

## Appendix

### Sex- and length-dependent variation in migratory propensity in brown trout

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## 1. SUPPLEMENTARY METHODS

### 1.1. Context

We studied the propensity of spring out-migration in would-be first-time brown trout (*Salmo trutta*) migrants using data from passive telemetry. Data were collected from seven streams (Table A1). All streams are groundwater-fed, with clear water and relatively stable flow and temperature regimes. The streams drain grasslands, with the exception of Leewasser and part of Klosterbach (Schwyz), which run through settlements. Channel size is similar, varying between (approximately) 1–3 m in width and 50–100 cm in depth. The substrate consists mostly of gravel and underwater vegetation, but muddy and sandy sections are also found in all streams. Stream banks are mostly vegetated and occasionally shaded by trees.

Within streams, four to eight sections were subject to electrofishing and tagging (Table A2). Tagging took place on 11 days in February–March 2015. For most streams, fieldwork dates were not unique, but two streams (Scheidgraben and Schützenbrunnen) were uniquely defined by the dates of tagging. Across all fieldwork dates, 3–43 (median = 13) individuals were sampled per stream section (Tables A2–3).

### 1.2. The probability of migration

We modelled the relationships between migration propensity and explanatory variables using generalised linear and generalised additive mixed models (GLMMs and GAMMs). We considered three alternative model formulations, one GLMM and two GAMMs (Table A6). The GLMM and GAMM models were fitted using `lme4` (Bates et al., 2015) and `mgcv` (Wood, 2017) respectively and evaluated according to their visual predictive performance, Akaike's information criterion (AIC) and residual diagnostics.

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We first considered a GLMM of migration events (0, 1) of the form:

$$\begin{aligned}
 & \text{migration}_{i,j,k} \sim \text{Bernoulli}(p_{i,j,k}) \\
 & \text{logit}(p_{i,j,k}) = \beta_0 + \beta_1 \text{male}_i + \beta_2 \log(\text{length}_i) + \beta_3 \text{male}_i \times \log(\text{length}_i) \\
 & \quad + \beta_4 \text{day}_i^T + \zeta_{j[i]}^{\text{stream}} + \zeta_{k[j[i]]}^{\text{section}} \\
 & \text{logit}(p_{i,j,k}) = \log\left(\frac{p_{i,j,k}}{1 - p_{i,j,k}}\right) \\
 & \zeta_{j[i]}^{\text{stream}} \sim N(0, \sigma_{\text{stream}}^2) \\
 & \zeta_{k[j[i]]}^{\text{section}} \sim N(0, \sigma_{\text{section}}^2)
 \end{aligned} \tag{1}$$

where  $i$ ,  $j$  and  $k$  index observations (individuals), streams and sections within streams,  $\beta_0$  is the intercept (the expected probability of migration, on the scale of the link function, averaged across streams/stream sections, for females),  $\beta_1$  is the difference in intercept for males versus females,  $\beta_2$  is the (partial) effect of (the logarithm of) individual standard length (cm) for females,  $\beta_3$  is the difference for males,  $\beta_4$  is the (partial) effect of the day of tagging and  $\zeta$  denotes normally distributed random effects (with variance  $\sigma_{\text{section}}^2$  and  $\sigma_{\text{stream}}^2$ ), included to account for variation within and among streams. In this model, we used the logarithm of length to improve model identifiability (and retained the same structure in subsequent models of migration probability).

We also considered two, more flexible GAM representations of the same processes. The second model is described in the Main Text. Visual comparison of the predictions and residuals of models one and two favoured the GAM, which better described the non-linear relationship between the observed proportion of out-migrants and standard length in females (Figure 2). This conclusion was borne out by AIC, with a 25-point difference in AIC between the two models (Table A6). However, while model two described the observed proportion of migrants reasonably well on average across streams, predictions for individual streams were (unsurprisingly) less accurate (see Main Text Results and Figure A3).

The results for model two suggested a third, more flexible model that permitted both sex- and stream-specific smoothers of the effect of length, each with their own degree of wigginess. This model took the form:

$$\text{migration}_{i,j,k} \sim \text{Bernoulli}(p_{i,j,k}) \tag{2}$$

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$$\text{logit}(p_{i,j,k}) = \text{sex}_i + f(\log(\text{length}_i), I(\text{sex}_i, \text{stream}_{j[i]})) + g(\text{day}_i^T) + \zeta_{j[i]}^{\text{stream}} \\ + \zeta_{k[j[i]]}^{\text{section}}$$

where  $f(\log(\text{length}), I(\text{sex}, \text{stream}))$  denotes the group-specific smoother of the interaction ( $I$ ) between sex and stream for length and other terms are as described elsewhere. However, visual examination of the predictions of this model and AIC indicated overfitting of the data for individual streams (Table A6). We therefore present results from the second model in the Main Text and subsequent Supplementary Materials.

### 2.2. The timing of migration

We considered four models of the relationship between migration timing and the standard length of first-time male and female migrants (Table A8). As in the previous analysis, we anticipated migration timing would depend on an interaction between sex and length, with the largest (less vulnerable) individuals migrating earlier than smaller individuals, but with females risking migration at earlier dates relative to males of equivalent size. In our first model, we thus considered the day of migration ( $\text{day}^M$ ) for each out-migrant in relation to an interaction between sex and length, alongside tagging date and stream/stream section, according to the equation:

$$\text{day}_{i,j,k}^M \sim N(\mu_{i,j,k}, \sigma^2) \quad (3)$$

$$u_{i,j,k} = \text{sex}_i + f(\text{length}_i, \text{sex}_i) + g(\text{day}_i^T) + \zeta_{j[i]}^{\text{stream}} + \zeta_{k[j[i]]}^{\text{section}}$$

where  $f(\text{length}_i, \text{sex}_i)$  fits a sex-specific smoother of the effect of length with a flexible degree of wigginess and other terms are as described elsewhere. We evaluated whether a second model with the logarithm of length as a predictor (as in the previous analysis) improved model fit by visually assessing model predictions and using AIC. Model predictions were broadly similar but AIC was considerably reduced so we retained length in the logged form (Table A8). Visual analysis of the predictions of model two showed that it described the data reasonably well on average across streams but the predictions for individual streams appeared overly constrained. As in the earlier analysis of migration probability, this led us to consider a third model which permitted both sex- and stream-specific effects of length. This model took the form:

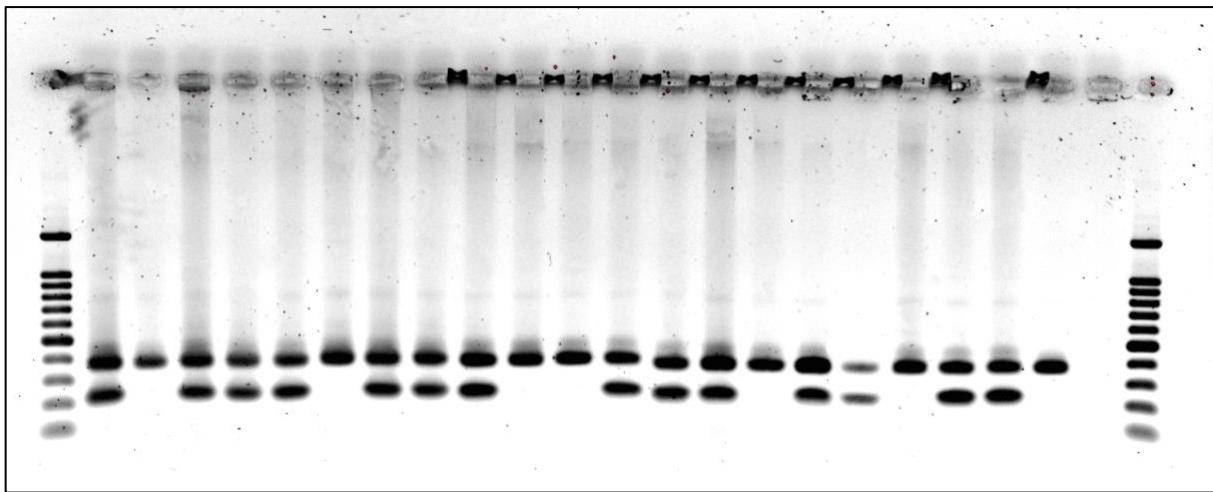
$$\text{day}_{i,j,k}^M \sim N(\mu_{i,j,k}, \sigma^2) \quad (4)$$

$$u_{i,j,k} = \text{sex}_i + f(\log(\text{length}_i), I(\text{sex}_i, \text{stream}_{j[i]})) + g(\text{day}_i^T) + \zeta_{j[i]}^{\text{stream}} + \zeta_{k[j[i]]}^{\text{section}}$$

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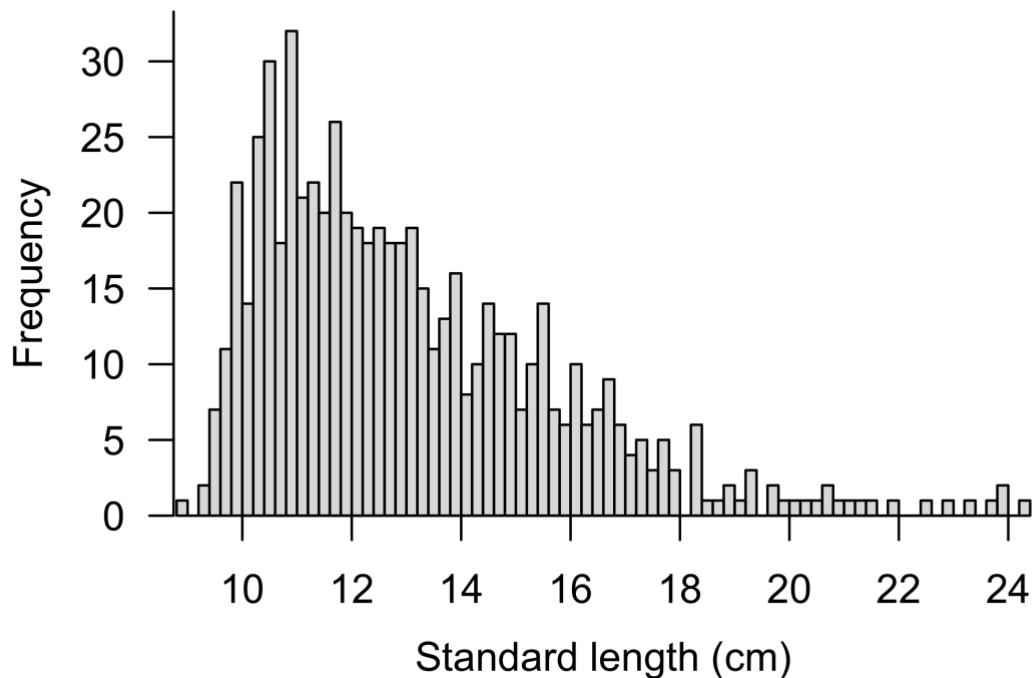
where all terms are as previously described. Visual analysis and AIC showed that this model fitted the data more effectively than previous models ( $\Delta\text{AIC} = 5.66$  compared to the second model) (Table A8). However, the length effect was consistently similar between sexes. We therefore considered whether a simpler, fourth model without the sex–stream interaction was better supported by the data and found that this was broadly the case ( $\Delta\text{AIC} = 1.91$  for model four versus three) (Table A8). The fourth model is thus presented as our best model.

**2. SUPPLEMENTARY FIGURES**

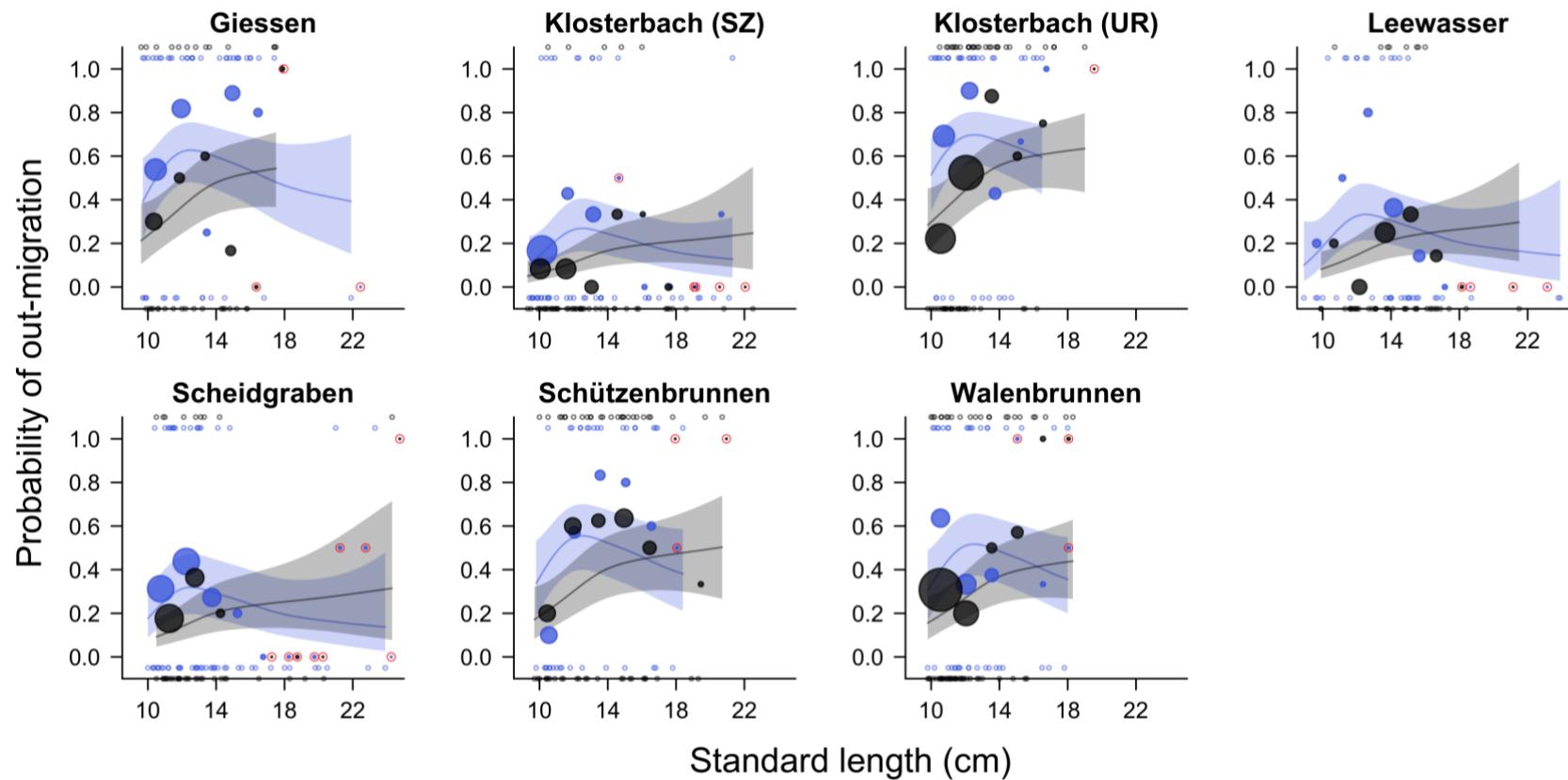


**Figure A1. Gel electrophoresis and the conventional duplex sexing PCR protocol.** The upper band is the universal 18S control and the lower band is the sdY gene (on the Y chromosome). Individuals that were positive for both bands were identified as genetically male, while individuals with the 18S band only (i.e., lacking the sdY gene) were identified as genetically female.

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**Figure A2. The length distribution of captured fish.** In the Lake Lucerne study system, the smallest individuals tagged in streams are expected to be one year of age; individuals from ~10–15 cm are typically two years of age; and larger individuals are three or more years of age. Bin width is 0.2 cm.



**Figure A3. The probability of spring downstream migration in relation to body length in males and females, by stream.** In all panels, black and blue colours distinguish males and females, respectively. Filled points mark the observed proportion of migrants in each 1.5 cm length class (and include individuals tagged at different times in different stream sections). Point size is proportional to the number of individuals in each class. The smallest points are highlighted in red. Lines and envelopes are predictions and 95 % confidence intervals from a Bernoulli generalised additive model for migration probability in relation to sex, length, day of tagging, stream and stream section. Predictions are shown for the median tagging day (2015-02-27) across the range of male and female lengths observed in each stream, but excluding the stream/section random effect. Open points mark the lengths of resident (bottom) and migrant (top) individuals.

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### 3. SUPPLEMENTARY TABLES

**Table A1. A summary of the study streams and fish samples.** For each stream, the location of the mouth (longitude, latitude and altitude), in-river distance from the start of the first section (i.e., the antennas) to Lake Lucerne, date range visited, number of visits, total number of samples, length range, number of migrants and proportion of migrants is shown. Altitudes were obtained from a 2 x 2 m digital elevation model (swissALTI3D) provided by the Federal Office of Topography. Rows ordered by stream.

Stream	Location	Altitude (m)	Distance (m)	Date	Visits	$N_T$	Length (cm)	$N_M$	$Pr_M$
Giessen (Uri)	8.618466, 46.89895	434	14	20-Feb–13-Mar	3	76	9.6–21.9	43	0.57
Klosterbach (Schwyz)	8.601273, 46.99380	434	598	26-Feb–06-Mar	2	95	9.3–22.5	16	0.17
Klosterbach (Uri)	8.604557, 46.88979	433	92	20-Feb–03-Mar	2	93	9.8–19.0	55	0.59
Leewasser (Schwyz)	8.601272, 46.99380	434	318	26-Feb–06-Mar	2	83	8.9–23.9	20	0.24
Scheidgraben (Nidwalden)	8.417523, 46.98219	434	11372	11-Feb–27-Feb	2	98	100–24.3	27	0.28
Schützenbrunnen (Uri)	8.612319, 46.89910	478	16	17-Feb–13-Mar	3	87	9.7–20.7	45	0.52
Walenbrunnen (Uri)	8.612317, 46.89905	449	5801	23-Feb–10-Mar	2	97	9.8–18.3	41	0.42

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**Table A2. A summary of sampling locations.** For each stream, sampling sections are defined alongside the altitude, the in-river distance between the start of the section and (i) the antennas and (ii) Lake Lucerne, sampling date or date range, the number of visits and sample details (following Table A1 but with information provided at a section-specific, rather than a stream-wide, scale). In each stream, sections are nominally labelled from 1, 2, ..., Z where 1 is the section closest to the lake and Z is the total number of sections. Not all sections in each stream were fished in this study, hence gaps in the numbering. Canton abbreviations are indicated in brackets for Klosterbach streams (Schwyz, SZ; Uri, UR). Rows ordered by stream and section.

Stream	Section	Altitude (m)	Distance to antennas (m)	Distance to lake (m)	Date	Visits	$N_T$	Length (cm)	$N_M$	$Pr_M$
Giessen	2	434	64	78	13-Mar	1	3	10.7–17.5	2	0.67
Giessen	3	434	159	173	20-Feb	1	6	12–17.4	5	0.83
Giessen	4	434	251	265	13-Mar	1	5	9.6–17.4	5	1.00
Giessen	5	437	387	402	05-Mar	1	17	9.7–21.9	8	0.47
Giessen	7	437	658	673	05-Mar	1	16	9.7–15.8	6	0.38
Giessen	8	435	758	772	20-Feb	1	3	12.3–14.7	2	0.67
Giessen	9	435	892	907	05-Mar	1	19	9.8–16	10	0.53
Giessen	10	436	1134	1148	20-Feb	1	7	9.9–15.8	5	0.71
Klosterbach (SZ)	3	435	226	824	26-Feb–06-Mar	2	33	10.3–22.5	5	0.15
Klosterbach (SZ)	6	435	630	1228	06-Mar	1	20	9.4–18.6	3	0.15
Klosterbach (SZ)	7	437	788	1386	26-Feb	1	20	9.3–21.3	1	0.05

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<b>Stream</b>	<b>Section</b>	<b>Altitude (m)</b>	<b>Distance to antennas (m)</b>	<b>Distance to lake (m)</b>	<b>Date</b>	<b>Visits</b>	$N_T$	<b>Length (cm)</b>	$N_M$	$Pr_M$
Klosterbach (SZ)	10	441	1291	1889	26-Feb	1	8	10.1–17.4	3	0.38
Klosterbach (SZ)	12	438	1470	2068	06-Mar	1	14	9.9–17.8	4	0.29
Klosterbach (UR)	2	437	116	208	20-Feb	1	9	10.3–14	4	0.44
Klosterbach (UR)	4	434	348	440	03-Mar	1	8	10–16.2	6	0.75
Klosterbach (UR)	6	435	616	709	20-Feb–03-Mar	2	39	10.2–19	24	0.62
Klosterbach (UR)	7	435	791	883	20-Feb	1	14	9.8–16.2	7	0.50
Klosterbach (UR)	8	434	348	440	03-Mar	1	7	10.2–12.2	3	0.43
Klosterbach (UR)	9	434	605	697	20-Feb	1	16	10–16.5	11	0.69
Leewasser	2	434	72	391	06-Mar	1	5	11.7–21.5	0	0.00
Leewasser	6	435	790	1109	26-Feb–06-Mar	2	32	9.9–23.9	11	0.34
Leewasser	10	437	1329	1648	26-Feb	1	14	9.6–15.5	2	0.14
Leewasser	13	439	1714	2033	26-Feb–06-Mar	2	32	8.9–16.6	7	0.22
Scheidgraben	2	434	88	104	27-Feb	1	15	10.6–24.3	3	0.20
Scheidgraben	3	434	260	276	11-Feb	1	9	10.3–23.9	2	0.22
Scheidgraben	4	434	472	488	27-Feb	1	13	10.9–20.5	2	0.15
Scheidgraben	5	435	642	658	11-Feb	1	11	10.6–15.5	2	0.18
Scheidgraben	6	436	888	904	11-Feb–27-Feb	2	20	10.4–17.2	5	0.25

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<b>Stream</b>	<b>Section</b>	<b>Altitude (m)</b>	<b>Distance to antennas (m)</b>	<b>Distance to lake (m)</b>	<b>Date</b>	<b>Visits</b>	$N_T$	<b>Length (cm)</b>	$N_M$	$Pr_M$
Scheidgraben	8	440	1304	1320	11-Feb	1	15	10.3–23.3	7	0.47
Scheidgraben	10	442	1787	1803	27-Feb	1	6	10–13.1	3	0.50
Scheidgraben	13	437	1363	1379	11-Feb	1	9	11.4–16.1	3	0.33
Schützenbrunnen	2	478	53	11425	17-Feb	1	12	10.4–20.7	8	0.67
Schützenbrunnen	4	478	171	11544	05-Mar	1	9	11.4–18.9	4	0.44
Schützenbrunnen	5	479	318	11690	17-Feb	1	7	10.5–15.4	4	0.57
Schützenbrunnen	6	478	397	11770	05-Mar–13-Mar	2	43	9.7–19.3	20	0.47
Schützenbrunnen	7	479	504	11876	17-Feb	1	10	10–16.9	5	0.50
Schützenbrunnen	8	480	590	11962	05-Mar	1	6	9.9–12.4	4	0.67
Walenbrunnen	1	449	0	5802	10-Mar	1	29	10.1–18	16	0.55
Walenbrunnen	3	451	265	6067	10-Mar	1	13	10–18.3	7	0.54
Walenbrunnen	4	450	470	6271	23-Feb	1	17	9.8–13.8	5	0.29
Walenbrunnen	7	452	872	6674	10-Mar	1	9	9.8–17.8	4	0.44
Walenbrunnen	8	453	1106	6907	23-Feb	1	11	10.2–17.2	4	0.36
Walenbrunnen	10	454	1558	7360	23-Feb	1	18	9.9–14.2	5	0.28

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**Table A3. A summary of tagged fish.** For each individual, a unique identifier, the tagging date, stream, section, sex, length and whether (1) or not (0) it was identified as a spring downstream migrant in the year of tagging is shown. Canton abbreviations are indicated in brackets for Klosterbach streams (Schwyz, SZ; Uri, UR). Rows ordered by ID (date, stream, section, sex, length, migration).

ID	Date	Stream	Section	Sex	Length (cm)	Migration
1	2015-02-11	Scheidgraben	13	F	11.4	1
2	2015-02-11	Scheidgraben	13	F	12.9	0
3	2015-02-11	Scheidgraben	13	F	13.1	0
4	2015-02-11	Scheidgraben	13	F	13.2	0
5	2015-02-11	Scheidgraben	13	F	14.5	0
6	2015-02-11	Scheidgraben	13	F	14.8	1
7	2015-02-11	Scheidgraben	13	F	16.1	0
8	2015-02-11	Scheidgraben	13	M	14.2	1
9	2015-02-11	Scheidgraben	13	M	14.6	0
10	2015-02-11	Scheidgraben	3	F	10.3	0
11	2015-02-11	Scheidgraben	3	F	11.2	1
12	2015-02-11	Scheidgraben	3	F	11.6	1
13	2015-02-11	Scheidgraben	3	F	12.8	0
14	2015-02-11	Scheidgraben	3	F	14.6	0
15	2015-02-11	Scheidgraben	3	F	22.9	0
16	2015-02-11	Scheidgraben	3	F	23.9	0
17	2015-02-11	Scheidgraben	3	M	11.9	0
18	2015-02-11	Scheidgraben	3	M	20.3	0
19	2015-02-11	Scheidgraben	5	F	10.6	0
20	2015-02-11	Scheidgraben	5	F	11.3	1
21	2015-02-11	Scheidgraben	5	F	11.8	0
22	2015-02-11	Scheidgraben	5	F	11.8	0
23	2015-02-11	Scheidgraben	5	F	12.5	1
24	2015-02-11	Scheidgraben	5	F	12.8	0
25	2015-02-11	Scheidgraben	5	F	15.5	0
26	2015-02-11	Scheidgraben	5	M	11.1	0
27	2015-02-11	Scheidgraben	5	M	11.1	0

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ID	Date	Stream	Section	Sex	Length (cm)	Migration
28	2015-02-11	Scheidgraben	5	M	11.3	0
29	2015-02-11	Scheidgraben	5	M	11.8	0
30	2015-02-11	Scheidgraben	6	F	10.4	0
31	2015-02-11	Scheidgraben	6	F	13.4	0
32	2015-02-11	Scheidgraben	6	F	14.1	1
33	2015-02-11	Scheidgraben	6	M	10.5	1
34	2015-02-11	Scheidgraben	6	M	11.8	0
35	2015-02-11	Scheidgraben	6	M	12.3	0
36	2015-02-11	Scheidgraben	8	F	10.3	0
37	2015-02-11	Scheidgraben	8	F	10.4	1
38	2015-02-11	Scheidgraben	8	F	10.8	0
39	2015-02-11	Scheidgraben	8	F	11.2	0
40	2015-02-11	Scheidgraben	8	F	12.1	1
41	2015-02-11	Scheidgraben	8	F	12.9	1
42	2015-02-11	Scheidgraben	8	F	13	1
43	2015-02-11	Scheidgraben	8	F	23.3	1
44	2015-02-11	Scheidgraben	8	M	10.9	1
45	2015-02-11	Scheidgraben	8	M	11.4	0
46	2015-02-11	Scheidgraben	8	M	11.8	0
47	2015-02-11	Scheidgraben	8	M	11.8	0
48	2015-02-11	Scheidgraben	8	M	12.2	0
49	2015-02-11	Scheidgraben	8	M	12.8	1
50	2015-02-11	Scheidgraben	8	M	14.5	0
51	2015-02-17	Schützenbrunnen	2	F	15	0
52	2015-02-17	Schützenbrunnen	2	F	15.1	1
53	2015-02-17	Schützenbrunnen	2	F	15.6	1
54	2015-02-17	Schützenbrunnen	2	F	16.7	0
55	2015-02-17	Schützenbrunnen	2	F	16.7	1
56	2015-02-17	Schützenbrunnen	2	F	18.4	1
57	2015-02-17	Schützenbrunnen	2	M	10.4	0
58	2015-02-17	Schützenbrunnen	2	M	11.3	0
59	2015-02-17	Schützenbrunnen	2	M	11.5	1

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ID	Date	Stream	Section	Sex	Length (cm)	Migration
60	2015-02-17	Schützenbrunnen	2	M	15.2	1
61	2015-02-17	Schützenbrunnen	2	M	19.7	1
62	2015-02-17	Schützenbrunnen	2	M	20.7	1
63	2015-02-17	Schützenbrunnen	5	F	10.8	0
64	2015-02-17	Schützenbrunnen	5	F	11.9	1
65	2015-02-17	Schützenbrunnen	5	F	14.9	1
66	2015-02-17	Schützenbrunnen	5	M	10.5	0
67	2015-02-17	Schützenbrunnen	5	M	11.3	1
68	2015-02-17	Schützenbrunnen	5	M	13	1
69	2015-02-17	Schützenbrunnen	5	M	15.4	0
70	2015-02-17	Schützenbrunnen	7	F	10.4	0
71	2015-02-17	Schützenbrunnen	7	F	13.2	1
72	2015-02-17	Schützenbrunnen	7	M	10	1
73	2015-02-17	Schützenbrunnen	7	M	10.4	0
74	2015-02-17	Schützenbrunnen	7	M	12.3	0
75	2015-02-17	Schützenbrunnen	7	M	13.7	1
76	2015-02-17	Schützenbrunnen	7	M	14.9	0
77	2015-02-17	Schützenbrunnen	7	M	15.7	1
78	2015-02-17	Schützenbrunnen	7	M	16.4	1
79	2015-02-17	Schützenbrunnen	7	M	16.9	0
80	2015-02-20	Giessen	10	F	10.3	1
81	2015-02-20	Giessen	10	F	10.5	1
82	2015-02-20	Giessen	10	F	12.3	1
83	2015-02-20	Giessen	10	F	14.6	1
84	2015-02-20	Giessen	10	M	9.9	1
85	2015-02-20	Giessen	10	M	11	0
86	2015-02-20	Giessen	10	M	15.8	0
87	2015-02-20	Giessen	3	F	14.6	1
88	2015-02-20	Giessen	3	F	14.8	1
89	2015-02-20	Giessen	3	F	16	1
90	2015-02-20	Giessen	3	F	16.5	1
91	2015-02-20	Giessen	3	M	12	0

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ID	Date	Stream	Section	Sex	Length (cm)	Migration
92	2015-02-20	Giessen	3	M	17.4	1
93	2015-02-20	Giessen	8	F	12.3	1
94	2015-02-20	Giessen	8	F	14.5	0
95	2015-02-20	Giessen	8	M	14.7	1
96	2015-02-20	Klosterbach (UR)	2	F	10.3	0
97	2015-02-20	Klosterbach (UR)	2	F	10.5	1
98	2015-02-20	Klosterbach (UR)	2	F	11.8	1
99	2015-02-20	Klosterbach (UR)	2	F	13.7	1
100	2015-02-20	Klosterbach (UR)	2	F	14	0
101	2015-02-20	Klosterbach (UR)	2	M	10.8	0
102	2015-02-20	Klosterbach (UR)	2	M	11	1
103	2015-02-20	Klosterbach (UR)	2	M	11.1	0
104	2015-02-20	Klosterbach (UR)	2	M	11.2	0
105	2015-02-20	Klosterbach (UR)	6	F	11	1
106	2015-02-20	Klosterbach (UR)	6	F	11.6	1
107	2015-02-20	Klosterbach (UR)	6	M	10.9	0
108	2015-02-20	Klosterbach (UR)	6	M	10.9	1
109	2015-02-20	Klosterbach (UR)	6	M	11.2	0
110	2015-02-20	Klosterbach (UR)	6	M	11.2	0
111	2015-02-20	Klosterbach (UR)	6	M	11.4	0
112	2015-02-20	Klosterbach (UR)	6	M	11.5	1
113	2015-02-20	Klosterbach (UR)	6	M	11.7	0
114	2015-02-20	Klosterbach (UR)	6	M	11.8	0
115	2015-02-20	Klosterbach (UR)	6	M	12	0
116	2015-02-20	Klosterbach (UR)	6	M	12.2	1
117	2015-02-20	Klosterbach (UR)	6	M	12.2	1
118	2015-02-20	Klosterbach (UR)	6	M	12.4	1
119	2015-02-20	Klosterbach (UR)	6	M	12.5	0
120	2015-02-20	Klosterbach (UR)	6	M	12.5	1
121	2015-02-20	Klosterbach (UR)	6	M	13.5	1
122	2015-02-20	Klosterbach (UR)	6	M	16.7	1
123	2015-02-20	Klosterbach (UR)	6	M	17.2	1

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ID	Date	Stream	Section	Sex	Length (cm)	Migration
124	2015-02-20	Klosterbach (UR)	6	M	17.2	1
125	2015-02-20	Klosterbach (UR)	6	M	19	1
126	2015-02-20	Klosterbach (UR)	7	F	10.4	1
127	2015-02-20	Klosterbach (UR)	7	F	13	0
128	2015-02-20	Klosterbach (UR)	7	F	15.5	1
129	2015-02-20	Klosterbach (UR)	7	F	16.2	1
130	2015-02-20	Klosterbach (UR)	7	M	9.8	0
131	2015-02-20	Klosterbach (UR)	7	M	10.7	0
132	2015-02-20	Klosterbach (UR)	7	M	10.8	0
133	2015-02-20	Klosterbach (UR)	7	M	10.9	0
134	2015-02-20	Klosterbach (UR)	7	M	11.2	1
135	2015-02-20	Klosterbach (UR)	7	M	11.7	1
136	2015-02-20	Klosterbach (UR)	7	M	12	0
137	2015-02-20	Klosterbach (UR)	7	M	12.8	1
138	2015-02-20	Klosterbach (UR)	7	M	12.9	0
139	2015-02-20	Klosterbach (UR)	7	M	13.2	1
140	2015-02-20	Klosterbach (UR)	9	F	10.7	1
141	2015-02-20	Klosterbach (UR)	9	F	11	1
142	2015-02-20	Klosterbach (UR)	9	F	11.2	0
143	2015-02-20	Klosterbach (UR)	9	F	12.3	1
144	2015-02-20	Klosterbach (UR)	9	F	12.5	1
145	2015-02-20	Klosterbach (UR)	9	F	13.4	0
146	2015-02-20	Klosterbach (UR)	9	F	14.3	0
147	2015-02-20	Klosterbach (UR)	9	F	14.7	0
148	2015-02-20	Klosterbach (UR)	9	F	16.5	1
149	2015-02-20	Klosterbach (UR)	9	M	10	0
150	2015-02-20	Klosterbach (UR)	9	M	11.4	1
151	2015-02-20	Klosterbach (UR)	9	M	12.5	1
152	2015-02-20	Klosterbach (UR)	9	M	13.9	1
153	2015-02-20	Klosterbach (UR)	9	M	13.9	1
154	2015-02-20	Klosterbach (UR)	9	M	14.4	1
155	2015-02-20	Klosterbach (UR)	9	M	15.7	1

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ID	Date	Stream	Section	Sex	Length (cm)	Migration
156	2015-02-23	Walenbrunnen	10	F	10.4	1
157	2015-02-23	Walenbrunnen	10	F	11	1
158	2015-02-23	Walenbrunnen	10	F	11.6	0
159	2015-02-23	Walenbrunnen	10	F	12.2	0
160	2015-02-23	Walenbrunnen	10	F	12.4	1
161	2015-02-23	Walenbrunnen	10	F	12.7	0
162	2015-02-23	Walenbrunnen	10	F	12.9	1
163	2015-02-23	Walenbrunnen	10	F	14	0
164	2015-02-23	Walenbrunnen	10	F	14.2	0
165	2015-02-23	Walenbrunnen	10	M	9.9	0
166	2015-02-23	Walenbrunnen	10	M	10.1	0
167	2015-02-23	Walenbrunnen	10	M	10.7	0
168	2015-02-23	Walenbrunnen	10	M	10.9	0
169	2015-02-23	Walenbrunnen	10	M	11.1	0
170	2015-02-23	Walenbrunnen	10	M	11.2	0
171	2015-02-23	Walenbrunnen	10	M	11.2	1
172	2015-02-23	Walenbrunnen	10	M	11.9	0
173	2015-02-23	Walenbrunnen	10	M	12.7	0
174	2015-02-23	Walenbrunnen	4	F	9.8	0
175	2015-02-23	Walenbrunnen	4	F	10.4	1
176	2015-02-23	Walenbrunnen	4	F	10.7	1
177	2015-02-23	Walenbrunnen	4	F	11.2	0
178	2015-02-23	Walenbrunnen	4	F	11.4	0
179	2015-02-23	Walenbrunnen	4	F	11.6	0
180	2015-02-23	Walenbrunnen	4	F	13.4	0
181	2015-02-23	Walenbrunnen	4	F	13.8	0
182	2015-02-23	Walenbrunnen	4	M	9.9	0
183	2015-02-23	Walenbrunnen	4	M	10.1	1
184	2015-02-23	Walenbrunnen	4	M	10.6	0
185	2015-02-23	Walenbrunnen	4	M	10.6	1
186	2015-02-23	Walenbrunnen	4	M	10.6	1
187	2015-02-23	Walenbrunnen	4	M	11.4	0

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ID	Date	Stream	Section	Sex	Length (cm)	Migration
188	2015-02-23	Walenbrunnen	4	M	11.4	0
189	2015-02-23	Walenbrunnen	4	M	11.5	0
190	2015-02-23	Walenbrunnen	4	M	11.7	0
191	2015-02-23	Walenbrunnen	8	F	10.2	0
192	2015-02-23	Walenbrunnen	8	F	11	0
193	2015-02-23	Walenbrunnen	8	F	13.2	0
194	2015-02-23	Walenbrunnen	8	F	14.4	1
195	2015-02-23	Walenbrunnen	8	F	16.9	0
196	2015-02-23	Walenbrunnen	8	F	17.2	1
197	2015-02-23	Walenbrunnen	8	M	10.9	1
198	2015-02-23	Walenbrunnen	8	M	12.3	0
199	2015-02-23	Walenbrunnen	8	M	13	0
200	2015-02-23	Walenbrunnen	8	M	14	0
201	2015-02-23	Walenbrunnen	8	M	14.9	1
202	2015-02-26	Klosterbach (SZ)	10	F	10.1	0
203	2015-02-26	Klosterbach (SZ)	10	F	10.1	1
204	2015-02-26	Klosterbach (SZ)	10	F	10.7	1
205	2015-02-26	Klosterbach (SZ)	10	F	13.6	0
206	2015-02-26	Klosterbach (SZ)	10	F	17	0
207	2015-02-26	Klosterbach (SZ)	10	M	12.4	0
208	2015-02-26	Klosterbach (SZ)	10	M	16	1
209	2015-02-26	Klosterbach (SZ)	10	M	17.4	0
210	2015-02-26	Klosterbach (SZ)	3	F	10.5	0
211	2015-02-26	Klosterbach (SZ)	3	F	11.8	0
212	2015-02-26	Klosterbach (SZ)	3	F	13.1	1
213	2015-02-26	Klosterbach (SZ)	3	F	13.6	0
214	2015-02-26	Klosterbach (SZ)	3	F	14.6	1
215	2015-02-26	Klosterbach (SZ)	3	F	16.2	0
216	2015-02-26	Klosterbach (SZ)	3	F	18.3	0
217	2015-02-26	Klosterbach (SZ)	3	F	20.2	0
218	2015-02-26	Klosterbach (SZ)	3	F	21.1	0
219	2015-02-26	Klosterbach (SZ)	3	M	10.3	0

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ID	Date	Stream	Section	Sex	Length (cm)	Migration
220	2015-02-26	Klosterbach (SZ)	3	M	10.5	1
221	2015-02-26	Klosterbach (SZ)	3	M	10.7	0
222	2015-02-26	Klosterbach (SZ)	3	M	10.7	0
223	2015-02-26	Klosterbach (SZ)	3	M	13.3	0
224	2015-02-26	Klosterbach (SZ)	3	M	14.8	1
225	2015-02-26	Klosterbach (SZ)	3	M	15.8	0
226	2015-02-26	Klosterbach (SZ)	7	F	9.5	0
227	2015-02-26	Klosterbach (SZ)	7	F	9.6	0
228	2015-02-26	Klosterbach (SZ)	7	F	9.8	0
229	2015-02-26	Klosterbach (SZ)	7	F	10.3	0
230	2015-02-26	Klosterbach (SZ)	7	F	11	0
231	2015-02-26	Klosterbach (SZ)	7	F	12.7	0
232	2015-02-26	Klosterbach (SZ)	7	F	13.3	0
233	2015-02-26	Klosterbach (SZ)	7	F	16.4	0
234	2015-02-26	Klosterbach (SZ)	7	F	16.4	0
235	2015-02-26	Klosterbach (SZ)	7	F	19.3	0
236	2015-02-26	Klosterbach (SZ)	7	F	21.3	1
237	2015-02-26	Klosterbach (SZ)	7	M	9.3	0
238	2015-02-26	Klosterbach (SZ)	7	M	9.5	0
239	2015-02-26	Klosterbach (SZ)	7	M	11	0
240	2015-02-26	Klosterbach (SZ)	7	M	13.6	0
241	2015-02-26	Klosterbach (SZ)	7	M	13.9	0
242	2015-02-26	Klosterbach (SZ)	7	M	14.4	0
243	2015-02-26	Klosterbach (SZ)	7	M	14.4	0
244	2015-02-26	Klosterbach (SZ)	7	M	15.7	0
245	2015-02-26	Klosterbach (SZ)	7	M	17.8	0
246	2015-02-26	Leewasser	10	F	9.6	0
247	2015-02-26	Leewasser	10	F	10.8	0
248	2015-02-26	Leewasser	10	F	11.4	1
249	2015-02-26	Leewasser	10	F	12	1
250	2015-02-26	Leewasser	10	F	14	0
251	2015-02-26	Leewasser	10	F	14.8	0

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ID	Date	Stream	Section	Sex	Length (cm)	Migration
252	2015-02-26	Leewasser	10	F	15	0
253	2015-02-26	Leewasser	10	F	15	0
254	2015-02-26	Leewasser	10	F	15.5	0
255	2015-02-26	Leewasser	10	M	9.9	0
256	2015-02-26	Leewasser	10	M	12	0
257	2015-02-26	Leewasser	10	M	12.7	0
258	2015-02-26	Leewasser	10	M	13.1	0
259	2015-02-26	Leewasser	10	M	15.5	0
260	2015-02-26	Leewasser	13	F	8.9	0
261	2015-02-26	Leewasser	13	F	9.7	0
262	2015-02-26	Leewasser	13	F	10	0
263	2015-02-26	Leewasser	13	F	10.3	1
264	2015-02-26	Leewasser	13	F	11.3	1
265	2015-02-26	Leewasser	13	F	12	1
266	2015-02-26	Leewasser	13	F	13.9	0
267	2015-02-26	Leewasser	13	F	14	0
268	2015-02-26	Leewasser	13	F	14	1
269	2015-02-26	Leewasser	13	F	14.6	0
270	2015-02-26	Leewasser	13	F	15.6	0
271	2015-02-26	Leewasser	13	M	13.1	0
272	2015-02-26	Leewasser	13	M	13.7	0
273	2015-02-26	Leewasser	13	M	13.8	0
274	2015-02-26	Leewasser	13	M	14.8	0
275	2015-02-26	Leewasser	13	M	16	1
276	2015-02-26	Leewasser	13	M	16.4	0
277	2015-02-26	Leewasser	6	F	11.6	0
278	2015-02-26	Leewasser	6	F	14	0
279	2015-02-26	Leewasser	6	F	15.3	0
280	2015-02-26	Leewasser	6	F	16.7	0
281	2015-02-26	Leewasser	6	F	17	0
282	2015-02-26	Leewasser	6	F	18.7	0
283	2015-02-26	Leewasser	6	F	23.8	0

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ID	Date	Stream	Section	Sex	Length (cm)	Migration
284	2015-02-26	Leewasser	6	F	23.9	0
285	2015-02-26	Leewasser	6	M	9.9	0
286	2015-02-26	Leewasser	6	M	11.3	0
287	2015-02-26	Leewasser	6	M	11.6	0
288	2015-02-26	Leewasser	6	M	13.1	0
289	2015-02-26	Leewasser	6	M	15.5	0
290	2015-02-26	Leewasser	6	M	16.1	0
291	2015-02-26	Leewasser	6	M	16.6	0
292	2015-02-26	Leewasser	6	M	16.7	0
293	2015-02-26	Leewasser	6	M	18.4	0
294	2015-02-27	Scheidgraben	10	F	10	0
295	2015-02-27	Scheidgraben	10	F	11.5	1
296	2015-02-27	Scheidgraben	10	M	11	0
297	2015-02-27	Scheidgraben	10	M	12.1	1
298	2015-02-27	Scheidgraben	10	M	13.1	0
299	2015-02-27	Scheidgraben	10	M	13.1	1
300	2015-02-27	Scheidgraben	2	F	10.6	0
301	2015-02-27	Scheidgraben	2	F	11	1
302	2015-02-27	Scheidgraben	2	F	11.9	0
303	2015-02-27	Scheidgraben	2	F	11.9	0
304	2015-02-27	Scheidgraben	2	F	12.6	0
305	2015-02-27	Scheidgraben	2	F	13.7	0
306	2015-02-27	Scheidgraben	2	F	13.9	0
307	2015-02-27	Scheidgraben	2	F	16.3	0
308	2015-02-27	Scheidgraben	2	F	18	0
309	2015-02-27	Scheidgraben	2	F	18.3	0
310	2015-02-27	Scheidgraben	2	F	20	0
311	2015-02-27	Scheidgraben	2	F	21	1
312	2015-02-27	Scheidgraben	2	M	16.5	0
313	2015-02-27	Scheidgraben	2	M	18.3	0
314	2015-02-27	Scheidgraben	2	M	24.3	1
315	2015-02-27	Scheidgraben	4	F	11.2	0

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ID	Date	Stream	Section	Sex	Length (cm)	Migration
316	2015-02-27	Scheidgraben	4	F	11.5	1
317	2015-02-27	Scheidgraben	4	F	12.9	1
318	2015-02-27	Scheidgraben	4	F	13.8	0
319	2015-02-27	Scheidgraben	4	F	14.1	0
320	2015-02-27	Scheidgraben	4	F	15.3	0
321	2015-02-27	Scheidgraben	4	F	19.8	0
322	2015-02-27	Scheidgraben	4	F	20.5	0
323	2015-02-27	Scheidgraben	4	M	10.9	0
324	2015-02-27	Scheidgraben	4	M	11.6	0
325	2015-02-27	Scheidgraben	4	M	12.4	0
326	2015-02-27	Scheidgraben	4	M	14.3	0
327	2015-02-27	Scheidgraben	4	M	19.2	0
328	2015-02-27	Scheidgraben	6	F	10.6	0
329	2015-02-27	Scheidgraben	6	F	10.9	0
330	2015-02-27	Scheidgraben	6	F	12.9	0
331	2015-02-27	Scheidgraben	6	F	13.1	1
332	2015-02-27	Scheidgraben	6	F	13.9	0
333	2015-02-27	Scheidgraben	6	F	17.2	0
334	2015-02-27	Scheidgraben	6	M	10.5	0
335	2015-02-27	Scheidgraben	6	M	10.9	0
336	2015-02-27	Scheidgraben	6	M	11	1
337	2015-02-27	Scheidgraben	6	M	12.8	0
338	2015-02-27	Scheidgraben	6	M	12.9	0
339	2015-02-27	Scheidgraben	6	M	13.2	0
340	2015-02-27	Scheidgraben	6	M	13.3	1
341	2015-02-27	Scheidgraben	6	M	13.9	0
342	2015-03-03	Klosterbach (UR)	4	F	10	1
343	2015-03-03	Klosterbach (UR)	4	F	11	1
344	2015-03-03	Klosterbach (UR)	4	F	12.5	1
345	2015-03-03	Klosterbach (UR)	4	F	13	1
346	2015-03-03	Klosterbach (UR)	4	F	13.6	1
347	2015-03-03	Klosterbach (UR)	4	M	11.6	0

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ID	Date	Stream	Section	Sex	Length (cm)	Migration
348	2015-03-03	Klosterbach (UR)	4	M	13.8	1
349	2015-03-03	Klosterbach (UR)	4	M	16.2	0
350	2015-03-03	Klosterbach (UR)	6	F	10.3	1
351	2015-03-03	Klosterbach (UR)	6	F	10.7	0
352	2015-03-03	Klosterbach (UR)	6	F	11.7	1
353	2015-03-03	Klosterbach (UR)	6	F	11.7	1
354	2015-03-03	Klosterbach (UR)	6	F	12.2	1
355	2015-03-03	Klosterbach (UR)	6	F	12.5	0
356	2015-03-03	Klosterbach (UR)	6	F	12.7	1
357	2015-03-03	Klosterbach (UR)	6	F	15.3	1
358	2015-03-03	Klosterbach (UR)	6	F	16	1
359	2015-03-03	Klosterbach (UR)	6	M	10.2	0
360	2015-03-03	Klosterbach (UR)	6	M	10.4	0
361	2015-03-03	Klosterbach (UR)	6	M	10.5	1
362	2015-03-03	Klosterbach (UR)	6	M	11.6	0
363	2015-03-03	Klosterbach (UR)	6	M	12.7	1
364	2015-03-03	Klosterbach (UR)	6	M	13.4	1
365	2015-03-03	Klosterbach (UR)	6	M	14.6	1
366	2015-03-03	Klosterbach (UR)	6	M	15.4	0
367	2015-03-03	Klosterbach (UR)	6	M	15.5	0
368	2015-03-03	Klosterbach (UR)	8	F	10.2	1
369	2015-03-03	Klosterbach (UR)	8	F	10.3	0
370	2015-03-03	Klosterbach (UR)	8	M	10.6	0
371	2015-03-03	Klosterbach (UR)	8	M	11.3	1
372	2015-03-03	Klosterbach (UR)	8	M	12	0
373	2015-03-03	Klosterbach (UR)	8	M	12.2	0
374	2015-03-03	Klosterbach (UR)	8	M	12.2	1
375	2015-03-05	Giessen	5	F	9.7	1
376	2015-03-05	Giessen	5	F	10	1
377	2015-03-05	Giessen	5	F	12.6	1
378	2015-03-05	Giessen	5	F	12.6	1
379	2015-03-05	Giessen	5	F	13.2	0

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ID	Date	Stream	Section	Sex	Length (cm)	Migration
380	2015-03-05	Giessen	5	F	14.2	1
381	2015-03-05	Giessen	5	F	16.8	0
382	2015-03-05	Giessen	5	F	17.4	1
383	2015-03-05	Giessen	5	F	21.9	0
384	2015-03-05	Giessen	5	M	9.9	0
385	2015-03-05	Giessen	5	M	10.1	0
386	2015-03-05	Giessen	5	M	10.5	1
387	2015-03-05	Giessen	5	M	10.6	0
388	2015-03-05	Giessen	5	M	12.7	0
389	2015-03-05	Giessen	5	M	12.8	1
390	2015-03-05	Giessen	5	M	13.2	0
391	2015-03-05	Giessen	5	M	14.5	0
392	2015-03-05	Giessen	7	F	9.7	0
393	2015-03-05	Giessen	7	F	10.9	0
394	2015-03-05	Giessen	7	F	11	0
395	2015-03-05	Giessen	7	F	11.6	0
396	2015-03-05	Giessen	7	F	12.6	1
397	2015-03-05	Giessen	7	F	13.2	0
398	2015-03-05	Giessen	7	F	15.3	1
399	2015-03-05	Giessen	7	M	10.6	0
400	2015-03-05	Giessen	7	M	11.4	1
401	2015-03-05	Giessen	7	M	11.8	1
402	2015-03-05	Giessen	7	M	12.2	0
403	2015-03-05	Giessen	7	M	12.3	1
404	2015-03-05	Giessen	7	M	13.6	1
405	2015-03-05	Giessen	7	M	14.3	0
406	2015-03-05	Giessen	7	M	15.2	0
407	2015-03-05	Giessen	7	M	15.8	0
408	2015-03-05	Giessen	9	F	9.8	0
409	2015-03-05	Giessen	9	F	9.8	1
410	2015-03-05	Giessen	9	F	9.9	0
411	2015-03-05	Giessen	9	F	9.9	0

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ID	Date	Stream	Section	Sex	Length (cm)	Migration
412	2015-03-05	Giessen	9	F	10.8	1
413	2015-03-05	Giessen	9	F	11.3	1
414	2015-03-05	Giessen	9	F	11.4	1
415	2015-03-05	Giessen	9	F	11.7	0
416	2015-03-05	Giessen	9	F	12	1
417	2015-03-05	Giessen	9	F	13.1	1
418	2015-03-05	Giessen	9	F	13.7	0
419	2015-03-05	Giessen	9	F	15	1
420	2015-03-05	Giessen	9	F	15.3	1
421	2015-03-05	Giessen	9	F	16	1
422	2015-03-05	Giessen	9	M	10.2	0
423	2015-03-05	Giessen	9	M	10.3	0
424	2015-03-05	Giessen	9	M	11.5	0
425	2015-03-05	Giessen	9	M	13.4	1
426	2015-03-05	Giessen	9	M	14.8	0
427	2015-03-05	Schützenbrunnen	4	M	11.4	0
428	2015-03-05	Schützenbrunnen	4	M	12.2	0
429	2015-03-05	Schützenbrunnen	4	M	12.5	1
430	2015-03-05	Schützenbrunnen	4	M	13	1
431	2015-03-05	Schützenbrunnen	4	M	15.3	0
432	2015-03-05	Schützenbrunnen	4	M	16.1	0
433	2015-03-05	Schützenbrunnen	4	M	16.5	1
434	2015-03-05	Schützenbrunnen	4	M	17.8	1
435	2015-03-05	Schützenbrunnen	4	M	18.9	0
436	2015-03-05	Schützenbrunnen	6	F	9.8	0
437	2015-03-05	Schützenbrunnen	6	F	10.3	0
438	2015-03-05	Schützenbrunnen	6	F	11	0
439	2015-03-05	Schützenbrunnen	6	F	11.2	0
440	2015-03-05	Schützenbrunnen	6	F	11.3	0
441	2015-03-05	Schützenbrunnen	6	F	11.8	0
442	2015-03-05	Schützenbrunnen	6	F	13.4	1
443	2015-03-05	Schützenbrunnen	6	F	13.6	1

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ID	Date	Stream	Section	Sex	Length (cm)	Migration
444	2015-03-05	Schützenbrunnen	6	F	15.6	1
445	2015-03-05	Schützenbrunnen	6	F	16.8	1
446	2015-03-05	Schützenbrunnen	6	F	16.9	1
447	2015-03-05	Schützenbrunnen	6	M	9.7	0
448	2015-03-05	Schützenbrunnen	6	M	10	0
449	2015-03-05	Schützenbrunnen	6	M	10.5	1
450	2015-03-05	Schützenbrunnen	6	M	10.9	0
451	2015-03-05	Schützenbrunnen	6	M	13.4	0
452	2015-03-05	Schützenbrunnen	6	M	13.6	1
453	2015-03-05	Schützenbrunnen	6	M	16.2	0
454	2015-03-05	Schützenbrunnen	6	M	19.3	0
455	2015-03-05	Schützenbrunnen	8	F	10.5	1
456	2015-03-05	Schützenbrunnen	8	F	11.8	1
457	2015-03-05	Schützenbrunnen	8	F	12.4	1
458	2015-03-05	Schützenbrunnen	8	M	9.9	0
459	2015-03-05	Schützenbrunnen	8	M	10.6	0
460	2015-03-05	Schützenbrunnen	8	M	12	1
461	2015-03-06	Klosterbach (SZ)	12	F	9.9	0
462	2015-03-06	Klosterbach (SZ)	12	F	10.1	0
463	2015-03-06	Klosterbach (SZ)	12	F	10.5	0
464	2015-03-06	Klosterbach (SZ)	12	F	10.9	1
465	2015-03-06	Klosterbach (SZ)	12	F	11.6	0
466	2015-03-06	Klosterbach (SZ)	12	F	12.2	1
467	2015-03-06	Klosterbach (SZ)	12	F	12.3	1
468	2015-03-06	Klosterbach (SZ)	12	F	17.8	0
469	2015-03-06	Klosterbach (SZ)	12	M	10.1	0
470	2015-03-06	Klosterbach (SZ)	12	M	11	0
471	2015-03-06	Klosterbach (SZ)	12	M	11.7	1
472	2015-03-06	Klosterbach (SZ)	12	M	11.9	0
473	2015-03-06	Klosterbach (SZ)	12	M	12.4	0
474	2015-03-06	Klosterbach (SZ)	12	M	12.9	0
475	2015-03-06	Klosterbach (SZ)	3	F	10.5	0

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ID	Date	Stream	Section	Sex	Length (cm)	Migration
476	2015-03-06	Klosterbach (SZ)	3	F	10.6	0
477	2015-03-06	Klosterbach (SZ)	3	F	12	0
478	2015-03-06	Klosterbach (SZ)	3	F	12.6	0
479	2015-03-06	Klosterbach (SZ)	3	F	13.1	1
480	2015-03-06	Klosterbach (SZ)	3	F	14.4	0
481	2015-03-06	Klosterbach (SZ)	3	F	19.4	0
482	2015-03-06	Klosterbach (SZ)	3	M	10.4	0
483	2015-03-06	Klosterbach (SZ)	3	M	11.7	0
484	2015-03-06	Klosterbach (SZ)	3	M	12	0
485	2015-03-06	Klosterbach (SZ)	3	M	12.1	0
486	2015-03-06	Klosterbach (SZ)	3	M	12.4	0
487	2015-03-06	Klosterbach (SZ)	3	M	12.5	0
488	2015-03-06	Klosterbach (SZ)	3	M	12.6	0
489	2015-03-06	Klosterbach (SZ)	3	M	17.5	0
490	2015-03-06	Klosterbach (SZ)	3	M	20.8	0
491	2015-03-06	Klosterbach (SZ)	3	M	22.5	0
492	2015-03-06	Klosterbach (SZ)	6	F	9.4	0
493	2015-03-06	Klosterbach (SZ)	6	F	9.6	0
494	2015-03-06	Klosterbach (SZ)	6	F	9.6	0
495	2015-03-06	Klosterbach (SZ)	6	F	9.9	0
496	2015-03-06	Klosterbach (SZ)	6	F	10.4	1
497	2015-03-06	Klosterbach (SZ)	6	F	13.5	1
498	2015-03-06	Klosterbach (SZ)	6	F	13.6	0
499	2015-03-06	Klosterbach (SZ)	6	M	9.9	0
500	2015-03-06	Klosterbach (SZ)	6	M	10	0
501	2015-03-06	Klosterbach (SZ)	6	M	10.3	0
502	2015-03-06	Klosterbach (SZ)	6	M	10.5	0
503	2015-03-06	Klosterbach (SZ)	6	M	10.8	0
504	2015-03-06	Klosterbach (SZ)	6	M	10.9	0
505	2015-03-06	Klosterbach (SZ)	6	M	11.1	0
506	2015-03-06	Klosterbach (SZ)	6	M	11.6	0
507	2015-03-06	Klosterbach (SZ)	6	M	12.2	0

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ID	Date	Stream	Section	Sex	Length (cm)	Migration
508	2015-03-06	Klosterbach (SZ)	6	M	13.8	1
509	2015-03-06	Klosterbach (SZ)	6	M	15.1	0
510	2015-03-06	Klosterbach (SZ)	6	M	17.6	0
511	2015-03-06	Klosterbach (SZ)	6	M	18.6	0
512	2015-03-06	Leewasser	13	F	12.5	1
513	2015-03-06	Leewasser	13	F	13.7	0
514	2015-03-06	Leewasser	13	F	15.1	0
515	2015-03-06	Leewasser	13	F	16.6	0
516	2015-03-06	Leewasser	13	M	11.6	0
517	2015-03-06	Leewasser	13	M	11.7	0
518	2015-03-06	Leewasser	13	M	11.9	0
519	2015-03-06	Leewasser	13	M	11.9	0
520	2015-03-06	Leewasser	13	M	12.1	0
521	2015-03-06	Leewasser	13	M	12.9	0
522	2015-03-06	Leewasser	13	M	13.1	0
523	2015-03-06	Leewasser	13	M	13.8	0
524	2015-03-06	Leewasser	13	M	14.8	0
525	2015-03-06	Leewasser	13	M	14.9	0
526	2015-03-06	Leewasser	13	M	15.6	1
527	2015-03-06	Leewasser	2	M	11.7	0
528	2015-03-06	Leewasser	2	M	16.3	0
529	2015-03-06	Leewasser	2	M	16.9	0
530	2015-03-06	Leewasser	2	M	17.4	0
531	2015-03-06	Leewasser	2	M	21.5	0
532	2015-03-06	Leewasser	6	F	12.6	1
533	2015-03-06	Leewasser	6	F	12.9	0
534	2015-03-06	Leewasser	6	F	13.5	1
535	2015-03-06	Leewasser	6	F	14.2	1
536	2015-03-06	Leewasser	6	F	14.5	1
537	2015-03-06	Leewasser	6	F	15	1
538	2015-03-06	Leewasser	6	M	9.9	0
539	2015-03-06	Leewasser	6	M	10.7	1

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ID	Date	Stream	Section	Sex	Length (cm)	Migration
540	2015-03-06	Leewasser	6	M	13.4	1
541	2015-03-06	Leewasser	6	M	13.8	1
542	2015-03-06	Leewasser	6	M	13.9	1
543	2015-03-06	Leewasser	6	M	14.1	0
544	2015-03-06	Leewasser	6	M	14.9	1
545	2015-03-06	Leewasser	6	M	15.4	0
546	2015-03-06	Leewasser	6	M	15.5	1
547	2015-03-10	Walenbrunnen	1	F	10.1	1
548	2015-03-10	Walenbrunnen	1	F	10.2	1
549	2015-03-10	Walenbrunnen	1	F	11.4	0
550	2015-03-10	Walenbrunnen	1	F	11.7	0
551	2015-03-10	Walenbrunnen	1	F	12.1	1
552	2015-03-10	Walenbrunnen	1	F	12.2	0
553	2015-03-10	Walenbrunnen	1	F	12.2	1
554	2015-03-10	Walenbrunnen	1	F	12.3	1
555	2015-03-10	Walenbrunnen	1	F	13.3	1
556	2015-03-10	Walenbrunnen	1	F	13.3	1
557	2015-03-10	Walenbrunnen	1	F	16.5	0
558	2015-03-10	Walenbrunnen	1	F	18	1
559	2015-03-10	Walenbrunnen	1	M	10.2	1
560	2015-03-10	Walenbrunnen	1	M	10.7	0
561	2015-03-10	Walenbrunnen	1	M	11	0
562	2015-03-10	Walenbrunnen	1	M	11	1
563	2015-03-10	Walenbrunnen	1	M	11.2	0
564	2015-03-10	Walenbrunnen	1	M	11.4	0
565	2015-03-10	Walenbrunnen	1	M	11.7	0
566	2015-03-10	Walenbrunnen	1	M	11.7	1
567	2015-03-10	Walenbrunnen	1	M	11.8	0
568	2015-03-10	Walenbrunnen	1	M	12.1	0
569	2015-03-10	Walenbrunnen	1	M	12.8	0
570	2015-03-10	Walenbrunnen	1	M	12.9	1
571	2015-03-10	Walenbrunnen	1	M	13.4	1

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ID	Date	Stream	Section	Sex	Length (cm)	Migration
572	2015-03-10	Walenbrunnen	1	M	15.2	1
573	2015-03-10	Walenbrunnen	1	M	15.6	0
574	2015-03-10	Walenbrunnen	1	M	16.7	1
575	2015-03-10	Walenbrunnen	1	M	17.9	1
576	2015-03-10	Walenbrunnen	3	F	11	1
577	2015-03-10	Walenbrunnen	3	F	15.3	1
578	2015-03-10	Walenbrunnen	3	M	10	1
579	2015-03-10	Walenbrunnen	3	M	10.3	0
580	2015-03-10	Walenbrunnen	3	M	10.5	0
581	2015-03-10	Walenbrunnen	3	M	10.6	0
582	2015-03-10	Walenbrunnen	3	M	11.1	0
583	2015-03-10	Walenbrunnen	3	M	11.9	0
584	2015-03-10	Walenbrunnen	3	M	12.6	1
585	2015-03-10	Walenbrunnen	3	M	13.4	1
586	2015-03-10	Walenbrunnen	3	M	14.8	0
587	2015-03-10	Walenbrunnen	3	M	16	1
588	2015-03-10	Walenbrunnen	3	M	18.3	1
589	2015-03-10	Walenbrunnen	7	F	17.8	0
590	2015-03-10	Walenbrunnen	7	M	9.8	0
591	2015-03-10	Walenbrunnen	7	M	10.5	0
592	2015-03-10	Walenbrunnen	7	M	10.9	0
593	2015-03-10	Walenbrunnen	7	M	12.3	1
594	2015-03-10	Walenbrunnen	7	M	14.4	1
595	2015-03-10	Walenbrunnen	7	M	14.5	1
596	2015-03-10	Walenbrunnen	7	M	15.5	0
597	2015-03-10	Walenbrunnen	7	M	16.1	1
598	2015-03-13	Giessen	2	F	10.7	1
599	2015-03-13	Giessen	2	M	14.4	0
600	2015-03-13	Giessen	2	M	17.5	1
601	2015-03-13	Giessen	4	F	11.2	1
602	2015-03-13	Giessen	4	F	15.2	1
603	2015-03-13	Giessen	4	F	15.8	1

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ID	Date	Stream	Section	Sex	Length (cm)	Migration
604	2015-03-13	Giessen	4	M	9.6	1
605	2015-03-13	Giessen	4	M	17.4	1
606	2015-03-13	Schützenbrunnen	6	F	10.4	0
607	2015-03-13	Schützenbrunnen	6	F	10.6	0
608	2015-03-13	Schützenbrunnen	6	F	10.6	0
609	2015-03-13	Schützenbrunnen	6	F	12.4	1
610	2015-03-13	Schützenbrunnen	6	F	12.5	0
611	2015-03-13	Schützenbrunnen	6	F	12.8	1
612	2015-03-13	Schützenbrunnen	6	F	12.9	1
613	2015-03-13	Schützenbrunnen	6	F	13.9	0
614	2015-03-13	Schützenbrunnen	6	F	16.8	0
615	2015-03-13	Schützenbrunnen	6	F	17.8	0
616	2015-03-13	Schützenbrunnen	6	M	11.2	1
617	2015-03-13	Schützenbrunnen	6	M	11.5	1
618	2015-03-13	Schützenbrunnen	6	M	12.7	0
619	2015-03-13	Schützenbrunnen	6	M	12.8	0
620	2015-03-13	Schützenbrunnen	6	M	12.8	1
621	2015-03-13	Schützenbrunnen	6	M	14.2	1
622	2015-03-13	Schützenbrunnen	6	M	14.6	1
623	2015-03-13	Schützenbrunnen	6	M	14.8	0
624	2015-03-13	Schützenbrunnen	6	M	14.8	1
625	2015-03-13	Schützenbrunnen	6	M	14.9	1
626	2015-03-13	Schützenbrunnen	6	M	14.9	1
627	2015-03-13	Schützenbrunnen	6	M	15.5	1
628	2015-03-13	Schützenbrunnen	6	M	16.1	1
629	2015-03-13	Schützenbrunnen	6	M	16.2	0

## Appendix

**Table A4. The PCR primer sequences used in this study.** These sequences were first published by Anglès d'Auriac et al. (2014).

Primer	Sequence
Trout sdY-Fw	(5'-CCCAGCACTGTTTCTTGTCTCA-3')
Trout sdY-Rv	(5'-CTTAAAACCACTCCACCCCTCCAT-3')
Trout 18S-Fw	(5'-GTYCGAAGACGATCAGATAACCGT-3')
Trout 18S-Rv	(5'-CCGCATAACTAGTTAGCATGCCG-3')

## Appendix

**Table A5. Summary of the number of resident and spring migratory males and females in each stream.** For each sex, the total number ( $N_T$ ) of individuals is shown alongside the number of residents ( $N_R$ ), the number of migratory individuals ( $N_M$ ) and the proportion of migrants ( $Pr_M$ ). Rows ordered by stream.

Stream	Sex							
	Males				Females			
	$N_T$	$N_R$	$N_M$	$Pr_M$	$N_T$	$N_R$	$N_M$	$Pr_M$
Giessen	32	19	13	0.40	44	14	30	0.68
Klosterbach (SZ)	48	43	5	0.10	47	36	11	0.23
Klosterbach (UR)	57	28	29	0.51	36	10	26	0.72
Leewasser	45	37	8	0.18	38	26	12	0.32
Scheidgraben	38	29	9	0.24	60	42	18	0.30
Schützenbrunnen	52	25	27	0.52	35	17	18	0.51
Walenbrunnen	59	36	23	0.39	38	20	18	0.47
<b>Totals</b>	<b>331</b>	<b>217</b>	<b>114</b>	<b>0.34</b>	<b>298</b>	<b>165</b>	<b>133</b>	<b>0.45</b>

**Table A6. Akaike information criterion (AIC) scores for the three models of migration probability.** For each model, the AIC score and the difference from the best (lowest) AIC score is shown. Rows ordered by AIC. For model details, see Main Text Methods and Appendix §1.2.

Model	AIC	$\Delta\text{AIC}$
2	763.34	0.00
3	767.32	3.99
1	789.01	25.67

**Table A7. Coefficient estimates from a generalised additive model of spring migration events in relation to sex, standard length, tagging date, stream and stream section (see equation 1, Main Text).** The model was fitted using 629 observations and explained 13.2 % of the deviance. For parametric coefficients, the estimate, standard error, z-value and *p*-value are shown. For smooth terms (denoted generically by *s*), the effective degrees of freedom, reference degrees of freedom,  $\chi^2$  value and approximate *p*-value are shown.

<b>Parametric coefficients</b>				
<i>Term</i>	<i>Estimate</i>	<i>SE</i>	<i>z-value</i>	<i>p-value</i>
(Intercept)	-0.152	0.315	-0.482	0.630
<i>male</i>	-0.634	0.182	-3.472	0.000
<b>Approximate significance of smooth terms</b>				
<i>Term</i>	<i>EDF</i>	<i>Ref DF</i>	$\chi^2$	<i>p-value</i>
<i>s(log(length)): female</i>	2.856	3.574	6.249	0.119
<i>s(log(length)): male</i>	1.935	2.456	12.636	0.004
<i>s(day<sup>T</sup>)</i>	1.876	3.000	21.368	0.072
<i>s(stream)</i>	5.399	6.000	51.962	0.000
<i>s(stream, section)</i>	0.004	42.000	0.004	0.564

**Table A8. Akaike information criterion (AIC) scores for the four models of migration timing.** For each model, the AIC score and the difference from the best (lowest) AIC score is shown. Rows ordered by AIC. For model details, see Main Text Methods and Appendix §1.3.

Model	AIC	$\Delta AIC$
4	2070.33	0.00
3	2072.24	1.91
2	2077.90	7.57
1	2084.04	13.71

**Table A9. Coefficient estimates from a generalised additive model of the day of migration in relation to sex, standard length, tagging date, stream and stream section (see equation 2, Main Text).** The model was fitted using 247 observations and explained 53.4 % of the deviance. For parametric coefficients, the estimate, standard error, *t*-value and *p*-value are shown. For smooth terms (denoted generically by *s*), the effective degrees of freedom, reference degrees of freedom, *F* value and approximate *p*-value are shown.

<b>Parametric coefficients</b>				
<i>Term</i>	<i>Estimate</i>	<i>SE</i>	<i>t-value</i>	<i>p-value</i>
(Intercept)	115.492	1.804	64.010	0.000
<i>male</i>	-2.777	2.006	-1.384	0.168
<b>Approximate significance of smooth terms</b>				
<i>Term</i>	<i>EDF</i>	<i>Ref DF</i>	<i>F</i>	<i>p-value</i>
<i>s(day<sup>T</sup>)</i>	0.925	3.000	7.854	0.002
<i>s(stream)</i>	0.298	6.000	0.064	0.394
<i>s(stream, section)</i>	18.927	41.000	0.972	0.001
<i>s(log(length)): Giessen</i>	1.000	1.001	22.529	0.000
<i>s(log(length)): Klosterbach (SZ)</i>	2.433	2.853	3.300	0.018
<i>s(log(length)): Klosterbach (UR)</i>	1.000	1.001	15.500	0.000
<i>s(log(length)): Leewasser</i>	1.002	1.004	7.316	0.008
<i>s(log(length)): Scheidgraben</i>	2.459	2.929	2.836	0.044
<i>s(log(length)): Schützenbrunnen</i>	1.000	1.000	18.149	0.000
<i>s(log(length)): Walenbrunnen</i>	1.002	1.005	28.476	0.000

#### 4. REFERENCES

- Anglès d'Auriac, M. B., Urke, H. A., & Kristensen, T. 2014. A rapid qPCR method for genetic sex identification of *Salmo salar* and *Salmo trutta* including simultaneous elucidation of interspecies hybrid paternity by high-resolution melt analysis. Journal of Fish Biology, 84: 1971–1977.
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