

SUPPL. 1: Assessment results. We analysed 27 approaches to assessing the impacts of invasive alien species (IAS) in terms of their purpose, assessment methods, transparency and in how far they meet certain requirements regarding the assessment of impacts, the consideration of context dependence, and the support of management decisions. The following table shows the detailed results. ● = fully / directly applies, ○ = partly / indirectly applies, — = does not apply / parameter is not included in study. For further information on operationalised criteria see Supplementary File 2: assessment criteria.

CRITERION / APPROACH	Panetta (1993)	Tucker and Richardson (1995)	Reichard and Hamilton (1997)	Pheloung et al. (1999)	Kowarik et al. (2003)	Kil et al. (2004)	Weber and Gut (2004)	Olenin et al. (2007)	Parker et al. (2007)	Molnar et al. (2008)	Ou et al. (2008)	Randall et al. (2008)	Stone et al. (2008)	Virtue et al. (2008)	Feng and Zhu (2010)	Magee et al. (2010)	Miller et al. (2010)	Skurka et al. (2011)	EPPO (2012)	Koop et al. (2012)	Kumschick et al. (2012)	Nehring et al. (2013)	Sandvik et al. (2013)	Blackburn et al. (2014)	Nentwig et al. (2016)	Branquart et al. (2016)	Davidson et al. (2017)	
PURPOSE OF ASSESSMENT																												
Predictive system	●	●	●	●	●	—	●	—	—	—	●	—	●	—	●	—	—	—	●	●	○	—	●	○	○	●	—	
Prioritisation tool	—	—	—	—	—	●	●	●	—	—	●	●	—	—	●	●	—	●	—	—	●	○	●	○	○	●	○	
Information tool	—	—	—	—	—	—	—	—	●	●	—	—	—	●	—	—	●	—	●	—	—	●	—	●	●	—	●	
ASSESSMENT METHODOLOGY																												
Decision tree	●	●	●	—	—	●	○	—	—	—	—	○	—	○	—	—	—	○	●	●	—	●	—	●	—	●	—	
Scoring system	—	—	—	●	—	—	●	—	●	●	●	●	●	●	●	●	●	●	—	●	●	—	—	—	●	—	●	
Matrix tool	—	—	—	—	●	—	—	●	—	—	—	—	—	●	—	—	—	—	●	—	—	—	●	—	—	●	—	
CONSIDERATION OF ENVIRONMENTAL IMPACTS																												
Environmental	○	○	—	●	●	●	○	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
COVERED BIODIVERSITY LEVELS																												
Genetic diversity	—	—	—	●	●	—	—	—	—	—	●	●	—	—	●	—	—	●	●	—	●	●	●	●	●	●	●	●
Species diversity	○	○	—	○	●	—	○	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Ecosystem diversity	—	—	—	●	●	●	—	●	○	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
IMPACT MAGNITUDE																												
Magnitude of overall impact	—	—	—	○	○	—	—	●	●	●	○	●	○	○	○	○	—	○	○	○	○	●	—	○	○	●	○	●
Effect size	—	—	—	—	○	—	—	●	○	●	○	●	●	○	○	—	—	●	●	—	●	—	●	●	●	●	●	●
Spatial extent	○	○	—	○	●	○	○	●	○	○	●	○	●	○	○	○	●	○	○	○	—	○	●	—	—	○	—	
Abundance	—	—	—	—	—	—	●	●	—	—	○	●	—	○	—	○	—	—	—	—	○	—	—	—	—	—	—	—
Cumulativeness	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	●	●	—	—	—	—	—	—	●	—	—	—	—
Irreversibility	—	—	—	—	—	—	—	○	—	—	○	○	—	—	○	—	—	—	—	—	○	—	—	●	—	—	○	○
CONTEXT DEPENDENCE OF ENVIRONMENTAL IMPACTS																												
Species potential to impact environment	○	○	—	●	●	●	○	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Potential distribution of IAS	○	○	—	○	●	—	○	—	○	—	○	○	●	○	○	—	○	—	○	○	—	—	●	—	—	○	○	
Actual distribution of IAS	—	—	—	—	—	○	○	●	—	○	●	○	—	○	○	○	●	○	○	—	—	○	—	—	—	○	—	
Identification and localisation of (potentially) affected resources	—	—	—	○	●	—	—	—	—	—	○	○	—	—	—	—	●	●	—	—	—	—	—	—	—	—	—	—
Conservation value of (potentially)	—	—	—	○	●	—	—	—	—	○	—	●	●	—	—	—	●	●	○	○	○	—	●	—	—	○	○	

CRITERION / APPROACH		Panetta (1993)	Tucker and Richardson (1995)	Reichard and Hamilton (1997)	Pheloung et al. (1999)	Kowarik et al. (2003)	Kil et al. (2004)	Weber and Gut (2004)	Olenin et al. (2007)	Parker et al. (2007)	Molnar et al. (2008)	Ou et al. (2008)	Randall et al. (2008)	Stone et al. (2008)	Virtue et al. (2008)	Feng and Zhu (2010)	Magee et al. (2010)	Miller et al. (2010)	Skurka et al. (2011)	EPPO (2012)	Koop et al. (2012)	Kumschick et al. (2012)	Nehring et al. (2013)	Sandvik et al. (2013)	Blackburn et al. (2014)	Nentwig et al. (2016)	Branquart et al. (2016)	Davidson et al. (2017)		
affected resources																														
Positive effects		—	—	—	○	—	●	—	—	○	—	—	—	○	—	—	—	—	—	—	—	—	●	—	—	—	—	—	●	
MANAGEMENT OF BIOLOGICAL INAVSIONS																														
Availability of effective and practicable methods		—	—	—	○	—	—	—	—	—	○	●	●	—	●	●	—	—	○	—	—	—	●	—	—	—	—	●	●	
Availability of personnel and financial resources within the required time frame		—	—	—	—	—	—	—	—	○	○	●	●	—	—	●	—	—	●	—	—	○	—	—	—	—	○	○	—	
Size of (potentially) infested area		○	○	—	○	●	○	○	●	○	○	●	○	●	○	○	—	○	●	○	○	—	○	○	—	—	—	○	—	
Number of infestations		—	—	—	—	—	—	—	○	—	—	○	—	—	—	—	○	—	—	—	—	○	—	—	—	—	—	—	○	
Detectability of infestations		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	●	—	—	—	—	—	—	—	—	○	—	
Accessibility of infestations		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	●	—	—	—	—	—	—	—	—	—	—	
Species traits or characteristics that might impede management		○	●	○	●	—	—	●	—	●	—	●	●	●	●	●	●	—	●	●	●	—	●	●	—	—	—	●	●	
Unwanted management effects		—	—	—	—	—	—	—	—	—	—	●	●	—	—	●	—	—	—	—	—	—	—	—	—	—	○	—	—	
Restorability of affected resources		—	—	—	—	—	—	—	○	—	—	●	○	—	—	○	—	—	—	—	—	○	—	—	—	○	—	—	○	
Cooperativeness of landowners		—	—	—	—	—	—	—	—	—	—	—	○	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
TRANSPARENCY OF ASSESSMENT APPROACHES																														
Transparency of criteria	Low	—		—	—	—	●	—	—	●	●	—	—	—	—	—	—	●	—	—	—	—	—	—	—	—	—	—	—	
	Middle	●	●	●	●	●	—	●	●	—	—	●	●	●	●	●	●	—	●	●	●	●	●	●	●	●	●	●	●	●
	High	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Transparency of approach	Low	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	Middle	—	—	—	—	—	—	—	—	—	●	—	—	●	—	—	—	●	●	—	●	—	—	—	—	—	—	—	—	●
	High	●	●	●	●	●	●	●	●	●	—	●	●	—	●	●	●	—	—	●	—	●	●	●	●	●	●	●	●	—
Disclosure of underlying values		—	—	—	○	●	—	—	—	—	○	—	○	○	—	—	—	○	○	○	○	○	○	●	●	—	—	●	—	
Term "invasive"	Applied, not defined	●	—	—	●	—	—	●	—	●	—	●	—	●	●	●	—	●	●	●	●	●	—	●	●	●	●	●	●	
	Applied and defined	—	●	●	—	●	●	—	●	—	●	—	●	—	—	—	●	—	—	—	—	—	●	—	—	—	—	—	—	
Term "damage / harm / impact / negative effect"	Applied, not defined	●	●	●	●	—	●	●	—	●	●	●	—	●	●	●	●	●	●	●	●	●	—	—	—	—	●	●	●	
	Applied and defined	—	—	—	—	●	—	—	●	—	—	—	●	—	—	—	—	—	—	—	—	—	●	●	●	—	—	—	—	