Indigenous Vegetation Cover

Ministry for the Environment Attribute Stocktake

Te Apu Otaota Taketake

Whakarārangi Āhuatanga a Te Manatū mō te Taiao

Ministry for the Environment
Manatū Mō Te Taiao

Te Kāwanatanga o Aotearoa
New Zealand Government

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Contents

Figures

Introduction

This document collates existing information and has been produced by the Ministry for the Environment. It complements the Ministry's commissioned stocktake of 55 environmental attributes. The stocktake involved 43 researchers from NIWA, Manaaki Whenua Landcare Research, Cawthron Institute and Environet Limited (Lohrer et al, 2024a). The attributes covered by the stocktake are in air, terrestrial, soil, freshwater, and estuaries and coastal waters domains.

State of knowledge conclusion

- State of knowledge of indigenous vegetation cover attribute: **Excellent/Well-established** – comprehensive analysis/syntheses; multiple studies agree.

Good information is available on indigenous vegetation cover, primarily from the Land Cover Database.[1]

Indigenous vegetation cover is monitored and reported by multiple parties in New Zealand including the Ministry for the Environment, Stats NZ, the Department of Conservation and councils via Land, Air, Water Aotearoa (LAWA).

It is well understood and accepted that indigenous vegetation cover is good coarse proxy for habitat and ecosystems, although more information is needed to provide context (eg, on representativeness and quality). The pressures on indigenous vegetation cover are also well understood and often direct (eg, vegetation clearance).

[1] Manaaki Whenua Landcare Research. *LCDB v5.0 – Land Cover Database version 5.0, Mainland, New Zealand*. Retrieved 27 May 2025 from https://lris.scinfo.org.nz/layer/104400-lcdb-v50-land-cover-database-version-50-mainland-new-zealand/

Part A – Attribute and method

A1: How does the attribute relate to ecological integrity or human health?

Indigenous vegetation cover is a key component of terrestrial ecological integrity. It creates the habitat and local environmental conditions required by many of our indigenous species, supporting far greater biodiversity than exists just within the cover itself (Walker et al, 2006). Indigenous vegetation cover also contributes to the maintenance of ecological functions and processes. For example, it provides clean air and water and plays a role in the decomposition of wastes, recycling of nutrients and maintenance of soil quality. It also aids pollination, regulates local climate, reduces flooding, contributes to soil structure, and provides unique food sources (IPBES, 2019).

As well as the direct impacts of loss of indigenous vegetation cover to the site where it is cleared, there are also impacts on the resilience of remaining land under indigenous vegetation. Losses increase the vulnerability of remaining indigenous vegetation cover to pressures such as habitat fragmentation, pest and weed invasion and climate change impacts (Kupfer et al, 2006; Mantyka-Pringle et al, 2015).

A2: What is the evidence of impact on (a) ecological integrity or (b) human health? What is the spatial extent and magnitude of degradation?

This attribute correlates to ecosystem extent attributes (eg, wetland extent, dune extent, lowland forest extent). The spatial layer of indigenous vegetation cover could be overlaid with ecosystem information to inform these attributes. Additionally, defining indigenous vegetation cover by land-cover class (and vice versa) could inform some of the method development of the indigenous plant dominance characteristic. Landscape connectivity is a way of describing the spatial distribution of indigenous vegetation cover, so indigenous vegetation cover data will be foundational to the connectivity attribute.

A3: What has been the pace and trajectory of change in this attribute, and what do we expect in the future 10–30 years under the status quo? Are impacts reversible or irreversible (within a generation)?

Although much indigenous vegetation loss is historic, indigenous vegetation cover continues to decline. Stats NZ reports a net decline of 13,000 ha between 2012 and 2018, as part of an

ongoing trend of net loss.[2] Indigenous scrub/shrubland and tussock grasslands are the two main indigenous vegetation cover classes experiencing contemporary net losses in extent. Over a longer timescale, 40,800 ha of indigenous forest, scrub and shrublands, and 44,800 ha of indigenous grasslands, were lost between 1996 and 2018 (DOC, 2020). Large historical losses mean even small further losses have significant impacts on ecological integrity.

The loss of indigenous vegetation cover brings irreversible impacts to species; it has been a significant driver of extinction and continues to be a risk. Over a quarter of Aotearoa New Zealand's terrestrial species with a threat classification are currently 'at risk of becoming threatened with extinction' (7 per cent) or 'threatened with extinction' (22 per cent) (DOC, 2020). Extinction of species is irreversible. If removed, some forms of indigenous vegetation cover can take many generations to recover to their original state, if they ever do.

A4: What monitoring is currently done and how is it reported (eg, is there a standard, and how consistently is it used; who is monitoring for what purpose)? Is there a consensus on the most appropriate measurement method?

The current state of indigenous vegetation cover is reported nationally by the Department of Conservation (proportion of Land Environments New Zealand (LENZ) protected and under indigenous cover);[3] by the Ministry for the Environment and Stats NZ in national environmental reporting (indigenous land cover); and by LAWA (land cover); as well as locally by most regional councils.

Currently, there is national-level monitoring of indigenous vegetation cover using data from the Land Cover Database (LCDB), which is produced by Manaaki Whenua Landcare Research and jointly funded by the Department of Conservation, Ministry for Primary Industries and Ministry for the Environment. The LCDB is produced about every five years using satellite data, and infers land-cover classes at a one-hectare resolution. This is used as the input for data for reporting on indigenous vegetation cover.

No national standard for how to use the LCDB data exists, but generally all reporting parties follow a consistent approach. Land-cover classes are assigned as either an indigenous or exotic category, and those areas are combined to infer the percentage of indigenous vegetation. Note the national Threatened Environment Classification (Walker et al, 2015) sets out which land-cover classes should be considered indigenous versus exotic (as determined by expert opinion).

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[2] Manaaki Whenua Landcare Research. *LCDB v5.0 – Land Cover Database version 5.0, Mainland, New Zealand*. Retrieved 27 May 2025 from https://lris.scinfo.org.nz/layer/104400-lcdb-v50-land-cover-database-version-50-mainland-new-zealand/

[3] Department of Conservation. *Proportion of LENZ protected and under indigenous cover 2020–2021: Assessing the overall changes in New Zealand's native vegetation by environment type.* Retrieved 27 May 2025 from https://www.doc.govt.nz/our-work/monitoring-reporting/national-status-and-trend-reports-2020-2021/lenz-environments-protected-2020-2021/

The same approach is also used to report current state regionally (eg, by Waikato Regional Council). The council-led Environmental Monitoring and Reporting initiative developed and agreed on an approach to reporting on indigenous vegetation cover (Bellingham et al, 2016).

There is no standard or method around ground truthing and enhancement with local data, which could be, for example, desktop analysis using councils' existing field data, aerial photographs, and/or ecosystem maps. A standard methodology becomes more important when using the LCDB at a regional scale.

A4(i): Are there any implementation issues such as accessing privately owned land to collect repeat samples for regulatory informing purposes?

Indigenous vegetation cover can be monitored remotely, and the LCDB forms the basis of most reporting, so implementation issues are unlikely. Where ground truthing is required, this can also be done remotely (eg, by satellite or aerial imagery).

A4(ii): What are the costs associated with monitoring the attribute? This includes up-front costs to set up for monitoring (eg, purchase of equipment) and ongoing operational costs (eg, analysis of samples).

This is largely a desktop analysis using existing data. As long as the LCDB continues to be centrally funded, and ground truthing can be largely desktop based using existing data, this monitoring and reporting is not expensive.

A5: Are there examples of this being monitored by iwi/Māori? If so, by whom and how?

Various cultural health monitoring tools are available, which communities have been using to monitor indigenous vegetation. These tools mainly focus on condition or quality, rather than extent of indigenous vegetation. Examples include the Tuhoe Tuawhenua Trust and Manaaki Whenua work led by Timoti and Lyver (Lyver et al, 2018), work on kauri forests by Shortland (2017), and a PhD thesis on forests in Nelson (Walker, 2019).

A6: Are there known correlations or relationships between this attribute and other attribute(s), and what is the nature of these relationships?

This attribute correlates to ecosystem extent attributes (eg, wetland extent, dune extent, lowland forest extent). The spatial layer of indigenous vegetation cover could be overlaid with ecosystem information to inform these attributes. Additionally, the definition of indigenous vegetation cover by land-cover class (and vice versa) could inform some of the method development of the indigenous plant dominance characteristic. Landscape connectivity is a way of describing the spatial distribution of indigenous vegetation cover, so indigenous vegetation cover data will be foundational to the connectivity attribute.

Part B – Current state and allocation options

B1: What is the current state of the attribute?

Roughly half of New Zealand is under indigenous vegetation (DOC, 2021) with significant variation between environments. Lowland and coastal environments have been most reduced. Less than 10 per cent of lowland areas in the North Island and eastern South Island are both protected and under indigenous cover.[4] By comparison, alpine areas have high levels of indigenous cover. See A2 for more information.

The current state of indigenous vegetation cover is reported nationally by the Department of Conservation, the Ministry for the Environment, LAWA, and in some cases by region (see A2–A4).

B2: Are there known natural reference states described for New Zealand that could inform management or allocation options?

Before humans, over 80 per cent of New Zealand was indigenous vegetation.[5] There are some reference states around the composition of the indigenous vegetation cover, but these are outside the scope of this attribute.

The composition of indigenous vegetation cover has changed over time, initially after Māori settlement. Pre-human New Zealand was over 80 per cent indigenous forest (Stats NZ, 2015). The composition of this early indigenous vegetation changed following Māori settlement (with indigenous forests becoming grasslands). The Potential Vegetation of New Zealand layer has been developed using statistical modelling to show indigenous vegetation cover types (Leathwick et al, 2012).

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4 See footnote 3 above.

5 Stats NZ. Predicted pre-human vegetation. Retrieved 27 May 2025 from https://www.stats.govt.nz/indicators/predicted-pre-human-vegetation/

B3: Are there any existing numeric or narrative bands described for this attribute? Are there any levels used in other jurisdictions that could inform bands (eg, US EPA, Biodiversity Convention, ANZECC, regional council set limit)?

No bands are set out for New Zealand, but some levels are set out in the Threatened Environment Classification (see below) and in other national policy direction, as well as in other projects.

Threatened Environment Classification

The Threatened Environment Classification (TEC) (Walker et al, 2015) was developed in 2006 to support identification of habitats and ecosystems important for indigenous biodiversity that are not represented within existing protected areas, or that are at significant risk of irreversible loss or decline.

The TEC looks at LENZ IV environments and assigns them either an indigenous or exotic vegetation cover category, based on LCDB cover classes (It also looks at legal protection, but that is not relevant here.)

The categories developed refer to anything with less than 30 per cent indigenous cover as a 'threatened environment'. For areas with more than 30 per cent indigenous cover, the categories are split based on the level of legal protection. The user guide provides a clear caveat that TEC categories do not define all that is important for ecological integrity and are not a statement about how much is enough.

Figure 1: Categories in the Threatened Environment Classification

Category	Category name and criteria
1	<10% indigenous cover left
2	10–20% indigenous cover left
3	20–30% indigenous cover left
4	>30% left and <10% protected
5	>30% left and 10–20% protected
6	>30% left and >20% protected

National Policy Statement for Indigenous Biodiversity

The National Policy Statement for Indigenous Biodiversity 2023 (NPSIB) sets out 10 per cent indigenous vegetation cover for any urban or non-urban environment (with below 10 per cent cover) equivalent to a minimum level target. The 10-per cent threshold was developed with some consideration of species area curves, although the initial advice was for an urban

context, which was later expanded to include non-urban environments. It is difficult to compare this directly to the TEC, as it uses a different spatial framework (not LENZ, but urban versus non-urban areas).

Past Ministry for the Environment national advice for prioritising environments

Priority 1 of the Statement of National Priorities for Protecting Rare and Threatened Indigenous Biodiversity on Private Land (Ministry for the Environment, Department of Conservation, 2007) is to protect indigenous vegetation associated with land environments (LENZ IV) that have 20 per cent or less remaining in indigenous cover. This is comparable to categories 1 and 2 in the TEC.

Eco-index

Eco-index is a Crown-funded research project with a vision of protected, restored and connected native ecosystems by 2121. Eco-index set a target of a minimum 15 per cent ecosystem land cover, which it considered to be pragmatic and adequate to address representation (Eco-index, 2023). This is broader than the general indigenous vegetation cover attribute.

Kunming-Montreal Global Biodiversity Framework

Target 3 of the Kunming-Montreal Global Biodiversity Framework (United Nations Environment Programme, 2022) is to:

> [e]nsure and enable that by 2030 at least 30 per cent of terrestrial, inland water, and of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem functions and services, are effectively conserved and managed…

The work of most other countries is aligned with this European Union Biodiversity Strategy, which sets out a commitment to legally protect at least 30 per cent of the European Union land area and 30 per cent of its seas (European Commission, 2021).

B4: Are there any known thresholds or tipping points that relate to specific effects on ecological integrity or human health?

More indigenous vegetation cover is better for ecological integrity, but the relationship is variable across ecosystems and specific outcomes. For example, although there are clear relationships between species occupancy and habitat area, these vary by ecosystem and species type, habitat quality (eg, invasives) and distribution (eg, fragmentation).

Walker et al (2008) set out the generalised species area relationship in their paper on indigenous cover in New Zealand, noting the different curves for different types of organisms. General agreement (as seen in B3 and underpinning data) is that steep decline is seen in ecological integrity when environments are reduced to below 30 per cent of original area.

B5: Are there lag times and legacy effects? What is the nature of these, and how do they impact state and trend assessment? Further, are there any naturally occurring processes, including long-term cycles, that may influence the state and trend assessments?

Historic losses of indigenous vegetation cover still pose significant threats to endangered species, as there is often a time-lag between the loss of habitat and the eventual collapse of populations (see Tilman et al, 1994 on extinction debt). Further, the loss of indigenous vegetation cover leads to habitat fragmentation and may facilitate the invasion of non-native species (Ewers et al, 2006).

As the extent of ecosystems decrease, so does the abundance and diversity of species (ie, species-area relationship). All these changes pose significant risks to indigenous biodiversity and degrade ecological integrity. Projections also show that the predicted loss of indigenous forest may result in an increased likelihood of extinction events in the future (Ewers et al, 2006).

B6: What tikanga Māori and mātauranga Māori could inform bands or allocation options and how (eg by contributing to defining minimally disturbed conditions, or unacceptable degradation)?

This will likely be more important for more specific attributes that may be linked to the type of vegetation (eg, ecosystem extent) or to the quality of habitat, and to management (see discussion in C3).

Part C – Management levers and context

C1: What is the relationship between the state of the environment and stresses on that state? Can this relationship be quantified?

Changes in attribute state are primarily driven by vegetation clearance. Conversion of land for agriculture and forestry are the major contemporary drivers of indigenous vegetation loss by area. For example, over 70 per cent of the 18,600 ha of indigenous scrub/shrubland lost between 2012 and 2018 were converted to exotic grass or forest.[6] This is consistent with an earlier finding that the most significant driver of indigenous forest between 1997 and 2002 was the expansion of plantation forestry (Ewers et al, 2006). Indigenous tussock grasslands also continue to decline, but at a slower pace, with 1,472 ha lost between 2012 and 2018.[7]

Note there is also a risk from wilding pine expansion, and more research is needed to quantify the effects of this expansion on indigenous vegetation. Wilding conifers cover more than 1.8 million ha of New Zealand, and they spread at an estimated rate of 5 per cent a year.[8]

C2: Are there interventions/mechanisms being used to affect this attribute? What evidence is there to show that they are/are not being implemented and being effective?

C2(i): Local government driven

Vegetation clearance rules

Although councils often have vegetation clearance rules, these are often focused on managing erosion and sedimentation, rather than a broader set of ecological integrity values. For example, Waikato Regional Council's rules focus on vegetation clearance on steeper slopes or in particular catchments, with no discrimination between indigenous or exotic vegetation. Management varies regionally, both within the rules, as well as how the rules are promoted and enforced.

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6 Stats NZ. *Indigenous land cover*. Retrieved 27 May 2025 from https://www.stats.govt.nz/indicators/indigenous-land-cover/

7 See footnote 6 above.

8 Department of Conservation. *Wilding conifers*. Retrieved 27 May 2025 from https://www.doc.govt.nz/nature/pests-and-threats/weeds/common-weeds/wilding-conifers/

Significant natural areas

Significant natural areas (SNAs) are covered by national direction contained in section 6 of the Resource Management Act 1991. Part of this provision is that areas of significant vegetation, and significant habitats of indigenous fauna, should be protected as a matter of national importance. However, this legislation only focuses on places identified as 'most important' and is not designed to manage entire landscapes. Without the presence of some other management tool, even if SNAs worked successfully, they would not necessarily have the coverage and representation required to enable New Zealand to maintain or improve ecological representation or ecological integrity.

Further, the processes and techniques to identify SNAs vary, and there are also various opportunities to allow activities that may affect SNAs.

Non-regulatory tools

Non-regulatory tools used to manage indigenous vegetation cover include council biodiversity strategic plans; land management agreements between councils and land owners; covenants; funding programmes or financial incentives such as rates relief or fencing/restoration; council-led restoration; and support of community monitoring and restoration initiatives. Several councils use non-regulatory tools as their primary means for achieving protection of indigenous biodiversity.

Non-regulatory measures appear to have had some positive effects on the integrity of natural areas, as well as prompting some positive restoration and revegetation initiatives. However, these measures continue to prioritise indigenous vegetation in places where people are willing to forego development opportunities, which often skews towards steeper or higher elevation lands. This does not result in ecological representation in other threatened areas, such as lowland environments.

Existing targets

Some councils already have targets for indigenous vegetation cover. For example, Hamilton City Council has already set the goal of moving from 2 per cent to 10 per cent native vegetation cover in Kirikiriroa/Hamilton by 2050. Accordingly, it has allocated $29 million over the 2021 to 2031 period.[9]

C2(ii): Central government driven

Many different policies seek to manage, monitor and report on indigenous vegetation cover. These are primarily targeted at protecting high-value biodiversity or climate change emissions reductions (which includes exotic and indigenous).

[9] Hamilton City Council. *Nature in the City*. Retrieved 27 May 2025 from https://hamilton.govt.nz/strategies-plans-and-projects/projects/nature-in-the-city

Biodiversity protection initiatives

Legal protection

Approximately one-third of New Zealand is under some form of legal protection,[10] but this is not an ecologically representative network and some of our most reduced and threatened environments are very poorly represented (see A2, B1). Legal protection is a broad definition, and some activities can still occur within different protection types (eg, mining can be approved for conservation land). Additionally, legal protection does not protect indigenous vegetation cover from weed and pest invasions or disease outbreak.

National Policy Statement for Indigenous Biodiversity (NPSIB)

The NPSIB provides direction to councils to protect, maintain and restore indigenous biodiversity and requires that, at least, no further reduction happens nationally. The national policy statement sets out indigenous vegetation cover targets of 10 per cent for urban and non-urban areas (in clause 3.22), and it provides national direction on SNAs and taonga species.

Resource management reform

The Government has signalled its intent to reform the resource management system, which could create new mechanisms and tools for managing indigenous vegetation cover.

Biodiversity credits market

The Government is in early conversations about the role of government in a biodiversity credits market, with a Ministry for the Environment consultation closing in November 2023.[11] This could be a way to manage and monitor, as well as report on indigenous vegetation cover.

Climate change initiatives

Emissions reduction plan

Focus Area 3 in the emissions reduction plan is to maintain existing forests. Action 14.3.1 states that "the Government will continue to monitor the deforestation of pre-1990 native forests". Action 14.3.2 states that "the Government will consider opportunities to incentivise and encourage management activities [that increase carbon storage in pre-1990 forests]".

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[10] Our Environment. *Protected Areas Network (2007)*. Retrieved 27 May 2025 from https://ourenvironment.scinfo.org.nz/maps-and-tools/app/Habitats/lenz_prot_areas

[11] Helping nature and people thrive – Exploring a biodiversity credit system for Aotearoa New Zealand. *Ministry for the Environment (2025).* Retrieved 27 June 2025 from Helping nature and people thrive – Exploring a biodiversity credit system for Aotearoa New Zealand — Ministry for the Environment — Citizen Space

New Zealand Emissions Trading Scheme

Currently, the New Zealand Emissions Trading Scheme (NZ ETS) covers a subset of indigenous vegetation cover, which has relevance for method development. A review of the NZ ETS is underway.

Climate action opportunities

Ministry for the Environment partners have recommended ways to recognise and reward on-farm sequestration, including woody vegetation that does not currently qualify under the NZ ETS.

Broader initiatives

One Billion Trees Programme

The Government has set a goal to plant a billion trees by 2028. To date, 474 million trees have been planted, with 80 per cent of these being native trees.[12]

Jobs for Nature

Jobs for Nature is a multi-year $1.2 billion dollar programme that manages funding to benefit the environment, people and the regions.[13] Projects include vegetation planting for freshwater and biodiversity restoration.

C2(iii): Iwi/hapū driven (eg, rāhui)

Many iwi/hapū are involved in restoration projects in their rohe that include planting of indigenous cover, and pest and weed control.

C2(iv): NGO, community driven

Queen Elizabeth II National Trust is an independent charitable trust, which partners with private land owners to protect land with perpetual covenants. These covenants currently cover 196,000 ha (Queen Elizabeth II National Trust, 2022). Covenants are an important way to protect indigenous vegetation cover in lowland and coastal environments that are poorly represented in New Zealand's conservation estate. Some of these areas are supported by councils with rates rebates (eg, Hutt City Council) or other mechanisms.

Ngā whenua rāhui kawenata is a legal protection mechanism for Māori land for a 25-year period.[14] The Local Government (Rating of Whenua Māori) Amendment Act 2021 makes kawenata land non-rateable, nationally.

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[12] Ministry for Primary Industries. *One Billion Trees Programme*. Retrieved 27 May 2025 from https://www.mpi.govt.nz/forestry/funding-tree-planting-research/one-billion-trees-programme/

[13] Jobs for Nature. *Mahi mō te Taiao*. Retrieved 27 May 2025 from https://www.jobsfornature.govt.nz/

[14] Department of Conservation. *Ngā Whenua Rāhui*. Retrieved 27 May 2025 from https://www.doc.govt.nz/get-involved/funding/nga-whenua-rahui/

Around New Zealand, many community groups are active in restoration and planting projects that improve the extent of indigenous vegetation cover.

C2(v): Internationally driven (eg, obligations to Convention on Biological Diversity, Kunming-Montreal Global Biodiversity Framework)

New Zealand is a signatory to the Convention on Biological Diversity, joining with nearly 200 parties to adopt the Kunming-Montreal Global Diversity Framework. Target 3 of the framework sets out the aim that "by 2030 at least 30 per cent of terrestrial, inland water, and of coastal and marine areas… are effectively conserved and managed…" (United Nations Environment Programme, 2022).

Part D – Impact analysis

D1: What would be the environmental/human health impacts of not managing this attribute?

The loss of indigenous vegetation cover following human arrival has been a significant driver of extinction for many species. At least 75 animal and plant species have become extinct since humans arrived in New Zealand (Ministry for the Environment, 2019). This includes 59 bird species, 3 frogs, 2 reptiles, 4 insects and 7 plants (see A1, A2, B4).

The loss of indigenous vegetation cover impacts broader wellbeing aspects of human health for current and future generations. These causal relationships are complex, and they interact with other factors like socioeconomics.

D2: Where and by whom would the economic impacts likely be felt (eg, horticulture in Hawke's Bay, electricity generation, housing availability and supply in Auckland)?

The economic impacts will depend on the tools used to manage indigenous vegetation cover. Generally, land owners with native indigenous vegetation (or the potential for native indigenous vegetation) will be most affected. The impacts could be positive (eg, rates rebates or options for biodiversity credits) or negative (eg, affecting future options for land-use change), depending on the tools.

From an impacts point of view, Māori land is likely to have greater indigenous vegetation cover than non-Māori land. Harmsworth et al (2010) found about 54 per cent of Māori land in New Zealand is under indigenous vegetation cover (using 2002 data). Maintaining and increasing indigenous vegetation cover may have different impacts on Māori compared to the general population, depending on the tools used.

D3: How will this attribute be affected by climate change? What will mitigating that require, in terms of management response?

Due to the broad nature of the indigenous vegetation cover attribute, it is unlikely to be affected by climate change. For example, climate change may shift the tree line but, as long as the cover is indigenous, the attribute does not discriminate between the type of cover. Perturbation events like wildfires or storms may increase, and it will be important to plan for reducing the impacts and revegetating the indigenous cover after these events.

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