SPACEWHALE

Using satellite imagery to survey whales in remote areas and thus to enhance conservation efforts

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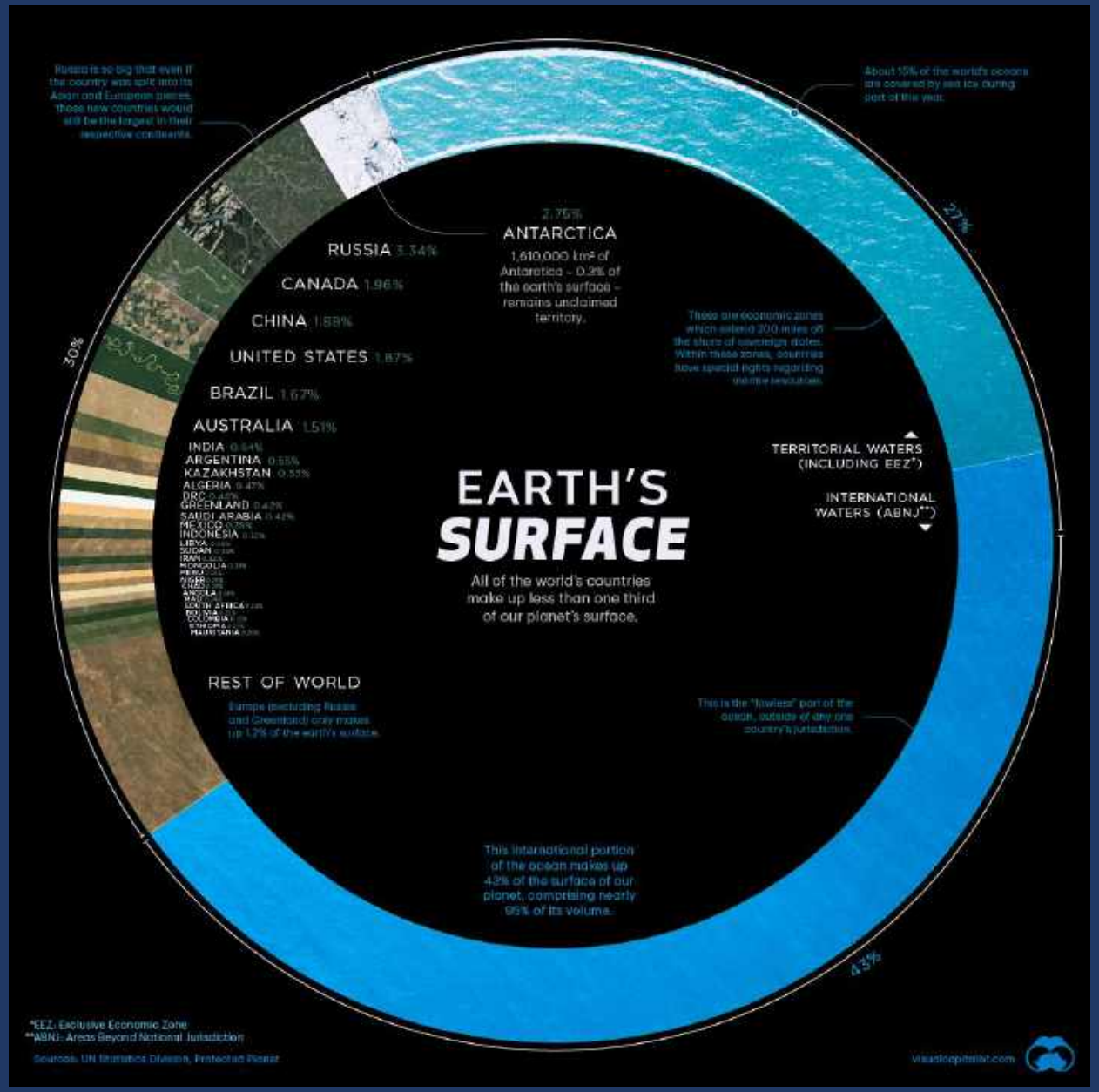
esa space solutions | business applications

SPACE WHALE

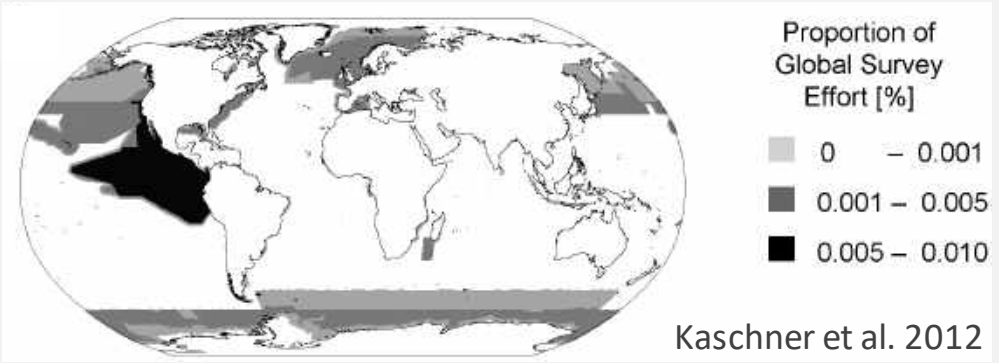
Bio Consult SH

HiDef AERIAL SURVEYING LIMITED



https://www.visualcapitalist.com/countries-by-share-of-earths-surface/

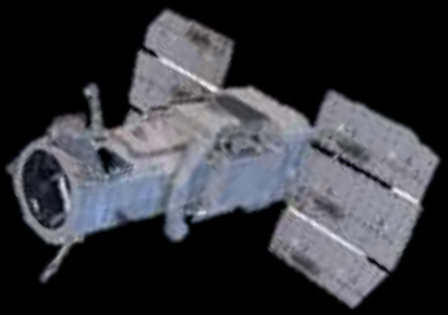
Small global survey effort…



Kaschner et al. 2012

… due to traditional survey methods

- Ship-based transect surveys
- Digital aerial surveys (HiDef)
- Passive Acoustic Monitoring



Satellites used so far

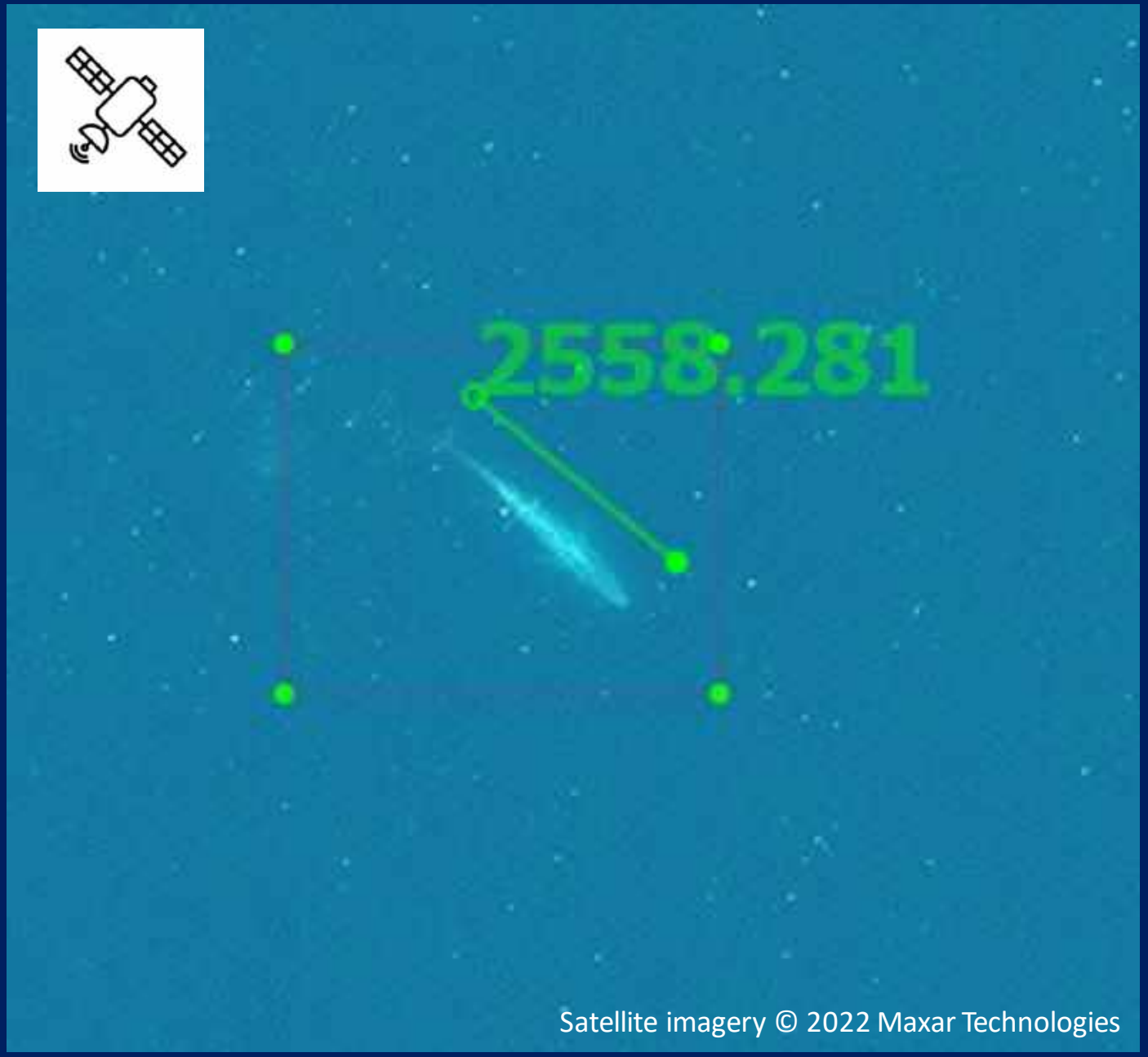
	WorldView-2	WorldView-3	Pléiades Neo
			
	MAXAR	MAXAR	AIRBUS
Resolution	46 cm	31 cm	30 cm (15 cm HD)
Tasking		X	X
Archival imagery	X		

About SPACEWHALE

- detecting whales from space using satellites – a service
- determine the number and distribution in large areas where it‘s too challenging for traditional surveys
- for baseline studies, population assessments and conservation efforts helping evidence-based decision making

photo credit: Michael Schauer

© Marc Carwardine



Satellite imagery © 2022 Maxar Technologies

photo credit: Marc Carwardine

Satellite imagery © 2022 Maxar Technologies

photo credit: Marc Carwardine

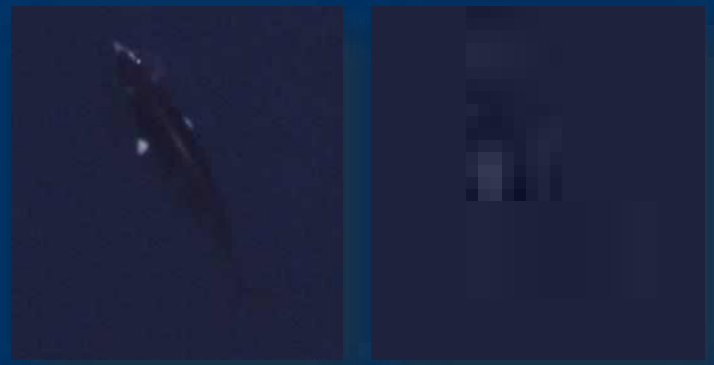
Satellite imagery © 2022 Maxar Technologies

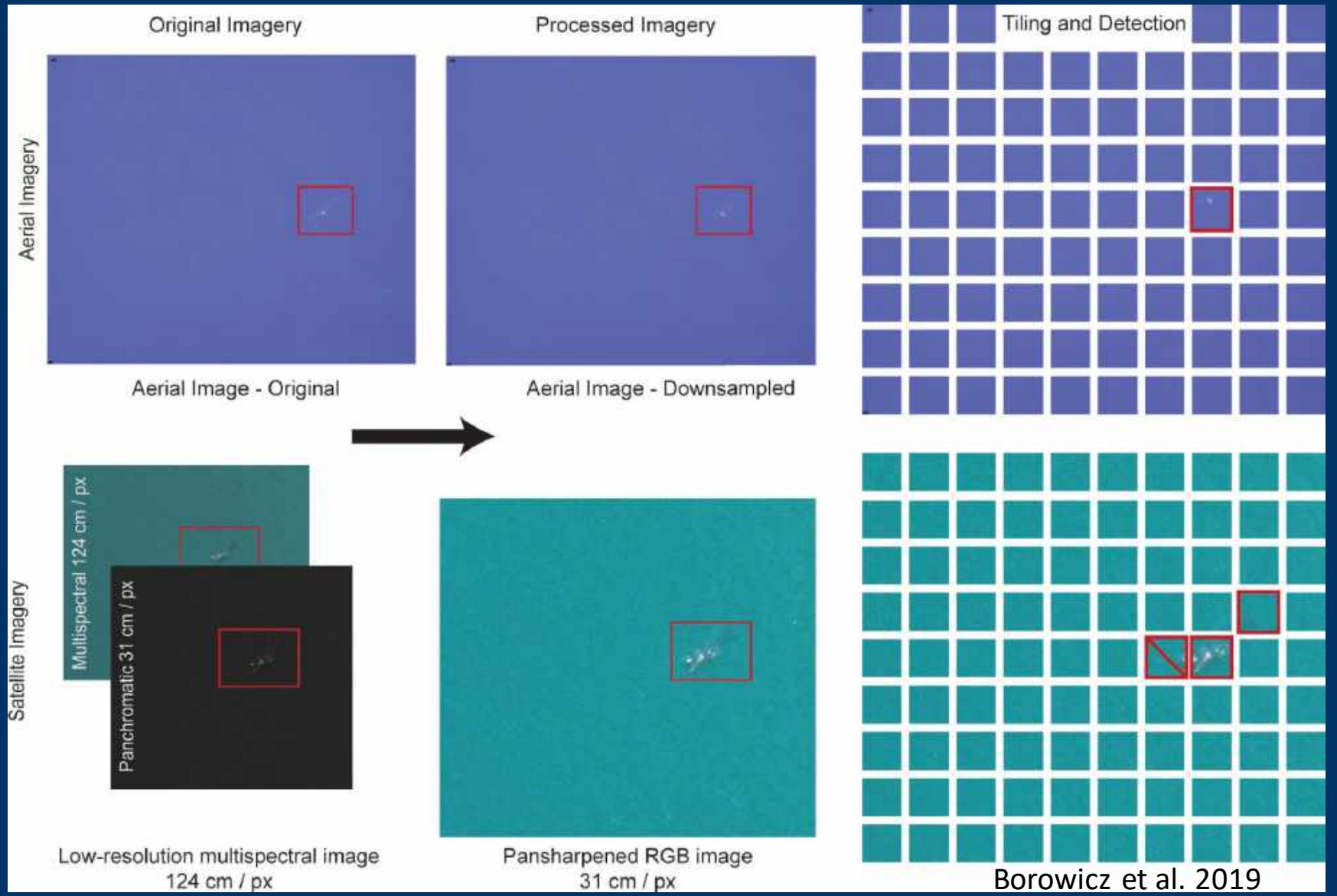
Training the algorithm

Aerial image
2 cm
388 pixels

WorldView-03
31cm
25 pixels

Training the SPACEWHALE algorithm





Borowicz et al. 2019

Combining state-of-the-art artificial intelligence and expert quality assurance

Trained algorithm using artificial intelligence

Expert review team for a QA

Images of cetaceans

From satellite

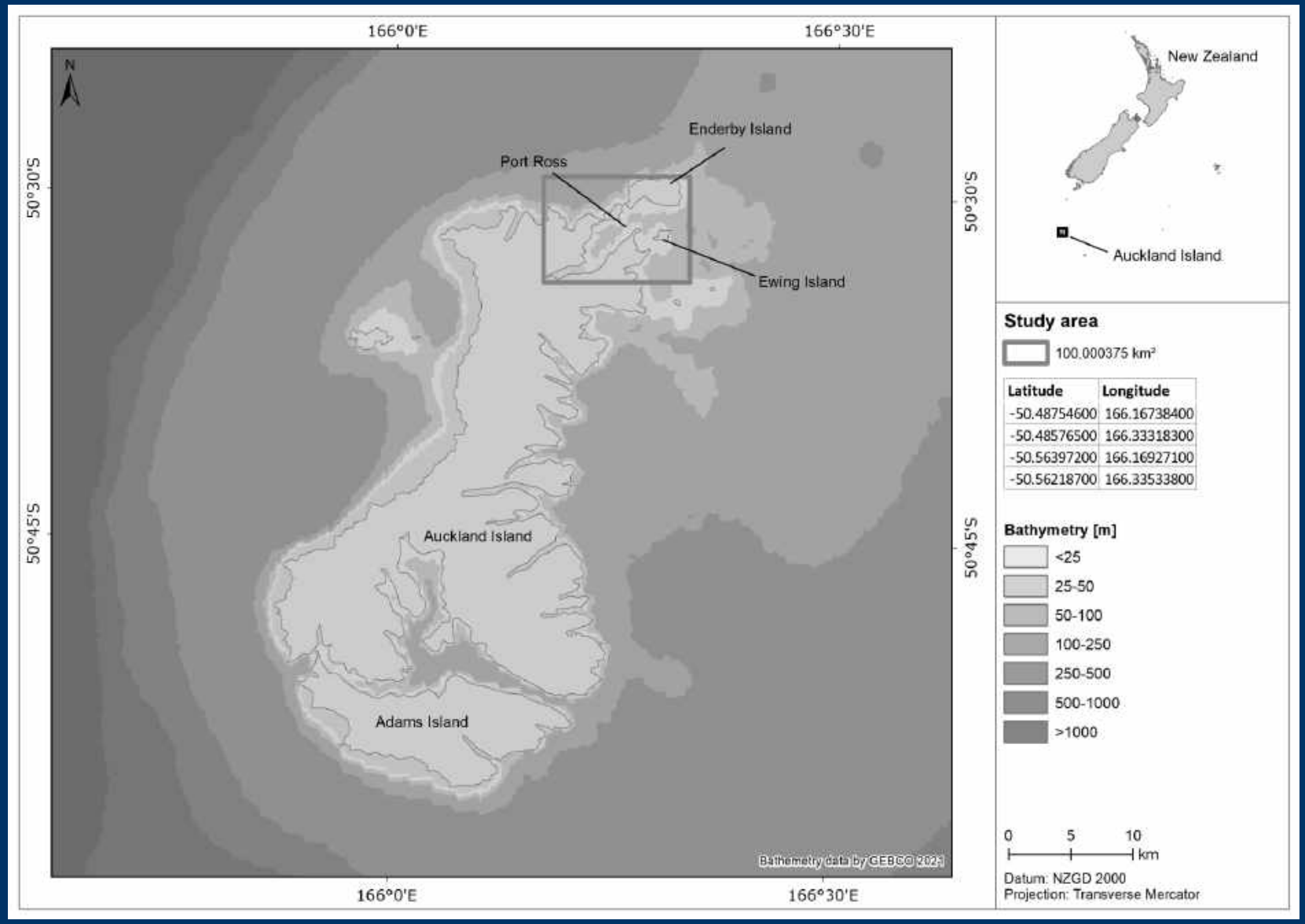
A failed story

of VHR imagery
Resons

Where can it be improved

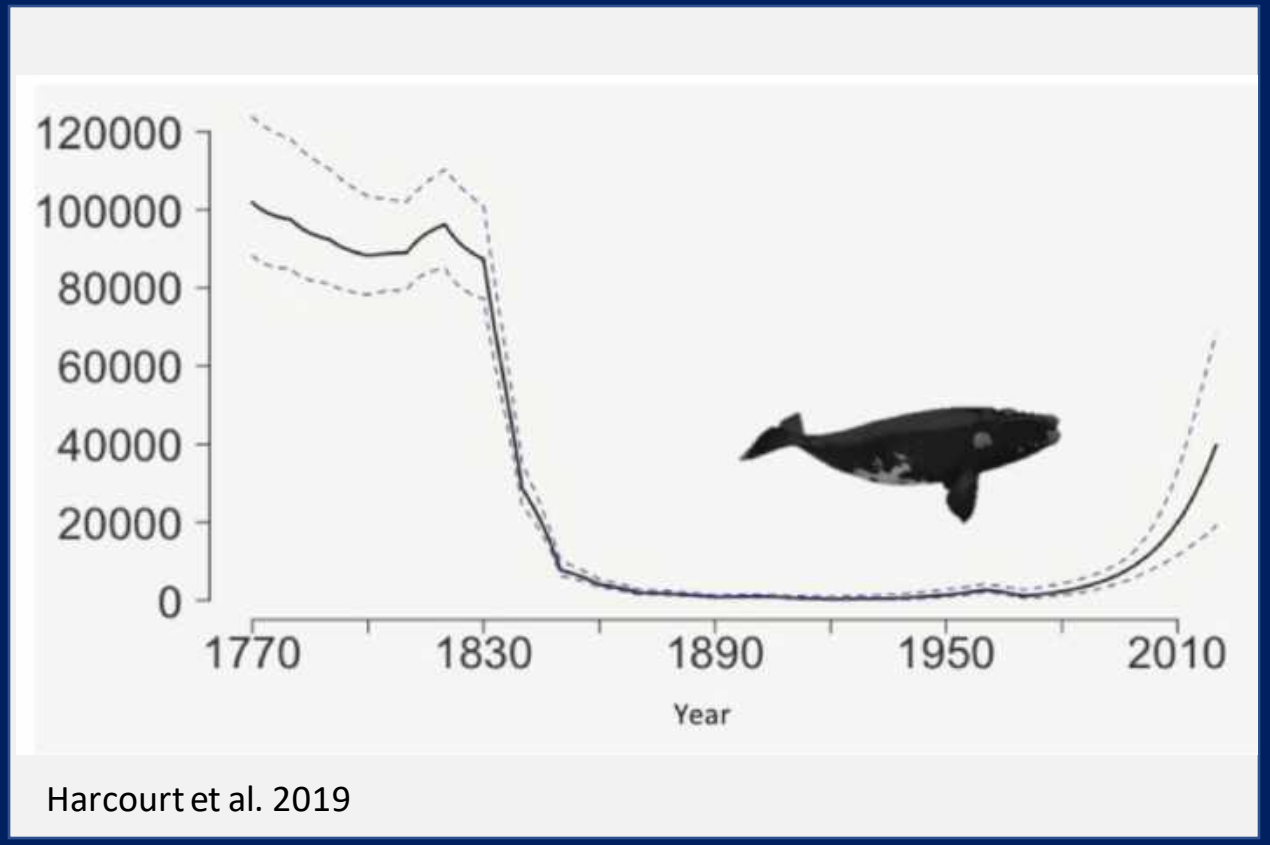
Southern right whale photo credit:
University of Auckland Southern Right Whale Research Team 2020, images taken under New Zealand Department of Conservation permit

Southern Right Whales in High Latitudes



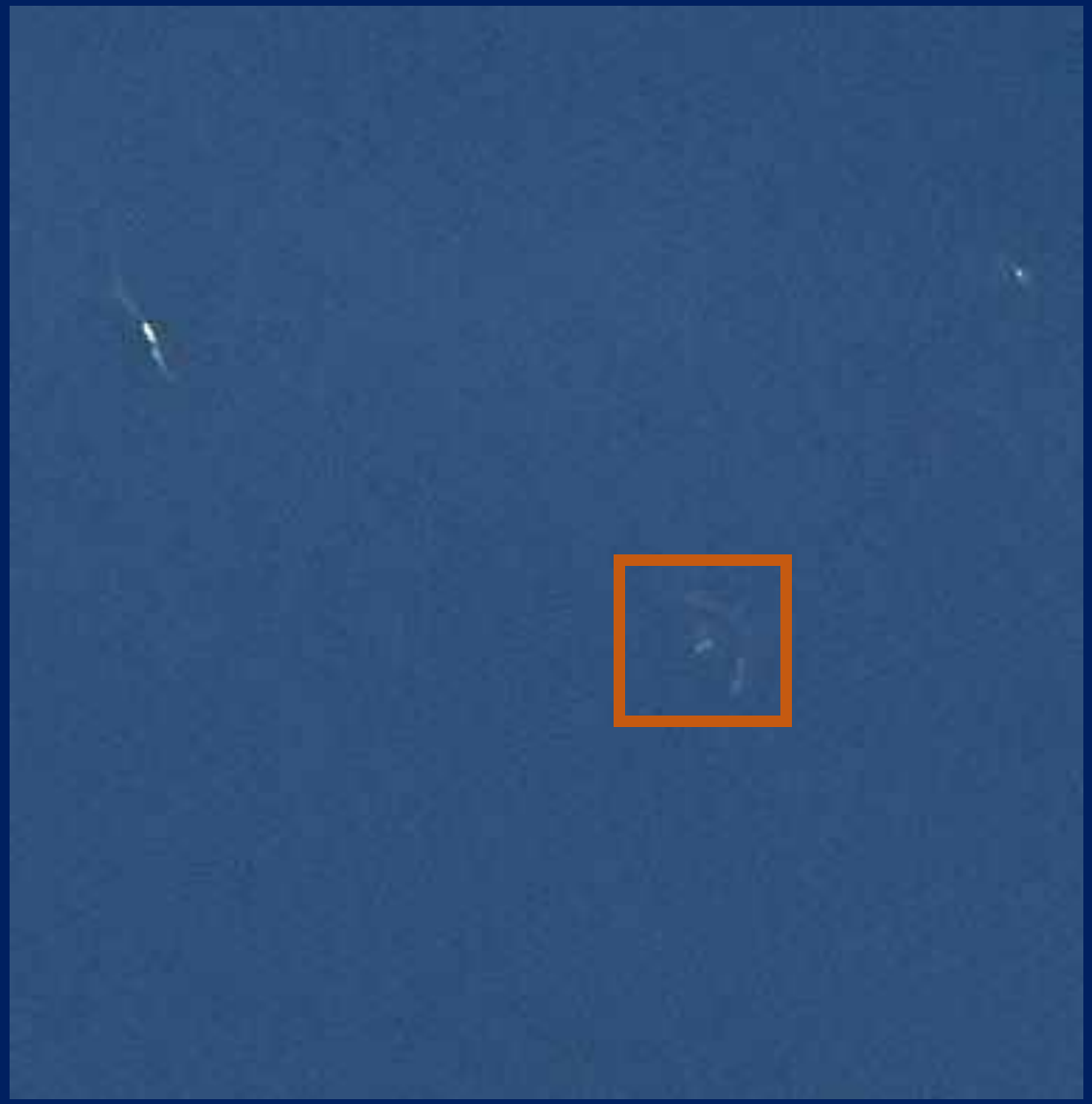
Port Ross – Auckland Islands

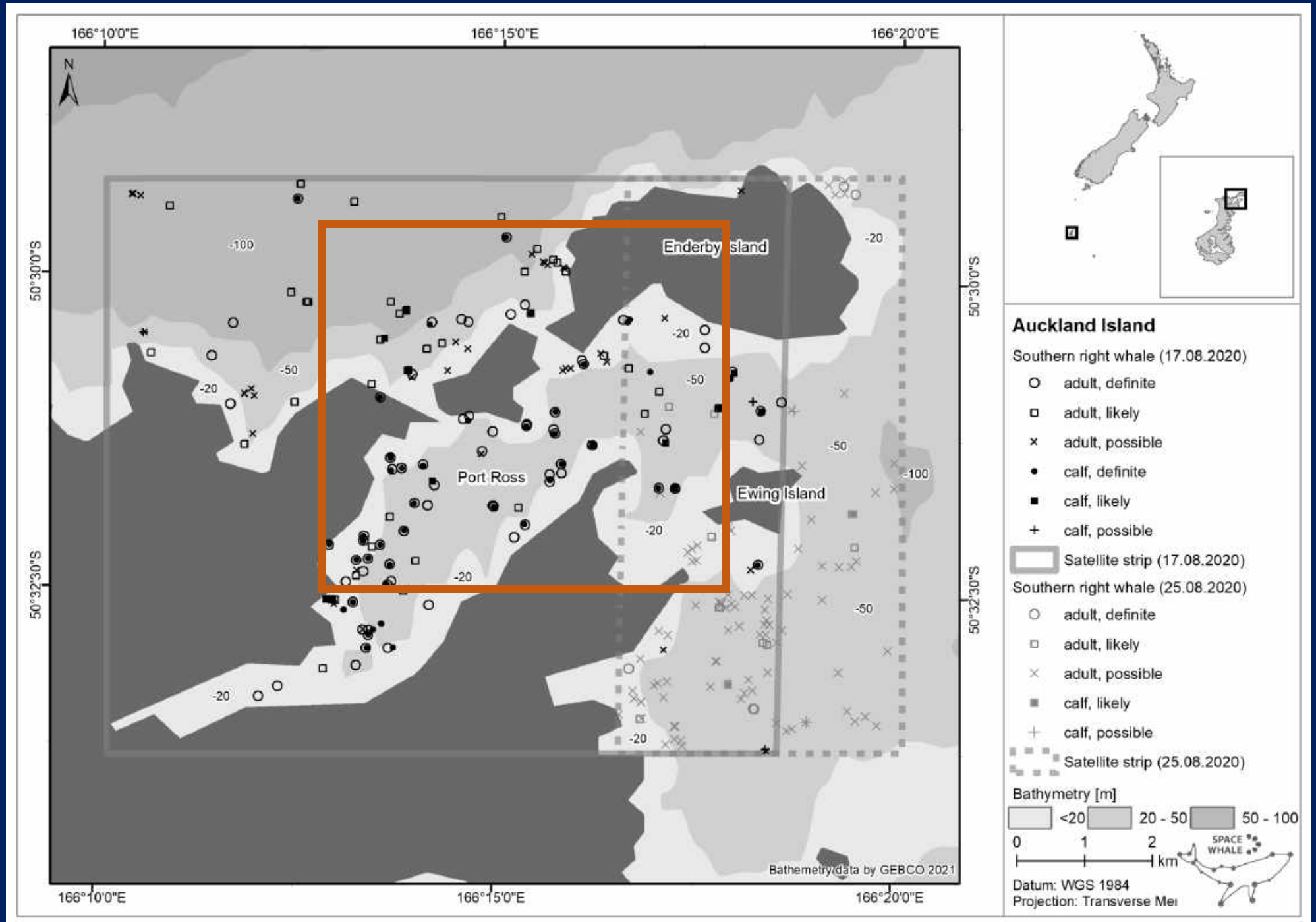
https://www.nzgeo.com/stories/thar-she-blows-a-grisly-trade-in-bone-and-oil/



Harcourt et al. 2019

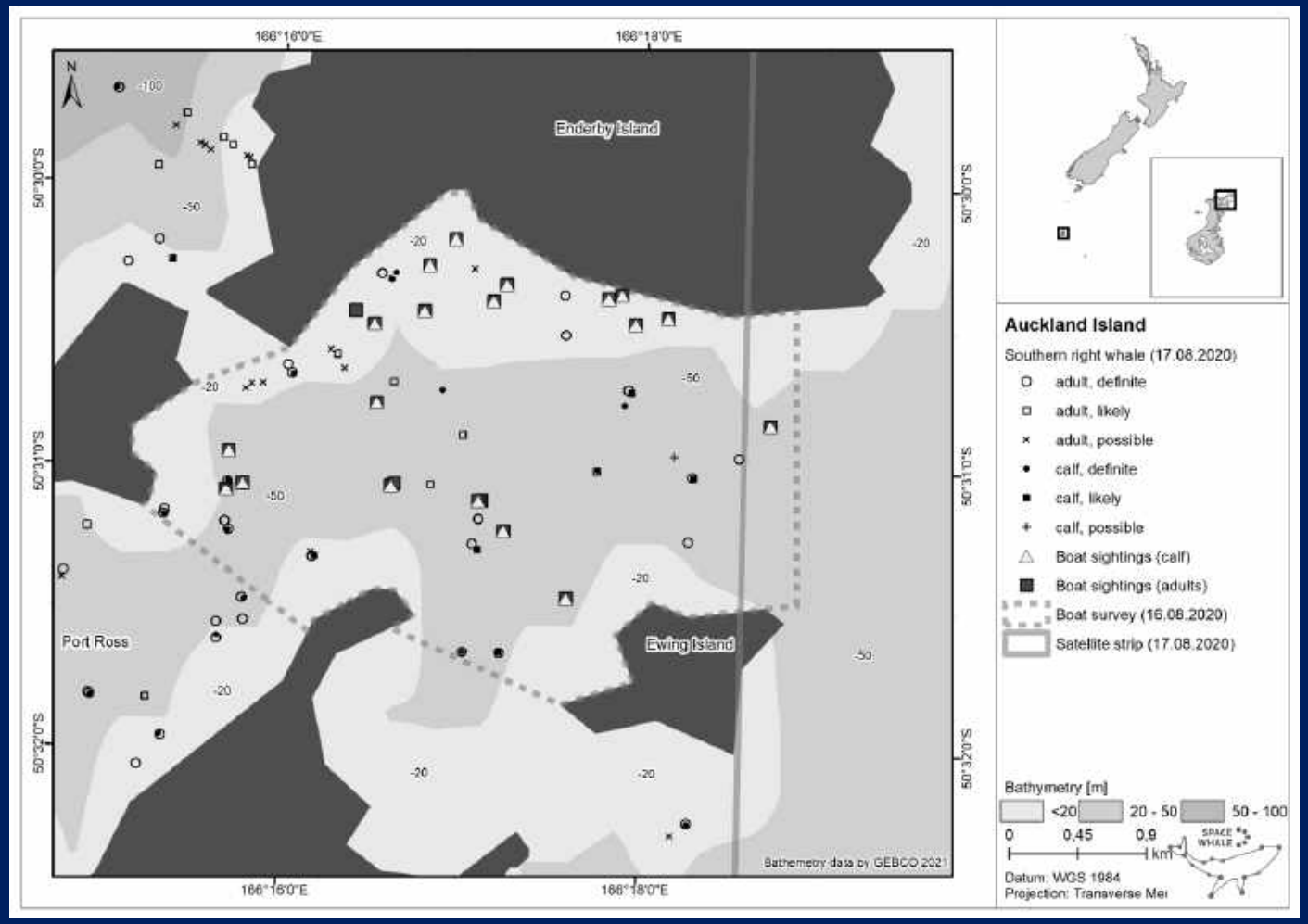
Port Ross: WorldView-2





Höschle et al. 2022, IWC

Port Ross

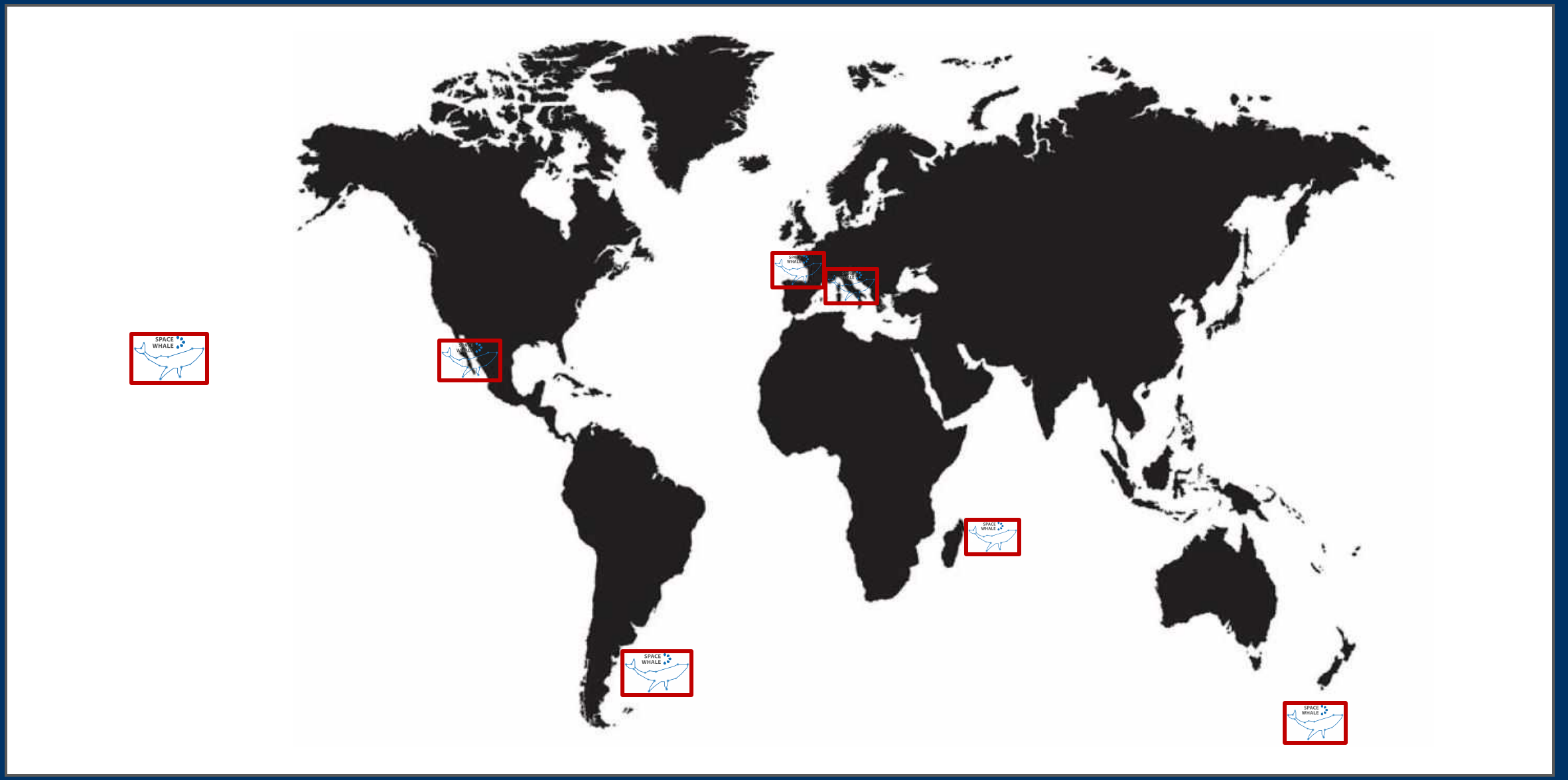


- Data were comparable to results of traditional survey methods
- SPACEWHALE can complement data in explored regions and provide baseline data in unexplored regions

Date	Methodology	Adult (southern right whales)	Calf (southern right whales)	Total (southern right whales)
2020-08-16	Boat-based survey	25	16	41
2020-08-17	Satellite survey (definite and likely)	23	18	41

Höschle et al. 2022, IWC

Successful surveys



Our market and customers

1

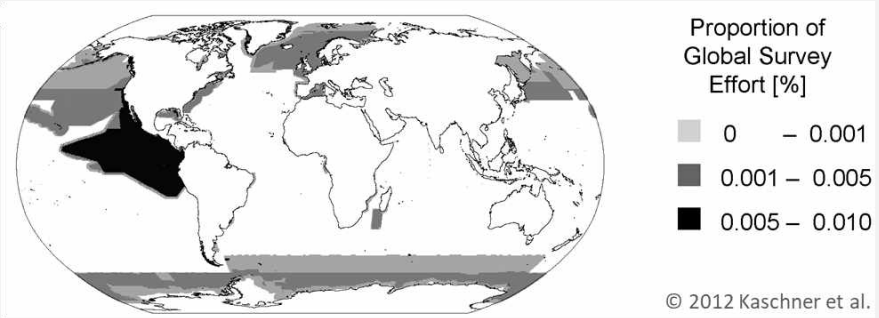
Providing data to find solutions for combining species conservation and human use of the seas (mostly commissioned by industry like offshore wind farm operators)

14 LIFE BELOW WATER

INTERNATIONAL WHALING COMMISSION

2

Providing a tool for mandatory baseline monitoring of whale populations (mostly commissioned by governments and universities)



3

Filling knowledge gaps and thus enhancing conservation like reaching the 30by30 target (mostly commissioned by NGOs)

Resolution of 10 cm

Expected to be launched 2025

…. Show specifications

Resolution of 10 cm

Expected to be launched 2025

…. Show specifications

Demosntation what is need..

Unique strength of the method

Restrictions

in data collection

In the analysis

Timing

Costs

Summary

Look into the future

……

www.spacewhales.de