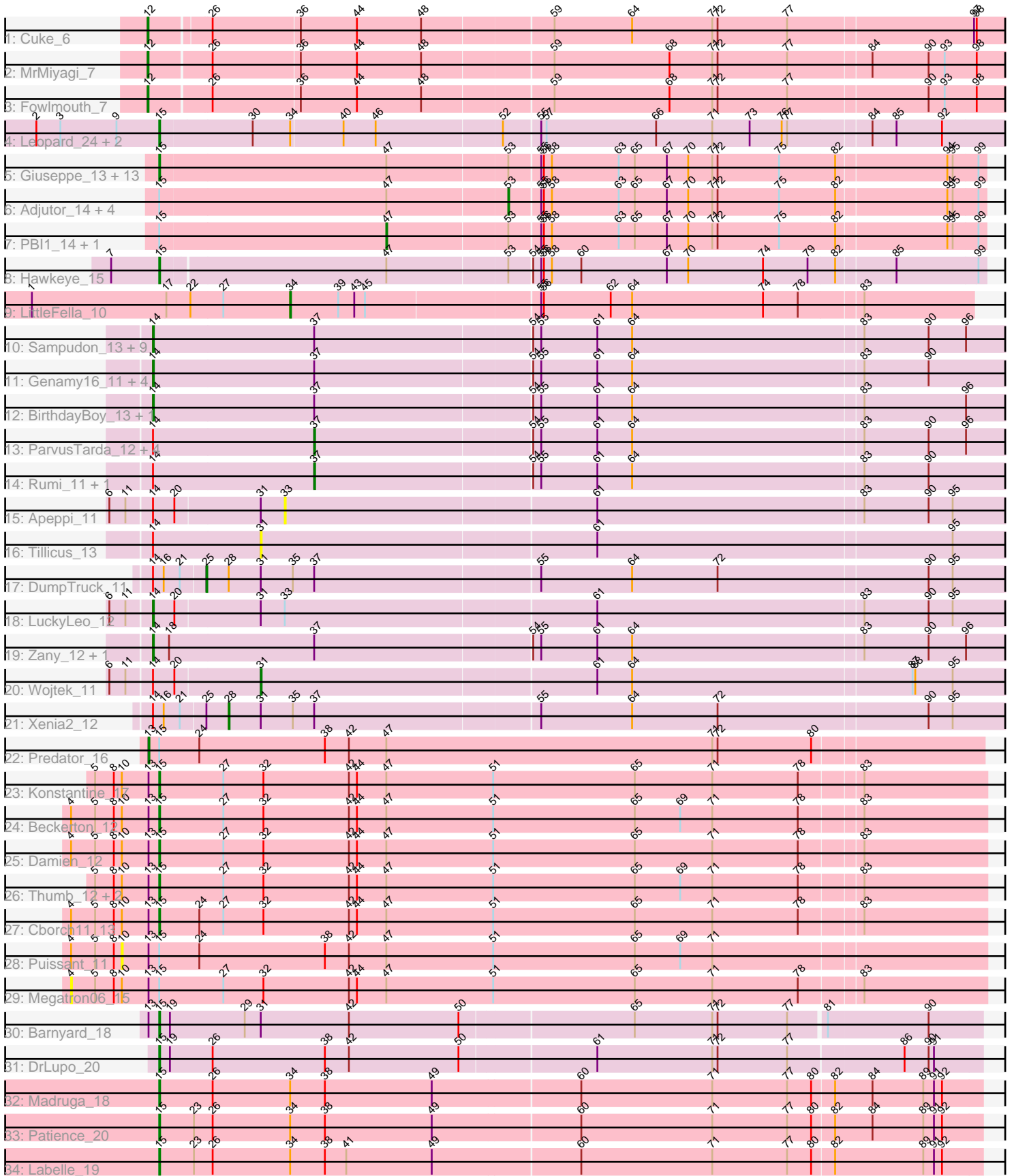


Pham 163561



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 163561 Report

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

Pham number 163561 has 76 members, 10 are drafts.

Phages represented in each track:

- Track 1 : Cuke\_6
- Track 2 : MrMiyagi\_7
- Track 3 : Fowlmouth\_7
- Track 4 : Leopard\_24, Onyinye\_25, Aikoy\_24
- Track 5 : Giuseppe\_13, Erk16\_13, SirHarley\_12, Mopey\_13, Delton\_13, Thoth\_13, Gumball\_12, KandZ\_13, Penelope2018\_13, Nova\_13, BigMama\_11, Butterscotch\_13, Troll4\_13, Visconti\_13
- Track 6 : Adjutor\_14, Chill\_14, PLOT\_14, Helpful\_14, WaldoWhy\_14
- Track 7 : PBI1\_14, Prager\_13
- Track 8 : Hawkeye\_15
- Track 9 : LittleFella\_10
- Track 10 : Sampudon\_13, Yikes\_13, OtterstedtS21\_12, NorManre\_13, Lila22\_14, GOATification\_13, Patos\_13, Fulcrum\_13, Ranch\_12, Sadboi\_12
- Track 11 : Genamy16\_11, NovaSharks\_11, Lambo\_12, Erutan\_12, Alyssamiracle\_11
- Track 12 : BirthdayBoy\_13, Gibbin\_13
- Track 13 : ParvusTarda\_12, Jalebi\_13, MoiGyank\_13, DoobyDoo\_11, GretelLyn\_12
- Track 14 : Rumi\_11, Avian\_11
- Track 15 : Apeppi\_11
- Track 16 : Tillicus\_13
- Track 17 : DumpTruck\_11
- Track 18 : LuckyLeo\_12
- Track 19 : Zany\_12, Benjamin420\_13
- Track 20 : Wojtek\_11
- Track 21 : Xenia2\_12
- Track 22 : Predator\_16
- Track 23 : Konstantine\_17
- Track 24 : Beckerton\_12
- Track 25 : Damien\_12
- Track 26 : Thumb\_12, Phreeze\_12, Oaker\_12
- Track 27 : Cborch11\_13
- Track 28 : Puissant\_11
- Track 29 : Megatron06\_15
- Track 30 : Barnyard\_18
- Track 31 : DrLupo\_20
- Track 32 : Madruga\_18
- Track 33 : Patience\_20

- Track 34 : Labelle\_19

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

The start number called the most often in the published annotations is 15, it was called in 30 of the 66 non-draft genes in the pham.

Genes that call this "Most Annotated" start:

- Aikoy\_24, Barnyard\_18, Beckerton\_12, BigMama\_11, Butterscotch\_13, Cborch11\_13, Damien\_12, Delton\_13, DrLupo\_20, Erk16\_13, Giuseppe\_13, Gumball\_12, Hawkeye\_15, KandZ\_13, Konstantine\_17, Labelle\_19, Leopard\_24, Madruga\_18, Mopey\_13, Nova\_13, Oaker\_12, Onyinye\_25, Patience\_20, Penelope2018\_13, Phreeze\_12, SirHarley\_12, Thoth\_13, Thumb\_12, Troll4\_13, Visconti\_13,

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

- Adjutor\_14, Chill\_14, Helpful\_14, Megatron06\_15, PBI1\_14, PLOT\_14, Prager\_13, Predator\_16, Puissant\_11, WaldoWhy\_14,

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

- Alyssmiracle\_11, Apeppi\_11, Avian\_11, BirthdayBoy\_13, Cuke\_6, DoobyDoo\_11, DumpTruck\_11, Erutan\_12, Fowlmouth\_7, Fulcrum\_13, GOATification\_13, Genamy16\_11, Gibbin\_13, GretelLyn\_12, Jalebi\_13, Lambo\_12, Lila22\_14, LittleFella\_10, LuckyLeo\_12, MoiGyank\_13, MrMiyagi\_7, NorManre\_13, NovaSharks\_11, OtterstedtS21\_12, ParvusTarda\_12, Patos\_13, Penjamin420\_13, Ranch\_12, Rumi\_11, Sadboi\_12, Sampudon\_13, Tillicus\_13, Wojtek\_11, Xenia2\_12, Yikes\_13, Zany\_12,

**Summary by start number:**

Start 4:

- Found in 5 of 76 ( 6.6% ) of genes in pham
- No Manual Annotations of this start.
- Called 20.0% of time when present
- Phage (with cluster) where this start called: Megatron06\_15 (H1),

Start 10:

- Found in 9 of 76 ( 11.8% ) of genes in pham
- No Manual Annotations of this start.
- Called 11.1% of time when present
- Phage (with cluster) where this start called: Puissant\_11 (H1),

Start 12:

- Found in 3 of 76 ( 3.9% ) of genes in pham
- Manual Annotations of this start: 3 of 66
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Cuke\_6 (AC), Fowlmouth\_7 (AC), MrMiyagi\_7 (AC),

Start 13:

- Found in 11 of 76 ( 14.5% ) of genes in pham
- Manual Annotations of this start: 1 of 66
- Called 9.1% of time when present
- Phage (with cluster) where this start called: Predator\_16 (H1),

#### Start 14:

- Found in 32 of 76 ( 42.1% ) of genes in pham
- Manual Annotations of this start: 18 of 66
- Called 62.5% of time when present
- Phage (with cluster) where this start called: Alyssamiracle\_11 (DV), BirthdayBoy\_13 (DV), Erutan\_12 (DV), Fulcrum\_13 (DV), GOATification\_13 (DV), Genamy16\_11 (DV), Gibbin\_13 (DV), Lambo\_12 (DV), Lila22\_14 (DV), LuckyLeo\_12 (DV), NorManre\_13 (DV), NovaSharks\_11 (DV), OtterstedtS21\_12 (DV), Patos\_13 (DV), Penjamin420\_13 (DV), Ranch\_12 (DV), Sadboi\_12 (DV), Sampudon\_13 (DV), Yikes\_13 (DV), Zany\_12 (DV),

#### Start 15:

- Found in 40 of 76 ( 52.6% ) of genes in pham
- Manual Annotations of this start: 30 of 66
- Called 75.0% of time when present
- Phage (with cluster) where this start called: Aikoy\_24 (AE), Barnyard\_18 (H2), Beckerton\_12 (H1), BigMama\_11 (D1), Butterscotch\_13 (D1), Cborch11\_13 (H1), Damien\_12 (H1), Delton\_13 (D1), DrLupo\_20 (H2), Erk16\_13 (D1), Giuseppe\_13 (D1), Gumball\_12 (D1), Hawkeye\_15 (D2), KandZ\_13 (D1), Konstantine\_17 (H1), Labelle\_19 (U), Leopard\_24 (AE), Madruga\_18 (U), Mopey\_13 (D1), Nova\_13 (D1), Oaker\_12 (H1), Onyinye\_25 (AE), Patience\_20 (U), Penelope2018\_13 (D1), Phreeze\_12 (H1), SirHarley\_12 (D1), Thoth\_13 (D1), Thumb\_12 (H1), Troll4\_13 (D1), Visconti\_13 (D1),

#### Start 25:

- Found in 2 of 76 ( 2.6% ) of genes in pham
- Manual Annotations of this start: 1 of 66
- Called 50.0% of time when present
- Phage (with cluster) where this start called: DumpTruck\_11 (DV),

#### Start 28:

- Found in 2 of 76 ( 2.6% ) of genes in pham
- Manual Annotations of this start: 1 of 66
- Called 50.0% of time when present
- Phage (with cluster) where this start called: Xenia2\_12 (DV),

#### Start 31:

- Found in 7 of 76 ( 9.2% ) of genes in pham
- Manual Annotations of this start: 1 of 66
- Called 28.6% of time when present
- Phage (with cluster) where this start called: Tillicus\_13 (DV), Wojtek\_11 (DV),

#### Start 33:

- Found in 2 of 76 ( 2.6% ) of genes in pham
- No Manual Annotations of this start.
- Called 50.0% of time when present
- Phage (with cluster) where this start called: Apeppi\_11 (DV),

Start 34:

- Found in 7 of 76 ( 9.2% ) of genes in pham
- Manual Annotations of this start: 1 of 66
- Called 14.3% of time when present
- Phage (with cluster) where this start called: LittleFella\_10 (DG2),

Start 37:

- Found in 28 of 76 ( 36.8% ) of genes in pham
- Manual Annotations of this start: 4 of 66
- Called 25.0% of time when present
- Phage (with cluster) where this start called: Avian\_11 (DV), DoobyDoo\_11 (DV), GretelLyn\_12 (DV), Jalebi\_13 (DV), MoiGyank\_13 (DV), ParvusTarda\_12 (DV), Rumi\_11 (DV),

Start 47:

- Found in 32 of 76 ( 42.1% ) of genes in pham
- Manual Annotations of this start: 1 of 66
- Called 6.2% of time when present
- Phage (with cluster) where this start called: PB11\_14 (D1), Prager\_13 (D1),

Start 53:

- Found in 22 of 76 ( 28.9% ) of genes in pham
- Manual Annotations of this start: 5 of 66
- Called 22.7% of time when present
- Phage (with cluster) where this start called: Adjutor\_14 (D1), Chill\_14 (D1), Helpful\_14 (D1), PLOT\_14 (D1), WaldoWhy\_14 (D1),

**Summary by clusters:**

There are 9 clusters represented in this pham: AC, AE, H2, H1, DG2, U, DV, D2, D1,

Info for manual annotations of cluster AC:

- Start number 12 was manually annotated 3 times for cluster AC.

Info for manual annotations of cluster AE:

- Start number 15 was manually annotated 3 times for cluster AE.

Info for manual annotations of cluster D1:

- Start number 15 was manually annotated 14 times for cluster D1.
- Start number 47 was manually annotated 1 time for cluster D1.
- Start number 53 was manually annotated 5 times for cluster D1.

Info for manual annotations of cluster D2:

- Start number 15 was manually annotated 1 time for cluster D2.

Info for manual annotations of cluster DG2:

- Start number 34 was manually annotated 1 time for cluster DG2.

Info for manual annotations of cluster DV:

- Start number 14 was manually annotated 18 times for cluster DV.
- Start number 25 was manually annotated 1 time for cluster DV.
- Start number 28 was manually annotated 1 time for cluster DV.
- Start number 31 was manually annotated 1 time for cluster DV.

- Start number 37 was manually annotated 4 times for cluster DV.

Info for manual annotations of cluster H1:

- Start number 13 was manually annotated 1 time for cluster H1.
- Start number 15 was manually annotated 7 times for cluster H1.

Info for manual annotations of cluster H2:

- Start number 15 was manually annotated 2 times for cluster H2.

Info for manual annotations of cluster U:

- Start number 15 was manually annotated 3 times for cluster U.

### **Gene Information:**

Gene: Adjutor\_14 Start: 9115, Stop: 9636, Start Num: 53

Candidate Starts for Adjutor\_14:

(Start: 15 @8731 has 30 MA's), (Start: 47 @8983 has 1 MA's), (Start: 53 @9115 has 5 MA's), (55, 9148), (56, 9151), (58, 9160), (63, 9235), (65, 9253), (67, 9289), (70, 9313), (71, 9340), (72, 9346), (75, 9415), (82, 9475), (94, 9595), (95, 9601), (99, 9628),

Gene: Aikoy\_24 Start: 14575, Stop: 15495, Start Num: 15

Candidate Starts for Aikoy\_24:

(2, 14437), (3, 14464), (9, 14527), (Start: 15 @14575 has 30 MA's), (30, 14674), (Start: 34 @14716 has 1 MA's), (40, 14773), (46, 14809), (52, 14947), (55, 14986), (57, 14992), (66, 15115), (71, 15178), (73, 15220), (76, 15256), (77, 15262), (84, 15349), (85, 15376), (92, 15427),

Gene: Alyssamiracle\_11 Start: 7442, Stop: 8389, Start Num: 14

Candidate Starts for Alyssamiracle\_11:

(Start: 14 @7442 has 18 MA's), (Start: 37 @7622 has 4 MA's), (54, 7859), (55, 7868), (61, 7931), (64, 7970), (83, 8225), (90, 8297),

Gene: Apeppi\_11 Start: 9296, Stop: 10096, Start Num: 33

Candidate Starts for Apeppi\_11:

(6, 9107), (11, 9125), (Start: 14 @9152 has 18 MA's), (20, 9176), (Start: 31 @9269 has 1 MA's), (33, 9296), (61, 9638), (83, 9932), (90, 10004), (95, 10031),

Gene: Avian\_11 Start: 7622, Stop: 8389, Start Num: 37

Candidate Starts for Avian\_11:

(Start: 14 @7442 has 18 MA's), (Start: 37 @7622 has 4 MA's), (54, 7859), (55, 7868), (61, 7931), (64, 7970), (83, 8225), (90, 8297),

Gene: Barnyard\_18 Start: 9413, Stop: 10318, Start Num: 15

Candidate Starts for Barnyard\_18:

(Start: 13 @9401 has 1 MA's), (Start: 15 @9413 has 30 MA's), (19, 9425), (29, 9509), (Start: 31 @9527 has 1 MA's), (42, 9626), (50, 9749), (65, 9938), (71, 10025), (72, 10031), (77, 10109), (81, 10148), (90, 10259),

Gene: Beckerton\_12 Start: 8502, Stop: 9422, Start Num: 15

Candidate Starts for Beckerton\_12:

(4, 8403), (5, 8430), (8, 8451), (10, 8460), (Start: 13 @8490 has 1 MA's), (Start: 15 @8502 has 30 MA's), (27, 8574), (32, 8619), (42, 8715), (44, 8724), (Start: 47 @8757 has 1 MA's), (51, 8877), (65,

9036), (69, 9087), (71, 9123), (78, 9219), (83, 9285),

Gene: BigMama\_11 Start: 8804, Stop: 9709, Start Num: 15

Candidate Starts for BigMama\_11:

(Start: 15 @8804 has 30 MA's), (Start: 47 @9056 has 1 MA's), (Start: 53 @9188 has 5 MA's), (55, 9221), (56, 9224), (58, 9233), (63, 9308), (65, 9326), (67, 9362), (70, 9386), (71, 9413), (72, 9419), (75, 9488), (82, 9548), (94, 9668), (95, 9674), (99, 9701),

Gene: BirthdayBoy\_13 Start: 9888, Stop: 10835, Start Num: 14

Candidate Starts for BirthdayBoy\_13:

(Start: 14 @9888 has 18 MA's), (Start: 37 @10068 has 4 MA's), (54, 10305), (55, 10314), (61, 10377), (64, 10416), (83, 10671), (96, 10785),

Gene: Butterscotch\_13 Start: 8791, Stop: 9696, Start Num: 15

Candidate Starts for Butterscotch\_13:

(Start: 15 @8791 has 30 MA's), (Start: 47 @9043 has 1 MA's), (Start: 53 @9175 has 5 MA's), (55, 9208), (56, 9211), (58, 9220), (63, 9295), (65, 9313), (67, 9349), (70, 9373), (71, 9400), (72, 9406), (75, 9475), (82, 9535), (94, 9655), (95, 9661), (99, 9688),

Gene: Cborch11\_13 Start: 7967, Stop: 8887, Start Num: 15

Candidate Starts for Cborch11\_13:

(4, 7868), (5, 7895), (8, 7916), (10, 7925), (Start: 13 @7955 has 1 MA's), (Start: 15 @7967 has 30 MA's), (24, 8012), (27, 8039), (32, 8084), (42, 8180), (44, 8189), (Start: 47 @8222 has 1 MA's), (51, 8342), (65, 8501), (71, 8588), (78, 8684), (83, 8750),

Gene: Chill\_14 Start: 9178, Stop: 9699, Start Num: 53

Candidate Starts for Chill\_14:

(Start: 15 @8794 has 30 MA's), (Start: 47 @9046 has 1 MA's), (Start: 53 @9178 has 5 MA's), (55, 9211), (56, 9214), (58, 9223), (63, 9298), (65, 9316), (67, 9352), (70, 9376), (71, 9403), (72, 9409), (75, 9478), (82, 9538), (94, 9658), (95, 9664), (99, 9691),

Gene: Cuke\_6 Start: 4018, Stop: 4962, Start Num: 12

Candidate Starts for Cuke\_6:

(Start: 12 @4018 has 3 MA's), (26, 4081), (36, 4177), (44, 4240), (48, 4312), (59, 4453), (64, 4540), (71, 4630), (72, 4636), (77, 4714), (97, 4918), (98, 4921),

Gene: Damien\_12 Start: 7967, Stop: 8887, Start Num: 15

Candidate Starts for Damien\_12:

(4, 7868), (5, 7895), (8, 7916), (10, 7925), (Start: 13 @7955 has 1 MA's), (Start: 15 @7967 has 30 MA's), (27, 8039), (32, 8084), (42, 8180), (44, 8189), (Start: 47 @8222 has 1 MA's), (51, 8342), (65, 8501), (71, 8588), (78, 8684), (83, 8750),

Gene: Delton\_13 Start: 8800, Stop: 9705, Start Num: 15

Candidate Starts for Delton\_13:

(Start: 15 @8800 has 30 MA's), (Start: 47 @9052 has 1 MA's), (Start: 53 @9184 has 5 MA's), (55, 9217), (56, 9220), (58, 9229), (63, 9304), (65, 9322), (67, 9358), (70, 9382), (71, 9409), (72, 9415), (75, 9484), (82, 9544), (94, 9664), (95, 9670), (99, 9697),

Gene: DoobyDoo\_11 Start: 9002, Stop: 9769, Start Num: 37

Candidate Starts for DoobyDoo\_11:

(Start: 14 @8822 has 18 MA's), (Start: 37 @9002 has 4 MA's), (54, 9239), (55, 9248), (61, 9311), (64, 9350), (83, 9605), (90, 9677), (96, 9719),

Gene: DrLupo\_20 Start: 9845, Stop: 10753, Start Num: 15

Candidate Starts for DrLupo\_20:

(Start: 15 @9845 has 30 MA's), (19, 9857), (26, 9905), (38, 10031), (42, 10058), (50, 10181), (61, 10328), (71, 10457), (72, 10463), (77, 10541), (86, 10667), (90, 10694), (91, 10700),

Gene: DumpTruck\_11 Start: 9142, Stop: 10029, Start Num: 25

Candidate Starts for DumpTruck\_11:

(Start: 14 @9085 has 18 MA's), (16, 9097), (21, 9115), (Start: 25 @9142 has 1 MA's), (Start: 28 @9166 has 1 MA's), (Start: 31 @9202 has 1 MA's), (35, 9238), (Start: 37 @9262 has 4 MA's), (55, 9508), (64, 9610), (72, 9706), (90, 9937), (95, 9964),

Gene: Erk16\_13 Start: 8794, Stop: 9699, Start Num: 15

Candidate Starts for Erk16\_13:

(Start: 15 @8794 has 30 MA's), (Start: 47 @9046 has 1 MA's), (Start: 53 @9178 has 5 MA's), (55, 9211), (56, 9214), (58, 9223), (63, 9298), (65, 9316), (67, 9352), (70, 9376), (71, 9403), (72, 9409), (75, 9478), (82, 9538), (94, 9658), (95, 9664), (99, 9691),

Gene: Erutan\_12 Start: 9335, Stop: 10282, Start Num: 14

Candidate Starts for Erutan\_12:

(Start: 14 @9335 has 18 MA's), (Start: 37 @9515 has 4 MA's), (54, 9752), (55, 9761), (61, 9824), (64, 9863), (83, 10118), (90, 10190),

Gene: Fowlmouth\_7 Start: 4184, Stop: 5143, Start Num: 12

Candidate Starts for Fowlmouth\_7:

(Start: 12 @4184 has 3 MA's), (26, 4250), (36, 4346), (44, 4409), (48, 4481), (59, 4622), (68, 4751), (71, 4799), (72, 4805), (77, 4883), (90, 5036), (93, 5054), (98, 5090),

Gene: Fulcrum\_13 Start: 9868, Stop: 10815, Start Num: 14

Candidate Starts for Fulcrum\_13:

(Start: 14 @9868 has 18 MA's), (Start: 37 @10048 has 4 MA's), (54, 10285), (55, 10294), (61, 10357), (64, 10396), (83, 10651), (90, 10723), (96, 10765),

Gene: GOATification\_13 Start: 9868, Stop: 10815, Start Num: 14

Candidate Starts for GOATification\_13:

(Start: 14 @9868 has 18 MA's), (Start: 37 @10048 has 4 MA's), (54, 10285), (55, 10294), (61, 10357), (64, 10396), (83, 10651), (90, 10723), (96, 10765),

Gene: Genamy16\_11 Start: 7442, Stop: 8389, Start Num: 14

Candidate Starts for Genamy16\_11:

(Start: 14 @7442 has 18 MA's), (Start: 37 @7622 has 4 MA's), (54, 7859), (55, 7868), (61, 7931), (64, 7970), (83, 8225), (90, 8297),

Gene: Gibbin\_13 Start: 9928, Stop: 10875, Start Num: 14

Candidate Starts for Gibbin\_13:

(Start: 14 @9928 has 18 MA's), (Start: 37 @10108 has 4 MA's), (54, 10345), (55, 10354), (61, 10417), (64, 10456), (83, 10711), (96, 10825),

Gene: Giuseppe\_13 Start: 8783, Stop: 9688, Start Num: 15

Candidate Starts for Giuseppe\_13:

(Start: 15 @8783 has 30 MA's), (Start: 47 @9035 has 1 MA's), (Start: 53 @9167 has 5 MA's), (55, 9200), (56, 9203), (58, 9212), (63, 9287), (65, 9305), (67, 9341), (70, 9365), (71, 9392), (72, 9398), (75, 9467), (82, 9527), (94, 9647), (95, 9653), (99, 9680),



Gene: GretellYn\_12 Start: 10382, Stop: 11149, Start Num: 37

Candidate Starts for GretellYn\_12:

(Start: 14 @10202 has 18 MA's), (Start: 37 @10382 has 4 MA's), (54, 10619), (55, 10628), (61, 10691), (64, 10730), (83, 10985), (90, 11057), (96, 11099),

Gene: Gumball\_12 Start: 8738, Stop: 9643, Start Num: 15

Candidate Starts for Gumball\_12:

(Start: 15 @8738 has 30 MA's), (Start: 47 @8990 has 1 MA's), (Start: 53 @9122 has 5 MA's), (55, 9155), (56, 9158), (58, 9167), (63, 9242), (65, 9260), (67, 9296), (70, 9320), (71, 9347), (72, 9353), (75, 9422), (82, 9482), (94, 9602), (95, 9608), (99, 9635),

Gene: Hawkeye\_15 Start: 8736, Stop: 9635, Start Num: 15

Candidate Starts for Hawkeye\_15:

(7, 8682), (Start: 15 @8736 has 30 MA's), (Start: 47 @8982 has 1 MA's), (Start: 53 @9114 has 5 MA's), (54, 9138), (55, 9147), (56, 9150), (58, 9159), (60, 9192), (67, 9288), (70, 9312), (74, 9396), (79, 9444), (82, 9474), (85, 9537), (99, 9627),

Gene: Helpful\_14 Start: 9175, Stop: 9696, Start Num: 53

Candidate Starts for Helpful\_14:

(Start: 15 @8791 has 30 MA's), (Start: 47 @9043 has 1 MA's), (Start: 53 @9175 has 5 MA's), (55, 9208), (56, 9211), (58, 9220), (63, 9295), (65, 9313), (67, 9349), (70, 9373), (71, 9400), (72, 9406), (75, 9475), (82, 9535), (94, 9655), (95, 9661), (99, 9688),

Gene: Jalebi\_13 Start: 10558, Stop: 11325, Start Num: 37

Candidate Starts for Jalebi\_13:

(Start: 14 @10378 has 18 MA's), (Start: 37 @10558 has 4 MA's), (54, 10795), (55, 10804), (61, 10867), (64, 10906), (83, 11161), (90, 11233), (96, 11275),

Gene: KandZ\_13 Start: 8888, Stop: 9793, Start Num: 15

Candidate Starts for KandZ\_13:

(Start: 15 @8888 has 30 MA's), (Start: 47 @9140 has 1 MA's), (Start: 53 @9272 has 5 MA's), (55, 9305), (56, 9308), (58, 9317), (63, 9392), (65, 9410), (67, 9446), (70, 9470), (71, 9497), (72, 9503), (75, 9572), (82, 9632), (94, 9752), (95, 9758), (99, 9785),

Gene: Konstantine\_17 Start: 9166, Stop: 10086, Start Num: 15

Candidate Starts for Konstantine\_17:

(5, 9094), (8, 9115), (10, 9124), (Start: 13 @9154 has 1 MA's), (Start: 15 @9166 has 30 MA's), (27, 9238), (32, 9283), (42, 9379), (44, 9388), (Start: 47 @9421 has 1 MA's), (51, 9541), (65, 9700), (71, 9787), (78, 9883), (83, 9949),

Gene: Labelle\_19 Start: 10953, Stop: 11867, Start Num: 15

Candidate Starts for Labelle\_19:

(Start: 15 @10953 has 30 MA's), (23, 10992), (26, 11013), (Start: 34 @11100 has 1 MA's), (38, 11139), (41, 11163), (49, 11259), (60, 11421), (71, 11568), (77, 11652), (80, 11679), (82, 11703), (89, 11802), (91, 11814), (92, 11823),

Gene: Lambo\_12 Start: 9872, Stop: 10819, Start Num: 14

Candidate Starts for Lambo\_12:

(Start: 14 @9872 has 18 MA's), (Start: 37 @10052 has 4 MA's), (54, 10289), (55, 10298), (61, 10361), (64, 10400), (83, 10655), (90, 10727),

Gene: Leopard\_24 Start: 14860, Stop: 15780, Start Num: 15

Candidate Starts for Leopard\_24:

(2, 14722), (3, 14749), (9, 14812), (Start: 15 @14860 has 30 MA's), (30, 14959), (Start: 34 @15001 has 1 MA's), (40, 15058), (46, 15094), (52, 15232), (55, 15271), (57, 15277), (66, 15400), (71, 15463), (73, 15505), (76, 15541), (77, 15547), (84, 15634), (85, 15661), (92, 15712),

Gene: Lila22\_14 Start: 9823, Stop: 10770, Start Num: 14

Candidate Starts for Lila22\_14:

(Start: 14 @9823 has 18 MA's), (Start: 37 @10003 has 4 MA's), (54, 10240), (55, 10249), (61, 10312), (64, 10351), (83, 10606), (90, 10678), (96, 10720),

Gene: LittleFella\_10 Start: 7738, Stop: 8487, Start Num: 34

Candidate Starts for LittleFella\_10:

(1, 7450), (17, 7600), (22, 7627), (27, 7663), (Start: 34 @7738 has 1 MA's), (39, 7792), (43, 7810), (45, 7822), (55, 8011), (56, 8014), (62, 8089), (64, 8113), (74, 8260), (78, 8299), (83, 8365),

Gene: LuckyLeo\_12 Start: 9152, Stop: 10096, Start Num: 14

Candidate Starts for LuckyLeo\_12:

(6, 9107), (11, 9125), (Start: 14 @9152 has 18 MA's), (20, 9176), (Start: 31 @9269 has 1 MA's), (33, 9296), (61, 9638), (83, 9932), (90, 10004), (95, 10031),

Gene: Madruga\_18 Start: 10621, Stop: 11535, Start Num: 15

Candidate Starts for Madruga\_18:

(Start: 15 @10621 has 30 MA's), (26, 10681), (Start: 34 @10768 has 1 MA's), (38, 10807), (49, 10927), (60, 11089), (71, 11236), (77, 11320), (80, 11347), (82, 11371), (84, 11413), (89, 11470), (91, 11482), (92, 11491),

Gene: Megatron06\_15 Start: 8403, Stop: 9422, Start Num: 4

Candidate Starts for Megatron06\_15:

(4, 8403), (5, 8430), (8, 8451), (10, 8460), (Start: 13 @8490 has 1 MA's), (Start: 15 @8502 has 30 MA's), (27, 8574), (32, 8619), (42, 8715), (44, 8724), (Start: 47 @8757 has 1 MA's), (51, 8877), (65, 9036), (71, 9123), (78, 9219), (83, 9285),

Gene: MoiGyank\_13 Start: 10419, Stop: 11186, Start Num: 37

Candidate Starts for MoiGyank\_13:

(Start: 14 @10239 has 18 MA's), (Start: 37 @10419 has 4 MA's), (54, 10656), (55, 10665), (61, 10728), (64, 10767), (83, 11022), (90, 11094), (96, 11136),

Gene: Mopey\_13 Start: 8791, Stop: 9696, Start Num: 15

Candidate Starts for Mopey\_13:

(Start: 15 @8791 has 30 MA's), (Start: 47 @9043 has 1 MA's), (Start: 53 @9175 has 5 MA's), (55, 9208), (56, 9211), (58, 9220), (63, 9295), (65, 9313), (67, 9349), (70, 9373), (71, 9400), (72, 9406), (75, 9475), (82, 9535), (94, 9655), (95, 9661), (99, 9688),

Gene: MrMiyagi\_7 Start: 4184, Stop: 5143, Start Num: 12

Candidate Starts for MrMiyagi\_7:

(Start: 12 @4184 has 3 MA's), (26, 4250), (36, 4346), (44, 4409), (48, 4481), (59, 4622), (68, 4751), (71, 4799), (72, 4805), (77, 4883), (84, 4973), (90, 5036), (93, 5054), (98, 5090),

Gene: NorManre\_13 Start: 9434, Stop: 10381, Start Num: 14

Candidate Starts for NorManre\_13:

(Start: 14 @9434 has 18 MA's), (Start: 37 @9614 has 4 MA's), (54, 9851), (55, 9860), (61, 9923), (64, 9962), (83, 10217), (90, 10289), (96, 10331),

Gene: Nova\_13 Start: 9215, Stop: 10120, Start Num: 15

Candidate Starts for Nova\_13:

(Start: 15 @9215 has 30 MA's), (Start: 47 @9467 has 1 MA's), (Start: 53 @9599 has 5 MA's), (55, 9632), (56, 9635), (58, 9644), (63, 9719), (65, 9737), (67, 9773), (70, 9797), (71, 9824), (72, 9830), (75, 9899), (82, 9959), (94, 10079), (95, 10085), (99, 10112),

Gene: NovaSharks\_11 Start: 7442, Stop: 8389, Start Num: 14

Candidate Starts for NovaSharks\_11:

(Start: 14 @7442 has 18 MA's), (Start: 37 @7622 has 4 MA's), (54, 7859), (55, 7868), (61, 7931), (64, 7970), (83, 8225), (90, 8297),

Gene: Oaker\_12 Start: 8223, Stop: 9143, Start Num: 15

Candidate Starts for Oaker\_12:

(5, 8151), (8, 8172), (10, 8181), (Start: 13 @8211 has 1 MA's), (Start: 15 @8223 has 30 MA's), (27, 8295), (32, 8340), (42, 8436), (44, 8445), (Start: 47 @8478 has 1 MA's), (51, 8598), (65, 8757), (69, 8808), (71, 8844), (78, 8940), (83, 9006),

Gene: Onyinye\_25 Start: 14741, Stop: 15661, Start Num: 15

Candidate Starts for Onyinye\_25:

(2, 14603), (3, 14630), (9, 14693), (Start: 15 @14741 has 30 MA's), (30, 14840), (Start: 34 @14882 has 1 MA's), (40, 14939), (46, 14975), (52, 15113), (55, 15152), (57, 15158), (66, 15281), (71, 15344), (73, 15386), (76, 15422), (77, 15428), (84, 15515), (85, 15542), (92, 15593),

Gene: OtterstedtS21\_12 Start: 9524, Stop: 10471, Start Num: 14

Candidate Starts for OtterstedtS21\_12:

(Start: 14 @9524 has 18 MA's), (Start: 37 @9704 has 4 MA's), (54, 9941), (55, 9950), (61, 10013), (64, 10052), (83, 10307), (90, 10379), (96, 10421),

Gene: PBI1\_14 Start: 8974, Stop: 9627, Start Num: 47

Candidate Starts for PBI1\_14:

(Start: 15 @8722 has 30 MA's), (Start: 47 @8974 has 1 MA's), (Start: 53 @9106 has 5 MA's), (55, 9139), (56, 9142), (58, 9151), (63, 9226), (65, 9244), (67, 9280), (70, 9304), (71, 9331), (72, 9337), (75, 9406), (82, 9466), (94, 9586), (95, 9592), (99, 9619),

Gene: PLOT\_14 Start: 9178, Stop: 9699, Start Num: 53

Candidate Starts for PLOT\_14:

(Start: 15 @8794 has 30 MA's), (Start: 47 @9046 has 1 MA's), (Start: 53 @9178 has 5 MA's), (55, 9211), (56, 9214), (58, 9223), (63, 9298), (65, 9316), (67, 9352), (70, 9376), (71, 9403), (72, 9409), (75, 9478), (82, 9538), (94, 9658), (95, 9664), (99, 9691),

Gene: ParvusTarda\_12 Start: 9186, Stop: 9953, Start Num: 37

Candidate Starts for ParvusTarda\_12:

(Start: 14 @9006 has 18 MA's), (Start: 37 @9186 has 4 MA's), (54, 9423), (55, 9432), (61, 9495), (64, 9534), (83, 9789), (90, 9861), (96, 9903),

Gene: Patience\_20 Start: 11512, Stop: 12426, Start Num: 15

Candidate Starts for Patience\_20:

(Start: 15 @11512 has 30 MA's), (23, 11551), (26, 11572), (Start: 34 @11659 has 1 MA's), (38, 11698), (49, 11818), (60, 11980), (71, 12127), (77, 12211), (80, 12238), (82, 12262), (84, 12304), (89, 12361), (91, 12373), (92, 12382),

Gene: Patos\_13 Start: 9434, Stop: 10381, Start Num: 14

Candidate Starts for Patos\_13:

(Start: 14 @9434 has 18 MA's), (Start: 37 @9614 has 4 MA's), (54, 9851), (55, 9860), (61, 9923), (64, 9962), (83, 10217), (90, 10289), (96, 10331),

Gene: Penelope2018\_13 Start: 8791, Stop: 9696, Start Num: 15

Candidate Starts for Penelope2018\_13:

(Start: 15 @8791 has 30 MA's), (Start: 47 @9043 has 1 MA's), (Start: 53 @9175 has 5 MA's), (55, 9208), (56, 9211), (58, 9220), (63, 9295), (65, 9313), (67, 9349), (70, 9373), (71, 9400), (72, 9406), (75, 9475), (82, 9535), (94, 9655), (95, 9661), (99, 9688),

Gene: Penjamin420\_13 Start: 9645, Stop: 10592, Start Num: 14

Candidate Starts for Penjamin420\_13:

(Start: 14 @9645 has 18 MA's), (18, 9663), (Start: 37 @9825 has 4 MA's), (54, 10062), (55, 10071), (61, 10134), (64, 10173), (83, 10428), (90, 10500), (96, 10542),

Gene: Phreeze\_12 Start: 7967, Stop: 8887, Start Num: 15

Candidate Starts for Phreeze\_12:

(5, 7895), (8, 7916), (10, 7925), (Start: 13 @7955 has 1 MA's), (Start: 15 @7967 has 30 MA's), (27, 8039), (32, 8084), (42, 8180), (44, 8189), (Start: 47 @8222 has 1 MA's), (51, 8342), (65, 8501), (69, 8552), (71, 8588), (78, 8684), (83, 8750),

Gene: Prager\_13 Start: 9052, Stop: 9705, Start Num: 47

Candidate Starts for Prager\_13:

(Start: 15 @8800 has 30 MA's), (Start: 47 @9052 has 1 MA's), (Start: 53 @9184 has 5 MA's), (55, 9217), (56, 9220), (58, 9229), (63, 9304), (65, 9322), (67, 9358), (70, 9382), (71, 9409), (72, 9415), (75, 9484), (82, 9544), (94, 9664), (95, 9670), (99, 9697),

Gene: Predator\_16 Start: 9457, Stop: 10386, Start Num: 13

Candidate Starts for Predator\_16:

(Start: 13 @9457 has 1 MA's), (Start: 15 @9469 has 30 MA's), (24, 9514), (38, 9655), (42, 9682), (Start: 47 @9724 has 1 MA's), (71, 10090), (72, 10096), (80, 10201),

Gene: Puissant\_11 Start: 8343, Stop: 9305, Start Num: 10

Candidate Starts for Puissant\_11:

(4, 8286), (5, 8313), (8, 8334), (10, 8343), (Start: 13 @8373 has 1 MA's), (Start: 15 @8385 has 30 MA's), (24, 8430), (38, 8571), (42, 8598), (Start: 47 @8640 has 1 MA's), (51, 8760), (65, 8919), (69, 8970), (71, 9006),

Gene: Ranch\_12 Start: 8375, Stop: 9322, Start Num: 14

Candidate Starts for Ranch\_12:

(Start: 14 @8375 has 18 MA's), (Start: 37 @8555 has 4 MA's), (54, 8792), (55, 8801), (61, 8864), (64, 8903), (83, 9158), (90, 9230), (96, 9272),

Gene: Rumi\_11 Start: 7622, Stop: 8389, Start Num: 37

Candidate Starts for Rumi\_11:

(Start: 14 @7442 has 18 MA's), (Start: 37 @7622 has 4 MA's), (54, 7859), (55, 7868), (61, 7931), (64, 7970), (83, 8225), (90, 8297),

Gene: Sadboi\_12 Start: 10202, Stop: 11149, Start Num: 14

Candidate Starts for Sadboi\_12:

(Start: 14 @10202 has 18 MA's), (Start: 37 @10382 has 4 MA's), (54, 10619), (55, 10628), (61, 10691), (64, 10730), (83, 10985), (90, 11057), (96, 11099),

Gene: Sampudon\_13 Start: 10378, Stop: 11325, Start Num: 14

Candidate Starts for Sampudon\_13:

(Start: 14 @10378 has 18 MA's), (Start: 37 @10558 has 4 MA's), (54, 10795), (55, 10804), (61, 10867), (64, 10906), (83, 11161), (90, 11233), (96, 11275),

Gene: SirHarley\_12 Start: 8720, Stop: 9625, Start Num: 15

Candidate Starts for SirHarley\_12:

(Start: 15 @8720 has 30 MA's), (Start: 47 @8972 has 1 MA's), (Start: 53 @9104 has 5 MA's), (55, 9137), (56, 9140), (58, 9149), (63, 9224), (65, 9242), (67, 9278), (70, 9302), (71, 9329), (72, 9335), (75, 9404), (82, 9464), (94, 9584), (95, 9590), (99, 9617),

Gene: Thoth\_13 Start: 8788, Stop: 9693, Start Num: 15

Candidate Starts for Thoth\_13:

(Start: 15 @8788 has 30 MA's), (Start: 47 @9040 has 1 MA's), (Start: 53 @9172 has 5 MA's), (55, 9205), (56, 9208), (58, 9217), (63, 9292), (65, 9310), (67, 9346), (70, 9370), (71, 9397), (72, 9403), (75, 9472), (82, 9532), (94, 9652), (95, 9658), (99, 9685),

Gene: Thumb\_12 Start: 7968, Stop: 8888, Start Num: 15

Candidate Starts for Thumb\_12:

(5, 7896), (8, 7917), (10, 7926), (Start: 13 @7956 has 1 MA's), (Start: 15 @7968 has 30 MA's), (27, 8040), (32, 8085), (42, 8181), (44, 8190), (Start: 47 @8223 has 1 MA's), (51, 8343), (65, 8502), (69, 8553), (71, 8589), (78, 8685), (83, 8751),

Gene: Tillicus\_13 Start: 8861, Stop: 9688, Start Num: 31

Candidate Starts for Tillicus\_13:

(Start: 14 @8741 has 18 MA's), (Start: 31 @8861 has 1 MA's), (61, 9230), (95, 9623),

Gene: Troll4\_13 Start: 8792, Stop: 9697, Start Num: 15

Candidate Starts for Troll4\_13:

(Start: 15 @8792 has 30 MA's), (Start: 47 @9044 has 1 MA's), (Start: 53 @9176 has 5 MA's), (55, 9209), (56, 9212), (58, 9221), (63, 9296), (65, 9314), (67, 9350), (70, 9374), (71, 9401), (72, 9407), (75, 9476), (82, 9536), (94, 9656), (95, 9662), (99, 9689),

Gene: Visconti\_13 Start: 8801, Stop: 9706, Start Num: 15

Candidate Starts for Visconti\_13:

(Start: 15 @8801 has 30 MA's), (Start: 47 @9053 has 1 MA's), (Start: 53 @9185 has 5 MA's), (55, 9218), (56, 9221), (58, 9230), (63, 9305), (65, 9323), (67, 9359), (70, 9383), (71, 9410), (72, 9416), (75, 9485), (82, 9545), (94, 9665), (95, 9671), (99, 9698),

Gene: WaldoWhy\_14 Start: 9178, Stop: 9699, Start Num: 53

Candidate Starts for WaldoWhy\_14:

(Start: 15 @8794 has 30 MA's), (Start: 47 @9046 has 1 MA's), (Start: 53 @9178 has 5 MA's), (55, 9211), (56, 9214), (58, 9223), (63, 9298), (65, 9316), (67, 9352), (70, 9376), (71, 9403), (72, 9409), (75, 9478), (82, 9538), (94, 9658), (95, 9664), (99, 9691),

Gene: Wojtek\_11 Start: 9185, Stop: 10012, Start Num: 31

Candidate Starts for Wojtek\_11:

(6, 9023), (11, 9041), (Start: 14 @9068 has 18 MA's), (20, 9092), (Start: 31 @9185 has 1 MA's), (61, 9554), (64, 9593), (87, 9902), (88, 9905), (95, 9947),

Gene: Xenia2\_12 Start: 9205, Stop: 10068, Start Num: 28

Candidate Starts for Xenia2\_12:

(Start: 14 @9124 has 18 MA's), (16, 9136), (21, 9154), (Start: 25 @9181 has 1 MA's), (Start: 28 @9205 has 1 MA's), (Start: 31 @9241 has 1 MA's), (35, 9277), (Start: 37 @9301 has 4 MA's), (55,

9547), (64, 9649), (72, 9745), (90, 9976), (95, 10003),

Gene: Yikes\_13 Start: 10466, Stop: 11413, Start Num: 14

Candidate Starts for Yikes\_13:

(Start: 14 @10466 has 18 MA's), (Start: 37 @10646 has 4 MA's), (54, 10883), (55, 10892), (61, 10955), (64, 10994), (83, 11249), (90, 11321), (96, 11363),

Gene: Zany\_12 Start: 9592, Stop: 10539, Start Num: 14

Candidate Starts for Zany\_12:

(Start: 14 @9592 has 18 MA's), (18, 9610), (Start: 37 @9772 has 4 MA's), (54, 10009), (55, 10018), (61, 10081), (64, 10120), (83, 10375), (90, 10447), (96, 10489),