

Opportunities to close the gap between science and practice for Marine Protected Areas in Brazil

Supplementary Materials

Morena Mills¹, Rafael A. Magris², Mariana M. P. B. Fuentes³, Roberta Bonaldo⁴, Dannieli F. Herbst⁵, Monique C. S. Lima⁶, Isabela K. G. Kerber⁷, Leopoldo C. Gerhardinger⁸, Rodrigo L. de Moura⁹, Camila Domit¹⁰, João B. Teixeira¹¹, Hudson T. Pinheiro¹², Gabriel Vianna¹³, Rodrigo Rodrigues de Freitas¹⁴

¹ Centre for Environmental Policy, Imperial College London, Silwood Park Campus, Buckhurst Road, Ascot, Berkshire, SL5 7PY, United Kingdom. Corresponding author: m.mills@imperial.ac.uk

²Chico Mendes Institute for Biodiversity Conservation, Brazilian Ministry of the Environment, Brasilia-DF 70.670-350 Brazil.

³Department of Earth, Ocean and Atmospheric Science, Florida State University, Tallahassee, Florida, United States of America.

⁴ Grupo de História Natural de Vertebrados, Instituto de Biologia, Universidade Estadual de Campinas, 13083-862, Campinas, SP, Brazil

⁵Universidade Federal de Santa Catarina. Câmpus Trindade, 88010-970 Florianópolis, SC, Brazil.

⁶São Carlos School of Engineering, University of São Paulo, São Carlos, São Paulo, Brazil.

⁷Geosciences Department, Federal University of Santa Catarina, Florianópolis, Santa Catarina, Brazil.

⁸Instituto Oceanográfico, Universidade de São Paulo, 05508-120, São Paulo, SP, Brazil.

⁹Instituto de Biologia and SAGE/COPPE, Universidade Federal do Rio de Janeiro, 21944-970, Rio de Janeiro, RJ, Brazil.

¹⁰Laboratory of Ecology and Conservation, Centro de Estudos do Mar, Universidade Federal do Paraná, Pontal do Paraná, Paraná, Brazil.

¹¹Departamento de Ciências Biológicas, Universidade Estadual de Santa Cruz, Ilhéus, BA CEP 45650-000, Brazil.

¹² Department of Ecology and Evolutionary Biology, University of California Santa Cruz, Santa Cruz, California, United States of America, and California Academy of Sciences, San Francisco, California, United States of America.

¹³ Oceana - SIG Quadra 1, Lote 985, sala 251, CEP 70610-410; Brasília, DF, Brazil.

¹⁴ Programa de Pós-Graduação em Ciências Ambientais, Universidade do Sul de Santa Catarina, Tubarão, SC, CEP 88704-900, Brazil.

Supplementary Table 1. All MPAs considered in this study and whether a management plan was available.

Marine Protected Area	Management plan? (Yes/No)
Área de Proteção Ambiental da Barra do Rio Mamanguape	Yes
Área de Proteção Ambiental de Guaraqueçaba	Yes
Área de Proteção Ambiental Costa dos Corais	Yes
Área de Proteção Ambiental da Baleia Franca	No
Área de Proteção Ambiental da Costa das Algas	No
Área De Proteção Ambiental De Cananéia-Iguapé-Peruíbe	Yes
Área de Proteção Ambiental de Guapimirim	Yes
Área de Proteção Ambiental de Piaçabuçu	Yes
Área de Proteção Ambiental do Anhatomirim	Yes
Área de Proteção Ambiental do Delta do Parnaíba	Yes
Área de Proteção Ambiental Fernando de Noronha	Yes
Área de Proteção Ambiental Arquipélago de São Pedro e São Paulo	No
Área de Proteção Ambiental Arquipelago de Trindade e Martim Vaz	No
Área de Relevante Interesse Ecológico Ilha Ameixal	No
Área de Relevante Interesse Ecológico Ilhas da Queimada Pequena e Queimada Grande	No
Área de Relevante Interesse Ecológico Manguezais da Foz do Rio Mamanguape	No
Área de Proteção Ambiental de Cairuçu	Yes
Estação Ecológica de Guanabara	Yes
Estação Ecológica de Guaraqueçaba	No
Estação Ecológica de Maracá Jipioca	No
Estação Ecológica de Tamoios	Yes
Estação Ecológica do Taim	No
Estação Ecológica dos Carijós	Yes
Estação Ecológica dos Tupiniquins	Yes
Estação Ecológica Tupinambás	No
Monumento Natural do Arquipélago das Ilhas Cagarras	No
Monumento Natural do Arquipélago de São Pedro e São Paulo	No
Monumento Natural do Arquipelago de Trindade e Martim Vaz	No
Parque Nacional de Saint-Hilaire/Lange	No
Parque Nacional da Lagoa do Peixe	Yes
Parque Nacional da Restinga de Jurubatiba	Yes
Parque Nacional do Cabo Orange	Yes
Parque Nacional do Jericoacoara	Yes
Parque Nacional do Superagui	No
Parque Nacional dos Lençóis Maranhenses	Yes
Parque Nacional Marinho das Ilhas dos Currais	No
Parque Nacional Marinho de Fernando de Noronha	Yes
Parque Nacional Marinhos dos Abrolhos	Yes
Refugio da Vida Silvestre de Santa Cruz	No

Refugio da Vida Silvestre Ilha dos Lobos	No
Reserva Biológica Atol das Rocas	Yes
Reserva Biológica de Comboios	Yes
Reserva Biológica de Santa Isabel	No
Reserva Biológica do Lago Piratuba	No
Reserva Biológica Marinha do Arvoredo	Yes
Reserva Extrativista Acaú-Goiana	No
Reserva Extrativista Chocoaré-Mato Grosso	No
Reserva Extrativista Corumbau	No
Reserva Extrativista de Canavieiras	No
Reserva Extrativista de Cassurubá	No
Reserva Extrativista de Cururupu	No
Reserva Extrativista de São João da Ponta	No
Reserva Extrativista do Batoque	No
Reserva Extrativista Mãe Grande de Curuçá	No
Reserva Extrativista Mandira	Yes
Reserva Extrativista Maracanã	No
Reserva Extrativista Marinha Araí Peroba	No
Reserva Extrativista Marinha de Caeté-Taperaçu	Yes
Reserva Extrativista Marinha de Gurupi-Piriá	No
Reserva Extrativista Marinha de Soure	No
Reserva Extrativista Marinha de Tracuateua	No
Reserva Extrativista Marinha do Arraial do Cabo	No
Reserva Extrativista Marinha Pirajubaé	No
Reserva Extrativista Prainha do Canto Verde	No
Reserva Extrativista Delta do Parnaíba	No
Reserva Extrativista Marinha Cuinarana	No
Reserva Extrativista Marinha da Baía de Iguape	No
Reserva Extrativista Marinha da Lagoa do Jequiá	No
Reserva Extrativista Marinha Mestre Lucindo	No
Reserva Extrativista Marinha Mocapajuba	No

Supplementary Table 2. Data collected for the MPAs based on the Ministry of the Environment website and the management plans available.

INFORMATION COLLECTED FOR EVERY MPA
Marine Protected Area name
Date Implemented
What jurisdictional scale is the MPA?
List relevant state or states
Area of MPA
Management plan available (Yes/No)
INFORMATION COLLECTED WITHIN EVERY EXISTING MANAGEMENT PLAN
Date management plan was published
Which organisation led the development of the management plan?
Was the management plan implemented?
Date of implementation?
Are the factors driving the creation of the management plan stated? (e.g. emerging threat, political opportunity) (Yes /No)
If yes, what are the factors driving the creation of the management plan? (e.g. emerging threat, political opportunity)
Are the costs involved in the development of the management plan stated? (Yes/No)
If yes, what are they?
Was a timeframe provided? (Yes/No)
Were the key stakeholders identified?
Planning region
What criteria are used to define the planning region boundaries?
Are land-based threats considered in the decision about the planning region boundaries? (Yes/No)
If yes, briefly describe how the land-sea approach was used to define the planning boundaries (e.g. main elements or criteria used to define the limits of the planning region)
Does the MPA have a buffer zone? (Yes/No)
If yes, what defines the buffer zone?
Have there been any changes to the activities that occur within the buffer zone?
What realms does the MPA cover? (terrestrial, marine, freshwater)
Are there indigenous areas within planning region? (Yes/No)
Goals, objectives and data
Stated goals of the MPA
Goals of MPA include (social/ecological/social and ecological)
Have the goals been converted to quantitative objectives? (Yes/No)
If yes, please explain which ones and what they are?
If no, are these qualitative objectives (e.g. statements of preferences which are more specific than the general goals)?
If yes, please describe what they are?
Does the plan have target species or ecosystems? (Yes/No)

If yes, what are they?
Are there quantitative objectives linked to the target species or ecosystem? (Yes/No)
If yes, please describe
If yes, how is the target measured/represented?
Does the plan target ecological processes? (Yes/No)
If yes, which ecological process?
If yes, how is/are the ecological process/processes represented?
Are threats considered in the management plan? (Yes/No)
If yes, which ones?
If yes, what information was used to represent threats?
Are costs considered in the management plan? (Yes/No)
If yes, which ones?
If yes, what information was used to represent costs?
Are opportunities considered in the development of the management plan? (Yes/No)
If yes, which ones?
If yes, what information was used to represent opportunities?
Management zones
Does the management plan consider multiple zones? (Yes/No)
If yes, what are they?
Does the placement of the management zones consider land-based threats?
Does the placement of the management zones change over time (temporally dynamic)? If so, please explain how.
Stakeholder involvement and knowledge/data integration
Were stakeholders involved in the planning process? (Yes/No)
If yes, at which stages of Pressey and Bottrill (2008) were they involved?
How were stakeholders involved (informed, provided information, active participation [e.g. involved in workshops], participated in decision-making)?
List stakeholder groups considered
Was there a planning guide/framework used to support the planning process? (Yes/No)
If yes, what was the guide/framework used to support planning process?
Identify all the methods and techniques used in the project to integrate and analyse the information and to construct the final products?
Implementation and adaptive management
Indicate the level of implementation of the plan
Were mainstreaming activities undertaken to communicate the plans results?
Indicate if the plan has been revised to produce and updated version
Is adaptation of the management plan scheduled? (Yes/No)
Is there monitoring of the plans objectives? (Yes/No)
If yes, what is monitored and how?
Which types of conservation actions have been proposed/done to improve alignment with proposed objectives (research priorities, enforcement needs)?
Does the plan mention the need to evaluate management?

Are there strategies for management evaluation? (Yes/No)
If yes, what are they?

Supplementary Table 3. Inflation rates correction based on the Banco Central do Brazil calculator to 03/2020 (IGP-M index)

Marine Protected Area	Date management plan published	Inflation rate correction
Área de Proteção Ambiental Costa dos Corais	12/01/12	1.63
Área de Proteção Ambiental de Piaçabuçu	05/01/10	1.91
Área de Proteção Ambiental Fernando de Noronha	01/01/05	2.33
Estação Ecológica de Tamoios	01/01/06	2.31
Estação Ecológica dos Tupiniquins	01/01/08	2.06
Parque Nacional da Lagoa do Peixe	01/01/99	5.21
Parque Nacional dos Lençóis Maranhenses	25/06/95	6.76
Reserva Biológica Atol das Rocas	01/01/07	2.22
Reserva Biológica de Comboios	07/01/97	5.71
Reserva Biológica Marinha do Arvoredo	07/01/04	2.62