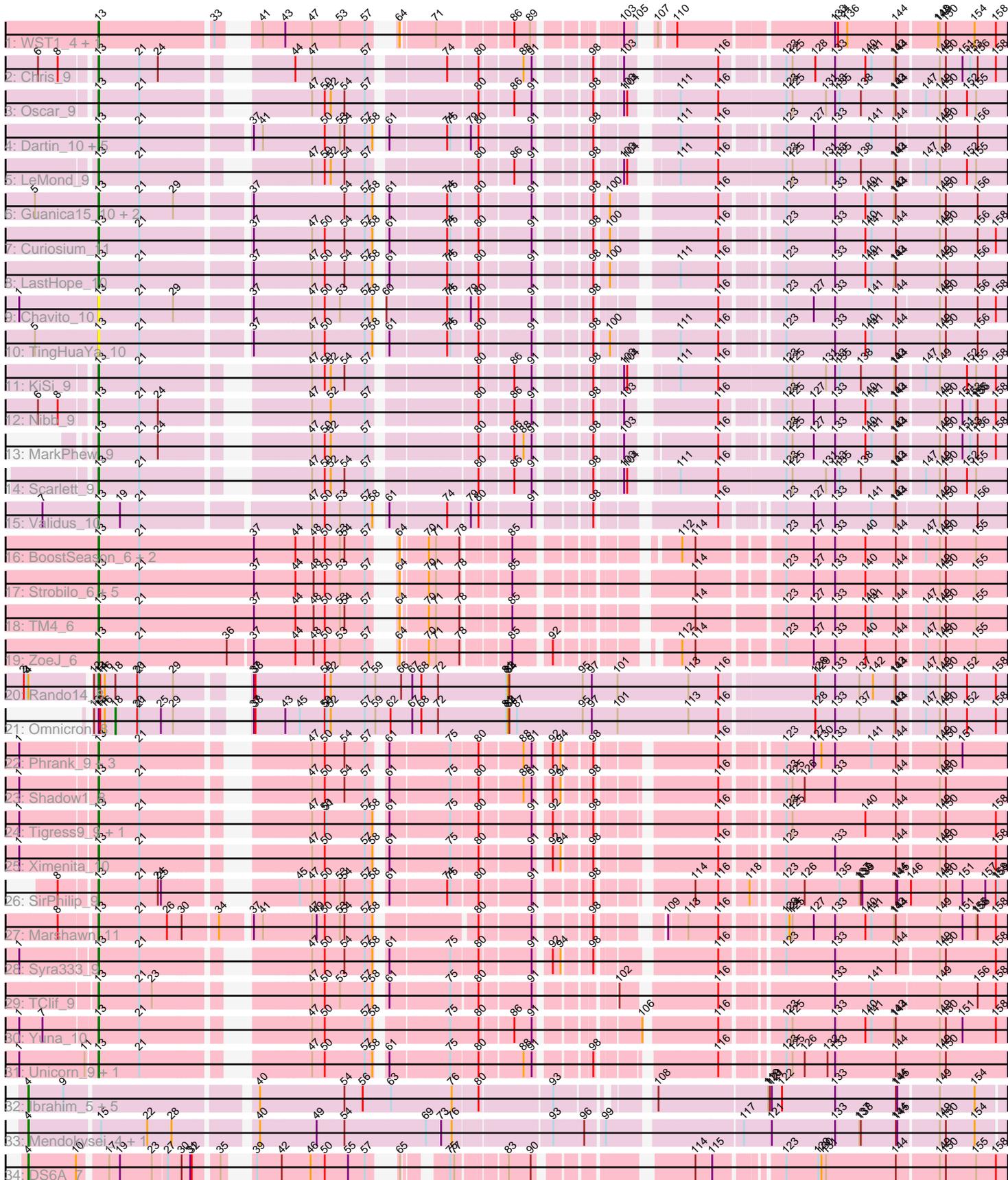


Pham 283829



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 283829 Report

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

Pham number 283829 has 60 members, 8 are drafts.

Phages represented in each track:

- Track 1 : WST1\_4, IdentityCrisis\_4
- Track 2 : Chris\_9
- Track 3 : Oscar\_9
- Track 4 : Dartin\_10, Niklas\_10, Shaobing\_10, Peanam\_10, Richo\_10, McMater\_10
- Track 5 : LeMond\_9
- Track 6 : Guanica15\_10, Yunkel11\_10, Efra2\_10
- Track 7 : Curiosium\_11
- Track 8 : LastHope\_10
- Track 9 : Chavito\_10
- Track 10 : TingHuaYa\_10
- Track 11 : KiSi\_9
- Track 12 : Nibb\_9
- Track 13 : MarkPhew\_9
- Track 14 : Scarlett\_9
- Track 15 : Validus\_10
- Track 16 : BoostSeason\_6, Doughnut\_6, Mufasa\_6
- Track 17 : Strobilo\_6, Milly\_6, DismalFunk\_6, Marcoliusprime\_6, DismalStressor\_6, Findley\_6
- Track 18 : TM4\_6
- Track 19 : ZoeJ\_6
- Track 20 : Rando14\_8
- Track 21 : Omnicron\_8
- Track 22 : Phrank\_9, Sunflower1121\_8, Bryler\_9, Cain\_9
- Track 23 : Shadow1\_8
- Track 24 : Tigress9\_9, Krueger\_9
- Track 25 : Ximenita\_10
- Track 26 : SirPhilip\_9
- Track 27 : Marshawn\_11
- Track 28 : Syra333\_9
- Track 29 : TClif\_9
- Track 30 : Yuna\_10
- Track 31 : Unicorn\_9, PhelpsODU\_9
- Track 32 : Ibrahim\_5, ZenTime222\_5, RonRayGun\_5, Bernal13\_5, Whitty\_5, Nairb\_5
- Track 33 : Mendokysei\_4, Nette\_5
- Track 34 : DS6A\_7

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

The start number called the most often in the published annotations is 13, it was called in 43 of the 52 non-draft genes in the pham.

Genes that call this "Most Annotated" start:

- BoostSeason\_6, Bryler\_9, Cain\_9, Chavito\_10, Chris\_9, Curiosium\_11, Dartin\_10, DismalFunk\_6, DismalStressor\_6, Doughnut\_6, Efra2\_10, Findley\_6, Guanica15\_10, IdentityCrisis\_4, KiSi\_9, Krueger\_9, LastHope\_10, LeMond\_9, Marcoliusprime\_6, MarkPhew\_9, Marshawn\_11, McMater\_10, Milly\_6, Mufasa\_6, Nibb\_9, Niklas\_10, Oscar\_9, Peanam\_10, PhelpsODU\_9, Phrank\_9, Rando14\_8, Richo\_10, Scarlett\_9, Shadow1\_8, Shaobing\_10, SirPhilip\_9, Strobilo\_6, Sunflower1121\_8, Syra333\_9, TClif\_9, TM4\_6, Tigress9\_9, TingHuaYa\_10, Unicorn\_9, Validus\_10, WST1\_4, Ximenita\_10, Yuna\_10, Yunkel11\_10, ZoeJ\_6,

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

- Omnicron\_8,

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

- Bernal13\_5, DS6A\_7, Ibrahim\_5, Mendokysei\_4, Nairb\_5, Nette\_5, RonRayGun\_5, Whitty\_5, ZenTime222\_5,

### **Summary by start number:**

Start 4:

- Found in 10 of 60 ( 16.7% ) of genes in pham
- Manual Annotations of this start: 8 of 52
- Called 90.0% of time when present
- Phage (with cluster) where this start called: Bernal13\_5 (T), DS6A\_7 (singleton), Ibrahim\_5 (T), Mendokysei\_4 (T), Nairb\_5 (T), Nette\_5 (T), RonRayGun\_5 (T), Whitty\_5 (T), ZenTime222\_5 (T),

Start 13:

- Found in 51 of 60 ( 85.0% ) of genes in pham
- Manual Annotations of this start: 43 of 52
- Called 98.0% of time when present
- Phage (with cluster) where this start called: BoostSeason\_6 (K2), Bryler\_9 (K6), Cain\_9 (K6), Chavito\_10 (K1), Chris\_9 (K1), Curiosium\_11 (K1), Dartin\_10 (K1), DismalFunk\_6 (K2), DismalStressor\_6 (K2), Doughnut\_6 (K2), Efra2\_10 (K1), Findley\_6 (K2), Guanica15\_10 (K1), IdentityCrisis\_4 (AJ), KiSi\_9 (K1), Krueger\_9 (K6), LastHope\_10 (K1), LeMond\_9 (K1), Marcoliusprime\_6 (K2), MarkPhew\_9 (K1), Marshawn\_11 (K6), McMater\_10 (K1), Milly\_6 (K2), Mufasa\_6 (K2), Nibb\_9 (K1), Niklas\_10 (K1), Oscar\_9 (K1), Peanam\_10 (K1), PhelpsODU\_9 (K6), Phrank\_9 (K6), Rando14\_8 (K5), Richo\_10 (K1), Scarlett\_9 (K1), Shadow1\_8 (K6), Shaobing\_10 (K1), SirPhilip\_9 (K6), Strobilo\_6 (K2), Sunflower1121\_8 (K6), Syra333\_9 (K6), TClif\_9 (K6), TM4\_6 (K2), Tigress9\_9 (K6), TingHuaYa\_10 (K1), Unicorn\_9 (K6), Validus\_10 (K1), WST1\_4 (AJ), Ximenita\_10 (K6), Yuna\_10 (K6), Yunkel11\_10 (K1), ZoeJ\_6 (K2),

Start 18:

- Found in 2 of 60 ( 3.3% ) of genes in pham
- Manual Annotations of this start: 1 of 52
- Called 50.0% of time when present
- Phage (with cluster) where this start called: Omnicron\_8 (K5),

### **Summary by clusters:**

There are 7 clusters represented in this pham: singleton, AJ, K2, K1, T, K5, K6,

Info for manual annotations of cluster AJ:

- Start number 13 was manually annotated 1 time for cluster AJ.

Info for manual annotations of cluster K1:

- Start number 13 was manually annotated 16 times for cluster K1.

Info for manual annotations of cluster K2:

- Start number 13 was manually annotated 11 times for cluster K2.

Info for manual annotations of cluster K5:

- Start number 13 was manually annotated 1 time for cluster K5.
- Start number 18 was manually annotated 1 time for cluster K5.

Info for manual annotations of cluster K6:

- Start number 13 was manually annotated 14 times for cluster K6.

Info for manual annotations of cluster T:

- Start number 4 was manually annotated 7 times for cluster T.

### **Gene Information:**

Gene: Bernal13\_5 Start: 4170, Stop: 5918, Start Num: 4

Candidate Starts for Bernal13\_5:

(Start: 4 @4170 has 8 MA's), (9, 4239), (40, 4575), (54, 4737), (56, 4773), (63, 4827), (76, 4944), (80, 4992), (93, 5127), (108, 5265), (119, 5469), (120, 5472), (121, 5475), (122, 5493), (133, 5598), (144, 5718), (145, 5721), (149, 5796), (154, 5862),

Gene: BoostSeason\_6 Start: 3571, Stop: 5079, Start Num: 13

Candidate Starts for BoostSeason\_6:

(Start: 13 @3571 has 43 MA's), (21, 3649), (37, 3871), (44, 3949), (48, 3985), (50, 4006), (53, 4033), (54, 4042), (57, 4081), (64, 4102), (70, 4147), (71, 4159), (78, 4198), (85, 4273), (112, 4498), (114, 4522), (123, 4663), (127, 4714), (133, 4756), (140, 4816), (144, 4876), (147, 4927), (149, 4954), (150, 4966), (155, 5023),

Gene: Bryler\_9 Start: 4458, Stop: 5957, Start Num: 13

Candidate Starts for Bryler\_9:

(1, 4317), (Start: 13 @4458 has 43 MA's), (21, 4536), (47, 4794), (50, 4818), (54, 4854), (57, 4893), (61, 4917), (75, 5022), (80, 5067), (88, 5136), (91, 5151), (92, 5175), (94, 5190), (98, 5232), (116, 5445), (123, 5541), (127, 5592), (130, 5607), (133, 5634), (141, 5706), (144, 5754), (149, 5832), (150, 5844), (151, 5874),

Gene: Cain\_9 Start: 4458, Stop: 5945, Start Num: 13

Candidate Starts for Cain\_9:

(1, 4317), (Start: 13 @4458 has 43 MA's), (21, 4536), (47, 4794), (50, 4818), (54, 4854), (57, 4893), (61, 4917), (75, 5022), (80, 5067), (88, 5136), (91, 5151), (92, 5175), (94, 5190), (98, 5232), (116, 5433), (123, 5529), (127, 5580), (130, 5595), (133, 5622), (141, 5694), (144, 5742), (149, 5820), (150, 5832), (151, 5862),

Gene: Chavito\_10 Start: 4613, Stop: 6124, Start Num: 13

Candidate Starts for Chavito\_10:

(1, 4466), (Start: 13 @4613 has 43 MA's), (21, 4691), (29, 4757), (37, 4880), (47, 4991), (50, 5015), (53, 5042), (57, 5090), (58, 5105), (60, 5108), (74, 5216), (75, 5222), (79, 5252), (80, 5264), (91, 5348), (98, 5429), (116, 5612), (123, 5708), (127, 5759), (133, 5801), (141, 5873), (144, 5921), (149, 5999), (150, 6011), (156, 6071), (158, 6101),

Gene: Chris\_9 Start: 4465, Stop: 5928, Start Num: 13

Candidate Starts for Chris\_9:

(6, 4372), (8, 4408), (Start: 13 @4465 has 43 MA's), (21, 4543), (24, 4579), (44, 4768), (47, 4801), (57, 4900), (74, 5026), (80, 5074), (88, 5143), (91, 5158), (98, 5239), (103, 5278), (116, 5416), (123, 5512), (125, 5524), (128, 5566), (133, 5605), (140, 5665), (141, 5677), (143, 5722), (144, 5725), (149, 5803), (150, 5815), (151, 5845), (153, 5860), (156, 5875), (158, 5905),

Gene: Curiosium\_11 Start: 4917, Stop: 6440, Start Num: 13

Candidate Starts for Curiosium\_11:

(Start: 13 @4917 has 43 MA's), (21, 4995), (37, 5184), (47, 5295), (50, 5319), (54, 5355), (57, 5394), (58, 5409), (61, 5418), (74, 5520), (75, 5526), (80, 5568), (91, 5652), (98, 5733), (100, 5751), (116, 5919), (123, 6015), (133, 6108), (140, 6168), (141, 6180), (144, 6228), (149, 6315), (150, 6327), (156, 6387), (158, 6417),

Gene: DS6A\_7 Start: 5169, Stop: 6722, Start Num: 4

Candidate Starts for DS6A\_7:

(Start: 4 @5169 has 8 MA's), (10, 5262), (17, 5310), (19, 5331), (23, 5391), (27, 5418), (30, 5442), (31, 5457), (32, 5460), (35, 5502), (39, 5523), (42, 5571), (46, 5628), (50, 5655), (55, 5697), (57, 5730), (65, 5751), (75, 5808), (77, 5814), (83, 5892), (90, 5934), (114, 6165), (115, 6198), (123, 6306), (129, 6366), (130, 6372), (131, 6381), (144, 6519), (149, 6597), (150, 6609), (155, 6666), (158, 6699),

Gene: Dartin\_10 Start: 4612, Stop: 6129, Start Num: 13

Candidate Starts for Dartin\_10:

(Start: 13 @4612 has 43 MA's), (21, 4690), (37, 4879), (41, 4897), (50, 5014), (53, 5041), (54, 5050), (57, 5089), (58, 5104), (61, 5113), (74, 5215), (75, 5221), (79, 5251), (80, 5263), (91, 5347), (98, 5428), (111, 5545), (116, 5617), (123, 5713), (127, 5764), (133, 5806), (141, 5878), (144, 5926), (149, 6004), (150, 6016), (156, 6076),

Gene: DismalFunk\_6 Start: 3574, Stop: 5094, Start Num: 13

Candidate Starts for DismalFunk\_6:

(Start: 13 @3574 has 43 MA's), (21, 3652), (37, 3874), (44, 3952), (48, 3988), (50, 4009), (53, 4036), (57, 4084), (64, 4105), (70, 4150), (71, 4162), (78, 4201), (85, 4276), (114, 4537), (123, 4678), (127, 4729), (133, 4771), (140, 4831), (144, 4891), (149, 4969), (150, 4981), (155, 5038),

Gene: DismalStressor\_6 Start: 3574, Stop: 5094, Start Num: 13

Candidate Starts for DismalStressor\_6:

(Start: 13 @3574 has 43 MA's), (21, 3652), (37, 3874), (44, 3952), (48, 3988), (50, 4009), (53, 4036), (57, 4084), (64, 4105), (70, 4150), (71, 4162), (78, 4201), (85, 4276), (114, 4537), (123, 4678), (127, 4729), (133, 4771), (140, 4831), (144, 4891), (149, 4969), (150, 4981), (155, 5038),

Gene: Doughnut\_6 Start: 3571, Stop: 5079, Start Num: 13

Candidate Starts for Doughnut\_6:

(Start: 13 @3571 has 43 MA's), (21, 3649), (37, 3871), (44, 3949), (48, 3985), (50, 4006), (53, 4033), (54, 4042), (57, 4081), (64, 4102), (70, 4147), (71, 4159), (78, 4198), (85, 4273), (112, 4498), (114, 4522), (123, 4663), (127, 4714), (133, 4756), (140, 4816), (144, 4876), (147, 4927), (149, 4954), (150, 4966), (155, 5023),

Gene: Efra2\_10 Start: 4520, Stop: 6043, Start Num: 13

Candidate Starts for Efra2\_10:

(5, 4400), (Start: 13 @4520 has 43 MA's), (21, 4598), (29, 4664), (37, 4787), (54, 4958), (57, 4997), (58, 5012), (61, 5021), (74, 5123), (75, 5129), (80, 5171), (91, 5255), (98, 5336), (100, 5354), (116, 5522), (123, 5618), (133, 5711), (140, 5771), (141, 5783), (143, 5828), (144, 5831), (149, 5918), (150, 5930), (156, 5990),

Gene: Findley\_6 Start: 3574, Stop: 5094, Start Num: 13

Candidate Starts for Findley\_6:

(Start: 13 @3574 has 43 MA's), (21, 3652), (37, 3874), (44, 3952), (48, 3988), (50, 4009), (53, 4036), (57, 4084), (64, 4105), (70, 4150), (71, 4162), (78, 4201), (85, 4276), (114, 4537), (123, 4678), (127, 4729), (133, 4771), (140, 4831), (144, 4891), (149, 4969), (150, 4981), (155, 5038),

Gene: Guanica15\_10 Start: 4536, Stop: 6059, Start Num: 13

Candidate Starts for Guanica15\_10:

(5, 4416), (Start: 13 @4536 has 43 MA's), (21, 4614), (29, 4680), (37, 4803), (54, 4974), (57, 5013), (58, 5028), (61, 5037), (74, 5139), (75, 5145), (80, 5187), (91, 5271), (98, 5352), (100, 5370), (116, 5538), (123, 5634), (133, 5727), (140, 5787), (141, 5799), (143, 5844), (144, 5847), (149, 5934), (150, 5946), (156, 6006),

Gene: Ibrahim\_5 Start: 4170, Stop: 5918, Start Num: 4

Candidate Starts for Ibrahim\_5:

(Start: 4 @4170 has 8 MA's), (9, 4239), (40, 4575), (54, 4737), (56, 4773), (63, 4827), (76, 4944), (80, 4992), (93, 5127), (108, 5265), (119, 5469), (120, 5472), (121, 5475), (122, 5493), (133, 5598), (144, 5718), (145, 5721), (149, 5796), (154, 5862),

Gene: IdentityCrisis\_4 Start: 3597, Stop: 5054, Start Num: 13

Candidate Starts for IdentityCrisis\_4:

(Start: 13 @3597 has 43 MA's), (33, 3804), (41, 3846), (43, 3888), (47, 3939), (53, 3990), (57, 4038), (64, 4059), (71, 4116), (86, 4230), (89, 4260), (103, 4386), (105, 4410), (107, 4419), (110, 4443), (133, 4722), (134, 4728), (136, 4746), (144, 4842), (148, 4917), (149, 4920), (150, 4932), (154, 4989), (158, 5031),

Gene: KiSi\_9 Start: 4421, Stop: 5917, Start Num: 13

Candidate Starts for KiSi\_9:

(Start: 13 @4421 has 43 MA's), (21, 4499), (47, 4757), (50, 4781), (52, 4793), (54, 4817), (57, 4856), (80, 5030), (86, 5081), (91, 5114), (98, 5195), (103, 5234), (104, 5240), (111, 5300), (116, 5372), (123, 5501), (125, 5513), (131, 5576), (133, 5594), (135, 5603), (138, 5645), (143, 5711), (144, 5714), (147, 5765), (149, 5792), (152, 5843), (155, 5861), (158, 5894),

Gene: Krueger\_9 Start: 4465, Stop: 5934, Start Num: 13

Candidate Starts for Krueger\_9:

(1, 4324), (Start: 13 @4465 has 43 MA's), (21, 4543), (47, 4801), (50, 4825), (51, 4828), (57, 4900), (58, 4915), (61, 4924), (75, 5029), (80, 5074), (91, 5158), (92, 5182), (98, 5239), (116, 5422), (123, 5518), (125, 5530), (140, 5671), (144, 5731), (149, 5809), (150, 5821), (158, 5911),

Gene: LastHope\_10 Start: 4563, Stop: 6086, Start Num: 13

Candidate Starts for LastHope\_10:

(Start: 13 @4563 has 43 MA's), (21, 4641), (37, 4830), (47, 4941), (50, 4965), (54, 5001), (57, 5040), (58, 5055), (61, 5064), (74, 5166), (75, 5172), (80, 5214), (91, 5298), (98, 5379), (100, 5397), (111, 5493), (116, 5565), (123, 5661), (133, 5754), (140, 5814), (141, 5826), (143, 5871), (144, 5874), (149, 5961), (150, 5973), (156, 6033),

Gene: LeMond\_9 Start: 4421, Stop: 5917, Start Num: 13

Candidate Starts for LeMond\_9:

(Start: 13 @4421 has 43 MA's), (21, 4499), (47, 4757), (50, 4781), (52, 4793), (54, 4817), (57, 4856), (80, 5030), (86, 5081), (91, 5114), (98, 5195), (103, 5234), (104, 5240), (111, 5300), (116, 5372), (123, 5501), (125, 5513), (131, 5576), (133, 5594), (135, 5603), (138, 5645), (143, 5711), (144, 5714), (147, 5765), (149, 5792), (152, 5843), (155, 5861),

Gene: Marcoliusprime\_6 Start: 3574, Stop: 5094, Start Num: 13

Candidate Starts for Marcoliusprime\_6:

(Start: 13 @3574 has 43 MA's), (21, 3652), (37, 3874), (44, 3952), (48, 3988), (50, 4009), (53, 4036), (57, 4084), (64, 4105), (70, 4150), (71, 4162), (78, 4201), (85, 4276), (114, 4537), (123, 4678), (127, 4729), (133, 4771), (140, 4831), (144, 4891), (149, 4969), (150, 4981), (155, 5038),

Gene: MarkPhew\_9 Start: 4375, Stop: 5835, Start Num: 13

Candidate Starts for MarkPhew\_9:

(Start: 13 @4375 has 43 MA's), (21, 4453), (24, 4489), (47, 4711), (50, 4735), (52, 4747), (57, 4810), (80, 4984), (86, 5035), (88, 5053), (91, 5068), (98, 5149), (103, 5188), (116, 5323), (123, 5419), (125, 5431), (127, 5470), (133, 5512), (140, 5572), (141, 5584), (143, 5629), (144, 5632), (149, 5710), (150, 5722), (151, 5752), (153, 5767), (156, 5782), (158, 5812),

Gene: Marshawn\_11 Start: 4973, Stop: 6472, Start Num: 13

Candidate Starts for Marshawn\_11:

(8, 4910), (Start: 13 @4973 has 43 MA's), (21, 5051), (26, 5105), (30, 5132), (34, 5195), (37, 5246), (41, 5264), (47, 5357), (49, 5366), (50, 5381), (53, 5408), (54, 5417), (57, 5456), (58, 5471), (80, 5621), (91, 5705), (98, 5786), (109, 5870), (113, 5903), (116, 5960), (123, 6056), (124, 6062), (125, 6068), (127, 6107), (133, 6149), (140, 6209), (141, 6221), (143, 6266), (144, 6269), (149, 6347), (151, 6389), (155, 6416), (156, 6419), (158, 6449),

Gene: McMater\_10 Start: 4612, Stop: 6129, Start Num: 13

Candidate Starts for McMater\_10:

(Start: 13 @4612 has 43 MA's), (21, 4690), (37, 4879), (41, 4897), (50, 5014), (53, 5041), (54, 5050), (57, 5089), (58, 5104), (61, 5113), (74, 5215), (75, 5221), (79, 5251), (80, 5263), (91, 5347), (98, 5428), (111, 5545), (116, 5617), (123, 5713), (127, 5764), (133, 5806), (141, 5878), (144, 5926), (149, 6004), (150, 6016), (156, 6076),

Gene: Mendokysei\_4 Start: 4077, Stop: 5855, Start Num: 4

Candidate Starts for Mendokysei\_4:

(Start: 4 @4077 has 8 MA's), (15, 4209), (22, 4296), (28, 4344), (40, 4482), (49, 4590), (54, 4644), (69, 4803), (73, 4830), (76, 4851), (93, 5034), (96, 5091), (99, 5121), (117, 5358), (121, 5412), (133, 5535), (137, 5583), (138, 5586), (144, 5655), (145, 5658), (149, 5733), (150, 5745), (154, 5799),

Gene: Milly\_6 Start: 3574, Stop: 5094, Start Num: 13

Candidate Starts for Milly\_6:

(Start: 13 @3574 has 43 MA's), (21, 3652), (37, 3874), (44, 3952), (48, 3988), (50, 4009), (53, 4036), (57, 4084), (64, 4105), (70, 4150), (71, 4162), (78, 4201), (85, 4276), (114, 4537), (123, 4678), (127, 4729), (133, 4771), (140, 4831), (144, 4891), (149, 4969), (150, 4981), (155, 5038),

Gene: Mufasa\_6 Start: 3571, Stop: 5079, Start Num: 13

Candidate Starts for Mufasa\_6:

(Start: 13 @3571 has 43 MA's), (21, 3649), (37, 3871), (44, 3949), (48, 3985), (50, 4006), (53, 4033), (54, 4042), (57, 4081), (64, 4102), (70, 4147), (71, 4159), (78, 4198), (85, 4273), (112, 4498), (114, 4522), (123, 4663), (127, 4714), (133, 4756), (140, 4816), (144, 4876), (147, 4927), (149, 4954), (150, 4966), (155, 5023),

Gene: Nairb\_5 Start: 4170, Stop: 5918, Start Num: 4

Candidate Starts for Nairb\_5:

(Start: 4 @4170 has 8 MA's), (9, 4239), (40, 4575), (54, 4737), (56, 4773), (63, 4827), (76, 4944), (80, 4992), (93, 5127), (108, 5265), (119, 5469), (120, 5472), (121, 5475), (122, 5493), (133, 5598), (144, 5718), (145, 5721), (149, 5796), (154, 5862),

Gene: Nette\_5 Start: 4077, Stop: 5855, Start Num: 4

Candidate Starts for Nette\_5:

(Start: 4 @4077 has 8 MA's), (15, 4209), (22, 4296), (28, 4344), (40, 4482), (49, 4590), (54, 4644), (69, 4803), (73, 4830), (76, 4851), (93, 5034), (96, 5091), (99, 5121), (117, 5358), (121, 5412), (133, 5535), (137, 5583), (138, 5586), (144, 5655), (145, 5658), (149, 5733), (150, 5745), (154, 5799),

Gene: Nibb\_9 Start: 4506, Stop: 5972, Start Num: 13

Candidate Starts for Nibb\_9:

(6, 4416), (8, 4452), (Start: 13 @4506 has 43 MA's), (21, 4584), (24, 4620), (47, 4842), (52, 4878), (57, 4941), (80, 5115), (86, 5166), (91, 5199), (98, 5280), (103, 5319), (116, 5460), (123, 5556), (125, 5568), (127, 5607), (133, 5649), (140, 5709), (141, 5721), (143, 5766), (144, 5769), (149, 5847), (150, 5859), (151, 5889), (153, 5904), (155, 5916), (156, 5919), (158, 5949),

Gene: Niklas\_10 Start: 4612, Stop: 6129, Start Num: 13

Candidate Starts for Niklas\_10:

(Start: 13 @4612 has 43 MA's), (21, 4690), (37, 4879), (41, 4897), (50, 5014), (53, 5041), (54, 5050), (57, 5089), (58, 5104), (61, 5113), (74, 5215), (75, 5221), (79, 5251), (80, 5263), (91, 5347), (98, 5428), (111, 5545), (116, 5617), (123, 5713), (127, 5764), (133, 5806), (141, 5878), (144, 5926), (149, 6004), (150, 6016), (156, 6076),

Gene: Omnicron\_8 Start: 4366, Stop: 5994, Start Num: 18

Candidate Starts for Omnicron\_8:

(12, 4324), (Start: 13 @4333 has 43 MA's), (14, 4336), (16, 4345), (Start: 18 @4366 has 1 MA's), (20, 4408), (21, 4411), (25, 4453), (29, 4477), (37, 4564), (38, 4567), (43, 4624), (45, 4651), (50, 4699), (51, 4702), (52, 4711), (57, 4777), (59, 4798), (62, 4828), (67, 4870), (68, 4888), (72, 4921), (81, 5050), (82, 5053), (84, 5056), (87, 5071), (95, 5200), (97, 5218), (101, 5266), (113, 5404), (116, 5461), (128, 5632), (133, 5671), (137, 5719), (143, 5788), (144, 5791), (147, 5842), (149, 5869), (150, 5881), (152, 5920), (158, 5971),

Gene: Oscar\_9 Start: 4422, Stop: 5918, Start Num: 13

Candidate Starts for Oscar\_9:

(Start: 13 @4422 has 43 MA's), (21, 4500), (47, 4758), (50, 4782), (52, 4794), (54, 4818), (57, 4857), (80, 5031), (86, 5082), (91, 5115), (98, 5196), (103, 5235), (104, 5241), (111, 5301), (116, 5373), (123, 5502), (125, 5514), (131, 5577), (133, 5595), (135, 5604), (138, 5646), (143, 5712), (144, 5715), (147, 5766), (149, 5793), (150, 5805), (152, 5844), (155, 5862),

Gene: Peanam\_10 Start: 4612, Stop: 6129, Start Num: 13

Candidate Starts for Peanam\_10:

(Start: 13 @4612 has 43 MA's), (21, 4690), (37, 4879), (41, 4897), (50, 5014), (53, 5041), (54, 5050), (57, 5089), (58, 5104), (61, 5113), (74, 5215), (75, 5221), (79, 5251), (80, 5263), (91, 5347), (98, 5428), (111, 5545), (116, 5617), (123, 5713), (127, 5764), (133, 5806), (141, 5878), (144, 5926), (149, 6004), (150, 6016), (156, 6076),

Gene: PhelpsODU\_9 Start: 4501, Stop: 5985, Start Num: 13

Candidate Starts for PhelpsODU\_9:

(1, 4357), (11, 4480), (Start: 13 @4501 has 43 MA's), (21, 4579), (47, 4837), (50, 4861), (57, 4936), (58, 4951), (61, 4960), (75, 5065), (80, 5110), (88, 5179), (91, 5194), (98, 5275), (116, 5464), (123, 5560), (125, 5572), (126, 5593), (132, 5638), (133, 5653), (144, 5773), (149, 5860), (150, 5872),

Gene: Phrank\_9 Start: 4464, Stop: 5945, Start Num: 13

Candidate Starts for Phrank\_9:

(1, 4323), (Start: 13 @4464 has 43 MA's), (21, 4542), (47, 4800), (50, 4824), (54, 4860), (57, 4899), (61, 4923), (75, 5028), (80, 5073), (88, 5142), (91, 5157), (92, 5181), (94, 5196), (98, 5238), (116, 5433), (123, 5529), (127, 5580), (130, 5595), (133, 5622), (141, 5694), (144, 5742), (149, 5820), (150, 5832), (151, 5862),

Gene: Rando14\_8 Start: 4362, Stop: 6023, Start Num: 13

Candidate Starts for Rando14\_8:

(2, 4236), (3, 4242), (Start: 4 @4245 has 8 MA's), (12, 4353), (Start: 13 @4362 has 43 MA's), (14, 4365), (16, 4374), (Start: 18 @4395 has 1 MA's), (20, 4437), (21, 4440), (29, 4506), (37, 4593), (38, 4596), (50, 4728), (52, 4740), (57, 4806), (59, 4827), (66, 4878), (67, 4899), (68, 4917), (72, 4950), (81, 5079), (82, 5082), (84, 5085), (95, 5229), (97, 5247), (101, 5295), (113, 5433), (116, 5490), (128, 5661), (129, 5667), (133, 5700), (137, 5748), (142, 5775), (143, 5817), (144, 5820), (147, 5871), (149, 5898), (150, 5910), (152, 5949), (158, 6000),

Gene: Richo\_10 Start: 4612, Stop: 6129, Start Num: 13

Candidate Starts for Richo\_10:

(Start: 13 @4612 has 43 MA's), (21, 4690), (37, 4879), (41, 4897), (50, 5014), (53, 5041), (54, 5050), (57, 5089), (58, 5104), (61, 5113), (74, 5215), (75, 5221), (79, 5251), (80, 5263), (91, 5347), (98, 5428), (111, 5545), (116, 5617), (123, 5713), (127, 5764), (133, 5806), (141, 5878), (144, 5926), (149, 6004), (150, 6016), (156, 6076),

Gene: RonRayGun\_5 Start: 4170, Stop: 5918, Start Num: 4

Candidate Starts for RonRayGun\_5:

(Start: 4 @4170 has 8 MA's), (9, 4239), (40, 4575), (54, 4737), (56, 4773), (63, 4827), (76, 4944), (80, 4992), (93, 5127), (108, 5265), (119, 5469), (120, 5472), (121, 5475), (122, 5493), (133, 5598), (144, 5718), (145, 5721), (149, 5796), (154, 5862),

Gene: Scarlett\_9 Start: 4421, Stop: 5917, Start Num: 13

Candidate Starts for Scarlett\_9:

(Start: 13 @4421 has 43 MA's), (21, 4499), (47, 4757), (50, 4781), (52, 4793), (54, 4817), (57, 4856), (80, 5030), (86, 5081), (91, 5114), (98, 5195), (103, 5234), (104, 5240), (111, 5300), (116, 5372), (123, 5501), (125, 5513), (131, 5576), (133, 5594), (135, 5603), (138, 5645), (143, 5711), (144, 5714), (147, 5765), (149, 5792), (150, 5804), (152, 5843), (155, 5861),

Gene: Shadow1\_8 Start: 4372, Stop: 5856, Start Num: 13

Candidate Starts for Shadow1\_8:

(1, 4231), (Start: 13 @4372 has 43 MA's), (21, 4450), (47, 4708), (50, 4732), (54, 4768), (57, 4807), (61, 4831), (75, 4936), (80, 4981), (88, 5050), (91, 5065), (92, 5089), (94, 5104), (98, 5146), (116, 5335), (123, 5431), (125, 5443), (126, 5464), (133, 5524), (144, 5644), (149, 5731), (150, 5743),

Gene: Shaobing\_10 Start: 4612, Stop: 6129, Start Num: 13

Candidate Starts for Shaobing\_10:

(Start: 13 @4612 has 43 MA's), (21, 4690), (37, 4879), (41, 4897), (50, 5014), (53, 5041), (54, 5050), (57, 5089), (58, 5104), (61, 5113), (74, 5215), (75, 5221), (79, 5251), (80, 5263), (91, 5347), (98, 5428), (111, 5545), (116, 5617), (123, 5713), (127, 5764), (133, 5806), (141, 5878), (144, 5926), (149, 6004), (150, 6016), (156, 6076),

Gene: SirPhilip\_9 Start: 4316, Stop: 5803, Start Num: 13

Candidate Starts for SirPhilip\_9:

(8, 4253), (Start: 13 @4316 has 43 MA's), (21, 4394), (24, 4430), (25, 4436), (45, 4628), (47, 4652), (50, 4676), (53, 4703), (54, 4712), (57, 4751), (58, 4766), (61, 4775), (74, 4877), (75, 4883), (80, 4925), (91, 5009), (98, 5090), (114, 5228), (116, 5273), (118, 5321), (123, 5369), (126, 5405), (135, 5474), (137, 5513), (138, 5516), (139, 5519), (144, 5585), (145, 5588), (146, 5615), (149, 5672), (150, 5684), (151, 5714), (157, 5759), (158, 5780), (159, 5783),

Gene: Strobilo\_6 Start: 3574, Stop: 5094, Start Num: 13

Candidate Starts for Strobilo\_6:

(Start: 13 @3574 has 43 MA's), (21, 3652), (37, 3874), (44, 3952), (48, 3988), (50, 4009), (53, 4036), (57, 4084), (64, 4105), (70, 4150), (71, 4162), (78, 4201), (85, 4276), (114, 4537), (123, 4678), (127, 4729), (133, 4771), (140, 4831), (144, 4891), (149, 4969), (150, 4981), (155, 5038),

Gene: Sunflower1121\_8 Start: 4371, Stop: 5858, Start Num: 13

Candidate Starts for Sunflower1121\_8:

(1, 4230), (Start: 13 @4371 has 43 MA's), (21, 4449), (47, 4707), (50, 4731), (54, 4767), (57, 4806), (61, 4830), (75, 4935), (80, 4980), (88, 5049), (91, 5064), (92, 5088), (94, 5103), (98, 5145), (116, 5346), (123, 5442), (127, 5493), (130, 5508), (133, 5535), (141, 5607), (144, 5655), (149, 5733), (150, 5745), (151, 5775),

Gene: Syra333\_9 Start: 4473, Stop: 5954, Start Num: 13

Candidate Starts for Syra333\_9:

(1, 4332), (Start: 13 @4473 has 43 MA's), (21, 4551), (47, 4809), (50, 4833), (54, 4869), (57, 4908), (58, 4923), (61, 4932), (75, 5037), (80, 5082), (91, 5166), (92, 5190), (94, 5205), (98, 5247), (116, 5442), (123, 5538), (133, 5631), (144, 5751), (149, 5829), (150, 5841), (158, 5931),

Gene: TClif\_9 Start: 4411, Stop: 5886, Start Num: 13

Candidate Starts for TClif\_9:

(Start: 13 @4411 has 43 MA's), (21, 4489), (23, 4513), (47, 4747), (50, 4771), (53, 4798), (57, 4846), (58, 4861), (61, 4870), (75, 4978), (80, 5020), (91, 5104), (102, 5215), (116, 5374), (133, 5563), (141, 5635), (149, 5761), (156, 5833), (158, 5863),

Gene: TM4\_6 Start: 3587, Stop: 5116, Start Num: 13

Candidate Starts for TM4\_6:

(Start: 13 @3587 has 43 MA's), (21, 3665), (37, 3887), (44, 3965), (48, 4001), (50, 4022), (53, 4049), (54, 4058), (57, 4097), (64, 4118), (70, 4163), (71, 4175), (78, 4214), (85, 4289), (114, 4550), (123, 4700), (127, 4751), (133, 4793), (140, 4853), (141, 4865), (144, 4913), (147, 4964), (149, 4991), (150, 5003), (155, 5060),

Gene: Tigress9\_9 Start: 4465, Stop: 5934, Start Num: 13

Candidate Starts for Tigress9\_9:

(1, 4324), (Start: 13 @4465 has 43 MA's), (21, 4543), (47, 4801), (50, 4825), (51, 4828), (57, 4900), (58, 4915), (61, 4924), (75, 5029), (80, 5074), (91, 5158), (92, 5182), (98, 5239), (116, 5422), (123, 5518), (125, 5530), (140, 5671), (144, 5731), (149, 5809), (150, 5821), (158, 5911),

Gene: TingHuaYa\_10 Start: 4567, Stop: 6090, Start Num: 13

Candidate Starts for TingHuaYa\_10:

(5, 4450), (Start: 13 @4567 has 43 MA's), (21, 4645), (37, 4834), (47, 4945), (50, 4969), (57, 5044), (58, 5059), (61, 5068), (74, 5170), (75, 5176), (80, 5218), (91, 5302), (98, 5383), (100, 5401), (111, 5497), (116, 5569), (123, 5665), (133, 5758), (140, 5818), (141, 5830), (144, 5878), (149, 5965), (150, 5977), (156, 6037),

Gene: Unicorn\_9 Start: 4501, Stop: 5985, Start Num: 13

Candidate Starts for Unicorn\_9:

(1, 4357), (11, 4480), (Start: 13 @4501 has 43 MA's), (21, 4579), (47, 4837), (50, 4861), (57, 4936), (58, 4951), (61, 4960), (75, 5065), (80, 5110), (88, 5179), (91, 5194), (98, 5275), (116, 5464), (123, 5560), (125, 5572), (126, 5593), (132, 5638), (133, 5653), (144, 5773), (149, 5860), (150, 5872),

Gene: Validus\_10 Start: 4528, Stop: 6045, Start Num: 13

Candidate Starts for Validus\_10:

(7, 4426), (Start: 13 @4528 has 43 MA's), (19, 4570), (21, 4606), (47, 4906), (50, 4930), (53, 4957), (57, 5005), (58, 5020), (61, 5029), (74, 5131), (79, 5167), (80, 5179), (91, 5263), (98, 5344), (116, 5533), (123, 5629), (127, 5680), (133, 5722), (141, 5794), (143, 5839), (144, 5842), (149, 5920), (150, 5932), (156, 5992),

Gene: WST1\_4 Start: 3597, Stop: 5054, Start Num: 13

Candidate Starts for WST1\_4:

(Start: 13 @3597 has 43 MA's), (33, 3804), (41, 3846), (43, 3888), (47, 3939), (53, 3990), (57, 4038), (64, 4059), (71, 4116), (86, 4230), (89, 4260), (103, 4386), (105, 4410), (107, 4419), (110, 4443), (133, 4722), (134, 4728), (136, 4746), (144, 4842), (148, 4917), (149, 4920), (150, 4932), (154, 4989), (158, 5031),

Gene: Whitty\_5 Start: 4170, Stop: 5918, Start Num: 4

Candidate Starts for Whitty\_5:

(Start: 4 @4170 has 8 MA's), (9, 4239), (40, 4575), (54, 4737), (56, 4773), (63, 4827), (76, 4944), (80, 4992), (93, 5127), (108, 5265), (119, 5469), (120, 5472), (121, 5475), (122, 5493), (133, 5598), (144, 5718), (145, 5721), (149, 5796), (154, 5862),

Gene: Ximenita\_10 Start: 4640, Stop: 6121, Start Num: 13

Candidate Starts for Ximenita\_10:

(1, 4499), (Start: 13 @4640 has 43 MA's), (21, 4718), (47, 4976), (50, 5000), (57, 5075), (58, 5090), (61, 5099), (75, 5204), (80, 5249), (91, 5333), (92, 5357), (94, 5372), (98, 5414), (116, 5609), (123, 5705), (133, 5798), (144, 5918), (149, 5996), (150, 6008), (158, 6098),

Gene: Yuna\_10 Start: 4624, Stop: 6123, Start Num: 13

Candidate Starts for Yuna\_10:

(1, 4480), (7, 4525), (Start: 13 @4624 has 43 MA's), (21, 4702), (47, 4960), (50, 4984), (57, 5059), (58, 5074), (75, 5188), (80, 5236), (86, 5287), (91, 5320), (106, 5476), (116, 5602), (123, 5698), (125, 5710), (133, 5791), (140, 5851), (141, 5863), (143, 5908), (144, 5911), (149, 5998), (150, 6010), (151, 6040), (158, 6100),

Gene: Yunkel11\_10 Start: 4536, Stop: 6059, Start Num: 13

Candidate Starts for Yunkel11\_10:

(5, 4416), (Start: 13 @4536 has 43 MA's), (21, 4614), (29, 4680), (37, 4803), (54, 4974), (57, 5013), (58, 5028), (61, 5037), (74, 5139), (75, 5145), (80, 5187), (91, 5271), (98, 5352), (100, 5370), (116, 5538), (123, 5634), (133, 5727), (140, 5787), (141, 5799), (143, 5844), (144, 5847), (149, 5934), (150, 5946), (156, 6006),

Gene: ZenTime222\_5 Start: 4170, Stop: 5918, Start Num: 4

Candidate Starts for ZenTime222\_5:

(Start: 4 @4170 has 8 MA's), (9, 4239), (40, 4575), (54, 4737), (56, 4773), (63, 4827), (76, 4944), (80, 4992), (93, 5127), (108, 5265), (119, 5469), (120, 5472), (121, 5475), (122, 5493), (133, 5598), (144, 5718), (145, 5721), (149, 5796), (154, 5862),

Gene: ZoeJ\_6 Start: 3565, Stop: 5052, Start Num: 13

Candidate Starts for ZoeJ\_6:

(Start: 13 @3565 has 43 MA's), (21, 3643), (36, 3808), (37, 3853), (44, 3931), (48, 3967), (50, 3988), (53, 4015), (57, 4063), (64, 4084), (70, 4129), (71, 4141), (78, 4180), (85, 4255), (92, 4312), (112, 4471), (114, 4495), (123, 4636), (127, 4687), (133, 4729), (140, 4789), (144, 4849), (147, 4900), (149, 4927), (150, 4939), (155, 4996),