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Cutting emissions, halting biodiversity loss: climate change solutions in the language of UK politicians and UK climate activists, 2018–2020

https://doi.org/10.1515/text-2024-0231
Received October 17, 2024; accepted June 4, 2025; published online June 23, 2025

Abstract: Activists and politicians are important groups in the context of climate change discourse but have thus far rarely been studied in terms of their discursive constructions of climate change solutions, especially via big data methods. This paper uses a corpus-assisted discourse studies approach to analyse semantic transitivity patterns in how climate change mitigation and adaptation are discussed in two corpora of UK climate activist and parliamentary discourse, 2018–2020. A novel aspect of the methodology involves locating discursive constructions of climate change mitigation and adaptation in large datasets via verbs which semantically address climate change causes and effects. The findings reveal a degree of similarity between the two groups, occasionally suggesting that their language is similar, particularly in 2019 where, for example, discussions of fossil fuel increase from a comparatively low level in the parliamentary corpus but decrease as a percentage share from a comparatively high level in the activist corpus. However, the findings also confirm existing research that climate change activists reject hegemonic discourses to which politicians tend to adhere, such as there being a greater emphasis on economic costs and opportunities in the parliamentary corpus. Both the methodology and the findings pose questions for future research.

Keywords: UK climate change discourse; climate activist discourse; parliamentary discourse; corpus-assisted discourse studies (CADS); semantic transitivity; mitigation and adaptation

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1 Introduction

Politicians and activists are two of the most important voices within climate change discourse. Political action far outweighs any individual action on climate change (Fisher 2024; Willis 2020). While politicians have the legislative power necessary for this, activists can pressure governments to pass environmental policies. An example of this dates back to 2019, when the UK parliament was among the first in the world to declare a climate emergency, subsequently amending the Climate Change Act with the aim of achieving net zero emissions by 2050. Traditionally seen as a leader on climate action, the UK has been one of the fastest countries to act in terms of setting ambitious targets, although a definitive policy for meeting these targets has been lacking (Committee on Climate Change 2023). Declaring a climate emergency was at least in part due to growing pressure from climate change activist groups (BBC News 2019). Exemplified here, then, is both the importance of language in terms of climate change – in this case, the need to discuss the issue with more urgency – and the fact that climate change discourse can be understood as a set of complex relations and networks between different groups, including activists and politicians (Anderson 2014). However, until now, research examining the language of activists and politicians regarding climate change is somewhat underdeveloped, especially in terms of big data methods, including corpus-assisted discourse studies (§3.2). This paper goes some way to addressing this gap.

Understanding how climate change and its potential solutions are conceptualised and communicated has never been more important. Our imagination and language "actively construe" our reality (Halliday 2001[1990]: 179), as indeed it has been argued that much of the negative impact humans have on the environment stems from social outlooks and language, including ideas of individual freedom (e.g., Ghosh 2016: 119–125) or that humans are separate from nature (e.g., Merchant 2020: 27). Moreover, any kind of climate action taken can only be based on that which is first articulated in language (Fløttum 2017: 7–8). Thus, it follows that a better understanding of how climate change and climate change solutions are conceptualised is an important contribution towards finding ways of dealing with climate change.

In this paper, I explore how climate change solutions are conceptualised and communicated on UK climate activist websites and in the UK House of Commons between 2018 and 2020. This is done through taking a corpus-assisted discourse studies approach (§3.2.1), using semantic transitivity (§2.2, §3.2.3). When it comes to climate change solutions, previous research examining how these are discursively constructed has tended to focus on those performing the action rather than what the action is addressing (§2.2) – another gap to which this paper attends. Climate change solutions are essentially examples of either mitigation – addressing *causes* of climate

change – or adaptation – addressing *effects* of climate change (Currie and Clarke 2022: 606–607; Intergovernmental Panel on Climate Change (IPCC) 2001: 379, 365; Moser 2014: 350; Ockwell et al. 2009). The specific research question for this paper, then, is: *To what extent and in what ways do UK parliamentary and UK climate activist discourses display similarities or differences in their discursive constructions of climate change mitigation and adaptation, 2018–2020?*

2 Literature review

2.1 Climate change activists and politicians

There is both space and a need for more research examining the language of climate change activists and politicians, especially in terms of corpus-assisted discourse studies. To the best of my knowledge, there is no research to date which directly compares the language of UK activists and politicians, except for Cunningham et al.'s (2022) small corpus-based study. Both activists and politicians frequently discuss acting against climate change (e.g., Cunningham et al. 2022; Currie and Clarke 2022; Van Eck and Feindt 2022), but there are differences in their linguistic strategies and tendencies. Activists are more direct compared to politicians in how they discursively construct climate change and solutions, emphasising the urgency of the issue, and rejecting hegemonic, neoliberal framings, and economic concerns (Cunningham et al. 2022; Mangat and Dalby 2018; Molek-Kozakowska 2021; Penz 2022; Van Eck and Feindt 2022). This directness can be displayed through war metaphors and the framing of fossil fuels, elites, and industrialisation as "enemies" (Mangat and Dalby 2018; Molek-Kozakowska 2021).

However, this kind of language may have negative consequences, inducing fear and panic, and has been criticised by certain activist groups as demotivating and demobilizing (Cassegård and Thörn 2022: 3; White et al. 2019: 29). Alarmist and pessimistic "stories" are found to be prevalent in climate activist blogposts between 2009 and 2015, although hopeful narratives are also found towards the end of this period, discussing opportunities of addressing climate change (Van Eck and Feindt 2022: 205). Moreover, research specifically examining youth climate activist websites reveals a tendency to take a potentially hopeful, "forward-looking approach" to climate change policy (Falcone 2024: 60).

In contrast to climate activists, UK politicians have traditionally struggled to articulate the urgency of climate change. Interviews with UK politicians (Willis 2019) and corpus analyses of parliamentary debates (Cunningham et al. 2022; Kirk-Browne 2021; Willis 2017) show that climate change is often discussed as a technical, scientific issue, and in terms of economic costs – of climate change effects and solutions – thus

perpetuating the kind of hegemonic discourses climate activists seem to reject. Moreover, impacts on the natural environment and on humans are often downplayed, or ignored (Cunningham et al. 2022: 15; Kirk-Browne 2021: 9; Willis 2017: 222–224) along with human agency as a cause of climate change (Currie and Clarke 2022: 601–602).

While Kirk-Browne (2021: 5) finds that the issue of climate change decreased in use in the UK Houses of Parliament between 2006 and 2018, other studies show UK politicians may be engaging more with the issue in recent years. Currie and Clarke (2022) show how climate change was discussed with increasing urgency in UK parliamentary discourse between 2015 and 2019 via the use of conflict metaphors. Moreover, Ebrey et al. (2020: 7), comparing the Tweets of UK MPs before and after the 2018 IPCC special report and subsequent large-scale climate protests in the UK, find that MPs became more inclined to tweet about climate change both generally and in terms of urgency and solutions, suggesting that the actions of climate activists might have influenced politicians' language.

2.2 Semantic transitivity

Having reviewed previous research on how activists and politicians discuss climate change and solutions, I now outline semantic transitivity in the tradition of Systemic Functional Linguistics. This is usefully adopted as a tool in this paper to analyse how responses to causes and effects of climate change are articulated. Transitivity analysis involves categorising language into process types and the various participant roles which occupy these processes, thereby helping to reveal how people "encode in language their mental picture of reality and how they account for their experience of the world around them" (Simpson 1993: 88). The six process types in English identified by Halliday and Matthiessen (2004) are material, mental, relational, verbal, behavioural, and existential. The transitivity analysis in this paper is concerned with material process types (§3.2.3), in which someone or something does something in the physical world either literally or metaphorically.

Previous research employing transitivity analysis to examine discursive constructions of climate change solutions includes Wei (2023), who investigates agency and responsibility regarding causes of and solutions to air pollution in the English language newspaper, the *China Daily*, 2008–2018. Solutions to air pollution are mainly construed through material processes, with "social agents" such as places, governments, and humans employing verbs including "tackle" and "disperse" (pp. 369–370). Schleppegrell (1997) and Roman and Busch (2016) also examine agency and responsibility, but on smaller scales and in the context of US school textbooks about climate change and biodiversity. Agency can be obscured grammatically (for example, using

nominalisations) or socially (for example, using "generic nouns" such as "people") (Schleppegrell 1997: 57; Roman and Busch 2016: 1171). When solutions are discursively constructed, removing individual responsibility could lead to students believing that climate change is only a problem for scientists (Roman and Busch 2016: 1174–1175). On the other hand, implying that the readers of textbooks have agency in terms of solutions to biodiversity loss can lead to students accepting responsibility, but looking for solutions at the wrong level as they falsely believe it to be an individual rather than systemic problem (Schleppegrell 1997: 63–64). While these studies have focussed on agency and responsibility (the doers), there seems to be a lack of relevant literature examining the done-tos, regarding climate change.

3 Methodology

3.1 Data collection

Two corpora of UK parliamentary and UK climate activist data have been compiled. The UK parliamentary data comprises debates and speeches from Hansard – an online record of what is said in the UK Houses of Parliament, from the nineteenth century to the present day. This was collected using a Python script which scraped all transcripts from the House of Commons between 2018 and 2020 via the website They Work For You (theyworkforyou.com). There is a considerable body of work on Hansard and what its data characterises; a dataset representing a range of voices, i.e., parliamentarians, reporters, and editors, it is nonetheless a faithful and accurate account of topics discussed in the UK parliament (Alexander 2023; Alexander and Struan 2022). While it is unsuitable for certain linguistic analyses such as hedging, it is considered wholly suitable regarding "primary sense-carrying parts of speech such as nouns, verbs, and adjectives" (Alexander and Struan 2022: 484).

The Activist corpus comprises data from the UK versions of the websites for Extinction Rebellion, Friends of the Earth, and Greenpeace. These organisations were chosen for several reasons, including the fact that all three are prominent within the UK and during the period between 2018 and 2020. As Extinction Rebellion began in 2018 – over forty years after Greenpeace and Friends of the Earth were established in the UK – the selection also provides a mixture of new and more traditional climate activism (De Moor et al. 2021). Moreover, all three activist groups' websites provide comparable forms of data to analyse: blogs, updates, news, and press releases. This corpus thus also contains a range of voices as with the Hansard corpus, including different writers, editors, and occasionally interviewees. The lack of comparable data meant that the climate youth movement Fridays for Future – perhaps an obvious choice for the Activist corpus, given the time period under study – was not included.

Again, a Python script was written to scrape all data from these sections of the websites published between 2018 and 2020.

Although the corpora represent different communicative situations – institutionalised, formal language of MPs and the personalised language of activists, aimed at mobilisation – care was taken to ensure that the analysis encapsulated the different language of both corpora in, for example, the creation of input strings (§3.2.1) and the selection of verb collocates (§3.2.2). The word counts of both corpora are displayed in Table 1.

Table 1: Profile of corpora – number of words.

	Hansard corpus	Activist corpus
2018	10,910,405	206,291
2019	9,740,254	709,016
2020	10,775,142	486,774
Total	**31,425,801**	**1,402,081**

3.2 Data analytic procedure

3.2.1 Developing input strings

In locating and analysing instances where solutions to causes and effects of climate change are discussed in the two corpora, I employ corpus-assisted discourse studies (CADS). This approach allows for qualitative aspects, which are necessary for developing search strings as part of data collection, carrying out the transitivity analysis, and identifying certain nuanced trends. The quantitative aspects and having access to a large amount of data help to lessen researcher subjectivity (Baker 2023: 13–15) and allow for greater validity of reported changes over time and differences between the two corpora.

To develop sensible search strings revealing instances when causes and effects of climate change are discussed in the two corpora, the first stage of analysis was to ascertain how the two groups under study define climate change causes and effects. Here, explainer sections of websites of the UK government and the three activist organisations which outline what they consider to be climate change causes and effects were consulted and coded. For example, consider an excerpt from the Greenpeace webpage, "What are the effects of climate change?" (https://www.greenpeace.org.uk/challenges/climate-change/effects-climate-change/). The bold highlights were judged to be effects of climate change:

> The effects of climate change include **extreme heat** and **drought**, **more rainfall** and **more frequent extreme weather events** such as **storms** and **floods**.

After consulting several such webpages, two lists of terms denoting causes and effects of climate change were compiled.

These lists were then searched for in the two corpora under study through Corpus Query Language (CQL) input strings, which could be fed into the corpus suite SketchEngine (Kilgarriff et al. 2014). To illustrate this, the CQL input string from the Greenpeace excerpt, above, is:

[lemma="extreme"][lemma="heat|weather"]|[lemma="more"][]{0,2}
[lemma="rainfall|flood|storm"]

Running this input string in the two corpora under study returns every instance of "extreme heat" and "extreme weather", including all morphological variants. The final input strings for causes and effects are included here as an Appendix. Creating these input strings involved much checking and rechecking to ensure they produced meaningful results. For example, certain causes or effects were judged to be infeasible to include, due to their specific wording, such as "poverty" – identified as an effect of climate change. Searching for "poverty" alone returns many false positives so the collocations "climate poverty" and "fuel poverty" were used instead.

It is important to emphasise that the aim with writing these input strings is to identify how the groups under study identify and discuss climate change causes and effects, rather than attempting to come towards a comprehensive, scientifically agreed list of terms. Moreover, while I do not assume that these input strings are entirely representative of how the groups under study define climate change causes and effects, they do provide at least a reasonably representative, thorough, and consistent way of searching for causes and effects of climate change in the two corpora, making comparisons possible. In making these comparisons, verb collocates were retrieved from the input strings as shall now be detailed.

3.2.2 Verb collocates

Verb collocates occurring within a span of four words to the left or right of each input string were retrieved. This was done separately for each corpus and for each year in the timeframe under study. For practical reasons, only the top twenty-five verb collocates, ranked by their LogDice score, were chosen for analysis. Within these twenty-five verb collocates, only verbs with a semantic meaning of *reducing*, *stopping*, *reversing*, or *tackling* were selected and coded. Verbs with these semantic meanings were chosen because it has been observed that they provide ways of identifying solutions or responses to causes and effects of climate change (Currie and Clarke 2022; Gillings and Dayrell 2024; Wei 2023). I therefore aimed to locate

discursive constructions of climate change mitigation and adaptation through the ways that the language addressing causes and effects of climate change appears in the corpora.

All collocates retrieved from the climate change causes input string ranged in frequency between 332 and 3 and had a LogDice score between 11.36 and 4.77, whereas for the climate change effects input string, the collocates retrieved had a frequency between 233 and 3 and a LogDice score between 11.82 and 3.60. Including all collocates across the three time periods under study and for both the causes- and effects-input strings results in 1,976 instances for analysis in the Activist corpus and 1,369 instances in the Hansard corpus (3,345 concordance lines in total).

By focussing on verbs with these semantic meanings I do not claim to account for all or even most discursive constructions of climate change mitigation and adaptation. For example, verbs such as "build" or "develop" (e.g., "…***build*** *more* ***flood defences***…", Bevitori and Johnson 2022) are not analysed in this paper. What I can claim with this methodology, however, is that the instances I identify *are* all discursive constructions of climate change mitigation and adaptation and that the method of collecting and analysing these instances is consistent across both corpora and across the three time periods, thus making the instances themselves appropriate and comparable units for analysis. This analysis was conducted via semantic transitivity as shall be outlined next.

3.2.3 Transitivity analysis

In order to examine language patterns around these discursive constructions of climate change mitigation and adaptation, transitivity was adopted as a tool of analysis. Due to the semantic meanings of the verbs selected, all positively coded instances were material process types, identified through the aid of re-expression tests (Bartlett 2014) and Neale's (2002) process type database. Concordance lines were then coded in terms of Actors (doers [Ac]) and Goals (done-tos [Go]). I adopted an inclusive approach by incorporating all clauses in the analysis, not only main clauses or matrix clauses. Actors which were thus implied or elided were also included where possible:

(1) "*Cars are designed to run on E10, and the Department for Transport estimates that it* [E10] (Ac) ***reduces*** *vehicle CO2 emissions* (Go)…"
(Hansard_2019_Causes)

Moreover, what are referred to as Goals and Actors are, in fact, Goal and Actor referents. In other words, whenever the Goal or Actor consists of more than one referent, each of them are counted:

(2) "*Action* (Ac) *needed now to* ***tackle*** *toxic air* (Go) *and climate-wrecking pollution* (Go)…" (Activist_2018_Causes)

There were, however, instances when no Actor could be identified, even when allowing for implied and elided Actors:

(3) "*That process of habitat loss* (Go) *needs to be* ***reversed***…" (Hansard_2020_Effects)

These instances were not counted in the total of Actors, but the Goals were included. There were no instances where Actors could be identified but Goals could not, which makes sense as the Goals are essentially pre-searched for with the CQL input strings.

Other instances excluded from the analysis at this stage include duplicates, instances when the verb collocate did not refer to the node, or when the instance was not climate change related. Instances of negation, such as "…*other countries that are* ***not cutting*** *their carbon emissions*…", were also excluded. Although negation would not normally be factored into a transitivity analysis (Halliday and Matthiessen 2004), it seemed clear that it would be misleading to treat negative and positive instances the same.

The Goals' and Actors' totals are shown in Table 2. Once identified, they were iteratively categorised as shall be discussed in the Findings section.

Table 2: Raw and (relative) frequency (per 100,000 words) of Goals and Actors identified.

Causes CQL	**Activist corpus**		**Hansard corpus**	
	Goals	**Actors**	**Goals**	**Actors**
2018	261 (126.52)	203 (98.40)	199 (1.82)	184 (1.69)
2019	520 (73.34)	466 (65.72)	459 (4.71)	394 (4.05)
2020	343 (70.46)	300 (61.63)	356 (3.30)	301 (2.79)
Effects CQL	**Goals**	**Actors**	**Goals**	**Actors**
2018	26 (12.60)	21 (10.18)	42 (0.38)	32 (0.29)
2019	254 (35.82)	244 (34.41)	100 (1.03)	84 (0.86)
2020	117 (24.04)	111 (22.80)	51 (0.47)	47 (0.44)

4 Findings

Here, the major findings are presented in three sub-sections. §4.1 and §4.2 concern Goals generated by the causes and effects input strings, respectively. §4.3 presents the findings of Actors generated by both input strings. The frequency of Goals and Actors is displayed in raw frequency, and as a percentage of all Goals / Actors in each time period. For example, in 2018 there are 261 Goals referring to causes of climate change in the Activist corpus; 84 of these (32.18 %) are categorised as 'emissions / greenhouse gas'.

4.1 Goals – climate change mitigation

Goals referring to causes of climate change are categorised as follows: 'emissions / greenhouse gas' (e.g., "emissions", "CO2"), 'pollution / waste' (e.g., "plastic waste", "air pollution"), 'fossil fuel' (e.g., "support for fossil fuels", "coal"), 'human effect on land' (e.g., "cutting down trees"), 'food production' (e.g., "intensive farming"), 'other' (e.g., "energy demand"). The frequency of Goals categorised is shown in Table 3.

Table 3: Categorisation of Goals referring to causes of climate change. Raw frequency and (percentage) of all causes Goals.

	Activist corpus		
Category	**2018**	**2019**	**2020**
Emissions / greenhouse gas	84 (32.18 %)	352 (67.69 %)	230 (67.06 %)
Pollution / waste	89 (34.10 %)	79 (15.19 %)	25 (7.29 %)
Fossil fuel	47 (18.01 %)	70 (13.46 %)	67 (19.53 %)
Human effect on land	41 (15.71 %)	19 (3.65 %)	20 (5.83 %)
Food production	0	0	0
Other	0	0	1 (0.29 %)
	Hansard corpus		
Category	**2018**	**2019**	**2020**
Emissions / greenhouse gas	124 (62.31 %)	303 (66.601 %)	254 (71.35 %)
Pollution / waste	61 (30.65 %)	106 (23.09 %)	72 (20.22 %)
Fossil fuel	4 (2.01 %)	42 (9.15 %)	9 (2.53 %)
Human effect on land	5 (2.51 %)	5 (1.09 %)	17 (4.78 %)
Food production	2 (1.01 %)	0	3 (0.84 %)
Other	3 (1.51 %)	3 (0.65 %)	1 (0.28 %)

There appears to be considerable overlap regarding the category 'emissions / greenhouse gas', especially in 2019 and 2020. This category occurs most frequently for both corpora and across all time periods – peaking in 2019 – except for 2018 in the Activist corpus, when it is second to 'pollution / waste'. The most common verb occurring in both corpora and across all three time periods to discuss acting against 'emissions / greenhouse gas' is "reduce", with "cut" as the second-most frequently used. While this suggests climate mitigation is similarly discussed in both corpora, i.e., that 'emissions / greenhouse gas' should be "reduced" more so than, say, "stopped", or "eliminated", the phrase "to (net) zero" occurs as part of the Goals here more frequently in the Activist corpus (367 of 666 instances) than in the Hansard corpus (9 of 681 instances). For example:

(4) "…*The Government must enact policy measures (Ac) to* ***reduce*** *carbon emissions to net zero* (Go)…" (Activist_2019_Causes)

(5) "…*we* (Ac) *have to move in the right direction by* ***reducing*** *carbon dioxide emissions* (Go) *and creating a cleaner, more sustainable environment*…" (Hansard_2019_Causes)

The category 'fossil fuel' occurs consistently more frequently in the Activist corpus than in the Hansard corpus. In 2019, however, the category peaks in use in the Hansard corpus while decreasing as a percentage share in the Activist corpus. 2019 is the only year when specific types of fossil fuel occur as Goals in the Hansard corpus ("coal", "fracking"), whereas "coal", "fracking", "oil" and "gas" appear in the Activist corpus across all three years. Moreover, 2019 is the only year the verbs "ban" and "stop" occur in the Hansard corpus alongside 'fossil fuel'; in 2018 and 2020, the verbs used are "divest from" and the perhaps semantically weaker "reduce" and "phase out". In the Activist corpus, "reduce" occurs only three times with 'fossil fuel' and "phase out" is absent. The most frequently used verbs include "stop", "end", "ban", and "divest from".

(6) "…*the case for* ***ending*** *our dependence on fossil fuels* (Go) *has only grown stronger*…" (Activist_2018_Causes)

(7) "*Nuclear energy* (Ac) *plays an important part in* ***reducing*** *our reliance on fossil fuels* (Go)…" (Hansard_2018_Causes)

In terms of both frequency of use and the way it is discussed, then, this category is most similarly represented in the two corpora in 2019.

'Human effect on land' occurs significantly more frequently in the Activist corpus in 2018 than for any of the other three time periods across either corpus; thereafter, the percentage share of this category between the two corpora is similar (though the raw frequency in the Activist corpus is higher), following the same trend

of increasing in use between 2019 and 2020, so that in terms of frequency and percentage share, there is similarity between the two corpora in 2020. Almost all Goals occurring in this category are grouped into two subcategories referring to 'deforestation' and 'pesticides':

(8) "…*there's a clear plan* (Ac) *to* ***reduce*** *pesticides* (Go)…" (Activist_2018_Causes)

(9) "…*we* (Ac) *have worked for many years to* ***tackle*** *deforestation* (Go)…" (Hansard_2020_Causes)

A surprising omission is the lack of reference to '(over)consumption' being addressed as a form of climate change mitigation, despite these terms being included in the CQL input string. It may be the case that these phenomena are discussed in different ways. The category 'food production' touches on a similar area to overconsumption, concerned with lifestyle changes, but there are only five instances of these, all within the Hansard corpus.

4.2 Goals – climate change adaptation

Goals referring to effects of climate change are categorised as follows: 'extreme weather' (e.g., "floods", "drought"), 'effect on biodiversity' (e.g., "biodiversity loss"), 'temperature rise' (e.g., "warming"), 'effect on humans' (e.g., "fuel poverty"), 'other' (e.g., "impending climate disaster"). The frequency of Goals categorised across the two corpora and all three time periods is shown in Table 4.

Table 4: Categorisation of Goals referring to effects of climate change. Raw frequency and (percentage) of all effects Goals.

	Activist corpus		
Category	**2018**	**2019**	**2020**
Extreme weather	2 (7.69 %)	8 (3.15 %)	4 (3.42 %)
Effect on biodiversity	0	226 (88.98 %)	97 (82.91 %)
Temperature rise	24 (92.31 %)	17 (6.69 %)	13 (11.11 %)
Effect on humans	0	2 (0.79 %)	3 (2.56 %)
Other	0	1 (0.39 %)	0
	Hansard corpus		
Category	**2018**	**2019**	**2020**
Extreme weather	12 (28.57 %)	42 (42 %)	31 (60.78 %)
Effect on biodiversity	6 (14.29 %)	18 (18 %)	7 (13.73 %)
Temperature rise	3 (7.14 %)	24 (24 %)	8 (15.69 %)
Effect on humans	20 (47.62 %)	12 (12 %)	2 (3.92 %)
Other	1 (2.38 %)	4 (4 %)	3 (5.88 %)

'Extreme weather' occurs with a consistently low frequency in the Activist corpus, although it is one of only two categories to appear in all three time periods. The category occurs frequently and consistently in the Hansard corpus, seemingly increasing in prominence over time, and occurring in over 60 % of all Goals concerning climate change effects in 2020. Aside from five instances in the Hansard corpus, and one in the Activist corpus, every occurrence of this category relates to flooding. The category is, moreover, almost entirely concerned with extreme weather events occurring in the UK:

(10) "…*a need for local action* (Ac) *to* ***reduce*** *flood risk* (Go)…" (Hansard_2018_Effects)

The category 'effect on biodiversity' is most noticeable in the Activist corpus, where it changes from not being mentioned at all in 2018 to accounting for more than 80 % of Goals concerning adaptation in 2019 and 2020. In the Hansard data, this category is the third most frequently occurring in each time period. For both corpora, there is a peak in frequency in 2019. The high frequency in the Activist corpus seems to be largely due to a demand of Extinction Rebellion, repeated on multiple pages in 2019 and 2020:

(11) "…*Government* (Ac) *must act now to* ***halt*** *biodiversity loss* (Go)…" (Activist_2019_Effects)

In the Activist corpus, the specific Goal in this category is "biodiversity loss" in 293 of the 323 instances, whereas it accounts for 3 of 31 Goals in the Hansard corpus. In terms of how 'effect on biodiversity' is addressed, the verbs primarily employed in both corpora seem to metaphorize the category (Lakoff and Johnson 1980) as something advancing, and the role of humanity is to stop or reverse the journey:

(12) "…*calling on the Government* (Ac) *to scrap HS2 immediately and* ***halt*** *the destruction of nature* (Go)…" (Activist_2020_Effects)

(13) "*Time is of the essence if we* (Ac) *are to* ***reverse*** *the loss of biodiversity* (Go)…" (Hansard_2020_Effects)

"Halt" occurs 311 times in the Activist corpus, with "reverse" occurring 3 times. In the Hansard corpus, "halt" does not feature, but "reverse" is the most prevalent verb in each year and occurs 18 times.

The category 'effect on humans' is not represented in 2018 in the Activist corpus and remains infrequent in 2019 and 2020. In the Hansard corpus, it is the most

prominent category in 2018 but decreases in 2019 and again in 2020. Every instance of this category in both corpora is triggered by the Goal "fuel poverty" or a variation such as "the scourge of fuel poverty" (except for two instances in the Activist corpus in 2019: "crop failure", "human extinction"). "Fuel poverty" is itself an economic consequence of climate change. In addition to this, a common trend in both corpora is that the act of addressing "fuel poverty" is described as an economic opportunity or side-benefit of climate action:

(14) "…*not only will that company take energy from renewables and boost the renewable energy sector, but it* [that company](Ac) *will also* ***tackle*** *fuel poverty* (Go)… (Hansard_2019_Effects)

(15) "…*empowering councils to act on the climate and nature crises* (Ac) *will bring many co-benefits including* ***tackling*** *fuel poverty* (Go), *creating jobs*…." (Activist_2020_Effects)

4.3 Actors

Categories for Actors are applied to returns from both the causes and effects input strings. These are 'human', 'human activity', and 'nature'. Subcategories are not presented in the tables due to space constraints. The category 'human' has the following subcategories: 'nations / the world' (e.g., "countries"), 'the UK' (e.g., "this country"), 'activists' (e.g., "Greenpeace"), 'government' (e.g., "the government"), 'politicians / leaders' (e.g., "ministers"), 'industry' (e.g., "retailers"), "we", and 'other' (e.g., "people"). The subcategory "we" is used whenever "we" alone is the Actor, as in many cases it is impossible to discern from the context who "we" is referring to, even when expanding the co-text (e.g., if used in the Hansard corpus, whether it refers to all humans, everyone in England, in the UK, a political party, the UK government, etc.).

The category 'human activity' has the following subcategories: 'technology / alternative fuel' (e.g., "new engine technology"), 'infrastructure / public transport' (e.g., "a bypass"), 'natural solutions' (e.g., "increasing tree cover"), 'laws / treaties' (e.g., "legislation"), 'measures' (e.g., "policy measures"), 'plans / policy' (e.g., "our plans") and 'other' (e.g., "our ability"). The category 'nature' has no subcategories, but includes "trees", "peatlands", "forests", etc.

The frequency of Actors categorised across the two corpora and all three time periods is shown in Tables 5 and 6.

Table 5: Categorisation of Actors referring to causes of climate change. Raw frequency and (percentage) of all causes Actors.

	Activist corpus		
Category	**2018**	**2019**	**2020**
Human	120 (59.11 %)	294 (63.09 %)	229 (76.33 %)
Human activity	82 (40.39 %)	156 (33.48 %)	69 (23.00 %)
Nature	1 (0.49 %)	16 (3.43 %)	2 (0.67 %)
	Hansard corpus		
Category	**2018**	**2019**	**2020**
Human	102 (55.43 %)	253 (64.21 %)	186 (61.79 %)
Human activity	82 (44.57 %)	136 (34.52 %)	111 (36.88 %)
Nature	0	5 (1.27 %)	4 (1.33 %)

Table 6: Categorisation of Actors referring to effects of climate change. Raw frequency and (percentage) of all effects Actors.

	Activist corpus		
Category	**2018**	**2019**	**2020**
Human	4 (19.05 %)	208 (85.25 %)	97 (87.39 %)
Human activity	16 (76.19 %)	33 (13.52 %)	10 (9.01 %)
Nature	1 (4.76 %)	3 (1.23 %)	4 (3.60 %)
	Hansard corpus		
Category	**2018**	**2019**	**2020**
Human	12 (37.50 %)	38 (45.24 %)	12 (25.53 %)
Human activity	18 (56.25 %)	45 (53.57 %)	30 (63.83 %)
Nature	2 (6.25 %)	1 (1.19 %)	5 (10.64 %)

There seems to be greater similarity regarding climate change mitigation than adaptation. Actors observed from the causes input string are primarily categorised as 'human', followed by 'human activity', with 'nature' rarely featuring. In terms of percentage shares, 'human' increases over time in the Activist corpus, whereas 'human activity' is decreasing. In the Hansard corpus there is a slightly different pattern, with 2019 being the year when 'human' peaks and 'human activity' is at its lowest, so that the percentage share of these two categories is almost identical across the two corpora in 2019. The effects input string shows a marked difference. Here,

'human activity' is consistently the most frequently occurring in the Hansard corpus, followed by 'human'. This is also seen in the Activist corpus in 2018, before there is a shift in 2019, continued to 2020, whereby the category 'human' becomes the most frequent, accounting for more than 80 % of Actors. In 2019, 'human' peaks in frequency and percentage share in the Hansard corpus, though this trend does not continue into 2020.

I now highlight the major trends in the distribution of Actors. There are similarities in both corpora regarding where most responsibility is attributed in the category 'human' (Table 7).

The subcategory 'government' is the most frequently occurring in the Activist corpus and the second most frequently occurring in the Hansard corpus. The subcategory "we" occurs most frequently in the Hansard corpus. In contrast, the subcategories 'activists' and "we" occur infrequently in the Activist corpus, while 'activist' does not occur at all in the Hansard corpus.

Table 7: Selection of subcategories of 'human' as an Actor. Raw frequencies displayed.

	Causes of climate change			Effects of climate change		
Activist corpus	**2018**	**2019**	**2020**	**2018**	**2019**	**2020**
"we"	8	16	22	2	3	3
'government'	30	209	107	2	180	89
'activists'	8	6	2	0	15	0
Hansard corpus	**2018**	**2019**	**2020**	**2018**	**2019**	**2020**
"we"	37	140	74	5	14	5
'government'	30	41	42	6	8	3
'activists'	0	0	0	0	0	0

(16) "…*we* (Ac) *have been making good progress in* ***reducing*** *fuel poverty in Cornwall* (Go)…" (Hansard_2019_Effects)

(17) "…*we ask governments* (Ac) *to* ***stop*** *deforestation* (Go)…" (Activist_2019_Causes)

Most responsibility, then, appears to be placed on governments to enact climate change solutions, although the "we" subcategory primarily used in the Hansard corpus may be an example of agency being socially obscured (Roman and Busch 2016; Schleppegrell 1997), as it is not always possible to identify who the "we" refers to.

Table 8: The subcategory 'technology / alternative fuel' within the category of Actor, 'human activity'. Raw frequency and (percentage) of all Actors in each period for causes / effects displayed.

	2018	2019	2020
Activist causes	5 (2.46 %)	3 (0.64 %)	2 (0.67 %)
Hansard causes	25 (13.59 %)	27 (6.85 %)	15 (4.98 %)
Activist effects	0	0	1 (0.90 %)
Hansard effects	0	0	0

A noticeable trend in the category 'human activity' concerns the subcategory 'technology / alternative fuel', which primarily occurs in the Hansard corpus as an Actor for climate change mitigation, as the second most frequent subcategory of 'human activity'. Table 8 shows that this subcategory appears to be decreasing over time in both corpora. In the Hansard corpus, this subcategory seems to frame climate change mitigation as an opportunity, tending to occur alongside mentions of cost savings, wealth and job creation, or an emphasis on technology developed in the UK. For example:

(18) "…*a nuclear power station, Wylfa Newydd, which* (Ac) *will create thousands of jobs and help to* ***reduce*** *our carbon emissions* (Go)…" (Hansard_2020_Causes)

This trend occurs only once in the Activist corpus (19). In other instances, it is common that the benefits emphasised are not related to money or employment but to contributions towards reducing individual emissions (20):

(19) "…*it* [an energy efficiency retrofitting programme] (Ac) *would provide much-needed employment opportunities all across the UK, prevent tens of thousands of deaths, and help avert the impacts of the climate crisis by dramatically* ***reducing*** *carbon emissions* (Go)…" (Activist_2020_Causes)

(20) "…*high-heat retention storage heaters* (Ac) *will* ***reduce*** *your greenhouse gas pollution* (Go) *compared to your gas boiler but not by as much as a heat pump*…" (Activist_2018_Causes)

Although this subcategory occurs predominantly in the Hansard corpus, the fact that when it does occur in either corpus it is used almost exclusively alongside causes of climate change, suggests a level of agreement. Climate change mitigation can be perceived as disruptive, so technological solutions may be more palatable than lifestyle changes (Lamb et al. 2020). Replacing a diesel car for an electric

car, for example, is probably less disruptive than abstaining from using a car at all.

5 Discussion and conclusion

The aim of this paper has been to explore the extent to which UK parliamentary and UK climate activist discourses display differences or similarities in discursive constructions of climate change mitigation and adaptation between 2018 and 2020. Overall, there is some overlap between the two groups. In terms of mitigation, 'emissions / greenhouse gas' is identified as the primary cause of climate change to be addressed and the distribution of Actors between the three categories is broadly similar. With adaptation, similarities exist in the journey metaphors used to discuss acting against 'effect on biodiversity', as well as the focus on flooding regarding 'extreme weather'. There is also agreement that governments are the primary human agent responsible for addressing climate change causes and effects, echoing existing research which reports that this period has seen activists push responsibility onto governments to implement and conceive of climate change solutions (De Moor et al. 2021). There are, however, numerous differences between the two groups, some of which are discussed below.

Parts of present findings confirm previous research (§2.1) that climate change activists appear more likely to reject hegemonic, economic framings in their discursive constructions of climate change solutions: in the Activist corpus, instances of "fuel poverty" are mentioned comparatively less frequently as an effect of climate change, and 'technology / alternative fuel' features less frequently as an Actor and is less likely to be used to discuss economic benefits of addressing climate change than in the Hansard corpus. In one sense, viewing climate change through the lens of economics is considered a "destructive" way of conceptualising the issue (Stibbe 2021: 22–23). However, discussing financial benefits of addressing climate change may encourage optimism, perhaps leading to public engagement (Van Eck and Feindt 2022). The increased space the Hansard corpus gives to discussing financial benefits is consistent with research on discursive constructions of adaptation in the Global North (Bevitori and Johnson 2022; Plastina 2022), as well as findings regarding how UK politicians discuss climate change, generally (Cunningham et al. 2022; Kirk-Browne 2021; Willis 2017, 2019). The emphasis of the financial benefits of *mitigation* through technology use is, however, not necessarily reported in existing research and this may be a novel finding.

The comparative lack of space in the Hansard corpus given to discussing means of addressing fossil fuel as a form of mitigation further highlights the divide between politicians and activists. Activists – able to occupy spaces outside of existing

hegemonic discourses – can communicate more explicitly about the need to address fossil fuel consumption (Mangat and Dalby 2018) than politicians, for whom questioning the interests of fossil fuel companies is challenging for both left- and right-of-centre parties (Willis 2020: 48). This potentially leads to a discourse of climate delay, where fossil fuels are not considered a problem, but rather part of the solution to climate change (Lamb et al. 2020: 3).

The discussion of nature is also worthy of consideration here. The categories 'human effect on land' – as a cause of climate change – and, especially, 'effect on biodiversity' – as a climate change effect – appear comparatively more frequently in the Activist corpus, again seemingly confirming previous research findings that UK politicians conceptualise climate change as an economic issue, rarely mentioning nature or the environment (Cunningham et al. 2022; Kirk-Browne 2021; Willis 2017). However, while discussing the effect on nature is important, another approach that either group could take would be to talk more about nature as an Actor aiding climate change mitigation and adaptation strategies. Examples of this are found in both corpora, but it occurs far less frequently than 'human' or 'human activity'. Conceptualising nonhuman referents, including nature, primarily as done-tos rather than doers is an example of how grammatical features in English can construct meaning in a way that is detrimental to humans' well-being, furthering a human-nature dichotomy (Halliday 2001[1990]: 193–194; Goatly 2017: 233–234).

Finally, some of the present findings point to "shifting dynamics" (Anderson 2014: 8) regarding the wider climate change discourse, as the discursive constructions of activists and politicians appear to become more similar to each other throughout the period under study. For example, instances of "fuel poverty" as an effect of climate change decrease in the Hansard corpus in 2019 and again in 2020, suggesting that UK parliamentary language is becoming more akin to that of climate activists. Moreover, 2019 – the year of mass climate protests and the declaration of a climate emergency in the UK – sees a clear peak in the frequency of 'fossil fuel' as a cause of climate change in the Hansard corpus, along with a move towards perhaps stronger linguistic strategies (e.g., "banning" or "stopping" fossil fuels), as found in Currie and Clarke (2022), and suggesting that UK politicians may be moving in line with some of the language used by climate activists, as per Ebrey et al. (2020), although this trend does not continue into 2020. Similarly, although 'fossil fuel' occurs consistently more frequently in the Activist corpus, it has its lowest percentage share compared to other causes of climate change in 2019. This may be evidence of climate activists toning down their language in line with that of politicians' during this period of high media exposure.

The methodology used in this paper is novel in its approach of locating discursive constructions of climate change mitigation and adaptation through causes and effects and semantically similar verbs. Although it cannot locate all instances of

climate change solutions (§3.2) – findings suggest this may be especially relevant in terms of climate change adaptation, as comparatively few instances are located here, particularly in 2018 – it is reasonably effective and does allow for comparisons to be made over large datasets. A limitation of this research is that it treats UK climate activist and UK parliamentary discourses as homogeneous in that there are no comparisons made within each corpus, between the different environmental organisations or political parties. While this paper is not unique in this sense (Cunningham et al. 2022; Willis 2017) and including this level of comparison with the current analysis would have made this study infeasible for a journal article, future research would do well to consider comparisons within as well as between groups.

Future research could replicate the methodology used in this paper, surveying a longer time period, or using a more delicate time measurement (e.g., six-monthly intervals) in order to better understand how discursive constructions of climate change solutions alter over time. Moreover, some of the key findings of the present study merit further exploration. For example, a closer or more varied linguistic analysis could examine how fossil fuels are discussed by both groups, particularly in 2019 when there seems to be greater similarity both in the manner and frequency in which they are discussed. Likewise, it would be merited to further explore how financial benefits of climate change solutions – particularly mitigation measures – are addressed in parliamentary discourse. The rarely occurring instances of natural referents as actors, while not discussed in this paper, could represent a more beneficial way of conceptualising nature and are worthy of further research. Politicians and activists are important actors to research in the context of climate change, but to get a fuller picture of the climate change discourse in the UK or other countries, the language of scientists, businesses, and news media should also be considered (Anderson 2014). Furthermore, while this present paper is concerned with the UK, future research should consider other national contexts due to the global nature of climate change and the need for international cooperation.

Acknowledgements: I am grateful to Daniel Lees Fryer at Østfold University College, and Ben Clarke, William Hedley Thompson, and Bill Noble at the University of Gothenburg for their help with data collection for this paper.

Appendices – CQL input stings

Appendix 1. Causes of climate change

[lemma="fossil"][lemma="fuel"]|[lemma="burn|use|explore|extract|drill|mine|produce|production|subsidise|subsidy|support|invest"][]{0,5}[lemma="coal|oil|gas"]|

[lemma="coal|oil|gas"][lemma="burn|use|explore|extract|drill|mine|produce|production|subsidise|subsidy|support|invest"]|[lemma="fracking"]|[lemma="manufacture|produce|production"][]{0,5}[lemma="cement|chemical|steel|metal|iron|plastic|cloth|electronic"]|[lemma="cement|chemical|steel|metal|iron|plastic|cloth|electronic"][lemma="manufacture|produce|production"]|[lemma="emission"]|[lemma="greenhouse|fluorinate|natural"][lemma="gas"]|[lemma="GHG|CO2|methane|CH4|N2O|HFC|Hydrofluorocarbon|gasoline|NF3|PFC|SF6"]|[lemma="carbon"][lemma="dioxide"]|[lemma="nitrous"][lemma="oxide"]|[lemma="pollution|pollute|fertilizer|detergent|pesticide|herbicide|pollutant|solvent|manure|aerosol|soot"]|[lemma="toxic"][lemma="air|sludge"]|[lemma="animal|plastic|industrial"][lemma="-waste"]|[lemma="industrial"][lemma="chemical"]|[lemma="leak"][]{0,3}[lemma="oil|gas"]|[lemma="oil|gas"][lemma="leak"]|[lemma="poisonous"][]{0,3}[lemma="metal"]|[lemma="overgrazing|deforestation"]|[lemma="land|soil"][lemma="-degradation|erosion"]|[lemma="cut|destroy|fell"][]{0,1}[lemma="tree|forest|woodland"]|[lemma="clear"][]{0,1}[lemma="land|forest"][]{0,3}[lemma="agriculture"]|[lemma="use"][]{0,3}[lemma="earth|natural"][lemma="resource"]|[lemma="overconsumption|overconsume|overpopulation"]|[lemma="increase|rise|growth|grow"][]{0,3}[lemma="consumption|population"]|[lemma="consumption|population"][lemma="increase|rise|growth|grow"]|[lemma="intensive"][lemma="agriculture|farming"]|[lemma="produce|production"][]{0,5}[lemma="meat|dairy|food"]|[lemma="meat|dairy|food"][lemma="produce|production"]|[lemma="increase|rise|growth|grow"][]{0,3}[lemma="energy|electricity"][lemma="demand|use"]|[lemma="increase|rise|growth|grow"][lemma="demand|use"][]{0,3}[lemma="energy|electricity"]|[lemma="increase|rise|growth|grow"][]{0,3}[lemma="livestock|cattle"][lemma="farming"]|[lemma="livestock|cattle"][lemma="farming"][lemma="increase|rise|growth|grow"]|[lemma="solar"][]{0,2}[lemma="radiation"]|[lemma="volcanic"][]{0,2}[lemma="activity"]|[lemma="tipping"][lemma="point"]|[lemma="melting"][]{0,2}[lemma="sea"][]{0,2}[lemma="ice"].

Appendix 2. Effects of climate change

[lemma="heatwave|warming|flood|flooding|drought|megadrought|wildfire|bushfire"]|[lemma="rise|increase"][]{0,3}[lemma="temperature|desert"]|[lemma="forest|moor"][lemma="fire"]|[lemma="extreme|severe|harsh"][lemma="cold|heat|temperature|weather"]|[lemma="high"][]{0,2}[lemma="temperature"]|[lemma="hot|warm"][lemma="ocean|sea|air|day|temperature"]|[lemma="dry"][lemma="spell"]|[lemma="-heat"][lemma="stress"]|[lemma="ocean"][lemma="warming"]|[lemma="melt|thaw"][]{0,2}[lemma="ice|glacier|permafrost"]|[lemma="global"][lemma="warming|temperature"]|[lemma="thermal"][lemma="expansion"][]{0,2}[lemma="ocean"]|

[lemma="shrink"][]{0,3}[lemma="glacier"][lemma="ice"]|[lemma="ice"][lemma="-loss|melt"]|[lemma="temperature"][]{0,2}[lemma="rise|increase"]|[lemma="catastrophic"][lemma="warming"]|[lemma="farmland"][]{0,2}[lemma="desert"]|[lemma="greenhouse"][lemma="effect"]|[lemma="reduce"][lemma="demand"][]{0,2}[lemma="heating"]|[lemma="increase"][lemma="demand"][]{0,2}[lemma="cooling"]|[lemma="sea|ocean"][]{0,1}[lemma="rise"]|[lemma="rise|warm"][lemma="sea|ocean"]|[lemma="more|increase|extreme|heavy|change"][]{0,2}[lemma="rainfall|rainstorm|rain|precipitation|weather|desertification|phenology"]|[lemma="rainfall|rainstorm|rain|precipitation|desertification"][lemma="increase|change"]|[lemma="-water"][lemma="scarcity|shortage"]|[lemma="deficit"][]{0,2}[lemma="water"][lemma="availability"]|[lemma="lack"][]{0,2}[lemma="precipitation"]|[lemma="ocean"][lemma="acidification|circulation"]|[lemma="ocean"][]{0,3}[lemma="more"][lemma="acidic"]|[lemma="ocean"][]{0,3}[lemma="higher"][lemma="pH"]|[lemma="decrease"][]{0,2}[lemma="water"][lemma="quality"]|[lemma="lack"][]{0,2}[lemma="-clean"][lemma="water"]|[lemma="affect|impact|endanger"][]{0,1}[lemma="water"][lemma="supply|table"]|[lemma="affect|impact"][]{0,1}[lemma="drinking"][lemma="water"]|[lemma="melt"][]{0,2}[lemma="ice|glaciers"]|[lemma="increase"][]{0,2}[lemma="water"][lemma="evaporate|evaporation"]|[lemma="increase"][lemma="evaporation"][]{0,2}[lemma="water"]|[lemma="threat"][]{0,2}[lemma="ocean|sea"]|[lemma="frozen"][lemma="ground"][]{0,2}[lemma="melt"]|[lemma="high"][lemma="river"][lemma="discharge"]|[lemma="city"][lemma="submerge"][]{0,3}[lemma="water|sea|ocean"]|[lemma="increase|rise|high"][]{0,5}[lemma="tropical|infectious|mosquito-borne|vector-borne|rodent-borne|water-borne|food-borne|zoonotic"][lemma="disease"]|[lemma="decline|diminish|reduce"][lemma="crop|agriculture|livestock"][lemma="yields"]|[lemma="heat-related"][lemma="illness"]|[lemma="fuel|climate"][lemma="poverty"]|[lemma="re-shape|loss"][]{0,3}[lemma="coastal"][lemma="region|wetland"]|[lemma="shrink"][lemma="nutrient"][]{0,3}[lemma="crop"]|[lemma="crop"][lemma="decline"]|[lemma="climate"][lemma="displacement|migration|refugee"]|[lemma="people"][]{0,3}[lemma="displace|evacuate"][]{0,3}[lemma="-climate"]|[lemma="rise"][]{0,3}[lemma="hunger"][]{0,3}[lemma="heatwave|drought"]|[lemma="regions"][]{0,3}[lemma="uninhabitable"]|[lemma="increase"][]{0,3}[lemma="heat-related"][lemma="mortality|morbidity"]|[lemma="decrease"][]{0,3}[lemma="cold-related"][lemma="mortality|morbidity"]|[lemma="erosion"][]{0,3}[lemma="coastline"]|[lemma="change"][]{0,3}[lemma="climate"][lemma="zone"]|[lemma="spread"][]{0,2}[lemma="invasive"][lemma="species"]|[lemma="disease"][]{0,2}[lemma="forest|crop"]|[lemma="threat"][]{0,3}[lemma="coastal"][lemma="-community"]|[lemma="biodiversity|wildlife|nature|habitat|wetland|species|coral|plant|insect|pollinator|life"][]{0,1}[lemma="loss|decline|destruction|extinction|fragmentation|damage|threat|impact"]|[lemma="loss|decline|destruction|extinction|fragmentation|damage|threat|impact|effect|annihilation"][]{0,3}[lemma="biodiversity|

wildlife|nature|habitat|wetland|species|coral|plant|insect|pollinator|life"]|[lemma="risk|high|mass"][]{0,3}[lemma="extinction"]|[lemma="wipe"][lemma="out"][]{0,2}[lemma="animal|plant|species"]|[lemma="loss"][]{0,2}[lemma="breeding"][lemma="ground"][]{0,2}[lemma="sea"][lemma="creatures"]|[lemma="animal"][]{0,4}[lemma="hard|difficult"][]{0,4}[lemma="find|discover"][]{0,4}[lemma="food|water"][]{0,3}[lemma="to"][lemma="live"]|[lemma="coral"][]{0,2}[lemma="bleach|die|death"]|[lemma="ecosystem"][]{0,2}[lemma="vulnerability"]|[lemma="vulnerable"][]{0,2}[lemma="ecosystem"]|[lemma="few|less"][]{0,2}[lemma="fish"][]{0,5}[lemma="eat"]|[lemma="climate"][]{0,1}[lemma="disaster"]|[lemma="tipping"][lemma="point"]|[lemma="soil"][lemma="degradation"]|[lemma="phenological"][lemma="change"]|[lemma="salinisation"]|[lemma="decline"][]{0,2}[lemma="organic"][lemma="matter"]|[lemma="nutrient"][lemma="leeching"]|[lemma="leeching"][]{0,2}[lemma="nutrient"]|[lemma="climate"][]{0,1}[lemma="adaptation"].

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Bionote

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