REGIONAL FLYWAY INITIATIVE TRAINING SERIES:

Workshop on Wetland Ecosystem Services and Nature-based Solutions THAILAND

27–29 November 2023

Coastal protection and water-related services of RFI sites in Thailand

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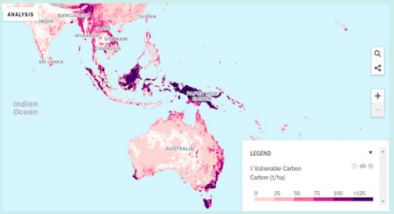
The two-pronged approach of the Regional Flyway Initiative

regulating ES

provisioning ES

site

High-level, modelling-based assessment

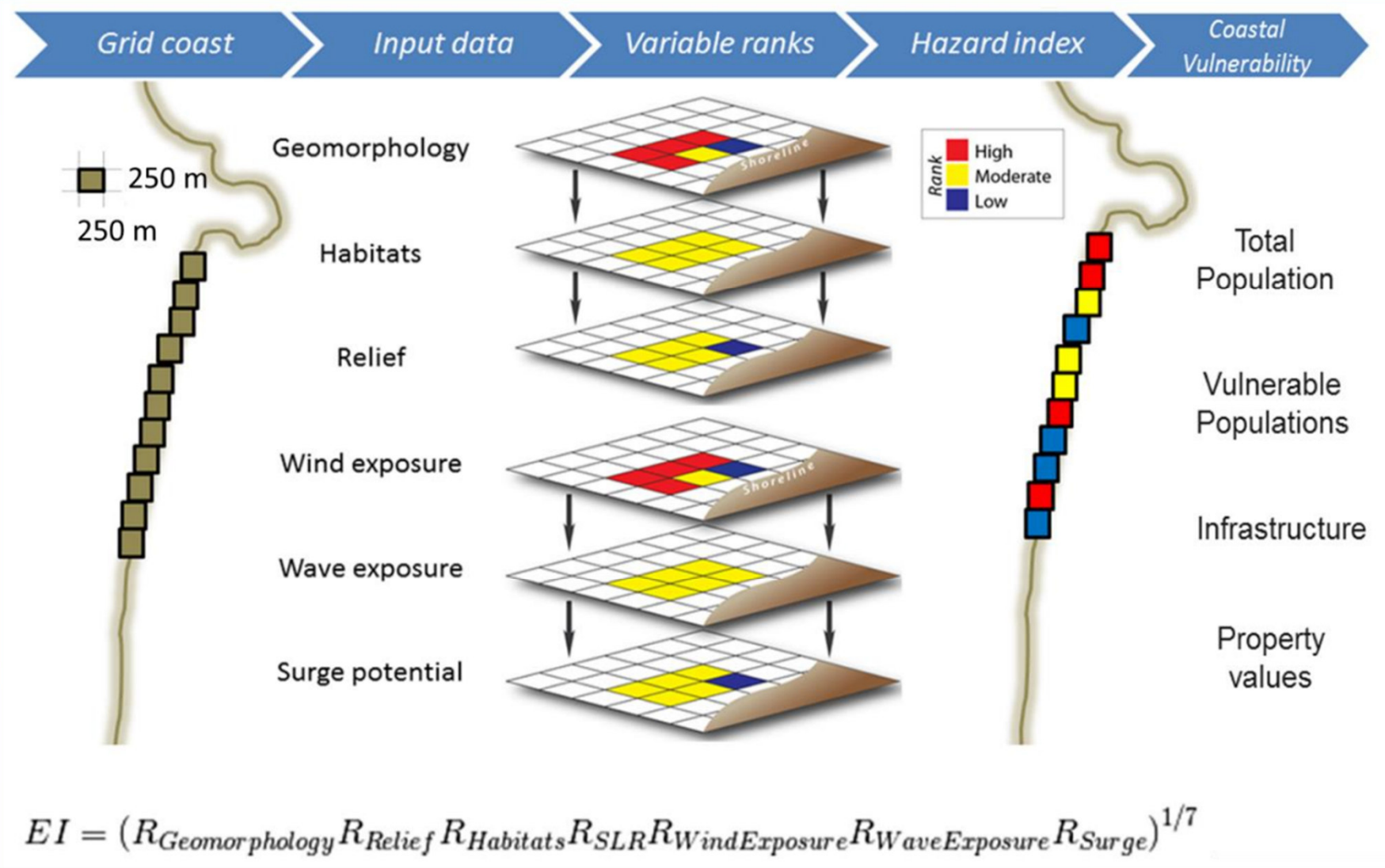


Site-level, participatory assessment

tessa

Source: East Asian-Australasian Flyway Partnership & Asian Development Bank

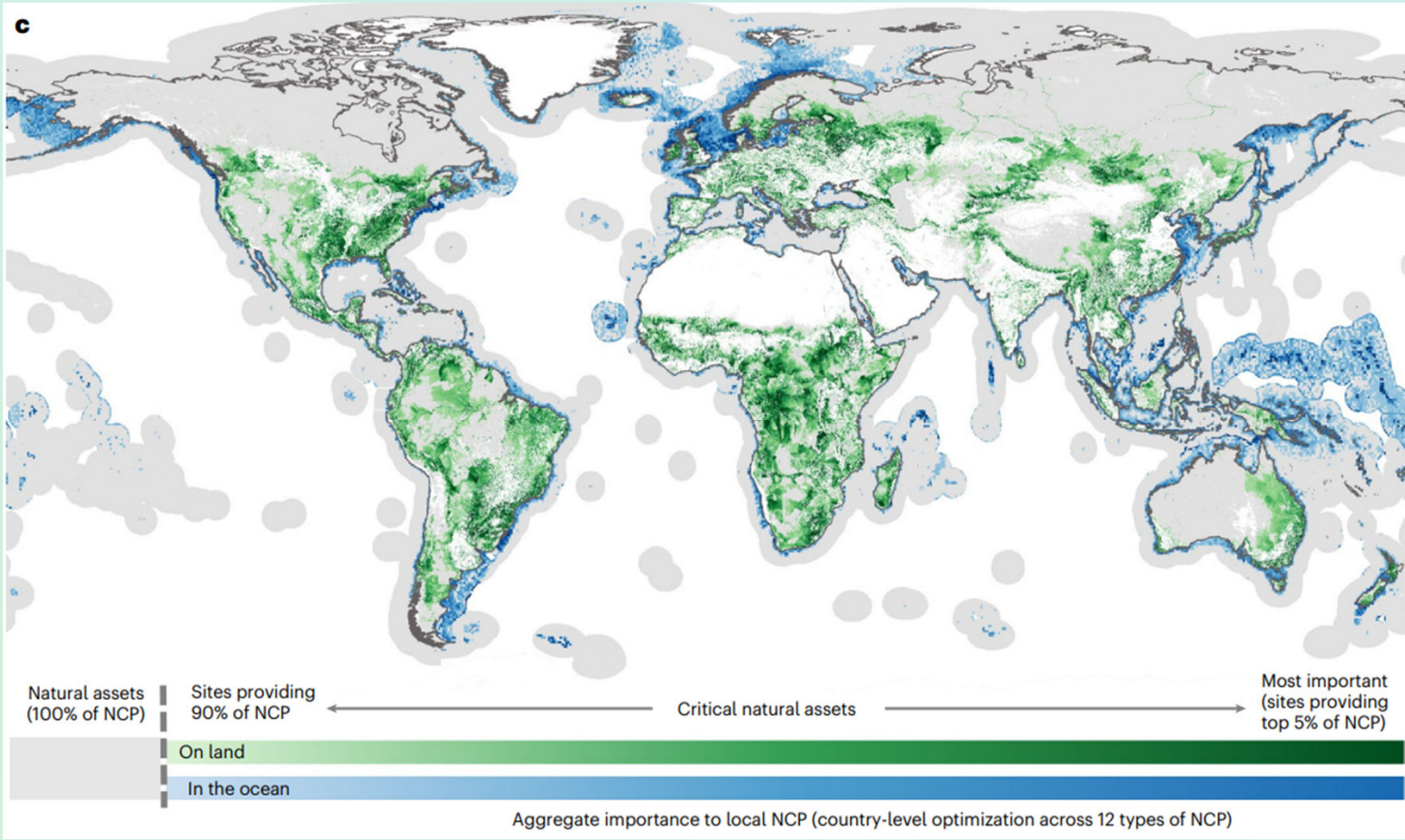
Modelling-based assessment: Coastal protection (biophysical)



Silver et al., 2019: A National Coastal Hazard and Social Vulnerability Analysis for The Bahamas

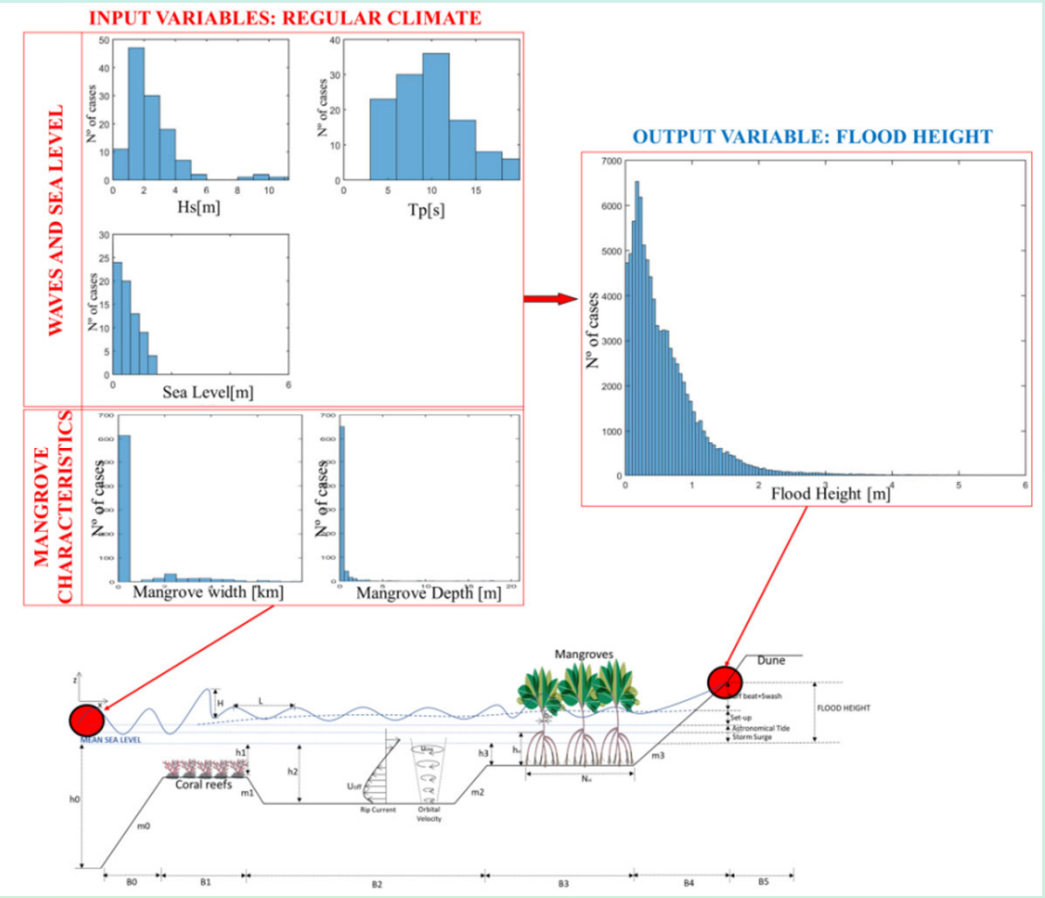
Modelling-based assessment: Coastal protection (biophysical)

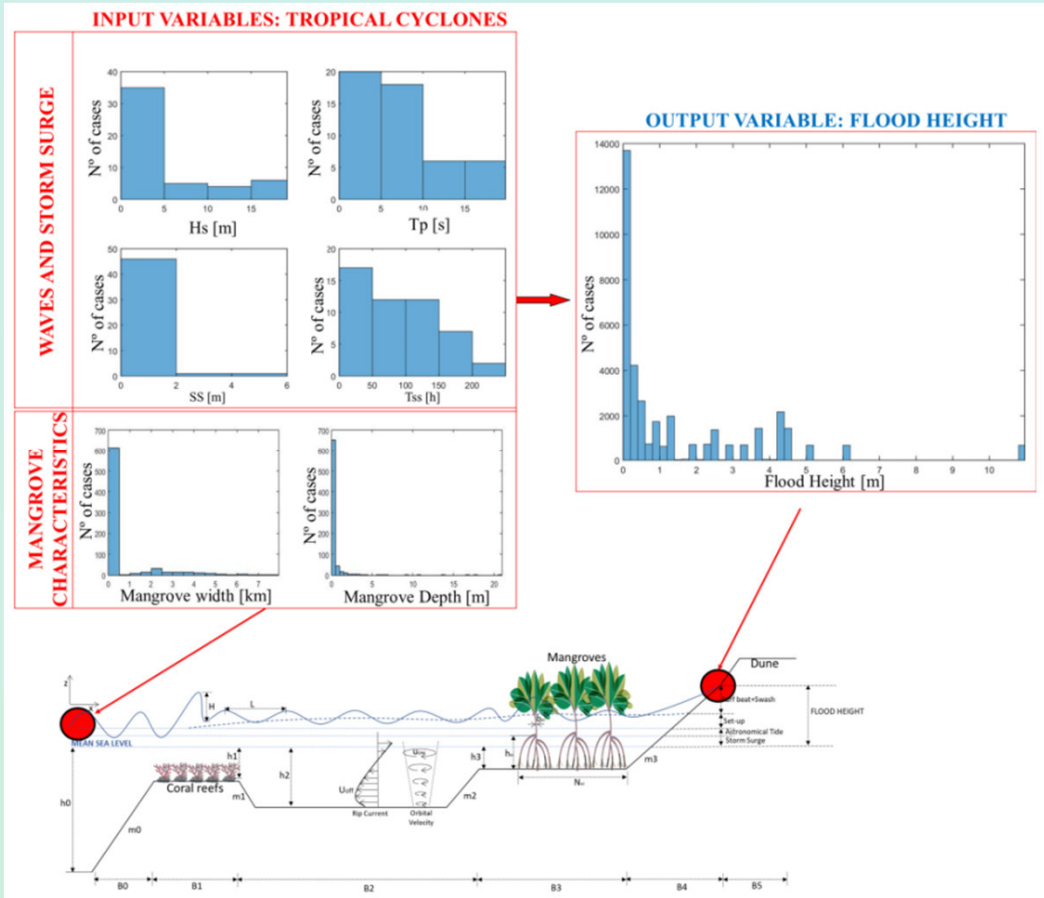
a List of local NCP modelled
Nitrogen retention for water quality regulation
Sediment retention for water quality regulation
Pollinator habitat sufficiency for pollination-dependent crops
Fodder for livestock
Timber production
Fuelwood production
Flood regulation
Riverine fish harvest
Access to terrestrial nature (for local recreation and gathering)
Coastal risk reduction (terrestrial and marine)
Marine fish harvest
Marine recreation (coral-reef tourism and associated livelihoods)



Chaplin-Kramer et al., 2022: Mapping the planet's critical natural assets

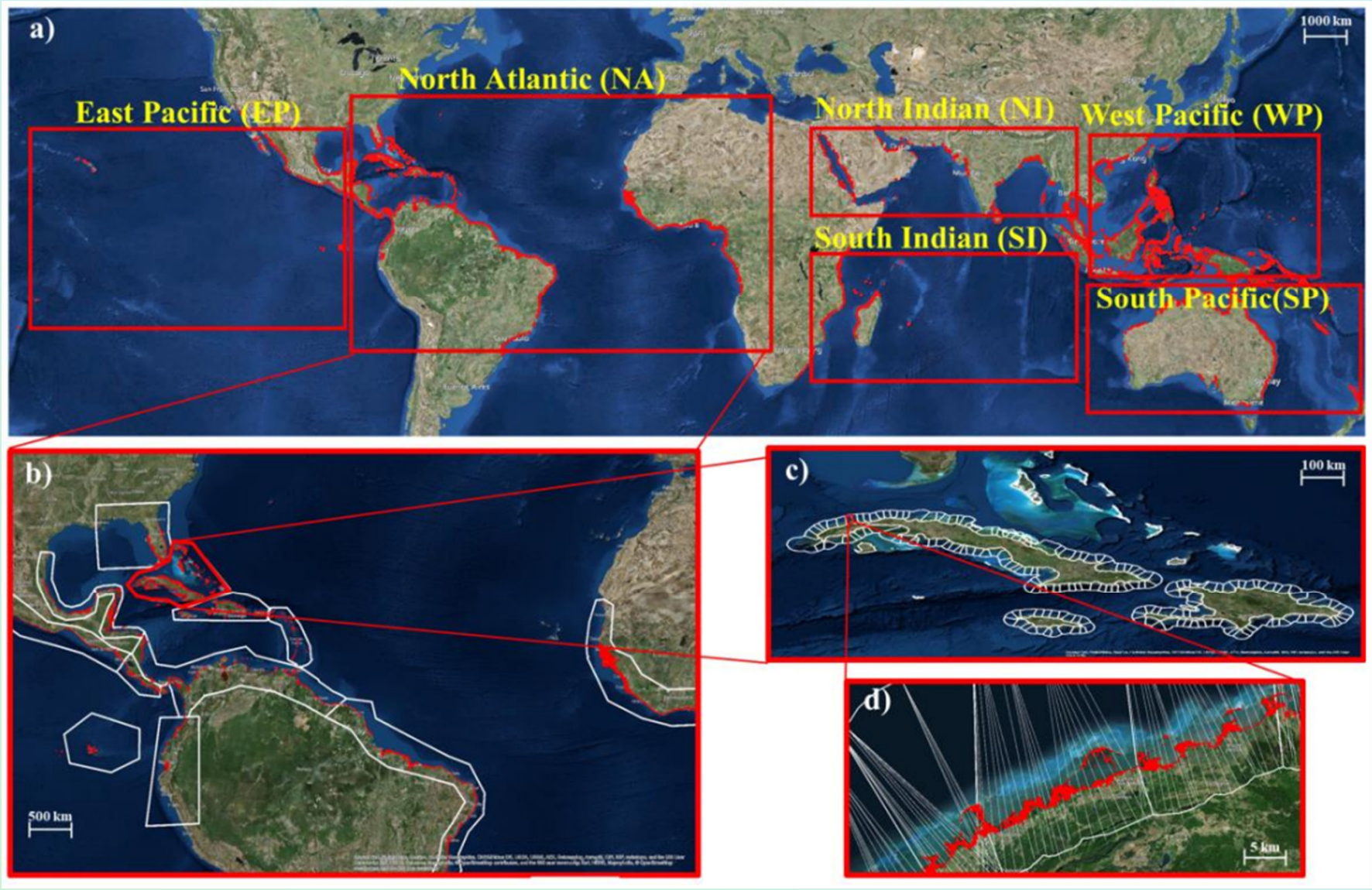
Modelling-based assessment: Coastal protection (economic)



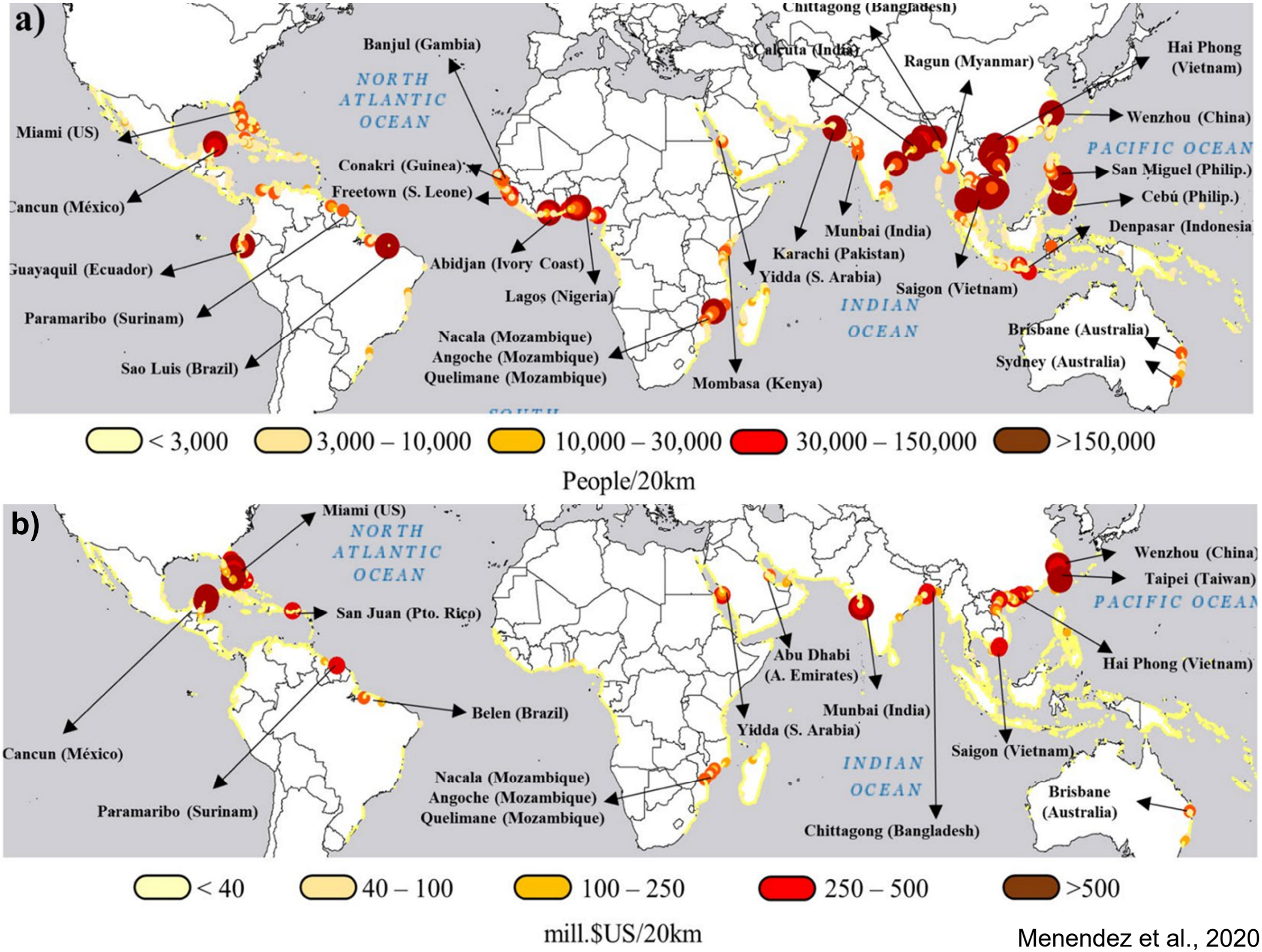


Menendez et al., 2020: The Global Benefits of Mangroves

Modelling-based assessment: Coastal protection (economic)

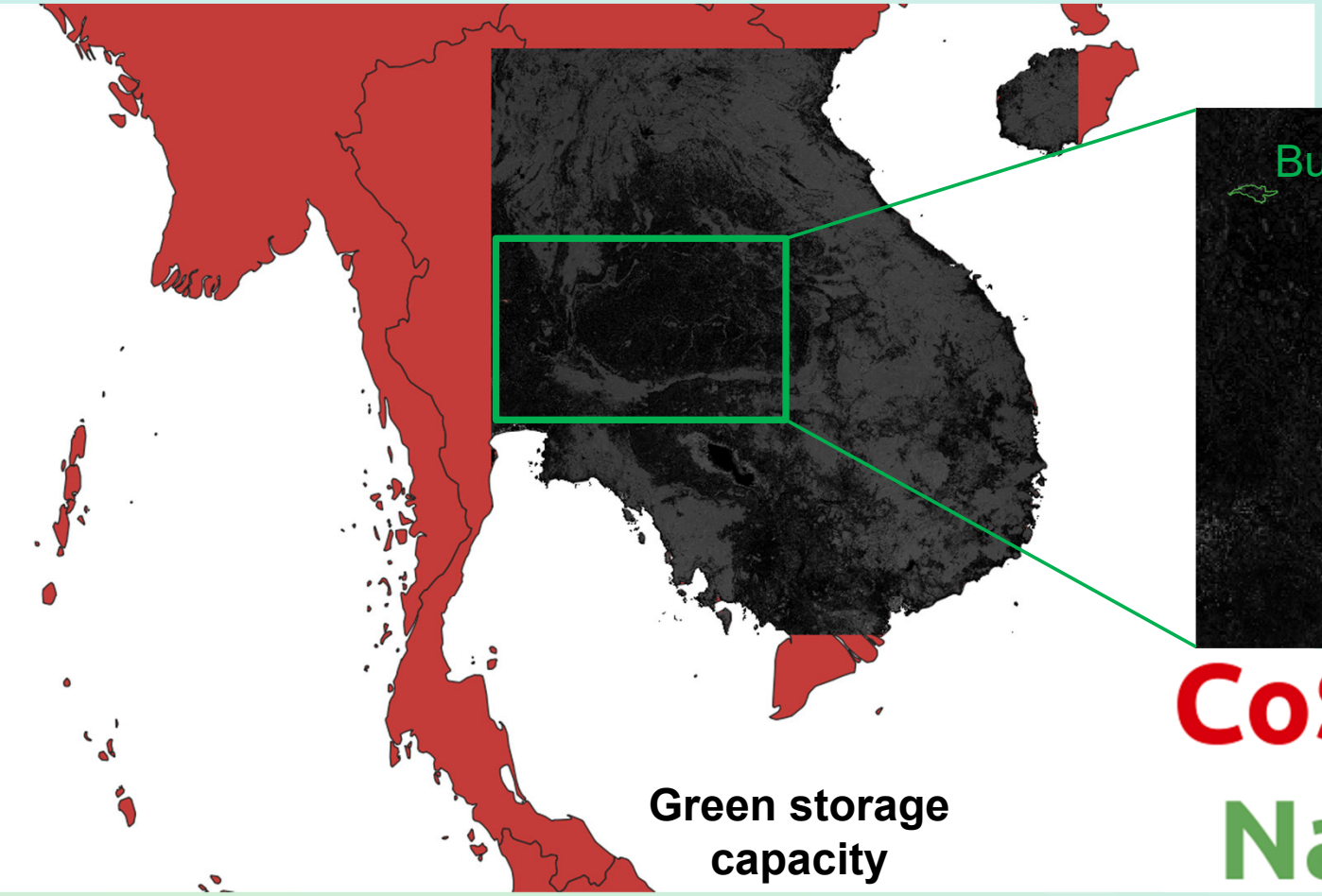


Menendez et al., 2020: The Global Benefits of Mangroves



Menendez et al., 2020

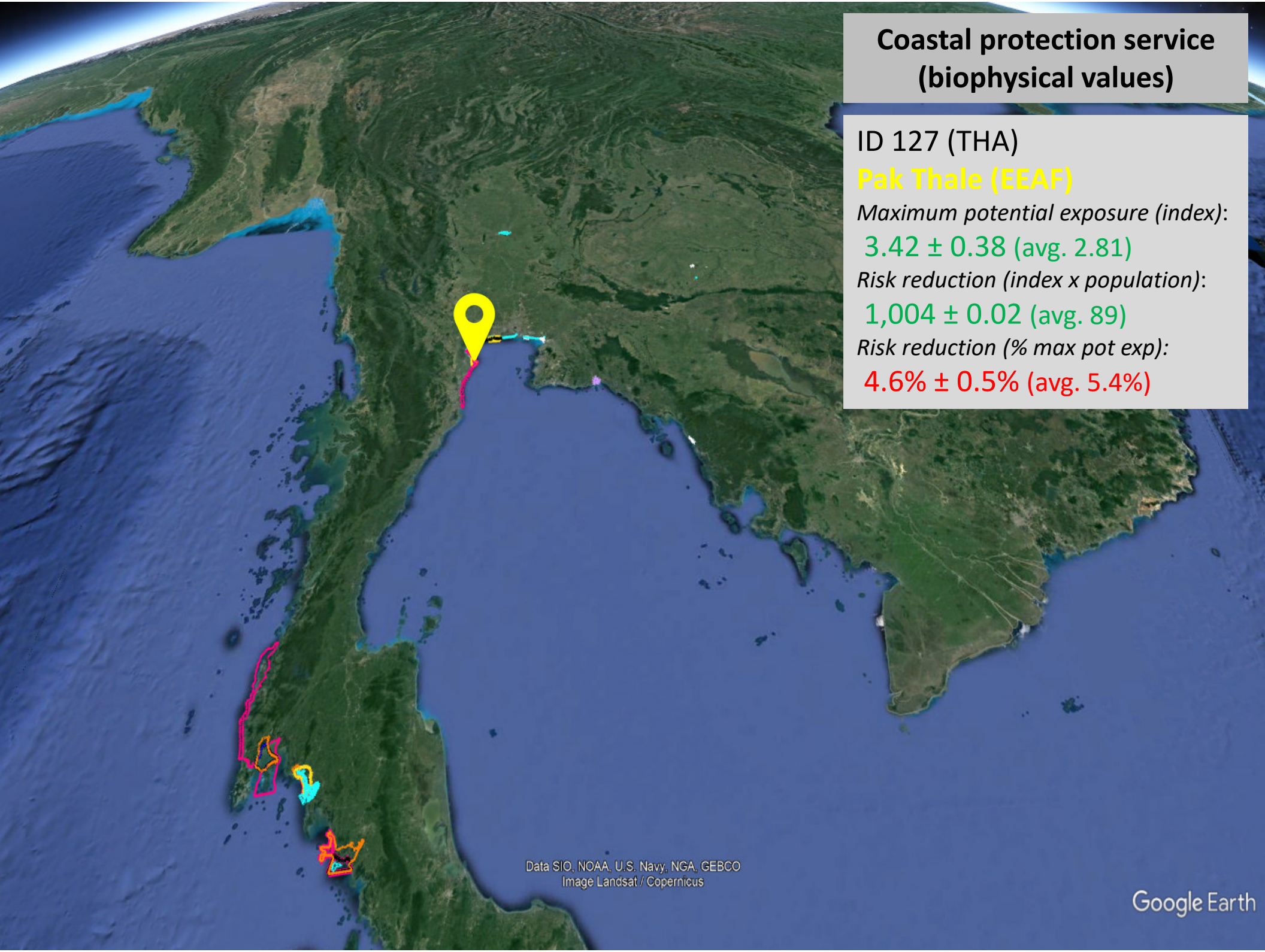
Modelling-based assessment: Flood Mitigation (biophysical)



Green storage capacity

Co$ting Nature Map

Mulligan, M. 2022: Co$tingNature Model V3.



Coastal protection service (biophysical values)

ID 127 (THA)

Pak Thale (EEAF)

Maximum potential exposure (index):

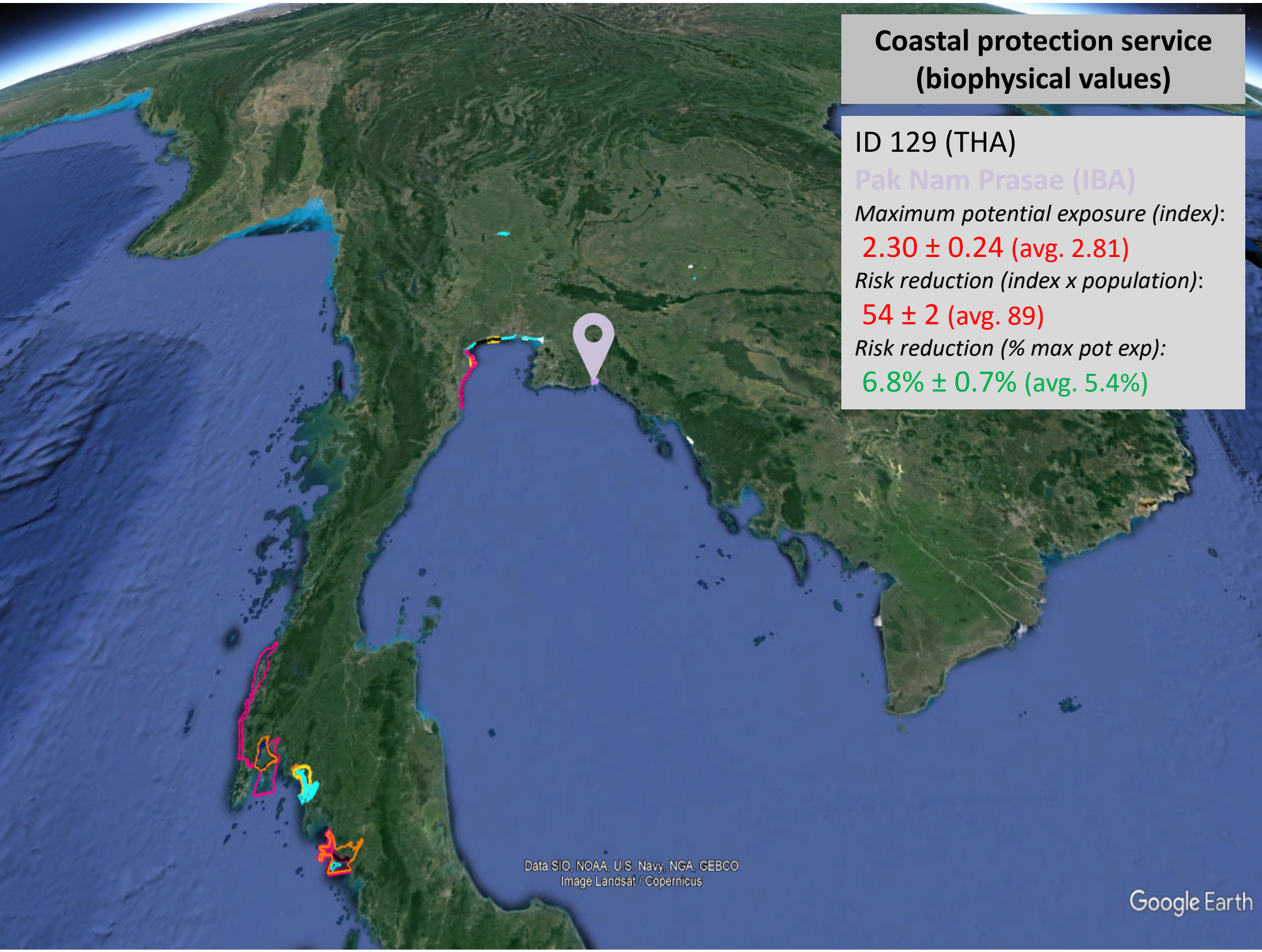
3.42 ± 0.38 (avg. 2.81)

Risk reduction (index x population):

1,004 ± 0.02 (avg. 89)

Risk reduction (% max pot exp):

4.6% ± 0.5% (avg. 5.4%)



Coastal protection service (biophysical values)

ID 129 (THA)

Pak Nam Prasae (IBA)

Maximum potential exposure (index):

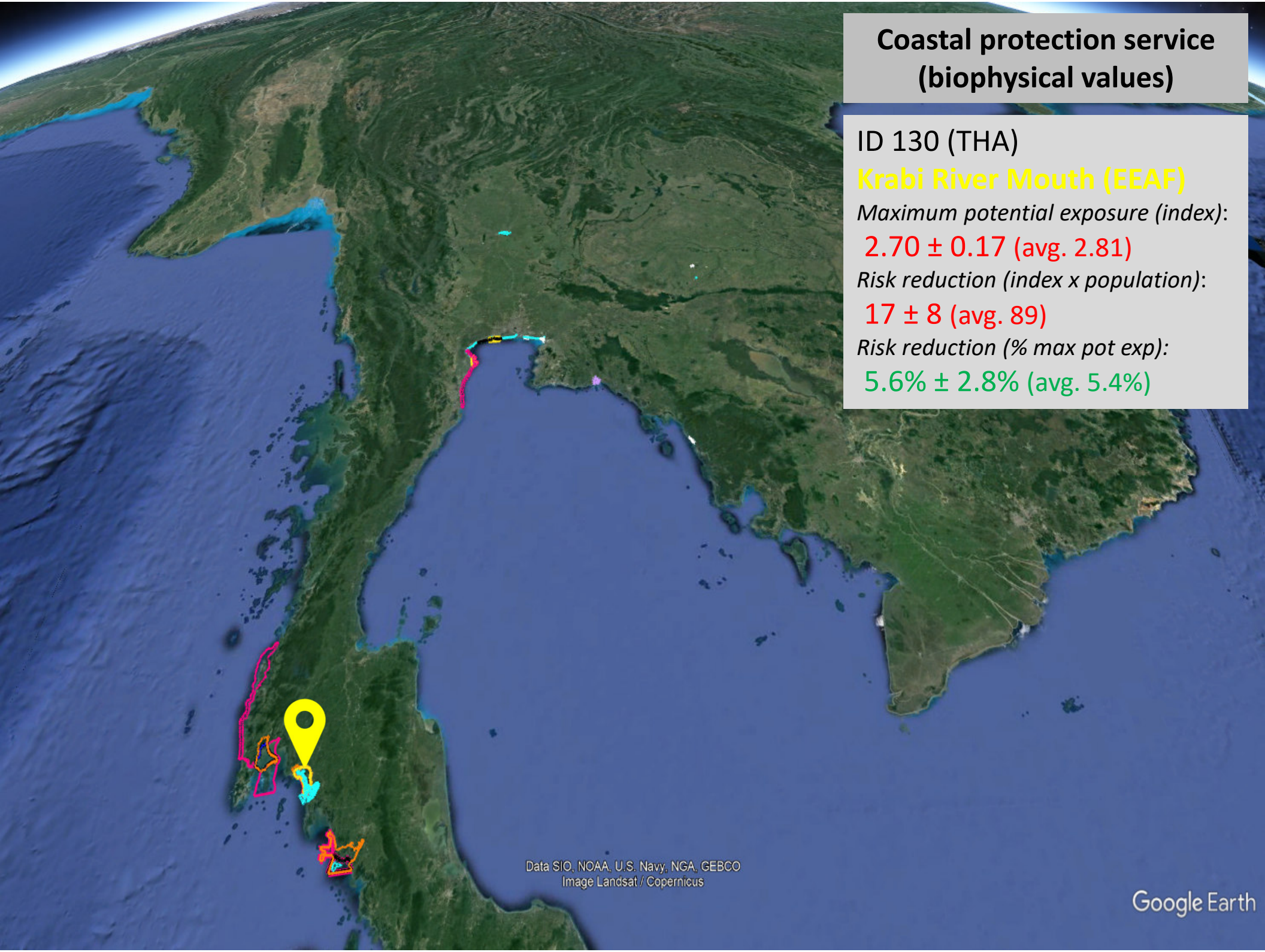
2.30 ± 0.24 (avg. 2.81)

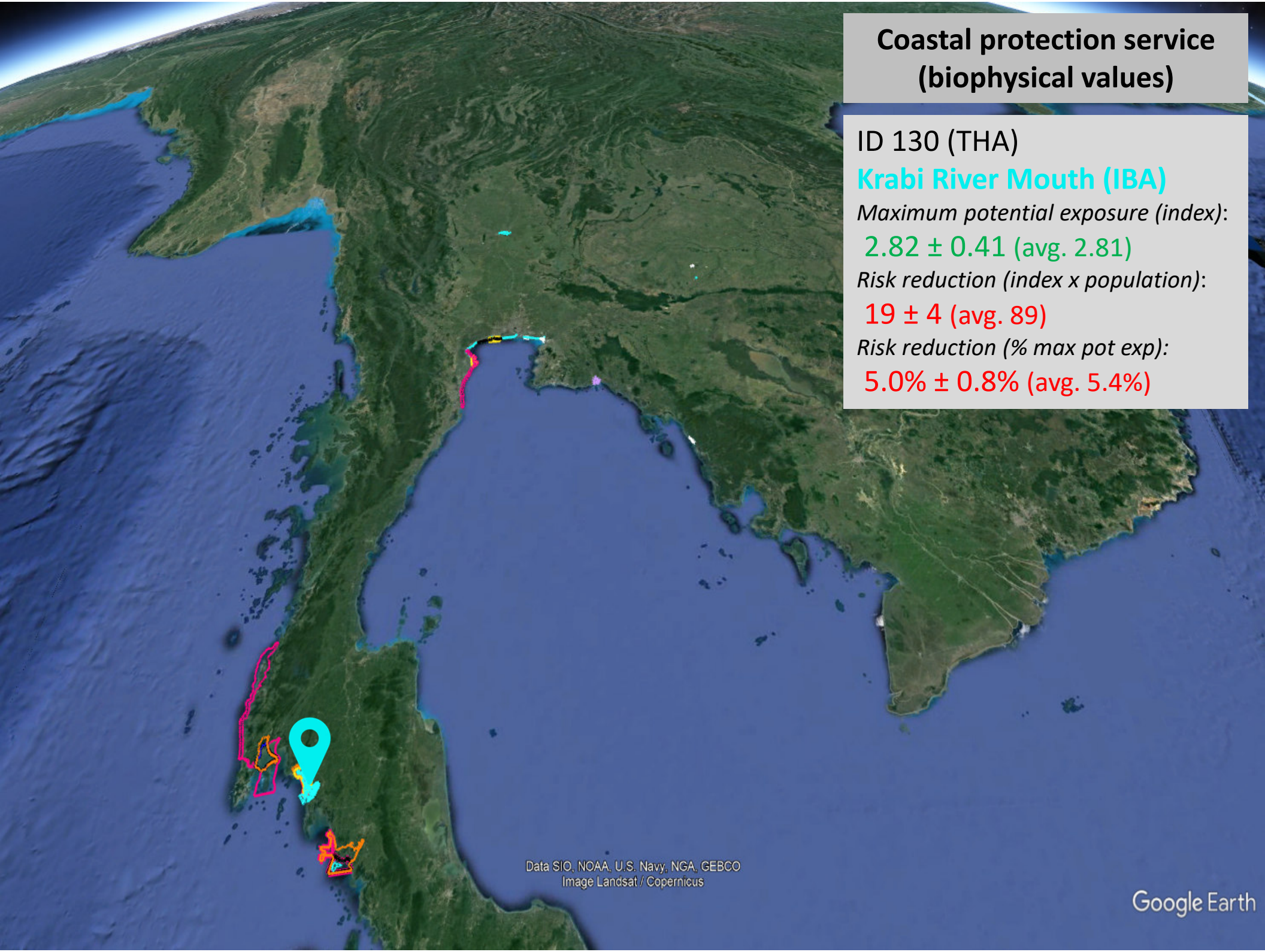
Risk reduction (index x population):

54 ± 2 (avg. 89)

Risk reduction (% max pot exp):

6.8% ± 0.7% (avg. 5.4%)


Coastal protection service
(biophysical values)
ID 130 (THA)
Krabi River Mouth (EEAF)
Maximum potential exposure (index):
2.70 ± 0.17 (avg. 2.81)
Risk reduction (index x population):
17 ± 8 (avg. 89)
Risk reduction (% max pot exp):
5.6% ± 2.8% (avg. 5.4%)
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Image Landsat / Copernicus
Google Earth



Coastal protection service (biophysical values)

ID 130 (THA)

Krabi River Mouth (IBA)

Maximum potential exposure (index):

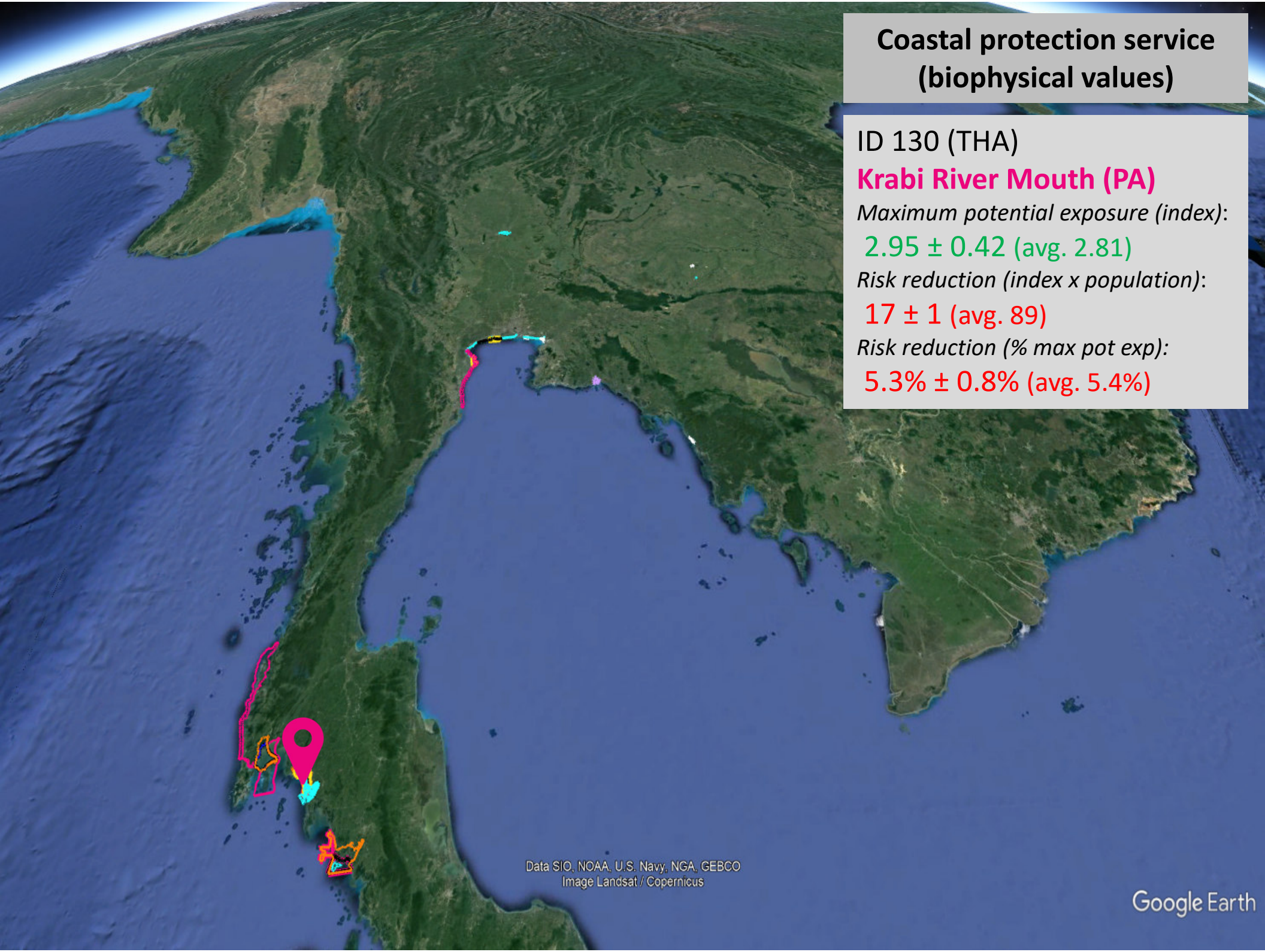
2.82 ± 0.41 (avg. 2.81)

Risk reduction (index x population):

19 ± 4 (avg. 89)

Risk reduction (% max pot exp):

5.0% ± 0.8% (avg. 5.4%)



Coastal protection service (biophysical values)

ID 130 (THA)

Krabi River Mouth (PA)

Maximum potential exposure (index):

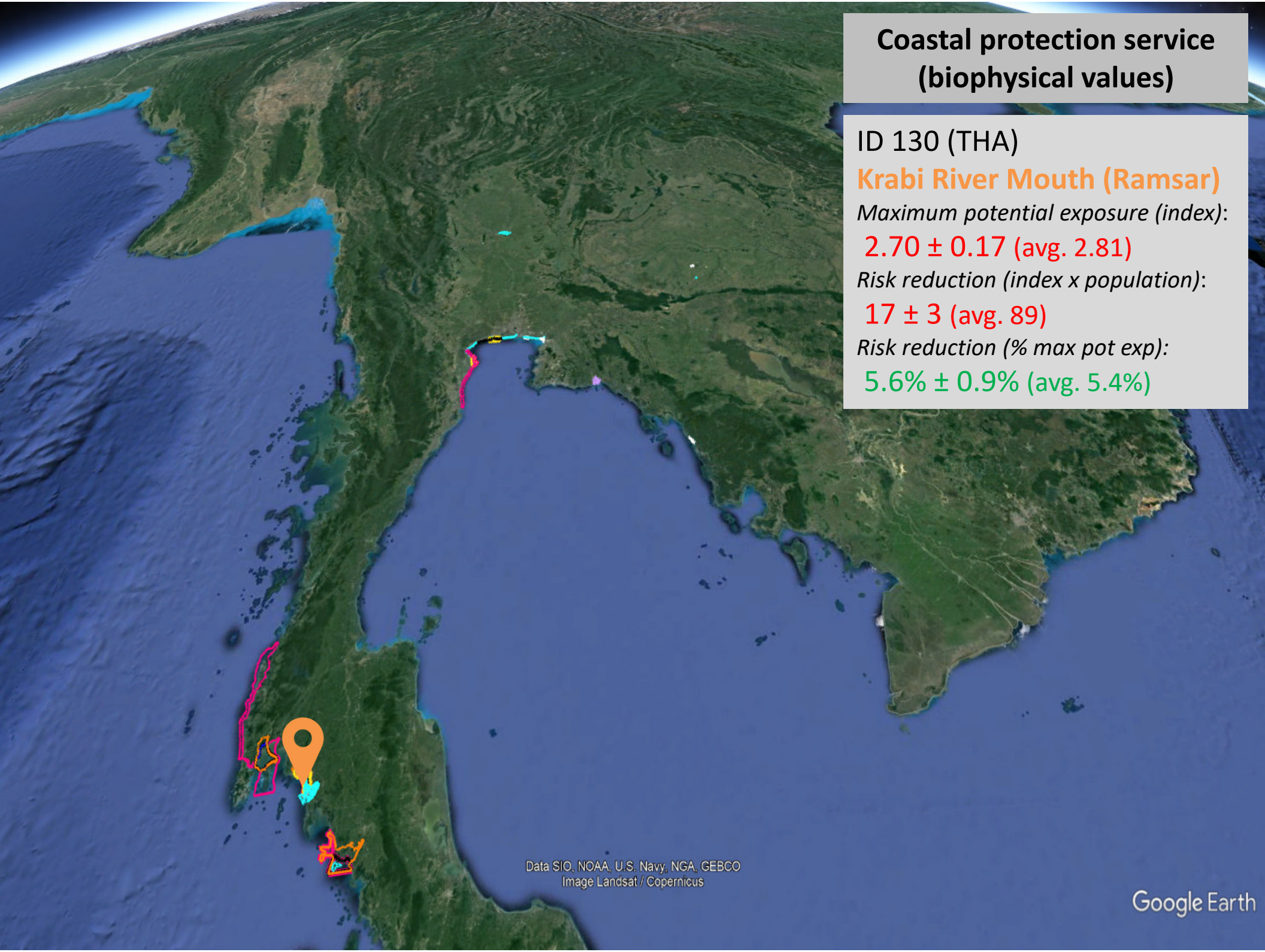
2.95 ± 0.42 (avg. 2.81)

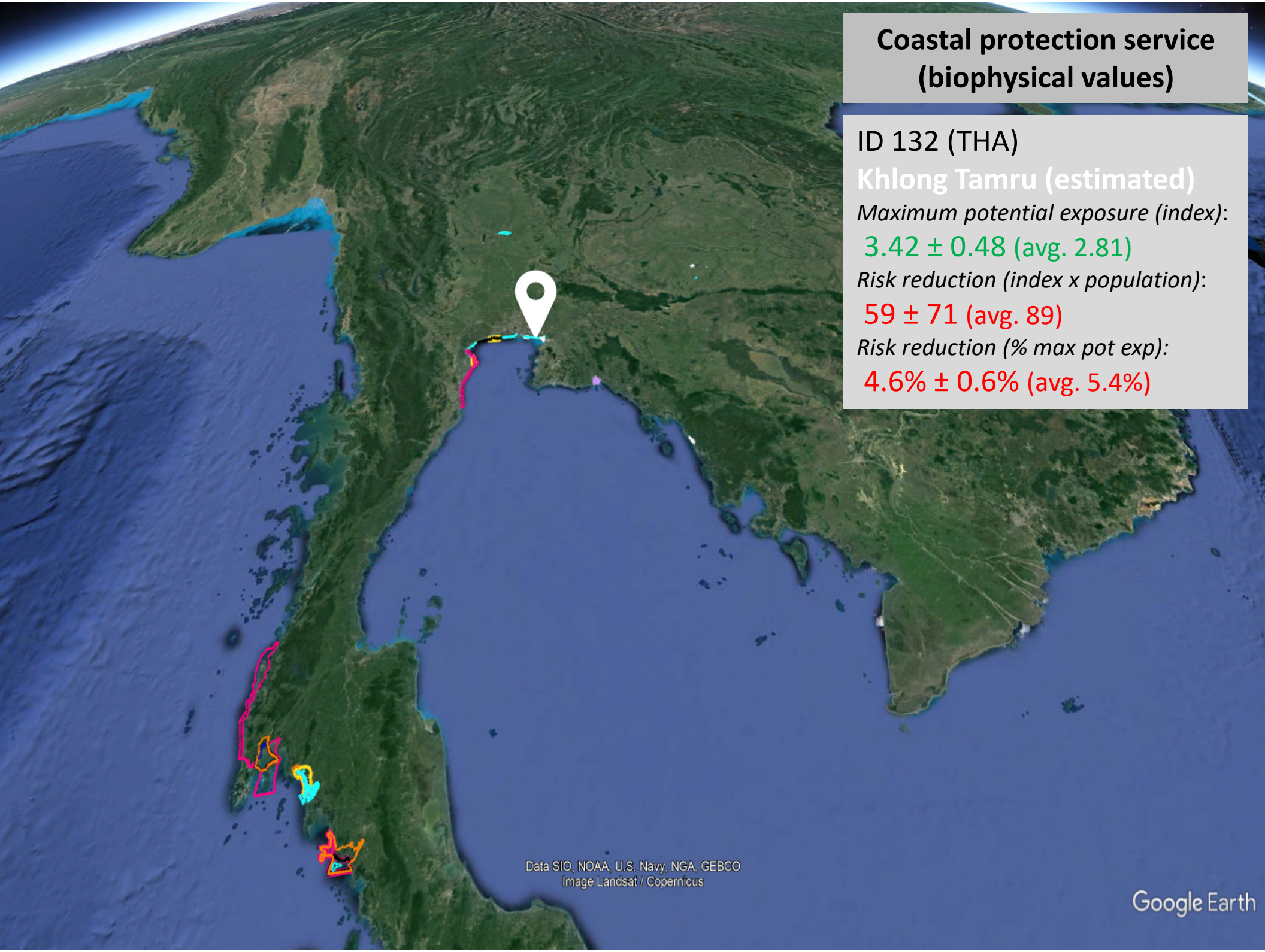
Risk reduction (index x population):

17 ± 1 (avg. 89)

Risk reduction (% max pot exp):

5.3% ± 0.8% (avg. 5.4%)


Coastal protection service (biophysical values)
ID 130 (THA)
Krabi River Mouth (Ramsar)
Maximum potential exposure (index):
2.70 ± 0.17 (avg. 2.81)
Risk reduction (index x population):
17 ± 3 (avg. 89)
Risk reduction (% max pot exp):
5.6% ± 0.9% (avg. 5.4%)
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Image Landsat / Copernicus
Google Earth



Coastal protection service (biophysical values)

ID 132 (THA)

Khlong Tamru (estimated)

Maximum potential exposure (index):

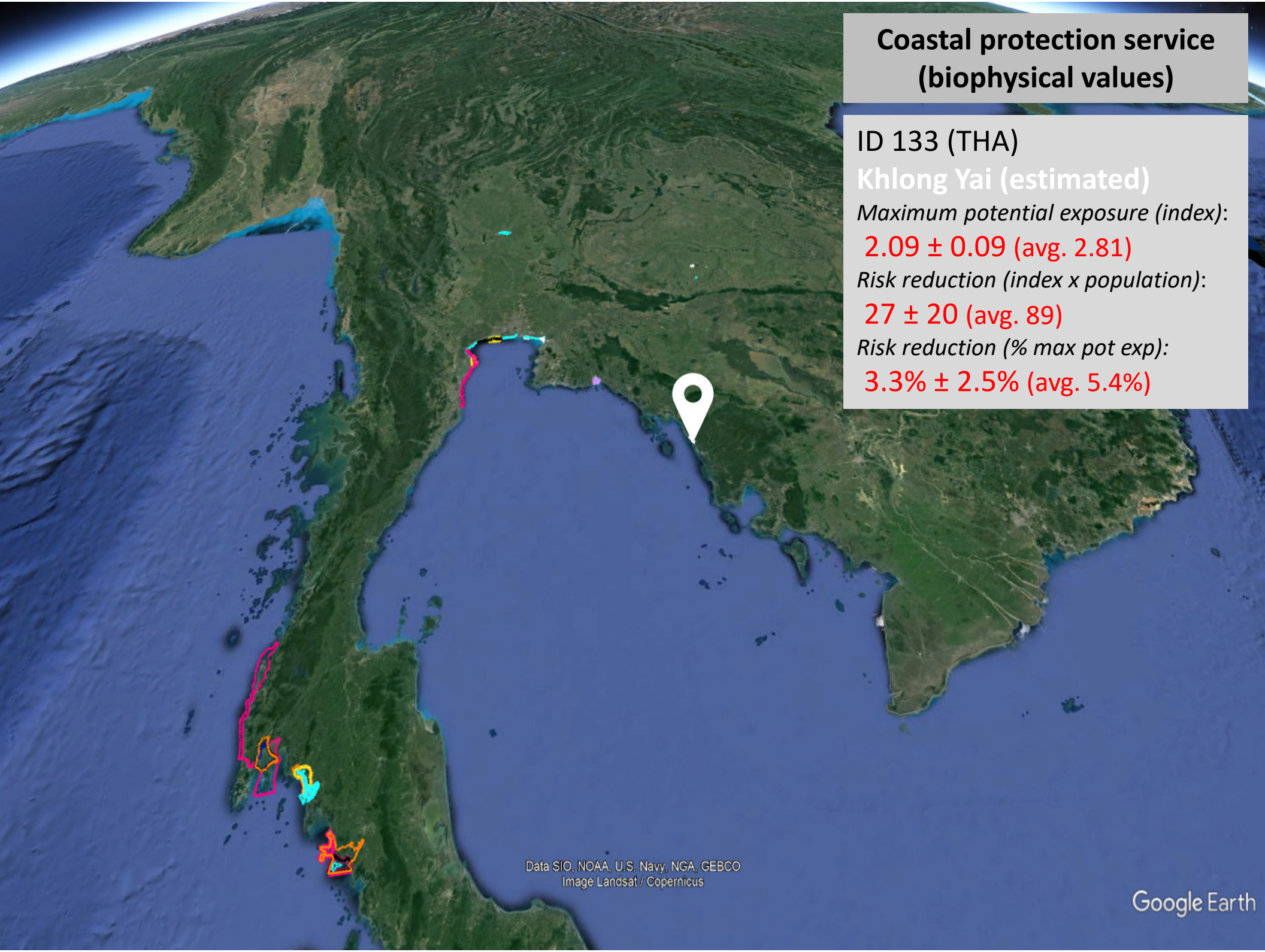
3.42 ± 0.48 (avg. 2.81)

Risk reduction (index x population):

59 ± 71 (avg. 89)

Risk reduction (% max pot exp):

4.6% ± 0.6% (avg. 5.4%)



Coastal protection service (biophysical values)

ID 133 (THA)

Khlong Yai (estimated)

Maximum potential exposure (index):

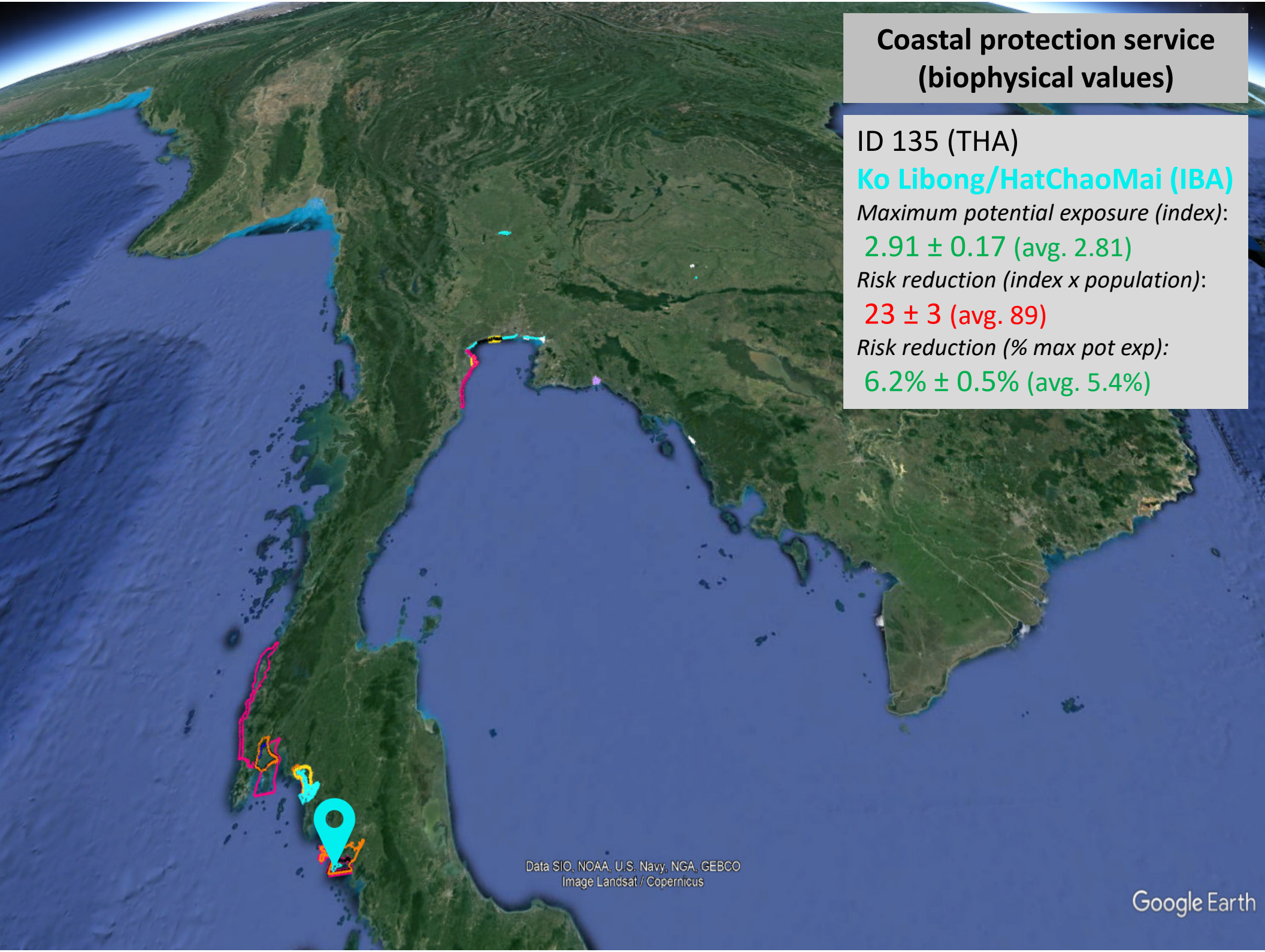
2.09 ± 0.09 (avg. 2.81)

Risk reduction (index x population):

27 ± 20 (avg. 89)

Risk reduction (% max pot exp):

3.3% ± 2.5% (avg. 5.4%)



Coastal protection service (biophysical values)

ID 135 (THA)

Ko Libong/HatChaoMai (IBA)

Maximum potential exposure (index):

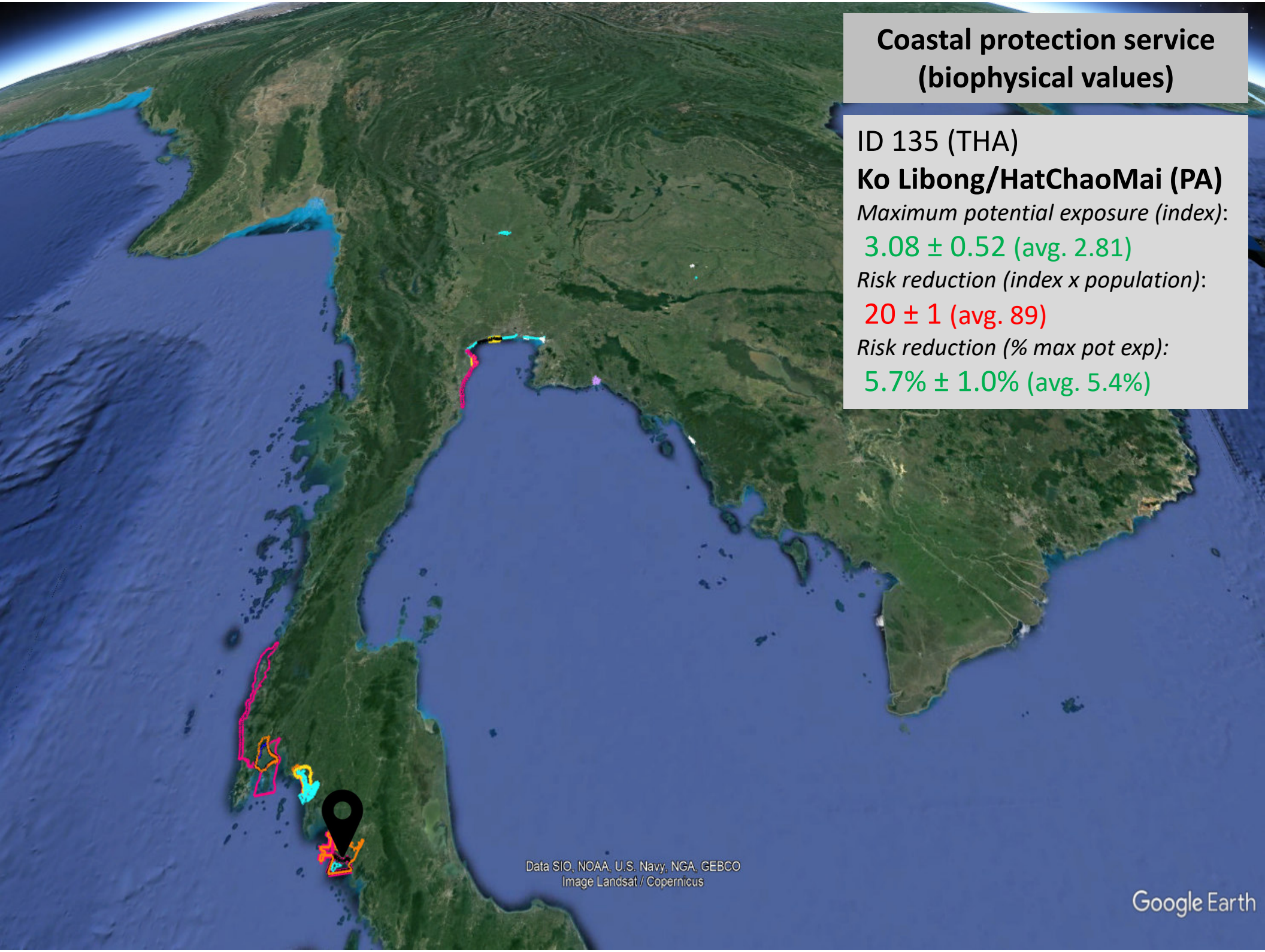
2.91 ± 0.17 (avg. 2.81)

Risk reduction (index x population):

23 ± 3 (avg. 89)

Risk reduction (% max pot exp):

6.2% ± 0.5% (avg. 5.4%)



Coastal protection service (biophysical values)

ID 135 (THA)

Ko Libong/HatChaoMai (PA)

Maximum potential exposure (index):

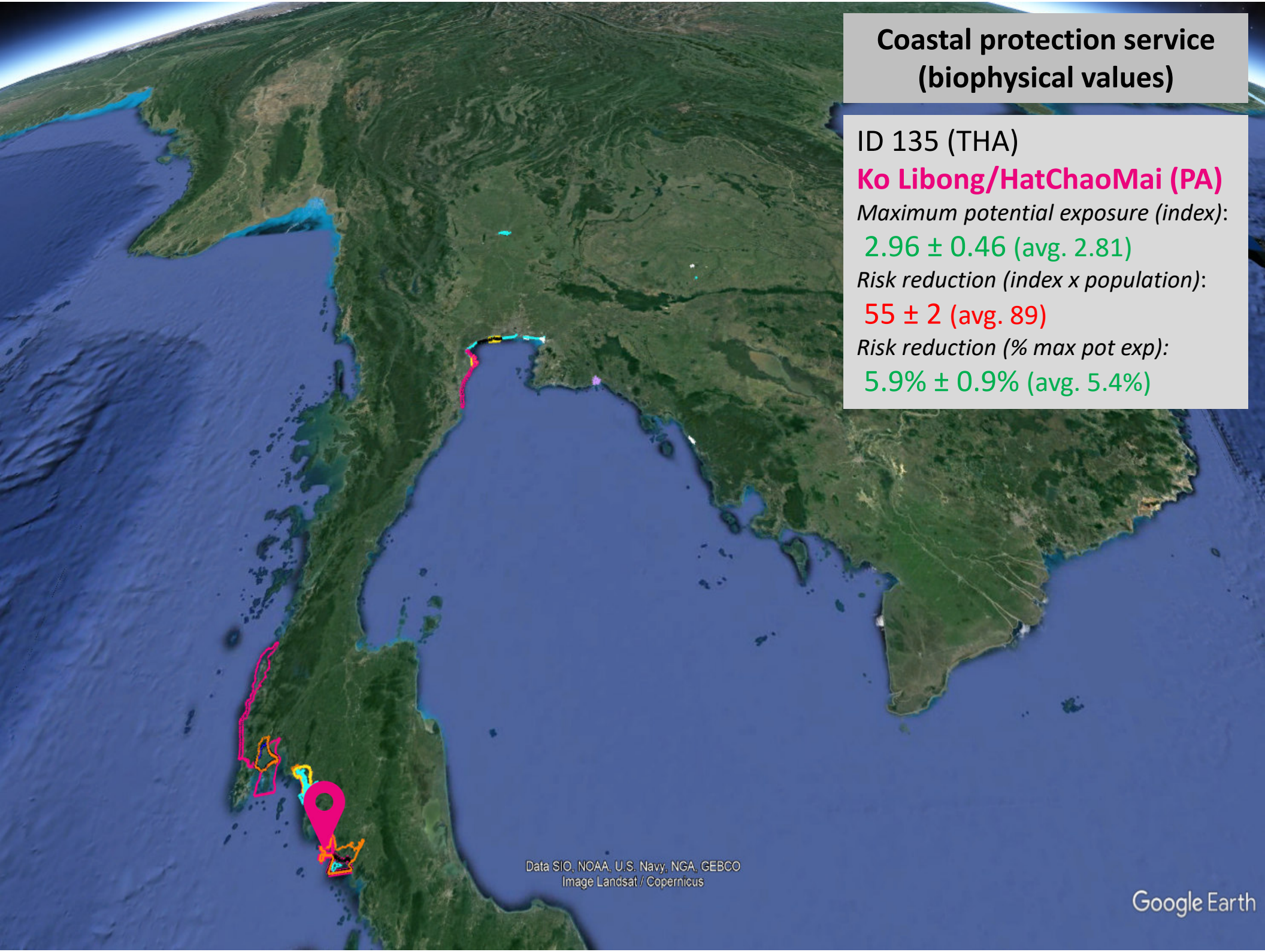
3.08 ± 0.52 (avg. 2.81)

Risk reduction (index x population):

20 ± 1 (avg. 89)

Risk reduction (% max pot exp):

5.7% ± 1.0% (avg. 5.4%)



Coastal protection service (biophysical values)

ID 135 (THA)

Ko Libong/HatChaoMai (PA)

Maximum potential exposure (index):

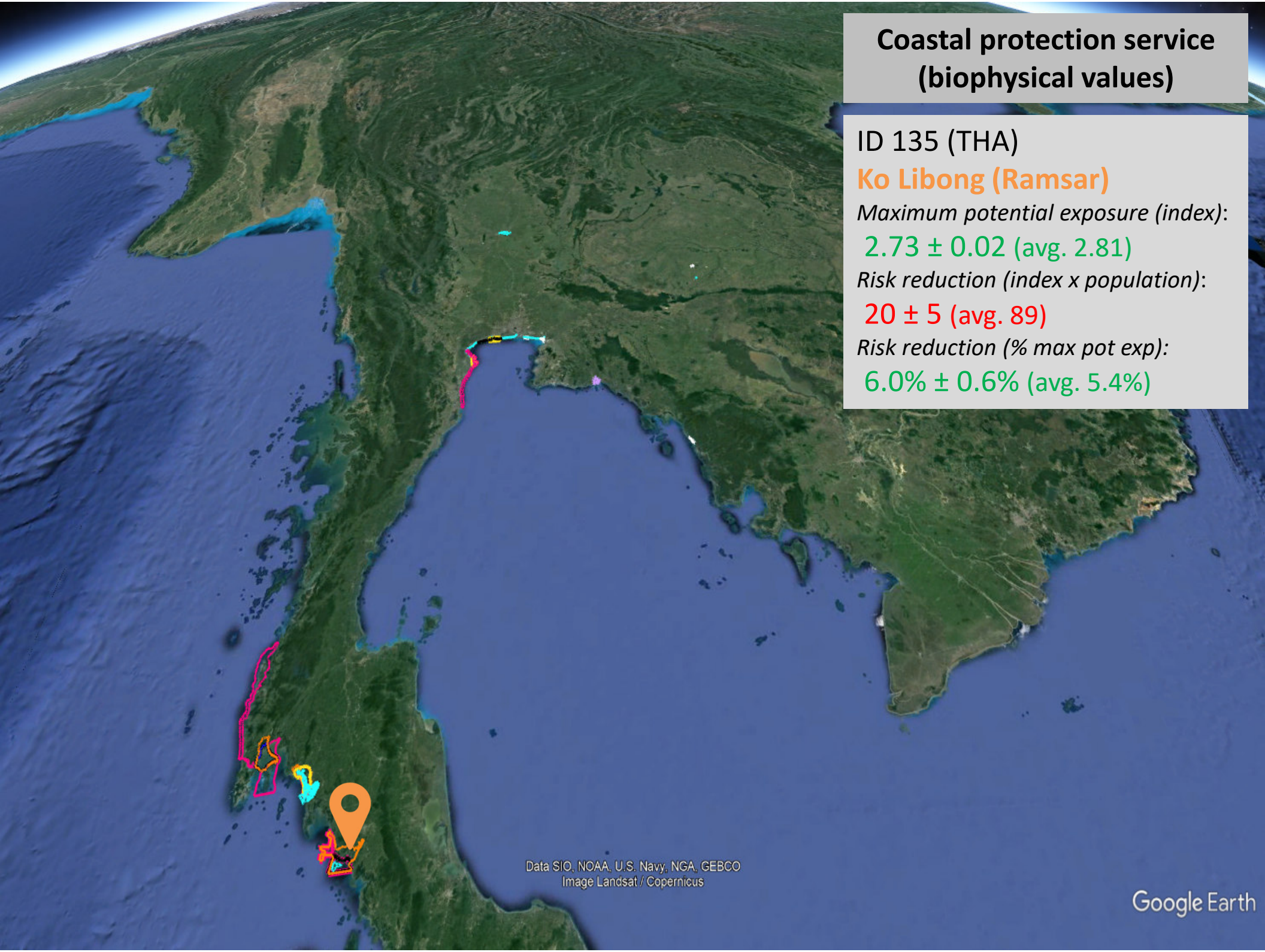
2.96 ± 0.46 (avg. 2.81)

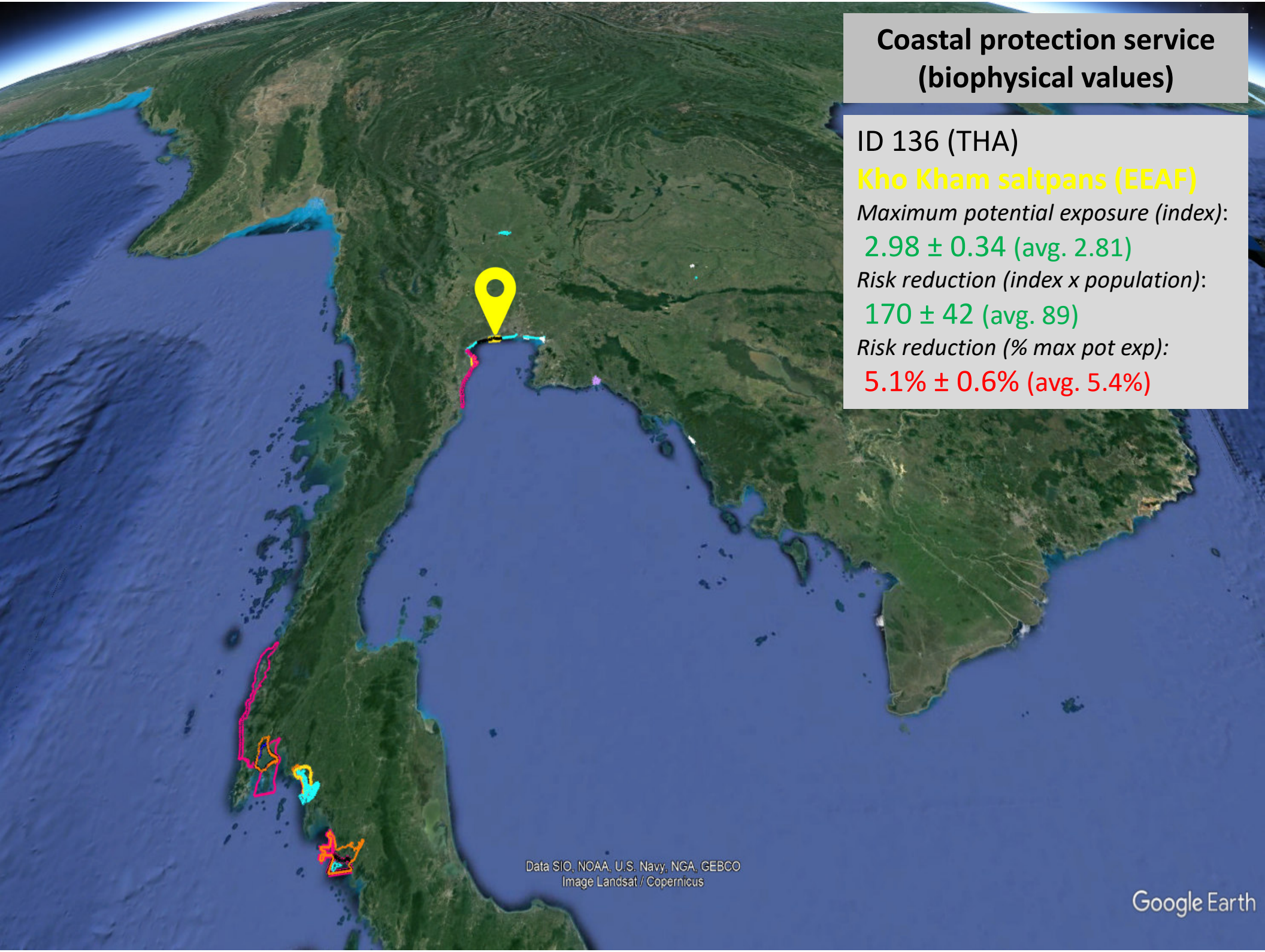
Risk reduction (index x population):

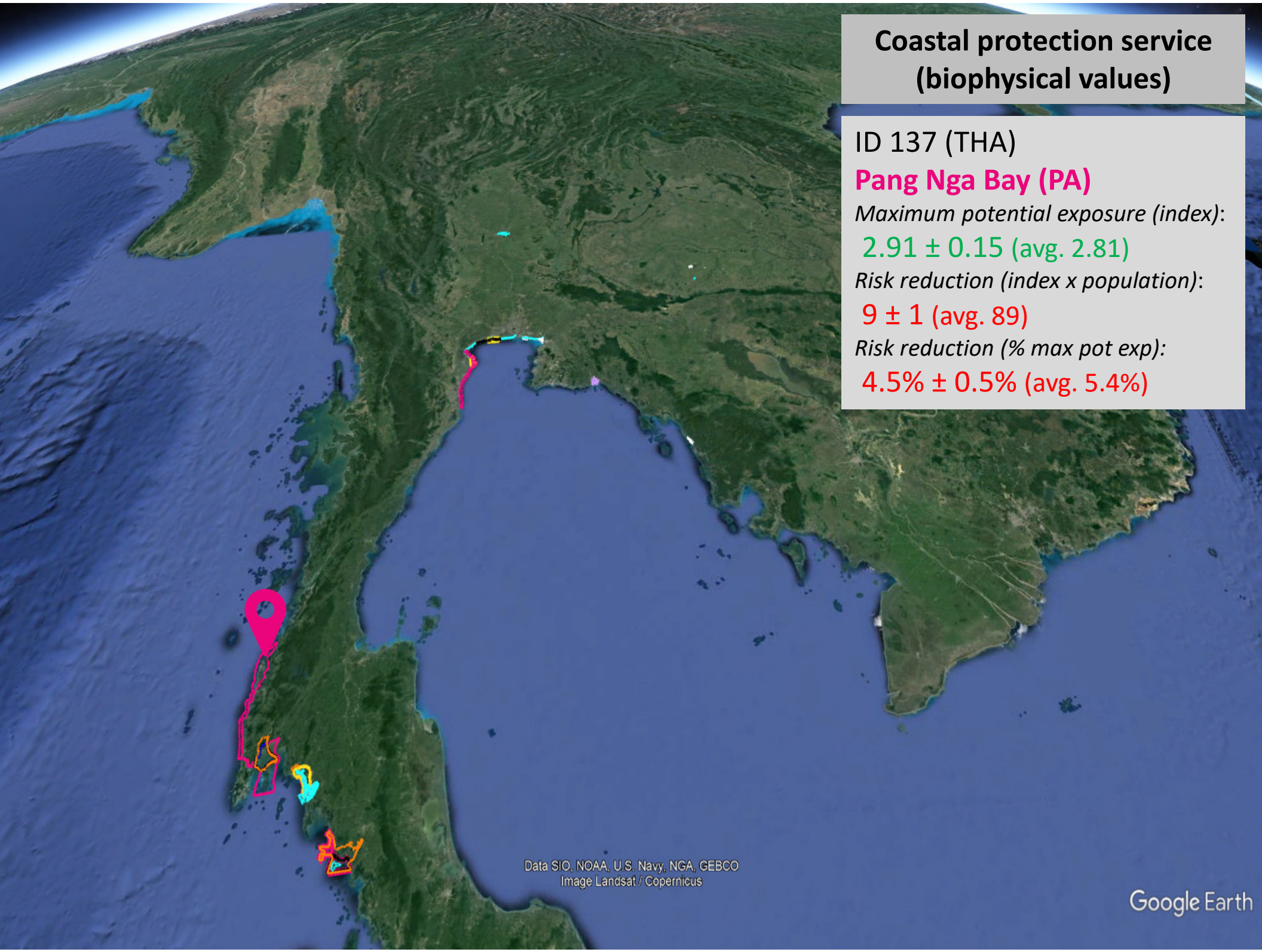
55 ± 2 (avg. 89)

Risk reduction (% max pot exp):

5.9% ± 0.9% (avg. 5.4%)


Coastal protection service (biophysical values)
ID 135 (THA)
Ko Libong (Ramsar)
Maximum potential exposure (index):
2.73 ± 0.02 (avg. 2.81)
Risk reduction (index x population):
20 ± 5 (avg. 89)
Risk reduction (% max pot exp):
6.0% ± 0.6% (avg. 5.4%)
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Image Landsat / Copernicus
Google Earth


Coastal protection service
(biophysical values)
ID 136 (THA)
Kho Kham saltpans (EEAF)
Maximum potential exposure (index):
2.98 ± 0.34 (avg. 2.81)
Risk reduction (index x population):
170 ± 42 (avg. 89)
Risk reduction (% max pot exp):
5.1% ± 0.6% (avg. 5.4%)
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Image Landsat / Copernicus
Google Earth



Coastal protection service (biophysical values)

ID 137 (THA)

Pang Nga Bay (PA)

Maximum potential exposure (index):

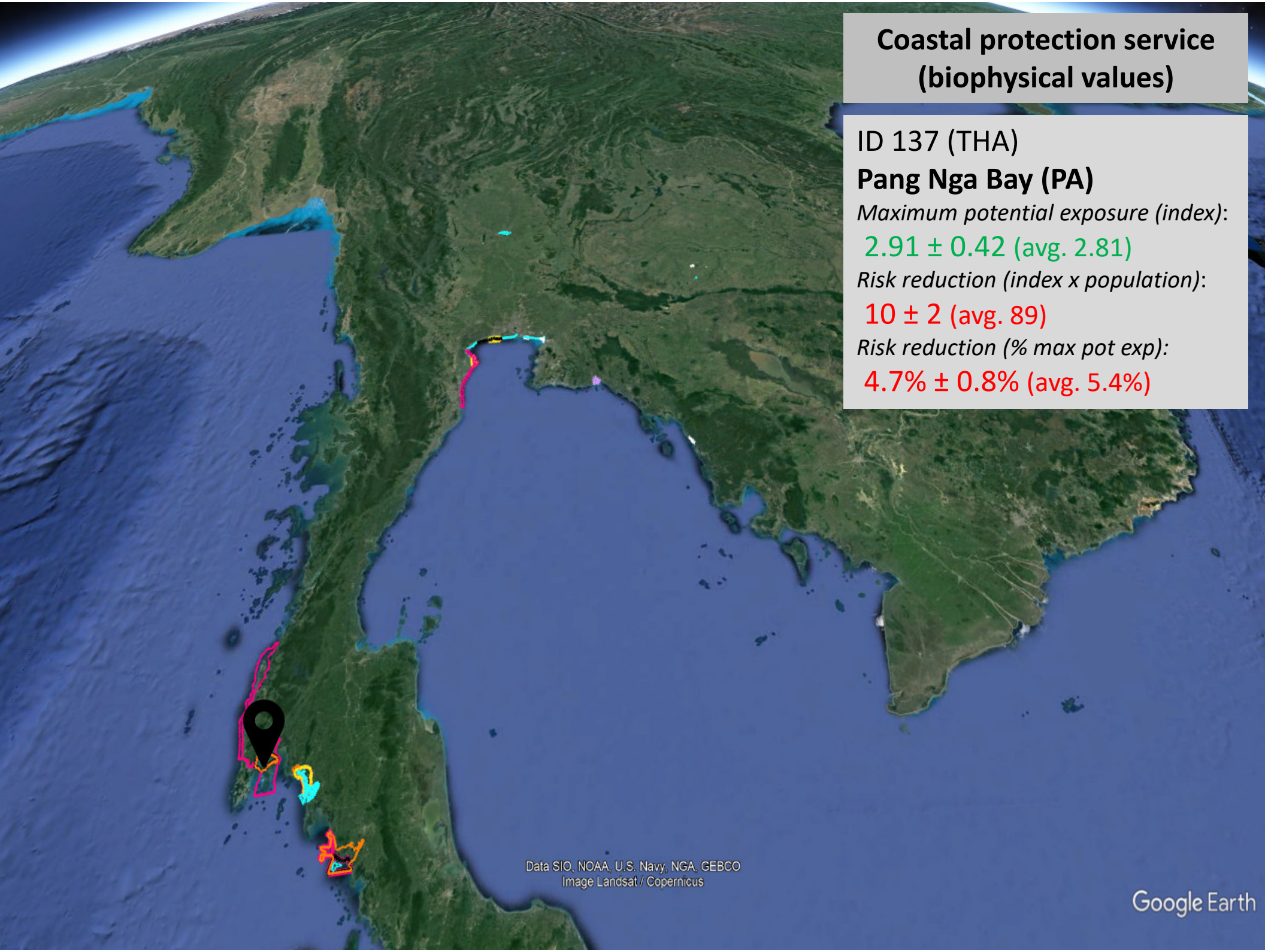
2.91 ± 0.15 (avg. 2.81)

Risk reduction (index x population):

9 ± 1 (avg. 89)

Risk reduction (% max pot exp):

4.5% ± 0.5% (avg. 5.4%)



Coastal protection service (biophysical values)

ID 137 (THA)

Pang Nga Bay (PA)

Maximum potential exposure (index):

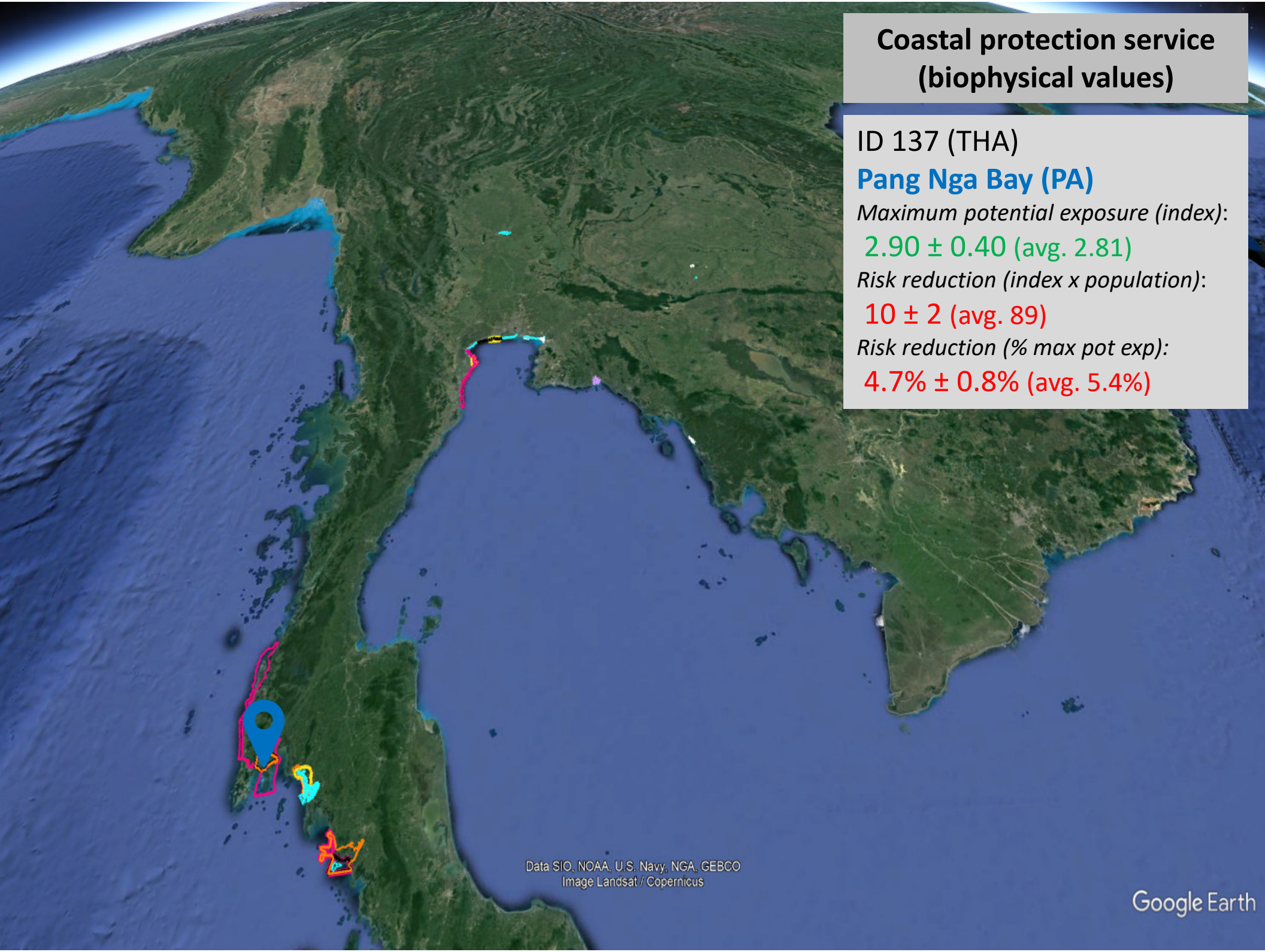
2.91 ± 0.42 (avg. 2.81)

Risk reduction (index x population):

10 ± 2 (avg. 89)

Risk reduction (% max pot exp):

4.7% ± 0.8% (avg. 5.4%)



Coastal protection service (biophysical values)

ID 137 (THA)

Pang Nga Bay (PA)

Maximum potential exposure (index):

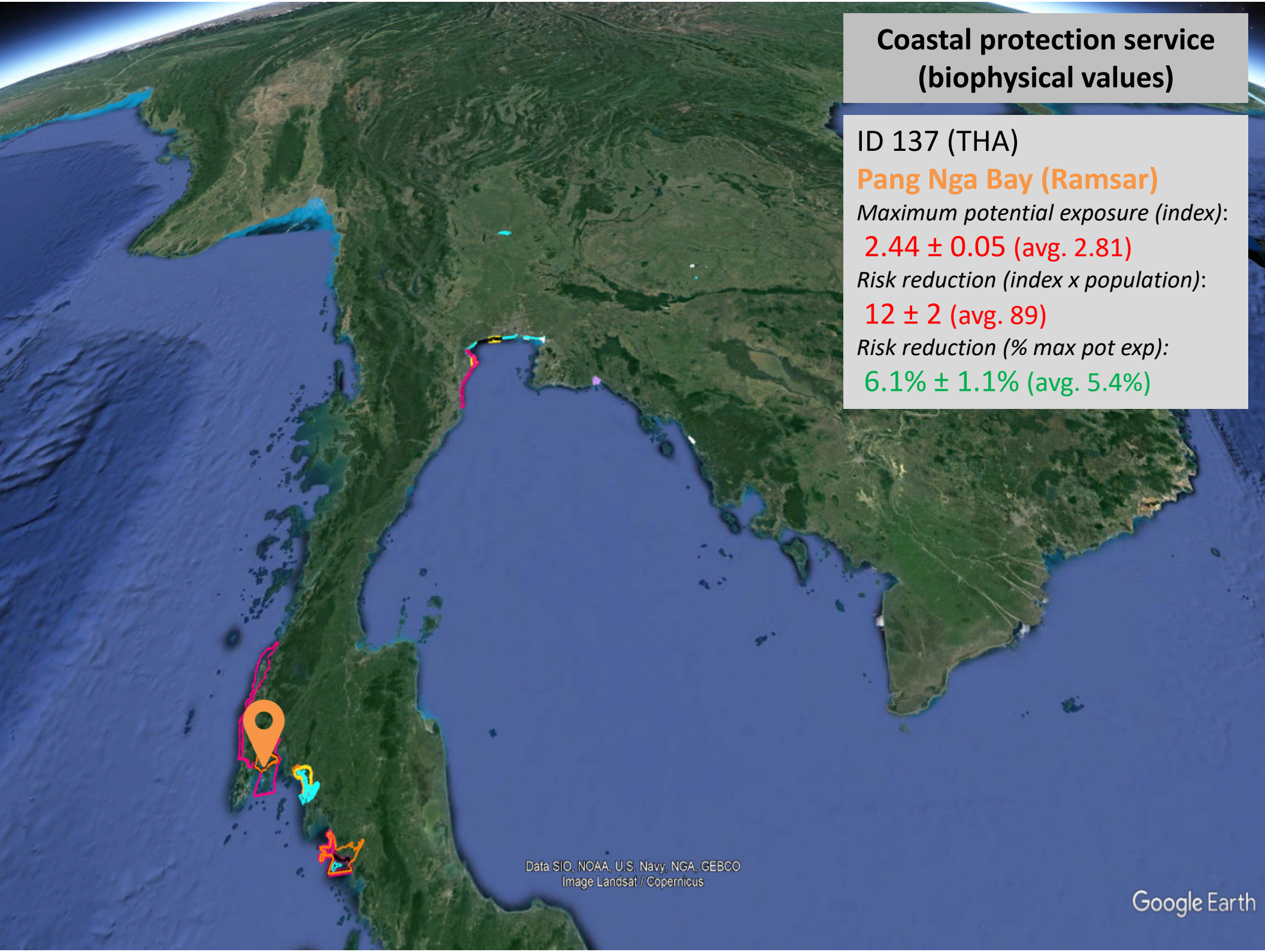
2.90 ± 0.40 (avg. 2.81)

Risk reduction (index x population):

10 ± 2 (avg. 89)

Risk reduction (% max pot exp):

4.7% ± 0.8% (avg. 5.4%)



Coastal protection service (biophysical values)

ID 137 (THA)

Pang Nga Bay (Ramsar)

Maximum potential exposure (index):

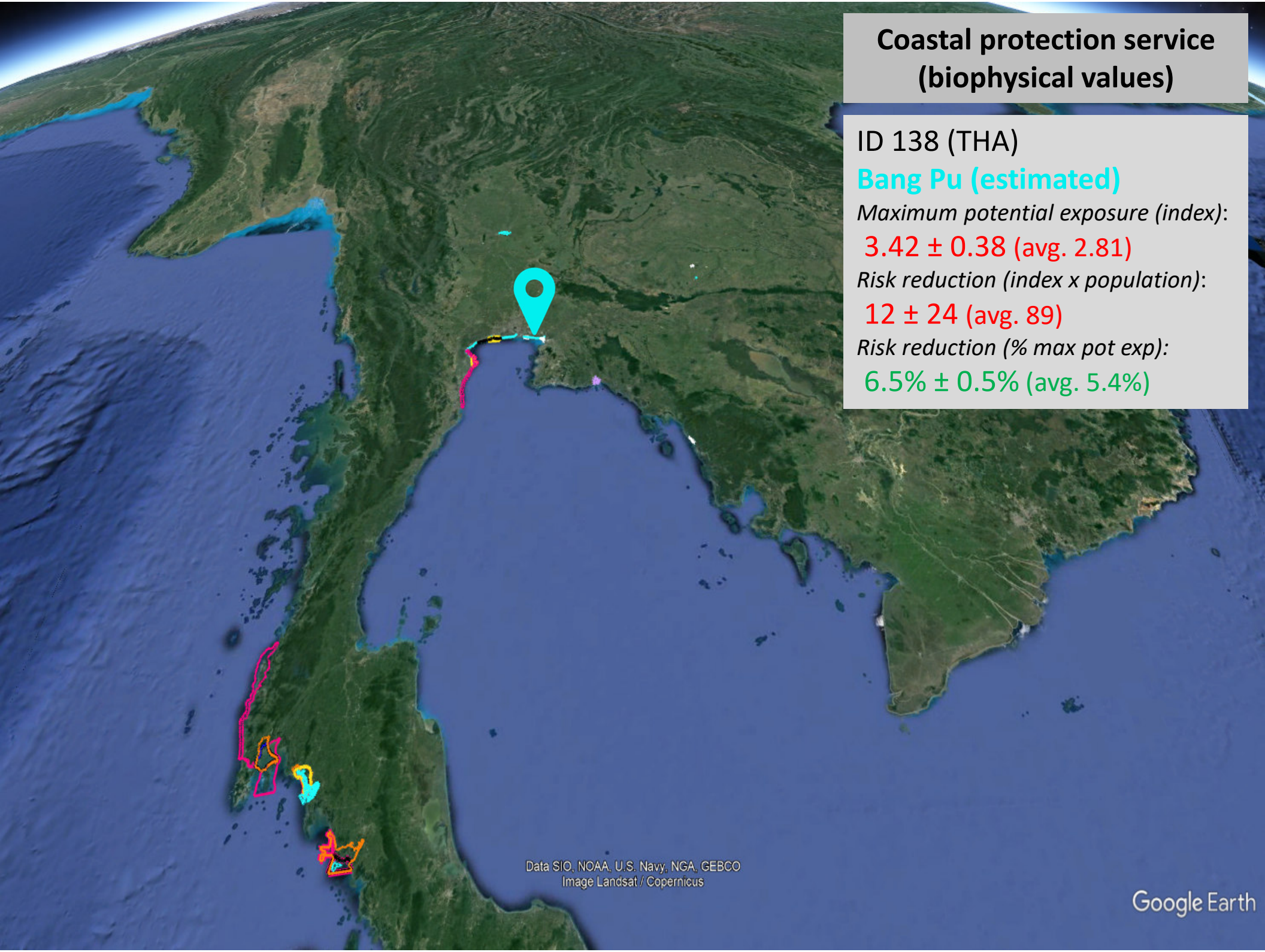
2.44 ± 0.05 (avg. 2.81)

Risk reduction (index x population):

12 ± 2 (avg. 89)

Risk reduction (% max pot exp):

6.1% ± 1.1% (avg. 5.4%)



Coastal protection service (biophysical values)

ID 138 (THA)

Bang Pu (estimated)

Maximum potential exposure (index):

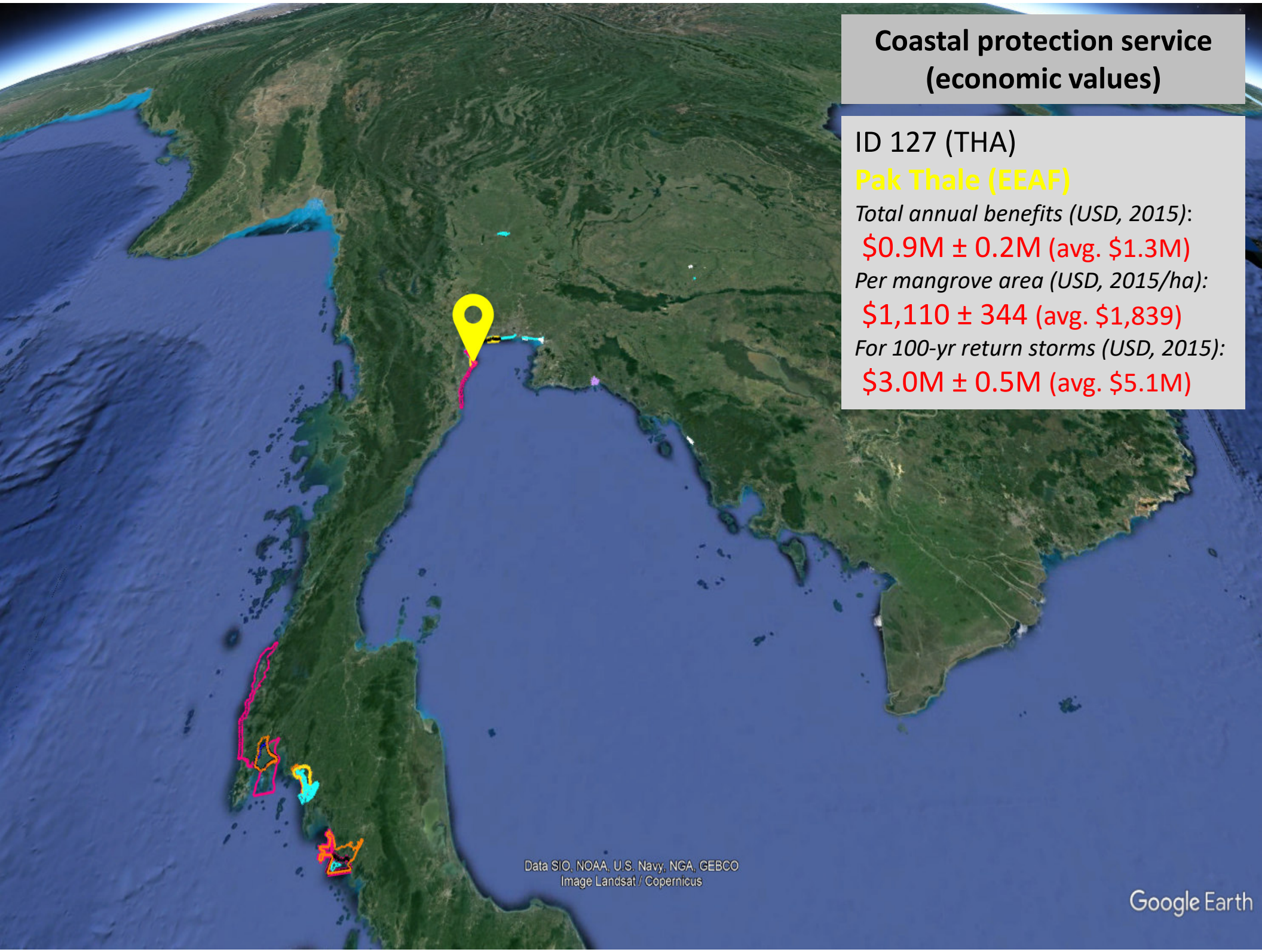
3.42 ± 0.38 (avg. 2.81)

Risk reduction (index x population):

12 ± 24 (avg. 89)

Risk reduction (% max pot exp):

6.5% ± 0.5% (avg. 5.4%)



Coastal protection service (economic values)

ID 127 (THA)

Pak Thale (EEAF)

Total annual benefits (USD, 2015):

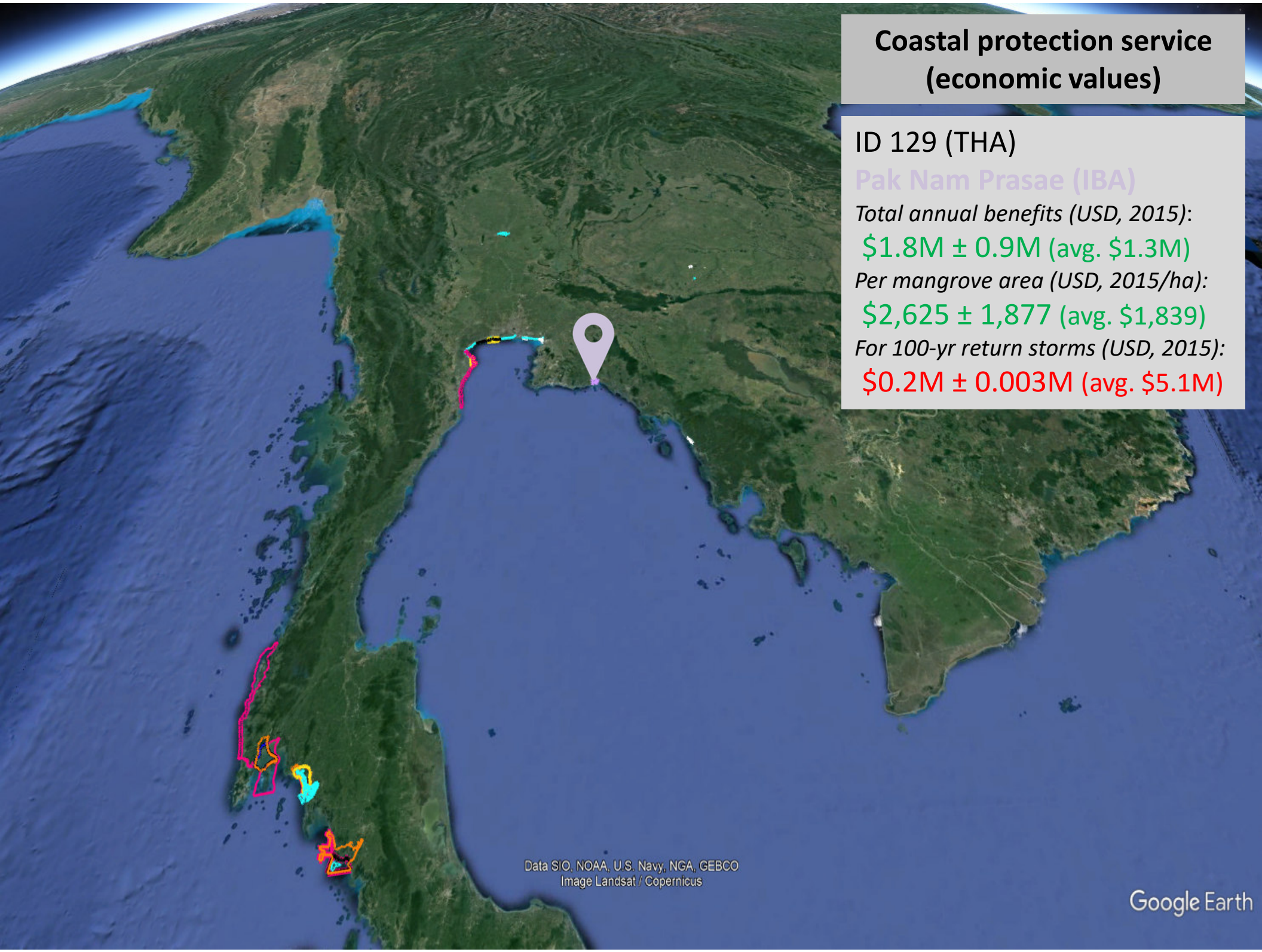
$0.9M ± 0.2M (avg. $1.3M)

Per mangrove area (USD, 2015/ha):

$1,110 ± 344 (avg. $1,839)

For 100-yr return storms (USD, 2015):

$3.0M ± 0.5M (avg. $5.1M)



Coastal protection service (economic values)

ID 129 (THA)

Pak Nam Prasae (IBA)

Total annual benefits (USD, 2015):

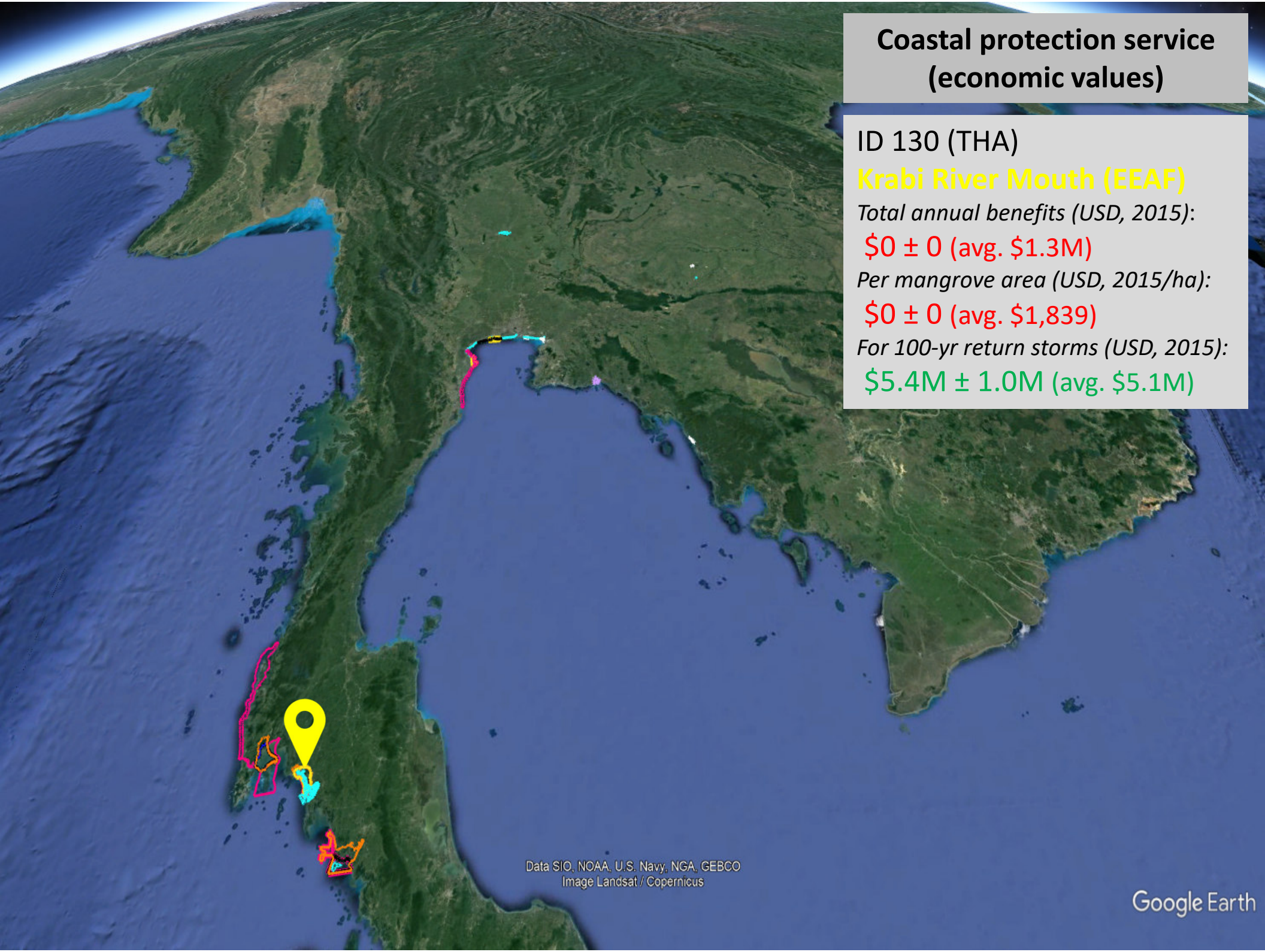
$1.8M ± 0.9M (avg. $1.3M)

Per mangrove area (USD, 2015/ha):

$2,625 ± 1,877 (avg. $1,839)

For 100-yr return storms (USD, 2015):

$0.2M ± 0.003M (avg. $5.1M)



Coastal protection service (economic values)

ID 130 (THA)

Krabi River Mouth (EEAF)

Total annual benefits (USD, 2015):

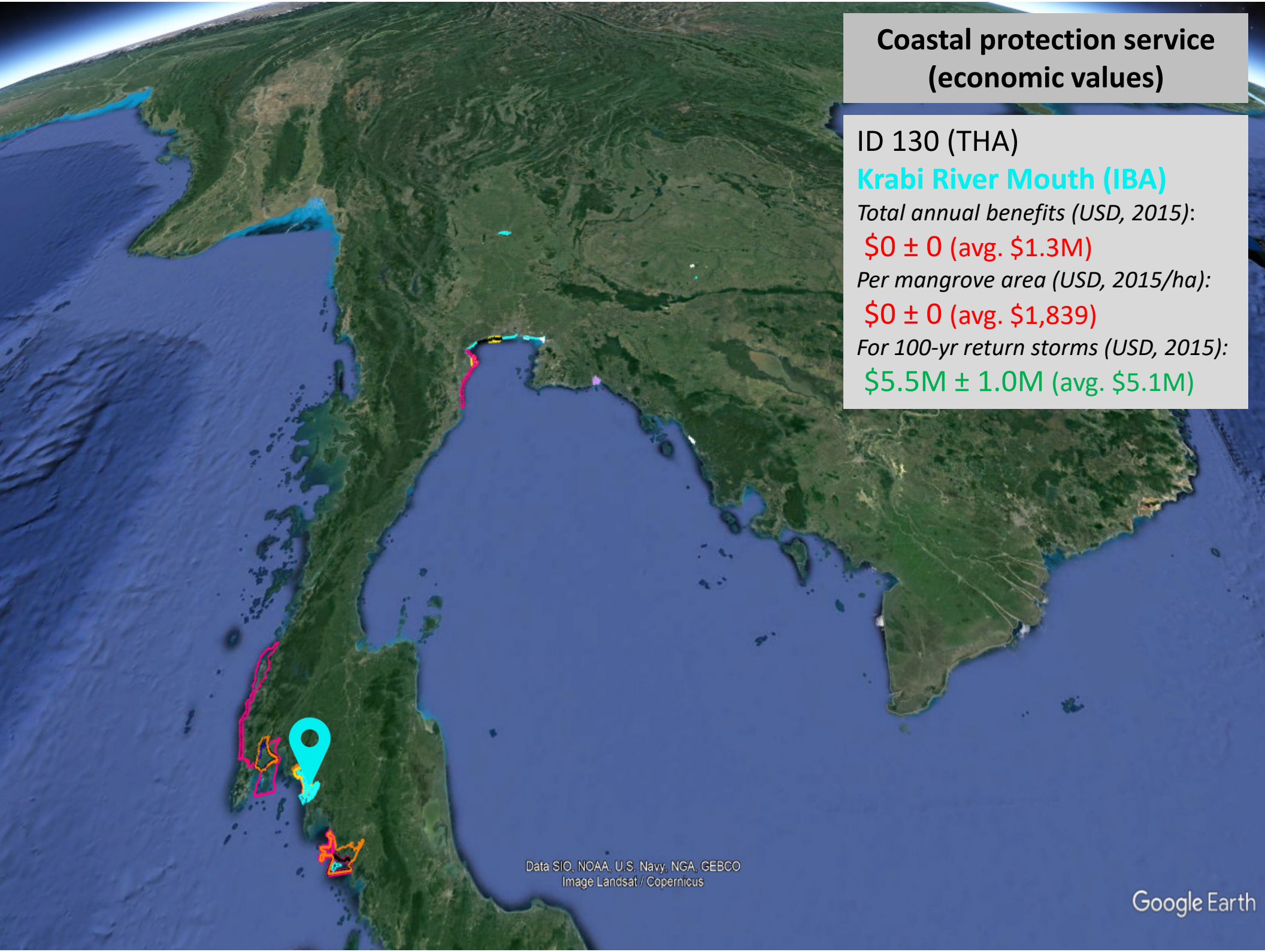
$0 ± 0 (avg. $1.3M)

Per mangrove area (USD, 2015/ha):

$0 ± 0 (avg. $1,839)

For 100-yr return storms (USD, 2015):

$5.4M ± 1.0M (avg. $5.1M)



Coastal protection service (economic values)

ID 130 (THA)

Krabi River Mouth (IBA)

Total annual benefits (USD, 2015):

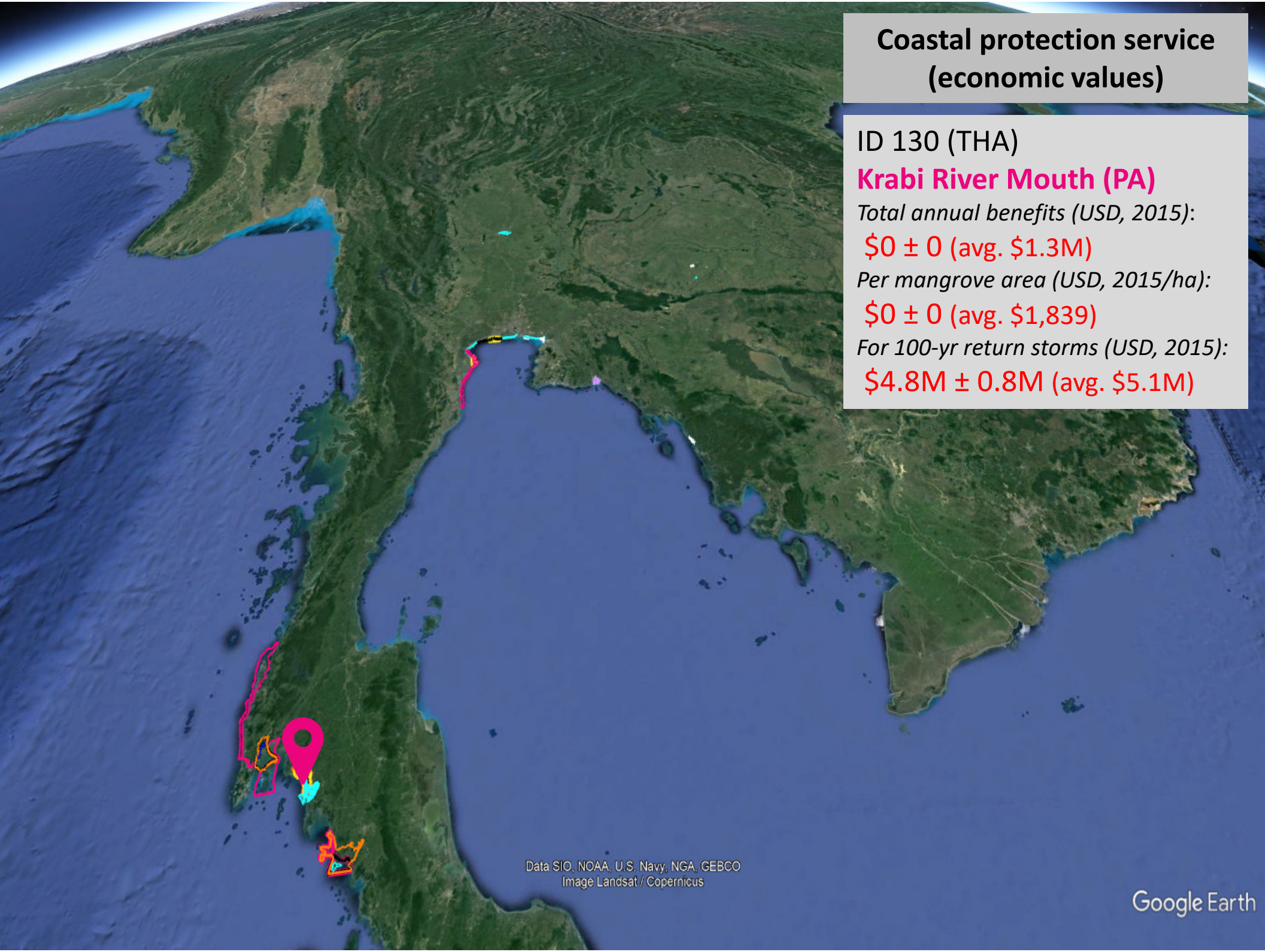
$0 ± 0 (avg. $1.3M)

Per mangrove area (USD, 2015/ha):

$0 ± 0 (avg. $1,839)

For 100-yr return storms (USD, 2015):

$5.5M ± 1.0M (avg. $5.1M)



Coastal protection service (economic values)

ID 130 (THA)

Krabi River Mouth (PA)

Total annual benefits (USD, 2015):

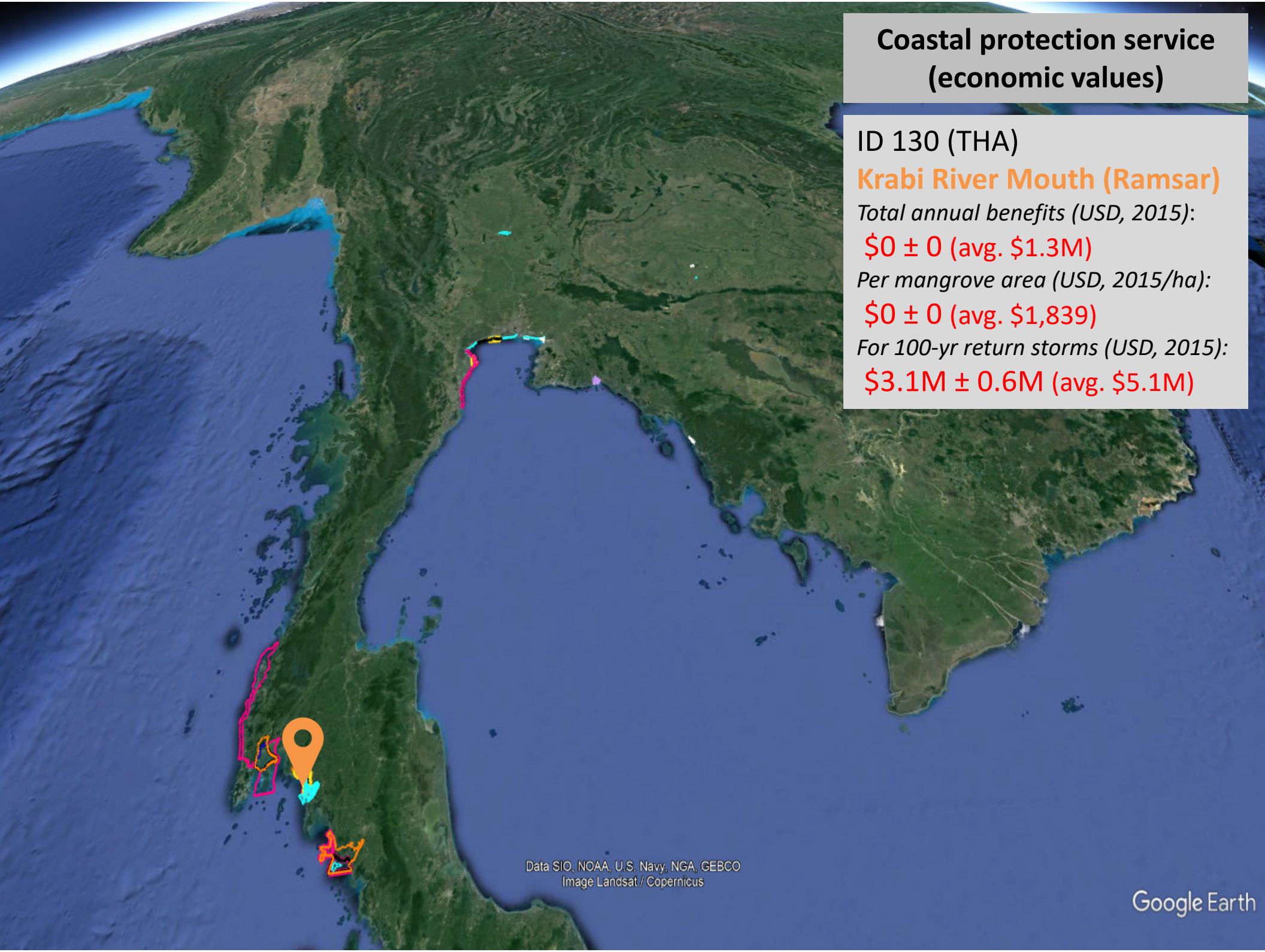
$0 ± 0 (avg. $1.3M)

Per mangrove area (USD, 2015/ha):

$0 ± 0 (avg. $1,839)

For 100-yr return storms (USD, 2015):

$4.8M ± 0.8M (avg. $5.1M)



Coastal protection service (economic values)

ID 130 (THA)

Krabi River Mouth (Ramsar)

Total annual benefits (USD, 2015):

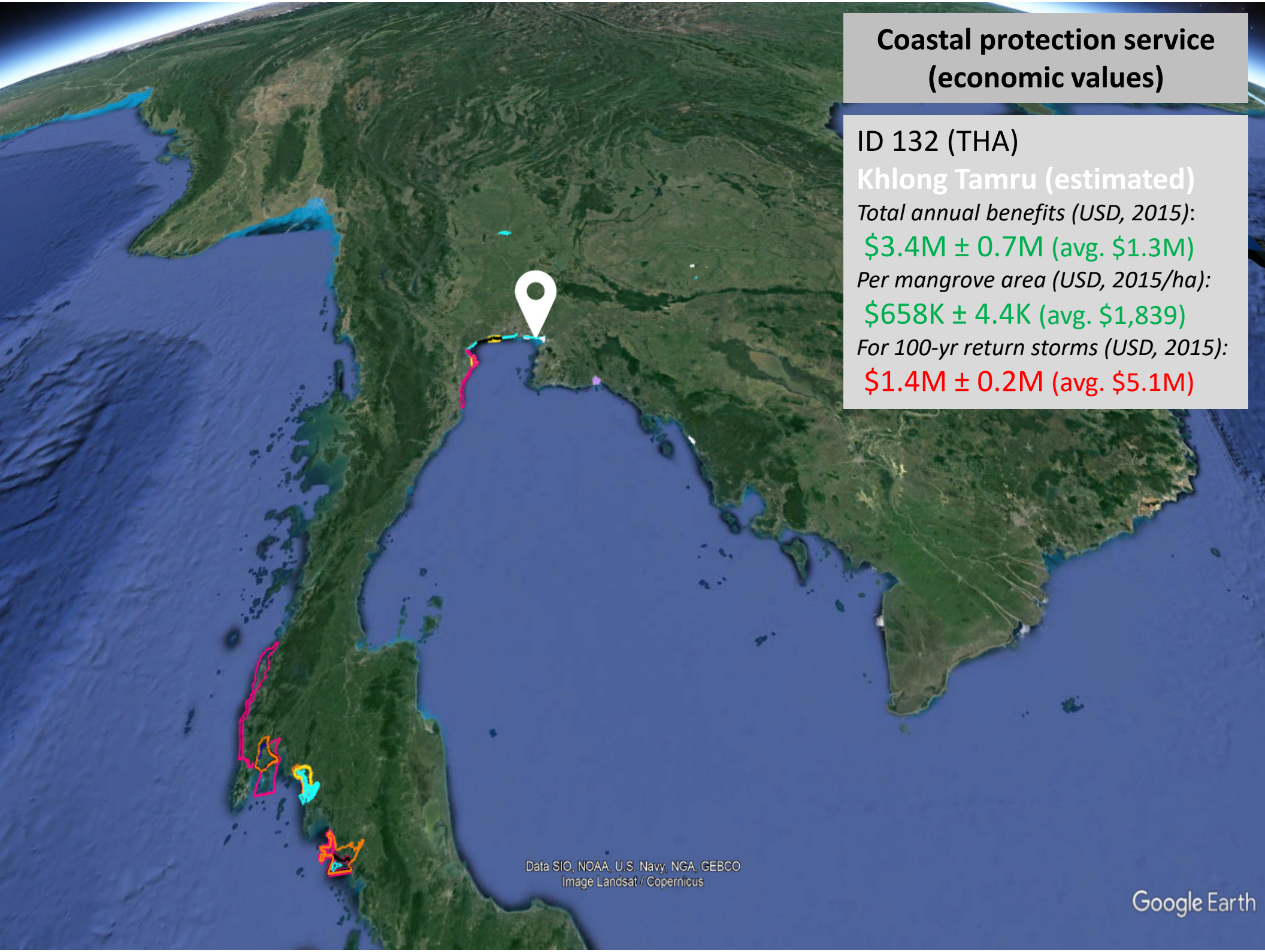
$0 ± 0 (avg. $1.3M)

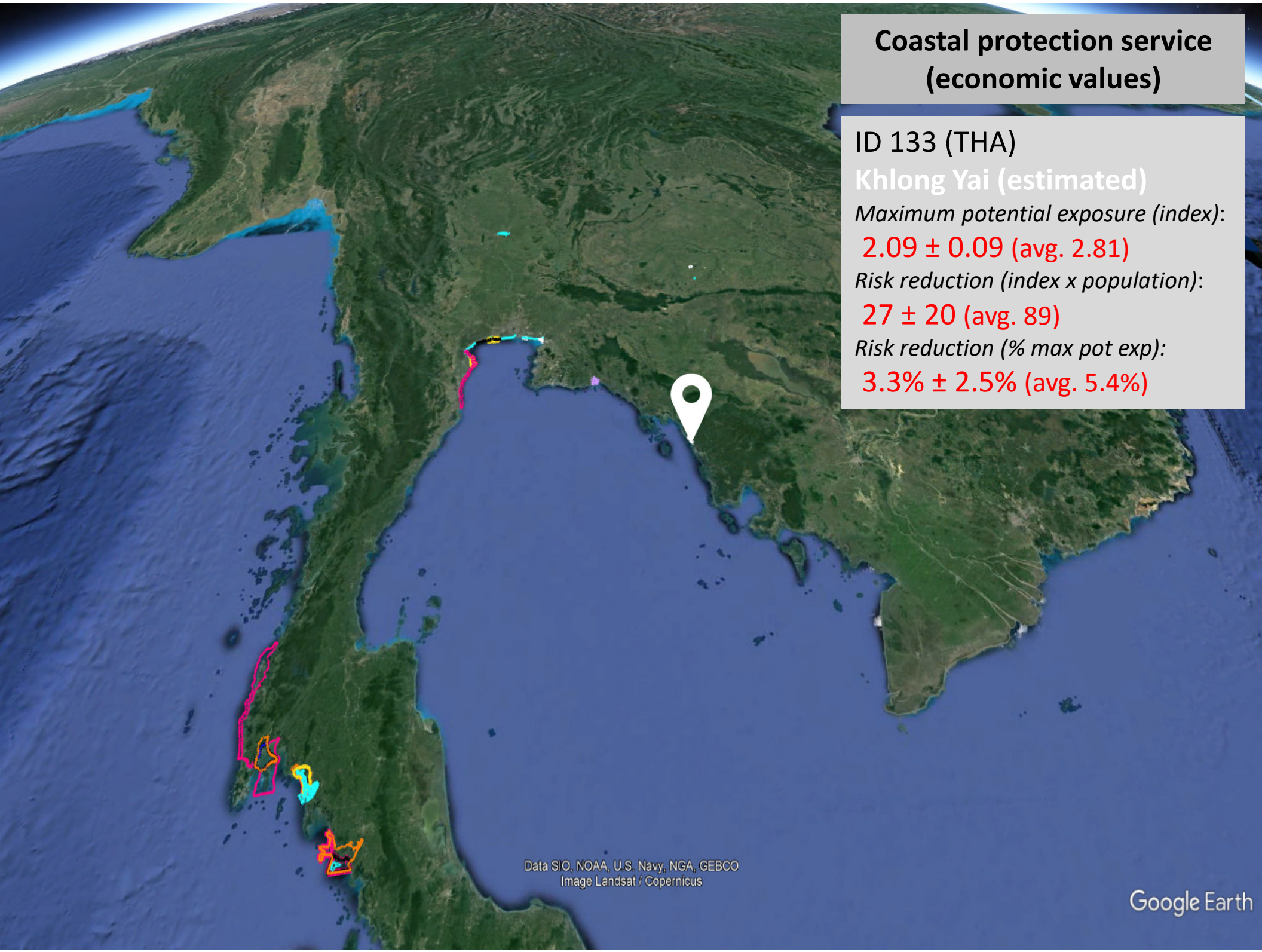
Per mangrove area (USD, 2015/ha):

$0 ± 0 (avg. $1,839)

For 100-yr return storms (USD, 2015):

$3.1M ± 0.6M (avg. $5.1M)


Coastal protection service (economic values)
ID 132 (THA)
Khlong Tamru (estimated)
Total annual benefits (USD, 2015):
$3.4M ± 0.7M (avg. $1.3M)
Per mangrove area (USD, 2015/ha):
$658K ± 4.4K (avg. $1,839)
For 100-yr return storms (USD, 2015):
$1.4M ± 0.2M (avg. $5.1M)
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Image Landsat / Copernicus
Google Earth



Coastal protection service (economic values)

ID 133 (THA)

Khlong Yai (estimated)

Maximum potential exposure (index):

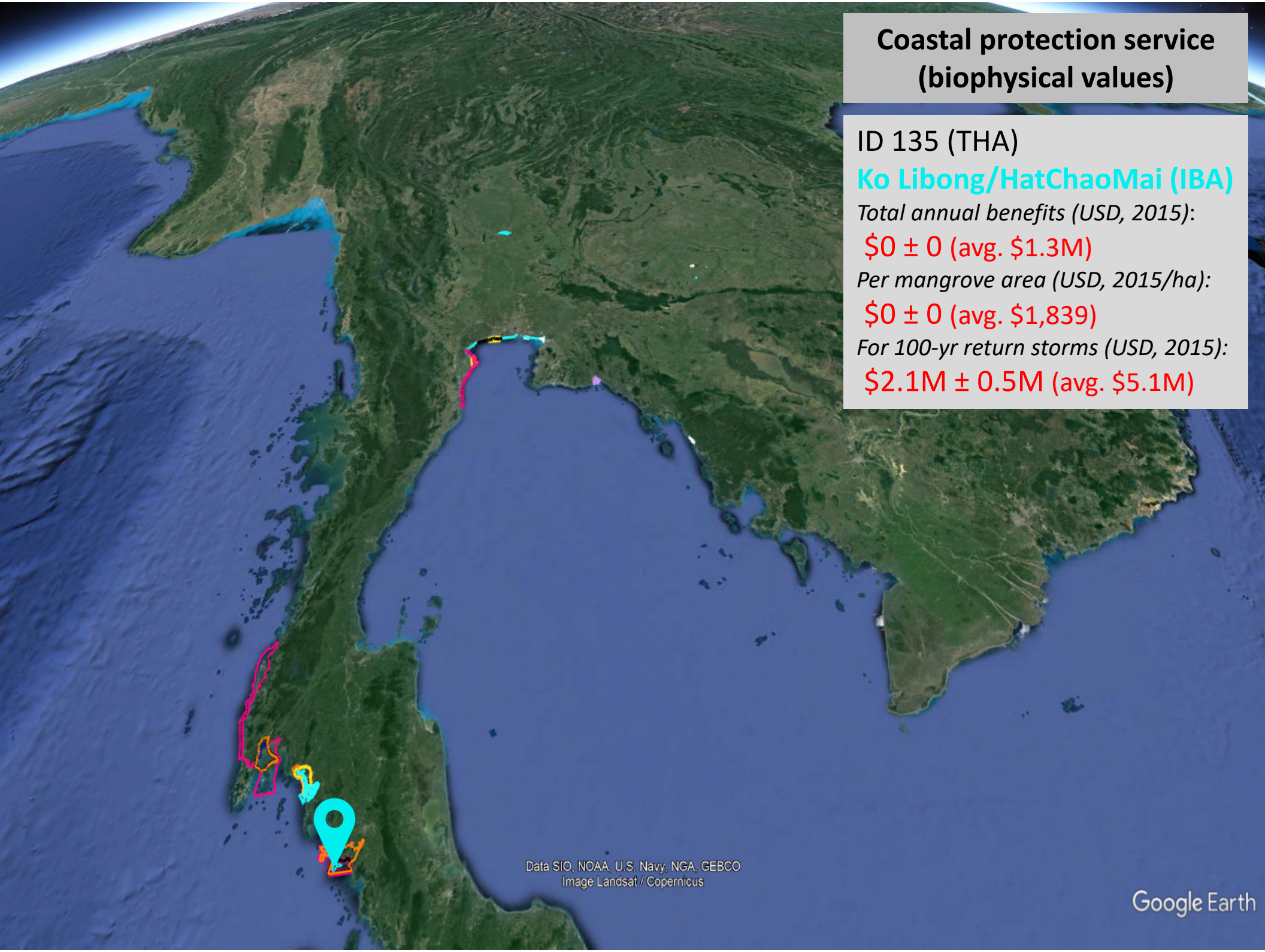
2.09 ± 0.09 (avg. 2.81)

Risk reduction (index x population):

27 ± 20 (avg. 89)

Risk reduction (% max pot exp):

3.3% ± 2.5% (avg. 5.4%)



Coastal protection service (biophysical values)

ID 135 (THA)

Ko Libong/HatChaoMai (IBA)

Total annual benefits (USD, 2015):

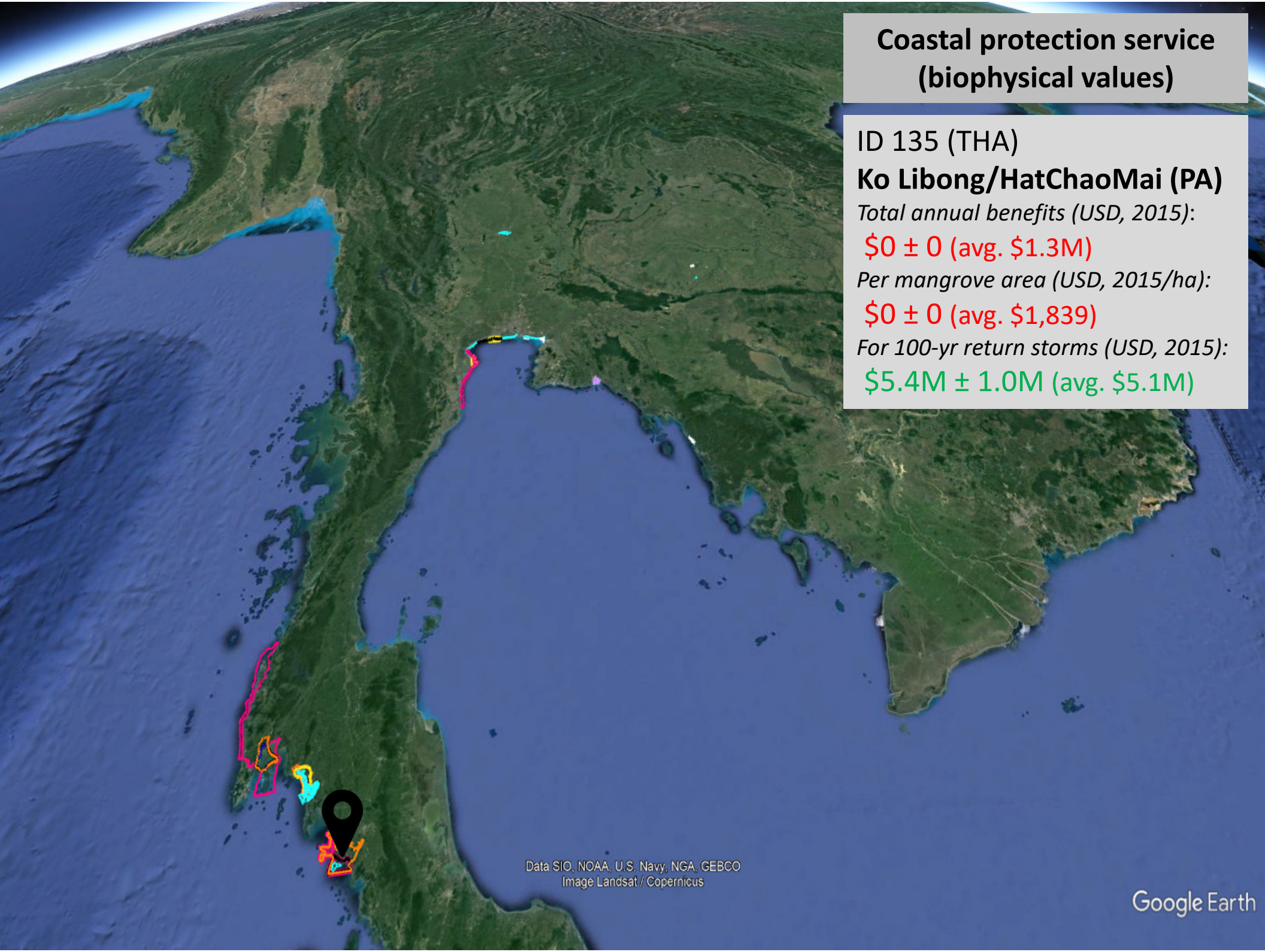
$0 ± 0 (avg. $1.3M)

Per mangrove area (USD, 2015/ha):

$0 ± 0 (avg. $1,839)

For 100-yr return storms (USD, 2015):

$2.1M ± 0.5M (avg. $5.1M)



Coastal protection service (biophysical values)

ID 135 (THA)

Ko Libong/HatChaoMai (PA)

Total annual benefits (USD, 2015):

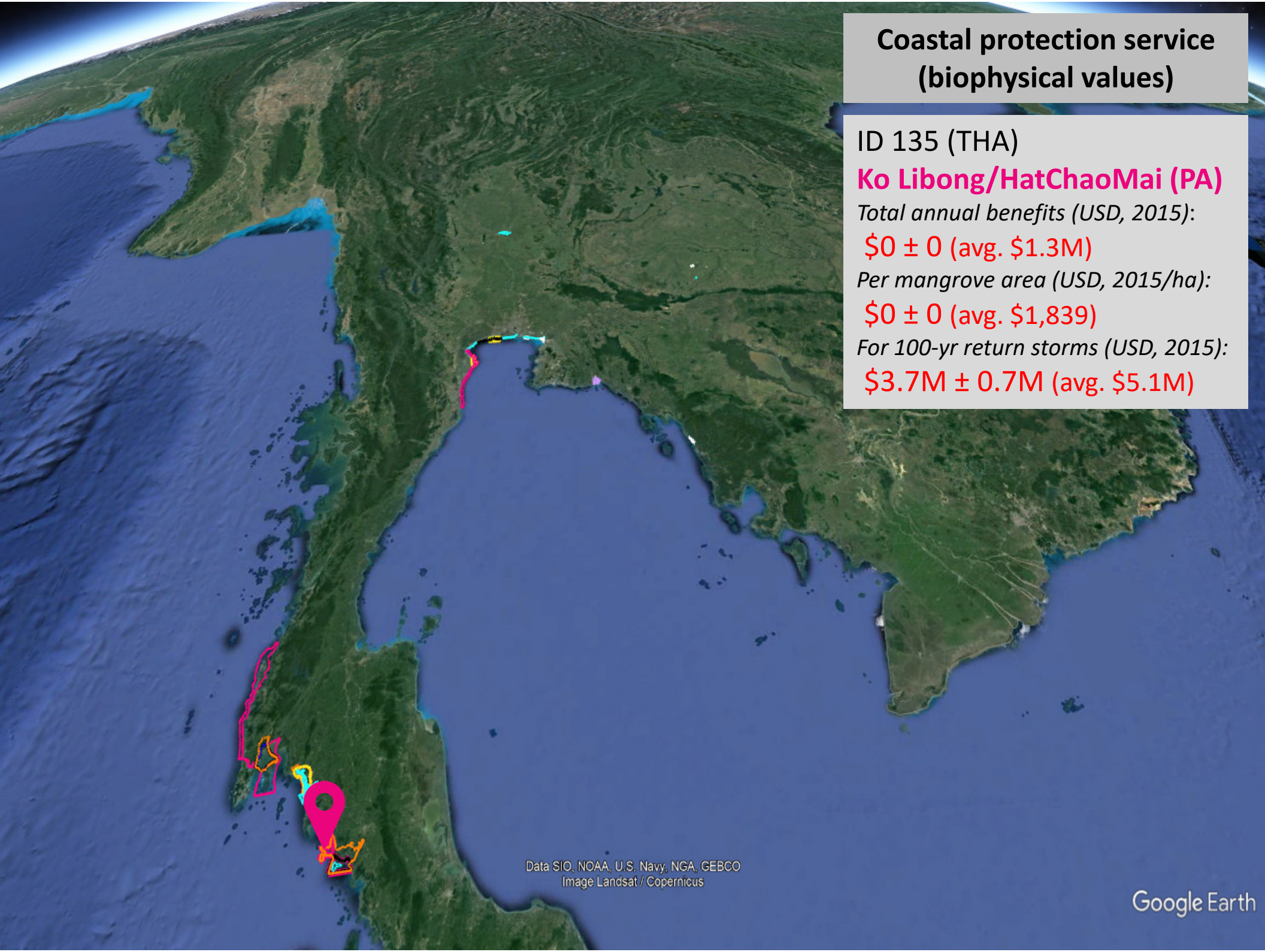
$0 ± 0 (avg. $1.3M)

Per mangrove area (USD, 2015/ha):

$0 ± 0 (avg. $1,839)

For 100-yr return storms (USD, 2015):

$5.4M ± 1.0M (avg. $5.1M)



Coastal protection service (biophysical values)

ID 135 (THA)

Ko Libong/HatChaoMai (PA)

Total annual benefits (USD, 2015):

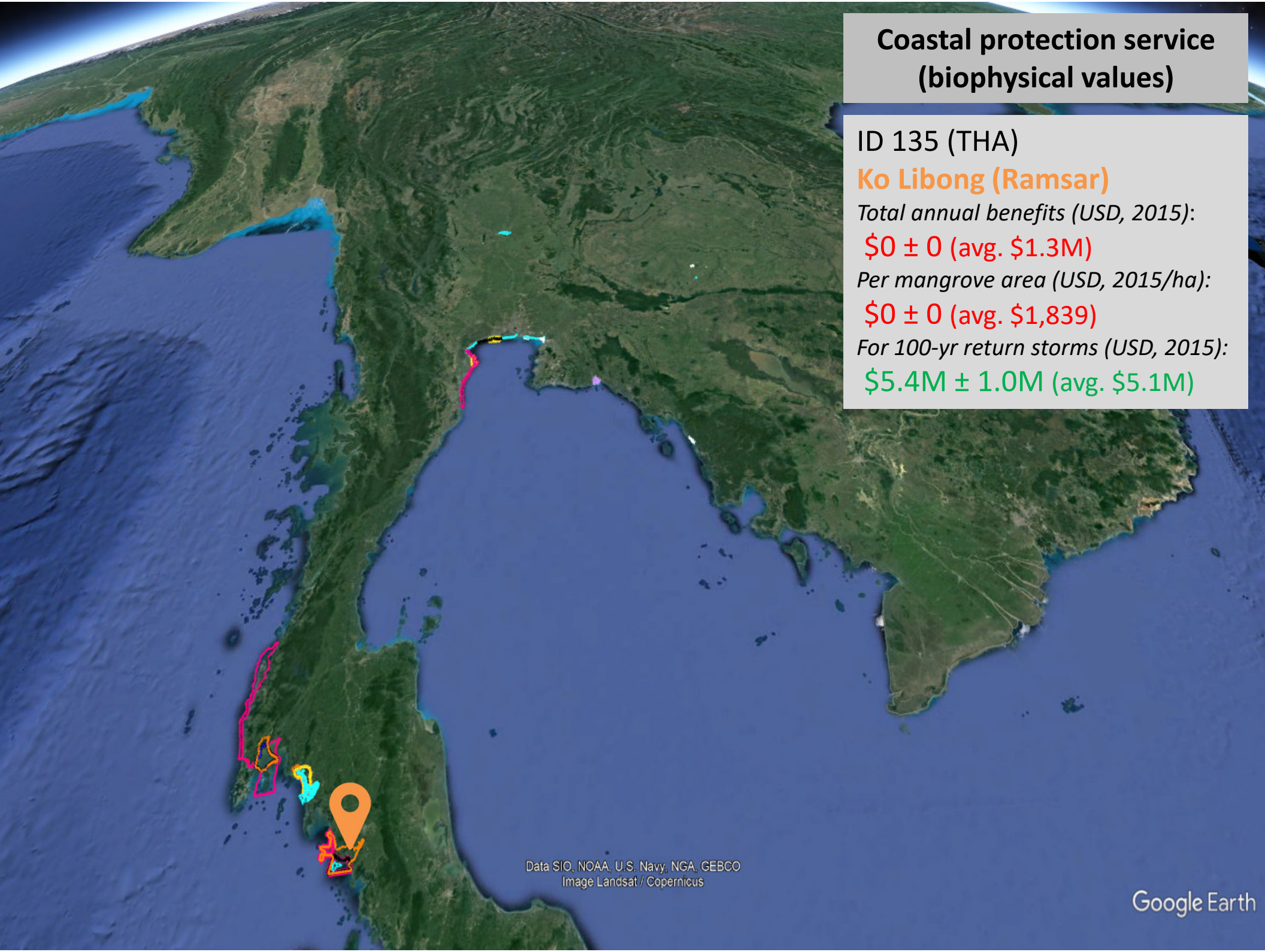
$0 ± 0 (avg. $1.3M)

Per mangrove area (USD, 2015/ha):

$0 ± 0 (avg. $1,839)

For 100-yr return storms (USD, 2015):

$3.7M ± 0.7M (avg. $5.1M)



Coastal protection service (biophysical values)

ID 135 (THA)

Ko Libong (Ramsar)

Total annual benefits (USD, 2015):

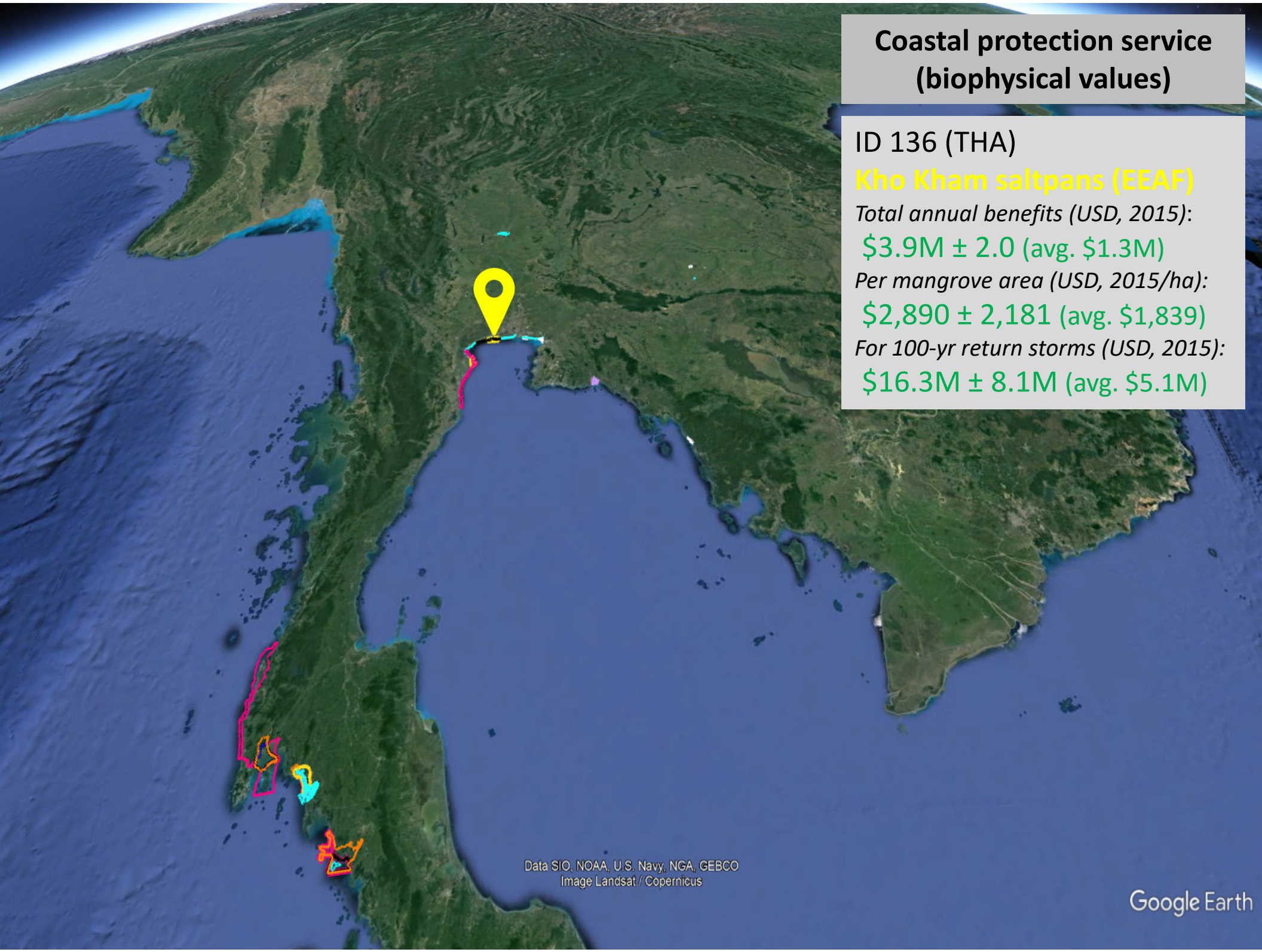
$0 ± 0 (avg. $1.3M)

Per mangrove area (USD, 2015/ha):

$0 ± 0 (avg. $1,839)

For 100-yr return storms (USD, 2015):

$5.4M ± 1.0M (avg. $5.1M)



Coastal protection service (biophysical values)

ID 136 (THA)

Kho Kham saltpans (EEAF)

Total annual benefits (USD, 2015):

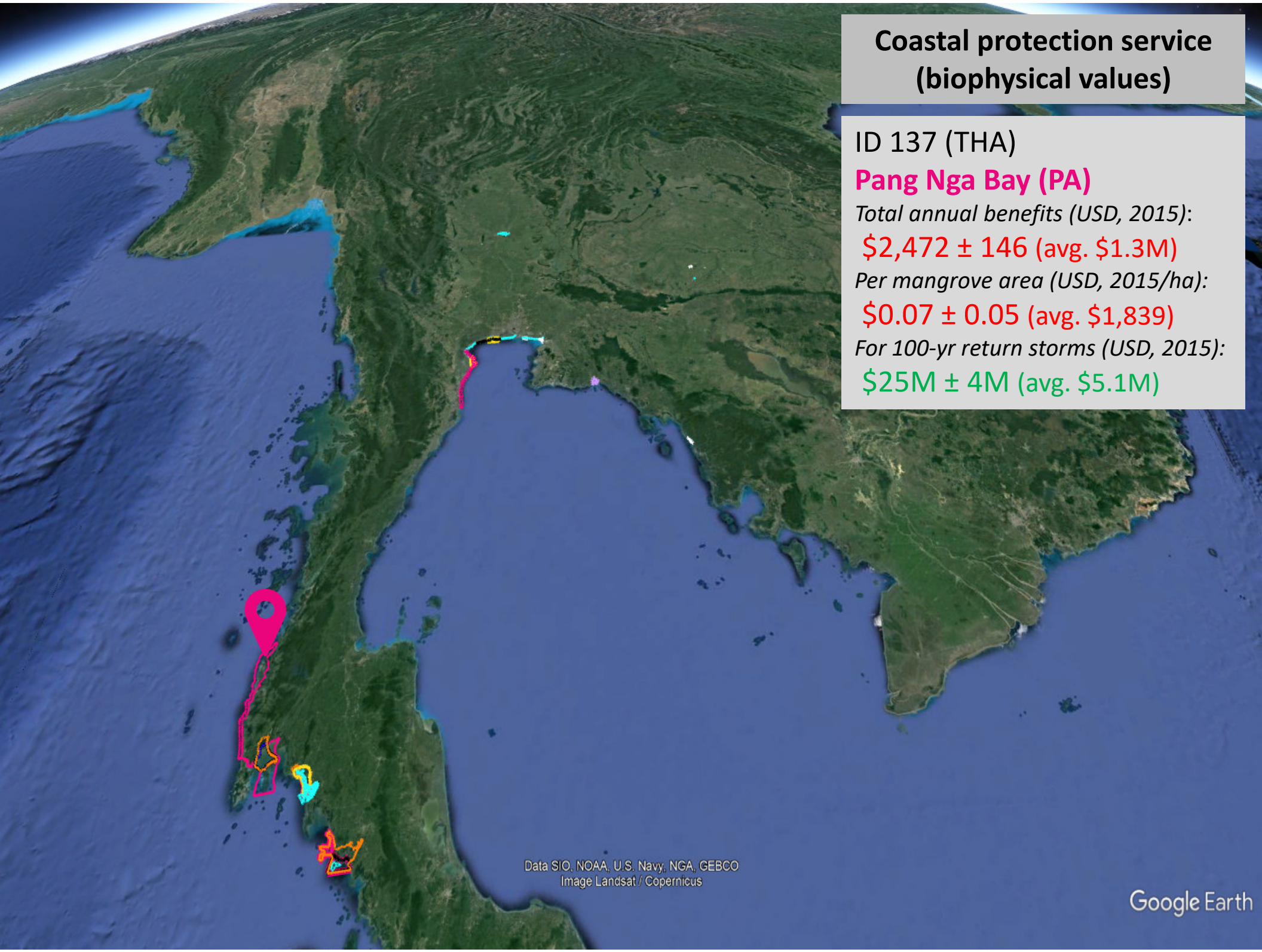
$3.9M ± 2.0 (avg. $1.3M)

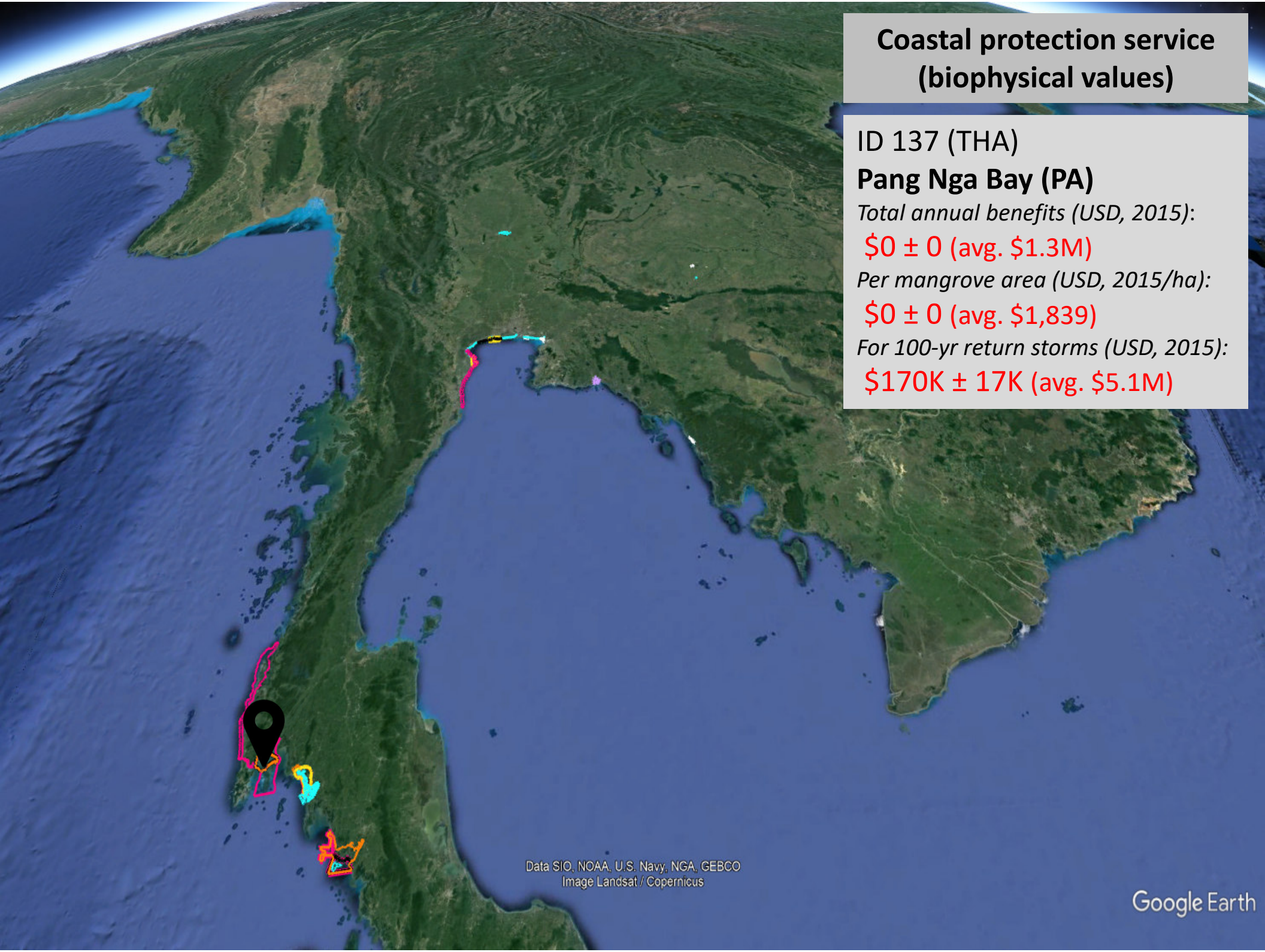
Per mangrove area (USD, 2015/ha):

$2,890 ± 2,181 (avg. $1,839)

For 100-yr return storms (USD, 2015):

$16.3M ± 8.1M (avg. $5.1M)


Coastal protection service
(biophysical values)
ID 137 (THA)
Pang Nga Bay (PA)
Total annual benefits (USD, 2015):
$2,472 ± 146 (avg. $1.3M)
Per mangrove area (USD, 2015/ha):
$0.07 ± 0.05 (avg. $1,839)
For 100-yr return storms (USD, 2015):
$25M ± 4M (avg. $5.1M)
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Image Landsat / Copernicus
Google Earth



Coastal protection service (biophysical values)

ID 137 (THA)

Pang Nga Bay (PA)

Total annual benefits (USD, 2015):

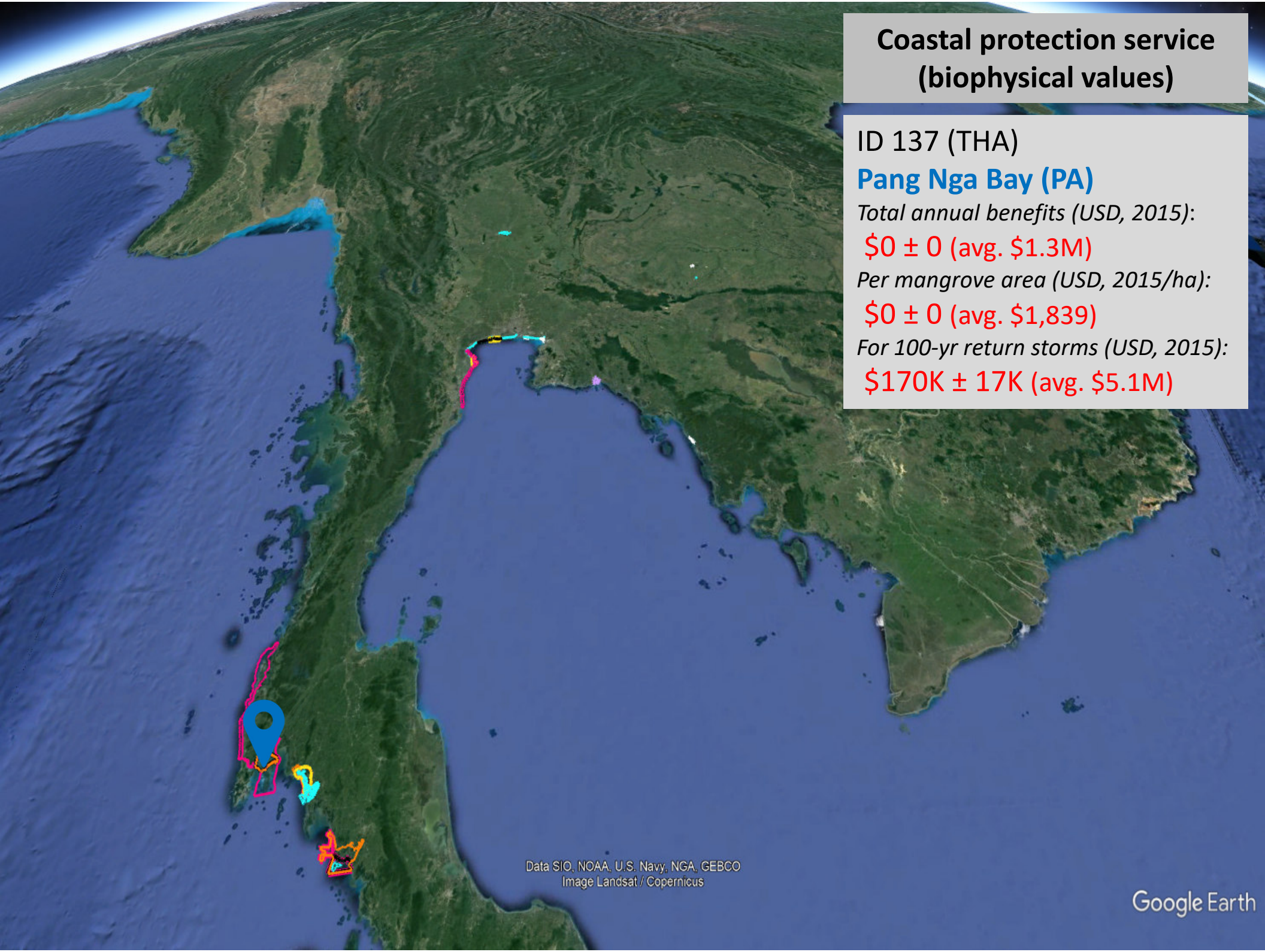
$0 ± 0 (avg. $1.3M)

Per mangrove area (USD, 2015/ha):

$0 ± 0 (avg. $1,839)

For 100-yr return storms (USD, 2015):

$170K ± 17K (avg. $5.1M)



Coastal protection service (biophysical values)

ID 137 (THA)

Pang Nga Bay (PA)

Total annual benefits (USD, 2015):

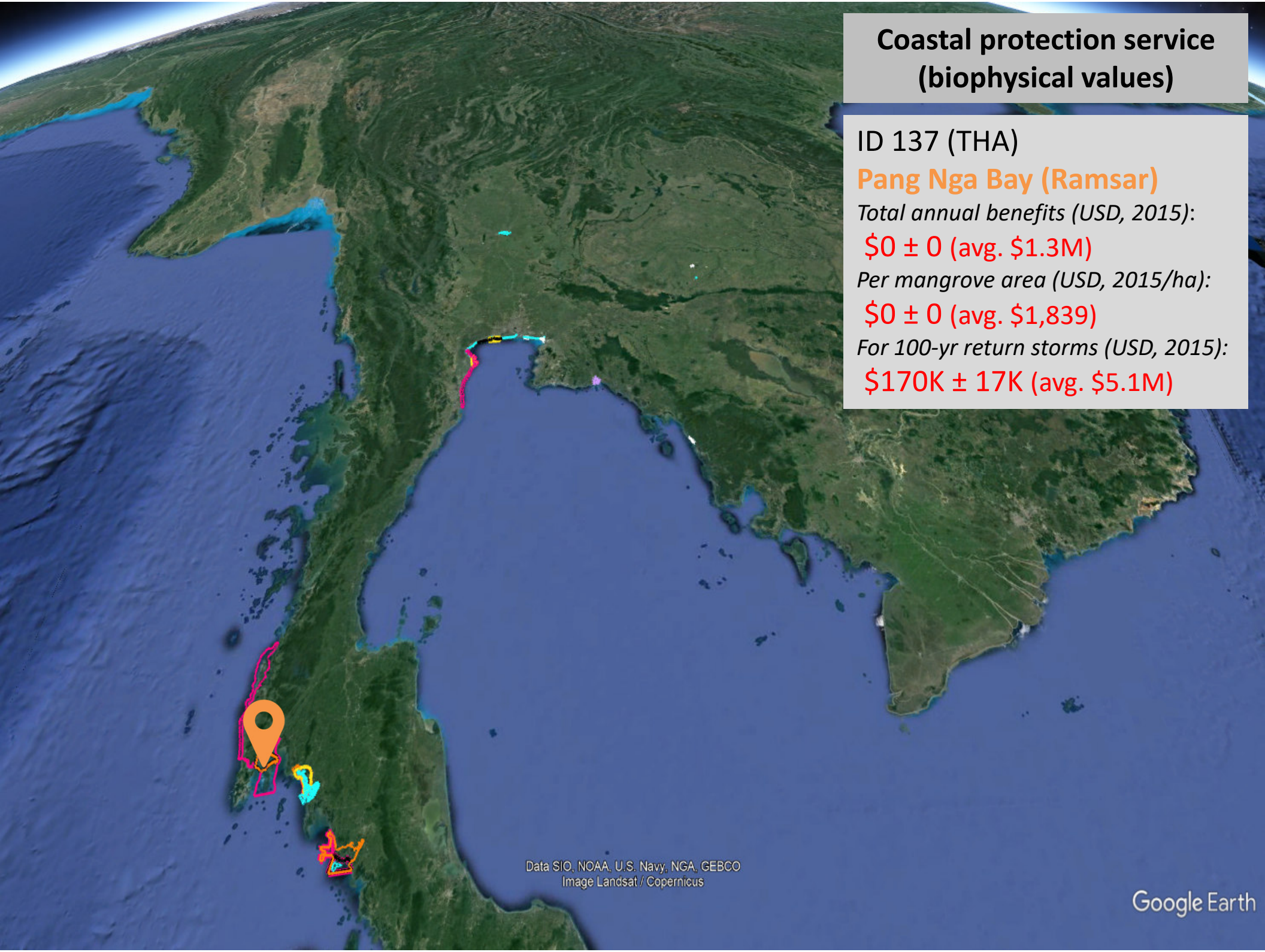
$0 ± 0 (avg. $1.3M)

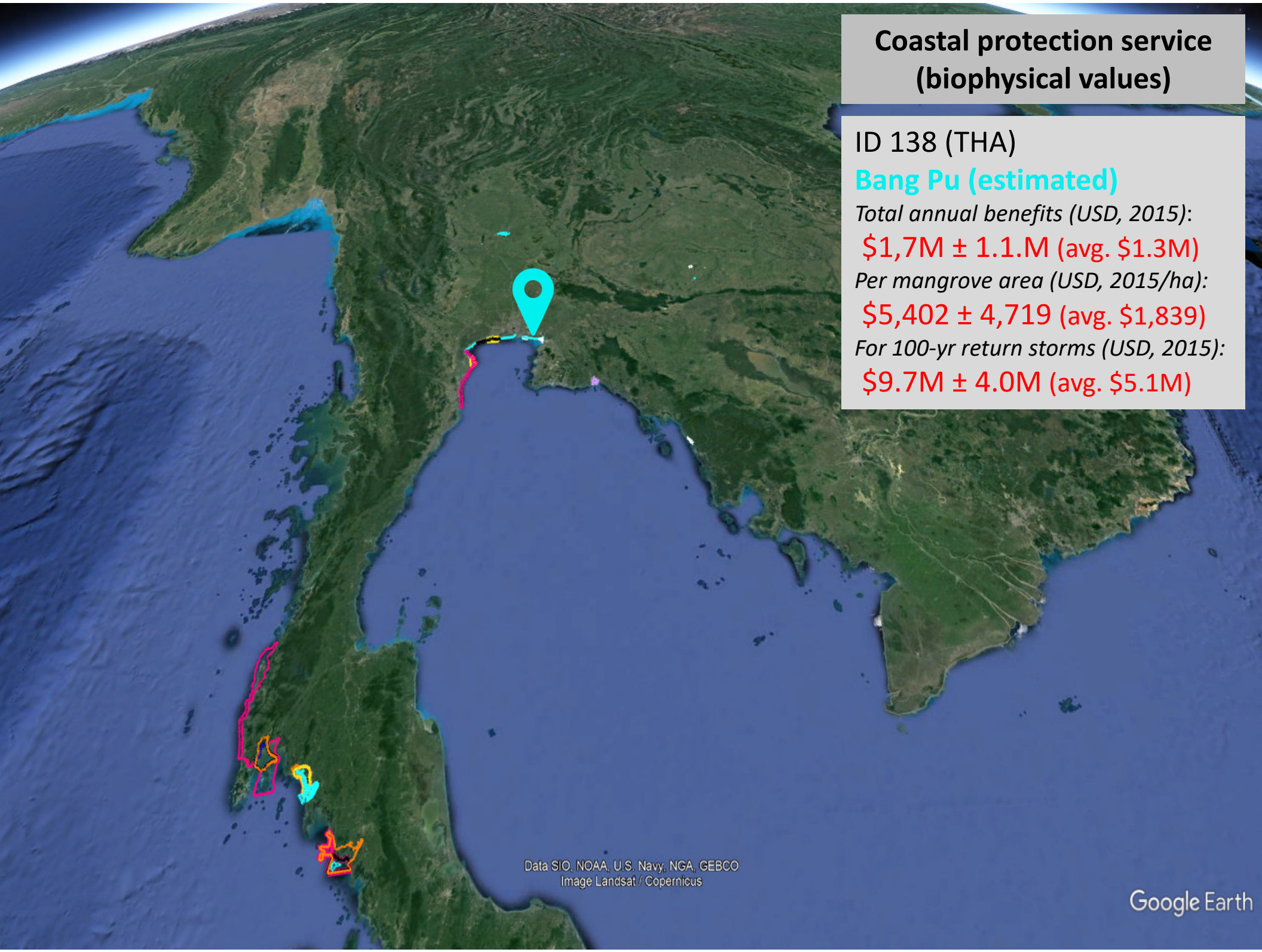
Per mangrove area (USD, 2015/ha):

$0 ± 0 (avg. $1,839)

For 100-yr return storms (USD, 2015):

$170K ± 17K (avg. $5.1M)


Coastal protection service (biophysical values)
ID 137 (THA)
Pang Nga Bay (Ramsar)
Total annual benefits (USD, 2015):
$0 ± 0 (avg. $1.3M)
Per mangrove area (USD, 2015/ha):
$0 ± 0 (avg. $1,839)
For 100-yr return storms (USD, 2015):
$170K ± 17K (avg. $5.1M)
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Image Landsat / Copernicus
Google Earth



Coastal protection service (biophysical values)

ID 138 (THA)

Bang Pu (estimated)

Total annual benefits (USD, 2015):

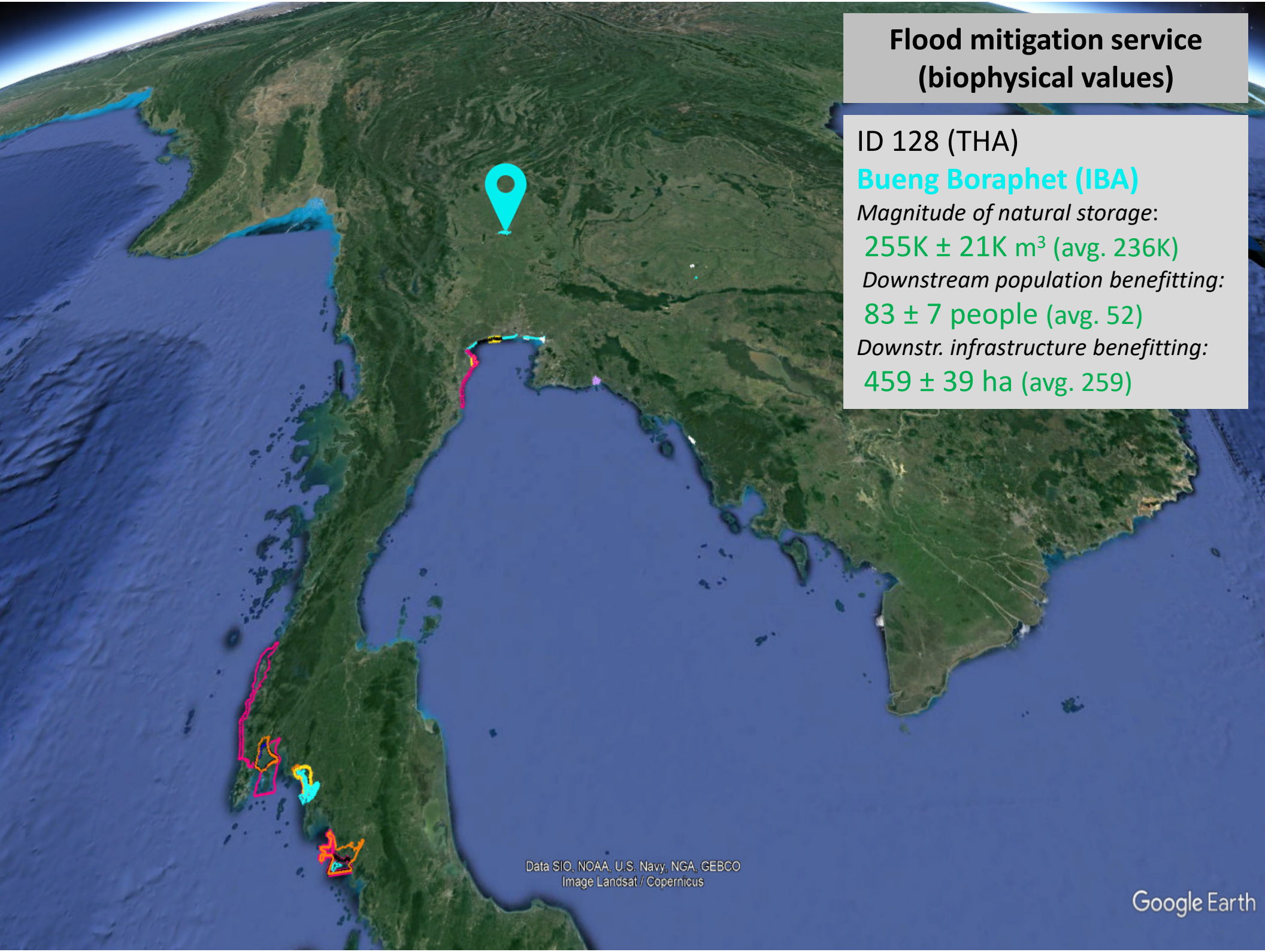
$1,7M ± 1.1.M (avg. $1.3M)

Per mangrove area (USD, 2015/ha):

$5,402 ± 4,719 (avg. $1,839)

For 100-yr return storms (USD, 2015):

$9.7M ± 4.0M (avg. $5.1M)



Flood mitigation service (biophysical values)

ID 128 (THA)

Bueng Boraphet (IBA)

Magnitude of natural storage:

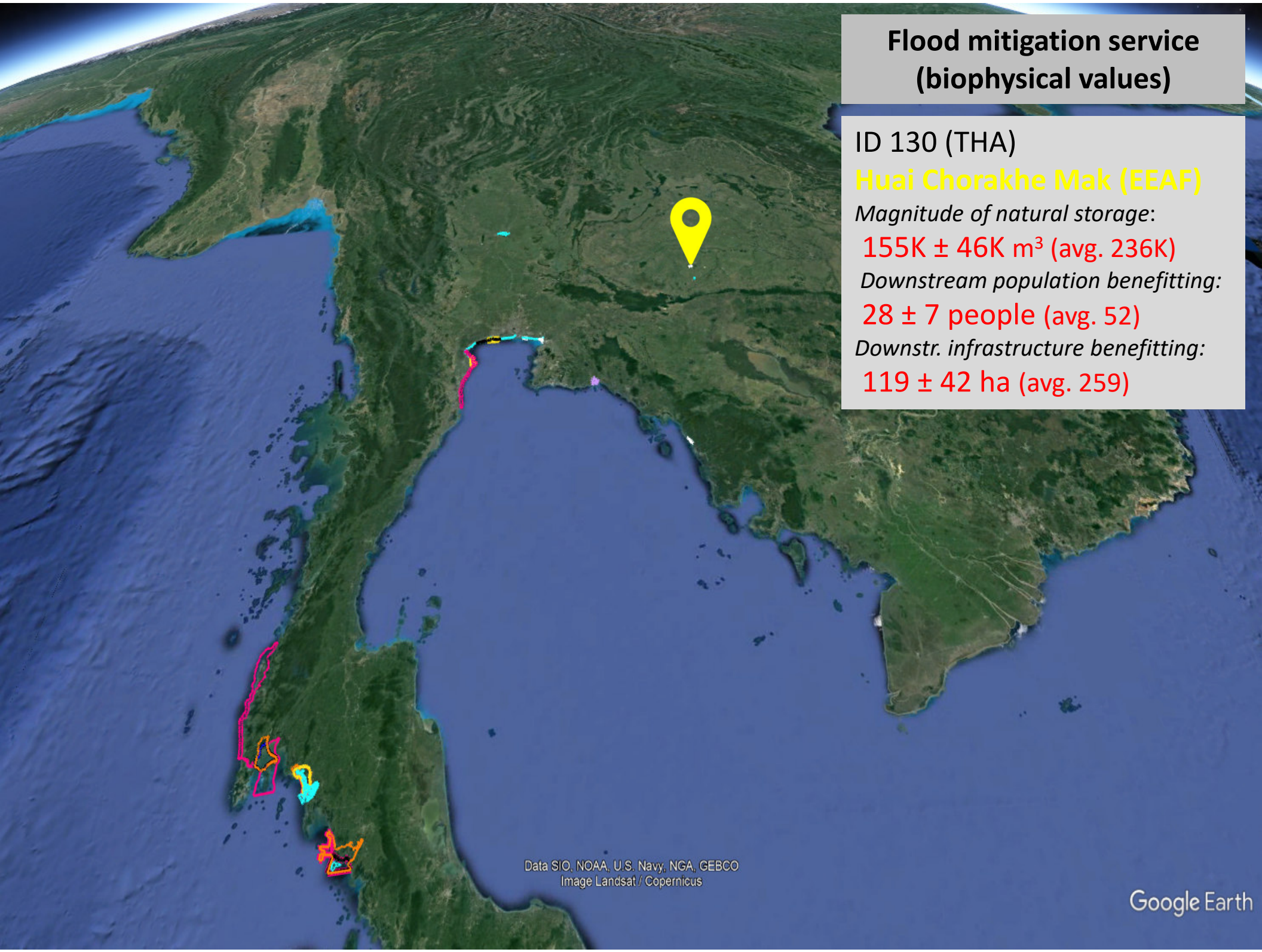
255K ± 21K m^3 (avg. 236K)

Downstream population benefitting:

83 ± 7 people (avg. 52)

Downstr. infrastructure benefitting:

459 ± 39 ha (avg. 259)



Flood mitigation service (biophysical values)

ID 130 (THA)

Huai Chorakhe Mak (EEAF)

Magnitude of natural storage:

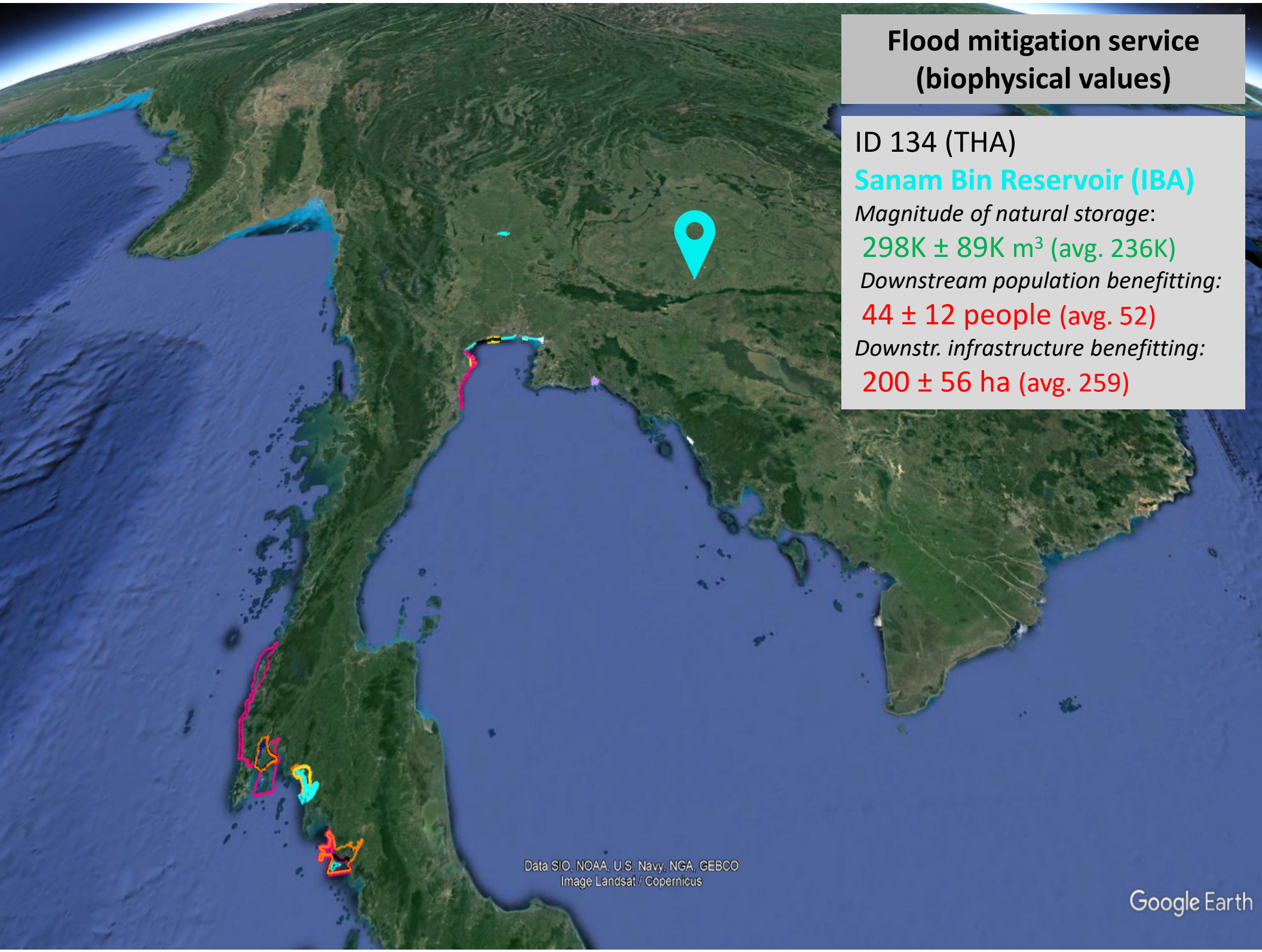
155K ± 46K m^3 (avg. 236K)

Downstream population benefitting:

28 ± 7 people (avg. 52)

Downstr. infrastructure benefitting:

119 ± 42 ha (avg. 259)



Flood mitigation service (biophysical values)

ID 134 (THA)

Sanam Bin Reservoir (IBA)

Magnitude of natural storage:

298K ± 89K m^3 (avg. 236K)

Downstream population benefitting:

44 ± 12 people (avg. 52)

Downstr. infrastructure benefitting:

200 ± 56 ha (avg. 259)

ANY QUESTIONS?

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