



# **FORRISK**

# **Final Conference**

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Identification and evaluation of common problems and their effects

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*Folgende NUTS III-Regionen gehören zum Programmgebiet:*

## **Österreich:**

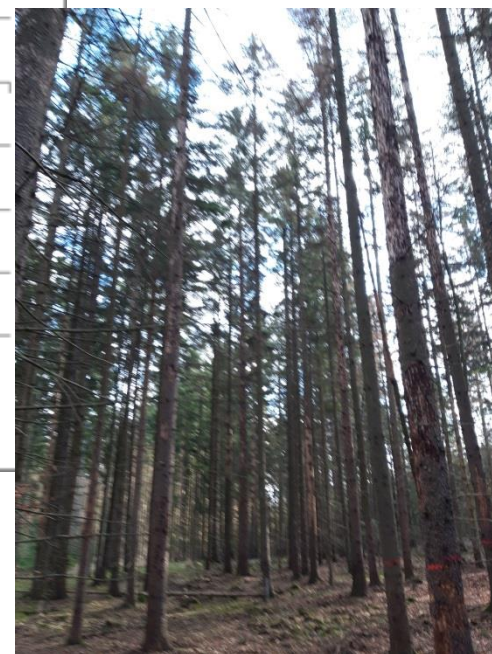
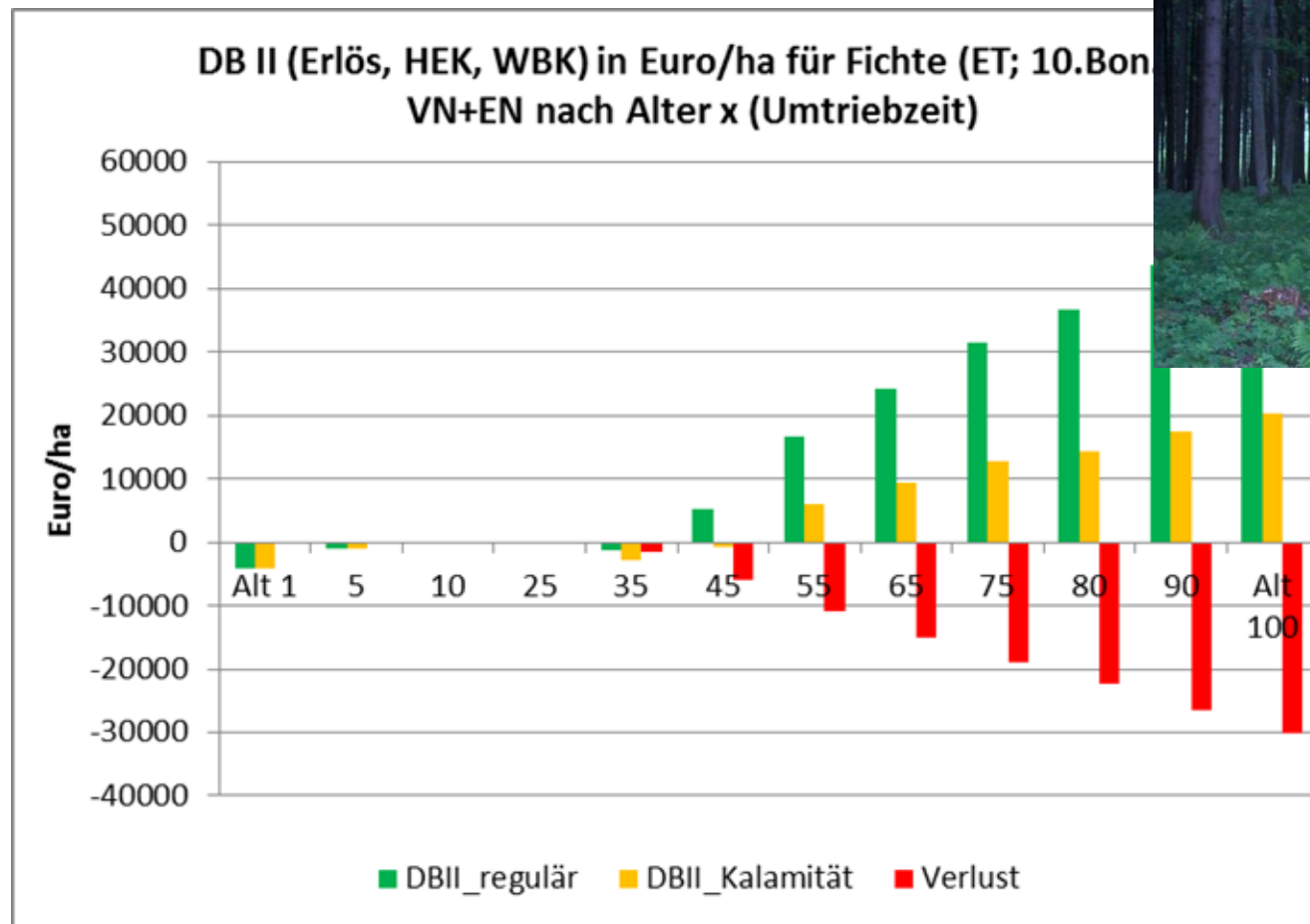
Mostviertel-Eisenwurzen, Sankt Pölten, Waldviertel, Weinviertel, Wiener Umland-Nordteil, Wien, Innviertel, Linz-Wels, Mühlviertel, Steyr-Kirchdorf

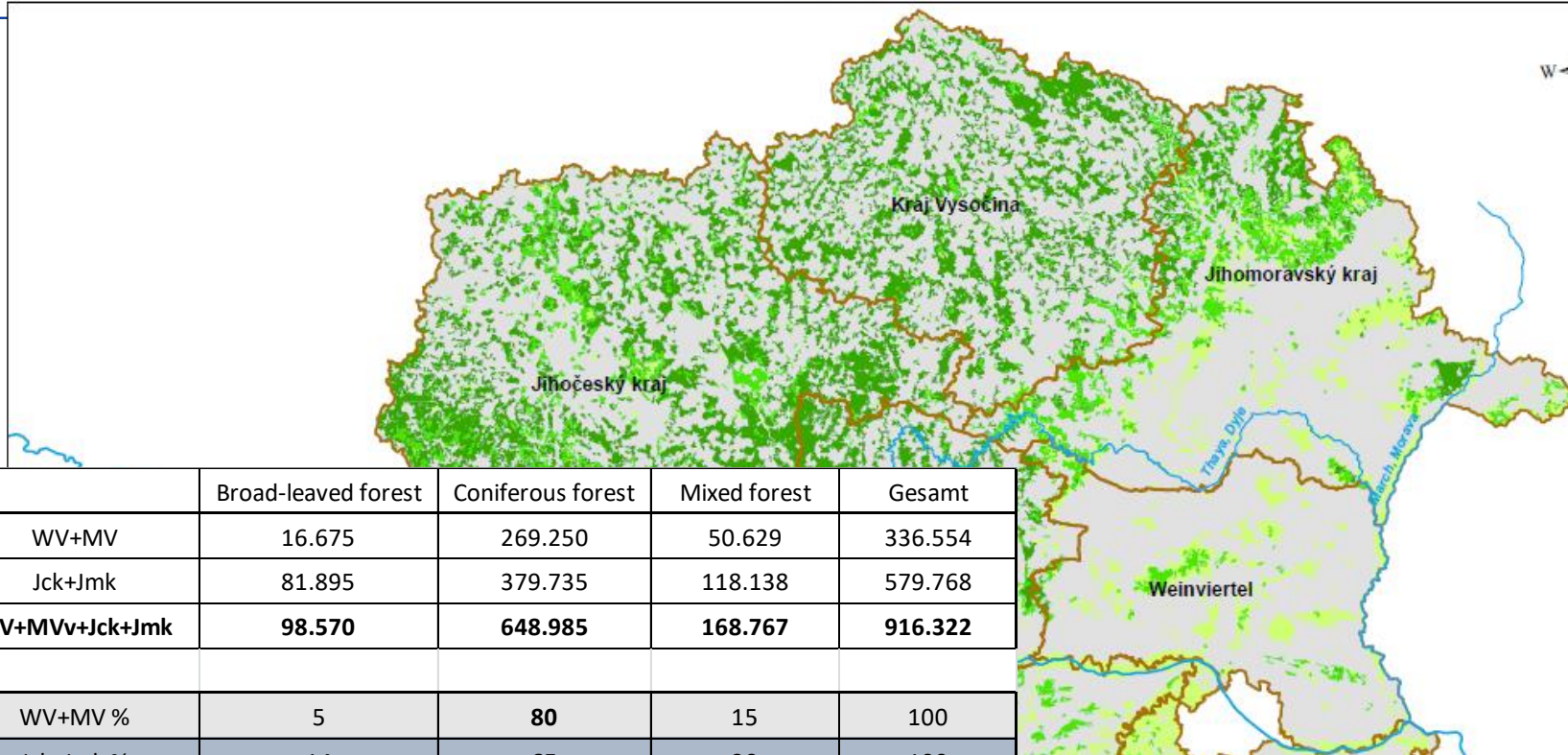
## **Tschechische Republik:**

Jihocheský kraj, Kraj Vysočina, Jihomoravský kraj

The damage situation in the forests of the border region, which has persisted for years poses major problems and challenges for forest owners, authorities and stakeholders at the cross-border region Austria and Czech Republic.

In the FORRISK project, operational and administrative procedures for dealing with the bark beetle crisis situation are identified.





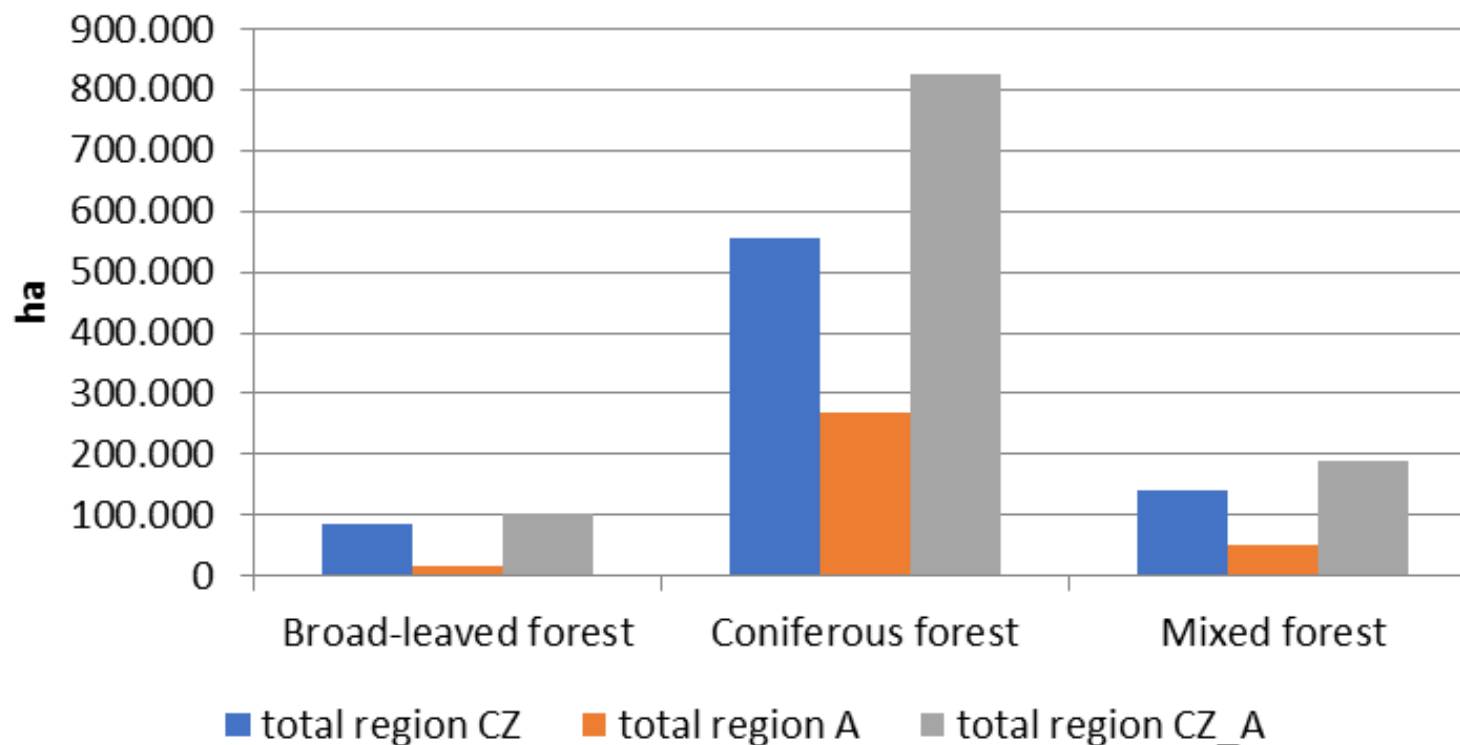
|                       | Broad-leaved forest | Coniferous forest | Mixed forest   | Gesamt         |
|-----------------------|---------------------|-------------------|----------------|----------------|
| WV+MV                 | 16.675              | 269.250           | 50.629         | 336.554        |
| Jck+Jmk               | 81.895              | 379.735           | 118.138        | 579.768        |
| <b>WV+MVv+Jck+Jmk</b> | <b>98.570</b>       | <b>648.985</b>    | <b>168.767</b> | <b>916.322</b> |
| WV+MV %               | 5                   | 80                | 15             | 100            |
| Jck+Jmk %             | 14                  | 65                | 20             | 100            |
| Jck+Jmk+KVy %         | 11                  | 71                | 18             | 100            |
| WV+MV+Jck+Jmk %       | 11                  | 71                | 18             | 100            |

| Region [ha]       | Broad-leaved forest | Coniferous forest | Mixed forest   |
|-------------------|---------------------|-------------------|----------------|
| Weinviertel       | 55.545              | 2.457             | 13.077         |
| Mostviertel       | 48.969              | 94.715            | 115.083        |
| Innviertel        | 2.292               | 49.150            | 10.470         |
| Hausruckviertel   | 5.821               | 23.089            | 33.325         |
| <b>total [ha]</b> | <b>112.628</b>      | <b>169.411</b>    | <b>171.955</b> |
| in %              | 24,8                | 37,3              | 37,9           |





## Bestandestypen/stand types





## Annual cut 2010 - 2020

| <b>CZ</b>  | <b>AT</b>                   |
|--|-----------------------------|
| <b>Total (mil m<sup>3</sup>) / proportion of salvage cutting (%)</b> |                             |
| 2010 – 16.74 / <b>38.6</b>   | 2010 – 17.83 / <b>28.6</b>  |
|  | 2015 – 17.55 / <b>42.3</b>  |
| 2016 – 17.61 / <b>53.4</b>   | 2016 – 16.76 / <b>32.0</b>  |
| 2017 – 19.39 / <b>60.6</b>   | 2017 – 17.65 / <b>36.7</b>  |
| 2018 – 25.69 / <b>89.6</b>   | 2018 – 19.19 / <b>51.73</b> |
| 2019 – 32.58 / <b>95.0</b>   | 2019 – 18.90 / <b>62.08</b> |
| 2020 – 35.80 / <b>94.8</b>   | 2020 – 16.79 / <b>53.07</b> |

### Salvage felling due to bark beetle attacks

2015–2020

South Moravian Region – 5.6 mil. m<sup>3</sup>

South Bohemian Region – 7.6 mil. m<sup>3</sup>

Vysočina Region – 12.8 mil. m<sup>3</sup>

2015–2020

Mühlviertel (Lower Austria) – 2.2 mil. m<sup>3</sup>  
 (9700 hectares damaged area)

Waldviertel (Upper Austria) – 9.6 mil. m<sup>3</sup>  
 (45800 hectares damaged area)



In the Austrian border region, the category  
“small forest owner (< 200 ha)”  
medium-sized and large private forest enterprises  
community forests and state forest <

45% (WV) and 60% (MV)  
20%  
3% of the forested area.

The Czech border region  
state forests  
National Park Thayatal  
urban and municipal forests  
private forests

55%  
8%  
20%  
17% ( ~ 1.6 ha)



## Wind calamities

2003 – South Bohemian Region, Vysočina Region

2007 – South Bohemian Region, Vysočina Region

2008 – all three regions

2010 – South Moravian Region

2013 – Vysočina Region

2018 – all three regions

2019 – South Bohemian Region, Vysočina Region

2007 – Waldviertel, Mühlviertel

2008 Waldviertel

2012, 2013 2017 damage levels by wind were relatively low in Wald- and Mühlviertel.

## snow / Ice / rime calamities

2006 – all three regions

2007 – South Moravian Region

2010 – South Moravian Region

2015 – all three regions

2019 – Vysočina Region

2006 – Waldviertel, Mühlviertel

2014 – Waldviertel

2019 – Waldviertel, Mühlviertel





## State founding programmes

### Compensation contribution rate (EURO/m<sup>3</sup>)

IV/2017 – 0.99

I/2018 – 5.93

II/2018 - 9.98

III/2018 – 14.63

IV/2018 – 19.89

2019\* – 15.50

2021 - governmental funding programme  
("Waldfonds")

10 main types of measures (selected  
measures)

**reforestation and weeding/cleaning:** 75%  
of the reforested plants are to be oriented  
towards the potential natural forest  
community [ 3,50 €/plant-deciduous]

**young stand treatment:** [1650 €/ha; stem  
number reduction/mixture regulation]

**protection against game damage:** fencing  
[fence roe deer 6 – 8 €/lfm]

**compensation for the loss of value caused  
by bark beetles** [3.500 Euro/ha]

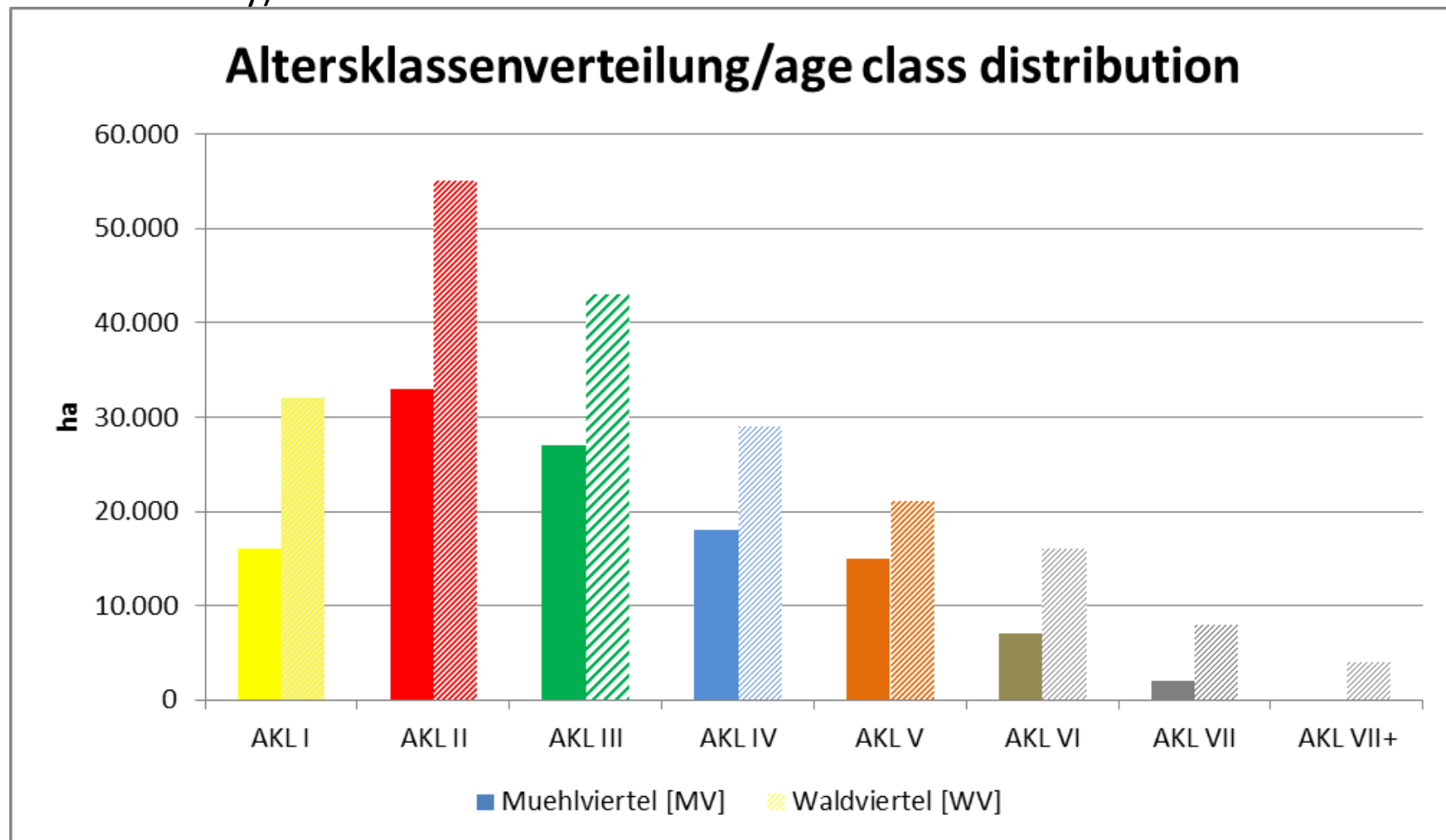


## **The current problems of forest management are connected to:**

- Forest exploitation in history
- Common use of the clear-cut system
- Artificial regeneration as main regeneration method
- Establishment of unstable even-aged homogeneous stands of conifers (Norway spruce and Scots pine)
- Neglected tending (too late, if any, thicket-sized treatments and thinnings and/or at low intensity)
- Reduction of habitat value and biodiversity
- High population densities of wild game
- Change of chemical composition of air and soil
- Global climate change generally stressing forests and leading to a change in disturbance regimes
- Increasing attack of insects and (mainly fungal) pathogens
- Introduction of invasive alien plants, insect pests and tree pathogens
- Lack or shortage of appropriate reproductive material of many tree species
- Ownership structure with many small forest owners, often lacking expertise and infrastructure to appropriately manage forests.

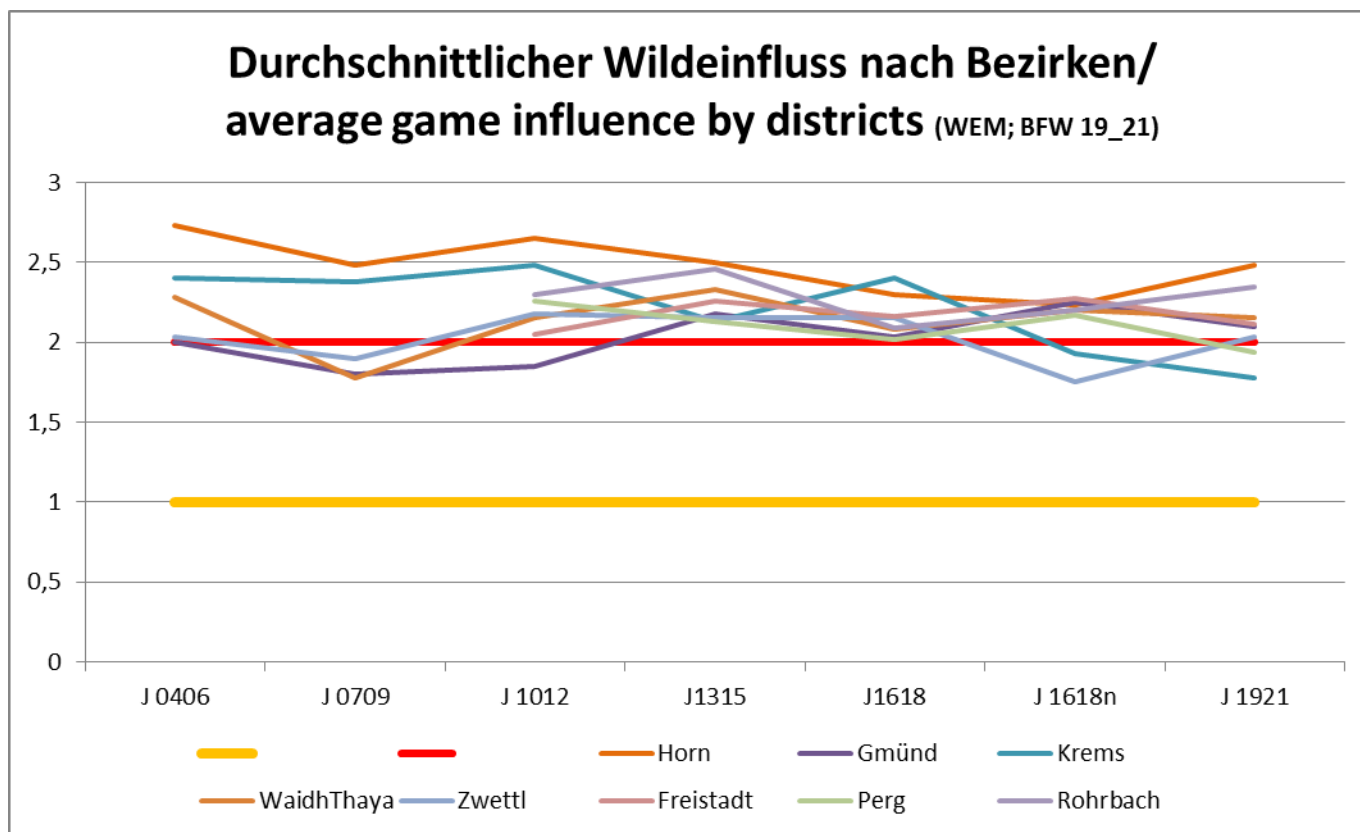


- Neglected tending (too late, if any, thicket-sized treatments and thinnings and/or at low intensity)





- High population densities of wild game



1= less game influence  
 2= moderate game influence  
 3= high game influence



## FORRISK



| Region                 | mean annual temperature [°] | mean annual precipitation [mm] |
|------------------------|-----------------------------|--------------------------------|
| Jihocesky Kraj [SB]    | 7,1 - 8,1                   | 650 - 710                      |
| Vysocina Region        | 7,2 - 8,2                   | 650 - 680                      |
| Jihomoravsky Kraj [SM] | 8,3 - 9,6                   | 540 - 560                      |
| Mühlviertel            | 6,2 - 7,3                   | 700 - 1000 (1100)              |
| Waldviertel            | 6,6 - 8,9                   | 500 - 700 (1000)               |

With mean annual temperatures of 7 to 10 ° and mean precipitation of 550 to 700 (1000), natural forest types of mixed deciduous forests dominate in the colline, submontane zone (oak-forest, oak-hornbeam-forest, beech (fir) forest) and in the montane zone mixed deciduous coniferous forests are of high importance beech-fir-spruce forest).



## Austria

| past climate                 |        | effective measures (rcp 4.5) |        |                       |        | business as usual (rcp 8.5) |        |                       |        |
|------------------------------|--------|------------------------------|--------|-----------------------|--------|-----------------------------|--------|-----------------------|--------|
| 1971-2000                    |        | near future                  |        | far future            |        | near future                 |        | far future            |        |
| region                       | mean   | climate change signal        | mean   | climate change signal | mean   | climate change signal       | mean   | climate change signal | mean   |
| <b>Mühl- and Waldviertel</b> |        |                              |        |                       |        |                             |        |                       |        |
| annual temperature           | 7.6°C  | +1.3°C                       | 8.9°C  | +2.3°C                | 9.9°C  | +1.5°C                      | 9.1°C  | +3.9°C                | 12.0°C |
| annual sum of precipitation  | 729 mm | +5.5%                        | 768 mm | +9.7%                 | 798 mm | +7.2%                       | 781 mm | +12.0%                | 816 mm |

## Czech Republic

| past climate                |                |                | effective measures (rcp 4.5) |        |                       |        | business as usual (rcp 8.5) |        |                       |        |
|-----------------------------|----------------|----------------|------------------------------|--------|-----------------------|--------|-----------------------------|--------|-----------------------|--------|
| region                      | mean 1961–1990 | mean 1981–2010 | climate change signal        | mean   | climate change signal | mean   | climate change signal       | mean   | climate change signal | mean   |
| <b>Jihomoravský kraj</b>    |                |                |                              |        |                       |        |                             |        |                       |        |
| annual temperature          | 8.3°C          | 8.9°C          | +1.8°C                       | 10.7°C | +2°C                  | 10.9°C | +1.9°C                      | 10.8°C | +2.6°C                | 11.5°C |
| annual sum of precipitation | 543 mm         | 559 mm         | -7 mm                        | 552 mm | -34 mm                | 525 mm | -7 mm                       | 552 mm | -37 mm                | 522 mm |
| <b>Jihočeský kraj</b>       |                |                |                              |        |                       |        |                             |        |                       |        |
| annual temperature          | 7.1°C          | 7.4°C          | +1.8°C                       | 9.2°C  | +2.2°C                | 9.6°C  | +1.9°C                      | 9.3°C  | +2.7°C                | 10.1°C |
| annual sum of precipitation | 659 mm         | 687 mm         | +7 mm                        | 694 mm | -54 mm                | 633 mm | +7 mm                       | 694 mm | -57 mm                | 630 mm |
| <b>Vysočina</b>             |                |                |                              |        |                       |        |                             |        |                       |        |
| annual temperature          | 7.2°C          | 7.4°C          | +1.8°C                       | 9.2°C  | +2.1°C                | 9.5°C  | +1.9°C                      | 9.3°C  | +2.6°C                | 10.0°C |
| annual sum of precipitation | 644 mm         | 673 mm         | +5mm                         | 678 mm | -40mm                 | 633 mm | +4 mm                       | 677 mm | -44 mm                | 629 mm |





Table 1: Current presence of main stand types across the three main altitudinal vegetation zones (c = colline, sm = submontane, m = montane) in the Czech Republic (CZ) and Austria (AT)

| Stand types/altitude level       | CZ c < 350 m | CZ sm 350 - 650 m | CZ m > 650 m | AT c < 300 m | AT sm 300 - 500 m | AT m > 500 m |
|----------------------------------|--------------|-------------------|--------------|--------------|-------------------|--------------|
| Secondary pure spruce stands     | rare         | middle            | high         | middle       | high              | high         |
| Scots pine stands                | high         | middle            | low          | middle       | low               |              |
|                                  |              |                   |              |              |                   |              |
| Mixed oak stands                 | high         | low               |              | low          | low               |              |
| Oak - noble hardwood stands      | low          | low               |              |              |                   |              |
| Mixed noble hardwood stands      | low          | low               |              |              |                   |              |
| Red oak stands                   |              |                   |              | low          | low               |              |
| European beech stand             | rare         | high              | low          | rare         | low               | low          |
| Beech - noble hardwood stands    |              |                   |              |              |                   |              |
| beech - fir stands               |              |                   |              |              | rare              |              |
| Mixed pioneer tree species       | rare         | low               | middle       | rare         | rare              | rare         |
| Mixed Scots pine-oak stands      | low          | rare              |              | low          | low               |              |
| Mixed spruce hardwood stands     | low          | middle            | low          | rare         |                   |              |
| spruce -beech stand              |              |                   |              |              |                   |              |
| larch-beech stands               |              |                   |              |              | rare              |              |
| Mixed European beech, larch, fir | rare         | high              | low          |              |                   |              |
| Spruce fir beech stands          |              | low               | middle       |              | low               | middle       |
| spruce- fir stands               |              |                   |              |              | low               | low          |
| spruce -alder - fir stand        |              |                   |              | low          | low               |              |
| Scots pine - spruce stand        |              |                   |              |              | middle            | low          |
| spruce -larch stand              |              |                   |              |              | low               |              |
| Natural spruce dominated stands  |              |                   | middle       |              |                   | middle       |
| Mixed Douglas fir - oak stands   | rare         | rare              |              | rare         | rare              | rare         |
| Mixed Douglas fir - beech stands |              |                   |              | rare         | rare              | rare         |