The Inlet

Newsletter for Guardians of Pāuatahanui Inlet

DECEMBER 2018

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.***

P O Box 57034
Mana
Porirua 5247
pauainlet@gmail.com
www.gopi.org.nz

Inside this issue:

FROM THE CHAIRPERSON

Although the year has ended on a sad note with the passing of our former Chair John Wells, 2018 has seen some high points and a lot of activity.

We have conducted all our usual annual activities including the photographic competition earlier in the year and, last month, the annual clean-up of the Pāuatahanui Inlet.

When it comes to advocating for the Inlet and its values we have been very productive. Several submissions to Porirua City and Greater Wellington Regional Councils have been made. These have concerned the Porirua City Council Long Term Plan and its District Plan, plus the GWRC Long Term Plan, Parks Network Plan Review and the proposed Regional Pest Management Plan.

Undoubted highpoints have been the reported presence of a Banded Rail in the Pāuatahanui Wildlife Reserve, of which there has now been four confirmed sightings, and the second successful translocation in April of fernbirds from Rotokare Scenic Reserve in South Taranaki to the Wildlife Reserve.

Keith Calder, the Porirua Harbour Strategy Coordinator, retires this month after 10 years in the role. Keith has been an enthusiastic, dedicated, advocate for the Inlet and has worked hard to highlight the issues surrounding sedimentation and pollution. We thank Keith for all his efforts and personal support of our activities, and we wish him well for the future.

As we reach the end of this eventful year I thank the management committee for all their work this past twelve months and in particularly Lindsay Gow for his work on all the submissions.

I wish all GOPI members safe and happy holidays.

Tony Shaw

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OBITUARY TO JOHN WELLS

It is with considerable sadness that we had to report, last month, the news that John Wells had passed away. John was a member of GOPI from 2000, on the committee from 2002 and the chair for 10 years. He will be sorely missed.

John was a Londoner, and grew up in Hammersmith. At the beginning of WWII, like many children from the city, he was evacuated to the countryside until the danger was considered to have passed. However the war came very close in 1944 when, after being returned to his home, a V1 narrowly missed him and his family hiding in a bomb shelter. It took out the top story of their house!

Post war John won a scholarship for University College, London University, and studied biological sciences. He also became an accomplished competitive swimmer and at one event he caught the eye of a swimming companion who decided there was no-one else in contention. After a short period John and Margery were married and remained a devoted couple for the rest of John's life.

After graduation John moved to Exeter University where he decided to focus his studies on harpacticoid copepods, a group of crustaceans that are global in occurrence and minute in size. He gained a PhD in this field and was noted for his attention to detail and skill at dissection of the tiny organisms. After a spell back at London University, in a junior teaching post, and a short spell in Rhodesia, he became a lecturer at Aberdeen University and moved there with Margery to become residents of Scotland from 1963 - 1976. Having had a long term desire to move to New Zealand he and Margery finally decided to take the plunge and applied for a post to Victoria University. He was appointed professor of Zoology. After a very successful and influential period in this role John was elevated to Dean of Science in 1991.

While at Victoria, John conducted some of his field research in the Pāuatahanui Inlet, and this was the beginning of what he described as a 'long-term love affair with the Inlet'.

Becoming involved in the wider community John was, first, a founding trustee of the Karori Wildlife Sanctuary Trust (Zealandia) from its establishment in 1993 until 1997. Then, after retirement, he joined the Guardians of Pāuatahanui Inlet in 2000, was elected to the committee in 2002 and chaired the committee for 10 years (2003-2013). He remained a committee member until earlier this year.

In addition to his work with The Guardians, John was also a trustee of the Pāuatahanui Inlet Community Trust from 2004 until it was wound up in 2015, and a founding trustee of the Porirua Harbour and Catchment Community Trust from its establishment in 2011 until 2016.

Obviously, John's time on these bodies overlapped, and there were four years when he was an active member of all three. During this time he was also a member of the Porirua Harbour Science Advisory and the Porirua Harbour Inter-agency Groups.

While that would be more work than most could imagine doing, John also organised triennial Cockle Population Surveys in the Inlet from 2004 until 2016. Held only every three years, each one still involves a

OBITUARY TO JOHN WELLS cont.

significant amount of planning, organisation and analysis before, during and after the day of the count. The results of these surveys are accepted as a reliable and valuable scientific indicator of the health of the Inlet and they are, reportedly, the longest running community science project of its kind in New Zealand.

John bought to all these activities a prodigious amount of work together with a deep level of scientific knowledge and expertise. His advice and views were trusted and valued by the staff of the Wellington Regional and Porirua City Councils. John's modest, polite and friendly manner meant that any meeting or discussion with him was always helpful and a pleasure.

John was 83 and is survived by his wife and two sons.

LAMB AND CALF DAY

Lamb and Calf day this year was on 3 November. It coincided with a strong northerly wind and periods of light rain which, while not totally overwhelming, made for an uncomfortable day for all concerned. The school did its best to use all the shelter there was for the displays and competitions that needed cover but obviously some activities were just outside in nature and these had to contend as best they could. Naturally, visitor numbers were down which is a great shame for the organisers who put so much work into the event each year. This was not helped by the lack of local parking space throughout the village although, from what we could tell, the attraction was still a mecca for the many diehards who annually support this event, come what may. Those who did turn up, particularly the youngsters, appeared to enjoy everything, despite the conditions.

Along with other stands, the organisers managed to find a spot for the GOPI display under the same canopy that we have enjoyed in previous years, albeit shared with others with similar needs. We displayed our usual information boards for the full four to five hours of activity and chatted with a number of people, some of whom were already members of the Guardians and others who expressed an interest in joining. A few membership forms were handed out but under the circumstances our contact with the public was less than in previous years.

We are always very grateful for the opportunity to be present on these gala days and congratulate the organisers on the way they were able to move so many activities under the shelter - and maintain their cheerful, friendly approach, regardless of the inclement weather. Well done to you all.

INLET CLEAN-UP 2018

Over a period of one year the road verges and shores surrounding Pāuatahanui Inlet become littered with the discarded paraphernalia that make our lives 'convenient' in so many ways. We are referring to the plastic bags, paper cups, bottles and innumerable other items for which disposal in a rubbish bin is considered by many to be just 'too inconvenient'. Of course there are accidental incidents where the wind might lift light items out of our hands, rubbish bins etc, and carry them off without our help. Either way, many items get washed or blown into the Inlet and create an unsightly and sometimes ecologically unhealthy mess.

Melina & Harley Curtis on the 2012 clean-up

Each year, around this time, GOPI, with the support of Conservation Volunteers NZ and members of the public, gather together at Browns Bay to collect as much of this litter as possible, from all around the shores. This year's event was on November 18 and as usual we had a great public turn-out. Over 70 people, young and old, came along to take part in the clean-up on a day when the weather smiled down on us. Sandwiched between periods of wind and rain, the Sunday turned out to be dry with a gentle breeze that was very bearable. That was great to find because we promise this event will take place rain or shine.

Lui (left) and Tom from Plimmerton School on the shores of Pāuatahanui Inlet. Photo: Hannah Henderson, 2018

Previous years have seen the results of this exercise bring in many very full bags of trash collected by the selected teams that scour the Inlet shores. These are large bags - larger than most domestic council-provided rubbish bags for weekly collection. So we are very happy to report this year that the bag count was considerably down and most people also commented on having their bag only half full. This was particularly the case for the area between the road and rail bridges, on the southern side, where there is usually a lot of rubbish gathered by the shifting tides.

And that is really good news. Overall, a lot less rubbish was found this time around, and we hope this will remain so in the coming years.

As usual, a BBQ was organised for all volunteers who had the stamina to remain until 12:30. Some great sausages were supplied, courtesy of Paremata New World, and Plimmerton Rotary were on hand to grill the sausages and dish out the bread and onions, making some superb hot dogs.

To finish off the day, GOPI ran a free raffle during lunch with two prizes on offer for the winners of the draw. Congratulations to you both.

Finally we'd like to pass on our thanks to all individual and group volunteers for a successful morning's work.

SUBMISSION ON PCC DISTRICT PLAN

GOPI has made a submission on the new Porirua City Draft District Plan that included a number of Strategic Directions, all of which we supported.

This is especially so for Strategic Direction 7: *To protect and manage the health and wellbeing of Te Awarua -o-Porirua Harbour.* However, in our view, both this Strategic Direction, and supporting provisions, need to be more explicit and need strengthening. Accordingly, the GOPI submission suggests wording changes and additions that we consider are needed to successfully implement the Strategic Intent.

The plan has an important provision to promote what is termed '*water-sensitive design'.* This is a way for subdivision, land use and development to be stormwater neutral and improve water quality. Essentially, water-sensitive urban design uses natural soil and plant processes to manage stormwater and promote water re-use. It keeps all stormwater run-off from buildings and other hard surfaces from carrying pollutants into water courses that lead into the harbour. It also reduces water run-off into the harbour by absorbing as much water as possible into soil and plants. This approach uses techniques such as recycling roof water for garden use, using grey water (from sinks and showers) for the garden or outside use, having roadside swales (a shallow channel on the roadside verge), and related ponding areas and wetlands, to absorb and filter water by appropriate planting and design. These areas become attractive amenities in an urban landscape and, where surplus water drains from these filtering areas, it is clean and pollution free. This approach removes conventional drains and culverts which are replaced with planted areas rather than gutters.

We strongly supported the water-sensitive design provisions but submitted that these should be stronger and should '*promote water quality outcomes by requiring water-sensitive design for all subdivision, land use and related development and, wherever practicable, require water-sensitive design for all re-development, especially higher density development. In particular water-sensitive design must include measures to eliminate, or prevent from entering the water, any physical, chemical or biological pollutants or contaminants coming from buildings or structures or related land uses.*'

We also covered a number of other points in our submission and in all cases suggested extra wording to specifically include water quality, water-sensitive design, water neutrality and the minimising of all adverse effects such as pollutants and contaminants from any discharges into water.

We also want to see provisions that *'ensure all storm water from subdivisions, and all related earthworks, are designed and managed to result in water-neutral and water-sensitive outcomes that have no adverse effects on the physical or ecological quality, or flow of water into the harbour.'*

FEATURE ARTICLE

Pāuatahanui Inlet is almost completely surrounded by hills that collectively form what is called the 'catchment' of the harbour. A catchment, or drainage basin, is an area where rainfall run-off collects into channels that all drain into a common body of water, in this case, our Inlet. Much is spoken about the catchment as this is the source of all the freshwater that goes into the harbour, carrying with it suspended solids (sediment), solutions of naturally occurring compounds and various man-made pollutants. The conditions in the Inlet are significantly affected by what is washed into it by the streams and it is these inputs that are of increasing concern to us and other organisations with a focus on the local environment. The following article describes this network of streams and highlights the importance of the network on the health of the harbour.

The Streams of Pāuatahanui Inlet

The catchment of Pāuatahanui Inlet encompasses a total area of 109km^2, much larger than the 4.5km^2 that is the Inlet itself. This huge area is the drainage basin for our Inlet, collecting all the run-off from rainfall and concentrating it into a total of twelve waterways that flow into the northern branch of Porirua Harbour.

An aerial view of the catchment clearly shows how this system of waterways is strongly governed by the geology of the area. A number of fault lines are visible, particularly in the northern hills. Some of the stream valleys directly follow these fault lines along which tectonic movement (earthquakes) occurred a long time ago.

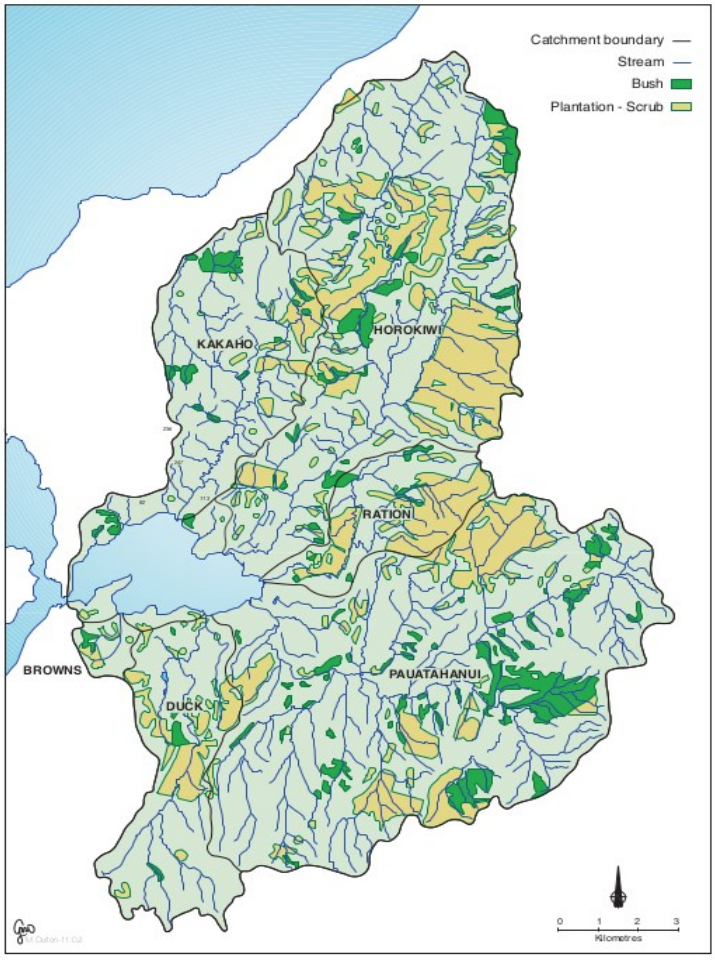
These valleys can be clearly seen in the this image, following a NNE or NE direction.

Smaller streams follow channels that were formed by general erosion of the hillsides and together with the major streams, result in a complex network of waterways that drain the hills after heavy rains characteristic of our temperate climate.

Relief map of Pāuatahanui Inlet catchment

The map on the next page clearly shows the catchment with its network of natural waterways. It is divided into six sub-catchments each of which has a major stream with which it is associated and after which it is named. These are the well-known waterways that grab most of the attention. As well as these six main streams there are at least half a dozen smaller rivulets, plus numerous drainage channels, around the

Feature Article cont.



Sub-catchments of Pāuatahanui Inlet

shores. The minor streams include two that flow east off the Camborne hills, two draining the hills on the north side of Grays Road, one to the west of Motukaraka Point and one flowing through the wildlife reserve.

Each of the six sub-catchments has different physical characteristics as tabulated below.

Sub-catchment	**Area** ***(km²)***	**Max. Elev.** ***(m)***	**Avge. Channel Slope** ***(degrees)***
Pauatahanui	43.4	431	1.3
Horokiri	32.9	530	1.3
Kakaho	11.2	440	2.1
Duck	10.5	490	1.9
Ration	6.1	260	1.5
Browns Bay	1.2	157	3.7

Simple addition shows that the six sub-catchments add up to 105.3km^2 of the total 109km$^{2.}$ The remaining 3.7km^2 consist of several much smaller drainage areas.

All these waterways, large and small, contribute to the aquatic environment in various ways and have the potential to affect harbour health, particularly if they are the object of human abuse and carelessness.

Feature Article cont.

The landscape around Pāuatahanui Inlet encompasses a range of dissected hill tops, an appearance characteristic of many New Zealand regions. After emergence from the sea around 5m years ago much of the hard basal rocks that form the core of New Zealand's land mass had been covered with soft sediments that would have been readily washed back to the sea if it weren't for a natural cloak of vegetation that developed over time. Left on its own for so long, a mature native forest cover formed on the hills around our area - a dense forest dominated by tall podocarps such as totara, rimu, matai and kahikatea, together with broadleaf trees like horopito, rata, lancewood and mahoe.

Five thousand years ago rising sea levels flooded the lower reaches of an ancient, westward flowing, glacial river valley resulting in the Inlet we know today. (*See our feature article on Geology of Pāuatahanui Inlet, The Inlet December 2017*). From around 1840 the arrival of Europeans brought in milling and farming practices that, in the space of 40 years, denuded the natural forest cover leaving only a small percentage untouched. The exposed land was subjected to erosion by frequent heavy rains, the result of which can now be seen in the dissected nature of the hills.

Where did the eroded land go? Into the Inlet of course, resulting in a substantial build-up of sediment on the harbour floor so that the Inlet is now much shallower than it otherwise would have been. This sedimentation continues at an accelerated rate even today. However, the contribution to this sediment build-up varies from stream to stream. It is highest for the steeper and more elevated Kakaho, Horokiri and Pāuatahanui sub-catchments due to the fact that transport of sand and gravel depends on flow velocity, which in turn depends on channel dimensions and the degree of slope. Sediment source characteristics will also be influential. For example, the flood-plain alluvium of Pāuatahanui Stream will yield sand and gravel derived from the Western Hutt hills, whereas wind-blown loess (accumulation of silt and dusty material) mantles the Duck Creek catchment and this produces finer muds. Consequently, there are differences in the type of sediment deposited at different sub-catchment outlets.

The intertidal flats (between low and high tide levels) that fringe the central mud basin of the Inlet are associated with small deltas that form at the stream outlets, visible at low tide. The largest intertidal flats occur on the north and eastern shores of the Inlet near the Kakaho, Horokiri and Pauatahanui outlets. Intertidal sediments are composed of poorly sorted muddy sand, although they can be well sorted on the upper flats where waves winnow mud from these sediments.

Being an important issue for the Inlet, sedimentation is monitored regularly to assess the effects of human activity. However, a number of other environmental factors are also monitored, particularly in the Horokiri and Pāuatahanui streams. This monitoring covers freshwater quality, the macroinvertebrate community and the population of fish.

Freshwater quality is assessed by monitoring the 'periphyton', the community of algae, cyanobacteria, heterotrophic microbes (that don't use photosynthesis) and detritus attached to submerged surfaces. Most of the streams appear to show periodic, short-duration, nuisance algal blooms that reflect moderate nutrient enrichment (nitrates and phosphates from farming) and alterations to the natural stream flow.

'Macroinvertebrates' is the term used for those invertebrates that are over half a millimetre in size and consist mainly of freshwater shrimp and crayfish, insects, shellfish and worms. Studies of the macroinvertebrate community in the streams of Pāuatahanui Inlet show a deviation from the expected populations for these types of stream and, therefore, also reflect moderate levels of disturbance and pollution.

In contrast to the above criteria, the fish community, with 16 different native species identified, is typical of

Feature Article cont.

undisturbed, normal conditions for the stream type. The main streams continue to be a habitat for more than 6 threatened indigenous fish species. In particular, even though there is a low percentage of indigenous riparian (stream edge) vegetation cover, the waters are a spawning habitat for inanga, essential for the continued survival of the galaxiid species that suffer annual predation by whitebaiters. (*For more on this have a look at our August 2014 issue of The Inlet*).

The foregoing is an overview of the catchment of the Inlet. This is important in order to understand its origins and overall environmental importance. However, while there is a lot of commonality between one stream and another, each waterway has some specific characteristics that determine its individual contribution to the overall harbour environment. The next issue of *The Inlet* will examine each stream separately and describe the location, origin, physical nature and environmental characteristics.

ANSWERS TO FAMILY CORNER

Yellow-eye mullet; Rig Shark; Spotted stargazer; Inanga; Giant kokopu; Sand flounder; Lamprey; Longfin eel; Common bully; Warehou.

FAMILY CORNER

Fishy Anagrams

Here's a challenging test if you like anagrams - words that have their letters shuffled around to conceal their original order and therefore the real name.

There are 10 different fish species in the table below. Each one can be found in Pāuatahanui Inlet, or the streams that feed it, but the letters are mixed up to conceal the name.

Your task is to re-order the letters to solve the problem of what fish it is.

ANAGRAM	WHAT IT SHOULD BE
Mutely yell woe el	
Shirk gar	
Gazetted roar psst	
Gain an	
Puking took a	
Unfolds nerd a	
Palm rye	
Lifelong en	
Colony lb mum	
Urea who	

If you find this too challenging without help there is plenty of information on-line about the fish species that can be found in the Inlet. To start with our own website has a list of the fish that can be found there but there are other places to look as well.

If you are really stuck, then the answers are on page 9.

PLEASE SIGN UP A FRIEND OR NEIGHBOUR

Sign up a neighbour, friend, or another family member. Just explain to them that membership numbers really count in giving us a strong voice to argue for what we all value about the Inlet. Membership forms can be downloaded from our website http://www.gopi.org.nz/assets/membersForm/Membership-new.doc or copied from the one at the back of this newsletter. Better still, if you've received this newsletter by email, just forward it to others with a note encouraging them to join.

EMERGENCY NUMBERS FOR THE PĀUATAHANUI INLET

Pollution: Discharges of contaminants to air, land, storm-water drains, streams, rivers or sea and for after hours consent enquiries: Greater Wellington 0800 496 734 (24 hours)

Boating infringements: Greater Wellington 384 5708 (24 hours)

Illegal fishing activity: Ministry for Primary Industries 0800 476 224 (24 hours)

Pāuatahanui Wildlife Reserve: Department of Conservation 0800 362 468

Let us know what you have reported so we can keep an accurate record and follow up if necessary.
233 9391 (Chairman, GOPI) or ***pauainlet@gmail.com*****.**

Guardians of Pāuatahanui Inlet

www.gopi.org.nz
pauainlet@gmail.com

Membership Form: new members

To join the Guardians of Pāuatahanui Inlet, you can pay your subscription either online or by post. IF YOU ARE PAYING ONLINE, PLEASE REMEMBER TO FILL IN THIS FORM WITH *ALL DETAILS*, AND EMAIL OR POST IT TO US.

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1. Pay your sub via e-banking into our Westpac account 03-1533-0009387-00. In the 'Particulars' or 'Reference' columns, **YOU MUST** write your surname **AND** initials **AND** the period of your sub (1-yr or 5-yr). 2. Then fill in this form and either email it to us at pauainlet@gmail.com or post it (see next column for our postal address)	1. Write a cheque made payable to 'Guardians of Pāuatahanui Inlet'. 2. Then fill in this form and send it, along with your cheque, to: Membership Secretary, Guardians of Pāuatahanui Inlet, Box 57034, Mana, Porirua 5247.

Please fill in your details for our records. If you are filling in this form electronically, click at the

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Date subs paid:		Reference appears as: ..... *(e-banking only)*	

We'd like to send you newsletters and notices via email. May we do this? ☐

Please tell us which of our activities you would like to be part of.

Annual Clean-up day	☐	Submissions to local bodies	☐
Three-yearly cockle survey	☐	Our educational programmes for schools	☐
Website and video clips	☐	Other:	

NOW EMAIL OR POST THE FORM. THANK YOU AND WELCOME