# Climate change and natural character

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At the same time as there are clear and continuing changes to our environment, both locally and globally, there is a growing sophistication as to how society views and values the environment.

This is especially relevant somewhere like New Zealand which, being islands, is fundamentally connected to our coastal environments. Furthermore, being one of the most recently occupied land masses on the planet, the perspective on 'natural character' is heightened compared to the global norm.

The purpose of this think piece is to explore the implications of our understanding of climate change impacts on the assessment of coastal natural character assessment here.

## Statutory context

The New Zealand Coastal Policy Statement (NZCPS) Policy 13 directs matters of national importance under Section 6 of the Resource Management Act 1991 and requires persons exercising functions and powers under the Act to "…preserve the natural character of the coastal environment and to protect it from inappropriate subdivision, use, and development…".

Levels of natural character within the coastal environment are assessed based on determining the extent of modification to existing natural elements, patterns, and processes that may occur across different contexts.

Such assessments consider both biophysical and some experiential landscape attributes, which can include coastal ocean temperatures, currents, climate, geology, geomorphology and ecological aspects alongside perceptions of how such biophysical dimensions have undergone or avoided modification.

In essence, natural character reflects the condition of biophysical aspects present and related experiential aspects, including wildness, remoteness, and the darkness of the night sky.

It is also important that an assessment of natural character excludes consideration of associative and some perceptual and aesthetic landscape attributes, a crucial difference between landscape and natural character assessment as directed by the NZCPS.

Within our coastal environments, climate change is already having an impact on relevant natural character attributes, including those within areas assessed as having 'high' and 'outstanding' natural character.

Understanding the effects of climate change within the coastal environment is therefore relevant to recognising how such modification may influence levels of natural character and how such relevant attributes are assessed and managed into the future.

With improved awareness of climate change impacts comes the question of how we can continue to seek to preserve natural character within environments subject to increasing change.

## Climate change impacts on natural character

The changing climate is already impacting on the biophysical condition of New Zealand's coastal environment. The seas around the country are warming at a rate well in excess of the global average.

The northern half of the nation especially will be subject to more and more marine heatwaves – a condition where the surface ocean is persistently warmer than normal for that time and place. Behrens et al. (2022) used a high-emission climate scenario to demonstrate that by the end of the century, marine heatwave intensities will nearly double and likely become the permanent condition.

Over the same time sea level rise impacts will become increasingly apparent. It is not so much the steady rise in sea level but how it exacerbates extreme events so that a tropical cyclone, arriving on a high tide, with another few decades of sea level rise will have significantly greater damaging effects than the same storm now.

Taite et al (2021) have shown how these largely physical impacts will feed through to biophysical changes to the coastal environment. There will be a greater influence and presence of subtropical species, decline in ocean pH impacting phytoplankton biodiversity and foodwebs, expansion of low nutrient waters, decrease in carbon sequestration abilities, regional variation of fish species and coral present due to warming.

Through such consequences, human induced climate change impacts will become increasingly more apparent.

## Perceived nature vs biophysical condition

While the biophysical condition of our coastal environment is changing due to human induced climate change, a tension remains between assessing biophysical condition and considering what people continue to perceive as natural.

While our coastal environment will exhibit increasing indications of human induced modification, many of these areas may still be regarded as retaining high experiential or perceived natural character values.

This is amplified when the driver of the departure from natural

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character is external to the region being assessed.

It is one thing to look at a coastal zone and say "yes this has been impacted by the installation of a seawall in 1965" – this encapsulates what, when, and who. It is another to identify how a relatively slow change in conditions, such as global ocean temperatures, are affecting natural character.

The relationship between biophysical and experiential attributes therefore presents increasing challenges for the identification of high and outstanding natural character.

While biophysical condition may become increasingly more modified due to human induced climate change (amongst other pressures) the experience of such modification within the coastal environment will change over different timeframes and may not change so drastically, at least initially. This view may change if it becomes more accepted that increased frequency of damaging events is climate-driven.

Craig Stevens

For now, it is typically not until there is a clear presence of human modification such as revetment, settlements, or marine farms, that the perception of 'natural', and consequential impacts on high and outstanding natural character may become apparent.

Therefore, we may increasingly face situations where the level of perceived naturalness remains high, or outstanding until necessary responses to actual modification become evident.

## Future management

With increasing tensions between preserving perceived nature versus actual biophysical changes that result from climate change, our understanding of the natural character of the coastal environment can essentially be assessed and managed in two divergent ways.

One approach favours a more perceptually driven measure of natural character despite actual modification, and the other a biophysically driven measure.

It is accepted that New Zealand's pre-human state is not a realistic benchmark to use when assessing natural character. While there is greater opportunity to be aware of the country's pre-human state given the relatively recent human history, we simply can't go back in time.

A more valid benchmark for today reflects the best possible condition that the coastal environment can now occur. In other words, for an area to be classified as having higher levels of natural character, natural elements, patterns, and processes must reflect more limited modification, including for example, all expected representative species remaining present.

From this, the ultimate outcome for management lies in how such natural character can be preserved given the collective impacts humans are having on our coastal environments. Consequentially, climate change may mean high natural character is no longer apparent for future generations or, the benchmark slides to maintain and identify areas of high natural character which would not previously have met today's standard.

There is a parallel discussion to natural character baselines in the scientific literature on marine heatwaves and how, and if, the goalposts should be shifted.

The perspective is, if by the end of the century we are in a permanent state of marine heatwave, is it still a marine heatwave?

On the one hand, shifting the baseline defeats the purpose, if the impacts are associated with long-term slowly varying equilibria. Alternately, if the aspect in question settles into some kind of stable condition rapidly then this may be appropriate. This has an equivalence in the natural character discussion whereby natural character reflects the best possible condition that can exist today.

Both of these scenarios have consequences for the assessment of natural character. As with all landscapes, the coastal environment is inherently dynamic and complex. Key areas cannot simply be ringfenced and set aside to be preserved regardless of ongoing human induced influences. Within this system, human-induced climate change will increasingly influence how coastal elements, patterns and processes occur.

If the benchmark was to lower and allow for areas which would not equate to high natural character today to qualify as high in the

future, there is the risk areas which contain our least modified and representative ecosystems are actually declining, akin to reinforcing a false dogma that climate change does not impact natural character.

Conversely if the benchmark remains as it is today where representative ecosystems and intact elements, patterns and processes may still exist, there is a risk there will eventually be no areas of high natural character remaining.

The latter appears the most logical and honest from a management perspective, however, suggests the current requirement to simply define and preserve the status quo may no longer be acceptable. Therefore, our response to managing natural character must increasingly look to NZCPS Policy 14, to restore.

Policy 14a of the NZCPS refers to "identifying areas and opportunities for restoration and rehabilitation" to promote the restoration or rehabilitation of the natural character of the coastal environment. While it is impossible to restore our coastal environment to a "pre-human" state, nor prevent impacts of climate change which are already 'locked in', it is possible to acknowledge change which will increasingly occur, alongside the indirect cause and effect through which global climate change impacts on our regions.

With this comes opportunities for restoration and seeking to inform how we can rehabilitate and improve the underlying biophysical condition and representative state of our coastal environments which will be increasingly subjected to change.

The implications of human induced climate change are inevitable, but the key to maintaining a future where 'high' natural character can still exist will be how these areas and our collective expectations are managed.

Such outcomes are derived from the same necessity to protect those key aspects of our most valued landscapes and ecosystems so future generations can appreciate natural character in the way we can today.