

Acoustic telemetry: A quick overview

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What is acoustic telemetry?

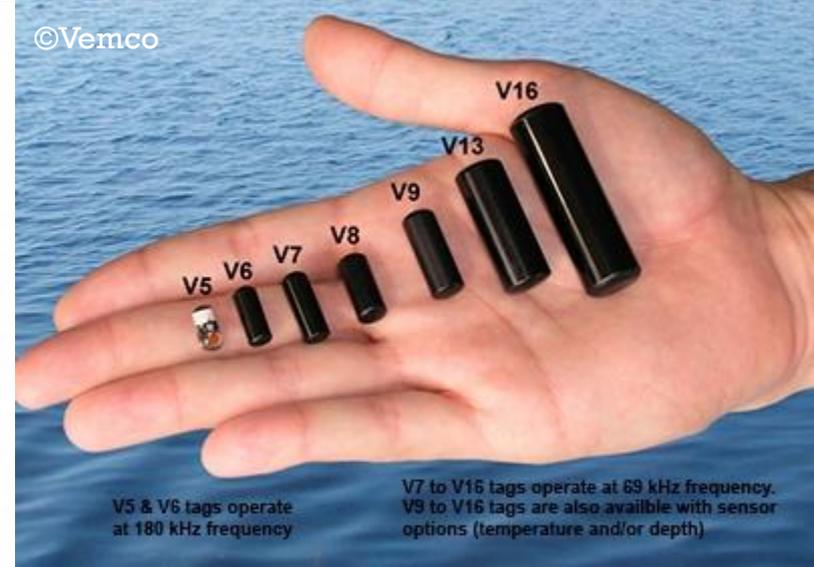
- Acoustic telemetry is a form of telemetry that uses high frequency sound (69 & 180 kHz) to transmit information
- Typical systems include a transmitter (tag) and a hydrophone receiver
- Uses water as its transmission medium
- Has been used to successfully tag and track fish for well over 50 years
- Modern technological advances now make it a viable technique to track wild salmonid smolts

Radio vs Acoustic

- Radio telemetry does not operate well in high conductivity water and at excessive depths (>35m), acoustic does
 - Important when potentially tracking fish in both freshwater and marine environments
- Automatic receiving equipment for radio is costly (~£5k per station) whilst acoustic is relatively cheap (~£1k per station)
- Radio automatic receiving equipment is relatively conspicuous and susceptible to vandals. Acoustic equipment is easy to conceal and is often wholly submerged apart from attachment ropes.
- Radio battery maintenance usually carried out weekly, acoustic receiver batteries last a year without maintenance
- Acoustic read ranges in air are almost null, radio tags operate both in and out of water
 - Potentially problematic when attributing acoustic tag losses to a source

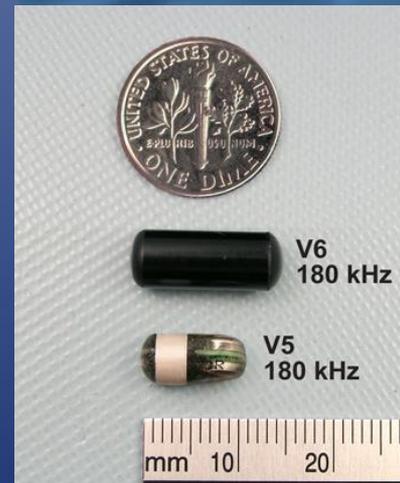
Tags and equipment

- Tags come in a variety of sizes
- Can be tracked using stationary logging receivers, manual tracking units or a combination of both



Acoustic 69 kHz vs 180 kHz

- Vemco now offer tags as small as 5 mm diameter
- Use a specialised 180 kHz band
- Tags requires a separate 180 kHz receiver to be detected
- Potentially very useful for projects only interested in tracking smolts



Manufacturers

- Three main tag manufacturers
 - Vemco, Thelma-Biotel and Lotek
- Two receiver manufacturers
 - Vemco and Lotek
- Vemco tags work best with Vemco receivers
- Thelma-Biotel tags are compatible with Vemco receivers but are often bulkier than Vemco equivalents

Recommended reading

- The migration of freshwater fish, Lucas & Baras, 2001
- Methods for studying spatial behaviour of freshwater fishes in the natural environment, Lucas & Baras, 2000
- Tracking animals in freshwater with electronic tags: past, present and future, Cooke *et al.*, 2013

- Good reviews on the topic