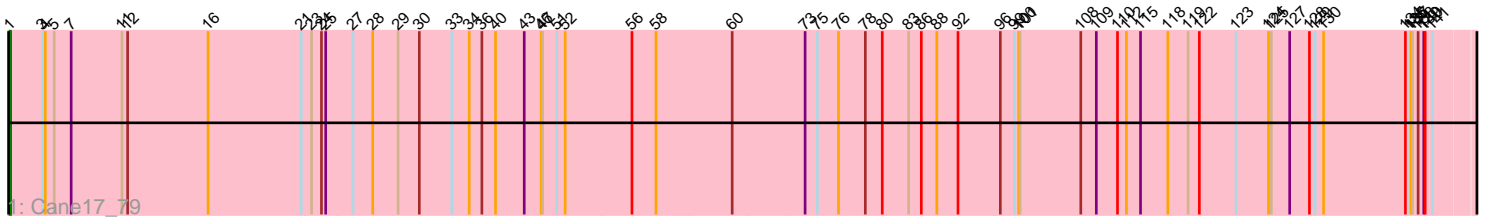
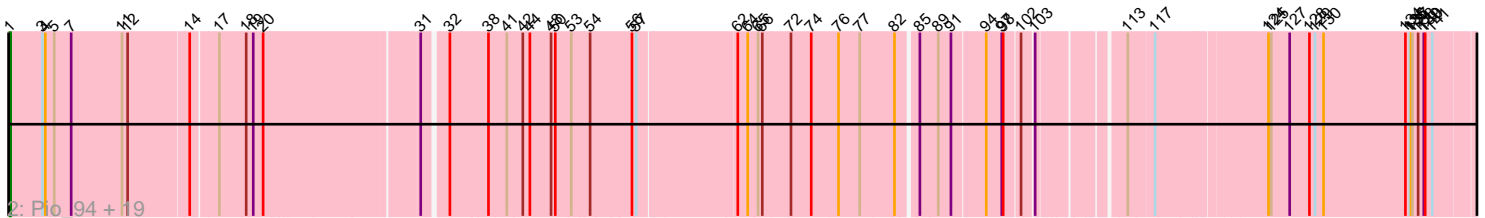


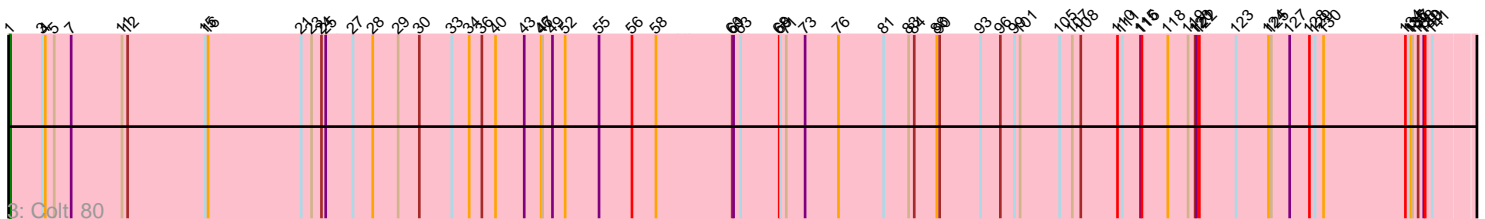
Zoomed Pham 163060



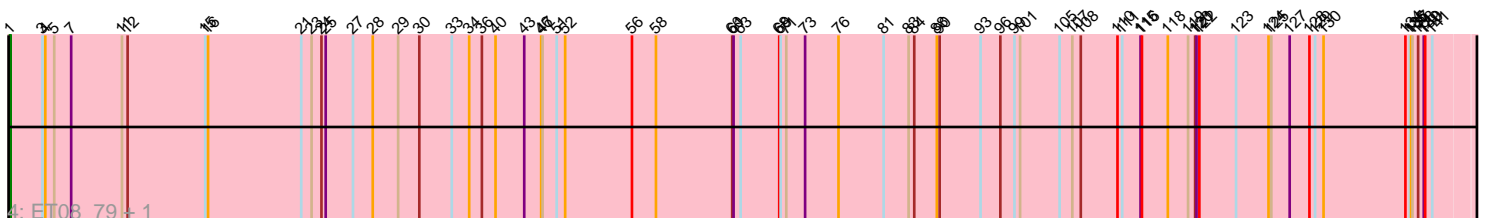
1: Cane17\_79



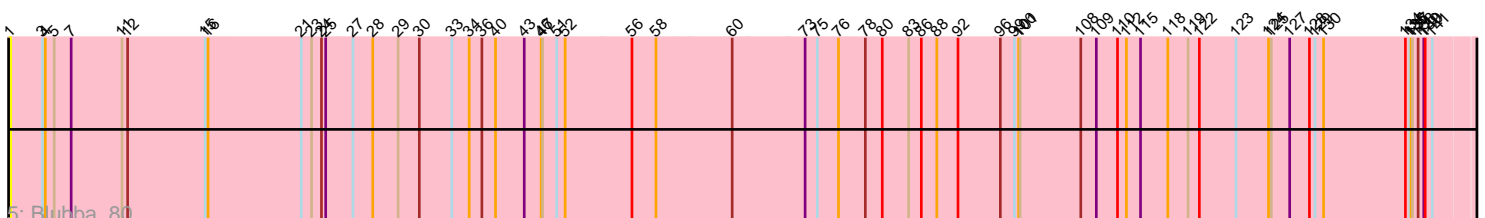
2: Pio\_94 + 19



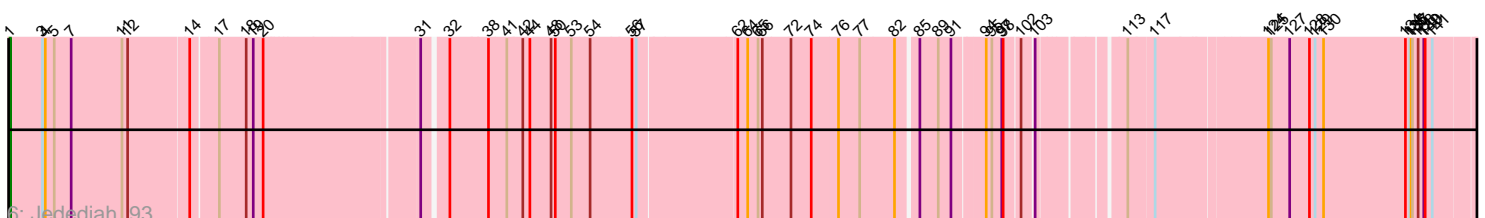
3: Colt\_80



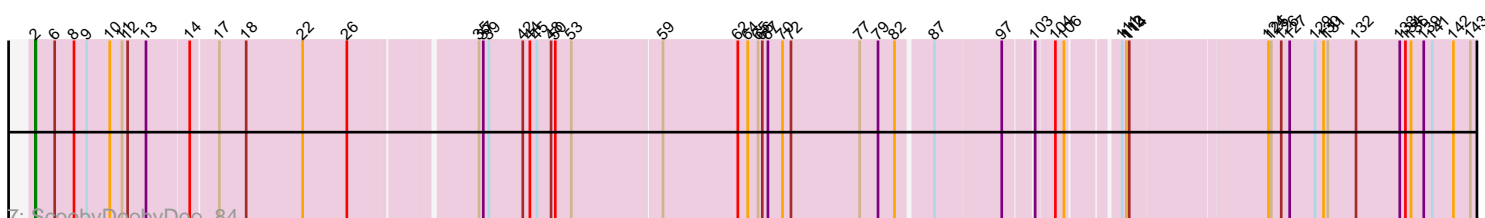
4: ET08\_79 + 1



5: Blubba\_80



6: Jedediah\_93



7: ScoobyDoobyDoo\_84

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 163060 Report

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

Pham number 163060 has 27 members, 5 are drafts.

Phages represented in each track:

- Track 1 : Cane17\_79
- Track 2 : Pio\_94, Jemmno\_90, JayJay\_92, Adlitam\_90, Ading\_90, Jaygup\_90, LifeSavor\_89, Pier\_94, Spec\_85, Rahel\_89, JPickles\_88, Essence\_87, Tyke\_92, CindyLou\_91, BeanWater\_82, Matsumoto\_88, Derek\_90, Shnickers\_90, Chomp\_87, ShiaLabeouf\_90
- Track 3 : Colt\_80
- Track 4 : ET08\_79, Gizmo\_94
- Track 5 : Blubba\_80
- Track 6 : Jedediah\_93
- Track 7 : ScoobyDoobyDoo\_84

### ***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 21 of the 22 non-draft genes in the pham.

Genes that call this "Most Annotated" start:

- Ading\_90, Adlitam\_90, BeanWater\_82, Blubba\_80, Cane17\_79, Chomp\_87, CindyLou\_91, Colt\_80, Derek\_90, ET08\_79, Essence\_87, Gizmo\_94, JPickles\_88, JayJay\_92, Jaygup\_90, Jedediah\_93, Jemmno\_90, LifeSavor\_89, Matsumoto\_88, Pier\_94, Pio\_94, Rahel\_89, ShiaLabeouf\_90, Shnickers\_90, Spec\_85, Tyke\_92,

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

- 

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

- ScoobyDoobyDoo\_84,

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

Start 1:

- Found in 26 of 27 ( 96.3% ) of genes in pham
- Manual Annotations of this start: 21 of 22
- Called 100.0% of time when present

- Phage (with cluster) where this start called: Ading\_90 (C1), Adlitam\_90 (C1), BeanWater\_82 (C1), Blubba\_80 (C1), Cane17\_79 (C1), Chomp\_87 (C1), CindyLou\_91 (C1), Colt\_80 (C1), Derek\_90 (C1), ET08\_79 (C1), Essence\_87 (C1), Gizmo\_94 (C1), JPickles\_88 (C1), JayJay\_92 (C1), Jaygup\_90 (C1), Jedediah\_93 (C1), Jemmno\_90 (C1), LifeSavor\_89 (C1), Matsumoto\_88 (C1), Pier\_94 (C1), Pio\_94 (C1), Rahel\_89 (C1), ShiaLabeouf\_90 (C1), Shnickers\_90 (C1), Spec\_85 (C1), Tyke\_92 (C1),

Start 2:

- Found in 1 of 27 ( 3.7% ) of genes in pham
- Manual Annotations of this start: 1 of 22
- Called 100.0% of time when present
- Phage (with cluster) where this start called: ScoobyDoobyDoo\_84 (C2),

### Summary by clusters:

There are 2 clusters represented in this pham: C2, C1,

Info for manual annotations of cluster C1:

- Start number 1 was manually annotated 21 times for cluster C1.

Info for manual annotations of cluster C2:

- Start number 2 was manually annotated 1 time for cluster C2.

### Gene Information:

Gene: Ading\_90 Start: 35182, Stop: 38610, Start Num: 1

Candidate Starts for Ading\_90:

(Start: 1 @35182 has 21 MA's), (3, 35251), (4, 35257), (5, 35275), (7, 35311), (11, 35419), (12, 35431), (14, 35554), (17, 35605), (18, 35659), (19, 35671), (20, 35692), (31, 35986), (32, 36031), (38, 36109), (41, 36145), (42, 36178), (44, 36193), (48, 36238), (50, 36247), (53, 36280), (54, 36316), (56, 36400), (57, 36406), (62, 36601), (64, 36622), (65, 36643), (66, 36652), (72, 36709), (74, 36751), (76, 36805), (77, 36850), (82, 36919), (85, 36955), (89, 36982), (91, 37009), (94, 37069), (97, 37102), (98, 37105), (102, 37135), (103, 37153), (113, 37294), (117, 37345), (124, 37555), (125, 37561), (127, 37600), (128, 37642), (129, 37654), (130, 37672), (134, 37846), (135, 37855), (136, 37858), (137, 37861), (138, 37873), (139, 37885), (140, 37888), (141, 37903), (144, 37990), (145, 38005), (146, 38149), (147, 38161), (148, 38341), (149, 38359), (152, 38440), (154, 38476), (155, 38497), (156, 38563),

Gene: Adlitam\_90 Start: 35199, Stop: 38627, Start Num: 1

Candidate Starts for Adlitam\_90:

(Start: 1 @35199 has 21 MA's), (3, 35268), (4, 35274), (5, 35292), (7, 35328), (11, 35436), (12, 35448), (14, 35571), (17, 35622), (18, 35676), (19, 35688), (20, 35709), (31, 36003), (32, 36048), (38, 36126), (41, 36162), (42, 36195), (44, 36210), (48, 36255), (50, 36264), (53, 36297), (54, 36333), (56, 36417), (57, 36423), (62, 36618), (64, 36639), (65, 36660), (66, 36669), (72, 36726), (74, 36768), (76, 36822), (77, 36867), (82, 36936), (85, 36972), (89, 36999), (91, 37026), (94, 37086), (97, 37119), (98, 37122), (102, 37152), (103, 37170), (113, 37311), (117, 37362), (124, 37572), (125, 37578), (127, 37617), (128, 37659), (129, 37671), (130, 37689), (134, 37863), (135, 37872), (136, 37875), (137, 37878), (138, 37890), (139, 37902), (140, 37905), (141, 37920), (144, 38007), (145, 38022), (146, 38166), (147, 38178), (148, 38358), (149, 38376), (152, 38457), (154, 38493), (155, 38514), (156, 38580),

Gene: BeanWater\_82 Start: 34836, Stop: 38264, Start Num: 1

Candidate Starts for BeanWater\_82:

(Start: 1 @34836 has 21 MA's), (3, 34905), (4, 34911), (5, 34929), (7, 34965), (11, 35073), (12, 35085), (14, 35208), (17, 35259), (18, 35313), (19, 35325), (20, 35346), (31, 35640), (32, 35685), (38, 35763), (41, 35799), (42, 35832), (44, 35847), (48, 35892), (50, 35901), (53, 35934), (54, 35970), (56, 36054), (57, 36060), (62, 36255), (64, 36276), (65, 36297), (66, 36306), (72, 36363), (74, 36405), (76, 36459), (77, 36504), (82, 36573), (85, 36609), (89, 36636), (91, 36663), (94, 36723), (97, 36756), (98, 36759), (102, 36789), (103, 36807), (113, 36948), (117, 36999), (124, 37209), (125, 37215), (127, 37254), (128, 37296), (129, 37308), (130, 37326), (134, 37500), (135, 37509), (136, 37512), (137, 37515), (138, 37527), (139, 37539), (140, 37542), (141, 37557), (144, 37644), (145, 37659), (146, 37803), (147, 37815), (148, 37995), (149, 38013), (152, 38094), (154, 38130), (155, 38151), (156, 38217),

Gene: Blubba\_80 Start: 32769, Stop: 36464, Start Num: 1

Candidate Starts for Blubba\_80:

(Start: 1 @32769 has 21 MA's), (3, 32838), (4, 32844), (5, 32862), (7, 32898), (11, 33006), (12, 33018), (15, 33183), (16, 33189), (21, 33384), (23, 33405), (24, 33426), (25, 33435), (27, 33492), (28, 33534), (29, 33588), (30, 33633), (33, 33702), (34, 33738), (36, 33765), (40, 33792), (43, 33852), (46, 33885), (47, 33888), (51, 33918), (52, 33936), (56, 34077), (58, 34128), (60, 34284), (73, 34437), (75, 34461), (76, 34506), (78, 34560), (80, 34596), (83, 34650), (86, 34677), (88, 34710), (92, 34755), (96, 34842), (99, 34872), (100, 34881), (101, 34884), (108, 35013), (109, 35046), (110, 35091), (112, 35109), (115, 35139), (118, 35196), (119, 35238), (122, 35262), (123, 35340), (124, 35409), (125, 35415), (127, 35454), (128, 35496), (129, 35508), (130, 35526), (134, 35700), (135, 35709), (136, 35712), (137, 35715), (138, 35727), (139, 35739), (140, 35742), (141, 35757), (144, 35844), (145, 35859), (146, 36003), (147, 36015), (148, 36195), (149, 36213), (152, 36294), (154, 36330), (155, 36351), (156, 36417),

Gene: Cane17\_79 Start: 32842, Stop: 36537, Start Num: 1

Candidate Starts for Cane17\_79:

(Start: 1 @32842 has 21 MA's), (3, 32911), (4, 32917), (5, 32935), (7, 32971), (11, 33079), (12, 33091), (16, 33262), (21, 33457), (23, 33478), (24, 33499), (25, 33508), (27, 33565), (28, 33607), (29, 33661), (30, 33706), (33, 33775), (34, 33811), (36, 33838), (40, 33865), (43, 33925), (46, 33958), (47, 33961), (51, 33991), (52, 34009), (56, 34150), (58, 34201), (60, 34357), (73, 34510), (75, 34534), (76, 34579), (78, 34633), (80, 34669), (83, 34723), (86, 34750), (88, 34783), (92, 34828), (96, 34915), (99, 34945), (100, 34954), (101, 34957), (108, 35086), (109, 35119), (110, 35164), (112, 35182), (115, 35212), (118, 35269), (119, 35311), (122, 35335), (123, 35413), (124, 35482), (125, 35488), (127, 35527), (128, 35569), (129, 35581), (130, 35599), (134, 35773), (135, 35782), (136, 35785), (137, 35788), (138, 35800), (139, 35812), (140, 35815), (141, 35830), (144, 35917), (145, 35932), (146, 36076), (147, 36088), (148, 36268), (149, 36286), (152, 36367), (154, 36403), (155, 36424), (156, 36490),

Gene: Chomp\_87 Start: 35732, Stop: 39160, Start Num: 1

Candidate Starts for Chomp\_87:

(Start: 1 @35732 has 21 MA's), (3, 35801), (4, 35807), (5, 35825), (7, 35861), (11, 35969), (12, 35981), (14, 36104), (17, 36155), (18, 36209), (19, 36221), (20, 36242), (31, 36536), (32, 36581), (38, 36659), (41, 36695), (42, 36728), (44, 36743), (48, 36788), (50, 36797), (53, 36830), (54, 36866), (56, 36950), (57, 36956), (62, 37151), (64, 37172), (65, 37193), (66, 37202), (72, 37259), (74, 37301), (76, 37355), (77, 37400), (82, 37469), (85, 37505), (89, 37532), (91, 37559), (94, 37619), (97, 37652), (98, 37655), (102, 37685), (103, 37703), (113, 37844), (117, 37895), (124, 38105), (125, 38111), (127, 38150), (128, 38192), (129, 38204), (130, 38222), (134, 38396), (135, 38405), (136, 38408), (137, 38411), (138, 38423), (139, 38435), (140, 38438), (141, 38453), (144, 38540), (145, 38555), (146, 38699), (147, 38711), (148, 38891), (149, 38909), (152, 38990), (154, 39026), (155, 39047), (156,

39113),

Gene: CindyLou\_91 Start: 35773, Stop: 39201, Start Num: 1

Candidate Starts for CindyLou\_91:

(Start: 1 @35773 has 21 MA's), (3, 35842), (4, 35848), (5, 35866), (7, 35902), (11, 36010), (12, 36022), (14, 36145), (17, 36196), (18, 36250), (19, 36262), (20, 36283), (31, 36577), (32, 36622), (38, 36700), (41, 36736), (42, 36769), (44, 36784), (48, 36829), (50, 36838), (53, 36871), (54, 36907), (56, 36991), (57, 36997), (62, 37192), (64, 37213), (65, 37234), (66, 37243), (72, 37300), (74, 37342), (76, 37396), (77, 37441), (82, 37510), (85, 37546), (89, 37573), (91, 37600), (94, 37660), (97, 37693), (98, 37696), (102, 37726), (103, 37744), (113, 37885), (117, 37936), (124, 38146), (125, 38152), (127, 38191), (128, 38233), (129, 38245), (130, 38263), (134, 38437), (135, 38446), (136, 38449), (137, 38452), (138, 38464), (139, 38476), (140, 38479), (141, 38494), (144, 38581), (145, 38596), (146, 38740), (147, 38752), (148, 38932), (149, 38950), (152, 39031), (154, 39067), (155, 39088), (156, 39154),

Gene: Colt\_80 Start: 33441, Stop: 37133, Start Num: 1

Candidate Starts for Colt\_80:

(Start: 1 @33441 has 21 MA's), (3, 33510), (4, 33516), (5, 33534), (7, 33570), (11, 33678), (12, 33690), (15, 33855), (16, 33861), (21, 34056), (23, 34077), (24, 34098), (25, 34107), (27, 34164), (28, 34206), (29, 34260), (30, 34305), (33, 34374), (34, 34410), (36, 34437), (40, 34464), (43, 34524), (46, 34557), (47, 34560), (49, 34581), (52, 34608), (55, 34680), (56, 34749), (58, 34800), (60, 34956), (61, 34959), (63, 34974), (68, 35055), (69, 35058), (71, 35070), (73, 35109), (76, 35178), (81, 35271), (83, 35322), (84, 35334), (88, 35382), (90, 35388), (93, 35475), (96, 35514), (99, 35544), (101, 35556), (105, 35640), (107, 35667), (108, 35685), (110, 35763), (111, 35772), (115, 35811), (116, 35814), (118, 35868), (119, 35910), (120, 35925), (121, 35928), (122, 35934), (123, 36009), (124, 36078), (125, 36084), (127, 36123), (128, 36165), (129, 36177), (130, 36195), (134, 36369), (135, 36378), (136, 36381), (137, 36384), (138, 36396), (139, 36408), (140, 36411), (141, 36426), (144, 36513), (145, 36528), (146, 36672), (147, 36684), (148, 36864), (149, 36882), (152, 36963), (154, 36999), (155, 37020), (156, 37086),

Gene: Derek\_90 Start: 35534, Stop: 38962, Start Num: 1

Candidate Starts for Derek\_90:

(Start: 1 @35534 has 21 MA's), (3, 35603), (4, 35609), (5, 35627), (7, 35663), (11, 35771), (12, 35783), (14, 35906), (17, 35957), (18, 36011), (19, 36023), (20, 36044), (31, 36338), (32, 36383), (38, 36461), (41, 36497), (42, 36530), (44, 36545), (48, 36590), (50, 36599), (53, 36632), (54, 36668), (56, 36752), (57, 36758), (62, 36953), (64, 36974), (65, 36995), (66, 37004), (72, 37061), (74, 37103), (76, 37157), (77, 37202), (82, 37271), (85, 37307), (89, 37334), (91, 37361), (94, 37421), (97, 37454), (98, 37457), (102, 37487), (103, 37505), (113, 37646), (117, 37697), (124, 37907), (125, 37913), (127, 37952), (128, 37994), (129, 38006), (130, 38024), (134, 38198), (135, 38207), (136, 38210), (137, 38213), (138, 38225), (139, 38237), (140, 38240), (141, 38255), (144, 38342), (145, 38357), (146, 38501), (147, 38513), (148, 38693), (149, 38711), (152, 38792), (154, 38828), (155, 38849), (156, 38915),

Gene: ET08\_79 Start: 33946, Stop: 37638, Start Num: 1

Candidate Starts for ET08\_79:

(Start: 1 @33946 has 21 MA's), (3, 34015), (4, 34021), (5, 34039), (7, 34075), (11, 34183), (12, 34195), (15, 34360), (16, 34366), (21, 34561), (23, 34582), (24, 34603), (25, 34612), (27, 34669), (28, 34711), (29, 34765), (30, 34810), (33, 34879), (34, 34915), (36, 34942), (40, 34969), (43, 35029), (46, 35062), (47, 35065), (51, 35095), (52, 35113), (56, 35254), (58, 35305), (60, 35461), (61, 35464), (63, 35479), (68, 35560), (69, 35563), (71, 35575), (73, 35614), (76, 35683), (81, 35776), (83, 35827), (84, 35839), (88, 35887), (90, 35893), (93, 35980), (96, 36019), (99, 36049), (101, 36061), (105, 36145), (107, 36172), (108, 36190), (110, 36268), (111, 36277), (115, 36316), (116, 36319), (118, 36373), (119, 36415), (120, 36430), (121, 36433), (122, 36439), (123, 36514), (124, 36583), (125, 36589),

(127, 36628), (128, 36670), (129, 36682), (130, 36700), (134, 36874), (135, 36883), (136, 36886), (137, 36889), (138, 36901), (139, 36913), (140, 36916), (141, 36931), (144, 37018), (145, 37033), (146, 37177), (147, 37189), (148, 37369), (149, 37387), (152, 37468), (154, 37504), (155, 37525), (156, 37591),

Gene: Essence\_87 Start: 34998, Stop: 38426, Start Num: 1

Candidate Starts for Essence\_87:

(Start: 1 @34998 has 21 MA's), (3, 35067), (4, 35073), (5, 35091), (7, 35127), (11, 35235), (12, 35247), (14, 35370), (17, 35421), (18, 35475), (19, 35487), (20, 35508), (31, 35802), (32, 35847), (38, 35925), (41, 35961), (42, 35994), (44, 36009), (48, 36054), (50, 36063), (53, 36096), (54, 36132), (56, 36216), (57, 36222), (62, 36417), (64, 36438), (65, 36459), (66, 36468), (72, 36525), (74, 36567), (76, 36621), (77, 36666), (82, 36735), (85, 36771), (89, 36798), (91, 36825), (94, 36885), (97, 36918), (98, 36921), (102, 36951), (103, 36969), (113, 37110), (117, 37161), (124, 37371), (125, 37377), (127, 37416), (128, 37458), (129, 37470), (130, 37488), (134, 37662), (135, 37671), (136, 37674), (137, 37677), (138, 37689), (139, 37701), (140, 37704), (141, 37719), (144, 37806), (145, 37821), (146, 37965), (147, 37977), (148, 38157), (149, 38175), (152, 38256), (154, 38292), (155, 38313), (156, 38379),

Gene: Gizmo\_94 Start: 35551, Stop: 39243, Start Num: 1

Candidate Starts for Gizmo\_94:

(Start: 1 @35551 has 21 MA's), (3, 35620), (4, 35626), (5, 35644), (7, 35680), (11, 35788), (12, 35800), (15, 35965), (16, 35971), (21, 36166), (23, 36187), (24, 36208), (25, 36217), (27, 36274), (28, 36316), (29, 36370), (30, 36415), (33, 36484), (34, 36520), (36, 36547), (40, 36574), (43, 36634), (46, 36667), (47, 36670), (51, 36700), (52, 36718), (56, 36859), (58, 36910), (60, 37066), (61, 37069), (63, 37084), (68, 37165), (69, 37168), (71, 37180), (73, 37219), (76, 37288), (81, 37381), (83, 37432), (84, 37444), (88, 37492), (90, 37498), (93, 37585), (96, 37624), (99, 37654), (101, 37666), (105, 37750), (107, 37777), (108, 37795), (110, 37873), (111, 37882), (115, 37921), (116, 37924), (118, 37978), (119, 38020), (120, 38035), (121, 38038), (122, 38044), (123, 38119), (124, 38188), (125, 38194), (127, 38233), (128, 38275), (129, 38287), (130, 38305), (134, 38479), (135, 38488), (136, 38491), (137, 38494), (138, 38506), (139, 38518), (140, 38521), (141, 38536), (144, 38623), (145, 38638), (146, 38782), (147, 38794), (148, 38974), (149, 38992), (152, 39073), (154, 39109), (155, 39130), (156, 39196),

Gene: JPickles\_88 Start: 33675, Stop: 37103, Start Num: 1

Candidate Starts for JPickles\_88:

(Start: 1 @33675 has 21 MA's), (3, 33744), (4, 33750), (5, 33768), (7, 33804), (11, 33912), (12, 33924), (14, 34047), (17, 34098), (18, 34152), (19, 34164), (20, 34185), (31, 34479), (32, 34524), (38, 34602), (41, 34638), (42, 34671), (44, 34686), (48, 34731), (50, 34740), (53, 34773), (54, 34809), (56, 34893), (57, 34899), (62, 35094), (64, 35115), (65, 35136), (66, 35145), (72, 35202), (74, 35244), (76, 35298), (77, 35343), (82, 35412), (85, 35448), (89, 35475), (91, 35502), (94, 35562), (97, 35595), (98, 35598), (102, 35628), (103, 35646), (113, 35787), (117, 35838), (124, 36048), (125, 36054), (127, 36093), (128, 36135), (129, 36147), (130, 36165), (134, 36339), (135, 36348), (136, 36351), (137, 36354), (138, 36366), (139, 36378), (140, 36381), (141, 36396), (144, 36483), (145, 36498), (146, 36642), (147, 36654), (148, 36834), (149, 36852), (152, 36933), (154, 36969), (155, 36990), (156, 37056),

Gene: JayJay\_92 Start: 36743, Stop: 40171, Start Num: 1

Candidate Starts for JayJay\_92:

(Start: 1 @36743 has 21 MA's), (3, 36812), (4, 36818), (5, 36836), (7, 36872), (11, 36980), (12, 36992), (14, 37115), (17, 37166), (18, 37220), (19, 37232), (20, 37253), (31, 37547), (32, 37592), (38, 37670), (41, 37706), (42, 37739), (44, 37754), (48, 37799), (50, 37808), (53, 37841), (54, 37877), (56, 37961), (57, 37967), (62, 38162), (64, 38183), (65, 38204), (66, 38213), (72, 38270), (74, 38312), (76, 38366), (77, 38411), (82, 38480), (85, 38516), (89, 38543), (91, 38570), (94, 38630), (97, 38663), (98,

38666), (102, 38696), (103, 38714), (113, 38855), (117, 38906), (124, 39116), (125, 39122), (127, 39161), (128, 39203), (129, 39215), (130, 39233), (134, 39407), (135, 39416), (136, 39419), (137, 39422), (138, 39434), (139, 39446), (140, 39449), (141, 39464), (144, 39551), (145, 39566), (146, 39710), (147, 39722), (148, 39902), (149, 39920), (152, 40001), (154, 40037), (155, 40058), (156, 40124),

Gene: Jaygup\_90 Start: 35200, Stop: 38628, Start Num: 1

Candidate Starts for Jaygup\_90:

(Start: 1 @35200 has 21 MA's), (3, 35269), (4, 35275), (5, 35293), (7, 35329), (11, 35437), (12, 35449), (14, 35572), (17, 35623), (18, 35677), (19, 35689), (20, 35710), (31, 36004), (32, 36049), (38, 36127), (41, 36163), (42, 36196), (44, 36211), (48, 36256), (50, 36265), (53, 36298), (54, 36334), (56, 36418), (57, 36424), (62, 36619), (64, 36640), (65, 36661), (66, 36670), (72, 36727), (74, 36769), (76, 36823), (77, 36868), (82, 36937), (85, 36973), (89, 37000), (91, 37027), (94, 37087), (97, 37120), (98, 37123), (102, 37153), (103, 37171), (113, 37312), (117, 37363), (124, 37573), (125, 37579), (127, 37618), (128, 37660), (129, 37672), (130, 37690), (134, 37864), (135, 37873), (136, 37876), (137, 37879), (138, 37891), (139, 37903), (140, 37906), (141, 37921), (144, 38008), (145, 38023), (146, 38167), (147, 38179), (148, 38359), (149, 38377), (152, 38458), (154, 38494), (155, 38515), (156, 38581),

Gene: Jedediah\_93 Start: 35700, Stop: 39128, Start Num: 1

Candidate Starts for Jedediah\_93:

(Start: 1 @35700 has 21 MA's), (3, 35769), (4, 35775), (5, 35793), (7, 35829), (11, 35937), (12, 35949), (14, 36072), (17, 36123), (18, 36177), (19, 36189), (20, 36210), (31, 36504), (32, 36549), (38, 36627), (41, 36663), (42, 36696), (44, 36711), (48, 36756), (50, 36765), (53, 36798), (54, 36834), (56, 36918), (57, 36924), (62, 37119), (64, 37140), (65, 37161), (66, 37170), (72, 37227), (74, 37269), (76, 37323), (77, 37368), (82, 37437), (85, 37473), (89, 37500), (91, 37527), (94, 37587), (95, 37599), (97, 37620), (98, 37623), (102, 37653), (103, 37671), (113, 37812), (117, 37863), (124, 38073), (125, 38079), (127, 38118), (128, 38160), (129, 38172), (130, 38190), (134, 38364), (135, 38373), (136, 38376), (137, 38379), (138, 38391), (139, 38403), (140, 38406), (141, 38421), (144, 38508), (145, 38523), (146, 38667), (147, 38679), (148, 38859), (149, 38877), (152, 38958), (154, 38994), (155, 39015), (156, 39081),

Gene: Jemmno\_90 Start: 35150, Stop: 38578, Start Num: 1

Candidate Starts for Jemmno\_90:

(Start: 1 @35150 has 21 MA's), (3, 35219), (4, 35225), (5, 35243), (7, 35279), (11, 35387), (12, 35399), (14, 35522), (17, 35573), (18, 35627), (19, 35639), (20, 35660), (31, 35954), (32, 35999), (38, 36077), (41, 36113), (42, 36146), (44, 36161), (48, 36206), (50, 36215), (53, 36248), (54, 36284), (56, 36368), (57, 36374), (62, 36569), (64, 36590), (65, 36611), (66, 36620), (72, 36677), (74, 36719), (76, 36773), (77, 36818), (82, 36887), (85, 36923), (89, 36950), (91, 36977), (94, 37037), (97, 37070), (98, 37073), (102, 37103), (103, 37121), (113, 37262), (117, 37313), (124, 37523), (125, 37529), (127, 37568), (128, 37610), (129, 37622), (130, 37640), (134, 37814), (135, 37823), (136, 37826), (137, 37829), (138, 37841), (139, 37853), (140, 37856), (141, 37871), (144, 37958), (145, 37973), (146, 38117), (147, 38129), (148, 38309), (149, 38327), (152, 38408), (154, 38444), (155, 38465), (156, 38531),

Gene: LifeSavor\_89 Start: 34965, Stop: 38393, Start Num: 1

Candidate Starts for LifeSavor\_89:

(Start: 1 @34965 has 21 MA's), (3, 35034), (4, 35040), (5, 35058), (7, 35094), (11, 35202), (12, 35214), (14, 35337), (17, 35388), (18, 35442), (19, 35454), (20, 35475), (31, 35769), (32, 35814), (38, 35892), (41, 35928), (42, 35961), (44, 35976), (48, 36021), (50, 36030), (53, 36063), (54, 36099), (56, 36183), (57, 36189), (62, 36384), (64, 36405), (65, 36426), (66, 36435), (72, 36492), (74, 36534), (76, 36588), (77, 36633), (82, 36702), (85, 36738), (89, 36765), (91, 36792), (94, 36852), (97, 36885), (98, 36888), (102, 36918), (103, 36936), (113, 37077), (117, 37128), (124, 37338), (125, 37344), (127,

37383), (128, 37425), (129, 37437), (130, 37455), (134, 37629), (135, 37638), (136, 37641), (137, 37644), (138, 37656), (139, 37668), (140, 37671), (141, 37686), (144, 37773), (145, 37788), (146, 37932), (147, 37944), (148, 38124), (149, 38142), (152, 38223), (154, 38259), (155, 38280), (156, 38346),

Gene: Matsumoto\_88 Start: 35164, Stop: 38592, Start Num: 1

Candidate Starts for Matsumoto\_88:

(Start: 1 @35164 has 21 MA's), (3, 35233), (4, 35239), (5, 35257), (7, 35293), (11, 35401), (12, 35413), (14, 35536), (17, 35587), (18, 35641), (19, 35653), (20, 35674), (31, 35968), (32, 36013), (38, 36091), (41, 36127), (42, 36160), (44, 36175), (48, 36220), (50, 36229), (53, 36262), (54, 36298), (56, 36382), (57, 36388), (62, 36583), (64, 36604), (65, 36625), (66, 36634), (72, 36691), (74, 36733), (76, 36787), (77, 36832), (82, 36901), (85, 36937), (89, 36964), (91, 36991), (94, 37051), (97, 37084), (98, 37087), (102, 37117), (103, 37135), (113, 37276), (117, 37327), (124, 37537), (125, 37543), (127, 37582), (128, 37624), (129, 37636), (130, 37654), (134, 37828), (135, 37837), (136, 37840), (137, 37843), (138, 37855), (139, 37867), (140, 37870), (141, 37885), (144, 37972), (145, 37987), (146, 38131), (147, 38143), (148, 38323), (149, 38341), (152, 38422), (154, 38458), (155, 38479), (156, 38545),

Gene: Pier\_94 Start: 36440, Stop: 39868, Start Num: 1

Candidate Starts for Pier\_94:

(Start: 1 @36440 has 21 MA's), (3, 36509), (4, 36515), (5, 36533), (7, 36569), (11, 36677), (12, 36689), (14, 36812), (17, 36863), (18, 36917), (19, 36929), (20, 36950), (31, 37244), (32, 37289), (38, 37367), (41, 37403), (42, 37436), (44, 37451), (48, 37496), (50, 37505), (53, 37538), (54, 37574), (56, 37658), (57, 37664), (62, 37859), (64, 37880), (65, 37901), (66, 37910), (72, 37967), (74, 38009), (76, 38063), (77, 38108), (82, 38177), (85, 38213), (89, 38240), (91, 38267), (94, 38327), (97, 38360), (98, 38363), (102, 38393), (103, 38411), (113, 38552), (117, 38603), (124, 38813), (125, 38819), (127, 38858), (128, 38900), (129, 38912), (130, 38930), (134, 39104), (135, 39113), (136, 39116), (137, 39119), (138, 39131), (139, 39143), (140, 39146), (141, 39161), (144, 39248), (145, 39263), (146, 39407), (147, 39419), (148, 39599), (149, 39617), (152, 39698), (154, 39734), (155, 39755), (156, 39821),

Gene: Pio\_94 Start: 37172, Stop: 40600, Start Num: 1

Candidate Starts for Pio\_94:

(Start: 1 @37172 has 21 MA's), (3, 37241), (4, 37247), (5, 37265), (7, 37301), (11, 37409), (12, 37421), (14, 37544), (17, 37595), (18, 37649), (19, 37661), (20, 37682), (31, 37976), (32, 38021), (38, 38099), (41, 38135), (42, 38168), (44, 38183), (48, 38228), (50, 38237), (53, 38270), (54, 38306), (56, 38390), (57, 38396), (62, 38591), (64, 38612), (65, 38633), (66, 38642), (72, 38699), (74, 38741), (76, 38795), (77, 38840), (82, 38909), (85, 38945), (89, 38972), (91, 38999), (94, 39059), (97, 39092), (98, 39095), (102, 39125), (103, 39143), (113, 39284), (117, 39335), (124, 39545), (125, 39551), (127, 39590), (128, 39632), (129, 39644), (130, 39662), (134, 39836), (135, 39845), (136, 39848), (137, 39851), (138, 39863), (139, 39875), (140, 39878), (141, 39893), (144, 39980), (145, 39995), (146, 40139), (147, 40151), (148, 40331), (149, 40349), (152, 40430), (154, 40466), (155, 40487), (156, 40553),

Gene: Rahel\_89 Start: 34801, Stop: 38229, Start Num: 1

Candidate Starts for Rahel\_89:

(Start: 1 @34801 has 21 MA's), (3, 34870), (4, 34876), (5, 34894), (7, 34930), (11, 35038), (12, 35050), (14, 35173), (17, 35224), (18, 35278), (19, 35290), (20, 35311), (31, 35605), (32, 35650), (38, 35728), (41, 35764), (42, 35797), (44, 35812), (48, 35857), (50, 35866), (53, 35899), (54, 35935), (56, 36019), (57, 36025), (62, 36220), (64, 36241), (65, 36262), (66, 36271), (72, 36328), (74, 36370), (76, 36424), (77, 36469), (82, 36538), (85, 36574), (89, 36601), (91, 36628), (94, 36688), (97, 36721), (98, 36724), (102, 36754), (103, 36772), (113, 36913), (117, 36964), (124, 37174), (125, 37180), (127, 37219), (128, 37261), (129, 37273), (130, 37291), (134, 37465), (135, 37474), (136, 37477), (137,



37480), (138, 37492), (139, 37504), (140, 37507), (141, 37522), (144, 37609), (145, 37624), (146, 37768), (147, 37780), (148, 37960), (149, 37978), (152, 38059), (154, 38095), (155, 38116), (156, 38182),

Gene: ScoobyDoobyDoo\_84 Start: 34152, Stop: 37481, Start Num: 2

Candidate Starts for ScoobyDoobyDoo\_84:

(Start: 2 @34152 has 1 MA's), (6, 34191), (8, 34230), (9, 34257), (10, 34299), (11, 34320), (12, 34332), (13, 34371), (14, 34455), (17, 34506), (18, 34560), (22, 34665), (26, 34752), (35, 34989), (37, 34998), (39, 35010), (42, 35079), (44, 35094), (45, 35109), (48, 35139), (50, 35148), (53, 35181), (59, 35355), (62, 35502), (64, 35523), (65, 35544), (66, 35553), (67, 35565), (70, 35592), (72, 35610), (77, 35751), (79, 35787), (82, 35820), (87, 35880), (97, 36003), (103, 36054), (104, 36084), (106, 36099), (111, 36183), (112, 36192), (113, 36195), (114, 36198), (124, 36456), (125, 36462), (126, 36483), (127, 36501), (129, 36555), (130, 36573), (131, 36582), (132, 36642), (133, 36735), (134, 36747), (136, 36759), (139, 36786), (141, 36804), (142, 36849), (143, 36885), (146, 37071), (149, 37239), (150, 37251), (151, 37266), (153, 37314), (156, 37434), (157, 37464),

Gene: ShiaLabeouf\_90 Start: 35640, Stop: 39068, Start Num: 1

Candidate Starts for ShiaLabeouf\_90:

(Start: 1 @35640 has 21 MA's), (3, 35709), (4, 35715), (5, 35733), (7, 35769), (11, 35877), (12, 35889), (14, 36012), (17, 36063), (18, 36117), (19, 36129), (20, 36150), (31, 36444), (32, 36489), (38, 36567), (41, 36603), (42, 36636), (44, 36651), (48, 36696), (50, 36705), (53, 36738), (54, 36774), (56, 36858), (57, 36864), (62, 37059), (64, 37080), (65, 37101), (66, 37110), (72, 37167), (74, 37209), (76, 37263), (77, 37308), (82, 37377), (85, 37413), (89, 37440), (91, 37467), (94, 37527), (97, 37560), (98, 37563), (102, 37593), (103, 37611), (113, 37752), (117, 37803), (124, 38013), (125, 38019), (127, 38058), (128, 38100), (129, 38112), (130, 38130), (134, 38304), (135, 38313), (136, 38316), (137, 38319), (138, 38331), (139, 38343), (140, 38346), (141, 38361), (144, 38448), (145, 38463), (146, 38607), (147, 38619), (148, 38799), (149, 38817), (152, 38898), (154, 38934), (155, 38955), (156, 39021),

Gene: Shnickers\_90 Start: 35200, Stop: 38628, Start Num: 1

Candidate Starts for Shnickers\_90:

(Start: 1 @35200 has 21 MA's), (3, 35269), (4, 35275), (5, 35293), (7, 35329), (11, 35437), (12, 35449), (14, 35572), (17, 35623), (18, 35677), (19, 35689), (20, 35710), (31, 36004), (32, 36049), (38, 36127), (41, 36163), (42, 36196), (44, 36211), (48, 36256), (50, 36265), (53, 36298), (54, 36334), (56, 36418), (57, 36424), (62, 36619), (64, 36640), (65, 36661), (66, 36670), (72, 36727), (74, 36769), (76, 36823), (77, 36868), (82, 36937), (85, 36973), (89, 37000), (91, 37027), (94, 37087), (97, 37120), (98, 37123), (102, 37153), (103, 37171), (113, 37312), (117, 37363), (124, 37573), (125, 37579), (127, 37618), (128, 37660), (129, 37672), (130, 37690), (134, 37864), (135, 37873), (136, 37876), (137, 37879), (138, 37891), (139, 37903), (140, 37906), (141, 37921), (144, 38008), (145, 38023), (146, 38167), (147, 38179), (148, 38359), (149, 38377), (152, 38458), (154, 38494), (155, 38515), (156, 38581),

Gene: Spec\_85 Start: 34965, Stop: 38393, Start Num: 1

Candidate Starts for Spec\_85:

(Start: 1 @34965 has 21 MA's), (3, 35034), (4, 35040), (5, 35058), (7, 35094), (11, 35202), (12, 35214), (14, 35337), (17, 35388), (18, 35442), (19, 35454), (20, 35475), (31, 35769), (32, 35814), (38, 35892), (41, 35928), (42, 35961), (44, 35976), (48, 36021), (50, 36030), (53, 36063), (54, 36099), (56, 36183), (57, 36189), (62, 36384), (64, 36405), (65, 36426), (66, 36435), (72, 36492), (74, 36534), (76, 36588), (77, 36633), (82, 36702), (85, 36738), (89, 36765), (91, 36792), (94, 36852), (97, 36885), (98, 36888), (102, 36918), (103, 36936), (113, 37077), (117, 37128), (124, 37338), (125, 37344), (127, 37383), (128, 37425), (129, 37437), (130, 37455), (134, 37629), (135, 37638), (136, 37641), (137, 37644), (138, 37656), (139, 37668), (140, 37671), (141, 37686), (144, 37773), (145, 37788), (146, 37932), (147, 37944), (148, 38124), (149, 38142), (152, 38223), (154, 38259), (155, 38280), (156,

38346),

Gene: Tyke\_92 Start: 37005, Stop: 40433, Start Num: 1

Candidate Starts for Tyke\_92:

(Start: 1 @37005 has 21 MA's), (3, 37074), (4, 37080), (5, 37098), (7, 37134), (11, 37242), (12, 37254), (14, 37377), (17, 37428), (18, 37482), (19, 37494), (20, 37515), (31, 37809), (32, 37854), (38, 37932), (41, 37968), (42, 38001), (44, 38016), (48, 38061), (50, 38070), (53, 38103), (54, 38139), (56, 38223), (57, 38229), (62, 38424), (64, 38445), (65, 38466), (66, 38475), (72, 38532), (74, 38574), (76, 38628), (77, 38673), (82, 38742), (85, 38778), (89, 38805), (91, 38832), (94, 38892), (97, 38925), (98, 38928), (102, 38958), (103, 38976), (113, 39117), (117, 39168), (124, 39378), (125, 39384), (127, 39423), (128, 39465), (129, 39477), (130, 39495), (134, 39669), (135, 39678), (136, 39681), (137, 39684), (138, 39696), (139, 39708), (140, 39711), (141, 39726), (144, 39813), (145, 39828), (146, 39972), (147, 39984), (148, 40164), (149, 40182), (152, 40263), (154, 40299), (155, 40320), (156, 40386),