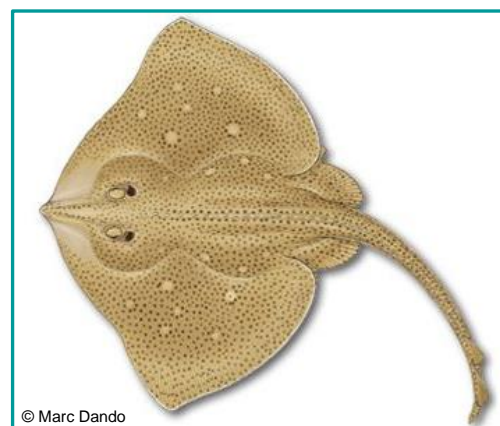


Blonde ray

(*Raja brachyura*)

Summary

Size (total length)	Max. 120 cm Usually 40-100 cm (Ebert and Stehmann, 2013)
Lifespan	-
Size of maturity (DW₅₀) (Celtic Sea & North Sea ecoregions)	Male 55-59 cm Female 59 cm
Fecundity	~30 egg capsules (Holden et al., 1971)
Reproductive frequency	Annual
IUCN Status	Near threatened (Ellis et al., 2009)
Capture methods	Primarily nets but also caught by trawl and rod & line
Minimum Conservation Reference Size	40 cm (disc width) 20 cm (detached wing)
Fishing Season	All year (peak Spring-Autumn)



Description

The blonde ray (*Raja brachyura*) is distributed in the Eastern North Atlantic around the coasts of the British Isles and southwards to Morocco, including the western Mediterranean Sea (Ebert and Stehmann, 2013). The British Isles is at the northern limits of the species' range and abundance is greater in the south and west of England (Ellis et al., 2005).

Blonde ray favour shallow coastal waters of less than 150 m in depth and live mainly on sandy grounds (Ebert and Stehmann, 2013; Martin et al., 2010). Juveniles feed upon crustaceans, including shrimps and crabs, whilst the main diet for adults consists of fish such as sand eels (Ebert and Stehmann, 2013).

Reproductive Life history

The blonde ray is amongst the largest species of skate, growing to a maximum total length of 120 cm (Ebert and Stehmann, 2013). It matures later than smaller skate species and is less fecund. Like all skate species the blonde ray is oviparous (egg-laying) and deposits eggs on the seafloor following internal fertilisation. In captivity the blonde ray has been observed to bury its eggs in the sand (Clark, 1922). It has been estimated blonde rays produce around 30 egg capsules throughout a single spawning season from February to August (Ebert and Stehmann, 2013). Holden et al., (1971) observed a female in a tank over five months from April to September and found over a period of 77 days 32 eggs were laid with irregular intervals between egg laying. Usually only one egg was deposited in a 24-hour period. After seven months of

development the embryo hatches at 16 to 18 cm in length (Ebert and Stehmann, 2013). Unlike other species of skate such as the thornback ray there is not thought to be a large difference in growth between male and female blonde rays as they reach similar maximum sizes (Holden, 1972). However, females do grow larger before the point of maturation as they require a large abdominal space to carry their egg cases (Catalano et al., 2007).

Immature individuals remain in shallower depths before migrating to deeper habitat as adults (Simpson, 2018; Ellis et al., 2005). Recapture studies have shown that similar to other skate and ray species blonde rays exhibit site fidelity with a maximum displacement of 61 km recorded for a single blonde ray (Simpson, 2018; Ellis et al., 2011). The combination of slow growth, late maturity, low fecundity and site fidelity increase the blonde ray's vulnerability to overfishing.

Size of maturity (SOM)

Size of maturity (SOM) is often used to help establish an appropriate Minimum Conservation Reference Size (MCRS) to ensure individuals can reproduce at least once before capture. SOM for skates and rays is commonly accepted as the total length (L) at which 50% of a population are mature and is referred to as the L_{50} . Some studies may also measure SOM based on the total disc width (DW) of a specimen (wing tip to wing tip). Table 1 includes total length-disc width conversions based on conversion factors in McCully et al, (2012).

Maturity in skates and rays is determined using criteria to define maturity stages either externally or internally. External observations are based upon analysing the length of claspers in males and the cloaca in females in relation to total body length. Internal examination includes macroscopic inspection of reproductive organs e.g., coiling of the vas deferens and development of the testes in males; development of the ovaries, ova and nidamental glands in females (Saglam and Ak, 2012).

There is limited data available for the size at 50% maturity for populations of blonde ray in the British Isles. Of the two studies conducted SOM was found to be between 78-82 cm total length for males and between 83-84 cm for females (table 1.). Lengths at first maturity were recorded as 55 cm and 60 cm for males and females respectively (McCully et al., 2012). The largest immature individuals sampled were 93 cm (female) and 91 cm (male) (McCully et al., 2012). A study undertaken in the waters of Jersey found the smallest mature male blonde ray to be 82 cm (Ellis et al., 2010).

In the Mediterranean male blonde rays mature at a similar size to those around the British Isles at 81 cm however, females were found to mature at a larger size of 87 cm (Porcu et al., 2014). All studies confirmed females matured at a larger size than males with a difference of up to 6 cm. In Ireland, Gallagher et al., (2005) found males reached maturity at 4.6 years whereas age at maturity for females was 5.5 years. Age at maturity for females in the Mediterranean has been found to be almost triple the age of females in the Irish Sea at 14 years and over double the age of males at 10 years (Porcu et al., 2014).

Table 1. Size at maturity estimates (L_{50}/DW_{50}) for blonde rays (*Raja brachyura*) in studies undertaken around and outside the British Isles. Male and female total length (L_{50}) has been converted to disc width (DW_{50}) using conversion factors ($DW=0.7125L_{50} + -0.3288$) presented in McCully et al., 2012. Measurements given in cm and figures rounded. Refer to the Appendix for more information.

Location	L_{50}		DW_{50}		Reference
	Male	Female	Male	Female	
UK*	78	83	55	59	McCully et al., 2012
Ireland	82	84	58	59	Gallagher et al., 2005
Outside British Isles					
Sardinia - Italy	81	87	57	62	Porcu et al., 2014

*ecoregions of Celtic Sea and North Sea combined

The minimum size for blonde rays in the Southern IFCA district is 40 cm and refers to disc width (wing tip to wing tip) rather than total length. Using the CEFAS conversion presented in McCully et al. (2012) the current minimum size for total length is 57 cm. The literature review infers the SOM of blonde rays in the British Isles is substantially above the current minimum size at 78-84 cm (L) / 55-59 cm (DW) (table 1). At the current minimum size observed within the Southern IFCA district immature individuals are at risk of removal from the fishery before having an opportunity to reproduce at least once.

Southern IFCA Fishery

Fishing activity

Blonde ray is a commercially important species that is specifically targeted in ray fisheries across the Southern IFCA district using gill, entangling and trammel nets. The species is also an important component of mixed demersal trawl fisheries and is taken as bycatch in a number of different target fisheries such as sole and plaice. Blonde rays are targeted throughout the year but are particularly abundant inshore from spring to autumn. They are similar in appearance to the spotted ray (*Raja montagui*) and occupy a similar geographic range therefore the two species can be confused (Leblanc et al., 2014; Simpson, 2018). A clear distinction can be made once individuals have reached their maximum size as blonde rays are considerably bigger at 110-120 cm compared to the spotted ray at 80 cm.

The wings of skates and rays are usually removed at sea rather than landed whole (excluding undulate rays which must be landed whole) because it is not always practical to retain the whole fish due to their size and market prices are based upon wing weight. The remaining parts of the tail and central body cavity aren't wasted as they can be used as bait for crab pots.

Recreational

Blonde rays are a popular target species for recreational rod and line fisheries both from the shore and at sea. They can be caught all year round but are mainly targeted inshore between May and September. The Southern IFCA district encompasses two of the largest charter boat ports in the UK at Weymouth and Poole (Williams and

Davies, 2018). Many of these boats provide specialised trips to target skates and rays, including blonde rays. A recent review undertaken by the MMO to map recreational sea angling activity in England found skates and rays to be the most valued species for charter boats operating in the South Inshore marine planning area (Devon and Severn, Southern and Sussex IFCA districts) and amongst the top three most valued species across England (MMO, 2020a). The vast majority of skates and rays caught recreationally are released.

Landings & Value of Fishery

In 2019, 2,000 tonnes of skates and ray (mixed species) worth £2.6 million was landed by UK vessels into England (MMO, 2019). Since 2017 landings have increased by 200 tonnes year-on-year, previous to this, landings remained around 1,600 tonnes between 2014 to 2017. Southern IFCA do not hold effort or catch data for the blonde ray fishery but landings data from the MMO can help indicate the scale of the commercial blonde ray fishery within the Southern IFCA district over time. Figure 1 shows landings and value of blonde ray into ports within the district since 2009. Before this point blonde ray landings were recorded under a general category of skates and rays.

In 2019 approximately 43* tonnes of blonde ray worth £71,250* was landed into ports across the SIFCA district (figure 1). Landings remained between 40-56 tonnes per year between 2012 to 2016 but declined by half in 2017 to 20 tonnes. In 2018 landings remained around this level (27 tonnes) before increasing in 2019. The value of blonde ray has fluctuated between £1,300 to £1,650 per tonne over the last 5 years.

*these figures represent vessels that land into ports in the Southern IFCA district, some of which would have fished outside the district and be >12 metres in length.

ICES advice states the stock and exploitation status of blonde rays relative to maximum sustainable yield cannot be assessed due to a lack of data, therefore a precautionary approach is applied for advised landings (ICES, 2019;2020). The stock structure of blonde ray in the western English Channel (Division 7.e) is unclear and it is not known whether the stock is associated with neighbouring stocks in the eastern English Channel (Division 7.d). Separate advice is therefore provided for the western English Channel (ICES,2018). In 2021 and 2022 ICES advises landings should be no more than 266 tonnes in each year for blonde rays caught within the western English Channel (ICES, 2020). Advice for stock located in the eastern English Channel is combined with the North Sea, Skagerrak and Kattegat (Subarea 4 and Divisions 3.a and 7.d) and states landings should be no more than 164 tonnes in each of the years 2020 and 2021 (ICES, 2019).

The value of the recreational blonde ray fishery or the quantity of retained catches in the district is not known.

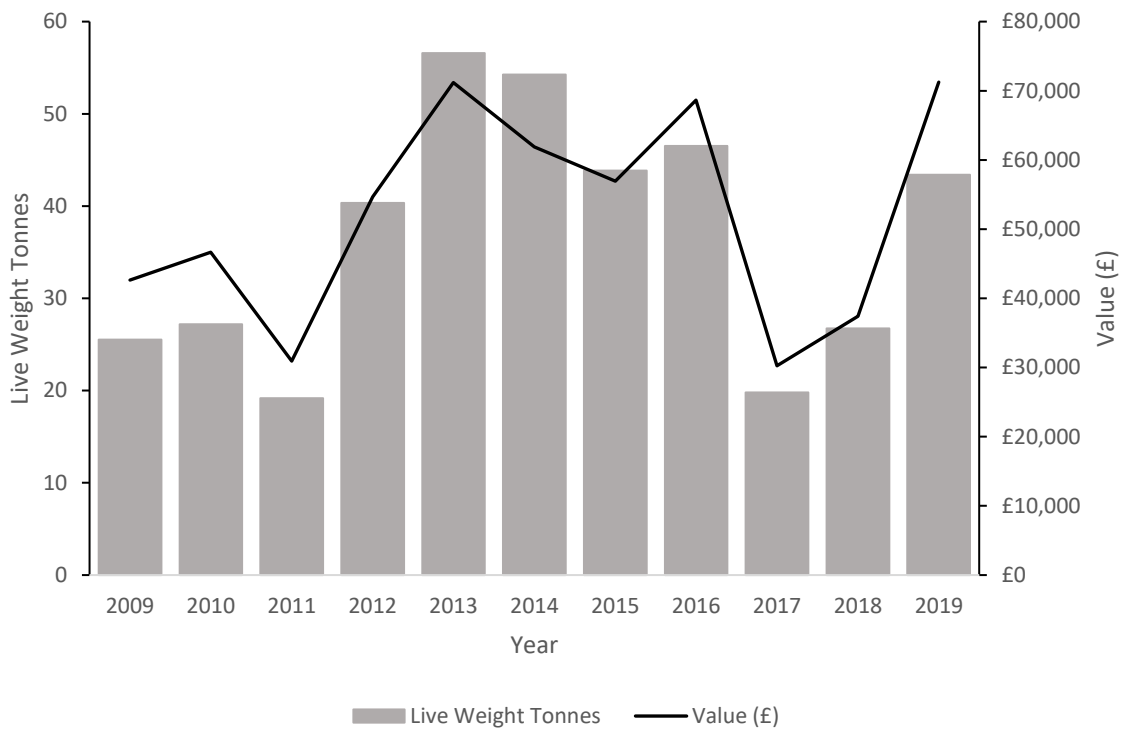


Figure 1. Landings of blonde ray (*Raja brachyura*) in the Southern IFCA district from 2009 to 2019. Data sourced from the Marine Management Organisation (MMO).

Associated management

Blonde rays caught within the Southern IFCA district are subject to a minimum size byelaw 'Skates and Rays – Minimum Size'. The byelaw prohibits the retainment of any species of skate or ray that measures less than 40 cm between the extreme tips of the wings or any detached wing that measures less than 20 cm in its maximum dimension. There are no minimum landing sizes for skates and rays on a national/EU level but some IFCAs have introduced minimum size byelaws within their districts (table 2). Kent and Essex IFCA's minimum size for skates and rays is 40 cm measured from the extreme tips of the wings and 19 cm for a detached wing measured in a straight line from the tip of the wing to the centre of the cut edge. North Western IFCA apply a minimum size within a certain area of their district, as introduced under the former Cumbria Sea Fisheries Committee District. Any skate or ray caught from Havrigg Point in Cumbria to the Scottish border in the Solway Firth must not measure less than 45 cm between the extreme tips of the wings and 22 cm based on maximum dimensions for detached wings.

Blonde rays are part of a mixed Total Allowable Catch (TAC) under the European Union's Common Fisheries Policy (CFP). Within recent years the CFP has introduced bycatch restrictions to reduce discarding. All quota species are subject to Landing Obligations meaning all catch must be landed and counted against quota regardless of size unless exemptions apply. Skates and rays (excl. undulate rays) caught in the English Channel are currently exempt of the Landings Obligation based on their survival rates (MMO, 2020b). Cefas have assessed the health condition of 17,259 individual skates and rays caught as bycatch from various projects and found 100%,

98% and 95% survived fishing capture in longline, otter trawl and net fisheries, respectively (Cefas, 2018).

Table 2. Minimum Conservation Reference Size (MCRS) for blonde ray (*Raja brachyura*) in Inshore Fisheries and Conservation Authority (IFCA) Districts in England. All measurements in cm measured wing tip to wing tip.

IFCA	Minimum Landing Size (MLS) (cm)	
Northumberland	-	
North Eastern	-	
Eastern	-	
Kent & Essex	40	Detached wing: 19*
Sussex	-	
Southern	40	Detached wing: 20*
Devon & Severn	-	
Cornwall	-	
Isles of Scilly	-	
North Western	45	Detached wing: 22 * **

*Please note detached wings are measured differently depending on the byelaw

**North Western IFCA MLS only applies to a certain area of the district (from Haverigg Point in Cumbria to the Scottish border in the Solway Firth)

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Appendix

Table A. Size at maturity estimates (L_{50}/DW_{50}) for blonde ray (*Raja brachyura*) in studies undertaken around and outside the British Isles. Male and female total length (L_{50}) has been converted to disc width (DW_{50}) using conversion factors ($DW=0.7125L_{50} + -0.3288$) presented in McCully et al., 2012. Measurements given in cm. Number of individuals in brackets represents the number of mature individuals within sample.

Study location	Total No. surveyed	No. of individuals (n)		Length Data		Size at Maturity Data										Reference	
				Size range		Total No. of individuals	No. of individuals (n)		Size of smallest mature individual		Size at 50% maturity (L_{50})		Size at 50% maturity (DW_{50})		Size range of mature individuals		
				M	F		M	F	M	F	M	F	M	F	M		F
UK	743	357	386	13-100	12-102	746 (42)	359 (25)	387 (17)	55	60	78	83.4	55.2	59	-	-	McCully et al., 2012
Ireland	268	127	141	-	-	-	-	-	-	-	81.9	83.5	58	59.2	-	-	Gallagher et al., 2005
Jersey	184	93	90	26-114		81	81	0	82	-	-	-	-	-	-	-	Ellis et al., 2010
Outside British Isles																	
Sardinia - Italy	1792	862	930	18-97	13-106	-	-	-	75	85	80.8	87.2	57.2	61.8	-	-	Porcu et al., 2014