Carpathian Expo
Carpathian Convention COP7

Assessment of climate change risks and adaptation options for Carpathian forest ecosystems and their services

UNEP Vienna Programme Office – Secretariat of the Carpathian Convention

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Photo by Stefan Rankovic

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Republic of Serbia
MINISTRY OF
ENVIRONMENTAL PROTECTION

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CARPATHIAN CONVENTION

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MANDATE AND ASSESSMENT DEVELOPMENT

- Called for by Carpathian Convention Conference of the Parties at its 6th meeting (COP6, 2020)
- Included in the Implementation Framework 2030 accompanying the Long-term Vision towards combating climate change in the Carpathians
- The 8th meeting of the Carpathian Convention Working Group on Climate Change (6 May 2021), called for initiating the assessment at the Forum Carpaticum 2021
- Special Session and Workshop on Forest ecosystem vulnerabilities to climate change in the Carpathians held at Forum Carpaticum 2021
- Informal subgroup of the Working Group on Climate Change and the Working Group on Sustainable Forest Management. Experts nominated by the Focal Points of the Carpathian Convention.
- Survey of the Experts, supported by a review of previous assessments, interviews with leading research groups, and a literature review

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ASSESSMENT - TOPICS

Key topics, impacts, and adaptation options derived by the survey and presented in the assessment include the following:

- Forest growth and productivity
- Biomass and Carbon Stocks
- Tree mortality
- Changes in species range, habitat shifts and abundance
- Invasion by non-native species
- Forest ecosystem services
- Forest – water interactions, including hydrologic regulation and riparian dynamics

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FINDINGS – Key Risks Identified by Focal Point Experts

Top Ranked Concern:	**Altered disturbance regimes**
Second Ranked Concern:	**Drought risks to forest resources and services**
Tertiary Concerns:	**Altered hydrologic regimes, flood risks, invasive species, and the need for restoration**
	Declines in forest growth and productivity
	Altered species composition and distribution
	Feedback mechanisms and effects on ecosystem services including carbon storage
	Climate interactions with land-use pressures

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ADAPTATION APPROACHES

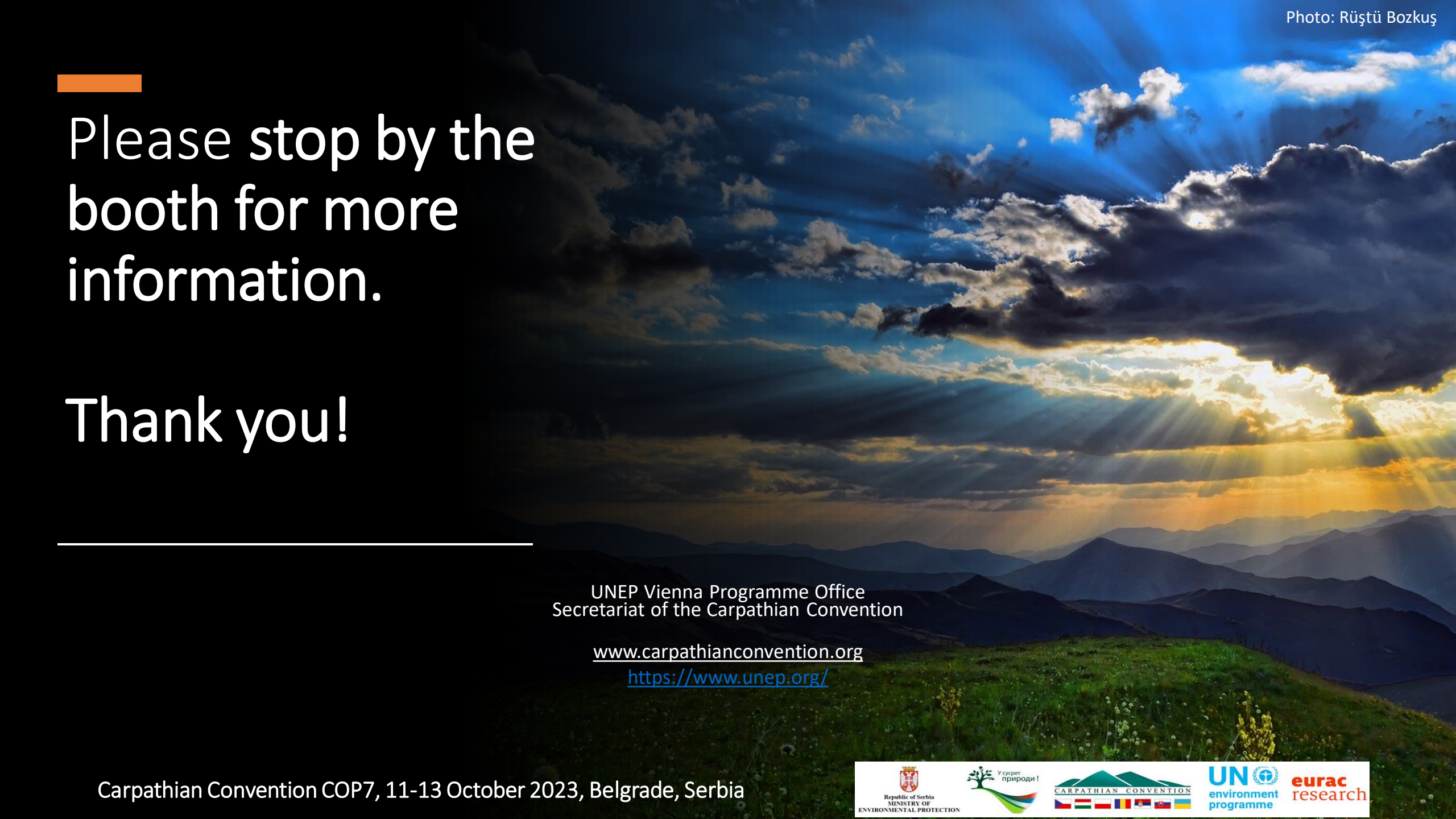
- Synthesis of adaptation response options clustered into Factsheets for priority topics identified

EXAMPLE: TREE MORTALITY

INCREASE RESILIENCE TO DISTURBANCE	
Characteristics	Approaches to enhance resilience include: • → Enhancing and maintaining species, structural and genetic diversity by favoring existing genotypes that are better adapted to future conditions, incorporating genetic diversity from a greater range of population sources and including pest- or drought-resistant varieties where appropriate. • → More intensive thinning practices and care of forest stand edges. • → Promoting redundancy of ecological representation within core protected areas. Also "functional redundancy," which means having multiple species or ecological components that perform similar functions, providing compensatory capacity if one species declines or is adversely affected by climate change. This functional diversity ensures that multiple ecological processes and services are maintained, even if some species or functional groups are lost or impacted. • → Establishing ecological corridors and maintaining landscape connectivity to facilitate the species' range shifts, dispersal and genetic interchange among populations, and continuation of ecological processes. Connected landscapes allow for the dispersal of species, enabling recolonization and gene flow following disturbances. Corridors can also help species adapt to shifting environmental conditions caused by climate change.
Main Impact/Risk addressed	Increasing soil moisture deficits and prolonged drought due to reduced precipitation and higher temperatures likely in some areas.
Intended effects	Enhanced diversity in forests exhibits a higher variability in resistance to pests, drought and access heat. Reducing stand densities, for instance in intensively managed coniferous forests, will lower competition and thus the probability of drought-related tree mortality. Enhanced complexity and diversity of patch mosaics (e.g., different types and ages of vegetative communities) across the landscape helps limit contagion and spread of insects and plant diseases.
Pros and cons (if any)	N/A depending on approaches to increase resilience

EXAMPLE: INVASION BY NON-NATIVE SPECIES

MANAGEMENT PRACTICES TO MAINTAIN OR IMPROVE THE ABILITY OF FORESTS TO RESIST PESTS AND PATHOGENS	
Characteristics	Forest management practices that manipulate the density, structure, or species composition of a forest may reduce susceptibility to some pests and pathogens, inter alia: • → Thinning to reduce the density of a pest's host species in order to discourage infestation, based on the knowledge that species are especially susceptible to pests and pathogens at particular stocking levels. • → Adjusting rotation length to decrease the period of time that a stand is vulnerable to insect pests and pathogens, based on the knowledge that species are especially susceptible to pests and pathogens at particular ages. • → Creating a diverse mix of forest or community types, age classes, and stand structures to reduce the availability of host species for pests and pathogens. • → Managing canopy conditions depending on types of invasive species, e.g., maintaining closed-canopy conditions to reduce the ability of light-loving invasive species to enter the understory or keeping canopy more open to reduce spreading of species (e.g., Pinus strobus) or pathogens that prefer conditions of shade, less wind, and higher humidity. • → Using biological control methods to manage pest populations in heavily infested areas. • → Restricting harvest and transportation of logs near stands already heavily infested with known pests or pathogens. • → Using impact models and monitoring data to anticipate the arrival of pests and pathogens and prioritize management actions.
Main Impact/Risk addressed	Invasion by non-native (alien) species may result in biome shifts, with consequent changes in the spectrum of forest ecosystem services provided.
Intended effects	Improved non-native species management with dedicated measures for prevention, early detection, control management, including rapid response and rehabilitation and restoration.
Pros and cons (if any)	N/A depending on management practices



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Thank you!

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