

ICM to CMSP : Toward more Resilient and Sustainable Society in Korea

First Expert Meeting of the Working Group on Marine
Geospatial Information
March 7, 2019
Grand Hotel, Busan, Korea

Jungho NAM



Presentation Outline

Overview on

Evolution of Coastal and Marine Spatial Management

Practical Application of

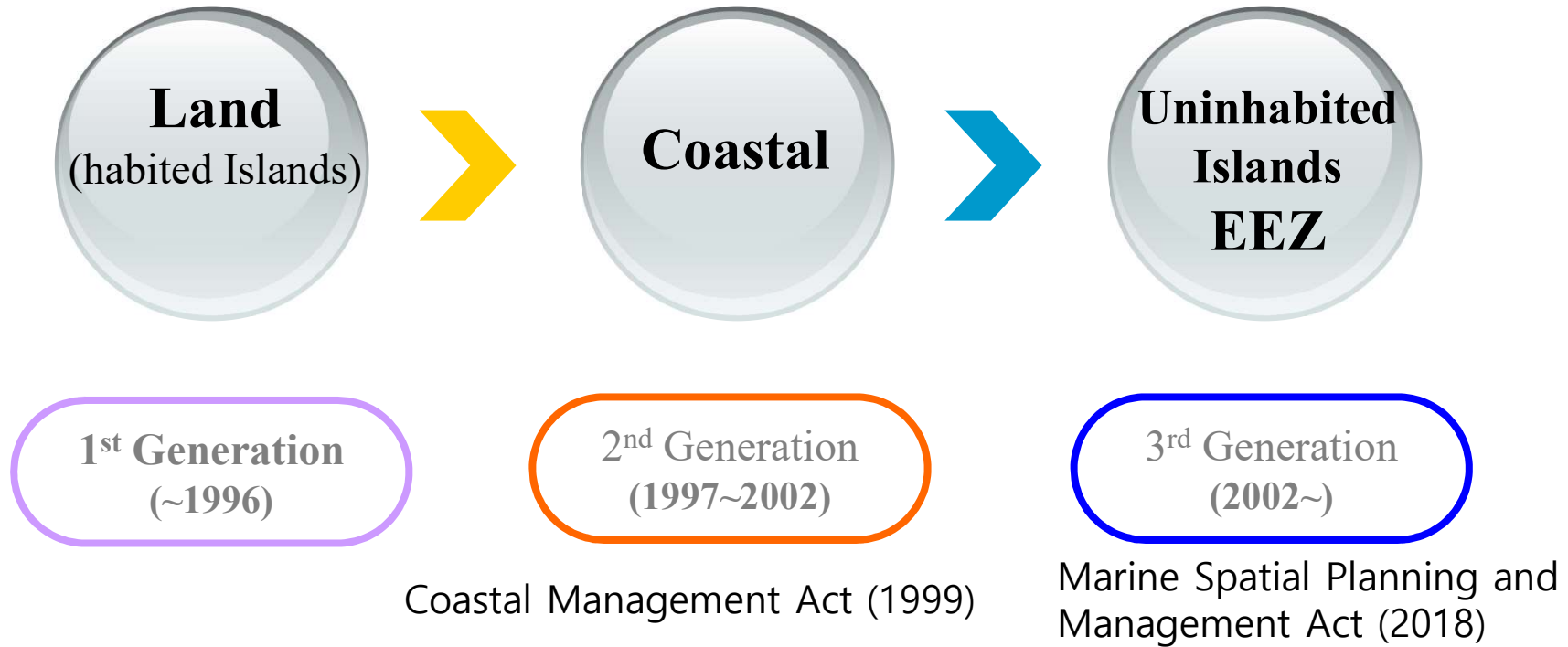
Spatial Data/Information to CMSP

Challenges :

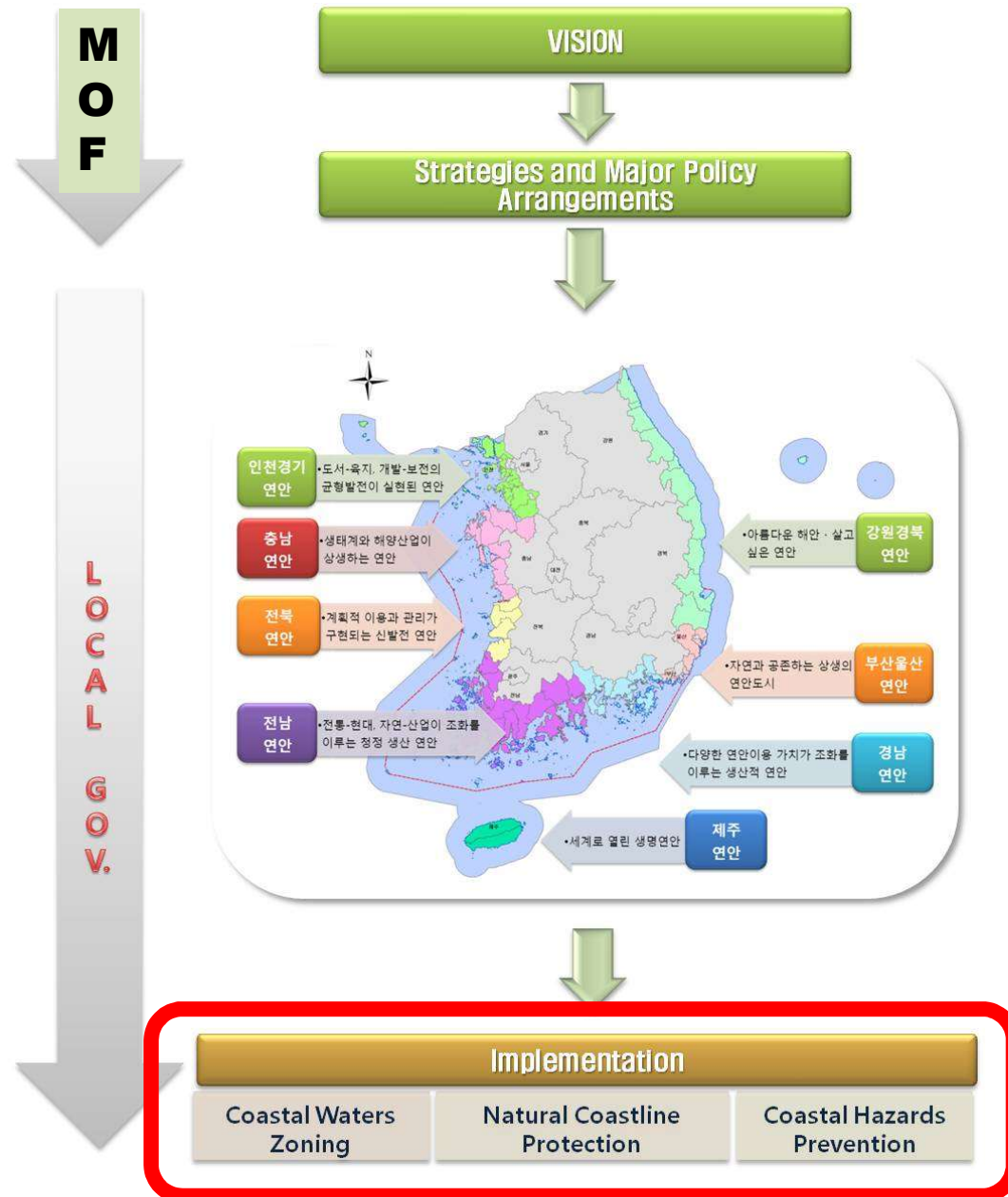
From existing data/information to ecosystem service –based planning

*Overview on
Evolution of Coastal and Marine Spatial Management*

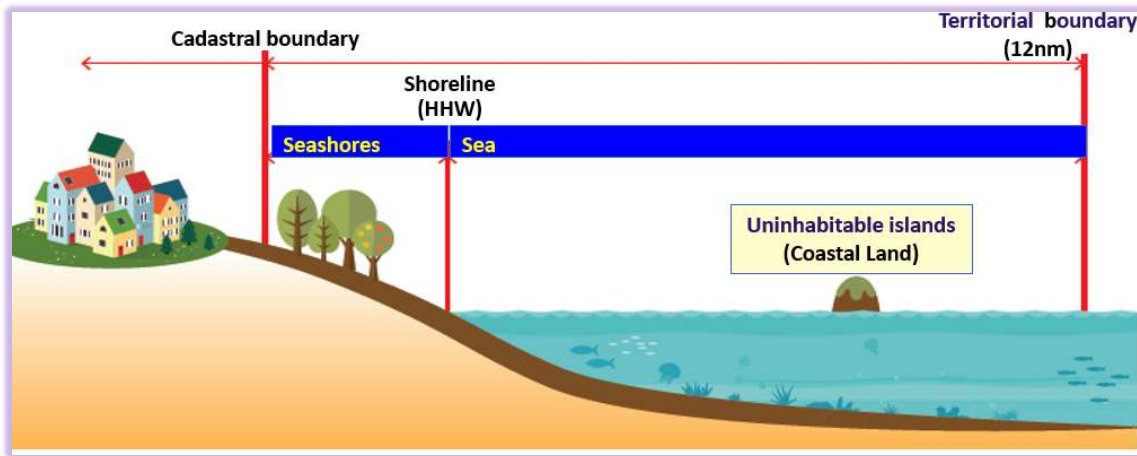
Evolution of National Spatial Management



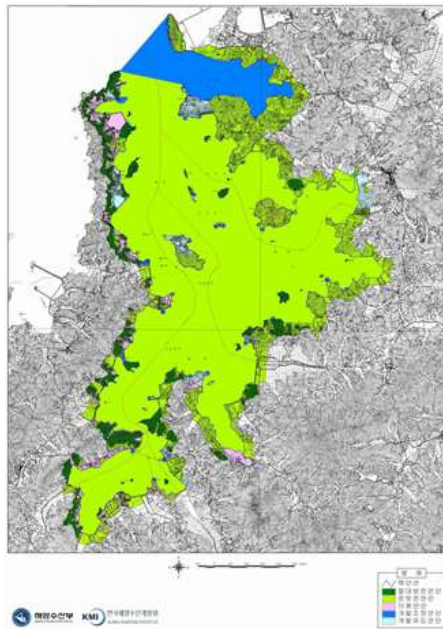
Integrated Coastal Management and Zoning Mechanism for Conflict Resolution and Better Society (1999~)



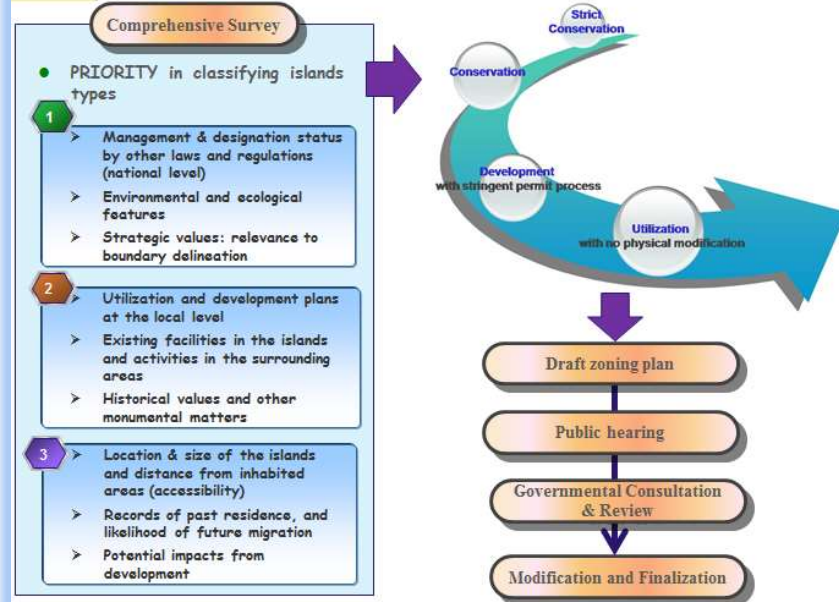
ICM Planning for Coastal Land(max.1km) and Territorial Sea Area



2001~2011 *ICM Planning with Zoning Mechanism at Local Levels*



2007 *Zoning Mechanism on Uninhabited Islands*



Coasts and Marine of Korea → COST & Matters of Korea ?

Spatial Competition and Conflicts

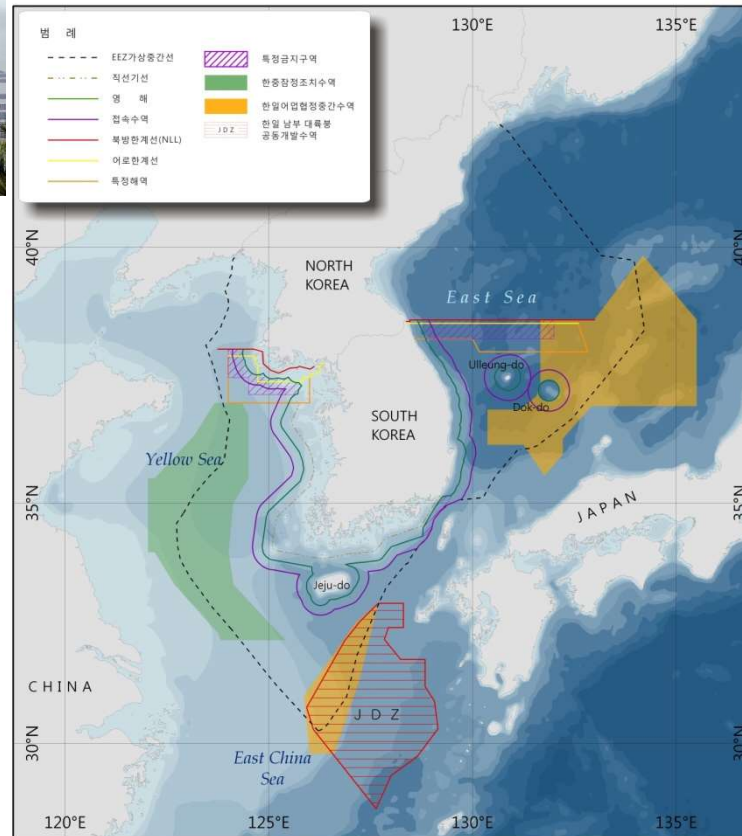
Fisheries & Aquaculture



Reclamation



Conservation



Shipping



Tourism & Recreation



Marine sand extraction



Tidal energy



Wind energy



Complicated and Less-Integrated Governance

MOF (Ocean & Fishery)

- Marine Environment Policy
- Marine & Coastal Planning/Mgt.
- Port development
- Logistics
- Tourism
- Marine R&D
- Fisheries

MOE (Environment)

- National Env. Policy
- National parks
- Waste treatment facilities
- Terrestrial Environment Protection

MAFRA (Agriculture)

- Agriculture
- Food
- Forestry
- Rural affairs

MOTIE (Trade and Industry)

- Industry
- Energy
- Minerals and Resources
- Trade

MOLIT (Land, Transportation)

- Land use / Urban Planning & Management
- Infrastructure
- Transport

Kor. Coast Guard

- Public Safety (Oil spill)
- Security

MCST

- Culture (cultural and natural heritage)
- Sports
- Tourism

complex

Paradigm Shift from ICM to the MES-based CMSP

	ICM		CMSP
Geographic Coverage	Territorial waters + coastal land	<i>Planning & Management for EEZ</i>	Territorial waters + EEZ
Zoning scheme	Two-tiered zoning scheme (4 uses zones and 19 sub-functional districts) <i>Complicated, less applicable to Korea</i>	<i>Applicability</i>	One-Tier Zoning scheme (9 zones) <i>Optimized to Korea</i>
Data and Information	Less than 20 data/information Coastal Water Suitability Assessment	<i>Data/Information Availability</i>	More than 50 data/information Marine Spatial Assessment
Conflict Resolution	Less dependent on evidence	<i>Efficient and rational Resolution</i>	Evidence-based approach Conflict analysis by Trade-off and Scenario analysis
Enforcement-supporting Tools	Permission, EIA, SEA, Licensing etc <i>of planned/fix activities under other ministries (no authority to cancel or actively review)</i>	<i>Implementation Effectiveness</i>	Marine Spatial Suitability Review before decision-making of other ministries Permission, EIA, SEA, Licensing etc

Zoning Scheme of Korea's Marine Spatial Planning



- Fisheries
- Mining and extraction
- Energy development
- Marine tourism
- Environment and ecosystem management
- Research and education
- Harbor and navigation
- Military activity area
- Safety management

*Practical Application of
Spatial Data/Information to CMSP*

Marine Spatial Information Agencies

KOEM

(Environment management)

Marine env. monitoring
Marine ecosystem survey
Marine env. Information System

NIFS (Fisheries Research)

Fishing grounds environment monitoring
Off-shore marine environment monitoring (limited)

KIOST (Ocean Research)

Research and Development for marine management

NFFC (Fisheries Cooperatives)

Geo-positioning based fishing catches
Tracking data on fishing vessels

MABIK

(Biodiversity conservation)

Survey, storage & exhibition for protection of marine biodiversity

KHOA

Ocean hydrographic survey

KMI (policy research)

Socio-economic data/information on marine uses

Ocean information Category for MSP

Basic data

Environment
Ecosystem

Topography

Mineral resource

Habitats & Species

Use

Fisheries

Aquaculture

Port and shipping

Tourism

Energy facility

Sand extraction

Military activities

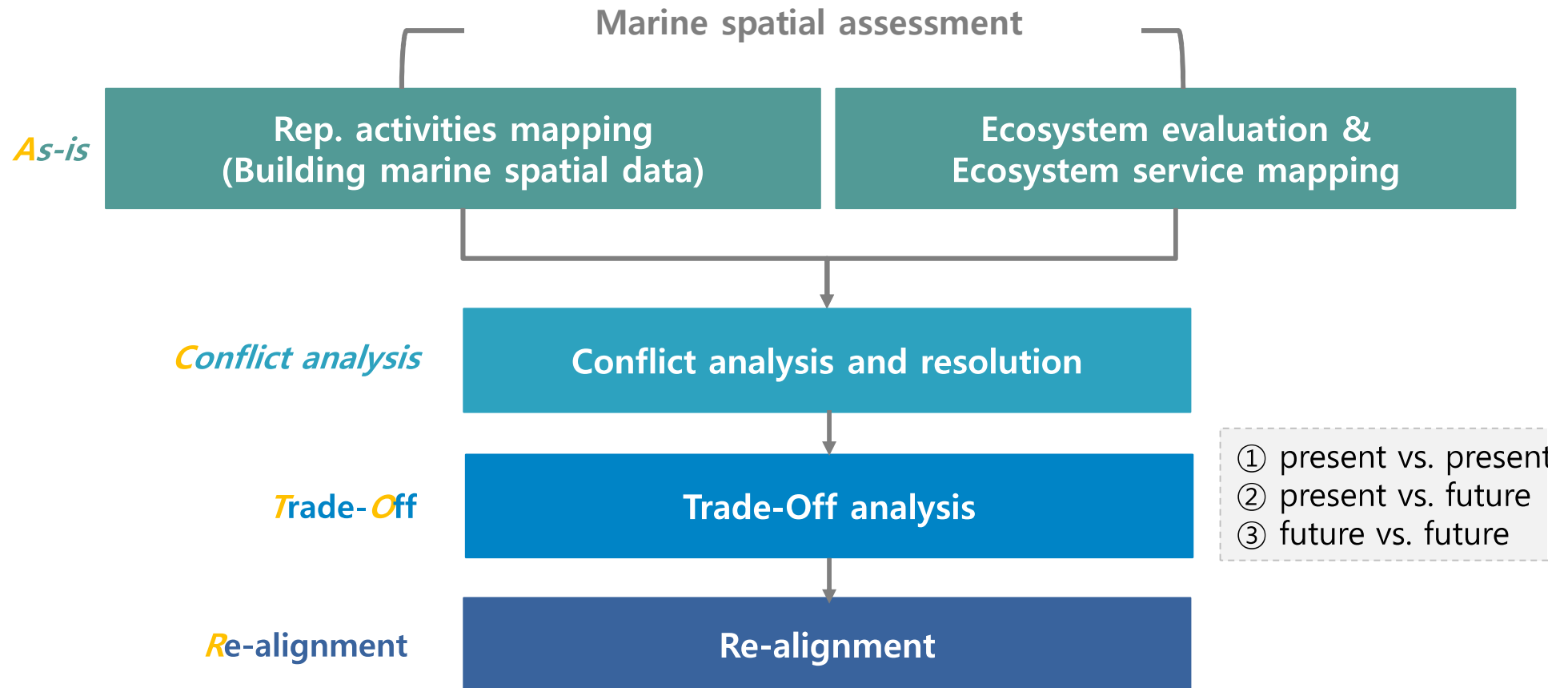
Management

Consultation on sea
area utilization

Public water use &
occupation

Legally binding zone

Evidence-based Decision Making : ACTOR



Step 1 : Setting up of Policy Objectives

Conflicts resolution, Environmental Protection, pollution prevention, Production Increase, Income Increase etc.

Spatial Allocation with Harmonization among Uses

Step 2 : Identification of Existing Data & Information

Availability Diagnosis and Gap Analysis

Identification of Data/Info Type (shp, papers, documents etc)

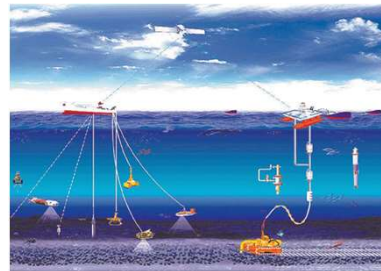
Step 3 : Collection of Objectives relevant Data & Info.

Step 4 : Spatial Analysis of the Data and Information

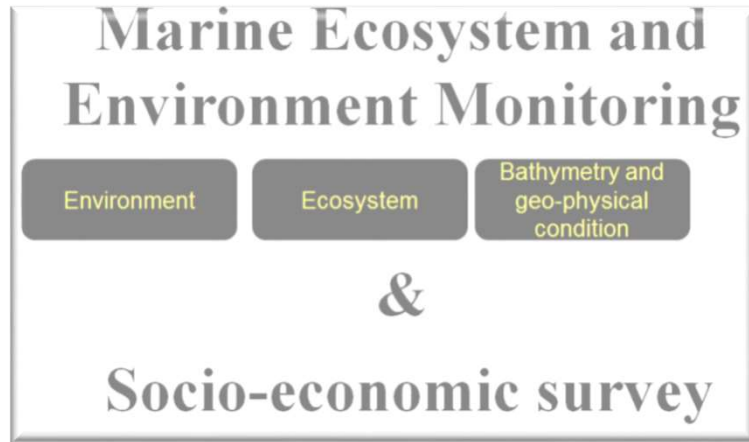
Step 5 : Mapping of draft Output for Decision-Making

Step 1 : Setting up of Policy Objectives

Identification of activities/plans and their conflicts


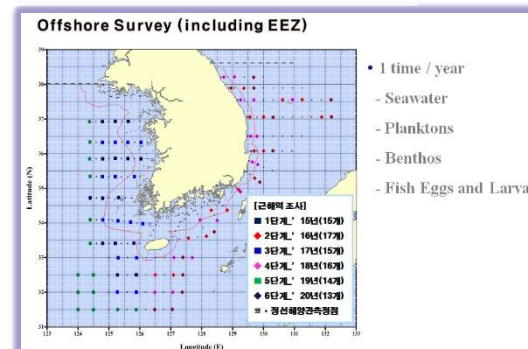
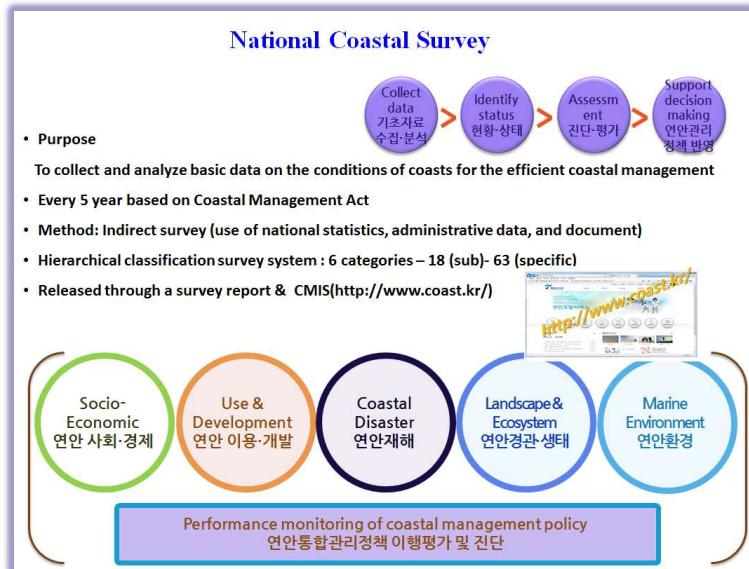
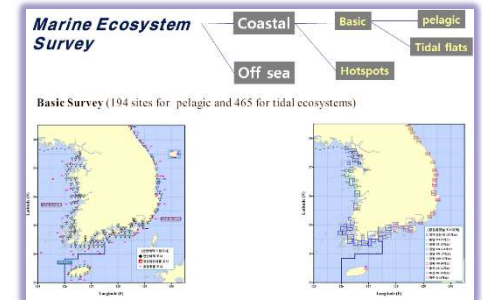
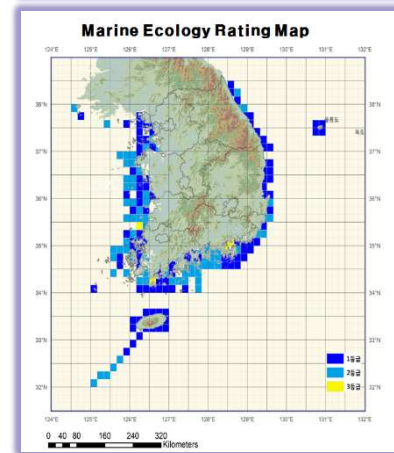


Step 2 : Identification of Existing Data & Information

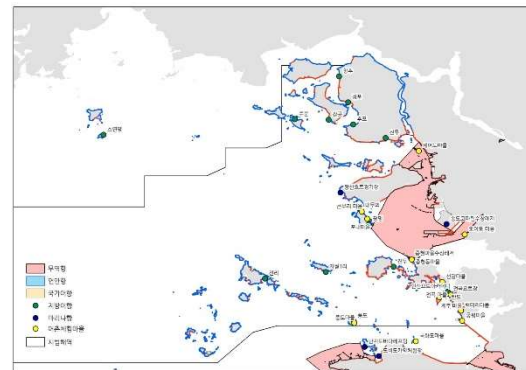
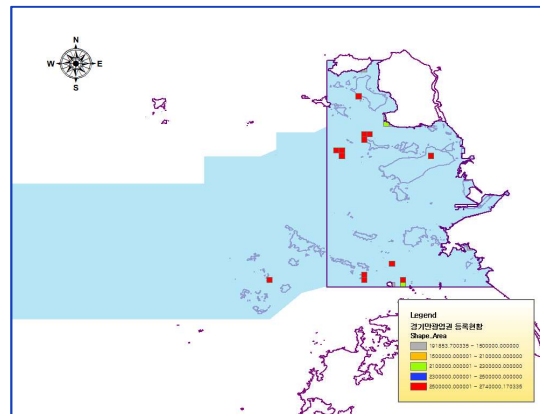
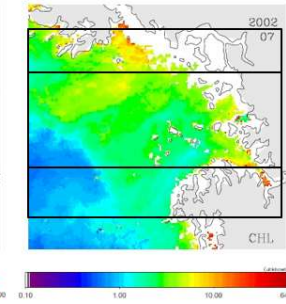
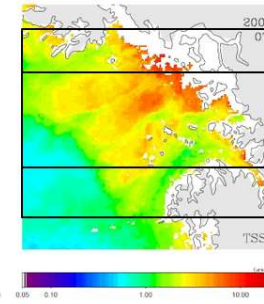
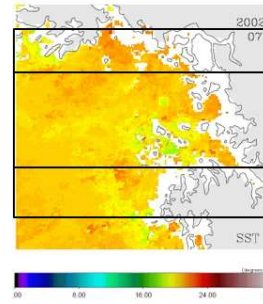
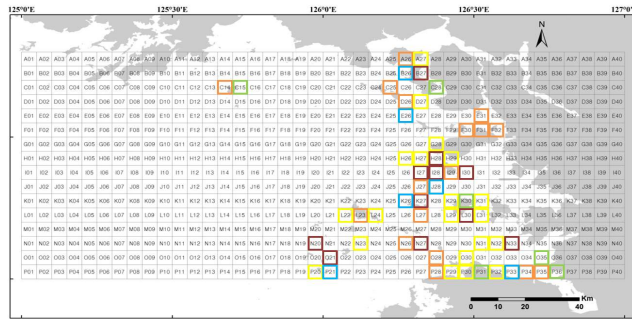


Marine Environmental Monitoring Network

Monitoring requirement	Required monitoring components
Seawater	General Items: Temp, Salinity, pH, DO, COD, TN, TP, NO ₂ -N, NO ₃ -N, NH ₄ -N, PO ₄ -P, SS, Oil & Grease, Clearness trace metal: Cu, Pb, Zn, Cd, Cr ⁶⁺ , total Hg, As, CN Organic contaminants: PCBs, TBT
Sediment	General Items: Particle size, IL, AVS, COD trace metal: Cu, Pb, Zn, Cd, Cr ⁶⁺ , total Hg, As Organic contaminants: PCBs, TBT, Pesticides, PAHs, PCDDs/DFs
Organism	General Items: CHI a trace metal: Cu, Pb, Zn, Cd, Cr ⁶⁺ , total Hg, As Organic contaminants: PCBs, TBT, Pesticides, PAHs, PCDDs/DFs

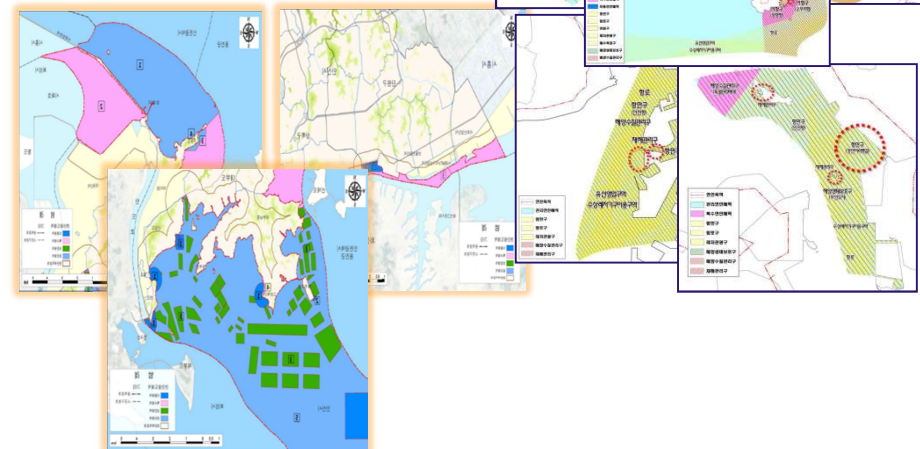
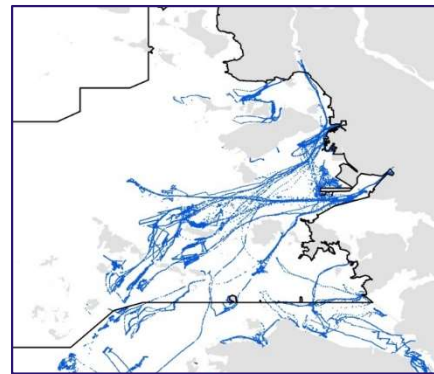
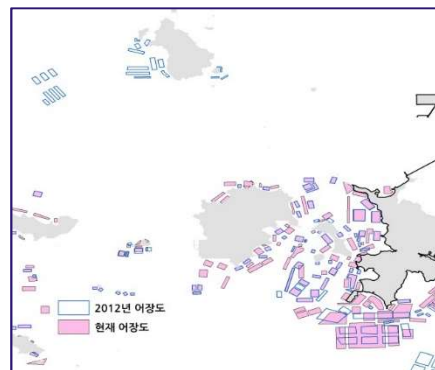



Step 2 : Identification of Existing Data & Information



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xy.csv - 메모장
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A: 8, longitude, latitude E, F, G
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35100019,2.01401E+16,126.1334983,36.68133333,0.12,511
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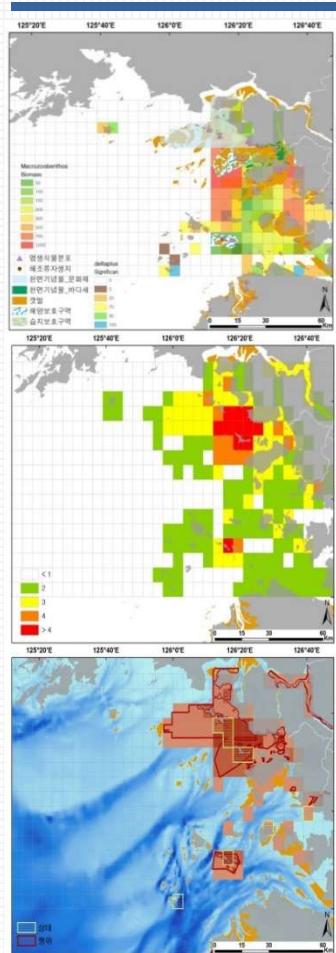
Step 2 : Identification of Existing Data & Information

Class.		Core Data & Information(>50)	Ancillary Data & Information(>20)
Basic Spatial Information		해양지명, EEZ(표기한계), 영해선, 연도교, 연육교. 퇴적상	
Environment & Ecosystem	Geography & Environmental Features	수심, 해안선, 유인도서, 무인도서, 갯벌, WQI, 퇴적물 중금속	영양염(COD), 빈산소수괴, 부유토사, 적조발생, 해파리 발생, 용존산소(저층), 해수특성(해류)
	Mineral Resources	광물자원분포, 에너지자원 분포	
	Habitats & Living organisms	어종분포도, 클로로필, 해양저서생물 (종다양성-delta+, 생물량), 염생식물, 해조류(미역 및 다시마) 자생지	해양생태도
Ocean uses and Infrastructure	Fisheries	연근해 어획정보, 조업 집중구역	인공어초, 바다숲
	Maricultures	양식어업권, 마을어업권, 정치망어업권	
	Ports	무역항, 연안항, 항로, 국가어항, 지방어항, 마리나항만	객선 통항 흐름도, 준설해역, 어선 통항
	Tourism	어촌체험마을, 관광자원 (물범, 바닷새, 경관, 갯바위 낚시 포인트, 해수욕장 등)	
	Energy	에너지 자원, 조력발전시설, 해상풍력시설, 화력발전시설, 수중케이블	해월전선
	Dredging	바다골재채취예정지, 바다골재채취허가, 광업권	
	Military	해상훈련 및 사격구역	
Spatial Management including permission, licensing, MPAs etc	Environmental assessment	용도, 기간	
	Public waters : occupation & Uses	용도, 기간	
	MPAs etc	특별관리해역, 습지보호지역, 해양보호구역, 천연기념물	폐기물 배출 해역, 특정금지구역, 법정조사 측정정점 (해양환경측정망, 해양생태계기본조사 등)
	Coastal Zoning	연안관리지역계획(1차 및 2차)	
	Uninhabited Islands Classification	무인도서 관리유형	
	Fisher management	어로한계선, 조업자제선 등	

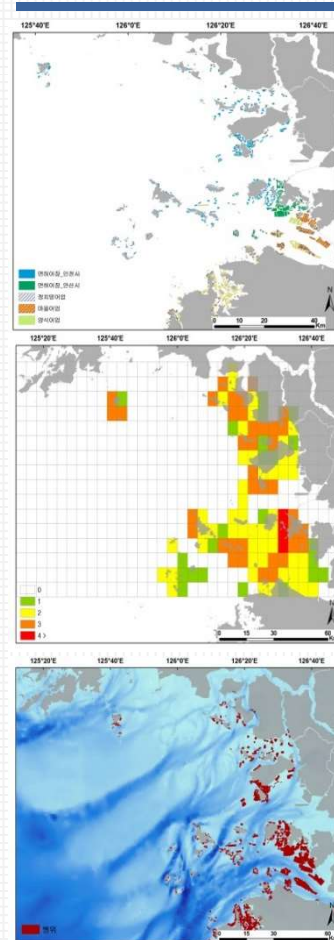
Over 200 layers

Step 3 : Collection of Objectives relevant Data & Info.

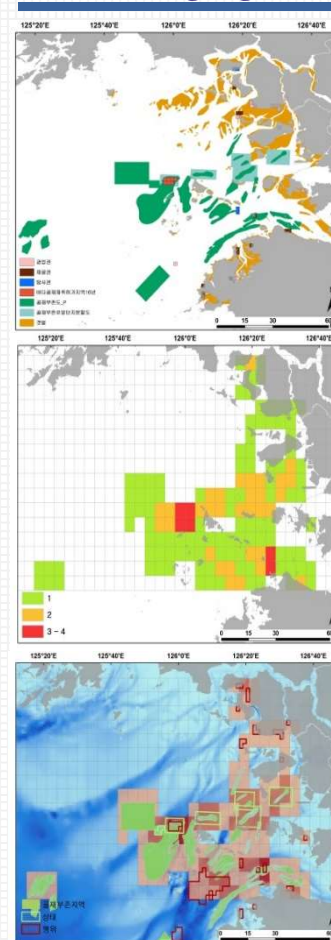
Ecosystem Protection



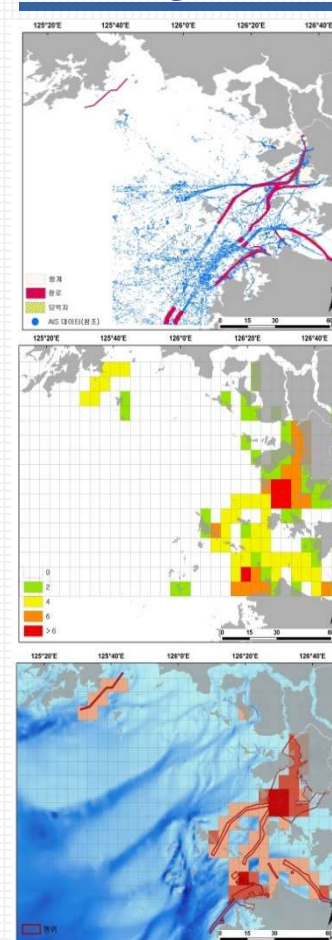
Mariculture



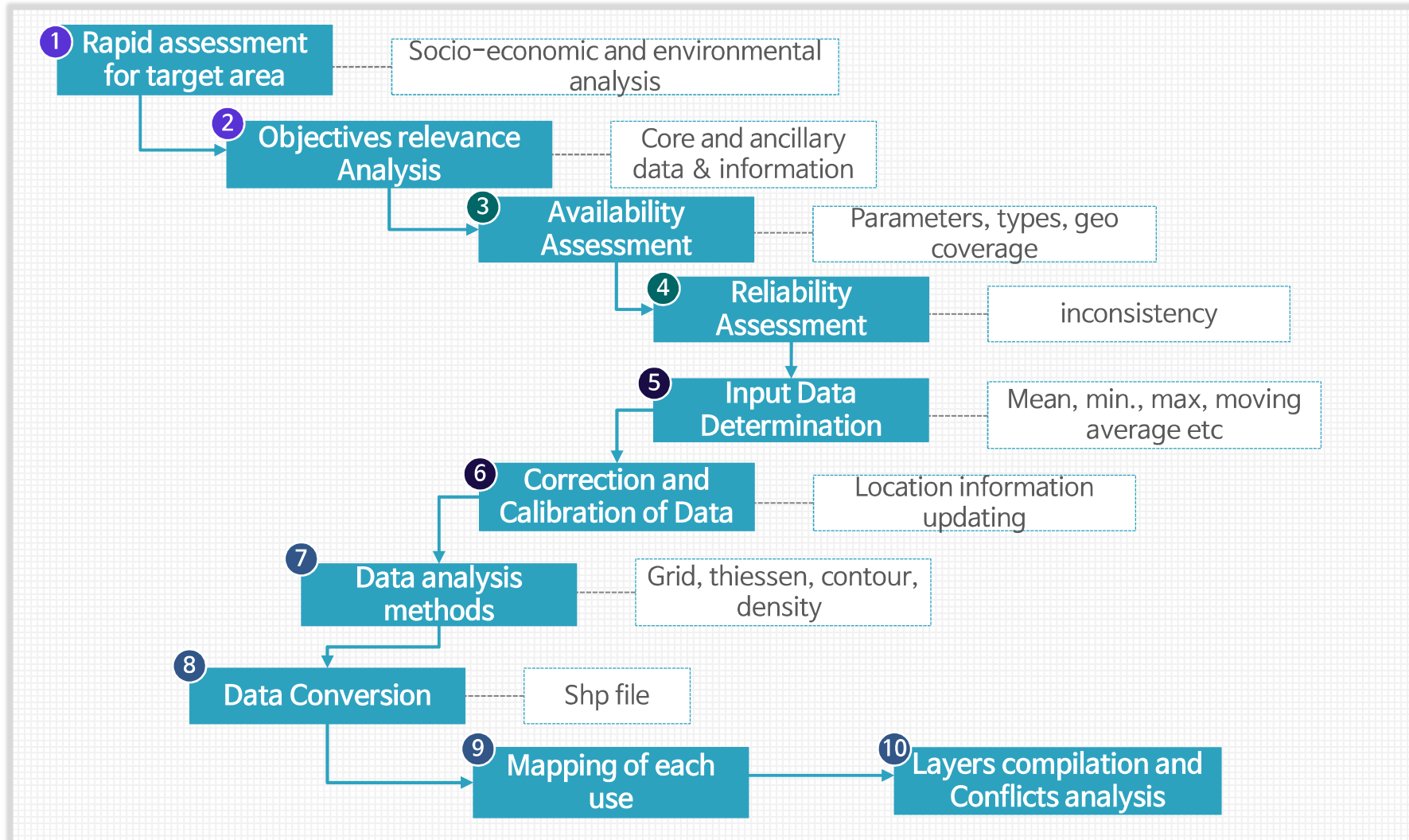
Mining and Sand dredging



Port and Navigation

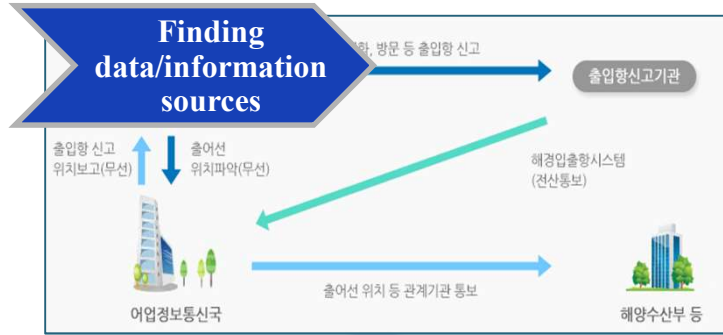


Step 4 : Spatial Analysis of the Data and Information



Step 4 : Spatial Analysis of the Data and Information

Overall process of data and information (e.g. Fishery catch)



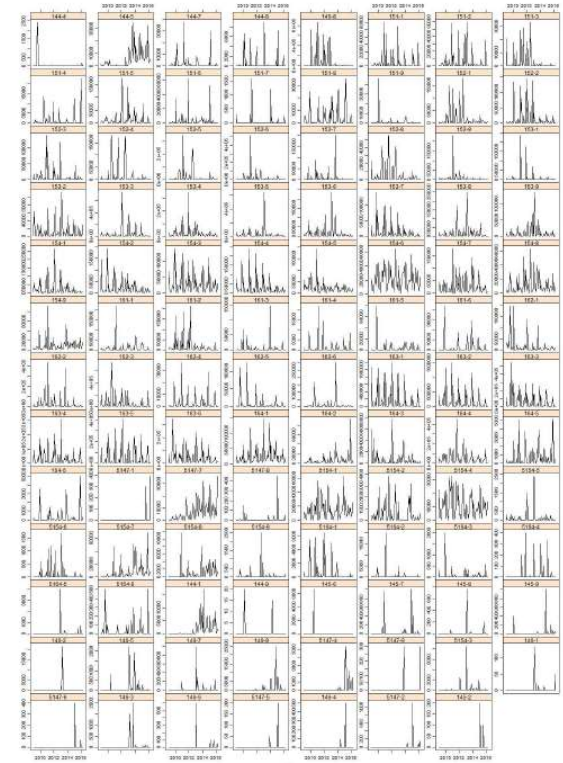
① Preparation

년	월	일	소해구	어선번호	톤수	어종	어종(13분류)	어획량	어종
134	2016	01	01	152-6	0090001-6281706	69	근해고정자망어업	50	수꽃게
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137	2016	01	01	154-3	0780001-6413900	2.6	연안자망어업	50	수꽃게
138	2016	01	01	154-3	0205001-6413906	2.74	연안자망어업	50	수꽃게
139	2016	01	01	154-3	0207002-6282008	7.93	연안개량안강망어업	50	자새우
140	2016	01	01	154-3	0780002-6413909	3.83	연안자망어업	50	알꽃게
141	2016	01	01	154-3	0780002-6413909	3.83	연안자망어업	50	알꽃게
142	2016	01	01	154-3	0304001-6282003	6.11	연안자망어업	50	수꽃게
143	2016	01	01	154-3	0205001-6413906	2.74	연안자망어업	50	알꽃게
144	2016	01	01	154-4	0203010-6287207	7.93	연안자망어업	50	알꽃게
145	2016	01	01	154-4	0203010-6287207	7.93	연안자망어업	50	알꽃게
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148	2016	01	01	154-4	9505005-6232004	7.93	연안개량안강망어업	50	자새우
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153	2016	01	01	154-4	0305004-6468200	4.97	연안자망어업	50	알꽃게
154	2016	01	01	154-4	1508001-6415705	7.93	연안자망어업	50	알꽃게



③ Time series Analysis

Change of fishery catch (Jan. 2009~April 2016)

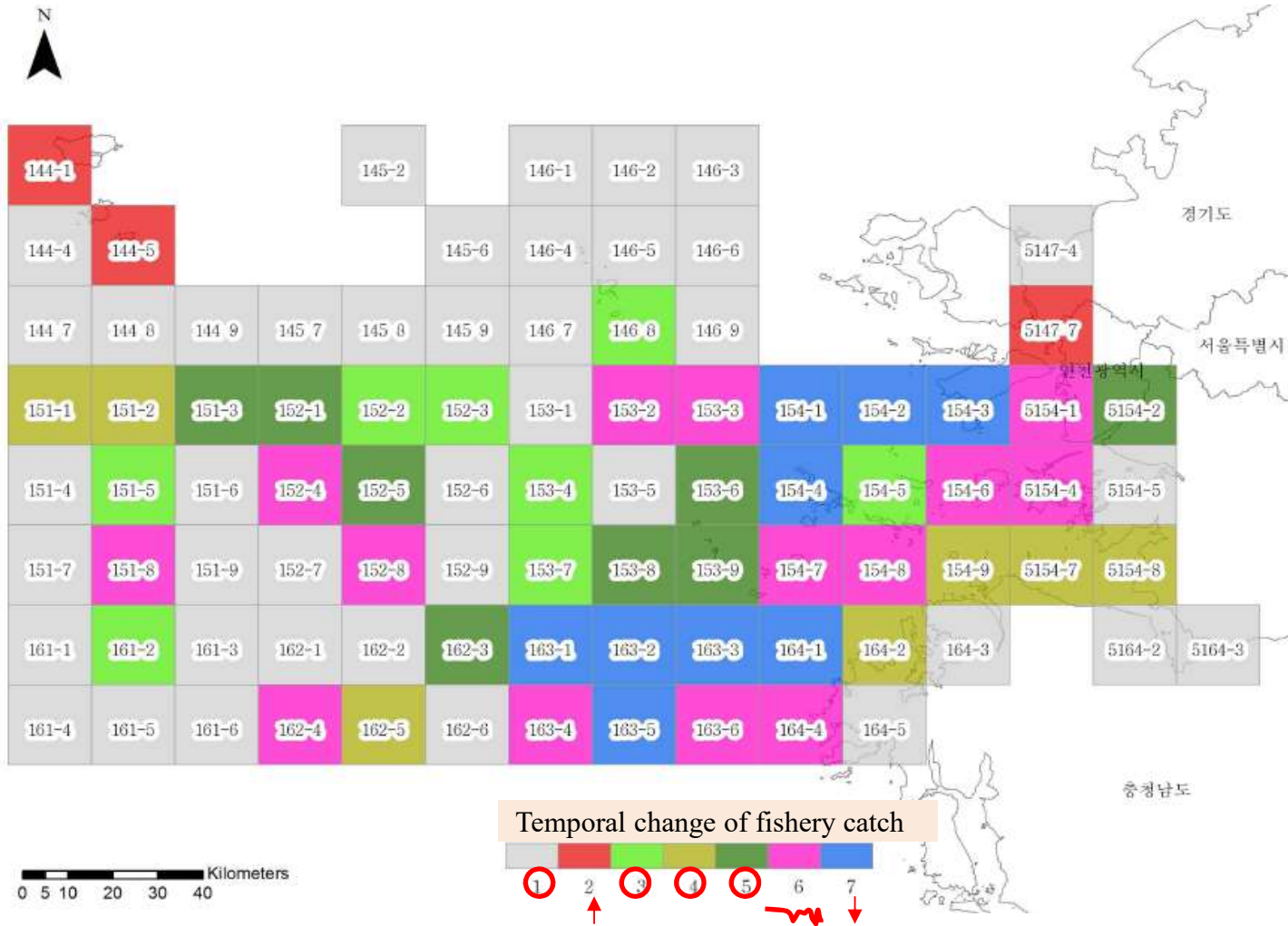


Step 4 : Spatial Analysis of the Data and Information

④ Identification of concerned area

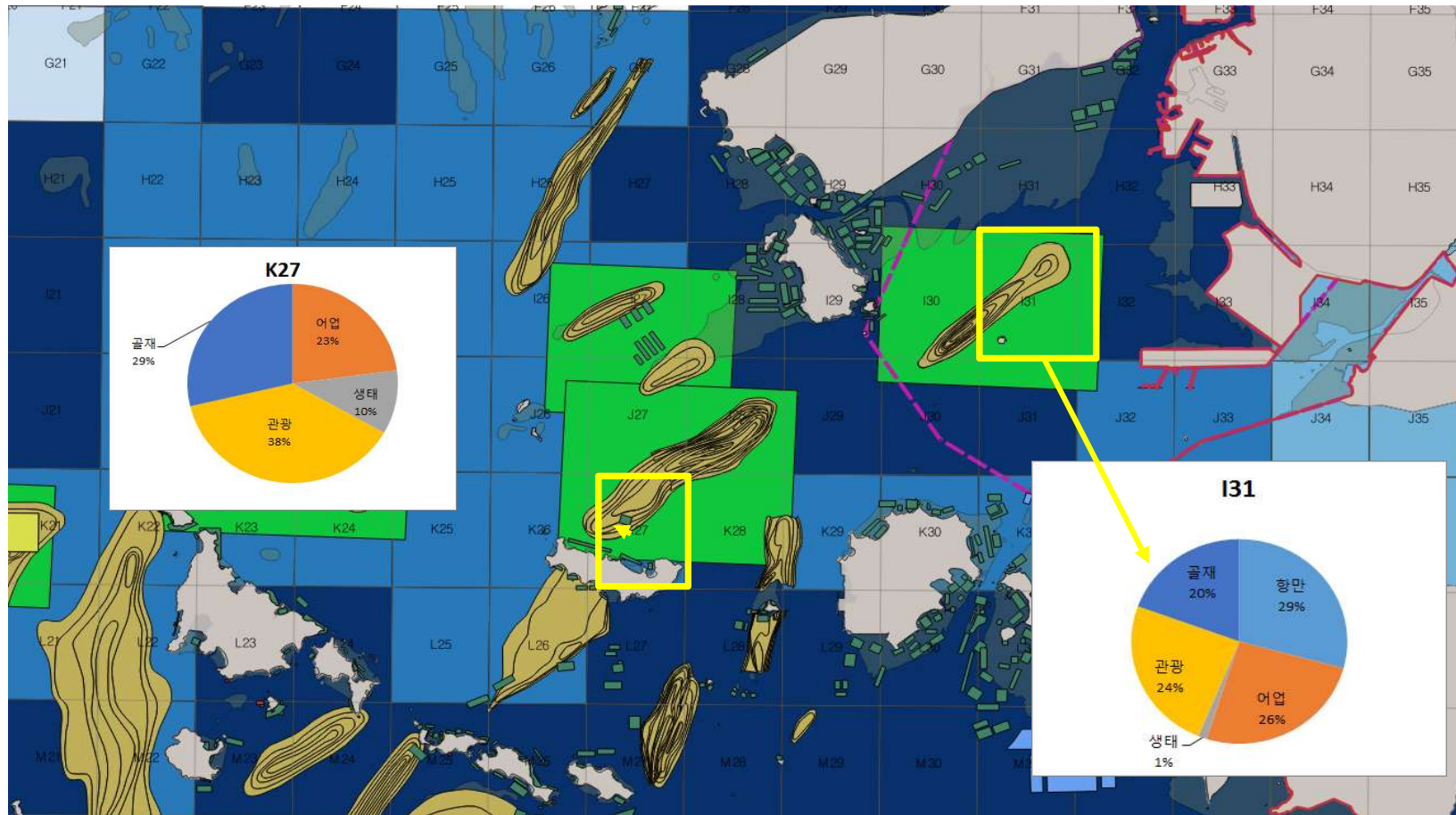
Identification of important area for Concerned activities

Basic Information for Decision

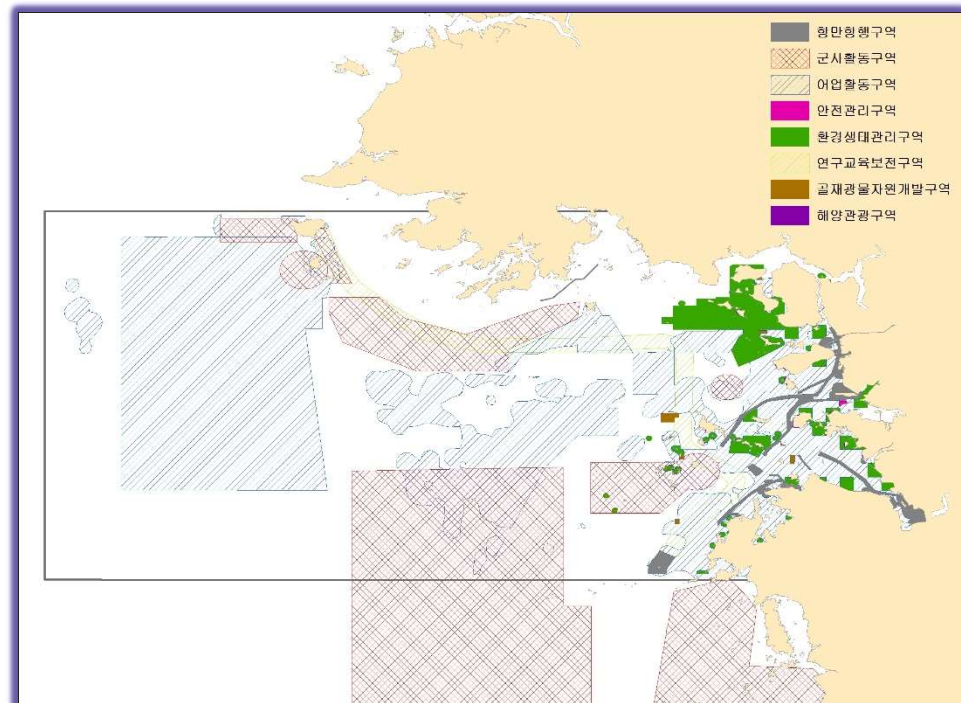
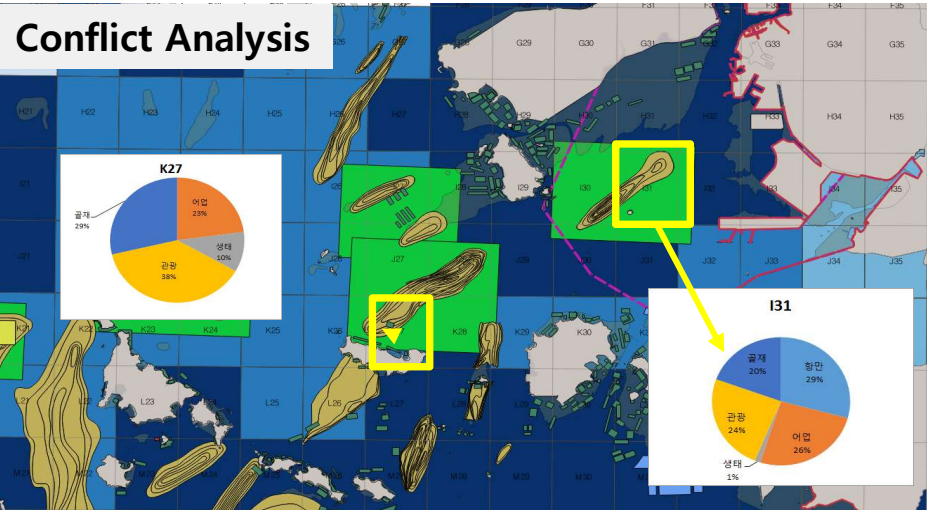
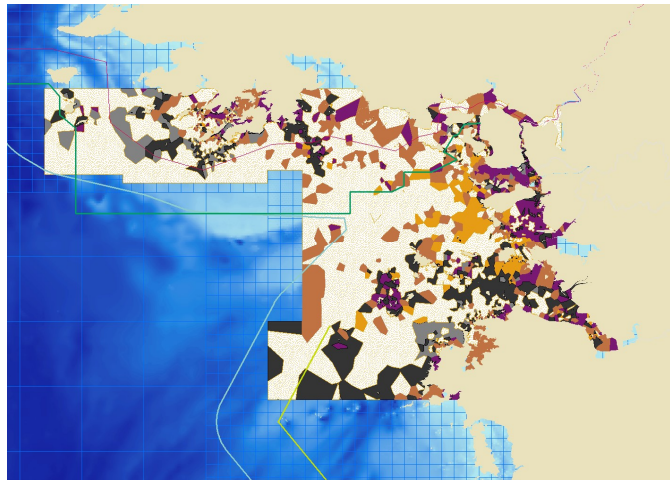
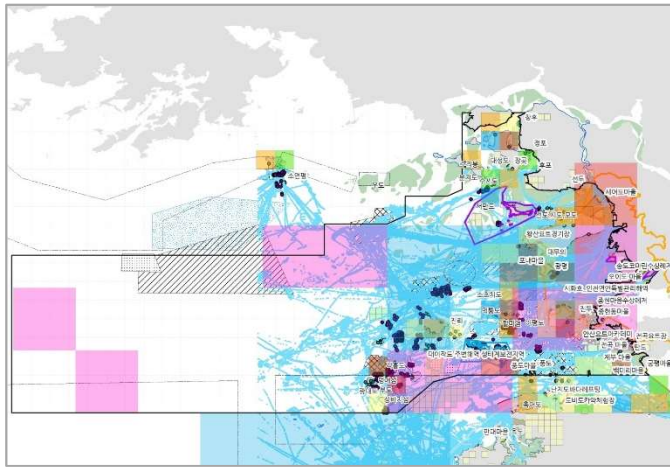


Step 4 : Spatial Analysis of the Data and Information

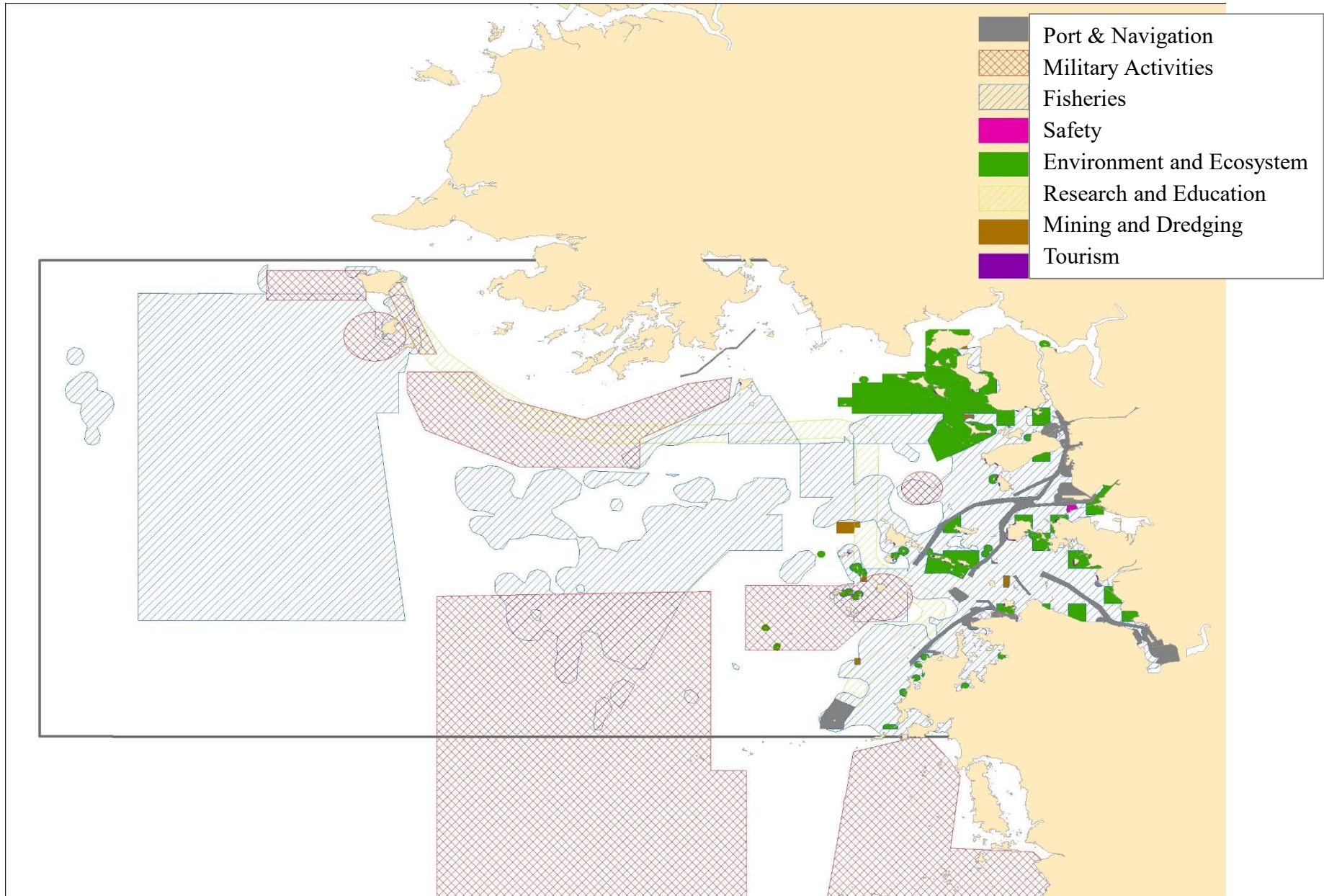
Conflicts Analysis



Step 5 : Mapping of draft Output for Decision-Making



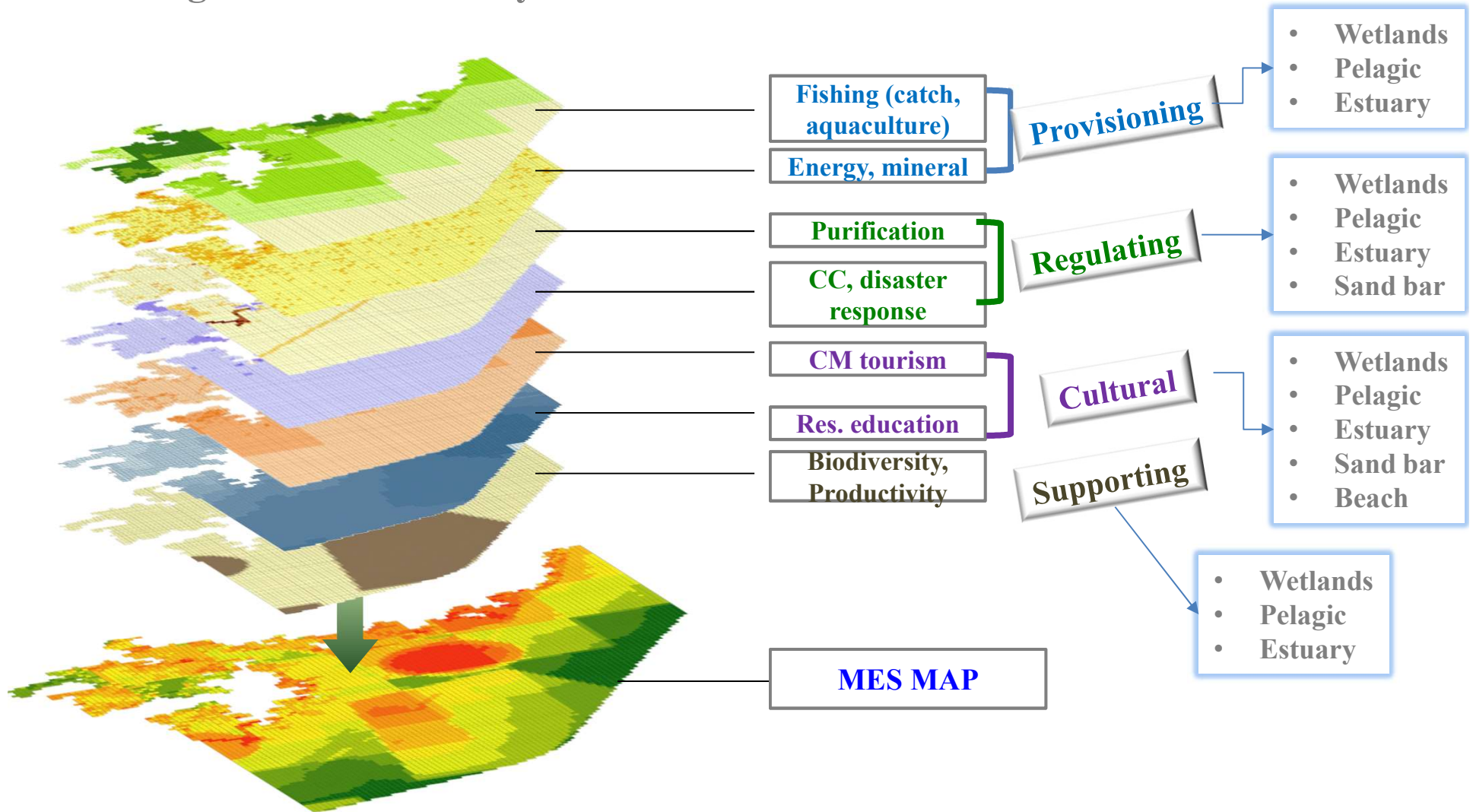
Step 5 : Mapping of draft Output for Decision-Making



Challenges :

From existing data/information to ecosystem service –based planning

Challenge for Marine Ecosystem Service based-MSP

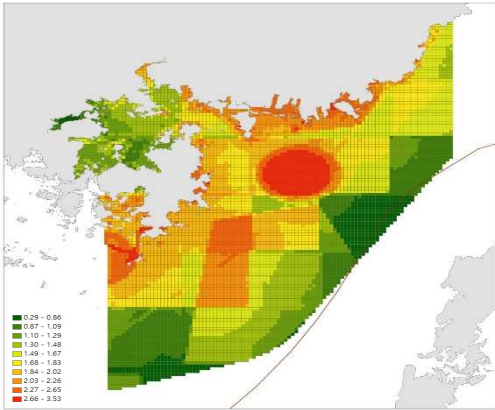


Scenario ACTOR Concept

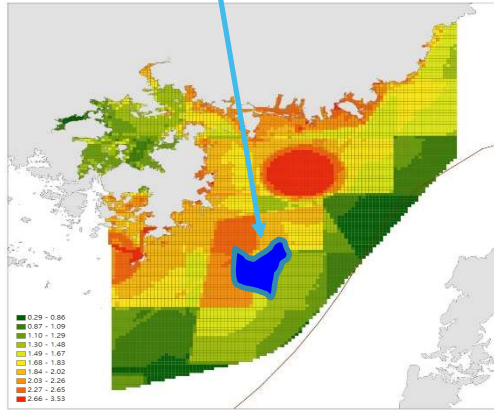
Suitability Assessment Request for

- ✓ New use and development projects
- ✓ Revision of zoning scheme

Service Map

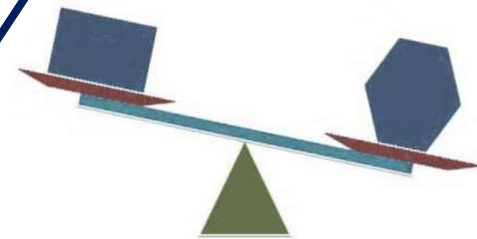


Impact Prediction



Assessment of Services and their Values

Trade Off
Benefits > Costs



Approval of the Proposal

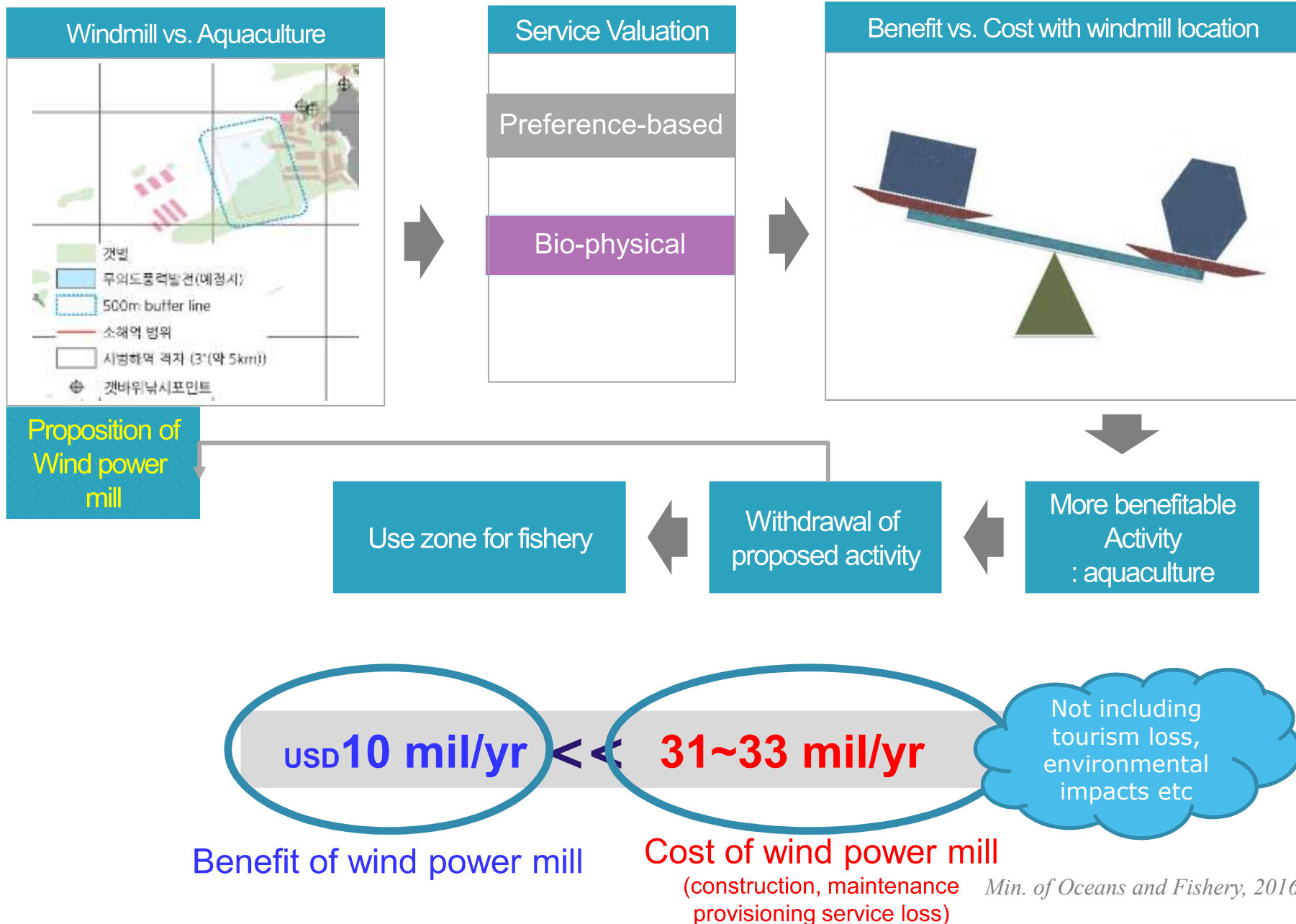
Scenario Planning for Location suggestion

Withdrawal of the Proposal

YES

NO

Ecosystem Service-based Decision-making Process



Thank you for Listening

