Viet Nam Ocean Accounting: Case study in Quang Ninh

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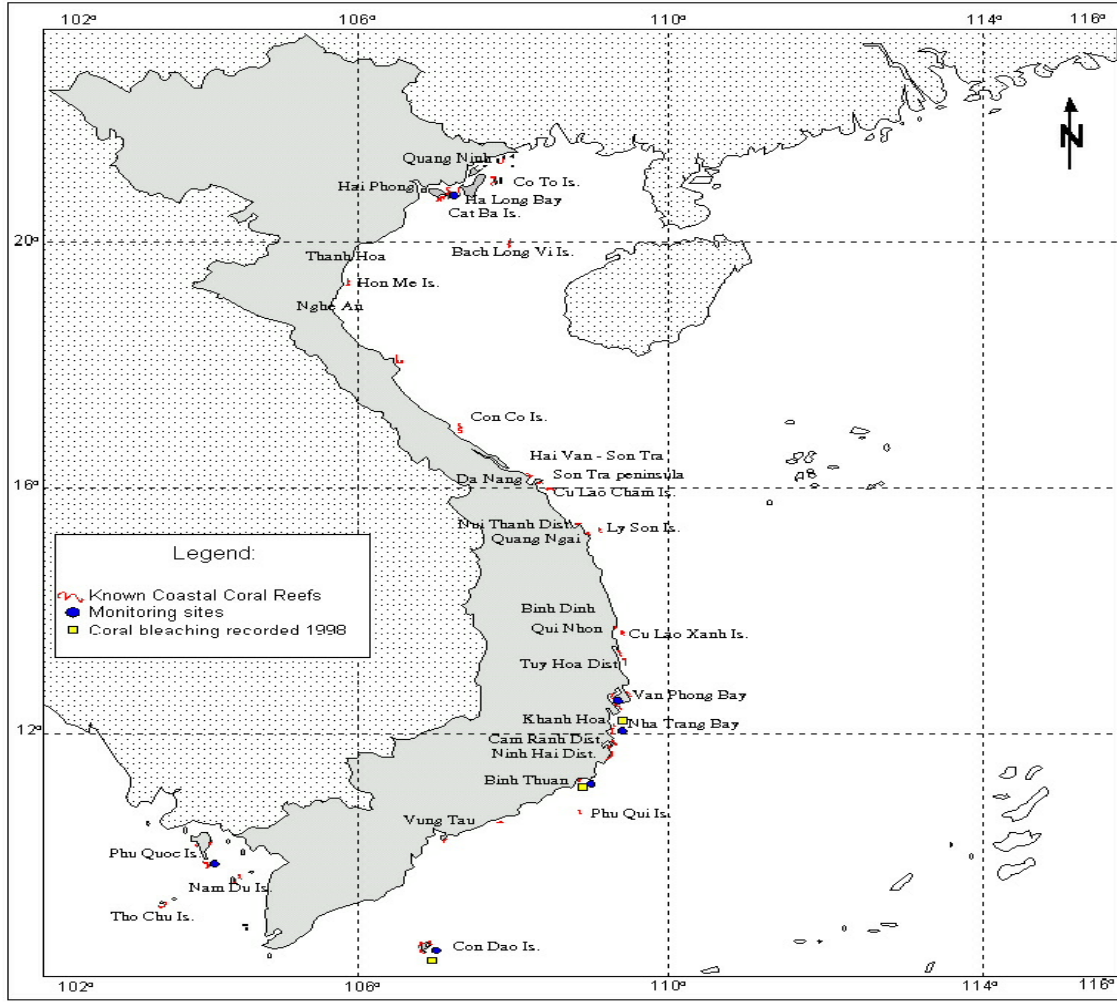
Global Ocean Accounts Partnership

System of Environmental Economic Accounting

Viet Nam Coastal area

- Vietnam is located in the west of the East Sea, surrounded by sea at 03 sides
- The coastline is **3,260 km long** with the total coastal area is over a million square kilometers, which is 03 times larger than land area
- **28 coastal provinces/cities**
- The sea of Vietnam is rich in resources and has a favorable position for marine economic development
- **High biodiversity** with many typical estuarine ecosystems, wetland ecosystems, mangrove forests, coral reefs, seagrass beds



Policy framework

- Decision 1393/QD-TTg on approving **National Strategy on Green Growth Strategy** and Decision 403/QD-TTg dated 20th March 2014 on approving National Action Plan on Green Growth in the period of 2014-2020
- Strategy **for sustainable exploitation and use of marine natural resources and environment protection** until 2020, with a vision towards 2030

Policy framework

- Decision 914/QD-TTg on approving **Action Plan for an integrated coastal zone management (ICZM) strategy** in Vietnam up to 2020, with a vision towards 2030
- Resolution 27/2007/NQ-CP dated 30th May 2007 of Prime Minister on issuing Action Plan to implement Resolultion 09-NQ/TW dated 09 February 2007 under the 04th conference of of the 10th Party Central Committee on the **Viet Nam's Sea Strategy 2020**
- Law on Natural Resources and Environment of the Sea and Islands;

Policy framework

- The **Planning Law** (Law No 14/2017/QH14) has defined the **National Maritime Spatial Plan** as a National master plan, concretizing the national master plan for functional zoning and reorganization, appropriate space for branches and domains on coastal land, islands, archipelagoes, sea areas and airspace under the sovereignty, the sovereign right and the national jurisdiction of Vietnam.

Figure 1 A stylized set of ocean accounts

SEEA-CF Mineral and Energy Assets; Aquatic resources

Drivers

Specific units	Industry		% to ocean
SEEA Air emissions			
SEEA Effluents[1]			
SEEA Solid wastes[1]			

[1] would benefit from spatial disaggregation

Ocean governance

Specific units	Industry		
Policies, plans and regulations			
Institutions			
Management practices			
Technologies			
SEEA Protection Expenditures			
- research			
- enforcement			
SEEA Goods and Services			
- technologies			

Ocean Assets:

Ocean Extent

hectares	Ecosystem Type[2]			Minerals (T)	Energy (MToE)	Fish stocks (T)
Beginning of period						
+ additions						
- reductions						
End of period						

Ocean Conditions

Specific units	Ecosystem Type[2]			Minerals (T)	Energy (MToE)	Fish stocks (T)
Acidification (pH)						
Eutrophication (BOD)						
Plastics (T)						
Carbon[3]						
Biodiversity[3]						
Temperature (°C)						
Accessibility/quality						

[2] Including critical natural capital areas, settlements, coastal infrastructure, protected areas, fishing zones, designated tourist areas, coral reefs, mangroves, coastal beaches…

[3] As in the SEEA-EEA, Carbon and Biodiversity could be full accounts.

Note: This is a stylistic representation of the SEEA-EEA with additional components required for including sources of land-based pollution, abiotic services (such as minerals, energy and medium for transport), expenditures and governance. This is not as comprehensive as described in the text. Much of the data on flows of land-based pollution, ecosystem types, and condition would be derived from detailed maps and aggregated as shown in the tables for reporting.

SNA for some services[6]

[6] Would benefit from disaggregation by large/small enterprise and linkage to employment by beneficiary type.

Ocean Services Supply (physical)

Service (specific units)	Ecosystem Type		
Provisioning			
Regulating and maintenance			
Cultural			
Abiotic: Minerals, energy, medium for transport			

Ocean Services Use (physical)

Service (specific units)	Beneficiary type[4]		
Provisioning			
Regulating and maintenance			
Cultural			
Abiotic: Minerals, energy, medium for transport			

[4] Disaggregated by coastal/urban/rural, high/low income, male/female

Ocean Services Supply (Monetary[5])

Service (monetary unit)	Ecosystem Type		
Provisioning			
Regulating and maintenance			
Cultural			
Abiotic: Minerals, energy, medium for transport			

[5] Only some services can be valued in monetary term

Ocean Services Use (Monetary[4])

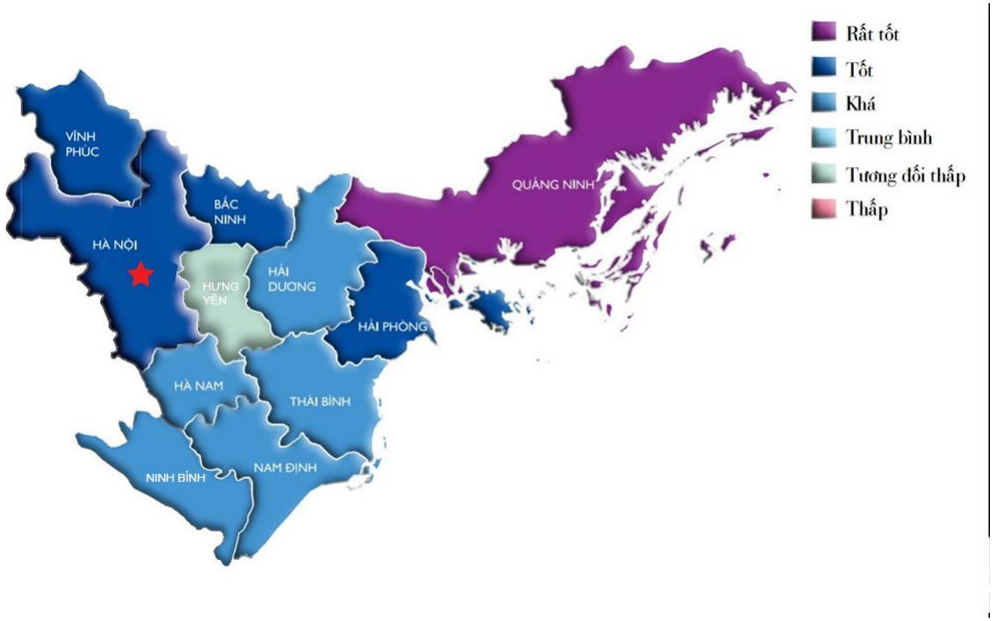
Service (monetary unit)	Beneficiary type		
Provisioning			
Regulating and maintenance			
Cultural			
Abiotic: Minerals, energy, medium for transport			

Scope of the pilot

- Focus on ecosystem and pollution account
- Pilot in Quang Ninh province
  - ✓Ecosystem extent
  - ✓Pollution
  - ✓Tourism

Quang Ninh province

- Top 5 province with largest state budget revenue
- 11% growth rate (6 year average)
- GDP per capita 2 times national average
- Key economic “pole” of the region
- Key sector:
  - Coal mine
  - Thermal energy (20% national)
  - Cement (15% national)
  - Ship/Port
  - Industry
  - Tourism (12 millions visitor ~ 1 billion USD)



Key environmental issues

- ❑Water pollution due to domestic, industrial wastewater and coal mining activities;
- ❑Impact due to urban solid waste and substance industrial solid waste,
- ❑Air pollution due to thermal power plants, cement,
- ❑Forest degradation and reduction of biodiversity.

Drivers

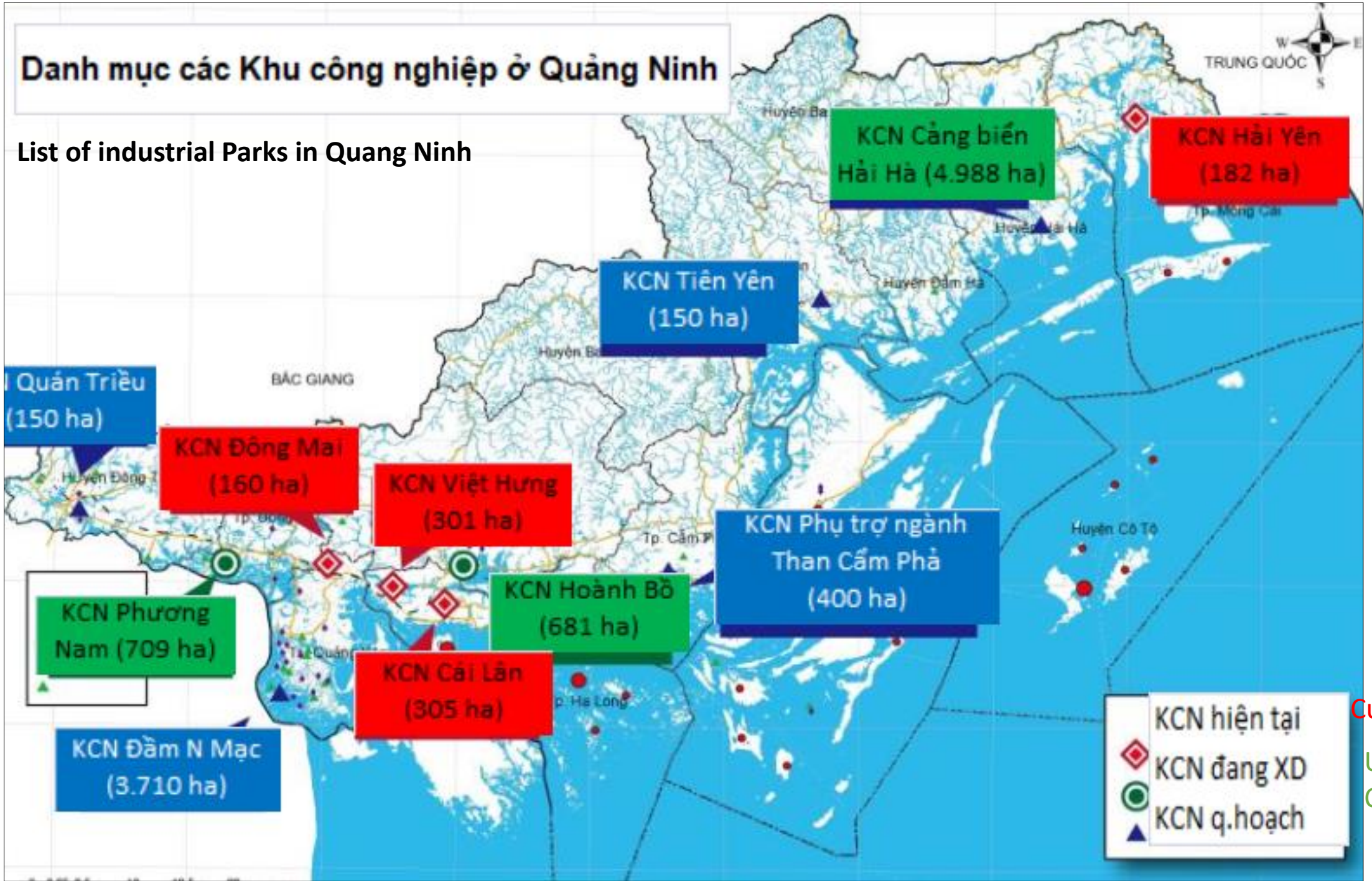
- Tourism
- Land-based pollution
- Pollution from industrial zone Loss of area or degradation of ecosystems (mangroves, seagrasses, coral reefs ...) due to the development of coastal construction, aquaculture and sedimentation
- Overexploitation of marine resources

4. Activities undertaken

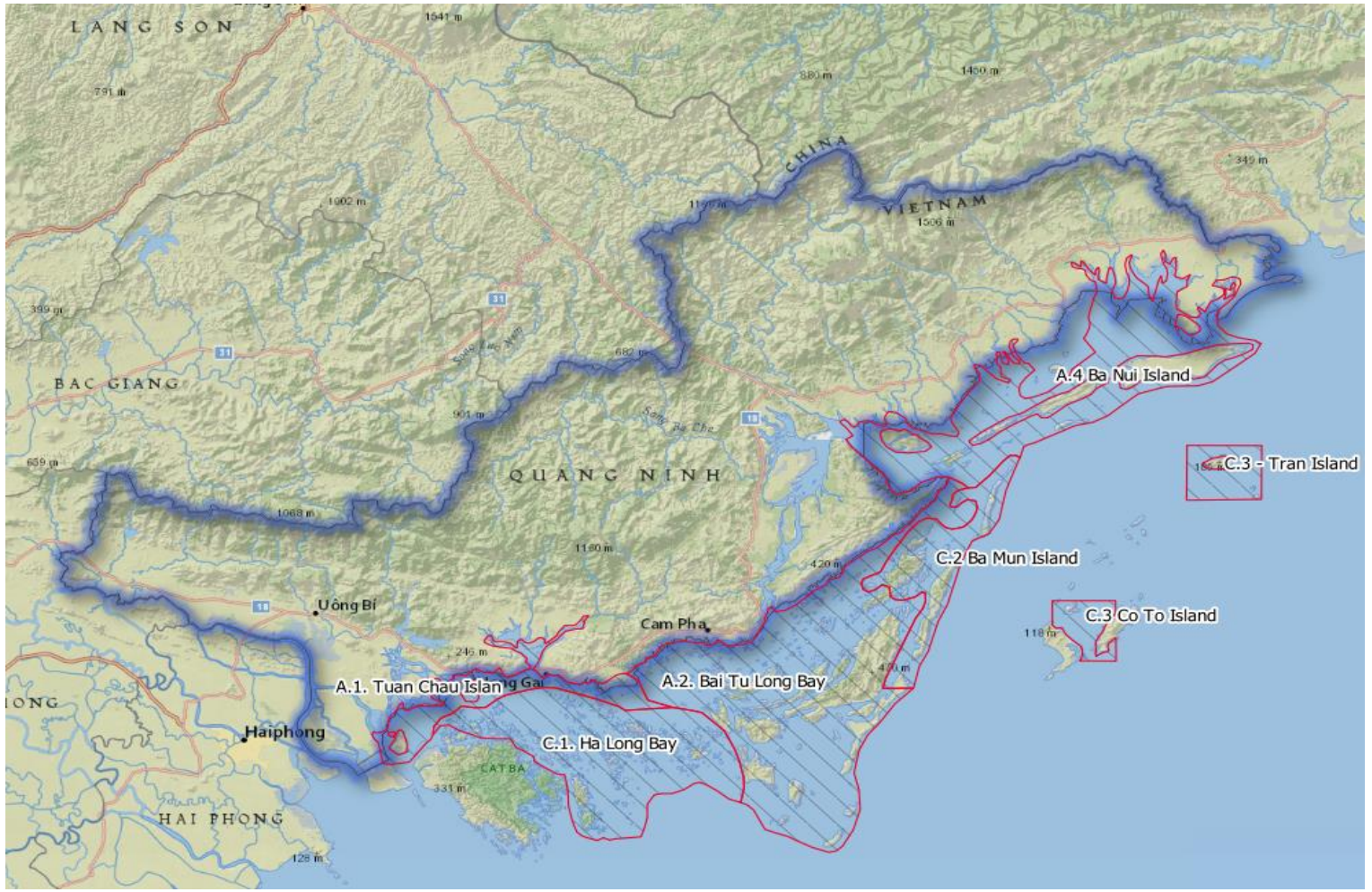
- Establishment of working group (GSO, MARD, MONRE, University, etc)
- Scoping study
- Secondary data review
- Consultation
- Data collection, integration
- Analysis, accounting, valuation…

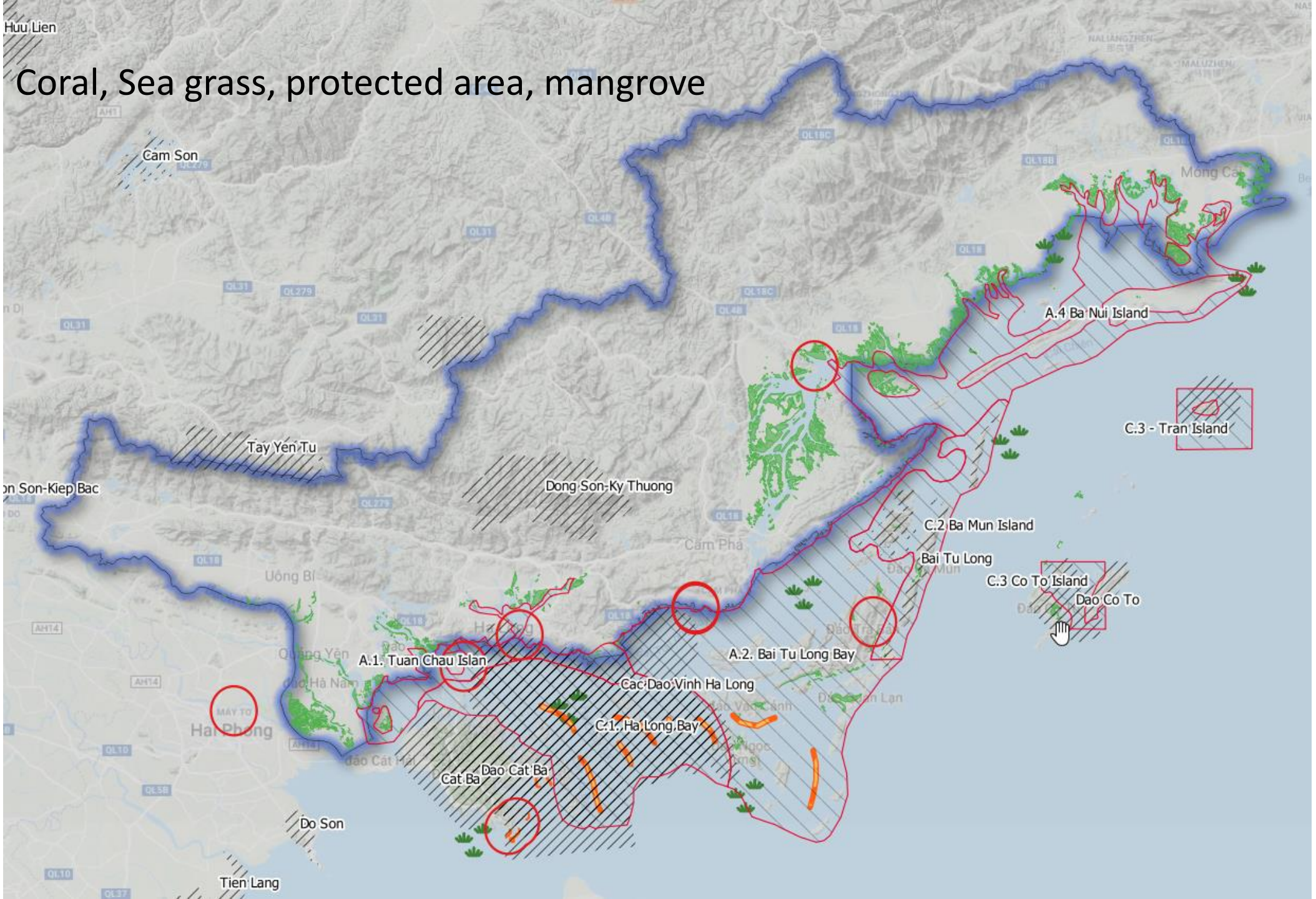
Data source

1	Quang Ninh land-based protected area	MARD	vector
2	Quang Ninh marine protected area	IUCN	vector
3	Quang Ninh forest map 2018	MARD	vector
4	Quang Ninh mangrove 2018	MARD	vector
5	Elevation	SRTM	Raster
6	Quang Ninh soil map	MARD	vector
7	Commune population	GSO	vector
8	Quang Ninh land cover	MONRE	vector
9	Hydrology	MONRE	vector
10	Coral reef	WCMC	Raster
11	Sea grass	WCMC	Raster
12	Quang Ninh environmental protection plan	DONRE	report
13	Ocean pollution assessment of Quang Ninh and Hai Phong	VASI	report
14	Global Urban Footprint in Vietnam	DLR	Raster
15	Quang Ninh LULC 2010 and 2015	MONRE	Vector


Danh mục các Khu công nghiệp ở Quảng Ninh
List of industrial Parks in Quang Ninh
TRUNG QUỐC
KCN Cảng biển Hải Hà (4.988 ha)
KCN Hải Yên (182 ha)
KCN Tiên Yên (150 ha)
Quán Triều (150 ha)
BẮC GIANG
KCN Đông Mai (160 ha)
KCN Việt Hưng (301 ha)
KCN Phụ trợ ngành Than Cẩm Phả (400 ha)
KCN Hoành Bồ (681 ha)
KCN Phương Nam (709 ha)
KCN Cái Lân (305 ha)
KCN Đầm N Mạc (3.710 ha)
KCN hiện tại
KCN đang XD
KCN q.hoạch
Current
Under Constructi
Planning

Coastal/marine area and spatial units

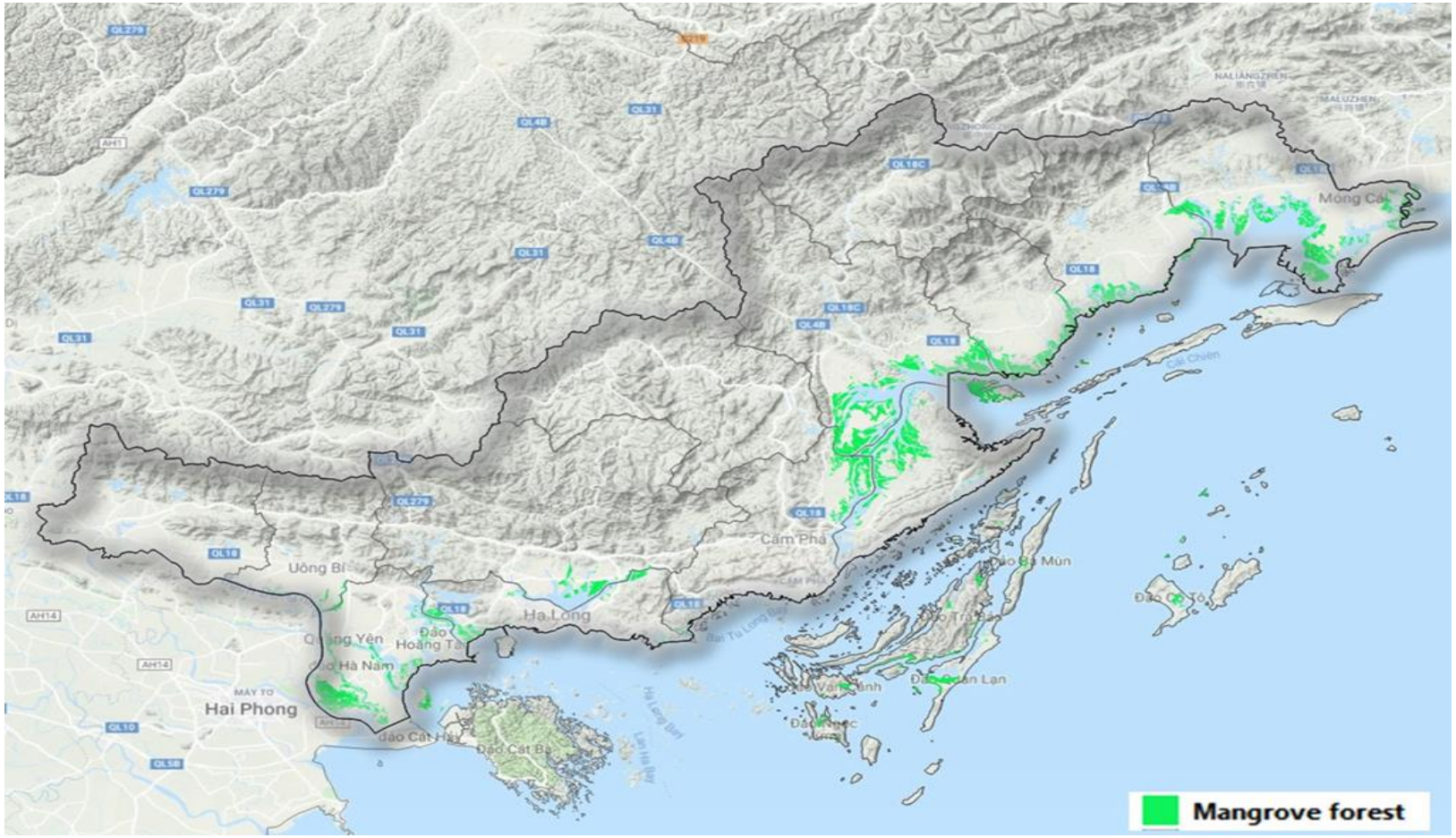



Coral, Sea grass, protected area, mangrove
Huu Lien
Cam Son
Tay Yen Tu
Dong Son-Ky Thuong
A.4 Ba Nui Island
C.3 - Tran Island
C.2 Ba Mun Island
Bai Tu Long
C.3 Co To Island
Dao Co To
A.1. Tuan Chau Islan
A.2. Bai Tu Long Bay
Cac Dao Vinh Ha Long
C.1. Ha Long Bay
Dao Cat Ba
Cat Ba
Do Son
Tien Lang

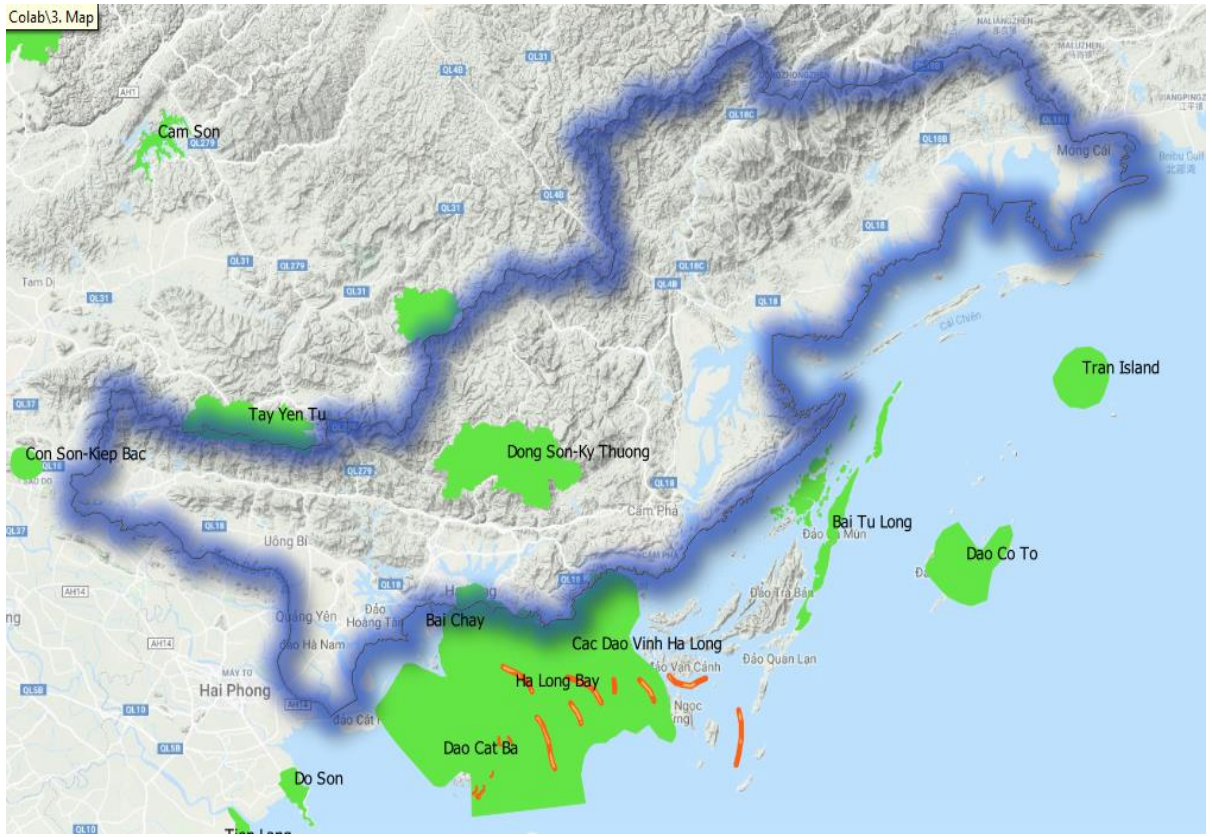
Mangrove forest

Mangrove forest	**2015**	**2018**
Total mangrove forest area	19,820	6,200
Mangrove forest within designated forest land	18,352	4,716
Special use	50	346
Protection	17,894	4,130
Production	407	240
Mangrove forest outside designated forest land	1,467	1,484

Mangrove forest 2018 (Forest Monitoring data 2018)



Protected area of Quang Ninh province



NAME	Description	Marine	AREA (km2)
Cat Ba Island	Marine Protected Area/ UNESCO-MAB	Yes	389
Ha Long Bay Islands	Cultural and Historical Site	Yes	373
Bai Tu Long	National Park	Yes	65
Ha Long Bay	World Heritage Site (natural or mixed)	Yes	471
Dong Son-Ky Thuong	Nature Reserve	No	171
Tran Island	Marine Protected Area	Yes	57
Dao Co To	Marine Protected Area	Yes	94

Seagrass area

#	Site	Area before 1995 (ha)	Area after 2003 (ha)	Percentage loss (%)
1	Vụng Hà Cối (Q.Ninh)	1200	150	87.5
2	Bãi Đầm Hà (Q.Ninh)	80	2	97.5
3	Quan Lạn (Q.Ninh)	100	1	99
4	Đồng Rui (Q.Ninh)	420	0	100
5	Tuần Châu (Q.Ninh)	120	0	100
6	Bồ Hòn (Q.Ninh)	1	0	100

Key issue with ecosystem mapping

- Mangrove: reduction of 25% mangrove are due to land conversion for industry, urbanization, aquaculture farm
- Seagrass and coral: few systematic study with update status.
  - Seagrass: 3 site loss 100%; 3 site loss more than 80%
  - Coral: reduce 30% on species richness, 70% on area
- Driver: aquaculture, construction, use of toxic chemical in fishing (Water sample in 2007 at Co To island have Xyanua 3-5 time higher than standard); flash flood pushing sediment to the sea that kill seagrass.

Ocean Pollution

Table 2. Area of Marin Units (0: Non-pollution; 1: Low pollution; 2: Medium pollution; 3: High pollution)

No.	Units	Area (km2)	%	Polluted by marine boat		Polluted by tourist boat		Polluted by fishing boat		Polluted by Aquaculture	Polluted by human activities in the island		
				Ballast water	Bilge water	Waste water	Bilge water	<90CV	>90CV		Sed.	Waste water	Sea Water
1	A.1 Tuan Chau Island	164.02	6.83	0	0	-	-	0,1,2	-	3	-	-	-
2	A.2. Bai Tu Long Bay	890.47	37.07	0,2,3	0	0	0-1		1,2	3	0	0,2	2,3
3	A.4 Ba Nui Island	516.72	21.51	-	-	-	-	-	-	3	-	-	-
4	C.1. Ha Long Bay	489.45	20.38	-	-	-	-	-	0,1,2	-	-	-	-
5	C.2. Ba Mun Island	208.43	8.68	-	-	-	-	-	1,2	-	0	0	2,3
6	C.3. Co To Island	54.26	2.26	-	-	-	-	-	-	3	0	0	2,3
7	C.3. Tran Island	78.49	3.27	-	-	-	-	-	-	-	-	-	-

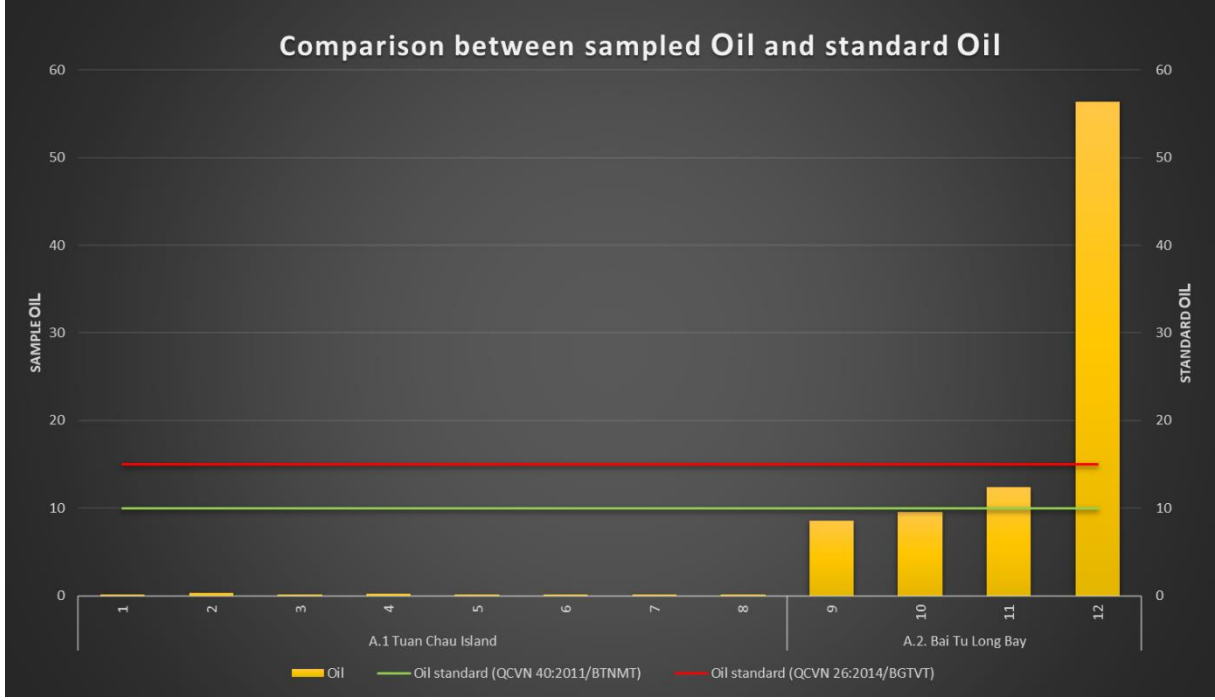
All acquaculture sites is heavily polluted: site with more than 3 parameters above ocean water standard

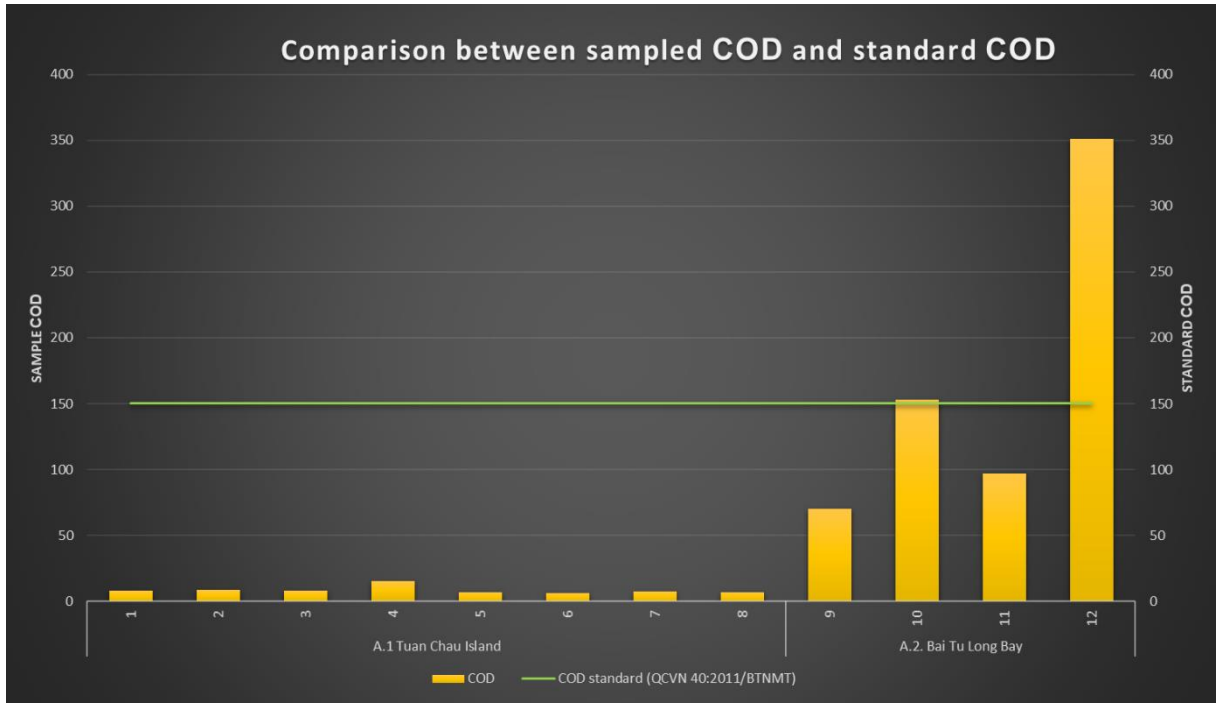
Bai Tu Long unit is most heavilty polluted among 7 unit: the source of pollution is very broad inclduing marine boat, fishing boat, tourist boat, acquaculture and human activity

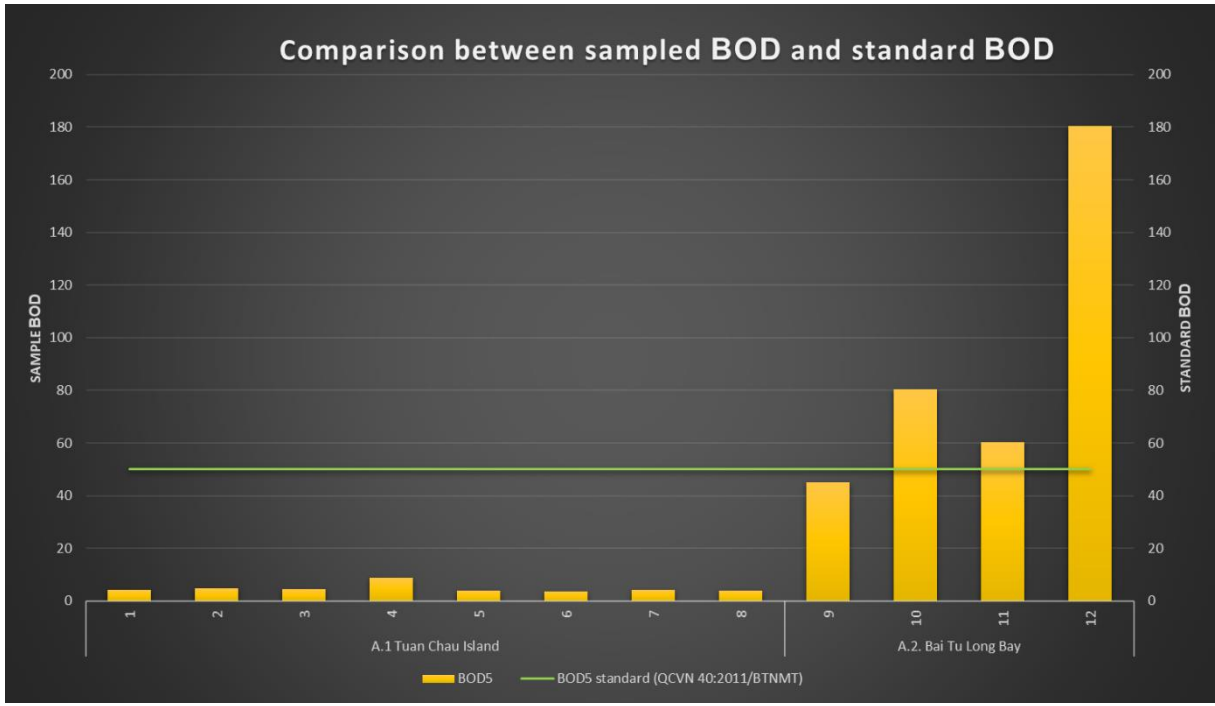
2 small island (Ba Mun and Co to) that include a marine protected area is heavily polluted by human activity.

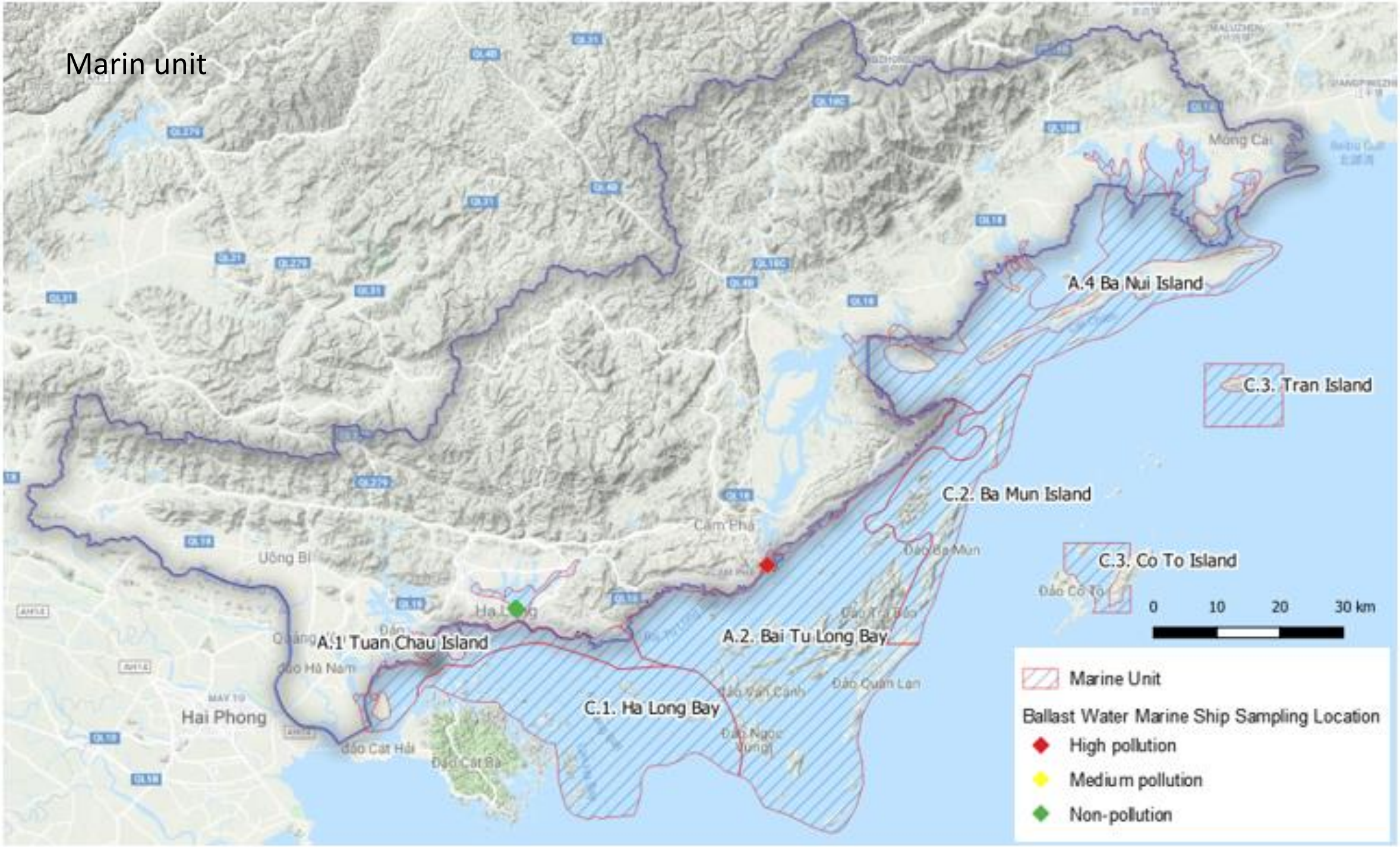
Example: Ballast water from marine ship

Marine Unit	Rank pollution	Count of sample
A.1 Tuan Chau Island	Non-pollution	8
A.2. Bai Tu Long Bay	High pollution	1
	Medium pollution	2
	Non-pollution	1
Grand Total		12

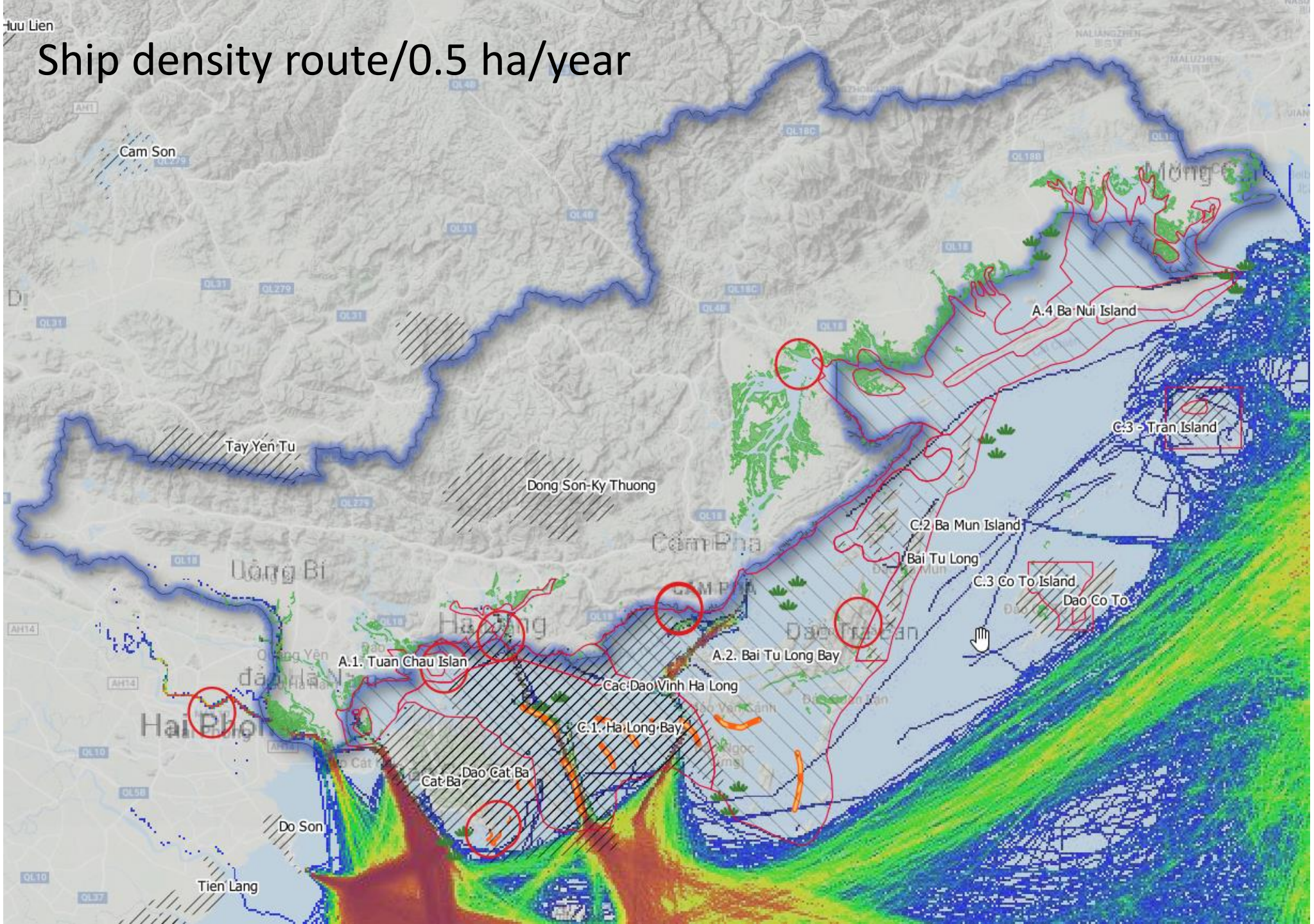


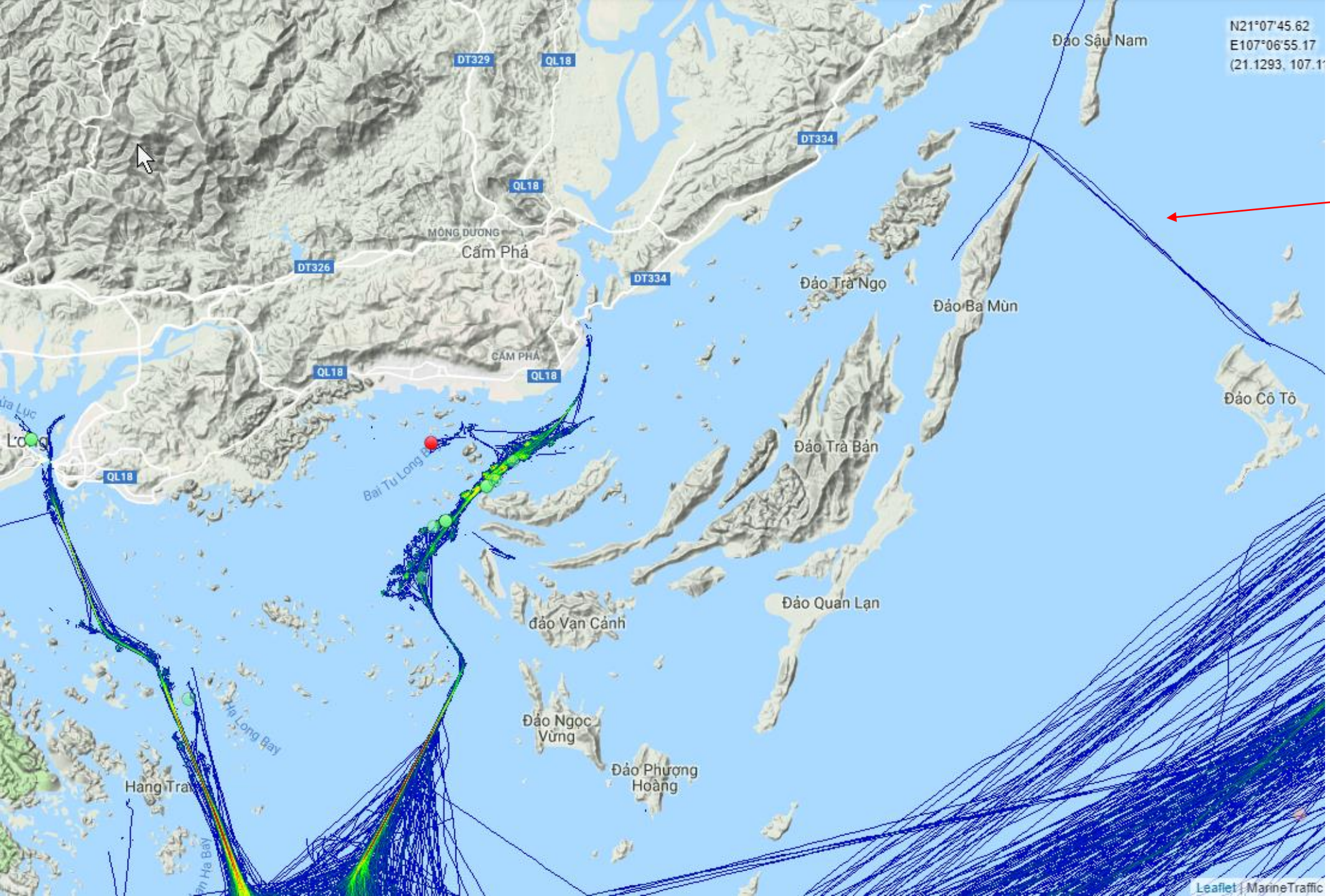





Marin unit
A.4 Ba Nui Island
C.3. Tran Island
C.2. Ba Mun Island
C.3. Co To Island
A.1 Tuan Chau Island
A.2. Bai Tu Long Bay
C.1. Ha Long Bay
Hai Phong
Cẩm Phả
Uông Bí
Móng Cái
0 10 20 30 km
Marine Unit
Ballast Water Marine Ship Sampling Location
High pollution
Medium pollution
Non-pollution

Ship density route/0.5 ha/year





New route to
Co To island

Tourism

No	Indicators	2016	2017	2018
1	The number of tourists (1000 person)	8,350	9,872	12,246
2	Total revenue (billion dong)	13,327	18,445	23,628
3	Contribution to GRDP (billion dong)	10,400	13,460	16,679
4	The number of jobs created by the aggregate impacts of QN tourism sector	128,728	170,714	198,994

Tourist expenditure 2018

	Total international tourist expenditures	Total domestic tourist expenditures	Total expenditures	Share (%)
Accommodation services	2,726	1,460	4,186	17.72
Food services	3,444	4,095	7,539	31.91
Transport services	1,333	1,268	2,601	11.01
Sightseeing services	1,354	1,392	2,746	11.62
Trade services	1,728	1,588	3,317	14.04
Entertainment services	1,300	1,065	2,365	10.01
Health services	15	9	24	0.10
Others	404	446	850	3.59
Total	12,305	11,323	23,628	100.00

Effect of tourism on Quang Ninh VA in 2018- Unit billion VND

	Total effect of tourism on VA	Direct effect of tourism on VA	Indirect effect of tourism on VA	GRDP in 2018
Accommodation services	3204	2218	986	
Food services	3485	2452	1034	
Transport services	2191	1110	1080	
Sightseeing services	1424	921	503	
Trade services	1203	314	889	
Entertainment services	1894	1146	748	
Health services	248	6	242	
Others	1219	797	422	
Total	14,868	8,964	5,904	
Share of GRDP	9,77%	5,89%	3,88%	152,250

Effect of tourism on Quang Ninh GRDP in 2018

	Total contribution	Direct contribution	Indirect contribution	GRDP estimate in 2018
Effect of tourism on VA (Billion dong)	14,868	8,964	5,904	
Product taxes (Billion dong)	1,811	1,092	719	
Effect of tourism on GRDP (Billion dong)	16,679	10,055	6,624	152,250
Share of GRDP (%)	10,96%	6,61%	4,35 %	

Pollutant discharge from tourists in Quang Ninh province

No	Indicators	Pollution load (kg/person/year)	Treatment efficiency (%)	
			Primary sedimentation	Biological treatment
1.	COD	20-55	10-20	30-60
2.	BOD_5	10-25	10-30	50-80
3.	T_N	4.0	20-40	20-50
4.	T_P	0.5-1.1	10-20	10-30
5.	$NO_3 + NO_2$*	0.04	20-40	20-50
6.	NH_4*	2.2	20-40	20-50
7.	PO_4*	0.27-0.594	10-20	10-30
8.	TSS	20-30	50-70	70-95

Value transfer: Unit of domestic waste load in according to UNEP, 1984 and calculated of San Deigo-McGlone et al., 2000

Pollutant discharge from tourists in Quang Ninh province

No	Indicator	Waste discharge from tourists (ton / year)		
		2016	2017	2018
1	COD	1062.4	1071	1585.3
2	BOD_5	531.197	1071	1585.3
3	T_N	188.870	535.522	792.635
4	T_P	26.560	190.408	281.826
5	$NO_3 + NO_2$*	1.889	26.776	39.632
6	NH_4*	103.879	1.904	2.818

Main challenges and needs

- Data from different sources
- Institutional (MONRE, MARD, MPI)
- Technical capacity (GIS, methodology)
- Study conducted in short time (6 months)

Next step

- Finalize the study results
- Communicate to key target audiences (i.e. government, business, community, etc.)
- Use the account to inform policy makers