Key Messages

1. Voluntary Carbon Offsetting is a meaningful sustainability commitment if done with integrity. It can have a huge positive impact on climate, biodiversity and community well-being. It is the last action in the hierarchy of emissions management, that means reducing real emissions before offsetting those that are unavoidable.
2. Carbon offsetting and carbon farming are contentious topics that attract media attention. Carbon offsetting may be perceived by as 'green washing' alongside other concerns about low quality projects that result in no real carbon reduction or removals. International carbon standards provide some assurance over the integrity of credits, but Z must also ensure that projects align with best practise principles.
3. Despite the high environmental integrity of New Zealand's (NZ) voluntary carbon offsetting market there are shortcomings that may lead to poor environmental and socio-economic outcomes. These include a system that is strongly bias towards exotic monocultures (invasive weeds) over native forest, the exclusion of rare and valuable ecosystems from earning credits and the expansion of carbon farming onto productive farmland. Emerging innovations in 'blue carbon' and biodiversity market mechanisms have potential to improve the system.
4. It is recommended that Z offsets its operational emissions with internationally sourced credits, supplemented by a substantial investment in large-scale biodiversity projects. This would optimise the spend across carbon reduction and NZ biodiversity outcomes. It aims to mitigate perception risks associated with the shift away from local projects to international projects. While this approach will not contribute to NZ's NDC, it will still support global efforts.

Background

5. For the past four years, Z has invested heavily in permanent local forests to offset its operational emissions[1] and is one of the biggest corporate players in the voluntary offsetting market. In April 2018, Z purchased 58,000 tonnes of carbon credits to offset its operational emissions for FY18, making Z the largest contributor at the time. Through its broker, Permanent Forests New Zealand (PFNZ)[2], Z has contributed to 20 forest projects, consisting of about half native and half exotic trees (including *Douglas fir*, eucalyptus and *Pinus radiata*).
6. The 2018 purchase was a large transaction for PFNZ. The partnership was built on aligned values to use local forest projects to sequester carbon and generate positive co-benefits for biodiversity. There were insufficient units available from native only projects to satisfy the quantity needed, so exotics were included by default.

[1] Those domestic emissions of which Z has the most control and influence over.

[2] PFNZ specialise in aggregating, marketing and selling NZ forest carbon credits on behalf of owners of forests registered under the Permanent Forest Sink Initiative.

7. The number of participants in the voluntary offsetting market is increasing, helped in part by the Carbon Neutral Government Programme (CNGP) which requires government agencies to be carbon neutral by the end of 2025, while the supply of units from native forests remains sparce.

Advice

Carbon offsetting is a meaningful sustainability commitment if done with integrity

8. Carbon offsetting and carbon farming are contentious topics both domestically and internationally. Offsetting is a form of compensation that enables us to remove unavoidable carbon emissions from the atmosphere generated by our activities. If done with integrity, it is a meaningful sustainability commitment that can have a huge positive impact on climate, biodiversity and community well-being. It is a way of financing additional emissions reductions outside of our own operations and an investment in future generations.
9. Carbon offsetting may be perceived by some as cheating or 'green washing'. The NZ Government has also been criticised in the media for its reliance on offshore mitigation to meet its NDC rather than faster action on decarbonisation. The increasing ambition of NZ's NDC means that NZ will likely pay developing countries to decarbonise or plant trees to meet up to two thirds of NZ emissions gap. However, given the scale of the challenge to meet our Paris target, this is the currently the least cost pathway.
10. Often purchasing offsets are cheaper and easier than making real emissions reductions and may create incentives to delay climate action. The voluntary market is not well regulated, there are transparency issues over pricing and concerns around low quality projects that result in no real carbon reduction or removal. Some may even have negative environmental and socio-economic impacts.
11. Many buyers have a limited understanding of the complexities of the voluntary offsetting market and some of the leading international carbon standards providing quality assurance over offsets still have room for improvement. The shift from Kyoto to the Paris agreement has further complicated the system and increased the risk of double-counting[3].
12. The NZ Government has taken a position that there will be no mechanism for a 'corresponding adjustment' to be made to its NDC based on voluntary action to ensure that voluntary offsets contribute towards New Zealand's net zero target. The only carbon credits currently available in the domestic market are NZ Units

[3] An example of double counting is where the host country of an emissions reduction or removal project counts the negative emissions towards its NDC (Paris target) and then a private company claims to be carbon neutral from offsetting with those same removals or reductions. To overcome double-counting, either the host country makes a 'corresponding adjustment' to its GHG inventory or its NDC for the emissions claimed or the company differentiates it's claim from 'carbon neutral' to a 'contribution claim' (helping the host country meet its NDC).

(NZUs) issued to participants in the Permanent Forest Sinks Initiative (PFSI)[4] which ensures protection over the land and fetches a premium price.

13. The International Carbon Reduction & Offset Alliance (ICROA) sets international best practice for offsetting and endorses certain standards. Its Code of Best Practice (ICROA Code) provides the following guiding principles for carbon offsets:
    a. real
    b. measurable
    c. permanent
    d. additional
    e. independently verified, and
    f. unique.
14. The voluntary offsetting market in NZ is not specifically regulated by the Government, but any claims made regarding carbon offsetting fall under the Fair Trading Act 1986. The Ministry for the Environment (MfE) has issued Guidance[5] on voluntary carbon offsetting that was valid to December 2021. The Guidance provides a set of principles for credible offsets which are consistent with the ICROA Code:
    a. transparent
    b. real, measurable and verified
    c. additional
    d. not double counted
    e. address leakage, and
    f. permanent.
15. MfE is awaiting Cabinet approval to issue revised guidance in 2022.

Eight suppliers were considered as part of the assessment

16. These were assessed against five criteria:
    a. cost per unit
    b. delivers positive social and environmental co-benefits
    c. contributes to New Zealand's NDC
    d. aligns with Z's purpose and values, and
    e. improves the system.
17. A summary of this assessment can be found at Appendix B.

[4] The PFSI is to be discontinued and replaced by a new permanent post-1089 forest activity in the NZ ETS.
[5] MfE (2020) *Guidance for voluntary carbon offsetting – updated and extended until 31 December 2021*, https://environment.govt.nz/assets/Publications/Files/guidance-for-voluntary-carbon-offsetting-updated-and-extended-until-31-December-2021.pdf

Price is driven by a range of factors

18. Credible voluntary carbon offsets may be sourced from either domestic or international emissions reduction and removal projects. Prices range significantly from ~$10 to upwards of $45 per tonne[6] (as at 2020). NZ based projects involving the establishment of permanent forests come at a significantly higher cost than international projects.

19. The price of voluntary offsets is driven by a range of factors with differences in perceived value and desirability resulting in differing demand. Some projects are more attractive because of the additional characteristics and social or environmental co-benefits[7]. Companies may choose to pay a premium for the brand alignment, marketing potential or alignment with corporate values.

20. Compliance based credits are generally more expensive as these are backed by AAUs or NZUs. Demand for these are greater as there is a legal requirements to purchase them (for example to comply with an emissions trading scheme). Many of the credits from overseas are created through voluntary standards where the unit is a VCU (voluntary carbon unit). The price set by the owner of the project may differ depending on any additional costs or exchange rates.

Current settings favour exotic trees over native

21. Carbon offsetting through permanent forests is a way to achieve positive biodiversity co-benefits. Sequestering carbon and helping to reverse the decline in New Zealand's biodiversity would be considered a win-win. However, due to a range of limitations and barriers in the NZ market, the economic incentives strongly favour planting exotic forests (e.g., *Pinus radiata* and *Douglas fir*) over native species, for both compliance and voluntary purposes. Commercially grown exotics are cheaper to establish and faster growing, sequestering more carbon in the short to medium term (<50years), providing a higher financial return,

22. Planting pine may cost $1500 to $2500 per ha compared to $1500 to $50,000 for a native forest established through planting or natural regeneration[8]. A native forest is significantly more complex than an exotic monoculture. Species selection, plant size, site preparation, fencing, supplementary planting and maintenance (including pest and weed control) can also impact costs. Of 325,000 ha of forest registered in the ETS, only 31,000 ha are native and almost 90% of this was established between 1990 and 2000 meaning it was not in response to the ETS.

23. Natives are further disadvantaged by the sequestration rates provided in the MPI carbon look-up tables (pre-calculated values of carbon stocks for a given age

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[6] The Aotearoa Circle (2020) *Native Forests: Resetting the balance,* P.10 (Market research carried out by Air New Zealand). Note the carbon price has increased since publication and prices may be as high as $80 per NZU (1T of CO_2).

[7] Toitū Environcare, (n.d.) *Frequently Asked Questions* https://www.toitu.co.nz/tools-and-resources/faqs-and-glossary

[8] MfE (2021) *Transitioning to a low-emissions and climate-resilient future: Emissions Reduction Plan consultation document,* https://environment.govt.nz/publications/emissions-reduction-plan-discussion-document/

and forest type). Research shows that rates provided for native forest correspond to naturally regenerating scrub (manuka and kanuka) rather than well managed planted native forest and mature regenerating forest[9]. Several studies have indicated that the actual sequestration of native forest is likely much higher and the real gap between exotics and natives is smaller[10]. Amending the carbon look-up tables would improve the business case for planting native forest as carbon sinks.

24. Sequestration rates aside, the underlying problem is that while NZ has successfully put a price on carbon, there is no such equivalent mechanism to incentivise investment in nature for other environmental outcomes and certainly not at the scale and pace needed to address the biodiversity crisis.

25. Native species provide essential ecosystem services[11] that are just not present in exotic monocultures. While exotic forests provide higher rates of carbon sequestration through to maturity, slope stability and partial habitat, native forest provide greater value for conservation and recreation benefits, and regulation of erosion and flooding. Native forests also offer the best habitats and food source for most native species[12], lower fire risk and are significant to people spiritually and culturally.

26. Despite the barriers, the demand for NZ natives remains strong, however nurseries are also struggling with capacity[13]. The sector is small with only handful of large producers alongside many small operators, often family owned and operated. The industry needs investment to upscale but there are underlying issues such as a lack of quality standards, agreed position on eco-sourcing, a shortage of skilled labour and inequality between business models (charitable trusts versus commercial nurseries).

27. Suppliers we talked to have indicated they would not be able to supply all the credits required solely from native forest projects, even if Z pays a premium. Air New Zealand made headlines recently as it was also unable to source sufficient carbon credits from NZ permanent native forest projects to satisfy its Fly Neutral programme. It now sources all of its offsets from international projects[14] and makes a 'biodiversity contribution' through Trees that Count (up until late 2021

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[9] Kimberly, M., Bergin, D. and Silvester W. (2021) *Carbon Sequestration by Native Forest: Setting the record straight,* Tane's Tree Trust and Pure Advantage. CP_digital_Master_231121 (tanestrees.org.nz)
*Regenerating kanuka/manuka shrubland: (6.5 tCO2 ha-1 yr-1 mean annual increment over 50 years).
**Planted forests of totara, kauri, kahikatea, rimu, other conifers, puriri, beech, and other broadleaves is in the range 10.0 to 16.4 tCO2 ha-1 yr-1 (mean annual increment over 50 years).

[10] NIWA (n.d.) *Native forests absorbing more carbon dioxide,* NIWA website: Native forests absorbing more carbon dioxide | NIWA

[11] See Appendix C for an explanation of ecosystem services.

[12] Claims that exotic forest can be used as a nurse crop for natives to grow are unsupported by evidence, as exotic conifers are likely to co-introduce exotic fungi, replace both light-demanding and shade-tolerant phases of forest development and modify site conditions such that native species can no longer thrive there.

[13] Stuff (04 Sep 21) *Nurseries struggling to keep up with 'extreme' demand for native plants.* Nurseries struggling to keep up with 'extreme' demand for native plants | Stuff.co.nz

[14] Stuff (8 Dec 21) *Air New Zealand boss says carbon offsets don't excite him* *https://www.stuff.co.nz/business/industries/127217322/air-new-zealand-boss-says-carbon-offsets-dont-excite-him-he-has-eyes-on-a-bigger-prize*

they were working with the Native Forest Restoration Trust, a project under the PFNZ portfolio).

Important rare ecosystems are excluded from carbon frameworks

28. Many rare ecosystems are not currently eligible for carbon credits. Carbon stocks are at risk of being lost through ongoing environmental degradation[15]. Wetlands, peatlands and estuaries, for example, are important carbon sinks, storing disproportionally large amounts of carbon compared with other ecosystems[16].

29. There is growing interest in the potential of other types of carbon stocks such as 'soil carbon' (the solid carbon stored in soil as organic matter and minerals) and 'blue carbon' (CO_2 stored in oceans and coastal ecosystems such as sea grass and salt marshes). Overseas, mangrove restoration projects have been certified for carbon credits, but similar ecosystems are not included in the NZ market.

30. Ecosystems such as estuaries are unique and valuable. They filter our water and provide habitat for taonga species. They provide economic, recreational and cultural benefits. Estuaries are particularly vulnerable to climate change due to the cumulative effects of existing pressures, warming, deoxygenation, ocean acidification and sea level rise[17]. Inappropriate responses to climate change such as sea walls and hardened structures 'squeeze' these ecosystems, preventing their ability to shift inland and lowering their resilience.

There is increasing public concern about the rapid expansion of carbon farming

31. Forests, both plantation and permanent, enable a least cost pathway to climate mitigation in NZ. They help to 'bridge the gap' to a low carbon future, allowing time for new technologies to be introduced. The inclusion of forestry in the ETS is an important part of NZ's approach to meeting its international obligations, but some participants have adopted unproven practises, make dubious claims about environmental benefits and may leave a costly mess for future generations to deal with.

32. New Zealand Carbon Farming grew to be the largest participant in the ETS with more than 89, 000 ha owned or leased in carbon farming. It claimed the pines planted would eventually regenerate into natives, however this is not supported by science[18].

33. In recent years, concerns have increased about the potential negative social and economic impacts of further land-use change driven by a high carbon price and the threat of mass exotic afforestation displacing productive land uses such as sheep and beef farming. Approximately 26,000 ha of farmland sold between

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[15] Ausseil, A-G. E. et al (??) *Climate regulation in New Zealand: Contribution of natural and managed ecosystems,* Manaaki Whenua Landcare Research, Lincoln https://www.nature.com/articles/

[16] Wetlands store 167 Mt C (612 Mt·CO2e), which is equivalent to 10 times the national emissions in 2010.

[17] PCE (2020) *Managing our estuaries*, https://www.pce.parliament.nz/media/197063/report-managing-our-estuaries-pdf-44mb.pdf

[18] Stuff (2021) *Carbon farmers bought swathes of NZ promising to create native forests – but researchers doubt it will work.* https://www.stuff.co.nz/environment/climate-news/125508000/carbon-farmers-bought-swaths-of-nz-promising-to-create-native-forests--but-researchers-doubt-it-will-work

2017 and 2020 was to forestry and carbon interests, which is 0.2% of total area farmed[19]. There has been a spike in the past year.

34. A report[20] delivered by PwC commissioned by Te Uru Rākau, *Economic Impact of Forestry in New Zealand*, revealed that a shift to permanent carbon forestry significantly reduces the GDP potential and generates almost no additional employment. Another report commissioned by Tairāwhiti Trust but written by BDO Gisborne raised contentious concerns about negative cash flows following forest maturity, job losses, ETS liability and permanently altered landscapes preventing native species to re-establish in these area[21].

35. The sale of Huiarua Station (5000 ha) on the East Coast to foreign owners (pending OIO approval) for carbon farming hit the media early this year being described as the 'beginning of the end for rural communities'[22].

Emerging solutions to address market failures

36. Minister Nash has said there are four major pieces of work underway to address rising concerns with carbon farming expansion[23]:

    - reviewing the process that overseas investors undertake when purchasing farms to convert to forestry
    - testing the premise that only native forestry should be allowed into the Permanent Forest category of the Emissions Trading Scheme (ETS) that comes into force on 1st January 2023
    - revising the sequestration rates of certain native species to calculate their carbon returns, and thus make carbon farming of native trees more financially attractive
    - amending the National Environmental Standard on Plantation Forestry to give local councils the right to plan where trees should and should not be planted.

37. The Nature Conservancy has commissioned Cawthron Institute to study the feasibility of blue carbon credits. They hope to create a blue carbon market to help fund large scale restoration projects, but there are significant challenges in achieving certification against standard methodologies[24]. A research project is

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[19] Harrison, E. and Brice, H. (2019) *Socio-economic impacts of large-scale afforestation on rural communities in the Wairoa District,* BakerAg for Beef and Lamb Microsoft Word - Wairoa Afforestation_FINAL (beeflambnz.com)

[20] Te Uru Rākau (2020) *Economic Impact of Forestry in New Zealand* Economic Impacts of Forestry FINAL + Methodology + Disclaimer (nzfoa.org.nz)

[21] BDO (2021) *Report on the impacts of permanent carbon farming in Te Tairāwhiti Region,* Tairāwhiti Trust; The Gisborne Herald, *Reporting on impacts of permanent carbon farming 'too narrow in scope',* Carbon farming concern – The Gisborne Herald; Stuff, *Carbon Farming will be 'losing money in 100 years' – East Coast report,* (n.d.) / Carbon farming land will be 'losing money in 100 years' — East Coast report | Stuff.co.nz.

[22] Newshub (11 Jan 22) *5000-hectare historic station on East Coast could soon be foreign-owned carbon farm | Newshub*

[23] The Herald (1 Feb 22) *Stuart Nash: right tree, right place, right reasons – changes underway in farm forestry,* Stuart Nash: Right tree, right place, right reasons - changes under way in farm forestry - NZ Herald

[24] Stuff (2021) *Coastal areas scoped as potential new 'blue carbon' credit sites,* https://www.stuff.co.nz/environment/climate-news/126525091/coastal-areas-scoped-as-potential-new-blue-carbon-credit-sites

also underway in the Waimea Inlet to find out how much carbon is stored in the estuary. They hope it will motivate communities to protect and restore them.

38. Preventing further degradation of New Zealand's mature native forests is also crucial to avoiding the worst impacts of climate change[25]. Our forests are among the most significant carbon sinks in the world due to their density. Around 18% of New Zealand's native forests are privately owned and there are few financial incentives to support their restoration. NZUs cannot be earned from pre-1990 forests for reasons of additionality, nor can they be earned by an action to forego logging rights or for predator control.

39. The Biodiversity Collaborative Group (BCG) advised that strong partnerships, meaningful support, and incentives to help landowners manage indigenous vegetation and habitats on their properties will be critical to achieve biodiversity restoration and enhancement. The BCG 2018 report included a recommendation to the Ministry for the Environment and the Department of Conservation to continue to investigate new funding mechanisms to assist with the cost of indigenous biodiversity protection on private land.

40. Some examples of approaches being trialled overseas are:

    a. Australia's Agriculture Biodiversity Stewardship Package. A government led project trialling a mix of approaches including linking biodiversity outcomes to a voluntary carbon market, payment for ecosystem services, accreditation schemes and a biodiversity trading platform.

    b. The United Kingdom's Environment Land Management Schemes. A government led project comprised of three voluntary schemes that operate together, paying for environmental and climate outcomes. Landowners can enter a combination of any of the three voluntary schemes.

    c. Singapore's Climate Impact X project. A private sector lead project including a digital marketplace for corporations to purchase composite carbon/sustainability credits. Currently focused on natural climate solutions (NCS), which involve protection and restoration of natural ecosystems like forests and mangroves.

    d. The European Union's Natural Capital Financing Facility. A government led project which offers funding to projects that promote conservation, restoration, management and enhancement of natural capital for biodiversity benefits. There are two main components, a finance component which can provide financing between 2 and 15 million euros, and a technical component which can provide support with project preparation, implementation and monitoring.

41. Trees that Count have been a strong advocate for the introduction of such market mechanisms to incentivise greater contributions towards nature restoration. They have assembled a portfolio of landscape scale transformation projects but will need a step change in the size of investment received through

[25] Goldstein, Allie et al (2020) *Protecting irrecoverable carbon in Earth's ecosystems,* Nature Climate Change https://www.nature.com/articles/

their community marketplace. They hope that new market incentives will provide the catalyst needed to move these projects.

Appendix C: FAQs on Voluntary Carbon Offsetting and Biodiversity

What are carbon offsets and why use them?

1. A carbon offset as a metric tonne of CO_2 equivalent that has either been removed from the atmosphere through carbon sequestration or has been prevented from reaching the atmosphere (reduced or avoided emissions)[26]. In purchasing a carbon offset, an individual or company is paying someone else to reduce emissions outside your business boundary. Carbon credits may be awarded to projects that store, avoid or reduce emissions. These projects are usually either permanent forests, renewable energy or some form of technology that reduces the volume of emissions produced. Cancelling a carbon credit, on an official registry, balances the atmospheric impact of emitting one tonne of greenhouse gases (in CO2e).
2. A carbon offset is not 'permission to pollute'. The focus of efforts should always be on measuring and reducing emissions as a matter of first priority. However, even after substantial efforts to reduce, there will likely be residual emissions as the marginal cost of reduction increases after the most easily achievable gains are made. Carbon offsetting enables companies to deliver the equivalent volume of emissions for the hard-to-reach reductions.

How does the voluntary carbon offset market operate in New Zealand?

3. Credible voluntary carbon offsetting means the measurement, reduction and offsetting of carbon emissions by the retirement or cancellation of units (also known as carbon credits). Voluntary offsetting is an action that goes over and above legislative requirements. Surrendering units as part of a legal requirement under the NZ ETS is not a voluntary carbon offset, although companies can use units from the NZ ETS for voluntary offsetting purposes.
4. MfE issued guidance[27] on voluntary carbon offsetting that is valid to December 2021. It is awaiting Cabinet approval to issue revised guidance in early 2022 on voluntary carbon offsetting using New Zealand-generated mitigation, for the Paris Agreement period of 2021–2030[28]. The principles[29] described in the guidance should be applied by NZ organisations to any voluntary carbon offsetting mechanisms that they are using, or intend to use.

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[26] In NZ, an NZU and AAU represents 1 T of CO_2

[27] The Ministry for the Environment (MfE) does not regulate or administer the voluntary offsetting market, although claims of carbon neutrality or offsetting should be compliant with requirements under the Fair Trading Act 1986. Guidance for voluntary offsetting can be found here: Guidance for voluntary carbon offsetting - Updated and extended until 31 December 2021 (environment.govt.nz).

[28] The current process, which prevents double claiming, will not be a credible approach to offset emissions generated under the Paris Agreement period.

[29] Transparent; real, measurable, and verified; additional; not double counted, claimed or used; address leakage; permanent.

What does 'carbon neutral' mean in the Paris Agreement period?

5. The voluntary offsetting market is not specifically regulated by the NZ Government. Claims of carbon neutrality associated with this market fall under the Fair Trading Act 1986. The term 'carbon neutral' is used when an activity, product, organisation etc. has zero net GHG emissions.
6. In 2021, NZ entered a new emissions reduction period under the Paris Agreement. The current process involving the cancellation of units originating under the Kyoto Protocol (which prevents double claiming) will not be a credible approach to offset emissions generated under the Paris Agreement period. Under the Paris Agreement, a claim of carbon neutrality must result in emission reductions or removals that are additional to existing commitments. This means that a company or individual cannot claim the same emissions reduction or removal that is being used by a host country to meet its climate change targets nor can an organisation claim carbon neutrality for simply surrendering units that are part of its compliance requirements under the NZ ETS.
7. Any abatement used for carbon neutrality claims must be accompanied by a corresponding adjustment to the target of the host country in which the mitigation occurred. The NZ Government has taken a position that there will be no mechanism for a corresponding adjustment to be made to its target based on voluntary action. This is to ensure NZ pursues the most ambitious Nationally Determined Contribution (NDC) and voluntary carbon offsets contribute to New Zealand's net zero goal.
8. Therefore, companies and individuals will not be able to claim "carbon neutrality" or "net zero" under the proposed voluntary carbon market in New Zealand.

How does climate change overshadow the biodiversity crisis?

9. Climate change and biodiversity loss are the two most pressing issues of the Anthropocene. They are inherently inter-connected but are generally managed separately. Climate change and biodiversity are addressed under different international frameworks (the UN Framework Convention on Climate Change and the Convention on Biological Diversity) and have separate international scientific advisory bodies (the Intergovernmental Panel on Climate Change (IPCC) and the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES).
10. The artificial separation creates a barrier to understanding our complex environment in its completeness. A narrow focus on carbon can lead to undesirable outcomes for biodiversity. Understanding the connection between climate and biodiversity outcomes is crucial at a time when both are in crisis and the globe is ramping up for action on dual fronts[30].
11. The Colmar Brunton report *Better Futures 2021,* found that overseas markets have a greater sense of the potential catastrophe that awaits from the loss of biodiversity

[30] IPBES-IPCC Co-Sponsored workshop (2021) *Biodiversity and Climate Change Workshop Report,* 20210609_workshop_report_embargo_3pm_CEST_10_june_0.pdf (ipbes.net)

than New Zealanders. While addressing the effects of climate change is of significant importance and urgency, a narrow focus on emissions has the effect to overshadow the alarming evidence that our biodiversity is in crisis too.

Why should we be concerned about biodiversity loss?

12. Nature and its essential contribution to people is deteriorating worldwide and the rate of deterioration is accelerating[31]. Limiting global warming to ensure a habitable climate and protecting biodiversity are mutually supporting goals essential for providing sustainable and equitable benefits to people. Over the past 150 years, land, freshwater and seascapes have been transformed at an unprecedented scale. New technology has supported better living standards for many, but have also led to changes in climate and accelerated the decline of biodiversity.

13. 77% of land (excluding Antarctica) and 87% of the area of the ocean have been modified by the direct effects of human activities. These changes are associated with the loss of 83% of wild mammal biomass, and half that of plants. Livestock and humans now account for nearly 96% of all mammal biomass on Earth and more species are threatened with extinction than ever before in human history.

14. Our species and ecosystems in Aotearoa are not only unique and irreplaceable, they are essential to our identity, culture, health and well-being. At least 75 animal and plant species have become extinct since humans arrived in NZ and a great many species (est. 4000) remain threatened or at risk of extinction[32]. Almost two thirds of our rare ecosystems (such as braided river systems) are threatened with collapse and, for coastal ecosystems, it is three quarters[33].

15. The main drivers of biodiversity decline are loss of habitat, introduced species (plant and animal pests, animal predators and browsers) and climate change. Pollution, diseases and extractive use also contribute to further loss. Biodiversity loss is complex and incredibly difficult to manage, as negative trends often result from cumulative impacts, direct and indirect pressures, as opposed to a single cause.

16. Climate change exacerbates existing pressures on biodiversity, while at the same time, ecosystems play a key role in regulating the fluxes of greenhouse gases and supporting adaptation. Degradation of ecosystems is a major contributor to cumulative CO_2. Actions to protect, sustainably manage and restore land and oceans have co-benefits for climate mitigation, adaptation and biodiversity.

17. The adaptive capacity of most ecosystems and social-ecological systems will be exceeded by unabated anthropogenic climate change, and significant adaptive

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[31] IPBES (2020) *The Global Assessment Report on Biodiversity and Ecosystem Services:* https://ipbes.net/sites/default/files/2020-02/ipbes_global_assessment_report_summary_for_policymakers_en.pdf

[32] As assessed under the New Zealand Threat Classification System (NZTCS).

[33] MfE (2019). *Our Environment Aotearoa 2019,* https://environment.govt.nz/assets/Publications/Files/environment-aotearoa-2019.pdf

capacity will be required to cope with residual climate change even under ambitious emissions reduction.

18. Biodiversity conservation approaches such as protected areas have been essential for successes to date, but, on aggregate, have been insufficient to stem the loss of biodiversity at a global scale. Nature-based solutions (NbS) can play an important role in climate mitigation, can be most effective when planned for longevity and not narrowly focussed on rapid carbon sequestration.

What are ecosystem services?

19. Ecosystem services are the benefits people obtain from nature. The Millennium Ecosystem Assessment identified four categories of ecosystem services: (1) provisioning, (2) regulating, (3) cultural and (4) supporting services as in the diagram below. The IPBES also built on this concept to develop the 'natures contribution to people' framework (NCP).