

Pham 224646



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 224646 Report

This analysis was run 03/28/25 on database version 593.

Pham number 224646 has 52 members, 23 are drafts.

Phages represented in each track:

- Track 1 : Toad24\_17, Gravel\_17, KendraB23\_17, Pelletreau\_17
- Track 2 : Brynnie\_16
- Track 3 : Galaxy\_16
- Track 4 : Eesa\_16
- Track 5 : Basilisk\_16
- Track 6 : Westrich\_17
- Track 7 : WileyE\_15, Chickaboom\_15
- Track 8 : TaylorSipht\_16
- Track 9 : Orcanus\_16
- Track 10 : Abidatro\_16
- Track 11 : Vulpecula\_16
- Track 12 : Ruchi\_16
- Track 13 : Jamun\_16
- Track 14 : Cygnet\_16
- Track 15 : Bible12\_17, HannahPhantana\_17
- Track 16 : Kepler\_16, Amelia\_17, Melons\_17, Coral\_16, Polka\_16, Cote\_17, OtsoOtso\_16, Colusalem\_16, Bedetta\_17, Jerole\_17, Lunar\_17, Daob\_17
- Track 17 : Kuleana\_16
- Track 18 : Antrice\_16
- Track 19 : LittleTokyo\_16
- Track 20 : Zhuangyuan\_18
- Track 21 : Babushka\_15
- Track 22 : Leona\_15, Rattail\_15
- Track 23 : Renna12\_16
- Track 24 : PhluffyCoco\_15, HamCheese\_15, Camara\_15
- Track 25 : AmiCi24\_15, KHumphrey\_15
- Track 26 : Juno112\_15, DanHam62\_15, Atlantica\_15, RedFox\_15
- Track 27 : Glotell\_16
- Track 28 : StuartMinion\_16
- Track 29 : Andrew\_16

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

The start number called the most often in the published annotations is 1, it was called in 27 of the 29 non-draft genes in the pham.

Genes that call this "Most Annotated" start:

- Abidatro\_16, Amelia\_17, AmiCi24\_15, Antrice\_16, Atlantica\_15, Babushka\_15, Basilisk\_16, Bedetta\_17, Bibble12\_17, Brynnie\_16, Camara\_15, Chickaboom\_15, Colusalem\_16, Coral\_16, Cote\_17, Cygnet\_16, DanHam62\_15, Daob\_17, Eesa\_16, Galaxy\_16, Gravel\_17, HamCheese\_15, HannahPhantana\_17, Jamun\_16, Jerole\_17, Juno112\_15, KHumphrey\_15, KendraB23\_17, Kepler\_16, Leona\_15, LittleTokyo\_16, Lunar\_17, Melons\_17, Orcanus\_16, OtsoOtso\_16, Pelletreau\_17, PhluffyCoco\_15, Polka\_16, Rattail\_15, RedFox\_15, Renna12\_16, Ruchi\_16, StuartMinion\_16, TaylorSipht\_16, Toad24\_17, Vulpecula\_16, Westrich\_17, WileyE\_15, Zhuangyuan\_18,

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

- Glotell\_16,

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

- Andrew\_16, Kuleana\_16,

### Summary by start number:

Start 1:

- Found in 50 of 52 ( 96.2% ) of genes in pham
- Manual Annotations of this start: 27 of 29
- Called 98.0% of time when present
- Phage (with cluster) where this start called: Abidatro\_16 (AS1), Amelia\_17 (AS2), AmiCi24\_15 (AS3), Antrice\_16 (AS2), Atlantica\_15 (AS3), Babushka\_15 (AS3), Basilisk\_16 (AS1), Bedetta\_17 (AS2), Bibble12\_17 (AS2), Brynnie\_16 (AS1), Camara\_15 (AS3), Chickaboom\_15 (AS1), Colusalem\_16 (AS2), Coral\_16 (AS2), Cote\_17 (AS2), Cygnet\_16 (AS2), DanHam62\_15 (AS3), Daob\_17 (AS2), Eesa\_16 (AS1), Galaxy\_16 (AS1), Gravel\_17 (AS1), HamCheese\_15 (AS3), HannahPhantana\_17 (AS2), Jamun\_16 (AS1), Jerole\_17 (AS2), Juno112\_15 (AS3), KHumphrey\_15 (AS3), KendraB23\_17 (AS1), Kepler\_16 (AS2), Leona\_15 (AS3), LittleTokyo\_16 (AS2), Lunar\_17 (AS2), Melons\_17 (AS2), Orcanus\_16 (AS1), OtsoOtso\_16 (AS2), Pelletreau\_17 (AS1), PhluffyCoco\_15 (AS3), Polka\_16 (AS2), Rattail\_15 (AS3), RedFox\_15 (AS3), Renna12\_16 (AS3), Ruchi\_16 (AS1), StuartMinion\_16 (AS3), TaylorSipht\_16 (AS1), Toad24\_17 (AS1), Vulpecula\_16 (AS1), Westrich\_17 (AS1), WileyE\_15 (AS1), Zhuangyuan\_18 (AS2),

Start 2:

- Found in 2 of 52 ( 3.8% ) of genes in pham
- Manual Annotations of this start: 2 of 29
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Andrew\_16 (AS3), Kuleana\_16 (AS2),

Start 11:

- Found in 16 of 52 ( 30.8% ) of genes in pham
- No Manual Annotations of this start.
- Called 6.2% of time when present
- Phage (with cluster) where this start called: Glotell\_16 (AS3),

### Summary by clusters:

There are 3 clusters represented in this pham: AS3, AS2, AS1,

Info for manual annotations of cluster AS1:

- Start number 1 was manually annotated 11 times for cluster AS1.

Info for manual annotations of cluster AS2:

- Start number 1 was manually annotated 10 times for cluster AS2.
- Start number 2 was manually annotated 1 time for cluster AS2.

Info for manual annotations of cluster AS3:

- Start number 1 was manually annotated 6 times for cluster AS3.
- Start number 2 was manually annotated 1 time for cluster AS3.

### **Gene Information:**

Gene: Abidatro\_16 Start: 10475, Stop: 12856, Start Num: 1

Candidate Starts for Abidatro\_16:

(Start: 1 @10475 has 27 MA's), (4, 10511), (7, 10529), (13, 10661), (15, 10679), (25, 10784), (37, 10943), (38, 10952), (42, 10973), (43, 10991), (52, 11060), (59, 11135), (60, 11147), (65, 11201), (71, 11279), (81, 11402), (88, 11477), (89, 11498), (90, 11519), (91, 11531), (93, 11561), (96, 11591), (97, 11594), (100, 11606), (103, 11621), (105, 11633), (107, 11651), (114, 11708), (117, 11726), (119, 11744), (123, 11780), (131, 11837), (132, 11852), (133, 11873), (138, 11915), (140, 11930), (141, 11933), (146, 11969), (149, 11999), (151, 12005), (153, 12020), (156, 12038), (163, 12104), (165, 12116), (166, 12134), (167, 12167), (172, 12236), (173, 12245), (174, 12248), (175, 12269), (182, 12365), (189, 12452), (190, 12494), (196, 12593), (198, 12656), (200, 12668), (210, 12740), (213, 12788),

Gene: Amelia\_17 Start: 10375, Stop: 12510, Start Num: 1

Candidate Starts for Amelia\_17:

(Start: 1 @10375 has 27 MA's), (4, 10408), (5, 10414), (7, 10426), (12, 10531), (28, 10696), (30, 10717), (41, 10831), (47, 10894), (55, 10936), (57, 10957), (58, 10978), (64, 11059), (65, 11062), (66, 11071), (67, 11083), (68, 11086), (76, 11203), (78, 11233), (83, 11275), (84, 11284), (95, 11401), (103, 11434), (106, 11461), (108, 11485), (111, 11497), (112, 11506), (113, 11515), (119, 11554), (123, 11590), (125, 11602), (127, 11614), (129, 11635), (132, 11662), (134, 11695), (136, 11710), (173, 11872), (175, 11896), (178, 11935), (181, 11971), (189, 12079), (191, 12133), (195, 12199), (196, 12220), (212, 12391), (214, 12424), (215, 12436), (217, 12481), (218, 12502),

Gene: AmiCi24\_15 Start: 9786, Stop: 12074, Start Num: 1

Candidate Starts for AmiCi24\_15:

(Start: 1 @9786 has 27 MA's), (3, 9798), (4, 9819), (6, 9828), (7, 9837), (11, 9939), (17, 9981), (28, 10119), (34, 10173), (35, 10203), (46, 10305), (47, 10317), (49, 10335), (55, 10359), (57, 10380), (58, 10401), (64, 10482), (65, 10485), (66, 10494), (67, 10506), (76, 10626), (78, 10656), (83, 10698), (95, 10824), (101, 10848), (105, 10869), (110, 10917), (112, 10929), (114, 10941), (116, 10950), (119, 10977), (123, 11013), (125, 11025), (126, 11028), (127, 11037), (132, 11085), (133, 11106), (155, 11271), (172, 11418), (173, 11427), (178, 11490), (179, 11502), (184, 11565), (191, 11688), (193, 11748), (195, 11754), (196, 11775), (201, 11850), (218, 12066),

Gene: Andrew\_16 Start: 10166, Stop: 12529, Start Num: 2

Candidate Starts for Andrew\_16:

(Start: 2 @10166 has 2 MA's), (4, 10199), (10, 10328), (12, 10358), (15, 10379), (16, 10385), (20, 10409), (29, 10541), (31, 10565), (33, 10583), (40, 10661), (44, 10694), (47, 10730), (48, 10736), (50, 10751), (51, 10760), (57, 10796), (60, 10850), (61, 10856), (63, 10892), (64, 10901), (66, 10913), (70, 10943), (72, 10997), (75, 11042), (79, 11099), (82, 11135), (85, 11168), (87, 11180), (95, 11279), (99, 11294), (104, 11315), (108, 11363), (119, 11432), (120, 11438), (125, 11480), (127, 11492), (130, 11516), (132, 11540), (134, 11573), (135, 11576), (155, 11726), (172, 11873), (173, 11882), (174, 11885), (175, 11906), (178, 11945), (180, 11966), (183, 12011), (184, 12020), (186, 12044), (190, 12131), (191, 12143), (194, 12206), (196, 12230), (206, 12347), (211, 12389), (212, 12407), (215, 12452), (217, 12497), (218, 12518),

Gene: Antrice\_16 Start: 10127, Stop: 12421, Start Num: 1

Candidate Starts for Antrice\_16:

(Start: 1 @10127 has 27 MA's), (4, 10163), (6, 10172), (7, 10181), (15, 10316), (18, 10331), (27, 10442), (34, 10520), (35, 10550), (38, 10583), (46, 10652), (47, 10664), (55, 10706), (58, 10748), (66, 10841), (67, 10853), (68, 10856), (73, 10928), (76, 10973), (78, 11003), (80, 11012), (95, 11171), (102, 11198), (108, 11255), (112, 11276), (116, 11297), (118, 11318), (127, 11384), (129, 11405), (132, 11432), (134, 11465), (135, 11468), (139, 11498), (155, 11618), (168, 11744), (173, 11774), (175, 11798), (178, 11837), (180, 11858), (181, 11873), (185, 11927), (190, 12023), (191, 12035), (192, 12089), (195, 12101), (196, 12122), (198, 12185), (201, 12197), (203, 12212), (204, 12224), (214, 12332), (217, 12389),

Gene: Atlantica\_15 Start: 9788, Stop: 12076, Start Num: 1

Candidate Starts for Atlantica\_15:

(Start: 1 @9788 has 27 MA's), (3, 9800), (4, 9821), (6, 9830), (7, 9839), (11, 9941), (17, 9983), (28, 10121), (34, 10175), (35, 10205), (46, 10307), (47, 10319), (49, 10337), (55, 10361), (57, 10382), (58, 10403), (64, 10484), (65, 10487), (66, 10496), (67, 10508), (76, 10628), (78, 10658), (83, 10700), (95, 10826), (101, 10850), (105, 10871), (110, 10919), (112, 10931), (114, 10943), (116, 10952), (119, 10979), (123, 11015), (125, 11027), (126, 11030), (127, 11039), (132, 11087), (133, 11108), (155, 11273), (172, 11420), (173, 11429), (178, 11492), (184, 11567), (191, 11690), (193, 11750), (195, 11756), (196, 11777), (201, 11852), (218, 12068),

Gene: Babushka\_15 Start: 9836, Stop: 12124, Start Num: 1

Candidate Starts for Babushka\_15:

(Start: 1 @9836 has 27 MA's), (3, 9848), (4, 9869), (6, 9878), (7, 9887), (11, 9989), (17, 10031), (18, 10034), (28, 10169), (30, 10190), (34, 10223), (46, 10355), (47, 10367), (49, 10385), (55, 10409), (57, 10430), (58, 10451), (64, 10532), (65, 10535), (66, 10544), (67, 10556), (76, 10676), (78, 10706), (83, 10748), (95, 10874), (101, 10898), (105, 10919), (110, 10967), (114, 10991), (119, 11027), (123, 11063), (125, 11075), (127, 11087), (129, 11108), (132, 11135), (172, 11468), (173, 11477), (178, 11540), (184, 11615), (196, 11825), (201, 11900), (218, 12116),

Gene: Basilisk\_16 Start: 10798, Stop: 13203, Start Num: 1

Candidate Starts for Basilisk\_16:

(Start: 1 @10798 has 27 MA's), (4, 10834), (7, 10852), (9, 10888), (10, 10963), (16, 11008), (24, 11095), (25, 11107), (37, 11266), (38, 11275), (52, 11383), (53, 11389), (60, 11470), (65, 11524), (70, 11563), (84, 11764), (88, 11800), (91, 11854), (96, 11914), (97, 11917), (103, 11944), (107, 11974), (113, 12028), (119, 12067), (121, 12085), (123, 12103), (130, 12151), (133, 12196), (141, 12256), (142, 12268), (145, 12289), (146, 12292), (150, 12325), (151, 12328), (152, 12334), (153, 12343), (154, 12355), (156, 12361), (158, 12376), (160, 12385), (165, 12439), (166, 12457), (167, 12490), (172, 12559), (173, 12568), (174, 12571), (175, 12592), (177, 12628), (182, 12688), (184, 12706), (196, 12916), (212, 13081), (216, 13138),

Gene: Bedetta\_17 Start: 10375, Stop: 12510, Start Num: 1

Candidate Starts for Bedetta\_17:

(Start: 1 @10375 has 27 MA's), (4, 10408), (5, 10414), (7, 10426), (12, 10531), (28, 10696), (30, 10717), (41, 10831), (47, 10894), (55, 10936), (57, 10957), (58, 10978), (64, 11059), (65, 11062), (66, 11071), (67, 11083), (68, 11086), (76, 11203), (78, 11233), (83, 11275), (84, 11284), (95, 11401), (103, 11434), (106, 11461), (108, 11485), (111, 11497), (112, 11506), (113, 11515), (119, 11554), (123, 11590), (125, 11602), (127, 11614), (129, 11635), (132, 11662), (134, 11695), (136, 11710), (173, 11872), (175, 11896), (178, 11935), (181, 11971), (189, 12079), (191, 12133), (195, 12199), (196, 12220), (212, 12391), (214, 12424), (215, 12436), (217, 12481), (218, 12502),

Gene: Bible12\_17 Start: 10378, Stop: 12513, Start Num: 1

Candidate Starts for Bible12\_17:

(Start: 1 @10378 has 27 MA's), (4, 10411), (5, 10417), (7, 10429), (12, 10534), (19, 10567), (28, 10699), (30, 10720), (41, 10834), (47, 10897), (55, 10939), (57, 10960), (58, 10981), (64, 11062), (65, 11065), (66, 11074), (67, 11086), (68, 11089), (76, 11206), (78, 11236), (83, 11278), (84, 11287), (95, 11404), (103, 11437), (106, 11464), (108, 11488), (111, 11500), (112, 11509), (113, 11518), (119, 11557), (123, 11593), (125, 11605), (127, 11617), (129, 11638), (132, 11665), (134, 11698), (136, 11713), (173, 11875), (175, 11899), (178, 11938), (181, 11974), (189, 12082), (191, 12136), (195, 12202), (196, 12223), (212, 12394), (214, 12427), (215, 12439), (217, 12484), (218, 12505),

Gene: Brynnie\_16 Start: 10610, Stop: 13015, Start Num: 1

Candidate Starts for Brynnie\_16:

(Start: 1 @10610 has 27 MA's), (4, 10646), (7, 10664), (9, 10700), (10, 10775), (16, 10820), (24, 10907), (25, 10919), (37, 11078), (38, 11087), (52, 11195), (53, 11201), (60, 11282), (65, 11336), (70, 11375), (74, 11468), (84, 11576), (88, 11612), (91, 11666), (96, 11726), (97, 11729), (103, 11756), (107, 11786), (113, 11840), (119, 11879), (121, 11897), (123, 11915), (130, 11963), (133, 12008), (140, 12065), (141, 12068), (142, 12080), (145, 12101), (146, 12104), (150, 12137), (151, 12140), (152, 12146), (153, 12155), (154, 12167), (156, 12173), (158, 12188), (160, 12197), (165, 12251), (166, 12269), (167, 12302), (172, 12371), (173, 12380), (174, 12383), (175, 12404), (177, 12440), (182, 12500), (184, 12518), (196, 12728), (212, 12893), (216, 12950),

Gene: Camara\_15 Start: 9789, Stop: 12077, Start Num: 1

Candidate Starts for Camara\_15:

(Start: 1 @9789 has 27 MA's), (3, 9801), (4, 9822), (6, 9831), (7, 9840), (11, 9942), (17, 9984), (28, 10122), (34, 10176), (35, 10206), (46, 10308), (47, 10320), (49, 10338), (55, 10362), (57, 10383), (58, 10404), (64, 10485), (65, 10488), (66, 10497), (67, 10509), (76, 10629), (78, 10659), (83, 10701), (95, 10827), (101, 10851), (105, 10872), (110, 10920), (112, 10932), (114, 10944), (116, 10953), (119, 10980), (123, 11016), (125, 11028), (126, 11031), (127, 11040), (132, 11088), (133, 11109), (155, 11274), (172, 11421), (173, 11430), (178, 11493), (179, 11505), (184, 11568), (188, 11616), (191, 11691), (193, 11751), (195, 11757), (196, 11778), (201, 11853), (218, 12069),

Gene: Chickaboom\_15 Start: 10149, Stop: 12554, Start Num: 1

Candidate Starts for Chickaboom\_15:

(Start: 1 @10149 has 27 MA's), (4, 10185), (7, 10203), (9, 10239), (10, 10314), (16, 10359), (24, 10446), (25, 10458), (37, 10617), (38, 10626), (52, 10734), (60, 10821), (65, 10875), (70, 10914), (71, 10953), (88, 11151), (91, 11205), (97, 11268), (98, 11271), (103, 11295), (114, 11382), (119, 11418), (133, 11547), (140, 11604), (141, 11607), (146, 11643), (148, 11661), (150, 11676), (151, 11679), (152, 11685), (153, 11694), (154, 11706), (156, 11712), (158, 11727), (160, 11736), (162, 11754), (163, 11778), (165, 11790), (166, 11808), (167, 11841), (172, 11910), (173, 11919), (174, 11922), (175, 11943), (177, 11979), (182, 12039), (184, 12057), (196, 12267), (212, 12432),

Gene: Colusalem\_16 Start: 10214, Stop: 12349, Start Num: 1

Candidate Starts for Colusalem\_16:

(Start: 1 @10214 has 27 MA's), (4, 10247), (5, 10253), (7, 10265), (12, 10370), (28, 10535), (30, 10556), (41, 10670), (47, 10733), (55, 10775), (57, 10796), (58, 10817), (64, 10898), (65, 10901), (66,

10910), (67, 10922), (68, 10925), (76, 11042), (78, 11072), (83, 11114), (84, 11123), (95, 11240), (103, 11273), (106, 11300), (108, 11324), (111, 11336), (112, 11345), (113, 11354), (119, 11393), (123, 11429), (125, 11441), (127, 11453), (129, 11474), (132, 11501), (134, 11534), (136, 11549), (173, 11711), (175, 11735), (178, 11774), (181, 11810), (189, 11918), (191, 11972), (195, 12038), (196, 12059), (212, 12230), (214, 12263), (215, 12275), (217, 12320), (218, 12341),

Gene: Coral\_16 Start: 10214, Stop: 12349, Start Num: 1

Candidate Starts for Coral\_16:

(Start: 1 @10214 has 27 MA's), (4, 10247), (5, 10253), (7, 10265), (12, 10370), (28, 10535), (30, 10556), (41, 10670), (47, 10733), (55, 10775), (57, 10796), (58, 10817), (64, 10898), (65, 10901), (66, 10910), (67, 10922), (68, 10925), (76, 11042), (78, 11072), (83, 11114), (84, 11123), (95, 11240), (103, 11273), (106, 11300), (108, 11324), (111, 11336), (112, 11345), (113, 11354), (119, 11393), (123, 11429), (125, 11441), (127, 11453), (129, 11474), (132, 11501), (134, 11534), (136, 11549), (173, 11711), (175, 11735), (178, 11774), (181, 11810), (189, 11918), (191, 11972), (195, 12038), (196, 12059), (212, 12230), (214, 12263), (215, 12275), (217, 12320), (218, 12341),

Gene: Cote\_17 Start: 10375, Stop: 12510, Start Num: 1

Candidate Starts for Cote\_17:

(Start: 1 @10375 has 27 MA's), (4, 10408), (5, 10414), (7, 10426), (12, 10531), (28, 10696), (30, 10717), (41, 10831), (47, 10894), (55, 10936), (57, 10957), (58, 10978), (64, 11059), (65, 11062), (66, 11071), (67, 11083), (68, 11086), (76, 11203), (78, 11233), (83, 11275), (84, 11284), (95, 11401), (103, 11434), (106, 11461), (108, 11485), (111, 11497), (112, 11506), (113, 11515), (119, 11554), (123, 11590), (125, 11602), (127, 11614), (129, 11635), (132, 11662), (134, 11695), (136, 11710), (173, 11872), (175, 11896), (178, 11935), (181, 11971), (189, 12079), (191, 12133), (195, 12199), (196, 12220), (212, 12391), (214, 12424), (215, 12436), (217, 12481), (218, 12502),

Gene: Cygnet\_16 Start: 10164, Stop: 12530, Start Num: 1

Candidate Starts for Cygnet\_16:

(Start: 1 @10164 has 27 MA's), (3, 10179), (4, 10200), (11, 10332), (18, 10395), (23, 10455), (26, 10494), (28, 10533), (30, 10554), (31, 10566), (32, 10575), (33, 10584), (39, 10656), (40, 10662), (44, 10695), (47, 10731), (48, 10737), (50, 10752), (57, 10797), (60, 10851), (61, 10857), (63, 10893), (64, 10902), (70, 10944), (72, 10998), (75, 11043), (85, 11169), (87, 11181), (91, 11223), (93, 11253), (95, 11280), (108, 11364), (112, 11385), (115, 11403), (122, 11454), (123, 11469), (125, 11481), (127, 11493), (128, 11502), (132, 11541), (134, 11574), (135, 11577), (143, 11640), (155, 11727), (167, 11805), (168, 11853), (178, 11946), (180, 11967), (181, 11982), (185, 12036), (192, 12198), (195, 12210), (196, 12231), (197, 12264), (198, 12294), (208, 12354), (216, 12465), (217, 12498),

Gene: DanHam62\_15 Start: 9788, Stop: 12076, Start Num: 1

Candidate Starts for DanHam62\_15:

(Start: 1 @9788 has 27 MA's), (3, 9800), (4, 9821), (6, 9830), (7, 9839), (11, 9941), (17, 9983), (28, 10121), (34, 10175), (35, 10205), (46, 10307), (47, 10319), (49, 10337), (55, 10361), (57, 10382), (58, 10403), (64, 10484), (65, 10487), (66, 10496), (67, 10508), (76, 10628), (78, 10658), (83, 10700), (95, 10826), (101, 10850), (105, 10871), (110, 10919), (112, 10931), (114, 10943), (116, 10952), (119, 10979), (123, 11015), (125, 11027), (126, 11030), (127, 11039), (132, 11087), (133, 11108), (155, 11273), (172, 11420), (173, 11429), (178, 11492), (184, 11567), (191, 11690), (193, 11750), (195, 11756), (196, 11777), (201, 11852), (218, 12068),

Gene: Daob\_17 Start: 10378, Stop: 12513, Start Num: 1

Candidate Starts for Daob\_17:

(Start: 1 @10378 has 27 MA's), (4, 10411), (5, 10417), (7, 10429), (12, 10534), (28, 10699), (30, 10720), (41, 10834), (47, 10897), (55, 10939), (57, 10960), (58, 10981), (64, 11062), (65, 11065), (66, 11074), (67, 11086), (68, 11089), (76, 11206), (78, 11236), (83, 11278), (84, 11287), (95, 11404), (103, 11437), (106, 11464), (108, 11488), (111, 11500), (112, 11509), (113, 11518), (119, 11557), (123,

11593), (125, 11605), (127, 11617), (129, 11638), (132, 11665), (134, 11698), (136, 11713), (173, 11875), (175, 11899), (178, 11938), (181, 11974), (189, 12082), (191, 12136), (195, 12202), (196, 12223), (212, 12394), (214, 12427), (215, 12439), (217, 12484), (218, 12505),

Gene: Eesa\_16 Start: 10396, Stop: 12624, Start Num: 1

Candidate Starts for Eesa\_16:

(Start: 1 @10396 has 27 MA's), (3, 10411), (4, 10432), (9, 10486), (10, 10561), (12, 10591), (15, 10612), (21, 10648), (29, 10774), (31, 10798), (32, 10807), (33, 10816), (39, 10888), (44, 10927), (47, 10963), (50, 10984), (54, 11005), (57, 11029), (60, 11083), (61, 11089), (62, 11095), (63, 11125), (64, 11134), (70, 11176), (72, 11230), (75, 11275), (87, 11413), (91, 11455), (93, 11485), (99, 11527), (105, 11557), (112, 11617), (114, 11629), (116, 11638), (118, 11659), (127, 11725), (132, 11773), (137, 11794), (144, 11809), (147, 11827), (157, 11887), (183, 12112), (196, 12331), (212, 12502), (216, 12559), (218, 12613),

Gene: Galaxy\_16 Start: 10481, Stop: 12862, Start Num: 1

Candidate Starts for Galaxy\_16:

(Start: 1 @10481 has 27 MA's), (4, 10517), (7, 10535), (13, 10667), (15, 10685), (25, 10790), (37, 10949), (38, 10958), (42, 10979), (43, 10997), (52, 11066), (59, 11141), (60, 11153), (65, 11207), (71, 11285), (81, 11408), (88, 11483), (91, 11537), (96, 11597), (97, 11600), (100, 11612), (103, 11627), (107, 11657), (114, 11714), (117, 11732), (119, 11750), (123, 11786), (131, 11843), (132, 11858), (133, 11879), (138, 11921), (140, 11936), (141, 11939), (142, 11951), (146, 11975), (151, 12011), (152, 12017), (153, 12026), (156, 12044), (161, 12077), (162, 12086), (163, 12110), (165, 12122), (166, 12140), (167, 12173), (172, 12242), (173, 12251), (174, 12254), (175, 12275), (182, 12371), (189, 12458), (190, 12500), (191, 12512), (196, 12599), (198, 12662), (200, 12674), (213, 12794),

Gene: Glotell\_16 Start: 9939, Stop: 12074, Start Num: 11

Candidate Starts for Glotell\_16:

(Start: 1 @9786 has 27 MA's), (3, 9798), (4, 9819), (6, 9828), (7, 9837), (11, 9939), (17, 9981), (28, 10119), (34, 10173), (35, 10203), (46, 10305), (47, 10317), (49, 10335), (55, 10359), (57, 10380), (58, 10401), (64, 10482), (65, 10485), (66, 10494), (67, 10506), (76, 10626), (78, 10656), (83, 10698), (95, 10824), (101, 10848), (105, 10869), (110, 10917), (112, 10929), (114, 10941), (116, 10950), (119, 10977), (123, 11013), (125, 11025), (126, 11028), (127, 11037), (132, 11085), (133, 11106), (155, 11271), (172, 11418), (173, 11427), (178, 11490), (179, 11502), (184, 11565), (191, 11688), (193, 11748), (195, 11754), (196, 11775), (201, 11850), (218, 12066),

Gene: Gravel\_17 Start: 10380, Stop: 12530, Start Num: 1

Candidate Starts for Gravel\_17:

(Start: 1 @10380 has 27 MA's), (4, 10416), (7, 10434), (8, 10455), (17, 10575), (22, 10626), (31, 10746), (40, 10842), (47, 10911), (49, 10929), (55, 10953), (58, 10995), (64, 11076), (65, 11079), (66, 11088), (67, 11100), (76, 11220), (78, 11250), (83, 11292), (94, 11406), (95, 11418), (104, 11454), (113, 11532), (115, 11541), (127, 11631), (132, 11679), (133, 11700), (137, 11733), (146, 11793), (169, 11862), (171, 11877), (183, 12018), (196, 12237), (202, 12324), (212, 12408), (216, 12465), (218, 12519),

Gene: HamCheese\_15 Start: 9788, Stop: 12076, Start Num: 1

Candidate Starts for HamCheese\_15:

(Start: 1 @9788 has 27 MA's), (3, 9800), (4, 9821), (6, 9830), (7, 9839), (11, 9941), (17, 9983), (28, 10121), (34, 10175), (35, 10205), (46, 10307), (47, 10319), (49, 10337), (55, 10361), (57, 10382), (58, 10403), (64, 10484), (65, 10487), (66, 10496), (67, 10508), (76, 10628), (78, 10658), (83, 10700), (95, 10826), (101, 10850), (105, 10871), (110, 10919), (112, 10931), (114, 10943), (116, 10952), (119, 10979), (123, 11015), (125, 11027), (126, 11030), (127, 11039), (132, 11087), (133, 11108), (155, 11273), (172, 11420), (173, 11429), (178, 11492), (179, 11504), (184, 11567), (188, 11615), (191, 11690), (193, 11750), (195, 11756), (196, 11777), (201, 11852), (218, 12068),



Gene: HannahPhantana\_17 Start: 10378, Stop: 12513, Start Num: 1

Candidate Starts for HannahPhantana\_17:

(Start: 1 @10378 has 27 MA's), (4, 10411), (5, 10417), (7, 10429), (12, 10534), (19, 10567), (28, 10699), (30, 10720), (41, 10834), (47, 10897), (55, 10939), (57, 10960), (58, 10981), (64, 11062), (65, 11065), (66, 11074), (67, 11086), (68, 11089), (76, 11206), (78, 11236), (83, 11278), (84, 11287), (95, 11404), (103, 11437), (106, 11464), (108, 11488), (111, 11500), (112, 11509), (113, 11518), (119, 11557), (123, 11593), (125, 11605), (127, 11617), (129, 11638), (132, 11665), (134, 11698), (136, 11713), (173, 11875), (175, 11899), (178, 11938), (181, 11974), (189, 12082), (191, 12136), (195, 12202), (196, 12223), (212, 12394), (214, 12427), (215, 12439), (217, 12484), (218, 12505),

Gene: Jamun\_16 Start: 10816, Stop: 13221, Start Num: 1

Candidate Starts for Jamun\_16:

(Start: 1 @10816 has 27 MA's), (4, 10852), (7, 10870), (9, 10906), (10, 10981), (16, 11026), (24, 11113), (25, 11125), (37, 11284), (38, 11293), (45, 11344), (52, 11401), (53, 11407), (60, 11488), (65, 11542), (70, 11581), (71, 11620), (88, 11818), (91, 11872), (96, 11932), (97, 11935), (103, 11962), (113, 12046), (119, 12085), (121, 12103), (123, 12121), (130, 12169), (133, 12214), (141, 12274), (142, 12286), (145, 12307), (146, 12310), (148, 12328), (150, 12343), (151, 12346), (152, 12352), (153, 12361), (154, 12373), (156, 12379), (158, 12394), (160, 12403), (162, 12421), (163, 12445), (165, 12457), (166, 12475), (167, 12508), (172, 12577), (173, 12586), (174, 12589), (175, 12610), (177, 12646), (182, 12706), (184, 12724), (196, 12934), (207, 13042), (212, 13099), (216, 13156),

Gene: Jerole\_17 Start: 10375, Stop: 12510, Start Num: 1

Candidate Starts for Jerole\_17:

(Start: 1 @10375 has 27 MA's), (4, 10408), (5, 10414), (7, 10426), (12, 10531), (28, 10696), (30, 10717), (41, 10831), (47, 10894), (55, 10936), (57, 10957), (58, 10978), (64, 11059), (65, 11062), (66, 11071), (67, 11083), (68, 11086), (76, 11203), (78, 11233), (83, 11275), (84, 11284), (95, 11401), (103, 11434), (106, 11461), (108, 11485), (111, 11497), (112, 11506), (113, 11515), (119, 11554), (123, 11590), (125, 11602), (127, 11614), (129, 11635), (132, 11662), (134, 11695), (136, 11710), (173, 11872), (175, 11896), (178, 11935), (181, 11971), (189, 12079), (191, 12133), (195, 12199), (196, 12220), (212, 12391), (214, 12424), (215, 12436), (217, 12481), (218, 12502),

Gene: Juno112\_15 Start: 9789, Stop: 12077, Start Num: 1

Candidate Starts for Juno112\_15:

(Start: 1 @9789 has 27 MA's), (3, 9801), (4, 9822), (6, 9831), (7, 9840), (11, 9942), (17, 9984), (28, 10122), (34, 10176), (35, 10206), (46, 10308), (47, 10320), (49, 10338), (55, 10362), (57, 10383), (58, 10404), (64, 10485), (65, 10488), (66, 10497), (67, 10509), (76, 10629), (78, 10659), (83, 10701), (95, 10827), (101, 10851), (105, 10872), (110, 10920), (112, 10932), (114, 10944), (116, 10953), (119, 10980), (123, 11016), (125, 11028), (126, 11031), (127, 11040), (132, 11088), (133, 11109), (155, 11274), (172, 11421), (173, 11430), (178, 11493), (184, 11568), (191, 11691), (193, 11751), (195, 11757), (196, 11778), (201, 11853), (218, 12069),

Gene: KHumphrey\_15 Start: 9786, Stop: 12074, Start Num: 1

Candidate Starts for KHumphrey\_15:

(Start: 1 @9786 has 27 MA's), (3, 9798), (4, 9819), (6, 9828), (7, 9837), (11, 9939), (17, 9981), (28, 10119), (34, 10173), (35, 10203), (46, 10305), (47, 10317), (49, 10335), (55, 10359), (57, 10380), (58, 10401), (64, 10482), (65, 10485), (66, 10494), (67, 10506), (76, 10626), (78, 10656), (83, 10698), (95, 10824), (101, 10848), (105, 10869), (110, 10917), (112, 10929), (114, 10941), (116, 10950), (119, 10977), (123, 11013), (125, 11025), (126, 11028), (127, 11037), (132, 11085), (133, 11106), (155, 11271), (172, 11418), (173, 11427), (178, 11490), (179, 11502), (184, 11565), (191, 11688), (193, 11748), (195, 11754), (196, 11775), (201, 11850), (218, 12066),

Gene: KendraB23\_17 Start: 10381, Stop: 12531, Start Num: 1

Candidate Starts for KendraB23\_17:

(Start: 1 @10381 has 27 MA's), (4, 10417), (7, 10435), (8, 10456), (17, 10576), (22, 10627), (31, 10747), (40, 10843), (47, 10912), (49, 10930), (55, 10954), (58, 10996), (64, 11077), (65, 11080), (66, 11089), (67, 11101), (76, 11221), (78, 11251), (83, 11293), (94, 11407), (95, 11419), (104, 11455), (113, 11533), (115, 11542), (127, 11632), (132, 11680), (133, 11701), (137, 11734), (146, 11794), (169, 11863), (171, 11878), (183, 12019), (196, 12238), (202, 12325), (212, 12409), (216, 12466), (218, 12520),

Gene: Kepler\_16 Start: 10213, Stop: 12348, Start Num: 1

Candidate Starts for Kepler\_16:

(Start: 1 @10213 has 27 MA's), (4, 10246), (5, 10252), (7, 10264), (12, 10369), (28, 10534), (30, 10555), (41, 10669), (47, 10732), (55, 10774), (57, 10795), (58, 10816), (64, 10897), (65, 10900), (66, 10909), (67, 10921), (68, 10924), (76, 11041), (78, 11071), (83, 11113), (84, 11122), (95, 11239), (103, 11272), (106, 11299), (108, 11323), (111, 11335), (112, 11344), (113, 11353), (119, 11392), (123, 11428), (125, 11440), (127, 11452), (129, 11473), (132, 11500), (134, 11533), (136, 11548), (173, 11710), (175, 11734), (178, 11773), (181, 11809), (189, 11917), (191, 11971), (195, 12037), (196, 12058), (212, 12229), (214, 12262), (215, 12274), (217, 12319), (218, 12340),

Gene: Kuleana\_16 Start: 10172, Stop: 12535, Start Num: 2

Candidate Starts for Kuleana\_16:

(Start: 2 @10172 has 2 MA's), (4, 10205), (10, 10334), (15, 10385), (23, 10460), (29, 10547), (31, 10571), (33, 10589), (40, 10667), (47, 10736), (48, 10742), (50, 10757), (57, 10802), (60, 10856), (61, 10862), (62, 10868), (63, 10898), (64, 10907), (70, 10949), (72, 11003), (75, 11048), (77, 11069), (85, 11174), (86, 11177), (87, 11186), (92, 11240), (93, 11258), (95, 11285), (99, 11300), (105, 11330), (110, 11378), (112, 11390), (119, 11438), (127, 11498), (128, 11507), (132, 11546), (134, 11579), (135, 11582), (136, 11594), (137, 11600), (155, 11732), (168, 11858), (178, 11951), (185, 12041), (192, 12203), (196, 12236), (197, 12269), (204, 12338), (205, 12344), (212, 12413), (217, 12503), (218, 12524),

Gene: Leona\_15 Start: 9839, Stop: 12127, Start Num: 1

Candidate Starts for Leona\_15:

(Start: 1 @9839 has 27 MA's), (3, 9851), (4, 9872), (6, 9881), (7, 9890), (11, 9992), (17, 10034), (28, 10172), (34, 10226), (35, 10256), (47, 10370), (49, 10388), (55, 10412), (57, 10433), (58, 10454), (64, 10535), (65, 10538), (66, 10547), (67, 10559), (76, 10679), (78, 10709), (83, 10751), (95, 10877), (101, 10901), (105, 10922), (114, 10994), (119, 11030), (123, 11066), (125, 11078), (127, 11090), (129, 11111), (132, 11138), (133, 11159), (155, 11324), (172, 11471), (173, 11480), (178, 11543), (179, 11555), (184, 11618), (191, 11741), (193, 11801), (195, 11807), (196, 11828), (201, 11903), (218, 12119),

Gene: LittleTokyo\_16 Start: 10123, Stop: 12486, Start Num: 1

Candidate Starts for LittleTokyo\_16:

(Start: 1 @10123 has 27 MA's), (3, 10138), (4, 10159), (6, 10168), (14, 10336), (17, 10351), (23, 10414), (26, 10453), (28, 10492), (29, 10501), (30, 10513), (31, 10525), (32, 10534), (33, 10543), (40, 10621), (44, 10654), (47, 10690), (50, 10711), (56, 10753), (57, 10756), (60, 10810), (61, 10816), (62, 10822), (63, 10852), (64, 10861), (70, 10903), (72, 10957), (75, 11002), (85, 11128), (87, 11140), (91, 11182), (93, 11212), (94, 11227), (95, 11239), (104, 11275), (109, 11326), (112, 11344), (115, 11362), (117, 11374), (122, 11413), (123, 11428), (124, 11437), (126, 11443), (127, 11452), (132, 11500), (134, 11533), (135, 11536), (155, 11686), (168, 11812), (173, 11842), (175, 11866), (178, 11905), (184, 11980), (187, 12025), (190, 12091), (192, 12157), (195, 12169), (196, 12190), (197, 12223), (198, 12253), (204, 12292), (205, 12298), (214, 12397), (217, 12454), (218, 12475),

Gene: Lunar\_17 Start: 10375, Stop: 12510, Start Num: 1

Candidate Starts for Lunar\_17:

(Start: 1 @10375 has 27 MA's), (4, 10408), (5, 10414), (7, 10426), (12, 10531), (28, 10696), (30, 10717), (41, 10831), (47, 10894), (55, 10936), (57, 10957), (58, 10978), (64, 11059), (65, 11062), (66, 11071), (67, 11083), (68, 11086), (76, 11203), (78, 11233), (83, 11275), (84, 11284), (95, 11401), (103, 11434), (106, 11461), (108, 11485), (111, 11497), (112, 11506), (113, 11515), (119, 11554), (123, 11590), (125, 11602), (127, 11614), (129, 11635), (132, 11662), (134, 11695), (136, 11710), (173, 11872), (175, 11896), (178, 11935), (181, 11971), (189, 12079), (191, 12133), (195, 12199), (196, 12220), (212, 12391), (214, 12424), (215, 12436), (217, 12481), (218, 12502),

Gene: Melons\_17 Start: 10375, Stop: 12510, Start Num: 1

Candidate Starts for Melons\_17:

(Start: 1 @10375 has 27 MA's), (4, 10408), (5, 10414), (7, 10426), (12, 10531), (28, 10696), (30, 10717), (41, 10831), (47, 10894), (55, 10936), (57, 10957), (58, 10978), (64, 11059), (65, 11062), (66, 11071), (67, 11083), (68, 11086), (76, 11203), (78, 11233), (83, 11275), (84, 11284), (95, 11401), (103, 11434), (106, 11461), (108, 11485), (111, 11497), (112, 11506), (113, 11515), (119, 11554), (123, 11590), (125, 11602), (127, 11614), (129, 11635), (132, 11662), (134, 11695), (136, 11710), (173, 11872), (175, 11896), (178, 11935), (181, 11971), (189, 12079), (191, 12133), (195, 12199), (196, 12220), (212, 12391), (214, 12424), (215, 12436), (217, 12481), (218, 12502),

Gene: Orcanus\_16 Start: 10174, Stop: 12324, Start Num: 1

Candidate Starts for Orcanus\_16:

(Start: 1 @10174 has 27 MA's), (4, 10210), (7, 10228), (8, 10249), (17, 10369), (22, 10420), (31, 10540), (34, 10561), (40, 10636), (47, 10705), (49, 10723), (55, 10747), (58, 10789), (64, 10870), (65, 10873), (66, 10882), (67, 10894), (76, 11014), (83, 11086), (94, 11200), (95, 11212), (104, 11248), (113, 11326), (115, 11335), (127, 11425), (132, 11473), (133, 11494), (137, 11527), (146, 11587), (169, 11656), (171, 11671), (183, 11812), (191, 11944), (192, 11998), (193, 12004), (194, 12007), (196, 12031), (202, 12118), (212, 12202), (216, 12259), (218, 12313),

Gene: OtsoOtso\_16 Start: 10214, Stop: 12352, Start Num: 1

Candidate Starts for OtsoOtso\_16:

(Start: 1 @10214 has 27 MA's), (4, 10250), (5, 10256), (7, 10268), (12, 10373), (28, 10538), (30, 10559), (41, 10673), (47, 10736), (55, 10778), (57, 10799), (58, 10820), (64, 10901), (65, 10904), (66, 10913), (67, 10925), (68, 10928), (76, 11045), (78, 11075), (83, 11117), (84, 11126), (95, 11243), (103, 11276), (106, 11303), (108, 11327), (111, 11339), (112, 11348), (113, 11357), (119, 11396), (123, 11432), (125, 11444), (127, 11456), (129, 11477), (132, 11504), (134, 11537), (136, 11552), (173, 11714), (175, 11738), (178, 11777), (181, 11813), (189, 11921), (191, 11975), (195, 12041), (196, 12062), (212, 12233), (214, 12266), (215, 12278), (217, 12323), (218, 12344),

Gene: Pelletreau\_17 Start: 10380, Stop: 12530, Start Num: 1

Candidate Starts for Pelletreau\_17:

(Start: 1 @10380 has 27 MA's), (4, 10416), (7, 10434), (8, 10455), (17, 10575), (22, 10626), (31, 10746), (40, 10842), (47, 10911), (49, 10929), (55, 10953), (58, 10995), (64, 11076), (65, 11079), (66, 11088), (67, 11100), (76, 11220), (78, 11250), (83, 11292), (94, 11406), (95, 11418), (104, 11454), (113, 11532), (115, 11541), (127, 11631), (132, 11679), (133, 11700), (137, 11733), (146, 11793), (169, 11862), (171, 11877), (183, 12018), (196, 12237), (202, 12324), (212, 12408), (216, 12465), (218, 12519),

Gene: PhluffyCoco\_15 Start: 9788, Stop: 12076, Start Num: 1

Candidate Starts for PhluffyCoco\_15:

(Start: 1 @9788 has 27 MA's), (3, 9800), (4, 9821), (6, 9830), (7, 9839), (11, 9941), (17, 9983), (28, 10121), (34, 10175), (35, 10205), (46, 10307), (47, 10319), (49, 10337), (55, 10361), (57, 10382), (58, 10403), (64, 10484), (65, 10487), (66, 10496), (67, 10508), (76, 10628), (78, 10658), (83, 10700), (95, 10826), (101, 10850), (105, 10871), (110, 10919), (112, 10931), (114, 10943), (116, 10952), (119, 10979), (123, 11015), (125, 11027), (126, 11030), (127, 11039), (132, 11087), (133, 11108), (155,

11273), (172, 11420), (173, 11429), (178, 11492), (179, 11504), (184, 11567), (188, 11615), (191, 11690), (193, 11750), (195, 11756), (196, 11777), (201, 11852), (218, 12068),

Gene: Polka\_16 Start: 10214, Stop: 12352, Start Num: 1

Candidate Starts for Polka\_16:

(Start: 1 @10214 has 27 MA's), (4, 10250), (5, 10256), (7, 10268), (12, 10373), (28, 10538), (30, 10559), (41, 10673), (47, 10736), (55, 10778), (57, 10799), (58, 10820), (64, 10901), (65, 10904), (66, 10913), (67, 10925), (68, 10928), (76, 11045), (78, 11075), (83, 11117), (84, 11126), (95, 11243), (103, 11276), (106, 11303), (108, 11327), (111, 11339), (112, 11348), (113, 11357), (119, 11396), (123, 11432), (125, 11444), (127, 11456), (129, 11477), (132, 11504), (134, 11537), (136, 11552), (173, 11714), (175, 11738), (178, 11777), (181, 11813), (189, 11921), (191, 11975), (195, 12041), (196, 12062), (212, 12233), (214, 12266), (215, 12278), (217, 12323), (218, 12344),

Gene: Rattail\_15 Start: 9839, Stop: 12127, Start Num: 1

Candidate Starts for Rattail\_15:

(Start: 1 @9839 has 27 MA's), (3, 9851), (4, 9872), (6, 9881), (7, 9890), (11, 9992), (17, 10034), (28, 10172), (34, 10226), (35, 10256), (47, 10370), (49, 10388), (55, 10412), (57, 10433), (58, 10454), (64, 10535), (65, 10538), (66, 10547), (67, 10559), (76, 10679), (78, 10709), (83, 10751), (95, 10877), (101, 10901), (105, 10922), (114, 10994), (119, 11030), (123, 11066), (125, 11078), (127, 11090), (129, 11111), (132, 11138), (133, 11159), (155, 11324), (172, 11471), (173, 11480), (178, 11543), (179, 11555), (184, 11618), (191, 11741), (193, 11801), (195, 11807), (196, 11828), (201, 11903), (218, 12119),

Gene: RedFox\_15 Start: 9788, Stop: 12076, Start Num: 1

Candidate Starts for RedFox\_15:

(Start: 1 @9788 has 27 MA's), (3, 9800), (4, 9821), (6, 9830), (7, 9839), (11, 9941), (17, 9983), (28, 10121), (34, 10175), (35, 10205), (46, 10307), (47, 10319), (49, 10337), (55, 10361), (57, 10382), (58, 10403), (64, 10484), (65, 10487), (66, 10496), (67, 10508), (76, 10628), (78, 10658), (83, 10700), (95, 10826), (101, 10850), (105, 10871), (110, 10919), (112, 10931), (114, 10943), (116, 10952), (119, 10979), (123, 11015), (125, 11027), (126, 11030), (127, 11039), (132, 11087), (133, 11108), (155, 11273), (172, 11420), (173, 11429), (178, 11492), (184, 11567), (191, 11690), (193, 11750), (195, 11756), (196, 11777), (201, 11852), (218, 12068),

Gene: Renna12\_16 Start: 9997, Stop: 12417, Start Num: 1

Candidate Starts for Renna12\_16:

(Start: 1 @9997 has 27 MA's), (3, 10009), (4, 10030), (6, 10039), (7, 10048), (11, 10150), (17, 10192), (28, 10330), (34, 10384), (35, 10414), (47, 10528), (49, 10546), (55, 10570), (57, 10591), (58, 10612), (64, 10693), (65, 10696), (66, 10705), (67, 10717), (78, 10867), (83, 10909), (95, 11035), (101, 11059), (104, 11071), (105, 11080), (110, 11128), (114, 11152), (116, 11161), (119, 11188), (123, 11224), (125, 11236), (132, 11296), (143, 11395), (164, 11614), (178, 11833), (184, 11908), (195, 12097), (196, 12118), (201, 12193), (212, 12298), (218, 12409),

Gene: Ruchi\_16 Start: 10744, Stop: 13149, Start Num: 1

Candidate Starts for Ruchi\_16:

(Start: 1 @10744 has 27 MA's), (4, 10780), (7, 10798), (9, 10834), (10, 10909), (16, 10954), (24, 11041), (25, 11053), (37, 11212), (38, 11221), (52, 11329), (53, 11335), (60, 11416), (65, 11470), (70, 11509), (84, 11710), (88, 11746), (91, 11800), (96, 11860), (97, 11863), (103, 11890), (107, 11920), (113, 11974), (119, 12013), (121, 12031), (123, 12049), (130, 12097), (133, 12142), (141, 12202), (142, 12214), (145, 12235), (146, 12238), (148, 12256), (150, 12271), (151, 12274), (152, 12280), (153, 12289), (154, 12301), (156, 12307), (158, 12322), (160, 12331), (163, 12373), (165, 12385), (166, 12403), (167, 12436), (172, 12505), (173, 12514), (174, 12517), (175, 12538), (177, 12574), (182, 12634), (184, 12652), (196, 12862), (212, 13027), (216, 13084),

Gene: StuartMinion\_16 Start: 9820, Stop: 12108, Start Num: 1

Candidate Starts for StuartMinion\_16:

(Start: 1 @9820 has 27 MA's), (4, 9853), (6, 9862), (7, 9871), (11, 9973), (17, 10015), (28, 10153), (34, 10207), (47, 10351), (49, 10369), (55, 10393), (58, 10435), (64, 10516), (65, 10519), (66, 10528), (67, 10540), (69, 10549), (76, 10660), (78, 10690), (82, 10729), (95, 10858), (101, 10882), (105, 10903), (114, 10975), (115, 10981), (118, 11005), (125, 11059), (126, 11062), (127, 11071), (132, 11119), (133, 11140), (155, 11305), (178, 11524), (179, 11536), (184, 11599), (190, 11710), (192, 11776), (195, 11788), (196, 11809), (199, 11881), (201, 11884), (212, 11986), (216, 12043), (218, 12097), (219, 12100),

Gene: TaylorSipt\_16 Start: 10274, Stop: 12499, Start Num: 1

Candidate Starts for TaylorSipt\_16:

(Start: 1 @10274 has 27 MA's), (3, 10289), (4, 10310), (12, 10469), (21, 10526), (23, 10565), (29, 10652), (30, 10664), (31, 10676), (32, 10685), (33, 10694), (36, 10742), (39, 10766), (40, 10772), (47, 10841), (50, 10862), (56, 10904), (57, 10907), (60, 10961), (61, 10967), (62, 10973), (63, 11003), (64, 11012), (70, 11054), (72, 11108), (75, 11153), (87, 11291), (91, 11333), (93, 11363), (99, 11405), (105, 11435), (114, 11507), (116, 11516), (118, 11537), (126, 11594), (127, 11603), (132, 11651), (137, 11672), (147, 11705), (157, 11765), (159, 11771), (168, 11831), (170, 11846), (179, 11936), (180, 11945), (182, 11981), (190, 12110), (191, 12122), (196, 12209), (202, 12296), (204, 12311), (209, 12353), (212, 12380), (216, 12437), (218, 12491),

Gene: Toad24\_17 Start: 10381, Stop: 12531, Start Num: 1

Candidate Starts for Toad24\_17:

(Start: 1 @10381 has 27 MA's), (4, 10417), (7, 10435), (8, 10456), (17, 10576), (22, 10627), (31, 10747), (40, 10843), (47, 10912), (49, 10930), (55, 10954), (58, 10996), (64, 11077), (65, 11080), (66, 11089), (67, 11101), (76, 11221), (78, 11251), (83, 11293), (94, 11407), (95, 11419), (104, 11455), (113, 11533), (115, 11542), (127, 11632), (132, 11680), (133, 11701), (137, 11734), (146, 11794), (169, 11863), (171, 11878), (183, 12019), (196, 12238), (202, 12325), (212, 12409), (216, 12466), (218, 12520),

Gene: Vulpecula\_16 Start: 10814, Stop: 13219, Start Num: 1

Candidate Starts for Vulpecula\_16:

(Start: 1 @10814 has 27 MA's), (4, 10850), (7, 10868), (9, 10904), (10, 10979), (16, 11024), (24, 11111), (25, 11123), (37, 11282), (38, 11291), (45, 11342), (52, 11399), (53, 11405), (60, 11486), (65, 11540), (70, 11579), (88, 11816), (91, 11870), (96, 11930), (97, 11933), (103, 11960), (107, 11990), (119, 12083), (121, 12101), (123, 12119), (133, 12212), (141, 12272), (142, 12284), (145, 12305), (146, 12308), (148, 12326), (150, 12341), (151, 12344), (152, 12350), (153, 12359), (154, 12371), (156, 12377), (158, 12392), (160, 12401), (162, 12419), (163, 12443), (165, 12455), (166, 12473), (167, 12506), (173, 12584), (174, 12587), (175, 12608), (176, 12626), (177, 12644), (182, 12704), (184, 12722), (196, 12932), (207, 13040), (212, 13097), (216, 13154),

Gene: Westrich\_17 Start: 10369, Stop: 12519, Start Num: 1

Candidate Starts for Westrich\_17:

(Start: 1 @10369 has 27 MA's), (4, 10405), (7, 10423), (8, 10444), (17, 10564), (22, 10615), (31, 10735), (40, 10831), (47, 10900), (49, 10918), (55, 10942), (57, 10963), (58, 10984), (64, 11065), (65, 11068), (66, 11077), (67, 11089), (68, 11092), (76, 11209), (83, 11281), (94, 11395), (95, 11407), (104, 11443), (113, 11521), (115, 11530), (127, 11620), (132, 11668), (133, 11689), (137, 11722), (146, 11782), (169, 11851), (171, 11866), (183, 12007), (191, 12139), (192, 12193), (193, 12199), (194, 12202), (196, 12226), (202, 12313), (212, 12397), (216, 12454), (218, 12508),

Gene: WileyE\_15 Start: 10149, Stop: 12554, Start Num: 1

Candidate Starts for WileyE\_15:

(Start: 1 @10149 has 27 MA's), (4, 10185), (7, 10203), (9, 10239), (10, 10314), (16, 10359), (24, 10446), (25, 10458), (37, 10617), (38, 10626), (52, 10734), (60, 10821), (65, 10875), (70, 10914), (71, 10953), (88, 11151), (91, 11205), (97, 11268), (98, 11271), (103, 11295), (114, 11382), (119, 11418), (133, 11547), (140, 11604), (141, 11607), (146, 11643), (148, 11661), (150, 11676), (151, 11679), (152, 11685), (153, 11694), (154, 11706), (156, 11712), (158, 11727), (160, 11736), (162, 11754), (163, 11778), (165, 11790), (166, 11808), (167, 11841), (172, 11910), (173, 11919), (174, 11922), (175, 11943), (177, 11979), (182, 12039), (184, 12057), (196, 12267), (212, 12432),

Gene: Zhuangyuan\_18 Start: 10550, Stop: 12916, Start Num: 1

Candidate Starts for Zhuangyuan\_18:

(Start: 1 @10550 has 27 MA's), (3, 10565), (4, 10586), (6, 10595), (13, 10748), (18, 10781), (23, 10841), (26, 10880), (28, 10919), (30, 10940), (31, 10952), (32, 10961), (33, 10970), (39, 11042), (44, 11081), (47, 11117), (50, 11138), (51, 11147), (54, 11159), (57, 11183), (60, 11237), (61, 11243), (62, 11249), (63, 11279), (64, 11288), (70, 11330), (72, 11384), (75, 11429), (85, 11555), (87, 11567), (91, 11609), (93, 11639), (95, 11666), (114, 11783), (115, 11789), (117, 11801), (123, 11855), (126, 11870), (127, 11879), (128, 11888), (132, 11927), (134, 11960), (135, 11963), (155, 12113), (168, 12239), (173, 12269), (175, 12293), (178, 12332), (184, 12407), (191, 12530), (192, 12584), (195, 12596), (196, 12617), (197, 12650), (198, 12680), (204, 12719), (212, 12794), (217, 12884),