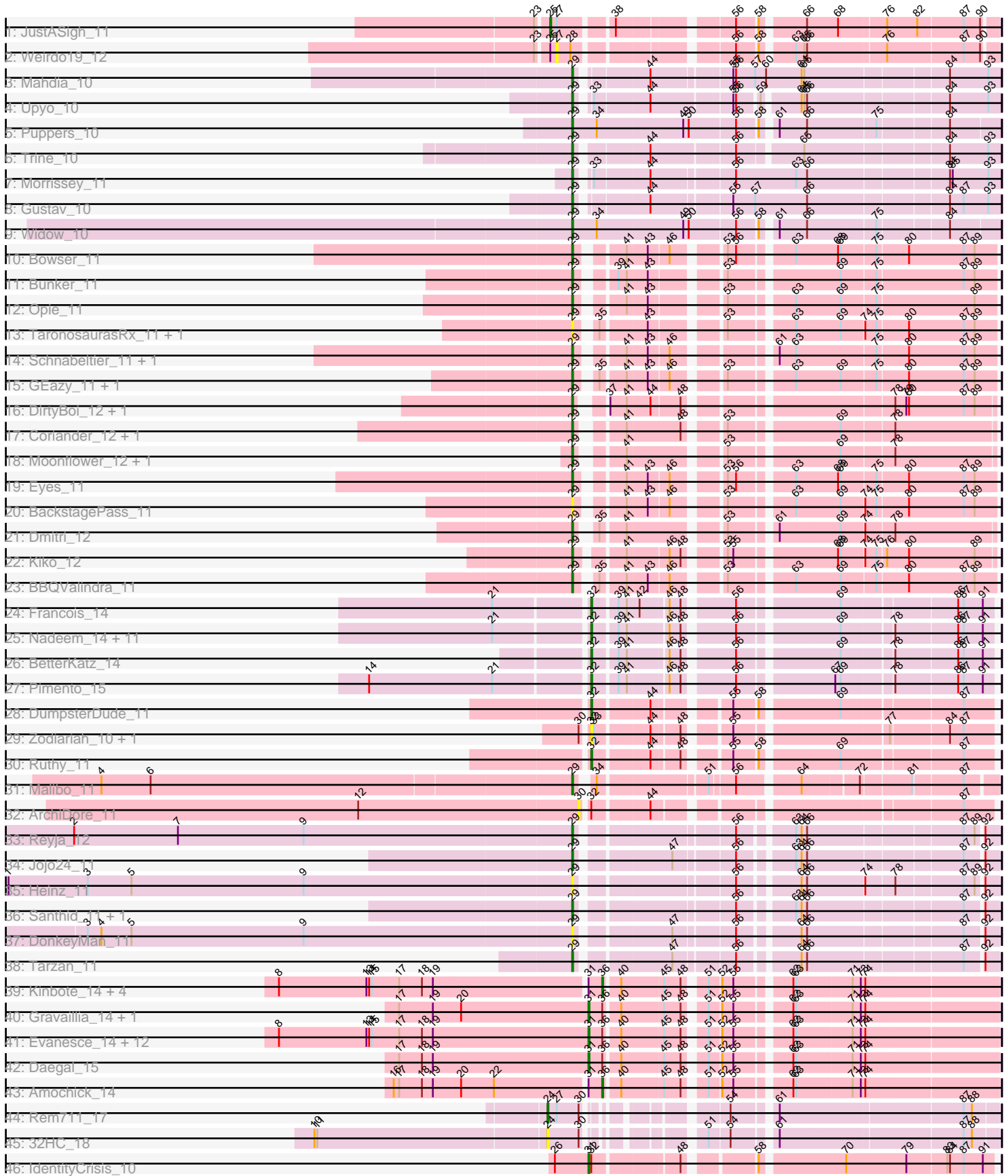


Pham 212533



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 212533 Report

This analysis was run 02/22/25 on database version 588.

Pham number 212533 has 82 members, 12 are drafts.

Phages represented in each track:

- Track 1 : JustASigh\_11
- Track 2 : Weirdo19\_12
- Track 3 : Mahdia\_10
- Track 4 : Upyo\_10
- Track 5 : Puppies\_10
- Track 6 : Trine\_10
- Track 7 : Morrissey\_11
- Track 8 : Gustav\_10
- Track 9 : Widow\_10
- Track 10 : Bowser\_11
- Track 11 : Bunker\_11
- Track 12 : Opie\_11
- Track 13 : TaronosaurusRx\_11, ZAYM\_11
- Track 14 : Schnabeltier\_11, MagicMan\_11
- Track 15 : GEazy\_11, HannahD\_11
- Track 16 : DirtyBoi\_12, Hedwig\_12
- Track 17 : Coriander\_12, Doggs\_11
- Track 18 : Moonflower\_12, RayTheFireFly\_12
- Track 19 : Eyes\_11
- Track 20 : BackstagePass\_11
- Track 21 : Dmitri\_12
- Track 22 : Kiko\_12
- Track 23 : BBQValindra\_11
- Track 24 : Francois\_14
- Track 25 : Nadeem\_14, Bock\_14, Brylie\_14, Chop\_14, Parada\_14, Hamood\_14, Mulch\_14, WheatThin\_14, Ayotoya\_14, DelRio\_15, NancyRae\_14, GrandSlam\_14
- Track 26 : BetterKatz\_14
- Track 27 : Pimento\_15
- Track 28 : DumpsterDude\_11
- Track 29 : Zodiariah\_10, MakCheese\_11
- Track 30 : Ruthy\_11
- Track 31 : Malibo\_11
- Track 32 : ArchiDore\_11
- Track 33 : Reyja\_12
- Track 34 : Jojo24\_11
- Track 35 : Heinz\_11
- Track 36 : Santhid\_11, Hibiscus\_11

- Track 37 : DonkeyMan\_11
- Track 38 : Tarzan\_11
- Track 39 : Kinbote\_14, LilHazelNut\_14, Webster2\_14, Wishmaker\_14, HH92\_14
- Track 40 : Gravaillia\_14, Gancho\_13
- Track 41 : Evanesce\_14, Hadrien\_14, Ein37\_14, Amymech\_14, Giles\_14, DeepSoil15\_14, OBUpride\_14, Dewey\_14, Forge\_14, Luke\_14, Luna22\_14, Hail\_14, Ubuntu\_14
- Track 42 : Daegal\_15
- Track 43 : Amochick\_14
- Track 44 : Rem711\_17
- Track 45 : 32HC\_18
- Track 46 : IdentityCrisis\_10

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

The start number called the most often in the published annotations is 29, it was called in 28 of the 70 non-draft genes in the pham.

Genes that call this "Most Annotated" start:

- BBQValindra\_11, BackstagePass\_11, Bowser\_11, Bunker\_11, Coriander\_12, DirtyBoi\_12, Dmitri\_12, Doggs\_11, DonkeyMan\_11, Eyes\_11, GEazy\_11, Gustav\_10, HannahD\_11, Hedwig\_12, Heinz\_11, Hibiscus\_11, Jojo24\_11, Kiko\_12, MagicMan\_11, Mahdia\_10, Malibo\_11, Moonflower\_12, Morrissey\_11, Opie\_11, Puppies\_10, RayTheFireFly\_12, Reyja\_12, Santhid\_11, Schnabeltier\_11, TaronosaurusRx\_11, Tarzan\_11, Trine\_10, Upyo\_10, Widow\_10, ZAYM\_11,

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

- 

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

- 32HC\_18, Amochick\_14, Amymech\_14, ArchiDore\_11, Ayotoya\_14, BetterKatz\_14, Bock\_14, Brylie\_14, Chop\_14, Daegal\_15, DeepSoil15\_14, DelRio\_15, Dewey\_14, DumpsterDude\_11, Ein37\_14, Evanesce\_14, Forge\_14, Francois\_14, Gancho\_13, Giles\_14, GrandSlam\_14, Gravaillia\_14, HH92\_14, Hadrien\_14, Hail\_14, Hamood\_14, IdentityCrisis\_10, JustASigh\_11, Kinbote\_14, LilHazelNut\_14, Luke\_14, Luna22\_14, MakCheese\_11, Mulch\_14, Nadeem\_14, NancyRae\_14, OBUpride\_14, Parada\_14, Pimento\_15, Rem711\_17, Ruthy\_11, Ubuntu\_14, Webster2\_14, Weirido19\_12, WheatThin\_14, Wishmaker\_14, Zodiariah\_10,

**Summary by start number:**

Start 24:

- Found in 2 of 82 ( 2.4% ) 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: 32HC\_18 (Z), Rem711\_17 (Z),

Start 25:

- Found in 2 of 82 ( 2.4% ) of genes in pham
- Manual Annotations of this start: 1 of 70

- Called 50.0% of time when present
- Phage (with cluster) where this start called: JustASigh\_11 (AH),

#### Start 27:

- Found in 3 of 82 ( 3.7% ) of genes in pham
- No Manual Annotations of this start.
- Called 33.3% of time when present
- Phage (with cluster) where this start called: Weirido19\_12 (AH),

#### Start 29:

- Found in 35 of 82 ( 42.7% ) of genes in pham
- Manual Annotations of this start: 28 of 70
- Called 100.0% of time when present
- Phage (with cluster) where this start called: BBQValindra\_11 (DB), BackstagePass\_11 (DB), Bowser\_11 (DB), Bunker\_11 (DB), Coriander\_12 (DB), DirtyBoi\_12 (DB), Dmitri\_12 (DB), Doggs\_11 (DB), DonkeyMan\_11 (DY), Eyes\_11 (DB), GEazy\_11 (DB), Gustav\_10 (CD), HannahD\_11 (DB), Hedwig\_12 (DB), Heinz\_11 (DY), Hibiscus\_11 (DY), Jojo24\_11 (DY), Kiko\_12 (DB), MagicMan\_11 (DB), Mahdia\_10 (CD), Malibo\_11 (DW), Moonflower\_12 (DB), Morrissey\_11 (CD), Opie\_11 (DB), Puppies\_10 (CD), RayTheFireFly\_12 (DB), Reyja\_12 (DY), Santhid\_11 (DY), Schnabeltier\_11 (DB), TaronosaurusRx\_11 (DB), Tarzan\_11 (DY), Trine\_10 (CD), Upyo\_10 (CD), Widow\_10 (CD), ZAYM\_11 (DB),

#### Start 30:

- Found in 5 of 82 ( 6.1% ) of genes in pham
- No Manual Annotations of this start.
- Called 20.0% of time when present
- Phage (with cluster) where this start called: ArchiDore\_11 (DW),

#### Start 31:

- Found in 23 of 82 ( 28.0% ) of genes in pham
- Manual Annotations of this start: 17 of 70
- Called 73.9% of time when present
- Phage (with cluster) where this start called: Amymech\_14 (Q), Daegal\_15 (Q), DeepSoil15\_14 (Q), Dewey\_14 (Q), Ein37\_14 (Q), Evanesce\_14 (Q), Forge\_14 (Q), Gancho\_13 (Q), Giles\_14 (Q), Gravaillia\_14 (Q), Hadrien\_14 (Q), Hail\_14 (Q), IdentityCrisis\_10 (singleton), Luke\_14 (Q), Luna22\_14 (Q), OBUpride\_14 (Q), Ubuntu\_14 (Q),

#### Start 32:

- Found in 21 of 82 ( 25.6% ) of genes in pham
- Manual Annotations of this start: 17 of 70
- Called 90.5% of time when present
- Phage (with cluster) where this start called: Ayotoya\_14 (DI), BetterKatz\_14 (DI), Bock\_14 (DI), Brylie\_14 (DI), Chop\_14 (DI), DelRio\_15 (DI), DumpsterDude\_11 (DW), Francois\_14 (DI), GrandSlam\_14 (DI), Hamood\_14 (DI), MakCheese\_11 (DW), Mulch\_14 (DI), Nadeem\_14 (DI), NancyRae\_14 (DI), Parada\_14 (DI), Pimento\_15 (DI), Ruthy\_11 (DW), WheatThin\_14 (DI), Zodiariah\_10 (DW),

#### Start 36:

- Found in 22 of 82 ( 26.8% ) of genes in pham
- Manual Annotations of this start: 6 of 70
- Called 27.3% of time when present

- Phage (with cluster) where this start called: Amochick\_14 (Q), HH92\_14 (Q), Kinbote\_14 (Q), LilHazelnut\_14 (Q), Webster2\_14 (Q), Wishmaker\_14 (Q),

### **Summary by clusters:**

There are 9 clusters represented in this pham: singleton, DI, AH, DB, CD, Q, DY, DW, Z,

Info for manual annotations of cluster AH:

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

Info for manual annotations of cluster CD:

- Start number 29 was manually annotated 7 times for cluster CD.

Info for manual annotations of cluster DB:

- Start number 29 was manually annotated 15 times for cluster DB.

Info for manual annotations of cluster DI:

- Start number 32 was manually annotated 15 times for cluster DI.

Info for manual annotations of cluster DW:

- Start number 29 was manually annotated 1 time for cluster DW.
- Start number 32 was manually annotated 2 times for cluster DW.

Info for manual annotations of cluster DY:

- Start number 29 was manually annotated 5 times for cluster DY.

Info for manual annotations of cluster Q:

- Start number 31 was manually annotated 16 times for cluster Q.
- Start number 36 was manually annotated 6 times for cluster Q.

Info for manual annotations of cluster Z:

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

### **Gene Information:**

Gene: 32HC\_18 Start: 11044, Stop: 11448, Start Num: 24

Candidate Starts for 32HC\_18:

(10, 10795), (11, 10798), (Start: 24 @11044 has 1 MA's), (30, 11077), (51, 11161), (54, 11182), (61, 11221), (87, 11413), (88, 11422),

Gene: Amochick\_14 Start: 9530, Stop: 9916, Start Num: 36

Candidate Starts for Amochick\_14:

(16, 9311), (17, 9317), (18, 9341), (19, 9353), (20, 9383), (22, 9419), (Start: 31 @9515 has 17 MA's), (Start: 36 @9530 has 6 MA's), (40, 9545), (45, 9590), (48, 9608), (51, 9626), (52, 9638), (55, 9650), (62, 9701), (63, 9704), (71, 9764), (73, 9773), (74, 9776),

Gene: Amymech\_14 Start: 9521, Stop: 9922, Start Num: 31

Candidate Starts for Amymech\_14:

(8, 9191), (13, 9287), (14, 9290), (15, 9293), (17, 9323), (18, 9347), (19, 9359), (Start: 31 @9521 has 17 MA's), (Start: 36 @9536 has 6 MA's), (40, 9551), (45, 9596), (48, 9614), (51, 9632), (52, 9644), (55,

9656), (62, 9707), (63, 9710), (71, 9770), (73, 9779), (74, 9782),

Gene: ArchiDore\_11 Start: 7674, Stop: 8060, Start Num: 30

Candidate Starts for ArchiDore\_11:

(12, 7434), (30, 7674), (Start: 32 @7680 has 17 MA's), (44, 7737), (87, 8028),

Gene: Ayotoya\_14 Start: 9234, Stop: 9620, Start Num: 32

Candidate Starts for Ayotoya\_14:

(21, 9138), (Start: 32 @9234 has 17 MA's), (39, 9258), (41, 9267), (46, 9306), (48, 9318), (56, 9366), (69, 9465), (78, 9516), (86, 9582), (87, 9588), (91, 9609),

Gene: BBQValindra\_11 Start: 7497, Stop: 7895, Start Num: 29

Candidate Starts for BBQValindra\_11:

(Start: 29 @7497 has 28 MA's), (35, 7512), (41, 7536), (43, 7557), (46, 7578), (53, 7623), (63, 7683), (69, 7731), (75, 7767), (80, 7800), (87, 7860), (89, 7872),

Gene: BackstagePass\_11 Start: 7474, Stop: 7872, Start Num: 29

Candidate Starts for BackstagePass\_11:

(Start: 29 @7474 has 28 MA's), (41, 7513), (43, 7534), (46, 7555), (53, 7600), (63, 7660), (69, 7708), (74, 7732), (75, 7744), (80, 7777), (87, 7837), (89, 7849),

Gene: BetterKatz\_14 Start: 9202, Stop: 9588, Start Num: 32

Candidate Starts for BetterKatz\_14:

(Start: 32 @9202 has 17 MA's), (39, 9226), (41, 9235), (46, 9274), (48, 9286), (56, 9334), (69, 9433), (78, 9484), (86, 9550), (87, 9556), (91, 9577),

Gene: Bock\_14 Start: 8952, Stop: 9338, Start Num: 32

Candidate Starts for Bock\_14:

(21, 8856), (Start: 32 @8952 has 17 MA's), (39, 8976), (41, 8985), (46, 9024), (48, 9036), (56, 9084), (69, 9183), (78, 9234), (86, 9300), (87, 9306), (91, 9327),

Gene: Bowser\_11 Start: 7495, Stop: 7893, Start Num: 29

Candidate Starts for Bowser\_11:

(Start: 29 @7495 has 28 MA's), (41, 7534), (43, 7555), (46, 7576), (53, 7621), (56, 7630), (63, 7681), (68, 7726), (69, 7729), (75, 7765), (80, 7798), (87, 7858), (89, 7870),

Gene: Brylie\_14 Start: 8949, Stop: 9335, Start Num: 32

Candidate Starts for Brylie\_14:

(21, 8853), (Start: 32 @8949 has 17 MA's), (39, 8973), (41, 8982), (46, 9021), (48, 9033), (56, 9081), (69, 9180), (78, 9231), (86, 9297), (87, 9303), (91, 9324),

Gene: Bunker\_11 Start: 7497, Stop: 7895, Start Num: 29

Candidate Starts for Bunker\_11:

(Start: 29 @7497 has 28 MA's), (39, 7527), (41, 7536), (43, 7557), (53, 7623), (69, 7731), (75, 7767), (87, 7860), (89, 7872),

Gene: Chop\_14 Start: 8982, Stop: 9368, Start Num: 32

Candidate Starts for Chop\_14:

(21, 8886), (Start: 32 @8982 has 17 MA's), (39, 9006), (41, 9015), (46, 9054), (48, 9066), (56, 9114), (69, 9213), (78, 9264), (86, 9330), (87, 9336), (91, 9357),

Gene: Coriander\_12 Start: 7873, Stop: 8268, Start Num: 29

Candidate Starts for Coriander\_12:

(Start: 29 @7873 has 28 MA's), (41, 7909), (48, 7966), (53, 7999), (69, 8107), (78, 8161),

Gene: Daegal\_15 Start: 9812, Stop: 10213, Start Num: 31

Candidate Starts for Daegal\_15:

(17, 9614), (18, 9638), (19, 9650), (Start: 31 @9812 has 17 MA's), (Start: 36 @9827 has 6 MA's), (40, 9842), (45, 9887), (48, 9905), (51, 9923), (52, 9935), (55, 9947), (62, 9998), (63, 10001), (71, 10061), (73, 10070), (74, 10073),

Gene: DeepSoil15\_14 Start: 9521, Stop: 9922, Start Num: 31

Candidate Starts for DeepSoil15\_14:

(8, 9191), (13, 9287), (14, 9290), (15, 9293), (17, 9323), (18, 9347), (19, 9359), (Start: 31 @9521 has 17 MA's), (Start: 36 @9536 has 6 MA's), (40, 9551), (45, 9596), (48, 9614), (51, 9632), (52, 9644), (55, 9656), (62, 9707), (63, 9710), (71, 9770), (73, 9779), (74, 9782),

Gene: DelRio\_15 Start: 9459, Stop: 9845, Start Num: 32

Candidate Starts for DelRio\_15:

(21, 9363), (Start: 32 @9459 has 17 MA's), (39, 9483), (41, 9492), (46, 9531), (48, 9543), (56, 9591), (69, 9690), (78, 9741), (86, 9807), (87, 9813), (91, 9834),

Gene: Dewey\_14 Start: 9521, Stop: 9922, Start Num: 31

Candidate Starts for Dewey\_14:

(8, 9191), (13, 9287), (14, 9290), (15, 9293), (17, 9323), (18, 9347), (19, 9359), (Start: 31 @9521 has 17 MA's), (Start: 36 @9536 has 6 MA's), (40, 9551), (45, 9596), (48, 9614), (51, 9632), (52, 9644), (55, 9656), (62, 9707), (63, 9710), (71, 9770), (73, 9779), (74, 9782),

Gene: DirtyBoi\_12 Start: 7867, Stop: 8259, Start Num: 29

Candidate Starts for DirtyBoi\_12:

(Start: 29 @7867 has 28 MA's), (37, 7885), (41, 7903), (44, 7927), (48, 7957), (78, 8152), (79, 8164), (80, 8167), (87, 8227), (89, 8239),

Gene: Dmitri\_12 Start: 7855, Stop: 8250, Start Num: 29

Candidate Starts for Dmitri\_12:

(Start: 29 @7855 has 28 MA's), (35, 7867), (41, 7891), (53, 7981), (61, 8023), (69, 8089), (74, 8113), (78, 8143),

Gene: Doggs\_11 Start: 7570, Stop: 7965, Start Num: 29

Candidate Starts for Doggs\_11:

(Start: 29 @7570 has 28 MA's), (41, 7606), (48, 7663), (53, 7696), (69, 7804), (78, 7858),

Gene: DonkeyMan\_11 Start: 7427, Stop: 7831, Start Num: 29

Candidate Starts for DonkeyMan\_11:

(3, 6899), (4, 6914), (5, 6947), (9, 7136), (Start: 29 @7427 has 28 MA's), (47, 7517), (56, 7577), (64, 7634), (66, 7640), (87, 7799), (92, 7817),

Gene: DumpsterDude\_11 Start: 7693, Stop: 8073, Start Num: 32

Candidate Starts for DumpsterDude\_11:

(Start: 32 @7693 has 17 MA's), (44, 7750), (55, 7816), (58, 7840), (69, 7918), (87, 8041),

Gene: Ein37\_14 Start: 9521, Stop: 9922, Start Num: 31

Candidate Starts for Ein37\_14:

(8, 9191), (13, 9287), (14, 9290), (15, 9293), (17, 9323), (18, 9347), (19, 9359), (Start: 31 @9521 has 17 MA's), (Start: 36 @9536 has 6 MA's), (40, 9551), (45, 9596), (48, 9614), (51, 9632), (52, 9644), (55, 9656), (62, 9707), (63, 9710), (71, 9770), (73, 9779), (74, 9782),

Gene: Evanesce\_14 Start: 9521, Stop: 9922, Start Num: 31

Candidate Starts for Evanesce\_14:

(8, 9191), (13, 9287), (14, 9290), (15, 9293), (17, 9323), (18, 9347), (19, 9359), (Start: 31 @9521 has 17 MA's), (Start: 36 @9536 has 6 MA's), (40, 9551), (45, 9596), (48, 9614), (51, 9632), (52, 9644), (55, 9656), (62, 9707), (63, 9710), (71, 9770), (73, 9779), (74, 9782),

Gene: Eyes\_11 Start: 7504, Stop: 7902, Start Num: 29

Candidate Starts for Eyes\_11:

(Start: 29 @7504 has 28 MA's), (41, 7543), (43, 7564), (46, 7585), (53, 7630), (56, 7639), (63, 7690), (68, 7735), (69, 7738), (75, 7774), (80, 7807), (87, 7867), (89, 7879),

Gene: Forge\_14 Start: 9521, Stop: 9922, Start Num: 31

Candidate Starts for Forge\_14:

(8, 9191), (13, 9287), (14, 9290), (15, 9293), (17, 9323), (18, 9347), (19, 9359), (Start: 31 @9521 has 17 MA's), (Start: 36 @9536 has 6 MA's), (40, 9551), (45, 9596), (48, 9614), (51, 9632), (52, 9644), (55, 9656), (62, 9707), (63, 9710), (71, 9770), (73, 9779), (74, 9782),

Gene: Francois\_14 Start: 8963, Stop: 9349, Start Num: 32

Candidate Starts for Francois\_14:

(21, 8867), (Start: 32 @8963 has 17 MA's), (39, 8987), (41, 8996), (42, 9008), (46, 9035), (48, 9047), (56, 9095), (69, 9194), (86, 9311), (87, 9317), (91, 9338),

Gene: GEazy\_11 Start: 7506, Stop: 7904, Start Num: 29

Candidate Starts for GEazy\_11:

(Start: 29 @7506 has 28 MA's), (35, 7521), (41, 7545), (43, 7566), (46, 7587), (53, 7632), (63, 7692), (69, 7740), (75, 7776), (80, 7809), (87, 7869), (89, 7881),

Gene: Gancho\_13 Start: 9221, Stop: 9622, Start Num: 31

Candidate Starts for Gancho\_13:

(17, 9023), (19, 9059), (20, 9089), (Start: 31 @9221 has 17 MA's), (Start: 36 @9236 has 6 MA's), (40, 9251), (45, 9296), (48, 9314), (51, 9332), (52, 9344), (55, 9356), (62, 9407), (63, 9410), (71, 9470), (73, 9479), (74, 9482),

Gene: Giles\_14 Start: 9521, Stop: 9922, Start Num: 31

Candidate Starts for Giles\_14:

(8, 9191), (13, 9287), (14, 9290), (15, 9293), (17, 9323), (18, 9347), (19, 9359), (Start: 31 @9521 has 17 MA's), (Start: 36 @9536 has 6 MA's), (40, 9551), (45, 9596), (48, 9614), (51, 9632), (52, 9644), (55, 9656), (62, 9707), (63, 9710), (71, 9770), (73, 9779), (74, 9782),

Gene: GrandSlam\_14 Start: 8982, Stop: 9368, Start Num: 32

Candidate Starts for GrandSlam\_14:

(21, 8886), (Start: 32 @8982 has 17 MA's), (39, 9006), (41, 9015), (46, 9054), (48, 9066), (56, 9114), (69, 9213), (78, 9264), (86, 9330), (87, 9336), (91, 9357),

Gene: Gravaillia\_14 Start: 9254, Stop: 9655, Start Num: 31

Candidate Starts for Gravaillia\_14:

(17, 9056), (19, 9092), (20, 9122), (Start: 31 @9254 has 17 MA's), (Start: 36 @9269 has 6 MA's), (40, 9284), (45, 9329), (48, 9347), (51, 9365), (52, 9377), (55, 9389), (62, 9440), (63, 9443), (71, 9503), (73, 9512), (74, 9515),

Gene: Gustav\_10 Start: 7169, Stop: 7594, Start Num: 29

Candidate Starts for Gustav\_10:



(Start: 29 @7169 has 28 MA's), (44, 7235), (55, 7313), (57, 7337), (66, 7394), (84, 7538), (87, 7553), (93, 7580),

Gene: HH92\_14 Start: 9536, Stop: 9922, Start Num: 36

Candidate Starts for HH92\_14:

(8, 9191), (13, 9287), (14, 9290), (15, 9293), (17, 9323), (18, 9347), (19, 9359), (Start: 31 @9521 has 17 MA's), (Start: 36 @9536 has 6 MA's), (40, 9551), (45, 9596), (48, 9614), (51, 9632), (52, 9644), (55, 9656), (62, 9707), (63, 9710), (71, 9770), (73, 9779), (74, 9782),

Gene: Hadrien\_14 Start: 9521, Stop: 9922, Start Num: 31

Candidate Starts for Hadrien\_14:

(8, 9191), (13, 9287), (14, 9290), (15, 9293), (17, 9323), (18, 9347), (19, 9359), (Start: 31 @9521 has 17 MA's), (Start: 36 @9536 has 6 MA's), (40, 9551), (45, 9596), (48, 9614), (51, 9632), (52, 9644), (55, 9656), (62, 9707), (63, 9710), (71, 9770), (73, 9779), (74, 9782),

Gene: Hail\_14 Start: 9521, Stop: 9922, Start Num: 31

Candidate Starts for Hail\_14:

(8, 9191), (13, 9287), (14, 9290), (15, 9293), (17, 9323), (18, 9347), (19, 9359), (Start: 31 @9521 has 17 MA's), (Start: 36 @9536 has 6 MA's), (40, 9551), (45, 9596), (48, 9614), (51, 9632), (52, 9644), (55, 9656), (62, 9707), (63, 9710), (71, 9770), (73, 9779), (74, 9782),

Gene: Hamood\_14 Start: 8982, Stop: 9368, Start Num: 32

Candidate Starts for Hamood\_14:

(21, 8886), (Start: 32 @8982 has 17 MA's), (39, 9006), (41, 9015), (46, 9054), (48, 9066), (56, 9114), (69, 9213), (78, 9264), (86, 9330), (87, 9336), (91, 9357),

Gene: HannahD\_11 Start: 7506, Stop: 7904, Start Num: 29

Candidate Starts for HannahD\_11:

(Start: 29 @7506 has 28 MA's), (35, 7521), (41, 7545), (43, 7566), (46, 7587), (53, 7632), (63, 7692), (69, 7740), (75, 7776), (80, 7809), (87, 7869), (89, 7881),

Gene: Hedwig\_12 Start: 7867, Stop: 8259, Start Num: 29

Candidate Starts for Hedwig\_12:

(Start: 29 @7867 has 28 MA's), (37, 7885), (41, 7903), (44, 7927), (48, 7957), (78, 8152), (79, 8164), (80, 8167), (87, 8227), (89, 8239),

Gene: Heinz\_11 Start: 7463, Stop: 7867, Start Num: 29

Candidate Starts for Heinz\_11:

(1, 6851), (3, 6938), (5, 6986), (9, 7175), (Start: 29 @7463 has 28 MA's), (56, 7613), (64, 7670), (66, 7676), (74, 7736), (78, 7766), (87, 7835), (89, 7847), (92, 7853),

Gene: Hibiscus\_11 Start: 7440, Stop: 7844, Start Num: 29

Candidate Starts for Hibiscus\_11:

(Start: 29 @7440 has 28 MA's), (56, 7590), (63, 7641), (64, 7647), (66, 7653), (87, 7812), (92, 7830),

Gene: IdentityCrisis\_10 Start: 7775, Stop: 8167, Start Num: 31

Candidate Starts for IdentityCrisis\_10:

(26, 7748), (Start: 31 @7775 has 17 MA's), (Start: 32 @7778 has 17 MA's), (48, 7862), (58, 7925), (70, 8009), (79, 8075), (83, 8117), (84, 8120), (87, 8135), (91, 8156),

Gene: Jojo24\_11 Start: 7435, Stop: 7839, Start Num: 29

Candidate Starts for Jojo24\_11:

(Start: 29 @7435 has 28 MA's), (47, 7525), (56, 7585), (63, 7636), (64, 7642), (66, 7648), (87, 7807), (92, 7825),

Gene: JustASigh\_11 Start: 8496, Stop: 8918, Start Num: 25

Candidate Starts for JustASigh\_11:

(23, 8484), (Start: 25 @8496 has 1 MA's), (27, 8502), (38, 8553), (56, 8661), (58, 8682), (66, 8724), (68, 8757), (76, 8805), (82, 8838), (87, 8886), (90, 8904),

Gene: Kiko\_12 Start: 7703, Stop: 8101, Start Num: 29

Candidate Starts for Kiko\_12:

(Start: 29 @7703 has 28 MA's), (41, 7745), (46, 7787), (48, 7799), (53, 7832), (55, 7838), (68, 7937), (69, 7940), (74, 7964), (75, 7976), (76, 7985), (80, 8009), (89, 8081),

Gene: Kinbote\_14 Start: 9536, Stop: 9922, Start Num: 36

Candidate Starts for Kinbote\_14:

(8, 9191), (13, 9287), (14, 9290), (15, 9293), (17, 9323), (18, 9347), (19, 9359), (Start: 31 @9521 has 17 MA's), (Start: 36 @9536 has 6 MA's), (40, 9551), (45, 9596), (48, 9614), (51, 9632), (52, 9644), (55, 9656), (62, 9707), (63, 9710), (71, 9770), (73, 9779), (74, 9782),

Gene: LilHazelnut\_14 Start: 9536, Stop: 9922, Start Num: 36

Candidate Starts for LilHazelnut\_14:

(8, 9191), (13, 9287), (14, 9290), (15, 9293), (17, 9323), (18, 9347), (19, 9359), (Start: 31 @9521 has 17 MA's), (Start: 36 @9536 has 6 MA's), (40, 9551), (45, 9596), (48, 9614), (51, 9632), (52, 9644), (55, 9656), (62, 9707), (63, 9710), (71, 9770), (73, 9779), (74, 9782),

Gene: Luke\_14 Start: 9521, Stop: 9922, Start Num: 31

Candidate Starts for Luke\_14:

(8, 9191), (13, 9287), (14, 9290), (15, 9293), (17, 9323), (18, 9347), (19, 9359), (Start: 31 @9521 has 17 MA's), (Start: 36 @9536 has 6 MA's), (40, 9551), (45, 9596), (48, 9614), (51, 9632), (52, 9644), (55, 9656), (62, 9707), (63, 9710), (71, 9770), (73, 9779), (74, 9782),

Gene: Luna22\_14 Start: 9521, Stop: 9922, Start Num: 31

Candidate Starts for Luna22\_14:

(8, 9191), (13, 9287), (14, 9290), (15, 9293), (17, 9323), (18, 9347), (19, 9359), (Start: 31 @9521 has 17 MA's), (Start: 36 @9536 has 6 MA's), (40, 9551), (45, 9596), (48, 9614), (51, 9632), (52, 9644), (55, 9656), (62, 9707), (63, 9710), (71, 9770), (73, 9779), (74, 9782),

Gene: MagicMan\_11 Start: 7834, Stop: 8232, Start Num: 29

Candidate Starts for MagicMan\_11:

(Start: 29 @7834 has 28 MA's), (41, 7873), (43, 7894), (46, 7915), (61, 8002), (63, 8020), (75, 8104), (80, 8137), (87, 8197), (89, 8209),

Gene: Mahdia\_10 Start: 7171, Stop: 7596, Start Num: 29

Candidate Starts for Mahdia\_10:

(Start: 29 @7171 has 28 MA's), (44, 7237), (55, 7315), (56, 7318), (57, 7339), (60, 7351), (64, 7390), (65, 7393), (84, 7540), (93, 7582),

Gene: MakCheese\_11 Start: 7500, Stop: 7880, Start Num: 32

Candidate Starts for MakCheese\_11:

(30, 7494), (Start: 32 @7500 has 17 MA's), (33, 7503), (44, 7557), (48, 7584), (55, 7623), (77, 7773), (84, 7833), (87, 7848),

Gene: Malibo\_11 Start: 7740, Stop: 8135, Start Num: 29

Candidate Starts for Malibo\_11:

(4, 7233), (6, 7287), (Start: 29 @7740 has 28 MA's), (34, 7752), (51, 7860), (56, 7884), (64, 7944), (72, 8001), (81, 8052), (87, 8103),

Gene: Moonflower\_12 Start: 7878, Stop: 8273, Start Num: 29

Candidate Starts for Moonflower\_12:

(Start: 29 @7878 has 28 MA's), (41, 7914), (53, 8004), (69, 8112), (78, 8166),

Gene: Morrissey\_11 Start: 7567, Stop: 7992, Start Num: 29

Candidate Starts for Morrissey\_11:

(Start: 29 @7567 has 28 MA's), (33, 7576), (44, 7633), (56, 7714), (63, 7780), (66, 7792), (84, 7936), (85, 7939), (93, 7978),

Gene: Mulch\_14 Start: 8949, Stop: 9335, Start Num: 32

Candidate Starts for Mulch\_14:

(21, 8853), (Start: 32 @8949 has 17 MA's), (39, 8973), (41, 8982), (46, 9021), (48, 9033), (56, 9081), (69, 9180), (78, 9231), (86, 9297), (87, 9303), (91, 9324),

Gene: Nadeem\_14 Start: 8949, Stop: 9335, Start Num: 32

Candidate Starts for Nadeem\_14:

(21, 8853), (Start: 32 @8949 has 17 MA's), (39, 8973), (41, 8982), (46, 9021), (48, 9033), (56, 9081), (69, 9180), (78, 9231), (86, 9297), (87, 9303), (91, 9324),

Gene: NancyRae\_14 Start: 8949, Stop: 9335, Start Num: 32

Candidate Starts for NancyRae\_14:

(21, 8853), (Start: 32 @8949 has 17 MA's), (39, 8973), (41, 8982), (46, 9021), (48, 9033), (56, 9081), (69, 9180), (78, 9231), (86, 9297), (87, 9303), (91, 9324),

Gene: OBUpride\_14 Start: 9515, Stop: 9916, Start Num: 31

Candidate Starts for OBUpride\_14:

(8, 9185), (13, 9281), (14, 9284), (15, 9287), (17, 9317), (18, 9341), (19, 9353), (Start: 31 @9515 has 17 MA's), (Start: 36 @9530 has 6 MA's), (40, 9545), (45, 9590), (48, 9608), (51, 9626), (52, 9638), (55, 9650), (62, 9701), (63, 9704), (71, 9764), (73, 9773), (74, 9776),

Gene: Opie\_11 Start: 7849, Stop: 8247, Start Num: 29

Candidate Starts for Opie\_11:

(Start: 29 @7849 has 28 MA's), (41, 7888), (43, 7909), (53, 7975), (63, 8035), (69, 8083), (75, 8119), (89, 8224),

Gene: Parada\_14 Start: 8949, Stop: 9335, Start Num: 32

Candidate Starts for Parada\_14:

(21, 8853), (Start: 32 @8949 has 17 MA's), (39, 8973), (41, 8982), (46, 9021), (48, 9033), (56, 9081), (69, 9180), (78, 9231), (86, 9297), (87, 9303), (91, 9324),

Gene: Pimento\_15 Start: 9153, Stop: 9539, Start Num: 32

Candidate Starts for Pimento\_15:

(14, 8922), (21, 9057), (Start: 32 @9153 has 17 MA's), (39, 9177), (41, 9186), (46, 9225), (48, 9237), (56, 9285), (67, 9378), (69, 9384), (78, 9435), (86, 9501), (87, 9507), (91, 9528),

Gene: Puppies\_10 Start: 7091, Stop: 7525, Start Num: 29

Candidate Starts for Puppies\_10:

(Start: 29 @7091 has 28 MA's), (34, 7118), (49, 7211), (50, 7217), (56, 7265), (58, 7286), (61, 7298), (66, 7328), (75, 7400), (84, 7472),

Gene: RayTheFireFly\_12 Start: 7879, Stop: 8274, Start Num: 29  
Candidate Starts for RayTheFireFly\_12:  
(Start: 29 @7879 has 28 MA's), (41, 7915), (53, 8005), (69, 8113), (78, 8167),

Gene: Rem711\_17 Start: 11092, Stop: 11496, Start Num: 24  
Candidate Starts for Rem711\_17:  
(Start: 24 @11092 has 1 MA's), (27, 11101), (30, 11125), (54, 11230), (61, 11269), (87, 11461), (88, 11470),

Gene: Reyja\_12 Start: 7576, Stop: 7980, Start Num: 29  
Candidate Starts for Reyja\_12:  
(2, 7033), (7, 7147), (9, 7285), (Start: 29 @7576 has 28 MA's), (56, 7726), (63, 7777), (64, 7783), (66, 7789), (87, 7948), (89, 7960), (92, 7966),

Gene: Ruthy\_11 Start: 7764, Stop: 8144, Start Num: 32  
Candidate Starts for Ruthy\_11:  
(Start: 32 @7764 has 17 MA's), (44, 7821), (48, 7848), (55, 7887), (58, 7911), (69, 7989), (87, 8112),

Gene: Santhid\_11 Start: 7444, Stop: 7848, Start Num: 29  
Candidate Starts for Santhid\_11:  
(Start: 29 @7444 has 28 MA's), (56, 7594), (63, 7645), (64, 7651), (66, 7657), (87, 7816), (92, 7834),

Gene: Schnabeltier\_11 Start: 7835, Stop: 8233, Start Num: 29  
Candidate Starts for Schnabeltier\_11:  
(Start: 29 @7835 has 28 MA's), (41, 7874), (43, 7895), (46, 7916), (61, 8003), (63, 8021), (75, 8105), (80, 8138), (87, 8198), (89, 8210),

Gene: TaronosaurusRx\_11 Start: 7848, Stop: 8246, Start Num: 29  
Candidate Starts for TaronosaurusRx\_11:  
(Start: 29 @7848 has 28 MA's), (35, 7863), (43, 7908), (53, 7974), (63, 8034), (69, 8082), (74, 8106), (75, 8118), (80, 8151), (87, 8211), (89, 8223),

Gene: Tarzan\_11 Start: 7432, Stop: 7836, Start Num: 29  
Candidate Starts for Tarzan\_11:  
(Start: 29 @7432 has 28 MA's), (47, 7522), (56, 7582), (64, 7639), (66, 7645), (87, 7804), (92, 7822),

Gene: Trine\_10 Start: 7087, Stop: 7506, Start Num: 29  
Candidate Starts for Trine\_10:  
(Start: 29 @7087 has 28 MA's), (44, 7156), (56, 7240), (65, 7303), (84, 7450), (93, 7492),

Gene: Ubuntu\_14 Start: 9521, Stop: 9922, Start Num: 31  
Candidate Starts for Ubuntu\_14:  
(8, 9191), (13, 9287), (14, 9290), (15, 9293), (17, 9323), (18, 9347), (19, 9359), (Start: 31 @9521 has 17 MA's), (Start: 36 @9536 has 6 MA's), (40, 9551), (45, 9596), (48, 9614), (51, 9632), (52, 9644), (55, 9656), (62, 9707), (63, 9710), (71, 9770), (73, 9779), (74, 9782),

Gene: Upyo\_10 Start: 7111, Stop: 7524, Start Num: 29  
Candidate Starts for Upyo\_10:  
(Start: 29 @7111 has 28 MA's), (33, 7120), (44, 7177), (55, 7258), (56, 7261), (59, 7282), (64, 7318), (65, 7321), (66, 7324), (84, 7468), (93, 7510),

Gene: Webster2\_14 Start: 9536, Stop: 9922, Start Num: 36

Candidate Starts for Webster2\_14:

(8, 9191), (13, 9287), (14, 9290), (15, 9293), (17, 9323), (18, 9347), (19, 9359), (Start: 31 @9521 has 17 MA's), (Start: 36 @9536 has 6 MA's), (40, 9551), (45, 9596), (48, 9614), (51, 9632), (52, 9644), (55, 9656), (62, 9707), (63, 9710), (71, 9770), (73, 9779), (74, 9782),

Gene: Weirido19\_12 Start: 8274, Stop: 8690, Start Num: 27

Candidate Starts for Weirido19\_12:

(23, 8256), (Start: 25 @8268 has 1 MA's), (27, 8274), (28, 8289), (56, 8433), (58, 8454), (63, 8484), (65, 8493), (66, 8496), (76, 8577), (87, 8658), (90, 8676),

Gene: WheatThin\_14 Start: 8949, Stop: 9335, Start Num: 32

Candidate Starts for WheatThin\_14:

(21, 8853), (Start: 32 @8949 has 17 MA's), (39, 8973), (41, 8982), (46, 9021), (48, 9033), (56, 9081), (69, 9180), (78, 9231), (86, 9297), (87, 9303), (91, 9324),

Gene: Widow\_10 Start: 7082, Stop: 7516, Start Num: 29

Candidate Starts for Widow\_10:

(Start: 29 @7082 has 28 MA's), (34, 7109), (49, 7202), (50, 7208), (56, 7256), (58, 7277), (61, 7289), (66, 7319), (75, 7391), (84, 7463),

Gene: Wishmaker\_14 Start: 9536, Stop: 9922, Start Num: 36

Candidate Starts for Wishmaker\_14:

(8, 9191), (13, 9287), (14, 9290), (15, 9293), (17, 9323), (18, 9347), (19, 9359), (Start: 31 @9521 has 17 MA's), (Start: 36 @9536 has 6 MA's), (40, 9551), (45, 9596), (48, 9614), (51, 9632), (52, 9644), (55, 9656), (62, 9707), (63, 9710), (71, 9770), (73, 9779), (74, 9782),

Gene: ZAYM\_11 Start: 7841, Stop: 8239, Start Num: 29

Candidate Starts for ZAYM\_11:

(Start: 29 @7841 has 28 MA's), (35, 7856), (43, 7901), (53, 7967), (63, 8027), (69, 8075), (74, 8099), (75, 8111), (80, 8144), (87, 8204), (89, 8216),

Gene: Zodiariah\_10 Start: 7490, Stop: 7870, Start Num: 32

Candidate Starts for Zodiariah\_10:

(30, 7484), (Start: 32 @7490 has 17 MA's), (33, 7493), (44, 7547), (48, 7574), (55, 7613), (77, 7763), (84, 7823), (87, 7838),