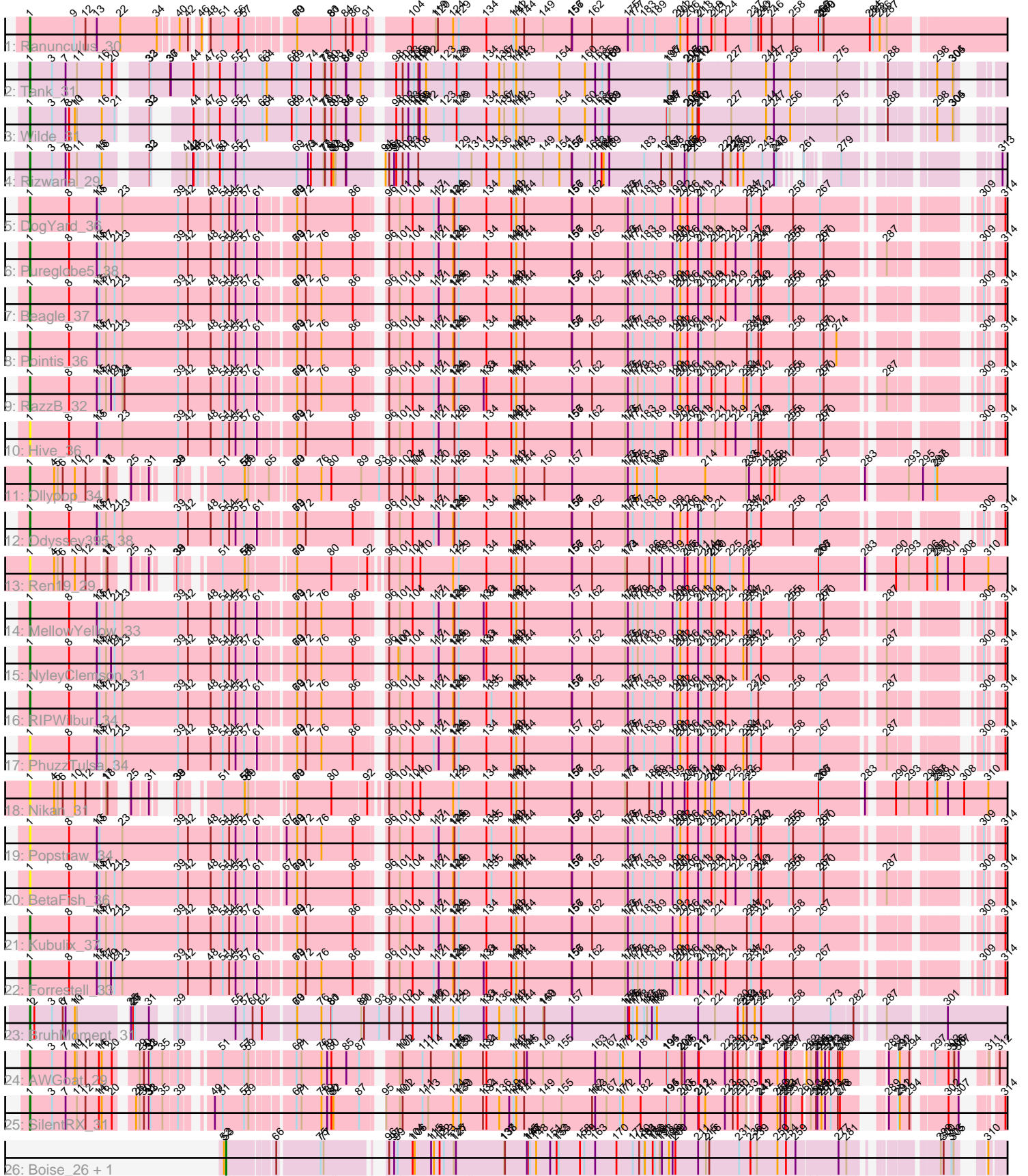


# Zoomed Pham 311914



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 311914 Report

This analysis was run 06/27/26 on database version 652.

Pham number 311914 has 27 members, 7 are drafts.

Phages represented in each track:

- Track 1 : Ranunculus\_30
- Track 2 : Tank\_31
- Track 3 : Wilde\_31
- Track 4 : Rizwana\_29
- Track 5 : DogYard\_36
- Track 6 : Pureglobe5\_38
- Track 7 : Beagle\_37
- Track 8 : Pointis\_36
- Track 9 : RazzB\_32
- Track 10 : Hive\_36
- Track 11 : Ollypop\_34
- Track 12 : Odyssey395\_38
- Track 13 : Ren19\_29
- Track 14 : MellowYellow\_33
- Track 15 : NyleyClemson\_31
- Track 16 : RIPWilbur\_34
- Track 17 : PhuzzTulsa\_34
- Track 18 : Nikan\_31
- Track 19 : Popstraw\_34
- Track 20 : BetaFish\_36
- Track 21 : Kubulix\_37
- Track 22 : Forrestell\_33
- Track 23 : BruhMoment\_31
- Track 24 : AWGoat\_29
- Track 25 : SilentRX\_31
- Track 26 : Boise\_26, RomansRevenge\_27

### ***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 19 of the 20 non-draft genes in the pham.

Genes that call this "Most Annotated" start:

- AWGoat\_29, Beagle\_37, BetaFish\_36, BruhMoment\_31, DogYard\_36, Forrestell\_33, Hive\_36, Kubulix\_37, MellowYellow\_33, Nikan\_31, NyleyClemson\_31, Odyssey395\_38, Ollypop\_34, PhuzzTulsa\_34, Pointis\_36, Popstraw\_34, Pureglobe5\_38, RIPWilbur\_34, Ranunculus\_30, RazzB\_32, Ren19\_29, Rizwana\_29, SilentRX\_31, Tank\_31, Wilde\_31,

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

- 

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

- Boise\_26, RomansRevenge\_27,

### Summary by start number:

Start 1:

- Found in 25 of 27 ( 92.6% ) of genes in pham
- Manual Annotations of this start: 19 of 20
- Called 100.0% of time when present
- Phage (with cluster) where this start called: AWGoat\_29 (AP4), Beagle\_37 (AP2), BetaFish\_36 (AP2), BruhMoment\_31 (AP3), DogYard\_36 (AP2), Forrestell\_33 (AP2), Hive\_36 (AP2), Kubulix\_37 (AP2), MellowYellow\_33 (AP2), Nikan\_31 (AP2), NyleyClemson\_31 (AP2), Odyssey395\_38 (AP2), Ollypop\_34 (AP2), PhuzzTulsa\_34 (AP2), Pointis\_36 (AP2), Popstraw\_34 (AP2), Pureglobe5\_38 (AP2), RIPWilbur\_34 (AP2), Ranunculus\_30 (AP), RazzB\_32 (AP2), Ren19\_29 (AP2), Rizwana\_29 (AP1), SilentRX\_31 (AP4), Tank\_31 (AP1), Wilde\_31 (AP1),

Start 53:

- Found in 2 of 27 ( 7.4% ) of genes in pham
- Manual Annotations of this start: 1 of 20
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Boise\_26 (FT), RomansRevenge\_27 (FT),

### Summary by clusters:

There are 6 clusters represented in this pham: FT, AP2, AP3, AP1, AP4, AP,

Info for manual annotations of cluster AP:

- Start number 1 was manually annotated 1 time for cluster AP.

Info for manual annotations of cluster AP1:

- Start number 1 was manually annotated 3 times for cluster AP1.

Info for manual annotations of cluster AP2:

- Start number 1 was manually annotated 12 times for cluster AP2.

Info for manual annotations of cluster AP3:

- Start number 1 was manually annotated 1 time for cluster AP3.

Info for manual annotations of cluster AP4:

- Start number 1 was manually annotated 2 times for cluster AP4.

Info for manual annotations of cluster FT:

- Start number 53 was manually annotated 1 time for cluster FT.

### **Gene Information:**

Gene: AWGoat\_29 Start: 22075, Stop: 26175, Start Num: 1

Candidate Starts for AWGoat\_29:

(Start: 1 @22075 has 19 MA's), (3, 22168), (7, 22225), (10, 22261), (11, 22270), (12, 22303), (14, 22360), (16, 22372), (20, 22414), (29, 22477), (30, 22495), (31, 22516), (32, 22519), (33, 22522), (35, 22573), (39, 22630), (51, 22741), (57, 22828), (59, 22846), (69, 22996), (71, 23017), (76, 23101), (79, 23125), (80, 23143), (85, 23206), (87, 23260), (101, 23368), (102, 23380), (111, 23464), (114, 23497), (124, 23590), (125, 23593), (129, 23614), (130, 23623), (132, 23713), (134, 23728), (141, 23836), (142, 23848), (144, 23881), (145, 23893), (149, 23959), (155, 24037), (163, 24178), (167, 24226), (171, 24283), (172, 24292), (181, 24364), (194, 24478), (195, 24481), (203, 24538), (204, 24541), (205, 24553), (211, 24610), (212, 24613), (223, 24721), (228, 24754), (230, 24775), (233, 24811), (241, 24838), (242, 24844), (250, 24907), (253, 24928), (254, 24934), (257, 24952), (262, 24994), (263, 25012), (264, 25033), (265, 25039), (268, 25054), (271, 25069), (272, 25084), (273, 25090), (276, 25117), (278, 25126), (280, 25135), (289, 25222), (291, 25249), (292, 25255), (294, 25291), (297, 25348), (302, 25405), (305, 25426), (306, 25429), (307, 25447), (311, 25480), (312, 25501), (315, 25546), (316, 25549), (318, 25636), (323, 25756), (325, 25777), (329, 25810), (335, 25891), (340, 25957), (353, 26128),

Gene: Beagle\_37 Start: 21530, Stop: 26407, Start Num: 1

Candidate Starts for Beagle\_37:

(Start: 1 @21530 has 19 MA's), (8, 21692), (13, 21809), (15, 21821), (17, 21848), (21, 21881), (23, 21914), (39, 22148), (42, 22190), (48, 22286), (51, 22337), (54, 22364), (55, 22391), (57, 22424), (61, 22466), (69, 22592), (70, 22595), (72, 22631), (76, 22697), (86, 22829), (96, 22919), (101, 22964), (104, 23018), (117, 23105), (121, 23126), (124, 23183), (126, 23189), (129, 23207), (134, 23321), (140, 23423), (141, 23432), (142, 23444), (144, 23477), (156, 23675), (157, 23678), (162, 23762), (173, 23900), (175, 23912), (177, 23933), (183, 23981), (189, 24026), (199, 24101), (201, 24119), (202, 24134), (206, 24164), (211, 24209), (213, 24221), (218, 24263), (221, 24278), (224, 24320), (229, 24362), (237, 24428), (240, 24452), (242, 24464), (255, 24578), (258, 24596), (267, 24704), (270, 24719), (309, 25142), (314, 25196), (320, 25337), (322, 25415), (332, 25547), (333, 25580), (347, 25769), (357, 25901), (361, 25991), (366, 26051), (367, 26069), (369, 26078), (370, 26081), (373, 26120), (382, 26219), (391, 26321), (392, 26351),

Gene: BetaFish\_36 Start: 21724, Stop: 26601, Start Num: 1

Candidate Starts for BetaFish\_36:

(Start: 1 @21724 has 19 MA's), (8, 21886), (13, 22003), (15, 22015), (17, 22042), (21, 22075), (23, 22108), (39, 22342), (42, 22384), (48, 22480), (51, 22531), (54, 22558), (55, 22585), (57, 22618), (61, 22660), (67, 22744), (69, 22786), (70, 22789), (72, 22825), (86, 23023), (96, 23113), (101, 23158), (104, 23212), (117, 23299), (121, 23320), (124, 23377), (126, 23383), (129, 23401), (134, 23515), (135, 23536), (140, 23617), (141, 23626), (142, 23638), (144, 23671), (156, 23869), (157, 23872), (162, 23956), (173, 24094), (175, 24106), (177, 24127), (183, 24175), (189, 24220), (199, 24295), (201, 24313), (202, 24328), (206, 24358), (211, 24403), (213, 24415), (218, 24457), (221, 24472), (224, 24514), (229, 24556), (237, 24622), (240, 24646), (242, 24658), (255, 24772), (258, 24790), (267, 24898), (270, 24913), (287, 25099), (309, 25336), (314, 25390), (320, 25531), (322, 25609), (332, 25741), (333, 25774), (347, 25963), (357, 26095), (361, 26185), (366, 26245), (367, 26263), (369, 26272), (370, 26275), (373, 26314), (382, 26413), (391, 26515), (392, 26545),

Gene: Boise\_26 Start: 20099, Stop: 23632, Start Num: 53

Candidate Starts for Boise\_26:

(52, 20090), (Start: 53 @20099 has 1 MA's), (66, 20273), (75, 20438), (77, 20450), (96, 20636), (97, 20657), (99, 20669), (104, 20729), (106, 20738), (115, 20807), (118, 20819), (122, 20843), (123, 20861), (125, 20903), (127, 20912), (137, 21113), (138, 21116), (145, 21209), (146, 21218), (147, 21221), (148, 21248), (151, 21305), (152, 21332), (153, 21341), (158, 21431), (159, 21449), (163, 21494), (170, 21584), (177, 21644), (180, 21671), (183, 21692), (184, 21695), (188, 21725), (189, 21734), (191, 21755), (193, 21764), (196, 21794), (199, 21809), (200, 21821), (211, 21917), (215, 21950), (216, 21959), (231, 22085), (236, 22133), (239, 22154), (250, 22241), (254, 22271), (259, 22304), (277, 22469), (281, 22502), (299, 22757), (300, 22769), (303, 22802), (305, 22811), (310, 22868), (325, 23174), (327, 23195), (328, 23204), (331, 23252), (334, 23303), (338, 23342), (339, 23348), (342, 23405), (352, 23534),

Gene: BruhMoment\_31 Start: 21088, Stop: 25983, Start Num: 1

Candidate Starts for BruhMoment\_31:

(Start: 1 @21088 has 19 MA's), (2, 21106), (3, 21181), (6, 21223), (7, 21235), (10, 21274), (11, 21283), (25, 21451), (26, 21460), (27, 21466), (31, 21520), (39, 21565), (55, 21730), (57, 21763), (60, 21799), (62, 21838), (69, 21964), (70, 21967), (76, 22069), (80, 22111), (81, 22114), (89, 22237), (90, 22249), (93, 22312), (96, 22354), (102, 22411), (104, 22453), (116, 22531), (117, 22540), (120, 22558), (124, 22618), (129, 22642), (133, 22744), (134, 22756), (136, 22807), (141, 22867), (142, 22879), (144, 22912), (149, 22990), (150, 22996), (157, 23113), (173, 23335), (175, 23347), (176, 23353), (177, 23368), (178, 23386), (183, 23416), (185, 23428), (187, 23449), (189, 23461), (190, 23470), (211, 23644), (221, 23713), (230, 23806), (232, 23830), (233, 23842), (234, 23845), (238, 23875), (242, 23902), (258, 24034), (273, 24187), (282, 24271), (287, 24340), (301, 24535), (322, 24997), (324, 25030), (330, 25087), (332, 25129), (335, 25174), (337, 25198), (343, 25294), (345, 25330), (347, 25351), (349, 25363), (354, 25450), (358, 25504), (360, 25561), (362, 25591), (364, 25624), (372, 25678), (373, 25705), (381, 25780), (387, 25855), (393, 25924),

Gene: DogYard\_36 Start: 21418, Stop: 26301, Start Num: 1

Candidate Starts for DogYard\_36:

(Start: 1 @21418 has 19 MA's), (8, 21580), (13, 21697), (15, 21709), (23, 21802), (39, 22036), (42, 22078), (48, 22174), (51, 22225), (54, 22252), (55, 22279), (57, 22312), (61, 22354), (69, 22480), (70, 22483), (72, 22519), (86, 22717), (96, 22807), (101, 22852), (104, 22906), (117, 22993), (121, 23014), (124, 23071), (126, 23077), (129, 23095), (134, 23209), (140, 23311), (141, 23320), (142, 23332), (144, 23365), (156, 23563), (157, 23566), (162, 23650), (173, 23788), (175, 23800), (177, 23821), (183, 23869), (189, 23914), (199, 23989), (202, 24022), (206, 24052), (211, 24097), (213, 24109), (221, 24166), (234, 24298), (237, 24316), (242, 24352), (258, 24484), (267, 24598), (309, 25036), (314, 25090), (320, 25231), (322, 25309), (332, 25441), (333, 25474), (347, 25663), (357, 25795), (361, 25885), (366, 25945), (367, 25963), (369, 25972), (370, 25975), (373, 26014), (382, 26113), (391, 26215), (392, 26245),

Gene: Forrestell\_33 Start: 20211, Stop: 25094, Start Num: 1

Candidate Starts for Forrestell\_33:

(Start: 1 @20211 has 19 MA's), (8, 20373), (13, 20490), (15, 20502), (17, 20529), (19, 20547), (21, 20562), (23, 20595), (39, 20829), (42, 20871), (48, 20967), (51, 21018), (54, 21045), (55, 21072), (57, 21105), (61, 21147), (69, 21273), (70, 21276), (72, 21312), (76, 21378), (86, 21510), (96, 21600), (101, 21645), (104, 21699), (117, 21786), (121, 21807), (124, 21864), (126, 21870), (129, 21888), (133, 21990), (134, 22002), (140, 22104), (141, 22113), (142, 22125), (144, 22158), (156, 22356), (157, 22359), (162, 22443), (173, 22581), (175, 22593), (177, 22614), (179, 22635), (183, 22662), (189, 22707), (199, 22782), (201, 22800), (202, 22815), (206, 22845), (211, 22890), (213, 22902), (218, 22944), (221, 22959), (224, 23001), (234, 23091), (237, 23109), (242, 23145), (258, 23277), (267, 23391), (309, 23829), (314, 23883), (320, 24024), (322, 24102), (332, 24234), (333, 24267), (351, 24510), (357, 24588), (361, 24678), (366, 24738), (367, 24756), (369, 24765), (370, 24768), (373, 24807), (382, 24906), (391, 25008), (392, 25038),

Gene: Hive\_36 Start: 21605, Stop: 26482, Start Num: 1

Candidate Starts for Hive\_36:

(Start: 1 @21605 has 19 MA's), (8, 21767), (13, 21884), (15, 21896), (23, 21989), (39, 22223), (42, 22265), (48, 22361), (51, 22412), (54, 22439), (55, 22466), (57, 22499), (61, 22541), (69, 22667), (70, 22670), (72, 22706), (86, 22904), (96, 22994), (101, 23039), (104, 23093), (117, 23180), (121, 23201), (126, 23264), (129, 23282), (134, 23396), (140, 23498), (141, 23507), (142, 23519), (144, 23552), (156, 23750), (157, 23753), (162, 23837), (173, 23975), (175, 23987), (177, 24008), (183, 24056), (189, 24101), (199, 24176), (202, 24209), (206, 24239), (211, 24284), (213, 24296), (221, 24353), (224, 24395), (229, 24437), (237, 24503), (240, 24527), (242, 24539), (255, 24653), (258, 24671), (267, 24779), (270, 24794), (309, 25217), (314, 25271), (320, 25412), (322, 25490), (332, 25622), (333, 25655), (347, 25844), (357, 25976), (361, 26066), (366, 26126), (367, 26144), (369, 26153), (370, 26156), (373, 26195), (376, 26258), (382, 26294), (391, 26396), (392, 26426),

Gene: Kubulix\_37 Start: 21714, Stop: 26597, Start Num: 1

Candidate Starts for Kubulix\_37:

(Start: 1 @21714 has 19 MA's), (8, 21876), (13, 21993), (15, 22005), (17, 22032), (21, 22065), (23, 22098), (39, 22332), (42, 22374), (48, 22470), (51, 22521), (54, 22548), (55, 22575), (57, 22608), (61, 22650), (69, 22776), (70, 22779), (72, 22815), (86, 23013), (96, 23103), (101, 23148), (104, 23202), (117, 23289), (121, 23310), (124, 23367), (126, 23373), (129, 23391), (134, 23505), (140, 23607), (141, 23616), (142, 23628), (144, 23661), (156, 23859), (157, 23862), (162, 23946), (173, 24084), (175, 24096), (177, 24117), (183, 24165), (189, 24210), (199, 24285), (202, 24318), (206, 24348), (211, 24393), (213, 24405), (221, 24462), (234, 24594), (237, 24612), (242, 24648), (258, 24780), (267, 24894), (309, 25332), (314, 25386), (320, 25527), (322, 25605), (332, 25737), (333, 25770), (347, 25959), (357, 26091), (361, 26181), (366, 26241), (367, 26259), (369, 26268), (370, 26271), (373, 26310), (376, 26373), (382, 26409), (391, 26511), (392, 26541),

Gene: MellowYellow\_33 Start: 20265, Stop: 25142, Start Num: 1

Candidate Starts for MellowYellow\_33:

(Start: 1 @20265 has 19 MA's), (8, 20427), (13, 20544), (15, 20556), (17, 20583), (21, 20616), (23, 20649), (39, 20883), (42, 20925), (48, 21021), (51, 21072), (54, 21099), (55, 21126), (57, 21159), (61, 21201), (69, 21327), (70, 21330), (72, 21366), (76, 21432), (86, 21564), (96, 21654), (101, 21699), (104, 21753), (117, 21840), (121, 21861), (124, 21918), (126, 21924), (129, 21942), (133, 22044), (134, 22056), (140, 22158), (141, 22167), (142, 22179), (144, 22212), (157, 22413), (162, 22497), (173, 22635), (175, 22647), (177, 22668), (179, 22689), (183, 22716), (189, 22761), (199, 22836), (201, 22854), (202, 22869), (206, 22899), (211, 22944), (213, 22956), (218, 22998), (221, 23013), (224, 23055), (232, 23130), (234, 23145), (237, 23163), (242, 23199), (255, 23313), (258, 23331), (267, 23439), (270, 23454), (287, 23640), (309, 23877), (314, 23931), (320, 24072), (322, 24150), (332, 24282), (333, 24315), (347, 24504), (357, 24636), (361, 24726), (366, 24786), (367, 24804), (369, 24813), (370, 24816), (373, 24855), (382, 24954), (391, 25056), (392, 25086),

Gene: Nikan\_31 Start: 20595, Stop: 25382, Start Num: 1

Candidate Starts for Nikan\_31:

(Start: 1 @20595 has 19 MA's), (4, 20697), (5, 20712), (6, 20733), (10, 20781), (12, 20826), (17, 20895), (18, 20898), (25, 20937), (31, 20979), (38, 21009), (39, 21012), (51, 21123), (57, 21210), (58, 21213), (59, 21228), (69, 21378), (70, 21381), (80, 21525), (92, 21663), (96, 21705), (101, 21750), (104, 21804), (110, 21837), (124, 21969), (129, 21993), (134, 22107), (140, 22209), (141, 22218), (142, 22230), (144, 22263), (156, 22461), (157, 22464), (162, 22548), (173, 22686), (174, 22695), (186, 22788), (189, 22812), (193, 22842), (199, 22887), (205, 22938), (206, 22950), (211, 22995), (214, 23025), (217, 23049), (219, 23052), (220, 23064), (225, 23127), (232, 23184), (235, 23199), (266, 23463), (267, 23469), (283, 23637), (290, 23718), (293, 23772), (296, 23844), (297, 23874), (298, 23883), (301, 23928), (308, 23997), (310, 24099), (319, 24303), (324, 24423), (325, 24435), (335, 24567), (340, 24642), (348, 24753), (349, 24756), (350, 24789), (351, 24798), (356, 24873), (371, 25059), (373, 25095), (376, 25158), (380, 25185), (384, 25239), (385, 25242), (386, 25260),

(388, 25278), (391, 25305), (392, 25335),

Gene: NyleyClemson\_31 Start: 20192, Stop: 25075, Start Num: 1

Candidate Starts for NyleyClemson\_31:

(Start: 1 @20192 has 19 MA's), (8, 20354), (13, 20471), (15, 20483), (17, 20510), (19, 20528), (21, 20543), (23, 20576), (39, 20810), (42, 20852), (48, 20948), (51, 20999), (54, 21026), (55, 21053), (57, 21086), (61, 21128), (69, 21254), (70, 21257), (72, 21293), (76, 21359), (86, 21491), (96, 21581), (100, 21620), (101, 21626), (104, 21680), (117, 21767), (121, 21788), (124, 21845), (126, 21851), (129, 21869), (133, 21971), (134, 21983), (140, 22085), (141, 22094), (142, 22106), (144, 22139), (157, 22340), (162, 22424), (173, 22562), (175, 22574), (177, 22595), (179, 22616), (183, 22643), (189, 22688), (199, 22763), (201, 22781), (202, 22796), (206, 22826), (211, 22871), (213, 22883), (218, 22925), (221, 22940), (224, 22982), (232, 23057), (234, 23072), (237, 23090), (242, 23126), (258, 23258), (267, 23372), (287, 23573), (309, 23810), (314, 23864), (320, 24005), (322, 24083), (332, 24215), (333, 24248), (351, 24491), (357, 24569), (361, 24659), (366, 24719), (367, 24737), (369, 24746), (370, 24749), (373, 24788), (382, 24887), (391, 24989), (392, 25019),

Gene: Odyssey395\_38 Start: 21543, Stop: 26426, Start Num: 1

Candidate Starts for Odyssey395\_38:

(Start: 1 @21543 has 19 MA's), (8, 21705), (13, 21822), (15, 21834), (17, 21861), (21, 21894), (23, 21927), (39, 22161), (42, 22203), (48, 22299), (51, 22350), (54, 22377), (55, 22404), (57, 22437), (61, 22479), (69, 22605), (70, 22608), (72, 22644), (86, 22842), (96, 22932), (101, 22977), (104, 23031), (117, 23118), (121, 23139), (124, 23196), (126, 23202), (129, 23220), (134, 23334), (140, 23436), (141, 23445), (142, 23457), (144, 23490), (156, 23688), (157, 23691), (162, 23775), (173, 23913), (175, 23925), (177, 23946), (183, 23994), (189, 24039), (199, 24114), (202, 24147), (206, 24177), (211, 24222), (213, 24234), (221, 24291), (234, 24423), (237, 24441), (242, 24477), (258, 24609), (267, 24723), (309, 25161), (314, 25215), (320, 25356), (322, 25434), (332, 25566), (333, 25599), (347, 25788), (357, 25920), (361, 26010), (366, 26070), (367, 26088), (369, 26097), (370, 26100), (373, 26139), (382, 26238), (391, 26340), (392, 26370),

Gene: Ollypop\_34 Start: 20617, Stop: 25488, Start Num: 1

Candidate Starts for Ollypop\_34:

(Start: 1 @20617 has 19 MA's), (4, 20719), (5, 20734), (6, 20755), (10, 20803), (12, 20848), (17, 20917), (18, 20920), (25, 20959), (31, 21001), (38, 21031), (39, 21034), (51, 21145), (57, 21232), (58, 21235), (59, 21250), (65, 21316), (69, 21400), (70, 21403), (76, 21505), (80, 21547), (89, 21673), (93, 21748), (96, 21790), (102, 21847), (104, 21889), (107, 21901), (117, 21976), (120, 21994), (126, 22060), (129, 22078), (134, 22192), (141, 22303), (142, 22315), (144, 22348), (150, 22432), (157, 22549), (173, 22771), (175, 22783), (177, 22804), (178, 22822), (183, 22852), (189, 22897), (190, 22906), (214, 23110), (233, 23278), (235, 23290), (242, 23338), (245, 23371), (248, 23392), (251, 23413), (267, 23569), (283, 23737), (293, 23872), (295, 23932), (297, 23980), (298, 23989), (319, 24409), (322, 24496), (332, 24628), (333, 24661), (335, 24673), (337, 24697), (340, 24748), (348, 24859), (349, 24862), (356, 24979), (359, 25015), (371, 25165), (373, 25201), (376, 25264), (380, 25291), (386, 25366), (391, 25411), (392, 25441),

Gene: PhuzzTulsa\_34 Start: 21503, Stop: 26386, Start Num: 1

Candidate Starts for PhuzzTulsa\_34:

(Start: 1 @21503 has 19 MA's), (8, 21665), (13, 21782), (15, 21794), (17, 21821), (21, 21854), (23, 21887), (39, 22121), (42, 22163), (48, 22259), (51, 22310), (54, 22337), (55, 22364), (57, 22397), (61, 22439), (69, 22565), (70, 22568), (72, 22604), (76, 22670), (86, 22802), (96, 22892), (101, 22937), (104, 22991), (117, 23078), (121, 23099), (124, 23156), (126, 23162), (129, 23180), (134, 23294), (140, 23396), (141, 23405), (142, 23417), (144, 23450), (157, 23651), (162, 23735), (173, 23873), (175, 23885), (177, 23906), (183, 23954), (189, 23999), (199, 24074), (201, 24092), (202, 24107), (206, 24137), (211, 24182), (213, 24194), (218, 24236), (221, 24251), (224, 24293), (232, 24368), (234, 24383), (237, 24401), (242, 24437), (258, 24569), (267, 24683), (287, 24884), (309, 25121),

(314, 25175), (320, 25316), (322, 25394), (332, 25526), (333, 25559), (347, 25748), (357, 25880), (361, 25970), (366, 26030), (367, 26048), (369, 26057), (370, 26060), (373, 26099), (382, 26198), (391, 26300), (392, 26330),

Gene: Pointis\_36 Start: 21547, Stop: 26424, Start Num: 1

Candidate Starts for Pointis\_36:

(Start: 1 @21547 has 19 MA's), (8, 21709), (13, 21826), (15, 21838), (17, 21865), (21, 21898), (23, 21931), (39, 22165), (42, 22207), (48, 22303), (51, 22354), (54, 22381), (55, 22408), (57, 22441), (61, 22483), (69, 22609), (70, 22612), (72, 22648), (76, 22714), (86, 22846), (96, 22936), (101, 22981), (104, 23035), (117, 23122), (121, 23143), (124, 23200), (126, 23206), (129, 23224), (134, 23338), (140, 23440), (141, 23449), (142, 23461), (144, 23494), (156, 23692), (157, 23695), (162, 23779), (173, 23917), (175, 23929), (177, 23950), (183, 23998), (189, 24043), (199, 24118), (201, 24136), (202, 24151), (206, 24181), (211, 24226), (213, 24238), (221, 24295), (234, 24427), (237, 24445), (240, 24469), (242, 24481), (258, 24613), (267, 24721), (270, 24736), (274, 24790), (309, 25159), (314, 25213), (320, 25354), (322, 25432), (332, 25564), (333, 25597), (347, 25786), (357, 25918), (361, 26008), (366, 26068), (367, 26086), (369, 26095), (370, 26098), (373, 26137), (382, 26236), (391, 26338), (392, 26368),

Gene: Popstraw\_34 Start: 21333, Stop: 26210, Start Num: 1

Candidate Starts for Popstraw\_34:

(Start: 1 @21333 has 19 MA's), (8, 21495), (13, 21612), (15, 21624), (23, 21717), (39, 21951), (42, 21993), (48, 22089), (51, 22140), (54, 22167), (55, 22194), (57, 22227), (61, 22269), (67, 22353), (69, 22395), (70, 22398), (72, 22434), (76, 22500), (86, 22632), (96, 22722), (101, 22767), (104, 22821), (117, 22908), (121, 22929), (124, 22986), (126, 22992), (129, 23010), (134, 23124), (135, 23145), (140, 23226), (141, 23235), (142, 23247), (144, 23280), (156, 23478), (157, 23481), (162, 23565), (173, 23703), (175, 23715), (177, 23736), (183, 23784), (189, 23829), (199, 23904), (201, 23922), (202, 23937), (206, 23967), (211, 24012), (213, 24024), (218, 24066), (221, 24081), (224, 24123), (229, 24165), (237, 24231), (240, 24255), (242, 24267), (255, 24381), (258, 24399), (267, 24507), (270, 24522), (309, 24945), (314, 24999), (320, 25140), (322, 25218), (332, 25350), (333, 25383), (347, 25572), (357, 25704), (361, 25794), (366, 25854), (367, 25872), (369, 25881), (370, 25884), (373, 25923), (376, 25986), (382, 26022), (391, 26124), (392, 26154),

Gene: Pureglobe5\_38 Start: 21730, Stop: 26607, Start Num: 1

Candidate Starts for Pureglobe5\_38:

(Start: 1 @21730 has 19 MA's), (8, 21892), (13, 22009), (15, 22021), (17, 22048), (21, 22081), (23, 22114), (39, 22348), (42, 22390), (48, 22486), (51, 22537), (54, 22564), (55, 22591), (57, 22624), (61, 22666), (69, 22792), (70, 22795), (72, 22831), (76, 22897), (86, 23029), (96, 23119), (101, 23164), (104, 23218), (117, 23305), (121, 23326), (124, 23383), (126, 23389), (129, 23407), (134, 23521), (140, 23623), (141, 23632), (142, 23644), (144, 23677), (156, 23875), (157, 23878), (162, 23962), (173, 24100), (175, 24112), (177, 24133), (183, 24181), (189, 24226), (199, 24301), (201, 24319), (202, 24334), (206, 24364), (211, 24409), (213, 24421), (218, 24463), (221, 24478), (224, 24520), (229, 24562), (237, 24628), (240, 24652), (242, 24664), (255, 24778), (258, 24796), (267, 24904), (270, 24919), (287, 25105), (309, 25342), (314, 25396), (320, 25537), (322, 25615), (333, 25780), (347, 25969), (357, 26101), (361, 26191), (366, 26251), (367, 26269), (369, 26278), (370, 26281), (373, 26320), (382, 26419), (391, 26521), (392, 26551),

Gene: RIPWilbur\_34 Start: 20857, Stop: 25740, Start Num: 1

Candidate Starts for RIPWilbur\_34:

(Start: 1 @20857 has 19 MA's), (8, 21019), (13, 21136), (15, 21148), (17, 21175), (21, 21208), (23, 21241), (39, 21475), (42, 21517), (48, 21613), (51, 21664), (54, 21691), (55, 21718), (57, 21751), (61, 21793), (69, 21919), (70, 21922), (72, 21958), (76, 22024), (86, 22156), (96, 22246), (101, 22291), (104, 22345), (117, 22432), (121, 22453), (124, 22510), (126, 22516), (129, 22534), (134, 22648), (135, 22669), (140, 22750), (141, 22759), (142, 22771), (144, 22804), (156, 23002), (157, 23005),

(162, 23089), (173, 23227), (175, 23239), (177, 23260), (183, 23308), (189, 23353), (199, 23428), (201, 23446), (202, 23461), (206, 23491), (211, 23536), (213, 23548), (218, 23590), (221, 23605), (224, 23647), (237, 23755), (240, 23779), (258, 23923), (267, 24037), (287, 24238), (309, 24475), (314, 24529), (320, 24670), (322, 24748), (332, 24880), (333, 24913), (347, 25102), (357, 25234), (361, 25324), (366, 25384), (367, 25402), (369, 25411), (370, 25414), (373, 25453), (382, 25552), (391, 25654), (392, 25684),

Gene: Ranunculus\_30 Start: 20630, Stop: 25639, Start Num: 1

Candidate Starts for Ranunculus\_30:

(Start: 1 @20630 has 19 MA's), (9, 20813), (12, 20858), (13, 20906), (22, 21002), (34, 21155), (40, 21218), (42, 21245), (46, 21278), (48, 21290), (51, 21338), (56, 21404), (57, 21425), (69, 21593), (70, 21596), (80, 21740), (81, 21743), (84, 21800), (86, 21830), (91, 21887), (104, 22019), (119, 22115), (120, 22124), (124, 22184), (129, 22208), (134, 22322), (141, 22433), (142, 22445), (144, 22478), (149, 22556), (156, 22676), (157, 22679), (162, 22763), (175, 22913), (177, 22934), (183, 22982), (189, 23027), (201, 23120), (202, 23135), (206, 23165), (211, 23210), (213, 23222), (218, 23264), (221, 23279), (224, 23321), (237, 23429), (240, 23453), (242, 23465), (246, 23507), (258, 23597), (266, 23699), (267, 23705), (269, 23717), (270, 23720), (284, 23915), (285, 23927), (286, 23957), (287, 23987), (319, 24560), (324, 24680), (325, 24692), (332, 24779), (333, 24812), (335, 24824), (337, 24848), (340, 24899), (348, 25010), (349, 25013), (356, 25130), (359, 25166), (363, 25241), (366, 25283), (373, 25352), (374, 25367), (378, 25430), (379, 25439), (380, 25442), (390, 25547),

Gene: RazzB\_32 Start: 20011, Stop: 24888, Start Num: 1

Candidate Starts for RazzB\_32:

(Start: 1 @20011 has 19 MA's), (8, 20173), (13, 20290), (15, 20302), (17, 20329), (19, 20347), (21, 20362), (23, 20395), (24, 20404), (39, 20629), (42, 20671), (48, 20767), (51, 20818), (54, 20845), (55, 20872), (57, 20905), (61, 20947), (69, 21073), (70, 21076), (72, 21112), (76, 21178), (86, 21310), (96, 21400), (101, 21445), (104, 21499), (117, 21586), (121, 21607), (124, 21664), (126, 21670), (129, 21688), (133, 21790), (134, 21802), (140, 21904), (141, 21913), (142, 21925), (144, 21958), (157, 22159), (162, 22243), (173, 22381), (175, 22393), (177, 22414), (179, 22435), (183, 22462), (189, 22507), (199, 22582), (201, 22600), (202, 22615), (206, 22645), (211, 22690), (213, 22702), (218, 22744), (221, 22759), (224, 22801), (232, 22876), (234, 22891), (237, 22909), (242, 22945), (255, 23059), (258, 23077), (267, 23185), (270, 23200), (287, 23386), (309, 23623), (314, 23677), (320, 23818), (322, 23896), (332, 24028), (333, 24061), (347, 24250), (357, 24382), (361, 24472), (366, 24532), (367, 24550), (369, 24559), (370, 24562), (373, 24601), (382, 24700), (391, 24802), (392, 24832),

Gene: Ren19\_29 Start: 20595, Stop: 25382, Start Num: 1

Candidate Starts for Ren19\_29:

(Start: 1 @20595 has 19 MA's), (4, 20697), (5, 20712), (6, 20733), (10, 20781), (12, 20826), (17, 20895), (18, 20898), (25, 20937), (31, 20979), (38, 21009), (39, 21012), (51, 21123), (57, 21210), (58, 21213), (59, 21228), (69, 21378), (70, 21381), (80, 21525), (92, 21663), (96, 21705), (101, 21750), (104, 21804), (110, 21837), (124, 21969), (129, 21993), (134, 22107), (140, 22209), (141, 22218), (142, 22230), (144, 22263), (156, 22461), (157, 22464), (162, 22548), (173, 22686), (174, 22695), (186, 22788), (189, 22812), (193, 22842), (199, 22887), (205, 22938), (206, 22950), (211, 22995), (214, 23025), (217, 23049), (219, 23052), (220, 23064), (225, 23127), (232, 23184), (235, 23199), (266, 23463), (267, 23469), (283, 23637), (290, 23718), (293, 23772), (296, 23844), (297, 23874), (298, 23883), (301, 23928), (308, 23997), (310, 24099), (319, 24303), (324, 24423), (325, 24435), (335, 24567), (340, 24642), (348, 24753), (349, 24756), (350, 24789), (351, 24798), (356, 24873), (357, 24876), (359, 24909), (361, 24966), (365, 25017), (368, 25050), (371, 25059), (373, 25095), (376, 25158), (380, 25185), (384, 25239), (385, 25242), (386, 25260), (388, 25278), (391, 25305), (392, 25335),

Gene: Rizwana\_29 Start: 20756, Stop: 25231, Start Num: 1

Candidate Starts for Rizwana\_29:

(Start: 1 @20756 has 19 MA's), (3, 20843), (7, 20900), (8, 20912), (11, 20945), (15, 21038), (16, 21047), (32, 21194), (33, 21197), (41, 21263), (43, 21281), (44, 21284), (45, 21302), (47, 21335), (50, 21383), (51, 21395), (55, 21449), (57, 21482), (69, 21704), (73, 21752), (74, 21764), (77, 21818), (78, 21824), (80, 21851), (82, 21860), (83, 21869), (84, 21911), (85, 21914), (94, 22016), (96, 22031), (97, 22052), (98, 22061), (102, 22088), (103, 22112), (108, 22154), (129, 22322), (131, 22376), (134, 22436), (136, 22487), (141, 22547), (142, 22559), (143, 22589), (149, 22670), (154, 22739), (156, 22790), (157, 22793), (161, 22868), (163, 22889), (164, 22916), (166, 22925), (169, 22949), (183, 23093), (192, 23165), (197, 23201), (198, 23210), (205, 23264), (206, 23276), (207, 23279), (209, 23306), (222, 23420), (226, 23453), (227, 23456), (230, 23483), (232, 23507), (243, 23573), (247, 23621), (249, 23630), (261, 23666), (279, 23747), (313, 24155), (321, 24320), (325, 24431), (332, 24518), (354, 24698), (355, 24719), (356, 24728), (358, 24752), (362, 24839), (364, 24872), (373, 24953), (383, 25061), (389, 25148), (394, 25199),

Gene: RomansRevenge\_27 Start: 20099, Stop: 23632, Start Num: 53

Candidate Starts for RomansRevenge\_27:

(52, 20090), (Start: 53 @20099 has 1 MA's), (66, 20273), (75, 20438), (77, 20450), (96, 20636), (97, 20657), (99, 20669), (104, 20729), (106, 20738), (115, 20807), (118, 20819), (122, 20843), (123, 20861), (125, 20903), (127, 20912), (137, 21113), (138, 21116), (145, 21209), (146, 21218), (147, 21221), (148, 21248), (151, 21305), (152, 21332), (153, 21341), (158, 21431), (159, 21449), (163, 21494), (170, 21584), (177, 21644), (180, 21671), (183, 21692), (184, 21695), (188, 21725), (189, 21734), (191, 21755), (193, 21764), (196, 21794), (199, 21809), (200, 21821), (211, 21917), (215, 21950), (216, 21959), (231, 22085), (236, 22133), (239, 22154), (250, 22241), (254, 22271), (259, 22304), (277, 22469), (281, 22502), (299, 22757), (300, 22769), (303, 22802), (305, 22811), (310, 22868), (325, 23174), (327, 23195), (328, 23204), (331, 23252), (334, 23303), (338, 23342), (339, 23348), (342, 23405), (352, 23534),

Gene: SilentRX\_31 Start: 21787, Stop: 25887, Start Num: 1

Candidate Starts for SilentRX\_31:

(Start: 1 @21787 has 19 MA's), (3, 21880), (7, 21937), (11, 21982), (12, 22015), (14, 22072), (16, 22084), (20, 22126), (28, 22174), (29, 22189), (30, 22207), (31, 22228), (32, 22231), (33, 22234), (35, 22285), (39, 22342), (49, 22420), (51, 22453), (57, 22540), (59, 22558), (69, 22708), (71, 22729), (76, 22813), (79, 22837), (80, 22855), (82, 22864), (87, 22972), (95, 23023), (101, 23080), (102, 23092), (111, 23176), (113, 23200), (124, 23302), (129, 23326), (130, 23335), (132, 23425), (134, 23440), (136, 23491), (139, 23530), (141, 23548), (142, 23560), (144, 23593), (149, 23671), (155, 23749), (162, 23878), (163, 23890), (167, 23938), (171, 23995), (172, 24004), (182, 24079), (194, 24190), (195, 24193), (203, 24250), (205, 24265), (211, 24322), (212, 24325), (214, 24352), (223, 24433), (228, 24466), (230, 24487), (233, 24523), (241, 24550), (242, 24556), (250, 24619), (252, 24631), (253, 24640), (254, 24646), (257, 24664), (260, 24703), (263, 24724), (264, 24745), (265, 24751), (268, 24766), (271, 24781), (273, 24802), (276, 24829), (278, 24838), (289, 24934), (291, 24961), (292, 24967), (294, 25003), (302, 25117), (307, 25159), (314, 25237), (315, 25258), (316, 25261), (317, 25327), (321, 25390), (325, 25489), (329, 25522), (335, 25603), (353, 25840),

Gene: Tank\_31 Start: 20703, Stop: 25535, Start Num: 1

Candidate Starts for Tank\_31:

(Start: 1 @20703 has 19 MA's), (3, 20790), (7, 20847), (11, 20892), (16, 20994), (20, 21036), (32, 21141), (33, 21144), (36, 21228), (37, 21231), (44, 21318), (47, 21369), (50, 21417), (55, 21483), (57, 21516), (63, 21594), (64, 21612), (68, 21717), (69, 21738), (74, 21798), (77, 21852), (78, 21858), (80, 21885), (83, 21903), (84, 21945), (85, 21948), (88, 22008), (98, 22095), (102, 22122), (103, 22146), (105, 22170), (108, 22188), (109, 22194), (112, 22221), (123, 22293), (128, 22347), (129, 22356), (134, 22470), (136, 22521), (137, 22542), (141, 22581), (142, 22593), (143, 22623), (154, 22773), (160, 22881), (163, 22923), (165, 22953), (168, 22980), (169, 22983), (195, 23226), (197, 23235), (206, 23310), (207, 23313), (208, 23331), (210, 23352), (212, 23358), (227, 23490), (244, 23622),

(247, 23655), (256, 23724), (275, 23898), (288, 24021), (298, 24159), (304, 24225), (305, 24228), (319, 24468), (321, 24489), (322, 24555), (326, 24621), (332, 24687), (333, 24720), (336, 24753), (337, 24756), (341, 24819), (344, 24885), (346, 24897), (347, 24909), (348, 24918), (354, 25002), (355, 25023), (362, 25143), (364, 25176), (373, 25257), (377, 25332), (382, 25356), (383, 25365),

Gene: Wilde\_31 Start: 20632, Stop: 25377, Start Num: 1

Candidate Starts for Wilde\_31:

(Start: 1 @20632 has 19 MA's), (3, 20719), (7, 20776), (8, 20788), (10, 20812), (11, 20821), (16, 20923), (21, 20977), (32, 21070), (33, 21073), (44, 21160), (47, 21211), (50, 21259), (55, 21325), (57, 21358), (63, 21436), (64, 21454), (68, 21559), (69, 21580), (74, 21640), (77, 21694), (78, 21700), (80, 21727), (83, 21745), (84, 21787), (85, 21790), (88, 21850), (98, 21937), (102, 21964), (103, 21988), (105, 22012), (108, 22030), (109, 22036), (112, 22063), (123, 22135), (128, 22189), (129, 22198), (134, 22312), (136, 22363), (137, 22384), (141, 22423), (142, 22435), (143, 22465), (154, 22615), (160, 22723), (163, 22765), (165, 22795), (168, 22822), (169, 22825), (194, 23065), (195, 23068), (197, 23077), (206, 23152), (207, 23155), (208, 23173), (210, 23194), (212, 23200), (227, 23332), (244, 23464), (247, 23497), (256, 23566), (275, 23740), (288, 23863), (298, 24001), (304, 24067), (305, 24070), (319, 24310), (321, 24331), (322, 24397), (326, 24463), (332, 24529), (333, 24562), (336, 24595), (341, 24661), (344, 24727), (346, 24739), (347, 24751), (354, 24844), (355, 24865), (362, 24985), (364, 25018), (373, 25099), (375, 25144), (377, 25174), (382, 25198), (383, 25207),