Interreg CENTRAL EUROPE

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RE-ENFORCE

Workshop and field trip report

FIELD TRIP TO MYSZYNIEC

Myszyniec Forest District of the Polish State Forest, October 14th

Before the RE-ENFORCE workshop on data requirements (DT1.3.1) at the Polish Forest Research Institute in Sękocin Stary, some members of the project team from the Forest Research Institute of Poland (IBL), the University of Padova in Italy (UNIPD) and the Austrian Research Centre for Forests (BFW) took the opportunity to visit the pilot action areas in Poland. On the 14th of October, we visited the pilot area in Myszyniec. First, we received a warm welcome at the headquarters of the Myszyniec Forest District of the Polish State Forest Administration (LP) by Marek Dzieżyk, Head of the Forest District, Michał Stępień, Deputy Head of the Forest District, Magdalena Stępień, Forest Service Senior Specialist for silviculture, tree selection, seed production and tree nursery, and Katarzyna Biedulska, Forest Service Specialist for forest protection, fire protection and education.

Figure 1: Group picture at the headquarters of the Myszyniec Forest District. From left to right: Michał Stępień (LP), Magdalena Stępień (LP), Katarzyna Biedulska (LP), Tadeusz Zachara (IBL), Marek Dzieżyk (LP), Marcin Klisz (IBL), Ewa Zin (IBL), Davide Marangon (UNIPD).

The forest managers told us about the forest fire in May 2014, which burned and destroyed almost 100 hectares of pine forest. The fire was started by an arsonist. About 90 % of the burnt area is managed by the Polish State Forest Administration. The forest in this area stands on very poor and sandy soils. Rapid regeneration is important to protect the site from erosion. In some parts of the burnt area, there were even shifting sand dunes with almost no organic soil material. The biggest challenge during the firefighting operation was to provide access for the fire engines. The forest roads on the sandy ground were not stable enough for the heavy trucks. Fortunately, a storm with heavy rainfall helped the firefighters to finish the job after a long and arduous labour.

To regenerate the degraded forests, it was decided to collaborate with local forestry scientists and establish three zones: a no-management zone with natural regeneration, a zone with artificial regeneration, and a combined option with natural and artificial regeneration. The research area was expanded to approximately 130 hectares to include surrounding stands that were damaged but not destroyed by the fire. This study aimed to investigate the ability of natural regeneration to protect the soil from aeolian erosion.

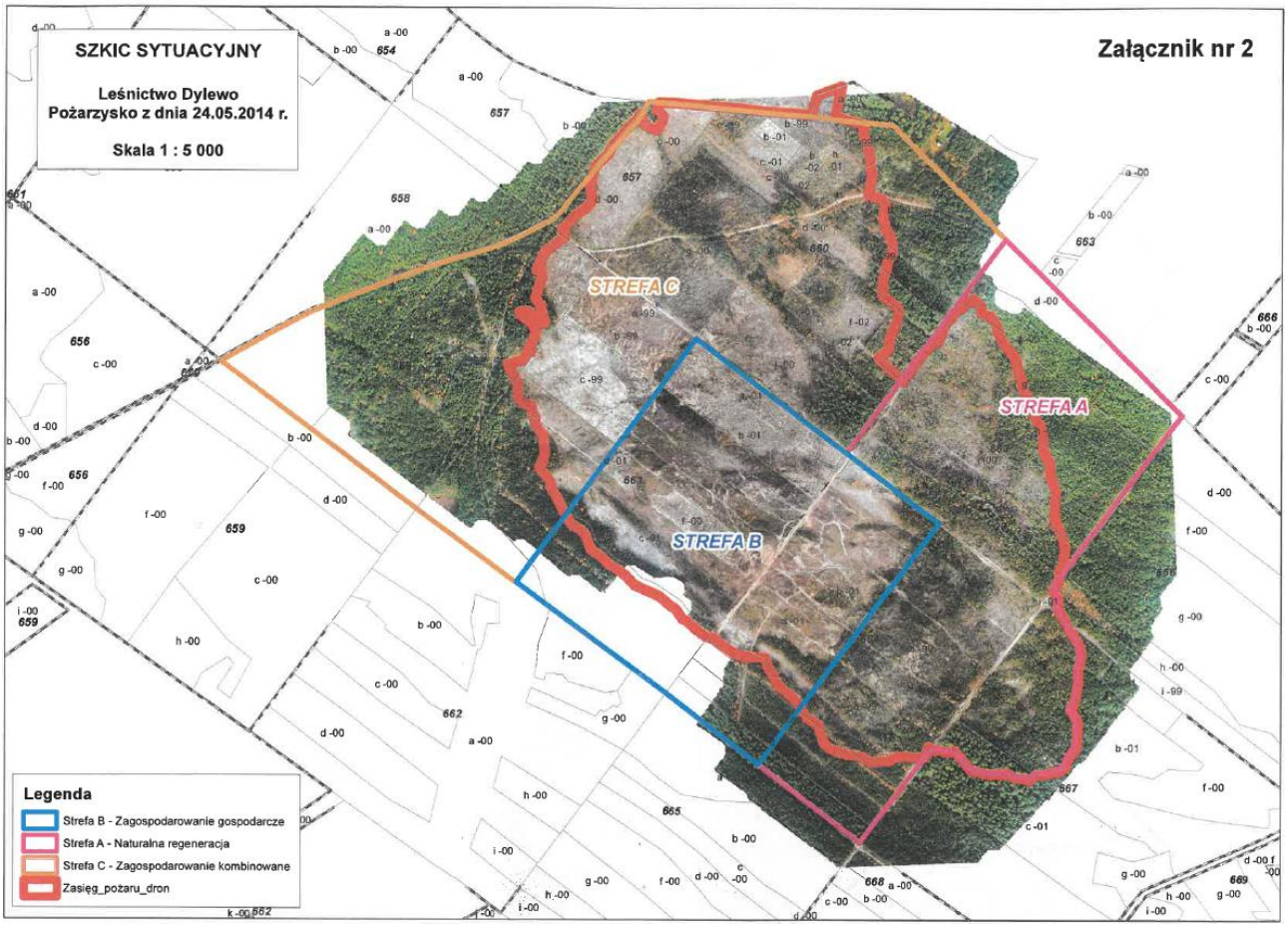

Figure 2: Map of the research area with the no-management zone (STREFA A), the artificial regeneration zone (STREFA B) and the zone with combined regeneration (STREFA C).

Scots pine *(Pinus sylvestris)* and birch *(Betula pendula)* were used for artificial regeneration, as only a few other tree species can survive these harsh conditions. Planting was a real challenge as 7,900 Scots pine seedlings per hectare were used to replant the pine forests and all trees were planted by hand. In some areas, up to 40 % mortality was recorded in the first year after planting due to drought. In the artificial regeneration zone, the soil was prepared for planting by ploughing furrows. This was done to facilitate the planting of trees, to reduce competing vegetation, and to create favourable small sites by directing rainwater to the seedlings. Unfortunately, soil preparation was not effective as the furrows were filled with the sandy soils of the surrounding small hills and covered the seedlings. Nevertheless, most of them managed to survive this.

10 years after the forest fire, the artificial regeneration measures showed good results. Aeolian erosion has been stopped within a few years by reforestation. To maintain the growth of Scots pine, protection against browsing is needed. As moose and red deer threaten the growth of the trees, the terminal shoots have been covered with a white substance to prevent damage by game. Scots pines planted and growing on the sand dunes had significantly smaller needles compared to those growing in fertile areas. The forest managers believe that such shorter needle sizes are a result of disproportionately higher allocation of resources to the development of healthy root systems compared to growth.

Figure 3: Picture of artificial regeneration of Scots pine (with game browsing protection) and birch. Along the embankment next to the forest road, the sandy soils are visible.

Interestingly, natural regeneration also managed to establish itself even under these poor conditions, protecting the soil from erosion. But only birch was able to grow on a large scale. Other tree species were rarely found. Therefore, further information on the long-term development of birch stands is needed, as birch is mostly a pioneer species under these climatic conditions, which is not able to establish stable late-successional and long-lived forests like Scots pine.

Figure 4: Natural regeneration of birch in the no-management zone.

In the unmanaged area, the deadwood of the burnt trees remained completely intact. It was evident that dead wood decomposes quickly here due to the relatively humid and warm climatic conditions. This shows that forest regeneration is very important to protect the sandy soils from aeolian erosion. Deadwood can only fulfil this function for a short time.

FIELD TRIP TO RYTEL

Rytel Forest District of the Polish State Forest, October 15th

On 15 October, we were warmly welcomed at the headquarters of the Rytel Forest District of the Polish State Forest Administration by Łukasz Rutkowski, Head of the Forest District, and Waldemar Wencel, Deputy Head of the Forest District. In August 2017, a massive hurricane hit the area. The wind damaged around 80,000 hectares of forest stands and caused 9.8 million cubic metres of damaged timber. The reforestation area was approximately 39,000 hectares. Rytel used to be one of the most densely forested districts of the Polish State Forestry Administration. However, during the hurricane, 66% or almost 11,000 hectares of the forest district area was damaged. Approximately 1.5 million cubic metres of wood were destroyed and 5,370 hectares had to be reforested.

Figure 5: Group picture at the headquarters of the Rytel Forest District. From left to right: Stefan Ebner (BFW), Ewa Zin (IBL), Davide Marangon (UNIPD), Tadeusz Zachara (IBL), Waldemar Wencel (LP), Marcin Klisz (IBL), Łukasz Rutkowski (LP).

In 2017, after the windthrow event, 39 harvesters, 34 forwarders and 27 other forestry machines were used to process the damaged timber. In 2018, one year after the event, 95 forestry machines were still working in the forest area of the Rytel Forest District. In addition to natural regeneration, approximately 44 million trees were planted. Most of the seedlings were Scots pine *(Pinus sylvestris)*, but 7 million oaks (*Quercus pertraea, Quercus robur)* and 4 million other species such as birch *(Betula pendula)*, beech *(Fagus sylvatica)*, lime *(Tilia spp.)*, maple *(Acer spp.)*, hornbeam *(Carpinus betulus)* and many more were also planted. The

sheer number of seedlings required was a challenge for the foresters, firstly because the trees were planted by hand, requiring a lot of manpower, and secondly because the local nurseries couldn't supply such a large number of seedlings. Fire safety issues were considered during the reforestation. Fire buffer zones were created by planting deciduous trees and a network of firebreaks was created.

Figure 6: Reforestation area after windthrow with Scots pine and birch. Firebreaks along the forest road by planting deciduous trees are visible.

The forest managers anticipate future problems due to game browsing and bark stripping. Hunting in such a large area is a big challenge for hunters. However, the presence of wild wolves in the area may help to control the game population.

During reforestation, forest researchers have established several experimental plots. We visited two different research areas. In the first plot, different methods of artificial regeneration of Scots pine are being tested. Bareroot and container seedlings were planted in autumn 2022 and spring 2023, resulting in four different treatments to compare. Unfortunately, the trees on this plot were too young to get any results. The first measurements of the trees will be carried out soon.

Figure 7: Picture of the excursion on the first research area.

The second trial we visited aims to test different tending methods. Naturally regenerated birch is a major competitor and often obstructs planted Scots pine in its early development. Different regimes of birch removal are being tested in this area. Four different treatments were applied: a reduction of 100 % of birch, a partial reduction leaving 20 accompanying individuals per hectare, a partial reduction leaving 100 accompanying individuals per hectare, and a control variant with no treatment. The partial reduction was implemented to observe possible positive ecological effects without compromising the objectives of timber production too much. The treatment was carried out a few weeks before the visit, so that the area was easily accessible, and the treatments could be compared visually. The untreated plots were particularly interesting, as competition between Scots pine and birch could already be observed on these areas. Long-term monitoring is needed to obtain more detailed information on the effects of the different treatments.

Figure 8: Picture of the second research area of a plot with partial reduction leaving 20 accompanying individuals per hectare (5 trees per plot).

Figure 9: Picture of the second research area of a plot with no treatment.

WORKSHOP RE-ENFORCE

Sękocin Stary, October 16th-17th

During October 16th–17th, 2024, a workshop of the RE-ENFORCE project on data requirements and modelling took place at the Forest Research Institute (IBL) in Sękocin Stary, Poland. The meeting was opened by Marcin Klisz (IBL), leader of the Polish team in the project, and Debojyoti Chakraborty (BFW, Austria), the project leader.

On the first day of the workshop, the responsible partners from the Czech Republic (CZU) (bark beetle), Italy (UNPD) (wind, fire), Germany (LFOA-MV) (ash dieback), Austria (BFW) (drought) and Poland (IBL) (wind, fire) presented the main drivers of forest degradation. After the presentations, a discussion was held on the data required for modelling the individual drivers. It was emphasised that several factors and drivers are interrelated, such as drought and bark beetle outbreaks. It was also emphasised that there are already many models for certain drivers that should be taken advantage of. It was noted that forest data (tree stand data) is crucial for several drivers. However, these data may not be available at the required resolution and quality across the region. It was emphasised that data collected in other projects (such as the EVA project) should be used where possible. It was decided that the focus should be on data that is available for the Central Europe. Since spatial resolution is database- and variable-depending (climate *vs.* stand information), a special concern should be given to the harmony between the different drivers and the resolution of the data. In general, it was emphasised that long-term average data or specific time periods with future scenarios should be used. The discussions were broad and intensive. Finally, it was agreed that the spatial scope should preferably be Europe, with the INTERREG Central Europe area as the minimum area of interest. It was decided that only forests and selected other categories of other semi-natural areas should be included, based on the Corine Land Classification: 3.1; 3.2.2; 3.2.3; 3.2.4; 3.3.4. It was agreed that two climate change scenarios should be used: SSP370 and SSP585. It was determined that the time period for the background/current trends analysis of the drivers should be 1981–2010 and the time period for modelling should be 2041–2070. It was emphasised that the period 2071–2100 can be included in some cases if necessary. The workshop participants decided that the variables should be defined by the individual working groups on the drivers. Finally, the date was set for an online meeting to discuss this with all participating modelling teams (November 14, 2024). In the late afternoon and evening, the discussion continued informally at a barbecue hosted by IBL.

Figure 10: Group picture at the headquarters of the Research Forest District.

The second day of the workshop was dedicated to defining the timeframe and details of the stakeholders' workshop (online) planned for the second half of November 2024. The introduction was made by Martina Dodan (CFRI). After a discussion, the final date (November 19, 2024) and duration (half day) of the workshop were set. It was also agreed that three stakeholders from each partner country should participate, both researchers and practitioners. The workshop was to be preceded by a survey of the invited stakeholders on the causes of forest degradation. The questions for the survey were discussed and agreed.

The last part of the workshop on the second day was dedicated to administration, finance and social media.

WORKSHOP RE-ENFORCE

Agenda 16th October 2024

09:00-10:00 Data requirement and modelling- Bark beetle (CZU)

10:00-11:00 Data Requirement and modelling- Wind (IBL+UNPD)

11:00-11:30 Coffee Break

11:30-12:30 Data Requirement and modelling- Fire (IBL+UNPD)

12:30-13:30 Lunch

13:30-14:30 Data Requirement and modelling- Ash Dieback (LFOA-MV)

14:30-15:30 Data Requirement and modelling- Fire (IBL+UNPD)

15:30-16:00 Coffee break

16:00-16:30 Data requirement and modelling- Drought (BFW)

16:30-17:00 Discussion- Open Issues

18:00 onwards Barbeque hosted by IBL

Agenda 17th October 2024

09:00-10:00 Discussion on Stakeholders' workshop

10:00-11:00 Discussion on the RE-ENFORCE Survey

11:00-11:30 Coffee Break

11:30-12:30 Admin and Finance Issues

12:30-13:30 Wrapping up

List of participants

Debojyoti Chakraborty

Jaroslav Cepl

Jiri Chuchlik

Martina Đodan

Stefan Ebner

Attila Fersch

Ivan Horvat

Marcin Klisz

Jan Kowalczyk

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Emanuele Lingua

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Sipos Stefánia

Eric Thurm

Anna Wöhlbrandt

Tadeusz Zachara

Ewa Zin