

Field testing of experimental gillnets on the bycatch rates of Franciscana dolphins in Argentina

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Outline

Background to the problem

Background of modified gillnet trials

Description of fishery

Methodology of gillnet experiments

Results

Underwater fishing behaviour of gillnets

Franciscana dolphin (*Pontoporia blainvillei*)



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Endemic coastal species

Bycatch in gillnet fisheries

Vulnerable



Four distinct Franciscana Management Areas (FMAs)

(Secchi et al. 2002)

FMA 4 Argentina

500-800 dolphins / year

17,000 dolphins

Over 2% of stock FM4

Isolated population at BSB

(Bordino et al 2004, Cappozzo et al 2010, Crespo et al. 2010, Mendez et al 2010)



Franciscana bycatch mitigation in Argentina

Pinger trials
(2002)



Gear switching
(2004)



Modified gillnets
(2007-present)



Background to modified gillnet trials

Considerable focus on increasing the acoustic reflectivity of gillnets with denser materials such as BaSO_4

Bycatch rates

Bordino et al. (unpublished), Larsen et al. 2007, Northridge et al. (unpublished), Trippel et al. 2003, 2009

Acoustic and mechanical properties

Larsen et al. 2007, Mooney et al. 2004, 2007, Trippel et al. 2003)

Echolocation behaviour

Cox and Read 2004

Unclear whether reductions in harbour porpoise bycatch rates were as a result of the **acoustic or mechanical** (stiffness) **properties** of these nets, **or both**.

Aims

Investigate bycatch rates of Franciscana dolphins in standard, acoustically reflective and “stiff” gillnets.

Compare the underwater fishing behaviour of these nets

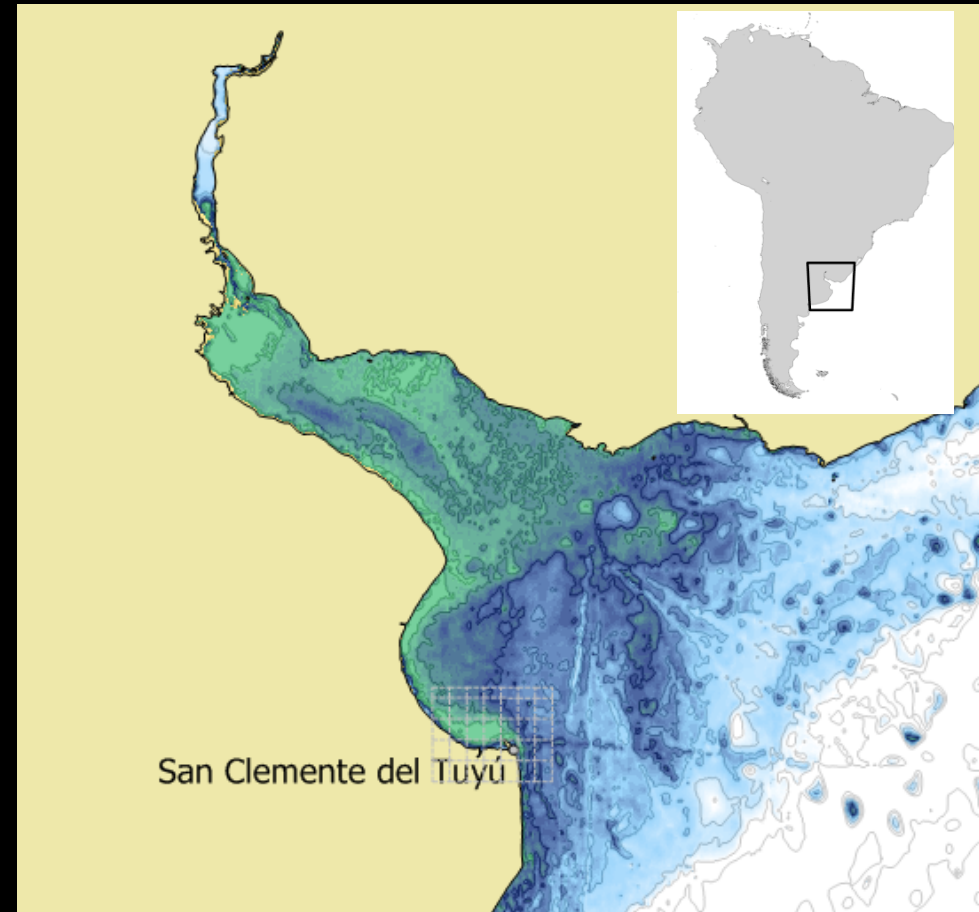
Description of fishery

Artisanal gillnet fishery

30-50 boats

Bahia Samborombon

Offshore San Clemente
del Tuyú



6-10m fibreglass launches

Description of fishery

striped weakfish (*Cynoscion guatucupa*)



white croaker (*Micropogonias furnieri*)



100m net length (2 x 50m panels)

24 hours soak time

Parallel / perpendicular

Hand hauled



Net characteristics

Three net types : Standard

BaSO₄ (10% by weight)

Chemically stiffened

Stretched mesh size	Twine diameter	Net length	Net height
140mm	0.6mm	100m	3.5m

All nets rigged with equal amount of lead and flotation

Individually numbered and colour coded.

Nets set at a minimum distance of 100m

Trial conducted with 5 UAPA (Argentina Artisanal Fishermen Federal Union) fishermen



Independent onboard observers:

- Set location and soak time
- Environmental variables
- Net orientation
- Fish catches (biomass and species)
- Dolphin bycatch
- Sea lion interactions (% of damage)



Results of experimental trial

883 hauls observed between October 2009 and March 2010

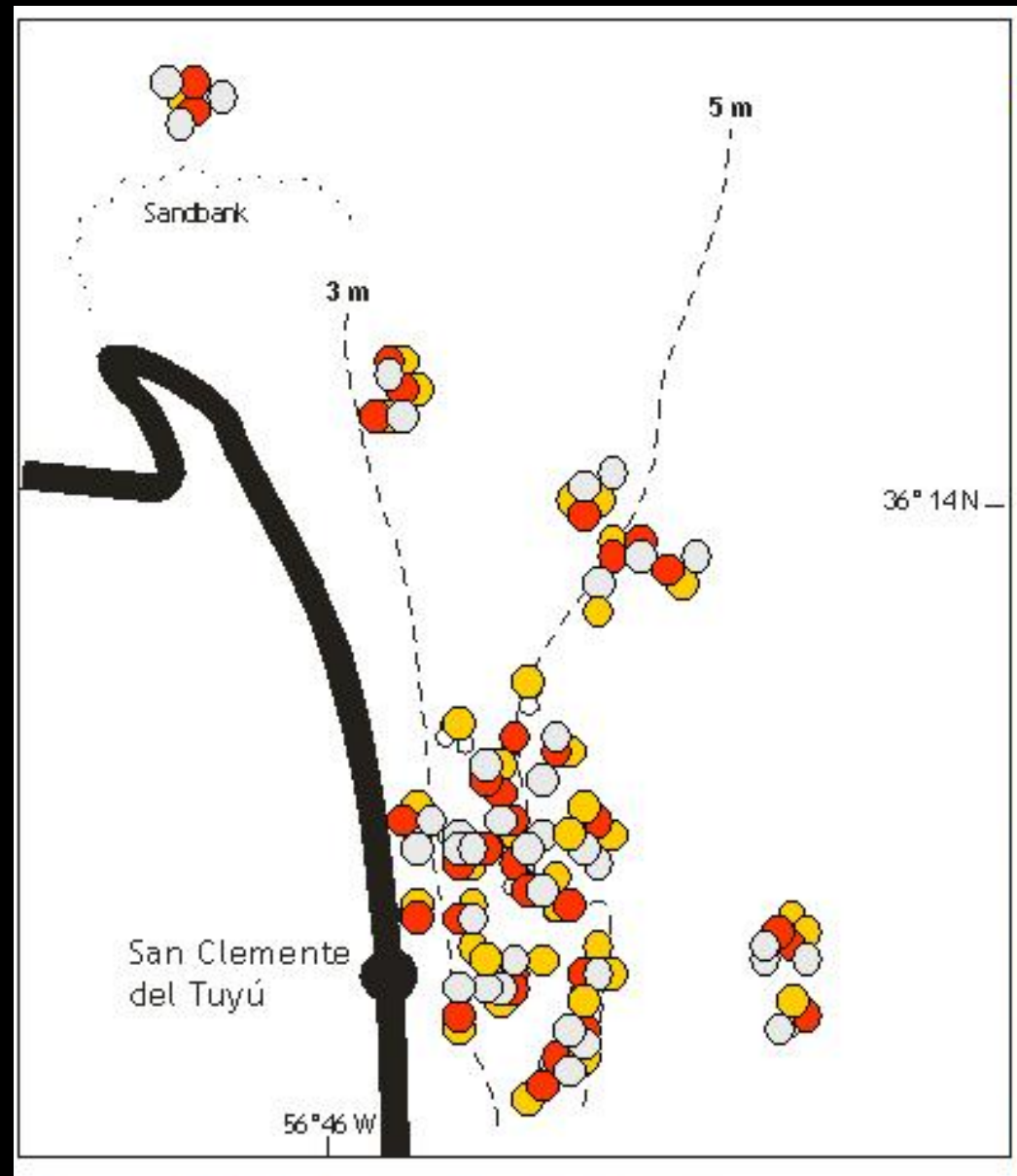
	Standard	BaSO₄	Stiff
Number of hauls	298	291	294
Fishing effort (m2 x hs)	3664400	3122000	3344000
Mean soak time (hs)	23.7	24.1	23.1

Spatial distribution of sets

● Standard

● BaSO₄

● Stiff



Results

	Standard	BaSO ₄	Stiff
Number of hauls	298	291	294
Mean CPUE weakfish (Kg/FE)	0.018	0.01	0.015
Mean CPUE white croaker (Kg/FE)	0.0027	0.0026	0.0024
No. of hauls with bycatch (total no. of individuals)	25(28)	22(26)	16(21)
CPUE dolphin	0.031	0.029	0.026
% sea lion interaction	28	29	28

No significant difference in CPUE of target catch

No significant difference in dolphin bycatch rates

Analysis of necropsy data

Statistical modelling:

Latitude/longitude

Depth

Net orientation

Net position



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Underwater fishing behaviour of nets

Modifying gear characteristics will effect how nets fish

↑ density of nylon = ↑ weight of net panel

Cox and Read 2004 – significantly higher catches
of lobster in BaSO₄ nets

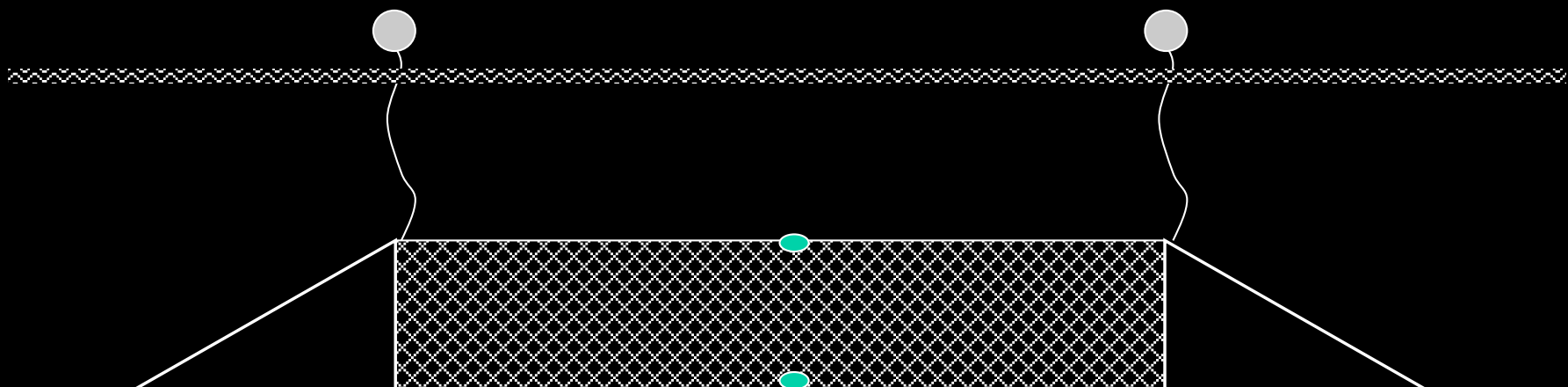
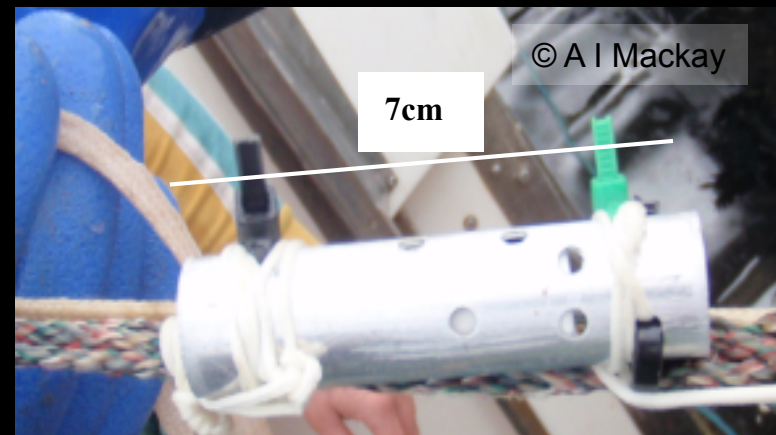
Nets in Argentinean trial rigged with equal amounts of
lead and flotation

Methods

Star ODDi DST-milli©

3.8 x 1.3mm, 5g in water

± 0.4m accuracy



Pair of sensors placed on lead line and float line of net

Data

First trial: October – December 2009

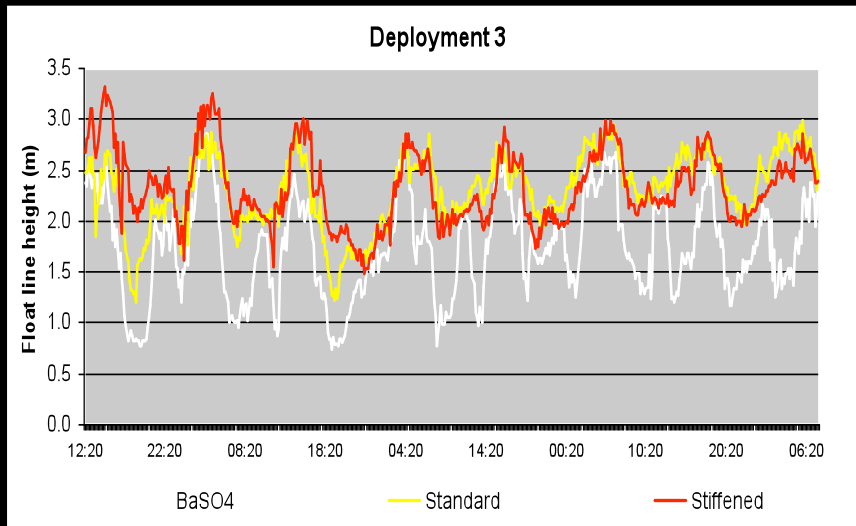
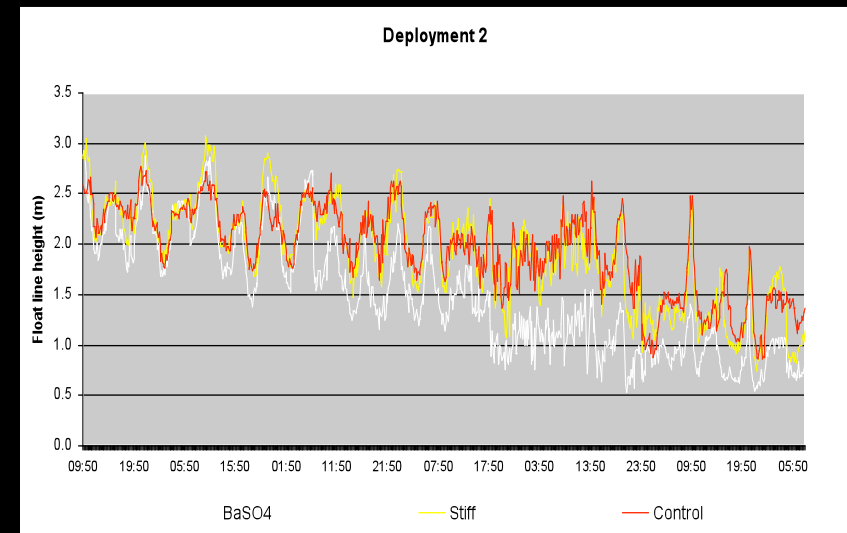
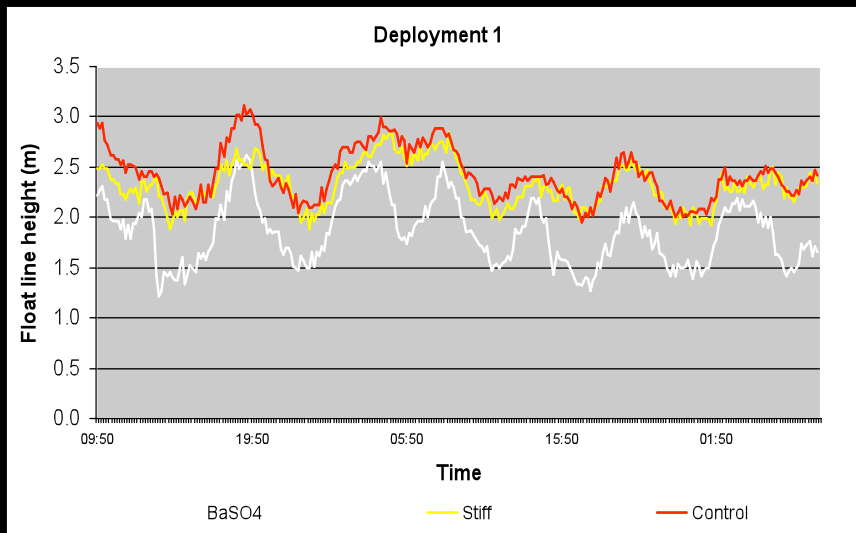
15 deployments each net type
parallel and perpendicular
all fishing locations

Second trial: August 2010

3 deployments each net type
perpendicular to current
inner bay

Deployment number	Total days recording
1	2
2	7
3	2

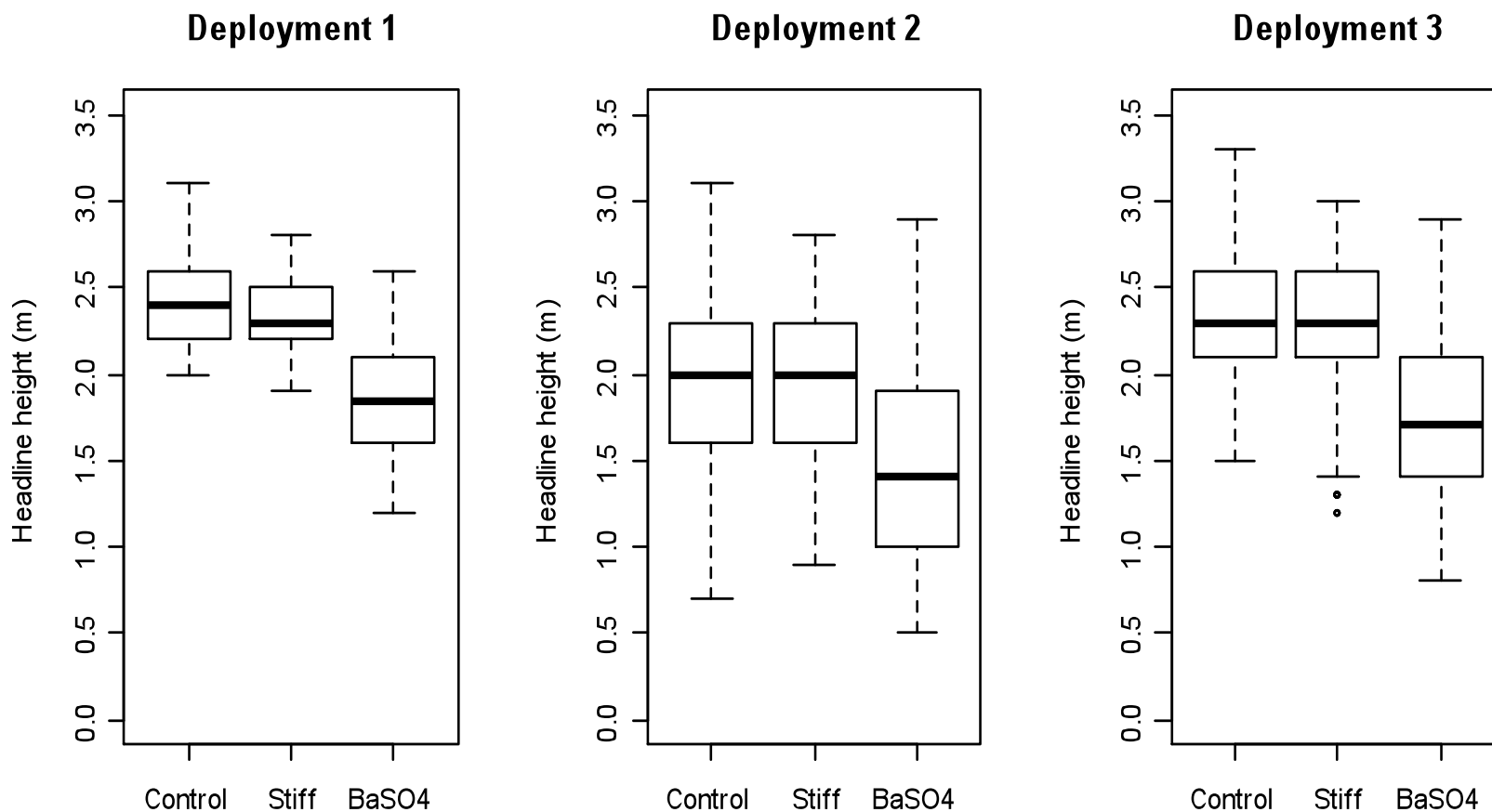
Results



Standard and stiff net fished
60%-70% rigged height

BaSO₄ net fished 40%-50%

Results



The headline height of the BaSO₄ net was statistically lower
In all deployments ($p < 0.001$)

Conclusions and future work

↓ fishing height of BaSO_4

No significant difference:

CPUE of target fish

Franciscana bycatch rates

Ongoing trial in Brazil (Eduardo Secchi)

Further net behaviour trials

Echolocation behaviour?



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