# INPLASY PROTOCOL

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**Conflicts of interest:**
**None declared.**

# The mental health effects of eco-anxiety – a systematic review of quantitative research

Lykins, A[1]; Robinson, K[2]; Ryan, R[3]; Tognella, J[4]; Tully, P[5].

**Review question / Objective:** **The aim of the review is to synthesise findings from quantitative studies that investigate ecological grief, eco-anxiety, and climate-anxiety in relation to self-reported mental health. Population of interest: The general adult population aged 18 years. Exposure (risk factor): The exposure is defined as the presence of any ecological grief, eco-anxiety, and/or climate-anxiety that is quantified either before, concurrently, or after a mental health symptom (e.g. depression, and/or anxiety - see Outcomes). As ecological grief, eco-anxiety, and climate-anxiety are relatively new concepts that lack a standard definition, we will include validated and emerging unvalidated self-report measures of these constructs, as well as closely related constructs; solastalgia, eco- and climate-grief, eco- and climate-guilt, eco- and climate-distress, eco- and climate-despair, eco- and climate-worry. Ineligible exposures are detrimental environmental events (e.g. flood, bushfire, drought) or climatic conditions (e.g. ambient temperatures) or distress related to psychosocial impacts of environmental events (e.g. loss of income or housing due to landslide). Comparator: The general adult population aged 18+ without ecological grief, eco-anxiety, and/or climate-anxiety or related constructs as defined above in Exposure. Outcome: The primary outcomes are mental health symptoms quantified by validated self-report measures of depression, anxiety, stress.**

**INPLASY registration number:** This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 11 January 2023 and was last updated on 11 January 2023 (registration number INPLASY202310025).

## INTRODUCTION

**Review question / Objective:** **The aim of the review is to synthesise findings from quantitative studies that investigate ecological grief, eco-anxiety, and climate-anxiety in relation to self-reported mental health. Population of interest: The general adult population aged 18 years. Exposure (risk factor): The exposure is defined as the presence of any ecological grief, eco-anxiety, and/or climate-anxiety that is quantified either before, concurrently, or after a mental health symptom (e.g.**

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**Rationale:** Climate change is a looming ecological crisis that has the potential to have broad-ranging effects on human health (IPCC, 2022). Whilst the ramifications of a changing environment for physical health is well-recognised, mental health effects are less understood (Hayes et al., 2018). Early research into the psychological effect of a changing climate used exploratory qualitative methods. More recently researchers have sought to measure and quantify "eco-anxiety" and in doing so have developed several psychometric measures (Clayton & Karcsia, 2020). The use of consistent and reliable measures provides a platform through which consensus can emerge and synthesis of the findings is necessary to take stock and provide clarity and direction for this emerging research area.

Research into the mental health effects of climate change has also been criticised for a lack of conceptual clarity (Coffey et al., 2021). Whilst a clear distinction has been made between direct, indirect, and vicarious impacts of climate change on mental health (Berry et al., 2010; Doherty, 2015), less is known about vicarious effects (Leger-Goodes, 2022). Direct experience of climate related disasters has been linked to psychological distress and pathology (Doherty, 2015). While climate-related stressors can also have indirect psychosocial impacts, such as forced migration from flooded land, loss of income due to depleted fish stocks, or food insecurity due to drought (IPCC, 2022).

In both direct and indirect cases, mental health outcomes arise from personal experience of climate-related events or environmental change (Doherty, 2015). What is less understood, and the subject of recent quantitative research, is how awareness of the risk posed by climate change may influence mental health vicariously. Vicarious trauma has been found among researchers with in-depth theoretical knowledge of ecological problems (Pihkala, 2020b). It has also been found in substantial proportions of the general population, particularly younger generations (Clayton & Karazsia, 2020). In a study of over 10,000 children and young people across ten countries, Hickman, and colleagues (2021) found that 84% of participants were worried about climate change - even those residing in countries where climate change impacts are less obvious. In recent studies using psychometric scales 17-27% of young adults in the United States were found to have eco-anxiety (Clayton & Karazsia, 2020), with a 21-29% prevalence among young Australian adults (Patrick et al., 2022).

**Condition being studied:** Negative psychological responses to climate change were identified as early as 2007 by Albrecht and colleagues (Albrecht et al., 2007), and the term 'psychoterratic' was coined to describe these experiences. The term 'solastalgia' was used to capture the grief, or 'homesickness' that people experience in response to the "chronically deteriorating" natural world (Ágoston et al., 2022, p. 2). Other researchers came up with a plethora or terms describing a suite of eco-related emotional reactions such as eco-anxiety, eco-grief, eco-depression, eco-guilt, eco-anger, and eco-dread,

among others (Coffey et al., 2021). Eco-anxiety is currently the term that is most widely used (Pihkala, 2020). It has been defined by The American Psychological Association (APA) as "a chronic fear of environmental doom" (Clayton et al., 2017, p. 68). Yet, while the term has been defined by the APA, it is not known if eco-anxiety is pathological or a rational/reasonable response to severe environmental threats (Clayton & Karazsia, 2020; Hogg et al., 2021). The condition being studied is eco-anxiety. Eco-anxiety is broadly defined by the American Psychological Association (APA) as "a chronic fear of environmental doom" (Clayton et al., 2017, p. 68).

## METHODS

**Search strategy:** Studies will be identified by searching three electronic databases: EBSCO, ProQuest, and MEDLINE via Web of Science. Search terms include eco-distress neologisms (e.g. solastalg*, psychoterra*, ecoanxi*), and combinations of two ecological prefixes (ecol*, climat*) with mental health related words (e.g. ecol* NEAR/5 depressi*). Each database will be searched by title and abstract only, with two limiters applied: English language, and peer-reviewed.

**Participant or population:** Population of interest: The general adult population aged 18 years.

**Intervention:** Exposure (risk factor): The exposure is defined as the presence of any ecological grief, eco-anxiety, and/or climate-anxiety that is quantified either before, concurrently, or after a mental health symptom (e.g. depression, and/or anxiety - see Outcomes). As ecological grief, eco-anxiety, and climate-anxiety are relatively new concepts that lack a standard definition, we will include validated and emerging unvalidated self-report measures of these constructs, as well as closely related constructs; solastalgia, eco- and climate-grief, eco- and climate-guilt, eco- and climate-distress, eco- and climate-despair, eco- and climate-worry.

**Comparator:** The general adult population aged 18+ without ecological grief, eco-anxiety, and/or climate-anxiety or related constructs as defined above in Exposure.

**Study designs to be included:** Eligible studies will be performed retro- or prospectively that are cross-sectional in design, or case-control or cohort studies.

**Eligibility criteria:** Studies are eligible where eco-anxiety or the related constructs defined above were quantified in relation to mental health symptoms and where data was reported as either correlations and related statistics (r family effect sizes) or between group effects (d family effect sizes). Studies must be published in English in a peer-reviewed journal. Ineligible studies are those that utilised only qualitative methods, or were letters, conference abstracts, editorials, or other literature reviews.

**Information sources:** Studies will be identified by searching three electronic databases: EBSCO, ProQuest, and MEDLINE via Web of Science. Google Scholar will be searched at the completion of database searches to identify any additional studies meeting inclusion criteria. To supplement the electronic search, a manual hand-search of included articles will be performed.

**Main outcome(s):** The primary outcomes are self-reported mental health symptoms of anxiety, depression, stress or distress that were quantified either before, concurrently, or after the onset of eco-anxiety (Exposure). It is anticipated that the primary outcomes will be quantified as linear effect sizes, either correlations or regression Beta values. In cross-sectional studies, the timing is concurrent with the eco-anxiety measure. In longitudinal studies, the mental health outcomes may be reported 5-10 years after the quantification of eco-anxiety. There is no restriction on follow-up length.

**Additional outcome(s):** Secondary outcomes are satisfaction with life and coping that were quantified either before,

concurrently, or after the onset of eco-anxiety (Exposure).

**Data management:** Records will be imported into the EndNote reference management system for Stage 1 and Stage 2 article selection. Articles will be screened independently by two reviewers, and a third reviewer utilised to arrive at consensus in the case of disagreements. Data extraction will be performed by one reviewer to a standardised data extraction template and independently checked by a second reviewer. Once approved, the information will be entered into Microsoft Excel and Word templates for data synthesis.

**Quality assessment / Risk of bias analysis:** Study quality will be assessed with The Johanna Briggs Institute assessment measures as appropriate for the study designs (e.g. cross-sectional analytical, cohort/longitudinal studies). Two reviewers will independently rate study quality and a third reviewer utilised to arrive at consensus in the case of disagreements.

**Strategy of data synthesis:** Data will be synthesised narratively and grouped according to primary outcomes (depression, anxiety, distress) and secondary outcomes (coping, satisfaction with life), identifying the number of studies assessing each of the outcomes, the range of effect sizes (low to high), and grouping together closely those studies that utilised similar measures of eco-anxiety or outcome assessment.
As the first review on this topic, it is anticipated that there will be too much methodological heterogeneity to perform a meaningful meta-analysis. In instances where 10 or more studies report similar primary or secondary outcome data from either the r or d family of effect sizes, a meta-analysis will be considered, utilising random effects and inverse variance method of data pooling. Forest plots will be used to depict the inverse-variance weighted individual effect sizes and the pooled effect size with 95% confidence interval.

**Subgroup analysis:** No a priori sub-group analyses are planned.

**Sensitivity analysis:** No a priori sensitivity analyses are planned.

**Language restriction:** Only studies that have been published in English language are eligible for inclusion.

**Country(ies) involved:** All authors reside in Australia where this work will be undertaken.

**Keywords:** Eco-anxiety; Climate change anxiety; mental health; eco-depression.

**Dissemination plans:** The findings of this review will be presented at scientific and academic congresses and distributed to community and government stakeholders. A manuscript summarising the systematic review findings will be submitted for publication in a peer-reviewed journal.

**Contributions of each author:**
Author 1 - Amy Lykins - Author 1 is responsible for the study idea, methodology, results and manuscript writing.
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