Climate MSE performance metric tables

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“**Supplementary Table 1.PM-1.** Summary of performance metric 1 (average annual catch) across OMs for **Pollock**.”

| **Cap** | **EM** | **1. Naive** | **2. w Ricker** | **3. SSP-126** | **4. w Ricker** | **5. SSP-245** | **6. w Ricker** | **7. SSP-585** | **8. w Ricker** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *FALSE* | *NPFMC Fix-M* | 574 | 573 | 286 | 220 | 161 | 115 | 168 | 135 |
|  | *NPFMC Fix-M (Dynamic B0)* | 582 | 558 | 321 | 193 | 201 | 116 | 206 | 144 |
|  | *NPFMC Est-M* | 424 | 602 | 154 | 149 | 80 | 73 | 77 | 74 |
|  | *NPFMC Est-M (Dynamic B0)* | 444 | 634 | 181 | 171 | 110 | 93 | 106 | 92 |
|  | *MS-B40 iter* | NA | 247 | NA | 173 | NA | 153 | NA | 189 |
|  | *MS-B40 simul* | 916 | 245 | 524 | 172 | 350 | 165 | 359 | 187 |
|  | *MS-MSY* | 2,294 | NA | 1,235 | NA | 776 | NA | 812 | NA |
|  | *MS-cMSY* | 1,386 | 137 | 788 | 156 | 512 | 173 | 531 | 186 |
| *TRUE* | *NPFMC Fix-M* | 276 | 203 | 167 | 95 | 99 | 59 | 100 | 69 |
|  | *NPFMC Fix-M (Dynamic B0)* | 282 | 180 | 195 | 81 | 133 | 65 | 131 | 78 |
|  | *NPFMC Est-M* | 212 | 187 | 106 | 68 | 62 | 38 | 58 | 44 |
|  | *NPFMC Est-M (Dynamic B0)* | 219 | 187 | 111 | 68 | 79 | 45 | 75 | 52 |
|  | *MS-B40 iter* | 297 | 151 | 228 | 74 | 169 | 70 | 157 | 83 |
|  | *MS-B40 simul* | 297 | 150 | 240 | 74 | 169 | 70 | 166 | 81 |
|  | *MS-MSY* | 299 | NA | 270 | NA | 197 | NA | 188 | NA |
|  | *MS-cMSY* | 299 | 202 | 262 | 72 | 188 | 72 | 182 | 81 |

[1] “**Supplementary Table 1.PM-2.** Summary of performance metric 2 (average interannual variation in catch (IAV)) across OMs for **Pollock**.”

| **Cap** | **EM** | **1. Naive** | **2. w Ricker** | **3. SSP-126** | **4. w Ricker** | **5. SSP-245** | **6. w Ricker** | **7. SSP-585** | **8. w Ricker** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *FALSE* | *NPFMC Fix-M* | 0.29 | 0.29 | 0.57 | 0.53 | 0.67 | 0.67 | 0.65 | 0.64 |
|  | *NPFMC Fix-M (Dynamic B0)* | 0.29 | 0.29 | 0.49 | 0.46 | 0.5 | 0.59 | 0.53 | 0.57 |
|  | *NPFMC Est-M* | 0.25 | 0.26 | 0.48 | 0.44 | 0.55 | 0.5 | 0.51 | 0.49 |
|  | *NPFMC Est-M (Dynamic B0)* | 0.24 | 0.26 | 0.4 | 0.39 | 0.39 | 0.38 | 0.4 | 0.4 |
|  | *MS-B40 iter* |  | 0.82 |  | 0.97 |  | 1.22 |  | 1.14 |
|  | *MS-B40 simul* | 0.4 | 0.82 | 0.65 | 0.97 | 0.77 | 1.24 | 0.78 | 1.13 |
|  | *MS-MSY* | 0.64 |  | 1.06 |  | 1.37 |  | 1.42 |  |
|  | *MS-cMSY* | 0.54 | 2.15 | 0.89 | 1.93 | 1.08 | 2.15 | 1.1 | 1.98 |
| *TRUE* | *NPFMC Fix-M* | 0.12 | 0.2 | 0.36 | 0.52 | 0.51 | 0.57 | 0.46 | 0.55 |
|  | *NPFMC Fix-M (Dynamic B0)* | 0.11 | 0.21 | 0.26 | 0.4 | 0.33 | 0.46 | 0.33 | 0.43 |
|  | *NPFMC Est-M* | 0.16 | 0.17 | 0.41 | 0.51 | 0.57 | 0.57 | 0.51 | 0.54 |
|  | *NPFMC Est-M (Dynamic B0)* | 0.15 | 0.17 | 0.31 | 0.33 | 0.35 | 0.41 | 0.36 | 0.39 |
|  | *MS-B40 iter* | 0.08 | 0.25 | 0.24 | 0.46 | 0.3 | 0.43 | 0.3 | 0.41 |
|  | *MS-B40 simul* | 0.08 | 0.25 | 0.23 | 0.46 | 0.31 | 0.43 | 0.3 | 0.41 |
|  | *MS-MSY* | 0.08 |  | 0.2 |  | 0.34 |  | 0.33 |  |
|  | *MS-cMSY* | 0.08 | 0.19 | 0.21 | 0.48 | 0.32 | 0.42 | 0.3 | 0.4 |

[1] “**Supplementary Table 1.PM-3.** Summary of performance metric 3 (probability that the population is overfished as determined from the OM) across OMs for **Pollock**.”

| **Cap** | **EM** | **1. Naive** | **2. w Ricker** | **3. SSP-126** | **4. w Ricker** | **5. SSP-245** | **6. w Ricker** | **7. SSP-585** | **8. w Ricker** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *FALSE* | *NPFMC Fix-M* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
|  | *NPFMC Fix-M (Dynamic B0)* | 0 | 0 | 0 | 0 | 0 | 0.09 | 0 | 0.15 |
|  | *NPFMC Est-M* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
|  | *NPFMC Est-M (Dynamic B0)* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
|  | *MS-B40 iter* |  | 0.84 |  | 0.76 |  | 0.8 |  | 0.78 |
|  | *MS-B40 simul* | 0.04 | 0.84 | 0.07 | 0.76 | 0.19 | 0.8 | 0.24 | 0.78 |
|  | *MS-MSY* | 0.72 |  | 0.72 |  | 0.78 |  | 0.82 |  |
|  | *MS-cMSY* | 0.67 | 0.91 | 0.66 | 0.9 | 0.71 | 0.9 | 0.75 | 0.9 |
| *TRUE* | *NPFMC Fix-M* | 0 | 0.01 | 0 | 0 | 0 | 0 | 0 | 0 |
|  | *NPFMC Fix-M (Dynamic B0)* | 0 | 0.37 | 0 | 0.49 | 0 | 0.55 | 0 | 0.49 |
|  | *NPFMC Est-M* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
|  | *NPFMC Est-M (Dynamic B0)* | 0 | 0.02 | 0 | 0.01 | 0 | 0.03 | 0 | 0.02 |
|  | *MS-B40 iter* | 0 | 0.55 | 0.05 | 0.74 | 0.16 | 0.74 | 0.19 | 0.71 |
|  | *MS-B40 simul* | 0 | 0.55 | 0.03 | 0.73 | 0.16 | 0.74 | 0.19 | 0.71 |
|  | *MS-MSY* | 0.01 |  | 0.31 |  | 0.58 |  | 0.56 |  |
|  | *MS-cMSY* | 0.01 | 0.38 | 0.27 | 0.78 | 0.51 | 0.76 | 0.5 | 0.74 |

[1] “**Supplementary Table 1.PM-4.** Summary of performance metric 4 (terminal spawning stock biomass) across OMs for **Pollock**.”

| **Cap** | **EM** | **1. Naive** | **2. w Ricker** | **3. SSP-126** | **4. w Ricker** | **5. SSP-245** | **6. w Ricker** | **7. SSP-585** | **8. w Ricker** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *FALSE* | *NPFMC Fix-M* | 702 | 715 | 351 | 266 | 206 | 38 | 217 | 13 |
|  | *NPFMC Fix-M (Dynamic B0)* | 691 | 644 | 296 | 143 | 138 | 1 | 166 | 0 |
|  | *NPFMC Est-M* | 875 | 1,066 | 493 | 507 | 215 | 61 | 222 | 22 |
|  | *NPFMC Est-M (Dynamic B0)* | 853 | 1,071 | 475 | 489 | 170 | 24 | 195 | 9 |
|  | *MS-B40 iter* | NA | 45 | NA | 3 | NA | 0 | NA | 0 |
|  | *MS-B40 simul* | 380 | 45 | 154 | 3 | 81 | 0 | 121 | 0 |
|  | *MS-MSY* | 178 | NA | 42 | NA | 27 | NA | 54 | NA |
|  | *MS-cMSY* | 161 | 0 | 38 | 0 | 30 | 0 | 57 | 0 |
| *TRUE* | *NPFMC Fix-M* | 795 | 404 | 337 | 147 | 207 | 12 | 220 | 6 |
|  | *NPFMC Fix-M (Dynamic B0)* | 786 | 161 | 294 | 13 | 145 | 0 | 177 | 0 |
|  | *NPFMC Est-M* | 854 | 652 | 386 | 195 | 210 | 13 | 224 | 7 |
|  | *NPFMC Est-M (Dynamic B0)* | 847 | 561 | 402 | 182 | 173 | 3 | 206 | 2 |
|  | *MS-B40 iter* | 765 | 34 | 185 | 0 | 58 | 0 | 61 | 0 |
|  | *MS-B40 simul* | 748 | 33 | 222 | 0 | 98 | 0 | 144 | 0 |
|  | *MS-MSY* | 777 | NA | 181 | NA | 52 | NA | 93 | NA |
|  | *MS-cMSY* | 770 | 91 | 192 | 0 | 69 | 0 | 111 | 0 |

[1] “**Supplementary Table 1.PM-5.** Summary of performance metric 5 (terminal dynamic SB0) across OMs for **Pollock**.”

| **Cap** | **EM** | **1. Naive** | **2. w Ricker** | **3. SSP-126** | **4. w Ricker** | **5. SSP-245** | **6. w Ricker** | **7. SSP-585** | **8. w Ricker** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *FALSE* | *NPFMC Fix-M* | 1,017 | 974 | 438 | 206 | 164 | 3 | 193 | 1 |
|  | *NPFMC Fix-M (Dynamic B0)* | 1,017 | 974 | 438 | 206 | 164 | 3 | 193 | 1 |
|  | *NPFMC Est-M* | 1,017 | 974 | 438 | 206 | 164 | 3 | 193 | 1 |
|  | *NPFMC Est-M (Dynamic B0)* | 1,017 | 974 | 438 | 206 | 164 | 3 | 193 | 1 |
|  | *MS-B40 iter* | NA | 980 | NA | 213 | NA | 3 | NA | 1 |
|  | *MS-B40 simul* | 1,017 | 984 | 438 | 211 | 164 | 3 | 193 | 2 |
|  | *MS-MSY* | 1,017 | NA | 438 | NA | 164 | NA | 193 | NA |
|  | *MS-cMSY* | 1,014 | 944 | 439 | 234 | 165 | 3 | 191 | 1 |
| *TRUE* | *NPFMC Fix-M* | 1,017 | 974 | 438 | 206 | 164 | 3 | 193 | 1 |
|  | *NPFMC Fix-M (Dynamic B0)* | 1,017 | 974 | 438 | 206 | 164 | 3 | 193 | 1 |
|  | *NPFMC Est-M* | 1,017 | 974 | 438 | 206 | 164 | 3 | 193 | 1 |
|  | *NPFMC Est-M (Dynamic B0)* | 1,017 | 974 | 438 | 206 | 164 | 3 | 193 | 1 |
|  | *MS-B40 iter* | 1,016 | 964 | 395 | 219 | 133 | 3 | 107 | 2 |
|  | *MS-B40 simul* | 1,017 | 957 | 438 | 200 | 164 | 4 | 193 | 1 |
|  | *MS-MSY* | 1,017 | NA | 438 | NA | 164 | NA | 189 | NA |
|  | *MS-cMSY* | 1,019 | 895 | 439 | 183 | 166 | 2 | 187 | 1 |

[1] “**Supplementary Table 1.PM-6.** Summary of performance metric 6 (terminal spawning stock biomass depletion relative to dynamic SB0) across OMs for **Pollock**.”

| **Cap** | **EM** | **1. Naive** | **2. w Ricker** | **3. SSP-126** | **4. w Ricker** | **5. SSP-245** | **6. w Ricker** | **7. SSP-585** | **8. w Ricker** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *FALSE* | *NPFMC Fix-M* | 0.69 | 0.74 | 0.85 | 1.85 | 1.31 | 23.85 | 1.15 | 11.85 |
|  | *NPFMC Fix-M (Dynamic B0)* | 0.68 | 0.64 | 0.66 | 0.61 | 0.82 | 0.18 | 0.85 | 0.11 |
|  | *NPFMC Est-M* | 0.87 | 1.16 | 1.19 | 3.69 | 1.35 | 39.18 | 1.18 | 20.11 |
|  | *NPFMC Est-M (Dynamic B0)* | 0.84 | 1.14 | 1.09 | 3.35 | 1.02 | 12.61 | 1 | 6.58 |
|  | *MS-B40 iter* |  | 0.04 |  | 0.01 |  | 0 |  | 0 |
|  | *MS-B40 simul* | 0.37 | 0.04 | 0.34 | 0.01 | 0.48 | 0 | 0.59 | 0 |
|  | *MS-MSY* | 0.18 |  | 0.1 |  | 0.17 |  | 0.24 |  |
|  | *MS-cMSY* | 0.16 | 0 | 0.09 | 0 | 0.18 | 0 | 0.25 | 0 |
| *TRUE* | *NPFMC Fix-M* | 0.74 | 0.39 | 0.75 | 0.96 | 1.29 | 5.06 | 1.17 | 4.44 |
|  | *NPFMC Fix-M (Dynamic B0)* | 0.72 | 0.14 | 0.6 | 0.04 | 0.85 | 0.01 | 0.88 | 0.01 |
|  | *NPFMC Est-M* | 0.82 | 0.65 | 0.88 | 1.21 | 1.31 | 5.57 | 1.19 | 5.5 |
|  | *NPFMC Est-M (Dynamic B0)* | 0.81 | 0.54 | 0.89 | 0.88 | 1.04 | 0.85 | 1.07 | 1.14 |
|  | *MS-B40 iter* | 0.69 | 0.03 | 0.36 | 0 | 0.38 | 0 | 0.49 | 0 |
|  | *MS-B40 simul* | 0.68 | 0.03 | 0.4 | 0 | 0.51 | 0 | 0.65 | 0 |
|  | *MS-MSY* | 0.7 |  | 0.26 |  | 0.17 |  | 0.28 |  |
|  | *MS-cMSY* | 0.69 | 0.08 | 0.29 | 0 | 0.28 | 0 | 0.42 | 0 |

[1] “**Supplementary Table 2.PM-1.** Summary of performance metric 1 (average annual catch) across OMs for **Cod**.”

| **Cap** | **EM** | **1. Naive** | **2. w Ricker** | **3. SSP-126** | **4. w Ricker** | **5. SSP-245** | **6. w Ricker** | **7. SSP-585** | **8. w Ricker** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *FALSE* | *NPFMC Fix-M* | 31 | 29 | 27 | 24 | 24 | 21 | 23 | 20 |
|  | *NPFMC Fix-M (Dynamic B0)* | 31 | 29 | 27 | 23 | 25 | 20 | 24 | 19 |
|  | *NPFMC Est-M* | 19 | 20 | 17 | 17 | 15 | 16 | 14 | 15 |
|  | *NPFMC Est-M (Dynamic B0)* | 19 | 20 | 17 | 17 | 15 | 16 | 14 | 15 |
|  | *MS-B40 iter* | NA | 23 | NA | 20 | NA | 18 | NA | 18 |
|  | *MS-B40 simul* | 22 | 23 | 19 | 20 | 17 | 18 | 17 | 18 |
|  | *MS-MSY* | 44 | NA | 39 | NA | 35 | NA | 34 | NA |
|  | *MS-cMSY* | 35 | 27 | 32 | 23 | 29 | 19 | 28 | 18 |
| *TRUE* | *NPFMC Fix-M* | 30 | 27 | 26 | 22 | 24 | 20 | 23 | 19 |
|  | *NPFMC Fix-M (Dynamic B0)* | 30 | 27 | 27 | 21 | 24 | 18 | 24 | 18 |
|  | *NPFMC Est-M* | 18 | 19 | 16 | 17 | 15 | 15 | 14 | 14 |
|  | *NPFMC Est-M (Dynamic B0)* | 18 | 19 | 16 | 16 | 15 | 15 | 14 | 15 |
|  | *MS-B40 iter* | 21 | 21 | 19 | 18 | 18 | 17 | 18 | 16 |
|  | *MS-B40 simul* | 21 | 22 | 18 | 18 | 17 | 16 | 16 | 16 |
|  | *MS-MSY* | 38 | NA | 34 | NA | 31 | NA | 30 | NA |
|  | *MS-cMSY* | 34 | 20 | 30 | 11 | 27 | 11 | 26 | 11 |

[1] “**Supplementary Table 2.PM-2.** Summary of performance metric 2 (average interannual variation in catch (IAV)) across OMs for **Cod**.”

| **Cap** | **EM** | **1. Naive** | **2. w Ricker** | **3. SSP-126** | **4. w Ricker** | **5. SSP-245** | **6. w Ricker** | **7. SSP-585** | **8. w Ricker** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *FALSE* | *NPFMC Fix-M* | 0.24 | 0.25 | 0.28 | 0.29 | 0.3 | 0.32 | 0.32 | 0.34 |
|  | *NPFMC Fix-M (Dynamic B0)* | 0.2 | 0.2 | 0.22 | 0.22 | 0.23 | 0.23 | 0.24 | 0.24 |
|  | *NPFMC Est-M* | 0.19 | 0.18 | 0.22 | 0.21 | 0.24 | 0.22 | 0.25 | 0.23 |
|  | *NPFMC Est-M (Dynamic B0)* | 0.18 | 0.17 | 0.19 | 0.18 | 0.2 | 0.19 | 0.21 | 0.19 |
|  | *MS-B40 iter* |  | 0.15 |  | 0.17 |  | 0.19 |  | 0.18 |
|  | *MS-B40 simul* | 0.15 | 0.15 | 0.16 | 0.17 | 0.17 | 0.19 | 0.18 | 0.18 |
|  | *MS-MSY* | 0.46 |  | 0.52 |  | 0.57 |  | 0.59 |  |
|  | *MS-cMSY* | 0.33 | 0.37 | 0.36 | 0.44 | 0.37 | 0.48 | 0.41 | 0.52 |
| *TRUE* | *NPFMC Fix-M* | 0.25 | 0.26 | 0.28 | 0.31 | 0.3 | 0.34 | 0.32 | 0.35 |
|  | *NPFMC Fix-M (Dynamic B0)* | 0.2 | 0.21 | 0.22 | 0.23 | 0.23 | 0.24 | 0.24 | 0.24 |
|  | *NPFMC Est-M* | 0.19 | 0.19 | 0.22 | 0.21 | 0.24 | 0.23 | 0.26 | 0.24 |
|  | *NPFMC Est-M (Dynamic B0)* | 0.18 | 0.17 | 0.19 | 0.19 | 0.21 | 0.2 | 0.21 | 0.2 |
|  | *MS-B40 iter* | 0.15 | 0.2 | 0.16 | 0.25 | 0.16 | 0.25 | 0.16 | 0.22 |
|  | *MS-B40 simul* | 0.15 | 0.21 | 0.17 | 0.23 | 0.17 | 0.25 | 0.18 | 0.22 |
|  | *MS-MSY* | 0.33 |  | 0.37 |  | 0.38 |  | 0.39 |  |
|  | *MS-cMSY* | 0.28 | 0.43 | 0.31 | 0.64 | 0.32 | 0.65 | 0.34 | 0.65 |

[1] “**Supplementary Table 2.PM-3.** Summary of performance metric 3 (probability that the population is overfished as determined from the OM) across OMs for **Cod**.”

| **Cap** | **EM** | **1. Naive** | **2. w Ricker** | **3. SSP-126** | **4. w Ricker** | **5. SSP-245** | **6. w Ricker** | **7. SSP-585** | **8. w Ricker** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *FALSE* | *NPFMC Fix-M* | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.02 |
|  | *NPFMC Fix-M (Dynamic B0)* | 0.01 | 0.01 | 0.01 | 0.04 | 0.01 | 0.13 | 0.01 | 0.21 |
|  | *NPFMC Est-M* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
|  | *NPFMC Est-M (Dynamic B0)* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
|  | *MS-B40 iter* |  | 0 |  | 0 |  | 0 |  | 0 |
|  | *MS-B40 simul* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
|  | *MS-MSY* | 0.88 |  | 0.85 |  | 0.83 |  | 0.84 |  |
|  | *MS-cMSY* | 0.12 | 0.34 | 0.13 | 0.41 | 0.13 | 0.52 | 0.16 | 0.61 |
| *TRUE* | *NPFMC Fix-M* | 0.01 | 0.01 | 0.01 | 0.02 | 0.01 | 0.03 | 0.02 | 0.03 |
|  | *NPFMC Fix-M (Dynamic B0)* | 0.01 | 0.03 | 0.01 | 0.14 | 0.01 | 0.31 | 0.02 | 0.34 |
|  | *NPFMC Est-M* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
|  | *NPFMC Est-M (Dynamic B0)* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
|  | *MS-B40 iter* | 0 | 0 | 0 | 0.01 | 0 | 0 | 0 | 0.01 |
|  | *MS-B40 simul* | 0 | 0 | 0 | 0 | 0 | 0.01 | 0 | 0.01 |
|  | *MS-MSY* | 0.9 |  | 0.88 |  | 0.87 |  | 0.86 |  |
|  | *MS-cMSY* | 0.18 | 0.65 | 0.17 | 0.74 | 0.18 | 0.83 | 0.19 | 0.72 |

[1] “**Supplementary Table 2.PM-4.** Summary of performance metric 4 (terminal spawning stock biomass) across OMs for **Cod**.”

| **Cap** | **EM** | **1. Naive** | **2. w Ricker** | **3. SSP-126** | **4. w Ricker** | **5. SSP-245** | **6. w Ricker** | **7. SSP-585** | **8. w Ricker** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *FALSE* | *NPFMC Fix-M* | 157 | 152 | 128 | 118 | 134 | 108 | 138 | 95 |
|  | *NPFMC Fix-M (Dynamic B0)* | 153 | 146 | 123 | 107 | 124 | 72 | 125 | 48 |
|  | *NPFMC Est-M* | 269 | 288 | 223 | 238 | 204 | 218 | 193 | 197 |
|  | *NPFMC Est-M (Dynamic B0)* | 270 | 290 | 225 | 243 | 203 | 218 | 191 | 191 |
|  | *MS-B40 iter* | NA | 277 | NA | 241 | NA | 223 | NA | 177 |
|  | *MS-B40 simul* | 251 | 274 | 210 | 238 | 190 | 212 | 179 | 177 |
|  | *MS-MSY* | 56 | NA | 43 | NA | 49 | NA | 54 | NA |
|  | *MS-cMSY* | 136 | 157 | 106 | 116 | 106 | 74 | 109 | 41 |
| *TRUE* | *NPFMC Fix-M* | 152 | 140 | 124 | 107 | 134 | 102 | 139 | 93 |
|  | *NPFMC Fix-M (Dynamic B0)* | 148 | 130 | 119 | 91 | 124 | 60 | 125 | 44 |
|  | *NPFMC Est-M* | 260 | 271 | 214 | 221 | 204 | 208 | 193 | 194 |
|  | *NPFMC Est-M (Dynamic B0)* | 261 | 272 | 215 | 222 | 202 | 203 | 191 | 188 |
|  | *MS-B40 iter* | 240 | 248 | 212 | 201 | 200 | 179 | 196 | 168 |
|  | *MS-B40 simul* | 240 | 237 | 200 | 209 | 189 | 171 | 179 | 165 |
|  | *MS-MSY* | 50 | NA | 40 | NA | 49 | NA | 56 | NA |
|  | *MS-cMSY* | 120 | 126 | 96 | 89 | 105 | 72 | 107 | 74 |

[1] “**Supplementary Table 2.PM-5.** Summary of performance metric 5 (terminal dynamic SB0) across OMs for **Cod**.”

| **Cap** | **EM** | **1. Naive** | **2. w Ricker** | **3. SSP-126** | **4. w Ricker** | **5. SSP-245** | **6. w Ricker** | **7. SSP-585** | **8. w Ricker** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *FALSE* | *NPFMC Fix-M* | 417 | 390 | 344 | 325 | 292 | 313 | 260 | 292 |
|  | *NPFMC Fix-M (Dynamic B0)* | 417 | 390 | 344 | 325 | 292 | 313 | 260 | 292 |
|  | *NPFMC Est-M* | 417 | 390 | 344 | 325 | 292 | 313 | 260 | 292 |
|  | *NPFMC Est-M (Dynamic B0)* | 417 | 390 | 344 | 325 | 292 | 313 | 260 | 292 |
|  | *MS-B40 iter* | NA | 390 | NA | 326 | NA | 316 | NA | 293 |
|  | *MS-B40 simul* | 417 | 390 | 344 | 327 | 292 | 303 | 260 | 293 |
|  | *MS-MSY* | 417 | NA | 344 | NA | 292 | NA | 260 | NA |
|  | *MS-cMSY* | 416 | 390 | 344 | 326 | 292 | 307 | 259 | 295 |
| *TRUE* | *NPFMC Fix-M* | 417 | 390 | 344 | 325 | 292 | 313 | 260 | 292 |
|  | *NPFMC Fix-M (Dynamic B0)* | 417 | 390 | 344 | 325 | 292 | 313 | 260 | 292 |
|  | *NPFMC Est-M* | 417 | 390 | 344 | 325 | 292 | 313 | 260 | 292 |
|  | *NPFMC Est-M (Dynamic B0)* | 417 | 390 | 344 | 325 | 292 | 313 | 260 | 292 |
|  | *MS-B40 iter* | 418 | 388 | 364 | 321 | 330 | 311 | 315 | 293 |
|  | *MS-B40 simul* | 417 | 393 | 344 | 328 | 292 | 305 | 260 | 298 |
|  | *MS-MSY* | 417 | NA | 344 | NA | 292 | NA | 260 | NA |
|  | *MS-cMSY* | 418 | 391 | 345 | 336 | 292 | 336 | 260 | 306 |

[1] “**Supplementary Table 2.PM-6.** Summary of performance metric 6 (terminal spawning stock biomass depletion relative to dynamic SB0) across OMs for **Cod**.”

| **Cap** | **EM** | **1. Naive** | **2. w Ricker** | **3. SSP-126** | **4. w Ricker** | **5. SSP-245** | **6. w Ricker** | **7. SSP-585** | **8. w Ricker** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *FALSE* | *NPFMC Fix-M* | 0.37 | 0.39 | 0.37 | 0.36 | 0.46 | 0.34 | 0.53 | 0.32 |
|  | *NPFMC Fix-M (Dynamic B0)* | 0.36 | 0.37 | 0.35 | 0.33 | 0.42 | 0.23 | 0.47 | 0.16 |
|  | *NPFMC Est-M* | 0.64 | 0.74 | 0.65 | 0.73 | 0.7 | 0.69 | 0.74 | 0.67 |
|  | *NPFMC Est-M (Dynamic B0)* | 0.65 | 0.74 | 0.65 | 0.74 | 0.69 | 0.69 | 0.73 | 0.65 |
|  | *MS-B40 iter* |  | 0.71 |  | 0.73 |  | 0.7 |  | 0.6 |
|  | *MS-B40 simul* | 0.6 | 0.7 | 0.61 | 0.72 | 0.65 | 0.7 | 0.68 | 0.59 |
|  | *MS-MSY* | 0.13 |  | 0.13 |  | 0.17 |  | 0.2 |  |
|  | *MS-cMSY* | 0.32 | 0.39 | 0.3 | 0.35 | 0.36 | 0.24 | 0.42 | 0.13 |
| *TRUE* | *NPFMC Fix-M* | 0.36 | 0.36 | 0.36 | 0.33 | 0.46 | 0.32 | 0.53 | 0.32 |
|  | *NPFMC Fix-M (Dynamic B0)* | 0.35 | 0.33 | 0.34 | 0.28 | 0.42 | 0.19 | 0.47 | 0.15 |
|  | *NPFMC Est-M* | 0.62 | 0.69 | 0.62 | 0.68 | 0.69 | 0.66 | 0.74 | 0.66 |
|  | *NPFMC Est-M (Dynamic B0)* | 0.62 | 0.69 | 0.62 | 0.68 | 0.69 | 0.64 | 0.73 | 0.64 |
|  | *MS-B40 iter* | 0.57 | 0.64 | 0.58 | 0.62 | 0.6 | 0.57 | 0.62 | 0.57 |
|  | *MS-B40 simul* | 0.57 | 0.6 | 0.58 | 0.64 | 0.64 | 0.56 | 0.68 | 0.54 |
|  | *MS-MSY* | 0.12 |  | 0.12 |  | 0.17 |  | 0.21 |  |
|  | *MS-cMSY* | 0.28 | 0.32 | 0.28 | 0.27 | 0.35 | 0.19 | 0.41 | 0.23 |

[1] “**Supplementary Table 3.PM-1.** Summary of performance metric 1 (average annual catch) across OMs for **Arrowtooth flounder**.”

| **Cap** | **EM** | **1. Naive** | **2. w Ricker** | **3. SSP-126** | **4. w Ricker** | **5. SSP-245** | **6. w Ricker** | **7. SSP-585** | **8. w Ricker** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *FALSE* | *NPFMC Fix-M* | 98 | 89 | 77 | 77 | 63 | 63 | 54 | 54 |
|  | *NPFMC Fix-M (Dynamic B0)* | 99 | 89 | 78 | 78 | 66 | 65 | 57 | 56 |
|  | *NPFMC Est-M* | 111 | 90 | 86 | 80 | 70 | 65 | 60 | 57 |
|  | *NPFMC Est-M (Dynamic B0)* | 111 | 90 | 88 | 80 | 74 | 66 | 65 | 58 |
|  | *MS-B40 iter* | NA | 89 | NA | 80 | NA | 64 | NA | 58 |
|  | *MS-B40 simul* | 123 | 89 | 98 | 80 | 82 | 64 | 72 | 59 |
|  | *MS-MSY* | 196 | NA | 155 | NA | 123 | NA | 102 | NA |
|  | *MS-cMSY* | 168 | 40 | 134 | 40 | 111 | 37 | 97 | 38 |
| *TRUE* | *NPFMC Fix-M* | 36 | 36 | 35 | 36 | 34 | 35 | 31 | 31 |
|  | *NPFMC Fix-M (Dynamic B0)* | 36 | 36 | 35 | 36 | 35 | 35 | 33 | 33 |
|  | *NPFMC Est-M* | 36 | 36 | 35 | 36 | 35 | 35 | 32 | 32 |
|  | *NPFMC Est-M (Dynamic B0)* | 36 | 36 | 35 | 36 | 35 | 35 | 34 | 33 |
|  | *MS-B40 iter* | 36 | 36 | 36 | 35 | 36 | 35 | 36 | 34 |
|  | *MS-B40 simul* | 36 | 35 | 35 | 35 | 35 | 35 | 34 | 34 |
|  | *MS-MSY* | 36 | NA | 35 | NA | 35 | NA | 35 | NA |
|  | *MS-cMSY* | 36 | 35 | 35 | 34 | 35 | 35 | 35 | 30 |

[1] “**Supplementary Table 3.PM-2.** Summary of performance metric 2 (average interannual variation in catch (IAV)) across OMs for **Arrowtooth flounder**.”

| **Cap** | **EM** | **1. Naive** | **2. w Ricker** | **3. SSP-126** | **4. w Ricker** | **5. SSP-245** | **6. w Ricker** | **7. SSP-585** | **8. w Ricker** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *FALSE* | *NPFMC Fix-M* | 0.14 | 0.15 | 0.17 | 0.17 | 0.21 | 0.21 | 0.25 | 0.24 |
|  | *NPFMC Fix-M (Dynamic B0)* | 0.14 | 0.15 | 0.17 | 0.17 | 0.2 | 0.2 | 0.23 | 0.23 |
|  | *NPFMC Est-M* | 0.22 | 0.27 | 0.28 | 0.3 | 0.34 | 0.37 | 0.39 | 0.42 |
|  | *NPFMC Est-M (Dynamic B0)* | 0.21 | 0.27 | 0.27 | 0.29 | 0.32 | 0.36 | 0.36 | 0.4 |
|  | *MS-B40 iter* |  | 0.44 |  | 0.54 |  | 0.62 |  | 0.57 |
|  | *MS-B40 simul* | 0.26 | 0.43 | 0.33 | 0.5 | 0.39 | 0.6 | 0.44 | 0.57 |
|  | *MS-MSY* | 0.81 |  | 0.94 |  | 1.15 |  | 1.42 |  |
|  | *MS-cMSY* | 0.4 | 1.72 | 0.5 | 1.73 | 0.59 | 1.83 | 0.68 | 1.77 |
| *TRUE* | *NPFMC Fix-M* | 0.08 | 0.08 | 0.08 | 0.08 | 0.09 | 0.08 | 0.11 | 0.1 |
|  | *NPFMC Fix-M (Dynamic B0)* | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 | 0.1 | 0.1 |
|  | *NPFMC Est-M* | 0.08 | 0.08 | 0.08 | 0.08 | 0.09 | 0.08 | 0.11 | 0.1 |
|  | *NPFMC Est-M (Dynamic B0)* | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 | 0.1 | 0.1 |
|  | *MS-B40 iter* | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 | 0.11 |
|  | *MS-B40 simul* | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 | 0.1 | 0.11 |
|  | *MS-MSY* | 0.08 |  | 0.08 |  | 0.08 |  | 0.08 |  |
|  | *MS-cMSY* | 0.08 | 0.09 | 0.08 | 0.09 | 0.08 | 0.1 | 0.1 | 0.16 |

[1] “**Supplementary Table 3.PM-3.** Summary of performance metric 3 (probability that the population is overfished as determined from the OM) across OMs for **Arrowtooth flounder**.”

| **Cap** | **EM** | **1. Naive** | **2. w Ricker** | **3. SSP-126** | **4. w Ricker** | **5. SSP-245** | **6. w Ricker** | **7. SSP-585** | **8. w Ricker** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *FALSE* | *NPFMC Fix-M* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
|  | *NPFMC Fix-M (Dynamic B0)* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 |
|  | *NPFMC Est-M* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
|  | *NPFMC Est-M (Dynamic B0)* | 0 | 0 | 0 | 0 | 0 | 0.04 | 0.01 | 0.24 |
|  | *MS-B40 iter* |  | 0.03 |  | 0.05 |  | 0.25 |  | 0.37 |
|  | *MS-B40 simul* | 0 | 0.03 | 0 | 0.04 | 0 | 0.23 | 0.04 | 0.36 |
|  | *MS-MSY* | 0.95 |  | 0.95 |  | 0.95 |  | 0.95 |  |
|  | *MS-cMSY* | 0.38 | 0.9 | 0.4 | 0.9 | 0.55 | 0.9 | 0.6 | 0.89 |
| *TRUE* | *NPFMC Fix-M* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
|  | *NPFMC Fix-M (Dynamic B0)* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.05 |
|  | *NPFMC Est-M* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
|  | *NPFMC Est-M (Dynamic B0)* | 0 | 0 | 0 | 0 | 0 | 0 | 0.03 | 0.08 |
|  | *MS-B40 iter* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.08 |
|  | *MS-B40 simul* | 0 | 0 | 0 | 0 | 0 | 0 | 0.04 | 0.08 |
|  | *MS-MSY* | 0 |  | 0 |  | 0 |  | 0.06 |  |
|  | *MS-cMSY* | 0 | 0 | 0 | 0 | 0 | 0 | 0.05 | 0.06 |

[1] “**Supplementary Table 3.PM-4.** Summary of performance metric 4 (terminal spawning stock biomass) across OMs for **Arrowtooth flounder**.”

| **Cap** | **EM** | **1. Naive** | **2. w Ricker** | **3. SSP-126** | **4. w Ricker** | **5. SSP-245** | **6. w Ricker** | **7. SSP-585** | **8. w Ricker** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *FALSE* | *NPFMC Fix-M* | 368 | 319 | 303 | 293 | 133 | 122 | 66 | 52 |
|  | *NPFMC Fix-M (Dynamic B0)* | 366 | 314 | 301 | 283 | 107 | 86 | 49 | 20 |
|  | *NPFMC Est-M* | 330 | 262 | 278 | 251 | 124 | 101 | 62 | 41 |
|  | *NPFMC Est-M (Dynamic B0)* | 327 | 246 | 273 | 226 | 95 | 58 | 44 | 10 |
|  | *MS-B40 iter* | NA | 170 | NA | 139 | NA | 29 | NA | 4 |
|  | *MS-B40 simul* | 298 | 168 | 251 | 154 | 86 | 31 | 40 | 4 |
|  | *MS-MSY* | 10 | NA | 12 | NA | 2 | NA | 1 | NA |
|  | *MS-cMSY* | 166 | 3 | 151 | 7 | 53 | 2 | 30 | 0 |
| *TRUE* | *NPFMC Fix-M* | 582 | 597 | 443 | 492 | 128 | 150 | 64 | 53 |
|  | *NPFMC Fix-M (Dynamic B0)* | 582 | 597 | 443 | 493 | 108 | 144 | 48 | 28 |
|  | *NPFMC Est-M* | 581 | 595 | 442 | 490 | 115 | 143 | 59 | 43 |
|  | *NPFMC Est-M (Dynamic B0)* | 581 | 595 | 442 | 490 | 99 | 142 | 42 | 19 |
|  | *MS-B40 iter* | 584 | 584 | 515 | 485 | 453 | 143 | 419 | 10 |
|  | *MS-B40 simul* | 581 | 586 | 443 | 490 | 99 | 143 | 39 | 11 |
|  | *MS-MSY* | 583 | NA | 445 | NA | 99 | NA | 21 | NA |
|  | *MS-cMSY* | 583 | 596 | 444 | 515 | 99 | 153 | 28 | 42 |

[1] “**Supplementary Table 3.PM-5.** Summary of performance metric 5 (terminal dynamic SB0) across OMs for **Arrowtooth flounder**.”

| **Cap** | **EM** | **1. Naive** | **2. w Ricker** | **3. SSP-126** | **4. w Ricker** | **5. SSP-245** | **6. w Ricker** | **7. SSP-585** | **8. w Ricker** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *FALSE* | *NPFMC Fix-M* | 703 | 710 | 560 | 603 | 214 | 284 | 109 | 140 |
|  | *NPFMC Fix-M (Dynamic B0)* | 703 | 710 | 560 | 603 | 214 | 284 | 109 | 140 |
|  | *NPFMC Est-M* | 703 | 710 | 560 | 603 | 214 | 284 | 109 | 140 |
|  | *NPFMC Est-M (Dynamic B0)* | 703 | 710 | 560 | 603 | 214 | 284 | 109 | 140 |
|  | *MS-B40 iter* | NA | 709 | NA | 601 | NA | 284 | NA | 142 |
|  | *MS-B40 simul* | 703 | 709 | 560 | 603 | 214 | 281 | 109 | 140 |
|  | *MS-MSY* | 703 | NA | 560 | NA | 214 | NA | 109 | NA |
|  | *MS-cMSY* | 703 | 711 | 560 | 601 | 214 | 283 | 109 | 140 |
| *TRUE* | *NPFMC Fix-M* | 703 | 710 | 560 | 603 | 214 | 284 | 109 | 140 |
|  | *NPFMC Fix-M (Dynamic B0)* | 703 | 710 | 560 | 603 | 214 | 284 | 109 | 140 |
|  | *NPFMC Est-M* | 703 | 710 | 560 | 603 | 214 | 284 | 109 | 140 |
|  | *NPFMC Est-M (Dynamic B0)* | 703 | 710 | 560 | 603 | 214 | 284 | 109 | 140 |
|  | *MS-B40 iter* | 704 | 706 | 629 | 597 | 566 | 282 | 533 | 140 |
|  | *MS-B40 simul* | 703 | 706 | 560 | 604 | 214 | 284 | 109 | 140 |
|  | *MS-MSY* | 703 | NA | 560 | NA | 214 | NA | 109 | NA |
|  | *MS-cMSY* | 703 | 706 | 560 | 615 | 214 | 283 | 109 | 142 |

[1] “**Supplementary Table 3.PM-6.** Summary of performance metric 6 (terminal spawning stock biomass depletion relative to dynamic SB0) across OMs for **Arrowtooth flounder**.”

| **Cap** | **EM** | **1. Naive** | **2. w Ricker** | **3. SSP-126** | **4. w Ricker** | **5. SSP-245** | **6. w Ricker** | **7. SSP-585** | **8. w Ricker** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *FALSE* | *NPFMC Fix-M* | 0.52 | 0.45 | 0.54 | 0.49 | 0.62 | 0.43 | 0.61 | 0.37 |
|  | *NPFMC Fix-M (Dynamic B0)* | 0.52 | 0.44 | 0.54 | 0.47 | 0.5 | 0.3 | 0.45 | 0.14 |
|  | *NPFMC Est-M* | 0.47 | 0.37 | 0.5 | 0.42 | 0.58 | 0.35 | 0.57 | 0.29 |
|  | *NPFMC Est-M (Dynamic B0)* | 0.46 | 0.35 | 0.49 | 0.37 | 0.44 | 0.2 | 0.4 | 0.07 |
|  | *MS-B40 iter* |  | 0.24 |  | 0.23 |  | 0.1 |  | 0.03 |
|  | *MS-B40 simul* | 0.42 | 0.24 | 0.45 | 0.26 | 0.4 | 0.11 | 0.37 | 0.03 |
|  | *MS-MSY* | 0.01 |  | 0.02 |  | 0.01 |  | 0.01 |  |
|  | *MS-cMSY* | 0.24 | 0 | 0.27 | 0.01 | 0.25 | 0.01 | 0.28 | 0 |
| *TRUE* | *NPFMC Fix-M* | 0.83 | 0.84 | 0.79 | 0.82 | 0.6 | 0.53 | 0.59 | 0.38 |
|  | *NPFMC Fix-M (Dynamic B0)* | 0.83 | 0.84 | 0.79 | 0.82 | 0.5 | 0.5 | 0.44 | 0.2 |
|  | *NPFMC Est-M* | 0.82 | 0.84 | 0.79 | 0.81 | 0.54 | 0.5 | 0.55 | 0.3 |
|  | *NPFMC Est-M (Dynamic B0)* | 0.82 | 0.84 | 0.79 | 0.81 | 0.46 | 0.5 | 0.38 | 0.14 |
|  | *MS-B40 iter* | 0.83 | 0.83 | 0.82 | 0.81 | 0.8 | 0.5 | 0.78 | 0.07 |
|  | *MS-B40 simul* | 0.83 | 0.83 | 0.79 | 0.81 | 0.46 | 0.5 | 0.36 | 0.08 |
|  | *MS-MSY* | 0.83 |  | 0.79 |  | 0.46 |  | 0.19 |  |
|  | *MS-cMSY* | 0.83 | 0.84 | 0.79 | 0.84 | 0.46 | 0.54 | 0.25 | 0.29 |