

Supporting documentation for carrying out buccal swabs on live loggerhead turtles

Introduction

- a) **Objective of the proposed works** (for example, as part of construction of a national road, repair of roofing, undertaking surveys etc.)

The objective of the proposed work is to collect DNA (using non-invasive method of a buccal swab) from 5 live stranded loggerhead turtles (*Caretta caretta*) currently held in Oceanworld Aquarium. The collection of DNA from these turtles will enable the applicant to determine their origin (are they from Florida or Cape Verde beaches). The analysis of the new DNA from the live turtles will be pooled with historical data (DNA extracted from stranded dead loggerheads that have been collected over the past 15 years on Irish beaches and are currently stored in a freezer in UCC).

- b) **Name, qualifications and relevant experience of scientific staff**, including trainees, (e.g. ecologist) involved in the preparation of the application and those responsible for carrying out the proposed activity.

The applicant (**Dr Thomas Doyle**) did his PhD on leatherback sea turtles in Irish waters and since then has been the national coordinator of turtle strandings in Irish waters (This duty has recently passed to IWDG). The applicant is a senior lecturer in zoology and has supervised 9 PhDs to completion. Dr Doyle has 75 publications and a h-index of 38. The applicant works with geneticist **Dr Eileen Dillane** who has carried out extensive genetic work on many different taxa from fish to dolphins and sea turtles. Dr Dillane is a Senior Technical Officer at UCC and supports research and teaching in molecular biology and genetics. Dr Dillane recently led the analysis of DNA samples from the stored loggerhead turtles in UCC.

- c) If this application is for the carrying out of surveys that may cause disturbance, qualifications of all involved must be provided and trainees must be clearly identified.

Non applicable.

2) **Background to proposed activity including location, ownership, type of and need for the proposed activity, planning history, policy context, zoning in relevant Development plan (or equivalent), etc.**

Five live loggerhead turtles (*Caretta caretta*) washed up on Irish beaches in during June and July 2025. These turtles are very small (20 – 30 cm curved carapace length) and are currently being rehabilitated in Oceanworld Aquarium. Loggerheads regularly strand on Irish beaches with 240 recorded sightings/strandings in the United Kingdom and Ireland since the 1910's (Botterell et al., 2020). However, the

stranding of 5 live loggerheads during the summer months is unique with no known previous record. These strandings present a unique opportunity to investigate the natal origins of these 5 turtles. The study proposes to collect dermal epithelial cells from the mouth (as it is carefully kept open for better handling) using a sterile cotton applicator scraping on the tongue and on the palate for approximately 5 seconds (Torres-Rodríguez et al 2017).

The examination of dead loggerheads (n=13) currently held in a UCC freezer will provide context for these live strandings as they may have a different origin as they typically washed-up during winter months.

Context:

Loggerhead sea turtles are the most abundant sea turtle in the North Atlantic and are considered of Least Concern by the IUCN. The two biggest nesting areas are located along the Atlantic coasts of Florida, and at the Cape Verde islands. In Florida, females nest during the months of April to September and then after birth, juvenile loggerheads enter the North Atlantic Subtropical Gyre (NASG) via the southern Gulf Stream (Carr 1986; Mansfield et al. 2014). These juveniles are passively transported around the Atlantic and towards the Azores, the Canaries and west coast of Africa which are considered important juvenile developmental grounds for loggerhead sea turtles. After an unknown time (years), these juveniles migrate back to the Caribbean and north American coastline where they remain in neritic waters. Several years later they start breeding near their natal beach (Varo-Cruz et al. 2016).

Juvenile loggerheads can become cold stunned due to the lower water temperatures ($<15^{\circ}\text{C}$). This especially occurs in the more northerly regions such as off the west coast of north America and in Irish, French and UK waters during winter months. The cold water causes hypothermic stunning, with the turtle experiencing a range of effects, including hypoxia, lethargy, and paralysis (Innis et al., 2019). Cold stunning commonly causes 100s of strandings annually in areas such as Cape Cod, USA (Rankin-Baransky et al., 2001). Areas such as Cape Cod are close to loggerhead turtle migration pathways and receive large quantities of strandings annually. However, loggerhead turtle strandings are much less common in Irish waters.

There have been >240 recorded sightings/strandings of loggerheads in Irish and UK shores since the 1910's (Botterell et al., 2020). Most loggerhead turtles found stranded are juvenile turtles, but some larger individuals are also found. It is thought that storms and extreme oceanographic events cause loggerhead turtles to enter Irish waters (Monzón-Argüello et al., 2012). The number of loggerhead turtles sighted/stranding each year varies but is typically only one or two. However, in some years larger numbers can wash up (e.g. 5-10). Most strandings occur in the winter months (from November through to April) when animals are more likely to be cold

stunned and get caught by storms. In terms of the origin (i.e. the natal beaches from which the turtles come from), there has been no research on Irish turtles. However, a study by Monzón-Argüello et al. (2012) found that loggerheads from UK and French beaches originated from west coast of America (Florida beaches) and the Cape Verde Islands.

During June and July 2025, five live loggerhead turtles washed up on Irish beaches. These turtles are very small (20 – 30 cm curved carapace length) and are currently being rehabilitated in Oceanworld Aquarium. The stranding of five live loggerheads during the summer months is unique with no known previous record.

Full details of proposed activity to be covered by the derogation (including a site plan). The site may be inspected by an NPWS representative, so the details given should clearly reflect the extent of the project. This information will be used to compare site conditions with the Method Statement.

The live turtles are currently held in Oceanworld Aquarium (Dingle). Dr Doyle and Dr Dillane will use a cotton swab to collect epithelial cells from the mouths of the turtles with assistance from Oceanworld staff. The procedure will take no more than 5 minutes for each turtle from capture, handling and use of cotton swab. Once the swab is collected the turtle will be returned to the tank.

For the dead stranded turtles in UCC freezer, a small piece of muscle tissue (approximately 3 x 3 mm) will be taken from each specimen using a scalpel.

Evidence to support the Derogation Tests

Test 1 - Reason for Derogation:

- i. There should be a clear explanation as to why a specific reason(s) has been selected in the application form.

The reason for this derogation is “For the purpose of research and education (Test 1d)”. Knowing where the five live loggerheads (and the 13 historically collected turtles) came from, is of scientific interest and wider societal interest. Scientifically it is important to understand where these turtles came from because we want to know more about the migratory patterns of juvenile turtles to help protect them. For decades the migratory pathways of juvenile turtles (known as ‘the lost years’) has puzzled scientists, but recent satellite studies have tracked juvenile turtles from Florida and demonstrated that they migrate towards the Azores and Europe (Mansfield et al. 2014).

The public are interested in knowing where these turtles came from. Seeing a turtle washed up on an Irish beach raises many questions but ultimately, where did they

come from. Knowing which natal area they came from, is hugely important information that can be relayed to the public.

b. Test 2 - Absence of Alternative Solutions

i. Applicants must list the alternatives to the proposed activity that have been considered, including the do-nothing alternatives in a clear and objective manner. A basic requirement is that these alternatives should be compared in terms of their impact on the species subject to strict protection. It should be clear to NPWS officials as to why the chosen approach has been selected.

There is no alternative to the collection of buccal swabs from these turtles other than 'not doing it'. If we chose that option, we would have lost an important opportunity to learn more about the migratory pathway of juvenile loggerheads (especially in an Irish context). Furthermore, the choice of using buccal swabs to collect DNA is a non-invasive technique that will minimise any impact.

c. Test 3 - Impact of a derogation on Conservation Status

i. Applicants should include details of the population at the appropriate geographic scale and an evaluation of how the proposed activity will affect the conservation status both before and after mitigation measures have been applied.

The loggerhead turtle is the most abundant turtle in the North Atlantic with healthy populations of loggerheads found at Florida and Cape Verde Islands. These populations were considered 'low risk-low threats' during the most recent global conservation status review (Wallace et al. 2025).

ii. Full and detailed descriptions of proposed mitigation measures that are relevant to the potential impact on the target species. Evidence that such mitigation has been successful elsewhere should be provided, where available.

Buccal swabs have been used to successfully recover DNA from loggerhead sea turtles. For example, Torres-Rodríguez et al. (2017) used this method in Colombia. They found that the method of tissue collection was effective, fast and an economic alternative to obtain good quality DNA. they described the technique as a non-invasive method that is advantageous over invasive procedures, with possibly less damage to an individual.

Monitoring the impacts of the derogations

a. Applicants must include details of how they propose to verify whether the derogations have been implemented correctly and whether they achieved their objective, using scientifically based evidence, and, if necessary, how the applicant will take corrective measures where required.

A report will be submitted to the NPWS on the collection of DNA via buccal swabs, the number of turtles and with supporting photographs. Details of the recovery rate of DNA will be presented.

b. Applicants should provide details of proposed reports to be submitted to the NPWS including the results of monitoring.

A report will be submitted to the NPWS on the collection of DNA via buccal swabs, the number of turtles and with supporting photographs. Details of the recovery rate of DNA will be presented.

References:

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