

Geography Level 10

Chapter 3 — Environmental change and management

This work is licensed under the Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License. To view a copy of this license, visit <http://creativecommons.org/licenses/by-nc-nd/4.0/> or send a letter to Creative Commons, PO Box 1866, Mountain View, CA 94042, USA.

Attribution: Classbasics Pty Ltd, vwx.au

Curriculum codes refer to the *Victorian Curriculum F–10 Version 2.0*, published by the Victorian Curriculum and Assessment Authority (VCAA). Classbasics is not affiliated with the VCAA; the VCAA does not endorse this resource and makes no warranties regarding it.

Distribution note: this document may be distributed, and whole pages may be removed from it, provided only WHOLE pages are removed (never part of a page). This allows teachers to remove tests, exams and subtopics they do not want to issue.

Aboriginal and Torres Strait Islander content has been excluded as accuracy cannot be guaranteed, and it is better to be respectful than cover the entire curriculum inaccurately.

Significant effort has been made to ensure this content is legal. Please send any areas of concern to admin@vwx.au with appropriate document/legal references so errors can be verified and changes be made.

Contents

Section	Page
Environmental change caused by people: effects on places and on how environments work	2
One environmental issue up close: its causes and consequences, examined geographically	18
Custodial responsibility in practice: a values-based way of managing the environment	32
Environmental worldviews: how what people believe shapes what they support	46
Managing one environmental issue: strategies weighed by environment, change, interconnection and sustainability	64

Environmental change caused by people: effects on places and on how environments work

Curriculum — Geography 10 · Chapter 3: Environmental change and management (VC2HG10K10).

Content description: VC2HG10K10. Draws on VC2HG10K10.E01, VC2HG10K10.E02, VC2HG10K10.E03, VC2HG10K10.E04 (linkage keys for the question bank and coverage audit, not a teaching order). First Nations disposition: none — and the question-bank item under .E02 that carries First Nations text is **not printed** in this section (TOC §2A, decision D3a). Cross-curriculum priority carried by this section: *Sustainability* — weighing what places need now against what they must keep for the future. Concepts woven through: place, change, interconnection, scale, sustainability. Related sections in this book: 1C (sustainability of farming), 1D (constraints on food production), 3B (causes and consequences of one selected environmental issue), 3D (environmental worldviews) and 3E (management of the selected issue).

Teaching sequence (for teachers)

This block is teacher-facing guidance, not student text. Allow about 6 lessons.

1. **Hook — what does the environment do for us?** Students list, in two columns, what their local area *gives* (water, food, timber, places to play) and what it *absorbs* (rubbish, wastewater, smoke). Collate on the board and lead into **Key ideas 1**: the four functions. Define *source*, *services* (which include *ecosystem services*), *sink* and *spiritual* at first use, and re-state the definition of *sustainability* from 1C with its attribution.
2. **Functions as criteria (.E01).** Use Figure 1. Practise turning each function into a test question (“Can the place keep supplying ...?”). Run Worked example 1 with Figure 10 (Gippsland Lakes) so students see the full model before using it themselves. Teacher reference: the Lakes’ wetlands also carry a listing under the Ramsar Convention (an international wetlands treaty); student text in this section says “internationally important wetland” instead.
3. **The catalogue of changes (.E02).** Use Figure 2 as the section’s map, then Figures 3–7 as the evidence trail: Cape Grim carbon dioxide (Figure 3), the warming record (Figure 4), reef bleaching (Figure 5), the Hazelwood mine fire (Figure 6) and the Menindee fish kills (Figure 7). Locate every place on Figure 8. Stress the naming discipline: type of change → what changes → named place → dated evidence.
4. **Impacts on places and their sustainability.** Key ideas 3. Apply the criteria from lesson 2 to a place students know; introduce scale (local → regional → national → global) and interconnection (upstream decisions reach downstream places). Link back to 1C and 1D.
5. **Tensions (.E03, .E04).** Key ideas 4 with Figure 9 (the phase-out of native forest logging in Victoria). Run the steelman box and mark the reasoning, not the side. Contrast the shorter plastics-ban tension at the household and business scale. Worked example 2.
6. **Inquiry task and consolidation.** The inquiry task is the section’s real-source data task (two named sources, retrieval dates, representation, reliability evaluation). The unscaffolded set suits lessons 5–6.

Assessment notes: the steelman and tension items (Q9, Worked example 2) mark reasoning, not the position reached (CONTESTED_TERMS Rule 5) — make this explicit to students. No item may draw on material excluded by TOC §2A; this section carries none, and the bank item under .E02 that carries First Nations text is not printed.

Key ideas

1. What the environment does for us: four functions (E01)

Everything people get from the environment falls into four **functions**.

- **Source** — the environment supplies the materials that life and economies run on: water, food, timber, minerals and energy. The irrigation water drawn from the Murray–Darling rivers for 1C’s farms is the environment working as a source.
- **Services** — natural systems do work for us for free: clean air and water, pollination of crops, protection from storms and floods, and the cycling of plant nutrients. Services performed by natural systems are called

ecosystem services. A coastal wetland that buffers a town from storm surges is doing the same job as a sea wall, at no building cost.

- **Sink** — the environment absorbs and breaks down our wastes, up to a limit. Air carries and disperses smoke; rivers, soils and oceans break down organic waste and take up carbon dioxide. A sink stops working when wastes arrive faster than they can be absorbed.
- **Spiritual** — places hold meaning: landscapes people love for their beauty and peace, places of identity and memory, and places made sacred by faith, as the River Ganges is for Hindus.

Sustainability is a **contested term** — different people use it in different ways. As in section 1C, this section uses it in the sense given by the World Commission on Environment and Development (the Brundtland Commission) in *Our Common Future* (1987): meeting the needs of the present **without** reducing the ability of future generations to meet their own needs. Other definitions exist and are not interchangeable with this one.

The functions give us criteria. A *criterion* is a test you apply when you judge something. Each function becomes a test for sustainability:

Function	The criterion it gives us
Source	Can the place keep supplying food, water and materials?
Services	Do clean water, habitat and recreation still work?
Sink	Are wastes below what the place can absorb?
Spiritual	Are places that hold deep meaning protected?

If a human-induced change weakens any of these functions, it lowers the sustainability of the places that depend on it.

The four functions of the environment, used as criteria for assessing sustainability



If a change weakens any function, it lowers the sustainability of the places that depend on it.

A four-panel diagram of what the environment does for people. Panel 1, Source: the environment supplies water, food, timber, minerals and energy, for example irrigation water from the Murray–Darling rivers. Panel 2, Services: natural systems do work for free, for example coastal wetlands buffering towns from storm surges. Panel 3, Sink: the environment absorbs and breaks down wastes up to a limit, for example carbon dioxide taken up by the air. Panel 4, Spiritual: places hold meaning, for example the River Ganges, sacred to Hindus. A footer reads: if a change weakens any function, it lowers the sustainability of the places that depend on it.

Figure 1 — The four functions of the environment, and the criterion each one gives us. Source: original diagram created for this section, drawn from the functions named in VC2HG10K10 .E01.

2. The catalogue of human-induced changes (E02)

The curriculum names five kinds of human-induced change. Figure 2 matches each one to a real Australian example studied in this section.

Human-induced environmental changes and real Australian examples

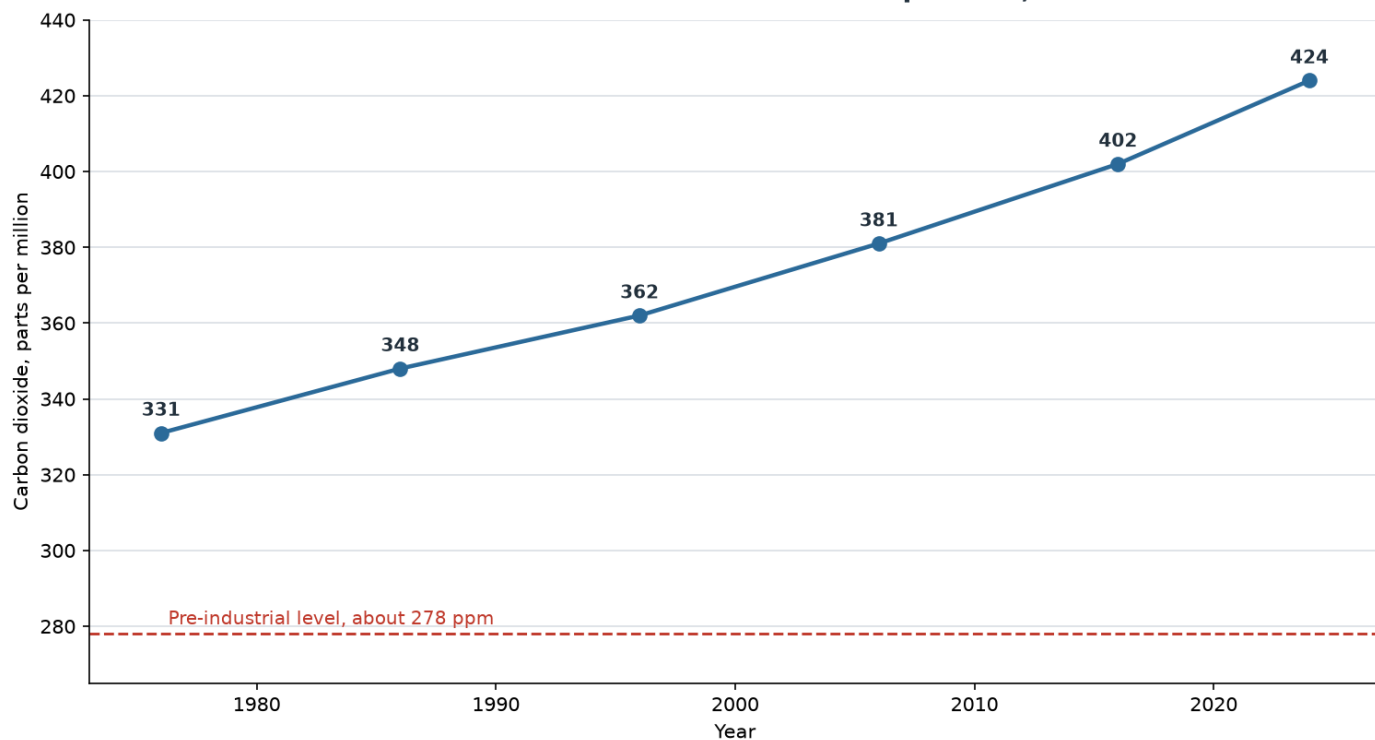
Type of change	What changes	Real Australian example
Water pollution	Harmful substances enter rivers, lakes, groundwater or the sea	Nutrient runoff into the Gippsland Lakes (Vic.) fed by the Latrobe, Avon, Mitchell, Nicholson and Tambo rivers; algae blooms followed
Atmospheric pollution	Harmful substances or particles enter the air	Smoke from the 2014 Hazelwood open-cut mine fire hung over Morwell (Vic.) for weeks; PM2.5 readings forced relocation advice
Loss of biodiversity	Species and habitats decline or disappear	More than 100 Australian species have become extinct since European settlement; over 1,900 are listed as threatened (State of the Environment 2021)
Land and water degradation	Land, rivers and seas lose condition and stop working well	Mass fish kills in the Darling River at Menindee (NSW) in 2018-19 and March 2023, after drought, low flows and algae blooms
Climate change	Greenhouse gases add heat to the climate system	Australia's land has warmed by 1.51 degrees since 1910; every year since 1996 has been above the 1961-1990 average (State of the Climate 2024)

A three-column table listing five human-induced environmental changes — water pollution; atmospheric pollution; loss of biodiversity; land and water degradation; and climate change — with a plain-language description of what changes and one real Australian example for each: nutrient runoff into the Gippsland Lakes, smoke over Morwell from the 2014 Hazelwood mine fire, extinctions and threatened species, mass fish kills at Menindee, and national warming of 1.51 degrees since 1910.

Figure 2 — Human-induced environmental changes and real Australian examples. Source: original table created for this section; the examples are drawn from the sources listed at the end of this section. Retrieved 25 August 2026.

Climate change — the gases and the heat. The Cape Grim Baseline Air Pollution Station, on the north-west tip of Tasmania, has measured clean background air since 1976. Because the air arriving there has crossed the Southern Ocean away from cities, it shows what is building up in the global atmosphere. Carbon dioxide has risen from about 331 parts per million in 1976 to about 424 in 2024, against a pre-industrial level of about 278 (Figure 3). The extra gas traps heat. *State of the Climate 2024* (Bureau of Meteorology and CSIRO) reports that Australia's land has warmed by **1.51 degrees** since national records began in 1910, and that **every year from 1996 to 2024** was warmer than the 1961–1990 average (Figure 4).

Carbon dioxide in clean baseline air at Cape Grim, 1976-2024



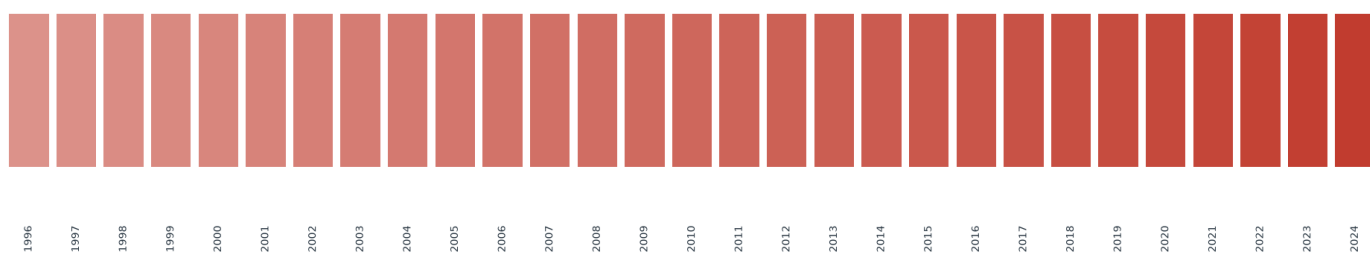
Source: Bureau of Meteorology / CSIRO, Cape Grim Baseline Air Pollution Station record. Values rounded to the nearest ppm; approximate.

A line graph of carbon dioxide in clean baseline air measured at Cape Grim, Tasmania, rising from about 331 parts per million in 1976 to about 424 in 2024, well above a dashed line marking the pre-industrial level of about 278 parts per million.

Figure 3 — Carbon dioxide in clean baseline air at Cape Grim, 1976–2024. Source: Bureau of Meteorology / CSIRO, Cape Grim Baseline Air Pollution Station record. Values rounded to the nearest part per million; approximate. Retrieved 25 August 2026.

Every year from 1996 to 2024 was warmer than Australia's 1961-1990 average

29 years in a row above the average - one coloured cell per year



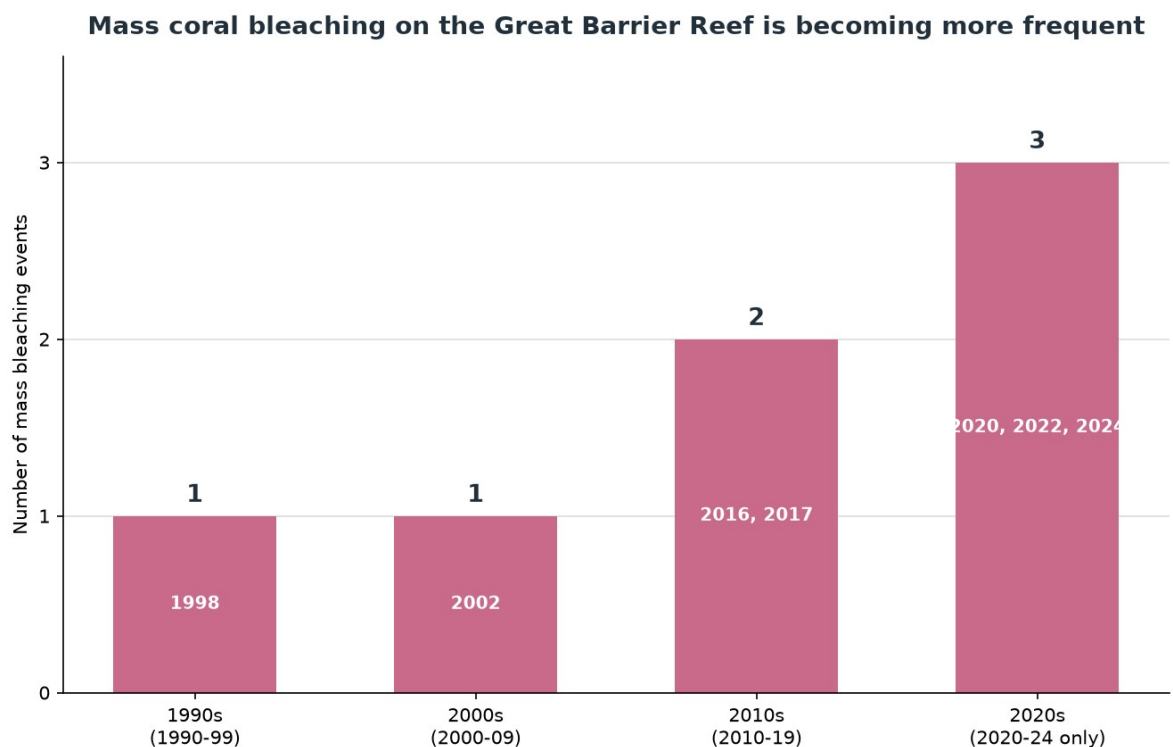
Australia's land has warmed by 1.51 degrees since national records began in 1910 (State of the Climate 2024, Bureau of Meteorology and CSIRO). Australia's seas have also warmed, and southern cool-season rainfall has declined.

A strip of 29 warm-coloured cells, one for each year from 1996 to 2024, showing every year was warmer than Australia's 1961–1990 average. A caption notes that Australia's land has warmed by 1.51 degrees since 1910, that the seas around Australia have also warmed, and that southern cool-season rainfall has declined.

Figure 4 — Every year from 1996 to 2024 was warmer than Australia's 1961–1990 average. Source: Bureau of Meteorology and CSIRO, *State of the Climate 2024*. Retrieved 25 August 2026.

Loss of biodiversity — the Great Barrier Reef. When sea water stays too warm, corals push out the tiny algae that feed them and turn white; this is **bleaching**. A bleached coral is not dead, but it is starving, and repeated bleaching kills reef life. Mass bleaching events on the Great Barrier Reef have become more frequent: 1998, 2002, 2016, 2017, 2020, 2022 and 2024 (Figure 5). In the 2022 aerial survey, bleaching was seen on about **91%** of the reefs surveyed. A

reef that loses its corals loses the fish, turtles and jobs that depend on them — a loss of biodiversity and of the reef’s services at once.



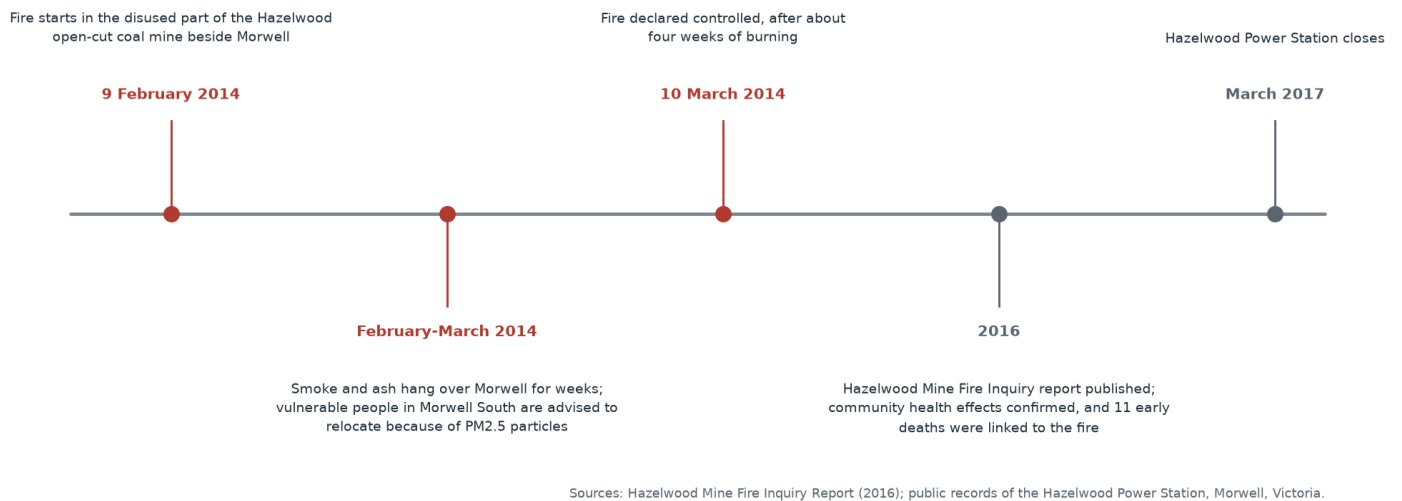
Source: Great Barrier Reef Marine Park Authority records of mass bleaching events. In its 2022 aerial survey, bleaching was observed on about 91% of the reefs surveyed.

A column graph counting mass coral bleaching events on the Great Barrier Reef by decade: one in the 1990s (1998), one in the 2000s (2002), two in the 2010s (2016 and 2017), and three in the 2020s so far (2020, 2022 and 2024). A caption notes that in the 2022 aerial survey, bleaching was observed on about 91 per cent of the reefs surveyed.

Figure 5 — Mass coral bleaching on the Great Barrier Reef is becoming more frequent. Source: Great Barrier Reef Marine Park Authority records of mass bleaching events; 2022 aerial survey. Retrieved 25 August 2026.

Atmospheric pollution — Hazelwood. On **9 February 2014** a fire started in the disused part of the Hazelwood open-cut coal mine beside Morwell, in Victoria’s Latrobe Valley. For weeks, smoke and ash hung over the town; vulnerable people in Morwell South were advised to relocate because of the fine particles (PM2.5) in the air. The fire was declared controlled on **10 March 2014**. The 2016 Hazelwood Mine Fire Inquiry confirmed health effects in the community and linked **11 early deaths** to the fire. Hazelwood Power Station closed in March 2017. For Morwell, the environment’s sink function failed: the air could not absorb and disperse what was poured into it (Figure 6).

The 2014 Hazelwood mine fire: atmospheric pollution meets a town

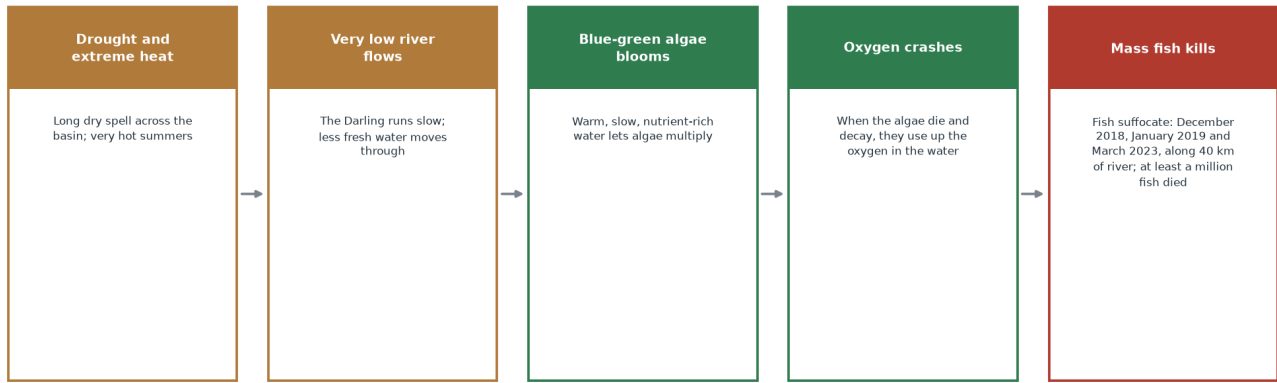


A timeline of the 2014 Hazelwood mine fire: the fire starts on 9 February 2014 in the disused part of the open-cut coal mine beside Morwell; through February and March 2014 smoke and ash hang over the town and vulnerable people in Morwell South are advised to relocate because of PM2.5 particles; the fire is declared controlled on 10 March 2014 after about four weeks of burning; the 2016 Hazelwood Mine Fire Inquiry report confirms community health effects and links 11 early deaths to the fire; Hazelwood Power Station closes in March 2017.

Figure 6 — The 2014 Hazelwood mine fire: atmospheric pollution meets a town. Source: Hazelwood Mine Fire Inquiry Report (2016); public records of the Hazelwood Power Station, Morwell, Victoria. Retrieved 25 August 2026.

Degradation of an aquatic environment — Menindee. At Menindee, in far western New South Wales, the Darling River runs past lakes that store water for the region. Drought and extreme heat, very low river flows, and nutrients in the water allowed **blue-green algae blooms** (sudden, harmful growths of algae) to form. When the algae died and decayed, the process used up the oxygen in the water, and fish suffocated. Mass fish kills struck in **December 2018, January 2019 and March 2023**, along about 40 kilometres of river; at least a million fish died (Figure 7). A river that can no longer hold its fish has been degraded as a place, a source and a sink.

Cause chain: degradation of an aquatic environment at Menindee (NSW)



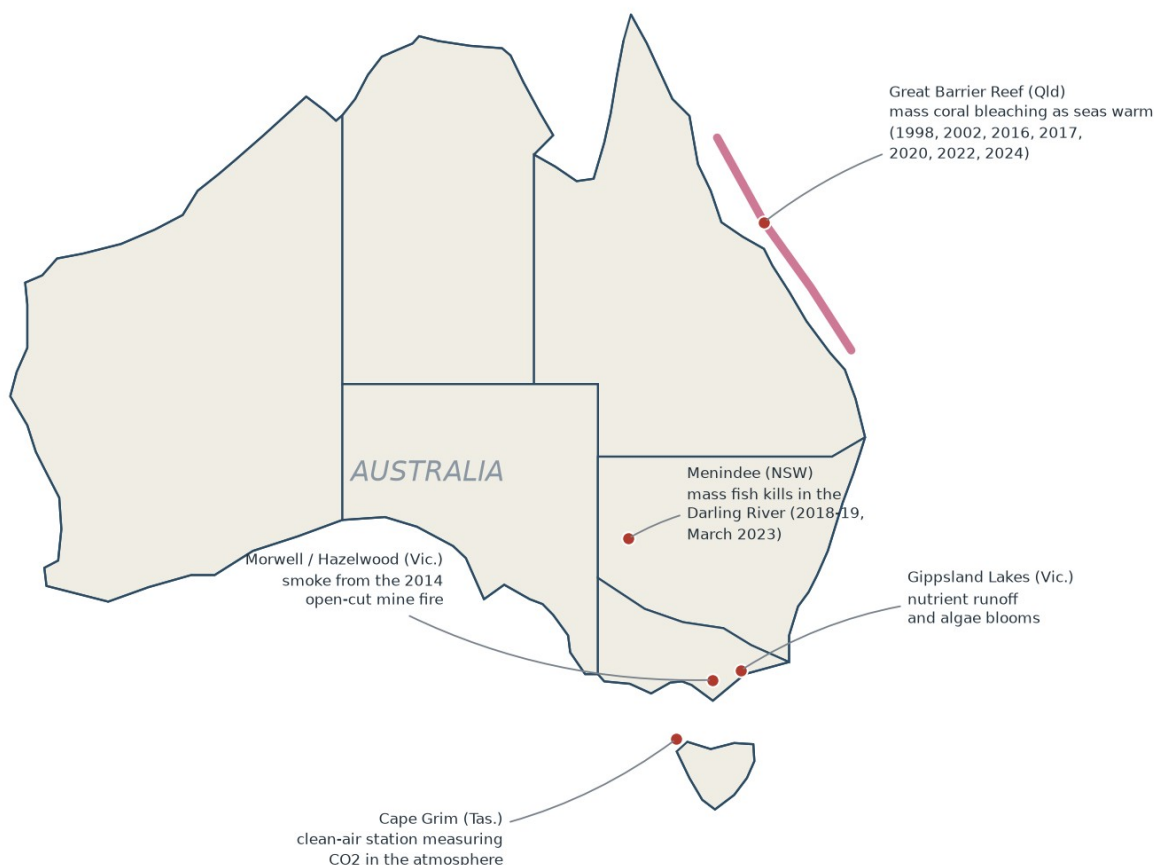
Drought and upstream water use reduced the flows that normally flush the river - how to balance those uses is one of the tensions in this section.

A cause-chain diagram of five boxes linked by arrows: drought and extreme heat lead to very low river flows; low flows let blue-green algae blooms form in warm, nutrient-rich water; decaying algae crash the oxygen level; and mass fish kills follow at Menindee in December 2018, January 2019 and March 2023, along 40 kilometres of river, with at least a million fish dying. A footer notes that drought and upstream water use reduced the flows that normally flush the river, and that how to balance those uses is one of the tensions in this section.

Figure 7 — Cause chain: degradation of an aquatic environment at Menindee (NSW). Source: New South Wales Government reporting and the independent review of the 2018–19 fish kills. Retrieved 25 August 2026.

The places on one map. Figure 8 locates the places studied in this section. Notice the spread: a global signal measured in Tasmania, a reef in Queensland, a river town in New South Wales, and two Victorian cases — the same catalogue of changes, playing out in different places at different scales.

Places studied in this section



Simplified, original sketch from the series' hand-drawn continent geometry; boundaries approximate and for study only - not for navigation.

A simplified sketch map of Australia marking five places studied in this section: Cape Grim on the north-west tip of Tasmania (clean-air station measuring carbon dioxide), the Great Barrier Reef off Queensland (mass coral bleaching in 1998, 2002, 2016, 2017, 2020, 2022 and 2024), Menindee in far western New South Wales (mass fish kills in the Darling River in 2018–19 and March 2023), the Gippsland Lakes in Victoria (nutrient runoff and algae blooms), and Morwell and Hazelwood in Victoria (smoke from the 2014 open-cut mine fire). A footer notes the sketch is simplified, with approximate boundaries, for study only.

Figure 8 — Places studied in this section. Source: original sketch map drawn on the series' hand-built continent geometry; boundaries approximate and for study only — not for navigation.

3. Impacts on places and their sustainability: scale and interconnection

A human-induced change is not just an event; it is a test of what a place can keep doing. Apply the four criteria to any place in Figure 8 and the impact on sustainability becomes measurable:

- **Morwell (local scale):** for the weeks of the fire, the air as a sink failed, and the town's sustainability fell — people were advised to leave, sport stopped, and the town's reputation and identity were tied to the smoke for years.
- **Gippsland Lakes (regional scale):** when nutrient-laden floodwater overloaded the sink in 2021–22, blue-green algae bloomed into May 2022; fishing, swimming and boating — the Lakes' source and service functions — were weakened, in a wetland system listed as internationally important under an international wetlands treaty, and monitored by EPA Victoria.
- **Australia (national scale):** more than 100 Australian species have become extinct since European settlement and over 1,900 are listed as threatened (Australia State of the Environment 2021). Extinction is permanent: a source of biodiversity, once lost, cannot be renewed for any future generation.

- **The globe (global scale):** carbon dioxide mixed into the world’s atmosphere warms seas thousands of kilometres from where the gas was released — the bleaching in Figure 5 is a global change landing on Australian places.

Interconnection is the reason impacts travel. Upstream water use and drought reduced the flows that normally flush the Darling River past Menindee; decisions made far away shaped the river’s fate. The 2019–20 **Black Summer** bushfires show the same link in the other direction: a record fire season — around 24 million hectares burnt and 2,779 homes lost in Australia — followed years of drought and heat made more likely by a warming climate, degrading land, wildlife and places at once.

Change in one function pulls the others. At the reef, warming (a climate change) causes bleaching (degradation of an aquatic environment), which loses species (biodiversity) and then tourism jobs and coastal protection (services and source). That chaining is exactly why the criteria must be applied together, never one at a time. The same reasoning appears in 1C and 1D: a climate that constrains food production weakens farming’s source function, and therefore the sustainability of the farming places built on it.

4. Tensions over sustainable practice (E03, E04)

Sustainability is contested because **individuals, communities, businesses and governments** weigh the four functions differently, and they carry the costs of change differently. Two Australian cases make this clear.

Case 1 — ending native forest logging in Victoria. In 2019 the Victorian Government announced that native forest logging would end by 2030. In May 2023 it brought the end date forward to **1 January 2024**. VicForests, the state-owned logging corporation, held about **1,639 direct jobs** and ceased to exist on 30 June 2024. Figure 9 lays out what mattered to each group, and why the same decision reads as protection to one group and as loss to another.

Perspectives and tensions: ending native forest logging in Victoria

Who	What matters to them	Their position on the phase-out
Individuals: timber workers and their families	Pay, job security, skills and pride in the work	Jobs face ending; workers need new training and income support; about 1,639 direct jobs were held by VicForests
Communities: mill towns and forest towns	Local income, services and identity built around forestry	Towns worry about losing population and services; some residents also want the forests protected for future generations
Communities: conservation groups and many tourists	Old-growth forest, wildlife and clean water catchments	Support the phase-out; argue logging threatened species (such as the Leadbeater’s possum and greater glider) and water supplies, and that forest tourism has value too
Businesses: sawmills, contractors and timber buyers	Reliable wood supply, contracts and time to switch sources	Need certainty about where wood will come from (plantations, imports) and time to change over
Government: Victorian Government	Balancing jobs and regional economies against species, forests and climate commitments	Set the phase-out date (1 January 2024) and promised support for workers and towns to move into new industries

A three-column table of five perspectives on ending native forest logging in Victoria — timber workers and their families; mill towns and forest towns; conservation groups and many tourists; sawmills, contractors and timber buyers; and the Victorian Government — showing what matters to each group and their position on the phase-out that took effect on 1 January 2024.

Figure 9 — Perspectives and tensions: ending native forest logging in Victoria. Source: Victorian Government announcements (6 November 2019; 23 May 2023); VicForests public records. Retrieved 25 August 2026.

Hear both sides (a “steelman” is the strongest, fairest version of each argument) — ending native forest logging in Victoria. *For continuing logging (many workers, some mill towns, timber businesses):* forestry pays wages, keeps towns and their services alive, and supplies local timber; ending it suddenly strands hard-won skills and can shift demand to imported timber or to plantations that do not replace every product, so the jobs and the town’s social sustainability carry the cost. *For ending logging (conservation groups, many tourists, parts of government):* native forests hold threatened species such as the Leadbeater’s possum and the greater glider, store carbon and protect the catchments that supply clean water; repeated logging and severe fires make recovery harder, and forest-based tourism employs people too. A sustainable answer has to weigh **both** — which is why the government paired the phase-out with support for workers and towns to move into new industries. Either conclusion can be reached; what earns marks is the reasoning, not the side.

Case 2 — the single-use plastics ban. From **1 February 2023**, Victoria banned several single-use plastic items, including straws, cutlery and foam foodware. The tension sits at a smaller scale but has the same shape: *individuals* lose convenience (and some people with disability rely on plastic straws), *businesses* such as caf  s face new costs and new suppliers, *communities* gain less litter in parks and waterways, and *government* weighs the environment’s sink — waterways that cannot absorb the plastic pouring into them — against those costs. Different weights, same four functions.

5. Bringing it together

The four functions turn “the environment” into four testable criteria (.E01). The catalogue names the changes to test: water pollution, atmospheric pollution, loss of biodiversity, land and water degradation, and climate change (.E02). Impacts are judged place by place, at the right scale, following the interconnections that carry change between places (§3). And because individuals, communities, businesses and governments weigh the functions differently, every response is a tension to be reasoned through, not a simple right or wrong (.E03, .E04). Section 3B now takes **one selected environmental issue** and studies its causes and consequences in depth with this toolkit; 3D asks why people’s worldviews lead them to disagree; 3E returns to the same issue to evaluate management.

Worked examples

Example 1 — scaffolded (functions as criteria, E01)

The Gippsland Lakes in Victoria are fed by six rivers — the Avon, Thomson, Latrobe, Mitchell, Nicholson and Tambo. Heavy rain in 2021 washed fertiliser and other nutrients from the catchment into the Lakes; blue-green algae bloomed into May 2022. The Lakes support fishing and water-based livelihoods, swimming and boating; their wetlands are listed as internationally important under an international wetlands treaty, and EPA Victoria monitors the water.

Using the four functions as criteria, assess how nutrient pollution affects the sustainability of the Gippsland Lakes.

Step	Reasoning
Name the change	Nutrient pollution of a water body — water pollution and degradation of an aquatic environment (Figure 2).
Source test	Can the place keep supplying? Blooms threaten fish stocks and fishing livelihoods → weakened .
Services test	Do clean water, habitat and recreation still work? Swimming and boating were reduced during the blooms, and wetland habitat was under pressure in an internationally listed wetland system → weakened .
Sink test	Are wastes below what the water can absorb? Nutrients arrived faster than the Lakes could absorb them — the

Step	Reasoning
Spiritual test	blooms are the proof → overloaded . Are meaningful places protected? The Lakes are loved for their beauty and peace; poor water quality lowers that value → under pressure .
Judge	With every function weakened, overloaded or under pressure, the change lowers the sustainability of the Lakes and of the towns that depend on them, until nutrient inputs are reduced.

Figure 10 shows the same reasoning as a single table — the model to copy when you assess any place.

Worked model: applying the functions as sustainability criteria to one change

Environmental function	The criterion it gives us	Nutrient pollution of the Gippsland Lakes	Judgement
Source	Can the place keep supplying food, water and materials?	The Lakes support fishing and water-based livelihoods; blooms threaten fish stocks	Weakened
Services	Do clean water, habitat and recreation still work?	Blooms reduce swimming, boating and habitat; the wetlands are listed as an internationally important wetland	Weakened
Sink	Are wastes below what the water can absorb?	Fertiliser and other nutrients from the catchment rivers exceed what the Lakes can absorb	Overloaded
Spiritual	Are places that hold deep meaning protected?	The Lakes are valued for their beauty and peace by communities and visitors; poor water quality lowers that value	Under pressure

A worked-model table applying the four environmental functions as sustainability criteria to nutrient pollution of the Gippsland Lakes, with a judgement for each function: source weakened, services weakened, sink overloaded, and spiritual under pressure.

Figure 10 — Worked model: applying the functions as sustainability criteria to one change. Source: original table created for this section, from the facts of the 2021–22 Gippsland Lakes algae bloom (EPA Victoria; international wetlands treaty listing). Retrieved 25 August 2026.

Example 2 — scaffolded (tensions, E03/E04)

Use Figure 9. Explain why the same decision — ending native forest logging on 1 January 2024 — is a win for one group and a loss for another, and why that makes it a sustainability tension rather than a simple right/wrong call.

Step	Reasoning
Pick two perspectives	A timber worker (an <i>individual</i>) and a conservation group (a <i>community</i>).
What each values	The worker: pay, job security, skills and pride in the work. The group: threatened species, old-growth forest and clean water catchments.
Same decision, opposite readings	For the group, the phase-out protects the forest's services, source and spiritual functions → more sustainable. For the worker, it removes an income and threatens the social sustainability of mill towns unless

Step	Reasoning
Judge with the definition	support arrives. Sustainability covers the environment, the economy and people (as in 1C). The decision trades one pillar against another in the short term, so the quality of the transition support — training, new industries, income for towns — decides how sustainable the outcome is.

Practice questions

Scaffolded

- Q1.** List the four functions of the environment used in this section.
- Q2.** Restate the definition of *sustainability* used in this section, and name the report and year it comes from.
- Q3.** Match each function to its criterion: (a) source, (b) services, (c) sink, (d) spiritual — with (i) wastes below what the place can absorb, (ii) keep supplying food, water and materials, (iii) meaningful places protected, (iv) clean water, habitat and recreation still working.
- Q4.** Using Figure 2 and Figure 8, name the main type of human-induced change studied at: (a) Morwell, (b) Menindee, (c) the Great Barrier Reef.
- Q5.** Use Figure 3. (a) Read the carbon dioxide value for 1976 and for 2024. (b) How far is the 2024 value above the pre-industrial level of about 278 parts per million?
- Q6.** From Figure 7, write the cause chain of the Menindee fish kills in order, in one sentence.

Un scaffolded

- Q7.** Explain why mass coral bleaching is both a loss of biodiversity and a threat to the sustainability of places that depend on the reef.
- Q8.** Using Figure 6, explain how the Hazelwood mine fire shows the environment's **sink** function failing, and describe one impact on the sustainability of Morwell as a place.
- Q9.** Steelman: give the strongest fair case you can for **both** sides of the Victorian logging phase-out, then say which side the evidence in this section supports better — and why the reasoning matters more than the side you pick.
- Q10.** "Climate change is a local issue as well as a global one." Use **two** places from Figure 8 to evaluate this claim.

Inquiry task — build your own evidence row (data and source task)

You will collect real data from named sources, represent it, and judge its reliability.

- Choose.** Pick one type of change from Figure 2 and one real place for it — either a place this section did not cover, or a second example for a place we did (for instance, an algae bloom, fish kill, fire, flood or pollution event in your own region).
- Collect.** Find **two** real sources for your event — for example EPA Victoria (or your state's environment protection authority), the Bureau of Meteorology, CSIRO, a marine park authority, the ABS, or a named local council or water authority. From each source record: the place, the date(s), what changed, and one number or dated fact.
- Represent.** Build a four-row table in the style of Figure 2 (type of change / what changes / your example / source and date), or sketch and label your place on a simple map in the style of Figure 8.
- Analyse.** Apply the four criteria from Key ideas 1 to your place: which functions were weakened, overloaded or under pressure?
- Evaluate.** Which of your two sources is more reliable, and why? Think about who collected the data, how, and when — and give the retrieval date for each source.

6. **Conclude.** Write three sentences on what your event shows about the sustainability of your place, using the words *function* and *sustainability* correctly.
-

Answers

Q1. Source, services (which include ecosystem services), sink, spiritual. **Q2.** Meeting the needs of the present without reducing the ability of future generations to meet their own needs; World Commission on Environment and Development (Brundtland Commission), *Our Common Future*, 1987. **Q3.** (a)–(ii), (b)–(iv), (c)–(i), (d)–(iii). **Q4.** (a) Atmospheric pollution. (b) Land and water degradation (with water pollution). (c) Loss of biodiversity driven by climate change (also degradation of an aquatic environment). **Q5.** (a) About 331 parts per million (1976) and about 424 parts per million (2024). (b) About 146 parts per million above 278. **Q6.** Drought and extreme heat cut river flows, low flows allowed blue-green algae blooms, decaying algae used up the oxygen, and fish suffocated in mass kills in December 2018, January 2019 and March 2023. **Q7–Q10.** See fully-worked solutions.

Inquiry task. Answers vary. Check that the student used two named real sources with retrieval dates, represented the event, applied the four criteria, and evaluated reliability by who collected the data, how and when.

Fully-worked solutions

Q7. Bleaching kills or weakens corals, and a reef that loses its corals loses the species that live on them — a direct loss of biodiversity. The same loss weakens the reef’s functions for people: fewer fish (source), less tourism work for reef towns such as Cairns and Townsville (source and services), weaker protection of coasts from waves (services), and less of the beauty and meaning that draws people to the reef (spiritual). Because several functions fall together, the sustainability of reef-dependent places falls with them.

Q8. For weeks the fire poured smoke and fine particles (PM2.5) into the air over Morwell faster than the air could absorb and disperse them — the sink function failed. One impact on the sustainability of Morwell as a place: vulnerable residents were advised to relocate, so the town for a time lost part of its community (social), local sport and daily life were disrupted (services), and the town’s name became tied to the smoke, weakening its identity and reputation (spiritual). A place whose air cannot be breathed is not sustaining its people.

Q9. Strongest form of the case for continuing logging: forestry is skilled, paid work that keeps mill towns and their services alive and supplies local timber; a sudden end strands those skills and shifts demand to imports or plantations that may not replace every product, so workers and towns pay the cost. Strongest form of the case for ending it: native forests hold threatened species (Leadbeater’s possum, greater glider), store carbon and protect water catchments; logging plus severe fires makes recovery harder, and forest tourism has value too. Evaluation: the evidence in this section supports the conservation side on the *environmental* functions (species, carbon, catchments are non-renewable on human timescales) while accepting that the *social* and *economic* costs are real and fell on identifiable workers and towns — which is why the phase-out was paired with transition support. A strong answer defines the perspectives, steelmans both, and judges with the sustainability definition; either conclusion can earn full marks.

Q10. Global in cause, local in impact. Carbon dioxide measured at Cape Grim is a global signal — the gas mixes around the whole planet — yet the warming it records lands on specific Australian places: seas warm enough to bleach the Great Barrier Reef, and a hotter, drier climate that helped set up the Menindee fish kills and the Black Summer fires. So the claim is sound: the change is global in scale, but its impacts on sustainability are felt locally, in named places, through their four functions. Any two places with the global→local chain made explicit earns the mark.

Sources

All figures in this section are original, generated from the values shown and listed below. Retrieval date for all cited datasets: 25 August 2026.

- World Commission on Environment and Development, *Our Common Future* (1987) — definition of sustainability, re-stated from section 1C.
- Bureau of Meteorology / CSIRO, Cape Grim Baseline Air Pollution Station record — carbon dioxide values, 1976–2024 (rounded to the nearest part per million; approximate). Figure 3.
- Bureau of Meteorology and CSIRO, *State of the Climate 2024* — warming of 1.51 degrees since 1910; every year 1996–2024 above the 1961–1990 average. Figure 4.

- Great Barrier Reef Marine Park Authority — records of mass bleaching events (1998, 2002, 2016, 2017, 2020, 2022, 2024); 2022 aerial survey, bleaching on about 91% of reefs surveyed. Figure 5.
- Hazelwood Mine Fire Inquiry Report (2016); public records of the Hazelwood Power Station, Morwell, Victoria — fire dates, relocation advice, health findings, March 2017 closure. Figure 6.
- New South Wales Government reporting and the independent review of the 2018–19 fish kills — Menindee events of December 2018, January 2019 and March 2023; at least a million fish along about 40 km of the Darling River. Figure 7.
- Australia State of the Environment 2021 — more than 100 extinctions since European settlement; over 1,900 species listed as threatened. Figure 2 and Key ideas 3.
- EPA Victoria; international wetlands treaty listing — Gippsland Lakes water quality, six catchment rivers, and the 2021–22 algae bloom. Figure 10 and Worked example 1.
- Victorian Government announcements (6 November 2019; 23 May 2023); VicForests public records — logging phase-out dates, about 1,639 direct jobs, cessation 30 June 2024. Figure 9.
- Victorian Government single-use plastics ban, stage one from 1 February 2023. Key ideas 4.
- Australian emergency-management reporting — Black Summer 2019–20 fires: about 24 million hectares burnt, 2,779 homes lost (approximate). Key ideas 3.
- Original diagrams — Figures 1, 2, 8, 9 and 10, drawn from the values and facts they display.

Note on scope: this section teaches VC2HG10K10 through real, named, neutral Australian and Victorian examples. No First Nations material appears in this section, and the question-bank item under .E02 that carries First Nations text is not printed, per the book’s design decisions. *Sustainability* is used in the Brundtland (1987) sense and treated as contested where Australians disagree; tension items mark the reasoning, not the position reached. All figures are original and drawn from the values they display; approximate values are labelled.

One environmental issue up close: its causes and consequences, examined geographically

Theory

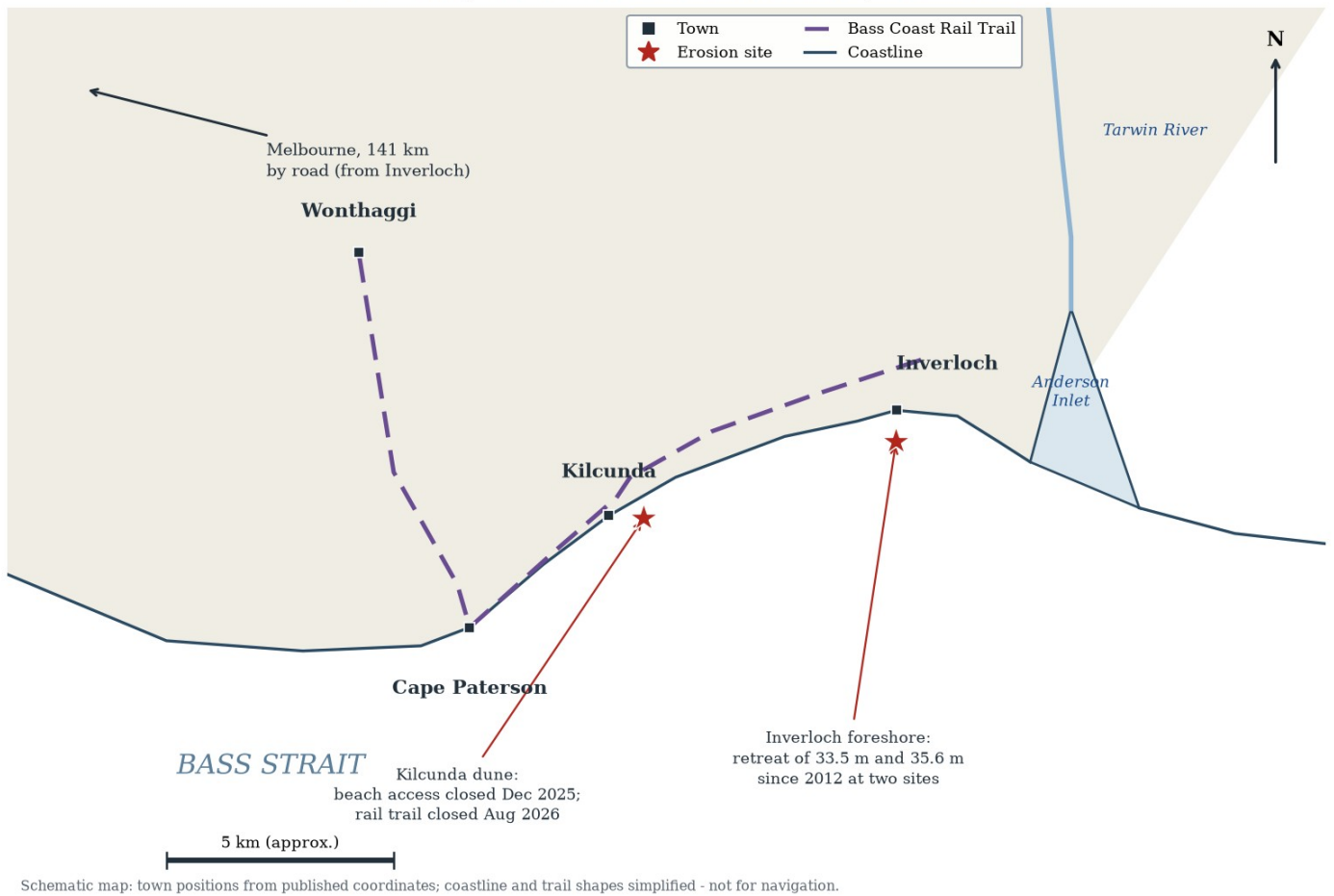
Part 1 — A geographical approach to an environmental issue

In this section, an **environmental issue** means a change in the environment, produced at least partly by human activity, that people judge to be a problem because it threatens places, people or the work the environment does for us. Naming something an “issue” is a value judgement — reasonable people can weigh the same change differently, and section 3D examines why people disagree. What makes geography different from a simple list of complaints is its **approaches**: organised ways of thinking that help us see a whole system. This section applies three of them to one real Australian issue:

1. **Interconnected (holistic) thinking** — tracing how human actions and **biophysical processes** (the workings of the natural world: waves, wind, water and sand) join together to produce the issue, and then digging down to the **underlying causes** of those human actions (E01).
2. **Scale** — sorting causes into local, regional and global, because the same issue is driven by decisions made in a local street and by processes that cover the whole planet.
3. **The four functions of the environment** — asking what the issue does to the environment’s work as a **source**, a provider of **services** (including ecosystem services), a **sink**, and a place of **spiritual** meaning, as set up in section 3A. Whether those functions can keep working into the future is the sustainability question (E02).

The selected issue is **coastal erosion on the Bass Coast surf coast of Victoria**, at the towns of **Inverloch** and **Kilcunda**. Section 3E will return to the same issue to study management responses. Figure 1 shows the study area.

The study area: Bass Coast surf coast, Victoria



Schematic map of the Bass Coast surf coast, Victoria, showing Wonthaggi inland, Cape Paterson, Kilcunda and Inverloch along the Bass Strait coast, Anderson Inlet and the Tarwin River to the east, the Bass Coast Rail Trail as a dashed line, and red stars at the two erosion sites

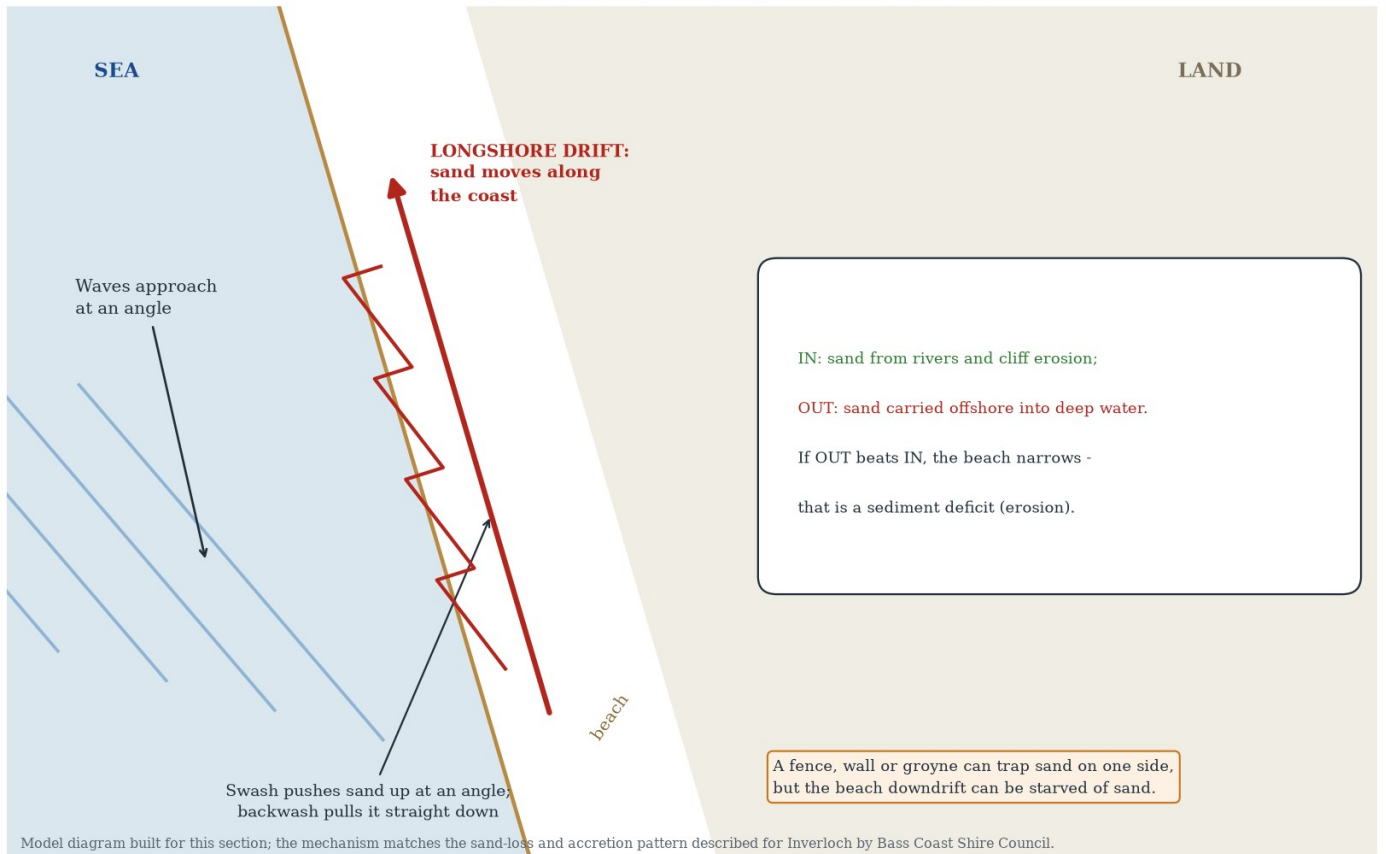
Figure 1. The study area: Bass Coast surf coast, Victoria.

Inverloch is a coastal town on Bass Strait, about 141 km south-east of Melbourne, beside Anderson Inlet, the shallow estuary where the Tarwin River meets the sea. Kilcunda sits about 7 km to the west. The **Bass Coast Rail Trail**, a walking and cycling path built on an old railway line, runs along the coast between Wonthaggi and Inverloch, close behind the dunes. Both towns front open sandy surf beaches — and at both, the coast is losing sand faster than the sand returns.

Part 2 — The biophysical processes: how a sandy coast works

A sandy beach is not a fixed thing. It is a store of sand that waves are always moving. When waves reach the shore at an angle, the **swash** (the water rushing up the beach) pushes sand along at that same angle, while the **backwash** (the water running back down) pulls it straight down the slope. The result is a slow sideways shuffle of sand along the coast, called **longshore drift** (Figure 2). Whether a beach grows or shrinks is its **sand budget**: sand arrives from rivers, cliff wear and longshore drift, and leaves when big waves carry it offshore into deep water. If more leaves than arrives, the beach narrows and the dune behind it is cut back — that is **erosion**.

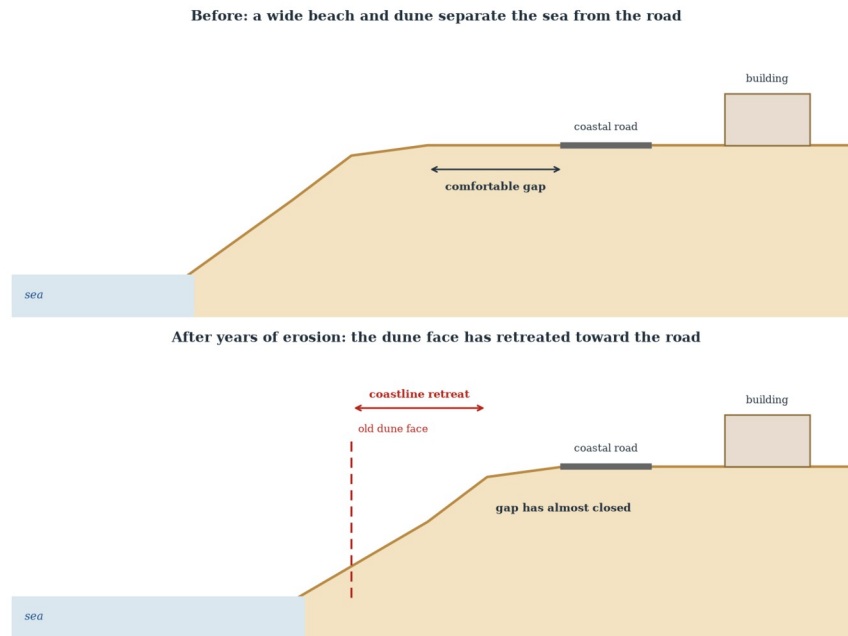
How waves move sand along a beach (model)



Plan-view model of a sandy beach: waves arriving at an angle to the coast, swash and backwash moving sand in a zigzag, longshore drift carrying sand along the shore, and a sand-budget box listing inputs (rivers and cliff wear) and outputs (sand carried offshore)

Figure 2. How waves move sand along a beach (model).

Now the local mechanism. The Inverloch foreshore is sheltered from the strong westerly winds of the middle latitudes, but it faces south, so it is exposed to southerly winds and **storm surge** (a temporary rise in sea level pushed up by storms). These surges are strongest in winter, while the calmer spring and summer allow sand to build back up. That seasonal see-saw is normal. What has changed, according to Bass Coast Shire Council, is that in recent years the sand lost during storm events has greatly exceeded the sand returning in the calm seasons — the budget has gone into deficit, so the coastline retreats (Figure 3).



Model cross-section built for this section. At Inverloch, Bass Coast Shire Council has measured 33.5 m and 35.6 m of coastline retreat since 2012 at two sites; at one site the road is now within 6 m of the eroding edge and a building stands 16 m from the dune face.

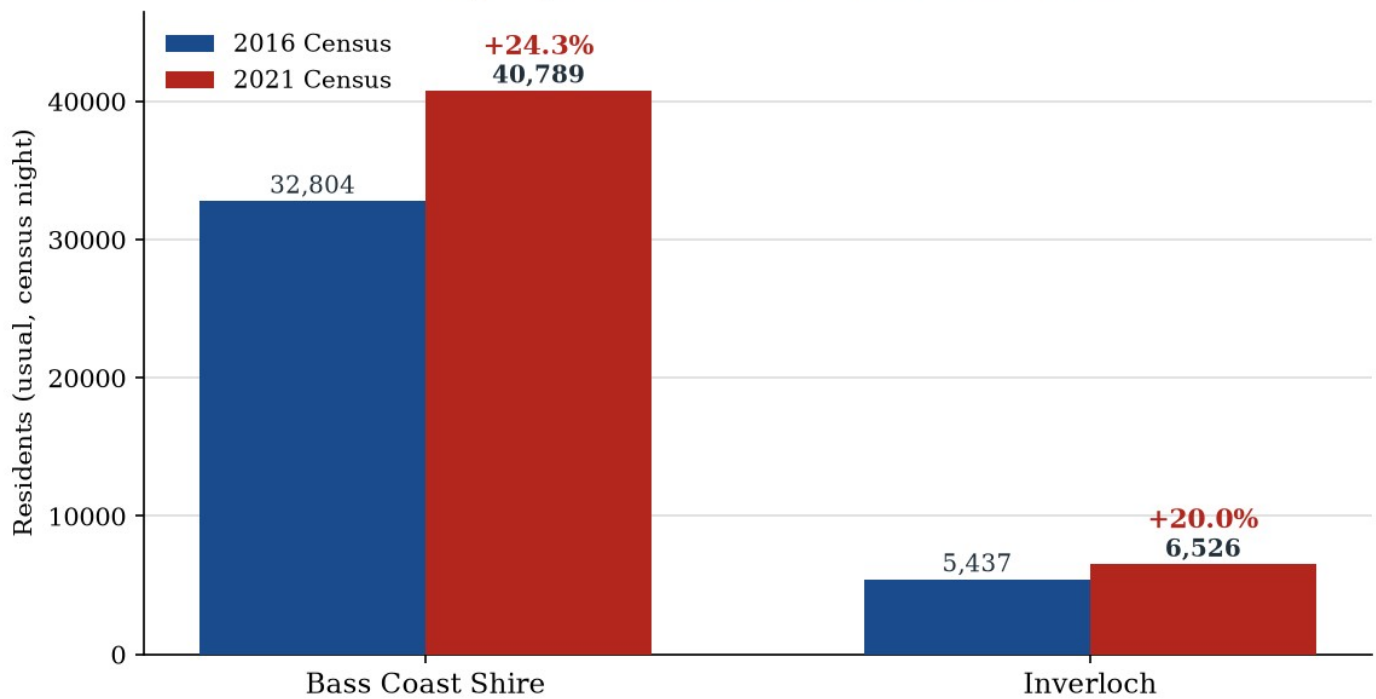
Two model cross-sections of a sandy coast: before, with a wide beach and dune between the sea and the coastal road; after years of erosion, with the dune face retreated toward the road and the gap almost closed

Figure 3. Coastline retreat, model cross-section. At Inverloch the council has measured 33.5 m of retreat since 2012 at the surf club site (building now 16 m from the dune face) and 35.6 m at the road site (road now within 6 m of the eroding edge).

Part 3 — Underlying causes: why are people and assets so close to the edge?

The biophysical processes above would erode an empty coast too. The *issue* — the thing people judge to be a problem — exists because homes, a surf life saving club, a road and a rail trail stand within tens of metres of the dune. That is where underlying causes enter (Figure 4).

More people want to live on the Bass Coast



Source: Australian Bureau of Statistics, Census of Population and Housing 2016 and 2021 (retrieved 25 August 2026).

Grouped bar chart of census population: Bass Coast Shire 32,804 in 2016 and 40,789 in 2021, up 24.3 per cent; Inverloch 5,437 in 2016 and 6,526 in 2021, up 20.0 per cent

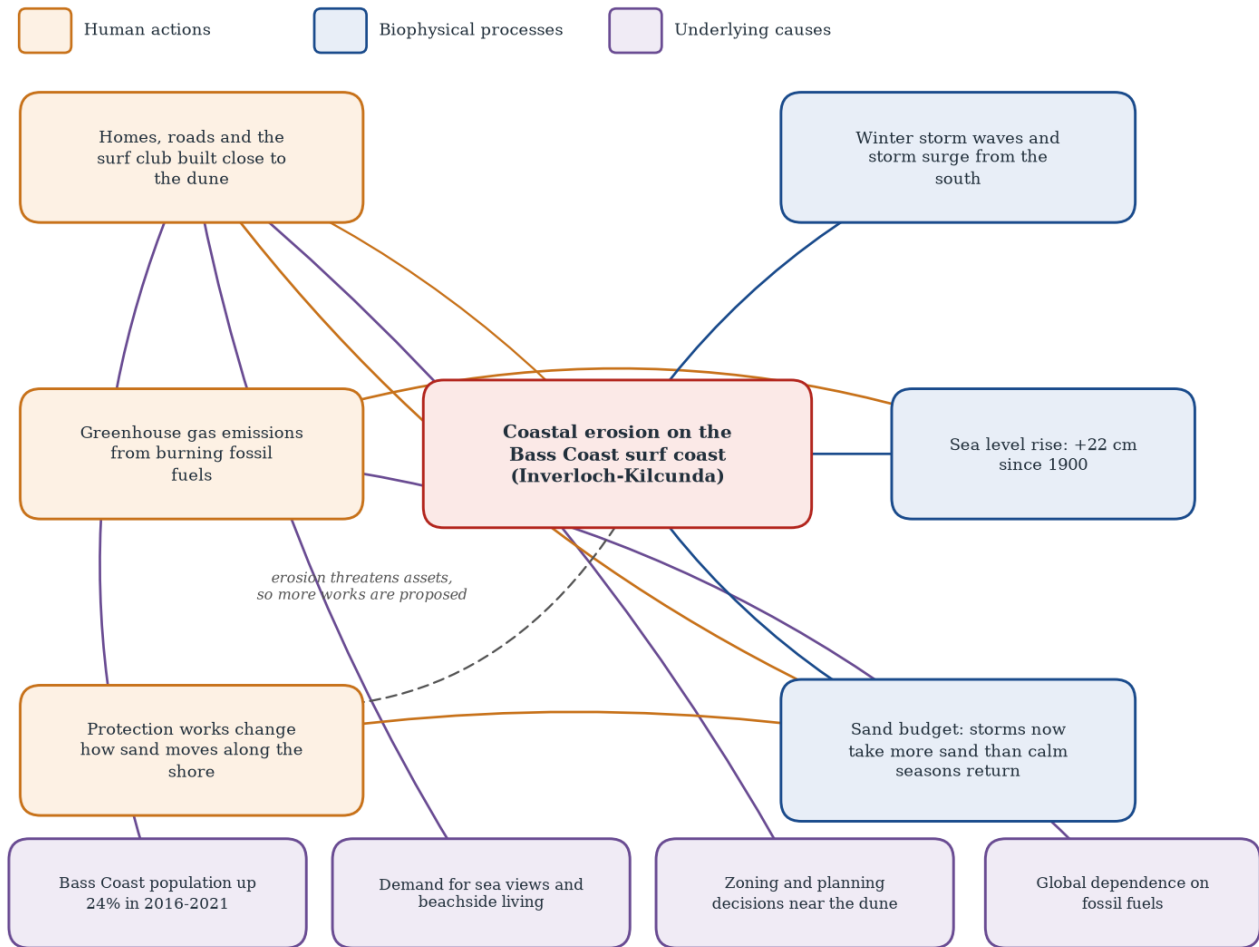
Figure 4. More people want to live on the Bass Coast (ABS Census).

Between the 2016 and 2021 Censuses, the Bass Coast Shire grew from 32,804 residents to 40,789 — up 24.3% — and Inverloch grew from 5,437 to 6,526, up 20.0%. Coastal living is in demand: people value sea views, beach access and a holiday lifestyle, and planning decisions over many decades zoned land close to the dunes for houses, roads and public facilities. Those decisions are the underlying causes of the human actions (building close to the dune) that turn a natural process into an issue.

Part 4 — Interconnected (holistic) thinking: the causes web

Holistic thinking puts parts 2 and 3 together instead of blaming one thing. Figure 5 is a **causes web** for the issue. Human actions (orange) and biophysical processes (blue) combine to produce the erosion, and the underlying causes (purple) explain the human actions. Follow a few threads: burning fossil fuels adds greenhouse gases, which warm the ocean and raise sea level; a higher sea level lifts the starting height of every storm surge, so winter surges attack the dune from a higher base; homes and roads built close to the dune put assets in the path of those surges; and walls and fences built to protect one spot can starve the next beach of sand.

A causes web for coastal erosion - interconnected (holistic) thinking



Model diagram built for this section. Arrows show connections, not exact amounts. Data labels: Bureau of Meteorology and CSIRO (2024); Australian Bureau of Statistics (2021 Census).

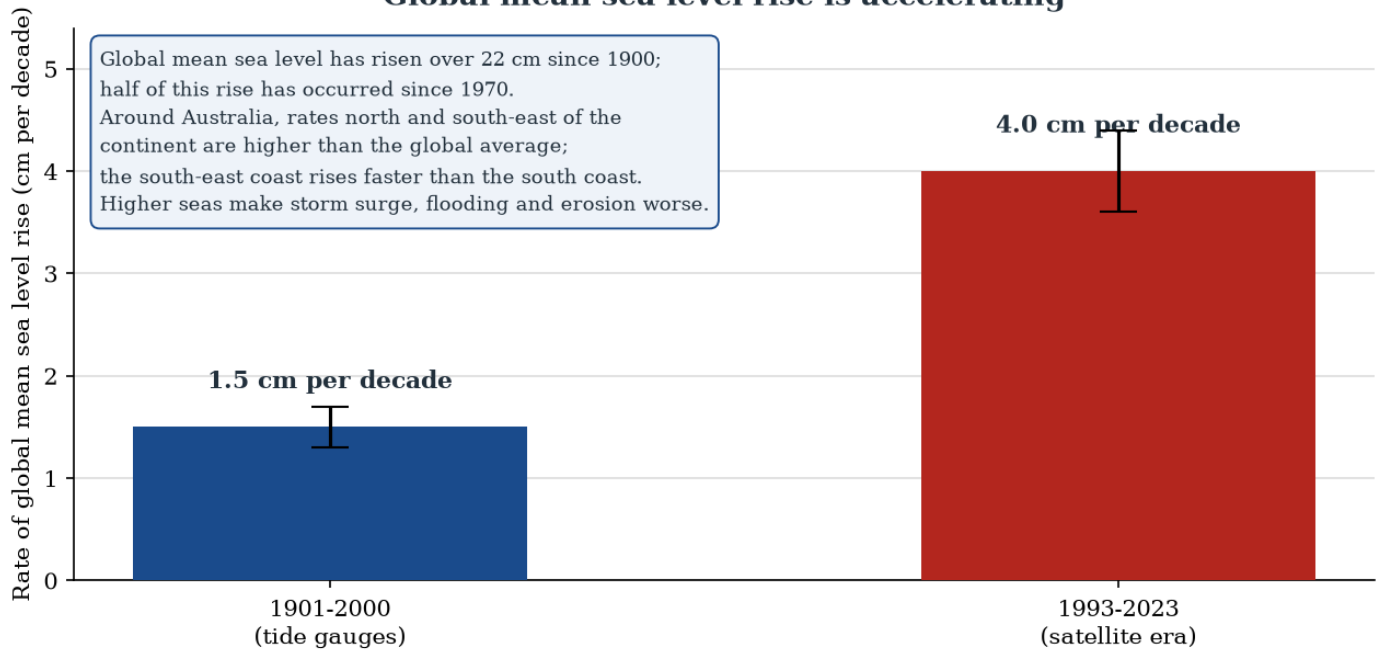
Systems web for coastal erosion on the Bass Coast surf coast: human actions in orange boxes, biophysical processes in blue boxes and underlying causes in purple boxes, joined by arrows to the central issue, with a dashed feedback arrow showing that erosion threatens assets and so prompts more protection works

Figure 5. A causes web for the issue (model).

The web also shows a feedback loop: erosion threatens the assets, which creates pressure for more protection works, which again change how sand moves. That loop is where honest disagreement sits, and both views deserve a fair hearing. One view says the deepest cause was ever building so close to a moving coast, and that walls and fences only delay a retreat that the sea will win. The other view says the community, its surf club and its road are here now, cannot simply be abandoned, and deserve protection while longer-term plans are worked out. Geographers do not settle that argument here; they make sure both sides can see the whole web.

Sea level is the global thread in the web (Figure 6). Global mean sea level has risen over 22 cm since 1900, half of it since 1970, and the rate has climbed from 1.5 cm per decade over 1901-2000 towards 4 cm per decade over 1993-2023. Around Australia the rise is uneven: rates north and south-east of the continent are significantly higher than the global average, and the south-east coast — the Bass Coast's neighbourhood — rises faster than the south coast.

Global mean sea level rise is accelerating



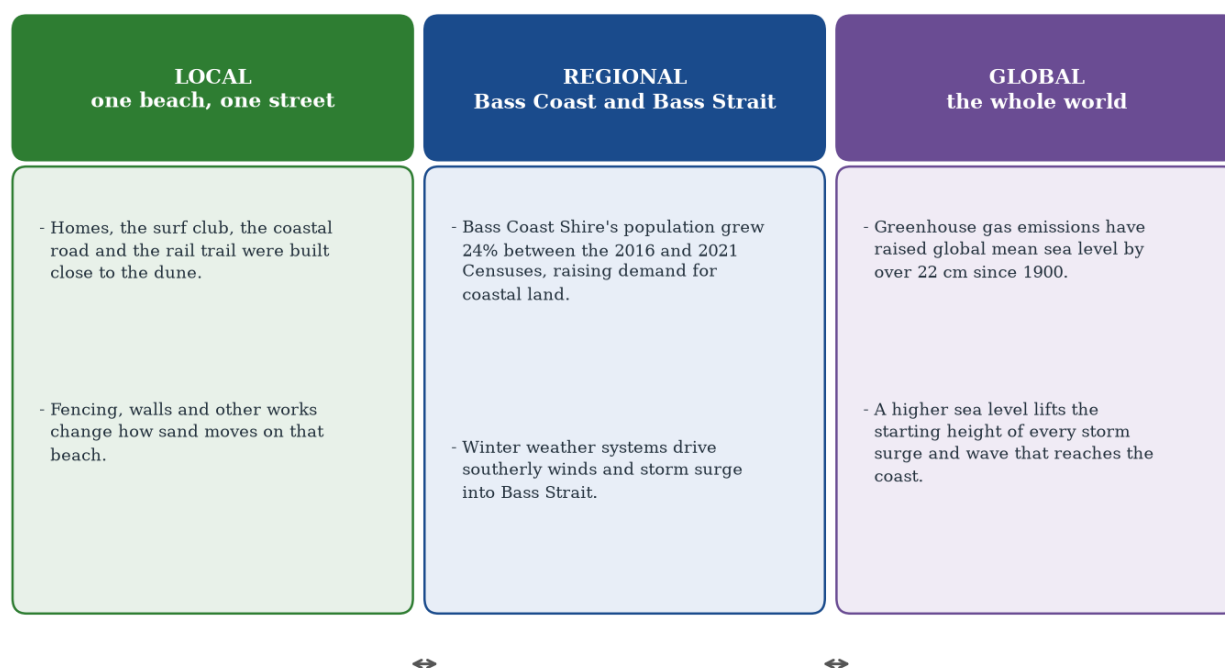
Source: Bureau of Meteorology and CSIRO, State of the Climate 2024, sea level section (retrieved 25 August 2026). Error bars are the published ranges.

Bar chart of the rate of global mean sea level rise: 1.5 cm per decade (plus or minus 0.2) over 1901-2000 and 4.0 cm per decade (plus or minus 0.4) over 1993-2023, with a note that the global mean sea level has risen over 22 cm since 1900 and that rates south-east of Australia are above the global average

Figure 6. Global mean sea level rise is accelerating.

Finally, sort the web by scale (Figure 7). The same issue looks different from each scale, and causes at one scale feed the others: global sea level rise lifts every local storm surge, while local building decisions put assets in the path of the waves.

One issue, three scales of cause



Causes at each scale flow into the others: global sea level rise lifts every local storm surge, and local building decisions put assets in the path of the waves.

Model table built for this section. Data: Australian Bureau of Statistics Census 2016 and 2021; Bureau of Meteorology and CSIRO, State of the Climate 2024.

Three-column table sorting causes of the issue by scale: local (assets built close to the dune; works change sand movement on that beach), regional (24 per cent population growth raising demand for coastal land; winter storm surge in Bass Strait) and global (emissions raising sea level over 22 cm since 1900; a higher sea lifting every storm surge)

Figure 7. One issue, three scales of cause (model).

Part 5 — Consequences: what the issue does to the functions of the environment

E02 asks us to describe the impacts of the issue on the sustainability of the environment's functions — that is, whether the environment can keep doing its work for people and nature into the future. Figure 8 applies the four functions from section 3A to the study area.

What is at stake: the four functions of the environment at the coast

SOURCE what the coast supplies Here it: Food from Bass Strait and Anderson Inlet; land for homes, shops and tourism businesses. Erosion threatens it: Erosion eats the land itself. Roads, the rail trail and buildings lose their footing.	SERVICES what the coast does for us (including ecosystem services) Here it: A beach for swimming, surfing and tourism; a dune that shelters the land behind it; nesting space for the hooded plover. Erosion threatens it: A narrower beach and a cut-back dune leave less room for people and wildlife.
SINK where the coast absorbs waste and energy Here it: The beach and dune soak up wave energy, store sand and take in storm water. Erosion threatens it: With less sand to soak up the waves, wave energy strikes roads and buildings directly.	SPIRITUAL what the coast means to people Here it: The meanings people attach to the coast: memories, calm, and a sense of place. Erosion threatens it: Losing loved beaches, walks and landmarks - like the trail past the trestle bridge - harms wellbeing.

Model table built for this section, applying the functions framework of section 3A to the study area.

Four-panel table applying the four functions of the environment to the Bass Coast coast: source (food and land), services (beach recreation, dune shelter, hooded plover nesting space), sink (the beach and dune soak up wave energy and storm water) and spiritual (meanings, memories and a sense of place), each with the threat erosion poses to it

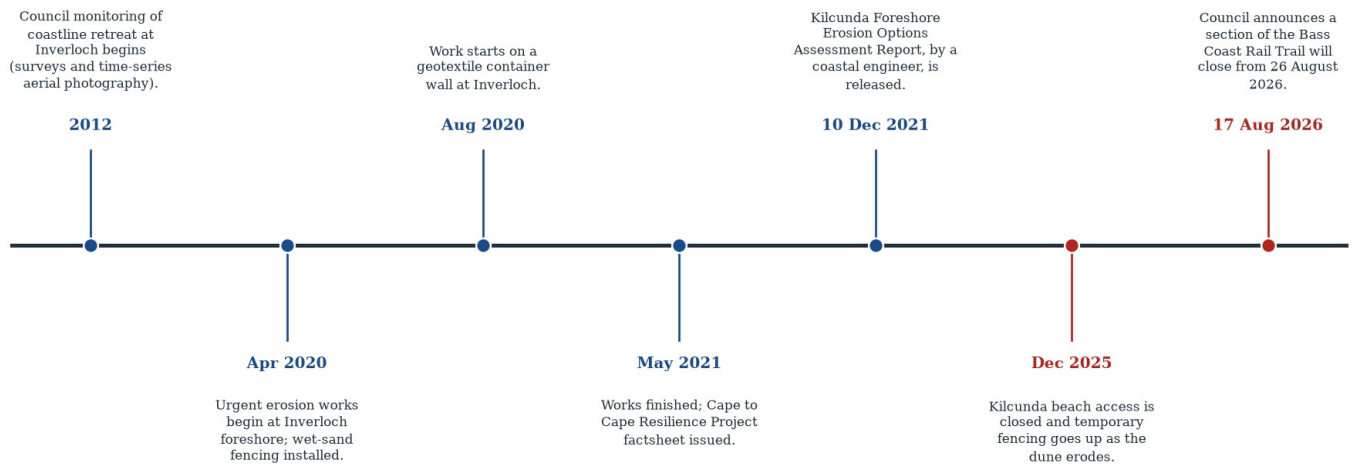
Figure 8. What is at stake: the four functions at the coast (model).

Read Figure 8 as a sustainability check. As a **source**, the coast supplies land and livelihoods that erosion is now eating into. As **services**, the beach supports swimming, surfing and tourism, and its dune shelters what stands behind it; the sandy beach is also nesting country for the **hooded plover**, a small beach-nesting bird listed as vulnerable in Victoria, which breeds between August and March — right across the summer beach season — so a narrower beach squeezes both visitors and wildlife. As a **sink**, the beach and dune absorb wave energy; with less sand, that energy is transferred to roads and buildings. And as a place of **spiritual** meaning — memories, calm, a sense of place — losing loved walks and landmarks, like the trail past the Bourne Creek trestle bridge, is a real cost to wellbeing. In every column, the issue is not just an inconvenience today; it shrinks what the coast can keep providing tomorrow.

Part 6 — The story so far, in dates

The human side of the web has a dated record (Figure 9): years of monitoring, then works, then closures as the retreat continued.

How the story has unfolded, 2012-2026



Source: Bass Coast Shire Council, Foreshore Erosion Response page, media releases and information sheets, 2020-2026 (retrieved 25 August 2026).

Timeline of dated milestones, 2012 to August 2026: monitoring of retreat begins in 2012; urgent works and wet-sand fencing from April 2020; geotextile container wall works from August 2020; works finished and Cape to Cape Resilience Project factsheet in May 2021; Kilcunda Foreshore Erosion Options Assessment Report on 10 December 2021; Kilcunda beach access closed in December 2025; council announces the rail trail section closes from 26 August 2026

Figure 9. How the story has unfolded, 2012-2026.

By December 2025 the dune at Kilcunda had eroded enough for the council to close the beach access and put up temporary fencing; further storms then washed away another 2 m of dune, and on 17 August 2026 the council announced that the section of the Bass Coast Rail Trail behind the car park — between the Kilcunda cemetery and the Bourne Creek trestle bridge — would close from 26 August 2026 while re-route options are studied. At Inverloch, surveying and time-series aerial photography are checked against a trigger point set with the state government department, and works such as wet-sand fencing (timber slats that let waves pass but trap their sand, so vegetation can rebuild the beach) have been tried. The story is still unfolding — which is exactly why 3E will study how places like this respond.

Worked examples

Example 1 — scaffolded (E01: interconnected thinking and underlying causes)

Question: Using the causes web (Figure 5) and the Kilcunda facts (Figure 9), build a cause chain that explains why a section of the Bass Coast Rail Trail closed on 26 August 2026.

Step	Reasoning
1. Name the biophysical process.	Winter storm waves and surge attack the dune from the sea side; a rising sea level (Figure 6) lifts the base of every surge. The sand budget is in deficit, so the dune face retreats.
2. Name the human action that put something in harm's way.	The rail trail was built close behind the dune, on flat land that people valued for recreation.
3. Join them.	Retreat plus an asset close to the dune means the asset loses ground: by December 2025 the beach access was fenced off, a further 2 m of dune washed away, and the trail section closed from 26 August 2026.

Step	Reasoning
4. Dig to the underlying cause.	Why was the trail there? Demand for coastal recreation and planning decisions placed it near the edge — the same underlying causes as at Inverloch.

Answer: The closure was produced by the *relationship* between a biophysical process (storm waves and surge cutting back a dune on a coast with a sand deficit, on top of a rising sea) and human actions (building the trail close behind the dune, driven by demand for coastal recreation and planning choices). Neither half alone explains the closure: an eroding dune with nothing behind it is not an issue, and a trail on a stable coast is not at risk. Holistic thinking holds both halves together, and then keeps digging to the underlying causes of the building decisions.

Example 2 — scaffolded (E02: impacts on the sustainability of the functions)

Question: Using Figure 8 and the Inverloch measurements (Figure 3), describe the impact of the issue on the sustainability of **two** of the four functions of the environment.

Step	Reasoning
1. Pick a function and name what it provides here.	<i>Sink:</i> the beach and dune absorb wave energy before it reaches what people built.
2. Describe the impact with evidence.	At the road site the coast has retreated 35.6 m since 2012 and the road now sits within 6 m of the eroding edge: the sink function has shrunk, so storm wave energy reaches the road.
3. State the sustainability consequence.	If retreat continues at the measured pace, the dune can no longer keep performing its sink work for the road — the function is not sustainable as it stands.
4. Repeat for a second function.	<i>Services:</i> the beach provides recreation and plover nesting space; a narrower beach and a cut-back dune (33.5 m of retreat at the surf club site) leave less room for both, and the rail trail closure removes a recreation service outright.

Answer: The issue attacks the sustainability of the functions by shrinking the resource that performs them. As a sink, the eroded dune can no longer absorb the wave energy now arriving within 6 m of the road; as services, the narrower beach supplies less recreation and nesting space, and the closed trail is a lost service. “Sustainability” here means whether the coast can keep doing that work into the future — and at the measured rates of retreat, two functions already cannot.

Practice questions

Scaffolded

Q1. Define *biophysical processes* as this section uses the term, and give the two examples of them named in part 2.

Q2. Look at Figure 1. Name the two towns marked with erosion stars, the body of water they face, and the estuary beside Inverloch.

Q3. Figure 6 shows two rates of global mean sea level rise. State both rates and how many times larger the later one is.

Q4. Figure 4 shows the Bass Coast Shire’s population in 2016 and 2021. State the percentage increase, and say which box colour in Figure 5 this cause sits in (human action, biophysical process, or underlying cause).

Q5. Figure 2 names the sideways shuffle of sand along the coast. What is it called, and what two water movements produce it?

Q6. In Figure 8, which function includes “nesting space for the hooded plover”, and in which months does the plover breed on these beaches?

Unscaffolded

Q7. Explain how **one** human action and **one** biophysical process combine to produce the erosion issue at Inverloch, and identify the underlying cause of that human action (E01).

Q8. “The causes of Bass Coast erosion operate at more than one scale.” Use Figure 7 to support this statement with one cause from each scale.

Q9. Describe two consequences of the erosion at Inverloch or Kilcunda for the sustainability of the functions of the environment (E02). Use at least one measured value from Figure 3 or one dated event from Figure 9.

Q10. The council reports that sand lost in storms now greatly exceeds sand returning in the calm seasons. Explain, using the sand-budget idea from Figure 2, why this means the beach and dune will keep narrowing until something changes.

Inquiry task

The erosion in numbers and on the map. At Inverloch, the council has measured coastline retreat since 2012: 33.5 m at the surf life saving club site, where the building now stands 16 m from the dune face, and 35.6 m near the Surf Parade intersection, where the road is now within 6 m of the eroding edge.

- Treat 2012 to 2026 as 14 years. Calculate the average retreat per year at each site, to one decimal place.
 - If each site kept retreating at its average rate, estimate how many years after 2026 it would take to close the remaining gap (16 m; 6 m). Give one reason why the real coast will not follow this simple average.
 - On a copy of Figure 1, mark both Inverloch sites and the Kilcunda closure with symbols of your own, and add them to a legend.
 - Choose one site. In one sentence each, describe the consequence for two different functions of the environment if its gap closed completely.
-

Answers

Q1. Biophysical processes are the workings of the natural world — here, waves, wind, water and sand. The two named in part 2 are longshore drift (waves moving sand along the shore) and the sand budget / storm-surge erosion of the dune. **Q2.** Inverloch and Kilcunda; Bass Strait; Anderson Inlet. **Q3.** 1.5 cm per decade (1901-2000) and 4.0 cm per decade (1993-2023); the later rate is about 2.7 times the earlier ($4.0 \div 1.5$). **Q4.** +24.3% (32,804 to 40,789). It is an underlying cause — the purple box in Figure 5. **Q5.** Longshore drift; the swash (up at an angle) and the backwash (straight back down). **Q6.** Services; August to March. **Q7.** Any correct pairing, e.g. houses/road built close to the dune (human action) plus winter storm surge cutting the dune on a rising sea (biophysical process); underlying cause: demand for coastal living / planning decisions that zoned land near the dune (or population growth). **Q8.** Local: assets built close to the dune. Regional: winter storm surge in Bass Strait (or regional population growth). Global: emissions raising sea level over 22 cm since 1900, lifting every surge. **Q9.** Any two with evidence, e.g. sink: road within 6 m of the eroding edge after 35.6 m of retreat — wave energy now strikes the road; services: rail trail closed 26 August 2026 (a lost recreation service) or narrower beach squeezing plover nesting; source: land and buildings losing their footing; spiritual: loss of loved walks such as the trail to the trestle bridge. **Q10.** The beach is a store: if the sand leaving in storms is greater than the sand returning in calm seasons, the store shrinks — a narrower beach and a cut-back dune — season after season, until inputs, outputs or the beach position changes.

Inquiry (a) Surf club: $33.5 \div 14 \approx 2.4$ m per year. Road site: $35.6 \div 14 \approx 2.5$ m per year. **(b)** Surf club: $16 \div 2.4 \approx 6.7$ years (around 2032-33). Road site: $6 \div 2.5 \approx 2.4$ years (during 2028). Reason the average will not hold: retreat comes in storm jumps, not a steady drip; works (fencing, walls, re-nourishment) or further sea level rise can slow or speed it up. **(c)** Check: two symbols at Inverloch (surf club and Surf Parade sites) and one at Kilcunda (trail behind the car park), all in a legend. **(d)** Any two functions with a sensible consequence, e.g. sink: wave energy strikes the road/building directly; services: the beach recreation space is lost; spiritual: a loved landmark goes.

Fully-worked solutions

Q1. Biophysical processes are the natural-world workings that shape a place — in this section, waves, wind, water and moving sand. Part 2 names two: longshore drift, the along-shore movement of sand produced by swash and backwash, and the storm-surge cutting of the dune when the sand budget is in deficit.

Q2. The erosion stars mark Inverloch and Kilcunda; both face Bass Strait; the estuary beside Inverloch is Anderson Inlet, where the Tarwin River meets the sea.

Q3. The global mean rate was 1.5 cm per decade over 1901-2000 and about 4.0 cm per decade over 1993-2023. $4.0 \div 1.5 \approx 2.7$, so the recent rate is roughly two and a half to three times the twentieth-century rate — sea level rise is accelerating.

Q4. The shire grew from 32,804 (2016) to 40,789 (2021), an increase of 24.3%. In Figure 5 this sits in the purple boxes: it is an underlying cause, because more residents and more demand for coastal living drive the building decisions that put assets near the dune.

Q5. The process is longshore drift. It is produced by the swash, which carries sand up the beach at the angle the waves arrive, and the backwash, which pulls sand straight back down the slope; repeated many times, the sand shuffles along the coast.

Q6. Nesting space for the hooded plover is a service (an ecosystem service). The plover breeds on these sandy beaches between August and March, which overlaps the summer holiday season — one reason a narrower beach is a squeeze for wildlife as well as people.

Q7. Take the human action “coastal road built close to the dune” and the biophysical process “winter storm surge cutting the dune, on top of a rising sea level”. Alone, neither is the issue: surge on an empty coast is just nature, and a road on a stable coast is safe. Together they produce retreat toward the road — 35.6 m since 2012 at the Surf Parade site. The underlying cause of the building decision is the demand for coastal living and the planning choices that zoned land near the dune (with population growth behind them).

Q8. At the local scale, homes, the surf club, the road and the trail were built close to the dune, and works change sand movement on that beach. At the regional scale, winter weather systems drive southerly winds and storm surge into

Bass Strait, and fast population growth raises demand for coastal land. At the global scale, greenhouse gas emissions have raised sea level over 22 cm since 1900, lifting the base of every surge. The same issue is therefore driven at three scales at once, and the scales feed each other.

Q9. Consequence one (sink): after 35.6 m of retreat since 2012, the road site near the Surf Parade intersection has the road within 6 m of the eroding edge — the beach and dune can no longer absorb the wave energy, which now arrives at the road, so the sink function cannot be sustained at its current position. Consequence two (services): the rail trail section behind the Kilcunda car park closed from 26 August 2026 after the dune lost a further 2 m — a recreation service removed, and the narrower beach also squeezes hooded plover nesting space. Both show functions shrinking toward a point where they cannot keep working into the future.

Q10. Think of the beach as a sand store with inputs (sand from rivers, cliff wear and longshore drift) and outputs (sand carried offshore by big waves). The council's observation — storm losses now greatly exceed calm-season gains — means outputs exceed inputs, so the store shrinks: a narrower beach today leaves the dune open to the next surge, which cuts it further. That is a deficit feeding on itself, so narrowing continues until an input rises, an output falls, or people change the system (works, re-nourishment, or moving assets back).

Inquiry (a) Surf club site: $33.5 \text{ m} \div 14 \text{ years} \approx 2.4 \text{ m per year}$. Road site: $35.6 \text{ m} \div 14 \text{ years} \approx 2.5 \text{ m per year}$. **(b)** Surf club: $16 \text{ m} \div 2.4 \text{ m/yr} \approx 6.7 \text{ years}$, i.e. around 2032-33. Road: $6 \text{ m} \div 2.5 \text{ m/yr} \approx 2.4 \text{ years}$, i.e. during 2028. The real coast will not follow the average because retreat happens in jumps during storms with quiet years between, and because works or a re-route may change the system (and sea level rise may speed it up). **(c)** Symbols placed at the two Inverloch sites and at the Kilcunda closure, with a matching legend. **(d)** Model answers: sink — with no gap left, storm wave energy strikes the road or building directly; services — the beach recreation space (and plover nesting room) at that site is lost; spiritual — a loved landmark or walk disappears from the community's life.

Sources (real, checkable referents; all retrieved 25 August 2026): (1) Bass Coast Shire Council, "Foreshore Erosion Response" page — 33.5 m retreat since 2012 at the surf club site with the building 16 m from the dune face; 35.6 m at the road site near the Surf Parade intersection, with the road within 6 m; the seasonal surge/accretion pattern and the shift to a sand deficit; areas of concern; monitoring against a DELWP trigger point; wet-sand fencing; the Kilcunda Foreshore Erosion Options Assessment Report (media release "Erosion action outlined for Kilcunda foreshore", 10 December 2021). (2) Bass Coast Shire Council media release "Bass Coast Rail Trail impacted by coastal erosion" (published 17 August 2026) — trail section between the Kilcunda cemetery and the Bourne Creek trestle bridge closes from 26 August 2026; beach access closed December 2025; a further 2 m of dune washed away. (3) Bureau of Meteorology and CSIRO, State of the Climate 2024, sea level section — over 22 cm of global mean rise since 1900, half since 1970; 1.5 cm (± 0.2) per decade 1901-2000 rising towards 4 cm (± 0.4) per decade 1993-2023; higher rates north and south-east of Australia, south-east coast above the south coast. (4) Australian Bureau of Statistics, Census of Population and Housing 2016 and 2021 (via the Wikipedia articles "Bass Coast Shire" and "Inverloch") — 32,804 to 40,789 and 5,437 to 6,526. (5) Wikipedia — "Inverloch, Victoria" (141 km south-east of Melbourne; Anderson Inlet as the Tarwin River estuary), "Bass Coast Rail Trail", and "Hooded plover" (listed vulnerable in Victoria; breeds August-March on sandy beaches). Figures 2, 3, 6, 7 and 8 are original model diagrams built for this section; their data labels draw on sources (1), (3) and (4).

Custodial responsibility in practice: a values-based way of managing the environment

Theory

In Section 3A we saw what the environment does for people — it supplies resources, provides services and absorbs waste — and how human activity changes it. This section asks the next question: **who takes responsibility for looking after the environment, and how?** The curriculum's name for this idea is *custodial responsibility*. Because that term is contested, this section fixes one meaning first and uses it the same way all the way through.

A contested term, with one fixed meaning

Custodial responsibility: the term this section stands on

The Victorian Curriculum uses the term but does not define it, so this section fixes one meaning before using it

What kind of word is this?

Some terms have one agreed meaning (like mass or distance). Others are defined in different ways by different people.

Custodial responsibility is the second kind: a contested term. People agree it is about caring for the environment, but they define the duty differently.

So this section says which meaning it uses, and every question in it can be answered on that meaning alone.

The working definition used in this section

Custodial responsibility

the duty people feel to look after an environment and keep it healthy — not just to use it — so that it is still there for the people who come after them.

A custodian is a person who looks after something that is not theirs to use up. In this section, custodians can be volunteers, landholders, organisations or governments.

Definition framed per house rule for contested terms (CONTESTED_TERMS Rule 1).

Two-panel figure: the left panel explains that custodial responsibility is a contested term; the right panel gives the working definition this section uses and defines a custodian

The Victorian Curriculum uses the term **custodial responsibility** but does not define it, so this section fixes one meaning before using it:

Custodial responsibility — the duty people feel to look after an environment and keep it healthy, not just to use it, so that it is still there for the people who come after them. A **custodian** is a person or body that looks after something that is not theirs to use up.

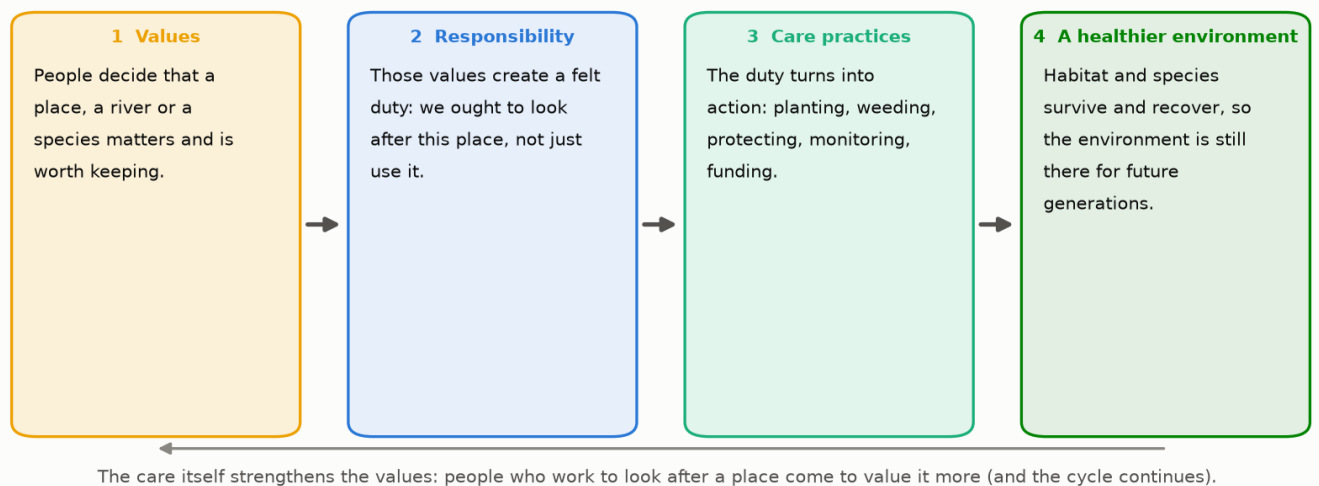
Some terms, like *mass* or *distance*, have one agreed meaning. Custodial responsibility is the other kind — a **contested term**. People agree it is about caring for the environment, but they define the duty differently: for some it is a personal moral duty, for others a legal duty set by parliament, for others a duty that organisations take on for the public. This section says which meaning it uses, and every question in it can be answered on that meaning alone.

How values become management

Custodial responsibility is a **values-based** approach: what people value decides what they feel they must do. The model in the figure below runs through the whole section. (Section 3D will name the deeper worldviews — human-centred, Earth-centred and eco-centred — that sit behind these values.)

How values become management

Custodial responsibility is a values-based approach: what people value decides what they feel they must do



Values-based action is one approach to environmental management, not the only one. This section shows who acts on it in Victoria, and the debate at the end weighs it against laws and rules.

Model built for this section from the working definition of custodial responsibility.

Four-step flow model: values lead to responsibility, responsibility leads to care practices, care practices lead to a healthier environment, with a feedback arrow showing that the care itself strengthens the values

Read the model both ways. Down the line, it explains action: people who value a place feel a duty, the duty becomes care practices, and the environment is healthier for it. Back along the feedback line, it explains commitment: people who work to look after a place come to value it more, so the care continues.

Values-based care is one approach to environmental management, not the only one. The other main approach is **laws and rules** — parliaments and councils setting standards that apply to everyone whether or not they share the values. Most real programs, as we will see, mix the two.

From duty to care practices

The duty only matters if it turns into action. The figure below matches each kind of care practice to a real Victorian example that appears in the case studies of this section.

What the duty of care looks like

Care practices are the actions a custodial approach turns into — each one matched with a real Victorian example

Care practice	What it involves	A real Victorian example
Clearing weeds and rubbish	Taking out what harms a place: pest plants, litter and dumped rubbish.	Landcare working bees clear weeds and rubbish from creeks and bushland across Victoria.
Restoring habitat (replanting)	Growing and planting local plants to rebuild the food and shelter a species needs.	A community nursery at Yellingbo grows local plants for helmeted honeyeater habitat, run on volunteer effort.
Protecting threatened species	Direct action for plants and animals at risk of extinction.	Captive breeding and releases are part of the helmeted honeyeater recovery program.
Monitoring and counting	Recording what lives where, so change can be tracked and counted.	Volunteer citizen-science counts at Yellingbo feed iNaturalist and BirdLife Australia's Birdata.
Protecting habitat on private land	Setting land aside so it cannot be cleared, now or by future owners.	Trust for Nature covenants protect more than 82,000 hectares on private land in Victoria.

Examples: Landcare Australia, Friends of the Helmeted Honeyeater, Trust for Nature (all retrieved 25 August 2026).

Three-column table matching five care practices to real Victorian examples: clearing weeds and rubbish at Landcare working bees; restoring habitat at the Yellingbo community nursery; protecting threatened species through captive breeding releases; monitoring and counting through iNaturalist and Birdata citizen science; and protecting private habitat through Trust for Nature covenants on more than 82,000 hectares

Two of these practices need names. **Revegetation** is the replanting of an area with the local native plants, usually from locally collected seed. **Citizen science** is the collection of data — counts, sightings, measurements — by ordinary people and volunteers, which scientists then use; iNaturalist and Birdata are two platforms volunteers record sightings on.

Four families of custodians

Custodial responsibility in Victoria is shared out. Different custodians work at different scales — a local creek, a region, the whole state, a single property — and they often work together in one program.

Who takes responsibility? Four families of custodians

Custodial responsibility is shared out — different custodians work at different scales, and they often work together

Community land stewardship

Local scale

Who: volunteers, farmers and local landholders in groups.

How: hands-on care of local land — planting, weeding, fencing, cleaning up creeks.

Case: the Landcare movement — born in Victoria in November 1986; today more than 6,000 groups and over 140,000 volunteers across Australia.

Conservation organisations

Regional to national scale

Who: zoos, scientists, bird groups, water authorities, councils and government departments in recovery teams.

How: captive breeding, habitat planting, monitoring and research for threatened species.

Case: the helmeted honeyeater recovery team works toward five self-sustaining colonies.

Government park management

State-wide scale

Who: Parks Victoria staff (more than 1,000 people at over 100 locations).

How: managing parks and reserves so they stay healthy for current and future generations.

Case: more than 4 million hectares of public land and water in Victoria; over 100 million visits each year.

Private landholders

On their own land

Who: farmers and property owners — 62% of Victoria is privately owned land.

How: protecting bushland on their properties, often with help from organisations such as Trust for Nature.

Case: more than 1,700 conservation covenants protect over 82,000 hectares of private land.

These families overlap: the helmeted honeyeater recovery team brings conservation organisations, Parks Victoria, local councils and volunteer groups into one program — and its habitat work runs across both public and private land.

Statistics: Landcare Australia; Friends of the Helmeted Honeyeater; Parks Victoria; Trust for Nature (all retrieved 25 August 2026).

Two-by-two grid of four custodian families — community land stewardship at local scale, conservation organisations at regional to national scale, government park management at state-wide scale, and private landholders on their own land — each with who acts, how they act, and one case, plus a strip noting that the families overlap in the helmeted honeyeater recovery team

The rest of the Theory walks through one real case for each family. All four cases are Victorian, all are dated, and all can be checked against the sources listed at the end of this section.

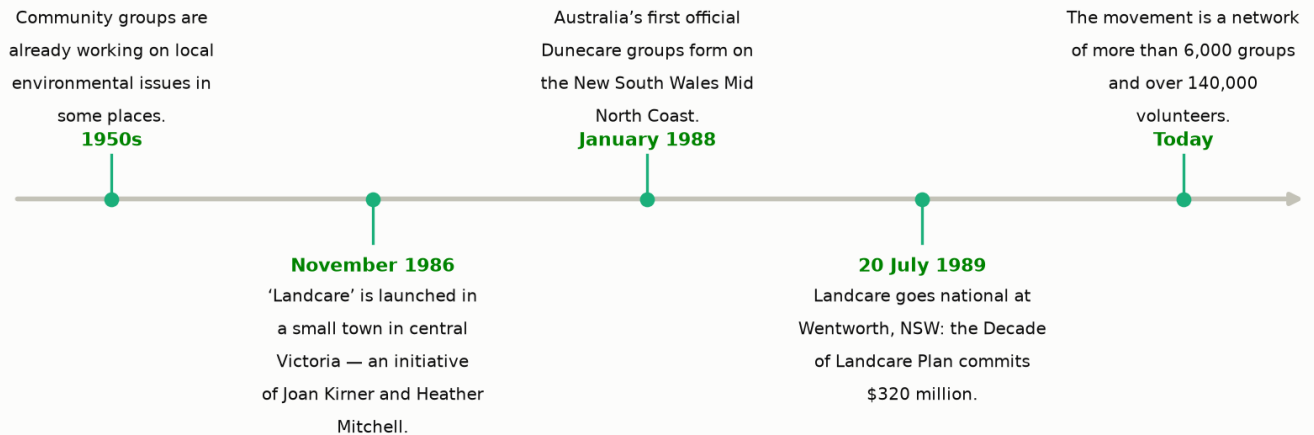
Case study 1 — Landcare: community land stewardship, born in Victoria

Case study: Landcare — community land stewardship, born in Victoria

From local working bees to a national movement

"The degradation of our environment is not simply a local problem ... the damage being done to our environment is a problem for us all."

— Bob Hawke AC, Prime Minister 1983–1991, at the national Landcare launch (1989)



Source: Landcare Australia, 'About us' and 'Origins of Landcare' (retrieved 25 August 2026).

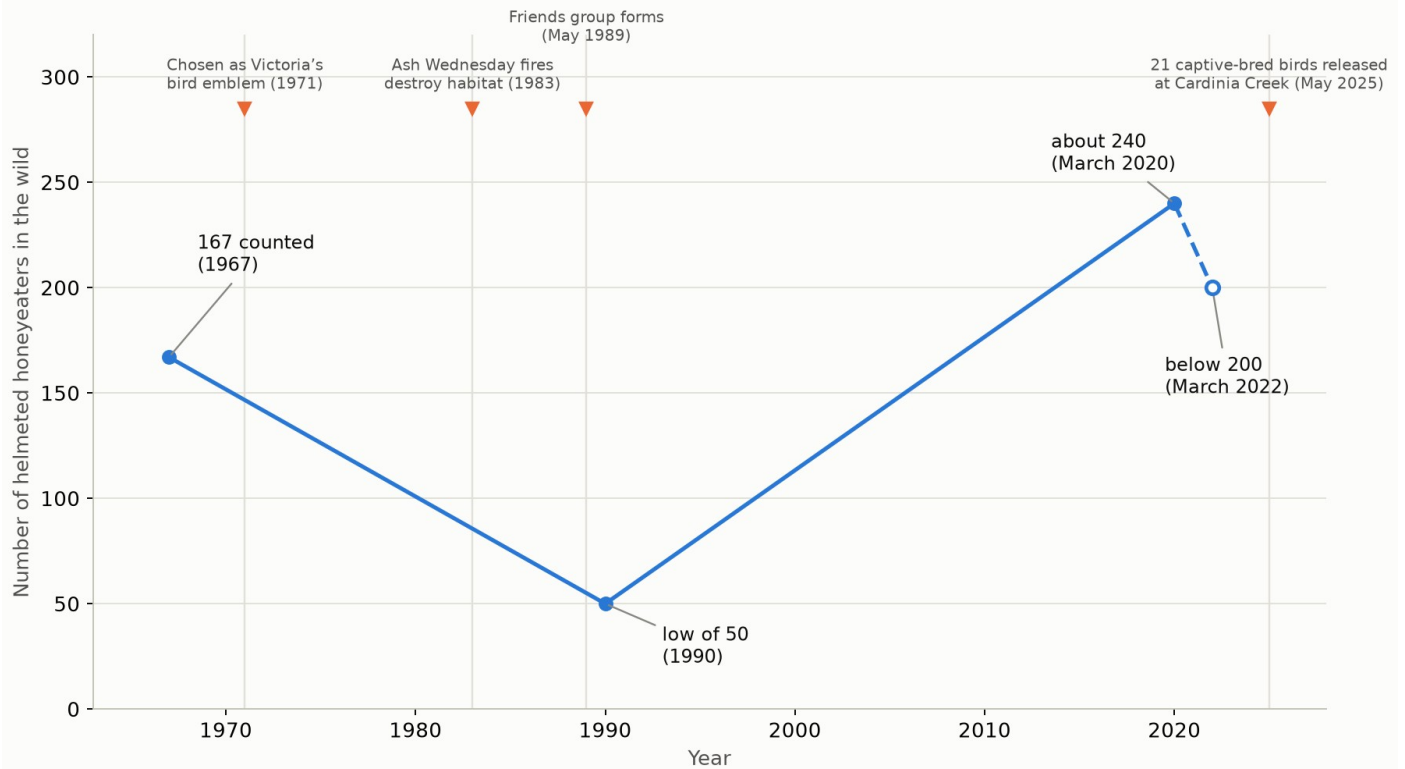
Timeline of the Landcare movement: community groups working in the 1950s; landcare launched in central Victoria in November 1986; Australia's first official Dunecare groups in January 1988; the national Landcare program launched at Wentworth on 20 July 1989 with a 320 million dollar plan; today a network of more than 6,000 groups and over 140,000 volunteers, headed by a 1989 quote from Prime Minister Bob Hawke

Landcare is the clearest Australian example of ordinary people taking custodial responsibility at local scale. Farmers and other volunteers form a group, adopt a local piece of land — a creek bank, a roadside, a patch of bush — and care for it in working bees: planting, weeding, fencing, cleaning up. The idea was launched in a small town in central Victoria in November 1986, and by 20 July 1989 it had become a national program, supported by both sides of politics, with the Decade of Landcare Plan committing \$320 million.

Case study 2 — the helmeted honeyeater: a conservation management program

The helmeted honeyeater is a small yellow-grey bird of the Yarra Ranges, chosen as Victoria's bird emblem in 1971. It came close to being an emblem for a lost species: the wild population was counted at 167 birds in 1967, fell to a low of 50 by 1990 — the Ash Wednesday bushfires of 1983 had destroyed much of its habitat — and the species is listed as critically endangered — the Acts' most severe threat category — under both the Victorian Flora and Fauna Guarantee Act 1988 and the Commonwealth Environment Protection and Biodiversity Conservation Act 1999.

The helmeted honeyeater: a population counted, lost and fought for



Counts and events as reported by the Friends of the Helmeted Honeyeater (retrieved 25 August 2026); the 2022 point is the reported upper bound ("below 200").

Line chart of the counted wild helmeted honeyeater population: 167 in 1967, a low of 50 in 1990, about 240 by March 2020 and below 200 by March 2022, with event markers for the 1971 bird emblem, the 1983 Ash Wednesday fires, the founding of the Friends group in May 1989, and the release of 21 captive-bred birds at Cardinia Creek in May 2025

The response to the decline is a **conservation management program**: the Helmeted Honeyeater Recovery Team, in which conservation organisations, government bodies, a university, councils and a volunteer group act as custodians together.

How the recovery works: a conservation management program

One species, many custodians — the Helmeted Honeyeater Recovery Team brings organisations and volunteers together

Who is on the recovery team

- Friends of the Helmeted Honeyeater (a founding member since 1989)
- Zoos Victoria
- BirdLife Australia
- Department of Energy, Environment and Climate Action (DEECA)
- Parks Victoria
- Melbourne Water
- Monash University
- Cardinia Shire Council and Yarra Ranges Council
- volunteer groups, schools and local landholders

What the program does

- follows a national recovery plan
- runs a captive breeding program and releases birds into restored habitat each year
- uses genetic rescue and supplementary feeding to strengthen the population
- tracks birds with radio transmitters
- grows local plants in a community nursery and runs habitat restoration and replanting
- monitors the population with citizen science counts
- works with private landholders to protect and plant habitat beyond the reserve

Goal: five self-sustaining colonies in separate but connected locations. In May 2025, 21 captive-bred birds were released at Cardinia Creek — the first there in 42 years — to build a third wild population.

Source: Friends of the Helmeted Honeyeater, 'Fact files' and 'Projects and partnerships' (retrieved 25 August 2026).

Two-panel figure listing who is on the Helmeted Honeyeater Recovery Team — including the Friends of the Helmeted Honeyeater, Zoos Victoria, BirdLife Australia, DEECA, Parks Victoria, Melbourne Water, Monash University and local councils — and what the program does, with a strip stating the goal of five self-sustaining colonies and the May 2025 release of 21 captive-bred birds at Cardinia Creek

In May 2025 the program released 21 captive-bred birds at Cardinia Creek — the first helmeted honeyeaters at that site in 42 years — to begin a third wild population. Note how the families overlap here: volunteers founded the Friends group in May 1989, government bodies fund and regulate, scientists track and breed, and some of the habitat being restored sits on private land.

Case study 3 — Parks Victoria: park management at state scale

Case study: Parks Victoria — park management at state scale

One government body acts as custodian of Victoria's public parks and reserves

**more than
4 million**

hectares of public
land and water
managed across
Victoria

**more than
100 million**

visits to Victoria's
parks every year

**more than
4,300**

native plant species
found in the parks

**around
1,000**

native animal
species found in the
parks

**more than
1,000 staff**

working at over 100
locations across the
state

The stated purpose — custodial language:

Parks Victoria says it helps visitors enjoy natural places while protecting their environmental values, and works to keep those places “healthy, resilient and accessible for current and future generations”. Managing land for the people who come after you is the duty of care in action — custodial responsibility carried out by a government body.

Source: Parks Victoria, 'About us' (retrieved 25 August 2026).

Five stat tiles for Parks Victoria — more than 4 million hectares of public land and water, more than 100 million visits a year, more than 4,300 native plant species, around 1,000 native animal species, more than 1,000 staff at over 100 locations — above a strip quoting its stated purpose of keeping parks healthy, resilient and accessible for current and future generations

At state scale, the custodian is a government body. Parks Victoria manages more than 4 million hectares of public land and water and more than 100 million visits a year. Its own stated purpose is custodial language word for word: keeping those places “healthy, resilient and accessible for current and future generations”. Managing land for the people who come after you is the duty of care in action, carried out by staff, budgets and rules rather than by volunteers alone.

Case study 4 — Trust for Nature: custodians on their own land

Custodians on their own land: private land and conservation covenants

Most of Victoria's nature sits outside parks — so private landholders are custodians too

Why private land matters

62%

of Victoria's land is privately owned — farms, homes and private blocks.

78%

of the native vegetation on private land is rare or threatened.

Without the land that gives them a home, species cannot survive — and much of that land belongs to private owners, not parks.

How a covenant answers

1972

Trust for Nature is established by an Act of the Victorian Parliament to protect nature on private land.

▼
1978

It creates conservation covenants — legally binding agreements written onto a property's title.

▼
How they work

A landholder agrees to protect the habitat on their land. The covenant binds every future owner, so the protection lasts forever.

▼
The result today

More than 1,500 landholders have protected more than 119,000 hectares; over 1,700 covenants alone cover more than 82,000 hectares; and more than 40 purchased properties (over 35,000 hectares) have become conservation reserves.

Source: Trust for Nature, 'About us' and 'What we do' (retrieved 25 August 2026).

Two-panel figure: the left panel shows that 62 per cent of Victoria's land is privately owned and that 78 per cent of the native vegetation on private land is rare or threatened; the right panel shows how a conservation covenant answers — Trust for Nature established by Act in 1972, covenants on title from 1978, binding every future owner, with more than 1,700 covenants protecting over 82,000 hectares today

Most of Victoria's nature sits outside parks: 62 per cent of the state's land is privately owned, and 78 per cent of the native vegetation on private land is rare or threatened. So private landholders are custodians too. Since 1978, Trust for Nature — established by an Act of the Victorian Parliament in 1972 — has written **conservation covenants** onto property titles: legally binding agreements in which a landholder agrees to protect the habitat on their land. A covenant binds every future owner of the property, so the protection lasts as long as the title does. More than 1,500 landholders now protect over 119,000 hectares this way.

Two approaches, steelmanned

Environmental management in Victoria runs on two engines: voluntary, values-based care (Landcare working bees, Friends groups, covenants a landholder chooses to sign) and laws and rules (the Flora and Fauna Guarantee Act 1988, national park rules, the \$320 million public funding of 1989). People disagree about which should lead. The figure below states each side in the strongest form its own supporters would accept — the steelman test — and the debate at the end of the section asks you to weigh them. Section 6B supplies the weighing method: environmental, economic and social criteria.

People disagree — steelman before you judge

Motion: should Victoria's environment be managed mainly by voluntary care — people choosing to act — or by laws and rules?

The strongest case FOR voluntary action

- People who value a place care for it for the long term — not just while a rule is being enforced.
- Volunteers reach small local places no government can patrol: more than 6,000 Landcare groups work across Australia.
- Covenants protect habitat on private land forever — more than 119,000 hectares in Victoria — without governments buying the land.
- Local knowledge counts: landholders know their own land, and care work builds skills and community as well as habitat.

The strongest case FOR laws and rules

- Voluntary action cannot stop damage by people who do not share the values — laws can.
- Laws set the same minimum standard across the whole state: the Flora and Fauna Guarantee Act 1988 (Vic) lists the helmeted honeyeater as critically endangered and requires recovery action.
- Rules and public money act at a scale and speed emergencies need — the 1989 national Landcare plan committed \$320 million.
- Enforcement and monitoring make protection last, instead of leaving it to goodwill that may fade.

Two checks before you judge:

- 1 Steelman test — is each side stated as strongly as its own supporters would accept? Beating only a weak version does not count.
- 2 Criteria test — weigh both sides against environmental, economic and social tests; Chapter 6 asks you to recommend and justify.

House rule: present each side in the strongest form its own supporters would accept, then evaluate (CONTESTED_TERMS Rules 4–5).

Debate figure stating the motion — should Victoria's environment be managed mainly by voluntary care or by laws and rules — with the strongest case for each side in parallel panels and two checks below: the steelman test and the criteria test

In practice the engines are coupled. The helmeted honeyeater survives because a law lists it as critically endangered **and** a volunteer group has counted, fed and replanted for it since 1989. A covenant is freely chosen **and** legally binding once signed. Holding both ideas at once — duty felt and duty enforced — is what custodial responsibility looks like in the real world.

Putting it together

Custodial responsibility is the duty people feel to look after an environment so that it is still there for the people who come after them. In Victoria it is carried by four families of custodians — community groups, conservation organisations, government park managers and private landholders — at scales from one creek to the whole state, usually as a mix of values-based care and laws. The four-step model (values → responsibility → care practices → a healthier environment) is the tool this section's questions use.

Worked examples

Example 1 — scaffolded (the values model, applied to the helmeted honeyeater)

Question: Using the four-step model (values → responsibility → care practices → a healthier environment) and the helmeted honeyeater case study, copy the table below and fill in one dated, real example for each step.

Step	Your example from the case study
1 Values	
2 Responsibility	
3 Care practices	
4 A healthier environment	

Answer:

Step	Example from the case study
1 Values	Victorians valued the bird — it was chosen as the state's bird emblem in 1971.
2 Responsibility	The falling counts (167 in 1967, 50 in 1990) created a felt duty to act; volunteers founded the Friends of the Helmeted Honeyeater in May 1989.
3 Care practices	The recovery team's practices: captive breeding, habitat replanting, supplementary feeding, radio tracking and citizen-science counts.
4 A healthier environment	The population climbed to about 240 by March 2020, and in May 2025 a third wild population began with the Cardinia Creek release.

Example 2 — scaffolded (classifying custodians)

Question: Each sentence below describes a real custodial act from this section. For each, name (a) the custodian family from the four-family figure and (b) the scale it works at, then (c) quote the words that show the act is custodial (a duty to the future) rather than just a use of the land.

1. A group spends Saturday pulling weeds and planting natives along a creek.
2. A farmer signs an agreement on her title agreeing to protect the bushland on it; the agreement will bind every future owner.
3. Staff manage more than 4 million hectares so the places stay “healthy, resilient and accessible for current and future generations”.

Answer: 1. (a) Community land stewardship (a Landcare group). (b) Local scale. (c) The group gives its own time to care for land it does not own — the creek is being looked after, not used. 2. (a) Private landholders (with Trust for Nature). (b) On their own land. (c) “bind every future owner” — the duty is written to outlast the present owner. 3. (a) Government park management (Parks Victoria). (b) State-wide scale. (c) “for current and future generations” — the duty is named as one owed to people who come after us.

Practice questions

Scaffolded

Q1. Complete the working definition used in this section: “Custodial responsibility is the duty people feel to look after an environment and keep it healthy, not just to _____ it, so that it is still there for the _____ who come after them.”

Q2. Look at the values model figure. List its four steps in order, and name the arrow that runs back from step 4 to step 1.

Q3. Read the helmeted honeyeater chart. State the counted wild population in 1967, in 1990 and in March 2020.

Q4. Match each custodian family to its case: (a) government park management, (b) community land stewardship, (c) private landholders, (d) conservation organisations. Cases: (i) conservation covenants on over 82,000 hectares, (ii) the movement launched in central Victoria in November 1986, (iii) the helmeted honeyeater recovery team, (iv) more than 100 million park visits a year managed.

Q5. Using the two percentages in the private-land figure, explain in one sentence why private landholders matter to Victoria's nature.

Q6. The Parks Victoria purpose statement includes the words “healthy, resilient and accessible for current and future generations”. Which phrase in it carries the custodial meaning, and why?

Un scaffolded

- Q7.** The honeyeater chart marks two events: the Ash Wednesday fires of 1983 and the Cardinia Creek release of May 2025. Explain what each event shows about (a) the vulnerability of the species and (b) the custodial response to it.
- Q8.** “A covenant binds every future owner.” Explain, using the working definition, why signing a covenant is an act of custodial responsibility and not a one-off good deed.
- Q9.** Use the steelman figure and at least two case studies from this section to discuss the motion: *Victoria’s environment is best managed by voluntary care rather than by laws and rules*. Give the strongest point for each side before you reach your own view.
- Q10.** A new Landcare group forms and says “we feel responsible for this creek”. Using the values model, predict two care practices the group is likely to carry out, and explain how the feedback line of the model predicts the group’s future.
-

Inquiry task

A custodian you can check. Choose **one** of the four source organisations of this section (Landcare Australia, Friends of the Helmeted Honeyeater, Parks Victoria, Trust for Nature). Using its website:

1. Find one current fact, project or figure that this section does not mention. Record it, with the page title, the URL and today’s date.
 2. Classify your organisation into one of the four custodian families and state the scale it works at.
 3. Link your new fact to one step of the values model (values, responsibility, care practices, a healthier environment) and justify the link in one sentence.
 4. Critical check: state one piece of evidence that would show the custodial approach is working in your case — and one that would show it is failing.
-

Answers

Q1. use; people.

Q2. Values → responsibility → care practices → a healthier environment. The arrow running back is the feedback line: the care itself strengthens the values.

Q3. 167 (1967); 50 (1990); about 240 (March 2020).

Q4. (a)–(iv); (b)–(ii); (c)–(i); (d)–(iii).

Q5. Because 62% of Victoria is privately owned and 78% of the native vegetation on private land is rare or threatened, much of the nature that needs a custodian sits on land only private landholders can protect.

Q6. “for current and future generations” — it names a duty owed to people who come after us, which is exactly the working definition’s “still there for the people who come after them”.

Q7. (a) 1983 shows vulnerability: a single event (fire) destroyed habitat and helped drive the count to its low of 50 by 1990. (b) 2025 shows the custodial response: decades of care practices (breeding, replanting, tracking) made it possible to begin a third wild population, 42 years after the species last bred there.

Q8. The definition’s duty is owed to “the people who come after them”. A one-off deed ends; a covenant is written onto the title and binds every future owner, so the duty is made to last as long as the land is owned at all.

Q9. Any discussion that (i) states the voluntary side fairly (long-term local care, reach into small places, skills and community), (ii) states the law side fairly (minimum standards for everyone, scale and speed, enforcement), and (iii) reaches a view using evidence — e.g. the honeyeater is listed in law *and* cared for by volunteers; covenants are chosen freely *and* binding in law.

Q10. Practices: e.g. planting and revegetation along the bank; weeding and rubbish removal; fencing; monitoring with citizen-science counts (any two). Feedback: working on the creek will strengthen the value members place on it, so the group is likely to keep caring — the cycle continues.

Fully-worked solutions

Q1. The working definition reads: “the duty people feel to look after an environment and keep it healthy, not just to **use** it, so that it is still there for the **people** who come after them.” The contrast “not just to use it” is the key: custodial responsibility is about care, not only use.

Q2. Step 1 values: people decide a place or species matters. Step 2 responsibility: the value creates a felt duty. Step 3 care practices: the duty becomes action (planting, weeding, protecting, monitoring). Step 4 a healthier environment: habitat and species survive and recover. The return arrow is the feedback line — the care itself strengthens the values, so people come to value the place more.

Q3. Reading the labelled points: 167 counted in 1967; a low of 50 in 1990; about 240 in March 2020. (The chart also shows below 200 by March 2022 — the population is not yet safe.)

Q4. (a) Government park management matches (iv), Parks Victoria’s 100 million-plus visits. (b) Community land stewardship matches (ii), the Landcare movement of November 1986. (c) Private landholders match (i), Trust for Nature covenants over 82,000 hectares. (d) Conservation organisations match (iii), the recovery team.

Q5. The figure says 62% of Victoria’s land is privately owned and 78% of the native vegetation on private land is rare or threatened. Put together: most of the rarest nature sits outside parks, on private titles — so without private landholders acting as custodians, that vegetation has no one else to protect it.

Q6. The custodial phrase is “for current and future generations”. “Healthy” and “accessible” describe the condition of the parks, but the words “future generations” name *who the duty is owed to* — people who come after us — which matches the working definition exactly.

Q7. The 1983 marker sits on the falling line between 167 (1967) and 50 (1990): the Ash Wednesday fires destroyed habitat, showing how one event can push a small population close to extinction — that is the vulnerability. The May 2025 marker sits after the recovery: 21 captive-bred birds released at Cardinia Creek, the first there in 42 years, starting a third wild population — that is the custodial response, made possible only by the care practices of 1989–2025 (the Friends group, breeding, replanting, tracking).

Q8. Step 1: the definition makes custodial responsibility a duty to the future — “still there for the people who come after them”. Step 2: a one-off good deed (a clean-up day, a donation) helps now but ends when the deed ends. Step 3: a covenant is different in kind — it is written onto the property’s title and binds every future owner, so the protection lasts as long as the land is owned. Step 4: that is the duty to the future made permanent, which is exactly what the definition requires.

Q9. Steelman first. For voluntary care: people who value a place care for it long after any rule is forgotten — the Friends group has counted and fed the honeyeater since May 1989; volunteers reach small local places (6,000-plus Landcare groups) no government can patrol; covenants protect over 119,000 hectares without the government buying the land. For laws and rules: voluntary care cannot stop damage by people who do not share the values — laws can; the FFG Act 1988 lists the honeyeater as critically endangered and requires recovery action; rules and public money act at the scale emergencies need (\$320 million in 1989). Weighing: every case study in this section mixes the two (law listing plus volunteer care; a freely signed covenant that then binds in law), so the stronger position is that voluntary care supplies the commitment and laws supply the floor and the scale — neither alone is enough.

Q10. Step 1 (values → responsibility): the group has already stated step 2 — it *feels* responsible. Step 2 (predict practices): the values model says the duty will turn into care practices; for a creek, the likely ones are revegetation and planting of the bank, and weeding or rubbish removal, plus monitoring with citizen-science counts (any two). Step 3 (the feedback line): as members work on the creek they will come to value it more, which renews the duty — the model predicts the group will still be caring for the creek in years to come, and may grow, as Landcare groups have since the 1950s.

Sources (real, checkable referents; figures computed from the values shown): Landcare Australia, ‘About us’ and ‘Origins of Landcare’ — 1950s community groups; launch in central Victoria November 1986 (Kirner–Mitchell initiative); first official Dunecare groups January 1988 (Hat Head, Diamond Beach, Scotts Head, Diggers Beach); national launch at Wentworth NSW on 20 July 1989, Decade of Landcare Plan committing \$320 million; Bob Hawke quote from the national launch; today more than 6,000 groups and over 140,000 volunteers; Friends of the Helmeted Honeyeater, ‘Fact files’ and ‘Projects and partnerships’ — emblem proclaimed 10 March 1971; counts of 167 (1967), 50 (1990), about 240 (March 2020), below 200 (March 2022); Friends group founded May 1989; recovery team membership; 21 captive-bred birds released at Cardinia Creek May 2025; Parks Victoria, ‘About us’ — more than 4 million hectares, more than 100 million visits a year, more than 4,300 native plant species, around 1,000 native animal species, more than 1,000 staff at over 100 locations, purpose statement; Trust for Nature, ‘About us’ and ‘What we do’ — established by Victorian Act 1972, covenants from 1978 binding on title, 62% of Victoria privately owned, 78% of native vegetation on private land rare or threatened, more than 1,500 landholders protecting over 119,000 hectares, over 1,700 covenants covering more than 82,000 hectares, over 40 reserves of more than 35,000 hectares. All retrieved 25 August 2026.

Environmental worldviews: how what people believe shapes what they support

Theory

Part 1 — Environmental worldviews: a contested term, fixed for this section

Two people can read the same news story about a proposed mine, a new freeway or a logging plan and reach opposite conclusions — even when they agree on every fact. One of the things that explains the split sits deeper than the facts: their basic beliefs about how people relate to the rest of nature. Geography’s name for that set of beliefs is an **environmental worldview**.

The Victorian Curriculum uses the term **environmental worldview** but does not define it, so this section fixes one working meaning and uses it the same way all the way through:

Environmental worldview — a person’s basic beliefs and values about the relationship between people and the rest of nature, and about how people therefore should treat the environment. In this section the term is used in the sense developed in research on environmental worldviews by Eckersley (1992) and by Dunlap and colleagues (2000). Other definitions exist; every question in this section can be answered on this one alone.

Two related terms, fixed at the same time. **Sustainability** in this book means meeting today’s needs without making it harder for future generations to meet theirs. **Environmental management** means the things people do — laws, programs, technology, daily choices — to shape how environments change.

A worldview is not a fact about the world that can be proved right or wrong. It is closer to a pair of glasses: it decides what you notice, what you count as a gain or a loss, and which solutions seem sensible. People rarely hold one worldview in pure form — most hold a mix, and their mix can differ from issue to issue. The three types below are thinking tools, not teams.

The curriculum names three environmental worldviews: **human-centred**, **eco-centred** and **Earth-centred**. Figure 1 compares them across four questions: their core idea, what they say nature’s value is, what role they give humans, and the approaches they typically lead to.

Three environmental worldviews, compared

	Human-centred	Eco-centred	Earth-centred
Core idea	Humans stand apart from nature, which exists mainly to meet human needs and wants.	Humans are members of nature; all living things and ecosystems have value.	The Earth as a whole has value beyond human use; humans are one part of the web of life.
Nature's value	Worthwhile for what it provides people: resources, services, recreation.	Worthwhile in itself, not only for its usefulness to people.	Land, water, species and natural systems matter whether or not people use them.
Humans' role	Users and managers of natural resources; can choose to care for nature (stewardship).	Citizens of the community of life, with a duty to protect ecosystems and species.	One species among many; should limit their impact on the Earth's systems.
Typical approaches	Use technology and management to use resources efficiently and fix problems as they arise.	Protect ecosystems and species, limit damage, and restore what has been damaged.	Live more lightly; limit growth and consumption; let natural processes guide decisions.

Original generalisations from the curriculum's three named worldviews; framed by Eckersley (1992) and Dunlap et al. (2000).

Table comparing three environmental worldviews across four rows: core idea, nature's value, humans' role and typical approaches. Human-centred: humans stand apart from nature, which exists mainly to meet human needs; nature is worthwhile for what it provides people; humans are users and managers who can choose to care for nature; typical approaches use technology and management to use resources efficiently and fix problems. Eco-centred: humans are members of nature and all living things and ecosystems have value; nature is worthwhile in itself, not only for its usefulness to people; humans are citizens of the community of life with a duty to protect ecosystems and species; typical approaches protect ecosystems and species, limit damage, and restore what has been damaged. Earth-centred: the Earth as a whole has value beyond human use and humans are one part of the web of life; land, water, species and natural systems matter whether or not people use them; humans are one species among many and should limit their impact on the Earth's systems; typical approaches live more lightly, limit growth and consumption, and let natural processes guide decisions

Figure 1. Three environmental worldviews, compared. The rows are generalisations; real people usually hold a mix. (VC2HG10K13.E01)

Part 2 — One scenario, three lenses

Here is one test of the three worldviews. A proposal would clear 200 hectares of remnant bushland — native bush that has never been cleared — on the edge of a Victorian regional town, to build housing. Nobody disputes the facts of the proposal. Watch how each worldview starts reasoning from a different first question.

One scenario, three lenses

A proposal would clear 200 hectares of remnant bushland on the edge of a Victorian regional town to build housing. How does each worldview reason about it — at its strongest?

Human-centred

- Housing meets real human needs: homes, jobs and rates for the town.
- Weigh the housing benefits against losing scenery, recreation and ecosystem services such as clean water.
- If services are lost, engineering can replace them; clearing may still be the best deal for people.

Eco-centred

- Remnant bushland shelters species and ecosystems that cannot be rebuilt once cleared.
- Look first for alternatives: build on already-cleared land, densify the town, or offset and restore habitat elsewhere.
- Humans are part of this ecosystem, so its health is also our health.

Earth-centred

- Ask whether expanding the town at this scale should happen at all.
- The land, water and species have value beyond the project's usefulness.
- Design within the limits of local natural systems rather than rearranging them to suit growth.

Original scenario and modelled responses created for this section; each position is given its strongest form.

Three-panel diagram showing one scenario read through three worldview lenses. Scenario: a proposal to clear 200 hectares of remnant bushland on the edge of a Victorian regional town for housing. Human-centred panel: housing meets real human needs such as homes, jobs and rates for the town; weigh the housing benefits against losing scenery, recreation and ecosystem services such as clean water; if services are lost, engineering can replace them, so clearing may still be the best deal for people. Eco-centred panel: remnant bushland shelters species and ecosystems that cannot be rebuilt once cleared; look first for alternatives such as building on already-cleared land, fitting more homes into the town's existing area, or offsetting and restoring habitat elsewhere; humans are part of this ecosystem, so its health is also our health. Earth-centred panel: ask whether expanding the town at this scale should happen at all; the land, water and species have value beyond the project's usefulness; design within the limits of local natural systems rather than rearranging them to suit growth

Figure 2. One scenario, three lenses: each worldview's case at its strongest.

Notice that none of the three lenses is careless or hostile to the environment — each gives its position in its strongest form (debaters call this the **steelman** test: state the other side as strongly as its own supporters would). The difference is where each one starts: the human-centred lens starts with human needs and weighs nature in the balance; the eco-centred lens starts with the living systems that cannot be rebuilt; the Earth-centred lens starts with limits.

This is exactly what E01 is about: worldviews lead people to different attitudes, and to different approaches to sustainability and to managing the environment. The same facts, the same town, the same 200 hectares — and three different answers to what should happen, and why.

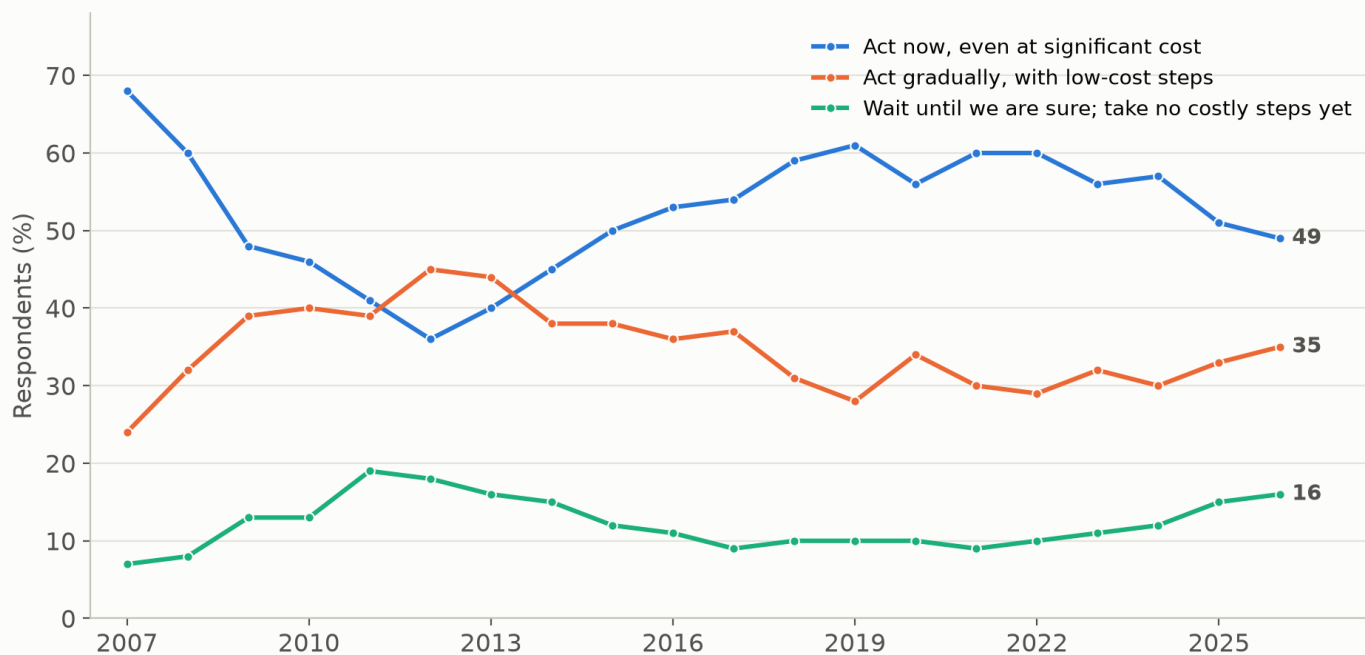
(VC2HG10K13.E01)

Part 3 — Australians disagree about causes and responses

Worldviews are personal, but they can be measured at the scale of a whole country. Large organisations run regular **surveys**: they ask the same questions of a **sample** — a smaller group chosen to stand for the whole population — and report what share of **respondents** (the people who answer) chose each option. Because a sample is only part of the population, surveys report a **margin of error**: how far the result could sit from the view of every Australian. Three of Australia's regular national surveys appear in the figures below: the Lowy Institute Poll (foreign policy and world issues), The Australia Institute's Climate of the Nation (climate views), and the Australian Election Study (what voters think at federal elections).

First: what do Australians think should be done? The Lowy Institute has asked versions of the same question since 2007 — act now even at significant cost, act gradually with low-cost steps, or wait until we are sure.

How Australians say we should respond to global warming, 2007-2026



Source: Lowy Institute Poll, climate-change trend question; values read from the published trend chart (whole percentages). Retrieved 25 August 2026.

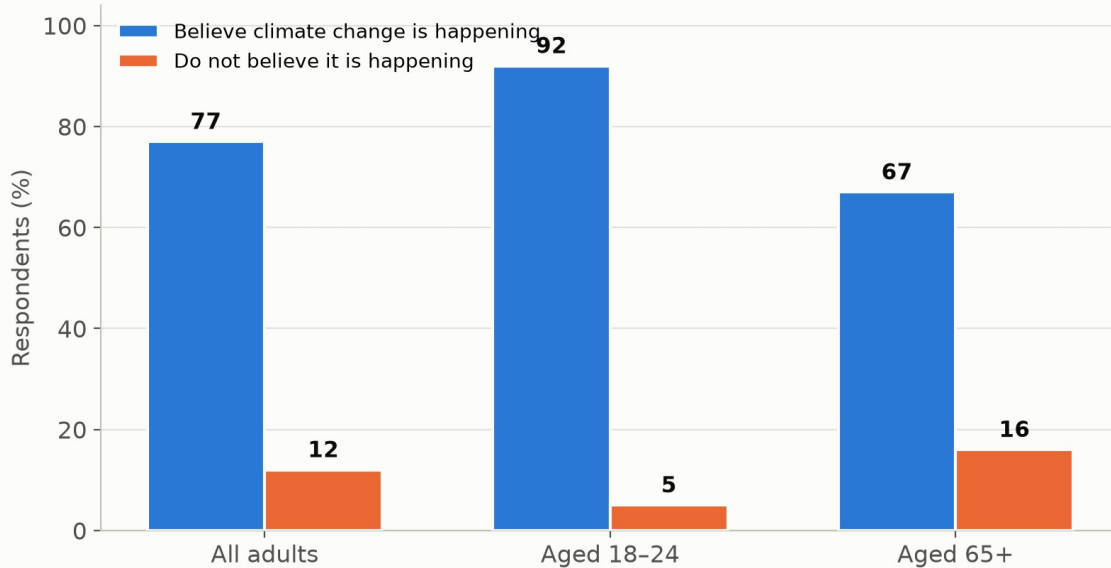
Line graph of three response options to global warming, 2007 to 2026, in per cent of respondents: act now even at significant cost starts at 68 in 2007, falls to 36 by 2012, climbs to 61 in 2019 and ends at 49 in 2026; act gradually with low-cost steps starts at 24, peaks at 45 in 2012 and ends at 35; wait until we are sure starts at 7, peaks at 19 in 2011 and ends at 16

Figure 3. How Australians say we should respond to global warming, 2007–2026.

Read Figure 3 twice. Across the whole period, acting now is always the most-chosen option — but its support has moved by more than 30 percentage points, falling from 68% in 2007 to 36% in 2012, then climbing back to 61% in 2019 before softening to 49% in 2026. Opinions about the same issue changed over time — with droughts, bushfires and floods, with energy prices, and with politics. Views about the environment are not fixed traits; they move.

Second: do the splits show up between groups of people? Figure 4 breaks one question — is climate change happening? — down by age.

Is climate change happening? Australians' answers, by age, 2023



Source: The Australia Institute, Climate of the Nation 2023 (n=2,089; fieldwork 16-23 June 2023). Remainder answered "don't know". Retrieved 25 August 2026.

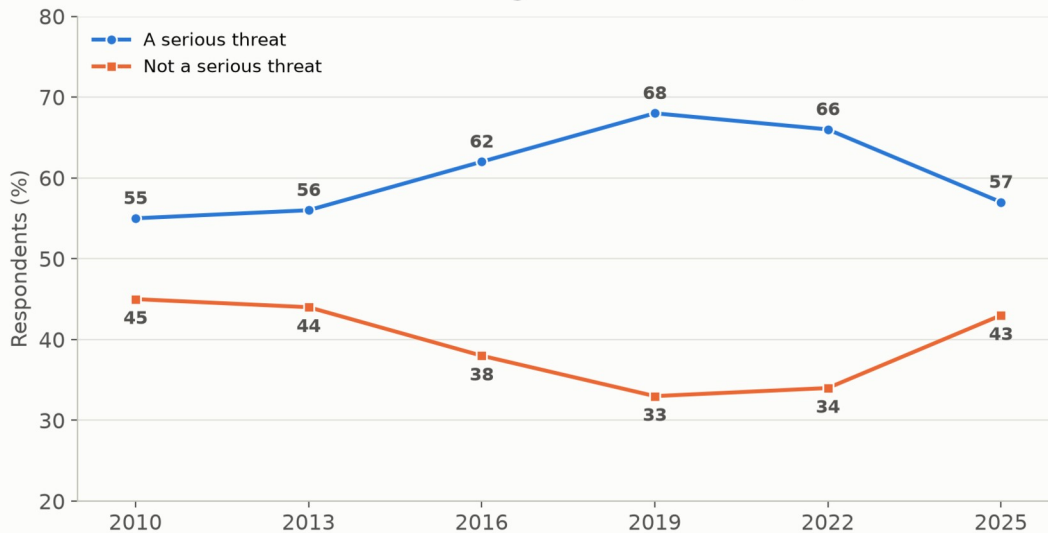
Grouped bar chart, 2023: belief that climate change is happening versus not believing it, for all adults, ages 18 to 24, and ages 65 and over. Happening: 77 per cent of all adults, 92 per cent of 18 to 24 year olds, 67 per cent of those 65 and over. Not happening: 12, 5 and 16 per cent respectively

Figure 4. Is climate change happening? Australians' answers by age, 2023.

In 2023, 77% of Australian adults said climate change is happening — but 92% of 18–24 year olds said so, against 67% of those aged 65 and over. Age is one of the strongest predictors of climate views in Australia: younger Australians are more likely to accept that change is happening and to want faster action.

Third: views about what should be done also split by politics. Figure 5 tracks one measure — how many Australians call the threat of climate change “a serious threat” — across six federal election studies.

Australians who see climate change as a serious threat, 2010-2025

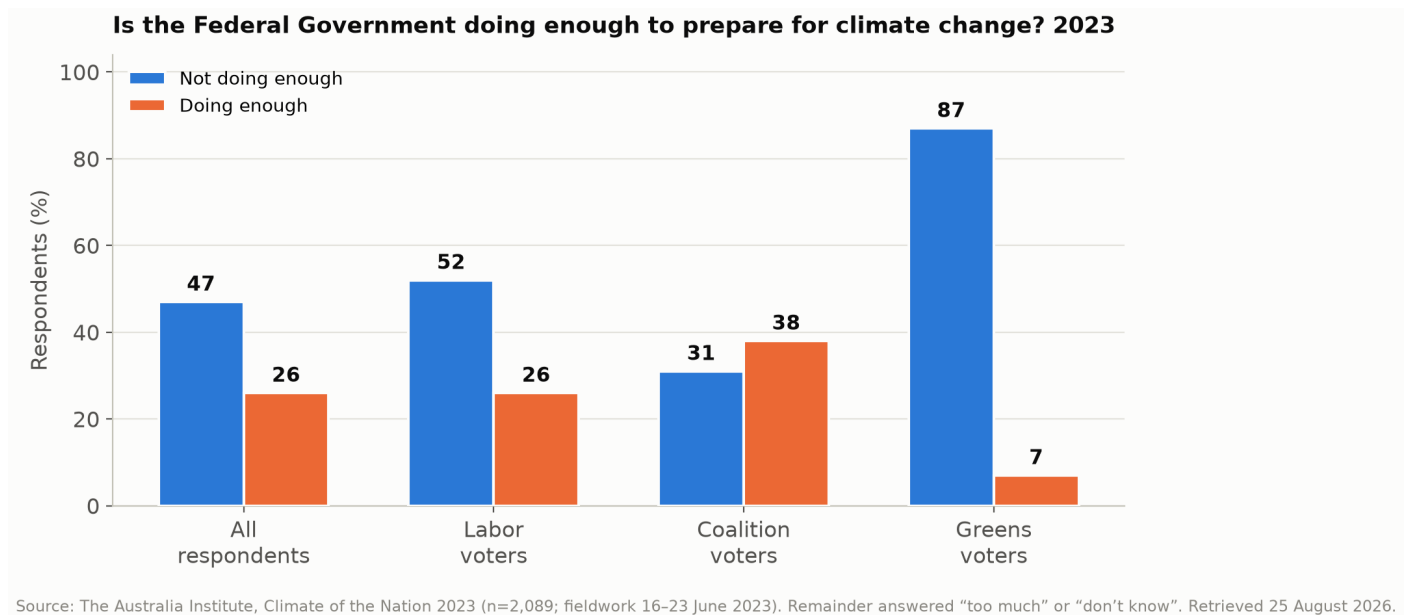


Source: Australian Election Study, Trends in Australian Political Opinion 1987-2025 (Cameron & McAllister); values read from published charts, rounded. Retrieved 25 August 2026.

Line chart, 2010 to 2025: share of respondents calling climate change a serious threat rises from 55 per cent in 2010 to 68 in 2019, holds at 66 in 2022, then falls to 57 in 2025; the not-a-serious-threat line moves as its mirror image, from 45 to 33 in 2019 then back to 43 in 2025

Figure 5. Australians who see climate change as a serious threat, 2010–2025.

Figure 5 shows the same moving pattern as Figure 3: concern climbed to 68% by the 2019 election, stayed high at 66% in 2022, and fell back to 57% by 2025 — even though a clear majority still calls the threat serious. And Figure 6 shows how the question “is the Federal Government doing enough?” divides Australians by who they vote for.



Grouped bar chart, 2023: whether the Federal Government is doing enough to prepare for climate change, for all respondents, Labor voters, Coalition voters and Greens voters. Not doing enough: 47 per cent of all respondents, 52 of Labor voters, 31 of Coalition voters, 87 of Greens voters. Doing enough: 26, 26, 38 and 7 per cent respectively

Figure 6. Is the Federal Government doing enough to prepare for climate change? 2023, by federal voting intention.

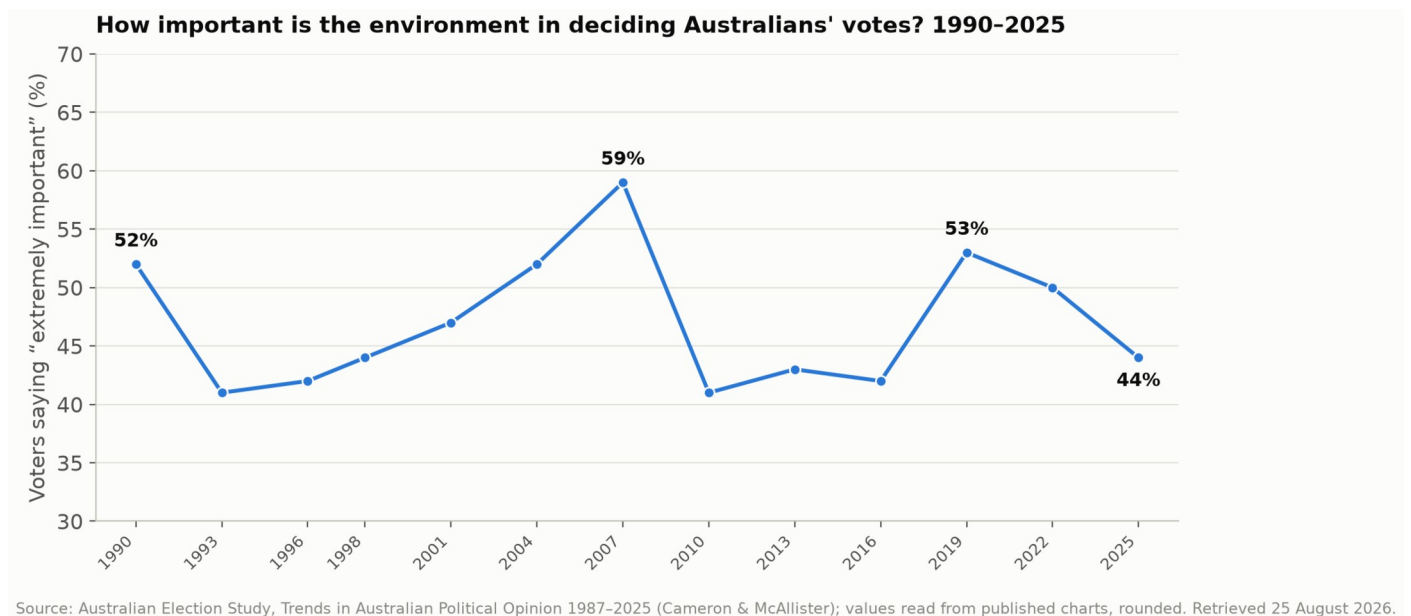
Figure 6 is E02 in one picture: Australians do not just disagree about what should be done — the disagreement lines up with political identity. In 2023, 87% of Greens voters said the Government was not doing enough; among Coalition voters, more said it was doing enough (38%) than not enough (31%). The same survey, the same question, four very different answers.

Put the three figures together and a pattern stands up: disagreement about the environment in Australia is **structured**. It is not random noise. It lines up with age, with political identity, and with time — because worldviews are shaped by experience, and people in different age groups, with different politics, have had different experiences (droughts, bushfires, price rises, changing governments). Section 5B will give you the full toolkit for asking whether a survey’s numbers can be trusted; here, note the three habits: name the source, check the sample size, and read the date.

(VC2HG10K13.E02)

Part 4 — How much priority Australians give the environment

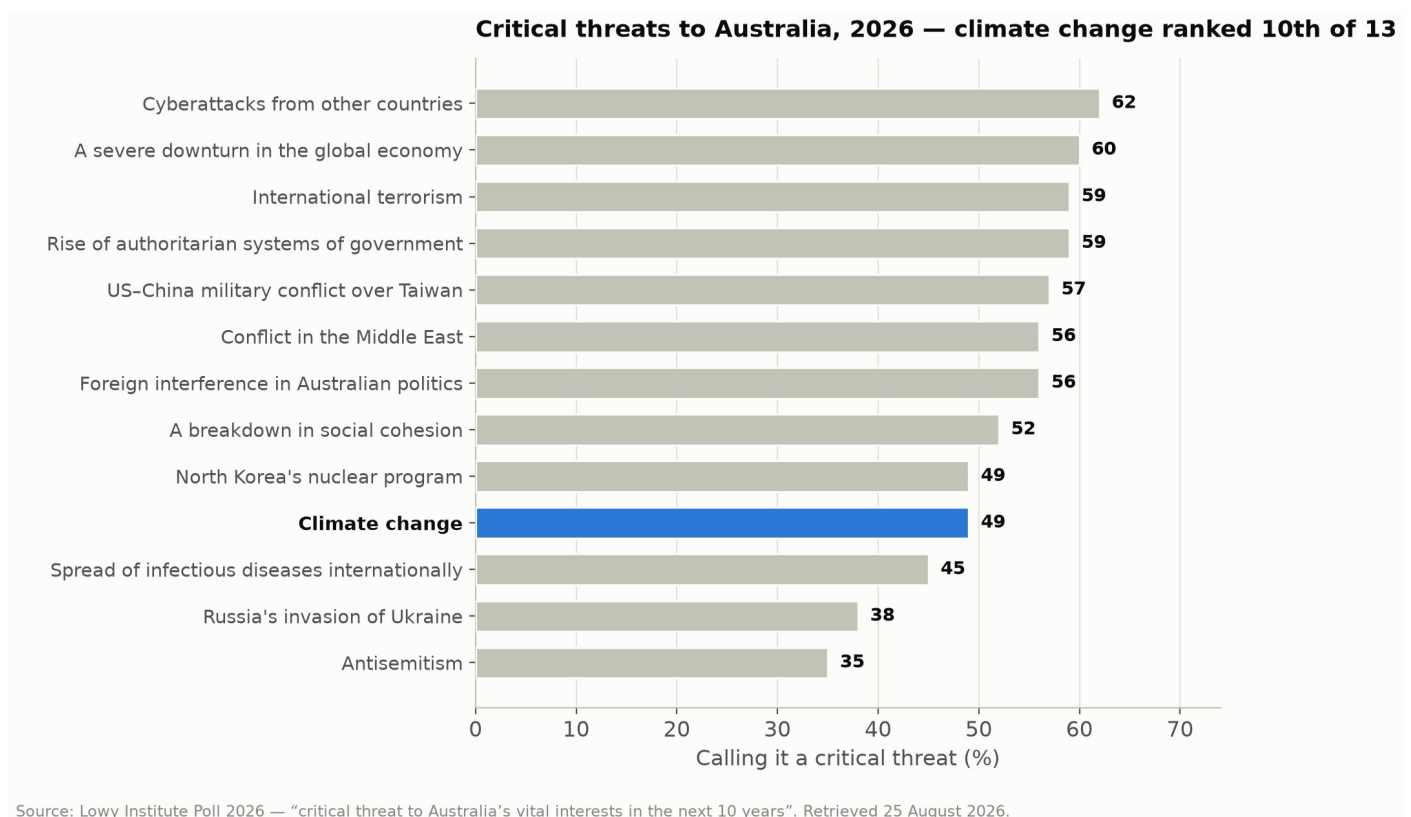
Priority here means which concerns come first — where attention and public money go when several problems compete. Most Australians support environmental programs in general; the harder question is whether the environment outranks other concerns when decisions are made. Two long-running measures test this.



Line chart, 1990 to 2025: share of voters saying the environment is extremely important in deciding their vote, ranging between 41 and 59 per cent, peaking at 59 in 2007 and 53 in 2019, and standing at 44 in 2025

Figure 7. How important is the environment in deciding Australians' votes? 1990–2025.

Figure 7 follows one question asked at every federal election from 1990 to 2025: is the environment extremely important in deciding your vote? The answer rises and falls — 52% in 1990, a peak of 59% in 2007 (in the middle of the Millennium Drought and the first big national climate debate), 53% in 2019 (the year of a federal election fought hard on climate and energy, and the spring when the Black Summer bushfire season began), and 44% in 2025. The environment is always a live issue in Australian elections, but its priority moves with events.



Horizontal bar chart of thirteen issues Australians were asked to rate as critical threats to Australia's vital interests in the next ten years, 2026, ranked from cyberattacks from other countries at 62 per cent down to antisemitism at 35 per cent; climate change, highlighted, sits tenth at 49 per cent

Figure 8. Critical threats to Australia, 2026 — climate change ranked 10th of 13.

Figure 8 asks Australians to rank threats to the country. In 2026, cyberattacks from other countries led at 62%; climate change was named a critical threat by 49% — tenth of the thirteen issues listed. Notice the tension this creates with Figures 4 and 5: a clear majority of Australians believes climate change is happening, and most call it a serious threat — yet when all concerns compete at once, other issues (the economy, security, conflict abroad) push it down the list. Support for environmental programs is broad; priority for them has to be won, election by election, against every other thing voters care about.

(VC2HG10K13.E03)

Part 5 — Is environmental change necessarily a problem?

E04 asks the sharpest question in this section: is environmental change **necessarily** a problem that people should manage? Start with a fact that cuts both ways: environments have always changed. Rivers shift course, forests burn and regrow, coastlines advance and retreat, cities grow. Section 3A sorted these changes into human-induced and natural, and used the environment's functions — source, services, sink — to judge their effects. Here the question is different: when does a change become a *problem*?

The working test this section uses: **a change is a problem when it threatens something people value, and people want it managed**. That test depends on values — so it depends on worldviews. Clearing bushland for housing is growth to one person and an irreversible loss to another. The same change, two different judgements.

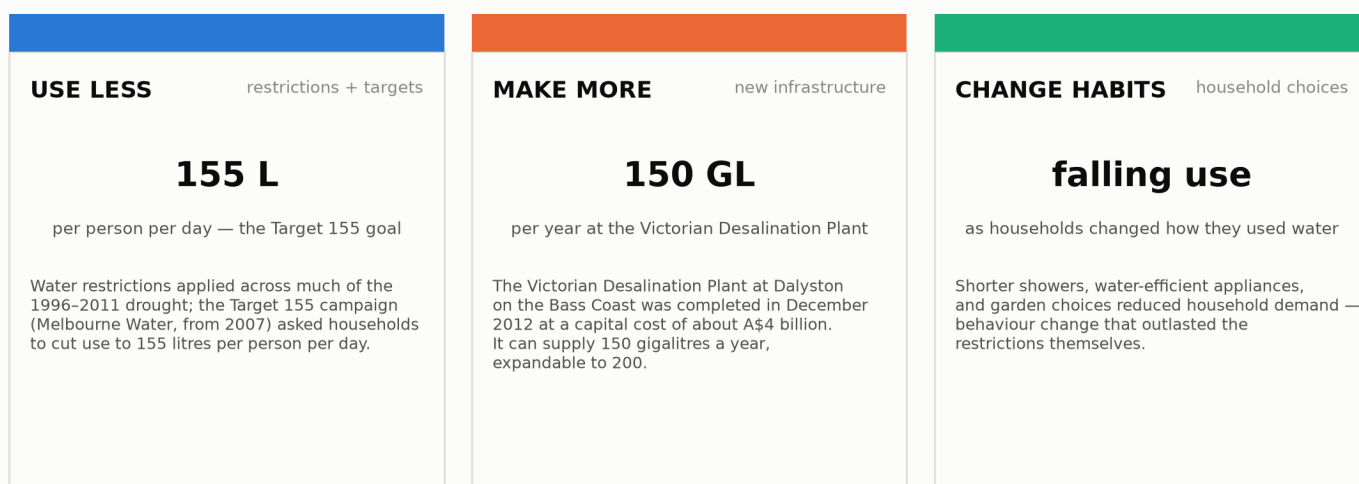
Both answers to E04's question have strong cases, and you should meet each at its strongest before choosing:

- **Change is not necessarily a problem.** Some changes are improvements almost everyone wants: a new water pipeline to a growing town, erosion works that protect a beach access, trees planted where there were none. Managing every change would freeze the world as it is — no new homes, no new infrastructure, no adaptation at all. People have always adapted to environmental change, and adaptation itself is a kind of management.
- **Unmanaged change can pass points of no return.** Some changes, left alone, become irreversible: a species lost, a coastline eaten back past the road, greenhouse gases already in the air continuing to warm the climate for decades. For these changes, waiting for certainty can mean missing the chance to act — and repairing damage later usually costs more than preventing it.

Reasonable, well-informed people hold both positions; the argument is about *which changes fall on which side*, not about who cares. In this book, debate tasks mark the quality of the reasoning — terms defined, evidence used, the other side stated fairly — not the conclusion you reach.

When people agree that a change is a problem, they still disagree about the **method**. Figure 9 shows three families of methods, using the way Melbourne responded to the Millennium Drought of 1996–2011: use less, make more, and change habits.

Three method families: how Melbourne responded to the Millennium Drought



Source: Melbourne Water (restrictions; Target 155 campaign); Victorian Government project records (desalination plant). Retrieved 25 August 2026.

Three-panel diagram of method families used during Melbourne’s Millennium Drought: use less, with restrictions and targets and the Target 155 goal of 155 litres per person per day from 2007; make more, with the Victorian Desalination Plant at Dalyston completed December 2012 supplying 150 gigalitres a year at a capital cost of about 4 billion dollars, expandable to 200 gigalitres; change habits, with falling household water use as households changed how they used water

Figure 9. Three method families: how Melbourne responded to the Millennium Drought.

A **gigalitre** is one thousand million litres — the desalination plant (a plant that makes fresh water from seawater) at Dalyston on the Bass Coast can supply 150 of them every year. Figure 10 shows a different family — laws and agreements that limit or end a damaging activity — using Victoria’s phase-out of native forest logging.

How Victoria ended native forest logging



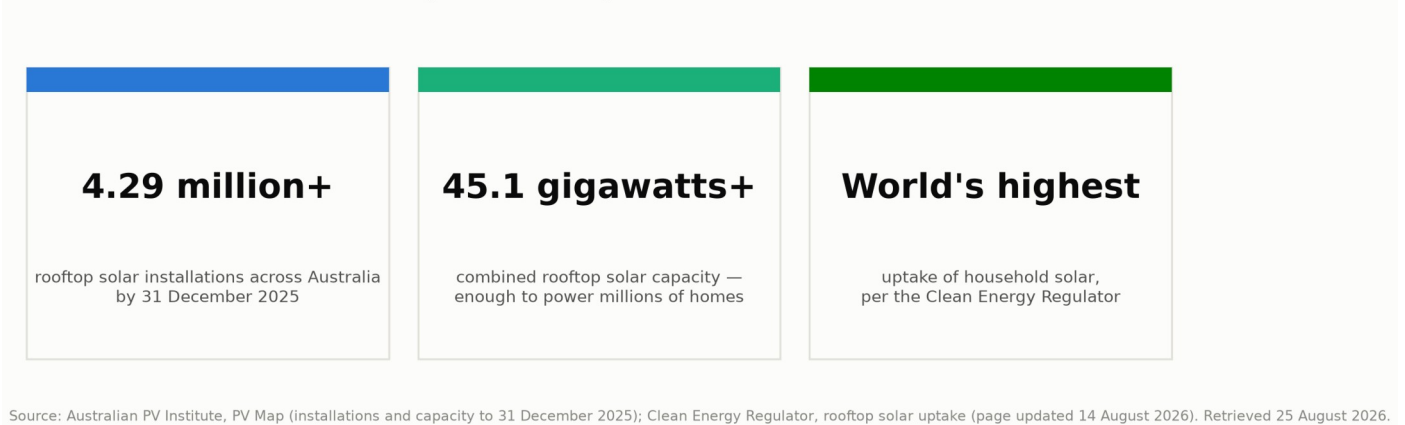
Source: Victorian Government announcements, 6 November 2019 and 23 May 2023; VicForests records. Retrieved 25 August 2026.

Timeline with four events: 6 November 2019, Victoria announces a transition away from native timber harvesting to start by 2030; 23 May 2023, the government brings the end of native forest logging forward to 1 January 2024; 1 January 2024, VicForests permanently ceases logging operations in Victoria’s native forests; 30 June 2024, VicForests ceases to exist as a state agency

Figure 10. How Victoria ended native forest logging.

The logging phase-out shows the debate this section is built on, in real life. Eco-centred supporters saw the end of logging as protecting habitat that cannot be replanted; some workers and forest towns saw the same change as the loss of jobs and an industry. The same policy is the solution for one worldview and the problem for another. Figure 11 returns to the drought’s third family — changing habits — but at national scale.

The choice households have already made: rooftop solar in Australia



Three stat tiles: more than 4.29 million rooftop solar installations across Australia by 31 December 2025; more than 45.1 gigawatts of combined rooftop solar capacity, enough to power millions of homes; world's highest uptake of household solar per the Clean Energy Regulator

Figure 11. The choice households have already made: rooftop solar in Australia.

A **gigawatt** is one thousand million watts of power. Millions of households made an individual choice — panels on their own roof — and the combined effect is national: 45.1 gigawatts of capacity, the world's highest uptake of household solar. Solar belongs to the same family as the drought's third response — changing habits — but it shows what that family can add up to when millions of people make the same choice.

That accounts for four of the five method families. The fifth is **restore and protect**: replanting native plants along farms and creeks so damaged land recovers, and setting aside remnant forest and water catchments in national parks so what remains is kept. Figure 12 gathers all five families together with a real Australian example of each.

Five families of methods for managing environmental change

Method family	How it works	Real Australian example
1. Use less (reduce demand)	People and industry cut how much of a resource they use — restrictions, targets, prices.	Melbourne's water restrictions and the Target 155 campaign during the Millennium Drought.
2. Make more (new supply)	Build infrastructure that adds, moves or stores resources.	Victorian Desalination Plant, Dalyston — up to 150 gegalitres of water a year.
3. Regulate and phase out	Laws and agreements limit or end activities that damage environments.	Victoria ended native forest logging on 1 January 2024.
4. Change household and community behaviour	People choose lower-impact technologies and habits.	Rooftop solar: more than 4.29 million installations by the end of 2025.
5. Restore and protect	Repair damaged ecosystems and protect what remains.	Replanting native plants along farms and creeks; national parks protecting remnant forest and water catchments.

Original table created for this section; examples are the verified referents studied in section 3D.

Table of five method families for managing environmental change, each with how it works and a real Australian example: use less, through restrictions, targets and prices, such as Melbourne's water restrictions and the Target 155 campaign; make more, building infrastructure that adds, moves or stores resources, such as the Victorian Desalination Plant at Dalyston supplying up to 150 gegalitres a year; regulate and phase out, using laws and agreements to limit or end damaging activities, such as Victoria ending native forest logging on 1 January 2024; change household and community behaviour, with people choosing lower-impact technologies and habits, such as more than 4.29 million rooftop solar installations by the end of 2025; restore and protect, repairing damaged ecosystems and protecting what remains, such as replanting native plants along farms and creeks and national parks protecting remnant forest and water catchments

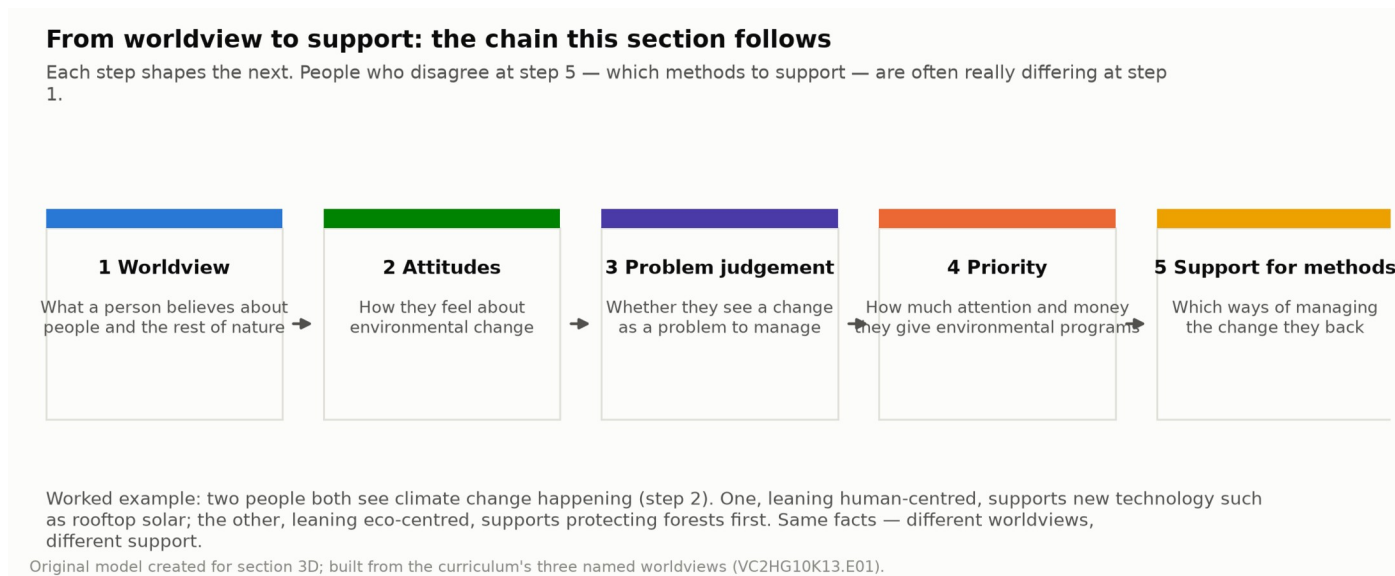
Figure 12. Five families of methods for managing environmental change.

One last step closes the loop with the section's title: **methods are chosen through worldview lenses**. A person leaning human-centred tends to reach for technology and new supply — desalination plants, better batteries, more efficient engines. A person leaning eco-centred tends to reach for limits and restoration — reserves, phase-outs, replanting. A person leaning Earth-centred asks whether the growth behind the demand should itself be limited. Every real program mixes methods — Melbourne's drought response used all three families at once — but the mix a person prefers is a fingerprint of their worldview.

(VC2HG10K13.E04)

Part 6 — Putting it together: from worldview to support

The whole section fits in one chain, and Figure 13 is the model the rest of the questions use.



Flow diagram of five linked steps: 1 worldview, what a person believes about people and the rest of nature; 2 attitudes, how they feel about environmental change; 3 problem judgement, whether they see a change as a problem to manage; 4 priority, how much attention and money they give environmental programs; 5 support for methods, which ways of managing the change they back. A note below: two people can both see climate change happening and still support different methods — same facts, different worldviews, different support

Figure 13. From worldview to support: the chain this section follows.

Read the chain from left to right and it explains support: beliefs shape attitudes, attitudes shape whether a change counts as a problem, that judgement sets the priority the person gives environmental programs, and priority shapes which methods they back. Read it backwards and it explains disagreement: when two Australians argue about a pipeline, a logging plan or a solar farm, they are usually not disagreeing about the facts — they are disagreeing at step 1, where the chain begins.

That is the influence the curriculum's title names. Environmental worldviews do not just sit in people's heads; they decide how much support environmental sustainability actually gets — in votes, in budgets, in working bees, in panels on roofs.

Worked examples

Example 1 — scaffolded (E01: classifying worldviews)

Question: Each statement below expresses an environmental worldview in action. Name which of the three worldviews — human-centred, eco-centred, Earth-centred — each statement leans towards most, and quote the words that told you.

Statement	Your call	Your evidence
(i) “If we manage our forests well, they can keep supplying timber, jobs and recreation for a long time.”		
(ii) “The Leadbeater’s possum has a right to exist whether or not it is useful to us.”		
(iii) “Before we approve another stage of urban growth, ask whether this city should keep expanding at this rate at all.”		
(iv) “Rooftop solar lets households cut their power bills and cut emissions at the same time.”		

Answer:

Statement	Call	Evidence
(i)	Human-centred	“supplying timber, jobs and recreation” — nature valued for what it provides people; “manage ... well” — humans as managers of resources.
(ii)	Eco-centred	“a right to exist whether or not it is useful to us” — value in itself, not for usefulness to people.
(iii)	Earth-centred	“should keep expanding at this rate at all” — questioning growth itself, designing within limits rather than managing the expansion.
(iv)	Human-centred	Technology solving two human problems at once (bills and emissions) — the typical human-centred approach of using technology and management to fix problems as they arise.

The traps are (iii) and (iv). Statement (iii) is not eco-centred, because it does not argue from the rights of species; it questions the scale of growth itself, which is the Earth-centred move. Statement (iv) sounds green, but its reasoning is about human benefits and technological fixes — human-centred. Judge by the reasoning, not by how environmental the topic sounds.

Example 2 — unscaffolded (E02: reading disagreement over time)

Question: Use Figure 3 (the Lowy Institute trend, 2007–2026).

- Describe two changes shown in the figure between 2007 and 2026, using numbers from the graph.
- Suggest one event or condition from this section’s content (or from section 3A) that could help explain why “act now” support rose towards 2019, and one that could help explain why it fell by 2026. Explain the link in each case.
- Match the three response options to the worldview each leans towards most, and justify one of your matches in one sentence.

(The fully worked solution is at the end of the section.)

Practice questions

Scaffolded

- Q1.** Complete the working definition used in this section: “An environmental worldview is a person’s basic beliefs and values about the _____ between people and the rest of nature, and about how people therefore _____ treat the environment.”
- Q2.** Figure 1. Match each worldview to its statement about nature’s value: (a) worthwhile in itself, not only for its usefulness to people; (b) worthwhile for what it provides people; (c) land, water and species matter whether or not people use them. Then state the typical approach of the eco-centred worldview in one sentence.
- Q3.** Figure 3. (a) State the share of respondents choosing “act now” in 2007 and in 2026. (b) In which year did “act now” support reach its low point, and what was the value? (c) By how many percentage points did “act now” support change between that low point and 2019?
- Q4.** Figure 4. (a) State the share of all adults who believe climate change is happening. (b) Name the age group with the highest belief and the age group with the lowest, and give both values. (c) How many percentage points separate the two age groups?
- Q5.** Figure 8. (a) Where does climate change rank among the thirteen threats, and what share named it a critical threat? (b) Name the top-ranked threat and its value. (c) How many percentage points separate the top-ranked threat from climate change?
- Q6.** Figure 12. (a) List the five method families. (b) Give the real Australian example the table uses for “regulate and phase out”, including its date. (c) Name the method family that Melbourne’s Target 155 campaign belongs to.

Un scaffolded

- Q7.** Use Figure 2. Explain why the same proposal — clearing 200 hectares of remnant bushland for housing — can be supported by one person and opposed by another even when both agree on every fact of the proposal. In your answer, name the different first question each worldview asks.
- Q8.** Use Figures 4 and 6. (a) Explain what each figure shows about how Australians’ climate views differ between groups, using numbers from both. (b) Which of the two — age or political identity — shows the bigger split in these figures? Show your working.
- Q9.** Debate the motion: *Change to the environment is necessarily a problem people should manage.* First state the strongest case for the motion and the strongest case against it (both are given in this section — use them). Then reach your own view, explaining the evidence and the reasoning that decided you. You will be marked on the quality of your reasoning, not on which side you reach.
- Q10.** Figure 7 shows the environment’s importance to voters peaking in 2007 and 2019 and falling by 2025. Use what part 3 taught you about why views move to explain both peaks, and predict one event or condition that could push the line up again. Justify your prediction in one or two sentences.
-

Inquiry task

Your class against the polls. Working in pairs, you will run a small survey and compare it with the national polls in this section.

- Design.** Choose two questions from this section to adapt: one from Figure 4 (is climate change happening?) and one from Figure 3 (act now / act gradually / wait). Write them with the same wording as the polls, so your results can be compared fairly.
- Collect.** Survey at least 20 respondents (students and staff). Record each answer anonymously. Note your sample size and the date.
- Represent.** Display your results as a labelled column or bar graph for each question (title, labelled axes, whole-number percentages).

4. **Compare.** For each question, state the matching national figure from this section (Figure 3 or Figure 4) and say whether your class result is higher, lower or about the same. For the bigger difference, give one reason using part 3's ideas — for example, your sample's age, or the experiences your sample has had.
5. **Evaluate.** Choose one of this section's sources (the Lowy Institute Poll, Climate of the Nation, or the Australian Election Study). Find its most recent published result for one question used in this section. Record the page title, the web address and today's date, and state whether the result has moved since this section's figure. Name one thing that makes the source reliable (for example, its sample size or how long it has run).
6. **Reflect.** In two or three sentences, state which worldview your own answers lean towards (human-centred, eco-centred, Earth-centred, or a mix) and give the reason.

Write up steps 3–6 on one page, with both graphs and both sources listed with retrieval dates.

Answers

Q1. relationship; should.

Q2. (a) eco-centred; (b) human-centred; (c) Earth-centred. The eco-centred approach: protect ecosystems and species, limit damage, and restore what has been damaged.

Q3. (a) 68% (2007); 49% (2026). (b) 2012, 36%. (c) 25 percentage points (36 to 61).

Q4. (a) 77%. (b) Highest: 18–24 year olds, 92%; lowest: 65 and over, 67%. (c) 25 percentage points.

Q5. (a) 10th of 13; 49%. (b) Cyberattacks from other countries, 62%. (c) 13 percentage points.

Q6. (a) Use less; make more; regulate and phase out; change household and community behaviour; restore and protect. (b) Victoria ended native forest logging on 1 January 2024. (c) Use less (reduce demand).

Q7. See fully-worked solutions.

Q8. See fully-worked solutions.

Q9. Marked on reasoning, not conclusion. See fully-worked solutions for the two steelman cases.

Q10. See fully-worked solutions.

Fully-worked solutions

Worked example 2. (a) Two changes, each with a number: support for “act now, even at significant cost” fell from 68% in 2007 to a low of 36% in 2012, then climbed back to 61% in 2019 before easing to 49% in 2026; meanwhile “act gradually” rose from 24% to a peak of 45% in 2012 and then fell back to 35%, roughly mirroring the “act now” line. (b) A rise towards 2019: the Millennium Drought had ended but its memory and the national climate debate were still fresh, and 2019 was a federal election year in which climate and energy were fought hard — events that make the environment hard to ignore push people towards acting now. A fall by 2026: by then, as Figure 8 shows, other concerns (the economy, security, conflict abroad) were ranked above climate change as threats, so when several worries compete, fewer people choose the costly “act now” option. Each earns its mark by naming the event and linking it to the line’s direction. (c) “Act now, even at significant cost” leans eco-centred (accepting real cost to limit damage); “act gradually, with low-cost steps” leans human-centred (protect the environment while managing costs to people); “wait until we are sure” is not really a worldview so much as a refusal to act yet, but if forced it sits closest to a human-centred weighing of costs before committing. Any one match justified in one sentence earns the mark.

Q1. The working definition reads: “a person’s basic beliefs and values about the **relationship** between people and the rest of nature, and about how people therefore **should** treat the environment.” The first blank fixes what the worldview is about (the relationship); the second fixes that it carries a judgement about how to act (should treat), which is why worldviews shape support for action.

Q2. Match the statements to the “Nature’s value” row of Figure 1: “worthwhile in itself” is the eco-centred column; “worthwhile for what it provides people” is the human-centred column; “matter whether or not people use them” is the Earth-centred column. The eco-centred typical approach, from the table’s bottom row: protect ecosystems and species, limit damage, and restore what has been damaged.

Q3. (a) Read the blue line’s end points: 68% in 2007, 49% in 2026. (b) The low point is 2012, at 36%. (c) From 36% in 2012 to 61% in 2019 is a rise of 25 percentage points. Note the language: a change from 36% to 61% is 25 *percentage points*, not 25 per cent.

Q4. (a) 77% of all adults. (b) Read the first bar in each group: 18–24 year olds are highest at 92%; those 65 and over are lowest at 67%. (c) $92 - 67 = 25$ percentage points. The age split in this figure (25 points between the youngest and oldest groups) is as wide as the movement in “act now” support between its low and its later peak (Q3c) — both show how much climate views can differ between groups and over time.

Q5. (a) Climate change ranks 10th of the 13 threats; 49% named it a critical threat. (b) The top-ranked threat is cyberattacks from other countries at 62%. (c) $62 - 49 = 13$ percentage points. The figure’s point is not that Australians

ignore climate change — a clear majority still believe it is happening (Figure 4) — but that other concerns rank higher when all threats are weighed at once.

Q6. (a) From Figure 12: use less (reduce demand); make more (new supply); regulate and phase out; change household and community behaviour; restore and protect. (b) The “regulate and phase out” example is Victoria ending native forest logging on 1 January 2024 (the phase-out announced in November 2019, brought forward in May 2023). (c) Target 155 asked households to keep water use to 155 litres per person per day — cutting demand, so it belongs to “use less”.

Q7. Step 1: the facts are agreed — both people know the clearing would happen, where, and how much. Step 2: the disagreement starts earlier, at the worldview. The human-centred person’s first question is about human needs — does the town need the homes, jobs and rates the housing brings? — with the bushland’s services weighed in the balance and possibly replaced by engineering. The eco-centred person’s first question is about the living systems — remnant bushland shelters species and ecosystems that cannot be rebuilt once cleared — and looks for alternatives (already-cleared land, fitting more homes into the existing town area, offsets) before accepting the clearing. The Earth-centred person’s first question is about limits — should the town expand at this scale at all? Step 3: so support and opposition flow from different starting questions, not from different facts — exactly the pattern Figure 13’s chain predicts.

Q8. Step 1 (Figure 4): belief that climate change is happening splits by age — 92% of 18–24 year olds against 67% of those 65 and over, a split of 25 percentage points. Step 2 (Figure 6): the judgement that the Government is not doing enough splits by political identity — 87% of Greens voters against 31% of Coalition voters, a split of 56 percentage points. Step 3 (compare): $56 > 25$, so in these two figures political identity shows the bigger split. Step 4 (careful reading): the two figures ask different questions (is it happening? against is the government doing enough?), so the fair conclusion is about these measures, not a universal claim — on these measures, political identity divides Australians more sharply than age.

Q9. Steelman for the motion (change is necessarily a problem): unmanaged change can pass points of no return — a species lost cannot be brought back, a coastline eaten back past the road cannot simply be rebuilt, and greenhouse gases already in the air keep warming the climate for decades; for these changes, waiting for certainty can mean missing the chance to act, and prevention usually costs less than repair. Steelman against the motion (change is not necessarily a problem): environments have always changed, and some changes are improvements almost everyone wants — a new pipeline to a growing town, erosion works that protect a beach access, trees planted where there were none; managing every change would freeze the world as it is, with no new homes or infrastructure and no adaptation at all, and people have always adapted to change. A strong answer then states its own view with a test — for example, using the section’s working test (a change is a problem when it threatens something people value and they want it managed) and naming a real case from the section (the logging phase-out, the drought response) where the test decides it. Marks go to defined terms, evidence from the section, fair statements of both sides, and a reasoned conclusion — not to which side is chosen.

Q10. Step 1 (the peaks): part 3’s pattern is that environmental concern rises when events make the environment hard to ignore. The 2007 peak (59%) came in the middle of the Millennium Drought, during Australia’s first big national climate debate; the 2019 peak (53%) came in a federal election year fought hard on climate and energy, just as the Black Summer bushfire season was beginning — both are experiences that push the environment up every voter’s list. Step 2 (the fall): by 2025, with the drought and fires further in the past and other concerns (costs, security, conflict abroad) ranking high in Figure 8, the environment slid to 44%. Step 3 (a justified prediction): any event that makes environmental damage direct and visible for many Australians — a major flood, a severe fire season, a water shortage in a capital city — could push the line up again, because part 3 showed views move with experience. The prediction earns its mark by naming the mechanism (experience shapes worldview and priority), not just an event.

Sources

- Lowy Institute Poll 2026 — share of Australians calling thirteen issues “a critical threat to Australia’s vital interests in the next 10 years” (climate change 49%, ranked 10th of 13; cyberattacks 62% at the top); and the climate-change trend question “which of the following statements comes closest to your view?” (act now even at significant cost / act gradually with low-cost steps / wait until we are sure), 2007–2026; values read from the published trend chart, whole percentages. Retrieved 25 August 2026.

- The Australia Institute, *Climate of the Nation 2023* (YouGov Galaxy online survey; fieldwork 16–23 June 2023; n = 2,089 Australians 18+; overall margin of error 2.26%) — belief that climate change is happening: all adults 77%, 18–24 year olds 92%, 65 and over 67%; whether the Federal Government is doing enough to prepare for and adapt to climate change: all respondents 47% not enough / 26% enough; Labor voters 52/26; Coalition voters 31/38; Greens voters 87/7. Retrieved 25 August 2026.
- Cameron, S. and McAllister, I., *Trends in Australian Political Opinion 1987–2025* (Australian Election Study) — “the threat of climate change is a serious threat”: 2010 55%, 2013 56%, 2016 62%, 2019 68%, 2022 66%, 2025 57%; the environment “extremely important” in deciding the vote, 1990–2025: 52, 41, 42, 44, 47, 52, 59, 41, 43, 42, 53, 50, 44 per cent. Values read from the published trends figure, rounded to whole per cent. Retrieved 25 August 2026.
- Melbourne Water — water restrictions across much of the 1996–2011 Millennium Drought period; the Target 155 campaign (from 2007), 155 litres per person per day. Retrieved 25 August 2026.
- Victorian Government — transition away from native timber harvesting announced 6 November 2019 (to start by 2030); end date brought forward to 1 January 2024, announced 23 May 2023; VicForests permanently ceased logging operations 1 January 2024 and ceased to exist as a state agency 30 June 2024. Retrieved 25 August 2026.
- Victorian Desalination Plant, Dalyston (Bass Coast) — completed December 2012; capacity 150 gigalitres per year, expandable to 200 gigalitres; construction capital about A\$4 billion. Retrieved 25 August 2026.
- Australian PV Institute, PV Map — more than 4.29 million rooftop PV installations and more than 45.1 gigawatts of combined capacity across Australia by 31 December 2025; Clean Energy Regulator, rooftop solar uptake — “Australia has the highest uptake of household solar in the world” (page updated 14 August 2026). Retrieved 25 August 2026.
- Eckersley, R. (1992), *Environmentalism and Political Theory: Toward an Ecocentric Approach*; Dunlap, R.E., Van Liere, K.D., Mertig, A.G. and Jones, R.E. (2000), *Journal of Social Issues* 56(3), 425–442 — framing sources for the three-worldview comparison in Figure 1.
- ACARA, Victorian Curriculum 2.0 Geography, Levels 9–10 — VC2HG10K13 and elaborations E01–E04; Sustainability cross-curriculum priority organising ideas VC2CCPSWV1 and VC2CCPSWV2 (E03).
- Figures 1–13 are original tables, charts and model diagrams built for this section; every data figure is computed from the values it displays, with its source in the figure’s printed source line.

All retrieval dates on or before 25 August 2026.

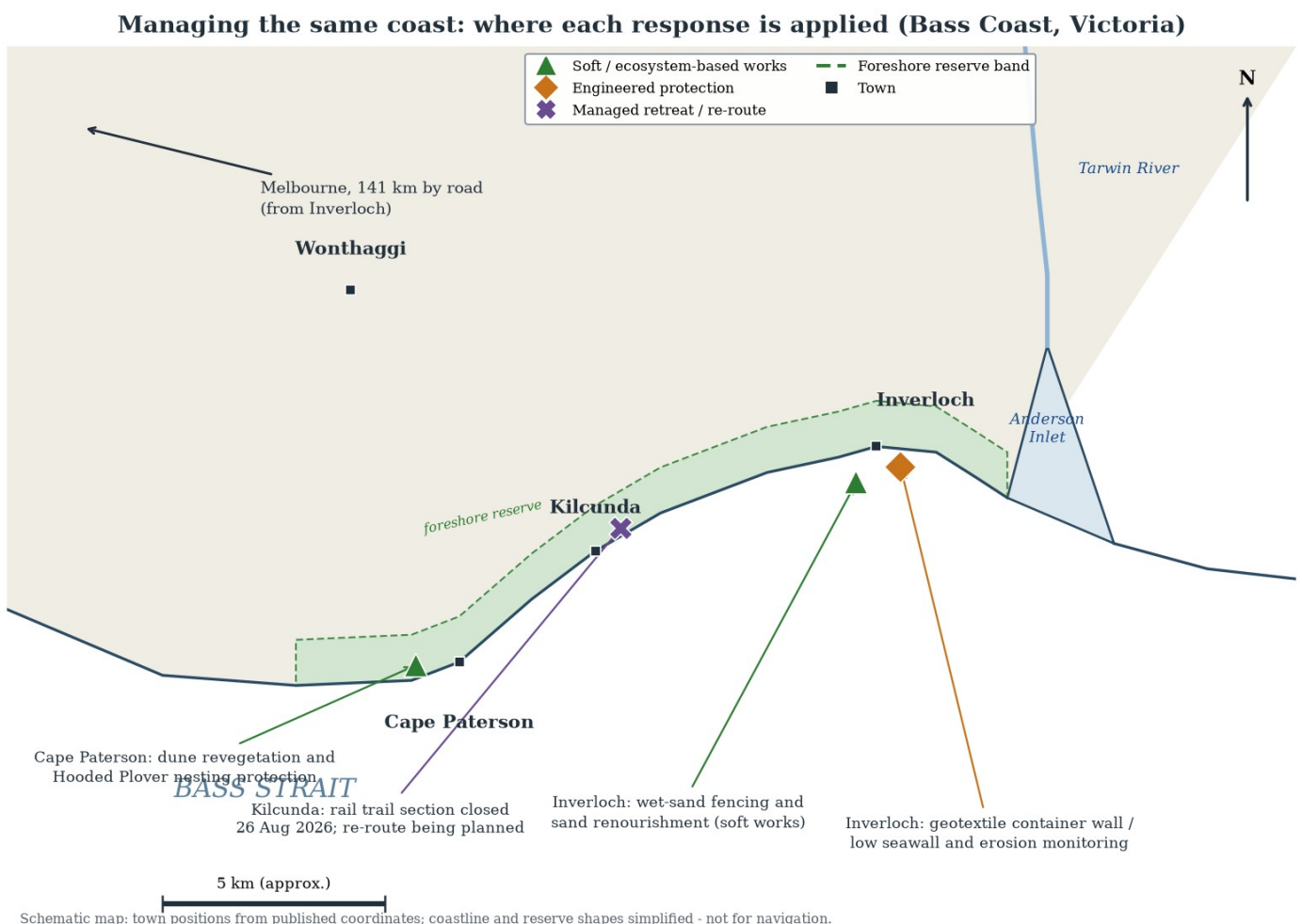
Managing one environmental issue: strategies weighed by environment, change, interconnection and sustainability

Theory

Part 1 — The same coast, a new question

Section 3B worked out the *causes and consequences* of coastal erosion on the Bass Coast surf coast of Victoria: at Inverloch the coastline has retreated 33.5 m since 2012 in front of the surf life saving club (the building now stands 16 m from the dune face) and 35.6 m at the road site near Surf Parade (the road now within 6 m of the eroding edge); at Kilcunda the beach access closed in December 2025 and a section of the Bass Coast Rail Trail closed from 26 August 2026. This section returns to the same coast and asks the management question: what do we do about it, and how do we decide?

That is what VC2HG10K14 asks geographers to do — not just list responses, but bring four big ideas to bear: **environment** (what the coast does for us and what it can absorb), **change** (how fast the coast is moving and where it is heading), **interconnection** (which causes and impacts are joined), and **sustainability** (whether the coast can keep doing its work into the future). Figure 1 shows the study area again, this time with the real management responses marked.



Schematic map of the Bass Coast surf coast, Victoria, with Wonthaggi inland and Cape Paterson, Kilcunda and Inverloch on the coast, a green foreshore reserve band hugging the shore, and management symbols: green triangles for soft and ecosystem-based works at Cape Paterson and Inverloch, an orange diamond for the geotextile wall and erosion monitoring at Inverloch, and a violet X for the closed rail trail section and planned re-route at Kilcunda, with a legend, north arrow and 5 km scale bar

Figure 1. Managing the same coast: where each response is applied (Bass Coast, Victoria).

Impacts and projected impacts. E01 is about the impacts of the issue *and* the impacts still projected for it — not just what has happened but what happens if the current pace continues. Measured impacts so far: retreating dune faces at Inverloch; a lost beach access and a closed rail trail section at Kilcunda; a narrower beach squeezing both summer visitors and nesting hooded plovers. Projected impacts: treating 2012-2026 as 14 years, the Inverloch sites retreated at about 2.4-2.5 m a year on average; at that pace the remaining 6 m gap at the road site closes in the late 2020s and the 16 m gap at the surf club in the early 2030s — and the pace is not guaranteed to stay slow, because a rising sea (over 22 cm since 1900, and accelerating) lifts every storm surge. So the projected impact is not “a slightly narrower beach”; it is roads, buildings and walking paths losing their footing within a school lifetime. That is why the coast is managed at all — and why the choice of strategy matters.

(VC2HG10K14.E01)

Part 2 — Spatial strategies: reserves, corridors and where things go

Management strategies are strongest when they are built on geographical concepts. Figure 2 sorts the strategies used on the Bass Coast into three families.

Management strategies built on geographical concepts (VC2HG10K14.E02)

Strategy family	What it means	Bass Coast example
Spatial strategy	Manage WHERE things happen: set aside reserves and corridors, zone land, plan roads and settlements away from hazard	A foreshore reserve band runs along much of the coast; the Bass Coast Rail Trail is being re-routed away from the eroding Kilcunda dune
Environmental strategy	Work WITH natural processes: ecosystem-based management, and environmental solutions instead of hard engineering	Wet-sand fencing and dune revegetation rebuild the beach at Inverloch rather than just walling it off
Interconnected thinking	Treat the causes and the impacts together: address both the immediate and the underlying causes of the change	Protect the beach now (immediate) while planning for sea level rise and limiting new building on the dune (underlying)

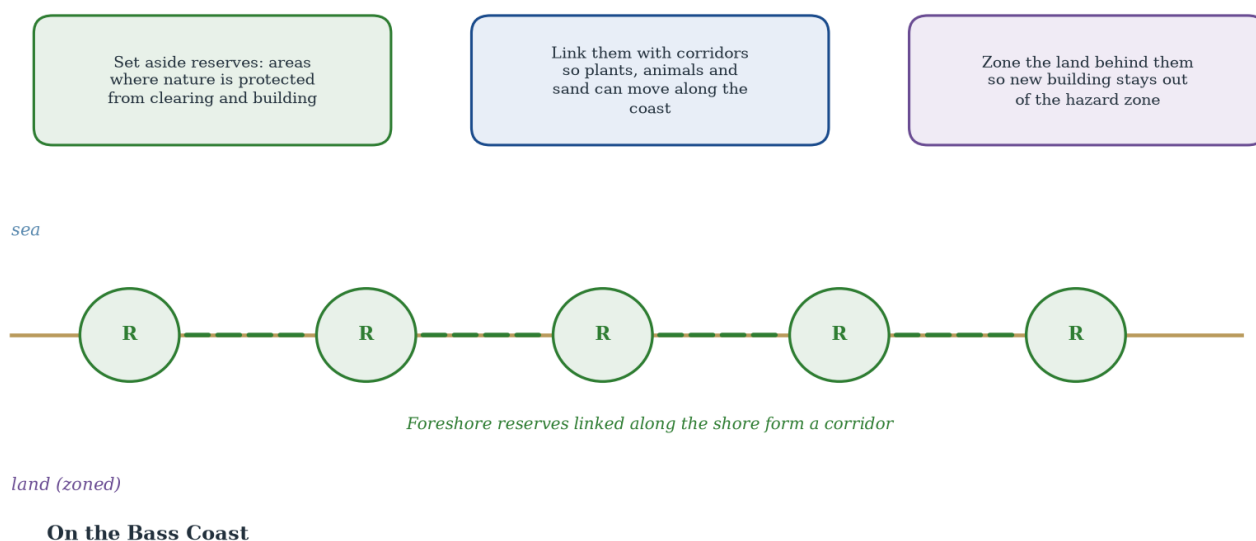
Three-row table of management strategy families: spatial strategy (manage where things happen — set aside reserves and corridors, zone land, plan roads and settlements away from hazard; Bass Coast example: a foreshore reserve band along the coast and the rail trail being re-routed away from the Kilcunda dune), environmental strategy (work with natural processes — ecosystem-based management and environmental instead of engineering solutions; example: wet-sand fencing and dune revegetation rebuilding the beach at Inverloch), and interconnected thinking (treat the causes and impacts together — address both immediate and underlying causes; example: protect the beach now while planning for sea level rise and limiting new building on the dune)

Figure 2. Management strategies built on geographical concepts (VC2HG10K14.E02).

The first family is **spatial strategies** — managing *where* things happen. The curriculum’s own example is setting aside reserves and corridors to protect biodiversity. A **reserve** is land set aside, protected from clearing and building; a **corridor** is a linked strip along which plants, animals and sand can move (Figure 3).

A spatial strategy: reserves and corridors along the coast

The idea



Two-part diagram of a spatial strategy: three idea boxes (set aside reserves where nature is protected; link them with corridors so plants, animals and sand can move along the coast; zone the land behind so new building stays out of the hazard zone) above a plan view of five circular reserves labelled R, linked along the shoreline by a dashed green corridor between the sea and zoned land, with a note that the shire manages 42 kilometres of coastline and 100 hectares of bushland

Figure 3. A spatial strategy: reserves and corridors along the coast.

On the Bass Coast this is real, not theoretical. The shire manages 42 km of coastline and 100 ha of bushland, much of it a continuous foreshore reserve behind the beach. Private building or fencing into the reserve is not allowed; council officers remove it and rehabilitate the land. The Cape Paterson Bay Beach Precinct Masterplan (December 2014) added revegetation with indigenous plants and protection for hooded plover nesting areas, and the Kilcunda Foreshore Management Plan (adopted 16 March 2016) does the same work further west. Kept continuous, the string of foreshore reserves works as a corridor: sand can shuffle along the shore, dune plants can spread, and beach-nesting birds keep their nesting space.

Spatial strategy also decides where *assets* go. After the Kilcunda dune kept retreating, the council closed the rail trail section on 26 August 2026 and began studying re-route options inland — moving the asset out of the hazard instead of fighting the sea for it. Zoning that keeps new building set back from the eroding edge applies the same idea to future houses.

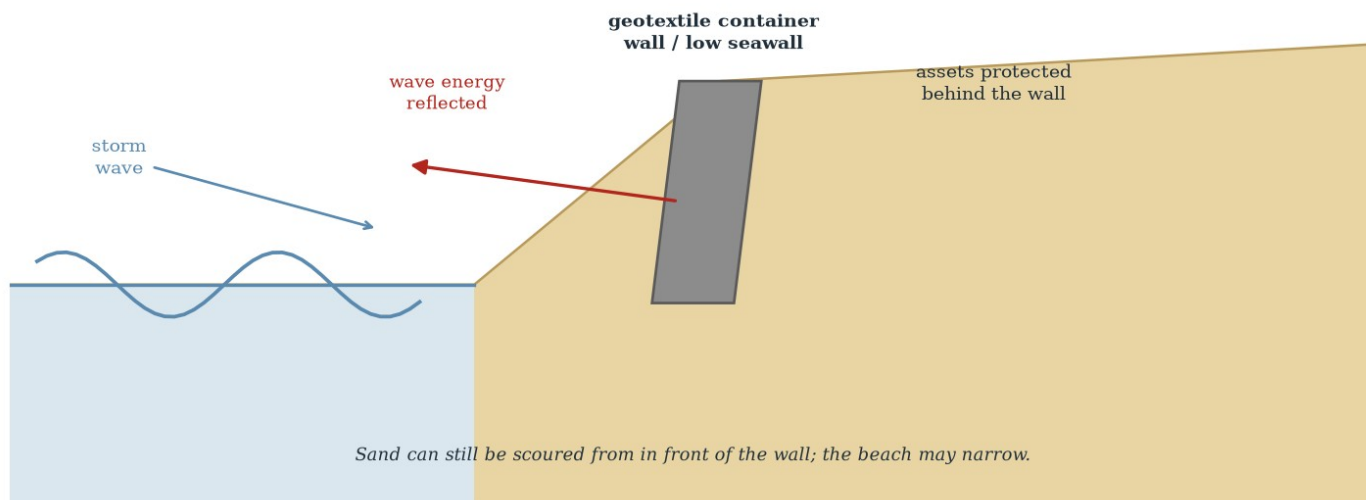
(VC2HG10K14.E02)

Part 3 — Environmental strategies: working with the coast

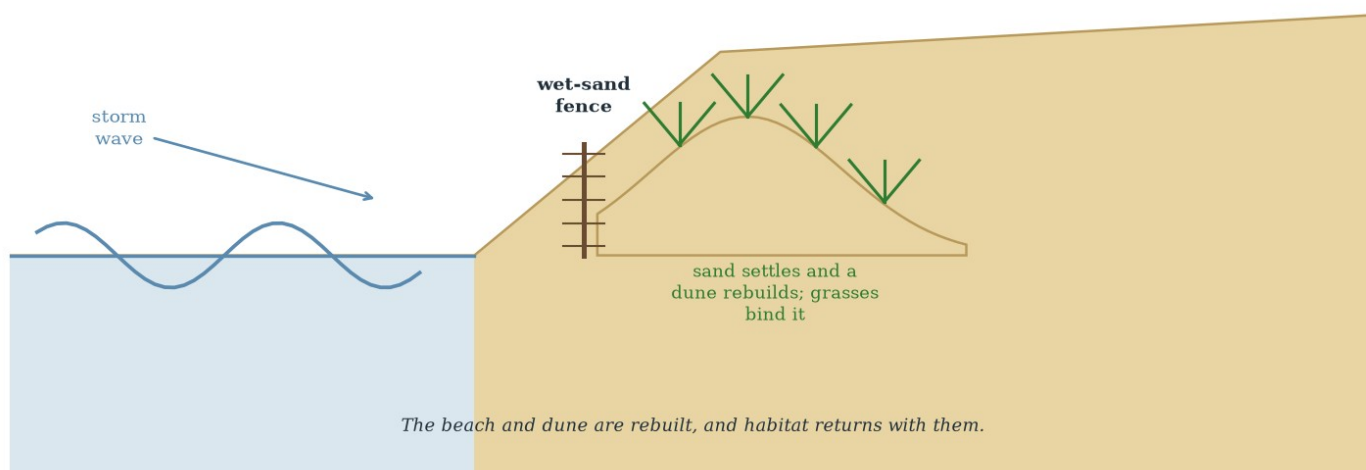
The second family is **environmental strategies** — working *with* natural processes instead of against them. The curriculum's examples include **ecosystem-based management** and choosing “environmental instead of engineering solutions”. Figure 4 contrasts the two styles on the same beach cross-section.

Two ways to hold a coast: engineering against the wave, or rebuilding the beach

Hard: engineered protection



Soft: environmental solution



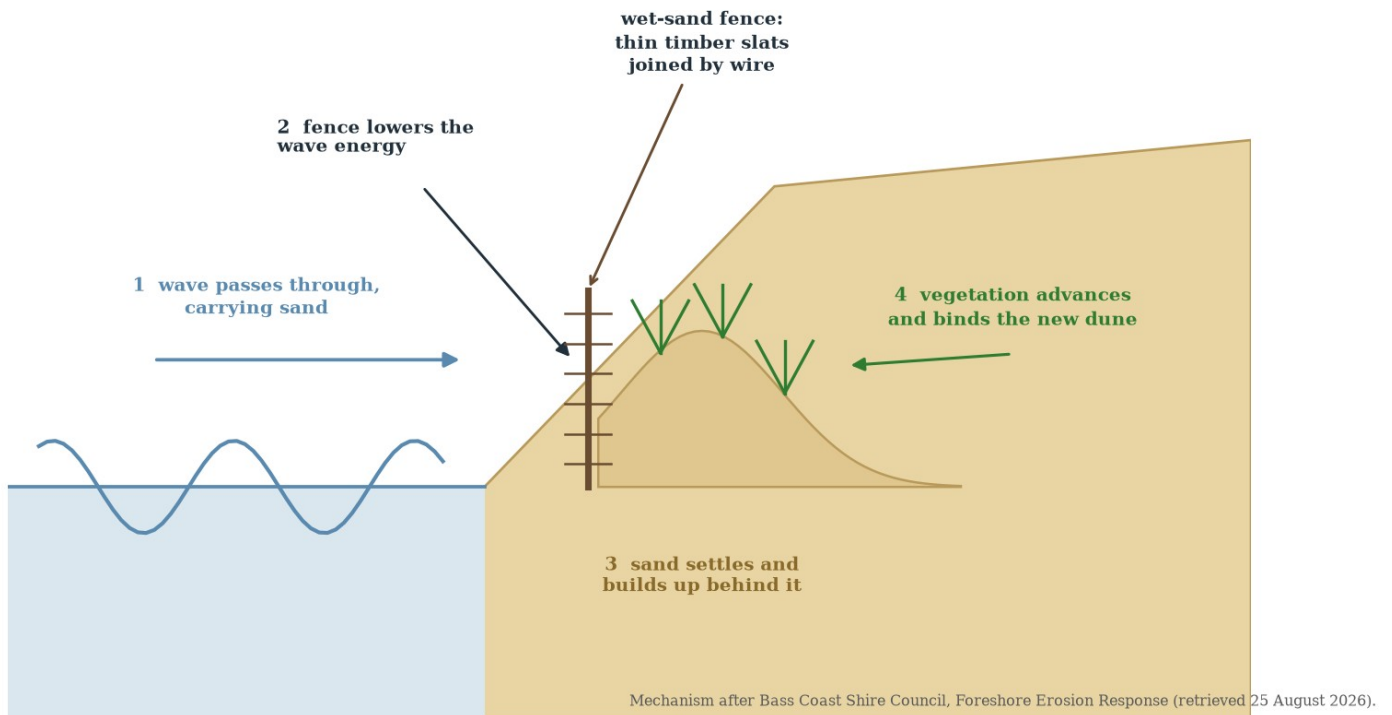
Two-panel model cross-section of a beach: left panel, a hard geotextile container wall holding the line behind it while reflected wave energy scours the beach in front; right panel, soft works with a wet-sand fence behind which sand has built up into a new vegetated dune bulge

Figure 4. Hard engineering and soft works on the same beach (model).

A **hard** option — a geotextile container wall or low seawall — holds the line behind it, but reflected wave energy can **scour** (wash out) the beach in front: the wall protects what stands behind it at a cost to the beach. A **soft** option rebuilds the beach itself. The Bass Coast's signature soft work is the **wet-sand fence** (Figure 5): thin timber slats joined by wire, installed from the estimated maximum erodible level of the beach. Waves pass through the slats carrying their sand; the fence lowers the wave energy, so the sand settles and builds up behind it; and as the new sand mound grows, dune vegetation advances and binds it.

How a wet-sand fence rebuilds a beach (used at Inverloch)

Installed from the estimated maximum erodible level of the beach. Combined with sand renourishment it retains far more sand than renourishment alone.



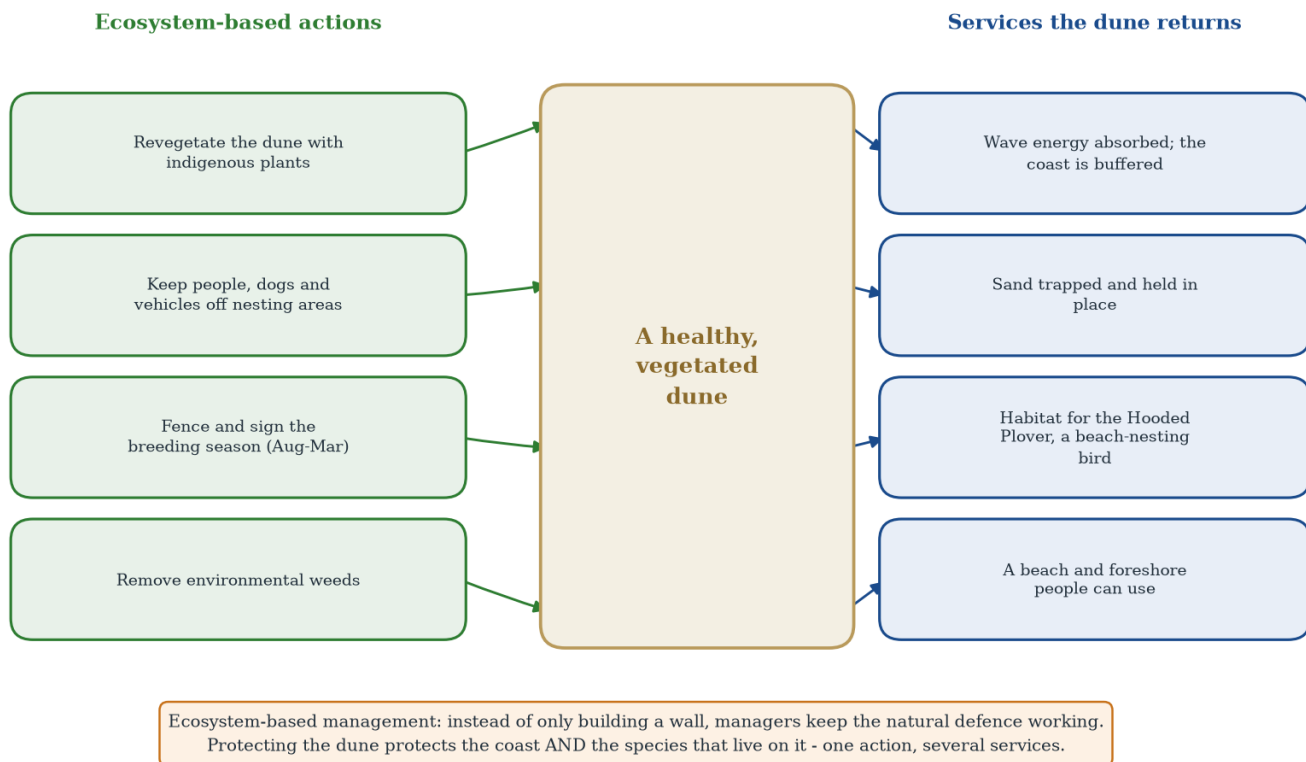
Four-step diagram of how a wet-sand fence rebuilds a beach at Inverloch: 1 the wave passes through carrying sand; 2 the fence of thin timber slats joined by wire lowers the wave energy; 3 sand settles and builds up behind it; 4 vegetation advances and binds the new dune; a note box says the fence is installed from the estimated maximum erodible level and, combined with renourishment, retains far more sand than renourishment alone

Figure 5. How a wet-sand fence rebuilds a beach (used at Inverloch).

The council's own monitoring makes the case for soft works: combined with **renourishment** (adding new sand to the beach), wet-sand fencing retains far more sand than renourishment alone.

Ecosystem-based management takes the same logic one step further: treat the living dune as the defence. Figure 6 shows the deal managers make with nature — four actions in, four services back.

Ecosystem-based management on the Bass Coast: the dune as a natural defence



Flow diagram of ecosystem-based management: four green action boxes (revegetate the dune with indigenous plants; keep people, dogs and vehicles off nesting areas; fence and sign the breeding season, August to March; remove environmental weeds) feed into a healthy vegetated dune, which returns four blue service boxes (wave energy absorbed and the coast buffered; sand trapped and held in place; habitat for the hooded plover, a beach-nesting bird; a beach and foreshore people can use)

Figure 6. Ecosystem-based management: the dune as a natural defence (model).

Revegetating the dune with indigenous plants, keeping people, dogs and vehicles off nesting areas, fencing and signing the breeding season (August to March), and removing environmental weeds together produce a healthy vegetated dune — which then absorbs wave energy, traps and holds sand, provides habitat for the hooded plover, and leaves a beach and foreshore people can use. One action, several services: that is the economic case for an environmental strategy, and it is why the council does this work with Parks Victoria, Phillip Island Nature Parks and volunteer groups such as Friends of the Hooded Plover.

None of this means hard works never happen. At the most exposed spots — the Rotary Park picnic area at Inverloch is one — a low seawall is planned, and a geotextile container wall already protects part of the foreshore. The geographical approach is to know which family a strategy belongs to, and what each family buys and costs.

(VC2HG10K14.E02)

Part 4 — Interconnected thinking: manage the causes, not just the symptoms

The third family is **interconnected (holistic) thinking** — addressing both the underlying and the immediate causes of the change. Section 3B built the causes web; Figure 7 lines the causes up in layers and matches each layer with a response.

Interconnected thinking: manage the immediate AND the underlying causes

Layer	The cause	A management response	What that response does
Immediate cause	Winter storm waves and storm surge strip sand from the beach faster than calm seasons can return it	Protect the beach now: wet-sand fencing, sand renourishment and, at the most exposed spots, a geotextile container wall or low seawall	Holds the line at the assets that matter most
Underlying cause	Sea level rise (+22 cm since 1900, and accelerating) makes every storm surge reach further inland	Reduce greenhouse gas emissions (the driver of sea level rise) and plan for the rise that is already locked in	Slows the problem growing worse over decades
Underlying cause	Homes, roads and the surf club were built close to the dune, and demand for beachside living keeps rising (Bass Coast population up 24% in 2016-2021)	Zone and plan so new building stays set back from the eroding edge; re-route assets like the rail trail when needed	Stops putting more people and property in harm's way

*Managing only the immediate cause protects today's assets but leaves the coast exposed as sea level keeps rising.
Managing only the underlying cause does nothing for the buildings about to fall off the dune. Both are needed.*

Three-row table of interconnected thinking: immediate cause (winter storm waves and storm surge strip sand from the beach faster than calm seasons can return it) matched with protecting the beach now through wet-sand fencing, renourishment and, at the most exposed spots, a wall; underlying cause (sea level rise of more than 22 cm since 1900 makes every surge reach further inland) matched with reducing emissions and planning for the rise already locked in; underlying cause (homes, roads and the surf club built close to the dune, with demand for beachside living rising) matched with setback zoning and re-routing assets such as the rail trail; a note says managing only one layer is not enough — both are needed

Figure 7. Interconnected thinking: manage the immediate AND the underlying causes.

Read Figure 7 as a check on every strategy in parts 2 and 3. The soft and hard works answer the *immediate* cause (winter storm waves and surge stripping sand faster than calm seasons return it). Cutting greenhouse gas emissions and planning for locked-in sea level rise answer one *underlying* cause. Setback zoning and re-routing answer the other (building close to a moving coast, driven by demand for coastal living). E03's point is that holistic thinking — following the interconnections — lets you trace the causes and the effects of human pressure on the environment; and the point of tracing them is exactly this: a coast managed only at the immediate layer is defended one storm at a time on a sea that keeps rising, while a coast managed only at the underlying layer leaves today's surf club 16 m from the dune face with nothing between. Both layers at once is the geographical approach.

(VC2HG10K14.E02, VC2HG10K14.E03)

Part 5 — Sustainability as the measuring stick

The fourth big idea is **sustainability** — and E04 uses it as a criterion: a yardstick for judging how significant an environmental change is. Section 3A gave the yardstick its four marks: the environment works as a **source**, a provider of **services**, a **sink**, and a place of **spiritual** meaning. A change is significant to the degree that it stops those functions continuing into the future. Figure 8 applies the four functions to the Bass Coast erosion.

Using the four functions as sustainability criteria: how significant is the erosion?

Environmental function	The criterion it gives us	Bass Coast erosion	Judgement
Source	Can the coast keep supplying food, materials and space?	Erosion eats the land itself: 33.5 m lost in front of the surf club and 35.6 m at the road site near Surf Parade, Inverloch, since 2012	Weakened
Services	Do protection, habitat and recreation still work?	The dune's wave-buffering weakens; the rail trail and beach access close at Kilcunda; nesting habitat for the Hooded Plover is squeezed	Weakened
Sink	Are wastes and pressures below what the coast can absorb?	Storm surge now strips sand faster than calm seasons replace it; the sand budget is in deficit, so the coast can no longer absorb the wave energy	Overloaded
Spiritual	Are places that hold deep meaning protected?	Beaches and the foreshore are valued by residents and visitors for beauty, play and peace; losing them lowers the meaning of the place	Under pressure

Judged against all four functions, the erosion is a significant environmental change - which is why it needs managing, and why the choice of strategy matters.

Four-row table applying the four functions of the environment as sustainability criteria to Bass Coast erosion: source weakened (erosion eats the land itself— 33.5 m lost in front of the surf club and 35.6 m at the road site since 2012), services weakened (the dune's wave-buffering weakens, the rail trail and beach access close at Kilcunda, plover nesting habitat is squeezed), sink overloaded (storm surge strips sand faster than calm seasons replace it, so the coast can no longer absorb the wave energy), spiritual under pressure (beaches and foreshore valued for beauty, play and peace lose meaning)

Figure 8. Using the four functions as sustainability criteria: how significant is the erosion?

Judged against all four, the erosion is a significant change: the source is being eaten (metres of land lost since 2012), the services are weakening (closed trail, squeezed nesting beach), the sink is overloaded (a sand budget in deficit cannot absorb the arriving wave energy), and the spiritual function — the beach as a place of memory, play and calm — is under pressure. Sustainability has done its work as a concept: it has turned “the beach is eroding” from a complaint into a measured judgement.

Sustainability also evaluates the *responses*. Figure 9 scores the three broad strategies against environmental, social and economic criteria.

Scorecard: which strategy does best on environmental, social and economic criteria?

Strategy	Environmental criterion	Rating	Social criterion	Rating	Economic criterion	Rating
Engineered wall (geotextile / low seawall)	Protects the asset right behind it, but can scour the beach in front and gives no habitat	Mixed	Keeps the surf club, road and picnic area safe for now	Strong	High to build; needs repair after big storms	Mixed
Soft works (wet-sand fence, renourishment, revegetation)	Rebuilds beach and dune and adds habitat, but needs calm weather and repeat work	Strong	Keeps an open, usable beach that people value	Strong	Cheaper materials but ongoing maintenance	Mixed
Managed retreat (re-route the trail, set building back)	Lets the coast move naturally; habitat can migrate inland	Strong	Loses familiar access in the short term; keeps people safe long term	Mixed	Low to build, but the cost of moving or losing assets	Mixed

No strategy scores 'strong' on everything - that is why management is a judgement, not a lookup. Notice how the best environmental choice and the cheapest choice are not always the same thing.

Scorecard table rating three strategies against environmental, social and economic criteria: engineered wall (Mixed, Strong, Mixed), soft works such as wet-sand fencing, renourishment and revegetation (Strong, Strong, Mixed), and managed retreat such as re-routing the trail and setting building back (Strong, Mixed, Mixed), with a note that no strategy scores strong on everything, so management is a judgement, not a lookup

Figure 9. Scorecard: which strategy does best on environmental, social and economic criteria? (Model judgements, open to argument.)

Read the scorecard slowly: no strategy scores strong on everything. The engineered wall is socially strong for now but environmentally mixed and expensive; soft works score environmentally and socially but need repeat spending; managed retreat is environmentally strong and cheap to build but socially painful in the short term. That is why management is a judgement, not a lookup — and why community support is part of the judgement. In 2023 the council proposed a special charge scheme to fund protection works at Surf Beach and Sunderland Bay; a majority of the affected property owners objected, and the scheme was abandoned on 13 December 2023. A strategy the community will not back is not socially sustainable, however it scores on paper.

(VC2HG10K14.E04)

Part 6 — Whose values? Debating the worldviews

Reasonable people can look at the same scorecard and still choose differently, because the choice sits on a **worldview** — a set of basic values about what nature is for. Section 3D names the three the curriculum uses: **human-centred** (nature matters most for what it gives people), **eco-centred** (living things and ecosystems have value in their own right), and **Earth-centred** (Earth's physical systems have limits people must respect, not just use). E05 asks us to debate how environmental worldviews influence positions on environmental issues — and on the Bass Coast the debate is concrete: at Rotary Park, should the planned low seawall go ahead, or should soft works and retreat take priority? Figure 10 sets each worldview's position out in its strongest form — steelmanned, as debaters say.

Three worldviews, three answers: how values shape the management of the same erosion



People can hold a mix of these, and reasonable people disagree - so the debate is judged on the quality of the reasoning, not on which side you land on.

Three-panel diagram of environmental worldviews applied to the same Bass Coast erosion: human-centred (nature matters for what it gives people; protect the assets people rely on; strongest case: safety, homes and livelihoods come first), eco-centred (living things have value in their own right; protect the dune, vegetation and hooded plover, preferring soft works and habitat over a hard wall; strongest case: a healthy dune protects the coast and its species, and lost habitat cannot be rebuilt), and Earth-centred (Earth's physical systems have limits; cut the emissions that raise sea level and stop building on land the sea is reclaiming; strongest case: walls fight the sea one storm at a time, and every defence is temporary unless the driver changes), with a footer that the debate is judged on the quality of the reasoning, not on which side you land on

Figure 10. Three worldviews, three answers: how values shape the management of the same erosion.

Notice what the debate is and is not. It is not “which side is correct” — the human-centred case for the wall (people's safety, homes and livelihoods come first, and governments are right to spend on protecting them) is genuinely strong; so is the eco-centred case for soft works and habitat (once a habitat is gone it cannot simply be rebuilt); so is the Earth-centred case for addressing the driver (unless the driver changes, every defence is temporary). It is “whose reasoning is strongest, and where do you land?” People hold mixes of the three, and the influence shows up in real decisions: a council weighing the surf club against the nesting beach is weighing worldviews whether it names them or not.

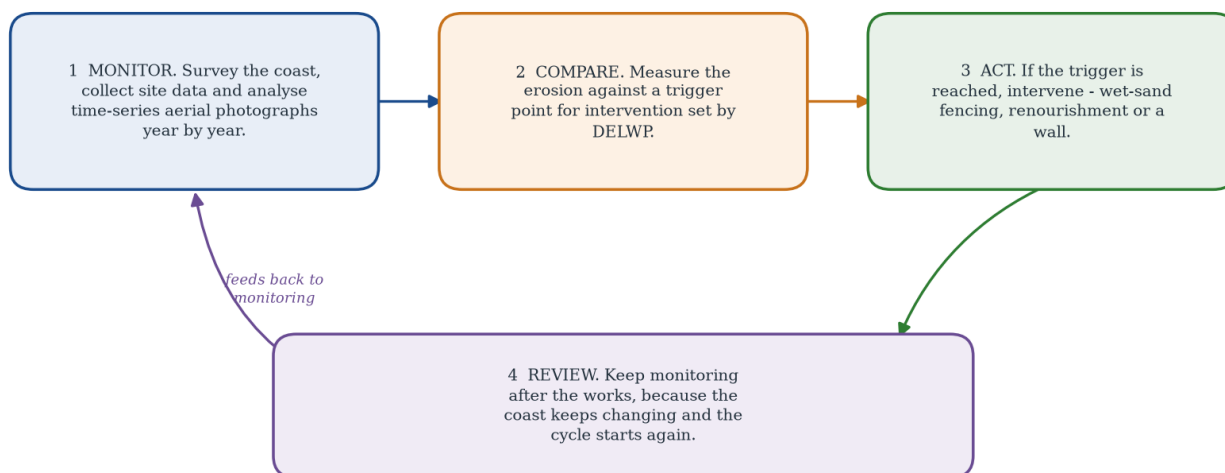
(VC2HG10K14.E05)

Part 7 — Putting it together: management as a cycle

Finally, the geographical approach to management is not a one-off fix but a repeated, data- driven cycle (Figure 11). On the Bass Coast, officers **monitor** the coast by surveying, collecting site data and analysing time-series aerial photographs year by year; they **compare** the measured erosion against a trigger point for intervention set with the state government department (DELWP, the Department of Environment, Land, Water and Planning); when the trigger is reached they **act** (wet-sand fencing, renourishment, a wall); and they **review** by keeping the monitoring going, because the coast keeps changing.

A geographical approach to management: monitor, compare, act, review

Management is not a one-off fix. It is a repeated, data-driven cycle: watch the change, decide by a clear rule, act, then watch again.



Flow diagram of the management cycle in four steps: 1 monitor (survey the coast, collect site data, analyse time-series aerial photographs), 2 compare (measure the erosion against the trigger point for intervention set by DELWP), 3 act (if the trigger is reached, intervene with wet-sand fencing, renourishment or a wall), 4 review (keep monitoring after the works), with an arrow feeding review back to monitoring

Figure 11. A geographical approach to management: monitor, compare, act, review.

The dated record from 3B is this cycle turning: monitoring from 2012; urgent works and fencing from 2020; the Kilcunda beach access closure in December 2025 after a further 2 m of dune washed away; the rail trail closure from 26 August 2026 while re-route options are studied; DELWP preparing medium- and long-term options with community engagement at the centre. The coast sets the pace; the cycle is how people keep up. Environment, change, interconnection and sustainability are not four separate topics — Figure 11 is what they look like used together.

Worked examples

Example 1 — scaffolded (E02: proposing strategies built on geographical concepts)

Question: Classify each real Bass Coast response below as a spatial strategy, an environmental strategy, or interconnected thinking, and give the reason for your call.

Working	Comment
(i) Re-route the Bass Coast Rail Trail inland from the Kilcunda dune; zone new building back from the eroding edge.	Spatial. It manages <i>where</i> people and assets sit relative to the hazard — the same family as reserves and corridors.
(ii) Wet-sand fencing and renourishment at Inverloch; dune revegetation and plover protection at Cape Paterson.	Environmental. It works with natural processes — trapping sand, rebuilding dune vegetation — and manages the ecosystem as the defence.
(iii) Protect the beach now with fencing and, where most exposed, a wall — AND plan for locked-in sea level rise — AND stop putting new assets in harm's way.	Interconnected thinking. It answers the immediate cause and the underlying causes together, layer by layer as in Figure 7.

Answer: (i) spatial, (ii) environmental, (iii) interconnected. The calls are right because the families are defined by *what the strategy acts on*: location (spatial), natural processes and ecosystems (environmental), or the web of causes (interconnected). One on-ground package can contain more than one family — the Inverloch works mix soft

environmental works with monitoring and longer-term planning — and naming the families is how geographers keep the mix honest.

Example 2 — unscaffolded (E04: sustainability as an evaluative criterion)

Question: Using Figures 8 and 9: (a) Explain in two or three sentences why the four functions of the environment work as sustainability criteria, and state the overall judgement Figure 8 reaches about the significance of the Bass Coast erosion. (b) Choose ONE strategy from Figure 9. Evaluate it against TWO different criteria, giving one strength and one weakness, and say whether the scorecard’s ratings agree with your call.

(The fully worked solution is at the end of the section.)

Practice questions

Scaffolded

Q1. Figure 1. (a) Name the four places marked with management symbols. (b) Which symbol type marks “managed retreat / re-route”, and where is it placed?

Q2. Figure 2. Match each meaning to its strategy family: (a) manage where things happen; (b) work with natural processes; (c) treat the immediate and the underlying causes together.

Q3. Figure 3. (a) What does a reserve set aside, and what does a corridor allow to move? (b) State the two figures the shire gives for the coastline and bushland it manages.

Q4. Figures 4 and 5. (a) Give one cost a hard wall can impose on the beach in front of it. (b) Put the wet-sand fence steps in order: sand settles and builds up behind the fence; vegetation advances and binds the new dune; the wave passes through, carrying sand; the fence lowers the wave energy. (c) Why does fencing plus renourishment retain more sand than renourishment alone?

Q5. Figure 6. (a) Name two ecosystem-based actions. (b) Name two services the healthy dune returns.

Q6. Figure 7. (a) Which layer do winter storm waves and storm surge belong to? (b) Which layer do sea level rise and building close to the dune belong to? (c) In one sentence, why is managing only the immediate cause not enough?

Unscaffolded

Q7. Figure 8 (and sections 3A/3B). Evaluate the significance of the Bass Coast erosion using sustainability criteria: use at least THREE of the four functions, and support each with one piece of evidence from the figure or from 3B’s measurements (E04).

Q8. Figure 9. The Rotary Park picnic area is one of Inverloch’s concern areas. Recommend ONE of the three strategies for it, defend your choice with two criteria, and concede one weakness of your choice.

Q9. Figure 10. The council plans a low seawall at Rotary Park. Write the strongest case FOR the wall from one worldview and the strongest case AGAINST it from a different worldview — steelman both. Then state which case you judge better reasoned, and why: reasons, not conclusions (E05).

Q10. Figure 11 and 3B’s timeline. “Coastal management on the Bass Coast is a cycle, not a one-off fix.” Support this statement with two dated events, and name what feeds the cycle back to its start.

Inquiry task

A management plan for one site, argued from evidence. Choose ONE concern area: the Inverloch surf club site, the Inverloch road site, the Rotary Park picnic area, or the Kilcunda rail trail section. In 200-250 words:

1. Name the immediate cause and ONE underlying cause at your site (3B’s causes web).
2. Propose ONE spatial strategy and ONE environmental strategy suited to it.
3. Evaluate your plan against TWO sustainability criteria (two of the four functions).

4. State which worldview (human-centred, eco-centred, Earth-centred) your plan leans on, and give the strongest counter-case from a different worldview in one or two sentences.
5. Name ONE thing you would monitor and the trigger that should prompt action (Figure 11).

Checklist: causes at two layers; one strategy from each of two families; two functions used as criteria; a named worldview with a steelmanned counter-case; a monitor-and-trigger pair; real place names and dates.

Answers

Q1. (a) Cape Paterson (revegetation and plover protection), Kilcunda (trail closure and planned re-route), and the two Inverloch sites (soft works; wall and monitoring). (b) The violet X; at the closed Kilcunda rail trail section. **Q2.** (a) spatial strategy; (b) environmental strategy; (c) interconnected thinking. **Q3.** (a) A reserve sets aside land protected from clearing and building; a corridor allows plants, animals and sand to move along the coast. (b) 42 km of coastline and 100 ha of bushland. **Q4.** (a) Reflected wave energy can scour (wash out) the beach in front of the wall. (b) The wave passes through, carrying sand → the fence lowers the wave energy → sand settles and builds up behind it → vegetation advances and binds the new dune. (c) The fence lowers the wave energy so added sand settles and stays; renourishment alone leaves the new sand exposed to the same waves that removed the old. **Q5.** (a) Any two: revegetate with indigenous plants; keep people, dogs and vehicles off nesting areas; fence and sign the breeding season; remove environmental weeds. (b) Any two: wave energy absorbed / coast buffered; sand trapped and held; hooded plover habitat; a usable beach and foreshore. **Q6.** (a) The immediate cause. (b) The underlying causes. (c) Because the sea keeps rising and demand keeps putting assets near the edge, today's defence is passed tomorrow unless the underlying causes are also managed. **Q7.** Sample: source — the land itself is being lost (33.5 m / 35.6 m of retreat since 2012), so the coast cannot keep supplying space; services — the closed rail trail section and the squeezed plover nesting beach are services removed or shrunk; sink — the sand budget in deficit means the coast can no longer absorb the arriving wave energy; spiritual — loved walks and landmarks are under pressure. Three such functions, evidenced, make the erosion a significant change by the sustainability criterion. **Q8.** Sample (soft works): environmental strong (rebuilds beach, dune and habitat), social strong (keeps an open, usable beach); conceded weakness — economic mixed (repeat spending, needs calm weather). Sample (managed retreat): environmental strong and cheap to build; conceded weakness — social mixed (familiar access lost for now). **Q9.** Sample: FOR, human-centred — the picnic area, surf club and road are here now; people's safety, homes and livelihoods come first, and a low wall buys time while longer-term options are prepared. AGAINST, Earth-centred — the wall fights the sea one storm at a time while the driver (rising sea level) is unaddressed, so every defence is temporary. Judge on reasoning: the against case is better reasoned only if it answers the for case's strongest point (the community cannot simply be abandoned now) with a staged alternative. **Q10.** Monitoring began by 2012 and never stopped; when triggers were reached the council acted (urgent works and fencing from 2020; a low seawall planned at Rotary Park); when the dune kept retreating (a further 2 m at Kilcunda) the cycle turned again — beach access closed December 2025, trail section closed 26 August 2026, re-route options studied. What feeds back: review and monitoring after the works, because the coast keeps changing. **Inquiry.** Assess against the checklist: two cause layers; a spatial and an environmental strategy; two functions used as criteria; a named worldview with a steelmanned counter-case; a monitor-and-trigger pair (e.g. the distance from the road to the dune face, acted on at the DELWP-set trigger); real names and dates.

Fully-worked solutions

Q1. (a) The four marked places are Cape Paterson (dune revegetation and hooded plover nesting protection), Kilcunda (rail trail section closed 26 August 2026, re-route being planned), and two Inverloch sites — wet-sand fencing and renourishment (soft works), and the geotextile container wall / low seawall with erosion monitoring. (b) Managed retreat / re- route is the violet X, placed at the closed rail trail section behind the Kilcunda dune.

Q2. (a) “Manage where things happen” is the spatial strategy family (reserves, corridors, zoning, re-routing). (b) “Work with natural processes” is the environmental strategy family (ecosystem-based management; environmental instead of engineering solutions). (c) “Treat the immediate and underlying causes together” is interconnected thinking.

Q3. (a) A reserve is land set aside, protected from clearing and building; a corridor is the link along which plants, animals and sand can move, so separate reserves work as one system. (b) Bass Coast Shire manages 42 km of coastline and 100 ha of bushland.

Q4. (a) A hard wall reflects wave energy, which can scour the beach in front — the wall holds; the beach in front of it may not. (b) Order: the wave passes through, carrying sand → the fence lowers the wave energy → sand settles and builds up behind it → vegetation advances and binds the new dune. (c) Renourishment alone adds sand, but the same waves that took the old sand take the new; the fence lowers the wave energy behind it so the added sand settles and stays — the council reports the combination retains far more sand.

Q5. (a) Any two of: revegetate the dune with indigenous plants; keep people, dogs and vehicles off nesting areas; fence and sign the breeding season (August to March); remove environmental weeds. (b) Any two of: wave energy absorbed, so the coast is buffered; sand trapped and held in place; habitat for the hooded plover; a beach and foreshore people can use.

Q6. (a) The immediate cause layer. (b) The underlying cause layer (sea level rise and building close to the dune both sit there). (c) Managing only the immediate cause holds today's line but leaves the coast exposed as sea level keeps rising and demand keeps putting assets near the edge — the underlying causes keep feeding the immediate one.

Q7. The four functions work as sustainability criteria because each names a job the environment does for people and nature; a change that stops the job continuing into the future is, by definition, unsustainable. Applied to the Bass Coast: as a **source** the coast is losing the land itself — 33.5 m of retreat at the surf club site and 35.6 m at the road site since 2012; as **services** the rail trail closure (26 August 2026) removes a recreation service outright and the narrower beach squeezes plover nesting; as a **sink** the sand budget in deficit means storm wave energy is no longer absorbed but passed on to roads and buildings; as **spiritual** meaning, loved walks and landmarks are under pressure. Three or more weakened functions is a strong evaluated judgement: the erosion is a significant environmental change (E04).

Q8. Model answer (soft works at Rotary Park): recommendation — wet-sand fencing and renourishment with dune revegetation. Environmental criterion: strong — it rebuilds the beach and dune and adds habitat, rather than scouring the beach as a wall can. Social criterion: strong — it keeps an open, usable beach and picnic foreshore that residents value. Conceded weakness (economic): mixed — materials are cheaper than a wall, but the works need calm weather and repeat spending, so the protection must be renewed. The scorecard's ratings (Strong / Strong / Mixed) agree. An equally creditable answer recommends managed retreat (environmental strong, cheap to build; conceded social weakness of lost access now) or a wall (social strong for now; conceded environmental and economic weaknesses).

Q9. Model answer. FOR (human-centred, steelmanned): the Rotary Park picnic area, the surf club and the road are used by real people now; their safety, homes and livelihoods come first, and a low seawall is a reasonable use of public money that buys time while medium- and long- term options are prepared. AGAINST (Earth-centred, steelmanned): sea level has risen over 22 cm since 1900 and the rate is accelerating, so a wall fights the sea one storm at a time while the driver is unaddressed; every defence is temporary, and money spent on walls is money not spent on retreat, re-routing and emissions. Judgement (reasons, not sides): the against case is better reasoned only if it answers the for case's strongest point — that the community cannot simply be abandoned today — with a staged plan; the for case is better reasoned only if it treats the wall as time bought within a longer plan, not a final answer. Credit lies in the quality of the engagement, not the conclusion (E05).

Q10. A one-off fix would end at “build and forget”; the Bass Coast record shows a cycle instead. Monitoring (surveying, site data, time-series aerial photography) began by 2012 and fed comparisons against the DELWP-set trigger; when triggers were reached the council acted — urgent works and wet-sand fencing from 2020, a geotextile container wall from August 2020. The coast kept changing regardless: at Kilcunda a further 2 m of dune washed away after the December 2025 beach access closure, and the trail section closed from 26 August 2026 while re-route options are studied — review feeding straight back into monitoring. The feedback arrow in Figure 11 is the dated record: because the coast never stops changing, management never stops cycling.

Example 2. (a) The four functions name the jobs the environment does — supplying, servicing, absorbing, giving meaning — so a change that stops a job continuing into the future is, by definition, unsustainable; the criteria turn “is it a problem?” into “how much of which jobs is being lost?”. Figure 8’s judgement: all four functions are weakened, overloaded or under pressure, so the erosion is a significant environmental change. (b) Model: managed retreat — environmental criterion: strong (the coast moves naturally and habitat can migrate inland); social criterion: mixed (familiar access is lost in the short term, though people are safer long term). Strength: the strongest environmental row on the scorecard; weakness: the hardest to win support for at a community meeting. The scorecard agrees (Strong / Mixed). Any strategy argued this way — two named criteria, a real strength and a real weakness, agreement checked — is correct.

Inquiry. Assess against the checklist. A strong response names, e.g., the road site: immediate cause — winter storm waves and surge stripping sand on a rising sea; underlying cause — the road was zoned and built within metres of a moving dune. Spatial strategy — set new building and re-located assets back behind a hazard line; environmental strategy — wet- sand fencing and revegetation to rebuild the buffer. Criteria — sink (does the rebuilt dune absorb the wave energy before it reaches the road?) and services (does the beach keep supplying recreation and nesting space?). Worldview — leans eco-centred (rebuild the natural defence), with the human-centred counter-case steelmanned: if the next storm closes the 6 m gap, ratepayers will ask why a wall was not built while there was still a road to save. Monitor-and-trigger — the distance from the road to the dune face, surveyed after each storm season, acted on at the DELWP-set trigger point.

Sources

- Bass Coast Shire Council, “Foreshore Erosion Response” page — 33.5 m of retreat since 2012 at the surf club site (building 16 m from the dune face) and 35.6 m at the road site near Surf Parade (road within 6 m); the concern areas including the Rotary Park picnic area; monitoring by surveying, site data and time-series aerial photography against a DELWP trigger point; the wet-sand fencing mechanism and how much more sand it retains when combined with renourishment; the low seawall planned at Rotary Park; DELWP preparing medium- and long-term options with community engagement. Retrieved 25 August 2026.
- Bass Coast Shire Council, media release “Bass Coast Rail Trail impacted by coastal erosion” (published 17 August 2026) — Kilcunda beach access closed December 2025; a further 2 m of dune washed away; the trail section between the Kilcunda cemetery and the Bourne Creek trestle bridge closed from 26 August 2026; re-route options under investigation. Retrieved 25 August 2026.
- Bass Coast Shire Council, Coast & Bushland Management pages — 42 km of coastline and 100 ha of bushland managed; Cape Paterson Bay Beach Precinct Masterplan (December 2014) with indigenous revegetation and hooded plover protection; Kilcunda Foreshore Management Plan adopted 16 March 2016; unauthorised private works in reserves removed and the land rehabilitated; hooded plover nesting August to March; work with Parks Victoria, Phillip Island Nature Parks, Friends of the Hooded Plover and Hooded Plover Watch. Retrieved 25 August 2026.
- Bass Coast Shire Council, media release on the Surf Beach and Sunderland Bay special charge scheme (13 December 2023) — scheme abandoned after a majority of affected property owners objected, under the Local Government Act 1989. Retrieved 25 August 2026.
- Bureau of Meteorology and CSIRO, *State of the Climate 2024*, sea level section — over 22 cm of global mean rise since 1900, half of it since 1970; 1.5 cm per decade over 1901-2000 rising towards 4.0 cm per decade over 1993-2023; rates north and south-east of Australia above the global average. Retrieved 25 August 2026.
- Australian Bureau of Statistics, Census of Population and Housing 2016 and 2021 — Bass Coast Shire 32,804 to 40,789 (up 24.3%). Retrieved 25 August 2026.

- ACARA, Victorian Curriculum 2.0 Geography, Levels 9-10 — VC2HG10K14 and elaborations E01-E05 (E05 trimmed per section 2A); VC2HG10K13.E01 (worldviews, via section 3D); VC2HG10K10.E01 (four functions, via section 3A).
- Figures 1-11 are original schematic or model diagrams built for this section; real referents and data labels draw on the sources above, and model figures are labelled as models.

All retrieval dates on or before 25 August 2026.