Freshwater Key Biodiversity Areas and the Natura 2000 network: designing an optimal network to address gaps in protection, now and under climate change

William Darwall (IUCN) *on behalf of*

Biofresh Work Package 7 Team

"Informing Policy for Conservation Planning"

Key Science and Policy Questions

1. **Where are the freshwater KBAs of Europe located?**

   How can the BioFresh KBA initiative work with the EC to endorse and make best use of this information?

2. **What subset of Freshwater KBAs will best meet targets to protect freshwater biodiversity?**

   Can we use this approach to help meet the EU Biodiversity Strategy for 15% restoration of degraded habitats & 50% of species on the Habitat Directive to show improved conservation status?

3. **Where are the current spatial gaps between the protected areas network and freshwater KBAs?**

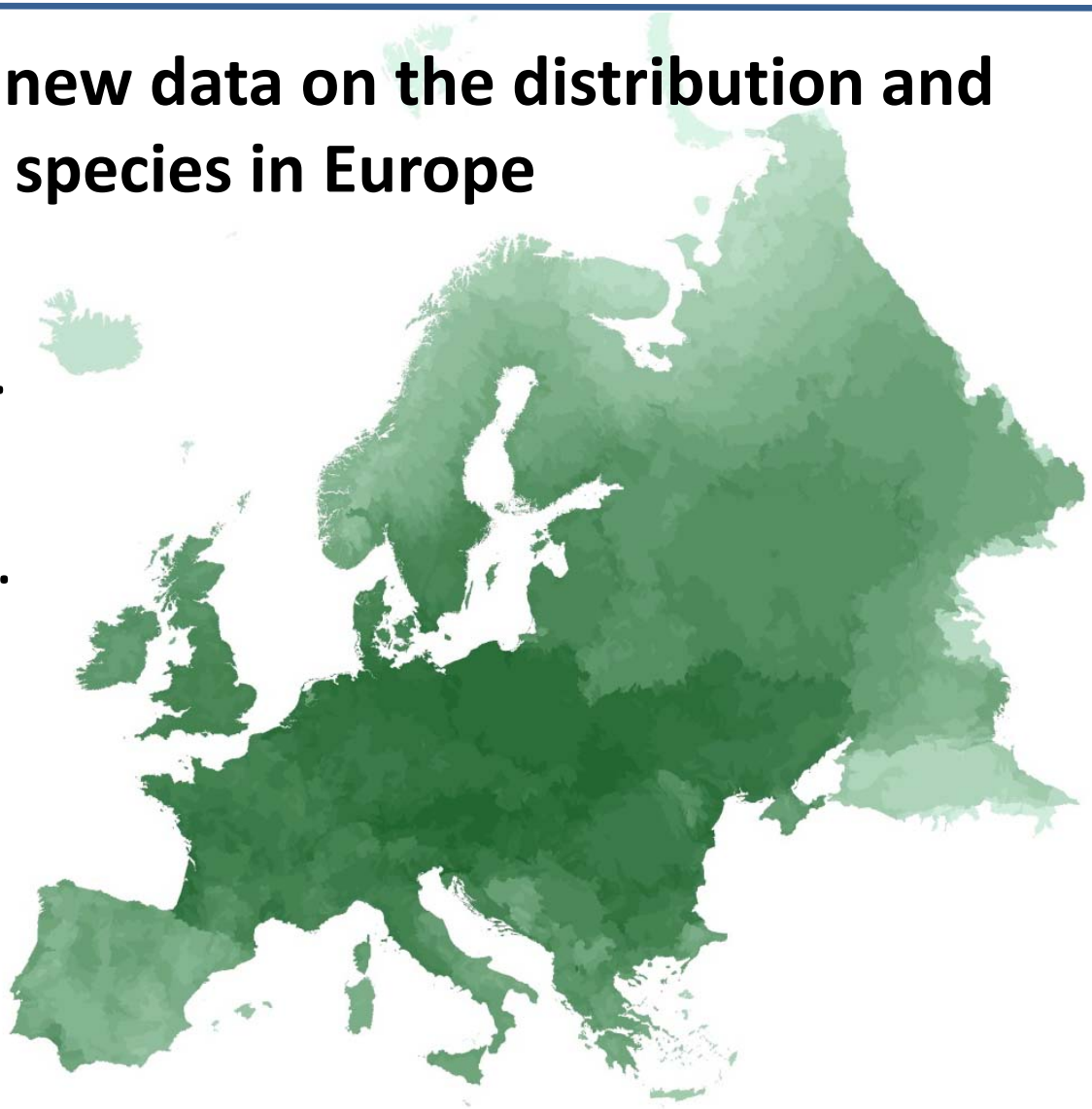
   What EU strategies are there to improve the efficacy of protected areas for freshwater species?

4. **How will climate change alter the distribution of freshwater biodiversity?**

   What initiatives aim to ensure protected areas are 'future proof'?

We now have much new data on the distribution and status of freshwater species in Europe

- ✓ Odonata 139 spp.
- ✓ Fishes 530 spp.
- ✓ Molluscs 680 spp.
- ✓ Plants 368 spp.



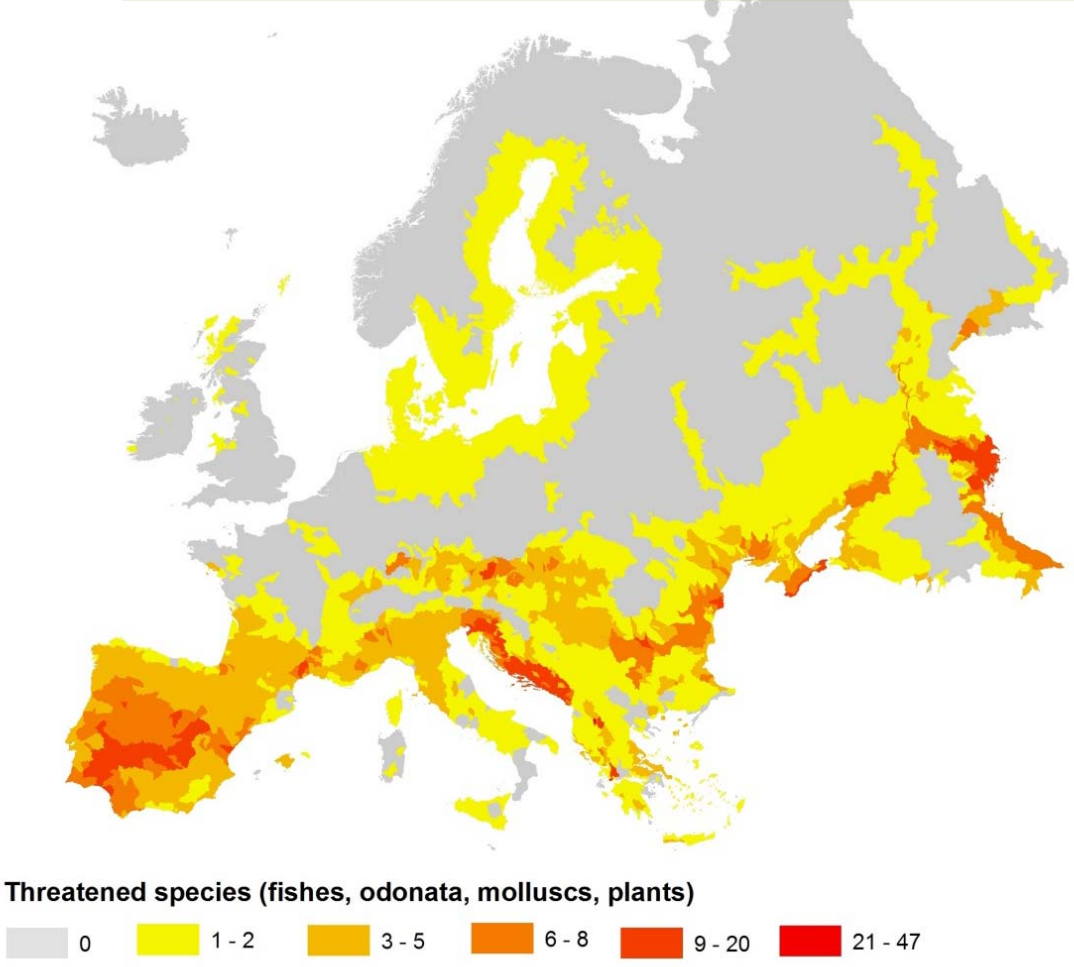
Map of species richness for fishes, molluscs, dragonflies & damselflies, and aquatic plants: numbers range from 6 – 395 spp. per catchment

Degree of threat:

- ✓ Molluscs 44%
- ✓ Fishes 37%
- ✓ Plants 16%
- ✓ Odonata 8%

Southern Europe is the centre of threat

Threatened species richness



Map of globally threatened species richness of fishes, molluscs, dragonflies & damselflies, and aquatic plants

Key Scientific Questions

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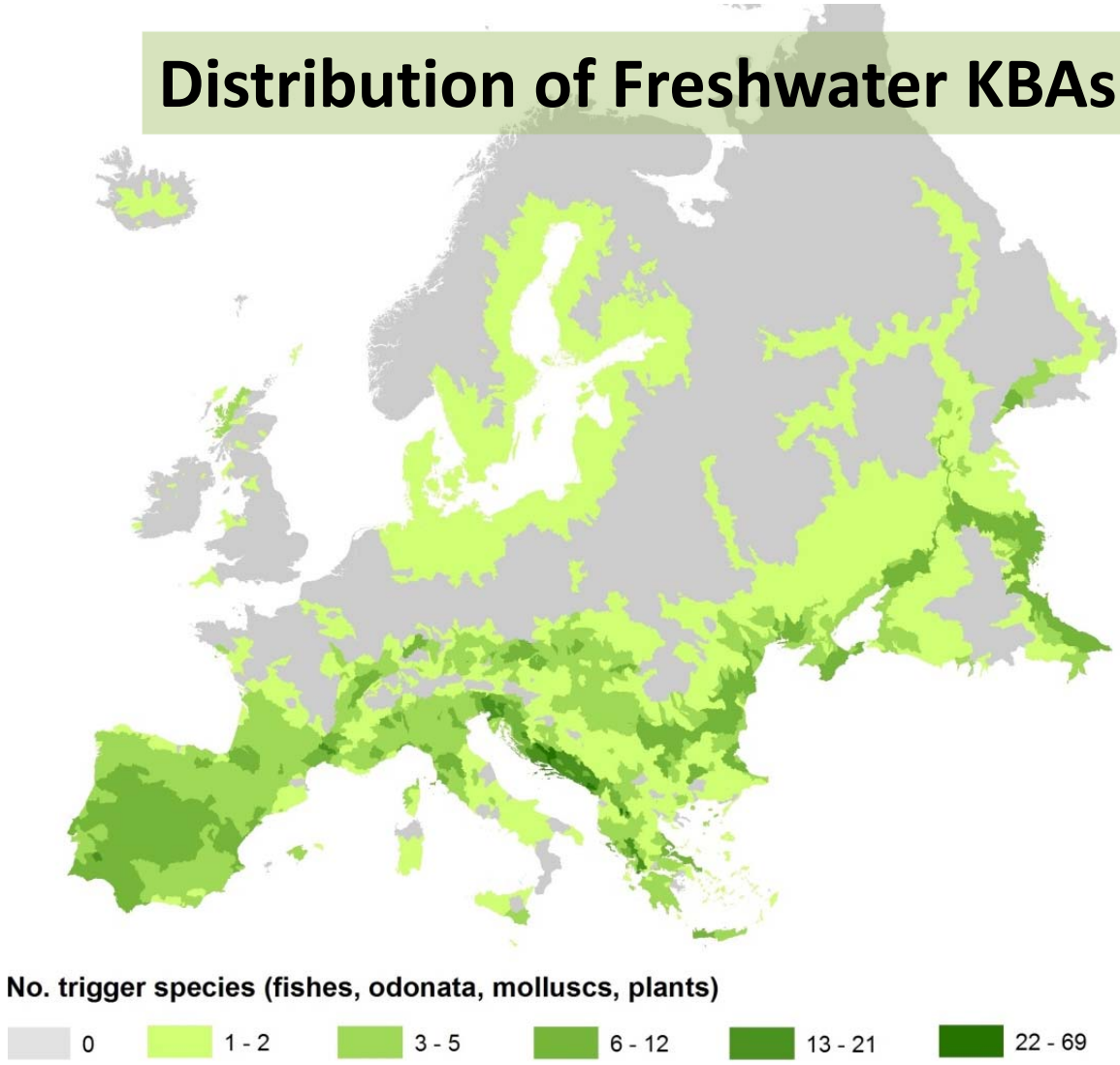
Distribution of Freshwater KBAs

45% of Europe's land area qualifies as FW KBA catchments

Darkest green catchments contain the highest numbers of qualifying species

FW KBAs are concentrated in southern Europe and the Mediterranean



Alliance for Zero Extinction catchments

Top priority sites for species at the highest risk of extinction

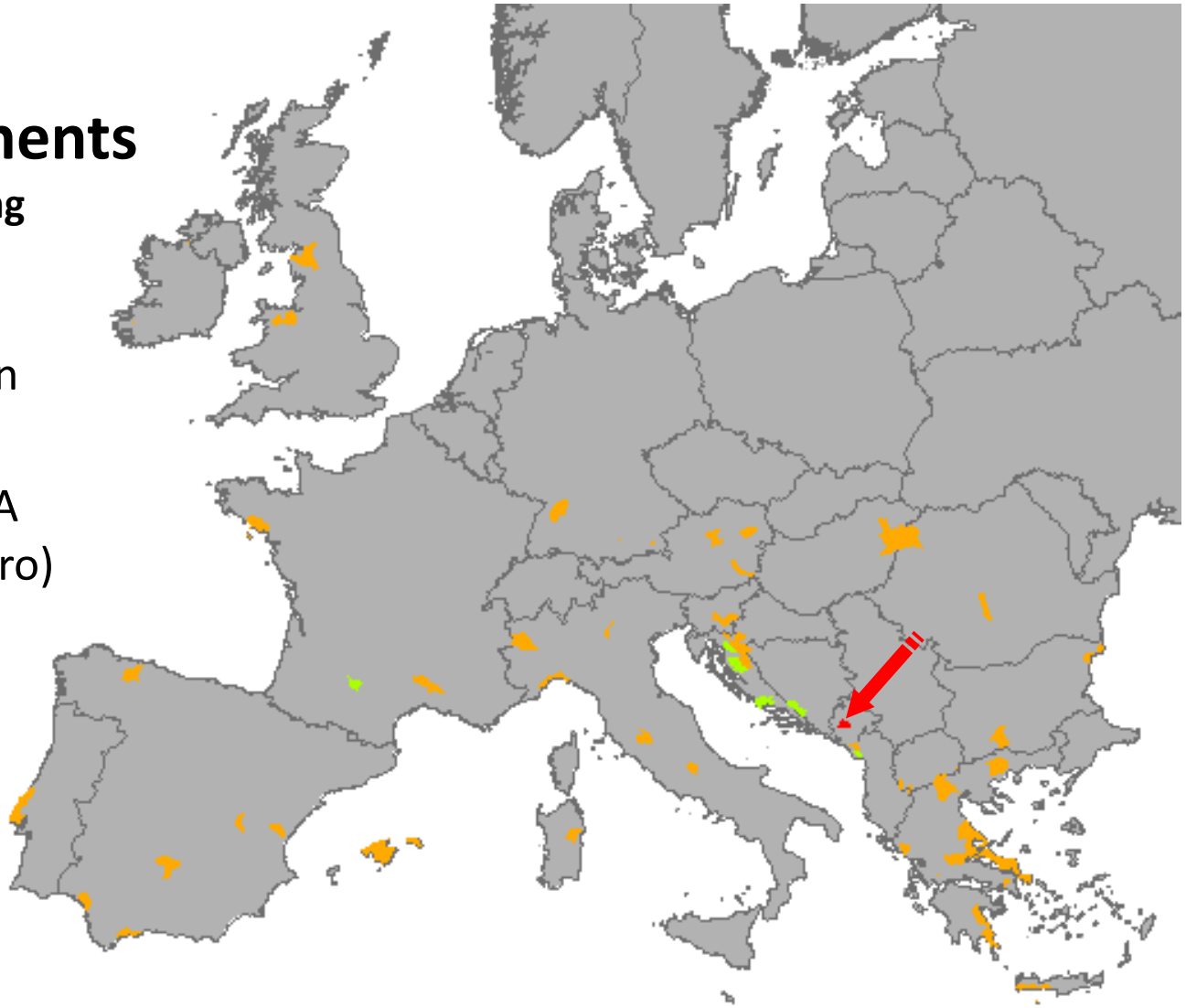
Catchments holding:

- At least 1 Critically Endangered or Endangered Species
- Holding >95% of the species known population
- With a definable boundary and ecological character distinct from adjacent areas

Alliance for Zero Extinction catchments

Current coverage by existing Protected Areas (PAs)

- ✓ 65 AZE-sites have been identified
- ✓ One AZE-site has no PA at all (Drin, Montenegro)
- ✓ 7 AZE-sites have less than 3% PA coverage



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Systematic Conservation Planning using MARXAN

Targets:

- 100% occurrences of CR species; 75% of EN species; 50% VU species
- Restricted Range species: 10% of occurrences
- All catchments with representative assemblages of species
- Maximum area set at 15% of the total area of Europe

We ran **4 Scenarios** for the following data sets:

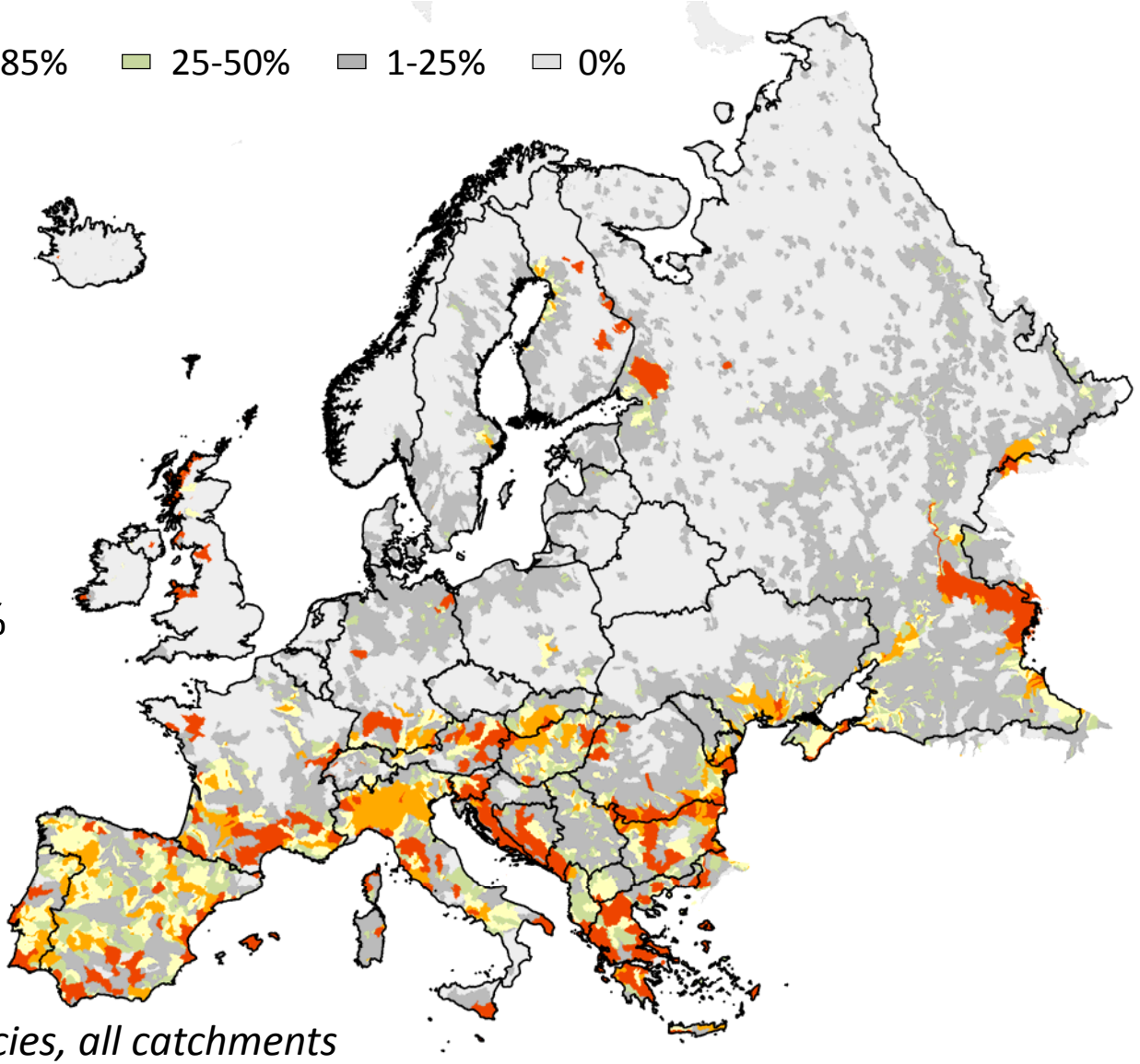
1) Global KBAs only
2) Global and Regional KBAs
3) All catchments with globally Red Listed species
4) **All catchments and all species (globally and regionally Red Listed)**

100% 85-99% 50-85% 25-50% 1-25% 0%

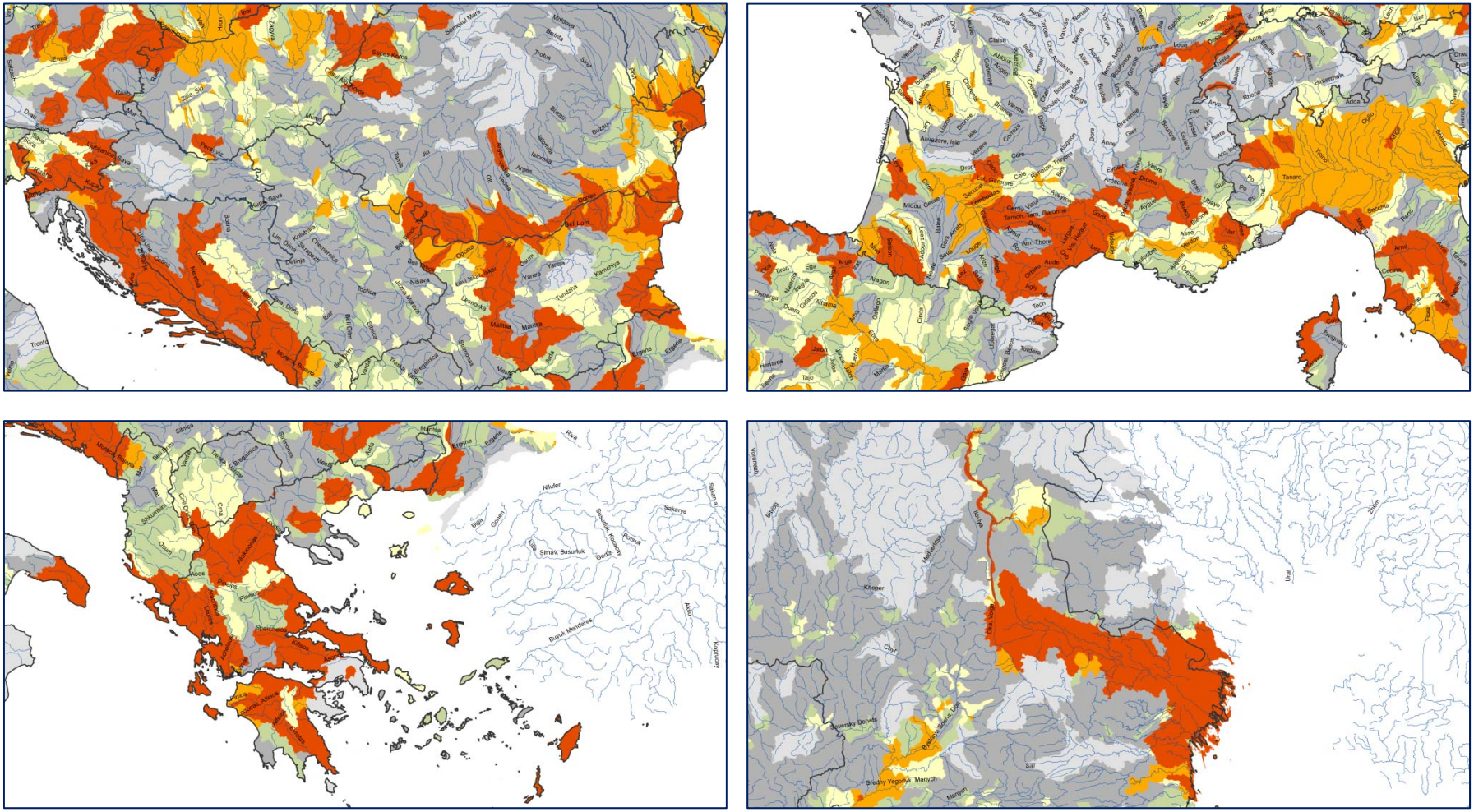
Frequency of selection of catchments indicating their irreplaceability

Top Priority "irreplaceable" KBA catchments in dark orange = 788 catchments

Average reduction to 67% of the total number of KBA catchments



Results for Scenario 4 – all species, all catchments



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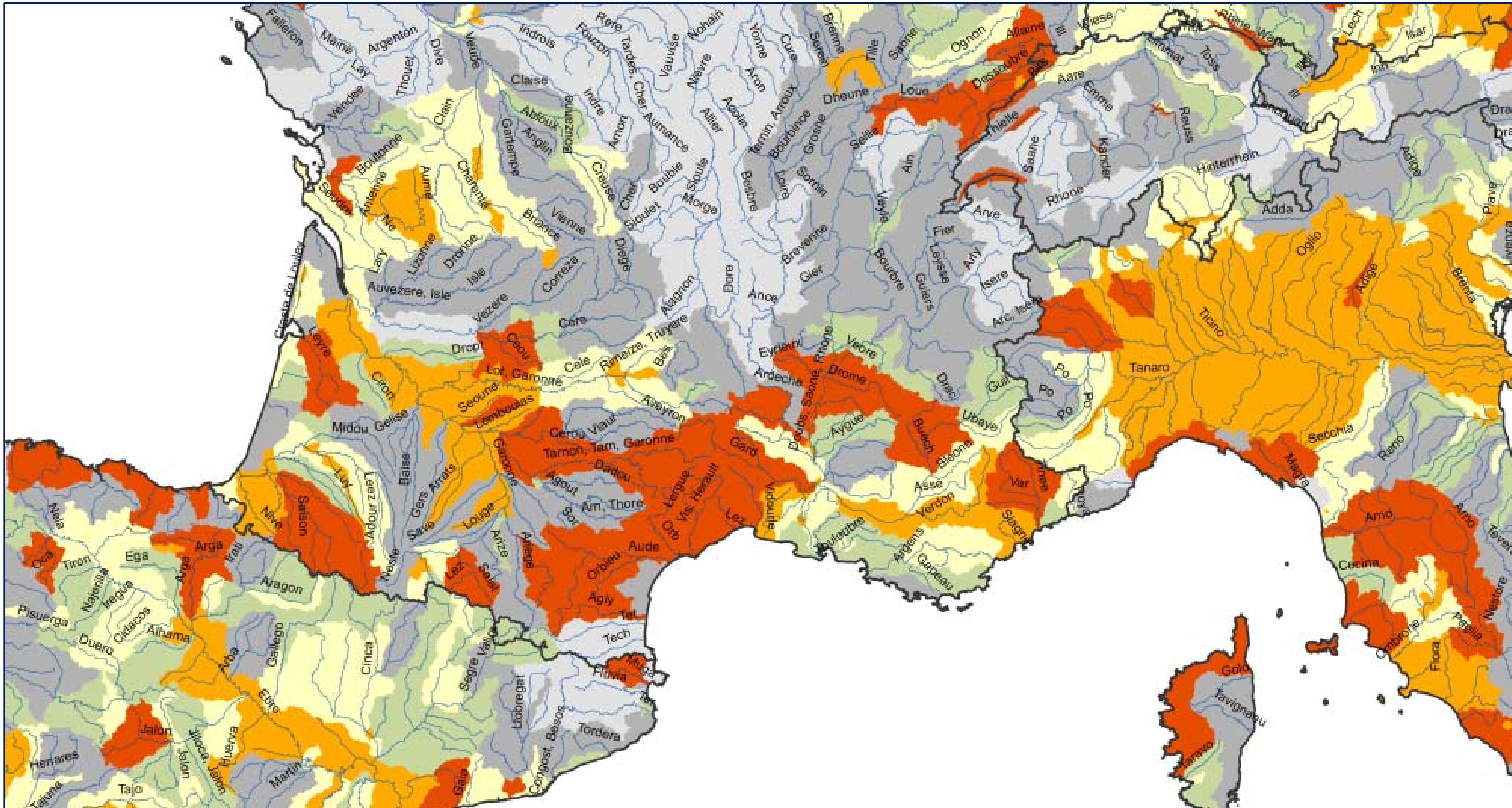
Water Lives Symposium BioFresh/REFRESH
Brussels 29-30 January 2014



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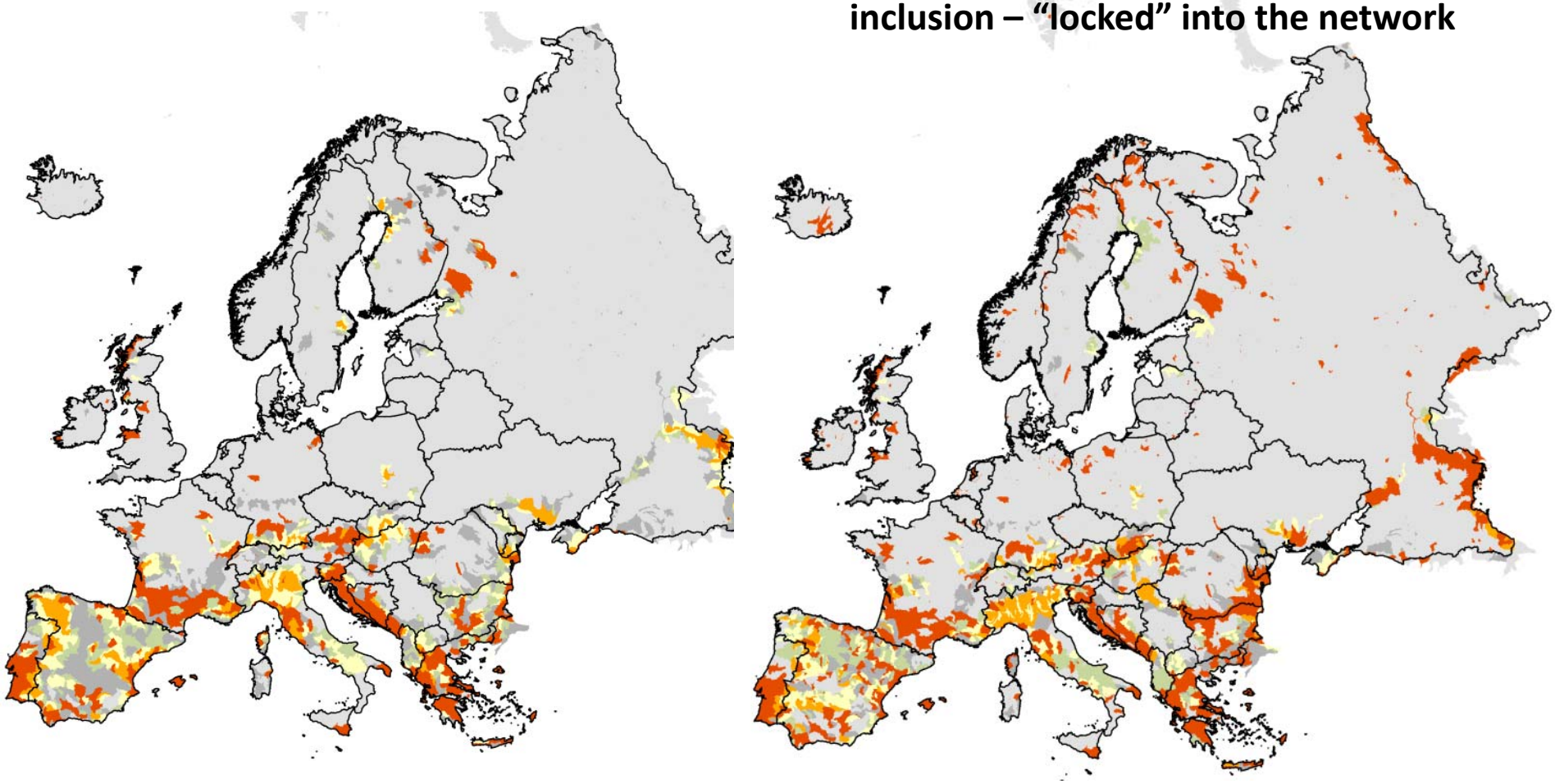
Next steps

- ✓ Run a MARXAN scenario where KBA catchments included in the existing PAs network are locked into the optimal networks
- ✓ These sites are locked in as the management infrastructure is already in place and the land is already set aside
- ✓ Assess current management benefit to freshwater species in these PAs.

Catchments with PA > 70%

No PAs "locked in"

PAs covering KBAs with 70%+ area inclusion – "locked" into the network



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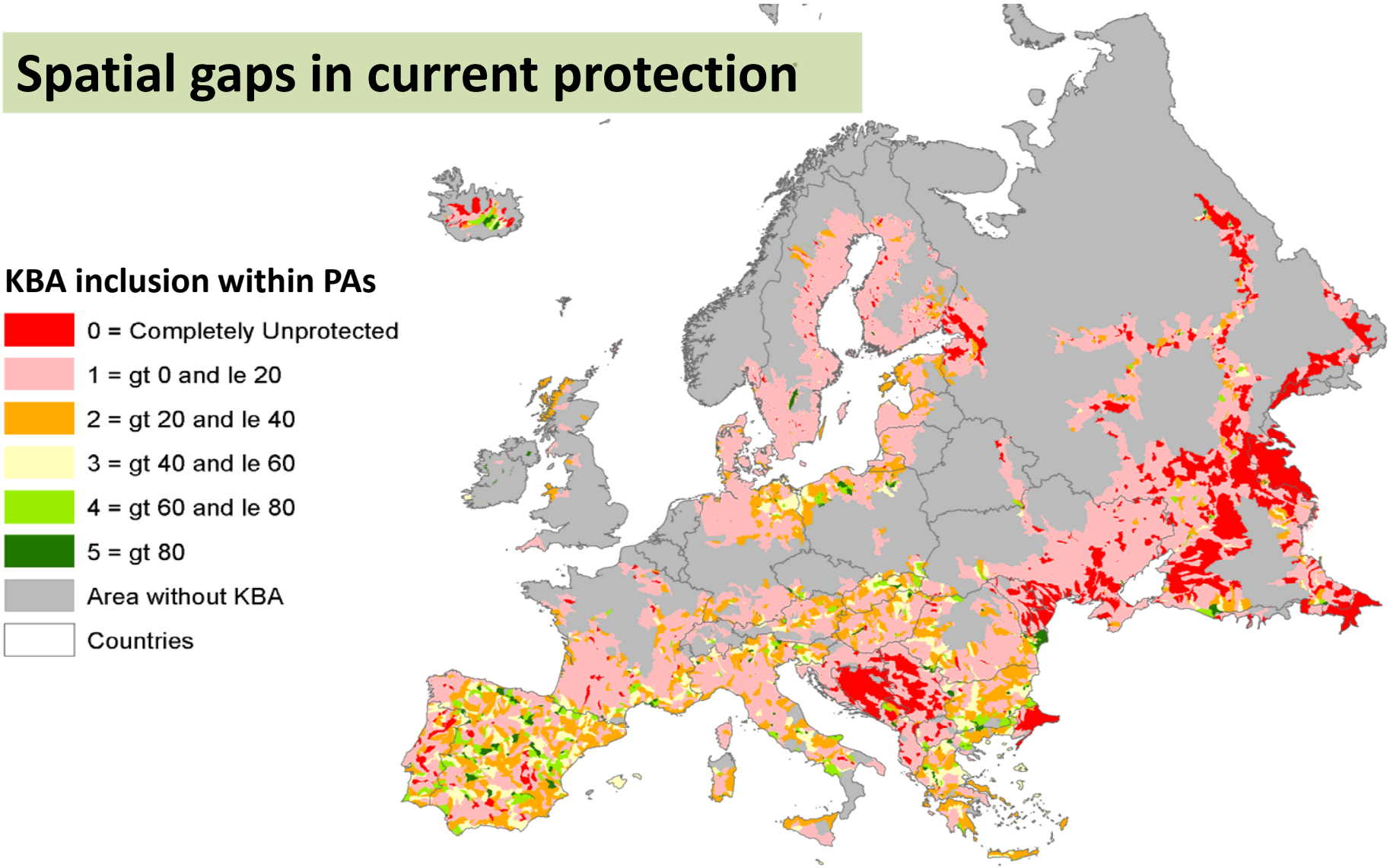
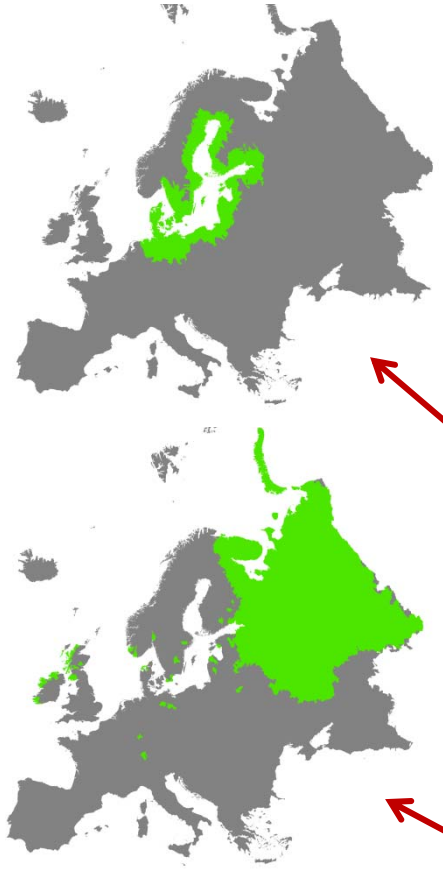
Spatial gaps in current protection

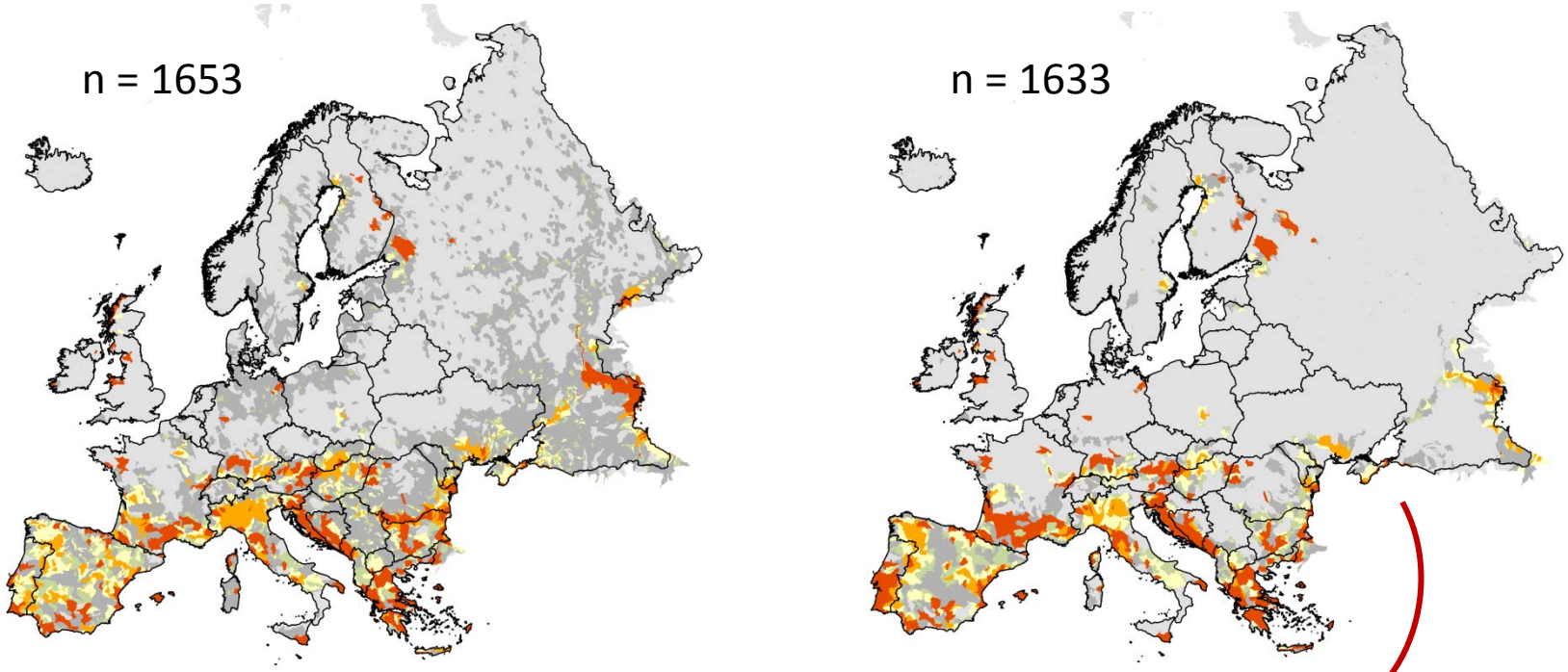


Gap Species



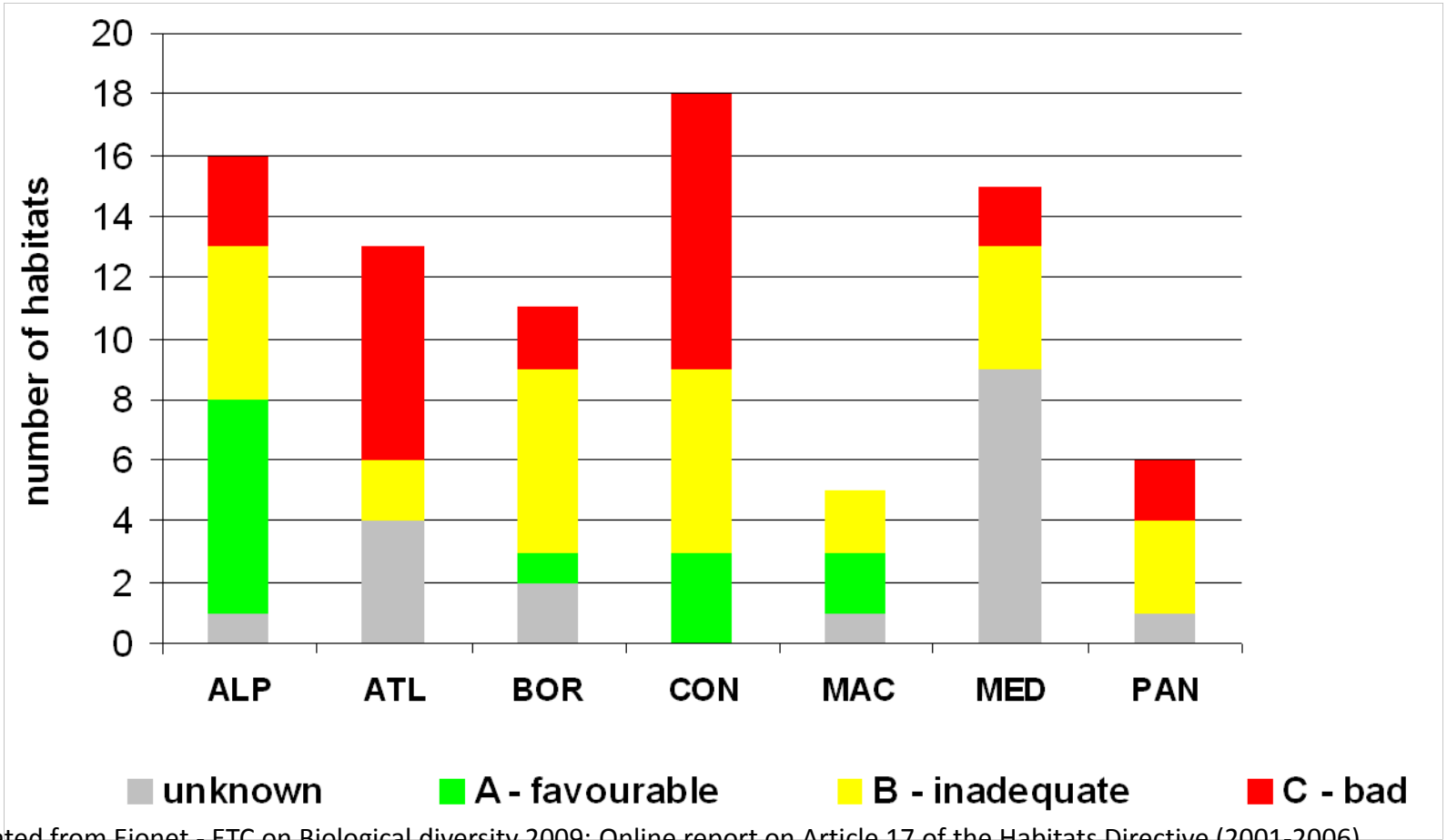
Taxon	Species	Red List status	Range size (km^2)	Proportion of range included in solution (Wide-Deep)
Fish	Acipenser gueldenstaedtii	CR	376 908	0.71
	Acipenser nudiventris	CR	91 634	0.91
	Acipenser persicus	CR	162 252	0.61
	Acipenser stellatus	CR	431 860	0.64
	Huso huso	CR	201 237	0.88
	Anaecypris hispanica	EN	65 895	0.91
	Chondrostoma soetta	EN	112 489	0.93
	Cobitis calderoni	EN	203 908	0.71
	Hucho hucho	EN	143 913	0.71
	Romanogobio benacensis	EN	103 689	0.92
	Acipenser ruthenus	VU	842 414	0.63
	Coregonus maraena	VU	864 090	0.15
	Cyprinus carpio	VU	1 305 623	0.59
Mollusc	Margaritifera auricularia	CR	64 066	0.70
	Theodoxus transversalis	EN	387 681	0.61
	Plagigeyeria gladilini	VU	244 160	0.98
Odonate	Lestes macrostigma	VU	1 570 666	0.72
	Sympetrum depressiusculum	VU	2 797 320	0.56
	Pilularia minuta	EN	85 447	0.94
Plant	Najas flexilis	VU	3 398 049	0.06

MARXAN re-run excluding 20 widespread, locally rare threatened species (e.g. six sturgeons)



- Targets now met for all threatened species (CR, EN, VU)
- Decreased priority for catchments in E Europe (lower Danube, Volga), increased priority for catchments in S Portugal and S France

Many Freshwater Habitats within Natura 2000 sites (EU25) remain in "bad" or "inadequate" condition



Data aggregated from Eionet - ETC on Biological diversity 2009: Online report on Article 17 of the Habitats Directive (2001-2006)

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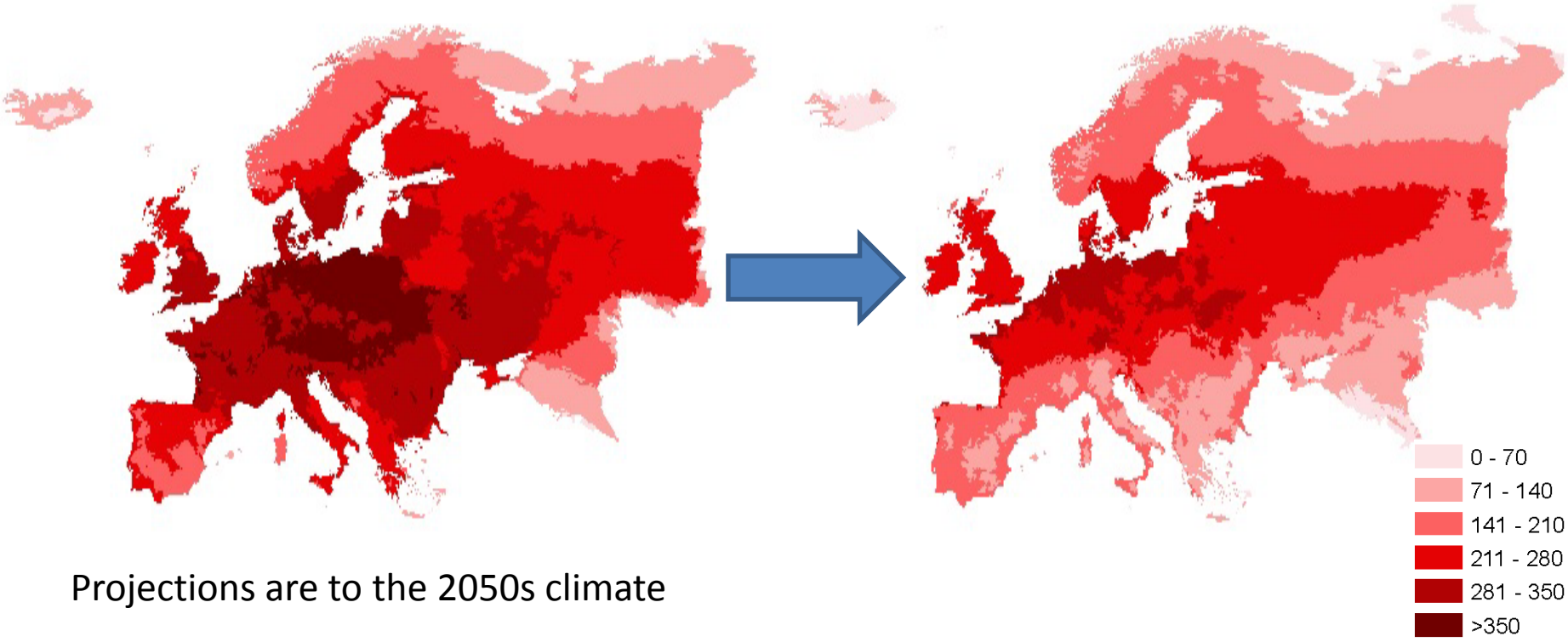
We can also predict how climate change may impact future KBA locations...

Current species richness

Projection (no dispersal)



Projections are to the 2050s climate

Summary of outputs from BioFresh

1. Freshwater KBAs of Europe have been mapped
2. Optimal site networks can be determined to meet specified conservation targets
3. Current gaps between the protected areas network and freshwater KBAs are identified
4. Climate change alterations to the distribution of freshwater biodiversity are predicted

Policy related questions for discussion

- *How can the BioFresh KBA initiative best work with the EC to endorse and make best use of this information?*
- *Can we help the EC meet the EU Biodiversity Strategy for: i) 15% restoration of degraded habitats, and ii) 50% of species on the Habitat Directive to show improved conservation status?*
- *What strategies does the EU have to improve the efficacy of protected areas for freshwater species?*
- *What initiatives aim to ensure protected area locations are 'future proof'?*

THANK YOU

BioFresh is funded by the European Union under the 7th Framework programme, **Contract No. 226874**

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