

# **Point Source Water Quality Offsets Policy 2019**



Environmental Policy and Programs Division, Department of Environment and Science

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November 2019



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## 1. Purpose

The Point Source Water Quality Offsets Policy 2019 (the policy) describes how existing or potential new **environmental authority<sup>1</sup> (EA)** holders can offset the water quality impacts of **wastewater** emissions.

The policy outlines how water quality offsets may be adopted as a voluntary option for managing **environmentally relevant activities (ERAs)**, including the release of wastewater containing **offset contaminants** into waterways. It provides alternative investment options to meet wastewater discharge requirements through the inclusion of **water quality offset conditions** that delivers an improvement in water quality in the receiving environment.

The policy provides guidance to EA holders for prescribed ERAs (e.g. sewage treatment plants, quarries, abattoirs and aquaculture operations) and resource ERAs who voluntarily consider implementing water quality offsets to counterbalance proposed increased wastewater discharge loads into the receiving environment. The policy also applies to new EAs.

Water quality offsets may come from another point source or from a diffuse source.

The policy also allows existing and potential EA holders to:

- consider a range of investment options for managing point source wastewater emissions,
- explore innovative solutions for managing point source wastewater emissions in accordance with local water quality objectives,
- employ greater flexibility in meeting regulatory requirements whilst delivering an improvement in water quality in the **receiving environment**,
- engage with regulators on technical requirements, such as identifying offset solutions and sites, and assessment processes, and
- demonstrate the benefits of **water quality offsets** to affected communities.

## 2. Context

The policy adds to established regulatory tools in Queensland, such as the use of biodiversity and carbon offsets under the *Environmental Offsets Act 2014*. It applies to new and existing EA holders for (i) prescribed ERAs (e.g. sewage treatment plants, quarries, abattoirs and aquaculture operations) and (ii) resource ERAs. Figure 1 shows a conceptual diagram for determining offset conditions under the policy.

When water quality offsets are considered under a new or amended EA, the policy informs **environmental management decisions** and conditions under the Environmental Protection Regulation 2019 (EP Regulation). Water quality offsets may be voluntarily considered, for example, when (i) existing EA holders seek to increase production or (ii) new EA holders seek to incorporate offsets within their EA conditions.

Queensland's Department of Environment and Science (DES) is keen to explore how the policy might be piloted in partnership with local government, utility or industry proponents. The policy contributes to the DES Strategic Plan 2018-22 by:

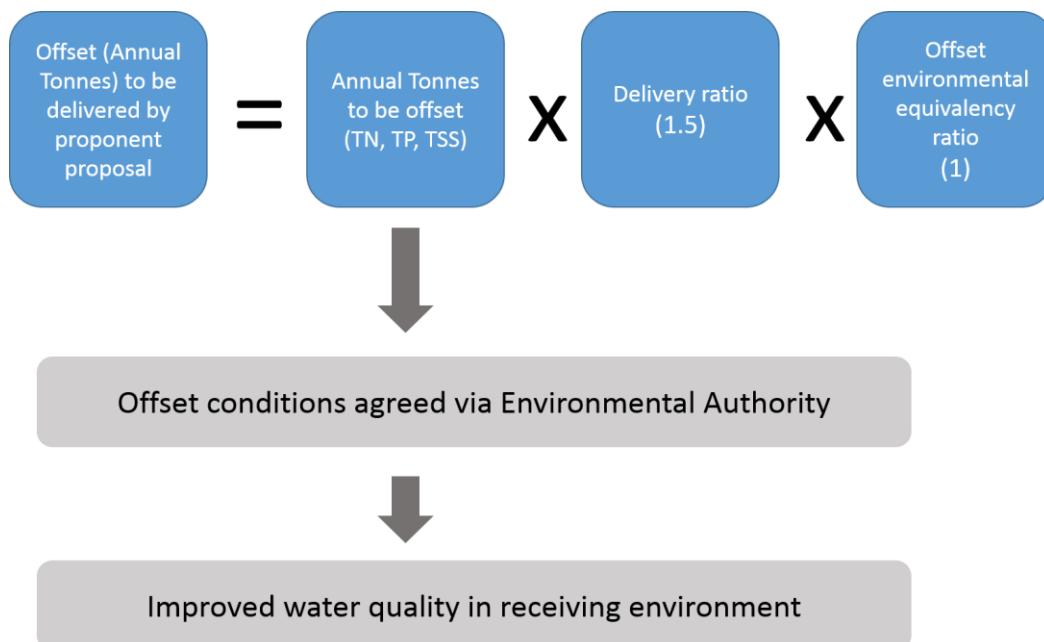
- establishing a framework, underpinned by science, to protect Queensland's natural, cultural and heritage values and ecosystems,
- working with industry, the community and other stakeholders to manage impacts on the environment and monitor environmental performance, and
- engaging with partners and communities to minimise negative interactions with wildlife and protect Queensland's ecosystems, habitats and species.

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<sup>1</sup> Terms in **bold** at first mention are explained in the Glossary

## Point Source Water Quality Offsets Policy 2019

The policy is an update of the 2014 policy ‘Flexible Options for Managing Point Source Emissions: a voluntary market-based mechanism for nutrient management’, and is informed by the draft Point Source Water Quality Offset Guideline 2019 (the Offset Guideline).



**Figure 1.** Conceptual diagram for determining offset conditions under the policy.

### 3. Principles

The water quality offset principles that guide this policy are listed below, and are consistent with national and international schemes.

- voluntary participation – new and existing EA holders may voluntarily consider point source water quality offsets as a way to help manage ERAs,
- regulatory requirements must be met – water quality offsets must comply with EA conditions, including the delivery and environmental equivalence ratios set by the Administering Authority (see Figure 1),
- impacts must be first avoided using prevention and mitigation measures: in accordance with the **management hierarchy** under the Environmental Protection (Water and Wetland Biodiversity) Policy 2019. See Figure 3,
- improved water quality in the receiving environment – water quality offsets provide an opportunity to achieve improved environmental outcomes and improvements in the water quality of receiving **waters**, whilst avoiding **environmental harm** to the environmental values of receiving waters,
- alignment with catchment management priorities: water quality offsets proposals should be consistent with the overall management approach for the basin/catchment/waterway, aligning with and complementing government priorities; for example, under the Reef 2050 Water Quality Improvement Plan 2017-2022, total water cycle management plans and local government plans,
- additionality of actions – water quality offsets must be additional to any actions already planned. Water quality offsets cannot be used to meet approvals under other legislation,
- measurable actions – water quality offsets and related actions must be measurable, based on the best available science,
- appropriate time and duration – results of the water quality offsets should occur over the same timeframe as the ERA wastewater emission increase and for the duration, as set by the Administering Authority,
- appropriately located – offset works are co-located, where possible, with works required under other legislative or policy instruments, such as the Land Restoration Fund,

## Point Source Water Quality Offsets Policy 2019

- verifiable, enforceable and accountable – water quality offsets must meet the requirements of the Administering Authority (under the EA conditions, the proponent remains accountable for the required duration, including if the offset was acquired through a market-based mechanism), and
- socially acceptable – information about water quality offsets should be transparent and acceptable to the community.

## 4. Application

The policy applies to:

- proponents – entities considering new EA proposals and existing EA holders proposing to amend EA conditions to increase discharge limits,
- all prescribed ERAs, resource ERAs and agriculture ERAs, including waters where the policy may have application in achieving zero net discharge to the receiving environment,
- future accredited market-based mechanisms recognised by the Administering Authority, where the scheme's framework complies with the policy, and
- the management of **offset contaminants**, including nitrogen (Total Nitrogen (TN) and Dissolved Inorganic Nitrogen (DIN)), phosphorous (Total Phosphorous (TP) and Filterable Reactive Phosphorous (FRP)), other stated chemicals and total suspended solids (TSS) in point source wastewater discharging to the receiving environment from ERAs under the *Environmental Protection Act 1994* (EP Act).

Note that EA conditions for water quality offsets may be based on net contaminant loads where the ERA results in a reduction in offset contaminants loads in wastewater compared with the input waters to the ERA (e.g. when considering aquaculture offset actions), as determined by the Administering Authority.

Policy application is not permitted:

- where ERAs directly impact receiving waters identified as high ecological value under the Environmental Protection (Water and Wetland Biodiversity) Policy 2019 or in **water supply buffer areas** (map layers are published on the DES website),
- where ERAs directly impact prescribed environmental matters under the *Environmental Offsets Act 2014* (map layers for matters of local, state and national environmental significance are available on the DES website),
- where water quality offset sites are located in Aquaculture Development Areas (ADAs) identified under a local government planning scheme (but the policy does apply to EA holders operating within the ADAs),
- where proposed inter catchment water quality offsets result in an increase in point source discharge of TN, TP or TSS in a catchment with high loads of TN, TP or TSS, to be offset in a catchment with corresponding low loads, and
- for the management of other contaminants (e.g. pathogens and toxicants) – treatment must be managed in accordance with EA conditions to avoid environmental harm.

Proponents should contact DES when considering preliminary proposals for water quality offsets projects. DES encourages a partnership approach to developing an offset project, including identifying water quality offsets sites, providing evidence-based site assessments and developing appropriate monitoring programs.

It is also important that proponents note:

- Legislative provisions and decisions under legislation take precedence over policy and guidelines,
- The EP Regulation prescribes the requirements for environmental management decisions. For new EAs and amendments to existing EAs, consideration of water quality offset conditions includes assessment in accordance with the management hierarchy, environmental values, water quality objectives and management intent as stated in the Environmental Protection (Water and Wetland Biodiversity) Policy 2019, and
- The policy relates to ERAs releasing offset contaminants in wastewater. It is distinct from the use of environmental offsets under the *Environmental Offsets Act 2014* to counterbalance the residual impacts of activities on a prescribed environmental matter (a matter of national environmental significance, state environmental significance or local environmental significance).

## 5. Types of water quality offsets

### 5.1 Point source offsets

Point source offsets can be used by regulated holders of one or multiple EAs.

#### 5.1.1 One EA holder – multiple EAs

An EA holder of two or more EAs managing two or more points of concern may apply for an amalgamated authority under a local government or project EA (see EP Act, sections 245, 246 and 247 regarding amalgamated EAs).

Approval of an application for an amalgamated local government authority will depend on the Administering Authority being satisfied that there is an appropriate degree of integration between the activities, and for an amalgamated project authority if it is satisfied that the relevant activities for the existing environmental authorities are being carried out as a single integrated operation. See EP Act section 113.

Subject to the above, the Administering Authority may consider offsets contaminant release limits from the activities to common receiving waters that are combined under the amalgamated EA to a new **annual mass load** limit for offset contaminants, in accordance with the policy.

#### 5.1.2 Market-based mechanisms

Future accredited market based mechanisms e.g. an accredited Reef Credit scheme, may be considered by the Administering Authority where the scheme framework is in accordance with this policy.

Future market based mechanisms have the potential to incentivise water quality improvements across catchments of the Great Barrier Reef and in South East Queensland, where EA holders may be able to purchase point source water quality offsets (credits) to increase an annual mass load limit, in accordance with this policy.

The purchased water quality offset credit must be verifiable and approved by the Administering Authority as a result of amendments to the EA conditions for both EA holders under a market based agreement with the offset provider that meets the policy requirements of delivering an improvement in water quality in the receiving environment.

For both of the above types of point source: point source offsets, the Administering Authority would consider the impact of contaminants in wastewater from the activities that are not able to be offset under this policy.

### 5.2 Diffuse source offsets

A **point source entity** may also offset its annual mass load limits by reducing offset contaminants from rural, urban or other **diffuse sources**. This would need to achieve a net improvement in water quality in the receiving environment.

Actions that may provide a water quality offset include:

- riparian area restoration,
- streambank and gully restoration,
- constructed or remediated wetlands,
- bioremediation technology (point source),
- riparian fencing for stock exclusion,
- reducing on-farm nutrient runoff through improved fertiliser application management above minimum standards (see Note 1 below),
- improved grazing land management practices above minimum standards (see Note 1 below), and
- water sensitive urban design, beyond meeting the stormwater management design objectives under the State Planning Policy 2017, State Interest Water Quality (see Note 2 below).

Other offset actions are potentially applicable and proponents are encouraged to discuss proposals with the Administering Authority. The water quality offset requirement would be reflected as an EA condition for the point source entity.

## Notes

1. Potential future market based mechanisms may provide on-farm nutrient runoff reduction offsets to be purchased by a point source EA holder - under a future market based scheme established in accordance with this policy and recognized by the Administering Authority.

Proposals to use land management practice as a diffuse source water quality offset should be discussed with the Administering Authority.

Proposals to use land use change from a non-ERA emitting diffuse pollutants to a subsequent ERA emitting point source wastewater to the receiving environment, such as agriculture to aquaculture, should be discussed with the Administering Authority.

2. Diffuse source urban: diffuse source urban or rural offsets are considered under the *Planning Act 2016*.

Under the *Planning Act 2016* and subsidiary State Planning Policy 2017, State Interest Water Quality, treated stormwater release to receiving waters from building and construction sites (i.e. post construction phase) may be managed off-site to achieve the stormwater management design objectives; in-lieu of on-site compliance. The consideration is voluntary for both a Local Government and a developer.

In adopting off-site solutions, residual on-site development requirements must be addressed including, flooding, hydrologic management (to protect receiving waterways geomorphic stability and aquatic ecosystems), landscaping and litter control.

Refer to the department's web site for further details on Off-site stormwater management, Implementation Guidance under the State Planning Policy 2017, State Interest Water Quality.

## 6. Requirements

The following requirements must be addressed by water quality offset proponents (entities considering new EA proposals and existing EA holders proposing changes to EA conditions).

### 6.1 Improved water quality in the receiving environment

For all water quality offset proposals, the proponent must demonstrate:

- an accredited scientific/engineering approach for designing, constructing, evaluating and monitoring the offset, reviewed and signed off by a Registered Professional Engineer Queensland (RPEQ) for diffuse source water quality offsets (refer to the Point Source Water Quality Offsets Guideline on the DES website),
- improved water quality in the receiving environment – the proposed water quality offset must achieve water quality improvements to the annual mass load of offset contaminants (see Figure 1), and
- that any increase in wastewater discharge or offset contaminants at the **point of concern** avoids environmental harm.

Water quality offsets must be designed to ensure there are no unintended consequences, such as increased flooding impacts. The proponent must also include contingency plans for access to the offset site in the event of landholder change.

### 6.2 Additionality

DES encourages water quality offset proposals that include co-benefits (e.g. biodiversity or carbon benefits). However, water quality offsets under this policy must be in addition to the requirements of any other prescribed legislative or policy instrument. Specifically, the water quality offset cannot be counted twice. For example, a water quality offset involving stormwater management under this policy cannot be used to counterbalance ERA wastewater generation under the State Planning Policy 2017, State Interest Water Quality.

The additionality requirement may extend to other considerations. For example, a Land Restoration Fund (LRF) proposal must separately account for any offset contaminants under this policy, in addition to any carbon offset requirements. Co-benefits are encouraged but cannot be counted twice.

## 6.3 Offset location – catchment planning frameworks

Water quality offset locations should align with priority areas in any regional or local catchment planning frameworks developed by a national, state or local government entity.

These include:

- Land Restoration Fund priority locations for co-benefits such as biodiversity and water quality,
- Reef 2050 Water Quality Improvement Plan,
- south east Queensland Council of Mayors catchment action plans,
- natural resource management plans, regional water quality improvement plans, local government and utility total water cycle management plans, strategic plans and stormwater quality management plans, and
- any other relevant statutory or recognised planning framework.

For further information on priority locations for water quality offsets please contact DES or local government.

## 6.4 Offset location – water type

The proponent should describe the water quality offset location options considered in proposing the final location. This should include an evaluation of available water quality offset locations in relation to the point source wastewater discharge e.g. upstream, downstream, same catchment/**river basin**, adjacent catchment/river basin, non-adjacent catchment river basin but common receiving waters.

The offset location may be in the same water type, e.g. freshwater or estuarine waters, or in different water types, e.g. offset location in freshwater with the release point source discharge in estuarine waters.

However if the proposed water quality offset is not:

- located within the same catchment or river basin as the release point source discharge, or
  - in accordance with a relevant catchment planning framework,
- the reasons should be discussed with the Administering Authority.

Proposals must demonstrate that any increase in wastewater discharge at the point of concern avoids environmental harm.

## 6.5 Delivery ratio and offset (environmental) equivalency ratio

Under the policy, voluntary EA offset conditions will normally apply a delivery ratio of 1:1.5 and an offset (environmental) equivalency ratio of 1:1. However, different ratios may be decided by the Administering Authority (see Figure 1).

### 6.5.1 Delivery ratio

The **delivery ratio** takes into account the uncertainty about delivering an equivalent pollution reduction (mass load) in the receiving environment.

The delivery ratio is a multiplying factor applied to the annual tonnes to be offset. It takes into account:

- uncertainty about delivering an equivalent pollution reduction in the receiving environment due to the distance between the receiving environment and the offset location,
- flow and duration of flow, and attenuation (i.e. the rate at which nutrients are reduced through natural processes),
- whether the offset location is upstream or downstream, or in the same catchment or river basin but with a common receiving environment, and
- uncertainty with regard to successful implementation of the water quality offset (see the Offset Guideline for further information).

The delivery ratio also sets aside a portion of pollution reduction for improving water quality in the receiving environment.

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Refer to section 6.7 and 6.8 with regards to temporal requirements. The water quality offset should be effective from commencement and for the duration of the EA amendment.

A delivery ratio of 1:1.5 (or as decided by the Administering Authority) will apply for both point source offsets and diffuse source offsets.

**Table 2.** Delivery ratio for different offset locations and water types

Location and water type for point source and diffuse source water quality offsets	Normal delivery ratio
Same river catchment and basin – upstream or downstream (near field) of the point of concern	1:1.5 (or as specified by the Administering Authority)
Same river catchment and basin – upstream or downstream (far field) of the point of concern	
Same river catchment and basin – same or different water type from the point of concern	
Different river catchments in the same or adjacent river basin from the point of concern – common receiving waters	
Non-adjacent catchments and river basins – common receiving waters and under the same EA	

Offset locations across different catchments or basins, with common receiving waters, must be discussed with the Administering Authority, and may not be permitted for reef catchments. See section 4 for the definition and spatial mapping availability of Queensland's river basins and contained catchments.

### Delivery ratio for other point source offsets

For amalgamated EAs and market-based mechanisms, a delivery ratio of 1:1.5 would apply (or as determined by the Administering Authority).

### Delivery ratio for point source: diffuse source rural or diffuse urban offsets

The delivery ratio of 1:1.5 will be applied for point source: diffuse source (rural or urban) water quality offsets to account for the uncertainty in delivering the annual mass load reduction in the receiving environment, or as decided by the Administering Authority to achieve the purpose of the policy.

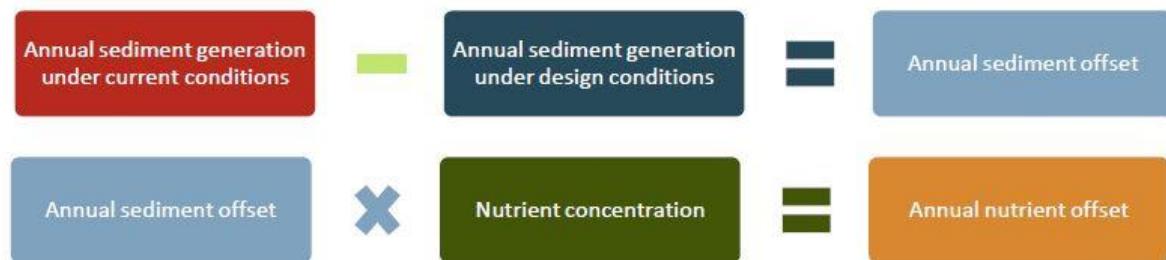
A range of actions have the potential to reduce nutrients and sediments, under a diffuse source offset such as those stated under section 5.2.

In order to assess the required annual mass load reduction to be achieved by the diffuse source offset, the proponent will be required to demonstrate the efficacy of the proposal as decided by the Administering Authority. This could include the use of appropriate modelling techniques and on-ground investigations/soil analysis to provide the underlying technical design information, detailing on-ground works and associated structures to achieve the offset.

The Offset Guideline provides further information with respect to streambank stabilisation and constructed wetland water quality offsets.

Figure 2 shows a framework from the Offset Guideline that describes the method used to calculate the annual mass load needed for nutrient offsets from streambank stabilisation offsets. The annual nutrient offset is calculated by multiplying the annual sediment offset (using an accepted methodology based on advice from a soil scientist) by the nutrient concentration found in the soil at the offset location. Nutrient loads bound to the eroding sediment can then be calculated.

A delivery ratio of 1:1.5 is used to account for the distance from the point source and the potential offset solution site and uncertainty in delivering a net reduction of nutrient loads in the receiving environment. The annual mass loads of TP and TN to be delivered by the offset are then calculated to meet the EA offset conditions (see Figure 1).



**Figure 2.** A framework for calculating annual mass loads delivered by a nutrient offset from streambank stabilisation actions.

### 6.5.2 Offset (environmental) equivalency ratio

An offset (environmental) equivalency ratio will also be applied for point source: diffuse source offsets, where the default ratio is 1:1, or as decided by the Administering Authority to achieve the purpose of the policy.

The offset equivalency ratio accounts for the uncertainty associated with the **environmental equivalence** (chemical form/species) between the point source wastewater emission and the water quality offset point source or diffuse source, to ensure that the delivery of improved water quality in the receiving environment is assessed on a like-for-like chemical basis.

The policy assumes chemical form/species equivalence between the point source emission and the point source or diffuse source offset. Research work has been commissioned to investigate potential diffuse source soils nutrient bio-availability in south east Queensland and reef catchments to build further knowledge on speciation for nitrogen and phosphorous. In the meantime, TN and TP are the surrogates for equivalency.

Note. The water quality offset proposal must avoid causing environmental harm to the receiving waters at the point of concern. In discussion with the Administering Authority and according to EA conditions, the proposal must demonstrate that any increases in wastewater emissions (**prescribed contaminants**) at the point of concern will not cause environmental harm.

#### Example water quality offset ratios in the United States and Victoria

##### US Environmental Protection Agency

In a review of over 20 water quality trading programs in the United States, the US EPA found that a 1:2 uncertainty ratio was most widely adopted. It represented the least restrictive application of an uncertainty ratio as the norm, although uncertainty ratios as high as 1:4 were observed. US EPA stated that 1:2 represented an uncertainty ratio (for diffuse source offsets) that is adequately conservative and protective of water quality while not being unduly restrictive so as to discourage transactions.

Given that certainty is higher for point sources (wastewater treatment plants and industrial sources) and that certainty is lower for nonpoint sources, higher uncertainty ratios are expected to be applied to credits (offsets or trades) generated by nonpoint sources. USEPA expects the jurisdictions to apply an uncertainty ratio of at least 1:1 to point source to point source transactions (offsets or trades) since point sources are directly and representatively monitored in a regulatory context.

(*Accounting for uncertainty in offset and trading programs. (US) EPA Technical Memorandum February 2014.*

##### Environmental Protection Agency VICTORIA

According to the Victorian Water Quality Offsets Framework, 2015, the following water quality offset ratios were suggested:

- Immediate or upstream location—ratio 1:1
- Greater than 2km from impact site—ratio 1:1.5
- Greater than 5km downstream of impact site—ratio 1:2

(*Alluvium, 2015, Water Quality Offsets Framework: Final report for the Victorian Smart fund*)

Refer to State Environment Protection Policy (Waters of Victoria), Clause 24, Use of offset measures to protect beneficial uses.

## 6.6 Management hierarchy

Section 14 of the Environmental Protection (Water and Wetland Biodiversity) Policy 2019 sets out a hierarchy of preferred measures for managing the release of ERA wastewater. The hierarchy covers avoidance, mitigation and release, and is designed to cascade so that each measure is triggered if the previous measure is insufficient to meet requirements:

- a) firstly—reduce the production of waste water or contaminants by reducing the use of water;
- b) secondly—prevent waste and implement appropriate waste prevention measures;
- c) thirdly—evaluate treatment and recycling options and implement appropriate treatment and recycling;
- d) fourthly—evaluate the following options for waste water or contaminants in the order in which they are listed—
  - (i) appropriate treatment and release to a waste facility or sewer;
  - (ii) appropriate treatment and release to land;
  - (iii) appropriate treatment and release to surface waters or groundwaters.

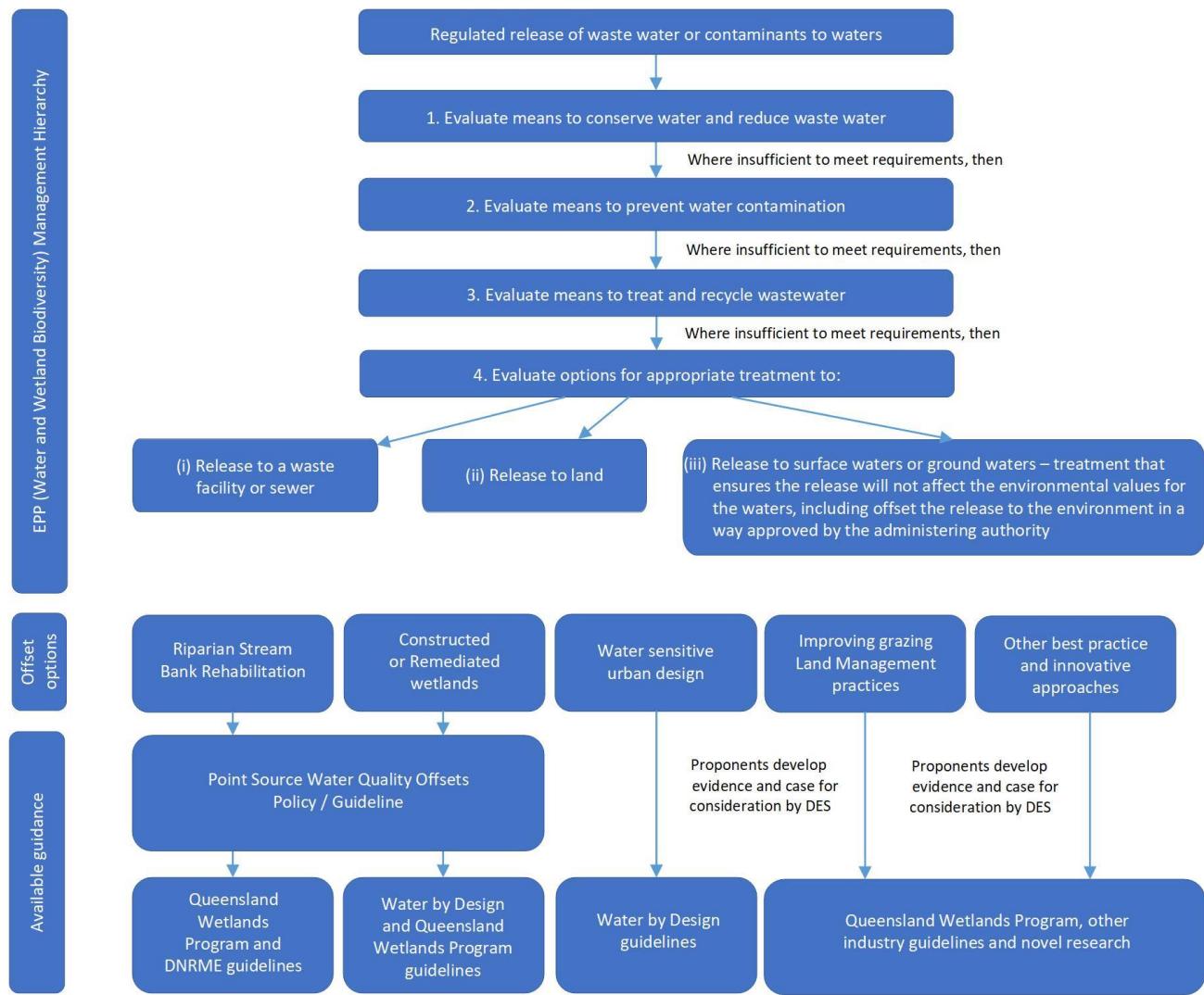
In this section, appropriate treatment means:

- a) for release to a sewerage service provider's waste facility or sewer—treatment that meets the service provider's requirements for the release to the waste facility or sewer; or
- b) for release to land—treatment that ensures the release to land is ecologically sustainable; or
- c) for release to surface waters or groundwaters—treatment that ensures, or the taking of other steps to ensure, that the release—
  - (i) will not affect the environmental values for the waters; or
  - (ii) is offset by undertaking an activity to counterbalance the impacts of releasing waste water or contaminants to waters, other than an offset to which the *Environmental Offsets Act 2014* applies.

Water quality offsets are considered as appropriate treatment at step d(ii) when evaluating the release of wastewater to surface waters or groundwaters.

Figure 3 depicts offset options in the context of the management hierarchy.

## Point Source Water Quality Offsets Policy 2019



**Figure 3.** Offset options in the context of the Environmental Protection (Water and Wetland Biodiversity) Policy 2019 management hierarchy.

## 6.7 Timing of implementation

Water quality offsets must be provided in advance of, or concurrently with, the impacts of increased wastewater emissions. This is to ensure that the offset provides the benefit at the time of additional point source wastewater release. The timing of offset effectiveness will be stated in the EA condition.

Examples of implementation timeframes in advance of emission impacts include:

- point source offset – immediate, and
- riparian and streambank restoration – time required for completion of on-ground works and vegetation to establish.

## 6.8 Duration

The water quality offset arrangements must remain in place for the period of time stated on the EA. The duration of the water quality offset will be negotiated between the proponent and the Administering Authority so that it aligns with the performance specifications and expected lifespan of the point source infrastructure.

EA conditions will stipulate that the proponent must monitor and maintain the performance of the water quality offset throughout its lifespan. Extension of the offset duration will be considered at the end of an offset tenure.

## 6.9 Monitoring and reporting

To demonstrate the efficacy of the water quality offset over time, an EA holder is responsible for monitoring and reporting water quality impacts at the point of concern, the water quality offset location and other relevant locations as specified in the EA conditions. This includes through any receiving environment monitoring program. The cost of monitoring and reporting are to be met by the EA holder.

Monitoring and reporting must be in accordance with the EA conditions and the Environmental Protection (Water and Wetland Biodiversity) Policy 2019 [Monitoring and Sampling Manual 2018](#) published on the DES website.

Monitoring results must be made available to the department as required by the Administering Authority.

## 6.10 Responsibility for performance

Under an EA, the EA holder is responsible for ensuring that the water quality offset (i) meets the design criteria (ii) is implemented diligently and (iii) maintains its performance for the life of the offset (See Section 6.8). This requirement will extend to any future offset credits scheme; for example, the scheme provider will assume that responsibility (i.e. performance for the life of the asset) under contract with the EA holder.

The EA holder may contract a third party (e.g. land owner, NRM body, manager, broker) to undertake management actions for the water quality offset. However, responsibility for the source and delivery of the water quality offset will remain with the EA holder as a requirement of the EA.

The EA conditions may also include requirements for when and how the water quality offset will be replaced in the event it is destroyed or damaged (e.g. in an extreme weather event).

## 7 Case studies

Interested parties are encouraged to visit the DES website for published information on actual water quality offset permits. These include examples of streambank stabilisation works and constructed wetland offsets.

For all water quality offsets, EA conditions will reflect the decision of the Administrating Authority on nutrient or sediment reduction actions (annual mass load reduction for TN, TP and TSS) and any wet weather/dry weather release conditions and associated recycling requirements. EAs will include further definitions of specific terms and calculation methods for defined terms (e.g. annual mass loads).

### 7.1 Beaudesert Sewage Treatment Plant Pilot Project

Begun in 2014, this pilot project demonstrates dry weather reuse of treated effluent and wet weather offsets delivered by streambank stabilisation.

A pilot project is underway in the Logan River to manage additional nitrogen and phosphorus discharges from the Beaudesert Sewage Treatment Plant (STP) as a result of population growth.

The project involves the provision of offsets for wet weather discharges into the Logan River and 100 per cent dry weather effluent re-use (zero dry weather release into the Logan River).

Modelling was used to determine the scale of works needed to offset the wet-weather related discharges from the STP into the Logan River. Historical erosion rates and bank erosion models were used to calculate the average sediment erosion during high flow events, and soil samples were taken to determine the percentage of TN and TP in the sediment. This informed an estimate of the annualised sediment load avoided by bank stabilisation activities (11,200 tonnes/year) and the associated annualised five tonnes per year of total nitrogen (TN) and one tonne per year of total phosphorus (TP).

Almost \$1 million has been invested by Queensland Urban Utilities to repair around 500 metres of eroded riparian bank located close to the STP. The works include structural bank stabilisation, pile fields and riparian planting.

The nitrogen and phosphorus savings allowed the STP to continue at its current capacity in the short-term without undertaking expensive upgrades. This means that about \$7 million in savings can be invested elsewhere in the sewage network.

## 7.2 Victoria's approach

This description of a potential offsets scheme in Victoria is from the *Water Quality Offsets, Goulburn Valley Water Kilmore case study*, 2018, published and developed by the Victorian water industry and EPA, Victoria

Many of the wastewater treatment facilities in inland Victoria are facing the challenges of population growth and the need to augment treatment and discharge capacity.

The options available to water corporations often involve complex trade-offs.

One approach involves the use of water quality offsets, allowing facilities to increase the amount of recycled water that they let flow to local waterways, so long as they offset the resulting increase in nutrients or other pollutants.

Suitable offsets might include stock exclusion from waterways, enhancement of riparian vegetation, stormwater management, gully erosion works and removal of aquatic weeds. Ideally, these offset measures address the same nutrient or pollutant threat posed by the discharge and should be located in close proximity.

This approach presents features and challenges.

- It may be cheaper to implement than an infrastructure solution.
- It may be implemented through a scaled program over time to match growth in discharge volumes.
- It may reduce threats to catchment conditions from poor land management practices.
- It may enhance flows in local catchments that are stressed due to water extractions and climate change.
- Environmental benefits must be attributable to the 'offset' activity.
- The activity must be monitored to ensure anticipated benefits are realised and enduring.
- The process must be transparent, enforceable and ensure accountability for the parties involved.

The *State Environment Protection Policy (Waters of Victoria)* lets EPA use water quality offsets as a regulatory tool when licensing wastewater discharges. These provisions allow EPA to apply less stringent discharge limits than would otherwise be the case if the applicant can demonstrate that equivalent or greater environmental benefits can be achieved through alternative measures.

Considering offset measures in the context of these legal instruments is important, as it provides a clear process for EPA to consider, evaluate and set conditions through a formal statutory instrument. These regulatory tools also provide a framework to ensure that any offset measures are legally enforceable over an agreed period of time, as well as a way for EPA to make successful applicants consult with the community and robustly assess local impacts.”

The case study report concluded that discharging increased flow to the creek and investing in offsetting investments would generate an improved environmental quality outcome. This would be less costly, able to be scaled up incrementally over time, and likely to generate community benefit.

Three types of works offered the best potential to restrict the movement of nutrients from the catchment into the waterways:

- gully rehabilitation
- riparian fencing for stock exclusion
- riparian vegetation.

## 8. Policy review and further information

This policy will be reviewed in three years to respond to developments in science, technology and market-based offset schemes. For further information on water quality offsets, refer to the Draft Point Source Water Quality Offsets Guideline published on the DES website or contact us at [evinfo@des.qld.gov.au](mailto:evinfo@des.qld.gov.au)

## 9. Glossary

Term	Meaning
Annual mass load of offset contaminant	The annual mass load of offset contaminant (kg) released into waters from the specified release point for the activity.  Annual mass load of offset contaminant (kg) = annual average daily release volume (ML) X 365 X long term median concentration of offset contaminant (mg/L).
Delivery ratio	A multiplying factor that takes into account uncertainty about delivering an equivalent pollution reduction (mass load) in the receiving environment due to the distance and hydrological conditions between the receiving environment and the offset location. It also takes into account flow and duration of flow, attenuation (i.e. the rate at which nutrients are reduced through natural processes).  Under this policy the delivery ratio starts at 1:1.5, or as determined by the Administering Authority. The ratio also accounts for the policy requirement to deliver improved water quality in the receiving environment.
Diffuse source	Non-point source pollutants (i.e. without a single point of origin or not introduced into a receiving stream from a specific outlet). Common diffuse sources are agriculture, forestry, urban areas and historical mining sites.
Dry weather day	means a day which less than 1 mm of rainfall is recorded at any rainfall measuring station recognised by the Commonwealth Bureau of Meteorology within the area connected to the point source location, or if no such measuring station exists, at the nearest such station to the point source location. The term also excludes days during which recorded rainfall over the 4 preceding days exceeds a cumulative rainfall of 50 mm.
Environmental Authority (EA)	Issued under section 195 of the EP Act, approval for an environmentally relevant activity applied for in an application.
Environmental harm	Under section 14 (1) and (2) of the EP Act, any adverse effect, or potential adverse effect (whether temporary or permanent and of whatever magnitude, duration or frequency) on an environmental value, and includes environmental nuisance. <i>Environmental harm</i> may be caused by an activity— (a) whether the harm is a direct or indirect result of the activity or (b) whether the harm results from the activity alone or from the combined effects of the activity and other activities or factors.
Environmentally Relevant Activity (ERA)	Under section 18 of the EP Act, each of the following is an environmentally relevant activity— (a) an agricultural ERA as defined under section 75; (i.e. commercial sugar cane and cattle grazing on property >2000ha—Burdekin dry tropics, Wet tropics catchment and Mackay Whitsunday catchment), (b) a resource activity as defined under section 107; (i.e. mining or petroleum or other activity), and (c) an activity prescribed under section 19 as an environmentally relevant activity.
Environmental Equivalency Ratio	Accounts for the uncertainty associated with the achievement of environmental equivalence (chemical form and quantity) between the water quality offset solution and the point source wastewater emissions in the receiving waters.  Under this policy the ratio starts at 1:1, or as determined by the Administering Authority.
Environmental Management Decision (EMD)	Under section 32 (1) of the EP Regulation, a decision under the Act for which the Administering Authority making the decision is required to comply with regulatory requirements.
Management hierarchy	Under section 14 of Environmental Protection (Water and Wetland Biodiversity) Policy 2019, the hierarchy of management actions that must be considered when making environmental management decisions under the EP Regulation.
Offset contaminant	Under this policy, total nitrogen (and/or stated chemical species e.g. dissolved inorganic nitrogen), total phosphorus (and/or stated chemical species e.g. filterable reactive phosphorus) and total suspended solids.

## Point Source Water Quality Offsets Policy 2019

Term	Meaning
Point of concern	The receiving environment adjacent to a point source discharge pipe (outfall) outlet.
Point source entity	The holder of an EA that allows the discharge or release of wastewater into waterways at the release point stated in the EA.
Prescribed contaminants	The contaminants listed in Schedule 10 of the EP Regulation.
Receiving environment	An ecosystem and its constituent parts that is likely to come in contact with wastewater released from an environmentally relevant activity.
River basin / catchment	Where water flows and drains across the landscape.  Queensland drainage divisions, major hydrological river basins and contained catchments are derived from Geoscience Australia data. The hydrologic mapping is available at: <a href="#">High resolution image of divisions and basins</a> .  Map products of drainage lines and major catchments are published at the Geoscience Australia website at: <a href="https://ecat.ga.gov.au/geonetwork/srv/eng/catalog.search?node=srv#/metadata/a05f7892-eab0-7506-e044-00144fdd4fa6">https://ecat.ga.gov.au/geonetwork/srv/eng/catalog.search?node=srv#/metadata/a05f7892-eab0-7506-e044-00144fdd4fa6</a>
Wastewater	Under the Environmental Protection (Water and Wetland Biodiversity) Policy 2019, aqueous waste, including water containing contaminants.
Waters	All tidal and non-tidal surface waters and groundwaters.
Water quality offset	An activity taken to counterbalance the residual impact of offset contaminants in a point source wastewater discharge at the point of concern, by providing a water quality improvement in the receiving environment.
Water quality offset condition	For an EA, the inclusion of a condition that requires a water quality offset to be undertaken (e.g. actions to rehabilitate a degraded riverbank, construct a wetland or establish riparian vegetation).
Water supply buffer areas	Water supply buffer area means areas within the water resource catchment that are particularly vulnerable to contamination, including groundwater recharge areas and areas in the vicinity of a dam, lake, reservoir or watercourse which supply drinking water.  Water supply buffer areas are shown in the State Planning Policy 2017 <a href="#">Interactive Mapping System</a> .
Wet weather day	means a day which is not a dry weather day.