Defining sub-jurisdictions

Robin Elahi

2 July 2021

Introduction

Here I define the sub-jurisdictions used in the original analysis submitted to Ecological Applications, and then I propose changes to these definitions. The impetus for the proposed changes was:

- 1. 9 of the the sub-jurisdictions had fewer than 5 grid cells, and 16 subjurisdictions had fewer than 11 grid cells (making it difficult to visualize and interpret the results; possibly introduced noise into the model)
- 2. 16 sub-jurisdictions were removed for the sub-jurisdictional analysis (see EcoApps V1 supplement, Figure S8), due in part to the low grid cell count in many of them (but also due to the fact that some had zero population density, which I may address in a different way)
- 3. The large imbalance in grid cell counts in some sub-jurisdictions (e.g., Florida Keys in Florida; St. Thomas and St. John in the U S Virgin Islands)

Note the following column definitions for this document:

- JURISDICTION: the jurisdiction used in the paper (in NOAA terms, a geographic priority area; and what reviewer 1 suggests I change to Region)
- REGION: what I call Sub-jurisdictions in the paper (and what reviewer 1 suggests I change to sub-region)
- REGION_SUB: these are the finest (spatial) reporting categories in the NOAA data I received from Shay Viehman and Ivor Williams. Many of these are finer than the sub-jurisdictions described in the 2014 NOAA report. I did not use these in the analysis, because some of these sub-jurisdictions cover very few grid cells (e.g., 2-5).

Sub-jurisdictions in the original analysis

dat <- read_csv("workspace/coral_total_cover_predictors_adjusted_regions.csv")</pre>

Florida

JURISDICTION	REGION	REGION_SUB	n
Florida	FLK	Biscayne	90
Florida	FLK	Lower Keys	238
Florida	FLK	Mid-Upper Keys Transition	93
Florida	FLK	Middle Keys	94
Florida	FLK	Upper Keys	183
Florida	SEFCRI	Broward-Miami	138
Florida	SEFCRI	Deerfield	8
Florida	SEFCRI	Martin	9
Florida	SEFCRI	North Palm Beach	20
Florida	SEFCRI	South Palm Beach	11
Florida	Tortugas	Marquesas	25
Florida	Tortugas	Marquesas-Tortugas Trans	14
Florida	Tortugas	Tortugas–Dry Tortugas NP	140
Florida	Tortugas	Tortugas–Tortugas Bank	64

JURISDICTION	REGION	n
Florida	FLK	698
Florida	SEFCRI	186
Florida	Tortugas	243

Note that the Florida Keys region (ie sub-jurisdiction) has about 3x as many reefs as the other two regions. For this reason, I split the Keys into upper / middle / lower sections, as described in Table 3 of NOAA report 2014.

Puerto Rico

JURISDICTION	REGION	REGION_SUB	n
PRICO	EPRICO	EPRICO	149
PRICO	NPRICO	NPRICO	56
PRICO	SWPRICO	SWPRICO	187

I did not change the original (NOAA) sub-region groupings in the first paper, and I will keep it the same for now.

US Virgin Islands

JURISDICTION	REGION	REGION_SUB	n
USVI	STTSTJ	EDGE	4
USVI	STTSTJ	MSR	82
USVI	STTSTJ	SLRK	19
USVI	STTSTJ	STJ	237
USVI	STTSTJ	STT	198
USVI	STX	ESTX	114
USVI	STX	LANG	41
USVI	STX	NWSTX	35
USVI	STX	SSTX	49

REGION	n
STTSTJ	540
STX	239
	STTSTJ

There are many more reefs sampled in St Thomas and St John, as compared with St Croix. For this reason, I will create three new sub-jurisdictions - one for St Thomas, St John, and 'offshore' - this third category includes the NOAA sub_regions:

- MSR: mid-shelf reef
- EDGE: presumably reefs at the edge of the mid-shelf reef (my interpretation of the map)
- Sail Rock (reefs west of St Thomas)

Marianas

JURISDICTION	REGION	REGION_SUB	n
MARIAN	Aguijan	Aguijan	10
MARIAN	Alamagan	Alamagan	11
MARIAN	Asuncion	Asuncion	21
MARIAN	Farallon de Pajaros	Farallon de Pajaros	11
MARIAN	Guam	Guam	73
MARIAN	Guguan	Guguan	11
MARIAN	Maug	Maug	40
MARIAN	Pagan	Pagan	43
MARIAN	Rota	Rota	28
MARIAN	Saipan	Saipan	48
MARIAN	Sarigan	Sarigan	11
MARIAN	Tinian	Tinian	19

My sub-jurisdictions (ie REGION) were the original REGION_SUBs - islands / atolls. But many of these only spanned 2-5 grid cells and were dropped from analysis at the sub-jurisdicional scale.

Samoa

JURISDICTION	REGION	REGION_SUB	n
SAMOA	Ofu & Olosega	Ofu & Olosega	51
SAMOA	Rose	Rose	47
SAMOA	Swains	Swains	32
SAMOA	Tau	Tau	46
SAMOA	Tutuila	Tutuila	156

My sub-jurisdictions (ie REGION) were the original REGION_SUBs - islands / atolls. But Tau, Ofu, and Olosega make geographic sense as a sub-jurisdiction (they compose the Manu'a Islands), and I will lump these together.

Main Hawaiian Islands

JURISDICTION	REGION	REGION_SUB	n
MHI	Hawaii	Hawaii	214
MHI	Kahoolawe	Kahoolawe	24
MHI	Kauai	Kauai	86
MHI	Lanai	Lanai	98
MHI	Maui	Maui	139
MHI	Molokai	Molokai	159
MHI	Niihau	Niihau	86
MHI	Oahu	Oahu	180

My sub-jurisdictions (ie REGION) were the original REGION_SUBs - islands / atolls. I will leave these unchanged.

Northwest Hawaiian Islands

JURISDICTION	REGION	REGION_SUB	n
NWHI	French Frigate	French Frigate	47
NWHI	Kure	Kure	39
NWHI	Lisianski	Lisianski	40
NWHI	Pearl & Hermes	Pearl & Hermes	55

My sub-jurisdictions (ie REGION) were the original REGION_SUBs - islands \slash atolls. I will leave these unchanged.

Proposed justification for these sub-jurisdictions (to go in the next manuscript)

Note that I am using the new suggested terminology of Reviewer 1:

- Cross-basin (new) = Global (old)
- Basin (new) = Ocean (old)
- Region (new) = Jurisdiction (old)
- Sub-region (new) = Sub-jurisdiction (old)

Data from the United States National Association of Oceanic and Atmospheric Administration's (NOAA) Coral Reef Conservation Program's (CRCP) National Coral Reef Monitoring Program met these criteria and were accessed for a six-year period (2012-2017). The data were structured according to the following spatial hierarchy (Appendix S1: Table S1): (1) cross-basin (all data); (2) basin (n = 2; western Atlantic, Pacific; xx-xx × 106 km2); (3) region (n = 7; Florida, Puerto Rico, U.S. Virgin Islands, main Hawaiian islands [which spans Hawai'i to Ni'ihau], northwest Hawaiian islands [which spans French Frigate Shoals to Kure Atoll], Mariana islands [which include Guam and the Commonwealth of the Northern Mariana Islands], American Samoa; xx-xx × 104 km2, median = xx km2); (4) sub-region (n = 36; e.g., Tortugas, lower Keys, middle Keys, upper Keys, and southeast Florida in the Florida jurisdiction, as well as islands in most other jurisdictions; x-xx km2, median = xx km2); and (5) reef (n = 4123; 30 m transect).

Regional and sub-regional scales are most relevant to reef management, and are derived from the NOAA Coral Program (2014). Regions represent the Coral Program's priority geographic areas, and are also termed 'Jurisdictions' by NOAA; these are considered to be the highest level of reporting and NOAA annual reports are developed per jurisdiction. Sub-regions constitute the minimum reporting units for the NOAA program, and are also called 'Sub-jurisdictions'. These are spatial units small enough to be ecologically meaningful, but large enough to permit sufficient site replication. We followed the designation of sub-regions by NOAA in the publicly available data or consulted reports (e.g., Table S3; NOAA Coral Program 2014), except when the sub-regions covered very few grid cells (e.g., small islands in the Marianas Islands). In the U.S. Virgin Islands, we added a new sub-region to the existing St. Thomas, St. John, and St. Croix sub-regions. Namely, sites in the mid-shelf and Sail Rock areas south of the two islands were grouped into a 'St. Thomas-St. John offshore' sub-region.

NOAA Coral Program (2014). National Coral Reef Monitoring Plan. Silver Spring, MD, NOAA Coral Reef Conservation Program.

Proposed changes

Here I present similar tables of the # of reefs in each sub-jurisdiction (REGION), but with the proposed changes.

Florida - Ilsa, please advise

JURISDICTION	REGION	REGION_SUB	n
Florida	Keys_lower	Lower Keys	238
Florida	Keys_middle	Mid-Upper Keys Transition	93
Florida	Keys_middle	Middle Keys	94
Florida	Keys_upper	Biscayne	90
Florida	Keys_upper	Upper Keys	183
Florida	SEFCRI	Broward-Miami	138
Florida	SEFCRI	Deerfield	8
Florida	SEFCRI	Martin	9
Florida	SEFCRI	North Palm Beach	20
Florida	SEFCRI	South Palm Beach	11
Florida	Tortugas	Marquesas	25
Florida	Tortugas	Marquesas-Tortugas Trans	14
Florida	Tortugas	Tortugas–Dry Tortugas NP	140
Florida	Tortugas	Tortugas–Tortugas Bank	64

JURISDICTION	REGION	n
Florida	Keys_lower	238
Florida	Keys_middle	187
Florida	Keys_upper	273
Florida	SEFCRI	186
Florida	Tortugas	243

Puerto Rico (no changes)

JURISDICTION	REGION	REGION_SUB	n
PRICO	EPRICO	EPRICO	149
DDICO	NIDDICO	NIDDICO	F (
PRICO	NPRICO	NPRICO	56
PRICO	SWPRICO	SWPRICO	187

US Virgin Islands - Pete, please advise

JURISDICTION	REGION	REGION_SUB	n
USVI	STJ	STJ	237

JURISDICTION	REGION	REGION_SUB	n
USVI	STT	STT	198
USVI	STT_STJ_offshore	EDGE	4
USVI	STT_STJ_offshore	MSR	82
USVI	STT_STJ_offshore	SLRK	19
USVI	STX	ESTX	114
USVI	STX	LANG	41
USVI	STX	NWSTX	35
USVI	STX	SSTX	49

JURISDICTION	REGION	n
USVI	STJ	237
USVI	STT	198
USVI	STT_STJ_offshore	105
USVI	STX	239

Marianas - Ilsa/Pete, please advise

JURISDICTION	REGION	REGION_SUB	n
MARIAN	Guam	Guam	73
MARIAN	Marianas_lower	Aguijan	10
MARIAN	Marianas_lower	Saipan	48
MARIAN	Marianas_lower	Tinian	19
MARIAN	Marianas_middle	Alamagan	11
MARIAN	Marianas_middle	Guguan	11
MARIAN	Marianas_middle	Pagan	43
MARIAN	Marianas_middle	Sarigan	11
MARIAN	Marianas_upper	Asuncion	21
MARIAN	Marianas_upper	Farallon de Pajaros	11
MARIAN	Marianas_upper	Maug	40
MARIAN	Rota	Rota	28

JURISDICTION	REGION	n
MARIAN	Guam	73
MARIAN	Marianas_lower	77
MARIAN	Marianas_middle	76
MARIAN	Marianas_upper	72
MARIAN	Rota	28

Samoa - Ilsa/Pete, please advise

JURISDICTION	REGION	REGION_SUB	n
SAMOA	Manua_islands	Ofu & Olosega	51
SAMOA	Manua_islands	Tau	46
SAMOA	Rose	Rose	47
SAMOA	Swains	Swains	32
SAMOA	Tutuila	Tutuila	156

JURISDICTION	REGION	n
SAMOA	Manua_islands	97
SAMOA	Rose	47
SAMOA	Swains	32
SAMOA	Tutuila	156

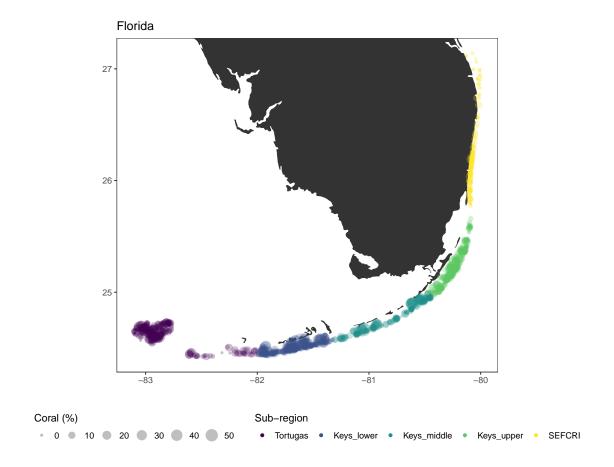
Main Hawaiian Islands (no changes)

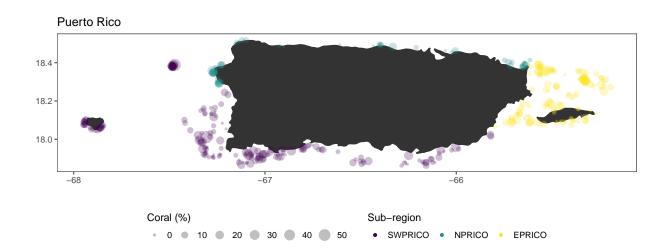
REGION	REGION_SUB	n
Hawaii	Hawaii	214
Kahoolawe	Kahoolawe	24
Kauai	Kauai	86
Lanai	Lanai	98
Maui	Maui	139
Molokai	Molokai	159
Niihau	Niihau	86
Oahu	Oahu	180
	Hawaii Kahoolawe Kauai Lanai Maui Molokai Niihau	Hawaii Hawaii Kahoolawe Kauai Kauai Lanai Lanai Maui Maui Molokai Molokai Niihau Niihau

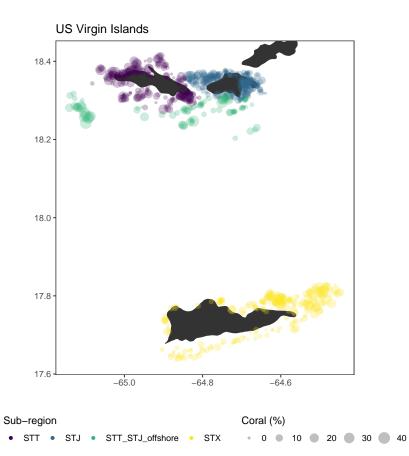
Northwest Hawaiian Islands (no changes)

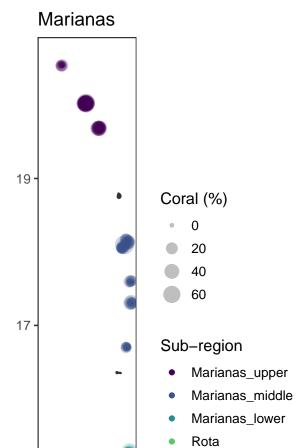
JURISDICTION	REGION	REGION_SUB	n
NWHI	French Frigate	French Frigate	47
NWHI	Kure	Kure	39
NWHI	Lisianski	Lisianski	40
NWHI	Pearl & Hermes	Pearl & Hermes	55

Maps with proposed changes







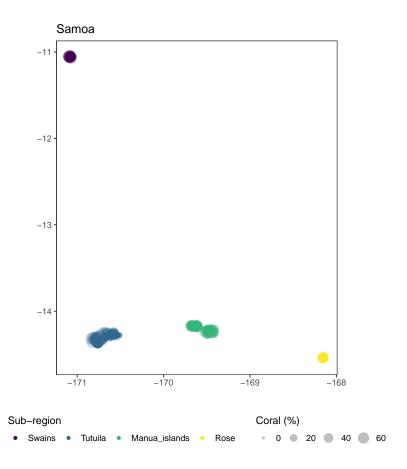


15 -

13 -

145.0 145.5

Guam



Northwest Hawaiian Islands

