**Supplementary Table 2.** Model parameters, fits (ΔQAIC) and comparison for the Lagged Identification Rate (LIR) of (A) immature and (B) mature male manta rays at Manta Bay (MB) in the Nusa Penida MPA, Indonesia.

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| --- | --- | --- | --- |
| Model | Model description | ΔQAIC | ΔQAIC |
|  |  | A) Immature males | B) Mature males |
| A | Closed (1/*a*1 = *N)* | 1379.76 | 19.62 |
| B | Closed (*a*1 = *N*) | 1379.76 | 19.62 |
| C  | Emigration/mortality (a1=emigration rate; 1/a2=N) | 0 | 5.88 |
| D | Emigration/mortality(a1=N; a2=mean residence) | 0 | 5.88 |
| E | Closed: emigration + re-immigration (a1=emigration rate; a2/(a2+a3)=proportion of population in study area at any time) | 1374.56 | 19.71 |
| F | Emigration + re-immigration (a1=N; a2=res time in; a3=res time out)  | 2 | 1.06 |
| G | Emigration + re-immigration + mortality | 92.19 | 8.57 |
| H | Emigration + re-immigration + mortality (a1=N; a2=res time in; a3=res time out; a4=mort) | 4 | 0 |
| N = population |  |  |