



The Inlet

Newsletter for Guardians of Pāuatahanui Inlet

DECEMBER

2023

The Inlet is a newsletter that brings together local and regional news affecting the Pāuatahanui Inlet and its environs.

The Inlet comes out three times a year and current or back issues can be downloaded from our website.

The newsletter includes items of concern that affect the area as well as general interest topics for everyone.

Please contact us if you would like to contribute to The Inlet.

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FROM THE CHAIR

As the end of 2023 approaches, I can report it has been another busy and fulfilling year for our organisation. During this year we have:

- Continued with our Inlet Planting Project (See the article on Restoration Planting)
- Distributed and monitored traps around the Inlet. To date we have recorded some 188 strikes
- Run another successful Inlet Clean-Up
- Run another successful Inlet Photo Competition
- Supported Porirua City Council's Stream Monitoring Programme (See the article on this)
- Engaged in submissions on plans and had discussions with councillors and staff of both Porirua City and Greater Wellington
- Supported the Te Awarua-o-Porirua Catchments and Community Trust's 'Show Us Your Harbour' photo competition
- Established a new website
- And of course produced this newsletter with its stand out feature articles



The feature article in this edition covers the saltmarsh plants that provide important fuel for the Inlet ecosystem - sea rush and jointed wire rush. Over the years the Inlet has lost too many of these critical plants - hence our Restoration Planting Project. It's pleasing to see how many of the sea rush we planted have survived and are thriving. The photo montage (page 5) attests to this.

It is pleasing to report that Greater Wellington Regional Council has produced Change 1 to its Natural Resources Plan and this change introduces the long awaited recommendations from the 2019 Te Awarua-o-Porirua Whaitua Implementation Programme. We have long advocated for this. If it comes into force it would make important changes to the quality of freshwater entering the Inlet and, with it, substantially improve the water and ecological quality of the Inlet. However, the new Government is likely to make changes to the National Freshwater Policy, which would lower its thresholds for water quality, and this could well affect Change No 1.

On a disappointing note, it turns out that the Transmission Gully Motorway Project has not yet fulfilled its environmental obligations. Radio NZ initiated inquiries from the Project, the Transport Agency and Greater Wellington Regional Council. Material from Radio NZ/GWRC clearly shows TGM has not finished its stormwater

From the Chair cont....

and stream rehabilitation requirements. Unfortunately, it seems that it is unclear as to who is responsible for what.

Unresolved issues include problems with fish passage through culverts, management of fish migration, no reports on post works inspections, stream flow problems, unconsented works, stormwater treatment issues and maintenance requirements and consequent potential adverse effects on the Harbour and Inlet. Over the lifetime of the project, some 285 exceedances were logged up until March 2022 (when the motorway opened). 55 of these remain unresolved.

As we approach 2024, the environmental policy horizon looks cloudy. We await detail on what the new Government will do about resource management and support for environmental projects. What we do know so far is that they will make changes to accelerate infrastructure and housing development. Let's hope these don't result in adverse and irreversible effects on valuable ecosystems such as the Pāuatahanui Inlet.

This said, can I thank the Committee and you, our members and supporters, for your help with all our various activities, and wish you a healthy, safe and enjoyable Christmas and New Year.

STREAM MONITORING PROGRAMME

Porirua City Council has started a Citizen Science Water Quality Monitoring Programme with support from Mountains to Sea Wellington.

The purpose of this programme is explained here by **Baillie Graham**, from Porirua City Council.

'Citizen scientists are ordinary people who will play a key role in helping to identify and monitor the current state of our streams and waterways. This stream monitoring programme involves volunteers collecting and testing water samples for visual clarity, phosphate, nitrate, temperature and E.coli. There is also an opportunity to observe macrobenthic invertebrates, periphyton*, macrophytes* and fish, and any other indicators that may be of interest.'* [* These terms are explained at the end of this article]



Volunteers looking for invertebrates in a water sample.



Recording pebble sizes to determine erosion risk in flood conditions.

'We recently held two workshops with volunteer community groups that reside within the Porirua catchments. These discussions highlighted people's interest in the current health of their streams, what action is needed to improve the stream water quality and if the restoration work they are currently doing is having a positive impact.'

'The Citizen Science Stream Monitoring Programme has now started and will help to raise community awareness and involvement, and will provide indicators that allow us all to observe the state of our streams. It will provide important information to better understand what's flowing into our harbour and how our restoration work is improving outcomes.'

Stream Monitoring Programme cont....

'We already have 4 sites that have been monitored by groups and individuals, with another 7 sites lined up ready to be monitored.'

'Alongside this programme, Porirua City Council is also conducting annual monitoring at different sites in the wider harbour catchment to help us also understand the bigger picture of water quality there. The data from our programme, and the Council's annual monitoring, will help produce an Environmental Report Card for our whole catchment. This data will allow us to report on progress and outcomes and will be publicly available to our catchment communities.'

Baillie also explains that....

'If you have a stream or waterway about which you would like to understand the current water quality, or the impact your restoration work is having, this is the opportunity for you! We will provide all the support, training and equipment needed to do the monitoring and, as you become confident, each session will only take between 1 and 2 hours every three months.'

'Please get in contact with streamside.planting@porirua.govt.nz.'

Baillie Graham

Community Engagement Advisor (Harbour and Waste Minimisation)
Porirua City Council.

Terms used above:

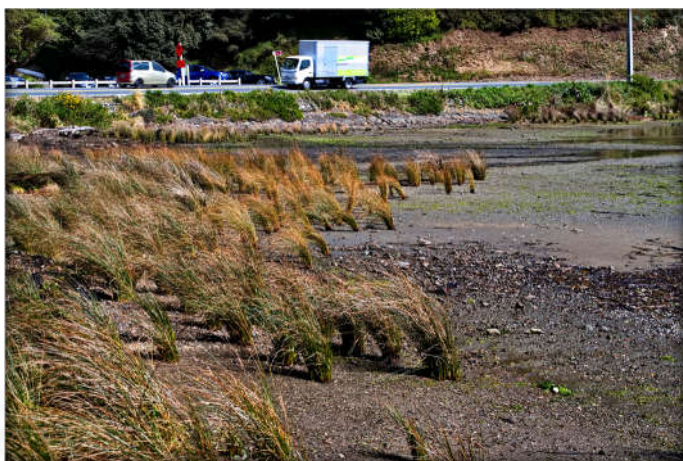
Macrobenthic invertebrate: an organism that lives at the bottom of the water column and is visible to the naked eye.

Periphyton: the collection of small animals and plants that adhere to open surfaces in aquatic environments.

Macrophyte: a plant that grows in or near water and is either emergent, submergent, or floating.

RECENT INLET RESTORATION PLANTING

On Saturday 16 September and Sunday 1 October, Andre van Halderen of GOPI oversaw two more restoration planting sessions, successfully adding to the three-year programme of shoreline revegetation that GOPI initiated in 2020. With the help of PCC and funding from GWRC, these infill plantings occurred at two sites where revegetation had previously been done.



Results of the planting session at Ivey Bay on 16 September 2023.

The first of these events was at Ivey Bay, on a very lovely day in September. Significantly, this activity was carried out in collaboration with the adjacent Paremata Kindergarten, ably co-ordinated by Anne-Marie Strickland. Volunteers included parents and children from the Kindy, together with staff from PCC and both past and present members of GOPI. In all, about 30 people attended and were able to dig in more than 400 plants on the shoreline, as well as higher up along the Inlet boundary next to the kindergarten. The plant species selected were sea rush and jointed wire rush in the high tide zone, with saltmarsh ribbonwood and flax placed above the high tide mark. Although the intertidal

Restoration planting cont.....

harbour floor was quite stony in most places, the organised teamwork and energetic participants resulted in all 400 planted by the time one and a half hours had passed. It was an immense effort by all concerned.

The second site was at Browns Bay. The same plant species were chosen for this beach, adding approximately another 400 to the intertidal zone and Inlet edges, extending the area previously planted in 2022. Nearly 20 volunteers took part this time and the work was completed in about an hour.

On both occasions refreshments were provided by PCC to reward everyone for taking part in this worthwhile activity.

AND....we were thrilled when, at Browns Bay, Mr Whippy offered everyone a free ice-cream cone from any of the options available. This was a wonderful gesture of support, very much appreciated by the team, that will be remembered for a long time. Thank you Mr Whippy.

Our thanks go out to PCC, especially Baillie Graham and Nigel Clark, for the logistics provided and for their personal contribution to the activity. We are also grateful to Greater Wellington Regional Council (and the efforts of Jo Fagan) for the financial support given to the project.



The working party at Browns Bay on 1 October.

We now await the establishment of these plants and their gradual spread to fill existing gaps. However, recent weather events, and future predicted climate patterns due to El Nino, are causing concern for their survival, the sea rush in particular. Plant debris (mostly seagrass and other dead plant material) is being washed up, at times in large quantities, into the bays, smothering the new plants before they can get established. Wind is also playing a part in burning the tops of the plants, resulting in a more stunted appearance. Andre and his wife Caroline have needed, on more than one occasion, to remove the offending material to 'release' the rushes from the debris and give them a better chance to grow and spread.

We will keep a close eye on this situation so that it doesn't become overwhelming. The plan is to release on a regular basis and GOPI hopes to encourage local residents and interested passers-by to have a go at clearing away the offending material when it becomes obvious. If you would like to help out, or want to notify us if this situation has occurred, please contact us by email (pauainlet@gmail.com) so that we can record any activity for our records.

On a brighter note, the whole restoration planting project has already transformed areas where revegetation has been undertaken, as can be seen from the before and after photographs in the following photographic montage. It has already helped towards our long-term goal of improving the health of the Inlet.



PHOTO MONTAGE OF OUR PLANTING SITES

Following on from the previous article, we have compiled a photographic record of the previous planting sessions around the Inlet. Some of these images may be repeats from earlier newsletters, but we wanted to emphasise the extent of the work that has been carried out over the past two to three years, aiming to improve Inlet health by revegetation of the estuarine margins.

Motukaraka Point — August 2021



<<< BEFORE

Our first major location. Showing the shore prior to planting,

...and the start of the action (below)



After the afternoon's work the team get a well earned break with refreshments. Some of the new plants in the foreground.

AFTER >>>

One year later, the results of the restoration are beginning to show.



*Photo Montage cont....***Browns Bay — July 2022**

Our team of volunteers is in action next to Browns Bay car park.

We had our new flags by this stage so we began to use them for most of our events.



<<< Another view of the working party doing some tidying of the bank above the shoreline.



On the other side of the Browns Stream, a team of four show off what they have accomplished. Rows of freshly planted green sea rush plants near the high tide mark.



<<< While, back by the carpark, the larger team pose for another group photograph.

*Photo Montage cont....***Camborne Walkway — July 2022**

On the same day as the Browns Bay planting session, another team also planted along the Camborne Walkway. What a day!

Further along the beach more plants were being put into the upper tidal zone.

We always chose a day when the tide was near its maximum ebb during the middle of the day.

**Ivey Bay — November 2022**

Results of the day's work.

The working party itself, with tools for the job.



*Photo Montage cont....***Ivey Bay — 16 September 2023****<<< BEFORE**

The condition of Ivey Bay just prior to the planting session. The rushes seen here were planted on the previous work day, in November 2022.

The team at work on Saturday 16 September, adding to the previous year's work.

**<<< AFTER**

The end result, taken a few days later.

*Photo Montage cont....***Browns Bay — 1 October 2023**

The team digging in a new set of plants at Browns Bay. The new ones are a lot greener than last year's plants.

You can see the previous plantings beside the car park that were done in 2022 and looking like they are establishing by now.

And there, in the background, is Mr. Whippy who kindly donated ice cream cones to all of us.



Nigel Clark, reviewing the day's work.

FEATURE ARTICLE

There are a number of saltmarshes around the shores of Pāuatahanui Inlet that are crucial to the Inlet's food chain. The most important one is part of the Wildlife Reserve at the eastern edge of the Inlet where the Pāuatahanui Stream ends its travels but there is also the Duck Creek saltmarsh and the Horokiri stream outlet plus some smaller examples in various other locations. Saltmarshes become established in the intertidal zone, between land and open salt or brackish water, where it is regularly flooded by high tide. They are dominated by dense stands of salt-tolerant plants that include rushes and their relatives. These plants are essential to the stability of the saltmarsh by trapping and binding sediments. Saltmarshes play a foundational role in the aquatic food web and in the delivery of nutrients to coastal waters. They also support terrestrial animals and provide coastal protection against erosion and pollutants from the adjacent land.

Our feature article this time focuses on the characteristics of the two most prominent plant species found in the saltmarshes of Pāuatahanui Inlet, the sea rush and jointed wire rush.

Saltmarsh Rushes

Coastal saltmarshes can be distinguished from terrestrial habitats by the daily tidal flows that regularly flood the area. Vegetation found at the low-water mark must be able to survive high salt concentrations, regular submersion and a certain amount of water movement. In the upper marsh, flooding is not as extreme. Here, rainfall can reduce the salt concentration while evaporation can increase it, producing dry, low-nutrient, conditions.

As a result of this range of conditions, a sequence of vegetation zones develops between the low and high tide marks. The zones of the upper marsh experience a lack of habitat protection with some competition between species while, in the lower marsh, plants are distinguished by their ability to tolerate the physiological stresses of high salinity, submergence and low oxygen levels. Plant species diversity and competition in the lower marsh is, therefore, low.

The only plants normally encountered at low water mark are the largely inconspicuous glasswort and the sea primrose. These are very low growing and often submerged for long periods.

However, much more obvious between low and high tide marks are two very dominant rush-like species. These are the *sea rush* and the *jointed wire rush* and, although looking superficially similar, they are in fact different in many respects, not least of which is their tolerance to submersion in salt water. Crucially, unlike most plants that absorb oxygen through their roots from air pockets in the soil, these plants are adapted to growing in oxygen-depleted, saturated sediments and instead store oxygen in their stems.

Sea rush and jointed wire rush both belong to a group of plants that include grasses and sedges but there the similarity ends because each belongs to a different family with different floral characteristics. Each species is described in more detail in the following passages.

Sea Rush (wiwi) *Juncus kraussii*

Juncus is a genus of plants in the family Juncaceae, the true rushes, of which about 460 are identified worldwide. *J. kraussii* is a coastal tussock-shaped perennial herb found in saltmarshes, brackish streams, lagoons,



Sea Rush

Feature Article ...cont.

estuaries and river margins in the low to mid-tide zone where submersion can be four hours a day. Growing from its many sub-soil rhizomes are loose or dense clumps of light to dark brown, straw-shaped and spine-tipped, flowering stems up to 1.2 m tall. The leaves are similar to the stems but shorter. Flowering between October and January it produces loosely branched, reddish-brown, flower heads near the top of the stem (*photo, page 12*). These wind-pollinated flowers contain both male and female parts. Fruiting follows between November to April with mucilaginous seeds that are dispersed by attachment to animals or by wind and water.



Large area of sea rush in the Wildlife Reserve

Sea rush is native to New Zealand but also found in Australia, S. Africa and S. America. Its importance to the environment is in the production of salt-laden stems and leaves that decay to provide raw material for the vast populations of invertebrates at the base of the food chain. The conditions under which it grows are quite specific. More than 4 hours daily submersion of its roots and it cannot produce new stems fast enough to replace the salt-accumulating ones. Any less than two hours inundation per day and it produces very few dead stems. Also, to redistribute the dead plant matter, there needs to be a free flow of tidal waters throughout the area where the rushes are growing. Consequently, sea rush colonises the zone that spreads inland from the edge of

the saltmarsh to the mid to high-tide level. At the Wildlife Reserve this zone is extensive and almost pure stands of the sea rush are visible over a wide area (*photo, above*)

Jointed wire rush (oioi) *Apodasmia similis*

Jointed wire rush, despite its appearance, is not a rush at all. Instead, it is classified in the botanical family known as *restiads* of which there are about 570 species worldwide. It is nevertheless a tussock-shaped perennial herb typical of coastal saltmarsh habitats but it grows at the upper tide zone. It forms dense clumps of close-set stems that are blueish-green to reddish-yellow in colour, growing up to 1.5m tall. The stems are thin and wiry with a slight zigzag appearance. The leaves are reduced to bract-like sheaths, dark brown to almost black, spaced at intervals up the stem (*photo, right*).

Jointed wire rush has separate male and wind-pollinated female flowers, borne on different plants. These flowers are very small and inconspicuous and appear on little spikes emerging from the upper sheaths, and at the tips of the stems (*photo, page 12*). Flowering is later than sea rush, occurring from October to December with the fruits produced from December to March. These fruits disperse and float on water, carrying seeds to new locations within the marsh.



Jointed wire rush

Jointed wire rush is found only in New Zealand. It is primarily coastal being found in estuaries, saltmarshes, dunes and sandy flats and hollows. It grows where inundation by incoming tides is less than two hours and therefore is found in the zone above sea rush and can be seen as a distinctive reddish band of vegetation (*photo, next page*).

Jointed wire rush can also be cultivated for landscaping purposes, away from the coast, but its colour then

Feature Article cont....

is grey-green. It's the salt in its natural habitat that gives it the reddish-yellow colour.



*Swathes of reddish jointed wire rush with paler sea rush in the background.
This shows the boundary of the tide level above which the sea rush doesn't grow.*

Environmentally, jointed wire rush is a natural healer, absorbing polluting minerals and filtering water runoff to remove sediment. The salt-tolerant, tightly spreading rhizomes, with a thick covering of hairs, create a strong hold on the soil and the closely-set stems provide an efficient filtering system which traps sediment, resisting tidal erosion and building up new land which in turn is colonized by shrubs and grasses.

The future of this species in the Inlet could, in years to come, be jeopardised by climate change. With an expected sea-level rise due to global warming of the seas and melting of ice sheets, the current boundary between sea rush and wire rush will be pushed further inland and towards higher ground. Eventually therefore the area subjected to the two-hour tidal submersion will vanish and with it, the jointed wire rush.

The image to the right gives a close-up comparison between the jointed wire rush and the sea rush flower heads.

(All images courtesy of Michael Waldron, Editor)



Flower heads

Left—jointed wire rush

Right—sea rush

The Pāuatahanui Restoration Planting Project

Both sea rush and jointed wire rush are the species being planted around the shores of the Inlet for the *Pauatahanui Restoration Planting Project* initiated by GOPI in 2020. They are being planted in areas where such species are sparse and it is hoped they will become established there and thus provide a buffer against road runoff, protection against eroding wave action and a trap for sediment thus providing new habitats for invertebrates, fish and birds.

ON THE HORIZON

Annual Inlet Clean-up

This is an advance notification of the next **Inlet Clean-up day**.

Sunday 3 March 2024

Note that start time is set for 10 am, meeting at Browns Bay for registration and allocation of sites.

As usual, safety gear like hi-viz vests, gloves etc. will be provided.

A sausage sizzle will be set up to offer hungry volunteers a welcome snack at the end of the morning.

All are welcome and we look forward to seeing you there.





Guardians of Pāuatahanui Inlet

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MEMBERSHIP FORM

To join the Guardians of Pāuatahanui Inlet you may pay your subscription in person or on line.

TO MAKE YOUR PAYMENT	NOTE
<p>Pay your subscription at a bank branch, or on line, into our Westpac account: 03-1533-0009387-00. When on line, use the 'Particulars', 'Code' and 'Reference' columns to write your surname, initials and the period of your sub (1-yr or 5-yr).</p>	<p>We do not have a postal address so please email all correspondence.</p> <p>If you have something that cannot be delivered electronically please send a request by email and we will contact you to arrange collection.</p>

Then fill in this form with all details.

(If you are filling in this form electronically **CLICK** at the beginning of a dotted line and then type).

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Please put 'x' next to the subscription you are paying. (For electronic completion **HIGHLIGHT** the box and type a lower case 'x').

You can also make a donation. (We are a registered charity for tax purposes. Registration Number: CC47523).

One-year individual (\$12.00)	<input type="checkbox"/>	Five-year individual (\$50.00)	<input type="checkbox"/>
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Donation \$	Do you require a receipt for your sub? <input type="checkbox"/>	or your donation?	<input type="checkbox"/>
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We'd like to send you newsletters and notices via email. May we do this? ☐

Please put 'x' in a box if you would like to take part in one or more of our activities.

Annual Clean Up day	<input type="checkbox"/>	Submissions to local bodies	<input type="checkbox"/>
Three-yearly cockle survey	<input type="checkbox"/>	Restoration Planting	<input type="checkbox"/>
Website and video clips	<input type="checkbox"/>	Other:	<input type="checkbox"/>

Now email the form to: pauainlet@gmail.com

Thank you and welcome to the Guardians