

Long term temperature monitoring of Salmon (*Salmo salar*) spawning streams in the Wye river catchment

Monitoring Results 2017/8 Spawning Period

Notes to aid interpretation

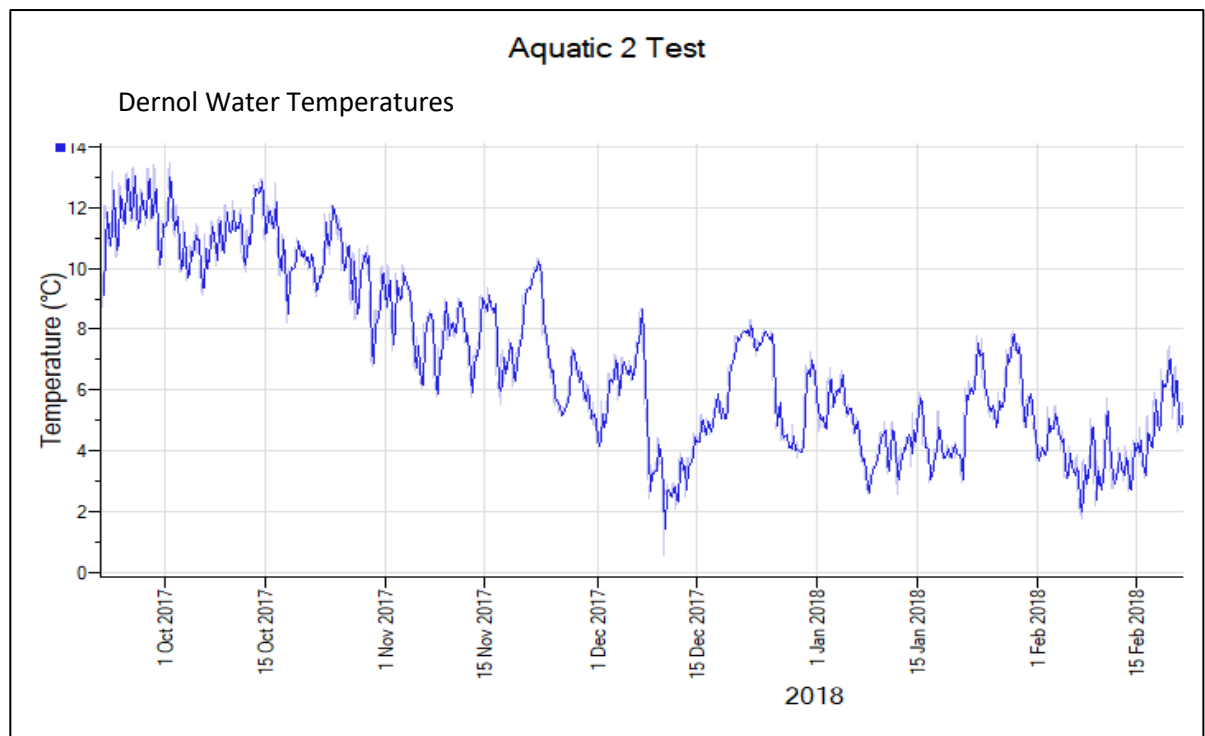
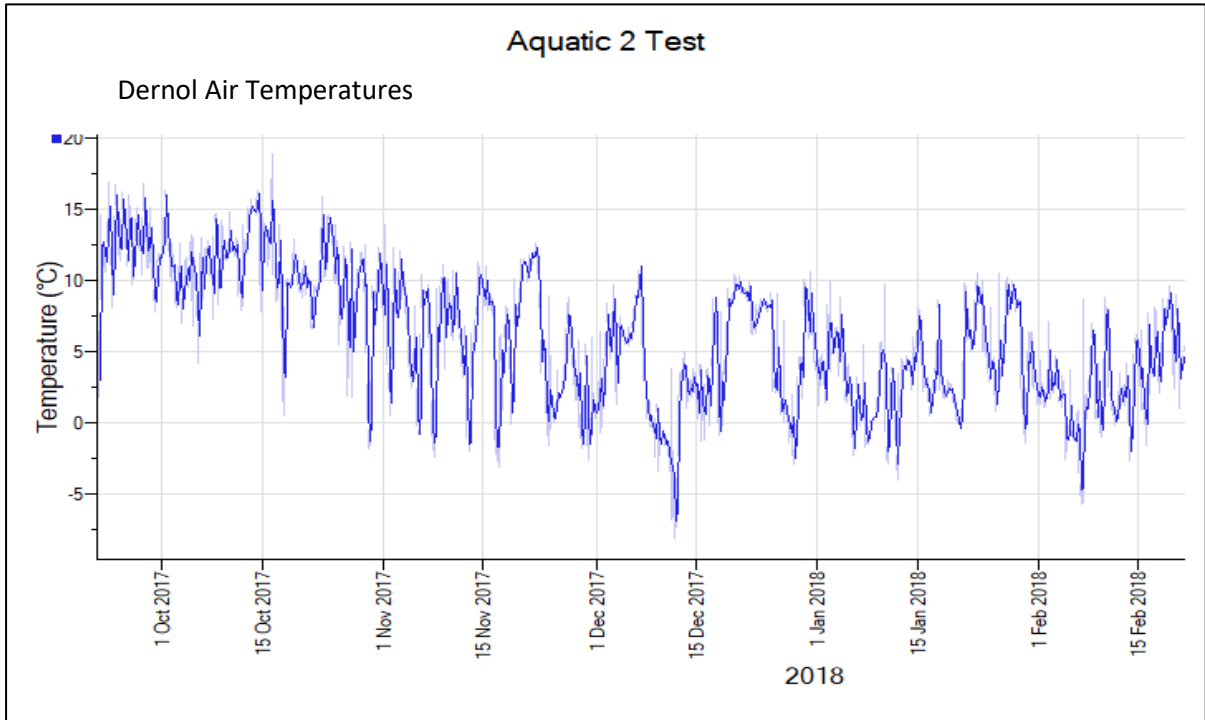
The papers in particular of Emilie Réalis-Doyelle, et al (2016) and Lightfoot, G, et al (2008) refer variously to breeding success and timing and the impact of and sensitivity to higher than normal water temperatures. Suggested maximum for survival of well-formed fry at first food intake was between 6°C and 8°C water temperatures. In one study at 12°C population fell dramatically (0.9% survival rate for well-formed fry at first food intake) and fry had almost no yolk sac at first food intake. At 10°C, there was also a lower survival rate (55.4% at first food intake). At 4°C, the survival rate was high (76.4% at first food intake), but the deformity rate was much higher (22% at first food intake) than at 6°C, 8°C, and 10°C. Lightfoot, G, et al (2008) suggests successful spawning is considered to only occur within a limited temperature range, ie. Below 11.5°C and above 4°C

Studies suggest increased water temperatures were likely to adversely affect other, environmental, factors such as toxicity of many pollutants. The solubility of oxygen in water falls as temperatures rise. Salmonids are a cold adapted species, requiring high levels of oxygenated water, lower oxygen levels and higher temperatures are likely to adversely affect the young stages, which are more sensitive to higher temperatures. The susceptibility of salmonids to pathogens and parasites could also be influenced by higher than normal temperatures. Where a choice is available, salmonids appear to avoid areas with temperatures outside their optimal temperature range spawning zones, Lightfoot, G, et al (2008). Warm temperatures can reduce fecundity, decrease egg survival, retard growth of fry and smolts, reduce rearing densities, increase susceptibility to disease and decrease the ability of young salmon and trout to compete with other species for food and to avoid predation (McCullough, 1999). Elliot and Hurley (1997) defined the lower and upper temperature limits for growth of Atlantic salmon as 6.0°C and 22.5°C, and 15.9°C as the optimum temperature. Crisp (1993) indicated that the species shows signs of stress at approximately 22° C and that upper lethal limits were between 25°C and 28°C.

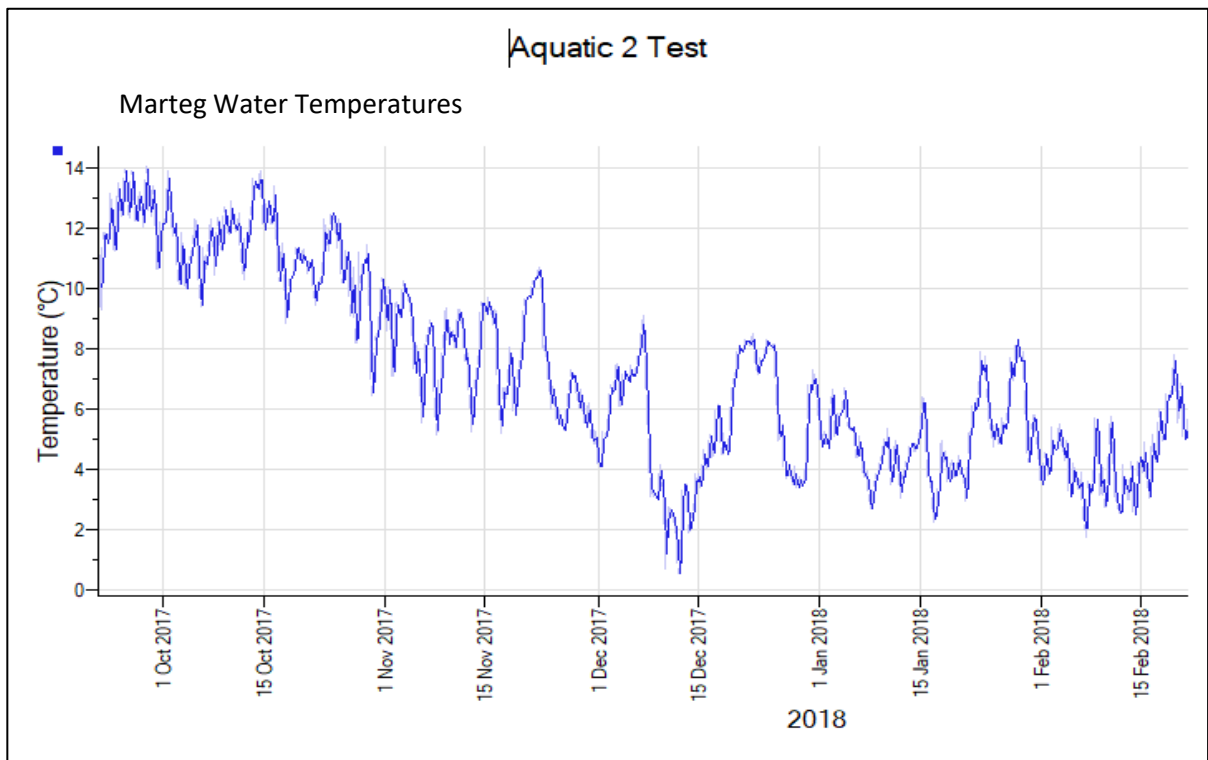
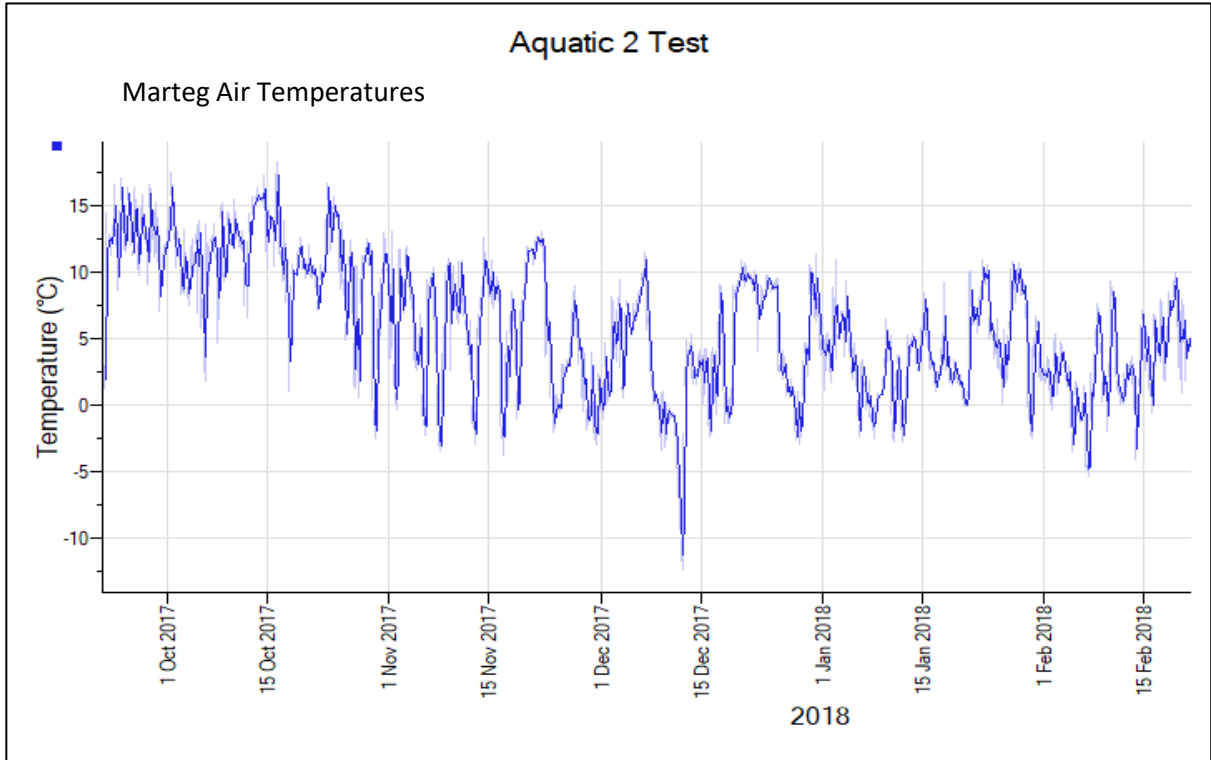
Eggs are described as the most temperature sensitive salmon life stage (Danie et al., 1984). While they thrive at temps as high as 7° C, when temps increase to 12° C there is a substantial increase in fungus, which may lead to mortality (DeCola, 1975). Elliot et al. (1998) found mortality of eggs increases at water temps below 4°C and Peterson et al. (1977) noted very low survival when temps dropped below 2° C. Danie et al. (1984) defined spawning temps as 4.4° and 10°C, while Beall and Marty (1983) found fish would spawn in water as warm as 12°C, but not in warmer conditions.

See attached data charts

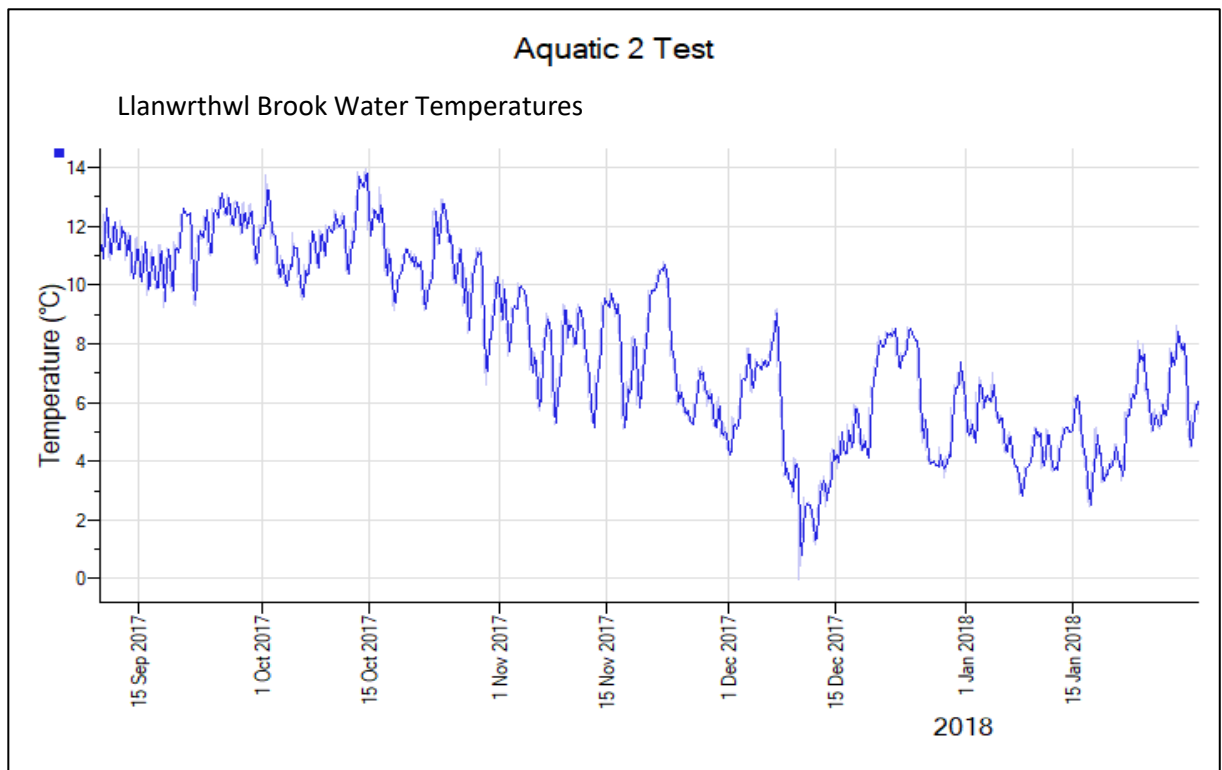
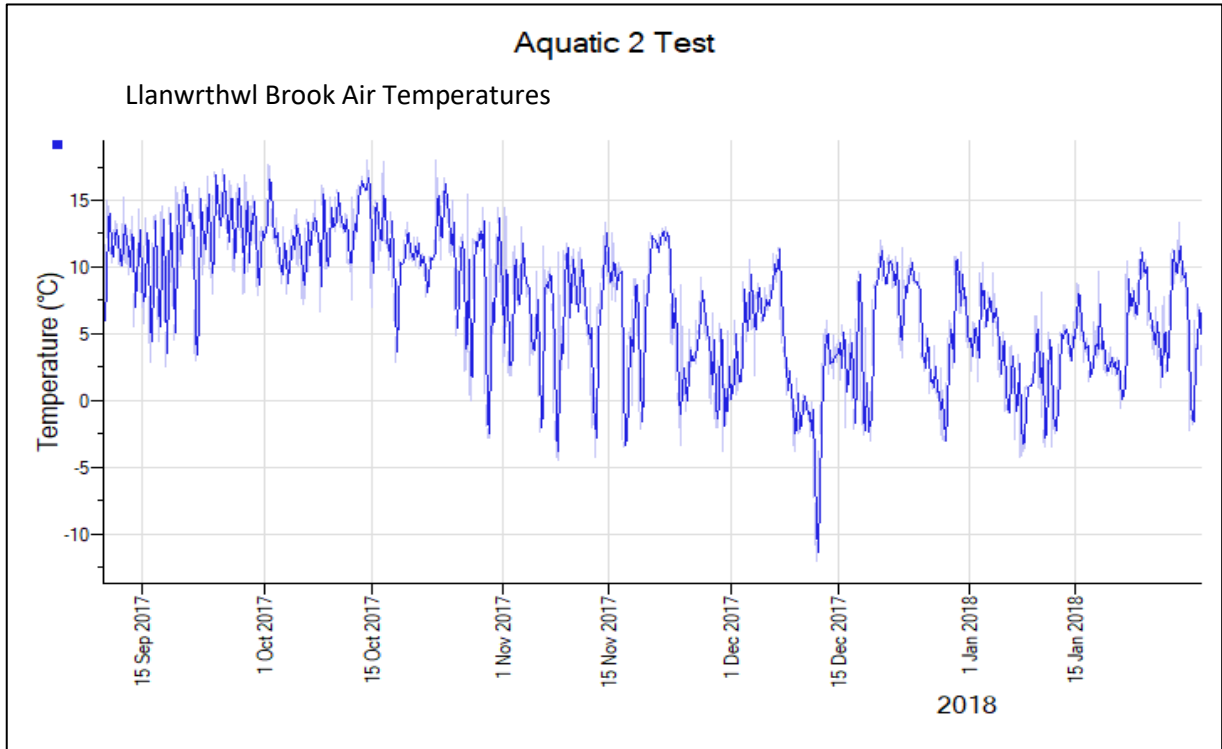
W001 DERNOL



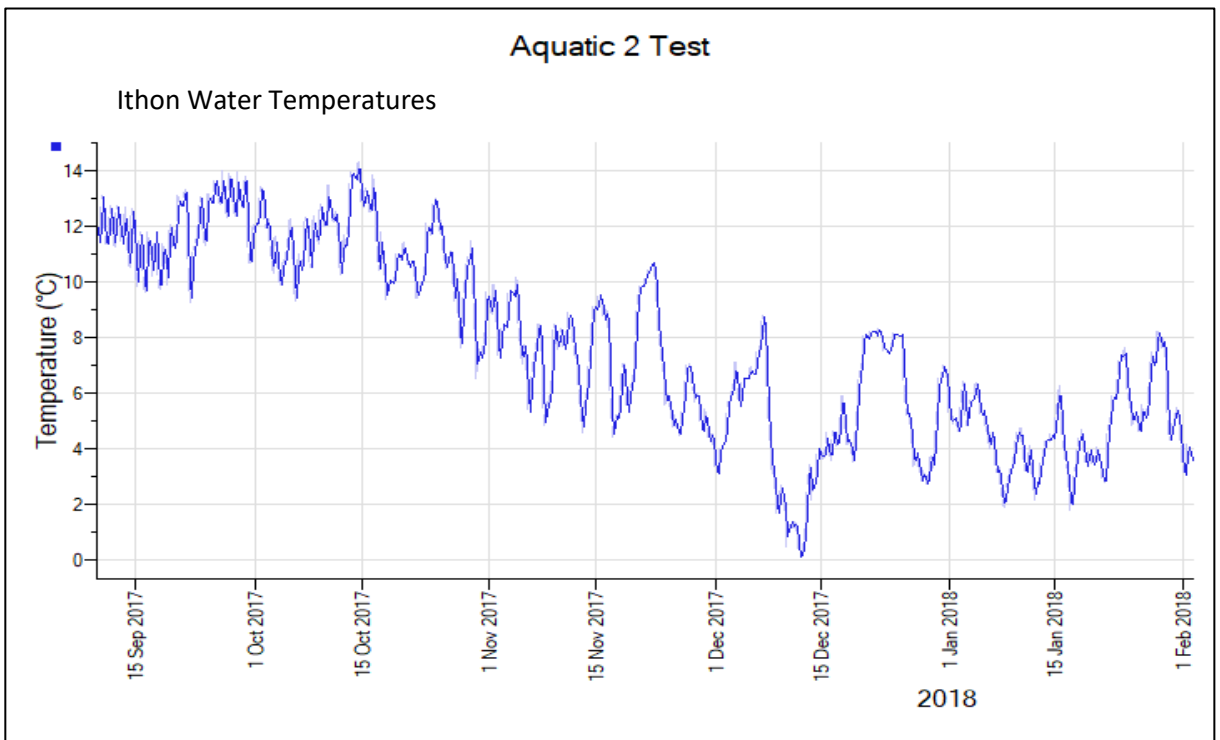
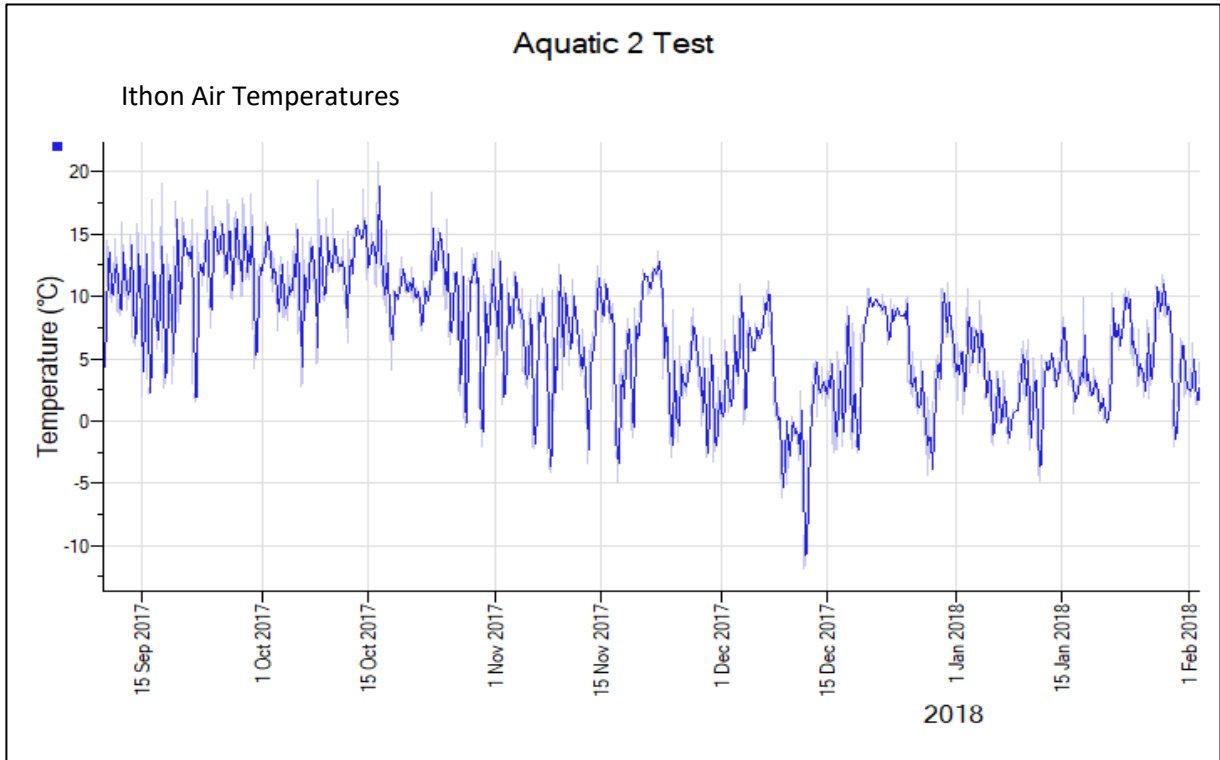
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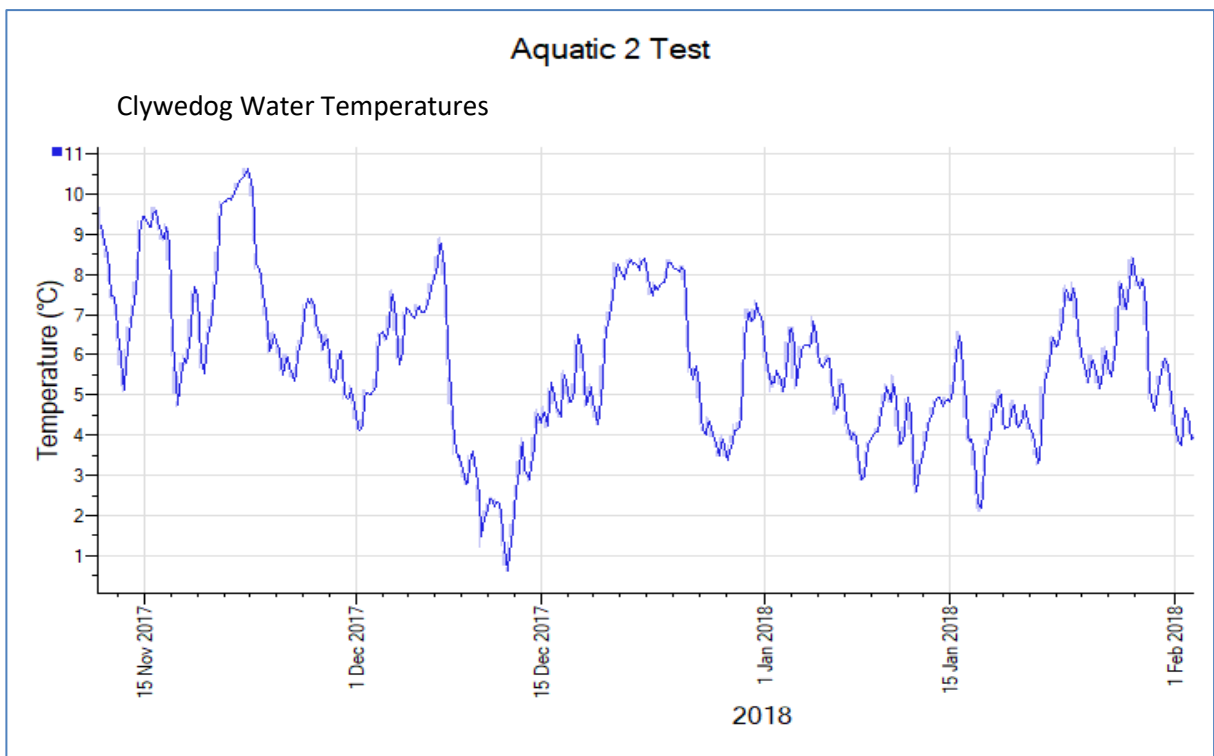
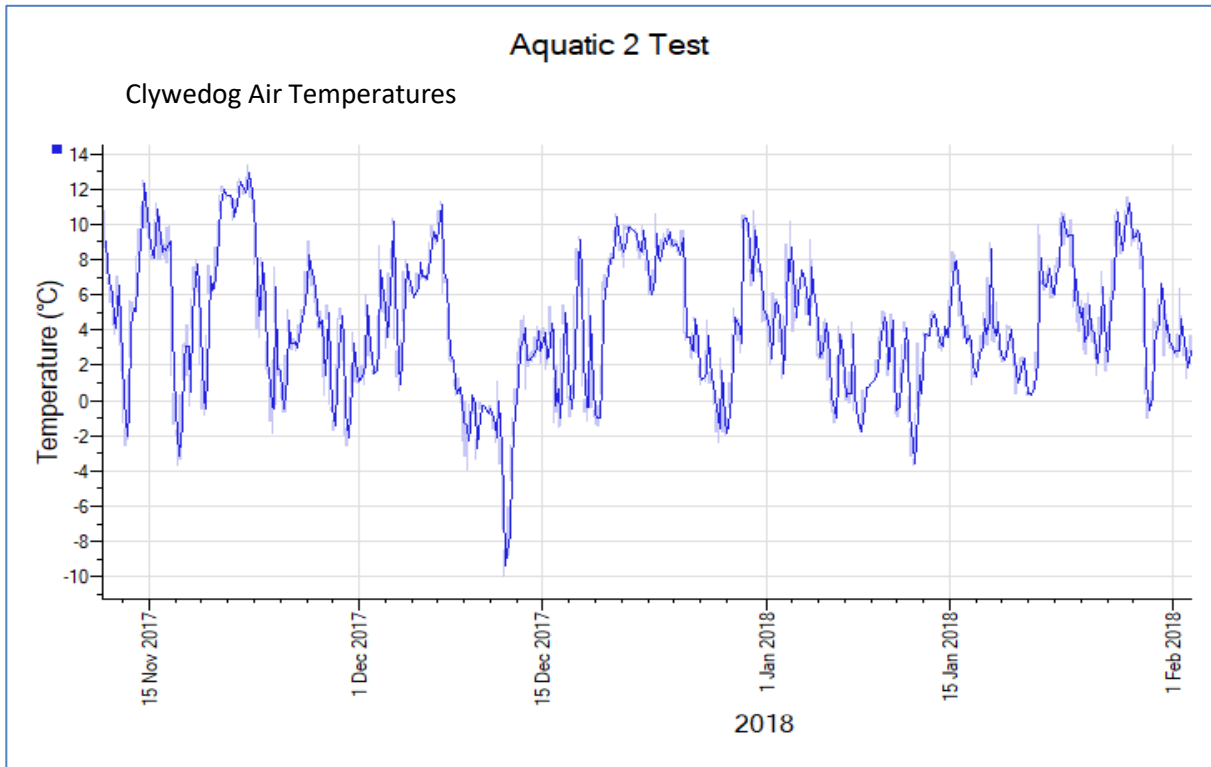
W003 LLANWRTHWL BROOK



W004 ITHON



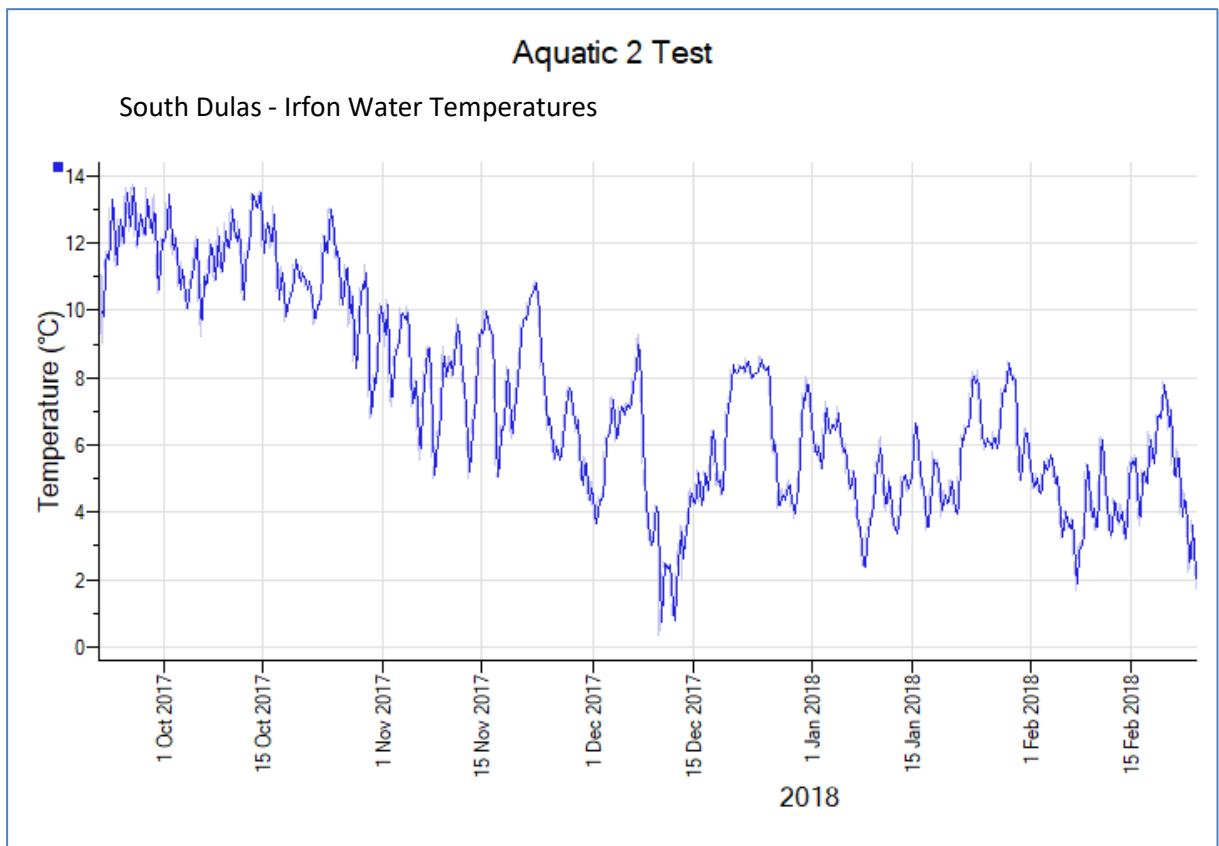
W005 CLYWEDOG [Note! Late recording start due to need to relocate – difficult landowner]



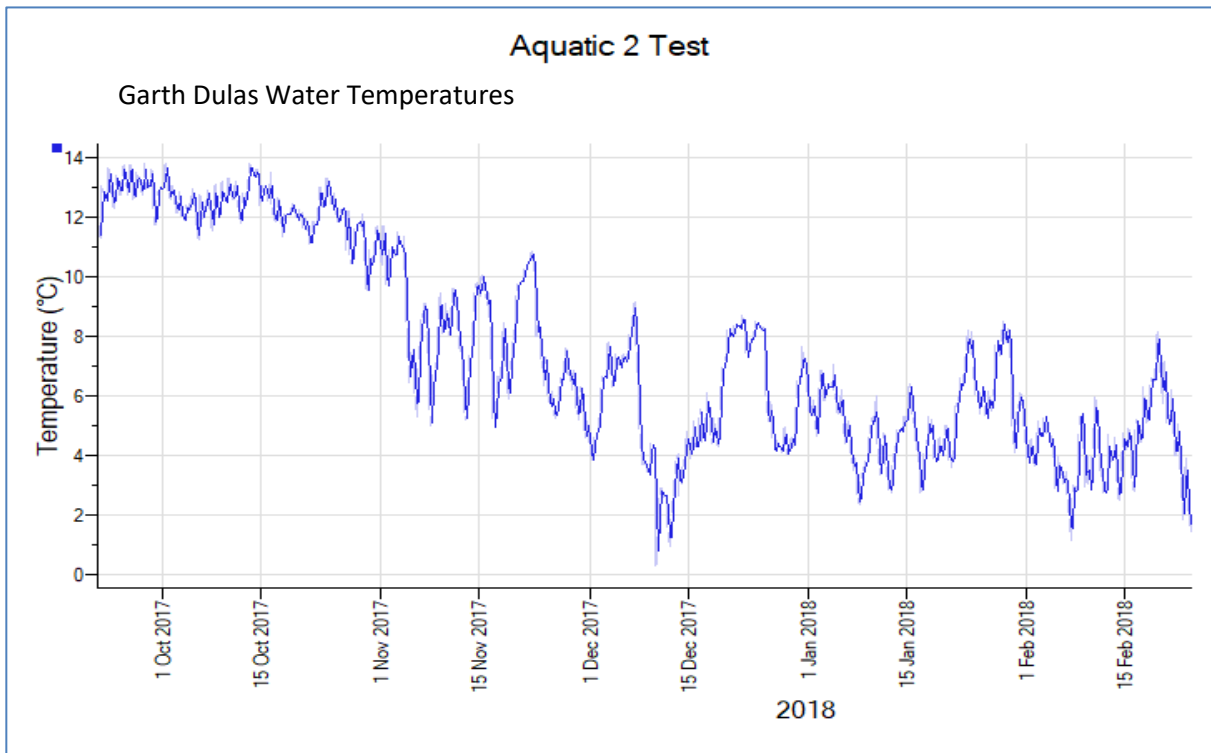
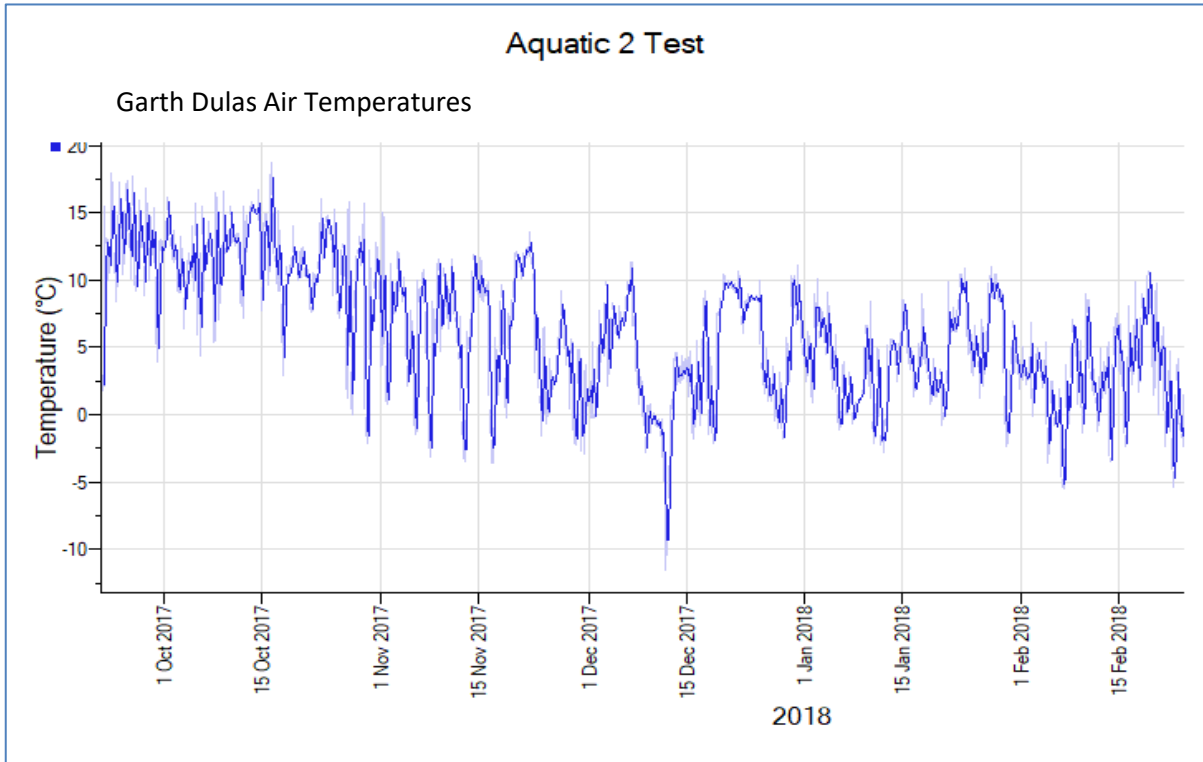


W007 SOUTH DULAS – IRFON

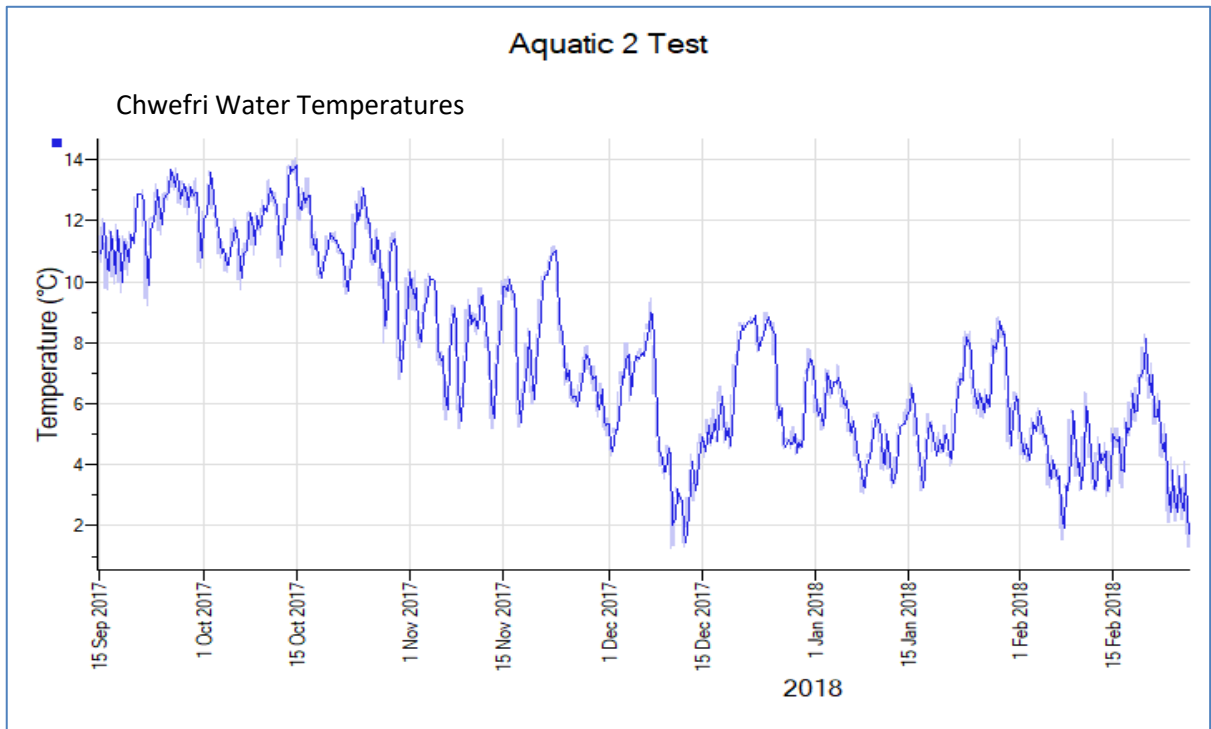
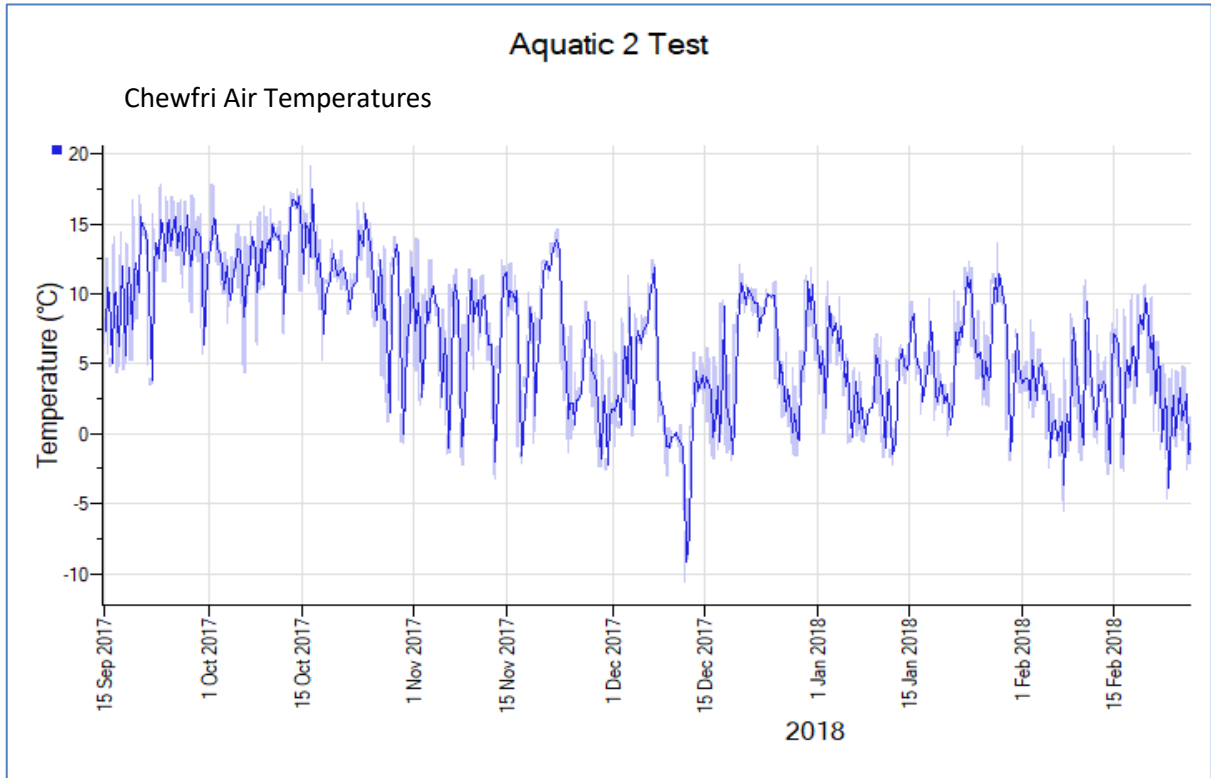
Air logger malfunction – battery failure



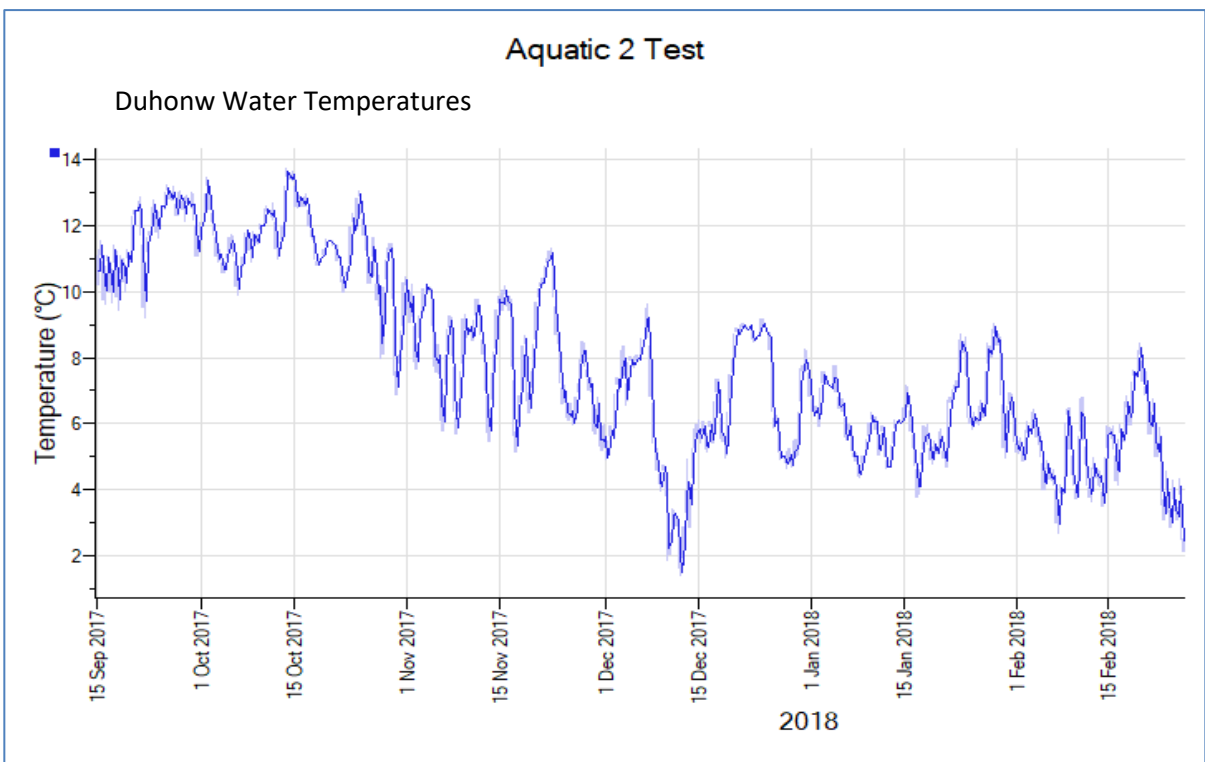
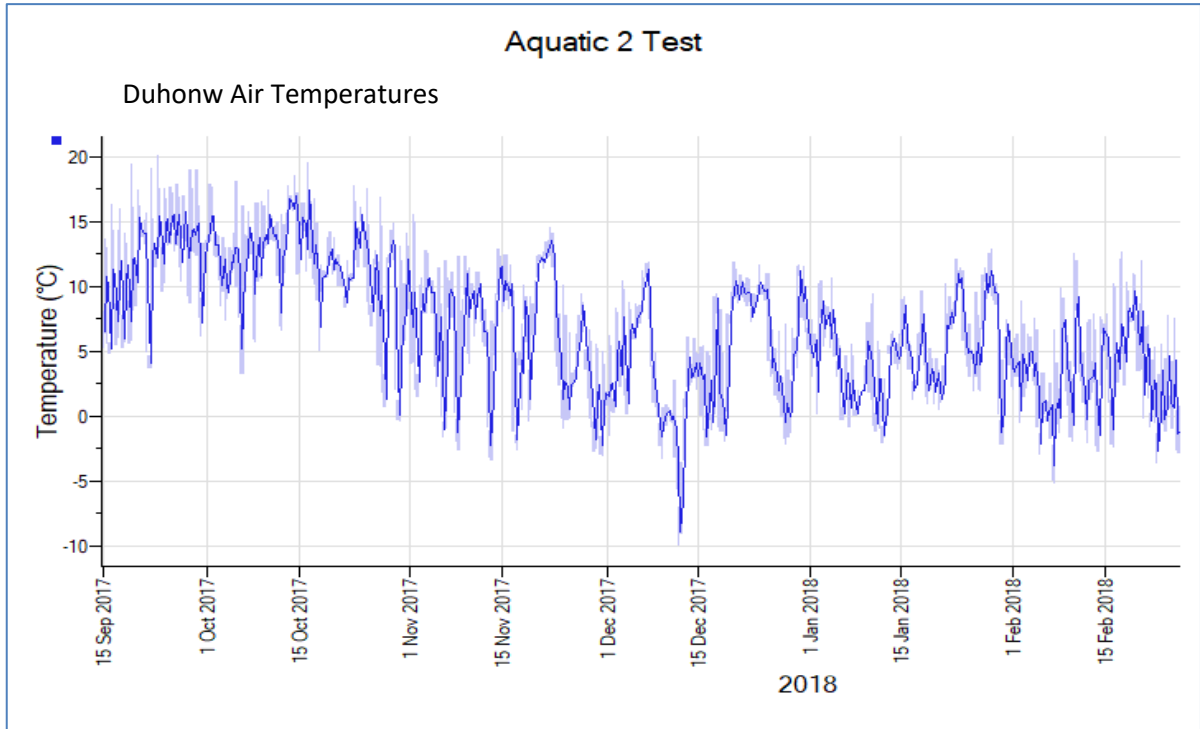
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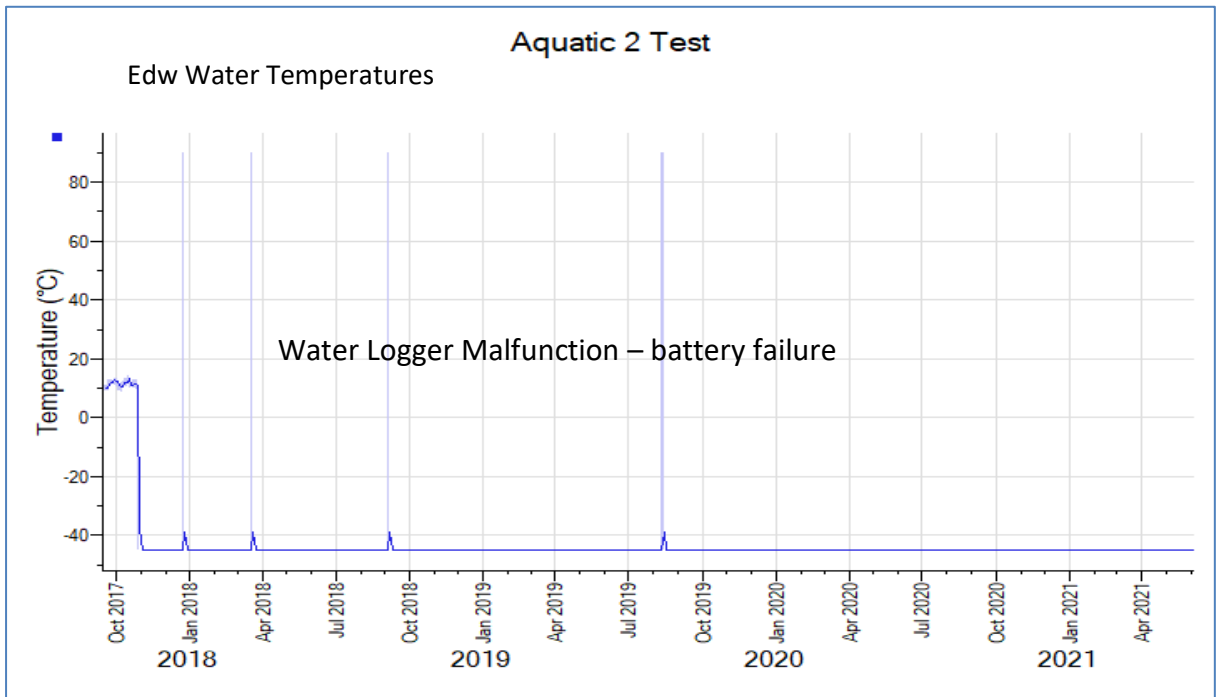
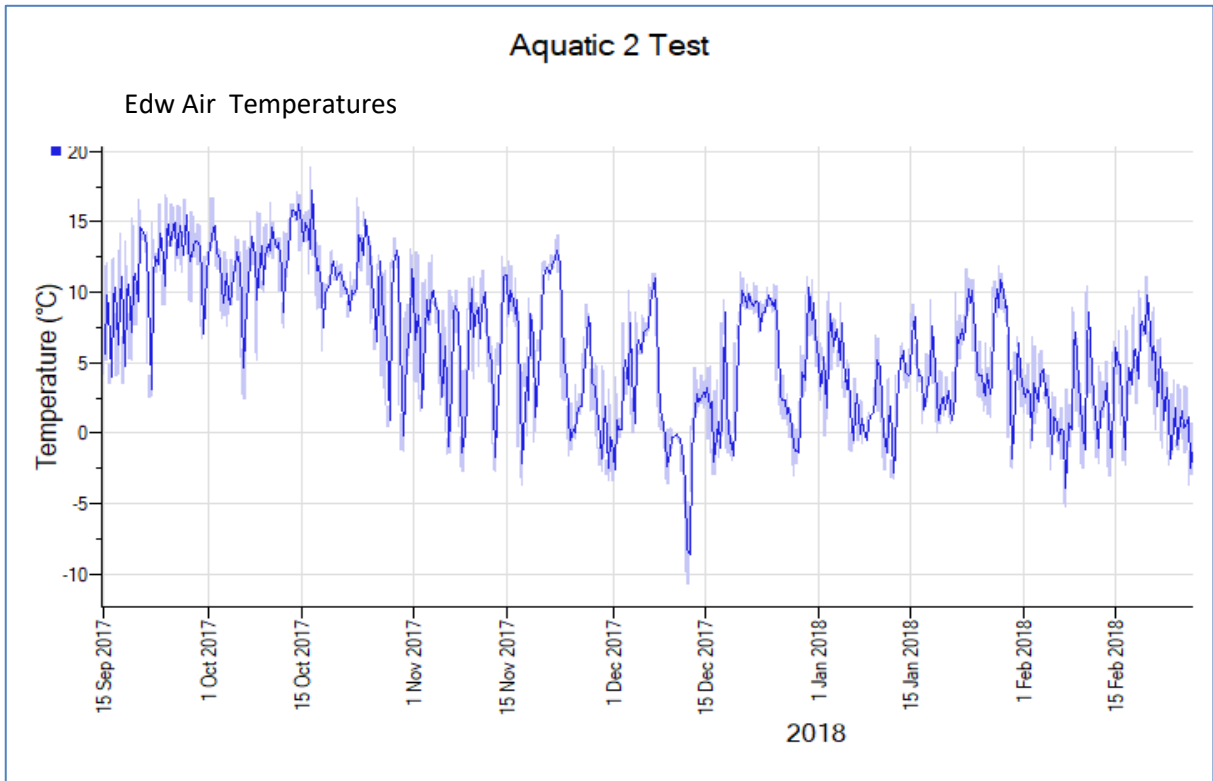
W009 CHWEFRI



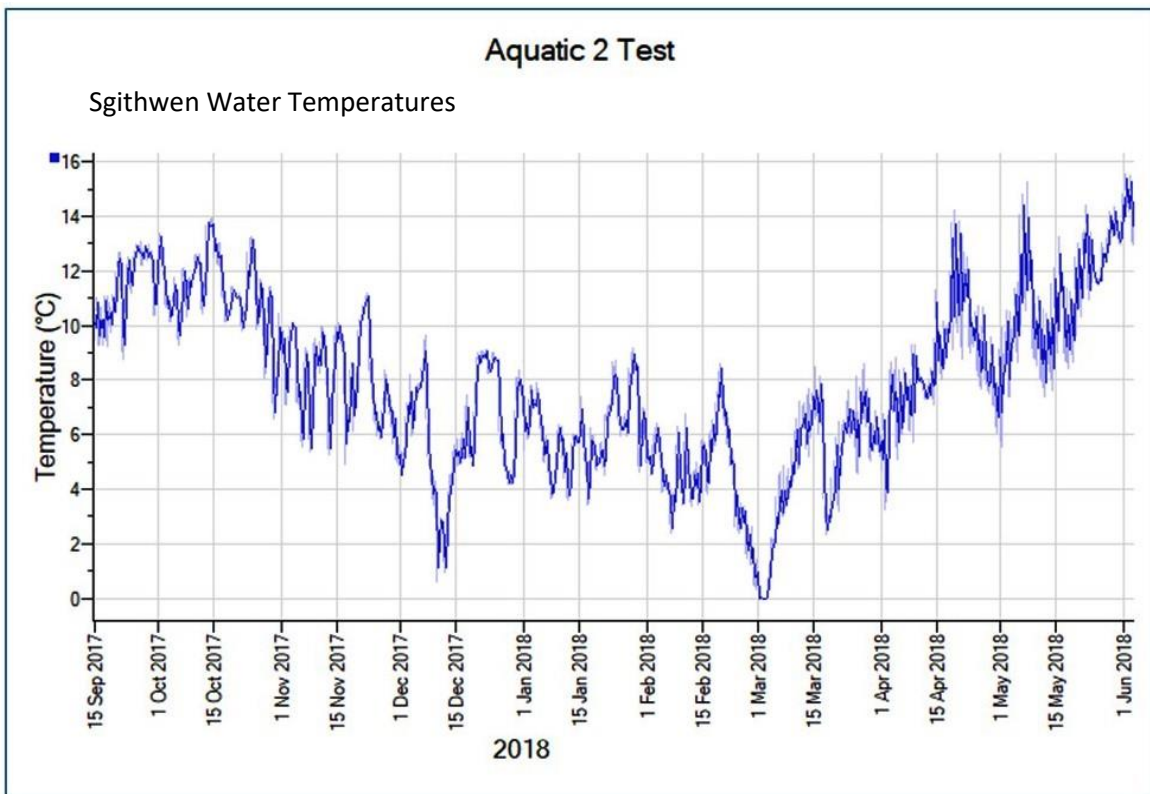
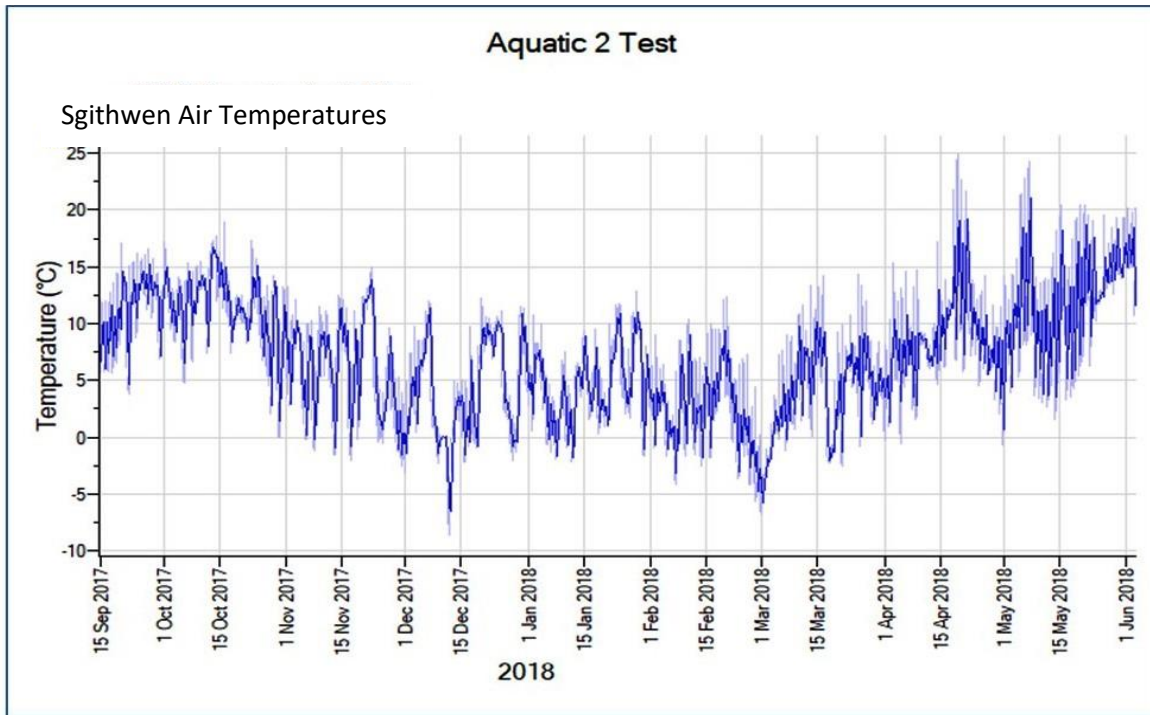
W010 DUHONW



W011 EDW



W012 SGITHWEN



Wye Salmon
Association
Cymdeithas
Eog Gwy

