

Rivers and Us – monitoring our waterways

Recorded webinar transcript

Introducing the Science Learning Hub and presenters and Index

Greta Dromgool

Tēnā koutou katoa and welcome to Science Learning Hub webinar today, about Rivers and Us, it's really great to have you here. If you aren't familiar with the Science Learning Hub, it is a website that is created by New Zealand teachers, for New Zealand teachers, and it brings in New Zealand scientists and research. It has a whole range of resources to have a look at and I highly recommend, having a play and seeing the amazing things that are on there.

And it is my great pleasure to welcome Alex Daniel today. Alex is going to be sharing the webinar presentation with me, and I'm really excited to have her here. I was wondering, Alex, if you could just give us a little bit of background?

Alex Daniel

Kia ora, so my name is Alex, thank you for introducing me Greta. I've been part of the EnviroSchools team, as part of the Waikato education, environmental education unit. I've been doing work with schools for about three years, I currently work in Taupō, Waipa and Hamilton. I feel really privileged in my job, getting to hopefully inspire and help motivate teachers to really get students engaged in this kind of education. I think it's really important, and it's, yeah, so worthwhile, it is a really great opportunity for the students to do some learning outside of the classroom as well. That hands-on contextual learning, which I think just embeds a lot of that stuff that happens in the background in the classroom, you go out and you do it. In an outside space, you can see how everything all works and fits together.

Greta Dromgool

Awesome, thank you. It's so good to have you along because yeah, to be able to speak to someone that's been out in the field and doing it, knows the practicalities as well as the theory behind and looking at our waterways. It's great to have you join us.

Purpose (video timecode 2:01)

Greta Dromgool

Connected to this is our purpose for our webinar and really it's all about getting you really excited about using this idea of getting out into the environment, monitoring our waterways and having that experiential learning experience for your students. So to support you with that, we're going to guide you on different water quality indicators that you might look at. We've got lots of resources to share with you, and we're going to just pick out where, some links to our New Zealand curriculum and also some strategies that you might find useful in the classroom, or out in the field.

Rivers and Us background (video timecode 2:39)

Greta Dromgool

Just before we go any further, Alex, I was hoping you could tell us a little bit of the behind the history of this thing we call 'Rivers and Us,' and where it's come from? Just so that people that are not familiar with it, know the background.

Alex Daniel

So the Rivers and Us resource has been around for quite some time and I still think there's an amazing resource. There's lots of great information in there to use, to really get students exploring local streams and waterways, understanding about habitat assessments, impacts and issues with stream health. So this resource was created by the Waikato Regional Council, quite some years ago, and over the past couple of years, it was sort of acknowledged that it definitely needed an update. This is created in partnership with Science Learning Hub, Waikato University, and a number of other educators and scientists, and it's just been great to see it finally come about and evolve and yeah, hopefully makes everything really easy and accessible for teachers to use.

Greta Dromgool

It's an amazing resource or collection of resources that's been created, and as a teacher, I did use the original Rivers and Us resource, and it did have good bones to start with and I really think, what's been able to happen, as you say, is that refresh and that increase in accessibility. So, yeah, really excited to share some of the, the fruits of that project with people today.

There was one point that you talked about earlier and that was around how this is a Waikato based resource, but actually so much of it is, is relevant to all over Aotearoa, and yeah, I think that's important to know, please don't, if you're not sitting in the Waikato right now, don't think that this is not for you because ideas that are, in there are, yeah, any waterway, wherever it is, is going to be impacted by the things we'll be talking about.

Alex Daniel

Yeah, and absolutely relevant and kind of nice to point out too, that nearly all regional councils that I know of have their own freshwater education resource, and particularly if, if you're going to do quite sort of, you know, a deeper inquiry and you want to learn about your particular local catchment, do go and have a look at your own local regional council, because they'll often have, you know, the great resources, the information that's here on Science Learning Hub, but in terms of learning about, you know, your relevant place and space. That's a good sort of starting point too.

Greta Dromgool

Absolutely, yeah, I think I love that idea of you've got this, this general knowledge that's really useful for you, for everybody around, but to pick up on some of those specific local environmental ideas, great.

Getting started, curriculum links and the Inquiry and action learning process (video timecode 5:38)

Greta Dromgool

Alright, I'm going to start off by sharing this particular resource and I'll ask one of the team to pop it into our chat. It's our introductory article, and I wanted to share this because it is, if you end up getting overwhelmed by all the resources that we share today, this is a really good starting point. So it outlines a little bit about the initiative around Rivers and Us, but then also has the links in there to a variety of other areas that you might want to go to, to find those out, and this is our introduction or landing page for the Rivers and Us resources.

Our articles often start off with an image or a video, they're always really useful ways to get familiar with what the content is about, and if you scroll down, it talks about the key themes and science ideas. So just a really nice place to start.

Key ideas and links to our science curriculum that will be really good to be thinking about quite early on in this process, because I, I think if you identify what it is that you

want out of this, then that's a really useful starting place. If you think about what we want for our students, then that helps us to really go well, what are we going to focus on if we're going to be going out into that environment? We've just got some of the ideas that have been called out through this, this process of developing these resources, and if you have a look through here, you can see it's pretty huge. There are lots and lots of really big ideas, really important ideas that we want our students to be involved in and talking about and taking action on in their lives.

So just for our participants, if you could have a look through and just see is there one particular that resonates with you that you would, if you were heading out to have a look at a waterway that you would be particularly interested in picking up on?

This particular page on the Science Learning Hub gives you this amazing overview of ideas of how you can bring to life this process of monitoring water. So how you can use it as an inquiry and action learning process, and when we were talking earlier, Alex, you talked a little bit about how good getting outside and, and being involved in our environment is, and the ways that we can go about that, and I just wondered if, while we have a look through this, if there's ideas that you wanted to share about your experience?

Alex Daniel

I think most teachers probably, and most educators who've used some sort of inquiry model, so this won't be new, but I really love the fact that that action is part of it. So getting students to engage in the environment, learning about it, sparking that curiosity, but then also saying, you know, so what, what could we do differently? How could we be part of the solution if there is an issue? So you're not looking at it just in terms of, 'wow, it's there, let's have a look and see what we can find', but being part of a meaningful change, so often you'll find, you know, if there's, erosion on a stream or waterway and you can say, you know, what could we do? Or you do a habitat assessment and you're thinking things aren't looking quite right. For me the answer is almost always planting trees, but, we can go into that later, but sort of, you know, being able to explore and search and learn, not always having the answers. So coming up with questions that you then need to research. Seeing if you can take part in action and then reflecting on, you know, what works well, what didn't, what will we do differently next time? and then also measuring change over time. It can be quite a long-term project that you end up embarking on, which I think is really exciting if you can see change over time.

Greta Dromgool

If you have that option, yeah, it's some really powerful learning that can take place, and I just see Andrea's popped in our chat that, that action is such an important step, and that question of, you know, what next? What can we do? And the empowering of students so that everybody is involved, yeah, and I, that's why I think I'm so excited about this interactive, because if you aren't confident in how to bring together inquiry and action learning and this particular context. There have been teachers working on this to show how you might do that. An example, if you're starting out, you might want to be having a look at how you might encourage that curiosity in your students, and if you were to have a look in here, so all I've done is click on the little button in the interactive, and if you scroll down, we've got a video that is talking about the importance of why we might want to do this, and then there's even, there's specific questions that you might want to be thinking about and ways that you could get students really getting, grabbing onto this idea and wanting to find out more.

Flowing through here and again, with any inquiry or action learning process, it's not this lovely linear tick the box processes is it Alex? It's messy and it's interesting and we, yeah, and you know, there's going to be times you're going to need to come back to things and revisit them, and that's what I love about this, is it gives you lots and lots of ideas of how you could do that.

So for example, I've always found, like I love this idea of inquiry and action learning, but that whole, like, how do you support students to then decide on the action that they're going to take? and this, the support is, is in here.

At this point in our webinar, I just wanted to check in with our participants, and see if there were particular questions you had at this point before we moved on?

Alex Daniel

We go into that stream study, it's really nice to have a sort of question in the back of your mind and it, it can be quite a complex question, it can be really straightforward, one that I often use is, do you think this is a healthy stream for, for life? you know, for freshwater fish for, is it a healthy ecosystem? and that's, you know, kind of good when you are asking the questions and you are doing the monitoring and you can put it in a context of, you know, would this be healthy if you were a fish swimming in the stream? Or so that kids can sort of think about it and different for different ages of course, and always thinking about, yeah, making sure that the, the questions that you're asking the students, are right for your learning focus.

Greta Dromgool

Absolutely, and again, thinking back to those curriculum links, you've talked a bit around, you know, what that might look like for primary and then what it might look for secondary, and how you can bring in those other aspects of the New Zealand curriculum. It certainly doesn't just have to be science that we're looking at, right? As soon as we're looking at science, then it's connected to all these other things.

Alex Daniel

Yeah, and often what people forget when we look at the environment is, environmental science actually relates to people's use of their environment. So how we behave, how we interact and the impacts that we have. So although, in high schools, you know, it's a really easy fit with the science curriculum, I would argue that it, it's equally relevant to social sciences. So you are looking at geography and social studies, yeah, looking at our resource use and that sort of thing, the decisions we make and the impacts that they have, and really easy primary and intermediate, healthy water. That starting point of, you know, what can we not live without? You know, we need to breathe, we need water, so one of the building, the, the most important things for life.

Greta Dromgool

Absolutely and thinking that primary sort of, our local environment and what's around us, often is something covered. So, great to include this.

Planning – where to go and what to do (video timecode 14:26)

Greta Dromgool

We've got a couple of other questions there and I just wanted to ask you one, Alex, and it asks "is it worth revisiting a stream or river regardless of the season or different weather, because it's often not possible to replicate those original conditions?"

Alex Daniel

So I would say what's really great about doing it in a different season and different conditions is being able to compare and contrast. So if you go in summer and you know, you can talk about the temperature and the stress that that would have on the fish and how is that going to change in winter and actually being able to see the difference. So although if you're doing it over time and you want to measure change, so you want similar conditions, it's, I think it's equally of value to see things in a different state, and one of the things we talked about with weather conditions, and this is more about

picking a stream site in health and safety, knowing that after heavy rainfall a stream is going to look really different. So how would that impact life in the stream? You know, are fish going to be able to survive and manage to stay living in that habitat if there's really heavy rainfall? You know, high water flow, you can then talk about the water velocity and that sort of thing. So I think, being able to visit the same stream or river and have different conditions is still a really great learning and talking point.

Greta Dromgool

Thank you. I think I'm convinced that it's a great thing to go and get involved outside, go and investigate a stream, but one of my big questions as a teacher is where do I go? What am I looking for?, you know, how does that work? So really looking keen to hear what your advice is.

Alex Daniel

It's really great if you've got local knowledge, so if you go for walks and wanders and you find streams, and often I've been invited to take part in the stream studies and I had no idea that there was even a stream there. So, and that can be really tricky, I've gone to do a riparian planting on a farm and this, the most pristine, amazing stream at the back of their farm, it had great macroinvertebrates, it was like, this is awesome, I didn't even know it was here, and so being really surprised. So local knowledge is great. If you are not sure, again, your local regional council usually has catchment management offices that can help or point you in the right direction, I'd say, but having a look around, there are streams everywhere, gullies, rivers, looking at places that connect. Sometimes you just need to go for a wander.

Obviously, you can't go on private land unless you've got permission, so it can just be a little bit of having a bit of a wander around talking to local people.

Greta Dromgool

And there was a question there, and you might not be able to answer Alex, but it was just around if you're in a rural area where there might be some, people that are feeling concerned or worried that you're coming in and you might be making judgements around what they're doing on their land. Any tips for if you're working in that?

Alex Daniel

I think it's always really great to go in from a starting point of we're interested to learn, and if people are feeling defensive, it's, it might be because things don't look great, and then that might be a great conversational starting point of, you know, could we work with you and be part of a restoration program? You know, that's, although it can be tricky and some people absolutely don't want you on or near their land, and you have to respect that, if there is someone who's willing but is a bit defensive, that could be a really great relationship starter in terms of working with the community for positive outcomes.

Greta Dromgool

And I think I like about a lot of the Rivers and Us resources is it's not all about like the negative things that, I mean, what am I trying to say? There's, there's so many wonderful things that agriculture brings to us as a society and there are people doing incredible work for the environment within that sector, and so I think that some of the resources are, mean that you're able to show students some really great stories of what farmers can be doing or what they are doing, and, that the positive impacts from that.

Alex Daniel

Yeah. I'm just seeing a couple more, sort of ideas in the chat. There's two that's different. One looking at the weather conditions, so actually using that as a kind of study or focus point when you're looking at how it can impact it. So that's that great thing,

we'll be looking at the stream, but we're also going to see how the weather around us changes things, and another comment from Jenny about the silt laden large flow sailing zone in town.

Greta Dromgool

So yeah, questioning whether it's worth if you've got a river that's not your picturesque stream.

Alex Daniel

And you might not, because one of, one of the things we'll talk about later is the macroinvertebrates, so the bug sampling is really engaging and if it's really silt laden that might not be there. So it is nice if you do have the opportunity to, maybe, you know, if there's a school camp where the kids are going in the bush or somewhere else completely different, being able to have the opportunity to do two different stream studies. One our local stream, not in great shape, this is a, you know, highlight the issues, maybe talk about how they've come about, you know, and action points from there, but also being able to see a stream that is in amazing condition so you can, students can get the idea of, wow, this is what it can be like. Different with estuaries though, so estuaries will look quite different, to freshwater streams.

Yeah, but then you might have some great opportunity to look at different things, like the impacts of mangroves and holding back silt, so why mangroves appear, that kind of stuff. Which, you know, I wouldn't generally get to do in Hamilton. So there's still opportunities for amazing things. You know, coastal science teams at the Waikato Regional Council should have some really interesting resources around estuarine stuff that, that could be sort of fed into that as well. I recently learned that although you can do estuarine soil samples and look at the different macroinvertebrates in there, there was also a possibility of looking at the feeding pits that stingrays use. This is going way off in left field, but different ways of, you know, of the way they crunch to shells and seeing what life is in there by measuring the stingray feeding pits, and that's something completely different that you wouldn't get to do in a freshwater stream. So, yeah, using your own local environment and..

Greta Dromgool

going back to making those connections with your local council and what's, yeah, the education team finding out what's out there.

We do need to move on, but there was a really great point around studying a stream, but at different points and I love that idea, and looking for those patterns or getting your students to look for those patterns that they...

Alex Daniel

and I have done that with the school, with two different schools and didn't realise it was the same stream. So different, that pristine stream, on a farm upstream that was just incredibly beautiful, and then finding it downstream where it met the Waikato River and no macroinvertebrate life whatsoever.

Greta Dromgool

How cool would it be to do it between schools though, like on purpose, have schools all contributing their data to the same waterway?

Alex Daniel

Yeah, yeah. Another opportunity.

Greta Dromgool

I'm just going to point out that as part of the Rivers and Us resources, there's this amazing page, it was interactive that gives you lots of activities to do with looking at

water catchments. And I always loved that, the hands-on modelling, so the idea of building a water catchment to help students understand what are we actually talking about? How is it connected? All those things. So just wanted to make sure people were aware that, there's a range of resources there to have a look at, and I think, so many opportunities to make those connections to those wider ideas or other ideas.

You mentioned before briefly about health and safety and weather, and we talked about needing to do a bit of a recce first. I just wondered, yeah, what do we need to have in our mind when we're thinking of going out into the environment?

Alex Daniel

So unless you've been to the stream many, many times before, you know, you always need to do a site check so that you know what you're looking at, you've seen that there's good access points. You can see that there's a nice bit where you can safely stand and view with students, and you may decide there are some streams that you know, might be totally safe for students to be in and around and collecting the water and other streams that that's not appropriate at all.

Or they could look amazing and great when you do the site recce and then, the day you go to do the stream study, there's been five days of heavy rainfall and you might have to do a, and I've been in these situations where you say, you know, the adult's going to be collecting the water and we'll have to do it slightly differently and modifying on the day. So health and safety is really important and that's also something to keep in mind when you are selecting a site to do the stream study.

Greta Dromgool

And something I've seen really effective, done really effectively is asking students to contribute to the thinking behind this as well, because then they understand when you say, actually we're, we're not going to do it today, or, you know, we're going to do it differently. They've gone through that process.

Now, these are resources that have been shared with me from Alex and I've put them on our Slack Forum, which we'll share the link to and again, I'll reference it at the end of our webinar. So these, these resources that we're going to be showing are going to be sitting in our forum ready for people to grab hold of after the webinar.

Alright, so we've found somewhere that we'd like to go, we might have talked to our local council or had a look around ourselves, might be a, a big muddy river or a little pretty stream, but what are some of the things that we can be looking at once we've found our waterway?

Alex Daniel

So I usually like to break the stream study down into four sections. So, if I start with the physical characteristics, so I would look at the temperature, the pH, and the clarity. Now if you were with maybe high school students and you wanted to go a step further, you could, use things from the SHMAK kit and look at nitrates and phosphates. Generally, I'm mostly working with primary schools, so that's not something that I would usually do. pH is really easy, so you are looking at that and it's, I mean, I've tried to explain pH to seven year olds, so you do have to modify the way you talk about it sometimes, I would often, it's really easy if you talk about fish and you can say 'If something's really acidic like lemon juice and you get it in your skin in a cut, you know, how does it feel?' and the kids will go ah, you know it burns, it stings, and I'm like what if you get soap in your eye? so you can talk about alkali, and acidity and that kind of framework, you know, so if you were a fish, how would it feel? and you can talk about different impacts, so different inputs, sorry, that would impact the pH. So looking at, urine or runoff or fertiliser that might change the pH and you can get little pH testing paper, it's really inexpensive. Use that, and you've got a colour code that the students can look at and

you can tell them about, you know, neutral pH being healthy or what, what the good range is.

If you don't, one of the things I wanted to mention that a lot of the things we use are not particularly specialised equipment. So if you don't have pH paper, and this is pretty cheap and easy to find, you can go to Mitre 10 and get some pool testing strips that has pH testing paper as well, which is equally good.

Greta Dromgool

If you haven't been, not confident teaching pH, or you're looking for some new resources, this particular, interactive goes through some of our monitoring and assessment ideas and provides a little video just really short and sweet and talks you through some of the basics behind that particular idea. So I think, yeah, I think really nice to be able to access that easily.

Alex Daniel

Yeah, and it sort of brings to mind, you know, is this an issue? How could it be an issue? I know that there have been companies that have put things down the drain and there's been massive fish death. You may or may not want to talk about that with students, but certainly, you know, it can cause real issues, and we would also talk with students about, you know, might if you're in an urban area and you're washing the car, why you might wash your car on the grass and be careful about what you use on it, rather than doing it near a drain, because the stormwater drains will feed into the streams and the rivers.

So that kind of thing about thinking about your own actions and what you could do differently. So that's pH,.

Temperature is pretty easy. I've got a sort of a nice waterproof thermometer here, but you can also go to a pool shop and get a relatively cheap pool thermometer.

Greta Dromgool

That sounds like me.

Alex Daniel

Works just as well, and talking about temperature, because often, you know, you think what's comfortable for you, so always making sure. So, I use a recording sheet, you probably can't see that very well and it'll be back to front, but talking about temperature range and what is suitable for invertebrates and periphyton. So talking about the healthy range, you know, excellent being between 10 and 14.9, so you can see the stream's colder or warmer, how that's going to impact stream life, and if it's really warm, what's going to happen in terms of seeing that difference in terms of insects that will or won't survive the fish, and that's really useful to talk about different changes in seasons, also shade of trees, how that will impact the water temperature, that kind of thing.

So you can bring in, I mean if you want to go a step further and a step deeper, you can talk about climate change. I don't know if you will want to do that, but talking about temperature, it can be really straightforward, but you can make it quite, you know, a deeper thing as well.

So temperature's really easy to take, also thinking about not putting it right on the side where it's really warm, but making sure it's sort of in, and if you can't, you know, using a bucket and getting the kids to do it that way if you don't really want them in the stream. So, there's different ways you can do it depending on your access to the water.

Greta Dromgool

And there's a hint here that you don't forget to put your string on your thermometer.

Alex Daniel

Don't drop it in the water.

Greta Dromgool

Yeah.

Alex Daniel

Sometimes I, it's not as fun as if you're standing in the water, but certainly in terms of keeping track of equipment, it's sometimes it is easier to use a bucket, grab the sample, bring it back so everyone can stand around depending on your group size as well.

Alex Daniel

So, pH and temperature and clarity. Now clarity is the one thing that is really cool, kids feel like a scientist to do it, but so far, I don't know how you can do this without special equipment and this is the one piece of equipment, a little bit expensive, but I use clarity tube, so I'll, I don't know how I'm going to do this, I've got a slightly loose bung

Greta Dromgool

We will, we're looking forward to it Alex.

**What gear do you need and how do you use it? (video
timecode 31:27)**

Alex Daniel

It's like a cooking show, this is something I prepared earlier. I don't know if you can see, this is a clarity tube, so what I've done in the end here, there's a wee bung, I've opened it up, I've poured my sample of river water in, now there's two plastic magnets. I'm going to pull them up to the top here, I don't, I'm not very good at not letting, so one's on the inside, one's on the outside, I'm just going to slide them down. So it's a magnet and along the side there's just, just a measuring ruler along there and it's, this is a metre.

Now normally you would have several children doing this and my arms aren't terribly long, so I'll see how we go. Down the end here is clear, so what you're going to do is look in the end and it's going to be, you can see the magnet I think in there, you're going to slide it and you'll have a child looking at the end, sliding the magnet along until they can't see it anymore, and then you do it from the other end and move back till they can't see it anymore, and you'll get a measurement of, you know, somewhere between hopefully not ten because that would be very terrible.

You know, probably between fifty and eighty or ninety. Very clear. If they can see all the way to the end, it's an amazing clean stream and everyone will be high fiving going, oh this is amazing, but it's something that all the kids can have a go at and you'll get slightly different measurements and then you can do a bit of maths with working out averages and coming up to, to a number there somewhere, between, you know, fifty and a hundred centimetres is fair, more than a hundred, excellent.

So you'll get this sort of rating and it's a really nice way of explaining, 'cause kids often will think, well they can see all the way through, but when you look at the end and it, the magnet disappears and they're like, oh wow, and they feel like being, you know, really a scientist doing fancy work, using a clarity tube, working out a measurement, and then seeing, talking about sediment and how it floating can affect, growth of plants, algal growth is poor, the invertebrates that eat the algae may die out. So clarity is important for fish to find their prey as well. So the different reasons why you'd do that.

Greta Dromgool

Yeah, I was wondering why, why we care about the clarity and I really like the way that you highlight that there is an important, you know, you need to understand what the parameters are to understand what it is that your results are telling you, and again, these resources that Alex has shared, are available for everybody to have a look at.

Macroinvertebrates (video timecode 34:04)

Alex Daniel

And I was talking to Greta before, if there's one thing that you can do with students, do a macroinvertebrate or bug hunt because it's the one thing that will just get kids so excited because you're in a stream, you can't see there's anything alive in there, and this is one thing, it's great if you've got a beautiful net, but you can equally use a sieve, you rub the rock downstream, you're catching them and then you'll empty them into a either a beautiful fancy white tray or a white ice cream container and then having a look through with a magnifying glass, very cheap, inexpensive and we've got the bug identification sheet.

Now this is one of mine that's not in great, it's not in colour, but there's one on the webpage that is, that's awesome to use, and why are macroinvertebrates or bugs important? The pollution tolerance index number is attached to the different, the bugs that you'll find, and saying to kids, wow, so the higher the pollution tolerance number, the less tolerant they are of pollution.

So you've got mayflies and caddisflies that are not pollution tolerant at all, and then at the other end you've got worms and water boatmen that are, you know, you'll find in sort of more polluted water. So depending on the types of insects you're finding in there and the spread and the sort of, you know, more or less of one or the other, that will actually give you a really good, indication of how healthy the stream is, and talking about bugs and, and the macroinvertebrates in terms of the ecosystem, all being part of that. You know, what's eating what? why is it important? All of the different insects having different roles, you know, whether they're shredders or, yeah, how they are part of that ecosystem is so cool.

Greta Dromgool

Oh and they're so exciting when you find them aye? like kids just, yeah, you see that smile on their face and that excitement and you know, yes! They're then going to want to find out more and get involved.

Greta Dromgool

We've had some great ideas coming through our chat that I just wanted to share before we leave. One was a journal story, North River where a class visits a river and it has an alternative to a clarity tube suggested, so.

Alex Daniel

Oh cool.

Greta Dromgool

Look at that, talking about like the biology and classification of the macroinvertebrates, you could really go into that and focus on that.

Alex Daniel

Yes.

Greta Dromgool

Angela's popped up there a monitoring sheet and we also do have that bug identification in there, that we'll add to our Slack as well. So just so many ideas, Alex, so many, and it's so exciting that, you know, if you've ever had the experiences of, of getting students out and involved and seeing them make those connections, it's just really amazing.

Alex Daniel

Absolutely, and just before because I know we need to wrap things up and I can talk for hours, in terms of accessing the kit, although a lot of what you can use to do the stream study you can find at Kmart, or The Pool Shop, or Mitre 10, or whatever, if you do want to borrow equipment, most regional councils will have resources available and people available to support you in doing this. So if you're not sure, that's a great place to start in terms of contacting you, Waikato Regional Council's got NIWA SHMAK Kits, which are very full on and comprehensive and amazing, but also have the tools if you do want to do the nitrates and phosphates, yeah, you can buy SHMAK Kit from NIWA, but it is a little bit expensive, so it depends on your budget, so yeah.

Greta Dromgool

Yeah, and I think there were also NIWA, there's a, they've got a whole manual that you were just showing before, that goes through all these processes as well, if you're needing that extra support. We also talked a little bit earlier around the data that's gathered and the, how it's lovely if you can do it over a long period of time, but also that you might access data that already exists, and we've got, you talked about LAWA.

Alex Daniel

The LAWA website is really great. So it has all of the water sampling that is done all over New Zealand. You can click on an area, it'll tell you the stream site and it's got graphs over time as well. You do have to understand what the parameters are that they're measuring. I remember talking with someone about, you know, is it safe for swimming?

That doesn't mean that you won't get sick, it means that you are, are unlikely to, you know, one in a hundred or one in, so, and that's looking at *E. coli* bacteria, which is slightly different, but it also will record nitrates and phosphates and that sort of thing, but great place to go if you want that really big picture.

Greta Dromgool

And the other one that I've learned about reasonably recently is the New Zealand Water Citizens Science projects and they provide a space for people to input their data and so you can actually be part of this project, which I think is so exciting to be, to be able to participate.

Thank you so much, we've got to the end of our time. Thank you so much for our participants and your amazing input to our chat. We really appreciate it. I will just put up our Slack, our contact details and also, if you are wanting to continue the conversation or have any questions for us, please, jump on and ask and if we don't know the answers then hopefully we can find someone that does, thank you Andrea, answering my chat questions, and yeah, we just love to, to hear from you. We love to know about whether the webinar's helpful and what other information that you might like. So please do be in touch with us and once again Alex, thank you so much for your time, really, really appreciate it.

I know you've been out today busy in the field yourself and to come back and share your knowledge with us.

Other useful links and support (video timecode 40:54)

Alex Daniel

Yeah, and certainly I should do a little pump here, so we've talked about regional councils a lot, Enviroschools is really supportive in getting students involved in environmental education. So that's my, that's my Enviroschools t-shirt I'm wearing there. So in terms of getting a stream study going, you know, contact the regional council or contact Enviroschools, even if you're not an Enviroschools' school, there's usually an environmental educator or a support system so that you can get support for that, and yeah, any opportunity to get students out there doing work in the environment is massive.

SLH links, keep in touch and thanks (video timecode 41:19)

Greta Dromgool

So valuable, great. Alright, that's us for today everybody. Thank you, ka kite, have a lovely rest of your week and we'll see you back for another webinar sometime.