From individual MPAs to an integrated Network in the Russian Arctic

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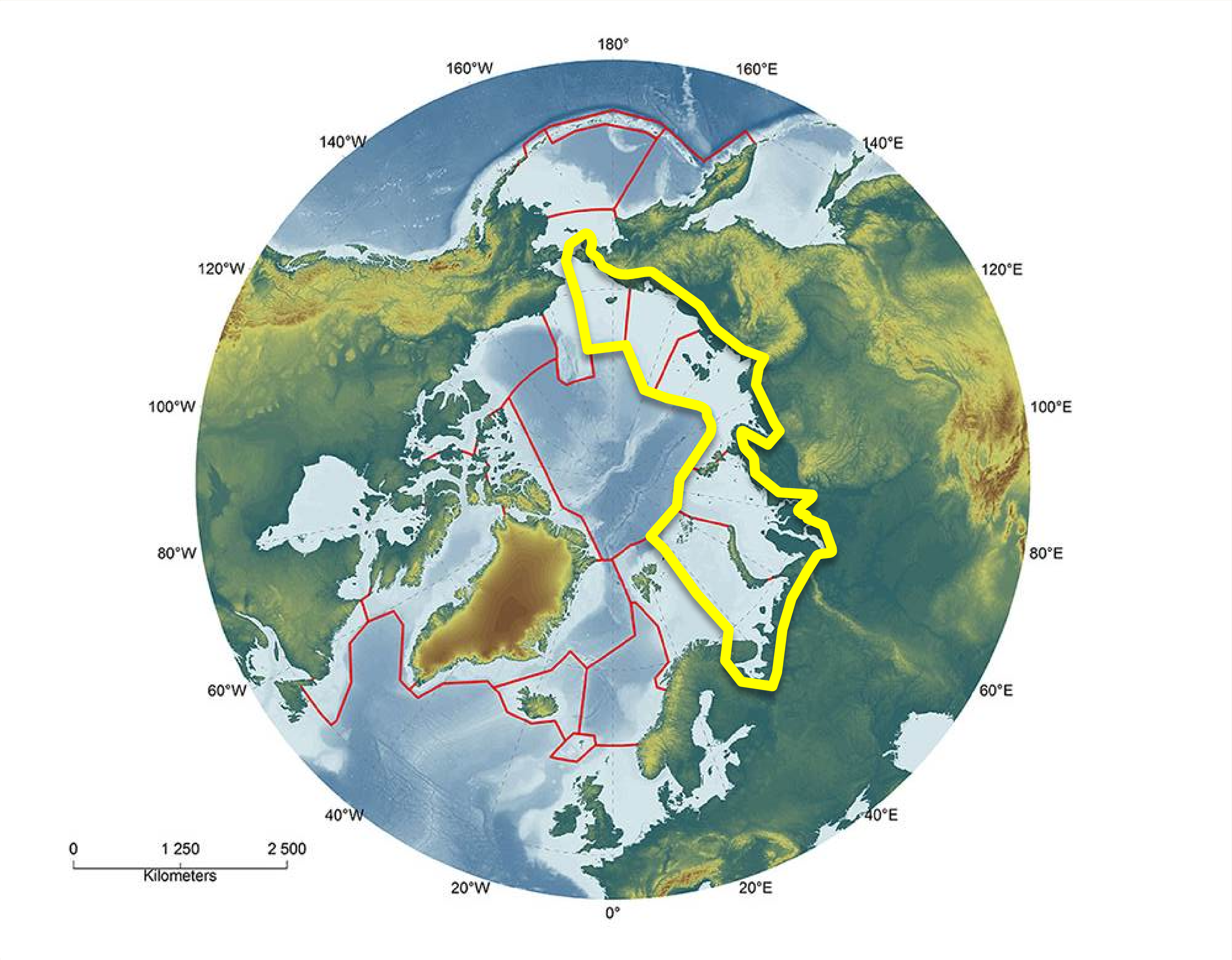
Work Area


180°
160°W
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1 250
2 500
Kilometers

Why we started the project

The Arctic Marine Protected Areas (I,II IUCN)

- 100,699 km2 of existing MPAs (size of Iceland)
- more than 100, 000 km2 of new MPAs
- ~ 5 % of EEZ/ ~35% representation

The Questions

- Do we need all this new areas?
- Is it enough?
- Is it representative?
- Is it a network or just a group of ad hoc created MPAs?
- Is it promotes resilience of biological diversity and ecological process?
- What we really want?

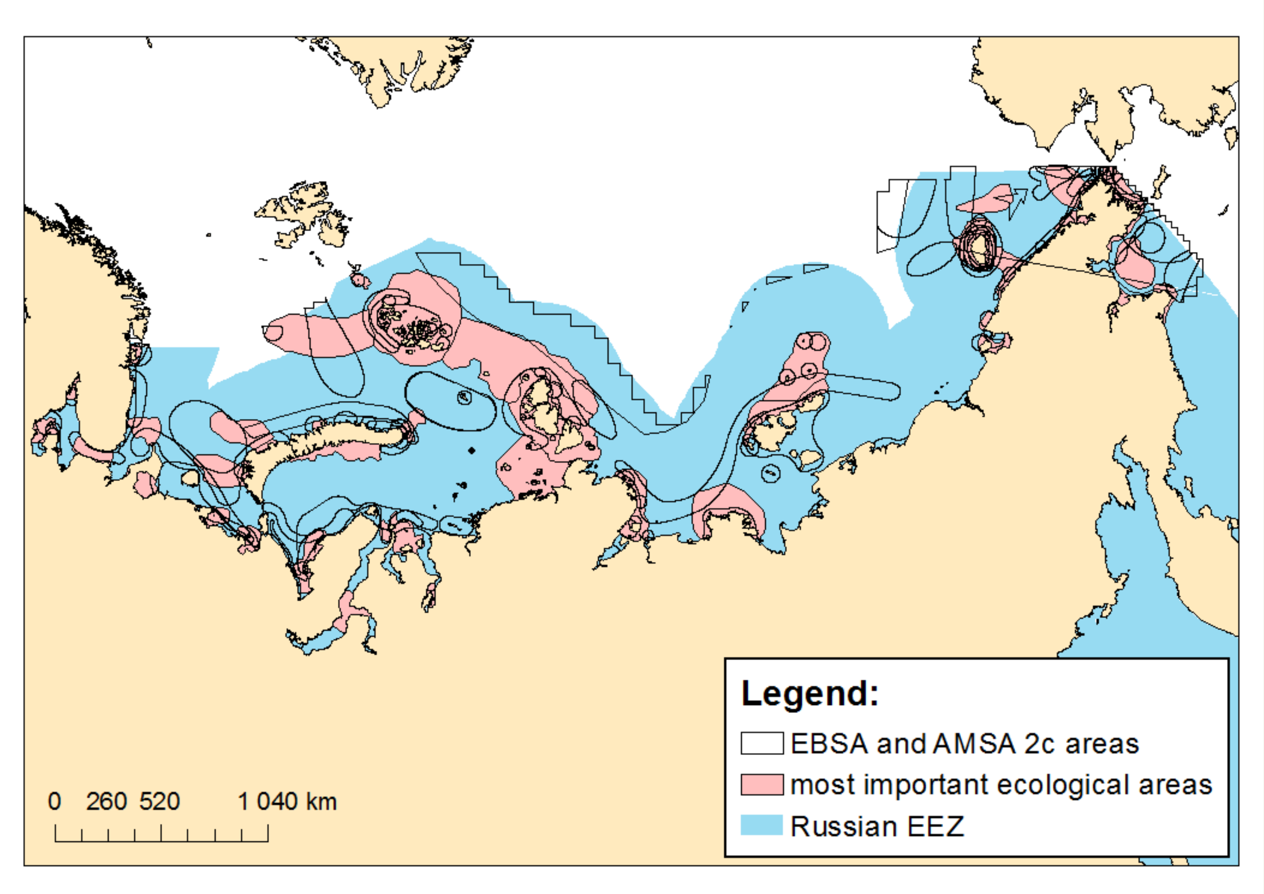
The Goal

to design
a representative, sufficient, connected,
network
of protected and specially managed areas
that protects and promotes the resilience of the biological diversity and ecological processes of the Russian Arctic marine environment

What we have

1. ~ 200,000 km2 of existing and planning federal MPAs
2. 6 Arctic Region with hundreds of their own existing and planning PAs.
3. Thousands of IBAs, important wetlands and peatlands, important marine mammals habitats, coral reefs, etc.
4. Dozens of areas recognized by different international process (EBSAS, IMO, AMSA 2c areas, no-go zones, etc.)
5. Thousands of Russian Arctic experts own ideas, etc.

1. Business as usual

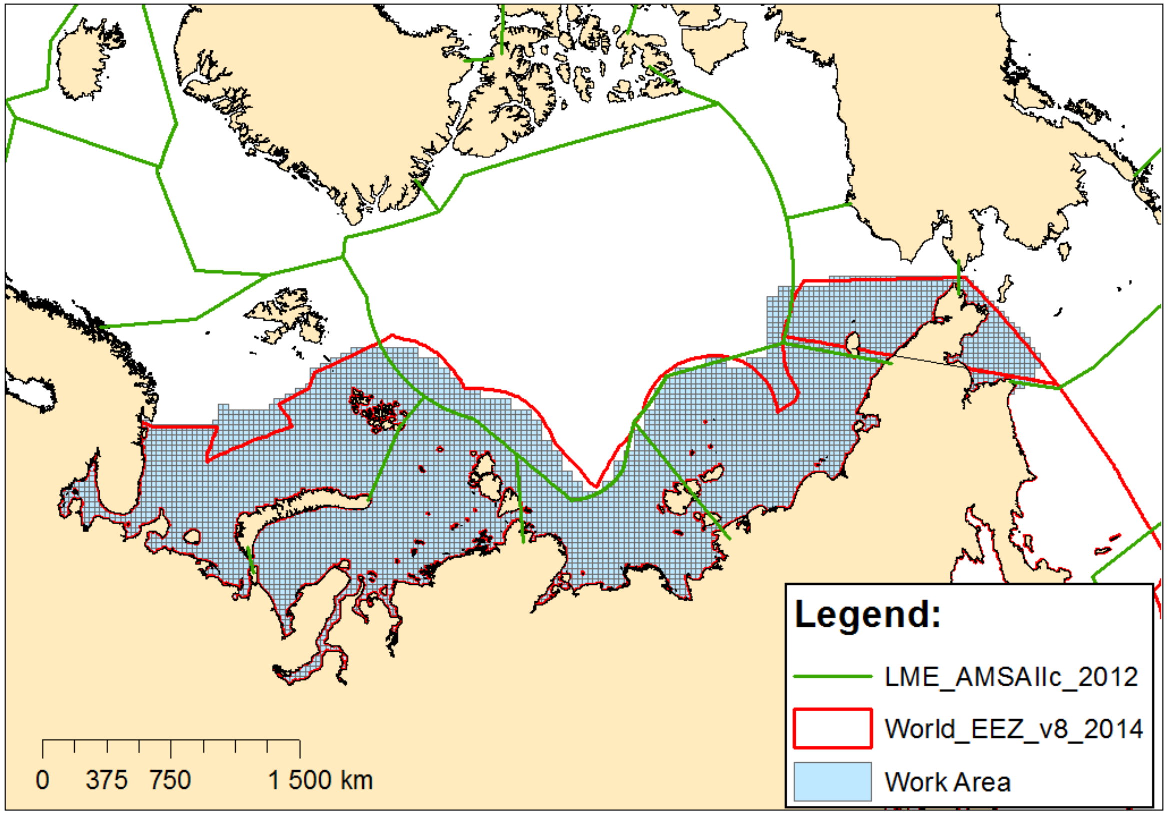


65 % of EEZ

Departure point wishes

1. Huge space
2. Urgency
3. Complex
4. Practical result

1. Boundaries



6- Seas, 5 -LMEs

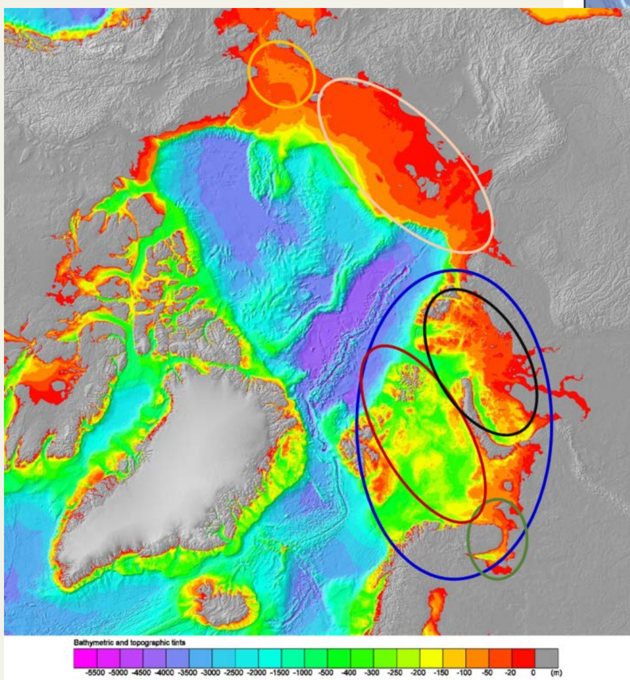
Common ground (conditions for conservation)

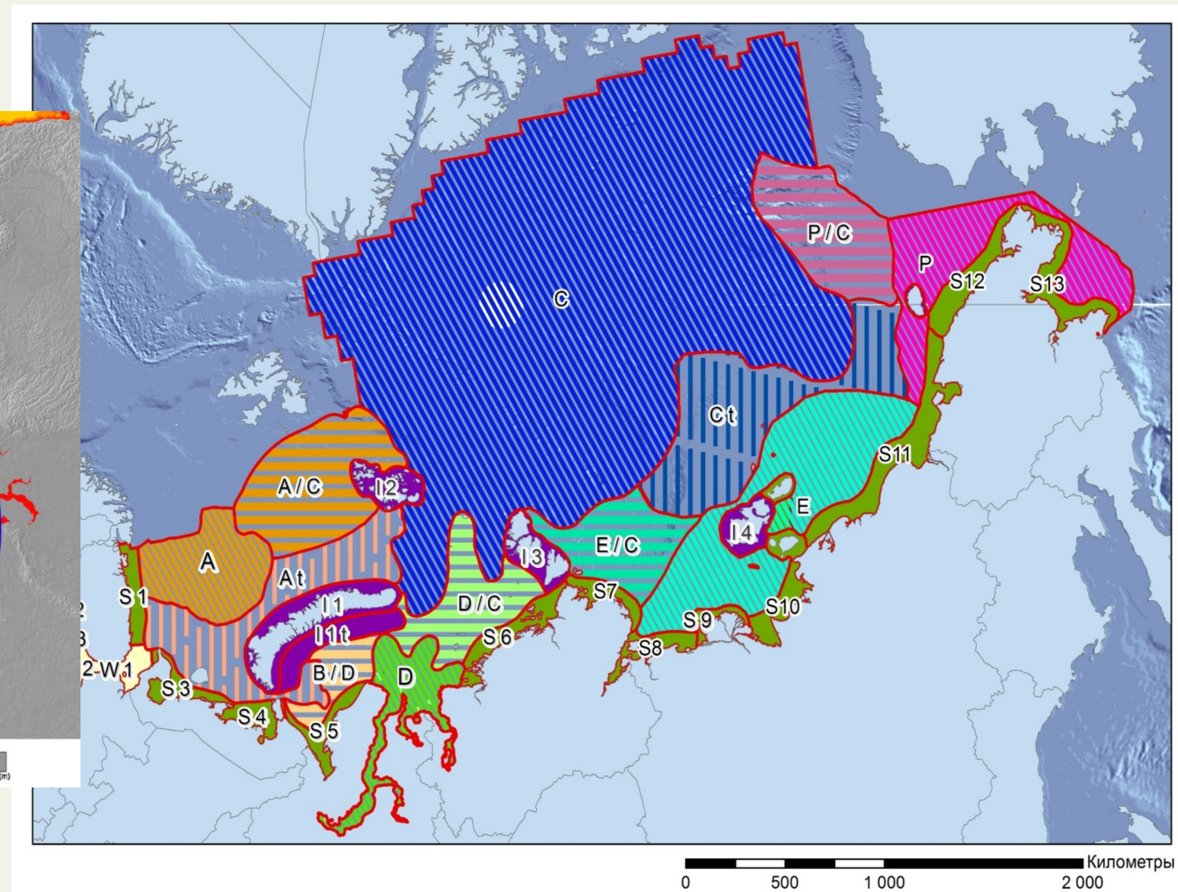
Regionalization (zoning) of

- Seas
- Ice
- Benthic and pelagic biotopes

– to make common ground and reflect general conditions.

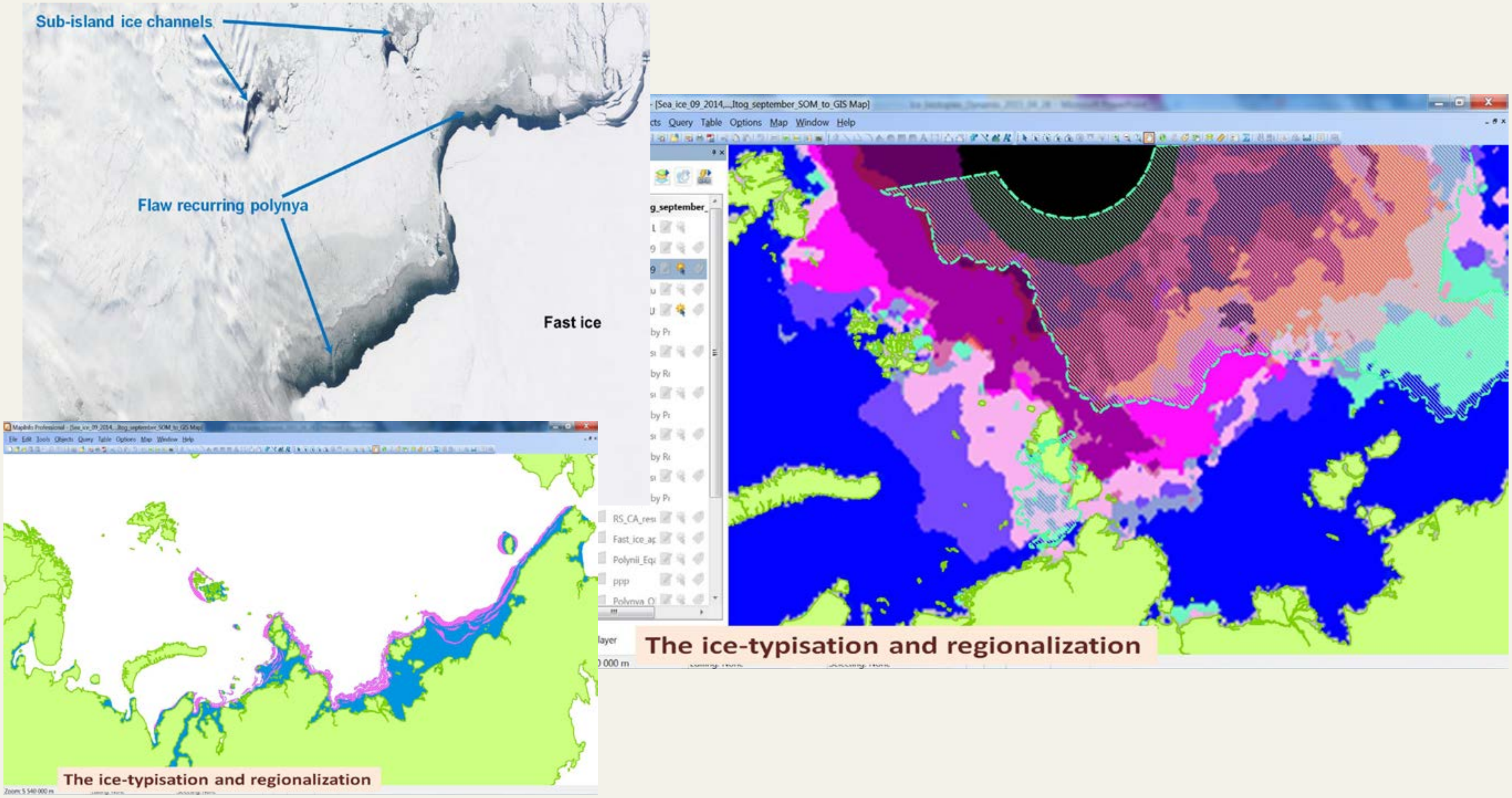
Zoning of the Arctic Seas





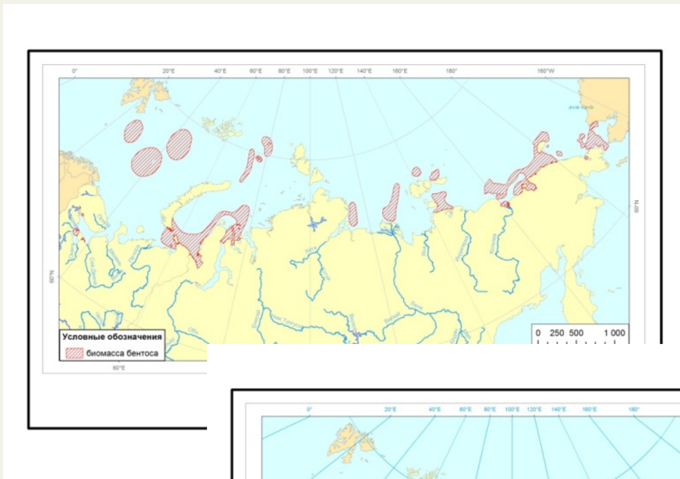
Cores and boundary water masses, frontal zones, transformation zones

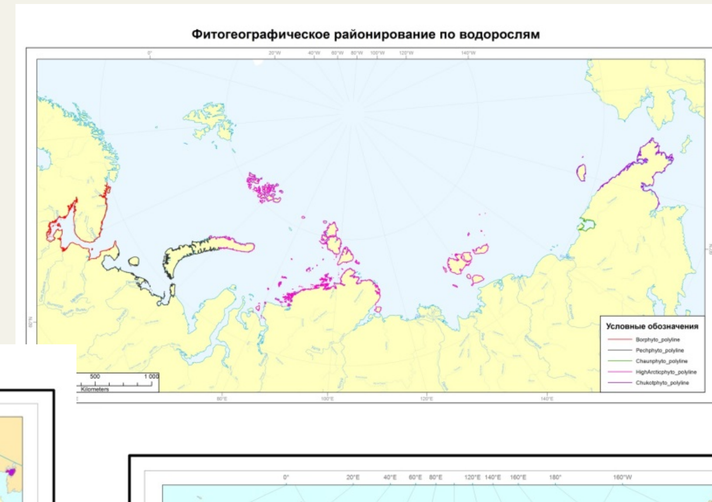
5. Ice typization and regionalization

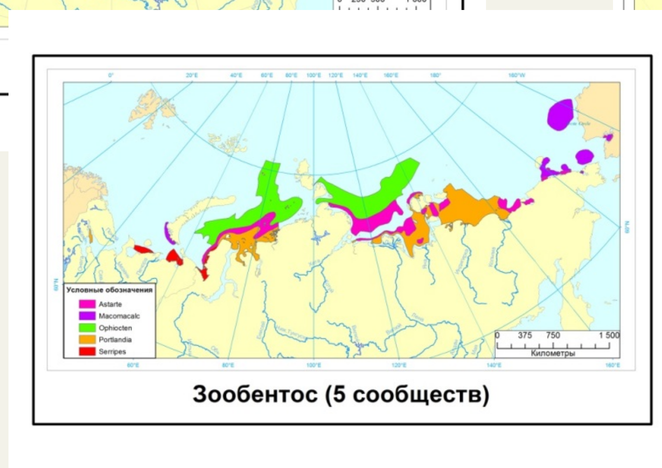


Ice concentration, ice edge, ice types, wind maps, polynyas, shore ice, etc.

Benthic and pelagic biotopes biogeographical classification







Types of basins, bathymetric zones, substrate,

kelp areas, sea grass spots, areas on heightened benthic biomass, etc.

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3. Methods

1. Define **criteria**
2. Define **what** we need to protect
3. Define **where** we need to protect
4. Define are **related** (1) and (2) **how**

Criteria for selection of conservation objects

International criteria (CBD EBSA/ IUCN MPA/IMO PSSA)

1. Uniqueness or rarity
2. Special importance for life history stages of species
3. Importance for threatened, endangered or declining species and/or habitats
4. Vulnerability, fragility, sensitivity, or slow recovery
5. Biological productivity
6. Biological diversity

WWF

Criteria for network

1. Representativity
2. Genetic diversity
3. Maintenance of functions/structures of ecosystems,
4. Areas/species of special importance for indigenous population

Selection of conservation objects (features)

High productivity/biodiversity zones (4)

Biotopes

1. benthic biotopes (36)
2. pelagic biotopes (30)
3. biotopes of ice-associated species & communities (7)

Red list and keystone species

1. species (19 marine mammals, 18 birds, 22 fish)
2. key habitats (129 bridling, feeding, wintering areas, etc.)

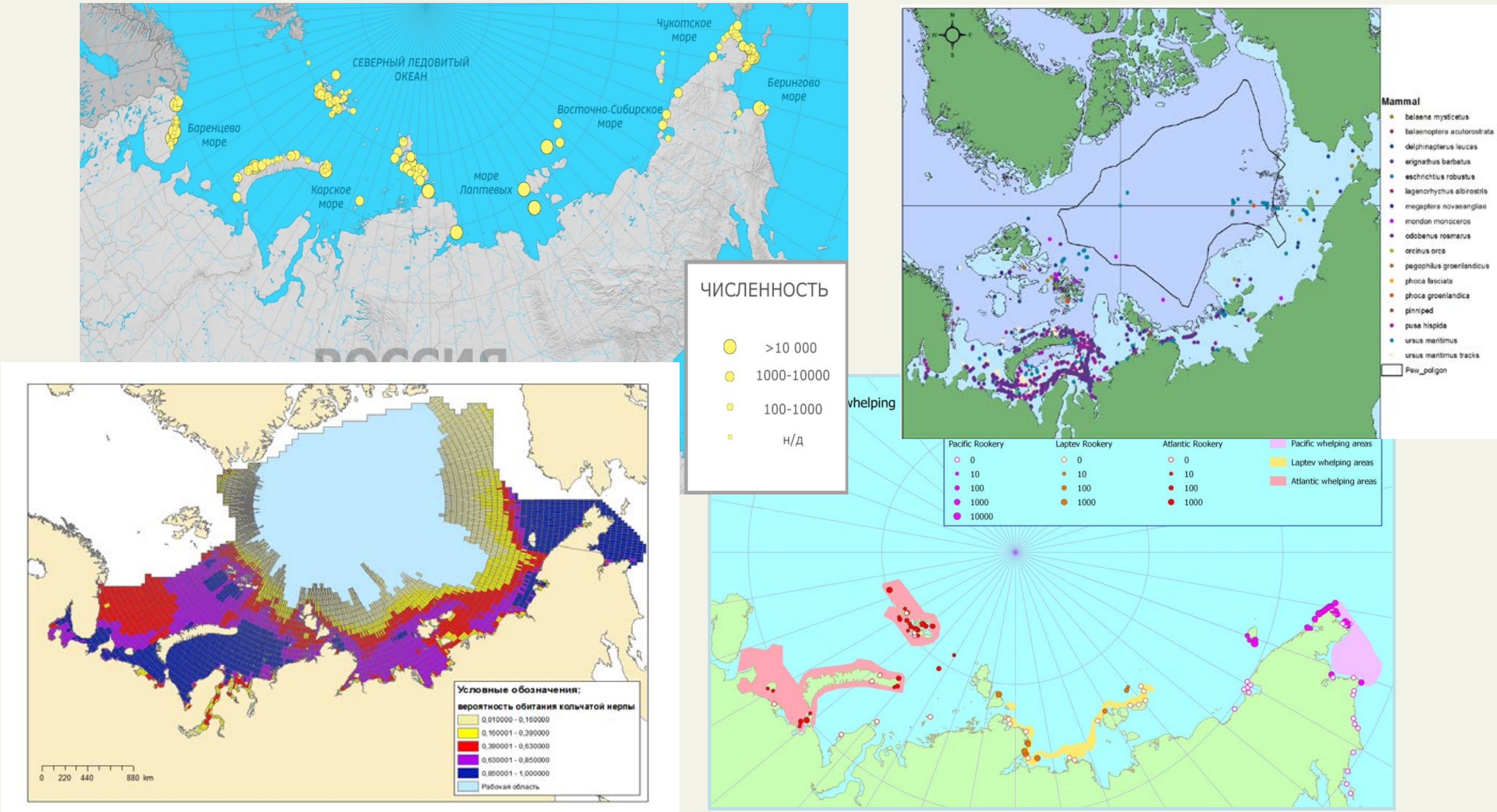
Setting targets

For example:

- conserve at least 10% of every biotope area in every geographical region

- conserve at least 70% of whelping area of each of the Russian Red Book species

4. DATA (GIS layers)



4. DATA (195 GIS layers)

69 benthic biotopes, habitats, biogeographical units, communities, vulnerable marine ecosystems

6 ice biotopes

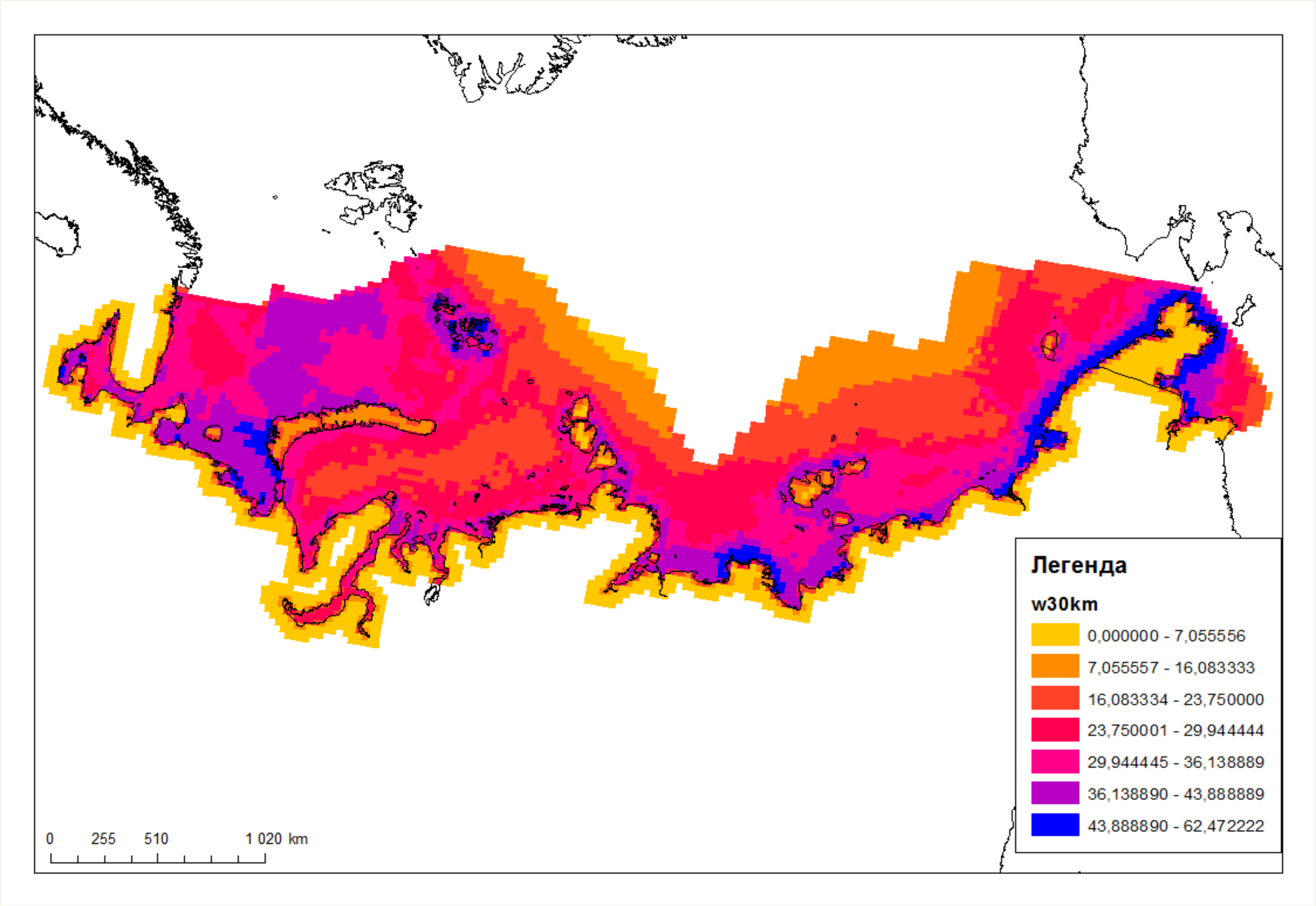
45 marine mammals key habitats and ranges

36 birds key habitats and ranges

38 fish key habitats, ranges and communities

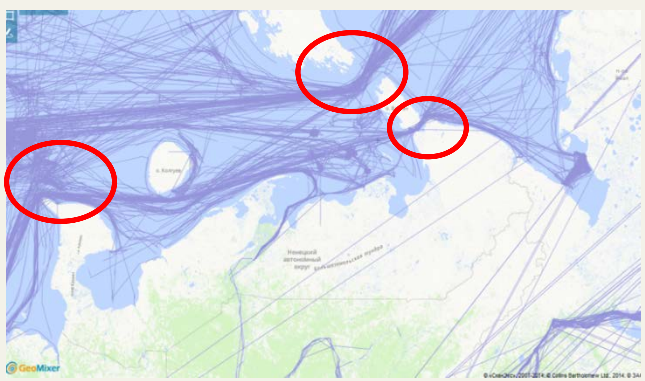
1 Naturalness

Density of the data layers used for the analyses

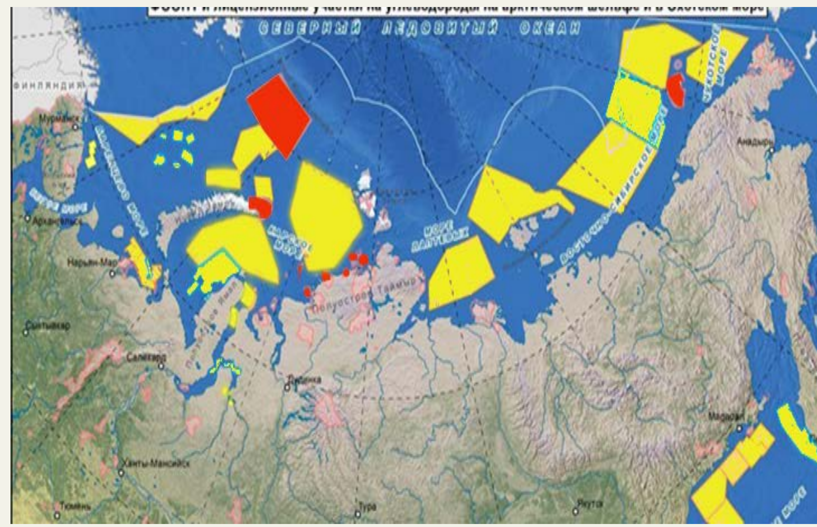


6. Social-economic data.

Shipping



Oil&Gas



~ 25 % of EEZ

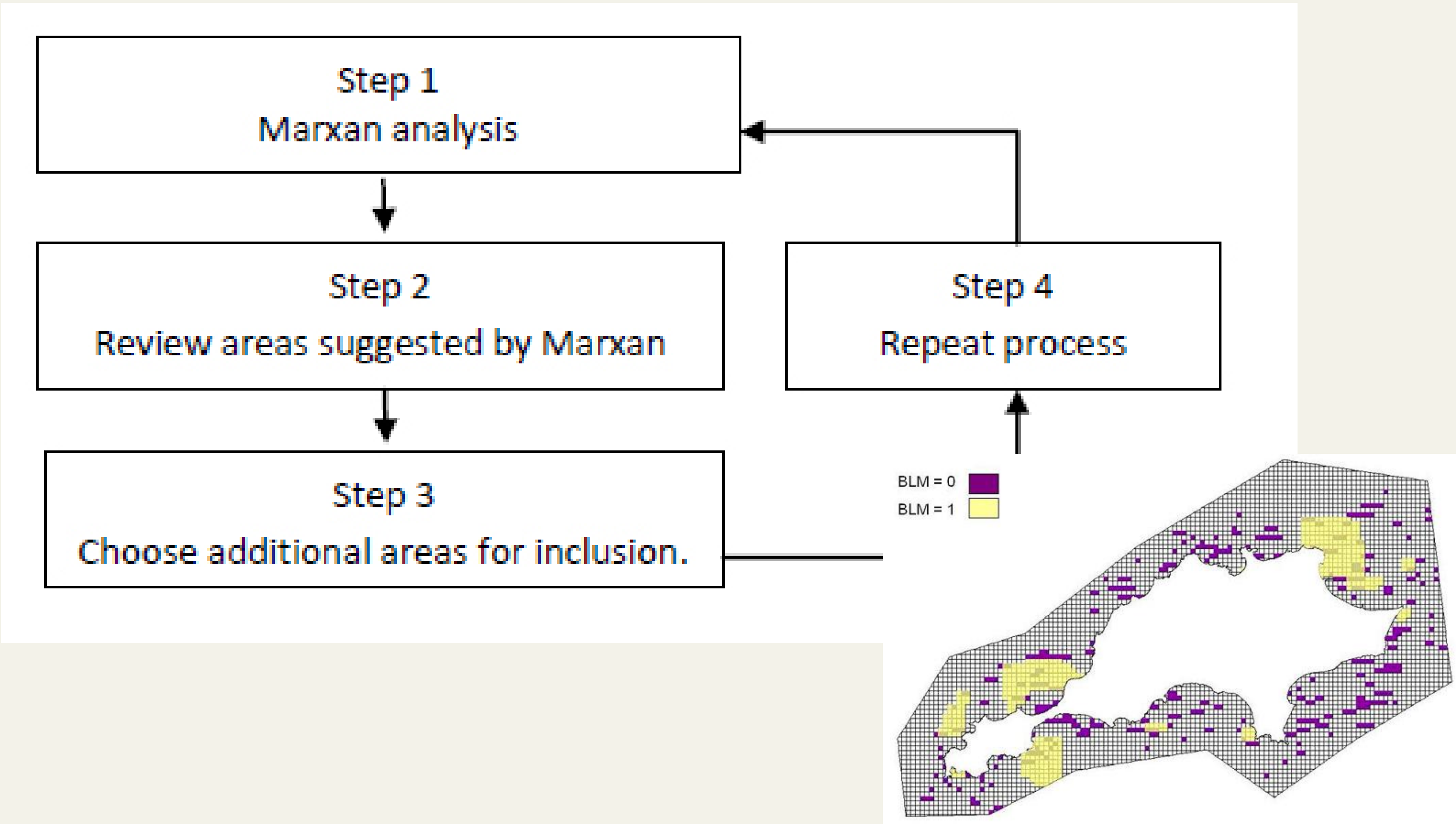
5. Marxan analyses – max result with min area

Marxan solves a type of problem described as **the minimum-set problem** - where the objective is to minimise cost subject to achieving defined targets.

$$\underbrace{\overbrace{\sum_{PUs} Cost}^{1} + \underbrace{BLM \sum_{PUs} Boundary}_{3}} + \overbrace{\sum_{ConValue} SPF \times Penalty}^{2} + \underbrace{CostThresholdPenalty(t)}_{4}$$

1. The total cost of the reserve network (required)
2. The penalty for not adequately representing conservation features (required)
3. The total reserve boundary length, multiplied by a modifier (optional)
4. The penalty for exceeding a preset cost threshold (optional – see footnote 3)

5. Designing the network.



For each conservation feature following parameters were analyzed:

- representation in proposed network
- naturalness
- sustainability
- ecological and geographical connectivity

Data was corrected then and another Marxan test was done

Geographical connectivity

Providing geographical (structural) connectivity for seasonal habitats of each conservation object:

- Including different seasonal habitats like independent conservation objects.

- Including different population like independent conservation object.

- Including bottleneck

Geographical connectivity

For example for polar bear:
4 independent population for each

- Breeding areas -70%
- Feeding areas – 20%
- Wintering areas – 70%

For example for terns:

Colonies of terns - 20%

The area of terns habitats - 10%

Areas of polynyas - 20%

WWF

Ecological connectivity

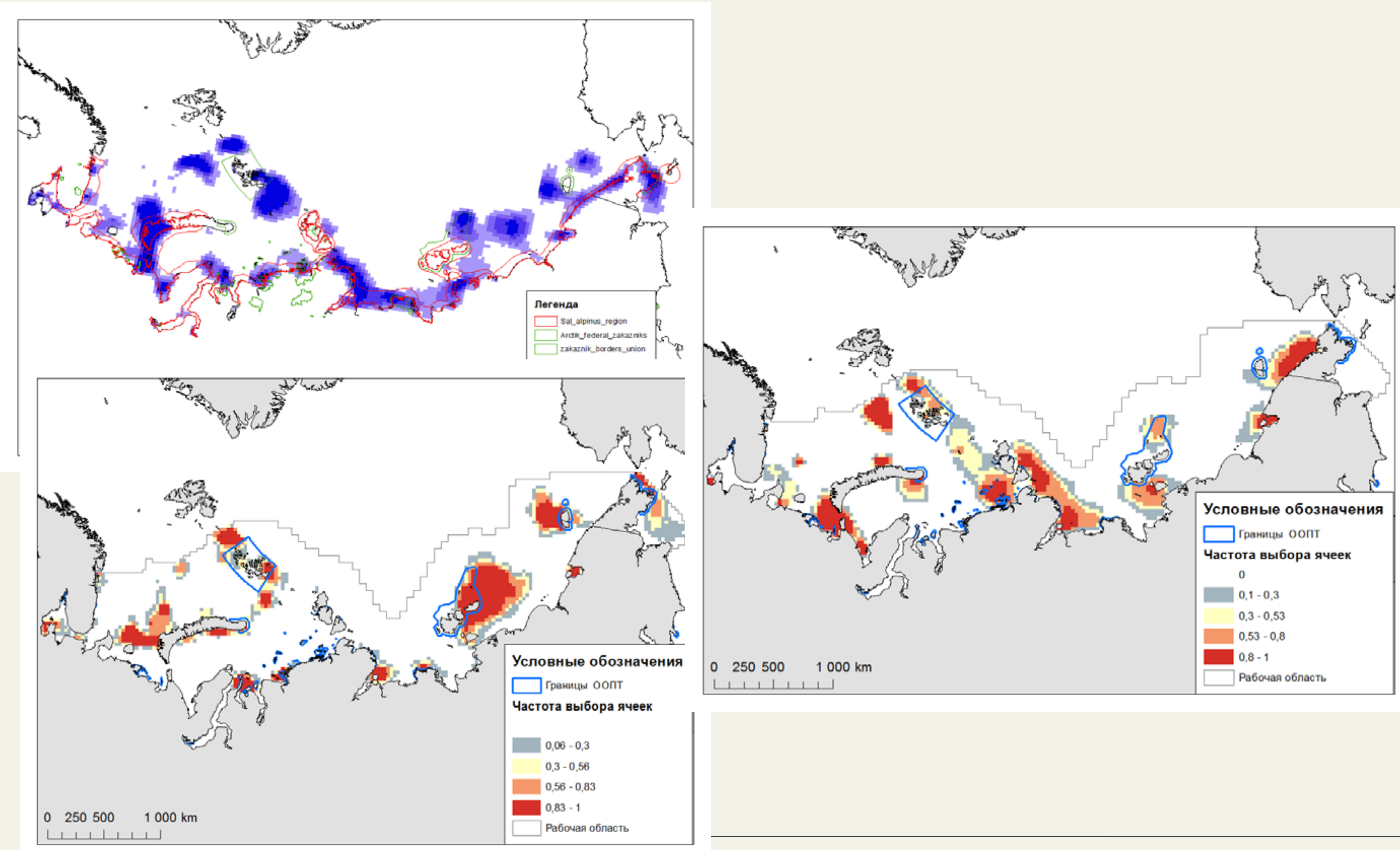
Providing ecological (ecosystem) connectivity - ensures the presence of predator and prey in the same place at the same time it’s main food sources.

Laptev Sea			
May-June	Polar bear	Ringed seal whelping	Arctic cod
Polar bear	407627	114755	
Ringed seal whelping	114755	819039	70860
Arctic cod			231542

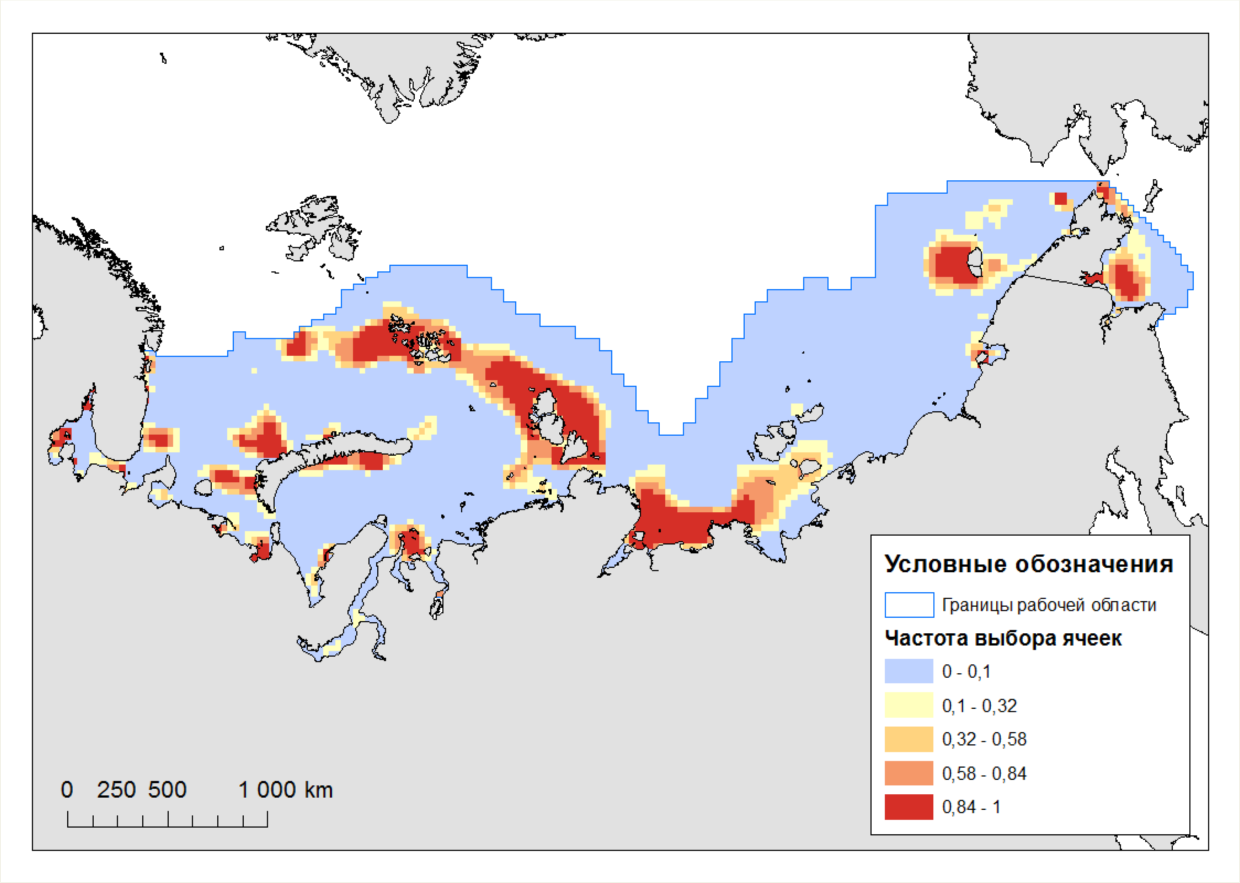
Polar|seal whelping	**34,14317459**
Polar|seal index	**35,46700893**
Seal|cod	**38,8216201**

Laptev Sea MPAs			
May-June	Polar bear	Ringed seal whelping	Arctic cod
Polar bear		39181	
Ringed seal whelping	39181		27509
Arctic cod		27509	

Marxan result

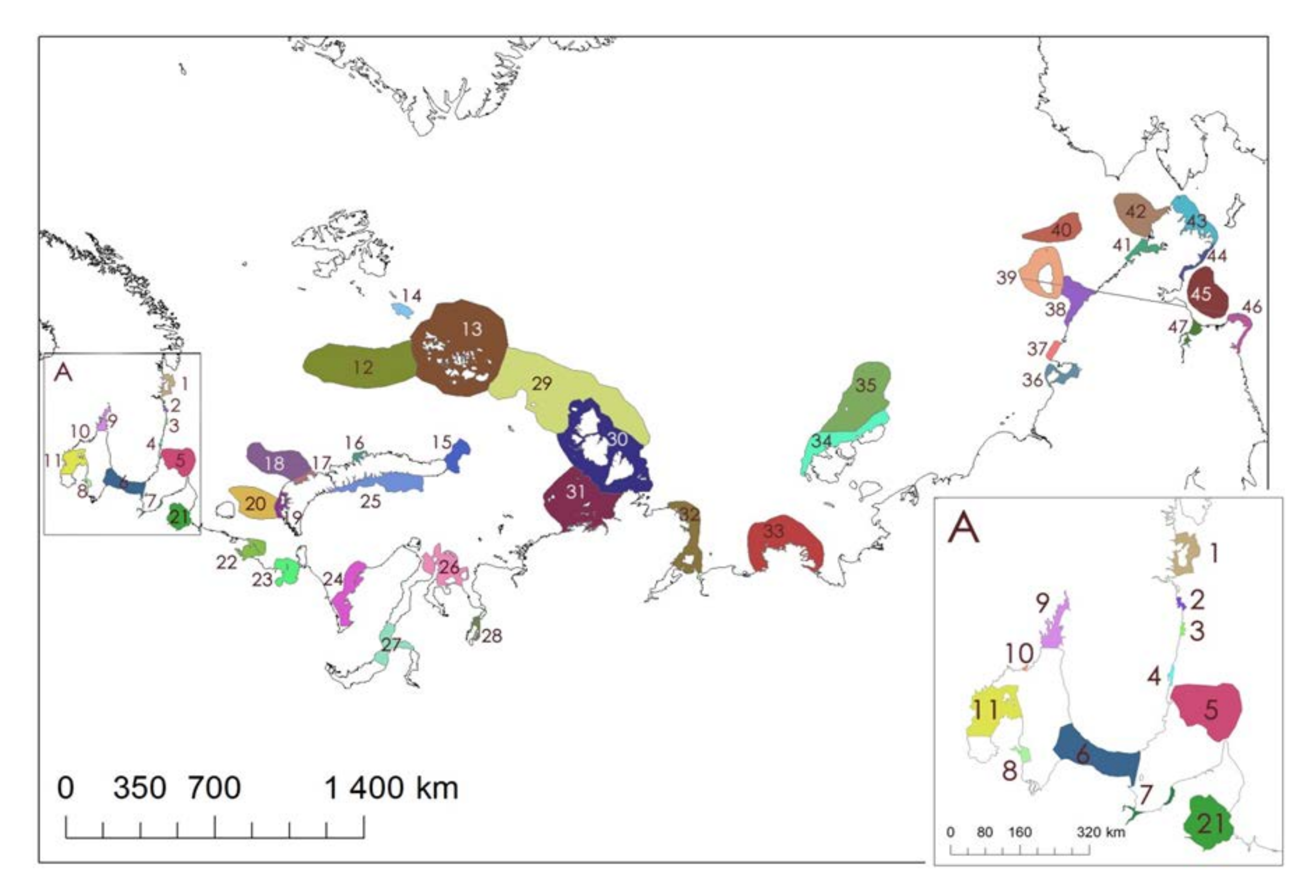


Marxan result



~ 15 % of EEZ

Network of important marine areas in the Russian Arctic



~ 26 % of EEZ

Lessons learned

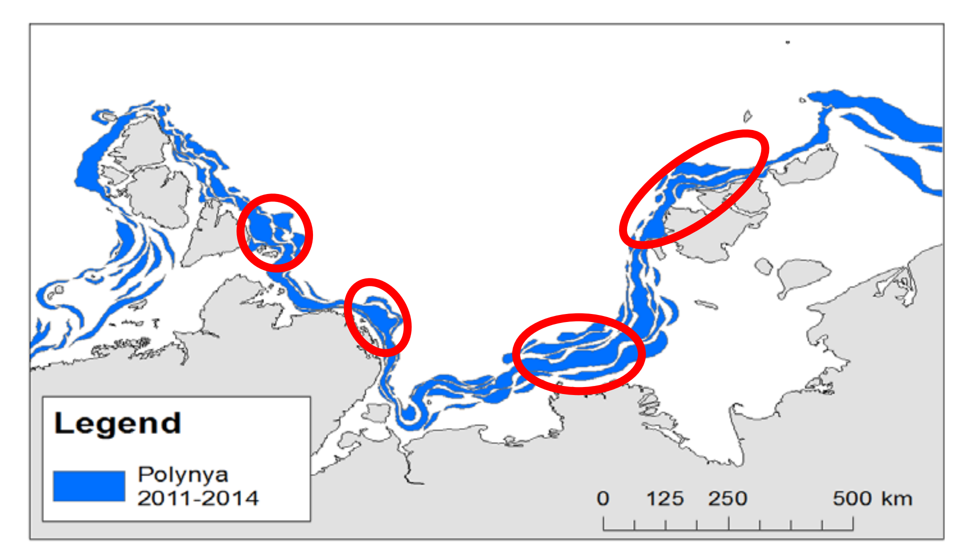
1. Before move forward we should see whole picture
2. Be clear about goals and targets.
3. We can move forward with data which we have.
4. Design MPA network for full range of biodiversity not for separate species
5. Get out of our own boxes and look at the Arctic as a whole
6. Start doing before it is too late
7. Taking into account climate change.

Practical ways to address the climate change issues

1. Use the newest possible data (remote sensing)

2. Take maximum amplitude for dynamic features (marginal ice zone, polynyas, etc.)
3. Detect and protect nuclear parts of dynamic feature

4. Protect stable biotopes, e.g. multiyear ice zones as conservation features



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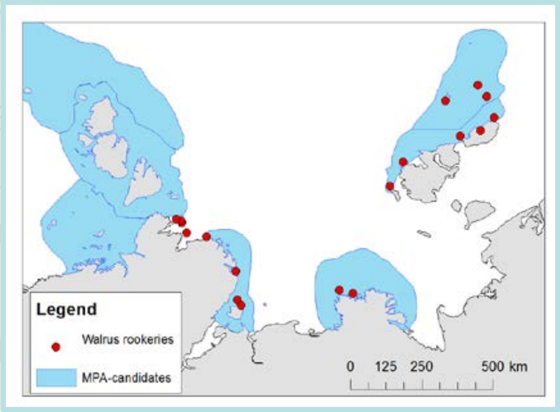

2. Ta... r c... (marginal ice zone, polynyas, et...
3. D... ar... ure
4. Pr... multiyear" ice zones as conservation features

5. Be sure that a conservation feature is protected in more than one Protected Area

6. Protected areas borders defined not only in form of geographical coordinates but by the most important geographical/ecological/biological features (polynya, front zone, current, etc) which should be object of monitoring.

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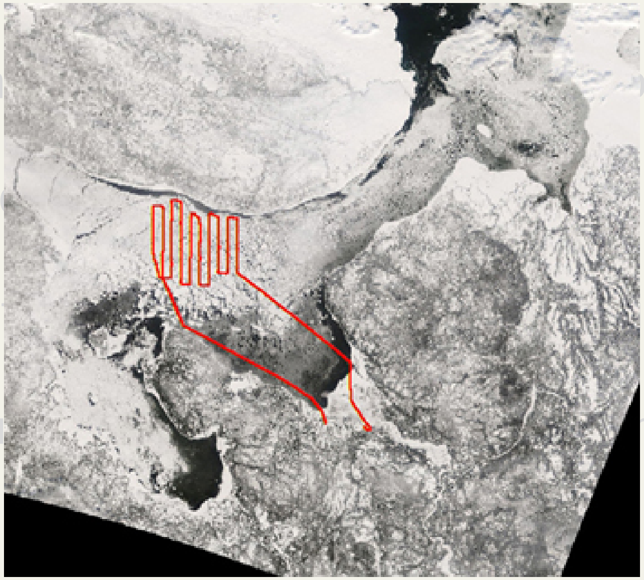

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