

Table S1. Null detection parameters for mottled duskywing. Link functions for parameters were logit for g_0 (detection probability at the activity centre), log for σ (spatial scale of movement around activity centres), and logit for ID (individual random effect).

| Site, Year | g_0 (s.e., lcl-ucl) | σ (s.e., lcl-ucl) | ID (s.e., lcl-ucl) |
|--------------|--|--|-----------------------------------|
| Site A, 2021 | 0.0007 (0.0001, 0.0005-0.0009) | 547755.6 (0.06, 547755.4-547755.7) | 0.05 (0.009, 0.03-0.07) |
| Site B, 2020 | 0.012 (0.002, 0.008-0.016) | 146.35 (8.86, 115.49-150.29) | 0.14 (0.02, 0.10-0.19) |
| Site B, 2021 | 0.002 (0.001, 0.0008-0.006) | 181.1 (65.18, 91.36-358.89) | 0.02 (0.009, 0.01-0.05) |

Table S2 Akaike’s Information Criterion (AIC) values for mottled duskywing detection covariate models for each site-year combination. Models included ‘occasion’ for day-to-day variation, ‘type of monitoring’ for either marking or re-sighting, and ‘time trend’. For each model the parameters of D (number of individuals ha⁻¹), σ (spatial scale of movement around activity centres), and ID (individual random effect) are set to 1. g_0 (detection probability at the activity centre) is modelled according to occasion (day-to-day differences), type of monitoring (mark days versus sight days), and time trend (accumulating differences over time) for Site A and B. K refers to the number of parameters in the model, logLik refers to the log likelihood, AICc refers to the small-sample corrected AIC, Δ AICc shows the differences between that model and the top model in AICc values, and AICcwt refers to the proportion of the total predictive power contained in that model. Occasion was the top performing detection model at all sites in all years.

| Location, Year | Name | K | logLik | AIC | AICc | Δ AICc | AICcwt |
|-------------------|--------------------|-----------|------------------|-----------------|-----------------|---------------|----------|
| Site A, | Occasion | 46 | -1670.75 | 3433.494 | 3456.867 | 0 | 1 |
| 2021 | Type of Monitoring | 5 | -2181.02 | 4372.031 | 4372.296 | 938.537 | 0 |
| | Time trend | 5 | -2219.11 | 4448.228 | 4448.494 | 1014.734 | 0 |
| | Null | 4 | -2224.86 | 4457.729 | 4457.905 | 1024.235 | 0 |
| Site B, | Occasion | 42 | -1216.98 | 2517.968 | 2554.825 | 0 | 1 |
| 2020 | Time trend | 5 | -1450.38 | 2910.767 | 2911.212 | 392.799 | 0 |
| | Null | 4 | -1457.05 | 2922.093 | 2922.387 | 404.125 | 0 |
| | Type of Monitoring | 5 | -1456.88 | 2923.763 | 2924.208 | 405.795 | 0 |
| Site B, | Occasion | 41 | -739.2151 | 1560.43 | 1624.208 | 0 | 1 |
| 2021 | Time trend | 5 | -874.2114 | 1758.423 | 1759.089 | 134.881 | 0 |
| | Null | 4 | -904.9538 | 1817.908 | 1818.347 | 194.139 | 0 |
| | Type of Monitoring | 5 | -904.4959 | 1818.992 | 1819.658 | 195.45 | 0 |

Table S3. Akaike’s Information Criterion (AIC) values for models describing variation in mottled duskywing density for two years at two sites. Models included *Ceanothus* host plant abundance, canopy, additive effects, and their interaction. Here, K refers to the number of parameters in the model, logLik refers to the log likelihood, AICc is the small-sample corrected AIC, Δ AICc shows the differences between that model and the top model in AICc values, and AICcwt refers to the proportion of the total predictive power contained in that model. Covariate models use a half-normal detection function, and detection parameters g_0 (detection probability at the activity centre), σ (spatial scale of movement around activity centres), and ID (individual random effect) are set to 1. Buffer width was set to 347 m for Site A and 844 m for Site B. Mask spacing was set to 15m at Site A and 10m at Site B.

| Location, Year | Density Model | K | logLik | AIC | AICc | Δ AIC | AICcwt |
|-------------------|----------------------------------|-----------|------------------|-----------------|-----------------|--------------|---------------|
| Site A, | <i>Ceanothus</i> | 5 | -2198.786 | 4407.572 | 4407.837 | 0 | 1 |
| 2021 | <i>Ceanothus</i> + Canopy | 7 | -2207.171 | 4428.342 | 4428.842 | 20.0770 | 0 |
| | Null | 4 | -2224.864 | 4457.729 | 4457.905 | 50.157 | 0 |
| | Canopy | 6 | -2224.865 | 4461.729 | 4462.103 | 54.157 | 0 |
| | <i>Ceanothus</i> * Canopy | 10 | -2223.864 | 4469.729 | 4470.724 | 62.157 | 0 |
| Site B, | <i>Ceanothus</i> * Canopy | 10 | -1115.548 | 2251.097 | 2252.789 | 0 | 1 |
| 2020 | <i>Ceanothus</i> | 5 | -1135.856 | 2281.712 | 2282.157 | 30.615 | 0 |
| | Null | 4 | -1137.786 | 2283.573 | 2283.867 | 32.476 | 0 |
| | Canopy | 6 | -1143.260 | 2298.519 | 2299.146 | 47.422 | 0 |
| | <i>Ceanothus</i> + Canopy | 7 | -1156.641 | 2327.282 | 2328.124 | 76.185 | 0 |
| Site B, | <i>Ceanothus</i> + Canopy | 7 | -863.2678 | 1740.536 | 1741.808 | 0 | 0.7592 |
| 2021 | <i>Ceanothus</i> * Canopy | 10 | -861.4166 | 1742.833 | 1745.421 | 2.297 | 0.2408 |
| | Canopy | 6 | -872.1576 | 1756.315 | 1757.259 | 15.779 | 0 |
| | <i>Ceanothus</i> | 5 | -877.4247 | 1764.849 | 1765.516 | 24.313 | 0 |
| | Null | 4 | -878.8761 | 1765.752 | 1766.192 | 25.216 | 0 |

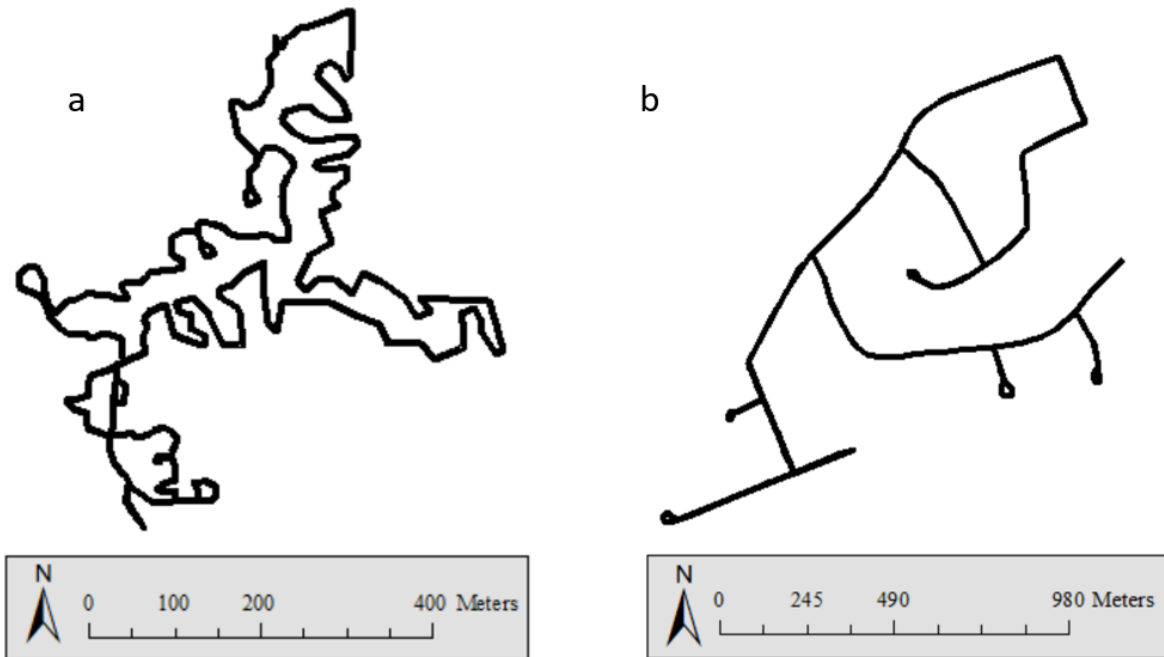


Figure S1. Sighting paths for mottled duskywing at (a) Site A (length = 4.2 km), and (b) Site B (length = 5.3 km). Specific names and geographic coordinates of both locations are not provided to protect this endangered species from possible poaching.

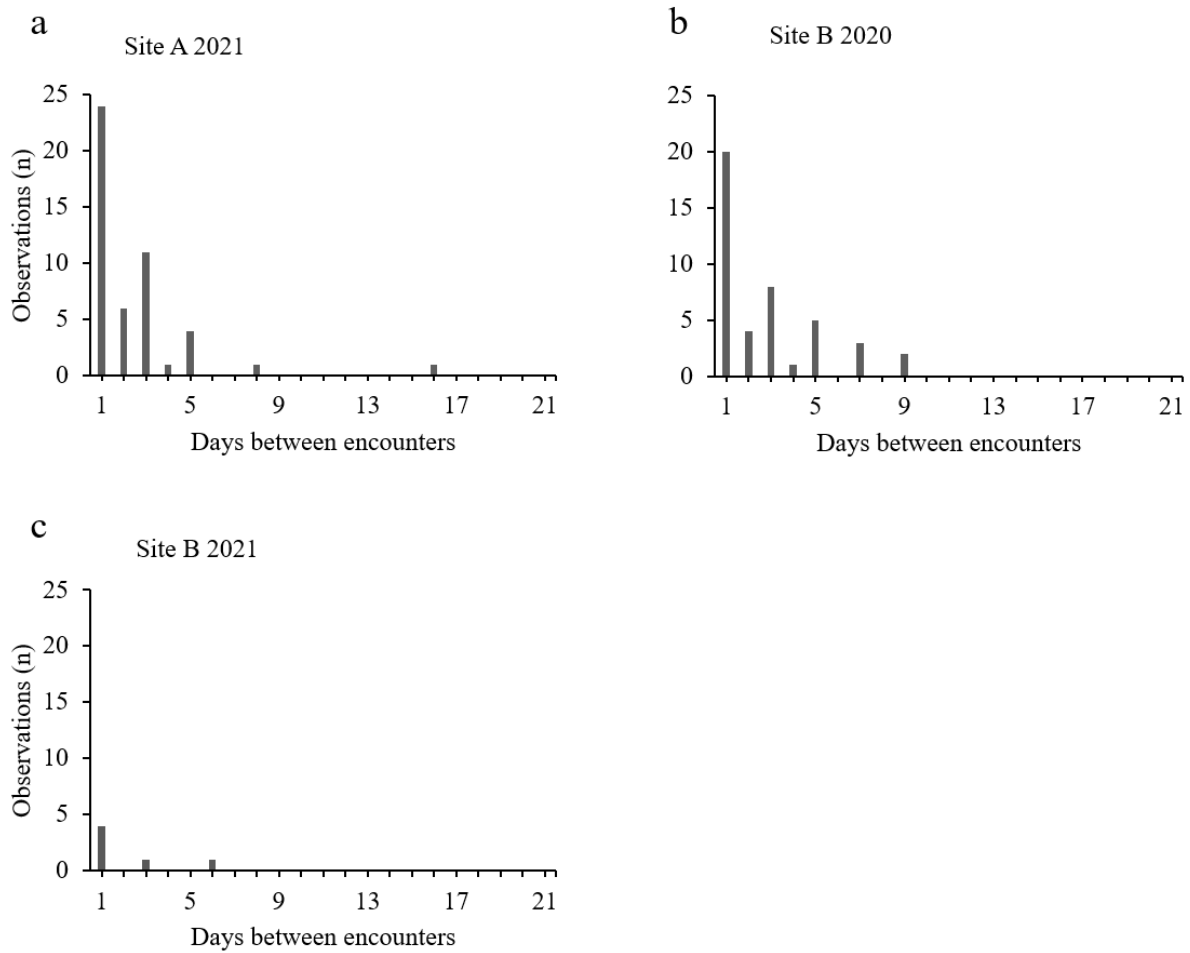


Figure S2. Days between first and second encounter of marked adult mottled duskywing at two sites and years. Encounters refer to either mark and later re-sight, or an initial re-sight and later re-sight. The number of observations of encounters at different intervals are shown from Site A in 2021 (a) and at Site B in 2020 (b) and in 2021 (c).