Jul 1st, 12:00 AM

Data set characterizing reforestation of drained peatlands

Victor Sidorencov

International Environmental Modelling and Software Society (iEMSs)
2012 International Congress on Environmental Modelling and Software
Managing Resources of a Limited Planet, Sixth Biennial Meeting, Leipzig, Germany
R. Seppelt, A.A. Voinov, S. Lange, D. Bankamp (Eds.)
http://www.iemss.org/society/index.php/iemss-2012-proceedings

Data set characterizing reforestation of drained peatlands

Victor Sidorencov
National Institute of Forestry and Forestry Mechanization, Russia
(lesvn@yandex.ru)

Abstract: The presentation concerns the problem of protecting such vulnerable carbon stocks as peat deposits at the drained peatlands. Due to reduced demands for peat since the middle of 1990s, a large part of peatlands drained in Vologda region (Russian North-West) between 1980 and 1990 were not used for peat mining. The risk of fire is high at such ecosystems, and so it was decided to grow forest on these lands. This paper presents the data set summarizing the results of survey that was undertaken to study reforestation of drained peatlands.

***Keywords*:** data set, reforestation of drained peatlands

1 INTRODUCTION

Reforestation of peatlands is important part of land reclamation in the North-West regions of Russia: it reduces the risk of peat fires and increases accumulation of carbon stocks in soils and vegetation.

About 5 mln ha of wetlands were drained in Russia during the period from 1925 to 1995 [Kobyakov, 2011]. Many of them are in the European part of Russia. According to preliminary estimates, about 1.5 mln ha of the drained lands have been waterlogged again.

The proximity of peatbog areas to settlements and extensive road network contributes to the risk of peat fires, which are accompanied by significant carbon dioxide emissions. In order to reduce the risk of peat fires, the Forest Service is undertaking large-scale reforestation of drained peatlands since 1990s.

This paper presents the results of a survey of forests grown on the abandoned peat mining sites located in the Cherepovetz district of Vologda region.

2 RESULTS

The survey is purported to study the state of naturally grown and planted stands of pine (Pínus sylvestris) and spruce (Picea abies). The results of survey were

compiled into a data set, which is distributed in xls format, and can be obtained on request from the web site of the National Institute of Forestry and Forestry Mechanization (www.vniilm.ru).

The data set includes information on the height, diameter, and viability of the trees. It also contains information that characterizes the class of growth, the size of tree crown, and environmental conditions of growth. The forest site is characterized by the type of soil [Kovda and Rozanova, 1988], conditions of growth [Vorobyev, 1953], and forest type. The forest management events are categorized into ameliorative (e.g. channel cleaning) and forestry events (e.g., cuts).

The survey of 45-year old spruce plantations has shown that spruce does not achieve the first class of growth in the environmental conditions which are typical for the drained wetlands under survey (Fig.1).

Fig 1 The 45-year old stand of spruce grown at the drained peatbog after peat extraction.

The root system of spruce is horizontal, and does not expand to a depth of more than 2 m. This results in high risk of windfall. The risk is not very high for the trees which are 40-60 years old, but in the older stands the windfall gaps are often observed.

The windfall gaps were not observed at pine plantations. Apparently, this reflects biological characteristics of pine, which forms a vertical root system. Besides, pine is less demanding to soil fertility, and to stability of hydrological regime. In the environmental conditions which are typical for the drained wetlands under survey, pine plantations are able to achieve the second class of growth (Fig. 2).

Fig 2 The 45-year old stand of pine grown at the drained peatbog after peat extraction in the case long-term effect of draining (left) and in the case of secondary waterlogging (right).

In the case of natural reforestation, deciduous species, especially birch, dominates over coniferous species. The latter have little chance to enter the upper layer of the stand if the deciduous species forms a dense canopy [Chuprov, 2008]. The same can be true even for the pine plantations in the lack of proper treatment: pine, has low class of vitality there and gradually dies out.

The natural reforestation in the flooded areas leads to patchy regeneration of pine and birch. In the mixed patches, birch, dies out within 20 years, whereas pine continues to grow.

3 CONCLUSION

Successful reforestation of drained peatlands requires a proper management strategy to promote coniferous species and to form stands which are less fire-prone. The data set summarizing the results of survey that was undertaken to study reforestation of drained peatlands is to provide an empirical ground for developing a strategy of such sort and stimulating efforts on implementation process-based ecological models to this practically important problem.

ACKNOWLEDGMENTS

We thank the staff of the Vologda district department of the Forest Service and Cherepovets unit of the Forest Service, for their assistance in organizing the expedition, searching for objects and data collection.

REFERENCES

Chuprov, N.P., *Birch forests of European North of Russia*, Arkhangelsk, 385 pp., 2008.

Kobyakov, K.N.,(eds.), M*apping of High Conservation Value Areas in Northwestern Russia: Gap-Analysis of the Protected Areas Network in Murmansk, Leningrad, Arkhangelsk, Vologda, and Karelia regions, and the city of Saint-Petersburg*. 506 pp., St. Petersburg, 2011.

Kovda, V.A., and B.G.Rozanova, *Soil science. Types of soiland their geographical usage*, High School, 373 pp., Moscow, 1988.

Vorobyev, D.V., *Forest Types of the European part of the USSR*, Academy of Sciences Publishing House, 450 pp., 1953.