



**Państwowe Gospodarstwo Leśne
Lasy Państwowe**

The Kostrzyca Forest Gene Bank

FORESTS´FUTURE 2021

**Consequences of Bark Beetle Calamity for the Future of Forestry
in Central Europe. On-line meeting March 23rd –24th 2021**

Czesław Kozioł

Michał Raj



FOUNDING OF THE KOSTRZYCA FOREST GENE BANK

The Kostrzyca Forest Gene Bank was established as a result of the implementation of the GEF Grant „Conservation of forest biological diversity in Poland” (1992).

The principles of the grant was negotiated by foresters with the World Bank for the purpose of protecting endangered forest ecosystems.



Grant initiated new directions of risk mitigation activities, as well as opened the possibility of implementing new lines of research and practical activities in forestry.

Establishment of the Kostrzyca FGB was financed by the State Forests National Forest Holding, World Bank, National Fund for Environmental Protection and Water Management, Regional Fund for Environmental Protection and Water Management in Wrocław and the European Union under the PHARE program.

On 13th December 1995 took place the ceremonial opening of the Kostrzyca FGB, and on **1st January 1996** start-up of its activities.



The Kostrzyca Forest Gene Bank



Beginnings of the Kostrzyca FGB

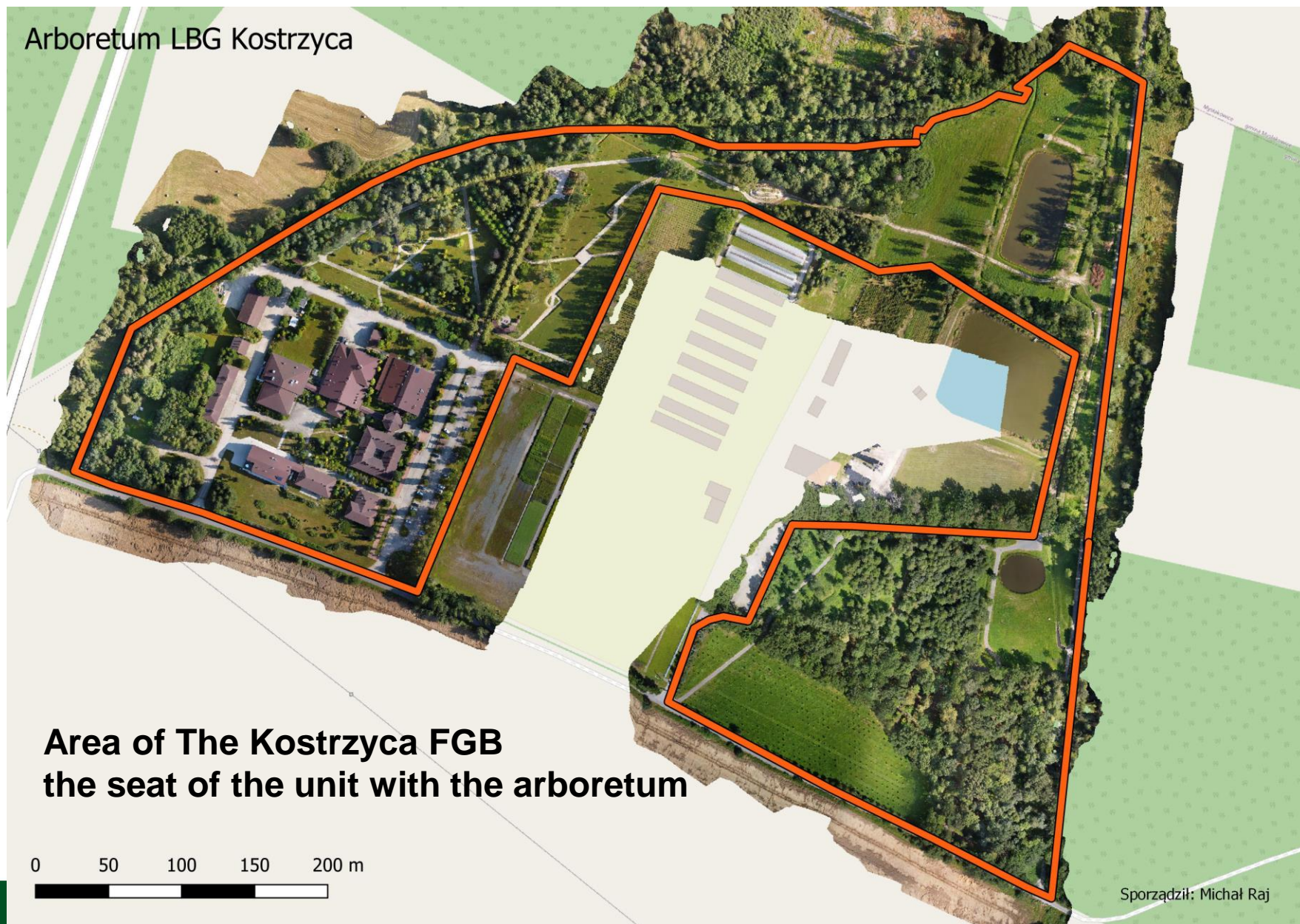


Beginnings of the Kostrzyca FGB



Present appearance of the unit

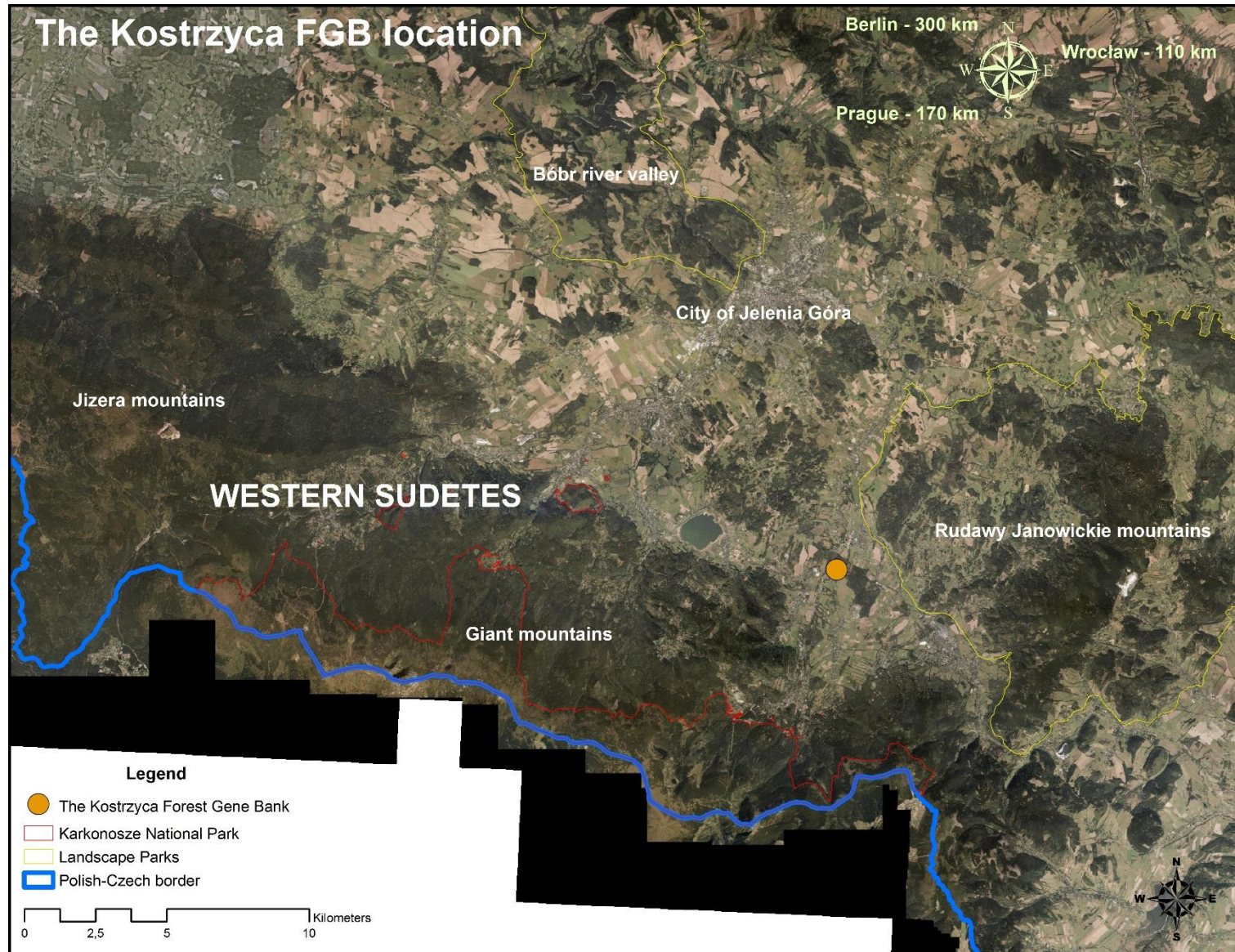
Arboretum LBG Kostrzyca



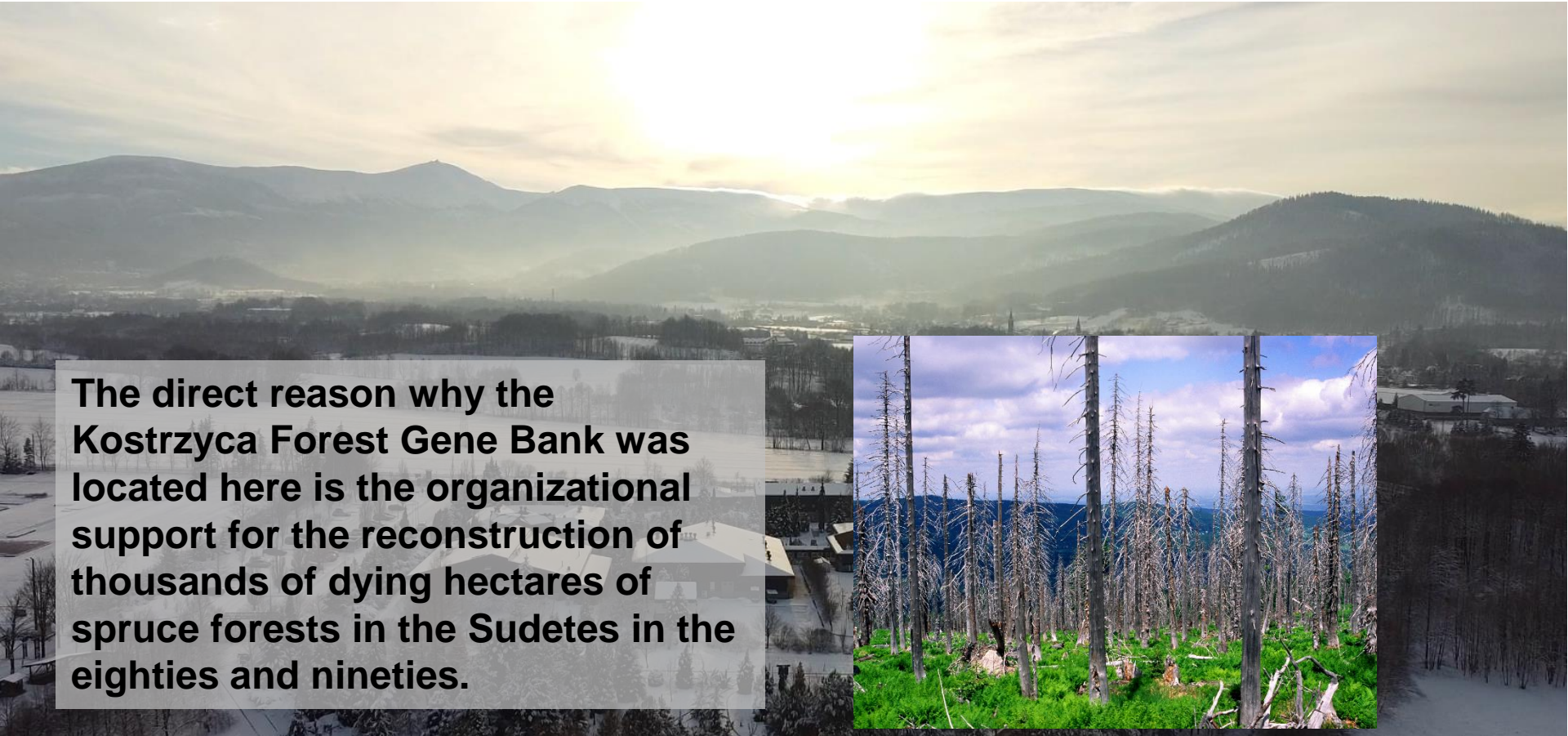
**Area of The Kostrzyca FGB
the seat of the unit with the arboretum**

0 50 100 150 200 m





- The Kostrzyca FGB location – why here ?



The direct reason why the Kostrzyca Forest Gene Bank was located here is the organizational support for the reconstruction of thousands of dying hectares of spruce forests in the Sudetes in the eighties and nineties.



- The Kostrzyca FGB – what for ?

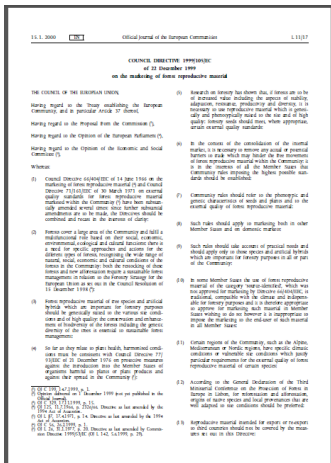
The facility was to be a security in the event of a similar type of disaster in the future.

The unit started operating under the national programs for the conservation of genetic resources and breeding of trees

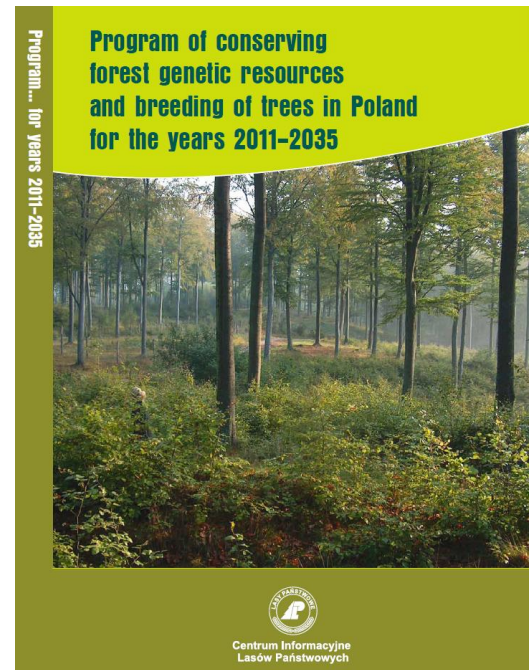
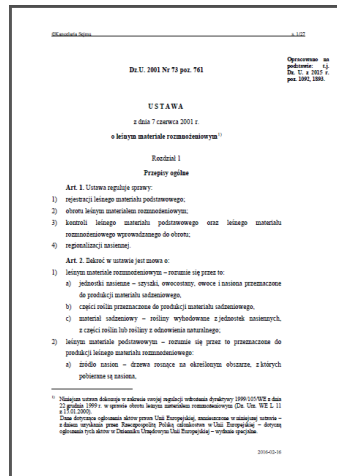


Seed and tree breeding regulation in Poland

COUNCIL DIRECTIVE 1999/105/EC of 22 December 1999 on the marketing of forest reproductive material



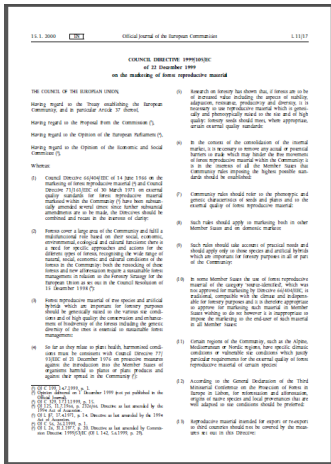
Act on forest reproductive material of 7 June 2001



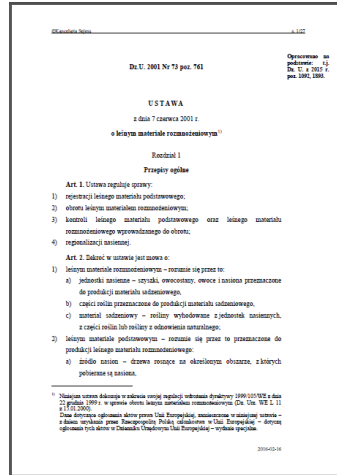
The State Forests
National Forest Holding

Seed and tree breeding regulation in Poland

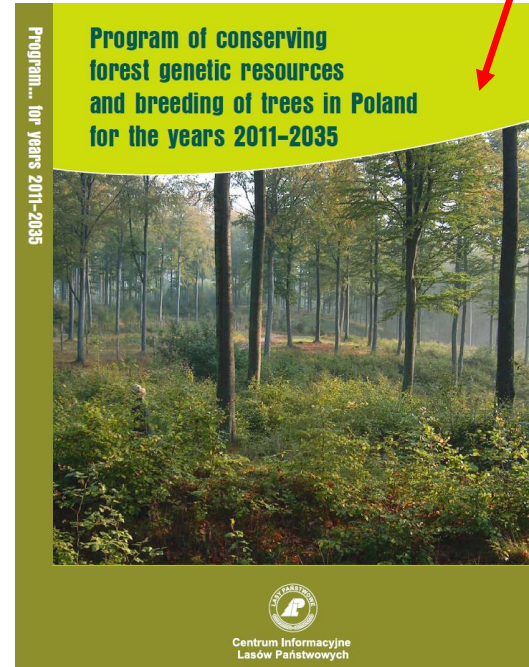
COUNCIL DIRECTIVE 1999/105/EC of 22 December 1999 on the marketing of forest reproductive material



Act on forest reproductive material of 7 June 2001



The Kostrzyca FGB role in the program



The State Forests
National Forest Holding



THE KOSTRZYCA FOREST GENE BANK ACTIVITY

The Kostrzyca Forest Gene Bank

Kostrzyca Forest Gene Bank is an organizational unit of the State Forests, which came into being in 1995.

The main activity involves **long-term storage of gene resources** of forest trees and shrubs as well as the monitoring of the quality of reproductive material, that is seeds from the most valuable seed objects of the State Forests, national parks, nature reserves, nature monuments, which are significant to the **environmental protection**.



The Kostrzyca FGB has been undertaking a multi-faceted effort to maintain the genetic resources of plants forming the native flora of Polish woods, thus fulfilling the provisions of **Convention on Biological Diversity**, as well as the **Declaration of the Ministerial Conference on the Protection of Forests in Europe**.

The preservation of the genetic diversity, both *in situ* as well as *ex situ*, refers to:

- The preservation of gene pool of the most valuable objects from the area of the State Forests for commercial purposes.
- The preservation of gene pool of both the oldest indigenous forest stands and the individual conservation trees.
- The preservation of gene pool of protected and endangered plants.
- Implementation of individual species restitution programmes, aimed at trees, shrubs and herbaceous plants.

As at 2020 in the Kostrzyca FGB there are:

- 8303 seed lots in cold rooms (-10 and -20°C),
- 1521 seed lots in cryogenic storage.
- 271 species.



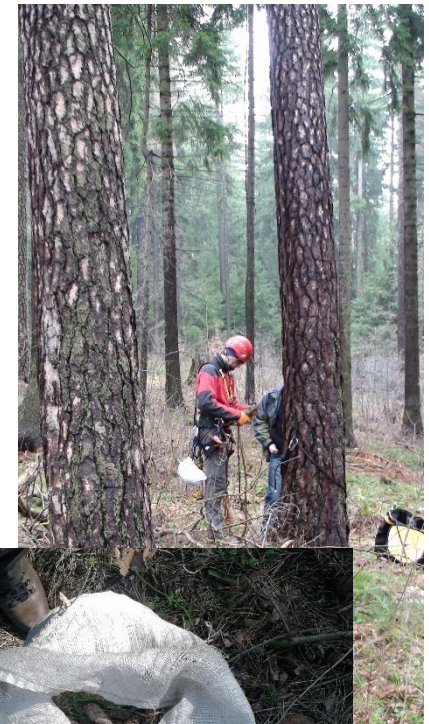
Activity

1. Species and objects indication for seed harvest, environmental monitoring.



Activity

2. Seed harvest coordination.



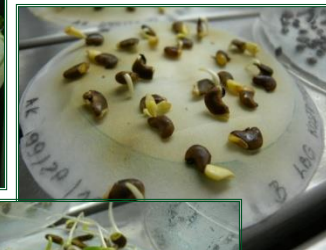
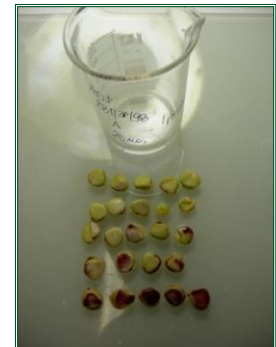
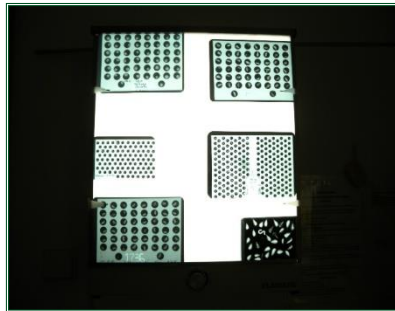
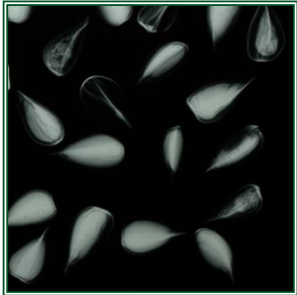
Activity

3. Seed extraction and separation (preparation for storage).



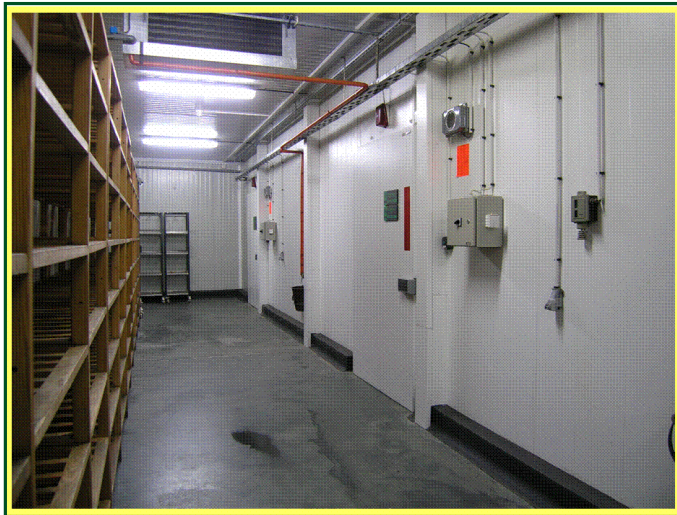
Activity

4. Seed testing.



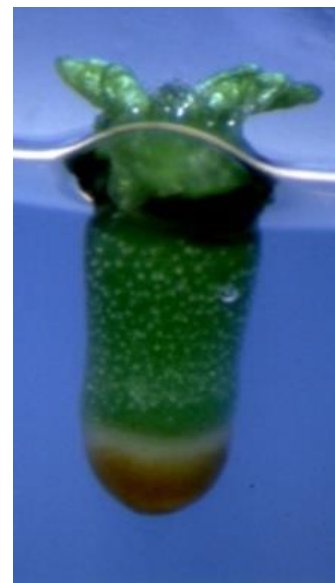
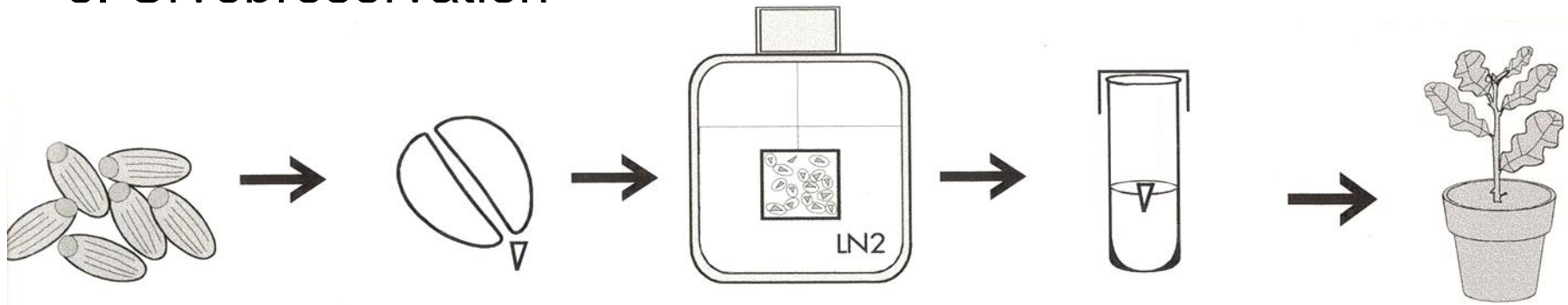
Activity

5. Long-term storage.



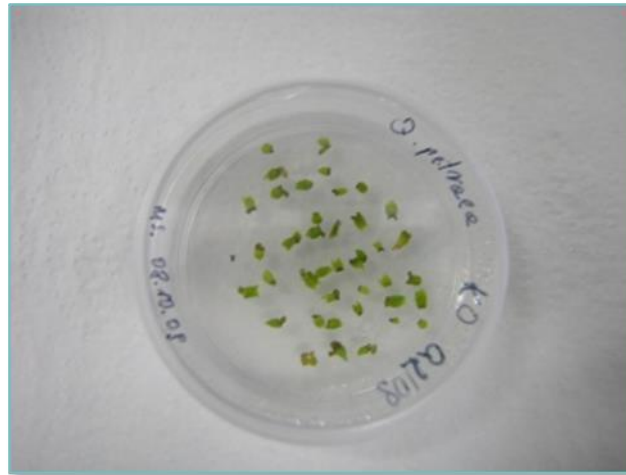
Activity

6. Cryopreservation



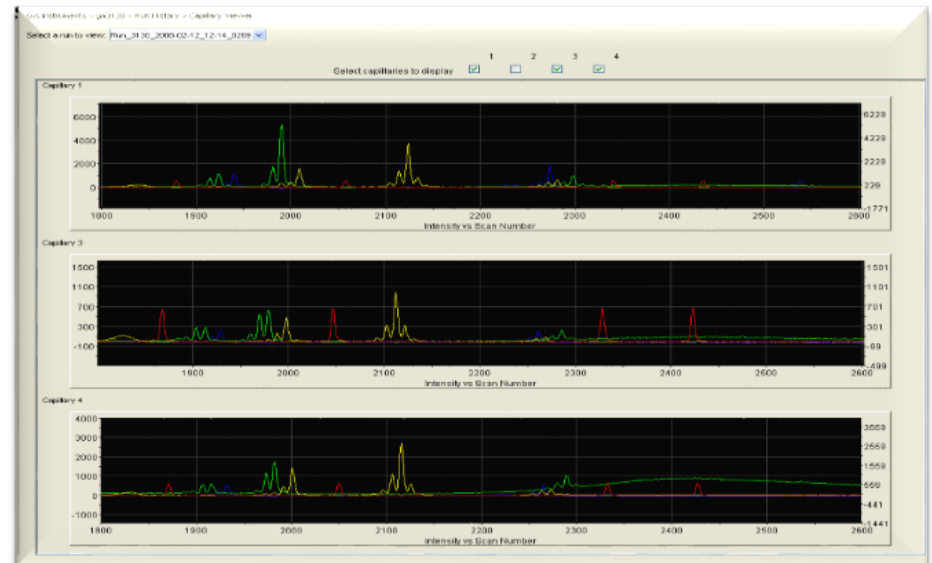
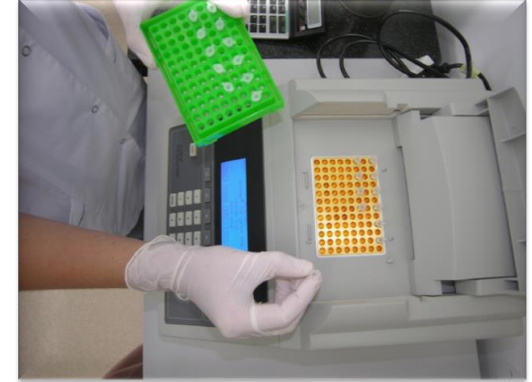
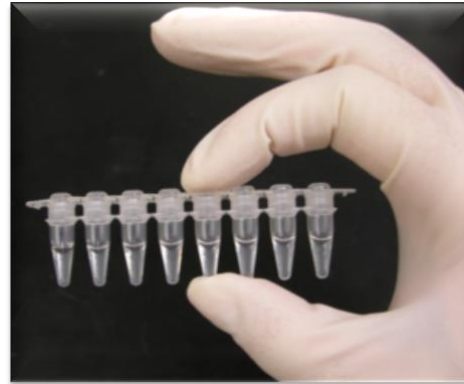
Activity

6. Cryopreservation



Activity

7. DNA analysis



Activity

8. Environmental education



Activity

9. Arboretum and clonal archives



Offered services (the possibility of cooperation)

- Seed harvest of specific species for customers (selected objects, plantations).
- Pretreatment (extraction, separations, thermotherapy,).
- Seed storage (short and long-term).
- Seed testing.
- Sale of high-quality seeds (selected objects, plantations).
- Preparation for sowing (stratification, scarification).
- Production of mycorrhizal vaccine for seedlings (*Hebeloma crustuliniforme*).
- DNA services:
 - DNA isolation from plant material.
 - Assessment of DNA quality and quantity.
 - Molecular identification of *H. fraxineus* (formerly *Chalara fraxinea*) in plant material (Common ash samaras, shoots, tissue).
- Accommodation (guest rooms inside arboretum).
- We are open for cooperation projects.



USE OF THE RESOURCES

Guidelines for the protection of genetic resources in Poland

"... After the decay of the selected seed stand, there should be a progeny generation.

As far as possible, you should strive to obtain the natural regeneration. In case of the need to apply the artificial regeneration and the lack of the seed supply from the stand, it is possible to use the gene resources from the Kostrzyca FGB... "

ZARZĄDZENIE NR 25
DYREKTORA GENERALNEGO LASÓW PAŃSTWOWYCH
z dnia 21 marca 2013 roku

w sprawie ochrony leśnych zasobów genowych na potrzeby nasiennictwa i hodowli drzew leśnych.

Znak: ZH – 7132 - 7 /2013

Na podstawie § 6 Statutu Państwowego Gospodarstwa Leśnego Lasy Państwowe, zwanego dalej Statutem, w wykonaniu zadania Dyrektora Generalnego Lasów Państwowych, określonego w art. 33 ust. 3 pkt 3 ustawy z dnia 28 września 1991 roku o lasach (Dz. U. z 2011 r. Nr 12, poz. 59, tekst jednolity z późniejszymi zmianami), a także zadań Dyrektora Generalnego Lasów Państwowych, powołanych w § 8 ust. 1 pkt 1 Statutu,

zarządzam, co następuje:

§ 1
Wprowadzam do stosowania w jednostkach organizacyjnych Lasów Państwowych „Wytyczne dotyczące ochrony leśnych zasobów genowych na potrzeby nasiennictwa i hodowli drzew leśnych” (II nowelizacja), stanowiące załącznik do niniejszego zarządzenia.

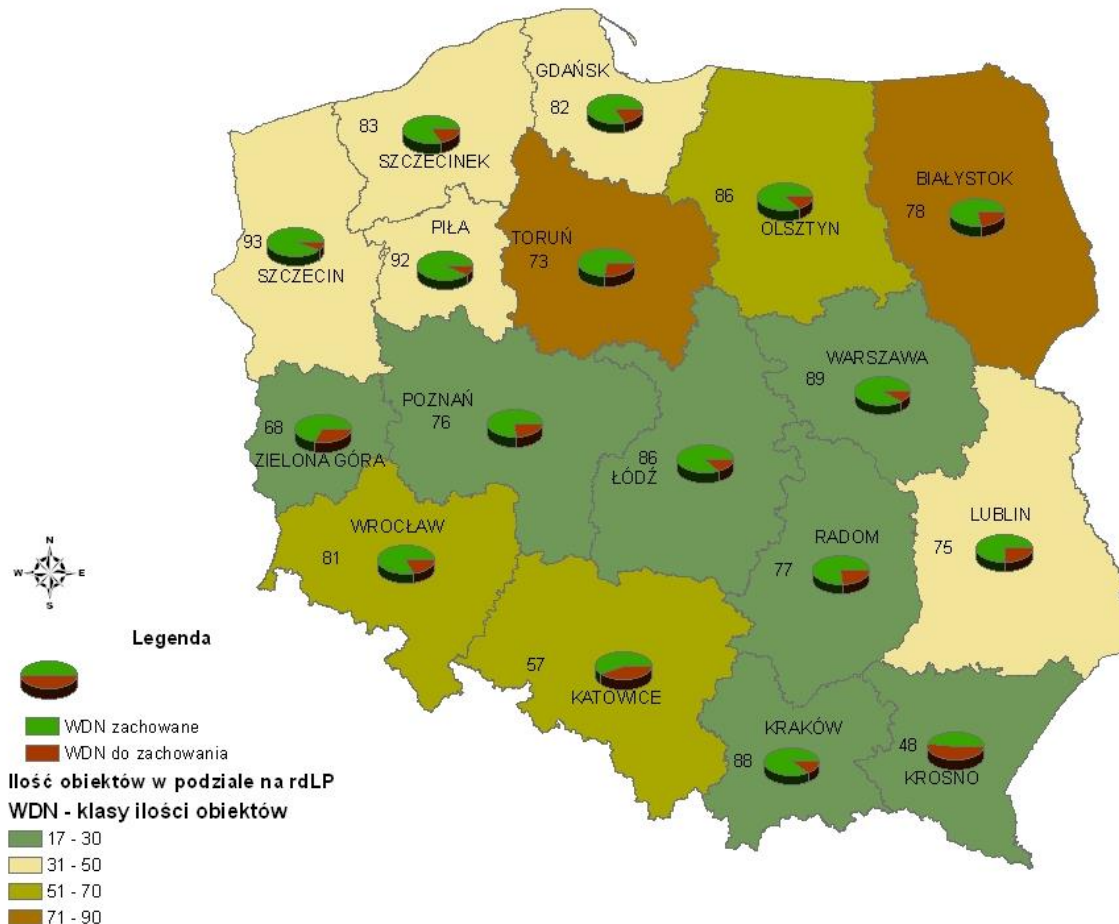
§ 2
Zobowiązuję dyrektorów regionalnych dyrekcji Lasów Państwowych do wdrożenia wytycznych w nadzorowanych nadleśnictwach, w terminie do dnia 30 czerwca 2013 r.

§ 3
Traci moc Zarządzenie Nr 7A Dyrektora Generalnego Lasów Państwowych z dnia 7 kwietnia 2006 r. w sprawie ochrony leśnych zasobów genowych na potrzeby nasiennictwa i hodowli drzew leśnych (znak sp. ZG/7130/ 7 /2006).

§ 4
Zarządzenie wchodzi w życie z dniem podpisania.


mgr inż. Andrzej Kłos

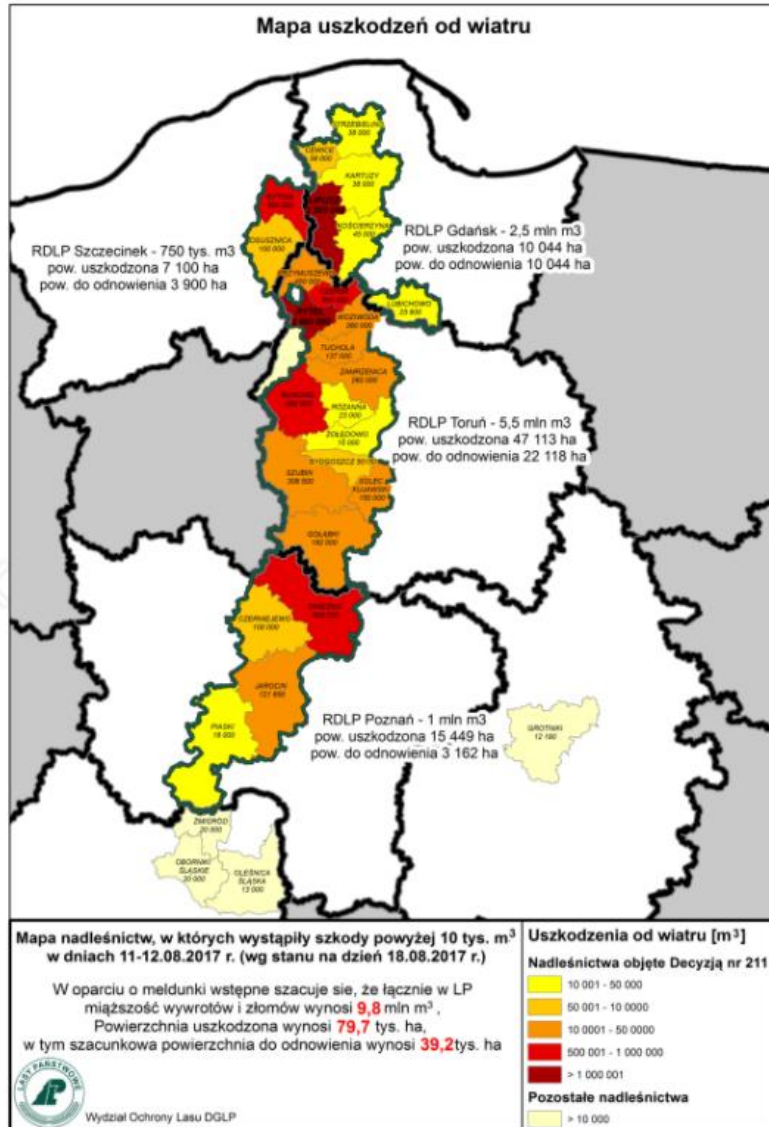
The Kostrzyca Forest Gene Bank preserves gene resources from over **80%** of the selected seed stands in Poland (species that can be stored traditionally on a large scale)



Examples of ecological disasters in Polish forests

1. The effects of the disaster in northern Poland as a result of the storms in August 2017:
 - 80,000 ha - area of damaged stands.
 - 40,000 ha - area to be renewed.
2. The effects of the disaster in Silesian forests as a result of the storms in July 2017:
 - 1 500 ha - area of damaged stands.
 - 800 ha - area to be renewed.
3. Consequences of the ecological disaster in the Białowieża Primeval Forest:
 - 7,200 ha - area of declining forest stands.
4. The effects of dieback of spruce forests in the Silesian Beskids and Żywiec Beskids in the years 2006-2015:
 - 24,000 ha - area of declining forest stands.
5. The effects of the hurricane in the Pisz Forest in 2002:
 - 12,000 ha - area of damaged stands.
 - 4,000 ha - area to be renewed.
6. Consequences of the fire in Rudy Raciborskie in 1992:
 - 9,000 ha - the area of burnt stands.
7. The effects of a fire in the Noteć Forest in 1992:
 - 6,000 ha - the area of burnt stands.





1. The effects of the disaster in northern Poland as a result of the storms in August 2017:

- 80,000 ha - area of damaged stands.
- 40,000 ha - area to be renewed.



Gene resources preserved in the Kostrzyca LBG (regional directorates of state forests affected by wind damage)

| Regional Directorate of the State Forests | Number of selected seed stands in FGB | Seed weight (kg) - all species |
|---|---------------------------------------|--------------------------------|
| Gdańsk | 34 | 68 |
| Łódź | 44 | 90 |
| Poznań | 33 | 60 |
| Szczecinek | 47 | 91 |
| Toruń | 54 | 114 |
| Wrocław | 80 | 219 |

THE KOSTRZYCA FOREST GENE BANK ACTIVITY IN TIMES OF THE INTENSIFICATION OF ECOLOGICAL DISASTERS

Our observations and influence on our work

Increasing orders from European contractors for the purchase of large quantities of seeds from the Polish seed base, especially from plantations



Increasing orders from European contractors for seed preparation and seedling production services



Increasing the species diversity of seeds collected and stored and prepared for sowing



Dysregulation of the cyclical years of seed crops for specific species (the effect of climate change)



Worsening seed quality, especially in the years apart from good seed crop for specific (the effect of climate change)



Worsening condition of many plant species and stands (including herbaceous plants). Urgent need to preserve and restore many species.



Cooperation with the Czech Karkonosze National Park on harvesting the *Sorbus sudetica* fruit



Proposal to start the restitution of the species considered extinct in Poland (IUCN)





**Państwowe Gospodarstwo Leśne
Lasy Państwowe**

**Thank you for your
attention**

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