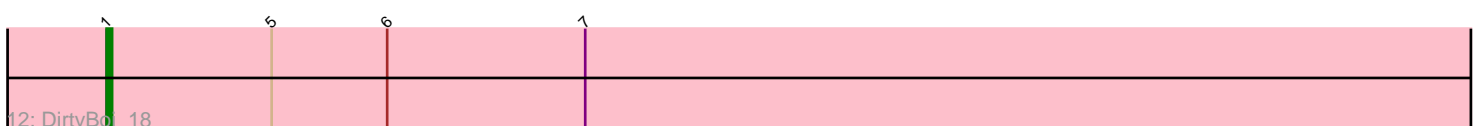
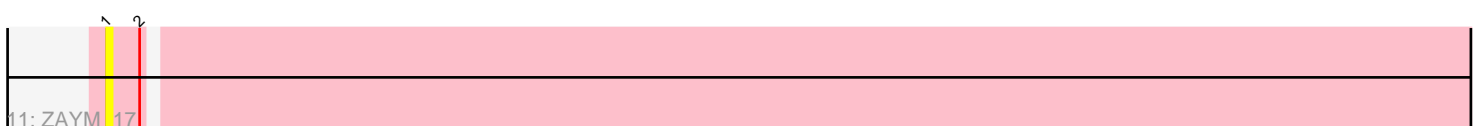
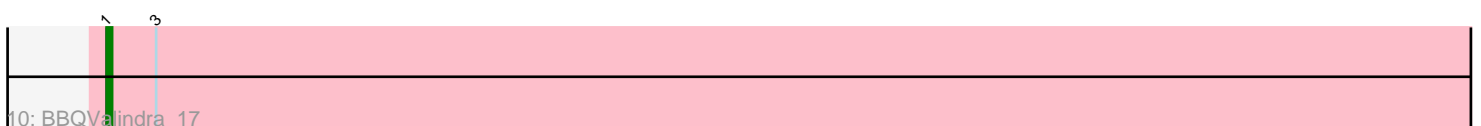
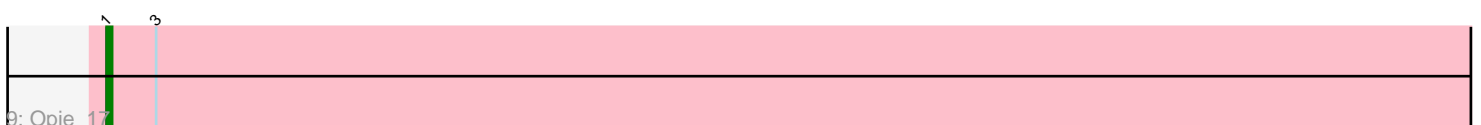
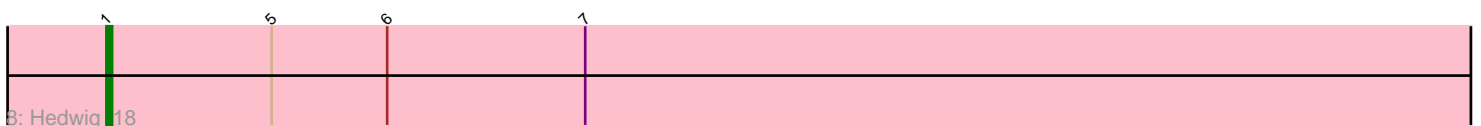
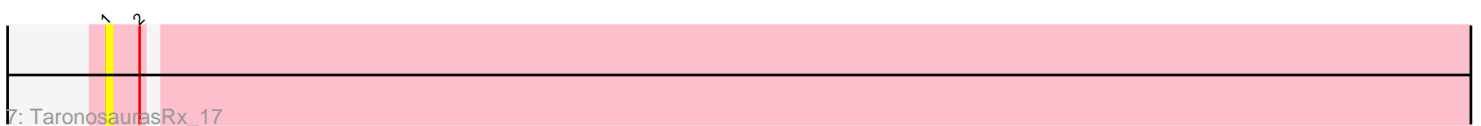
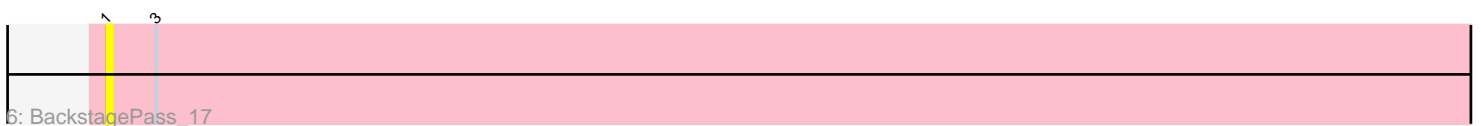
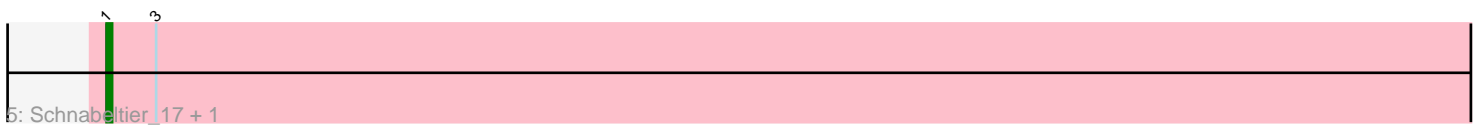
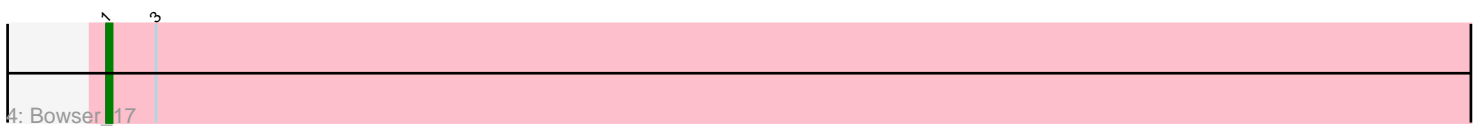
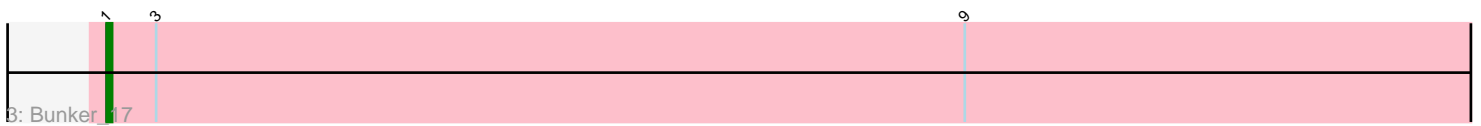
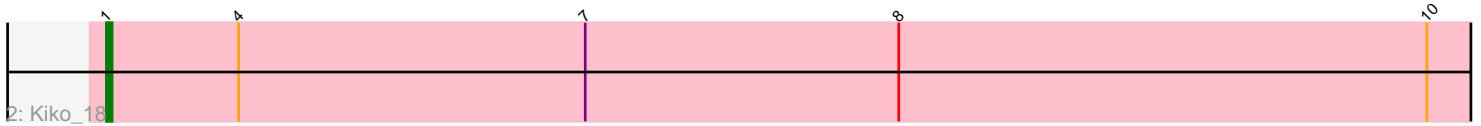
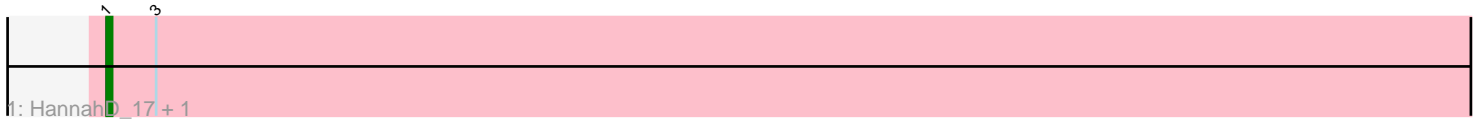


# Zoomed Pham 163087



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 163087 Report

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

Pham number 163087 has 15 members, 3 are drafts.

Phages represented in each track:

- Track 1 : HannahD\_17, GEazy\_17
- Track 2 : Kiko\_18
- Track 3 : Bunker\_17
- Track 4 : Bowser\_17
- Track 5 : Schnabeltier\_17, MagicMan\_17
- Track 6 : BackstagePass\_17
- Track 7 : TaronosaurusRx\_17
- Track 8 : Hedwig\_18
- Track 9 : Opie\_17
- Track 10 : BBQValindra\_17
- Track 11 : ZAYM\_17
- Track 12 : DirtyBoi\_18
- Track 13 : Eyes\_17

### ***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 12 of the 12 non-draft genes in the pham.

Genes that call this "Most Annotated" start:

- BBQValindra\_17, BackstagePass\_17, Bowser\_17, Bunker\_17, DirtyBoi\_18, Eyes\_17, GEazy\_17, HannahD\_17, Hedwig\_18, Kiko\_18, MagicMan\_17, Opie\_17, Schnabeltier\_17, TaronosaurusRx\_17, ZAYM\_17,

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

- 

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

- 

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

Start 1:

- Found in 15 of 15 ( 100.0% ) of genes in pham

- Manual Annotations of this start: 12 of 12
- Called 100.0% of time when present
- Phage (with cluster) where this start called: BBQValindra\_17 (DB), BackstagePass\_17 (DB), Bowser\_17 (DB), Bunker\_17 (DB), DirtyBoi\_18 (DB), Eyes\_17 (DB), GEazy\_17 (DB), HannahD\_17 (DB), Hedwig\_18 (DB), Kiko\_18 (DB), MagicMan\_17 (DB), Opie\_17 (DB), Schnabeltier\_17 (DB), TaronosaurusRx\_17 (DB), ZAYM\_17 (DB),

### Summary by clusters:

There is one cluster represented in this pham: DB

Info for manual annotations of cluster DB:

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

### Gene Information:

Gene: BBQValindra\_17 Start: 10583, Stop: 15709, Start Num: 1

Candidate Starts for BBQValindra\_17:

(Start: 1 @10583 has 12 MA's), (3, 10592), (13, 10865), (14, 10874), (15, 10904), (21, 10970), (33, 11126), (35, 11144), (43, 11297), (45, 11339), (47, 11426), (50, 11618), (55, 11735), (57, 11774), (58, 11858), (59, 11867), (60, 11891), (61, 11900), (62, 11909), (63, 11942), (64, 11954), (65, 11978), (67, 12023), (68, 12032), (69, 12068), (73, 12104), (74, 12116), (75, 12134), (77, 12170), (81, 12293), (85, 12335), (87, 12359), (92, 12470), (93, 12473), (94, 12476), (96, 12491), (99, 12545), (101, 12584), (109, 12665), (112, 12680), (114, 12701), (115, 12716), (116, 12728), (117, 12764), (120, 12800), (129, 12962), (136, 13019), (141, 13031), (142, 13034), (144, 13067), (145, 13073), (146, 13085), (150, 13160), (151, 13166), (152, 13172), (153, 13193), (154, 13196), (155, 13199), (159, 13262), (160, 13298), (162, 13313), (163, 13337), (165, 13352), (166, 13355), (169, 13415), (170, 13514), (171, 13556), (173, 13634), (177, 13703), (178, 13721), (180, 13829), (181, 13832), (182, 13838), (183, 13856), (184, 13859), (185, 13880), (186, 13898), (187, 13901), (188, 13910), (191, 14015), (192, 14045), (193, 14063), (194, 14069), (199, 14129), (202, 14189), (204, 14237), (205, 14267), (208, 14315), (210, 14327), (212, 14387), (217, 14444), (218, 14462), (219, 14507), (220, 14534), (221, 14552), (222, 14582), (223, 14591), (225, 14630), (226, 14636), (227, 14645), (234, 14804), (235, 14846), (240, 15038), (241, 15041), (242, 15098), (243, 15107), (244, 15119), (245, 15140), (250, 15353), (251, 15392), (253, 15461), (254, 15515), (258, 15668), (260, 15692),

Gene: BackstagePass\_17 Start: 10561, Stop: 15849, Start Num: 1

Candidate Starts for BackstagePass\_17:

(Start: 1 @10561 has 12 MA's), (3, 10570), (13, 10843), (14, 10852), (15, 10882), (20, 10945), (22, 10957), (23, 10972), (26, 10999), (32, 11083), (33, 11104), (36, 11131), (37, 11143), (43, 11275), (45, 11317), (46, 11371), (47, 11404), (52, 11605), (54, 11683), (58, 11836), (60, 11869), (61, 11878), (62, 11887), (63, 11920), (64, 11932), (65, 11956), (67, 12001), (70, 12055), (72, 12079), (73, 12082), (74, 12094), (75, 12112), (77, 12148), (81, 12271), (85, 12313), (92, 12448), (94, 12454), (96, 12469), (100, 12559), (101, 12562), (104, 12586), (106, 12613), (110, 12646), (112, 12658), (114, 12679), (116, 12706), (120, 12778), (130, 12949), (131, 12952), (132, 12964), (133, 12973), (137, 13057), (139, 13102), (144, 13174), (146, 13192), (147, 13225), (148, 13237), (151, 13273), (155, 13306), (158, 13357), (160, 13405), (163, 13444), (165, 13459), (166, 13462), (167, 13468), (168, 13513), (170, 13621), (171, 13663), (173, 13741), (176, 13765), (177, 13810), (180, 13933), (181, 13936), (184, 13963), (185, 13984), (186, 14002), (187, 14005), (188, 14014), (191, 14119), (194, 14173), (206, 14398), (207, 14434), (212, 14524), (214, 14566), (219, 14647), (220, 14674), (221, 14692), (223, 14731), (225, 14770), (226, 14776), (227, 14785), (234, 14944), (235, 14986), (240, 15178),

(241, 15181), (243, 15247), (244, 15259), (245, 15280), (246, 15283), (250, 15493), (251, 15532), (253, 15601), (254, 15655), (258, 15808),

Gene: Bowser\_17 Start: 10588, Stop: 15702, Start Num: 1

Candidate Starts for Bowser\_17:

(Start: 1 @10588 has 12 MA's), (3, 10597), (13, 10870), (14, 10879), (15, 10909), (16, 10918), (21, 10975), (29, 11038), (32, 11110), (33, 11131), (35, 11149), (43, 11302), (45, 11344), (46, 11398), (51, 11626), (55, 11740), (57, 11779), (58, 11863), (60, 11896), (61, 11905), (62, 11914), (63, 11947), (64, 11959), (65, 11983), (67, 12028), (69, 12073), (73, 12109), (74, 12121), (75, 12139), (77, 12175), (81, 12298), (82, 12322), (85, 12340), (92, 12475), (94, 12481), (95, 12493), (96, 12496), (99, 12550), (101, 12589), (103, 12610), (104, 12613), (105, 12631), (106, 12640), (112, 12685), (114, 12706), (116, 12733), (121, 12811), (129, 12967), (136, 13024), (141, 13036), (142, 13039), (144, 13072), (146, 13090), (150, 13165), (151, 13171), (152, 13177), (153, 13198), (154, 13201), (155, 13204), (159, 13267), (160, 13303), (162, 13318), (163, 13342), (165, 13357), (166, 13360), (167, 13366), (168, 13411), (169, 13420), (170, 13519), (171, 13561), (174, 13645), (177, 13708), (178, 13726), (180, 13834), (182, 13843), (183, 13861), (184, 13864), (186, 13903), (187, 13906), (188, 13915), (192, 14050), (194, 14074), (202, 14194), (203, 14239), (205, 14272), (208, 14320), (210, 14332), (212, 14392), (219, 14512), (220, 14539), (221, 14557), (225, 14635), (226, 14641), (227, 14650), (232, 14770), (234, 14809), (235, 14851), (236, 14944), (240, 15037), (241, 15040), (242, 15097), (243, 15106), (244, 15118), (245, 15139), (248, 15244), (250, 15352), (251, 15391), (253, 15460), (254, 15514), (258, 15664),

Gene: Bunker\_17 Start: 10580, Stop: 15829, Start Num: 1

Candidate Starts for Bunker\_17:

(Start: 1 @10580 has 12 MA's), (3, 10589), (9, 10736), (13, 10862), (14, 10871), (17, 10934), (18, 10940), (19, 10946), (21, 10967), (23, 10991), (27, 11021), (29, 11030), (33, 11123), (34, 11135), (35, 11141), (43, 11294), (45, 11336), (46, 11390), (47, 11423), (52, 11624), (58, 11855), (60, 11888), (61, 11897), (62, 11906), (63, 11939), (64, 11951), (65, 11975), (67, 12020), (68, 12029), (73, 12101), (74, 12113), (75, 12131), (77, 12167), (81, 12290), (82, 12314), (90, 12431), (92, 12467), (94, 12473), (96, 12488), (99, 12542), (101, 12581), (103, 12602), (104, 12605), (105, 12623), (106, 12632), (112, 12677), (113, 12695), (114, 12698), (116, 12725), (121, 12803), (130, 12968), (132, 12983), (133, 12992), (137, 13076), (143, 13187), (144, 13193), (145, 13199), (147, 13244), (148, 13256), (151, 13292), (152, 13298), (153, 13319), (155, 13325), (156, 13331), (158, 13376), (159, 13388), (160, 13424), (163, 13463), (165, 13478), (166, 13481), (167, 13487), (168, 13532), (171, 13682), (173, 13760), (174, 13766), (177, 13832), (178, 13850), (180, 13958), (181, 13961), (183, 13985), (184, 13988), (186, 14027), (187, 14030), (188, 14039), (189, 14087), (192, 14174), (194, 14198), (199, 14258), (202, 14318), (205, 14396), (208, 14444), (210, 14456), (212, 14516), (219, 14633), (220, 14660), (225, 14756), (226, 14762), (227, 14771), (234, 14930), (235, 14972), (243, 15230), (244, 15242), (245, 15263), (246, 15266), (247, 15284), (250, 15476), (251, 15515), (254, 15638), (258, 15788), (260, 15812),

Gene: DirtyBoi\_18 Start: 11005, Stop: 16017, Start Num: 1

Candidate Starts for DirtyBoi\_18:

(Start: 1 @11005 has 12 MA's), (5, 11035), (6, 11056), (7, 11092), (14, 11296), (15, 11326), (22, 11401), (31, 11506), (35, 11566), (40, 11644), (41, 11647), (43, 11719), (45, 11761), (47, 11848), (58, 12277), (60, 12310), (62, 12328), (64, 12373), (65, 12397), (67, 12442), (68, 12451), (69, 12487), (70, 12496), (72, 12520), (74, 12535), (75, 12553), (79, 12640), (80, 12694), (81, 12712), (88, 12787), (89, 12817), (92, 12889), (94, 12895), (96, 12910), (99, 12964), (104, 13027), (105, 13045), (107, 13072), (109, 13084), (112, 13099), (114, 13120), (122, 13240), (124, 13267), (125, 13300), (127, 13339), (128, 13354), (129, 13402), (132, 13426), (134, 13456), (137, 13519), (139, 13564), (140, 13567), (144, 13636), (149, 13708), (150, 13729), (151, 13735), (152, 13741), (154, 13765), (155, 13768), (157, 13789), (158, 13819), (159, 13831), (160, 13867), (165, 13921), (166, 13924), (167, 13930), (168, 13975), (169, 13984), (171, 14125), (172, 14158), (173, 14203), (174, 14209), (175, 14221),

(177, 14272), (179, 14356), (181, 14380), (183, 14404), (184, 14407), (188, 14458), (190, 14506), (192, 14593), (194, 14617), (195, 14629), (196, 14650), (199, 14677), (203, 14782), (205, 14815), (208, 14863), (210, 14875), (213, 14947), (215, 14956), (229, 15112), (233, 15142), (238, 15334), (245, 15454), (246, 15457), (249, 15601), (250, 15664), (254, 15826), (255, 15838), (256, 15895), (257, 15970), (258, 15976), (261, 16006), (262, 16009),

Gene: Eyes\_17 Start: 10596, Stop: 15716, Start Num: 1

Candidate Starts for Eyes\_17:

(Start: 1 @10596 has 12 MA's), (3, 10605), (11, 10848), (13, 10878), (14, 10887), (15, 10917), (18, 10956), (21, 10983), (33, 11139), (35, 11157), (43, 11310), (45, 11352), (46, 11406), (50, 11631), (51, 11634), (53, 11670), (55, 11748), (57, 11787), (58, 11871), (60, 11904), (61, 11913), (62, 11922), (63, 11955), (64, 11967), (65, 11991), (67, 12036), (68, 12045), (69, 12081), (73, 12117), (74, 12129), (75, 12147), (77, 12183), (78, 12192), (81, 12306), (85, 12348), (92, 12483), (93, 12486), (94, 12489), (96, 12504), (99, 12558), (101, 12597), (109, 12678), (112, 12693), (114, 12714), (117, 12777), (120, 12813), (129, 12975), (136, 13032), (141, 13044), (142, 13047), (144, 13080), (146, 13098), (150, 13173), (151, 13179), (152, 13185), (153, 13206), (154, 13209), (155, 13212), (159, 13275), (160, 13311), (162, 13326), (163, 13350), (165, 13365), (166, 13368), (167, 13374), (169, 13428), (170, 13527), (171, 13569), (173, 13647), (177, 13716), (178, 13734), (180, 13842), (181, 13845), (183, 13869), (184, 13872), (185, 13893), (187, 13914), (188, 13923), (192, 14058), (194, 14082), (199, 14142), (202, 14202), (203, 14247), (205, 14280), (208, 14328), (210, 14340), (212, 14400), (220, 14550), (221, 14568), (225, 14646), (226, 14652), (227, 14661), (228, 14688), (232, 14781), (234, 14820), (235, 14862), (237, 15015), (240, 15048), (241, 15051), (242, 15108), (243, 15117), (244, 15129), (245, 15150), (247, 15171), (250, 15363), (251, 15402), (253, 15471), (254, 15525), (258, 15678),

Gene: GEazy\_17 Start: 10605, Stop: 15728, Start Num: 1

Candidate Starts for GEazy\_17:

(Start: 1 @10605 has 12 MA's), (3, 10614), (13, 10887), (14, 10896), (15, 10926), (29, 11055), (35, 11166), (39, 11223), (45, 11361), (46, 11415), (47, 11448), (52, 11649), (53, 11679), (55, 11757), (56, 11775), (57, 11796), (58, 11880), (60, 11913), (61, 11922), (62, 11931), (63, 11964), (64, 11976), (65, 12000), (67, 12045), (68, 12054), (69, 12090), (70, 12099), (73, 12126), (74, 12138), (75, 12156), (77, 12192), (81, 12315), (85, 12357), (92, 12492), (93, 12495), (94, 12498), (96, 12513), (99, 12567), (101, 12606), (109, 12687), (112, 12702), (114, 12723), (115, 12738), (116, 12750), (117, 12786), (120, 12822), (129, 12984), (136, 13041), (141, 13053), (142, 13056), (144, 13089), (146, 13107), (150, 13182), (151, 13188), (152, 13194), (153, 13215), (154, 13218), (155, 13221), (159, 13284), (160, 13320), (162, 13335), (163, 13359), (165, 13374), (166, 13377), (169, 13437), (170, 13536), (171, 13578), (173, 13656), (177, 13725), (178, 13743), (180, 13851), (183, 13878), (184, 13881), (186, 13920), (187, 13923), (188, 13932), (189, 13980), (192, 14067), (194, 14091), (199, 14151), (202, 14211), (205, 14289), (208, 14337), (210, 14349), (212, 14409), (214, 14451), (219, 14532), (220, 14559), (221, 14577), (222, 14607), (225, 14655), (226, 14661), (227, 14670), (231, 14718), (232, 14790), (234, 14829), (235, 14871), (240, 15057), (241, 15060), (242, 15117), (243, 15126), (244, 15138), (245, 15159), (250, 15372), (251, 15411), (253, 15480), (254, 15534), (256, 15606), (258, 15687), (260, 15711),

Gene: HannahD\_17 Start: 10605, Stop: 15728, Start Num: 1

Candidate Starts for HannahD\_17:

(Start: 1 @10605 has 12 MA's), (3, 10614), (13, 10887), (14, 10896), (15, 10926), (29, 11055), (35, 11166), (39, 11223), (45, 11361), (46, 11415), (47, 11448), (52, 11649), (53, 11679), (55, 11757), (56, 11775), (57, 11796), (58, 11880), (60, 11913), (61, 11922), (62, 11931), (63, 11964), (64, 11976), (65, 12000), (67, 12045), (68, 12054), (69, 12090), (70, 12099), (73, 12126), (74, 12138), (75, 12156), (77, 12192), (81, 12315), (85, 12357), (92, 12492), (93, 12495), (94, 12498), (96, 12513), (99, 12567), (101, 12606), (109, 12687), (112, 12702), (114, 12723), (115, 12738), (116, 12750), (117, 12786), (120, 12822), (129, 12984), (136, 13041), (141, 13053), (142, 13056), (144, 13089), (146, 13107),

(150, 13182), (151, 13188), (152, 13194), (153, 13215), (154, 13218), (155, 13221), (159, 13284), (160, 13320), (162, 13335), (163, 13359), (165, 13374), (166, 13377), (169, 13437), (170, 13536), (171, 13578), (173, 13656), (177, 13725), (178, 13743), (180, 13851), (183, 13878), (184, 13881), (186, 13920), (187, 13923), (188, 13932), (189, 13980), (192, 14067), (194, 14091), (199, 14151), (202, 14211), (205, 14289), (208, 14337), (210, 14349), (212, 14409), (214, 14451), (219, 14532), (220, 14559), (221, 14577), (222, 14607), (225, 14655), (226, 14661), (227, 14670), (231, 14718), (232, 14790), (234, 14829), (235, 14871), (240, 15057), (241, 15060), (242, 15117), (243, 15126), (244, 15138), (245, 15159), (250, 15372), (251, 15411), (253, 15480), (254, 15534), (256, 15606), (258, 15687), (260, 15711),

Gene: Hedwig\_18 Start: 11001, Stop: 16013, Start Num: 1

Candidate Starts for Hedwig\_18:

(Start: 1 @11001 has 12 MA's), (5, 11031), (6, 11052), (7, 11088), (14, 11292), (15, 11322), (22, 11397), (31, 11502), (35, 11562), (40, 11640), (41, 11643), (43, 11715), (45, 11757), (47, 11844), (58, 12273), (59, 12282), (60, 12306), (62, 12324), (64, 12369), (65, 12393), (67, 12438), (68, 12447), (69, 12483), (70, 12492), (72, 12516), (74, 12531), (75, 12549), (76, 12573), (79, 12636), (80, 12690), (81, 12708), (88, 12783), (89, 12813), (92, 12885), (94, 12891), (96, 12906), (97, 12927), (99, 12960), (104, 13023), (105, 13041), (107, 13068), (109, 13080), (112, 13095), (114, 13116), (122, 13236), (124, 13263), (125, 13296), (127, 13335), (128, 13350), (129, 13398), (132, 13422), (134, 13452), (137, 13515), (139, 13560), (140, 13563), (144, 13632), (149, 13704), (150, 13725), (151, 13731), (152, 13737), (154, 13761), (155, 13764), (157, 13785), (158, 13815), (159, 13827), (160, 13863), (165, 13917), (166, 13920), (167, 13926), (168, 13971), (169, 13980), (171, 14121), (172, 14154), (173, 14199), (174, 14205), (175, 14217), (177, 14268), (179, 14352), (181, 14376), (183, 14400), (184, 14403), (188, 14454), (190, 14502), (192, 14589), (194, 14613), (195, 14625), (196, 14646), (199, 14673), (203, 14778), (205, 14811), (208, 14859), (210, 14871), (213, 14943), (215, 14952), (229, 15108), (233, 15138), (238, 15330), (245, 15450), (246, 15453), (249, 15597), (250, 15660), (254, 15822), (255, 15834), (256, 15891), (257, 15966), (258, 15972), (261, 16002), (262, 16005),

Gene: Kiko\_18 Start: 10875, Stop: 15764, Start Num: 1

Candidate Starts for Kiko\_18:

(Start: 1 @10875 has 12 MA's), (4, 10899), (7, 10962), (8, 11019), (10, 11115), (11, 11127), (12, 11142), (14, 11166), (15, 11196), (25, 11307), (26, 11313), (27, 11316), (28, 11322), (29, 11325), (30, 11337), (31, 11376), (33, 11418), (34, 11430), (38, 11490), (42, 11523), (43, 11589), (44, 11610), (45, 11631), (46, 11685), (47, 11718), (49, 11835), (50, 11910), (52, 11919), (53, 11949), (55, 12027), (58, 12147), (61, 12189), (62, 12198), (63, 12231), (64, 12243), (65, 12267), (66, 12276), (68, 12321), (69, 12357), (70, 12366), (71, 12384), (75, 12423), (77, 12459), (78, 12468), (79, 12510), (81, 12582), (86, 12645), (90, 12723), (91, 12756), (92, 12759), (94, 12765), (96, 12780), (97, 12801), (98, 12831), (99, 12834), (102, 12876), (106, 12924), (107, 12942), (108, 12948), (111, 12963), (112, 12969), (113, 12987), (114, 12990), (116, 13017), (118, 13065), (119, 13074), (122, 13110), (123, 13113), (125, 13170), (126, 13200), (128, 13224), (129, 13272), (132, 13296), (133, 13305), (134, 13326), (138, 13416), (143, 13500), (144, 13506), (158, 13557), (160, 13605), (162, 13620), (163, 13644), (164, 13656), (165, 13659), (166, 13662), (167, 13668), (168, 13713), (169, 13722), (171, 13863), (172, 13896), (173, 13941), (180, 14136), (181, 14139), (182, 14145), (186, 14205), (188, 14217), (191, 14322), (194, 14376), (197, 14412), (199, 14436), (209, 14637), (216, 14727), (224, 14844), (229, 14886), (239, 15093), (241, 15102), (243, 15168), (245, 15201), (250, 15411), (254, 15573), (255, 15585), (256, 15642), (259, 15726), (261, 15753),

Gene: MagicMan\_17 Start: 10932, Stop: 16046, Start Num: 1

Candidate Starts for MagicMan\_17:

(Start: 1 @10932 has 12 MA's), (3, 10941), (13, 11214), (14, 11223), (15, 11253), (16, 11262), (21, 11319), (29, 11382), (32, 11454), (33, 11475), (35, 11493), (43, 11646), (45, 11688), (46, 11742), (47, 11775), (50, 11967), (51, 11970), (53, 12006), (55, 12084), (57, 12123), (58, 12207), (60, 12240), (61, 12249), (62, 12258), (63, 12291), (64, 12303), (65, 12327), (67, 12372), (68, 12381), (69, 12417), (70,

12426), (73, 12453), (74, 12465), (75, 12483), (77, 12519), (81, 12642), (85, 12684), (92, 12819), (93, 12822), (94, 12825), (96, 12840), (99, 12894), (101, 12933), (107, 13002), (109, 13014), (112, 13029), (114, 13050), (115, 13065), (116, 13077), (117, 13113), (120, 13149), (129, 13311), (136, 13368), (141, 13380), (142, 13383), (144, 13416), (150, 13509), (151, 13515), (152, 13521), (153, 13542), (154, 13545), (155, 13548), (159, 13611), (160, 13647), (162, 13662), (163, 13686), (165, 13701), (166, 13704), (167, 13710), (169, 13764), (170, 13863), (171, 13905), (173, 13983), (176, 14007), (177, 14052), (180, 14178), (182, 14187), (183, 14205), (184, 14208), (186, 14247), (187, 14250), (188, 14259), (194, 14418), (202, 14538), (205, 14616), (208, 14664), (210, 14676), (212, 14736), (219, 14853), (220, 14880), (221, 14898), (225, 14976), (226, 14982), (227, 14991), (228, 15018), (232, 15111), (234, 15150), (235, 15192), (237, 15345), (240, 15378), (241, 15381), (242, 15438), (243, 15447), (244, 15459), (245, 15480), (247, 15501), (250, 15693), (251, 15732), (253, 15801), (254, 15855), (258, 16008),

Gene: Opie\_17 Start: 10940, Stop: 16069, Start Num: 1

Candidate Starts for Opie\_17:

(Start: 1 @10940 has 12 MA's), (3, 10949), (13, 11222), (14, 11231), (21, 11327), (24, 11369), (29, 11390), (33, 11483), (35, 11501), (45, 11696), (48, 11855), (50, 11975), (51, 11978), (53, 12014), (55, 12092), (58, 12215), (60, 12248), (61, 12257), (62, 12266), (63, 12299), (64, 12311), (65, 12335), (67, 12380), (69, 12425), (73, 12461), (74, 12473), (75, 12491), (77, 12527), (81, 12650), (85, 12692), (92, 12827), (93, 12830), (94, 12833), (96, 12848), (99, 12902), (101, 12941), (109, 13022), (112, 13037), (114, 13058), (115, 13073), (116, 13085), (117, 13121), (120, 13157), (129, 13319), (135, 13352), (136, 13376), (141, 13388), (142, 13391), (144, 13424), (146, 13442), (151, 13523), (152, 13529), (153, 13550), (154, 13553), (155, 13556), (160, 13655), (162, 13670), (163, 13694), (165, 13709), (166, 13712), (167, 13718), (169, 13772), (170, 13871), (171, 13913), (172, 13946), (173, 13991), (176, 14015), (177, 14060), (178, 14078), (180, 14186), (184, 14216), (186, 14255), (187, 14258), (188, 14267), (200, 14516), (201, 14540), (208, 14684), (211, 14708), (212, 14759), (219, 14876), (220, 14903), (221, 14921), (225, 14999), (226, 15005), (227, 15014), (228, 15041), (232, 15134), (234, 15173), (235, 15215), (237, 15368), (240, 15401), (241, 15404), (242, 15461), (243, 15470), (244, 15482), (245, 15503), (247, 15524), (250, 15716), (251, 15755), (252, 15821), (253, 15824), (254, 15878), (258, 16031),

Gene: Schnabeltier\_17 Start: 10933, Stop: 16047, Start Num: 1

Candidate Starts for Schnabeltier\_17:

(Start: 1 @10933 has 12 MA's), (3, 10942), (13, 11215), (14, 11224), (15, 11254), (16, 11263), (21, 11320), (29, 11383), (32, 11455), (33, 11476), (35, 11494), (43, 11647), (45, 11689), (46, 11743), (47, 11776), (50, 11968), (51, 11971), (53, 12007), (55, 12085), (57, 12124), (58, 12208), (60, 12241), (61, 12250), (62, 12259), (63, 12292), (64, 12304), (65, 12328), (67, 12373), (68, 12382), (69, 12418), (70, 12427), (73, 12454), (74, 12466), (75, 12484), (77, 12520), (81, 12643), (85, 12685), (92, 12820), (93, 12823), (94, 12826), (96, 12841), (99, 12895), (101, 12934), (107, 13003), (109, 13015), (112, 13030), (114, 13051), (115, 13066), (116, 13078), (117, 13114), (120, 13150), (129, 13312), (136, 13369), (141, 13381), (142, 13384), (144, 13417), (150, 13510), (151, 13516), (152, 13522), (153, 13543), (154, 13546), (155, 13549), (159, 13612), (160, 13648), (162, 13663), (163, 13687), (165, 13702), (166, 13705), (167, 13711), (169, 13765), (170, 13864), (171, 13906), (173, 13984), (176, 14008), (177, 14053), (180, 14179), (182, 14188), (183, 14206), (184, 14209), (186, 14248), (187, 14251), (188, 14260), (194, 14419), (202, 14539), (205, 14617), (208, 14665), (210, 14677), (212, 14737), (219, 14854), (220, 14881), (221, 14899), (225, 14977), (226, 14983), (227, 14992), (228, 15019), (232, 15112), (234, 15151), (235, 15193), (237, 15346), (240, 15379), (241, 15382), (242, 15439), (243, 15448), (244, 15460), (245, 15481), (247, 15502), (250, 15694), (251, 15733), (253, 15802), (254, 15856), (258, 16009),

Gene: TaronosaurusRx\_17 Start: 10940, Stop: 16063, Start Num: 1

Candidate Starts for TaronosaurusRx\_17:

(Start: 1 @10940 has 12 MA's), (2, 10946), (13, 11219), (14, 11228), (16, 11267), (21, 11324), (29, 11387), (33, 11480), (35, 11498), (43, 11651), (45, 11693), (47, 11780), (50, 11972), (51, 11975), (53, 12011), (54, 12059), (58, 12212), (60, 12245), (61, 12254), (62, 12263), (63, 12296), (64, 12308), (65, 12332), (67, 12377), (68, 12386), (70, 12431), (73, 12458), (74, 12470), (75, 12488), (81, 12647), (82, 12671), (83, 12680), (84, 12683), (92, 12824), (93, 12827), (94, 12830), (95, 12842), (96, 12845), (99, 12899), (101, 12938), (112, 13034), (114, 13055), (115, 13070), (116, 13082), (120, 13154), (129, 13316), (136, 13373), (141, 13385), (142, 13388), (144, 13421), (150, 13514), (151, 13520), (152, 13526), (153, 13547), (154, 13550), (155, 13553), (157, 13574), (158, 13604), (160, 13652), (161, 13658), (162, 13667), (163, 13691), (165, 13706), (166, 13709), (167, 13715), (168, 13760), (169, 13769), (170, 13868), (171, 13910), (172, 13943), (173, 13988), (176, 14012), (177, 14057), (178, 14075), (184, 14213), (185, 14234), (186, 14252), (187, 14255), (188, 14264), (198, 14495), (200, 14513), (201, 14537), (208, 14681), (211, 14705), (212, 14756), (220, 14900), (221, 14918), (223, 14957), (225, 14996), (226, 15002), (227, 15011), (230, 15053), (232, 15131), (234, 15170), (236, 15305), (240, 15398), (241, 15401), (242, 15458), (243, 15467), (244, 15479), (245, 15500), (250, 15713), (251, 15752), (253, 15821), (254, 15875), (258, 16025),

Gene: ZAYM\_17 Start: 10932, Stop: 16055, Start Num: 1

Candidate Starts for ZAYM\_17:

(Start: 1 @10932 has 12 MA's), (2, 10938), (13, 11211), (14, 11220), (16, 11259), (21, 11316), (29, 11379), (33, 11472), (35, 11490), (43, 11643), (45, 11685), (47, 11772), (50, 11964), (51, 11967), (53, 12003), (54, 12051), (58, 12204), (60, 12237), (61, 12246), (62, 12255), (63, 12288), (64, 12300), (65, 12324), (67, 12369), (68, 12378), (73, 12450), (74, 12462), (75, 12480), (81, 12639), (82, 12663), (83, 12672), (84, 12675), (92, 12816), (93, 12819), (94, 12822), (96, 12837), (99, 12891), (101, 12930), (112, 13026), (114, 13047), (115, 13062), (116, 13074), (120, 13146), (129, 13308), (136, 13365), (141, 13377), (142, 13380), (144, 13413), (150, 13506), (151, 13512), (152, 13518), (153, 13539), (154, 13542), (155, 13545), (157, 13566), (158, 13596), (160, 13644), (161, 13650), (162, 13659), (163, 13683), (165, 13698), (166, 13701), (167, 13707), (168, 13752), (169, 13761), (170, 13860), (171, 13902), (172, 13935), (173, 13980), (176, 14004), (177, 14049), (178, 14067), (184, 14205), (185, 14226), (186, 14244), (187, 14247), (188, 14256), (198, 14487), (200, 14505), (201, 14529), (208, 14673), (211, 14697), (212, 14748), (220, 14892), (221, 14910), (223, 14949), (225, 14988), (226, 14994), (227, 15003), (230, 15045), (232, 15123), (234, 15162), (236, 15297), (240, 15390), (241, 15393), (242, 15450), (243, 15459), (244, 15471), (245, 15492), (250, 15705), (251, 15744), (253, 15813), (254, 15867), (258, 16017),