Plymouth, 9/04/2015

I: Interviewer (Gregor Halfmann)

R: Respondent (Rob Camp)

recording DR2901:

I: Okay, the first thing I would want to talk about is the technology of the CPR.

R: Sure.

I: I read that you are the instrumentation technician at SAHFOS or one of them.

R: Yeah, one of them.

I: What are your tasks, actually, as technician?

R: So, a number of the routes had historically different instruments fitted for a variety of reasons. Some of them because they cross an interesting body of water, some simply contractually have been obliged as part of their contract package to fit some instrumentation on them. And the day-to-day part of my role is working with the operations department who produce a tow sheet about when the ship is going to go out and what dates they are going to tow and to fit instruments that those ships require. Set them up in advance to the right sampling interval, correct recording windows, and fit them to the CPRs. I will give you a copy of this to take away so you can see, but generally these are details about what additional fitments there will be. Some of this is just operational as far as additional towing blocks or wires, whatever …

I: So it all depends on where they go or on which ship?

R: Yeah, some of it is just because we have always used a particular instrument on a particular route and there is no necessary scientific reason for why we are doing it; we just keep doing it. It is another long-term time series that we collect alongside the plankton data but it is only about twenty years’ worth in total versus the eighty years or so of plankton. So with their form, which as you can see, regularly changes, because you are reliant on ships of opportunity rather than your own research vessels, you always have to do things according to where and when those ships are going to be, which always is likely to change. So fitting with this and then making sure that the instruments are fitted to go out.

I: That's interesting, because I thought that every CPR would be equipped the same.

R: No. The majority of the CPRs have at least temperature sensors on board, which are relatively simple, small instruments. These are like fish tag CTDs, so not very accurate but cheap and robust. So there are quite a number of CPRs which just have temperature sensors, then there are a few which have a CTD, so they are measuring salinity and depth of the CPR as well, and then there are a few that have a full CTD [unclear], research vessel device and then like you heard from Rowena this morning, the water sampler for actually taking whole water samples as well as the CPR sample, because the size of the mesh in the CPR internal is not great at sampling nano- and pico-plankton, bacteria, fungi, viruses, all of that stuff.

I: So this is the water sampler?

R: This is the water sampler. This doesn't have its bags. You can see behind you. So it's effectively a medical nutrient bag, they are sterile before we fit them, and then this is pre-programmed to start. It switches on when it goes into the water and in whatever [unclear] you set up, it collects those samples alongside the CPR samples. And then you can do comparisons between CPR samples versus what you find in the water plus lots of other things that we could not even see with light-microscopic …

I: So can you show me a CPR, actually?

R: We can go down to the workshop and I can show you a CPR. No problem at all. [We go downstairs to the workshop.] So … quite a lot. Going back to number one which is still operational or still potentially operational, but you can see going through to some of the very latest ones, like these, as you can see, there are some design differences to make them more robust. Also, the material is slightly different. These are all laser-cut, so they are all standardised, whereas in the past each one would be handmade.

I: So how many do you have in total?

R: There are probably about eighty operational CPRs. I'll be able to get you exact figures. And there are quite a number of … So 54 CPRs plus there are others out in other surveys around the world. A hundred or more internals, because some of the CPRs have a number of different internals that fit, so that you can use the same CPR and change the internal cassette in and out. You can see next door the internal mechanisms. That is also part of the workshop area, the internal is the more delicate part of it. They are operated on separately. So as you see here for CPR 109, you have internal number 1, internal number 2, so you could deploy the CPR, then haul it, change the internal and put that in for another two hundred nautical miles or so.

I: Do you mind if I take pictures?

R: No, no, carry on. And again you see some of the earlier ones versus something like this, which is significantly newer, and again, it would have been laser-cut. You want me to take one out, so you can take a photo of an internal? And you can take pictures of the shelves as well. But again, that means that for the latest ones you can swap any internal in any body. They all fit each other, which means you don't have to worry about making sure that the pairs match up. In the past you had to make sure that “oh, we need two or three [unclear] for this particular route, therefore we can only use this CPR, because it's the only one that three different internals fit.” Whereas nowadays every single one of them should effectively be exactly the same.

I: So how exactly does it work?

R: From the nose of the CPR, water comes in and the hole in the nose is of a certain size and it expands, the space inside, which reduces the pressure. Therefore it means that the pressure on the silk that is collecting is not as high as in the water; because we are towing at maybe up to twenty knots or more, which would damage the plankton, if we were collecting at that speed. So because the space in the front widens, it effectively reduces the speed when it hits the silk. So the water will enter here, and then a roll of silk will effectively filter onto it, a band of silk. Then a second band of silk comes in on top and the two bands of silk come together, so the plankton then does not move off the particular place it was collected and then it winds up and ends up in a little holding tank here, which has formalin in it, and it is preserved. So it will end up here in this space. So yeah, the two bits come in sandwiched together and then rest in here and then there is an area with a cotton-wool soaked in formalin inside, which starts at about forty percent that is put in, but with the dilution with the seawater as well, ends up at about four percent or so, which is enough for preservation by the time it comes back to us. And then, if I then show you the next step.

I: So this is one of the newer ones …

R: This is fairly new.

I: I am puzzled by the continuity of the technology, that it is basically still the same …

R: Yeah, the design is effectively the same from …

I: What would you say makes it so reliable and so robust?

R: Just because it is very old technology. It is ninety to hundred kilos of steel and it just can survive those conditions.

I: But what are same upgrades that have been made?

R: I will send you a link to a paper that explains exactly the upgrades, but you can see … the internal is effectively exactly the same.

I: Okay.

R: Apart from it being laser-cut so that the dimensions are exactly the same on each one, the design is exactly the same. But if you look on an earlier one like this, it has a single diving plane and, I don't know if you can see it in the back, it has a tail fin there, and it just has a cage there around the propeller. So the only changes really have been to make it a little bit more robust. So the newer diving plane is shaped like this, but it still performs in the same way and this [unclear], because its shape being a little bit like a shock absorber if it crashes against the ship. And then with the box tail as well; it just gives it a little bit more protection. We have done tests on how the angle of attack of the CPR influences the efficiency of collection; there is no difference. So the continuity of the data continues, but the design of the CPR is just a little bit more robust. And again all of them have a prop protector now here which is effectively a blade that spins with the propeller, because with things like fishing nets or other material in the water that would clog the propeller, it chops it up and spits it out in the back. Again, I'm happy to send you some photographs as well, so you can see. There is a good paper by Chris Reid, which shows the evolution of the different designs and how this [unclear] has slightly changed over the years.

I: Yeah, I have seen that.

R: Yeah, but the internal just stayed the same.

I: So, do you keep some of these for experimental purposes to test new equipment?

R: The one we use the most has just gone out for exactly that reason. 192, so one of the newest ones, is the one we regularly use on our closest route that goes from Roscoe in France back to Plymouth. It is towed by Brittany Ferries and because they tow right back into Plymouth, we can deliver it to them by hand and pick it up by hand, whereas normally we would send them out in a yellow box. A transport company would take it away, it goes to a port, the port sticks it on a ship and it is done there. It is done remotely.

I: I was going to ask exactly this. How do the logistics work?

R: Yes, so one would be boxed up. We know what is required for the ship and one will be boxed up. These are the ones that go out. These are just empty boxes, but one would go out with the details on it. The courier company will come, pick it up, deliver it to the port, the port will be aware of where it has to go, what ship it has to be on, they will take it to the ship. We will have emailed the ship and tell them when we want it to be towed and where from, they will tow and when they have towed they can then email us back the log form of where they have been and what they have done with it and then maybe a few days later, the whole CPR will come back to us.

I: So the ship crew actually knows how to set it up and …

R: Yeah, if it is just a single tow, the internal might already be in the CPR and all they have to do is throw it over the side of the ship on the cable, and they know where to let out the cable to a certain length so it tows at the right depth, haul it in, stick it back in the box and just send it back to us. For the tows that are a bit longer and they have to maybe change the CPR or change the internal, they have a bit more training so they know how to do that. But yes, it is a relatively straightforward task and they all have some training; and they are happy doing it.

I: Do they have the training here, or … ?

R: Occasionally some might come here, but normally Lance, [unclear], will go out and visit the ships, you know, you go and bring some chocolate as a good will gesture and you would chat to them and check if there have been any updates or new information they need, if the ship needs any more information, and also, we then have to inspect the point that they tow from and check that all of that meets … you know, if it's in a good condition, they have got a [unclear] and safety inspection for it. They maybe change over some of the other equipment that we use for paying out the wire, but yeah, it is a relatively simple task but they do a very good job for the fact that you are relying on someone and not keeping an eye on them.

I: Let me see if I have any more questions on this. Yeah, so what is essentially the information that goes with it, when you send them out? Is there like an …

R: There is a little bit … I can show you an example if we go back up. Is there anything else you want to see here?

I: No, I think that was the technical part. I'll take one more picture of the shelf.

R: Yeah, so there is a form which we will send them, which is basically for them to record when they put it in the water and where, what course they went along the route, and where they hauled it again, any other information they might want to collect about the sea state, the weather conditions as well. But we will also send them a letter to the ship's captain and also to the crew saying “please put it in at this point, and please tow it for two hundred nautical miles, and then recover it.” With a new ship you have to be a little bit more careful and explain to them exactly what to do, but those who are doing it routinely every month, they are in the routine and they know what they are doing exactly.

I: Is there a mechanism to make sure that they follow these instructions?

R: There are ways of us checking. So me being involved in instrumentation, we ask them to fill out a log of where they have been.

I: Because they might change routes.

R: Yeah, exactly. Normally, most of these are regular shipping routes so they tow it on a pretty straight line. And again these ships are on a regular route, every month they do the same thing. But I do have ways of knowing whether they have done what they have said they have done. So the instrument will record when they went into the water and when they went out. So I know if they were correct, when they went in; and then I can check the satellite position of the ship to see if the ship actually went where they say it went. And if there is any significant disagreement, then we might change what they have told us, but generally, you know, it is not necessary to actually change anything and it just uses a validation and they are actually all correct. Because each sample is effectively a ten nautical mile area, a deviation by maybe a minute or two in the time that they shot it or hauled it does not matter for what we do with the data. And the same with exactly its position, it does not matter whether or not it maybe a nautical mile or two off from where it is reported. We are not making those claims that this plankton is from this exact spot. It is “this is the plankton collected within this sea area.” And therefore those slight differences don't make a difference. But yeah, again there are more forms I can send you, which show you exactly what we send out with them. … So effectively the next step when it comes back, is … This isn't actually how they come back, because normally they would come back in a pot like this. So the workshop would get the CPR back, and then they unload the internal and then you have the spool there which would go into a pot with the details of where it has come from, with some formalin to keep it preserved. And at some point the cutters would then lay out the whole ribbon of silk and cut it into individual ten nautical mile samples for us to then analyse. So eventually you end up with a long role of … well that's just a plastic bag. Again, I have got a lot of photos of the process from our procedures manual. I don't know if there is an example of the procedures manual here, but anyway, I will show you photos of how the spool comes back and what we do with it.

I: So how many spools come back?

R: There are about twenty tows per month. So maybe one a day or one every other day. It is typical that lots of them come back on the same day and then not for a week. And then we [unclear] a box in there, a plastic box for which is worked out who is going to have which samples. Effectively it is a random process, so there is no bias. And then they are out of our box and we would go into the lab to analyse them. So there is [unclear] box with her samples in there that she has been allocated; and then she will take out an individual sample. So this is a ten nautical mile sample and this is the filtering silk and this is the covering silk that will go on top. So they come back like that, they are cut together. So this is the one that actively filters, this is the one that swishes against it. Then we each get those and then we analyse it here.

I: I have a few questions about this, but I am also getting another lab tour on Monday from David Johns.

R: Yes, that will probably be far better for explaining everything as far as the whole process.

I: Yeah, but on your twitter page it says you are also a plankton taxonomist, so you also do this?

R: Yes, about twenty hours a week I spend looking into a microscope and the other half of my time is fitting the instruments and downloading the data and handling the data, and a little bit with the curation of the store. When we go over to PML, when I show you how we store our samples long-term, that is another bit of my job. Once all of these are finished and analysed and we have done quality control checks on our results, they are then boxed up into their route boxes and then they go over for long-term storage.

I: Okay, I can see that this is microscoping, but what are the actual skills that this activity requires?

R: Yeah, so the first stage is the phytoplankton stage, semi-quantitatively. So we would do ten fields. If you look into the microscope and you look into the gaps in the mesh, you look at ten fields across that way, turn it and do ten fields across. So effectively an “x” across the sample, ten fields, and then working out what percentage of the sample you are looking at, you can multiply the numbers that you find to give you a total count or a rough idea of the total counts. Then we would do small zooplankton analysis which is a stepped analysis across the sample, which again is semi-quantitatively, but you are looking at a larger percentage of the silk for some of the larger organisms. And then again you can multiply those numbers. Then the final stage will be the large zooplankton analysis, which is what [unclear] is doing now. So some things she has been able to identify by eye, so she does not need to take them over there to analyse. She just put them to one side and then all the rest of material, anything above about two millimetres, she has taken off to to look at them under these microscopes and that will be fully quantitative. So effectively you are going to count every organism that you see. So there is quite a lot of training involved because we have to recognise an awful lot of taxa, over five hundred different taxa. So there is a lot of training required, you are not really fully released without supervision until maybe after two years of analysis and that is still only North Sea and North Atlantic samples. It might be some time after that until you would be looking at Pacific samples or South Atlantic, Antarctic samples, because the communities are different, there is additional training on that.

I: So is there cross-checking?

R: Yes, so there will be cross-checking. All the samples will be looked at in our database and any unusual looking results will be send back for a different analyst to look at to see whether or not that was really found. And also, it is a relatively recent step we brought in, but actually just to randomly pick any sample, one in ten samples or so, and completely re-analyse it and compare the differences; but not based on anything of the results; simply as another quality control check.

I: So is actually every sample that you get back going through this same process and is fully analysed?

R: We only analyse the odd samples, not the even ones. The even ones are cut and then preserved and put into the store, so that if for any reason we needed to look at a completely unanalysed sample with no effect, we can look at that one. Also of course, if anyone wants to maybe use the samples for any other reason, if anyone wanted to do analysis on the actual samples or maybe try a different technology that has not even been brought up yet, something that you could do with them, there are preserved samples that have been untouched by us apart from just cutting them and storing them that can be looked at by the people.

I: Maybe we go back outside, because it is a little bit loud and I don't know how the recorder takes that.

R: Yeah, so then … Of course, after we have analysed them, then they would go from your own box into an actual route box. So each route has a different letter corresponding to where it is or where it is going from. Then each tow has a different number of that route, so this is [unclear] of the BC route. And then they are all wrapped up, put in those boxes and once a box is full, it then goes over to the store for long-term storage.

I: But the samples you analyse here are also then stored so that you can re-analyse them …

R: Yeah, everything is stored. We have samples in the store going back to the 1960s. We would have them going back to the 1940s, but unfortunately in the past, at some point someone decided “oh, we don't need these samples” and they threw out some of the early samples. But we still have samples going back to the 1960s and everything has been stored.

I: I will have more questions on that when we are there. …

R: So any more questions for down here, anything you want to look at?

I: No, I think we can go back upstairs and then I check if I have any more questions.

R: I have no access on that computer, but I will show you my other desk. The actual database then which the samples go into. And then I will show you a little bit on the whole checking procedure as well. This is where I normally am, when I am not doing instrumentation itself. So we have console which is our bespoke database for the samples and it also has data for operational reasons. So how it is broken down is: these are tows, the first section here is tows. So if I pick something which happened recently … So this is an electronic representation of the form that comes back. This is the actual form that would come back from the ship and so they have recorded what date it was, what time it was and what they did. So they shot it there, they altered course a number of times and then they hauled it there where they were at those times on what course, and maybe any other information. This is an electronic version, so it is then copied from this to the electronic version and then from this you can work out where each sample would have been. So you look how much silk has gone through the mechanism, and then you can tie that up with how far the ship has gone and you know exactly where each sample was taken. You effectively end up with a map like this: This is Roscoff, France, back to here, so you know where the ship has been. So that is just the first stage as far as operational but then when we get our samples, we have another thing to do with the samples. You then get an area where you can put in what you found in phytoplankton, what you found in small zooplankton, and what you found in large zooplankton.

I: So that is where you enter the numbers.

R: That is where you enter numbers and as you can see, some of this is actually not total counts, so based on how many you find, there is a multiplication factor based on what percentage of the silk you are looking at, which gives you a category. So again, a lot of data we release is not whole counts, it is categories, and therefore it helps remove any [unclear] saying “there are this many in this area.” You may be saying “there are between 200 to 250 of these within this area.”

I: So when you are in the lab downstairs you have like a notebook …

R: Sure. Yes, we are just recording it on a notebook, again phytoplankton, small zooplankton and larger, any comments maybe about the sample. Then you have a comments box as well where you can put in maybe anything unusual. So again, there is another transcription from here to this, but you do this with someone else as well. You might enter it by yourself, but before you sign it off, you have another analyst with you just checking that you have done [unclear] enough and correctly. But yes, you are right, there are a lot of transcription steps along the way, where there is potential for errors.

I: Are these notebooks kept, too?

R: Yeah, yeah, all of your notebooks going back to the first one, I have them all there. And even going back to … I am analyst number 104, but even back to the early analysts, we still have their books, so if you ever wanted to go back and check what they actually found, you could go back and check. And in fact, we got some funding a little while ago to digitise a lot of the records that were never put on here. They were in people's notebooks but before we had a database. And it was given time to people to go all through their handwritten notes and actually enter it into it, so it could all be compared. So there are [unclear]. So what it will end up giving you is, for the people who then check across the results, something like this. So it shows who the analyst is, what they found, it tells you the different species and what the count is that they found and then the people checking could go along and go “does anything look out of the order here?” So this person has a nine count here, this person has none. You don't know, that may be because … something like that might flag a query going “go have another look at it, see if you find anything.” So given to a different analyst to look up to see if there are any counts. And then that process is generated by … you get check blocks like this. You get a message sent, say, “on this sample, could you look for this please?” And then you can give your answer and then they have of course the original count, and your count and then they have to work out which one they are going to decide on. You know, which is the more likely, or maybe somewhere between the two. It potentially causes problems, because you have two results for the same thing. Which one do you believe? But, to some extent, based on seniority or what you would expect in a certain area. If someone finds something and you think “that shouldn't really be there, perhaps you have misidentified it,” then you go back. So once that is checked, the whole route can be finalised, the data can go into the database and be fully released at the end of the year when we release all the data for that year.

I: Do you know when this was all digitalised?

R: No, not from the top of my head. I have only been here six years, but before my time. I think probably, maybe in the late 90s. David will be able to give you exact dates for when all this came in, he has been here for quite a long time. He probably even remembers it before the times when it was done in this way.

I: Do you sometimes get any samples of silk that are completely unusable?

R: Certainly. There are a number of reasons for why we could not analyse a sample. It could be that the tow is okay but the form is wrong. And if we cannot guarantee where it was taken, there is no point in analysing it really, apart from maybe for training purposes. However with the processes I am bringing in to satellite track the ships, you don't need to rely on the ships. You could have a situation like that, where the tow goes fine but you can't be sure where it was from. You do sometimes get jams, occasionally the mechanism fails, damage might happen to the CPR, or something has not worked quite right and the silk has not moved on or not properly and therefore you are not filtering it at the correct rate, and therefore you can't be sure where things are. And then some samples may be rotten, they have not preserved properly. That very rarely happens but sometimes they have not preserved. Sometimes, because it is so much material, it overwhelmed the amount of formalin we put in. So it has not preserved and it is very mushy and smelly. And then we had examples in the past where there have been really high amounts of fungus in the water which coloured it black and make it very difficult to see things, or through patches of sewage or blobs of oil or other things like that which just make it very difficult to analyse. We still try to do the best we can but you often can't guarantee, you know, again we will make a note and say “you can't make an actual count on this sample, because it just isn't analysable.”

I: So how many samples out of a hundred would be …

R: Maybe one out of a hundred. And that may be for all reasons, maybe one out of a hundred. So very rarely do you get a fail. And that is probably one out of a hundred tows rather than samples, it may be even less in the number of samples. You also might have a small section of a whole tow that is unusable. Maybe just a little bit of it gets damaged or you just cannot see what is going on, but the rest of it is okay. So you might lose three or four samples from the beginning or the end of the route, but everything else is okay.

I: I just realised I had one more question about the technology. What is required in terms of maintenance?

R: It depends on what condition they come back in. Some come back and have really been bashed around, if they towed through a storm. Once they are deployed it is not so problematic, it is very robust, but when you bring it back aboard the ship in stormy conditions it may bash against the side of the ship when it is being brought in. So the body may need quite a lot of maintenance. There are a number of bits that can just be removed like the tail or shock absorbers. Sometimes the actual body itself is twisted, but it can all be taken apart and re-welded and put back together. The internals, each one is checked at the end to make sure that the correct amount of silk has gone through, it is performing well, and it will be signed off saying “yes, everything is fine”. Of course each one of them will be cleaned and checked and then reassembled before the next tow.

I: If they need repairing, is that also done here?

R: That is all done here, yeah. So an outside company built them for us originally, but …

I: Which company?

R: I forgot exactly, there is a local engineering company and they make them for us. But all the maintenance and the repairing happen in-house. So the operations team can do all of those things to both the internal and the body.

I: One more question about your background. You said you have been here for six years now?

R: Yeah.

I: But I remember that you told me that your background is not in …

R: No, I mean my education is marine biology, but I was working in medical research before coming here. I was there for about a similar time, for about six years.

I: So basically, you have come back to what you learned.

R: Yeah. I came back to what I was educated in doing, but yeah, I think I have said to you before, there is quite a difference in the amount of funding that is available, therefore the facilities and therefore the checks that you can do. It is a whole step change different. In science you are always fighting for money and for equipment, in medical research you ask for something and they send you two. And the rules and regulations in that field are much, much stricter than they are here.

I: Do you know the procedures when you try to get new ships to tow CPRs?

R: Yeah, our [unclear] department would actually get in contact with a ship saying that “maybe there is a ship we are using that goes offline or gets scrapped, we need to find a new ship.” So we would contact the owners of that ship and the captain of the ship whether or not they would consider doing it. And then we would make a visit to the ship and explain to them exactly what we wanted to do. It has been very beneficial in the past, our head of operations, he only recently retired, was in the merchant navy for many years and worked on board ships. And therefore when you are going to new ships and explaining to them, you know, he knows what it is like at sea, he knows what they go through, and he was easy to convince them that it is safe and it will all be fine.

I: So it is not like you have a lot of recorders here but not enough ships …

R: Finding ships is never the problem. Finding ships is not a problem. There are lots and lots of ships and crews, who are more than happy to do it for us. Simply the funding, the analysis is the most expensive part of the process. Preparing the CPR and sending it out to a ship costs us very, very little, which is why we can be so cost-effective. And we are only paying the ship in [unclear] effectively, it is only sixty pounds per tow. So it is only like either beer money, or maybe for their television fund, or whatever else they might want to spend it on.

I: So the limiting factor is not having enough money to analyse more …

R: For analysis, yes. We would happily double the amount of routes tomorrow, that's probably what we would do. But the money for actual analysis is high, which is also why when looking at things like instrumentation, there is an opportunity maybe to tow CPRs without any internal in them, but simply collecting the physical data or other data, which is much easier to … Well of course there are costs involved in Rowena's analysis of water samples but it is nowhere near as much as it is to analyse the silk samples. So you might see in the future a situation where we send out CPRs without the traditional internal. So the method of towing is still the same, but you are not doing the original silk samples. You are still covering routes but you are doing different analysis which is a lot cheaper, or much easier to share the data; we just give out the raw data, rather than our manipulated data.

(end of recording)

recording DR2902:

R: So yeah, I think they are going to maybe Immingham, possibly they will be going out of …

I: So they are all going to ports that are nearby?

R: Yeah I think both routes will probably go to the same port. If they are being loaded together, they go on the same truck and go to the same port, but on two different ships that leave from the same port.

I: I think there are also CPR projects in other parts of the world …

R: There are, certainly. We have a sister survey. So GACS is the Global Alliance of CPR Surveys.

I: But the archive and the analysis here are only for the UK …

R: No, no. Not every sister survey sends us their samples but the Pacific routes do. So we have the North Sea, North Atlantic routes here, we have the Pacific routes here and we have the South Atlantic routes here, which are sort of run out of here, but it is the British Antarctic Survey that helps take the CPR down to the South Atlantic and it's South Georgia Fisheries Protection Vessel [unclear] that actually tows it for us. But again, those samples come back here. So anything that we analyse is stored here, but also some routes that actually don't get analysed by us or only part will do. All of this comes eventually [unclear]. The Australian does not come back here. So there is the CSIRO-run AusCPR. There is a bit that goes right around Australia. There is also a Tasmanian bit which goes from Tasmania down to the Antarctic. We don't get those samples back.

(end of recording)

recording DR2903:

R: So there are not just our samples that are in here. The MBA still has some stuff and PML as well, so anything that is in particular formalin-preserved stuff is kept in here. … So it is not the nicest of …

I: So what did you measure now?

R: It is just a formalin reading, this is a formalin meter. We have similar things in the lab back at SAHFOS. However, the extraction system there is so good that actually normally the readings are next to nothing. You can never smell it like you can here. Although still, this is well within, you know, it is a tenth of what save working limits are. So for the amount of time that we are in here … I just record whenever I am I here what the readings are. I just take these back, and then I'll come back.

I: Yeah. …

R: So yeah, the boxes that you saw over on the other side, once we are done with them, this is where they then go. So we end up with racks and racks and racks of samples going from the more recent stuff here right all the way back to some of the oldest stuff right back at the end. So, going back to some of the earliest samples of some of the routes. And even this does not even go back to the very beginnings of some of the routes, because some stuff was thrown out back when people considered it not to be worthwhile.

I: So these are the tow numbers?

R. These would be the tow numbers [unclear]. So there is section here of the V route, this and then this and then this are the routes as well. And Astrid back at SAHFOS has a big long list of exactly what samples are where. So say if people were looking for a particular sample we could direct them to base 1, bay 2, whatever will be in there, whatever shelf it is on, and they can go and find exactly what they want and spend as little time here as possible. Because as you can see, it is not the most pleasant of environments to be in. Then of course, we have black plastic on there, just to give it some sort of UV protection, but of course in here it does not matter. And everything will then be laid out neatly, neat and tidy. So all the samples are in there. Again I have photos of these as well and of the processing, and procedures explaining exactly how the process works. And then these will be checked every so often. Every so often we do a visual check. I might be able to find you an example of one that is not so good. If I push these this way, I might find you one. Of course the boxes are not completely airtight, otherwise there would not be any formalin in the air. So over time, there is some evaporation and once they start to dry out, the formalin level will drop and the opportunity is there for bacteria and fungus to start growing. And for some of the earlier routes … That is an older route, but it is still looking to be in fairly good condition. There is a bit discolouration compared to this.

I: Oh, I see.

R: As you can see … You might even be able to smell it as well. So you can see there is mould and fungus starting to come in. Yeah, it smells. You know, it does not smell like formalin so much any more. It smells of mould, it is dried out. The formalin level has dropped and mould has started coming in.

I: So could you still use these?

R: For some things. Some organisms preserve better than others, so you might still find some stuff that is easy. The count could be as good as when it was first done. Other things, maybe not so much. And of course the discolouration after a while makes it sometimes very difficult to see the faint things. Something like this is probably too far past doing much trying to save it.

I: There is no chance of getting it back into a better condition?

R: You could add more formalin and at least stop it getting worse but it is probably unlikely that you will ever make it better. So you might just decide, well at some point, this is in such a poor condition that they throw it out. And part of Astrid's record keeping gives you an indication as to what the condition of the samples are. So everything in green is in excellent condition, going down to stuff that is in very poor condition. So what was the one that I just got? So 559, 549? So she has it in good condition, so that possibly needs revisiting.

I: I think it was 550.

R: Okay, sorry. Yeah, so she put this in a poor condition. So knowing that, if someone was going to look and someone wanted that sample from that year, in that region, maybe it is a waste of their time even coming here and getting that box out, because it is not very good, maybe you look for a different route. And again, these ones from 549 were taken earlier than 550, but they are in a significantly better condition.

I: So how does that happen?

R: Maybe a contaminant has come into that one, fungus has got in. And because they are stored together, you only need one sample to be bad for it to spread. Now really, in the future, it would be much better to change the way we store samples and to store each sample individually, in its own container, in larger boxes. But again, space is a constraint, money is a constraint. You do the best you can. And for most things, you know, even samples that are now sixty, seventy years old, are absolutely fine. There will always be some losses, but at least they have been analysed once. Again, you can see one amongst other which are actually quite good, but one just starts to turn a bit.

I: But then for those that are still good, someone regularly comes here and …

R: We will regularly. So you basically start at the beginning and work your way through. And once you get to the end, you start back at the beginning again and you go through and you would just maybe look at the box. Is it still moist? Has it completely dried out? Does the formalin level need any topping up? Some will maybe look wetter than others. Again, it is a bit mouldy, you can see some moisture in there. That one may be starting to look a little dry, but there is some cotton wool in each box just to keep the moisture content up. It has also been discussed that maybe once we [unclear] one here and we have checked it, to vacuum-seal it and leave it on the shelf. Then it should not have any evaporation and then only to have the seal broken when someone wants to look a that box again, which is not very often. Then the sample will be good, and you might not even have to store it in an extra [unclear]; fully sealed, you can store it anywhere.

I: So what is the limit of this store?

R: We are about there. We are about at the limit. So this is our base where we got some materials for curation and then there are other random [unclear] of things, so [unclear] and jarred samples from other random collections. There is no CPR stuff here, but we are up to the back of this shelf. So we only have … Of course, this stuff does not have to live here. When we really need some more space, this will come out. But we have only one more set of shelf left.

I: When is this going to be filled, approximately?

R: Maybe a year, maybe two years. So we are currently looking for somewhere else to move to. The MBA used to have a lot of stuff here. They don't have nearly so much stuff here as well, but PML uses this space as well and they charge us for using their space. So there will come a point where … It is also not very fit for our needs anyway. It is the best we can do at the moment but we are looking for somewhere else. Maybe somewhere with much better facilities, maybe analysis facilities in the room as well. So rather than currently, where we would collect some samples and take them back over to the lab and then analyse them and then bring them back, actually to have a separate space within the building with a CPR analysis and the microscopes there and a networked computer. That way we could carry out work independently at that site, take some samples, look at them, and return them. It is much easier then for us to curate samples, look after them, keep an eye on everything. And what I hope as well is to separate every sample off individually, so if any damage happens to one sample, it does not spread to the others. And also, if people want to handle the samples, take them for any reason, they are not handling all the other samples. So therefore again, the risk of contamination is minimised. And we would actually do that; when we are finished with it at the other site, we stick it in its own separate box or bag, which might still go into a whole box for the route, but each one is individually sealed, and then it goes here. So that you preserve the samples as much as possible.

I: So maybe we go back outside, because it is noisy.

R: Yeah, it is not a pleasant space to be in. … The fortunate thing with it is, a lot of this is not very photogenic, but we do have some photos, if you want it …

I: Yeah, I don't know how I will use the pictures, but it is good to have them.

R: Sure, and none of it is commercially sensitive or for any reasons … So you would have the photos of our actual procedures, so …

I: So, no matter what condition they are in, no sample ever gets discarded?

R: It has not. Now we probably need to make a decision at some point. What are we going to do? Are we going to bother saving them if they have no value to us any more? But I guess, at least if the whole box is contaminated, but it is not at risk of contaminating other boxes, then that is fine. My concern is, unless people are strict with the way they handle things, they will handle one box and then they will handle the next box and they will spread whatever contamination. So that is why I normally prefer to supervise anyone going in there and handling samples, because of that very reason: that you cannot be sure that people are going to follow the protocols. But you are right, if they are to no more value to us, why not throw them away and gain the space back, but that decision has not been made yet.

(end of recording)

recording DR2904:

R: … can’t see anything on the samples, maybe Rowena can, maybe she can still get DNA fragments from those samples, or … So there is always a resistance to maybe throw things away, because you never know what new technology might come along in the future, you know. Back when the CPR Survey started there was no such thing as DNA analysis.

I: Right.

R: There was no sort of molecular analysis or that sort of level of chemical analysis of things. So technology has moved forward and then we have been able to apply different analytical techniques to the same samples. That is also why we are careful with, depending on what people want a sample, how destructive those processes are going to be, because what might be cutting edge now and is very destructive to the sample, in five years’ time, there might be a whole new way of doing it, which would not destroy the samples. But of course then, how long do you save a sample for maybe the future might bring something that … So there is always a balancing act of exactly what someone wants to do with a sample and whether we think they are really going to get any good results from it.

I: So who is deciding this then whenever such a question comes up?

R: It is a group sort of decision. So David who you will discuss with next week will have an input into it. Also, [unclear] are they looking at enough samples or too many to work out, so statistically to be able to make conclusions out of these things? Or are the things they find in the samples simply not going to give them any good enough data for them to do anything with it? As well, sort of a price per sample versus how valuable it is and how likely that we might revisit it for the reason as well, so how destructive it is. So a number of different people will get involved, I will have an input to say whether or not the method that they might want to handle the sample is the best way. A while back, someone asked for small pieces of samples to look at some very small plankton. So I cut them off some very small pieces of the silk from the edges of the sample to cause as least destruction on the sample as possible. And it was just because I have been told it was simply just a test of hypothesis. But then from the samples that they sent, they made conclusion about what they found. If I had known they were aiming to make those conclusions, I would have sent them much more representative bits of sample. So again, I try to tailor things for what they said they wanted, they would then make claims. I wasn’t so comfortable with them making claims. I would be going “If you told me this is what you plan to do I would have sent you much better samples,” but also, maybe be more destructive to samples, cut pieces out from the middle of the sample.

I: I had exactly that question. If someone makes an enquiry about having a sample, you are also asking them why they want it and it is better if you know?

R: Yeah, exactly. Partly because we can decide yes or no whether we let them have it but also the more information we have, the more we can help them and we can target which samples we pick, how many samples they get, how destructive they can be. We tend to not be so happy to let people have our even samples because we have not touched those. Now of course if a good enough reason comes along as to why someone might want those, we would happily share them, but we prefer they did work on the odd samples that we have already analysed first, partly also because they can make comparisons between the results we have got and what they find, which we can’t do with the ones we have not analysed. But also so that our pristine untouched samples stay that way. … But yes, as far as we know, if they give us information as to what they want to find, we can help them out with making suggestions as to how many samples we give them, which samples are going to be suitable, which may be not so …

I: So how many enquiries do you get? Roughly …

R: Probably, maybe two or three a year get accepted. I am not party to how many enquiries are made. I am more involved further down the line as far as “Okay, potentially this will work. We are happy for you to have some.” And then I can maybe sort of tailor it to … And then there are a number of different users within SAHFOS and associated researchers who also use them, so Rowena and …

I: So two or three externals?

R: Two or three externals and maybe two or three different projects going on internally as well. So like Rowena doing genetic analysis, Priscilla and Claudia look at jellyfish or particular copepod species, they might revisit samples and do more in-depth analysis of certain samples.

(end of recording)