

Bulgaria – Panagiurishte case study

Case study forest area: 6,584 ha

Ownership: 93% public, 7% private

Forest goods and services:

Wood products: fire wood for local citizens, pulpwood, technology wood (for wood based panels). Non wood products: mushrooms, herbs, tourism. Services: grazing, hunting. Non market services: Protection against landslides and soil erosion.

Special local conditions:

The Executive Forest Agency is responsible for forest management in all types of forest in Bulgaria, irrespective of ownership. It participates in the process of design and implementation of forest management plans together with the owners.

Stakeholders

State and municipal public bodies, green NGOs, local hunters and tourist companies, local farmers, all local householders for providing winter heating.

Management and governance issues

The forest regulatory framework applies to both public and private forests (there are no local or regional forest policies). However, differences in management of forests are evident in the case study with small private owners practicing clear-felling, while large state or municipal owners are concerned with converting coppice stands into broadleaves (high forest), which excludes clear-cutting. Maintenance of some black pine plantations to provide some softwood supply for the local economy is a traditional aim.

Proportion of species of Panagiurishte

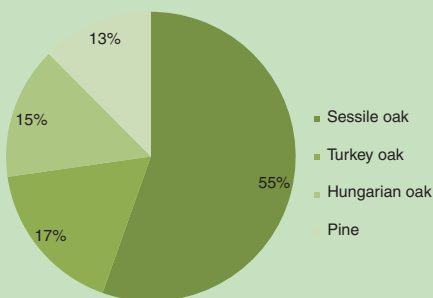
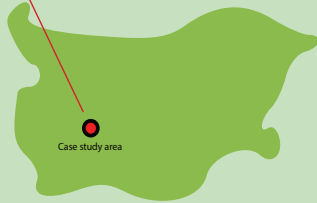


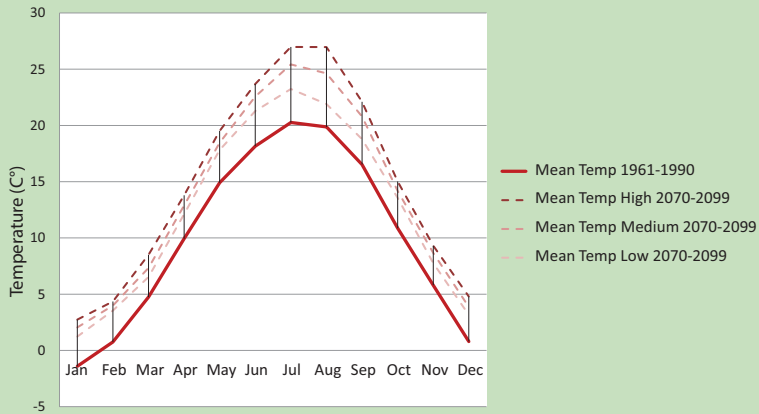
Photo: E. Rafailova.



Climate change challenge

Droughts and less favourable growing conditions will cause substantial decrease in mean annual increment of forest stands, a decrease in seed regeneration and increased fire risk.

Mean Monthly Temperature



Mean Monthly Precipitation

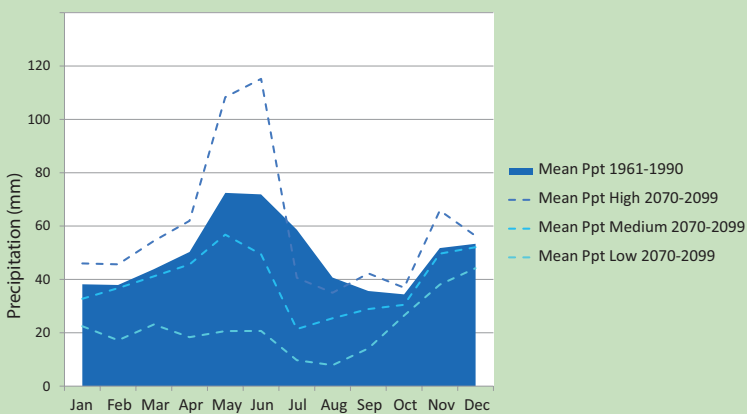


Table 1. Mid- to longterm tree species’ sensitivities towards projected climate change for the three forest ecosystem processes. + increase, ~ no change, - decrease.

Tree species	growth		regeneration		mortality	
	2020–2050	2050–2100	2020–2050	2050–2100	2020–2050	2050–2100
Turkey oak – coppice	~	--	++	+	~	+
Turkey oak – high	-	---	~	-	~	-
Sessile oak – coppice	-	--	+	~	~	--
Sessile oak – high	--	---	-	---	-	---
Hungarian oak – coppice	-	--	+	+	~	-
Hungarian oak – high	-	---	~	--	-	--
Austrian pine	-	--	~	+	~	--
Flowering ash	~	-	~	+	~	-



Photo: Georgi Kostov.

Fire risk is increased by reduced precipitation and longer dry periods. The presence of coniferous plantations which are not regularly thinned as well as abandoned agricultural land covered by tall grasses also increase fire risk.

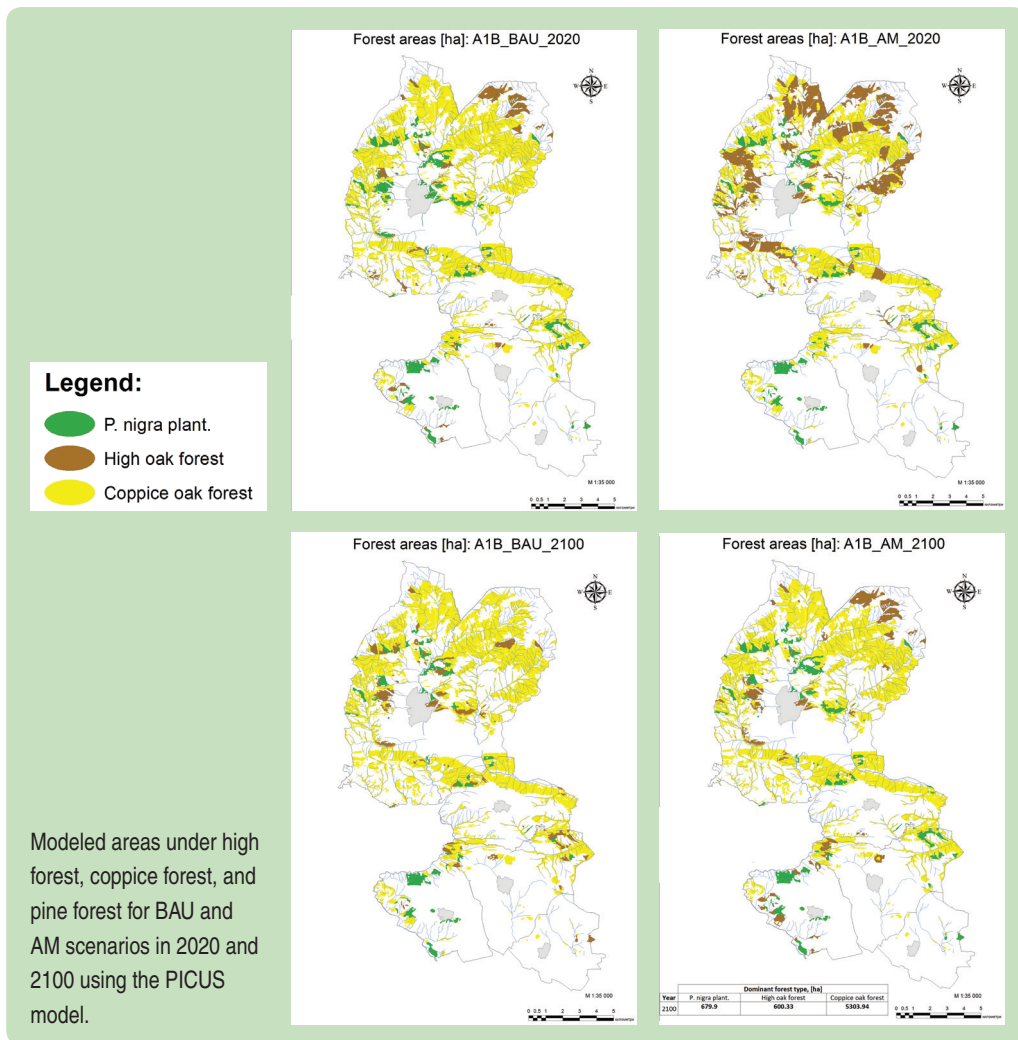
Seed regeneration will become difficult for oak coppice stands as mature oak trees need favourable climate to produce acorns. Young seedlings are also more sensitive to drought stress. Warmer winters could lead to early blossoming and susceptibility to frost damage.



Photo: Executive Forest Agency, Bulgaria.

Current management practices (business as usual; BAU) operate with the goal of converting existing coppice stands into high forest through natural regeneration. This would increase timber quality and productivity in the long-term.

Using the PICUS model, under the BAU scenario for 2100, it was found that the mean Annual Increment of high oak was less than that of coppice oak. The main goal of transformation from coppice to high forest would not be reached with BAU management.



Adaptive management includes shortening the rotation age of coppice stands to facilitate conversion to high forest, and more intensive tending and thinning of young forest stands. This management promotes a greater area under high forest than the BAU scenario. However the long term modeled projection indicates that area-wide conversion to high forest will not occur because of time-lags and the underlying set of different sites, climatic conditions and management actions affecting regeneration processes.

Conclusion

Adaptive management activities may not be able to fully mitigate the negative consequences of climate change, still negative impacts as expected for BAU management will be attenuated under AM.