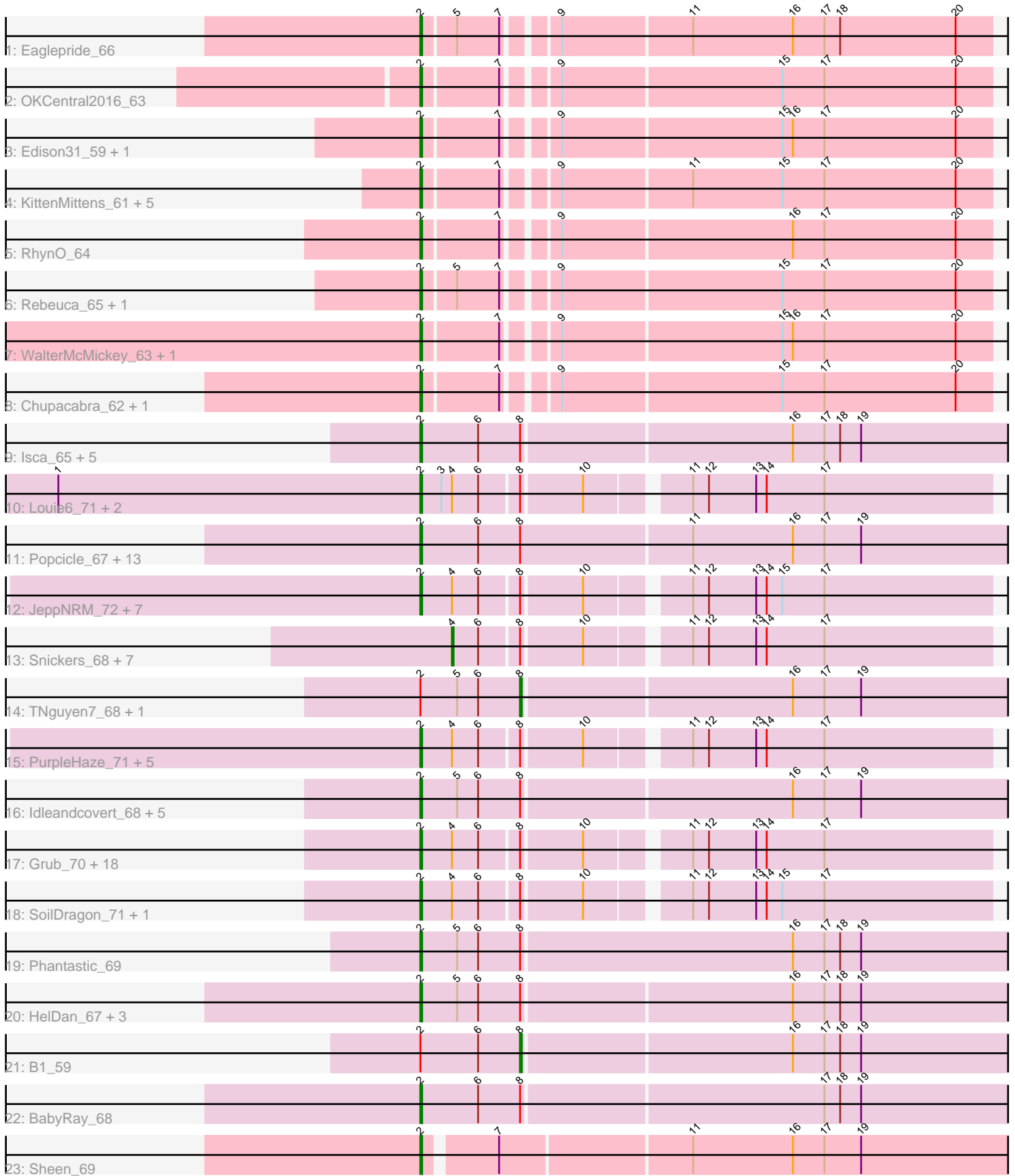


# Pham 163493



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 163493 Report

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

Pham number 163493 has 99 members, 6 are drafts.

Phages represented in each track:

- Track 1 : Eaglepride\_66
- Track 2 : OKCentral2016\_63
- Track 3 : Edison31\_59, Topanga\_61
- Track 4 : KittenMittens\_61, Poompha\_61, Trike\_61, Severus\_62, Drake94\_62, PeaceMeal1\_62
- Track 5 : RhynO\_64
- Track 6 : Rebeuca\_65, Kristoff\_63
- Track 7 : WalterMcMickey\_63, Twister\_63
- Track 8 : Chupacabra\_62, Goose\_65
- Track 9 : Isca\_65, JF4\_65, Rockstar\_66, MK4\_67, MA5\_67, JF2\_65
- Track 10 : Louie6\_71, Misomonster\_73, KADY\_69
- Track 11 : Popcicle\_67, Caviar\_67, Pocahontas\_66, Todacoro\_67, Panamaxus\_65, Texage\_65, Lambert1\_67, Veracruz\_64, Noella\_67, Norbert\_63, ResDef\_65, QuinnKiro\_66, Margo\_67, Hookmount\_67
- Track 12 : JeppNRM\_72, HaveUMetTed\_72, Gemma\_69, PhishRPhriends\_68, Kalb97\_72, OlanP\_70, Manu\_71, ACFishhook\_69
- Track 13 : Snickers\_68, Mainiac\_71, Daishi\_71, JHC117\_68, Sabia\_70, MadMarie\_70, Dieselweasel\_72, Tiffany\_71
- Track 14 : TNguyen7\_68, Puppy\_68
- Track 15 : PurpleHaze\_71, Heliosoles\_69, Groupthink\_72, Kalnoky\_72, Marius\_72, Zetzy\_69
- Track 16 : Idleandcovert\_68, SaturnRing\_67, BlueBird\_70, Bugatti\_67, Pistachio\_67, Giroux\_66
- Track 17 : Grub\_70, BreSam8\_72, Methuselah\_65, Soshari\_74, Lilith\_70, Pembroke\_72, Microwolf\_68, Watson\_71, DaHudson\_71, AgronaGT15\_69, Farber\_72, PGHhamlin\_74, Vix\_68, MuchMore\_75, Malinsilva\_74, MarQuardt\_72, Aglet\_73, Wooldri\_74, AugsMagnumOpus\_75
- Track 18 : SoilDragon\_71, Jobu08\_68
- Track 19 : Phantastic\_69
- Track 20 : HelDan\_67, Scout\_66, Fred313\_65, Heathen\_67
- Track 21 : B1\_59
- Track 22 : BabyRay\_68
- Track 23 : Sheen\_69

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

The start number called the most often in the published annotations is 2, it was called in 83 of the 93 non-draft genes in the pham.

Genes that call this "Most Annotated" start:

- ACFishhook\_69, Aglet\_73, AgronaGT15\_69, AugsMagnumOpus\_75, BabyRay\_68, BlueBird\_70, BreSam8\_72, Bugatti\_67, Caviar\_67, Chupacabra\_62, DaHudson\_71, Drake94\_62, Eaglepride\_66, Edison31\_59, Farber\_72, Fred313\_65, Gemma\_69, Giroux\_66, Goose\_65, Groupthink\_72, Grub\_70, HaveUMetTed\_72, Heathen\_67, HelDan\_67, Heliosoles\_69, Hookmount\_67, Idleandcovert\_68, Isca\_65, JF2\_65, JF4\_65, JeppNRM\_72, Jobu08\_68, KADY\_69, Kalb97\_72, Kalnoky\_72, KittenMittens\_61, Kristoff\_63, Lambert1\_67, Lilith\_70, Louie6\_71, MA5\_67, MK4\_67, Malinsilva\_74, Manu\_71, MarQuardt\_72, Margo\_67, Marius\_72, Methuselah\_65, Microwolf\_68, Misomonster\_73, MuchMore\_75, Noella\_67, Norbert\_63, OKCentral2016\_63, OlanP\_70, PGHhamlin\_74, Panamaxus\_65, PeaceMeal1\_62, Pembroke\_72, Phantastic\_69, PhishRPhriends\_68, Pistachio\_67, Pocahontas\_66, Poompha\_61, Popcicle\_67, PurpleHaze\_71, QuinnKiro\_66, Rebeuca\_65, ResDef\_65, RhynO\_64, Rockstar\_66, SaturnRing\_67, Scout\_66, Severus\_62, Sheen\_69, SoilDragon\_71, Soshari\_74, Texage\_65, Todacoro\_67, Topanga\_61, Trike\_61, Twister\_63, Veracruz\_64, Vix\_68, WalterMcMickey\_63, Watson\_71, Wooldri\_74, Zetzy\_69,

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

- B1\_59, Puppy\_68, TNguyen7\_68,

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

- Daishi\_71, Dieselweasel\_72, JHC117\_68, MadMarie\_70, Mainiac\_71, Sabia\_70, Snickers\_68, Tiffany\_71,

### Summary by start number:

Start 2:

- Found in 91 of 99 ( 91.9% ) of genes in pham
- Manual Annotations of this start: 83 of 93
- Called 96.7% of time when present
- Phage (with cluster) where this start called: ACFishhook\_69 (A3), Aglet\_73 (A3), AgronaGT15\_69 (A3), AugsMagnumOpus\_75 (A3), BabyRay\_68 (A3), BlueBird\_70 (A3), BreSam8\_72 (A3), Bugatti\_67 (A3), Caviar\_67 (A3), Chupacabra\_62 (A10), DaHudson\_71 (A3), Drake94\_62 (A10), Eaglepride\_66 (A10), Edison31\_59 (A10), Farber\_72 (A3), Fred313\_65 (A3), Gemma\_69 (A3), Giroux\_66 (A3), Goose\_65 (A10), Groupthink\_72 (A3), Grub\_70 (A3), HaveUMetTed\_72 (A3), Heathen\_67 (A3), HelDan\_67 (A3), Heliosoles\_69 (A3), Hookmount\_67 (A3), Idleandcovert\_68 (A3), Isca\_65 (A3), JF2\_65 (A3), JF4\_65 (A3), JeppNRM\_72 (A3), Jobu08\_68 (A3), KADY\_69 (A3), Kalb97\_72 (A3), Kalnoky\_72 (A3), KittenMittens\_61 (A10), Kristoff\_63 (A10), Lambert1\_67 (A3), Lilith\_70 (A3), Louie6\_71 (A3), MA5\_67 (A3), MK4\_67 (A3), Malinsilva\_74 (A3), Manu\_71 (A3), MarQuardt\_72 (A3), Margo\_67 (A3), Marius\_72 (A3), Methuselah\_65 (A3), Microwolf\_68 (A3), Misomonster\_73 (A3), MuchMore\_75 (A3), Noella\_67 (A3), Norbert\_63 (A3), OKCentral2016\_63 (A10), OlanP\_70 (A3), PGHhamlin\_74 (A3), Panamaxus\_65 (A3), PeaceMeal1\_62 (A10), Pembroke\_72 (A3), Phantastic\_69 (A3), PhishRPhriends\_68 (A3), Pistachio\_67 (A3), Pocahontas\_66 (A3), Poompha\_61 (A10), Popcicle\_67 (A3), PurpleHaze\_71 (A3), QuinnKiro\_66 (A3), Rebeuca\_65 (A10), ResDef\_65 (A3), RhynO\_64 (A10), Rockstar\_66 (A3), SaturnRing\_67 (A3), Scout\_66 (A3), Severus\_62 (A10), Sheen\_69

(A7), SoilDragon\_71 (A3), Soshari\_74 (A3), Texage\_65 (A3), Todacoro\_67 (A3), Topanga\_61 (A10), Trike\_61 (A10), Twister\_63 (A10), Veracruz\_64 (A3), Vix\_68 (A3), WalterMcMickey\_63 (A10), Watson\_71 (A3), Wooldri\_74 (A3), Zetzy\_69 (A3),

**Start 4:**

- Found in 46 of 99 ( 46.5% ) of genes in pham
- Manual Annotations of this start: 7 of 93
- Called 17.4% of time when present
- Phage (with cluster) where this start called: Daishi\_71 (A3), Dieselweasel\_72 (A3), JHC117\_68 (A3), MadMarie\_70 (A3), Mainiac\_71 (A3), Sabia\_70 (A3), Snickers\_68 (A3), Tiffany\_71 (A3),

**Start 8:**

- Found in 81 of 99 ( 81.8% ) of genes in pham
- Manual Annotations of this start: 3 of 93
- Called 3.7% of time when present
- Phage (with cluster) where this start called: B1\_59 (A3), Puppy\_68 (A3), TNguyen7\_68 (A3),

**Summary by clusters:**

There are 3 clusters represented in this pham: A3, A10, A7,

Info for manual annotations of cluster A10:

- Start number 2 was manually annotated 16 times for cluster A10.

Info for manual annotations of cluster A3:

- Start number 2 was manually annotated 66 times for cluster A3.
- Start number 4 was manually annotated 7 times for cluster A3.
- Start number 8 was manually annotated 3 times for cluster A3.

Info for manual annotations of cluster A7:

- Start number 2 was manually annotated 1 time for cluster A7.

**Gene Information:**

Gene: ACFishhook\_69 Start: 42330, Stop: 42022, Start Num: 2

Candidate Starts for ACFishhook\_69:

(Start: 2 @42330 has 83 MA's), (Start: 4 @42312 has 7 MA's), (6, 42297), (Start: 8 @42276 has 3 MA's), (10, 42243), (11, 42192), (12, 42183), (13, 42156), (14, 42150), (15, 42141), (17, 42117),

Gene: Aglet\_73 Start: 42442, Stop: 42134, Start Num: 2

Candidate Starts for Aglet\_73:

(Start: 2 @42442 has 83 MA's), (Start: 4 @42424 has 7 MA's), (6, 42409), (Start: 8 @42388 has 3 MA's), (10, 42355), (11, 42304), (12, 42295), (13, 42268), (14, 42262), (17, 42229),

Gene: AgronaGT15\_69 Start: 42290, Stop: 41982, Start Num: 2

Candidate Starts for AgronaGT15\_69:

(Start: 2 @42290 has 83 MA's), (Start: 4 @42272 has 7 MA's), (6, 42257), (Start: 8 @42236 has 3 MA's), (10, 42203), (11, 42152), (12, 42143), (13, 42116), (14, 42110), (17, 42077),

Gene: AugsMagnumOpus\_75 Start: 42433, Stop: 42125, Start Num: 2

Candidate Starts for AugsMagnumOpus\_75:

(Start: 2 @42433 has 83 MA's), (Start: 4 @42415 has 7 MA's), (6, 42400), (Start: 8 @42379 has 3 MA's), (10, 42346), (11, 42295), (12, 42286), (13, 42259), (14, 42253), (17, 42220),

Gene: B1\_59 Start: 40295, Stop: 39984, Start Num: 8

Candidate Starts for B1\_59:

(Start: 2 @40352 has 83 MA's), (6, 40319), (Start: 8 @40295 has 3 MA's), (16, 40145), (17, 40127), (18, 40118), (19, 40106),

Gene: BabyRay\_68 Start: 42157, Stop: 41789, Start Num: 2

Candidate Starts for BabyRay\_68:

(Start: 2 @42157 has 83 MA's), (6, 42124), (Start: 8 @42100 has 3 MA's), (17, 41932), (18, 41923), (19, 41911),

Gene: BlueBird\_70 Start: 42204, Stop: 41836, Start Num: 2

Candidate Starts for BlueBird\_70:

(Start: 2 @42204 has 83 MA's), (5, 42183), (6, 42171), (Start: 8 @42147 has 3 MA's), (16, 41997), (17, 41979), (19, 41958),

Gene: BreSam8\_72 Start: 42435, Stop: 42127, Start Num: 2

Candidate Starts for BreSam8\_72:

(Start: 2 @42435 has 83 MA's), (Start: 4 @42417 has 7 MA's), (6, 42402), (Start: 8 @42381 has 3 MA's), (10, 42348), (11, 42297), (12, 42288), (13, 42261), (14, 42255), (17, 42222),

Gene: Bugatti\_67 Start: 42204, Stop: 41836, Start Num: 2

Candidate Starts for Bugatti\_67:

(Start: 2 @42204 has 83 MA's), (5, 42183), (6, 42171), (Start: 8 @42147 has 3 MA's), (16, 41997), (17, 41979), (19, 41958),

Gene: Caviar\_67 Start: 42160, Stop: 41789, Start Num: 2

Candidate Starts for Caviar\_67:

(Start: 2 @42160 has 83 MA's), (6, 42127), (Start: 8 @42103 has 3 MA's), (11, 42007), (16, 41950), (17, 41932), (19, 41911),

Gene: Chupacabra\_62 Start: 41312, Stop: 41004, Start Num: 2

Candidate Starts for Chupacabra\_62:

(Start: 2 @41312 has 83 MA's), (7, 41270), (9, 41246), (15, 41123), (17, 41099), (20, 41024),

Gene: DaHudson\_71 Start: 42434, Stop: 42126, Start Num: 2

Candidate Starts for DaHudson\_71:

(Start: 2 @42434 has 83 MA's), (Start: 4 @42416 has 7 MA's), (6, 42401), (Start: 8 @42380 has 3 MA's), (10, 42347), (11, 42296), (12, 42287), (13, 42260), (14, 42254), (17, 42221),

Gene: Daishi\_71 Start: 41292, Stop: 41002, Start Num: 4

Candidate Starts for Daishi\_71:

(Start: 4 @41292 has 7 MA's), (6, 41277), (Start: 8 @41256 has 3 MA's), (10, 41223), (11, 41172), (12, 41163), (13, 41136), (14, 41130), (17, 41097),

Gene: Dieselweasel\_72 Start: 42426, Stop: 42136, Start Num: 4

Candidate Starts for Dieselweasel\_72:

(Start: 4 @42426 has 7 MA's), (6, 42411), (Start: 8 @42390 has 3 MA's), (10, 42357), (11, 42306), (12, 42297), (13, 42270), (14, 42264), (17, 42231),

Gene: Drake94\_62 Start: 40387, Stop: 40079, Start Num: 2

Candidate Starts for Drake94\_62:

(Start: 2 @40387 has 83 MA's), (7, 40345), (9, 40321), (11, 40249), (15, 40198), (17, 40174), (20, 40099),

Gene: Eaglepride\_66 Start: 41419, Stop: 41111, Start Num: 2

Candidate Starts for Eaglepride\_66:

(Start: 2 @41419 has 83 MA's), (5, 41401), (7, 41377), (9, 41353), (11, 41281), (16, 41224), (17, 41206), (18, 41197), (20, 41131),

Gene: Edison31\_59 Start: 41187, Stop: 40879, Start Num: 2

Candidate Starts for Edison31\_59:

(Start: 2 @41187 has 83 MA's), (7, 41145), (9, 41121), (15, 40998), (16, 40992), (17, 40974), (20, 40899),

Gene: Farber\_72 Start: 42431, Stop: 42123, Start Num: 2

Candidate Starts for Farber\_72:

(Start: 2 @42431 has 83 MA's), (Start: 4 @42413 has 7 MA's), (6, 42398), (Start: 8 @42377 has 3 MA's), (10, 42344), (11, 42293), (12, 42284), (13, 42257), (14, 42251), (17, 42218),

Gene: Fred313\_65 Start: 41797, Stop: 41432, Start Num: 2

Candidate Starts for Fred313\_65:

(Start: 2 @41797 has 83 MA's), (5, 41776), (6, 41764), (Start: 8 @41740 has 3 MA's), (16, 41590), (17, 41572), (18, 41563), (19, 41551),

Gene: Gemma\_69 Start: 42254, Stop: 41946, Start Num: 2

Candidate Starts for Gemma\_69:

(Start: 2 @42254 has 83 MA's), (Start: 4 @42236 has 7 MA's), (6, 42221), (Start: 8 @42200 has 3 MA's), (10, 42167), (11, 42116), (12, 42107), (13, 42080), (14, 42074), (15, 42065), (17, 42041),

Gene: Giroux\_66 Start: 42203, Stop: 41835, Start Num: 2

Candidate Starts for Giroux\_66:

(Start: 2 @42203 has 83 MA's), (5, 42182), (6, 42170), (Start: 8 @42146 has 3 MA's), (16, 41996), (17, 41978), (19, 41957),

Gene: Goose\_65 Start: 41128, Stop: 40820, Start Num: 2

Candidate Starts for Goose\_65:

(Start: 2 @41128 has 83 MA's), (7, 41086), (9, 41062), (15, 40939), (17, 40915), (20, 40840),

Gene: Groupthink\_72 Start: 42258, Stop: 41950, Start Num: 2

Candidate Starts for Groupthink\_72:

(Start: 2 @42258 has 83 MA's), (Start: 4 @42240 has 7 MA's), (6, 42225), (Start: 8 @42204 has 3 MA's), (10, 42171), (11, 42120), (12, 42111), (13, 42084), (14, 42078), (17, 42045),

Gene: Grub\_70 Start: 42433, Stop: 42125, Start Num: 2

Candidate Starts for Grub\_70:

(Start: 2 @42433 has 83 MA's), (Start: 4 @42415 has 7 MA's), (6, 42400), (Start: 8 @42379 has 3 MA's), (10, 42346), (11, 42295), (12, 42286), (13, 42259), (14, 42253), (17, 42220),

Gene: HaveUMetTed\_72 Start: 42243, Stop: 41935, Start Num: 2

Candidate Starts for HaveUMetTed\_72:

(Start: 2 @42243 has 83 MA's), (Start: 4 @42225 has 7 MA's), (6, 42210), (Start: 8 @42189 has 3 MA's), (10, 42156), (11, 42105), (12, 42096), (13, 42069), (14, 42063), (15, 42054), (17, 42030),

Gene: Heathen\_67 Start: 41892, Stop: 41527, Start Num: 2

Candidate Starts for Heathen\_67:

(Start: 2 @41892 has 83 MA's), (5, 41871), (6, 41859), (Start: 8 @41835 has 3 MA's), (16, 41685), (17, 41667), (18, 41658), (19, 41646),

Gene: HelDan\_67 Start: 42108, Stop: 41743, Start Num: 2

Candidate Starts for HelDan\_67:

(Start: 2 @42108 has 83 MA's), (5, 42087), (6, 42075), (Start: 8 @42051 has 3 MA's), (16, 41901), (17, 41883), (18, 41874), (19, 41862),

Gene: Heliosoles\_69 Start: 42261, Stop: 41953, Start Num: 2

Candidate Starts for Heliosoles\_69:

(Start: 2 @42261 has 83 MA's), (Start: 4 @42243 has 7 MA's), (6, 42228), (Start: 8 @42207 has 3 MA's), (10, 42174), (11, 42123), (12, 42114), (13, 42087), (14, 42081), (17, 42048),

Gene: Hookmount\_67 Start: 42161, Stop: 41790, Start Num: 2

Candidate Starts for Hookmount\_67:

(Start: 2 @42161 has 83 MA's), (6, 42128), (Start: 8 @42104 has 3 MA's), (11, 42008), (16, 41951), (17, 41933), (19, 41912),

Gene: Idleandcovert\_68 Start: 42204, Stop: 41836, Start Num: 2

Candidate Starts for Idleandcovert\_68:

(Start: 2 @42204 has 83 MA's), (5, 42183), (6, 42171), (Start: 8 @42147 has 3 MA's), (16, 41997), (17, 41979), (19, 41958),

Gene: Isca\_65 Start: 41657, Stop: 41289, Start Num: 2

Candidate Starts for Isca\_65:

(Start: 2 @41657 has 83 MA's), (6, 41624), (Start: 8 @41600 has 3 MA's), (16, 41450), (17, 41432), (18, 41423), (19, 41411),

Gene: JF2\_65 Start: 40352, Stop: 39984, Start Num: 2

Candidate Starts for JF2\_65:

(Start: 2 @40352 has 83 MA's), (6, 40319), (Start: 8 @40295 has 3 MA's), (16, 40145), (17, 40127), (18, 40118), (19, 40106),

Gene: JF4\_65 Start: 40352, Stop: 39984, Start Num: 2

Candidate Starts for JF4\_65:

(Start: 2 @40352 has 83 MA's), (6, 40319), (Start: 8 @40295 has 3 MA's), (16, 40145), (17, 40127), (18, 40118), (19, 40106),

Gene: JHC117\_68 Start: 42422, Stop: 42132, Start Num: 4

Candidate Starts for JHC117\_68:

(Start: 4 @42422 has 7 MA's), (6, 42407), (Start: 8 @42386 has 3 MA's), (10, 42353), (11, 42302), (12, 42293), (13, 42266), (14, 42260), (17, 42227),

Gene: JeppNRM\_72 Start: 42259, Stop: 41951, Start Num: 2

Candidate Starts for JeppNRM\_72:

(Start: 2 @42259 has 83 MA's), (Start: 4 @42241 has 7 MA's), (6, 42226), (Start: 8 @42205 has 3 MA's), (10, 42172), (11, 42121), (12, 42112), (13, 42085), (14, 42079), (15, 42070), (17, 42046),

Gene: Jobu08\_68 Start: 42273, Stop: 41965, Start Num: 2

Candidate Starts for Jobu08\_68:

(Start: 2 @42273 has 83 MA's), (Start: 4 @42255 has 7 MA's), (6, 42240), (Start: 8 @42219 has 3 MA's), (10, 42186), (11, 42135), (12, 42126), (13, 42099), (14, 42093), (15, 42084), (17, 42060),

Gene: KADY\_69 Start: 42469, Stop: 42161, Start Num: 2

Candidate Starts for KADY\_69:

(1, 42676), (Start: 2 @42469 has 83 MA's), (3, 42457), (Start: 4 @42451 has 7 MA's), (6, 42436), (Start: 8 @42415 has 3 MA's), (10, 42382), (11, 42331), (12, 42322), (13, 42295), (14, 42289), (17, 42256),

Gene: Kalb97\_72 Start: 42257, Stop: 41949, Start Num: 2

Candidate Starts for Kalb97\_72:

(Start: 2 @42257 has 83 MA's), (Start: 4 @42239 has 7 MA's), (6, 42224), (Start: 8 @42203 has 3 MA's), (10, 42170), (11, 42119), (12, 42110), (13, 42083), (14, 42077), (15, 42068), (17, 42044),

Gene: Kalnoky\_72 Start: 42255, Stop: 41947, Start Num: 2

Candidate Starts for Kalnoky\_72:

(Start: 2 @42255 has 83 MA's), (Start: 4 @42237 has 7 MA's), (6, 42222), (Start: 8 @42201 has 3 MA's), (10, 42168), (11, 42117), (12, 42108), (13, 42081), (14, 42075), (17, 42042),

Gene: KittenMittens\_61 Start: 40395, Stop: 40087, Start Num: 2

Candidate Starts for KittenMittens\_61:

(Start: 2 @40395 has 83 MA's), (7, 40353), (9, 40329), (11, 40257), (15, 40206), (17, 40182), (20, 40107),

Gene: Kristoff\_63 Start: 41709, Stop: 41401, Start Num: 2

Candidate Starts for Kristoff\_63:

(Start: 2 @41709 has 83 MA's), (5, 41691), (7, 41667), (9, 41643), (15, 41520), (17, 41496), (20, 41421),

Gene: Lambert1\_67 Start: 42160, Stop: 41789, Start Num: 2

Candidate Starts for Lambert1\_67:

(Start: 2 @42160 has 83 MA's), (6, 42127), (Start: 8 @42103 has 3 MA's), (11, 42007), (16, 41950), (17, 41932), (19, 41911),

Gene: Lilith\_70 Start: 42434, Stop: 42126, Start Num: 2

Candidate Starts for Lilith\_70:

(Start: 2 @42434 has 83 MA's), (Start: 4 @42416 has 7 MA's), (6, 42401), (Start: 8 @42380 has 3 MA's), (10, 42347), (11, 42296), (12, 42287), (13, 42260), (14, 42254), (17, 42221),

Gene: Louie6\_71 Start: 42471, Stop: 42163, Start Num: 2

Candidate Starts for Louie6\_71:

(1, 42678), (Start: 2 @42471 has 83 MA's), (3, 42459), (Start: 4 @42453 has 7 MA's), (6, 42438), (Start: 8 @42417 has 3 MA's), (10, 42384), (11, 42333), (12, 42324), (13, 42297), (14, 42291), (17, 42258),

Gene: MA5\_67 Start: 41561, Stop: 41193, Start Num: 2

Candidate Starts for MA5\_67:

(Start: 2 @41561 has 83 MA's), (6, 41528), (Start: 8 @41504 has 3 MA's), (16, 41354), (17, 41336), (18, 41327), (19, 41315),

Gene: MK4\_67 Start: 41636, Stop: 41268, Start Num: 2



Candidate Starts for MK4\_67:

(Start: 2 @41636 has 83 MA's), (6, 41603), (Start: 8 @41579 has 3 MA's), (16, 41429), (17, 41411), (18, 41402), (19, 41390),

Gene: MadMarie\_70 Start: 42425, Stop: 42135, Start Num: 4

Candidate Starts for MadMarie\_70:

(Start: 4 @42425 has 7 MA's), (6, 42410), (Start: 8 @42389 has 3 MA's), (10, 42356), (11, 42305), (12, 42296), (13, 42269), (14, 42263), (17, 42230),

Gene: Mainiac\_71 Start: 42417, Stop: 42127, Start Num: 4

Candidate Starts for Mainiac\_71:

(Start: 4 @42417 has 7 MA's), (6, 42402), (Start: 8 @42381 has 3 MA's), (10, 42348), (11, 42297), (12, 42288), (13, 42261), (14, 42255), (17, 42222),

Gene: Malinsilva\_74 Start: 42433, Stop: 42125, Start Num: 2

Candidate Starts for Malinsilva\_74:

(Start: 2 @42433 has 83 MA's), (Start: 4 @42415 has 7 MA's), (6, 42400), (Start: 8 @42379 has 3 MA's), (10, 42346), (11, 42295), (12, 42286), (13, 42259), (14, 42253), (17, 42220),

Gene: Manu\_71 Start: 42258, Stop: 41950, Start Num: 2

Candidate Starts for Manu\_71:

(Start: 2 @42258 has 83 MA's), (Start: 4 @42240 has 7 MA's), (6, 42225), (Start: 8 @42204 has 3 MA's), (10, 42171), (11, 42120), (12, 42111), (13, 42084), (14, 42078), (15, 42069), (17, 42045),

Gene: MarQuardt\_72 Start: 42443, Stop: 42135, Start Num: 2

Candidate Starts for MarQuardt\_72:

(Start: 2 @42443 has 83 MA's), (Start: 4 @42425 has 7 MA's), (6, 42410), (Start: 8 @42389 has 3 MA's), (10, 42356), (11, 42305), (12, 42296), (13, 42269), (14, 42263), (17, 42230),

Gene: Margo\_67 Start: 42186, Stop: 41815, Start Num: 2

Candidate Starts for Margo\_67:

(Start: 2 @42186 has 83 MA's), (6, 42153), (Start: 8 @42129 has 3 MA's), (11, 42033), (16, 41976), (17, 41958), (19, 41937),

Gene: Marius\_72 Start: 42255, Stop: 41947, Start Num: 2

Candidate Starts for Marius\_72:

(Start: 2 @42255 has 83 MA's), (Start: 4 @42237 has 7 MA's), (6, 42222), (Start: 8 @42201 has 3 MA's), (10, 42168), (11, 42117), (12, 42108), (13, 42081), (14, 42075), (17, 42042),

Gene: Methuselah\_65 Start: 42465, Stop: 42157, Start Num: 2

Candidate Starts for Methuselah\_65:

(Start: 2 @42465 has 83 MA's), (Start: 4 @42447 has 7 MA's), (6, 42432), (Start: 8 @42411 has 3 MA's), (10, 42378), (11, 42327), (12, 42318), (13, 42291), (14, 42285), (17, 42252),

Gene: Microwolf\_68 Start: 42457, Stop: 42149, Start Num: 2

Candidate Starts for Microwolf\_68:

(Start: 2 @42457 has 83 MA's), (Start: 4 @42439 has 7 MA's), (6, 42424), (Start: 8 @42403 has 3 MA's), (10, 42370), (11, 42319), (12, 42310), (13, 42283), (14, 42277), (17, 42244),

Gene: Misomonster\_73 Start: 42468, Stop: 42160, Start Num: 2

Candidate Starts for Misomonster\_73:

(1, 42675), (Start: 2 @42468 has 83 MA's), (3, 42456), (Start: 4 @42450 has 7 MA's), (6, 42435), (Start: 8 @42414 has 3 MA's), (10, 42381), (11, 42330), (12, 42321), (13, 42294), (14, 42288), (17,

42255),

Gene: MuchMore\_75 Start: 42433, Stop: 42125, Start Num: 2

Candidate Starts for MuchMore\_75:

(Start: 2 @42433 has 83 MA's), (Start: 4 @42415 has 7 MA's), (6, 42400), (Start: 8 @42379 has 3 MA's), (10, 42346), (11, 42295), (12, 42286), (13, 42259), (14, 42253), (17, 42220),

Gene: Noella\_67 Start: 42161, Stop: 41790, Start Num: 2

Candidate Starts for Noella\_67:

(Start: 2 @42161 has 83 MA's), (6, 42128), (Start: 8 @42104 has 3 MA's), (11, 42008), (16, 41951), (17, 41933), (19, 41912),

Gene: Norbert\_63 Start: 42160, Stop: 41789, Start Num: 2

Candidate Starts for Norbert\_63:

(Start: 2 @42160 has 83 MA's), (6, 42127), (Start: 8 @42103 has 3 MA's), (11, 42007), (16, 41950), (17, 41932), (19, 41911),

Gene: OKCentral2016\_63 Start: 40871, Stop: 40563, Start Num: 2

Candidate Starts for OKCentral2016\_63:

(Start: 2 @40871 has 83 MA's), (7, 40829), (9, 40805), (15, 40682), (17, 40658), (20, 40583),

Gene: OlanP\_70 Start: 42431, Stop: 42123, Start Num: 2

Candidate Starts for OlanP\_70:

(Start: 2 @42431 has 83 MA's), (Start: 4 @42413 has 7 MA's), (6, 42398), (Start: 8 @42377 has 3 MA's), (10, 42344), (11, 42293), (12, 42284), (13, 42257), (14, 42251), (15, 42242), (17, 42218),

Gene: PGHhamlin\_74 Start: 42433, Stop: 42125, Start Num: 2

Candidate Starts for PGHhamlin\_74:

(Start: 2 @42433 has 83 MA's), (Start: 4 @42415 has 7 MA's), (6, 42400), (Start: 8 @42379 has 3 MA's), (10, 42346), (11, 42295), (12, 42286), (13, 42259), (14, 42253), (17, 42220),

Gene: Panamaxus\_65 Start: 42160, Stop: 41789, Start Num: 2

Candidate Starts for Panamaxus\_65:

(Start: 2 @42160 has 83 MA's), (6, 42127), (Start: 8 @42103 has 3 MA's), (11, 42007), (16, 41950), (17, 41932), (19, 41911),

Gene: PeaceMeal1\_62 Start: 40396, Stop: 40088, Start Num: 2

Candidate Starts for PeaceMeal1\_62:

(Start: 2 @40396 has 83 MA's), (7, 40354), (9, 40330), (11, 40258), (15, 40207), (17, 40183), (20, 40108),

Gene: Pembroke\_72 Start: 42442, Stop: 42134, Start Num: 2

Candidate Starts for Pembroke\_72:

(Start: 2 @42442 has 83 MA's), (Start: 4 @42424 has 7 MA's), (6, 42409), (Start: 8 @42388 has 3 MA's), (10, 42355), (11, 42304), (12, 42295), (13, 42268), (14, 42262), (17, 42229),

Gene: Phantastic\_69 Start: 41822, Stop: 41451, Start Num: 2

Candidate Starts for Phantastic\_69:

(Start: 2 @41822 has 83 MA's), (5, 41801), (6, 41789), (Start: 8 @41765 has 3 MA's), (16, 41612), (17, 41594), (18, 41585), (19, 41573),

Gene: PhishRPhriends\_68 Start: 41439, Stop: 41131, Start Num: 2

Candidate Starts for PhishRPhriends\_68:

(Start: 2 @41439 has 83 MA's), (Start: 4 @41421 has 7 MA's), (6, 41406), (Start: 8 @41385 has 3 MA's), (10, 41352), (11, 41301), (12, 41292), (13, 41265), (14, 41259), (15, 41250), (17, 41226),

Gene: Pistachio\_67 Start: 41751, Stop: 41383, Start Num: 2

Candidate Starts for Pistachio\_67:

(Start: 2 @41751 has 83 MA's), (5, 41730), (6, 41718), (Start: 8 @41694 has 3 MA's), (16, 41544), (17, 41526), (19, 41505),

Gene: Pocahontas\_66 Start: 42157, Stop: 41786, Start Num: 2

Candidate Starts for Pocahontas\_66:

(Start: 2 @42157 has 83 MA's), (6, 42124), (Start: 8 @42100 has 3 MA's), (11, 42004), (16, 41947), (17, 41929), (19, 41908),

Gene: Poompha\_61 Start: 40394, Stop: 40086, Start Num: 2

Candidate Starts for Poompha\_61:

(Start: 2 @40394 has 83 MA's), (7, 40352), (9, 40328), (11, 40256), (15, 40205), (17, 40181), (20, 40106),

Gene: Popcicle\_67 Start: 42157, Stop: 41786, Start Num: 2

Candidate Starts for Popcicle\_67:

(Start: 2 @42157 has 83 MA's), (6, 42124), (Start: 8 @42100 has 3 MA's), (11, 42004), (16, 41947), (17, 41929), (19, 41908),

Gene: Puppy\_68 Start: 41766, Stop: 41455, Start Num: 8

Candidate Starts for Puppy\_68:

(Start: 2 @41823 has 83 MA's), (5, 41802), (6, 41790), (Start: 8 @41766 has 3 MA's), (16, 41616), (17, 41598), (19, 41577),

Gene: PurpleHaze\_71 Start: 42257, Stop: 41949, Start Num: 2

Candidate Starts for PurpleHaze\_71:

(Start: 2 @42257 has 83 MA's), (Start: 4 @42239 has 7 MA's), (6, 42224), (Start: 8 @42203 has 3 MA's), (10, 42170), (11, 42119), (12, 42110), (13, 42083), (14, 42077), (17, 42044),

Gene: QuinnKiro\_66 Start: 42160, Stop: 41789, Start Num: 2

Candidate Starts for QuinnKiro\_66:

(Start: 2 @42160 has 83 MA's), (6, 42127), (Start: 8 @42103 has 3 MA's), (11, 42007), (16, 41950), (17, 41932), (19, 41911),

Gene: Rebeuca\_65 Start: 41710, Stop: 41402, Start Num: 2

Candidate Starts for Rebeuca\_65:

(Start: 2 @41710 has 83 MA's), (5, 41692), (7, 41668), (9, 41644), (15, 41521), (17, 41497), (20, 41422),

Gene: ResDef\_65 Start: 42160, Stop: 41789, Start Num: 2

Candidate Starts for ResDef\_65:

(Start: 2 @42160 has 83 MA's), (6, 42127), (Start: 8 @42103 has 3 MA's), (11, 42007), (16, 41950), (17, 41932), (19, 41911),

Gene: RhynO\_64 Start: 41351, Stop: 41043, Start Num: 2

Candidate Starts for RhynO\_64:

(Start: 2 @41351 has 83 MA's), (7, 41309), (9, 41285), (16, 41156), (17, 41138), (20, 41063),

Gene: Rockstar\_66 Start: 41645, Stop: 41277, Start Num: 2

Candidate Starts for Rockstar\_66:

(Start: 2 @41645 has 83 MA's), (6, 41612), (Start: 8 @41588 has 3 MA's), (16, 41438), (17, 41420), (18, 41411), (19, 41399),

Gene: Sabia\_70 Start: 42432, Stop: 42142, Start Num: 4

Candidate Starts for Sabia\_70:

(Start: 4 @42432 has 7 MA's), (6, 42417), (Start: 8 @42396 has 3 MA's), (10, 42363), (11, 42312), (12, 42303), (13, 42276), (14, 42270), (17, 42237),

Gene: SaturnRing\_67 Start: 42204, Stop: 41836, Start Num: 2

Candidate Starts for SaturnRing\_67:

(Start: 2 @42204 has 83 MA's), (5, 42183), (6, 42171), (Start: 8 @42147 has 3 MA's), (16, 41997), (17, 41979), (19, 41958),

Gene: Scout\_66 Start: 41355, Stop: 40990, Start Num: 2

Candidate Starts for Scout\_66:

(Start: 2 @41355 has 83 MA's), (5, 41334), (6, 41322), (Start: 8 @41298 has 3 MA's), (16, 41148), (17, 41130), (18, 41121), (19, 41109),

Gene: Severus\_62 Start: 40394, Stop: 40086, Start Num: 2

Candidate Starts for Severus\_62:

(Start: 2 @40394 has 83 MA's), (7, 40352), (9, 40328), (11, 40256), (15, 40205), (17, 40181), (20, 40106),

Gene: Sheen\_69 Start: 45854, Stop: 45495, Start Num: 2

Candidate Starts for Sheen\_69:

(Start: 2 @45854 has 83 MA's), (7, 45818), (11, 45713), (16, 45656), (17, 45638), (19, 45617),

Gene: Snickers\_68 Start: 42397, Stop: 42107, Start Num: 4

Candidate Starts for Snickers\_68:

(Start: 4 @42397 has 7 MA's), (6, 42382), (Start: 8 @42361 has 3 MA's), (10, 42328), (11, 42277), (12, 42268), (13, 42241), (14, 42235), (17, 42202),

Gene: SoilDragon\_71 Start: 41889, Stop: 41581, Start Num: 2

Candidate Starts for SoilDragon\_71:

(Start: 2 @41889 has 83 MA's), (Start: 4 @41871 has 7 MA's), (6, 41856), (Start: 8 @41835 has 3 MA's), (10, 41802), (11, 41751), (12, 41742), (13, 41715), (14, 41709), (15, 41700), (17, 41676),

Gene: Soshari\_74 Start: 42465, Stop: 42157, Start Num: 2

Candidate Starts for Soshari\_74:

(Start: 2 @42465 has 83 MA's), (Start: 4 @42447 has 7 MA's), (6, 42432), (Start: 8 @42411 has 3 MA's), (10, 42378), (11, 42327), (12, 42318), (13, 42291), (14, 42285), (17, 42252),

Gene: TNguyen7\_68 Start: 42107, Stop: 41796, Start Num: 8

Candidate Starts for TNguyen7\_68:

(Start: 2 @42164 has 83 MA's), (5, 42143), (6, 42131), (Start: 8 @42107 has 3 MA's), (16, 41957), (17, 41939), (19, 41918),

Gene: Texage\_65 Start: 42161, Stop: 41790, Start Num: 2

Candidate Starts for Texage\_65:

(Start: 2 @42161 has 83 MA's), (6, 42128), (Start: 8 @42104 has 3 MA's), (11, 42008), (16, 41951), (17, 41933), (19, 41912),

Gene: Tiffany\_71 Start: 42309, Stop: 42019, Start Num: 4

Candidate Starts for Tiffany\_71:

(Start: 4 @42309 has 7 MA's), (6, 42294), (Start: 8 @42273 has 3 MA's), (10, 42240), (11, 42189), (12, 42180), (13, 42153), (14, 42147), (17, 42114),

Gene: Todacoro\_67 Start: 42160, Stop: 41789, Start Num: 2

Candidate Starts for Todacoro\_67:

(Start: 2 @42160 has 83 MA's), (6, 42127), (Start: 8 @42103 has 3 MA's), (11, 42007), (16, 41950), (17, 41932), (19, 41911),

Gene: Topanga\_61 Start: 41190, Stop: 40882, Start Num: 2

Candidate Starts for Topanga\_61:

(Start: 2 @41190 has 83 MA's), (7, 41148), (9, 41124), (15, 41001), (16, 40995), (17, 40977), (20, 40902),

Gene: Trike\_61 Start: 40401, Stop: 40093, Start Num: 2

Candidate Starts for Trike\_61:

(Start: 2 @40401 has 83 MA's), (7, 40359), (9, 40335), (11, 40263), (15, 40212), (17, 40188), (20, 40113),

Gene: Twister\_63 Start: 41311, Stop: 41003, Start Num: 2

Candidate Starts for Twister\_63:

(Start: 2 @41311 has 83 MA's), (7, 41269), (9, 41245), (15, 41122), (16, 41116), (17, 41098), (20, 41023),

Gene: Veracruz\_64 Start: 42160, Stop: 41789, Start Num: 2

Candidate Starts for Veracruz\_64:

(Start: 2 @42160 has 83 MA's), (6, 42127), (Start: 8 @42103 has 3 MA's), (11, 42007), (16, 41950), (17, 41932), (19, 41911),

Gene: Vix\_68 Start: 42524, Stop: 42216, Start Num: 2

Candidate Starts for Vix\_68:

(Start: 2 @42524 has 83 MA's), (Start: 4 @42506 has 7 MA's), (6, 42491), (Start: 8 @42470 has 3 MA's), (10, 42437), (11, 42386), (12, 42377), (13, 42350), (14, 42344), (17, 42311),

Gene: WalterMcMickey\_63 Start: 41311, Stop: 41003, Start Num: 2

Candidate Starts for WalterMcMickey\_63:

(Start: 2 @41311 has 83 MA's), (7, 41269), (9, 41245), (15, 41122), (16, 41116), (17, 41098), (20, 41023),

Gene: Watson\_71 Start: 42433, Stop: 42125, Start Num: 2

Candidate Starts for Watson\_71:

(Start: 2 @42433 has 83 MA's), (Start: 4 @42415 has 7 MA's), (6, 42400), (Start: 8 @42379 has 3 MA's), (10, 42346), (11, 42295), (12, 42286), (13, 42259), (14, 42253), (17, 42220),

Gene: Wooldri\_74 Start: 42353, Stop: 42045, Start Num: 2

Candidate Starts for Wooldri\_74:

(Start: 2 @42353 has 83 MA's), (Start: 4 @42335 has 7 MA's), (6, 42320), (Start: 8 @42299 has 3 MA's), (10, 42266), (11, 42215), (12, 42206), (13, 42179), (14, 42173), (17, 42140),

Gene: Zetzy\_69 Start: 42004, Stop: 41696, Start Num: 2

Candidate Starts for Zetzy\_69:

(Start: 2 @42004 has 83 MA's), (Start: 4 @41986 has 7 MA's), (6, 41971), (Start: 8 @41950 has 3 MA's), (10, 41917), (11, 41866), (12, 41857), (13, 41830), (14, 41824), (17, 41791),