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Biodiversity Roadmap 2030 for the Finnish construction industry

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The Biodiversity Roadmap 2030 compiled by The Confederation of Finnish Construction Industries RT (CFCI) demonstrates the Finnish construction industry's impacts on biodiversity and how the industry can contribute to halting biodiversity loss.

Reading guide and key concepts

Reading guide

If biodiversity is a familiar topic to you: We recommend that you start reading from the Biodiversity Roadmap section on page 13. Continue to read the annexes if you need more information on a topic.

If biodiversity is a new topic for you: We recommend that you start by reading the annexes, then move on to the Biodiversity Roadmap section on page 13. This will allow you to familiarise yourself with the topic before reading the Biodiversity Roadmap itself.

Value chain describes each stage of a product lifecycle from raw materials to finished product and from there to end-use and recycling or disposal.

Biodiversity is the variety of life on Earth. It consists of genetic diversity, species diversity and ecosystem diversity.

Ecosystem is a community of living organisms and the nonliving components of their environment with which they interact.

Ecosystem services are the supporting, regulating, provisioning and cultural services provided by nature on which the well-being of human society depends.[1]

Mitigation hierarchy is an approach to managing biodiversity impacts, where negative impacts are avoided, then reduced, then restored, then compensated (see annexes on page 57 for more details). [2,3]

Biodiversity loss refers to a large-scale and rapid decline in biodiversity. [4]

Nature-based solutions refer to solutions that support ecosystem services in generating benefits to people and nature. They refer to practices, policies and processes that improve the ecological status of nature while contributing to human well-being, and that are economically viable, especially in the long term (see annexes on page 58 for more).[5,6]

Nature-positivity means halting and reversing biodiversity loss so that the impact on nature becomes positive. It is achieved through improving the health, abundance, diversity and resilience of species, ecosystems, and natural processes.[7]

Net positivity means that caused impacts on biodiversity are balanced or outweighed by measures according to the mitigation hierarchy, so that no loss remains, and the gain exceeds the loss.[3]

Regenerative actions are solutions that renew the functionality of already degraded ecosystem services and enhance the ecological state of impoverished habitats. Regenerative actions and regenerative business broaden the concept of sustainability and corporate responsibility. Regenerative activities aim to improve the state of nature and ecological state of habitats compared to the baseline.[8]

[1] Millennium Ecosystem Assessment, 2005
[2] Arlidge et al., 2018
[3] IUCN, 2017
[4] Ministry of the Environment, 2022B
[5] European Commission, 2015
[6] Nature Based Solutions Guidelines Info, n.d.
[7] Nature Positive Initiative, n.d.
[8] Hellström, 2023

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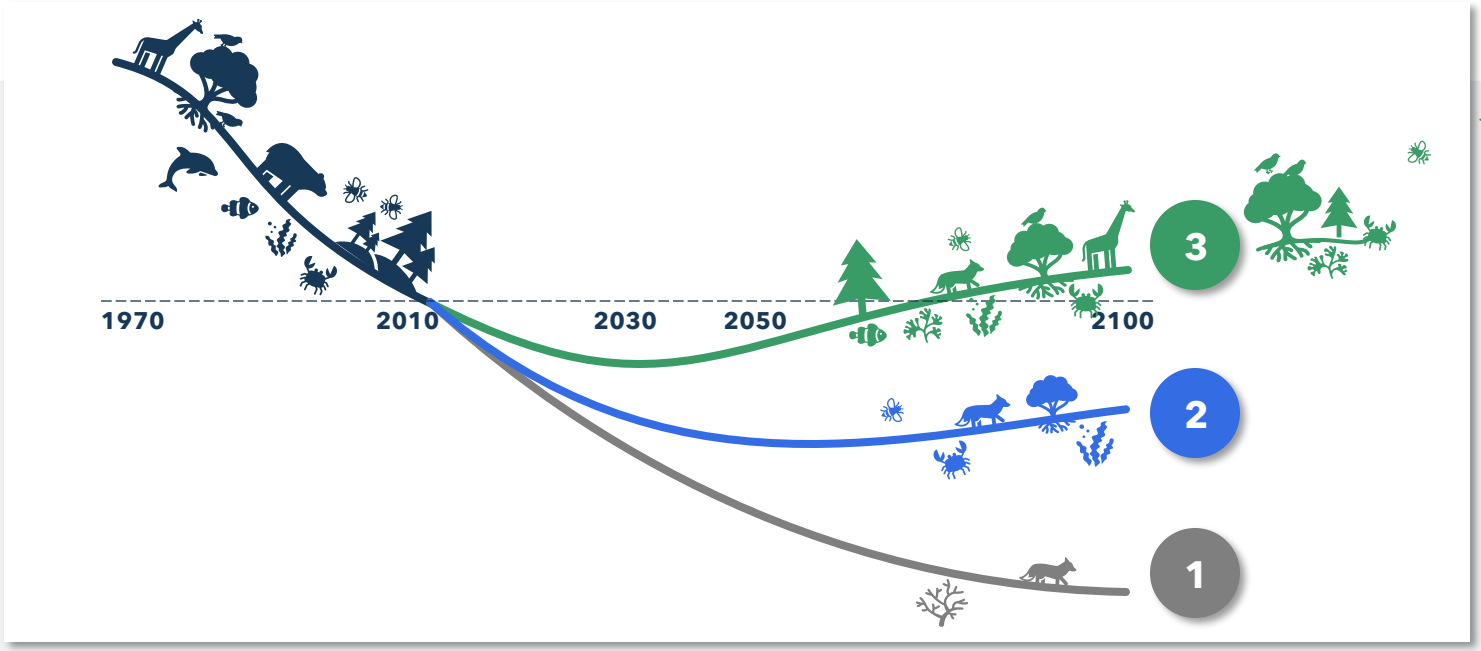
Executive Summary

Systemic change is needed to reverse biodiversity loss[1]



1 Continuing current trends "business as usual"

- 1/3 of nature on Earth being destroyed by 2050
- 6th mass extinction underway
- 1,000,000 species at risk of extinction
- Biodiversity loss is a systemic risk to business and society

2 Increasing nature conservation and restoration

- Conservation and restoration do not address the root causes of biodiversity loss, such as unsustainable consumption
- Conservation alone does not provide sufficient incentives and markets for companies to change their practices

3 Nature-positive transition

- Nature-positivity is a new business model that not only avoids harm but also supports and regenerates nature
- Both the UN and the EU have set a target of halting biodiversity loss by 2030, which will guide the development of Finnish legislation
- Systemic change brings significant opportunities for the construction industry

[1] Based on: CBD, 2022A; World Economic Forum, 2020; Ministry of Environment, 2022B; CBD, 2022B; Figure based on Leclère et al, 2022 ; Leclère et al., 2020

The construction industry must aim for net positivity throughout the value chain

Target 2030: The construction industry contributes to halting biodiversity loss and restoring biodiversity, so that by 2030, nature is visibly and measurably on the path to recovery.[1]

- Halting biodiversity loss is seen as a strategic topic for the construction industry, affecting business models and practices.
- The construction industry is committed to multidisciplinary cooperation and contributes to meeting international and national biodiversity targets.
- The construction industry seeks to provide tools to halt biodiversity loss and promote biodiversity in the built environment and along the construction sector's value chains.
- The construction industry aims to develop and increase proactive stakeholder cooperation in order to create a favourable environment for generating positive impacts on nature.

Our aim is to support these...

Supporting services
e.g. oxygen production, photosynthesis, soil formation, carbon sequestration, water, nitrogen, carbon and nutrient cycles

Regulating services
e.g. groundwater formation, plant pollination, erosion and climate regulation, mitigation and prevention of floods and extreme weather events

Provisioning services
e.g. plants, fungi, animals, fresh water, fibres (e.g. wood and cotton), building materials, minerals, energy and fuels, medicines

Cultural services
e.g. landscape and recreational values, mental and physical well-being, source of science, art and education

= ecosystem services[1]

...and reduce these

Land and sea use changes
e.g. exploited areas and changes in their ecological state

Resource use
e.g. plants, wood and other natural fibres, water, soil materials, minerals and metals

Climate change
e.g. greenhouse gas emissions and loss of carbon sinks

Pollution
e.g. waste, emissions, microplastics, noise and light pollution and other disturbances

Invasive species
e.g. cultivation and breeding of alien species, spread of alien species e.g. through logistics

= direct drivers of biodiversity loss[2]

[1] Based on the Millennium Ecosystem Assessment, 2005, a breakdown of ecosystem services
[2] Based on IPBES, 2019 definition of direct drivers of habitat loss

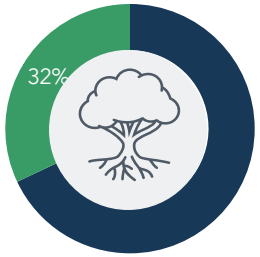
The baseline: the construction industry's impacts on biodiversity in Finland

The impact on biodiversity loss[1]

6.

- Of all industries in Finland, the construction industry has the sixth largest impact on biodiversity loss (2015, based on modelling that is being updated in late 2023).
- Most of the biodiversity loss caused by the construction industry is domestic, but about a third is estimated to occur abroad.

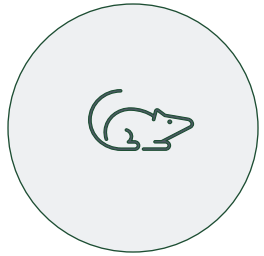
The use of natural resources



The use of raw materials

- Raw materials used in construction, including the value chain (RMR): 116 Mt (2015) [1]
- Total use of raw materials in the Finnish economy (RMR): 343 Mt (2015) [2]

Invasive species



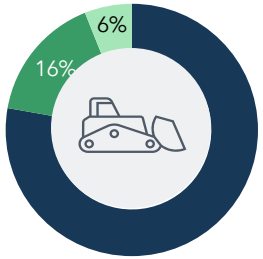
- 26 harmful alien species or groups of species have been identified in Finland [3]
- Construction activities, such as the transport of soil and organic materials, can cause the spread of invasive species[4]

Changes in land and sea use

5.

Land use

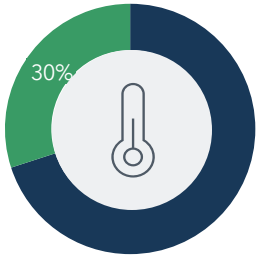
- The size of the built environment: 10,000 km [2] (2018) [5]
- The construction industry has the fifth largest impact on land use in Finland (2015) [1]



Endangered habitats [6]

- Construction activities have a significant impact on 12 habitats and a relative impact on 31 habitats (2018)
- There are 192 threatened habitats in Finland (2018)

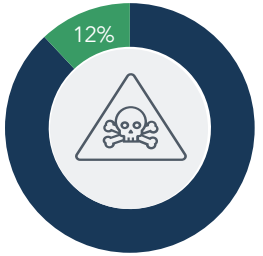
Climate change [7]



Carbon footprint

- The carbon footprint of the built environment (including the use phase): 17 Mt CO_2e (2018)
- The carbon footprint of Finland as a whole: 56.5 Mt CO_2e (2018)

Pollution [8]

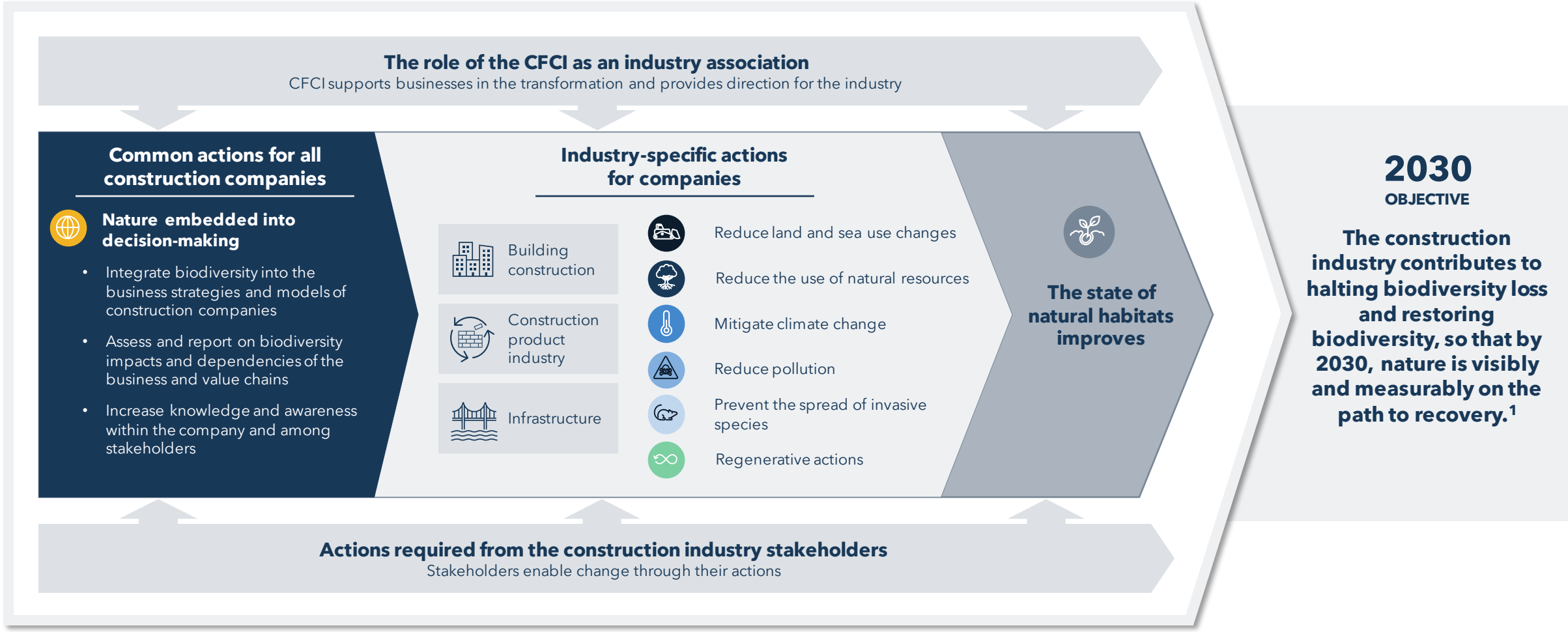


Waste

- Direct waste from construction: 13,700 Mt (2020)
- Total waste from Finnish industries: 113,579 Mt (2020)

[1] Ruokamo et al., 2023
[2] Nissinen & Savolainen, 2019
[3] Huusela-Veistola et al., 2020
[4] Viertiö et al., 2022
[5] Finnish Environment Institute, 2018
[6] Kontula & Raunio, 2018
[7] Laine et al., 2020
[8] Statistics Finland, 2021

The Biodiversity Roadmap demonstrates the required actions for the construction industry and its stakeholders



[1] The target is based on the definition of nature positivity as defined in Nature Positive Initiative, n.d.

The progress of the roadmap is monitored by indicators of change in the industry

The indicators have been designed in such a way that they can be used as baseline data or monitored by CFCI through a member survey. It should be noted that the selected indicators demonstrate current trends on a general level, and more comprehensive indicators can be added as knowledge base and data availability improve.

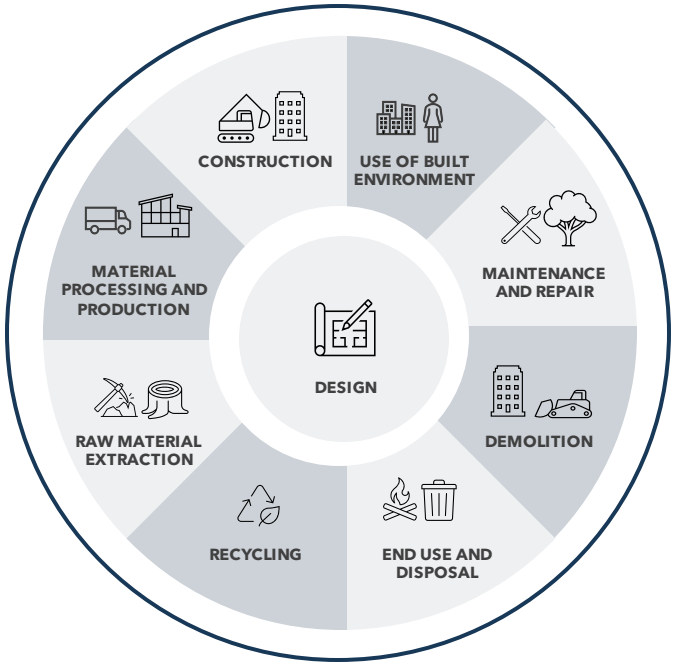
Subject:	Indicator	Unit
Nature embedded into decision-making	• The proportion of companies which have integrated biodiversity into business strategies and models • The proportion of companies that conduct a comprehensive assessment and reporting of biodiversity impacts along the value chain • The proportion of companies stating that knowledge and awareness about biodiversity increases	• % • % • %
Land and sea use changes	• The area of built environment subject to restoration increases • The hectares of ecological compensation under the Nature Conservation Act by the construction industry increases • The area of the built environment is monitored	• km² • hha • km²
Use of natural resources	• The recycling rate of construction and demolition waste increases • The use of primary raw materials in construction value chains decreases (i.e. not including circular raw materials (RMR))	• % • Mt
Climate change	• Annual net greenhouse gas emissions are on track to fall to 3.7 $MtCO_2e$ by 2035 (Low-carbon Roadmap: Low-carbon built environment in 2035)	• Mt COe_2
Pollution	• Waste generated by the construction industry decreases (chemical waste, metal waste, paper and cardboard waste, wood waste, animal and vegetable waste, sludge, mineral waste, other waste)	• Mt
Invasive species	• The proportion of construction projects for which a control and management plan for invasive species is made increases	• %
Regenerative actions	• The share of construction projects that improve the state of local nature increases	• %
State of natural habitats	• The number of habitats to which construction has high and relatively high impacts decreases	• Pcs

The construction industry has a key role in creating a nature-positive future and society

The construction industry can contribute to slowing down biodiversity loss through various means

- Nature as infrastructure and an ecosystem service provider
- Nature-friendly land use planning
- Compact built environment
- Sustainable architecture and design
- Low carbon, and energy efficiency
- Circular economy and material efficiency
- Development of the existing built environment and of adaptability
- Handling and selecting of chemicals
- Managing invasive species
- Ecological compensation or nature credits

A holistic view of the value chain and cooperation are key



Biodiversity impacts occur along the entire value chain – managing biodiversity impacts requires cooperation between all actors.

Systemic change requires cooperation between industries

Cooperation between the construction industry and other industries create solutions for a sustainable future:

- **Energy sector** - Integration of energy infrastructure into the built environment and nature-positive renewable energy production
- **Mining** - Resource efficiency, reuse of materials, use of side streams as building materials, and nature-friendly mining infrastructure
- **Forestry** - Regenerative forestry and restoration services
- **Agriculture** – Infrastructure for regenerative agriculture, implementation of food production in cities and urban areas
- **Manufacturing and recycling industry** - Resource efficiency, material recycling, side streams and the development of fossil-free products
- **Financial sector** - Financing nature-positive construction and infrastructure

Restoring biodiversity creates value for society and opportunities for companies in the construction industry

The nature-positive transition

brings significant business opportunities, as the construction industry can provide solutions for a nature-positive built environment, energy, and lifestyle.

Transitioning towards nature-positivity in built environment could create more than $3,000 billion of annual global business benefits and 117 million new jobs by 2030.[1]

Opportunities created by the nature-positive transition

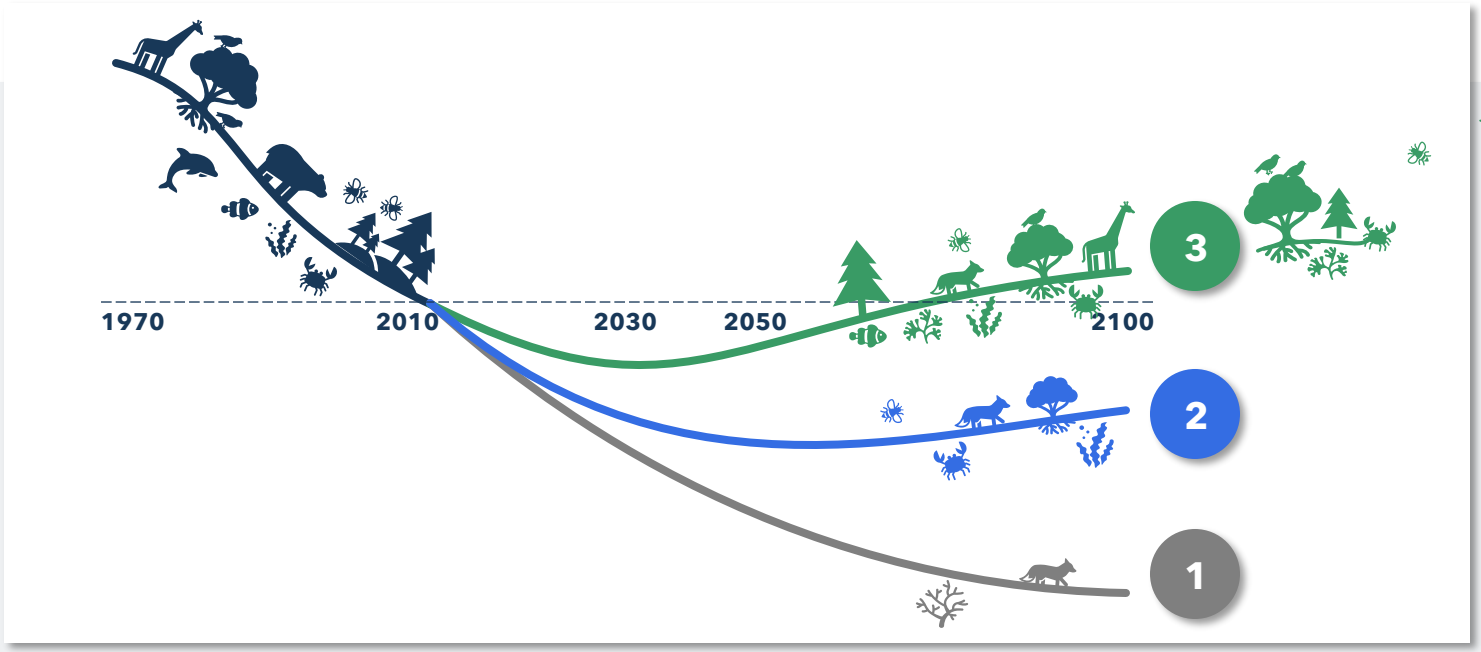
- New nature-positive solutions and markets
- Resource efficiency, raw material, and cost savings
- Risk management related to environmental stresses, such as stormwater and extreme temperatures
- Improves supply chain management and resilience
- Increases attractiveness and desirability of properties
- Promotes people's well-being and health, and improves their relationship with nature
- Ensures more affordable financing
- Creates and maintains interesting business partnerships

[1] World Economic Forum, 2020

1. Nature-positive transition and the biodiversity target of the Finnish construction industry

1.1 The scenarios for biodiversity loss
1.2 The role and opportunities for the construction industry in the nature-positive transition
1.3 The future vision of the nature-positive construction industry
1.4 The biodiversity target of the Finnish construction industry
1.5 The guiding principles for the biodiversity work

Systemic change is needed to reverse biodiversity loss[1]



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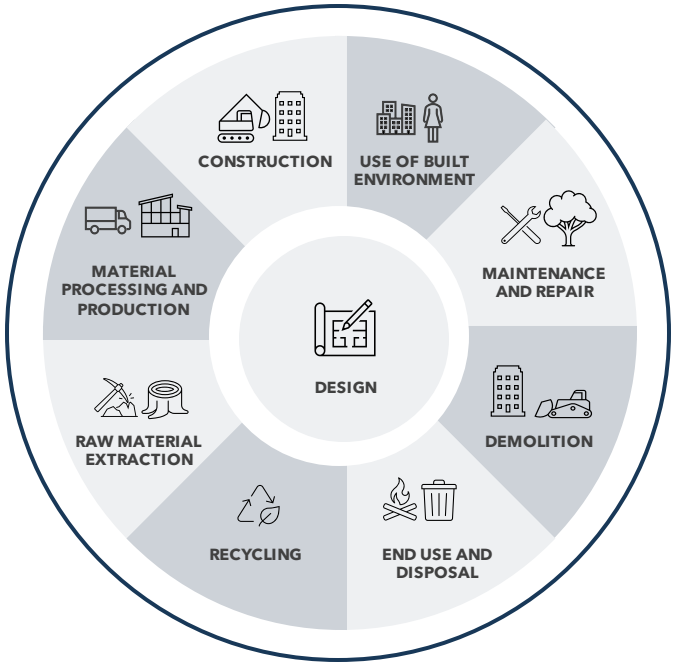

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[1] World Economic Forum, 2020

The future vision: Biodiversity is highly valued and acknowledged among businesses, value chains and the society

The future vision represents a possible view of a desirable future, where biodiversity loss has been halted. It is a vision outlined by CFCI members and stakeholders representing the future opportunities that may unfold throughout construction value chains.

Finland and the EU have a **coherent legal framework for the construction industry** that has biodiversity considerations integrated

Habitat impacts and biodiversity are considered in a comprehensive way in land use planning and at every stage of a project's life cycle

New procurement models support and encourage the development of nature-positive solutions and new business models

Biodiversity is integrated into the construction industry's **education programmes and curriculum**

The industry has developed **well-established methods for impact monitoring and ecosystem accounting,** and is also able to model and manage delayed impacts

Financial incentives, subsidies, taxes and public procurement support decision-making that promotes biodiversity

There is a comprehensive knowledge and understanding of biodiversity among construction industry actors and stakeholders

Biodiversity is considered **in the criteria for raw material sourcing**

Spatial planning and **construction takes place primarily in areas already in use** and areas with minimal use are restored and returned to their natural state

Users of the built environment recognise the value of biodiversity

The future vision: The built environment and practices in raw material extraction for construction support local biodiversity

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The way if living has changed to conserve resources and allow more space for nature

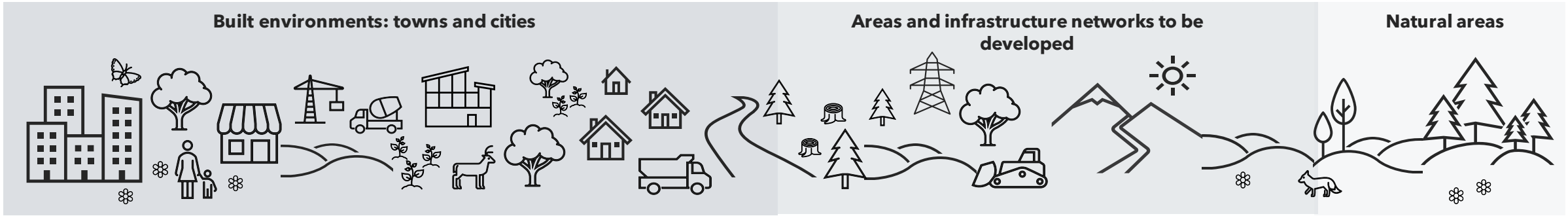
Urban green areas include **a diverse range of local natural plant species, deadwood and wetlands**

Construction and maintenance respect the surrounding nature of the sites

Ecological corridors are strengthened, and **fragmentation of natural habitats is avoided**

Raw material extraction practices respect and preserve surrounding nature and environment

Conservation and improved ecological state of natural areas



Nature-based solutions promote biodiversity and increase the resilience of the built environment to extreme weather conditions

Solutions for sustainable mobility, including the development of public transport and other transport networks

Citizens' relationship with nature and well-being improves

Resource efficiency and minimised consumption of virgin raw materials through circular economy solutions saves and restores nature

Restorative and regenerative measures to increase the ecological state of existing sites

Construction services are used to restore nature, for example by restoring streams or marshes

Green roofs and other green structures and corridors **increase urban green space and urban biodiversity**

Grassland and meadow habitats exist within urban areas, cities and roadside verges

Existing building stock and infrastructure is developed and repurposed to extend their life cycle

New building practices prevent disturbances to nature **and the presence of invasive species**

The construction industry must aim for net positivity throughout the value chain

Target 2030: The construction industry contributes to halting biodiversity loss and restoring biodiversity, so that by 2030, nature is visibly and measurably on the path to recovery.[1]

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[1] Based on the Millennium Ecosystem Assessment, 2005, a breakdown of ecosystem services
[2] Based on IPBES, 2019 definition of direct drivers of habitat loss

Value chain thinking, mitigation hierarchy and net positivity are the guiding principles for restoring biodiversity[1]

Value chain thinking

Biodiversity impacts and dependencies in the construction industry are addressed across the value chain. The most relevant impacts for each activity are identified along the value chain, rather than focusing on the direct impacts of the activity alone.

The mitigation hierarchy

The management of biodiversity impacts in the construction industry follows a mitigation hierarchy, where negative impacts are avoided, reduced, restored, and lastly, compensated. (see annexes on page 57 for more details).

Net positivity

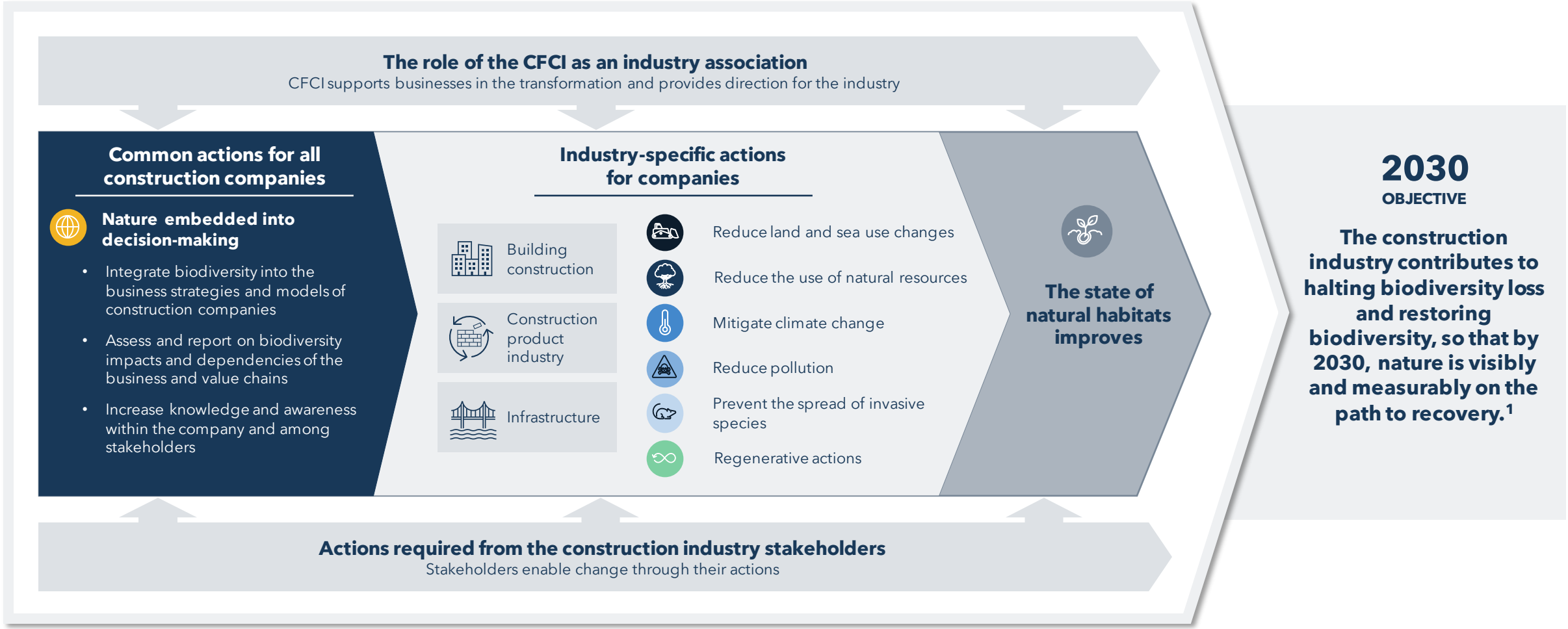
The construction industry aims for systemic change, minimising negative impacts on nature and maximising positive ones. It is likely that not all negative impacts will be eliminated within the timeframe of the roadmap. The construction industry will therefore aim for net positivity. It means identifying where positive biodiversity impacts can be created to turn overall impacts into net positive.

[1] Guiding principles based on CFCI's study Biodiversity in the construction industry, Viertiö et al., 2022

2. Key actions to reach the biodiversity target

2.1 The target, key themes and actions of the Biodiversity Roadmap
2.2 Actions required from the construction industry stakeholders
2.3 The role of the CFCI as an industry association
2.4 Common actions for all construction companies
2.5 Industry-specific actions for companies

The Biodiversity Roadmap demonstrates the required actions for the construction industry and its stakeholders



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The nature-positive transition requires enabling actions from stakeholders

The construction industry cannot achieve the nature-positive transition and halt biodiversity loss without an operating environment that enables the change. This requires actions not only from construction companies and CFCI, but also from key stakeholders. In addition, collaboration across industries is highlighted as an enabler of the nature-positive transition.

Planning and permitting

The state, provinces, and municipalities are expected to form and implement regional land use policies so that the overall state of Finland's nature does not deteriorate, and areas of high environmental value are not degraded.

New criteria should be introduced in the land use planning, zoning and permitting to support the development, adoption, and uptake of biodiversity-friendly solutions.

Design and architecture

The design of buildings and infrastructure must consider the impacts of their entire life cycle. The design should also enable and promote circular economy solutions, saving natural resources, extended life cycles, renewing and repurposing existing buildings and infrastructure rather than new construction, and preserving existing natural areas.

Also, increasing the functional diversity of nature-based solutions and ecosystems should be a key element in design and architecture.

Public and private procurement

In tendering and procurement, contracting authorities should adopt criteria that favour construction solutions that respect nature and promote biodiversity.

Collaboration in procurement models should be increased. In the early phases of procurement, more discussions are needed to find and enable innovative solutions and processes for managing biodiversity impacts. Procurement criteria should better enable experimental solutions and reward the gaining of positive biodiversity impacts.

Legislation and decision-makers

EU and Finnish legislation and incentives must be developed to support the construction industry's ability to offer nature-positive solutions and enable national and international efforts to reduce the consumption of natural resources and land use.

The national data collection and data bases for nature data should be improved to support evidence-based decision-making and monitoring.

Financial institutions

Financial institutions must be aware of the biodiversity impacts of the project and/or company they fund. Biodiversity impacts should be assessed and reported.

Financing conditions should include criteria and requirements to promote biodiversity. Funding should be directed towards businesses, projects and investments that promote the nature-positive transition.

Users of the built environment

Users of the built environment need to adapt and change their expectations and ways of living. Users play a major role in the development of the built environment; thus, it is important to demand biodiversity actions from housing and infrastructure providers. Changes to the status quo can include e.g., leaving green areas in their natural state instead of regular maintenance, repurposing existing buildings, and developing more compact built environments incl. communal living, sharing spaces and the favouring of public transport.

The CFCI supports companies in the transition and promotes the development of the operating environment through stakeholder cooperation

The role of the construction industry association CFCI is to help drive the systemic change by bringing together companies, decision-makers and other stakeholders to develop solutions and approaches that promote biodiversity.

Supporting change in member companies

- **Communicating the need for change and the importance of biodiversity,** for example via the Biodiversity Roadmap.
- **Sharing information on different solutions and approaches to promote biodiversity** both in Finland and internationally.
- **Promoting discussion and cooperation between members** on the management of biodiversity impacts in value chains and the implementation of the roadmap.
- **Supporting cooperation between members and stakeholders** in the implementation of the roadmap, e.g. through events and workshops.
- **Supporting members in adopting new reporting requirements** and find indicators that are appropriate for companies.
- **Providing training** for companies and stakeholders to increase skills.
- **Promoting learning and improved knowledge**, e.g. the production and publication of articles, studies, and theses on biodiversity.

Driving systemic change by influencing regulation, barriers, and incentives

- **Requiring the use of the mitigation hierarchy in planning and implementing land use** so that the state of Finland's nature does not deteriorate. Promoting the integration of biodiversity into spatial planning, incl. the intactness of habitats and ecological corridors, as well as identifying possible synergies between different projects (e.g.in circularity).
- **Promoting the prerequisites for circular economy and other nature-friendly solutions** by identifying and removing the barriers caused by Finnish and EU-level regulation and permitting. For example, promoting changes in land use permitting so that already developed areas can be utilized as much as possible to avoid development of new areas.
- **Promoting the development of incentives, subsidies and regulation for the construction industry and other industries to ensure** that biodiversity impacts are considered by all actors.
- **Developing procurement models with stakeholders** to include discussion on finding and enabling innovative solutions and processes for managing biodiversity impacts. Through collaborative procurement models, ensuring that the procurement criteria for public and private tenders better enable experimental solutions and reward the gaining of positive biodiversity impacts whilst promoting competition.
- **Promoting cooperation with other industries** on cross-industry biodiversity issues.
- **Communicating** about biodiversity actions and their benefits to **users of the built environment and other stakeholders** to promote attitude change.

Enabling data-driven decision-making

- **Increasing stakeholder awareness of the linkages between business activities and biodiversity impacts. In addition, providing information on the concrete impacts of businesses' actions to halt biodiversity loss**. Contributing to the enhancement of national and international knowledge bases and statistics regarding the construction industry's impact and dependency on nature, as well as those of other industries.
- **Advocating for clear and actionable national and EU-level targets** that businesses can easily understand and implement.
- **Contributing to the development and implementation of harmonised assessment and measurement methods** for assessing biodiversity impacts and integrating data into decision-making models.
- **Monitoring the progress of biodiversity work in the construction industry** and developing monitoring based on public national data and companies' reports (e.g. CSRD reporting).
- **Contributing to building a better understanding of the interdependencies of biodiversity impacts between industries.**

Construction companies need to integrate biodiversity into decision-making and business development

Construction companies have the opportunity to develop new business models and practices that enable the nature-positive transition. This requires nature to be integrated into decision-making and business development.

Nature embedded into decision-making

Integrate biodiversity into the business strategies and models

Construction companies should integrate biodiversity into their business strategies and into their business models.

Biodiversity should be on the agenda of steering groups and management boards.

Construction companies should follow the mitigation hierarchy in all their operations and decision-making processes.

Assess, report, and manage biodiversity impacts of a company and its value chain

Construction companies should assess and report on their dependencies and impacts on nature.

Companies should adopt frameworks and set targets such as SBT for Nature[1] and TNFD.[2]

Biodiversity impacts should be included in procurement criteria and in supplier assessments and audits.

A biodiversity assessment and its results should be integrated into business operations and decision-making. A mandatory ecological assessment and EIA requirements should be complemented with a voluntary biodiversity assessment (see annexes for more details).

Increase the knowledge and awareness of both internal and external stakeholders

Companies should be active in various business networks, communities, and organisations, both learning and sharing knowledge about biodiversity.

Companies should promote the production and publication of articles, studies and theses on biodiversity.

Companies should openly share information on different solutions and approaches both in Finland and internationally.

[1] Science Based Targets for Nature, n.d.
[2] Taskforce on Nature-related Financial Disclosure, n.d.

Construction companies need to develop business models and practices that enable the nature-positive transition

Building construction | **Construction product industry** | **Infrastructure**

Industry-specific actions for companies to manage their impacts on nature

Avoiding and reducing impacts on biodiversity offer business opportunities.

Minimising damage to nature and maximising positive impacts on biodiversity through actions that are categorised according to the direct drivers of biodiversity loss:

- **Reduce land and sea use changes**
- **Reduce the use of natural resources**
- **Mitigate climate change**
- **Reduce pollution**
- **Prevent the spread of invasive species**

Construction companies can develop regenerative approaches and provide solutions that renew and support ecosystem services and increase the ecological state of degraded habitats.

Regenerative actions and regenerative business[1] broaden the concept of sustainability and corporate responsibility. Regenerative actions improve biodiversity and ecological values compared to the baseline.

- **Regenerative actions**

Industry-specific actions have been ranked according to the mitigation hierarchy principle.

The ranking has been made on an industry level and therefore it may differ from company to company depending on the core business.

The prioritization principle of the mitigation hierarchy is:

1. **Avoid**
2. **Minimise**
3. **Restore**
4. **Compensate**

[1]For more information on biodiversity impacts, drivers of habitat loss, mitigation hierarchy, net positivity and nature-positive solutions, see the annex section on page 36 onwards.

Building construction[1]

Implementing industry-specific actions requires support from stakeholders and society. Listed actions apply to the whole value chain unless otherwise specified.

Mitigation hierarchy:	Reduce land and sea use changes	Reduce the use of natural resources	Mitigate climate change	Reduce pollution	Prevent the spread of invasive species
Avoid	Identify threatened or endangered habitats. Avoiding harm and creating positive impacts guide decision-making. Use biodiversity criteria for site selection. Limit the impacted area in construction, e.g. protect surrounding vegetation, build on already exploited areas or renewing and repurposing the existing building stock. Combine projects and find synergies between projects to reduce land use.	Design and construct buildings with a focus on extended life cycle, repairability, biodiversity-friendly maintenance and adaptability. Favour reusable building components and products made from recycled raw materials. Use biodiversity criteria for raw material sourcing. Ensure the durability, recyclability, and reusability of the materials.	Ensure energy and carbon efficiency of the building during the whole life cycle. Favour low carbon options in procurement of construction products, elements, and services.	Avoid the use of substances of very high concern. Substitute and avoid the use of harmful substances, both in own processes and in procurement and the value chain.	Implement policies and measures to prevent the spread of harmful invasive species in procurement, freight, and logistics. Require invasive species prevention policies from suppliers. Map potential harmful invasive species on the site and potential activities that may spread those species.
Minimise	Minimise the transport of soil and maximise synergies between projects by planning soil use and storage in advance.	Provide and develop solutions to extend buildings' life cycles, including reuse, repairing, repurposing, and easy and cost-effective maintenance. Ensure the recycling of raw materials on site already during the project. Ensure recyclability and reuse of raw materials at the end of the life cycle. Address these aspects already in the design and construction phase.	Use construction methods and practices that avoid the release of carbon from the soil. Preserve existing vegetation in sites to safeguard carbon sinks.	Schedule construction, maintenance, and other activities outside of breeding season and blooming times of local species to avoid disturbances. Treat waste, dust, and harmful substances in a way that they do not harm the nature. Reduce the generation of microplastics by minimising plastic waste and promoting recycling processes. Avoid the use of large window and glass surfaces and marked glass surfaces to avoid bird-window collisions. Optimise e.g., lighting frequency, timing and targeting in factories and excavation sites to minimise effects of lighting on different species. Minimise noise pollution by using e.g., noise absorbers or silencers.	Remove harmful invasive species and establish policies preventing them to spread e.g., in soil transfers.
Restore	Save and strengthen ecological corridors and surrounding nature and create biodiversity-friendly green spaces. Integrate nature-based solutions in projects and the built environment. Execute restorative actions in the built environment and in the value chain. Address prerequisites for biodiversity-friendly maintenance and restoration when planning and constructing buildings.		Maintain and create green spaces and wetlands in the built environment to protect against extreme weather conditions such as heat waves and heavy rainfall.	Remove pollutants from soil, air, and water. Pay special attention to soil transfers, treatment and remediation.	Integrate an on-going process for invasive species prevention and control.
Compensate	Compensate residual harm to nature after following the mitigation hierarchy. Execute compensation according to the generally accepted and verifiable ecological compensation process.		Execute compensation.		

[1] The tools are examples collected from CFCI members in the workshops of the Biodiversity Roadmap.

Innovative actions

Construction product industry[1]

Implementing industry-specific actions requires support from the stakeholders and society. Listed actions apply to the whole value chain unless otherwise specified.

Mitigation hierarchy:	Reduce land and sea use changes	Reduce the use of natural resources	Mitigate climate change	Reduce pollution	Prevent the spread of invasive species
Avoid	Identify threatened or endangered habitats. Avoiding harm and creating positive impacts guide decision-making. Avoid the use of new areas in extraction and production of raw materials, at least avoid areas with high ecological values. Utilise already developed areas as far as possible in order to avoid development of new areas Provide products and services that restore biodiversity and reduce land use: e.g. green structures and building elements, methods and devices that reduce land use and save nature.	Design products with a focus on extending the life cycle: e.g., durability, reusability, repairing, easy-maintenance and adaptability. Address life-cycle thinking in material choices: e.g., durability, and end-of-life recycling and reuse opportunities. Favour recycled raw materials and extended life cycle in product development. Use biodiversity criteria for raw material sourcing.	Prefer low carbon options in procurement of raw materials and components. Ensure energy and carbon efficiency of the product and its effects on buildings' life-cycle emissions and energy efficiency.	Avoid the use of substances of very high concern. Substitute and avoid the use of harmful substances, both in own processes and in procurement and the value chain. Innovate solutions for window and glass surfaces that will reduce bird-window collisions.	Implement policies and measures to prevent the spread of harmful invasive species in procurement, freight and logistics. Require invasive species prevention policies from suppliers. Map potential harmful invasive species on the site and potential activities that may spread those species.
Minimise	Minimise land use and maximise synergies in land use between projects and throughout the entire life cycle. Minimise the harm caused to the surrounding nature and ecological corridors. Minimise the transport of soil and maximise synergies between projects by planning soil use and storage in advance.	Provide and develop products and services to extend buildings' life cycles. Provide products and services that save natural resources: e.g., rainwater harvesting. Innovate products that enable repairing instead of demolition and reconstruction. Increase material efficiency and the use of side streams in production	Improve the energy efficiency of production processes and reduce caused carbon emissions.	Treat waste, dust, and harmful substances in a way that they do not harm nature. Reduce the generation of microplastics by minimising plastic waste and promoting recycling processes. Optimise e.g., lighting frequency, timing and targeting in factories and excavation sites to minimise effects of lighting on different species. Minimise noise pollution by using e.g., noise absorbers or silencers. Schedule e.g., construction of a new factory or raw material extraction activities outside of breeding season of local species to avoid disturbances.	Remove harmful invasive species and establish policies preventing them to spread e.g., in soil transfers.
Restore	Establish long-term restoration and management plans for extraction and production sites.	Turn waste streams into new materials.	Provide products and services that maintain, support, or create carbon sinks.		Integrate an on-going process for invasive species prevention and control.
Compensate	Compensate residual harm to nature after following the mitigation hierarchy. Execute compensation according to the generally accepted and verifiable ecological compensation process.		Execute compensation.		

[1] The tools are examples collected from CFCI members in the workshops of the Biodiversity Roadmap.

Innovative actions

Infrastructure[1]

Implementing industry-specific actions requires support from the stakeholders and society. Listed actions apply to the whole value chain unless otherwise specified.

Mitigation hierarchy:	Reduce land and sea use changes	Reduce the use of natural resources	Mitigate climate change	Reduce pollution	Prevent the spread of invasive species
Avoid	Identify threatened or endangered habitats. Avoiding harm and creating positive impacts guide decision-making Limit the impacted area in construction, e.g. protect surrounding vegetation, build on already developed areas or minimise land use changes. Save and strengthen ecological corridors and the surrounding nature in cooperation with stakeholders. Combine projects and find synergies between projects to reduce land use.	Design and construct infrastructure with a focus on extended life cycle, repairability, biodiversity-friendly maintenance and adaptability. Ensure recyclability and reuse of raw materials at the end of the life cycle. Address these aspects already in the design and construction phase. Ensure the durability, recyclability, and reusability of the materials. Favour reusable building components and products made from recycled raw materials. Ensure the recycling of raw materials on site already during the project.	Ensure energy and carbon efficiency of the building during the whole life cycle. Prefer low carbon options in procurement of construction products, elements and services.	Avoid the use of substances of very high concern. Substitute and avoid the use of harmful substances, both in own processes and in procurement and the value chain.	Implement policies and measures to prevent the spread of harmful invasive species in procurement, freight and logistics. Require invasive species prevention policies from suppliers. Map potential harmful invasive species on the site and potential activities that may spread those species.
Minimise	Minimise the transport of soil and maximise synergies between projects by planning soil use and storage in advance.	Provide and develop solutions to extend infrastructure's life cycle, incl. reuse, repairing, repurposing, and easy and cost-effective maintenance.	Use construction methods and practices that avoid the release of carbon from the soil.	Treat waste, dust, and harmful substances in a way that they do not harm nature. Schedule construction, maintenance, and other activities outside of breeding season and blooming times of local species to avoid disturbances. Reduce the generation of microplastics by minimising plastic waste and promoting recycling processes. Avoid the use of large window and glass surfaces and marked glass surfaces to avoid bird-window collisions. Optimise e.g., lighting frequency, timing and targeting in factories and excavation sites to minimise effects of lighting on different species. Minimise noise pollution by using e.g., noise absorbers or silencers.	Remove harmful invasive species and establish policies preventing them to spread e.g., in soil transfers.
Restore	Integrate nature-based solutions in projects and built environment. Execute restorative actions in the constructed areas and infrastructure.		Provide solutions that contribute to maintaining, supporting or creating new carbon sinks Maintain and create new green spaces and wetlands in the built environment to protect against extreme weather events such as heat waves and heavy rainfall.	Remove pollutants from soil, air and water. Pay special attention to soil transfers, treatment and remediation.	Integrate an on-going process for invasive species prevention and control.
Compensate	Compensate residual harm to nature after following the mitigation hierarchy. Execute compensation according to the generally accepted and verifiable ecological compensation process.		Execute compensation.		

[1] The tools are examples collected from CFCI members in the workshops of the Biodiversity Roadmap.

Innovative actions

3. Monitoring and measuring the progress of the Biodiversity Roadmap

3.1 Development of the measurement and monitoring
3.2 Indicators for the progress of the roadmap
3.3 Current status of the indicators
3.4 Monitoring implementation

Measuring and monitoring biodiversity impacts in the construction industry requires significant knowledge base improvements

As the availability and reliability of biodiversity impact data improves, the selection of the indicators should be expanded and refined.

In the future, the set of selected indicators can be supplemented to monitor changes more comprehensively. However, this will require a significant improvement of the knowledge base and joint development by various actors. Initially, the data for the indicators can be collected in Finland, but in the future measurement and monitoring should be extended beyond national borders and to global value chains.

Challenges in measuring biodiversity

No single metric: at least for the time being, it is not possible to monitor impacts on biodiversity with a single metric.

Complex causal relationships: linking specific human actions to impacts and changes in nature is often challenging.

Delays in impact materialisation and impact data: there is already a delay between human activities and impact materialisation, and there is often a delay in the publication of nature data, too.

Uncertainties related to the selected indicators

There is not comprehensive or up-to-date data on businesses' biodiversity impacts at company or national level, and thus the indicators monitoring progress are based on a partially incomplete data and knowledge base.

Existing information on biodiversity impacts is often based on studies carried out on individual projects, from a single perspective or at a single point in time.

The set of indicators has had to be limited according to the available data points, and thus the indicators do not cover all biodiversity impacts of the construction industry.

Required improvements in data availability

National efforts: for example, the Finnish Environment Institute, the Natural Resources Institute Finland and the Ministry of the Environment have highlighted the need to improve the coverage and accessibility of national nature data.[1]

Comprehensive information from individual companies: in addition to public national data, CFCI should be able to execute monitoring based on the data reported by individual companies.

Increasing sustainability reporting requirements: companies will be required to report more comprehensively about their impacts on nature, including land use and water consumption.

[1] Finnish Environment Institute, Finnish Natural Resources Institute and Ministry of the Environment, n.d.

CFCI can immediately start monitoring the selected indicators

Definitions for the selected indicators:

Indicators have been set for all **five direct drivers of biodiversity loss:**

- **Land and sea use changes:** The emphasis is on restoring and regenerating nature. The area of the built environment will also be monitored.
- **Resource use:** The indicators will monitor the consumption of primary resources and the development of circular economy.
- **Climate change:** The indicator is aligned with the industry's Low-carbon Roadmap.
- **Pollution:** The indicator chosen for pollution is the amount of waste generated. Pollution could be measured by hundreds of indicators relating to harmful substances and disturbances, so the indicator chosen is a generalisation.
- **Invasive species:** No aggregated data on invasive species was identified in the context of the construction industry. Therefore, data for this indicator will be collected via a member survey.

Nature embedded into decision-making: Actions will be measured through a member survey carried out by CFCI.

Regenerative actions: In addition to minimising negative impacts, the indicators also monitor regenerative actions taken by the industry.

State of natural habitats: The progress of the overall biodiversity actions will be monitored by assessing the improvement in the state of natural habitats.

Selected indicators measure change at the construction industry level, based on public national data and industry-level data.

The aim was to keep the set of indicators compact and easy to understand.

Indicators were selected if baseline data already existed or if CFCI can collect the data through a survey.

The set of indicators is not profound and does not cover all possible and relevant aspects. The indicators can be complemented as the data and knowledge base improves.

- The selected indicators do not cover all biodiversity impacts of the construction industry.
- In addition, the indicators do not yet adequately capture the impact of the whole value chain, but as the data and knowledge base improves, the measurement should be extended to the value chain.

[1] Based on IPBES, 2019 definition of direct drivers of biodiversity loss
[2] Ruokamo et al., 2021
[3] Oberle et al., 2019

The progress of the roadmap is monitored by indicators of change in the industry

The indicators have been designed in such a way that they can be used as baseline data or monitored by CFCI through a member survey. It should be noted that the selected indicators demonstrate current trends on a general level, and more comprehensive indicators can be added as knowledge base and data availability improve.

Subject:	Indicator	Unit
Nature embedded into decision-making	• The proportion of companies which have integrated biodiversity into business strategies and models • The proportion of companies that conduct a comprehensive assessment and reporting of biodiversity impacts along the value chain • The proportion of companies stating that knowledge and awareness about biodiversity increases	• % • % • %
Land and sea use changes	• The area of built environment subject to restoration increases • The hectares of ecological compensation under the Nature Conservation Act by the construction industry increases • The area of the built environment is monitored	• km² • hha • km²
Use of natural resources	• The recycling rate of construction and demolition waste increases • The use of primary raw materials in construction value chains decreases (i.e. not including circular raw materials (RMR))	• % • Mt
Climate change	• Annual net greenhouse gas emissions are on track to fall to 3.7 $MtCO_2e$ by 2035 (Low-carbon Roadmap: Low-carbon built environment in 2035)	• Mt COe_2
Pollution	• Waste generated by the construction industry decreases (chemical waste, metal waste, paper and cardboard waste, wood waste, animal and vegetable waste, sludge, mineral waste, other waste)	• Mt
Invasive species	• The proportion of construction projects for which a control and management plan for invasive species is made increases	• %
Regenerative actions	• The share of construction projects that improve the state of local nature increases	• %
State of natural habitats	• The number of habitats to which construction has high and relatively high impacts decreases	• Pcs

The current status of the indicators demonstrates the impacts on biodiversity and enables monitoring their progress

Subject:	Indicator	Current status	Source from	Update interval
Nature embedded into decision-making	• The company has a biodiversity strategy or action plan in place • The company addresses biodiversity aspects in value chain management • The company does not have enough knowledge about biodiversity	• 21% of respondents • 10% of respondents • 31% of respondents	• Membership survey carried out as part of the Biodiversity Roadmap work	• CFCI monitors regularly, last implemented in 2023
Land and sea use changes	• The area of built environment subject to restoration increases • Total area used for ecological compensation (executed according to the Finnish Nature Conservation Act's principles) • Total area of the built environment	• Current status not known • Current status not known • 10,000 km^2 (2018) / 15,170 km^2 (2021)	• Monitoring can be done by conducting a member survey • National register of ecological compensation • Corine Land Cover 2018, Finnish Environment Institute 2018 / Greenhouse gas emissions in Finland, Statistics Finland, 2023	• CFCI monitors regularly • Continuous maintenance • Corine Land Cover data is updated regularly / Statistics Finland's data is updated annually
Use of natural resources	• Recycling rate of construction and demolition waste • Raw material use in construction value chains (RMR)	• 54 % (2017) • 116 Mt (2015)	• Green Deal for Sustainable Demolition, Sitoumus 2050 (n.d.) • Exploring the potential of circular economy to mitigate pressures on biodiversity, Ruokamo et al., 2023	• Not known • Update based on 2019 data coming in late 2023
Climate change	• Carbon footprint of the built environment (including the use phase)	• 17 Mt CO_2e (2018)	• Low-carbon Roadmap for the Finnish construction industry 2035, Laine et al., 2020	• CFCI monitors regularly
Pollution	• Waste generated by the construction industry is decreasing	• 13,700 Mt (2020)	• Waste generation by industry, Statistics Finland 2021	• Regularly updated
Invasive species	• Percentage of construction projects for which a control and management plan for invasive species is prepared	• Current status not known	• Monitoring can be done by conducting a member survey	• CFCI monitors regularly
Regenerative actions	• Proportion of projects that involve actions that regenerate the ecological state of local habitats	• Current status not known	• Monitoring can be done by conducting a membership survey	• CFCI monitors regularly
State of natural habitats	• The number of habitats to which construction has high and relatively high impacts decreases	• High impact on 12 habitats (2018) • Quite high impact on 31 habitats (2018)	• Red List of Habitats, Kontula & Raunio, 2018	• Not known

Monitoring the progress of the Biodiversity Roadmap should be regular, transparent and systematic

Monitoring progress and effectiveness will be regular

- Some of the data is based on public databases that are updated annually, so monitoring can be carried out on an annual basis.
- The monitoring of the Nature Embedded into Decision-Making objective can be carried out through a membership survey, e.g. annually.
- Due to the current knowledge base, monitoring of other indicators can be carried out less frequently.

The main responsibility for monitoring lies with CFCI

- CFCI will ensure that monitoring is carried out regularly as planned.
- CFCI will involve other parties in the monitoring process as necessary, for example to improve the database so that the indicators can be updated regularly and reliably.

The roadmap and its progress will be systematically assessed on the way to 2030

- The development of national and international biodiversity targets as well as the knowledge base will be actively followed and, if necessary, the roadmap targets, actions, and indicators will be reviewed and updated.
- A systematic mid-term review of progress towards the target and actions of the roadmap will be carried out in 2025 and 2027, with a final review in the target year 2030. Based on the findings, possible additions or modifications to the actions will be made and/or the necessary support for companies will be provided.

RAKENNUS·
TEOLLISUUS

ANNEXES

Table of contents

1. Background to the Biodiversity Roadmap

1.1 Approach the Biodiversity Roadmap

1.2 Authors and contributors

The key words of the Biodiversity Roadmap are science-based, impactful, inclusive and concrete

AMBITION LEVEL AND TARGET SETTING

What role does the construction industry play in halting biodiversity loss and restoring biodiversity?

How is the nature-positive transition perceived in the industry? How will biodiversity considerations affect the business in the construction industry?

What is the ambition level, objectives, and commitment to the Biodiversity Roadmap in the industry?

SCIENCE-BASED | IMPACTFUL

2. Scientific approach to biodiversity loss and measures to halt it:

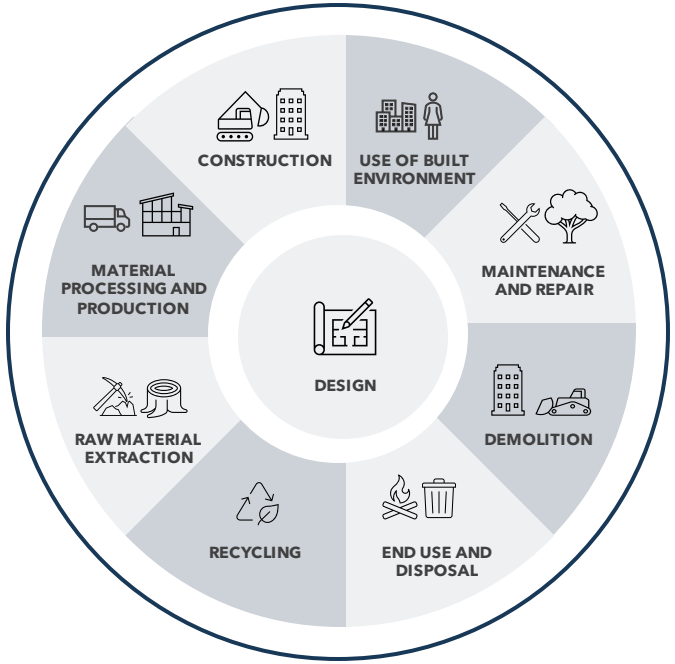
- Drivers of biodiversity loss
- The mitigation hierarchy
- Local vs. global impacts

3. Different approaches for target setting, measurement and monitoring:

- Three levels of biodiversity
- Organisation level approaches
- International frameworks and indicators
- UN's Global Biodiversity Framework targets
- EU targets and regulation
- National Biodiversity Strategy & Programme

4. Scenarios, models and lessons learned

- Construction industry's Low-carbon Roadmap
- Scenarios of biodiversity loss



INCLUSIVE | CONCRETE

5. Addressing the needed actions and cooperation throughout the value chain

- Designers and architects
- Planners
- Public authorities
- Developers
- Property owners and users
- Buyers
- Subcontractors
- Compensation service providers
- Nature conservation actors
- + Member organisations of the CFCI

6. Concretise the actions for the different construction industries

- Building construction
- Construction product industry
- Infrastructure

The roadmap responds to the international transition towards the nature-positivity

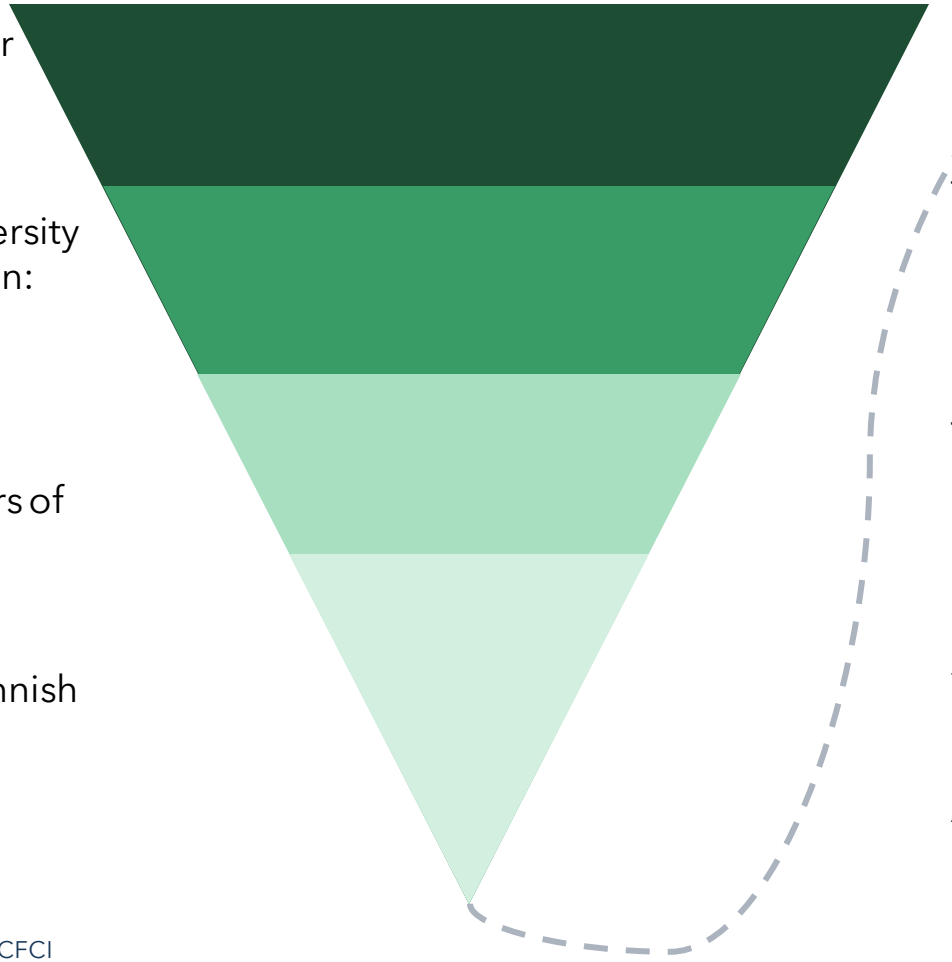
Approach of the roadmap

The scientific basis for biodiversity loss and how to halt it

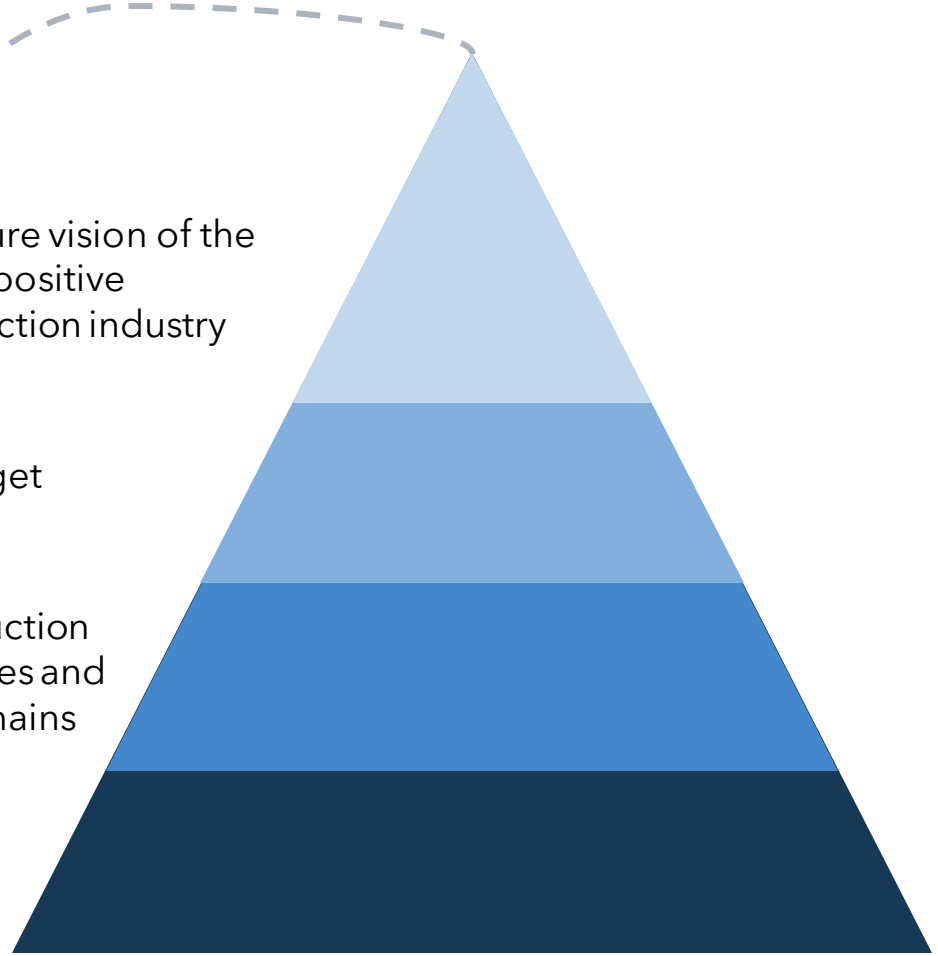
The common biodiversity targets and regulation: UN, EU, Finland

Systemic change and influencing the drivers of biodiversity loss

The context and perspective of the Finnish construction industry



Roadmap structure



The roadmap was developed in cooperation with The Confederation of Finnish Construction Industries RT (CFCI), member companies and Gaia Consulting Oy

CFCI project and communications team

- CFCI is the joint interest organization of building contractors, special contractors and the construction product industry.
- The project team was responsible for steering the roadmap project and working together with Gaia's experts
- The Biodiversity Roadmap work is a part of the implementation of CFCI's Sustainable Construction Programme
- CFCI's communication team was responsible for communicating the findings and results of the project to CFCI's members and stakeholders

Luhanka, Juha, CFCI Project Director
Laurila, Juha, CFCI Project Manager
Kunnas, Tuuli
Vuorinen, Pekka
Ginström, Anu-Liina

Sustainable Construction Programme's Steering Group

- A representative group of CFCI member companies guided the content of the work and provided the companies' insights to the Biodiversity Roadmap.

Airaksinen, Miimu, SRV Group (Chair of the Steering Group)
Joutsenoja, Tuomo, Kreate Oy
Kesti, Jyrki, Ruukki Construction
Leveelahti, Ulla, Finnsementti
Rauhamäki, Terhi, Rudus
Räsänen, Maiju, Peab Asfalt
Suomi, Markus, NCC

Also, other CFCI member companies from different sectors as well as stakeholder representatives have contributed to the roadmap through workshops executed as a part of this work.

Gaia Consulting Oy

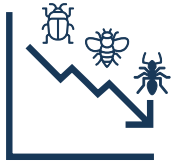
- Content planning and production, project management, and facilitation of events of the Biodiversity Roadmap work.

Pessala, Piia, Project Director of Gaia
Viertiö, Virve, Project Manager at Gaia
Koski, Ilona
Saarinen, Iina
Laine, Anna
Pokela, Pekka

2. Introduction to biodiversity

2.1 Current state of nature and biodiversity
2.2 Mechanisms and causes of biodiversity loss
2.3 The scenarios for biodiversity loss

Biodiversity loss threatens business and society, but we can still change the direction

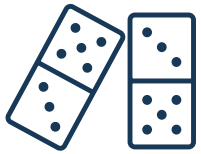


Nature is declining at an alarming rate [1]

1/3
of nature to be destroyed by 2050

6th
mass extinction is in progress

1,000,000
species in danger of extinction



Biodiversity loss threatens the economy and society[2]

Potential risks:

- Food security in danger
- Less raw materials
- Availability of fresh water is decreasing
- Occurrence of pests or diseases increase and spread
- The protection nature offers against extreme weather events collapses
- People's physical health and mental health is deteriorating
- Culture declines

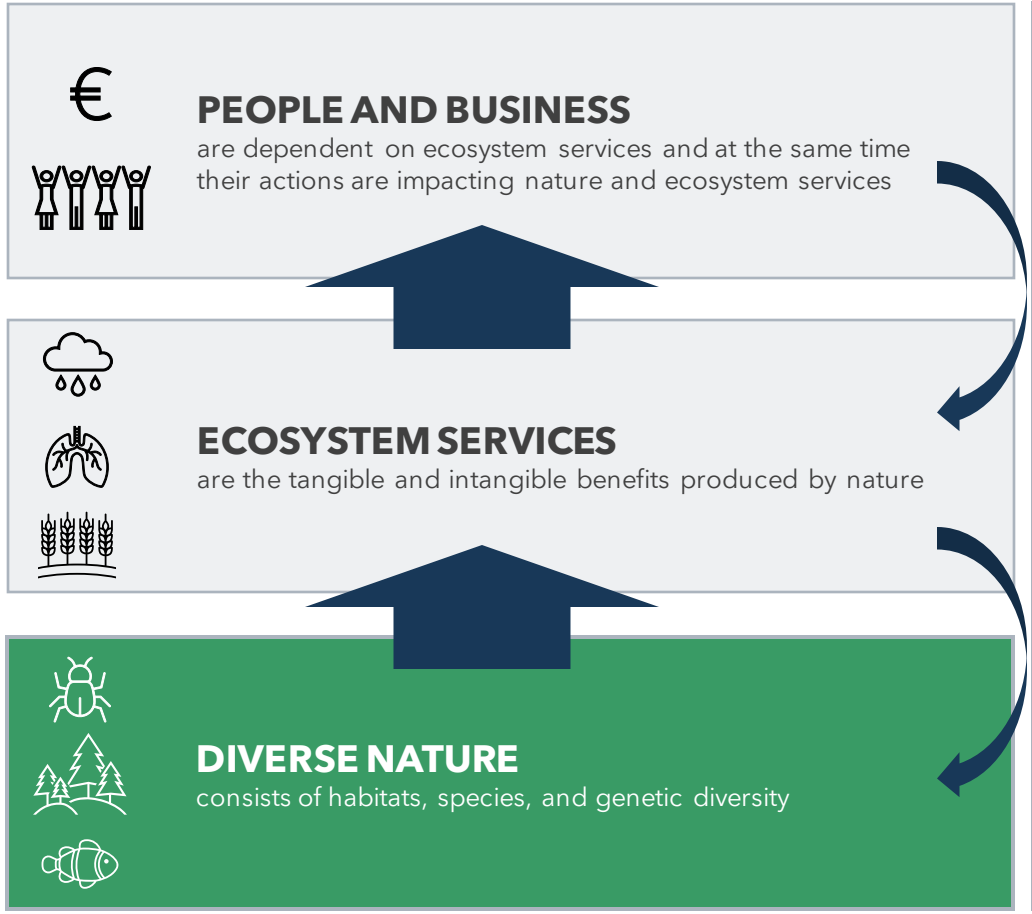
The Finnish construction industry contributes to biodiversity loss

The construction industry's impacts on nature through five direct drivers of biodiversity loss[2]

- Land and sea use changes
- Resource use
- Climate change
- Pollution
- Invasive species

[1] Ministry of the Environment, 2022B
[2] IPBES, 2019

Our society is based on biodiversity and ecosystem services



Biodiversity impacts[1]

Land and sea use changes
e.g. the areas to be exploited and their ecological state

Resource use
e.g. plants, wood and other natural fibres, water, soil materials, and minerals and metals

Climate change
e.g. greenhouse gas emissions and loss of carbon sinks

Pollution
e.g. waste, emissions, noise, light pollution, and other disturbances

Invasive species
e.g. cultivation and breeding of alien species, spread of alien species e.g. through logistics

Biodiversity dependencies[2]

Supporting services
e.g. oxygen production, photosynthesis, soil formation, carbon sequestration, water, nitrogen, carbon and nutrient cycles

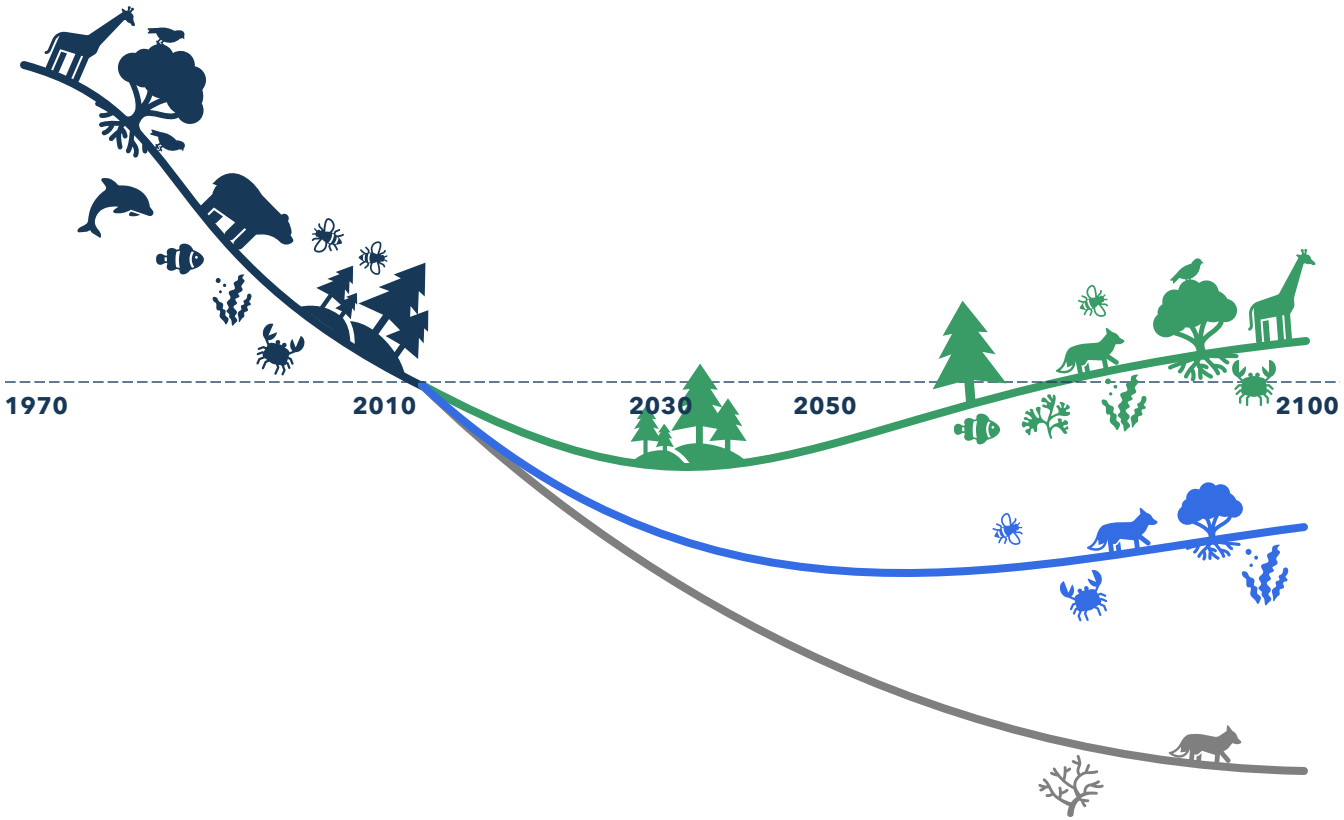
Regulating services
e.g. groundwater formation, plant pollination, erosion and climate regulation, mitigation and prevention of floods and extreme weather events

Provisioning services
e.g. plants, fungi, animals, fresh water, fibres (e.g. wood and cotton), building materials, minerals, energy and fuels, medicines

Cultural services
e.g. landscape and recreational values, mental and physical well-being, source of science, art and education

[1] Based on the Millennium Ecosystem Assessment, 2005, a breakdown of ecosystem services
[2] Based on IPBES, 2019 definition of direct drivers of habitat loss

There is still a chance for a shift towards nature positivity



Scenarios for biodiversity loss[1]

3 **Nature-positive transition**

2 **Increasing nature conservation and restoration**

1 **Continuing current trends "business as usual"**

[1] Based on: CBD, 2022A; World Economic Forum, 2020; CBD, 2022B
Figure based on Leclère et al, 2022 ; Leclère et al., 2020

3. International and national biodiversity policies

3.1 Strategic approaches to biodiversity in UN, EU and Finland

3.2 Current state of biodiversity regulation

3.3 A view on the upcoming biodiversity regulation

International and national policy guidelines steer towards halting biodiversity loss by 2030

The UN Global Biodiversity Framework [1]

EU Biodiversity Strategy 2030 [2]

Draft of Finland's Biodiversity Strategy 2035 [3]

Aligning targets

2030 targets are coherent
- Both the UN and the EU have set a target to halt biodiversity loss by 2030

The 2050 vision is also shared
- In addition, both strategies have a long-term goal to halt and reverse biodiversity loss to put nature on a path to recovery and bring human activities into harmony with nature by 2050

Identifying solutions

Focus on land use changes
- There are 30 % conservation and restoration targets for land and marine ecosystems
- The construction industry has a significant impact on land use

Other drivers of biodiversity loss are also identified
- Climate change, linkages to circular economy, preventing invasive species and pollution

Promoting nature-based solutions and green infrastructure
- Directing cash flows and investments
- Urban and regional planning

Securing cash flows

Efforts to direct financial flows towards biodiversity restoration
- A wide range of private and public funding is being mobilised and directed to biodiversity-friendly investments
- The CSRD, SFDR and EU taxonomy, among others, help to direct cash flows

Reformation of incentives policies
- In particular, the UN's agreement addresses removing subsidies that are harmful to biodiversity

Anticipating future legislation

EU and UN targets are also being incorporated into Finnish national legislation
- Legislation to halt biodiversity loss will increase
- One example is EU's Nature Restoration Law[4]

The minimum level of corporate responsibility is rising, and pioneers will step up
- Businesses are encouraged to monitor, manage and report on nature related risks, opportunities and impacts
- CSRD[5] , CSDDD[6] and the EU taxonomy are already promoting the change

[1] CBD, 2022B
[2] European Commission, n.d.
[3] Finnish Government, 2021
[4] European Commission, 2022C
[5] European Commission, 2023
[6] European Commission, 2022A

Regulation to halt biodiversity loss has recently increased both in Finland and globally

The background study on **Biodiversity and the Finnish Construction Industry**[1] **was published in June 2022.**

In October 2022, the European Commission published a proposal for the EU Restoration Law[2].

In December 2022, the COP15 negotiations took place, resulting in **the adoption of a** new **Global Biodiversity Framework**[3].

In December 2022, the Parliament in Finland adopted the new Nature Conservation Act[4]. As a new tool for biodiversity conservation, the act provides criteria for **voluntary ecological compensation**[1]. The law entered into force on 1 June 2023.

In January 2023, the Parliament in Finland adopted the new Building Act[6] and it will enter into force on 1.1.2025.

In January 2023, the EU taxonomy[5] entered **into force**. Climate criteria are in force for the construction industry. Also, there are draft criteria for circular economy and other environmental objectives are still under preparation for the construction industry.

No political agreement on Finland's Biodiversity Strategy[8] **was reached before the Finnish parliamentary elections in spring 2023.** Thus, the final decisions and publication were postponed to the next government term.

The Corporate Sustainability Reporting Directive (CSRD)[7] came into **force in January 2023.** It requires companies to report on the environmental impacts of their business activities based on a materiality assessment and 12 ESRS standards. One of the standards is "Biodiversity and ecosystems". The final reporting standards were published in summer 2023.

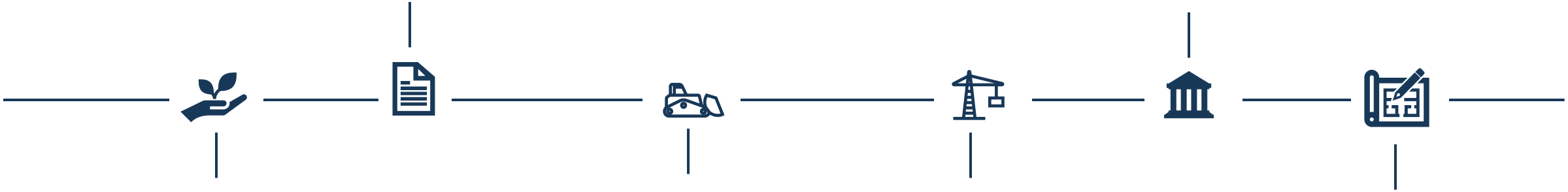
[1] Viertiö et al., 2022
[2] European Commission, 2022C
[3] European Commission, 2022B
[4] Ministry of the Environment, 2022C
[5] EU Taxonomy Info, n.d.
[6] Ministry of the Environment, 2023A
[7] European Commission, 2023
[8] Finnish Government, 2021.

Regulation to drive biodiversity restoration is being developed and new initiatives will enter into force soon

EU

In February 2022, the Commission adopted a proposal for a **Corporate Sustainability Due Diligence Directive (CSDDD)**[2] . It requires companies to manage human rights issues and environmental impacts throughout the value chain. The final text of the Directive is still being finalised and will **enter into force in 2024 at the earliest.**

In June 2022, the Commission has proposed a so-called "**Nature Restoration Law"**[4] , which would set ecosystem restoration targets up to 2030. Member States should draw up restoration plans which will also have impacts on the construction industry. **The proposal is still under discussion.**



Finland

The Ecological Compensation Decree was adopted on 15 September 2023. The Decree complements the Nature Conservation Act adopted in June 2023 by providing guidelines and calculation principles for compensation.

Former Land Use and Building Act was divided into two separate laws. The amendments were adopted by Parliament on 24 February 2023, which will change the name of the Act to the Regional Planning Act and narrow its scope to regional planning and zoning. The **new Regional Planning Act**[3] **will enter into force on 1.1.2025.**

In the reform of the former Land Use and Building Act, the regulation of construction will be transferred to the new Construction Act, which will be adopted by Parliament on 1 March 2023 and will regulate construction permits. The **Construction Act**[3] **will enter into force on 1.1.2025.** One of the main objectives of the reform is to strengthen biodiversity.

Just as the Climate Change Act combats the climate crisis, a new Nature Act is being considered to halt biodiversity loss. **A Nature Act**[5] would coordinate biodiversity protection targets and actions. **Preparation of the law is still in the planning stage.**

[1] Ministry of the Environment, 2022C
[2] European Commission, 2022A
[3] Finnish Government, 2023
[4] Ministry of the Environment, 2022A
[5] Ministry of the Environment, 2023B

4. Biodiversity impacts and dependencies of the construction industry

4.1 Biodiversity impacts of the construction industry
4.2 Biodiversity dependencies of the construction industry

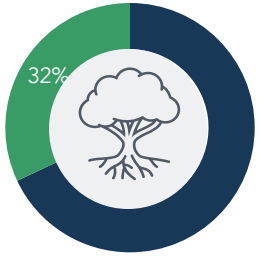
The baseline: the construction industry's impacts on biodiversity in Finland

The impact on biodiversity loss[1]

6.

- Of all industries in Finland, the construction industry has the sixth largest impact on biodiversity loss (2015, based on modelling that is being updated in late 2023).
- Most of the biodiversity loss caused by the construction industry is domestic, but about a third is estimated to occur abroad.

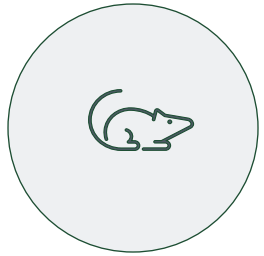
The use of natural resources



The use of raw materials

- Raw materials used in construction, including the value chain (RMR): 116 Mt (2015) [1]
- Total use of raw materials in the Finnish economy (RMR): 343 Mt (2015) [2]

Invasive species



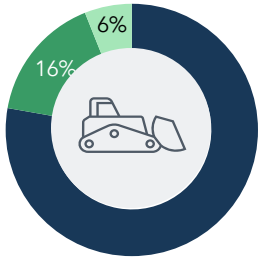
- 26 harmful alien species or groups of species have been identified in Finland [3]
- Construction activities, such as the transport of soil and organic materials, can cause the spread of invasive species[4]

Changes in land and sea use

5.

Land use

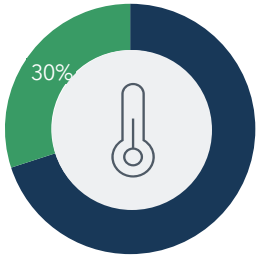
- The size of the built environment: 10,000 km [2] (2018) [5]
- The construction industry has the fifth largest impact on land use in Finland (2015) [1]



Endangered habitats [6]

- Construction activities have a significant impact on 12 habitats and a relative impact on 31 habitats (2018)
- There are 192 threatened habitats in Finland (2018)

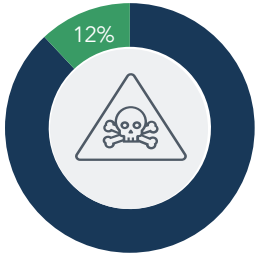
Climate change [7]



Carbon footprint

- The carbon footprint of the built environment (including the use phase): 17 Mt CO_2e (2018)
- The carbon footprint of Finland as a whole: 56.5 Mt CO_2e (2018)

Pollution [8]



Waste

- Direct waste from construction: 13,700 Mt (2020)
- Total waste from Finnish industries: 113,579 Mt (2020)

[1] Ruokamo et al., 2023
[2] Nissinen & Savolainen, 2019
[3] Huusela-Veistola et al., 2020
[4] Viertiö et al., 2022
[5] Finnish Environment Institute, 2018
[6] Kontula & Raunio, 2018
[7] Laine et al., 2020
[8] Statistics Finland, 2021

Biodiversity impacts occur along the entire value chain[1]

Impact: very high, high, medium, low, not assessed

Construction
- Terrestrial ecosystem use
- Water consumption
- Use of freshwater and marine ecosystems
- Greenhouse gas emissions
- Other emissions
- Solid waste
- Noise and light pollution
- Discharges and waste to soil and water

Materials processing and production
- Terrestrial ecosystem use
- Water consumption
- Use of freshwater and marine ecosystems
- Greenhouse gas emissions
- Solid waste
- Noise and light pollution
- Discharges and wastes to soil and water
- Other emissions

Raw materials procurement
- Terrestrial ecosystem use
- Water consumption
- Use of freshwater ecosystems
- Greenhouse gas emissions
- Solid waste
- Noise and light pollution
- Other emissions
- Discharges and waste to soil and water

Recycling
- Water use
- Greenhouse gas emissions
- Other emissions

Use of built environment
- Water consumption
- Discharges and wastes to soil and water
- Other emissions
- Solid waste

Maintenance, repair and servicing
- Water consumption
- Greenhouse gas emissions
- Terrestrial ecosystem use
- Use of freshwater and marine ecosystems
- Other emissions
- Discharges and wastes to soil and water

Demolition
- Solid waste
- Terrestrial ecosystem use
- Use of freshwater and marine ecosystems
- Greenhouse gas emissions
- Other emissions
- Discharges and wastes to soil and water

End use and disposal
- Solid waste
- Terrestrial ecosystem use
- Use of freshwater and marine ecosystems
- Greenhouse gas emissions
- Other emissions
- Discharges and wastes to soil and water

[1] Based on analysis by Gaia using the ENCORE, n.d. tool, sub-industries: homebuilding, construction and engineering, construction materials, mining, real-estate services and development, environmental and facilities services. The magnitude of the impacts was not available for all impacts, in which case significance was not assessed.

Current state and previous development of the built environment in Finland

Land and sea use changes

The new land taken up for construction is mostly forest land

80 % of the land used by the built environment is forest land. Between 2000 and 2012, most of the new construction took place on forest land (69 %), some on agricultural land (21 %) and only a small proportion on already exploited land (9 %). In 2020, it is estimated that the annual loss of forest area will be around 10,000 hectares, of which construction will account for about half. [1]

Soil extraction plays a major role in the construction industry value chain's land use

There is significant land use in the construction value chain. Over the last decade, the most land use intensive activities were mining and other mineral extraction sites (18 %), construction of leisure apartments and facilities (17 %) and residential construction (15 %). [1]

Construction causes half of Finland's deforestation

The trend is declining land use, but deforestation will continue. Over the last decade, deforestation in Finland has averaged around 14,000 ha per year. Construction accounts for about half of Finland's deforestation. [2]

[1] Timonen, 2020
[2] Assmuth et al., 2022

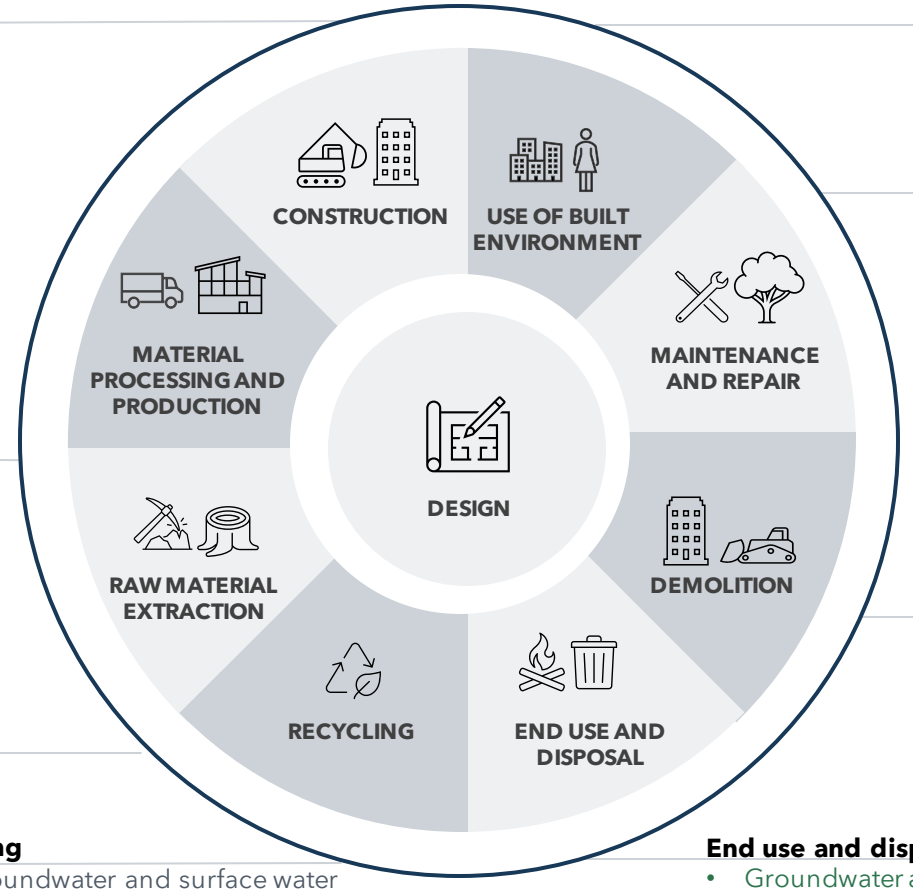
The construction industry is dependent on ecosystem services[1]

Dependence: very high, high, medium, low, no estimate of magnitude

Construction
- The protective effect of vegetation against floods and storms
- Long-term carbon storage
- Groundwater and surface water
- Soil stabilisation and erosion control
- Maintenance of surface water flow
- Filtering and preventing noise and light pollution
- Soil decontamination by biological organisms
- Maintaining biogeochemical processes in the soil
- Filtering pollutants and improving air quality
- Healthy ecosystems preventing harmful invasive species to spread and supporting pest control
- Filtration, capture, and storage of pollutants and contaminants

Materials processing and production
- Groundwater and surface water
- Maintenance of surface water flow
- The protective effect of vegetation against floods and storms
- Maintaining groundwater and surface water quality
- Filtering and preventing noise and light pollution
- Soil stabilisation and erosion control
- Dilution of water and atmospheric emissions

Raw materials procurement
- Groundwater and surface water
- Long-term carbon storage
- Maintaining surface water flow
- Soil stabilisation and erosion control



Use of built environment
- Soil decontamination by biological organisms
- Soil stabilisation and erosion control

Maintenance, repair and servicing
- The protective effect of vegetation against floods and storms
- Maintenance of surface water flow
- Long-term carbon storage
- Maintaining biogeochemical processes in the soil
- The benefits of vegetation for air quality
- Soil decontamination by biological organisms
- Filtration, capture and storage of pollutants and contaminants
- Filtering and preventing noise and light pollution
- Healthy ecosystems preventing harmful invasive species to spread and supporting pest control

Demolition
- Soil stabilisation and erosion control
- Filtration, capture and storage of pollutants and contaminants

Recycling
- Groundwater and surface water
- Filtration, capture and storage of pollutants and contaminants

End use and disposal
- Groundwater and surface water
- Filtration, capture and storage of pollutants and contaminants

[1] Based on analysis by Gaia using the ENCORE, n.d. tool, sub-industries: homebuilding, construction and engineering, construction materials, mining, real-estate services and development, environmental and facilities services. Dependence magnitude data were not available for all dependencies, in which case significance was not assessed.

5. In-depth knowledge for integrating nature into business

5.1 Value chain thinking
5.2 The mitigation hierarchy
5.3 Nature-based solutions
5.4 Biodiversity assessment
5.5 The nexus between biodiversity and other sustainability topics

Biodiversity impacts occur along the entire value chain and managing biodiversity impacts requires cooperation between all actors

A holistic view of the value chain and cooperation are the key elements for success in biodiversity work

- Biodiversity impacts often occur along the entire value chain, thus a holistic view of the value chain is needed to understand the whole picture.
- Biodiversity dependencies also exist throughout the value chain and can materialise into various risks along the value chain, leading, e.g., to rising production and raw material costs.
- Identification and management of biodiversity impacts and dependencies requires cooperation between different actors in the value chain.

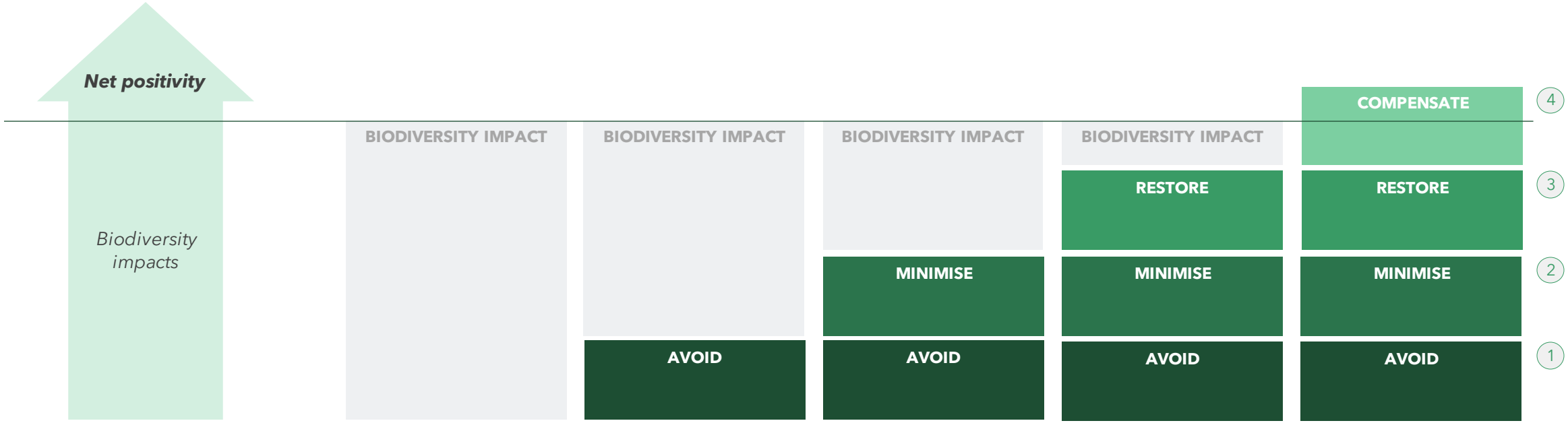
The mitigation hierarchy is an approach to managing biodiversity impacts[1,2]

The aim is to reduce biodiversity impacts by following the hierarchy:

1. First, avoid causing any damage
2. After that, minimise the extent of damages that cannot be avoided
3. Then, integrate restorative actions to improve ecological state of the area
4. The last option is ecological compensation, which means protection and restoration activities that take place elsewhere

By following the mitigation hierarchy, net positivity can be achieved

- Net positivity refers to a situation where the overall impact on nature turns from negative to positive.[2] It is essential to integrate nature-positive contributions across the entire value chain. [4]
- Net positivity requires new and innovative ways of doing business, which means changing and challenging prevailing habits and practices.
- Net positive thinking follows the mitigation hierarchy principles and requires that caused damages must be remedied and restored in the same area.[5]



[1] Arlidge et al., 2018
[2] IUCN, 2017
[4] Nature Positive Initiative, 2022
[5] Holdorf et al., 2021

Nature-based solutions offer business opportunities and support risk management

Nature-based solutions[1,2] support and enhance ecosystem services generating continuous or increasing benefits to people and nature. They refer to practices, policies, and processes that improve the ecological state of nature while contributing to human well-being, and are economically viable, especially in the long term. At the same time, it contributes to risk management.

Nature-based solutions can, among other things:

a. Reduce caused biodiversity impacts
b. Renew degraded ecosystem services and improve the ecological state of habitats
c. Manage risks, such as climate change adaptation: e.g., adaptation to extreme heat waves, rainfalls and floods

Examples of nature-based solutions:

Preserving and using natural landforms in construction

Creating green spaces for enhancing rainfall infiltration into the soil and increasing flood storage capacity

Preserving vegetation and trees to cool down the urban climate and filter pollutants from the air

Protecting water bodies to avoid the need for water filtration processes and infrastructure

Maintaining and increasing vegetation and trees to stabilise soil and protect against flooding

Preserving wetlands to manage stormwater and cool the urban climate

[1] European Commission, 2015
[2] Nature Based Solutions Guidelines Info, n.d.

Executing a biodiversity assessment helps to identify the most effective measures to manage biodiversity impacts

Regulation guides actors to conduct different kinds of environmental assessments. However, proactive and successful biodiversity work requires going beyond the requirements of legislation and supplementing the mandatory obligations with the most up-to-date tools and methods.

For example, EIA procedure is a familiar requirement for most construction companies. However, it can be supplemented to ensure adequate measures to preserve biodiversity. Thus, voluntary biodiversity assessment is recommended as a part of each new and on-going project where land use is involved.

Recommended principles for biodiversity assessments:

1. Up-to-date information on nature is needed to support land-use planning and the sustainable use of natural resources. Ecological values can be safeguarded only if they are identified, and effective measures to prevent damages can take place only if potential biodiversity impacts are assessed at a planning phase of the project. [1]
2. Biodiversity impacts must be identified according to the five direct drivers of biodiversity loss: land and sea use changes, resource use, climate change, pollution and invasive species.
3. The ecological state should be assessed through three different levels: 1) the site, 2) surrounding habitats and 3) the broader nature network and ecological corridors.[2]
4. The results of the biodiversity assessment must be integrated into all activities and decision-making in the planning and implementation of projects.
5. Concrete measures will be executed according to the mitigation hierarchy.

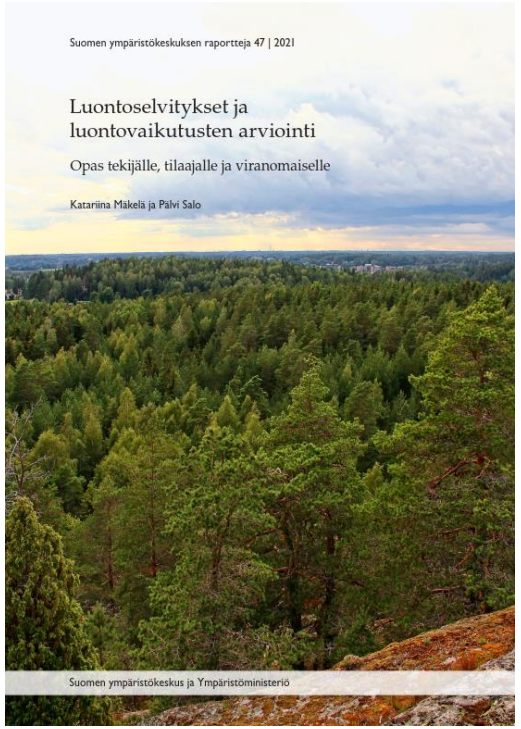


Photo: the Finnish Environment Institute's LUOPAS guidance can be used as a basis for the planning and implementation of a biodiversity assessment.

[1] Mäkelä & Salo, 2021
[2] Eklund, 2023

The nexus between biodiversity, climate change, circular economy as well as social responsibility calls for action

Climate change mitigation and adaptation are linked to biodiversity[1]

- Climate change is one of the drivers of biodiversity loss and reducing carbon emissions will halt both biodiversity loss and climate change.
- In addition to reducing carbon emissions, carbon sequestration can be increased by increasing and maintaining carbon stocks in vegetation and soil.
- Vegetation, green spaces and wetlands lower temperatures in cities and indoors: this can reduce the need for air conditioning, and thus reduce energy consumption.
- As heavy rainfalls and storms become more frequent, green areas and wetlands help to store stormwater and prevent flooding
- Vegetation and natural landforms can act as flood barriers

Circular economy reduces the need for virgin raw materials and land use[2]

- Circular economy can reduce greenhouse gas emissions and safeguard biodiversity.
- Reduced need for new raw material extraction reduces the pressure on land use.
- Circular economy improves resource efficiency, optimises material use, increases product reusability and extends product life cycles.

Flourishing nature contributes to human health and well-being[1,3]

- Vegetation, green spaces, and wetlands reduce temperatures in cities and indoors, and filter e.g., air pollutant and noise.
- Green spaces encourage physical activity and sports.
- Green spaces provide areas for relaxation and social encounters.
- Research suggests that people enjoy green spaces and nature more when they perceive that there is a diversity of vegetation and animals.[4]
- Access to green spaces improves mental well-being, reducing the need for treatment for mental health problems.

[1] see e.g. Scott, 2012
[2] see e.g. Ruokamo et al., 2021
[3] see e.g. Tyrväinen & Korpela, 2009
[4] Dallimer et al., 2014

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