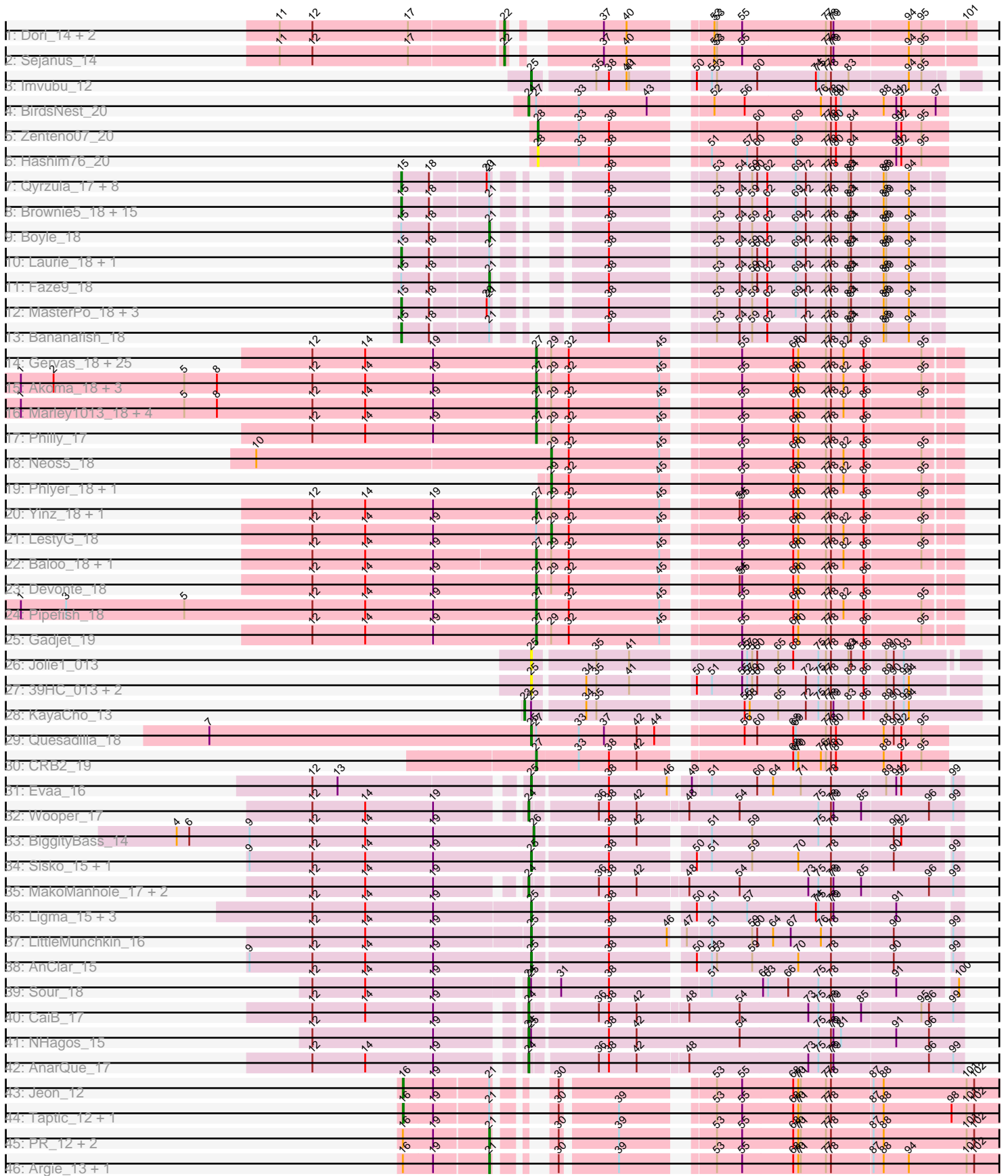


Pham 163450



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 163450 Report

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

Pham number 163450 has 122 members, 14 are drafts.

Phages represented in each track:

- Track 1 : Dori\_14, Mask\_14, Mao1\_13
- Track 2 : Sejanus\_14
- Track 3 : Imvubu\_12
- Track 4 : BirdsNest\_20
- Track 5 : Zenteno07\_20
- Track 6 : Hashim76\_20
- Track 7 : Qyrzula\_17, Godines\_18, LizLemon\_18, Arbitr\_18, Kheth\_18, Glass\_18, Allegro\_18, Calamitous\_18, Holeinone\_18
- Track 8 : Brownie5\_18, Rhinoforte\_18, Ares\_18, Opia\_18, Tres\_18, Rosebush\_18, Eaglehorse\_18, ItsyBitsy1\_18, Sabella\_18, Lephleur\_18, FrenchFry\_18, West99\_18, Blocker23\_18, Tinciduntolum\_19, Lars\_18, Hedgerow\_18
- Track 9 : Boyle\_18
- Track 10 : Laurie\_18, Phantasmagoria\_18
- Track 11 : Faze9\_18
- Track 12 : MasterPo\_18, Kaleb\_18, TA17A\_18, Coffee\_18
- Track 13 : Bananafish\_18
- Track 14 : Gervas\_18, OrangeOswald\_18, HarveySr\_18, Jackstina\_17, Ben11\_17, SynergyX\_18, Tydolla\_18, Briakila\_18, Corofin\_18, Rita1961\_18, RagingRooster\_18, Chandler\_18, Abinghost\_18, SlippinJimmy\_18, Audrey\_18, Deenasa\_18, Kronus\_17, Daisy\_18, MmasiCarm\_18, Obutu\_18, Phaedrus\_17, Athena\_19, Casbah\_17, Kamiyu\_18, Halfpint\_17, Compostia\_19
- Track 15 : Akoma\_18, Bernardo\_18, Yahalom\_18, Phayeta\_18
- Track 16 : Marley1013\_18, GlenHope\_19, Morty007\_18, Mortcellus\_17, ChaChing\_18
- Track 17 : Philly\_17
- Track 18 : Neos5\_18
- Track 19 : Phlyer\_18, RomaT\_18
- Track 20 : Yinz\_18, Heathcliff\_18
- Track 21 : LestyG\_18
- Track 22 : Baloo\_18, Nozo\_18
- Track 23 : Devonte\_18
- Track 24 : Pipefish\_18
- Track 25 : Gadjet\_19
- Track 26 : Jolie1\_013
- Track 27 : 39HC\_013, Hosp\_011, 40BC\_013
- Track 28 : KayaCho\_13
- Track 29 : Quesadilla\_18

- Track 30 : CRB2\_19
- Track 31 : Evaa\_16
- Track 32 : Wooper\_17
- Track 33 : BiggityBass\_14
- Track 34 : Sisko\_15, Yago84\_15
- Track 35 : MakoManhole\_17, CloverMinnie\_17, MossRose\_17
- Track 36 : Ligma\_15, Axumite\_15, Shatter\_15, Fresco\_15
- Track 37 : LittleMunchkin\_16
- Track 38 : AnClar\_15
- Track 39 : Sour\_18
- Track 40 : CaiB\_17
- Track 41 : NHagos\_15
- Track 42 : AnarQue\_17
- Track 43 : Jeon\_12
- Track 44 : Taptic\_12, Megabear\_12
- Track 45 : PR\_12, Cepens\_12, D12\_12
- Track 46 : Argie\_13, GodPhather\_13

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

The start number called the most often in the published annotations is 27, it was called in 41 of the 108 non-draft genes in the pham.

Genes that call this "Most Annotated" start:

- Abinghost\_18, Akoma\_18, Athena\_19, Audrey\_18, Baloo\_18, Ben11\_17, Bernardo\_18, Briakila\_18, CRB2\_19, Casbah\_17, ChaChing\_18, Chandler\_18, Compostia\_19, Corofin\_18, Daisy\_18, Deenasa\_18, Devonte\_18, Gadget\_19, Gervas\_18, GlenHope\_19, Halfpint\_17, HarveySr\_18, Heathcliff\_18, Jackstina\_17, Kamiyu\_18, Kronus\_17, Marley1013\_18, MmasiCarm\_18, Mortcellus\_17, Morty007\_18, Nozo\_18, Obutu\_18, OrangeOswald\_18, Phaedrus\_17, Phayeta\_18, Philly\_17, Pipefish\_18, RagingRooster\_18, Rita1961\_18, SlippinJimmy\_18, SynergyX\_18, Tydolla\_18, Yahalom\_18, Yinz\_18,

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

- BirdsNest\_20, LestyG\_18, Quesadilla\_18,

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

- 39HC\_013, 40BC\_013, Allegro\_18, AnClar\_15, AnarQue\_17, Arbiter\_18, Ares\_18, Argie\_13, Axumite\_15, Bananafish\_18, BiggityBass\_14, Blocker23\_18, Boyle\_18, Brownie5\_18, CaiB\_17, Calamitous\_18, Cepens\_12, CloverMinnie\_17, Coffee\_18, D12\_12, Dori\_14, Eaglehorse\_18, Evaa\_16, Faze9\_18, FrenchFry\_18, Fresco\_15, Glass\_18, GodPhather\_13, Godines\_18, Hashim76\_20, Hedgerow\_18, Holeinone\_18, Hosp\_011, Imvubu\_12, ItsyBitsy1\_18, Jeon\_12, Jolie1\_013, Kaleb\_18, KayaCho\_13, Kheth\_18, Lars\_18, Laurie\_18, Lephleur\_18, Ligma\_15, LittleMunchkin\_16, LizLemon\_18, MakoManhole\_17, Mao1\_13, Mask\_14, MasterPo\_18, Megabear\_12, MossRose\_17, NHagos\_15, Neos5\_18, Opia\_18, PR\_12, Phantasmagoria\_18, Phlyer\_18, Qyrzula\_17, Rhinoforte\_18, RomaT\_18, Rosebush\_18, Sabella\_18, Sejanus\_14, Shatter\_15, Sisko\_15, Sour\_18, TA17A\_18, Taptic\_12, Tinciduntolum\_19, Tres\_18, West99\_18, Wooper\_17, Yago84\_15, Zenteno07\_20,

## Summary by start number:

### Start 15:

- Found in 34 of 122 ( 27.9% ) of genes in pham
- Manual Annotations of this start: 30 of 108
- Called 94.1% of time when present
- Phage (with cluster) where this start called: Allegro\_18 (B2), Arbiter\_18 (B2), Ares\_18 (B2), Bananafish\_18 (B2), Blocker23\_18 (B2), Brownie5\_18 (B2), Calamitous\_18 (B2), Coffee\_18 (B2), Eaglehorse\_18 (B2), FrenchFry\_18 (B2), Glass\_18 (B2), Godines\_18 (B2), Hedgerow\_18 (B2), Holeinone\_18 (B2), ItsyBitsy1\_18 (B2), Kaleb\_18 (B2), Kheth\_18 (B2), Lars\_18 (B2), Laurie\_18 (B2), Lephleur\_18 (B2), LizLemon\_18 (B2), MasterPo\_18 (B2), Opia\_18 (B2), Phantasmagoria\_18 (B2), Qyrzula\_17 (B2), Rhinoforte\_18 (B2), Rosebush\_18 (B2), Sabella\_18 (B2), TA17A\_18 (B2), Tinciduntolum\_19 (B2), Tres\_18 (B2), West99\_18 (B2),

### Start 16:

- Found in 8 of 122 ( 6.6% ) of genes in pham
- Manual Annotations of this start: 3 of 108
- Called 37.5% of time when present
- Phage (with cluster) where this start called: Jeon\_12 (W), Megabear\_12 (W), Taptic\_12 (W),

### Start 21:

- Found in 42 of 122 ( 34.4% ) of genes in pham
- Manual Annotations of this start: 7 of 108
- Called 16.7% of time when present
- Phage (with cluster) where this start called: Argie\_13 (W), Boyle\_18 (B2), Cepens\_12 (W), D12\_12 (W), Faze9\_18 (B2), GodPhather\_13 (W), PR\_12 (W),

### Start 22:

- Found in 4 of 122 ( 3.3% ) of genes in pham
- Manual Annotations of this start: 3 of 108
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Dori\_14 (AD), Mao1\_13 (AD), Mask\_14 (AD), Sejanus\_14 (AD),

### Start 23:

- Found in 1 of 122 ( 0.8% ) of genes in pham
- Manual Annotations of this start: 1 of 108
- Called 100.0% of time when present
- Phage (with cluster) where this start called: KayaCho\_13 (B6),

### Start 24:

- Found in 9 of 122 ( 7.4% ) of genes in pham
- Manual Annotations of this start: 8 of 108
- Called 100.0% of time when present
- Phage (with cluster) where this start called: AnarQue\_17 (DR), BirdsNest\_20 (B13), CaiB\_17 (DR), CloverMinnie\_17 (DR), MakoManhole\_17 (DR), MossRose\_17 (DR), NHagos\_15 (DR), Sour\_18 (DR), Wooper\_17 (DR),

### Start 25:

- Found in 18 of 122 ( 14.8% ) of genes in pham
- Manual Annotations of this start: 9 of 108
- Called 83.3% of time when present
- Phage (with cluster) where this start called: 39HC\_013 (B6), 40BC\_013 (B6), AnClar\_15 (DR), Axumite\_15 (DR), Evaa\_16 (DR), Fresco\_15 (DR), Hosp\_011 (B6), Imvubu\_12 (B10), Jolie1\_013 (B6), Ligma\_15 (DR), LittleMunchkin\_16 (DR), Quesadilla\_18 (B9), Shatter\_15 (DR), Sisko\_15 (DR), Yago84\_15 (DR),

#### Start 26:

- Found in 1 of 122 ( 0.8% ) of genes in pham
- Manual Annotations of this start: 1 of 108
- Called 100.0% of time when present
- Phage (with cluster) where this start called: BiggityBass\_14 (DR),

#### Start 27:

- Found in 47 of 122 ( 38.5% ) of genes in pham
- Manual Annotations of this start: 41 of 108
- Called 93.6% of time when present
- Phage (with cluster) where this start called: Abinghost\_18 (B3), Akoma\_18 (B3), Athena\_19 (B3), Audrey\_18 (B3), Baloo\_18 (B3), Ben11\_17 (B3), Bernardo\_18 (B3), Briakila\_18 (B3), CRB2\_19 (B9), Casbah\_17 (B3), ChaChing\_18 (B3), Chandler\_18 (B3), Compostia\_19 (B3), Corofin\_18 (B3), Daisy\_18 (B3), Deenasa\_18 (B3), Devonte\_18 (B3), Gadget\_19 (B3), Gervas\_18 (B3), GlenHope\_19 (B3), Halfpint\_17 (B3), HarveySr\_18 (B3), Heathcliff\_18 (B3), Jackstina\_17 (B3), Kamiyu\_18 (B3), Kronus\_17 (B3), Marley1013\_18 (B3), MmasiCarm\_18 (B3), Mortcellus\_17 (B3), Morty007\_18 (B3), Nozo\_18 (B3), Obutu\_18 (B3), OrangeOswald\_18 (B3), Phaedrus\_17 (B3), Phayeta\_18 (B3), Philly\_17 (B3), Pipefish\_18 (B3), RagingRooster\_18 (B3), Rita1961\_18 (B3), SlippinJimmy\_18 (B3), SynergyX\_18 (B3), Tydolla\_18 (B3), Yahalom\_18 (B3), Yinz\_18 (B3),

#### Start 28:

- Found in 2 of 122 ( 1.6% ) of genes in pham
- Manual Annotations of this start: 1 of 108
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Hashim76\_20 (B13), Zenteno07\_20 (B13),

#### Start 29:

- Found in 46 of 122 ( 37.7% ) of genes in pham
- Manual Annotations of this start: 4 of 108
- Called 8.7% of time when present
- Phage (with cluster) where this start called: LestyG\_18 (B3), Neos5\_18 (B3), Phlyer\_18 (B3), RomaT\_18 (B3),

### Summary by clusters:

There are 9 clusters represented in this pham: AD, B2, W, B6, B13, B10, B3, DR, B9,

Info for manual annotations of cluster AD:

- Start number 22 was manually annotated 3 times for cluster AD.

Info for manual annotations of cluster B10:

- Start number 25 was manually annotated 1 time for cluster B10.

Info for manual annotations of cluster B13:

- Start number 24 was manually annotated 1 time for cluster B13.
- Start number 28 was manually annotated 1 time for cluster B13.

Info for manual annotations of cluster B2:

- Start number 15 was manually annotated 30 times for cluster B2.
- Start number 21 was manually annotated 2 times for cluster B2.

Info for manual annotations of cluster B3:

- Start number 27 was manually annotated 40 times for cluster B3.
- Start number 29 was manually annotated 4 times for cluster B3.

Info for manual annotations of cluster B6:

- Start number 23 was manually annotated 1 time for cluster B6.

Info for manual annotations of cluster B9:

- Start number 25 was manually annotated 1 time for cluster B9.
- Start number 27 was manually annotated 1 time for cluster B9.

Info for manual annotations of cluster DR:

- Start number 24 was manually annotated 7 times for cluster DR.
- Start number 25 was manually annotated 7 times for cluster DR.
- Start number 26 was manually annotated 1 time for cluster DR.

Info for manual annotations of cluster W:

- Start number 16 was manually annotated 3 times for cluster W.
- Start number 21 was manually annotated 5 times for cluster W.

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

Gene: 39HC\_013 Start: 13570, Stop: 14058, Start Num: 25

Candidate Starts for 39HC\_013:

(Start: 25 @13570 has 9 MA's), (34, 13627), (35, 13639), (41, 13678), (50, 13732), (51, 13747), (55, 13783), (57, 13789), (59, 13795), (60, 13801), (65, 13825), (72, 13858), (75, 13873), (77, 13882), (78, 13888), (83, 13909), (86, 13927), (89, 13951), (90, 13960), (93, 13972), (94, 13978),

Gene: 40BC\_013 Start: 13570, Stop: 14058, Start Num: 25

Candidate Starts for 40BC\_013:

(Start: 25 @13570 has 9 MA's), (34, 13627), (35, 13639), (41, 13678), (50, 13732), (51, 13747), (55, 13783), (57, 13789), (59, 13795), (60, 13801), (65, 13825), (72, 13858), (75, 13873), (77, 13882), (78, 13888), (83, 13909), (86, 13927), (89, 13951), (90, 13960), (93, 13972), (94, 13978),

Gene: Abinghost\_18 Start: 15003, Stop: 15464, Start Num: 27

Candidate Starts for Abinghost\_18:

(12, 14739), (14, 14802), (19, 14880), (Start: 27 @15003 has 41 MA's), (Start: 29 @15018 has 4 MA's), (32, 15039), (45, 15147), (55, 15216), (68, 15276), (70, 15282), (77, 15315), (78, 15321), (82, 15336), (86, 15360), (95, 15426),

Gene: Akoma\_18 Start: 15003, Stop: 15464, Start Num: 27

Candidate Starts for Akoma\_18:

(1, 14391), (2, 14430), (5, 14586), (8, 14625), (12, 14739), (14, 14802), (19, 14880), (Start: 27 @15003 has 41 MA's), (Start: 29 @15018 has 4 MA's), (32, 15039), (45, 15147), (55, 15216), (68, 15276), (70, 15282), (77, 15315), (78, 15321), (82, 15336), (86, 15360), (95, 15426),

Gene: Allegro\_18 Start: 16139, Stop: 16681, Start Num: 15

Candidate Starts for Allegro\_18:

(Start: 15 @16139 has 30 MA's), (18, 16172), (20, 16232), (Start: 21 @16235 has 7 MA's), (38, 16319), (53, 16418), (54, 16445), (59, 16460), (60, 16466), (62, 16478), (69, 16511), (72, 16523), (77, 16547), (78, 16553), (83, 16574), (84, 16577), (88, 16613), (89, 16616), (94, 16643),

Gene: AnClar\_15 Start: 14164, Stop: 14637, Start Num: 25

Candidate Starts for AnClar\_15:

(9, 13834), (12, 13909), (14, 13972), (19, 14050), (Start: 25 @14164 has 9 MA's), (38, 14248), (50, 14338), (51, 14353), (53, 14359), (59, 14401), (70, 14455), (78, 14494), (90, 14566), (99, 14626),

Gene: AnarQue\_17 Start: 14776, Stop: 15270, Start Num: 24

Candidate Starts for AnarQue\_17:

(12, 14545), (14, 14608), (19, 14686), (Start: 24 @14776 has 8 MA's), (36, 14848), (38, 14860), (42, 14893), (48, 14950), (73, 15091), (75, 15103), (78, 15118), (79, 15121), (96, 15232), (99, 15259),

Gene: Arbiter\_18 Start: 16226, Stop: 16768, Start Num: 15

Candidate Starts for Arbiter\_18:

(Start: 15 @16226 has 30 MA's), (18, 16259), (20, 16319), (Start: 21 @16322 has 7 MA's), (38, 16406), (53, 16505), (54, 16532), (59, 16547), (60, 16553), (62, 16565), (69, 16598), (72, 16610), (77, 16634), (78, 16640), (83, 16661), (84, 16664), (88, 16700), (89, 16703), (94, 16730),

Gene: Ares\_18 Start: 16139, Stop: 16681, Start Num: 15

Candidate Starts for Ares\_18:

(Start: 15 @16139 has 30 MA's), (18, 16172), (Start: 21 @16235 has 7 MA's), (38, 16319), (53, 16418), (54, 16445), (59, 16460), (62, 16478), (69, 16511), (72, 16523), (77, 16547), (78, 16553), (83, 16574), (84, 16577), (88, 16613), (89, 16616), (94, 16643),

Gene: Argie\_13 Start: 14276, Stop: 14797, Start Num: 21

Candidate Starts for Argie\_13:

(Start: 16 @14180 has 3 MA's), (19, 14213), (Start: 21 @14276 has 7 MA's), (30, 14312), (39, 14372), (53, 14459), (55, 14489), (68, 14549), (70, 14555), (71, 14558), (77, 14588), (78, 14594), (87, 14642), (88, 14654), (94, 14684), (101, 14753), (102, 14762),

Gene: Athena\_19 Start: 15766, Stop: 16227, Start Num: 27

Candidate Starts for Athena\_19:

(12, 15502), (14, 15565), (19, 15643), (Start: 27 @15766 has 41 MA's), (Start: 29 @15781 has 4 MA's), (32, 15802), (45, 15910), (55, 15979), (68, 16039), (70, 16045), (77, 16078), (78, 16084), (82, 16099), (86, 16123), (95, 16189),

Gene: Audrey\_18 Start: 15003, Stop: 15464, Start Num: 27

Candidate Starts for Audrey\_18:

(12, 14739), (14, 14802), (19, 14880), (Start: 27 @15003 has 41 MA's), (Start: 29 @15018 has 4 MA's), (32, 15039), (45, 15147), (55, 15216), (68, 15276), (70, 15282), (77, 15315), (78, 15321), (82, 15336), (86, 15360), (95, 15426),

Gene: Axumite\_15 Start: 13329, Stop: 13802, Start Num: 25

Candidate Starts for Axumite\_15:

(12, 13077), (14, 13140), (19, 13218), (Start: 25 @13329 has 9 MA's), (38, 13413), (50, 13503), (51, 13518), (57, 13560), (74, 13641), (75, 13644), (78, 13659), (79, 13662), (91, 13734),

Gene: Baloo\_18 Start: 15000, Stop: 15461, Start Num: 27

Candidate Starts for Baloo\_18:

(12, 14739), (14, 14802), (19, 14880), (Start: 27 @15000 has 41 MA's), (Start: 29 @15015 has 4 MA's), (32, 15036), (45, 15144), (55, 15213), (68, 15273), (70, 15279), (77, 15312), (78, 15318), (82, 15333), (86, 15357), (95, 15423),

Gene: Bananafish\_18 Start: 16136, Stop: 16678, Start Num: 15

Candidate Starts for Bananafish\_18:

(Start: 15 @16136 has 30 MA's), (18, 16169), (Start: 21 @16232 has 7 MA's), (38, 16316), (53, 16415), (54, 16442), (59, 16457), (62, 16475), (72, 16520), (77, 16544), (78, 16550), (83, 16571), (84, 16574), (88, 16610), (89, 16613), (94, 16640),

Gene: Ben11\_17 Start: 14827, Stop: 15288, Start Num: 27

Candidate Starts for Ben11\_17:

(12, 14563), (14, 14626), (19, 14704), (Start: 27 @14827 has 41 MA's), (Start: 29 @14842 has 4 MA's), (32, 14863), (45, 14971), (55, 15040), (68, 15100), (70, 15106), (77, 15139), (78, 15145), (82, 15160), (86, 15184), (95, 15250),

Gene: Bernardo\_18 Start: 15002, Stop: 15463, Start Num: 27

Candidate Starts for Bernardo\_18:

(1, 14390), (2, 14429), (5, 14585), (8, 14624), (12, 14738), (14, 14801), (19, 14879), (Start: 27 @15002 has 41 MA's), (Start: 29 @15017 has 4 MA's), (32, 15038), (45, 15146), (55, 15215), (68, 15275), (70, 15281), (77, 15314), (78, 15320), (82, 15335), (86, 15359), (95, 15425),

Gene: BiggityBass\_14 Start: 13261, Stop: 13734, Start Num: 26

Candidate Starts for BiggityBass\_14:

(4, 12841), (6, 12856), (9, 12928), (12, 13003), (14, 13066), (19, 13144), (Start: 26 @13261 has 1 MA's), (38, 13345), (42, 13378), (51, 13450), (59, 13498), (75, 13576), (78, 13591), (90, 13663), (92, 13672),

Gene: BirdsNest\_20 Start: 14291, Stop: 14755, Start Num: 24

Candidate Starts for BirdsNest\_20:

(Start: 24 @14291 has 8 MA's), (Start: 27 @14300 has 41 MA's), (33, 14348), (43, 14429), (52, 14480), (56, 14516), (76, 14606), (78, 14618), (80, 14624), (81, 14630), (88, 14681), (91, 14696), (92, 14702), (97, 14741),

Gene: Blocker23\_18 Start: 16256, Stop: 16798, Start Num: 15

Candidate Starts for Blocker23\_18:

(Start: 15 @16256 has 30 MA's), (18, 16289), (Start: 21 @16352 has 7 MA's), (38, 16436), (53, 16535), (54, 16562), (59, 16577), (62, 16595), (69, 16628), (72, 16640), (77, 16664), (78, 16670), (83, 16691), (84, 16694), (88, 16730), (89, 16733), (94, 16760),

Gene: Boyle\_18 Start: 16353, Stop: 16799, Start Num: 21

Candidate Starts for Boyle\_18:

(Start: 15 @16257 has 30 MA's), (18, 16290), (Start: 21 @16353 has 7 MA's), (38, 16437), (53, 16536), (54, 16563), (59, 16578), (62, 16596), (69, 16629), (72, 16641), (77, 16665), (78, 16671), (83, 16692), (84, 16695), (88, 16731), (89, 16734), (94, 16761),

Gene: Briakila\_18 Start: 15768, Stop: 16229, Start Num: 27

Candidate Starts for Briakila\_18:



(12, 15504), (14, 15567), (19, 15645), (Start: 27 @15768 has 41 MA's), (Start: 29 @15783 has 4 MA's), (32, 15804), (45, 15912), (55, 15981), (68, 16041), (70, 16047), (77, 16080), (78, 16086), (82, 16101), (86, 16125), (95, 16191),

Gene: Brownie5\_18 Start: 16256, Stop: 16798, Start Num: 15

Candidate Starts for Brownie5\_18:

(Start: 15 @16256 has 30 MA's), (18, 16289), (Start: 21 @16352 has 7 MA's), (38, 16436), (53, 16535), (54, 16562), (59, 16577), (62, 16595), (69, 16628), (72, 16640), (77, 16664), (78, 16670), (83, 16691), (84, 16694), (88, 16730), (89, 16733), (94, 16760),

Gene: CRB2\_19 Start: 16553, Stop: 17008, Start Num: 27

Candidate Starts for CRB2\_19:

(Start: 27 @16553 has 41 MA's), (33, 16601), (38, 16637), (42, 16670), (68, 16826), (69, 16829), (70, 16832), (76, 16859), (77, 16865), (78, 16871), (80, 16877), (88, 16934), (92, 16955), (95, 16979),

Gene: CaiB\_17 Start: 14761, Stop: 15255, Start Num: 24

Candidate Starts for CaiB\_17:

(12, 14530), (14, 14593), (19, 14671), (Start: 24 @14761 has 8 MA's), (36, 14833), (38, 14845), (42, 14878), (48, 14935), (54, 14995), (73, 15076), (75, 15088), (78, 15103), (79, 15106), (85, 15139), (95, 15208), (96, 15217), (99, 15244),

Gene: Calamitous\_18 Start: 16136, Stop: 16678, Start Num: 15

Candidate Starts for Calamitous\_18:

(Start: 15 @16136 has 30 MA's), (18, 16169), (20, 16229), (Start: 21 @16232 has 7 MA's), (38, 16316), (53, 16415), (54, 16442), (59, 16457), (60, 16463), (62, 16475), (69, 16508), (72, 16520), (77, 16544), (78, 16550), (83, 16571), (84, 16574), (88, 16610), (89, 16613), (94, 16640),

Gene: Casbah\_17 Start: 14855, Stop: 15316, Start Num: 27

Candidate Starts for Casbah\_17:

(12, 14591), (14, 14654), (19, 14732), (Start: 27 @14855 has 41 MA's), (Start: 29 @14870 has 4 MA's), (32, 14891), (45, 14999), (55, 15068), (68, 15128), (70, 15134), (77, 15167), (78, 15173), (82, 15188), (86, 15212), (95, 15278),

Gene: Cepens\_12 Start: 14000, Stop: 14521, Start Num: 21

Candidate Starts for Cepens\_12:

(Start: 16 @13904 has 3 MA's), (19, 13937), (Start: 21 @14000 has 7 MA's), (30, 14036), (39, 14096), (53, 14183), (55, 14213), (68, 14273), (70, 14279), (71, 14282), (77, 14312), (78, 14318), (87, 14366), (88, 14378), (101, 14477), (102, 14486),

Gene: ChaChing\_18 Start: 15018, Stop: 15479, Start Num: 27

Candidate Starts for ChaChing\_18:

(1, 14406), (5, 14601), (8, 14640), (12, 14754), (14, 14817), (19, 14895), (Start: 27 @15018 has 41 MA's), (Start: 29 @15033 has 4 MA's), (32, 15054), (45, 15162), (55, 15231), (68, 15291), (70, 15297), (77, 15330), (78, 15336), (82, 15351), (86, 15375), (95, 15441),

Gene: Chandler\_18 Start: 15777, Stop: 16238, Start Num: 27

Candidate Starts for Chandler\_18:

(12, 15513), (14, 15576), (19, 15654), (Start: 27 @15777 has 41 MA's), (Start: 29 @15792 has 4 MA's), (32, 15813), (45, 15921), (55, 15990), (68, 16050), (70, 16056), (77, 16089), (78, 16095), (82, 16110), (86, 16134), (95, 16200),

Gene: CloverMinnie\_17 Start: 14701, Stop: 15195, Start Num: 24

Candidate Starts for CloverMinnie\_17:

(12, 14470), (14, 14533), (19, 14611), (Start: 24 @14701 has 8 MA's), (36, 14773), (38, 14785), (42, 14818), (48, 14875), (54, 14935), (73, 15016), (75, 15028), (78, 15043), (79, 15046), (85, 15079), (96, 15157), (99, 15184),

Gene: Coffee\_18 Start: 16253, Stop: 16795, Start Num: 15

Candidate Starts for Coffee\_18:

(Start: 15 @16253 has 30 MA's), (18, 16286), (20, 16346), (Start: 21 @16349 has 7 MA's), (38, 16433), (53, 16532), (54, 16559), (59, 16574), (62, 16592), (69, 16625), (72, 16637), (77, 16661), (78, 16667), (83, 16688), (84, 16691), (88, 16727), (89, 16730), (94, 16757),

Gene: Compostia\_19 Start: 15436, Stop: 15897, Start Num: 27

Candidate Starts for Compostia\_19:

(12, 15172), (14, 15235), (19, 15313), (Start: 27 @15436 has 41 MA's), (Start: 29 @15451 has 4 MA's), (32, 15472), (45, 15580), (55, 15649), (68, 15709), (70, 15715), (77, 15748), (78, 15754), (82, 15769), (86, 15793), (95, 15859),

Gene: Corofin\_18 Start: 15028, Stop: 15489, Start Num: 27

Candidate Starts for Corofin\_18:

(12, 14764), (14, 14827), (19, 14905), (Start: 27 @15028 has 41 MA's), (Start: 29 @15043 has 4 MA's), (32, 15064), (45, 15172), (55, 15241), (68, 15301), (70, 15307), (77, 15340), (78, 15346), (82, 15361), (86, 15385), (95, 15451),

Gene: D12\_12 Start: 13993, Stop: 14514, Start Num: 21

Candidate Starts for D12\_12:

(Start: 16 @13897 has 3 MA's), (19, 13930), (Start: 21 @13993 has 7 MA's), (30, 14029), (39, 14089), (53, 14176), (55, 14206), (68, 14266), (70, 14272), (71, 14275), (77, 14305), (78, 14311), (87, 14359), (88, 14371), (101, 14470), (102, 14479),

Gene: Daisy\_18 Start: 15024, Stop: 15485, Start Num: 27

Candidate Starts for Daisy\_18:

(12, 14760), (14, 14823), (19, 14901), (Start: 27 @15024 has 41 MA's), (Start: 29 @15039 has 4 MA's), (32, 15060), (45, 15168), (55, 15237), (68, 15297), (70, 15303), (77, 15336), (78, 15342), (82, 15357), (86, 15381), (95, 15447),

Gene: Deenasa\_18 Start: 15766, Stop: 16227, Start Num: 27

Candidate Starts for Deenasa\_18:

(12, 15502), (14, 15565), (19, 15643), (Start: 27 @15766 has 41 MA's), (Start: 29 @15781 has 4 MA's), (32, 15802), (45, 15910), (55, 15979), (68, 16039), (70, 16045), (77, 16078), (78, 16084), (82, 16099), (86, 16123), (95, 16189),

Gene: Devonte\_18 Start: 15003, Stop: 15464, Start Num: 27

Candidate Starts for Devonte\_18:

(12, 14739), (14, 14802), (19, 14880), (Start: 27 @15003 has 41 MA's), (Start: 29 @15018 has 4 MA's), (32, 15039), (45, 15147), (54, 15213), (55, 15216), (68, 15276), (70, 15282), (77, 15315), (78, 15321), (86, 15360),

Gene: Dori\_14 Start: 11980, Stop: 12462, Start Num: 22

Candidate Starts for Dori\_14:

(11, 11722), (12, 11761), (17, 11875), (Start: 22 @11980 has 3 MA's), (37, 12058), (40, 12085), (52, 12160), (53, 12163), (55, 12193), (77, 12292), (78, 12298), (79, 12301), (94, 12388), (95, 12403), (101, 12451),

Gene: Eaglehorse\_18 Start: 16160, Stop: 16702, Start Num: 15

Candidate Starts for Eaglehorse\_18:

(Start: 15 @16160 has 30 MA's), (18, 16193), (Start: 21 @16256 has 7 MA's), (38, 16340), (53, 16439), (54, 16466), (59, 16481), (62, 16499), (69, 16532), (72, 16544), (77, 16568), (78, 16574), (83, 16595), (84, 16598), (88, 16634), (89, 16637), (94, 16664),

Gene: Evaa\_16 Start: 14619, Stop: 15095, Start Num: 25

Candidate Starts for Evaa\_16:

(12, 14385), (13, 14415), (Start: 25 @14619 has 9 MA's), (38, 14706), (46, 14775), (49, 14790), (51, 14811), (60, 14865), (64, 14883), (71, 14916), (78, 14952), (89, 15015), (91, 15027), (92, 15033), (99, 15084),

Gene: Faze9\_18 Start: 16349, Stop: 16795, Start Num: 21

Candidate Starts for Faze9\_18:

(Start: 15 @16253 has 30 MA's), (18, 16286), (Start: 21 @16349 has 7 MA's), (38, 16433), (53, 16532), (54, 16559), (59, 16574), (60, 16580), (62, 16592), (69, 16625), (72, 16637), (77, 16661), (78, 16667), (83, 16688), (84, 16691), (88, 16727), (89, 16730), (94, 16757),

Gene: FrenchFry\_18 Start: 16256, Stop: 16798, Start Num: 15

Candidate Starts for FrenchFry\_18:

(Start: 15 @16256 has 30 MA's), (18, 16289), (Start: 21 @16352 has 7 MA's), (38, 16436), (53, 16535), (54, 16562), (59, 16577), (62, 16595), (69, 16628), (72, 16640), (77, 16664), (78, 16670), (83, 16691), (84, 16694), (88, 16730), (89, 16733), (94, 16760),

Gene: Fresco\_15 Start: 13329, Stop: 13802, Start Num: 25

Candidate Starts for Fresco\_15:

(12, 13077), (14, 13140), (19, 13218), (Start: 25 @13329 has 9 MA's), (38, 13413), (50, 13503), (51, 13518), (57, 13560), (74, 13641), (75, 13644), (78, 13659), (79, 13662), (91, 13734),

Gene: Gadget\_19 Start: 15007, Stop: 15468, Start Num: 27

Candidate Starts for Gadget\_19:

(12, 14743), (14, 14806), (19, 14884), (Start: 27 @15007 has 41 MA's), (Start: 29 @15022 has 4 MA's), (32, 15043), (45, 15151), (55, 15220), (68, 15280), (70, 15286), (77, 15319), (78, 15325), (86, 15364), (95, 15430),

Gene: Gervas\_18 Start: 14986, Stop: 15447, Start Num: 27

Candidate Starts for Gervas\_18:

(12, 14722), (14, 14785), (19, 14863), (Start: 27 @14986 has 41 MA's), (Start: 29 @15001 has 4 MA's), (32, 15022), (45, 15130), (55, 15199), (68, 15259), (70, 15265), (77, 15298), (78, 15304), (82, 15319), (86, 15343), (95, 15409),

Gene: Glass\_18 Start: 16256, Stop: 16798, Start Num: 15

Candidate Starts for Glass\_18:

(Start: 15 @16256 has 30 MA's), (18, 16289), (20, 16349), (Start: 21 @16352 has 7 MA's), (38, 16436), (53, 16535), (54, 16562), (59, 16577), (60, 16583), (62, 16595), (69, 16628), (72, 16640), (77, 16664), (78, 16670), (83, 16691), (84, 16694), (88, 16730), (89, 16733), (94, 16760),

Gene: GlenHope\_19 Start: 14993, Stop: 15454, Start Num: 27

Candidate Starts for GlenHope\_19:

(1, 14381), (5, 14576), (8, 14615), (12, 14729), (14, 14792), (19, 14870), (Start: 27 @14993 has 41 MA's), (Start: 29 @15008 has 4 MA's), (32, 15029), (45, 15137), (55, 15206), (68, 15266), (70, 15272), (77, 15305), (78, 15311), (82, 15326), (86, 15350), (95, 15416),

Gene: GodPhather\_13 Start: 14258, Stop: 14779, Start Num: 21

Candidate Starts for GodPhather\_13:

(Start: 16 @14162 has 3 MA's), (19, 14195), (Start: 21 @14258 has 7 MA's), (30, 14294), (39, 14354), (53, 14441), (55, 14471), (68, 14531), (70, 14537), (71, 14540), (77, 14570), (78, 14576), (87, 14624), (88, 14636), (94, 14666), (101, 14735), (102, 14744),

Gene: Godines\_18 Start: 16139, Stop: 16693, Start Num: 15

Candidate Starts for Godines\_18:

(Start: 15 @16139 has 30 MA's), (18, 16172), (20, 16232), (Start: 21 @16235 has 7 MA's), (38, 16331), (53, 16430), (54, 16457), (59, 16472), (60, 16478), (62, 16490), (69, 16523), (72, 16535), (77, 16559), (78, 16565), (83, 16586), (84, 16589), (88, 16625), (89, 16628), (94, 16655),

Gene: Halfpint\_17 Start: 14828, Stop: 15289, Start Num: 27

Candidate Starts for Halfpint\_17:

(12, 14564), (14, 14627), (19, 14705), (Start: 27 @14828 has 41 MA's), (Start: 29 @14843 has 4 MA's), (32, 14864), (45, 14972), (55, 15041), (68, 15101), (70, 15107), (77, 15140), (78, 15146), (82, 15161), (86, 15185), (95, 15251),

Gene: HarveySr\_18 Start: 14980, Stop: 15441, Start Num: 27

Candidate Starts for HarveySr\_18:

(12, 14716), (14, 14779), (19, 14857), (Start: 27 @14980 has 41 MA's), (Start: 29 @14995 has 4 MA's), (32, 15016), (45, 15124), (55, 15193), (68, 15253), (70, 15259), (77, 15292), (78, 15298), (82, 15313), (86, 15337), (95, 15403),

Gene: Hashim76\_20 Start: 14543, Stop: 14998, Start Num: 28

Candidate Starts for Hashim76\_20:

(Start: 28 @14543 has 1 MA's), (33, 14591), (38, 14627), (51, 14720), (57, 14762), (60, 14774), (69, 14819), (77, 14855), (78, 14861), (80, 14867), (84, 14885), (91, 14939), (92, 14945), (95, 14969),

Gene: Heathcliff\_18 Start: 14965, Stop: 15426, Start Num: 27

Candidate Starts for Heathcliff\_18:

(12, 14701), (14, 14764), (19, 14842), (Start: 27 @14965 has 41 MA's), (Start: 29 @14980 has 4 MA's), (32, 15001), (45, 15109), (54, 15175), (55, 15178), (68, 15238), (70, 15244), (77, 15277), (78, 15283), (86, 15322), (95, 15388),

Gene: Hedgerow\_18 Start: 16238, Stop: 16780, Start Num: 15

Candidate Starts for Hedgerow\_18:

(Start: 15 @16238 has 30 MA's), (18, 16271), (Start: 21 @16334 has 7 MA's), (38, 16418), (53, 16517), (54, 16544), (59, 16559), (62, 16577), (69, 16610), (72, 16622), (77, 16646), (78, 16652), (83, 16673), (84, 16676), (88, 16712), (89, 16715), (94, 16742),

Gene: Holeinone\_18 Start: 16138, Stop: 16680, Start Num: 15

Candidate Starts for Holeinone\_18:

(Start: 15 @16138 has 30 MA's), (18, 16171), (20, 16231), (Start: 21 @16234 has 7 MA's), (38, 16318), (53, 16417), (54, 16444), (59, 16459), (60, 16465), (62, 16477), (69, 16510), (72, 16522), (77, 16546), (78, 16552), (83, 16573), (84, 16576), (88, 16612), (89, 16615), (94, 16642),

Gene: Hosp\_011 Start: 11772, Stop: 12260, Start Num: 25

Candidate Starts for Hosp\_011:

(Start: 25 @11772 has 9 MA's), (34, 11829), (35, 11841), (41, 11880), (50, 11934), (51, 11949), (55, 11985), (57, 11991), (59, 11997), (60, 12003), (65, 12027), (72, 12060), (75, 12075), (77, 12084), (78, 12090), (83, 12111), (86, 12129), (89, 12153), (90, 12162), (93, 12174), (94, 12180),

Gene: Imvubu\_12 Start: 12561, Stop: 13034, Start Num: 25

Candidate Starts for Imvubu\_12:

(Start: 25 @12561 has 9 MA's), (35, 12630), (38, 12645), (40, 12666), (41, 12669), (50, 12723), (51, 12738), (53, 12744), (60, 12792), (74, 12861), (75, 12864), (77, 12873), (78, 12879), (83, 12900), (94, 12969), (95, 12984),

Gene: ItsyBitsy1\_18 Start: 16130, Stop: 16672, Start Num: 15

Candidate Starts for ItsyBitsy1\_18:

(Start: 15 @16130 has 30 MA's), (18, 16163), (Start: 21 @16226 has 7 MA's), (38, 16310), (53, 16409), (54, 16436), (59, 16451), (62, 16469), (69, 16502), (72, 16514), (77, 16538), (78, 16544), (83, 16565), (84, 16568), (88, 16604), (89, 16607), (94, 16634),

Gene: Jackstina\_17 Start: 14929, Stop: 15390, Start Num: 27

Candidate Starts for Jackstina\_17:

(12, 14665), (14, 14728), (19, 14806), (Start: 27 @14929 has 41 MA's), (Start: 29 @14944 has 4 MA's), (32, 14965), (45, 15073), (55, 15142), (68, 15202), (70, 15208), (77, 15241), (78, 15247), (82, 15262), (86, 15286), (95, 15352),

Gene: Jeon\_12 Start: 13904, Stop: 14521, Start Num: 16

Candidate Starts for Jeon\_12:

(Start: 16 @13904 has 3 MA's), (19, 13937), (Start: 21 @14000 has 7 MA's), (30, 14036), (53, 14183), (55, 14213), (68, 14273), (70, 14279), (71, 14282), (77, 14312), (78, 14318), (87, 14366), (88, 14378), (101, 14477), (102, 14486),

Gene: Jolie1\_013 Start: 13551, Stop: 14030, Start Num: 25

Candidate Starts for Jolie1\_013:

(Start: 25 @13551 has 9 MA's), (35, 13620), (41, 13659), (55, 13764), (57, 13770), (59, 13776), (60, 13782), (65, 13806), (68, 13824), (75, 13854), (77, 13863), (78, 13869), (83, 13890), (84, 13893), (86, 13908), (89, 13932), (90, 13941), (93, 13953),

Gene: Kaleb\_18 Start: 16256, Stop: 16798, Start Num: 15

Candidate Starts for Kaleb\_18:

(Start: 15 @16256 has 30 MA's), (18, 16289), (20, 16349), (Start: 21 @16352 has 7 MA's), (38, 16436), (53, 16535), (54, 16562), (59, 16577), (62, 16595), (69, 16628), (72, 16640), (77, 16664), (78, 16670), (83, 16691), (84, 16694), (88, 16730), (89, 16733), (94, 16760),

Gene: Kamiyu\_18 Start: 14974, Stop: 15435, Start Num: 27

Candidate Starts for Kamiyu\_18:

(12, 14710), (14, 14773), (19, 14851), (Start: 27 @14974 has 41 MA's), (Start: 29 @14989 has 4 MA's), (32, 15010), (45, 15118), (55, 15187), (68, 15247), (70, 15253), (77, 15286), (78, 15292), (82, 15307), (86, 15331), (95, 15397),

Gene: KayaCho\_13 Start: 13548, Stop: 14048, Start Num: 23

Candidate Starts for KayaCho\_13:

(Start: 23 @13548 has 1 MA's), (Start: 25 @13554 has 9 MA's), (34, 13611), (35, 13623), (56, 13770), (58, 13776), (65, 13809), (72, 13842), (75, 13857), (77, 13866), (78, 13872), (79, 13875), (83, 13893), (86, 13911), (89, 13935), (90, 13944), (93, 13956), (94, 13962),

Gene: Kheth\_18 Start: 16139, Stop: 16681, Start Num: 15

Candidate Starts for Kheth\_18:

(Start: 15 @16139 has 30 MA's), (18, 16172), (20, 16232), (Start: 21 @16235 has 7 MA's), (38, 16319), (53, 16418), (54, 16445), (59, 16460), (60, 16466), (62, 16478), (69, 16511), (72, 16523), (77, 16547), (78, 16553), (83, 16574), (84, 16577), (88, 16613), (89, 16616), (94, 16643),

Gene: Kronus\_17 Start: 15586, Stop: 16047, Start Num: 27

Candidate Starts for Kronus\_17:

(12, 15322), (14, 15385), (19, 15463), (Start: 27 @15586 has 41 MA's), (Start: 29 @15601 has 4 MA's), (32, 15622), (45, 15730), (55, 15799), (68, 15859), (70, 15865), (77, 15898), (78, 15904), (82, 15919), (86, 15943), (95, 16009),

Gene: Lars\_18 Start: 16256, Stop: 16798, Start Num: 15

Candidate Starts for Lars\_18:

(Start: 15 @16256 has 30 MA's), (18, 16289), (Start: 21 @16352 has 7 MA's), (38, 16436), (53, 16535), (54, 16562), (59, 16577), (62, 16595), (69, 16628), (72, 16640), (77, 16664), (78, 16670), (83, 16691), (84, 16694), (88, 16730), (89, 16733), (94, 16760),

Gene: Laurie\_18 Start: 16134, Stop: 16676, Start Num: 15

Candidate Starts for Laurie\_18:

(Start: 15 @16134 has 30 MA's), (18, 16167), (Start: 21 @16230 has 7 MA's), (38, 16314), (53, 16413), (54, 16440), (59, 16455), (60, 16461), (62, 16473), (69, 16506), (72, 16518), (77, 16542), (78, 16548), (83, 16569), (84, 16572), (88, 16608), (89, 16611), (94, 16638),

Gene: Lephleur\_18 Start: 16136, Stop: 16678, Start Num: 15

Candidate Starts for Lephleur\_18:

(Start: 15 @16136 has 30 MA's), (18, 16169), (Start: 21 @16232 has 7 MA's), (38, 16316), (53, 16415), (54, 16442), (59, 16457), (62, 16475), (69, 16508), (72, 16520), (77, 16544), (78, 16550), (83, 16571), (84, 16574), (88, 16610), (89, 16613), (94, 16640),

Gene: LestyG\_18 Start: 15022, Stop: 15468, Start Num: 29

Candidate Starts for LestyG\_18:

(12, 14743), (14, 14806), (19, 14884), (Start: 27 @15007 has 41 MA's), (Start: 29 @15022 has 4 MA's), (32, 15043), (45, 15151), (55, 15220), (68, 15280), (70, 15286), (77, 15319), (78, 15325), (82, 15340), (86, 15364), (95, 15430),

Gene: Ligma\_15 Start: 13329, Stop: 13802, Start Num: 25

Candidate Starts for Ligma\_15:

(12, 13077), (14, 13140), (19, 13218), (Start: 25 @13329 has 9 MA's), (38, 13413), (50, 13503), (51, 13518), (57, 13560), (74, 13641), (75, 13644), (78, 13659), (79, 13662), (91, 13734),

Gene: LittleMunchkin\_16 Start: 14770, Stop: 15246, Start Num: 25

Candidate Starts for LittleMunchkin\_16:

(12, 14521), (14, 14584), (19, 14662), (Start: 25 @14770 has 9 MA's), (38, 14857), (46, 14926), (47, 14935), (51, 14962), (59, 15010), (60, 15016), (64, 15034), (67, 15055), (76, 15091), (78, 15103), (90, 15175), (99, 15235),

Gene: LizLemon\_18 Start: 16256, Stop: 16798, Start Num: 15

Candidate Starts for LizLemon\_18:

(Start: 15 @16256 has 30 MA's), (18, 16289), (20, 16349), (Start: 21 @16352 has 7 MA's), (38, 16436), (53, 16535), (54, 16562), (59, 16577), (60, 16583), (62, 16595), (69, 16628), (72, 16640), (77, 16664), (78, 16670), (83, 16691), (84, 16694), (88, 16730), (89, 16733), (94, 16760),

Gene: MakoManhole\_17 Start: 14779, Stop: 15273, Start Num: 24

Candidate Starts for MakoManhole\_17:

(12, 14548), (14, 14611), (19, 14689), (Start: 24 @14779 has 8 MA's), (36, 14851), (38, 14863), (42, 14896), (48, 14953), (54, 15013), (73, 15094), (75, 15106), (78, 15121), (79, 15124), (85, 15157), (96, 15235), (99, 15262),

Gene: Mao1\_13 Start: 12376, Stop: 12858, Start Num: 22

Candidate Starts for Mao1\_13:

(11, 12118), (12, 12157), (17, 12271), (Start: 22 @12376 has 3 MA's), (37, 12454), (40, 12481), (52, 12556), (53, 12559), (55, 12589), (77, 12688), (78, 12694), (79, 12697), (94, 12784), (95, 12799), (101, 12847),

Gene: Marley1013\_18 Start: 15787, Stop: 16248, Start Num: 27

Candidate Starts for Marley1013\_18:

(1, 15175), (5, 15370), (8, 15409), (12, 15523), (14, 15586), (19, 15664), (Start: 27 @15787 has 41 MA's), (Start: 29 @15802 has 4 MA's), (32, 15823), (45, 15931), (55, 16000), (68, 16060), (70, 16066), (77, 16099), (78, 16105), (82, 16120), (86, 16144), (95, 16210),

Gene: Mask\_14 Start: 12377, Stop: 12859, Start Num: 22

Candidate Starts for Mask\_14:

(11, 12119), (12, 12158), (17, 12272), (Start: 22 @12377 has 3 MA's), (37, 12455), (40, 12482), (52, 12557), (53, 12560), (55, 12590), (77, 12689), (78, 12695), (79, 12698), (94, 12785), (95, 12800), (101, 12848),

Gene: MasterPo\_18 Start: 16136, Stop: 16678, Start Num: 15

Candidate Starts for MasterPo\_18:

(Start: 15 @16136 has 30 MA's), (18, 16169), (20, 16229), (Start: 21 @16232 has 7 MA's), (38, 16316), (53, 16415), (54, 16442), (59, 16457), (62, 16475), (69, 16508), (72, 16520), (77, 16544), (78, 16550), (83, 16571), (84, 16574), (88, 16610), (89, 16613), (94, 16640),

Gene: Megabear\_12 Start: 13847, Stop: 14464, Start Num: 16

Candidate Starts for Megabear\_12:

(Start: 16 @13847 has 3 MA's), (19, 13880), (Start: 21 @13943 has 7 MA's), (30, 13979), (39, 14039), (53, 14126), (55, 14156), (68, 14216), (70, 14222), (71, 14225), (77, 14255), (78, 14261), (87, 14309), (88, 14321), (98, 14402), (101, 14420), (102, 14429),

Gene: MmasiCarm\_18 Start: 15000, Stop: 15461, Start Num: 27

Candidate Starts for MmasiCarm\_18:

(12, 14736), (14, 14799), (19, 14877), (Start: 27 @15000 has 41 MA's), (Start: 29 @15015 has 4 MA's), (32, 15036), (45, 15144), (55, 15213), (68, 15273), (70, 15279), (77, 15312), (78, 15318), (82, 15333), (86, 15357), (95, 15423),

Gene: Mortcellus\_17 Start: 15641, Stop: 16102, Start Num: 27

Candidate Starts for Mortcellus\_17:

(1, 15029), (5, 15224), (8, 15263), (12, 15377), (14, 15440), (19, 15518), (Start: 27 @15641 has 41 MA's), (Start: 29 @15656 has 4 MA's), (32, 15677), (45, 15785), (55, 15854), (68, 15914), (70, 15920), (77, 15953), (78, 15959), (82, 15974), (86, 15998), (95, 16064),

Gene: Morty007\_18 Start: 15787, Stop: 16248, Start Num: 27

Candidate Starts for Morty007\_18:

(1, 15175), (5, 15370), (8, 15409), (12, 15523), (14, 15586), (19, 15664), (Start: 27 @15787 has 41 MA's), (Start: 29 @15802 has 4 MA's), (32, 15823), (45, 15931), (55, 16000), (68, 16060), (70, 16066), (77, 16099), (78, 16105), (82, 16120), (86, 16144), (95, 16210),

Gene: MossRose\_17 Start: 14758, Stop: 15252, Start Num: 24

Candidate Starts for MossRose\_17:

(12, 14527), (14, 14590), (19, 14668), (Start: 24 @14758 has 8 MA's), (36, 14830), (38, 14842), (42, 14875), (48, 14932), (54, 14992), (73, 15073), (75, 15085), (78, 15100), (79, 15103), (85, 15136), (96, 15214), (99, 15241),

Gene: NHagos\_15 Start: 13225, Stop: 13731, Start Num: 24

Candidate Starts for NHagos\_15:

(12, 12994), (19, 13135), (Start: 24 @13225 has 8 MA's), (Start: 25 @13228 has 9 MA's), (38, 13315), (42, 13348), (54, 13471), (75, 13564), (78, 13579), (79, 13582), (81, 13591), (91, 13654), (96, 13693),

Gene: Neos5\_18 Start: 15810, Stop: 16256, Start Num: 29

Candidate Starts for Neos5\_18:

(10, 15462), (Start: 29 @15810 has 4 MA's), (32, 15831), (45, 15939), (55, 16008), (68, 16068), (70, 16074), (77, 16107), (78, 16113), (82, 16128), (86, 16152), (95, 16218),

Gene: Nozo\_18 Start: 15765, Stop: 16226, Start Num: 27

Candidate Starts for Nozo\_18:

(12, 15504), (14, 15567), (19, 15645), (Start: 27 @15765 has 41 MA's), (Start: 29 @15780 has 4 MA's), (32, 15801), (45, 15909), (55, 15978), (68, 16038), (70, 16044), (77, 16077), (78, 16083), (82, 16098), (86, 16122), (95, 16188),

Gene: Obutu\_18 Start: 14998, Stop: 15459, Start Num: 27

Candidate Starts for Obutu\_18:

(12, 14734), (14, 14797), (19, 14875), (Start: 27 @14998 has 41 MA's), (Start: 29 @15013 has 4 MA's), (32, 15034), (45, 15142), (55, 15211), (68, 15271), (70, 15277), (77, 15310), (78, 15316), (82, 15331), (86, 15355), (95, 15421),

Gene: Opia\_18 Start: 16136, Stop: 16678, Start Num: 15

Candidate Starts for Opia\_18:

(Start: 15 @16136 has 30 MA's), (18, 16169), (Start: 21 @16232 has 7 MA's), (38, 16316), (53, 16415), (54, 16442), (59, 16457), (62, 16475), (69, 16508), (72, 16520), (77, 16544), (78, 16550), (83, 16571), (84, 16574), (88, 16610), (89, 16613), (94, 16640),

Gene: OrangeOswald\_18 Start: 15003, Stop: 15464, Start Num: 27

Candidate Starts for OrangeOswald\_18:

(12, 14739), (14, 14802), (19, 14880), (Start: 27 @15003 has 41 MA's), (Start: 29 @15018 has 4 MA's), (32, 15039), (45, 15147), (55, 15216), (68, 15276), (70, 15282), (77, 15315), (78, 15321), (82, 15336), (86, 15360), (95, 15426),

Gene: PR\_12 Start: 13970, Stop: 14491, Start Num: 21

Candidate Starts for PR\_12:

(Start: 16 @13874 has 3 MA's), (19, 13907), (Start: 21 @13970 has 7 MA's), (30, 14006), (39, 14066), (53, 14153), (55, 14183), (68, 14243), (70, 14249), (71, 14252), (77, 14282), (78, 14288), (87, 14336), (88, 14348), (101, 14447), (102, 14456),

Gene: Phaedrus\_17 Start: 14921, Stop: 15382, Start Num: 27

Candidate Starts for Phaedrus\_17:

(12, 14657), (14, 14720), (19, 14798), (Start: 27 @14921 has 41 MA's), (Start: 29 @14936 has 4 MA's), (32, 14957), (45, 15065), (55, 15134), (68, 15194), (70, 15200), (77, 15233), (78, 15239), (82, 15254), (86, 15278), (95, 15344),

Gene: Phantasmagoria\_18 Start: 16136, Stop: 16678, Start Num: 15

Candidate Starts for Phantasmagoria\_18:

(Start: 15 @16136 has 30 MA's), (18, 16169), (Start: 21 @16232 has 7 MA's), (38, 16316), (53, 16415), (54, 16442), (59, 16457), (60, 16463), (62, 16475), (69, 16508), (72, 16520), (77, 16544), (78, 16550), (83, 16571), (84, 16574), (88, 16610), (89, 16613), (94, 16640),



Gene: Phayeta\_18 Start: 14879, Stop: 15340, Start Num: 27

Candidate Starts for Phayeta\_18:

(1, 14267), (2, 14306), (5, 14462), (8, 14501), (12, 14615), (14, 14678), (19, 14756), (Start: 27 @14879 has 41 MA's), (Start: 29 @14894 has 4 MA's), (32, 14915), (45, 15023), (55, 15092), (68, 15152), (70, 15158), (77, 15191), (78, 15197), (82, 15212), (86, 15236), (95, 15302),

Gene: Philly\_17 Start: 14869, Stop: 15330, Start Num: 27

Candidate Starts for Philly\_17:

(12, 14605), (14, 14668), (19, 14746), (Start: 27 @14869 has 41 MA's), (Start: 29 @14884 has 4 MA's), (32, 14905), (45, 15013), (55, 15082), (68, 15142), (70, 15148), (77, 15181), (78, 15187), (86, 15226),

Gene: Phlyer\_18 Start: 15753, Stop: 16199, Start Num: 29

Candidate Starts for Phlyer\_18:

(Start: 29 @15753 has 4 MA's), (32, 15774), (45, 15882), (55, 15951), (68, 16011), (70, 16017), (77, 16050), (78, 16056), (82, 16071), (86, 16095), (95, 16161),

Gene: Pipefish\_18 Start: 15887, Stop: 16348, Start Num: 27

Candidate Starts for Pipefish\_18:

(1, 15275), (3, 15329), (5, 15470), (12, 15623), (14, 15686), (19, 15764), (Start: 27 @15887 has 41 MA's), (32, 15923), (45, 16031), (55, 16100), (68, 16160), (70, 16166), (77, 16199), (78, 16205), (82, 16220), (86, 16244), (95, 16310),

Gene: Quesadilla\_18 Start: 16370, Stop: 16834, Start Num: 25

Candidate Starts for Quesadilla\_18:

(7, 15986), (Start: 25 @16370 has 9 MA's), (Start: 27 @16376 has 41 MA's), (33, 16427), (37, 16457), (42, 16496), (44, 16517), (56, 16595), (60, 16610), (68, 16652), (69, 16655), (77, 16691), (78, 16697), (80, 16703), (88, 16760), (90, 16772), (92, 16781), (95, 16805),

Gene: Qyrzula\_17 Start: 16226, Stop: 16768, Start Num: 15

Candidate Starts for Qyrzula\_17:

(Start: 15 @16226 has 30 MA's), (18, 16259), (20, 16319), (Start: 21 @16322 has 7 MA's), (38, 16406), (53, 16505), (54, 16532), (59, 16547), (60, 16553), (62, 16565), (69, 16598), (72, 16610), (77, 16634), (78, 16640), (83, 16661), (84, 16664), (88, 16700), (89, 16703), (94, 16730),

Gene: RagingRooster\_18 Start: 15004, Stop: 15465, Start Num: 27

Candidate Starts for RagingRooster\_18:

(12, 14740), (14, 14803), (19, 14881), (Start: 27 @15004 has 41 MA's), (Start: 29 @15019 has 4 MA's), (32, 15040), (45, 15148), (55, 15217), (68, 15277), (70, 15283), (77, 15316), (78, 15322), (82, 15337), (86, 15361), (95, 15427),

Gene: Rhinoforte\_18 Start: 16253, Stop: 16795, Start Num: 15

Candidate Starts for Rhinoforte\_18:

(Start: 15 @16253 has 30 MA's), (18, 16286), (Start: 21 @16349 has 7 MA's), (38, 16433), (53, 16532), (54, 16559), (59, 16574), (62, 16592), (69, 16625), (72, 16637), (77, 16661), (78, 16667), (83, 16688), (84, 16691), (88, 16727), (89, 16730), (94, 16757),

Gene: Rita1961\_18 Start: 14999, Stop: 15460, Start Num: 27

Candidate Starts for Rita1961\_18:

(12, 14735), (14, 14798), (19, 14876), (Start: 27 @14999 has 41 MA's), (Start: 29 @15014 has 4 MA's), (32, 15035), (45, 15143), (55, 15212), (68, 15272), (70, 15278), (77, 15311), (78, 15317), (82, 15332), (86, 15356), (95, 15422),

Gene: RomaT\_18 Start: 15800, Stop: 16246, Start Num: 29

Candidate Starts for RomaT\_18:

(Start: 29 @15800 has 4 MA's), (32, 15821), (45, 15929), (55, 15998), (68, 16058), (70, 16064), (77, 16097), (78, 16103), (82, 16118), (86, 16142), (95, 16208),

Gene: Rosebush\_18 Start: 16253, Stop: 16795, Start Num: 15

Candidate Starts for Rosebush\_18:

(Start: 15 @16253 has 30 MA's), (18, 16286), (Start: 21 @16349 has 7 MA's), (38, 16433), (53, 16532), (54, 16559), (59, 16574), (62, 16592), (69, 16625), (72, 16637), (77, 16661), (78, 16667), (83, 16688), (84, 16691), (88, 16727), (89, 16730), (94, 16757),

Gene: Sabella\_18 Start: 16139, Stop: 16681, Start Num: 15

Candidate Starts for Sabella\_18:

(Start: 15 @16139 has 30 MA's), (18, 16172), (Start: 21 @16235 has 7 MA's), (38, 16319), (53, 16418), (54, 16445), (59, 16460), (62, 16478), (69, 16511), (72, 16523), (77, 16547), (78, 16553), (83, 16574), (84, 16577), (88, 16613), (89, 16616), (94, 16643),

Gene: Sejanus\_14 Start: 13310, Stop: 13792, Start Num: 22

Candidate Starts for Sejanus\_14:

(11, 13052), (12, 13091), (17, 13205), (Start: 22 @13310 has 3 MA's), (37, 13388), (40, 13415), (52, 13490), (53, 13493), (55, 13523), (77, 13622), (78, 13628), (79, 13631), (94, 13718), (95, 13733),

Gene: Shatter\_15 Start: 13329, Stop: 13802, Start Num: 25

Candidate Starts for Shatter\_15:

(12, 13077), (14, 13140), (19, 13218), (Start: 25 @13329 has 9 MA's), (38, 13413), (50, 13503), (51, 13518), (57, 13560), (74, 13641), (75, 13644), (78, 13659), (79, 13662), (91, 13734),

Gene: Sisko\_15 Start: 13672, Stop: 14145, Start Num: 25

Candidate Starts for Sisko\_15:

(9, 13342), (12, 13417), (14, 13480), (19, 13558), (Start: 25 @13672 has 9 MA's), (38, 13756), (50, 13846), (51, 13861), (59, 13909), (70, 13963), (78, 14002), (90, 14074), (99, 14134),

Gene: SlippinJimmy\_18 Start: 15768, Stop: 16229, Start Num: 27

Candidate Starts for SlippinJimmy\_18:

(12, 15504), (14, 15567), (19, 15645), (Start: 27 @15768 has 41 MA's), (Start: 29 @15783 has 4 MA's), (32, 15804), (45, 15912), (55, 15981), (68, 16041), (70, 16047), (77, 16080), (78, 16086), (82, 16101), (86, 16125), (95, 16191),

Gene: Sour\_18 Start: 15094, Stop: 15573, Start Num: 24

Candidate Starts for Sour\_18:

(12, 14854), (14, 14917), (19, 14995), (Start: 24 @15094 has 8 MA's), (Start: 25 @15097 has 9 MA's), (31, 15127), (38, 15184), (51, 15289), (61, 15349), (63, 15355), (66, 15379), (75, 15415), (78, 15430), (91, 15505), (100, 15568),

Gene: SynergyX\_18 Start: 15004, Stop: 15465, Start Num: 27

Candidate Starts for SynergyX\_18:

(12, 14740), (14, 14803), (19, 14881), (Start: 27 @15004 has 41 MA's), (Start: 29 @15019 has 4 MA's), (32, 15040), (45, 15148), (55, 15217), (68, 15277), (70, 15283), (77, 15316), (78, 15322), (82, 15337), (86, 15361), (95, 15427),

Gene: TA17A\_18 Start: 16136, Stop: 16678, Start Num: 15

Candidate Starts for TA17A\_18:

(Start: 15 @16136 has 30 MA's), (18, 16169), (20, 16229), (Start: 21 @16232 has 7 MA's), (38, 16316), (53, 16415), (54, 16442), (59, 16457), (62, 16475), (69, 16508), (72, 16520), (77, 16544), (78, 16550), (83, 16571), (84, 16574), (88, 16610), (89, 16613), (94, 16640),

Gene: Taptic\_12 Start: 13847, Stop: 14464, Start Num: 16

Candidate Starts for Taptic\_12:

(Start: 16 @13847 has 3 MA's), (19, 13880), (Start: 21 @13943 has 7 MA's), (30, 13979), (39, 14039), (53, 14126), (55, 14156), (68, 14216), (70, 14222), (71, 14225), (77, 14255), (78, 14261), (87, 14309), (88, 14321), (98, 14402), (101, 14420), (102, 14429),

Gene: Tinciduntolum\_19 Start: 16255, Stop: 16797, Start Num: 15

Candidate Starts for Tinciduntolum\_19:

(Start: 15 @16255 has 30 MA's), (18, 16288), (Start: 21 @16351 has 7 MA's), (38, 16435), (53, 16534), (54, 16561), (59, 16576), (62, 16594), (69, 16627), (72, 16639), (77, 16663), (78, 16669), (83, 16690), (84, 16693), (88, 16729), (89, 16732), (94, 16759),

Gene: Tres\_18 Start: 16136, Stop: 16678, Start Num: 15

Candidate Starts for Tres\_18:

(Start: 15 @16136 has 30 MA's), (18, 16169), (Start: 21 @16232 has 7 MA's), (38, 16316), (53, 16415), (54, 16442), (59, 16457), (62, 16475), (69, 16508), (72, 16520), (77, 16544), (78, 16550), (83, 16571), (84, 16574), (88, 16610), (89, 16613), (94, 16640),

Gene: Tydolla\_18 Start: 15741, Stop: 16202, Start Num: 27

Candidate Starts for Tydolla\_18:

(12, 15477), (14, 15540), (19, 15618), (Start: 27 @15741 has 41 MA's), (Start: 29 @15756 has 4 MA's), (32, 15777), (45, 15885), (55, 15954), (68, 16014), (70, 16020), (77, 16053), (78, 16059), (82, 16074), (86, 16098), (95, 16164),

Gene: West99\_18 Start: 16256, Stop: 16798, Start Num: 15

Candidate Starts for West99\_18:

(Start: 15 @16256 has 30 MA's), (18, 16289), (Start: 21 @16352 has 7 MA's), (38, 16436), (53, 16535), (54, 16562), (59, 16577), (62, 16595), (69, 16628), (72, 16640), (77, 16664), (78, 16670), (83, 16691), (84, 16694), (88, 16730), (89, 16733), (94, 16760),

Gene: Wooper\_17 Start: 14767, Stop: 15261, Start Num: 24

Candidate Starts for Wooper\_17:

(12, 14536), (14, 14599), (19, 14677), (Start: 24 @14767 has 8 MA's), (36, 14839), (38, 14851), (42, 14884), (48, 14941), (54, 15001), (75, 15094), (78, 15109), (79, 15112), (85, 15145), (96, 15223), (99, 15250),

Gene: Yago84\_15 Start: 13681, Stop: 14154, Start Num: 25

Candidate Starts for Yago84\_15:

(9, 13351), (12, 13426), (14, 13489), (19, 13567), (Start: 25 @13681 has 9 MA's), (38, 13765), (50, 13855), (51, 13870), (59, 13918), (70, 13972), (78, 14011), (90, 14083), (99, 14143),

Gene: Yahalom\_18 Start: 15015, Stop: 15476, Start Num: 27

Candidate Starts for Yahalom\_18:

(1, 14403), (2, 14442), (5, 14598), (8, 14637), (12, 14751), (14, 14814), (19, 14892), (Start: 27 @15015 has 41 MA's), (Start: 29 @15030 has 4 MA's), (32, 15051), (45, 15159), (55, 15228), (68, 15288), (70, 15294), (77, 15327), (78, 15333), (82, 15348), (86, 15372), (95, 15438),

Gene: Yinz\_18 Start: 15042, Stop: 15503, Start Num: 27

Candidate Starts for Yinz\_18:

(12, 14778), (14, 14841), (19, 14919), (Start: 27 @15042 has 41 MA's), (Start: 29 @15057 has 4 MA's), (32, 15078), (45, 15186), (54, 15252), (55, 15255), (68, 15315), (70, 15321), (77, 15354), (78, 15360), (86, 15399), (95, 15465),

Gene: Zenteno07\_20 Start: 14497, Stop: 14952, Start Num: 28

Candidate Starts for Zenteno07\_20:

(Start: 28 @14497 has 1 MA's), (33, 14545), (38, 14581), (60, 14728), (69, 14773), (77, 14809), (78, 14815), (80, 14821), (84, 14839), (91, 14893), (92, 14899), (95, 14923),