



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 283679 Report

This analysis was run 02/23/26 on database version 636.

Pham number 283679 has 95 members, 11 are drafts.

Phages represented in each track:

- Track 1 : PLOT\_19, Mopey\_18, Visconti\_18, Gumball\_17, KandZ\_18, WaldoWhy\_19, Helpful\_19, Delton\_18, SirHarley\_17, Thoth\_18, Nova\_18, BigMama\_16, Chill\_19, Prager\_18, Penelope2018\_18, SuperheroCarly\_19, Troll4\_18, Adjutor\_19, Erk16\_18, Giuseppe\_18, PBI1\_19, Phalaborwa\_18, Butterscotch\_18
- Track 2 : Hawkeye\_20
- Track 3 : LilyPad\_14
- Track 4 : Djokovic\_13, Terapin\_13, BiteSize\_13, Madi\_13, Sienna\_13, BeyonCage\_13
- Track 5 : Suzy\_14
- Track 6 : LittleFella\_15
- Track 7 : RazorC\_16, Zany\_17, Rumi\_17, OtterstedtS21\_18, Fulcrum\_19, Charminar\_16, Ranch\_18, Alyssamiracle\_17, Stormer\_16, Gibbin\_19, Lila22\_18, Genamy16\_17, Mima20\_17, Sampudon\_18, ParvusTarda\_18, Patos\_19, DaviePasture\_18, DoobyDoo\_17, GretelLyn\_18, MoiGyank\_20, Avian\_16, Sadboi\_18, LavAbarElk\_16, Jalebi\_18, Alephilan\_16, Wojtek\_17, BirthdayBoy\_19, NovaSharks\_17, Jamemuya19\_16, Yikes\_19, NorManre\_19, Astralis\_16, GOATification\_19, Rukungu\_18, Erutan\_18
- Track 8 : Rota\_17
- Track 9 : Lambo\_18
- Track 10 : LuckyLeo\_17, Apeppi\_16
- Track 11 : DumpTruck\_17, Xenia2\_18
- Track 12 : Tillicus\_18
- Track 13 : Huwbart\_41, Triscuit\_40
- Track 14 : Predator\_21
- Track 15 : Damien\_17, Phreeze\_17, Beckerton\_17, Konstantine\_22, BobtimousPrime\_16
- Track 16 : Cborch11\_18
- Track 17 : Puissant\_16
- Track 18 : Megatron06\_19, Thumb\_17, Oaker\_17
- Track 19 : DrLupo\_25
- Track 20 : Barnyard\_23
- Track 21 : Demikore\_25, Patience\_25, SuperSonics\_24, Labelle\_24, Madruga\_23

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

The start number called the most often in the published annotations is 4, it was called in 40 of the 84 non-draft genes in the pham.

Genes that call this "Most Annotated" start:

- Adjutor\_19, Barnyard\_23, Beyoncage\_13, BigMama\_16, BiteSize\_13, Butterscotch\_18, Chill\_19, Delton\_18, Demikore\_25, Djokovic\_13, DrLupo\_25, Erk16\_18, Giuseppe\_18, Gumball\_17, Hawkeye\_20, Helpful\_19, KandZ\_18, Labelle\_24, LilyPad\_14, LittleFella\_15, Madi\_13, Madruga\_23, Megatron06\_19, Mopey\_18, Nova\_18, Oaker\_17, PBI1\_19, PLOT\_19, Patience\_25, Penelope2018\_18, Phalaborwa\_18, Prager\_18, Predator\_21, Sienna\_13, SirHarley\_17, SuperSonics\_24, SuperheroCarly\_19, Suzy\_14, Terapin\_13, Thoth\_18, Thumb\_17, Troll4\_18, Visconti\_18, WaldoWhy\_19,

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

- Beckerton\_17, BobtimousPrime\_16, Cborch11\_18, Damien\_17, Konstantine\_22, Phreeze\_17, Puissant\_16,

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

- Alephilan\_16, Alyssamiracle\_17, Apeppi\_16, Astralis\_16, Avian\_16, BirthdayBoy\_19, Charminar\_16, DaviePasture\_18, DoobyDoo\_17, DumpTruck\_17, Erutan\_18, Fulcrum\_19, GOATification\_19, Genamy16\_17, Gibbin\_19, Gretellyn\_18, Huwbert\_41, Jalebi\_18, Jamemuya19\_16, Lambo\_18, LavAbarElk\_16, Lila22\_18, LuckyLeo\_17, Mima20\_17, MoiGyank\_20, NorManre\_19, NovaSharks\_17, OtterstedtS21\_18, ParvusTarda\_18, Patos\_19, Ranch\_18, RazorC\_16, Rota\_17, Rukungu\_18, Rumi\_17, Sadboi\_18, Sampudon\_18, Stormer\_16, Tillicus\_18, Triscuit\_40, Wojtek\_17, Xenia2\_18, Yikes\_19, Zany\_17,

### Summary by start number:

Start 2:

- Found in 2 of 95 ( 2.1% ) of genes in pham
- Manual Annotations of this start: 2 of 84
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Huwbert\_41 (GG), Triscuit\_40 (GG),

Start 3:

- Found in 10 of 95 ( 10.5% ) of genes in pham
- Manual Annotations of this start: 5 of 84
- Called 70.0% of time when present
- Phage (with cluster) where this start called: Beckerton\_17 (H1), BobtimousPrime\_16 (H1), Cborch11\_18 (H1), Damien\_17 (H1), Konstantine\_22 (H1), Phreeze\_17 (H1), Puissant\_16 (H1),

Start 4:

- Found in 51 of 95 ( 53.7% ) of genes in pham
- Manual Annotations of this start: 40 of 84
- Called 86.3% of time when present
- Phage (with cluster) where this start called: Adjutor\_19 (D1), Barnyard\_23 (H2), Beyoncage\_13 (DG1), BigMama\_16 (D1), BiteSize\_13 (DG1), Butterscotch\_18 (D1), Chill\_19 (D1), Delton\_18 (D1), Demikore\_25 (U), Djokovic\_13 (DG1), DrLupo\_25 (H2), Erk16\_18 (D1), Giuseppe\_18 (D1), Gumball\_17 (D1), Hawkeye\_20 (D2), Helpful\_19 (D1), KandZ\_18 (D1), Labelle\_24 (U), LilyPad\_14 (DG1), LittleFella\_15

(DG2), Madi\_13 (DG1), Madrugá\_23 (U), Megatron06\_19 (H1), Mopey\_18 (D1), Nova\_18 (D1), Oaker\_17 (H1), PBI1\_19 (D1), PLOT\_19 (D1), Patience\_25 (U), Penelope2018\_18 (D1), Phalaborwa\_18 (D1), Prager\_18 (D1), Predator\_21 (H1), Sienna\_13 (DG1), SirHarley\_17 (D1), SuperSonics\_24 (U), SuperheroCarly\_19 (D1), Suzy\_14 (DG1), Terapin\_13 (DG1), Thoth\_18 (D1), Thumb\_17 (H1), Troll4\_18 (D1), Visconti\_18 (D1), WaldoWhy\_19 (D1),

Start 5:

- Found in 42 of 95 ( 44.2% ) of genes in pham
- Manual Annotations of this start: 37 of 84
- Called 97.6% of time when present
- Phage (with cluster) where this start called: Alephilan\_16 (DV), Alyssmiracle\_17 (DV), Apeppi\_16 (DV), Astralis\_16 (DV), Avian\_16 (DV), BirthdayBoy\_19 (DV), Charminar\_16 (DV), DaviePasture\_18 (DV), DoobyDoo\_17 (DV), DumpTruck\_17 (DV), Erutan\_18 (DV), Fulcrum\_19 (DV), GOATification\_19 (DV), Genamy16\_17 (DV), Gibbin\_19 (DV), GretelLyn\_18 (DV), Jalebi\_18 (DV), Jamemuya19\_16 (DV), Lambo\_18 (DV), LavAbarElk\_16 (DV), Lila22\_18 (DV), LuckyLeo\_17 (DV), Mima20\_17 (DV), MoiGyank\_20 (DV), NorManre\_19 (DV), NovaSharks\_17 (DV), OtterstedtS21\_18 (DV), ParvusTarda\_18 (DV), Patos\_19 (DV), Ranch\_18 (DV), RazorC\_16 (DV), Rukungu\_18 (DV), Rumi\_17 (DV), Sadboi\_18 (DV), Sampudon\_18 (DV), Stormer\_16 (DV), Tillicus\_18 (DV), Wojtek\_17 (DV), Xenia2\_18 (DV), Yikes\_19 (DV), Zany\_17 (DV),

Start 8:

- Found in 39 of 95 ( 41.1% ) of genes in pham
- No Manual Annotations of this start.
- Called 2.6% of time when present
- Phage (with cluster) where this start called: Rota\_17 (DV),

### Summary by clusters:

There are 9 clusters represented in this pham: DG2, H2, H1, GG, DG1, U, DV, D2, D1,

Info for manual annotations of cluster D1:

- Start number 4 was manually annotated 21 times for cluster D1.

Info for manual annotations of cluster D2:

- Start number 4 was manually annotated 1 time for cluster D2.

Info for manual annotations of cluster DG1:

- Start number 4 was manually annotated 8 times for cluster DG1.

Info for manual annotations of cluster DG2:

- Start number 4 was manually annotated 1 time for cluster DG2.

Info for manual annotations of cluster DV:

- Start number 5 was manually annotated 37 times for cluster DV.

Info for manual annotations of cluster GG:

- Start number 2 was manually annotated 2 times for cluster GG.

Info for manual annotations of cluster H1:

- Start number 3 was manually annotated 5 times for cluster H1.
- Start number 4 was manually annotated 4 times for cluster H1.

Info for manual annotations of cluster H2:

- Start number 4 was manually annotated 2 times for cluster H2.

Info for manual annotations of cluster U:

- Start number 4 was manually annotated 3 times for cluster U.

### **Gene Information:**

Gene: Adjutor\_19 Start: 12400, Stop: 12732, Start Num: 4

Candidate Starts for Adjutor\_19:

(Start: 4 @12400 has 40 MA's), (15, 12517), (17, 12538), (21, 12568), (25, 12619), (27, 12628), (31, 12694),

Gene: Alephilan\_16 Start: 12943, Stop: 13254, Start Num: 5

Candidate Starts for Alephilan\_16:

(Start: 5 @12943 has 37 MA's), (8, 12985), (14, 13048), (20, 13096), (23, 13129), (24, 13138),

Gene: Alyssamiracle\_17 Start: 11350, Stop: 11661, Start Num: 5

Candidate Starts for Alyssamiracle\_17:

(Start: 5 @11350 has 37 MA's), (8, 11392), (14, 11455), (20, 11503), (23, 11536), (24, 11545),

Gene: Apeppi\_16 Start: 13065, Stop: 13376, Start Num: 5

Candidate Starts for Apeppi\_16:

(Start: 5 @13065 has 37 MA's), (10, 13140), (14, 13170), (20, 13218), (23, 13251),

Gene: Astralis\_16 Start: 11350, Stop: 11661, Start Num: 5

Candidate Starts for Astralis\_16:

(Start: 5 @11350 has 37 MA's), (8, 11392), (14, 11455), (20, 11503), (23, 11536), (24, 11545),

Gene: Avian\_16 Start: 11350, Stop: 11661, Start Num: 5

Candidate Starts for Avian\_16:

(Start: 5 @11350 has 37 MA's), (8, 11392), (14, 11455), (20, 11503), (23, 11536), (24, 11545),

Gene: Barnyard\_23 Start: 13941, Stop: 14273, Start Num: 4

Candidate Starts for Barnyard\_23:

(Start: 4 @13941 has 40 MA's), (24, 14148), (26, 14169),

Gene: Beckerton\_17 Start: 12784, Stop: 13161, Start Num: 3

Candidate Starts for Beckerton\_17:

(Start: 3 @12784 has 5 MA's), (Start: 4 @12790 has 40 MA's), (12, 12895), (19, 12955), (26, 13021), (28, 13030), (35, 13132), (36, 13150),

Gene: Beyoncage\_13 Start: 8817, Stop: 9137, Start Num: 4

Candidate Starts for Beyoncage\_13:

(Start: 4 @8817 has 40 MA's), (13, 8919), (20, 8976), (21, 8982),

Gene: BigMama\_16 Start: 12476, Stop: 12808, Start Num: 4

Candidate Starts for BigMama\_16:

(Start: 4 @12476 has 40 MA's), (15, 12593), (17, 12614), (21, 12644), (25, 12695), (27, 12704), (31, 12770),

Gene: BirthdayBoy\_19 Start: 13796, Stop: 14107, Start Num: 5

Candidate Starts for BirthdayBoy\_19:

(Start: 5 @13796 has 37 MA's), (8, 13838), (14, 13901), (20, 13949), (23, 13982), (24, 13991),

Gene: BiteSize\_13 Start: 8817, Stop: 9137, Start Num: 4

Candidate Starts for BiteSize\_13:

(Start: 4 @8817 has 40 MA's), (13, 8919), (20, 8976), (21, 8982),

Gene: BobtimousPrime\_16 Start: 12704, Stop: 13081, Start Num: 3

Candidate Starts for BobtimousPrime\_16:

(Start: 3 @12704 has 5 MA's), (Start: 4 @12710 has 40 MA's), (12, 12815), (19, 12875), (26, 12941), (28, 12950), (35, 13052), (36, 13070),

Gene: Butterscotch\_18 Start: 12460, Stop: 12792, Start Num: 4

Candidate Starts for Butterscotch\_18:

(Start: 4 @12460 has 40 MA's), (15, 12577), (17, 12598), (21, 12628), (25, 12679), (27, 12688), (31, 12754),

Gene: Cborch11\_18 Start: 12247, Stop: 12624, Start Num: 3

Candidate Starts for Cborch11\_18:

(1, 12193), (Start: 3 @12247 has 5 MA's), (Start: 4 @12253 has 40 MA's), (12, 12358), (19, 12418), (26, 12484), (28, 12493), (35, 12595), (36, 12613),

Gene: Charminar\_16 Start: 11350, Stop: 11661, Start Num: 5

Candidate Starts for Charminar\_16:

(Start: 5 @11350 has 37 MA's), (8, 11392), (14, 11455), (20, 11503), (23, 11536), (24, 11545),

Gene: Chill\_19 Start: 12466, Stop: 12798, Start Num: 4

Candidate Starts for Chill\_19:

(Start: 4 @12466 has 40 MA's), (15, 12583), (17, 12604), (21, 12634), (25, 12685), (27, 12694), (31, 12760),

Gene: Damien\_17 Start: 12246, Stop: 12623, Start Num: 3

Candidate Starts for Damien\_17:

(Start: 3 @12246 has 5 MA's), (Start: 4 @12252 has 40 MA's), (12, 12357), (19, 12417), (26, 12483), (28, 12492), (35, 12594), (36, 12612),

Gene: DaviePasture\_18 Start: 13553, Stop: 13864, Start Num: 5

Candidate Starts for DaviePasture\_18:

(Start: 5 @13553 has 37 MA's), (8, 13595), (14, 13658), (20, 13706), (23, 13739), (24, 13748),

Gene: Delton\_18 Start: 12472, Stop: 12804, Start Num: 4

Candidate Starts for Delton\_18:

(Start: 4 @12472 has 40 MA's), (15, 12589), (17, 12610), (21, 12640), (25, 12691), (27, 12700), (31, 12766),

Gene: Demikore\_25 Start: 15499, Stop: 15828, Start Num: 4

Candidate Starts for Demikore\_25:

(Start: 4 @15499 has 40 MA's), (10, 15589), (11, 15592), (17, 15643), (18, 15658), (19, 15664), (29, 15769),

Gene: Djokovic\_13 Start: 8817, Stop: 9137, Start Num: 4

Candidate Starts for Djokovic\_13:

(Start: 4 @8817 has 40 MA's), (13, 8919), (20, 8976), (21, 8982),

Gene: DoobyDoo\_17 Start: 12730, Stop: 13041, Start Num: 5

Candidate Starts for DoobyDoo\_17:

(Start: 5 @12730 has 37 MA's), (8, 12772), (14, 12835), (20, 12883), (23, 12916), (24, 12925),

Gene: DrLupo\_25 Start: 14352, Stop: 14684, Start Num: 4

Candidate Starts for DrLupo\_25:

(Start: 4 @14352 has 40 MA's), (24, 14559), (26, 14580), (30, 14628), (34, 14679),

Gene: DumpTruck\_17 Start: 12984, Stop: 13295, Start Num: 5

Candidate Starts for DumpTruck\_17:

(Start: 5 @12984 has 37 MA's), (8, 13026), (10, 13059), (23, 13170), (25, 13194), (26, 13200), (33, 13284),

Gene: Erk16\_18 Start: 12463, Stop: 12795, Start Num: 4

Candidate Starts for Erk16\_18:

(Start: 4 @12463 has 40 MA's), (15, 12580), (17, 12601), (21, 12631), (25, 12682), (27, 12691), (31, 12757),

Gene: Erutan\_18 Start: 13243, Stop: 13554, Start Num: 5

Candidate Starts for Erutan\_18:

(Start: 5 @13243 has 37 MA's), (8, 13285), (14, 13348), (20, 13396), (23, 13429), (24, 13438),

Gene: Fulcrum\_19 Start: 13776, Stop: 14087, Start Num: 5

Candidate Starts for Fulcrum\_19:

(Start: 5 @13776 has 37 MA's), (8, 13818), (14, 13881), (20, 13929), (23, 13962), (24, 13971),

Gene: GOATification\_19 Start: 13776, Stop: 14087, Start Num: 5

Candidate Starts for GOATification\_19:

(Start: 5 @13776 has 37 MA's), (8, 13818), (14, 13881), (20, 13929), (23, 13962), (24, 13971),

Gene: Genamy16\_17 Start: 11350, Stop: 11661, Start Num: 5

Candidate Starts for Genamy16\_17:

(Start: 5 @11350 has 37 MA's), (8, 11392), (14, 11455), (20, 11503), (23, 11536), (24, 11545),

Gene: Gibbin\_19 Start: 13836, Stop: 14147, Start Num: 5

Candidate Starts for Gibbin\_19:

(Start: 5 @13836 has 37 MA's), (8, 13878), (14, 13941), (20, 13989), (23, 14022), (24, 14031),

Gene: Giuseppe\_18 Start: 12452, Stop: 12784, Start Num: 4

Candidate Starts for Giuseppe\_18:

(Start: 4 @12452 has 40 MA's), (15, 12569), (17, 12590), (21, 12620), (25, 12671), (27, 12680), (31, 12746),

Gene: Gretellyn\_18 Start: 14110, Stop: 14421, Start Num: 5

Candidate Starts for Gretellyn\_18:

(Start: 5 @14110 has 37 MA's), (8, 14152), (14, 14215), (20, 14263), (23, 14296), (24, 14305),

Gene: Gumball\_17 Start: 12410, Stop: 12742, Start Num: 4

Candidate Starts for Gumball\_17:

(Start: 4 @12410 has 40 MA's), (15, 12527), (17, 12548), (21, 12578), (25, 12629), (27, 12638), (31, 12704),

Gene: Hawkeye\_20 Start: 12347, Stop: 12667, Start Num: 4

Candidate Starts for Hawkeye\_20:

(Start: 4 @12347 has 40 MA's), (25, 12566),

Gene: Helpful\_19 Start: 12460, Stop: 12792, Start Num: 4

Candidate Starts for Helpful\_19:

(Start: 4 @12460 has 40 MA's), (15, 12577), (17, 12598), (21, 12628), (25, 12679), (27, 12688), (31, 12754),

Gene: Huwbert\_41 Start: 21622, Stop: 21954, Start Num: 2

Candidate Starts for Huwbert\_41:

(Start: 2 @21622 has 2 MA's), (6, 21658), (21, 21805), (26, 21862), (32, 21928),

Gene: Jalebi\_18 Start: 14286, Stop: 14597, Start Num: 5

Candidate Starts for Jalebi\_18:

(Start: 5 @14286 has 37 MA's), (8, 14328), (14, 14391), (20, 14439), (23, 14472), (24, 14481),

Gene: Jamemuya19\_16 Start: 11350, Stop: 11661, Start Num: 5

Candidate Starts for Jamemuya19\_16:

(Start: 5 @11350 has 37 MA's), (8, 11392), (14, 11455), (20, 11503), (23, 11536), (24, 11545),

Gene: KandZ\_18 Start: 12560, Stop: 12892, Start Num: 4

Candidate Starts for KandZ\_18:

(Start: 4 @12560 has 40 MA's), (15, 12677), (17, 12698), (21, 12728), (25, 12779), (27, 12788), (31, 12854),

Gene: Konstantine\_22 Start: 13448, Stop: 13825, Start Num: 3

Candidate Starts for Konstantine\_22:

(Start: 3 @13448 has 5 MA's), (Start: 4 @13454 has 40 MA's), (12, 13559), (19, 13619), (26, 13685), (28, 13694), (35, 13796), (36, 13814),

Gene: Labelle\_24 Start: 15501, Stop: 15830, Start Num: 4

Candidate Starts for Labelle\_24:

(Start: 4 @15501 has 40 MA's), (10, 15591), (11, 15594), (17, 15645), (18, 15660), (19, 15666), (29, 15771),

Gene: Lambo\_18 Start: 13780, Stop: 14091, Start Num: 5

Candidate Starts for Lambo\_18:

(Start: 5 @13780 has 37 MA's), (8, 13822), (14, 13885), (20, 13933), (23, 13966),

Gene: LavAbarElk\_16 Start: 12213, Stop: 12524, Start Num: 5

Candidate Starts for LavAbarElk\_16:

(Start: 5 @12213 has 37 MA's), (8, 12255), (14, 12318), (20, 12366), (23, 12399), (24, 12408),

Gene: Lila22\_18 Start: 13734, Stop: 14045, Start Num: 5

Candidate Starts for Lila22\_18:

(Start: 5 @13734 has 37 MA's), (8, 13776), (14, 13839), (20, 13887), (23, 13920), (24, 13929),

Gene: LilyPad\_14 Start: 9536, Stop: 9856, Start Num: 4

Candidate Starts for LilyPad\_14:

(Start: 4 @9536 has 40 MA's), (13, 9638), (14, 9647), (20, 9695),

Gene: LittleFella\_15 Start: 11437, Stop: 11757, Start Num: 4

Candidate Starts for LittleFella\_15:

(Start: 4 @11437 has 40 MA's), (13, 11539),

Gene: LuckyLeo\_17 Start: 13065, Stop: 13376, Start Num: 5

Candidate Starts for LuckyLeo\_17:

(Start: 5 @13065 has 37 MA's), (10, 13140), (14, 13170), (20, 13218), (23, 13251),

Gene: Madi\_13 Start: 8817, Stop: 9137, Start Num: 4

Candidate Starts for Madi\_13:

(Start: 4 @8817 has 40 MA's), (13, 8919), (20, 8976), (21, 8982),

Gene: Madruga\_23 Start: 15170, Stop: 15499, Start Num: 4

Candidate Starts for Madruga\_23:

(Start: 4 @15170 has 40 MA's), (10, 15260), (11, 15263), (17, 15314), (18, 15329), (19, 15335), (29, 15440),

Gene: Megatron06\_19 Start: 12787, Stop: 13158, Start Num: 4

Candidate Starts for Megatron06\_19:

(Start: 3 @12781 has 5 MA's), (Start: 4 @12787 has 40 MA's), (12, 12892), (19, 12952), (26, 13018), (28, 13027), (35, 13129), (36, 13147),

Gene: Mima20\_17 Start: 13463, Stop: 13774, Start Num: 5

Candidate Starts for Mima20\_17:

(Start: 5 @13463 has 37 MA's), (8, 13505), (14, 13568), (20, 13616), (23, 13649), (24, 13658),

Gene: MoiGyank\_20 Start: 14147, Stop: 14458, Start Num: 5

Candidate Starts for MoiGyank\_20:

(Start: 5 @14147 has 37 MA's), (8, 14189), (14, 14252), (20, 14300), (23, 14333), (24, 14342),

Gene: Mopey\_18 Start: 12460, Stop: 12792, Start Num: 4

Candidate Starts for Mopey\_18:

(Start: 4 @12460 has 40 MA's), (15, 12577), (17, 12598), (21, 12628), (25, 12679), (27, 12688), (31, 12754),

Gene: NorManre\_19 Start: 13342, Stop: 13653, Start Num: 5

Candidate Starts for NorManre\_19:

(Start: 5 @13342 has 37 MA's), (8, 13384), (14, 13447), (20, 13495), (23, 13528), (24, 13537),

Gene: Nova\_18 Start: 12887, Stop: 13219, Start Num: 4

Candidate Starts for Nova\_18:

(Start: 4 @12887 has 40 MA's), (15, 13004), (17, 13025), (21, 13055), (25, 13106), (27, 13115), (31, 13181),

Gene: NovaSharks\_17 Start: 11350, Stop: 11661, Start Num: 5

Candidate Starts for NovaSharks\_17:

(Start: 5 @11350 has 37 MA's), (8, 11392), (14, 11455), (20, 11503), (23, 11536), (24, 11545),

Gene: Oaker\_17 Start: 12511, Stop: 12882, Start Num: 4

Candidate Starts for Oaker\_17:

(Start: 3 @12505 has 5 MA's), (Start: 4 @12511 has 40 MA's), (12, 12616), (19, 12676), (26, 12742), (28, 12751), (35, 12853), (36, 12871),

Gene: OtterstedtS21\_18 Start: 13432, Stop: 13743, Start Num: 5

Candidate Starts for OtterstedtS21\_18:

(Start: 5 @13432 has 37 MA's), (8, 13474), (14, 13537), (20, 13585), (23, 13618), (24, 13627),

Gene: PBI1\_19 Start: 12391, Stop: 12723, Start Num: 4

Candidate Starts for PBI1\_19:

(Start: 4 @12391 has 40 MA's), (15, 12508), (17, 12529), (21, 12559), (25, 12610), (27, 12619), (31, 12685),

Gene: PLOT\_19 Start: 12463, Stop: 12795, Start Num: 4

Candidate Starts for PLOT\_19:

(Start: 4 @12463 has 40 MA's), (15, 12580), (17, 12601), (21, 12631), (25, 12682), (27, 12691), (31, 12757),

Gene: ParvusTarda\_18 Start: 12914, Stop: 13225, Start Num: 5

Candidate Starts for ParvusTarda\_18:

(Start: 5 @12914 has 37 MA's), (8, 12956), (14, 13019), (20, 13067), (23, 13100), (24, 13109),

Gene: Patience\_25 Start: 16060, Stop: 16389, Start Num: 4

Candidate Starts for Patience\_25:

(Start: 4 @16060 has 40 MA's), (10, 16150), (11, 16153), (17, 16204), (18, 16219), (19, 16225), (29, 16330),

Gene: Patos\_19 Start: 13342, Stop: 13653, Start Num: 5

Candidate Starts for Patos\_19:

(Start: 5 @13342 has 37 MA's), (8, 13384), (14, 13447), (20, 13495), (23, 13528), (24, 13537),

Gene: Penelope2018\_18 Start: 12460, Stop: 12792, Start Num: 4

Candidate Starts for Penelope2018\_18:

(Start: 4 @12460 has 40 MA's), (15, 12577), (17, 12598), (21, 12628), (25, 12679), (27, 12688), (31, 12754),

Gene: Phalaborwa\_18 Start: 12493, Stop: 12825, Start Num: 4

Candidate Starts for Phalaborwa\_18:

(Start: 4 @12493 has 40 MA's), (15, 12610), (17, 12631), (21, 12661), (25, 12712), (27, 12721), (31, 12787),

Gene: Phreeze\_17 Start: 12246, Stop: 12623, Start Num: 3

Candidate Starts for Phreeze\_17:

(Start: 3 @12246 has 5 MA's), (Start: 4 @12252 has 40 MA's), (12, 12357), (19, 12417), (26, 12483), (28, 12492), (35, 12594), (36, 12612),

Gene: Prager\_18 Start: 12472, Stop: 12804, Start Num: 4

Candidate Starts for Prager\_18:

(Start: 4 @12472 has 40 MA's), (15, 12589), (17, 12610), (21, 12640), (25, 12691), (27, 12700), (31, 12766),

Gene: Predator\_21 Start: 13774, Stop: 14148, Start Num: 4

Candidate Starts for Predator\_21:

(Start: 4 @13774 has 40 MA's), (9, 13840), (10, 13864), (12, 13879), (19, 13939), (26, 14005), (35, 14119),

Gene: Puissant\_16 Start: 12702, Stop: 13079, Start Num: 3

Candidate Starts for Puissant\_16:

(Start: 3 @12702 has 5 MA's), (Start: 4 @12708 has 40 MA's), (7, 12747), (10, 12798), (12, 12813), (16, 12834), (19, 12873), (26, 12939), (28, 12948), (35, 13050), (36, 13068),

Gene: Ranch\_18 Start: 12280, Stop: 12591, Start Num: 5

Candidate Starts for Ranch\_18:

(Start: 5 @12280 has 37 MA's), (8, 12322), (14, 12385), (20, 12433), (23, 12466), (24, 12475),

Gene: RazorC\_16 Start: 11350, Stop: 11661, Start Num: 5

Candidate Starts for RazorC\_16:

(Start: 5 @11350 has 37 MA's), (8, 11392), (14, 11455), (20, 11503), (23, 11536), (24, 11545),

Gene: Rota\_17 Start: 13280, Stop: 13549, Start Num: 8

Candidate Starts for Rota\_17:

(Start: 5 @13238 has 37 MA's), (8, 13280), (14, 13343), (20, 13391), (23, 13424), (24, 13433),

Gene: Rukungu\_18 Start: 13979, Stop: 14290, Start Num: 5

Candidate Starts for Rukungu\_18:

(Start: 5 @13979 has 37 MA's), (8, 14021), (14, 14084), (20, 14132), (23, 14165), (24, 14174),

Gene: Rumi\_17 Start: 11350, Stop: 11661, Start Num: 5

Candidate Starts for Rumi\_17:

(Start: 5 @11350 has 37 MA's), (8, 11392), (14, 11455), (20, 11503), (23, 11536), (24, 11545),

Gene: Sadboi\_18 Start: 14110, Stop: 14421, Start Num: 5

Candidate Starts for Sadboi\_18:

(Start: 5 @14110 has 37 MA's), (8, 14152), (14, 14215), (20, 14263), (23, 14296), (24, 14305),

Gene: Sampudon\_18 Start: 14286, Stop: 14597, Start Num: 5

Candidate Starts for Sampudon\_18:

(Start: 5 @14286 has 37 MA's), (8, 14328), (14, 14391), (20, 14439), (23, 14472), (24, 14481),

Gene: Sienna\_13 Start: 8817, Stop: 9137, Start Num: 4

Candidate Starts for Sienna\_13:

(Start: 4 @8817 has 40 MA's), (13, 8919), (20, 8976), (21, 8982),

Gene: SirHarley\_17 Start: 12392, Stop: 12724, Start Num: 4

Candidate Starts for SirHarley\_17:

(Start: 4 @12392 has 40 MA's), (15, 12509), (17, 12530), (21, 12560), (25, 12611), (27, 12620), (31, 12686),

Gene: Stormer\_16 Start: 11350, Stop: 11661, Start Num: 5

Candidate Starts for Stormer\_16:

(Start: 5 @11350 has 37 MA's), (8, 11392), (14, 11455), (20, 11503), (23, 11536), (24, 11545),

Gene: SuperSonics\_24 Start: 15227, Stop: 15556, Start Num: 4

Candidate Starts for SuperSonics\_24:

(Start: 4 @15227 has 40 MA's), (10, 15317), (11, 15320), (17, 15371), (18, 15386), (19, 15392), (29, 15497),

Gene: SuperheroCarly\_19 Start: 12322, Stop: 12654, Start Num: 4  
Candidate Starts for SuperheroCarly\_19:  
(Start: 4 @12322 has 40 MA's), (15, 12439), (17, 12460), (21, 12490), (25, 12541), (27, 12550), (31, 12616),

Gene: Suzy\_14 Start: 10045, Stop: 10365, Start Num: 4  
Candidate Starts for Suzy\_14:  
(Start: 4 @10045 has 40 MA's), (13, 10147), (20, 10204), (21, 10210), (22, 10228), (25, 10261),

Gene: Terapin\_13 Start: 8817, Stop: 9137, Start Num: 4  
Candidate Starts for Terapin\_13:  
(Start: 4 @8817 has 40 MA's), (13, 8919), (20, 8976), (21, 8982),

Gene: Thoth\_18 Start: 12457, Stop: 12789, Start Num: 4  
Candidate Starts for Thoth\_18:  
(Start: 4 @12457 has 40 MA's), (15, 12574), (17, 12595), (21, 12625), (25, 12676), (27, 12685), (31, 12751),

Gene: Thumb\_17 Start: 12253, Stop: 12624, Start Num: 4  
Candidate Starts for Thumb\_17:  
(Start: 3 @12247 has 5 MA's), (Start: 4 @12253 has 40 MA's), (12, 12358), (19, 12418), (26, 12484), (28, 12493), (35, 12595), (36, 12613),

Gene: Tillicus\_18 Start: 12659, Stop: 12970, Start Num: 5  
Candidate Starts for Tillicus\_18:  
(Start: 5 @12659 has 37 MA's), (14, 12764), (20, 12812), (23, 12845),

Gene: Triscuit\_40 Start: 21537, Stop: 21869, Start Num: 2  
Candidate Starts for Triscuit\_40:  
(Start: 2 @21537 has 2 MA's), (6, 21573), (21, 21720), (26, 21777), (32, 21843),

Gene: Troll4\_18 Start: 12461, Stop: 12793, Start Num: 4  
Candidate Starts for Troll4\_18:  
(Start: 4 @12461 has 40 MA's), (15, 12578), (17, 12599), (21, 12629), (25, 12680), (27, 12689), (31, 12755),

Gene: Visconti\_18 Start: 12470, Stop: 12802, Start Num: 4  
Candidate Starts for Visconti\_18:  
(Start: 4 @12470 has 40 MA's), (15, 12587), (17, 12608), (21, 12638), (25, 12689), (27, 12698), (31, 12764),

Gene: WaldoWhy\_19 Start: 12466, Stop: 12798, Start Num: 4  
Candidate Starts for WaldoWhy\_19:  
(Start: 4 @12466 has 40 MA's), (15, 12583), (17, 12604), (21, 12634), (25, 12685), (27, 12694), (31, 12760),

Gene: Wojtek\_17 Start: 12987, Stop: 13298, Start Num: 5  
Candidate Starts for Wojtek\_17:  
(Start: 5 @12987 has 37 MA's), (8, 13029), (14, 13092), (20, 13140), (23, 13173), (24, 13182),

Gene: Xenia2\_18 Start: 13026, Stop: 13337, Start Num: 5  
Candidate Starts for Xenia2\_18:

(Start: 5 @13026 has 37 MA's), (8, 13068), (10, 13101), (23, 13212), (25, 13236), (26, 13242), (33, 13326),

Gene: Yikes\_19 Start: 14371, Stop: 14682, Start Num: 5

Candidate Starts for Yikes\_19:

(Start: 5 @14371 has 37 MA's), (8, 14413), (14, 14476), (20, 14524), (23, 14557), (24, 14566),

Gene: Zany\_17 Start: 13500, Stop: 13811, Start Num: 5

Candidate Starts for Zany\_17:

(Start: 5 @13500 has 37 MA's), (8, 13542), (14, 13605), (20, 13653), (23, 13686), (24, 13695),