The Threats to Our Marine Environment:
A Ten-Year Study by SOS Jersey

Demonstrating the Urgent Need for Independent Environmental Regulation

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Cover photo: La Collette Reclamation and Port area in 2014, courtesy of Sy Mildren

Welcome and thank you

Welcome to SOS Jersey's latest report, *The Threats to Our Marine Environment: A Ten-Year Study by SOS Jersey, Demonstrating the Urgent Need for Independent Environmental Regulation*: it is one of many independent reports that we have produced over the 25+ years since our organisation began.

We are indebted to the Jersey branch of the Channel Islands Co-operative Society for their support in its contribution to the funding of our 10-year shellfish study as part of their 2019 Environmental Grant scheme. This study formed part of our overall study of all aspects of the threats to our marine environment and is included in this report.

We would like to thank Nick Hubbard, the States Analyst, for his time and support and the volunteers from the 2009 and 2019 shellfish studies:

> 2009: Organiser Andrew Syvret, former States Coastal Officer, marine biologist and creator of the famous Violet Bank 'Moonwalks', Lara Luke, Pollution Consultant for SOS Jersey, and Christian Guest, a post-graduate student in Marine Biology from Portsmouth University.
>
> 2019: Steve and Lindsay Robins, Hautlieu 'A' Level students. Jacqui Carrel, Environmental Scientist for SOS Jersey, Andrew Le Quesne of Earth Project Jersey.

We would also like to thank SOS Jersey's supporters and contributors who generously helped with their time and donations.

SOS Jersey, 22 April 2021

SOSJ Jersey members and students at Le Hocq, July 2019 (Photo: SOS Jersey)

1. SOS Jersey - Who we are and what we do

Jersey's 45-mile shoreline is arguably the most precious area of the Island. As well as boasting an amazingly rich group of ecosystems, it is a source of shellfish (both farmed and wild) and an important breeding area for juvenile fish. Just as importantly, it is a prime resource for Islanders' health, wellbeing and education.

On the south-east coast, the amazing inter-tidal abundance of species and variety has been internationally recognised as a Ramsar Area, a 'Wetland Area of International Importance'. More information about Ramsar can be found later in this report. SOS Jersey were instrumental in working towards our first Ramsar designation on the south-east coast.

With an increasing population and very little left of the Island to be developed, every square metre assumes a huge importance and is impacted by many competing interests. Jersey's laws and international obligations have not kept pace with modern recommended practises and, due to the lack of rigorous environmental policies, several major pollution events have taken place.

This is where SOS Jersey, formerly Save Our Shoreline Jersey, comes in.

SOS Jersey (SOSJ), a non-governmental organisation comprised of a team of experienced volunteers and supporters from a variety of professional and educational backgrounds seeks to:

- Bring together the various stakeholders needed to protect our coastal areas
- Raise issues on behalf of the public when other sources of representation have failed them
- Monitor development on the coastline and intervenes where necessary at the planning application stage

So that the public receive relevant and correct data, SOS Jersey endeavours to seek out and confirm the facts pertaining to the each of the issues it takes on and not be influenced by political and public service pressure and 'spin'.

SOS Jersey is also a member of the Ramsar Management Authority (RMA), which, while having some problems in the past, is now working hard with its members to contribute valuable ideas and policy suggestions for both Ramsar and our Island's policies.

2. Introduction

Whilst Jersey has a very special marine environment, it is facing multiple pressures from overcrowding and over-development.

Enormous pressures are being placed upon our creaking infrastructure, with the knock-on effects being felt by our fragile ecosystems both on land and in our surrounding waters.

These cracks have been evident for some years, including the degradation of the beaches by scouring caused by reclamation and the reduction in species to be found in the intertidal zones.

SOS Jersey recently completed a ’snapshot in time' of the health of our shellfish on the south east coast by sampling, 10 years apart, three species of bi-valve molluscs from the same three locations and on the same dates and tidal states.

Details follow later in the report but, in brief, there has been an overall increase in heavy metals; they are still (mostly) within ‘safe’ levels, but only because of the massive tidal range and strong currents which take most of our pollution out to sea.

Jersey must not rely on this 'natural cleaning' any longer and must prevent more pollution events.

Pollution events such as those experienced in 2009 during the construction of the new incinerator at La Collette, and more recently in 2019 at the Horizon development on the Waterfront, are the more visually obvious ways that all types of toxins and metals are transferred from land to sea.

The island also has large ‘bacterial loads’ being released into the sea in times of high rain; a constant flow of partly-treated sewage containing excessive nitrates from the Bellozanne outfall in St Aubin’s Bay, which causes the regular sea lettuce ‘blight’; the leaching of heavy metals from below the older ash pits at La Collette; and ‘episodes’ of construction-related marine contamination.

These pose a significant threat to the health of our waters and its marine life.

Excessively fast building expansion in the face of an ailing infrastructure, a continued lack of immigration policy and unregulated environmental controls continue to contribute to the degradation of our inshore waters on the south and east coast.

One result of this, for example, is that the waters in St Clement’s and Grouville Bays is categorised as Grade ‘B’; this means shellfish farmers need to filter their oysters for 48 hours in clean water before being sold for consumption. (In fact, this is a mandatory requirement if the oysters are to be exported to France.)

After yet another construction-related pollution issue in 2019, explained in more detail later, SOS Jersey decided that it would be sensible to take more samples of shellfish in key areas on the south east coast and test them once again for heavy metals.

Shown in detail below, our shellfish study conclusions also consider wider, but related, crucial pollution issues.

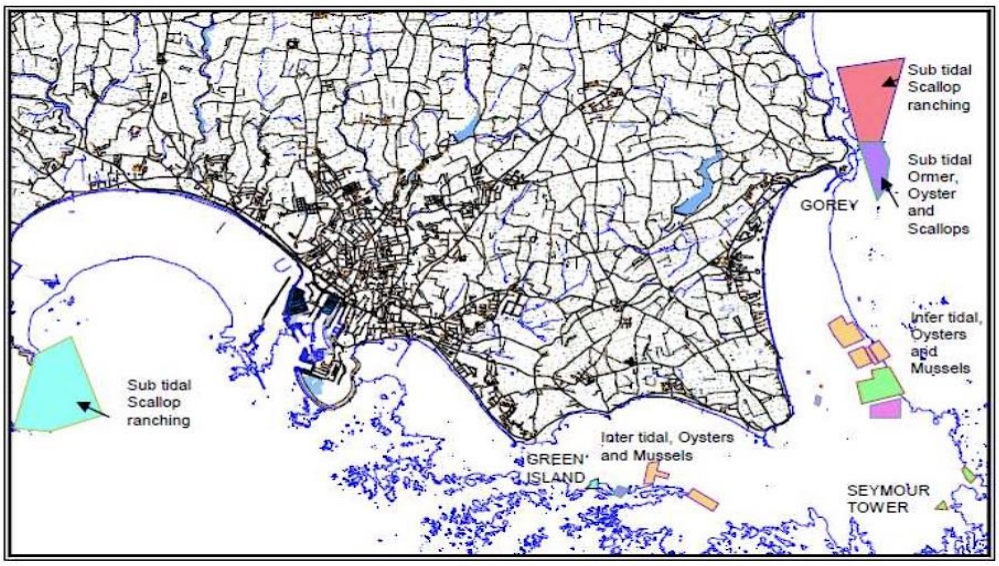
We hope that this report will also be helpful in informing those political candidates who will be preparing for Jersey’s elections in 2021, civil servants and the Island’s population at large.

3. The Area under threat (Ramsar South-East area)

Jersey's south-east coast Ramsar area is amongst the largest intertidal reef sites in Europe, with tides of up to 40 ft (12 metres). The tide can drop so much that the Island's area is doubled, exposing a vast landscape (17.5m^2) of intertidal and low tide areas, each with its own unique biodiversity. Many papers have been written by learned organisations, such as the Société Jersiaise, celebrating the rich abundance of species that the area is host to, from the higher rock pools to the vast areas of sand bars and a complex system of soft substrate gullies in the intertidal zone.

Havre des Pas to La Collette: Part of Jersey's Ramsar area (south-east coast) at low tide. (Photo: SOS Jersey, 2019)

The area is farmed both inter-tidally and sub-tidally by various and growing shellfish concessions. Oysters, mussels and scallops are among the species farmed. This map, courtesy of Fisheries and Marine Resources 2009, shows the locations of these concessions:



In 2009, SOS Jersey became seriously worried about the possibility of contamination by heavy metals – present in huge quantities in reclaimed land to the west of the Ramsar area – being released from the toxic landfill and entering the Ramsar area. Their worries were realised.

In 2009, consultants Aquafish Solutions Limited, a UK based company, were tasked by the States of Jersey to produce a strategy for a management plan for the local aquaculture industry, which had grown by 58% since 2004. The report was quite comprehensive, but the consultants only researched bacterial pollution sources from farm runoff, foul water and sewage escapes, and not pollution by heavy metals, which, SOS Jersey were assured at the time, was not considered to be an issue.

Here we see La Collette, the designated reclaimed area that is used to house some of Jersey's heavy metal and asbestos waste. In 2009, this was the site of a major and extended contamination event that carried heavy metal pollution into the Ramsar area.

Above: La Collette in 1977. Note the German bunker (circled) has not been moved but is now 'inland' in the photo below. (Photo: Environment Department)

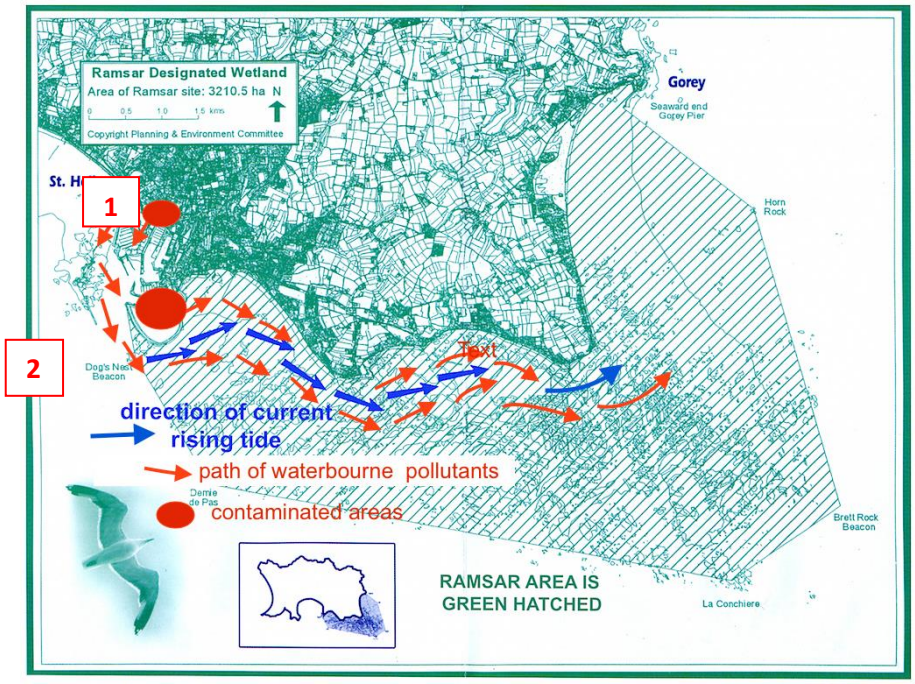
Below: (also cover photo) Aerial shot of La Collette Reclamation in 2014, already nearly full. The 'lagoon' (bottom left) is already shrinking. (Photo: Sy Mildren)

3.1. Currents and tides

Jersey's tidal range of up to 40 ft (12 metres) combined with the extensive reefs, gullies and sandbank systems on the south-east coast means that the currents in this area are fast and treacherous; currents can also be 'terrain specific' within each area.

At dead low tide, the tidal flow stops for an hour and then reverses. This causes a circulatory effect, which was nicely illustrated when drogues that were released into St Aubin's Bay during a States of Jersey study on the Bellozanne outflow, returned to the same area a day later.

The diagram below shows the areas from which over the years, contaminants have been deposited into inshore marine waters (red spots). Area 1 is the Waterfront and port area, and area 2 is La Collette reclamation site with its ash pits. The red arrows show where pollutants are dispersed.



Above: How contaminants reach the south-east coast, Ramsar Area on a rising tide. (Illustration adapted from Government Ramsar document)

Contaminants, a cocktail of toxic incinerator ash containing heavy metals and a range of building materials and rubbish, including asbestos, exist in substantial quantities within the reclamation areas. These contaminants are released into the marine environment, either by:

- A slow process over the years; for example, from below the ash pits at La Collette and the Waterfront landfill

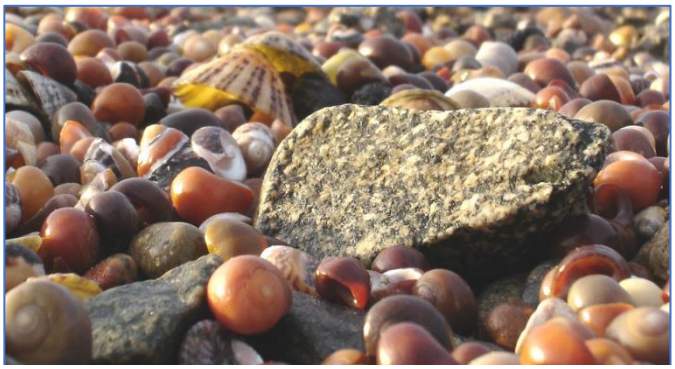
- Or quickly, when contractors on major construction projects fail to stop the rising tides entering the sites and subsequently drawing contaminated materials out to sea; for example, from deep excavation pits such as those for the incinerator base, the Horizon foundations and underground car parks

These events are explained in detail in our previous reports, available from our website, sosjersey.co.uk.

3.2. Specific currents

Along the south-east coast in the intertidal zone, lie gullies and reefs – all of which can alter the currents and accelerate them (by 'funnelling') so that there can be cross currents and reverse currents at different depths.

Robin Bay looking west from La Rocque Harbour. An abundance of narrow gullies that produce unusual currents which are unique to each area. (SOSJ, 2013)



Some areas of the coast have specific areas that receive specific types of shells: at Le Hocq, one small area of beach in the summer months becomes covered in an accumulation of orange and brown winkle shells.

Cluster of periwinkle shells at Le Hocq. (Photo: SOSJ, 2013)

This specific current behaviour is relevant to how metals become established in the sand and sediment, 'dropping out' over time from the main longshore current.

The heavy metal particles within the water gradually sink to the bottom and become locked into the sand to be ingested by shellfish which then, in their turn, are eaten by other fish. These fish become food for larger animals, including humans. These shellfish are also collected straight from the beach for human consumption by low water fishermen.

3.3. Scouring caused by reclamation

Reclamation at La Colette began in earnest in May 1994.

Pictured below are the 'Men Only' rocks, part of a larger group of rocks and gullies, which were destroyed and became part of the reclamation site.

The fuel farm (just visible to the right) was then on the eastern edge of the first reclamation site.

Alongside the fuel farm today, now well inland, stands the German bunker which used to be a landmark on the tip of the old jetty at La Collette.

Above: La Collette taken from the Gardens in May 1994. (Photo: SOS Jersey)

Note the pristine sand in that small bay. All the sand before reclamation was clean and healthy. What is left is grey and poorly oxygenated. The beaches have now degraded all the way around this part of the coast to La Grève d'Azette and often smell foul on neap tides.

The pebble banks have moved and the footings have become exposed on some of the sea walls. The beaches that used to be golden sand and full of life (both human and marine) are very poor by comparison, and few people venture down there now.

The area is a shadow of its former self on every level and its destruction could have been prevented.

Reclamation at La Collette has changed the currents not only in the immediate area but also along the east coast.

3.4. The damage to Havre des Pas

Scouring of the beach has also occurred at Havre des Pas where, before the sea wall was built, small boats were dragged up the beach, and ships built at the shipyards in the area were moved down to the sea.

The photo below shows how the beach below the hotels lining the south promenade at Havre des Pas has been scoured by the effect of current being speeded up by the reclamation site. Pebbles from this area have been deposited across the bay at Grève d'Azette.

Above: The power of currents and how they have changed: sand levels below the promenade, Havre des Pas, following La Collette reclamation. (Photo: SOS Jersey, 2015)

The health of the beach has suffered as the healthy top sand has been swept away; now, all we see is heavier clay-like sand with little oxygen.

When SOS Jersey raised this concern with the Planning Officers at the planning stage of La Collette reclamation project, it was informed that there would be no loss of sand in the bay. The subsequent loss of sand that SOSJ reported following reclamation at La Collette was explained by senior officers as temporary and 'seasonal'.

This 'temporary' and 'seasonal' loss of sand has so far lasted three decades. The beach is permanently damaged by erosion.

What effect the change in currents has had on the deposition of metals in suspension is unknown as no testing of the areas described in our studies was done in any meaningful way prior to reclamation. The SOSJ studies in 2009 are the first baseline studies of this kind.

4. What lies under the Waterfront?

The initial phases of reclamation used incinerator ash and builders' waste, including asbestos coated material as fill. The fill was compacted, and the height of the beach slowly raised; a new sea wall was constructed, leaving the old Georgian granite sea wall in place. The surface of the reclaimed land at the Esplanade is now 10 metres above the level of the existing beach.

The filling of the area was poorly regulated. In addition to heavy metals from fly and bottom ash, asbestos and building materials in the ground on the Waterfront, there are also a variety of chemicals and oil-based products.

The fill across the waterfront site, and indeed all the reclaimed land prior to 1995, is extremely toxic and is constantly leaching heavy metals into the marine environment. Deadly fibres from asbestos-coated waste can become released to the air when the reclaimed areas are excavated.

Below is a photograph taken by an SOSJ camera mounted above the Esplanade car park site of the first two buildings of the International Finance Centre. The material being brought up is probably asbestos lagging from old glasshouses. There was so much asbestos and incinerator ash dug up that the entire excavation fill had to be buried in sealed pits at La Collette.

Metals found in high concentrations within the mixed ash:

Antimony
Arsenic
Chromium
Cobalt
Copper
Lead
Manganese
Mercury
Nickel
Selenium
thallium
Tin
Vanadium
Zinc

Photo: Esplanade car park excavation. (SOS Jersey)

Asbestos is now stored in sealed cells at La Collette; this was after lobbying by SOSJ between 2011 and 2014, and the support of the then Minister of TTS. Prior to this time, asbestos had been stored in rusting shipping containers to the east of the reclamation at La Collette alongside the Ramsar Area.

4.1. Inconsistencies in information and regulation

In April 2014, members of SOS Jersey met Lee Henry, CEO of the States of Jersey Development Company (SoJDC), to offer him the use of the WRC-Arup reports commissioned by the Waterfront Enterprise Board (SoJDC's predecessors), which include maps of where the incinerator ash is buried, both by area and method. The CEO declined the offer, saying that while his consultants knew about the report, their view was that there was minimal contamination on the site.

On 15 July 2015, the then Treasury Minister assured members of the States of Jersey that all was well. The Minister said, *"There is a belief – and this has been mentioned before – that there will be some contamination on the site. This has been mentioned previously by SoJDC. It is estimated at most at around about 4 to 5 per cent, …I understand, is what is happening with this particular site where the levels are deemed to be very low indeed, if at all."*

However, official reports from a later Environmental Impact Assessment said, *"During recent development works on the site of Building 4 undertaken in 2015, excavated soils from the basement car park were found to contain large proportions of incinerator ash and asbestos classifying a greater than expected volume of the excavated soils as hazardous."*

So, in fact, the site had 24% of contamination, 5-6 times more than the States were informed of.

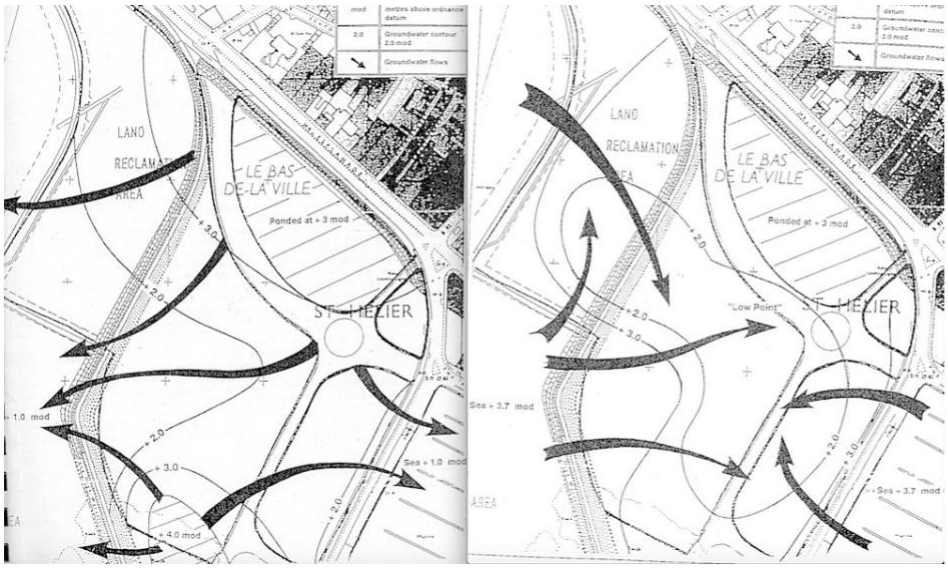
Above: on one side of the fence, workers in full hazmat protection suits excavate hazardous ash and asbestos.
Right: On the other side of the fence nursery workers push babies in prams, while dust covers the pavement. (Photos: SOSJ site cam)

After receiving complaints from the public about the dust and water in the area, SOS Jersey went to investigate and were horrified to see a) excavation dust and water coating the pavement and road, and b) pedestrians, including babies and toddlers, being obliged to walk past the site with no protection, despite workers in full hazmat suits excavating contaminated fill a few yards away. As seen in the pictures, there was only shutter-ply between the protected workers and the non-protected pedestrians. SOS Jersey asked SoJDC to erect plastic sheeting but they declined.

A complaint to the regulator (who had previously cautioned SOJDC when dust from topsoil blew across the road) was rejected, the regulator saying that his daughter walked past the site regularly, and that it was safe to do so. As the dust would have most certainly contained particles of asbestos, SOS Jersey can only wonder why simple precautions were not taken?

4.2. Tidal flow beneath the Waterfront

What is not fully realised by many, is that the area below the Esplanade reclaimed land is still tidal. A tide of about 35ft or more will reach the old sea wall 10 metres below the surface and return to sea carrying material with it. It is a slow but constant process.



Left: At low tide under the Esplanade, groundwater flows from the land to the sea.

Right: The incoming tide mixes with the groundwater and the falling tide takes it out to sea with toxic pollutants in suspension. (Map: WRC Environmental Management)

The Waterfront Enterprise Board was established to develop the reclaimed site on the waterfront at St Helier, and they commissioned an assessment of the reclaimed land from WRC Environmental Management in November 1995. The report concluded:

> *"The effects of flushing by sea water extended beneath the major part of the fill area. At high tide, the external sea level charges the ground with sea water; at low tide seaward gradients are developed, indicating a clear interchange of groundwater…*
>
> *"The rate of groundwater migration, estimated to be 21 metres per year, would tend to indicate that a plume of contaminated waters could take up to 20 years to migrate from the oldest areas of ash disposal to the current sea wall. On this basis, and taking into account the progressive seaward reclamation taking place, it is likely that the heavy metal contaminant front from the leaching of ash has yet to reach the sea wall."*

If the report is correct, as SOSJ believe it to be, then heavy metals have been leaking into the sea from the Waterfront, on a twice daily basis since 2015.

The legacy of bad early dumping practises, combined with poor regulation, the rush to develop reclaimed land, States of Jersey backed projects and their environmental fallout through mistakes and lack of consideration to the power of the sea, have all been factors in bringing us to a point where, environmentally, our Island is on an environmental knife edge.

We must all acknowledge past mistakes without acrimony and work together.

Immediate action must be taken or we will lose our clean air, clean water and clean soil – the basic requirements for a pleasant and healthy environment.

5. Why the Shellfish Studies were necessary

Having monitored the dumping of toxic incinerator ash and other building material at La Collette and the Waterfront since reclamation began, SOS Jersey hoped to ensure that development on this land did not cause further pollution.

Serious marine pollution events have occurred following the use of St Helier foreshore as a dump for the Bellozanne incinerator toxic fly and bottom ash by the then Public Services Department, which was also responsible for the unregulated dumping of unsorted building materials directly onto the beach or into the sea.

The Waterfront is, in effect, one gigantic toxic waste dump.

When raising contaminated site issues with the relevant authorities in the past, the answer SOSJ invariably received was that adequate safeguards were in place. The regulations, however, do not specifically cover the hydropneumatic effects of huge volumes of sea water being forced through the sides (or bottom) of the excavations at each high spring tide. At these times, toxic materials move into the water and get washed to the sea in suspension.

Toxic incinerator ash from the Bellozanne Incinerator being buried in layers of lined pits at La Collette, which now form the 'mound' below the new incinerator. These pits slowly leach heavy metals from the bottom into the Ramsar Area, south-east coast. (Photo: Environment Department)

The photo above shows what is beneath the ash mound at La Collette. The old Bellozanne incinerator ash still poses a threat to the marine environment. The ash cells fill up with ground water and the 'liquor' is:

1. Drained off through the pipes
2. Sent to Bellozanne to be treated
3. Returned to sea via the outflow at First Tower

Photos show how poorly the early cells were made:

- The jagged fill was contained by only a thin membrane
- The cells were driven over by JCBs to tamp the sand down
- The fly ash was then dumped on top
- Further layers of sand and ash were added before the cells were covered
- The process was repeated

Shockingly, before the pits were used, the ash was simply spread on the beach. The early dumping and safety protocols were very poor and the thin linings of the cells could easily be torn.

The Environment Department now acknowledges that heavy metals *do* leach from the bottom of the pits into the sea. Of course, this is a slow process, unlike the frantic pumping of the thick toxic liquor to sea by contractors from the incinerator site at each spring tide, and dilution helps.

However, over time, metals, such as lead, cadmium and zinc sink to the sediment where they can be ingested by filter feeders such as oysters and crabs. These harmful metals then enter the human food chain directly or indirectly.

A dye test by the Jersey Electricity Company in July 2011. (Photo: Tony Pike)

Jersey Electricity (formerly the Jersey Electricity Company) add biocide[1] into the cooling water to prevent the growth of weed and shellfish that clog up the system. The chemical is diluted with the heated water and enters the Ramsar Area directly via the culvert, as is perfectly demonstrated by the photo. While in not considered to be a big threat to the environment, it is one more chemical to be taken into account in the wider picture of the studies.

[1] The biocide was changed fairly recently to comply with EU standards.

6. Pollution from the construction of the Energy from Waste Plant, 2009

In March 2009, thousands of tonnes of contaminated leachate were pumped out of the foundations of the excavated pit of the new incinerator into the sea.

Under the terms of the International Ramsar Treaty to which Jersey is a signatory, the States of Jersey should have immediately reported this pollution to the Ramsar Bureau (via DEFRA) but they failed to do so.

When SOSJ subsequently discussed this event with Tobias Salathé (the Deputy Director of the Ramsar Bureau) he was extremely concerned by the potential harm to bottlenose dolphins and wrote to the Director of Environment but with no success. The Director refused to report either the pollution or simply the fact of the construction.

It should also be noted that the States of Jersey was obliged by the protocol to which it was a signatory, to notify Ramsar that they were going to construct the island's new incinerator a few metres from the edge of the Ramsar Area, but it failed to comply with this requirement.

In an effort to minimise what had happened, in its internal report, the then Transport and Technical Services Department (TTS) referred to the heavily polluted leachate as 'muddy water'.

Above: Contractors illegally pumped toxic leachate into the Ramsar area of La Collette via the cooling culvert belonging to the Jersey Electricity Company (now Jersey Electricity)
(Photo: SOS Jersey, 2009)

6.1. Environmental Scrutiny Panel's Report

SOS Jersey carefully recorded the events from witness reports, site records and photographs and presented the resulting dossier to the States of Jersey. SOS J's concerns were shared by the then Environment Scrutiny Panel, which initiated an independent review and firmly supported SOS J's findings.

New States Members were elected in October, 2011, and a new Environment Scrutiny Panel formed. In a post-election Report (SR25/2011, presented to the States on 9th November 2011) the outgoing Environment Scrutiny Panel's report.

One year later, on 10th January 2012, the (new) Minister for the Environment responded to SR25/2011 in a presentation to the States. The Minister accepted many serious shortcomings in the Report and set out recommendations that would be implemented by the Department.
These recommendations were approved by the States.

The main finding of the panel stated: *'Manpower and resources within the Department cannot always meet legitimate stakeholder aspirations, and in the event of a serious environmental incident the regular workload of the Environmental Protection team is compromised.*'

Further findings addressed the following issues:

- lack of clarity of legally enforceable legislation;
- limited knowledge of the chemical status of Jersey waters;
- not all pollutants were being monitored - the need to out-source investigative monitoring;-
- lack of help for public to access data relating to the marine environment,
- investigation needed into the metal burden entering the Bellozanne STW and its eventual disposal into the marine environment.

Amongst the comments from the Minister (presumably written by senior officers involved in the EFW pollution) were these:

'A serious environmental incident will add pressure on EP's manpower and time resource and again pull resources away from other areas of work. EP use a risk-based approach when securing compliance with the various laws that it administers and uses appropriate enforcement powers including prosecution as an important mechanism for achieving this Environmental safeguard.

In the context of the Panel's second point, a serious environmental incident involves extensive work and will always be prioritised. The criminal process for prosecution requires sufficient, admissible and reliable evidence that the offence has been committed, that there is a realistic prospect of conviction and that it is in the public interest to proceed. This will involve the submission of a comprehensive case file to the Law Officers' Department. The decision to prosecute then lies with the Law Officers.'

The Planning and Environment Minister commented that he was committed to the fundamental aim of SOS Jersey, In the introduction, he said:

'As the Minister for Planning and Environment, I am committed to the protection of the Island's unique marine environment. This is of great importance, not only for the ecology and associated designated Ramsar sites, but also for tourism, the shellfish and fishing industries and the intrinsic well-being of the public. '

Yet, a full 10 years later, as our report is finally ready for publication, what has changed, and what improvements have there been? The events described in our report following on from the EFW pollution which was the catalyst for the Scrutiny Panel's report and findings in 2011, graphically show that our warnings were not heeded, and that Environment Protection withheld vital evidence from the Attorney General.

The answer really to the question: 'What has improved since 2011?' is, 'Not a lot', and environmentally, Jersey is poorer as a result.

The above account demonstrates the real need for independent regulation for, apart from the lack of follow up and monitoring on States-approved recommendations, no prosecution proceedings were undertaken by the Attorney General as would, in normal circumstances, have been expected.

The internal regulator had issued written warnings to the contractors and was well aware of the situation which the Department attempted to keep secret. He received a written offer from the key witness in the case, the Environmental Consultant for the contractors, expressing that he, the witness, wished to give evidence under oath, but the regulator rejected it.

The regulator received SOS Jersey's report but report (although we now understand that this was not passed on to the Attorney General.)

A prosecution could still have gone ahead even on the basis of the information that the Attorney General did actually receive, but the latter refused to prosecute on the grounds that 'it was not in the public interest to continue'.

Above: The Energy from Waste Plant under construction, 10th April 2010. The plant abuts the Ramsar Area, south-east coast. The ash mounds are on the right, rusting containers containing asbestos on the left. (Photo: SOS Jersey)

Data showing the pit water contamination are shown in Appendix 1.

7. Pollution from the Horizon Construction (Elizabeth Marina), 2019

Fast forward 10 years to 2019: members of both SOS Jersey and Earth Project Jersey (EPJ) observed and monitored a further serious pollution event at the States-backed Horizon development on the Waterfront. Once more, despite SOS Jersey and EPJ reporting the pollution, no timely action was taken and pollutants may have been able to disperse with the predominant current to the Ramsar area ('the receptor'), via the Elizabeth Marina.

On this occasion, the Environment Department did eventually react, but only after SOS Jersey and others had taken samples from the Marina which proved to contain very elevated levels of heavy metals. The contractors were charged and fined £10,000.

7.1. The Pathway of pollution

For over a month, on high spring tides, the Elizabeth Marina became muddy and discoloured about two hours after high tide. SOS Jersey collected photographic evidence whilst EPJ members collected water samples at a) high spring tides a month apart, b) at a neap tide, and c) control samples of clear water.

Above: the pathway of pollution from the Horizon excavation to the Elizabeth Marina.

SOS Jersey had requested that work should stop immediately once the flooding and pollution has been noticed. The 'sump' should have been filled in with clean, graded inert rubble to prevent the tide coming in and suspended solids escaping. These measures would have helped prevent further marine pollution while a proper engineering solution was found.

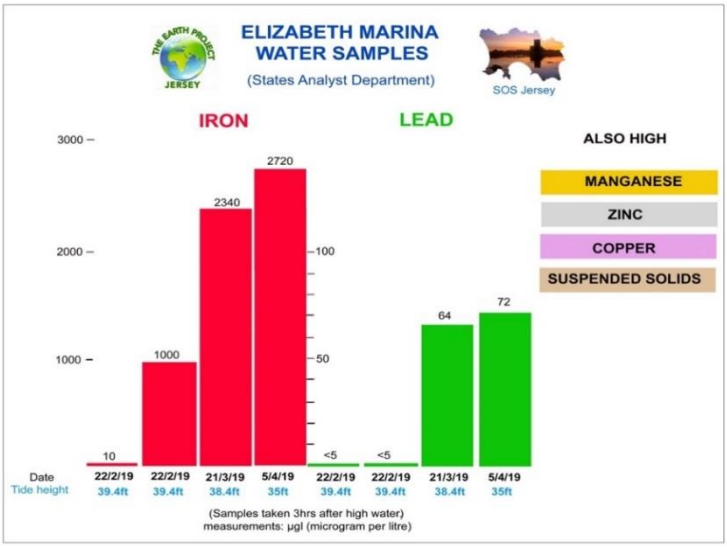
In the event, the work continued, and so did the pollution.

The Environment Department finally started an investigation – and immediately closed the door on the public. The Department would not even discuss what they were doing with the Environment Minister. Despite being excluded, SOS Jersey carried on observing the site.

Despite the marine contamination problems, instead of immediately stopping work, the contractors tried putting geotextile matting into the hole. This did not work. The contractors then dug deeper holes, filling in the areas and digging again.

The process made things worse in the Marina.

The site was entered by the sea twice a day on every tide, even at neap tides. As the chart below shows, the States Analyst's testing for heavy metals showed very elevated levels of a number of toxic metals such as lead, iron, copper, manganese, arsenic and zinc with very high levels of suspended solids.



Above and below: Results of heavy metal samples taken one month apart in Elizabeth Marina. Seawater samples analysed by the States Analyst show extremely high levels of lead and iron. Manganese, zinc and copper levels were also very high.

■ **Analysis:**
The samples have been analysed with the following results;

Parameter	control water, marina 22/02/19	silty water, marina 22/02/19	silty water, marina 21/03/19	Unit
Lead	<5	<5	64	µg/L Pb
Zinc	<10	10	60	µg/L Zn
copper	<10	<10	20	µg/L Cu
iron	10	~1000	2340	µg/L Fe
manganese	<10	30	180	µg/L Mn
arsenic	<5	<5	5	µg/L As
chromium	<2	<2	2.7	µg/L Cr
cadmium	<0.5	<0.5	<0.5	µg/L Cd
nickel	<10	<10	<10	µg/L Ni
suspended solids	137	246	423	mg/L

The Horizon development is being carried out by the States of Jersey-owned Quango, the States of Jersey Development Company (SOJDC).

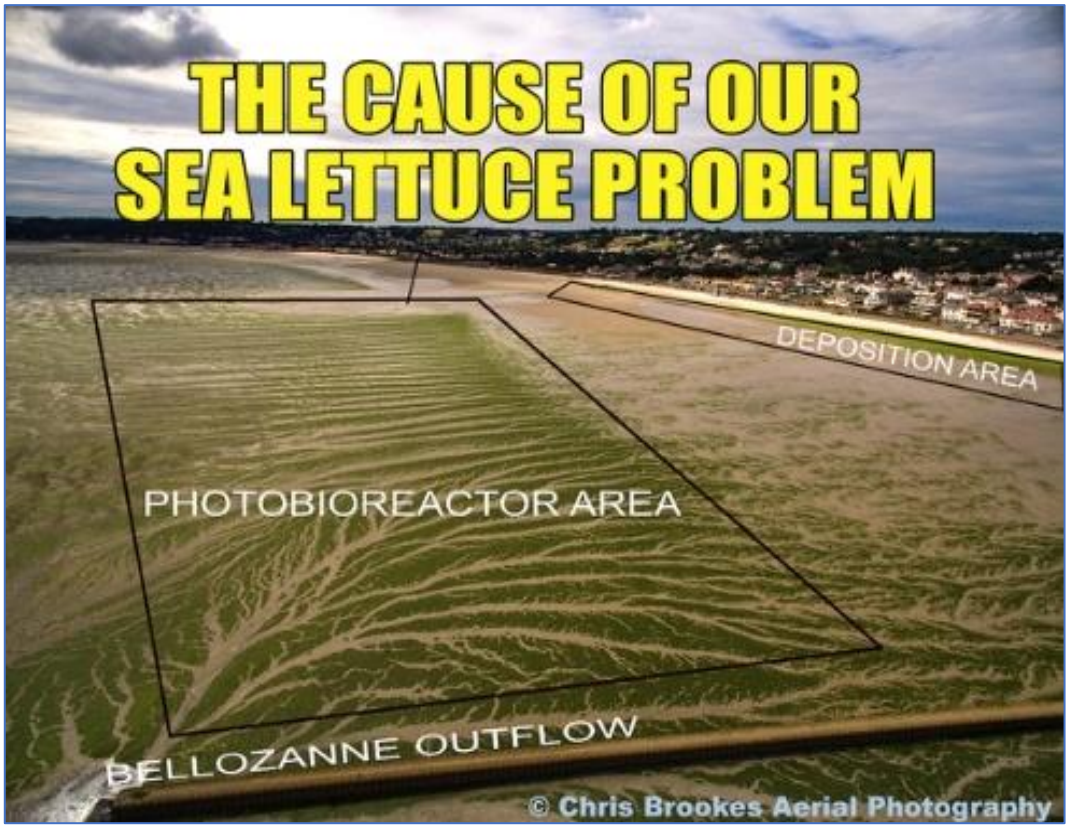
Had the project been undertaken by a private contractor, SOS Jersey believe that work would have immediately been stopped. Instead, as with other SOJDC-caused pollution events (during the first building in the International Finance Centre, and the construction of the Energy from Waste Plant), work carried on.

8. Excess nitrates and sea lettuce in St Aubin's Bay

In 2016, as thick swathes of sea lettuce once again blighted St Aubin's Bay, an SOS Jersey team sampled several outflows in the Bay and further along the south and east coasts, to determine whether excess nitrates (the main cause of the problem), were entering the bay and from which outflows.

The view of the then Transport and Technical Services (TTS), which were responsible for the Bellozanne outflow at First Tower, was that the bulk of the nitrates came in from France and the CEO and Minister denied that the outflow was responsible. SOS Jersey had previously asked to see results from the testing of the outflow but were assured by the Environmental Regulator that there was no need to test the outflow as the Department 'knew what went in, so they knew what came out'.

After obtaining aerial shots that gave a visual indication that our suspicions were correct, SOSJ Jersey put a team on the beach for several weeks during the summer of 2016, collecting samples from several key outflows along the south coast, including the First Tower outfall (shown in the picture below), which runs from the Bellozanne sewage treatment plant.

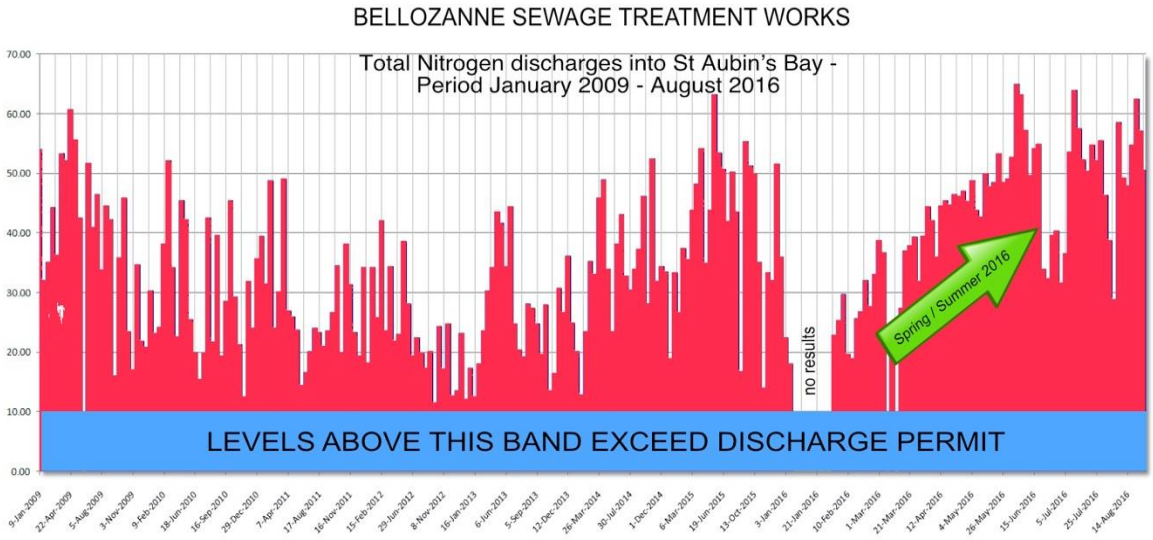


Above: An aerial photo showing how the nutrients from the Bellozanne sewage treatment works outflow at First Tower develop and take hold along St Aubin's Bay. (Photo courtesy of Chris Brookes)

The samples were tested by the States Analyst's Department. The results were conclusive: nitrate nitrite and ammonia levels were high. It was only following a Freedom of Information request that SOS Jersey obtained data going back to 2009 showing that TTS had released up to five times the legally agreed amount under their Discharge Permit.

8.1. Consistent, illegal discharges

As can be seen from these data, high levels of nitrates were regularly discharged into St Aubin's Bay. As high levels were not consistently found in the other outflows, it can be shown that the Bellozanne outflow was mainly responsible for the discharge – and, during hot weather, huge swathes of sea lettuce growth through most of the summers in question.



Graph depicting the official data finally received via an FOI request. (SOS Jersey)

This situation indicated the need for an Independent Regulator as it was clear that the public and the States of Jersey were being misled.

Previous reports on Jersey's sea lettuce problem can be found on sosjersey.co.uk.

Sea lettuce builds up at West Park. (Photo: EPJ, August 2017)

9. PFAS in drinking water

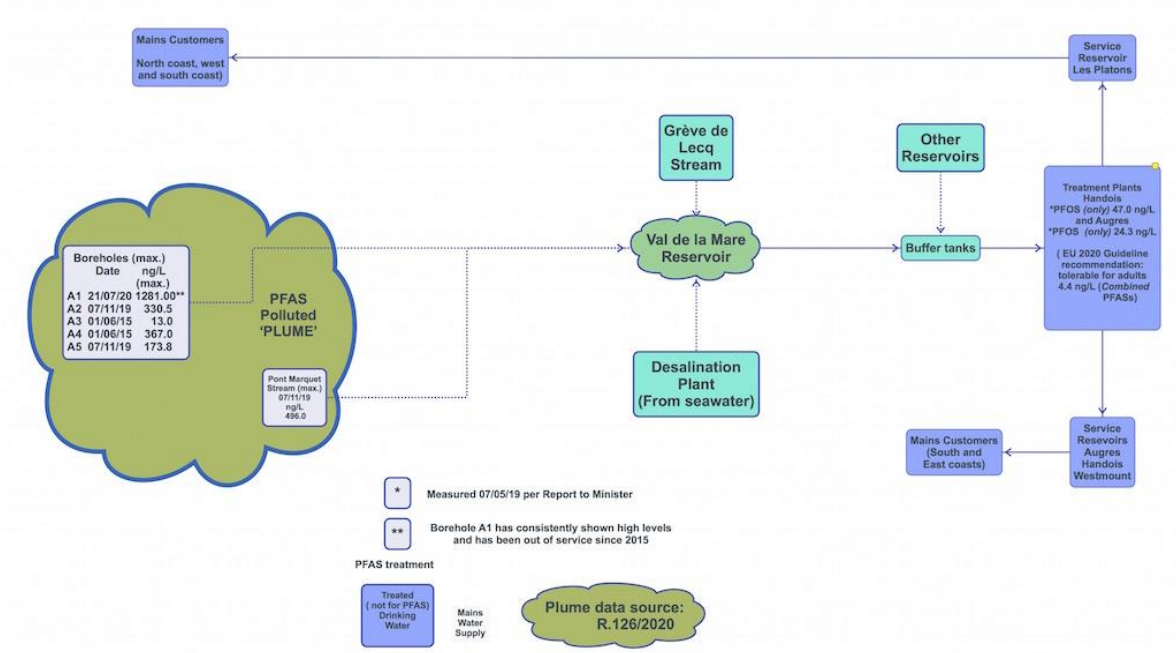
Although SOS Jersey concentrates on the marine environment, fresh water on land – runoff from farmland, streams, outfalls, water from boreholes and mains water from the reservoirs – must be factored in, as all this water ends up in our inshore waters.

As seen above, heavy metal contamination from La Collette and the Waterfront and the discharges from the Bellozanne sewage treatment works and other sources are sources of concern. Worryingly, there is now another pollutant to add to the list.

In recent years, it has emerged that the Island has a major pollution problem with 'polyfluoroalkyl substances' (PFAS), which is a generic title for many hundreds of many similar individual toxic chemicals). Due to the weekly use of fire retardants[2] on fire drill practice over many years at the airport, a vast accumulation of PFAS soaked into the soil and spread into a massive plume infiltrating the aquifer below St Ouen's Bay. It continues to do so.

PFAS is non-biodegradable and, if ingested, accumulates in living organisms, including humans. It can eventually lead to adverse health outcomes, including kidney problems. For many years, residents in and around this plume had complained to the health authorities about their abnormally high incidence of serious illnesses. They believed there to be a connection between the problems and their ingestion of drinking water from their private boreholes, but their concerns were dismissed.

This diagram shows how PFAS enters our water system and how it is spread:



Sourcing, collecting, transferring, treatment and distribution of our drinking water. (Illustration: SOS Jersey, using official PFAS measurements)

[2] Perfluorooctanesulphonic acid (PFOS), which is a flagged problem-causing toxin, was one of the PFAS chemicals present.

An investigation undertaken by SOS Jersey and others in 2020 revealed that not only those with private boreholes were being affected but that heavily PFAS contaminated States-owned boreholes nearby were being pumped into a primary source for the Island's mains water supply, Val de la Mare reservoir, and subsequently, via the central treatment works to every mains outlet in the Island. The central treatment process has not been equipped to remove PFAS and its installation would be extremely costly as well as involving substantial land requisitioning.

Costly soil remediation is years overdue and has become increasingly relevant, if not inevitable, as the level of PFAS in drinking water deemed acceptable by the EU and USA has dropped rapidly in recent years to be nearly approaching the actual level in Jersey. Being a 'forever chemical', PFAS is either being recycled through the environment until it eventually drains into the sea, where it continues to cause environmental damage, or being assimilated into animals and humans.

Despite the cost of remediation, Guernsey, which had a similar problem with firefighting foam contaminating an area adjacent to their airport, excavated the soil and cleaned up the area, replacing the soil.

Jersey's Government, however, did not take the same approach, and it has recently been confirmed that the Government signed a 'Deed of Settlement' with the US manufacturers 3M, manufacturers of the synthetic foam that was used at the Airport and which caused the pollution. In January 2005, after a 'behind closed doors' debate, the government accepted a payment of £2.6 million from 3M.

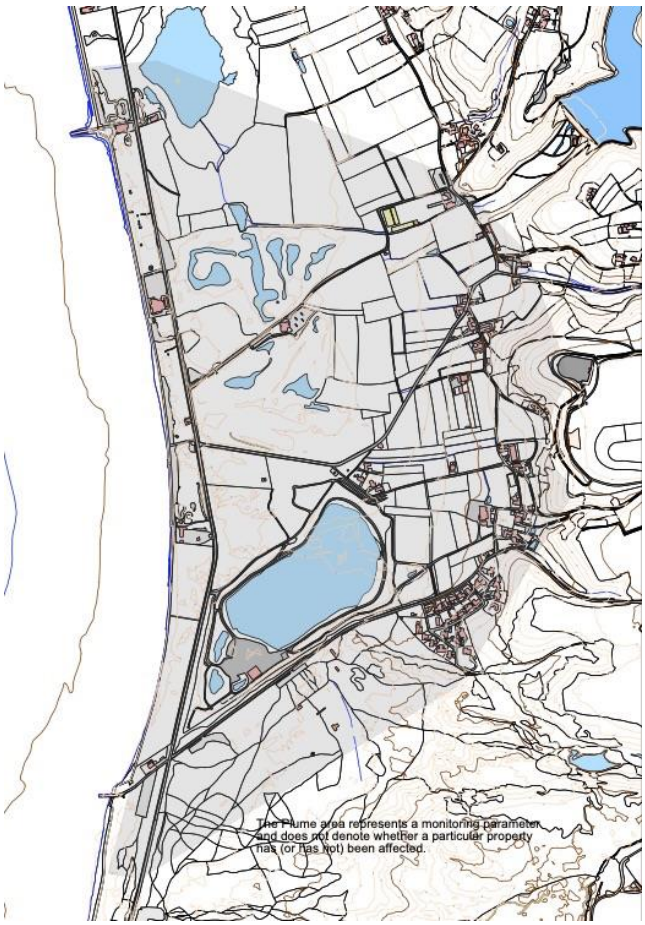


Illustration from the official States of Jersey report

As part of the deal, the government is legally obliged to provide information to 3M to help the firm defend any claim that may be made against it including by Islanders who may have suffered health problems in the area.

This picture shows the 'plume' of the contaminated area. In the case of residents in the St Peter's area affected, many residents have drunk contaminated water from boreholes for years and have subsequently developed a range of worrying and serious illnesses. They have had to arrange their own blood tests at significant expense.

It will be up to the individuals to prove any connection with PFAS should they seek compensation, as the Government now cannot help the residents under the terms of the 'pay off'.

10. SOS Jersey shellfish studies, 2009 and 2019

In 2009, concerned about pollution emanating from the La Collette and Waterfront areas, SOS Jersey decided to take baseline samples of shellfish from the South East Ramsar area for heavy metal analysis.

The study was a 'snapshot in time':

- From three key areas
- Using three key species of bi-valve bottom-feeding filter feeders, chosen as they feed where heavy metals collect
- From three locations in the south-east coast part of Jersey's Ramsar Area, 'downstream' from La Collette and the Waterfront

The three species chosen were: the (wild) Pacific oyster, common cockle, and common slipper limpet. These shellfish are all good indicators of the purity of seawater and will absorb heavy metals.

SOS Jersey took the decision to repeat this exercise ten years later, in 2019, and succeeded in doing so, thanks to obtaining the necessary funding for testing following a grant from the Co-op and donations from the public. Volunteers repeated the process on the same tides, days and areas as accurately as could be achieved. All samples were sent to the States Analyst's department for testing.

Above: SOS Jersey Members and Hautlieu students prepare to collect samples at Le Hocq, July 2019 (Photo: SOS Jersey)

10.1. Areas sampled

Samples were collected from the Ramsar Area at three points: La Collette/Havre des Pas, Green Island and Le Hocq.

Samples were collected over the course of two days on the lowest spring tide. To ensure accuracy and relevance, the GPS points, tides, times and species were replicated from the 2009 testing points as accurately as possible.

Above: Map of the Collection points: 1: La Collette/Havre des Pas; 2: Green Island; 3: Le Hocq. (Courtesy Christian Guest)

10.2. Species sampled

Bottom feeding bi-valves were chosen. Although they purify seawater and remove excess nitrates, these shellfish absorb metals such as zinc, copper and lead and these elements are found in their flesh.

When the farmed oysters are filtered in clean water for 48 hours to remove bacteria before being sold for human consumption, they retain heavy metals, which are then ingested by humans when eaten.

In the wild, these shellfish become part of the food chain and are eaten by wading birds and many species of fish and crustacea. In the Ramsar Area, oysters, cockles and mussels are collected directly from the beach by low water fishermen and eaten without being treated.

The teams thus collected Pacific oysters, common cockles and slipper limpets in both 2009 and 2019; there is more about these bivalves in Appendix 2.

10.3. Results of the shellfish surveys

The data collected are shown below.

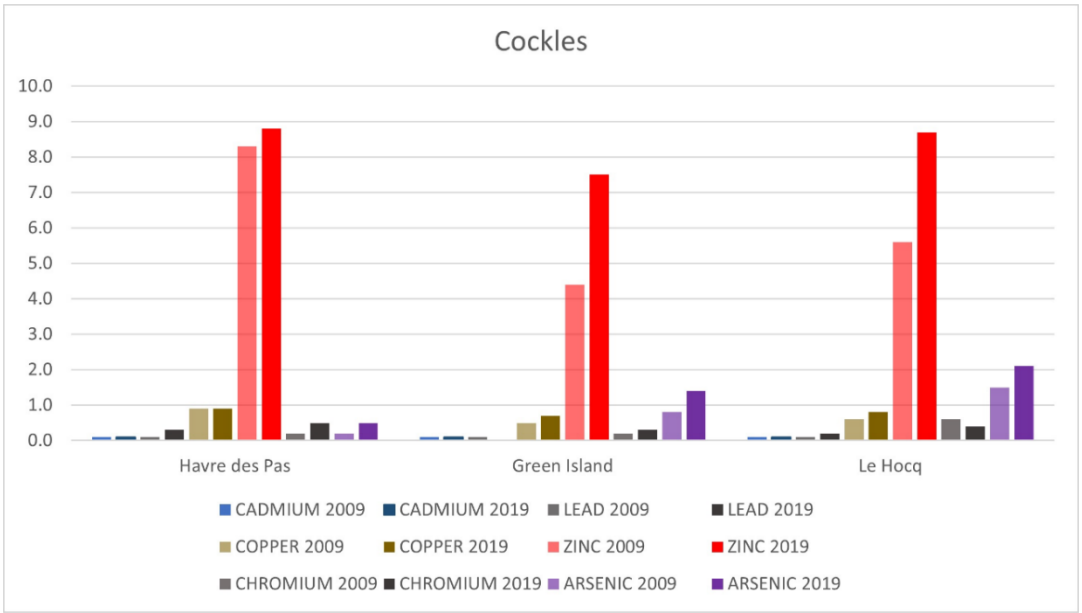
KEY

Samples in mg/kg wet weight; dry weight data are available on request
n/a not available *Italicised 0.1* = <0.1
2009 data 2019 data
Cells highlighted in red = % increase
HP = Havre des Pas GI = Green Island LH = Le Hocq

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	**COCKLE**	**HP 2009**	**HP 2019**	**CHANGE**	**% INCREASE**		**GI 2009**	**GI 2019**	**CHANGE**	**% INCREASE**		**LH 2009**	**LH 2019**	**CHANGE**	**% INCREASE**
2	CADMIUM	*0.1*	*0.1*	0.0	0.00		*0.1*	*0.1*	0.0	0.00		*0.1*	*0.1*	0.0	0.00
3	LEAD	0.1	0.3	0.2	200.00		*0.1*	n/a	n/a	n/a		0.1	0.2	0.1	100.00
4	COPPER	0.9	0.9	0.0	0.00		0.5	0.7	0.2	40.00		0.6	0.8	0.2	33.33
5	ZINC	8.3	8.8	0.5	6.02		4.4	7.5	3.1	70.45		5.6	8.7	3.1	55.36
6	CHROMIUM	0.2	0.5	0.3	150.00		0.2	0.3	0.1	50.00		0.6	0.4	-0.2	-33.33
7	ARSENIC	1.3	1.8	0.5	38.46		0.8	1.4	0.6	75.00		1.5	2.1	0.6	40.00
8															
9	**OYSTER**	**HP 2009**	**HP 2019**	**CHANGE**	**% INCREASE**		**GI 2009**	**GI 2019**	**CHANGE**	**% INCREASE**		**LH 2009**	**LH 2019**	**CHANGE**	**% INCREASE**
10	CADMIUM	0.2	0.2	0.0	0.00		0.1	0.3	0.2	200.00		0.2	*0.1*	-0.1	-50.00
11	LEAD	0.3	0.2	-0.1	-33.33		0.2	0.3	0.1	50.00		0.3	0.2	-0.1	-33.33
12	COPPER	17.0	11.4	-5.6	-32.94		13.7	21.6	7.9	57.66		30.3	6.4	-23.9	-78.88
13	ZINC	400.0	281.0	-119.0	-29.75		292.0	617.0	325.0	111.30		848.0	239.0	-609.0	-71.82
14	CHROMIUM	0.2	*0.1*	-0.1	-50.00		0.1	0.4	0.3	300.00		0.2	*0.1*	-0.1	-50.00
15	ARSENIC	3.4	3.3	-0.1	-2.94		3.1	3.3	0.2	6.45		3.6	3.0	-0.6	-16.67
16															
17	**SLIPPER LIMPET**	**HP 2009**	**HP 2019**	**CHANGE**	**% INCREASE**		**GI 2009**	**GI 2019**	**CHANGE**	**% INCREASE**		**LH 2009**	**LH 2019**	**CHANGE**	**% INCREASE**
18	CADMIUM	*0.1*	*0.1*	0.0	0.00		n/a	*0.1*	n/a	n/a		n/a	*0.1*	n/a	n/a
19	LEAD	0.1	0.2	0.1	100.00		n/a	0.3	n/a	n/a		n/a	0.2	n/a	n/a
20	COPPER	4.8	6.1	1.3	27.08		n/a	3.4	n/a	n/a		n/a	2.4	n/a	n/a
21	ZINC	4.1	5.2	1.1	26.83		n/a	7.4	n/a	n/a		n/a	8.1	n/a	n/a
22	CHROMIUM	*0.1*	0.1	0.0	0.00		n/a	0.1	n/a	n/a		n/a	*0.1*	n/a	n/a
23	ARSENIC	1.5	3.2	1.7	113.33		n/a	2.8	n/a	n/a		n/a	2.9	n/a	n/a

Above: A simple spreadsheet of the results.

Below: One of the comparisons charts; this one shows heavy metals in cockles. Note the small but possibly significant rise in some metals over the period. See Appendix 3 for further charts.



10.4. Findings from the shellfish survey

1: There has been a marked elevation of heavy metals in some shellfish since 2009

While recognising that for cost reasons SOS Jersey was constrained in the number of samples it could take from each area, a pattern has emerged which suggests that there has been an increase of the levels of heavy metals in three of the species sampled, and in most of the areas where samples were taken since 2019.

There are anomalies which need to be explained; for example, why did the oysters have elevated levels of most metals in three areas but a decrease in another? The anomaly could be attributed to:

- The low numbers of samples taken
- The individual feeding mechanisms of each species of bivalve
- Different currents carrying different metals differently

Levels of all metals (in particular, lead) are elevated in cockles in all areas, and have risen by significant amounts over the 10 years between samplings. This may be because cockles burrow below the surface and are found deeper than oysters and where, as one would expect, metals with a heavier molecular weight, such as lead, settle. Cockles at Havre des Pas showed, for instance, a 200% increase in lead and 150% increase in chromium.

Havre des Pas is closest to the La Collette reclamation site, where the ash pits are stacked, and while any connection with the ash pits cannot be established until more testing is done, indications so far are worrying.

2: There has been a reduction in numbers and varieties of some species over the decade

One thing struck those of the team who regularly visit the beaches and who have been involved in the collection of shellfish either as a leisure pastime or for study: since the first study in 2009, samples were harder to locate. Slipper limpets were not found in the areas of Le Hocq and Green Island, two areas in which they were plentiful in 2009. Other samples were harder to find.

It is notable that the inter-tidal areas of these beaches have lower shellfish numbers than they did 10 years ago[3]. This could be because collecting for home consumption has become more popular in recent years; in the upper beach areas, even the humble limpets are scarce as a result.

3: There is a need for a further study

Given the results of these studies, *SOS Jersey recommend further and ongoing monitoring and measurement of shellfish contamination, particularly in the areas of high risk identified, with all the results being made public.*

[3] Anyone who has visited Grouville or St Clement's Bays with a prawning net will say that the abundance of prawns, which used to be plentiful, are either scarce or not to be found. This is arguably the result of over-fishing rather than pollution and requires further study to ascertain. Razor clams have been subject to virus problems in recent years and their numbers have diminished.

11. SOS Jersey – Executive Summary

1. There is an urgent need for an Independent Environmental Regulator

Monitoring of several Waterfront developments by SOS Jersey over many years have shown that current planning regulations and environmental controls are not suited to conditions found on or in highly contaminated reclaimed land. It is further noted that where developments are Government-sanctioned, environmental controls appear to be weaker than they should be.

2. Reports and feedback from the public must be dealt with properly

A lack of trust is inevitable when no action is taken (or there is a reluctance to act even in the face of hard evidence) when waterborne or airborne pollution events are reported.

Our government departments must always act appropriately and be seen to do so.

In addition, our government departments must not be seen to favour contractors or projects that have political support and we can only speculate as to why they might not be acting in the way we would expect them to.

Jersey has Independent Financial Regulation, a Children's Commissioner and a Data Commissioner and more, yet our Island's most precious commodity, its natural environment, is not similarly protected.

3. Special factors relating to the staffing of the Environment Department (ED)

The relationship between SOSJ and the ED has at times proved to be difficult with the latter appearing to always be reactive and on the defensive rather than being proactive and looking enthusiastically at new ideas and ways of doing things. This could well be a result of the island's isolation from the mainland with its greater ease of cross communication and job mobility in a fast-changing world. This has resulted locally in a tendency to prioritise the protection of the department and its management as opposed to providing active leadership across the board in a tiny crowded island with urgent environmental requirements.

4. Significant judicial functions should not be housed within the Environment Department

With the increasing and competing demands placed upon the fast-growing Island from all sides, the pressure on its environment has recently grown dramatically. Almost every major decision taken impacts the environment in some way. Public awareness of the importance of environmental issues and the need for information and engagement with the public is much greater than in the past. However, officers in the Environment Department are constantly working within the Government hierarchy and are subject to political and possibly even conflicts arising due to personal reporting pressures. This conflict, perhaps acceptable in the past, is no longer appropriate or even fair on those involved.

12. Comment and conclusion

SOS Jersey suggests, that while this comparative study was vital to undertake, it would never have been necessary if:

a. The right laws had been in place

b. What laws there were had been upheld

c. Due diligence had been observed by the bodies causing the pollution

In addition, SOSJ was surprised to learn last year from the Attorney General that their 2009 evidence dossier regarding pollution from the Energy from Waste Plant excavation, approved and supported by the Environmental Scrutiny Panel at the time, was withheld from the evidence presented to the Attorney General of the time.

SOS Jersey was also more recently informed that the samples that had been collected from the Elizabeth Marina in 2019 (and shown by the States Analyst to have extremely high levels of heavy metals in suspension) were *not* sent to the Attorney General in the evidence package sent by the Environment Department.

The reason given to the Chairman of Earth Project Jersey, Andrew Le Quesne, for this omission by the Regulator, was that the Regulator had had decided to withhold the evidence of the results of the laboratory tests carried out by the States Analyst on the basis that they 'did not comply with Environmental Management Standards'.

This raises many questions, including about the relationship of the States Analyst Department and the Environment Department, who surely must work collaboratively and to an agreed set of standards?

Please note that the quoted standard was a 2008 EU Directive (not widely adopted) that forms no part of any Jersey Law; this was confirmed to Mr Le Quesne via a Freedom of Information Request.

SOS Jersey suggest that vital evidence was withheld for no publicly-ostensible reason, and apparently to protect the regulatory failure of the very Department charged with the investigation.

All the above illustrates beyond doubt the need for an Independent Regulatory body.

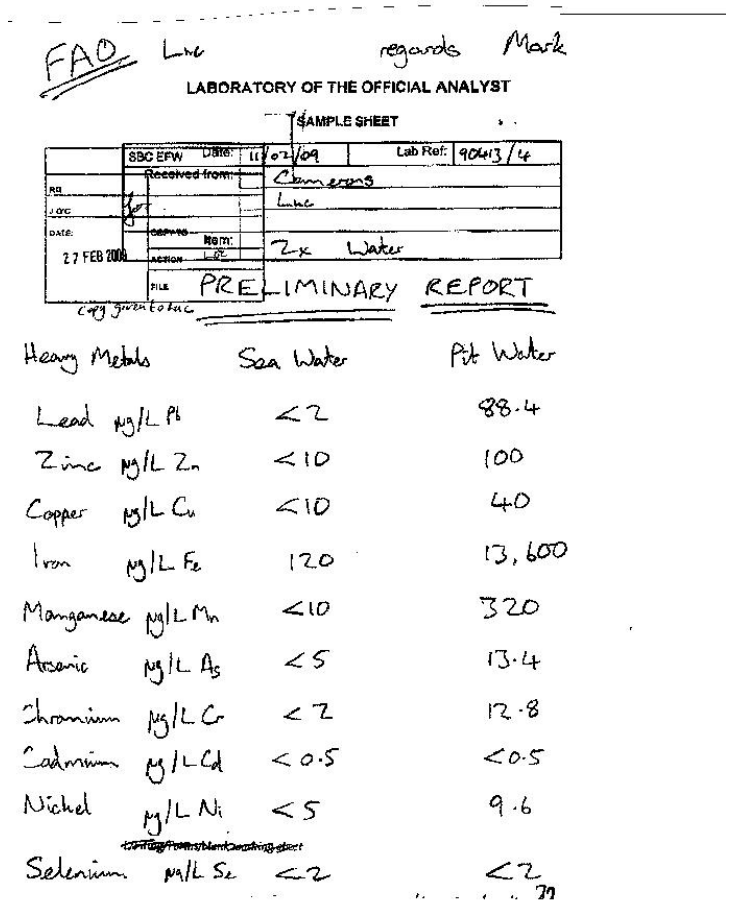
SOS Jersey call for the appointment of an
Independent Environmental Regulator in Jersey.

The Chairman and Committee
SOS Jersey
22 April 2021

Spokesperson on this issue: David Cabeldu – mobile: 077977 33613 email: jerseyinperil@gmail.com

Appendix 1. Pit water contamination data

In the results of this sample of pit water, note the difference between the levels of lead, zinc and manganese compared to normal seawater.



FAO Luc regards Mark

LABORATORY OF THE OFFICIAL ANALYST

SAMPLE SHEET

SBC EFW Date: 11/02/09 Lab Ref: 90413/4

Received from: Camerons

Luc

Nom:

2 x Water

27 FEB 2009

PRELIMINARY REPORT

copy given to Luc

Heavy Metals		Sea Water	Pit Water
Lead	µg/L Pb	<2	88.4
Zinc	µg/L Zn	<10	100
Copper	µg/L Cu	<10	40
Iron	µg/L Fe	120	13,600
Manganese	µg/L Mn	<10	320
Arsenic	µg/L As	<5	13.4
Chromium	µg/L Cr	<2	12.8
Cadmium	µg/L Cd	<0.5	<0.5
Nickel	µg/L Ni	<5	9.6
Selenium	µg/L Se	<2	<2

Sample of pit water taken by the contractors at the incinerator construction site and analysed by the States Analyst.

Appendix 2. About the shellfish species collected

Pacific oysters (*Crassostrea gigas*)

SOSJ sampled wild Pacific oysters that affix to rocks rather than the farmed oysters grown in cages on trestles.

The Pacific oyster (also Japanese oyster, or Miyagi oyster) is native to the Pacific coast of Asia. It has become an introduced species in North America, Australia, Europe, and New Zealand.

Pacific oysters grow quickly and reproduce rapidly. They first mature and reproduce as males, then later develop into females. Spawning is seasonal and depends on water temperature.

Pacific Oyster (Photo: Commons)

Slipper limpet (*Crepidula fornicata*)

Crepidula fornicata was brought to Europe on imported American oysters in the late 19th century and is now considered an invasive pest there.

They are not, as the name suggests, limpets; they merely look like them. In fact, they are snails, a member of the calyptraeid family, more closely related to conches and cowries.

Calyptraeids may form a tower of up to 25 animals. The bottom snail is always female. When the female dies, the male above her will change from male to female – and so the chain continues.

Slipper Limpet (Photo: Commons)

Common cockle (*Cerastoderma edule*)

Cockles are edible, marine bivalve molluscs, which can be found in sandy, sheltered beaches throughout the world.

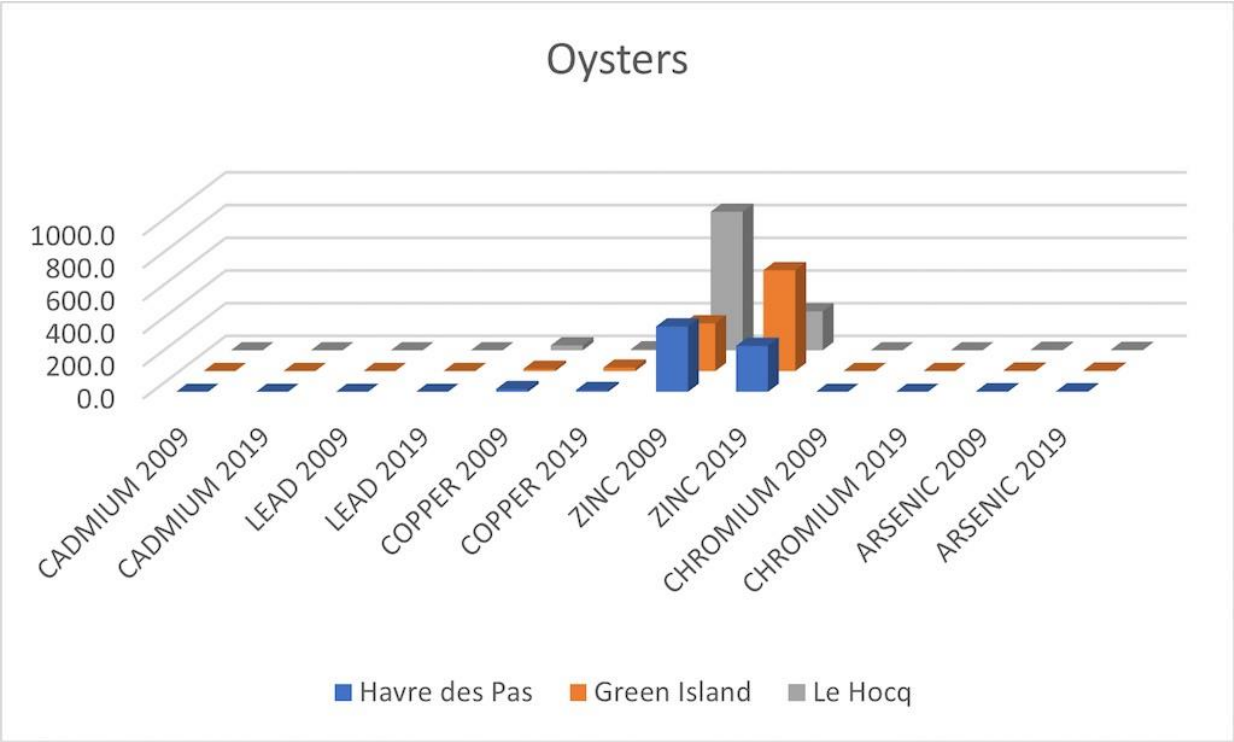
Cockles are common in Jersey and it was with some surprise that sourcing them in 2019 was difficult.

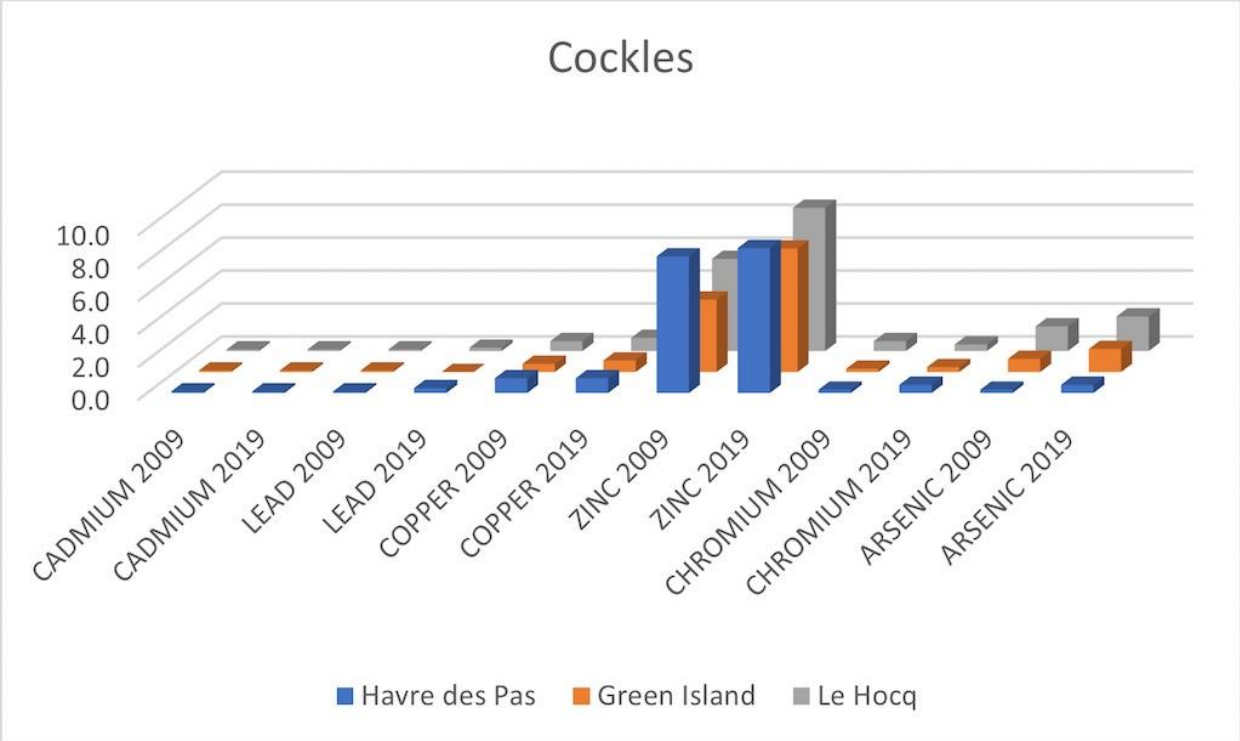
The common cockle plays a major role as a source of food for crustaceans, fish and wading birds.

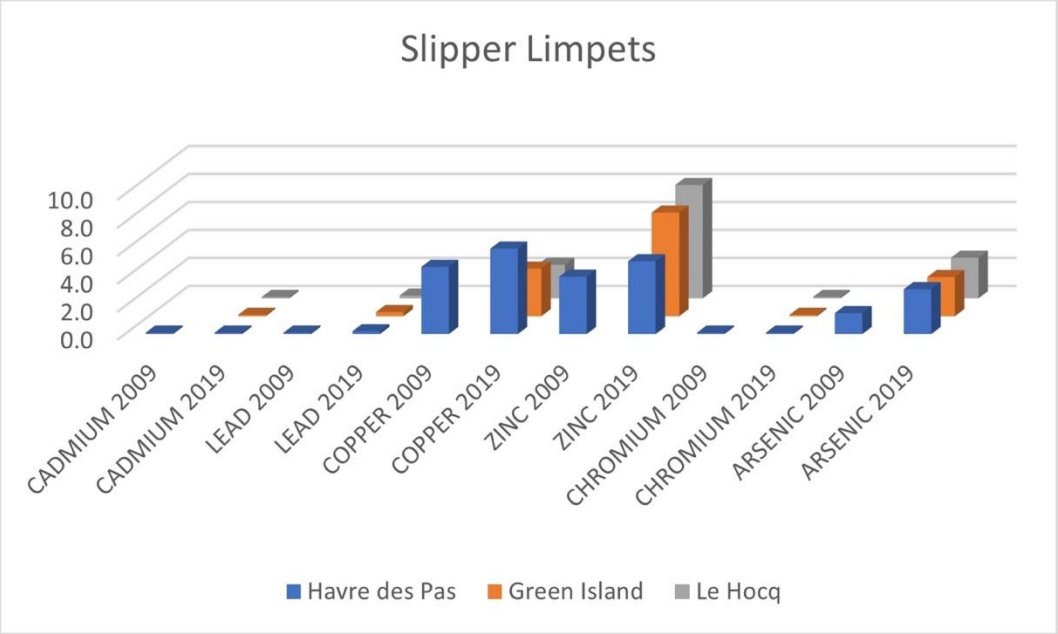
Common cockle (Photo: Commons)

Appendix 3. Graphs and data (shellfish study)

These graphs reflect dry weight measurements; dry weight data are available on request

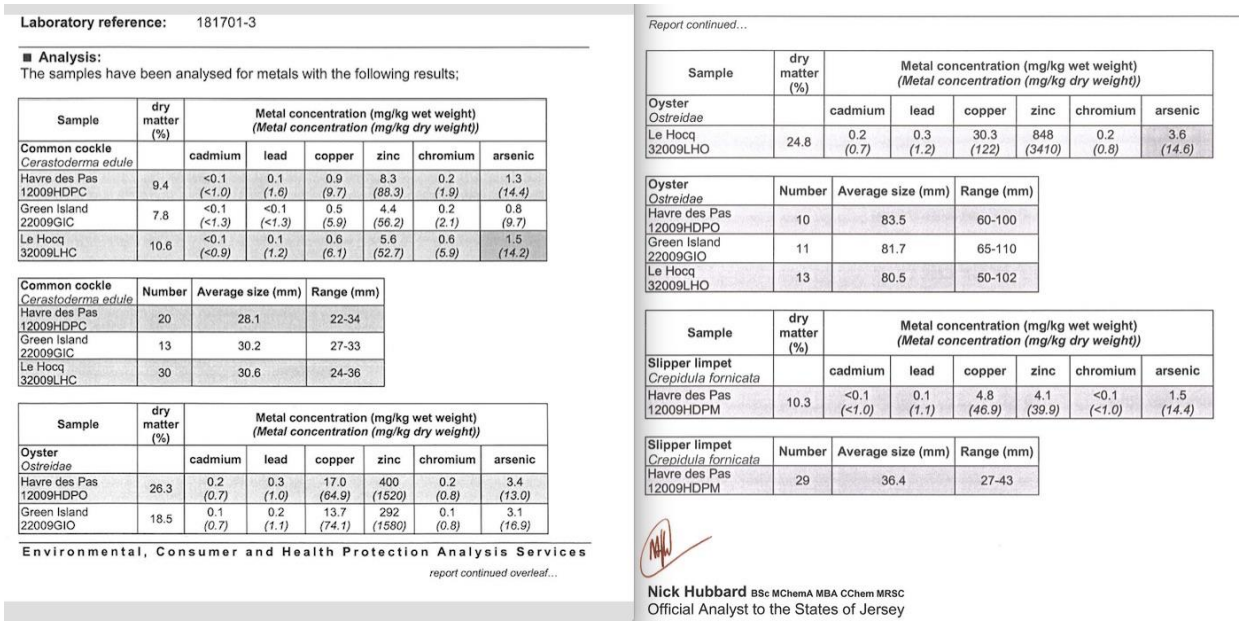





Slipper Limpets
10.0
8.0
6.0
4.0
2.0
0.0
CADMIUM 2009
CADMIUM 2019
LEAD 2009
LEAD 2019
COPPER 2009
COPPER 2019
ZINC 2009
ZINC 2019
CHROMIUM 2009
CHROMIUM 2019
ARSENIC 2009
ARSENIC 2019
Havre des Pas
Green Island
Le Hocq

Appendix 4: Laboratory results from shellfish samples

States of Jersey Analyst's Laboratory results for samples collected August, 2009



Laboratory reference: 181701-3

Analysis:
The samples have been analysed for metals with the following results;

Sample	dry matter (%)	Metal concentration (mg/kg wet weight) *(Metal concentration (mg/kg dry weight))*					
Common cockle *Cerastoderma edule*		cadmium	lead	copper	zinc	chromium	arsenic
Havre des Pas 12009HDPC	9.4	<0.1 *(<1.0)*	0.1 *(1.6)*	0.9 *(9.7)*	8.3 *(88.3)*	0.2 *(1.9)*	1.3 *(14.4)*
Green Island 22009GIC	7.8	<0.1 *(<1.3)*	<0.1 *(<1.3)*	0.5 *(5.9)*	4.4 *(56.2)*	0.2 *(2.1)*	0.8 *(9.7)*
Le Hocq 32009LHC	10.6	<0.1 *(<0.9)*	0.1 *(1.2)*	0.6 *(6.1)*	5.6 *(52.7)*	0.6 *(5.9)*	1.5 *(14.2)*

Common cockle *Cerastoderma edule*	Number	Average size (mm)	Range (mm)
Havre des Pas 12009HDPC	20	28.1	22-34
Green Island 22009GIC	13	30.2	27-33
Le Hocq 32009LHC	30	30.6	24-36

Sample	dry matter (%)	Metal concentration (mg/kg wet weight) *(Metal concentration (mg/kg dry weight))*					
Oyster *Ostreidae*		cadmium	lead	copper	zinc	chromium	arsenic
Havre des Pas 12009HDPO	26.3	0.2 *(0.7)*	0.3 *(1.0)*	17.0 *(64.9)*	400 *(1520)*	0.2 *(0.8)*	3.4 *(13.0)*
Green Island 22009GIO	18.5	0.1 *(0.7)*	0.2 *(1.1)*	13.7 *(74.1)*	292 *(1580)*	0.1 *(0.8)*	3.1 *(16.9)*

Environmental, Consumer and Health Protection Analysis Services

report continued overleaf...

Report continued...

Sample	dry matter (%)	Metal concentration (mg/kg wet weight) *(Metal concentration (mg/kg dry weight))*					
Oyster *Ostreidae*		cadmium	lead	copper	zinc	chromium	arsenic
Le Hocq 32009LHO	24.8	0.2 *(0.7)*	0.3 *(1.2)*	30.3 *(122)*	848 *(3410)*	0.2 *(0.8)*	3.6 *(14.6)*

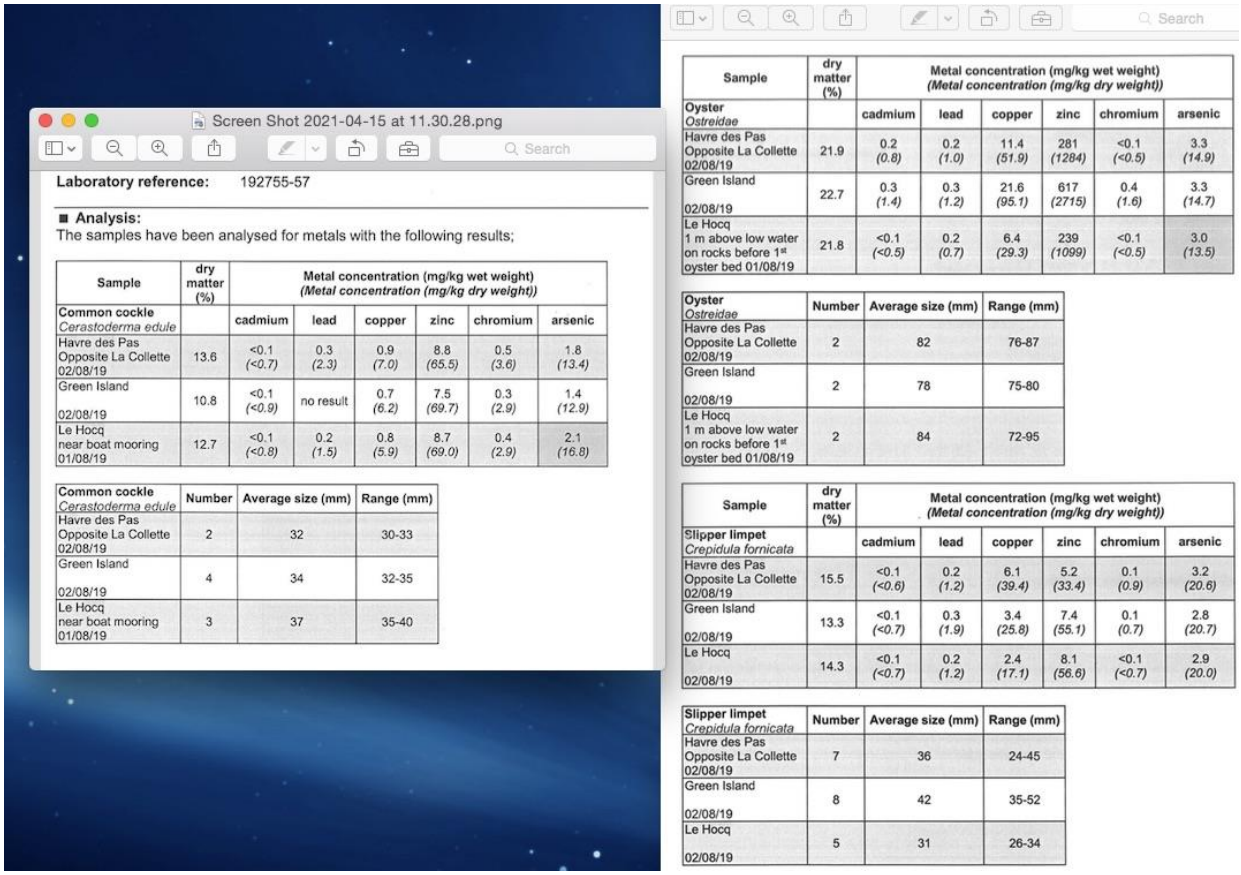
Oyster *Ostreidae*	Number	Average size (mm)	Range (mm)
Havre des Pas 12009HDPO	10	83.5	60-100
Green Island 22009GIO	11	81.7	65-110
Le Hocq 32009LHO	13	80.5	50-102

Sample	dry matter (%)	Metal concentration (mg/kg wet weight) *(Metal concentration (mg/kg dry weight))*					
Slipper limpet *Crepidula fornicata*		cadmium	lead	copper	zinc	chromium	arsenic
Havre des Pas 12009HDPM	10.3	<0.1 *(<1.0)*	0.1 *(1.1)*	4.8 *(46.9)*	4.1 *(39.9)*	<0.1 *(<1.0)*	1.5 *(14.4)*

Slipper limpet *Crepidula fornicata*	Number	Average size (mm)	Range (mm)
Havre des Pas 12009HDPM	29	36.4	27-43

Nick Hubbard BSc MChemA MBA CChem MRSC
Official Analyst to the States of Jersey

States of Jersey Analyst's Laboratory results for samples collected August, 2019



Screen Shot 2021-04-15 at 11.30.28.png

Laboratory reference: 192755-57

Analysis:
The samples have been analysed for metals with the following results;

Sample	dry matter (%)	Metal concentration (mg/kg wet weight) *(Metal concentration (mg/kg dry weight))*					
Common cockle *Cerastoderma edule*		cadmium	lead	copper	zinc	chromium	arsenic
Havre des Pas Opposite La Collette 02/08/19	13.6	<0.1 *(<0.7)*	0.3 *(2.3)*	0.9 *(7.0)*	8.8 *(65.5)*	0.5 *(3.6)*	1.8 *(13.4)*
Green Island 02/08/19	10.8	<0.1 *(<0.9)*	no result	0.7 *(6.2)*	7.5 *(69.7)*	0.3 *(2.9)*	1.4 *(12.9)*
Le Hocq near boat mooring 01/08/19	12.7	<0.1 *(<0.8)*	0.2 *(1.5)*	0.8 *(5.9)*	8.7 *(69.0)*	0.4 *(2.9)*	2.1 *(16.8)*

Common cockle *Cerastoderma edule*	Number	Average size (mm)	Range (mm)
Havre des Pas Opposite La Collette 02/08/19	2	32	30-33
Green Island 02/08/19	4	34	32-35
Le Hocq near boat mooring 01/08/19	3	37	35-40

Sample	dry matter (%)	Metal concentration (mg/kg wet weight) *(Metal concentration (mg/kg dry weight))*					
Oyster *Ostreidae*		cadmium	lead	copper	zinc	chromium	arsenic
Havre des Pas Opposite La Collette 02/08/19	21.9	0.2 *(0.8)*	0.2 *(1.0)*	11.4 *(51.9)*	281 *(1284)*	<0.1 *(<0.5)*	3.3 *(14.9)*
Green Island 02/08/19	22.7	0.3 *(1.4)*	0.3 *(1.2)*	21.6 *(95.1)*	617 *(2715)*	0.4 *(1.6)*	3.3 *(14.7)*
Le Hocq 1 m above low water on rocks before 1st oyster bed 01/08/19	21.8	<0.1 *(<0.5)*	0.2 *(0.7)*	6.4 *(29.3)*	239 *(1099)*	<0.1 *(<0.5)*	3.0 *(13.5)*

Oyster *Ostreidae*	Number	Average size (mm)	Range (mm)
Havre des Pas Opposite La Collette 02/08/19	2	82	76-87
Green Island 02/08/19	2	78	75-80
Le Hocq 1 m above low water on rocks before 1st oyster bed 01/08/19	2	84	72-95

Sample	dry matter (%)	Metal concentration (mg/kg wet weight) *(Metal concentration (mg/kg dry weight))*					
Slipper limpet *Crepidula fornicata*		cadmium	lead	copper	zinc	chromium	arsenic
Havre des Pas Opposite La Collette 02/08/19	15.5	<0.1 *(<0.6)*	0.2 *(1.2)*	6.1 *(39.4)*	5.2 *(33.4)*	0.1 *(0.9)*	3.2 *(20.6)*
Green Island 02/08/19	13.3	<0.1 *(<0.7)*	0.3 *(1.9)*	3.4 *(25.8)*	7.4 *(55.1)*	0.1 *(0.7)*	2.8 *(20.7)*
Le Hocq 02/08/19	14.3	<0.1 *(<0.7)*	0.2 *(1.2)*	2.4 *(17.1)*	8.1 *(56.6)*	<0.1 *(<0.7)*	2.9 *(20.0)*

Slipper limpet *Crepidula fornicata*	Number	Average size (mm)	Range (mm)
Havre des Pas Opposite La Collette 02/08/19	7	36	24-45
Green Island 02/08/19	8	42	35-52
Le Hocq 02/08/19	5	31	26-34

Appendix 5. Ramsar area (Jersey) information[4]

Les Écréhous & Les Dirouilles

Jersey Site number: 1,455 | Country: United Kingdom of Great Britain and Northern Ireland | Administrative region: Jersey Area: 5,459 ha. Coordinates: 49°18'N 01°58'W |Designation dates: 02-02-2005.

The site consists of two reefs which form an extensive shoal area on the east of the Channel Island of Jersey. At high tide only a group of rocky heads and an islet, Le Maître Isle, are uncovered -- at low tide various habitats are exposed, including reefs, boulder fields, sandy shores and shingle banks.

The tidal range can exceed 12 metres. The area is fed clean well-oxygenated water, and this factor, together with the range of habitats and the site's biogeographical position, supports a wide range of rich and diverse biotopes and some unusual species assemblages.

The flora and fauna are characterised by limit-of-range species at the northern and southern margins of their distributions. These areas are important nursery zones for shore and shallow sublittoral fish communities.

A small population of grey seals (*Halichoerus grypus)* and one of the largest breeding populations of bottlenose dolphins (*Tursiops truncates*) in the British Isles are recorded in the area. Fishing within the site is of great cultural, social and traditional importance to the population of Jersey.

Les Minquiers

Jersey Site number: 1,456 | Country: United Kingdom of Great Britain and Northern Ireland | Administrative region: Jersey Area: 9,575 ha. Coordinates: 48°58'N 02°07'W | Designation dates: 02-02-2005.

This site is an extensive shoal area lying 34 km due south from the Channel Island of Jersey. At high tide, only rocky heads and a small supralittoral area are exposed. At low tide various habitats are uncovered exposed, including reefs, boulder fields, sandy shores and shingle banks.

The areas of shallow water and the large number of intertidal channels and pools within the site provide habitat for many species of fish, sponge and ascidian communities. Likewise, the rich infaunal communities of the mud and sand flats are important for their range of mollusc and worm species.

The combination of biogeographic location, the strong tidal streams, a wide variety of wave energy conditions and physical features provide ideal conditions for the support of a wide diversity of organisms and enhance biodisparity.

Different locations within the site support several species of wintering and passage waders and wildfowl with feeding and roosting locations. Fishing within the site is of great cultural, social and traditional importance to the population of Jersey. Ramsar site no. 1456. Most recent RIS information: 2005.

[4] Further information available from:
gov.je/Government/Departments/PlanningEnvironment/AdvisoryGroups/pages/ramsarauthority.aspx
ramsar.org/about/the-convention-on-wetlands-and-its-mission
gov.je/SiteCollectionDocuments/Government%20and%20administration/R%20Ramsar%20management%20plan%20status%20report%202017%2020190805%20DM.pdf

Les Pierres de Lecq

Site number: 1,457 | Country: United Kingdom of Great Britain and Northern Ireland | Administrative region: Jersey Area: 512 ha. Coordinates: 49°18'N 02°12'W | Designation dates: 02-02-2005.

This is an extensive reef uncovered at low tide, lying off the northwest coast of Jersey - with one of the largest tidal ranges in the world, sometimes exceeding 12 metres, only four heads are exposed at high tide.

Due to the wide range of substrata and wave exposure, the site has a diverse range of habitats, communities, and species.

It favours recruitment of planktonic larvae, and the large number of intertidal rocky platforms and diverse algal assemblages are important to many invertebrate and vertebrate organisms, providing shelter, protection and food for both larval and adult stages.

These areas are important nursery zones for shore and shallow sublittoral fish communities. The overlap between the cold and warm temperate marine biogeographical regions promotes increased species richness.

Among the most important fish species are *Acipenser sturgo*, *Hippocampus hippocampus*, and *Salmo salar*. The Jersey Island Plan 2003 includes a presumption against most kinds of development and ensures the sustainable use of the marine environment.