

Description of the Northumberland IFCA Periwinkle Fishery

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Summary

This report brings together current knowledge on the Northumberland periwinkle fishery, including activity levels and extent, potential impacts of activity, discussing stakeholder views, and potential management options.

Periwinkle gathering occurs on rocky shores throughout the Northumberland IFCA (NIFCA) district both commercially and recreationally. It is an unregulated fishery with no requirements to be a commercial picker. Commercial gatherers sell their catch to local wholesalers who export the majority to Europe.

NIFCA, through the MPA assessment process, have recognised the knowledge gaps that exist for this fishery. To address these gaps, NIFCA have reviewed studies and carried out survey work to understand more about this fishery, its spatial extent and its impacts. NIFCA routinely monitor collection activity and have identified areas of higher collection pressure throughout the district. At current levels, it is unlikely that collection is affecting periwinkle populations or rocky shore communities however, it is difficult to determine this without a full assessment of the stock.

The existing national and regional legislation in place has been summarised and options for regional management put forward. For this fishery, a permit scheme is recommended as it will regulate the fishery and improve the information held on the amount of periwinkle removed from collection locations in the district.

Introduction

Background information on Periwinkle

The periwinkle (*Littorina littorea*), known as the common or edible periwinkle, is found around the coast of the United Kingdom (Moore, 1937; Smith & Newell, 1955), it is distributed on all coasts however is rarely found in the Channel Islands and Isles of Scilly (Cummins et al., 2002; Jackson, 2008).. It is the largest British periwinkle species reaching a maximum height of 52mm (Reid, 1996) though normally does not exceed a height of approximately 35mm (Cummins et al., 2002). *L. littorea* distribution spans from Northern Spain to the White Sea in Northern Russia. They are found on North Atlantic coasts of Western Europe and Northeast America (Fretter & Graham, 1962; Jackson, 2008).

L. littorea are found on a variety of intertidal habitats including rocks, stones, and gravels. They can also be found on softer sediment such as mud and sand, they are one of the only littorinid species to be found on both hard and soft substrates (Bandel, 1974). However, they are most commonly found in rocky intertidal areas, with a vertical range extending from the high-water neap tide level to the extreme low water spring tide level (Moore, 1937).

L. littorea can reach densities of hundreds of individuals per square metre; in the UK densities are normally <200 per square metre (Norton et al., 1990). They prefer a more complex rugose shore offering increased protection against predation and exposure at low tide (Carlson, 2006) and are often found in clusters in crevices or rockpools (Newell, 1958).

L. littorea is an omnivorous grazer and is highly selective in favour of the foliose ephemeral green algae *Ulva lactuca* and *Enteromorpha intestinalis* (Cummins et al., 2002). Their grazing activity can significantly modify intertidal habitats by altering the distribution and abundance of algae on rocky shores and converting soft-sediment habitats to hard substrates through the removal of sediments bound by algal cover (Bertness, 1984). Due to their role as bioengineers, harvesting of periwinkles can have negative impacts on the intertidal environment as well as reduce the prey availability for birds and fish (Tinlin-Mackenzie, 2018, Crossthwaite et al., 2012).

L. littorea normally have a life span of 5-10 years, though one individual reached over 20 years in an aquarium (Woodward, 1913 as cited in Cummins et al., 2002). Periwinkles reach maturity at around 2-3 years depending on environmental conditions (Jackson, 2008). *L. littorea* are annual episodic spawners capable of breeding all year round (Williams, 1964; Jackson, 2008). The majority of spawning occurs in March and April (Grahame, 1975) however in the UK can occur from January to June (Cummins et al., 2002), with significant variation in spawning time in different geographic locations depending on food availability and exposure (Fish, 1972). For more information on periwinkle reproductive life history, please see Northumberland IFCA Periwinkle Ecology and Size of Maturity Study¹

Size at maturity can vary based on geographic location (Figure 1), maturity is thought to occur 12-18 months after settlement. Estimates of shell length at maturity range from 11-17 mm. In Northumberland, there is an absence of localised data on size at maturity, however, estimates

¹ NIFCA Report: Periwinkle Ecology and Size of Maturity Study. Harvey, 2021

from a study by Robson & Williams (1971) indicates it is likely periwinkles in Northumberland mature at >15mm shell length (Harvey, 2021).

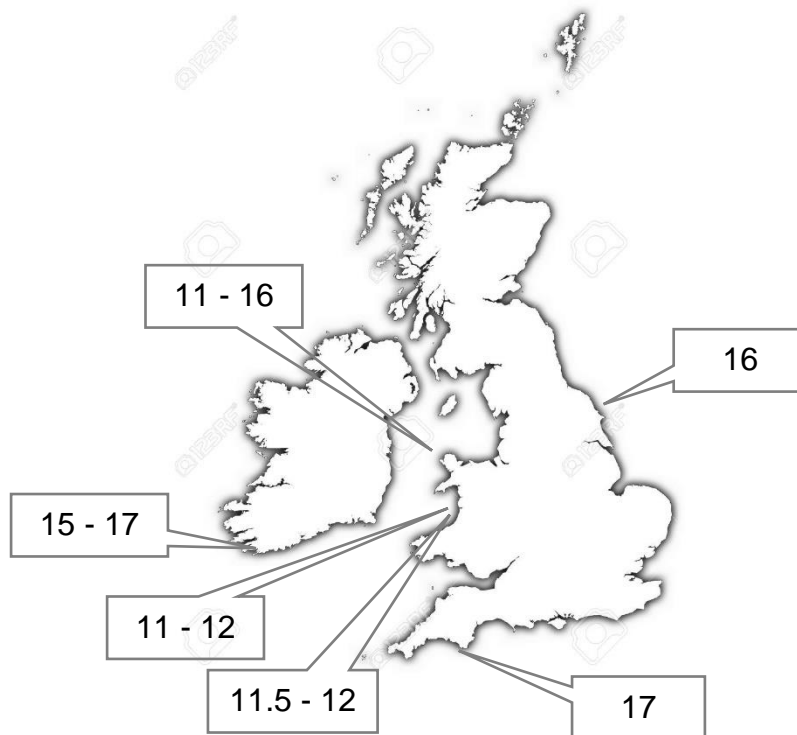


Figure 1 Geographical variation in periwinkle size at maturity (shell length in mm) in the UK and Ireland. Studies referenced in Table 2.

Northumberland IFCA Periwinkle Fishery

Periwinkles can be harvested from the shore when uncovered by the tide. Harvesters will hand-pick the target species from the shore, collecting them into buckets, this can involve turning rocks, cobbles or boulders. The activity occurs both recreationally and commercially on rocky intertidal areas up and down the Northumberland Coast.

France, the United Kingdom and Ireland are the countries with the most important gastropod fisheries in Europe, accounting for over 90% of catches between 1979–1996 (Leiva & Castilla, 2001). Periwinkles are one of the most harvested species and are mainly exported to Europe, predominantly France and Spain (Cummins et al., 2002). The market value of the periwinkle fishery in England is unknown (Tinlin-Mackenzie, 2018) though was estimated at £5 million in Ireland in 1994 (Pearson, 1994 as cited by Cummins et al., 2002). It is difficult to accurately assess the size of periwinkle fisheries as they are unregulated, under reported, and often black market in nature (Cummins et al., 2002; Crossthaite et al., 2012). There is a peak in price and

demand at Christmas with more intense harvesting, however periwinkles are harvested year-round with summer demand from restaurants in France (Crossthwaite et al., 2012).

There are currently no regulations in place to control the quantities of periwinkles harvested. There are no requirements to be a 'picker' or harvester and as such it is an unregulated fishery. There is a difficulty in gathering information regarding the periwinkle fishery on the Northumberland Coast due to its 'black market' nature. Harvester and wholesalers are reluctant to provide information for fear of economic or regulatory consequences.

A PhD study was conducted by Tinlin-Mackenzie (2018) on intertidal collection within the Berwickshire and North Northumberland Coast (BNNC) European Marine Site (EMS) which covers a significant proportion of the NIFCA district from Alnmouth to north of the Scottish border. The study found periwinkle harvesting occurs throughout Northumberland, with Seahouses and Berwick popular collection sites probably due to the proximity of wholesalers there. In general, there was a southerly skew to collection activities due to the higher population density in the south of the district. Summer was the peak periwinkle collection season and spring tides were favoured. The average mass taken by each collector was 12.14kg, with collectors often filling several large sacks. 45% of collectors were commercial and harvest more intensively, for longer durations and at greater frequencies than recreational gatherers. Overall, Tinlin-Mackenzie estimated that over 3 million periwinkles are removed from the BNNC EMS every year and the estimated economic value of the fishery is £133,982.

NIFCA officers record sightings of intertidal hand work activity observed during routine patrols when a site visit coincides with low water (± 2 hours). Sightings have been recorded since 2016, these sightings have been mapped to produce charts showing areas of high, medium and low collection.

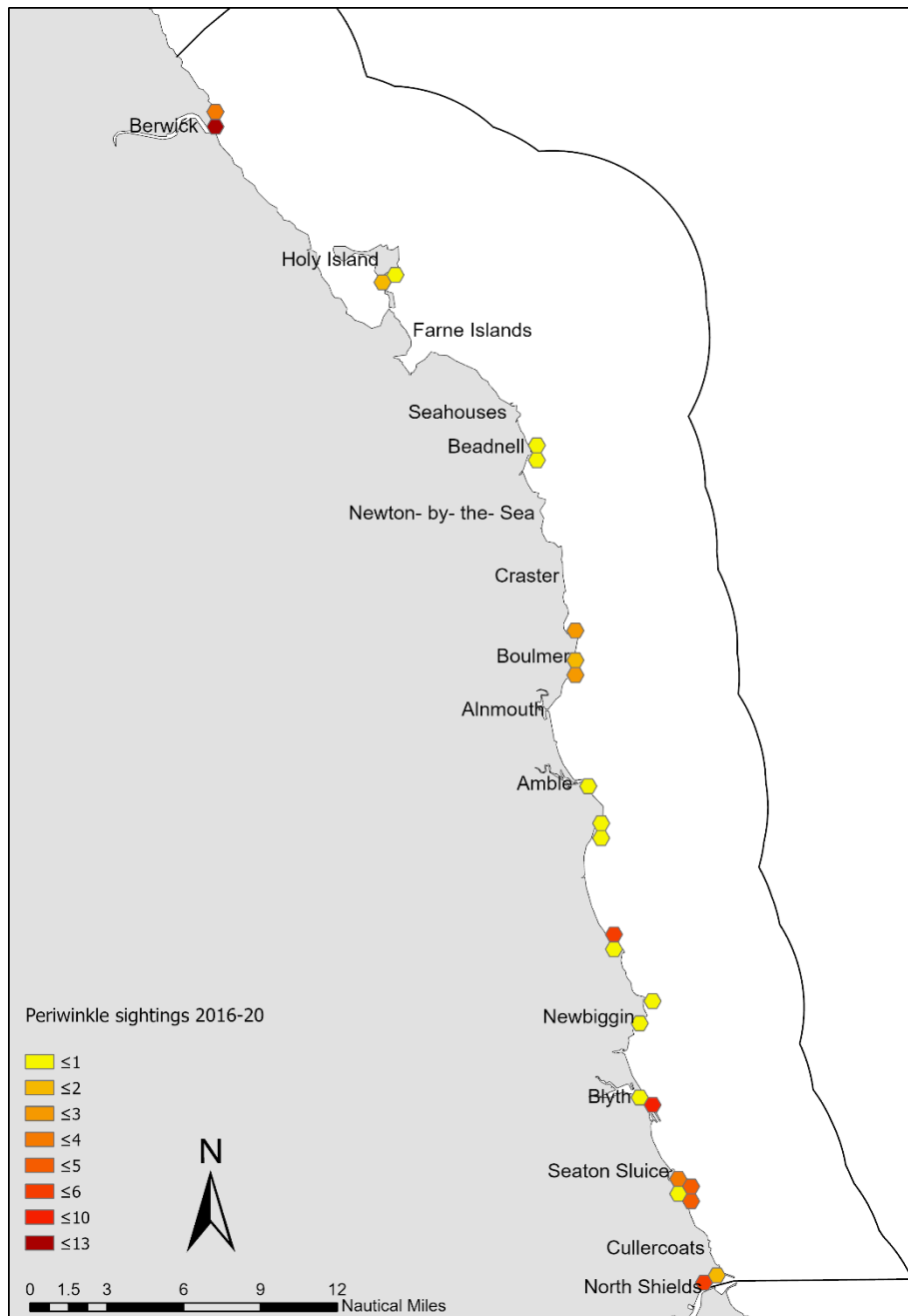


Figure 2 NIFCA sightings of periwinkle gathering from patrols in 2016-20.

Gathering information on where and when this activity is occurring has allowed NIFCA to define areas of higher collection pressure. These areas or ‘hotspots’ include Berwick, Holy Island, Boulmer, Cresswell, Cambois, and St Mary’s Island (Figure 2). Periwinkle collection is recorded on 27% of patrols throughout the whole district, in areas of high collection pressure this percentage increases particularly at Berwick where it is recorded on 70% of patrols, significantly more than at other hotspot areas.

Periwinkles harvested on the Northumberland Coast go through wholesalers at Berwick-upon-Tweed and on to France. The price offered per kilo depends on both size of periwinkle and

present market demand. Prices offered to gatherers varies but is usually around £1/kg for small, £2/kg for medium and £3/kg for large, this can increase to £5/kg for large size classes around Christmas. Commercial collectors will collect periwinkle by hand, as described above, into 'onion' sacks which hold around 25kg of periwinkle. Wholesalers report that they return the discards to a suitable area of rocky shore through trusted collectors and fishers. Periwinkles are also sold privately through internet sales on sites such as Facebook. This makes monitoring the fishery extremely difficult.

Anecdotal evidence from officers talking to collectors out on the coast suggests that gatherers do not target the same shore every time they gather. Rather, they 'cycle' through shore. One gatherer said he starts in Berwick and goes down the coast as far as Boulmer, so there are often 3-4 weeks in between targeting the same shore.

Impacts of the activity

Target species

Collection of periwinkles involves removal of target species from their natural habitat which could have an impact on periwinkles population abundance and periwinkle size. A study of the direct effects of periwinkle collection including boulder turning and trampling using simulated harvesting methods has been conducted by Crossthwaite (2012). The study found no effect of experimental periwinkle harvesting or simulated disturbance on periwinkle abundance or body size over a 12-week period.

Periwinkle size in areas subject to differing collection pressure was compared by Tinlin-McKenzie (2018) to previous studies (Morell 1976; Quigley, 1999). On the most heavily collected shore studied (Boulmer) the largest shell height had not decreased suggesting harvesting periwinkles had not led to a reduction in maximum shell height over the last 50 years. There is no correlation between periwinkle size and density and harvesting pressures at current exploitation levels (Tilin et al., 2010). Natural variation in density between shores due to factors such as habitat selection is likely to have a greater impact than that of harvesting (Gendron, 1977).

Periwinkle densities on Northumberland shores have been found to vary based on collection pressure but with different directions of difference. Quigley (1999) found densities of periwinkle to be higher on 2 out of 3 shores with 'high' collection rates when compared to adjacent shores with 'low' collection rates. Relatively high densities may have been sustained due to dispersive larval recruitment from other shores (Jackson, 2008) or refuge areas.

Crossthwaite (2012) found that long-term exploitation did significantly affect population abundance and age structure. Exploitation levels may be higher in these study areas, which are in Northern Ireland where periwinkles are heavily exploited at around double that of the Northumberland Coast (McKay et al., 1997; Tinlin-McKenzie 2018). This represents a smaller level of collection on the Northumberland Coast compared elsewhere in the UK and Ireland, although this doesn't necessarily mean a smaller impact.

The most recent local studies conclude that collection is unlikely to be impacting periwinkle size and population abundance in Northumberland (Quigley, 1999, Tinlin-MacKenzie, 2018, Harvey, 2021).

Impacts on intertidal communities

Physical damage to flora and fauna from boulder turning and trampling disturbance can cause a reduction in habitat stability and reduced biodiversity (Berthelon et al., 2004, Davenport and Davenport, 2006). This can damage under-boulder communities which require stable boulder habitats. It can also adversely impact organisms that depend on upper rock surfaces, such as seaweeds (Liddiard et al., 2011). Reduction in habitat stability from boulder turning can be lethal to fauna, algae, and under-boulder communities through crushing, smothering and desiccation (Berthelon et al., 2004).

Reduction in species composition through trampling can reduce biodiversity, abundance, and biomass (JNCC and NE, 2011). It can lead to a higher percentage of bare rock with a decrease in algal cover (Tyler-Walters, 2008; Liddard et al., 2011). These effects can be seen at low trampling with long term impacts (Povey and Keough, 1991). These impacts are variable, dependent upon intensity, duration, and frequency of the trampling (JNCC and NE, 2011).

These disturbances can negatively alter community structure, they vary spatially and temporally (Berthelon et al., 2004) and most severely impact long lived sedentary species that are slow to reproduce (Berthelon et al., 2004).

Periwinkle removal can have indirect effects on community composition through impacts to predators, prey, and/or competitors of periwinkles (Quigley, 1999). Periwinkles are key grazers within rocky intertidal communities and are a key species for the classification of various biotopes therefore changes in frequency or abundance could change community composition (JNCC, 2014). A reduction in abundance could alter this role as both predator and prey for birds and crab

(Buschbaum, 2000). Evidence of changes in abundance of other species following exclusion of periwinkles has been documented (Buschbaum, 2000; Pertraitis, 1989; Cervin and Aberg, 1997) with some species increasing and others decreasing.

Although previous studies show direct impacts of rocky shore disturbance, the impacts can be difficult to predict locally. Natural England commissioned a study investigating the scale, locale, and ecological impacts of harvesting intertidal species including periwinkles (Tinlin-McKenzie, 2018). Results found that periwinkle collection does not appear to be negatively impacting rocky shore floral and faunal communities at current intensity levels. Quigley (1999) reported that between shores in Northumberland with different collection pressures ('collected' and 'uncollected') two out of three sites showed no significant difference in non-target animal mean abundance. Therefore, the local evidence available (Tinlin-McKenzie, 2018; Quigley, 1999) suggests that periwinkle collection, at current levels, does not appear to be negatively impacting rocky shore floral and faunal communities in the ways described above.

However, literature from other areas of the UK suggest the most significant potential impacts appear to be on non-target rocky shore dwelling plants and animals which experience physical disturbance from human activities (Berthelon *et al.*, 2004; Crossthwaite, 2012). The hydrodynamics along the Northumberland Coast is variable, in more exposed areas wave and wind naturally turns some small boulders/cobbles. Thus, intertidal and infralittoral communities subject to this natural disturbance will be more resistant to disturbance pressures than communities in sheltered areas. Overall, the Northumberland intertidal rocky reef is subject to naturally high levels of physical disturbance and recovery of rocky reef communities is predicted to be medium (Mieszkowska and Sugden, 2014).

Northumberland IFCA Periwinkle Study

Building on the foundations of the research previously carried out in the region, NIFCA develop a monitoring survey to better understand the impacts of collection on periwinkle density and size, and impacts on wider intertidal communities. The survey methodology and results will be described briefly here, for more information see the Periwinkle surveys report². NIFCA surveyed five known periwinkle collection hotspots (Berwick-Upon-Tweed, Boulmer Haven, Cresswell, Holy

² NIFCA Report: Periwinkle surveys 2020-21. Harvey, 2021.

Island and St Mary's Island) within the district every two months (when possible, due to Covid-19 restrictions) from June 2020 until April 2021.

Each survey comprised a quadrat survey and a timed search. The shore was split into 'high', 'medium', and 'low' shore areas with five quadrats and one timed search carried out at each shore height. All flora and fauna within each quadrat were identified and counted (or percentage cover estimated), all periwinkle were counted and measured. Timed searches were carried out for set time periods (10 minutes) targeting crevices, under boulders, and rock pools. All periwinkle collected were counted and measured.

The results after one year of surveys suggest there is no correlation between collection pressure and periwinkle abundance. However, on the shore with the highest collection pressure (Berwick) the abundance of periwinkle was lowest (Figure 3). Collection pressure here was double that of other shores surveyed.

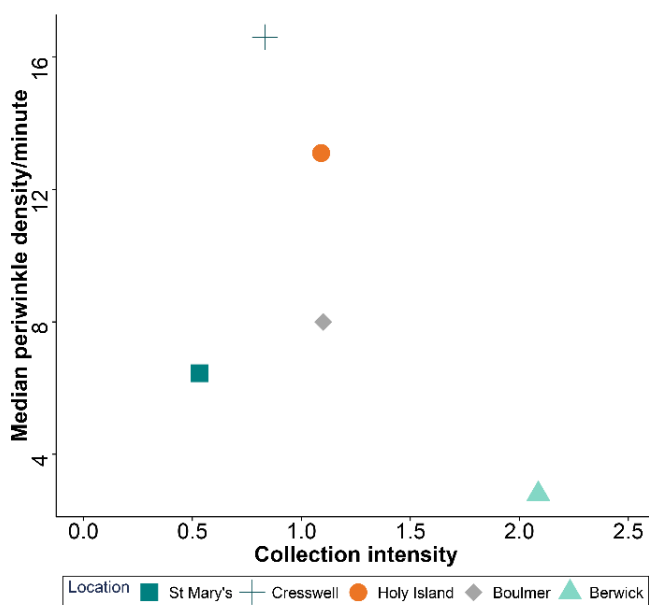


Figure 3 Median periwinkle density per minute from timed searches, correlated with collection intensity, measured as the average number of collectors seen on patrol at each location.

Periwinkle abundance is positively correlated with cover of gravel. The survey found increased numbers of periwinkle on shore with a higher percentage of gravel cover. Periwinkle density was not significantly related to cover of other substrate types.

Periwinkle size varied between locations but did not appear to be related to collection intensity. The survey found size was, however, negatively correlated with periwinkle density: shores with higher densities had lower average sizes.

The survey also looked at whether collection pressure is having an impact on species that make up the rocky shore community. Overall, neither animal nor algal abundance, species richness or diversity is correlated with periwinkle collection intensity. Algal composition and abundance, and faunal species richness and diversity varied significantly across the different locations and differences recorded are likely to be factors of the differences in environmental conditions at each site.

Periwinkle harvesting at current levels in collection hotspots within the NIFCA district, does not appear to be negatively impacting periwinkle populations or other rocky shore communities. Environmental variation in terms of substrate cover and other factors likely have a greater impact on periwinkle densities than collection pressures, however it should be noted that Berwick does have particularly low densities of periwinkle and should be monitored over time for changes in both collection pressure and periwinkle density. Periwinkles are generally resilient to localised impacts due to their ability to recolonise from larvae which disperse widely in the sea, therefore harvested populations could be maintained from uncollected populations elsewhere. Indirect impacts of periwinkle harvesting were also not detected in this study and would be indistinguishable from other users of the rocky shore.

Impacts on birds

Periwinkle collection could impact estuarine and coastal bird species through disturbance pressure or through removal of their prey source. Periwinkles form a component part of the diets of estuarine and coastal birds. This section discusses potential impacts of collection on protected bird species on the Northumberland coast, the majority of protected bird species in the region spend the majority of time out at sea and are unlikely to be impacted by intertidal collection activity.

Food availability

Purple sandpiper and turnstone are protected features of the Northumberland rocky shore, periwinkles form a component part of the diets of both species. The diet of turnstones is extremely diverse ranging from coastal invertebrates, small fish, carrion, unattended eggs of other avian species to human garbage (Nettleship, 2000). They congregate at high tide to roost on the mainland shore or continue to feed on banks of washed-up seaweed on the strand line.

Turnstones have been observed changing their food preference depending on food availability for example feeding on dipterans in the strand line at high tide, then amphipods as the tide goes out (Harris, 1979). Given the varied diet of turnstones, with periwinkles reported to be a small proportion (Harris, 1979), it is unlikely that the collection on periwinkles will significantly impact turnstone food availability.

The purple sandpiper's diet is less varied almost entirely restricted to rocky shore species (Feare, 1996). Analysis of the gut contents from eastern and northern Scotland showed that most of the diet at low tide consisted of molluscs, particularly littorinids (winkles), but also *Mytilus edulis* (mussels), *Nucella lapillus* (dogwhelks) and *Rissoa interrupta*. crustaceans, annelids and algae are also eaten (Summers et al., 1990). The importance of periwinkle in their diet has been observed around the UK (Feare 1966; McKee, 1982) with very small sizes preferred. Dierschke (1993) found that the largest shell height found in purple sandpiper stomach contents was 3mm. This is significantly smaller than the size targeted by hand gatherers (12mm minimum market size). Given the disparity in preferred sizes between purple sandpiper and periwinkle gatherers, and the conclusions of local study suggesting that collection at current levels is not impacting adult periwinkle abundance, it is unlikely that the collection of periwinkles will significantly impact purple sandpiper food availability.

Periwinkles are component parts of the diet of other local species. Eider ducks are known to feed on periwinkles however they are not considered an important food source (Leopold et al., 2001) with eider preferentially targeting bivalve molluscs such as mussels and cockles. They may switch to a more periwinkle focussed diet if there are food shortages elsewhere (Leopold et al., 2001)

Disturbance

Given the nature of periwinkle collection, it has the potential to cause disturbance to roosting or feeding birds. Collectors are present on the shore for an average of 2-3 hours over low water (Tinlin-McKenzie, 2018), therefore will only impact on the feeding activity carried out over this period and should not impact birds as they roost, or feed, at high tide. Further, periwinkle collection is one of a number of activities occurring in intertidal areas along the coastline. Any disturbance pressure from this activity is likely to be compounded by other, mainly recreational, activities.

Public concerns

Northumberland IFCA receive correspondence from members of the public reporting this activity. The majority of responses are received from people concerned about the levels of activity they see and the associated impacts. The majority of the correspondence is for the Berwick area, with reports of 12+ gatherers on one tide.

NIFCA ran a public 'Call for Information' to understand the thoughts and opinions of stakeholders in relation to both bait collection and hand gathering activity (including periwinkles). This includes information on current activity levels, whether they have any concerns about these activities, and

whether they think management options should be explored. A total of 33 responses to the Call for Information were received, two respondents collected periwinkle recreationally with no further comment. 19 responses were from people who had witnessed collection of periwinkles. They were concerned about the scale of the collection, the commercial nature, and the impacts of this collection on the local environment. This is in line with the independent correspondence NIFCA have received from the public detailed above. NIFCA are working to address public concerns regarding this activity.

Northumberland IFCA monitoring

NIFCA have carried out a literature review and while there is information from this and previous studies from which we can take information, there remains knowledge gaps on this fishery (Table 1).

Table 1 The current knowledge gaps around the Northumberland periwinkle hand gathering fishery, NIFCA actions, and outcomes/results to fill the knowledge gap.

Knowledge gap	NIFCA Aims	Outcomes
Scale and intensity of activity <ul style="list-style-type: none"> - Number of collectors - Area covered in collection - Amount of periwinkle removed 	Liaise with wholesalers / Northumberland County Council / Consider permits	Number of collectors and extent of activity can be inferred from NIFCA intertidal sightings collection system. The amount of periwinkle removed remains a knowledge gap.
Distribution of activity	Record intertidal sightings of activity.	Collection areas categorised: high collection areas include Berwick, Beadnell, Boulmer, Seahouses and St Mary's Island.
Harvest rates (catch per trip/month)	Review literature and liaise with wholesalers.	Some information in Tinlin-McKenzie (2018). The activity has been reported to be higher in summer, with the most activity recorded in August. Collection is higher over spring tides. On average, collectors carry out 5 trips per month, spending 3 hours collecting per trip. They collect, on average, 13.9 kg per trip.
Stock Assessment	TBD	TBD

Impacts on protected features within Marine Protected Areas (MPAs)	NIFCA Periwinkle Survey	No impacts detected at current collection pressure. Monitoring is ongoing.
Size at maturity	Literature review	Size at maturity could be from 11-17 mm. Best estimate for Northumberland coast is 15 mm.
What happens to the discards from the wholesalers	Liaise with wholesalers	Wholesaler information – reports from wholesalers that all undersized periwinkle and any other discards go back to the intertidal area through collectors or other fishers.
Seasonal variation – either in collection patterns or market demands	Review literature and liaise with stakeholders	Some information in Tinlin-McKenzie (2018). Activity increases in the summer months. Market demand increases in the lead up to Christmas.
Target sizes – minimum market size	Liaise with wholesalers. Measure samples at wholesalers to understand sizes targeted and size ranges when sorted.	Wholesaler information – 12mm = minimum market size. Large 17+ mm, medium 14-17 mm, small 12-14 mm.

Intertidal activity

Northumberland IFCA officers carry out regular intertidal activity monitoring surveys which record any periwinkle collection activity sighted. This information can be used to understand the extent of collection activity and infer intensity (Figure 2).

Size at maturity

The 'generally accepted' periwinkle size of maturity or SOM (11 – 12mm) is not evidenced by the available literature, which instead shows that SOM ranges from 11 – 17mm and varies geographically. In the NIFCA district this is likely to be >15mm however this is based on a single study from Yorkshire (Robson & Williams, 1971).

Other studies have used length frequency data to estimate size at maturity by assigning year classes based on length curves (Johnson & McDermott, 2018). NIFCA aimed to do this analysis using measurements taken through the periwinkle survey work however distributions were unable

to be resolved into separate size classes for population modelling because they do not have separate peaks for different size classes. Minimum harvest size should be either based on local, accurate SOM data or a more conservative approach could be to protect all periwinkles in their second year and some in their third, allowing harvesting of individuals >20mm as suggested elsewhere (Johnson & McDermott, 2018).

NIFCA Remit in relation to periwinkle collection

NIFCA has a remit under the Marine and Coastal Access Act to ensure the sustainable exploitation of sea fisheries resources (section 153), this includes commercial and recreational gathering of periwinkles. Further NIFCA must ensure that the conservation objectives of MCZs are met and furthered (Section 154) and that any activities exploiting fisheries resources do not hinder the objectives of MCZs. NIFCA also have a remit to ensure the conservation objectives of other MPAs (Special Areas of Conservation SACs, and Special Protection Areas SPAs) are met.

Regulation

National

There is national and European legislation outlining practice for the collection and sale of shellfish for human consumption. Shellfish is categorised as, Live Bivalve Molluscs (for example cockles and mussels) and Live Shellfish (periwinkle falls into this category). The following applies to all Live Shellfish (and therefore periwinkles):

- Food Safety Act 1990
- Food Safety & Hygiene (England) Regulations 2013
- Food Law Code of Practice (England)
- Food Law Practice Guidance (England) - It is the statutory obligation to treat **food** intended for human consumption in a controlled and managed way. The key requirements of the **Act** are that **food** must comply with **food safety** requirements, must be "of the nature, substance and quality demanded", and must be correctly described (labelled).
- Regulation (EC) No 178/2002 - laying down the general principles and requirements of food law, establishing the European Food Safety Authority and laying down procedures in matters of food safety.
- Regulation (EC) No 854/2004, Article 6, Annex II (as amended) - laying down specific hygiene rules for food of animal origin.

To enact the legislation in place, Northumberland County Council have a registration system which requires wholesalers or collectors to document information about the catch including the location

harvested from, amount collected, and date collected. This information is for the identification of each batch of live shellfish during transport from the production area to a despatch centre, purification centre, relaying area or processing plant.

Under Regulation 853/2004, each batch of LBM / LS that are to be placed on the market (i.e. commercial volumes in excess of 5kgs) must be accompanied by a registration document (unless issued with a permanent transport authorisation) to identify each batch harvested and transported. The registration document must be completed upon landing and accompany the batch from the classified harvesting area, and between establishments, up to and including the arrival of the batch at a relay area, dispatch centre or processing establishment.

Regional

Periwinkles are classified as ‘seafish’ and there is therefore a public right to collect both personally and commercially (Cummins et al., 2002). As a ‘seafish’, commercial collection of *L. littorea* is controlled under fisheries legislation; however, there are currently no regulations in place to control the quantities of periwinkles harvested. Byelaws can regulate the public right to fish, and some IFCAs have periwinkle harvesting regulations in place (see Table 3).

In 2020 NIFCA published a voluntary Periwinkle Gathering Code of Conduct (Annex 1) which is posted at intertidal sites within the district, with guidelines for minimising disturbance to intertidal rocky shores and a recommendation to only collect periwinkles over the minimum market size of 12mm shell length. This has the possible advantages of securing local support and is flexible to changing conditions, however, may have limited success as not everyone is made aware (Tinlin-Mackenzie, 2018). Adherence to the Code of Conduct is unknown and represents a current knowledge gap.

Table 3. Periwinkle collection regulations in the UK

Region/Area	Management	Regulation
Northumberland IFCA	Voluntary Code of Conduct	Guidelines to minimise disturbance, minimum harvesting size of 12mm, returning undersize individuals to area of collection.
Cornwall IFCA	Voluntary Code of Conduct	Winkle Fishing Code of Practice specifies a gatherer should use a riddle with bars spaced at least 16cm, return undersize individuals to the area they were caught, seek landowner’s permission, and have regard for other legislation i.e. SSSI consents.

Devon and Severn IFCA	Byelaw	Minimum harvesting size of 16mm using a gauge with a square opening
North Western IFCA	Byelaw (Legacy – old Cumbria SFC area only)	Only hand gathering allowed, minimum harvesting size of 16mm using a gauge with a square opening
Southern IFCA	Byelaw	Only hand gathering allowed, and closed season from 15th May to 15th September
	Byelaw	Poole Harbour Shellfish Hand Gathering byelaw specifies that within defined areas from 1 st November-31 st March no shellfish of any kind may be removed by any means.
Kent and Essex IFCA	Byelaw	Specifies winkles can only be removed by hand.
Sussex IFCA	Voluntary Code of Conduct	Generic for all hand gathering/bait collection activity – nothing specific to periwinkles
Jersey	Byelaw	Recreational bag limits – 200 periwinkle per day

Many IFCA Byelaws specify a minimum size of 16mm when sorted through a square gauge or riddle with bars, though these are all legacy Byelaws from Sea Fisheries Committees which are older regulations and the justification for the 16mm size is unknown. A 2019 D&S IFCA report states that ‘The size of the winkle (16mm) [in the 1988 legacy Byelaw] was questioned during the call for information phase. It was suggested it should be increased, resulting in a larger winkle size that could be removed legally.’

A Shellfish report on Best-Practice of SFC shellfish byelaws (Wilson, 2009) states that although the evidence behind the 16mm specification is questionable, ‘it is clear that the MLS remains a useful tool for future management and having a specification is better than having an unregulated and unprotected winkle fishery’.

Management of periwinkle fishery

Need for management

Periwinkles are ubiquitous on the UK rocky shore; evidence suggests that in Northumberland exploitation levels are not high enough to cause significant concern to periwinkle populations. There is, however, evidence suggesting that high exploitation levels impact local periwinkle

abundance and size structure (Crossthwaite, 2012). There is also no evidence to suggest that periwinkle collection is having an adverse impact on rocky shore communities at current levels, however the risk to intertidal communities can come from trampling and turning boulders without returning them to their original position. While local evidence on the impact on birds species is lacking, evidence from elsewhere suggests that collection pressure will not impact prey availability. Disturbance pressure may have an impact on birds where their feeding and roosting sites overlap with collection areas, however it is difficult to disentangle disturbance caused by periwinkle collector from other intertidal activities.

Despite work described above, there exists a large knowledge gap: the amount of periwinkle taken from each shore. This knowledge is vital in understanding the wider impacts of this fishery over time and could be a reason to implement management.

Management options

NIFCA officers discussed potential management options across the range of options available from 'Do nothing' to a full prohibition. This allowed us to understand the pros and cons of each measure and which, if any, are needed in this situation. Below is a summary of the pros and cons of each measure and recommendations for management.

Table 2 Advantages and disadvantages of all options for managing periwinkle collection. Options to be taken forward for consideration are highlighted in blue.

Management option	Pros	Cons
Do nothing	<ul style="list-style-type: none"> No resource burden Does not impact any 'gatherer' or wholesaler stakeholders 	<ul style="list-style-type: none"> Potentially not fulfilling IFCA statutory duty Outstanding knowledge gap will not be addressed Commercial fishery will remain unregulated Does not address public concerns
Non-statutory measures		
Code of Conduct	<ul style="list-style-type: none"> Already in place, will monitor for compliance 	
Voluntary Permit Scheme	<ul style="list-style-type: none"> Would generate catch and effort information Would fill a knowledge gap on the fishery Would not affect current collection practice Would not affect wholesaler businesses 	<ul style="list-style-type: none"> Resource and administration burden May not be very high uptake if voluntary
Statutory measures		

Permit scheme	<ul style="list-style-type: none"> • Would generate catch and effort information • Can add other management measures as permit conditions where required • Can differentiate between commercial and recreational collectors and manage accordingly • Would have contact information for collectors making it easier to communicate 	<ul style="list-style-type: none"> • Resource and administration burden • Difficult to identify who needs a permit to implement an effective system • Difficult to enforce • People may be resistant to getting a permit (current black market nature of the fishery) • Could impact wholesaler businesses
Seasonal closures	<ul style="list-style-type: none"> • Could protect vulnerable life history stages • Could protect from all impacts of collection for certain times in the year • Would allow collection to continue • Easy to enforce – wouldn't have to enforce throughout whole year • Offers chance for recovery, if needed • May address some public concerns 	<ul style="list-style-type: none"> • No evidence that this is required • Effort may increase in the open months • Could impact wholesalers businesses
Size limits	<ul style="list-style-type: none"> • Periwinkle will have the chance to reproduce, sustaining the population • Part of the population definitely protected • Other IFCA's/management bodies have this in place already • Familiar provision - already in the Code of Conduct • May address public concerns 	<ul style="list-style-type: none"> • No evidence that this is required • Difficult to enforce on the coast
Catch limits	<ul style="list-style-type: none"> • Can target commercial only sector • Would be effective in reducing numbers taken and therefore pressure on stocks • If combined with a permit scheme, it could be easily changed based on available evidence. • May address public concerns 	<ul style="list-style-type: none"> • No evidence that this is required • Difficult to set a limit • Could impact on wholesaler businesses • Resource burden • Difficult to enforce

Spatial closures	<ul style="list-style-type: none"> • Easy to enforce • Offers protection from any potential impact to an area • Could offer the chance of recovery if needed • Option to rotate areas • Could protect most vulnerable habitats • May address public concerns 	<ul style="list-style-type: none"> • No evidence to suggest that this is required • May be difficult to communicate and confusing to follow • Could displace effort or concentrate it in certain areas • Could impact on wholesaler businesses • Would encompass recreational collectors
Total prohibition	<ul style="list-style-type: none"> • Complete protection from any potential impacts of periwinkle collection • Easy to enforce • May address public concerns 	<ul style="list-style-type: none"> • No evidence that this is required • May not be proportionate or fair • Would remove a potential income stream for some people • Would impact on wholesaler businesses • Unpopular

Conclusions and recommendations

Work carried out by NIFCA in relation to this activity suggests that at current levels periwinkle harvesting is not having an adverse impact on periwinkle populations or the wider intertidal community. Impacts to birds is likely to be small, however further research is required to determine impacts on bird species. These conclusions are drawn from activity at current levels and monitoring of this fishery should continue into the future.

One of the main concerns highlighted in this report remains: the unregulated nature of the fishery and the lack of information on quantities being removed. This remains a knowledge gap and may be a reason to bring in management measures.

Through reviewing management measures the most appropriate option, should statutory measures be needed, is a permit system. This would regulate the fishery, and supply information on catch, effort, and location of the activity. This option has been explored further through speaking to wholesalers and gatherers, however, would be difficult to put in place and enforce. NIFCA officers have discussed this with members of the NIFCA Technical and Scientific committee who, on reviewing the evidence, decided to continue monitoring without statutory management.

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Annex 1 Northumberland IFCA Periwinkle Code of Conduct



Northumberland IFCA Periwinkle Gathering Code of Conduct

PURPOSE

Collecting periwinkles in large numbers has the potential to damage seaweed and animals found on the rocky shore. Bird life can also be harmed by taking their food resources and causing disturbance.

To reduce these impacts **the guidelines listed below should be followed** by any person removing periwinkles. These guidelines apply to the coastline from the River Tyne to the Scottish border.

GUIDELINES



1. Do not create unnecessary disturbance:
 - rocks that are moved to search for or collect periwinkles should be replaced,
 - Care should be taken not to damage or displace any living organism.
 - Avoid bird disturbance in important feeding and resting areas.
2. Only collect periwinkles above 12 mm (minimum size taken by local wholesalers) to avoid taking juvenile periwinkles.
3. Sort out and return small periwinkles (under 12mm) as close as possible to area of collection. Northumberland IFCA recommends using a sieve or riddle constructed of rigid mesh or bars spaced at least 12 mm apart to separate out smaller winkles.
4. Periwinkles should be measured across the height of the shell from tip to tip (see diagram).
5. Only collect edible periwinkles and no other similar looking species (see guide below).

EDIBLE PERIWINKLE GUIDE

Periwinkles are usually black/ dark grey-brown in colour with a white interior around the mouth

They are usually around 2-3 cm high

They have a smooth or slightly ribbed shell which extends to a pointed tip.



Northumberland IFCA will monitor the collection of periwinkles to check whether the points listed above are followed. If they are not, this may result in the application of statutory measures.

For more information please visit: www.nifca.gov.uk

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