

Supplementary Material

**Forest Managers' Perspectives on Environmental changes in the
Biosphere Reserve Mura-Drava-Danube**

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1 Questionnaire

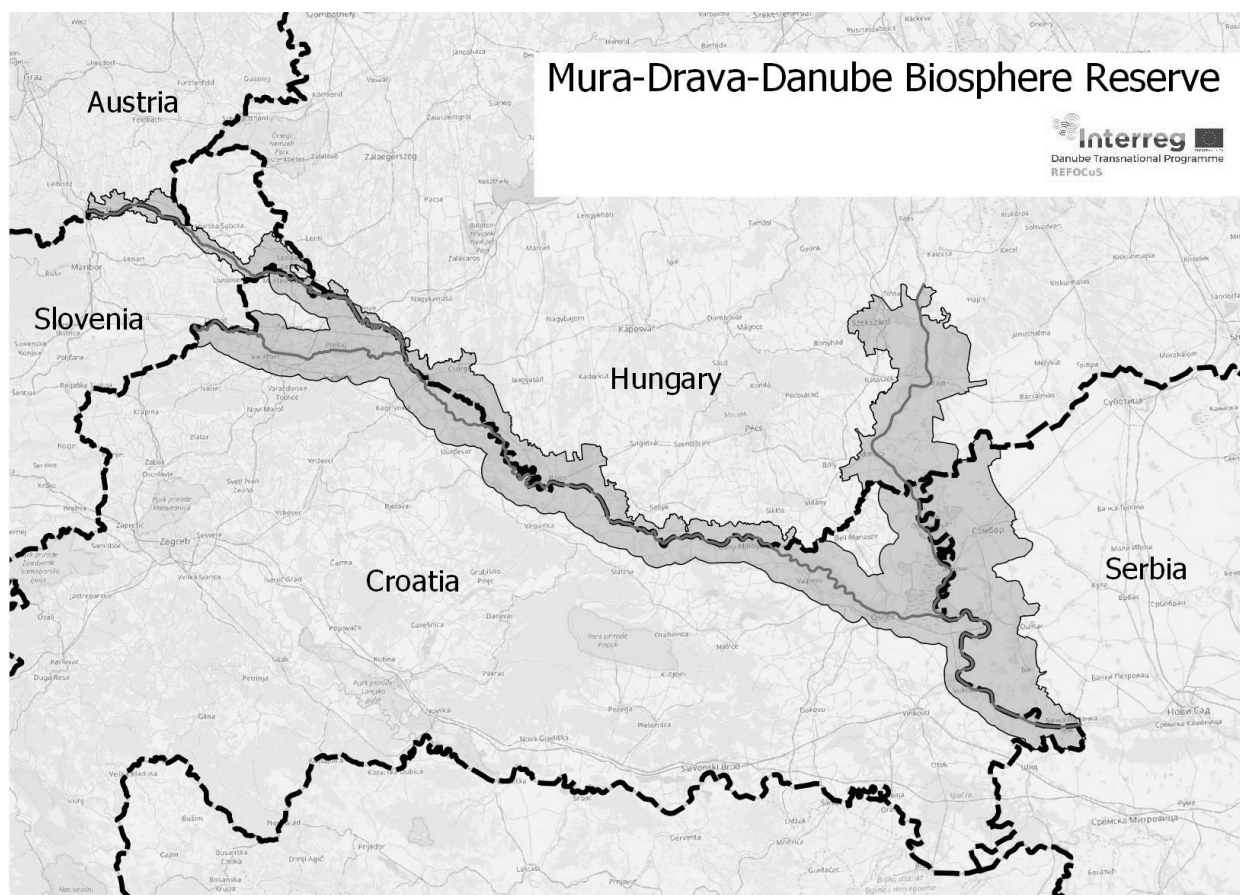


REFOCuS stakeholder survey: Identification of forest and conservation management objectives

1. Welcome to our survey!

This survey consists of an online questionnaire structured into 6 sections and will take about 15 minutes of your time. Your responses will be later analyzed and compared with those of other participants across Austria, Croatia, Hungary, Slovenia, and Serbia.

Purpose of the questionnaire: The objective of the survey is to analyse the awareness of people connected to the Mura-Drava-Danube Biosphere Reserve about issues related to riparian forests of the area:



[\(link to high resolution map\)](#)

The survey is integrated in the process of identifying forest and conservation management objectives, aiming to support the development of a management handbook in the REFOCuS project that will be understandable and accepted by all groups.

Want to know more about our project? The REFOCuS project aims to increase resilience in the

riparian forests of the Mura-Drava-Danube Biosphere Reserve. This reserve has recently been extended to nearly 850,000 ha along the Drava, Mura and Danube rivers. The project consortium consists of 5 project partners and 6 associated partners from Austria, Hungary, Slovenia, Croatia and Serbia, geographically covering the entire territory of the Biosphere Reserve. We aim to better understand regional disparities of national policies and explore the diversity of perceptions of the riparian forests of the Biosphere Reserve by different forest stakeholders.

For more information:

[Official REFOCuS Interreg Homepage](#)

[Facebook REFOCuS](#)

Privacy notice: Data collected through this survey will be treated confidentially and anonymously for the purposes of REFOCuS project research, in compliance with the General Data Protection Regulation (GDPR), Regulation (EU) 2016/679.

By filling the questionnaire you give REFOCuS staff the permission to process data you provide for the purposes of REFOCuS project research.

There are 27 question in this survey.

This survey is anonymous.

Administration: The questionnaire is administered by the Austrian Research and Training Centre for Forests, Natural Hazards and Landscape in cooperation with all Project Partners.

Contact: 1131 Vienna, Austria, Seckendorff-Gudent-Weg 8, Tel.: +43 1 878 38-0

To contact for questions: Dipl.-Ing. Markus Sallmannshofer, markus.sallmannshofer@bfw.gv.at





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2. Starters

* 1. Please indicate your connection to the Biosphere Reserve Mura-Drava-Danube:

- I live in the Biosphere Reserve
- I work within the area of the Biosphere Reserve
- I have a forest related job in the Biosphere Reserve (not only forestry sector)
- I spend leisure time in the Biosphere Reserve
- I hunt in the Biosphere Reserve
- I have no connection to the Biosphere Reserve
- Other (please specify)

* 2. How frequently do you visit the forests of the Biosphere Reserve?

- At least once per week
- At least twice per month
- At least once per month
- Less than once a month
- Other (please specify)



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3. Perception of the state of the forests

* 3. How would you rate the current state of the forests in the Biosphere Reserve?

- Deteriorating
- No changes
- Improving
- I cannot tell

* 4. Have you personally observed changes in the state of forests in the Biosphere Reserve?

- Yes
- No
- I cannot tell



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4. Perception of the state of the Forests II

* 5. If yes, which **changes** in the state of forests in the Biosphere Reserve have you **already observed**?

	-3 (decline)	-2	-1	0 (intermediate)	+1	+2	+3 (increase)	I cannot tell
Dieback of trees	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Increase of forest growth (annual increment)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Increase of the forest area	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Drought stress, wind damage, storms (abiotic damage)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Damages by living organisms such as fungi, parasites, insects or plants (biotic damage)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Natural forest regeneration	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Spread of Non-native species	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Other (please specify including weight)



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5. Expected changes

* 6. Do you expect **changes** in the state of the forests in the Biosphere Reserve **in the future**?

- Yes
- No
- I cannot tell



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6. Management

* 7. If yes, what kinds of **changes** do you **expect in the future** for the forest of the Biosphere Reserve?

	-3 (decline)	-2	-1	0 (intermediate)	1	2	3 (increase)	I cannot tell
Dieback of trees	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Forest growth (annual increment)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Forest area	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Drought stress, wind damage, storms (abiotic damage)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Damages by living organisms such as fungi, parasites, insects or plants (biotic damage)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Natural forest regeneration	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Non-native species	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Other (please specify including weight)



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7. Management II

* 8. With which of the following do you identify most?

- Forester
- Forest owner
- Conservationist
- Other (please specify)
- Hunter
- Local resident
- Tourist or visitor to the Biosphere Reserve



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8. Management III

* 9. Do you **intend to adapt** your management to the expected changes?

- Yes
- No
- I do not manage a forest area
- I cannot tell



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9. Management IV

* 10. Please complete the following sentence by choosing one option:

*I would **adapt my management if forest growth** (wood increment) declines by...*

- >10%
- >25%
- >50%
- >75%

* 11. Please complete the following sentence by choosing one option:

*I would **adapt my management if the following number of target tree species faces a serious dieback***

- 1 target tree species
- 2 target tree species
- 3 target tree species
- more than 3 target tree species



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10. Management V

* 12. What are your **main target native tree species**?

	for wood production purposes	for conservation purposes	other purposes (please explain below)	not targeted
Acer campestre	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Acer platanoides	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Acer pseudoplatanus	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Alnus glutinosa	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Alnus incana	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fraxinus angustifolia	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fraxinus excelsior	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Juglans regia	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Populus alba	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Populus nigra	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Populus tremula	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Quercus robur	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Salix alba	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Salix fragilis	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Salix purpurea	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tilia cordata	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tilia platyphyllos	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ulmus laevis	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ulmus minor	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Other tree species (please specify including purposes)

* 13. Please complete the following sentence by choosing one option:

*I would **adapt my management** if the following percentage of my **target tree species** failed to regenerate...*

	>10%	>25%	>50%	>75%
Natural regeneration (direct seedfall)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Artificial regeneration (seeding, planting)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



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11. Management VI

* 14. Are **non-native tree species** (=not native to Europe) and/or **artificial clones or hybrid tree species occurring** in the Biosphere Reserve?

- Yes
- No
- I cannot tell



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12. Management VI

* 15. Which non-native tree species (=not native to Europe) and/or artificial clones or hybrid **tree species are present** in the area of the Biosphere Reserve and **how are they managed in your opinion?** *Multiple answers per row possible*

	not present	present and managed for wood production purposes	present and managed for conservation purposes	present and managed for other purposes	present and not targeted in management
Acer negundo	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ailanthus altissima	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fraxinus pennsylvanica / F. americana	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Juglans nigra	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Robinia pseudoacacia	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Paulownia spp.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hybrid poplars	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Artificial poplar clones	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Artificial willow clones	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Other (please specify including management purpose)



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13. Management VI

* 16. How do you consider the **importance of the following impacts** on forests in the Biosphere Reserve currently?

	0 (no impact)	1	2	3	4 (strong impact)	I cannot tell
Manmade changes of water dynamics (e.g. river regulations)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Climate change	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Native pest and diseases in forests	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Invasive alien species	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Changes of natural regeneration potential	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Availability of local high quality Forest Reproductive Material	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Influence by game species	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Deforestation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Flooding	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Recreational activities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Policy and regulation issues	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Other (please specify including impact)

* 17. Which **goods** do you personally think should be **protected and sustained** by forest management in the Biosphere Reserve?

	0 (no protection)	1 (very soft protection)	2 (soft protection)	3 (rather strong protection)	4 (strong protection)	I cannot tell
all native plant species	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
endangered plant species only	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
all native animal species including game	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
endangered animal species only	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
cultural sites	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
human culture and traditions of utilizing natural resources	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Other (please specify including weight)

18. Please indicate **management techniques** that you think are **appropriate to use** in the forests of the Biosphere Reserve?

- Planting of seedlings
- Natural regeneration
- Clear cutting
- Individual tree felling
- Cutting and felling of tree groups (patch size up to one tree length)
- Short rotation period coppices
- Planted forest stands of only one tree species
- Planting of non-native tree species to raise productivity
- Planting of non-native tree species to compensate the loss of native tree species whose status is deteriorating
- Close-to-nature-forestry/Continuous-cover forestry
- No forest management (in terms of forestry)
- Game management
- Hunting tourism
- Visitor guidance to concentrate visitors in less sensitive areas in terms of conservation
- Other (please specify)

* 19. Do you think **conservation** should be **integrated in mainstream forest management**?

- Yes
- No
- Partly
- I cannot tell



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14. Concept of a Biosphere Reserve

* 20. Which of the following **descriptions** applies to a **Biosphere Reserve**?

- Strictly protected areas set aside for protecting biodiversity
- "Models for sustainable development" containing protected and unprotected areas
- Usually largely unmodified or slightly modified areas that are protected and managed so as to preserve their natural condition.
- I cannot tell

* 21. Do you **expect** that the **establishment of the Biosphere Reserve** will **change** the following aspects?

	deteriorate	no change	improve
Ecological situation (e.g. conservation, adapted management)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Economic situation (e.g. marketability)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Social situation (e.g. recreational offers)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
State of forests (e.g. health, stability)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cross-sectoral cooperation between stakeholders	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Other (please specify including expected change)

22. Please **describe** the **strongest indicated change** of the previous question.



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15. Background

* 23. Imagine having to cooperate in a small project. Regardless of the technical or administrative value added, with whom would **you prefer to cooperate** closely?

	0 (not likely at all)	1 (rather not likely)	2 (intermediate)	3 (rather likely)	4 (very likely)
Conservationist	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Forester	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Forest owner	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Natural scientist	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hunter	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tourism professional	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tourist	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Local resident	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Local government/authorities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

* 24. Where do you **live**?
 If you are a visitor only, which part of the Biosphere reserve do you **visit**?

Country (mandatory)

Municipality / place / village

* 25. What is your **age**?

- Under 18
- 18-24
- 25-34
- 35-44
- 45-54
- 55-64
- 65+

* 26. What is your **gender**?

- I am female
- I am male

* 27. What is your **highest completed level of education**?

	In the field of forestry, conservation or equivalent	In another field not related to nature
Primary education (ISCED 1)	<input type="radio"/>	<input type="radio"/>
Lower secondary education (ISCED 2)	<input type="radio"/>	<input type="radio"/>
Apprenticeship (ISCED 3)	<input type="radio"/>	<input type="radio"/>
Upper secondary education including high school graduation (ISCED 3)	<input type="radio"/>	<input type="radio"/>
Bachelor, Master, Doctoral or equivalent (ISCED 6-8)	<input type="radio"/>	<input type="radio"/>



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16. Thank you!

Thank you very much for participating in our survey. The results will be analyzed and published in form of a report that you are able to access by end of 2019 via this link: <http://www.interreg-danube.eu/approved-projects/refocus/outputs>

If you wish to receive our newsletter (twice a year) and the results of the survey, please give your contact information by here:

28. Contact information (voluntary)

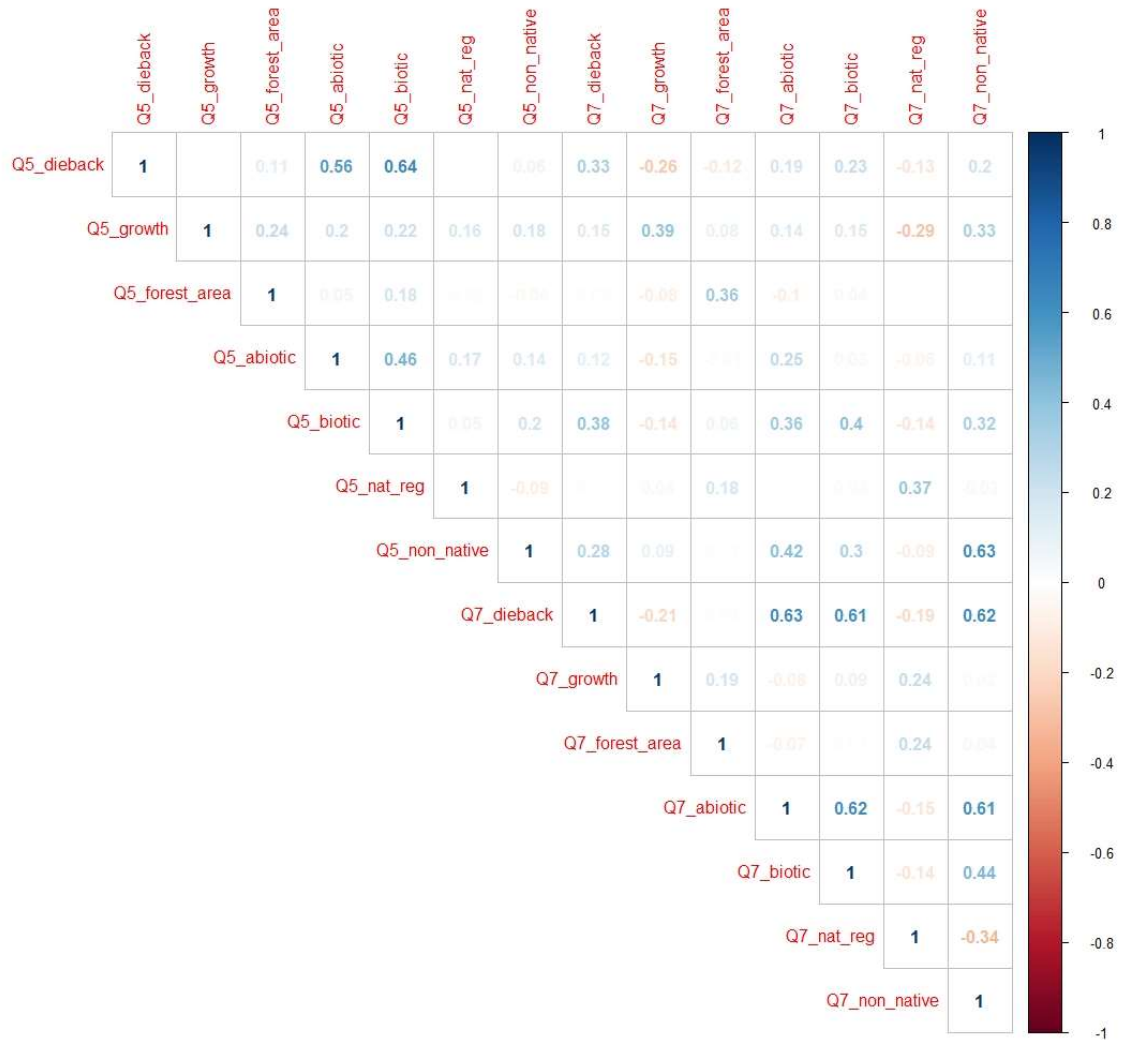
Name

Company

Country

Email Address

2 Supplementary Figure



Supplementary Figure 1. Plot showing correlations between the perceived intensity of observed (Q5) and expected (Q7) forest-related changes in riparian forests of the Biosphere Reserve. The full questions can be found in Appendix A Question 5 and Question 7.