# Risks and impacts of poor soil erosion and sediment control practices during urban development



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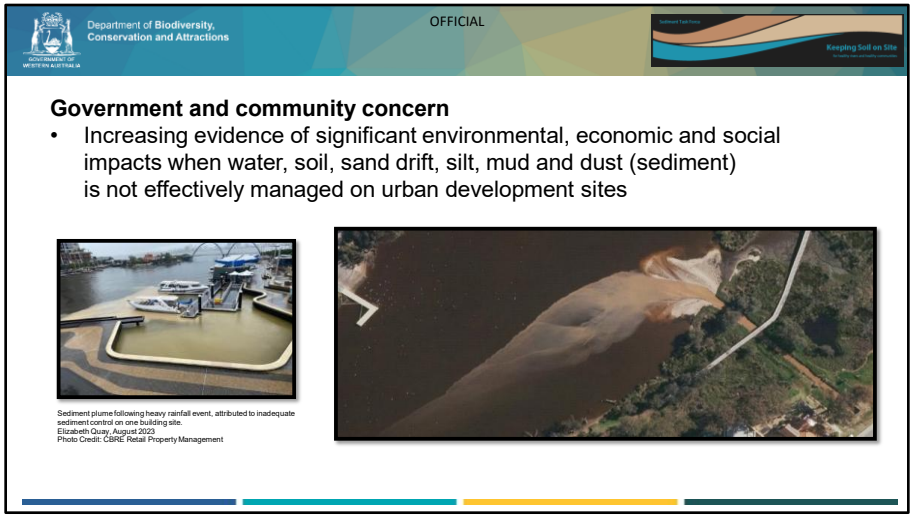


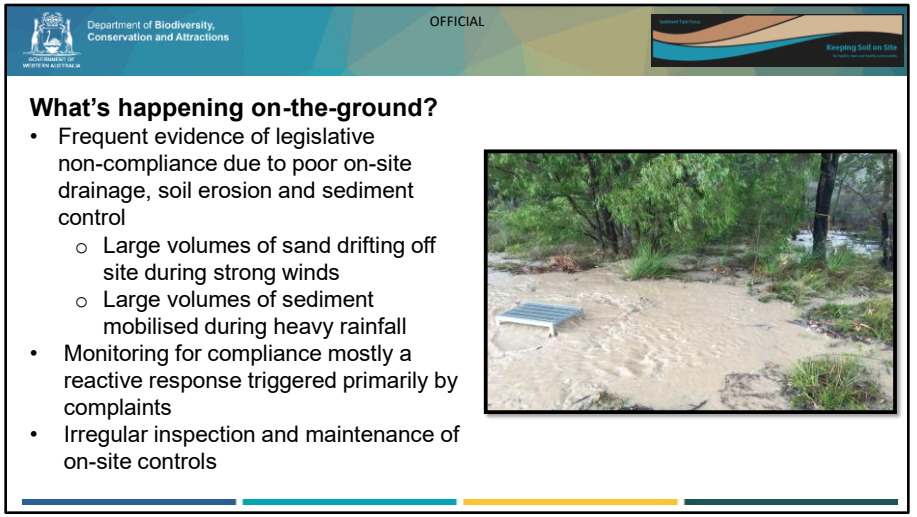

In 2020, the Department of Water and Environmental Regulation determined that “In WA, the main water quality issues in waterways are salinisation, acidification, nutrient enrichment, low dissolved oxygen, shallow groundwater and erosion and sedimentation”.

The main contributors to increasing turbidity and sedimentation of waterways and wetlands in the Swan-Canning catchment are soil erosion from degraded land and river foreshores in the upper catchments, and poor industry practices during urban development.

Prior to, and since then, there has been increasing evidence of significant environmental, economic and social impacts when water and soil, sand, silt, mud and dust (collectively known as sediment) is not effectively managed during subdivision, infrastructure development, building and other construction activities.

We know that poor site management practices are degrading water quality and adversely impacting wildlife and aquatic and riparian vegetation species, biodiversity and ecosystem health.

This confirms that regulators cannot rely on the whole of industry to apply adequate erosion and sediment controls and comply with legislative requirements.



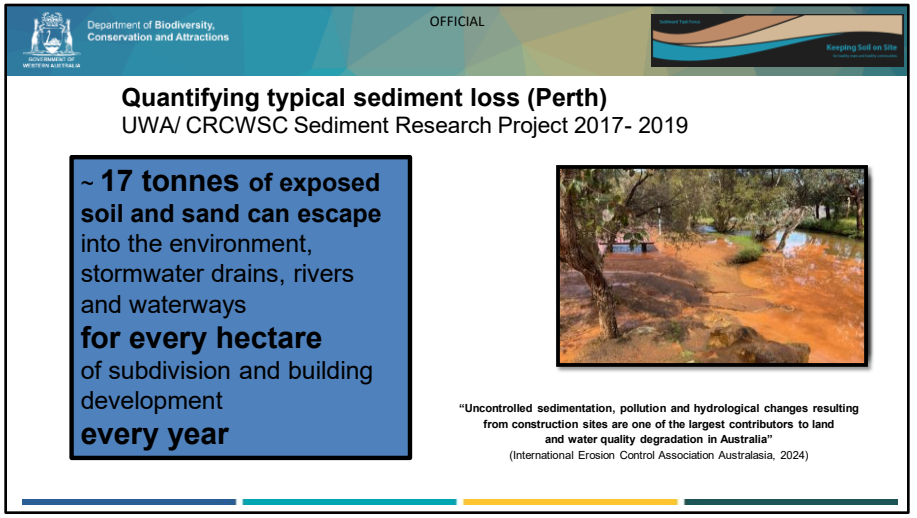

There is 'frequent everyday evidence' of non-compliance on construction sites throughout the Swan Canning catchment, despite clear legislative requirements and simple, affordable, and effective erosion and sediment control products being available.

Fines for non-compliance are very low, compared to other States, monitoring for compliance is mostly a reactive response, triggered primarily by complaints, and there is often insufficient maintenance of on-site controls.

Poor on-site water management practices are often observed and include no, insufficient or ineffective water diversion, badly designed sediment compensation basins and on building sites there is even hosing and sweeping of sediment down drains to 'clean-up'.

A lack of designated site access ways means sediment is often tracked from sites and verges onto roads.

This is resulting in large volumes of sand being allowed to drift off site and large volumes of sediment being mobilised during rainfall events, clogging up drains and Water Sensitive Urban Design assets. This sediment laden-runoff is conveyed by drains or flows overland into our precious waterways and wetlands.

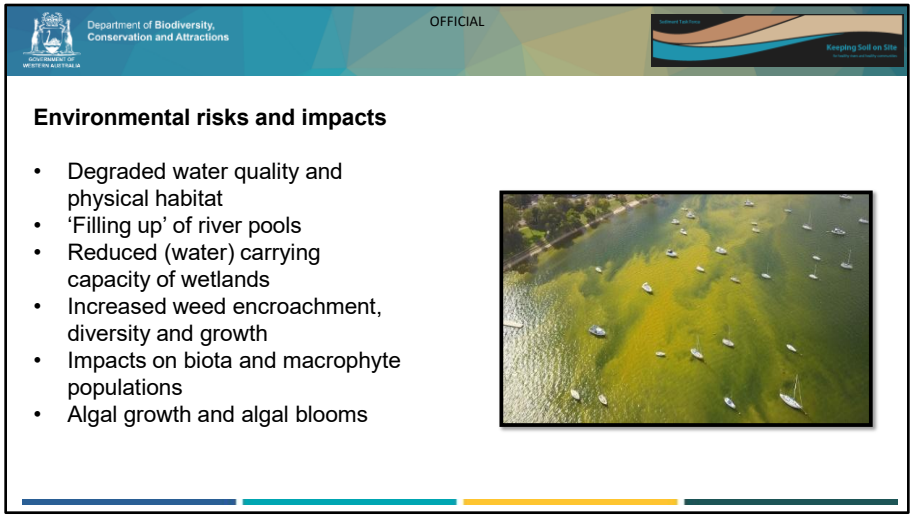



The University of Western Australia and the CRC for Water Sensitive Cities conducted research at Heron Park Estate in Armadale during 2017-2019, which was funded by the Sediment Task Force.

This research concluded **17 tonnes of exposed (bare) soil and sand** can escape into the environment, stormwater drains, rivers and waterways **for every hectare** of subdivision and building development **every year**. At this site, an increased baseflow of sediment due to seasonally high groundwater levels was recorded in the Balinup Drain.

And it's not just subdivision, building sites, roadworks and infrastructure projects sediment is escaping from, or just waterways being impacted.

It's also sediment run-off from unsealed surfaces, poor erosion and sediment control during the provision of services and utilities, and sand drift into adjacent bushland.




Poor erosion and sediment control on urban development sites degrades water quality and physical habitat due to smothering, filling of voids, and changes to benthic structure.

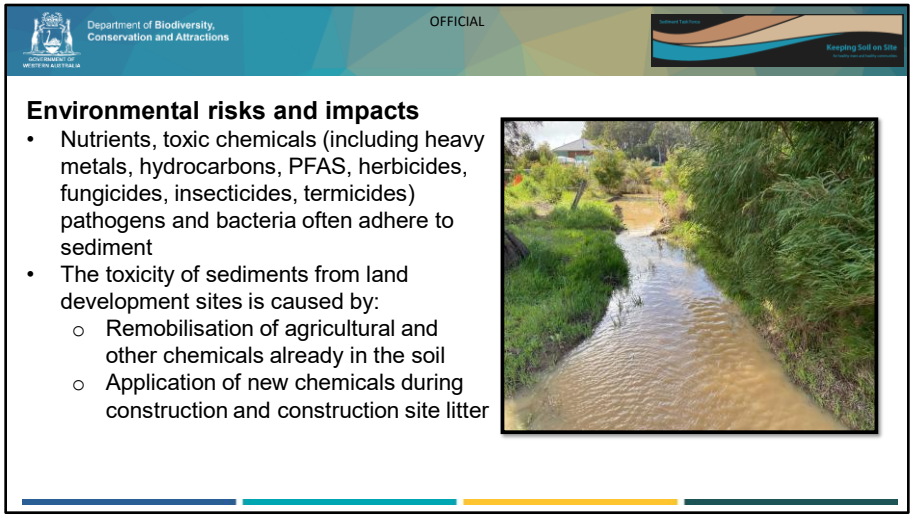
This is 'filling-up' river pools which provide critical habitat and impacts flow and ecological processes, increases river and stream bank erosion, weed growth and encroachment into waterways and reduces the carrying capacity of wetlands.

Sediment pollution and sedimentation impacts on biota, due to reduced light, decreased primary production, oxygen availability and habitat diversity, which alters species composition.

Increases in turbidity adversely impact the macrophyte populations we depend on for water quality improvement in both constructed and natural waterways, and on algal growth which can result in algal blooms.

Uncontrolled sediment run-off delivers excess phosphorus and nitrogen and other nutrients into river systems and wetlands, which can also lead to eutrophication.

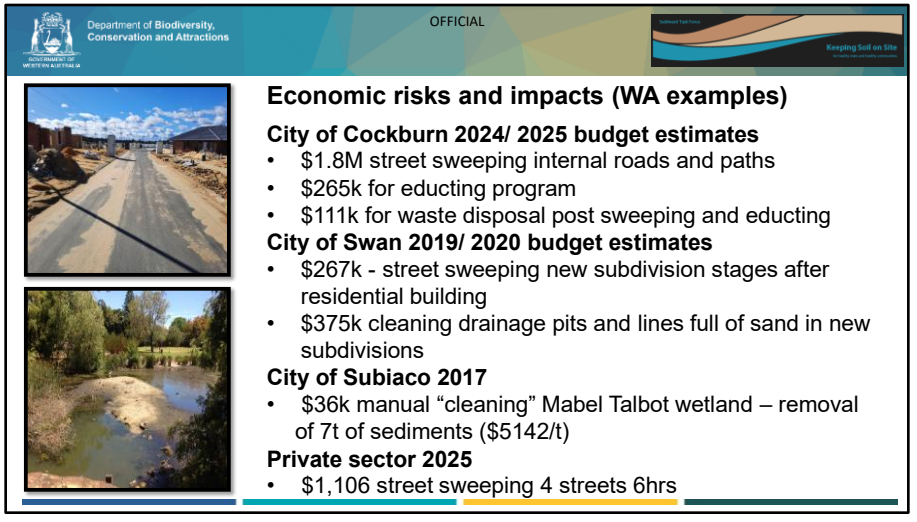
Sedimentation can also reduce macroinvertebrate and fish populations, as sediments cover the macroinvertebrate egg bank, macrophyte seedbank and benthic algae.




Nutrients and toxic chemicals are often adhered to sediment, increasing the potential for fish kills and ecological impacts on other species.

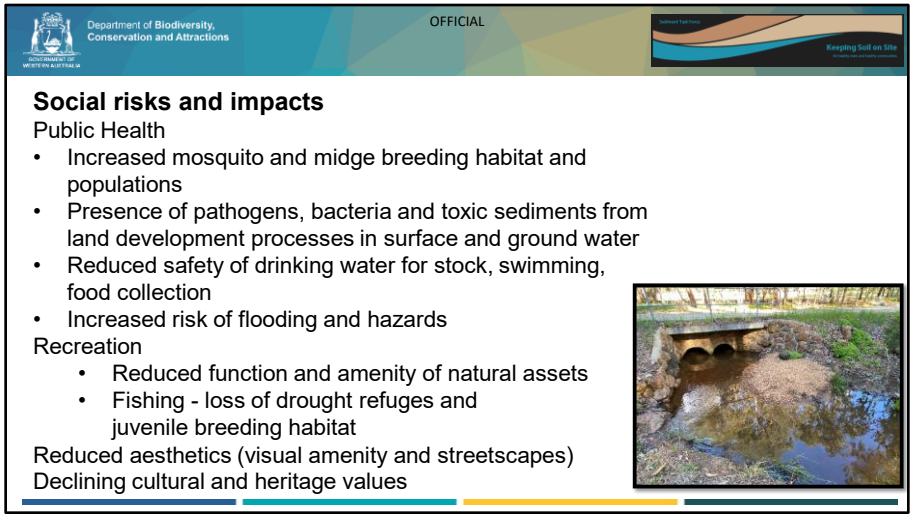
Potential toxins include heavy metals, hydrocarbons and pfas, herbicides, fungicides, insecticides, termicides, nutrients and bacteria.

The toxicity of sediments from urban development sites is caused by the remobilisation of agricultural and other chemicals already in the soil, the application of new chemicals during construction and uncontrolled construction site litter, including plastics, oils, paints, solvents, cigarette butts and vapes.




Here's some examples of the economic costs incurred to clean up sediment, which in WA are primarily borne by local government.

Insufficient or ineffective sediment management impacts local government drainage assets, adding significant costs for street sweeping activities, de-silting, sediment removal and disposal, the reinstatement of Water Sensitive Urban Design assets such as biofilters, raingardens and wetlands not properly protected from sediment during development, and to remediate drainage and environmental assets.




Public health impacts include increased mosquito and midge breeding habitat and populations, as sediment deposition creates shallow densely isolated habitats and reduces natural mosquito predator access and food sources.

The presence of pathogens, bacteria and toxic sediments in surface and ground water from land development processes has negative implications for safe drinking water limits for stock, swimming and food collection.

Urban development increases impervious surfaces, altering the groundwater and stormwater system which, along with sediment deposition in drains and waterways, may increase flooding.

There is also an increase in the prevalence of on-site hazards.

People value the important cultural heritage values and their enjoyment of being in, on or fishing, exercising

and picnicking alongside Perth’s iconic river.

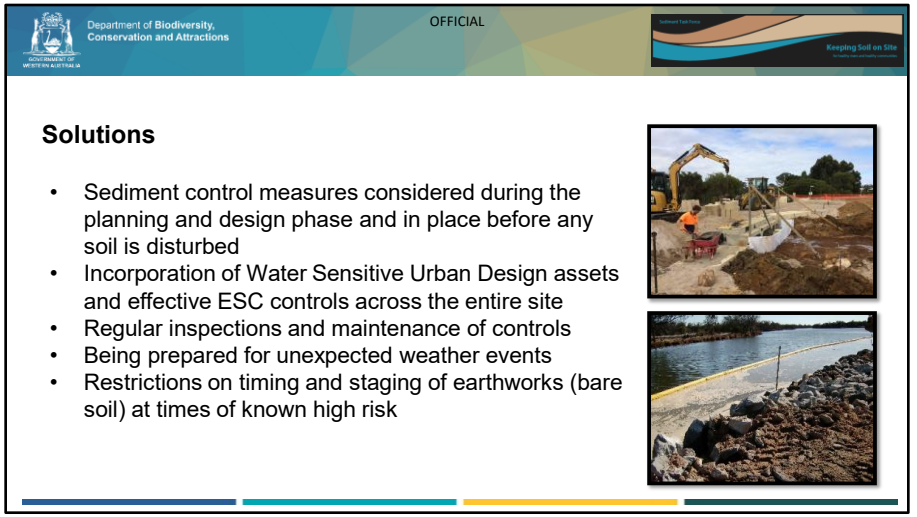
Recreational impacts of uncontrolled sediment include reduced function and amenity of natural assets and the loss of drought refuges and juvenile breeding habitat for fishes and other wildlife.

There is also a not well understood decline in cultural and heritage values.


Monitoring for compliance is critical to improving industry practices and protecting waterways and the environment.

Regular site inspections to assess compliance with legislation and commitments made in construction management, site management, foreshore management and erosion and sediment control plans are essential.

An informed and compliant industry will self-audit, which should result in immediate corrective action.




Each site is different, and the choice of controls should be considered during the planning and design phase and incorporated in construction and site management plans.

Local soil type, slope, weather conditions, proximity to waterways and risk of environmental harm must be assessed and effective strategies to mitigate risk put into place.

All sites need to be prepared for unexpected weather events, and all controls regularly maintained.

Incorporating Water Sensitive Urban Design assets and more controls than those traditionally used in WA, such as the High Efficiency Sediment Basins commonly used in Queensland, will help keep soil and sand on site.

Restrictions on timing and staging of earthworks during windy and high rainfall seasons, greatly reduces risk.


Responding to the current housing crisis and pressure to reduce red tape and cost to industry and consumers is compounding these risks and impacts.

Reducing them requires wide-spread industry adoption of best practice soil erosion and sediment control, during all forms and all stages of development.

This is being done well in some instances, as we will learn next, however a collaborative approach by governments to support industry to improve sediment management outcomes is essential, as is ensuring there is adequate resourcing to monitor for compliance.

This will mean governments and industry can meet community expectations to protect the environment and prevent unnecessary rate-payer and tax-payer expenditure.