

## Dr. Ross N. Cuthbert

### Contact Details

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### Current Positions

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Jan 2020 – Present     **Alexander von Humboldt Postdoctoral Research Fellow**  
*GEOMAR Helmholtz Centre for Ocean Research Kiel (hosted by Dr. Elizabeta Briski)*

**Visiting Scholar**  
*Queen's University Belfast*

**Honorary Research Associate**  
*South African Institute for Aquatic Biodiversity*

### Education & Employment History

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Sep 2016 – Dec 2019     **Ph.D.** Biological control of *Culex* mosquitoes using multiple predators  
*Queen's University Belfast/University of Reading (supervised by Prof. Jaimie T.A. Dick, Dr. Neil Reid and Prof. Amanda Callaghan)*  
 Pass (ungraded)

Feb 2019 – Aug 2019     **Visiting Ph.D. Research Fellow**  
 Sep 2017 – Apr 2018     *South African Institute for Aquatic Biodiversity*  
 Ecological impacts of invasive fishes; biological control agent screening from ephemeral aquatic ecosystems

Oct 2018 – Nov 2018     **Visiting Ph.D. Research Fellow**  
*CEREEP-Ecotron Île-de-France*  
 Abiotic context-dependencies governing invasive fish impacts

Jun 2018 – Sep 2018     **Visiting Ph.D. Research Fellow**  
*University of Reading*  
 Behavioural responses of mosquitoes to natural enemies; impacts of microplastics in freshwater ecosystems

- Sep 2014 – Sep 2016    **M.Sc. Ecological Management and Conservation Biology**  
*Queen's University Belfast*  
 Pass with Distinction (82 %)  
 Research Project: Invasive aquatic macrophytes: Invasion risk modelling and chemical control viability for *Lagarosiphon major*
- Feb 2015 – Aug 2016    **Positional Improvement Quality Control Operator**  
*Land and Property Services, Dept. of Finance Northern Ireland*  
 Digitisation and analysis of land registry using Geographical Information Systems (GIS); managing performance of team of staff
- June 2014 – Aug 2014    **Mapping and Charting Officer**  
*Land and Property Services, Dept. of Finance Northern Ireland*  
 Digitisation and updating of agricultural boundaries using GIS
- Sep 2011 – Sep 2014    **B.Sc. (Hons) Geography**  
*Queen's University Belfast*  
 First Class (73 %)  
 Research Project: Investigating the distribution and environmental impacts of the invasive intertidal cordgrass *Spartina anglica*

## Research Interests & Background

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I am an ecologist with broad interests surrounding the effects of global change on ecosystems, economies and societies. I particularly focus on the implications of environmental changes for trophic interaction strengths, and consequently the outcomes for ecosystem stability, as well as impacts of biological invasions. My research has enabled delivery of diverse, cutting-edge teaching and supervision to undergraduate and postgraduate students. I have a wide range of skills, from field-based methodologies conducting surveys and sampling, to laboratory experiments and analyses. I also possess strong quantitative skills surrounding the development and use of statistical models to answer complex ecological and socio-economic questions. Most recently, I have been examining the interplays between environmental change and biological invasions, and developing measures of invasive species economic costs. During my Ph.D., I applied and developed my skillset to address questions relating to the biotic resistance of natural enemies towards pests, disease vectors and invasive species. A major focus of this work involved quantifying biotic interaction strengths relevant to natural enemy selection to facilitate effective target population regulation, particularly in the context of mosquito-borne disease. During my Masters and Honours research projects, I applied a range of field and laboratory methodologies to understand the impacts of invasive species, including ecological surveys, alongside geochemical and ecotoxicity analyses. In addition, I have applied my skillset in both academic and applied settings, having been employed in a managerial position within a spatial analysis domain during my Masters degree. My research has hitherto combined field and laboratory experiments with cutting-edge statistical techniques to aid the inference of species interactions, and has ecological, economic and public health relevance. In addition, I have developed novel metrics for stakeholders and practitioners to quantify ecological impacts of global changes such as biological invasion. I am involved in a wealth of collaborative projects with researchers both nationally and internationally, as evidenced by my strong publication record.

## Papers Published or In Press

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2021

115. **Cuthbert, R.N.\***, Diagne, C., Haubrock, P.J., Turbelin, A.J., Courchamp, F. 2021. Are the “100 of the world’s worst” invasive species also the costliest? *Biological Invasions*, in press.
114. Coughlan, N.E.\*, **Cuthbert, R.N.**, Cunningham, E.M., Potts, S., McSweeney, D., Vong, G.Y.W., Healey, E., Crane K., Caffrey, J.M., Lucy, F.E., Davis, E., Dick, J.T.A. 2021. Smoke on the water: comparative assessment of combined thermal shock treatments for control of invasive Asian clam, *Corbicula fluminea*. *Environmental Management*, in press.
113. Dickey, J.W.E.\*, Coughlan, N.E., Dick, J.T.A., Médoc, V., McCard, M., Leavitt, P.R., Lacroix, G., Fiorini, S., Millot, A., **Cuthbert, R.N.** 2021. Breathing Space: Deoxygenation of aquatic environments can drive differential ecological impacts across biological invasion stages. *Biological Invasions*, in press.
112. **Cuthbert, R.N.\***, Wasserman, R.J., Keates, C., Dalu, T. 2021. Food webs. In: Dalu, T., Wasserman, R.J. *Fundamentals of Tropical Freshwater Wetlands*. Academic Press, London, in press.
111. Haubrock, P.J.\*<sup>†</sup>, **Cuthbert, R.N.<sup>†</sup>**, Yeo, D., Banerjee, A.K., Liu, C., Diagne, C., Courchamp, F. 2021. Biological invasions in Singapore and Southeast Asia: data gaps fail to mask potentially massive economic costs. *NeoBiota*, in press. (Special Issue)
110. **Cuthbert, R.N.\***, Briski, E. 2021. Temperature, not salinity, drives impact of an emerging Ponto-Caspian invasive species. *Science of the Total Environment*, 780: 146640.
109. **Cuthbert, R.N.\***, Dalu, T., Wasserman, R.J., Weyl, O.L.F., Froneman, P.W., Callaghan, A., Dick, J.T.A. 2021. Prey and predator density-dependent interactions under different water volumes. *Ecology and Evolution*, in press.
108. Cunningham, E.M.\*, **Cuthbert, R.N.**, Coughlan, N.E., Kregting, L., Cairnduff, V., Dick, J.T.A. 2021. Microplastics do not affect the feeding rates of a marine predator. *Science of the Total Environment*, 779: 146487.
107. Rico-Sánchez, A.E.\*<sup>†</sup>, Haubrock, P.J.<sup>†</sup>, **Cuthbert, R.N.<sup>†</sup>**, Angulo, E.<sup>†</sup>, Ballesteros-Mejia, L., López-López, E., Duboscq-Carra, V.G., Nuñez, M.A., Diagne, C., Courchamp, F. 2021. Economic costs of invasive alien species in Mexico. *NeoBiota*, in press. (Special Issue)
106. Dalu, T., Banda, T., Mutshekwa, T., Munyai, L.F., **Cuthbert, R.N.\*** 2021. Effects of urbanisation and a wastewater treatment plant on microplastic densities along a subtropical river system. *Environmental Science and Pollution Research*, in press.
105. Dalu, T.\*, Dlamini, P., Wasserman, R.J., Mokgoebo, M., Mutshekwa, T., Dondofema, F., **Cuthbert, R.N.** 2021. Examining the effects of environmental

variables on macroinvertebrate community assemblages in subtropical reservoirs. *Chemistry and Ecology*, in press.

104. Liu, C.\*, Diagne, C., Angulo, E., Banerjee, A.K., Chen, Y., **Cuthbert, R.N.**, Haubrock, P.J., Kirichenko, N., Pattison, Z., Watari, Y., Xiong, W., Courchamp, F. 2021. Economic costs of biological invasions in Asia. *NeoBiota*, in press. (Special Issue)

103. Crystal-Ornelas, R.\*, Hudgins, E., **Cuthbert, R.N.**, Haubrock, P.J., Fantle-Lepczyk, J., Angulo, E., Kramer, A., Ballesteros-Mejia, L., Leroy, B., Leung, B., López-López, E., Diagne, C., Courchamp, F. 2021. Economic costs of biological invasions within North America. *NeoBiota*, in press. (Special Issue)

102. Bradshaw, C.\*, Haubrock, P.J., **Cuthbert, R.N.**, Diagne, C., Leroy, B., Andrews, L., Page, B., Cassey, P., Hoskins, A., Courchamp, F. 2021. Comprehensive assessment of the economic costs of invasive species in Australia. *NeoBiota*, in press. (Special Issue)

101. **Cuthbert, R.N.\***, Wasserman, R.J., Dalu, T., Briski, E. 2021. Warming mediates intraspecific multiple predator effects from an invasive crustacean. *Marine Biology*, 168: 35.

100. **Cuthbert, R.N.\***, Pattison, Z., Taylor, N.G., Verbrugge, L., Diagne, C., Ahmed, D.A., Leroy, B., Angulo, E., Briski, E., Capinha, C., Catford, J.A., Dalu, T., Essl, F., Gozlan, R.E., Haubrock, P.J., Kourantidou, M., Kramer, A.M., Renault, D., Wasserman, R.J., Courchamp, F. 2021. Global economic costs of aquatic invasive alien species. *Science of the Total Environment*, 775: 145238.

99. Haubrock, P.J.\*†, **Cuthbert, R.N.†**, Sundermann, A., Diagne, C., Golivets, M., Courchamp, F. 2021. Economic costs of invasive species in Germany. *NeoBiota*, in press. (Special Issue)

98. Haubrock, P.J.\*, Balzani, P., Hundertmark, I., **Cuthbert, R.N.** 2021. Spatial and size variation in dietary niche of a non-native freshwater fish. *Copeia*, in press.

97. McCard, M., South, J., **Cuthbert, R.N.\***, Dickey, J.W.E., McCard, N., Dick, J.T.A. 2021. Pushing the switch: functional responses and prey switching by invasive lionfish may mediate their ecological impact. *Biological Invasions*, in press.

96. **Cuthbert, R.N.\***, Bartlett, A.C., Turbelin, A., Haubrock, P.J., Diagne, C., Pattison, Z., Courchamp, F., Catford, J. 2021. Economic costs of biological invasions in the United Kingdom. *NeoBiota*, in press. (Special Issue)

95. Kourantidou, M.\*†, **Cuthbert, R.N.†**, Haubrock, P.J.†, Novoa, A.†, Taylor, N.G.†, Leroy, B., Capinha, C., Renault, D., Angulo, A., Diagne, C., Courchamp, F. 2021. Economic costs of invasive alien species in the Mediterranean basin. *NeoBiota*, in press. (Special Issue)

94. Haubrock, P.J.\*†, **Cuthbert, R.N.†**, Tricario, E., Diagne, C., Gozlan, R.E., Courchamp, F. 2021. The economic costs of alien invasive species in Italy. *NeoBiota*, in press. (Special Issue)

93. Kirichenko, N.I.\*†, Haubrock, P.J.†, **Cuthbert, R.N.**†, Akulov, E.N., Karimova, E.V., Schneider, Y.A., Liu, C., Angulo, E., Diagne, C., Courchamp, F. 2021. Economic costs of biological invasions in terrestrial ecosystems in Russia. *NeoBiota*, in press. (Special Issue)
92. Haubrock, P.J.\*†, Turbelin, A.J.†, **Cuthbert, R.N.**†, Novoa, A.†, Taylor, N.G. †, Angulo, E., Ballesteros-Mejia, L., Bodey, T.W., Capinha, C., Diagne, C., Essl, F., Golivets, M., Kirichenko, N., Kourantidou, M., Leroy, B., Renault, D., Verbrugge, L., Courchamp, F. 2021. Economic costs of invasive alien species across Europe. *NeoBiota*, in press. (Special Issue)
91. Dalal, A.\* , Gallogly, J., **Cuthbert, R.N.**, Lavery, C., Dickey, J.W.E, Dick, J.T.A. 2021. Ecological impacts of an invasive predator are mediated by reproductive cycle. *Biological Invasions*, 23: 669–675.
90. Dickey, J.W.E.\* , **Cuthbert, R.N.**, Steffan, G., Dick, J.T.A., Briski, E. 2021. Sea freshening may drive the ecological impacts of emerging and existing invasive alien species. *Diversity and Distributions*, 27: 144–156.
89. Crane, K. †, **Cuthbert, R.N.**\*†, Ricciardi, A., Kregting, L., Coughlan, N.E., MacIsaac, H.J., Reid, N., Dick, J.T.A. 2021. Gimme Shelter: Differential utilisation and propagule creation of invasive macrophytes by native caddisfly larvae. *Biological Invasions*, 23: 95–109.
88. Wasserman, R.J.\* , Sanga, S., Buxton, M., Dalu, T., **Cuthbert, R.N.** 2021. Does invasive river red gum (*Eucalyptus camaldulensis*) alter leaf litter decomposition dynamics in arid zone temporary river? *Inland Water*, 11: 104–113.
87. Gotcha, N., Machekano, H., **Cuthbert R.N.**, Nyamukondiwa, C.\* 2021. Heat tolerance may determine activity time in coprophagic beetle species (Coleoptera: Scarabaeidae). *Insect Science*, in press.

## 2020

86. Buxton, M., Nyamukondiwa, C.\* , Dalu, T., **Cuthbert, R.N.**, Wasserman, R.J. 2020. Implications of increasing temperature stress for predatory biocontrol of vector mosquitoes. *Parasites and Vectors*, 13: 604.
85. Coughlan, N.E.\* , Lyne, L., **Cuthbert, R.N.**, Cunningham, E.M., Lucy, F.E., Davis, E., Caffrey, J.M., Dick, J.T.A. 2020. In the black: information harmonisation and educational potential amongst international databases for invasive alien species designated as of Union Concern. *Global Ecology and Conservation*, 24: e01332.
84. Dalu, T.\* , Tshivhase, R., **Cuthbert, R.N.**, Murungweni, F.M., Wasserman, R.J. 2020. Metal distribution and sediment quality variation across sediment depths of a subtropical Ramsar declared wetland. *Water*, 12: 2779.
83. Dalu, T.\* , **Cuthbert, R.N.**, Taylor, J.C., Magoro, M.L., Weyl, O.L.F., Froneman, P.W., Wasserman, R.J. 2020. Benthic diatom-based indices and isotopic biomonitoring of nitrogen pollution in a warm temperate Austral river system. *Science of the Total Environment*, 748: 142542.

82. Mutshekwa, T., **Cuthbert, R.N.\***, Wasserman, R.J., Murungweni, F.M., Dalu, T. 2020. Nutrient release dynamics associated with native and invasive leaf litter decomposition: a mesocosm experiment. *Water*, 12: 2350.
81. **Cuthbert, R.N.\***, Kotronaki, S.G., Dick, J.T.A., Briski, E. 2020. Salinity tolerance and geographic origin predict global alien amphipod invasions. *Biology Letters*, 16: 20200354.
80. Dalu, M.T., **Cuthbert, R.N.**, Muhali, H., Chari, L.D., Manyani, A.T., Masunungure, C., Dalu, T.\* 2020. Is awareness on plastic pollution being raised in schools? Understanding perceptions of primary and secondary school educators. *Sustainability*, 12: 6775.
79. Netshiongolwe, N.R., **Cuthbert, R.N.**, Maenetje, M.M., Chari, L.D., Motitsoe, S.N., Wasserman, R.J., Munyai, L.F., Dalu, T.\* 2020. Quantifying metal contamination and potential uptake by *Phragmites australis* (Cav.) Steud. (Poaceae) along a subtropical river system. *Plants*, 9, 846.
78. Dalu, T., Murudi, T.T., Dondofema, F., Wasserman, R.J., Chari, L.D., Mrugunweni, F.M., **Cuthbert, R.N.\*** 2020. Balloon milkweed *Gomphocarpus physocarpus* distribution and drivers in an internationally protected wetland. *Bioinvasions Records*, 9: 627–641.
77. Tladi, M., Nyamukondiwa, C., **Cuthbert, R.N.**, Wasserman, R.J.\* 2020. Emergent effects of light and temperature on hatching success of *Streptocephalus cafer* (Branchiopoda: Anostraca) resting eggs. *Austral Ecology*, 45: 1062–1066.
76. Coughlan, N.E.\*, **Cuthbert, R.N.**, Dick, J.T.A. 2020. Aquatic biosecurity remains a damp squib. *Biodiversity and Conservation*, 21: 3091–3093.
75. Coughlan, N.E.\*, Cunningham, E.M., Potts, S., McSweeney, D., Healey, E., Dick, J.T.A., Vong, G.Y.W., Crane, K., Caffrey, J.M., Lucy, F.E., Davis, E., **Cuthbert, R.N.** 2020. Steam and flame applications as novel methods of population suppression for invasive Asian clam *Corbicula fluminea* and Zebra mussel *Dreissena polymorpha*. *Environmental Management*, 66: 654–663.
74. Mutshekwa, T., **Cuthbert, R.N.**, Wasserman R.J., Murungweni, F.M., Dalu, T.\* 2020. Macroinvertebrate colonisation associated with native and invasive leaf litter decomposition. *Knowledge and Management of Aquatic Ecosystems*, 421: 32.
73. Haubrock, P.J.\* †, **Cuthbert, R.N.** †, Veselý, L. †, Balzani, P., Baker, N., Dick, J.T.A., Kouba, A. 2020. Predatory functional responses under increasing temperatures of two life stages of an invasive gecko. *Scientific Reports*, 10: 10119.
72. **Cuthbert, R.N.\***, Wasserman, R.J., Dalu, T. 2020. Arid-adapted paradiaptomid copepods contribute to mosquito regulation. *African Zoology*, 55: 185–186.
71. **Cuthbert, R.N.\***, Dalu, T., Wasserman, R.J., Weyl, O.L.F., Froneman, P.W., Callaghan, A., Dick, J.T.A. 2020. Inter-population similarities and differences in predation efficiency of a mosquito natural enemy. *Journal of Medical Entomology*, 57: 1983–1987.

70. Lucy, F.E.\*, Davis, E., Anderson, R., Booy, O., Bradley, K., Britton, R., Bryne, C., Caffrey, J., Coughlan, N.E., Crane, K., **Cuthbert, R.N.**, Dick, J.T.A., Dickey, J.W.E., Fisher, J., Gallagher, C., Harrison, S., Jebb, M., Johnson, M., Lawton, C., Lyons, D., Mackie, T., Maggs, C., Marnell, F., McLoughlin, T., Minchin, D., Monaghan, O., Montgomery, I., Moore, N., Morrison, L., Muir, R., Nelson, B., Niven, A., O'Flynn, C., Osborne, B., Ramsay, R., Reid, N., Roy, H., Sheehan, R., Stewart, D., Sullivan, M., Tierney, P., Treacy, P., Tricarico, E., Trodd, W. 2020. Horizon scan of invasive alien species for the island of Ireland. *Management of Biological Invasions*, 11: 155–177.
69. **Cuthbert, R.N.\***, Wasserman, R.J., Dalu, T., Kaiser, H., Weyl, O.L.F., Dick, J.T.A., Sentis, A., McCoy, M.W., Alexander, M.E. 2020. Influence of intra- and interspecific variations in predator-prey body size ratios on trophic interaction strengths. *Ecology and Evolution*, 10: 5946–5962.
68. Froneman, P.W.S.\*, **Cuthbert, R.N.** Ratio-independent prey preferences by an estuarine mysid. 2020. *Journal of Plankton Research*, 42: 398–401.
67. **Cuthbert, R.N.\***, Bacher, S., Blackburn, T.M., Briski, E., Diagne, C., Dick, J.T.A., Essl, F., Genovesi, P., Haubrock, P.J., Latombe, G., Lenzner, B., Meinard, Y., Pauchard, A., Pyšek, P., Ricciardi, A., Richardson, D.M., Russell, J.C., Simberloff, D., Courchamp, F. 2020. Invasion costs, impacts, and human agency: response to Sagoff 2019. *Conservation Biology*, 34: 1579–1582.
66. Coughlan, N.E.\*, O'Hara, S., Crane, K., Dick, J.T.A., MacIsaac, H.J., **Cuthbert, R.N.** 2020. Touch too much: aquatic disinfectants and steam exposure treatments can inhibit further spread of invasive bloody-red mysid shrimp *Hemimysis anomala*. *Wetlands Ecology and Management*, 28: 397–402.
65. Mbedzi, R., **Cuthbert, R.N.**, Wasserman, R.J., Murungweni, F., Dalu, T.\* 2020. Spatiotemporal variation in microplastic contamination along a subtropical reservoir shoreline. *Environmental Science and Pollution Research*, 27: 23880–23887.
64. **Cuthbert, R.N.\***, Vong, G.Y.W., Paolacci, S., Dick, J.T.A., Callaghan, A., Coughlan, N.E. 2020. Aquatic plant extracts and coverage mediate larval mosquito survivorship and development. *Biological Control*, 145: 104263.
63. **Cuthbert, R.N.\***, Dalu, T., Wasserman, R.J., Weyl, O.L.F., Froneman, P.W., Callaghan, A., Dick, J.T.A. 2020. Examining intraspecific multiple predator effects across shifting predator sex ratios. *Basic and Applied Ecology*, 45: 12–21.
62. Coughlan, N.E.\*, Bradbeer, S.J., **Cuthbert, R.N.**, Cunningham, E.O., Crane, K., Potts, S., Caffrey, J.M., Lucy, F.E., Dunn, A.M., Davis, E., Renals, T., Quinn, C., Dick, J.T.A. 2020. Better off dead: assessment of aquatic disinfectants and thermal shock treatments to prevent the spread of invasive freshwater bivalves. *Wetlands Ecology and Management*, 28: 285–295.
61. Buxton, M., **Cuthbert, R.N.**, Dalu, T., Nyamukondiwa, C., Wasserman, R.J.\* 2020. Complementary impacts of heterospecific predators facilitate improved biological control of mosquito larvae. *Biological Control*, 144: 104216.

60. Dickey, J.W.E.\*, **Cuthbert, R.N.**, South, J., Britton, J.R., Caffrey, J., Chang, X., Crane, K., Coughlan, N.E., Fadaei, E., Farnsworth, K.D., Ismar, S.M.H., Joyce, P.W.S., Julius, M., Lavery, C., Lucy, F.E., MacIsaac, H.J., McCard, M., McGlade, C.L.O., Reid, N., Ricciardi, A., Wasserman, R.J., Weyl, O.L.F., Dick, J.T.A. 2020. On the RIP: Using the Relative Impact Potential metric to assess the ecological impacts of invasive alien species. *NeoBiota*, 55: 27–60.
59. Buxton, M., **Cuthbert, R.N.**, Dalu, T., Nyamukondiwa, C., Wasserman, R.J.\* 2020. Cattle-induced eutrophication favours disease-vector mosquitoes. *Science of the Total Environment*, 715: 136952
58. Crane, K.\*, Coughlan, N.E., **Cuthbert, R.N.**, Dick, J.T.A., Kregting, L., Ricciardi, A., MacIsaac, H., Reid, N. 2020. Friends of mine: an invasive freshwater mussel facilitates growth of invasive macrophytes and mediates their competitive interactions. *Freshwater Biology*, 65: 1063–1072
57. Coughlan, N.E.\*, Armstrong, F., **Cuthbert, R.N.**, Eagling, L.E., Kregting, L., Dick, J.T.A., MacIsaac, H.J., Crane, K. 2020. Dead and gone: steam exposure kills layered clumps of invasive curly waterweed *Lagarosiphon major*. *Aquatic Botany*, 162: 103204.
56. Buxton, M., **Cuthbert, R.N.**, Dalu, T., Nyamukondiwa, C., Wasserman, R.J.\* 2020. Predator density modifies mosquito regulation in increasingly complex environments. *Pest Management Science*, 76: 2079–2086.
55. Dalu, T.\*, **Cuthbert, R.N.**, Chabalala, T., Froneman, P.W., Wasserman, R.J. 2020. Assessing sediment particle-size effects on benthic algal colonisation and total carbohydrate production. *Science of the Total Environment*, 710: 136348.
54. Bradbeer, S.J., Coughlan, N.E., **Cuthbert, R.N.**, Crane, K., Dick, J.T.A., Caffrey, J.M., Lucy, F.E., Renals, T., Davis, E., Warren, D.A., Pile, B., Quinn, C., Dunn, A.M.\* 2020. The effectiveness of disinfectant and steam exposure treatments to prevent the spread of the highly invasive killer shrimp, *Dikerogammarus villosus*. *Scientific Reports*, 10: 1919.
53. **Cuthbert, R.N.\***, Sithagu, R., Weyl, O.L.F., Wasserman, R.J., Dick, J.T.A., Callaghan, A., Froneman, P.W., Foord, S., Dalu, T. 2020. Water volume differentially modifies copepod predatory strengths on two prey types. *Limnologia*, 81: 125747.
52. Crane, K., **Cuthbert, R.N.**, Cunningham, E.M., Bradbeer, S.J., Eagling, L., Kregting, L., Dick, J.T.A., Dunn, A.M., Smith, E.R.C., Shannon, C., Caffrey, J.M., Davis, E., Coughlan, N.E.\* 2020. Tomorrow Never Dies: biodegradation and subsequent viability of invasive macrophytes following exposure to aquatic disinfectants. *Management of Biological Invasions*, 11: 26–43.
51. **Cuthbert, R.N.\***, Dalu, T., Wasserman, R.J., Weyl, O.L.F., Froneman, P.W., Callaghan, A., Dick, J.T.A. 2020. Sex demographics alter the effect of habitat structure on predation by a temporary pond specialist. *Hydrobiologia*, 847: 831–840.
50. **Cuthbert, R.N.\***, Dalu, T., Wasserman, R.J., Monaco, C.J., Callaghan, A., Weyl, O.L.F., Dick, J.T.A. 2020. Assessing multiple predator, diurnal and search area

effects on predatory impacts by ephemeral wetland specialist copepods. *Aquatic Ecology*, 54: 181–191.

49. Khosa, D.\*, South, J., **Cuthbert, R.N.**, Wasserman, R.J., Weyl, O.L.F. 2020. Temperature regime drives differential predatory performance in Young of the Year Largemouth Bass and Florida Bass. *Environmental Biology of Fishes*, 103: 67–76.

48. **Cuthbert, R.N.\***, Coughlan, N.E., Dick, J.T.A., Callaghan, A. 2020. Sink trap: duckweed and dye attractant reduce mosquito populations. *Medical and Veterinary Entomology*, 34: 97–104.

47. Dalal, A.\*, **Cuthbert, R.N.**, Lavery, C., Dick, J.T.A., Sentis, A., Barrios-O'Neill, D., Ortiz-Perea, N., Callaghan, A., Gupta, S. 2020 Prey size and predator density modify impacts by natural enemies towards mosquitoes. *Ecological Entomology*, 45: 423–433.

46. **Cuthbert, R.N.\***, Dalu, T., Wasserman, R.J., Weyl, O.L.F., Froneman, P.W., Callaghan, A., Dick, J.T.A. 2020. Lack of prey switching and strong preference for mosquito prey by a temporary pond specialist predator. *Ecological Entomology*, 45: 369–372.

45. **Cuthbert, R.N.\***, Cunningham, E.M., Crane, K., Dick, J.T.A., Callaghan, A., Coughlan, N.E. 2020. In for the kill: novel biosecurity approaches for invasive and medically important mosquito species. *Management of Biological Invasions*, 11: 9–25.

44. **Cuthbert, R.N.\***, Callaghan, A., Sentis, A., Dalal, A., Dick, J.T.A. 2020. Additive multiple predator effects can reduce mosquito populations. *Ecological Entomology*, 45: 243–250.

43. Dalal, A.\*, **Cuthbert, R.N.**, Dick, J.T.A., Gupta, S. 2020. Prey preferences of notonectids towards larval mosquitoes across prey ontogeny and search area. *Pest Management Science*, 76: 609–616.

42. **Cuthbert, R.N.\***, Dalu, T., Wasserman, R.J., Weyl, O.L.F., Froneman, P.W., Callaghan, A., Coughlan, N.E., Dick, J.T.A. 2020. Alternative prey impedes the efficacy of a natural enemy of mosquitoes. *Biological Control*, 141: 104146.

## 2019

41. **Cuthbert, R.N.\***, Dalu, T., Wasserman, R.J., Weyl, O.L.F., Froneman, P.W., Callaghan, A., Dick, J.T.A. 2019. Additive multiple predator effects of two specialist paradiaptomid copepods towards larval mosquitoes. *Limnologia*, 79: 125727.

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31. **Cuthbert, R.N.\***, Weyl, O.L.F., Wasserman, R.J., Dick, J.T.A., Froneman, P.W., Callaghan, A., Dalu, T. 2019. Combined impacts of warming and salinisation on trophic interactions and mortality of a specialist ephemeral wetland predator. *Freshwater Biology*, 64: 1584–1592.
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28. **Cuthbert, R.N.\***, Callaghan, A., Dick, J.T.A. 2019. Differential interaction strengths and prey preferences across larval mosquito ontogeny by a cohabiting predatory midge. *Journal of Medical Entomology*, 56: 1428–1432.

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26. **Cuthbert, R.N.\***, Ortiz-Perea, N., Dick, J.T.A., Callaghan, A. 2019. Elusive enemies: consumptive and ovipositional effects on mosquitoes by predatory midge larvae are enhanced in dyed environments. *Biological Control*, 132: 116–121.
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24. Dalal, A. \*, **Cuthbert, R.N.**, Dick, J.T.A., Gupta, S. 2019. Water depth-dependent notonectid predatory impacts across larval mosquito ontogeny. *Pest Management Science*, 74: 2610–2617
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22. Coughlan, N.E.\*, **Cuthbert, R.N.**, Dickey, J.W.E., Caffrey, J.M., Lucy, F.E., Davis, E., Dick, J.T.A. 2019. Better biosecurity: spread prevention of the invasive Asian clam, *Corbicula fluminea* (Müller, 1774). *Management of Biological Invasions*, 10: 111–126.
21. **Cuthbert R.N.**, Crane, K., Dick, J.T.A, Caffrey, J.M., MacIsaac, H.J., Coughlan, N.E.\* 2019. Die Hard: impact of aquatic disinfectants on the survival and viability of invasive *Elodea nuttallii*. *Aquatic Botany*, 154: 11–17.
20. Crane, K.\*, **Cuthbert, R.N.**, Dick, J.T.A., Kregting, L., MacIsaac, H.J., Coughlan, N.E. 2019. Full steam ahead: direct steam exposure to inhibit spread of invasive aquatic macrophytes. *Biological Invasions*, 21: 1311–1321.
19. **Cuthbert, R.N.\***, Dalu, T., Wasserman, R.J., Callaghan, A., Weyl, O.L.F., Dick, J.T.A. 2019. Using functional responses to quantify notonectid predatory impacts across increasingly complex environments. *Acta Oecologica*, 95: 116–119.
18. McSweeney, D., Coughlan, N.E.\*, **Cuthbert, R.N.**, Halton, P., Ivanov, S. 2019. Micro-sonic sensor technology enables enhanced grass height measurement by a Rising Plate Meter. *Information Processing in Agriculture*, 6: 279–284.
17. **Cuthbert, R.N.\***, Callaghan, A., Dick, J.T.A. 2019. The effect of the alternative prey, *Paramecium caudatum* (Peniculida: Parameciidae), on the predation of *Culex pipiens* (Diptera: Culicidae) by the copepods *Macrocyclus albidus* and *Megacyclus viridis* (Cyclopoida: Cyclopidae). *Journal of Medical Entomology*, 56: 276–279.
16. **Cuthbert, R.N.\***, Al-Jaibachi, R., Dalu, T., Dick, J.T.A., Callaghan, A. 2019. The influence of microplastics on trophic interaction strengths and oviposition preferences of dipterans. *Science of the Total Environment*, 651: 2420–2423.

15. Dickey, J.W.E.\*, **Cuthbert, R.N.**, Rea, M., Lavery, C., Crane, K., South, J., Briski, E., Chang, X., Coughlan, N.E., MacIsaac, H.J., Ricciardi, A., Riddell, G.E., Xu, M., Dick, J.T.A. 2018. Assessing the relative potential ecological impacts and invasion risks of emerging and future invasive alien species. *NeoBiota*, 40: 1–24.
14. Al-Jaibachi, R., **Cuthbert, R.N.**, Callaghan, A.\* 2018. Examining effects of ontogenic microplastic transference on *Culex* mosquito mortality and adult weight. *Science of the Total Environment*, 651: 871–876.
13. Al-Jaibachi, R., **Cuthbert, R.N.**, Callaghan, A.\* 2018. Up and away: ontogenic transference as a pathway for aerial dispersal of microplastics. *Biology Letters*, 14: 20180479.
12. **Cuthbert, R.N.\***, Dalu, T., Wasserman, R.J., Dick, J.T.A., Mofu, L., Callaghan, A., Weyl, O.L.F. 2018. Intermediate predator naïveté and sex-skewed vulnerability predict the impact of an invasive higher predator. *Scientific Reports*, 8: 14282
11. Hoxha, T., Crookes, S., Lejeusne, C., Dick, J.T.A., Chang, X., Bouchemousse, S., **Cuthbert, R.N.**, MacIsaac, H.J.\* 2018. Comparative feeding rates of native and invasive ascidians. *Marine Pollution Bulletin*, 135: 1067–1071
10. **Cuthbert, R.N.\***, Dickey, J.W.E., McMorro, C., Lavery, C., Dick, J.T.A. 2018. Resistance is futile: lack of predator switching and a preference for native prey predict the success of an invasive prey species. *Royal Society Open Science*, 5: 180339
9. **Cuthbert, R.N.\***, Dalu, T., Wasserman, R.J., Coughlan, N.E., Callaghan, A., Weyl, O.L.F., Dick, J.T.A. 2018. Muddy waters: efficacious predation of container-breeding mosquitoes by a newly-described calanoid copepod across differential water clarities. *Biological Control*, 127: 25–30.
8. Coughlan, N.E.\*, Walsh, D.A., Caffrey, J., Davis, E., Lucy, F. E., **Cuthbert, R.N.**, Dick, J.T.A. 2018. Cold as ice: a novel eradication method for invasive Asian clam, *Corbicula fluminea*, using pelleted dry ice. *Management of Biological Invasions*, 9: 463–474.
7. Wasserman, R.J.\*, **Cuthbert, R.N.**, Alexander, M.E., Dalu, T. 2018. Shifting interaction strength between estuarine mysid species across a temperature gradient. *Marine Environmental Research*, 140: 390–393.
6. **Cuthbert, R.N.\***, Dalu, T., Wasserman, R.J., Callaghan, A., Weyl, O.L.F., Dick, J.T.A. 2018. Calanoid copepods: an overlooked tool in the control of disease vector mosquitoes. *Journal of Medical Entomology*, 55: 1656–1658.
5. **Cuthbert, R.N.\***, Coughlan, N.E., Crane, K., Caffrey, J.M., MacIsaac, H.J., Dick, J.T.A. 2018. A dip or a dab: assessing the efficacy of Virasure® Aquatic disinfectant to reduce secondary spread of the invasive curly waterweed *Lagarosiphon major*. *Management of Biological Invasions*. 9: 259–265.
4. Coughlan, N.E.\*, **Cuthbert, R.N.**, Kelly, T.C., Jansen, M.A.K. 2018. Parched plants: survival and viability of invasive aquatic macrophytes following exposure to various desiccation regimes. *Aquatic Botany*, 150: 9–15.

3. **Cuthbert, R.N.\***, Callaghan, A., Dick, J.T.A. 2018. Dye another day: the predatory impact of cyclopoid copepods on larval mosquito *Culex pipiens* is unaffected by dyed environments. *Journal of Vector Ecology*, 43: 334–336.
2. **Cuthbert, R.N.\***, Callaghan, A., Dick, J.T.A. 2018. Interspecific variation, habitat complexity and ovipositional responses modulate the efficacy of cyclopoid copepods in disease vector control. *Biological Control*, 121: 80–87.
1. **Cuthbert, R.N.\***, Dick, J.T.A., Callaghan, A., Dickey, J.W.E. 2018. Biological control agent selection under environmental change using functional responses, abundances and fecundities; the Relative Control Potential (RCP) metric. *Biological Control*, 121: 50–57.

\*corresponding author, †equal contributions

## Research Grants & Funding

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- 2020 – 2022: Alexander von Humboldt Foundation Postdoctoral Fellowship at GEOMAR Helmholtz Centre for Ocean Research Kiel: offered £88,000 postdoctoral funding: *accepted*.
- 2020 – 2022: Rhodes University Postdoctoral Fellowship: offered £21,000 postdoctoral funding; *not accepted*.
- 2020 – 2022: Groupe de Recherche Interuniversitaire en Limnologie (GRIL) and Liber Ero (co-funding) Postdoctoral Fellowship at McGill University: offered £60,000 postdoctoral funding; *not accepted*.
- 2019: G and M Williams fund: £2000 to support research at Queen’s University Marine Laboratory into quantifications of multiple predator interactions.
- 2019: Irish Marine Institute travel grant: £1000 to support conference networking and travel costs.
- 2019: G and M Williams fund: £1000 to support research at Queen’s University Marine Laboratory into mosquito biocontrol using botanical derivatives.
- 2018: European AQUACOSM Transnational access project (CEREAP-Ecotron ÎleDeFrance): £20,000 to conduct mesocosm-based research to examine the ecological impacts of existing and emerging invasive aquatic species under ranging environmental contexts (co-lead).
- 2017: William and Betty MacQuitty travel grant: £1000 to support research concerning mosquito biological control and ephemeral pond trophic interactions at the South African Institute for Aquatic Biodiversity.
- 2016 – 2019: Department for the Economy (DfE) Northern Ireland studentship: offered £58,000 PhD funding (Biological mosquito control using multiple predators: *accepted*)
- 2016 – 2019: Department for the Economy (DfE) Northern Ireland studentship: offered £58,000 PhD funding (The impacts of permafrost degradation on boreal ecosystems in the central Northwest Territories, Canada: *not accepted*)
- 2016 – 2020: Natural Environment Research Council (NERC) IAPETUS studentship: offered £82,000 PhD funding (Valuing neo-native species: Is naturalised Scots pine a threat or benefit for climate resilience?: *not accepted*).

- 2014: Queen's University Belfast (QUB) postgraduate scholarship: £2500 to undertake M.Sc. Ecological Management and Conservation Biology.
- 2014: Estyn Evans Prize: £100 for submitting the best undergraduate dissertation in B.Sc. Geography.

## Research Skills

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**Field experience:** Survey sampling design and implementation; GPS and map reading; undertaking ecological fieldwork in both temperate and tropical regions; biomonitoring of freshwaters; field techniques for invertebrates (gravid trapping, sweep netting; kick sampling); field techniques for ichthyology (seine netting, fyke netting; snorkel surveying); experience in captive breeding of insects and crustaceans as well as cultivation of aquatic macrophytes.

**Laboratory skills:** Design and execution of predator-prey dynamics experiments; geochemical analyses (scanning electron microscopy; loss-on-ignition); ecological sample processing for biomonitoring; ecotoxicology experiments; taxonomy and identification of insects and crustaceans; parasite load quantifications; collection and husbandry of animals (particularly aquatic invertebrates).

**Data analysis:** R-package (frequent: lme4, frair, emmeans, ggplot2, car, betareg, ordinal, ape, invacost); statistical model assumptions and selection; functional response analyses; species distribution modelling; econometric models; ArcGIS; Spatial Studio; ImageJ; InkScape; SPSS.

**Interpersonal skills:** Leadership/Management skills: Throughout my career, I have developed excellent leadership and management skills across both academic and non-academic backgrounds. I have managed projects, demonstrated and supervised students at both Honours and Masters level, and led teams to meet targets in industrial settings.

Team work: Although I am highly capable of working independently, much of my work has been collaborative, involving expertise from academics across the globe. Further, I have experience in participating within and leading teams during both field and laboratory work in both temperate and tropical regions. I feel I am a strong team-player, and that this is an essential attribute for the success of research projects.

Communication: I have a lot of experience in communicating to both specialist and non-specialist audiences, across both written and verbal mediums. I believe that this is an essential element of any piece of research in order to increase scope and impact, and for wide dissemination of results.

## Teaching & Supervision

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**Teaching:** Masters, Current Topics in Marine Ecology module (M.Sc. Biological Oceanography, GEOMAR): lecture and seminar.

Masters, Advanced Practical Course in Biological Oceanography module (M.Sc. Biological Oceanography, GEOMAR): practical project supervision.

Undergraduate, Level 1 Biodiversity module (B.Sc. Biological Science, Queen's University Belfast): demonstrating in field and laboratory practicals.

**Supervision:** Involved in the overseeing of eight Honours (four B.Sc. Biological Sciences, Queen’s University Belfast; one B.Sc. Biological Sciences, University of Reading; one B.Sc. Conservation Biology, University of Venda; one B.Sc. Biological Sciences, Senckenberg; one B.Sc. Biology, University of Kiel) projects and three Masters (one M.Sc. Ecological Management and Conservation Biology, Queen’s University Belfast; two M.Sc. Environmental Science, University of Venda) projects, including experimental design and implementation, data analyses and thesis writing. Also supervised the summer project of one Nuffield Foundation placement student at Queen’s University Belfast.

## **Selected Press**

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“Teure Eindringlinge”, Der Spiegel

“Eingeschleppte Wasserbewohner sorgen für enorme Schäden”, Wiener Zeitung

“Teure Wassertierchen”, Sued Deutsche Zeitung

“Invasive Arten richten massiven Schaden an”, n-tv

“Milliardenschäden durch eingewanderte Arten”, Frankfurter Zeitung

“Aquatic invasive species cause damage worth billions of dollars”, Phys

“Aquatic invasive species cause damage worth billions of dollars”, EurekAlert

“Reading study finds 'new pathway' for plastic pollution”, BBC

“Mosquitos are eating plastic and contaminating food chains, according to new research”, The Telegraph

“Microplastics can spread via flying insects, research shows”, The Guardian

“Mosquitoes eating microplastics raise fears of pollution harming birds and bats”, Independent, UK

“Microplastics may enter foodchain through mosquitoes”, Phys

“Microplastics are introduced into the food chain by mosquitoes and other flying insects that eat the waste when they hatch in water, scientists warn”, Daily Mail

“Microplastics may enter food chain through mosquitoes”, The Straits Times

“Mosquitoes are eating plastic and spreading it to new food chains”, New Scientist

“Mosquitoes may be contaminating ecosystems with tiny bits of plastic”, Science Magazine

“Mosquitoes are eating plastic. Why that's a big problem”, CNBC

*The above microplastics research was picked up by 68 news outlets in total.*

“New directions in mosquito control”, SAIAB Features

## **Additional Experience & Qualifications**

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- Full, clean UK driving licence.
- Conversational Spanish, French and German.

- First Aid at Work certification (St John Ambulance, 2017).
- Demonstrator course (QUB, 2016).
- Taxonomic course for plants, bats and birds (QUB, 2015).
- Advanced GIS course (QUB, 2014).

## Professional Activities

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- Associate Editor: *Marine Biology* (2021 – present).
- Reviewer for *Global Change Biology*, *Conservation Biology*, *Diversity and Distributions*, *Science of The Total Environment*, *Biology Letters*, *Freshwater Biology*, *Marine Biology*, *Biological Invasions*, *Ecology and Evolution*, *Global Ecology and Conservation*, *Ecology*, *PeerJ*, *Ecological Entomology*, *BioInvasions Records*, *Aquatic Invasions*, *Biological Control*, *Aquaculture Research*, *Journal of Fish Biology* and *Journal of Vector Ecology*.
- Guest Editor for special issue in *International Journal of Environmental Research and Public Health*, November 2019 – November 2020.
- Hosted workshop on statistical approaches for consumer-resource modelling at Queen's University Belfast, November 2019.
- Participated in InvaCost workshop to quantify invasive species economic costs at University of Paris Saclay, November 2019.
- Participated in invasive species horizon scanning exercise for island of Ireland at IT Sligo, April 2017.
- Member of British Ecological Society.
- Member of Society for Vector Ecology.
- Member of Environmental Science Association of Ireland.
- Member of Irish Ecological Association.
- Member of European Mosquito Control Association.
- Member of Entomological Society of America.

## Conference Presentations

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**Salinity and geographic origin mediate global alien amphipod invasions** (September, 2020), NeoBiota conference, Vodice, Croatia.

**Biotic resistance from native predators predicts mosquito invasion success and informs biocontrol strategies** (October, 2019), International Conference on Aquatic Invasive Species, Montreal, Canada.

**Towards improved quantifications of interaction strengths in temporary ponds** (July, 2019), Zoological Society of Southern Africa conference, Skukuza, South Africa.

**Intermediate predator naïveté and sex-skewed vulnerability predict the impact of an invasive higher predator** (September, 2018), NeoBiota conference, Dublin, Ireland.

**Biological control of the emerging mosquito problem in the UK and Ireland** (April, 2017), ENVIRON conference, Athlone, Ireland.

(excluding 20+ presentations as a co-author).

## **Referees**

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**Dr. Elizabeta Briski**, GEOMAR Helmholtz Centre for Ocean Research Kiel, Kiel, 24105, Germany. Email: ebriski@geomar.de

**Prof. Amanda Callaghan**, University of Reading, Whiteknights, Reading, RG6 6AS, UK. Email: a.callaghan@reading.ac.uk

**Prof. Franck Courchamp**, University of Paris, Bat 362 F, Paris, 91405, France. Email: franck.courchamp@u-psud.fr

**Prof. Jaimie T.A. Dick**, Queen's University Belfast, 19 Chlorine Gardens, Belfast, BT9 5DL, UK. Email: j.dick@qub.ac.uk

**Prof. Ryan J. Wasserman**, Rhodes University, Makhanda, 6140, South Africa. Email: r.wasserman@ru.ac.za