Population assessment of *Nautilus* in the Philippines, Australia, Fiji, and American Samoa

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Miscellaneous Quotes

- "The shells have hitherto found little market; locally they are used as drinking cups, or flower vases, and are sometimes cut into roughly shaped spoons… now bought extensively by Chinese shopkeepers, and at such <u>good prices that there will probably be a goodly Nautilus fishery before long</u>… export the shells to China, where they are used as material for button-making." (Dean 1901)

Miscellaneous Quotes

- “Capture of nautilus in the lower depth range can be a useful supplementary source of income.” (Blanc 1987)

- “Export of living nautilus for aquariums could be investigated, in addition to local sale of the shells.” (Blanc 1987)

Catch Effort

- 20 “shells” per basket (Dean 1901; Tanon)
- Chinese traders – 3000 N (Dean 1901; Tanon?)
- 1 Trap : 36 N (Vanuatu, Blanc 1987)

Primary Goals

1. **Count *Nautilus* in traps**
   - Calculate Catch per Unit Effort
   - Baited traps

2. **Count *Nautilus* on video**
   - Calculate population abundance
   - Baited remote underwater video systems (BRUVS)

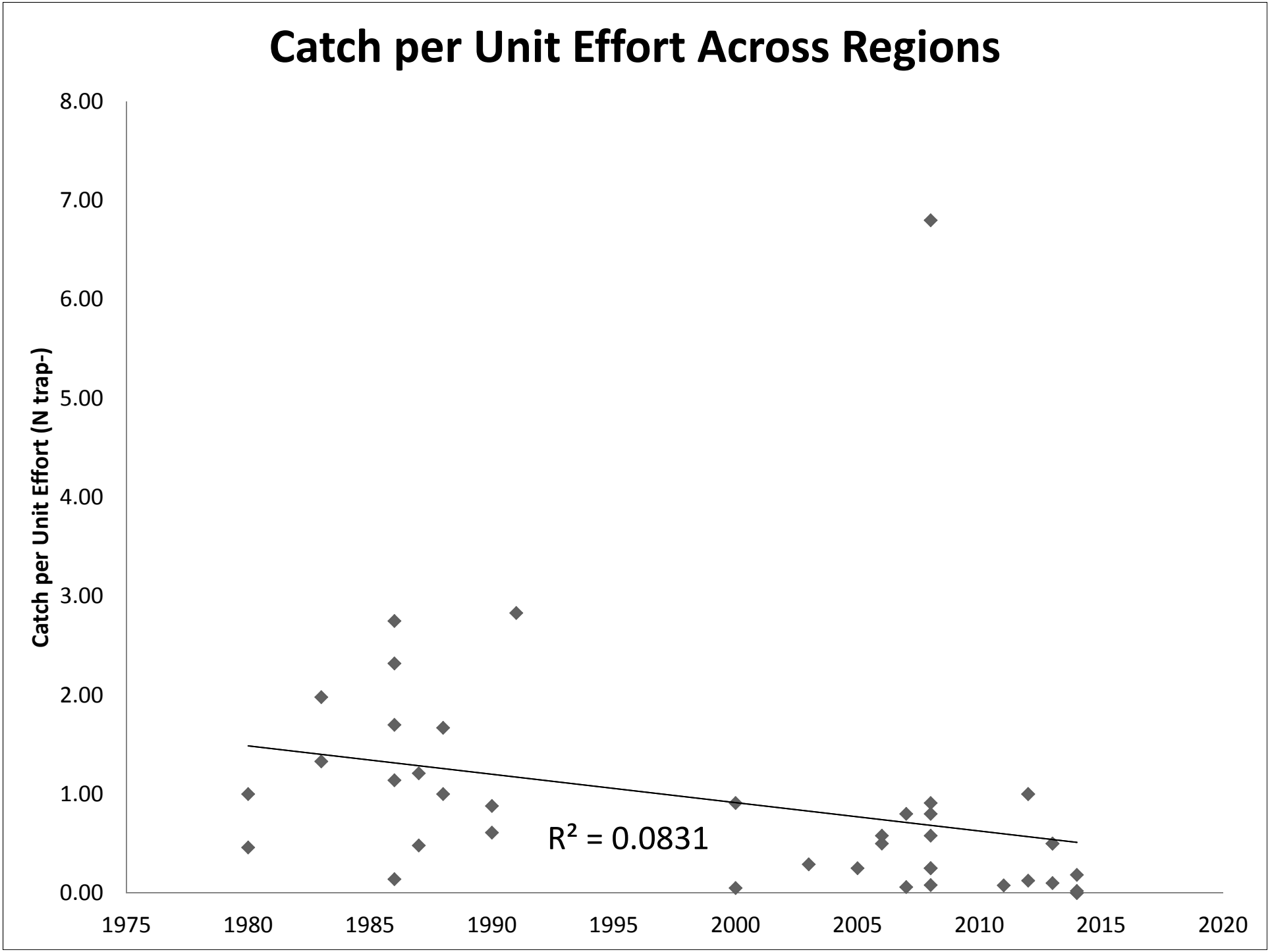
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
US Dept of State Geographer
© 2013 Cnes/Spot Image
Image © 2013 TerraMetrics
Google earth
Tour Guide
eye alt 9215.55 km

Objective 1: Catch per Unit Effort

- Catch per Unit Effort (CPUE)
  - Total number of *Nautilus* per trap
- Data:
  - CPUE
  - Diameter and width
  - Weight
  - Sex
  - Morphology
  - Photographs (Hotspotter)
  - By-catch

Catch per Unit Effort

Location	Year	CPUE	Location	Year	CPUE	Location	Year	CPUE
Binduyan	1980	1.00	Brookes Point	1990	0.88	Balabac	2008	0.80
Roxas	1980	0.46	PNG	1991	2.83	Balabac	2008	0.58
Suva	1983	1.33	Brookes Point	2000	0.05	Osprey	2008	6.80
Pacific Harbour	1983	1.98	Balabac	2000	0.91	Bohol Sea	2011	0.08
Binduyan	1986	1.70	Roxas	2003	0.29	GBR	2012	1.00
Roxas	1986	0.14	Quezon	2005	0.25	Bohol Sea	2012	0.13
Roxas	1986	1.14	Quezon	2006	0.50	Andaman Sea	2012	1.00
Suva	1986	2.32	Balabac	2006	0.58	Bohol Sea	2013	0.10
Ovalau	1986	2.75	Quezon	2007	0.06	Pacific Harbour	2013	0.50
Brookes Point	1987	0.48	Balabac	2007	0.80	Pago Pago	2013	0.50
Vanuatu	1987	1.21	Brookes Point	2008	0.08	Bohol Sea	2014	0.18
Quezon	1988	1.00	Binduyan	2008	0.25	Siquijor	2014	0.00
Quezon	1988	1.67	Binduyan	2008	0.25	Delaguete	2014	0.00
Quezon	1990	0.61	Balabac	2008	0.91	Delaguete	2014	0.02


Catch per Unit Effort Across Regions
Catch per Unit Effort (N trap-)
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1975
1980
1985
1990
1995
2000
2005
2010
2015
2020
R² = 0.0831

Catch per Unit Effort

Location	Year	CPUE		Location	Year	CPUE		Location	Year	CPUE
Pacific Harbour	1983	1.98		Brookes Point	2000	0.05		Balabac	2008	0.58
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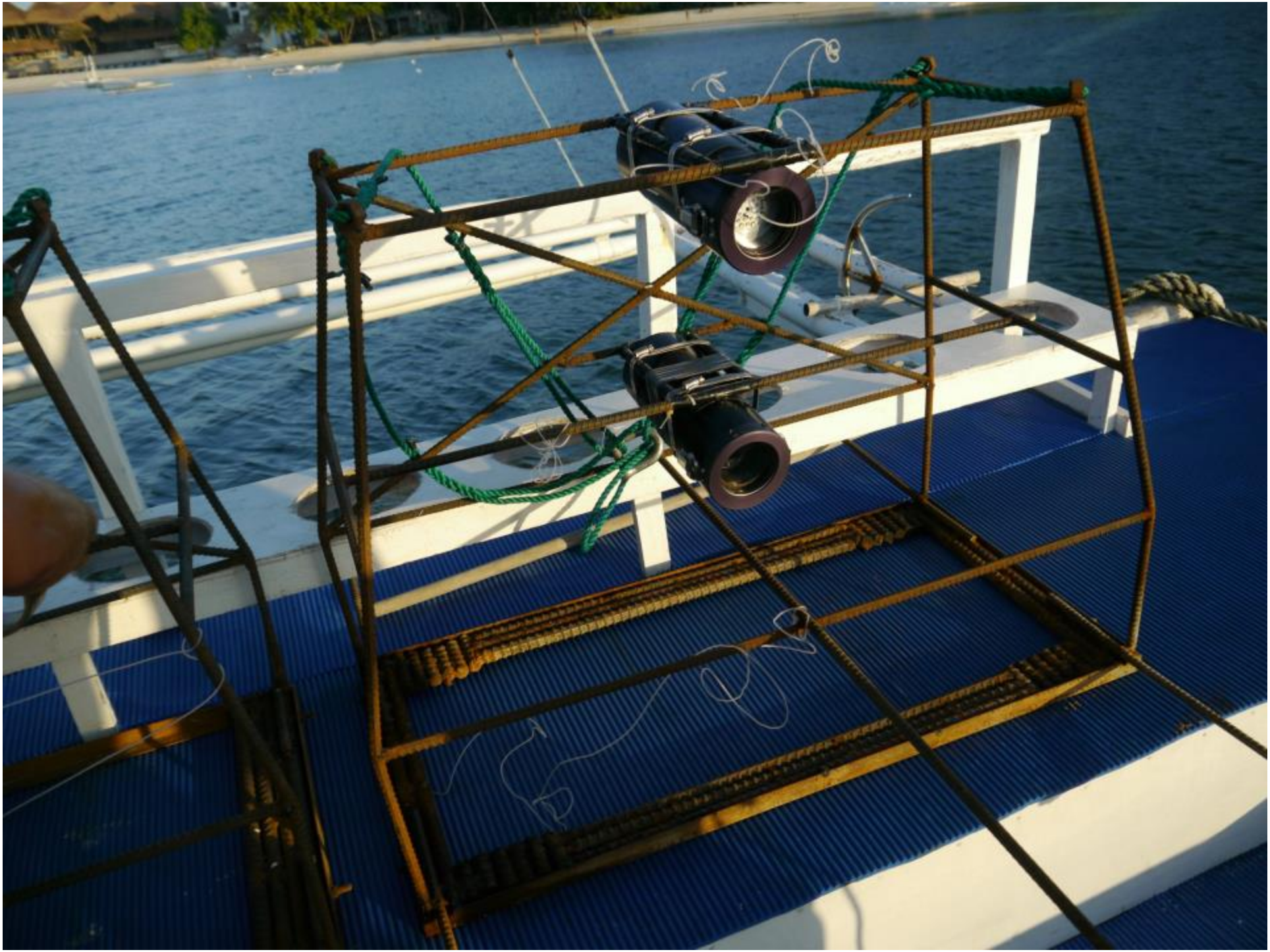
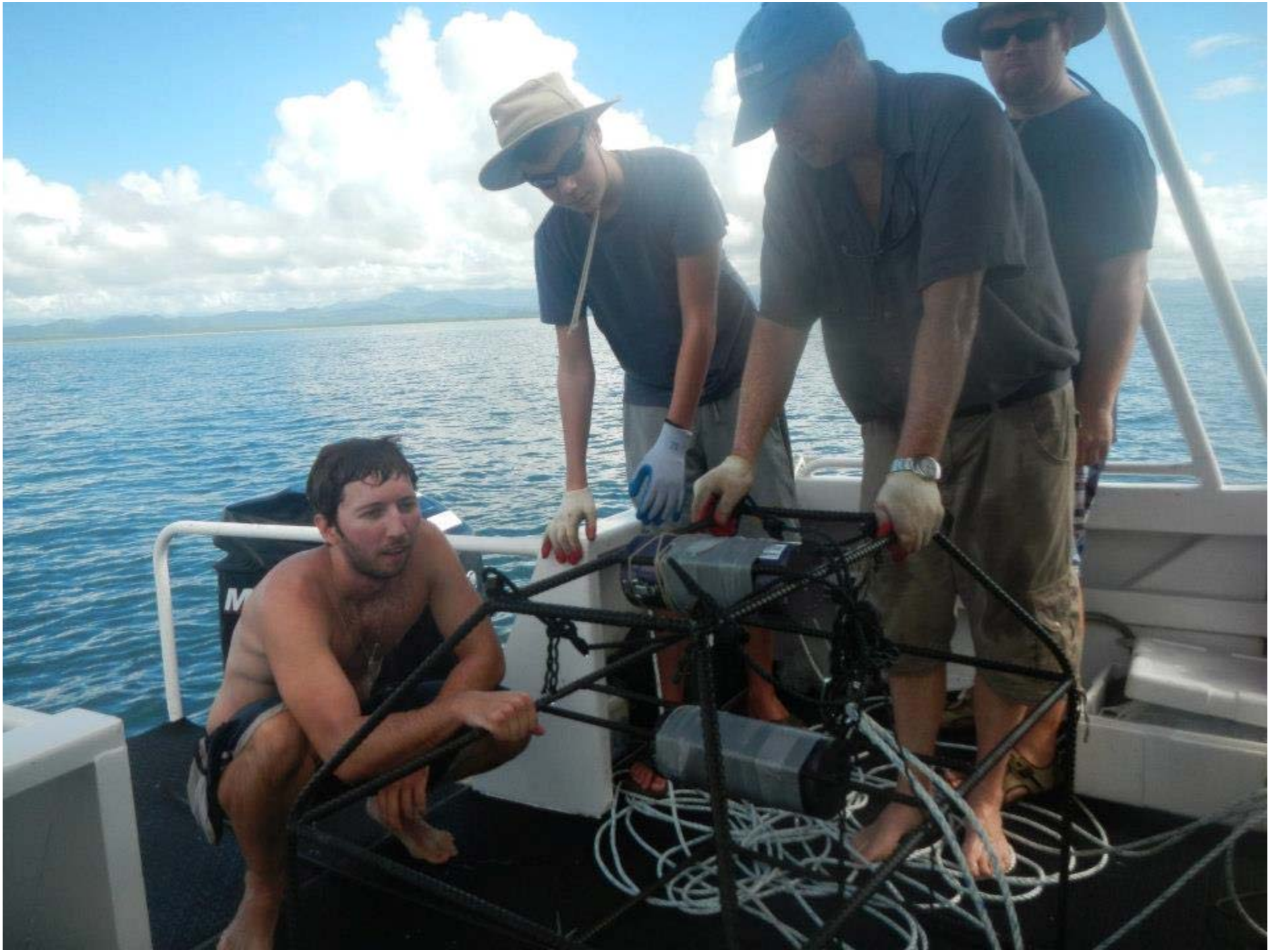
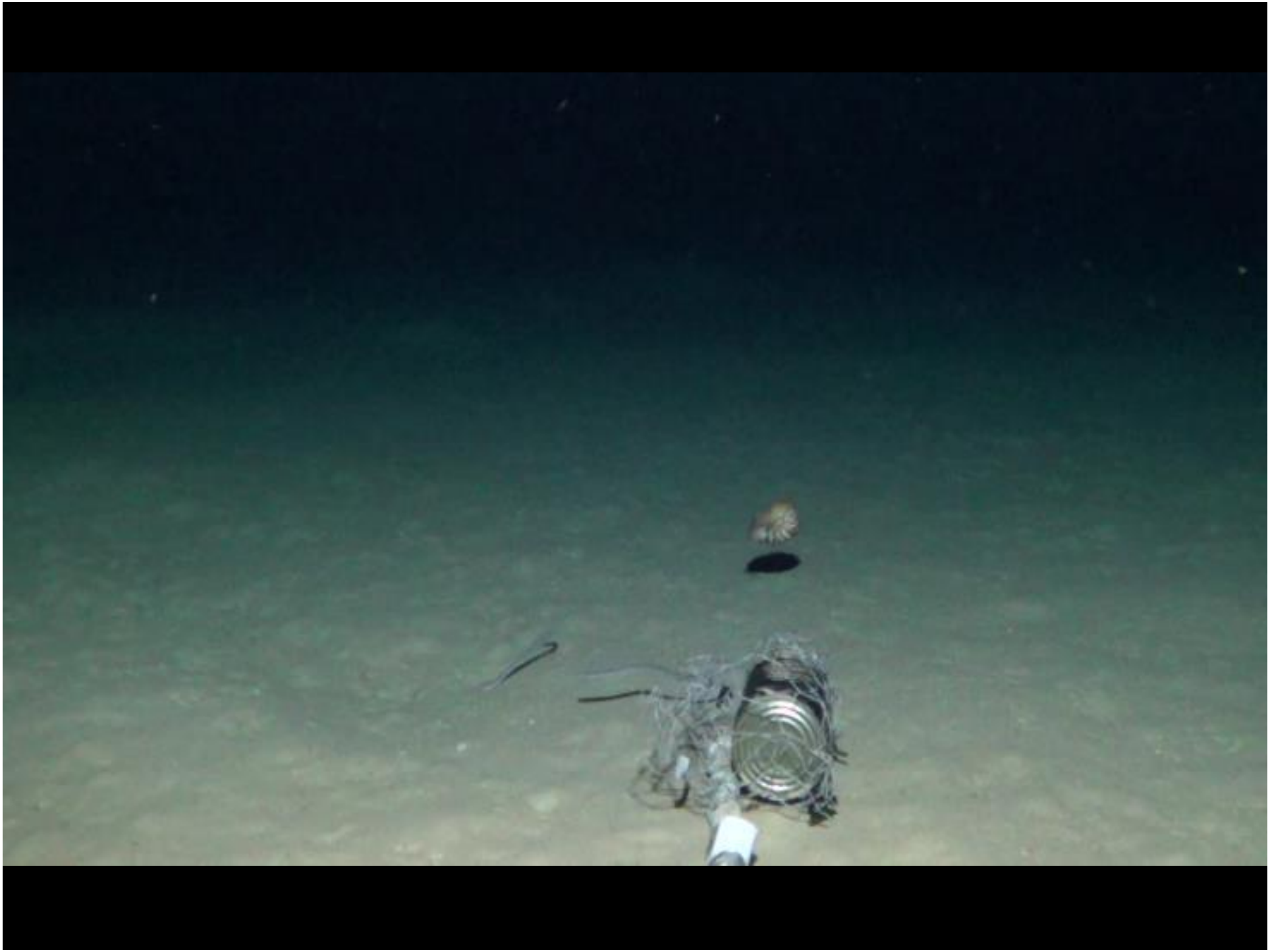
PNG	1991	2.83		Balabac	2008	0.80		Delaguete	2014	0.02

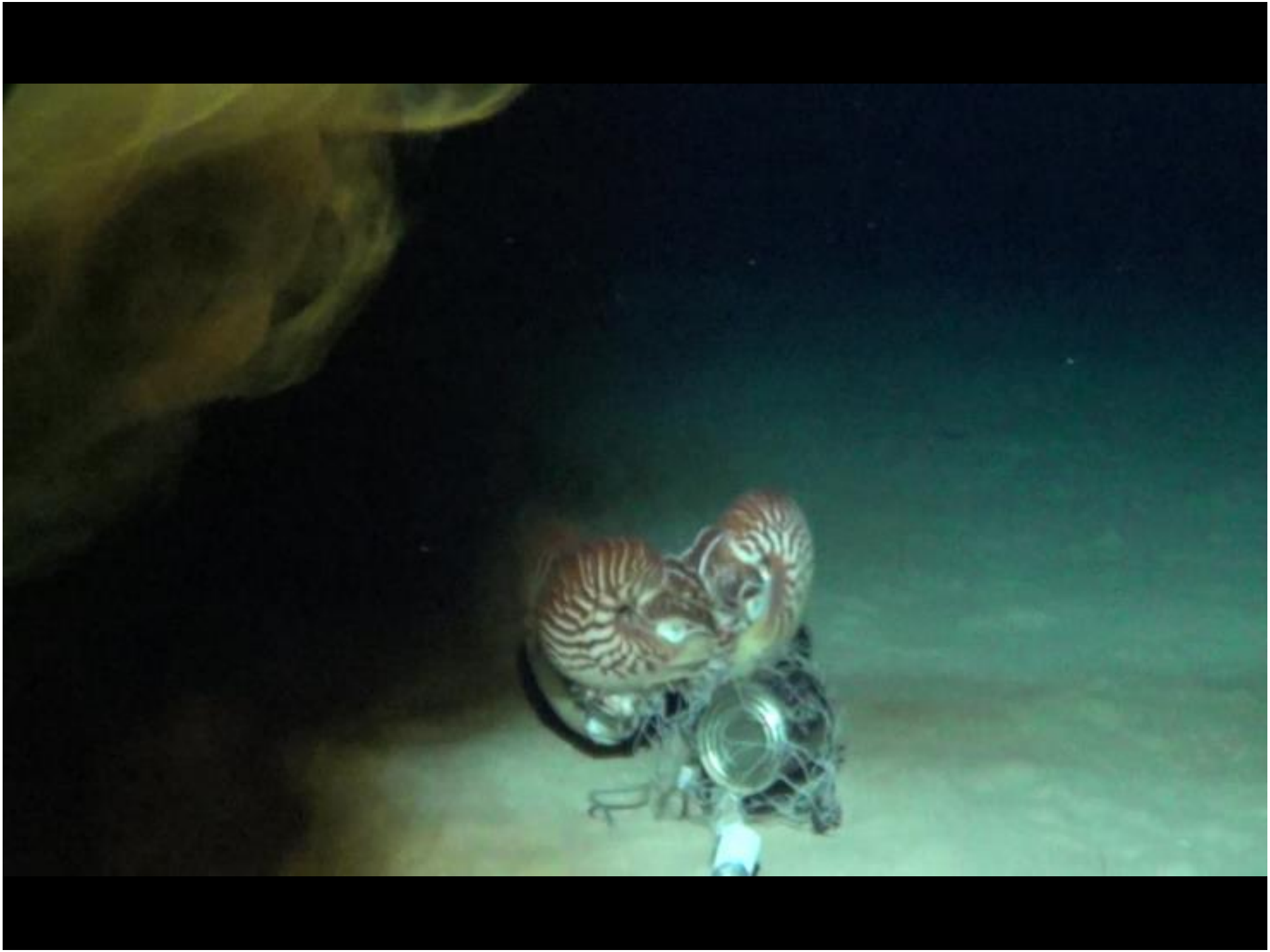
Objective 2: Population Abundance

- Baited remote underwater video systems (BRUVS)
- Data:
  - Total number of *Nautilus*
  - *Nautilus* attraction rate to bait
  - Population abundance
  - Species composition
  - Habitat descriptions
  - Behavior
  - Snap shots (Hotspotter)

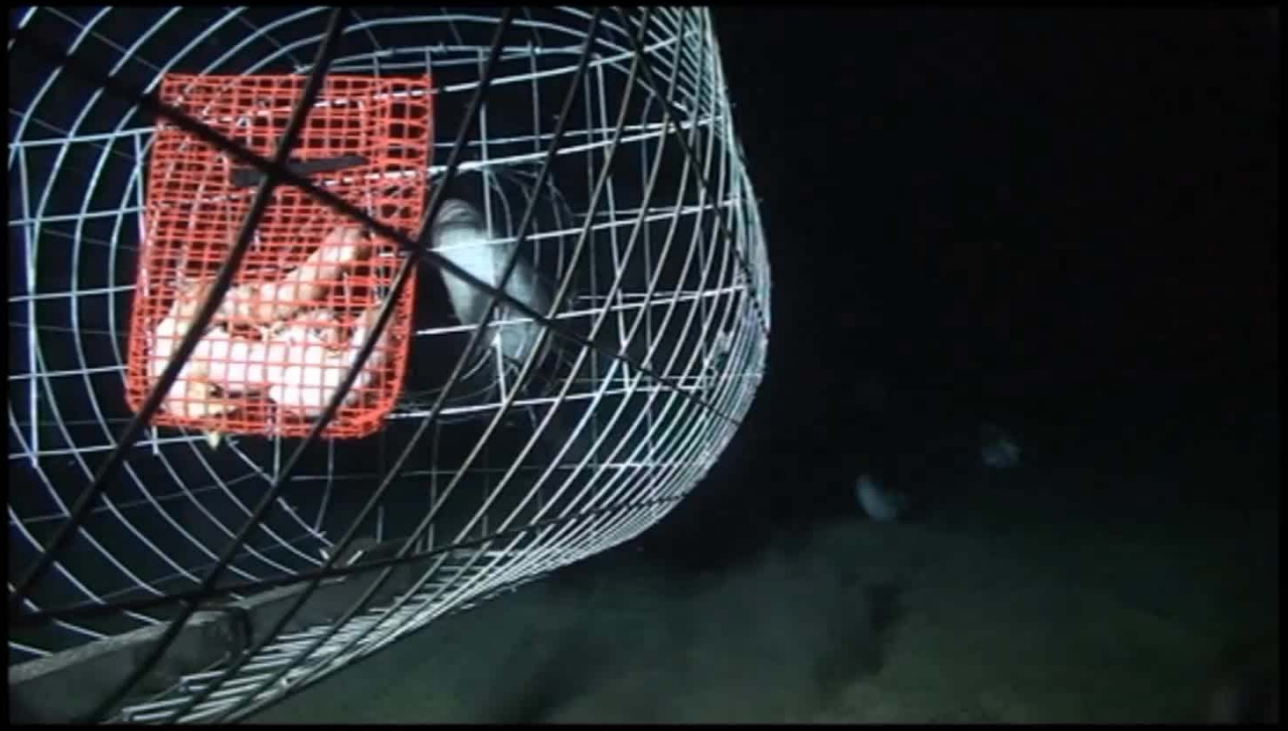




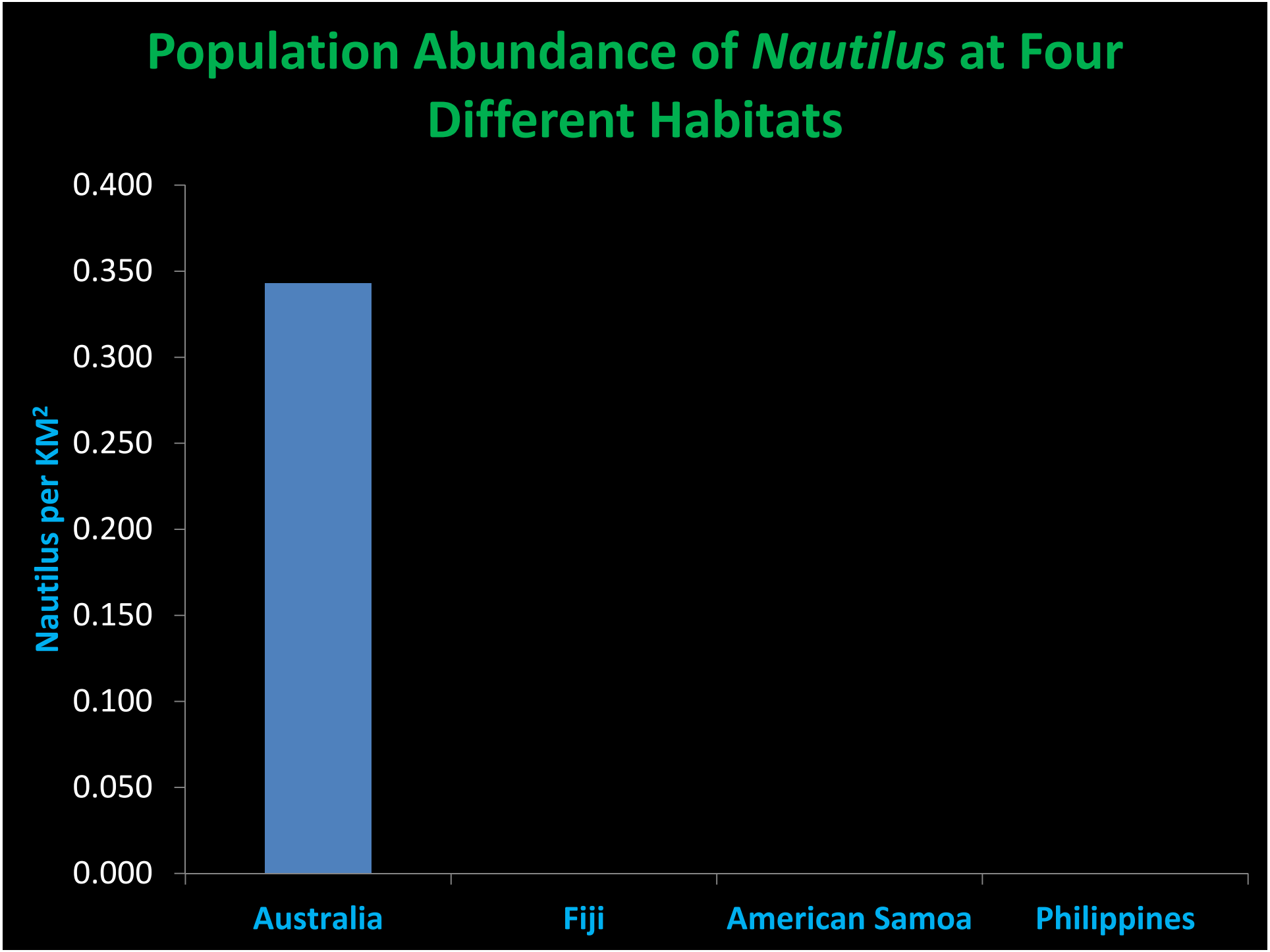


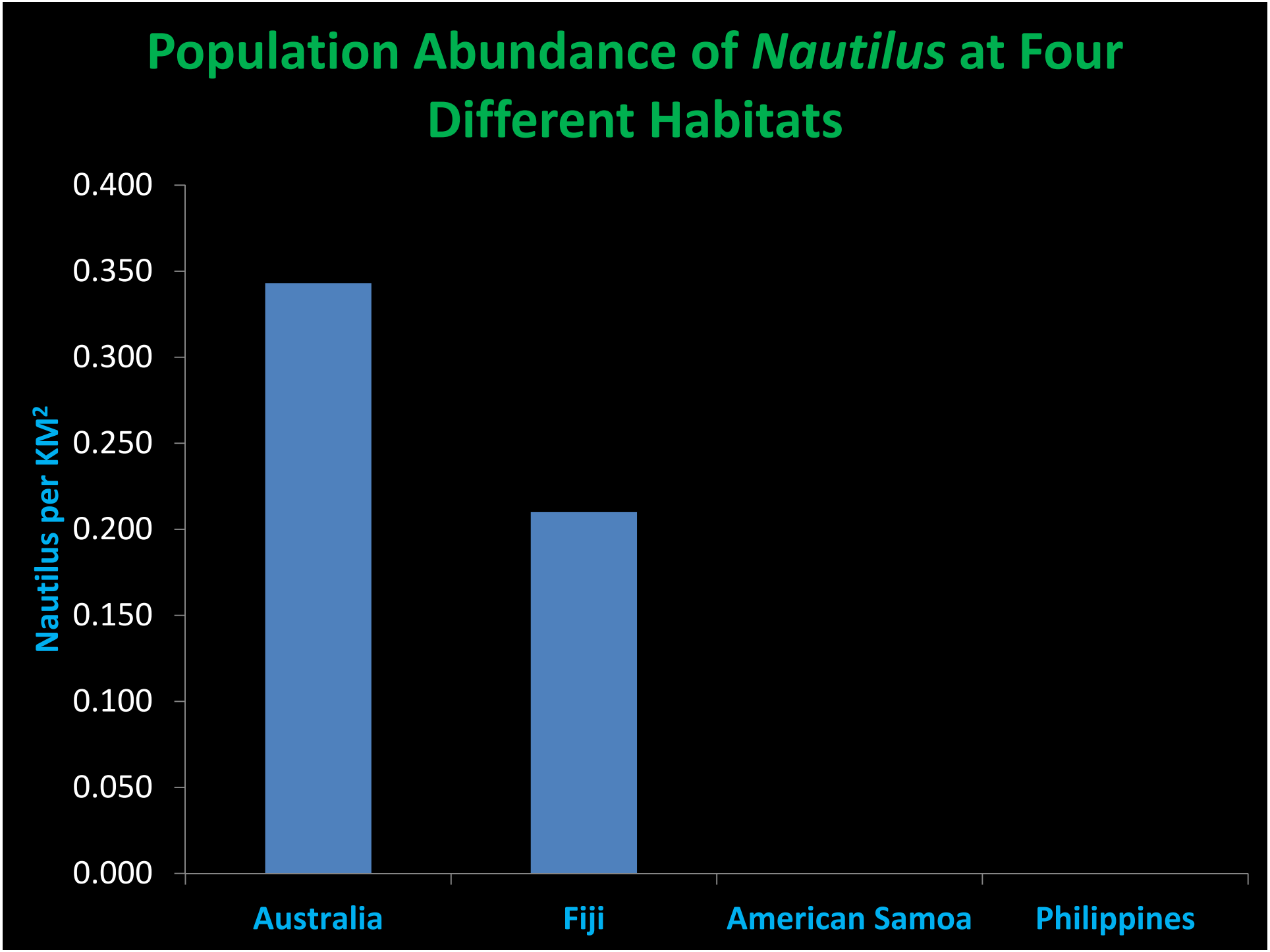


Australia



Population Abundance of *Nautilus* at Four Different Habitats


Population Abundance of *Nautilus* at Four Different Habitats
Nautilus per KM2
0.400
0.350
0.300
0.250
0.200
0.150
0.100
0.050
0.000
Australia
Fiji
American Samoa
Philippines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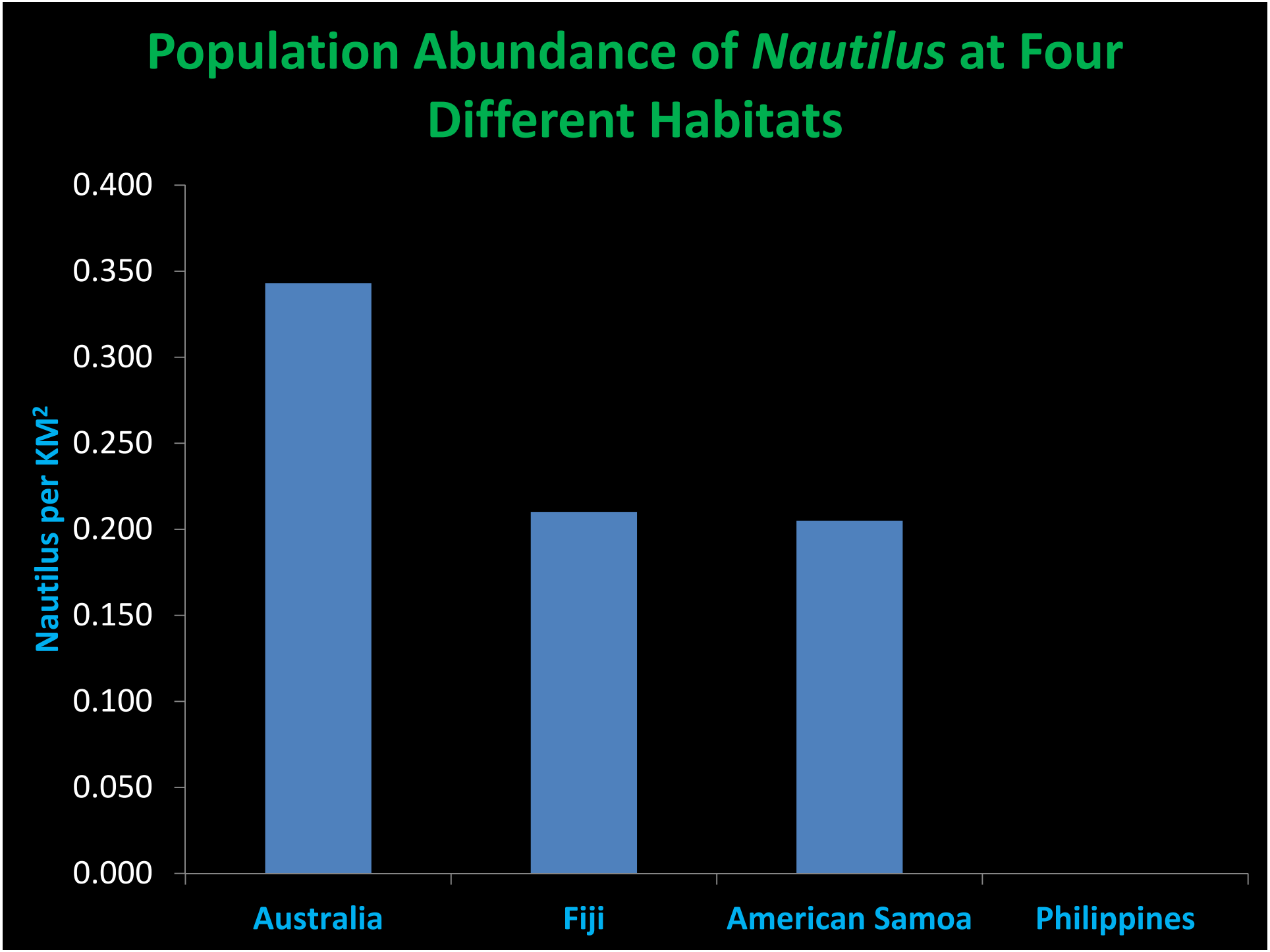
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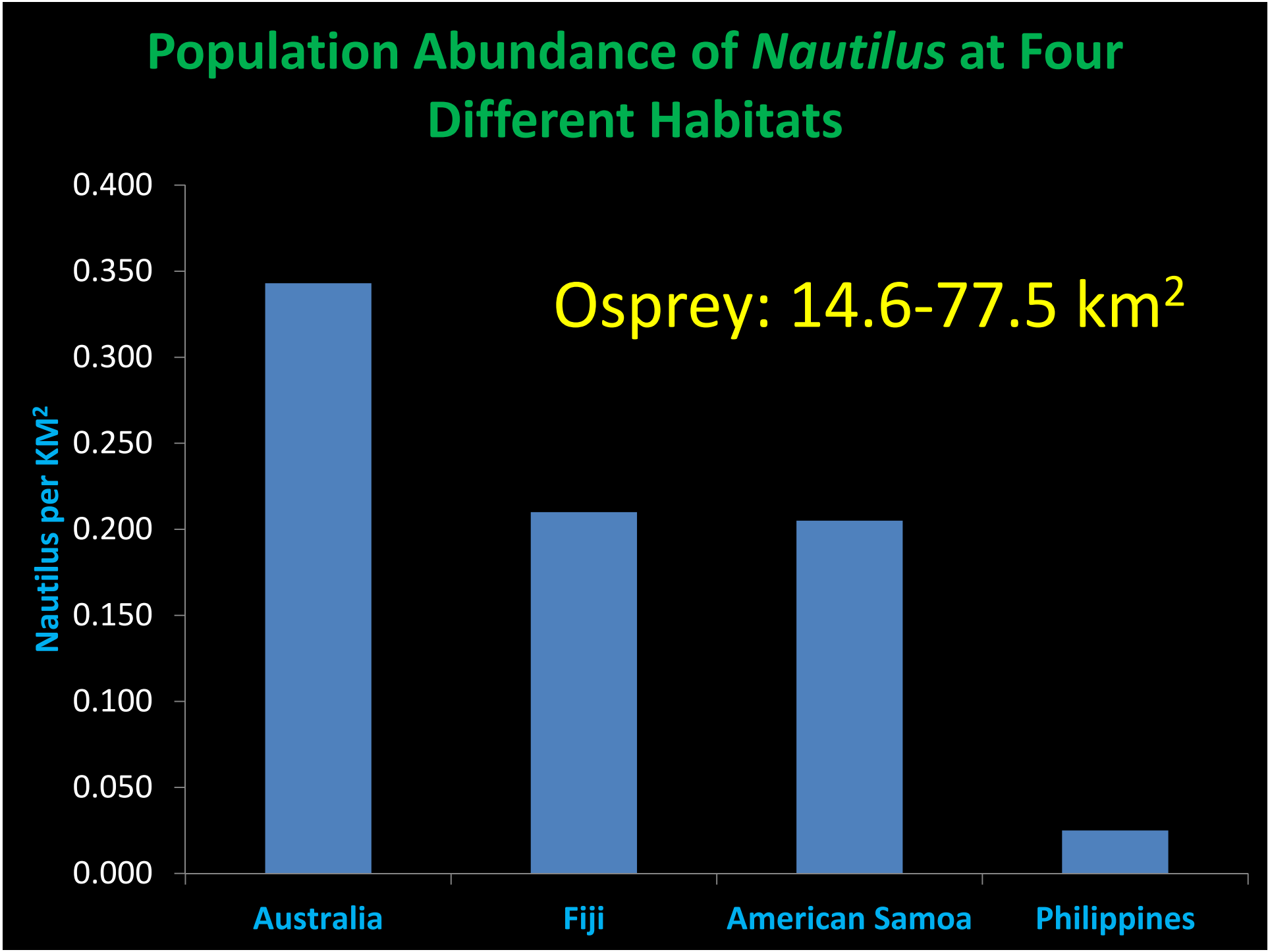
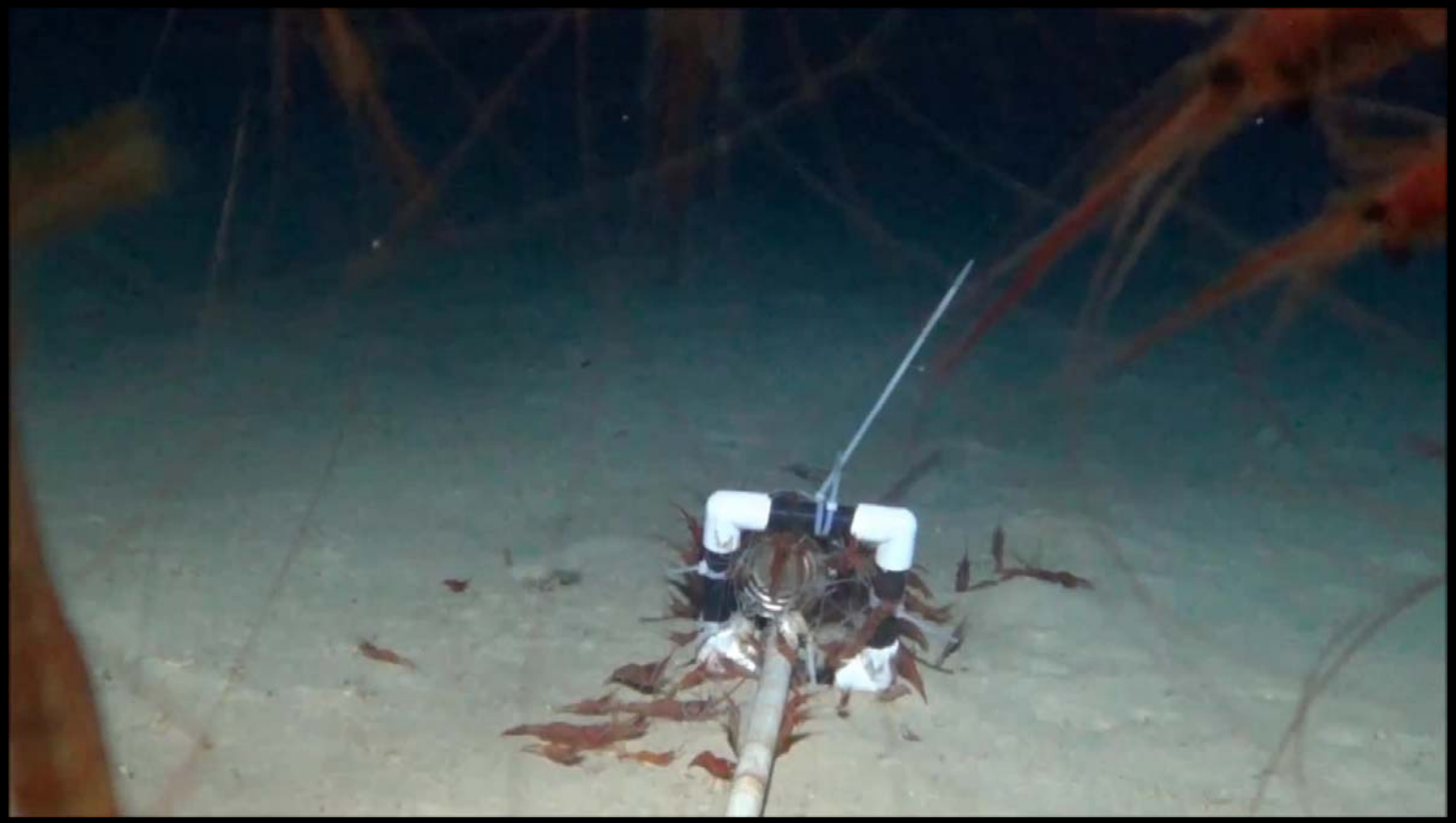

Population Abundance of *Nautilus* at Four Different Habitats
Nautilus per KM2
0.400
0.350
0.300
0.250
0.200
0.150
0.100
0.050
0.000
Osprey: 14.6-77.5 km2
Australia
Fiji
American Samoa
Philippines

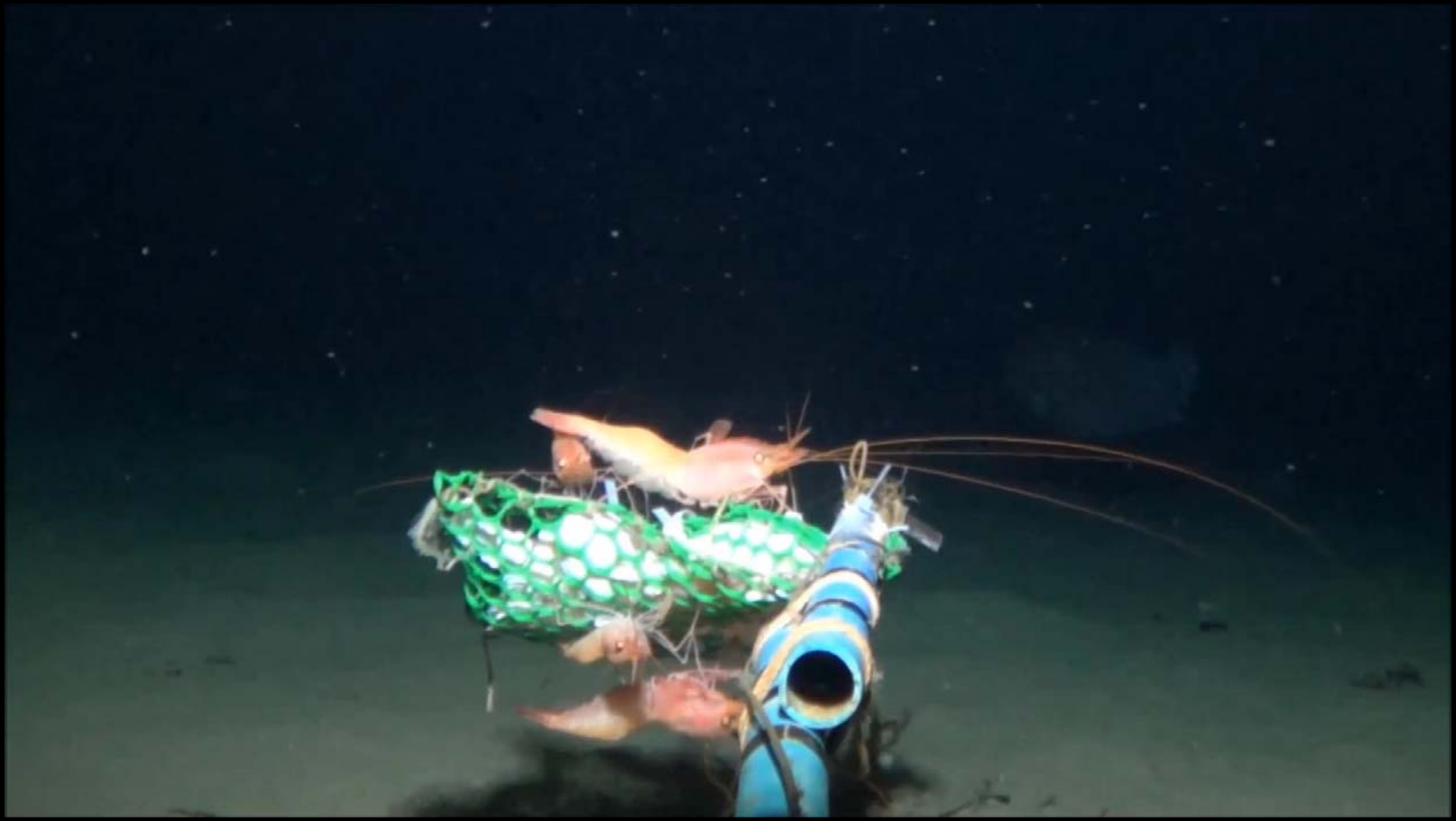
More Questions

- Does seasonality *really* affect population data?
- How does depth affect values?
- What effect does trap design have?
- What are the limitations of BRUVS?
- Is CPUE better/worse than BRUVS?

More Cephalopods



More Cephalopods



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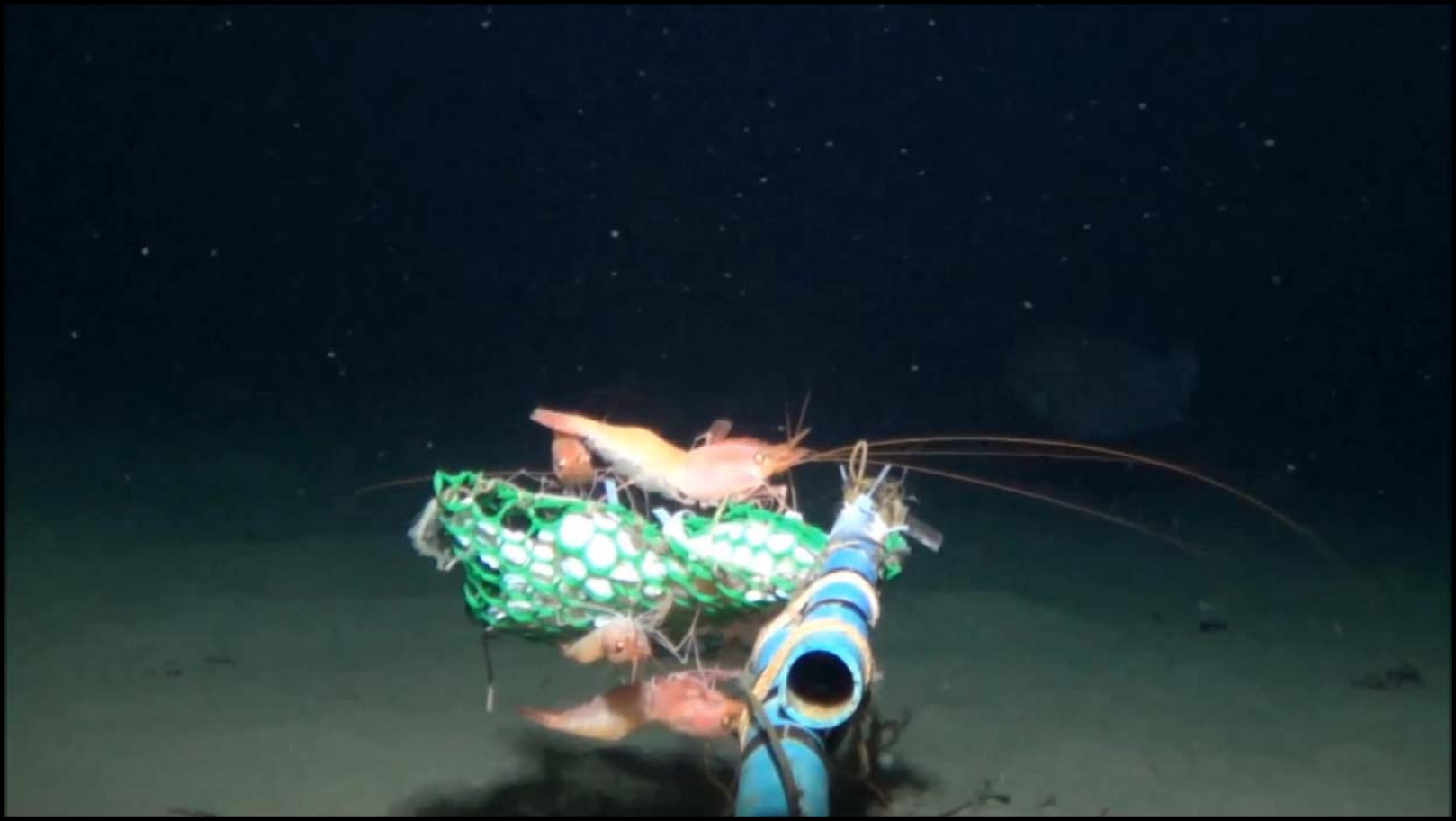

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