



Inquiry into Ecosystem Decline in Victoria

Environment and Planning Committee, Parliament of Victoria

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Very high biodiversity

- More catalogued biotopes in Victoria than Europe
- Very high species richness
- Biodiversity hotspots of international significance
 - Gippsland sand-bed infauna
 - Port Phillip Heads seaweed
 - Entrance Canyon sponge gardens



Exceptional seascapes and habitats

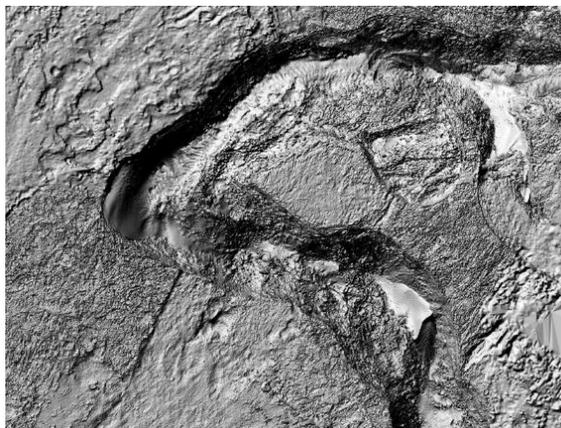
- Corner Inlet dendritic channels and seagrass flats
- Wilsons Promontory plunging granite complexes
- Underwater cliffs Cape Otway, Cape Bridgewater
- Entrance Canyon, Port Phillip Heads



Example sponge diversity in Entrance Canyon

State of knowledge

- Many areas unsurveyed
- Most information out of date
- Time series for shallow reef only



Ecosystem Services

- Intrinsic natural values provide ecosystem services
- Natural capital, social values, provisioning, regulating:
- Ecosystem and environmental stability
- Bioprospecting – medical and chemistry
- Habitat and productivity for fisheries
- Waterways for shipping, transport and ports
- Tidal and sea level regulation (e.g. Entrance Canyon sponge gardens)
- Regulating services – nutrients, sediments, toxicants, coastal, water quality
- Social services – outdoor activities, recreation, education, cultural spiritual, inspirational
- Knowledge services – science and knowledge progression

Examples of major declines:

- Extinction of *Macrocystis* kelp forests (pre 2003)
- Extinction of Port Phillip *Caulerpa* beds, mussel reefs, sponge clumps, deep seagrass (pre 1970s)
- Severe losses Westernport intertidal seagrass (pre 1980s)
- Transformation of Port Phillip Bay sediment communities to pest species (1990s)
- Severe losses Corner Inlet *Posidonia* broadleaf seagrass (2000s to now)
- Complete loss of Point Addis to Torquay *Ecklonia* kelp bed canopy (pre 2014)
- Loss of eastern Wilsons Prom sea whip community (2011)
- Seastar disease declines to 10 %, Port Phillip Heads (2015)
- Kelp disease outbreaks with Japanese kelp infestation, Port Phillip (ongoing)
- Reef ecosystem flip from seaweed to sea urchin barrens in East Gippsland (ongoing)
- Nearshore eutrophication status along western Port Phillip Bay (2017-2019, ongoing)



Kelp bed disease



Sea urchin barren

Major effects and pressures

- Fishing pressure, poaching
- Underwater noise, seismic survey percussion
- Urbanisation, urban and industrial pollution
- Emerging pollution – plastics, persistent toxicants ('forever' chemicals), endocrine disruptors, pharmaceuticals
- Oil and gas pollution and seabed impacts
- Dredging, seabed loss, turbidity, sediment toxicants
- Disease outbreaks – seastars, kelps
- Sea urchin outbreaks
- Nutrient release, eutrophication, oxygen dead zones
- Marine pest invasions, translocation
- Climate change – wind direction, rainfall, sea temperature, dissolved CO₂, sea level

Causes: Poor information, controls and management

- **Mostly anthropogenic causes**
- Cumulative impacts
- Poor knowledge status
- Unreliable science
- No management framework
- Lack of intervention and actions
- No enforcement and no consequences

Existing legislation strengths

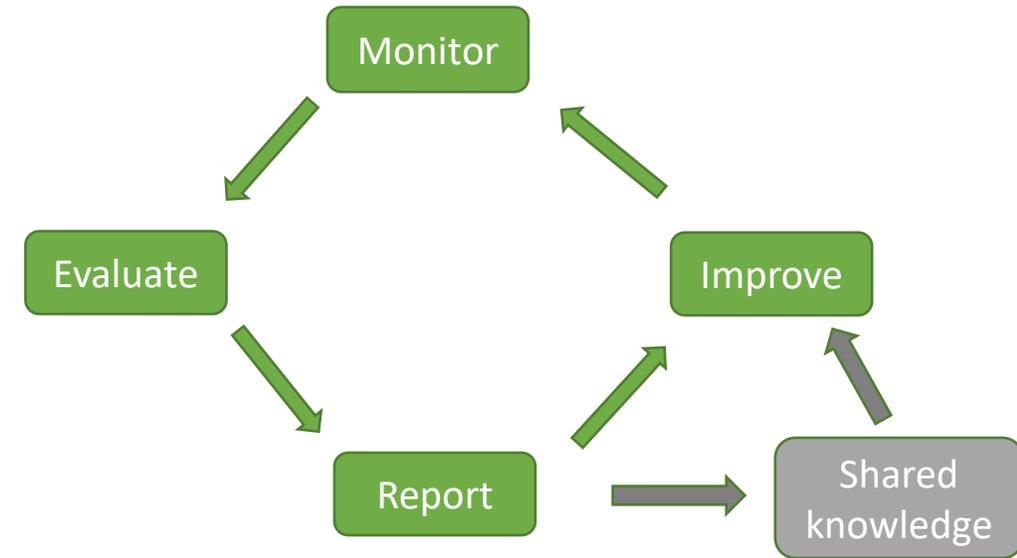
- Marine and Coastal Act - principles of EBM, ESD, evidence basis, Precautionary Principle, wholistic ecosystem assessment
- M&C Act – Marine Knowledge Framework
- EPA Act – General Environmental Duty
- Fisheries Act – EBM, ESD, marine pests
- EES Act – Protection of wetlands
- FFG Act – recognition of threatened species and communities

Existing legislation weaknesses

- EPA Act – Does not explicitly address integrity of ecosystems (references beneficial uses)
- EPA Act – Discretionary – large organisations treated leniently
- EPA Act – no outcomes based ecosystem assessment and no knowledge building
- Fisheries Act – Co-management weakened
- EES Act – no requirement for truth, integrity of evidence or scientific standard
- EES Act – Most EES succeed on ‘game play’ not evidence. No protection at inquiries and hearings for protecting factual evidence versus opinion, persuasion, advocacy and manouvres.
- Few consequences for misinformation/bias, delay or obfuscation
- No scientific checks and balances – no protection against misleading information and corruption
- Lack of transparency
 - monitoring and managing public natural capital, including fisheries, MPA, environmental monitoring, biodiversity status should be open to public and scientific scrutiny.

Failings of implementation

- Siloed management between the responsibilities of the Acts – no shared knowledge or management actions – e.g. poaching in MPAs, nutrients on fishing in Port Phillip
- No accountability for failings – e.g. fishery collapse, eutrophication
- Organisations ‘too big to fail’ held to lower standards - leniency
- No regulation of scientific standards, requirements of evidence (can be opinion)
- No regulation information needs and integrity of supporting information
- No enforcement of EMS frameworks, continual improvement and knowledge building
- No protection against bias and corruption – information ingested at face value
- Threatened species not on FFG list ignored, no knowledge to manage
- Cumbersome EPA processes – prevent adaptive management cycles, agile management
- Absence of regulators at key decision points – EES, VCAT – hearings enabled to consider things outside the boundaries of the Acts and policies
- Avoidance and delay is an option



Environmental Management Systems

- Well established frameworks
- ISO 14000, continual improvement
- Adaptive management cycles
- MERI – Monitoring Evaluation Reporting Improvement
- Not applied in marine environment
- In policy, but not enforced

State of Knowledge

- **Most data out of date – little fieldwork in past 10 years**
- Drop in quality and reliability of science
- No baselines, no mapping in most habitats, locations
- High regurgitation of historical data
- Virtually no impact assessment monitoring
- Minimal advancement on ecosystem knowledge

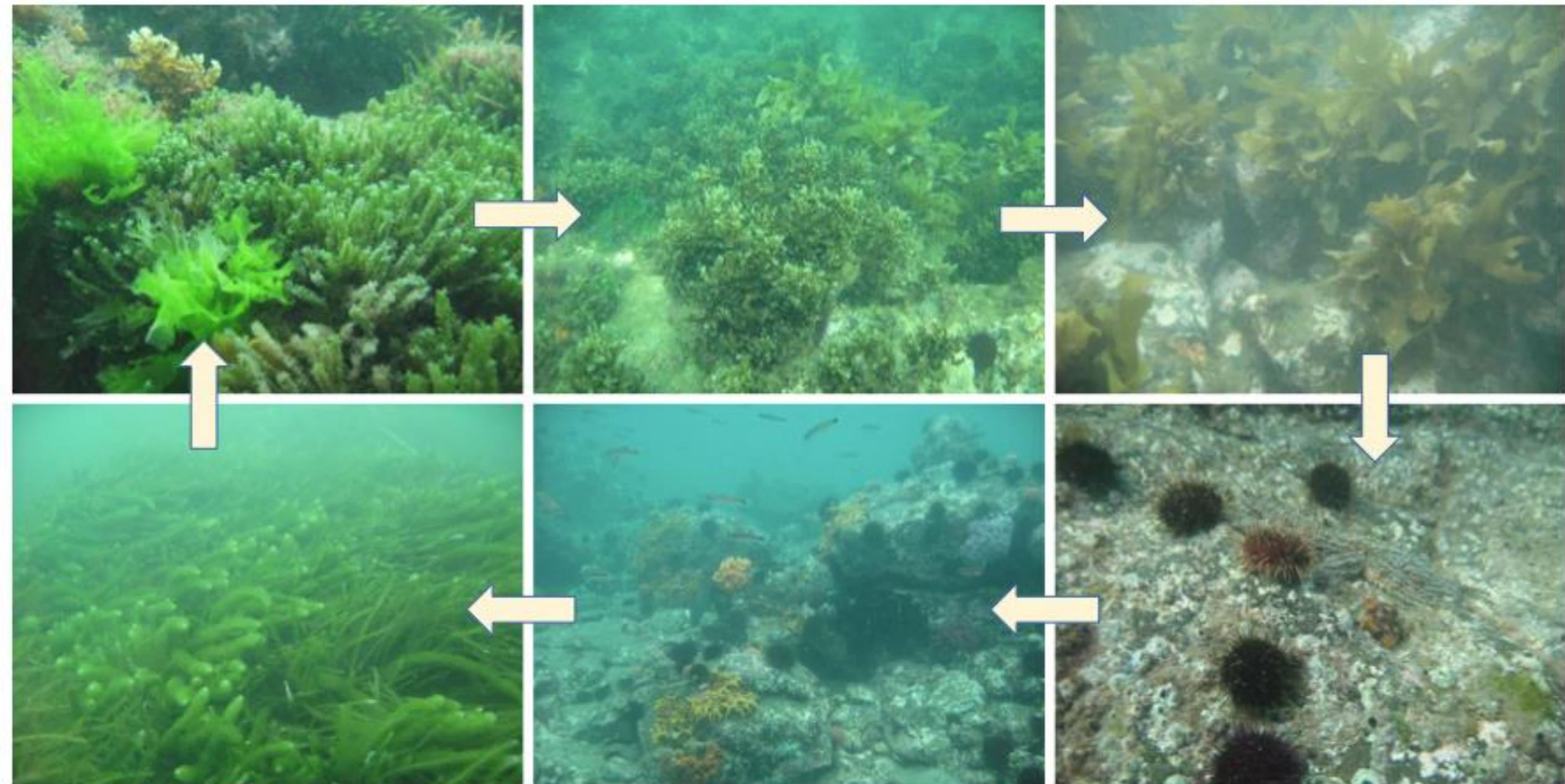
Dropping standards

- All long term monitoring programs discontinued
- Declining quality and reliability of science
- Independent review processes reduced, infrequent
- Presently no assessment or data standards
- Persistence of outdated techniques (e.g. towed video).
- False information published (e.g. SeaMap, VEAC).
- Misleading impact reporting (Rock fall monitoring)
- Declining transparency for review
- Models not calibrated to real world

Systemic Issues

- Low evidence standards – subjective assessments, expert judgements, desktop prioritised over field observation.
- Low science and ethics standards – advocacy and bias is rife
- Uncritical expert review groups – lockstep with proponents (IEG, OEM)
- Investments diverted to expert specialist fields rather than filling pressing knowledge gaps.
- Professional science programs defunded over citizen science programs
- Programs atomised, preventing ecosystem understanding
- Hyper competitiveness, siloed science, no knowledge building.
- Disincentives to provide full and frank information and advice
- No accountability to meet standards or ensure good environmental outcomes.
- No professional standards system, no avenues for review and contest of misleading information or corruption.
- Marine scientific fieldwork capital in Victoria being reduced -> devolved to citizen scientists (without support).
- Head in sand – avoidance (e.g. Entrance Canyon issues).
- Dumbing down of ecosystem complexity

Knowledge Building – Ecosystem Studies



Key scientific and information issues

- Poor quality science is contributing to ecological decline through poorly informed decisions or awareness of problems
 - e.g. Entrance Canyon status and ecosystem regulation for Port Phillip Bay
- There is no intelligence system for detecting and reacting to marine ecosystem events in a timely manner
 - e.g. science-supported custodians, stewards, rangers, co-managers and citizen scientists would be valuable here
- There is no framework for observing ecosystem impacts, improving environmental pressures and assessing the outcomes
 - e.g. there has never been any monitoring of sediment ecological responses to any dredging campaign in Port Phillip Bay to date, so we still have no knowledge base to evaluate impacts of proposals for dredging into the future.
- Present knowledge building is too slow. There is need for rapid investment to catch up to increasing frequency of ecosystem state-changes.
 - The costs are minimal compared to the size of the economy and the services and natural capital provided by marine ecosystems.