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1 ANNEX 14.1.4.D: MRSEA MODEL DIAGNOSTICS

1.1 INTRODUCTION

1.1.1.1 This document is an appendix to the **Annex 14.1.4: MRSea Modelling Report, Volume 2c** of the **Appendix 14.1: Ornithology Baseline Report, Volume 2c**. It should be read in conjunction with:

- **Appendix 14.1, Volume 2c;**
- **Annex 14.1.4, Volume 2c;**
- **Annex 14.1.4.A: MRSea Unapportioned and Uncorrected Abundance and Density Estimates, Volume 2c;**
- **Annex 14.1.4.B: MRSea Apportioned and Corrected Abundance and Density Estimates, Volume 2c;**
- **Annex 14.1.4.C: MRSea Model Abundance Confidence Limits and Coefficient of Variation, Volume 2c.**

1.1.1.2 The figures in this appendix show key model diagnostics for the following species:

- Kittiwake;
- Gannet;
- Guillemot;
- Razorbill;
- Puffin.

1.1.1.3 The model diagnostics are shown for each model fitted. Note that models were not fitted for every survey for each species; see **Annex 14.1.4, Volume 2c** for further details. The model diagnostics are:

- Fitted values against scaled Pearson residuals;
- Observed values against fitted values;
- COVRATIO statistic by omitted block;
- PRESS statistic by omitted block;
- Mean fitted value against variance in residuals.

1.2 KITTIWAKE

1.2.1 SURVEY 01 (MARCH 2022)

Plate 1-1 Kittiwake survey 01 best fitting model scaled Pearsons residuals

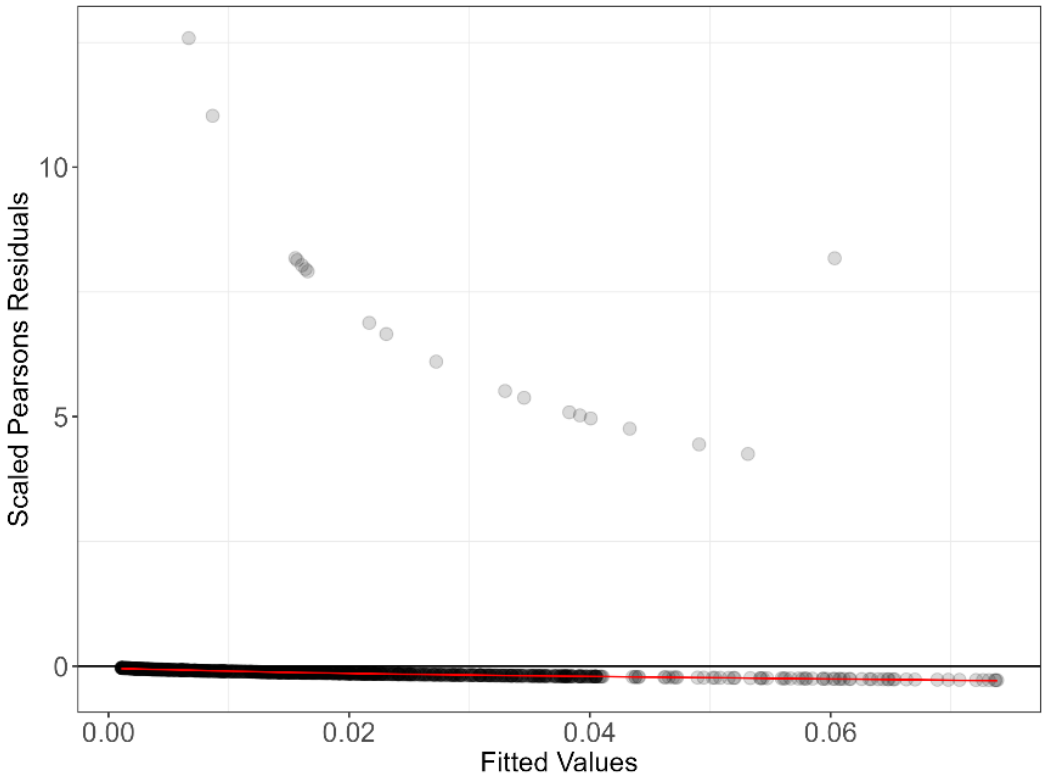


Plate 1-2 Kittiwake survey 01 fitted versus observed

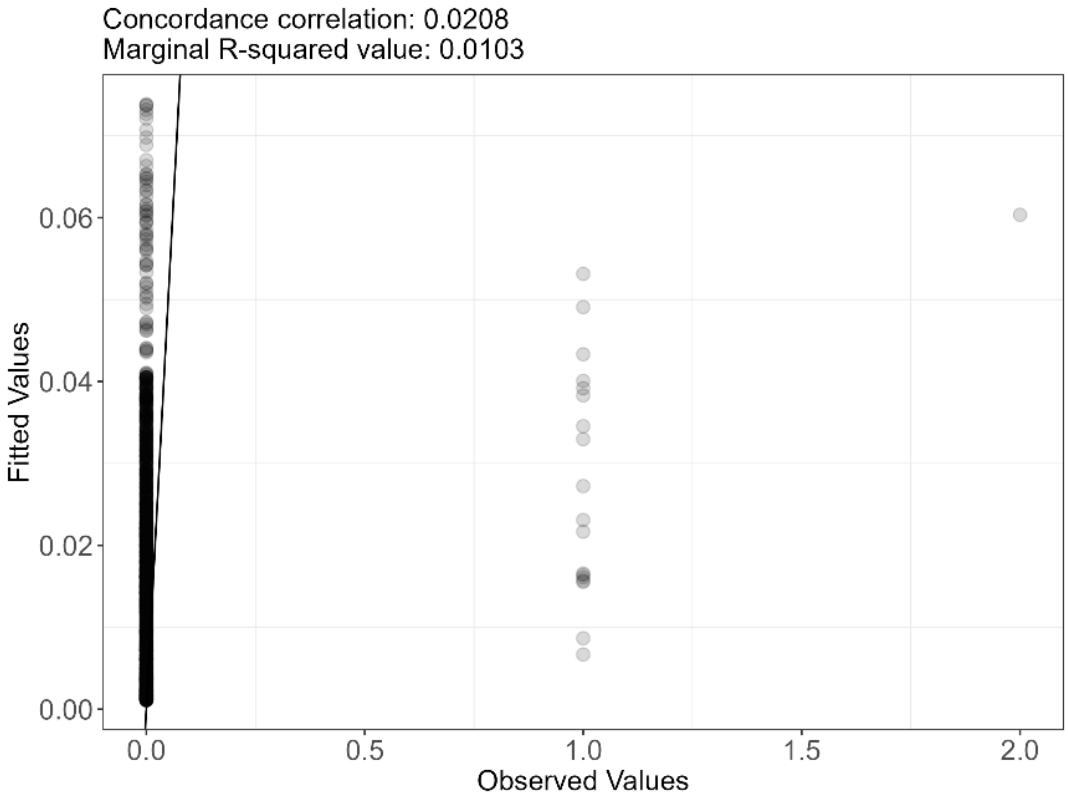


Plate 1-3 Kittiwake survey 01 COVRATIO statistic

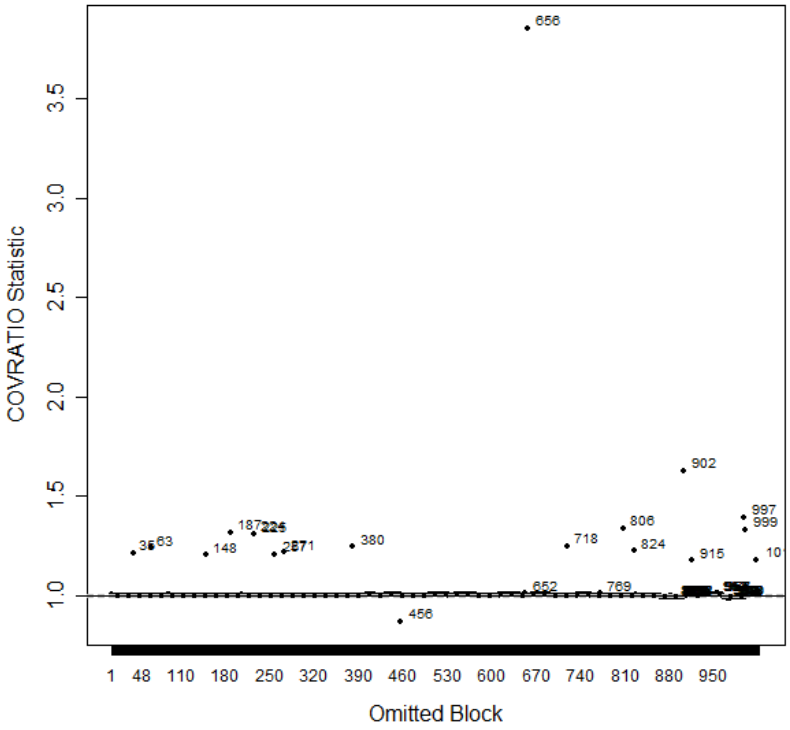


Plate 1-4 Kittiwake survey 01 PRESS statistic

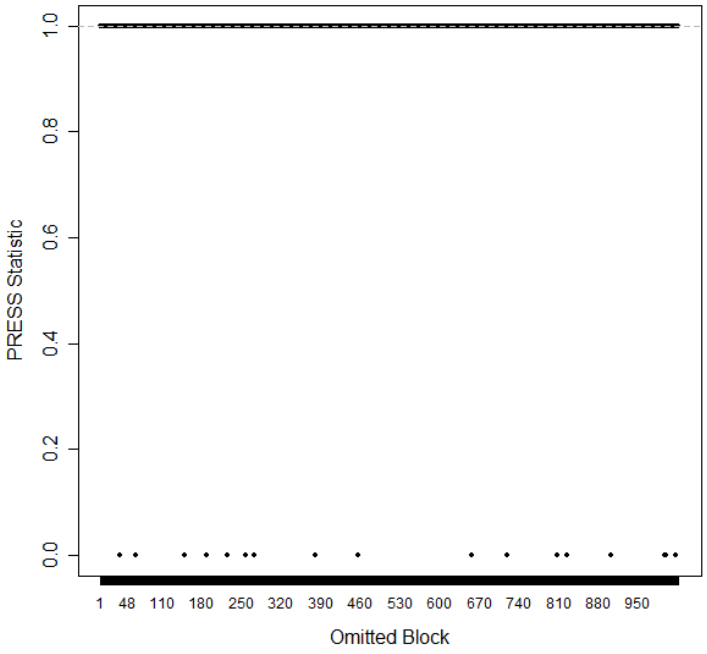
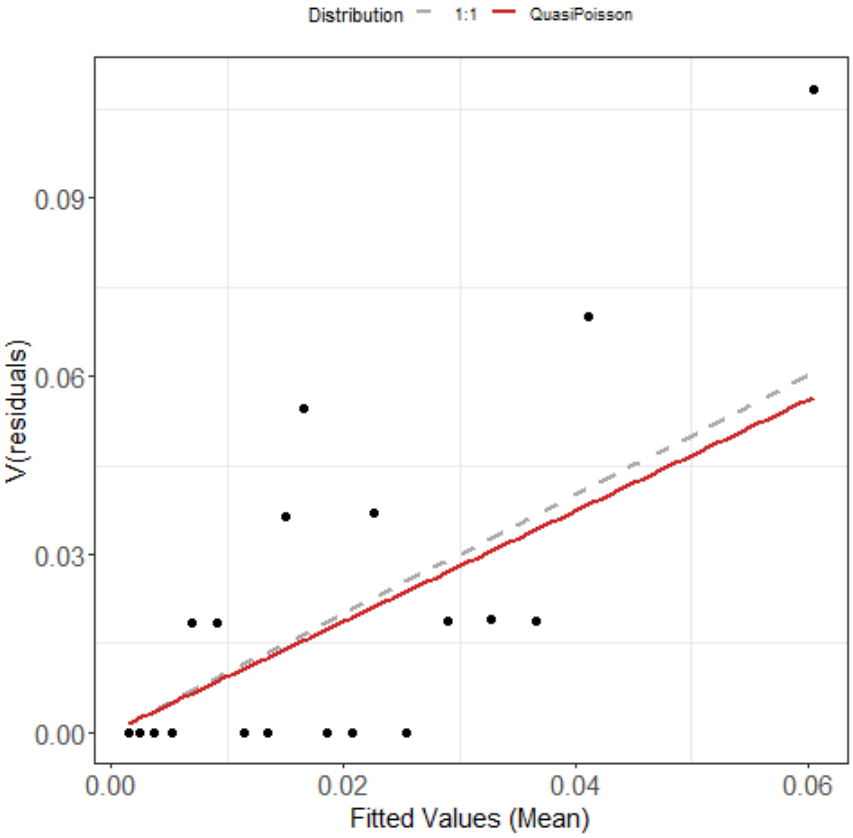


Plate 1-5 Kittiwake survey 01 mean-variance relationship


Distribution
1:1
QuasiPoisson
V(residuals)
0.09
0.06
0.03
0.00
0.00
0.02
0.04
0.06
Fitted Values (Mean)

1.2.2 SURVEY 02 (APRIL 2022)

Plate 1-6 Kittiwake survey 02 best fitting model scaled Pearsons residuals

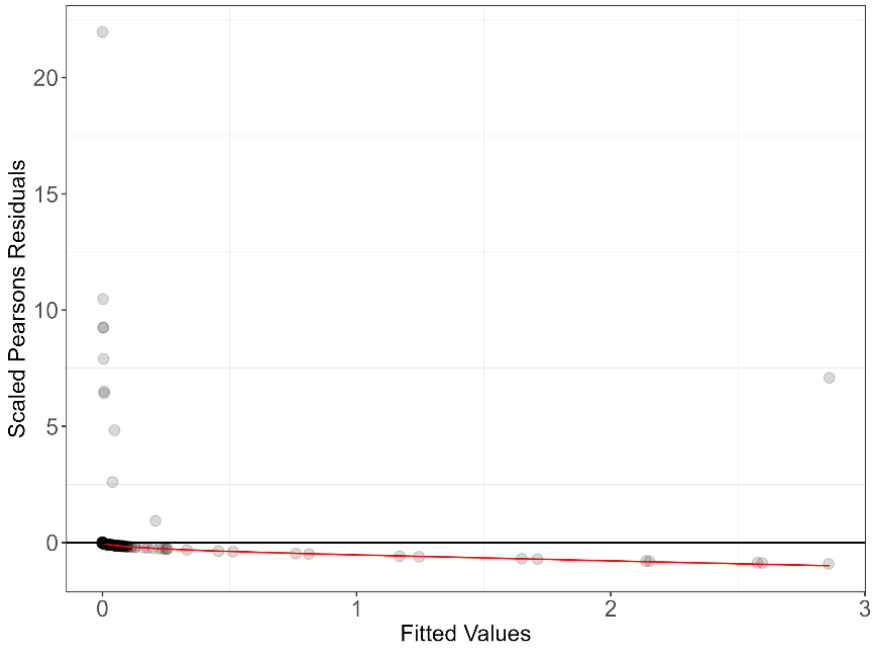


Plate 1-7 Kittiwake survey 02 fitted versus observed

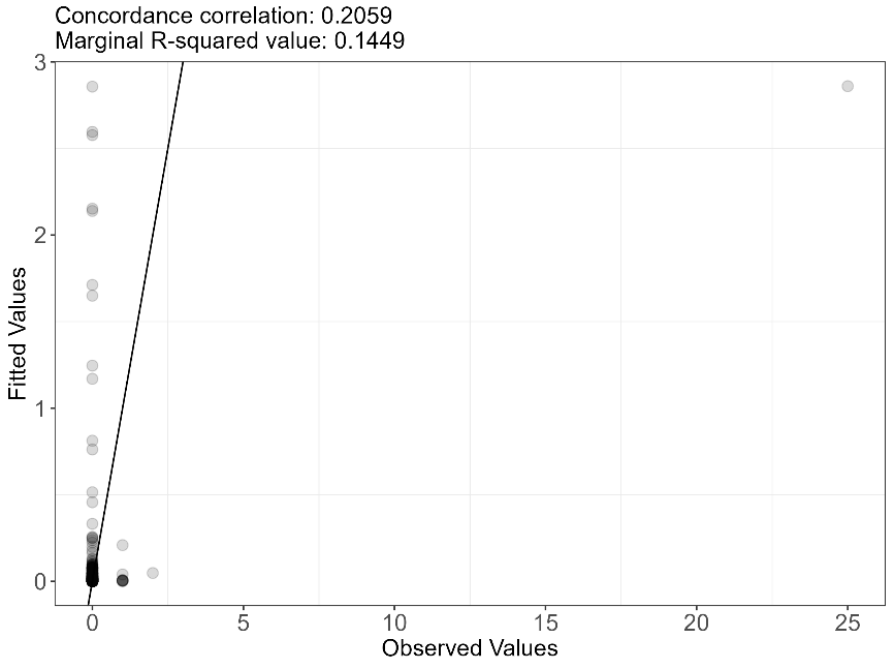


Plate 1-8 Kittiwake survey 02 COVRATIO statistic

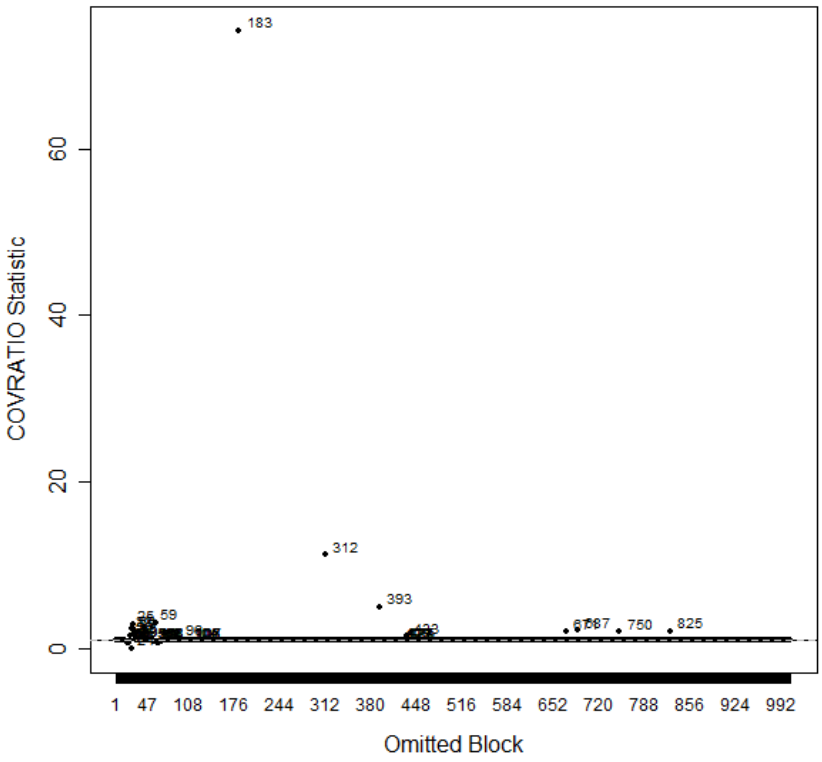


Plate 1-9 Kittiwake survey 02 PRESS statistic

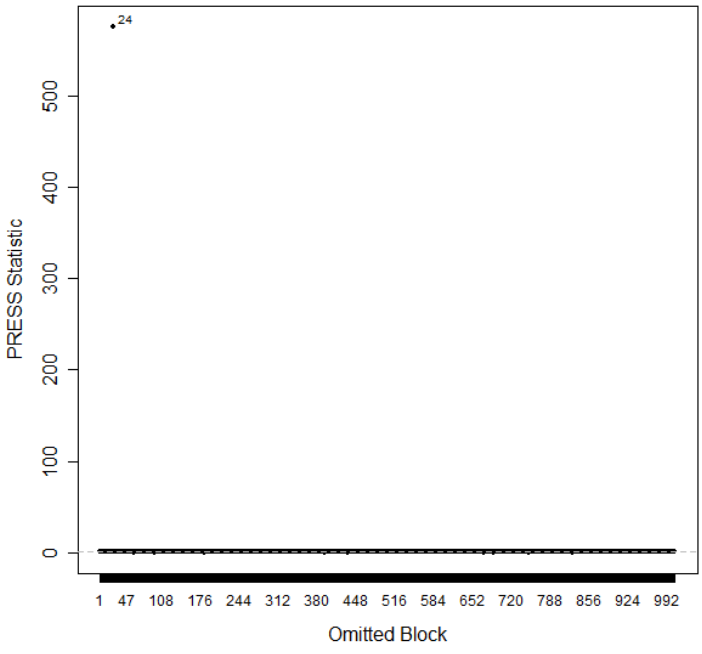
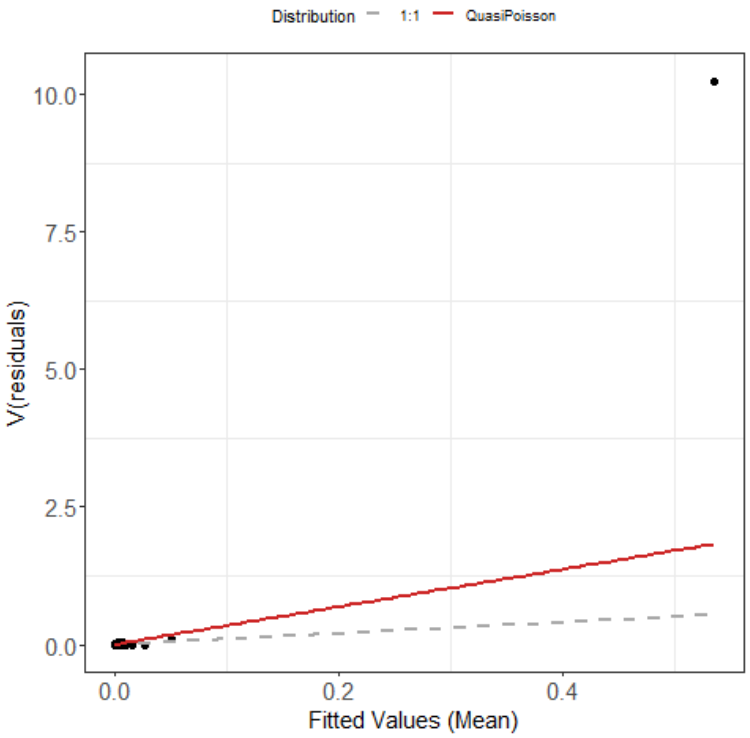


Plate 1-10 Kittiwake survey 02 mean-variance relationship



1.2.3 SURVEY 03 (MAY 2022)

Plate 1-11 Kittiwake survey 03 best fitting model scaled Pearsons residuals

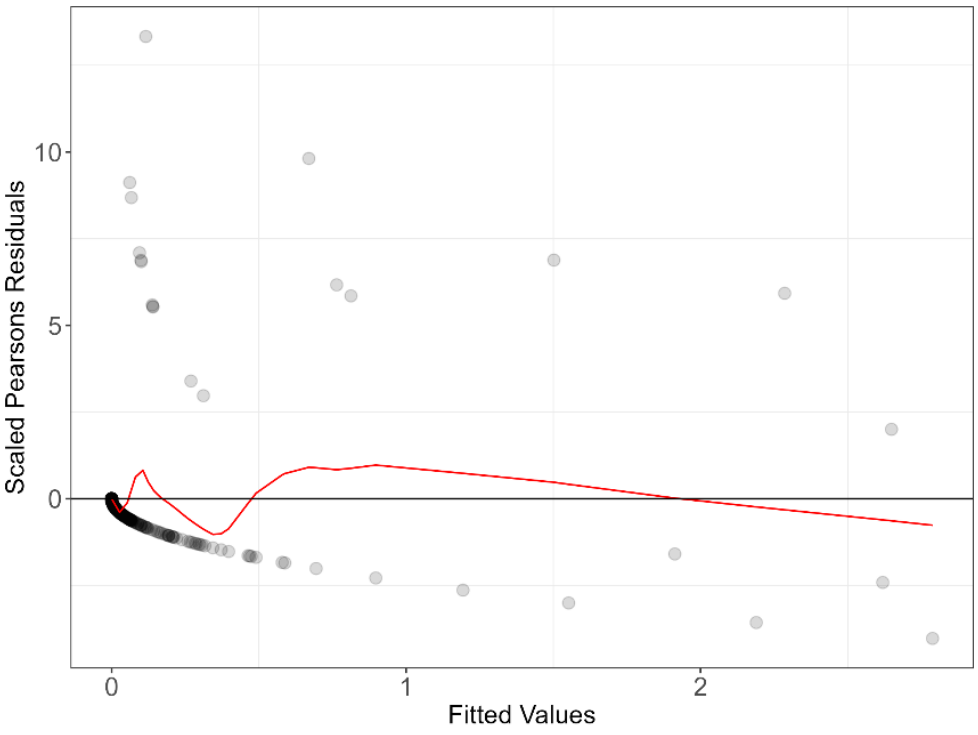


Plate 1-12 Kittiwake survey 03 fitted versus observed

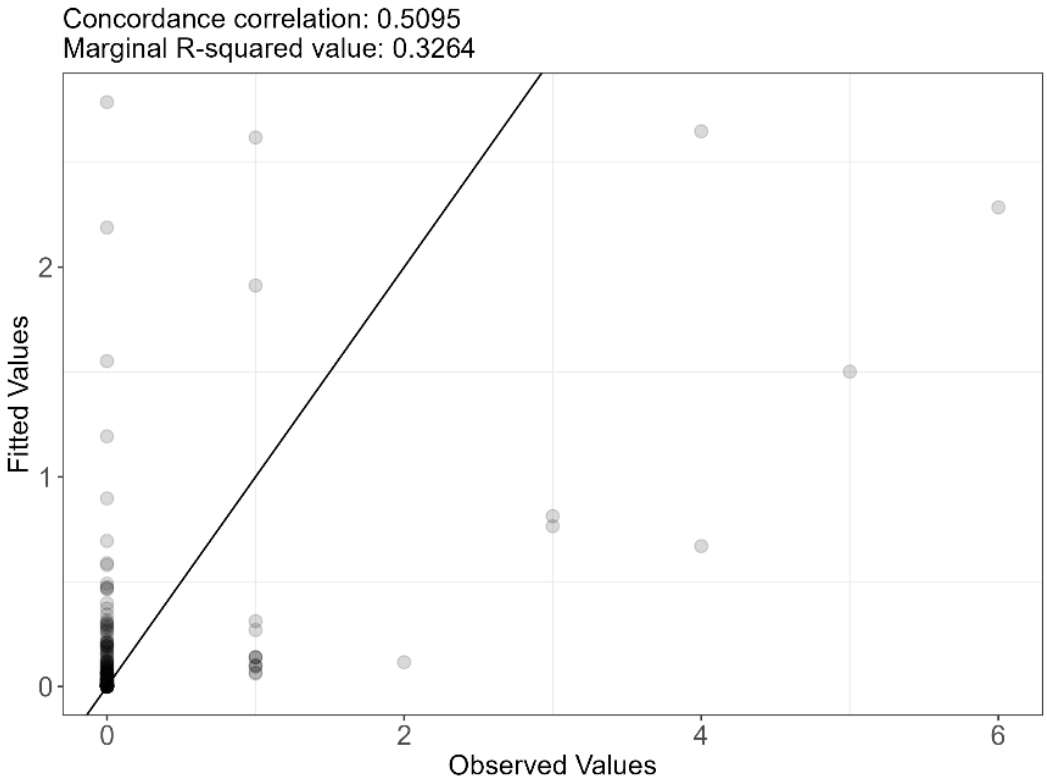


Plate 1-13 Kittiwake survey 03 COVRATIO statistic

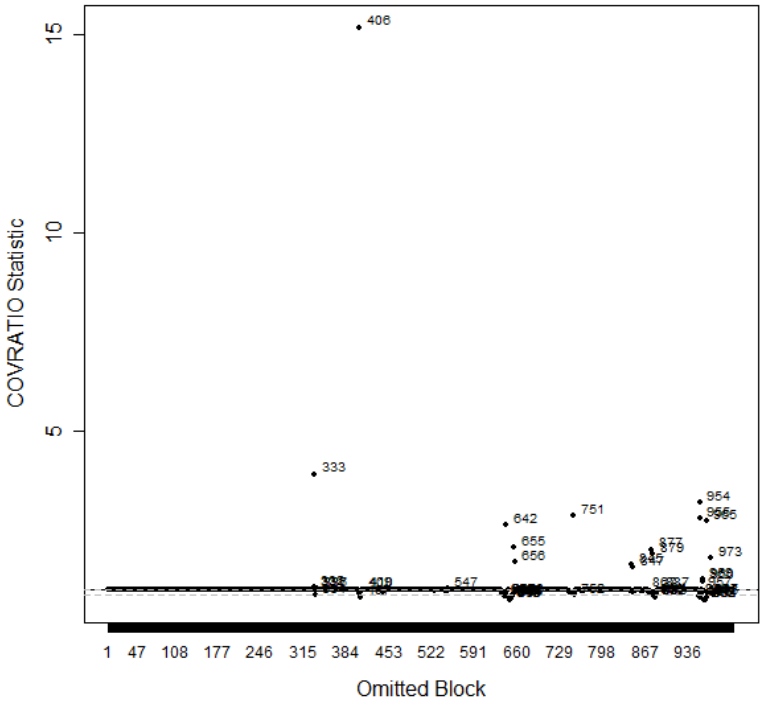


Plate 1-14 Kittiwake survey 03 PRESS statistic

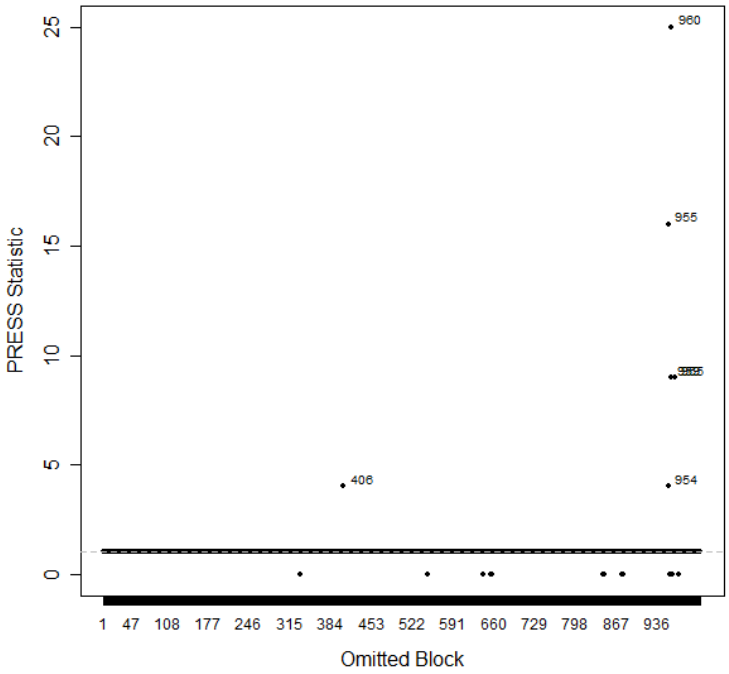
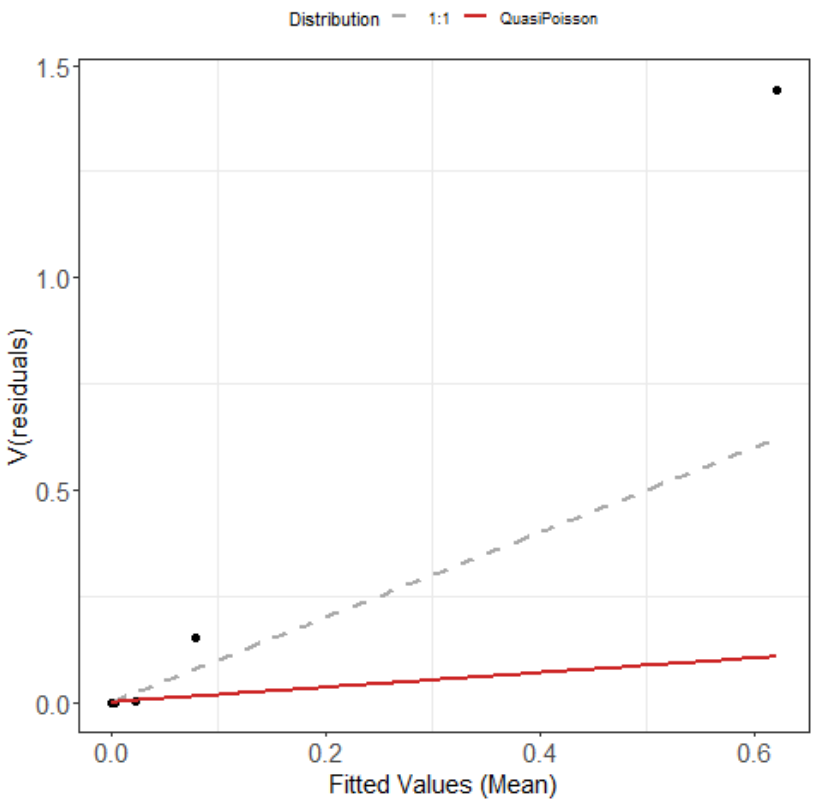


Plate 1-15 Kittiwake survey 03 mean-variance relationship



1.2.4 SURVEY 05 (JULY 2022)

Plate 1-16 Kittiwake survey 05 best fitting model scaled Pearsons residuals

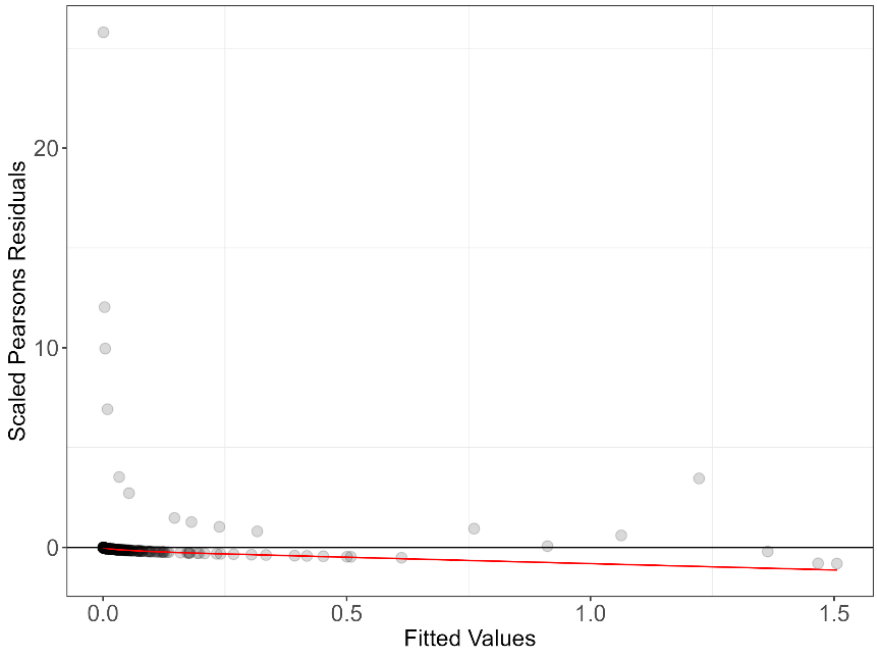


Plate 1-17 Kittiwake survey 05 fitted versus observed

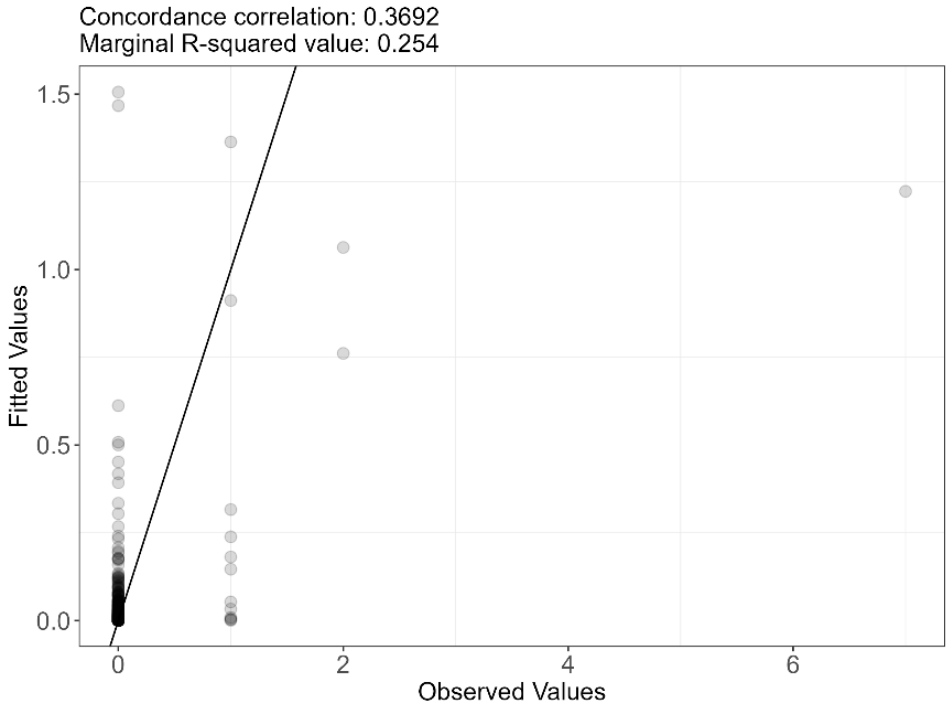


Figure 1.1 Kittiwake survey 05 COVRATIO statistic

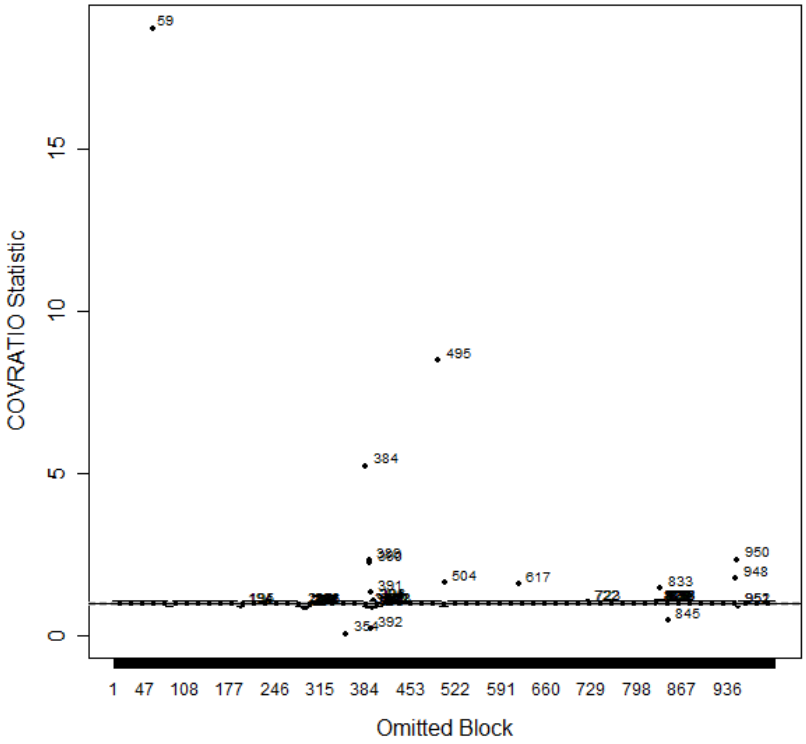


Plate 1-18 Kittiwake survey 05 PRESS statistic

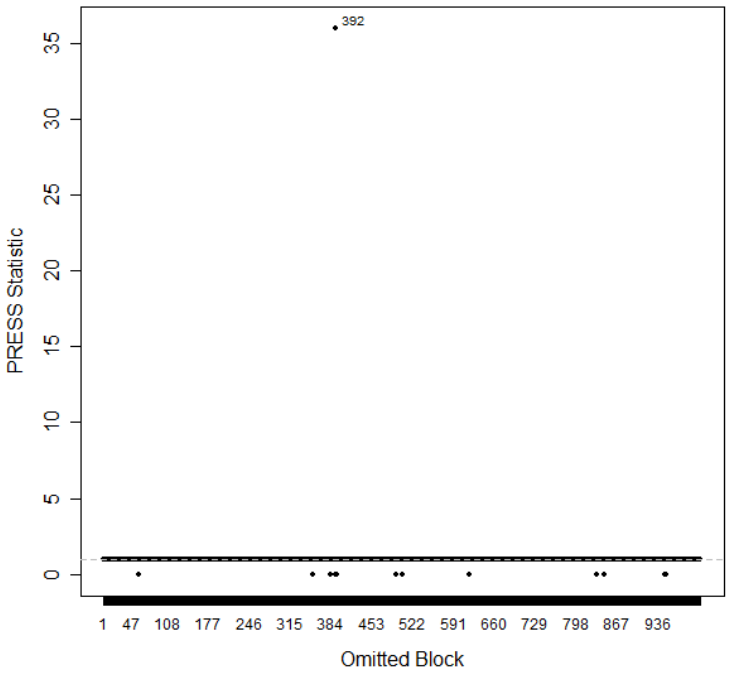
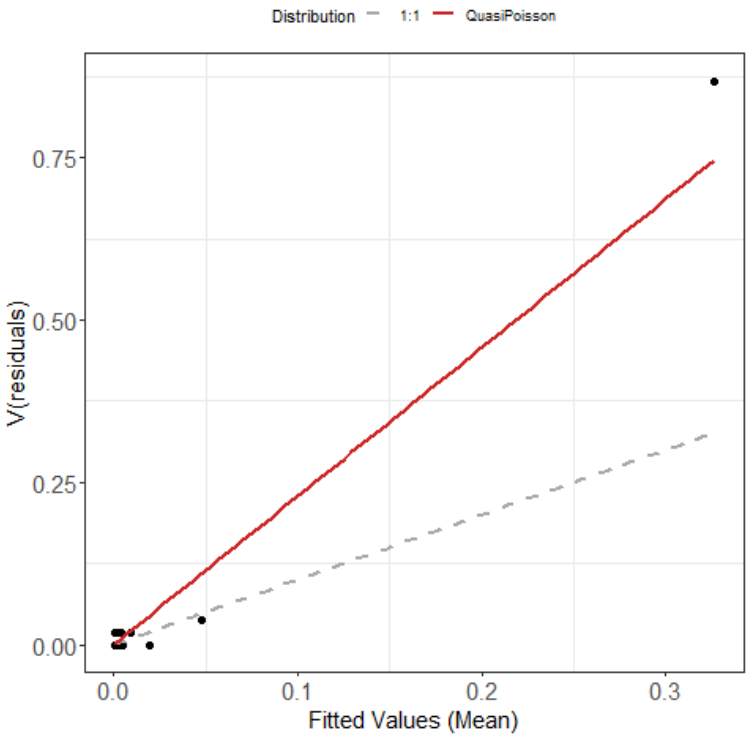


Plate 1-19 Kittiwake survey 05 mean-variance relationship



1.2.5 SURVEY 08 (OCTOBER 2022)

Plate 1-20 Kittiwake survey 08 best fitting model scaled Pearsons residuals

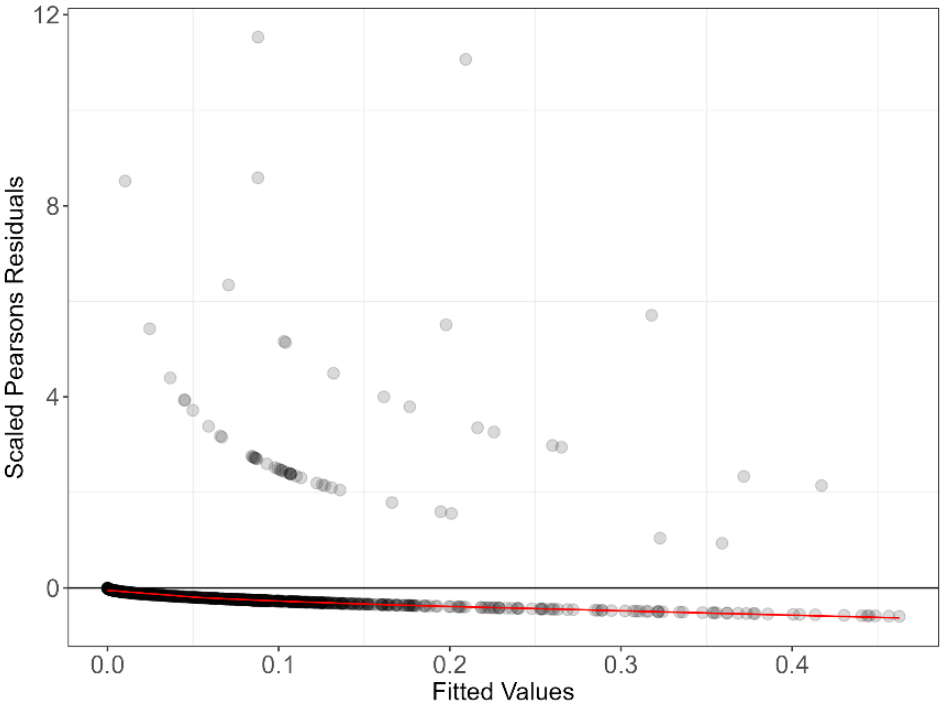


Plate 1-21 Kittiwake survey 08 fitted versus observed

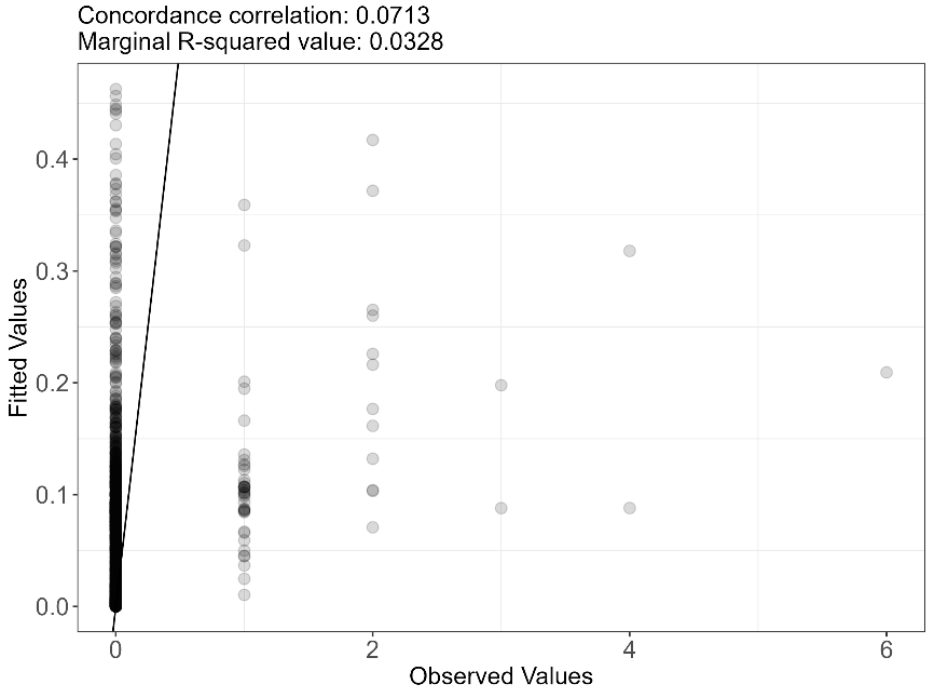


Plate 1-22 Kittiwake survey 08 COVRATIO statistic

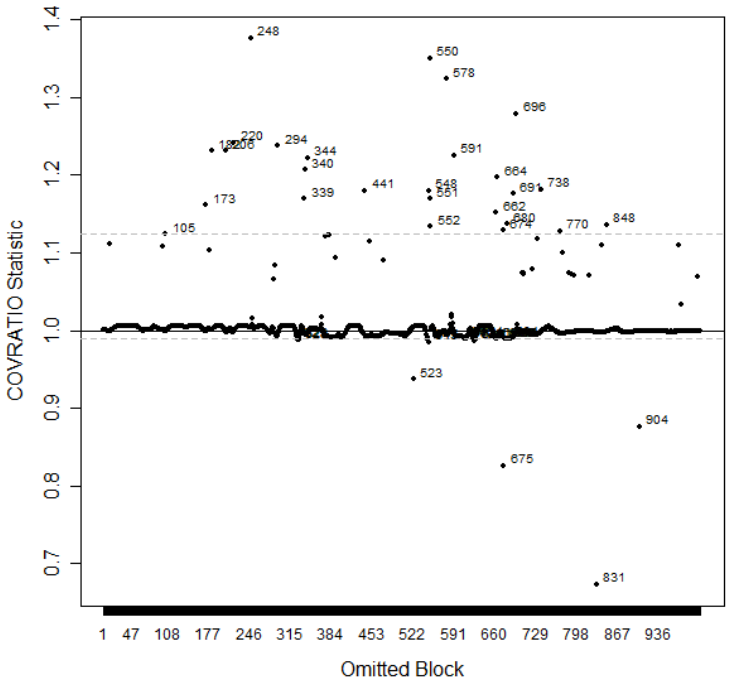


Plate 1-23 Kittiwake survey 08 PRESS statistic

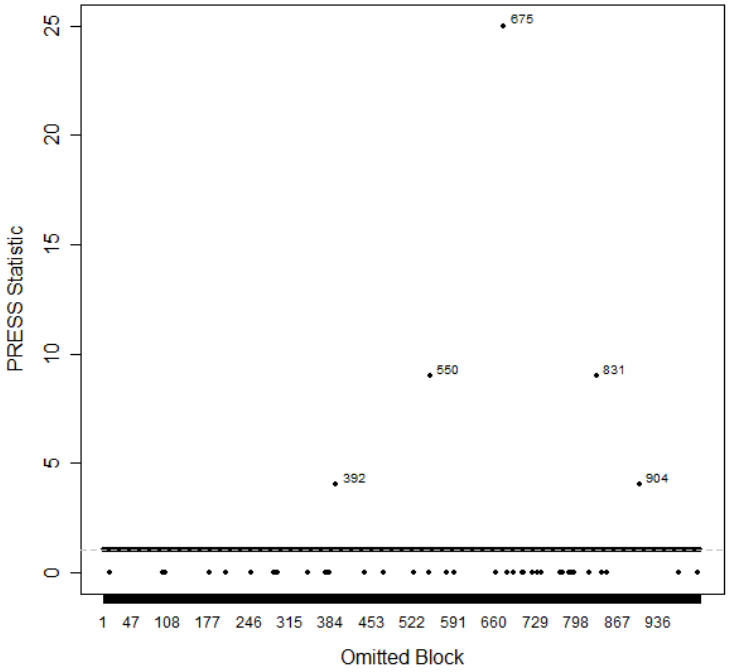
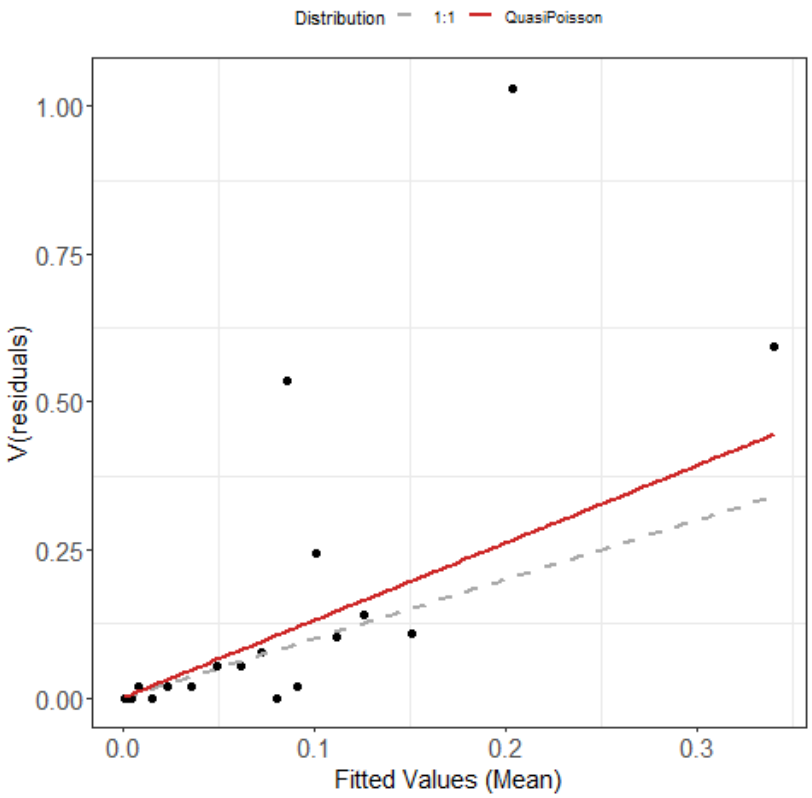


Plate 1-24 Kittiwake survey 08 mean-variance relationship



1.2.6 SURVEY 09 (NOVEMBER 2022)

Plate 1-25 Kittiwake survey 09 best fitting model scaled Pearsons residuals

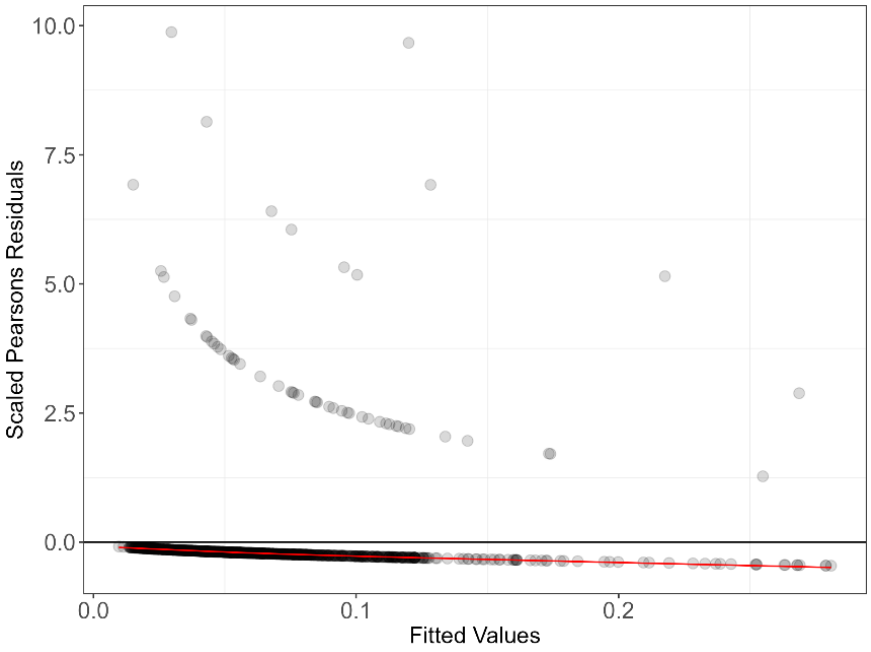


Plate 1-26 Kittiwake survey 09 fitted versus observed

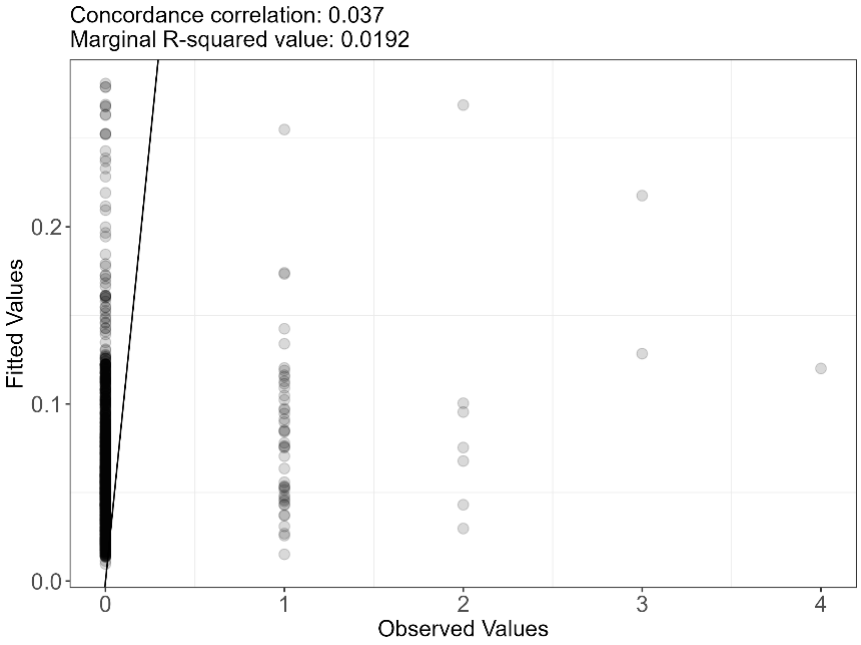


Plate 1-27 Kittiwake survey 09 COVRATIO statistic

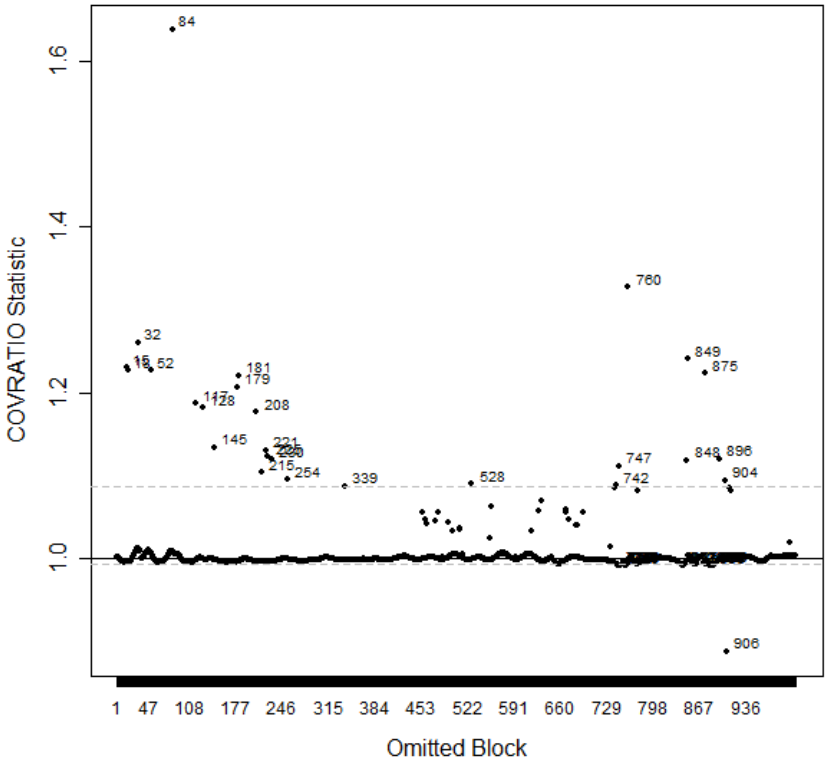


Plate 1-28 Kittiwake survey 09 PRESS statistic

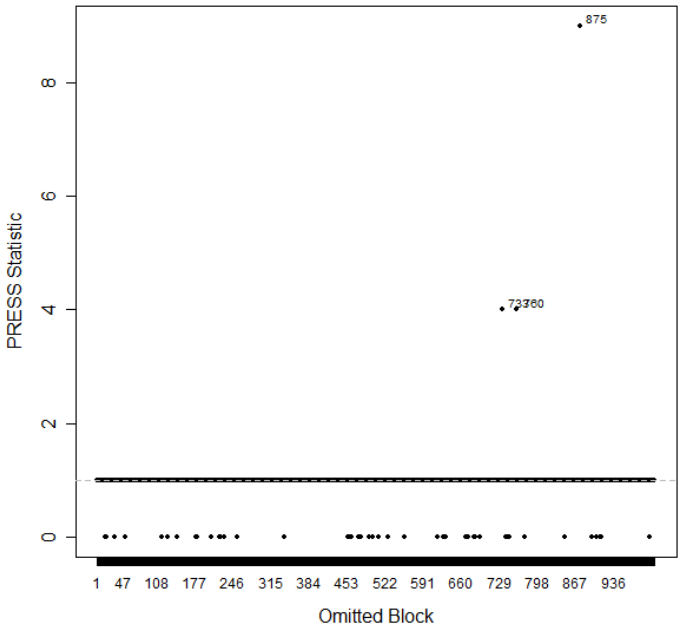
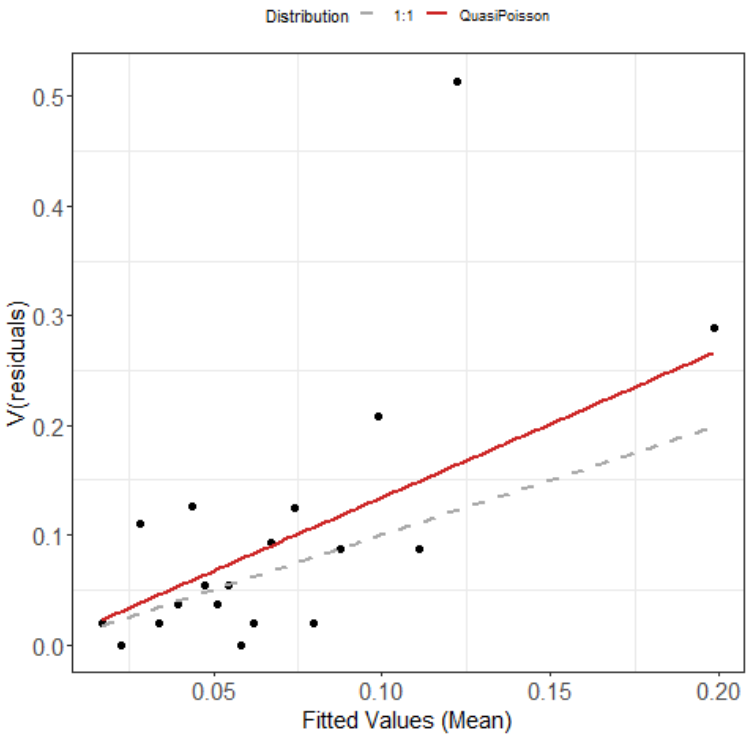


Plate 1-29 Kittiwake survey 09 mean-variance relationship



1.2.7 SURVEY 10 (DECEMBER 2022)

Plate 1-30 Kittiwake survey 10 best fitting model scaled Pearsons residuals

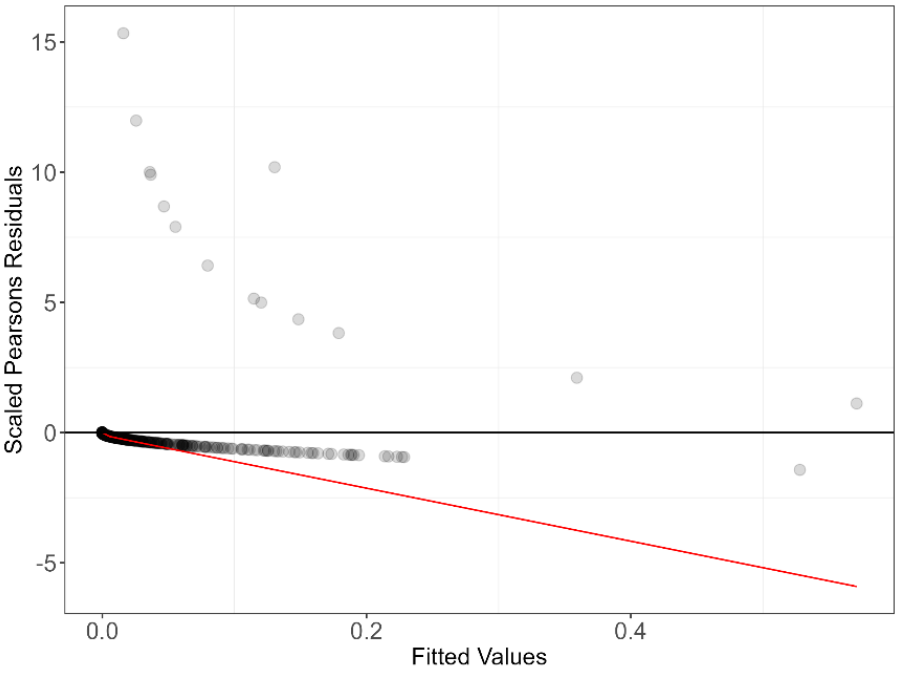


Plate 1-31 Kittiwake survey 10 fitted versus observed

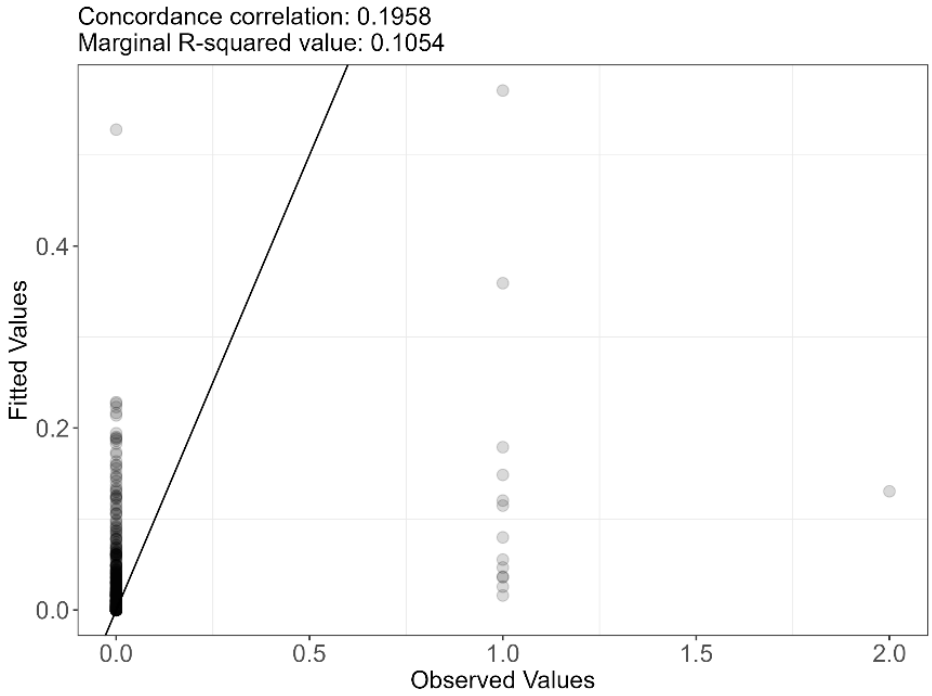


Plate 1-32 Kittiwake survey 10 COVRATIO statistic

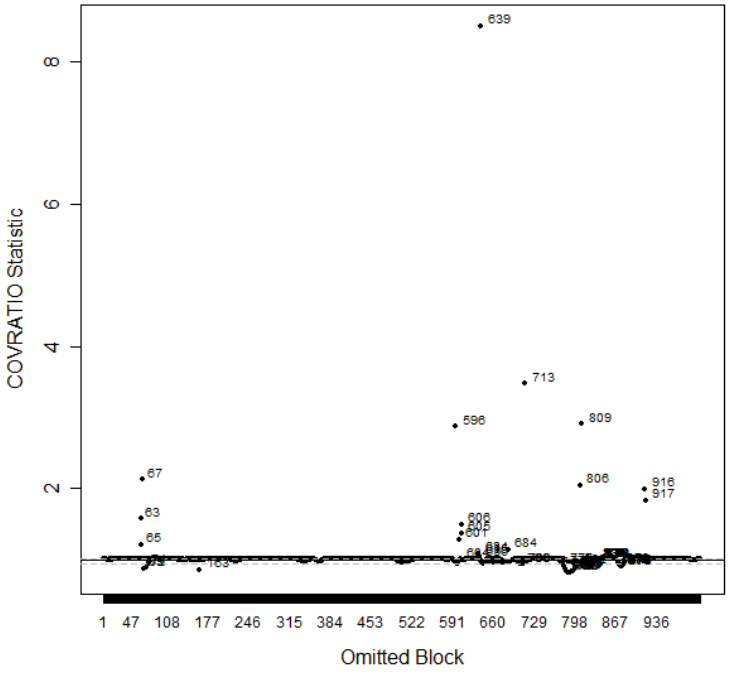


Plate 1-33 Kittiwake survey 10 PRESS statistic

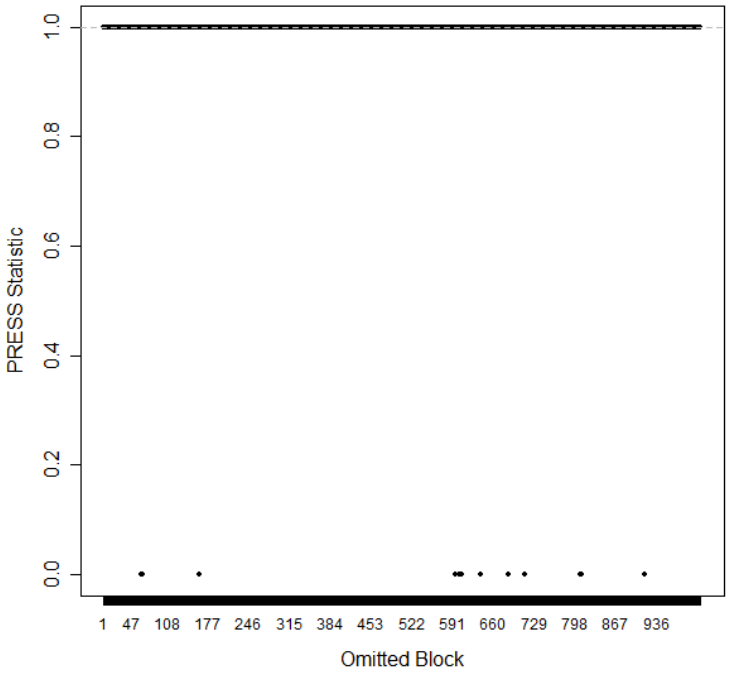
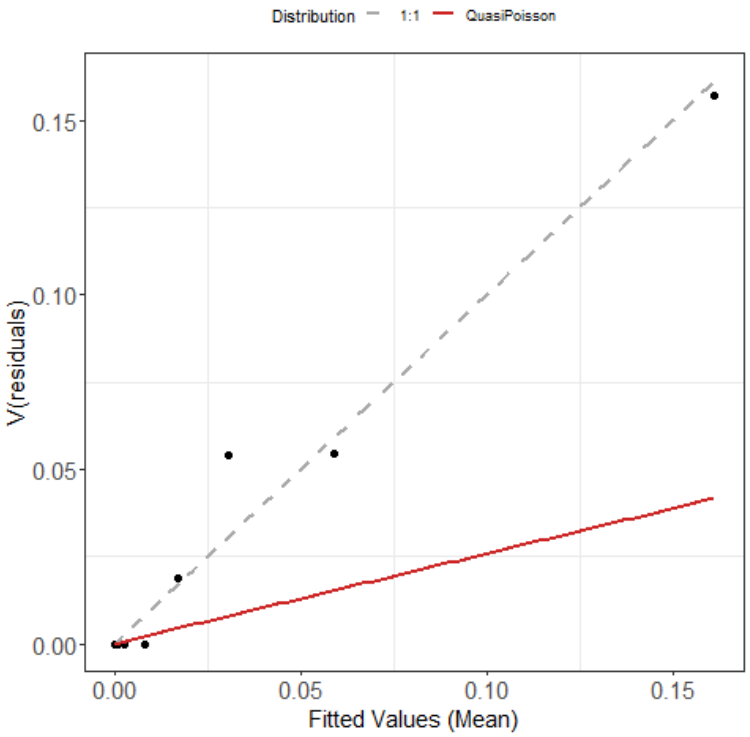


Plate 1-34 Kittiwake survey 10 mean-variance relationship



1.2.8 SURVEY 11 (JANUARY 2023)

Plate 1-35 Kittiwake survey 11 best fitting model scaled Pearsons residuals

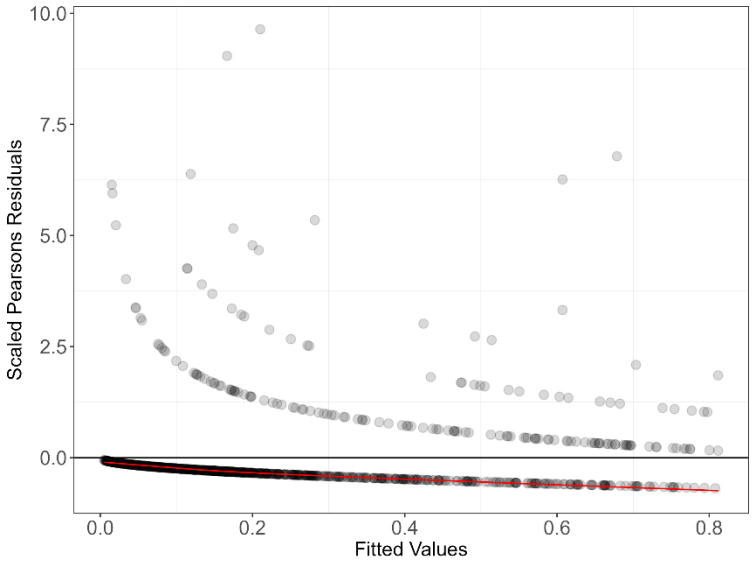


Plate 1-36 Kittiwake survey 11 fitted versus observed

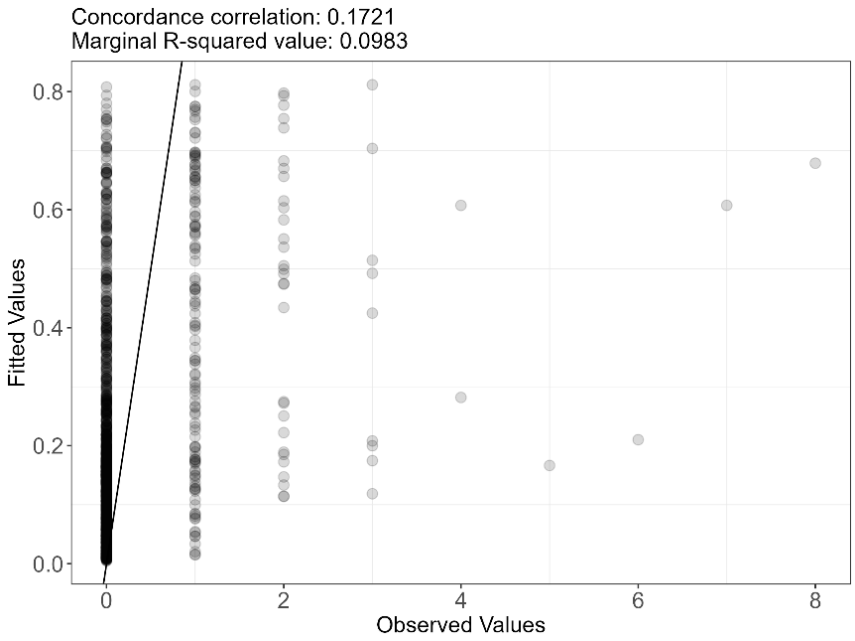


Plate 1-37 Kittiwake survey 11 COVRATIO statistic

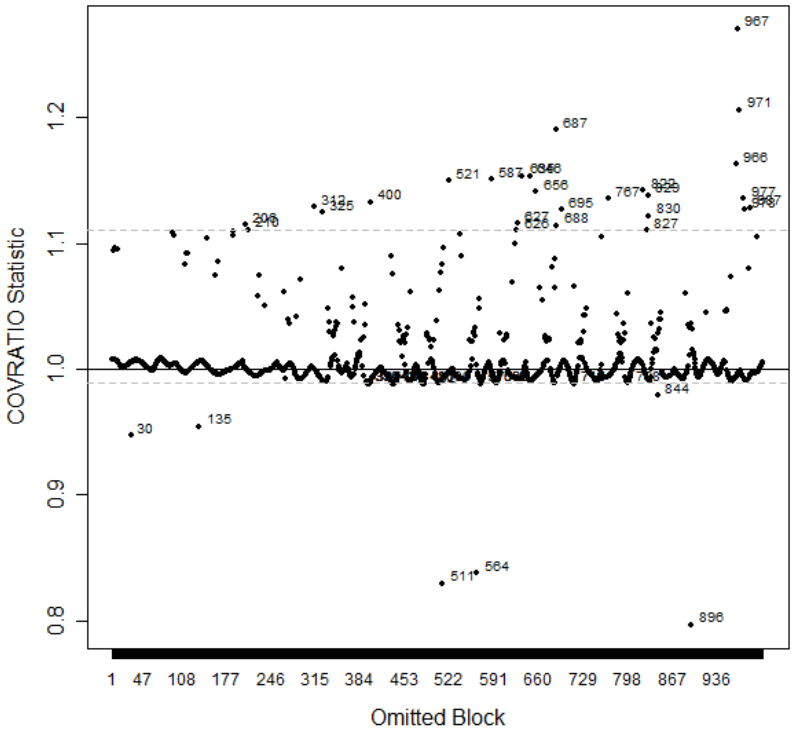


Plate 1-38 Kittiwake survey 11 PRESS statistic

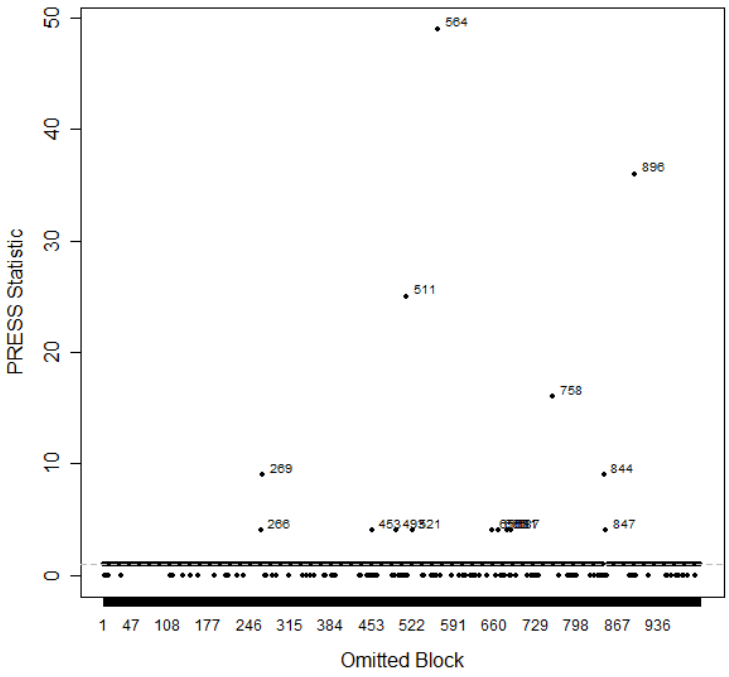
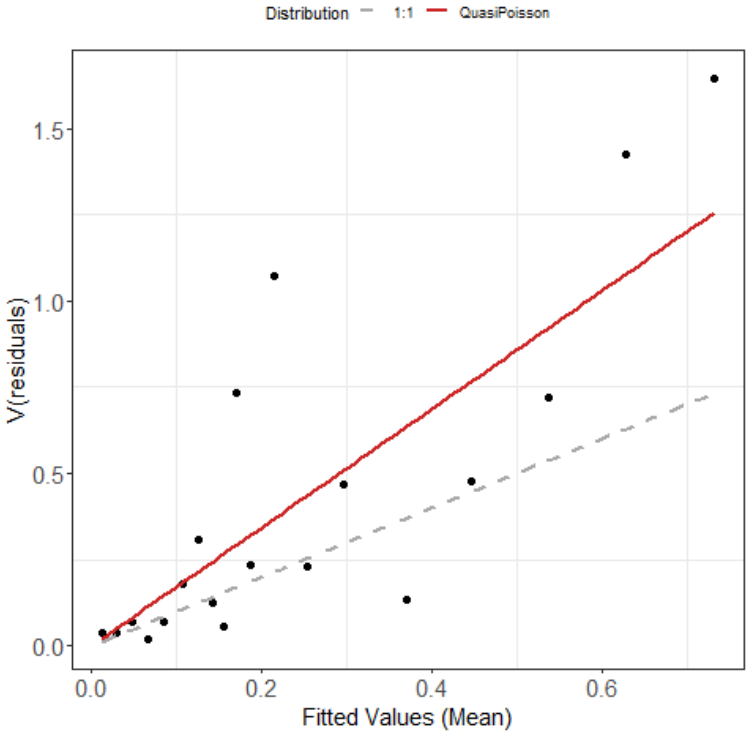


Plate 1-39 Kittiwake survey 11 mean-variance relationship



1.2.9 SURVEY 12 (FEBRUARY 2023)

Plate 1-40 Kittiwake survey 12 best fitting model scaled Pearsons residuals

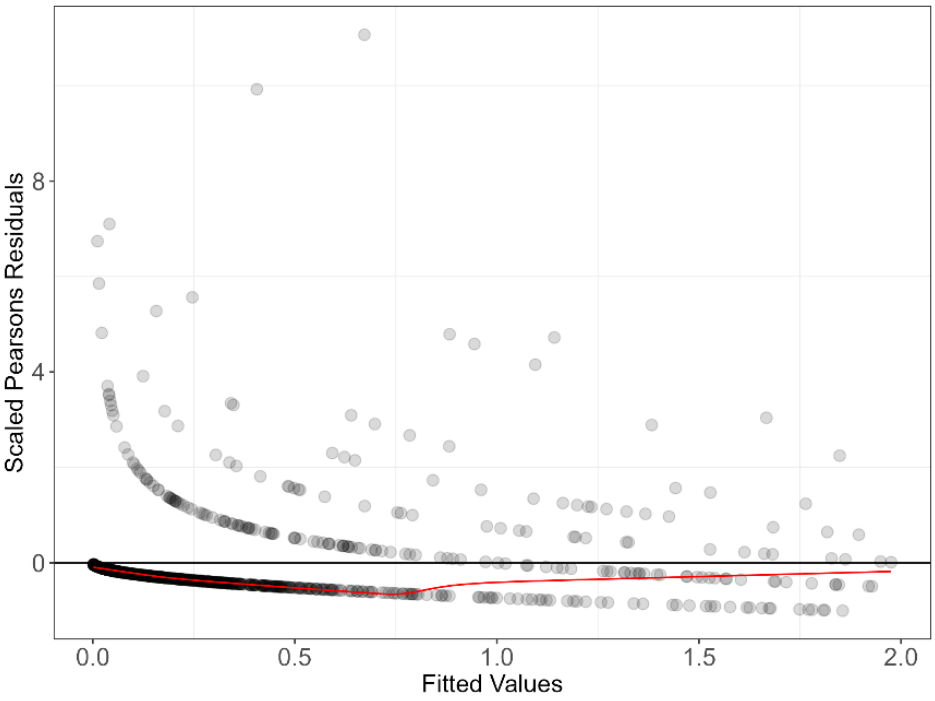


Plate 1-41 Kittiwake survey 12 fitted versus observed

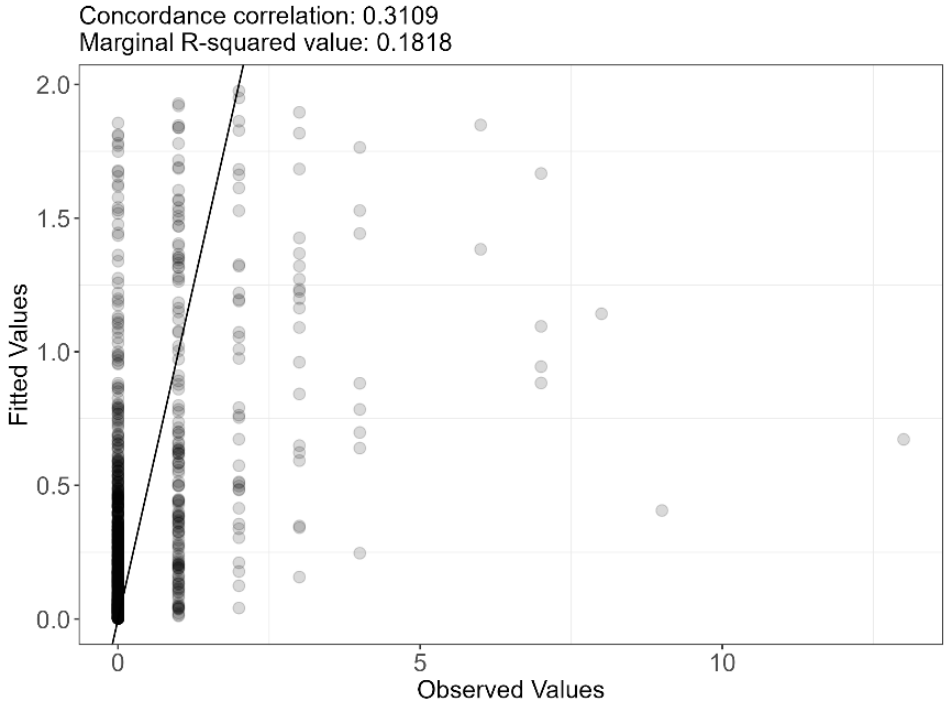


Plate 1-42 Kittiwake survey 12 COVRATIO statistic

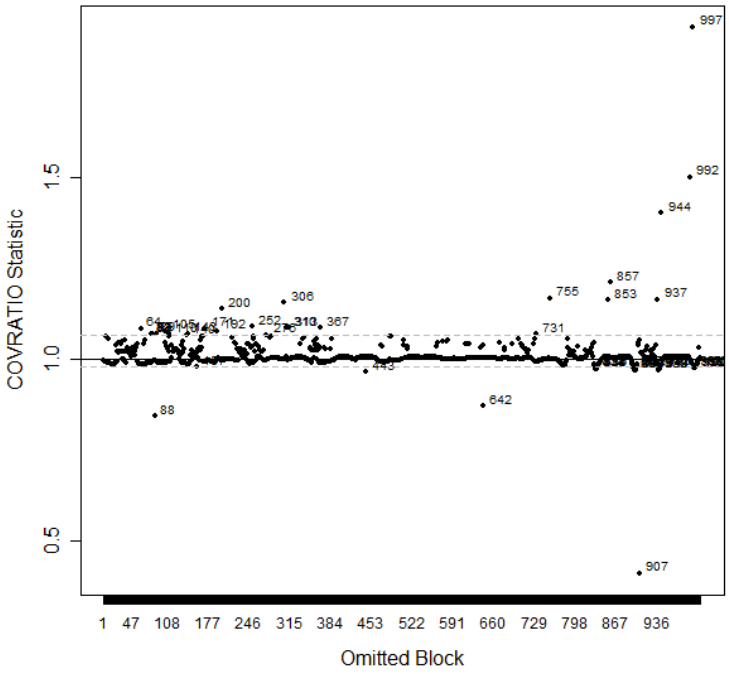


Plate 1-43 Kittiwake survey 12 PRESS statistic

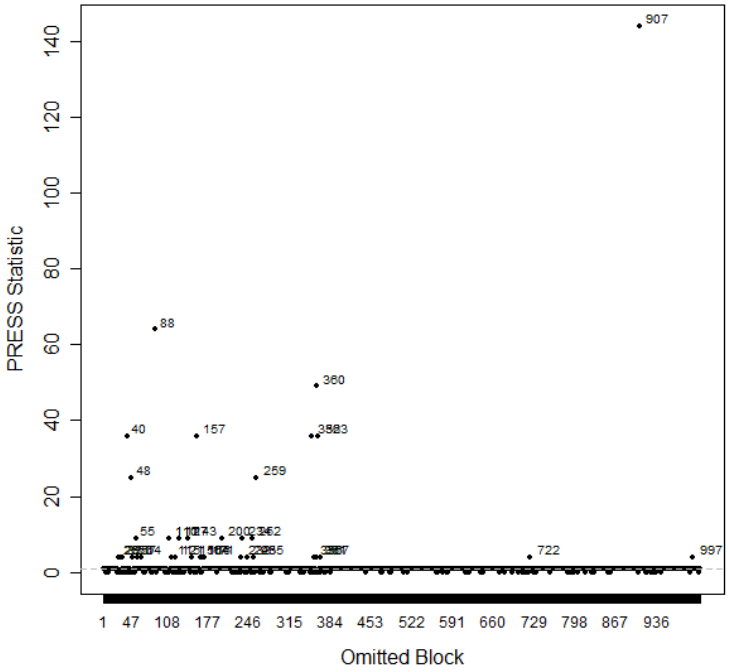
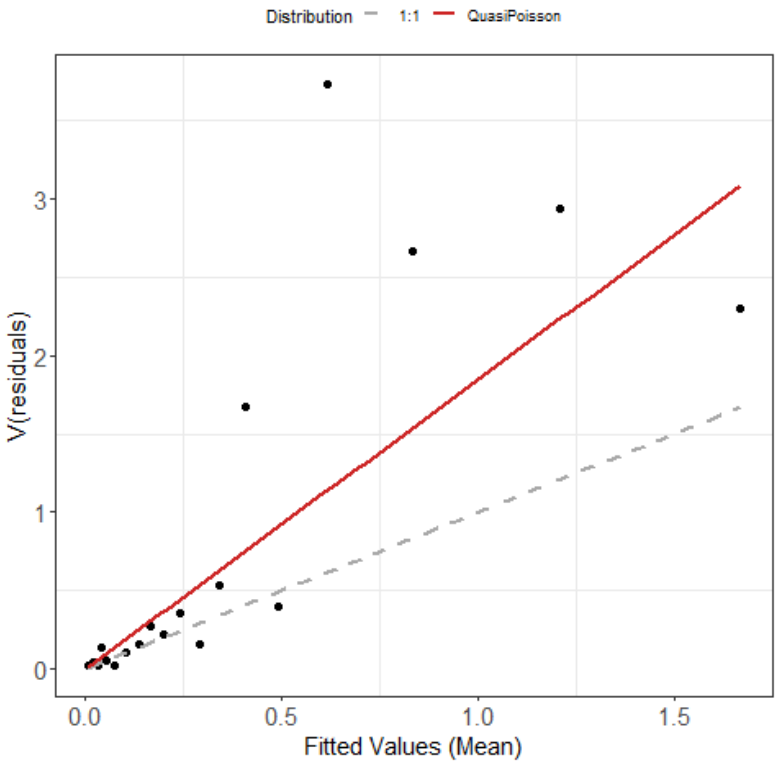


Plate 1-44 Kittiwake survey 12 mean-variance relationship



1.2.10 SURVEY 13 (MARCH 2023)

Plate 1-45 Kittiwake survey 13 best fitting model scaled Pearsons residuals

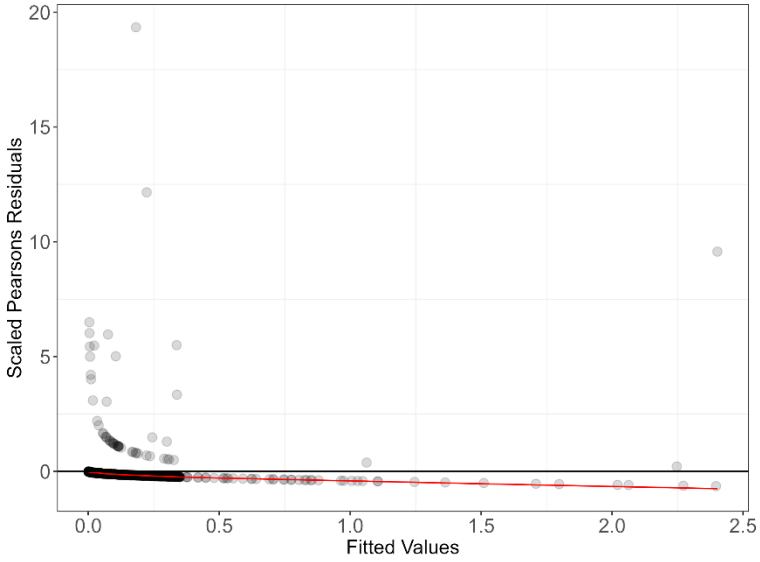


Plate 1-46 Kittiwake survey 13 fitted versus observed

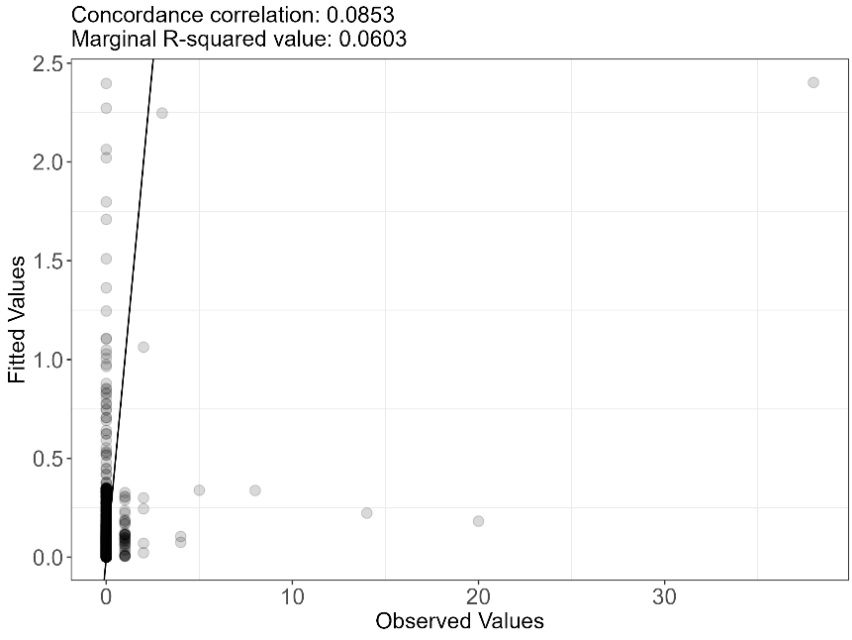


Plate 1-47 Kittiwake survey 13 COVRATIO statistic

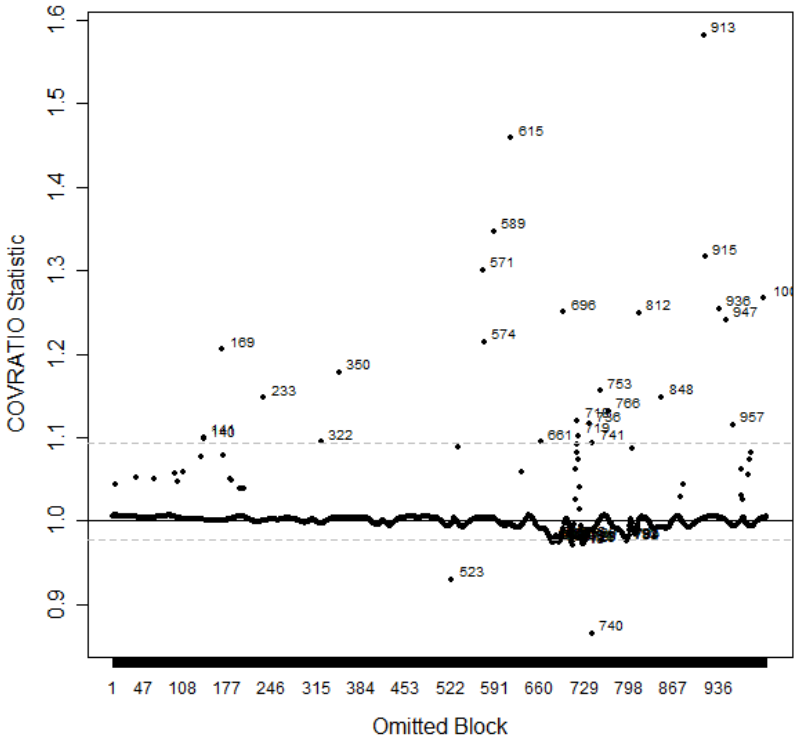


Plate 1-48 Kittiwake survey 13 PRESS statistic

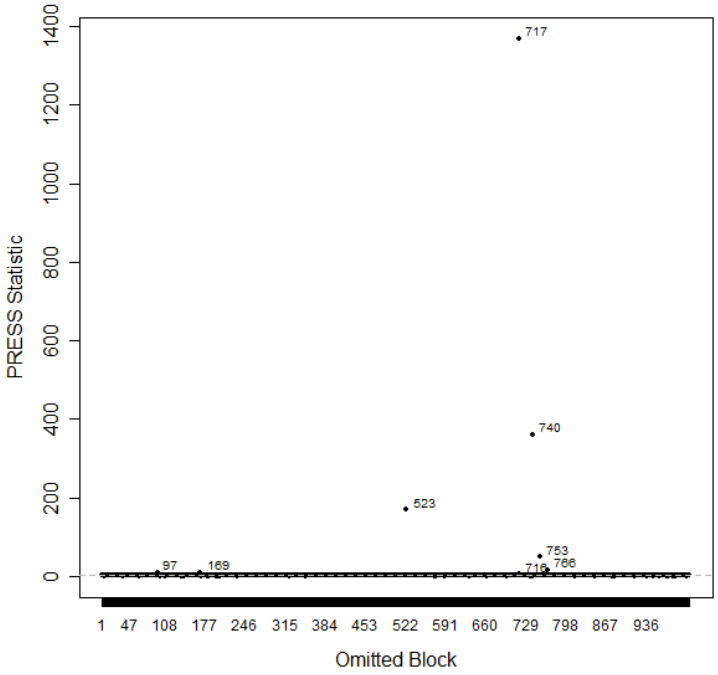
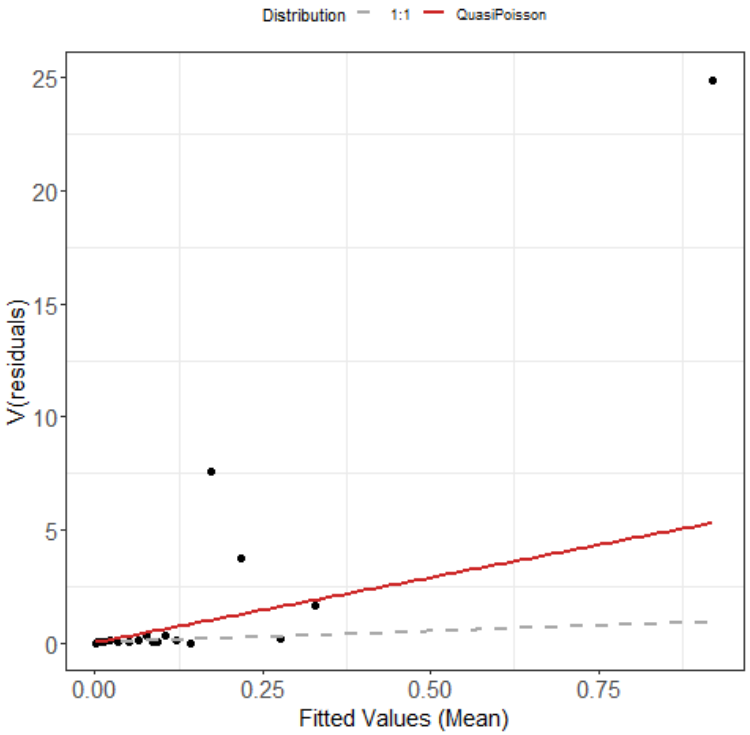


Plate 1-49 Kittiwake survey 13 mean-variance relationship



1.2.11 SURVEY 15 (MAY 2023)

Plate 1-50 Kittiwake survey 15 best fitting model scaled Pearsons residuals

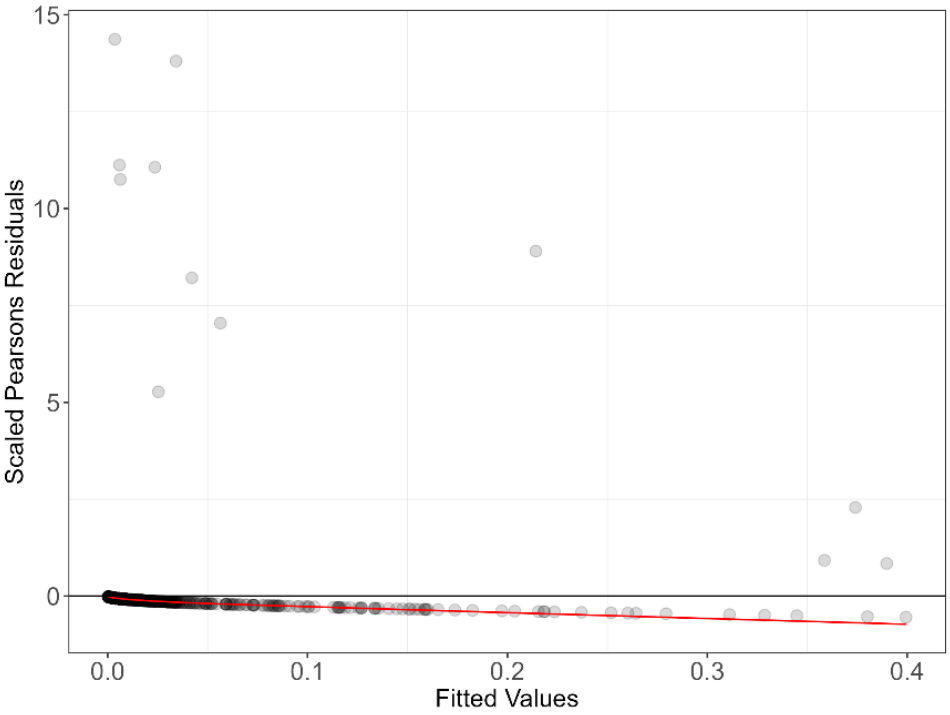


Plate 1-51 Kittiwake survey 15 fitted versus observed

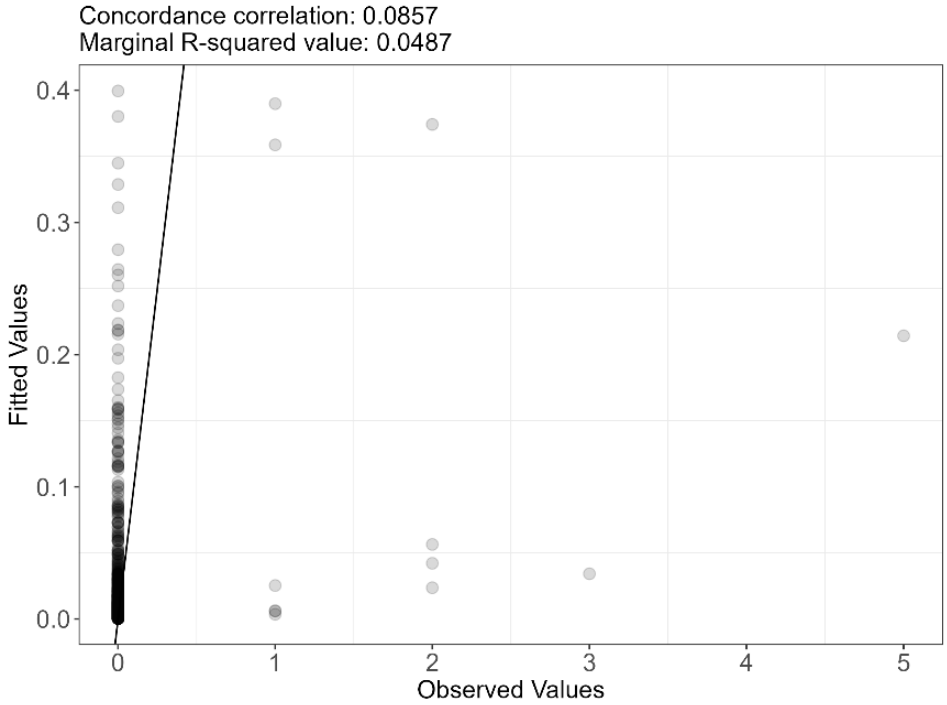


Plate 1-52 Kittiwake survey 15 COVRATIO statistic

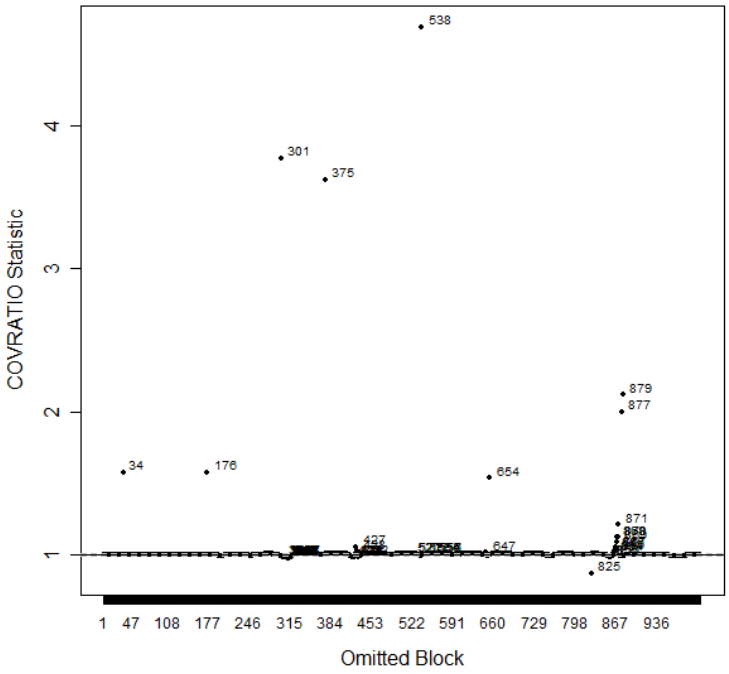


Plate 1-53 Kittiwake survey 15 PRESS statistic

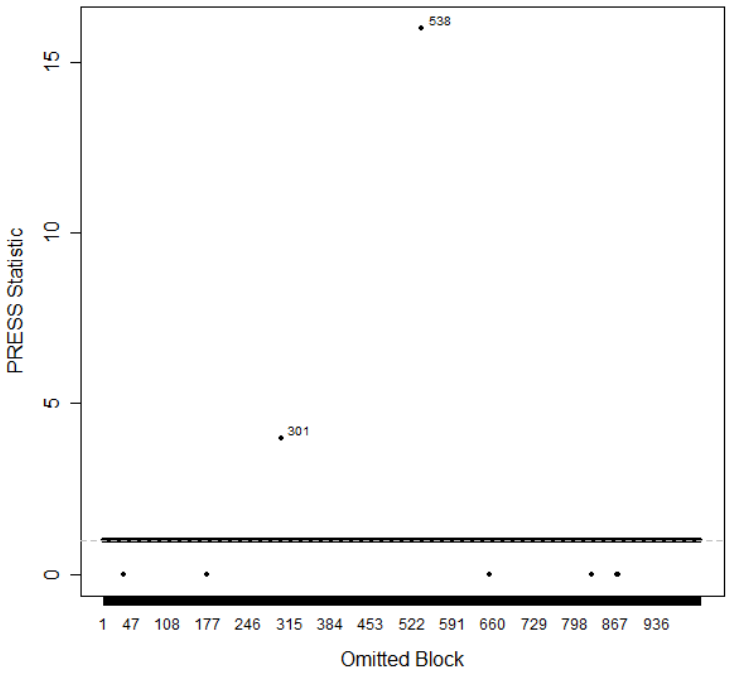
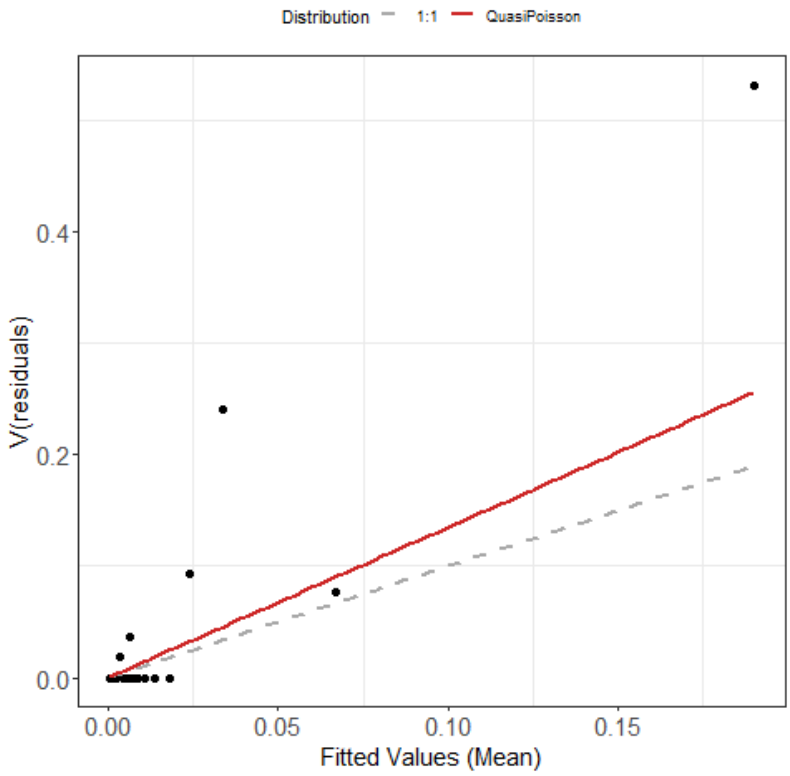


Plate 1-54 Kittiwake survey 15 mean-variance relationship



1.2.12 SURVEY 16 (JUNE 2023)

Plate 1-55 Kittiwake survey 16 best fitting model scaled Pearsons residuals

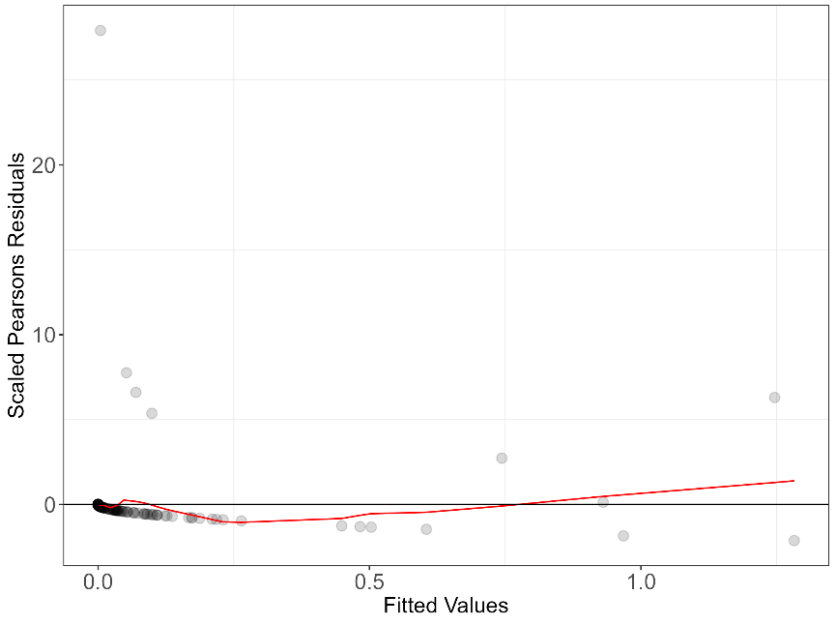


Plate 1-56 Kittiwake survey 16 fitted versus observed

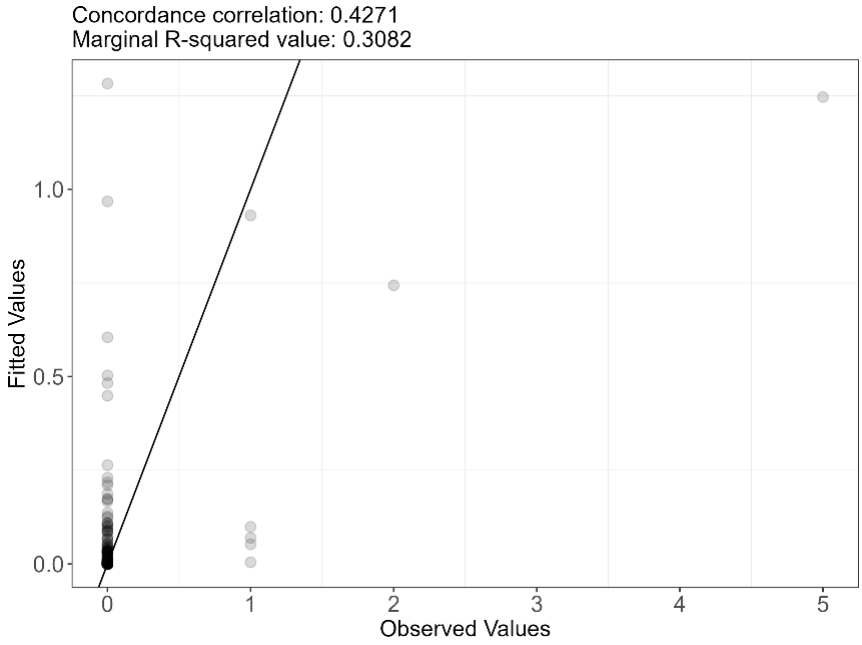


Plate 1-57 Kittiwake survey 16 COVRATIO statistic

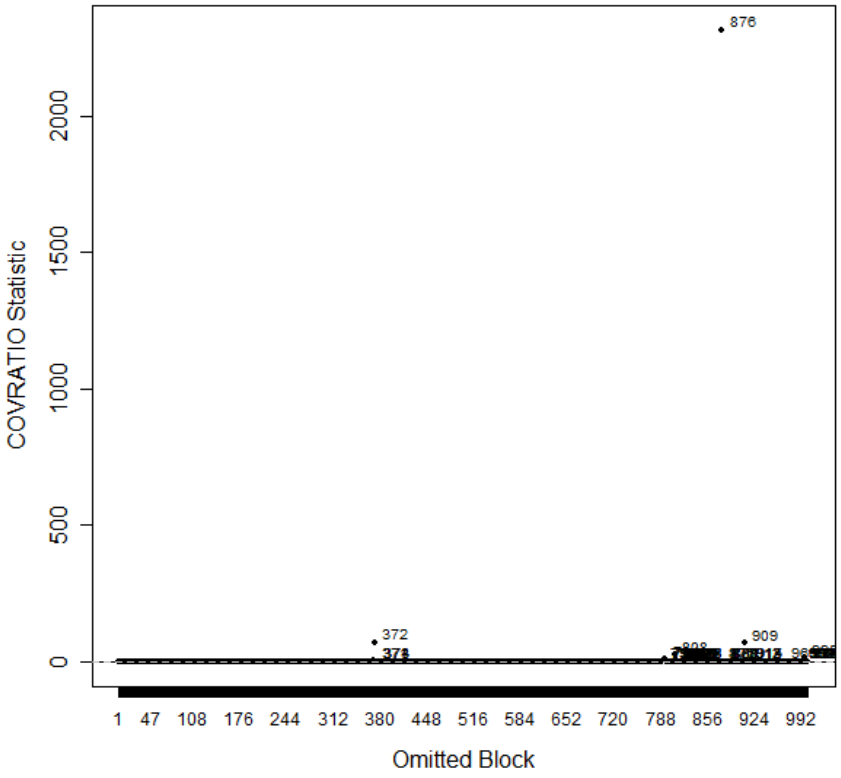


Plate 1-58 Kittiwake survey 16 PRESS statistic

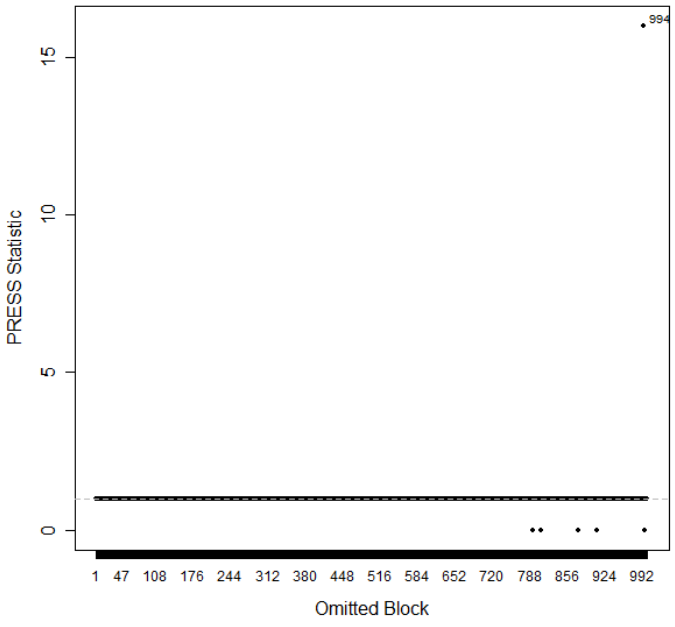
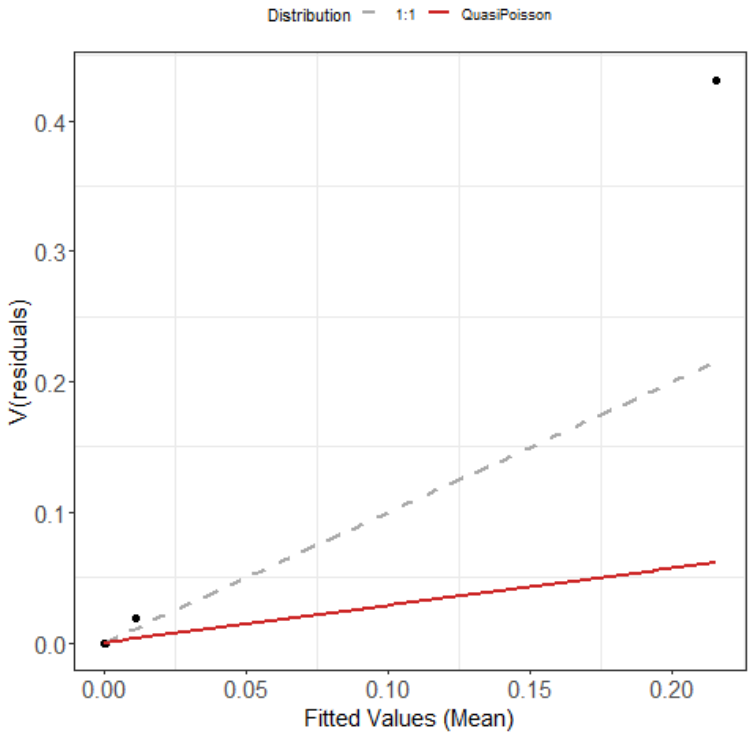


Plate 1-59 Kittiwake survey 16 mean-variance relationship



1.2.13 SURVEY 17 (JULY 2023)

Plate 1-60 Kittiwake survey 17 best fitting model scaled Pearsons residuals

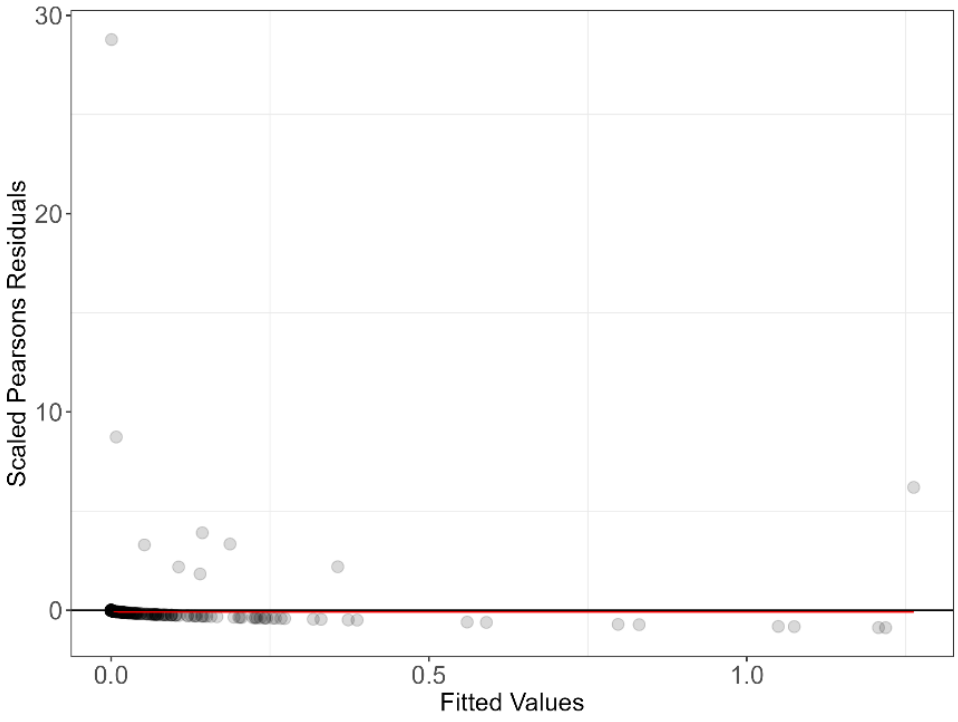


Plate 1-61 Kittiwake survey 17 fitted versus observed

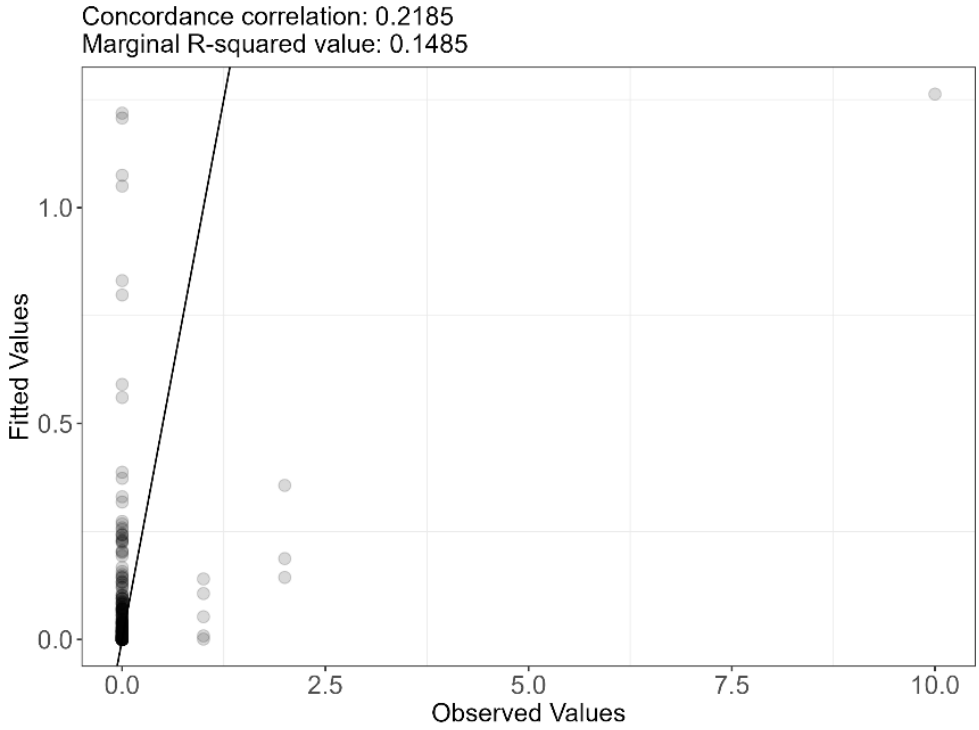


Plate 1-62 Kittiwake survey 17 COVRATIO statistic

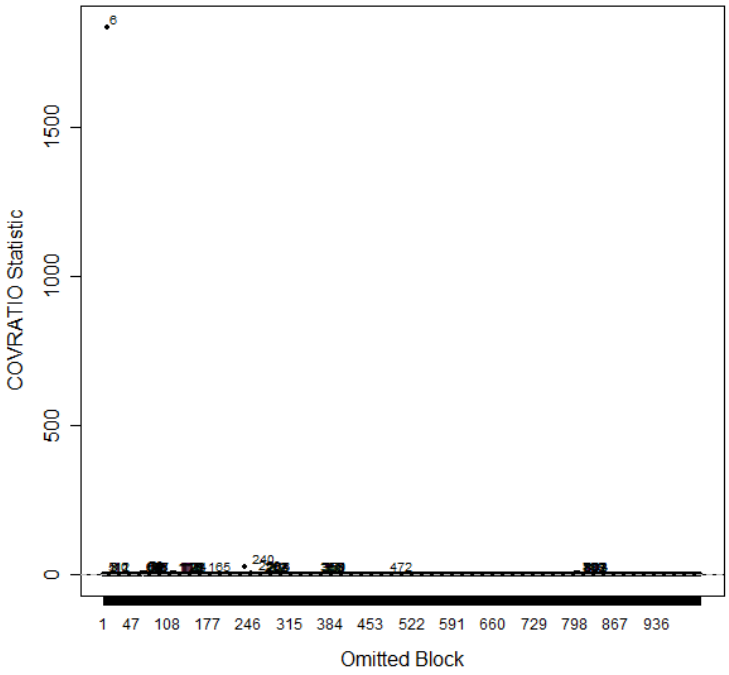


Plate 1-63 Kittiwake survey 17 PRESS statistic

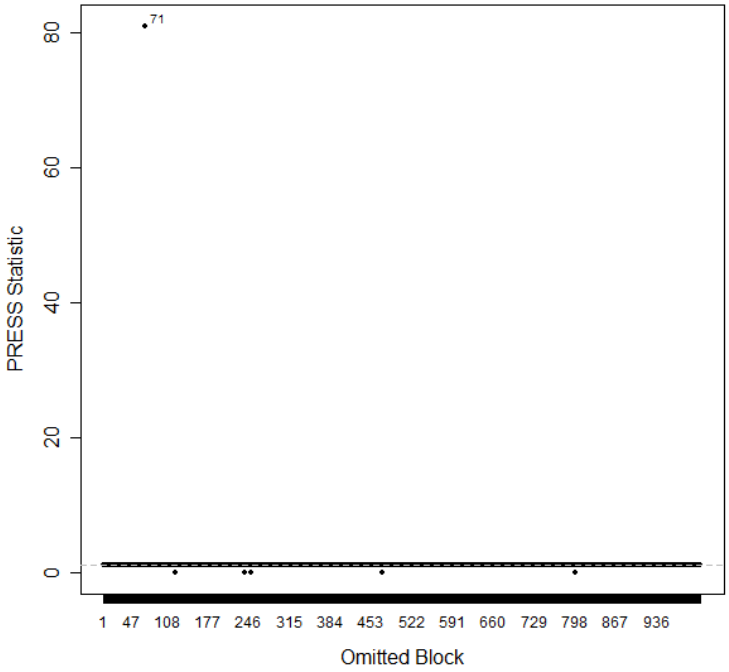
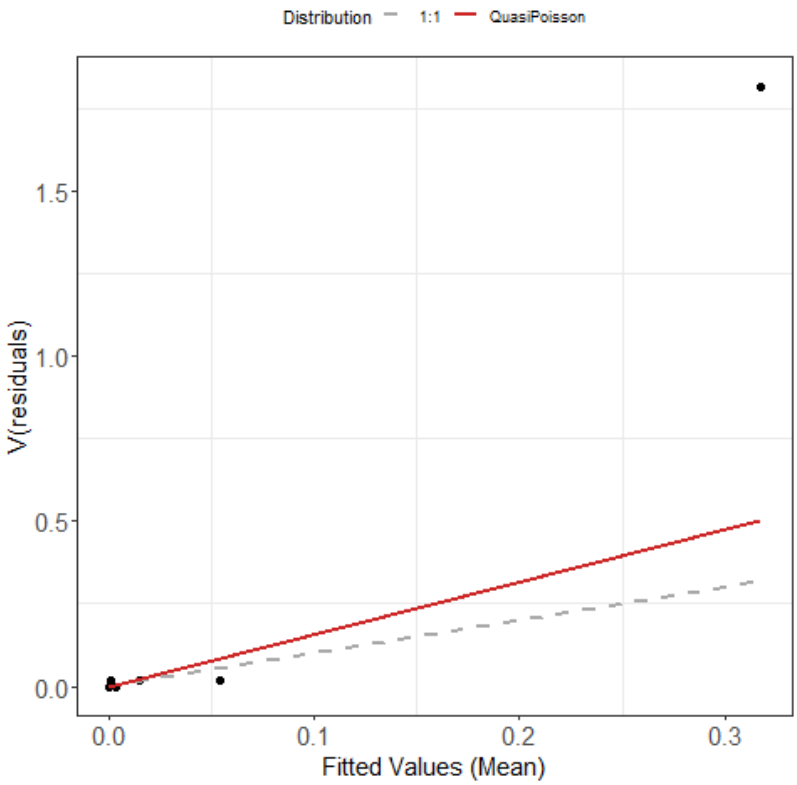


Plate 1-64 Kittiwake survey 17 mean-variance relationship



1.2.14 SURVEY 20 (OCTOBER 2023)

Plate 1-65 Kittiwake survey 20 best fitting model scaled Pearsons residuals

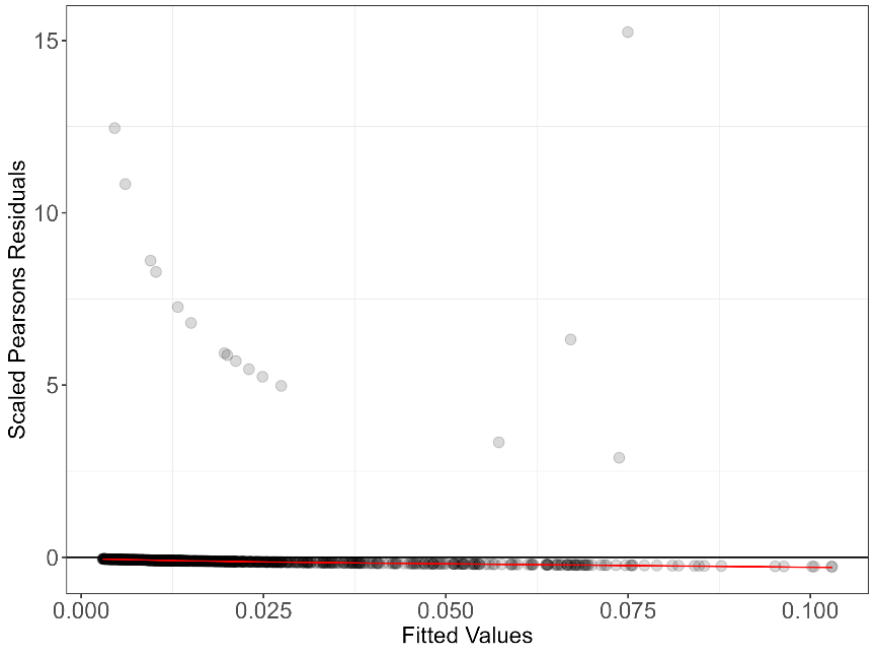


Plate 1-66 Kittiwake survey 20 fitted versus observed

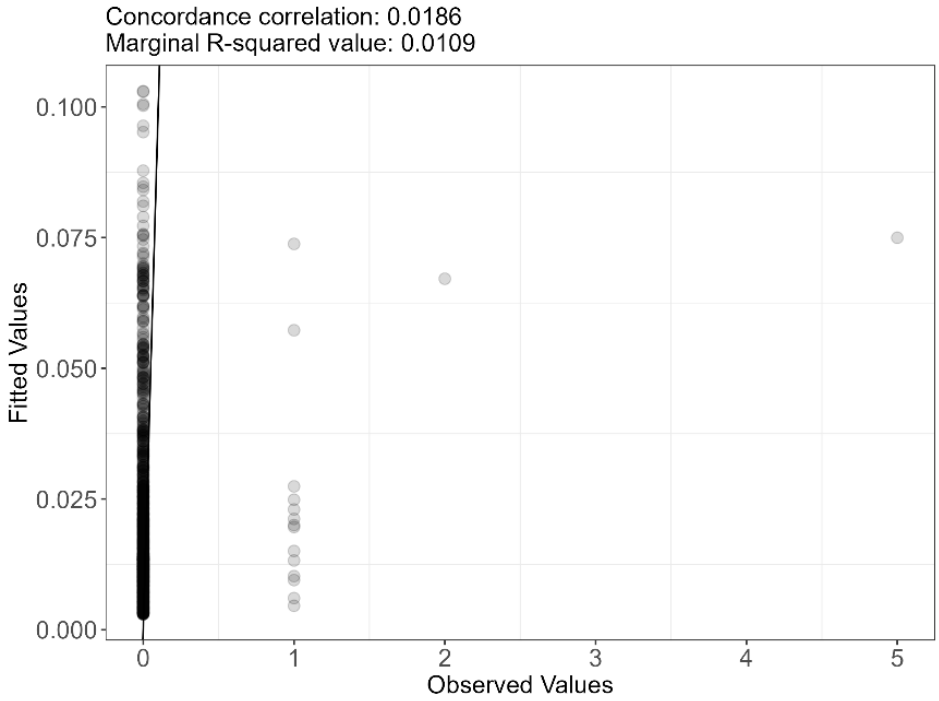


Plate 1-67 Kittiwake survey 20 COVRATIO statistic

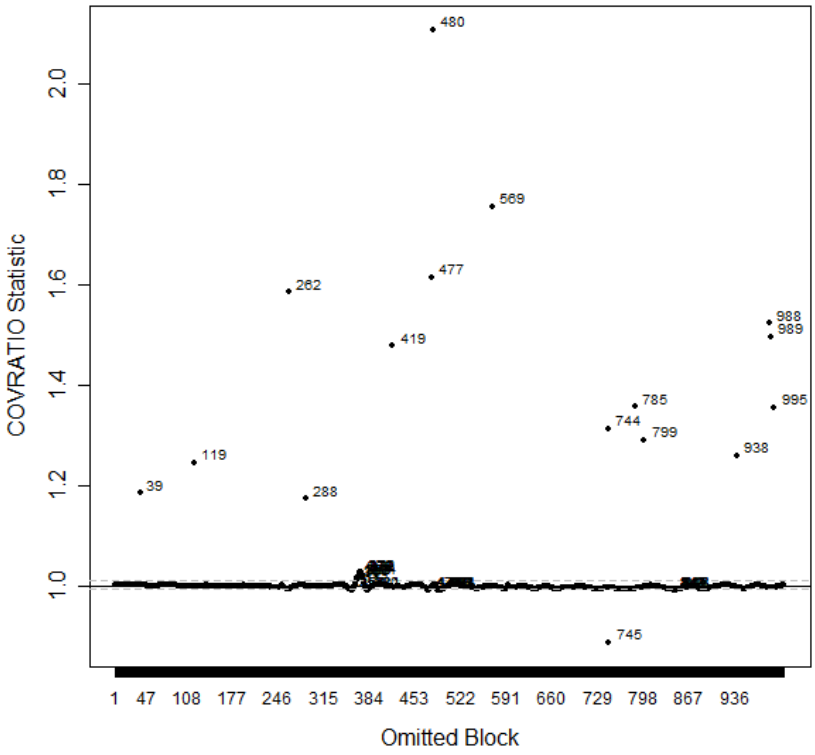


Plate 1-68 Kittiwake survey 20 PRESS statistic

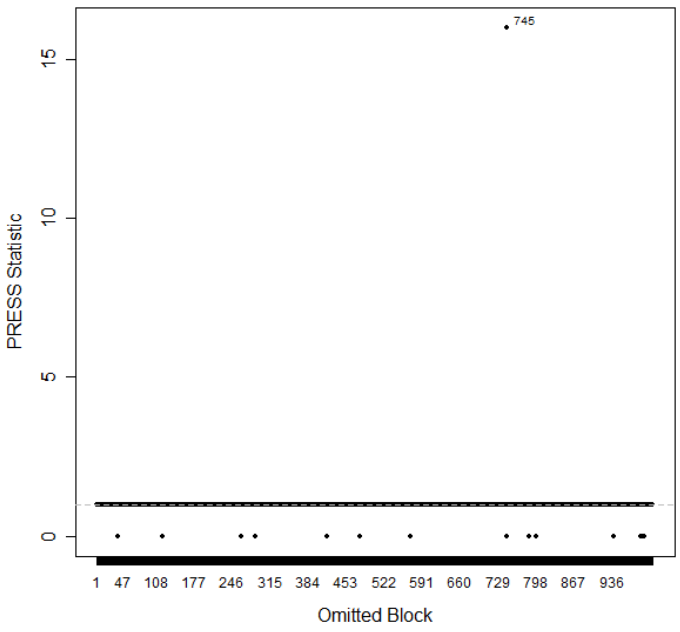
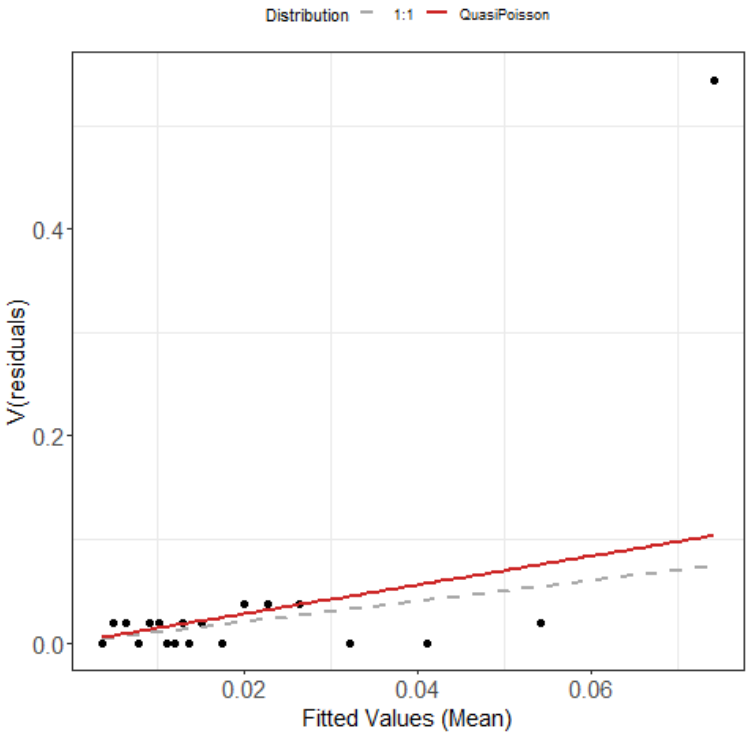


Plate 1-69 Kittiwake survey 20 mean-variance relationship



1.2.15 SURVEY 21 (NOVEMBER 2023)

Plate 1-70 Kittiwake survey 21 best fitting model scaled Pearsons residuals

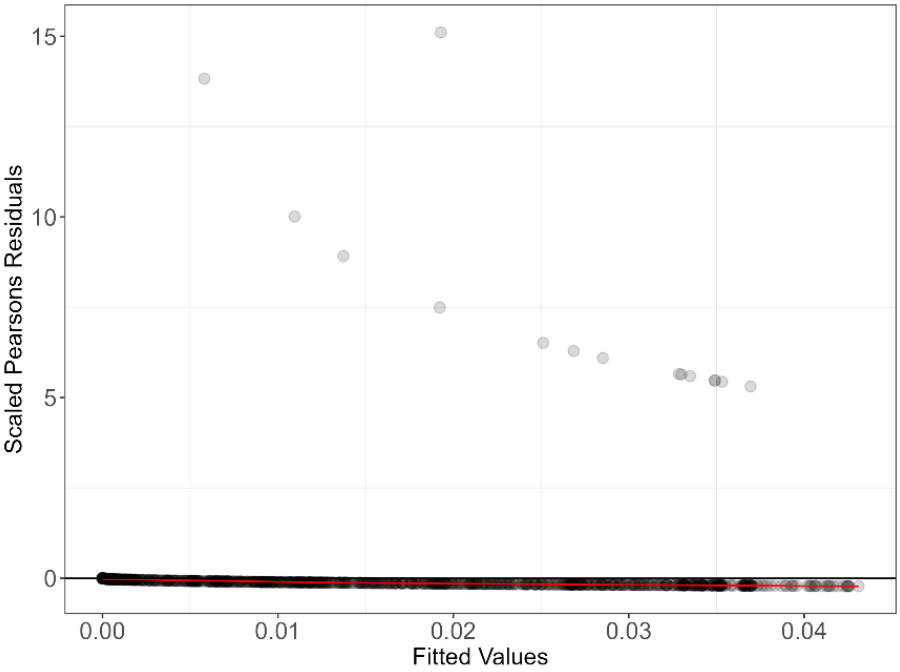


Plate 1-71 Kittiwake survey 21 fitted versus observed

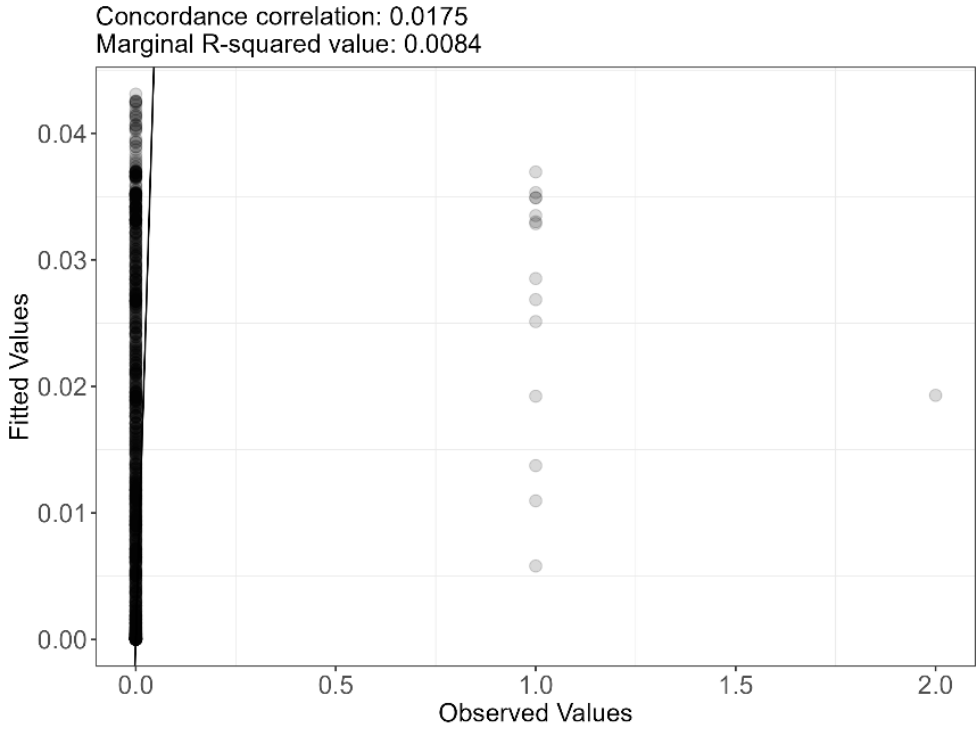


Plate 1-72 Kittiwake survey 21 COVRATIO statistic

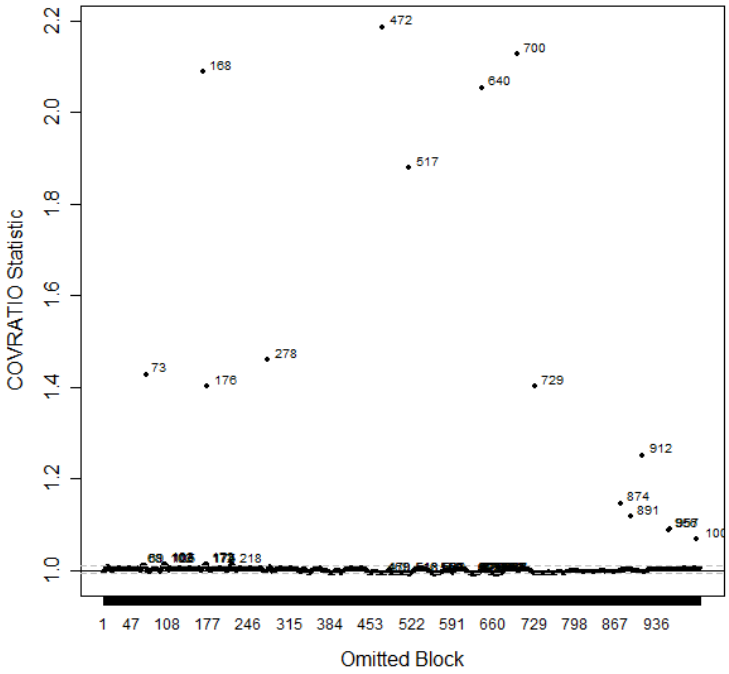


Plate 1-73 Kittiwake survey 21 PRESS statistic

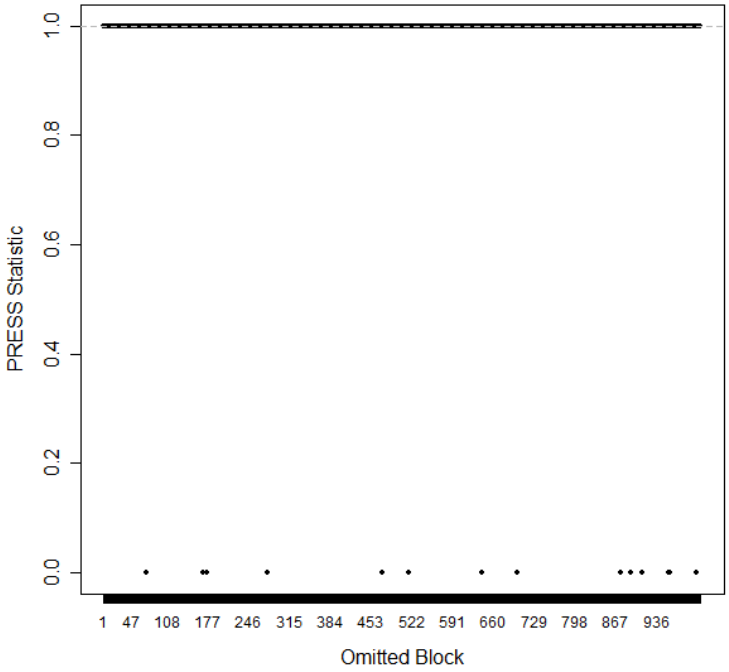
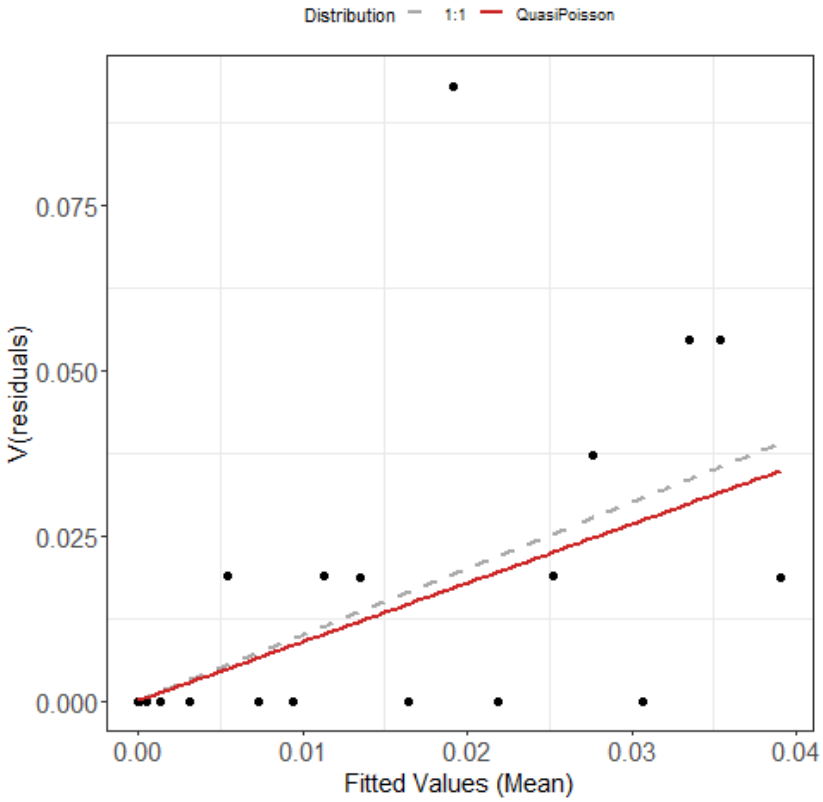


Plate 1-74 Kittiwake survey 21 mean-variance relationship



1.2.16 SURVEY 22 (DECEMBER 2023)

Plate 1-75 Kittiwake survey 22 best fitting model scaled Pearsons residuals

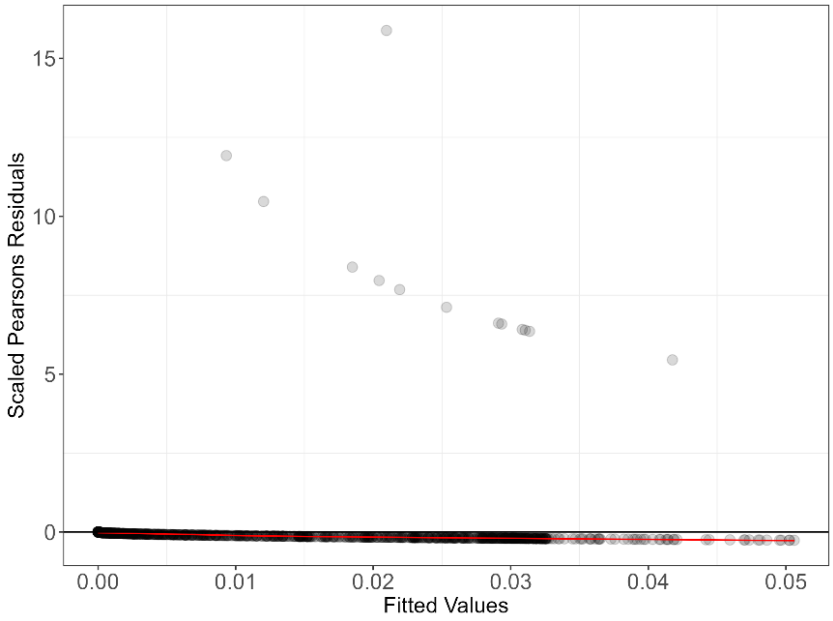


Plate 1-76 Kittiwake survey 22 fitted versus observed

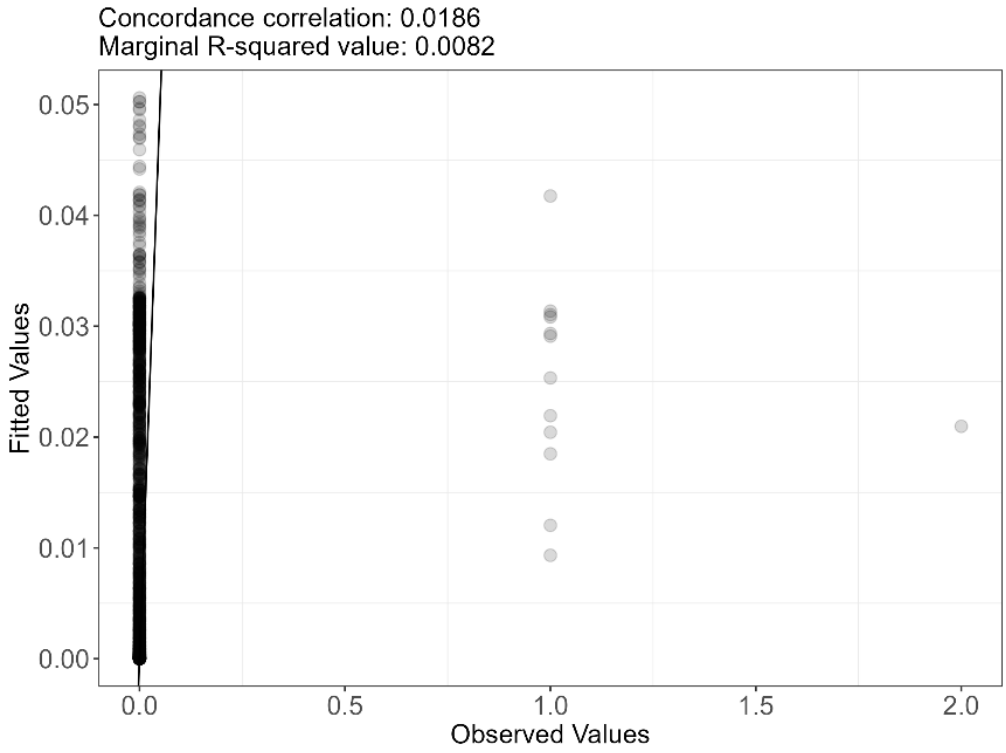


Plate 1-77 Kittiwake survey 22 COVRATIO statistic

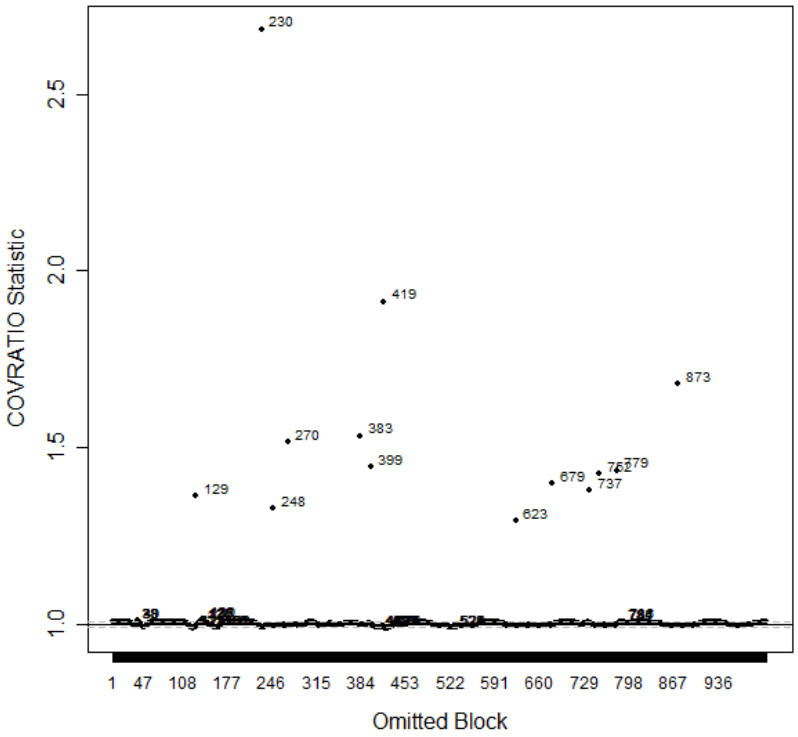


Plate 1-78 Kittiwake survey 22 PRESS statistic

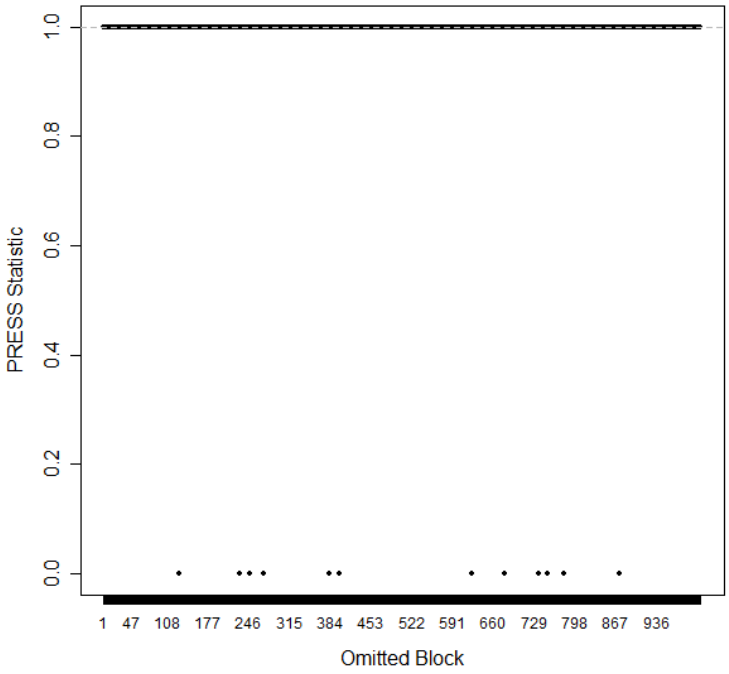
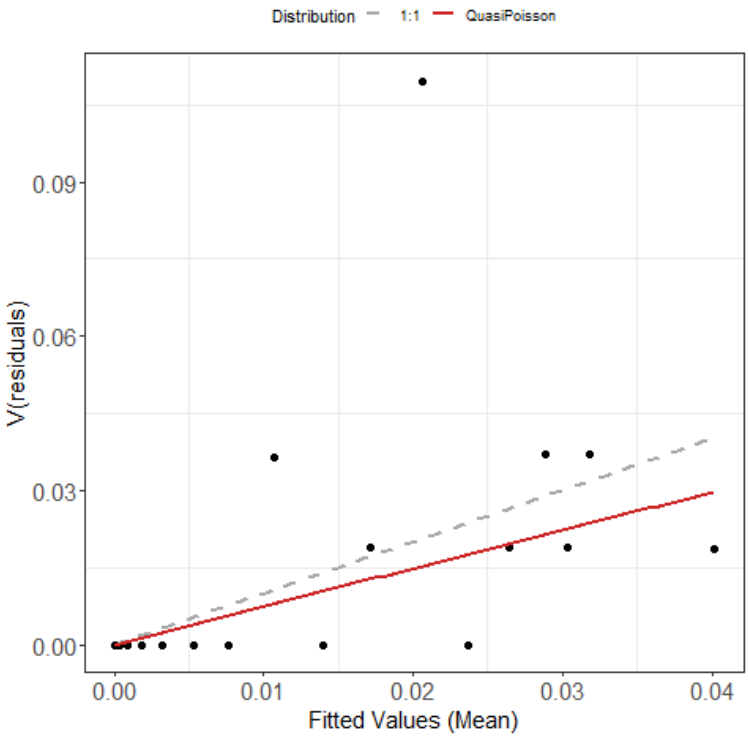


Plate 1-79 Kittiwake survey 22 mean-variance relationship



1.2.17 SURVEY 24 (FEBRUARY 2024)

Plate 1-80 Kittiwake survey 24 best fitting model scaled Pearsons residuals

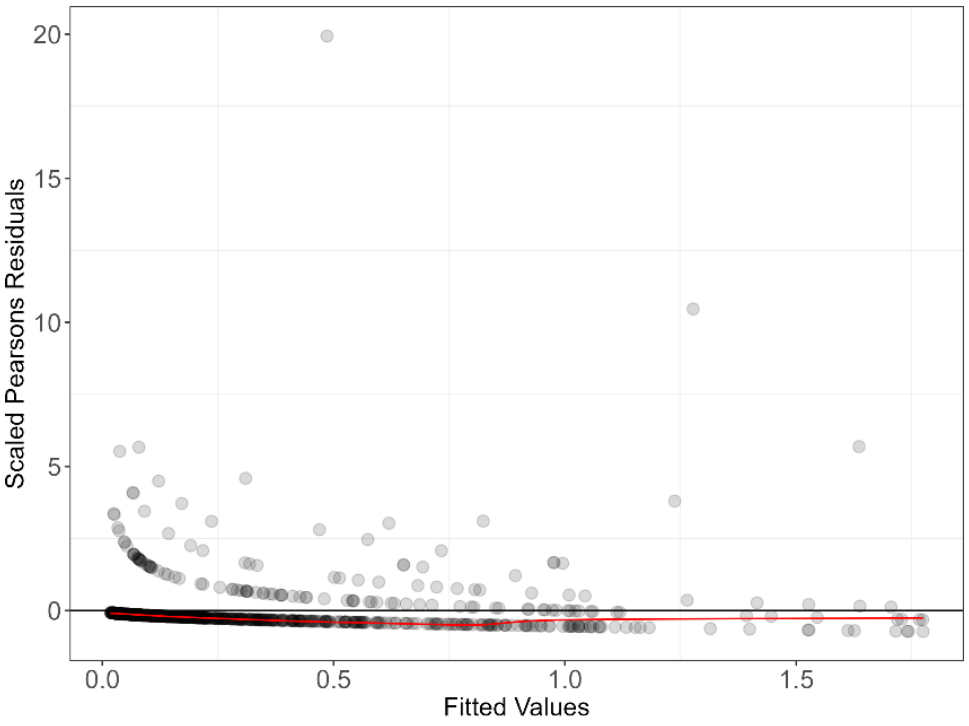


Plate 1-81 Kittiwake survey 24 fitted versus observed

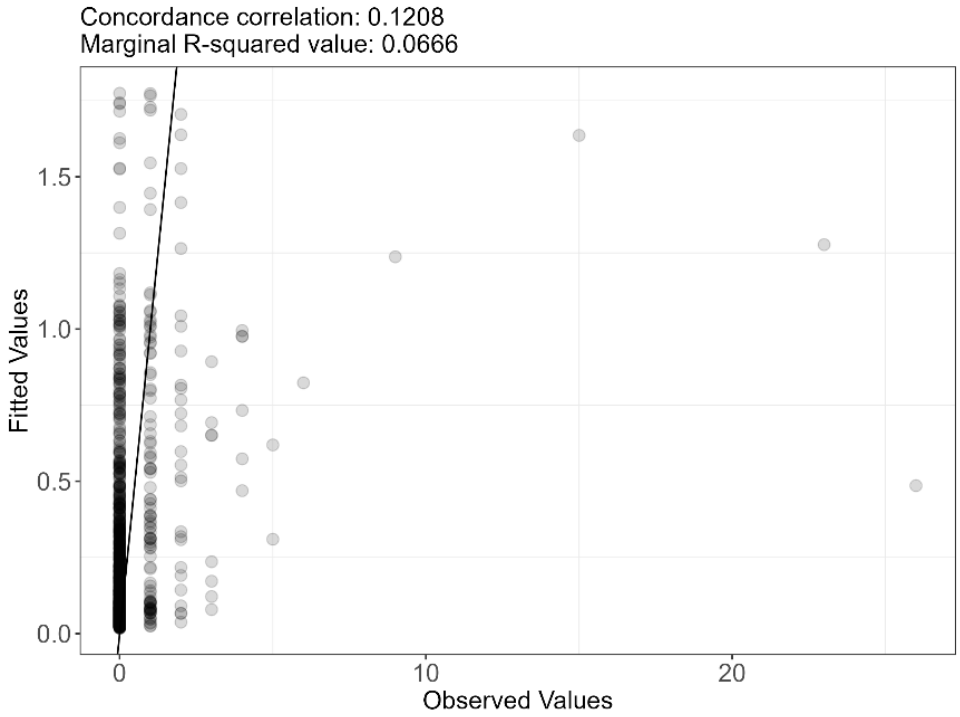


Plate 1-82 Kittiwake survey 24 COVRATIO statistic

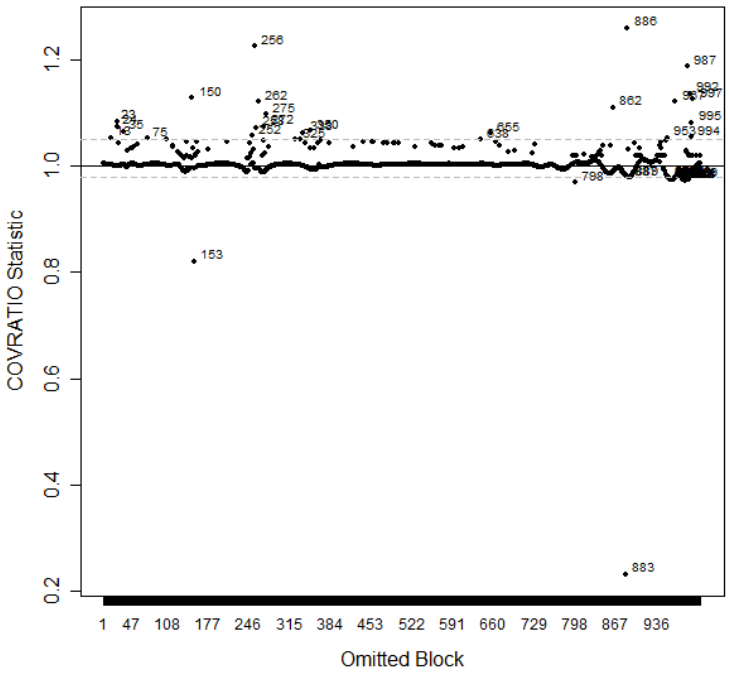


Plate 1-83 Kittiwake survey 24 PRESS statistic

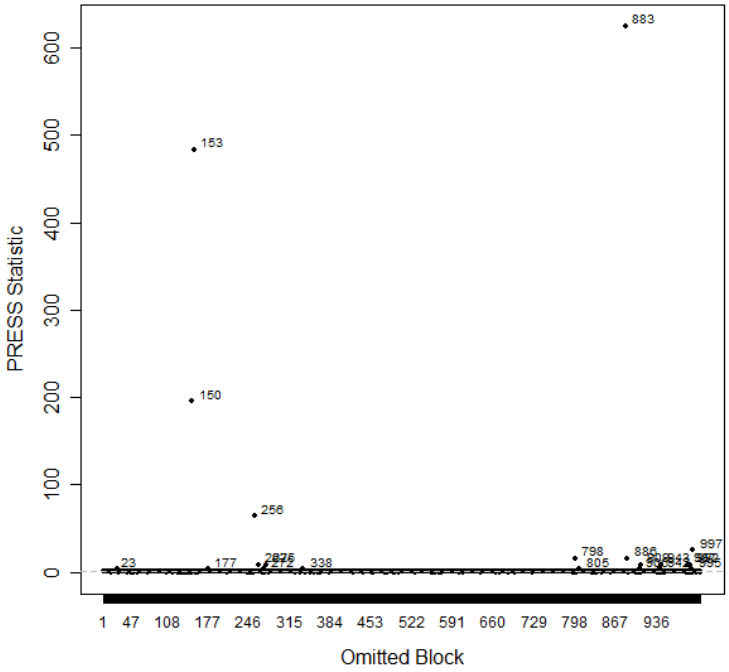
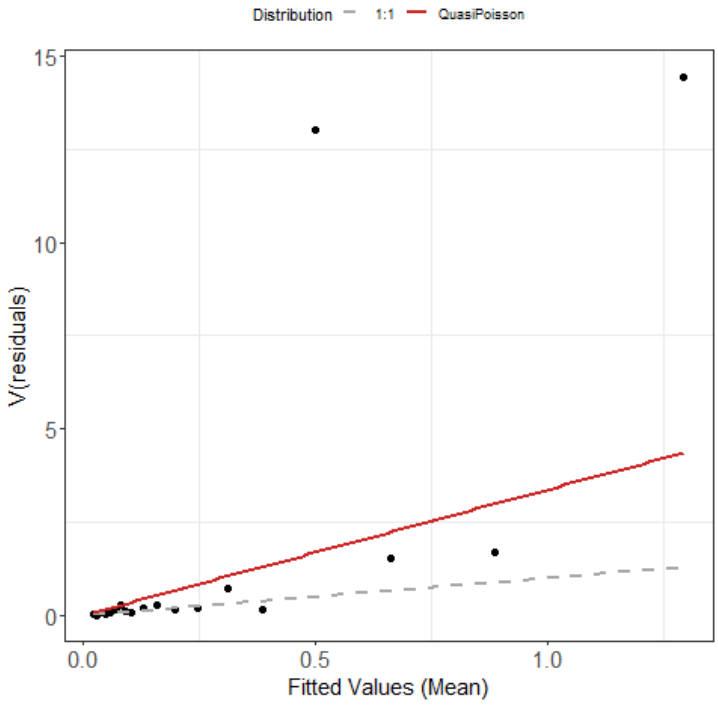


Plate 1-84 Kittiwake survey 24 mean-variance relationship



1.3 GANNET

1.3.1 SURVEY 01 (MARCH 2022)

Plate 1-85 Gannet survey 01 best fitting model scaled Pearsons residuals

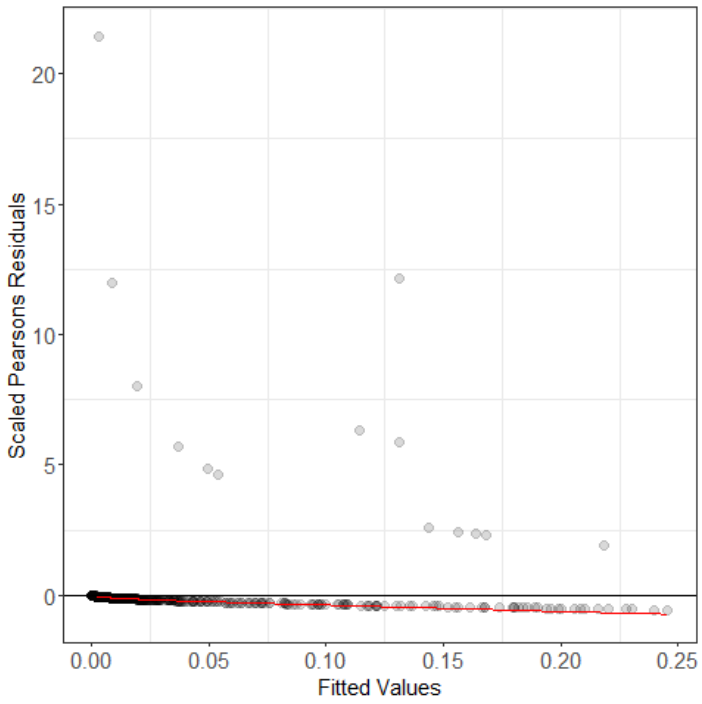


Plate 1-86 Gannet survey 01 fitted versus observed

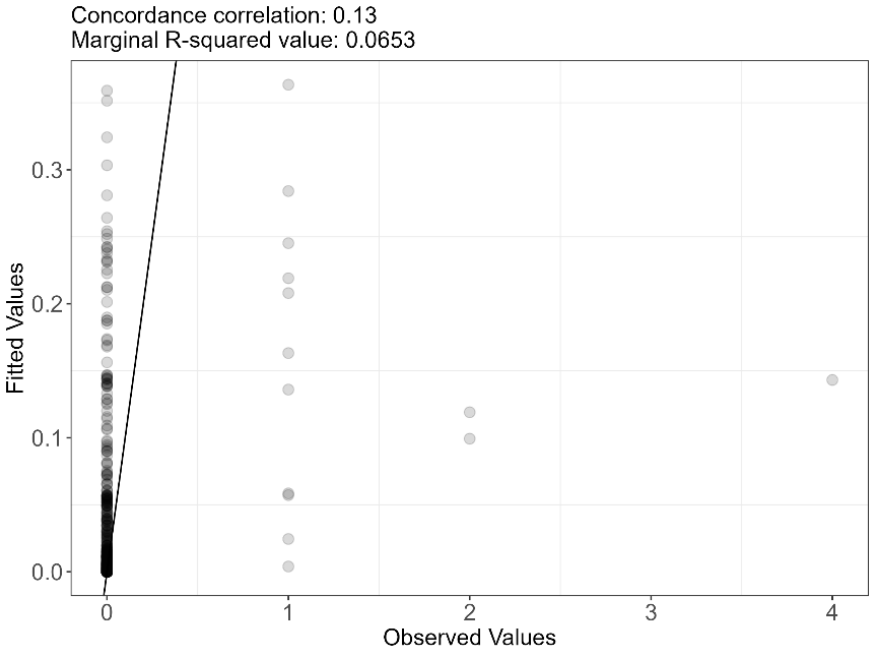


Plate 1-87 Gannet survey 01 COVRATIO statistic

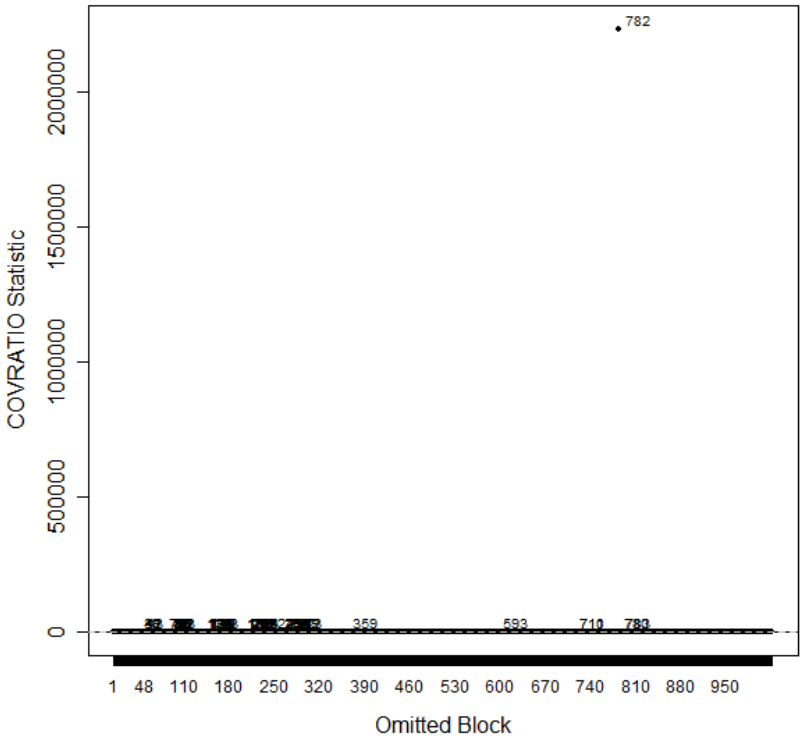


Plate 1-88 Gannet survey 01 PRESS statistic

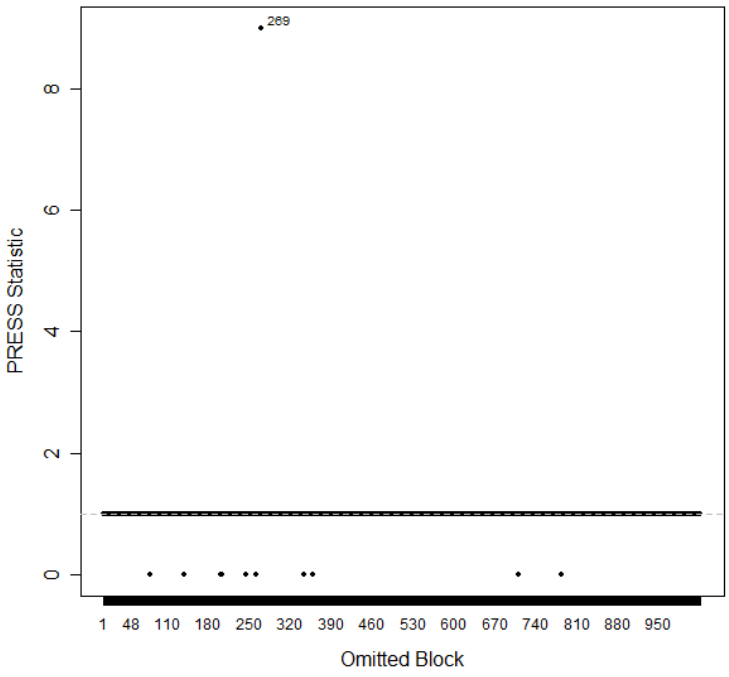
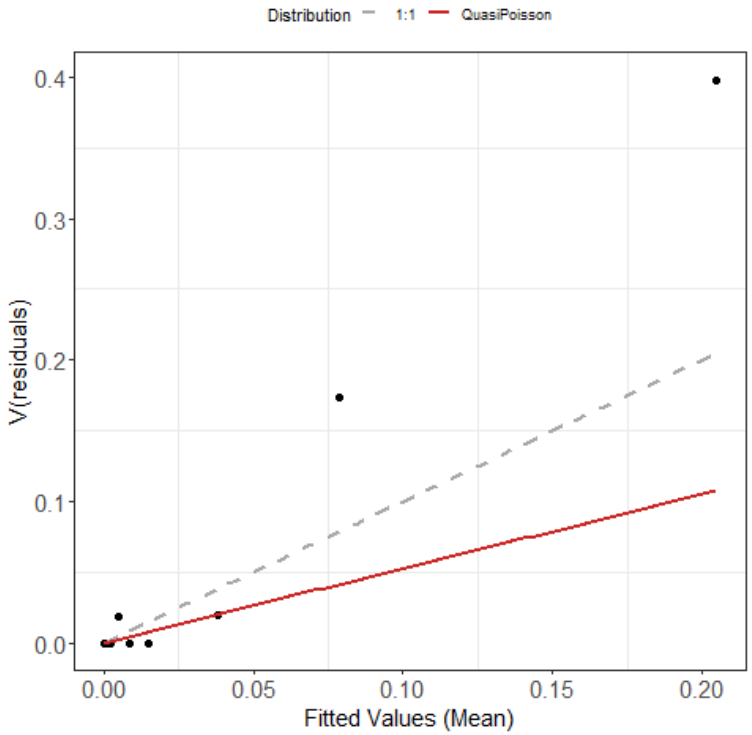


Plate 1-89 Gannet survey 01 mean-variance relationship



1.3.2 SURVEY 02 (APRIL 2022)

Plate 1-90 Gannet survey 02 best fitting model scaled Pearsons residuals

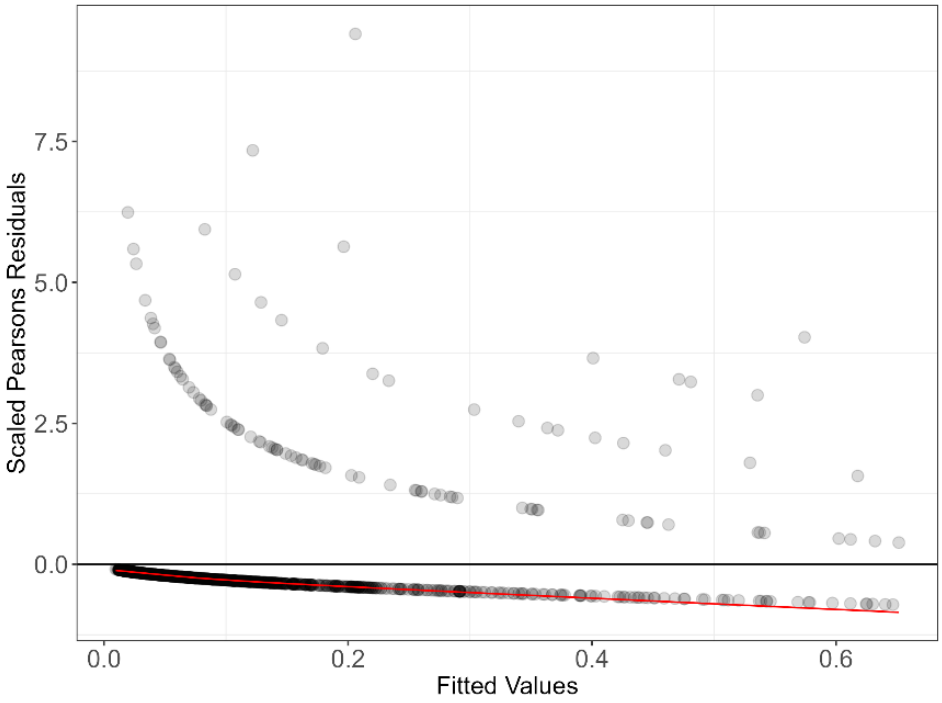


Plate 1-91 Gannet survey 02 fitted versus observed

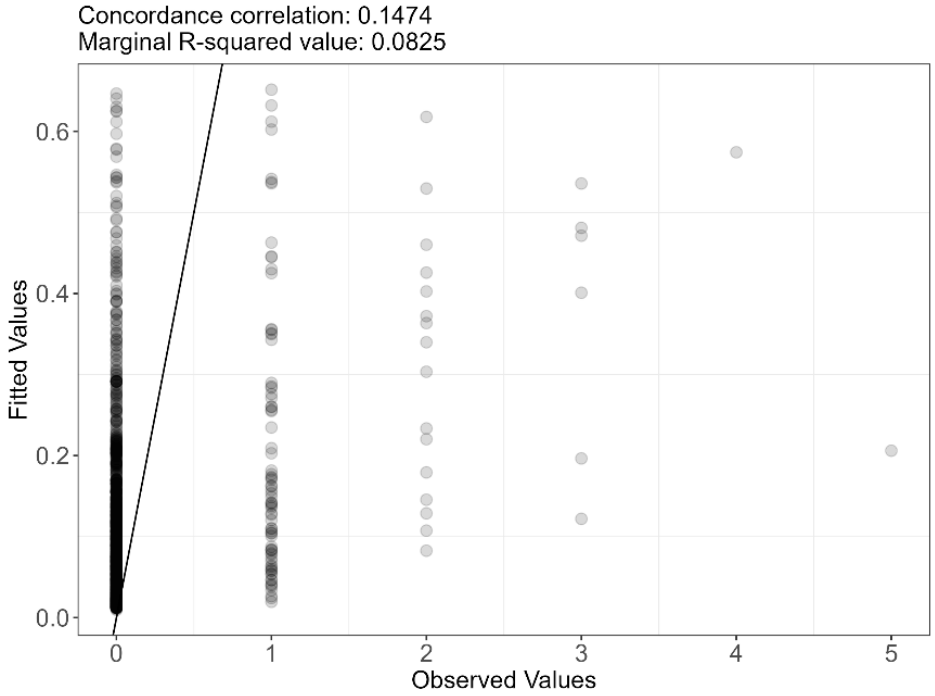


Plate 1-92 Gannet survey 02 COVRATIO statistic

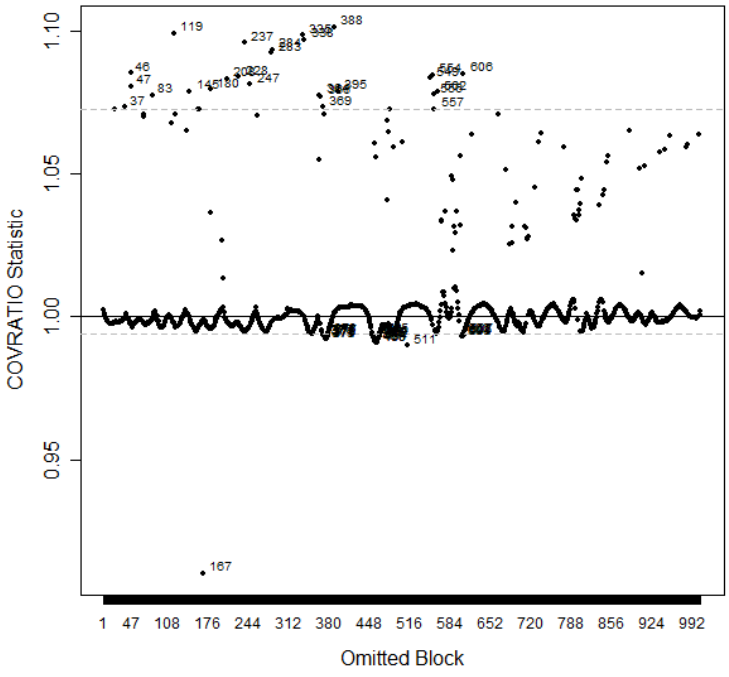


Plate 1-93 Gannet survey 02 PRESS statistic

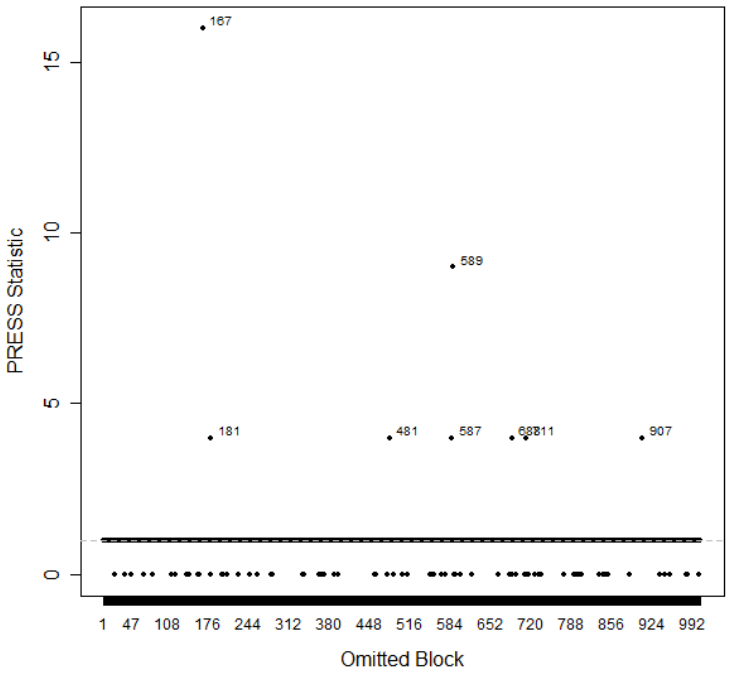
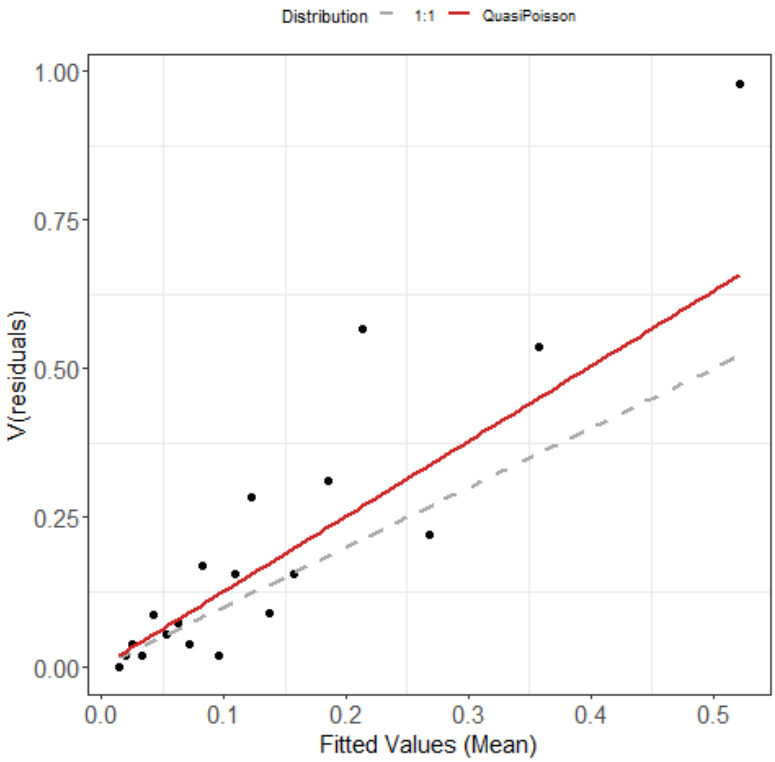


Plate 1-94 Gannet survey 02 mean-variance relationship



1.3.3 SURVEY 03 (MAY 2022)

Plate 1-95 Gannet survey 03 best fitting model scaled Pearsons residuals

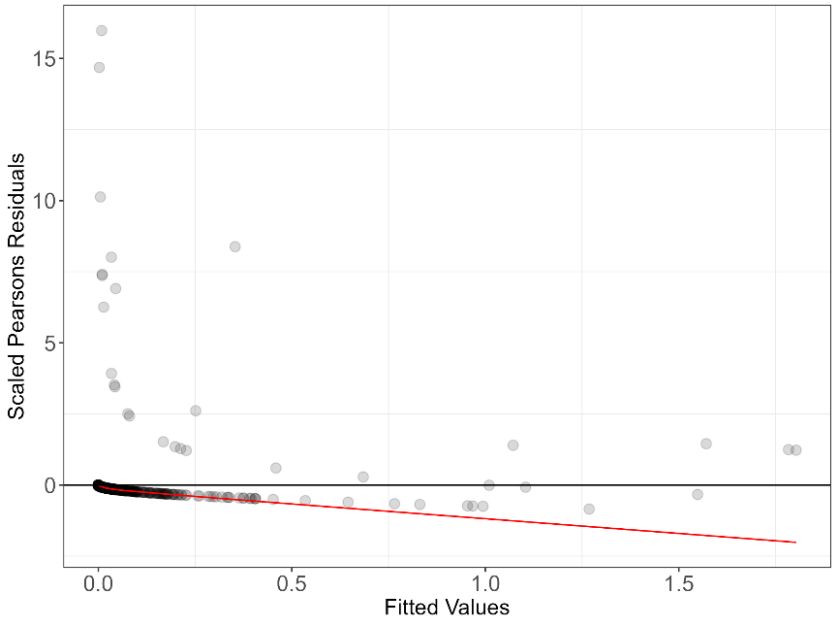


Plate 1-96 Gannet survey 03 fitted versus observed

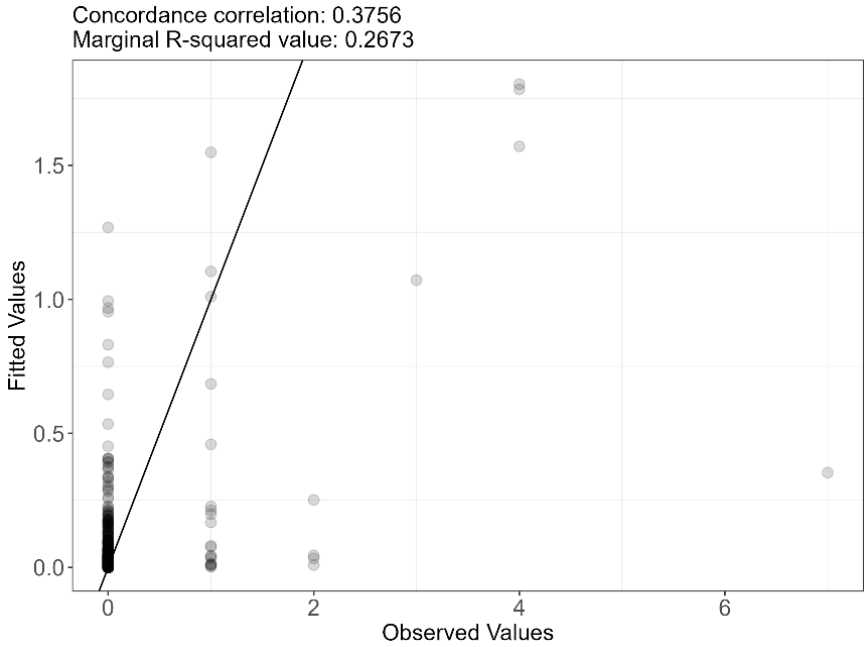


Plate 1-97 Gannet survey 03 COVRATIO statistic

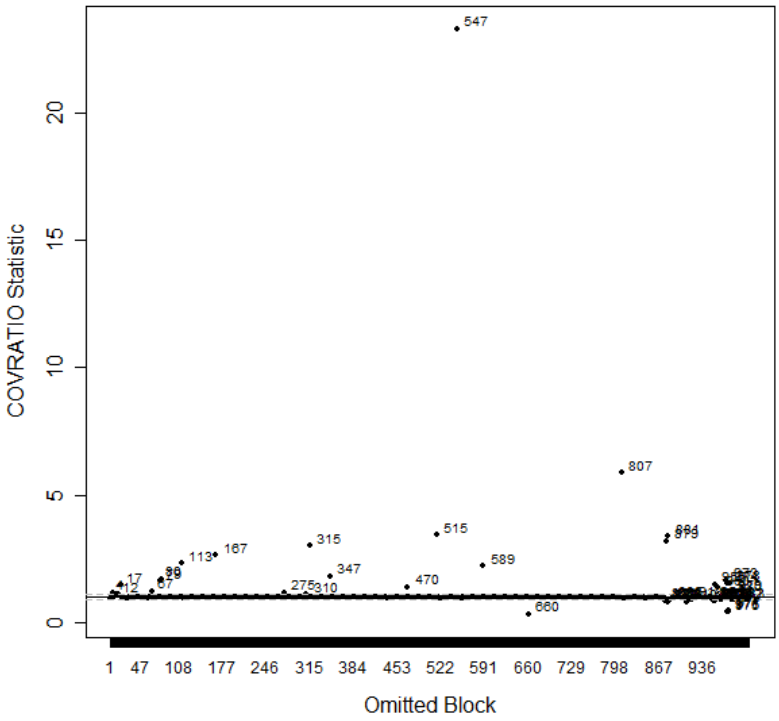


Plate 1-98 Gannet survey 03 PRESS statistic

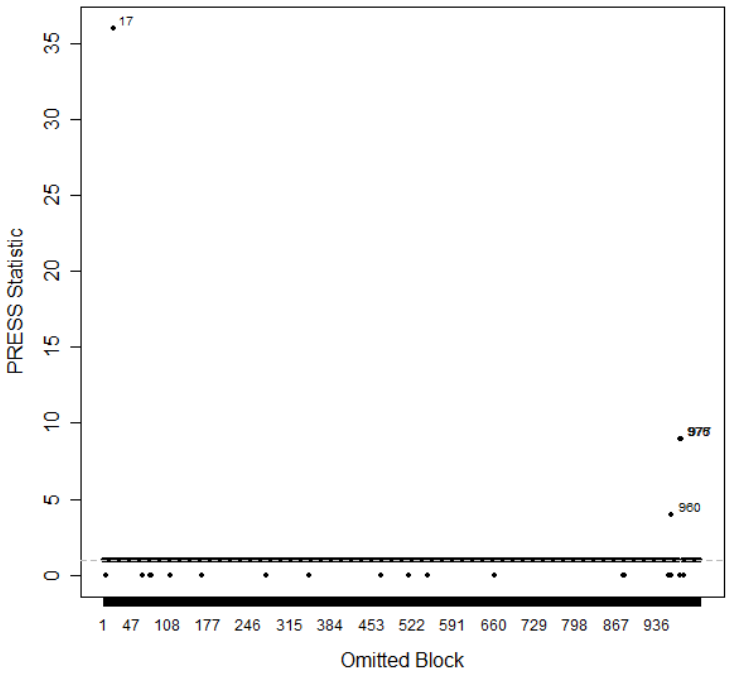
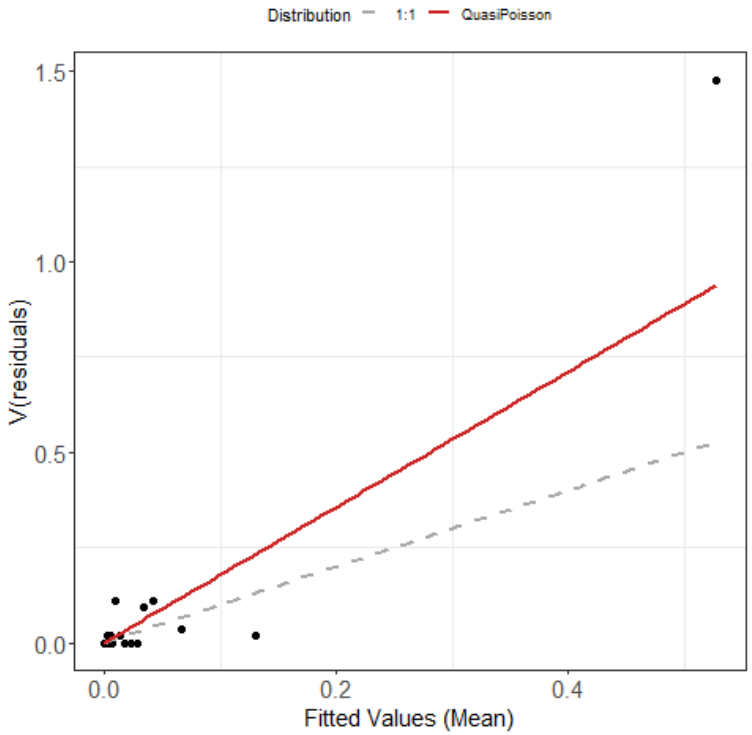


Plate 1-99 Gannet survey 03 mean-variance relationship



1.3.4 SURVEY 04 (JUNE 2022)

Plate 1-100 Gannet survey 04 best fitting model scaled Pearsons residuals

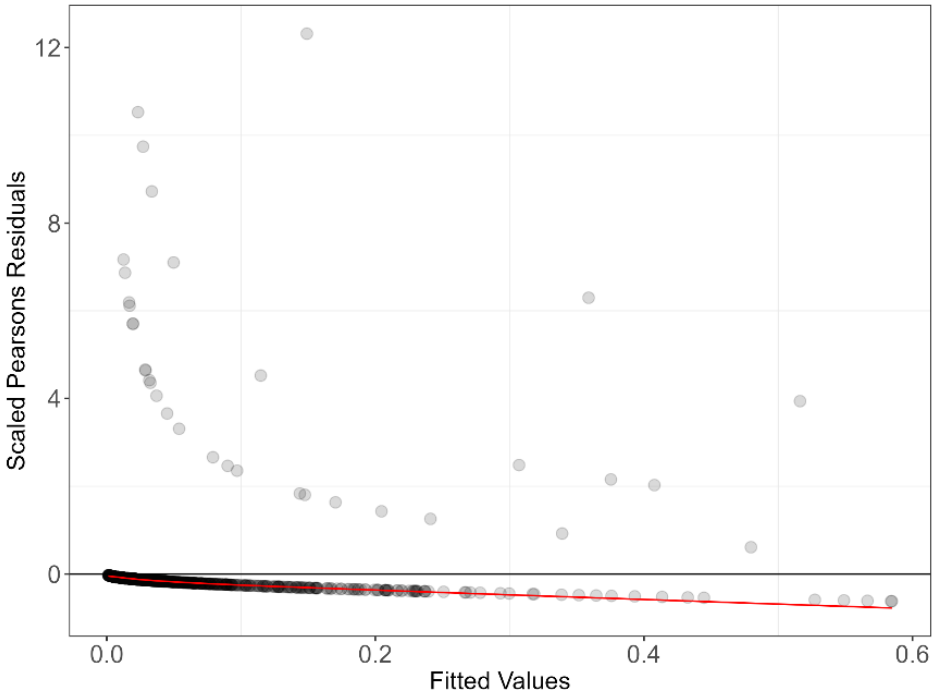


Plate 1-101 Gannet survey 04 fitted versus observed

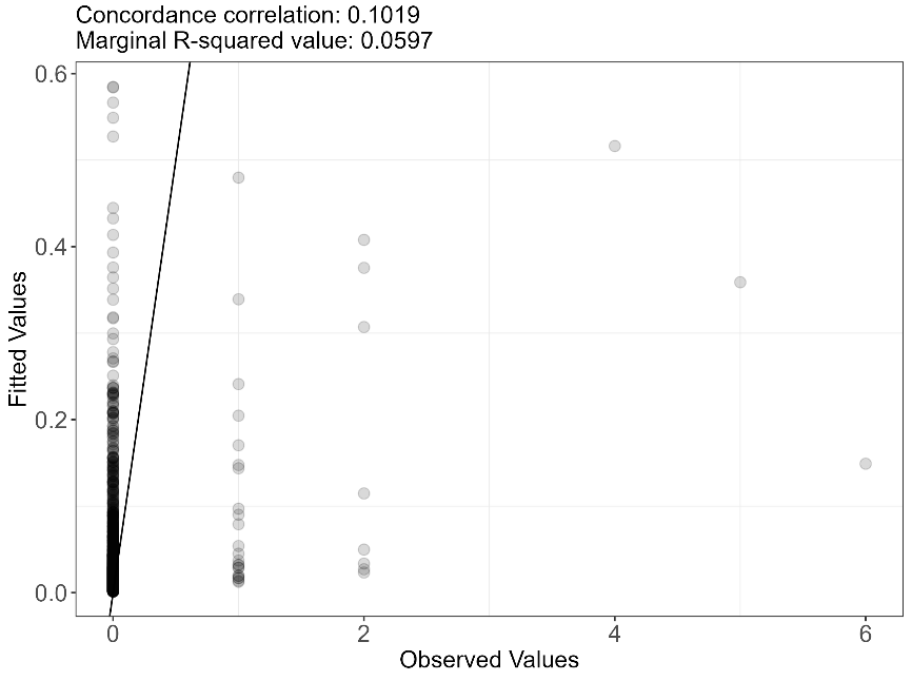


Plate 1-102 Gannet survey 04 COVRATIO statistic

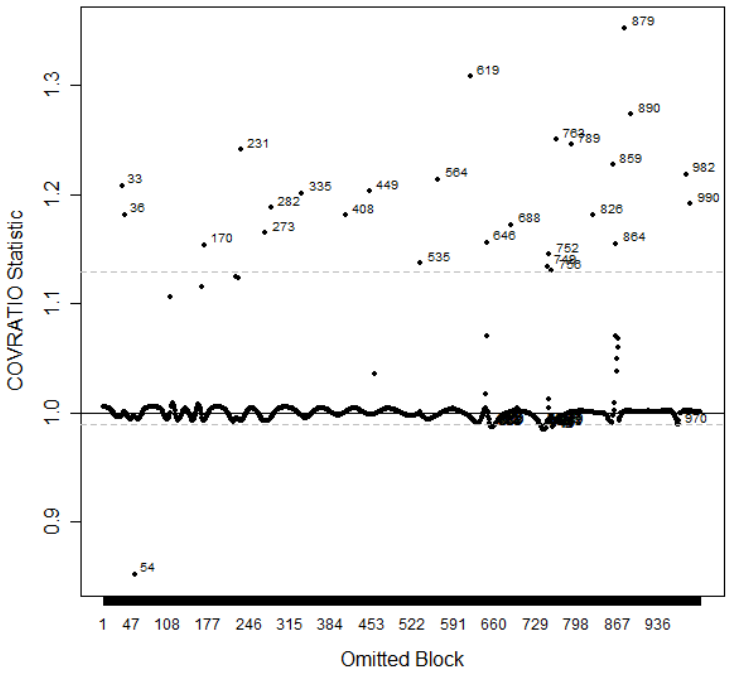


Plate 1-103 Gannet survey 04 PRESS statistic

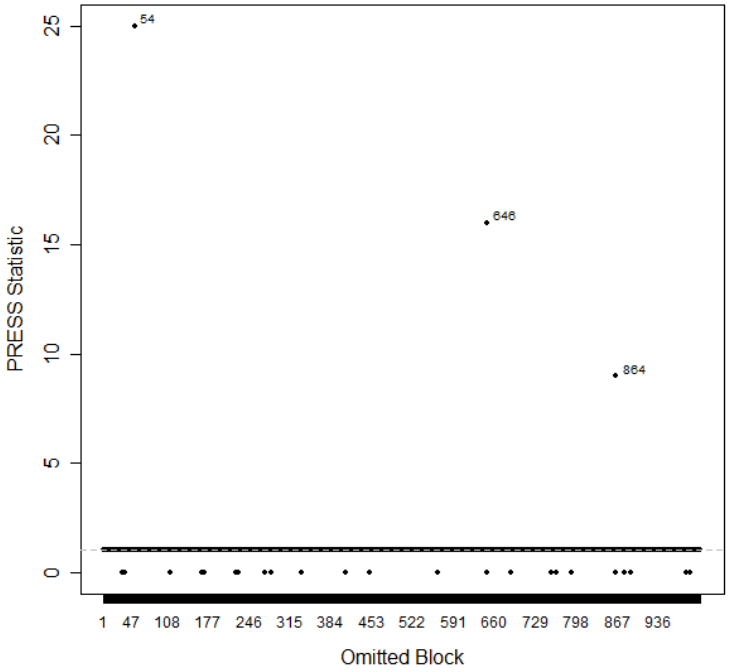
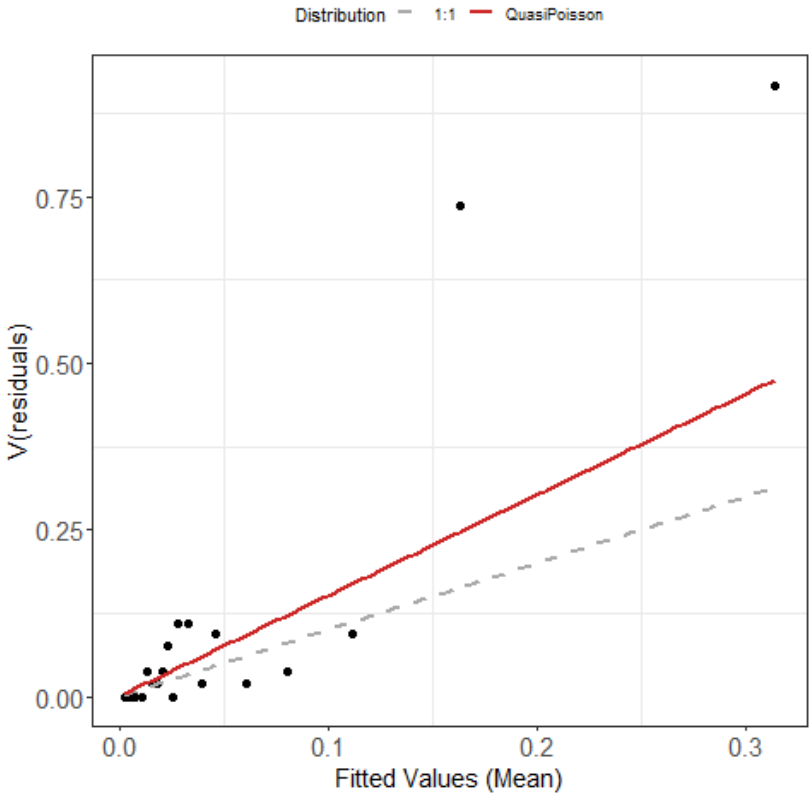


Plate 1-104 Gannet survey 04 mean-variance relationship



1.3.5 SURVEY 05 (JULY 2022)

Plate 1-105 Gannet survey 05 best fitting model scaled Pearsons residuals

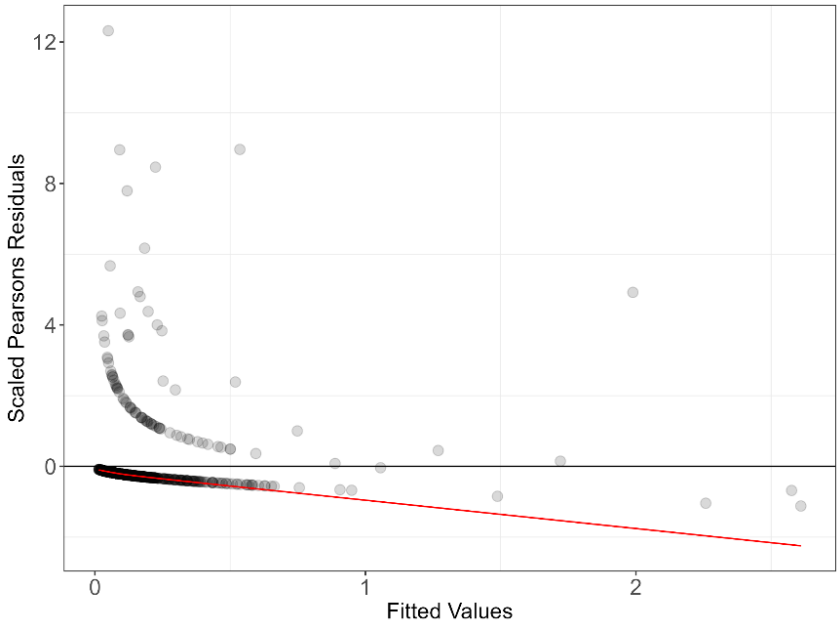


Plate 1-106 Gannet survey 05 fitted versus observed

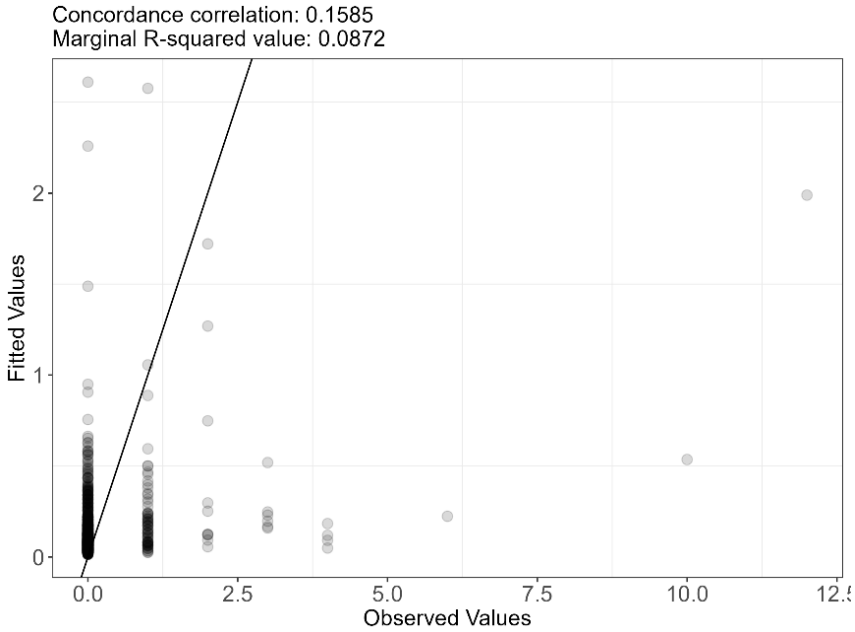


Plate 1-107 Gannet survey 05 COVRATIO statistic

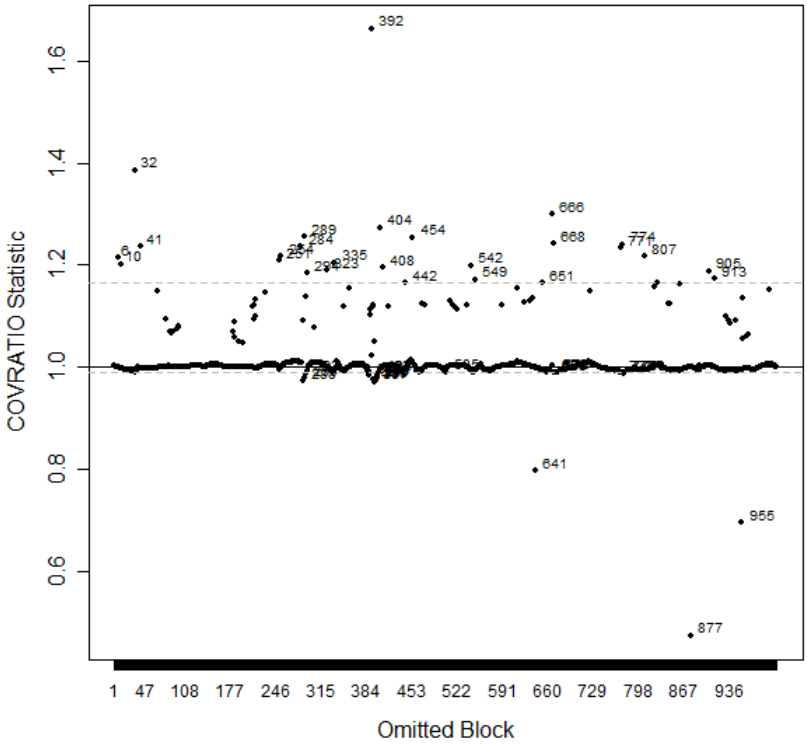


Plate 1-108 Gannet survey 05 PRESS statistic

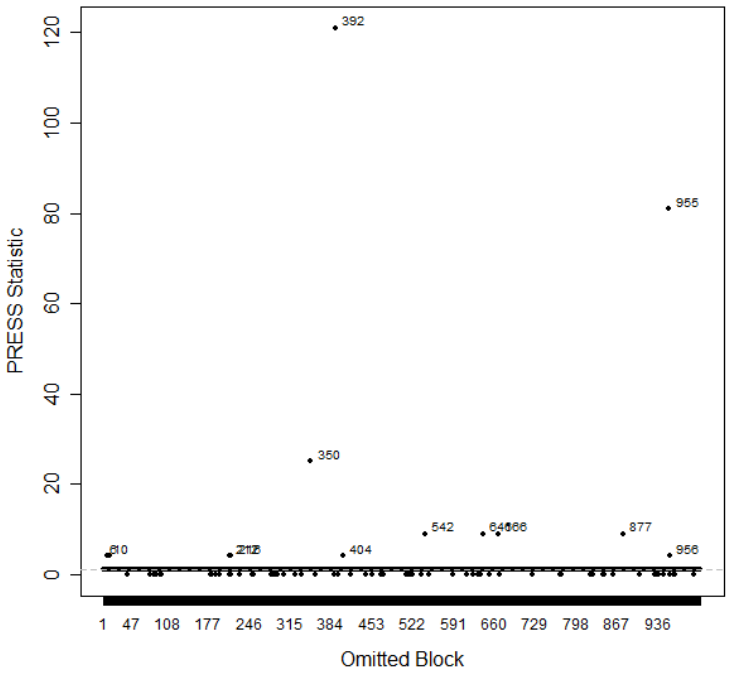
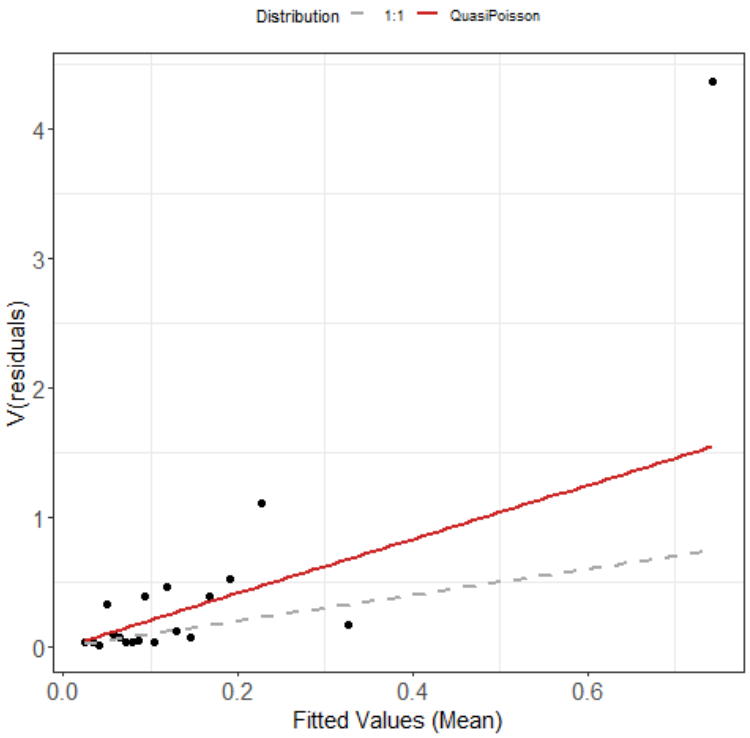


Plate 1-109 Gannet survey 05 mean-variance relationship



1.3.6 SURVEY 06 (AUGUST 2022)

Plate 1-110 Gannet survey 06 best fitting model scaled Pearsons residuals

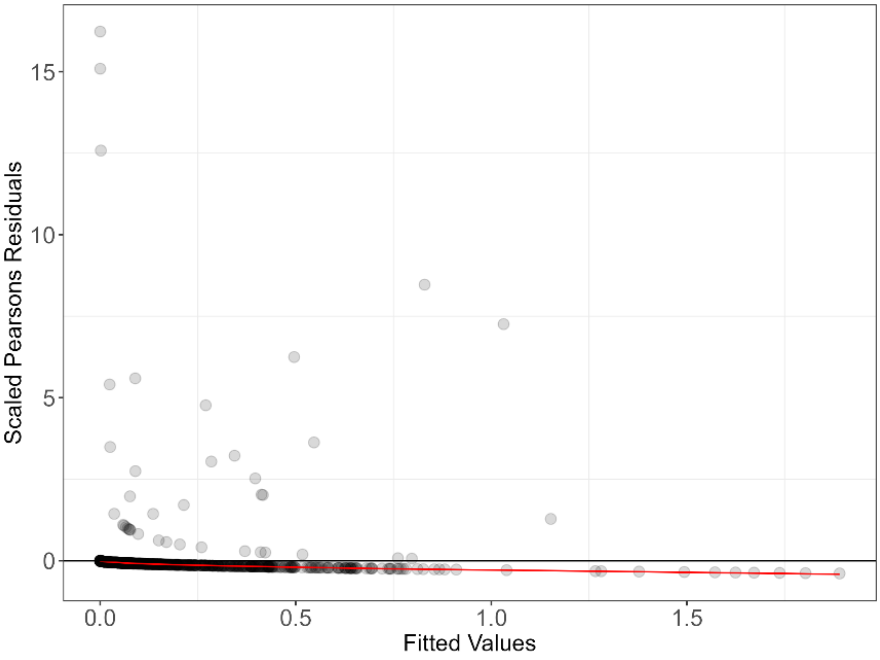


Plate 1-111 Gannet survey 06 fitted versus observed

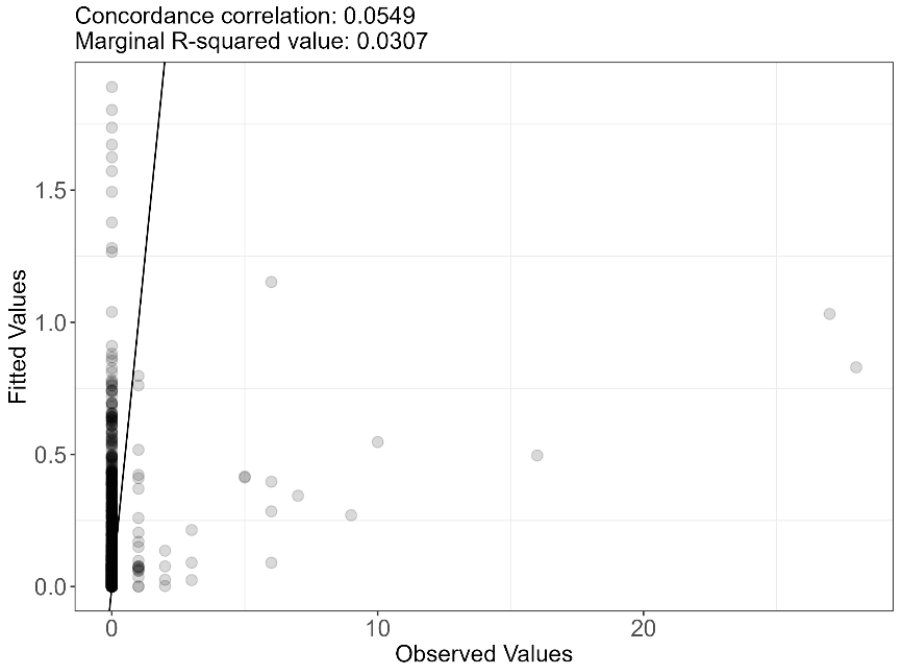


Plate 1-112 Gannet survey 06 COVRATIO statistic

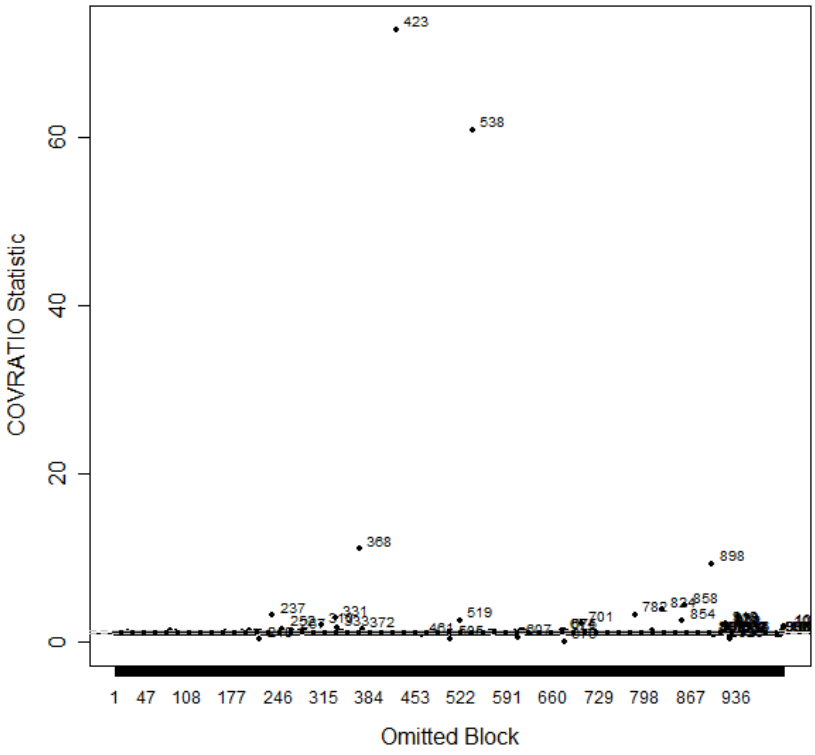


Plate 1-113 Gannet survey 06 PRESS statistic

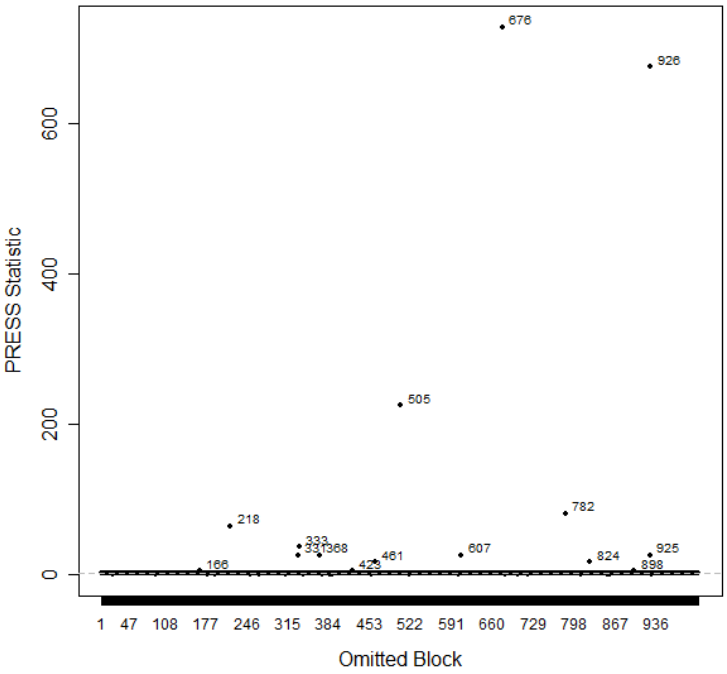
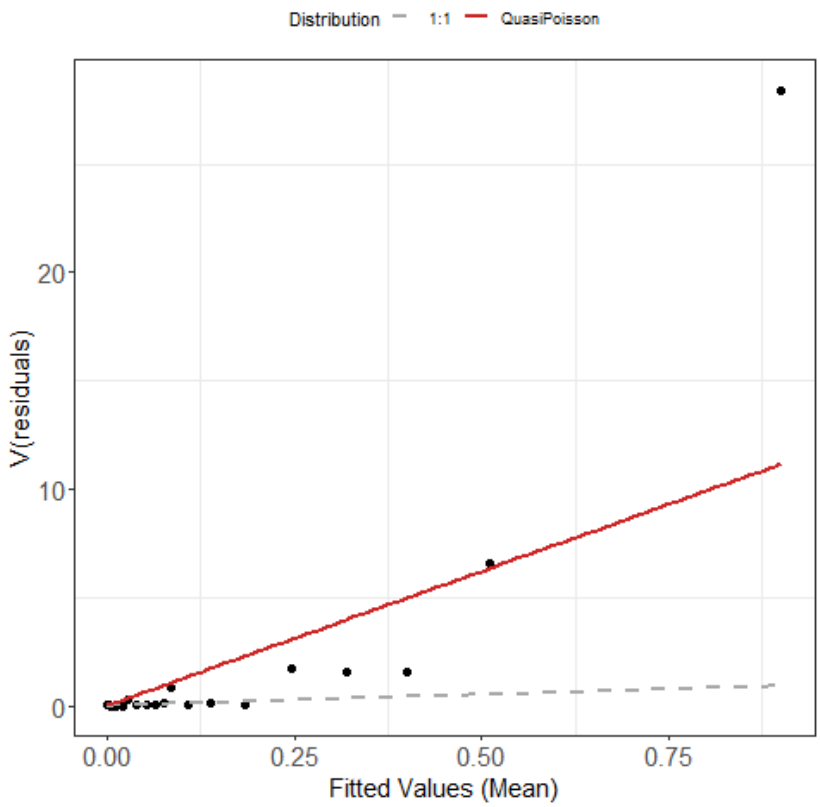


Plate 1-114 Gannet survey 06 mean-variance relationship



1.3.7 SURVEY 07 (SEPTEMBER 2022)

Plate 1-115 Gannet survey 07 best fitting model scaled Pearsons residuals

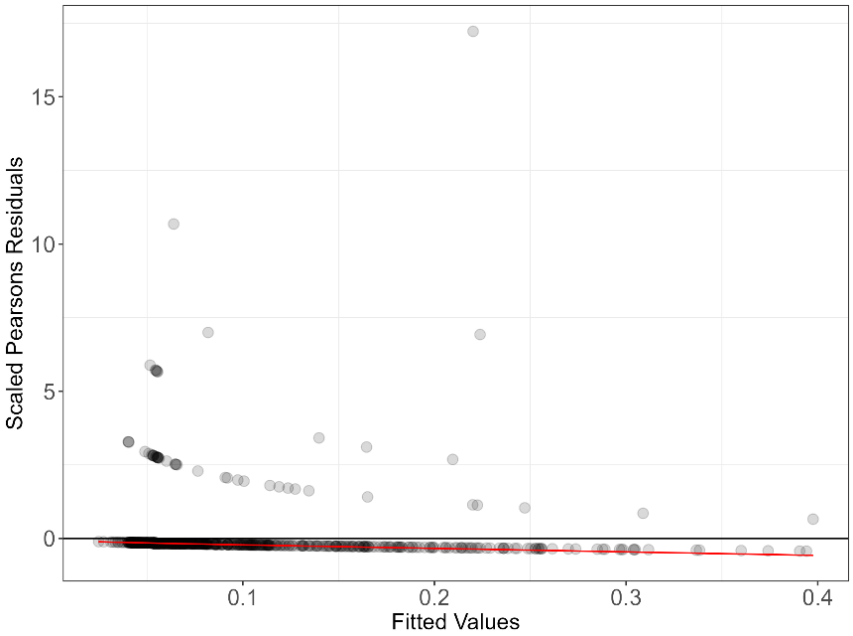


Plate 1-116 Gannet survey 07 fitted versus observed

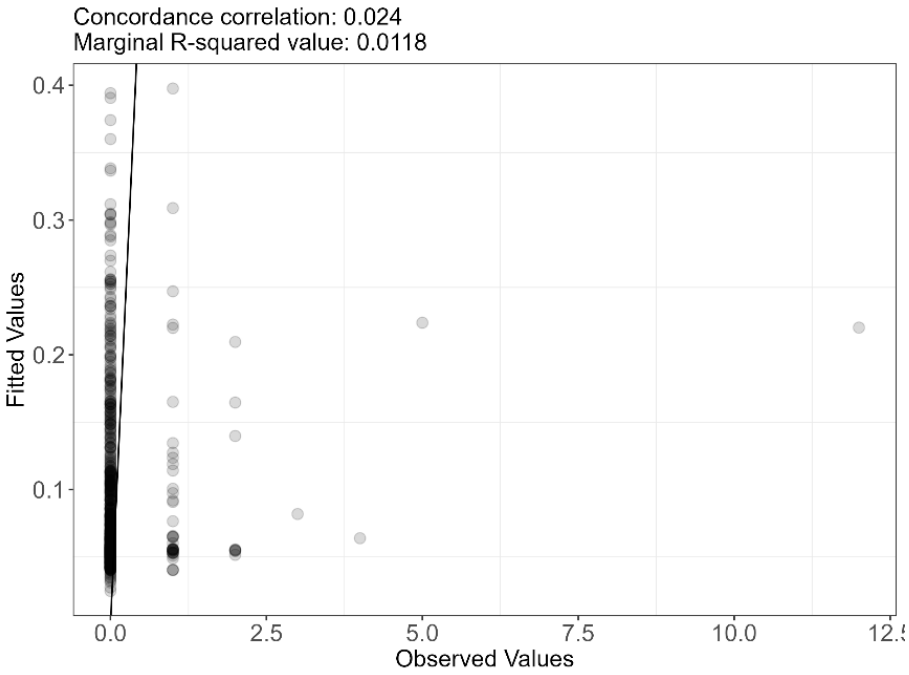


Plate 1-117 Gannet survey 07 COVRATIO statistic

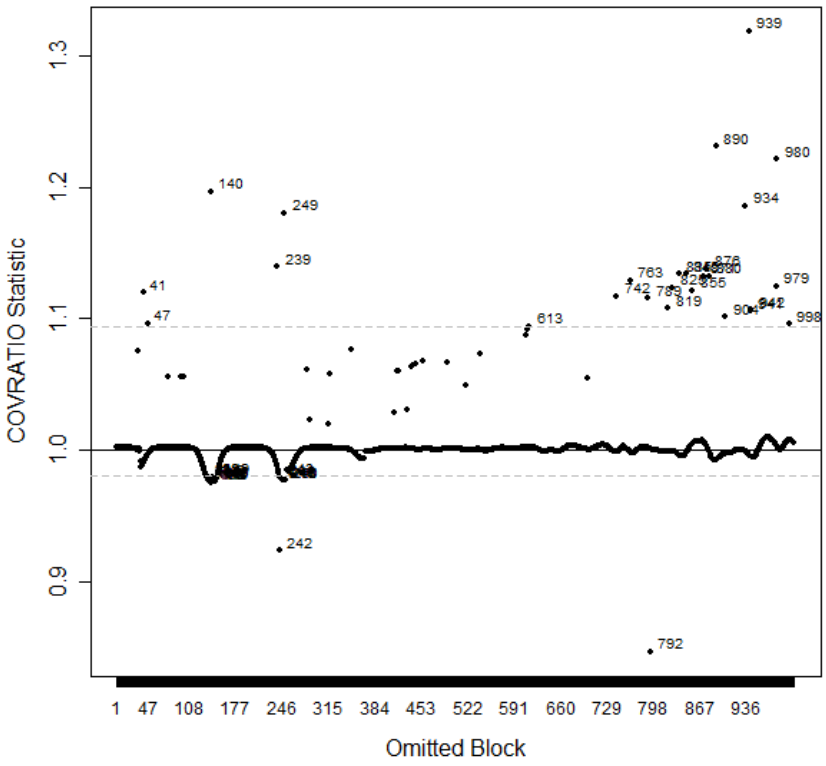


Plate 1-118 Gannet survey 07 PRESS statistic

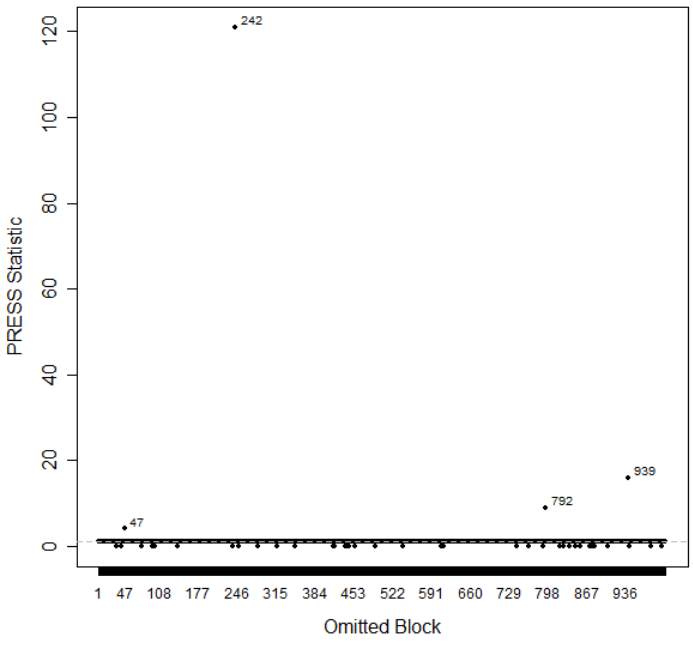
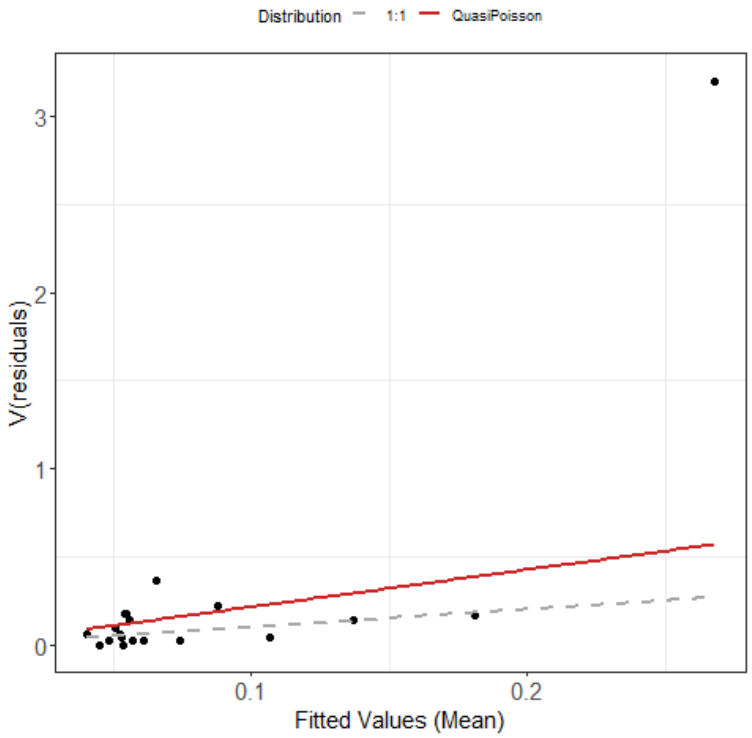


Plate 1-119 Gannet survey 07 mean-variance relationship



1.3.8 SURVEY 08 (OCTOBER 2022)

Plate 1-120 Gannet survey 08 best fitting model scaled Pearsons residuals

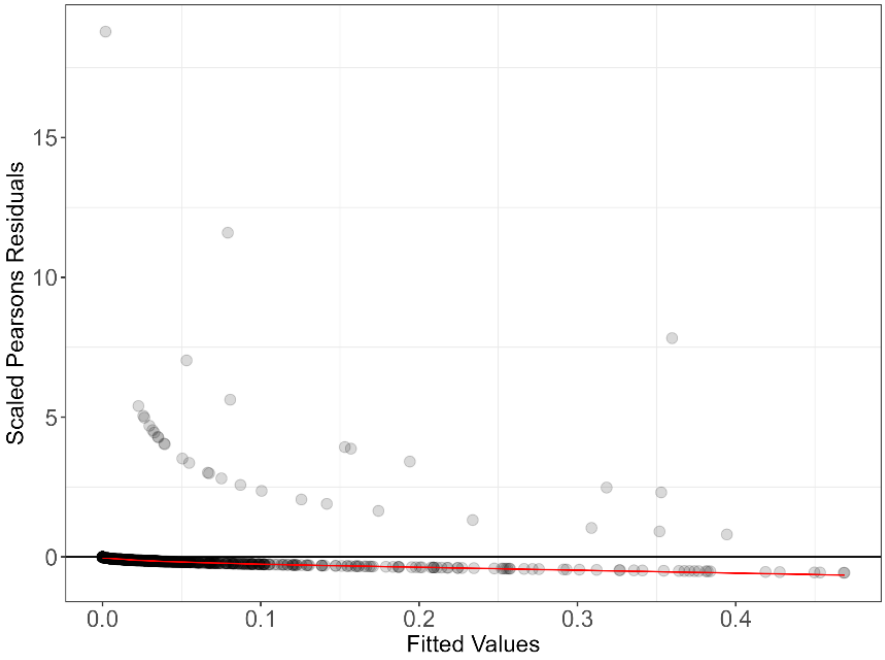


Plate 1-121 Gannet survey 08 fitted versus observed

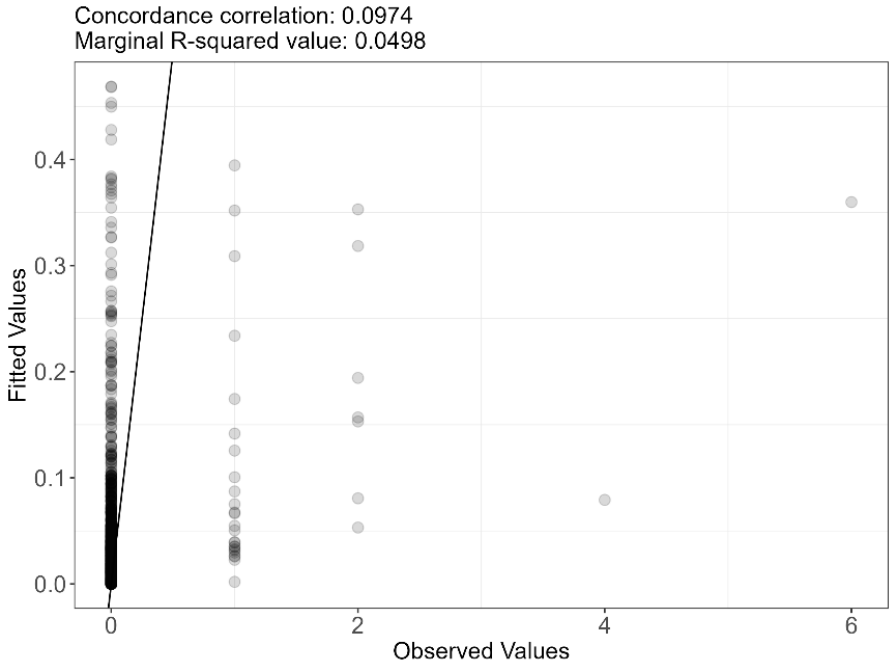


Plate 1-122 Gannet survey 08 COVRATIO statistic

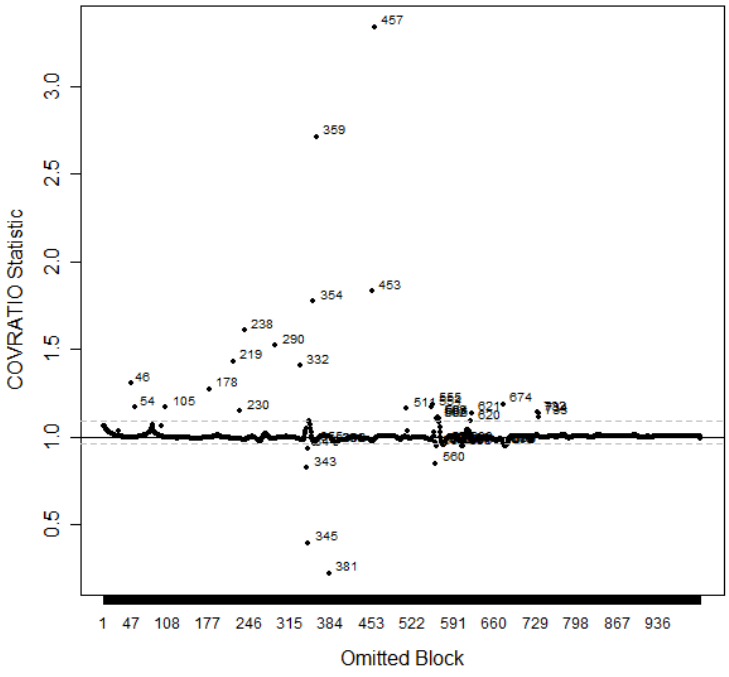


Plate 1-123 Gannet survey 08 PRESS statistic

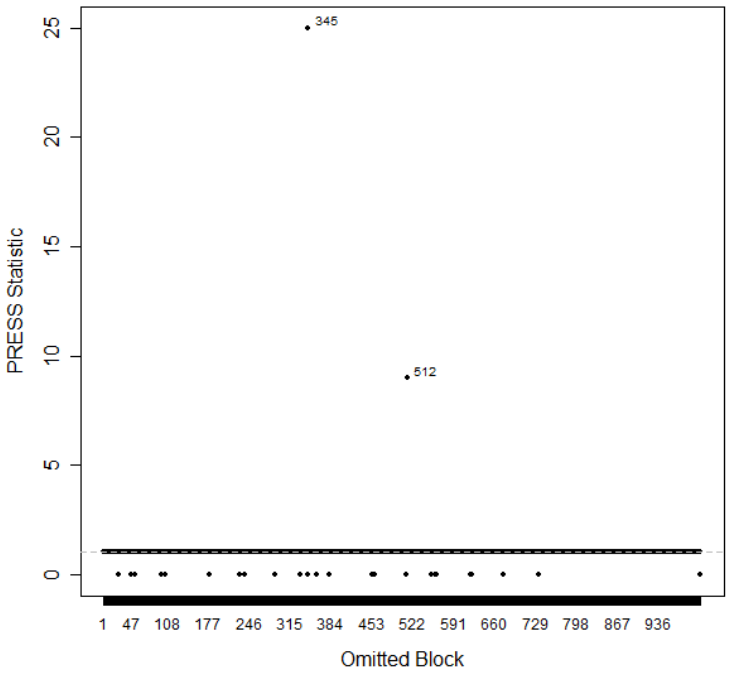
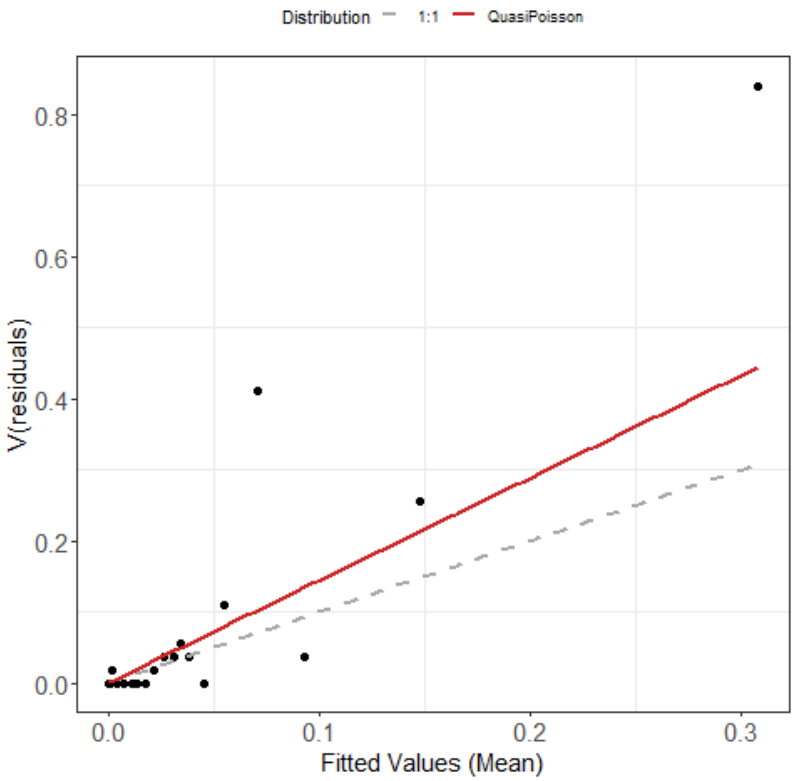


Plate 1-124 Gannet survey 08 mean-variance relationship



1.3.9 SURVEY 11 (JANUARY 2023)

Plate 1-125 Gannet survey 11 best fitting model scaled Pearsons residuals

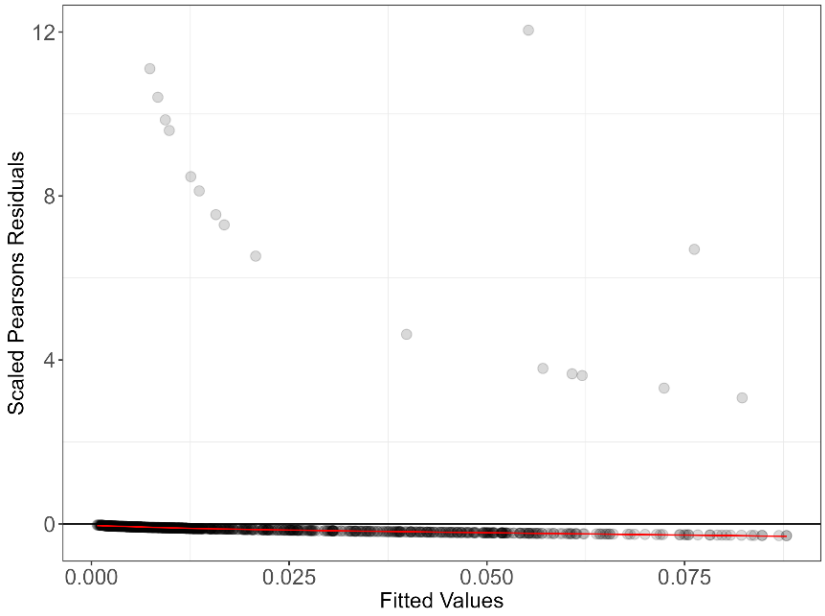


Plate 1-126 Gannet survey 11 fitted versus observed

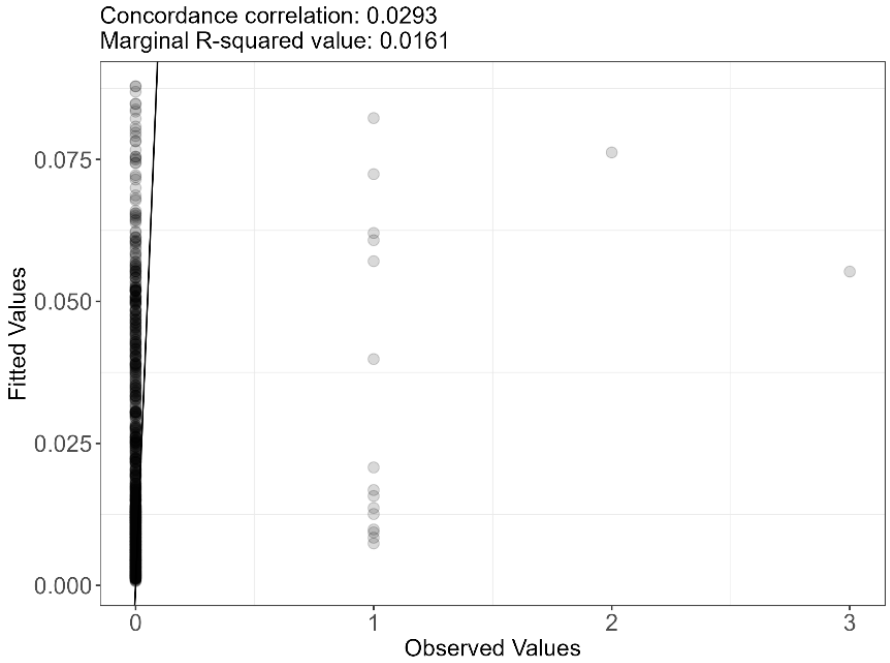


Plate 1-127 Gannet survey 11 COVRATIO statistic

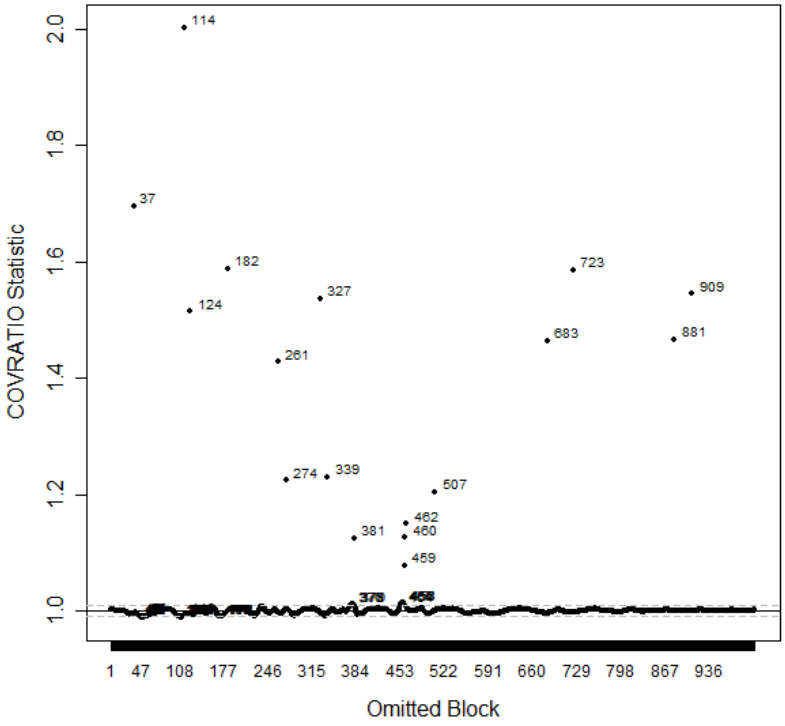


Plate 1-128 Gannet survey 11 PRESS statistic

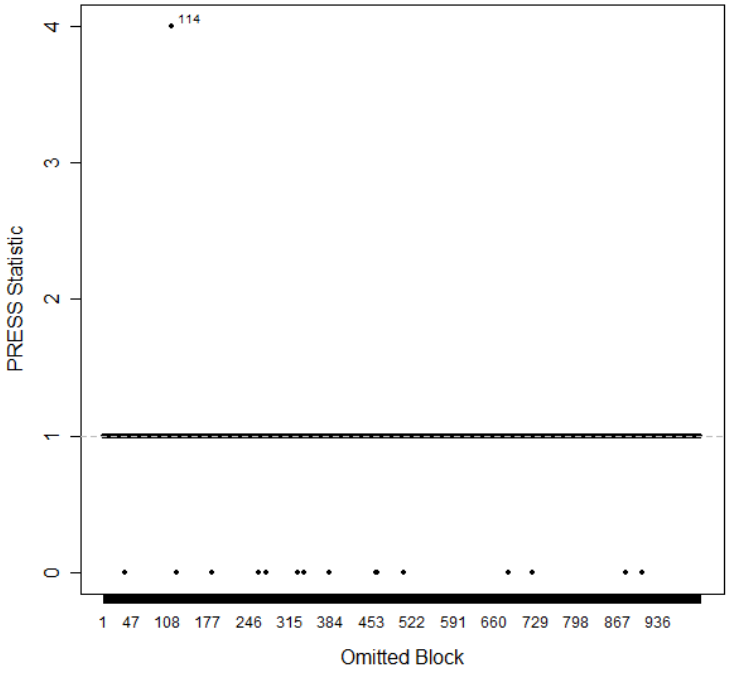
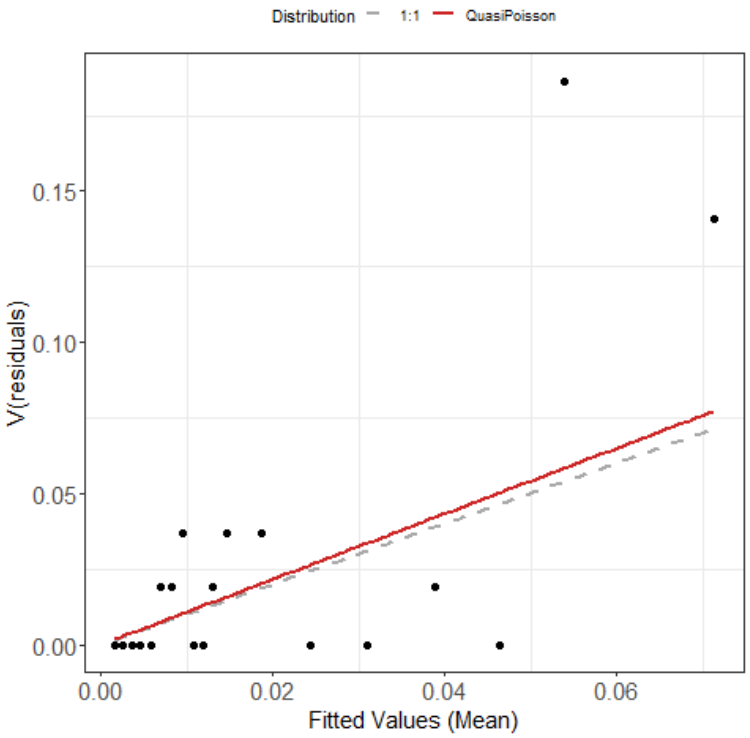


Plate 1-129 Gannet survey 11 mean-variance relationship



1.3.10 SURVEY 13 (MARCH 2023)

Plate 1-130 Gannet survey 13 best fitting model scaled Pearsons residuals

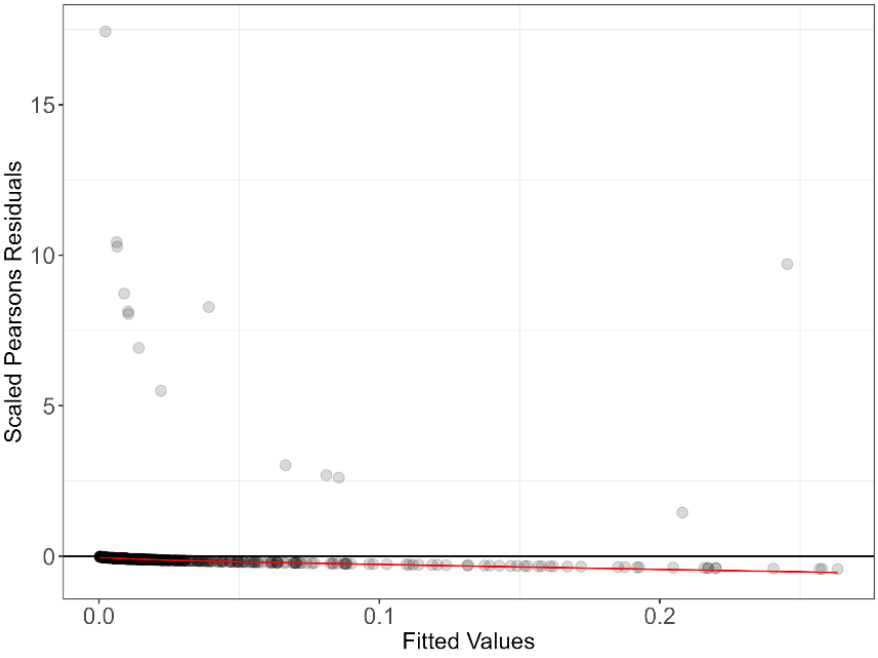


Plate 1-131 Gannet survey 13 fitted versus observed

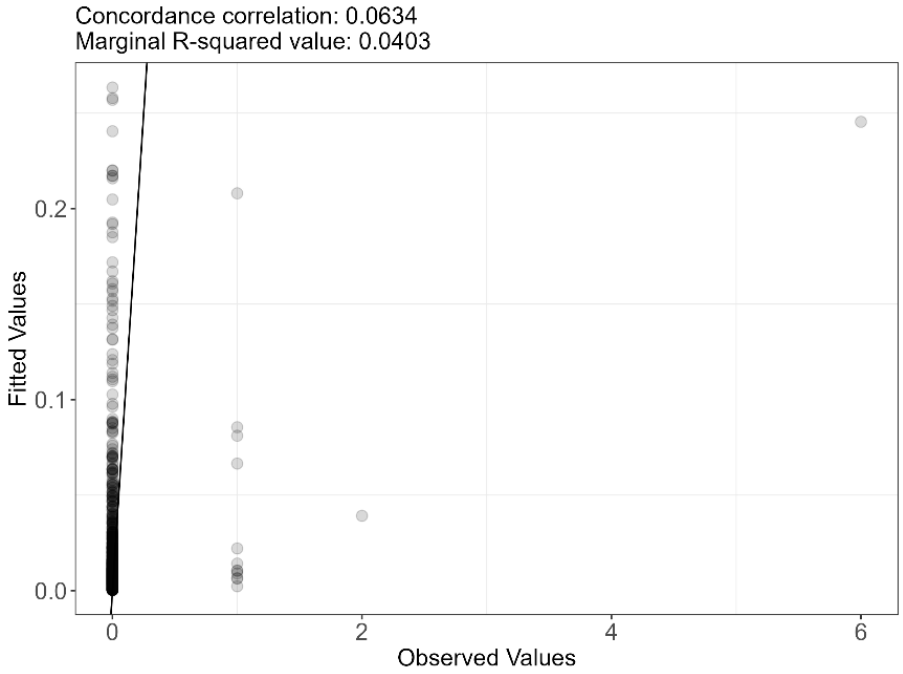


Plate 1-132 Gannet survey 13 COVRATIO statistic

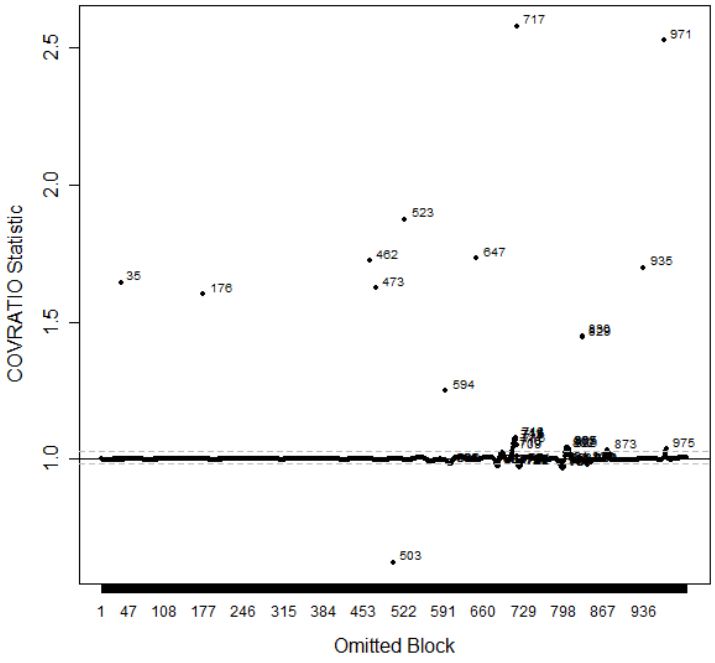


Plate 1-133 Gannet survey 13 PRESS statistic

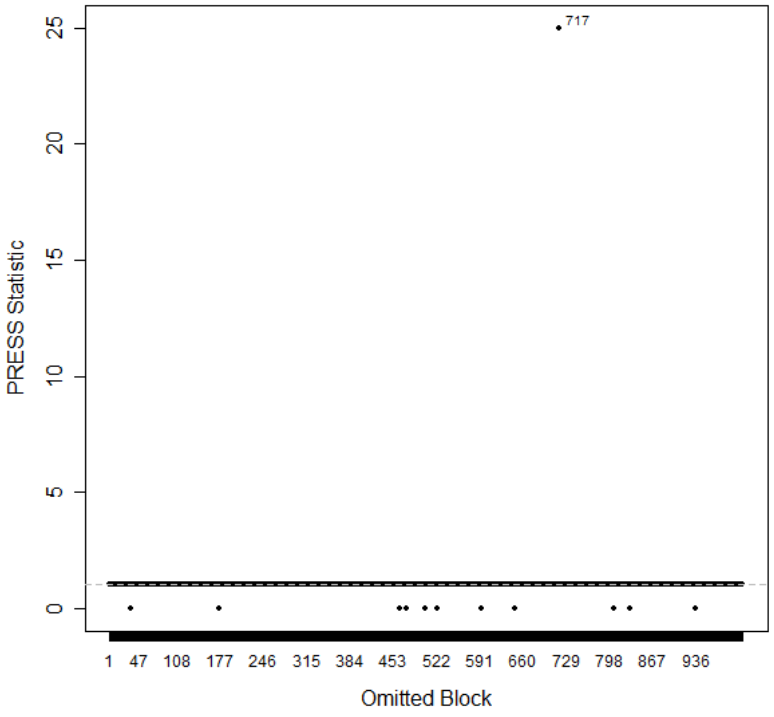
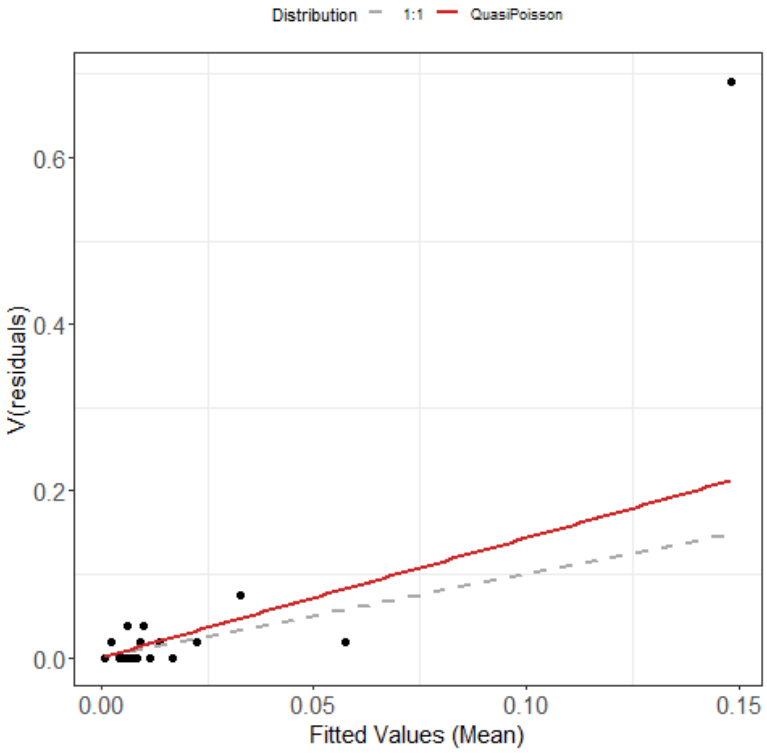


Plate 1-134 Gannet survey 13 mean-variance relationship



1.3.11 SURVEY 14 (APRIL 2023)

Plate 1-135 Gannet survey 14 best fitting model scaled Pearsons residuals

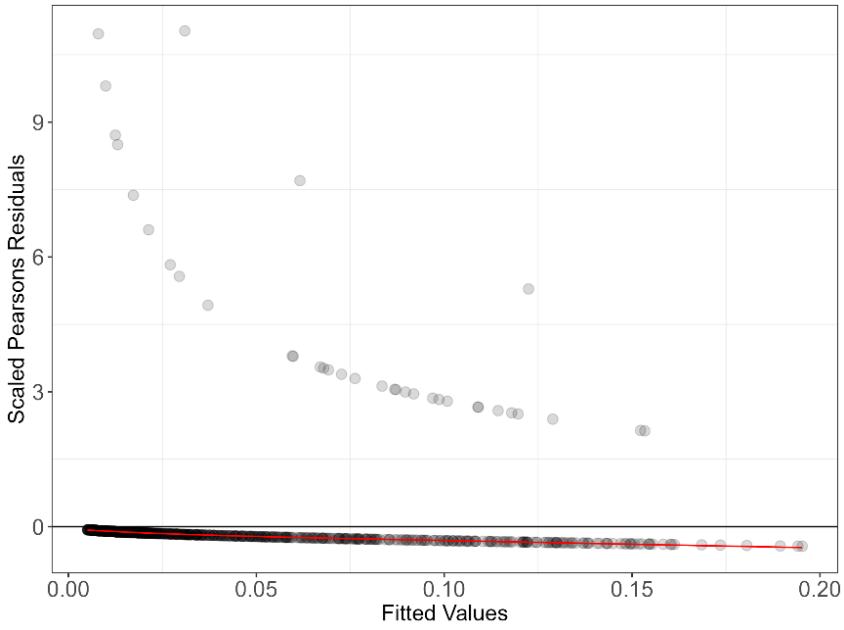


Plate 1-136 Gannet survey 14 fitted versus observed

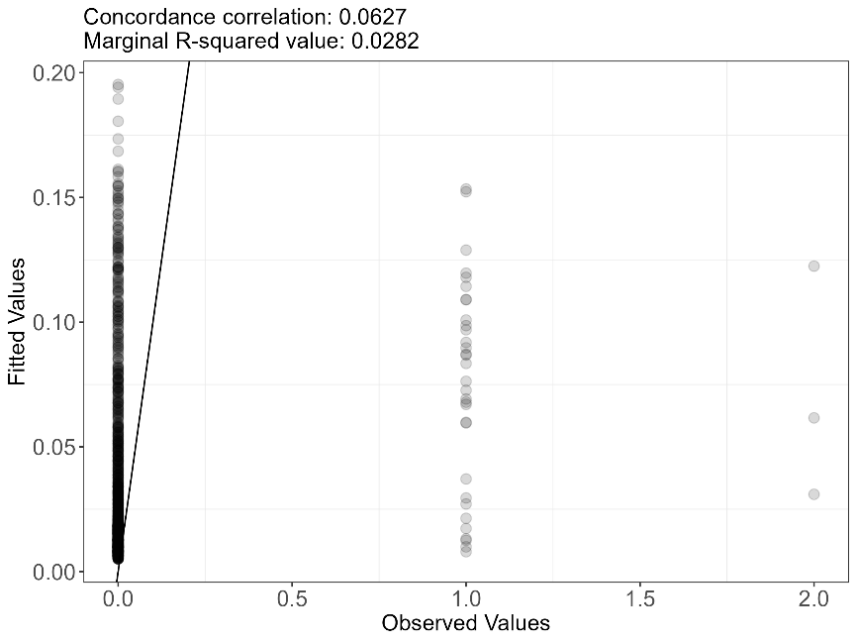


Plate 1-137 Gannet survey 14 COVRATIO statistic

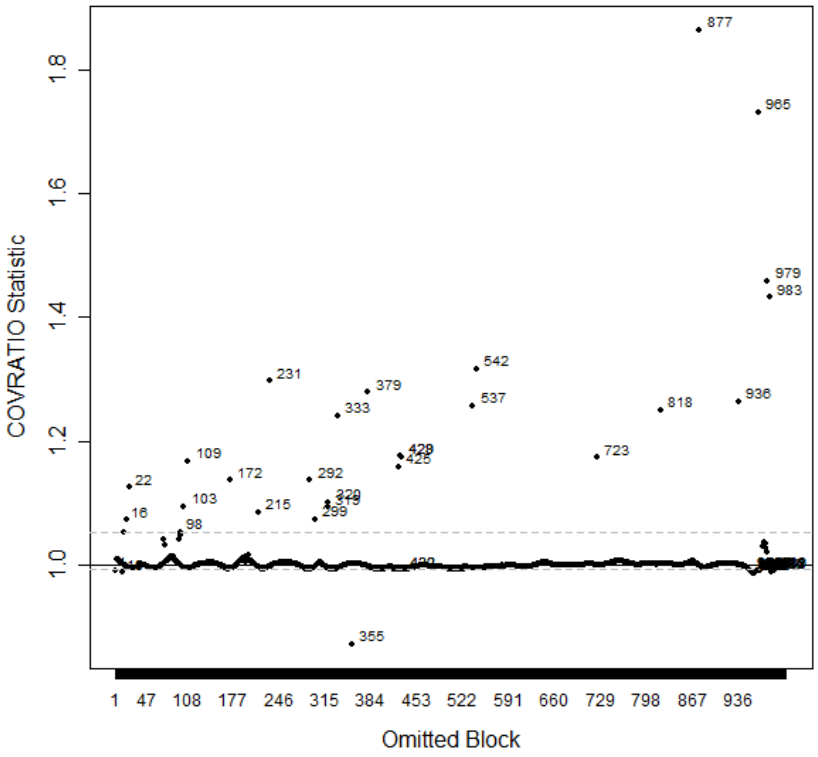


Plate 1-138 Gannet survey 14 PRESS statistic

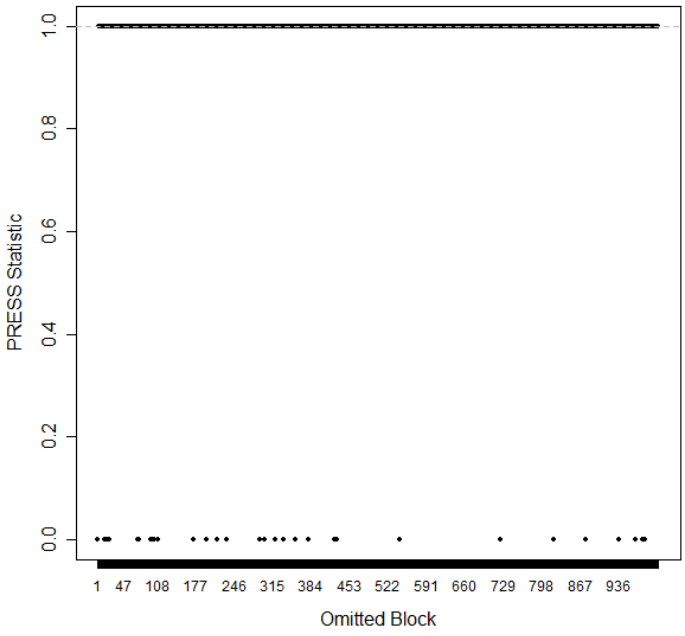
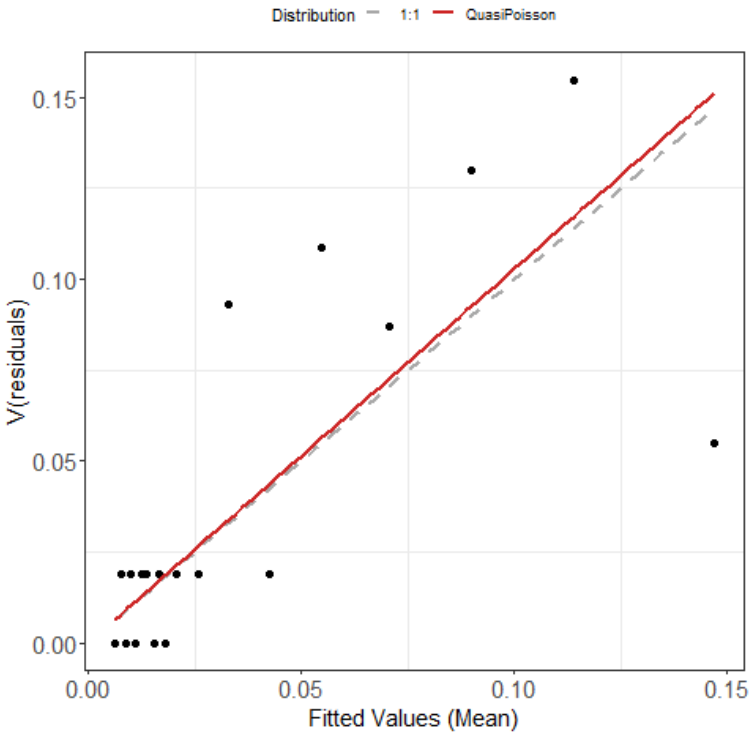


Plate 1-139 Gannet survey 14 mean-variance relationship



1.3.12 SURVEY 15 (MAY 2023)

Plate 1-140 Gannet survey 15 best fitting model scaled Pearsons residuals

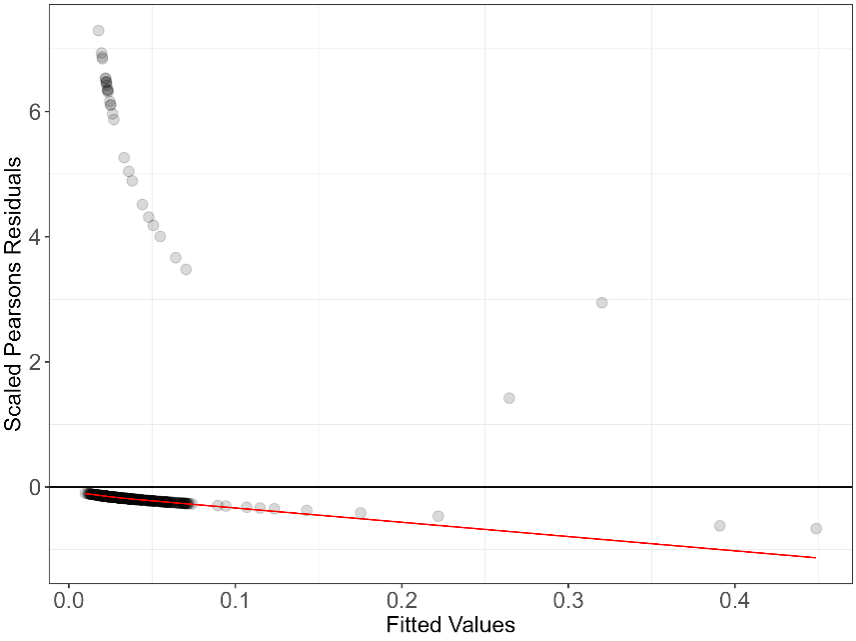


Plate 1-141 Gannet survey 15 fitted versus observed

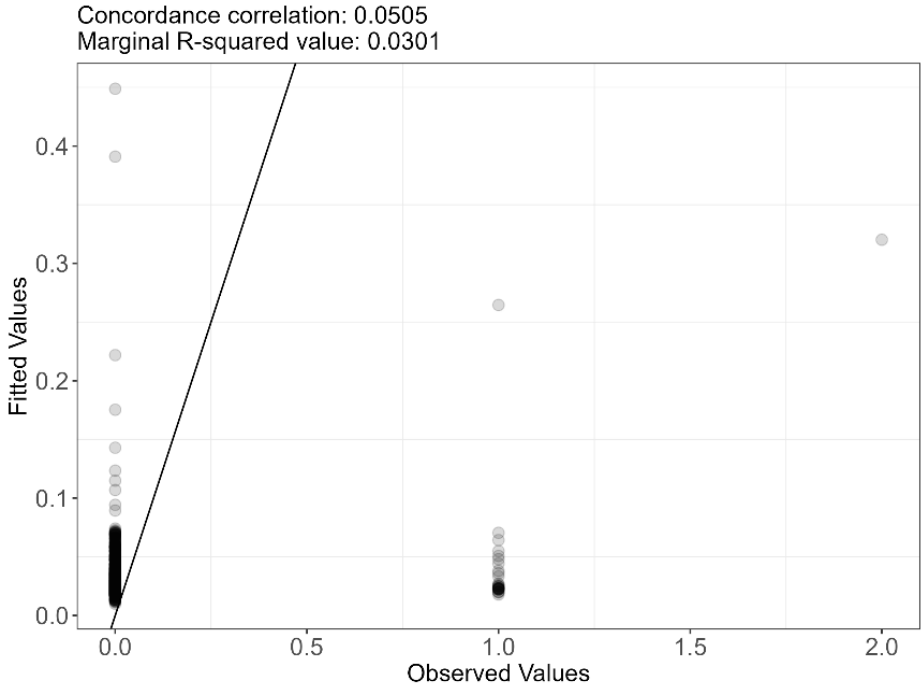


Plate 1-142 Gannet survey 15 COVRATIO statistic

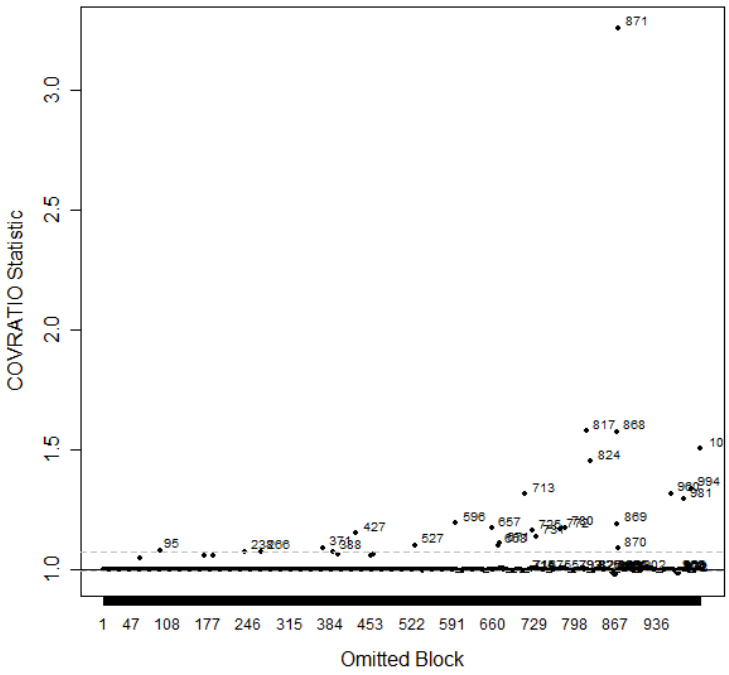


Plate 1-143 Gannet survey 15 PRESS statistic

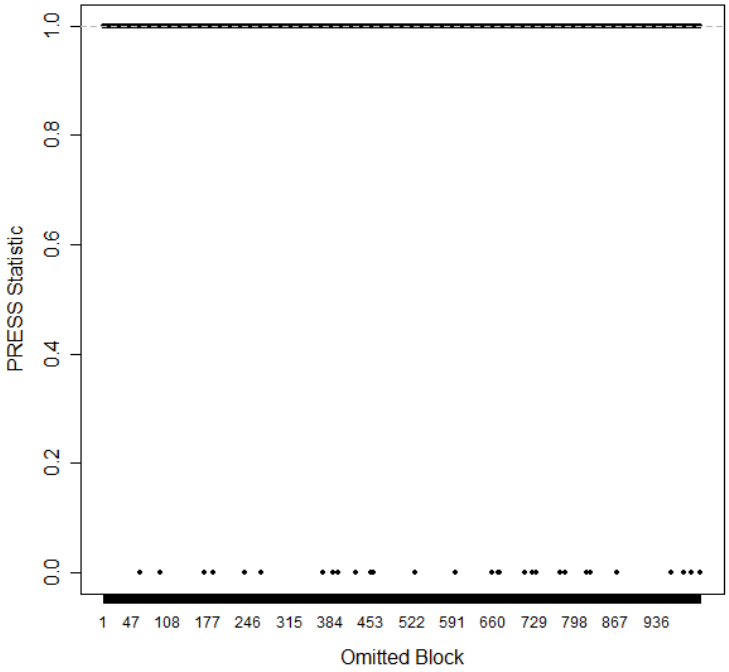
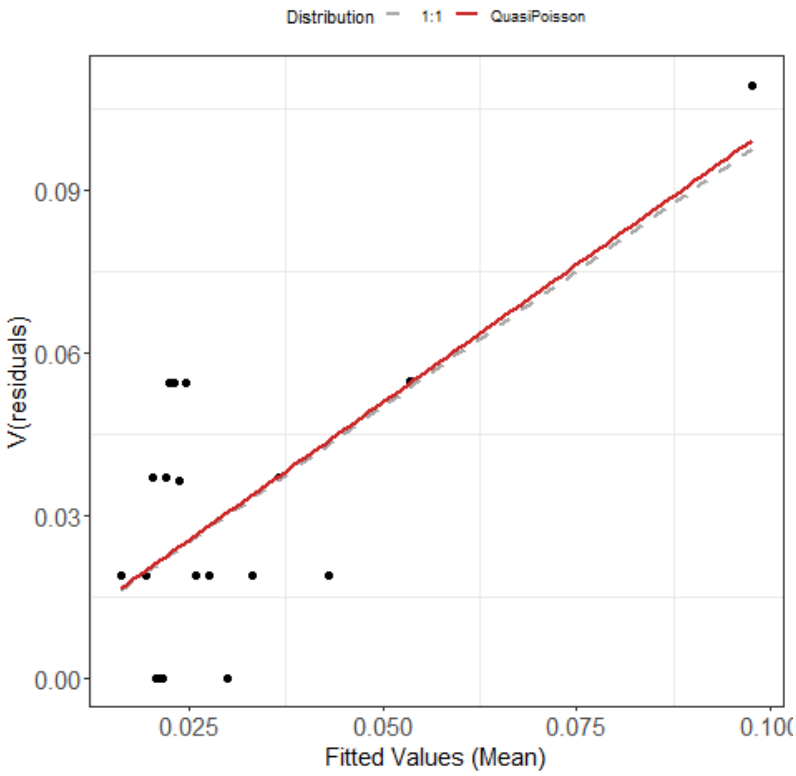


Plate 1-144 Gannet survey 15 mean-variance relationship



1.3.13 SURVEY 16 (JUNE 2023)

Plate 1-145 Gannet survey 16 best fitting model scaled Pearsons residuals

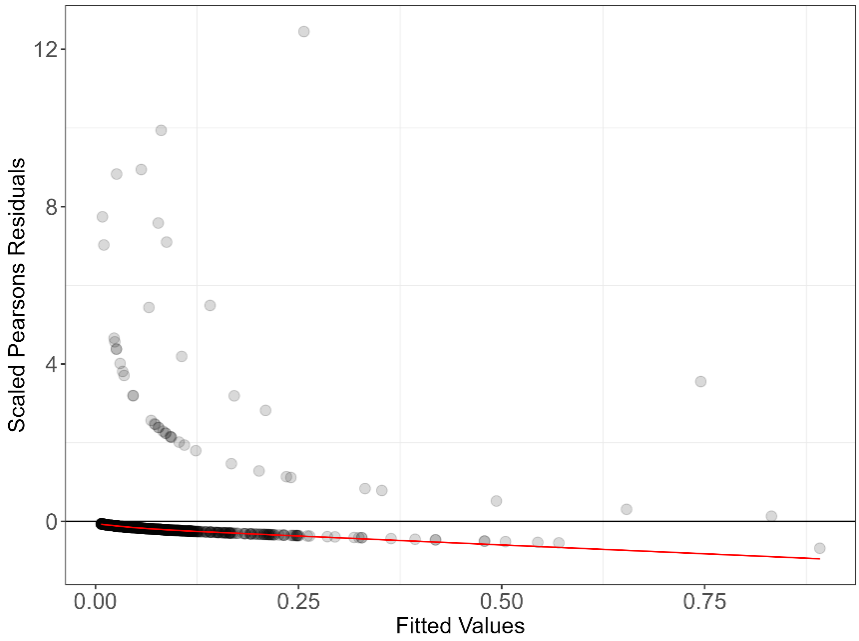


Plate 1-146 Gannet survey 16 fitted versus observed

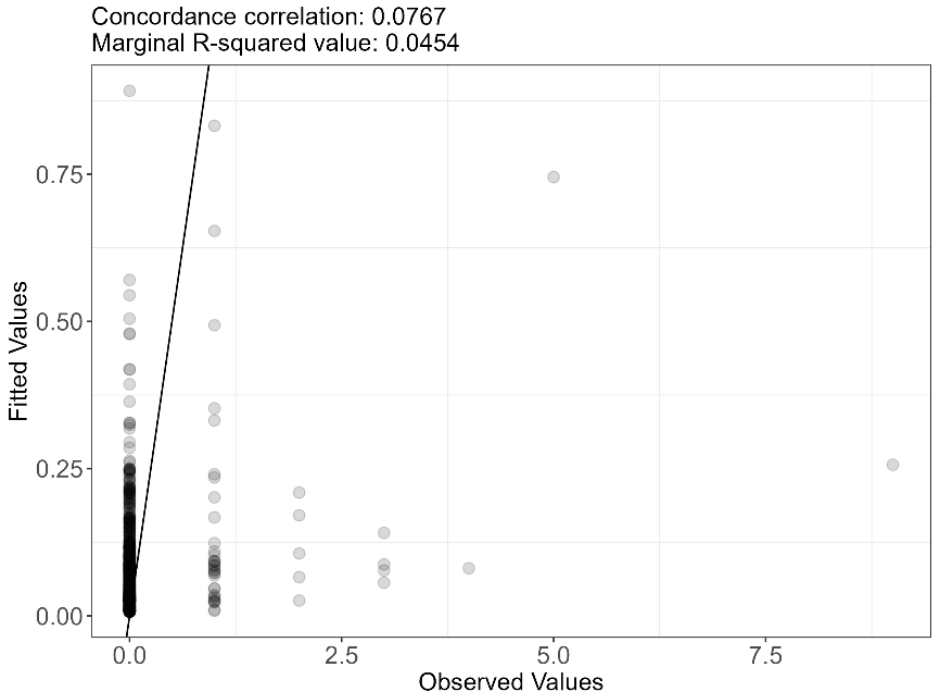


Plate 1-147 Gannet survey 16 COVRATIO statistic

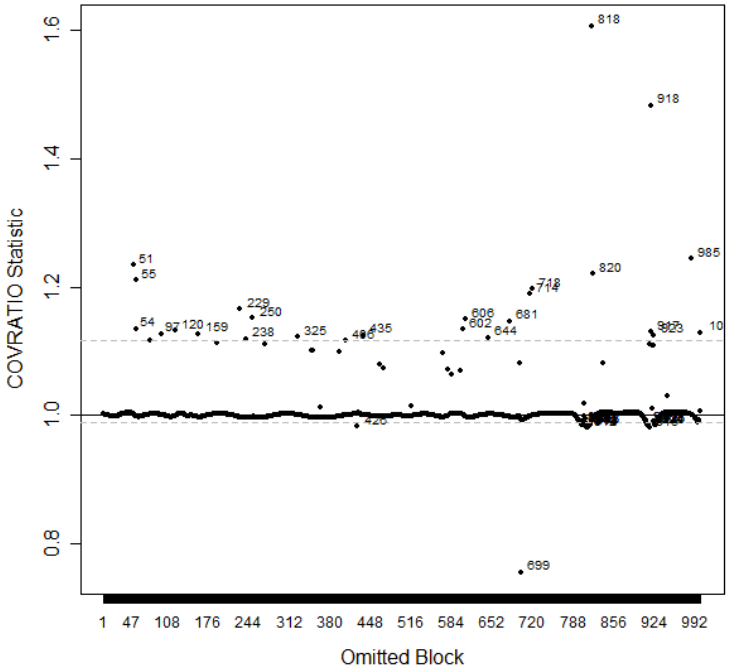


Plate 1-148 Gannet survey 16 PRESS statistic

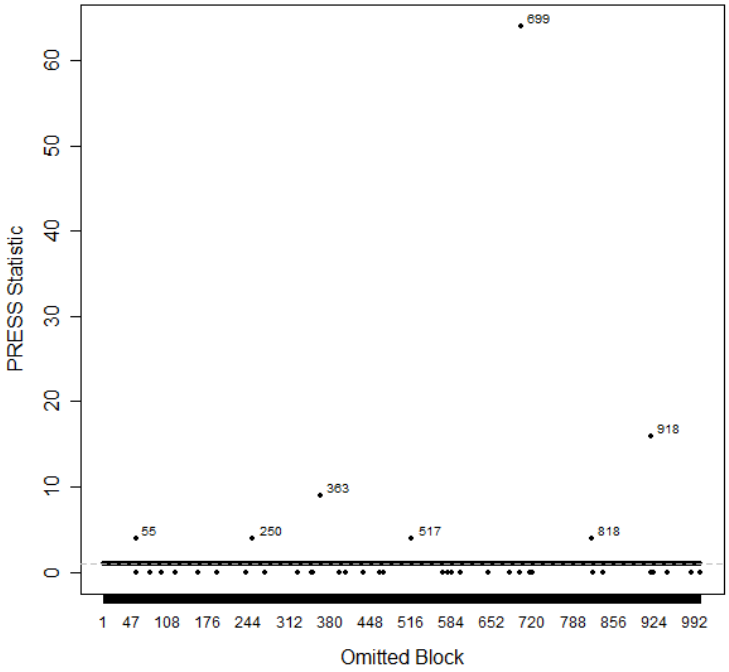
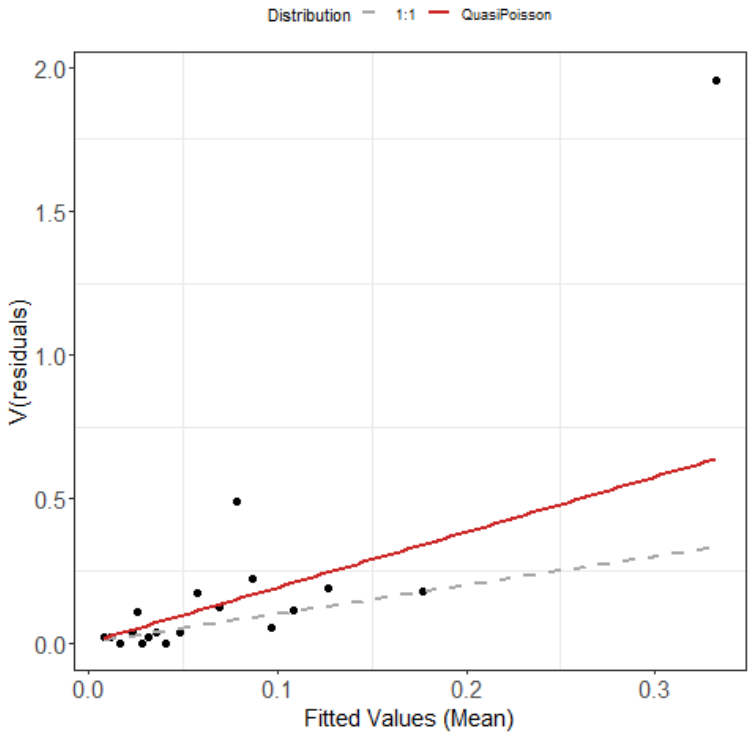


Plate 1-149 Gannet survey 16 mean-variance relationship



1.3.14 SURVEY 17 (JULY 2023)

Plate 1-150 Gannet survey 17 best fitting model scaled Pearsons residuals

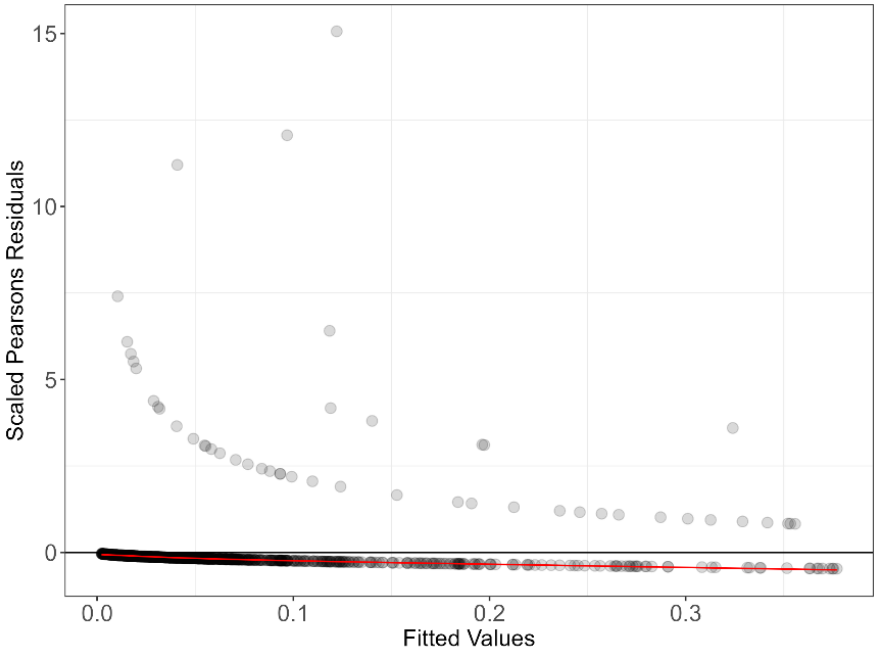


Plate 1-151 Gannet survey 17 fitted versus observed

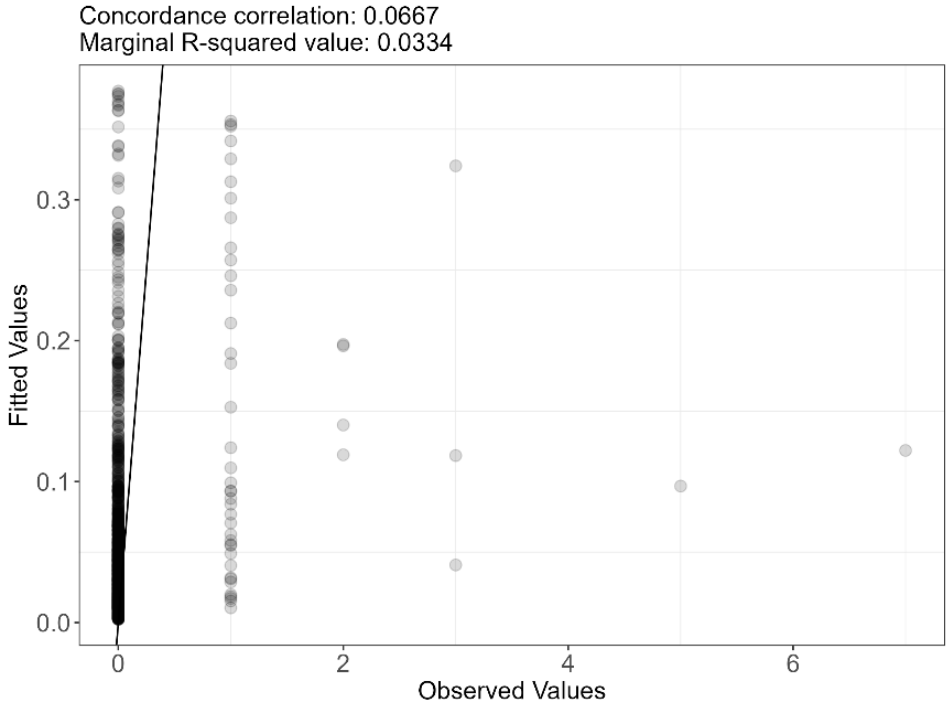


Plate 1-152 Gannet survey 17 COVRATIO statistic

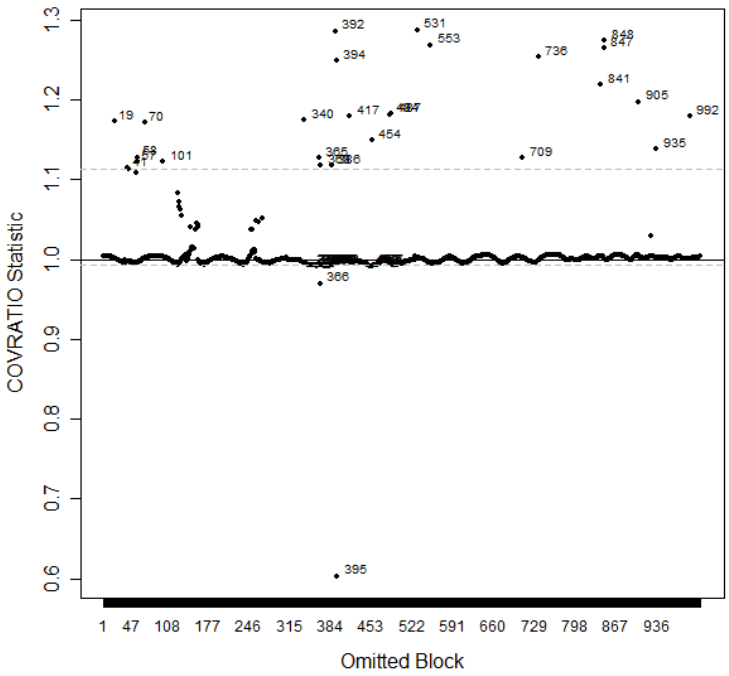


Plate 1-153 Gannet survey 17 PRESS statistic

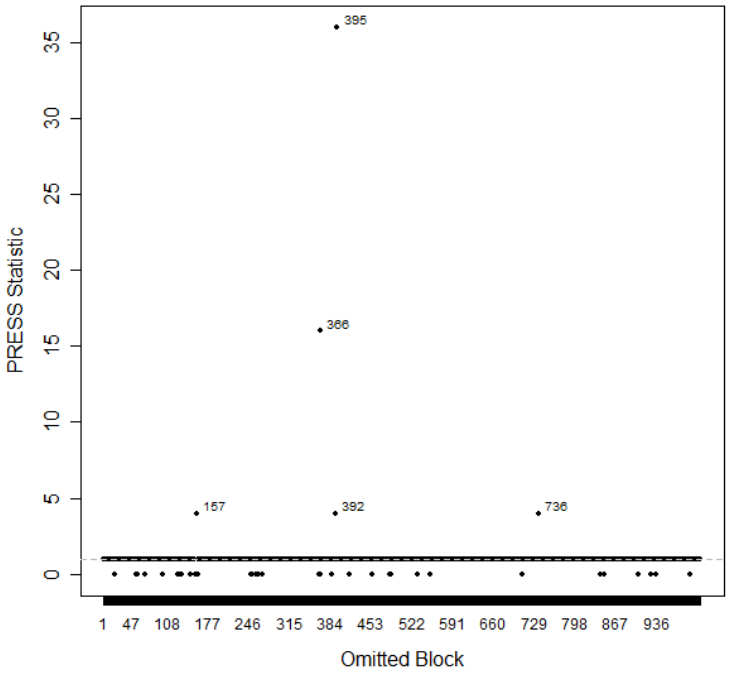
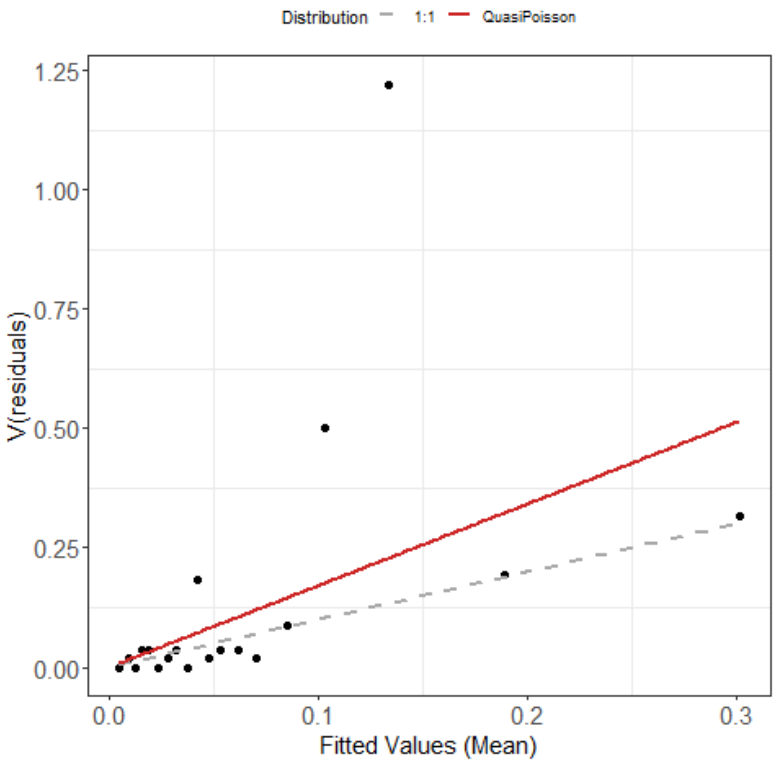


Plate 1-154 Gannet survey 17 mean-variance relationship



1.3.15 SURVEY 18 (AUGUST 2023)

Plate 1-155 Gannet survey 18 best fitting model scaled Pearsons residuals

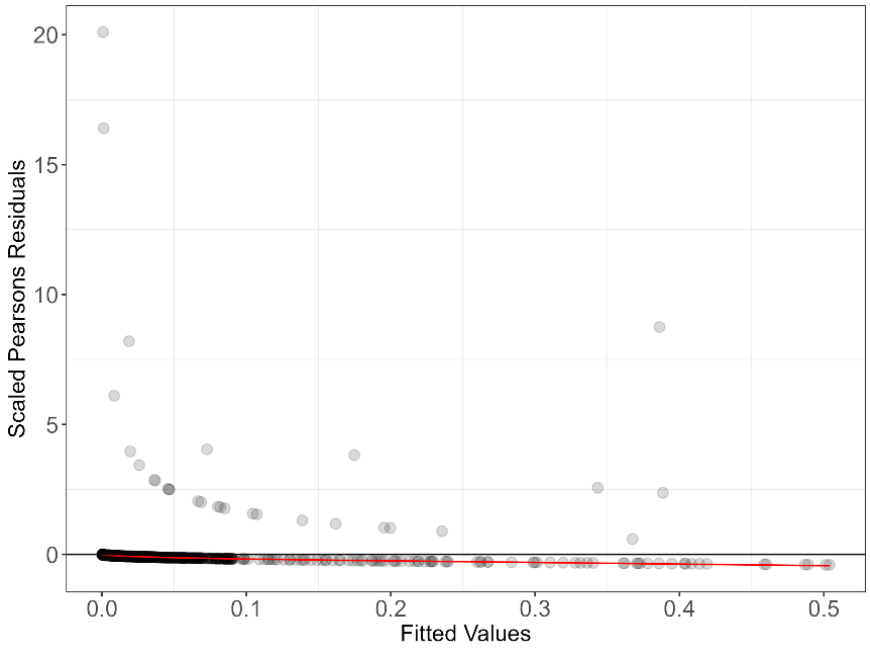


Plate 1-156 Gannet survey 18 fitted versus observed

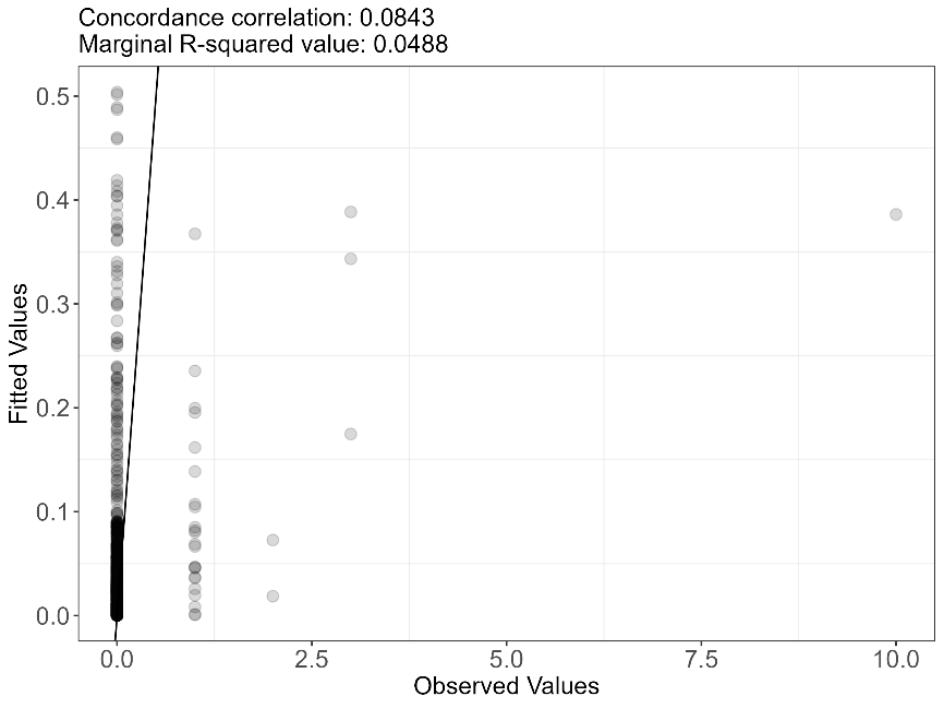


Plate 1-157 Gannet survey 18 COVRATIO statistic

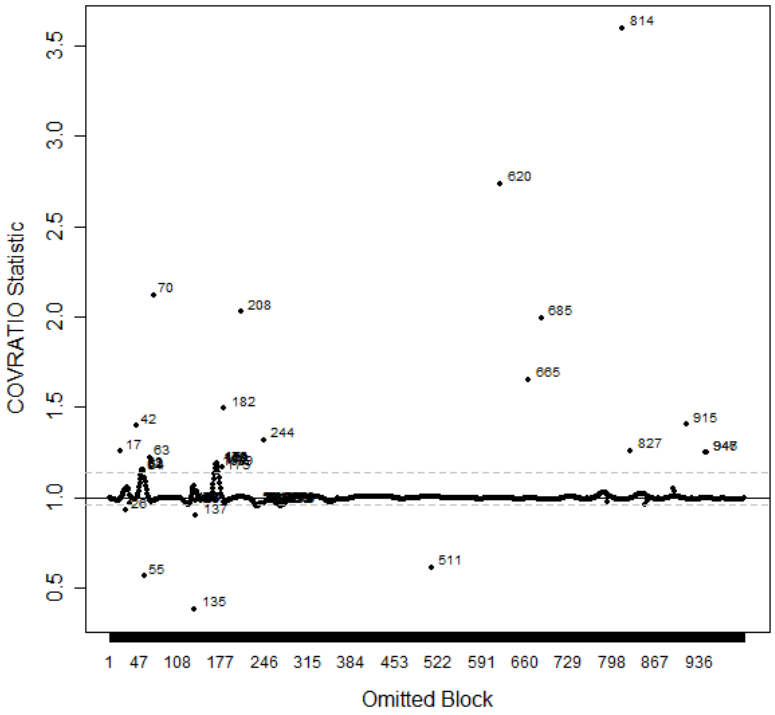


Plate 1-158 Gannet survey 18 PRESS statistic

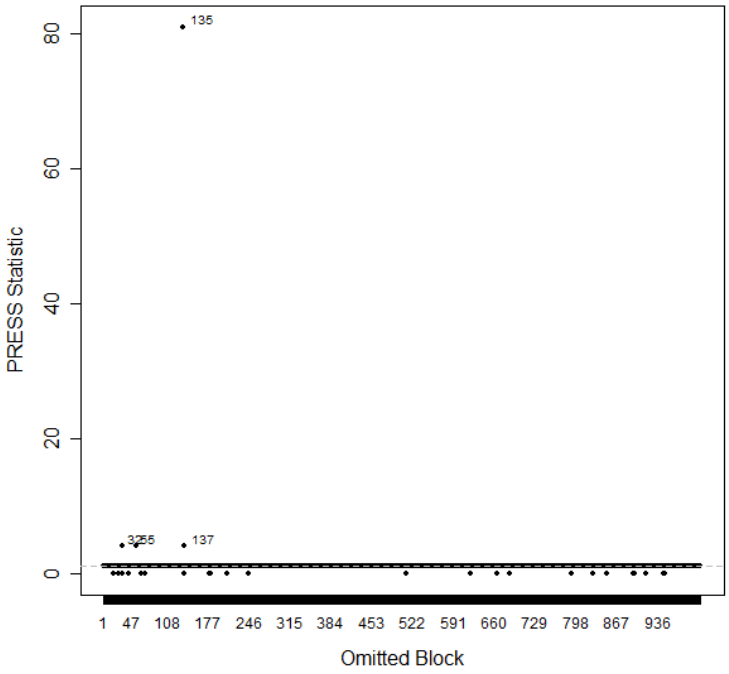
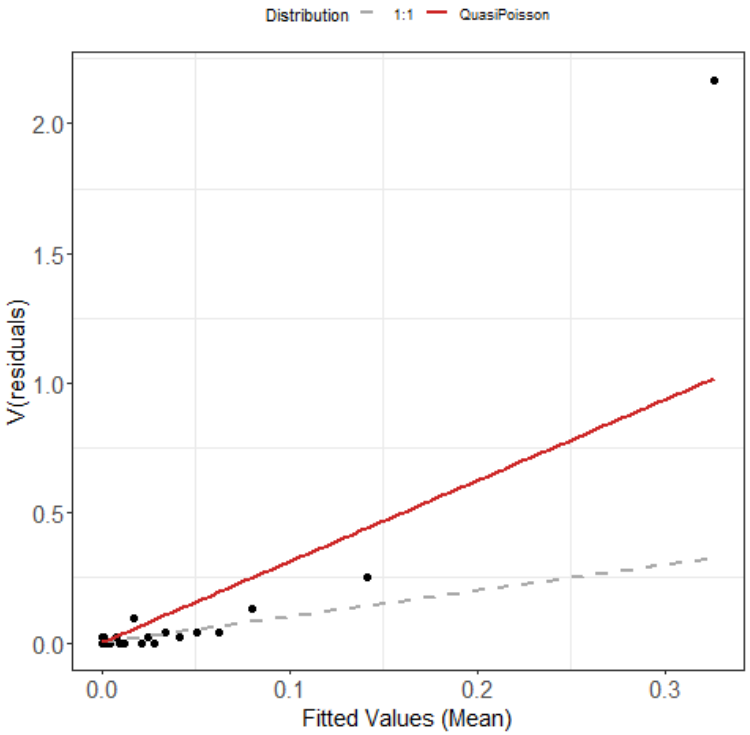


Plate 1-159 Gannet survey 18 mean-variance relationship



1.3.16 SURVEY 19 (SEPTEMBER 2023)

Plate 1-160 Gannet survey 19 best fitting model scaled Pearsons residuals

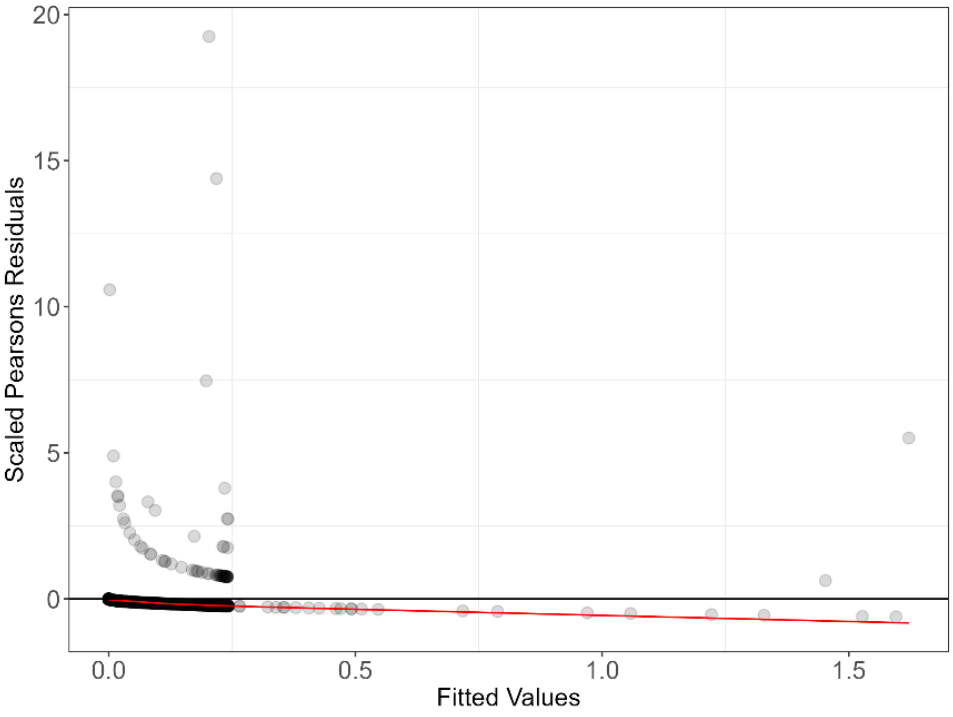


Plate 1-161 Gannet survey 19 fitted versus observed

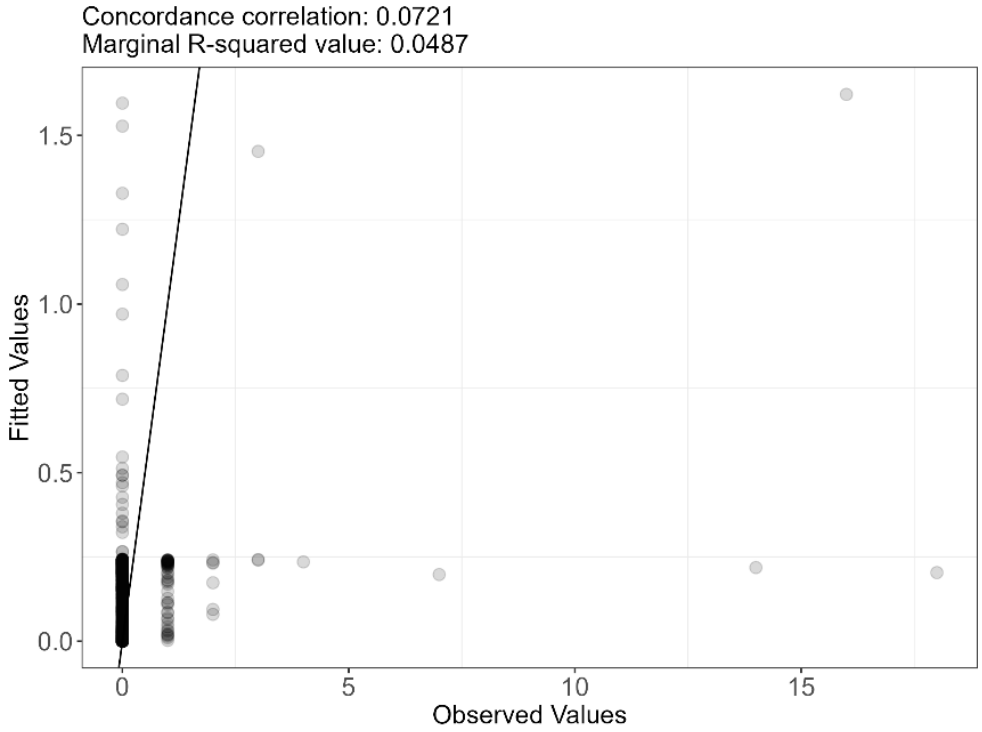


Plate 1-162 Gannet survey 19 COVRATIO statistic

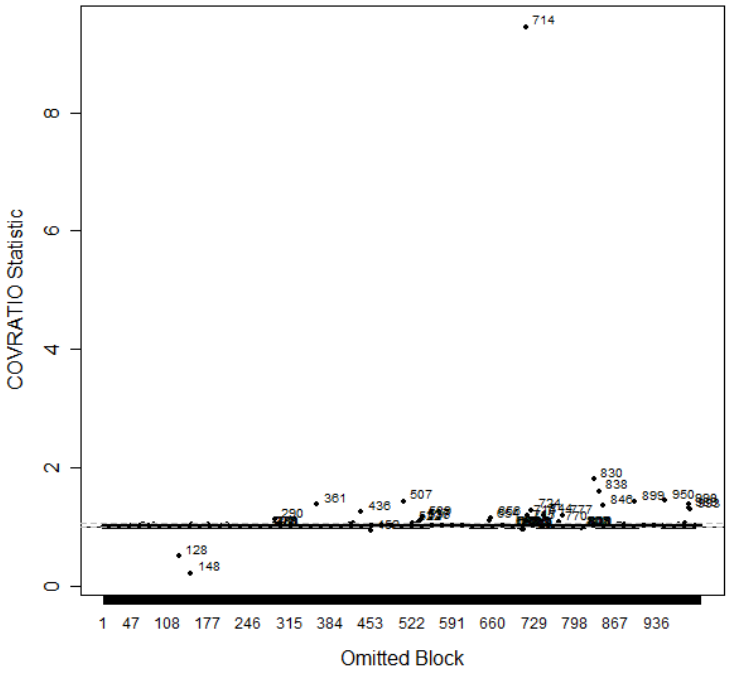


Plate 1-163 Figure 1.2 Gannet survey 19 PRESS statistic

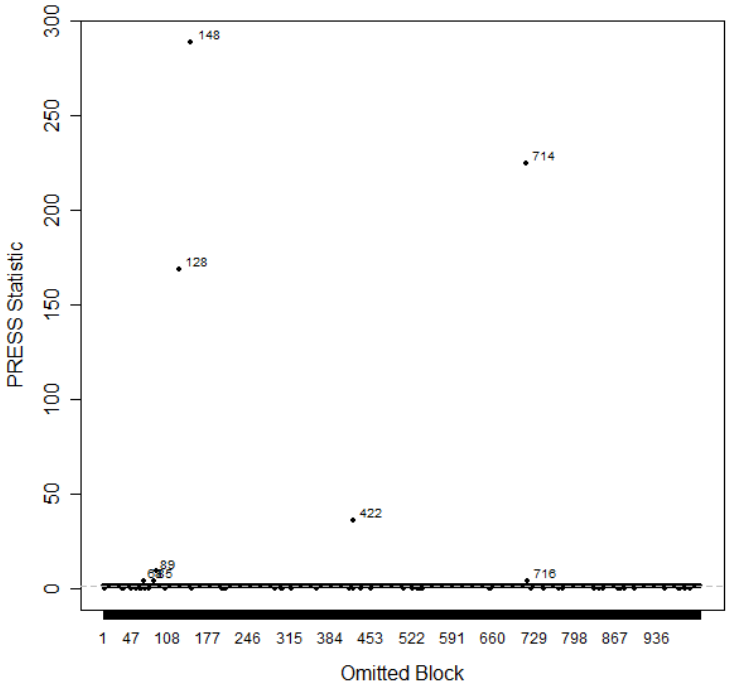
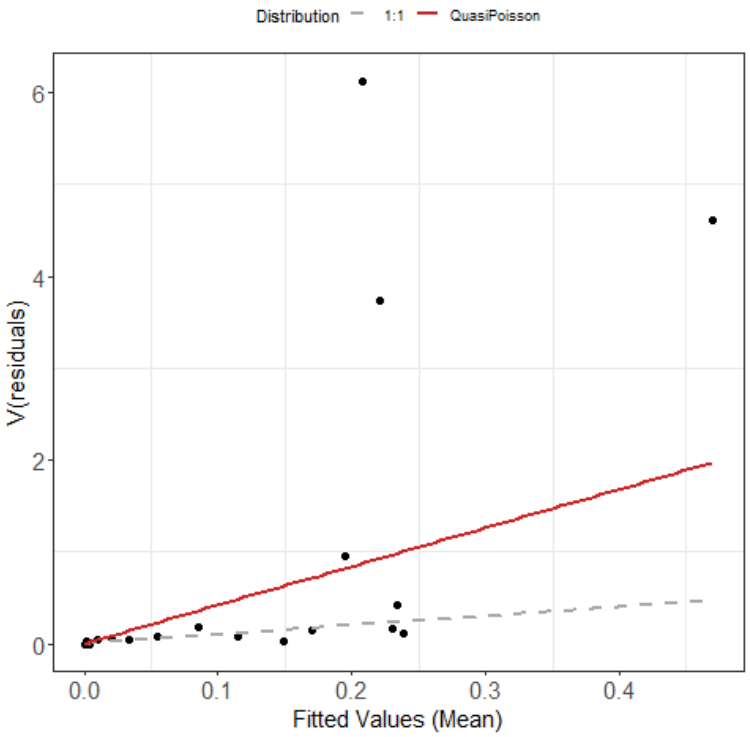


Plate 1-164 Gannet survey 19 mean-variance relationship



1.4 GUILLEMOT

1.4.1 SURVEY 01 (MARCH 2022)

Plate 1-165 Guillemot survey 01 best fitting model scaled Pearsons residuals

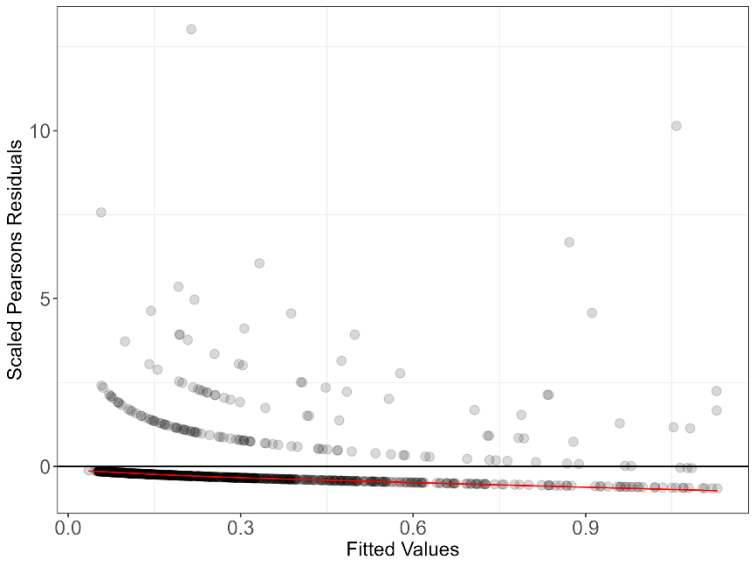


Plate 1-166 Guillemot survey 01 fitted versus observed

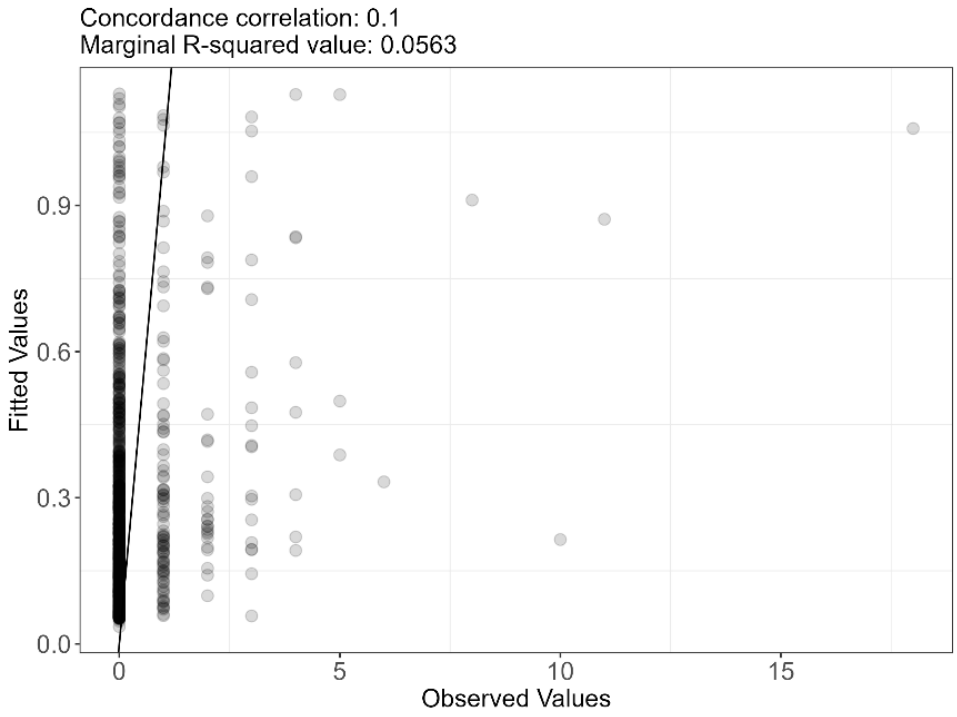


Plate 1-167 Guillemot survey 01 COVRATIO statistic

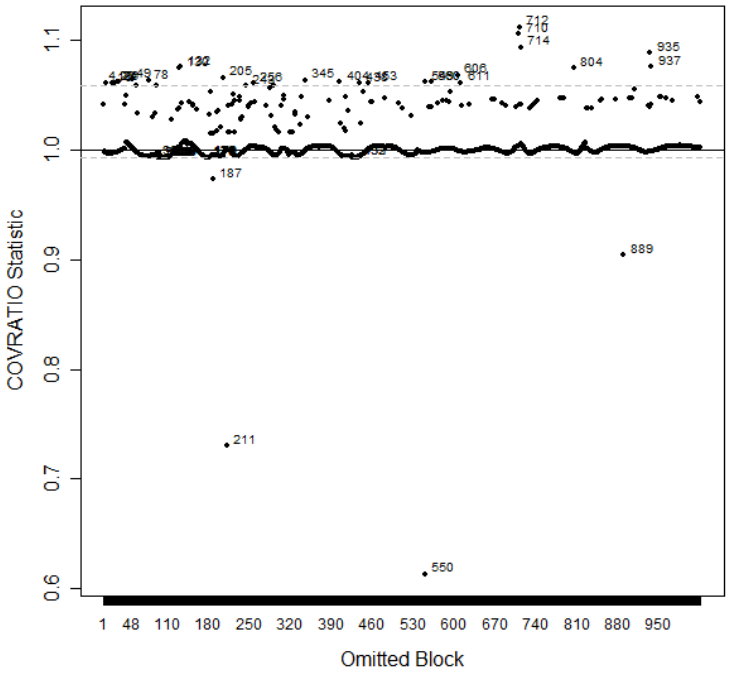


Plate 1-168 Guillemot survey 01 PRESS statistic

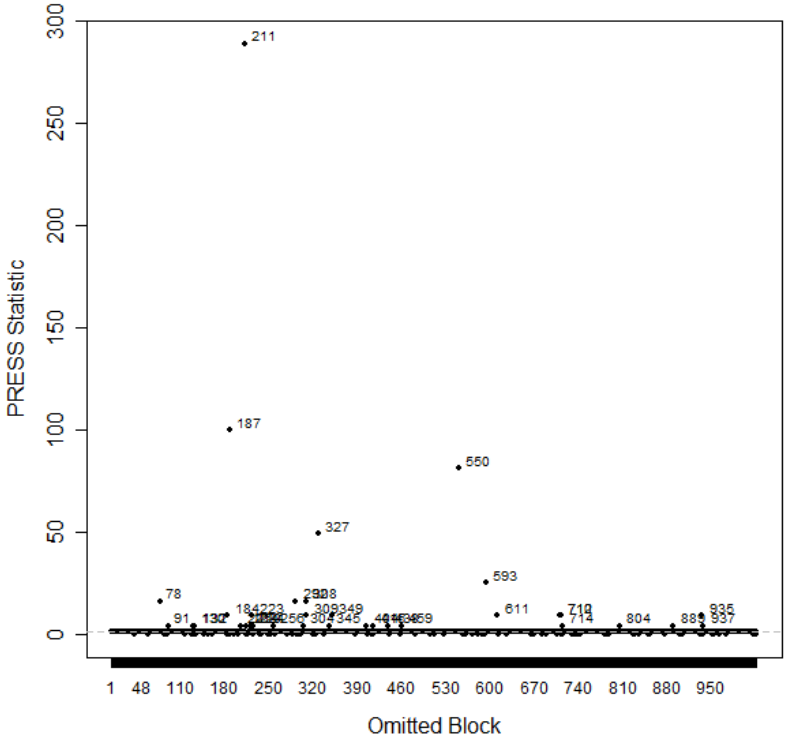
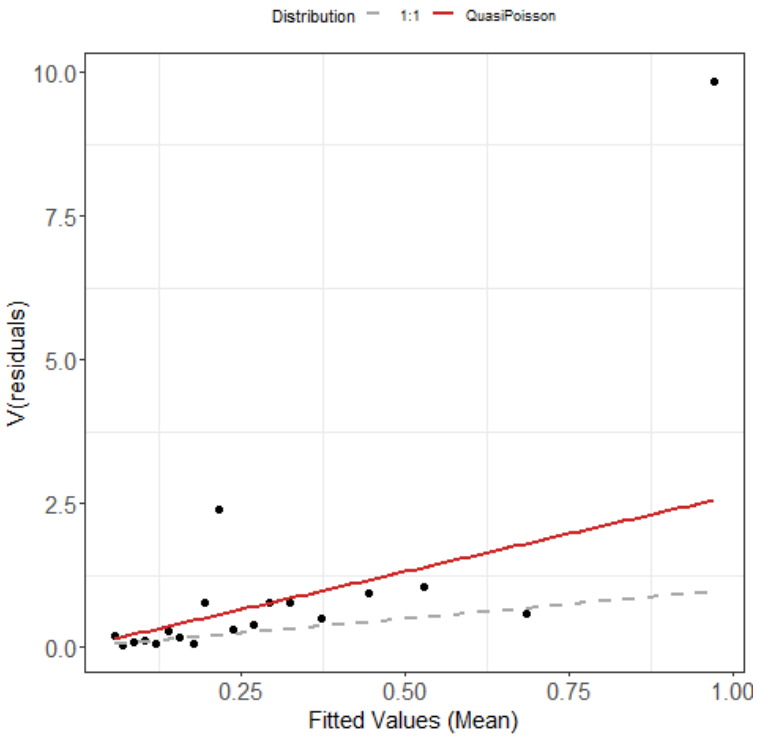


Plate 1-169 Guillemot survey 01 mean-variance relationship



1.4.2 SURVEY 02 (APRIL 2022)

Plate 1-170 Guillemot survey 02 best fitting model scaled Pearsons residuals

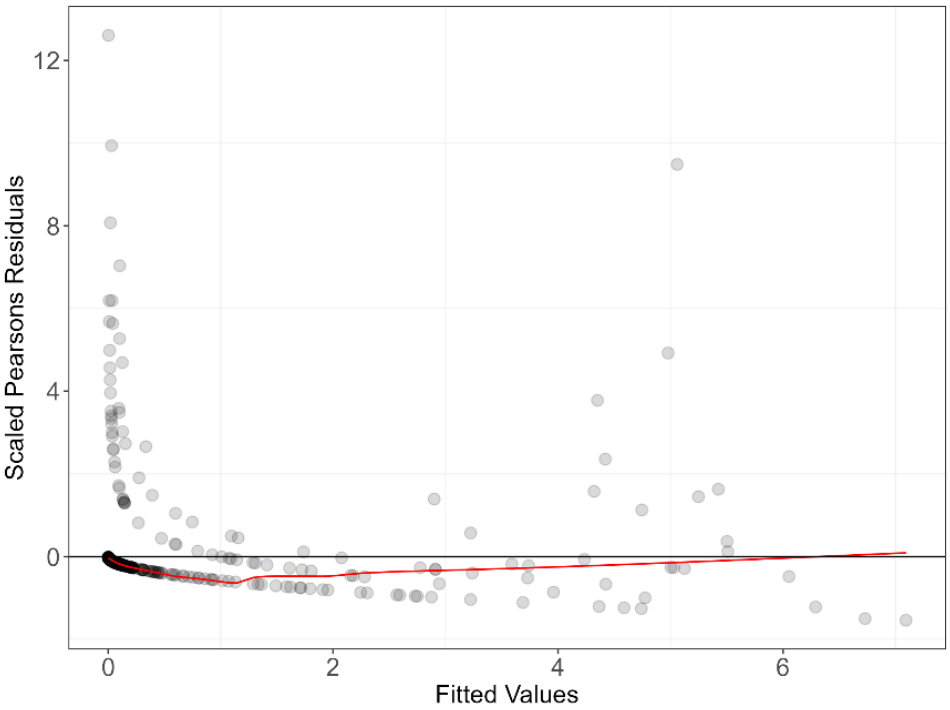


Plate 1-171 Guillemot survey 02 fitted versus observed

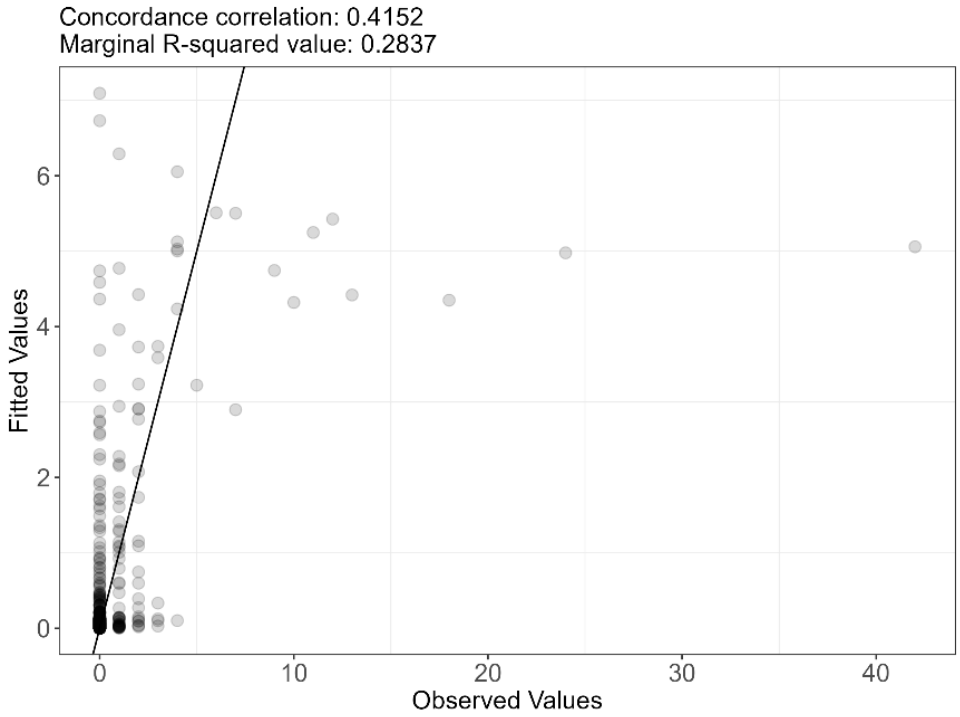


Plate 1-172 Guillemot survey 02 COVRATIO statistic

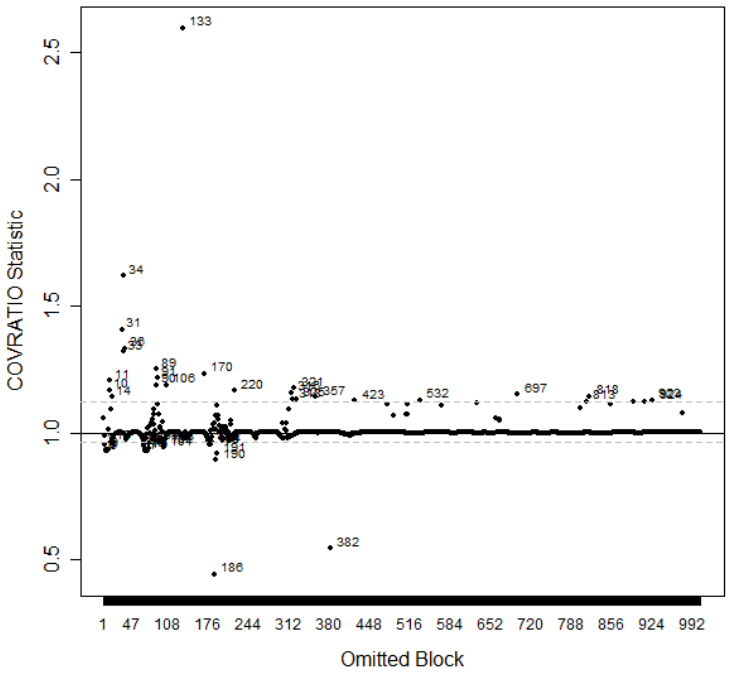


Plate 1-173 Guillemot survey 02 PRESS statistic

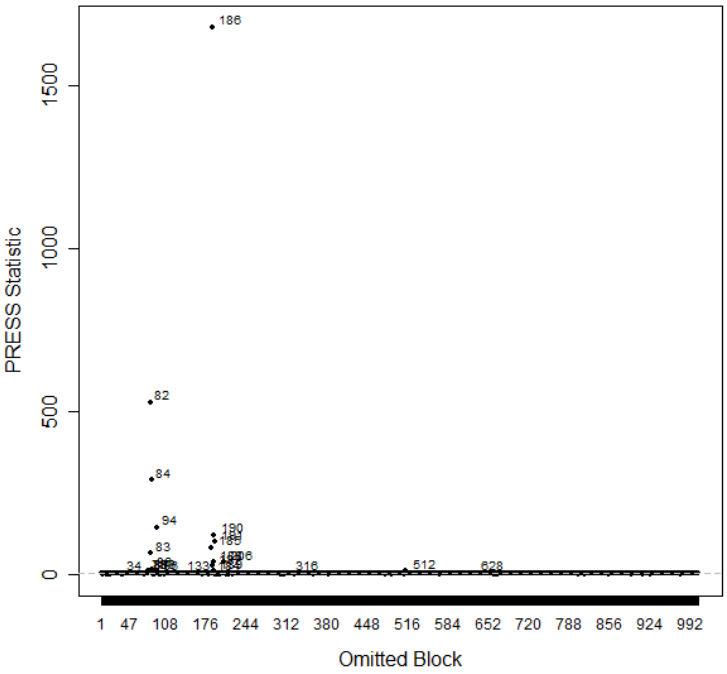
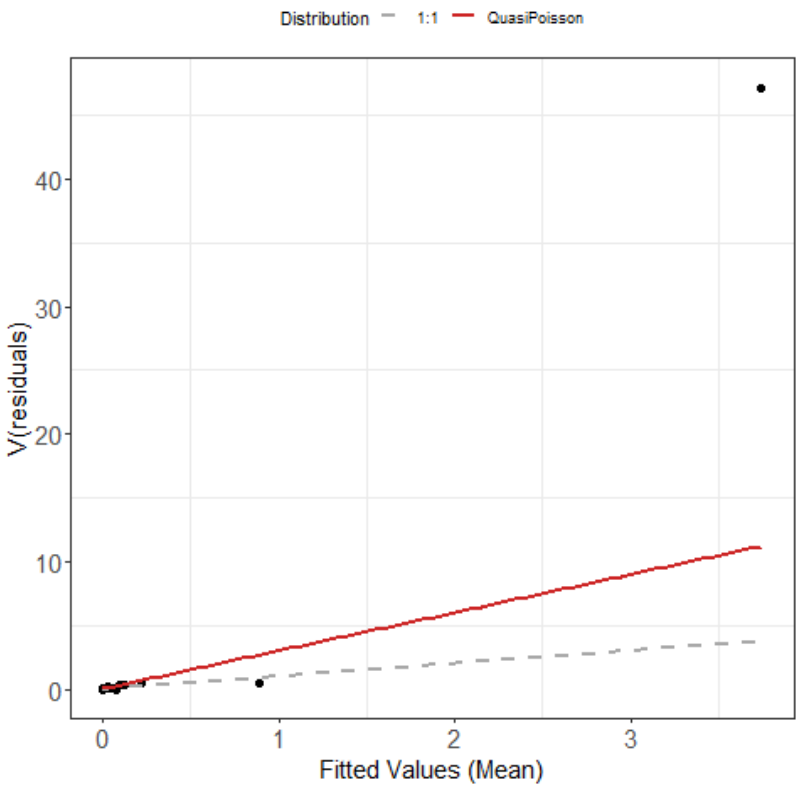


Plate 1-174 Guillemot survey 02 mean-variance relationship



1.4.3 SURVEY 03 (MAY 2022)

Plate 1-175 Guillemot survey 03 best fitting model scaled Pearsons residuals

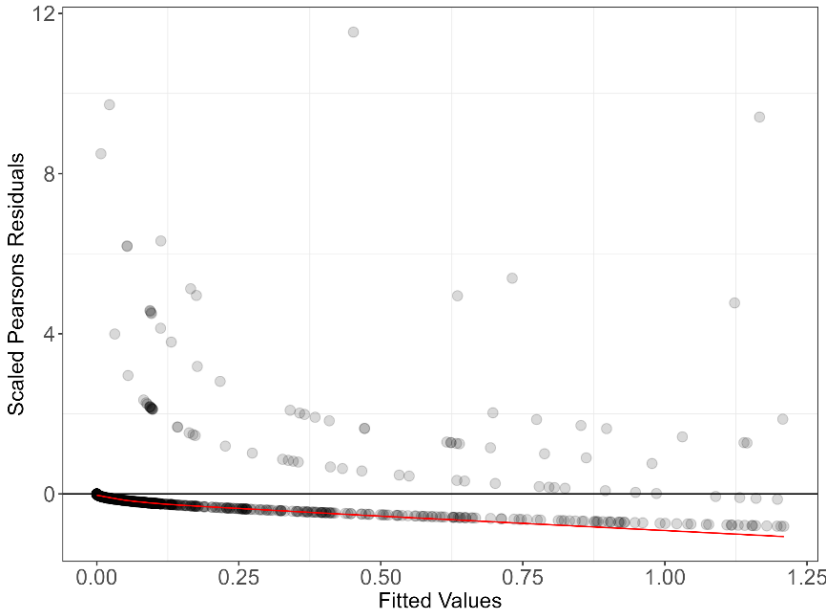


Plate 1-176 Guillemot survey 03 fitted versus observed

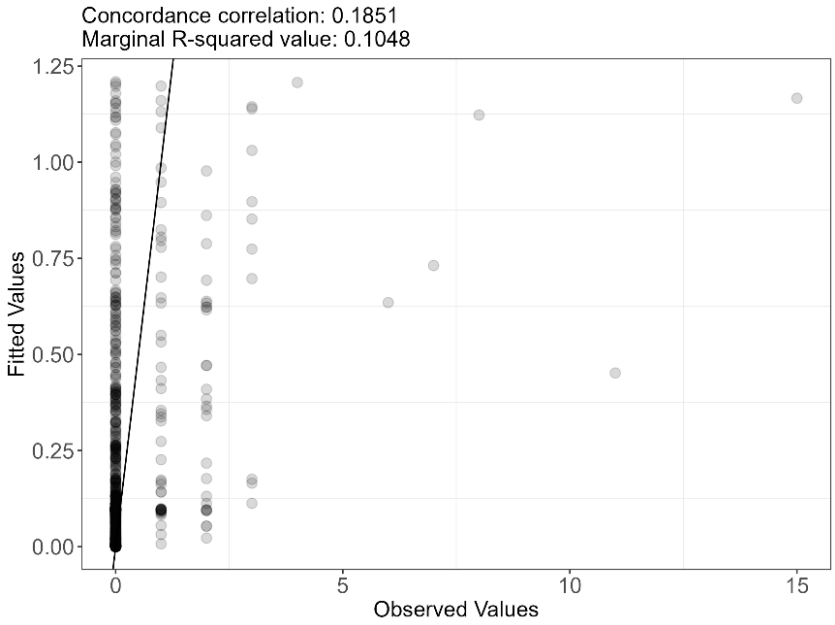


Plate 1-177 Guillemot survey 03 COVRATIO statistic

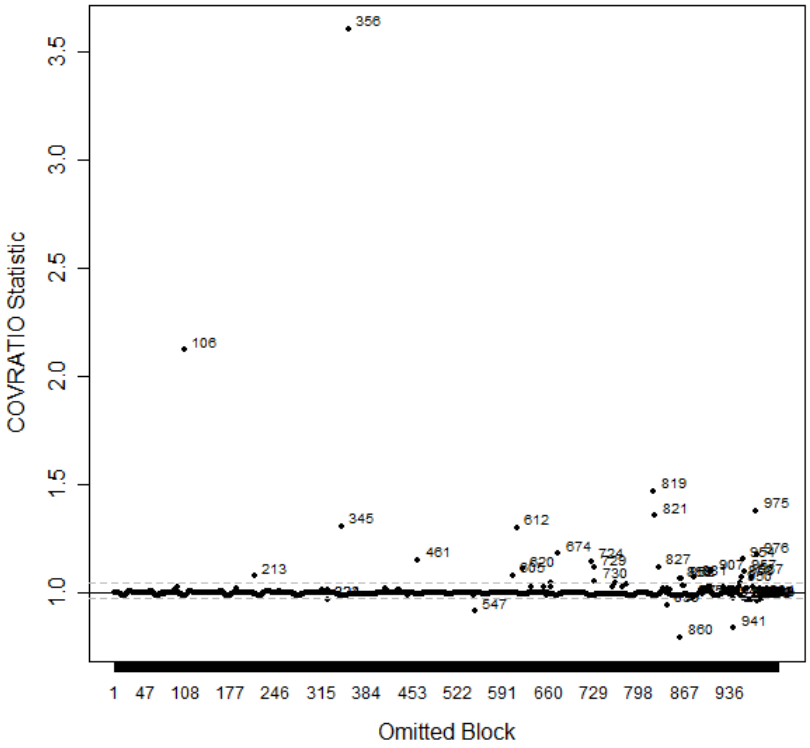


Plate 1-178 Guillemot survey 03 PRESS statistic

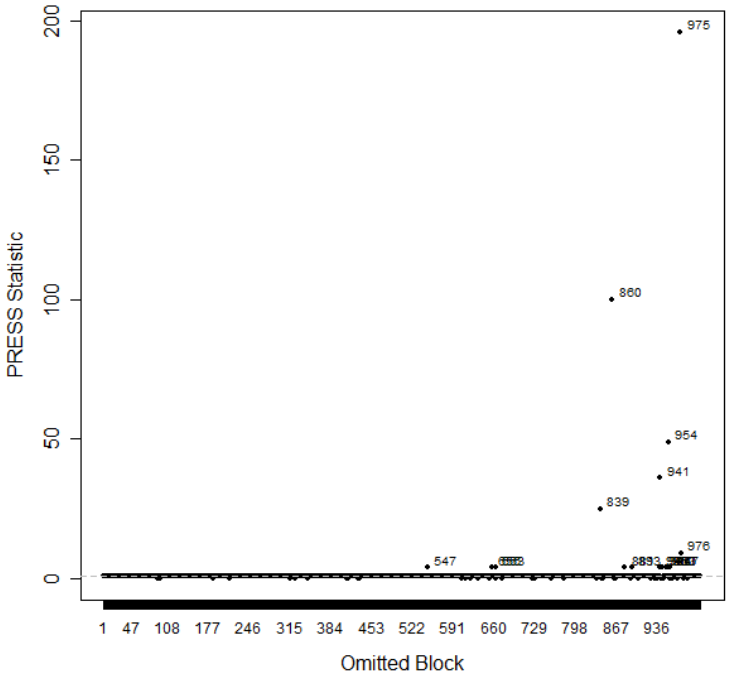
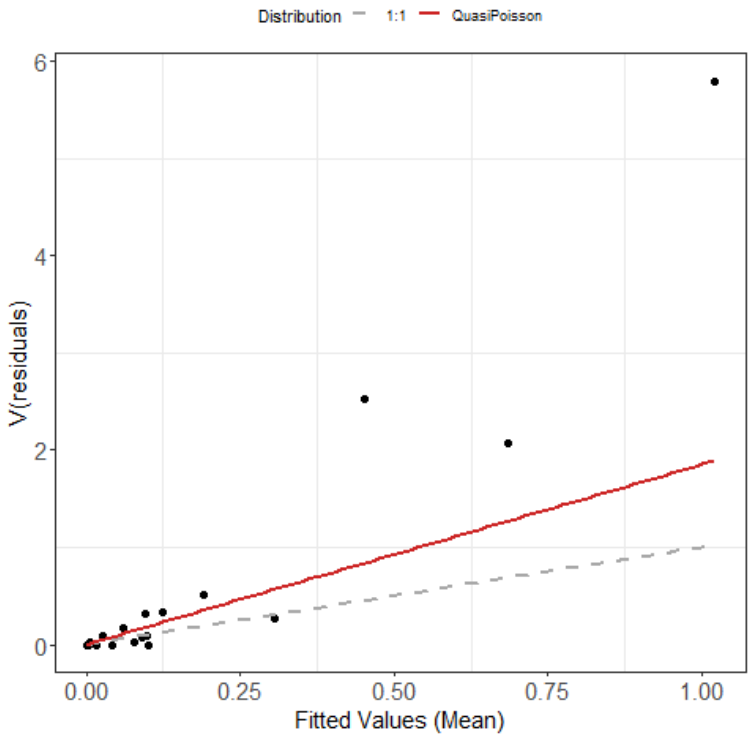


Plate 1-179 Guillemot survey 03 mean-variance relationship



1.4.4 SURVEY 04 (JUNE 2022)

Plate 1-180 Guillemot survey 04 best fitting model scaled Pearsons residuals

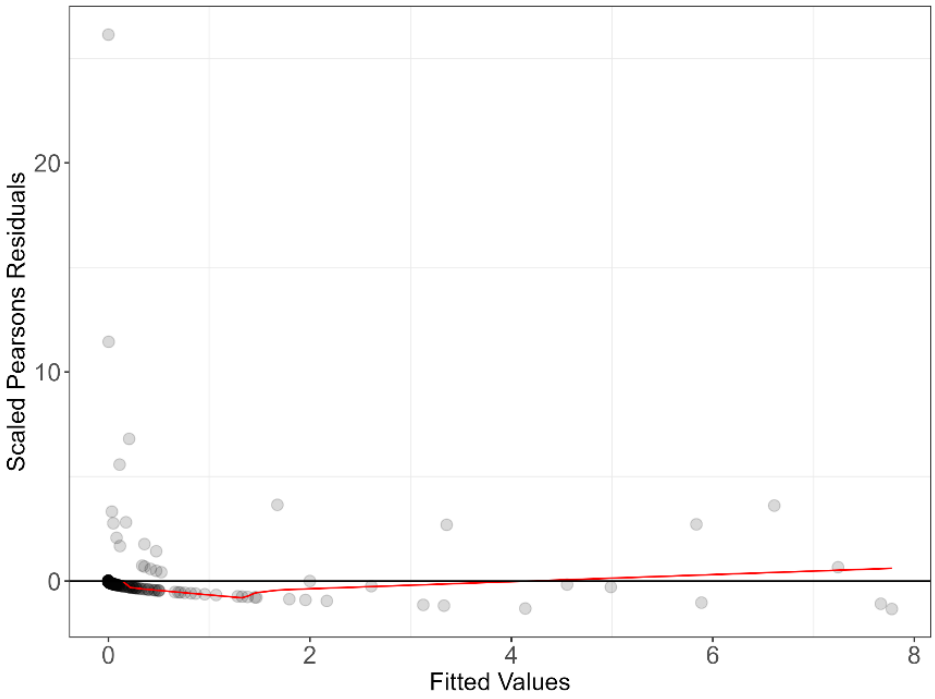


Plate 1-181 Guillemot survey 04 fitted versus observed

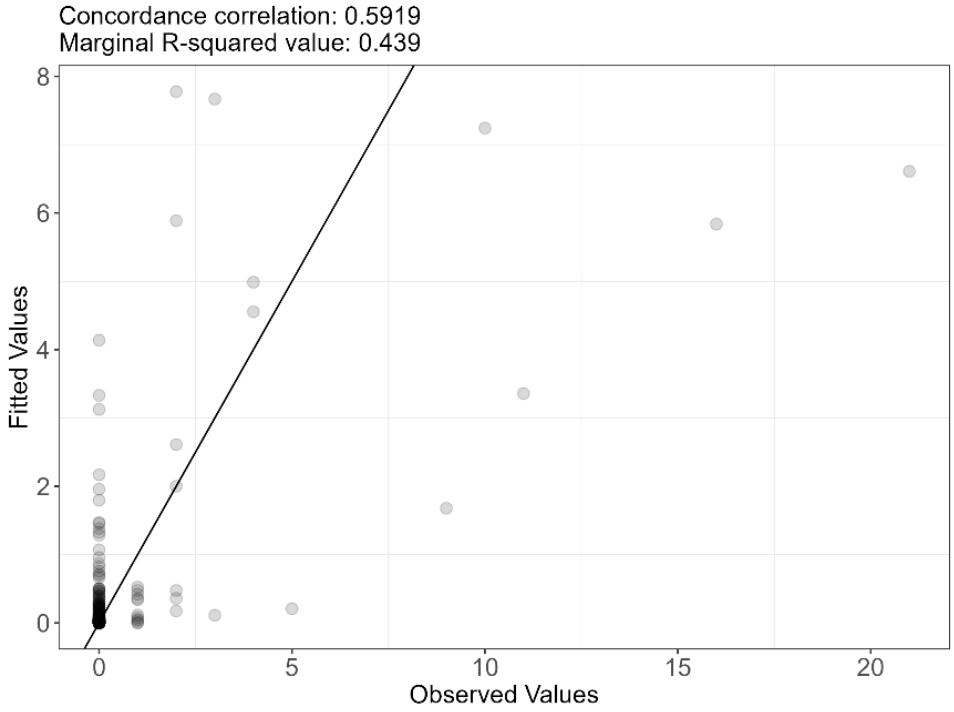


Plate 1-182 Guillemot survey 04 COVRATIO statistic

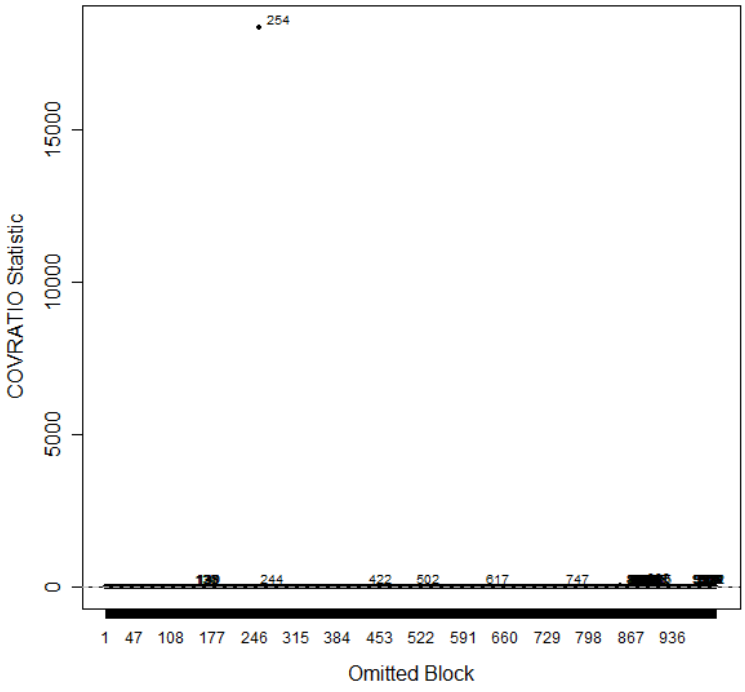


Plate 1-183 Guillemot survey 04 PRESS statistic

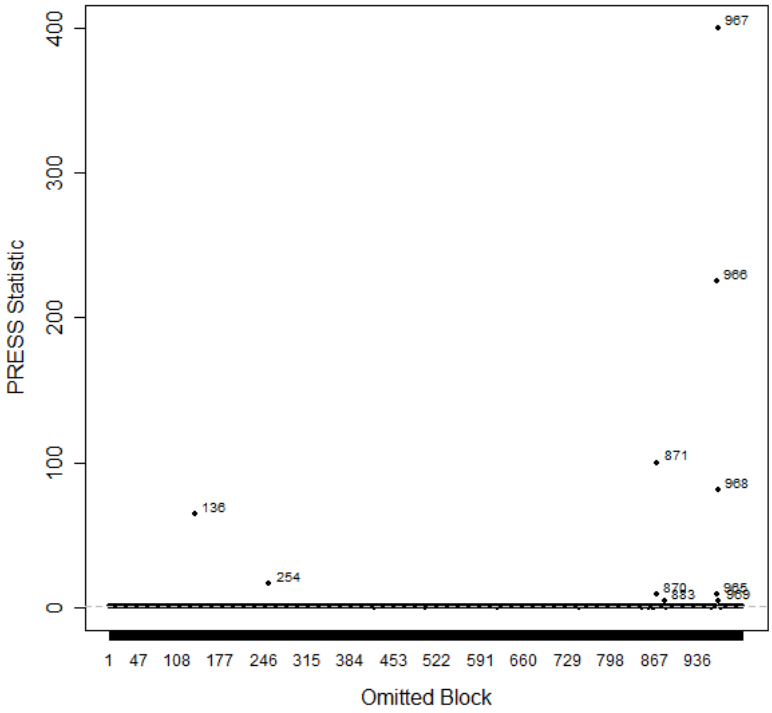
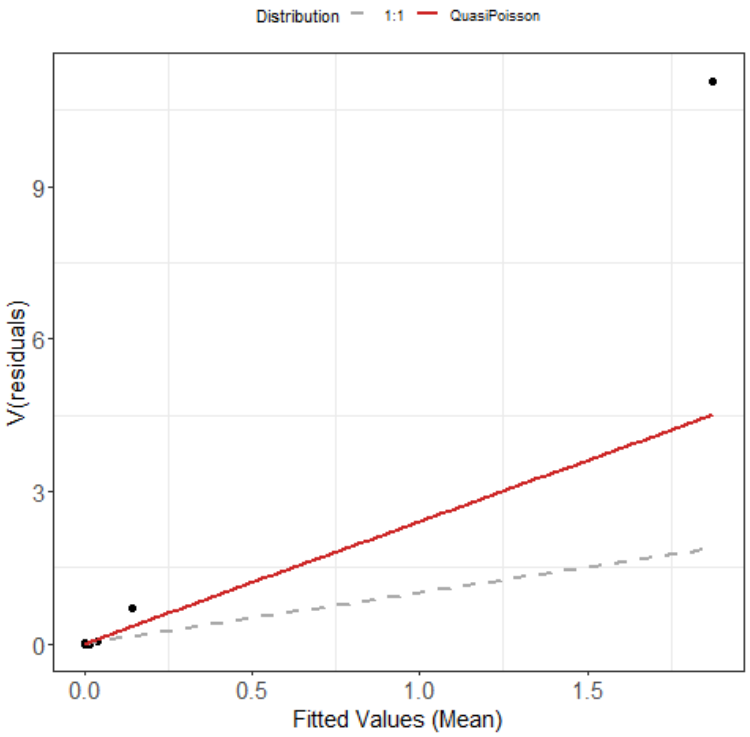


Plate 1-184 Guillemot survey 04 mean-variance relationship



1.4.5 SURVEY 05 (JULY 2022)

Plate 1-185 Guillemot survey 05 best fitting model scaled Pearsons residuals

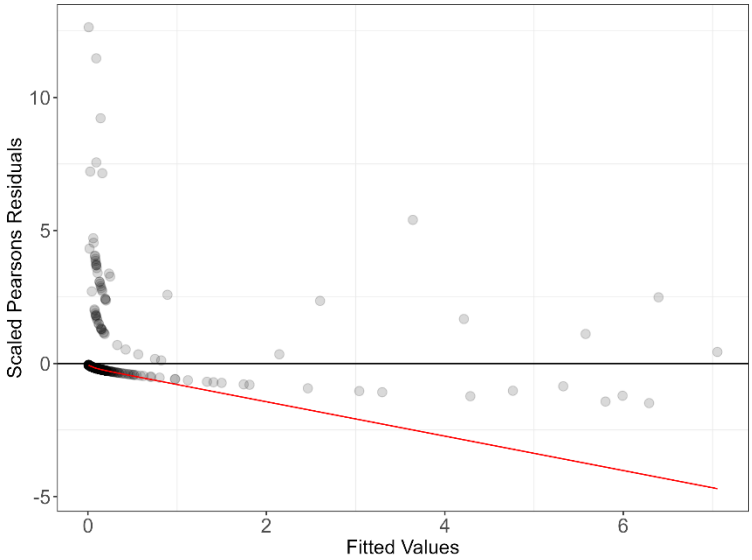


Plate 1-186 Guillemot survey 05 fitted versus observed

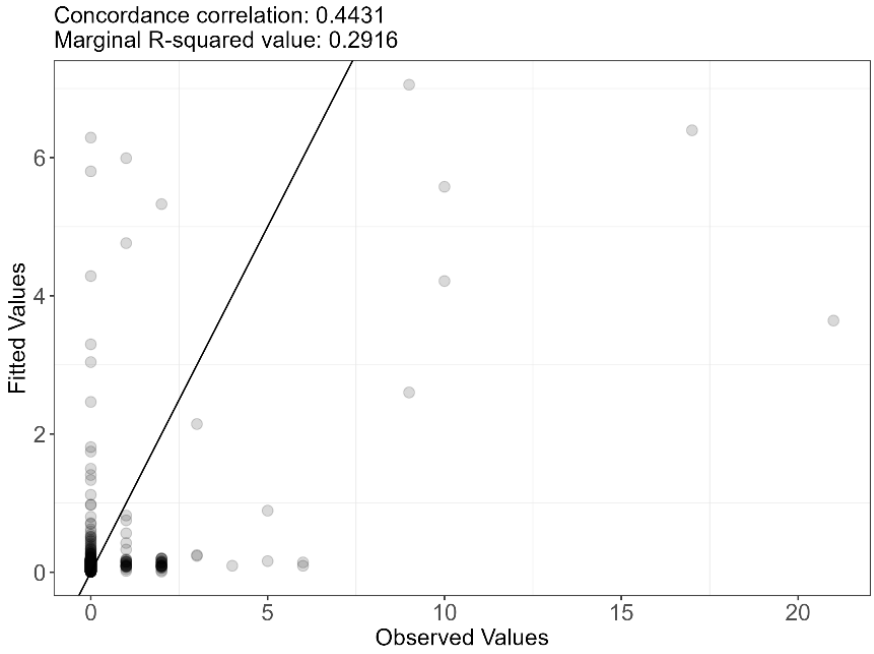


Plate 1-187 Guillemot survey 05 COVRATIO statistic

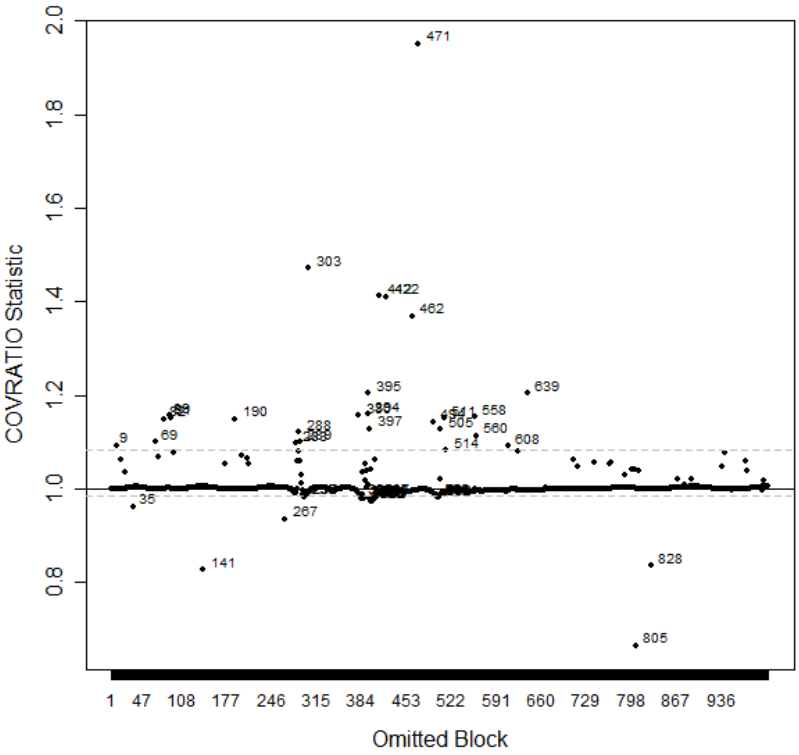


Plate 1-188 Guillemot survey 05 PRESS statistic

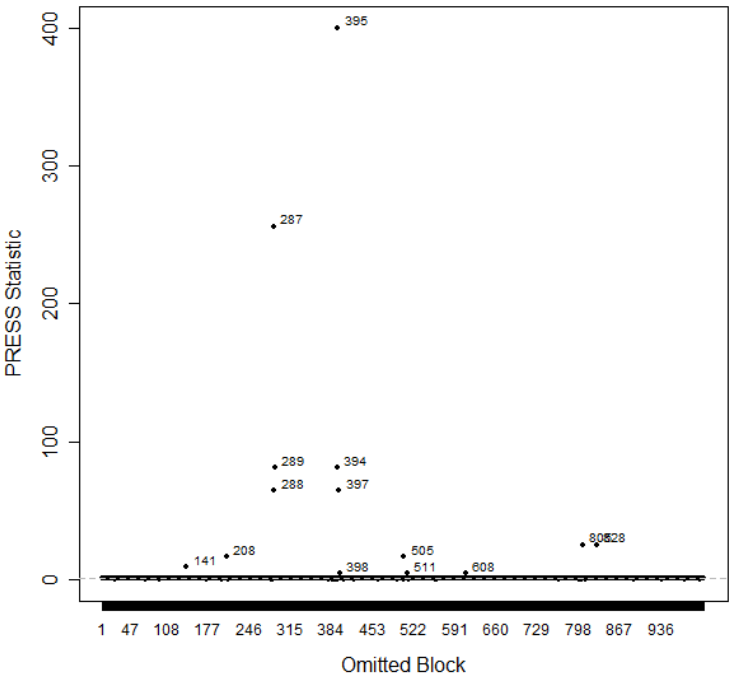
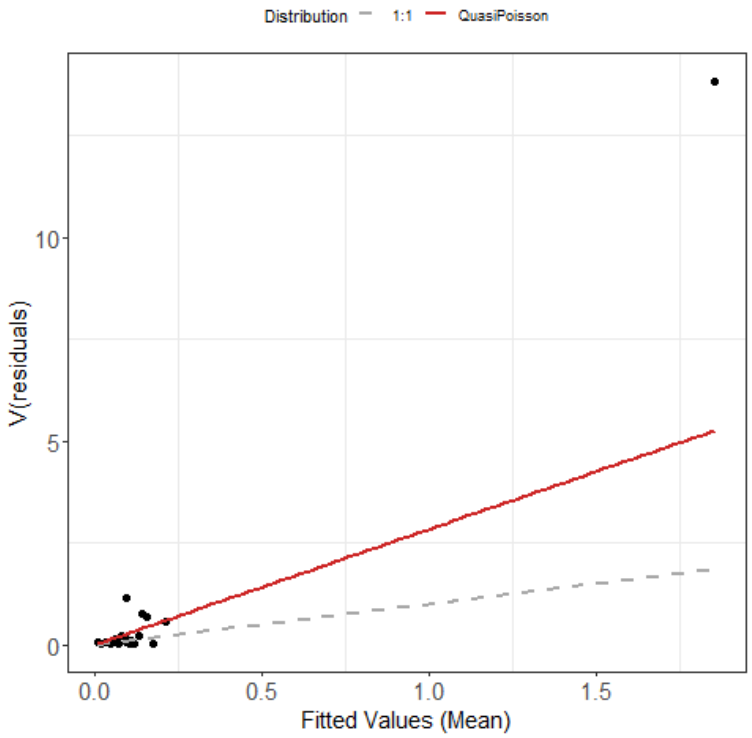


Plate 1-189 Guillemot survey 05 mean-variance relationship



1.4.6 SURVEY 06 (AUGUST 2022)

Plate 1-190 Guillemot survey 06 best fitting model scaled Pearsons residuals

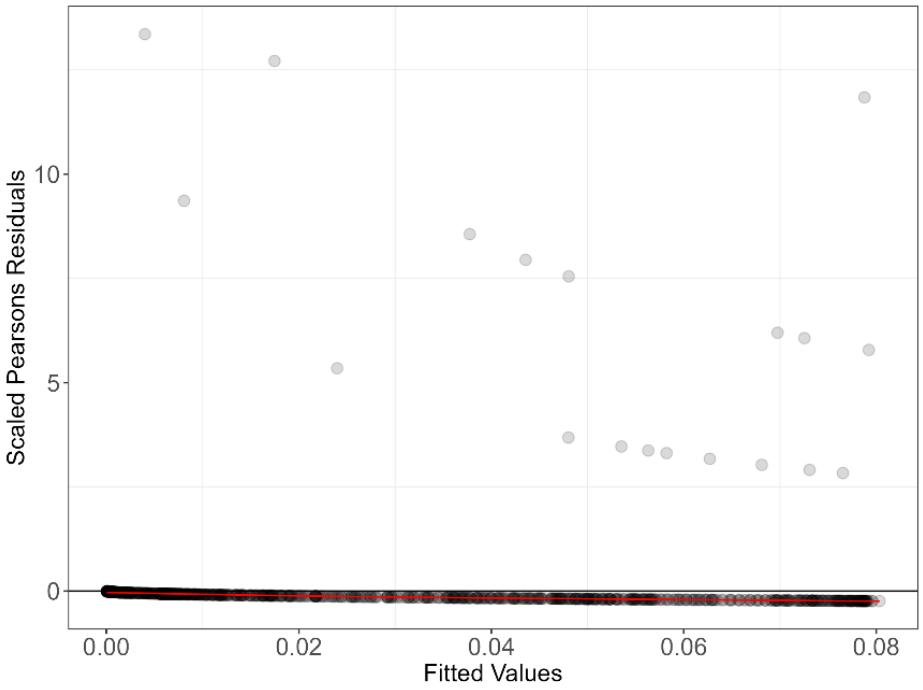


Plate 1-191 Guillemot survey 06 fitted versus observed

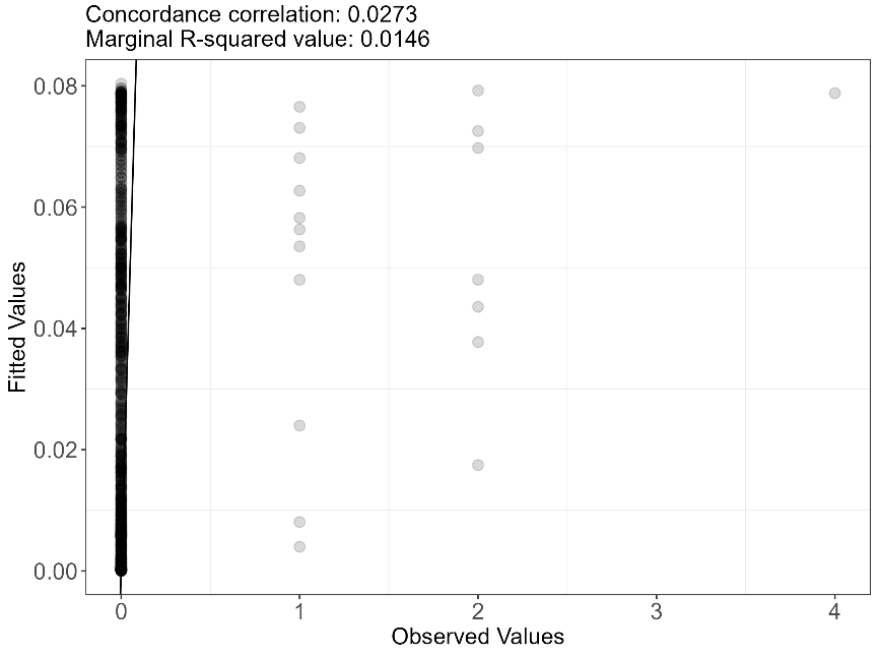


Plate 1-192 Guillemot survey 06 COVRATIO statistic

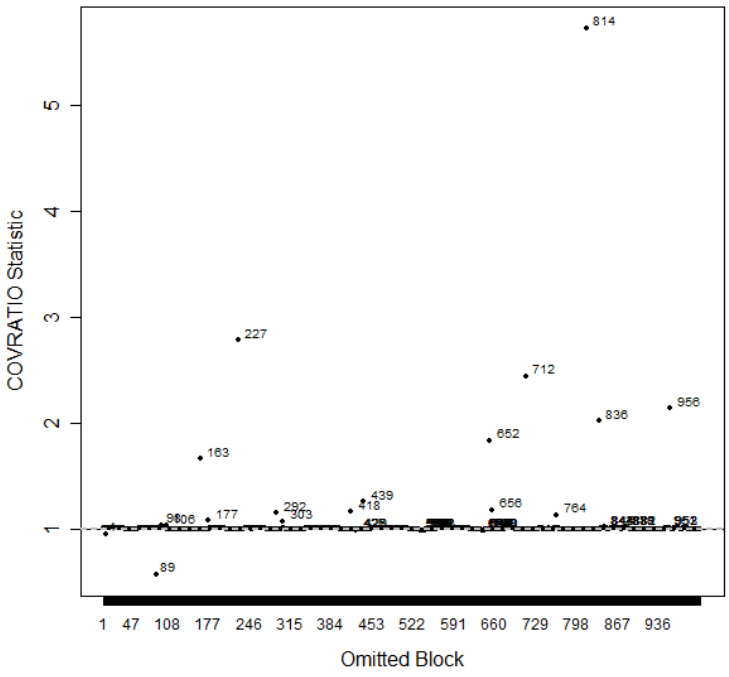


Plate 1-193 Guillemot survey 06 PRESS statistic

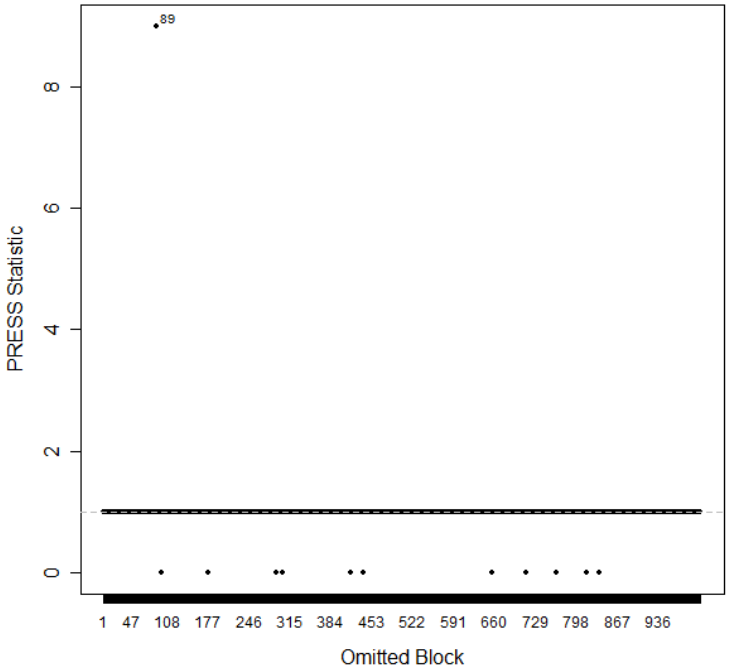
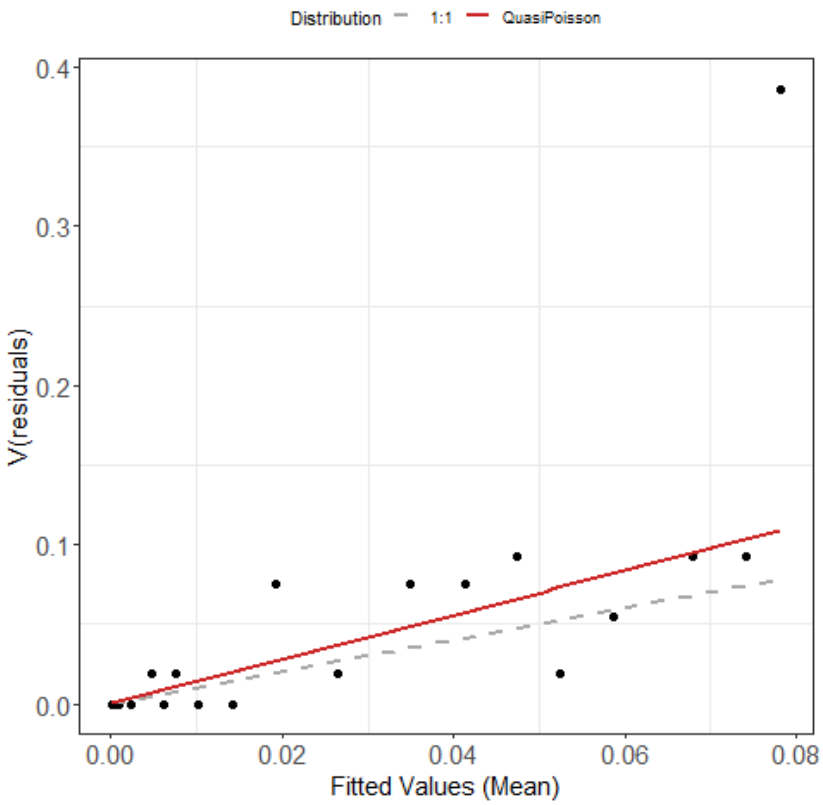


Plate 1-194 Guillemot survey 06 mean-variance relationship



1.4.7 SURVEY 07 (SEPTEMBER 2022)

Plate 1-195 Guillemot survey 07 best fitting model scaled Pearsons residuals

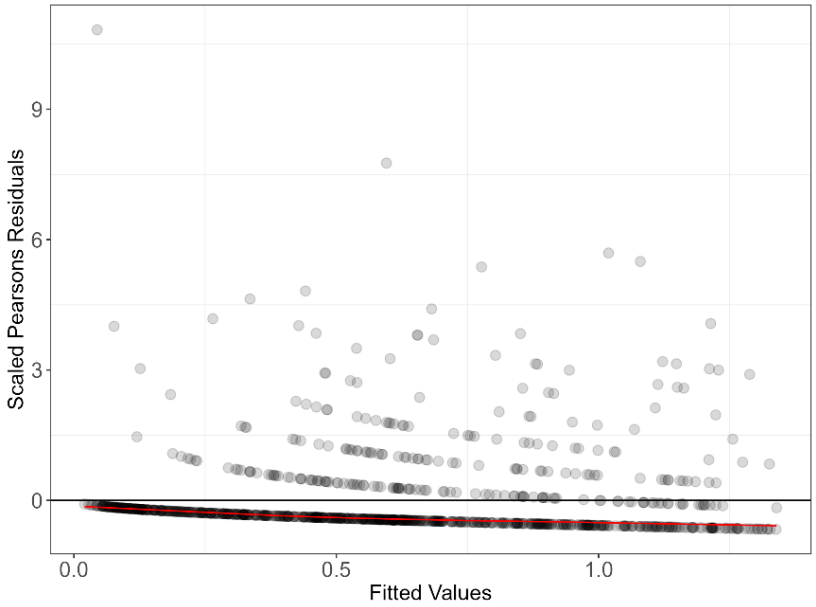


Plate 1-196 Guillemot survey 07 fitted versus observed

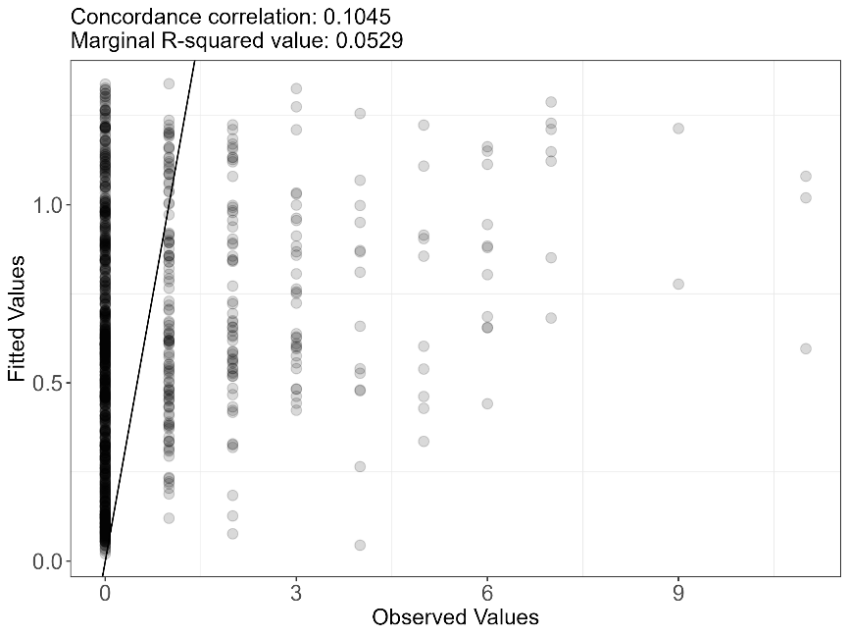


Plate 1-197 Guillemot survey 07 COVRATIO statistic

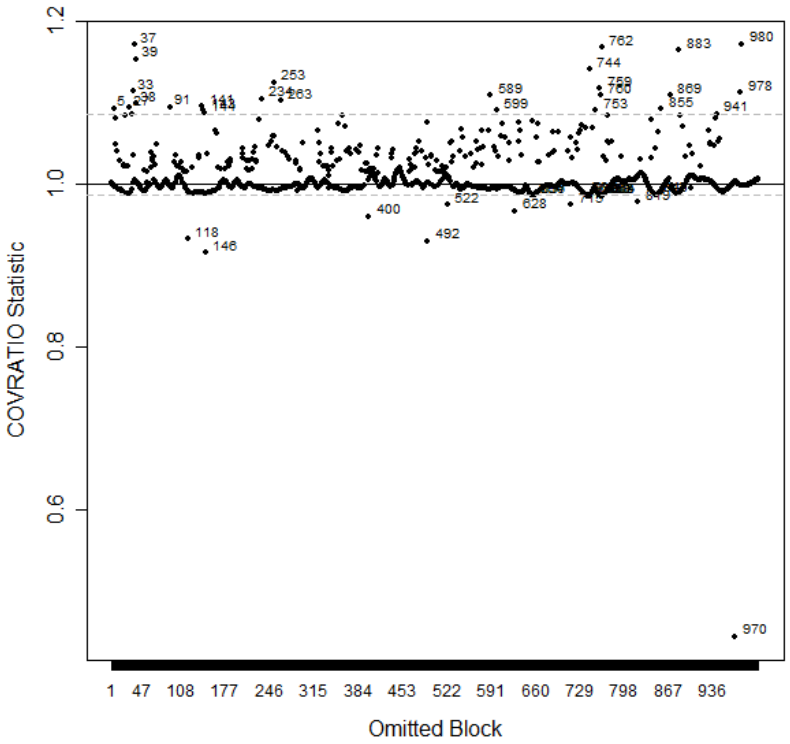


Plate 1-198 Guillemot survey 07 PRESS statistic

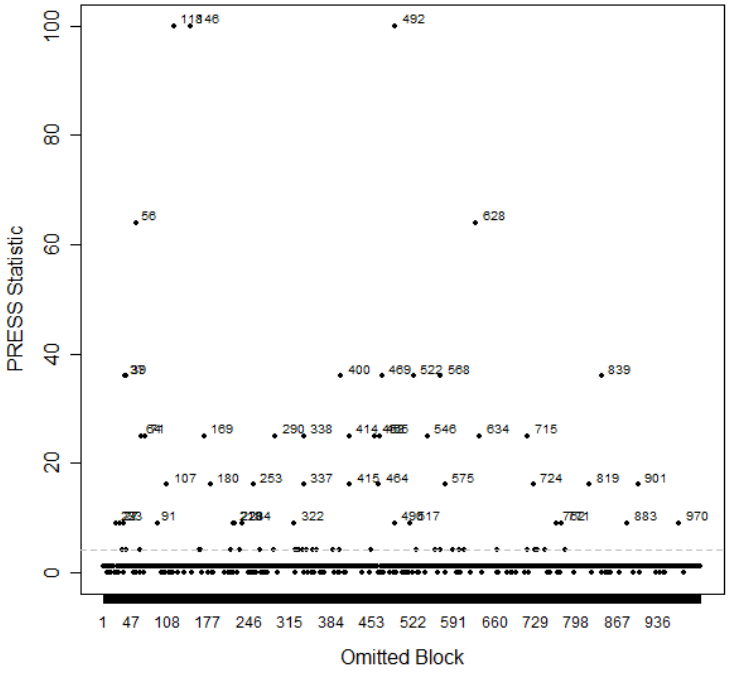
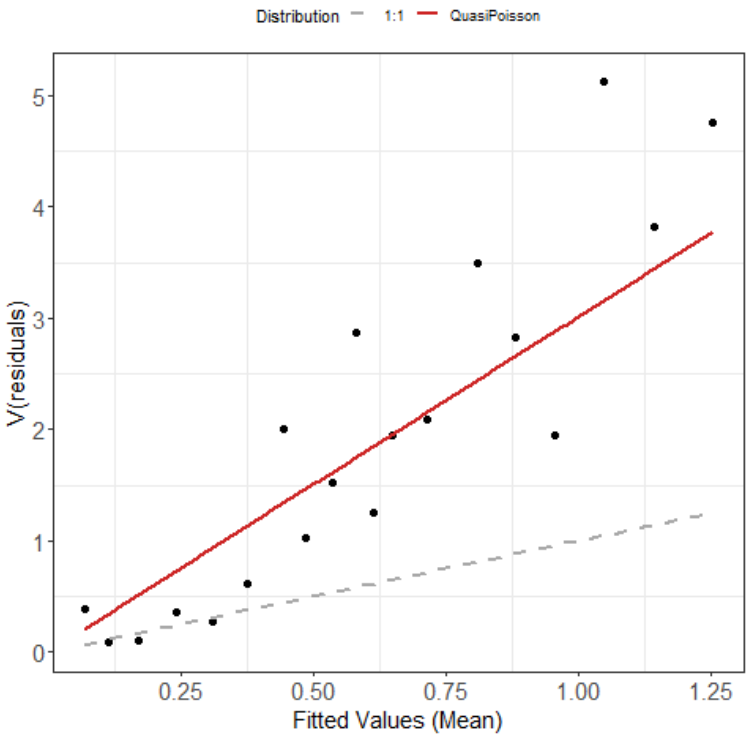


Plate 1-199 Guillemot survey 07 mean-variance relationship



1.4.8 SURVEY 08 (OCTOBER 2022)

Plate 1-200 Guillemot survey 08 best fitting model scaled Pearsons residuals

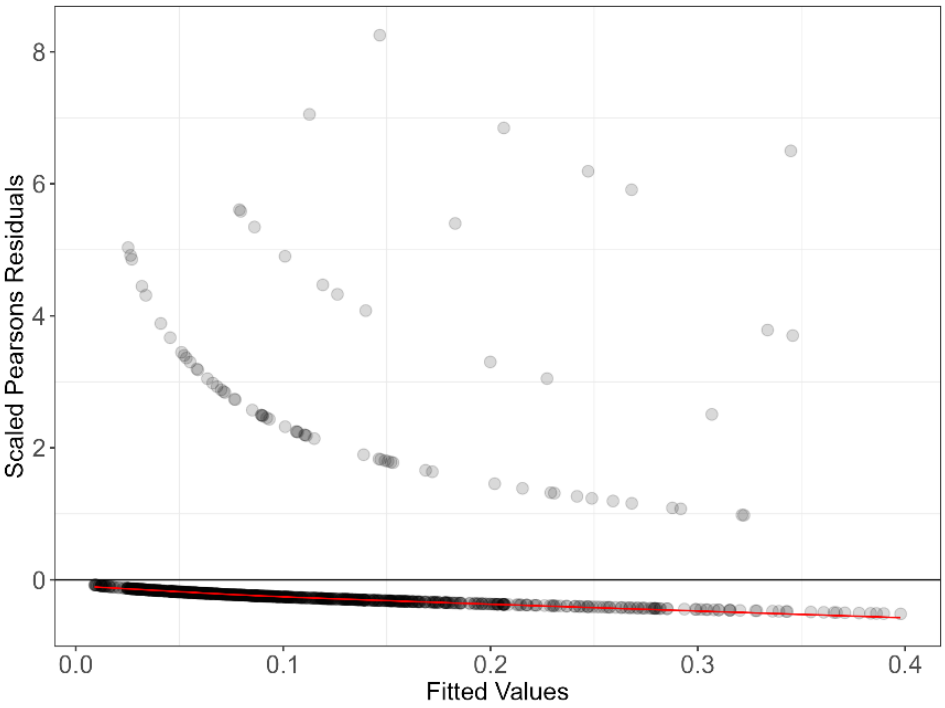


Plate 1-201 Guillemot survey 08 fitted versus observed

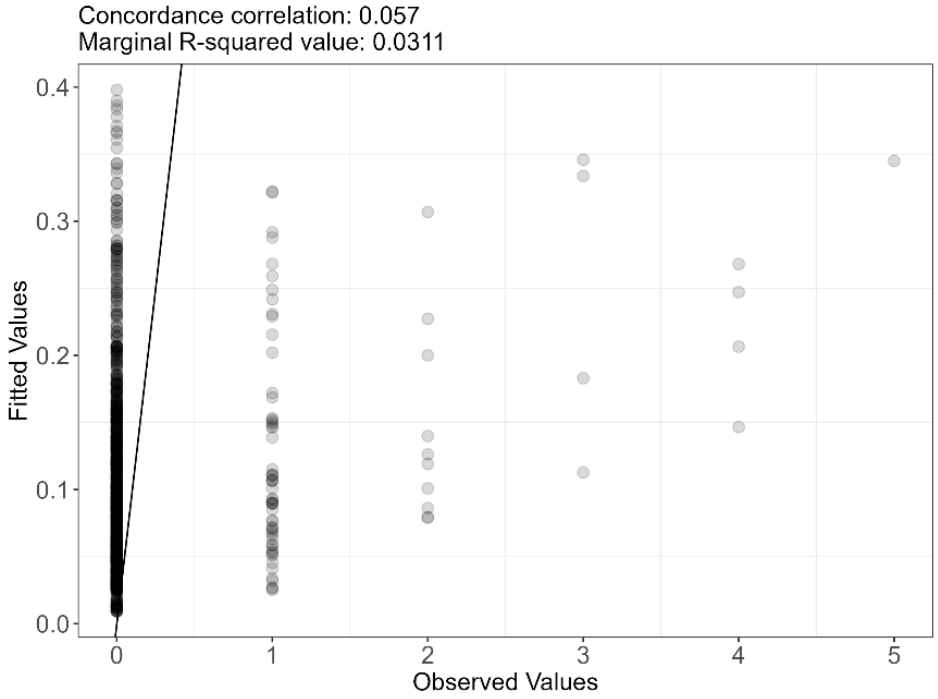


Plate 1-202 Guillemot survey 08 COVRATIO statistic

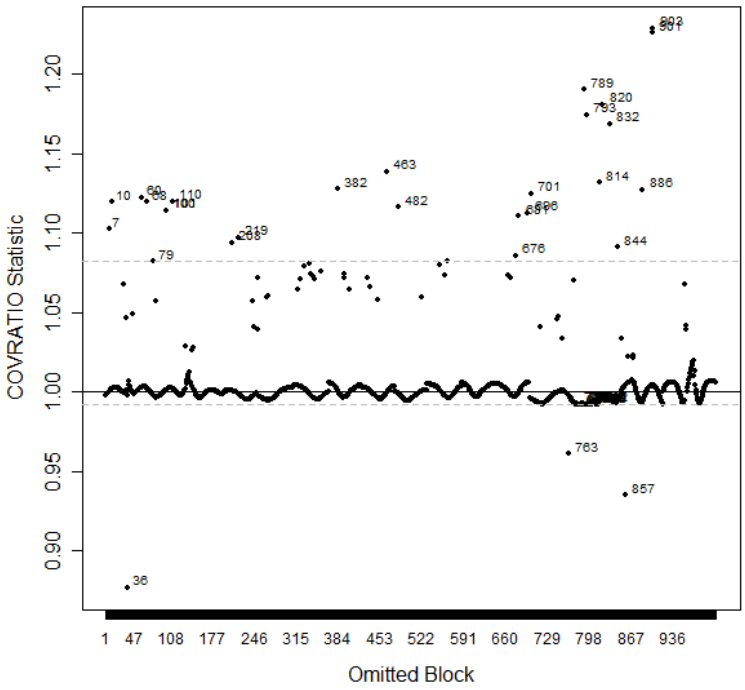


Plate 1-203 Guillemot survey 08 PRESS statistic

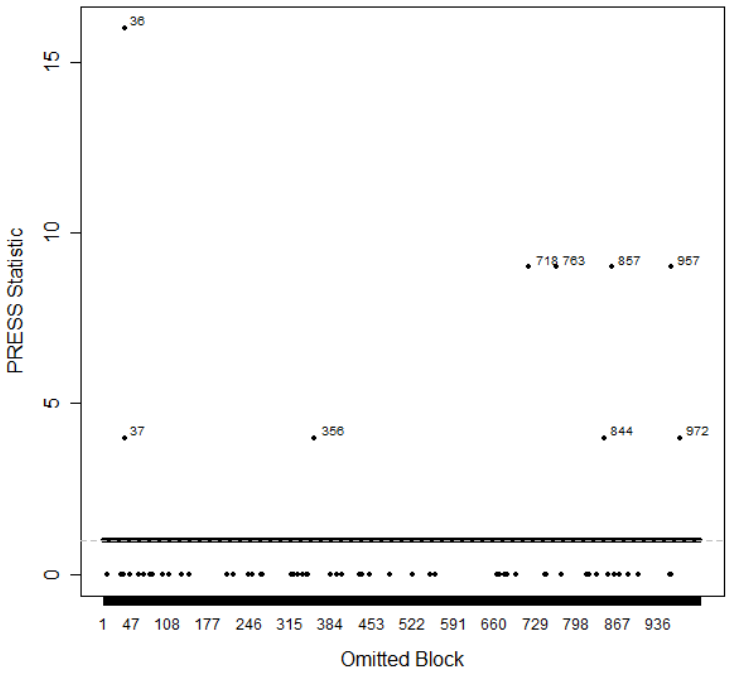
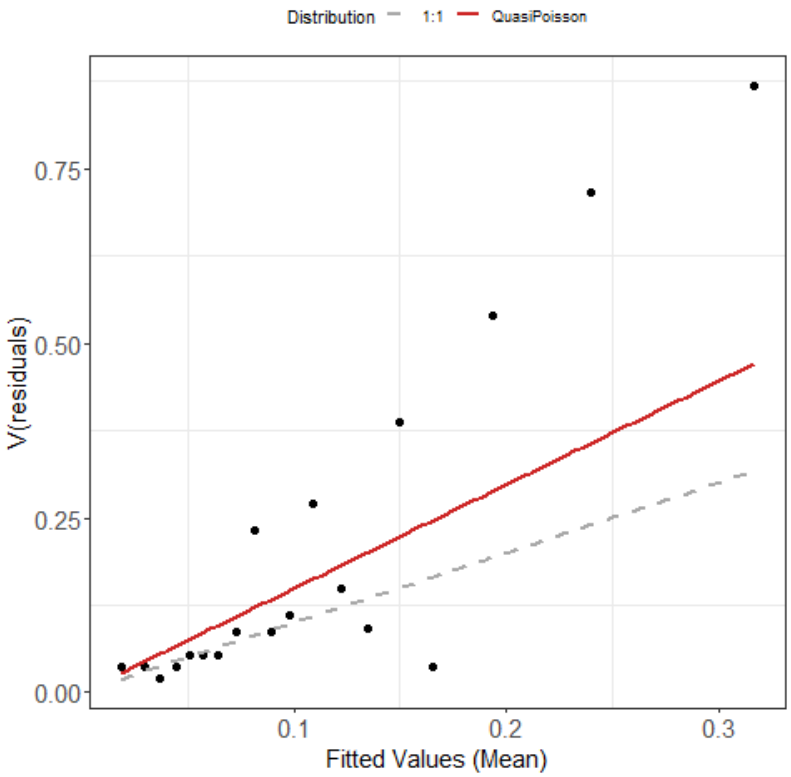


Plate 1-204 Guillemot survey 08 mean-variance relationship



1.4.9 SURVEY 09 (NOVEMBER 2022)

Plate 1-205 Guillemot survey 09 best fitting model scaled Pearsons residuals

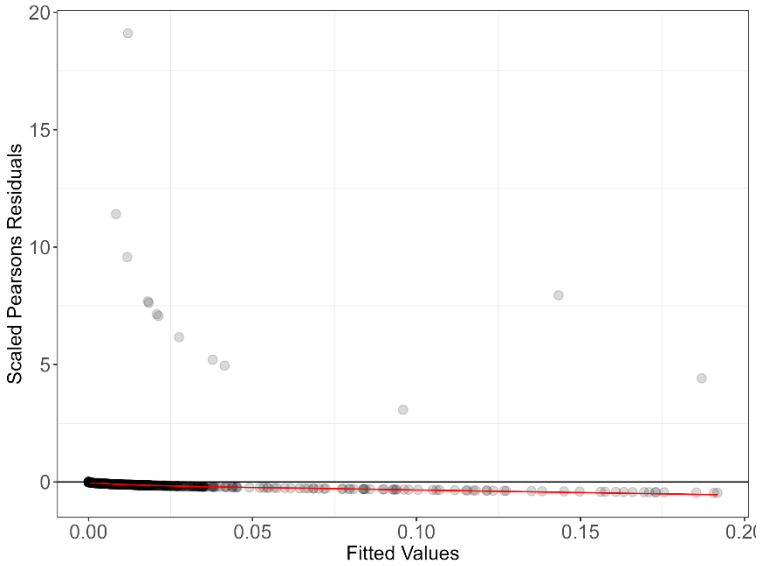


Plate 1-206 Guillemot survey 09 fitted versus observed

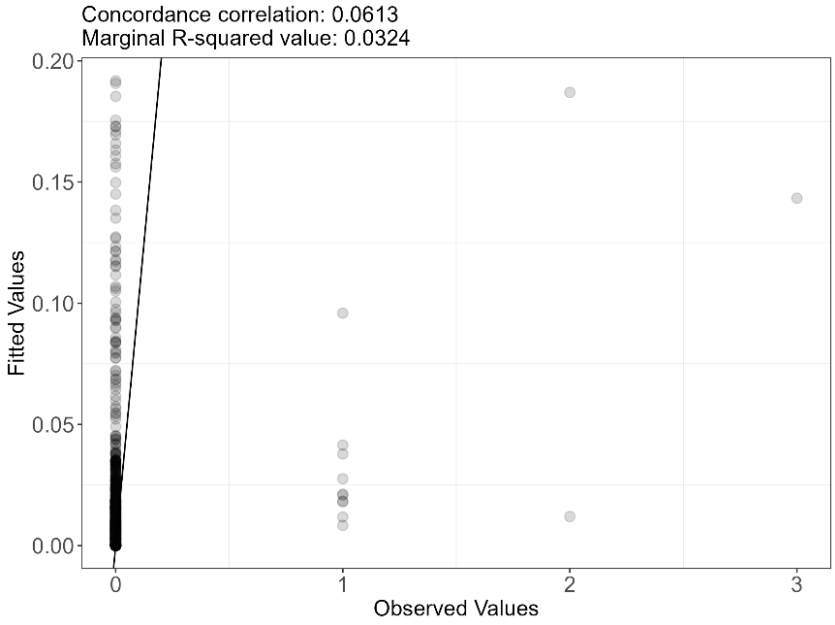


Plate 1-207 Guillemot survey 09 COVRATIO statistic

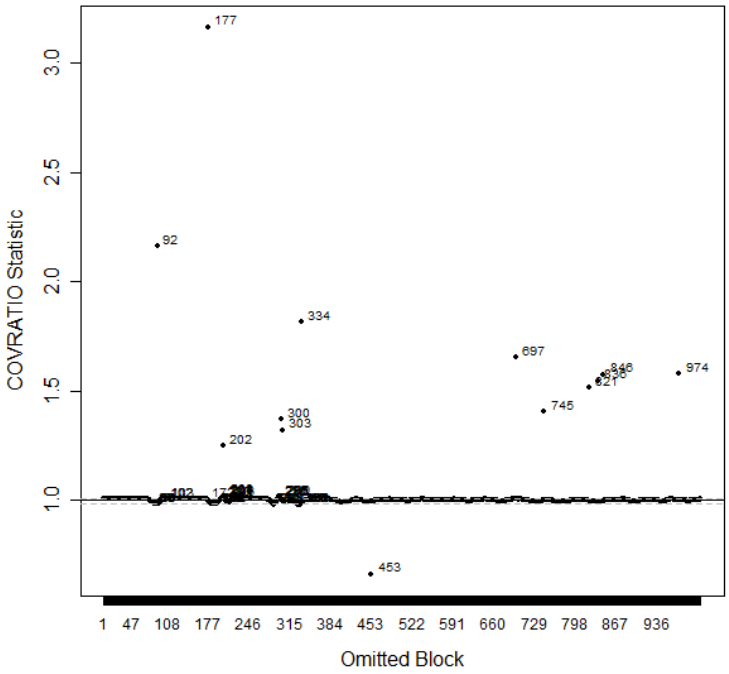


Plate 1-208 Guillemot survey 09 PRESS statistic

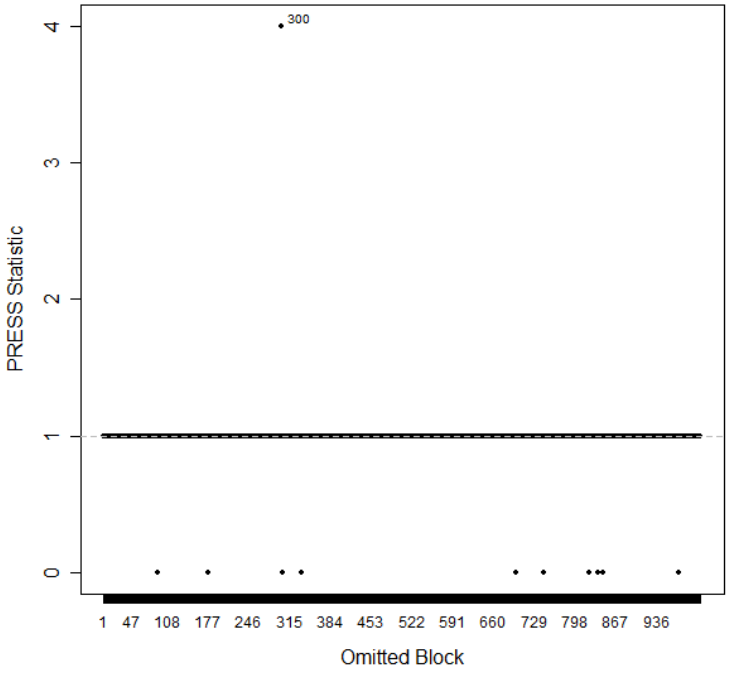
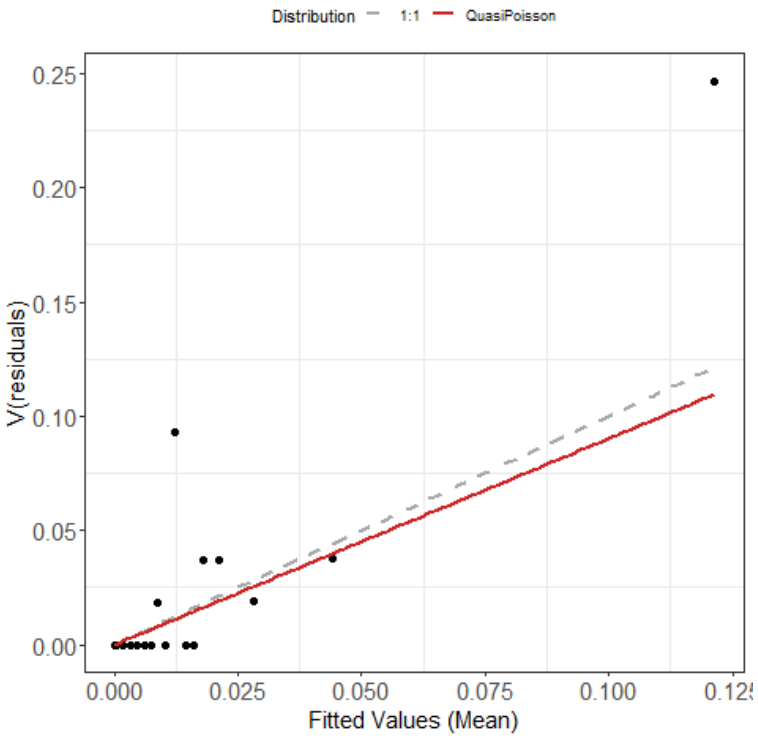


Plate 1-209 Guillemot survey 09 mean-variance relationship



1.4.10 SURVEY 10 (DECEMBER 2022)

Plate 1-210 Guillemot survey 10 best fitting model scaled Pearsons residuals

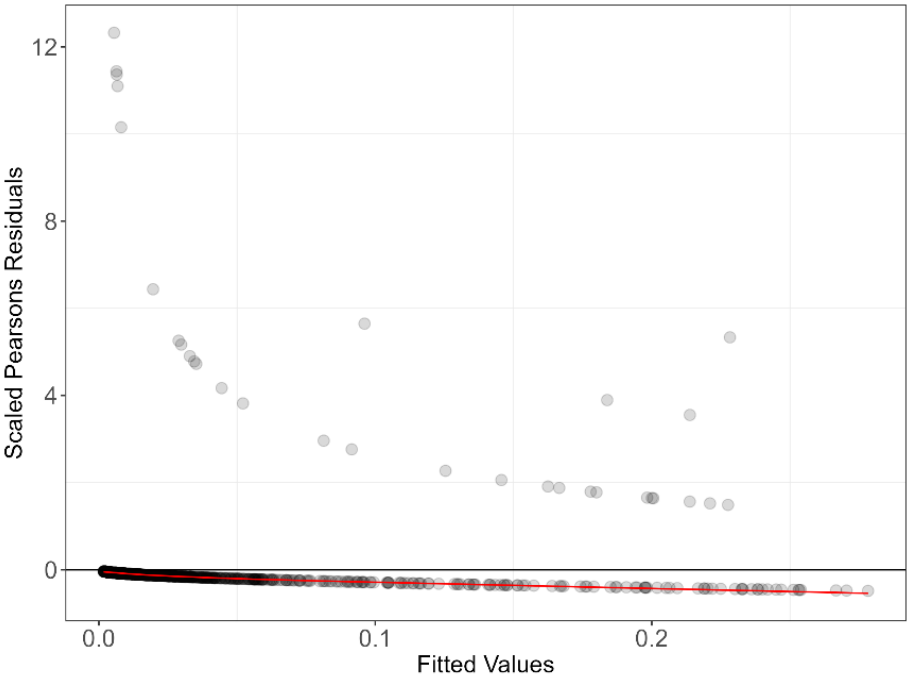


Plate 1-211 Guillemot survey 10 fitted versus observed

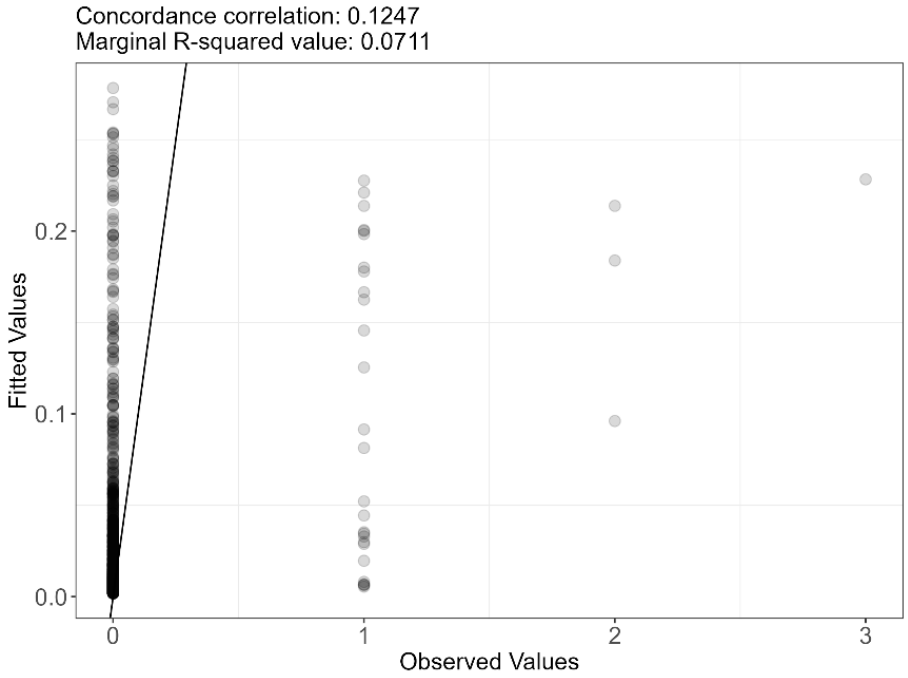


Plate 1-212 Guillemot survey 10 COVRATIO statistic

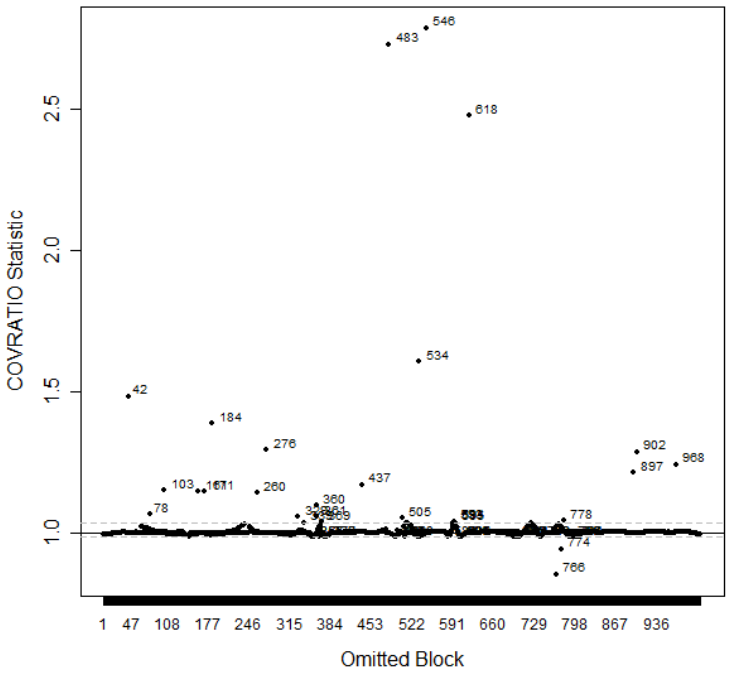


Plate 1-213 Guillemot survey 10 PRESS statistic

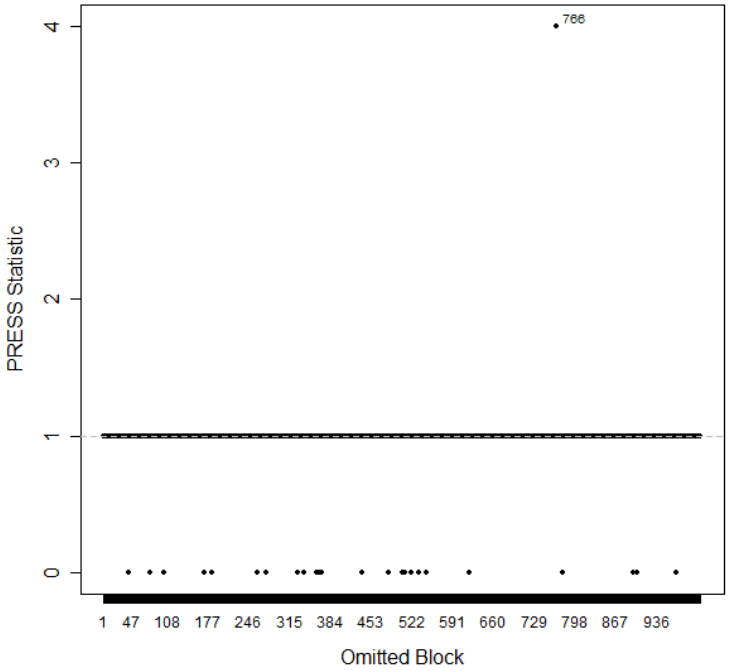
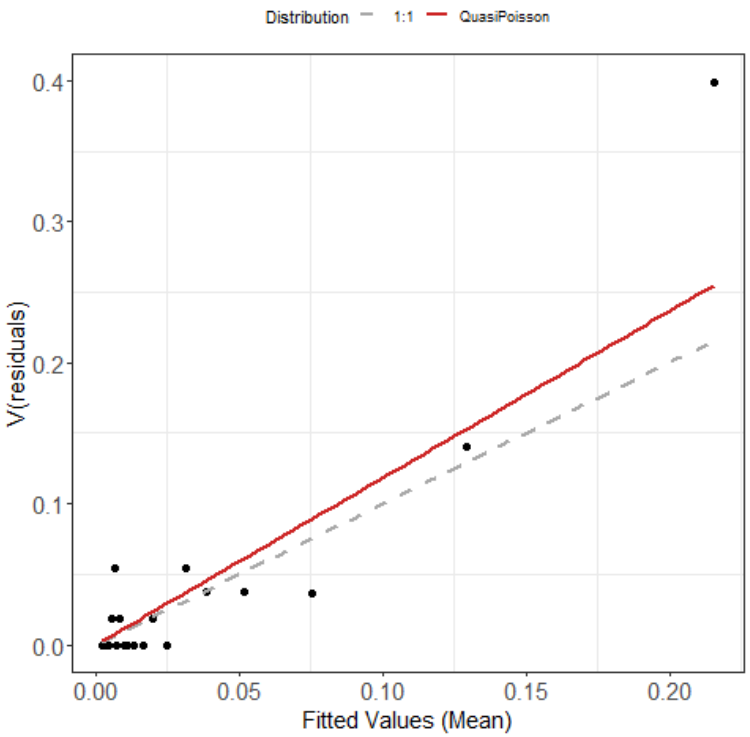


Plate 1-214 Guillemot survey 10 mean-variance relationship



1.4.11 SURVEY 11 (JANUARY 2023)

Plate 1-215 Guillemot survey 11 best fitting model scaled Pearsons residuals

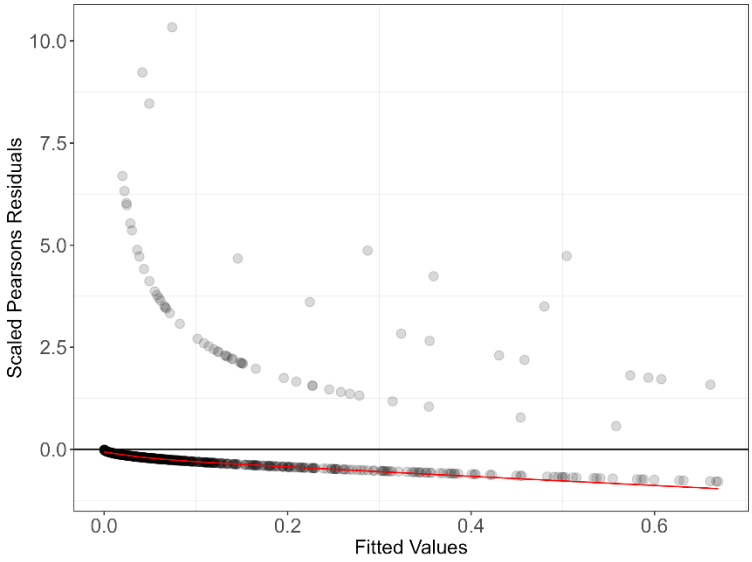


Plate 1-216 Guillemot survey 11 fitted versus observed

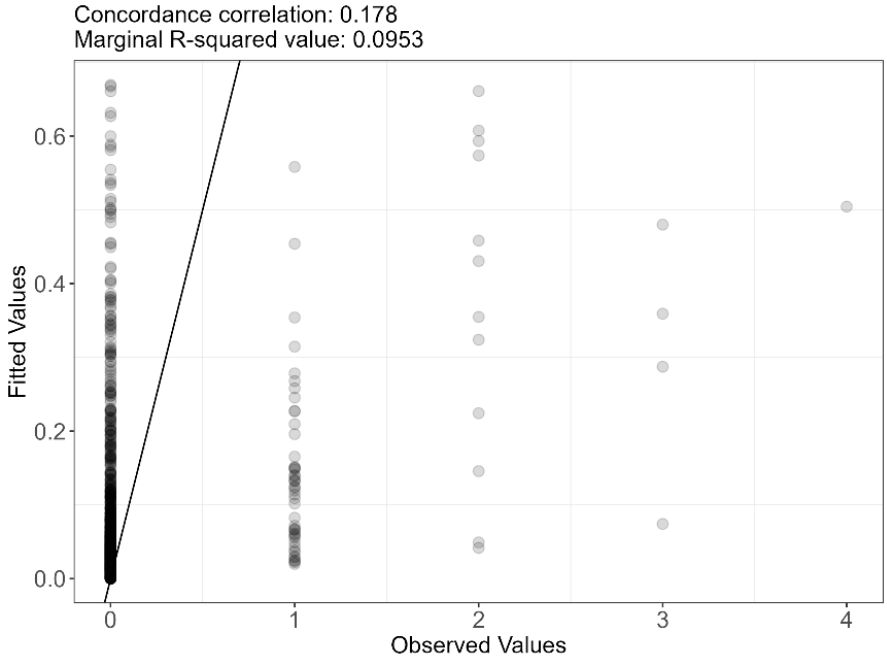


Plate 1-217 Guillemot survey 11 COVRATIO statistic

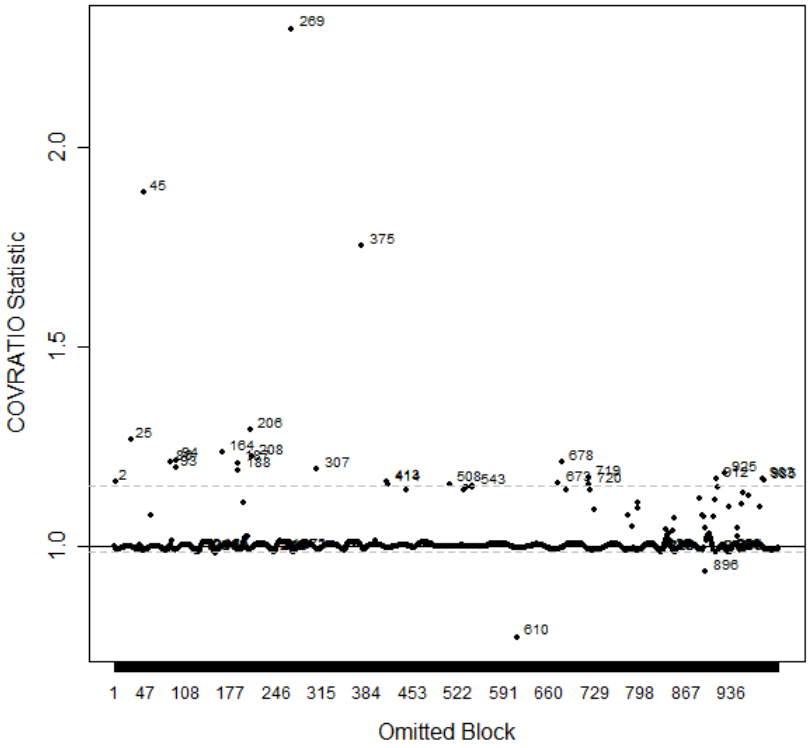


Plate 1-218 Guillemot survey 11 PRESS statistic

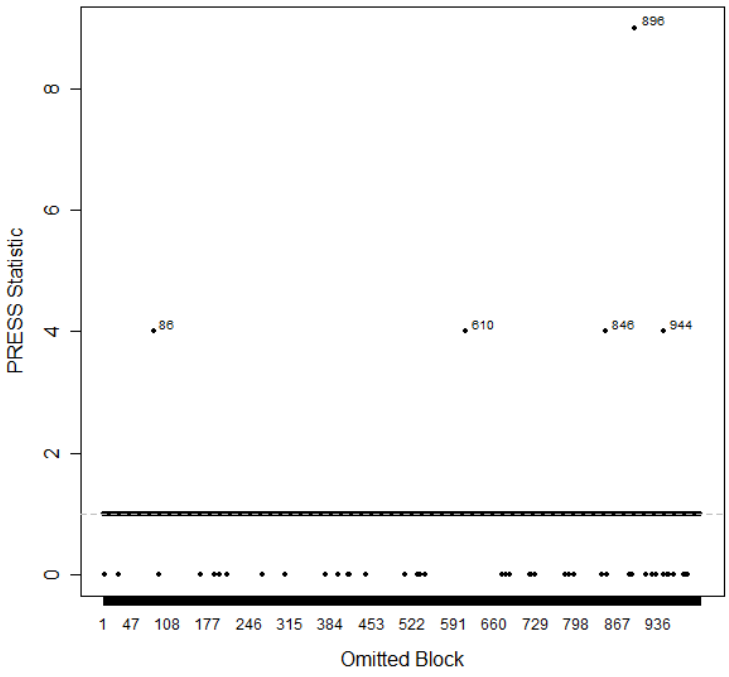
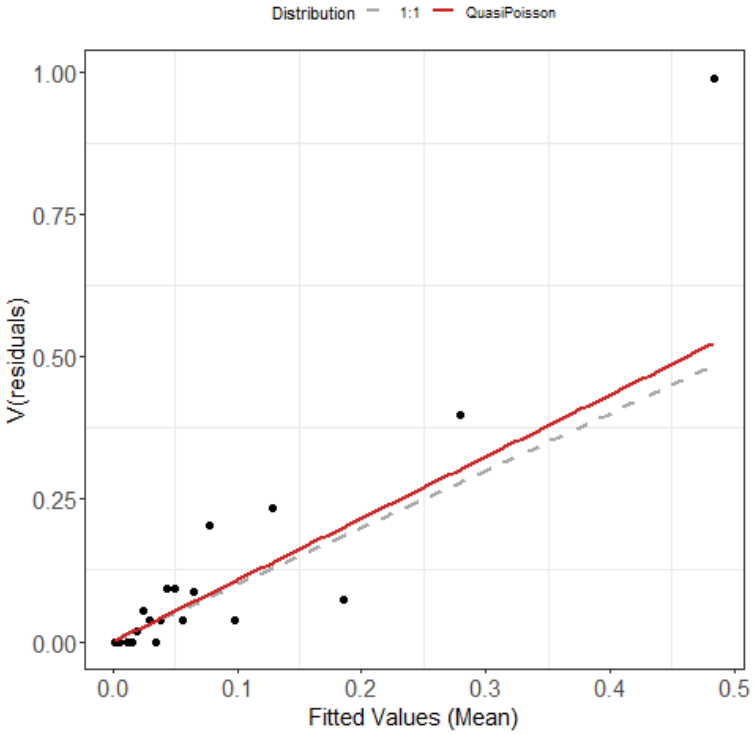


Plate 1-219 Guillemot survey 11 mean-variance relationship



1.4.12 SURVEY 12 (FEBRUARY 2023)

Plate 1-220 Guillemot survey 12 best fitting model scaled Pearsons residuals

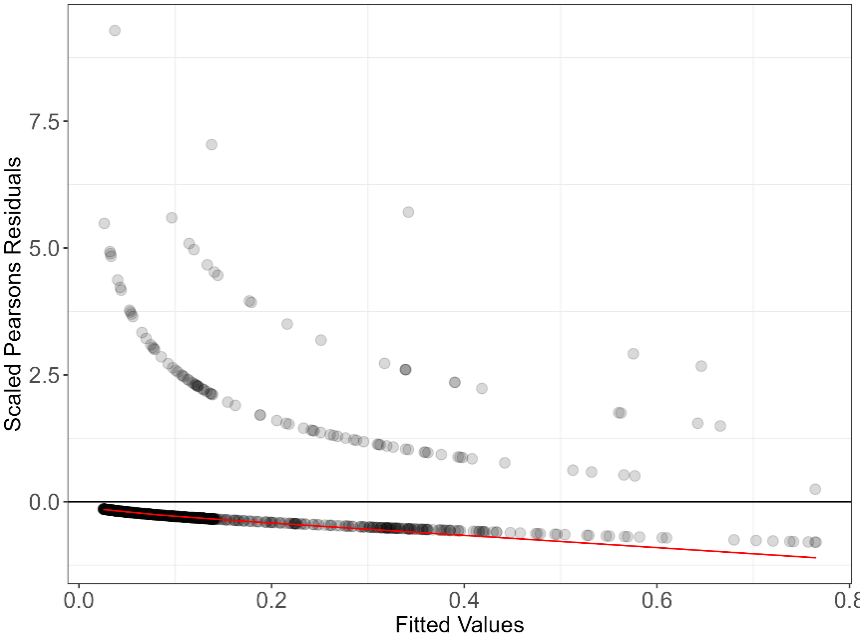


Plate 1-221 Guillemot survey 12 fitted versus observed

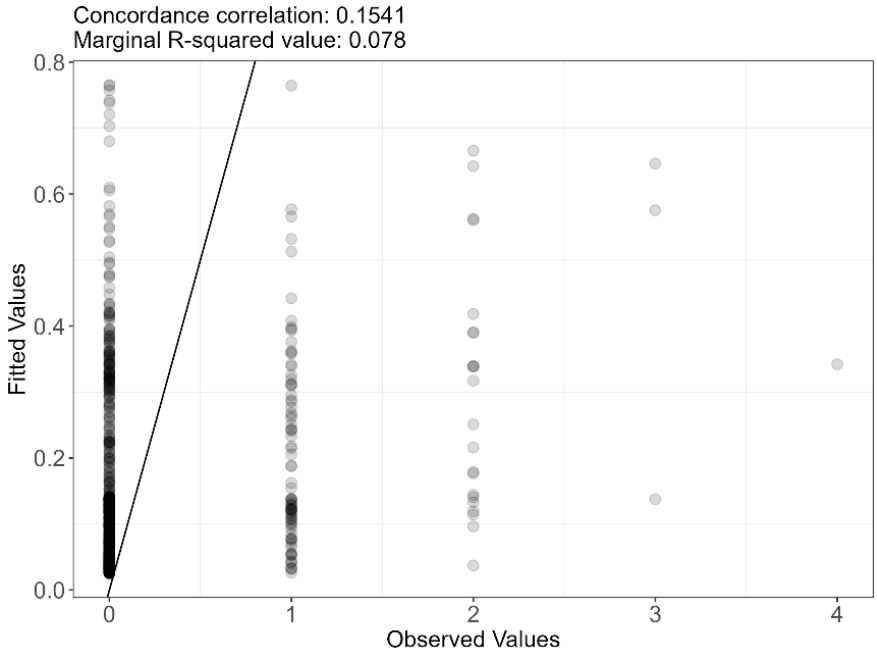


Plate 1-222 Guillemot survey 12 COVRATIO statistic

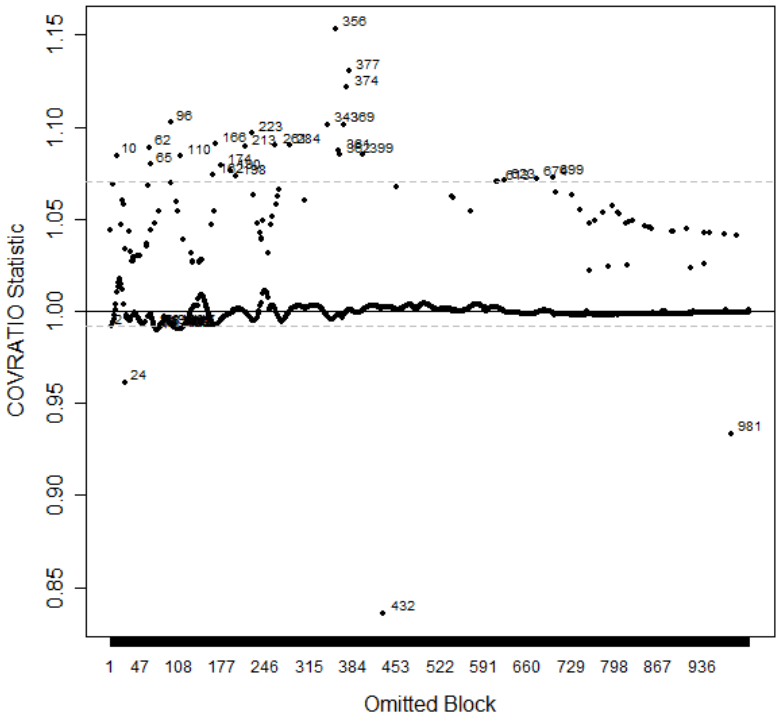


Plate 1-223 Guillemot survey 12 PRESS statistic

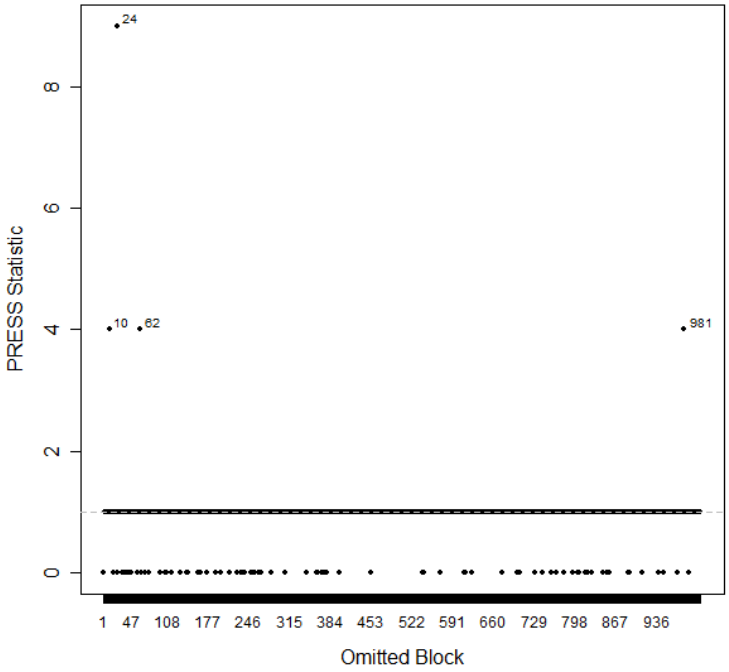
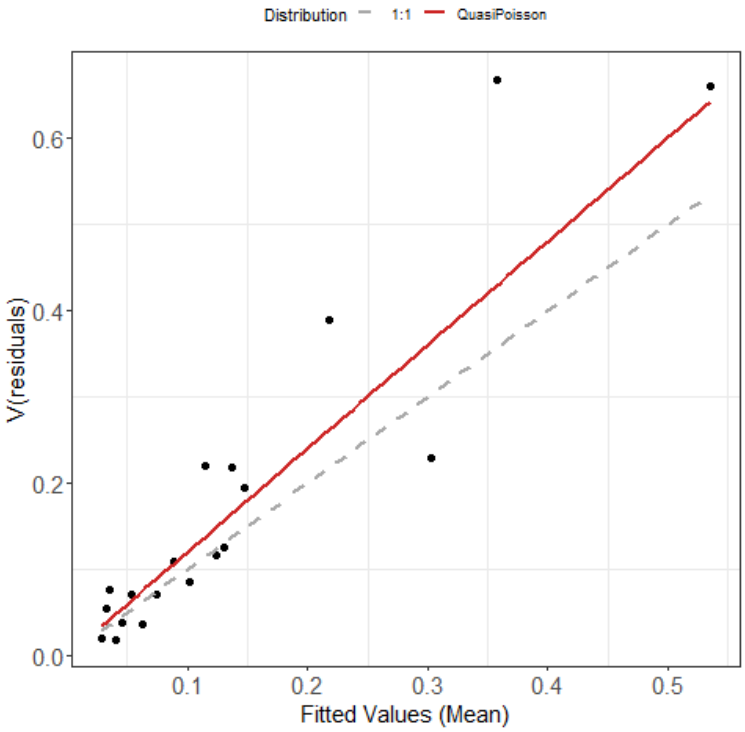


Plate 1-224 Guillemot survey 12 mean-variance relationship



1.4.13 SURVEY 13 (MARCH 2023)

Plate 1-225 Guillemot survey 13 best fitting model scaled Pearsons residuals

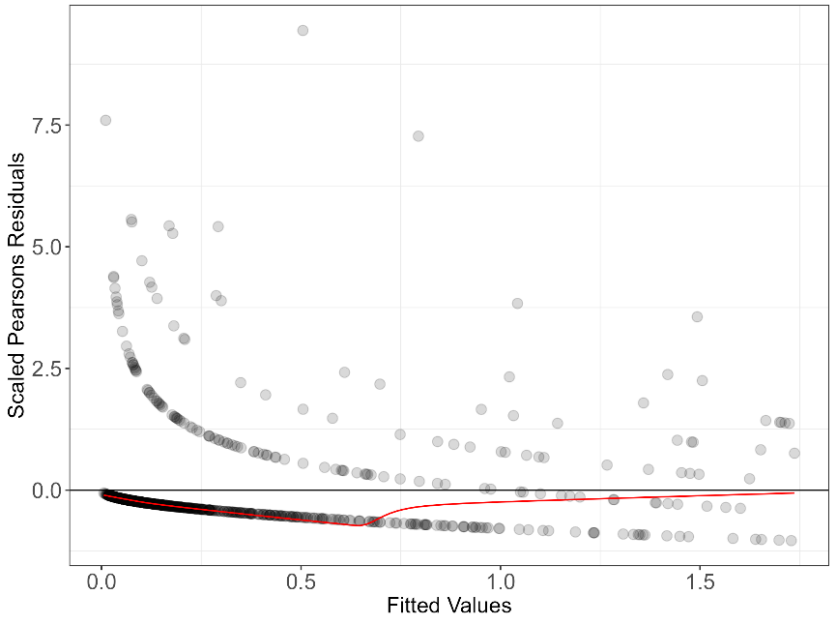


Plate 1-226 Guillemot survey 13 fitted versus observed

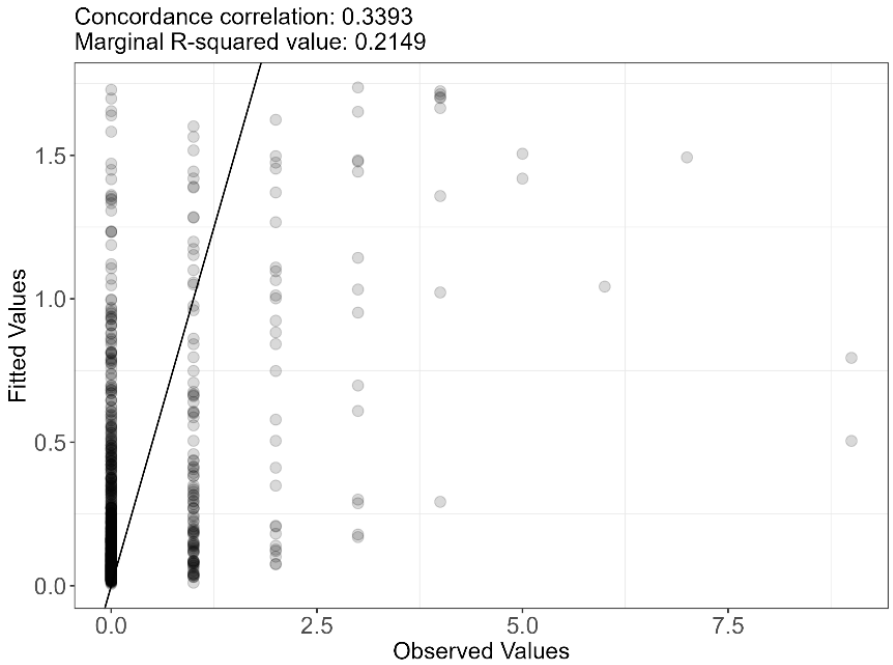


Plate 1-227 Guillemot survey 13 COVRATIO statistic

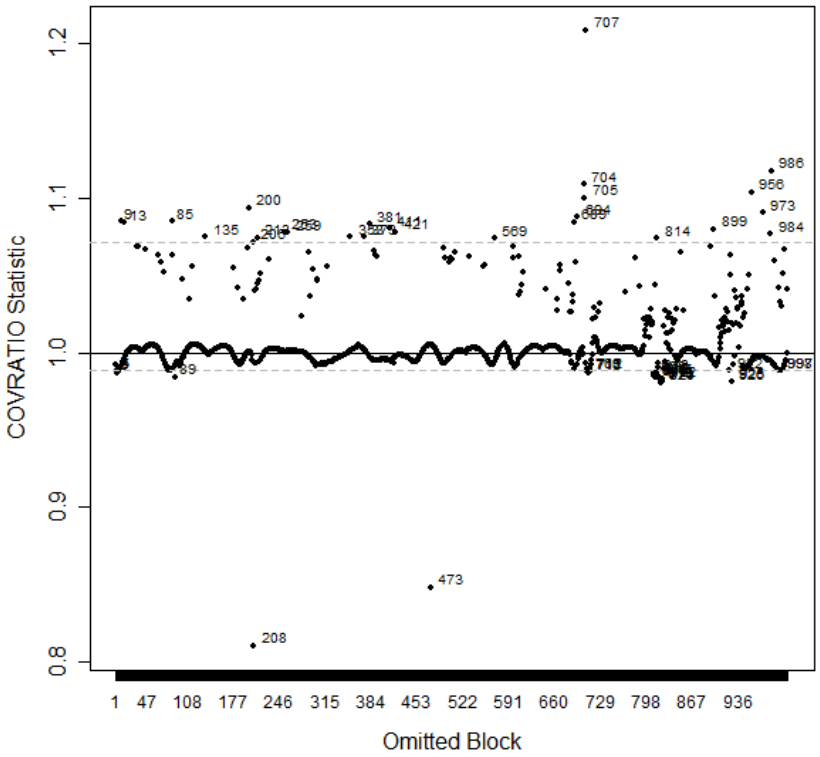


Plate 1-228 Guillemot survey 13 PRESS statistic

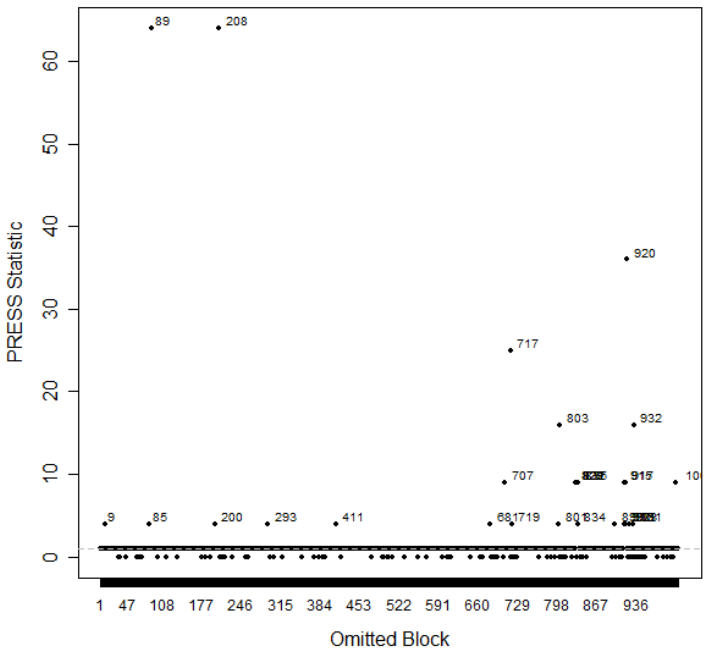
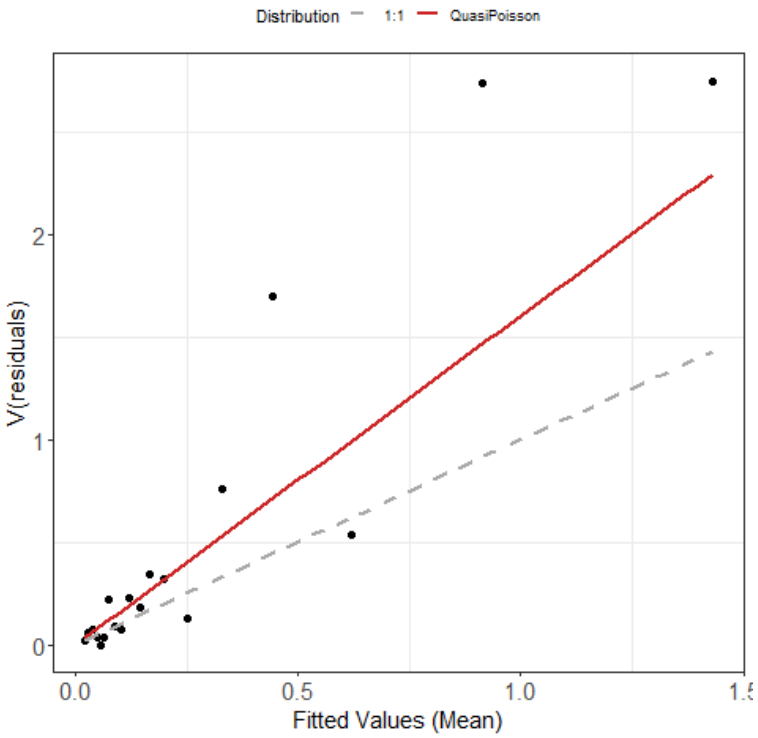


Plate 1-229 Guillemot survey 13 mean-variance relationship



1.4.14 SURVEY 14 (APRIL 2023)

Plate 1-230 Guillemot survey 14 best fitting model scaled Pearsons residuals

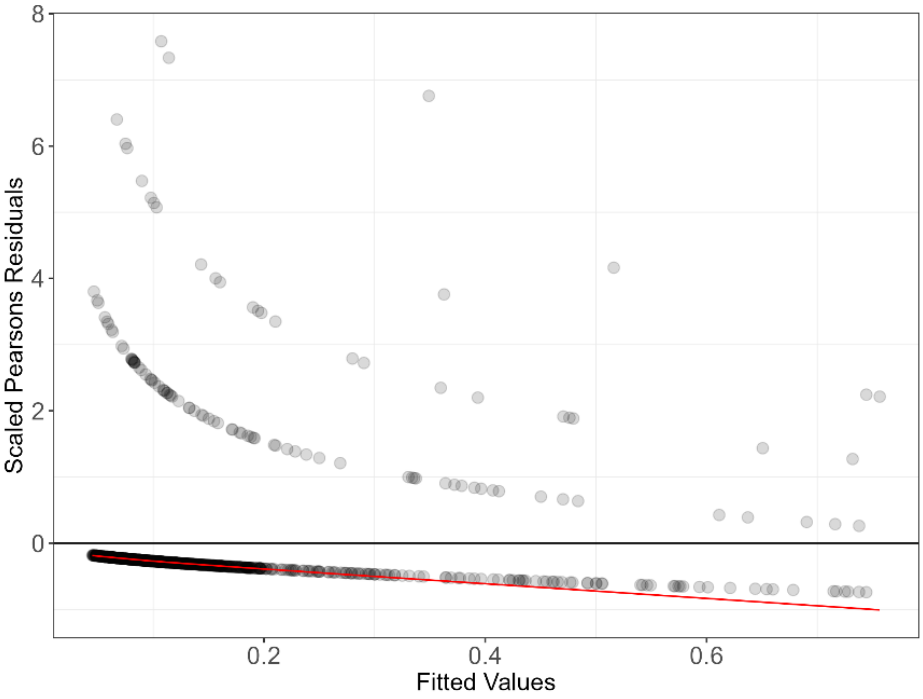


Plate 1-231 Guillemot survey 14 fitted versus observed

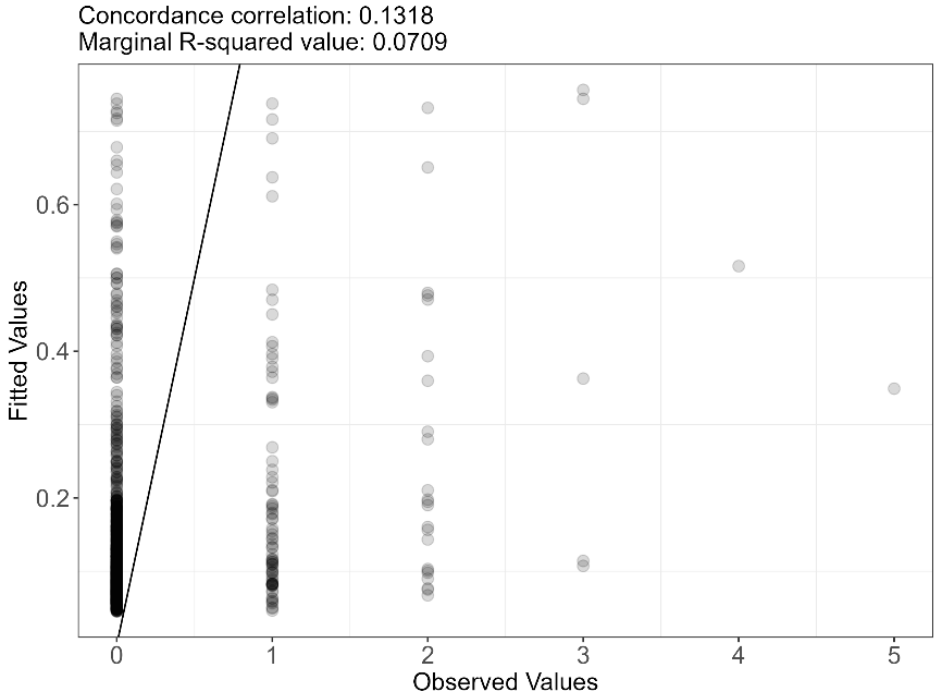


Plate 1-232 Guillemot survey 14 COVRATIO statistic

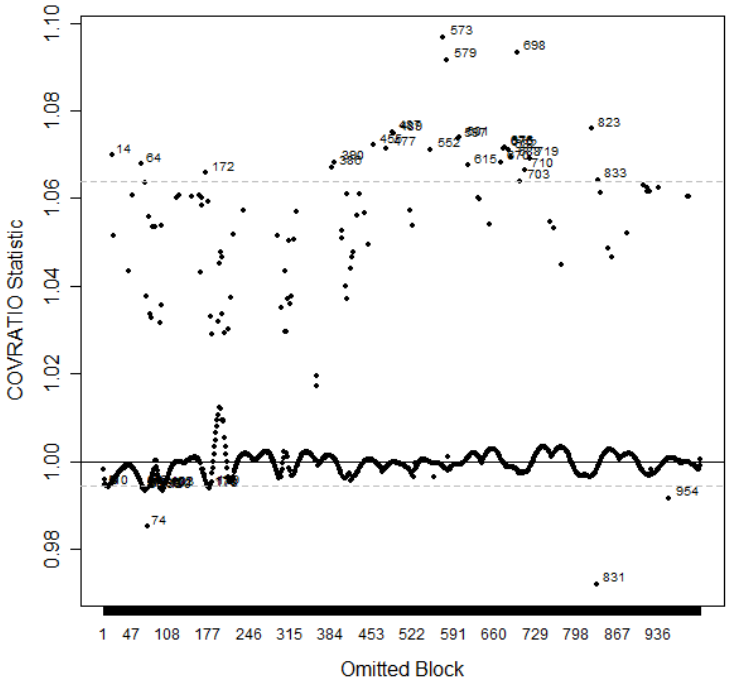


Plate 1-233 Guillemot survey 14 PRESS statistic

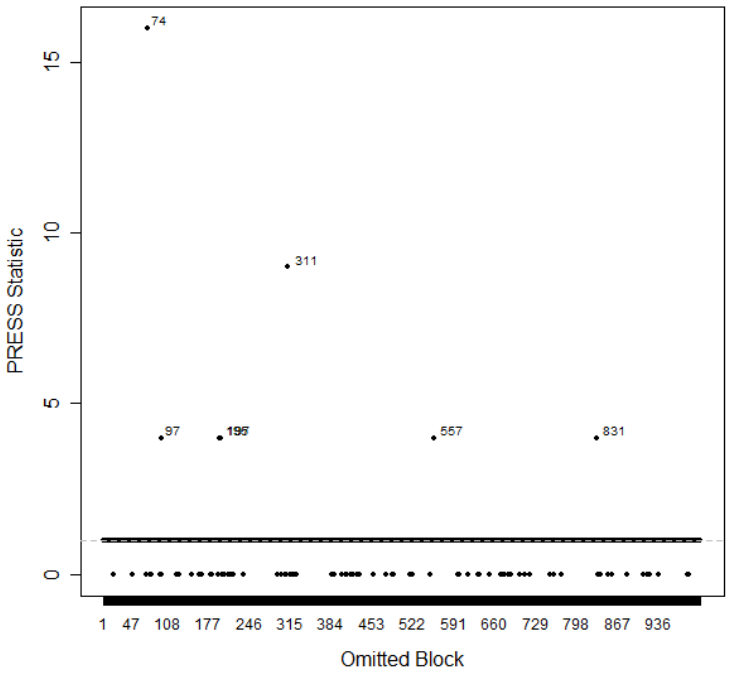
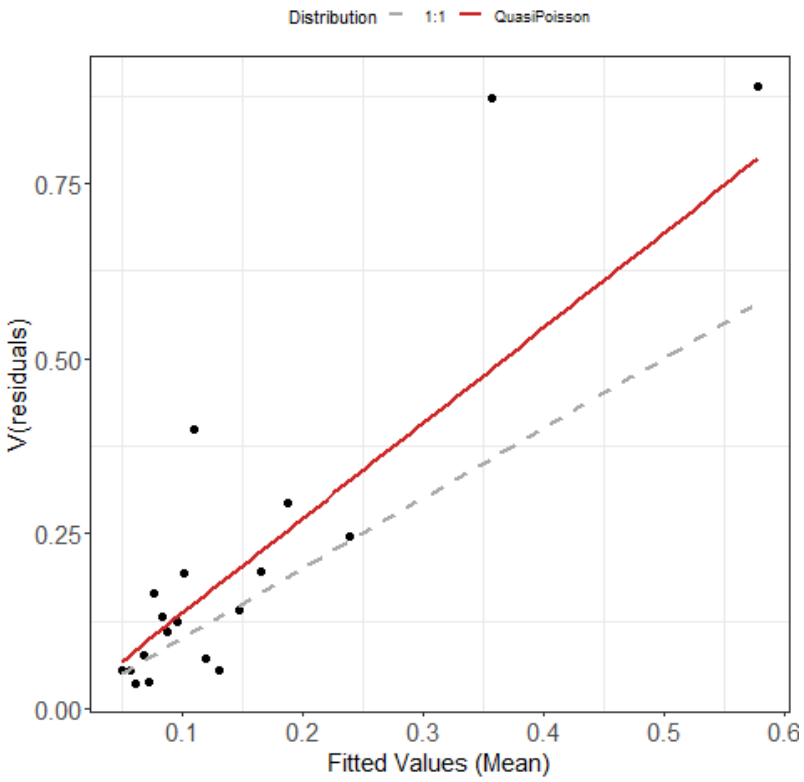


Plate 1-234 Guillemot survey 14 mean-variance relationship



1.4.15 SURVEY 15 (MAY 2023)

Plate 1-235 Guillemot survey 15 best fitting model scaled Pearsons residuals

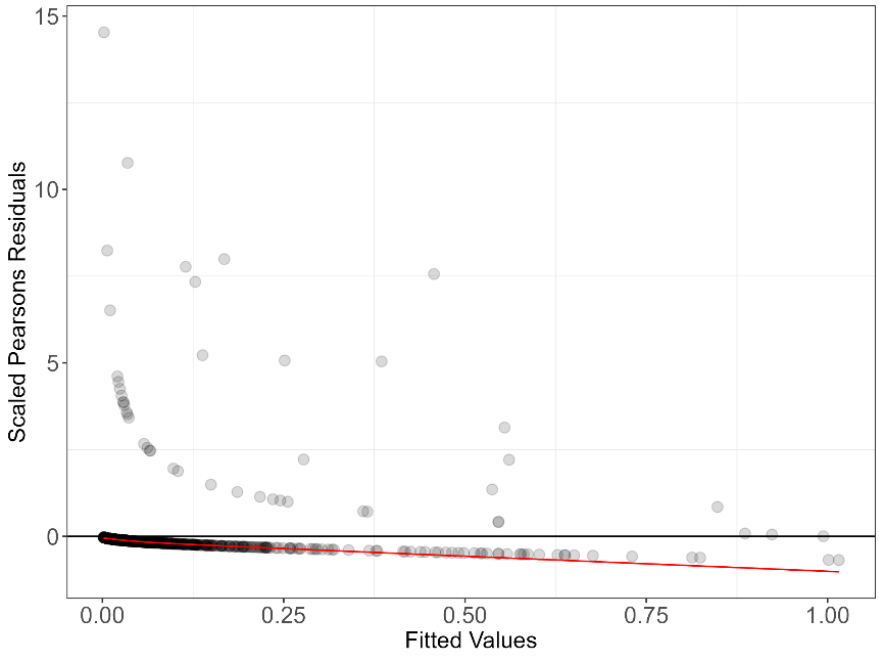


Plate 1-236 Guillemot survey 15 fitted versus observed

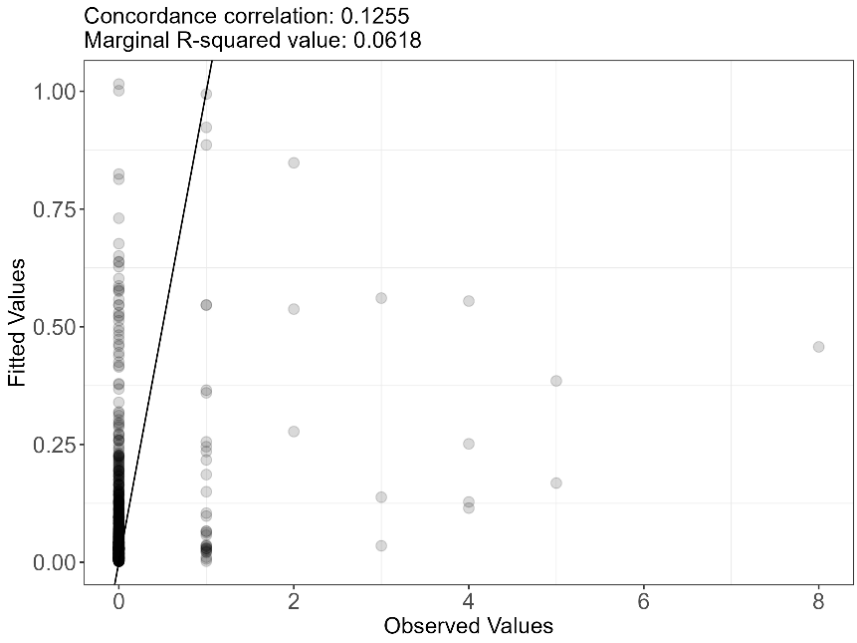


Plate 1-237 Guillemot survey 15 COVRATIO statistic

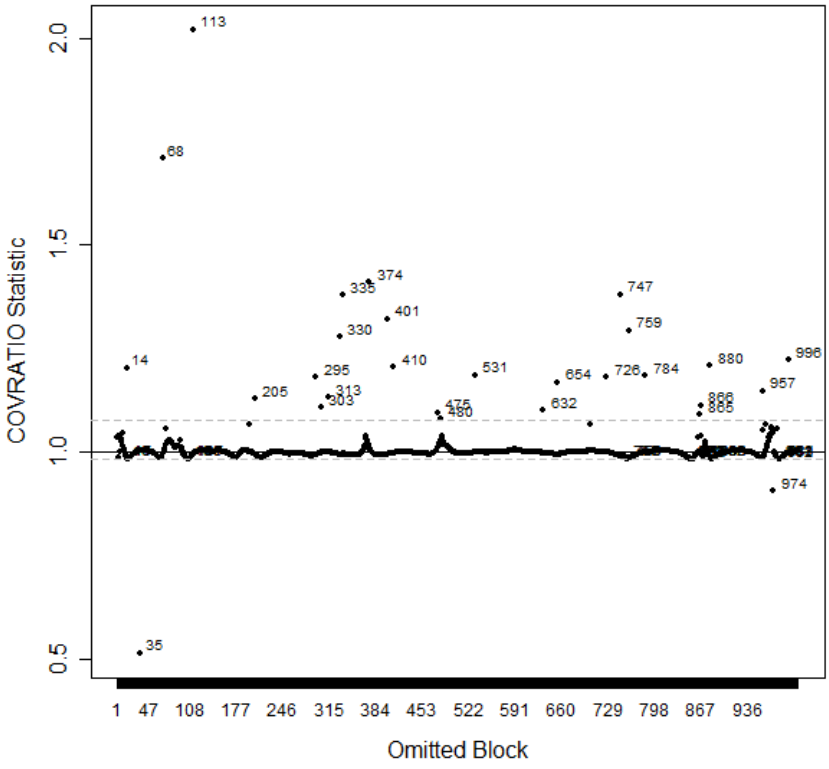


Plate 1-238 Guillemot survey 15 PRESS statistic

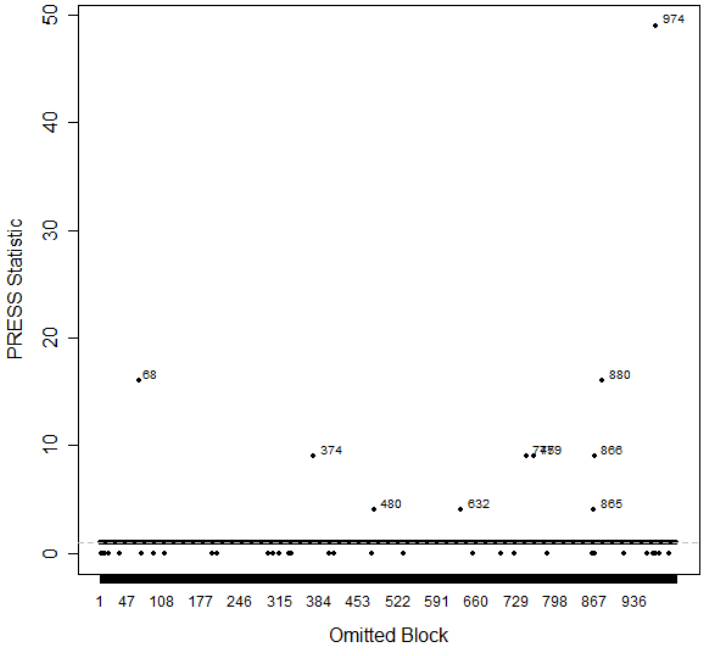
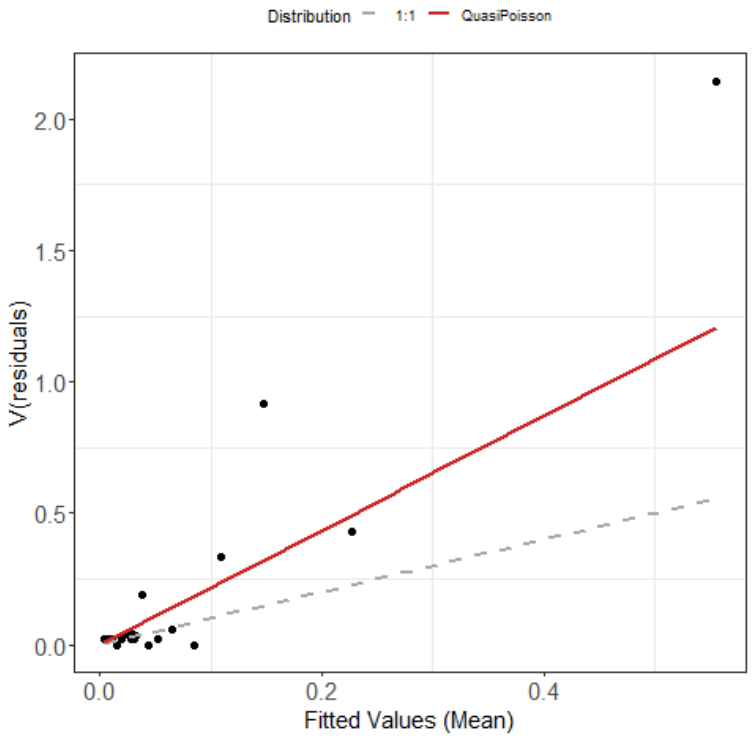


Plate 1-239 Guillemot survey 15 mean-variance relationship



1.4.16 SURVEY 16 (JUNE 2023)

Plate 1-240 Guillemot survey 16 best fitting model scaled Pearsons residuals

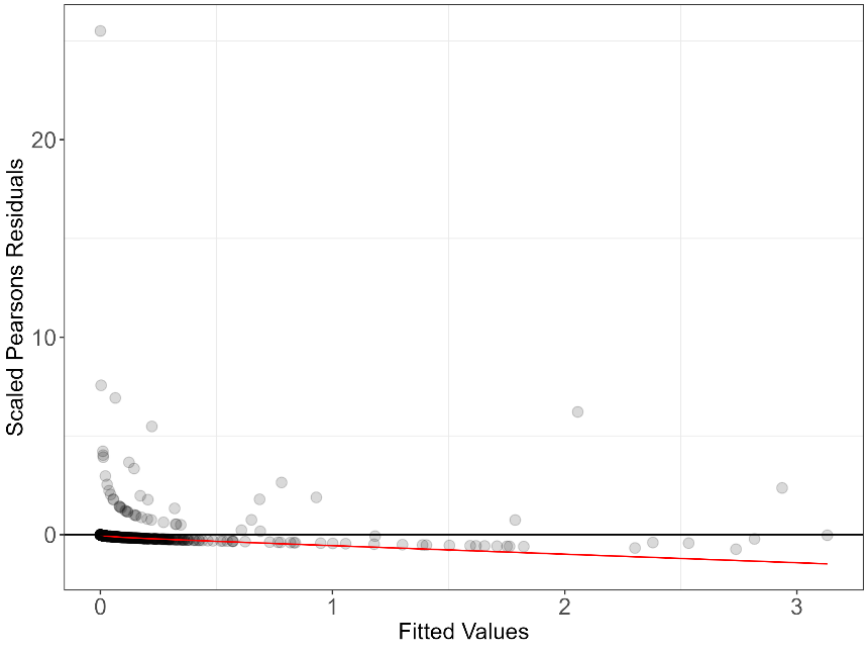


Plate 1-241 Guillemot survey 16 fitted versus observed

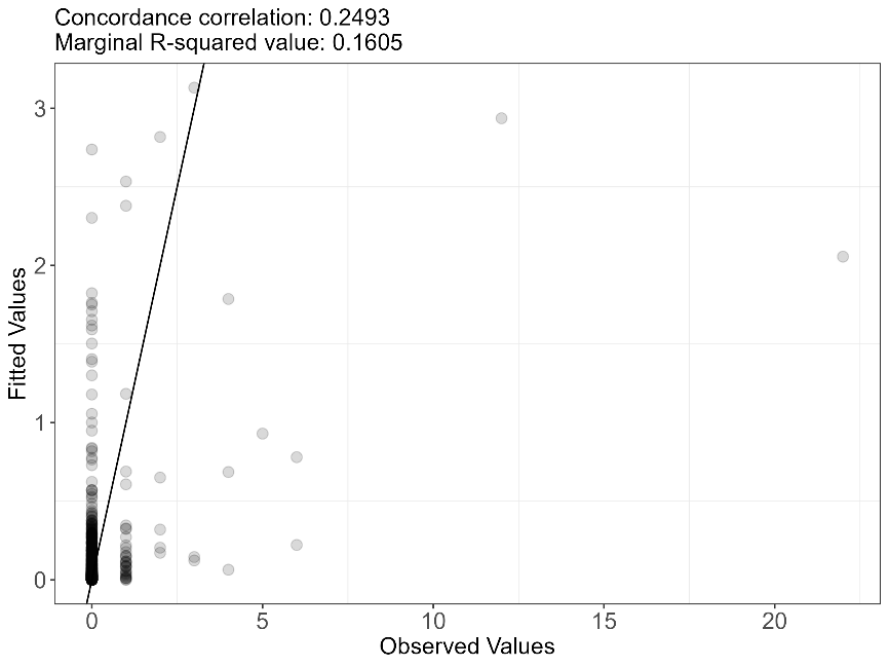


Plate 1-242 Guillemot survey 16 COVRATIO statistic

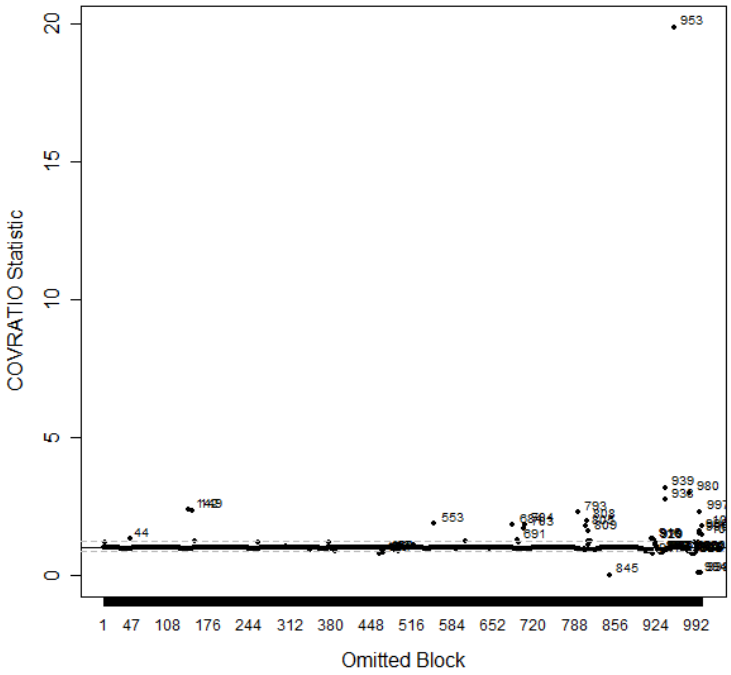


Plate 1-243 Guillemot survey 16 PRESS statistic

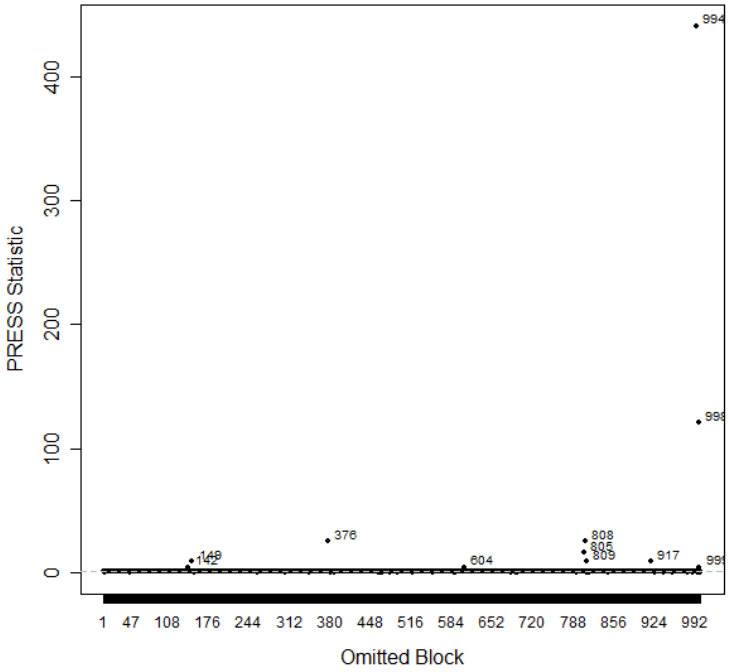
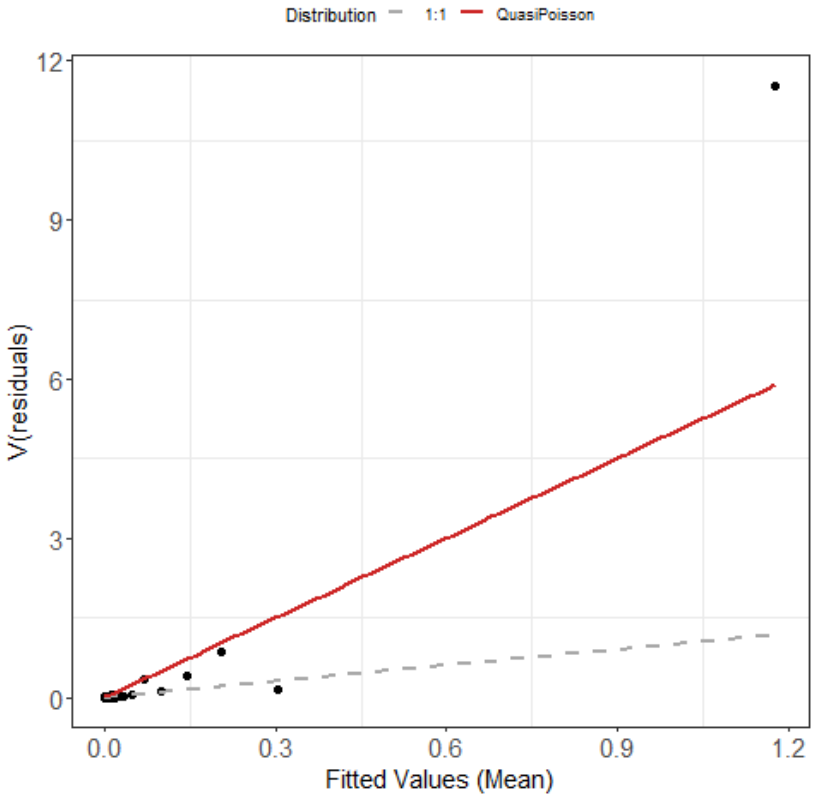


Plate 1-244 Guillemot survey 16 mean-variance relationship



1.4.17 SURVEY 17 (JULY 2023)

Plate 1-245 Guillemot survey 17 best fitting model scaled Pearsons residuals

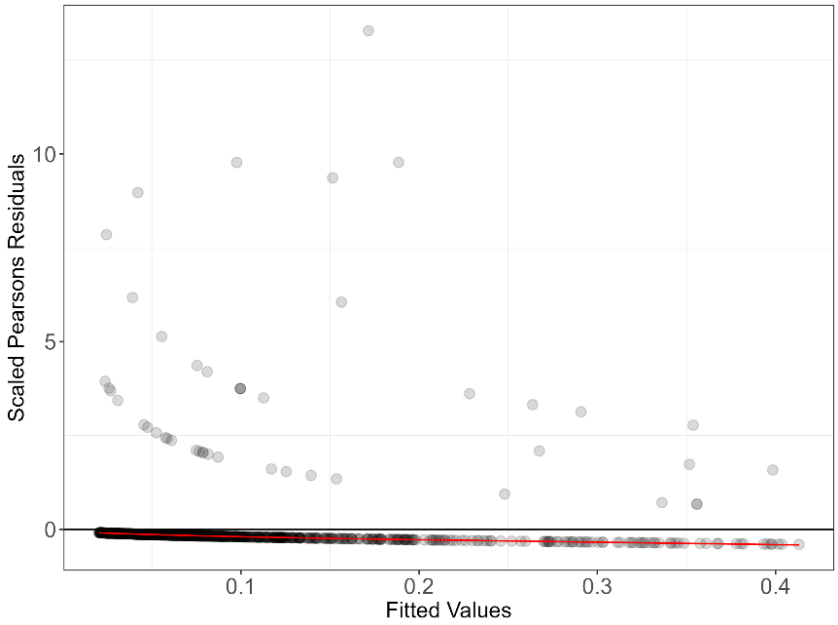


Plate 1-246 Guillemot survey 17 fitted versus observed

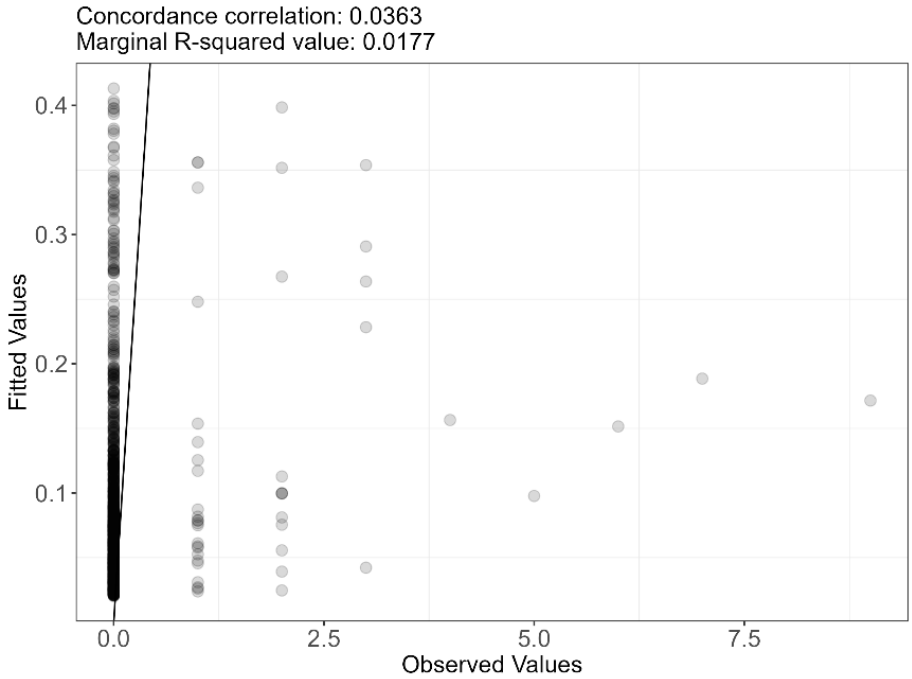


Plate 1-247 Guillemot survey 17 COVRATIO statistic

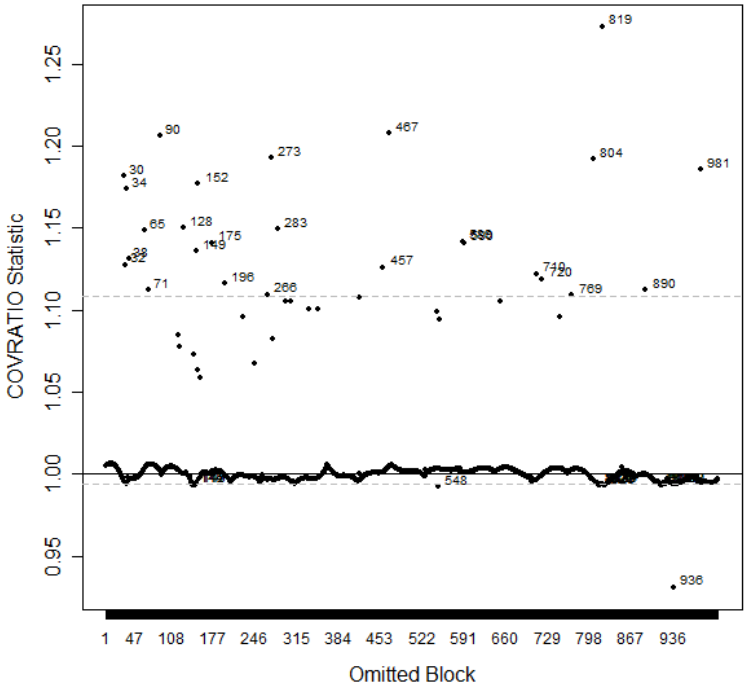


Plate 1-248 Guillemot survey 17 PRESS statistic

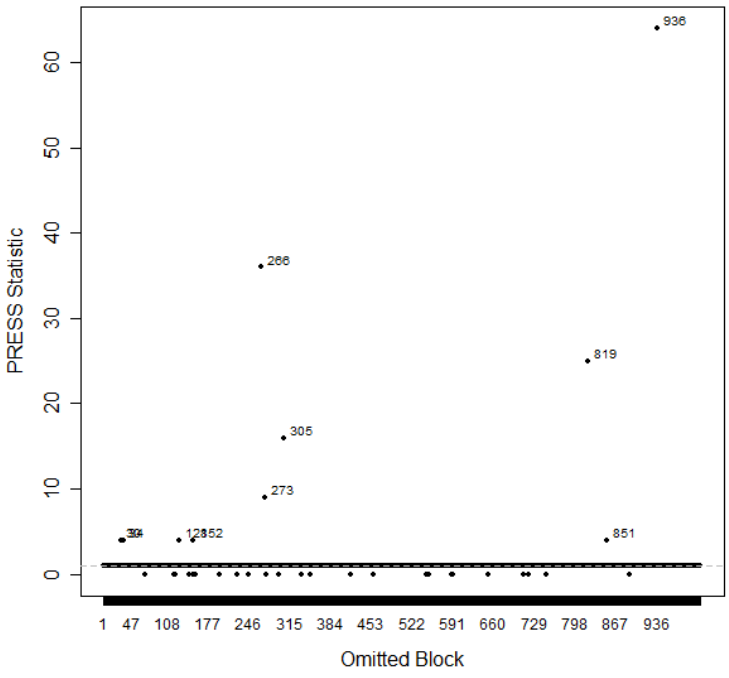
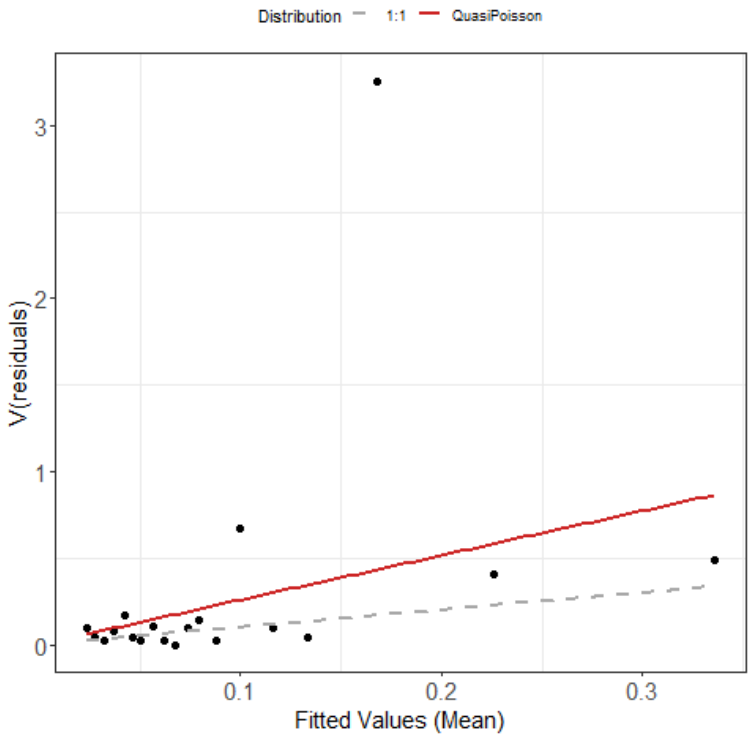


Plate 1-249 Guillemot survey 17 mean-variance relationship



1.4.18 SURVEY 18 (AUGUST 2023)

Plate 1-250 Guillemot survey 18 best fitting model scaled Pearsons residuals

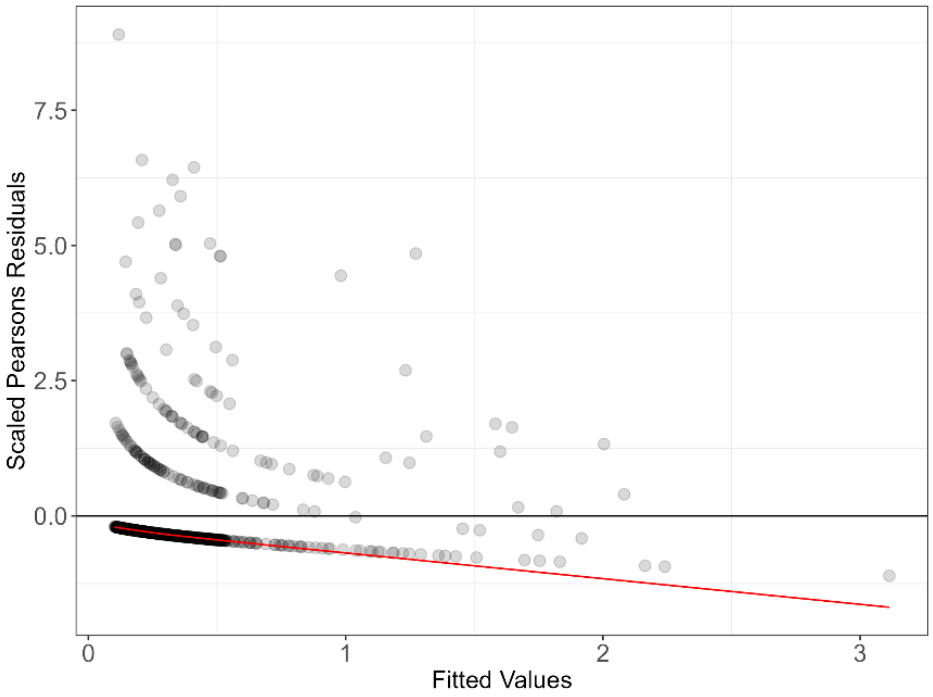


Plate 1-251 Guillemot survey 18 fitted versus observed

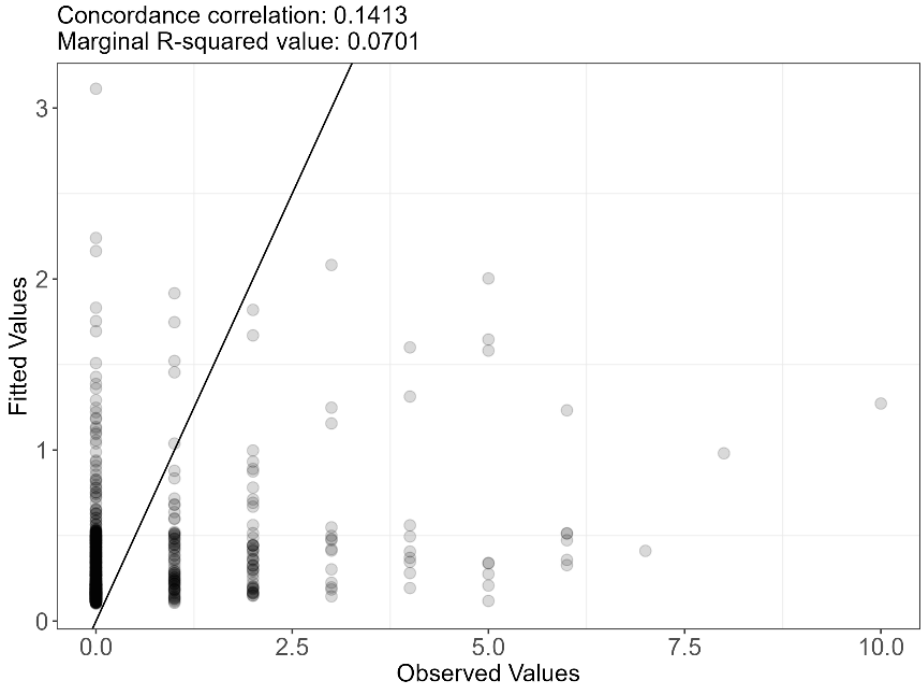


Plate 1-252 Guillemot survey 18 COVRATIO statistic

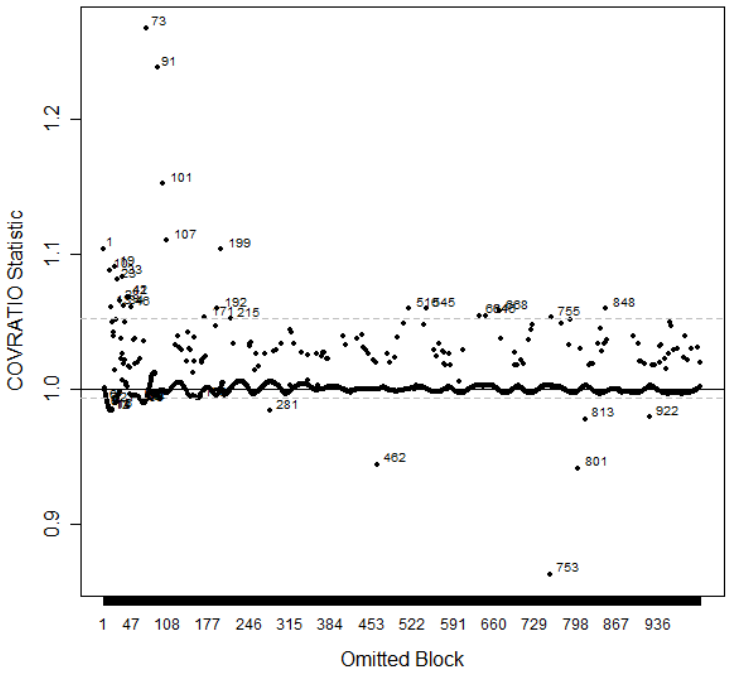


Plate 1-253 Guillemot survey 18 PRESS statistic

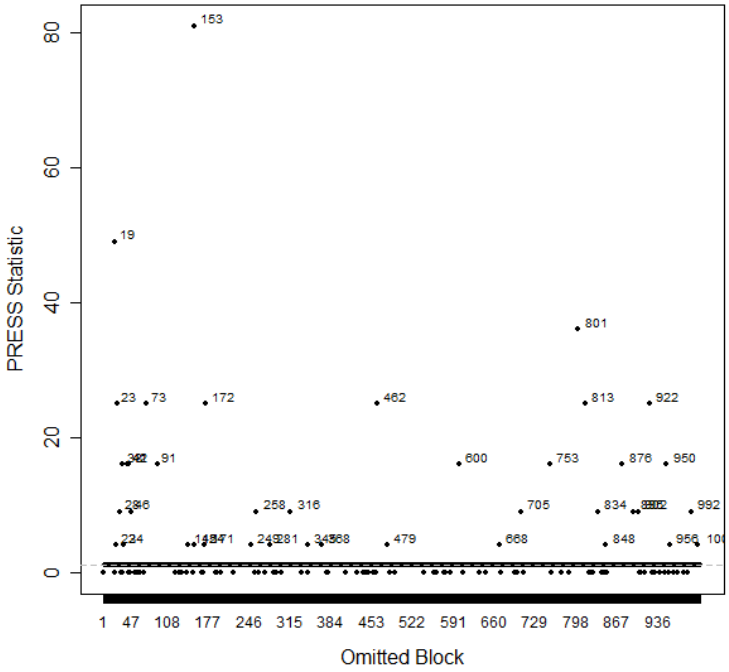
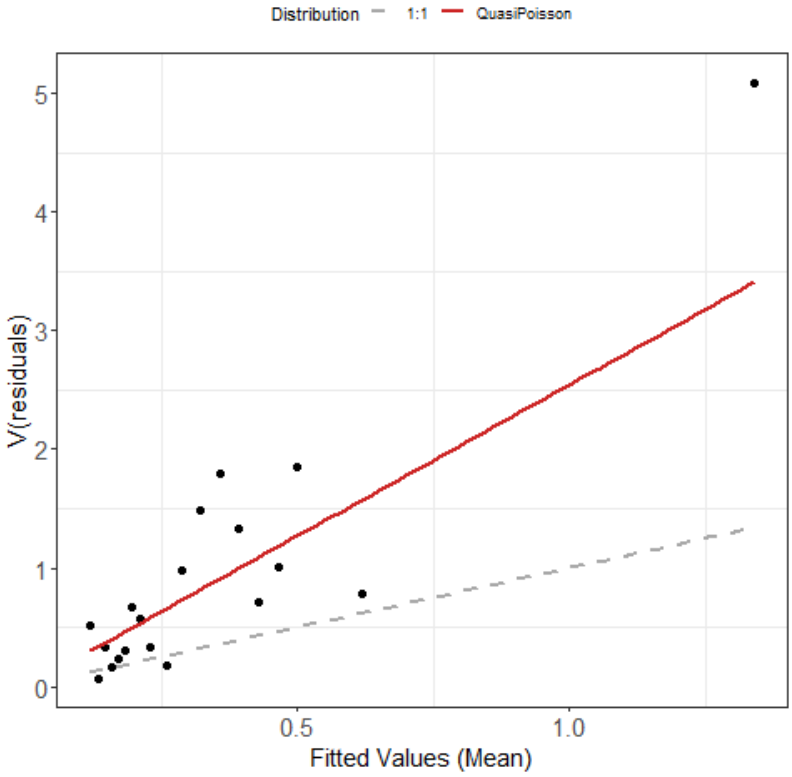


Plate 1-254 Guillemot survey 18 mean-variance relationship



1.4.19 SURVEY 19 (SEPTEMBER 2023)

Plate 1-255 Guillemot survey 19 best fitting model scaled Pearsons residuals

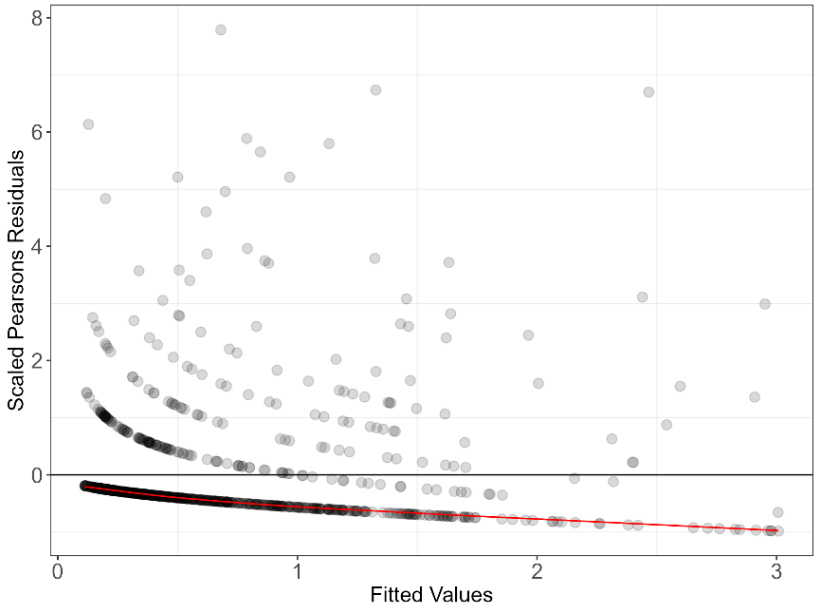


Plate 1-256 Guillemot survey 19 fitted versus observed

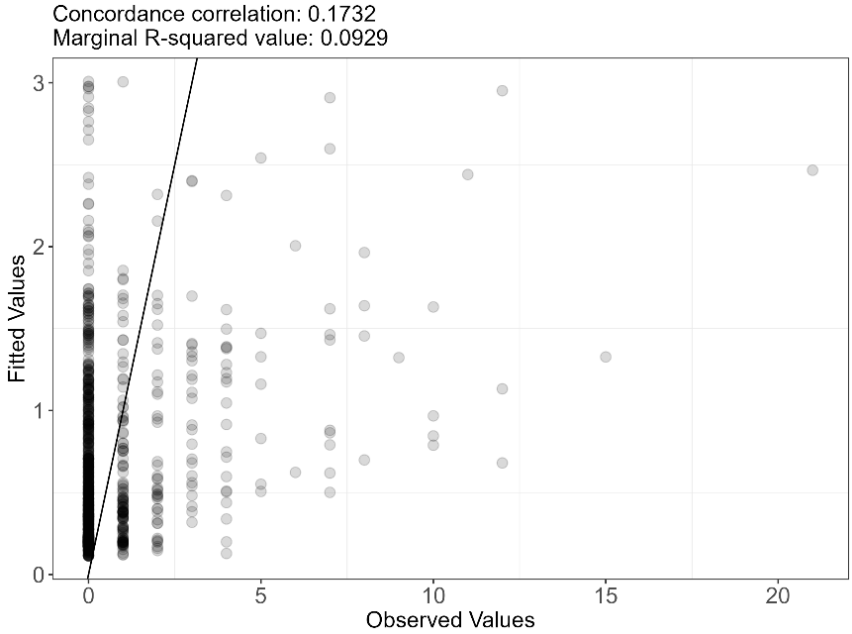


Plate 1-257 Guillemot survey 19 COVRATIO statistic

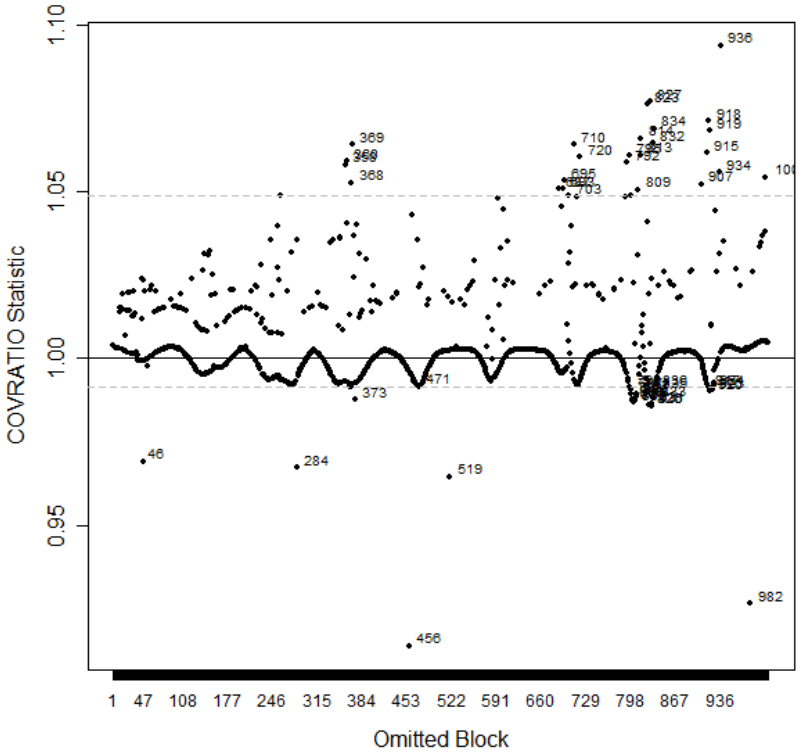


Plate 1-258 Guillemot survey 19 PRESS statistic

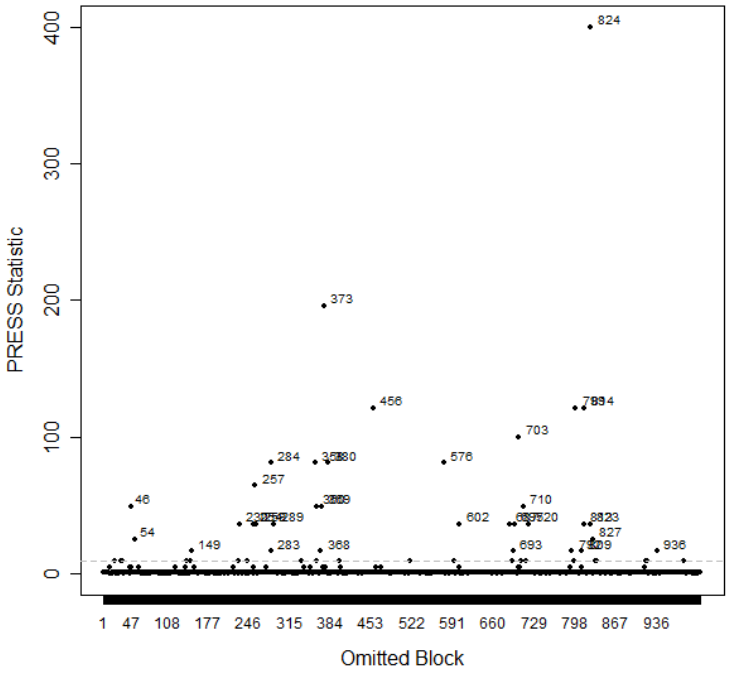
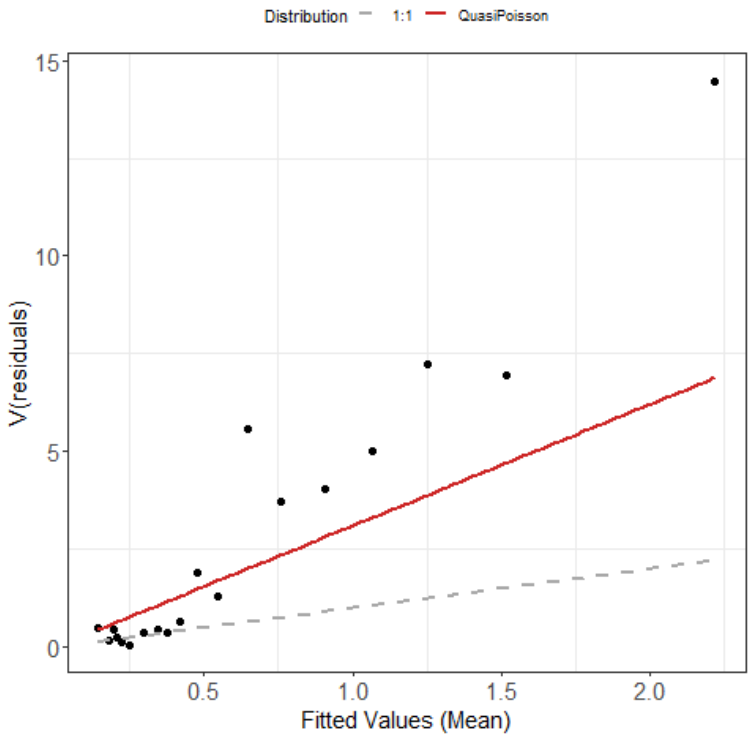


Plate 1-259 Guillemot survey 19 mean-variance relationship



1.4.20 SURVEY 20 (OCTOBER 2023)

Plate 1-260 Guillemot survey 20 best fitting model scaled Pearsons residuals

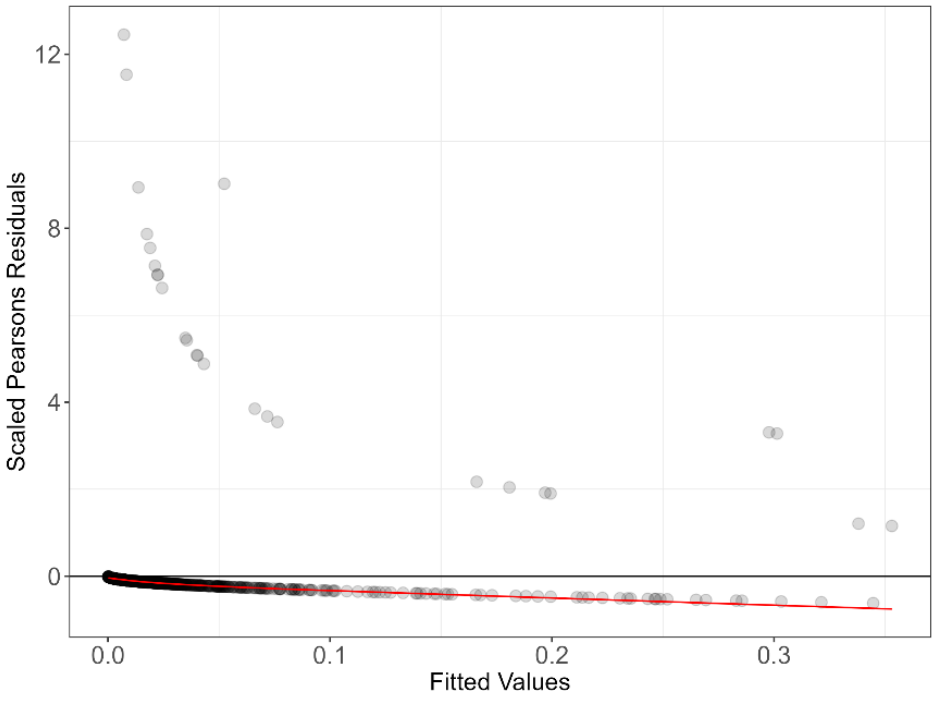


Plate 1-261 Guillemot survey 20 fitted versus observed

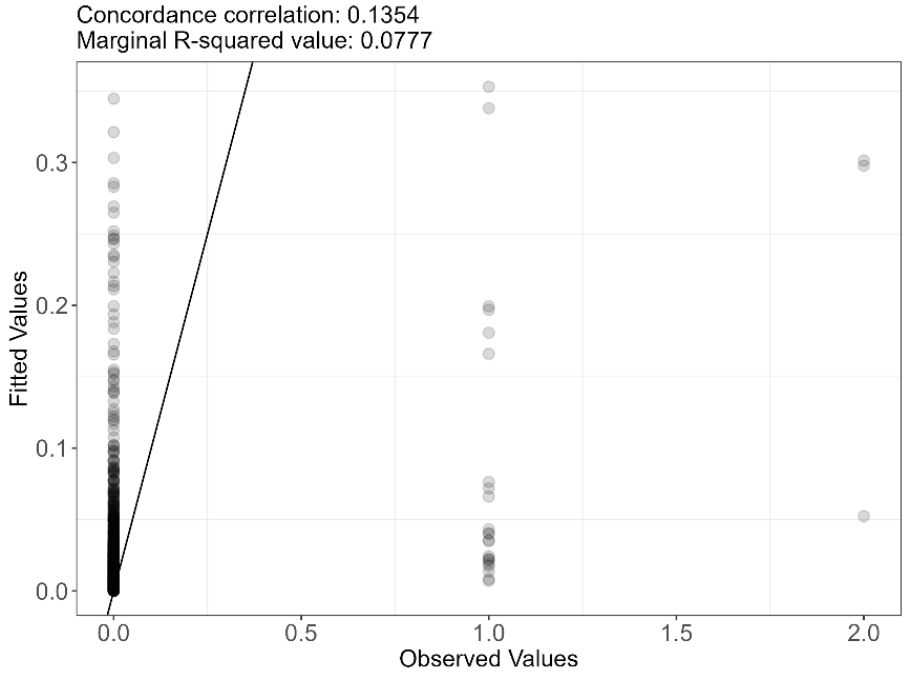


Plate 1-262 Guillemot survey 20 COVRATIO statistic

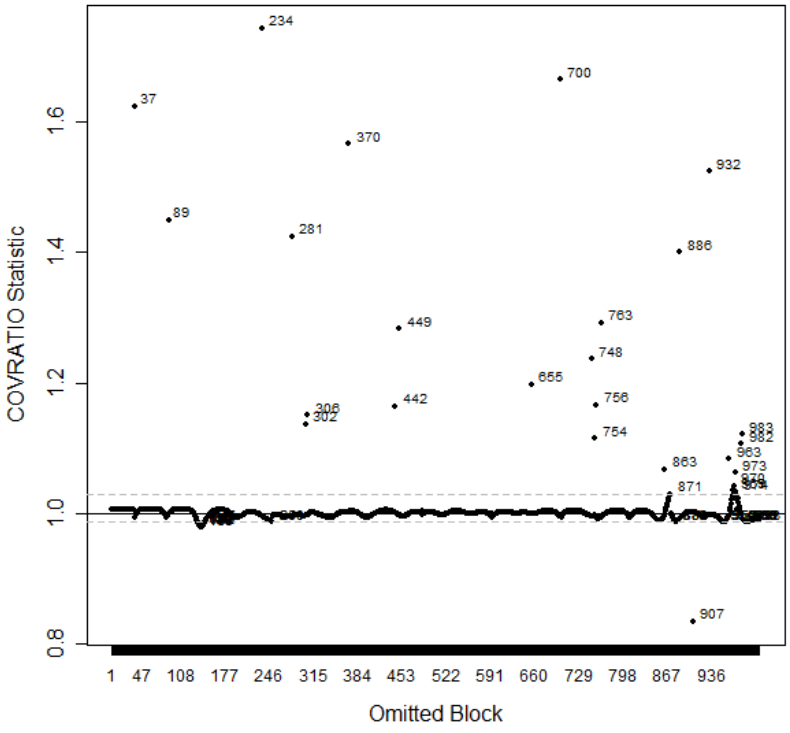


Plate 1-263 Guillemot survey 20 PRESS statistic

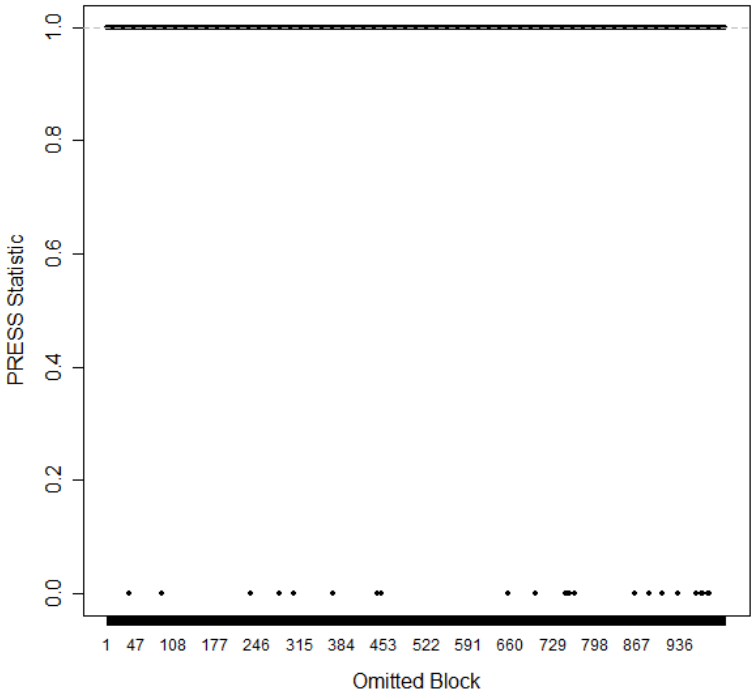
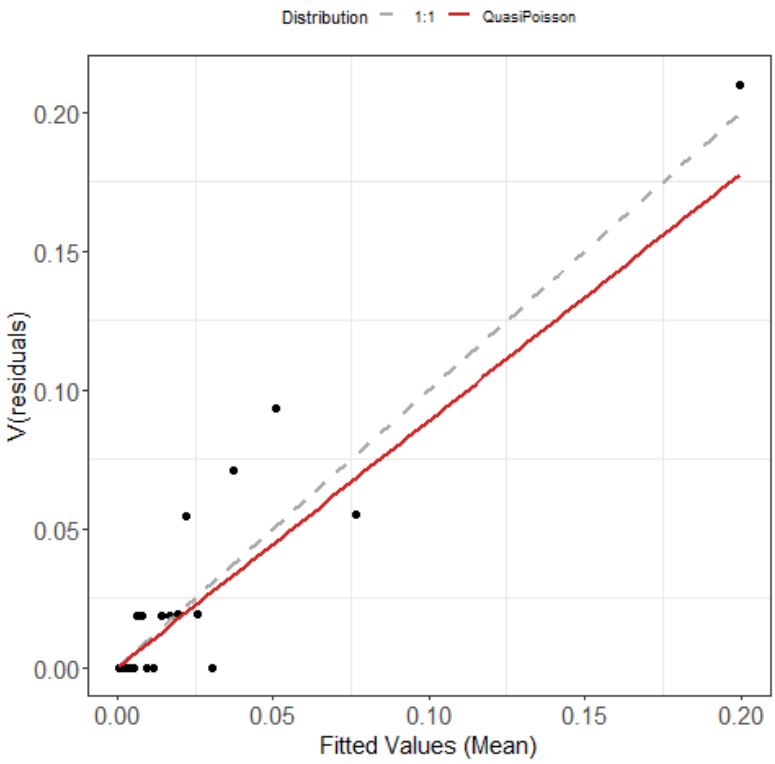


Plate 1-264 Guillemot survey 20 mean-variance relationship



1.4.21 SURVEY 21 (NOVEMBER 2023)

Plate 1-265 Guillemot survey 21 best fitting model scaled Pearsons residuals

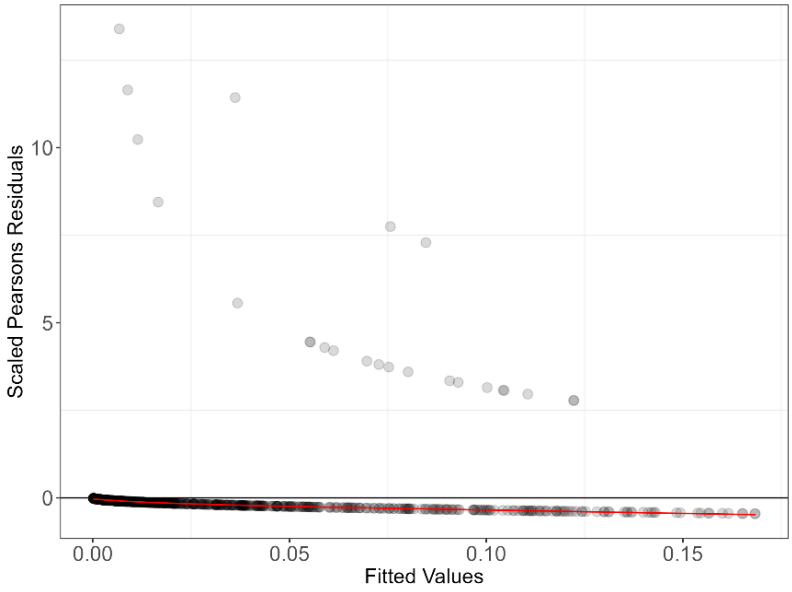


Plate 1-266 Guillemot survey 21 fitted versus observed

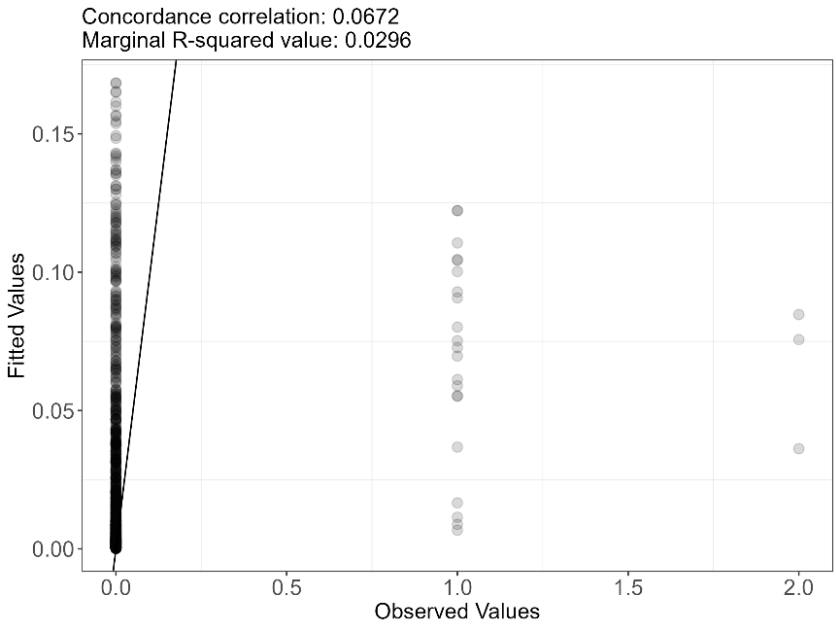


Plate 1-267 Guillemot survey 21 COVRATIO statistic

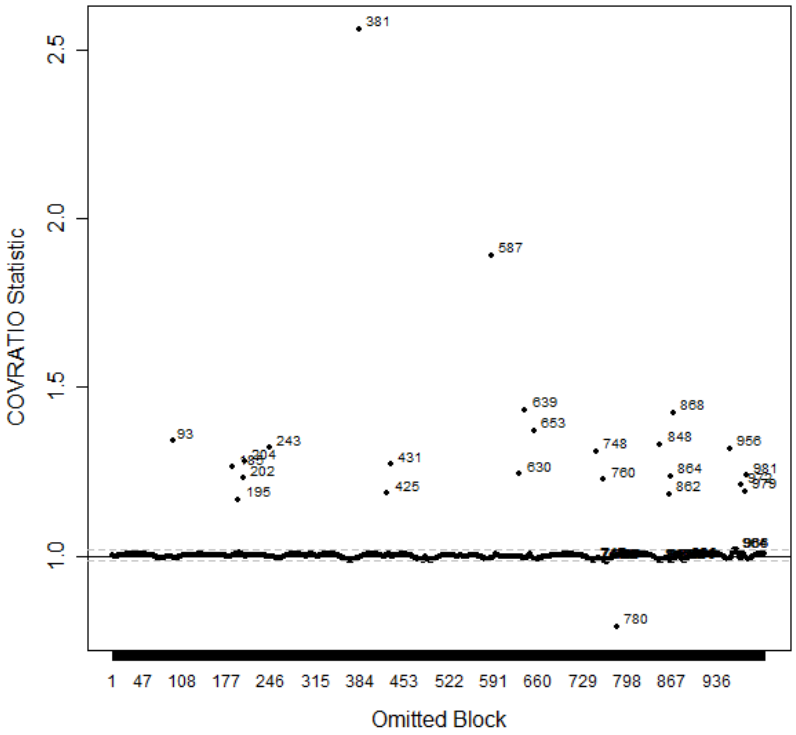


Plate 1-268 Guillemot survey 21 PRESS statistic

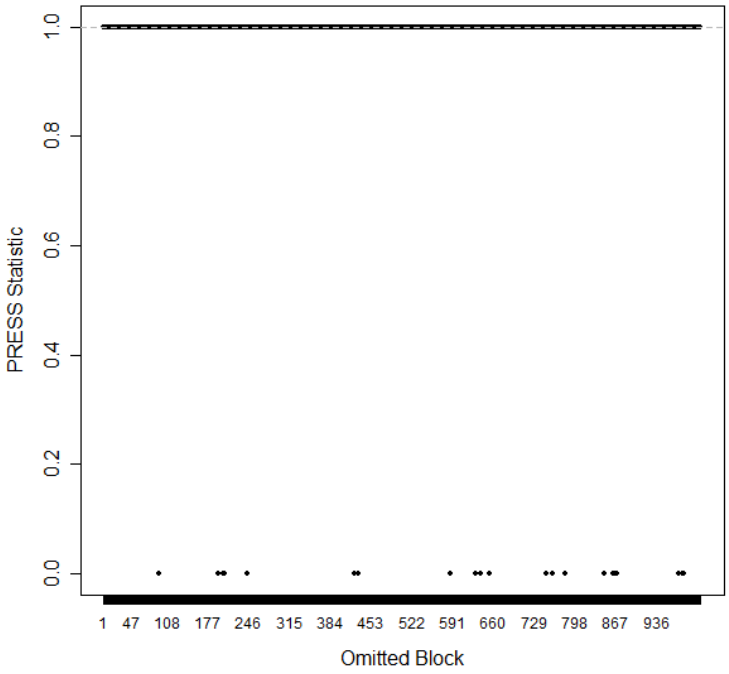
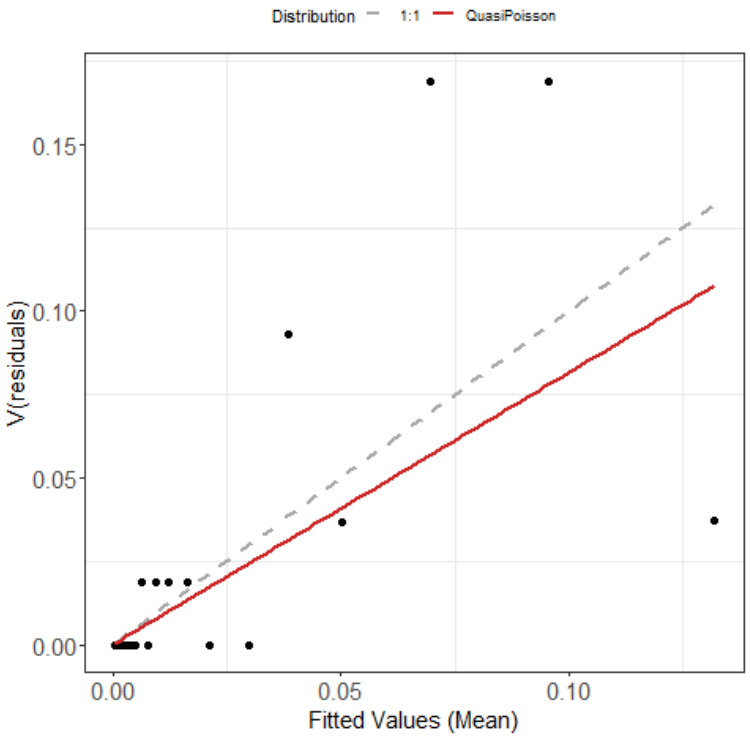


Plate 1-269 Guillemot survey 21 mean-variance relationship



1.4.22 SURVEY 22 (DECEMBER 2023)

Plate 1-270 Guillemot survey 22 best fitting model scaled Pearsons residuals

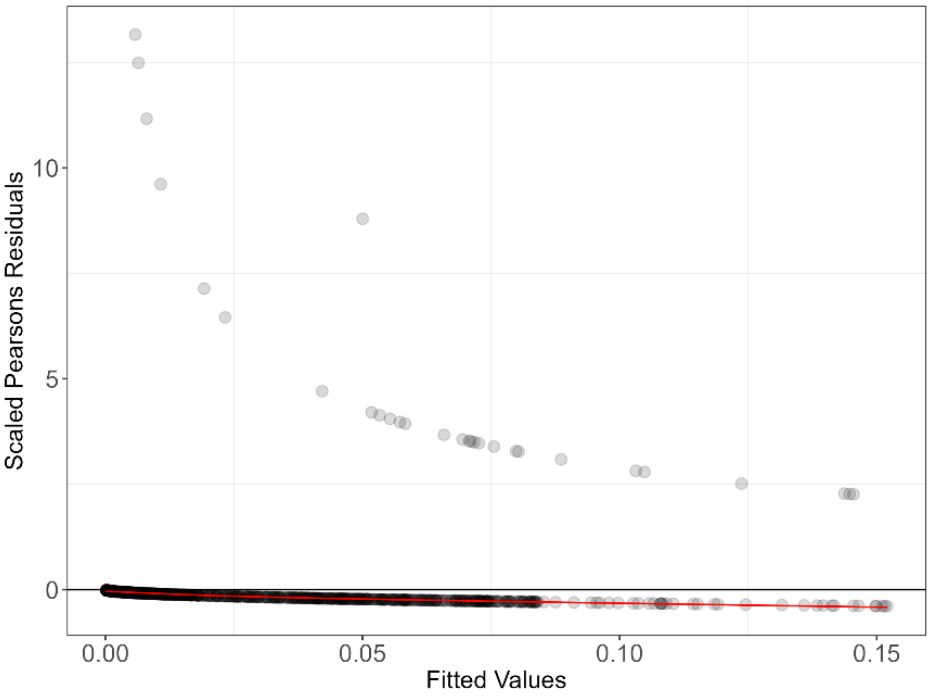


Plate 1-271 Guillemot survey 22 fitted versus observed

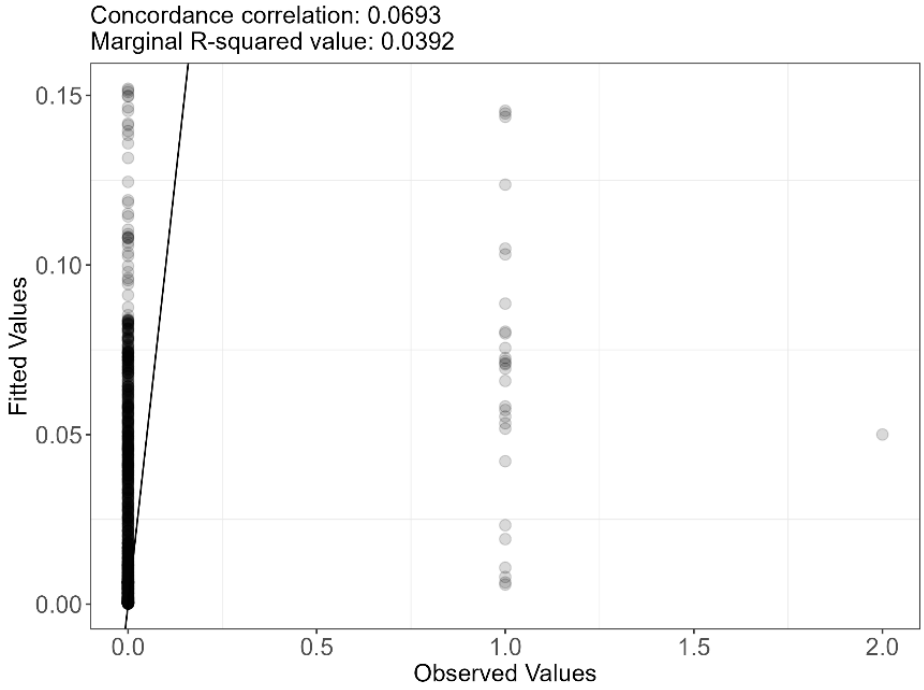


Plate 1-272 Guillemot survey 22 COVRATIO statistic

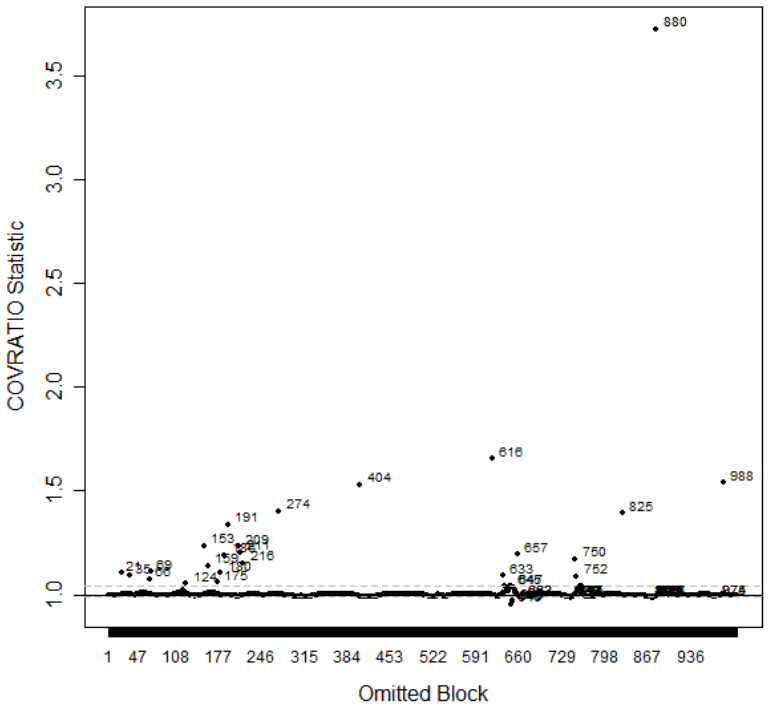


Plate 1-273 Guillemot survey 22 PRESS statistic

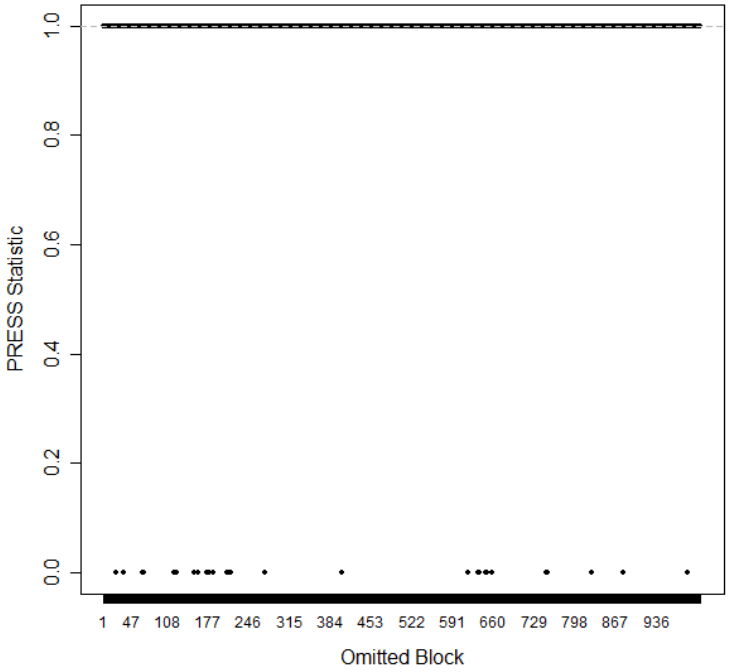
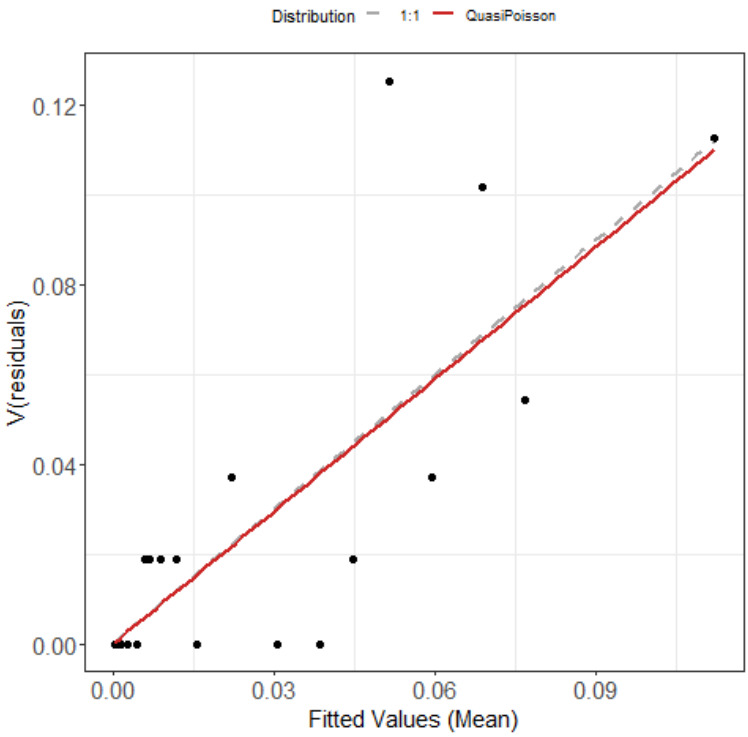


Plate 1-274 Guillemot survey 22 mean-variance relationship



1.4.23 SURVEY 23 (JANUARY 2024)

Plate 1-275 Guillemot survey 23 best fitting model scaled Pearsons residuals

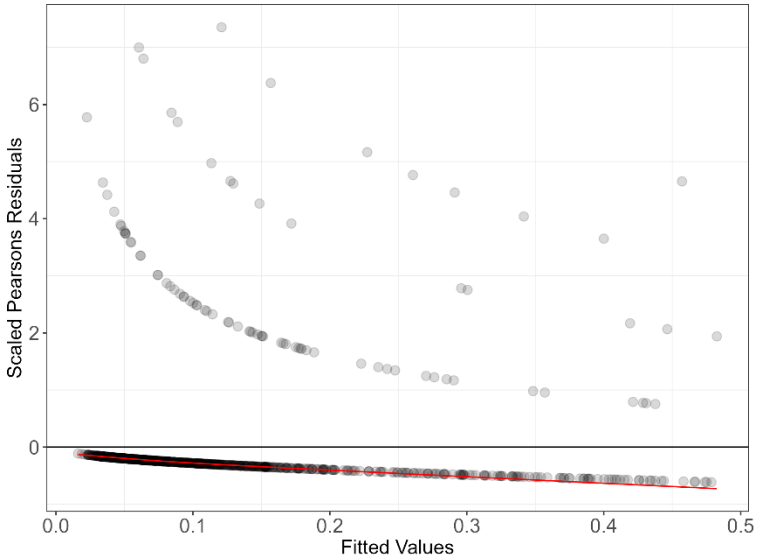


Plate 1-276 Guillemot survey 23 fitted versus observed

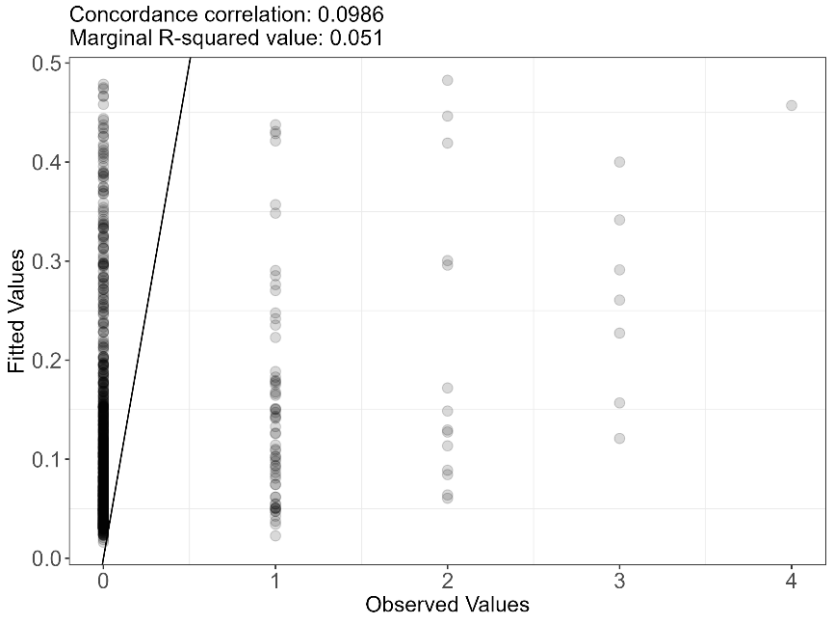


Plate 1-277 Guillemot survey 23 COVRATIO statistic

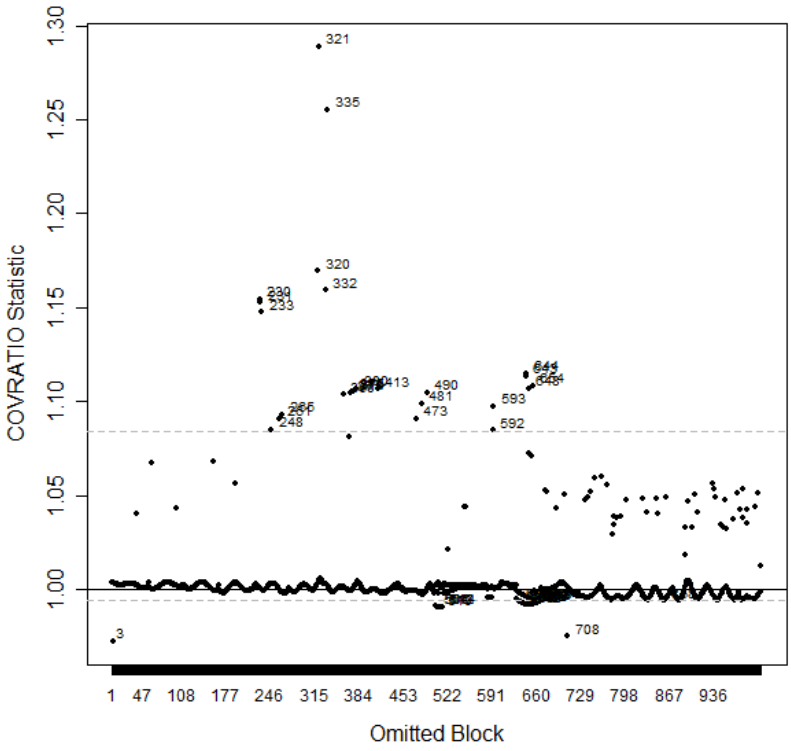


Plate 1-278 Guillemot survey 23 PRESS statistic

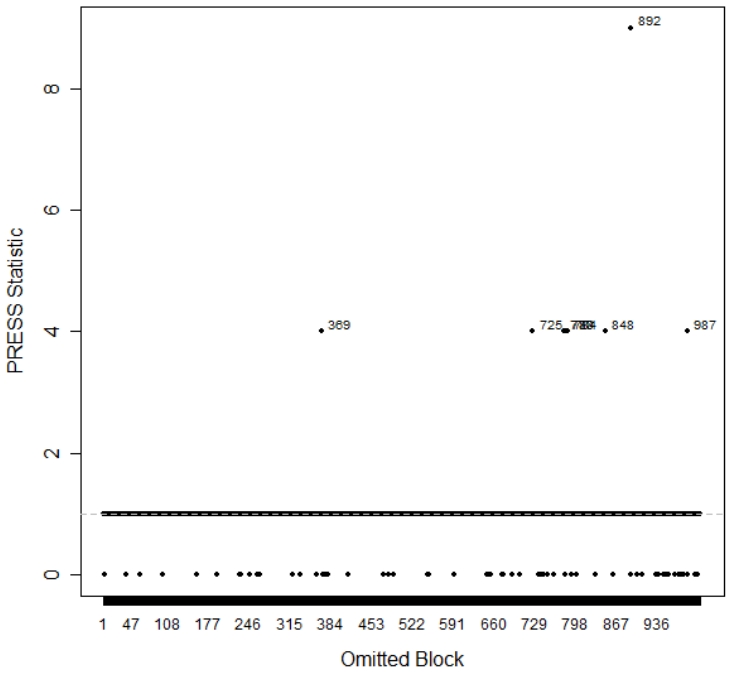
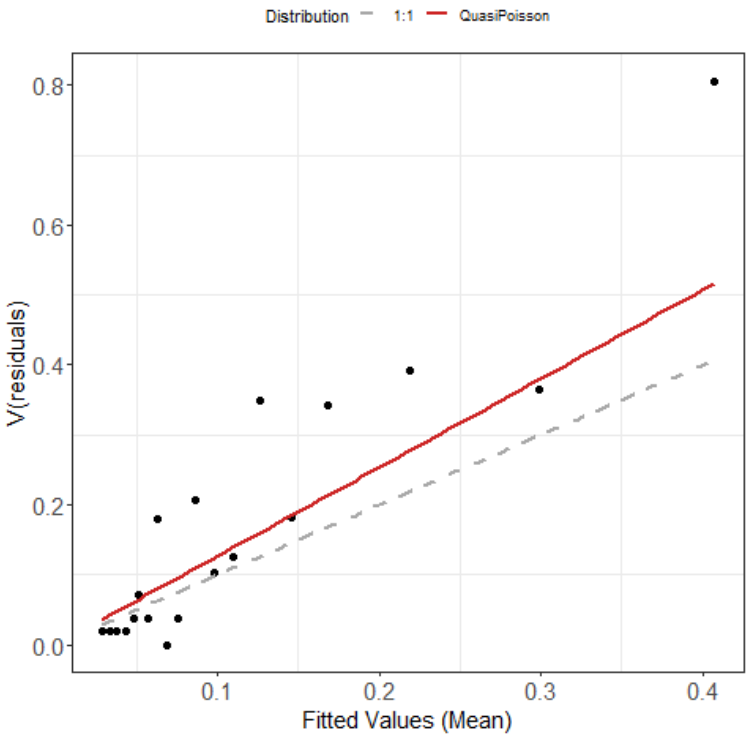


Plate 1-279 Guillemot survey 23 mean-variance relationship



1.4.24 SURVEY 24 (FEBRUARY 2024)

Plate 1-280 Guillemot survey 24 best fitting model scaled Pearsons residuals

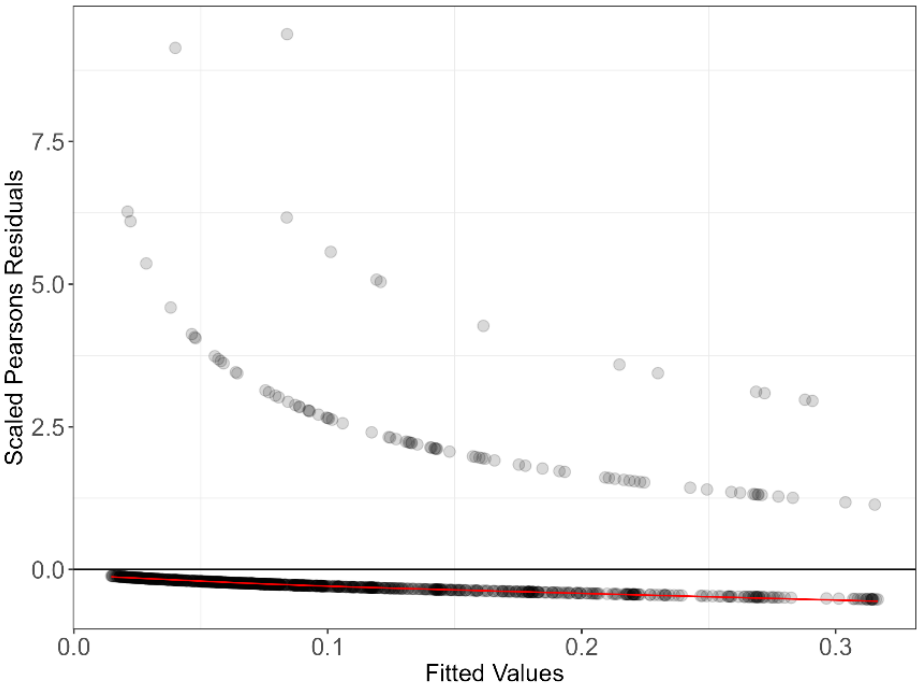


Plate 1-281 Guillemot survey 24 fitted versus observed

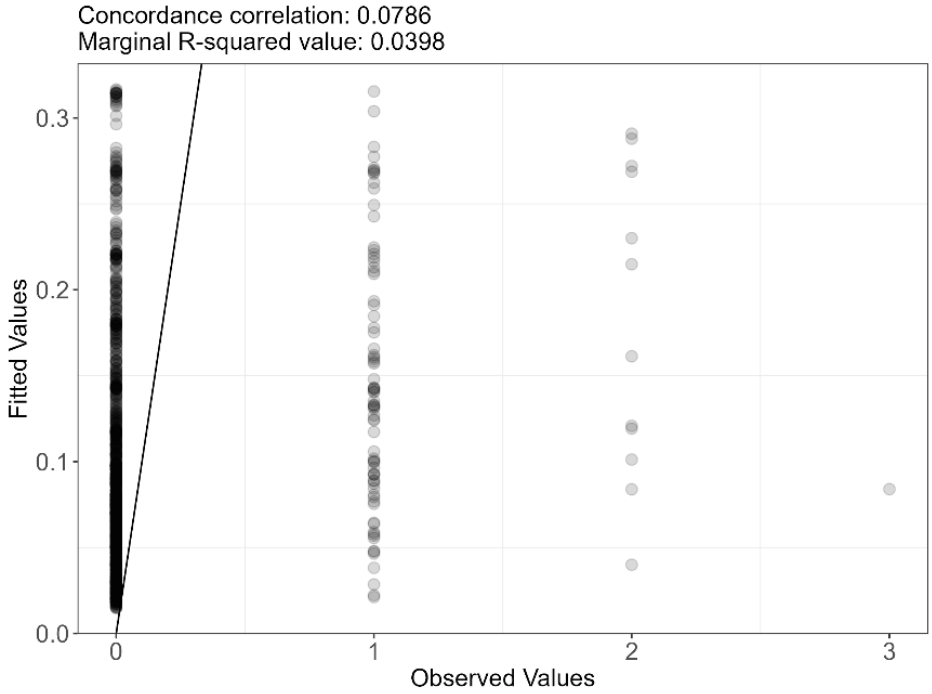


Plate 1-282 Guillemot survey 24 COVRATIO statistic

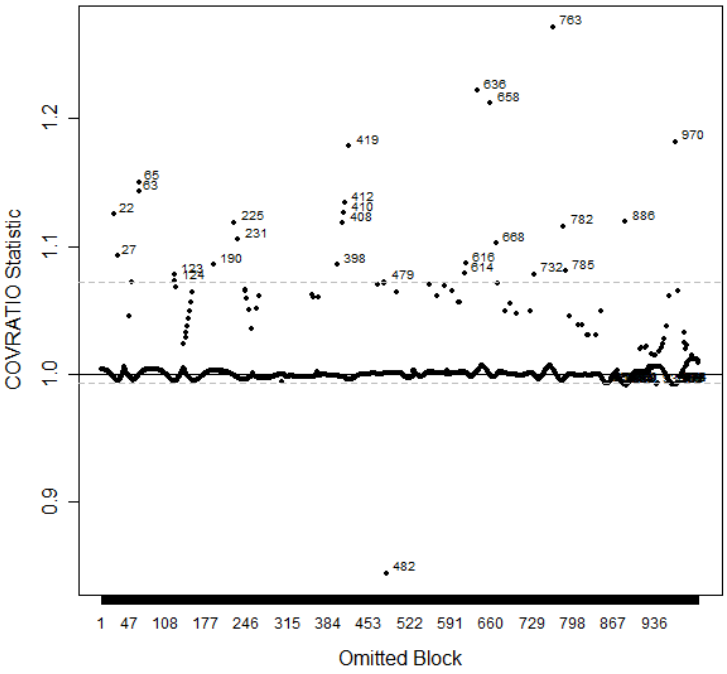


Plate 1-283 Guillemot survey 24 PRESS statistic

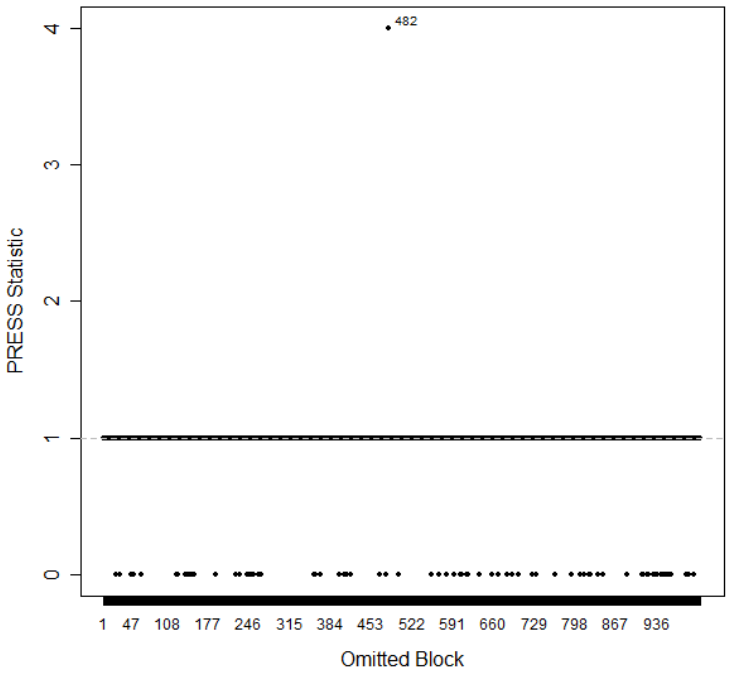
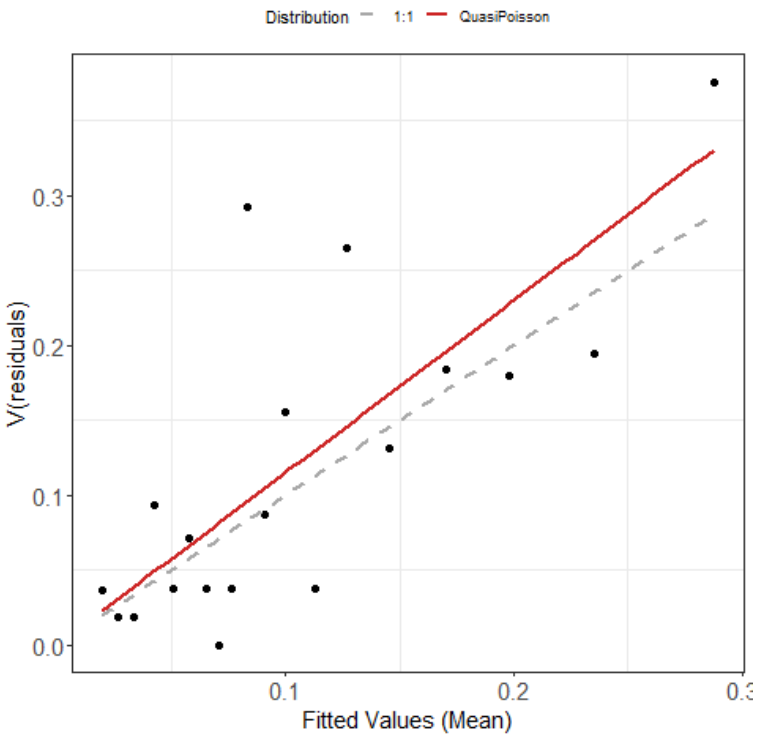


Plate 1-284 Guillemot survey 24 mean-variance relationship



1.5 RAZORBILL

1.5.1 SURVEY 01 (MARCH 2022)

Plate 1-285 Razorbill survey 01 best fitting model scaled Pearsons residuals

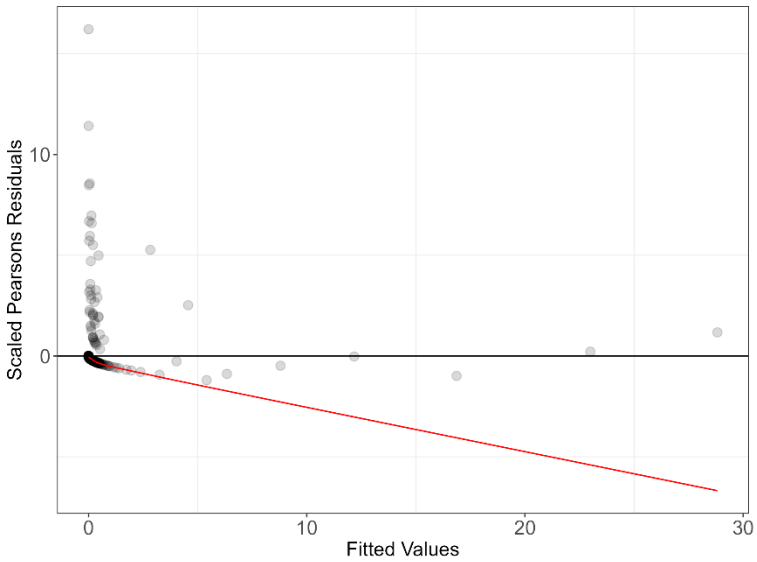


Plate 1-286 Razorbill survey 01 fitted versus observed

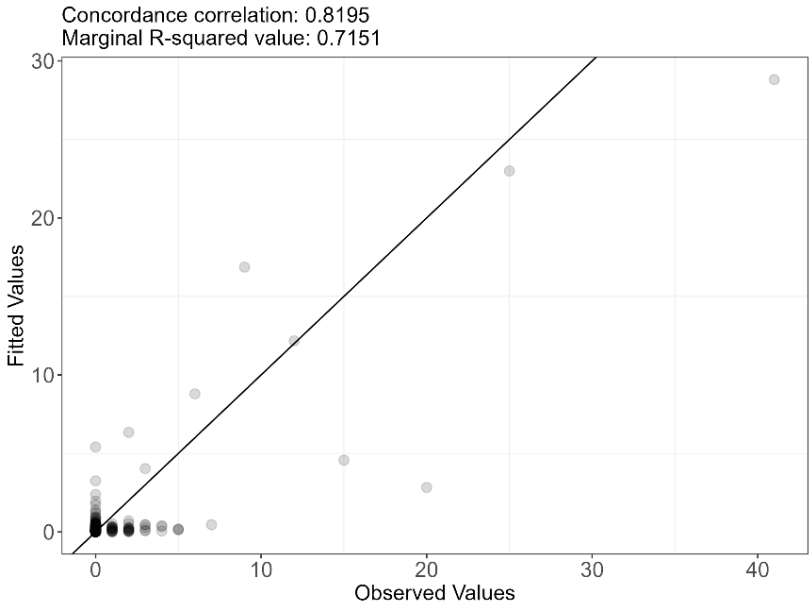


Plate 1-287 Razorbill survey 01 COVRATIO statistic

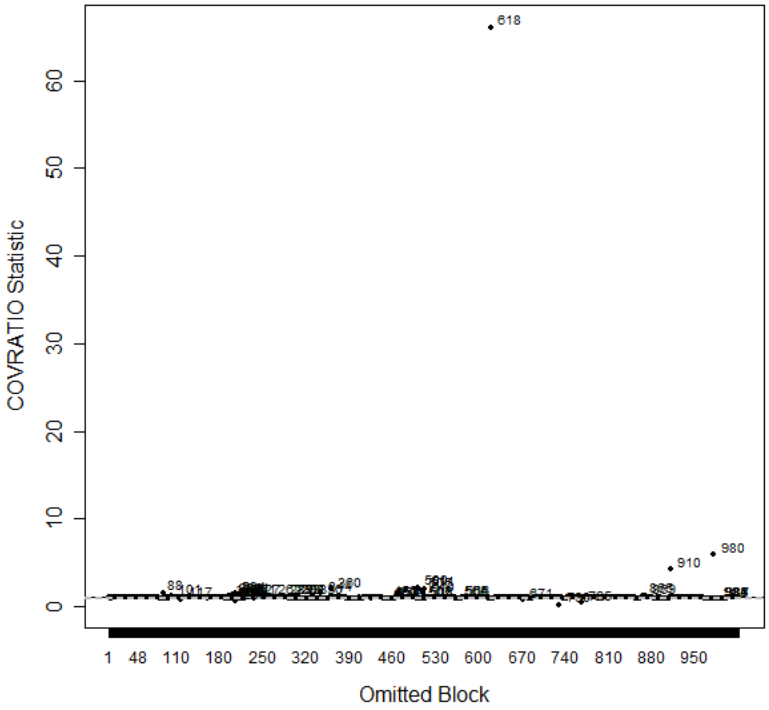


Plate 1-288 Razorbill survey 01 PRESS statistic

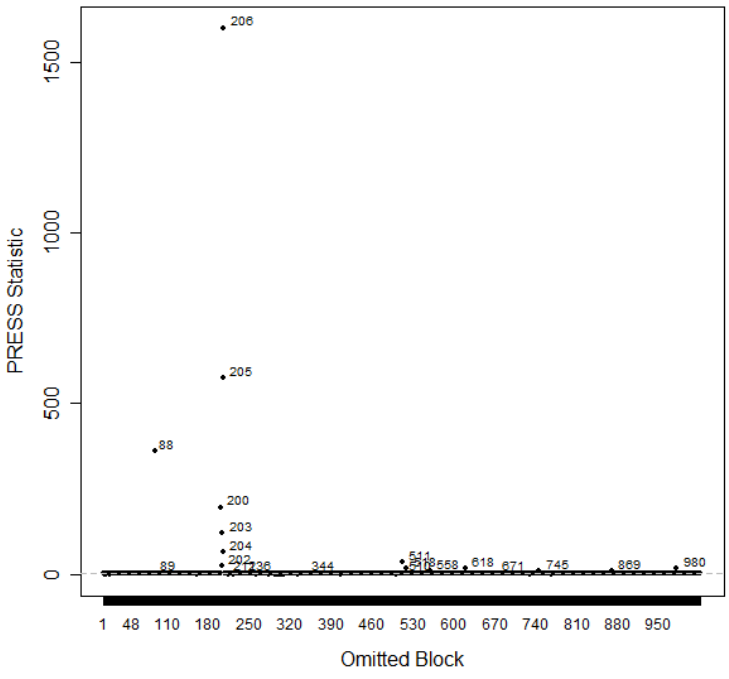
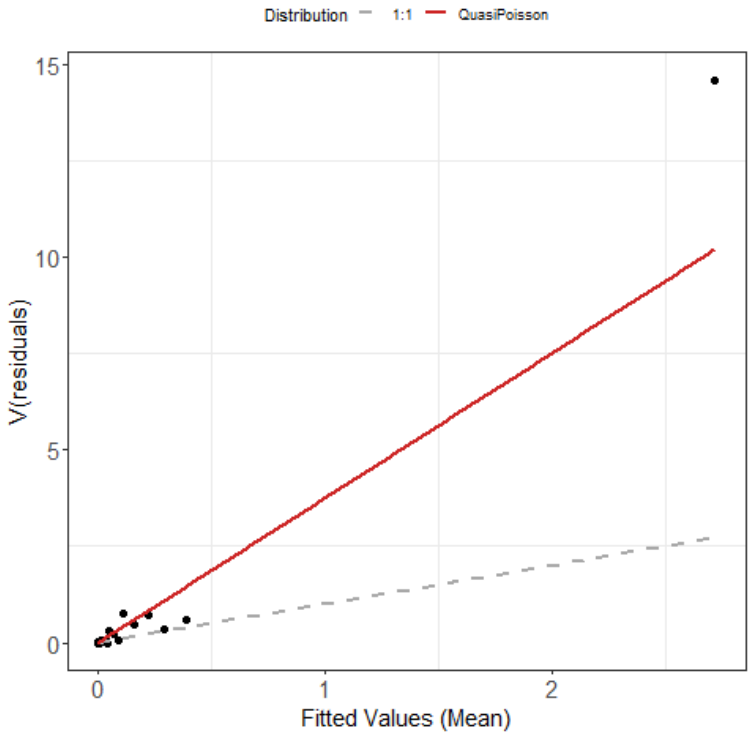


Plate 1-289 Razorbill survey 01 mean-variance relationship



1.5.2 SURVEY 02 (APRIL 2022)

Plate 1-290 Razorbill survey 02 best fitting model scaled Pearsons residuals

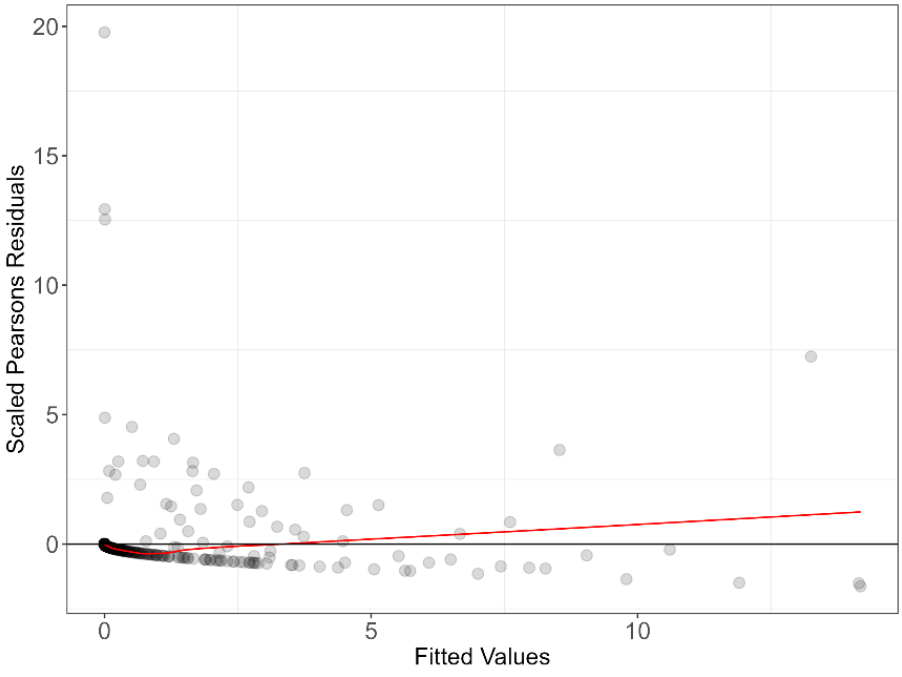


Plate 1-291 Razorbill survey 02 fitted versus observed

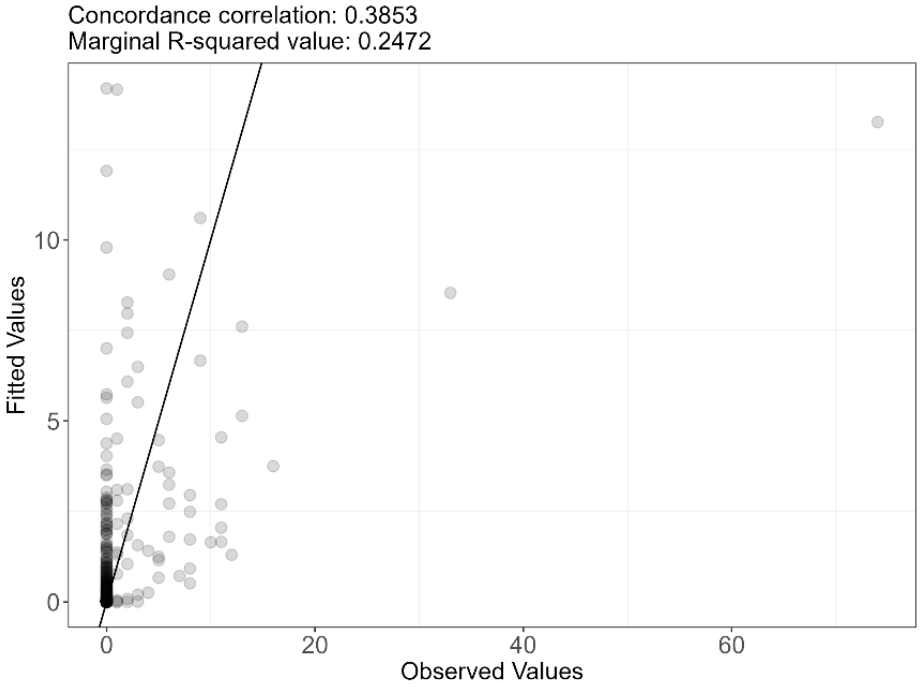


Plate 1-292 Razorbill survey 02 COVRATIO statistic

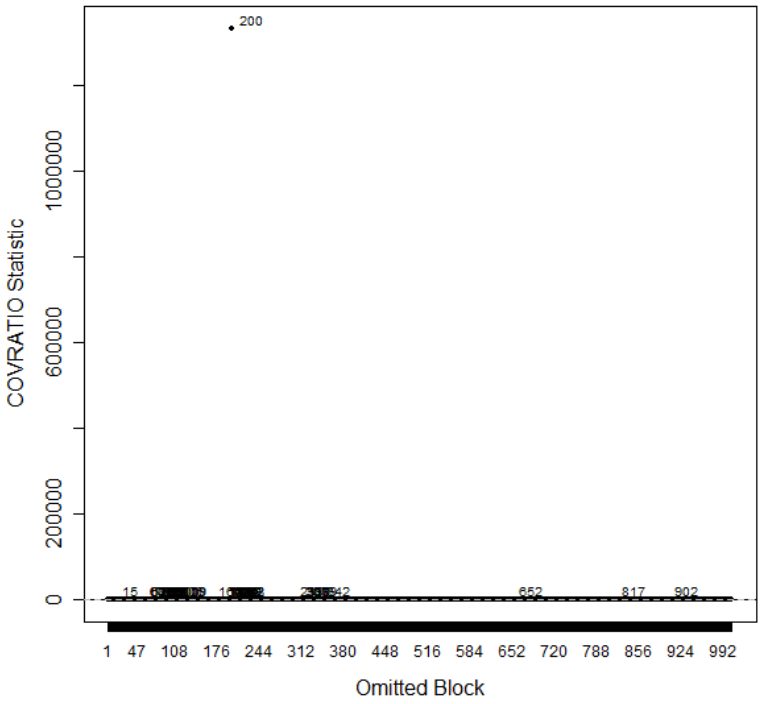


Plate 1-293 Razorbill survey 02 PRESS statistic

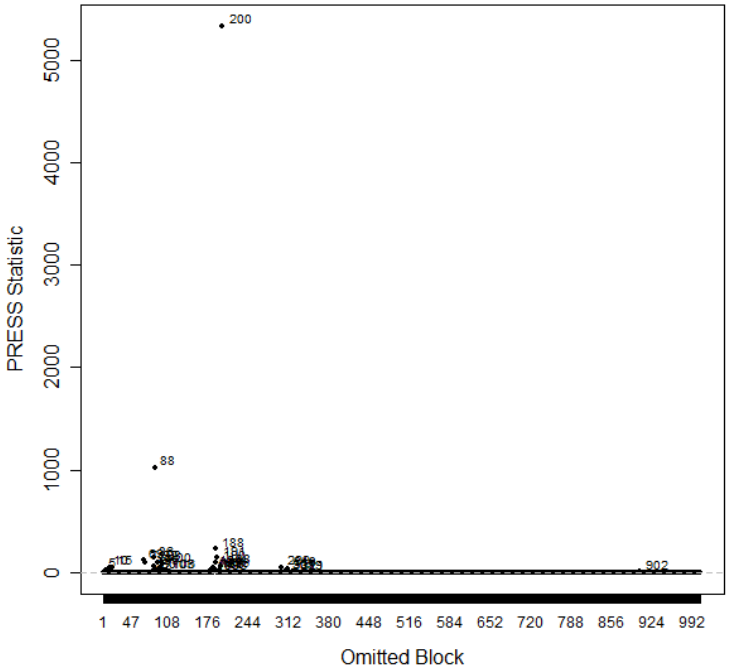
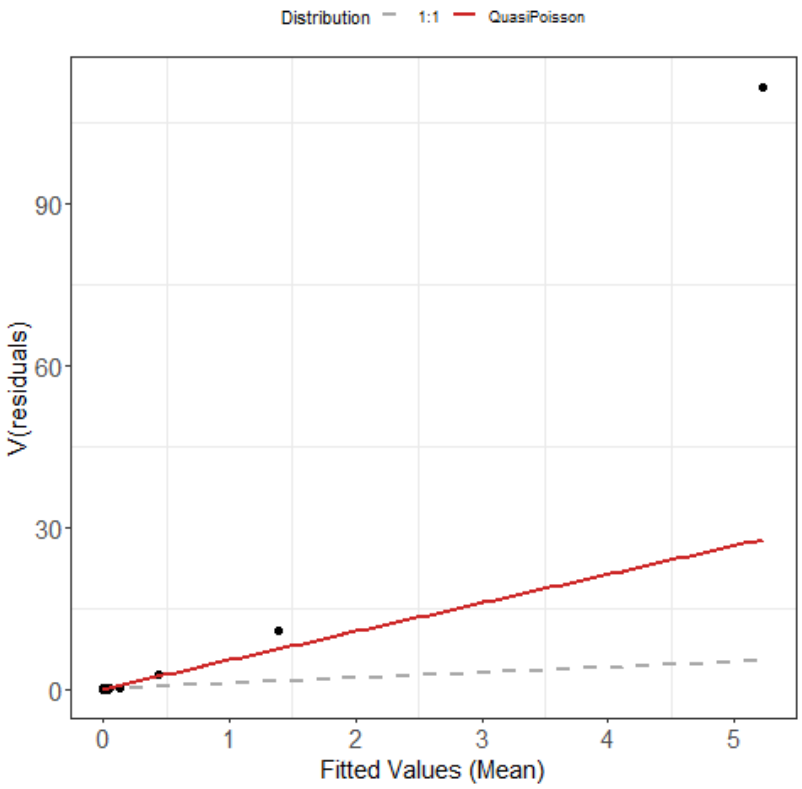


Plate 1-294 Razorbill survey 02 mean-variance relationship



1.5.3 SURVEY 03 (MAY 2022)

Plate 1-295 Razorbill survey 03 best fitting model scaled Pearsons residuals

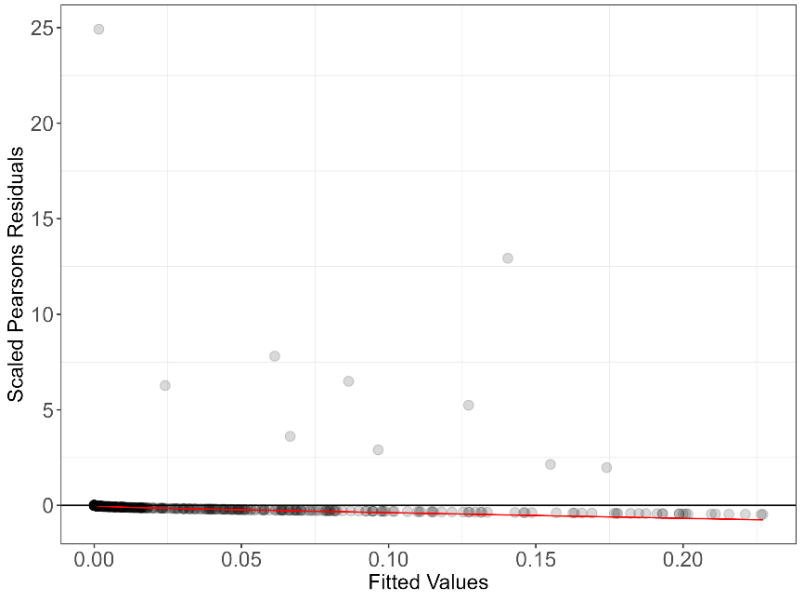


Plate 1-296 Razorbill survey 03 fitted versus observed

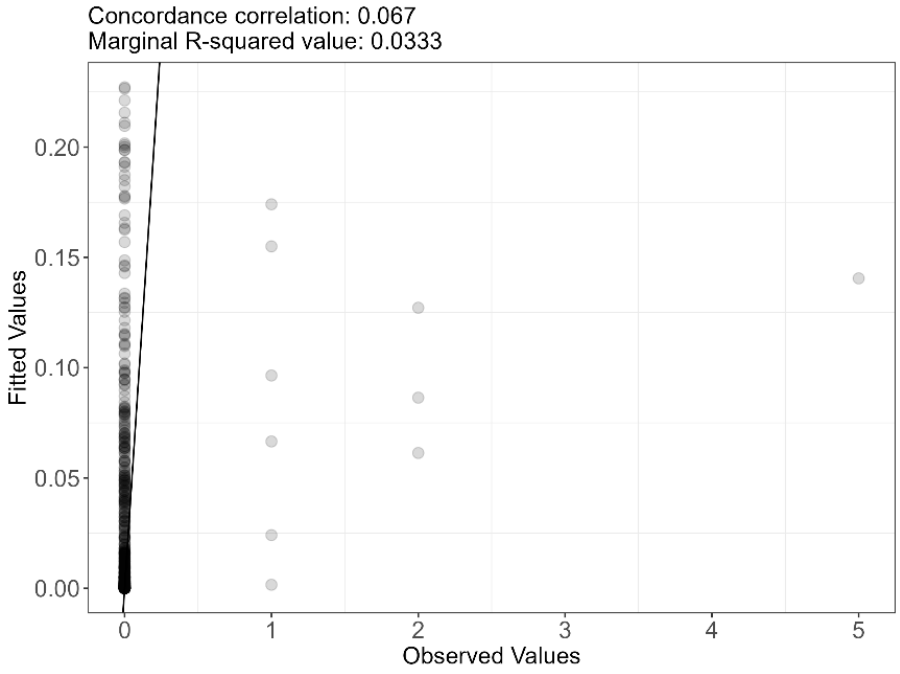


Plate 1-297 Razorbill survey 03 COVRATIO statistic

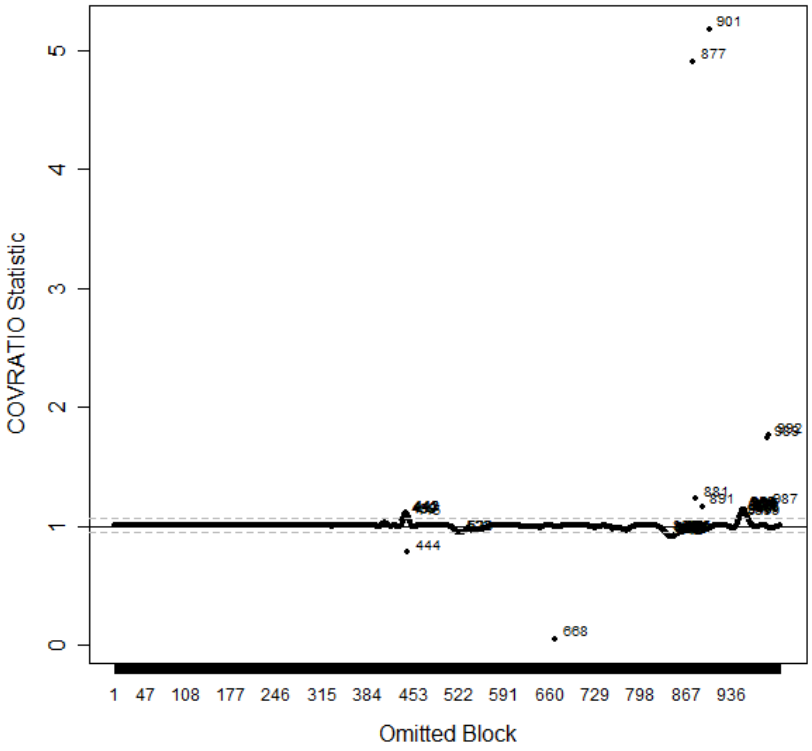


Plate 1-298 Razorbill survey 03 PRESS statistic

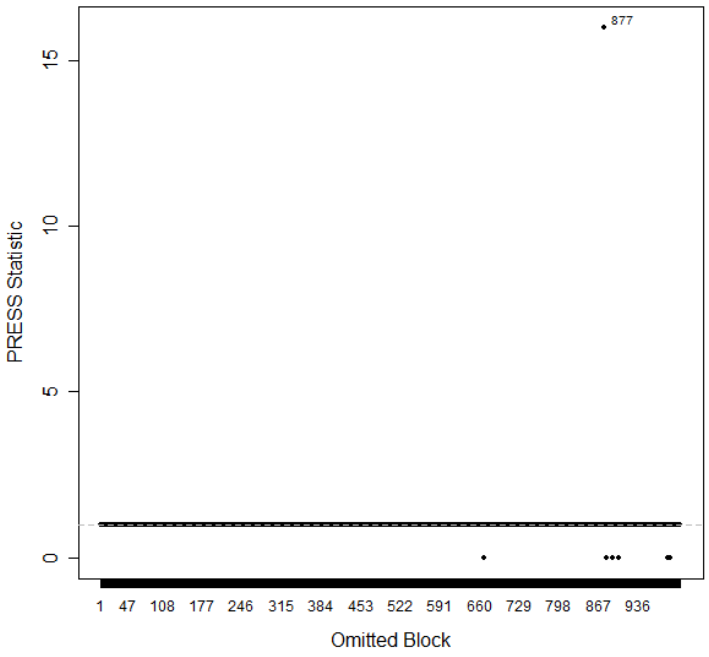
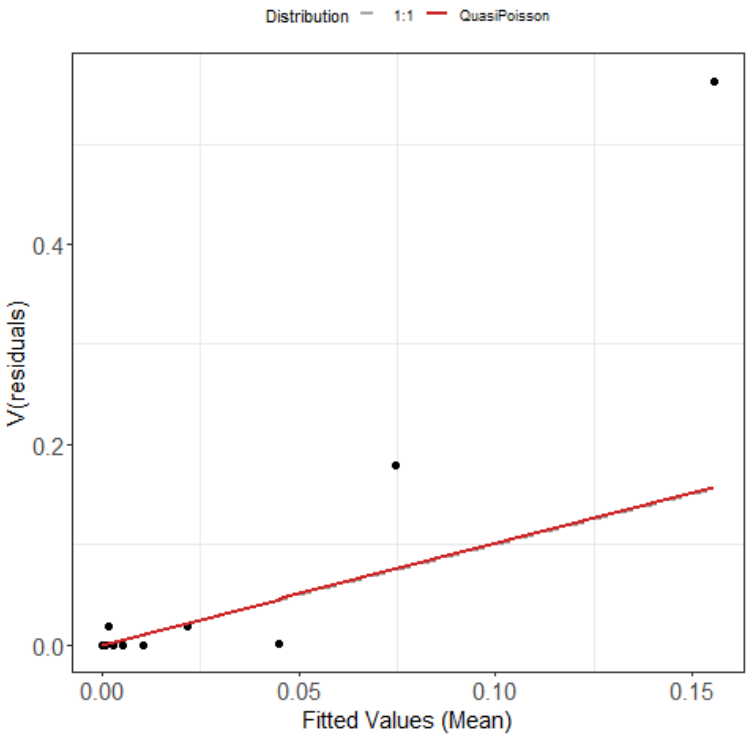


Plate 1-299 Razorbill survey 03 mean-variance relationship



1.5.4 SURVEY 05 (JULY 2022)

Plate 1-300 Razorbill survey 05 best fitting model scaled Pearsons residuals

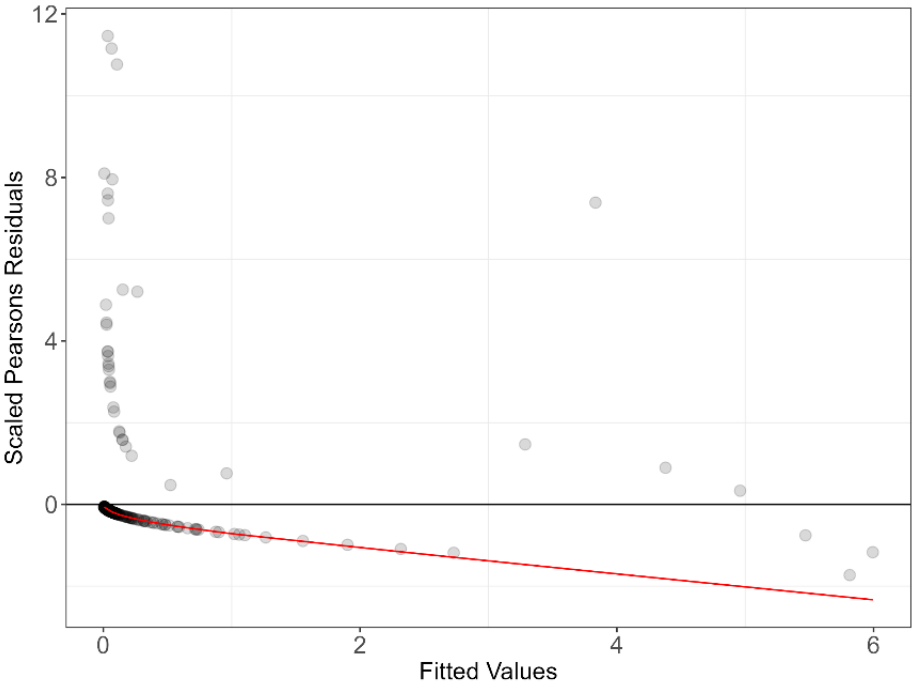


Plate 1-301 Razorbill survey 05 fitted versus observed

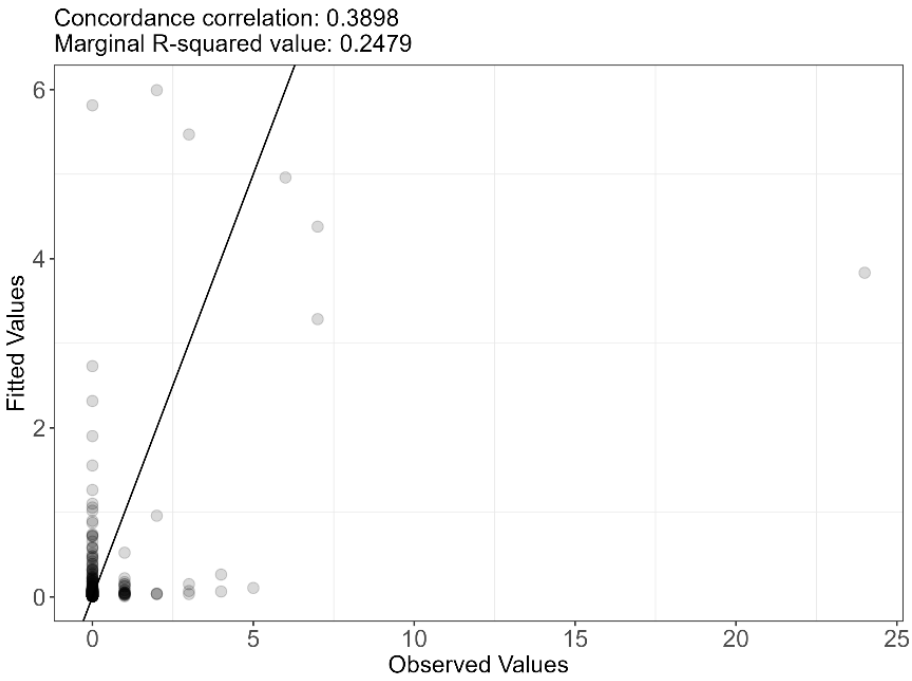


Plate 1-302 Razorbill survey 05 COVRATIO statistic

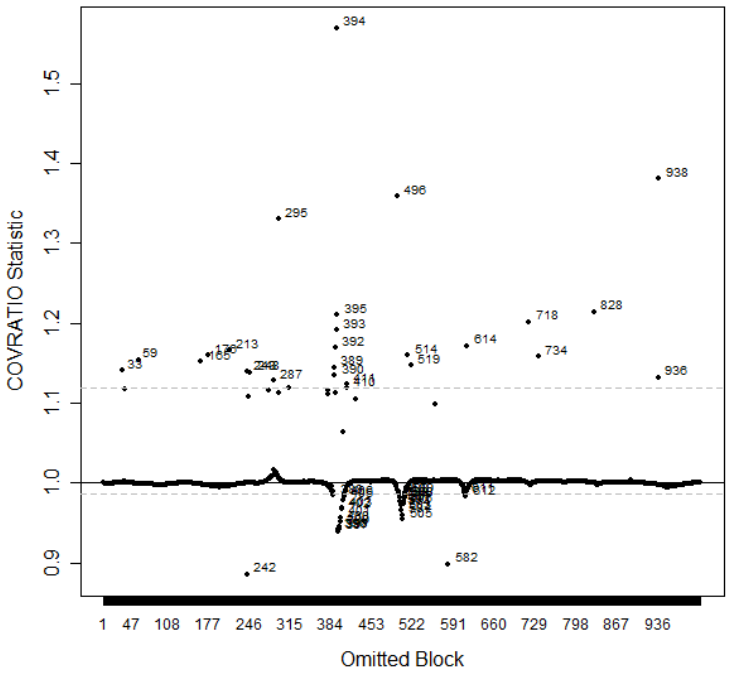


Plate 1-303 Razorbill survey 05 PRESS statistic

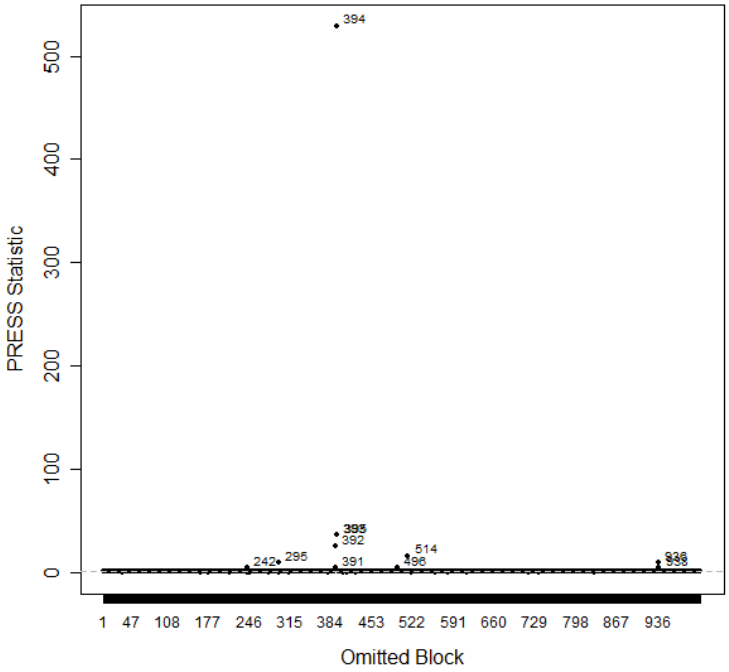
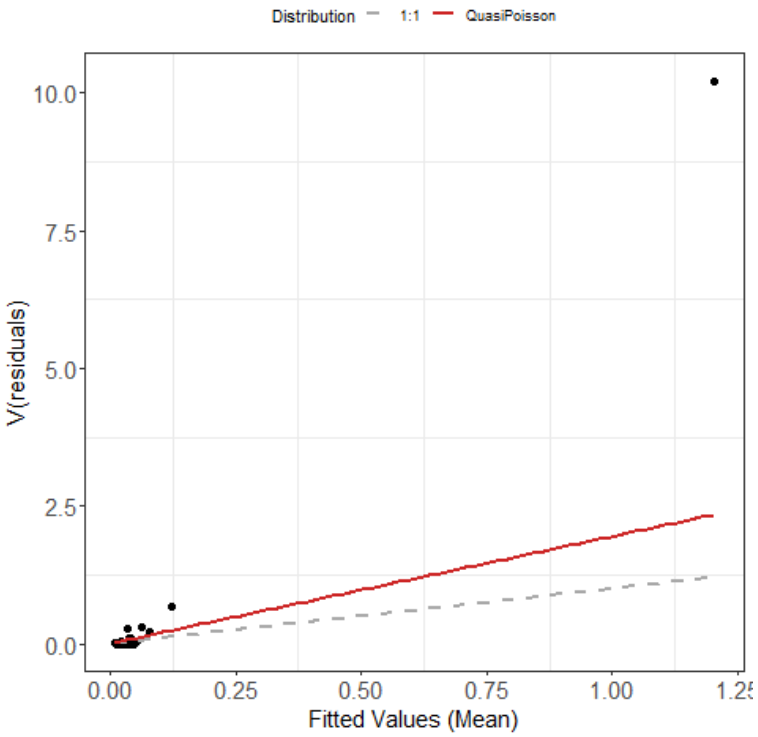


Plate 1-304 Razorbill survey 05 mean-variance relationship



1.5.5 SURVEY 07 (SEPTEMBER 2022)

Plate 1-305 Razorbill survey 07 best fitting model scaled Pearsons residuals

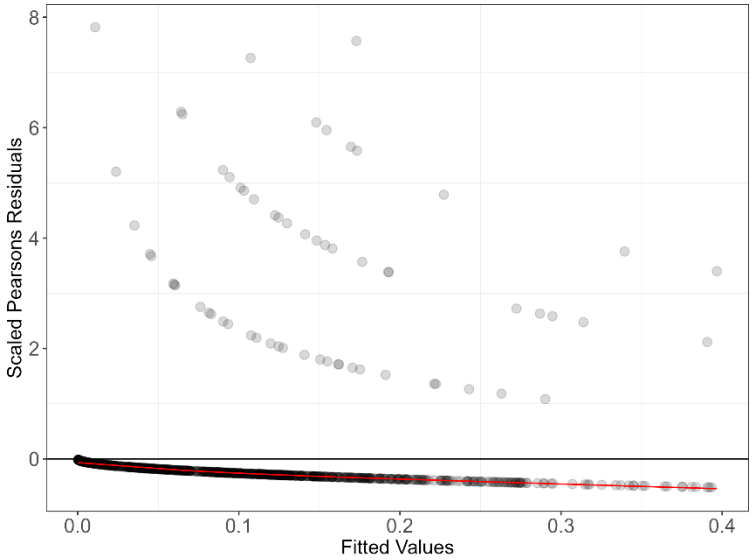


Plate 1-306 Razorbill survey 07 fitted versus observed

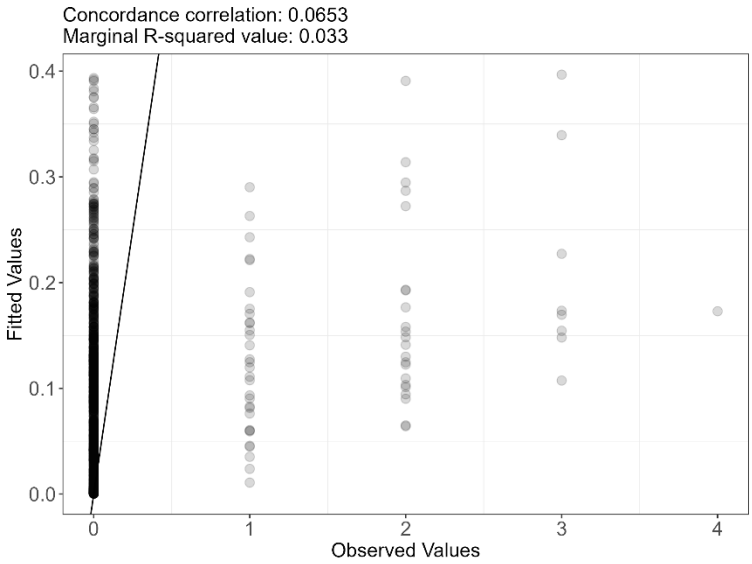


Plate 1-307Razorbill survey 07 COVRATIO statistic

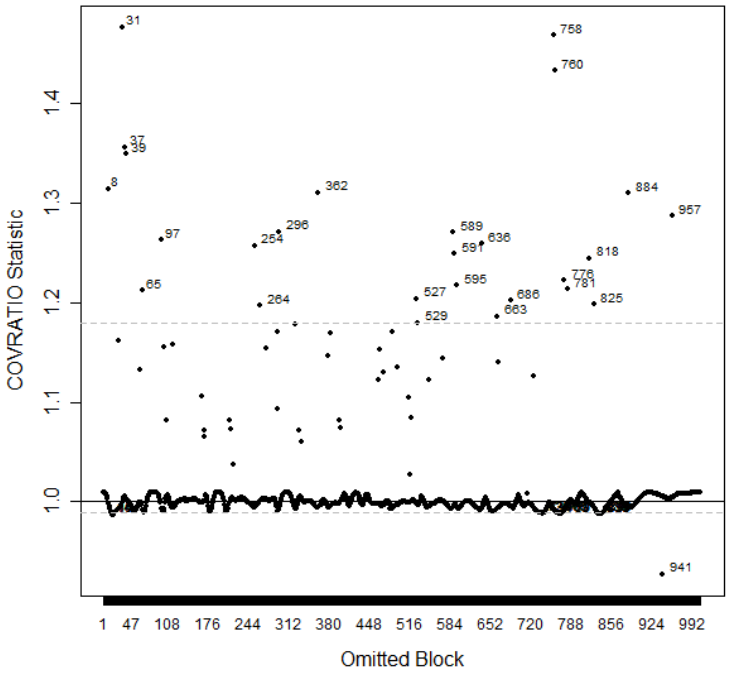


Plate 1-308 Razorbill survey 07 PRESS statistic

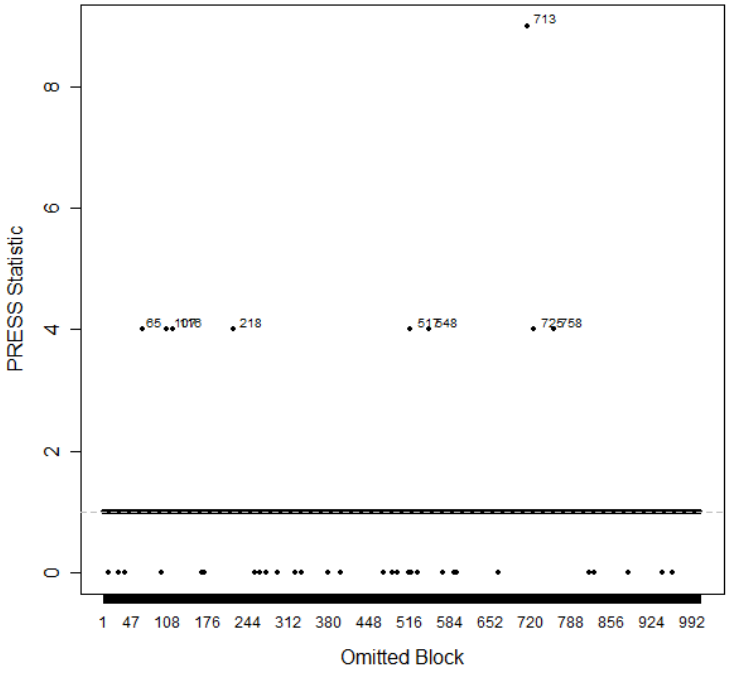
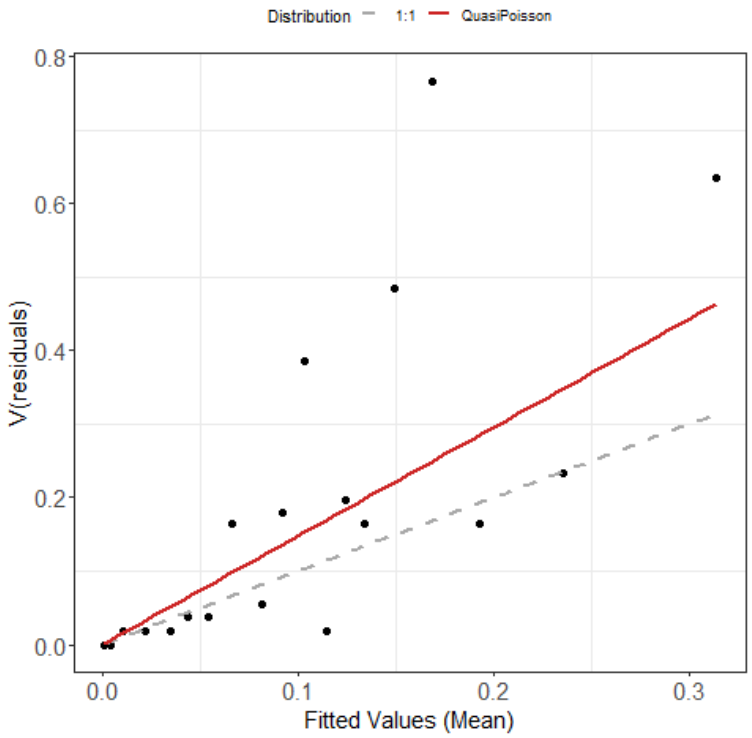


Plate 1-309 Razorbill survey 07 mean-variance relationship



1.5.6 SURVEY 12 (FEBRUARY 2023)

Plate 1-310 Razorbill survey 12 best fitting model scaled Pearsons residuals

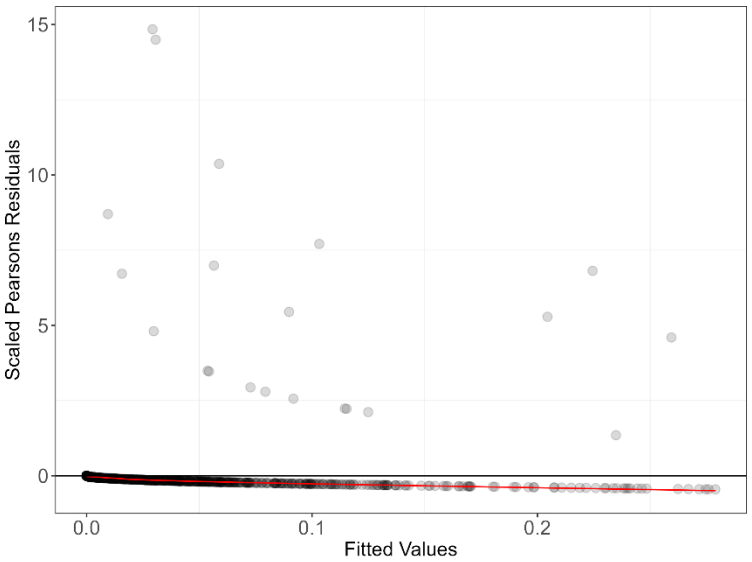


Plate 1-311 Razorbill survey 12 fitted versus observed

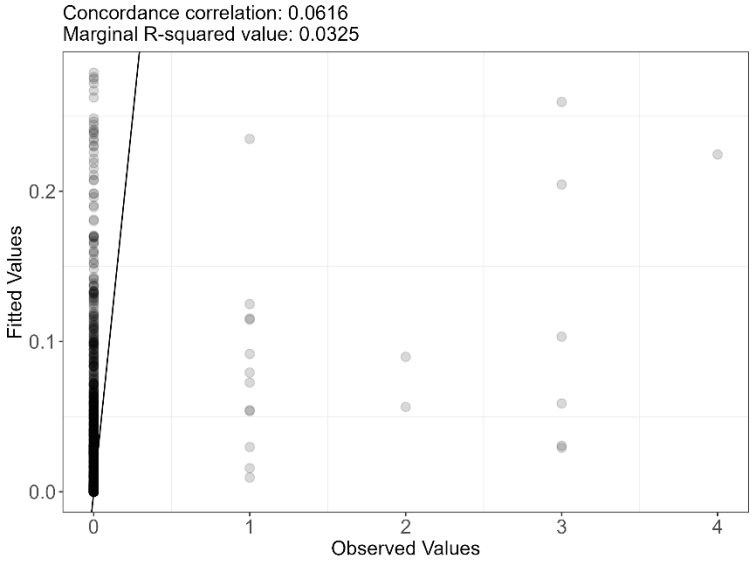


Plate 1-312 Razorbill survey 12 COVRATIO statistic

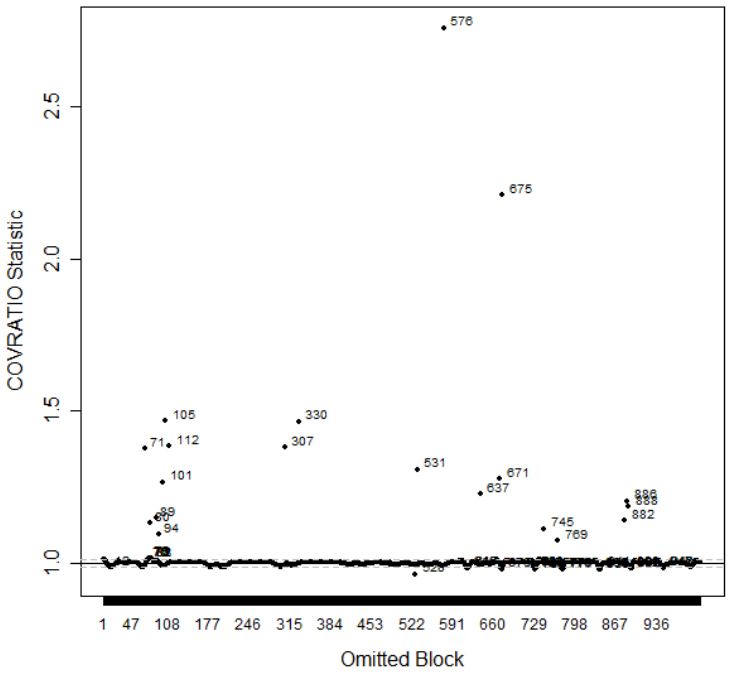


Plate 1-313 Razorbill survey 12 PRESS statistic

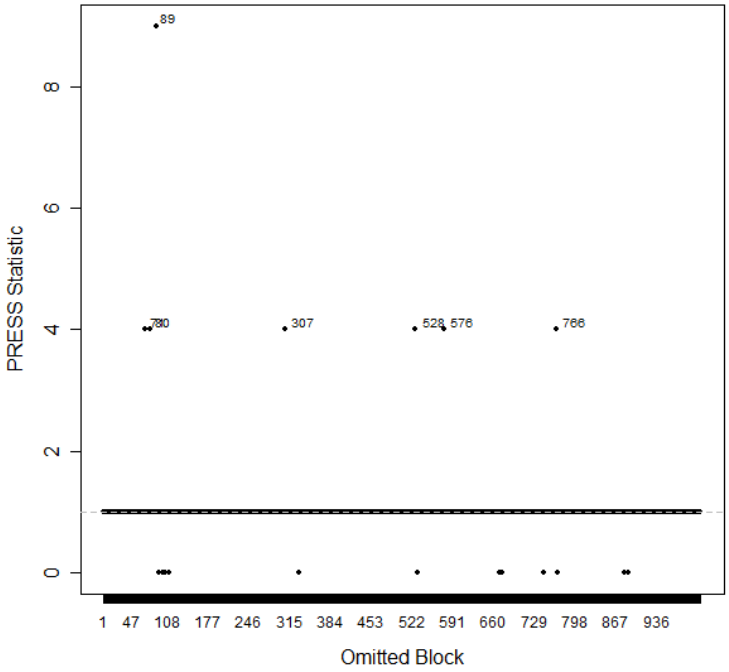
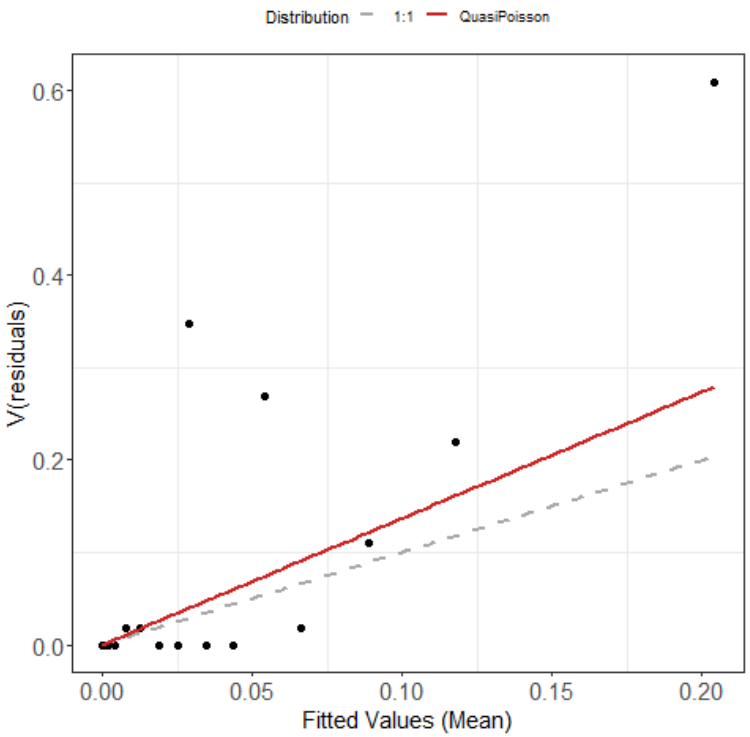


Plate 1-314 Razorbill survey 12 mean-variance relationship



1.5.7 SURVEY 13 (MARCH 2023)

Plate 1-315 Razorbill survey 13 best fitting model scaled Pearsons residuals

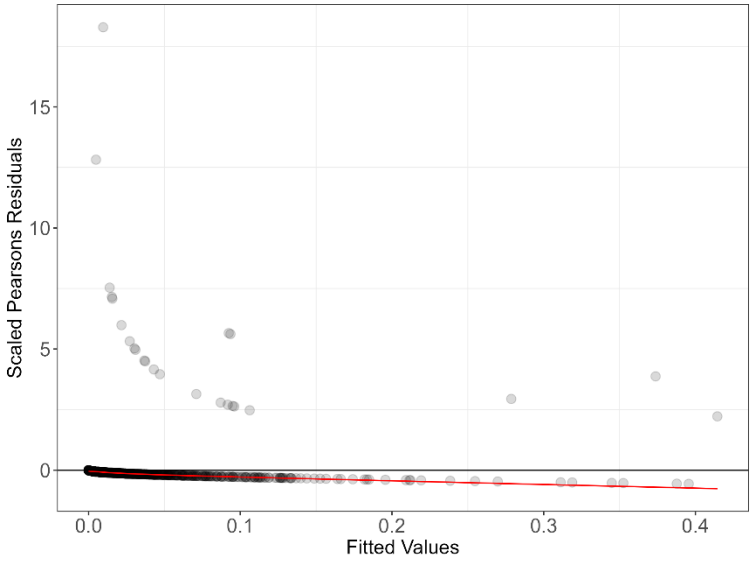


Plate 1-316 Razorbill survey 13 fitted versus observed

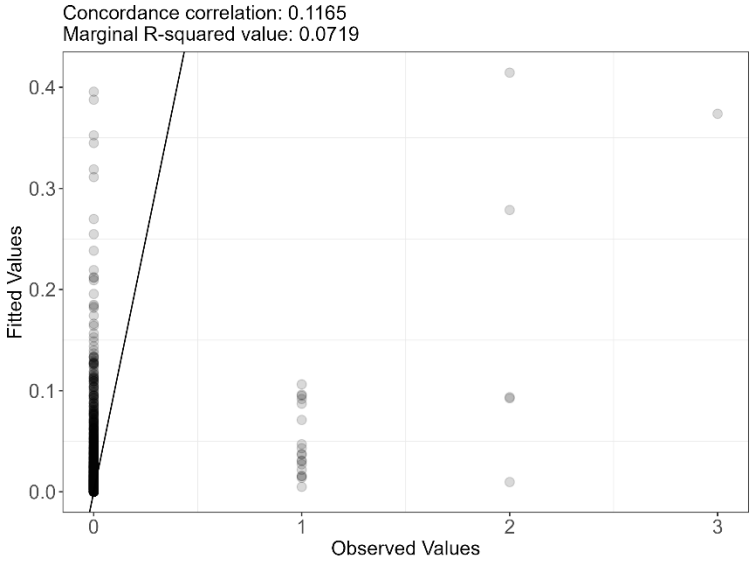


Plate 1-317 Razorbill survey 13 COVRATIO statistic

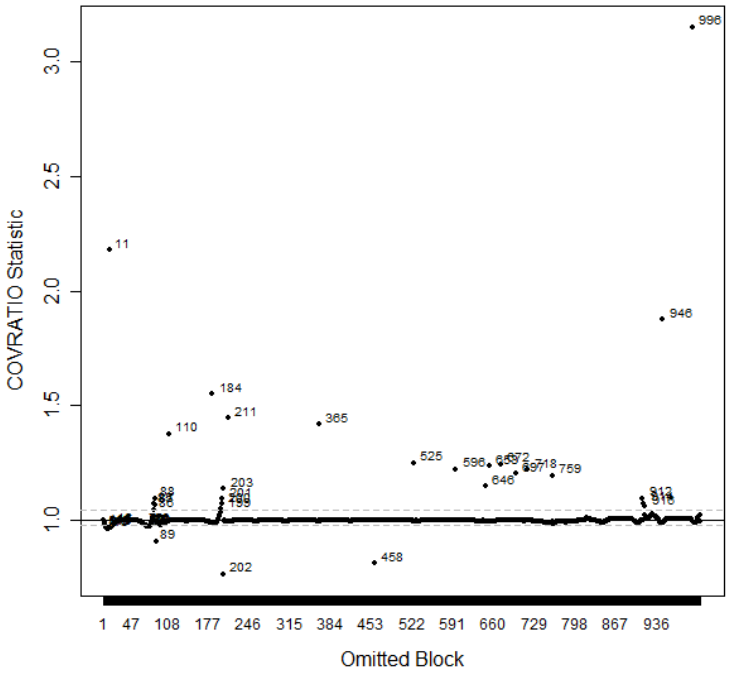


Plate 1-318 Razorbill survey 13 PRESS statistic

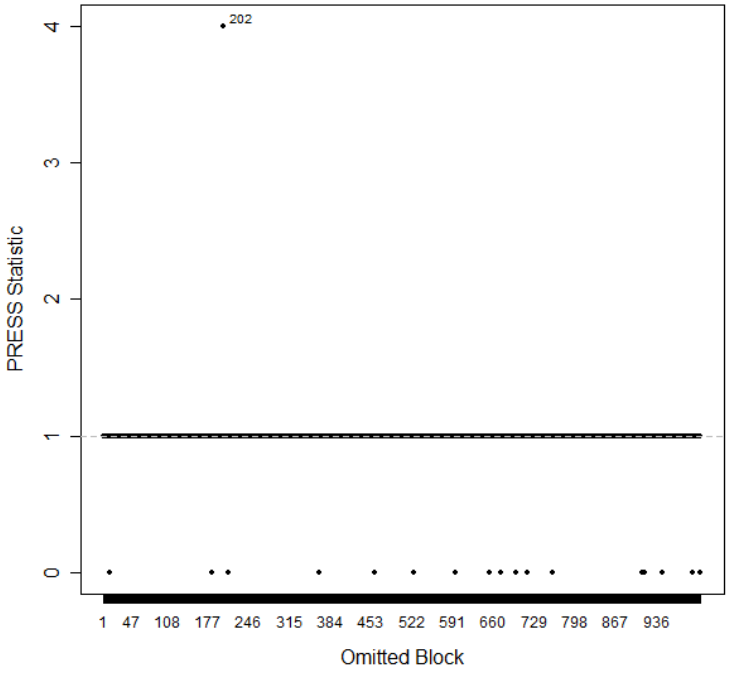
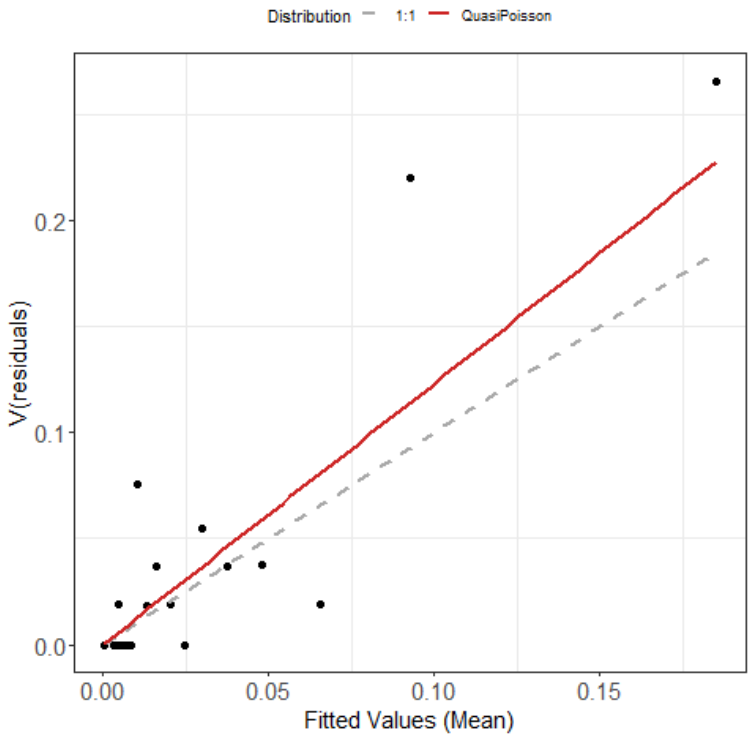


Plate 1-319 Razorbill survey 13 mean-variance relationship



1.5.8 SURVEY 14 (APRIL 2023)

Plate 1-320 Razorbill survey 14 best fitting model scaled Pearsons residuals

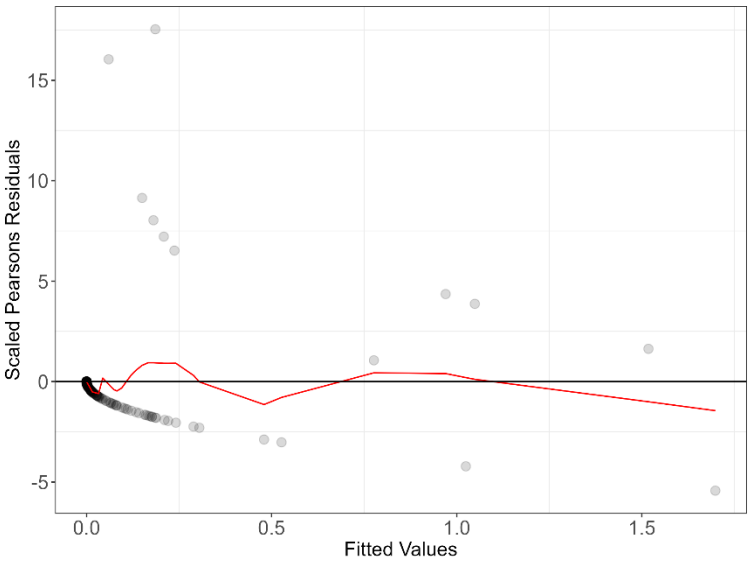


Plate 1-321 Razorbill survey 14 fitted versus observed

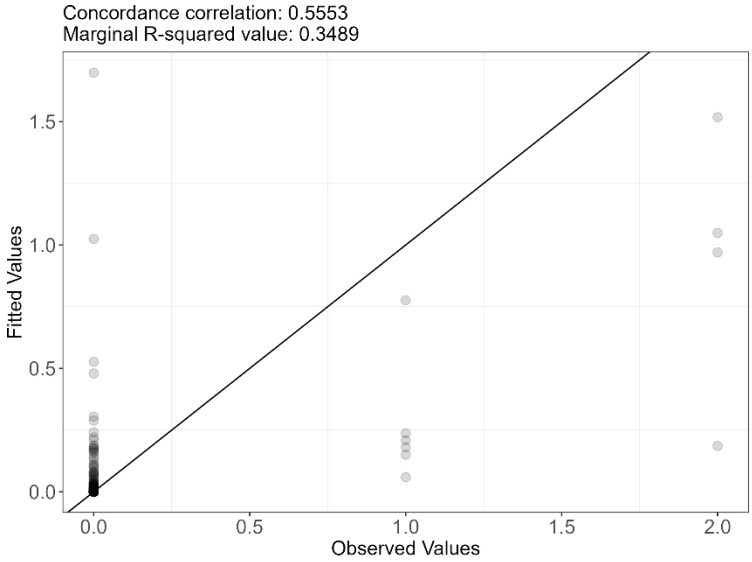


Plate 1-322 Razorbill survey 14 COVRATIO statistic

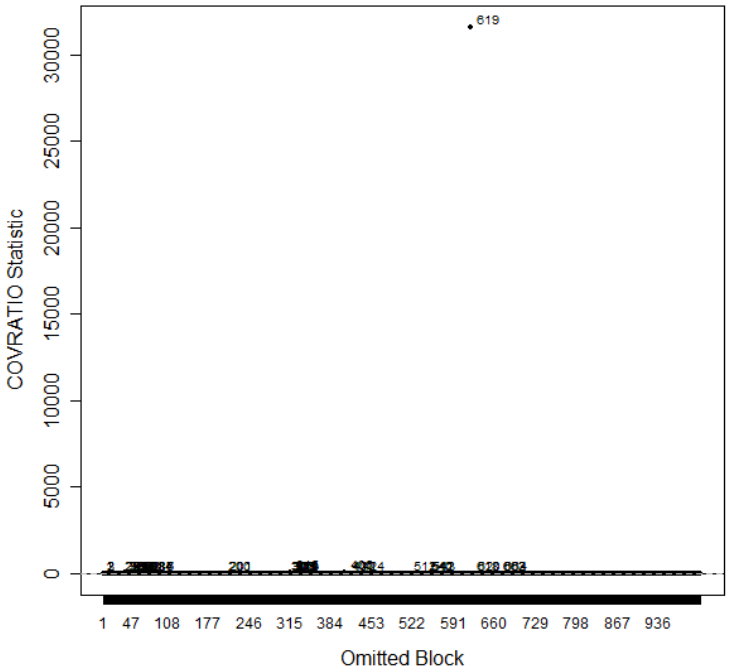


Plate 1-323 Razorbill survey 14 PRESS statistic

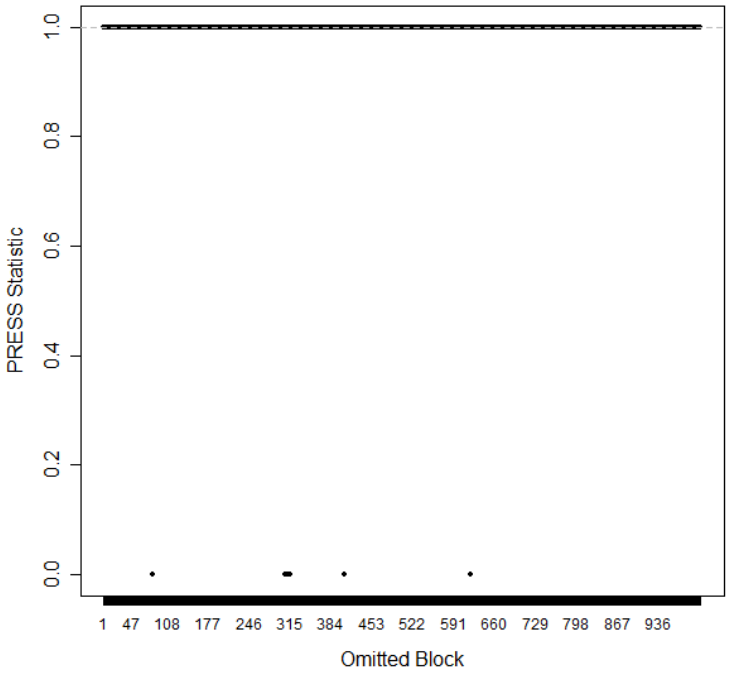
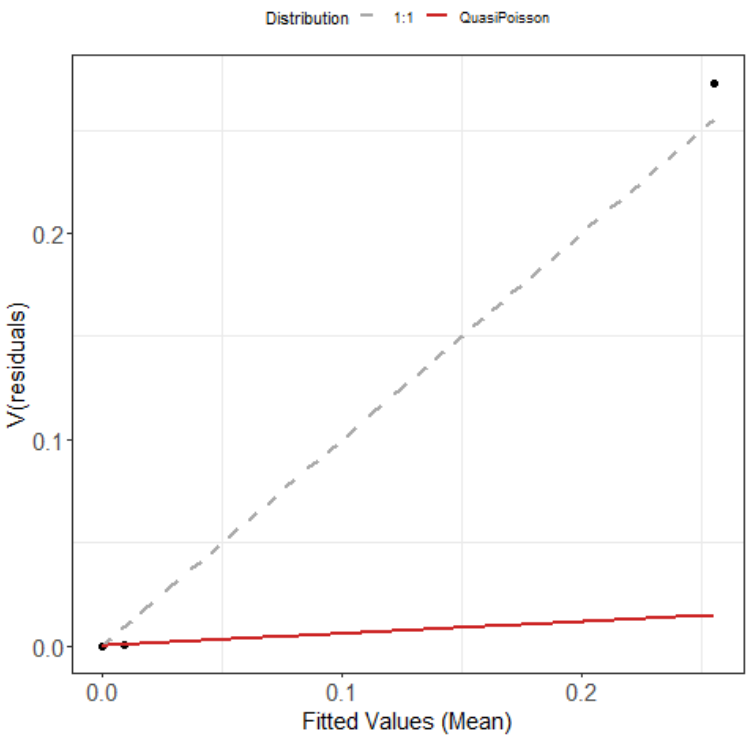


Plate 1-324 Razorbill survey 14 mean-variance relationship



1.5.9 SURVEY 15 (MAY 2023)

Plate 1-325 Razorbill survey 15 best fitting model scaled Pearsons residuals

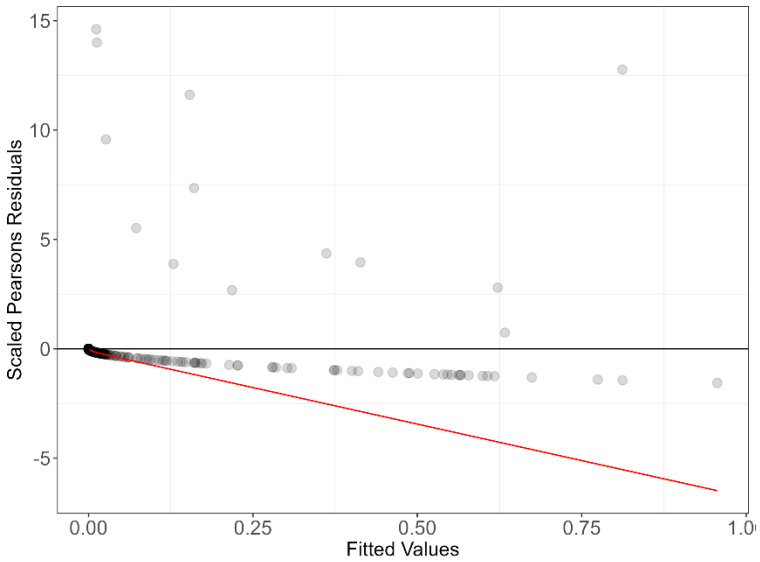


Plate 1-326 Razorbill survey 15 fitted versus observed

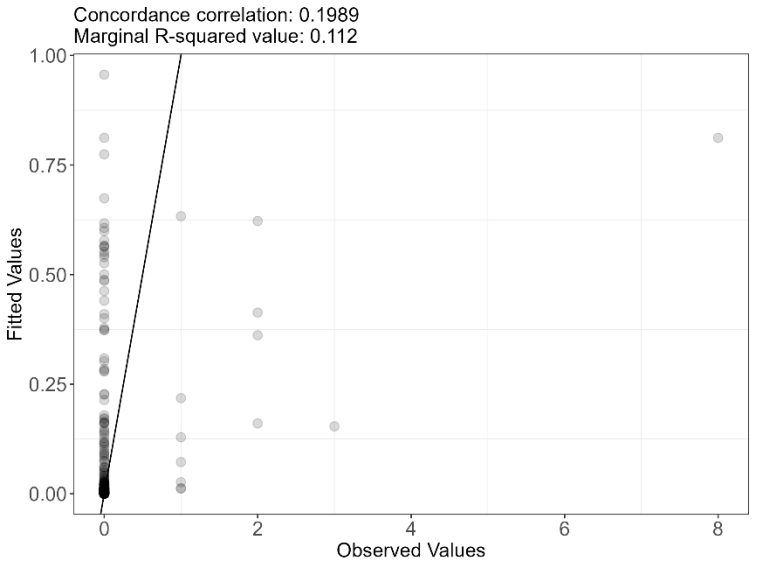


Plate 1-327 Razorbill survey 15 COVRATIO statistic

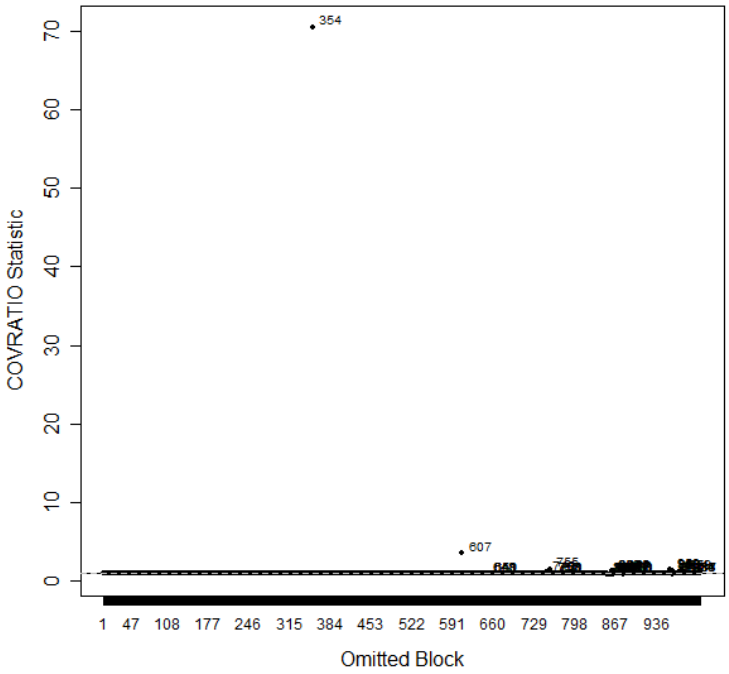


Plate 1-328 Razorbill survey 15 PRESS statistic

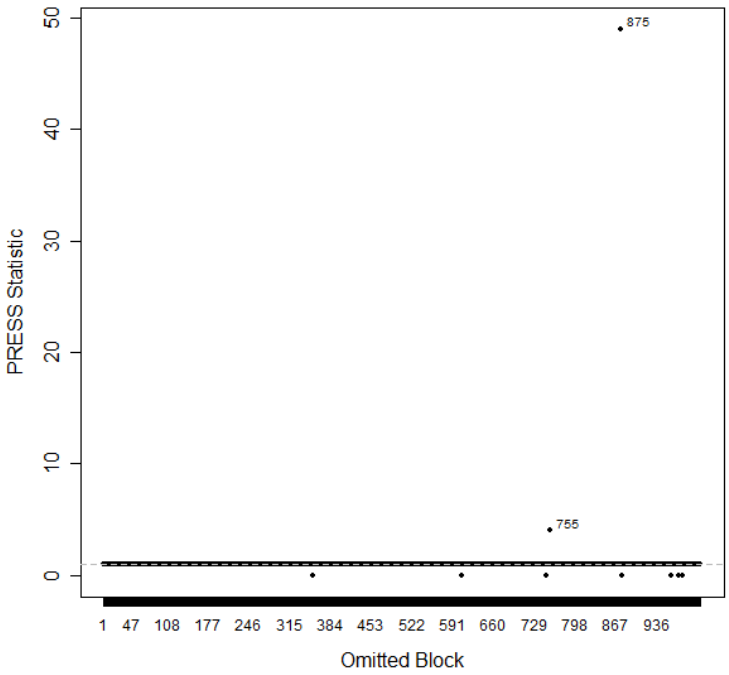
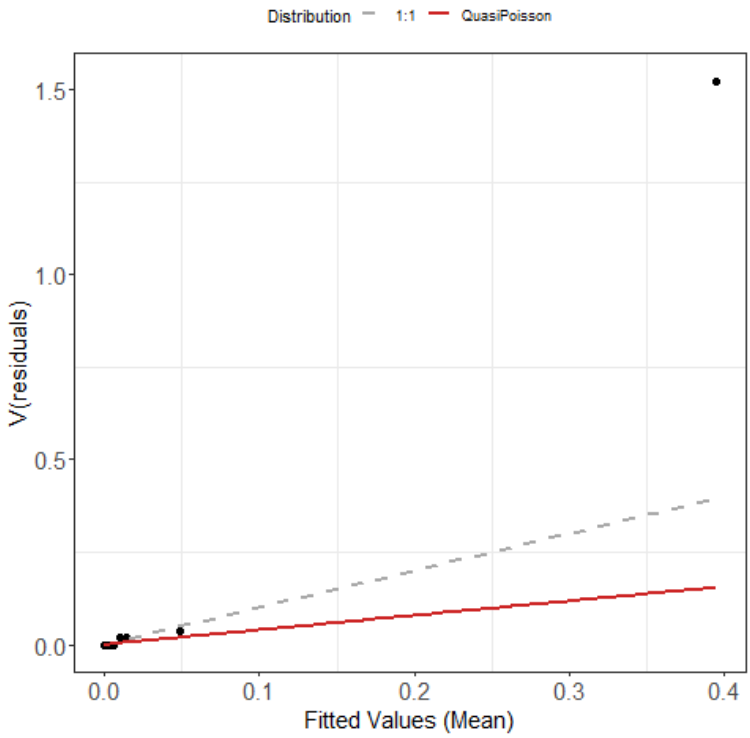


Plate 1-329 Razorbill survey 15 mean-variance relationship



1.5.10 SURVEY 16 (JUNE 2023)

Plate 1-330 Razorbill survey 16 best fitting model scaled Pearsons residuals

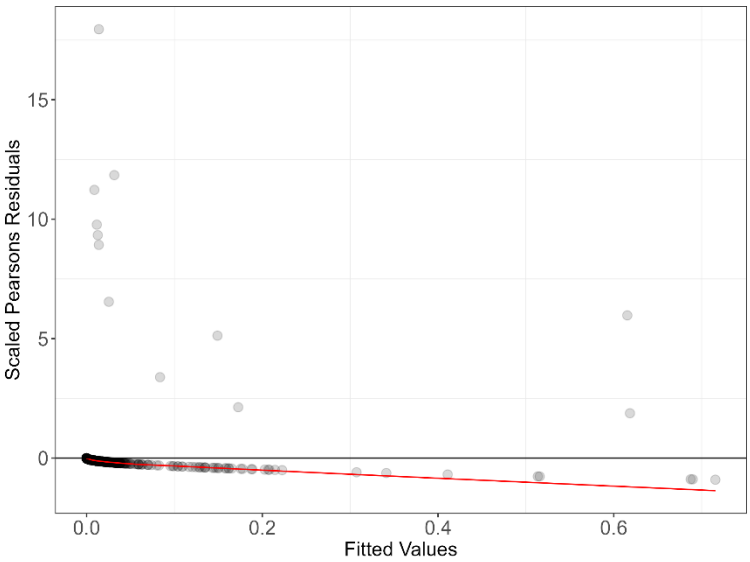


Plate 1-331 Razorbill survey 16 fitted versus observed

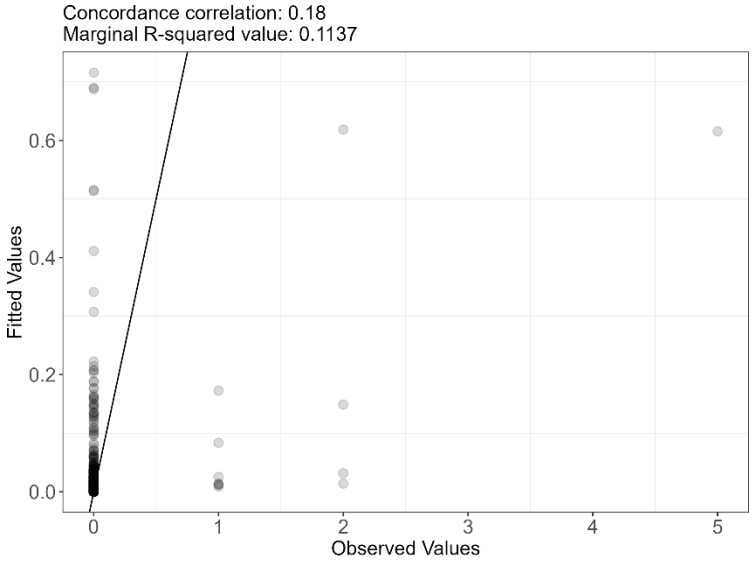


Plate 1-332 Razorbill survey 16 COVRATIO statistic

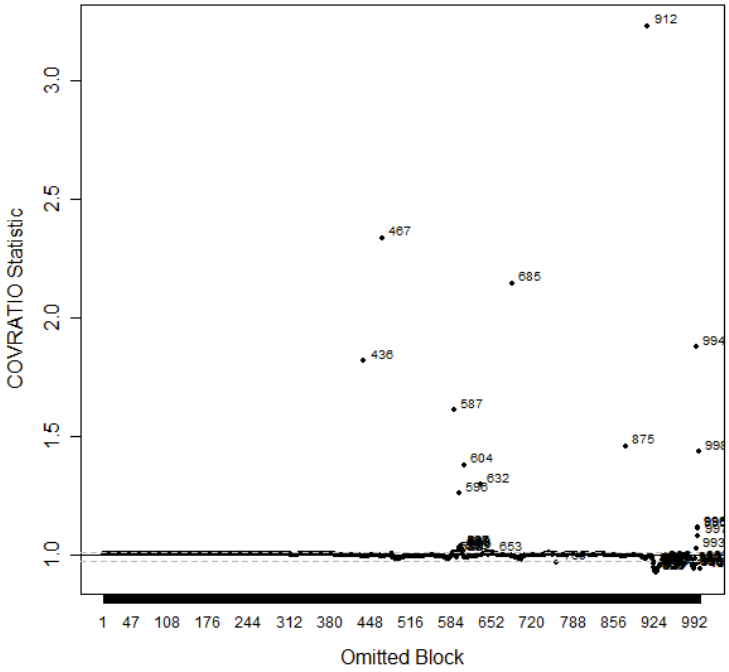


Plate 1-333 Razorbill survey 16 PRESS statistic

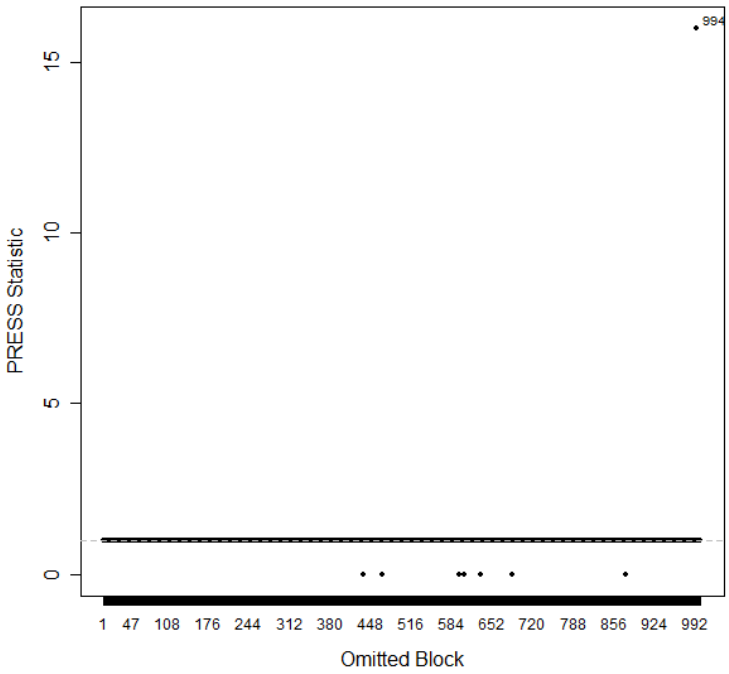
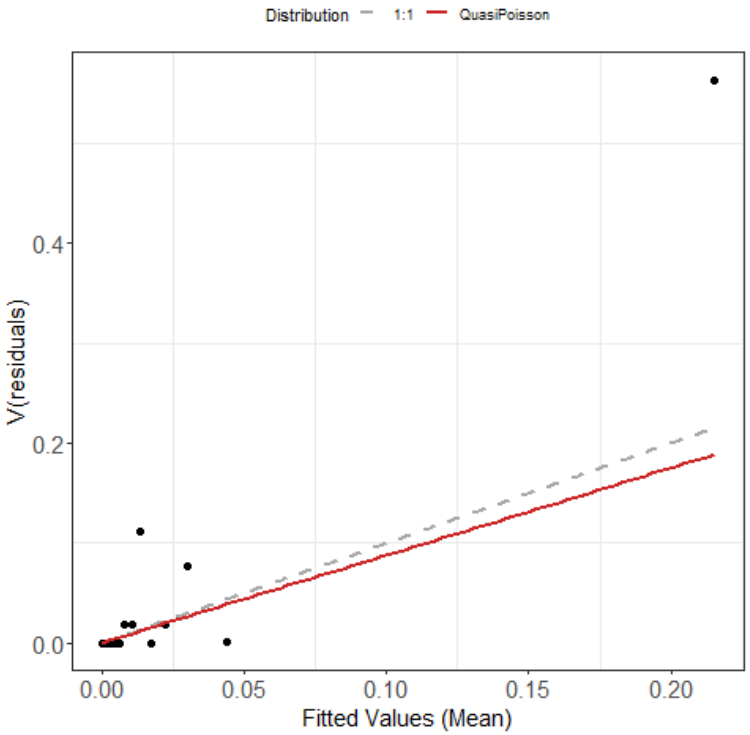


Plate 1-334 Razorbill survey 16 mean-variance relationship



1.5.11 SURVEY 18 (AUGUST 2023)

Plate 1-335 Razorbill survey 18 best fitting model scaled Pearsons residuals

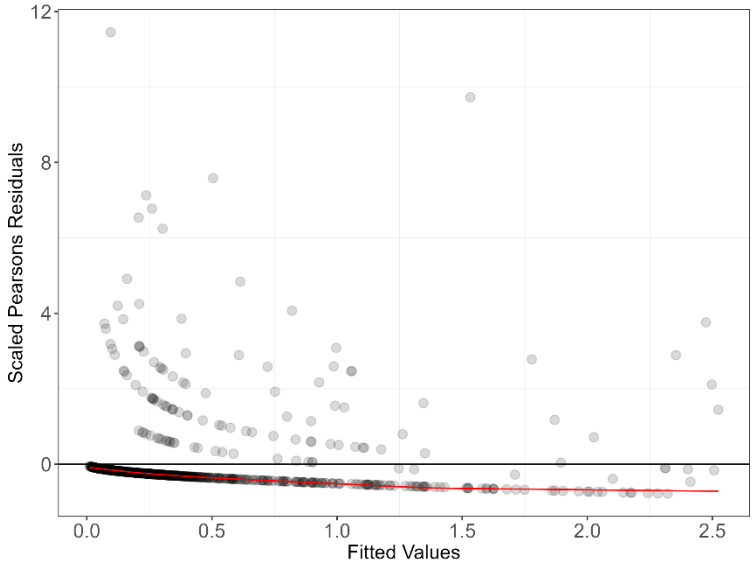


Plate 1-336 Razorbill survey 18 fitted versus observed

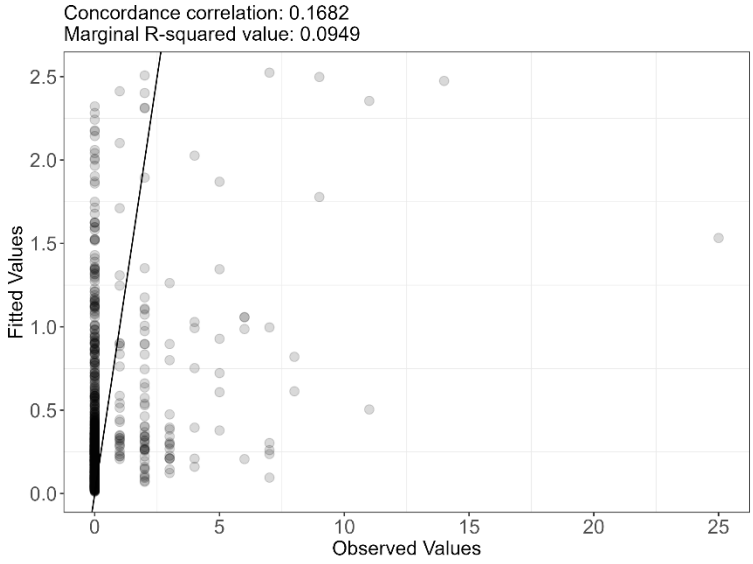


Plate 1-337 Razorbill survey 18 COVRATIO statistic

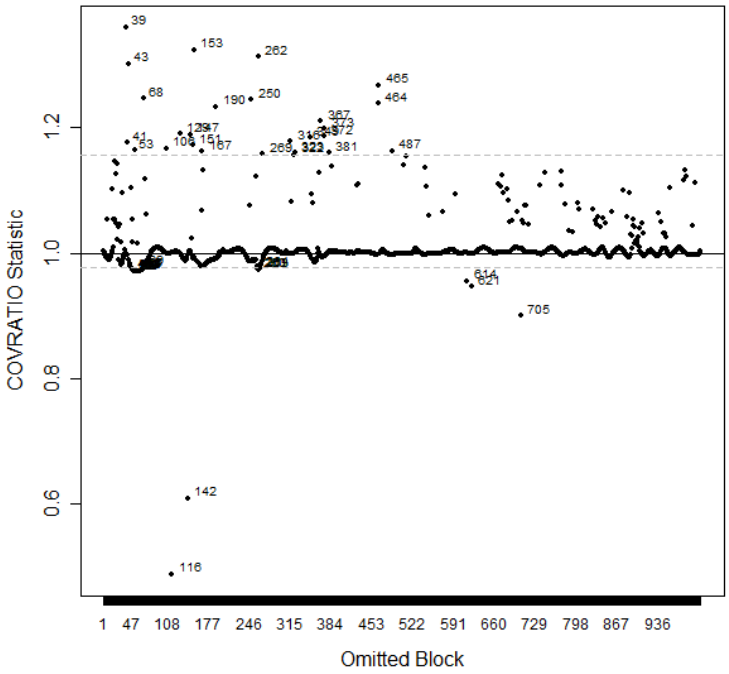


Plate 1-338 Razorbill survey 18 PRESS statistic

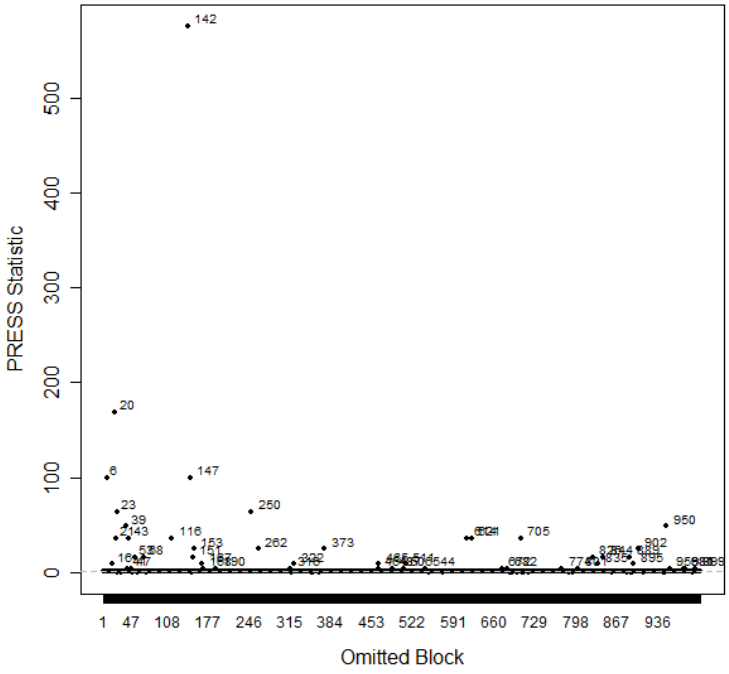
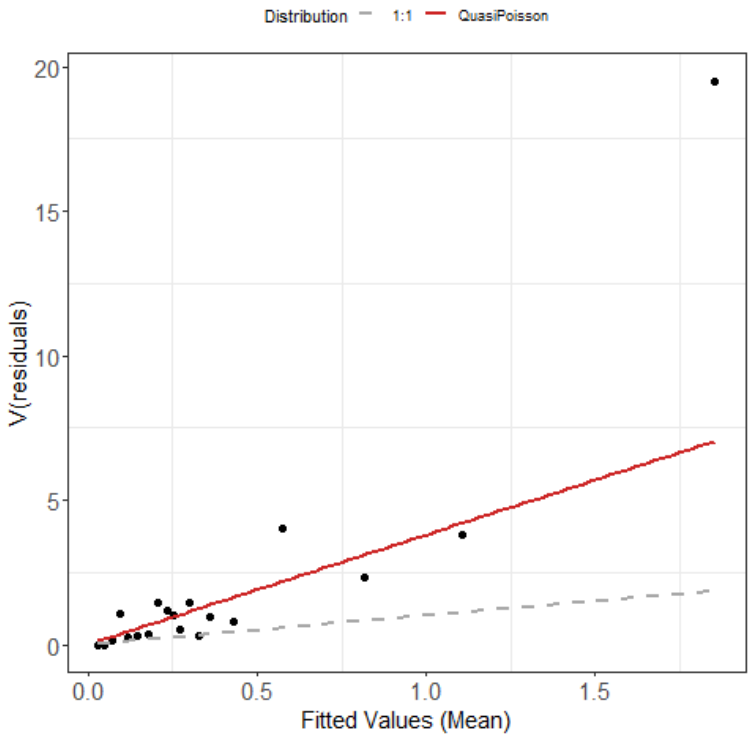


Plate 1-339 Razorbill survey 18 mean-variance relationship



1.5.12 SURVEY 19 (SEPTEMBER 2023)

Plate 1-340 Razorbill survey 19 best fitting model scaled Pearsons residuals

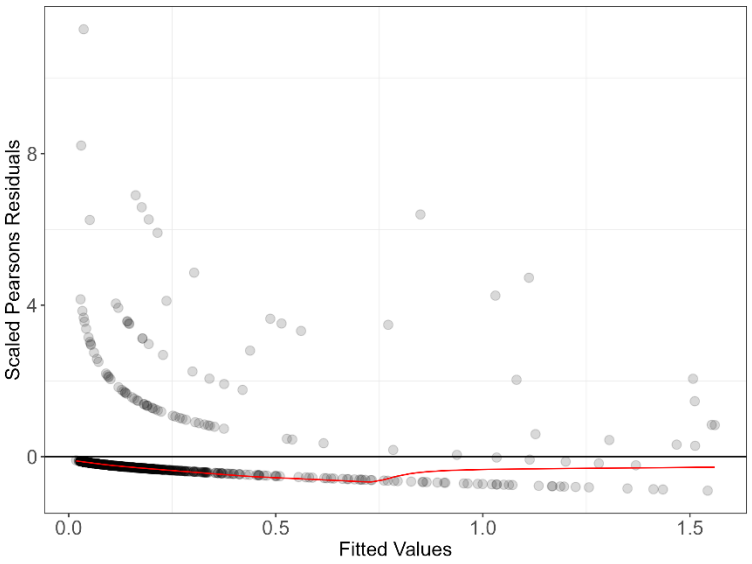


Plate 1-341 Razorbill survey 19 fitted versus observed

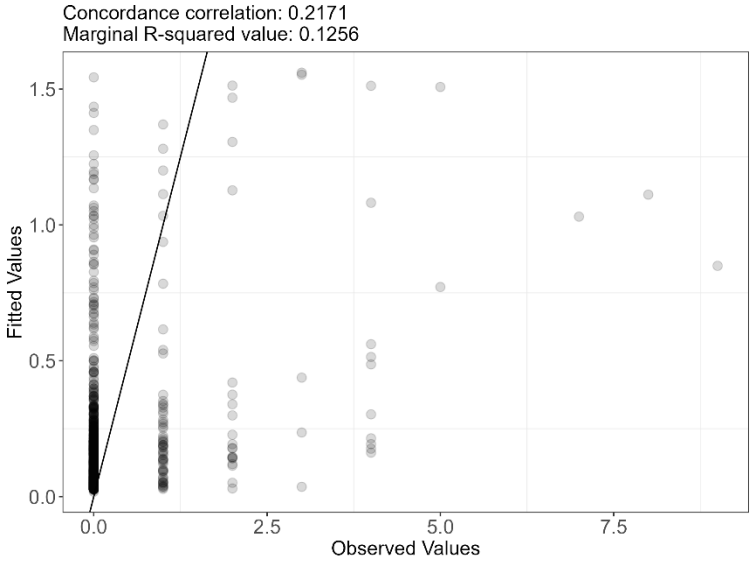


Plate 1-342 Razorbill survey 19 COVRATIO statistic

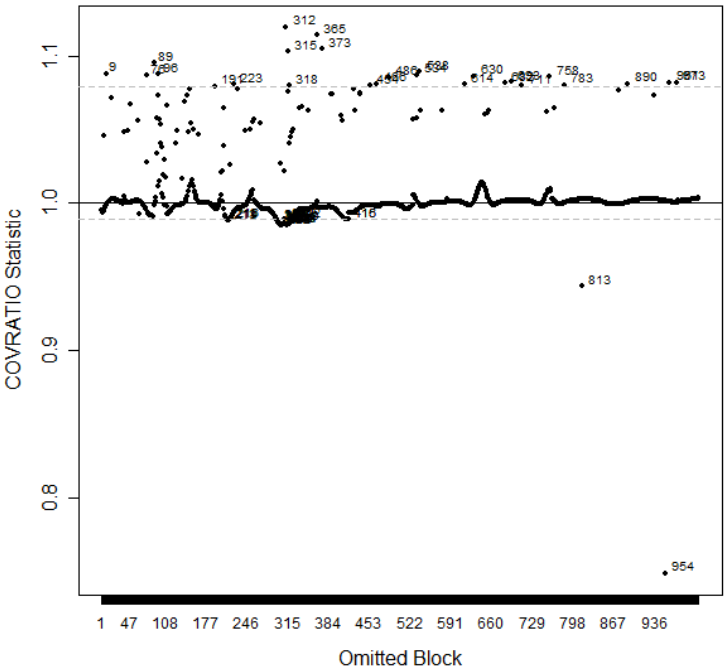


Plate 1-343 Razorbill survey 19 PRESS statistic

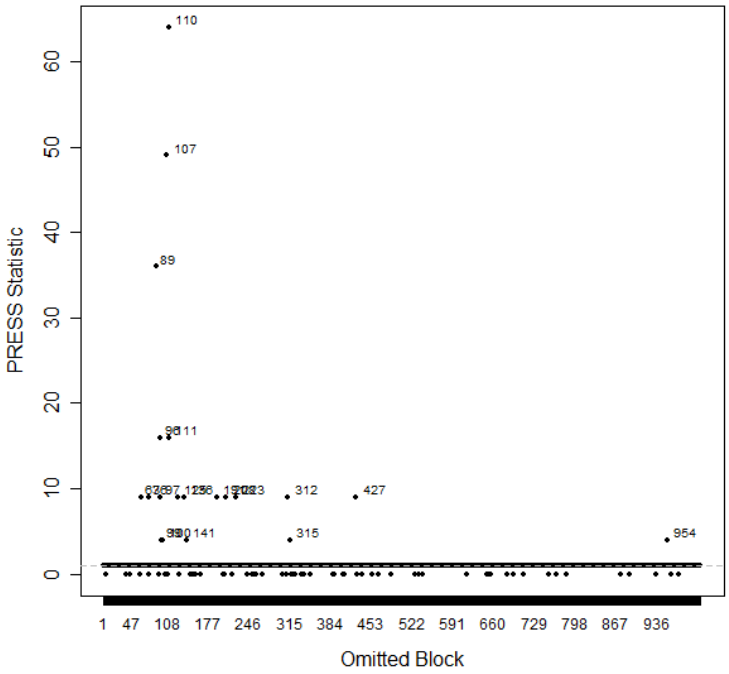
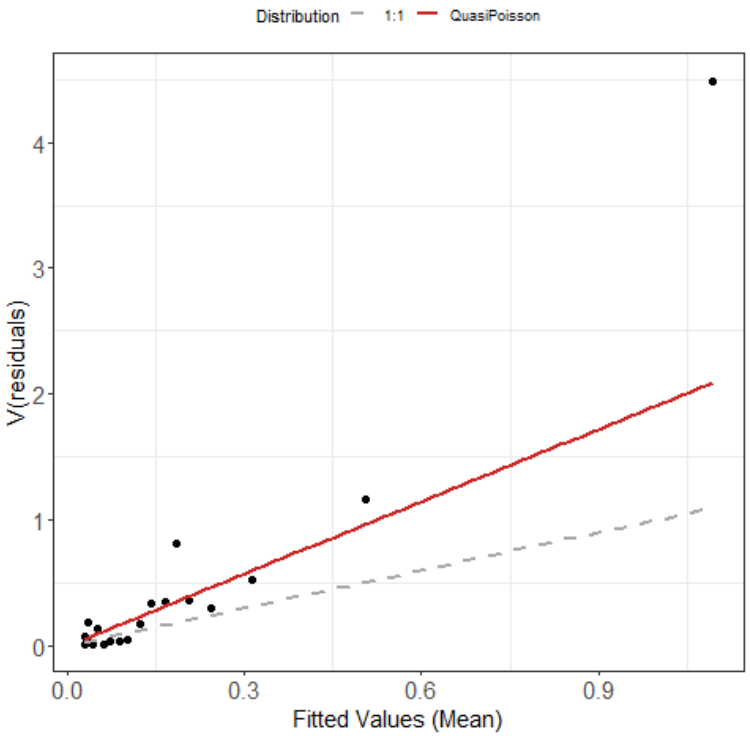


Plate 1-344 Razorbill survey 19 mean-variance relationship



1.5.13 SURVEY 20 (OCTOBER 2023)

Plate 1-345 Razorbill survey 20 best fitting model scaled Pearsons residuals

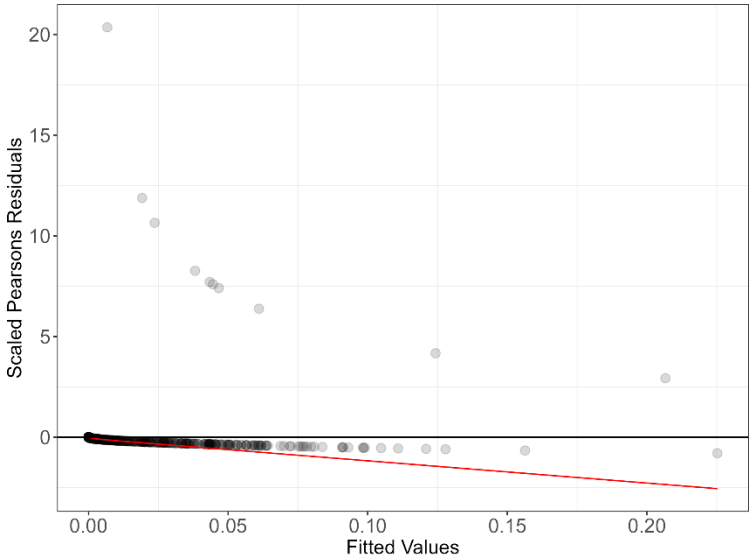


Plate 1-346 Razorbill survey 20 fitted versus observed

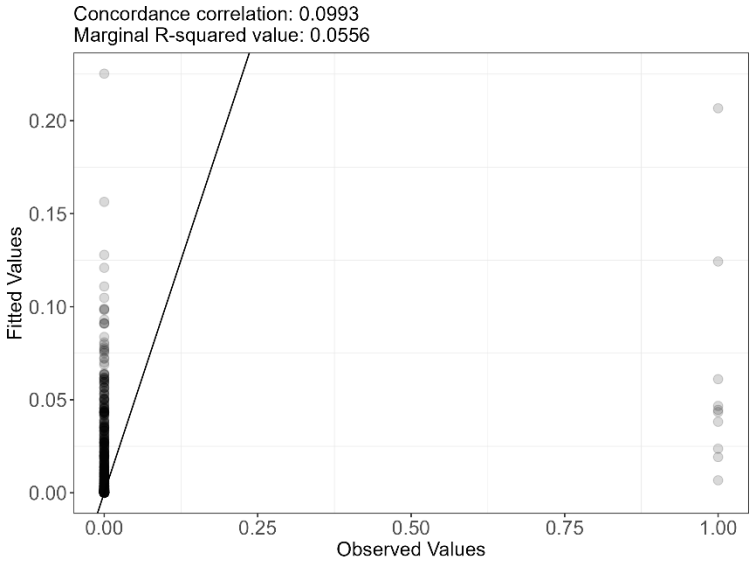


Plate 1-347 Razorbill survey 20 COVRATIO statistic

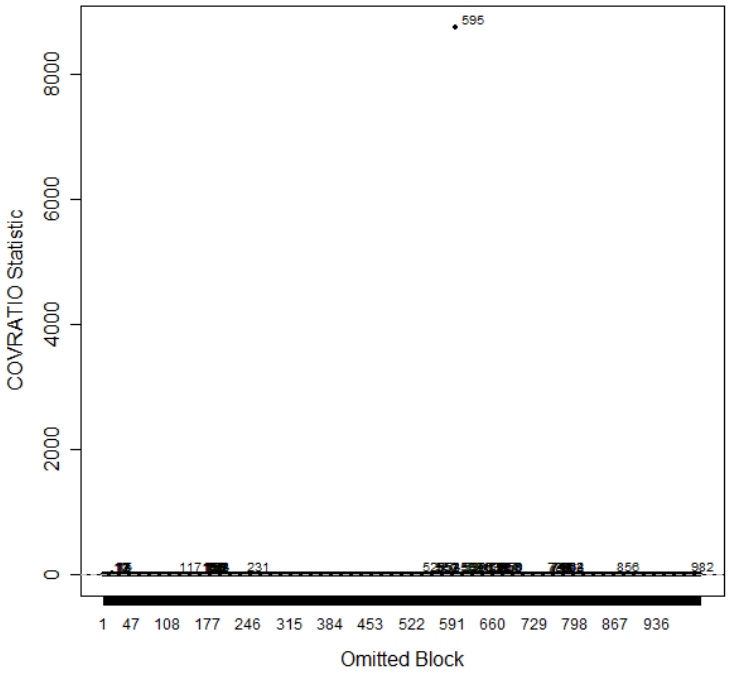


Plate 1-348 Razorbill survey 20 PRESS statistic

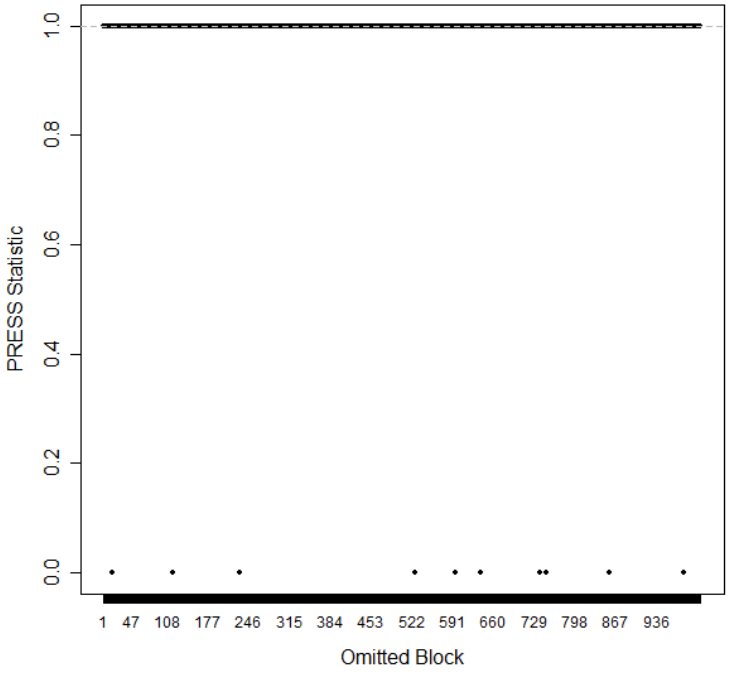
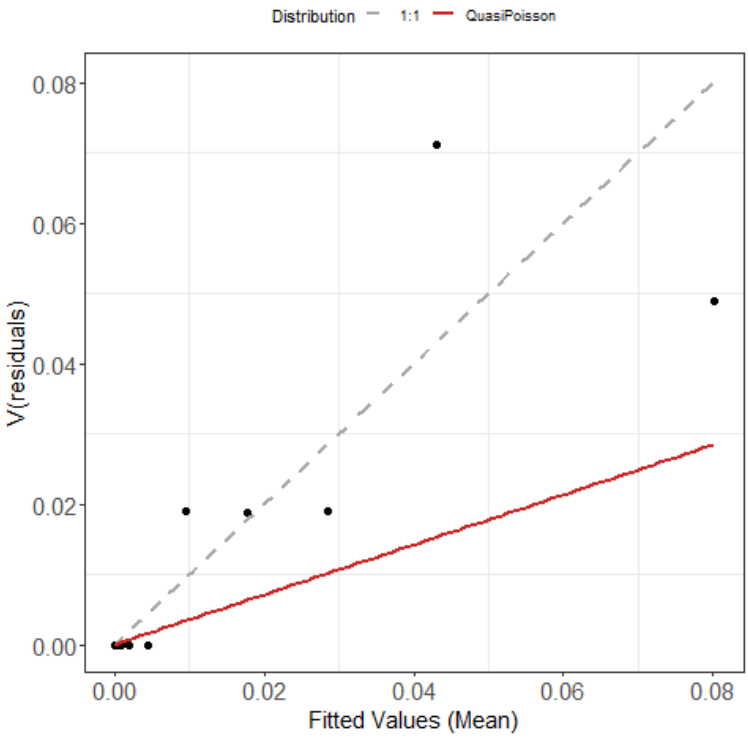


Plate 1-349 Razorbill survey 20 mean-variance relationship



1.5.14 SURVEY 23 (JANUARY 2024)

Plate 1-350 Razorbill survey 23 best fitting model scaled Pearsons residuals

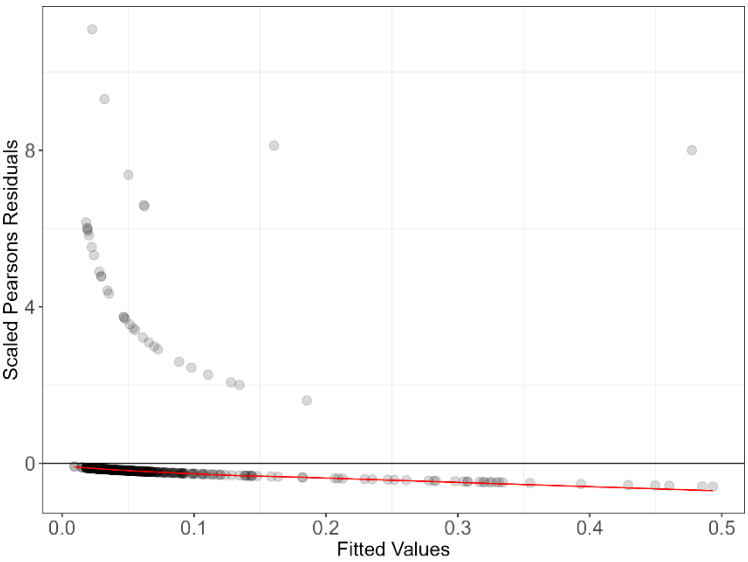


Plate 1-351 Razorbill survey 23 fitted versus observed

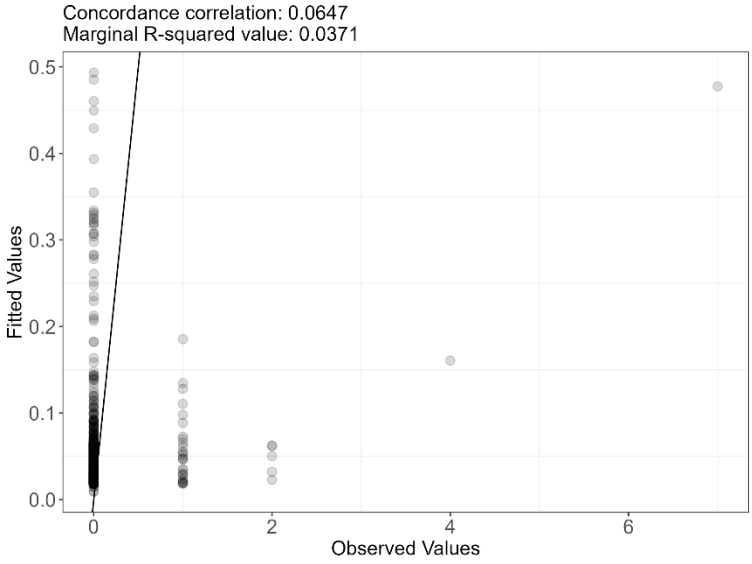


Plate 1-352 Razorbill survey 23 COVRATIO statistic

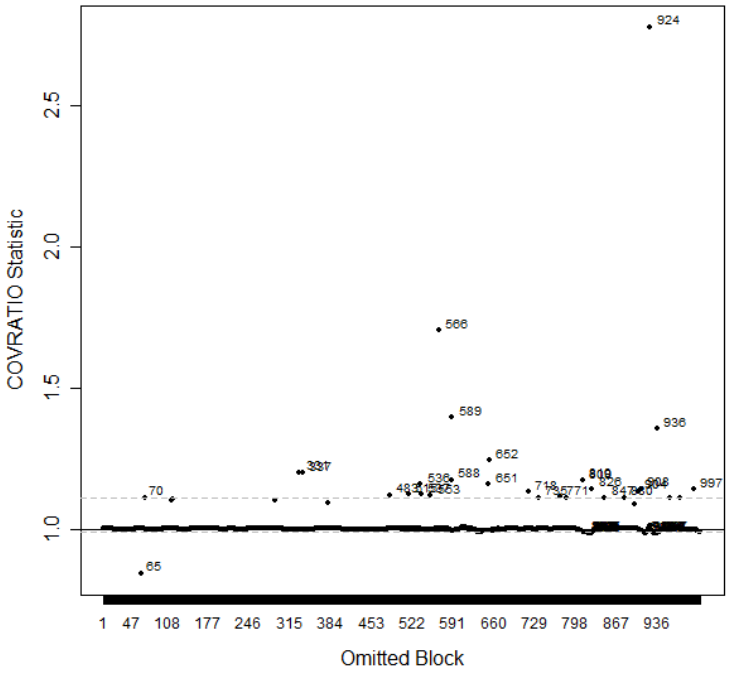


Plate 1-353 Razorbill survey 23 PRESS statistic

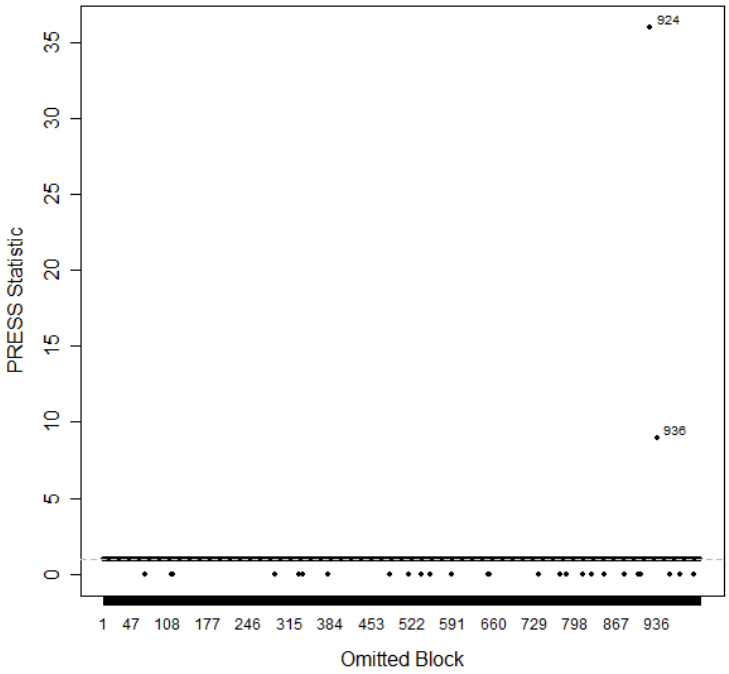
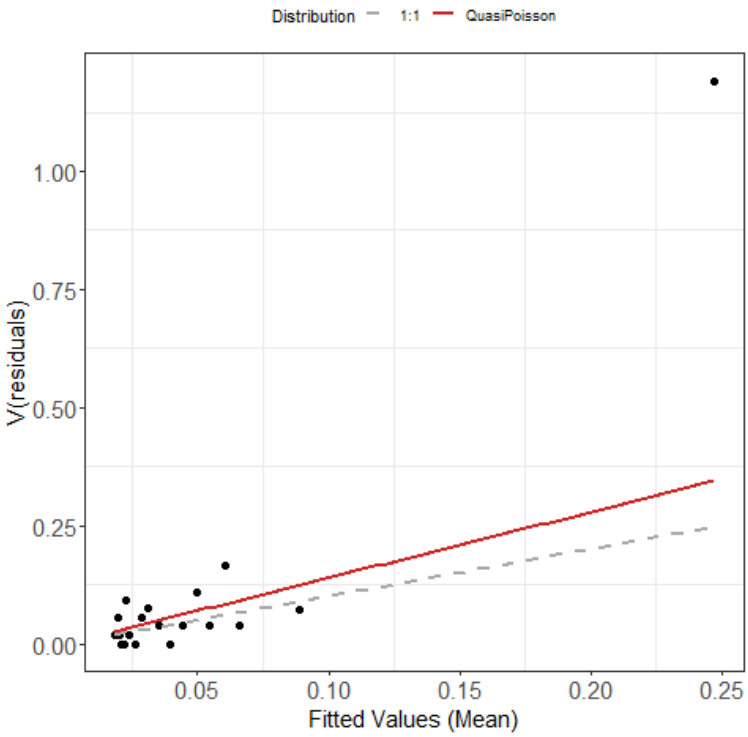


Plate 1-354 Razorbill survey 23 mean-variance relationship



1.5.15 SURVEY 24 (FEBRUARY 2024)

Plate 1-355 Razorbill survey 24 best fitting model scaled Pearsons residuals

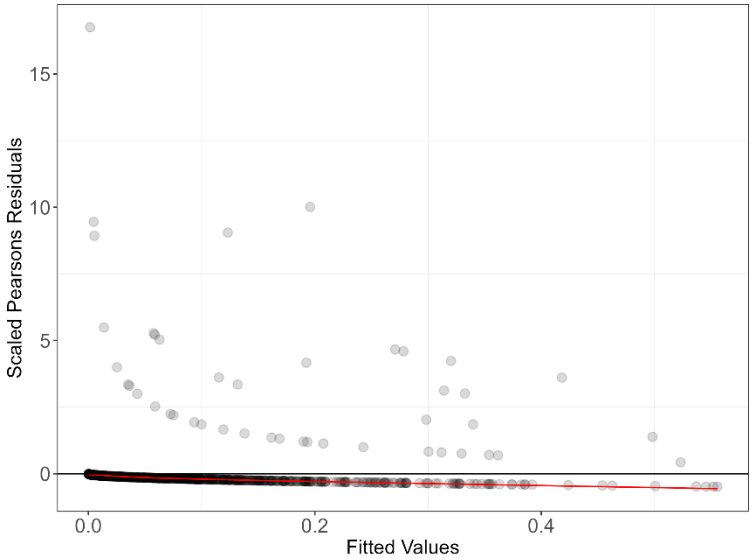


Plate 1-356 Razorbill survey 24 fitted versus observed

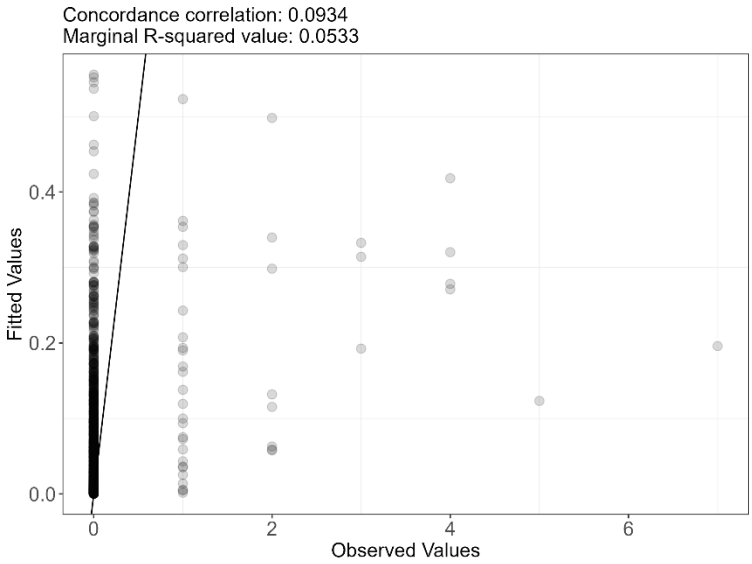


Plate 1-357 Razorbill survey 24 COVRATIO statistic

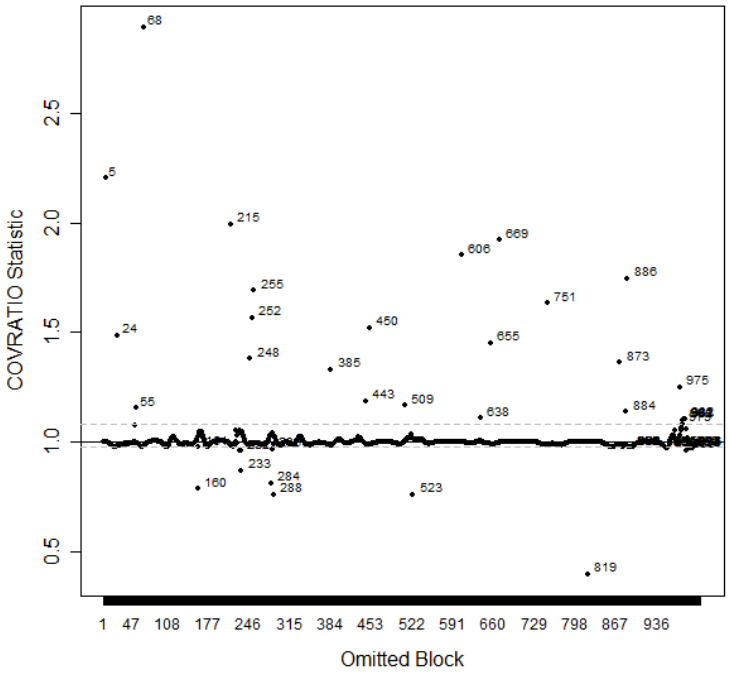


Plate 1-358 Razorbill survey 24 PRESS statistic

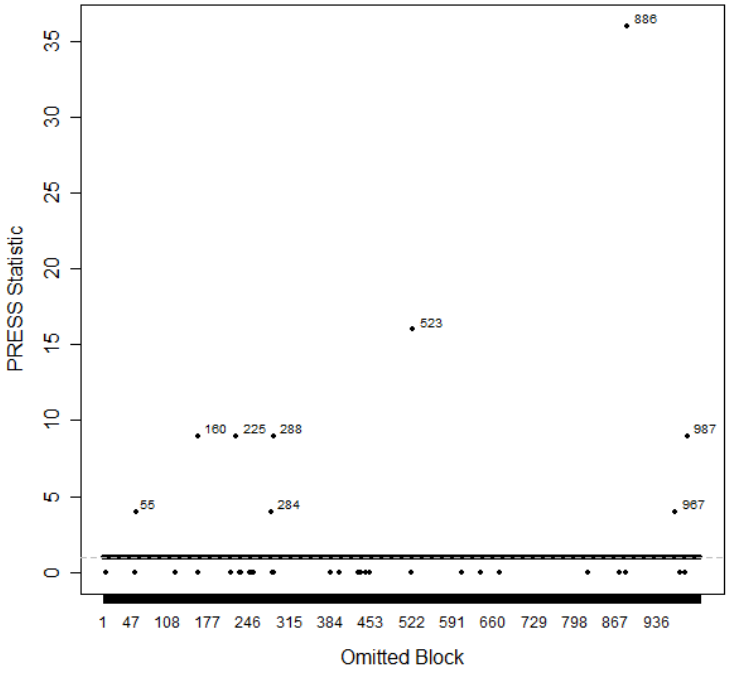
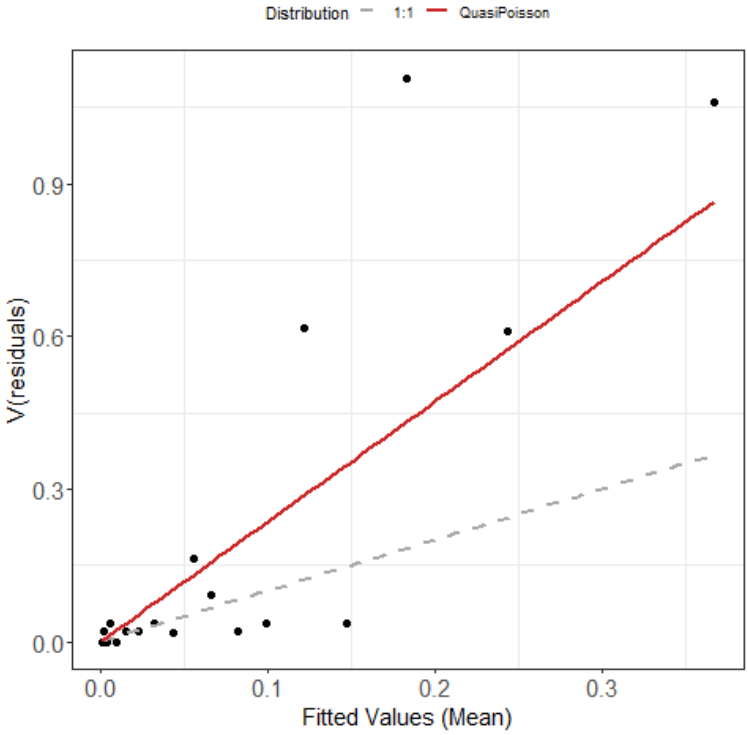


Plate 1-359 Razorbill survey 24 mean-variance relationship



1.6 PUFFIN

1.6.1 SURVEY 02 (APRIL 2022)

Plate 1-360 Puffin survey 02 best fitting model scaled Pearsons residuals

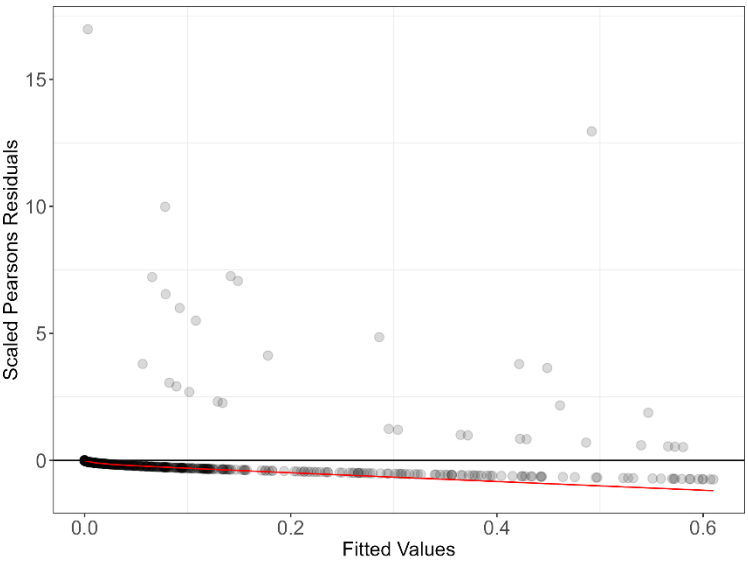


Plate 1-361 Puffin survey 02 fitted versus observed

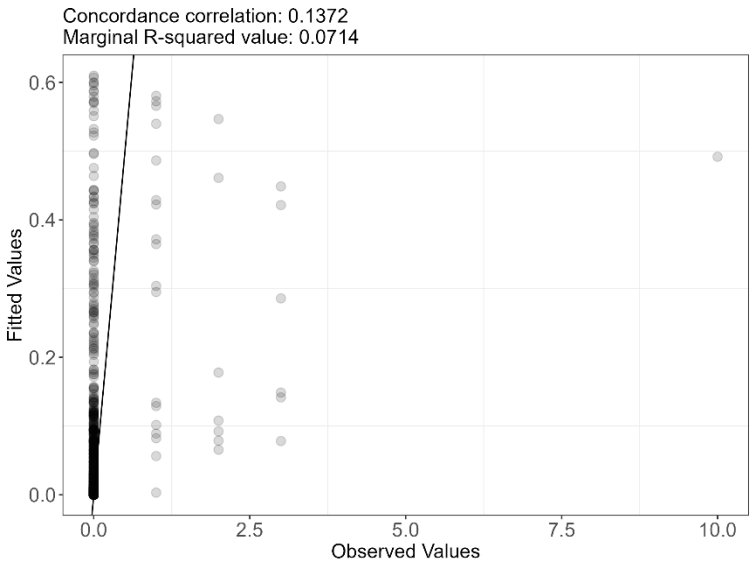


Plate 1-362 Puffin survey 02 COVRATIO statistic

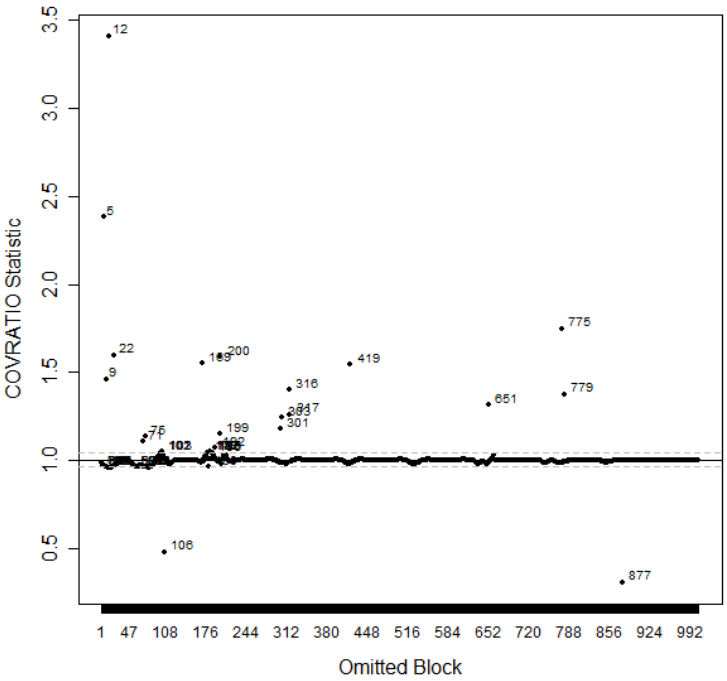


Plate 1-363 Puffin survey 02 PRESS statistic

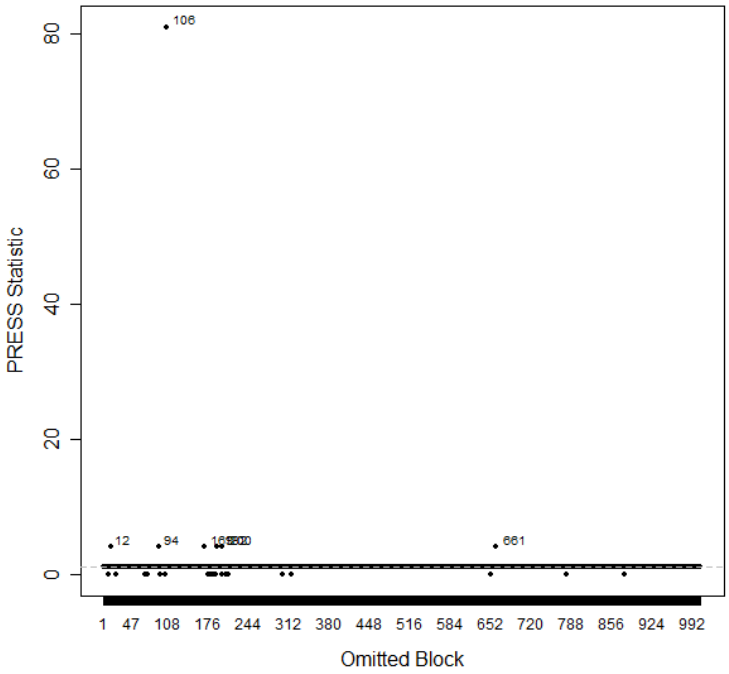
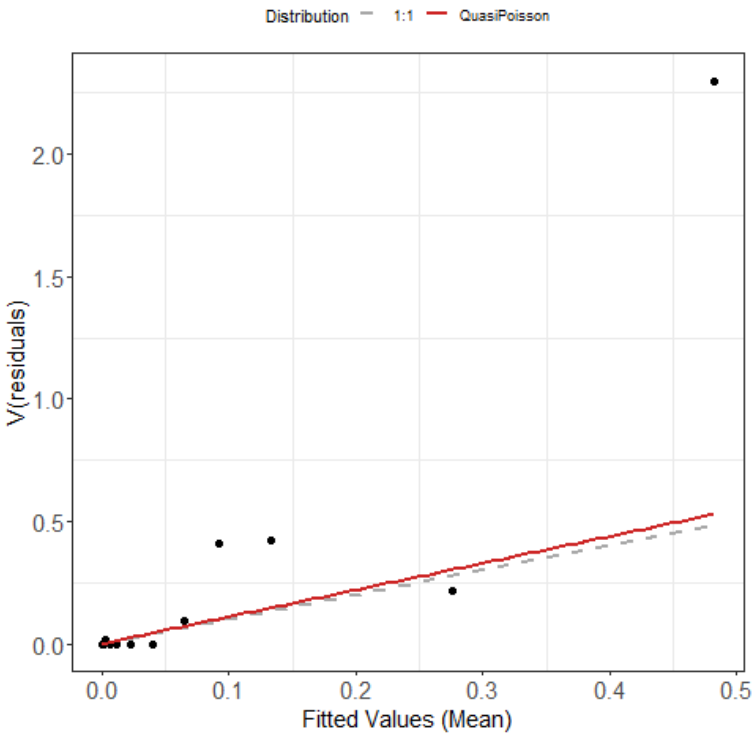


Plate 1-364 Puffin survey 02 mean-variance relationship



1.6.2 SURVEY 05 (JULY 2022)

Plate 1-365 Puffin survey 05 best fitting model scaled Pearsons residuals

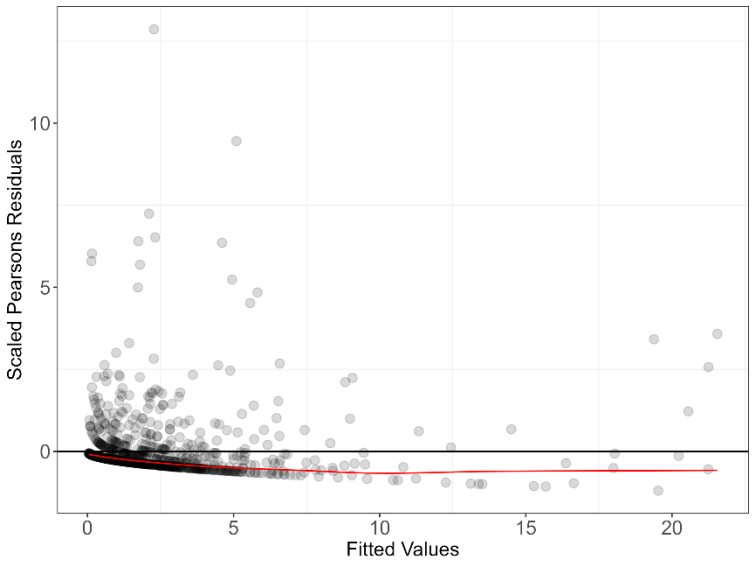


Plate 1-366 Puffin survey 05 fitted versus observed

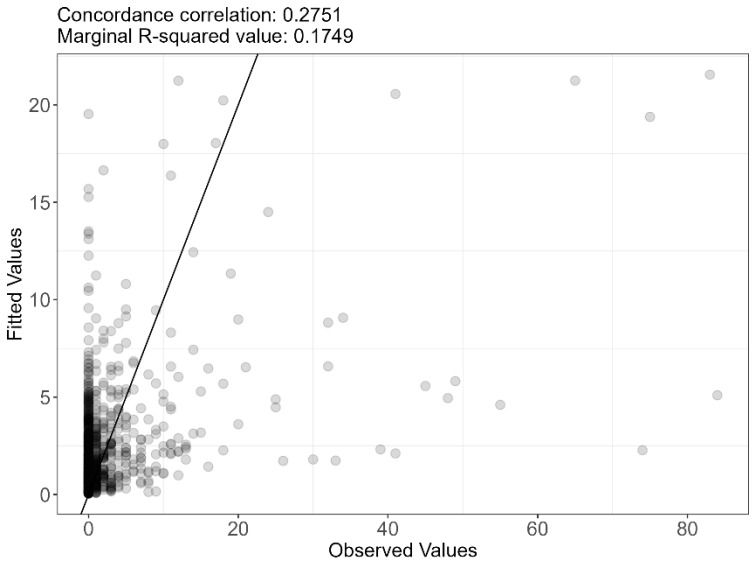


Plate 1-367 Puffin survey 05 COVRATIO statistic

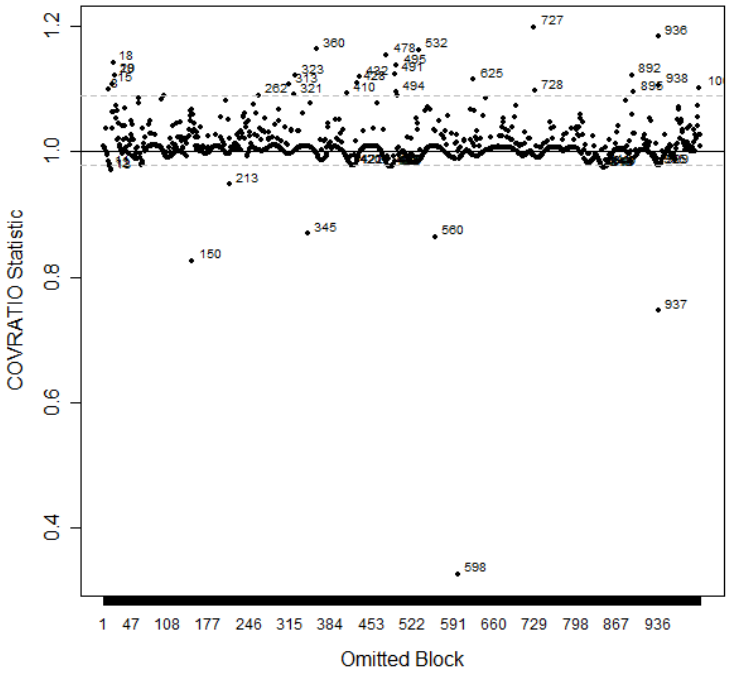


Plate 1-368 Puffin survey 05 PRESS statistic

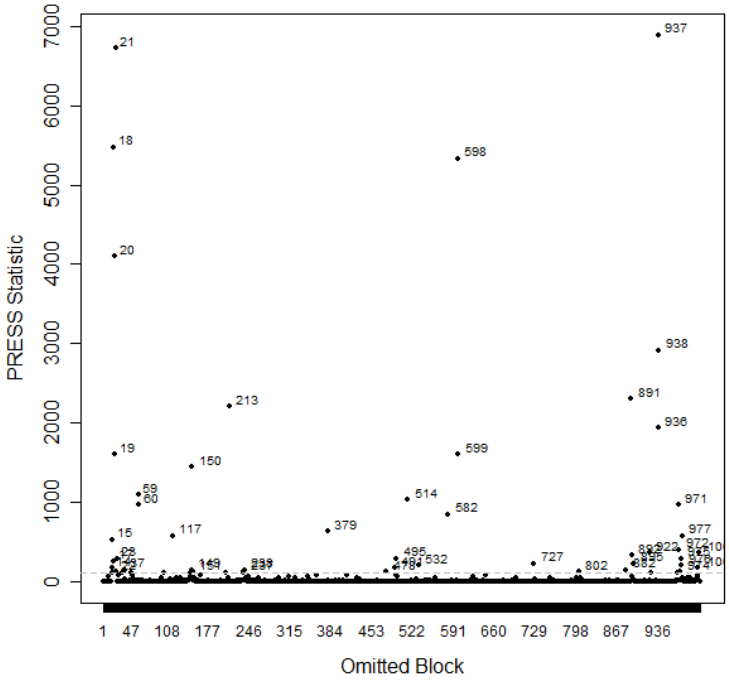
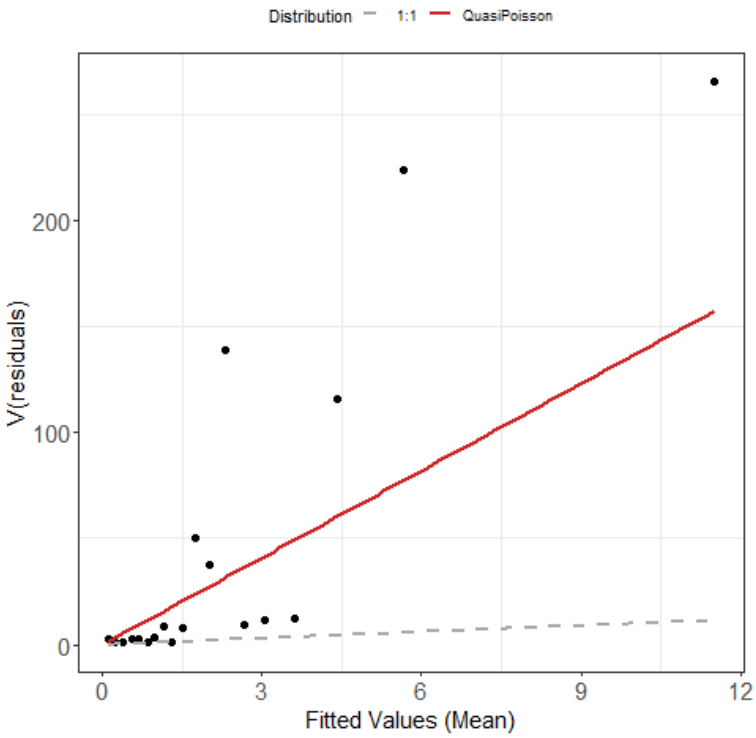


Plate 1-369 Puffin survey 05 mean-variance relationship



1.6.3 SURVEY 06 (AUGUST 2022)

Plate 1-370 Puffin survey 06 best fitting model scaled Pearsons residuals

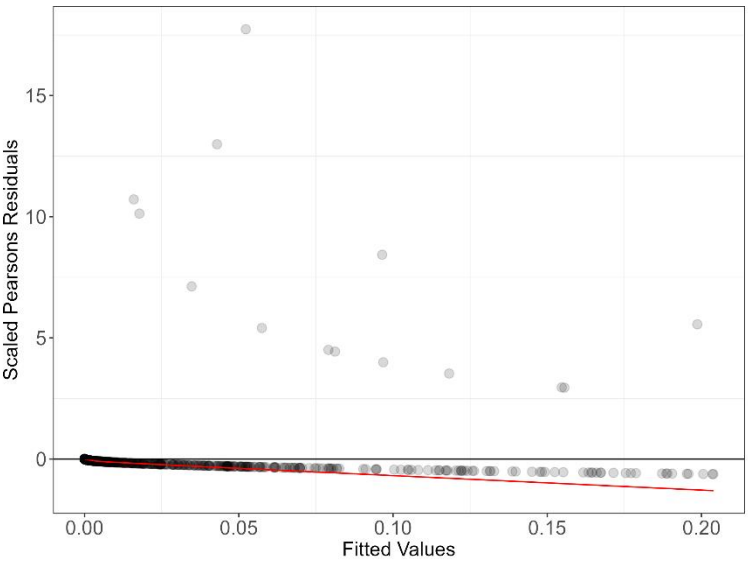


Plate 1-371 Puffin survey 06 fitted versus observed

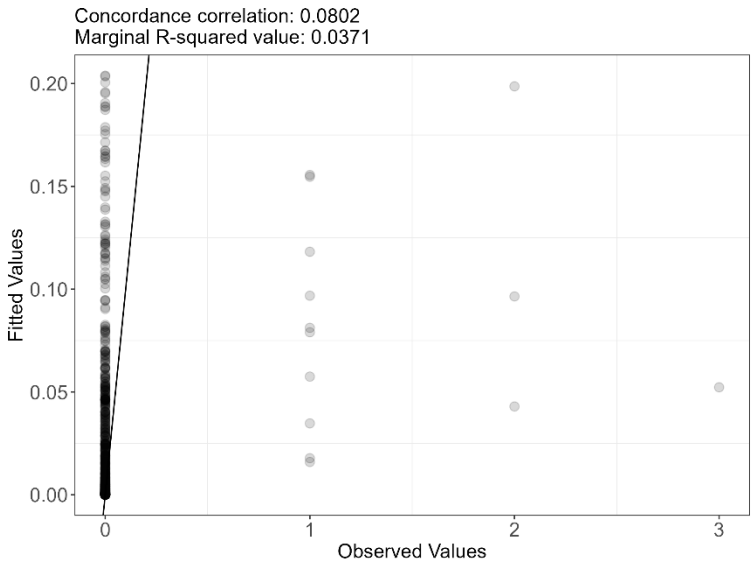


Plate 1-372 Puffin survey 06 COVRATIO statistic

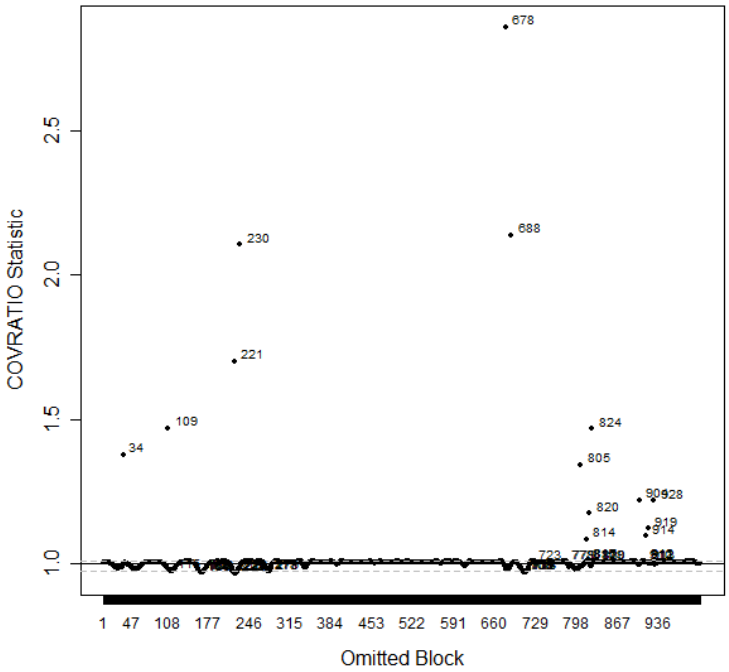


Plate 1-373 Puffin survey 06 PRESS statistic

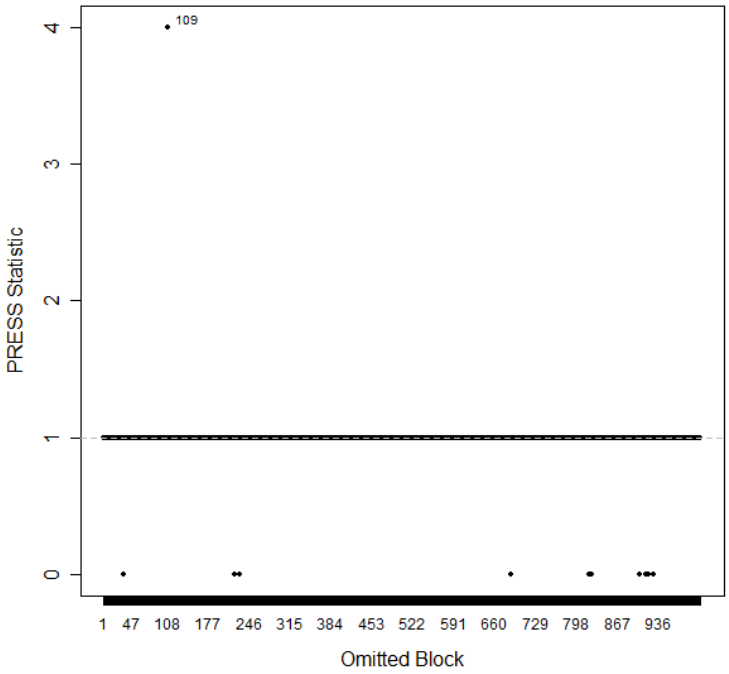
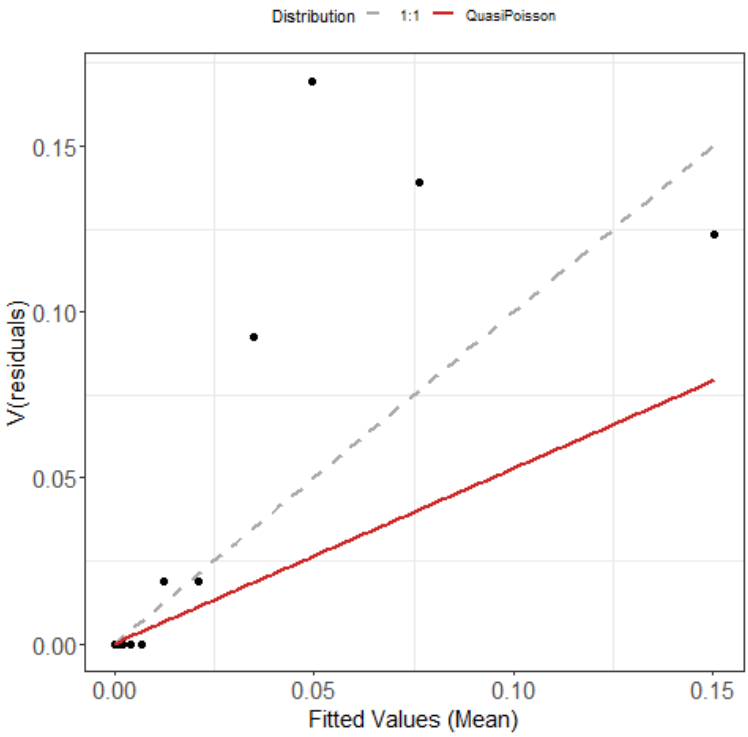


Plate 1-374 Puffin survey 06 mean-variance relationship



1.6.4 SURVEY 07 (SEPTEMBER 2022)

Plate 1-375 Puffin survey 07 best fitting model scaled Pearsons residuals

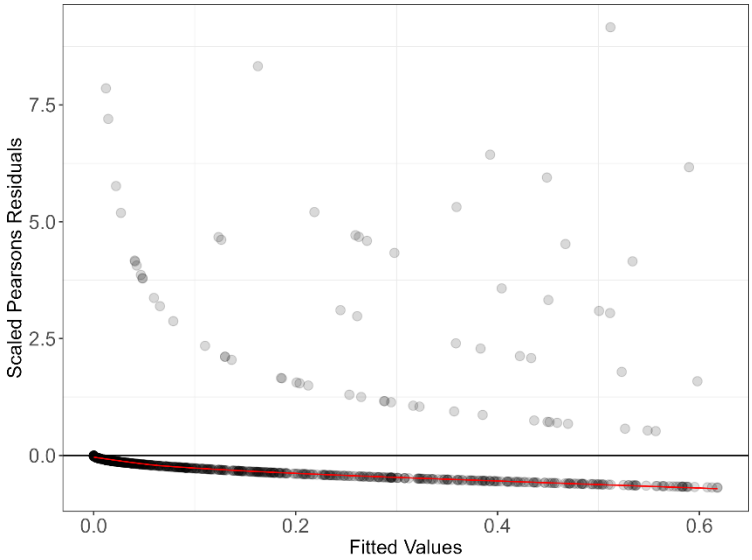


Plate 1-376 Puffin survey 07 fitted versus observed

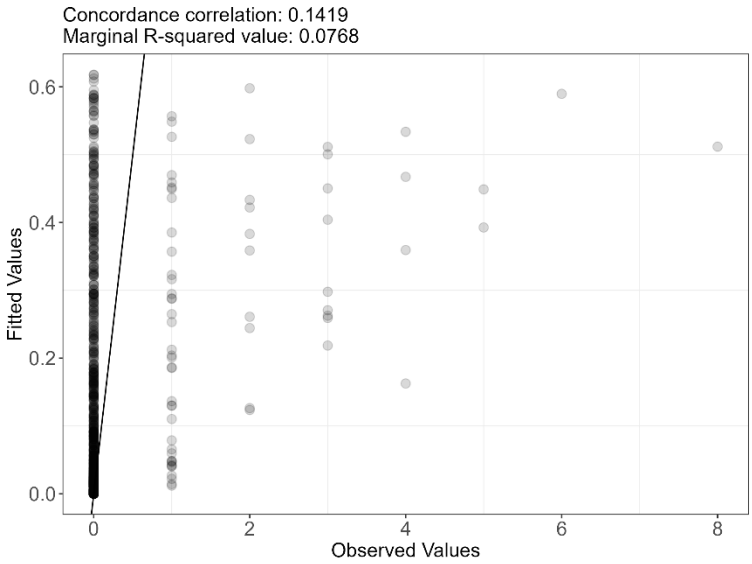


Plate 1-377 Puffin survey 07 COVRATIO statistic

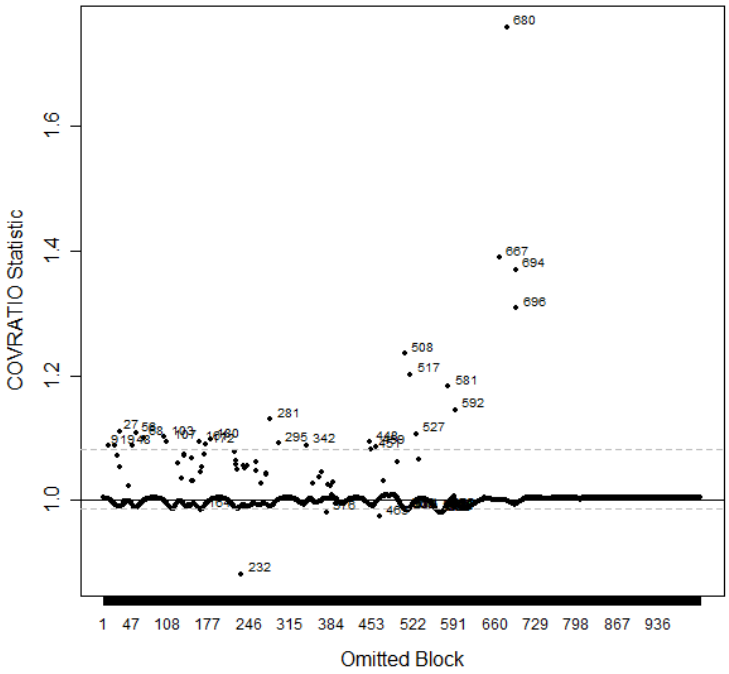


Plate 1-378 Puffin survey 07 PRESS statistic

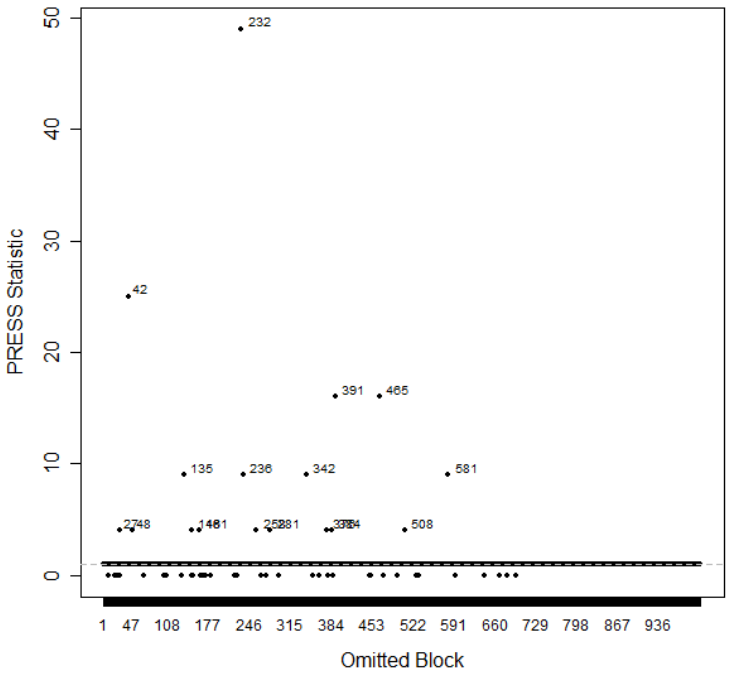
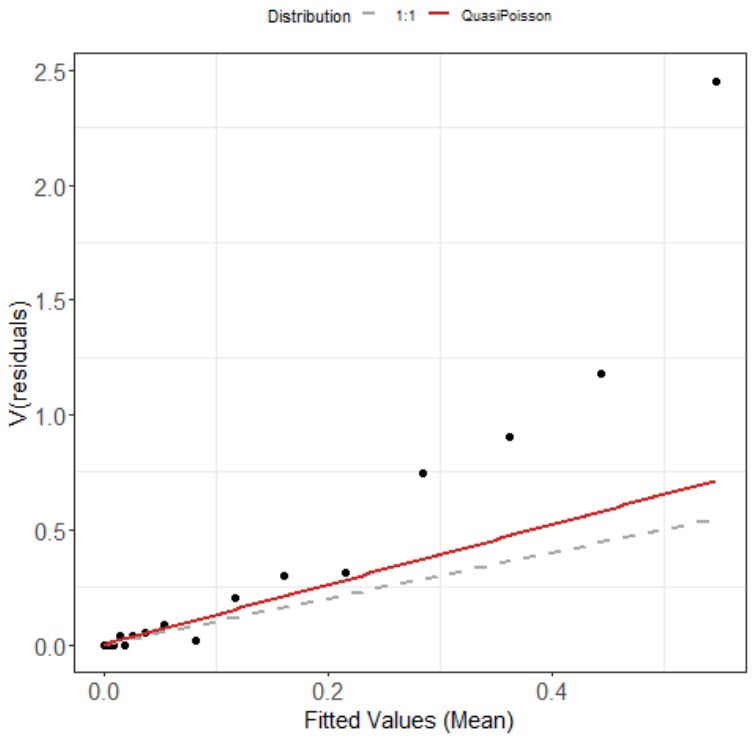


Plate 1-379 Puffin survey 07 mean-variance relationship



1.6.5 SURVEY 10 (DECEMBER 2022)

Plate 1-380 Puffin survey 10 best fitting model scaled Pearsons residuals

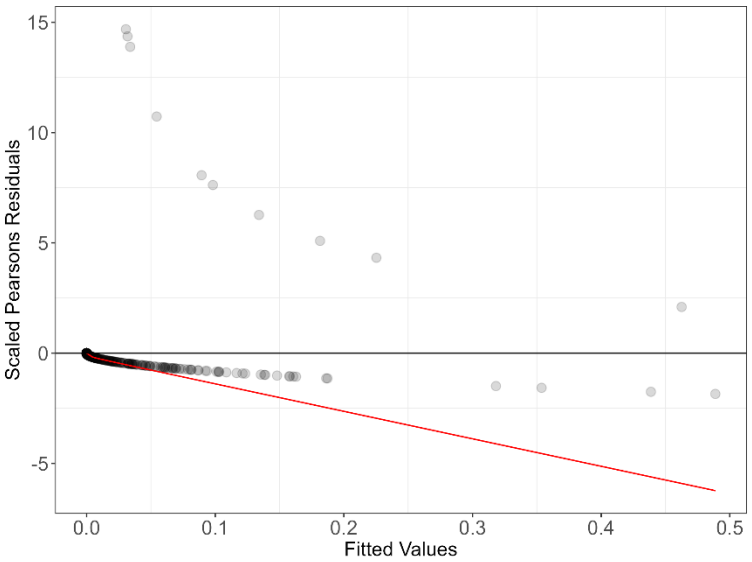


Plate 1-381 Puffin survey 10 fitted versus observed

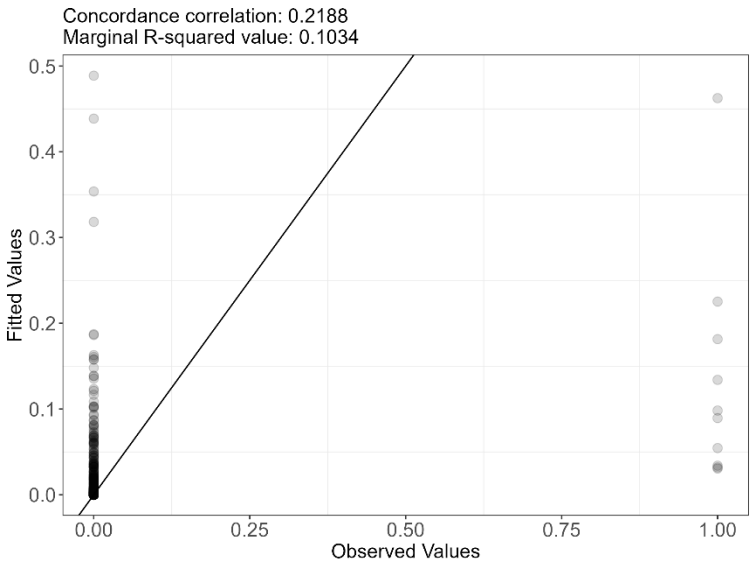


Plate 1-382 Puffin survey 10 COVRATIO statistic

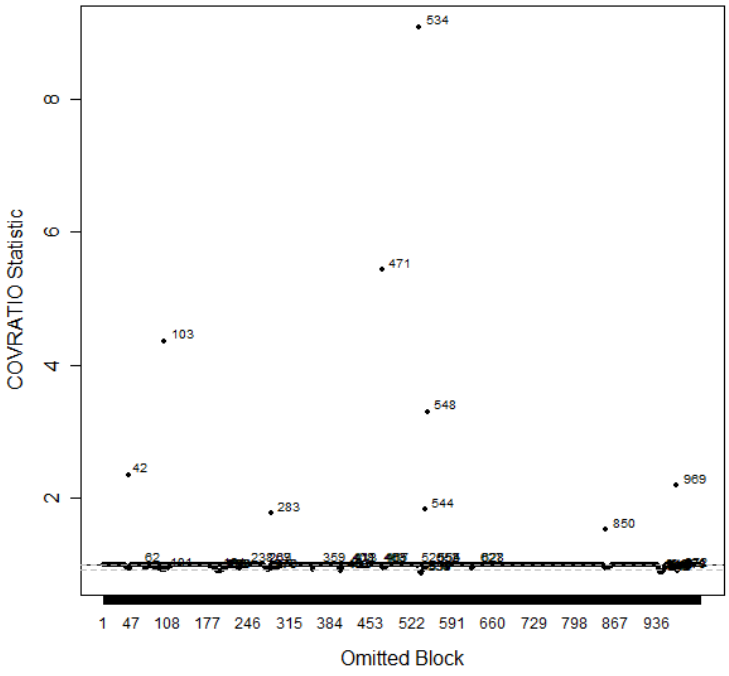


Plate 1-383 Puffin survey 10 PRESS statistic

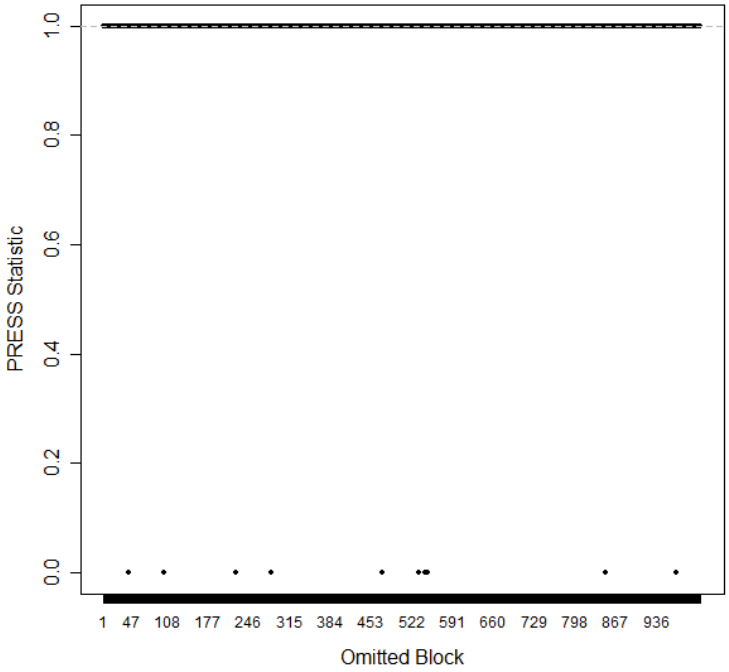
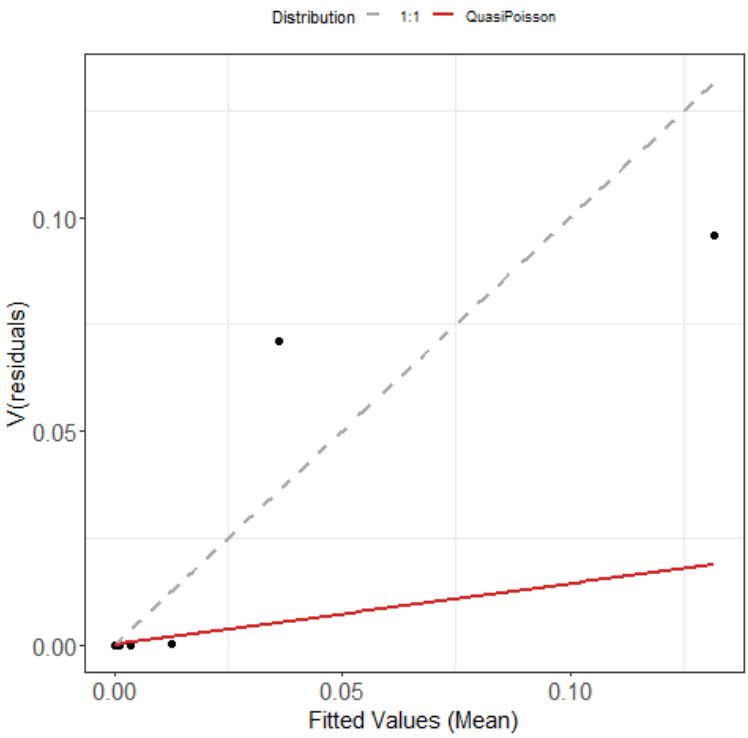


Plate 1-384 Puffin survey 10 mean-variance relationship



1.6.6 SURVEY 14 (APRIL 2023)

Plate 1-385 Puffin survey 14 best fitting model scaled Pearsons residuals

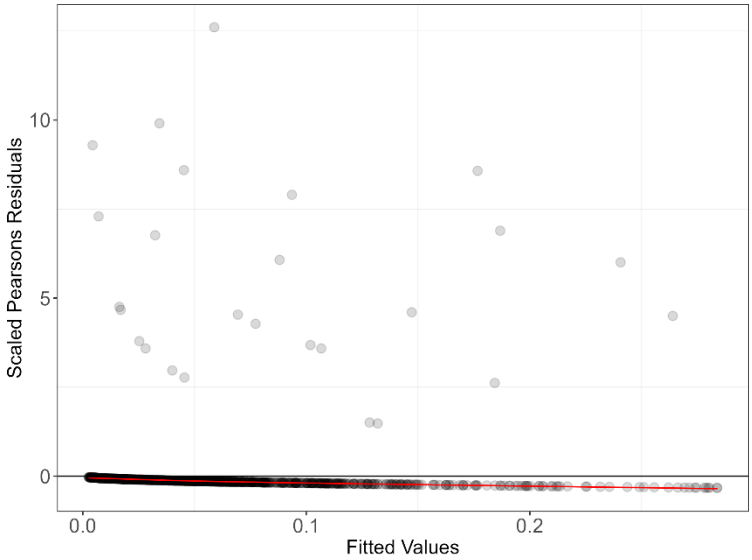


Plate 1-386 Puffin survey 14 fitted versus observed

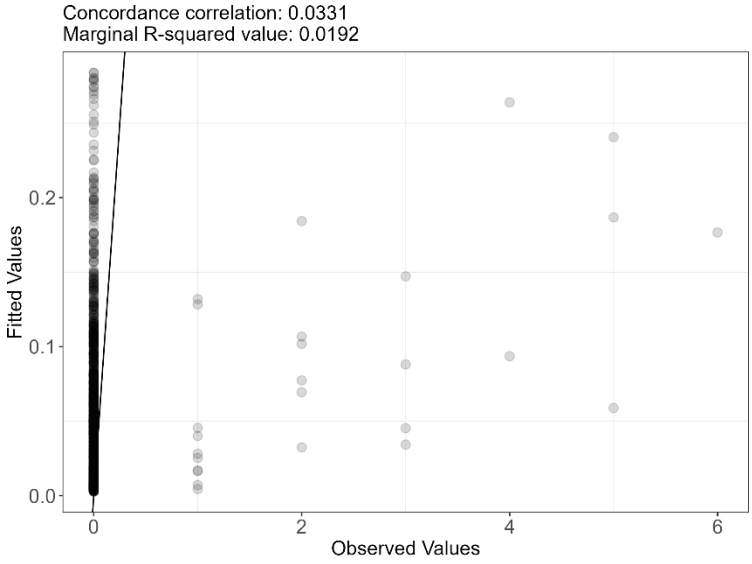


Plate 1-387 Puffin survey 14 COVRATIO statistic

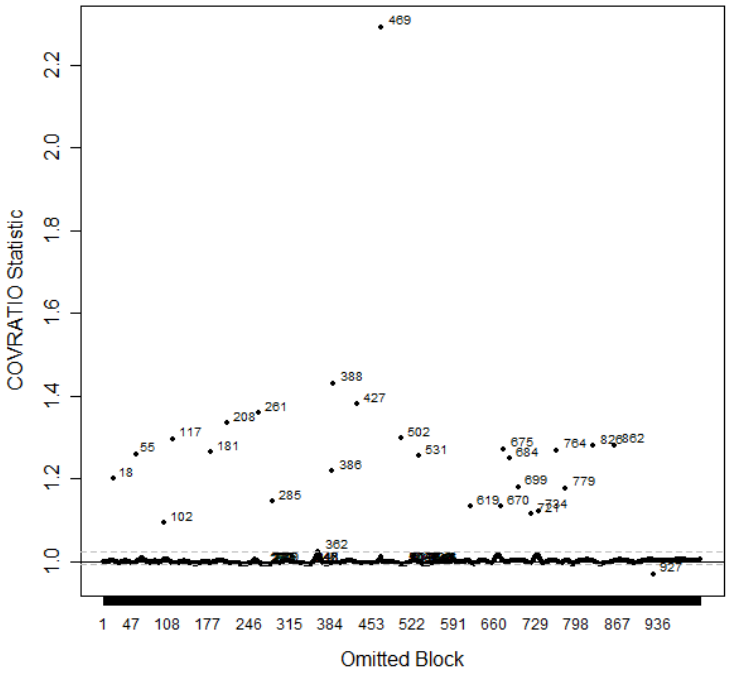


Plate 1-388 Puffin survey 14 PRESS statistic

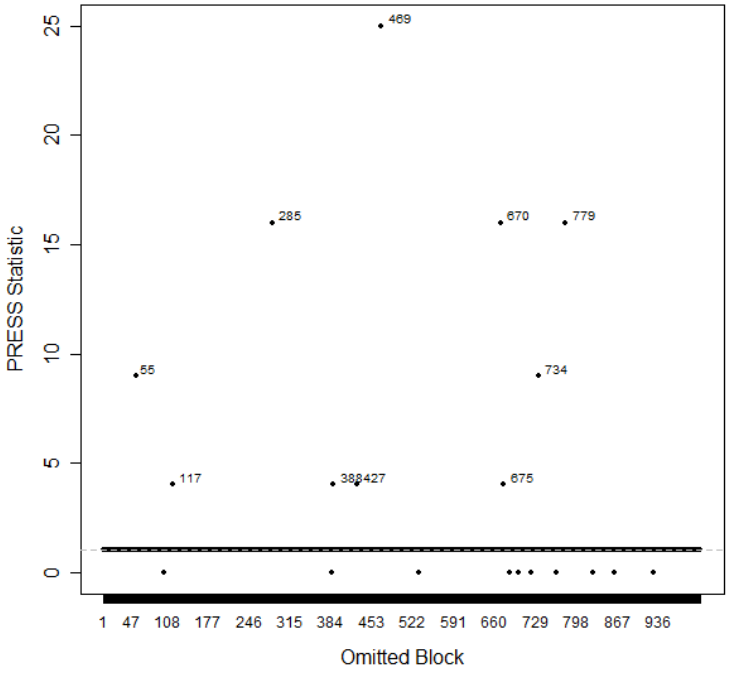
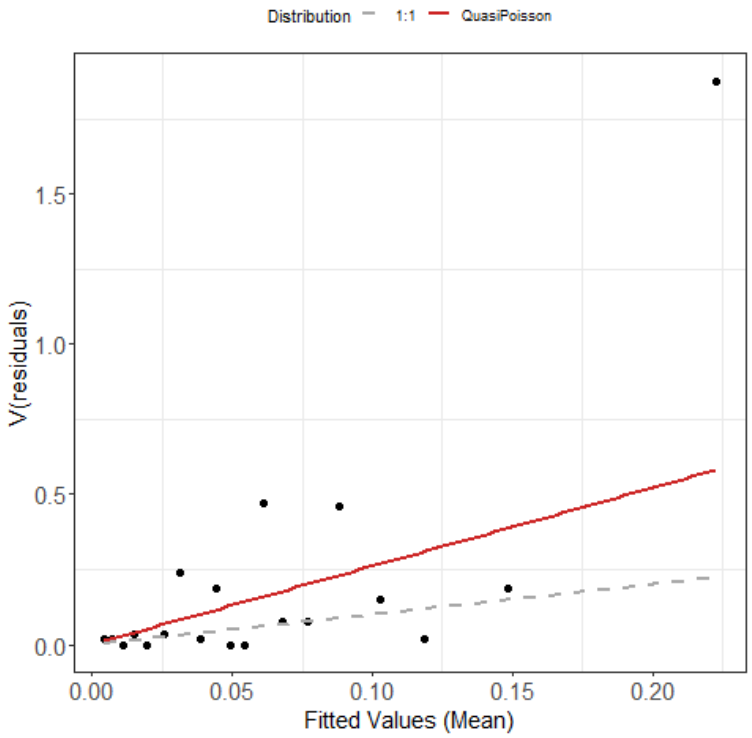


Plate 1-389 Puffin survey 14 mean-variance relationship



1.6.7 SURVEY 15 (MAY 2023)

Plate 1-390 Puffin survey 15 best fitting model scaled Pearsons residuals

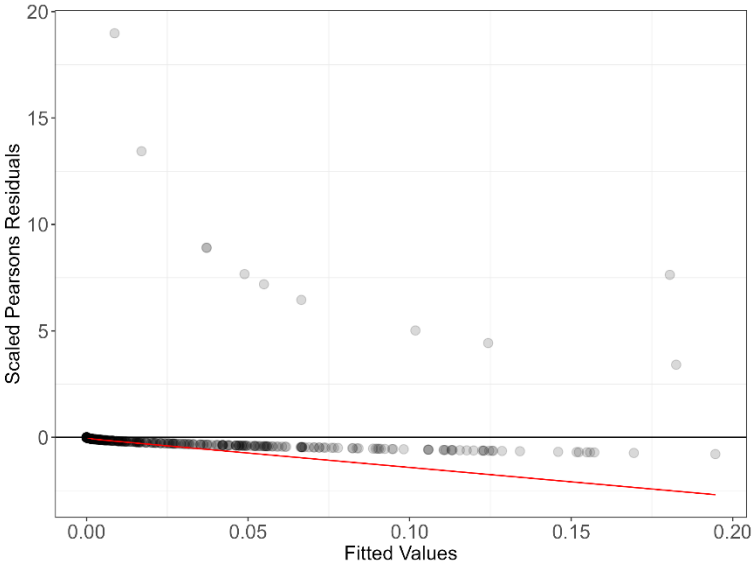


Plate 1-391 Puffin survey 15 fitted versus observed

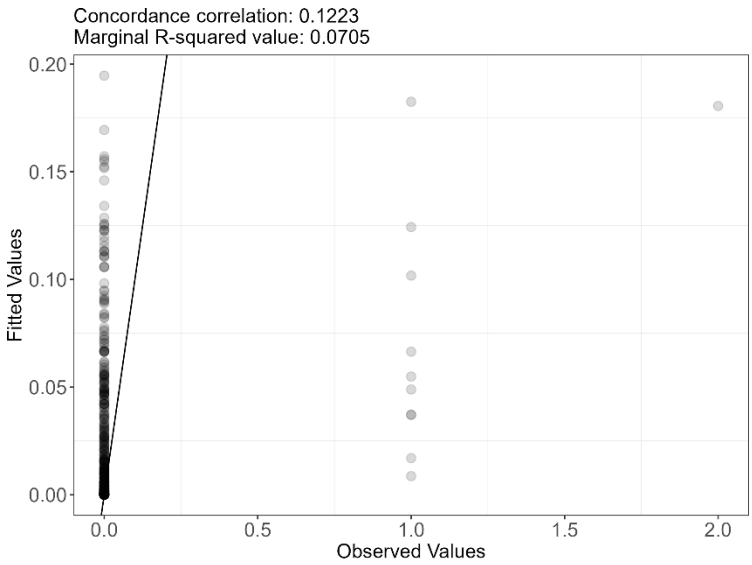


Plate 1-392 Puffin survey 15 COVRATIO statistic

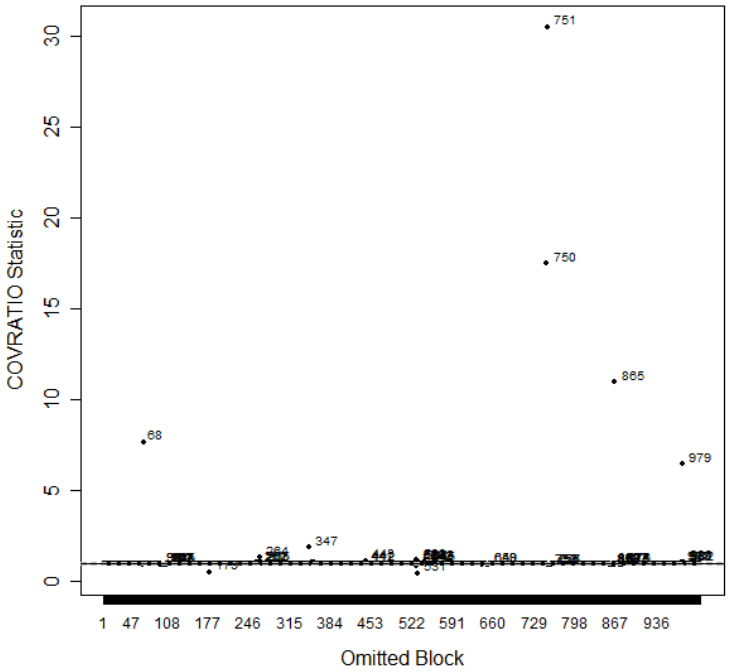


Plate 1-393 Puffin survey 15 PRESS statistic

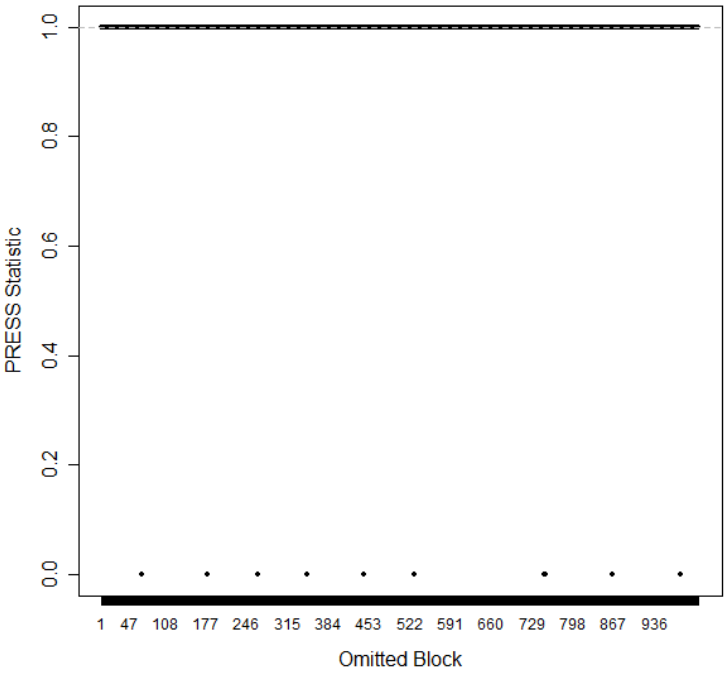
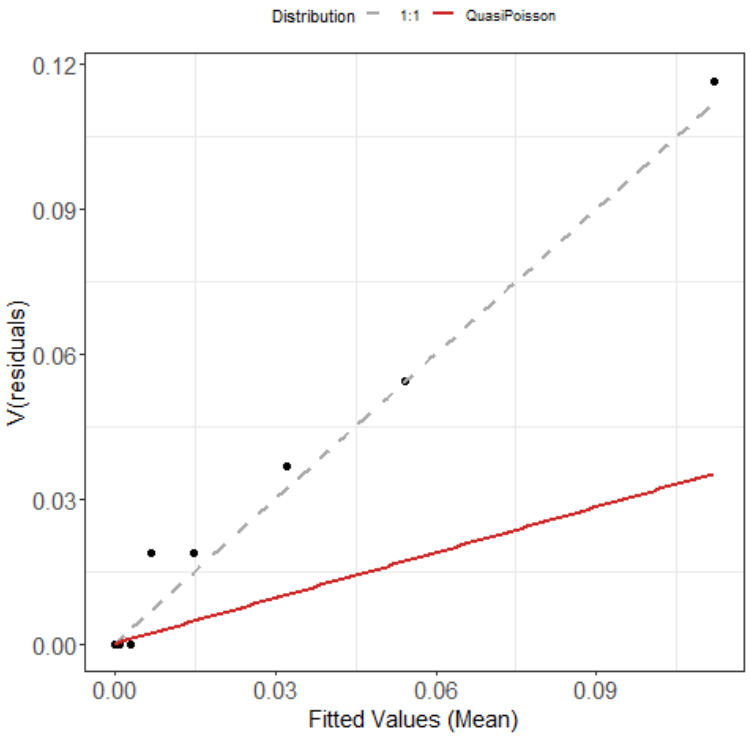


Plate 1-394 Puffin survey 15 mean-variance relationship



1.6.8 SURVEY 16 (JUNE 2023)

Plate 1-395 Puffin survey 16 best fitting model scaled Pearsons residuals

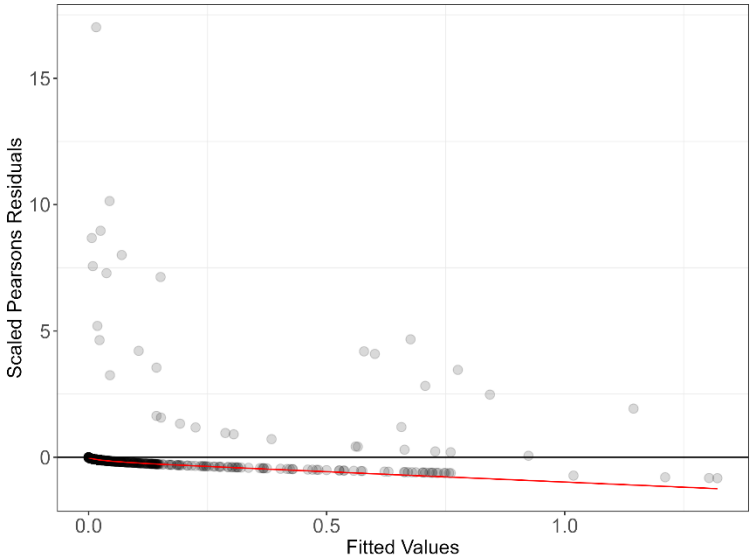


Plate 1-396 Puffin survey 16 fitted versus observed

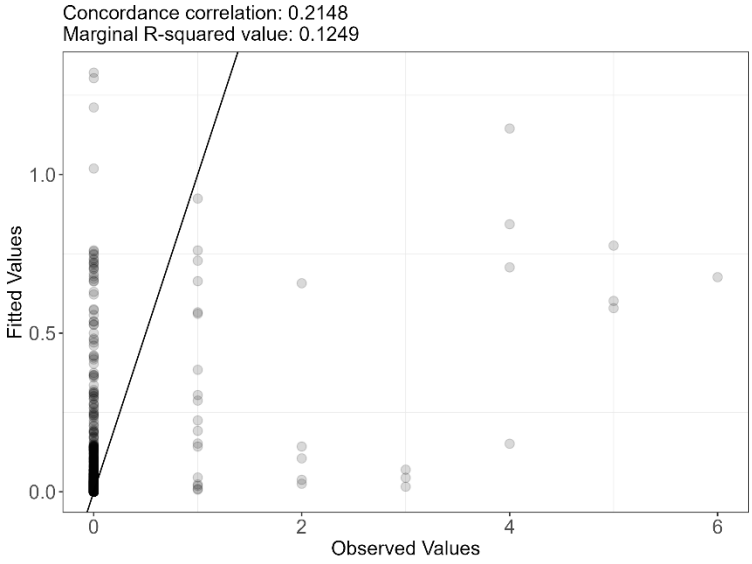


Plate 1-397 Puffin survey 16 COVRATIO statistic

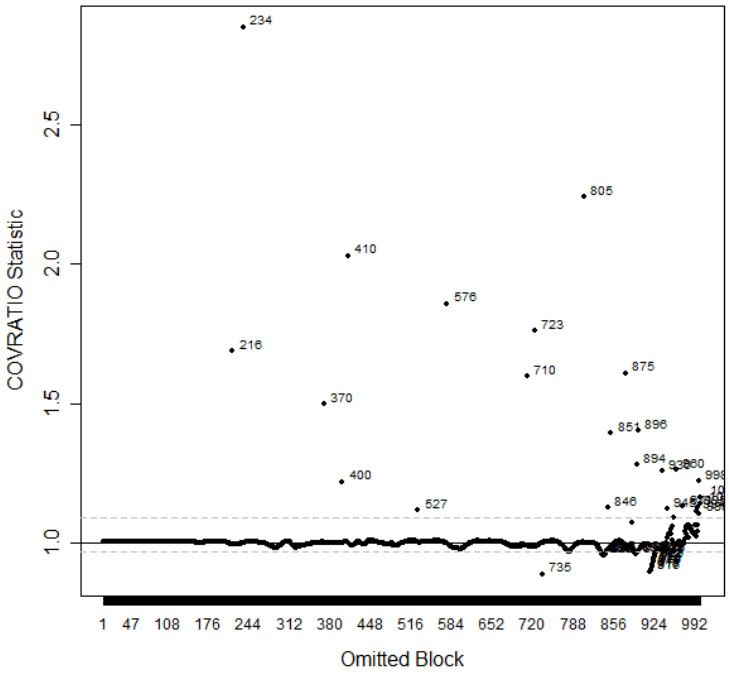


Plate 1-398 Puffin survey 16 PRESS statistic

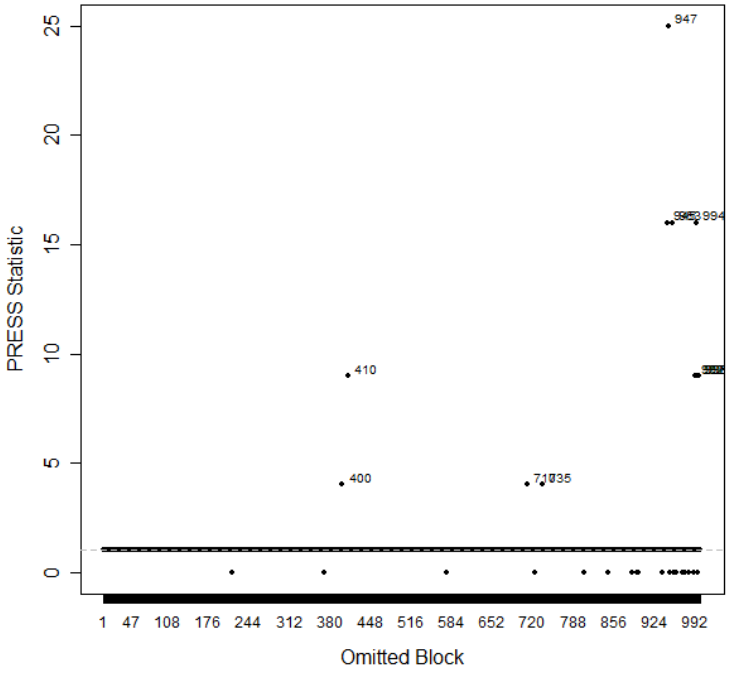
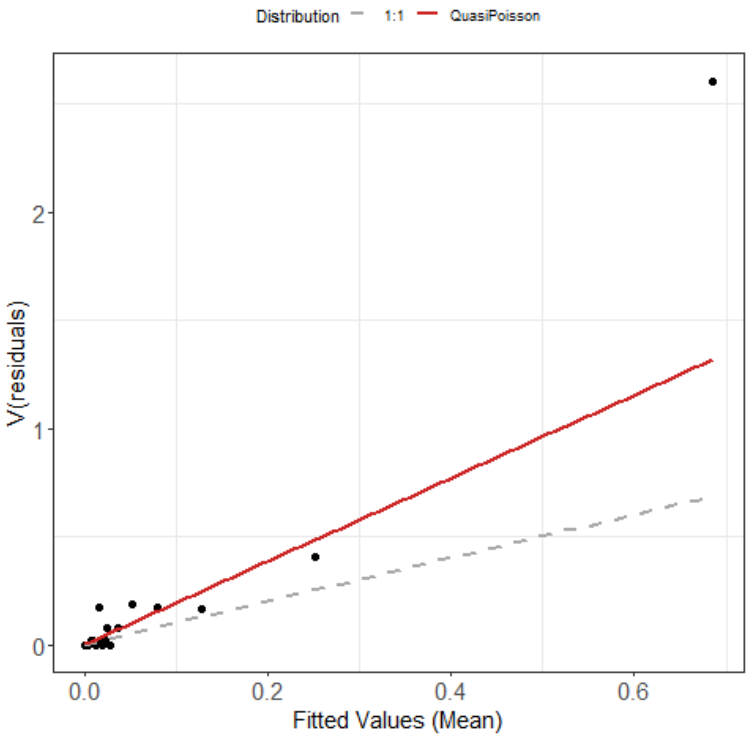


Plate 1-399 Puffin survey 16 mean-variance relationship



1.6.9 SURVEY 17 (JULY 2023)

Plate 1-400 Puffin survey 17 best fitting model scaled Pearsons residuals

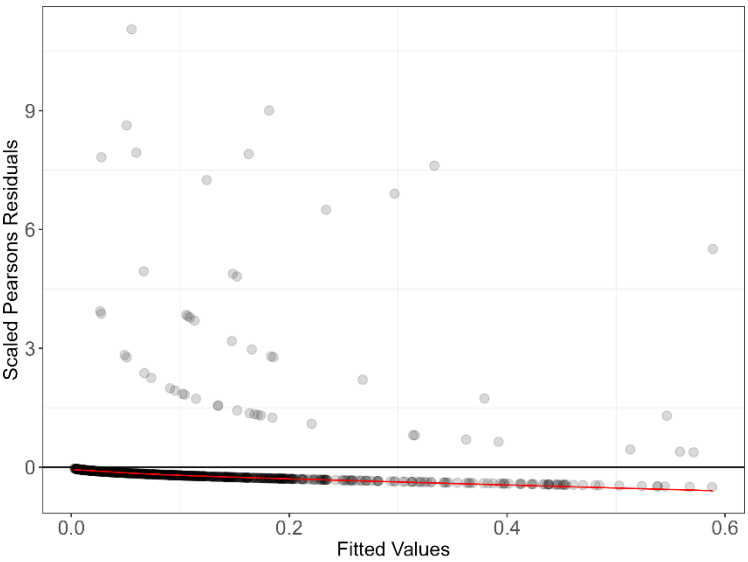


Plate 1-401 Puffin survey 17 fitted versus observed

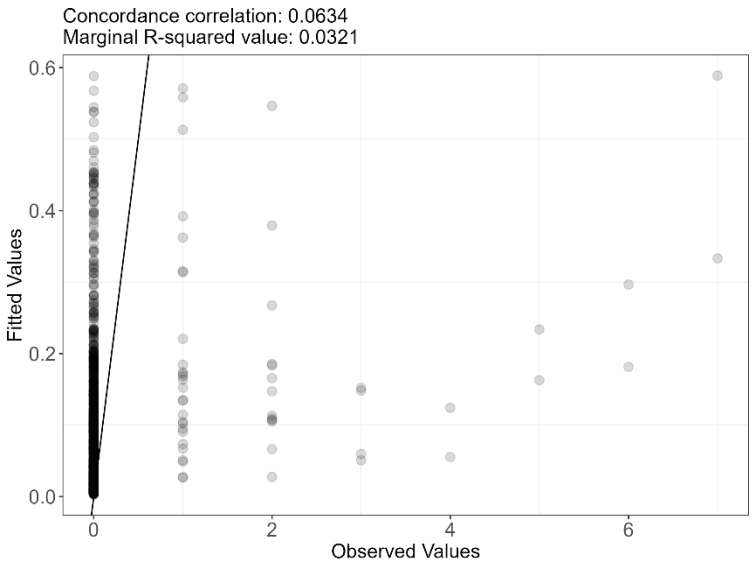


Plate 1-402 Puffin survey 17 COVRATIO statistic

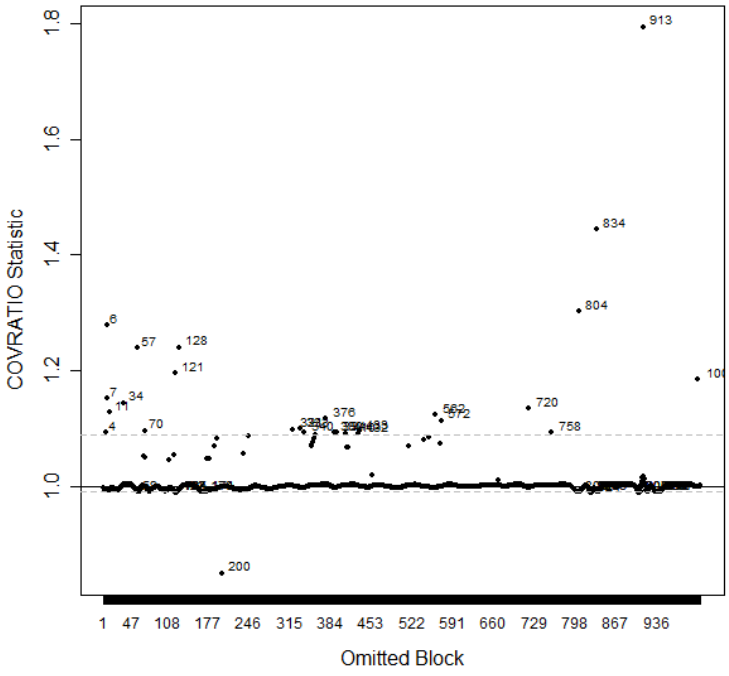


Plate 1-403 Puffin survey 17 PRESS statistic

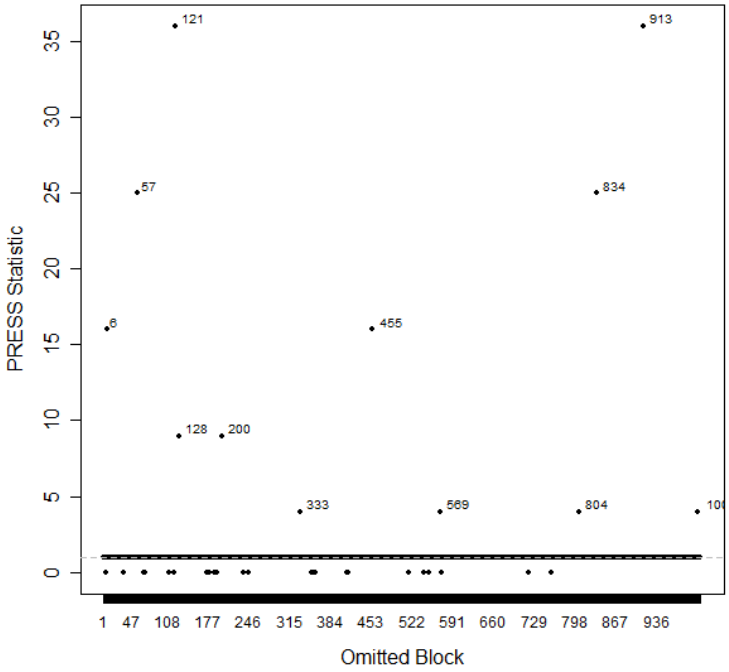
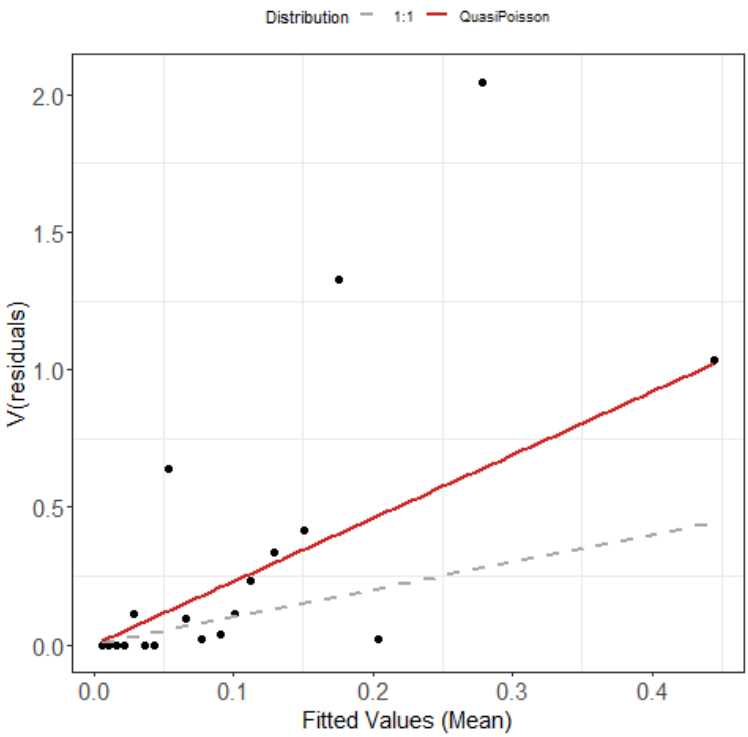


Plate 1-404 Puffin survey 17 mean-variance relationship



1.6.10 SURVEY 18 (AUGUST 2023)

Plate 1-405 Puffin survey 18 best fitting model scaled Pearsons residuals

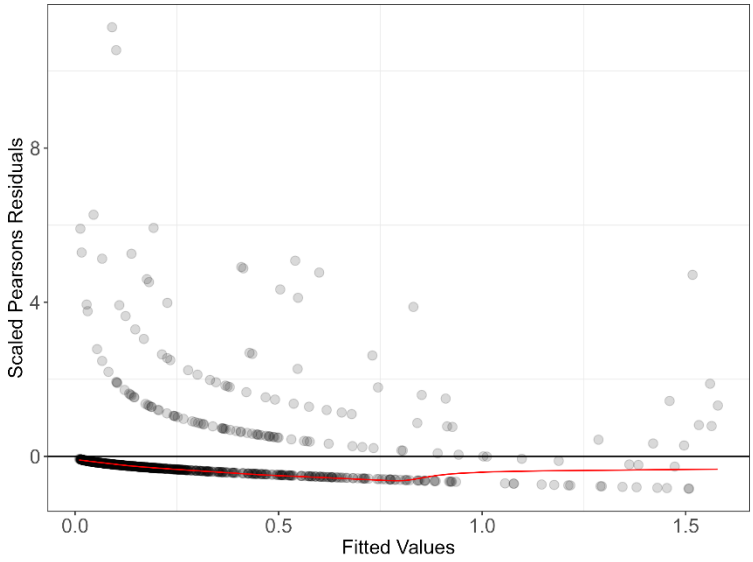


Plate 1-406 Puffin survey 18 fitted versus observed

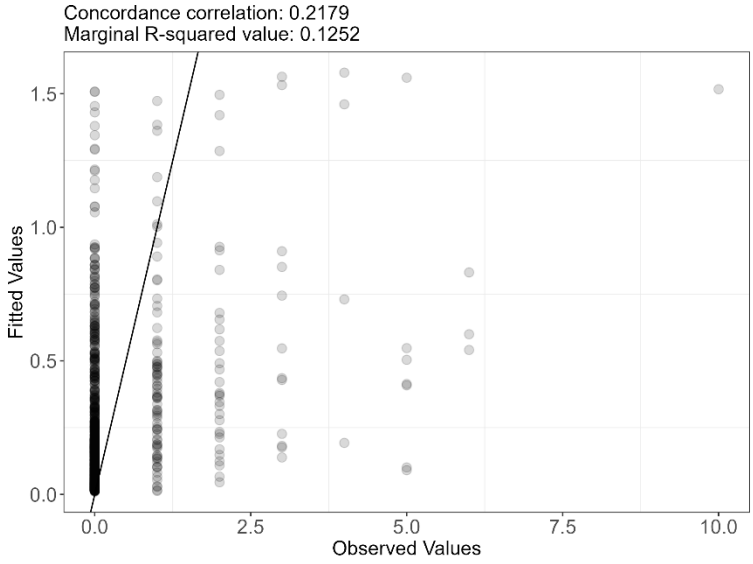


Plate 1-407 Puffin survey 18 COVRATIO statistic

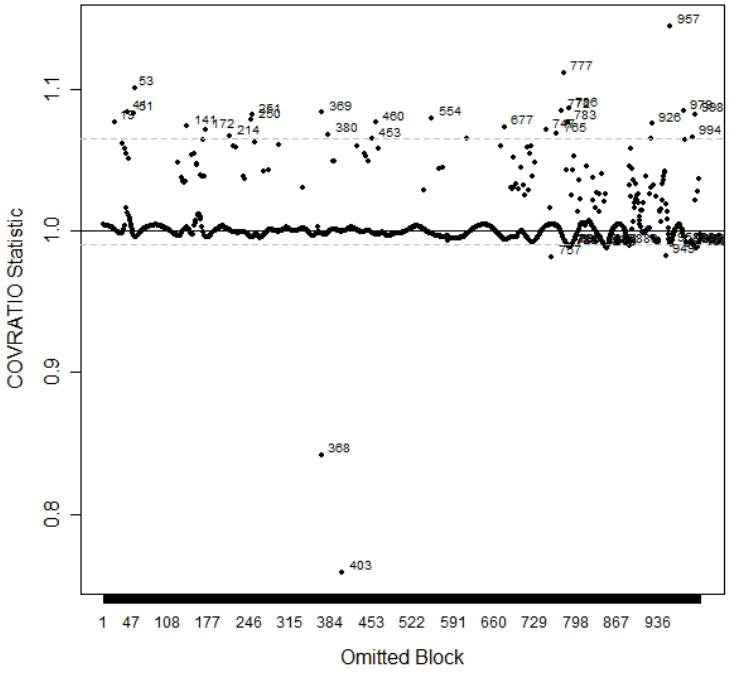


Plate 1-408 Puffin survey 18 PRESS statistic

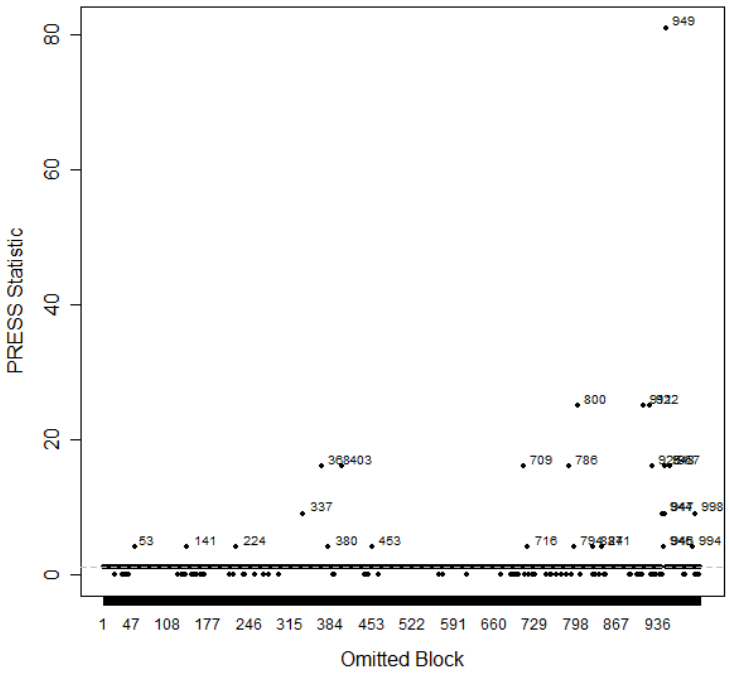
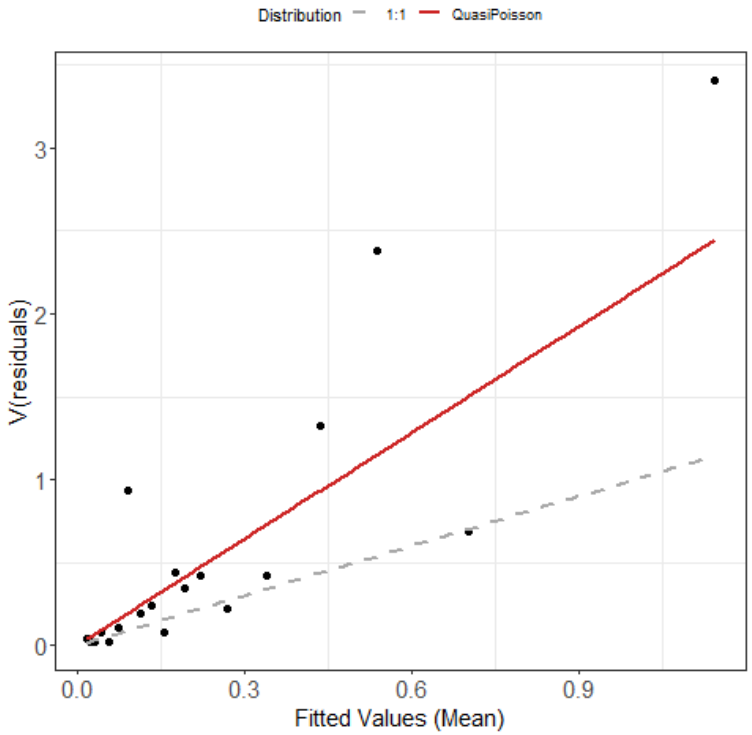


Plate 1-409 Puffin survey 18 mean-variance relationship



1.6.11 SURVEY 19 (SEPTEMBER 2023)

Plate 1-410 Puffin survey 19 best fitting model scaled Pearsons residuals

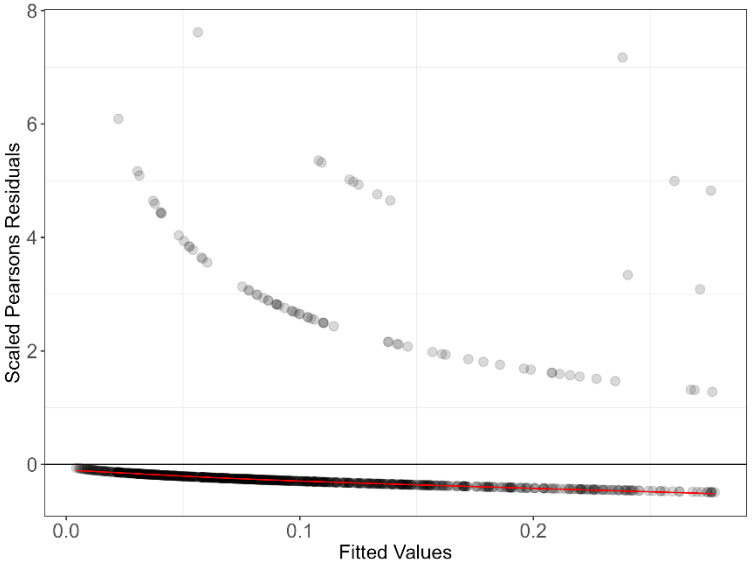


Plate 1-411 Puffin survey 19 fitted versus observed

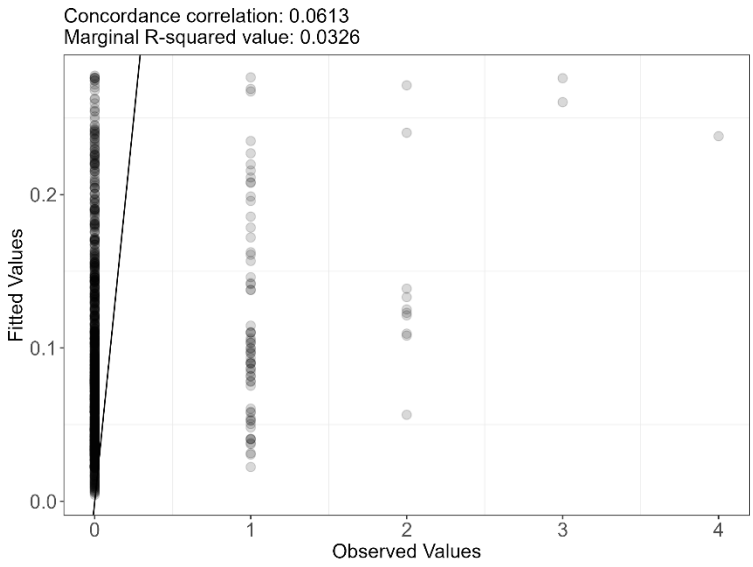


Plate 1-412 Puffin survey 19 COVRATIO statistic

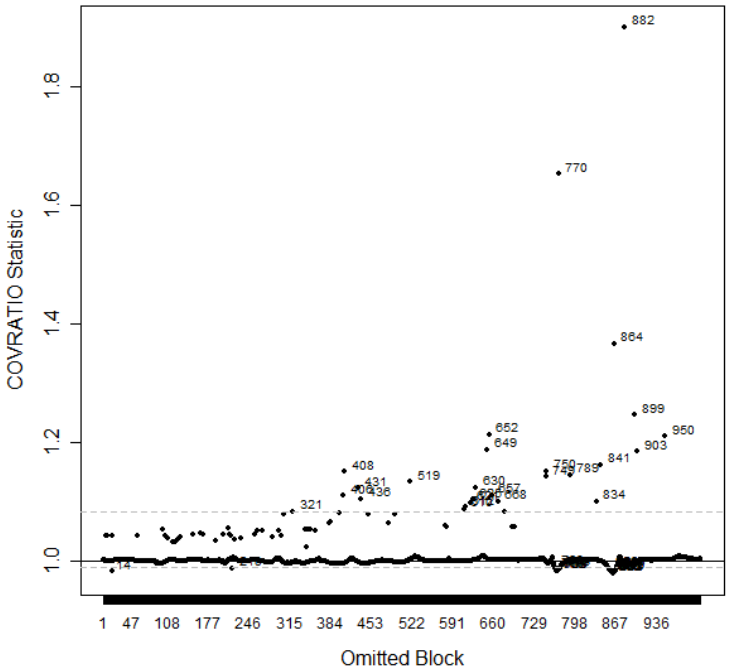


Plate 1-413 Puffin survey 19 PRESS statistic

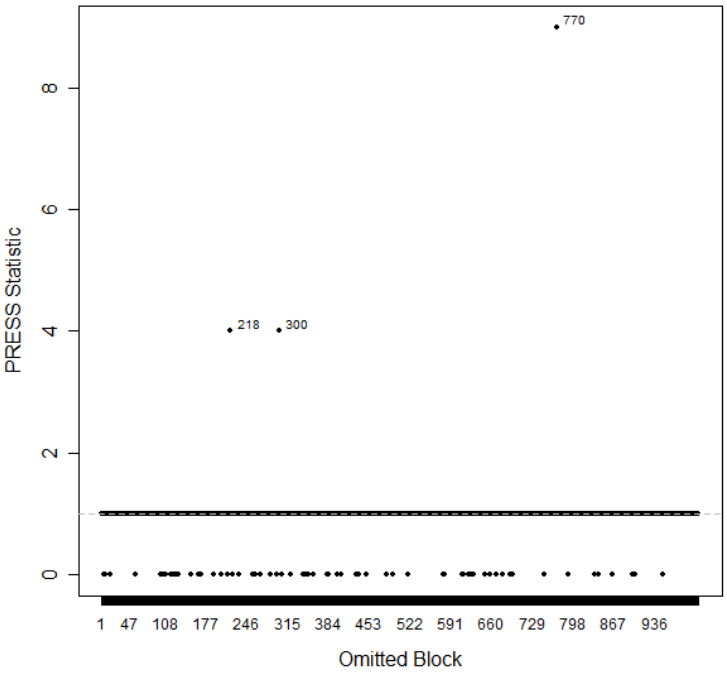
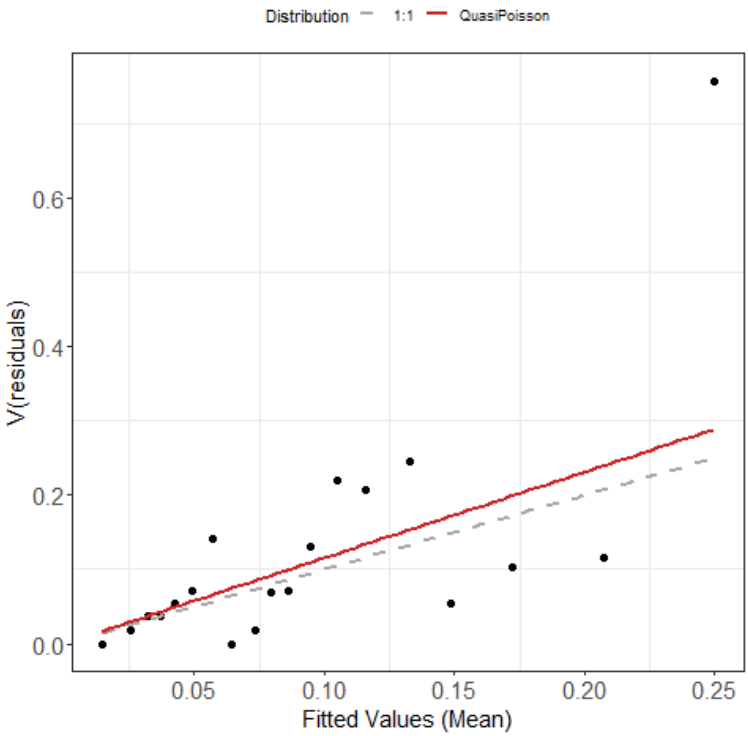


Plate 1-414 Puffin survey 19 mean-variance relationship



1.6.12 SURVEY 20 (OCTOBER 2023)

Plate 1-415 Puffin survey 20 best fitting model scaled Pearsons residuals

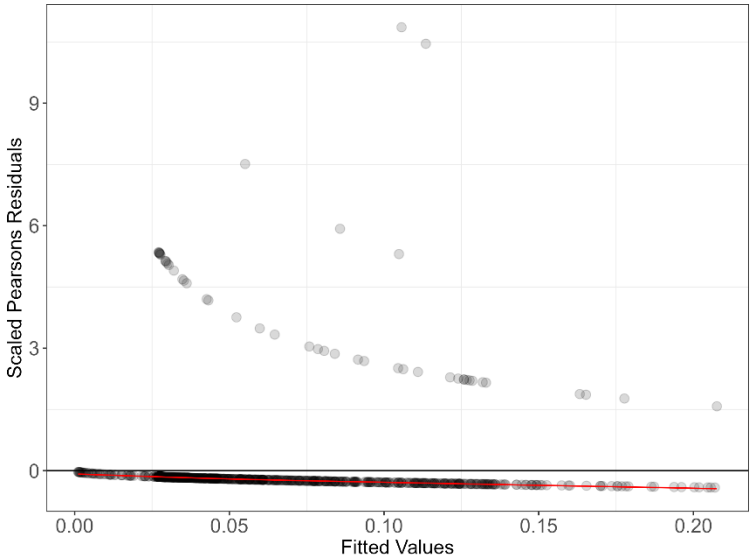


Plate 1-416 Puffin survey 20 fitted versus observed

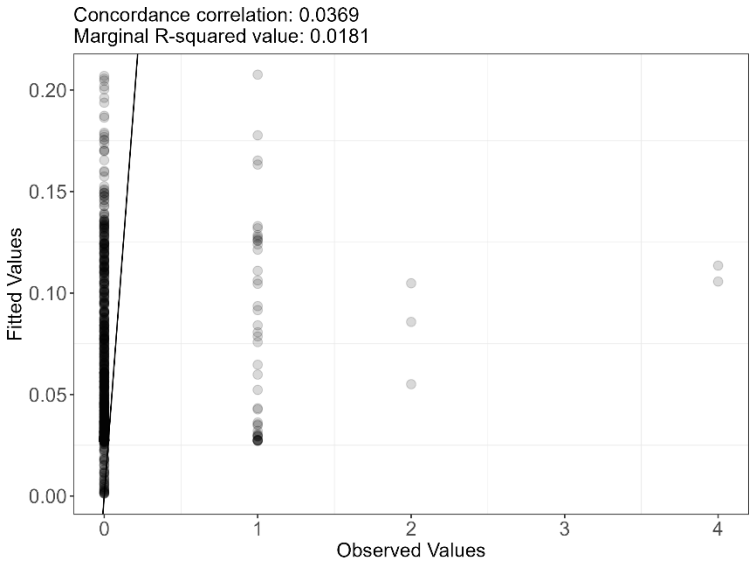


Plate 1-417 Puffin survey 20 COVRATIO statistic

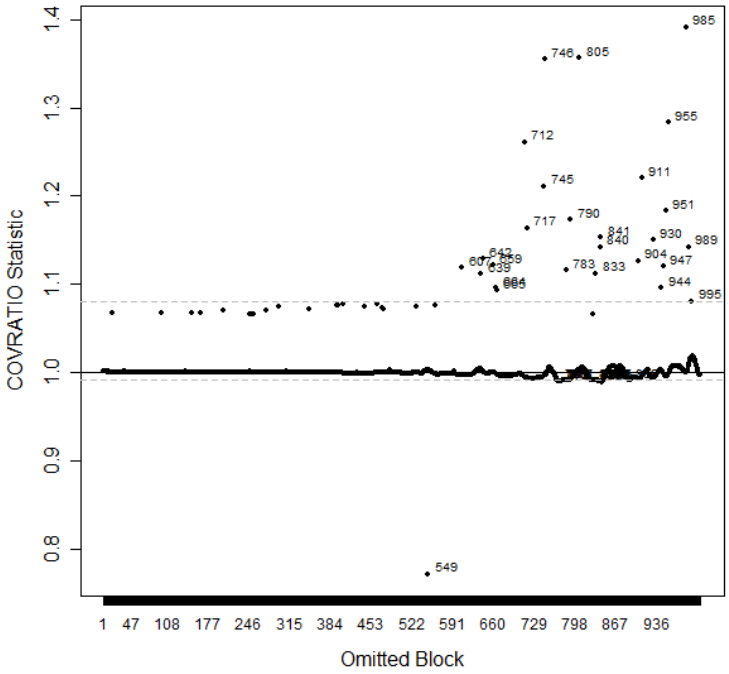


Plate 1-418 Puffin survey 20 PRESS statistic

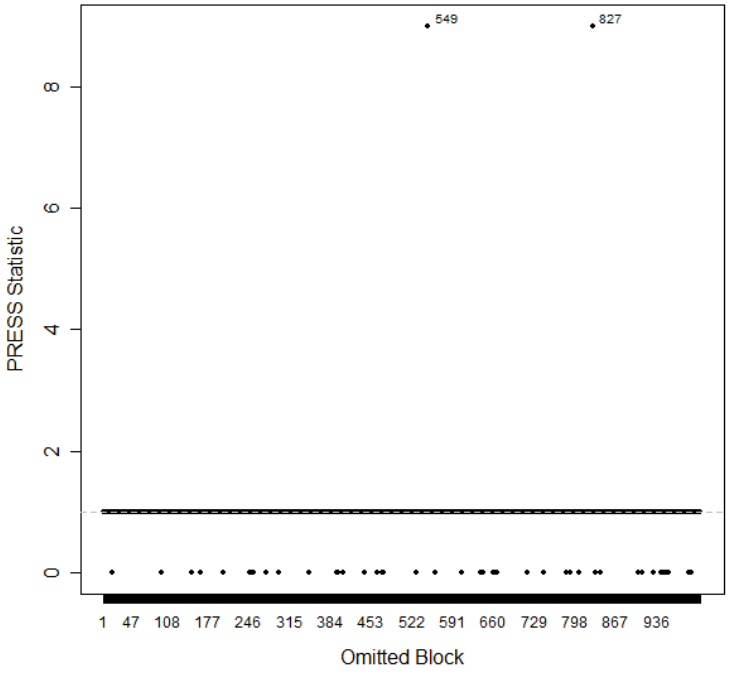
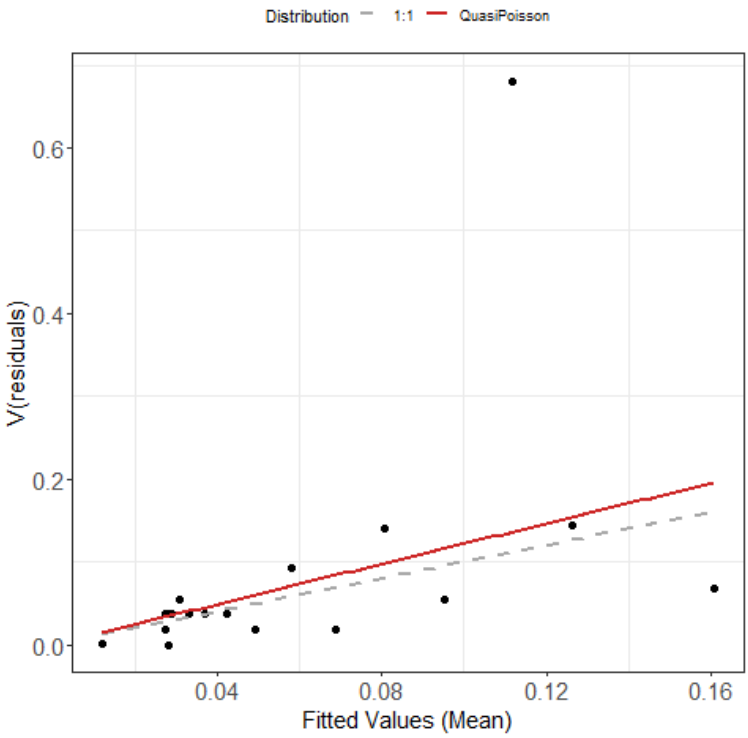


Plate 1-419 Puffin survey 20 mean-variance relationship



1.6.13 SURVEY 21 (NOVEMBER 2023)

Plate 1-420 Puffin survey 21 best fitting model scaled Pearsons residuals

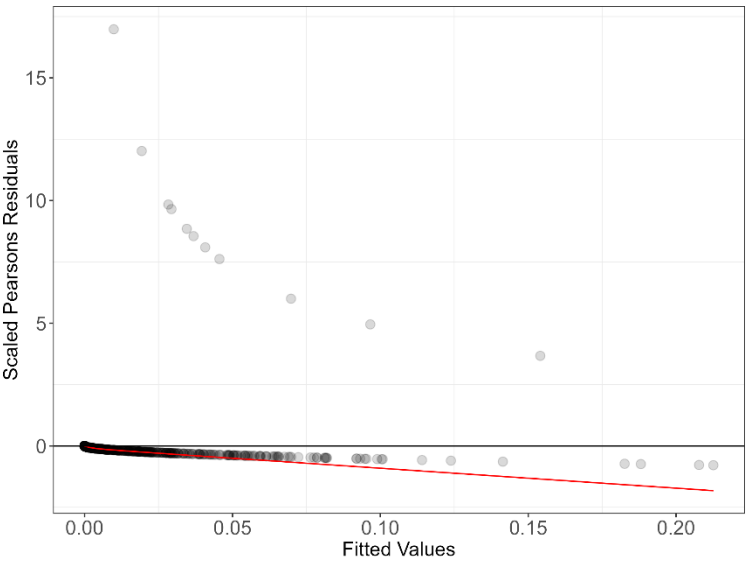


Plate 1-421 Puffin survey 21 fitted versus observed

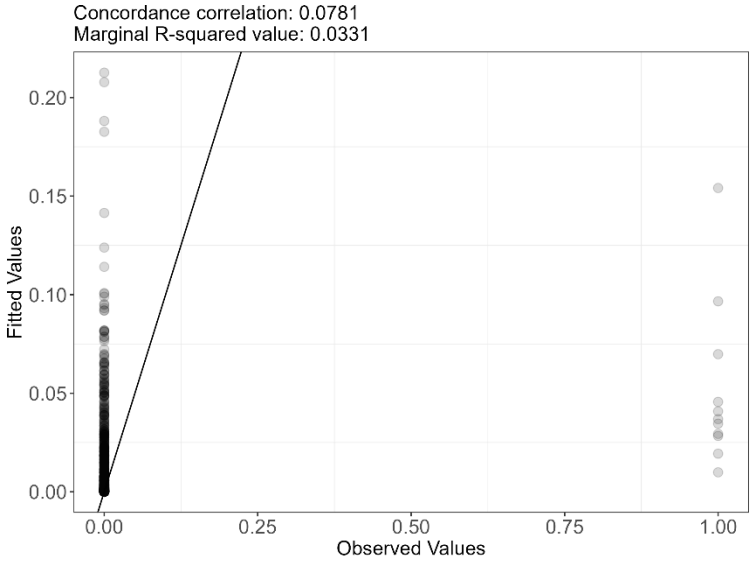


Plate 1-422 Puffin survey 21 COVRATIO statistic

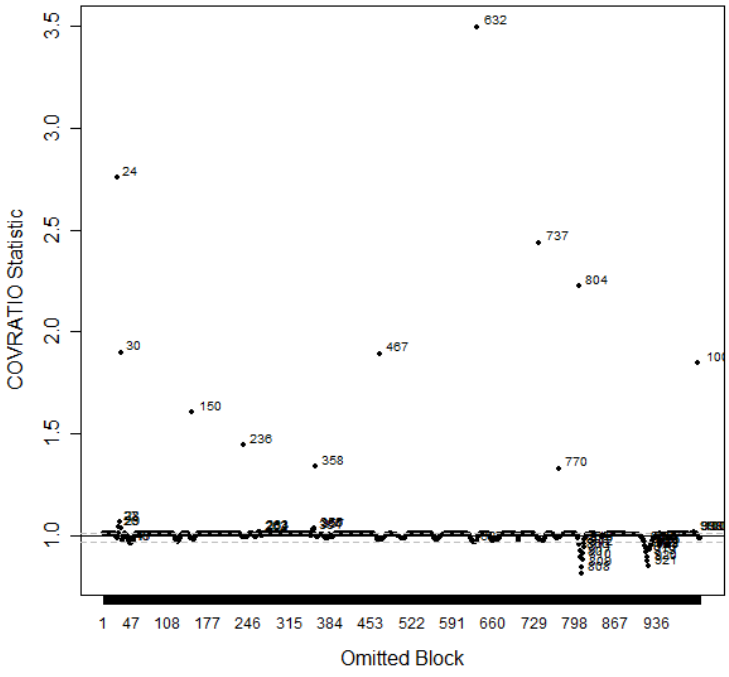


Plate 1-423 Puffin survey 21 PRESS statistic

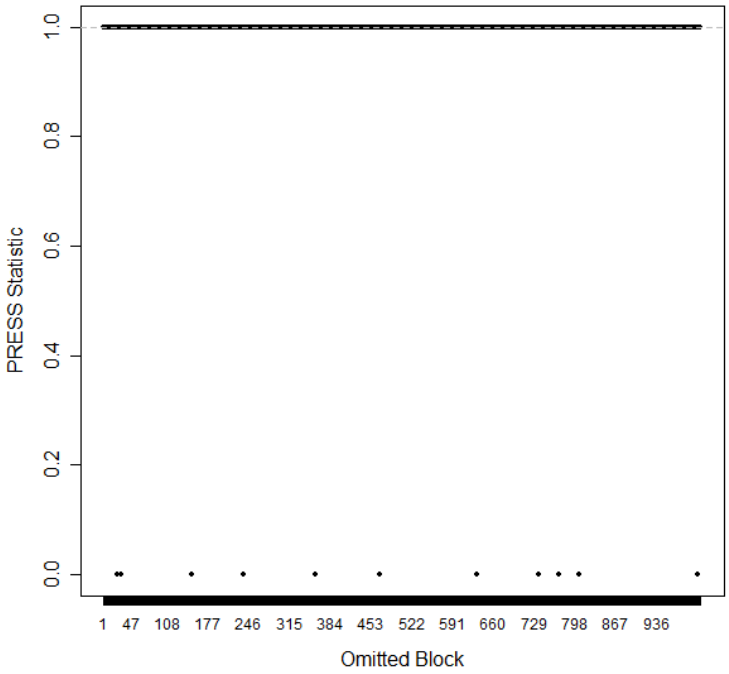
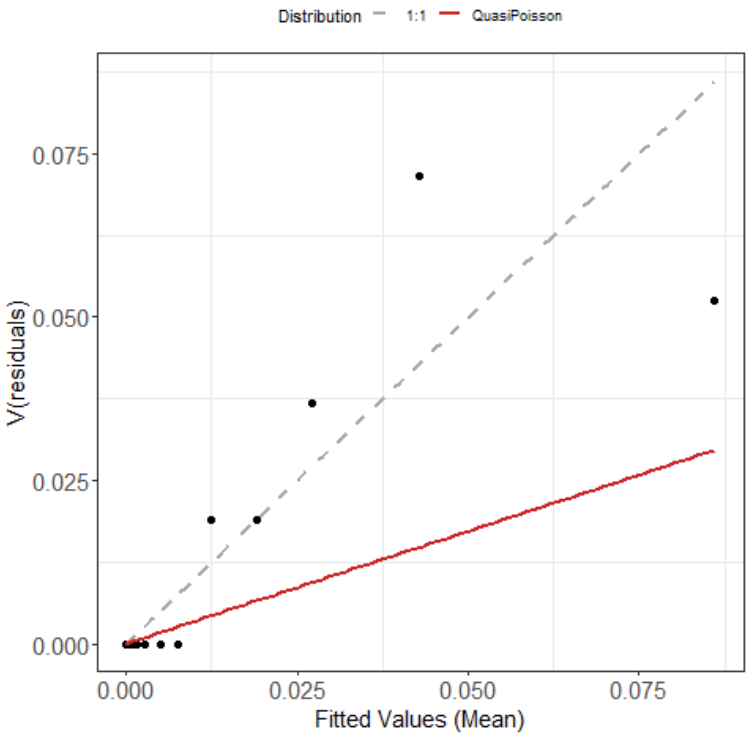


Plate 1-424 Puffin survey 21 mean-variance relationship



1.7 GLOSSARY OF TERMS AND ABBREVIATIONS

1.7.1.1 A list of key terms and glossary used in this appendix is provided in **Table 1-1** and **Table 1-2.**

Table 1-1 Acronyms and Abbreviations

Term	Meaning
LCL	Lower confidence limit
UCL	Upper confidence limit
SD	Standard Deviation

Table 1-2 Glossary

Term	Meaning
COVRATIO	This statistic signals the change in the precision of the parameter estimates when each block is omitted. Values greater than 1 signal removing the block inflates parameter standard errors. Values less than 1 signal standard errors are smaller when that block is excluded.
Lower confidence limit	Represents the lower bound of a confidence interval
PRESS	This statistic is the sum of the squared PRESS residuals in a deletion set (block ID). The PRESS residuals are the difference between the observed value and the predicted mean, where the predicted value is obtained without the observations in question.
Upper confidence limit	Represents the upper bound of a confidence interval
Standard Deviation	A statistic measuring the dispersion of a dataset relative to its mean. It is calculated as the square root of the variance

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