Interreg Atlantic Area

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DiadSea

DiadSea Booklet

An identification guide to migratory diadromous fish at sea

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This project is co-financed by the Interreg Atlantic Area Programme through the European Regional Development Fund.

1 Project Overview

Diadsea - Transnational cooperation to improve the management and conservation of diadromous fish at sea (EAPA_0011/2022) is an EU-funded INTERREG Atlantic Area project led by the University of Évora with many other partners across Europe. The main aim of this project is to foster a transnational cooperation in the Atlantic Area (AA) and to enhance the sustainable management and conservation of diadromous fishes (DF) in the marine environment.

2 Booklet Objective

This identification booklet is designed to be an aid in fish identification (DiadSea Deliverable D3), particularly diadromous fish (DF) species in tidal and coastal waters. DF species are known to migrate between freshwater and marine environments throughout their lifecycles. The species mentioned in this booklet have historically been poorly recorded at sea and often discarded or ignored as bycatch. These fish species are hugely important ecologically, culturally and economically (in some countries) as well as useful indicators in changing climate related processes. Accurate identification of DF presence in the marine environment is essential in order to fill the knowledge gaps which exist regarding their distribution at sea.

3 Image Sourcing

All images used in this document have been sourced by Inland Fisheries Ireland or the Marine Institute unless clearly stated otherwise.

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4 Reporting a catch:

If you catch any of the fish species listed in this booklet we would greatly appreciate it if you could contact us with the following details:

1. Fish species (a corresponding photo if possible)
2. Exact or approximate capture location
3. Date of capture
4. Fish measurements where possible

You can email us the details at the email address below:
Diad@fisheriesireland.ie
Our aim is to catalogue, preserve and conserve Ireland's fish biodiversity for current and future generations. We all have a role to play!

Glossary of terms

Term	Description
Diadromous	Migratory between marine and freshwater
Dorsal fin	An unpaired fin located on the back of the fish
Pectoral fins	Pair of fins located either side just behind the head
Dorso ventral	Area extending from the back down to the belly
Adipose fin	A small fleshy fin without rays found behind the dorsal fin
Maxillary bone	A bone that forms the upper part of the jaw
Gill rakers	"Comb-like" bony projections located behind the gill plate on the gill arch
Lateral line	Visible line along the side of a fish consisting of sensory organs
Keel	Sharp ridge that runs along the abdomen of the fish

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5 Atlantic Salmon (*Salmo salar*)

Identifiable features:

• Post-smolts and adults steel-blue or silver in colour at sea/ freshly returned to freshwater
• Colour gradually changes to dark brown after returning to freshwater
• Streamlined shape with pointed head
• Upper jaw does not extend beyond the rear of the eye
• Few, if any black spots found below the lateral line
• Concave/forked tail with a slim tail wrist
• Easy to pick up by tail
• Juvenile 'Smolts' typically leave freshwater from March – late May
•'Multi-sea winter' adult fish typically return to freshwater in spring and 'grilse' from June onwards to spawn over the winter months. Post spawning adults known as 'Kelts' are encountered in freshwater during their downstream migration from winter to early spring.

Table 1. Salmon freshwater/marine presence calendar.

Salmon (Adult)												
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Marine phase				Marine or Freshwater				Freshwater phase				

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6 Sea Trout (*Salmo trutta*)

Identifiable features:

- Adults at sea are generally silver in colour
- Thickset in appearance with a rounded head
- Upper jaw extends beyond the eye
- Often has a lot of black spots extending below the lateral line
- Convex/square tail with a broad tail wrist
- Tail slips through the hand when lifting
- Juvenile 'Smolts' typically leave freshwater between March - late May
- Adults typically return to freshwater from June onwards however some may over winter in the marine environment

Table 2. Sea trout freshwater/marine presence calendar.

Sea trout (Adult)												
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Marine phase				Marine or Freshwater				Freshwater phase				

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7 European eel (*Anguilla anguilla*)

Identifiable features:

- Long slender bodies with continuous anal and dorsal fins
- Pair of small pectoral fins located behind the gill openings
- Lower jaw slightly longer than the upper (Note: conger upper jaw is longer than lower jaw)
- Adults typically 20 - 120cm in length
- Immature eel, known as a yellow or brown eel, have a brown back and a green to yellow underbelly.
- A maturing eel, known as a silver eel, has a metallic appearance (silver through to copper colour), larger eyes with distinct copper/gold iris, a clear lateral line with black dots and an obvious dorso-ventral colour difference.

Table 3. European Eel freshwater/marine presence calendar.

European Eel (Silver stage)												
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Marine phase						Freshwater phase						

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8 Twaite Shad (*Alosa fallax*)

Identifiable features:

- Average length 25 – 40cm
- Body moderately deep, depth at pectoral fin generally less than head length (fishbase, 2024)
- Upper jaw notched with lower jaw fitting into it
- Usually has multiple black spots (4-8 avg) behind the gill opening along the lateral line
- Sharp keel on belly/underside
- Gill rakers short and widely spaced unlike allis shad (avg count <60)

Table 4. Twaite shad freshwater/marine presence calendar.

Twaite Shad												
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Marine phase						Freshwater phase						

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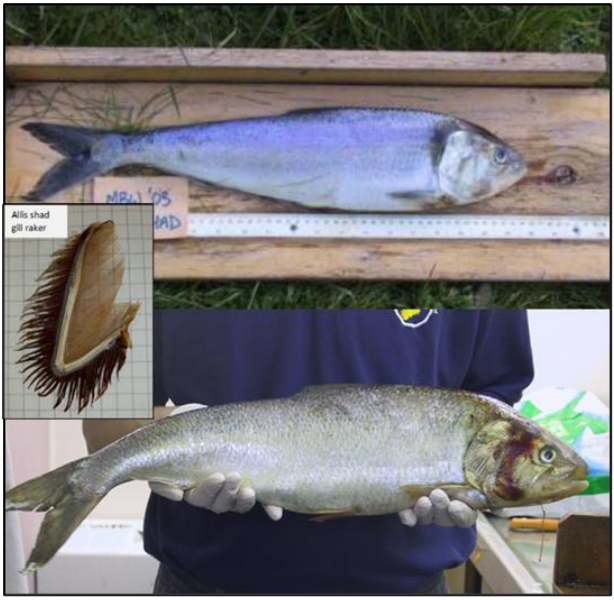
9 Allis Shad (*Alosa alosa*)



Identifiable features:

- Average adult length 45 – 50cms
- Deep body, depth at pectoral fin generally longer than head length (fishbase, 2024)
- Upper jaw notched with lower jaw fitting into it
- Usually a dark spot behind gill cover, occasionally more spots behind this
- Sharp keel on belly/underside
- Gill rakers long, fine and closely spaced (avg count >90)

Table 5. Allis shad freshwater/marine presence calendar.

Allis shad												
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Marine phase						Freshwater phase						

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10 Flounder (*Platichthys flesus*)

Identifiable features:

- Average adult length 25-30cm but can be up to 50cm
- Upwards side a mottled brown/greenish colour occasionally with orange spots
- Underside white/opaque in colour – sometimes with considerable amounts of dark pigment 'blotching'
- Best identified by touch, i.e. they have rough 'prickley' skin along the lateral line and at the base of dorsal and anal fins (not present in plaice)
- Scales are smooth – unlike rough scales of a dab
- Lateral line is straight with slight rounding around the pectoral fins

Table 6. Flounder freshwater/marine presence calendar.

Flounder												
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Marine phase						Freshwater/Estuarine phase						

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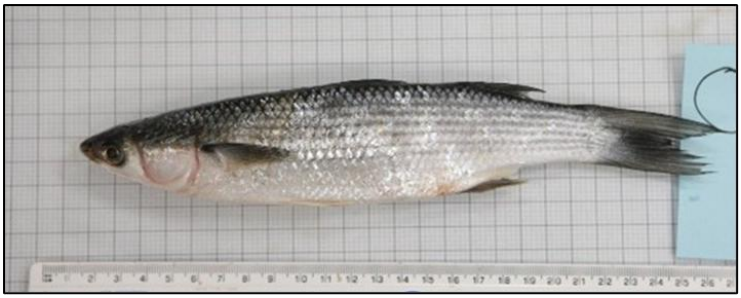
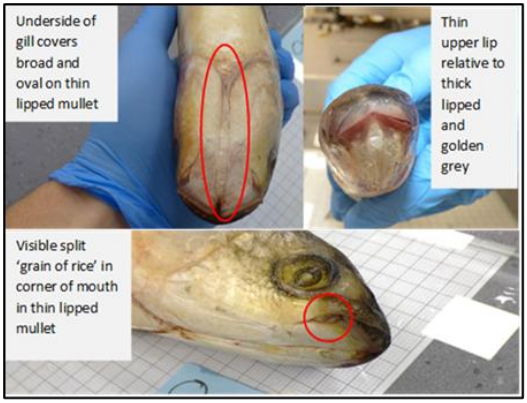
11 Thin-lipped Mullet (*Chelon ramada*)



Thin-lipped mullet head features (Chelon ramada)



Identifiable features:

- Avg adult length of 35cm
- Pectoral fins do not reach the eyes when folded forward
- Tiny bristle-like teeth on the edge of upper lip
- Underside gill covers broad and oval
- Small upper lip when compared to thick lip mullet
- Visible maxillary bone 'Split grain of rice' in corner of mouth

Table 7. Thin-lipped mullet freshwater/marine presence calendar.

Thin lipped mullet												
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Marine phase						Freshwater/Estuarine phase						

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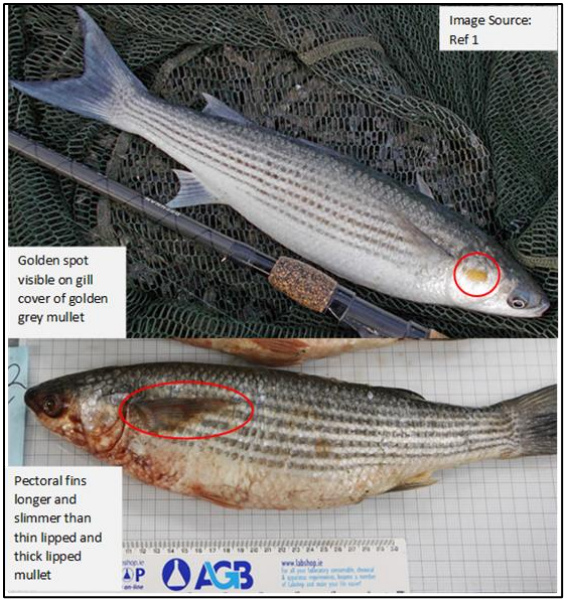
12 Golden-grey mullet (*Chelon auratus*)



Identifiable features:

- Average adult length of 30cm
- Moderately large teeth on edge of upper lip (see image above)
- Bright yellow patch on either gill cover
- Long, slim pectoral fins longer than thick or thin lipped mullet and reach the eye when folded forward
- Very slimey compared to other mullet species

Table 8. Golden-grey mullet freshwater/marine presence calendar.

Golden grey mullet												
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Marine phase						Freshwater/Estuarine phase						

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13 Sea Lamprey (*Petromyzon marinus*)

Identifiable features:

- Average adult length 60 – 100cm
- Visibly different from eels as they are jawless and have no pectoral fins
- Large oral sucker disc with rows of curved teeth
- Dark mottled grey/brown colour
- Seven visible gill openings

Table 9. Sea Lamprey freshwater/marine presence calendar.

Sea Lamprey												
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Marine phase												
Freshwater phase												

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14 River Lamprey (*Lampetra fluviatilus*)

Identifiable features:

- Average adult length: 25 – 35cm
- Visibly different from eels as they are jawless and have no pectoral fins
- Smaller in size than sea lamprey
- Circular oral disc with blunt teeth (different to the obvious teeth of sea lamprey)
- Seven gill openings behind eyes
- Dark grey/ mottled brown colouration along the back and sides, lightly coloured underbelly

Table 10. River Lamprey freshwater/marine presence calendar.

River Lamprey												
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Marine phase						Freshwater phase						

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15 Smelt (*Osmerus eperlanus*)

Identifiable features:

- Average adult size approx 10 – 20cm
- Large mouth relative to its size with projecting lower jaw
- Produce a noticeable 'cucumber smell' when caught
- Olive-green colouration along back of fish with silver flanks
- Dorsal fin found behind the base of the pelvic fins on the middle of the back
- Adipose fin present

Table 11. Smelt freshwater/marine presence calendar.

Smelt												
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Marine phase						Freshwater phase						

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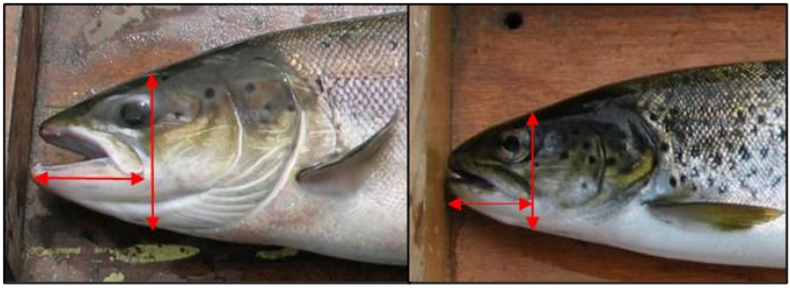
16 Direct visible comparisons:

Salmon vs Sea trout



Salmon (left): Upper jaw does not extend further than the rear of the eye.
Sea trout (right): Upper jaw extends further than the rear of the eye.

European eel vs Sea lamprey:

Eel (left): Clearly developed jaw.
Sea lamprey (right): No jaw present, oral sucker disc present instead

European eel vs Conger eel:
Conger upper jaw extends beyond lower jaw. European eel lower jaw extends beyond upper jaw.
Conger dorsal fin begins just behind pectoral fin, further back on a European eel.

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17 Lamprey induced wound identification:

Sea and River Lamprey are both parasitic species within marine ecosystems. They attach to fish and marine mammal hosts using their oral disks, this allows them to feed by sucking blood, fluids and tissues through induced wounds on the flesh of the host. Information relating to the sea-feeding ecology of these parasitic species is limited. Duration of the feeding marine phase and their habitat usage are still areas with large knowledge gaps. Direct evidence of the feeding behaviour is needed to increase the overall understanding of their development at sea. We are therefore requesting that any lamprey wounds/marks you notice on fish/marine mammal species be recorded.

If you see marks similar to these (may be larger or smaller in size), could you please record the host species and location of the catch along with a photo where possible. This information should be sent to: **Diad@fisheriesireland.ie**

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18 Wild vs Farmed salmon:

Identifiable differences between Wild and farmed salmon:

Wild salmon:

- Sharp fins
- Proportionate head size
- Normal darkened colour into autumn

Farmed salmon:

- Torn, fused and wavy fins
- Shortened snout
- Exhibit abnormal silver colouration into Autumn

Visible fin differences:

Wild salmon (left) 'sharp/winged' fins vs Farmed salmon (right) 'torn' fins. Fins of farmed fish lose their normal shape and often appear torn, wavy and fused together when compared to wild fish.

Visible head differences:

Wild salmon head (left) vs shortened 'stubby' reared salmon head (right)

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19 Pink salmon (*Oncorhynchus gorbuscha*) identification:

Identifiable features:

- Typical length range: 40 – 55 cm (max 76cm)
- Large black oval spots on the tail
- Anal fin has 11-19 rays (Atlantic salmon have 7-11)
- Much smaller scales than similar-sized Atlantic salmon
- No dark spots on the gill covers
- Upper jaw typically extends beyond eye
- Males develop a pronounced humpback in freshwater

In 2017, the non-native 'pink salmon' species were caught in Ireland, mostly in rivers in the West, and elsewhere in Europe in unprecedented numbers. They reappeared in 2019, 2021 and 2023. Inland Fisheries Ireland is closely monitoring the occurrence of pink salmon in Ireland's rivers and collecting samples to assess whether they have the potential to spawn and become an invasive species.

What to do if you catch one:

Anglers are asked to keep and freeze any pink salmon they catch and to report them to Inland Fisheries Ireland by calling **0818 34 74 24** (open 24 hours a day, 7 days a week) without delay.

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20 Rainbow trout (*Oncorhynchus mykiss*) identification:

Identifiable features:

- Speckled with black spots predominantly along its blue/green coloured back
- Distinguishable flush of rosy pink colour along lateral line
- Heavily spotted tail (see image above) unlike brown trout
- Populations in Ireland usually restricted to recreational angling lakes

Rainbow trout (top) vs Brown trout (bottom)

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21 References:

21.1 Websites:

https://www.fishbase.se/search.php (Accessed May 2024)

21.2 Image references:

Ref 1: mulletobsession.co.uk (Accessed 05 April 2024)

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