Opportunities and challenges for fishery by-products and by-catches to contribute to the supply of aquaculture feed ingredients.

A study based on the British fishery-aquaculture continuum.

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IFFO THE MARINE INGREDIENTS ORGANISATION

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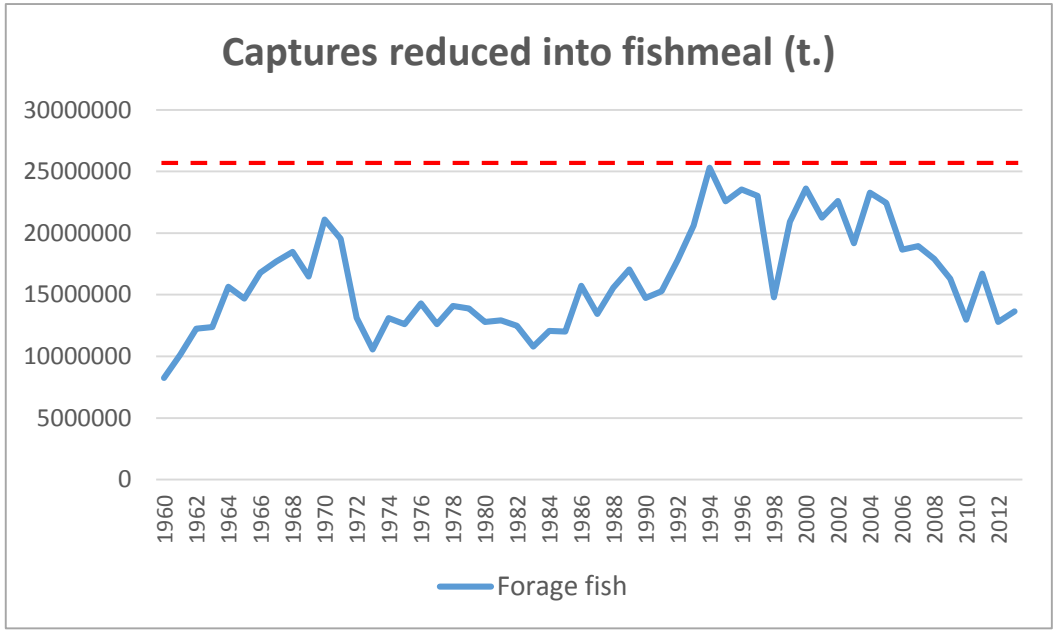
Why should we use by-products?

- **Aquaculture:** + 70 million tonnes by 2050.

  - **Need resources:**
    industrial fisheries fully exploited.

  - **Substitution with veg. ingredients:**
    cannot replace all the fish meal.

  - **Alternative:**
    fish by-products to make fish meal (35% in 2012).

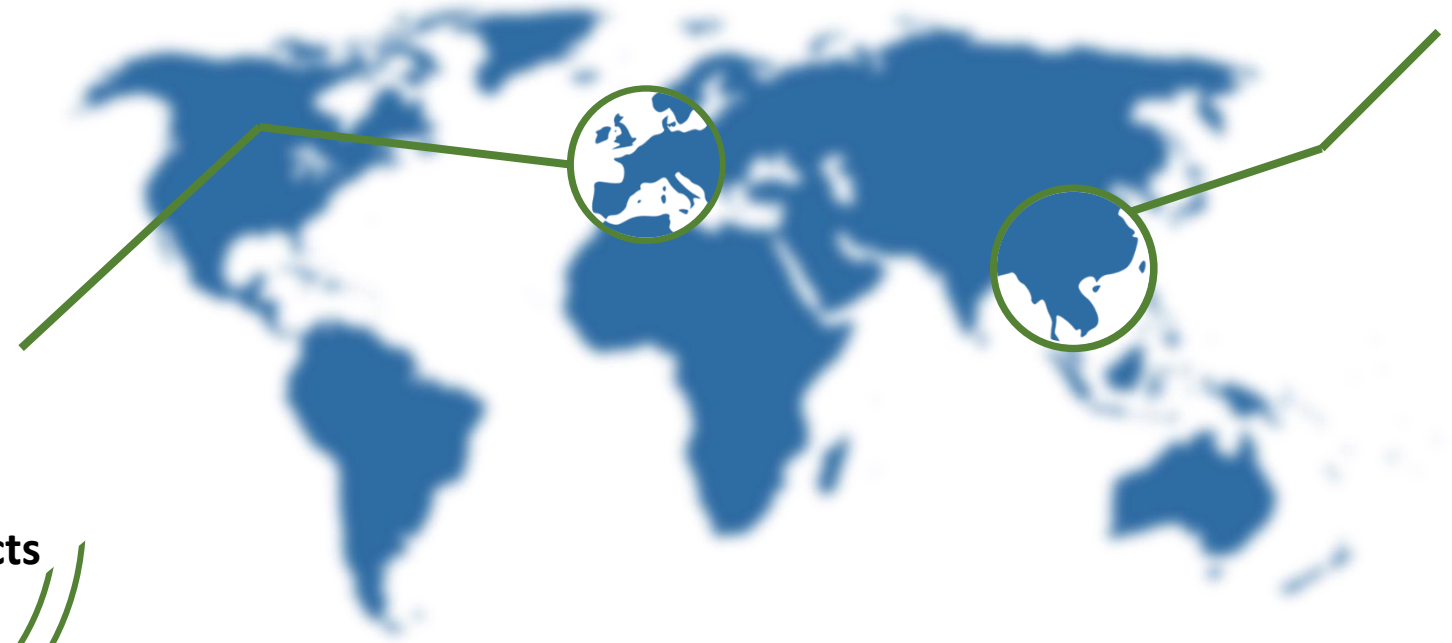


(World resource institute, 2014), (FAO, 2014)

Are there more by-products?

- **Previous study of IFFO & IoA (2016):**
  - identify further supplies to make fish meal.

Fish could be more highly processed in the factories.



Opportunities for using fisheries by-catch and by-products produced at sea.

An economic study for this year:

- **1 objective:**
  - Fill knowledge gaps: look at detailed data to establish the facts and figures when it comes to use fishery by-products and by-catch for aquafeed ingredients in a given location.

- **These information are essential in the way that:**
  - Provide IFFO's members with a summary of the opportunities and challenges for using fishery by-products and by-catch as aqua-feed ingredients.
  - Develop a methodology based on the UK that is transferable to other countries.

Our approach in 3 key milestones:

1

Review of the facts and figures of the fishery sector.

-Secondary data review.
-Develop contacts with K.I. persons.

2 months

-Inventory of the B.P. and B.C. in the UK.
Based on capture and trade statistics.
-Inventory of the current routes.
K.I. interviews/fishing & processing sector.
Questionnaires/fishermen & processors.

2

Resource mapping and inventory of the destinations.

2 months

3

Assessment of the opportunities and challenge for using BP & BC.

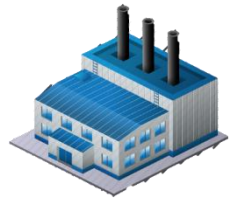
-Based on the compilation of the knowledge gained through stage 1 and 2.
-K.I. interviews: aqua-feed sector.

1 months

By-products and by-catches?

- **Produced at sea and on-shore:**

AT SEA



ON SHORE

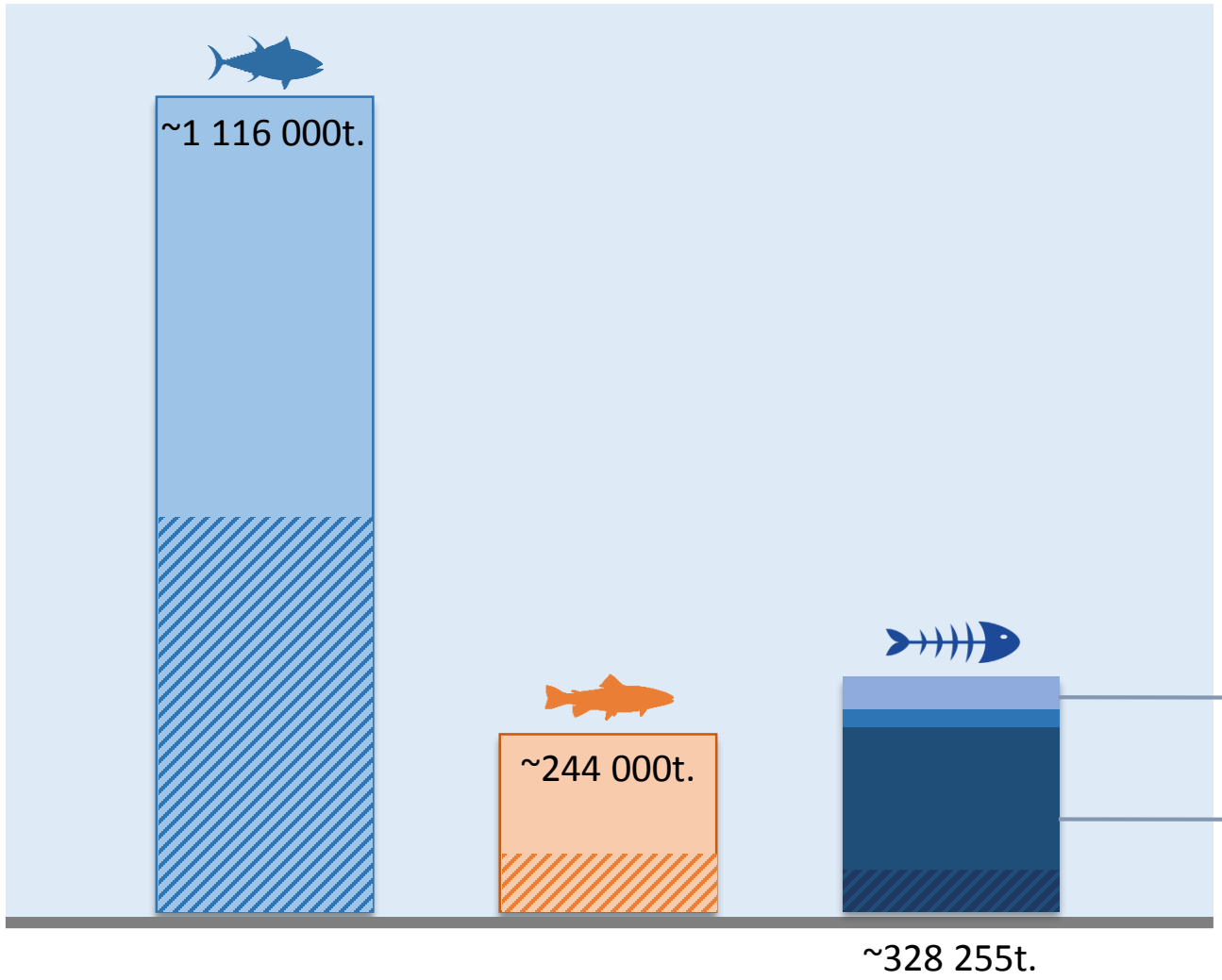
By-catch:
- *No market value.*
- *No right to land it.*

1st processing b.p.:
- *Non-edible portion.*
- *No market demand.*

2nd processing b.p.:
- *Non-marketable portion.*
- *No market demand.*

Volumes of B.P. & B.C. in the UK (2014):

Resource mapping and inventory of the destinations.



24% at sea

-By-catches: **45 568t.**

-1st by-products: **30 961t.**

76% on shore

-2nd by-products: 251 726t.

*Imports.

**Results from our national statistics analysis: 4360 vessels, 333 processors.*

Current routes for B.P. & B.C.:

Resource mapping and inventory of the destinations.

AT SEA

At sea: all discarded.

-Market: *price offered for FM too low.*
-Logistic: *more convenient to discard.*

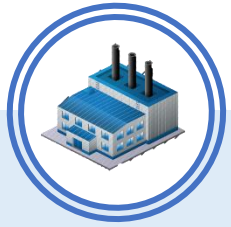
~75 000t. of fish products **discarded at sea.**

~30 961t.

~45 568t.

1st by-products.

By-catches.



ON SHORE

~251 726t.

On-shore: current uses, low value added or cost.

-Fish meal: *~(+)£80/T.*
-Disposal: *~(-)£50-120/T.*
-Few remaining: *geographically constrained.*

~180-190 000t. **reduced into fishmeal.**

~20-70 000t. shells wastes **disposed.**

2nd by-products.

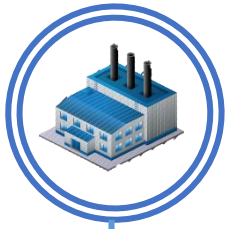
**Results from our national statistics analysis: 4360 vessels, 333 processors.*

First observations.

First observations:

- **Utilised resource in the UK: poorly valued, going to fishmeal, only option.**
- **Under-utilised resources/ economic constraints:**

ON SHORE



In remote areas or for small volumes, expensive to collect for FM producers.

AT SEA

Lack of economic incentive to land the 1st by-products & by-catches.

Study case.

Study on higher-value upgrading options:

- Fish protein hydrolysates production (FPH):

  Much stricter requirements for sourcing raw materials:

  - 1) Need mono-specific whereas fish meal will take up anything as long as it swims.
  - 2) Much more advanced & complex production: need consistency in the volume, composition and freshness.

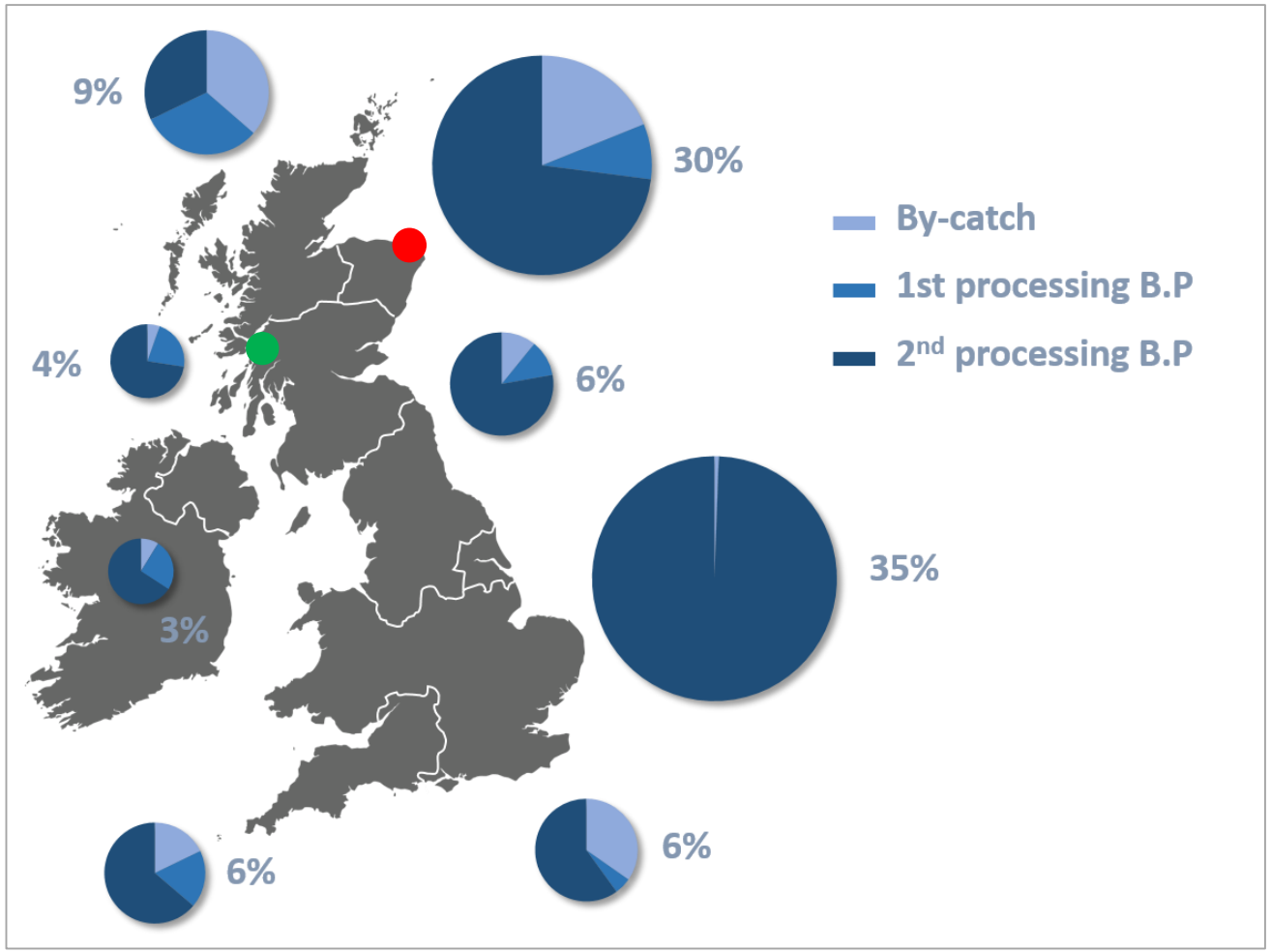
Suitability for the fishery industry?

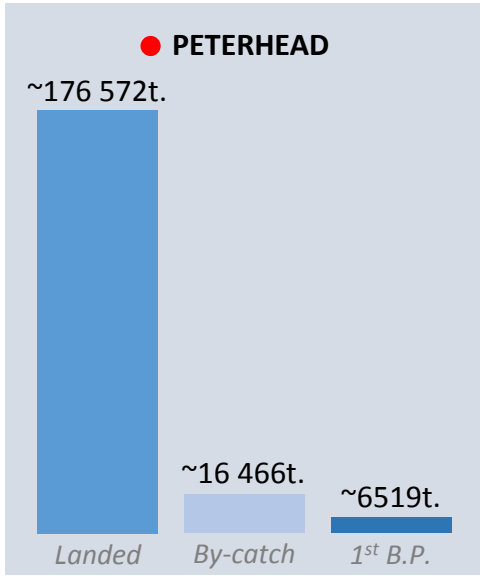
A single product suitable for FPH.

Diverse species and products going for fishmeal.

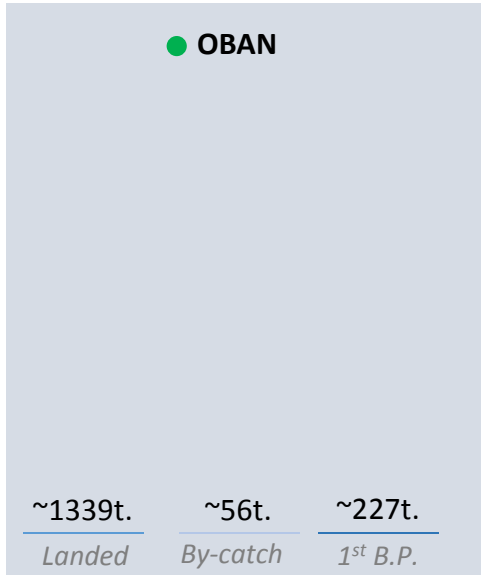
Regional disparities: 1st B.P. & B.C.

Regional repartition of the total B.P. & B.C. in the UK:





>95% of fish products



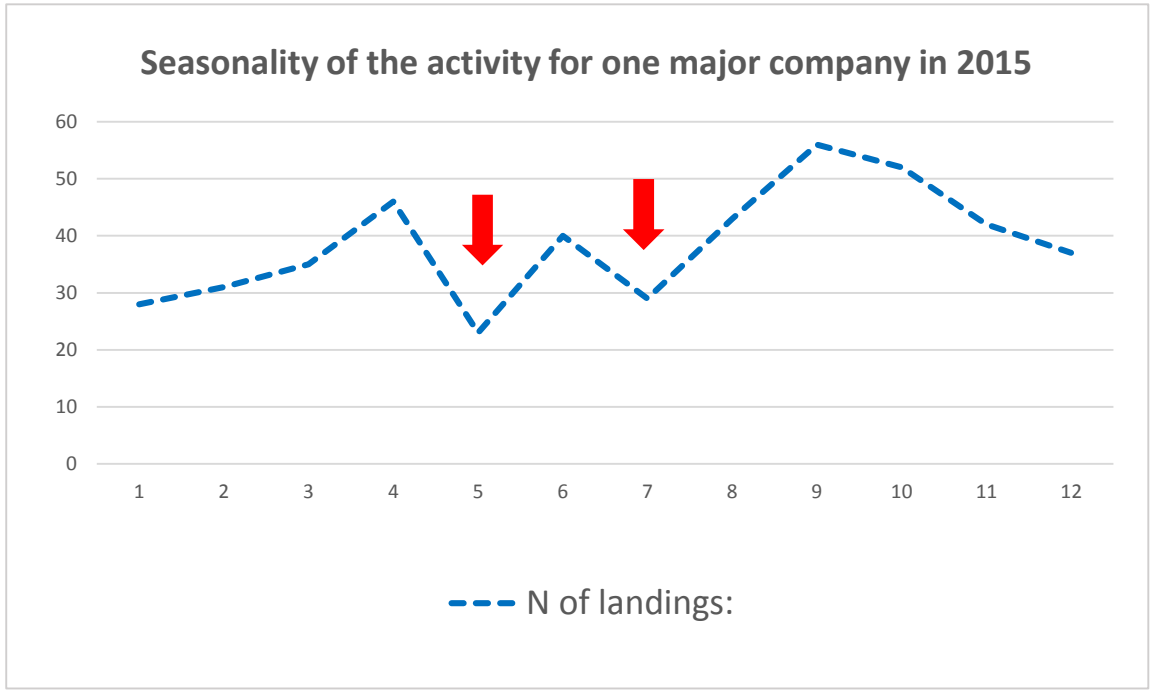
>97.5% of shellfish products

**Results from our national statistics analysis: 4360 vessels, 333 processors.*

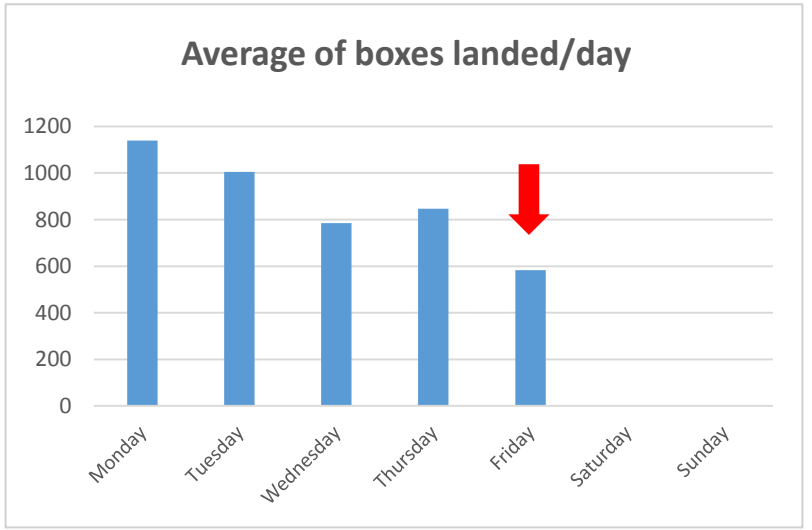
Inconsistent volumes: 1st B.P. & B.C.

- **Results from our boat-scale analysis in Peterhead: fleet of 23 demersal trawlers.**

Seasonally



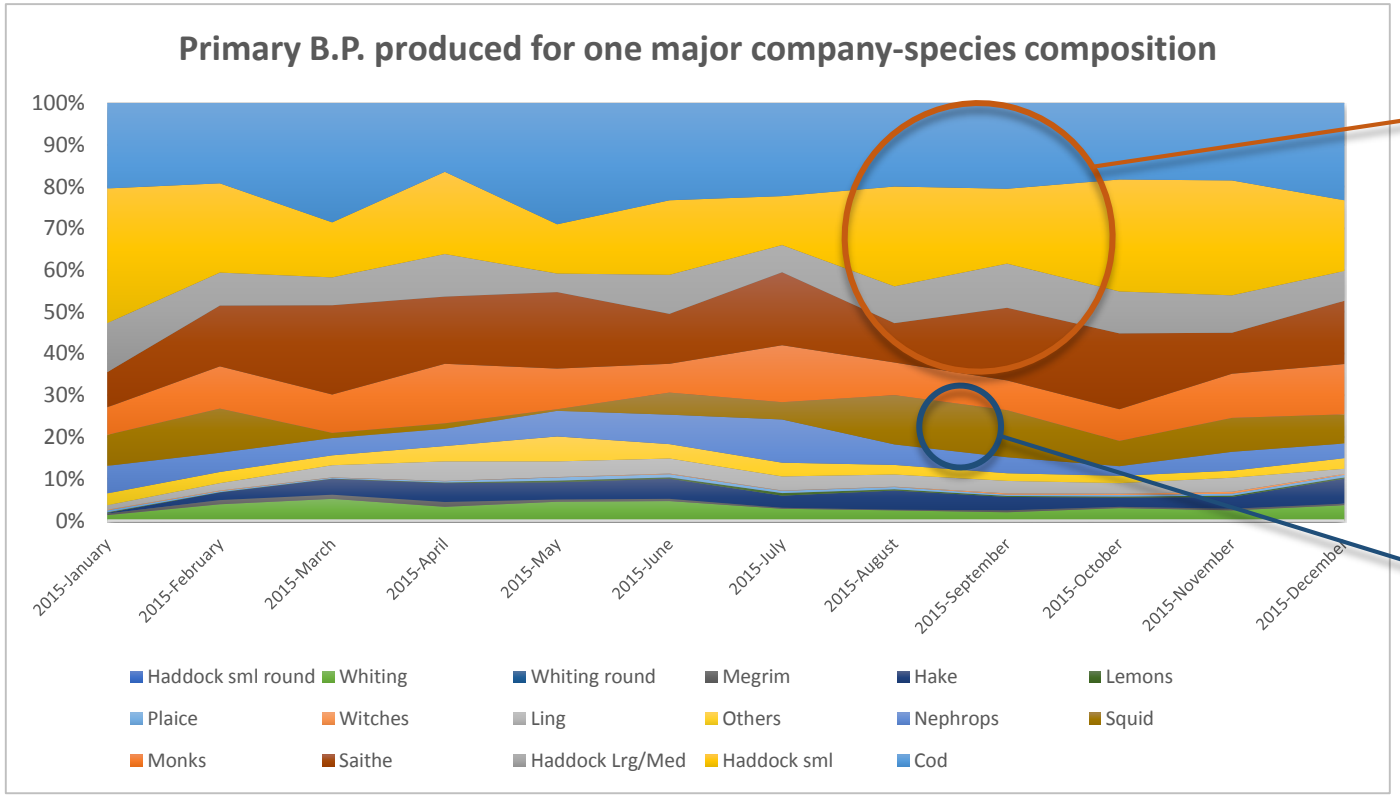
Weekly



**Results from our boat-scale analysis in Peterhead: 23 vessels.*

Inconsistent composition: 1st B.P. & B.C.

- **Results from our boat-scale analysis in Peterhead: fleet of 23 demersal trawlers.**



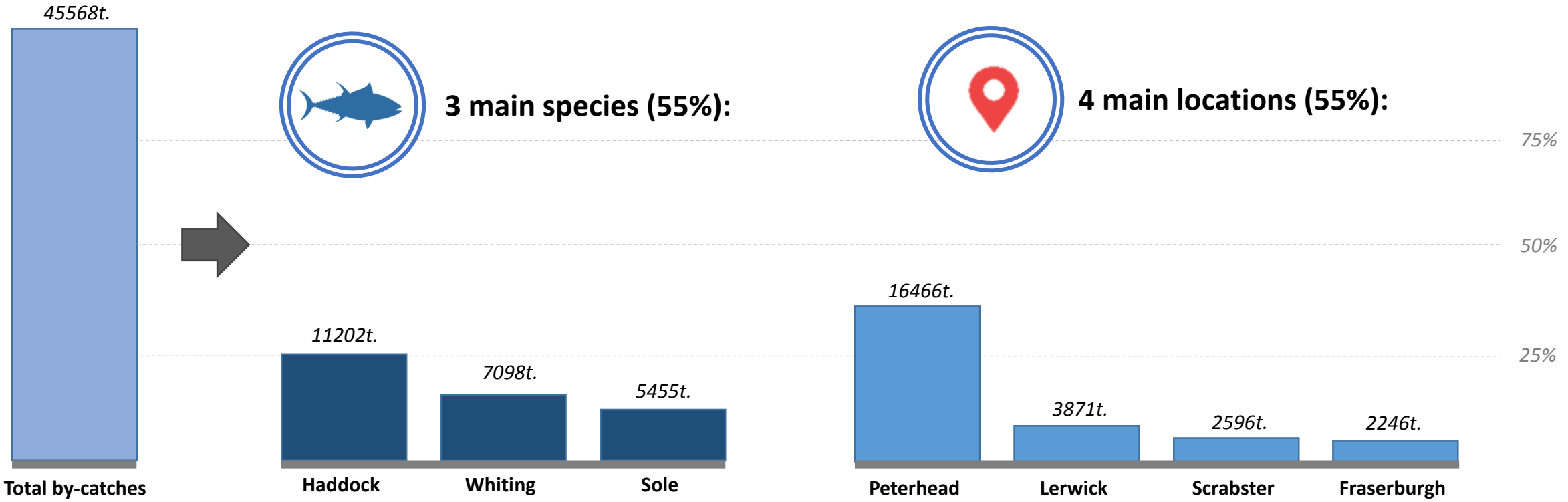
Some fishermen are traditional in their target species: haddock, cod, anglerfish, etc.

Some are more varied in their target species: squid.

**Results from our boat-scale analysis in Peterhead: 23 vessels.*

Opportunities for by-catches:

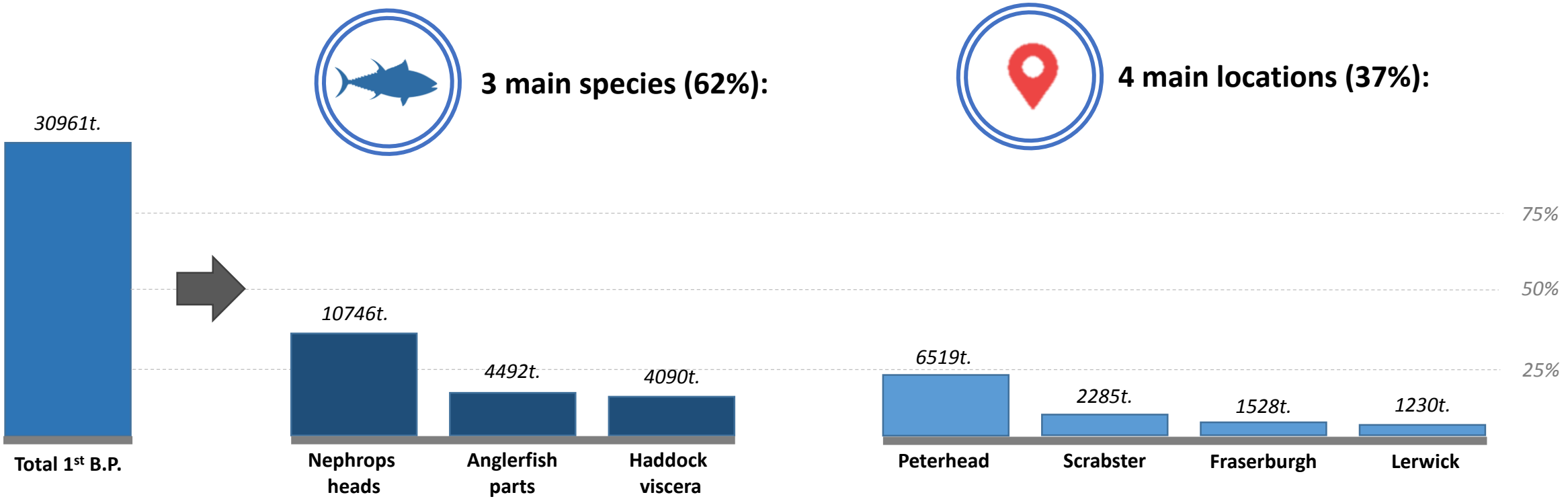
- Landing obligation of the by-catches:
  - Implementation of a discard ban from 2016 to 2019 in the EU *(Article 15, CFP regulation 1380/2013).*



**Results from our national statistics analysis: 4360 vessels, 333 processors.*

Opportunities for 1st B.P. :

- Not counted against quotas:
  - Can land as much as we want.
  - The 23 vessels in PD: 49% empty on average in 2015 (3850t. of overcapacity).



*Results from our national statistics analysis: 4360 vessels, 333 processors.

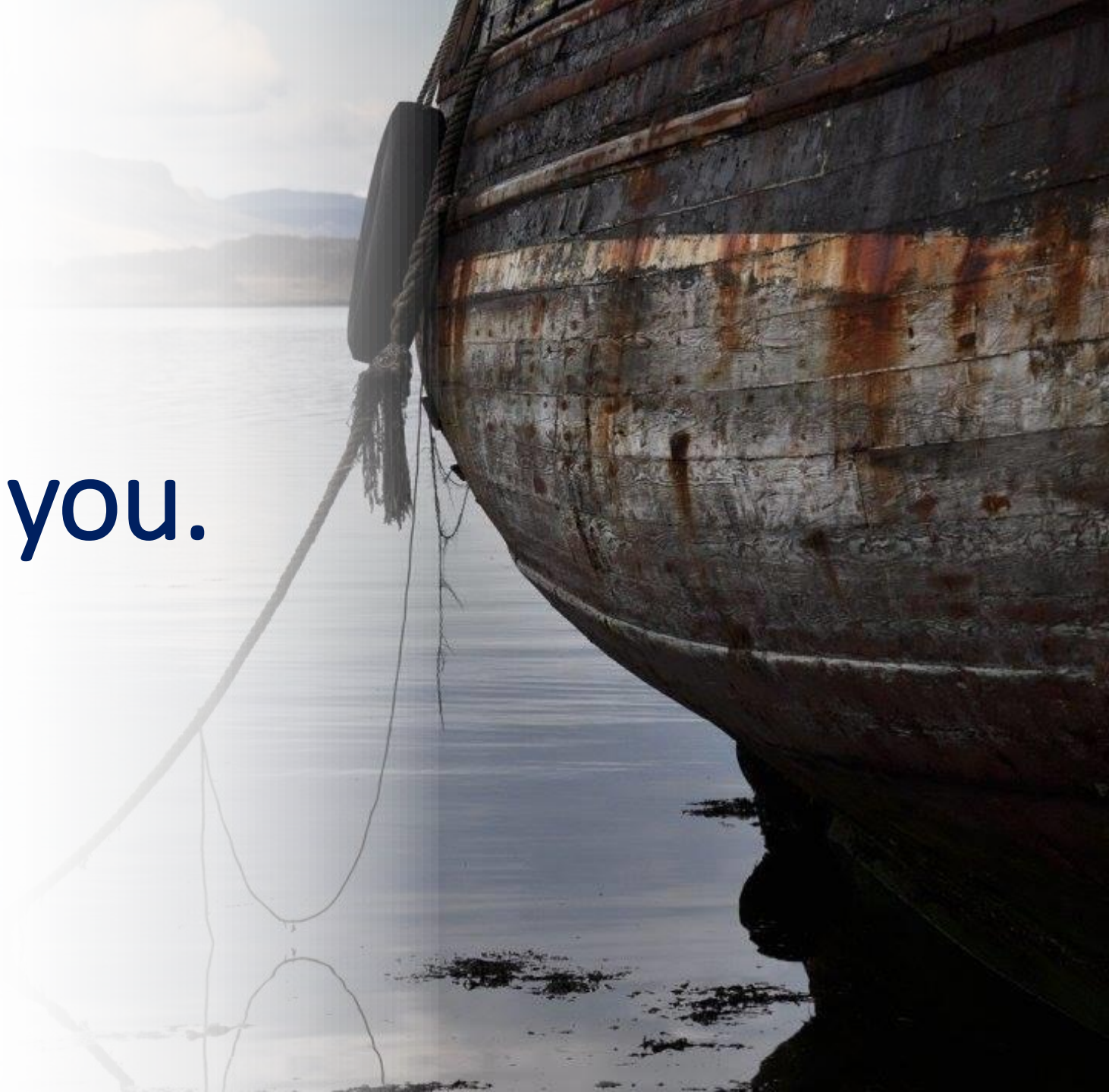
Research gaps.

- **Optimise consistency:** solutions to mitigate the constraints implied to B.P. & B.C. derived from multiples sources and species, at different seasons.
- **Optimise quality:** solutions to ensure the preservation of the B.P. & B.C. on-board.
- **Avoid wastage:** bring innovative solutions to shellfish wastes.
- **Support constrained locations:** develop tailored approaches and cost-effective models to improve the utilization of small and geographically remote fishery B.P. & B.C. (*e.g. West of Scotland*).

Recommendations

- **Look site by site:** Clear mapping of locations where there are opportunities for implementing circular models between the fishery sector and aqua-feed sector in the UK.
- **Network well:** promote collaborative works with the fishery organisations to have access the information.
- **Bring the stakeholders together:** call for greater collaborations between the two sectors to develop innovative and adapted upgrading processes and business models.

Thank you.



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