

## Appendix 1. Analysis grid and published studies assessment.

ID	Reference	General information			Issue 1 (LEK functions)				Issue 1 (Modeling steps)				Issue 2 (Interdisciplinarity)	Issue 3 (Elicitation)					Issue 4 (Models)
		Location	Object	Purpose	Substantive	Normative	Instrumental	Quotes	Objectives	Conceptual model	Data provision	Analysis & validation	Journal purpose	Systematic expert selection	n	Pooling	Uncertainty	Bias	Type of model
1	Anadón JD, Giménez A, and Ballestar R. 2010. Linking local ecological knowledge and habitat modeling to predict absolute species abundance on large scales. <i>Biodivers Conserv</i> <b>19</b> : 1443–54.	Almeria, Spain	terrestrial species distribution	fundamental	x			"The results obtained show that LEK provides high-quality and low-cost information about the distribution and relative abundance of T. graeca."			x		Disciplinary	x	172	x			GLM + multivariate
2	Bastari A, Beccacece J, Ferretti F, et al. 2017. Local Ecological Knowledge Indicates Temporal Trends of Benthic Invertebrates Species of the Adriatic Sea. <i>Front Mar Sci</i> <b>4</b> : 157.	Adriatic Sea, Italy	aquatic communities	fundamental	x			"Over the last decades, 'Local Ecological Knowledge' (LEK) has emerged as an alternative approach to collecting information on species presence or abundances when historical data are lacking"			x		Thematic		44	x			Logistic, model selection
3	Bridger MC, Johnson CJ, and Gillingham MP. 2016. Assessing cumulative impacts of forest development on the distribution of furbearers using expert- based habitat modeling. <i>Ecol Appl</i> <b>26</b> : 499–514.	British Columbia, Canada	terrestrial species distribution	applied	x			"When empirical data are unavailable, expert knowledge can be used to parameterize such models."	x		x		Disciplinary	x	21	x	x	x	Analytical Hierarchy Process (AHP)
4	Cuerrier A, Brunet ND, Gérin-Lajoie J, et al. 2015. The Study of Inuit Knowledge of Climate Change in Nunavik, Quebec: A Mixed Methods Approach. <i>Hum Ecol</i> <b>43</b> : 379–94.	Nunavik, Canada	terrestrial vegetal and animal communities	fundamental	x	x		"TEK has been an important resource in understanding how systems have changed over time by providing otherwise inaccessible early records of variation over very long timeframes" "Still, this recognition of the value of TEK does not often translate into its use in science and decision making where scientific knowledge, measurements and projections are privileged"			x		Interdisciplinary	x	46	x			Multivariate
5	Ehrich D, Strømeng MA, and Killengreen ST. 2016. Interference in the tundra predator guild studied using local ecological knowledge. <i>Oecologia</i> <b>180</b> : 1195–203.	Low arctic and subarctic, Norway and Russia	terrestrial animal communities	fundamental	x			"The arctic tundra and adjacent forest tundra is characterized by vast remote territories and very low densities of predators, making it difficult to obtain reliable data about species abundances (Reid et al. 2013). In such situations, the knowledge of local people living and working in the local ecosystem (Local Ecological Knowledge—LEK) may yield relevant biological information"			x		Disciplinary		113	x			Multivariate
6	Espinosa-Tenorio A, Wolff M, Espejel I, and Montaño-Moctezuma G. 2013. Using traditional ecological knowledge to improve holistic fisheries management: Transdisciplinary modeling of a lagoon ecosystem of Southern Mexico. <i>Ecol Soc</i> <b>18</b> .	Southern Mexico	aquatic systems	applied	x		x	"Such TEK can potentially inform scientific approaches to management, either as a source of baseline data to fill information gaps that cannot otherwise be addressed, or to provide alternative management approaches from which scientists and managers might learn." "With most capital investment coming from foreign loans, these countries' massive fisheries have largely followed the management policies of developed nations such as command control measures and single-species management."	x	x	x		Interdisciplinary	x	33+39	x			Loop Analysis
7	García-Oujano CG. 2007. Fishers' knowledge of marine species assemblages: Bridging between scientific and LEK in southeastern Puerto Rico. <i>Am Anthropol</i> <b>109</b> : 529–36.	Puerto Rico	aquatic animal communities	applied	x	x		"LEK can be the source of insights and information about ecosystem function and change that otherwise are unavailable to Western science, especially to resource management and governance agencies." "Much inquiry has focused on studying local ecological knowledge (LEK) held by small-scale natural resource users (e.g., fishers, farmers, hunters-gatherers), considering how to include this knowledge in natural resource management"			x		Disciplinary	x	18+37	x			Multivariate
8	Girondot M and Rizzo A. 2015. Bayesian Framework to Integrate Traditional Ecological Knowledge into Ecological Modeling: A Case Study. <i>J Ethnobiol</i> <b>35</b> : 337–53.	French Guyana	aquatic species	fundamental	x			"The main advantage of TEK is that it is based on a longer and much richer experience with the ecological system"			x		Interdisciplinary		3	x			Bayesian Network
9	Grant S and Berkes F. 2007. Fisher knowledge as expert system: A case from the longline fishery of Grenada, the Eastern Caribbean. <i>Fish Res</i> <b>84</b> : 162–70.	Gouyave, Granada	aquatic ecosystems	fundamental	x			"Fisher knowledge (also referred to as local or traditional ecological knowledge) can complement scientific knowledge (Johannes, 1996; Johannes et al., 2000), improve decision-making (Berkes and Folke, 1998; Batcados, 2004), and provide practical information"			x	x	Thematic		40				Fuzzy
10	Leenhardt P, Stelzenmüller V, Pascal N, et al. 2017. Exploring social-ecological dynamics of a coral reef resource system using participatory modeling and empirical data. <i>Mar Policy</i> <b>78</b> : 90–7.	Moorea Island, French Polynesia	aquatic system	applied	x		x	"In this study the term expert refers to anyone with relevant and extensive or in-depth experience in relation to a topic of interest"			x		Thematic	x	25				Regressions, correlations
11	Liedloff AC, Woodward EL, Harrington GA, and Jackson S. 2013. Integrating indigenous ecological and scientific hydro-geological knowledge using a Bayesian Network in the context of water resource development. <i>J Hydrol</i> <b>499</b> : 177–87.	North-western Australia	aquatic system	applied	x	x		"Indigenous knowledge, which can be 'geographically and temporally more extensive' (Fraser et al., 2006) than research-based (or scientific) knowledge, may be of value to researchers and water managers for its empirical strength." "Furthermore, indigenous people have distinct and diverse interests in the outcomes of water allocation decisions and therefore need to be involved in deliberating over the consequent costs and benefits of water use scenarios"	x	x	x	x	Disciplinary	x	9			x	Bayesian Network
12	Luzza MW, Wakie T, Evangelista PH, and Jarnevic CS. 2016. Integrating local pastoral knowledge, participatory mapping, and species distribution modeling for risk assessment of invasive rubber vine ( <i>Cryptostegia grandiflora</i> ) in Ethiopia's Afar region. <i>Ecol Soc</i> <b>21</b> .	Afar region, Ethiopia	plant terrestrial species	applied	x	x	x	"Ecological knowledge of local communities can provide an important tool for early detection and understanding of invasion impacts" "Despite an array of research noting the importance of local ecological knowledge for resource management and conservation planning '...], and the growing call for broader inclusion of stakeholder perceptions in invasion research"	x	x	x		Interdisciplinary		46			x	Habitat modeling
13	Lynam T, Drewry J, Higham W, and Mitchell C. 2010. Adaptive modelling for adaptive water quality management in the Great Barrier Reef region, Australia. <i>Environ Model Softw</i> <b>25</b> : 1291–301.	Great coral reef region, Australia	aquatic ecology	applied			x	"Not only is adaptive management advocated by government policy but it is also advocated by managers and researchers in the GBR (Eberhard et al., 2008; Hughes et al., 2007) with some identifying adaptive management as 'to effective conservation, use and management of Australia's coastal catchments and waterways' (Bennett et al., 2005). Conceptually at least, learning is the heart of adaptive management"			x	x	Interdisciplinary		NA			x	Bayesian Network
14	Mackinson S. 2001. Integrating local and scientific knowledge: An example in fisheries science. <i>Environ Manage</i> <b>27</b> : 533–45. Mackinson S. 2000. An adaptive fuzzy expert system for predicting structure, dynamics and distribution of herring shoals. <i>Ecol Modell</i> <b>126</b> : 155–78.	British Columbia, Canada	aquatic species behaviour	fundamental	x			"Fortunately, since fishers, fishery managers and alike, operate within the same mesoscale realm as the fish (individual shoals being their target), some of their knowledge is appropriate to combine with scientific information"			x	x	Disciplinary (1), interdisciplinary (1)		24	x	x		Fuzzy
15	Mantyka-Pringle CS, Jardine TD, Bradford L, et al. 2017. Bridging science and traditional knowledge to assess cumulative impacts of stressors on ecosystem health. <i>Environ Int</i> <b>102</b> : 125–37.	North-West Territories, Canada	ecosystem	applied	x	x	x	"This paper empirically contributes to the debates by operationalizing the integration and complementarity of TK and SK for environmental and natural resources decision-making" "There have been persistent calls for greater inclusion of local and indigenous or traditional knowledge (TK) alongside conventional scientific knowledge (SK) in making decisions about natural resources" "Co-production of TK and SK can also enhance capacity in rural or vulnerable communities observing resource declines, allowwideas and	x	x	x	x	Interdisciplinary		11 and 16	x	x	x	Bayesian Network
16	McGregor S, Lawson V, Christophersen P, et al. 2011. Indigenous Wetland Burning: Conserving Natural and Cultural Resources in Australia's World Heritage-listed Kakadu National Park. <i>Hum Ecol</i> <b>38</b> : 721–9.	Kakadu National Park, Australia	terrestrial ecology	applied	x	x	x	"Driven by concerns about the failure of western science and management to address ecosystem degradation and species loss, people are looking to the deep ecological understandings and management practices that have guided indigenous use of natural resources for millennia for alternative ways of sustainably managing the earth's natural resources" "This new recognition of traditional knowledge, coupled with greater control by indigenous peoples over their land and sea estates, holds great "Resource management often includes many components and stakeholders with their own demands in terms of resources, uses, goods, and services."			x	x	Interdisciplinary		NA				Bayesian Network
17	Mendoza GA and Prabhu R. 2006. Participatory modeling and analysis for sustainable forest management: Overview of soft system dynamics models and applications. <i>For Policy Econ</i> <b>9</b> : 179–96.	Indonesia	socio ecosystem	applied		x	x	"The paradigm of participatory or collaborative management has been widely accepted as a more appropriate and effective paradigm for natural re-source management particularly in the developing nations."			x		Disciplinary	x	9999	x			Cognitive mapping (fuzzy)
18	Muller, Birgit, Christian Wissel, Anja Linstädter, Karin Frank MB. 2007. Learning from local knowledge: modeling the pastoral- nomadic range management of the himba, namibia ". <i>Ecol Appl</i> <b>17</b> : 1857–75.	Himba, Namibia	systèmes agricoles	applied	x			"The transfer of local knowledge to global scientific knowledge may help to find basic principles. These principles could be, under certain conditions, applicable to other range management systems with different ecological and economic settings."			x		Disciplinary		NA				Multi-agent
19	Olsen PM, Kolden CA, and Gadamas L. 2015. Developing theoretical marine habitat suitability models from remotely-sensed data and traditional ecological knowledge. <i>Remote Sens</i> <b>7</b> : 11663–86.	Bering Strait region, USA, Russia, Canada	aquatic species distribution	fundamental	x	x		"An alternative source of information on bearded seals during summer and fall seasons is indigenous hunters and community elders, who have detailed multi-generational knowledge and observations of seals and their hunting areas" "Additionally, local experts were frustrated when Western scientific studies conducted in the region neglected TEK and produced conclusions that were easily invalidated by local observations (Gadamas, personal observation)"			x		Thematic		NA				Classification Tree Analysis
20	Poffus JL, Heinemeyer K, and Hebblewhite M. 2014. Comparing traditional ecological knowledge and western science woodland caribou habitat models. <i>J Wildl Manage</i> <b>78</b> : 112–21.	British Columbia, Canada	terrestrial species habitat	fundamental	x			"Recent studies demonstrate that when TEK is brought into play early in a wildlife management process, the combination with scientific data can lead to more efficient and effective wildlife management decisions"			x		Thematic	x	8	x			Rule-Based Habitat Suitability Index
21	Rajaram T and Das A. 2010. Modeling of interactions among sustainability components of an agro-ecosystem using local knowledge through cognitive mapping and fuzzy inference system. <i>Expert Syst Appl</i> <b>37</b> : 1734–44.	South of India	système agricole	applied			x	"Participatory approaches have been acknowledged as an effective way to take advantage of the rich traditional knowledge available with the local community and to bring a sense of ownership to policies and programs."			x		Thematic	x	NA		x		Fuzzy
22	Yamada K, Eith J, McCarthy M, and Zenger A. 2003. Eliciting and integrating expert knowledge for wildlife habitat modelling. <i>Ecol Modell</i> <b>165</b> : 251–64.	Victoria, Australia	population espede terrestre	fundamental	x			"Expert knowledge is an important resource that may improve the reliability of modelling (Dzierski et al., 1997; Venterink and Wassen, 1997; Hackett and Vamcnay, 1998; Horst et al., 1998; Moltgen et al., 1999). It is particularly valuable where no systematic field investigations have been conducted."			x	x	Disciplinary		9	x			Multivariate + Habitat Suitability Index
23	Zhang X and Vincent ACJ. 2017. Integrating multiple datasets with species distribution models to inform conservation of the poorly-recorded Chinese seahorses. <i>Biol Conserv</i> <b>211</b> : 161–71.	China (shore)	aquatic species	fundamental	x			"Compared with traditional surveys (e.g. transect sampling), interview-based LEK research can generate cost-effective but often coarse-resolution (e.g. 10 × 10 km <sup>2</sup> ) datasets"			x	x	Disciplinary	x	463	x			Habitat suitability (Maxent, presence only)