Supporting Information

Tag settings

In this document, we wish to supply some additional information on the choice of tag settings applied for different species (Table S1), as we believe our experiences can aid other researchers in their study design. The three species (Starry smooth-hound, *Mustelus asterias*; European seabass, *Dicentrarchus labrax*; Atlantic cod, *Gadus morhua*) were all known or hypothesized to reside in the range of the permanent Belgian acoustic receiver network (PBARN) (Reubens *et al.* 2019) during a part of the year, but to migrate elsewhere during another period. The ADST was therefore deemed an optimal tag choice for these species to investigate 1) migration trajectories with archival data and 2) habitat use at specific locations using acoustic telemetry. In addition, the relatively large geographical range of the PBARN would enhance the probability of detecting fish along their migrations, which would be of high value for the validation of the geolocation model.

With these objectives in mind, we strived to select optimal tag settings, learning and adapting along the way. A first major consideration was tag longevity, which would be determined by battery power and/or storage memory. Because of the energy-demanding acoustic component, transmitting delay and power output were the limiting factors for battery lifetime. Considering the high levels of environmental and anthropogenic noise in the study area, we chose to set transmitting power output to 'High' (151 dB for ADST-V9TP, 154 dB for ADST-V13TP). Starry smooth-hounds were tagged with the larger ADST-V13TP, resulting in battery lifetimes of 518 days for a mean transmitting delay of 2.5 minutes. For the other species, provided with the smaller ADST-V9TP however, this delay would have resulted in inadequately short lifetimes. Therefore, tags were programmed to transmit at longer delays when seabass and cod were expected to be migrating (i.e. transmitting delays were defined in different steps). Because of field work issues, 27 tags that were supposed to be used for cod, were instead applied on seabass. In this case, the ability to reprogram the tag settings would have been very useful to fine-tune the delays to study objectives of a study on another species. In this specific case, we would have preferred shorter delays in the period seabass was expected to reside in our study area. Sensor measurements (as measured at the time of transmission) were transmitted at a fixed ratio, for which we initially chose 1:3 (Temperature:Pressure). Since temperature models existed for our study area, temperature measurements (at the known location of the receiver) were much less informative than depth use. Therefore, we switched to a ratio of 1:9. For the data logged on the tag itself, we also considered pressure to be of higher information value than temperature, as it informed on vertical movement behaviour. Temperature was therefore logged at a higher interval (double or more) than pressure. It would be good to bear in mind to use a multiple of the other interval, as the geolocation model used temperature at depth. However, editing our initial logging intervals for seabass, we mistakenly used the logging interval 300 – 90 seconds (Temperature – Pressure). In summary, tag settings were selected in consideration of the study species, the study objectives and the trade-off with battery lifetime.

Table S1. Tag settings applied for different species. Temperature (T) and pressure (P) sensor measurements were logged continuously at a fixed interval and were transmitted at a fixed ratio. Signals were transmitted at a random delay between a minimum and maximum interval for a fixed period of time.

Species	N	Type	Battery life (days)	Logging interval T - P (s)	Transmit ratio T:P	Transmitting delay
European seabass	27	ADST-V9TP	354	180 - 90	1:3	90 days (240 - 360 s); 150 days (120 - 240 s); 104 days (240 - 360 s)
	40	ADST-V9TP	339	180 - 90	1:3	120 days (120 - 240 s); 239 days (240 - 360 s)
	19	ADST-V9TP	400	180 - 90	1:9	120 days (180 - 200 s); 280 days (300 - 400 s)
	23	ADST-V9TP	425	300 -90	1:9	70 days (180 - 280 s); 355 days (300 - 400 s)
Atlantic cod	3	ADST-V9TP	339	180 - 90	1:3	90 days (240 - 360 s); 150 days (120 - 240 s); 104 days (240 - 360 s)
	12	ADST-V9TP	350	180 - 90	1:3	120 days (140 - 220 s); 230 days (250 - 350 s)
Starry smooth-hound	30	ADST-V13TP	518	240 - 120	1:3	518 days (100 - 200 s)