



## Inshore Fisheries Information Booklet

### Introduction

The Falkland Islands are economically a fishing nation, with around 40% of the nation's GDP resulting from marine resource extraction, primarily in the form of squid and finfish. All commercial fishing is currently conducted offshore, with limits set at three nautical miles beyond the territorial baselines. The shallow marine environment/inshore waters of the Falkland Islands are also incredibly productive. Despite this, and despite there being provision for inshore fisheries through the Inshore Fishing Regulations of 1988, there is currently only one inshore fishery: Eagle Inshore Limited which targets and captures the snow crab (*Paralomis granulosa*, called centollon in Chile) at the south of the East Island.

Aside from some recreational harvest, very little exploitation of inshore resources has occurred in the Falklands. But in an era of encouraged diversification and economic expansion, harvest of commercially viable species should be considered. Numerous species found within the shallow waters of the Falklands are harvested elsewhere in the world, particularly in southern Chile. In some instances this harvest, elsewhere, has been shown to be sustainable, but in others it has led to local extinctions. Consideration of a species' life history and analysis of fisheries management success elsewhere can help ensure that any extraction of species in Falklands' waters is done in such a way that the resource continues to produce a viable population so as to avoid loss of biodiversity and to ensure future yields.

This report presents nine species found between high tide and 20 meters depth around the Falkland Islands. Some information on their life histories is presented when known, their harvests elsewhere, and some recipe suggestions.



### Rough thorn drupe/caracole (*Acanthina monodon*)



*Acanthina monodon* reaches a maximum size of 6cm. A large tooth projects from the outer lip of the shell. The species is found on rocky substrates from the intertidal to a depth of approximately 20 m. The species feeds on other molluscs, particularly bivalves. Evidence from Chile suggests that they primarily feed during the night. It has separate sexes, reaches sexual maturity at shell length of 3cm, and lays its eggs on rocky substrates.

### Magellanic copper limpet/lapas (*Nacella magellanica*)



This large-bodied limpet is found in the intertidal and shallow subtidal environments, usually associated with bare rock. It is common in Chilean and Argentinian Patagonia, and the Falkland Islands. Sexes are separate and display external fertilization.

Evidence suggests that this species is relatively common in the Falkland Islands, but densities and life history parameters would need to be determined before commercial extraction. It may have potential as an aquaculture species, though artificial feed may be required.

The rough thorn drupe has a taste similar to crab or lobster or, some suggest, Caribbean conch. This species is not currently being harvested in Chile or elsewhere. Therefore, this lack of a consumer base may make this a difficult species to market.

Recipe suggestions for this species include all those that use Caribbean conch, for example: salad, chowder, ceviche or fritters (<http://www.keysfisheries.com/restaurant/recipes/conch/>).

Both the limpets within the *Nacella* genus and the keyhole limpets (see below) are known as "lapas" in Chile. They have been commonly extracted and consumed in the southern part of the country for thousands of years. *N. magellanica* can be found on nearly all intertidal rocky shores in the Falklands, although not in estuaries with low salinities. It can be found in high densities within some areas.

These species are frequently consumed by people in coastal regions of Chile. The product is generally eaten in empanadas but also included in stews or soup, or fried with butter, garlic and herbs. For some recipe suggestions visit (<http://www.theworldwidegourmet.com/recipes/3-limpet-recipes-3-madeiran-classics/>).

## Keyhole limpets/lapas (*Fissurella* spp.)



These large limpets are characterised by a hole in the top of their shell. They inhabit the intertidal zone to depths of 50m. Five species within this genus have been identified within the Magellanic region. *Fissurella* graze on

algae within their rocky habitats and display separate sexes.

Although they are relatively common within the Falklands, they have not been studied here, until now. They have been better studied elsewhere, such as in Chile. For example, *Fissurella maxima* in Chile has been found to be relatively fast growing and has been found to achieve 10 years of age in northern Chile. Higher latitude populations (such as the Falkland Islands) are likely to have a slower growth rate due to lower temperatures.

See above for recipe ideas for these species.

## Striped clam/almejas (*Eurhomalea exalbida*)



*Eurhomalea exalbida* is a large (10+ cm) clam that is grey in colour and characterised by growth ridges on its shell. Individuals are slow-growing and have been known to attain ages up to 70 years. They are found in shallow waters in sheltered sandy bays. It is found throughout southern South America, and is considered a commercial resource in the Beagle Channel. Research here has suggested that increased fishing pressure may shift

populations to a more productive yet stable state with a greater share of young, small, faster growing animals. However, this would require careful control to avoid over-exploitation.

Within the Falklands, this species can be found in relatively high abundance. However, the reproductive age and growth processes of the Falklands population would require further study.

As with similar clam, or almeja, species, this species can have a relatively high yield of meat and is suitable for cooking in various recipes. It is delicious in a chowder, or *a la parmesana* (similar to Machas a la parmesana – a very popular dish in Chile). For more recipe ideas visit:

<http://www.bonappetit.com/recipes/slideshow/clam-recipes/?slide=1>

### Ribbed mussel/cholgas (*Aulacomya atra*)



This large (up to 20 cm) black mussel is distinguishable from other mussel species by the grooves running the length of the shell. The species is found in enclosed bays, shallow waters and rocky or muddy outcrops where it can grow in dense aggregations. It has separate sexes, and a minimum spawning size of 6.5 cm. It is distributed throughout southern Peru, Chile, Argentina and the Falkland Islands.

The species is both fished and farmed in Chile, with the production from aquaculture overtaking that of fishing, in some parts of Chile. *Aulacomya atra* is common within the Falkland Islands, especially found within enclosed bays. However, it forms a habitat for a community of species and it would therefore not be environmentally sound to extract large numbers from natural populations.

As with other mussel species, this mussel is delicious when cooked in the traditional way of steaming it in white wine and garlic. Mussels provençal is also a popular choice. Including these mussels in a seafood soup or stew is also popular in Chile. For more recipe ideas go to:

<http://eatingchile.blogspot.com/2009/05/eating-chilean-mussels.html>

### Blue mussel/choritos (*Mytilus edulis*)



The blue mussel is found throughout much of the world's oceans, inhabiting temperate and polar intertidal and subtidal waters around the world. Larvae settle in rocky areas, generally preferring existing mussel beds. It has separate sexes and individuals can live up to 11 years and reach 12 cm in length.

*Mytilus edulis* is harvested from both wild and farmed populations throughout the world. Due to dense aggregations and high growth rates, annual meat production can reach 1kg per m<sup>2</sup> of mussel bed. Recently, aquaculture has provided vastly more *M. edulis* than harvest from the wild. The majority of the Chilean harvest is exported to Spain, Portugal, Italy and Argentina.

Within the Falkland Islands blue mussels are extremely common and widespread. They were farmed at Goose Green, with approximately 20 tonnes of mussels farmed on ropes at any one time from naturally settling spat. The market was primarily for domestic consumption. Efforts to farm the species continue.

For recipe suggestions, see above.

Giant mussel/choro zapato  
(*Choromytilus chorus*)



This largest of the South American mussels can grow up to 26 cm, or more and is distributed along most of the coastline, including Peru, Brazil, Chile and the Falkland Islands. It inhabits depths between 0 and 20 meters and is often found in estuarine areas. It has separate sexes and is slow growing, taking from 7 – 8 years to reach 12cm. They grow on rocky grounds, often in the presence

Patagonian scallop/vieira  
Patagonica  
(*Zygochlamys patagonica*)



This species is distributed around the southern tip of South America from northern Chile to southern Brazil. It inhabits muddy and sandy bottoms between 10 and 200 m. Individuals can live for 18 years and attain shell lengths of 7.5cm. Sexes are separate. Both live and dead shells represent a hard substrate in soft-bottom areas, providing an

of filamentous red algae.

This species is the most valuable of the mussel species in South America. It was heavily exploited in Chile, until the stock became depleted in the 1940s. Since then, attempts have been made to farm the species and growth of farmed individuals is more rapid than in natural populations, with individuals reaching up to 6cm in two years.

This species grows within the Falkland Islands, often in amongst the other large mussel species (*M. edulis* and *A. atra*). Harvest from wild banks for the local market may be feasible, though farming may be a favourable option.

See other mussels, above, for recipe suggestions.

attachment point for a high diversity of sessile organisms.

*Zygochlamys patagonica* is harvested in both Uruguay and Argentina, mostly from offshore high-density scallop beds between 75 and 110 meters in depth. A bottom trawl fishery in Argentina began in 1996. Most of these are exported to markets in France and the USA. This fishery was awarded MSC certification in 2006 and was recertified as sustainable in 2012.

There have been previous attempts at an experimental fishery on offshore banks of *Z. patagonica*, within the waters of the Falkland Islands. Between 2003 and 2006, 685 to 1,358 tonnes were harvested each year. The fishery was interrupted when the only vessel sank in 2006 in shallow waters. Every year some minor amounts (5 to 15 tonnes) of scallops

are taken as by-catch by squid trawlers and mostly released alive.

These scallops are comparatively quite small and have a very sweet taste. As with all scallops, they are good in a chowder, or

briefly seared and served with other accompaniments. A favourite recipe is seared scallops with grilled black pudding and pea puree. For recipe suggestions go to: <http://www.coastalliving.com/food/kitchen-assistant/scallops-recipes>.

### Southern red octopus/pulpo (*Enteroctopus megalocyathus*)

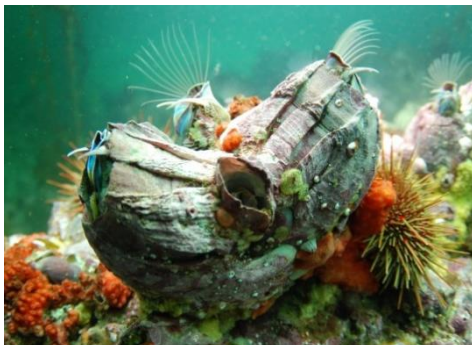


This large inshore octopus inhabits rocky grounds from 0 – 220 m depth. This species can reach 120 cm and weigh up to 6 kg. Reproduction occurs during a major spring spawning peak and a minor autumn peak. The female broods her eggs in sheltered shallow waters (6 – 14 m) for several months. The species feeds mostly on crabs and lobster krill, but cannibalism has also been documented.

Commercial harvest of *E. megalocyathus* within southern South America usually occurs between April and November and is done by hand-picking at low tide and by harpoon and hook by divers between 15 – 25 m. Within the Falklands, *E. megalocyathus* is the most important prey item for sea lions (*Otaria flavescens*) and is occasionally collected opportunistically at low tide for individual human consumption. It is also a by-catch species in the trawler fisheries and is either discarded or kept for consumption onboard.

As with all octopus species, it is quite versatile and can be cooked by boiling or grilling. One popular recipe is pulpo Gallego – or Galician style octopus – which is sliced boiled octopus served with boiled potatoes, olive oil and sweet paprika. For recipe suggestions, go to: <http://www.food.com/topic/octopus>

### Giant barnacle/picoroco (*Austromegabalanus psittacus*)



*Austromegabalanus psittacus* is a large (up to 30 cm) barnacle inhabiting 3 – 10 m deep semi-exposed hard substrates. It is found from southern Peru to the Straits of Magellan, and the Falkland Islands. As with other barnacle species, a hard calcite covering surrounds the animal and it extends its legs to capture food from the water column. Though occasionally found growing in isolation, this species can grow on top of each other in such a way as to form hummocks or large reef-like

structures. These can in turn provide habitat for communities of species. Individuals are simultaneous hermaphrodites.

Picoroco is an economically important species in Chile where artisanal fishermen harvest between 200 and 600 tonnes per year. Extraction requires divers to remove them from rock surfaces. They are sold fresh in the domestic Chilean market and are exported as frozen or canned.

The giant barnacle is found quite readily within the Falklands, however, as it is a habitat forming species, any extraction from

natural populations would be detrimental to the local environment. Individuals can reach commercial harvest size from 18 to 30 months after initial settlement. Therefore, it is a potential species for aquaculture.

This popular seafood in Chile has a taste similar to scallop, brown crab meat or clams. In Chile it is often served in seafood stews or soups

(<http://www.chilenacocina.com/2011/04/commemorando-el-dia-de-la-cocina.html>), or in a ceviche, among others. It can be boiled, steamed, grilled or barbecued with a dash of white wine and lemon juice in it.

### Snow crab/centollon (*Paralomis granulosa*)



This lithodid crab inhabits depths from 0 – 100 m, but is most abundant at depths between 10 and 40 m. It is found from Chile to southern Brazil. Juveniles live in dense kelp beds in the shallower end of the range while adults prefer bottoms with weak tidal currents and firm substrates. Individuals can reach a carapace length of 11.5 cm and a maximum weight of 1.5 kg. After molting in the spring months, a female spawns and broods up to 10,000 eggs on her abdomen for 18 – 22 months. The species has an extended hatching period of about 7 weeks and then the planktonic larvae drift near the bottom for

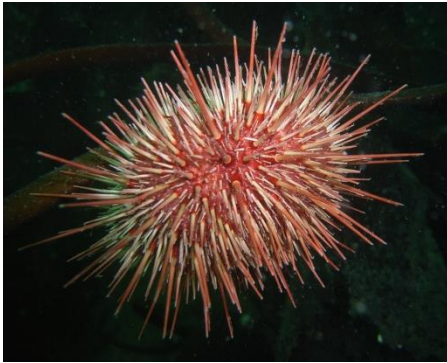
another 2 months before settling. The species feeds on algae, bryozoans, molluscs and other crustaceans.

In the 1990s, after the collapse of the southern king crab (*Lithodes santolla*) stocks, *Paralomis granulosa* became a new target lithodid crab fishery. Since the 1990s, within the Falklands' waters, there have been sporadic crab fishing efforts in Choiseul Sound and around George Island. The crabs were processed locally for domestic sales of fresh, frozen and tinned product. Between 8 and 15 tonnes of crab were collected annually between 2003 and 2006. Other harvest in the Falklands includes a minor recreational fishery via crab pots. A small scale fishery exists at George Island, currently, called Eagle Inshore Fishery, who provide crab for the local market.

This delicate crab is delicious in salads, dips, as an accompaniment to white fish. For some recipe ideas, see:

<http://www.coastalliving.com/food/kitchen-assistant/twenty-crab-recipes>

Red sea urchin/erizo  
(*Loxechinus albus*)



This shallow-water sea urchin is distributed around South America from Ecuador to Uruguay. It commonly inhabits depths from subtidal pools to 20 m, but has been found as deep as 340 m. The red urchin prefers exposed bedrock and boulders covered with encrusting coralline algae and kelp. Spawning is intermittent and, around the Falkland Islands, occurs in summer. Adults feed on drift algae which is captured and manipulated with suction-cup tube feet.

The species is intensively harvested for its edible gonads by waders and divers in Chile. It represents one of the main artisanal fisheries in the Magellan Region. Annual catches have

declined from 2000 to 2008. Minimum legal size is 7cm, and specimens with yellow-gold coloured gonads are highly sought after as they are most in demand by the international market (primarily Asian markets). Overharvesting has caused the extinction of many Chilean populations.

The species is not exploited around the Falklands, though its abundance can be locally very high. Stocks have not been assessed, but could presumably support a medium scale fishery by divers from a small boat with a sustainable annual catch of several hundred tonnes. The product could probably be canned and sold overseas with the development of relevant infrastructure.

In Chile, erizos are eaten in several ways, including in omelettes and tarts. A popular way to eat them, however, is raw and often mixed into a sauce of lemon juice, oil, diced onion and parsley, served with bread. For a few recipe suggestions, go to: <http://www.thedaily meal.com/best-recipes/sea-urchin>