



Forest restoration strategies after disaster disturbances - examples from Polish forestry

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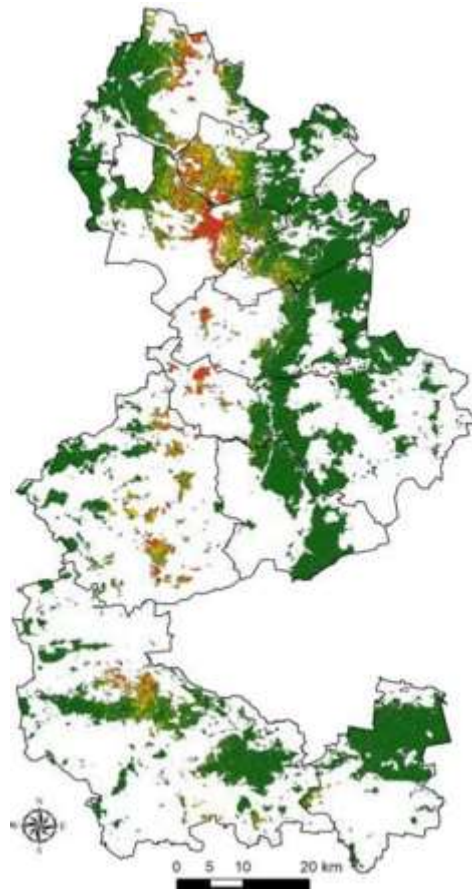
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The hurricane which passed over the northern part of Poland in the night 11th/12th of August 2017 destroyed the forest ecosystems on area of more than 40 thousands hectare in RDSF Toruń/over 100 thous. ha in Poland/ca. 12 mln m³



Share of destroyed areas in Forest Districts administered by RDSF Toruń:

- Rytel – 62,5 %
- Runowo – 47,6 %
- Czersk – 40,2 %
- Przymuszewo – 32,6 %
- Szubin – 30,5 %
- Zamrzenica – 21,3 %
- Woziwoda – 15,6 %
- Tuchola – 8,4 %
- Solec Kujawski – 4,8 %
- Różanna – 2,7 %



Scale ! Organization

Late frosts on open areas

Drought

Browsing



- **Risk dispersion – diversity of species and regeneration methods: planting, self-seeding; avoiding of schematism**



Restoration of mono-species forest stands:

- natural regeneration where is it possible
- use of native species according to site fertility
- combined regeneration (artificial supplement of natural regeneration on poor sites)
- use of native species and provenances climate-adapter
- the use of coppice regeneration on poor sites



**Program zachowania
leśnych zasobów genowych
i hodowli selekcyjnej drzew w Polsce
na lata 2011–2035**



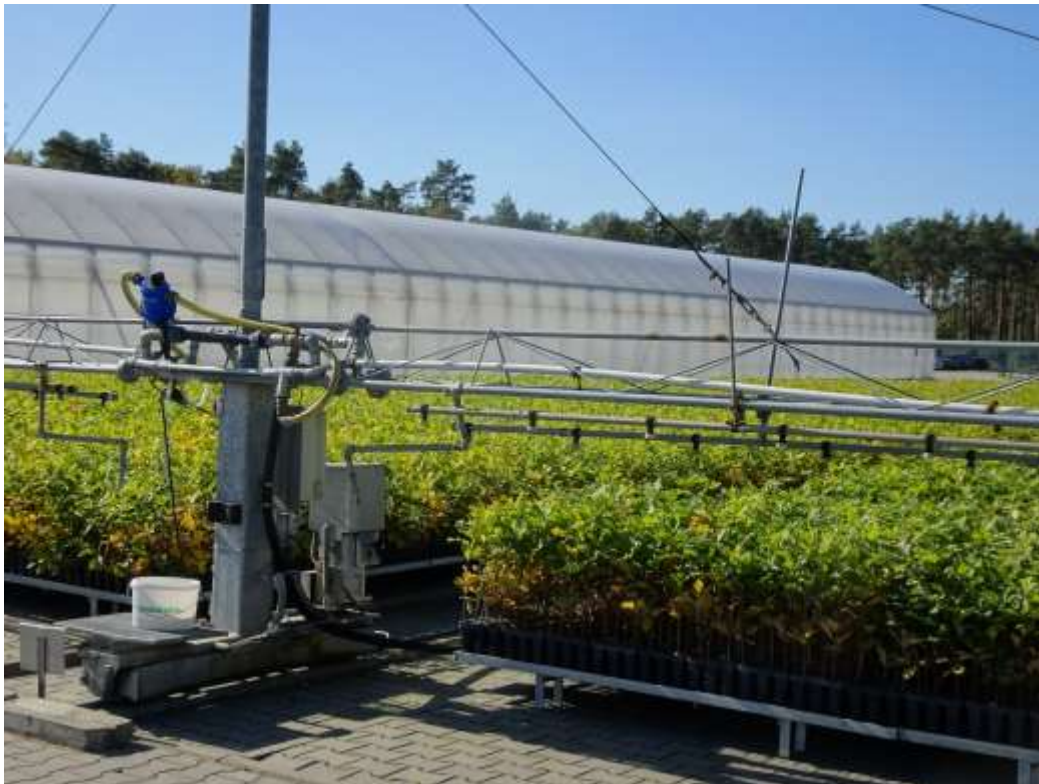
Centrum Informacyjne
Lasów Państwowych

**Program of conserving forest genetic
resources and breeding of trees in Poland for
the years 2011–2035**



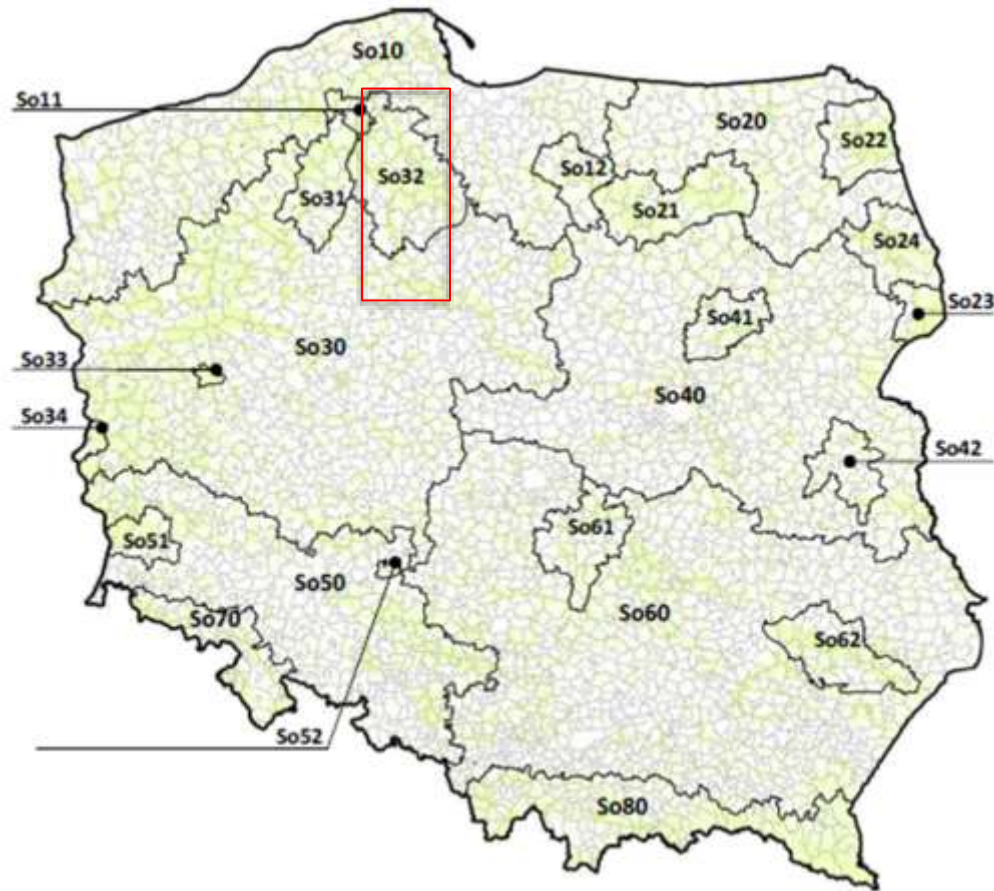
Objectives of regionalization:

- Records of origin of forest reproductive material (FRM)
- Reduction of possible economic damage due to unsuitability of FRM to the place of growth (especially mountainous areas !!)
- Protection of genetic variability (regions of maternal character)

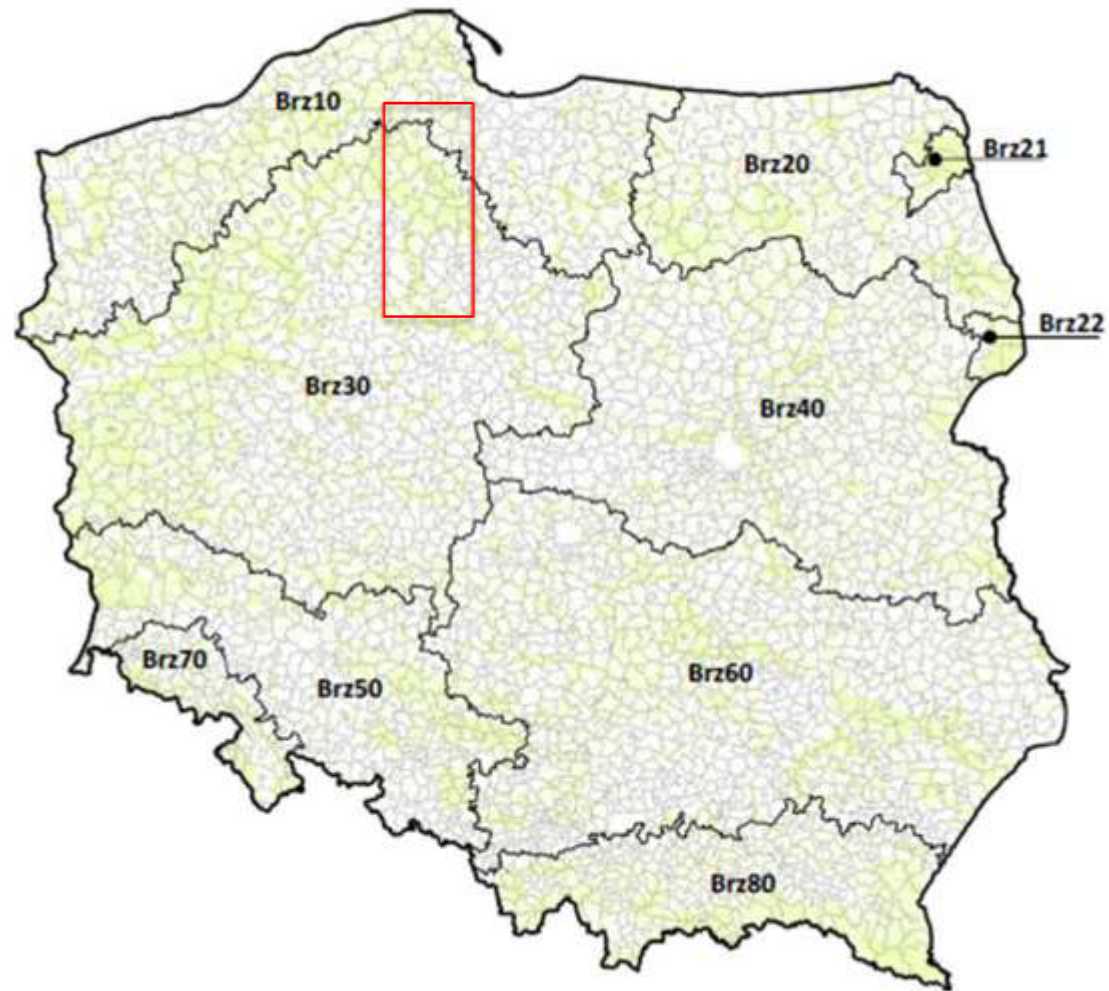


Seed regions for species:

1. *Pinus sylvestris*
2. *Picea abies*
3. *Larix decidua*
4. *Abies alba*
5. *Fagus silvatica*
6. *Quercus robur*
7. *Quercus petraea*
8. *Alnus glutinosa*
9. *Betula pendula*



Betula pendula



„Elaboration of silviculture practices on regenerated large-scale calamity areas in Regional Direction of State Forests Toruń” (financed by General Directorate of State Forests)

Time of realization: 2022-2026

Goal of the project: Rules of regeneration and tending new forest cultures in difficult conditions of open areas focused on their resistance to different harmful factors

Special tasks:

- **Influence of different soil preparation methods and seedlings type for regeneration effectiveness;**
- **Possibility of use of natural regeneration in restoration of damaged areas;**
- **Shaping species composition in a time and space according to soil and climatic conditions;**
- **Tending methods taking into account protection against drought, frosts and browsing**

Area of research: newly regenerated areas in Forest Districts of RDSF Toruń

Methods:

- 1) Observations in already regenerated objects (temporal research plots)**
- 2) Series of experiments with different regeneration and tending methods (permanent research plots)**

		Each unit - 6 planting rows					
Treatments		1	2	3	4	5	6
120 m	Block IV						
	Block III						
	Block II						
	Block I						
Planting method	Mechanic				Hand-made		
Soil preparation	no		yes (Plough LPZ)				
Seedlings	1/0	3/0	1/0	3/0	1/0	3/0	
Planting time	Spring 2022						

Treatments:

- 1-year-old Scots pine seedlings, bareroot – planting autumn 2022
- 1-year-old Scots pine seedlings, bareroot – planting spring 2023
- 1-year-old Scots pine seedlings, containers – planting autumn 2022
- 1-year-old Scots pine seedlings, containers – planting spring 2023

Unit area – 900 m² (30 m x 30 m)

No fencing

Oak plantation with different age of seedlings, soil preparation and planting methods

Block I	Block II	Block III	Block IV
1	2	3	4
3	4	1	2
2	1	4	3
4	3	2	1

Unit area – 900 m² (30 m x 30 m)

Treatments:

1. 1-year-old Scots pine seedlings, bareroot – planting autumn 2022
2. 1-year-old Scots pine seedlings, bareroot – planting spring 2023
3. 1-year-old Scots pine seedlings, containers – planting autumn 2022
4. 1-year-old Scots pine seedlings, containers – planting spring 2023

No fencing

Dead seedlings:

1. 7,5%,
2. 2,6%,
- 3. 28,7%,**
- 4. 11,9%**



Thank you for your attention

