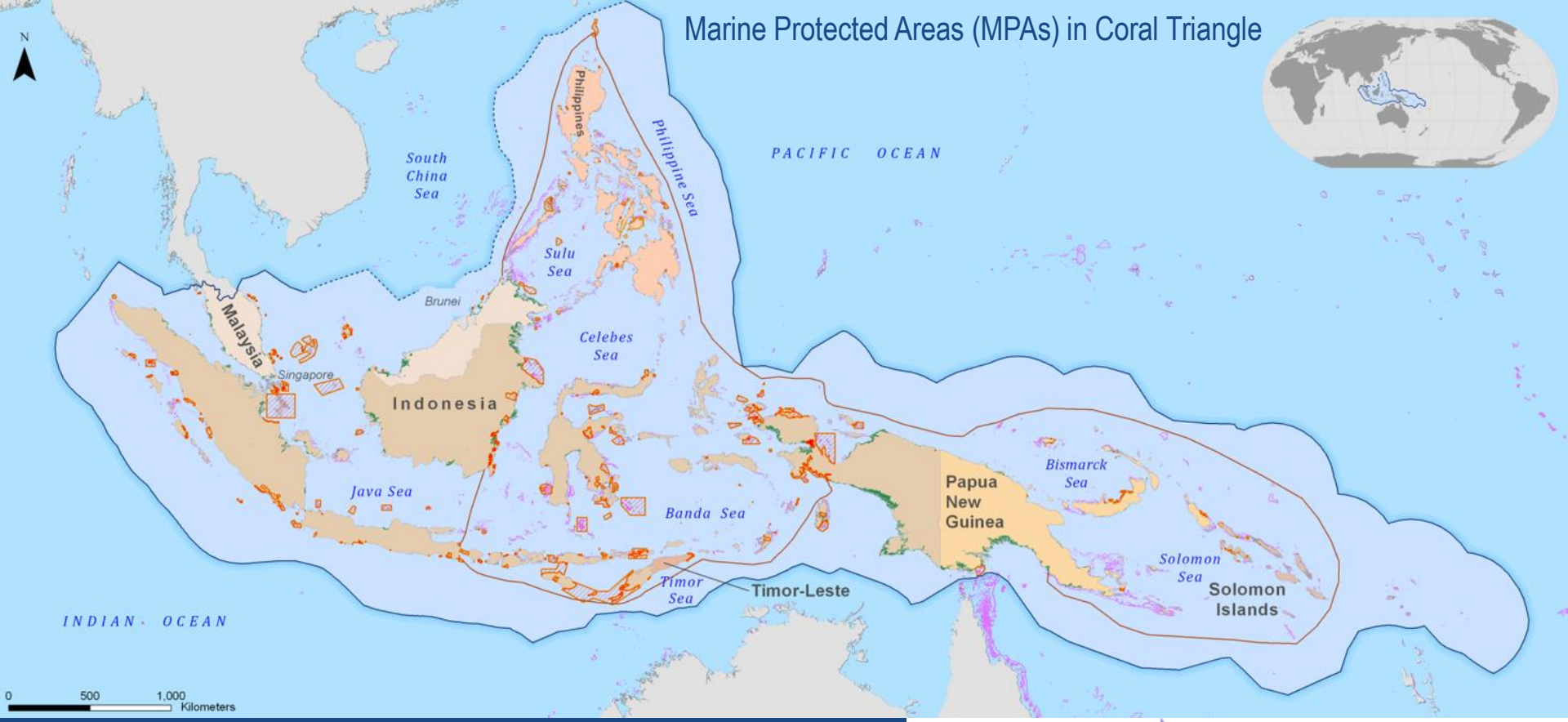



# The Coral Triangle Atlas 2.0 Indicators and M&E Challenges

Shwu Jiau Teoh, Nurulhuda Ahmad Fatan, Stanley Tan

9 July 2020

CORAL TRIANGLE ATLAS

CORAL TRIANGLE INITIATIVE ON CORAL REEFS, FISHERIES AND FOOD SECURITY

WorldFish

# The Coral Triangle Atlas (CT Atlas)

**Vision:** To provide a common platform for all the countries in the Coral Triangle to share their data, and to create a growing, updated database for better marine resource management decisions and science

## The Coral Triangle Atlas portal:

**2009-2013:**

- Created through support from CTI-CTSP
- CT Atlas team – TNC, WWF, WorldFish

**2013-2019:**

- WorldFish continue hosting the website

**2019-2020**:

- CTI-CFF Regional Secretariat contracted WorldFish to do the CT Atlas website revamp & migration


http://ctatlas.reefbase.org/

# Roles & Responsibilities

- Provide technical expertise to develop the newer version of CT Atlas
- Redesign, coding, migrate existing data, collate new data
- Provide training to relevant partners on updating the online data
- Train the IT/GIS officer in Regional Secretariat on managing the CT Atlas

- Provide strategic vision for the new CT Atlas development
- Hire an IT/GIS officer to interact with WorldFish team for technical setup, operate and maintain the newer CT Atlas web site hosted by CTI Regional Secretariat cloud server

# CT Atlas Redesign & Migration (2019 APRIL-2020 DECEMBER)

1. **CT Atlas requirements & system setup study**

**WorldFish, CTI-CFF RS, T/GWG, NCC, CTI-CFF partners**

– CT Atlas consultative workshop, system requirements study, develop detail work plan

2. **Redesign CT Atlas**

**WorldFish, CTI-CFF RS**

– Design and develop new interface/branding of CT Atlas, design system infrastructure and backup routine, setup web server

3. **Develop CT Atlas**

**WorldFish, CTI-CFF RS, TWG, MEWG, NCC**

– Develop the new database structure, coding, source & quality check the new data, compile & visualize indicators to measure RPOA/NPOA progress

4. **Training & maintenance**

**WorldFish, CTI-CFF RS, TWG, MEWG, NCC**

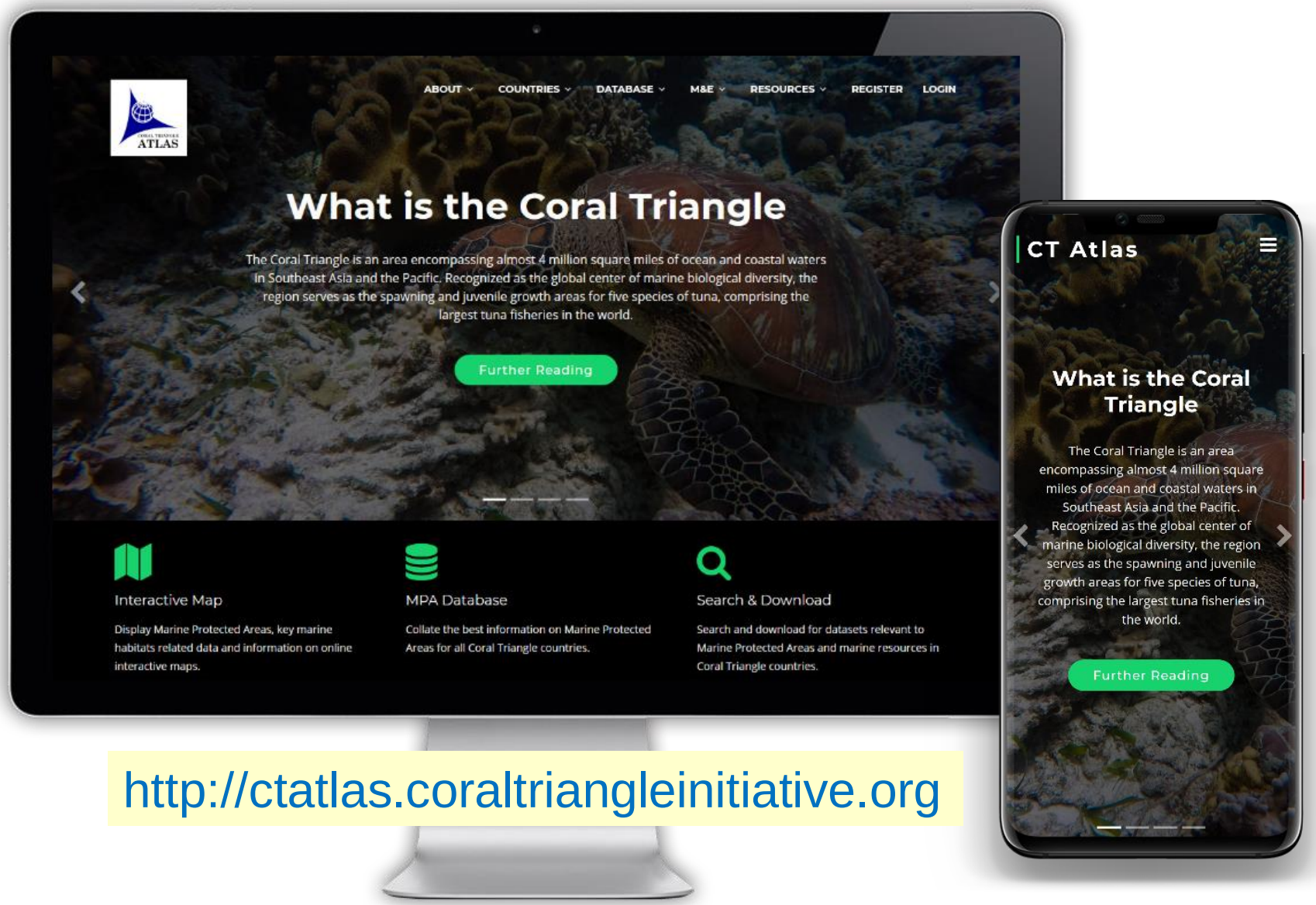
– Develop user guide/tutorial, conduct CT Atlas training to TWG/NCC to add/update data, train the IT/GIS officer to continue maintain the CT Atlas

5. **Sign-off the transition of CT Atlas management to CTI-CFF RS**

**WorldFish, CTI-CFF RS**

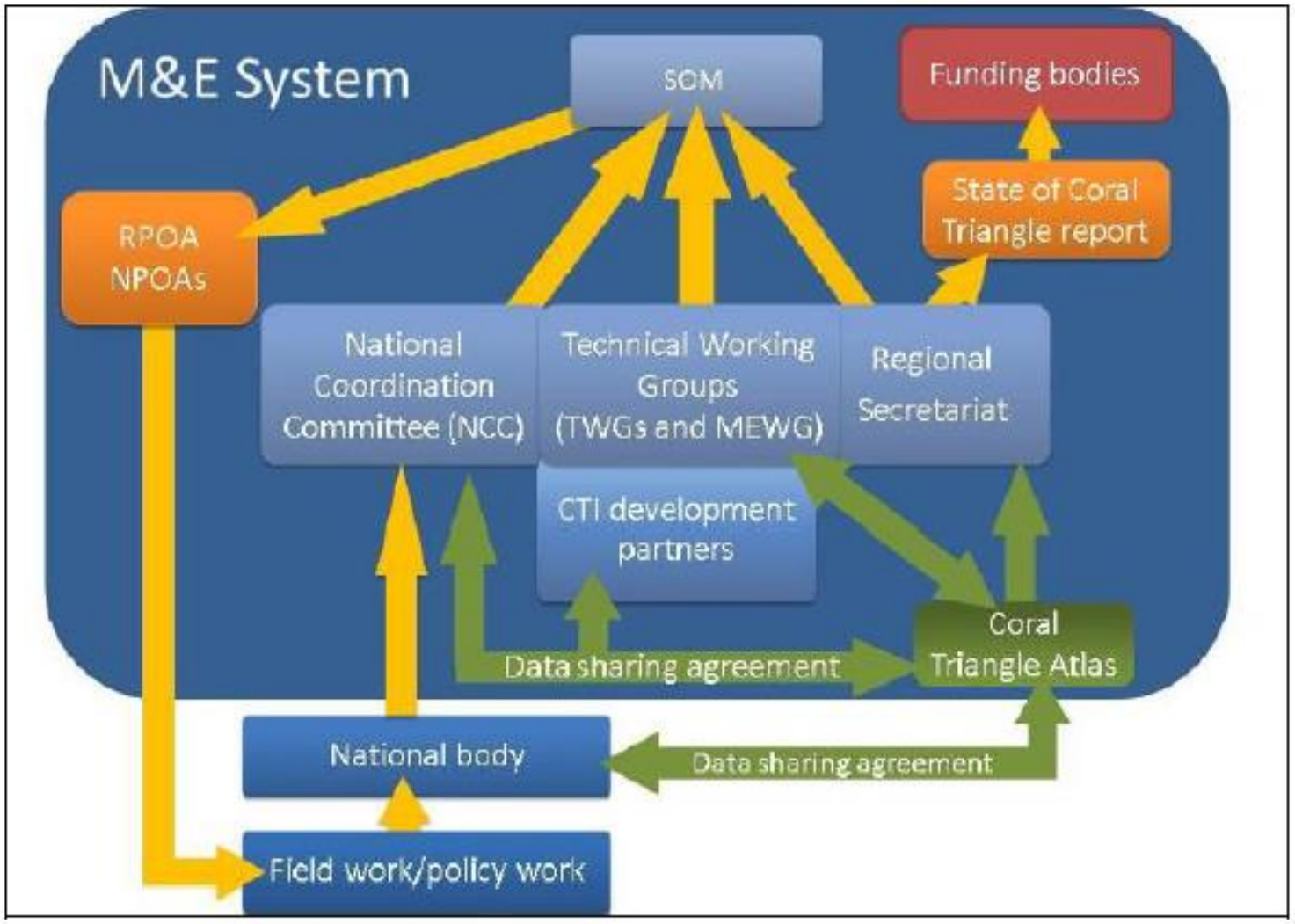
– CTI-CFF RS will continue maintain the CT Atlas independently!

# The Coral Triangle Atlas 2.0



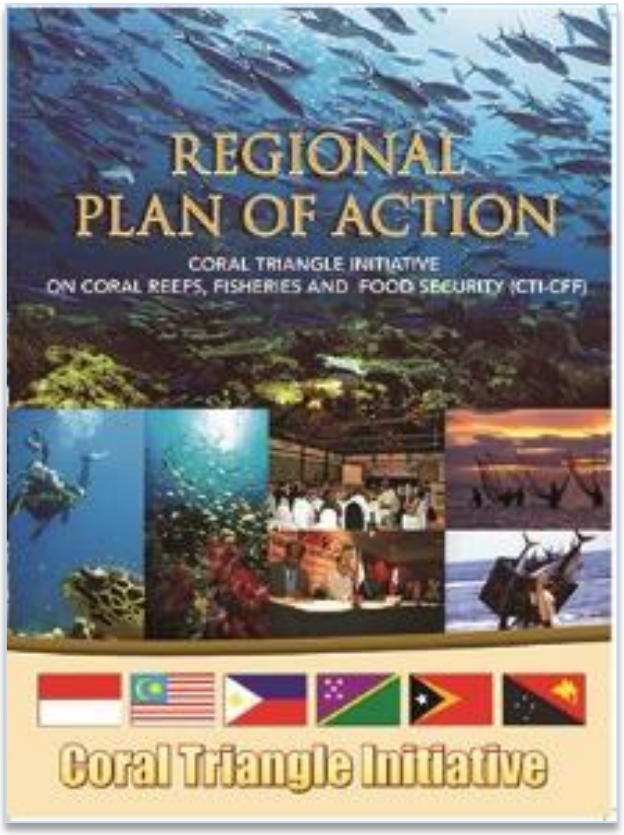

http://ctatlas.coraltriangleinitiative.org

# RPOA: M&E System (2013)




Source: Coral Triangle Initiative on Coral Reefs, Fisheries and Food Security (CTI-CFF). 2013. Monitoring and Evaluation System Operations Manual. US Coral Triangle Initiative Support Program and CTI-CFF Monitoring and Evaluation Working Group.

# RPOA (CTI-CFF Regional Plan of Action)




## RPOA Goals:

1. "Priority Seascapes" Designated and Effectively Managed
2. Ecosystem Approach to Management of Fisheries (EAFM) and other marine resources fully applied
3. Marine Protected Areas (MPAs) established and effectively managed
4. Climate Change Adaptation Measures Achieved
5. Threatened Species Status Improving

http://ctatlas.coraltriangleinitiative.org/RPOA



This page is under construction.

# REGIONAL PLAN OF ACTION

The Monitoring and Evaluation System of the CTI-CFF:

1. Developed with the objective of keeping track of the results and progress towards achieving the five goals set in the CTI-CFF's Regional Plan of Action (RPOA), as well as the 3 high level outcomes.
2. Described in the Monitoring and Evaluation System Operations Manual.
3. Provides a set of common indicators (SMART -specific, measurable, attainable, relevant, and time bound), comparable across geographies and cultures.
4. The status of each indicator during the year 2009 (adoption date of the CTI-CFF RPOA) will be used as a baseline.

A list of 5 CTI-CFF RPOA goals, its targets and the indicators to measure progress towards achieving these are displayed below. For each indicator, a list of the datasets needed to measure it is provided, with a link to download the datasets (when available).

## GOAL 1:
## PRIORITY SEASCAPES DESIGNATED AND EFFECTIVELY MANAGED

Seascapes are defined as: "Large, multiple-use marine areas, defined scientifically and strategically, in which government authorities, private organizations, and other stakeholders cooperate to conserve the diversity and abundance of marine life and to promote human well-being." A guidebook to select, develop and implement Seascapes can be found here.

A set of priority seascapes across the Coral Triangle will be designated, to serve as the geographic focus of major investments and action during 2010 – 2020. Comprehensive Seascape Investment Plans for each priority seascape need to be completed, along with an overall scheme for the sequencing of investments across the 10-year timeframe of the CTI Plan of Action.

# GOAL 3:
# MARINE PROTECTED AREAS ESTABLISHED AND EFFECTIVELY MANAGED

The CTMPAS include four categories of MPAs and MPA networks:
Category 4 – Regional Flagship Sites
Category 3 – Priority Development Sites
Category 2 – Effectively Managed CTMPAS Sites
Category 1 – Recognized CTMPAS Sites.

For more information in the CTMPAs, refer to the developed CTMPAs framework here.

| | |
|---|---|
| **Target 3.1** | **Region-wide Coral Triangle MPA System (CTMPAS) in place and fully functional.** |
| Indicator 3.1.1 | CTMPAS Framework developed and adopted by CT6.<br>Download document |
| Indicator 3.1.2 | Percent or area of total marine habitat in CT region in marine protected or managed areas.<br>Download marine protected areas dataset |
| Indicator 3.1.3 | Percent of each major marine and coastal habitat type in strictly protected "no-take replenishment zones".<br>Download marine protected areas dataset<br>Download coral reefs dataset<br>Download mangrove dataset<br>Download seagrass dataset |
| Indicator 3.1.4 | Percent or area (km2) of marine protected areas under "effective" management.<br>Download marine protected areas dataset |
| Indicator 3.1.5 | Percent or area of marine protected/ managed areas included in CTMPAS.<br>Download marine protected areas dataset |

# GOAL 4:
# CLIMATE CHANGE ADAPTATION MEASURES ACHIEVED

A region-wide Early Action Plan for Climate Change Adaptation (REAP) for the near-shore marine and coastal environment (including small island ecosystems) has been completed. CTI countries should implement this plan,– addressing economic and livelihood needs of coastal communities heavily dependent on marine and coastal resources, and biodiversity conservation objectives. In order to facilitate this, the CTI-CFF has created a roadmap which establishes regional priorities of the Coral Triangle countries for the years 2013 through 2019. These priorities were established after taking stock of regional, national, and local actions implemented since the establishment of the CTI.

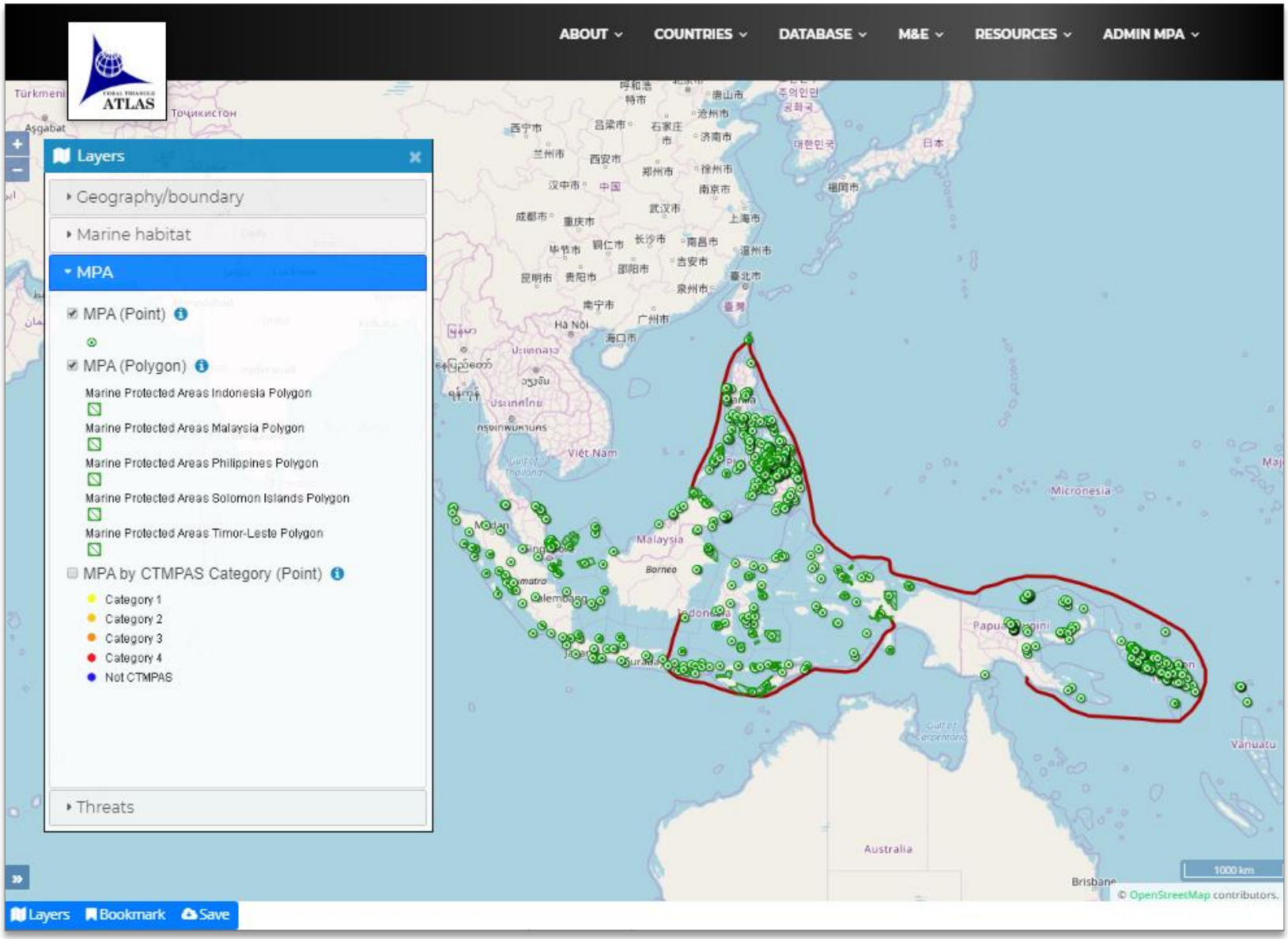
| | |
|---|---|
| **Target 4.1** | **Region-wide Early Action Plan for Climate Change Adaptation for the near-shore marine and coastal environment and small island ecosystems developed and implemented.** |
| Indicator 4.1.1 | Number of regional agreements/frameworks/plans (e.g. REAP) developed.<br>Download regional CCA policies dataset |
| Indicator 4.1.2 | Number of national policies (including national CCA plans and frameworks) laws and regulations on climate change adaptation proposed and adopted.<br>Download national CCA policies dataset |
| Indicator 4.1.3 | Proportion of local governments that have integrated climate adaptation into local governance (plans and actions).<br>Download local CCA implementation dataset |
| Indicator 4.1.4 | Area of Mangroves (hectares).<br>Download mangrove dataset |

| | |
|---|---|
| **Target 4.2** | **Networked national centers of excellence on climate change adaptation for marine and coastal environments are established and in full operation.** |
| Indicator 4.2.1 | A national institution within CT6 designated and networked to address climate change adaptation coordinated with national government support.<br>* Dataset not available yet |

# CTMPAS by Category in CT Atlas


- Develop a comprehensive map and geo-referenced database delineating a region-wide **Coral Triangle Marine Protected Area System (CTMPAS)**
- Holds the best publishable MPA datasets - holds >1200 MPAs in the region as at 2014

# Interactive Map



# Indicators for Tracking Progress RPOA Goal 3: MPAS Established and Effectively Managed

| Target | Indicator | Regional Action | Spatial | Who Measures | Who reports | Means to Verify | Frequency | Source of Baseline Regional (2012) | Source of Baseline National |
|---|---|---|---|---|---|---|---|---|---|
| 3.1 Region-Wide Coral Triangle MPA System (CTMPAS) in place and fully functional by 2020 | 3.1.1 *CTMPAS Framework* developed and adopted by CT6 | Action 1 | No | CTI MPA-TWG | CTI MPA-TWG | Copy of *CTMPAS Framework* document; CTI MPA-TWG Minutes of Meeting, SOM Decision Document | Once | Target by November 2012 during SOM | N/A |
| | 3.1.2 Percent/Area of total marine habitat area in CT region in marine protected or managed areas | Action 2 | Yes | CT Atlas | CTI MPA-TWG | CT Atlas map; *CTMPAS Framework* and progress report | Every two years | *CTMPAS Framework*, CT Atlas, and rSCTR | CT6 SCTR; national gap analysis |
| | 3.1.3 Percent/area of each major marine and coastal habitat type in strictly protected "no-take replenishment zones" | Target outcome | Yes | CT Atlas | CTI MPA-TWG | CT Atlas map, CTMPAS progress reports | Every two years | *CTMPAS Framework*, CT Atlas, and rSCTR | CT6 SCTR; national gap analysis |
| | 3.1.4 Percent/Area (in sq km) of marine protected areas under "effective" management | Target outcome | Yes | CT Atlas | CTI MPA-TWG | MPA Management Assessment Ratings/ Report | Every two years | *CTMPAS Framework*, CT Atlas, and rSCTR | SCTR; national gap analysis |
| | 3.1.5 Percent/Area of marine protected/ managed areas included in CTMPAS | Actions 3, 4 and 5 | Yes | CT Atlas | CTI MPA-TWG | CT Atlas maps/ database; CTMPAS progress reports | Every two years | *CTMPAS Framework*, CT Atlas, and rSCTR | MPA TWG, CT Atlas and SCTR |

*Coastal Management*, 42:87–106, 2014

ISSN: 0892-0753 print / 1521-0421 online
DOI: 10.1080/08920753.2014.878177

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# Marine Protected Areas in the Coral Triangle: Progress, Issues, and Options

ALAN T. WHITE,[1] PORFIRIO M. ALIÑO,[2] ANNICK CROS,[1] NURULHUDA AHMAD FATAN,[3] ALISON L. GREEN,[4] SHWU JIAU TEOH,[3] LYNETTE LAROYA,[5] NATE PETERSON,[4] STANLEY TAN,[3] STACEY TIGHE,[6] RUBÉN VENEGAS-LI,[3] ANNE WALTON,[7] AND WEN WEN[8]

Summary data for coverage of all recognized MPAs in the Coral Triangle countries

| Marine Protected Areas (MPAs) | Indonesia | Malaysia[a] | Papua New Guinea | Philippines | Solomon Islands | Timor- Leste | Region |
|---|---|---|---|---|---|---|---|
| Number of MPAs (reported by government)[b] | 108 | 51 | 59 | 1653 | 100 | 1 | ***1972*** |
| Total MPA area ($km^2$) (reported by government)[b] | 157,841 | 15,661 | 4,558 | 20,940 | 1,325 | 556 | ***200,881*** |
| Number MPA records in CT Atlas (point or polygon format) | 83 | 51 | 59 | 627 | 100 | 1 | ***920*** |
| Number of MPAs with known boundaries in CT Atlas[c] | 83 | 50 | 35 | 348 | 82 | 1 | ***599*** |
| Total area of MPAs ($km^2$) with known boundaries | 170,841 | 13,653 | 4,558 | 17,164 | 1,325 | 557 | ***208,152*** |
| Percent MPA areal cover in EEZ[d] | 2.7% | 3.5% | 0.2% | 1.1% | 0.1% | 1.3% | **1.6%** |
| Percent MPA areal cover in territorial waters (12 n. miles) | 13.1% | 12.7% | 1.3% | 4.2% | 0.9% | 3.4% | ***9.4%*** |
| Average size of MPAs ($km^2$) | 1461.5 | 270.4 | 130.2 | 12.7 | 16.0 | 556.0 | **407.80** |
| Size range of MPAs ($km^2$) | 0.9 | 11.83 | 0.04 | 0.02 | 0.02 | — | ***0.02*** |
| Minimum | 35,211 | 10,200 | 2334 | 2789 | 823 | — | ***35,211*** |
| Maximum | | | | | | | |
| **Coral Reefs[e]** | | | | | | | |
| Coral reef area ($km^2$) | 19,868 | 1,698 | 7256 | 12,021 | 2,804 | 35 | ***43,682*** |
| Reef area in MPAs ($km^2$) | 6,208 | 661 | 357 | 471 | 113 | 10 | ***7,757*** |
| Reefs in MPAs (%) | 31.2% | 38.9% | 4.9% | 3.9% | 4.0% | 29.5% | ***17.8%*** |
| **Mangroves[f]** | | | | | | | |
| Mangrove area ($km^2$) | 31,894 | 7,097 | 4,265 | 2,568 | 603 | 18 | ***46,445*** |

*Coastal Management*, 42:128–142, 2014

ISSN: 0892-0753 print / 1521-0421 online
DOI: 10.1080/08920753.2014.877760

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# Spatial Data Quality Control for the Coral Triangle Atlas

ANNICK CROS,[1] RUBEN VENEGAS-LI,[2,3] SHWU JIAU TEOH,[3] NATE PETERSON,[4] WEN WEN,[5] AND NURULHUDA AHMAD FATAN[3]

[1]Asia-Pacific Program, The Nature Conservancy, Honolulu, Hawaii, USA
[2]Fundación Keto, San José, Costa Rica
[3]WorldFish, Penang, Malaysia
[4]Asia-Pacific Program, The Nature Conservancy, Brisbane, Australia
[5]Indonesia Marine Program, The Nature Conservancy, Denpasar, Indonesia

**Table 1**
Total number and area of MPAs in the Coral Triangle, and completeness of spatial data for these areas in the Coral Triangle Atlas

| | Indonesia[b] | Malaysia[c] | Papua New Guinea | Philippines | Solomon Islands | Timor-Leste |
|---|---|---|---|---|---|---|
| Total number of MPAs as reported by governments.[a] | 108 | 51 | — | 1,653 | — | 1 |
| Total MPA Area (km$^2$) as reported by governments.[a] | 157,841 | 15,661 | — | 20,940 | — | 556 |
| Total number of MPA records in CT Atlas (point or polygon) | 83 | 51 | 59 | 627 | 100 | 1 |
| Total # of MPA with known boundaries—polygon format-(CT Atlas) | 83 | 50 | 35 | 348 | 82 | 1 |
| Total Area (km$^2$) of known boundaries for MPAs—polygon format- (CT Atlas) | 170,841 | 13,653 | 4,558 | 17,164 | 1,325 | 557 |

**Table 2**
Comparison polygons representing boundaries of marine protected areas between CT Atlas (2013) and WDPA (2012), for each of the CT6 countries (all of the numbers represent MPA number).

| MPA represented by a polygon in: | Indonesia | Malaysia | Papua New Guinea | Philippines | Solomon Islands | Timor-Leste | Total |
|---|---|---|---|---|---|---|---|
| CT Atlas only | 12 | 5 | 28 | 112 | 74 | — | 231 |
| CT Atlas and WDPA, and both polygons are equal | 40 | — | 7 | 171 | 3 | 1 | 222 |
| CT Atlas and WDPA, but polygons have a different shape/location | 39 | 45 | — | 65 | 6 | — | 155 |

# Spatial Data: Different source and resolution

## Example: Coral Reefs

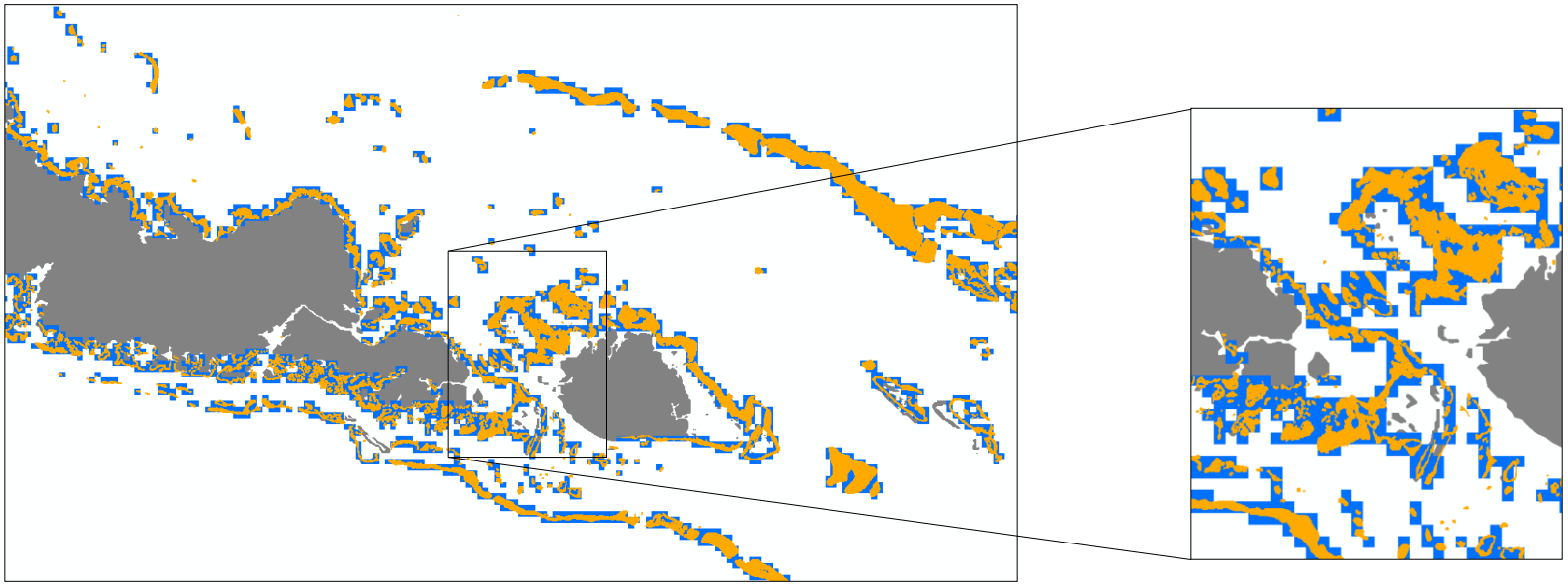
- UNEP-WCMC (2010) ***Global Distribution of Coral Reefs.*** Download from UNEP-WCMC's Ocean Data Viewer (http://data.unep-wcmc.org/datasets/13)
- WRI (2011) ***Reefs At Risk Revisited*****.** Download from http://www.wri.org/publication/reefs-at-risk-revisited#datasets.

| Key Differences: | UNEP-WCMC (2010) | WRI (2011) |
|---|---|---|
| **Sources** | ▪ Millennium Coral Reefs (Unvalidated)<br>▪ Millennium Coral Reefs (Validated)<br>▪ Other sources | ▪ Millennium Coral Reefs (Unvalidated)<br>▪ Millennium Coral Reefs (Validated)<br>▪ UNEP-WCMC. *Coral Reef Map*. 2002.<br>▪ Other Sources |
| **Spatial Resolution** | ▪ **30m resolution (Landsat data)**<br>▪ Scales for data from other sources range from 10,000 to 8,000,000 | ▪ **500m resolution (Grid data)**<br>▪ Scales for data from other sources range from 60,000 to 1,000,000 |

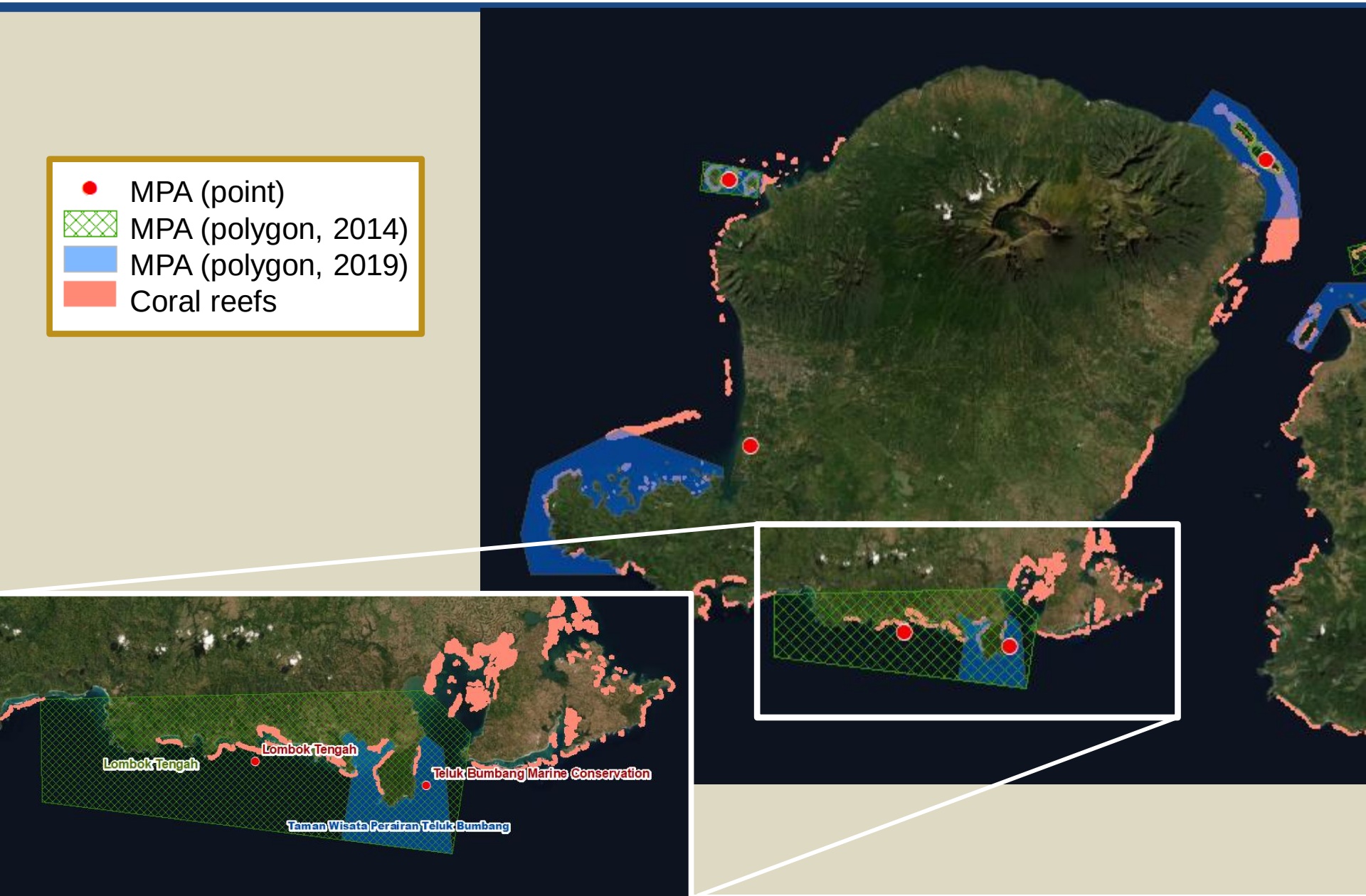
UNEP-WCMC (2010)
in 30m-vector polygon

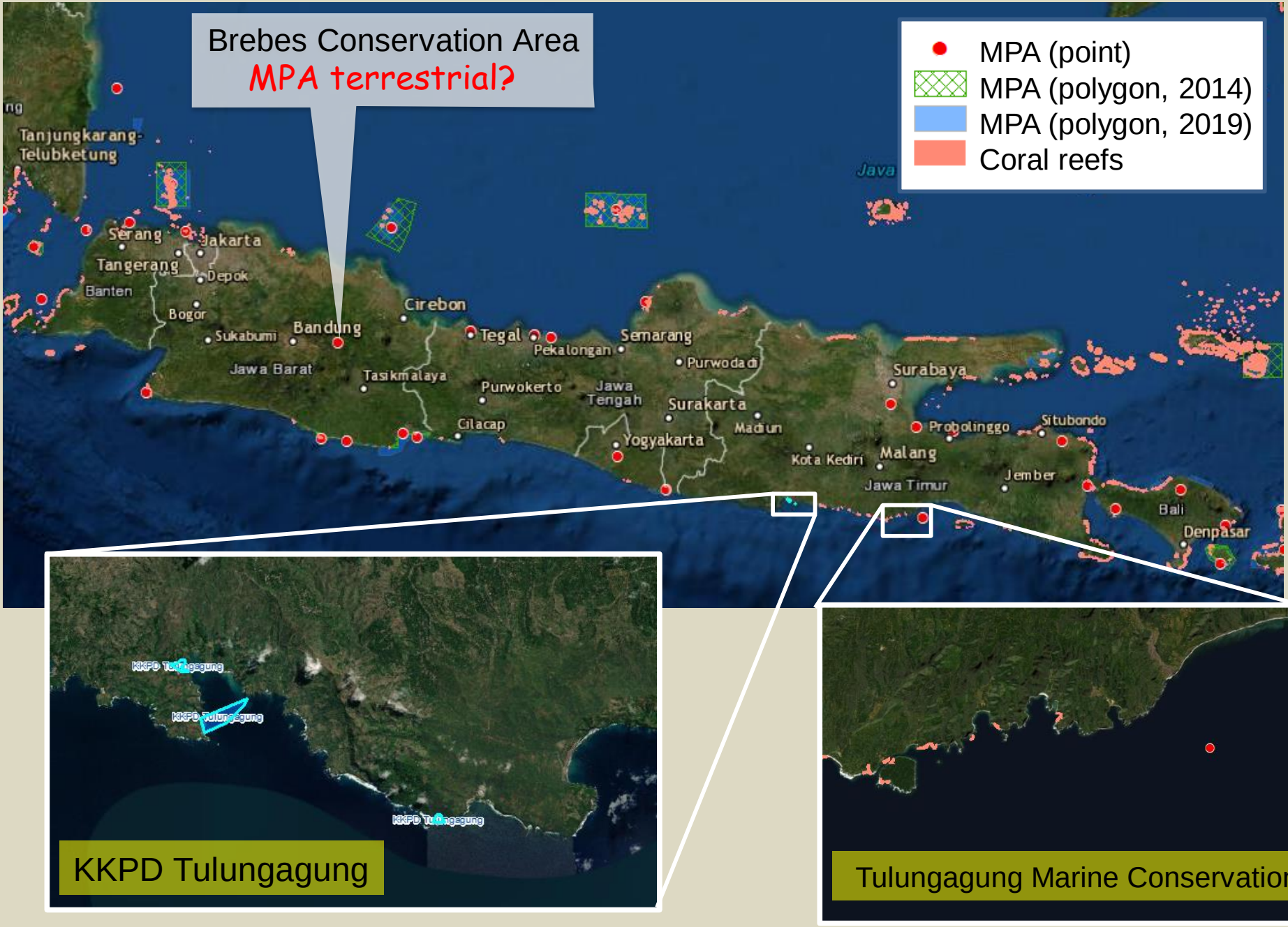
WRI (2011) Reefs at Risk Revisited
in 500-m grid

The estimates of reef areas for Solomon Island (SLB) and Papua New Guinea (PNG) using vector-based and grid-based datasets will caused very huge different number as the reefs in SLB and PNG are mostly **small patches**

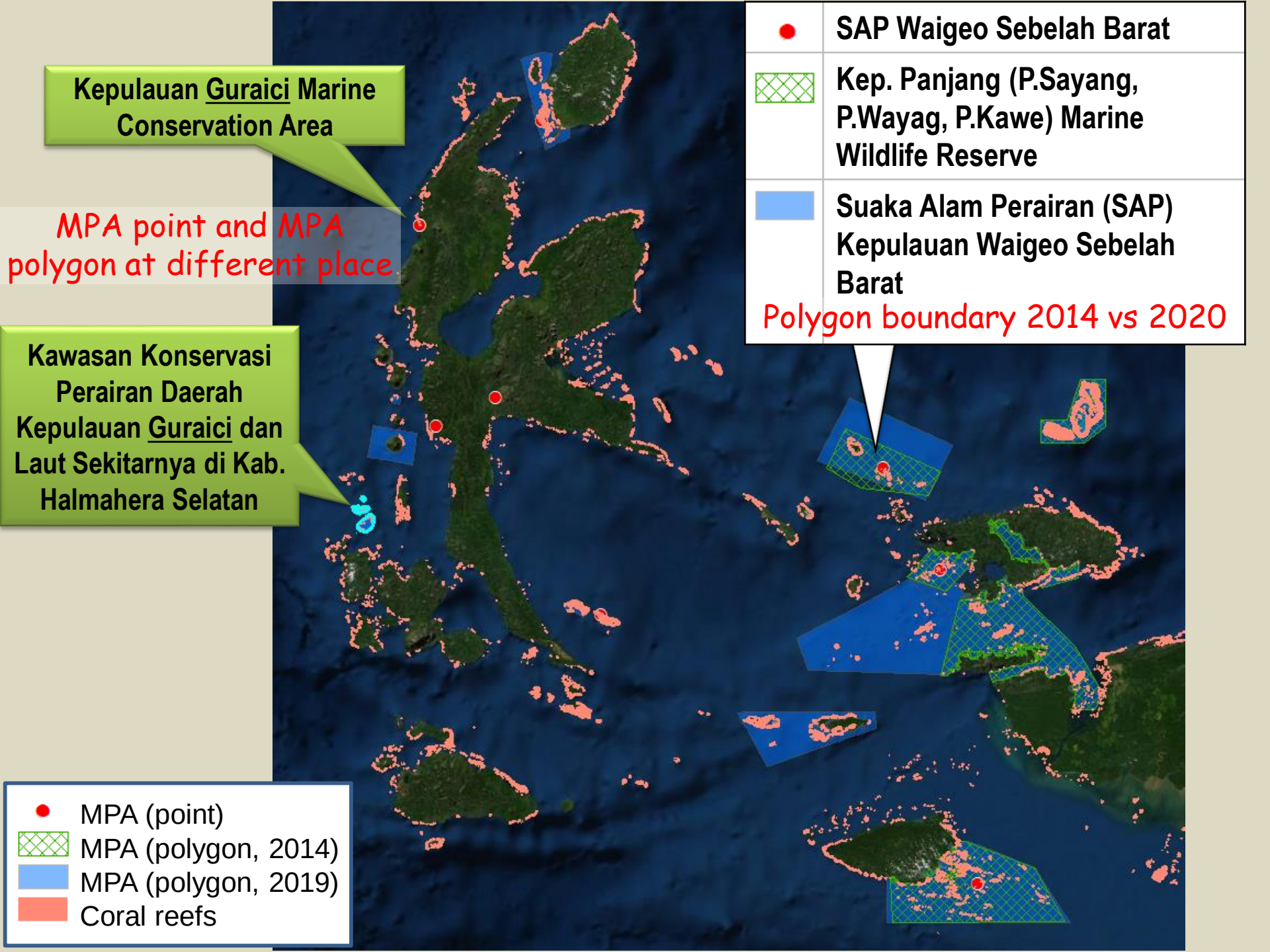


# MPA Data: Different source and date





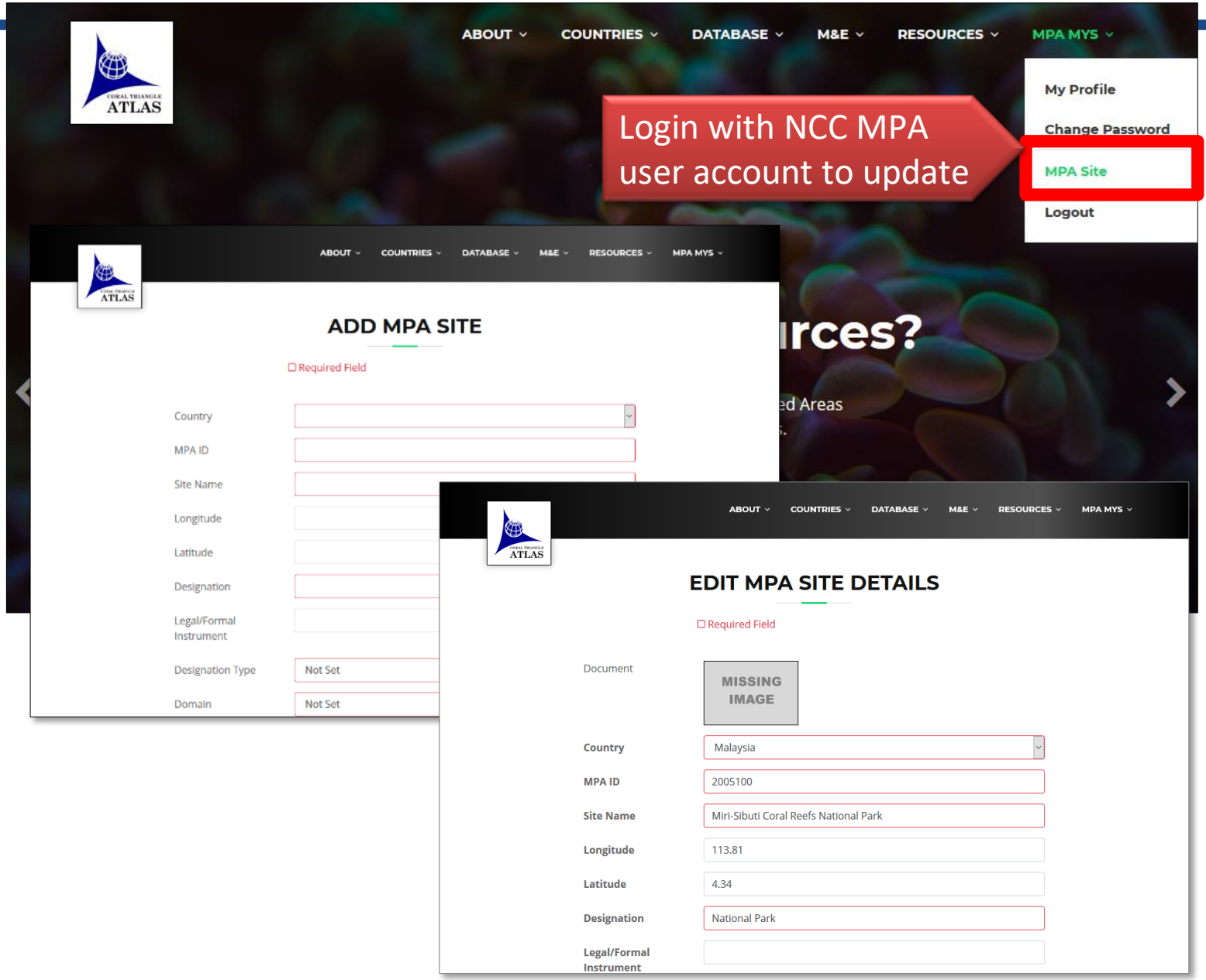

MPA polygon vs MPA point


Kepulauan Guraici Marine Conservation Area
MPA point and MPA polygon at different place
Kawasan Konservasi Perairan Daerah Kepulauan Guraici dan Laut Sekitarnya di Kab. Halmahera Selatan
SAP Waigeo Sebelah Barat
Kep. Panjang (P.Sayang, P.Wayag, P.Kawe) Marine Wildlife Reserve
Suaka Alam Perairan (SAP) Kepulauan Waigeo Sebelah Barat
Polygon boundary 2014 vs 2020
MPA (point)
MPA (polygon, 2014)
MPA (polygon, 2019)
Coral reefs

# Update MPA data

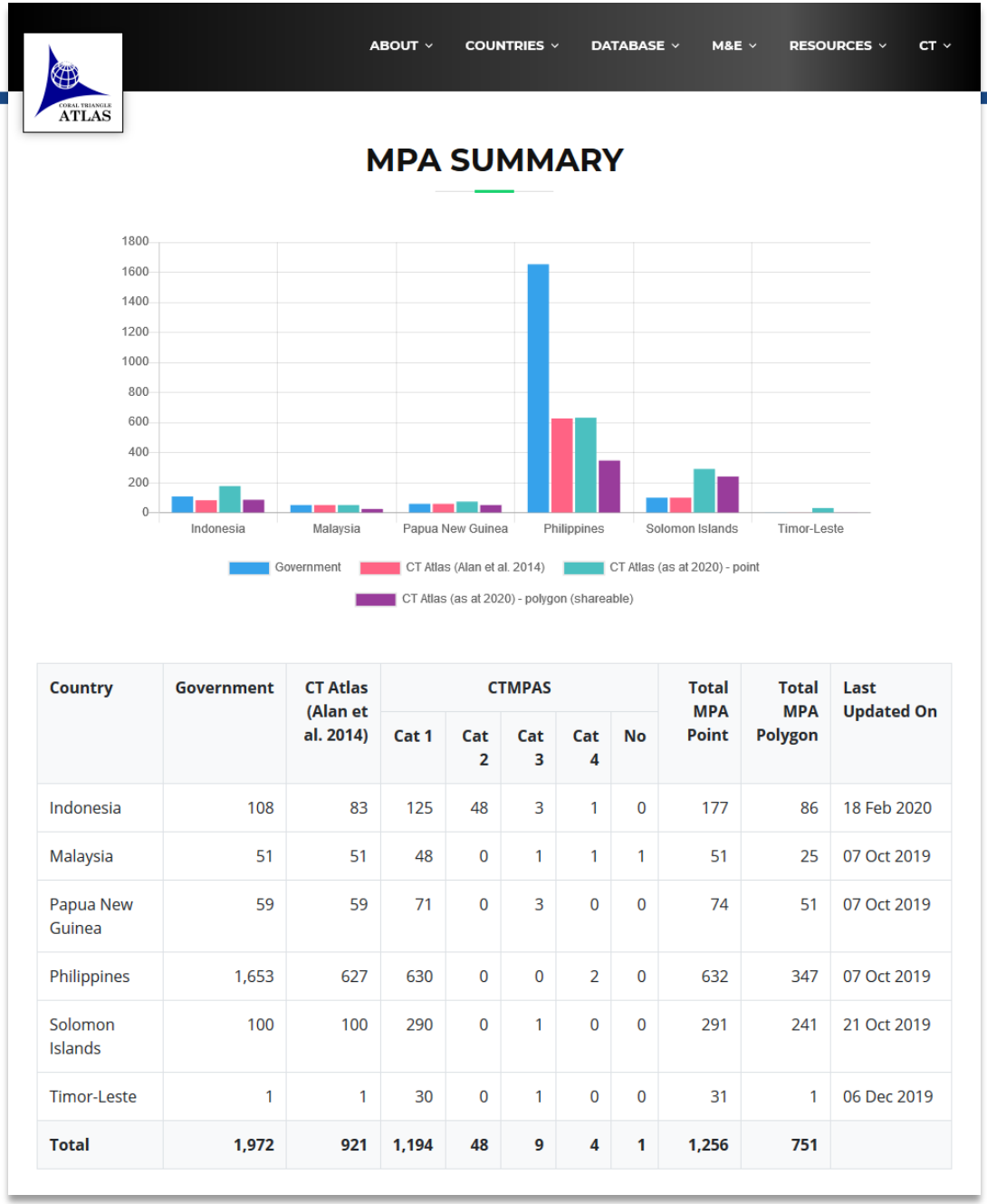
**MPA Database**

- MPA Database
- Indonesia
- Malaysia
- Papua New Guinea
- Philippines
- Solomon Islands
- Timor-Leste



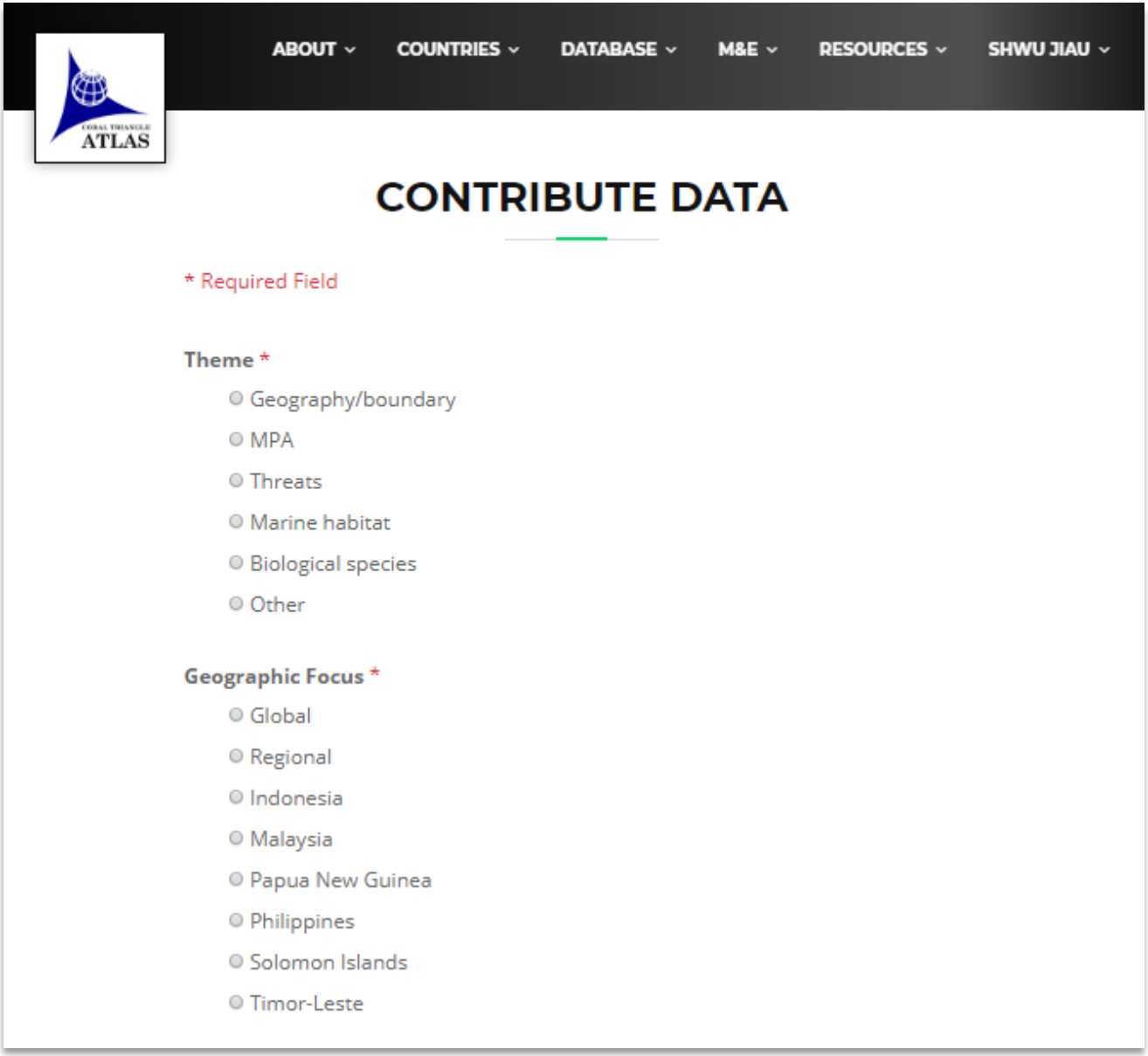
# MPA Dashboard

- Show the latest progress of MPAs updated for each country *(i.e. comparing the numbers of MPA reported by government; numbers by CTMPAS Category; missing boundary info [polygon]; last updated date)*
- Currently can access through MPA Administrator account log in only

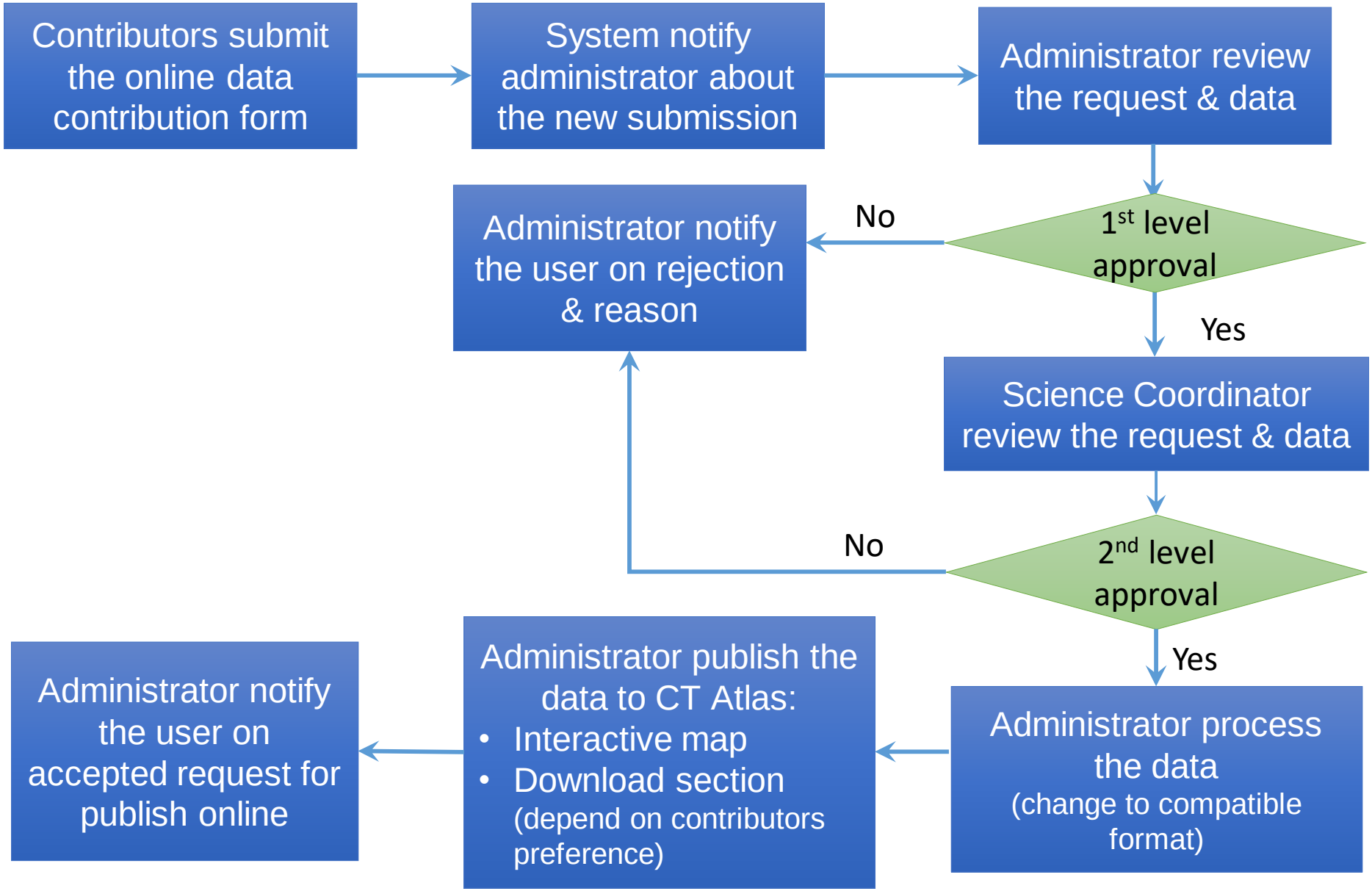



| Country | Government | CT Atlas (Alan et al. 2014) | CTMPAS | | | | | Total MPA Point | Total MPA Polygon | Last Updated On |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Cat 1 | Cat 2 | Cat 3 | Cat 4 | No | | | |
| Indonesia | 108 | 83 | 125 | 48 | 3 | 1 | 0 | 177 | 86 | 18 Feb 2020 |
| Malaysia | 51 | 51 | 48 | 0 | 1 | 1 | 1 | 51 | 25 | 07 Oct 2019 |
| Papua New Guinea | 59 | 59 | 71 | 0 | 3 | 0 | 0 | 74 | 51 | 07 Oct 2019 |
| Philippines | 1,653 | 627 | 630 | 0 | 0 | 2 | 0 | 632 | 347 | 07 Oct 2019 |
| Solomon Islands | 100 | 100 | 290 | 0 | 1 | 0 | 0 | 291 | 241 | 21 Oct 2019 |
| Timor-Leste | 1 | 1 | 30 | 0 | 1 | 0 | 0 | 31 | 1 | 06 Dec 2019 |
| **Total** | **1,972** | **921** | **1,194** | **48** | **9** | **4** | **1** | **1,256** | **751** | |

# Contribute Spatial Data



# CT Atlas Data Contribution and Approval Mechanism



# What's Next and Recommendations…

- CTI-CFF Regional Secretariat team to takeover CT Atlas 2.0 and continue update the contents
- WorldFish team will provide supports if any questions arise during transition period *(until December 2020)*
- Important of quality control for ALL datasets, especially MPA data
- Important of sustain partnerships with data providers
- Explore the CT Atlas opportunity to improve M&E in RPOA 2.0

# RPOA 2.0

**2025 Objective A:** The ability of the **coastal and marine ecosystems** to cope with impacts of climate change

- **A1: Coral reefs**
- **A2: Mangrove forests and seagrass beds**
- **A3: Endangered species**
- **A4: Fish stocks**


**2025 Objective B:** The ability of the **coastal communities** to cope with impacts of climate change

- **B1: Food security**
- **B2: Coastal livelihoods**

CORAL TRIANGLE ATLAS

# Thank You

CORAL TRIANGLE INITIATIVE ON CORAL REEFS, FISHERIES AND FOOD SECURITY

WorldFish

Contact:
s.teoh@cgiar.org