Państwowe Gospodarstwo Leśne
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Forest Carbon Farms:
the Polish State Forests innovative project for climate protection

Warszawa, Las2017, 9th October 2017

Forest management as a tool for mitigating CO_2 growth in the Earth's atmosphere

The United Nations Framework Convention on Climate Change (UNFCCC), adopted in 1992 in Rio de Janeiro ("Rio Convention")

The Kyoto Protocol adopted in 1997

The Paris Agreement 2015 (inclusion of forests in climate policy)

- common, legally binding global climate agreement (adopted by 195 countries)
- the role of forests in the absorption of CO_2 has been emphasized; representatives of Poland discussed the project of forest carbon farms, which stimulates the absorption of CO_2 while increasing biodiversity and intensifying wood production
- conference participants have acclaimed promoting forests, as a natural carbon sink; as a conclusion forests has been included into the Paris Agreement

Art. 5 PA

Parties should take action to conserve and enhance, as appropriate, sinks and reservoirs of greenhouse gases (…) including forests

Forests in Poland

- total area **9.2** million hectares
- forest cover **29.4%**
- dominant species: pine (spruce, fir and beech in the mountains)
- forest ownership:
  - 77.1% publicly-owned, administrated by the State Forests
  - 17.9% individual ownership
  - 5.0% other (including national parks)

- **The State Forests National Forest Holding** (7.5 million hectares)
  - organization protecting, utilizing, and shaping Poland's forests for over ninety years
  - the Polish forestry model is **highly appreciated in whole Europe, promoting non-productive forest functions** (among others role of forests in total carbon balance in nature)

Forest Carbon Farms Project (FCF Project)

- **Directive no 2 of the Director–General of the State Forests' dated 17th January 2017** regarding the realisation of a developmental project called Forest Carbon Farms, implemented as a joint venture of the State Forest organisational units.
- Goals and directions:

  - ✓ expression of the role of **forest areas** in mitigating the negative effects of climate change in the context of international agreements;
  - ✓ **storage** of additional organic carbon in separated parts of the forest;
  - ✓ **verification** of the effectiveness of additional measures to increase CO_2 retention;
  - ✓ creating a CO_2 absorption **model** by Polish forests;
  - ✓ Introduction of the **trading system** for CO_2 units to the economic practice
  - ✓ **a research program** constituting an integral part of the FCF Project

- Project implementation - the first quarter 2017
- Costs of Project – The State Forests Forest Fund.
- Pilot Project, including both additional activities in forest areas and **scientific research**

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Actions in forestry in the context of climate protection

Additional activities in the forest

FCF Project

Active protection of wetlands

Energy wood yards

Developmental project in forest areas – (years: 2017-2026)

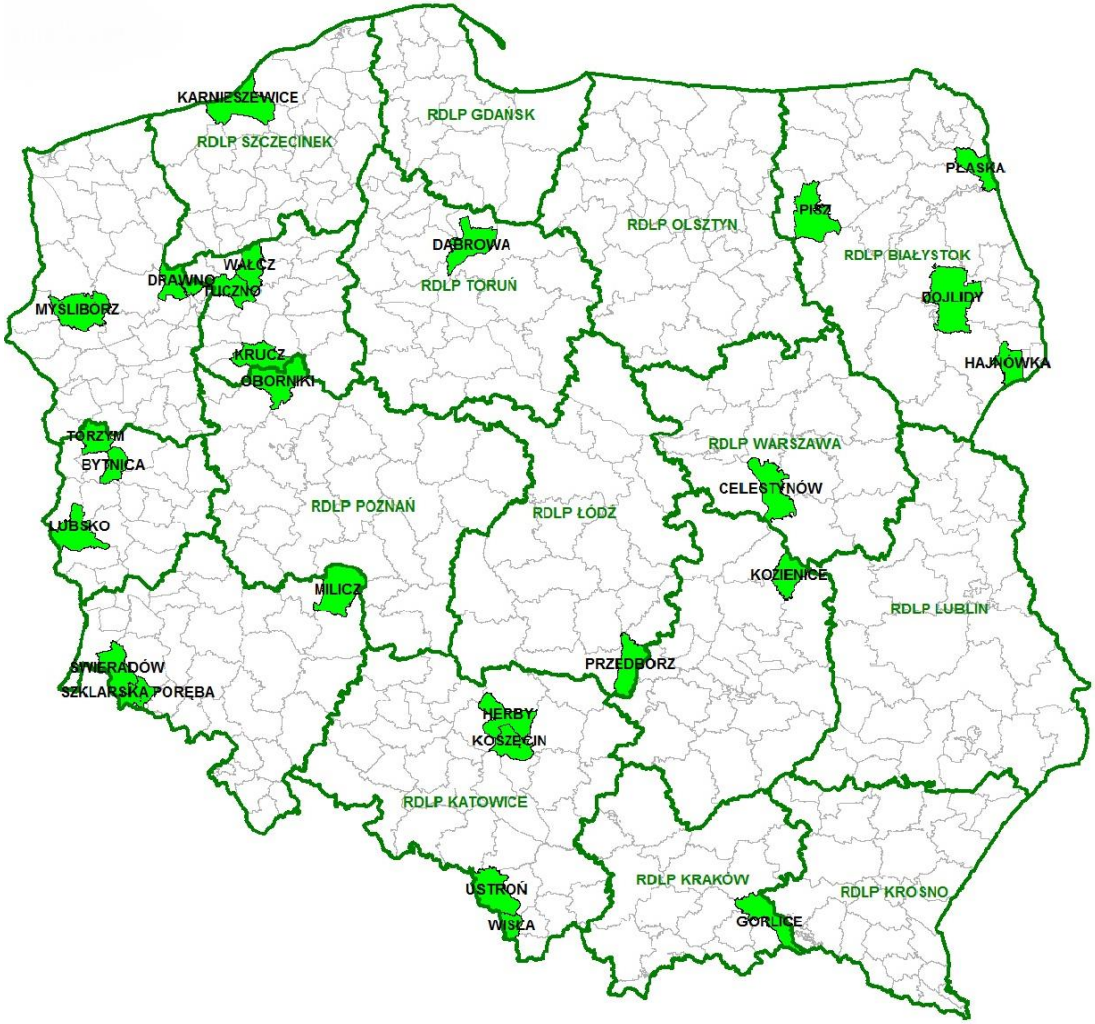
- preparation of list and spacial scope of **activities** for Forest CarbonFarms project
- **inventory of carbon** in Polish forests
- creating a **carbon balance model** for Polish forests,
- **assessment of efectiveness of additional activities** with regard to absorbtion
- **granting marketing authorization** for carbon dioxide units

- after 2026:

- establishing anther areas within FCF project
- the settlement of generation process and the sales of units of the absorbed CO^2.

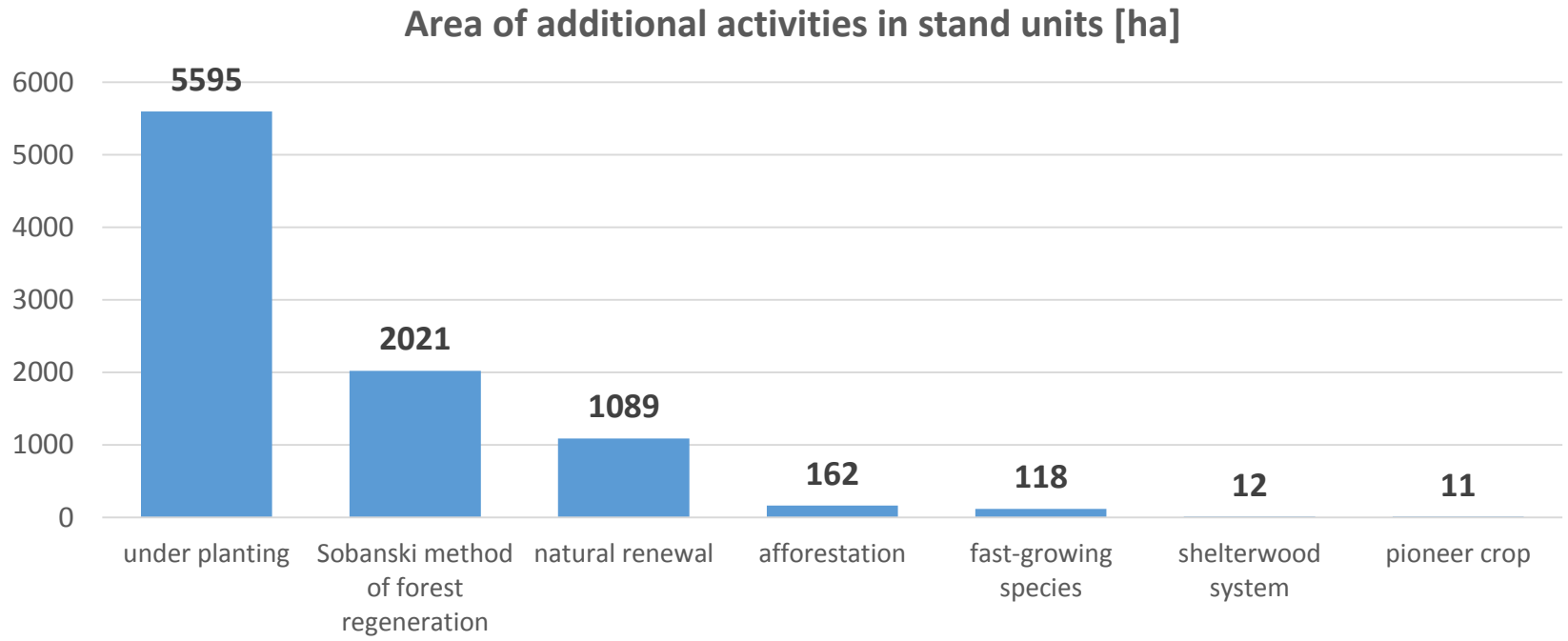
Forest districts participating in the Project

Forest district	Number of stand units	Area [ha]
Bytnica	423	1134,58
Celestynów	210	823,9
Dąbrowa	254	627,55
Dojlidy	145	517,14
Drawno	120	577,7
Gorlice	44	88,65
Herby	73	214
Karnieszewice	163	381,85
Koszęcin	107	318,75
Kozienice	82	333,38
Krucz	115	401,55
Lubsko	182	457,66
Milicz	97	356,64
Myślibórz	48	91,78
Oborniki	126	431,22
Płaska	52	230,33
Przedbórz	148	323,07
Torzym	118	231,13
Tuczno	51	242,82
Ustroń	90	369,76
Wałcz	127	588,86
Wisła	66	265,52
TOTAL	**2841**	**9007,84**



Additional activities in stand units

Aiming at the accumulation of additional amounts of carbon in strictly defined layers of the forest



Revised list of area and activities in the units and estimated additional carbon sequestration results in the **Carbon Program** design.

Estimation of predicted extra-carbon (LGW and REF) absorbed quantities will be carried out using appropriate tools (CBM and others).

Actions on energy wood yards

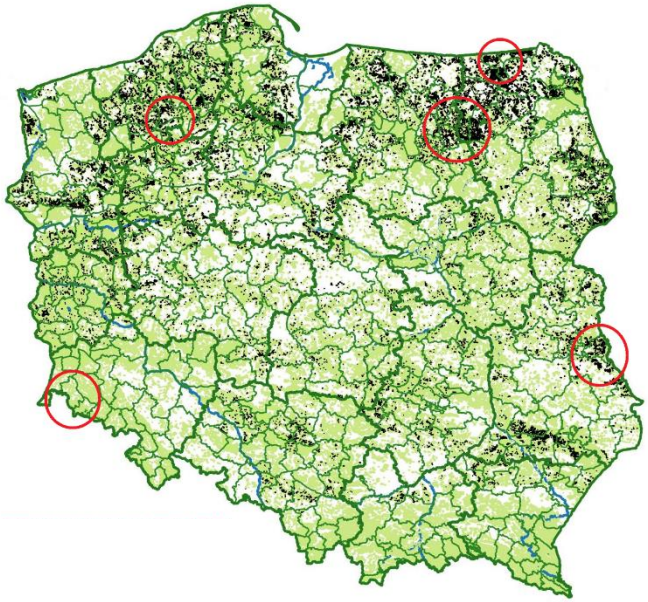
- Accumulation of organic carbon contained in organic matter to inhibit the release of greenhouse gases into the atmosphere over time from the acquisition of wood material to its actual energy consumption

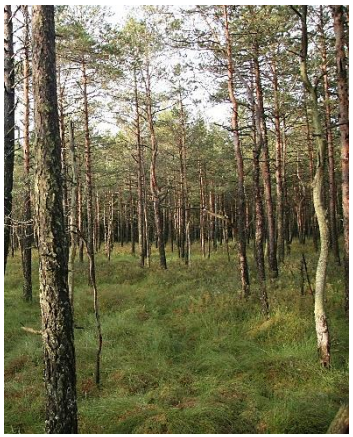
- **Definition of energy wood / forest biomass:** "Wood material, which, due to its qualitative and physical aspect and physico-chemical properties, has a reduced technical and utility value that makes it impossible for industrial use." Detailed definition (Regulation 46 § 76)

- **In 2017 the 3 yards are opened in:**
  - ✓ **Pisz**
  - ✓ **Browsk**
  - ✓ **Lądek Zdrój**
    Forest Districts

Active protection of wetlands

- around 10 Forest Districts in 5 units
- 10 years of pilot period, 50 years of prognosis and permanence
- rewetting of drained peatlands (degraded for various reasons, e.g. drying, peat harvesting, afforestation, ...)
- outcome: not only the reduction of CO_2 emissions but also the restoration of valuable habitats, protection of biodiversity and strengthening of other non-productive functions of the forest
- inhibiting the degradation process (mineralization and eutrophication of the surface layer) of wetlands





Activities in wetlands

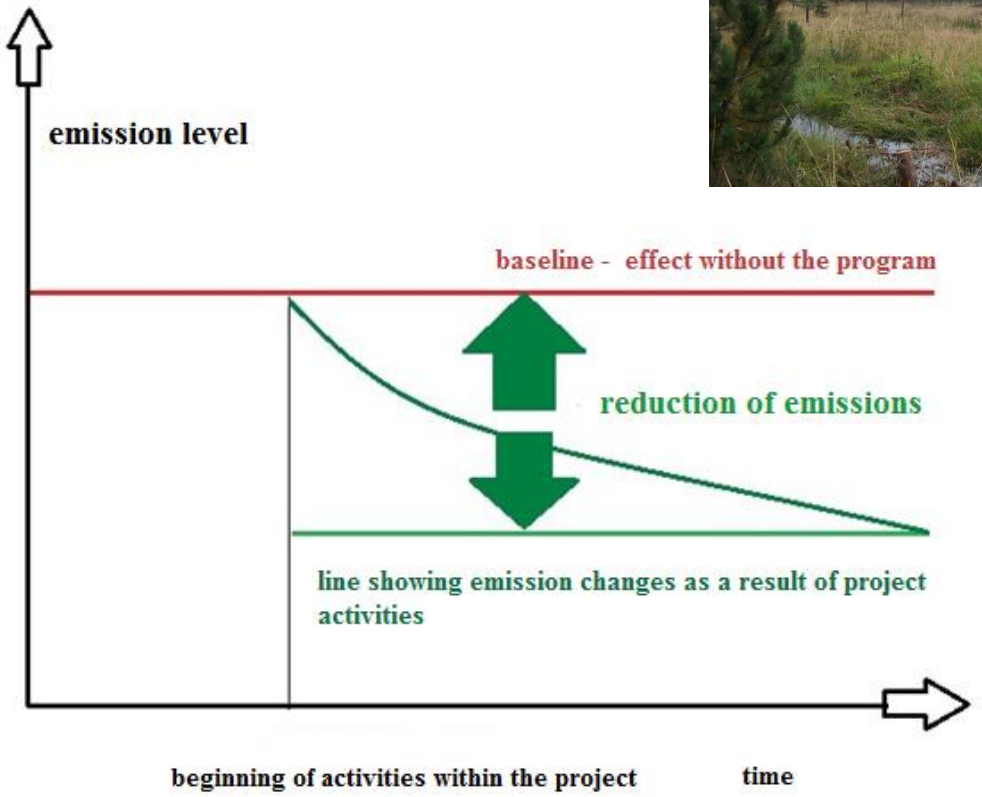
A REDUCTION OF CO2 EMISSIONS

may appear in the rehydrated areas

Example:

„Kieve” project (Meklemburgia Western Pomerania) :

- 50-year period of the impact,
- Effect- 14.3 thousand T eqCO2
- Price of 1 carbon credit equals 35 euro
- The improvement of natural habitat condition
- Protection of water resources and quality



on the basis of German Environment Agency (UBA)

acc. to : Ministerium fur Landwirtschaft, Umwelt und Verbraucherschutz Mecklenburg Vorpommern 2016

Participants

Supervision: General Directorate of The State Forests

Coordination: Coordination Center for Environmental Projects

Commissioned assignment:

1) The State Forests IT Department
2) The State Forests Development and Deployment Center
3) The State Forests Information Center
4) Regional Directorates of The State Forests
5) Forest Districts
6) Auditor Unit
7) Bureau for Forest Management and Geodesy
8) Other units of forest management planning and forest monitoring: e.g. TAXUS SI Sp. z o.o.
9) The National Center for Emissions Management
10) Scientific institutions (4 Universities, 2 Scientific Institutes)
11) Support units
12) Other

Units of Carbon Dioxide (JDW)

JDW – amount of organic carbon corresponding to 1 Mg of CO_2, which in consequence of additional activities was accumulated in forest ecosystem reservoirs or in forest energy wood yards. The unit will also demonstrate the effect of reducing emissions as a result of actions taken in areas with high humidity (wetlands).

Market of Carbon Dioxide Units:

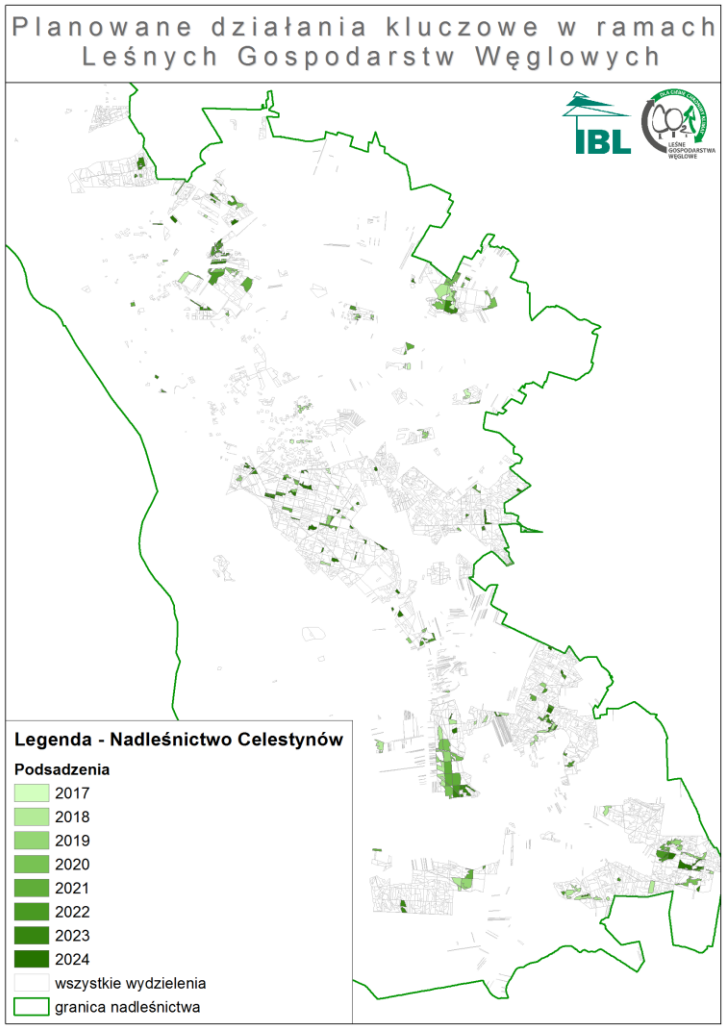
- Acquisition: Public Relations, Corporate Social Responsibility
- Disposal: revenue for The State Forests - non-productive forest function
- Indication by the buyer of the investments financed by the sales of the JDW:
  - ✓ forest management,
  - ✓ the non-productive functions of forests (social, environmental)
  - ✓ active nature conservation,
  - ✓ forestry and historical education,
  - ✓ infrastructure projects
  - ✓ improvement of the functioning of the State Forests as an institution.

Calculating carbon resources

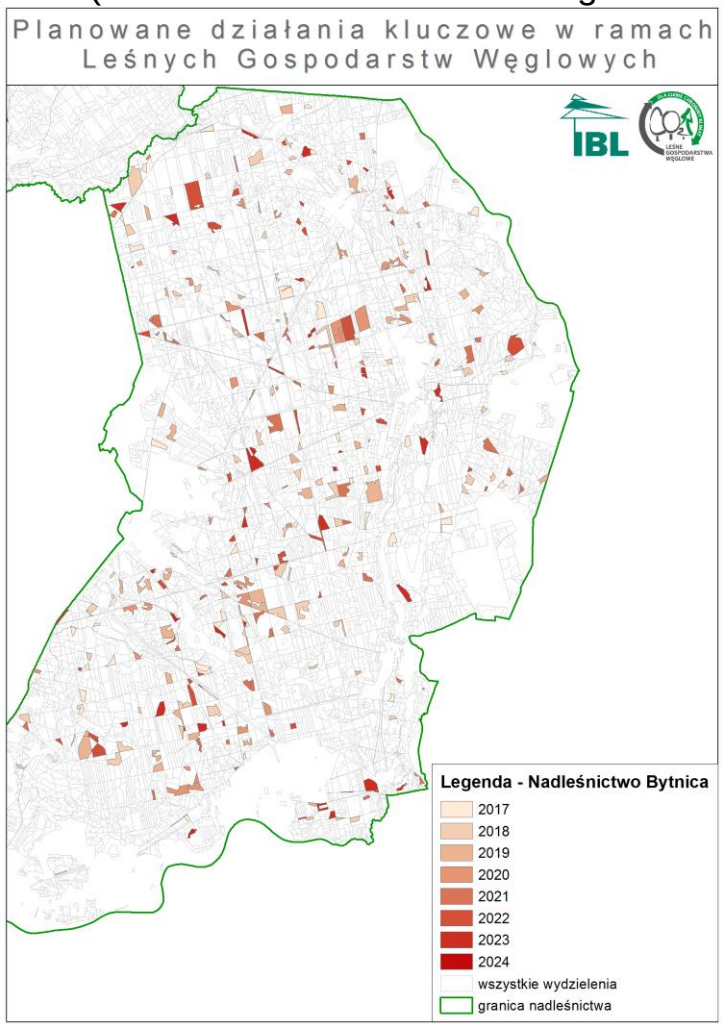
- Operational-Scale Carbon Budget Model of the Canadian Forest Sector (CBM-CFS3)
  - a stand- and landscape- level modeling framework that can be used to simulate the dynamics of all forest carbon stocks
  - Polish algorhitms and equations
  - Research and model improvement
    (adjusting for Polish tree species, soils, forest management model and silvicultural treatments, and additional acitivites in forestry)

Simulation examples showing the effect of additional activities using the CBM

Celestynów Forest District (under planting)

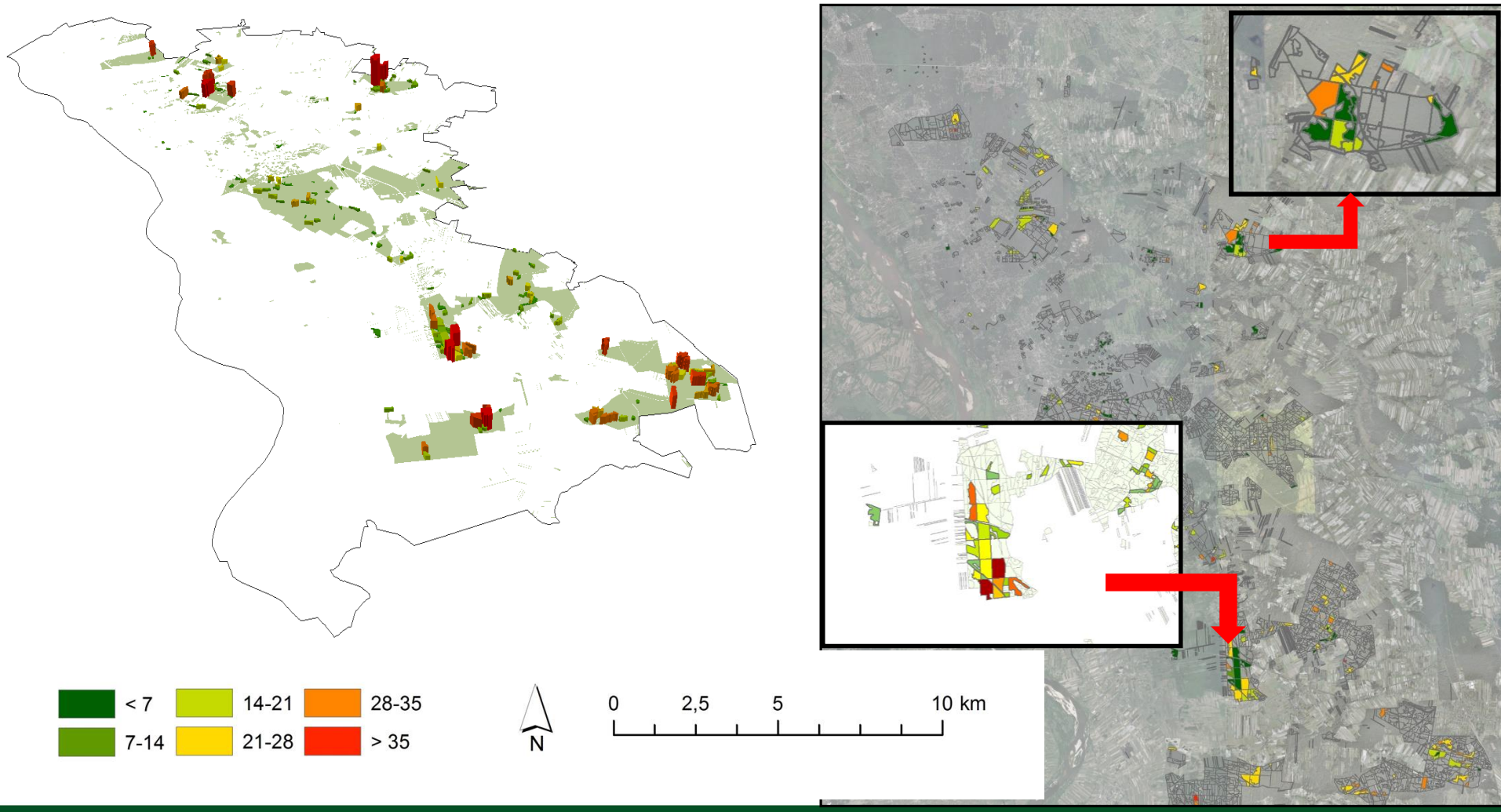


Bytnica Forest District
(Sobanski method of forest regeneration)

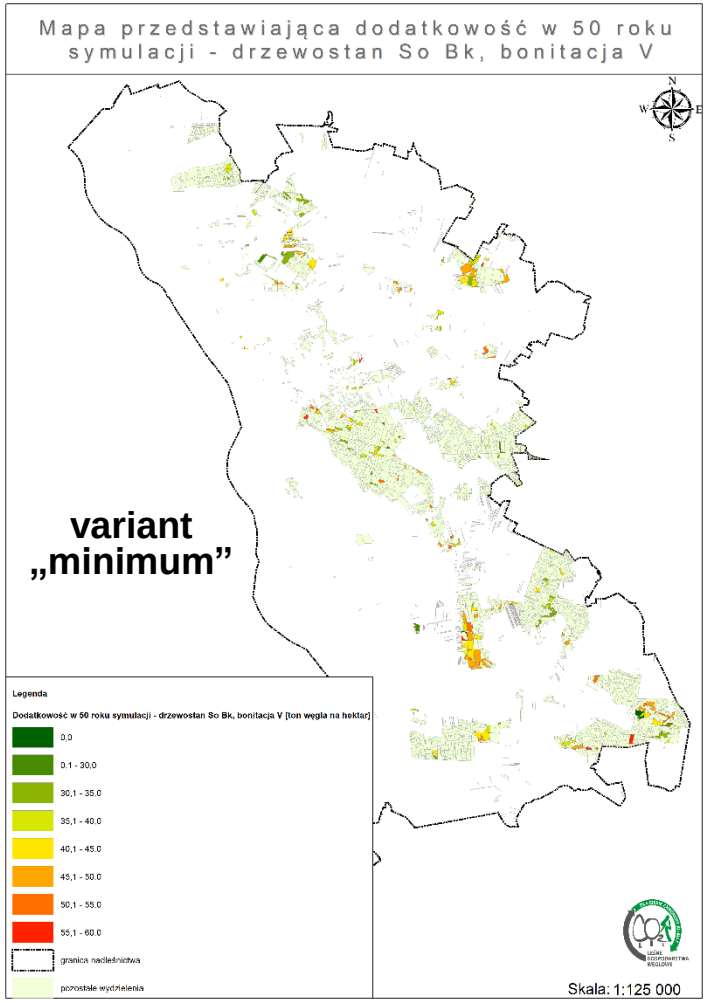


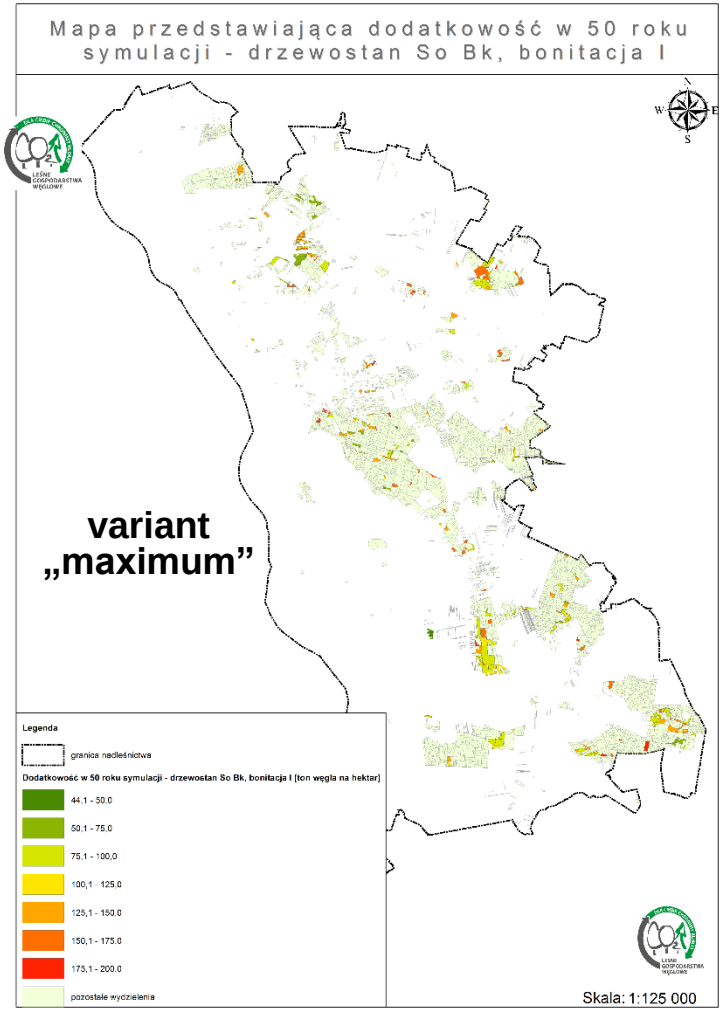
Simulation example showing the effect of additional activities using the CBM

Celestynów Forest District – underplanting of beeches after 25 years

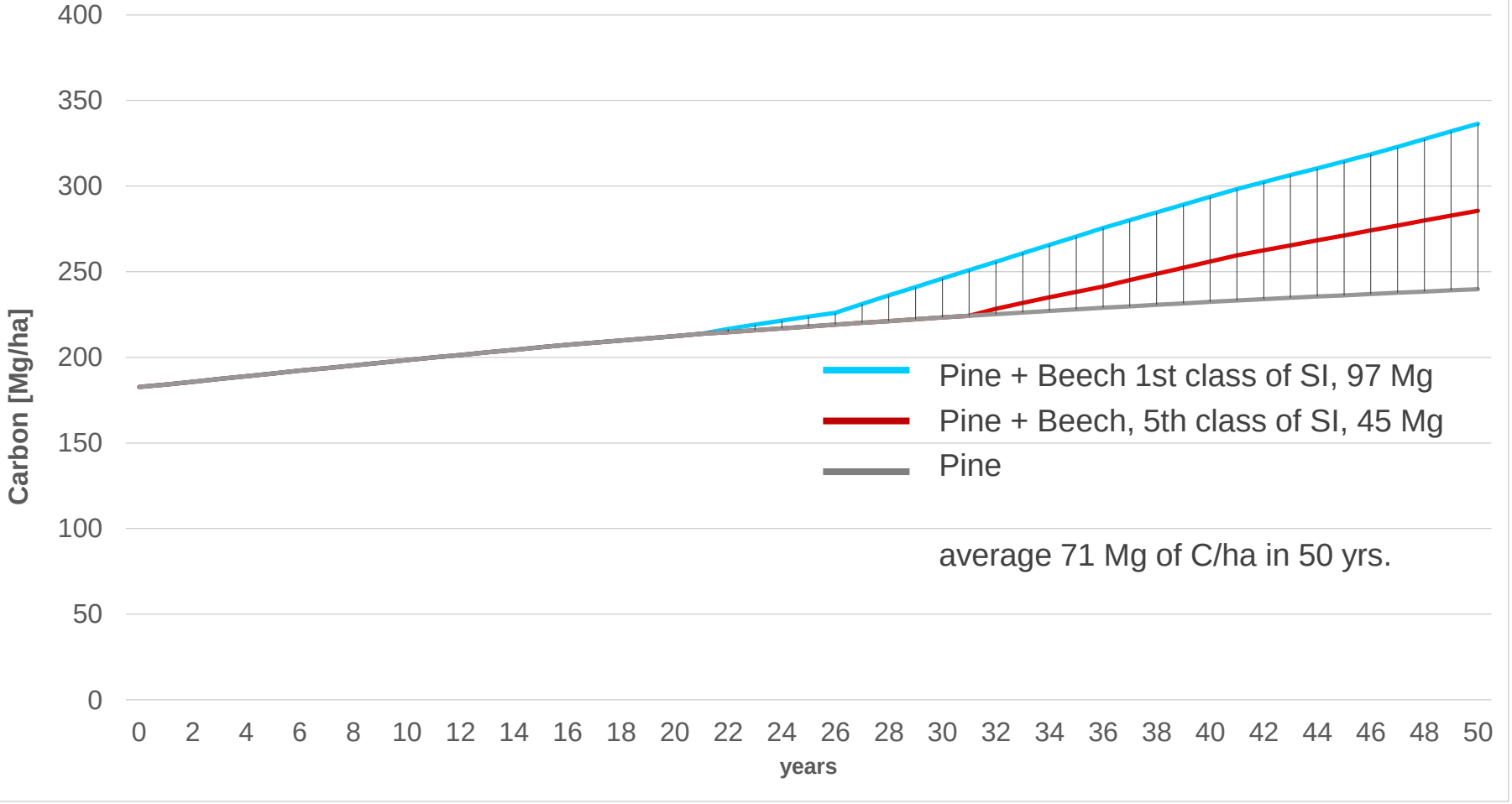


Simulation examples showing the effect of additional activities using the CBM for Celestynów Forest District
- underplanting of beech – variant „maximum” and „minimum”





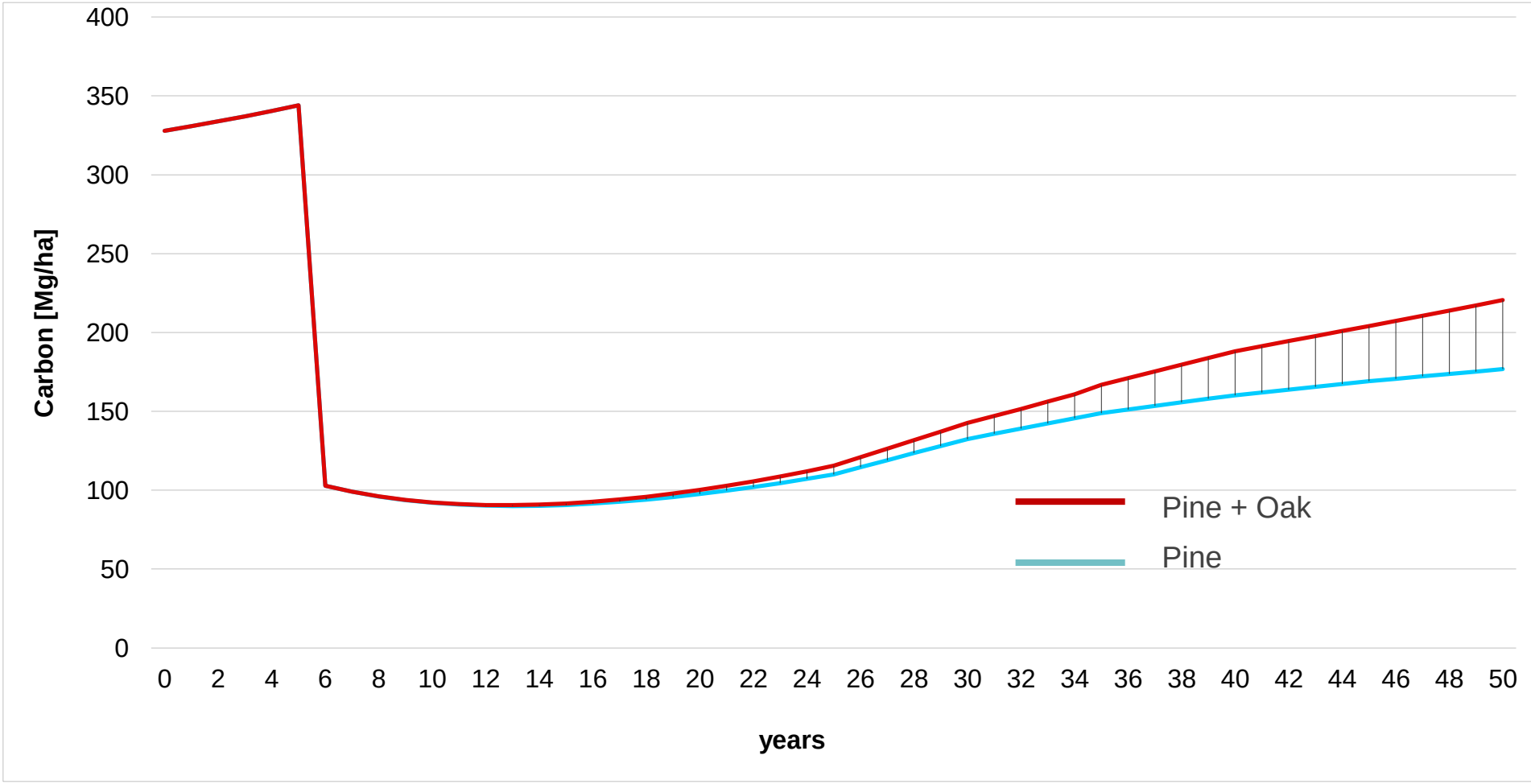
Simulation examples showing the effect of additional activities using the CBM for Celestynów Forest District - underplanting of beech: variant „maximum" and „minimum" – Scots pine 100%, 54 years, site index II, underplanting of beech in 1st year of FCF



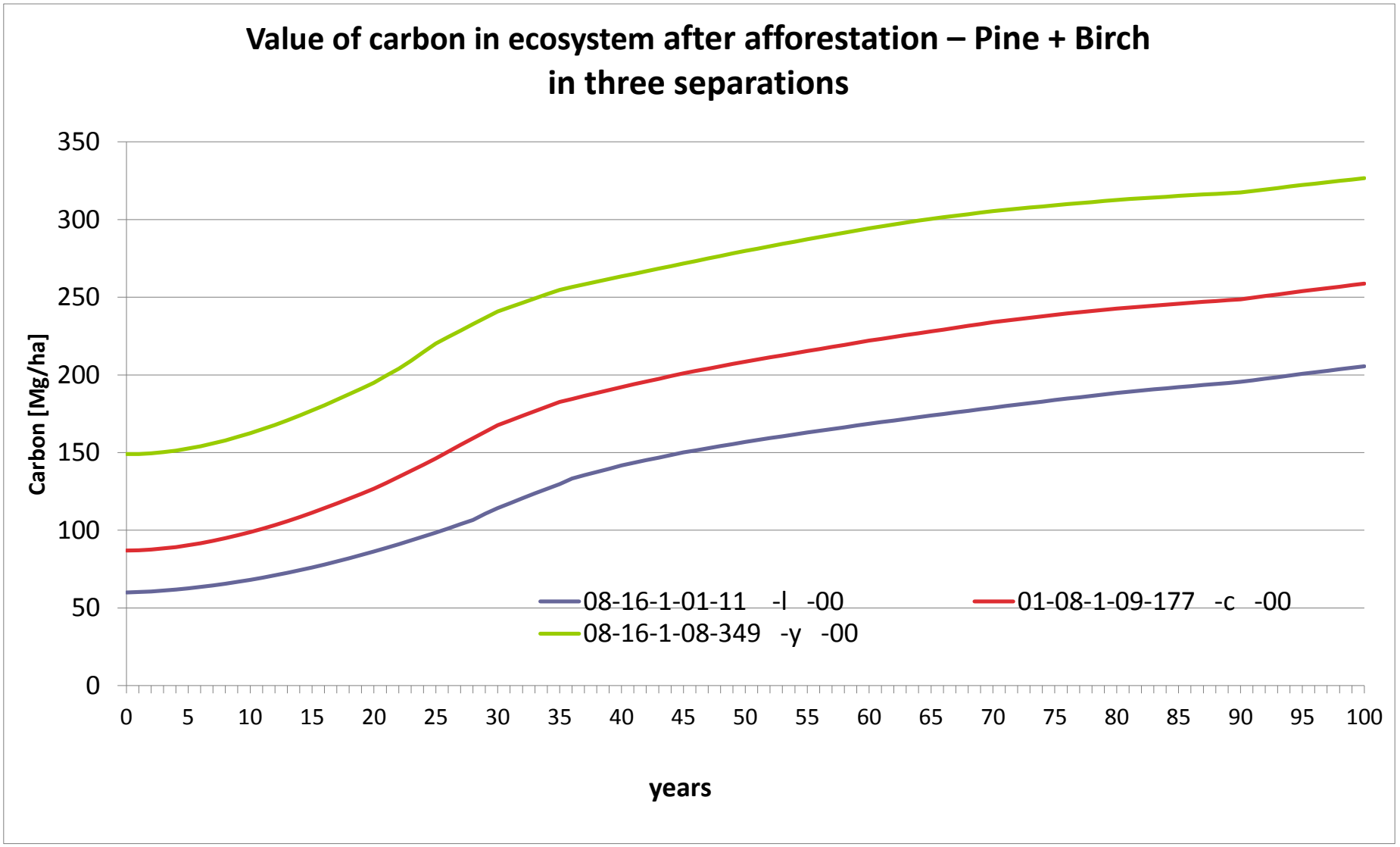
Simulation examples showing the effect of additional activities using the CBM I for Bytnica Forest District

(Sobanski method of forest regeneration)

Scots pine 100%, 94 years, site index II, planned to cut in 2023

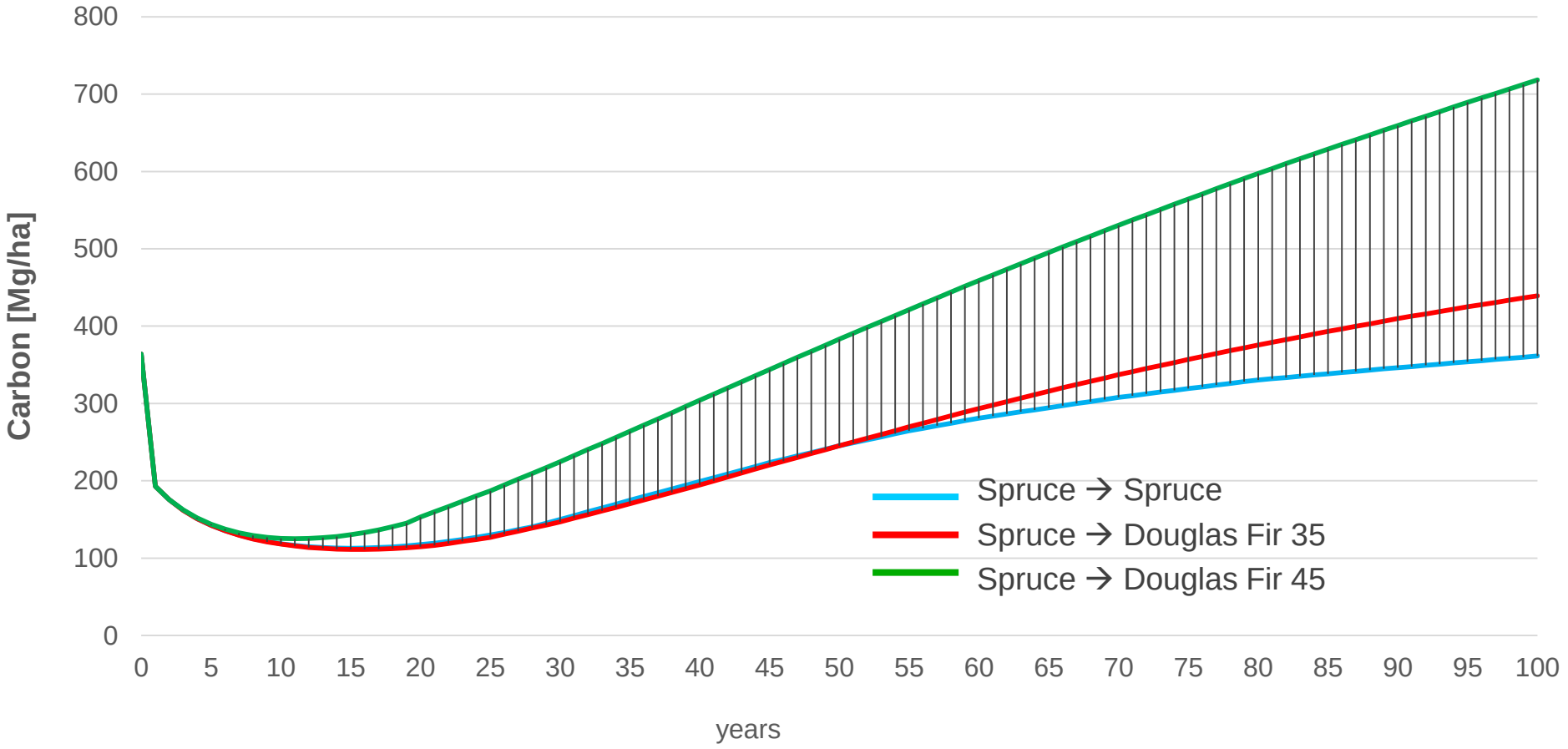


Afforestation of former farmland

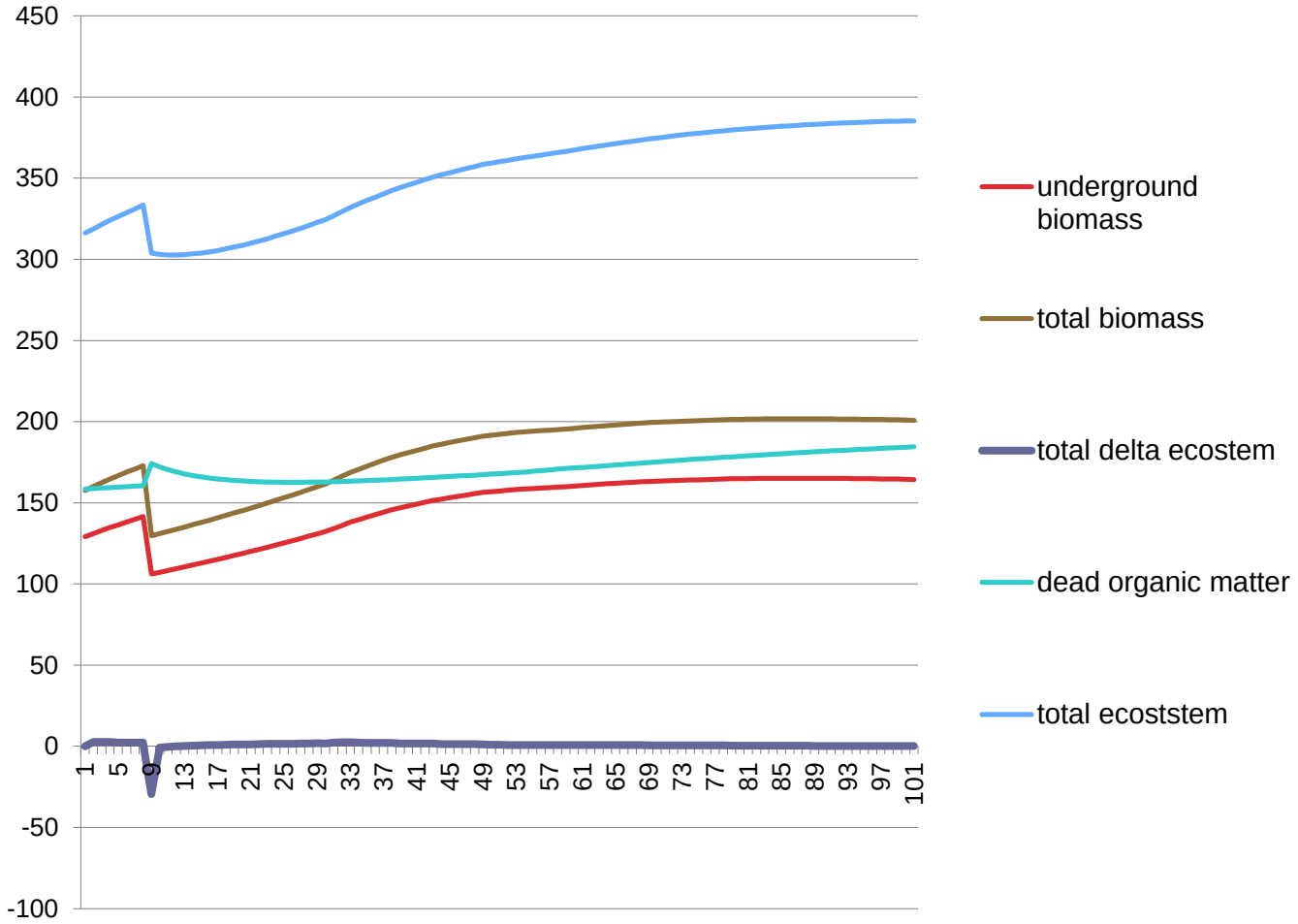


Simulation examples showing the effect of additional activities using the CBM – reforestation with fast-growing species

(Douglas fir instead of typical Norway spruce)



Symulation of additionality– Torzym Forest District alternating the age of trees for cutting (lowering for the purpose of the generation replacement)



division 219 c-01,

total area/reduction 11,62/3,00 ha

**So 57l; – fresh mixed coniferous forest, Proper rusty soils;
planned thinning: late thinning**

simulated effect of tree stand removal in 2025, when tree stand is 66 years old

First stage of research - field work was launched

Goals:

1) Determination of carbon stocks at the beginning of the forecasting period for different forest ecosystem reservoirs in the FCF Project stands and in reference areas

2) Professionalization of the Canadian model
(the research material will be used to develop equations considering Polish conditions)

Field work includes, among others:

- **extended and updated stand description and inventories**
  - ✓ establishing the value of the stand characteristics which will allow the modeling of carbon stocks in different reservoirs
  - ✓ tree stands included in the FCF and reference areas

- **basic Carbon Sample Plot (BCSP) - selection of representative parts of stands for sampling of organic material**
  - ✓ soil exploration, different types of soil samples from different genetic levels
  - ✓ undergrowth - cutting and chipping
  - ✓ forest floor, litter (uniform grid of circle sample plots of 0,2 m^2)
  - ✓ tree stand-sample trees (sectional measurements, determination of fresh biomass of all tree components, sampling for laboratory testing from the aboveground and underground parts of PKW, including dead roots)
  - ✓ securing and transporting the samples to the laboratory

- **evaluation of biodiversity**

Activities related to the collection of research material

Activities related to the collection of research material

Thick roots picking

Activities related to the collection of research material

Sectional measurement of felled trees
Preparing trunks for weighting
Labeling discs

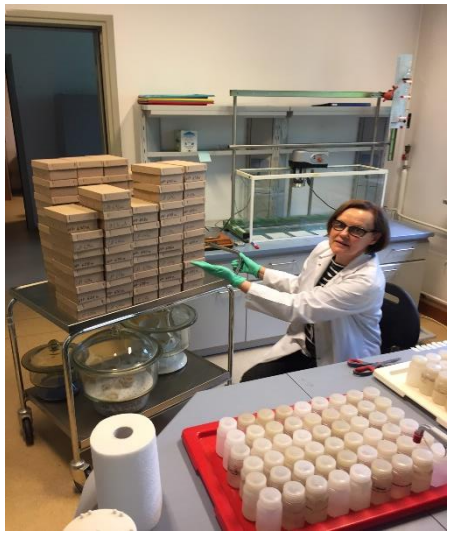
Activities related to the collection of research material

Basic Carbon Sample Plot (BCSP)
Sampling from forest cover and litter

Activities related to the collection of research material

Soil sampling

Activities related to laboratory works



Plan for today…

- ✓ Launching a remaining research coverage
- ✓ Implementation of additional activities
- ✓ Implementation of the system for assessing amount of carbon in ecosystem (CBM);
- ✓ Creating a CO2 Portal;
- ✓ Preperation to launch parts regarding wetlands;
- ✓ Implementation of the system for monitoring works and support for units;
- ✓ Informative campaign.

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Thank you
for your attention!

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