# Water Management Plan 2017–2021

**Presented to the States on 8th December 2016**
**by the Minister for the Environment**

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# Minister's Foreword

A healthy, good quality water environment is vital for the health and well-being of all those who live on the Island, as well as its visitors. We should, indeed must, have good quality water resources in the Island.

A clean and adequate supply of water is essential for our economy – water is used in direct consumption, for agriculture, for fisheries, for aquaculture and for many other uses. It is also socially, culturally and recreationally important. The shoreline, cliff paths, valleys and reservoir walks: these environments are rich in both wildlife and cultural meaning. Fishing, sailing and other water-dependent activities are of great importance to locals and visitors alike.

A natural system supports all of this. We need to ensure that the Island's ecological quality and biodiversity is maintained and enhanced, firstly for its own sake and also because it underpins the social and economic benefits that we derive from it.

The work that my officers and I have undertaken for this plan, to analyse evidence and gather new information, shows that that the quality of the Island's water environment is improving, but there is a lot still to be done, particularly in respect of levels of nutrients and pesticides. The quality of our water environment is not good enough. This Water Management Plan sets out actions that need to be taken over the next 5 years in order to improve the status of the water environment.

Over 4,000 Islanders responded to the recent 'Shaping our Future' public consultation. Over half of Islanders had the highest possible aspiration for clean and sustainable water – few other outcomes scored as highly. Although current progress was rated positively, scores indicated that Islanders believe that there is a significant gap to close to meet this future aspiration. Sustainable, healthy water is a shared aspiration.

I firmly believe that using an evidence-based and integrated water management approach in Jersey is key to safeguarding the resource for the future. The implementation of this first 5-year Water Management Plan for Jersey will help us to achieve our aspirations in respect of sustainable and healthy water.

As Minister for the Environment, I am pleased to present the Water Management Plan 2017–2021.

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# Foreword

***Water is a precious resource, particularly on a densely populated Island. Everyone has an important part to play in safeguarding it for human use and protecting the important habitats and species that depend on it.***

In November 2014, the Department of the Environment published the report **Challenges for the Water Environment of Jersey**, summarising the key water management issues facing the Island. This 'challenges' document was the first step in the water management planning process for Jersey; it set out the current status of the water environment and the key pressures acting upon the resource.

This Water Management Plan (WMP) follows on, setting out the actions we need to take to help ensure healthy water supplies and better environmental conditions on the Island into the future. It will be implemented over 5 years between 2017 and 2021.

The Island needs to balance growing the economy with protecting and enhancing the environment and keeping Jersey as a great place to live and work in 2016 and beyond. The quality of our water environment is key to a sustainable future; currently, the status of the water environment in Jersey has been shown to be lower than it should be. This has been underlined again in recent months with the spotlight on pesticide issues.

# Structure of this document

Firstly there is a brief overview of why we need a Water Management Plan, followed by a more in depth exploration of the priority issues we propose to focus on in the first Water Management Plan planning period, between 2017 and 2021.

Following this, we have explained how we have appraised a range of measures that could be applied in Jersey, including consideration of how these could be delivered.

The measures recommended for implementation in this first WMP are then presented. This is accompanied by a high level assessment of the implications of these measures on different users of the water environment of Jersey and the wider benefits the Island can expect to see as a result of the actions taken.

# 1. Executive Summary

Water resources, and the range of services they provide, underpin economic growth, healthy communities and environmental sustainability.

Globally, water scarcity is among the most pressing issue to be faced in the 21st century. Freshwater provides society with goods that are essential to human wellbeing: clean water, food and energy. Freshwaters also provide other services that are less tangible but equally important. For example, they enable recreation and provide cultural and spiritual inspiration and meaning. All these benefits that freshwaters provide to humans are the so-called 'water eco-system services'.

In the last century water use has been growing at more than twice the rate of population increase. The World Economic Forum in its annual 'Global Risks Report' 2015 recently ranked 'water crises' as one of the top concerns in respect of likelihood of occurrence and gravity of impact. Many of the eco-system services provided by the environment are either undervalued or have no recognised financial value at all. Recently it was estimated that for the entire biosphere the minimum estimated value of the services provided (most of which is outside the market) is thought to be in the range of $US 125–145 trillion per year[1] which is almost twice the total global gross domestic product.

Integrated water management planning is a key tool to manage water resources sustainably. Key users and beneficiaries need to play their part in securing a healthy and usable water environment into the future.

## 1.1 What is the Water Management Plan (WMP)?

Over the last 15-20 years Jersey, the States of Jersey, through the Water Resources Section, has been working to protect the water environment in Jersey. The Section has developed a water monitoring network[2], introduced legislation to protect water and has implemented a number of measures to tackle water pollution and manage the water resource. Ongoing monitoring shows that the quality of the Island's water is improving but there is a lot still to be done. We all need to ensure that the water that we use, and the way in which we use it does not compromise its use in the future. This plan brings together and further builds upon previous work by considering carefully how we manage land to protect our waters.

This is the second report in a 2-part Plan; the first part identified the key water management challenges in Jersey and assigned a status classification to all water bodies on the Island. The main issues that were identified as affecting the health of our waters were the elevated levels of nutrients (particularly nitrate), the risk of elevated levels of the nutrient phosphorus and the risk of pesticide contamination (States of Jersey, 2014).

[1] Changes in the global value of eco-system services, Costanza et al, Global Environmental Change Volume 26, May 2014 pgs. 152–158.

[2] Monitoring is carried out on all 'controlled waters', including the Island's fresh water (ground water and streams) and marine waters. For more details please access: https://www.gov.je/Environment/ProtectingEnvironment/Water/Pages/index.aspx

## 1.2 The condition of our water environment

The work undertaken through the first part of this process (Challenges for the Water Environment of Jersey, States of Jersey, 2014) identified the primary water bodies in Jersey and used existing data to classify them according to their current ecological health.

The status classifications are High, Good, Moderate, Poor and Bad, in line with categories used in the EU. High status indicates that the relevant biological elements are undisturbed from natural conditions. Good status indicates only a slight disturbance compared with the natural condition. Moderate status indicates that the relevant biological elements are moderately changed from natural conditions. Poor status indicates a progressively more disturbed quality status compared with moderate. Bad status indicates that these components are shown to be severely changed from the natural example as a result of human activities.

**Currently, the majority of Jersey's water bodies are at moderate status.**

This is mostly driven by the elevated levels of nutrients found in both surface waters and groundwater.

**The overall long-term target is to improve the environmental status of as many of our water bodies as possible that are currently below the target level of good status.**

**Nutrient enrichment and pesticide contamination of our watercourses affects the ecological health of our waters and also severely limits our ability to use freshwater for drinking water purposes.**

Jersey Water supplies about 7,000 Mega Litres[3] of water to their business and domestic customers per year, the vast majority of which comes from surface water streams via reservoirs on the Island. In 2013 an estimated 2,162 Mega Litres[4] was abstracted from groundwater in Jersey for private supplies.

Jersey's untreated water resources have some of the highest concentrations of nitrate in water in the whole of Europe: approximately half of all samples taken from either surface or groundwater contain more than 50 mg/l nitrate. This compares to about 3% of surface water and 15% of groundwater samples exceeding 50 mg/l of nitrate in the countries of the EU[5].

Because of the high levels of nitrate in our streams and groundwater Jersey Water cannot guarantee to meet drinking water standards for nitrate in the mains drinking water supply at all times. Consequently, the company has to take active measures to control the nitrate levels in supply by careful blending and dilution. They also have to blend sources and remove sources from supply periodically to make sure pesticide levels remain within legal limits. The Company currently has a dispensation from the Minister for the Environment for those occasions when nitrate levels in water resources exceed manageable concentrations. Another concern is that many of the 3,400 households on borehole/well water only have access to water that is higher than the drinking water standard of 50 mg/l nitrate.

These issues are arising predominantly from "diffuse pollution" because no single point source can be identified for them; contributions of nitrates, phosphorus and pesticides come from across the Island's agricultural and rural, and to a lesser extent urban, landscapes.

[3] 7,000 million or 7 billion litres
[4] 2,000 million 2 billion litres
[5] The EU Nitrate Directive, January 2010, European Commission Publications Office: http://ec.europa.eu/environment/water/water-nitrates/index_en.html

## 1.3 What are we trying to achieve through the WMP?

Recognising the limited resource that is available to implement the WMP, and that this is a 5-year plan, it is proposed that the first cycle should focus on the priority issues. In summary, the key issues identified for the first 5-year plan are:

- **Nitrate:** We must reduce the nitrate concentrations in our groundwater and surface water;
- **Phosphate**: We need to increase our understanding of the scale of the likely phosphate issue on the Island in our inland waters and encourage or require further good practice measures to reduce soil P indices and losses to freshwater; and
- **Pesticides**: We must work to understand better the levels of pesticides in surface and groundwater throughout the Island. We must also strengthen the mechanisms we have to regulate, control and monitor pesticide use.

**We also plan to improve the monitoring strategy in order to increase our understanding of environmental risks where we are currently lacking information.** We will also carry out a screening for priority and priority hazardous substances.

Collecting good baseline data is important so that we can make decisions as and when we need to change priorities and policies to tackle emerging issues in future iterations of this plan. In the future, for example, upward trends in the Island's population may place more pressure on water availability or further contribute to diffuse urban pollution; climate change may result in rising water temperatures and more extreme weather events; economic trends may result in a changing agricultural focus of the Island. Ongoing monitoring and review will allow us to respond to this.

**To make progress towards good status we have set a series of objectives that are to be addressed through implementation of this Plan.**

Over the short term, through the period of 2017 to 2018 the objectives are to:

- Promote an Island-wide ethic of sustainable land use in Jersey such that the effects of land-based activities on the water environment are well known, accepted and mitigated where at all possible.
- Communicate the WMP amongst the sectors responsible for, and involved with, delivery of measures.
- Update and implement the policy mechanisms necessary for effective delivery of the chosen measures: specifically the Water Pollution Law, the Pesticide Law and their associated codes of practice.
- Rationalise the ongoing environmental monitoring programme (already underway) to incorporate targeted phosphates and pesticide monitoring.
- Develop any additional funding mechanisms required to implement the plan.

In the medium term, throughout the WMP (2017 to 2021), the objectives are to:

- Reduce the levels of nitrate found in surface waters and groundwaters (maximum and mean levels).
- Remove the need for the nitrate dispensation.
- Reduce the number of pesticide breaches in streams.
- Increase compliance monitoring for the measures identified in the Plan across the land based sectors in respect of losses of nutrients and pesticides to water (% compliance with mandatory measures).
- Increase frequency and coverage of existing environmental monitoring for pesticides and phosphorus such that a higher number of Jersey's water bodies can undergo classification in 2020 ready for the next round of the WMP.

- Implement additional compliance and advisory capabilities and capacity to ensure adherence to new regulations and provide internal advice to DoE.

In the longer term, through future iterations of the WMP process (beyond 2021 in blocks of 5 years) the objectives are to:

- Achieve a nitrate level of below 50 mg/l in all drinking water sources (streams and groundwater).
- Achieve good status for pesticides in all groundwaters which are relied on for drinking water supply.
- Achieve good status for phosphates in streams and ponds.
- Have an established and effective monitoring programme in place which allows for progressive and iterative classification of Jersey's water bodies in each iteration of the WMP, including coastal waters.
- Continue to employ WMP processes to identify and address current and emerging issues to ensure sustainable future for the Island's water environment.

## 1.4 How do we make progress towards the objectives?

A wide ranging survey of possible measures to help reduce nitrate, phosphorus and pesticide pollution has been undertaken. These were appraised and reduced down to a manageable list of locally applicable measures. This list was then packaged up into several implementation scenarios as options:

- **Scenario 0: Do nothing. Rural payments[6] are removed and we do not introduce any further mechanisms.**
- **Scenario 1: Business as usual, no change.**
- **Scenario 2a: Rural payments[7] are no longer in place but Water Catchment Management Orders (WCMOs) are introduced.**
- **Scenario 2b: Rural payments[8] continue and Water Catchment Management Orders (WCMOs) are introduced**
- **Scenario 3: Rural payments[9] continue, Water Catchment Management Orders (WCMOs) are introduced plus there is the introduction of more targeted measures including the requirement for arable reversion in specific problem areas and the introduction of a capital grant fund.**

These scenarios were designed to reflect a range of policy environments that could have arisen in Jersey over the next 5 years.

The precise effectiveness of catchment management measures is very difficult to quantify when scaling up from field to catchment and requires complex modelling, particularly given that timeframes for a response are relatively slow, particularly in groundwaters. Jersey does not have such a resource to draw upon. Because of this we have taken a different approach to comparing effectiveness between the different scenarios to help decide the appropriate way forward.

We worked on the premise that the different policy environments would drive varying levels of uptake of the underlying measures. Any changes to who the measure would target were also assessed. Under each policy scenario the likely uptake rate of each measure was considered, and

[6] The Single Area Payment at the time of writing but this will be delivered differently under the new Rural Economy Strategy.
[7] As above
[8] As above
[9] As above

compared with the uptake level at the moment. The difference essentially dictates the "effectiveness". Under Scenario 0 for example, existing policy instruments supporting the implementation of measures are removed. Unsurprisingly it was estimated that effectiveness of measures to improve the status of our waters under Scenario 0 would therefore be low. Under Scenario 2b the implementation of some additional policy instruments would make some measures mandatory and therefore the effectiveness of the scenario would be much higher.

We then added in cost information. Cost estimates (gathered from available sources from Jersey and elsewhere in the UK) were then combined with the uptake rates in order to allow for a comparison of costs between each scenario, and to estimate to what sector the additional costs might fall. The cost implications of the scenarios have been considered for comparison purposes and to facilitate planning for delivery.

**Our preferred Scenario, after careful consideration of the balance of effectiveness and cost is Scenario 2b. Under this scenario rural payments[10] continue and Water Catchment Management Orders (WCMOs) are introduced.**

**Scenario 3 can be implemented at a later date under the next WMP after 2021, or if additional resourcing is identified.**

We propose to designate the whole Island as a Water Catchment Management Area (WCMA) under the Water Pollution (Jersey) Law, 2000 (WPL). Thereafter, Water Catchment Management Orders (WCMOs) can be passed by the Minister for the Environment which would allow for cornerstone elements of good practice to become legislative requirements across all sectors for anyone carrying out certain activities. This creates a level playing-field for land managers to operate. However the mechanism chosen will still enable us to target compliance effort where there are specific pollution hotspots or where environmental sensitivity is greatest in some catchments.

Under Scenario 3 action would be enhanced by the addition of even more targeted measures either across Jersey or just in certain areas but using the same WCMA mechanism. This would enable further, more specialised actions or restrictions to become mandatory (for example arable reversion to grassland), but it would also be much more costly.

We have appraised the existing elements of best practice, and considered further elements, to arrive at the following new proposed regulatory controls:

| | WCMO TITLE | KEY PRESSURE ADDRESSED | SECTORS CONDITION APPLIES TO |
|---|---|---|---|
| **WCMO 1** | Fertiliser imports and sales | Nitrates and Phosphates | All non-domestic users of fertilisers |
| **WCMO 2** | Nutrient Planning and Management | Nitrates and Phosphates | All non-domestic users of fertilisers and organic manures |
| **WCMO 3** | Field operations and applications | Nitrates and Phosphates | Agricultural sector |
| **WCMO 4** | Soil Protection | Nitrates, phosphates and pesticides | All non-domestic land managers |
| **WCMO 5[11]** | Pesticide storage and application | Pesticides | All non-domestic users of pesticides |

[10] The Single Area Payment at the time of writing but this will be delivered differently under the new Rural Economy Strategy
[11] Q4 2016 update: This will be delivered through pesticide legislation, not using A WCMO

## 1.5 How costs will be shared

The measures appraisal process allowed for a high level comparison of the potential cost implications of each scenario. This is indicative only and is not designed to estimate the absolute cost implications of the Plan and does not replace the role of a Regulatory Impact Assessment.

**The table below sets out the <u>additional</u> costs borne by different sectors as a result of adoption of scenario 2b, relative to the current position (scenario 1).** The figures are the change in undiscounted implementation costs between the 2 scenarios, by sector over the 5 years of the WMP.

**Additional costs borne by different sectors as a result of adoption of scenario 2b, relative to the current position (scenario 1) over the 5 years of the plan**

| | |
|---|---|
| **Water industry** | **Average cost over 5 years £1,188k** |
| **Government** | **Average cost over 5 years £494k** |
| **Land managers, including farmers** | **Average cost over 5 years £648k** |
| **Industry** | **Average cost over 5 years £188k** |

**Additional Government costs are envisaged to be just under £100k per year. This is mainly for development and implementation of increased regulation (through WCMOs) and codes of good practice, for advice and compliance checking and for additional water quality monitoring.**

Government costs in the Plan have been kept to a minimum. However, delivery of the Water Plan cannot be achieved using in house resources past the point of preparation and production of the WCMOs. Additional resource needs to be found to ensure compliance checking and advice is deliverable, and that we can collect the information that we need.

To fund the Government costs proportion of the plan in the medium to longer term under Scenario 2b there are a number of options that need to be investigated further:

a) A tax on fertilisers and/or pesticides.
b) Additional revenue generated from the sewerage charge proposed by Department for Infrastructure.

It is recognised that other fiscal mechanisms will require preparatory work but they need to be in place to fund the additional compliance and advice required to ensure Water Catchment Management Orders are complied with. Funding has already been prioritised within the Department of the Environment for law drafting and other preparatory work for 2016 and 2017.

**The additional costs for the land management sector of approximately £130k per year for the whole sector are associated with complying and demonstrating compliance with the new regulatory baseline of good practice.**

However, some of the costs of the proposed new regulatory requirements to be borne by the Land Management sector were based on the assumption that everyone was implementing them from the start without anything at all already in place. This is not actually the case. In fact, the vast majority of this sector is claiming Single Area Payment, receipt of which is contingent on having many of these measures in place. Although we recognise that compliance is lower than it should be, the vast majority are at least partially compliant. Market assurance schemes (e.g. Tesco Nurture or Leaf) also demand evidence of environmental good practice. For those that are not fully compliant already, it will cost those who are the least compliant the most additional cost to catch up with what will be the new regulatory baseline.

**The additional water industry costs (which includes Jersey Water and the Department for Infrastructure) are driven by the implementation of a reservoir bypass scheme by Jersey Water under scenarios 2a, 2b and 3 – this is a large cost item at a mean cost of £1M over the 5 years of the plan. The remaining cost to the water industry in Scenario 2b is the introduction of charging for discharge permits. Industry (other) will bear the least increase in cost and will pay the remaining proportion of the discharge permit charges of approximately £37k per annum.**

The potential costs in respect of inaction have not been considered here.

## 1.6 What are the next steps and how will we judge success?

We have established a set of Key Performance Indicators (KPIs) against which to judge the success of the implementation of the Plan. These KPIs reflect the need to recognise success based on both activity as well as outcome, particularly as there may be a lag time before water quality improvements are evident.

- **KPI 1** Increased communications and awareness of the water management challenges on Jersey
- **KPI 2** Behavioural change to adopt more sustainable water management
- **KPI 3** Increased compliance checking
- **KPI 4** Optimising phosphate levels in soils
- **KPI 5** Continued trend of reductions in groundwater and surface water nitrate levels
- **KPI 6** Progressive reduction in the number of nitrate dispensations required
- **KPI 7** Reduction in the pesticide levels in raw water supplies
- **KPI 8** Enhanced and more focused environmental monitoring programme

In 2020 we will use the classification tools (built as part of the previous phase of work in 2014) with updated environmental monitoring data (gathered throughout 2016–2020) to re-classify the water bodies. Comparing the data from 2014 and 2020 we will then be able to re-appraise the measures needed for the subsequent 5-year planning cycle and produce the next plan.

# 2. Introduction

## 2.1 Why do we need a Water Management Plan?

Globally, water scarcity[12] [13] is among the most pressing issues to be faced in the 21st century. In the last century, water use has been growing at more than twice the rate of population increase. The World Economic Forum in its annual 'Global Risks Report' 2015 recently ranked 'water crises' as one of the top concerns in respect of likelihood of occurrence and gravity of impact (Table 1). It is also the top risk in terms of impact.

**Table 1: The Global Risks Landscape 2015**[14]

**Table 1:** The Ten Global Risks in Terms of Likelihood and Impact

| Top 10 global risks in terms of Likelihood | Top 10 global risks in terms of Impact |
|---|---|
| 1 Interstate conflict | 1 Water crises |
| 2 Extreme weather events | 2 Spread of infectious diseases |
| 3 Failure of national governance | 3 Weapons of mass destruction |
| 4 State collapse or crisis | 4 Interstate conflict |
| 5 Unemployment or underemployment | 5 Failure of climate-change adaptation |
| 6 Natural catastrophes | 6 Energy price shock |
| 7 Failure of climate-change adaptation | 7 Critical information infrastructure breakdown |
| 8 Water crises | 8 Fiscal crises |
| 9 Data fraud or theft | 9 Unemployment or underemployment |
| 10 Cyber attacks | 10 Biodiversity loss and ecosystem collapse |

Categories: Economic; Environmental; Geopolitical; Societal; Technological

Source: Global Risks Perception Survey 2014, World Economic Forum.

Freshwaters provide society with goods that are essential to human wellbeing, such as clean water, food and energy. Freshwaters also provide other services that are less tangible but equally important. For example, they enable recreation and provide cultural and spiritual inspiration and meaning. All these benefits that freshwaters provide to humans are the so-called 'water eco-system services'.

Many of the eco-system services provided by the environment are either undervalued or have no recognised financial value at all. Recently it was estimated that for the entire biosphere the minimum estimated value of the services provided (most of which is outside the market) is thought to be in the range of $US 125–145 trillion ($10^{12}$) per year [15] which is almost twice the total global gross domestic product.

[12] Water scarcity relates to both quantity and quality.
[13] Water crisis is defined as "a significant decline in the available quality and quantity of fresh water, resulting in harmful effects on human health and/or economic activity". Global Risks 2015, 10th Edition, World Economic Forum This report and an interactive data platform are available at www.weforum.org/risks.
[14] Global Risks Perception Survey 2014, World Economic Forum. Global Risks 2015, 10th Edition, World Economic Forum This report and an interactive data platform are available at www.weforum.org/risks.
[15] Changes in the global value of eco-system services, Costanza et al, Global Environmental Change Volume 26, May 2014 Pgs. 152-158.

## 2.2 Uses of water in Jersey

### 2.2.1 Public Water Supply

It is estimated that approximately 90–95% of households on the Island have a mains water connection to their property. Jersey Water supplies about 7,000 Mega Litres (Ml) (which is 7 billion litres or 7,047,000 $m^3$) of water to their business and domestic customers per year, the vast majority of which comes from surface water streams via reservoirs on the Island. The supply of mains water in Jersey is regulated through the Water (Jersey) Law 1972.

As part of the demand management measures necessary under the company's 25-year Water Resources Management Plan, there has been a move to universal metering that is now almost complete. With just 120 days of water storage in the reservoirs, Jersey Water also own and operate a desalination plant capable of producing 10.8 Ml per day (approximately 50% of daily demand).

### 2.2.2 Private Water Supply

Of the 41,595[16] households in the Island, approximately 3,390 are served by private boreholes and wells. In 2013 an estimated 2,162 Ml (2,162,597 $m^3$) was abstracted from groundwater in Jersey, mostly for private and business use. The quality of this water is unregulated and mostly untreated – the quality is entirely dependent on the quality of the water in the environment.

### 2.2.3 Business and industry

All businesses in Jersey are water dependant in some way, even if it is just the need to service staff with drinking water and sanitation. Industries such as agriculture and fisheries are of course heavily water-dependant.

### 2.2.4 Recreation

Our water environment also provides opportunities for participation in a wide range of water-related leisure activities that are vital for wellbeing and are also economically, socially and culturally significant. The water environment is part of the recreational experience for many, either along the cliff paths, valleys and reservoir walks or for the numerous shore and water-based activities on offer in the Island.

### 2.2.5 Natural Environment

In respect of biodiversity, Jersey's geographical position and favoured climate allows many species normally restricted to either Britain or the European continent to extend their range, resulting in an overlapping mixture of animals and plants found only in the Channel Islands. Many of Jersey's designated ecological Sites of Scientific Interest (SSIs) have an important land-water interface and support important aquatic or semi-aquatic species. Beyond the land, the ecological importance of Jersey's waters is recognised by the fact that an area of our intertidal habitat larger than Jersey itself (almost 190 square kilometres) is designated as a site of international importance under the Ramsar Convention. An adequate supply of good quality water is essential for ecological status in our waters and on the eco-systems that are dependent on our waters.

[16] Jersey in figures, 2014

The natural environment of Jersey is also highly important to the people of Jersey. According to a recent States of Jersey survey of residents on issues regarding the Island's heritage[17], the character of the Island's environment was consistently ranked as *the most* important factor by respondents. Participants at a 2013 stakeholder workshop who were asked to produce a vision for St. Aubin's Bay said that it should be "*an attractive bay with good water quality that is widely used for leisure and work and which supports a rich diversity of marine and bird life*". It was felt that the aims of water management should include the bay being a place for tourism, recreation and business to thrive, which has good and protected water quality, a managed and healthy fishery and a diversity of marine and bird life, and we should also gain a better understanding of what drives the periodic sea lettuce blooms. This suggests that at least a proportion of the public in Jersey are well aware of the balance between social, environmental and economic considerations in environmental protection.

### 2.2.6 The Water Management Plan and the Strategic Plan 2015-2018

The current States of Jersey Strategic Plan 2015–2018[18] refers to a number of important strategies, policies and legislation, which includes the "new Water Strategy" (this WMP) and a "Climate Change Adaptation Strategy". The Strategic Plan states that one of Government's key purposes is to deliver positive, sustainable economic, social and environmental outcomes for Jersey which includes the protection and enhancement the Island's natural and built environment.

Improving health and wellbeing and optimising economic growth are 2 of the 5 chosen priorities to be addressed during this term. Water that meets EU and World Health Organisation (WHO) drinking water standards is a fundamental necessity for health and wellbeing. In addition, if Jersey's credibility and standing in the market place amongst informed investors is to be improved and enhanced in terms of environmental sustainability we need clear action to address priority issues such as water quality.

The recent Environmental Policies Review carried out by the Environment, Housing and Technical Services Scrutiny Panel presented to the States on 24th April 2015 supported the necessity of a longer-term, more sustainable approach to planning for the future, and also expressed concern about the high nitrate levels and recommended that the prospective WMP should resolve the problem of high nitrate levels as a priority.

The Strategic Plan also proposes the need for an 'Island vision' – that provides clarity about Jersey's future direction and ensures that all aspects of Jersey's future sustainability are being addressed in a coherent way.

The development of this Island vision is underway.
Figure 1. shows how the vision recognises the importance of balancing community, economic and environmental goals in order to ensure our Island is one of prosperity and opportunity, to foster a community that is caring, healthy and vibrant and to preserve this beautiful and special place for future generations.

[17] http://www.gov.je.Government/JerseyWorld/StatisticsUnit/PeopleCommunities/Pages/SurveyonHeritageinJersey/aspx
[18] https://www.gov.je/Government/Pages/StatesReports.aspx?ReportID=1424

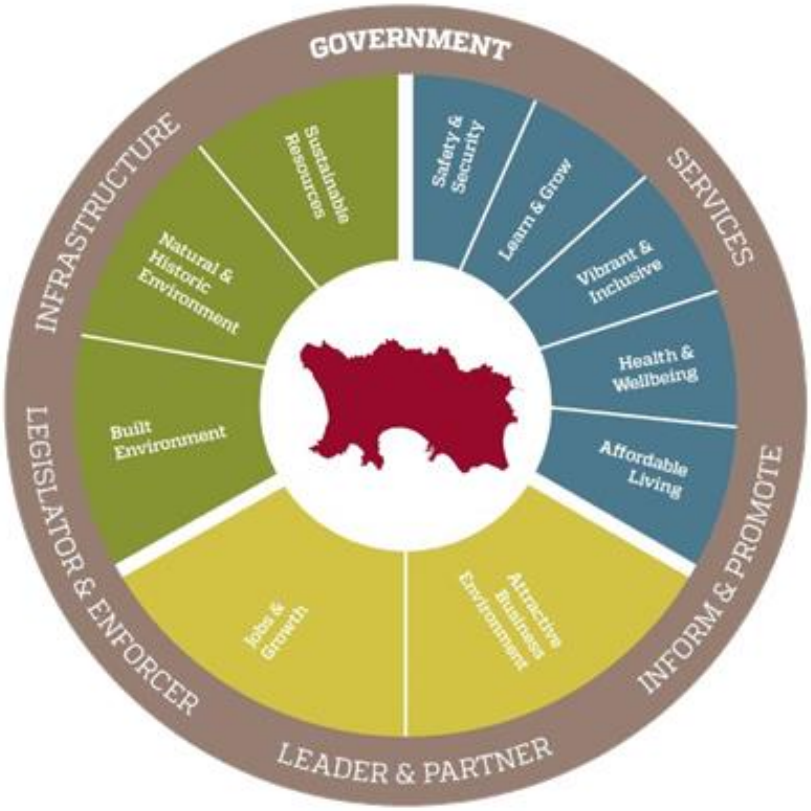



**Figure 1: The vision being developed for Jersey**

Sustainable water resource use is one of the cornerstones of this vision, and this WMP and process will help us translate this vision into action.

# 3. Preparation of this WMP

## 3.1 The underlying principles

We have broadly followed the core principles of the EU Water Framework Directive (WFD) in preparing this WMP for Jersey. One of the principles is that plans should be produced using a cyclical and iterative approach so that lessons learnt, new information and emerging issues are reflected in the next plan (Figure 2).

Throughout 2015, work has been focused on identifying measures which could be drawn upon to help tackle some of the priority water challenges. The end point of this phase of work in is the WMP – this report.

The next phase of work will be focused on implementing the actions set out throughout the period 2017 to 2021 and monitoring the success of these measures through monitoring the environment and level of stakeholder engagement and behaviour change.

After 2020, the classifications defined in the first phase of work will be updated to understand the outcomes of the WMP before refining the action plan for the next planning cycle (2022–2026).

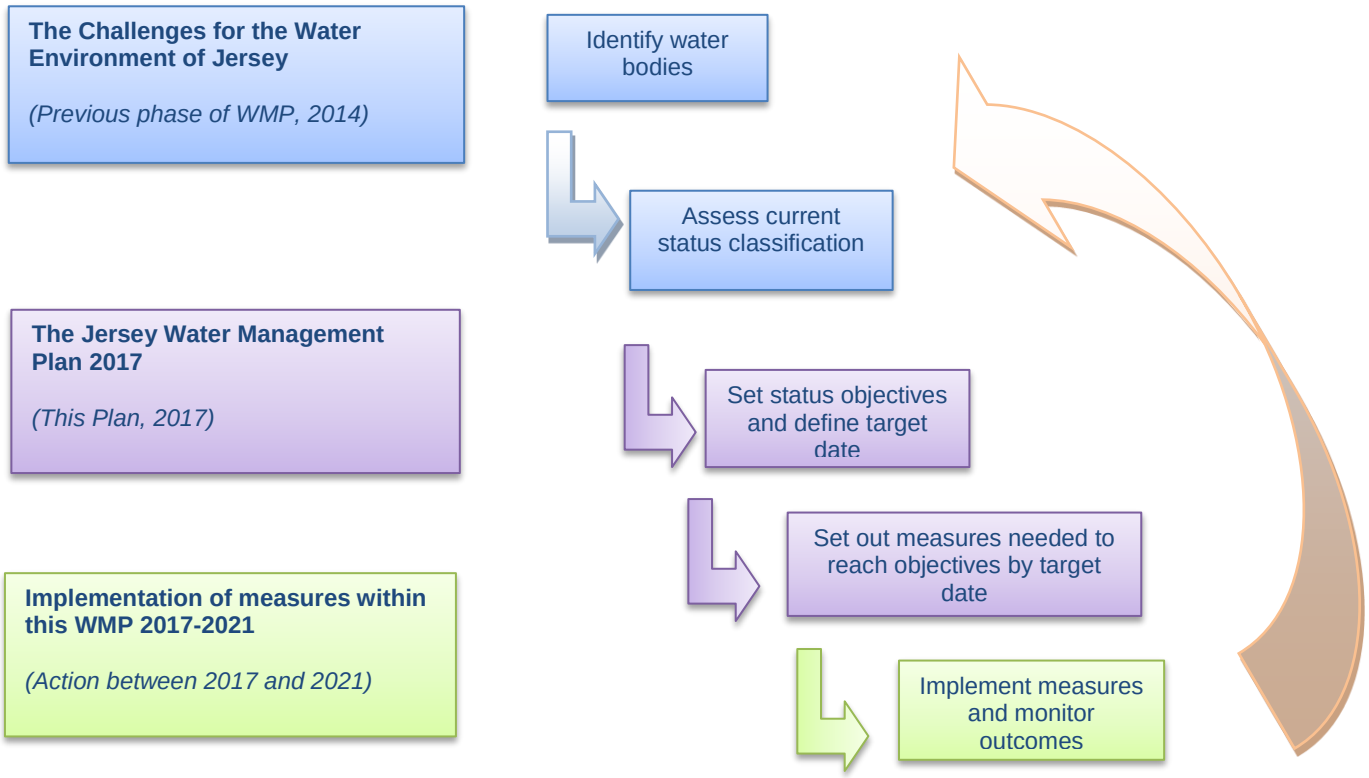



**Figure 2: the WMP Process**

### 3.2 What are the key changes compared with previous water management approaches?

Historically water quality has been managed separately from water resources and aquatic biology. The new way of working recognises that each individual pollutant and pressure has a role to play in the overall ecological 'health' of the water environment. Therefore a more holistic management plan, which seeks to address a range of issues, is required. This is particularly relevant in Jersey as land use and water quality are very closely linked.

The process of working on this plan has provided a driver for better integration, by bringing together specialists from the marine sector and the freshwater environment, alongside land management and agricultural specialists.

During the first stage of the process (in 2014), data were integrated and combined across these policy areas for the first time in order to define the status of water bodies. In the second stage of the WMP process (2015), an appraisal of all the existing measures in Jersey was undertaken, so we have a much better understanding of what measures are most useful along with measures in place elsewhere.

Next we considered how the uptake of measures might change under different policy scenarios that may occur and suggested a combination of measures to be implemented over the next 5 years. We have also considered the wider eco-system benefits, aside from water management, that implementation of the WMP will provide.

### 3.3 Planning cycle and terminology

The approach taken to selecting the actions to be pursued in the next 5 years has been to initially consider what needs to be done (i.e. the 'measures') and then to consider how best the measures could be delivered (i.e. the 'mechanisms').

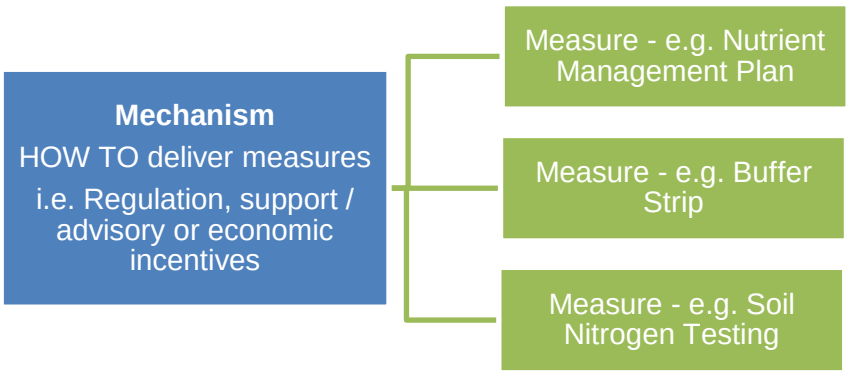



**Figure 3: The relationship between measures and mechanisms**

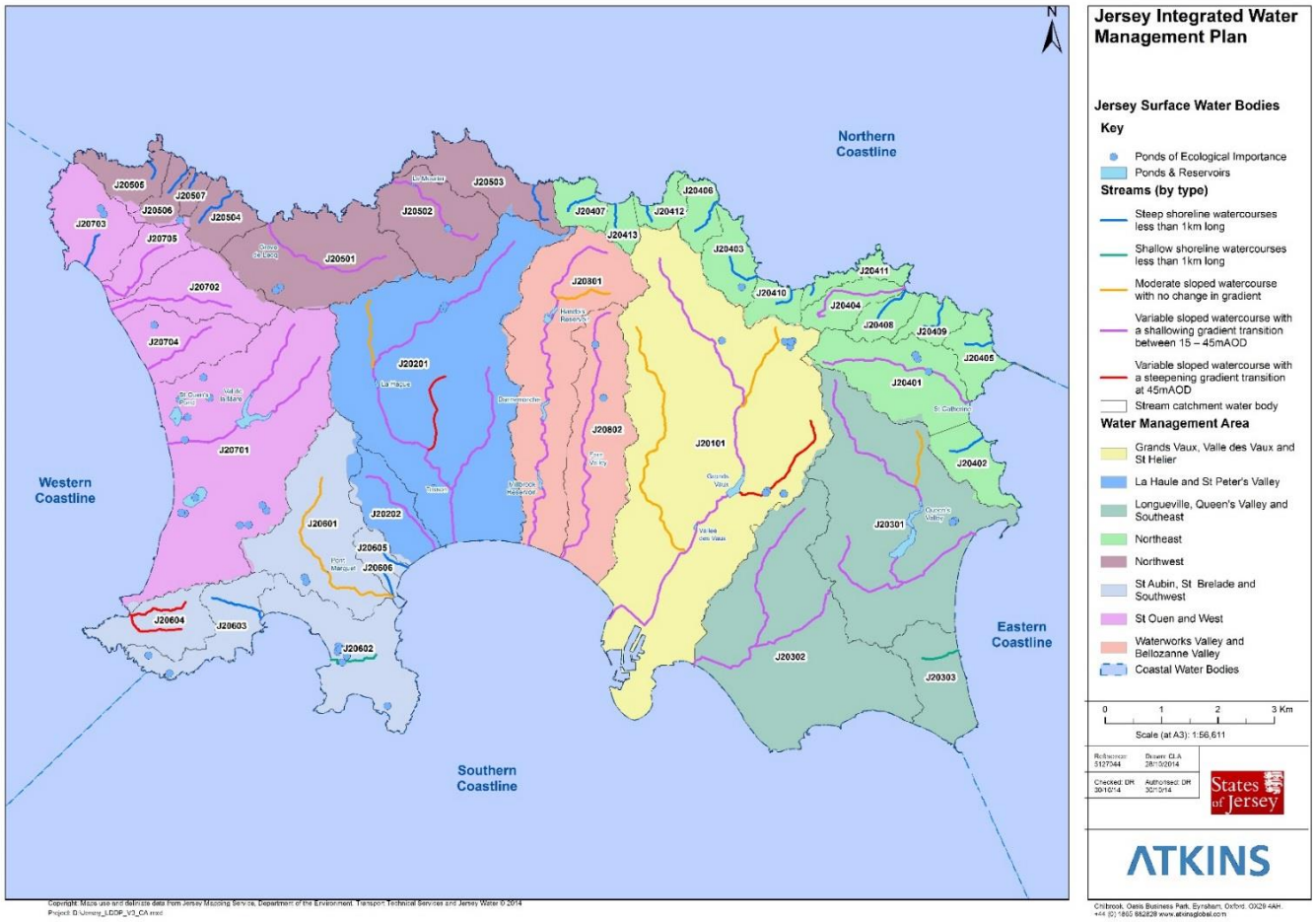
# 4. Water management priorities for 2017–2021

## 4.1 Challenges for the Water Environment

The first report in 2014 – 'Challenges for the water environment of Jersey[19]' – set out the current status of the water environment and what the priority issues are.

As a first step, the streams, ponds, reservoirs, ground waters and coastal waters in Jersey were identified, along with the Water Management Area (WMA) to which they belong (Figure 4). Alongside this, a non-statutory system of Priority Protection Areas were also assigned.

**Figure 4: Jersey's water bodies and Water Management Areas (WMAs)**




[19] http://www.gov.je/Government/Pages/StatesReports.aspx?ReportID=1123

## 4.2 The Status of Jersey's Water

The current status assessment of the water bodies was undertaken by examining existing monitoring data. The classification status[20] of each water body was subsequently assigned in the categories of high, good, moderate, poor and bad[21].

**All of the streams in Jersey are currently at less than good overall ecological status, with nutrients being the most significant (commonly occurring) issues driving this classification** (
Figure 5).

**This WMP seeks to address the issues identified in any water body with a classification of lower than good status.**

The issue with nitrate in Jersey is well documented. Phosphate monitoring is not as widespread or longstanding on the Island but, on the basis of limited monitoring data, all stream water bodies have been assessed as 'moderate' status in a precautionary approach. The data availability is limited for ponds and reservoirs but the data available for reservoirs also suggest that phosphate is a concern; hence this issue needs further investigation.

For surface waters, the 'Chemical Status' and 'Specific Pollutant' assessment was based on chemical standards set for substances that are significant at a Europe-wide level in the former instance (so-called priority or priority hazardous substances), and at a national level (in this case drawn from England, Wales and France) in the latter case (so-called Specific Pollutants). Some pesticides are included amongst these lists, for example Simazine and Linuron.

A further broader risk assessment was undertaken for other pesticides related to drinking waters in streams and, when combined with the groundwater chemical assessment, highlighted that further investigation is needed into Island-wide pesticide levels. Recent pesticide detection in local water bodies have highlighted the need for action in respect of pesticides both in terms of assessment and understanding and in terms of measures to reduce pesticide losses to water.

[20] The classification methodology is complex, but in simple terms a range of aspects were examined (such as water quality, quantity and ecological health), to see how these elements compare to the natural situation. The status classifications for each element (with the exceptions of hydrology and morphology because these are 'supporting element' assessments, rather than elements that drive status classifications) were then combined into a single classification with the overall classification result being determined by the lowest status of any of the elements – a 'one-out, all-out' approach. This is consistent with the approach in the Water Framework Directive and so allows us to compare our results with other jurisdictions.

[21] **Good status** indicates that the classification assessment shows that the relevant biological quality elements are only **slightly** disturbed, compared with the natural, undisturbed, condition. **Moderate status** indicates that the relevant biological quality elements are moderately changed from natural conditions. **Poor status** indicates a progressively more disturbed quality status compared with Moderate. **Bad status** indicates that these components are shown to be severely changed from the natural example as a result of human activities.

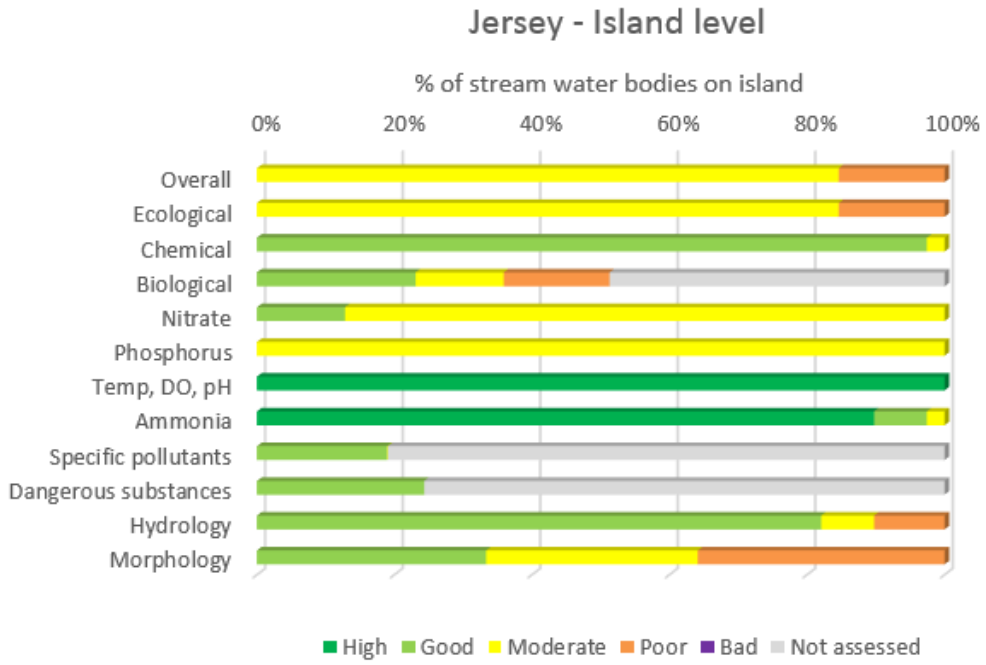



**Figure 5: The status of Jersey's stream water bodies (States of Jersey, 2014)**

Groundwater was also assessed for status in the categories of quantitative (i.e. amount) and qualitative (i.e. chemical). Quantitative status was determined to be good although this does not mean that there are no abstraction pressures on groundwater, or that groundwater resources will not become stressed during droughts or in the future due to population pressures or climate change.

The qualitative (chemical) classification results underlined and supported the surface water findings that nitrates and pesticides required further consideration in the next stages of the water management planning process (
Table 2).

Table 2 below shows the parameters for which there were sufficient monitoring data in groundwater to carry out chemical screening and classification. Perfluorooctanesulfonic acid (PFOS), a Specific Pollutant, is a known contaminant in the groundwater in St. Ouen's Water Management Area (WMA).

The other 2 groups of substances with a poor status result are nitrate and pesticides. These are recognised as the most widespread groundwater contaminants across Europe.

For pesticides, the monitoring results analysed showed that 4 out of the 8 WMAs have sites that show pesticide levels higher than the EC standard for one or more pesticides on one or more occasions. Although the concentrations were normally low, the standard is also very low, so the status result for pesticides has been assigned as 'Poor' in these 4 WMAs.

The occurrence of pesticides in groundwater is not a new issue in Jersey and is referred to for example in BGS (2000).

Finally, for nitrates the percentage of sites exceeding the threshold value of 37.5 mg/l $NO_3$ (average) varies between 33% and 100%. This exceeds the recommended 20% so all WMAs fail the screening for nitrate.

**Table 2: Groundwater Qualitative Status Summary (States of Jersey, 2014)**

| Parameter | Groundwater Qualitative Status |
|---|---|
| **Nitrate $NO_3$** | Poor in all WMAs |
| **1,1,1-Trichloroethane**[6] | Good in all WMAs |
| **1,1,2,2-Tetrachloroethane**[6] | Good in all WMAs |
| **Vinyl chloride**[22] | Good in all WMAs |
| **Pesticides (individual)** | Poor in 4 out of 8 WMAs |
| **PFOS**[23] | Poor in 1 WMA (St. Ouen WMA due to the airport) |
| **Phosphate** | Unknown status |
| **Salinity** | Good in all WMAs |
| **Sulphate** | Good in all WMAs |

The coastal water in and around St. Aubin's Bay was assessed using the following classification elements: dissolved oxygen; total inorganic nitrogen; phytoplankton; macroinvertebrates; seagrass; and seaweed. The overall combined classification of the coastal water was moderate status. This has been driven by the seaweed assessment: all the other elements were classed as high or good. A similar assessment of the other coastal areas around Jersey was not possible as the environmental monitoring does not extend around the Island.

Although nutrients and pesticides have been identified as the top priorities for this first cycle of WMP, other water management issues were identified. Hydro-morphology is one such issue: that is the natural form and function of the watercourse. Many of the Island's streams and coastal waters have been modified in some way which affects the naturalness of the watercourse.

Another concern that was highlighted as part of the previous phase of work was the resilience of water resources during periods of drought. These issues have currently been assigned a lower priority than nutrients and pesticides as we have mechanisms in place through the Water Resources Law, the drought plan and the Department's hydrogeological expertise to manage these effectively at the current time. However, the resilience of water resources may become more prominent under climate change scenarios or population growth in the medium to longer term and the loss of the Hydrogeologist is one of the identified Departmental savings over the life of this plan.

[22] These are all industrial chemicals, the first 2 are used as industrial solvents and the latter is used in the production of PVC and vinyl products.

[23] Perfluorooctanesulfonic acid (PFOS) has been used to make aqueous film forming foam (AFFF) a component of fire-fighting foams previously used in airport fire-fighting.

## 4.3 The impact of nutrients and pesticides

**Nutrients and pesticides have been identified as the key water management issues. Elevated levels of these substances result in a range of impacts relating to drinking water quality, environmental water quality and overall eco-system health.**

The main nutrients of concern, phosphorus and nitrogen, are common pollutants generated from urban and agricultural land use, and are associated with human and animal wastes and fertiliser. As a consequence, water quality is strongly associated with land use.

Nitrogen and phosphorus are plant nutrients required by plants to grow so they are used in agriculture in the form of fertilisers and are also used in domestic gardening and amenity horticulture. Organic manures such as slurry and manure applied to land also contribute to the nutrient loading to land, as do private drainage systems such as septic tanks and soakaways. Private drainage systems are in fairly widespread use in Jersey where no mains drains are available. Water falling as precipitation carries these nutrients into streams and reservoirs and/or percolates down through the soil and into groundwater.

A pesticide is any substance or mixture of substances used to destroy, suppress or alter the life cycle of any pest, and they are widely used in commercial land based industries as well as in domestic gardening. Overuse, or misapplication of pesticides leads to the chemical substances in them contaminating water. In particular, plant protection products released into the environment in an uncontrolled way by spray drift, leaching or run-off may pollute soil, surface water and groundwater. Environmental contamination can also occur during and after application, when cleaning equipment, or through the uncontrolled illegal disposal of pesticides or of their containers.

### 4.3.1 Nitrate

**Despite improvements over the last 15 years (as indicated by the data in Figure 6 and Figure 7), Jersey's groundwater, surface water streams and ponds still have some of the highest levels of nitrate in the whole of Europe. Approximately 50% of all sample results for nitrate taken from either surface or groundwater are above 50 mg/l nitrate ($NO_3$). In comparison, across the EU approximately 3% of surface water and 15% of groundwater samples exceed 50 mg/l of $NO_3$[24].**

High nitrate levels in streams and reservoirs can cause disruption to drinking water supplies – either through an increased need for blending different sources of water (which carries a potential impact on water bills) or, in more severe cases, can result in a raw water source being taken out of supply. This nitrate is strongly associated with land use practices and consequently varies in severity of impact between catchments, depending on the predominant land use in the catchment. This trend was highlighted by the status assessments carried out for this WMP and by the data for different water management areas (Figure 6).

[24] The EU Nitrate Directive, January 2010, European Commission Publications Office, http://ec.europa.eu/environment/water/water-nitrates/index_en.html

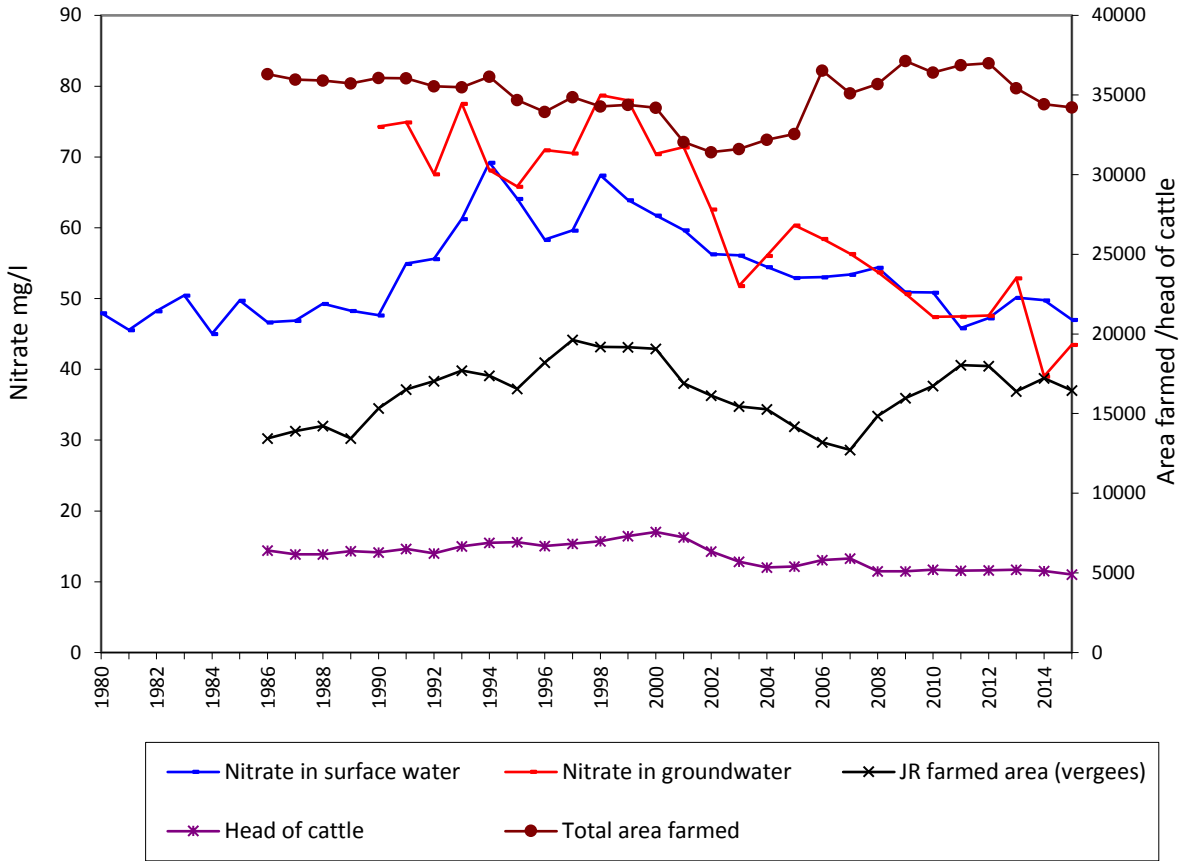



**Figure 6: Average nitrate (mg/l) in surface streams and groundwater in Jersey compared to area of Jersey Royals planted (vergées) and number of cattle, 1980–2015. In 2015 the average level of nitrates in surface streams was 47 mg/l, the same level as recorded in 2014.**

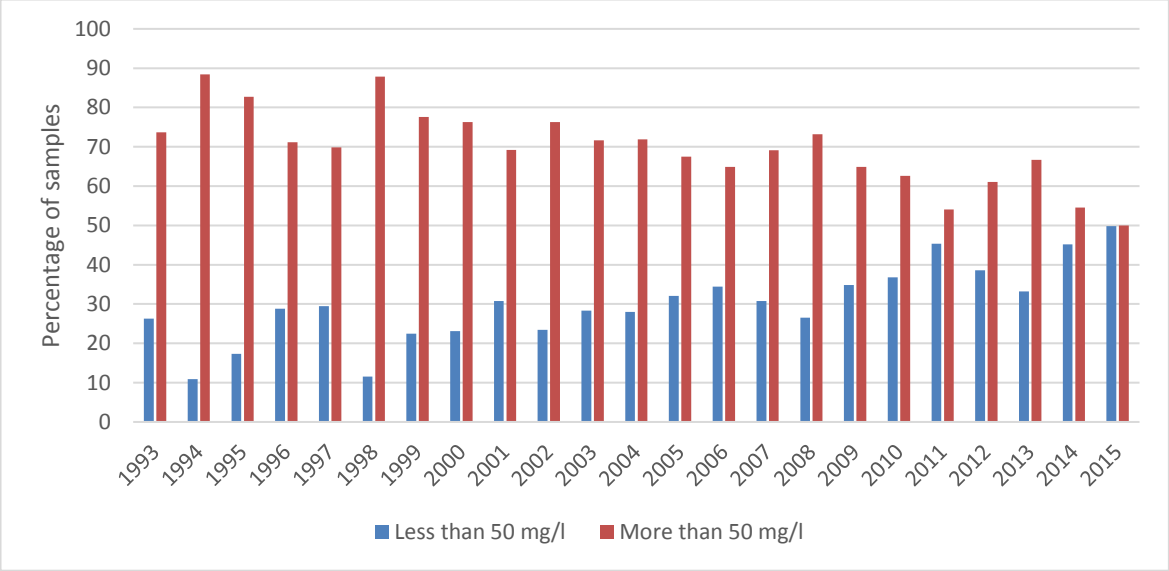



**Figure 7: Percentage of surface stream samples below and above 50 mg/l (Jersey Water data). The graph shows that the proportion of samples at less than 50 mg/l has increased, whilst the proportion above 50 mg/l has reduced. In 2015, half of all samples exceeded the limit of 50 mg/l.**

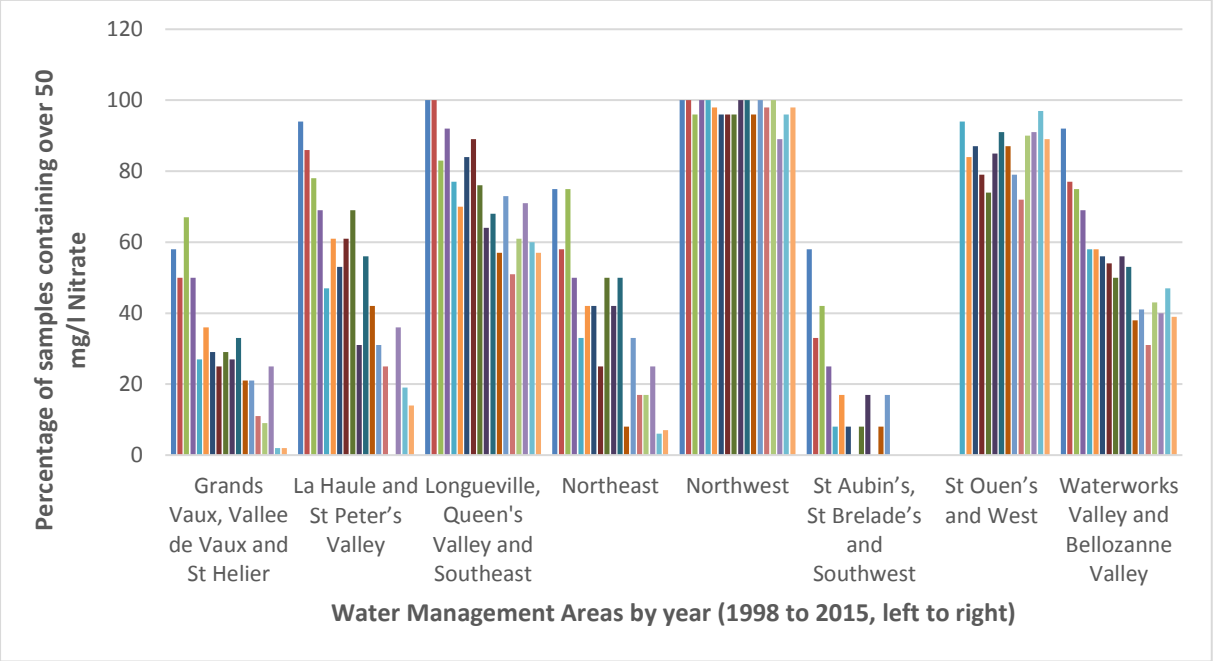



**Figure 8: Percentage of surface stream samples taken that are over 50 mg/l nitrate by Water Management Area (1998 to 2015, from left to right). It can be clearly seen that the reducing trend is not apparent in the 'North West' or 'St. Ouen's and the West' catchments.**

#### 4.3.1.1 Nitrate impacts on Public Water Supply

At certain times of the year the level of nitrate in our streams and groundwater is so high that Jersey Water cannot guarantee to meet the local and international standard of 50 mg/l of nitrate in the mains drinking water supply. Consequently, the Company takes active measures to control the concentrations of nitrate in supply by careful blending and dilution of its water resources. The Company applies for a dispensation from the Minister for the Environment for those occasions when nitrate levels in water resources exceed manageable concentrations.

During the consultation on the 2009 dispensation, the Health and Social Services Department agreed to the dispensation, but advised that they would not continue to support it unless steps were taken to tackle catchment inputs of nitrogen, which are the source of the problem. As a result, the Environment Department started working with farmers under the Diffuse Pollution Project to see what could be achieved using voluntary means.

The Health and Social Services Department then agreed to a dispensation for 3 more years from 2013 on the condition that the maximum level in supply under the derogation was tightened and the time window that these exceedances could take place were reduced to 6 months of the year. The current dispensation ceases on 31st December 2016 and the terms of a new dispensation have just been agreed to run over the same time-period as this plan.

As part of the Nitrate Working Group work in 2014 and 2015 the Public Health directorate (States of Jersey) reviewed the health effects of nitrates in water following concerns raised about high levels of nitrates in the Jersey water supply. Their report recommended that work continues to examine all possible interventions to ensure that nitrate levels in Jersey water are within WHO guidelines. It also stated that the Public Health Department should continue to research cancer data, particularly around those cancers that have been linked to elevated

nitrate levels in drinking water, and revise advice given to consumers with a private water supply, which has been done.

Jersey Water carries out tests on about 7,000 samples throughout the year from water sources, treatment works, storage reservoirs and customers' taps. In 2014, the treated water supplied was 99.99% compliant with all physical, chemical and bacteriological standards under the Water (Jersey) Law 1972, and the dispensation for nitrate was not used in 2014 or in 2015. Figure 9 shows the maximum level in supply from 2001 to 2015.

Currently, Jersey Water uses its reservoirs and raw water transfer network to dilute and blend water sources to try to meet the limits. To achieve this on a more consistent basis in the future, Jersey Water are currently planning a scheme involving the installation of bypasses to Val De La Mare and Queen's Valley Reservoirs, which will help prevent high nitrate or otherwise polluted water from entering the reservoirs. However, blending and diverting high-nitrate sources around reservoirs during certain times of year are not in themselves always sufficient to ensure the 50 mg/l is achieved. In addition, this blending and diverting strategy can only be employed if there is sufficient storage to serve the water needs of the Island. The option of using the desalination plant is available; however, this is expensive in the long term, and as such these measures taken should not be viewed as the only solution in the long term. Furthermore, this technique does not address water quality concerns for those on private water supplies, or those relating to wider eco-system health.

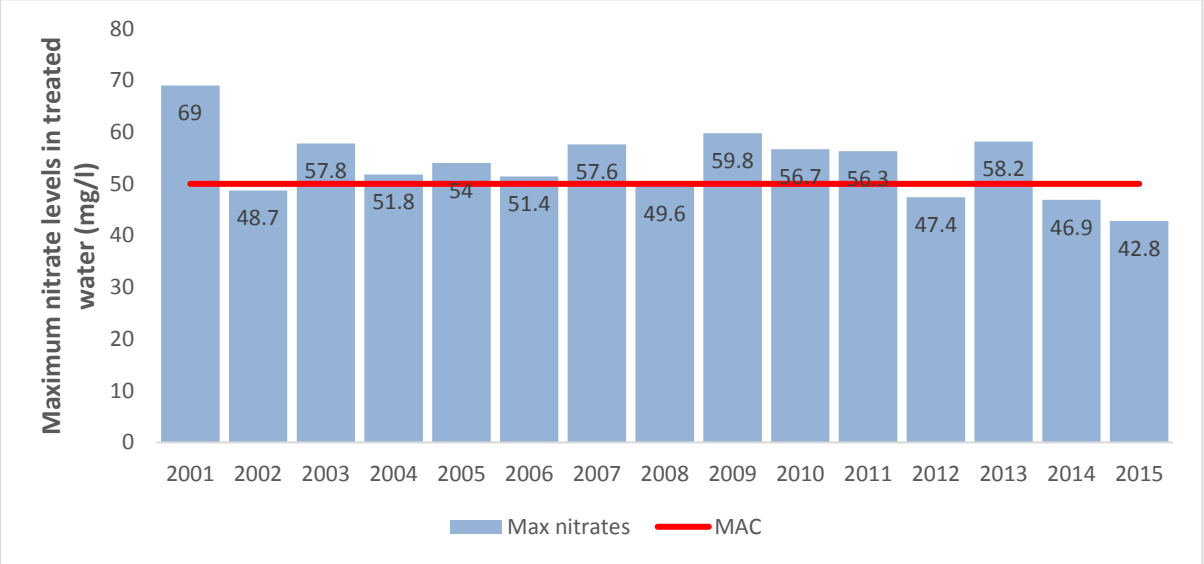



**Figure 9: Maximum nitrate levels in mains water supply 2001–2015 against Maximum Allowable Concentration (MAC)**

Treatment to remove nitrate from the supply is an option. Nitrate removal, for example by ion exchange, is possible but is not a desirable option for the following reasons:

- It would be extremely costly (in excess of £3M capital cost plus operating costs).
- Depending on the method chosen it may result in a loss of 10% to 15% of the total applied flow, which would affect water availability significantly.
- It would not mitigate other pollutants like pesticide and phosphate.
- It would not address eco-system damage caused by pollution.
- It wouldn't address the private water supply issue (approx. 3,400 private households in Jersey).
- It does not mitigate the costs for other downstream users and recipients, such as St. Aubin's Bay.

Lastly, the waste-stream itself would have a very high nitrate concentration of around 3,200 mg/l and contain chloride at near sea-level equivalents (38,000 mg/l) and there would be a major issue of disposal or discharge of this effluent that would need to be overcome.

#### 4.3.1.2 Nitrate impact on Private Water supplies

As part of the work carried out for the Nitrate Working Group in 2014 and 2015, the available records for water submitted to the States of Jersey Official Analyst Department were retrieved and analysed. A total of 468 water tests of borehole and well water between 2008 and 2014 by the Official States Analyst's Department were analysed on samples that were submitted by householders. The combination of data for all years (2008–2014) shows that just under half (48%) of the samples from households on boreholes and wells had a water supply that was in excess of the EU Drinking Water and Island limit for nitrate (50 mg/l). Taking the years with large data sets (2012–2014), little variation is shown in nitrate levels between years. Some 10% of samples were above 100 mg/l.

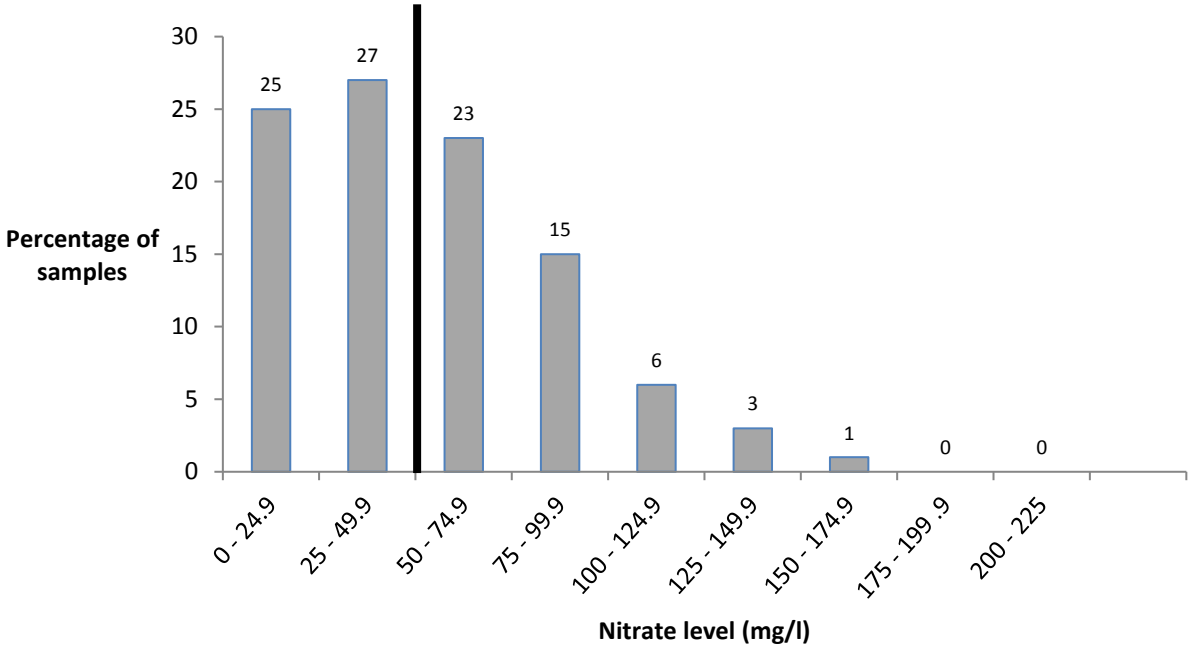



**Figure 10: The distribution (% of samples) of nitrate levels in Island boreholes and wells, 2008–2014 combined, sample number = 468**

Samples are from householders who are concerned about nitrate and therefore may bring in samples that are more likely to be prone to nitrate pollution. However, this finding is consistent with the pattern of analysis of other groundwater sources.

#### 4.3.1.3 Environmental Impacts of high nitrate levels

As well as having unwanted impacts on drinking water quality, excess nutrients in natural environmental waters have other consequences. These include growth of algal or bacterial populations leading to unsightly blooms, de-oxygenation of the water and harm to fish and other animals. The socio-economic costs of diffuse pollution are often borne 'downstream' by a range of sectors including water supply (public and private water supply issues and sewage treatment), recreational water use (including tourism), and fisheries and shellfish production.

Elevated nitrate inputs to the marine environment are a particular problem, as often this nutrient triggers the growth of algae. Indeed the current 'moderate' interim status of St. Aubin's Bay is driven entirely by the seaweed component of the classification assessment – more specifically the opportunistic seaweed. That excess seaweed drives down the classification status of the Bay will not come as a surprise to most people – the 'Ulva' or 'sea lettuce' we see on the beach at St. Aubin in the summer months is the opportunistic seaweed referred to here (Figure 11). However, it is positive to note that, based on current evidence, it is the seaweed that is the only classification not achieving good status – all other elements are at good status or higher. This suggests that the sea lettuce issue is not impacting on other aspects of the classification but is nonetheless an issue that affects the aesthetics of the coastline and the way in which we use the beaches and near shore areas.

**Figure 11: Seaweed growth in St. Aubin's Bay**

### 4.3.2 Phosphate

**In the fresh water environment it is elevated levels of phosphate rather than nitrate that tends to trigger impacts on the aquatic ecology. Elevated phosphate levels in streams, ponds and reservoirs can promote the development of algal blooms that can then cause oxygen levels to drop; this can harm, or even kill, aquatic life.** These algal blooms not only affect the ecology of the water body, but can also affect water supplies from reservoirs as algae can affect the taste of water, disrupt treatment processes and in some cases be harmful to people and animals. As a consequence, tight phosphate standards are a key part of the status assessment for freshwater under the Water Framework Directive.

**Figure 12: Algae growth in streams**

### 4.3.3 Pesticides

**Pesticide contamination of water sources is of key concern on the Island. Pesticides applied to land can easily make their way into surface waters either directly (through point source incidents such as spillages, incorrect disposal and misapplication) or by indirect means (so-called 'diffuse' sources such as misapplication and drift). Pesticides can also seep through the soil and contaminate groundwater.**

Even a small amount of pesticide in a water source can render water supplies unfit for human consumption – the standard drinking water limit is 0.1 ug/l (1 microgram (ug) equals a millionth of a gram), which is the maximum allowable concentration of any given pesticide in drinking water supplies. This is a tiny amount and very hard to envisage, but here are some equivalents: 1 second in 320 years, 1p in £100 million, a grain of wheat in 390 tonnes[25].

Pesticide contamination of water is a particularly serious concern for an Island so heavily reliant on surface waters for public supply and on groundwater for private water supply in areas where there is no mains supply. Jersey Water reports (as 'breaches') to the Department of the Environment when the samples that they take of raw water (stream water) show levels that are greater than the drinking water standard (Figure 13). This does not get into the public water supply as the samples act as an early warning system, and when necessary water is blended (and hence diluted) before treatment and distribution.

However, it is not unusual for levels of pesticides exceeding drinking water limits to be reported in stream water. Jersey Water cannot abstract water from a stream for as long as the contamination continues. On a number of occasions, levels of pesticide contamination have been so great in incoming waters that the levels of pesticide in the receiving reservoir have led to that entire reservoir being temporarily taken out of service[26]. In 2016, routine tests picked up Oxadixyl, a pesticide that hadn't been used since 2003, in surface and groundwater in many parts of Jersey. Although levels of Oxadixyl were below advisory World Health Organisation health limits, Jersey Water now needs to further blend sources in respect of Oxadixyl as well as nitrate to make sure levels in treated water remain under the regulatory limit. This latest issue has underlined that the pesticide issue needs urgent attention.

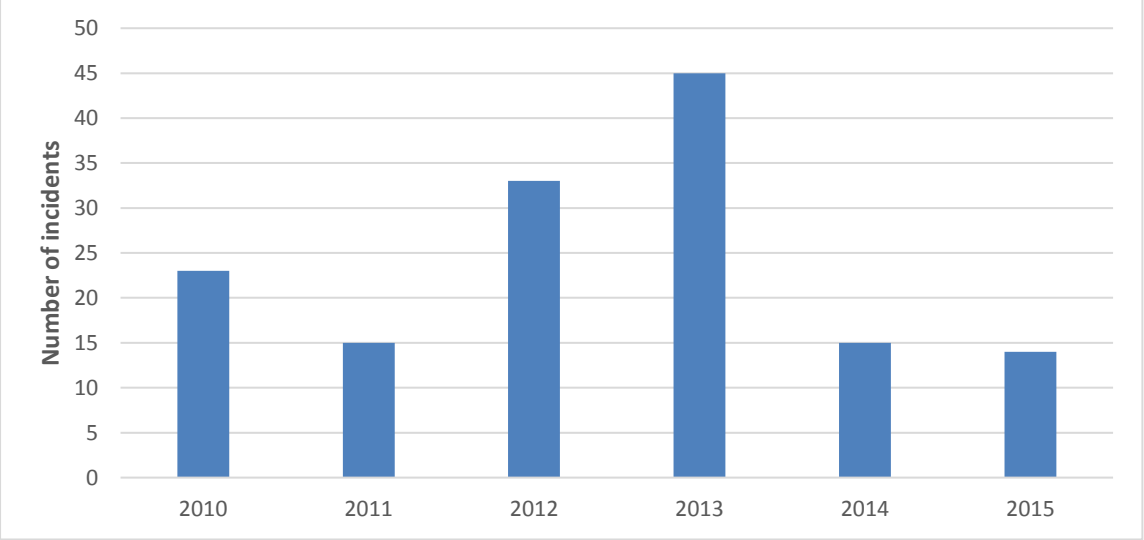



**Figure 13: Number of incidents of pesticide detected (>0.1 ug/l) in stream water tested by Jersey Water Island-wide by year**

[25] The Voluntary Initiative – www.voluntaryinitiative.org.uk, accessed 15 October 2014
[26] E.g. Queens Valley, 2, 4 – D, 2011011, Grands Vaux reservoir, Cyanazine, 2005011, Val de la Mare 2016.

Pesticides in water can also cause adverse effects on plants and wildlife. They can be directly toxic to organisms and cause changes to habitats and the food chain[27].

The ecological impacts of pesticides in water are determined by toxicity, persistence, breakdown products and environmental fate and behaviour. Pesticides can have a major effect on biological diversity, alongside habitat loss and climate change[28].

## 4.4 Priorities for 2017-2021

Recognising the limited resource that is available to implement the WMP, it is proposed that the first cycle should focus on the priority issues. In summary, the key issues identified for the first 5-year plan are:

- **Nitrate:** We must reduce the nitrate concentrations in our groundwater and surface water;
- **Phosphate**: We need to increase our understanding of the scale of the likely phosphate issue on the Island in our inland waters and encourage or require further good practice measures to reduce soil P indices and the concomitant losses to freshwater; and
- **Pesticides**: We must work to understand better the levels of pesticides in surface and groundwater throughout the Island. We must also strengthen the mechanisms we have to regulate, control and monitor pesticide use. We will also carry out a screening for priority and priority hazardous substances.

### 4.4.1 Monitoring

As previously mentioned, monitoring and good quality data are the basis of evidence-based water quality management and regulation. Therefore another area that needs focus throughout this first planning cycle is to use the work undertaken to date to rationalise and refocus our environmental monitoring programme so that the monitoring programme is in line with the WMP requirements. One area where we are currently rationalising and focusing our environmental monitoring efforts is with our chemical monitoring, for which we have undertaken a risk-based screening exercise[29]. Monitoring has focused on priority hazardous substances, priority substances, specific pollutants and chemical investigation programme chemicals that are pesticides or metals rather than industrial chemicals. We are still monitoring for some banned pesticides that are known to have left a legacy (e.g. Simazine was detected in September 2015 and Oxadixyl in 2016). We have also rationalised our ecological monitoring programme to focus on filling the gaps in our monitoring records so we can gain a more complete picture of the water bodies across the Island.

By working with others we are also making sure that we are not unnecessarily duplicating samples or monitoring undertaken by others, for example Jersey Water and the Natural Environment Team.

The WMP priorities set out above have a strong focus on the protection of drinking waters on the Island and are thus considered top priority. However, these issues are also relevant to environmental water quality and in combination with other pressures can affect the overall ecological health of Jersey's waters.

[27] http://www.pan-uk.org/pestnews/Issue/pn88/PN88_p4-7.pdf
[28] http://www.nature.com/news/pesticides-spark-broad-biodiversity-loss-1.13214, accessed 4 October 2015
[29] in consultation with Jersey Water and alongside WHO-related advice from an independent consultant.

# 5. Objectives

We should aim to improve the quality of our water bodies where they are currently below good status and to also ensure that water bodies are protected from anything that would cause deterioration[30] in their status.

However, this needs to be done proportionally. The Island is reliant on the water environment for the provision of a wide range of essential services: we need to be able to use the water environment for economic and social purposes. It therefore isn't always technically feasible or economically justified to simply cease (or reverse) activities that may be having an impact. Issues of cost benefit, disproportionate costs and technical feasibility all have to be taken into account when deciding on the steps to be taken to address the issues identified. There are invariably issues that limit the practicalities of achieving overall good status in all water bodies – for example, we would not look to remove all culverts or sea defences to naturalise the streams and coastal areas. Equally, it would not be possible to remove the impacts on flow and morphology of the reservoirs that are crucial to the Island's water supply. However, we can aim to achieve good status with respect to water quality and prevent deterioration in status.

## 5.1 Objectives for Jersey

Analysis of the first river basin plans in Europe shows that countries vary significantly in terms of what improvements they are aiming to achieve and by when. This 'level of ambition' depends largely on the starting point, as measured by the proportion of water bodies at less than good status (European Commission, 2012).

So how does Jersey compare to other countries across Europe in terms of the starting point? The European Environment Agency (2012) found a strong relationship between the population density[31], the percentage of arable land and the number of water bodies being reported as less than good status. Population density and proportion of arable land are the 2 major drivers affecting the ecological status of European rivers, and so it comes as no surprise that Jersey has a high proportion of waters at less than good status.

**The majority of water bodies in Jersey at the moment are of moderate status. We believe that in the longer term, we should be aiming at 'good status' when it comes to water quality. The Island has some large challenges in terms of population density, intensive land use and the level of modification of many of our water bodies. We need to balance growing the economy, protecting and enhancing the environment and keeping Jersey as a great place to live and work in 2017 and beyond.**

**We do not believe that we should be content with 'moderate' status, despite the improvements in water quality that have been achieved over the last 10–15 years, and with our continued inability to meet drinking water standards for nitrate and with the number of pesticide breaches in raw waters.**

[30] 'deterioration' is considered to occur as soon as the status of at least one of the quality elements falls by one class, even if that fall does not result in a fall in classification of the body of surface water as a whole.
[31] Jersey has a population density of over 831 people/km$^2$, approximately double that of England.

Other countries have applied varying levels of 'exemptions' to achieving good status on the grounds of technical feasibility or disproportionate cost. However these exemptions do not apply to water bodies designated for the protection of drinking waters, and the whole Island would be designated as such due to the reliance on the streams, reservoirs and groundwaters for provision of drinking water.

We believe that in Jersey the key pressures currently identified as priorities (pesticides, nitrates and phosphates) must continue to be addressed and that we should continue to strive for improvement. We also need to ensure that we don't allow any water bodies to deteriorate in status.

**In recognition that the issues are longstanding and difficult to resolve, and that resources are currently scarce, we are proposing to set and stagger our objectives in the categories of short-term, medium-term and long-term. Short-term objectives relate to measures that can be implemented immediately. Medium-term objectives relate to this planning cycle – i.e. by the end of 2021 (5-year horizon). Long-term objectives extend beyond the current planning cycle into subsequent planning cycles (i.e. 5 to 10-year horizon).**

The objectives (and the related Key Performance Indicator (KPI); see section 0) are as follows.

### 5.1.1 Short term objectives (2017-2018)

Over the short term, through the period of 2017 to 2018 the objectives are to:

- Promote an Island-wide ethic of sustainable land use on Jersey such that the effects of land-based activities on the water environment are well known, accepted, regulated and mitigated where at all possible (as measured by KPI 1).
- Communicate the WMP amongst the sectors responsible for, and involved with, delivery of measures (as measured by KPI 1).
- Update and implement the policy mechanisms necessary for effective delivery of the chosen measures: specifically the Water Pollution Law, the Pesticide Law and their associated codes of practice.
- Rationalise the ongoing environmental monitoring programme (already underway) to incorporate targeted phosphates and pesticide monitoring (as measured by KPI 8).
- Develop additional funding mechanisms required to implement the plan.

### 5.1.2 Medium term objectives (2017–2021)

In the medium term, throughout the WMP (2017 to 2021), the objectives are to:

- Reduce the levels of nitrate found in surface waters and groundwaters (maximum and mean levels) (as measured by KPI 5).
- Remove the need for the nitrate dispensation (as measured by KPI 6).
- Reduce the number of pesticide breaches in streams (as measured by KPI 7).
- Increase compliance monitoring for the measures identified in the Plan across the land based sectors in respect of losses of nutrients and pesticides to water (% compliance with Water Catchment Management Orders (WCMOs)) (as measured by KPI 3).
- Increase frequency and coverage of existing environmental monitoring for pesticides and phosphorus such that a higher number of Jersey's water bodies can undergo classification in 2020 ready for the next round of the WMP (as measured by KPI 8).
- Develop additional compliance and advisory capabilities and capacity to ensure adherence to new regulations and to provide internal advice to DoE.

### 5.1.3 Long-term objectives (beyond 2021 to 2035)

In the longer term (beyond 2021 in blocks of 5 years) the objectives are to:

- Achieve a nitrate level of below 50 mg/l in all drinking water sources (streams and groundwater).
- Achieve good status for pesticides in all groundwaters which are relied on for drinking water supply.
- Achieve good status for phosphates in streams and ponds.
- Have an established and effective monitoring programme in place which allows for progressive and iterative classification of Jersey's water bodies in each cycle of the WMP, including coastal waters.
- Continue to employ WMP processes to identify and address current and emerging issues to ensure a sustainable future for Island's water environment.

Once the objectives are set, we need to look at how best to achieve them.

# 6. A tool kit for the challenges ahead

## 6.1 Measures identification and selection

In order to select a list of actions (measures) to meet our objectives, an assessment process was necessary. A wide range of measures and mechanisms that are known to help address the priority issues we face on the Island – nitrates, pesticides and phosphates – have been considered carefully during this process[32].

The starting point of this phase was to review what measures are already in place in Jersey. A brief synopsis of 'who does what' and the main laws or policies in place can be found in "Challenges for the Water Environment, 2014" and so will not be repeated here.

The measures reviewed included the work that has already been done over the past 5-10 years through the Rural Economy Strategy, including the Farming Advisory Service, subsidy Cross Compliance and the Diffuse Pollution Project. The effectiveness and shortcomings of these measures was reviewed. A wider historic literature review of past work in Jersey was also included to inform the measures identification process, including the recommendations made in a previous Nitrate and Pesticide Joint Working Party Report[33] and the findings of research carried out since the 1980s in Jersey into land management practices, and how they relate to point and diffuse pollution of water.

We have also listened to different groups within the Department of the Environment, to specialists from the UK, and to stakeholders, in arriving at the measures proposed here. Through a States of Jersey workshop held in December 2014, a range of specialists were brought together from different disciplines and policy areas to identify the spectrum of measures that could be used to respond to the key challenges identified on Jersey and to assist with the integrated approach.

Ideas have also been taken forward from feedback from the Diffuse Pollution Project and the Nitrate Working Group. The Nitrate Working Group met approximately every 6 weeks between mid-2014 and 2015. The group had an independent chairman and was composed of representatives from various departments of the States of Jersey, Jersey Water and the farming community and was tasked by the Minister for the Environment to make recommendations to address the nitrate issue in Jersey's waters.

We also looked at good practice examples of measures to tackle diffuse pollution from nutrients and pesticides from other countries.

The above process produced a list of over 150 individual measures[34] which were a combination of existing measures appropriate to the Jersey landscape and land uses and experience from other countries and situations. The mechanisms for delivery were also discussed and listed for consideration.

[32] The measures were considered using the source-pathway-receptor model where source control is the preferred option in the first instance.

[33] Nitrate and Pesticide Joint Working Party Report, States of Jersey, undated but known to be the mid- to late-1990s.

[34] The long list of measures was compiled from existing plans and policies on Jersey, including literature reviews of past work, and supplemented with expert judgement from DoE. Furthermore, other measures were included from the England and Wales examples of WFD, particularly measures around diffuse water pollution, e.g. NVZ measures and Defra Mitigation Methods User Guide measures.

## 6.2 Treatment – or solving the problem at source?

How best do we respond to the challenges in an integrated and sustainable way? Different approaches to solving the problem may be illustrated using the contamination of raw water sources with pesticide.

The first approach is to protect the receptor, in this case the human being at the end of the supply pipeline. Using this approach, the problem would be addressed by installing treatment at, or just before, the point of human consumption (the household or treatment works, known as 'end of pipe' treatment). The second approach is to limit or prevent the pollutant getting into the water in the first place through source control – in this case introducing catchment[35] management measures to reduce inputs or losses of pesticides into the whole system and thereby reducing levels of these contaminants in the underlying resource.

According to the National Audit Office, between 2004–05 and 2008–09, water companies in England spent some £189 million on 'end of pipe' treatment to remove nitrates and £92 million removing pesticides from their water supplies[36]. However, in recent years catchment management has become widely accepted as a much more sustainable and long-term solution to the problem that can minimise the need for treatment. Ofwat[37] has supported water companies' proposals to invest £60 million on more than 100 catchment management schemes and investigations over the 5-year period from 2010 to 2015[38].

The actual cost-benefit ratio varies from site to site; Wessex Water in England have calculated that on average when using land-based management measures, it is now solving water quality problems for approximately one-sixth the cost of the treatment alternative. Since the Wessex Water catchment management programme began in 2005, there have been no nitrate exceedances in treated water at any of their 'at risk' catchments. In addition, they no longer require additional treatment for pesticides and metaldehyde removal at one groundwater site and 2 surface reservoirs.

Since 2013, Defra[39] has also adopted 'a catchment-based approach' as national policy in England, to be delivered through local partnerships in each catchment.

Scotland is widely recognised as having one of the leading approaches in Europe for dealing with rural diffuse pollution. They have combined a catchment approach using site visits and advice, underpinned by regulation, targeted at the control of land management activities liable to cause pollution. This has been augmented by a 'sustainable land management incentive scheme' led by Scottish Water, which included catchment visits, advice and an incentive scheme to encourage land-users to take up measures that contribute to the improvement and protection of water sources in the catchment, over and above the expected regulatory compliance.

A key additional difference in approaches is that integrated management measures are much more likely to also deliver other eco-system service benefits. Addressing the underlying

[35] Catchment – a geographic area defined naturally by hydrology
[36] https://www.nao.org.uk/wp-content/uploads/2010/07/1011188.pdf
[37] The Water Services Regulation Authority, or Ofwat, is the body responsible for economic regulation of the privatised water and sewerage industry in England and Wales.
[38] There was a planned £60M investment by Water Companies in the UK over 2010–2015 that Ofwat supported under PR09; this is expected to rise in the next periodic review period (PR14).
[39] The Department for Environment, Food and Rural Affairs (Defra) is the government department responsible for environmental protection, food production and standards, agriculture, fisheries and rural communities in the United Kingdom of Great Britain and Northern Ireland.

problem at source has a cascade effect of multiple benefits in terms of eco-system health, downstream damage costs avoided and benefits to other users.

We therefore advocate taking a catchment management approach in Jersey in order to solve the underlying problem.

### 6.2.1 Measures selection

Initially we put together a long list of measures, each of which we then qualitatively scored as high, medium and low, for a range of factors, including:

- Measure applicability in the local context
- Effectiveness of the measure on an individual basis (i.e. measure effectiveness) at reducing nitrate, phosphate or pesticides, as informed by Defra, 2011.
- Likely cost of implementing the measure
- Proportionality of the measure
- Business continuity (for delivery)
- Whether it prioritises source control and can be implemented across the whole Island
- Whether an existing mechanism could deliver the measure and if not what it would require
- The polluter pays principle
- The user pays principle
- Consideration of multiple gains and wider eco-system benefits
- Whether it fulfils the need to address the key uncertainties in our understanding of the status of the water environment.

In this way, we condensed the long list into a shortlist containing the measures that we felt would be most useful to form the basis of the WMP (Table 3 that follows) and that warranted further consideration of how they could be implemented (Figure 14).

A full methodology is contained within a separate report (States of Jersey, 2016).

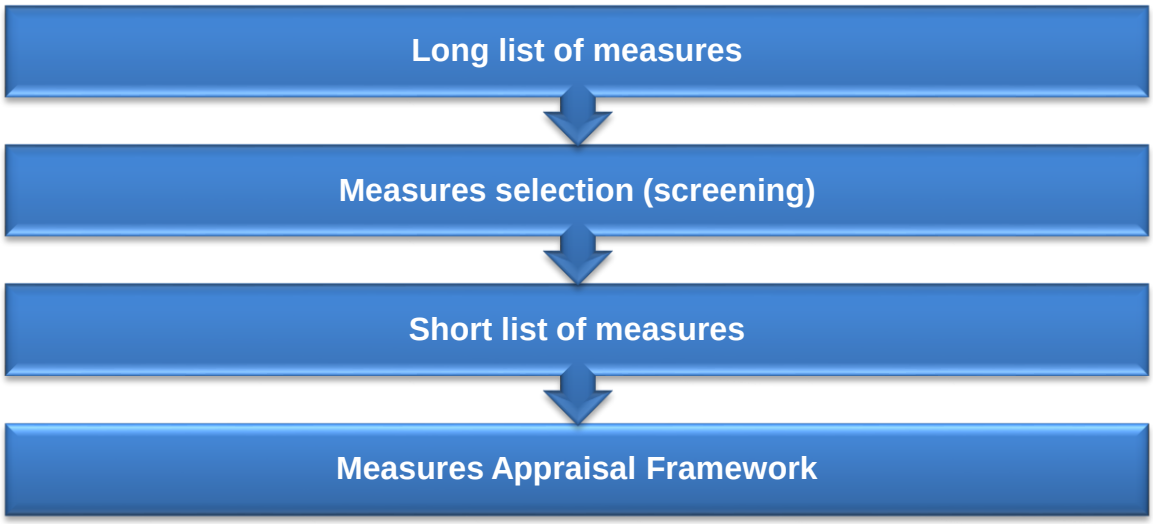



**Figure 14: Measures selection and appraisal process**

### 6.2.2 Measures appraisal framework

The primary purpose of the 'measures appraisal framework' was to examine the ways in which we could implement the selected measures. This was undertaken by bundling measures together for delivery through a number of scenarios.

The different scenarios vary primarily on the basis of different policy environments driving delivery mechanisms to implement the measures ('what-ifs'). The mechanism available to deliver the measure dictates how widely each measure would be implemented and who it would affect. We could then consider effectiveness, as variation in uptake of measures under each scenario ultimately dictated how effective the overall WMP would likely be in reducing the priority pollutants in Jersey.

### 6.2.3 Costs

Indicative implementation costs were included in this appraisal to facilitate the decision-making process[40]. The evaluation takes the form of a high level cost-effectiveness analysis, a technique which seeks to identify the least cost option for meeting a particular objective and facilitate prioritisation between options.

Initially an attempt was made to cost each of the measures in the shortlist using existing information from English and Welsh examples (Defra, 2011). Where possible this was then altered to reflect Jersey-specific costs, practices and environment. The localised costing assumptions were built up by States of Jersey specialists who were best placed to contribute to the estimates of the potential financial costs of different measures.

The qualitative cost-effectiveness assessment gives an indication of what the costs and effectiveness of combinations of measures are, but it is not the sole consideration. Our focus has been on how to best target the limited resources available to achieve the biggest benefit to the most important issues. In addition, we have also considered the wider benefits that the options are likely to deliver. This has taken the form of an eco-system services assessment in line with the approach recently applied for the second cycle river basin plans in the UK (Environment Agency (2014a)) and following the principles set out in the Millennium Ecosystem Assessment framework (2005).

### 6.2.4 Water Catchment Management Areas and Orders

Three of the forecasted scenarios include reference to Water Catchment Management Orders (WCMOs) to ensure widespread implementation of a core set of measures that have been selected to help achieve the objectives.

We believe that a mixture of regulation, advice and incentives are the best tools to address diffuse pollution. We propose that it is now time to implement additional regulatory provisions under the Water Pollution (Jersey) Law 2000 to augment our current approach, particularly with uncertainty about the future of subsidy (cross compliance conditions) to incentivise the agricultural sector in respect of 'Good Practice'.

[40] In situations where it is necessary to decide whether or not to take action, or how far to go, then economic analysis commonly takes the form of a cost-benefit analysis in which costs and benefits are converted into money values for comparison. However, in our case, action is imperative to address the priority issues, in particular nitrates and pesticides, so we have not carried out a monetised cost-benefit assessment.

We propose to designate the whole Island as a Water Catchment Management Area (WCMA) under the Water Pollution (Jersey) Law 2000, which will support the States of Jersey's adoption of the objectives set out in this Plan.

Thereafter, WCMOs can be passed by the Minister for the Environment, which would allow for cornerstone elements of good practice to become legislative requirements across all sectors for anyone carrying out certain activities. This creates a level playing-field for land managers to operate. However, the mechanism chosen will still enable us to target compliance effort where there are specific pollution hotspots or where environmental sensitivity is greatest in some catchments.

Under Scenario 3, action would be enhanced by the addition of even more targeted measures either across Jersey or just in certain areas, but using the same WCMA mechanism. This would enable further, more specialised actions or restrictions to become mandatory (for example arable reversion to grassland), but it would also be much more costly.

### 6.3 What scenarios have we appraised?

We have appraised 5 scenarios or options, which have been selected on the basis of the mechanisms available, or likely to be available at the time of writing. We have also included scope to make progress in the first 5 years (WMP1) whilst laying the foundations for longer term action in WMP2 and beyond. The way it has been done and set out allows the possibility of a phased approach in moving from Scenario 2b to 3 at a later date, given the limited resources available with which to implement measures in the WMP.

At the time of drafting it has been difficult to forecast the manpower or the budget that is likely to be available in the future, and to predict whether some of the delivery mechanisms are likely to be maintained. There has been (and continues to be) considerable uncertainty due to Government reform and potential savings in Government spending being required. The issue is further complicated by the water portfolio, as it related to rural diffuse pollution being delivered thematically: some of the current major delivery mechanisms are externally controlled, such as the Single Area Payment (SAP) (currently administered by the Economic Development Department (EDD)).

**These are the 5 scenarios or options that have been appraised:**

- **Scenario 0: Do nothing. Rural payments are removed and we do not introduce any further mechanisms.**
- **Scenario 1: Business as usual, no change.**
- **Scenario 2a: Rural payments[41] are no longer in place but Water Catchment Management Orders (WCMOs) are introduced.**
- **Scenario 2b: Rural payments continue[42] and Water Catchment Management Orders (WCMOs) are introduced.**

[41] The Single Area Payment at the time of writing, but this will be delivered differently under the new Rural Economy Strategy.

[42] The Single Area Payment at the time of writing, but this will be delivered differently under the new Rural Economy Strategy.

- **Scenario 3: Existing rural payments continue[43], Water Catchment Management Orders (WCMOs) are introduced plus there is the introduction of more targeted measures including the requirement for arable reversion in specific problem areas and the introduction of a capital grant fund.**

The scenarios reflect an incremental increase in effectiveness and costs, through a progressive increase in regulatory emphasis backed up with advisory and compliance checking capacity (see Figure 15 below).

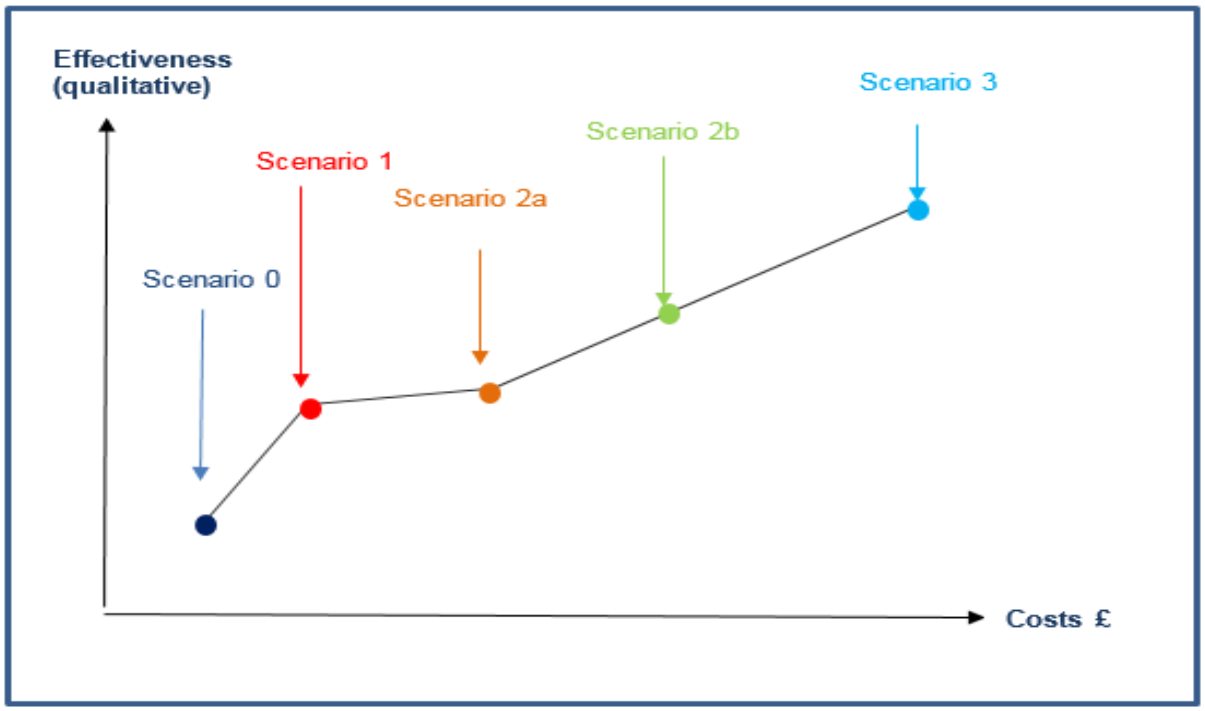



**Figure 15. Schematic showing the incremental increase in both effectiveness and costs of the 5 scenarios appraised (costs excluding the rural payment from EDD)[44].**

### 6.3.1 Measures within each scenario

The list of measures, and how they are included in different scenarios is set out in Table 3 below.

[43] The Single Area Payment at the time of writing, but this will be delivered differently under the new Rural Economy Strategy.
[44] These are direct delivery costs. The net costs to government resulting from Scenario 0 could be much higher.

**Table 3: Measures**

| | | Issue the measure addresses | | | | Relevant scenarios | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Purpose** | **Measure** | **Nitrates** | **Phosphorus** | **Pesticides** | **Monitoring** | **Scenario 1** | **Scenario 0** | **Scenario 2a** | **Scenario 2b** | **Scenario 3** |
| Best practice and/or precision agriculture | Provision of mapping tools | ✓ | ✓ | ✓ | | ✓ | | ✓ | ✓ | ✓ |
| | Calibration of fertiliser spreaders | ✓ | ✓ | | | ✓ | ✓ | ✓ | ✓ | ✓ |
| | Regular soil analysis to indicate appropriate fertiliser application | ✓ | ✓ | | | ✓ | ✓ | ✓ | ✓ | ✓ |
| | Soil analyses for nitrogen to indicate appropriate fertiliser application | ✓ | | | | ✓ | | ✓ | ✓ | ✓ |
| | Organic manure nitrogen limit | ✓ | | | | ✓ | | ✓ | ✓ | ✓ |
| | Nitrogen Max Limits for certain crops | ✓ | | | | | | ✓ | ✓ | ✓ |
| | Organic manure spreading equipment calibration | ✓ | ✓ | | | | | ✓ | ✓ | ✓ |
| | Field application of organic manures – avoiding high risk areas | ✓ | ✓ | | | ✓ | ✓ | ✓ | ✓ | ✓ |
| | Applying manufactured fertilisers – Closed periods for applying manufactured N fertilisers | ✓ | | | | ✓ | | ✓ | ✓ | ✓ |
| | Applying manufactured fertilisers – Non-spreading conditions and areas | ✓ | ✓ | ✓ | | | | ✓ | ✓ | ✓ |
| | Storing organic manures – increasing capacity and separating dirty water | ✓ | ✓ | | | | | | | ✓ |
| | Soil P index – No applying inorganic Phosphate to soils of > index 5 | | ✓ | | | | | ✓ | ✓ | ✓ |
| Better management and planning | Farm Manure and Waste Management Plan | ✓ | ✓ | | | ✓ | ✓ | ✓ | ✓ | ✓ |
| | Nutrient Management Plan | ✓ | ✓ | | | ✓ | ✓ | ✓ | ✓ | ✓ |
| | Pesticide application recording | | | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ |
| | Soil protection | ✓ | ✓ | ✓ | | ✓ | | ✓ | ✓ | ✓ |
| | Water pollution contingency plan | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ |
| | Manure and slurry spreading closed period | ✓ | ✓ | | | ✓ | | ✓ | ✓ | ✓ |
| | Storing organic manures – Rules for temporary storage of manure heaps in fields | ✓ | ✓ | | | | | ✓ | ✓ | ✓ |

| | | Issue the measure addresses | | | | Relevant scenarios | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Purpose | Measure | Nitrates | Phosphorus | Pesticides | Monitoring | Scenario 1 | Scenario 0 | Scenario 2a | Scenario 2b | Scenario 3 |
| Improving regulation and/or developing codes of practice | Ensure that Pesticide legislation (and Code of Practice) are fit for purpose | | | ✓ | | | | ✓ | ✓ | ✓ |
| | Update the Water Code | ✓ | ✓ | ✓ | | | | ✓ | ✓ | ✓ |
| | WCMA and WCMO drafting instructions | ✓ | ✓ | ✓ | | | | ✓ | ✓ | ✓ |
| | Charging for industrial discharge permits under the Water Pollution (Jersey) Law 2000 | | | | | | ✓ | ✓ | ✓ | ✓ |
| | Additional provisions for 'Water Catchment Management Areas' | ✓ | ✓ | ✓ | | | | | | ✓ |
| | Private drainage systems – new Code of Practice | ✓ | ✓ | | | ✓ | ✓ | ✓ | ✓ | ✓ |
| | Regulatory compliance checking of these measures | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ |
| | Storage and application of pesticides | | | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ |
| Information provision and exchange | One-to-one advice to sectors | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ |
| | Fertiliser Import Registration (N and P) – All inorganic fertiliser imports and sales need to be registered with SoJ (and reconciliation of purchase and use) | ✓ | ✓ | | ✓ | | | ✓ | ✓ | ✓ |
| | Using private borehole monitoring data from SoJ and land use/farm-type data, target specific hotspots | | | | ✓ | | | ✓ | ✓ | ✓ |
| | Additional water monitoring to fill identified gaps | | | | ✓ | | | ✓ | ✓ | ✓ |
| | Continue research into sea lettuce in St. Aubin's Bay and other marine monitoring to allow full classification | | | | ✓ | | | ✓ | ✓ | ✓ |
| | Continue with existing monitoring but rationalise and re-target | | | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| | Undertake a 'willingness to pay' survey to ascertain the value of the natural environment and safe drinking water on the Island. | | | | ✓ | | | ✓ | ✓ | ✓ |
| | Strategy for identifying risk, gathering data and controlling/ eradicating non-native species | | | | | | | ✓ | ✓ | ✓ |

| Purpose | Measure | Issue the measure addresses | | | Relevant scenarios | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Nitrates | Phosphorus | Pesticides | Monitoring | Scenario 1 | Scenario 0 | Scenario 2a | Scenario 2b | Scenario 3 |
| Targeted intervention (Subsidised capital, infield or stream bank items) | Slurry application – alternative technology | ✓ | ✓ | | | | | | | ✓ |
| | Arable reversion | ✓ | ✓ | ✓ | | | | | | ✓ |
| | Grass buffer strips/areas to intercept run-off | | ✓ | ✓ | | | | | | ✓ |
| | Re-direction of run-off: hedges, earth-banks and ditches | | ✓ | | | | | | | ✓ |
| | Fencing-off watercourse, provide alternative sources of drinking water for livestock and control stream crossings to prevent water pollution | ✓ | ✓ | | | | | | | ✓ |
| | Storing organic manures – increasing capacity and separating dirty water | ✓ | ✓ | | | | | | | ✓ |
| | Jersey Water reservoir bypass works | ✓ | ✓ | ✓ | | | ✓ | ✓ | ✓ | ✓ |

## 6.4 Assessing the effectiveness of the different scenarios

The qualitative[45] assessment of the effectiveness of each scenario in improving good ecological status across the Island's water bodies is summarised in Table 4 below.

**Table 4: Qualitative assessment of scenario effectiveness**

| | Qualitative effectiveness of scenarios | |
|---|---|---|
| **Scenario 0** | Very low | This scenario would involve doing less than what is currently done. The uptake of measures currently required under the Single Area Payment (SAP) and funding under the Countryside Enhancement Scheme (CES) decreases, as these mechanisms will no longer be in place. Other measures, such as additional monitoring of water quality by Government, are not implemented under this scenario. Levels of nutrients and pesticides in water bodies could increase as uptake of measures is less consistent than the current situation. This scenario is therefore considered to have a **very low effectiveness** in terms of achieving good ecological status across the Island. Furthermore, there could be a **risk of deterioration** of current status. |

[45] It is not possible at this stage to quantify the effectiveness of either individual measures or the scenarios in terms of, for example, the anticipated reduction in nitrogen and phosphate in water bodies. The effectiveness of measures is not well enough understood at the catchment scale; this is a widely accepted situation that is not unique to Jersey. There is also a high level of uncertainty associated with the level of improvement in water quality that can be attributed to individual measures.

| | Qualitative effectiveness of scenarios | |
|---|---|---|
| **Scenario 1** | Low | This scenario represents the current situation, or 'business as usual'. The previous phase of work has shown that the majority of water bodies on the Island are currently at moderate ecological status and increased intervention is needed to improve the situation in Jersey. This scenario is therefore considered to have a **low effectiveness** in terms of achieving good ecological status across the Island. |
| **Scenario 2a** | Medium | This scenario introduces the concept of WCMOs as a delivery mechanism, through which a range of measures would be required as part of the regulatory baseline. This scenario is therefore anticipated to result in a significant increase in the uptake of these measures. However, as this scenario also includes the removal of incentives under rural payments and schemes, the uptake of some measures that are not required under WCMOs is anticipated to decrease. Overall, the effectiveness of this scenario in achieving good ecological status across the Island is predicted to be **medium**. |
| **Scenario 2b** | Medium – high | This scenario is very similar to scenario 2a, except with the continuation of a rural payment and CES incentives that support implementation of best practice. The overall effectiveness of this scenario in achieving good ecological status across the Island is predicted to be **medium to high**. |
| **Scenario 3** | High | This scenario includes the designation of additional conditions under WCMOs in addition to those under Scenario 2a and 2b and also the provision of capital grants for other mitigation measures. It also includes the continuation of current rural payments and schemes. Uptake of best practice measures is therefore anticipated to be highest of all the scenarios. Overall effectiveness in terms of achieving good ecological status is therefore anticipated to be **high**. |

## 6.5 The relative costs of the scenarios to different sectors

Under each scenario, the uptake of each measure (as a percentage of the likely maximum uptake by target recipient groups or individuals) has been estimated. This is based on the likely change in uptake if a measure is for example made a regulatory requirement, or part-funded by Government, or is voluntary only. However, as uptake by more people or organisations increases, the total cost increases. This is how the indicative costs have been arrived at.

**Cost for each measure under each scenario =**
**Unit cost of the measure (per cost bearer or unit) x number of units x % uptake[46]**

[46] **Unit cost:** a measure has an estimated unit cost, either capital (one off) or operational (annual) or both. There is usually an upper and lower bound estimate, and for comparisons at the scenario level the average values have been used.
**Cost owner:** This is the cost bearer of the measure.
**Number of units:** An estimate of how many individuals or businesses or the areas of land that the measure will be targeted at. This may change between scenarios because for example being made part of the regulatory baseline may also extend the number of cost units (businesses, individuals, hectares or whatever unit has been used) the measure will affect; in the above example the measure moves from affecting current Single Area Payment claimants to all non-domestic land managers.
**% uptake:** If a measure is to become part of the regulatory baseline, the uptake factor for that measure will be higher compared with the uptake if the mechanism is a financial incentive with a more limited target audience, or if it is a voluntary measure. These uptakes have been assessed by interpreting the available information and data and making a professional estimate.

For example, for the Nutrient Management Plan measure:

| Unit cost: CAPITAL | Unit cost: ANNUAL | Cost source | Scenario 1 | Scenario 2a | Scenario 2b | Scenario 3 | Scenario 0 |
|---|---|---|---|---|---|---|---|
| £180 to £610 per plan | £520 to £740 per plan | ADAS (2011) NVZ Mitigation Measures Impact Assessment – Cost of preparations of NVZ plans plus estimated annual costs of record keeping | | | | | |
| **Cost owner** | | | All commercial farms | All non-domestic land managers | All non-domestic land managers | All non-domestic land managers | All commercial farms |
| **Number of units (to which % uptake is applied)** | | | 80 farms (SAP claims) | 100 land managers | 100 land managers | 100 land managers | 80 farms (SAP claims) |
| **% uptake** | | | 50% | 95% | 95% | 95% | 25% |

The costs for each sector have then been summarised at the scenario level. These summary estimates have been compared with each other in order to reflect the potential magnitude of change in costs between the scenarios. It is not considered a full and absolute cost assessment. A more detailed methodology is provided in a separate technical report (States of Jersey, 2016).

### 6.5.1 Sector groupings

For the purpose of this plan, the sectors whose activities can affect the water environment have been placed in one of 4 main groups, shown below in Table 5.

**Table 5: Overview of sector groupings used in this Plan**

| Sector | Description |
|---|---|
| **Water industry** | Jersey Water and Department for Infrastructure (DfI) (essentially 2 cost owners) |
| **Land managers and land-based industry (farmers, golf-course managers, etc.)** | Managers of land used for agriculture, amenity grassland (e.g. golf-courses), parks and playing-fields (multiple cost owners depending on the activity being targeted by any given measure) |
| **Government** | States of Jersey Department of Environment (one cost owner) |
| **Industry (non-land-based)** | Industry, manufacturing and other business (including chemicals), quarrying (multiple cost owners) |

### 6.5.2 Comparing the relative costs of the scenarios

As previously outlined, the costs for the measures under each scenario for the 5-year duration of the WMP have been estimated in order to provide an understanding of the approximate magnitude of change in cost between the scenarios and to which sectors the additional costs might fall[47].

The table provides an estimate of the change in costs of each scenario, relative to the current baseline (scenario 1) for each of the 4 principal sectors included in the analysis (water industry, Government, land managers and industry). It should be noted that the cost to Government of providing SAP payments is not included in the costs presented below. The reason for this is that SAP, although a very useful delivery mechanism, is not solely targeted towards water protection and is granted by the Economic Development Department (EDD). The SAP payment has therefore been excluded from the figures but at the time of writing was approximately £700,000 per annum (distributed between approximately 70 claimants).

**The table sets out the <u>additional</u> costs borne by different sectors as a result of adoption of scenario 2b, relative to the current position (scenario 1).**

The figures are the change in undiscounted implementation costs between the 2 scenarios, by sector over the 5 years of the WMP.

| | |
|---|---|
| **Water industry** | **Average cost over 5 years £1,188k** |
| **Government** | **Average cost over 5 years £494k** |
| **Land managers, including farmers** | **Average cost over 5 years £648k** |
| **Industry** | **Average cost over 5 years £188k** |

**Table 6: Additional costs borne by different sectors as a result of adoption of scenario 2b, relative to the current position (scenario 1) over the 5 years of the plan**

**Land managers and government will bear similar increase in costs. Government costs, at just under £100k per year come mainly from making sure the legislation and supporting codes of practice are fit-for-purpose and funding the increasing compliance burden, as well as increased water monitoring costs.**

**The additional costs for the Land Management sector of approximately £130k per year for the whole sector are associated with complying and demonstrating compliance with the new regulatory baseline of good practice.**

[47] The cost implications of the scenarios have been considered for comparison purposes and to facilitate planning for delivery; they were not the sole basis for selecting the preferred scenario for implementation. There is a degree of uncertainty associated with the cost assessment because there is limited information available on the overall cost of current measures on different sectors; this is why costs have been used for between-scenario comparisons only, and presented as such, rather than considering costs in terms of absolute values. As previously mentioned, there is also a degree of variability between uptake and target 'market' depending on the mechanism used, which precludes direct comparisons across all the scenarios and measures. However, the methodology still gives an indication of who will bear additional costs of improvements to the water environment.

However, some of the costs of the proposed new regulatory requirements were based on the assumption that everyone was implementing them from the start without anything at all already in place. This is not actually the case. In fact, the vast majority of this sector is claiming Single Area Payment, receipt of which is contingent on having many of these measures in place; and although we recognise that compliance is lower than it should be, the vast majority are partially compliant. The cost of having farm plans for example are currently offset by the SAP grant from government to a large proportion of this target group of approximately £700k per year for the provision of public goods and services, including water protection measures. For those that are not fully compliant already, it will cost those who are the least compliant the most additional cost to catch up with what will be the new regulatory baseline.

**The additional water industry costs (which groups Jersey Water and the Department for Infrastructure) are driven by the implementation of a reservoir bypass scheme by Jersey Water under scenarios 2a, 2b and 3 – this is a large cost item at a mean cost of £1M over the 5 years of the plan. The remaining cost to the Water Industry in Scenario 2b is the introduction of charging for discharge permits. Industry (other) will bear the least increase in cost and will pay the other proportion of the discharge permit charges of approximately £37k per annum.**

The potential negative costs in respect of inaction have not been considered here.

It is important to bear in mind that the scenarios are based on estimations of costs, percentage uptakes and numbers of cost units. Although these estimations are based on the best available data, there is still a degree of uncertainty associated with the numbers. The costs of different scenarios and the changes between the current situation (scenario 1) and the other scenarios should be considered as high-level estimates rather than fixed costs (or savings). In addition, the costs under scenario 1 do not include many of the other measures already undertaken across all sectors, as this would be beyond the scope of the analysis.

### 6.5.3 Is the cost of implementing the measures disproportionate?

Consideration has been given as to whether the costs of implementing this plan may be disproportionately costly. In the case of Jersey, the priority is to address the nitrate and pesticide issue and this is a statutory requirement – to meet drinking water standards. When addressing a statutory requirement, a disproportionate cost assessment based on a balance of costs and benefits is not applicable. Rather, as set out in Section 5.1, the aim is to identify the least cost option for meeting a particular objective, but also to assess whether such improvements adhere to the polluter pays principle, impose a fair burden on particular sectors, and are affordable. This is consistent with the principles of integrated water management planning elsewhere, under the Water Framework Directive, where the cost-benefit elements of a disproportionate cost assessment do not apply to water bodies afforded special protection (protected areas). In the case of Jersey, the entire Island comprises a Priority Protection Area for Drinking Water.

## 6.6 Uses and impacts – shared benefits and shared costs?

### 6.6.1 Wider benefits of scenarios

Eco-system services are the benefits people obtain from the environment. To examine how the wider benefits and dis-benefits differ between each scenario, an eco-system services assessment has been undertaken at a scenario level. This examines how the different scenarios differ in terms of their provision of and affect a range of eco-system services including climate regulation and adaptation (see Table 7 below).

This is a qualitative assessment[48] of how the benefits derived from the water environment (eco-system services) are likely to change compared to the baseline scenario (business as usual), and the approach is based on that applied in the recent draft river basin management plans (RBMPs) for England. The eco-system services assessed are those considered to be most relevant to Jersey and the impacts of the scenarios. The categories covered[49] within the assessment are based on the Millennium Eco-system Assessment framework (2005)[50].

### 6.6.1 Summary of wider benefits assessment

The assessment shows that scenarios 2b and 3 have the highest eco-system services benefits, whilst scenario 0 (do nothing) results in a number of negative impacts on eco-system service provision across all 4 categories of services (Table 7).

[48] This is based on the economic analysis undertaken by the Environment Agency as part of the draft update to River Basin Management Plans. Reference: Environment Agency (2014a). A consultation on the draft update to the river basin management plan – Part 3: Economic analysis – extended report

[49] **Provisioning services:** These are the products people obtain from eco-systems, such as food, freshwater, fuel, fibre and genetic resources.
**Regulating services:** These are the benefits people obtain from the regulation of eco-system processes, including water purification, climate regulation, erosion control and water regulation (including flood risk). Measures aimed at reducing run-off and increasing the retention of top soils can provide benefits in terms of erosion regulation, and can reduce the potential for downstream flooding. Water bodies can dilute, store and detoxify waste products and pollutants. Measures aimed at improving water quality support water bodies in delivering this eco-system service.
**Cultural services:** These are the non-material benefits people obtain from eco-systems such as recreation and aesthetic experiences, wellbeing and a sense of heritage and identity. Cultural services can also include the benefits to people from knowing that a resource exists, even if they never use that resource, often termed 'non-use' or 'existence' value.
**Supporting services:** Supporting services are those that are necessary for the production of all other eco-system services, such as primary production, soil formation, provision of habitat and production of oxygen.

[50] For more information visit http://www.millenniumassessment.org/en/index.html

**Table 7: Assessment of wider benefits compared to scenario 1 ('business-as-usual')**

| | Scenario 0 – Do nothing | | Scenario 2a – no rural payments but WCMOs introduced | | Scenario 2b – Rural payments continue and WCMOs introduced | | Scenario 3 – Rural payments continue, WCMOs introduced plus additional conditions and capital grant fund | |
|---|---|---|---|---|---|---|---|---|
| **Category** | **Scenario 0 notes** | | **Scenario 2a notes** | | **Scenario 2b notes** | | **Scenario 3 notes** | |
| **Provisioning services** | | | | | | | | |
| Freshwater | o | No net change to freshwater quantity as there are no measures aimed at reducing abstraction or consumption | o | No net change to freshwater quantity as there are no measures aimed at reducing abstraction or consumption | o | No net change to freshwater quantity as there are no measures aimed at reducing abstraction or consumption | o | No net change to freshwater quantity as there are no measures aimed at reducing abstraction or consumption |
| Food | v | Reduction in uptake of best practice could reduce yields over the longer-term due to unsustainable management | o | No net change – measures constitute best practice so are unlikely to significantly change yield | o | No net change – measures constitute best practice so are unlikely to significantly change yield | v | Implementation of arable reversion may result in a small decrease in food production |
| Water for non-consumptive use | o | No net impact on water quantity for non-consumptive use | o | No net impact on water quantity for non-consumptive use | o | No net impact on water quantity for non-consumptive use | o | No net impact on water quantity for non-consumptive use |
| **Regulating services** | | | | | | | | |
| Climate regulation and adaptation | v | Higher greenhouse gas emissions from reduced uptake of nitrate management measures | ^ | Reduced greenhouse gas emissions from increased uptake of nitrate management measures | ^ | Reduced greenhouse gas emissions from increased uptake of nitrate management measures | ^ | Reduced greenhouse gas emissions from increased uptake of nitrate management measures |
| Water regulation (including flood risk) | v | Increased runoff and flood risk due to reduced uptake of best practice measures | ^ | Reduced flood risk as runoff reduced | ^ | Reduced flood risk as runoff reduced | ^ | Reduced flood risk as runoff reduced |

| | Scenario 0 – Do nothing | | Scenario 2a – no rural payments but WCMOs introduced | | Scenario 2b – Rural payments continue and WCMOs introduced | | Scenario 3 – Rural payments continue, WCMOs introduced plus additional conditions and capital grant fund | |
|---|---|---|---|---|---|---|---|---|
| **Category** | **Scenario 0 notes** | | **Scenario 2a notes** | | **Scenario 2b notes** | | **Scenario 3 notes** | |
| Erosion regulation | v | Reduced retention of agricultural top soils from reduced uptake of best practice measures | v | Reduced retention of agricultural top soils from reduced uptake of best practice measures | ^ | Increased retention of agricultural top soils from improved soil management | ^ | Increased retention of agricultural top soils from improved soil management |
| Water purification and waste treatment | vv | Reduced water quality from reduced uptake of best practice measures | ^ | Improved water quality from suite of measures aimed at improving water quality. Reduced uptake of some measures (e.g. water pollution contingency plan) due to removal of SAP | ^ ^ | Improved water quality from increased uptake of a suite of measures | ^ ^ | Improved water quality from increased uptake of a suite of measures including water catchment management areas |
| **Cultural services** | | | | | | | | |
| Cultural heritage | v | Farming in Jersey has a high importance in terms of cultural heritage. Removal of SAP may reduce profitability in the dairy industry, potentially leading to reduced dairy farming | v | Farming in Jersey has a high importance in terms of cultural heritage. Removal of SAP may reduce profitability in the dairy industry, potentially leading to reduced dairy farming | o | No net change – negligible impacts on sites of cultural heritage | o | No net change – negligible impacts on sites of cultural heritage |
| Recreation and tourism | vv | Reduced bathing water quality; lower quality angling and other water-based recreation | ^ | Improvement in bathing water quality; better quality angling and other water-based recreation | ^ | Improvement in bathing water quality; better quality angling and other water-based recreation | ^ ^ | Potential for significant improvement in bathing water quality; better quality angling and other water-based recreation |

| | Scenario 0 – Do nothing | | Scenario 2a – no rural payments but WCMOs introduced | | Scenario 2b – Rural payments continue and WCMOs introduced | | Scenario 3 – Rural payments continue, WCMOs introduced plus additional conditions and capital grant fund | |
|---|---|---|---|---|---|---|---|---|
| **Category** | | **Scenario 0 notes** | | **Scenario 2a notes** | | **Scenario 2b notes** | | **Scenario 3 notes** |
| Aesthetic value | vv | Reduction in water clarity due to increase in sediment and nutrients | ^ | Improved water clarity due to reduction in sediments and nutrients | ^ | Improved water clarity due to reduction in sediments and nutrients | ^ ^ | Potentially significant improvement in water clarity due to reduction in sediments and nutrients |
| Non-use/existence value | vv | Reduced water quality resulting in dis-benefit to biodiversity | ^ | Improved water quality resulting in benefits to biodiversity | ^ ^ | Potentially significant improvements to water quality resulting in benefits to biodiversity | ^ ^ | Potentially significant improvements to water quality resulting in benefits to biodiversity |
| Human health and wellbeing | v | Decline in wellbeing felt by public/individuals due to reduced water and overall environmental quality | ^ | Improvement in wellbeing felt by public/individuals due to improvements in water quality and environment | ^ ^ | Improvement in wellbeing felt by public/individuals due to potentially significant improvements in water quality and environment | ^ ^ | Improvement in wellbeing felt by public/individuals due to potentially significant improvements in water quality and environment |
| **Supporting services** | | | | | | | | |
| Provision of habitat | vv | Reduction in habitat quality and quantity due to reduction in uptake of best practice measures. | ^ | Improvement in habitat quality and quantity from increased uptake of best practice, although reduced uptake of some measures due to removal of SAP. | ^ ^ | Potentially significant improvement in habitat quality and quantity from increased uptake of best practice. | ^ ^ | Potentially significant improvement in habitat quality and quantity from increased uptake of best practice and implementation of water catchment management areas. |

# 7. Putting the Plan into Action

## 7.1 Our views on the preferred scenario

If the Island wants to move towards good status in our waters it seems clear that we cannot remain as we currently are (Scenario 1). We also cannot do less than we are currently doing (Scenario 0) without risking making the problems of nitrates, phosphates and pesticides worse.

This leaves Scenarios 2a, 2b and 3 as our options.

Scenarios 2a, 2b and 3 all include the introduction of Water Catchment Management Areas and Orders as a way of increasing uptake of basic nutrient management measures across the Island and across a wide range of sectors, and provide the regulatory tools to allow the States of Jersey to take action.

Scenarios 2a and 2b differ only in relation to whether or not the current rural subsidy and grant regime is maintained. This is dictated not by this study but by the policy direction within the States of Jersey at the time of writing in relation to the Rural Economy Strategy and more specifically the budget for the Single Area Payment and the Countryside Enhancement Scheme.

Scenario 3 would require further planning work, more regulatory change, increased associated advice and compliance and for funds to be allocated for capital items including payments to take areas out of production in order to be implemented. It is therefore also the most expensive option; Government costs over the 5 years are approximately tripled compared with the costs of 2a and 2b. As such, scenario 3 is not accounted for by current budget limits.

**Our chosen course of action is taking Scenario 2b during this WMP. Under this scenario, rural payments (the SAP or equivalent) continue[51] and Water Catchment Management Orders (WCMOs) are introduced. The level of compliance checking and advice giving is increased, as is regulatory action for non-compliance. However, under this scenario, farmers are still also incentivised financially to provide environmental goods and services as well as the food or other materials they produce and so there is not the potential fall in compliance that may be seen if this support is removed (Scenario 2a).**

We plan to progress with the development of Water Catchment Management Areas and Orders by implementing Part 3 of the Water Pollution (Jersey) Law 2000. The detail of these can be discussed, consulted upon and finalised during 2017. The exact detail and extent will, to some degree, depend on the decisions made around the Rural Economy Strategy and the Single Area Payment, to allow mechanisms to be complementary. The new Code of Practice for the Protection of Water will also be developed, and Pesticide legislation and Codes of Practice will similarly be reviewed and renewed and/or strengthened.

During the period of the first plan the potential for using the additional measures proposed within Scenario 3 should also be investigated, to supplement additional outcomes in future iterations of the WMP.

[51] This may be at current or somewhat reduced levels and delivered differently under the new Rural Economy Strategy.

One of the other aspects that has not been included in the plan is liming. This measure was considered and initially costed; however it appeared to be an excessive cost if it were to be made compulsory or subsidised by Government, despite it being a fundamental driver for nutrient uptake. Liming should therefore be encouraged as good practice but remains voluntary.

## 7.2 Water Catchment Management Orders

Throughout the development of this WMP, our primary focus has been on how best to increase uptake of best practice and ensure it is undertaken consistently across the Island, alongside gaining a better understanding of the nutrient balance of the Island through monitoring fertiliser imports and usage.

The existing primary water management legislation (the Water Pollution (Jersey) Law 2000) is a very effective tool to enable us to better prevent, control and respond to point sources of pollution. However, it doesn't currently allow us to effectively react and deal with the issue of diffuse pollution (nitrogen, phosphates and pesticides) because, unlike point sources of pollution, it is extremely difficult to prove a definite and clear connection between source and receptor in any particular case. However, using Part 3 of the Water Pollution Law[52] will allow us to have a more appropriate regulatory response to the problem of diffuse pollution using the concept taken from elsewhere of General Binding Rules (Scotland) and the new 'Basic Rules' being considered for England and we propose to implement this mechanism.

A number of measures have been considered as appropriate for inclusion in Water Catchment Management Orders; the selection has in a large part been driven by recommendations from the Nitrate Working Group alongside experience from agricultural advisers from the States of Jersey. Five aspects are being considered, under which sit a combination of measures assessed through the Measures Appraisal Framework. Most of the conditions will put in place a legal requirement to follow what is already accepted good practice and is already mandatory for anyone claiming SAP, as set out in the current Water Code. Some of these existing conditions will be strengthened to reflect developments in what is considered good practice, and the new Water Code will also be changed to reflect this. Under the chosen scenarios they will be mandatory irrespective of what happens to rural payments.

**Proposed Areas for regulation using Water Catchment Management Orders**

| | WCMO TITLE | KEY PRESSURE CONDITION ADDRESSES | SECTORS CONDITION APPLIES TO |
|---|---|---|---|
| **WCMO 1** | Fertiliser imports and sales | Nitrates and Phosphates | All non-domestic users of fertilisers |
| **WCMO 2** | Nutrient Planning and Management | Nitrates and Phosphates | All non-domestic users of fertilisers and organic manures |
| **WCMO 3** | Field operations and applications | Nitrates and Phosphates | Agricultural sector |
| **WCMO 4** | Soil Protection | Nitrates, Phosphates and Pesticides | All non-domestic land managers |
| **WCMO 5[53]** | Pesticide storage and application | Pesticides | All non-domestic users of pesticides |

[52] Article 12: Water Quality orders; Article 13: Compliance with water quality objectives; Article 14: Water Catchment Management Areas; Article 15: Water Catchment Management Orders.
[53] 2016 update: This will be delivered through pesticide legislation, not using a WCMO.

### 7.2.1 WCMO 1 – Fertiliser imports and sales

One of the key challenges we face when it comes to controlling the use of nutrients on the Island is that we don't have complete figures on how much is being imported and where it is being used, and by whom. This situation can be improved either through the implementation of a WCMO or by using the information provision article under the Water Pollution Law. This condition will require all commercial imports and sales of fertilisers to be recorded. Information required might include mass of nitrogen and phosphates imported, importing entity, sales purpose type (agricultural or amenity) and substance, concentration, location and date of sale. This would apply to all importers and commercial sellers of fertilisers and is important, as it will enable us to develop a nutrient balance for the whole Island and cross-check with farm or organisational nutrient planning and recording. There is already a provision in place under the Pesticides Law to request information in relation to Pesticide imports and sales.

### 7.2.2 WCMO 2 – Nutrient planning and management

This condition is targeted towards the agricultural sector, as the main users and producers of fertilisers and organic manures in Jersey, but will also extend to other non-domestic land managers, where applicable (for example golf-courses, playing-fields, parks, etc.). The following areas of good practice will be covered by this condition:

- **Farm manure and waste management planning –** This is currently a requirement under SAP for claimants who keep livestock, import organic manures, sewage sludge, water treatment sludge or compost, or allow other farmers to apply these to the claimant's land. This should be extended to anyone non-domestic spreading or allowing spreading of organic manures. **A farm manure plan** includes an assessment of available spreading land, keeping a record of all applications, and carrying out risk assessments. There are also maximum limits on spreading organic manures to land and a closed period for spreading.

- **Nutrient management planning –** This is currently a requirement under SAP in the form of a field-scale plan of chosen crops in any given year, setting out requirements for nutrients and taking into account inputs of organic manures and inorganic fertilisers based on recognised principles; plus record keeping of actual applications of organic and inorganic nutrients on the same basis. This measure should be included within the condition so that it extends to all commercial users of nutrients (e.g. States of Jersey Parks and Gardens, golf-courses, agriculturalists, etc.), who should be planning and recording nutrient use annually, including any organic manures applied. Evidence should be provided as to how the amount of fertiliser applied to each field/area was calculated under good practice guidelines (e.g. crop need using RB209, a nationally recognised and evidenced fertiliser manual produced by Defra). This plan will include a requirement for record keeping for 3–5 years and records of actual applications.

- **Regular soil analysis to indicate appropriate fertiliser application –** Soil analysis is currently required for nutrient management planning (which is a requirement under SAP), but compliance with the soil testing measure is currently assumed rather than checked (as it is necessary in order to undertake nutrient management). A Nitrate Working Group recommendation is to undertake soil testing on all fields/areas used by commercial agricultural and commercial non-agricultural users of fertilisers and/or organic manures. This should be undertaken once every 4 years to provide an analysis of the soil pH, P and K indices. Evidence of compliance should be checked.

### 7.2.3 WCMO 3 – Field operations and applications of nutrients

This condition is concerned with the way in which organic and inorganic fertilisers are applied at the field level and includes measures that provide overall control and limits on the amount applied to land, through better calibration of equipment and more appropriate and considered timing and rates of application.

- **Limits to application**
  - **Inorganic nitrogen fertiliser limits:** It is not permitted to apply more than the fertiliser recommended in RB209 or and/or those of a FACTS qualified adviser (FACTS is the body responsible for setting and maintaining standard for advice given on farms) to any crop. The limit for early potatoes will be set according to good practice.
  - **Organic manure nitrogen limit:** A maximum field application limit of 170 kg N/ha per annum for animal manure (spreading and direct voiding) should be introduced; including no slurry applications to loafing paddocks and other heavily grazed fields as deposition loading is high on these fields.
  - **No applying inorganic phosphate fertiliser to soils with a P soil index in excess of 5:** This measure will require land managers to refrain from adding inorganic phosphates to soils with an already elevated soil P index (>5), unless there is an evidence-based agronomic need that outweighs the environmental dis-benefits.

- **Calibration**
  - **Organic manure spreading equipment calibration:** Again driven by the Nitrate Working Group, this is a new requirement under the WMP and stipulates regular (i.e. annual) calibration of manure spreaders (including splash plates) to ensure the spread pattern and quantity are calculated correctly and evidence kept of the calibration.
  - **Calibration of fertiliser spreaders:** The Water Code currently contains the requirement to calibrate the applicator regularly.

- **Application – non spreading conditions and areas**
  - **Applying manufactured fertilisers – non-spreading conditions and areas:** This measure is currently included in the Water Code. The Water Code currently requires inorganic fertiliser to be spread at the correct rate and suitable location, and not during unsuitable weather or in certain land conditions. It is proposed that a 2 to 5 metre prohibition zone next to watercourses is introduced.
  - **Field application of organic manures – non spreading conditions and areas:** This is currently included as a measure for all SAP claimants, but will be included as a WCMO so it applies to anyone applying organic manures. It will include the requirement to assess conditions and also the 10 metre buffer zones around watercourses and 50 metre buffer zones around boreholes and wells.
  - **Closed period for manure and slurry spreading:** This measure is currently in the Water Code and only applies to slurry. The closed period dates can be changed by Ministerial Decision and this facility will be used. Other aspects being considered within this measure include inclusion of restrictions on use of poultry manure. Farm Yard Manure (FYM) has low leaching capacity and should continue to be excluded from the closed period.
  - **Closed period for applying manufactured fertilisers –** This measure is currently included in the Water Code, but should be made a condition. In developing the specifics of this condition we will be considering individual crop needs, e.g. for the Jersey Royals.

- **Storage**
  - **Storing organic manures – rules for temporary storage of manure heaps in fields –** This was also a Nitrate Working Group recommendation on the field storage of commercially produced organic manures, which included a requirement that the maximum storage time of organic manure at any one location should not exceed 12 months. Furthermore, the location should not be used again to store organic manure for another 2 years. The producer or holder of the organic manure should maintain annual records of the heaps, including the period of storage and location of the fields. Organic manures should also not be stored within 10 metres of a watercourse or 50 metres of a borehole or well.

### 7.2.4 WCMO 4 – Soil Protection

A soil protection review is a current requirement for all agriculturalists in receipt of SAP. Tackling problems like soil erosion and compaction is really important for sustainability, as well as protecting water quality, so this will become a regulatory requirement for any non-domestic land managers, alongside implementing measures in problem areas, to reduce erosion in fields that are experiencing persistent runoff of soil in heavy rainfall for example.

### 7.2.5 WCMO 5 – Pesticide storage and application[54]

Pesticides have been identified as a key risk to the Island's drinking water sources, as it only takes a very small amount of pesticides to render a water source unusable. Alongside our work undertaking more widespread monitoring to ascertain the exact extent of pesticide occurrences, we feel that it is appropriate to have a precautionary approach in place to protect us from this risk. The following measures could be made mandatory under either the WCMO mechanism or through the Pesticides (Jersey) Law 1991 (as amended, updated or superseded by new pesticide legislation) for anyone using pesticides on a commercial scale, such as in agriculture, large-scale land managers, amenity users, local authority or highways, or even tourism and recreation.

- **Storage and application of pesticides –** Certain elements of good practice that relate to storage, preparation and application will be made mandatory, to include application in accordance with the terms and instructions of the relevant product approval.
- **Training of operators –** Ongoing training after initial certificate of competence received by commercial users is currently undertaken on a voluntary basis, but would be made mandatory for anyone storing and applying pesticides commercially.
- **Pesticide application recording –** This is already required for claimants of SAP and for most farm assurance schemes. The condition will extend to all commercial users of pesticides, who will be required to keep a record of the application amounts and rates by field.

[54] 2016 update: This will be delivered through pesticide legislation, not using a WCMO.

## 7.3 Measures within the preferred scenario

The measures to be delivered in the preferred scenario are set out in the following table (Table 8), along with the current and proposed delivery mechanism for each measure.

**Table 8: Measures and delivery mechanisms in the preferred scenario**

| Measure purpose | Measure | Current Delivery Mechanism/sector that measure applies to | Chosen scenario Delivery Mechanism/main sector that measure applies to |
|---|---|---|---|
| **Best practice and/or precision agriculture** | Provision of mapping tools | Government activity/ Government | Government activity/ Government |
| | Calibration of fertiliser spreaders | Water Code (SAP)/all commercial farms | WCMO/all non-domestic land managers |
| | Regular soil analysis to indicate appropriate fertiliser application | Water Code (SAP)/all commercial farms | WCMO/all non-domestic land managers |
| | Soil analyses for nitrogen to indicate appropriate fertiliser application | Government activity/ Government | Government activity/ Government |
| | Organic manure nitrogen limit | Water Code (SAP)/all commercial farms | Anyone non-domestic spreading or allowing the spreading of eligible organic manure |
| | Nitrogen Max Limits for certain crops | Water Code (SAP) all commercial farms | WCMO/all non-domestic land managers |
| | Organic manure spreading equipment calibration | Voluntary (no specific delivery mechanism)/ all non-domestic land managers spreading organic manures | WCMO/all non-domestic land managers spreading organic manures |
| | Field application of organic manures – avoiding high risk areas | Water Code (SAP)/all commercial farms | WCMO/all non-domestic land managers |
| | Applying manufactured fertilisers – Closed periods for applying manufactured fertilisers | Water Code (SAP)/all commercial farms | WCMO/all non-domestic land managers |
| | Applying manufactured fertilisers – Non-spreading conditions and areas | Water Code (SAP)/all commercial farms | WCMO/all non-domestic land managers |
| | Soil P index – No applying inorganic Phosphate to soils of > index 5. | Water Code (SAP)/all commercial farms | WCMO/all non-domestic land managers |

| Measure purpose | Measure | Current Delivery Mechanism/sector that measure applies to | Chosen scenario Delivery Mechanism/main sector that measure applies to |
|---|---|---|---|
| **Better management and planning** | Farm Manure and Waste Management Plan | Water Code (SAP)/all commercial farms | WCMO/all non-domestic land managers |
| | Nutrient Management Plan | Water Code (SAP)/all commercial farms | WCMO/all non-domestic land managers |
| | Pesticide application recording | Water Code (SAP)/all commercial farms | WCMO/all non-domestic land managers |
| | Soil protection | Water Code (SAP)/all commercial farms | WCMO/all non-domestic land managers |
| | Water pollution contingency plan | Water Code (SAP)/all commercial farms | Water Code (SAP)/all commercial farms |
| | Manure and slurry spreading closed period | Water Code (SAP)/all commercial farms | WCMO/Anyone non-domestic spreading or allowing the spreading of eligible organic manures |
| | Storing organic manures – Rules for temporary storage of manure heaps in fields | Water Code (SAP)/all commercial farms | WCMO/all non-domestic land managers |
| **Improving regulation and/or developing codes of practice** | Ensure that Pesticide legislation (and codes of practice) are fit for purpose | Government activity/ Government | Government activity/ Government |
| | Update the Water Code | Government activity/ Government | Government activity/ Government |
| | WCMA and WCMO drafting instructions | Government activity/ Government | Government activity/ Government |
| | Charging for industrial discharge permits under the Water Pollution (Jersey) Law 2000 | None/industrial discharge permit holders | Water Pollution (Jersey) Law 2000/ industry and water services sector |
| | Additional provisions for 'Water Catchment Management Areas' | None/Government | None/Government |
| | Private drainage systems – new Code of Practice | None/Government | Government activity/ Government |
| | Compliance checking | Government activity/ Government | Government activity/ Government |

| Measure purpose | Measure | Current Delivery Mechanism/sector that measure applies to | Chosen scenario Delivery Mechanism/main sector that measure applies to |
|---|---|---|---|
| | Storage and application of pesticides | Mixture of Regulatory (Pesticide Law) and Water Code (SAP) and voluntary (farm assurance schemes)/ commercial farms/all non-domestic land managers | WCMO/all non-domestic land managers |
| **Information provision and exchange** | 1:1 advice to land managers | Government activity/ Government | Government activity/ Government |
| | Fertiliser Import Registration (N and P) – All inorganic fertiliser imports and sales need to be registered with SoJ (and reconciliation of purchase and use) | None/Government | Government activity/ Government |
| | Using private borehole monitoring data from SoJ and land use/farm type data, target specific hot spots | None/Government | Government activity/ Government |
| | Additional monitoring | None/Government | Government activity/ Government |
| | Monitoring of 3 remaining coastal water bodies to allow classification | None/Government | Government activity/ Government |
| | Continue with existing monitoring but rationalise and re-target | Government activity/ Government | Government activity/ Government |
| | Undertake a willingness to pay survey to ascertain the value of the natural environment and safe drinking water on the Island | None/Government | Government activity/ Government |
| | Strategy for identifying risk, gathering data and controlling/eradicating INNS | None/Government | Government activity/ Government |

| Measure purpose | Measure | Current Delivery Mechanism/sector that measure applies to | Chosen scenario Delivery Mechanism/main sector that measure applies to |
|---|---|---|---|
| **Targeted intervention (Subsidised capital, infield or riparian items)** | Slurry application – alternative technology | Voluntary (no specific delivery mechanism)/ Farms that spread slurry | Voluntary (no specific delivery mechanism)/ Government |
| | Arable reversion | Voluntary (no specific delivery mechanism)/ Government | Voluntary (no specific delivery mechanism)/ Government |
| | Grass buffer strips / areas to intercept run-off | Voluntary (no specific delivery mechanism) / Government | Voluntary (no specific delivery mechanism) / Government |
| | Re-direction of run off: hedges, earth banks and ditches | Voluntary (no specific delivery mechanism)/ Government | Voluntary (no specific delivery mechanism)/ Government |
| | Fencing off watercourse, provide alternative sources of drinking water for livestock and control stream crossings to prevent water pollution | Voluntary (no specific delivery mechanism)/ Government | Voluntary (no specific delivery mechanism)/ Government |
| | Storing organic manures – increasing capacity and separating dirty water | Voluntary (no specific delivery mechanism)/ dairy farms | Voluntary (no specific delivery mechanism)/ Government |
| | Jersey Water reservoir bypass works | Jersey Water activity/ Jersey Water | Jersey Water activity/ Jersey Water |

**Many existing Water Code measures will be enhanced, extended or tightened under WCMOs*

## 7.4 Who will deliver these measures?

The measures we are proposing to implement require action to be taken outside of the States of Jersey Environment Department. Water quality is an Island-wide problem that is both affected by, and affects, everyone. We therefore believe it is appropriate that, since everyone is part of the problem, everyone should also be part of the solution. This is going to be a challenging problem to overcome and it will require collaborative working as well as investment.

The measures we have included in this first WMP have been prioritised to focus on the most serious issues first: nitrate in drinking waters and the risks from phosphates and pesticides. The measures are therefore targeted towards the sectors contributing the most to these priority issues, and in the case of nitrate it is widely recognised that this is primarily from the use of fertilisers in agriculture. However, by introducing the concept of WCMOs, we are also requiring broad-scale action across multiple sectors. The WCMOs are for everyone who uses nutrients and pesticides to follow and will be compulsory.

Aside from the WCMOs set out previously, we will also be looking to specific sectors to help solve the current problem.

### 7.4.1 Government

We, the Department of the Environment, have set out the measures to be implemented through the WMP. We are currently (and will in the future be) responsible for overseeing the implementation of the measures via the various sector organisations involved. We are also responsible for implementing a revised environmental monitoring programme, so that the outcomes of the measures can be assessed through future iterations of the WMP.

As mentioned, we believe that the majority of the priority issues are caused by diffuse pollution from a wide range of sources. The existing primary water management legislation (the Water Pollution (Jersey) Law 2000) doesn't currently allow us to effectively react and deal with the issue of diffuse agricultural pollution (nitrogen, phosphates and pesticides) because, unlike point sources of pollution, it is extremely difficult to prove a definite and clear connection between source and impact in any individual case.

Part 3 of the Water Pollution Law, if correctly utilised, will allow us to have a more appropriate regulatory response to the problem of diffuse pollution using the concept taken from elsewhere of Water Catchment Management Orders (WCMOs) focusing on the 5 key areas.

The benefits of WCMOs are that they apply across a range of sectors, not just farming. Furthermore, compliance with the measures will increase because there will be legal implications for those who do not adhere to the WCMOs. We will also be responsible for implementing a number of other legislative, regulatory, advisory, and monitoring and compliance checking measures if Scenario 2b is implemented.

Additional government costs in the Plan have been kept to a minimum. However, it does still need some additional funding in order to be delivered. Delivery of the Water Plan cannot be achieved using in-house resources past the point of preparation and production of the WCMOs. Additional money needs to be found to ensure compliance checking and advice is deliverable. The previous Scrutiny Review concluded that Environmental Protection was already under-resourced to deliver its wide and growing mandate. This ranges from regulation of water, waste and plant health and agricultural inspection.

The total additional cost to Government (which in this context is defined as the Department of the Environment) over the 5 years of the Plan for implementing Scenario 2b is estimated at around £100,000 per year. This is mainly for development and implementation of increased regulation (through WCMOs) and codes of good practice, for advice and compliance checking and for additional water quality monitoring.

To fund the Government costs proportion of the plan in the medium to longer term under Scenario 2b there are a number of options that need to be investigated further:

a) A tax on fertilisers and/or pesticides. This could be levied on all nitrate-based fertilisers or plant protection products imported into or sold on the Island, and has the advantage of being directly consistent with the polluter pays principle, being proportional to use and acting as a disincentive to over-application.

b) Additional revenue generated from the sewerage charge proposed by Department for Infrastructure.

**It is recognised that other fiscal mechanisms will require preparatory work, but they need to be in place to fund the additional compliance and advice required to ensure Water Catchment Management Orders are complied with. Funding has already been prioritised within the Department of the Environment for Law Drafting and other preparatory work for 2016 and 2017.**

### 7.4.2 Water supply

Jersey Water, as the only water supply company on the Island, is critical to helping us safeguard and protect the water environment on the Island. As the provider of the public water supply, they are bound by the requirements of the Water (Jersey) Law 1972 to supply water that meets certain quality parameters. As such, Jersey Water are taking measures under each scenario to implement reservoir bypass options to help meet their obligations.

Jersey Water have undertaken numerous studies into the options available to manage nitrates and pesticides in the treated water supply, and have consulted with industry experts and other water companies. Based on their review, they have concluded that the most cost-effective, sustainable and beneficial solution is through effective control at source; managing the catchments such that diffuse pollution is minimised by reducing fertiliser and pesticide inputs.

The Company has for many years advocated for the need for additional protection for water catchments through increased regulation by Government to reduce pollution from the Island's agricultural and horticultural activity and to avoid the need for dispensations for nitrates being necessary.

We will continue to work with Jersey Water in terms of their quality concerns, on monitoring and data-sharing and also on the issue of nitrate dispensations. Jersey Water will continue to share their data with us and work with the Department to support and undertake proactive catchment engagement as part of their water safety planning.

Although an engineering solution rather than a catchment management one, Jersey Water are also making contributions to the WMP objectives that relate to drinking water through planned implementation of a reservoir bypass scheme. They will also continue to contribute as a major water abstractor and licence holder and through the charges for discharge permits which are proposed.

### 7.4.3 Wastewater

The Wastewater sector (Department for Infrastructure, formally Transport and Technical Services) will play a vital role over the next 5 to 10 years in safeguarding the inland and coastal waters of Jersey. This work was already planned and precedes this Plan, as detailed in the 2014 Wastewater Strategy[55]. The phased replacement of Bellozanne sewage treatment works will be central to this, producing a more stable and compliant effluent which is easier to treat and regulate, ensuring St. Aubin's Bay is protected in a cost-effective way. The planned upgrade will also increase the full flow to treatment capacity, and therefore reduce 'storming events' significantly that result in the secondary process of treatment being bypassed. The new sewage treatment works would benefit from a reduction in nitrogen loading going into the plant if catchment levels are reduced by the implementation of this plan.

[55] http://www.statesassembly.gov.je/AssemblyPropositions/2014/P.039-2014.pdf?_ga=1.55818859.1557964527.1439458011

Aside from these upgrade works, Department for Infrastructure (DfI) also manage much of the larger essential infrastructure required for storm water conveyance on the Island, and are continuing investment in surface and foul separation, maintaining the existing infrastructure, identifying and removing illegal connections and the extension of mains drains. This is a vital part of protecting water quality.

DfI will also need to work with others to recycle the organic wastes produced as part of the sewage treatment process and through municipal composting, and do their part to ensure that this is used for the benefit of the soil and not in excess of the nutrient requirements of the crop.

We will also plan to introduce a charging mechanism for industrial discharge permits under the Water Pollution Law. This is consistent with the polluter pays principle and will bring in revenue to help us to assess compliance and administer the discharge permit scheme more effectively. We also plan to work with DfI on the sewerage charge that they are proposing, and develop an agreement that a proportion of the revenue generated can be used to fund our catchment management work. In this way DfI have demonstrated that they are in support of and aware of the bigger picture benefits to all of catchment management activity.

### 7.4.4 Land managers

The way in which we manage the land on the Island holds the key to success when it comes to reducing diffuse pollution; that is why the measures set out in this first WMP are primarily focused around controlling the timing and application of organic and inorganic nutrients and fertilisers to land, and also to assess, manage and reduce the risks from pesticides.

Every land manager and agricultural specialist using fertilisers and pesticides has a role to play in delivering environmental outcomes contributing to the sustainable management of the Island's water resources and environment. We have already engaged with the industry through the Nitrate Working Group and through training and advice, and this relationship generally has been and is very positive, guiding development of the WCMOs. We will continue to work alongside industry representatives in implementing the measures. Outside of the agricultural sector, other land managers will also play a role through adoption of the WCMOs, including non-domestic users of manure and pesticides, such as managers of amenity grassland, parks, gardens (non-domestic), golf-courses, municipal recreational fields, greenhouses and septic tank owners, etc. We started to further engage with them through advice and training in 2015.

### 7.4.5 Industry

The industrial sector is bound by the requirements for discharge permits and water abstraction licences under the current legislation. Where a business currently has a discharge permit or an abstraction licence, the conditions on the licence or permit must be adhered to. The Department of the Environment should be contacted if any changes to the licence or permit are required. Under this Plan, industry will also be subject to an appropriate charge for industrial discharge permits under the Water Pollution Law if a charging scheme is introduced.

## 7.5 How will we know when the measures are working?

### 7.5.1 How far will the measures get us?

We do not know whether the measures set out in this Plan are going to be sufficient to achieve good status in the Island's water bodies. Other countries have attempted to understand this "gap to good status" through extensive and data-intensive modelling studies; however, even with considerable resource allocated, there has been found to still be a large degree of uncertainty involved at the current time. What we do know, however, is that good practice and limiting pollutant losses at source does drive improvements.

Some of the key issues identified, particularly nitrates, are longstanding, quite severe and result in concerns for the provision of drinking water to the Island's population; it is widely accepted that action needs to be taken immediately. We therefore feel it is appropriate and pragmatic to progress with implementing the best, and most logical, combination of measures over the course of the next 5 years (2017 to 2021) and monitor the outcomes of these measures before the next WMP is developed.

### 7.5.2 Key Performance Indicators

Aside from not knowing how far the measures will get us over the next 5 years, we also have the problem that environmental responses to the measures set out can be relatively slow – for instance the measures focused on reducing nitrate leaching to groundwater could be implemented immediately, but the detectable response in groundwater nitrate levels could lag behind by several years. This is also the case with pesticides, as this is the nature of groundwater and diffuse pollution. In England, the Catchment Sensitive Farming programme (Environment Agency, 2014b) and the Demonstration Test Catchment programme (DTC, undated) have also recognised the issue of time-lag in responses. These programmes have proposed measuring progress over shorter timescales against components such as engagement, attitudes and measure implementation, recognising that changes at outlets or receptors, particularly for larger catchments, may take longer to be realised (Figure 16).

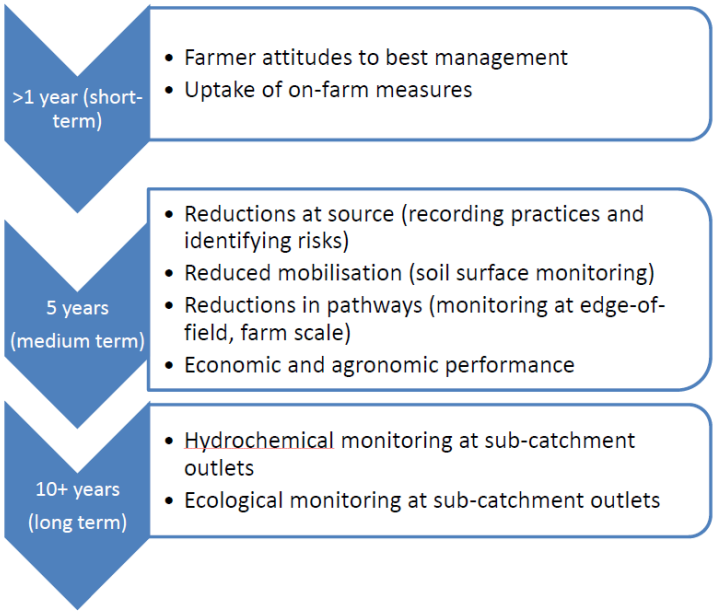



**Figure 16. A framework for measuring progress on tackling diffuse pollution, after DTC (undated).**

Consistent with the approach taken elsewhere, for this WMP we have set out 8 Key Performance Indicators (KPIs); these are a combination of activity-focused and outcome-focused measurements/indicators.

The KPIs are set out in Table 9 as follows:

**Table 9: KPIs for the WMP**

| KPI | Outcome required | How will achievement of the outcome be measured? | |
|---|---|---|---|
| **1 (Activity)** | Increased communications and awareness of the water management challenges in Jersey | Measure: | Public, industry and business levels of understanding and awareness of the water management issues and challenges in Jersey |
| | | Measured by: | DoE questionnaire to ascertain improved understanding of water management amongst sectors |
| | | Frequency: | The questionnaire would be developed twice in the 5-year cycle – once at the beginning and again at the end. |
| | | Target: | The first questionnaire will form a baseline from which to benchmark the subsequent improvements in understanding. The questions within the survey will be structured around the need to understand improvement. The first target is an increased level of response to the water management questions; the second target is an improved understanding of the issues as gauged by the questions asked. |
| **2 (Activity)** | Behavioural change to adopt more sustainable water management | Measure: | Uptake of WCMO measures across relevant sectors |
| | | Measured by: | DoE compliance checking |
| | | Frequency: | Annual |
| | | Target: | The target under the selected scenario (2b) is 95% compliance with WCMO requirements by 2020. |
| **3 (Activity)** | Increased compliance checking | Measure: | Rate of compliance checking |
| | | Measured by: | DoE |
| | | Frequency: | Annual |
| | | Target: | Currently, 20 days per year are spent on compliance checking. Under the chosen scenario we are increasing this to 100 days per year by 2020, subject to resource constraints. |
| **4 (Outcome)** | Optimising phosphate levels in soils | Measure: | Monitoring phosphate levels in soils |
| | | Measured by: | Monitoring by DoE at representative farms where measures are being implemented |
| | | Frequency: | Annual |
| | | Target: | Current mean P index in soils to reduce by 2020. |

| KPI | Outcome required | How will achievement of the outcome be measured? | |
|---|---|---|---|
| **5 (Outcome)** | Continued trend of reductions in groundwater and surface water nitrate levels | Measure: | Groundwater and surface water measured nitrate levels |
| | | Measured by: | Jersey Water and DoE |
| | | Frequency: | Annual |
| | | Target: | Percentage of samples in excess of 50 mg/l reduced. Mean and maximum levels of nitrate are reducing in ground and surface water on long term sentinel sites. |
| **6 (Outcome)** | Progressive reduction in the number of nitrate dispensations required | Measure: | Number of dispensation uses |
| | | Measured by: | DoE |
| | | Frequency: | Monitored yearly by DoE |
| | | Target: | Zero dispensations for nitrate by 2020 |
| **7 (Outcome)** | Reduction in the pesticide levels in raw water supplies | Measure: | Raw water supply pesticide levels |
| | | Measured by: | Jersey Water |
| | | Frequency: | Annual |
| | | Target: | Mean and maximum levels of pesticides reducing in raw water intakes at selected sentinel sites. Proportion of samples breaching 0.1 ug/l reducing at selected sentinel sites. |
| **8 (Outcome)** | Enhanced and more focused environmental monitoring programme | Measure: | Data coverage and frequency |
| | | Measured by: | DoE |
| | | Frequency: | One classification per 5-year cycle |
| | | Target: | Monitoring data sufficient to undertake more complete classifications in 2021. |

# 8. Comments or questions?

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