**Appendix A** The 171 sourced articles that comprise the WOE-ERA evidence base used in this research, showing some of the extracted information including the risk domain, the uncertainties identified, the UMTs utilised, and the type of WOE framework.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **ID** | **Reference** | **Risk domain** | **Uncertainty identified** | **UMT(s) utilised** | **WOE framework** |
| 1 | Acosta *et al.* 2010 | Ecology | Language: vagueness | Fuzzy logic | Semi-quantitative: logic |
|   |   |   | Language: underspeciﬁcity  | Fuzzy logic |   |
|   |   |   | Language: ambiguity | Fuzzy logic |   |
| 2 | Agüero *et al.* 2008 | Toxicology | Data: reliability | Monte-Carlo simulation | Quantitative: computational modelling |
| 3 | Ahlers *et al.* 2008 | Toxicology | Extrapolation: spatial | Multi-criteria decision analysis | Quantitative: multi-criteria decision analysis |
|   |   |   | Extrapolation: interspecies | Multi-criteria decision analysis |   |
| 4 | Alden *et al.* 2005 | Toxicology | Data: reliability | No action | Semi-quantitative: logic |
| 5 | Alvarez-Guerra, M | Sediment management | Variability: human | Multi-criteria decision analysis | Semi-quantitative: ranking; multi-criteria decision analysis |
| 6 | An *et al.* 2007 | Microbiology | Variability: natural | Monte-Carlo simulation | Quantitative: computational modelling |
|   |   |   | Data: reliability | Monte-Carlo simulation |   |
| 7 | Apitz *et al.* 2007 | Sediment management | Data: reliability  | No action | Semi-quantitative: logic |
| 8 | ApSimon *et al.* 2002 | Contamination studies | Data: reliability  | Monte-Carlo simulation | Quantitative: computational modelling |
|   |   |   | Model: structure | Monte-Carlo simulation |   |
|   |   |   | Variability: natural | Monte-Carlo simulation |   |
| 9 | Arhonditsis *et al.* 2007 | Ecology | Model: structure | Sensitivity analysis; Monte-Carlo simulation | Quantitative: computational modelling |
|   |   |   | Data: reliability (model input) | Sensitivity analysis; Monte-Carlo simulation |   |
| 10 | Aspinall *et al.* 2003 | Volcanology | Decision | Bayesian belief network | Quantitative: statistics |
| 11 | Avagliano and Parrella 2009 | Contamination studies | Model: output | Sensitivity analysis | Quantitative: computational modelling |
|   |   |   | Data: reliability (model input) | Further data collection |   |
| 12 | Avagliano *et al.* 2005 | Contamination studies | Data: reliability (model input) | Sensitivity analysis | Quantitative: computational modelling |
|   |   |   | Model: output | Sensitivity analysis |   |
| 13 | Babendreier and Castleton 2005 | Hazardous materials | Model: structure | Monte-Carlo simulation | Quantitative: computational modelling |
| 14 | Baccou *et al.* 2008 | Radionuclides | Data: availability (model input) | Monte-Carlo simulation | Quantitative: numerical modelling |
| 15 | Barron *et al.* 2004 | Toxicology | Data: reliability | Latin hypercube sampling | Quantitative: computational modelling |
|   |   |   | Extrapolation: interspecies | Latin hypercube sampling |   |
| 16 | Batley *et al.* 2002 | Sediment management | Data: reliability  | Uncertainty factor | Semi-quantitative: logic |
|   |   |   | Extrapolation: laboratory | Uncertainty factor |   |
|   |   |   | Extrapolation: interspecies | Uncertainty factor |   |
|   |   |   | Extrapolation: intraspecies | Uncertainty factor |   |
| 17 | Batzias and Siontorou 2007 | Contamination studies | Data: reliability | Further data collection | Quantitative: computational modelling |
| 18 | Baudrit *et al.* 2007 | Contamination studies | Variability: natural | Monte-Carlo simulation |   |
|   |   |   | Data: precision  | Fuzzy logic |   |
| 19 | Benekos *et al.* 2007 | Contamination studies | Data: reliability (model input) | Monte-Carlo simulation | Quantitative: computational modelling |
|   |   |   | Model: output | Monte-Carlo simulation |   |
|   |   |   | Data: availability | Monte-Carlo simulation |   |
| 20 | Benke and Hamilton 2008 | Microbiology | Data: reliability (model input) | Monte-Carlo simulation | Quantitative: numerical modelling |
| 21 | Bennett *et al.* 2007 | Toxicology | Data: reliability | Monte-Carlo simulation | Quantitative: computational modelling |
| 22 | Beyer *et al.* 2009 | Contamination studies | Data: reliability (model input) | Monte-Carlo simulation | Quantitative: numerical modelling |
|   |   |   | Model: structure | Model validation |   |
| 23 | Bittueva *et al.* 2007 | Plant Science | Variability: natural | Other (discriminant analysis) | Semi-quantitative: ranking |
| 24 | Blazkova and Beven 2004 | Hydrology | Data: availability (model input) | Monte-Carlo simulation | Quantitative: computational modelling |
|   |   |   | Model: output | Fuzzy logic |   |
| 25 | Borsuk *et al.* 2006 | Ecology | Data: reliability (model input) | Bayesian belief network | Quantitative: numerical modelling |
|   |   |   | Model: structure | Bayesian belief network |   |
|   |   |   | Variability: natural | Latin hypercube sampling |   |
| 26 | Bosgra *et al.* 2005 | Toxicology | Extrapolation: interspecies | Monte-Carlo simulation | Quantitative: computational modelling |
|   |   |   | Extrapolation: intraspecies | Monte-Carlo simulation  |   |
|   |   |   | Extrapolation: quantity | Monte-Carlo simulation  |   |
|   |   |   | Data: reliability (model input) | Monte-Carlo simulation  |   |
| 27 | Bosgra *et al.* 2009 | Toxicology | Data: reliability (model input) | Monte-Carlo simulation | Quantitative: numerical modelling |
|   |   |   | Extrapolation: interspecies | Monte-Carlo simulation |   |
|   |   |   | Extrapolation: intraspecies | Monte-Carlo simulation |   |
| 28 | Brèchignnac and Doi 2009 | Toxicology | Extrapolation: interspecies | Precautionary management |   |
|   |   |   | Extrapolation: quantity | Precautionary management |   |
|   |   |   | Extrapolation: spatial | Precautionary management |   |
|   |   |   | System: process | Precautionary management |   |
| 29 | van den Brink *et al.* 2008 | Contamination studies | Data: reliability | Monte-Carlo simulation; Latin hypercube sampling | Quantitative: computational modelling |
|   |   |   | Model: output | Sensitivity analysis |   |
| 30 | Brouwer and De Blois 2008 | Contamination studies | System: process | Monte-Carlo simulation | Semi-quantitative: ranking |
|  |   |   | Variability: natural | Monte-Carlo simulation |   |
|  |   |   | Extrapolation: spatial | Monte-Carlo simulation |   |
|  |   |   | System: cause | Causal influence |   |
| 31 | Buekers *et al.* 2009 | Toxicology | Data: reliability | Further data collection | Semi-quantitative: logic |
| 32 | Burgman *et al.* 1999 | Ecology | Variability: natural | Monte-Carlo simulation | Semi-quantitative: ranking |
|  |   |   | Model: structure | Monte-Carlo simulation |   |
|  |   |   | Variability: human | Other (statistics) |   |
| 33 | Burton *et al.* 2005 | Toxicology | Extrapolation: laboratory | Further data collection | Semi-quantitative: logic |
|  |   |   | Variability: natural | Further data collection |   |
| 34 | Caley *et al.* 2006 | Biological science | Model: structure | Sensitivity analysis | Quantitative: statistics |
|  |   |   | System: process | Bootstrapping |   |
| 35 | Campbell and Longsine 1990 | Hazardous materials | Model: output | Monte-Carlo simulation; Latin hypercube sampling | Quantitative: computational modelling |
|  |   |   | Data: availability (model input) | Monte-Carlo simulation; Latin hypercube sampling |   |
|  |   |   | Variability: natural | Monte-Carlo simulation; Latin hypercube sampling |   |
| 36 | Cañellas-Boltà *et al.* 2005 | Sediment management | System: effect | Precautionary management | Qualitative: listing evidence |
|  |   |   | System: process | Precautionary management |   |
| 37 | Carlon *et al.* 2008 | Contamination studies | Data: reliability (model input) | Monte-Carlo simulation | Quantitative: computational modelling |
|  |   |   | Extrapolation: spatial | Interpolation |   |
| 38 | Carrington *et al.* 1997 | Toxicology | Variability: natural | Monte-Carlo simulation | Quantitative: computational modelling |
|  |   |   | Model: structure | Sensitivity analysis |   |
|  |   |   | Model: output | Monte-Carlo simulation |   |
| 39 | Cesar *et al.* 2009 | Toxicology | Data: reliability | No action | Quantitative: statistics |
| 40 | Chapman 2007 | Contamination studies | Variability: natural | Further data collection | Semi-quantitative: ranking |
|  |   |   | Data: reliability | Further data collection |   |
| 41 | Chen and Ma 2007 | Hazardous materials | Data: reliability (model input) | Monte-Carlo simulation | Quantitative: computational modelling |
|  |   |   | Variability: natural | Monte-Carlo simulation |   |
|  |   |   | Model: output | Sensitivity analysis |   |
| 42 | Chen *et al.* 2007 | Water quality | Data: reliability | Bayesian belief network; Expert elicitation | Semi-quantitative: logic |
|  |   |   | Variability: human | Bayesian belief network; Expert elicitation |   |
|  |   |   | Data: availability | Bayesian belief network; Expert elicitation |   |
| 43 | Chowdhury and Flentje 2002 | Geology | Extrapolation: spatial | Expert elicitation | Qualitative: best professional judgement |
|  |   |   | System: process | Expert elicitation |   |
|  |   |   | Model: structure | Sensitivity analysis |   |
| 44 | Chowdhury *et al.* 2009 | Contamination studies | Variability: natural | Latin hypercube sampling | Quantitative: numerical modelling and statistics |
|  |   |   | System: process | Latin hypercube sampling |   |
|  |   |   | Data: precision | Fuzzy logic |   |
|  |   |   | Language: vagueness (linguistic) | Fuzzy logic |   |
|  |   |   | Language: ambiguity | Fuzzy logic |   |
| 45 | Collins *et al.* 2000 | Nutrient loading | Data: reliability (model input) | Error propagation; Bootstrapping | Quantitative: statistics |
| 46 | Collins *et al.* 2004 | Toxicology | Extrapolation: intraspecies | Uncertainty factor | Qualitative: listing evidence |
|  |   |   | Extrapolation: interspecies | Uncertainty factor |   |
|  |   |   | Extrapolation: temporal | Uncertainty factor |   |
| 47 | Cothern *et al.* 1986 | Contamination studies | Extrapolation: intraspecies | Uncertainty factor | Qualitative: listing evidence |
|  |   |   | Variability: natural | Uncertainty factor |   |
|  |   |   | Extrapolation: spatial | Uncertainty factor |   |
|  |   |   | Extrapolation: temporal | Uncertainty factor |   |
| 48 | Crane and MacDonald 2003 | Contamination studies | System: cause | Causal influence | Semi-quantitative: logic |
| 49 | Critto *et al.* 2007 | Contamination studies | Decision | Multi-criteria decision analysis | Quantitative: multi-criteria decision analysis |
| 50 | Croke *et al.* 2007 | Water management | Variability: human: interpretation | Bayesian belief network | Qualitative: best professional judgement |
| 51 | Culp *et al.* 2000 | Toxicology | Data: reliability | No action | Qualitative: listing evidence |
| 52 | Cupit *et al.* 2002 | Toxicology | Decision | No action | Semi-quantitative: ranking |
| 53 | Daniels *et al.* 2000 | Contamination studies | Data: reliability | Monte-Carlo simulation | Quantitative: numerical modelling |
| 54 | DelValls and Riba 2007 | Sediment management | Variability: natural | No action | Semi-quantitative: logic |
| 55 | Dey *et al.* 2000 | Water quality | Data: availability (model input) | Monte-Carlo simulation | Semi-quantitative: causal criteria |
|  |   |   | Decision | Adaptive management |   |
| 56 | Diodato and Ceccarelli 2005 | Water management | Extrapolation: spatial | Interpolation | Quantitative: computational modelling and statistics |
| 57 | Ducey and Larson 1999 | Ecology | Variability: human | Fuzzy logic | Semi-quantitative: ranking |
|  |   |   | Decision | Multi-criteria decision analysis |   |
| 58 | Dunham *et al.* 2003 | Ecology | Decision | Adaptive management | Semi-quantitative: causal criteria |
| 59 | Dussault *et al.* 2008 | Toxicology | Data: reliability | Uncertainty factor | Semi-quantitative: causal criteria |
|  |   |   | System: cause | Uncertainty factor |   |
| 60 | Echevarria *et al.* 2001 | Radiation | Variability: natural | Further data collection | Semi-quantitative: ranking |
| 61 | Efroymson *et al.* 2007 | Water quality | Extrapolation: laboratory | Error propagation | Semi-quantitative: causal criteria |
|  |   |   | Extrapolation: spatial | Error propagation |   |
|  |   |   | Extrapolation: interspecies | Error propagation |   |
| 62 | Enick and Moore 2007 | Toxicology | Extrapolation: quantity | Uncertainty factor | Qualitative: listing evidence |
|  |   |   | System: process | Uncertainty factor |   |
|  |   |   | Data: availability | Expert elicitation |   |
| 63 | Fewtrell *et al.* 2001 | Water quality | Data: reliability | Uncertainty factor | Qualitative: best professional judgement |
| 64 | Fiksel 1985 | Hazardous materials | Data: availability | No action | Quantitative: computational modelling |
|  |   |   | Model: structure | No action |   |
|  |   |   | Variability: natural | No action |   |
|  |   |   | Extrapolation: interspecies | Sensitivity analysis |   |
|  |   |   | Data: precision | No action |   |
|  |   |   | Extrapolation: temporal | No action |   |
|  |   |   | Extrapolation: spatial | No action |   |
| 65 | Filipsson *et al.* 2009 | Hazardous materials | Data: reliability  | Confidence interval | Quantitative: computational modelling and statistics |
|  |   |   | Data: reliability (model input) | Other (probability bounds analysis - PBA) |   |
| 66 | Fischer 2005 | Toxicology | System: process  | Uncertainty factor | Semi-quantitative: logic |
| 67 | Fish *et al.* 2009 | Environmental policy | Variability: human: interpretation | Expert elicitation | Qualitative: best professional judgement |
| 68 | Forbes and Calow 2002 | Ecology | System: cause | No action | Semi-quantitative: causal criteria |
|  |   |   | System: effect | No action |   |
| 69 | Fuhrer 2009 | Ecology | Model: output | No action | Qualitative: listing evidence |
|  |   |   | Data: reliability (model input) | No action |   |
| 70 | Godduhn and Duffy 2003 | Toxicology | Extrapolation: interspecies | Precautionary Management | Semi-quantitative: causal criteria |
|  |   |   | Extrapolation: temporal | Precautionary Management |   |
| 71 | Golden *et al.* 1997 | Toxicology | System: effect | Uncertainty factor | Qualitative: listing evidence |
| 72 | Goodman *et al.* 1997 | Toxicology | System: process | No action | Qualitative: listing evidence |
|  |   |   | Variability: natural | No action |   |
|  |   |   | Data: reliability  | No action |   |
|  |   |   | Extrapolation: interspecies | No action |   |
| 73 | Gottschalk *et al.* 2010 | Nanotoxicology | Data: reliability (model input) | Sensitivity analysis; Monte-Carlo simulation | Quantitative: computational modelling |
|  |   |   | Data: availability | Sensitivity analysis; Monte-Carlo simulation |   |
|  |   |   | System: effect | Sensitivity analysis; Monte-Carlo simulation |   |
| 74 | Greenberg 1997 | Toxicology | Extrapolation: intraspecies | Uncertainty factor | Semi-quantitative: logic |
| 75 | Griffin *et al.* 1999 | Toxicology | Data: reliability (model input) | Monte-Carlo simulation | Quantitative: computational modelling |
| 76 | Grist *et al.* 2003 | Water quality | Extrapolation: intraspecies | bootstrapping | Quantitative: statistics |
|  |   |   | Variability: natural | bootstrapping |   |
|  |   |   | Data: reliability  | bootstrapping |   |
| 77 | Gurjar and Mohan 2002 | Toxicology | Extrapolation: interspecies | Uncertainty factor | Semi-quantitative: causal criteria |
|  |   |   | Extrapolation: quantity | Uncertainty factor |   |
| 78 | Hacon *et al.* 1997 | Toxicology | Data: reliability (model input) | Monte-Carlo simulation; Latin hypercube sampling | Quantitative: computational modelling |
| 79 | Hamilton *et al.* 2006 | Microbiology | Data: availability (model input) | Sensitivity analysis | Quantitative: numerical modelling and statistics |
| 80 | Hayes and Landis 2004 | Ecology | Extrapolation: spatial | Monte-Carlo simulation | Semi-quantitative: ranking |
|  |   |   | Extrapolation: interspecies | Monte-Carlo simulation |   |
|  |   |   | Data: reliability | Monte-Carlo simulation |   |
|  |   |   | System: effect | Monte-Carlo simulation |   |
|  |   |   | System: cause | Monte-Carlo simulation |   |
|  |   |   | Extrapolation: temporal | Monte-Carlo simulation |   |
| 81 | Hays *et al.* 2009 | Toxicology | Extrapolation: intraspecies | Uncertainty factor | Semi-quantitative: logic  |
|  |   |   | Extrapolation: interspecies | Uncertainty factor |   |
| 82 | Henning-de Jong *et al.* 2008 | Toxicology | Data: reliability (model input) | Monte-Carlo simulation; Latin hypercube sampling | Semi-quantitative: ranking and computational modelling |
| 83 | Hughes *et al.* 2003 | Toxicology | Extrapolation: interspecies | No action | Qualitative: listing evidence |
|  |   |   | System: cause | No action |   |
|  |   |   | Extrapolation: temporal | No action |   |
|  |   |   | Extrapolation: intraspecies | No action |   |
|  |   |   | System: effect | No action |   |
| 84 | Hung *et al.* 2009 | Hazardous materials | Data: availability (model input) | Monte-Carlo simulation | Quantitative: computational modelling |
| 85 | Huysmans *et al.* 2006 | Contamination studies | Data: availability | Monte-Carlo simulation; Sensitivity analysis | Quantitative: computational modelling |
|  |   |   | Model: output | Monte-Carlo simulation; Sensitivity analysis |   |
| 86 | Jackson *et al.* 2004 | Toxicology | Extrapolation: spatial | No action | Quantitative: computational modelling |
| 87 | Jones *et al.* 2009 | Toxicology | Extrapolation: interspecies | Monte-Carlo simulation | Quantitative: computational modelling |
| 88 | Kaloudis *et al.* 2005 | Wildfire | Extrapolation: temporal | Fuzzy logic | Quantitative: computational modelling |
|  |   |   | Extrapolation: spatial | Fuzzy logic |   |
|  |   |   | Data: reliability | Fuzzy logic |   |
|  |   |   | Data: availability (model input) | Fuzzy logic |   |
|  |   |   | Model: output | Fuzzy logic |   |
| 89 | Kandlikar *et al.* 2007 | Nanotoxicology | Variability: human | Expert elicitation; Probability density function; Bayesian belief network | Qualitative: best professional judgement |
|  |   |   | Extrapolation: intraspecies | Expert elicitation; Probability density function; Bayesian belief network |   |
|  |   |   | System: effect | Expert elicitation; Probability density function; Bayesian belief network |   |
|  |   |   | Extrapolation: interspecies | Expert elicitation; Probability density function; Bayesian belief network |   |
|  |   |   | Variability: natural | Expert elicitation; Probability density function; Bayesian belief network |   |
|  |   |   | System: process | Expert elicitation; Probability density function; Bayesian belief network |   |
| 90 | Kapo and Burton 2006 | Toxicology | Extrapolation: spatial | Sensitivity analysis | Quantitative: computational modelling |
| 91 | Keiter *et al.* 2009 | Toxicology | Data: reliability (empirical) | Fuzzy logic | Semi-quantitative: logic |
|  |   |   | Variability: natural | Fuzzy logic |   |
|  |   |   | Language: ambiguity | Fuzzy logic |   |
|  |   |   | Language: vagueness (linguistic) | Fuzzy logic |   |
|  |   |   | Language: underspecificity | Fuzzy logic |   |
| 92 | Kelly *et al.* 2009 | Toxicology | Extrapolation: intraspecies | Further data collection | Semi-quantitative: logic  |
|  |   |   | Extrapolation: spatial | Further data collection |   |
|  |   |   | Extrapolation: temporal | Further data collection |   |
| 93 | Kentel and Aral 2007 | Toxicology | Variability: natural | Monte-Carlo simulation | Quantitative: computational modelling |
|  |   |   | Data: availability | Fuzzy logic |   |
|  |   |   | Data: reliability | Fuzzy logic |   |
|  |   |   | System: process | Fuzzy logic |   |
| 94 | King and Richardson 2003 | Water quality | System: process | Bootstrapping | Quantitative: statistics |
| 95 | Klier *et al.* 2008 | Plant Science | Data: reliability (model input) | Latin hypercube sampling | Quantitative: computational modelling |
| 96 | Kooistra *et al.* 2005 | Ecology | Data: availability (model input) | Monte-Carlo simulation | Quantitative: computational modelling |
|  |   |   | Extrapolation: spatial | Interpolation |   |
| 97 | Krayer von Krauss *et al.* 2004 | Plant Science | System: process | Expert elicitation | Qualitative: best professional judgement |
|  |   |   | Data: availability | Expert elicitation |   |
|  |   |   | Model: output | Expert elicitation |   |
| 98 | Kumar *et al.* 2009 | Toxicology | Variability: natural | Fuzzy-stochastic | Quantitative: computational modelling |
|  |   |   | Data: reliability | Fuzzy-stochastic |   |
|  |   |   | Data: precision | Fuzzy-stochastic |   |
|  |   |   | Extrapolation: spatial | Fuzzy-stochastic |   |
|  |   |   | Extrapolation: temporal | Fuzzy-stochastic |   |
| 99 | Landis *et al.* 2004 | Ecology | Variability: natural | Further data collection | Semi-quantitative: ranking |
|  |   |   | Extrapolation: temporal | Further data collection |   |
| 100 | Lee *et al.* 2008 | Toxicology | Data: availability (model input) | Monte-Carlo simulation | Semi-quantitative: causal criteria |
|  |   |   | Extrapolation: spatial | Interpolation |   |
| 101 | Lemke and Bahrou 2009 | Contamination studies | Extrapolation: interspecies | Monte-Carlo simulation | Quantitative: computational modelling |
|  |   |   | Data: reliability | Monte-Carlo simulation |   |
| 102 | Li *et al.* 2008 | Contamination studies | Language: vagueness (linguistic) | Fuzzy-stochastic | Quantitative: computational modelling |
|  |   |   | Language: underspecificity | Fuzzy-stochastic |   |
|  |   |   | Data: availability | Fuzzy-stochastic |   |
| 103 | Li *et al.* 2007 | Contamination studies | Language: vagueness | Fuzzy-stochastic | Quant computational modelling |
|  |   |   | Language: ambiguity | Fuzzy-stochastic |   |
|  |   |   | Data: availability | Fuzzy-stochastic |   |
| 104 | Li *et al.* 2006 | Contamination studies | Data: availability | Fuzzy logic | Quantitative: computational modelling |
|  |   |   | Extrapolation: interspecies | Fuzzy logic |   |
| 105 | Liao and Chou 2005 | Toxicology | System: process | Monte-Carlo simulation; Sensitivity analysis; Model validation | Quantitative: computational modelling |
|  |   |   | Data: availability | Monte-Carlo simulation; Sensitivity analysis; Model validation |   |
| 106 | Lindenschmidt *et al.* 2008 | Water management | Data: reliability (model input) | Sensitivity analysis; Monte-Carlo simulation | Quantitative: computational modelling |
| 107 | Linkov and Burmistrov 2005 | Ecology | Data: reliability (model input) | Monte-Carlo simulation | Quantitative: computational modelling |
| 108 | Linkov *et al.* 2001 | Sediment management | Data: reliability (model input) | Latin hypercube sampling | Quantitative: computational modelling |
| 109 | Liu *et al.* 2007 | Contamination studies | Data: reliability (model input) | Monte-Carlo simulation | Quantitative: computational modelling |
| 110 | Loos *et al.* 2009 | Toxicology | System: effect | Further data collection | Quantitative: computational modelling |
| 111 | Lu *et al.* 2003 | Ecology | Extrapolation: interspecies | Uncertainty factor | Quantitative: computational modelling |
|  |   |   | Data: reliability (model input) | Uncertainty factor |   |
| 112 | Ma 2002 | Contamination studies | Data: reliability (model input) | Monte-Carlo simulation; Other (statistics) | Quantitative: computational modelling |
| 113 | Ma and van der Voet 1993 | Toxicology | Data: availability (model input) | Error propagation | Quantitative: numerical modelling |
| 114 | Matson *et al.* 2009 | Toxicology | Extrapolation: laboratory | Further data collection | Semi-quantitative: ranking |
| 115 | Maxim and McConnell 2001 | Toxicology | Extrapolation: interspecies | Uncertainty factor | Semi-quantitative: ranking |
| 116 | Maxwell and Kastenberg 1999 | Contamination studies | Data: reliability | Monte-Carlo simulation | Quantitative: computational modelling |
|  |   |   | System: process | Monte-Carlo simulation |   |
|  |   |   | Extrapolation: intraspecies | Monte-Carlo simulation |   |
| 117 | Maycock and Benford 2007 | Toxicology | Extrapolation: interspecies | Uncertainty factor | Semi-quantitative: causal criteria |
|  |   |   | Extrapolation: intraspecies | Uncertainty factor |   |
|  |   |   | Data: availability | Uncertainty factor |   |
| 118 | McDonald and Wilcockson 2003 | Toxicology | Extrapolation: laboratory | Uncertainty factor | Semi-quantitative: logic |
|  |   |   | Extrapolation: interspecies | Uncertainty factor |   |
| 119 | Meek and Hughes 1995 | Toxicology | Extrapolation: interspecies | Uncertainty factor | Semi-quantitative: ranking |
|  |   |   | Extrapolation: quantity | Uncertainty factor |   |
| 120 | Meek *et al.* 2002 | Toxicology | Extrapolation: intraspecies | Uncertainty factor | Semi-quantitative: logic |
|  |   |   | Extrapolation: interspecies | Uncertainty factor |   |
|  |   |   | Extrapolation: spatial | Uncertainty factor |   |
|  |   |   | Data: reliability | Uncertainty factor |   |
|  |   |   | Extrapolation: quantity | Uncertainty factor |   |
| 121 | Meyer *et al.* 2009 | Water management | Data: reliability | Multi-criteria decision analysis | Quantitative: multi-criteria decision analysis; computational modelling |
| 122 | Mugglestone *et al.* 2001 | Water quality | Model: output | Confidence interval; Error propagation | Qualitative: listing evidence |
| 123 | Mukhtasor *et al.* 2004 | Water quality | Data: availability | Monte-Carlo simulation; Latin hypercube sampling | Quantitative: computational modelling |
|  |   |   | Data: reliability (model input) | Monte-Carlo simulation; Latin hypercube sampling |   |
| 124 | Naito *et al.* 2006 | Toxicology | System: process | Uncertainty factor | Semi-quantitative: logic |
|  |   |   | Extrapolation: laboratory | Uncertainty factor |   |
|  |   |   | System: effect | Uncertainty factor |   |
| 125 | Nasiri *et al.* 2002 | Contamination studies | Variability: human | Fuzzy logic | Semi-quantitative: ranking  |
|  |   |   | Language: ambiguity | Fuzzy logic |   |
|  |   |   | Language: vagueness (linguistic) | Fuzzy logic |   |
|  |   |   | Language: underspecificity | Fuzzy logic |   |
| 126 | de Nazelle and Rodríguez 2009 | Contamination studies | Data: reliability (model input) | Monte-Carlo simulation; Sensitivity analysis | Quantitative: computational modelling |
| 127 | Nazir *et al.* 2008 | Contamination studies | Data: reliability (model input) | Sensitivity analysis; Bootstrapping | Quantitative: numerical modelling |
| 128 | Neuhäuser and Terhorst 2007 | Geology | Data: availability (model input) | Uncertainty factor | Semi-quantitative: causal criteria |
| 129 | de Nijs *et al.* 1993 | Toxicology | Variability: natural | Uncertainty factor | Quantitative: computational modelling |
| 130 | Oughton *et al.* 2008 | Radiation | Data: reliability | Probability density function; Expert elicitation; No action; Uncertainty factor;  | Quantitative: numerical modelling |
|  |   |   | Data: precision | Probability density function; Expert elicitation; No action; Uncertainty factor;  |   |
|  |   |   | Variability: natural | Probability density function; Expert elicitation; No action; Uncertainty factor;  |   |
|  |   |   | Model: output | Sensitivity analysis |   |
|  |   |   | Model: structure | Sensitivity analysis |   |
|  |   |   | Extrapolation: temporal | Sensitivity analysis |   |
|  |   |   | Extrapolation: spatial | Sensitivity analysis |   |
|  |   |   | System: process | Other (scenario analysis) |   |
| 131 | Park *et al.* 2008 | Toxicology | Data: reliability (model input) | Latin hypercube sampling | Quantitative: computational modelling |
| 132 | Pascoe *et al.* 1993 | Contamination studies | Extrapolation: spatial | Further data collection | Semi-quantitative: causal criteria |
|  |   |   | Extrapolation: temporal | Further data collection |   |
|  |   |   | Extrapolation: intraspecies | Further data collection |   |
|  |   |   | Extrapolation: interspecies | Further data collection |   |
|  |   |   | System: cause | Further data collection |   |
| 133 | Persson and Destouni 2009 | Contamination studies | Data: reliability (model input) | Probability density function | Quantitative: computational modelling |
|  |   |   | Variability: natural | Probability density function |   |
|  |   |   | Data: availability | Probability density function |   |
|  |   |   | Extrapolation: spatial | Probability density function |   |
|  |   |   | Model: structure | Probability density function |   |
| 134 | Phillips *et al.* 2008 | Toxicology | Data: availability | Uncertainty factor | Semi-quantitative: logic |
|  |   |   | System: effect | Uncertainty factor |   |
|  |   |   | System: cause | Uncertainty factor |   |
|  |   |   | Extrapolation: interspecies | Uncertainty factor |   |
|  |   |   | Extrapolation: intraspecies | Uncertainty factor |   |
|  |   |   | Extrapolation: quantity | Uncertainty factor |   |
|  |   |   | Extrapolation: temporal | Uncertainty factor |   |
| 135 | Pollino *et al.* 2007 | Hydrology | System: process | Bayesian belief network | Semi-quantitative: logic |
|  |   |   | Data: reliability (model input) | Other (entropy) |   |
| 136 | Proctor *et al.* 2002 | Contamination studies | Data: reliability | Probability density function; Monte-Carlo simulation | Quantitative: computational modelling |
| 137 | Prudhomme *et al.* 2003 | Climate change | Data: reliability (model input) | Further data collection | Quantitative: computational modelling |
|  |   |   | Variability: natural | Further data collection |   |
|  |   |   | Model: structure | No action |   |
|  |   |   | Extrapolation: temporal | Monte-Carlo simulation; No action |   |
|  |   |   | Extrapolation: spatial | Monte-Carlo simulation; No action |   |
| 138 | Qin and Huang 2009 | Contamination studies | Extrapolation: spatial | Fuzzy-stochastic | Quantitative: computational modelling |
|  |   |   | Data: availability | Fuzzy-stochastic |   |
|  |   |   | Data: reliability (model input) | Fuzzy-stochastic |   |
| 139 | Ranke 2002 | Toxicology | Data: reliability (model input) | Monte-Carlo simulation | Quantitative: numerical modelling |
|  |   |   | Model: structure | Monte-Carlo simulation |   |
| 140 | Rutherford *et al.* 2003 | Toxicology | Extrapolation: laboratory | Uncertainty factor | Semi-quantitative: ranking |
|  |   |   | Extrapolation: interspecies | Uncertainty factor |   |
|  |   |   | Extrapolation: intraspecies | Uncertainty factor |   |
|  |   |   | System: cause | Uncertainty factor |   |
|  |   |   | Data: availability | Uncertainty factor |   |
| 141 | Sander and Öberg 2006 | Contamination studies | Data: precision (model input) | Probability density function; Monte-Carlo simulation | Quantitative: numerical modelling |
|  |   |   | Model: output | Probability density function; Monte-Carlo simulation |   |
| 142 | Sanderson *et al.* 2006 | Toxicology | Extrapolation: laboratory | Further data collection | Semi-quantitative: ranking |
|  |   |   | Extrapolation: quantity | Further data collection |   |
| 143144 | Sanderson *et al.* 2007 | Toxicology | Extrapolation: laboratory | Further data collection | Semi-quantitative: ranking |
| 144 | Scherm 2000 | Plant science | Data: availability (model input) | Fuzzy logic | Semi-quantitative: numerical modelling |
|  |   |   | Variability: natural | Fuzzy logic |   |
| 145 | Schoeny *et al.* 2006 | Water quality | System: process | Uncertainty factor | Qualitative: listing evidence |
| 146 | Schwartz *et al.* 2000 | Toxicology | Data: reliability (model input) | Monte-Carlo simulation | Quantitative: numerical modelling |
|  |   |   | Variability: natural | Monte-Carlo simulation |   |
| 147 | Scott *et al.* 2005 | Hazardous materials | Data: reliability (model input) | Monte-Carlo simulation | Quantitative: computational modelling |
|  |   |   | Data: availability | No action |   |
|  |   |   | Variability: natural | No action |   |
| 148 | Shakhawat *et al.* 2006 | Water quality | Data: reliability (model input) | Fuzzy logic | Quantitative: numerical modelling |
|  |   |   | Data: precision | Fuzzy logic |   |
|  |   |   | Model: structure | Fuzzy logic |   |
| 149 | Smith *et al.* 2009 | Toxicology | Data: availability | Monte-Carlo simulation; Sensitivity analysis | Quantitative: numerical modelling |
|  |   |   | Data: reliability (model input) | Monte-Carlo simulation; Sensitivity analysis |   |
| 150 | Smith *et al.* 2007 | Toxicology | Data: availability | Other (statistics) | Qualitative: listing evidence |
|  |   |   | Data: reliability | Hazard quotient |   |
| 151 | Son *et al.* 2006 | Contamination studies | Data: reliability (model input) | Monte-Carlo simulation | Quantitative: numerical modelling |
| 152 | van Sprang *et al.* 2009 | Toxicology | Extrapolation: interspecies | Further data collection | Quantitative: computational modelling |
|  |   |   | Variability: natural | Bootstrapping; Monte-Carlo simulation |   |
| 153 | Staples *et al.* 2002 | Toxicology | Extrapolation: laboratory | Uncertainty factor | Semi-quantitative: logic |
| 154 | Stevens *et al.* 2007 | Contamination studies | Data: availability (model input) | Probability density function | Quantitative: computational modelling |
| 155 | Teunis *et al.* 1997 | Water quality | Data: reliability | Monte-Carlo simulation | Quantitative: numerical modelling |
| 156 | Therriault and Herborg 2008 | Ecology | System: effect | Expert elicitation | Qualitative: best professional judgement |
| 157 | Thorsen *et al.* 2006 | Contamination studies | Data: reliability (model input) | Monte-Carlo simulation | Quantitative: computational modelling |
| 158 | Tillman and Weaver 2006 | Contamination studies | Data: reliability (model input) | Sensitivity analysis | Quantitative: computational modelling |
|  |   |   | Model: output | Sensitivity analysis |   |
| 159 | Tsuji *et al.* 2004 | Toxicology | Data: reliability | Uncertainty factor | Qualitative: listing evidence |
|  |   |   | Extrapolation: quantity | Uncertainty factor |   |
| 160 | Twining and Cameron 1997 | Toxicology | Data: availability | Confidence interval | Semi-quantitative: logic |
| 161 | Vallack *et al.* 1998 | Toxicology | System: effect | Expert elicitation | Qualitative: best professional judgement |
| 162 | Verdonck *et al.* 2008 | Environmental policy | Data: reliability (model input) | Further data collection; Uncertainty factor; Monte-Carlo simulation | Quantitative: computational modelling |
|  |   |   | Data: availability | Further data collection; Uncertainty factor; Monte-Carlo simulation |   |
|  |   |   | Extrapolation: interspecies | Further data collection; Uncertainty factor; Monte-Carlo simulation |   |
|  |   |   | Variability: natural | Further data collection; Uncertainty factor; Monte-Carlo simulation |   |
|  |   |   | Extrapolation: intraspecies | Further data collection; Uncertainty factor; Monte-Carlo simulation |   |
| 163 | Walker *et al.* 2001 | Ecology | System: cause | Sensitivity analysis | Semi-quantitative: ranking |
| 164 | Wang *et al.* 2009 | Water quality | Data: reliability | Hazard quotient; Monte-Carlo simulation | Quantitative: numerical modelling |
|  |   |   | System: effect | Hazard quotient; Monte-Carlo simulation |   |
|  |   |   | Data: availability | Hazard quotient; Monte-Carlo simulation |   |
|  |   |   | Extrapolation: laboratory | Hazard quotient; Monte-Carlo simulation |   |
|  |   |   | Variability: natural | Hazard quotient; Monte-Carlo simulation |   |
|  |   |   | Extrapolation: intraspecies | Hazard quotient; Monte-Carlo simulation |   |
| 165 | Weyers *et al.* 2004 | Toxicology | Extrapolation: laboratory | Uncertainty factor | Semi-quantitative: logic |
|  |   |   | Variability: natural | Uncertainty factor |   |
|  |   |   | System: process | Uncertainty factor |   |
|  |   |   | System: cause | Uncertainty factor |   |
|  |   |   | System: effect | Uncertainty factor |   |
| 166 | Wiegers *et al.* 1998 | Ecology | Data: availability | Sensitivity analysis | Semi-quantitative: ranking |
|  |   |   | System: process | Sensitivity analysis |   |
|  |   |   | Language: ambiguity | Sensitivity analysis |   |
|  |   |   | Variability: natural | Sensitivity analysis |   |
|  |   |   | Variability: human | Sensitivity analysis |   |
| 167 | Wright-Walters *et al.* 2011 | Ecology | Extrapolation: interspecies | No action | Semi-quantitative: logic |
|  |   |   | Data: reliability | No action |   |
| 168 | Wu and Tsang 2004 | Ecology | System: process | Monte-Carlo simulation | Quantitative: numerical modelling |
|  |   |   | Variability: natural | Monte-Carlo simulation |   |
|  |   |   | Data: reliability (model input) | Monte-Carlo simulation |   |
| 169 | Xiao *et al.* 2008 | Contamination studies | Data: availability (model input) | Monte-Carlo simulation | Quantitative: numerical modelling |
| 170 | Zalk *et al.* 2009 | Nanotoxicology | System: cause | Uncertainty factor | Semi-quantitative: ranking |
|  |   |   | System: effect | Uncertainty factor |   |
|  |   |   | System: process | Uncertainty factor |   |
| 171 | Zhang *et al.* 2009 | Toxicology | Extrapolation: spatial | Interpolation | Quantitative: computational modelling |
|   |   |   | Extrapolation: temporal | Further data collection |   |
|   |   |   | Variability: natural | Further data collection |   |

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