biodiversity

off-site

The housing industry in Australia has a substantial impact on biodiversity. This factsheet uses a life cycle approach to help you identify significant off-site impacts, guide your design and material choices, and influence your suppliers to provide biodiversity-friendly products.

Biodiversity is the variety of all life forms - the different plants, animals and micro-organisms, the genes they contain and the ecological systems to which they contribute.

Australia's first National State of the Environment Report found that the loss of Australia's biodiversity is the single most important environmental issue facing this nation.

THREATS TO BIODIVERSITY

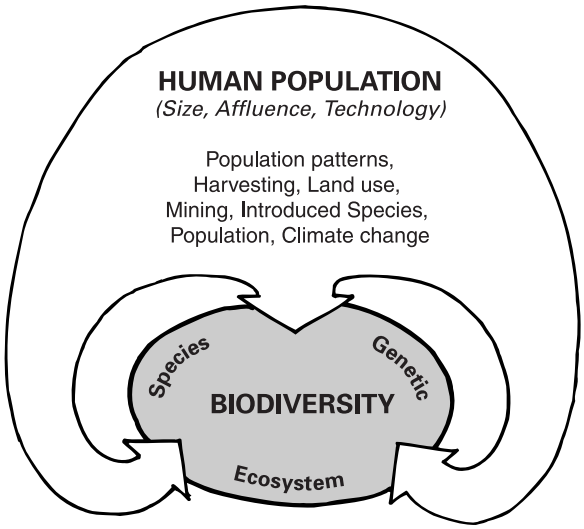
Clearing native vegetation poses the most serious threat to biodiversity. Once land is cleared it is impossible to restore the full suite of indigenous species, remove pest plants and animals, and repair ecological processes.

Fragmentation of habitat into smaller patches is also a serious problem. Habitat quality is important and its degradation occurs more rapidly in smaller patches. Populations of flora and fauna decline when habitats shrink. When the gene pool shrinks, so does the ability of species to compete, fight disease or adapt to changing conditions.

Habitat degradation can result from many processes including:

- Removal of biomass such as trees, fodder plants, etc.
- Spread of pest plants and animals.
- Changes to water flow and quality.
- Toxic effects of salinity, pesticides and pollutants.
- Disruptions to ecosystem functions, eg. road/fence barriers to animal movements.
- Changed fire regimes.
- Climate change.

Our demand for the metals, timber, stone, sand, plastics, energy and countless other materials to build, equip and run our homes and cities is high. The combined impacts over a building's life include the clearance and permanent disturbance of ecosystems both near and far (See the case study map).



Courtesy of State of Environmental Report (1990)

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BIODIVERSITY-FRIENDLY BUILDING

Aim for a net contribution to biodiversity.

Aim to use 100 percent recycled materials and recycle those materials at the end of their use.

Minimise habitat clearing or degrading.

Eliminate greenhouse gas emissions.

Eliminate the use of toxic substances.

Minimise the lock-out effect by avoiding the use of areas proposed for habitat restoration in biodiversity plans.

Maximise land use efficiency by reducing the land required to produce and supply inputs to a building over its life.

Minimise the use of material, energy and water except where this conflicts with other environmental goals (eg. more insulation is usually better than less).

RULES OF THUMB FOR DESIGN

Unfortunately, most "green building" and environmental purchasing schemes are unlikely to provide a clear idea of the relative biodiversity impacts of design and product choices. The following rules of thumb for design and material selection should help until more effective decision making aides are available.

View the entire life cycle of your building development as an opportunity to generate a contribution to biodiversity.

Seek to enhance biodiversity through design and material selection. You may also wish to contribute to biodiversity recovery programs and habitat restoration projects elsewhere.

Optimal building design must account for all biodiversity impacts arising from each phase of a building's life, from construction and operation to demolition, disposal or recycling.

Less severe biodiversity impacts can be traded off over a building's entire life. For example, using slightly more material in some stages of a building's construction might be offset by reductions in the operation and demolition, disposal and recycling phases.

Do not trade-off severe impacts likely to be linked with irreversible damage to species and ecological communities in one phase against reduced impacts in another.

Design: Construction phase

Reduce the quantity of materials used where this does not affect the whole-system performance and select for biodiversity friendliness (See Rules of thumb for materials selection and guidelines).

Design: Operation phase

Design to minimise negative and maximise positive impacts of inputs and outputs during the operation of the building where this does not affect the whole-system performance.

You can dramatically reduce impacts on biodiversity by avoiding or reducing:

Consumption of water from natural systems.

Use of firewood, the sourcing of which often threatens habitat.

Use of fossil fuels, which adds to the greenhouse effect and the extraction/processing of which leads to pollution and impacts on ecosystems.

Disposal of sewage and other waste.

Use of materials (eg. timber, paints and pesticides) for repairs and maintenance, the extraction/processing of which leads to numerous impacts.

Use of lights that attract insects, bats and birds.

Design: Demolition/disposal phase

Aim for 100 percent re-use or reprocessing at the end of a building's life. The building sector is such a large consumer of materials that the industry can not look to any other sector to supply the bulk of its recycled materials.

RULES OF THUMB FOR MATERIAL SELECTION

Re-used or reprocessed materials are best for biodiversity because their production creates relatively little demand for land or water.

Use recycled timber for floorboards, recycled concrete for aggregate in new concrete, and re-used bricks.

Use farm or factory-produced resources where the land was cleared long ago and is not needed for habitat rehabilitation (eg. sand from long-cleared land).

Avoid nature-derived commodities (low-cost high-volume materials) that may lead to clearing or habitat degradation (eg. structural timbers from native forest, sand, gravel and minerals from bushland).

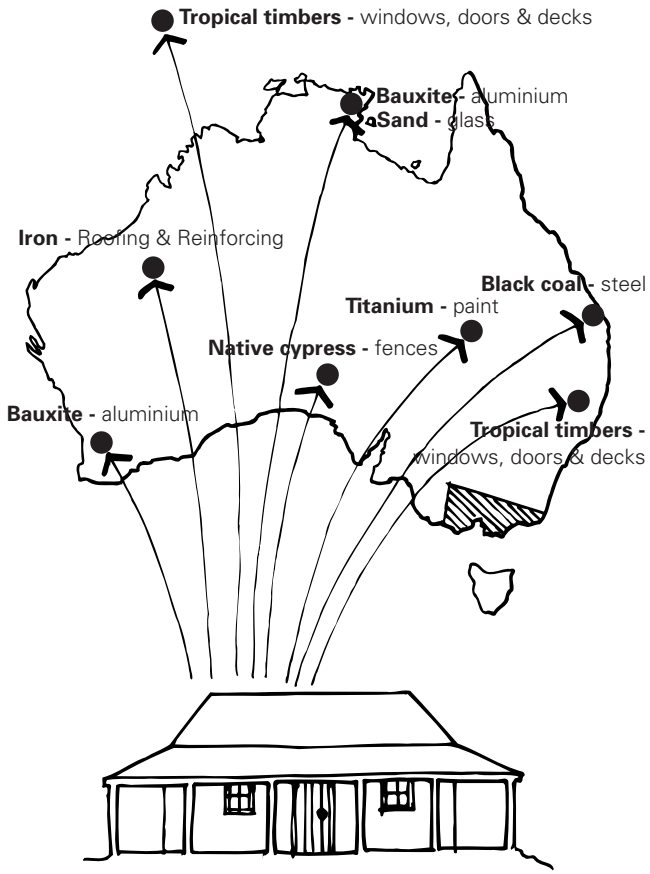
Do not source materials from threatened ecosystems or natural areas such as rainforests.

CASE STUDY

Your home will affect biodiversity in many places. The following case study is based in Melbourne but could be anywhere in Australia.

OTHER ACTIONS YOU CAN TAKE

Seek advice on biodiversity impacts of materials from reliable sources. Organisations with a strong commitment to nature conservation are likely to deal with biodiversity impacts more carefully. Check to see that the criteria used by certification or rating systems explicitly account for biodiversity impacts.



Find suppliers who can give you information about the biodiversity impacts of the source of their materials. This will encourage the development of material data systems that make it easier to find out about the relative impacts of your options.

Support initiatives to improve information on building materials' biodiversity impacts and the systems for recording and disseminating that information. For example, subscribe to a green purchasing advisory service or participate in industry programs to improve research, monitoring or reporting of biodiversity impacts.

Support initiatives to produce and promote biodiversity friendly materials and products.

BUILDING INDUSTRY IMPACTS

HARVESTING AND EXTRACTION

The highest impacts occur where land is cleared for agriculture, quarries, roads, mine sites, factories, etc.

Infrastructure associated with exploration, quarrying and mining activities in natural areas usually involves significant clearing and disturbance to surrounding native vegetation and sometimes waterways. Creation of the roads, camps, dumps, airstrips, etc. that are often involved can cause long term damage. Long-distance transport contributes to the greenhouse effect, which will increasingly cause habitat degradation and biodiversity loss.

LOCALLY SOURCED MATERIALS

Melbourne & surrounds
Clay - bricks & tiles
Sand - concrete
Gravel & stone - concrete & garden

Rest of Victoria
Water - domestic use
Brown coal, gas & oil - energy
Native timber - weatherboard, floors & firewood
Broombrush - fences
Pine - Frame

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MINING AND EXTRACTIVE INDUSTRIES

Surface mining and quarrying frequently occur in areas that still support native vegetation, usually because the landform containing the materials has low potential for agricultural development. Extensive mining operations, such as open-cut extraction of coal, bauxite and manganese, and sand mining in coastal heathlands, have caused long-term changes to biodiversity despite attempts at rehabilitation.

Recent protection of areas of Stockton Bight, NSW, resulted from concern for over 27 threatened species occurring in a mining area.

While there is limited information on the extent of mining nationally, the land area occupied by mine sites and petroleum fields is thought to be about the same area as all our cities and towns.

Mining also affects biodiversity when pollutants are released into air or water. For example, when pyrite is brought to the surface during mining it is oxidised to sulfuric acid, which in turn mobilises heavy metals. This acid mine waste can severely pollute rivers and destroy biodiversity.

PROCESSING

The production of some building materials can result in pollution of inland and marine waters. The use of greenhouse-gas-intensive energy sources such as coal also contributes to longer-term pressures on biodiversity.

DISPOSAL

The disposal of building waste can impact on biodiversity in several ways. Using land for dumps increases the pressure to clear habitat. The waste generates greenhouse gases and significant pollution, especially to groundwater. Because the discarded materials are not made available for recycling/re-use, the production of virgin raw materials is much greater than necessary.

GUIDELINES FOR SOURCING MATERIALS

A. BEST OPTIONS

Criteria defining materials for this option:

> The materials are sourced and produced from sustainably managed forests and have negligible impacts on natural hydrological cycles or the atmosphere, AND

> The level of recycling of the total industry-wide output of the material is very high (eg. over 80 percent) AND

> The production process is very efficient in its use of land AND

> The materials are durable, non-toxic and recyclable (with low quality loss after being recycled) (Note[1])

> If possible, the production process or the organisations associated with production create a net benefit for biodiversity

For example:

> Recycled materials produced in ways that have negligible impact on biodiversity

> Materials from renewable sources that do not involve biodiversity impacts and do not create a major demand for land

> Habitat restoration or species/ecological community recovery is coupled with the sourcing and/or production of the materials

Timber - re-used wood, non-toxic reconstituted/reprocessed timber products (maximum post-consumer waste)

Other biological materials - re-used/recycled materials (maximum post-consumer waste)

Metal, bricks, sand, stone, concrete, etc. - re-used, recycled (maximum post-consumer waste)

Energy - renewable resources (solar, wind, waste-biomass-to-energy) where siting or material sourcing does not involve native species habitats or other significant impacts on native species and does not create a major demand for land.

Water - waste water; run-off from structures which have a primary purpose unrelated to water capture

Note

([1]) Materials become progressively less desirable as their durability and recyclability falls and their toxicity rises. As their quality falls, they would be located within a progressively lower option class.

B. SECOND-BEST OPTIONS

Criteria defining materials for this option:

> The materials are grown in plantations ([2]) or on farms using long-cleared land which is not needed for habitat restoration and where the biodiversity-orientated environmental management system is excellent; or

> The materials are not commodities and are produced in low volumes from natural systems where the biodiversity-orientated environmental management is excellent ([3]); or

> Materials have been recycled but the level of recycling of the total industry output of the material is not 'very high'; but the biodiversity-orientated environmental management of the production process is excellent ([3]).

Biological materials - produced from farms or plantations (eg. tea-tree/broombrush fencing; native cyprus); non-commodity products in low volume from native habitats

Metal, bricks, sand, stone, concrete, etc. - recycled materials, or new materials extracted from long-cleared land

Energy - generated with a very small ecological impact within natural systems; purpose-grown biomass crops on long-cleared land

Water - sourced from protected bushland catchments with guaranteed generous environmental flows for downstream waterways and wetlands

Notes

([2]) Production from plantations on long-cleared land is in category B rather than category A because of the major demand for land that it creates. Also note that the term "plantation timber" used by some suppliers does not necessarily indicate a category B source, as "plantations" are sometimes established on land which has been recently cleared of native forest for the purpose. (the Tasmanian RFA process allowed for clearing of native forest for plantation establishment because other areas were not necessarily suited to timber production. In the RFA, the Commonwealth has accredited Tasmania's forest management practices).

([3]) Claims of excellent biodiversity-orientated environmental management must be verified by an independent, qualified party, especially where materials are sourced from natural systems.

C. SECOND-WORST OPTIONS

Criterion defining materials for this option:

Commodities (low-cost, high-volume products) from natural systems with good environmental management, involving no glaringly-obvious major impacts and using land which is not of high conservation value and is not needed for habitat restoration

Biological materials - commodity materials from native habitat; non-commodity materials from areas of native habitat affected by high impact management; high volumes of natural materials where nutrient or micro-habitat removal could cause degradation of the system eg. seagrass harvested from the wild for insulation

Metal, bricks, sand, stone, concrete, etc. - made from new materials extracted from native habitat where rehabilitation occurs

Energy - biomass-to-energy using wood from native forest; fossil fuels from long cleared land

Water - sourced from non-native catchments; only moderate environmental flows for downstream waterways and wetlands guaranteed

D. WORST OPTIONS

Criterion defining materials for this option:

> Commodities (low-cost high-volume products) from natural systems without any environmental management or with ineffective environmental management.

> Materials sourced from ecological communities that are threatened or from areas of high conservation value for species or ecological communities even where the environmental management is argued to be good.

> Worse still, materials produced in a way that results in the permanent conversion of habitat to land uses with no significant conservation value.

Biological materials - from threatened/high conservation value habitats eg. rainforest; from any area cleared to make farm-style or plantation production possible; from any type of native habitat where environmental management is poor or non-existent.

Metal, bricks, sand, stone, concrete, etc. - made from new materials involving permanent clearing of natural habitat

Energy - from native habitats with significant habitat disruption/damage; fossil fuels

Water - from diversions and impoundments that destroy natural habitats; no or low environmental flows guaranteed

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Principal author: Kathy Preece, Green Innovations