Table S1．Results of all experiments conducted with froglets

| $\stackrel{\text { だ }}{\text { た }}$ |  | $\begin{gathered} 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ \tilde{\omega} \end{gathered}$ |  |  |  | ư 0 0 0 0 0 0 0 0 $Z$ |  |  |  | Rayleig h Z；$P$ | $\begin{aligned} & \mathrm{r} \\ & (\mathrm{CSD}) \end{aligned}$ | $\mu\left({ }^{\circ}\right)$ |  | $\begin{aligned} & \text { Rayleig } \\ & h \\ & Z ; P \end{aligned}$ | $\begin{array}{\|l} \hline \mathrm{r} \\ (\mathrm{CSD}) \end{array}$ | $\begin{aligned} & \mu \\ & \left({ }^{\circ}\right) \end{aligned}$ |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Froglets from right side population，captured and released 14－17 days before start of migration |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2017 | September 21 | September $21$ | F1 | left | 45 | 4 | $48^{a}$ | 45 | 45 | $\begin{aligned} & 3.07 ; \\ & \mathbf{0 . 0 4 5} \end{aligned}$ | $\begin{aligned} & \hline 0.26 \\ & (93.9) \end{aligned}$ | 182 | 30 | $\begin{array}{\|l\|} \hline 3.09 ; \\ \mathbf{0 . 0 4 4} \end{array}$ | $\begin{aligned} & \hline 0.32 \\ & (86.4) \end{aligned}$ | 202 | N |
| 2017 | September $20$ | September | F1 | right | 39 | 4 | 39 | 39 | 39 | $\begin{aligned} & 24.08 ; \\ & <\mathbf{0 . 0 0 1} \end{aligned}$ | $\begin{aligned} & 0.79 \\ & (39.8) \end{aligned}$ | 140 | 30 | $\begin{array}{\|l\|} \hline 22.93 ; \\ <\mathbf{0 . 0 0 1} \end{array}$ | $\begin{aligned} & 0.87 \\ & (29.7) \end{aligned}$ | 137 | Calm |
| 2017 | September | $\begin{aligned} & \text { September } \\ & 23 \end{aligned}$ | F1 | right | 45 | 4 | 33 | 33 | 33 | $\begin{array}{\|l\|} \hline 24.47 ; \\ <\mathbf{0 . 0 0 1} \\ \hline \end{array}$ | $\begin{array}{\|l\|} \hline 0.86 \\ (31.3) \\ \hline \end{array}$ | 140 | 28 | $\begin{array}{\|l\|} \hline 19.84 \\ <\mathbf{0 . 0 0 1} \\ \hline \end{array}$ | $\begin{array}{\|l\|} \hline 0.84 \\ (33.6) \\ \hline \end{array}$ | 143 | Calm |
| 2017 pooled sample |  |  | F1 | right | 84 | 4 | 72 | 72 | 72 | $\begin{aligned} & 48.45 ; \\ & <\mathbf{0 . 0 0 1} \end{aligned}$ | $\begin{aligned} & 0.82 \\ & (36.1) \end{aligned}$ | 140 | 58 | $\begin{array}{\|l\|} \hline 42.66 \\ <\mathbf{0 . 0 0 1} \\ \hline \end{array}$ | $\begin{aligned} & 0.86 \\ & (31.8) \end{aligned}$ | 140 | －－－ |
| Froglets from right side population，captured and released 1－3 days before start of migration |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2016 | September 18 | September 18 | F1 | left | 64 | 5 | 57 | 57 | 57 | $\begin{aligned} & 2.15 ; \\ & 0.12 \end{aligned}$ | $\begin{array}{\|l\|} \hline 0.19 \\ (103.7) \end{array}$ | －－－ | 28 | $\begin{array}{\|l\|} \hline 0.23 ; \\ 0.8 \end{array}$ | $\begin{array}{\|l\|} \hline 0.09 \\ (125.9) \\ \hline \end{array}$ | －－－ | N |
| 2016 | September $19$ | September $19$ | F1 | right | 54 | 3 | $49^{\text {b }}$ | 48 | 39 | $\begin{aligned} & 2.46 ; \\ & 0.085 \end{aligned}$ | $\begin{aligned} & \hline 0.25 \\ & (95.3) \\ & \hline \end{aligned}$ | －－－ | 16 | $\begin{aligned} & 2.06 ; \\ & 0.13 \end{aligned}$ | $\begin{array}{\|l\|} \hline 0.36 \\ (82) \\ \hline \end{array}$ | －－－ | N |
| 2017 | October 5 | October 5 | F1 | right | 44 | 2 | 44 | 44 | 44 | $\begin{aligned} & \hline 0.49 ; \\ & 0.62 \end{aligned}$ | $\begin{array}{\|l\|} \hline 0.11 \\ (121.6) \end{array}$ | －－－ | 27 | $\begin{aligned} & \hline 0.99 ; \\ & 0.37 \end{aligned}$ | $\begin{aligned} & \hline 0.19 \\ & (104) \end{aligned}$ | －－－ | S |
| 2018 | $\begin{aligned} & \text { September } \\ & 20 \\ & \hline \end{aligned}$ | $\begin{aligned} & \text { September } \\ & 20 \end{aligned}$ | F1 | right | 32 | 2 | 34 | 33 | 33 | $\begin{array}{\|l\|} \hline 1.15 \\ 0.32 \end{array}$ | $\begin{aligned} & 0.19 \\ & (104.9) \end{aligned}$ | －－－ | 28 | $\begin{array}{\|l\|} \hline 0.68 ; \\ 0.51 \end{array}$ | $\begin{array}{\|l} 0.16 \\ (110.6) \end{array}$ |  | SW |
| 2016＋2017＋2018，1－3 days before migration，pooled sample |  |  | F1 | right | 130 | $\begin{aligned} & \hline 2- \\ & 3 \end{aligned}$ | 127 | 125 | 116 | $\begin{aligned} & \hline 2.55 ; \\ & \mathbf{0 . 0 2 9} \end{aligned}$ | $\begin{aligned} & \hline 0.18 \\ & (107) \end{aligned}$ | 124 | 71 | $\begin{array}{\|l\|} \hline 2.92 \\ 0.054 \end{array}$ | $\begin{array}{\|l\|} \hline 0.2 \\ (102.3) \end{array}$ | －－－ | －－－ |

Froglets from right side population，captured and released after start of migration

| 2016 | September $21$ | September $21$ | F1 | left | 84 | 4 | 77 | 77 | 76 | $\begin{array}{l\|} \hline 4.5 ; \\ \mathbf{0 . 0 1} \end{array}$ | $\begin{aligned} & \hline 0.24 \\ & (96.3) \end{aligned}$ | 197 | 48 | $\begin{aligned} & \hline 4.31 ; \\ & 0.01 \end{aligned}$ | $\begin{aligned} & 0.3 \\ & (88.96) \end{aligned}$ | 194 | Calm |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 2018 | September $23$ | September $23$ | F1 | right | 64 | 3 | 59 | 57 | 56 | $\begin{array}{\|l\|} \hline 2.29 \\ 0.1 \\ \hline \end{array}$ | $\begin{aligned} & 0.2 \\ & (102.4) \end{aligned}$ | --- | 53 | $\begin{array}{\|l\|} \hline 1.8 ; \\ 0.17 \\ \hline \end{array}$ | $\begin{aligned} & 0.18 \\ & (105.4) \end{aligned}$ | --- | WNW |
| 2018 | $\begin{aligned} & \hline \text { September } \\ & 25 \\ & \hline \end{aligned}$ | September $25$ | F1 | right | 36 | 2 | 29 | 29 | 29 | $\begin{array}{\|l\|} \hline 1.46 ; \\ 0.23 \\ \hline \end{array}$ | $\begin{aligned} & 0.23 \\ & (99) \\ & \hline \end{aligned}$ | --- | 25 | $\begin{array}{\|l} \hline 2.35 \\ 0.095 \\ \hline \end{array}$ | $\begin{array}{\|l\|} \hline 0.31 \\ (88.1) \\ \hline \end{array}$ | --- | W |
| 2018, pooled sample |  |  | F1 | right | 100 | $\begin{array}{\|l\|} \hline 2- \\ 3 \end{array}$ | 88 | 86 | 85 | $\begin{array}{\|l\|} \hline 8.5 ; \\ <\mathbf{0 . 0 0 1} \\ * * * * \\ \hline \end{array}$ | $\begin{aligned} & \hline 0.2 \\ & (102) \end{aligned}$ | $\mathrm{NW},$ SE | 78 | $\begin{aligned} & 5.99 \\ & \mathbf{0 . 0 0 2} \\ & * * * * \end{aligned}$ | $\begin{aligned} & \hline 0.22 \\ & (100.2) \end{aligned}$ | $\begin{aligned} & \hline \mathrm{N} \\ & \mathrm{~W}, \\ & \mathrm{SE} \end{aligned}$ |  |
| 2018 | $\begin{aligned} & \text { September } \\ & 20,23,25 \end{aligned}$ | September $28$ | F1 | right <br> (repea ted releas e) | 118 | 1 | 117 | 117 | 117 | $\begin{aligned} & 17.62 \\ & <\mathbf{0 . 0 0 1} \end{aligned}$ | $\begin{aligned} & \hline 0.39 \\ & (78.8) \end{aligned}$ | 298 | -//- | -//- | -//- | -//- | WNW |
| 2018 | September $23$ | September $23$ | M | left | 119 | 2 | 107 | 104 | 104 | $\begin{array}{\|l\|} \hline 40.36 \\ <\mathbf{0 . 0 0 1} \\ \hline \end{array}$ | $\begin{aligned} & 0,62 \\ & (55,7) \end{aligned}$ | 13 | 101 | $\begin{array}{\|l\|} \hline 42.84 \\ <\mathbf{0 . 0 0 1} \\ \hline \end{array}$ | $\begin{array}{\|l} \hline 0,65 \\ (53) \\ \hline \end{array}$ | 13 | WNW |
| 2018 | September $26$ | September $26$ | M | right | 101 | 3 | 98 | 89 | $89^{\text {c }}$ | $\begin{aligned} & 25.01 ; \\ & <\mathbf{0 . 0 0 1} \end{aligned}$ | $\begin{aligned} & 0,53 \\ & (64,6) \end{aligned}$ | 320 | 73 | $\begin{aligned} & 21.21 ; \\ & <\mathbf{0 . 0 0 1} \end{aligned}$ | $\begin{aligned} & 0,54 \\ & (63,7) \end{aligned}$ | 328 | NW |
| 2015 | October 1 | October 1 | R2 | left | 54 | 4 | 60 | 60 | 60 | $\begin{aligned} & 10,47 \\ & <\mathbf{0 . 0 0 1} \end{aligned}$ | $\begin{aligned} & \hline 0.42 \\ & (75.7) \\ & \hline \end{aligned}$ | 354 | 37 | $\begin{array}{\|l\|} \hline 11.1 \\ <\mathbf{0 . 0 0 1} \\ \hline \end{array}$ | $\begin{array}{l\|} \hline 0.55 \\ (62.9) \\ \hline \end{array}$ | 354 | W |
| 2016 | September $20$ | September $20$ | R1 | right | 70 | 3 | 69 | 69 | 69 | $\begin{array}{l\|} \hline 29.82 \\ <\mathbf{0 . 0 0 1} \\ \hline \end{array}$ | $\begin{aligned} & 0.66 \\ & (52.5) \end{aligned}$ | 337 | 36 | $\begin{aligned} & 17.85 \\ & <\mathbf{0 . 0 0 1} \end{aligned}$ | $\begin{aligned} & 0.7 \\ & (47.9) \end{aligned}$ | 332 | Calm |
| 2016 | September $20$ | September $20$ | R1 | left | 65 | 3 | 69 | 69 | 67 | $\begin{aligned} & 14.89 \\ & <\mathbf{0 . 0 0 1} \end{aligned}$ | $\begin{aligned} & 0.47 \\ & (70.3) \end{aligned}$ | 319 | 47 | $\begin{aligned} & 16.1 ; \\ & <\mathbf{0 . 0 0 1} \end{aligned}$ | $\begin{array}{\|l\|} \hline 0.59 \\ (59.3) \\ \hline \end{array}$ | 312 | NW |
| 2018 | September $24$ | September $24$ | R1 | right | 70 | 2 | 70 | 70 | 68 | $\begin{array}{\|l} \hline 22.56 \\ <\mathbf{0 . 0 0 1} \\ \hline \end{array}$ | $\begin{aligned} & 0.58 \\ & (60.2) \\ & \hline \end{aligned}$ | 331 | 58 | $\begin{array}{\|l\|} \hline 24.58 \\ <\mathbf{0 . 0 0 1} \\ \hline \end{array}$ | $\begin{array}{\|l\|} \hline 0.65 \\ (53.1) \\ \hline \end{array}$ | 329 | WNW |
| 2018 | September $28$ | September $28$ | R1 | left | 69 | 3 | 66 | 64 | 63 | $\begin{array}{\|l\|} \hline 16.73 \\ <\mathbf{0 . 0 0 1} \\ \hline \end{array}$ | $\begin{aligned} & 0.52 \\ & (65.9) \end{aligned}$ | 356 | 45 | $\begin{aligned} & 12.46 \\ & <\mathbf{0 . 0 0 1} \end{aligned}$ | $\begin{aligned} & 0.53 \\ & (64.9) \end{aligned}$ | 358 | NW |
| 2015+2016+2018, pooled sample |  |  | $\begin{aligned} & \mathrm{R} 2 \\ & +\mathrm{R} \\ & 1 \\ & \hline \end{aligned}$ | left | 188 | 3 | 194 | 193 | 190 | $\begin{aligned} & 38 ; \\ & <0.001 \end{aligned}$ | $\begin{aligned} & 0.45 \\ & (72.7) \end{aligned}$ | 343 | 137 | $\begin{aligned} & 32.66 \\ & <\mathbf{0 . 0 0 1} \end{aligned}$ | $\begin{aligned} & 0.49 \\ & (68.6) \end{aligned}$ | 341 |  |
| 2016+2018, pooled sample |  |  | R1 | right | 140 | $\begin{aligned} & 2- \\ & 3 \end{aligned}$ | 139 | 139 | 137 | $\begin{array}{l\|} \hline 52.01 \\ <\mathbf{0 . 0 0 1} \\ \hline \end{array}$ | $\begin{aligned} & \hline 0.62 \\ & (56.4) \end{aligned}$ | 334 | 94 | $\begin{aligned} & 42.33 \\ & <\mathbf{0 . 0 0 1} \end{aligned}$ | $\begin{aligned} & \hline 0.67 \\ & (51.2) \\ & \hline \end{aligned}$ | 330 |  |


| Froglets from right side population, captured and released at night after start of migration |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 2016 | September $22$ | September $22$ | R1 | left | 48 | 2 | 48 | 47 | $29^{\text {d }}$ | $\begin{array}{\|l\|} \hline 7 ; \\ <\mathbf{0 . 0 0 1} \\ \hline \end{array}$ | $\begin{aligned} & \hline 0.49 \\ & (68) \\ & \hline \end{aligned}$ | 284 | 26 | $\begin{array}{\|l\|} \hline 6.57 \\ \mathbf{0 . 0 0 1} \\ \hline \end{array}$ | $\begin{aligned} & \hline 0,5 \\ & (67.2) \\ & \hline \end{aligned}$ | 286 | Calm |
| 2017 | October 13 | October 13 | R1 | left | 45 | 2 | 44 | 39 | 36 | $\begin{array}{\|l\|} \hline 10.86 \\ <\mathbf{0 . 0 0 1} \\ \hline \end{array}$ | $\begin{aligned} & \hline 0.55 \\ & (62.7) \\ & \hline \end{aligned}$ | 63 | 27 | $\begin{aligned} & \hline 7.43 ; \\ & <\mathbf{0 . 0 0 1} \\ & \hline \end{aligned}$ | $\begin{aligned} & 0.53 \\ & (65) \\ & \hline \end{aligned}$ | 65 | W |
| 2018 | September $26$ | September $26$ | R1 | left | 65 | 2 | 62 | 57 | 54 | $\begin{array}{\|l\|} \hline 14.21 ; \\ <\mathbf{0 . 0 0 1} \\ \hline \end{array}$ | $\begin{aligned} & 0.51 \\ & (66.2) \\ & \hline \end{aligned}$ | 23 | 47 | $\begin{array}{l\|} \hline 13.77 \\ <\mathbf{0 . 0 0 1} \\ \hline \end{array}$ | $\begin{aligned} & \hline 0.54 \\ & (63.5) \\ & \hline \end{aligned}$ | 27 | W |
| 2016 | September $21$ | September $21$ | R1 | right | 51 | 3 | 53 | 53 | 53 | $\begin{aligned} & 6.5 ; \\ & \mathbf{0 . 0 0 2} \end{aligned}$ | $\begin{aligned} & \hline 0.35 \\ & (82.9) \\ & \hline \end{aligned}$ | 336 | 43 | $\begin{array}{\|l\|} \hline 3.52 \\ \mathbf{0 . 0 2 9} \\ \hline \end{array}$ | $\begin{aligned} & 0.29 \\ & (89.5) \\ & \hline \end{aligned}$ | 341 | Calm |
| 2018 | September $27$ | September $27$ | R1 | right | 70 | 2 | 69 | 60 | 57 | $\begin{aligned} & 25.9 ; \\ & <\mathbf{0 . 0 0 1} \end{aligned}$ | $\begin{aligned} & \hline 0.67 \\ & (50.9) \\ & \hline \end{aligned}$ | 317 | 55 | $\begin{array}{l\|} \hline 25.79 \\ <\mathbf{0 . 0 0 1} \\ \hline \end{array}$ | $\begin{aligned} & \hline 0.69 \\ & (49.9) \\ & \hline \end{aligned}$ | 317 | Calm |
| $2016+2017+2018, \text { pooled }$ sample |  |  | R1 | left | 158 | 2 | 154 | 143 | 119 | $\begin{aligned} & 13.84 \\ & <\mathbf{0 . 0 0 1} \end{aligned}$ | $\begin{aligned} & 0.34 \\ & (84) \\ & \hline \end{aligned}$ | 21 | 100 | $\begin{array}{\|l\|} \hline 11.86 ; \\ <\mathbf{0 . 0 0 1} \\ \hline \end{array}$ | $\begin{aligned} & 0,34 \\ & (83.6) \\ & \hline \end{aligned}$ | 20 |  |
| 2016+2018, pooled sample |  |  | R1 | right | 121 | $\begin{array}{\|l\|} \hline 2- \\ 3 \\ \hline \end{array}$ | 122 | 113 | 110 | $\begin{aligned} & 28.82 \\ & <\mathbf{0 . 0 0 1} \\ & \hline \end{aligned}$ | $\begin{aligned} & 0.51 \\ & (66.3) \\ & \hline \end{aligned}$ | 324 | 98 | $\begin{aligned} & \hline 24.72 ; \\ & <\mathbf{0 . 0 0 1} \\ & \hline \end{aligned}$ | $\begin{aligned} & 0.5 \\ & (67.2) \\ & \hline \end{aligned}$ | 323 | Calm |
| Froglets from left side population, captured and released after start of migration |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2017 | October 7 | found in are $\mathrm{A}^{* * * * *}$ |  | left |  | 1 | 46 | 42 | 42 | $\begin{aligned} & 8.79 ; \\ & <\mathbf{0 . 0 0 1} \end{aligned}$ | $\begin{array}{\|l\|} \hline 0.46 \\ (71.7) \\ \hline \end{array}$ | 194 | On | ne check |  |  | --- |
| 2017 | October 7 | October 8 | are <br> na <br> A | right | 42 | 2 | 44 | 42 | 42 | $\begin{aligned} & 10.71 \\ & <\mathbf{0 . 0 0 1} \end{aligned}$ | $\begin{aligned} & \hline 0.51 \\ & (66.9) \end{aligned}$ | 185 | 31 | $\begin{aligned} & 14.11 ; \\ & <\mathbf{0 . 0 0 1} \end{aligned}$ | $\begin{aligned} & \hline 0.68 \\ & (50.8) \end{aligned}$ | 175 | Calm |
| 2017 | October $10$ | October 11 | R3 | left | 50 | 4 | 46 | 44 | 44 | $\begin{aligned} & 17.73 \\ & <\mathbf{0 . 0 0 1} \end{aligned}$ | $\begin{aligned} & \hline 0.64 \\ & (54.62) \\ & \hline \end{aligned}$ | 108 | 26 | $\begin{array}{\|l\|} \hline 16.26 ; \\ <\mathbf{0 . 0 0 1} \\ \hline \end{array}$ | $\begin{aligned} & \hline 0.79 \\ & (39.3) \\ & \hline \end{aligned}$ | 107 | SSW |
| 2018 | September $30$ | September $30$ | R3 | left | 31 | 3 | 31 | 28 | 28 | $\begin{array}{\|l\|} \hline 14.64 ; \\ <\mathbf{0 . 0 0 1} \\ \hline \end{array}$ | $\begin{aligned} & \hline 0.72 \\ & (46.1) \end{aligned}$ | 173 | 11 | $\begin{aligned} & \hline 7.37 ; \\ & <\mathbf{0 . 0 0 1} \\ & \hline \end{aligned}$ | $\begin{aligned} & \hline 0.82 \\ & (36.3) \\ & \hline \end{aligned}$ | 170 | W |
| 2018 | September $29$ | September $29$ | R3 | right | 82 | 4 | $77^{c}$ | 68 | 68 | $\begin{aligned} & 27.9 \\ & <\mathbf{0 . 0 0 1} \end{aligned}$ | $\begin{aligned} & 0.64 \\ & (54.1) \end{aligned}$ | 189 | 65 | $\begin{aligned} & 27.88 ; \\ & <\mathbf{0 . 0 0 1} \end{aligned}$ | $\begin{aligned} & 0.66 \\ & (52.7) \end{aligned}$ | 190 | Calm |
| 2017+2018, pooled sample |  |  | R3 | left | 81 | $\begin{array}{\|l\|} \hline 3- \\ 4 \end{array}$ | 78 | 72 | 72 | $\begin{aligned} & 23.07 \\ & <\mathbf{0 . 0 0 1} \end{aligned}$ | $\begin{aligned} & \hline 0.57 \\ & (61.1) \end{aligned}$ | 134 | 37 | $\begin{aligned} & 18.26 \\ & <\mathbf{0 . 0 0 1} \end{aligned}$ | $\begin{aligned} & \hline 0.7 \\ & (48.2) \\ & \hline \end{aligned}$ | 125 |  |
| Froglets from right side population, captured before and released after start of migration (kept in captivity) |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2013 | $\begin{aligned} & \text { September } \\ & 13-20 \end{aligned}$ | September $21$ | F2 | right | 65 | 3 | 63 | 63 | 63 | $\begin{aligned} & \hline 16.86 \\ & <\mathbf{0 . 0 0 1} \\ & \hline \end{aligned}$ | $\begin{aligned} & 0.52 \\ & (65.78) \\ & \hline \end{aligned}$ | 316 | 49 | $\begin{aligned} & 13.07 ; \\ & <\mathbf{0 . 0 0 1} \end{aligned}$ | $\begin{aligned} & 0.52 \\ & (65.9) \end{aligned}$ | 312 | N |


| 2015 | September 20-25 | September 28 | $\begin{aligned} & \hline \text { F1 } \\ & \& \\ & \text { F2 } \end{aligned}$ | left | 69 | 3 | 63 | 63 | 63 | $\begin{aligned} & 14.99 \\ & <\mathbf{0 . 0 0 1} \end{aligned}$ | $\begin{aligned} & \hline 0.49 \\ & (68.6) \end{aligned}$ | 132 | 62 | $\begin{aligned} & 16.18 ; \\ & <\mathbf{0 . 0 0 1} \end{aligned}$ | $\begin{aligned} & \hline 0.51 \\ & (66.4) \end{aligned}$ | 132 | WNW |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Froglets from right side population, captured and released after start of migration, but kept in captivity for 3 days before release |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2016 | September $21$ | September $24$ | R1 | right | 58 | 3 | 57 | 56 | 55 | $\begin{aligned} & 12,78 \\ & <\mathbf{0 . 0 0 1} \end{aligned}$ | $\begin{aligned} & \hline 0.56 \\ & (61.7) \\ & \hline \end{aligned}$ | 341 | 30 | $\begin{aligned} & 8.42 ; \\ & <\mathbf{0 . 0 0 1} \end{aligned}$ | $\begin{aligned} & \hline 0.53 \\ & (64.6) \\ & \hline \end{aligned}$ | 1 | Calm |
| 2016 | September 21 | September 24 | R1 | left | 59 | 3 | 54 | 54 | 51 | $\begin{aligned} & 18.81 \\ & <\mathbf{0 . 0 0 1} \end{aligned}$ | $\begin{aligned} & 0.61 \\ & (57.2) \end{aligned}$ | 350 | 16 | $\begin{aligned} & 9.93 ; \\ & <\mathbf{0 . 0 0 1} \end{aligned}$ | $\begin{aligned} & 0.79 \\ & (39.5) \end{aligned}$ | 354 | Calm |

Notes: F, captured in forest; M, captured in the meadow; R, captured at the river bank near water.
$\mu$, mean vector or compass directions (e.g. N for North, SW for Southwest, NNE for North-North-East, etc.); r, length of mean vector; CSD, circular standard deviation in degrees; significant differences are highlighted in bold.

* Total number of recaptured froglets, includes individuals with body length $>38 \mathrm{~mm}$ and froglets recaptured inside the arena outside of the groove with traps.
** Total number of recaptured young-of-the-year froglets with body length $\leq 38 \mathrm{~mm}$ includes individuals recaptured inside the arena outside of the groove with traps.
*** Number of froglets with body length $\leq 38 \mathrm{~mm}$ and recaptured only in traps. These specimens were included in further analysis.
**** Since we suspected a bimodal distribution, the Rayleigh test was used after the doubling the angles procedure (Batschelet 1981).
***** Froglets that were found in the traps of arena A (left side of the river) after arena wall was broken by the wind; these froglets correspond to those caught in the meadow.
${ }^{a}$ three of two-year-old specimens from left side population were captured.
${ }^{\mathrm{b}}$ Nine specimens were captured near the center.
${ }^{\text {c }}$ A large number of two-year-old specimens were captured.
${ }^{\mathrm{d}}$ The majority of the froglets was found outside of traps.

Table S2. Survey of potential hibernation sites of the froglets in winter and spring of 2019

| Site | Environmental remarks | Result of revisions |
| :---: | :---: | :---: |
| Bardinskii gully (capture site F1) | The slopes and bottom of the gully are formed by soft and moist soil that did not freeze during the winter under snow (January 25, the temperature dropped to $-26^{\circ} \mathrm{C}$ ) and was inhabited by insect larvae. Notably, the number of froglets in the gully, where they apparently come to eat, increases 2 weeks before the start of migration. | On April 6 (snow did not melt completely), we found two young froglets in the ground at approximately 10 cm depth; they were very inactive and most likely spent the winter there. No adult specimens were found. Like Bannikov (Bannikov, 1940), we interpret these young individuals as the specimens "late" for migration into the river before the final temperature drop. This delay can be associated with accumulation of fat essential for the hibernation. Such correlation between the start of migration and storing fat was observed in birds (Dolnik and Blyumental, 1967; King and Farner, 1963; Sandberg, 2003). Assembling in humid places before migration makes it possible for "late" frogs to survive the winter by burrowing into moist soil, where the temperature would not drop below zero due to the decay processes. |
| Stream in the Bardinskii gully | The stream had running water under ice even after severe frosts $\left(-26^{\circ} \mathrm{C}\right)$; during five surveys (January-March), | We were unable to find young-of-the-year common frogs. However, the wintering in general is possible, since on March 30 (snow did not melt), a young-of-the-year common toad and numerous live insect larvae were found in soil of the bottom of the stream ( 12 cm depth). |
| Moskva <br> River | The ice on the Moskva River broke up in late March. | on April 6, the first adult frogs appeared on the river bank opposite of the pond 4 and traveled in its direction; on April 9, we found the first froglets (approx. a dozen specimens) emerging from the river and moving towards the forest. |
| Ponds |  | We found no froglets emerging from the ponds. |

