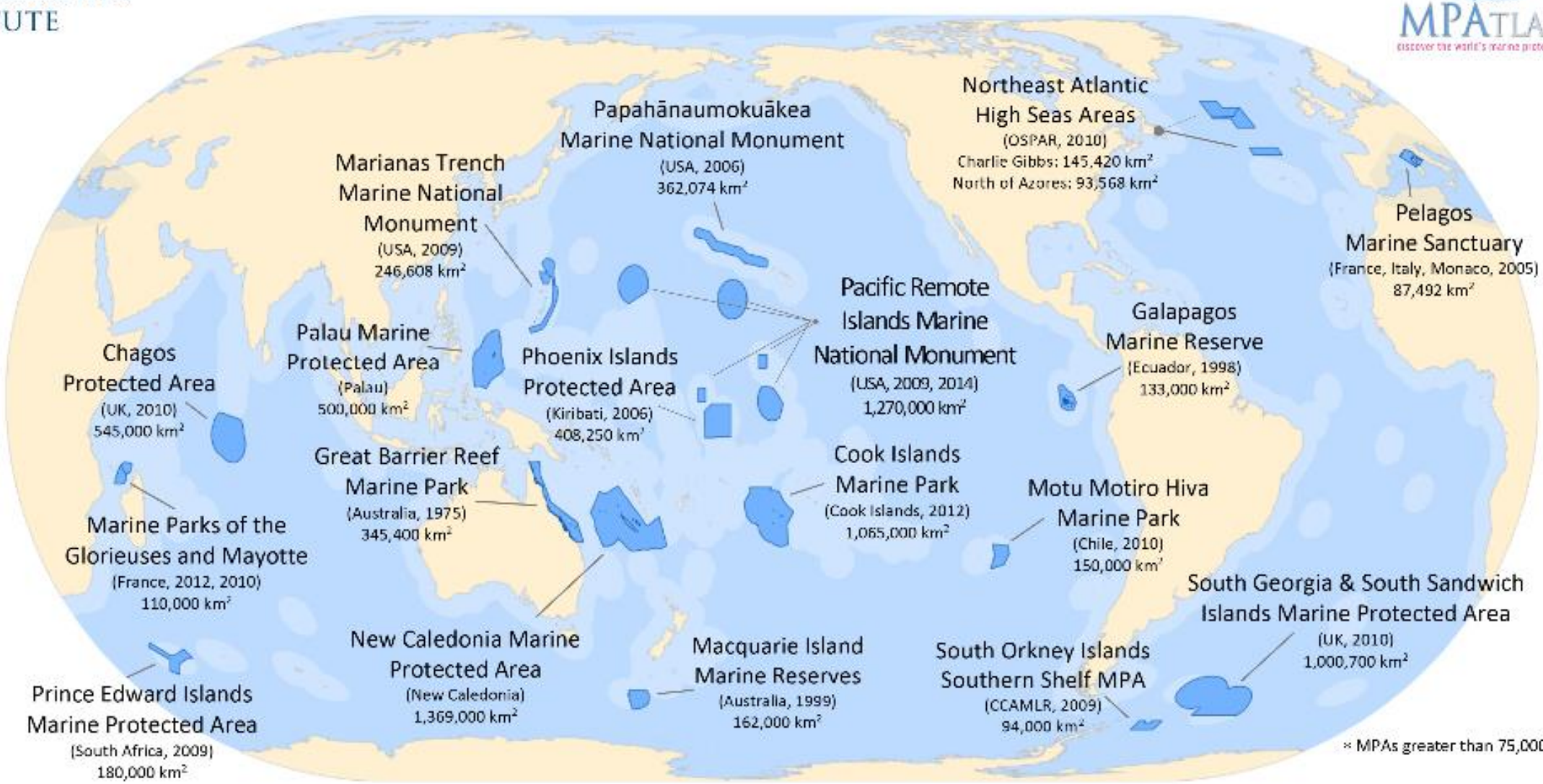
The Controversy over Marine Protected Areas

Science meets policy

Very Large Marine Protected Areas*

Marine Conservation Institute

MPAtlas.org
discover the world's marine protected areas



* MPAs greater than 75,000 km²

Recently – 13th September

Talk outline

- Part 1 – concepts from political theory
- Part 2 – contextualising the science
- Part 3 – the evidence (up to 2010)
- Part 4 – roles of advocacy, evidence, and pragmatism in the planning of English Marine Conservation Zones

Key questions

- What factors have driven policy on MPAs?
- What values lie behind the science?
- How robust is the evidence base for MPA ecological effects?
- How was science used in the planning of Marine Conservation Zones?
- How should scientists engage with the policy process?

Part 1 - Political theory

How can we explain policy change?

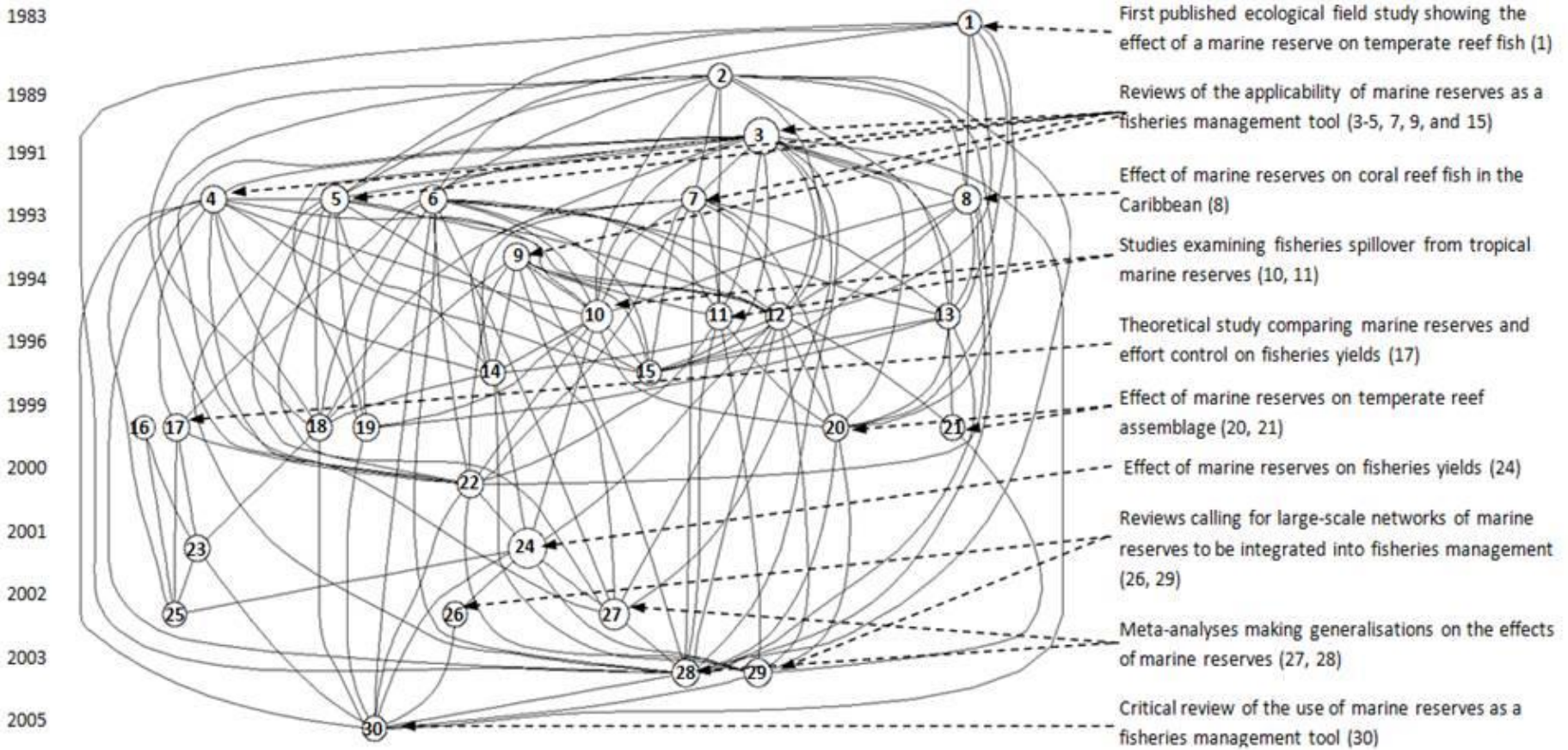
- Opposing viewpoints on humans' relationship with the environment, summed up as Nature Protectionists (NPs) vs Social Conservationists (SCs) (Miller et al 2011)

- Interaction of actors/ institutions in policy networks:
  - Epistemic communities (Haas 1989)
  - Advocacy coalitions (Sabatier 1988)

Characteristics of policy networks

	Epistemic community	Advocacy coalition
Membership	Scientists/experts, and senior bureaucrats	Scientists, bureaucrats, elected officials, lobbyists, grassroots activists, industry, wider civil society
What binds members together?	Common body of knowledge	Principled beliefs
Decision-making model	Consensus	Compromise
Science-policy model	Linear model	Deliberative model
How does policy change occur?	Integration of experts of the international regime into their respective national governments, holding those governments to account	Policy change reflects the influence of competing advocacy coalitions, and unless one coalition is overwhelmingly dominant, a policy compromise usually results
Influence of the scientist	Scientists are central to policy change; they analyse the problem and set the policy agenda	Scientists align themselves with their preferred interest groups and offer their expertise in policy debate
Examples	Mediterranean pollution control; control of chlorofluorocarbons (CFCs)	MPAs in California; tropical deforestation

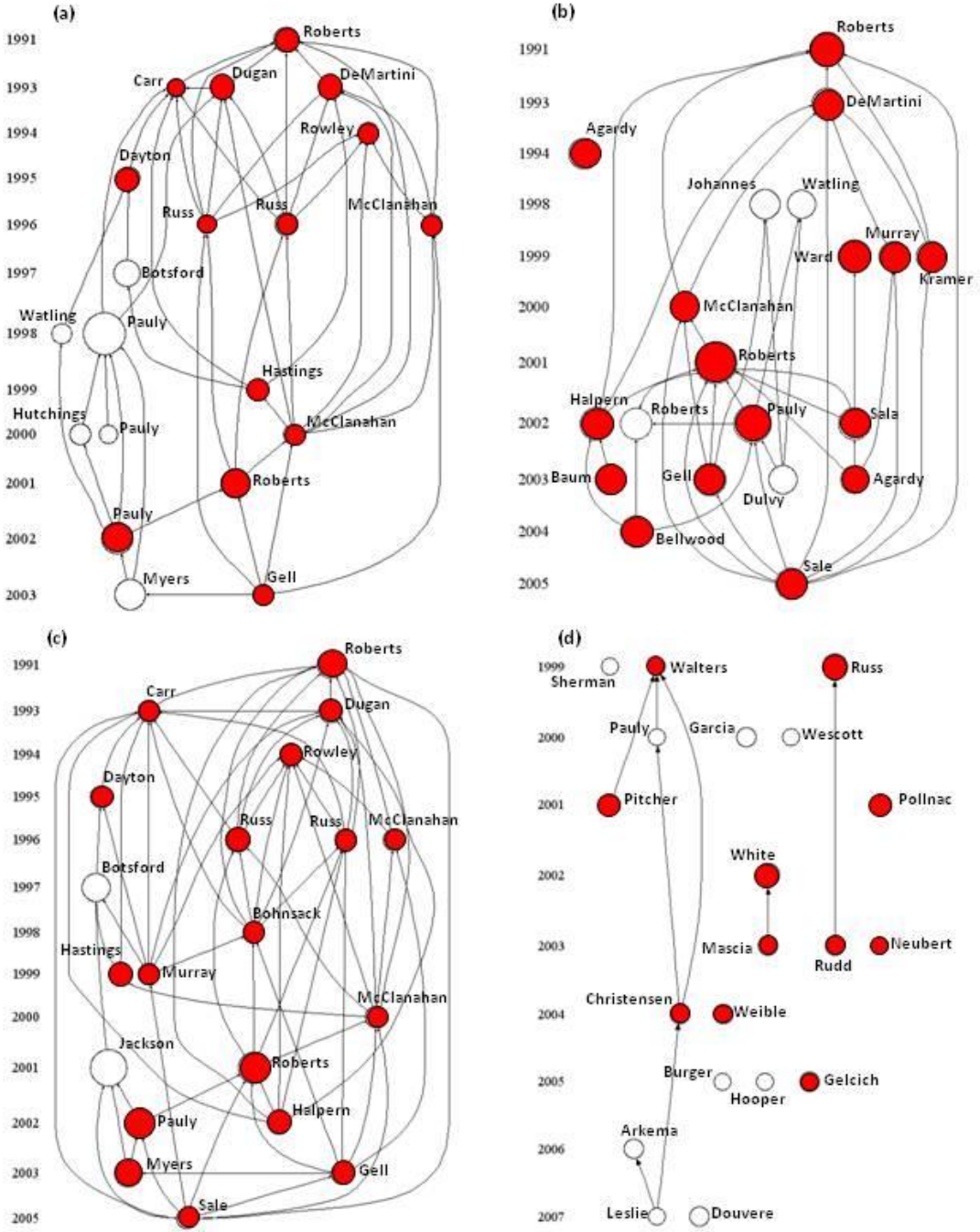
Part 2 – contextualising the science



Most highly cited studies on MPAs.

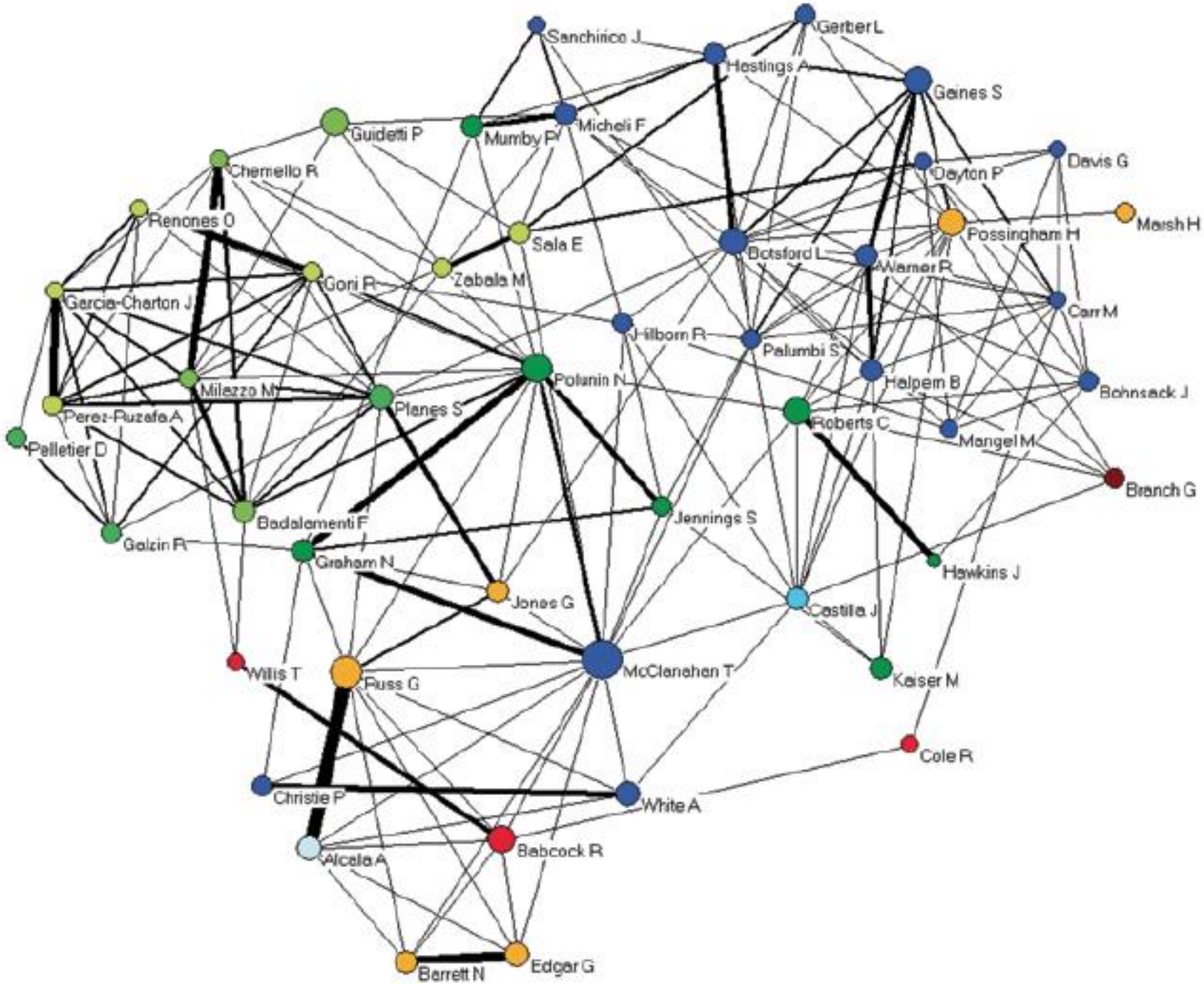
ID	Paper	LCS	GCS	Type
1	Bell JD, 1983, J Appl Ecol, V20, P357	95	132	E, Te
2	Russ, GR, 1989, Mar Ecol Progr Ser, V56, P13	92	139	E, Tr
3	Roberts CM, 1991, Reviews in Fish Biology, V1, P65	204	260	R, Tr
4	Carr MH, 1993, Can J Fish Aquat Sci, V50, P2019	113	144	R, Te
5	Dugan JE, 1993, Can J Fish Aquat Sci, V50, P2029	133	171	R, Te
6	DeMartini EE, 1993, Fish Bull, V91, P414	122	135	T, Tr
7	Roberts CM, 1993, Ambio, V22, P363	98	116	R, Tr
8	Polunin NVC, 1993, Mar Ecol Progr Ser, V100, P167	133	175	E, Tr
9	Rowley RJ, 1994, Aquat Conserv, V4, P233	117	133	R, Te
10	Russ GR, 1996, Mar Ecol Progr Ser, P947	156	168	E, Tr
11	McClanahan TR, 1996, Conserv Biol, V10, P1187	119	143	E, Tr
12	Russ GR, 1996, Ecol Appl, V6, P947	156	168	E, Tr
13	Rakitin A, 1996, Mar Ecol Progr Ser, P97	102	113	E, Tr
14	Bohnsack JA, 1998, Aust J Ecol, V23, P298	98	115	R, Tr
15	Guenette S, 1998, Rev Fish Biol Fisheries, V8, P251	92	108	R

ID	Paper	LCS	GCS	Type
16	Swearer SE, 1999, Nature, V402, P799	87	377	E, Tr
17	Hastings A, 1999, Science, V284, P1537	116	141	T
18	Murray SN, 1999, Fisheries, V24, P11	106	135	R
19	Kramer DL, 1999, Environ Biol Fish, V55, P65	113	171	E, Tr
20	Edgar GJ, 1999, J Exp Mar Biol Ecol, V242, P107	106	125	E, Te
21	Babcock RC, 1999, Mar Ecol Progr Ser, V189, P125	98	140	E, Te
22	McClanahan TR, 2000, Ecol Appl, V10, P1792	119	150	E, Tr
23	Botsford LW, 2001, Ecol Lett, V4, P144	103	155	T
24	Roberts CM, 2001, Science, V294, P1920	234	323	E, Tr
25	Sala E, 2002, Science, V298, P1991	95	141	T, Tr
26	Pauly D ,2002, Nature, V418, P689	102	614	R
27	Halpern BS, 2002, Ecol Lett, V5, P361	148	183	E
28	Halpern BS, 2003, Ecol Appl, V13, P117	121	182	E
29	Gell FR, 2003, Trend Ecol Evolut, V18, P448	123	177	R
30	Sale PF, 2005, Trend Ecol Evolut, V20, P74	102	197	R



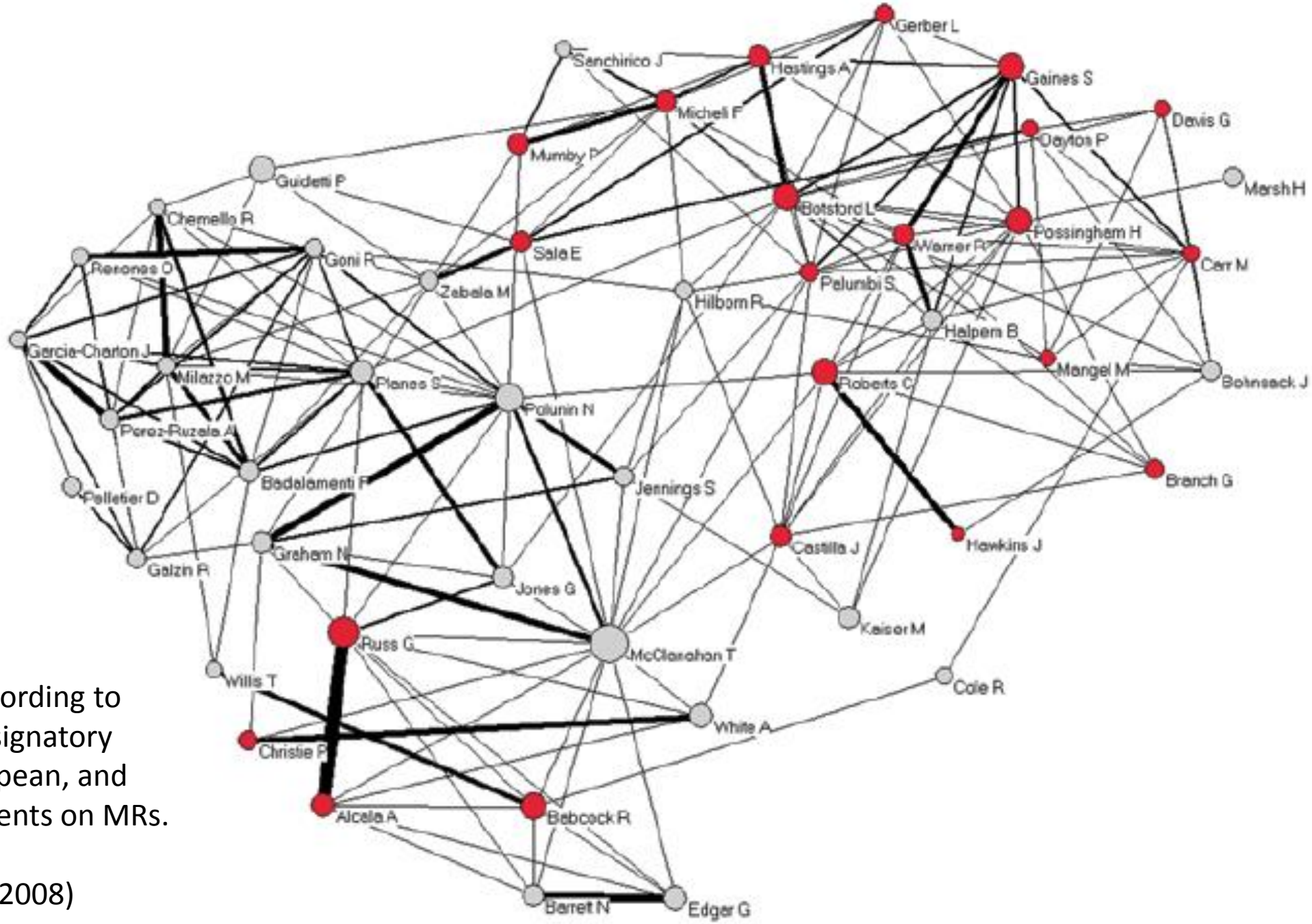
Paper citation networks of the top 20 papers from searches:
a *Marine and fisher* (threshold 100 citations).
b *Marine and conservation* (threshold 50 citations).
c *Marine and management* (threshold 86 citations).
d *Marine and policy* (threshold 6 citations).

The *node size* denotes relative number of citations that a paper has in its respective database. *Shaded nodes* indicate papers that are also present from the original search (i.e. *marine and 'marine reserve'*)



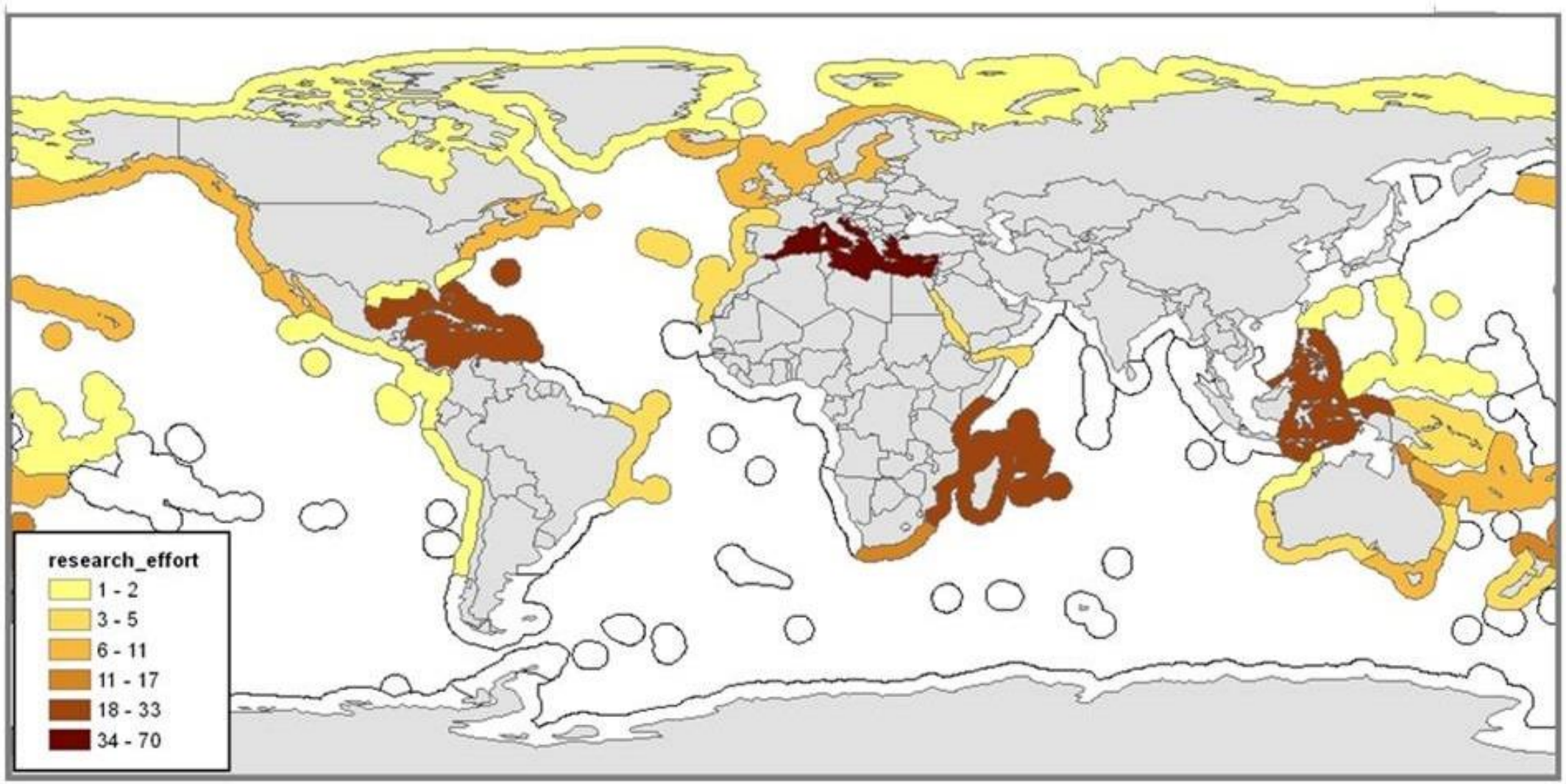
	Australia
	New Zealand
	Philippines
	South Africa
	Chile
	USA
	UK
	France
	Italy
	Spain

Coauthor network of the most productive authors in MPA science from 1970 to 2010 (*n* = 48)

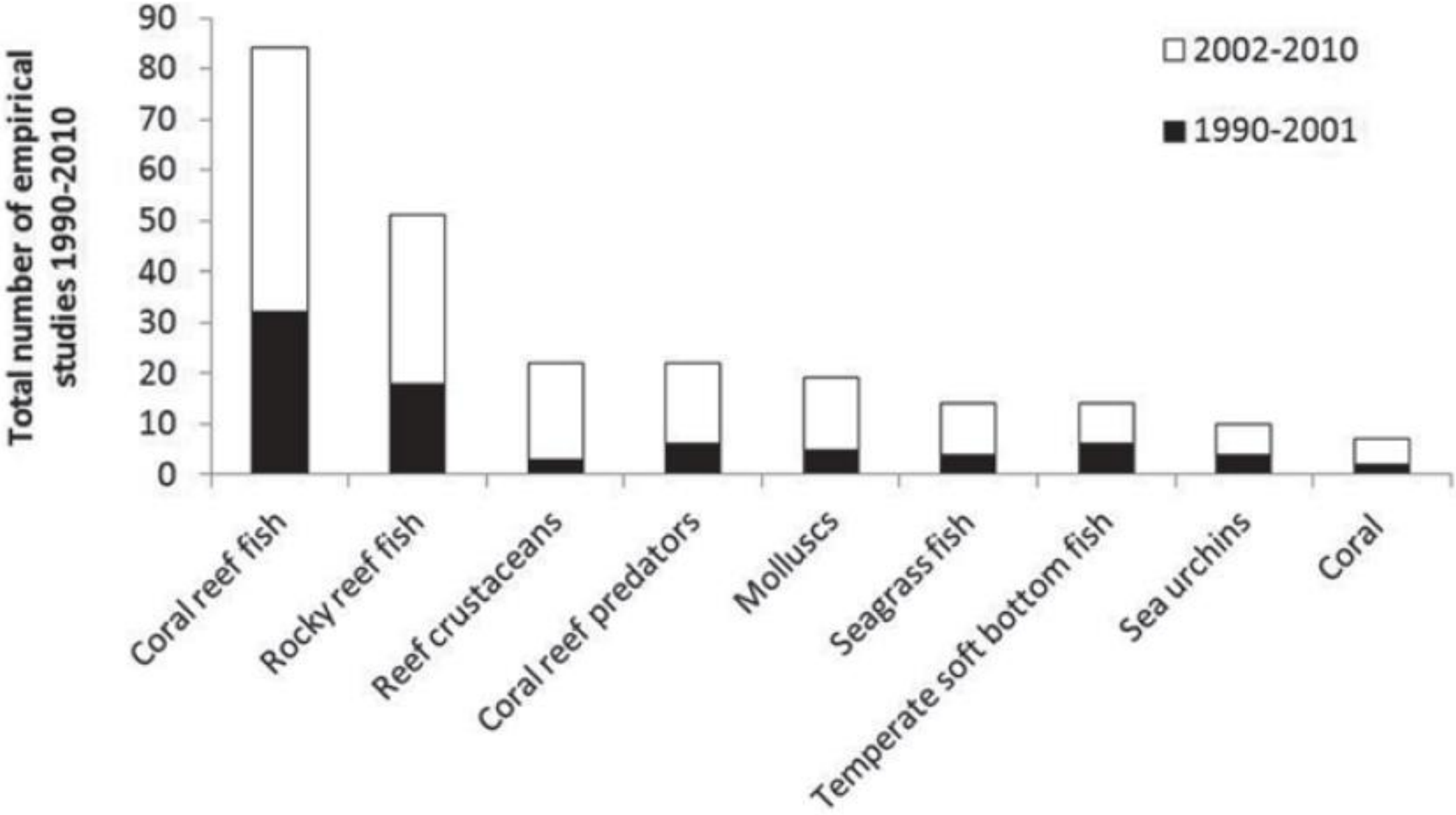


Authors are coloured *red* according to whether the scientist was a signatory to the North American, European, and Australian consensus statements on MRs. (NCEAS
2001; Roberts 2007a; AMSA 2008)

Part 3 – The evidence (up to 2010)



- As of 2010, around 170 MPAs had been studied.
- Eighty-seven percent of the empirical literature had focused on effects of MRs.
- Twenty-five percent of the empirical literature had come from the 10 MRs.
- Reef-type habitats had been most studied with only 16 % of studies being carried out over soft habitats. no-trawl areas.


Total number of empirical studies 1990-2010
90
80
70
60
50
40
30
20
10
0
2002-2010
1990-2001
Coral reef fish
Rocky reef fish
Reef crustaceans
Coral reef predators
Molluscs
Seagrass fish
Temperate soft bottom fish
Sea urchins
Coral

Evidence post-2010 (UK relevant)

Ecological recovery

- Recovery of a temperate reef assemblage (Sheehan et al 2013)
- Increased recruitment of scallops (Howarth et al 2015)

Risk mitigation

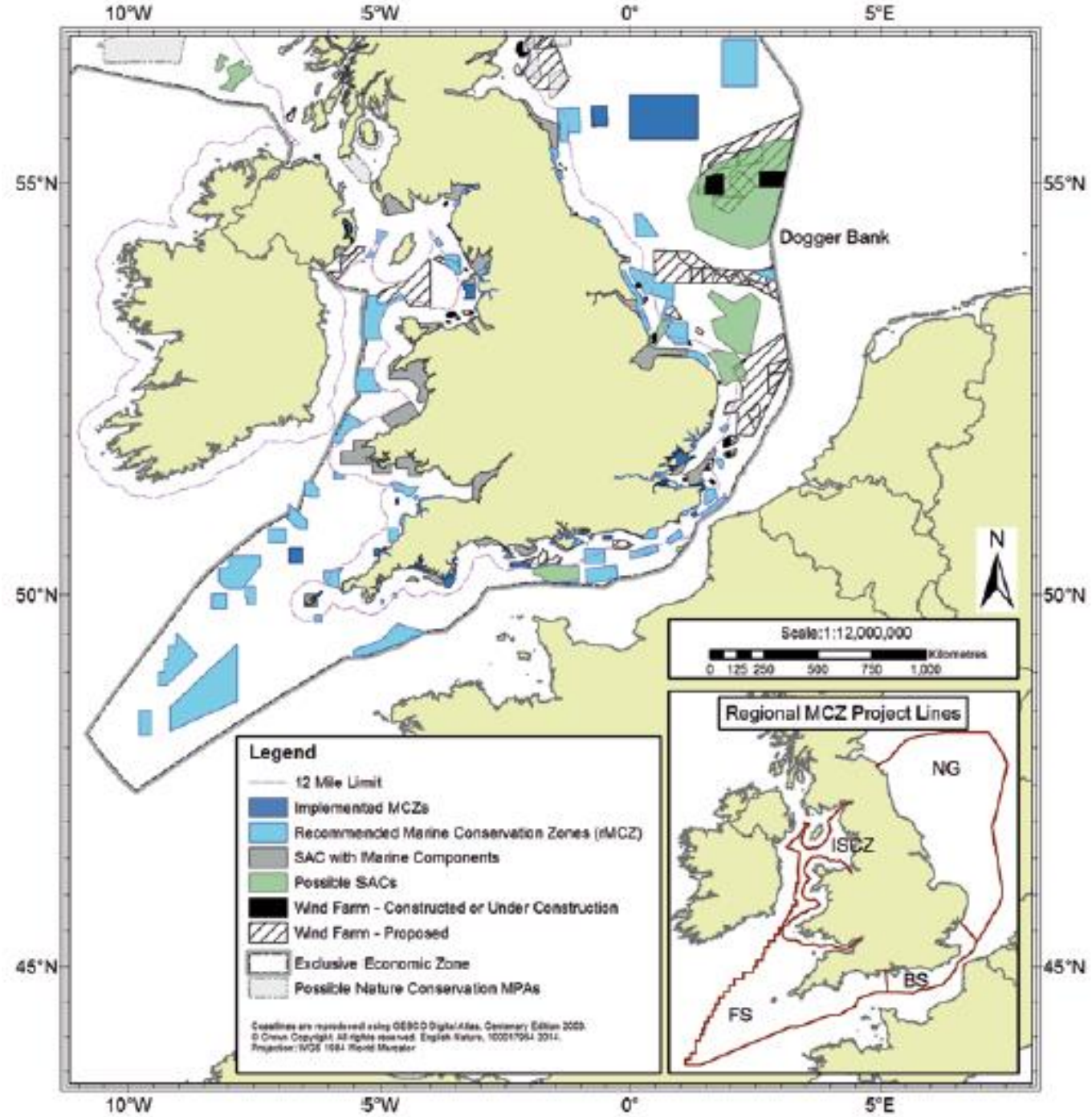
- Fishery footprints (Jennings et al 2012)

Fisheries benefits???

- Reserves in jurisdictions with well-managed fisheries are unlikely to provide a net spillover benefit (Buxton et al 2014)
- Though are all UK fisheries well-managed?

Part 4 – planning of English MCZs

Undertook a desk-based study supplemented by key-informant interviews in an attempt to explain how MPA policy in England developed, with a focus on the Marine Act and planning of MCZs



Advocacy role of scientists?

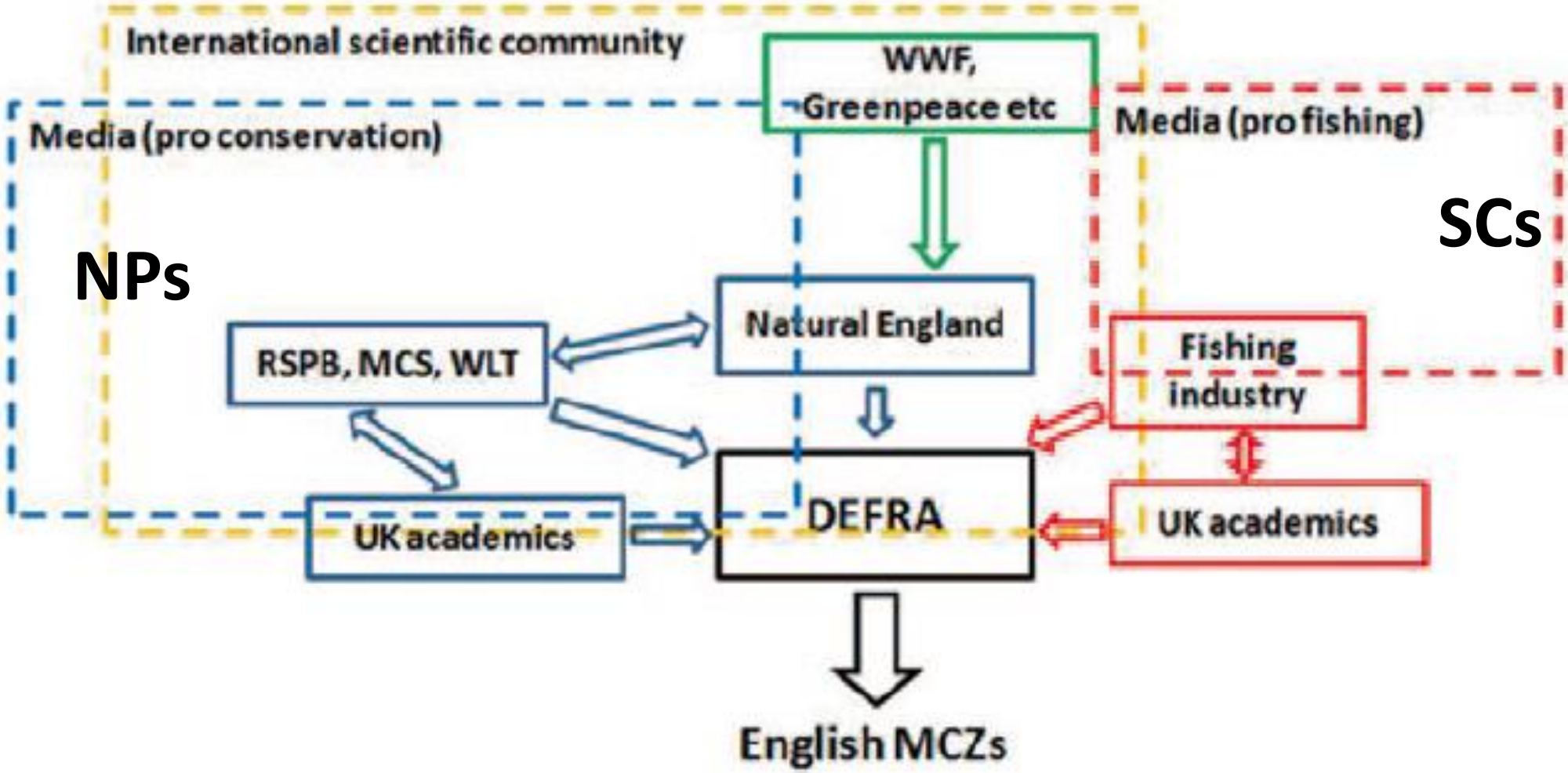
- Unsubstantiated claims made on the benefits of marine reserve networks in documents that shaped policy (e.g. Turning the Tide, 2004, p 205, para 8.96)

- Positive economic assessments of £16.8 million made on broad assumptions (Defra 2008)

- Advocacy implicit in high-level ecological guidance, and calls for an ecologically coherent MPA network?

- Science Advisory Panel composed of mainly marine ecologists

Role of discourse and policy networks



	Nature protectionists	Social conservationists
Objectives of MCZs	To systematically protect representative habitats and species through networks	To protect habitats and species vulnerable to fishing
Main criteria for MCZ designation	Representative habitats	Vulnerable habitats/species
Approach	Systematic conservation planning	Local spatial planning
Governance process to set MCZ objectives	Top-down decision making with some input from stakeholders	Bottom-up decision making through deliberative discussion between stakeholders
Attitudes towards science-policy	Natural science criteria to lead process; socioeconomic evidence to choose between similar sites	Natural science and socioeconomic evidence treated equally. Political compromise necessary
Attitude towards science and the precautionary approach	Decisions based on 'best available science'. Burden of proof on the fishing industry to show that activities don't cause damage to a conservation feature	Decisions based on robust scientific evidence. Burden of proof on protectionists to show that a feature sensitive to fishing exists
Attitude towards conservation	Ecosystem preservation necessary for sustainable use	Some impact inevitable, though should protect sensitive habitats
Scale	National/regional	Local
Time frame for decision	Relatively short	Long
Narratives from scientific literature	Spillover benefits, ecological coherence, habitat destruction	Displacement, effect on local communities, wider economic impacts (e.g. food supply, and users moving elsewhere)
Criticisms from opposing discourse	Preservationist, inhumane, ignores the needs of local people	Favours short-term economic interests, potentially could miss strategic conservation goals

NPs vs SCs

- Opposing views on conservation baselines
- Contrasting attitudes to risk management (including planning of network, and use of evidence to inform management)
- Initial narratives polarised: SCs criticised as short-termist, and NPs as eco-fascists.

Realities of planning and controversies up to 2012

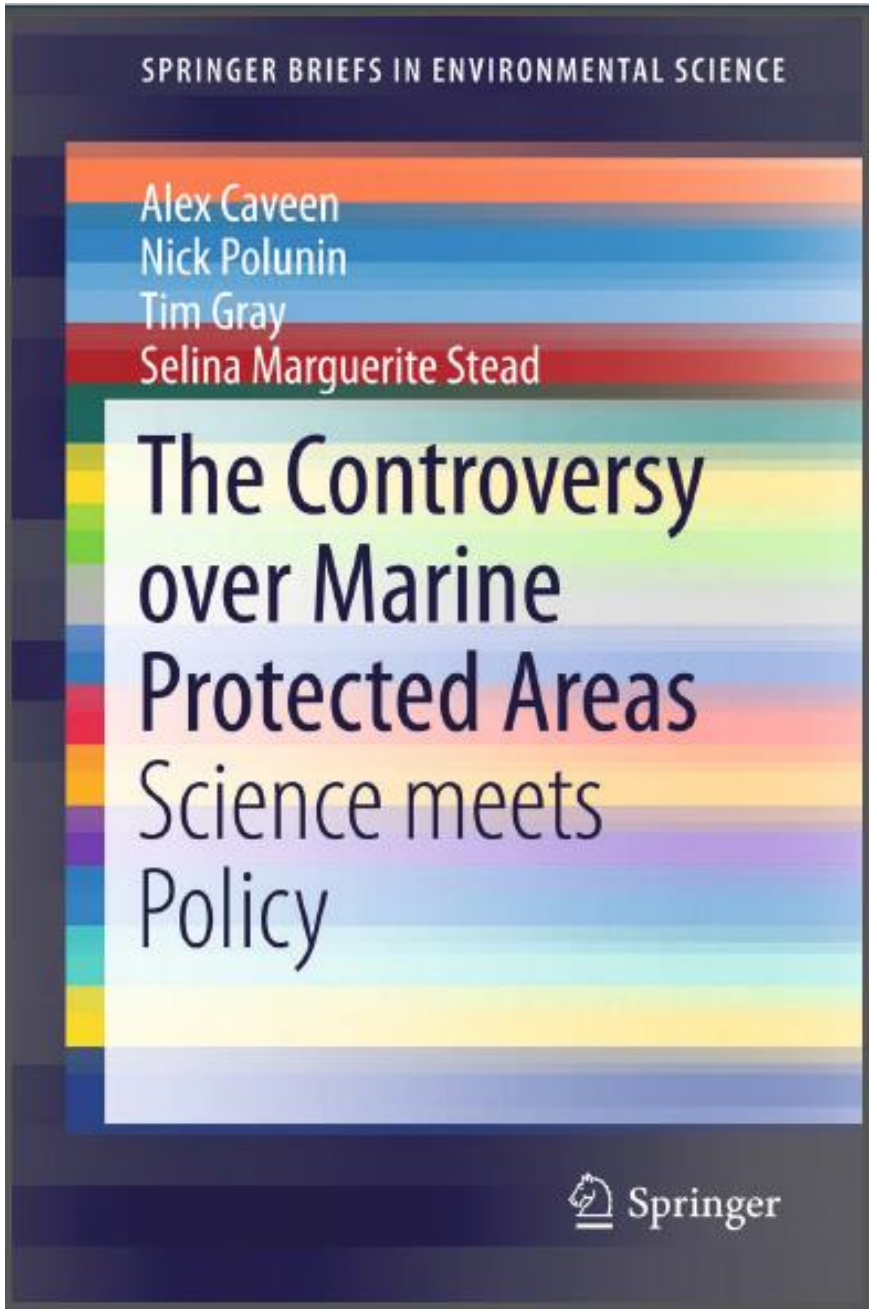
- Data deficiencies
- Time-scales to recommend sites
- Adequacy of consultations
- Equity

Where next?

- 27 MCZs designated in November 2013.
- 7 offshore areas being considered for designation in 2015.
- Management still being decided.

Read more…

Individual chapters can be downloaded from https://newcastle.academia.edu/AlexCaveen



And thanks for listening