



OFFICIAL REPORT
AITHISG OIFIGEIL

Environment, Climate Change and Land Reform Committee

Tuesday 4 October 2016

Session 5



The Scottish Parliament
Pàrlamaid na h-Alba

© Parliamentary copyright. Scottish Parliamentary Corporate Body

Information on the Scottish Parliament's copyright policy can be found on the website - www.parliament.scot or by contacting Public Information on 0131 348 5000

Tuesday 4 October 2016

CONTENTS

	Col.
DECISION ON TAKING BUSINESS IN PRIVATE	1
SCOTLAND'S CLIMATE CHANGE ADAPTATION PROGRAMME	2
SUBORDINATE LEGISLATION.....	36
Climate Change (Annual Targets) (Scotland) Order 2016 [Draft]	36
Climate Change (Limit on Use of Carbon Units) (Scotland) Order 2016 [Draft]	38
Smoke Control Areas (Exempted Fireplaces) (Scotland) Revocation Order 2016 (SSI 2016/292).....	39
Smoke Control Areas (Authorised Fuels) (Scotland) Revocation Regulations 2016 (SSI 2016/293).....	39

ENVIRONMENT, CLIMATE CHANGE AND LAND REFORM COMMITTEE
7th Meeting 2016, Session 5

CONVENER

*Graeme Dey (Angus South) (SNP)

DEPUTY CONVENER

*Maurice Golden (West Scotland) (Con)

COMMITTEE MEMBERS

*Claudia Beamish (South Scotland) (Lab)
*Alexander Burnett (Aberdeenshire West) (Con)
*Finlay Carson (Galloway and West Dumfries) (Con)
*Kate Forbes (Skye, Lochaber and Badenoch) (SNP)
*Jenny Gilruth (Mid Fife and Glenrothes) (SNP)
*Emma Harper (South Scotland) (SNP)
*Angus MacDonald (Falkirk East) (SNP)
*Mark Ruskell (Mid Scotland and Fife) (Green)
*David Stewart (Highlands and Islands) (Lab)

*attended

THE FOLLOWING ALSO PARTICIPATED:

Roseanna Cunningham (Cabinet Secretary for Environment, Climate Change and Land Reform)
Angela Heaney (Stirling Council)
Diarmid Hearn (National Trust for Scotland)
Dr Maggie Keegan (Scottish Wildlife Trust)
Dr Anna Moss (University of Dundee)
Martin Ogilvie (Dumfries and Galloway Council)
Professor Gary Pender (Institution of Civil Engineers)
Dr Emily Taylor (Crichton Carbon Centre)

CLERK TO THE COMMITTEE

Lynn Tullis

LOCATION

The Robert Burns Room (CR1)

Scottish Parliament
**Environment, Climate Change
 and Land Reform Committee**

Tuesday 4 October 2016

[The Convener opened the meeting at 10:01]

**Decision on Taking Business in
 Private**

The Convener (Graeme Dey): Good morning and welcome to the seventh meeting in 2016 of the Environment, Climate Change and Land Reform Committee. The first item of business is consideration of whether to take item 8 in private. Are we all agreed to do that?

Members *indicated agreement.*

**Scotland's Climate Change
 Adaptation Programme**

10:02

The Convener: The second item is evidence on Scotland's climate change adaptation programme. We are joined by a range of stakeholders and academics. Because of the number of witnesses involved and the nature of the discussion, the committee felt that this would be best done in what we call a round-table session, whereby members and witnesses are mixed in among each other providing for, I hope, a good, considered dialogue.

If anyone wishes to speak on any particular topic, they should please indicate that to me; microphones will come on automatically. Although we have a reasonable amount of time set aside for this session, people should not feel that they have to make a comment on a topic if they do not feel that they have the expertise to do so. If they do wish to comment, please catch my eye and I will seek to involve as many people as possible in the discussion.

All the witnesses are very welcome, but rather than welcome everyone individually, I ask everyone to introduce themselves.

Jenny Gilruth (Mid Fife and Glenrothes) (SNP): Hello. I represent Mid Fife and Glenrothes.

Dr Emily Taylor (Crichton Carbon Centre): I am from the Crichton Carbon Centre, where I head up the land management programme.

Finlay Carson (Galloway and West Dumfries) (Con): I am the constituency member for Galloway and West Dumfries.

Professor Gary Pender (Institution of Civil Engineers): I work at Heriot-Watt University and have worked in flood risk management for the past 15 years. Today I am representing the Institution of Civil Engineers in Scotland.

Kate Forbes (Skye, Lochaber and Badenoch) (SNP): I am the member for Skye, Lochaber and Badenoch.

Diarmid Hearn (National Trust for Scotland): I am the head of policy at the National Trust for Scotland.

Mark Ruskell (Mid Scotland and Fife) (Green): I am a regional member for Mid Scotland and Fife.

Dr Anna Moss (University of Dundee): I am a research fellow at the University of Dundee and the joint lead on development of the ClimateXChange adaptation indicators.

David Stewart (Highlands and Islands) (Lab): I am a member for the Highlands and Islands region.

Angela Heaney (Stirling Council): I am the senior sustainable development officer at Stirling Council.

Angus MacDonald (Falkirk East) (SNP): I am the member for Falkirk East.

Emma Harper (South Scotland) (SNP): I am a member for the South Scotland region.

Martin Ogilvie (Dumfries and Galloway Council): I am the resilience and community safety manager at Dumfries and Galloway Council.

Alexander Burnett (Aberdeenshire West) (Con): I am the constituency member for Aberdeenshire West.

Dr Maggie Keegan (Scottish Wildlife Trust): I am the head of policy and planning at the Scottish Wildlife Trust.

Claudia Beamish (South Scotland) (Lab): I am a member for South Scotland.

Maurice Golden (West Scotland) (Con): I am a member for West Scotland.

The Convener: I am the member for Angus South and the convener of the committee.

Thank you for that. We will kick off by looking at the natural environment, beginning with biodiversity.

Maurice Golden: Clearly we want to ensure that Scotland's biodiversity is protected and enhanced. I am particularly keen to hear views on the data that will allow that to be progressed. How should that work be conducted? How strong is the biodiversity baseline, and will it allow the Parliament to support biodiversity going forward?

Dr Keegan: First of all, thank you for inviting the Scottish Wildlife Trust to give evidence today. On the issue of data, the "State of Nature" report showed that, of the vast number of species in Scotland, only just over 1,000 of them were being recorded. The best data that we have is on butterflies and birds; we have some data on marine species through fish counts and so on; and there is also some data on plant species. However, there are a lot of invertebrates that we do not know anything about, because we do not regularly collect data. Therefore, it is difficult to know what the baseline is, and it is particularly difficult to know what is happening everywhere.

The other thing that has come out of the Scottish biodiversity strategy is a suite of indicators called ecosystem health indicators, which have been developed to measure the

ecological health of our habitats and ecosystems. However, according to the Scottish biodiversity strategy update, which came out last week—perhaps the day before Lord Krebs et al gave evidence—not much progress has been made on implementing those indicators, and we at the Scottish Wildlife Trust would like them to be out there so that we can see whether what we are doing is helping to bring our ecosystems back into a good ecological condition. I might also suggest that in future the committee might want to look at why the indicators are not being used.

Dr Moss: I agree with those points, and I would also add that there is very little data around some species and habitats that we know are climate sensitive. Scottish Natural Heritage has been working quite closely with ClimateXChange on what is basically a risk assessment to understand which species and habitats are most at risk, but we still do not know enough about some critical and important species and habitats in Scotland such as snow beds, which we know are under pressure from climate change.

Moreover, although SNH has taken a great step by adding climate change as a pressure to be considered in its site condition monitoring, it has recognised that there needs to be guidance on how that pressure is acknowledged in the monitoring process. At the moment, it is not clear whether it should be acknowledged because there is a perceived risk or because impact has already been detected on the sites.

The Convener: If we have covered that, that is excellent. In that case, we will move on to Claudia Beamish and the issue of marine and coastal environment.

Claudia Beamish: Good morning, everyone. We should be aware that the Committee on Climate Change has said that understanding of the impacts of climate change on the marine environment could be better and that more progress needs to be made on shoreline management and coastal realignment. There are, of course, other relevant marine issues, and I would like to open things up and ask our witnesses to comment on marine and coastal matters and to highlight any other such matters that should be raised.

Diarmid Hearn: This plays into the larger question of the role of the planning system in biodiversity. We have quite a lot of the building blocks in place with the biodiversity strategy, the land use strategy, Scottish planning policy and the national planning framework, but although they refer to each other, they are not integrated in any terribly deep way. That could be something to look at in the future.

If the land use strategy becomes better embedded in the planning system, that would bring in issues such as shoreline management, coastal retreat and the creation of new habitats. As conservationists, we are quite often concerned with the protection of existing habitats, and we often undertake such protection for habitats in our ownership. However, there is also the issue of creating or enhancing new habitats. I would look to wrap that into planning's role in delivering biodiversity, which is a larger issue.

Dr Keegan: On the marine environment, there is a store of carbon sequestration in the form of blue carbon. In the second report on proposals and policies—RPP2—entitled, “Low Carbon Scotland: Meeting our Emissions Reduction Targets 2013-2027”, it came out that there had not been enough research, so we do not know how much stuff we have, what the resource is or exactly where it all is. As with peatlands, we are probably missing a trick in building that resource to help mitigate, and adapt to, climate change and, at the same time, build the resilience of the marine environment.

We have 30 marine protected areas, and we need management and monitoring of those to enable us to see whether they are helping with the recovery of our seas so that we achieve the healthy seas that we want.

The Convener: You referenced peatlands, which leads nicely on to the United Kingdom Committee on Climate Change, which is clearly looking for further work to be done to enhance peatlands. The CCC's report “Scottish Climate Change Adaptation Programme: An independent assessment for the Scottish Parliament” states in recommendation 4 that the Scottish Government

“should by the end of 2017 establish a target in the Scotland National Peat Action Plan for the area of peatland that will be under restoration by 2030 and introduce and monitor a delivery programme”.

We have seen the number of restoration projects double between 2012 and 2015, but we are still nowhere near hitting the target of 21,000 hectares per year that is claimed to be achievable. Are we, as Maggie Keegan said, missing a trick with peatlands? In the first instance, I look to Dr Emily Taylor for a response.

Dr Taylor: It is very useful to look back at the peatland action plan that was rolled out across Scotland in 2012, with good funding behind it. The project was administered by Scottish Natural Heritage but had external facilitators who were paid peatland action project officers across Scotland, from Shetland all the way down to the Scottish Borders and Dumfries and Galloway. Through that project, from 2012 up to March 2016, we saw 8,500 hectares of peatland restored. The project very much started from a point of relatively

low interest in peatlands and peatland restoration and very little understanding of how we might go about peatland restoration. We learned much from the work carried out in the north of England, because we were a bit behind in Scotland.

Now we are in a different position and have that momentum behind us, but we possibly do not have the mechanisms at the moment to help fund the restoration projects. However, I think that meeting the 21,000 hectares target is possible if we mean by restoration mechanical intervention by putting in peat dams and that sort of thing. Alternatively, we could have good peatland management through, say, agri-environment schemes to improve conditions.

The Convener: So the target is achievable, but how realistic is it at the moment?

Dr Taylor: At the moment, it is not very realistic without the funding behind it. Currently, the only way to get money for peatland restoration is through a small pot of money from Scottish Natural Heritage for management plans on Natura sites; or through the Scotland rural development programme's agri-environment climate scheme, which has provisions for peatland restoration but just for ditch-blocking, and the applications are very onerous. I rang round all the previous peatland action project officers and found only that Shetland has done just six applications; and I have done three applications for the whole of Dumfries and Galloway. The uptake of the SRDP scheme is therefore very low. Without improving access to funding, we will not meet that 21,000 hectares target.

Finlay Carson: Is there a potential conflict of interest between forestry and peat restoration, given that the forestry sector is not planting the required number of trees and is well back on its projections? Do you foresee any conflict between the aim of restoring and protecting peat beds and the demand for planting more forests?

10:15

Dr Taylor: Yes. We are already seeing conflicts on the ground, although it should be recognised that Forest Enterprise Scotland undertook 1,000 hectares of restoration under the peatland action programme, so it is very keen on peatland restoration in the right place.

However, we are seeing trees being felled in areas that are very poor quality and those areas being replanted because of the pressures to meet the woodland cover target. They may be being replanted with broad-leaved trees, but the drainage networks are still intact on those deep peat sites, so it might be better to restore the land back to open habitat. The need for compensatory planting can also often be an issue if the

landholder does not have an area where they can feasibly put that compensatory planting.

I have worked on projects for which we have received funding through peatland action to work with Forest Enterprise Scotland to gather all the evidence that we need to consider a forest design plan and where we would want to restore the land to open habitat. We have looked at drains, hydrology, peatland condition, peat depth and yield class for trees and have come up with areas where it is more sensible to go back to open habitat. However, it takes a long time for the Forestry Commission to sign off those projects, despite the wealth of information, which SNH is effectively administering funds to get. Therefore, there are already tensions in the policies that will have to be considered if we are seeking to restore 21,000 hectares a year.

The Convener: That is extremely useful.

Dr Keegan: If we had an effective land use strategy, some of those conflicts would not happen because there would be constraints on such opportunities. It is a bit of a no-brainer that we should not be planting or restoring trees on deep peat.

I spoke to representatives of the International Union for Conservation of Nature peatland programme yesterday. I did not realise that, across the UK, 16 million tonnes of carbon are being emitted from all of our peatlands and the saving effort across the UK is 13 million tonnes. That gives an idea of the scale of things if we really got real about restoring our peatlands, of which we have a massive resource in Scotland of 1.7 million hectares. If we restore 21,000 hectares a year, that will be just 1.5 per cent of what needs to be restored.

If we put off until tomorrow what we need to do today, doing it becomes a lot more expensive.

The Convener: Yes. That is very thought provoking. Thank you.

I turn to soils and agriculture. Recommendation 8 of the UKCCC report calls for the publication of an action plan before the next SCCAP report, which would include proposals for a scheme to monitor the health of agricultural soils and the uptake of soil conservation measures and, indeed, to ensure that there is enforcement action when poor management practices are found. Lord Krebs justified that last week when he made the point that “current farming practices” not only in Scotland but UK-wide and beyond

“are essentially mining natural capital as though it was a depleting resource rather than husbanding it for the long-term future.”—[*Official Report, Environment, Climate Change and Land Reform Committee*, 27 September 2016; c 10.]

I would welcome some thoughts on that subject.

Diarmid Hearn: I was going to throw something else into the mix, which is the loss of farmland, which is something that we have seen around the green belts. Currently, there are 11 green belts in Scotland. Edinburgh obviously has very demanding housing needs and housing targets to meet, and I am conscious that we are seeing the loss of farmland in the green belt around Edinburgh. However, one reason why green belts were brought in post world war two was to maintain good farmland and not lose it to development. In that area, the planning system needs to work alongside soil management and biodiversity, but I do not think that the two agendas are getting mutual recognition. Certainly, when we have looked at green-belt issues, we have not seen the loss of farmland being a consideration; it has been more about amenity.

The Convener: I will let Mark Ruskell come in.

Mark Ruskell: The green-belt issue is an interesting one, but I think that the convener’s point is about soils and soil erosion. Last week, the committee highlighted some of the massive soil erosion that has taken place on the east coast of Scotland. We are now—maybe—in a post common agricultural policy, post Brexit scenario in which there is an opportunity to redesign agriculture policy. What are the views from around the table? Will we in the future have an agriculture system that is primarily about food production, or will it be about delivery of public goods and the protection of soils and habitats? How does adaptation fit into that? What will it look like on the ground?

Dr Moss: As has been touched on, the point about soil condition cuts across different issues regarding adaptation. It is not only an issue for agriculture—it is also a serious issue from the perspective of water quality. On the evidence that we were able to utilise in developing the indicators, which then informed the CCC’s report, we found that very little is being done on management of soils. There are some moves to improve that—for example, the James Hutton Institute is looking at field drainage. However, we have found that information that was previously collected officially on agriculture management practices that contribute to soil erosion is not now routinely collected. We certainly do not want to see a decline or an erosion—no pun intended—of existing data.

Dr Keegan: The Scottish Wildlife Trust is developing a sustainable agriculture policy. We need to think about how taxpayers’ money will best be spent on food production and sustainable farming post Brexit. Farmers need to recognise that they are the custodians of our rural land and we need to develop a mechanism through which

we pay for ecosystem services, which could include management of soil quality. We should not support practices that continue to deplete soil quality. About 20 per cent of greenhouse gas emissions come from agriculture. In the farming for a better climate scheme, which is voluntary, the guidelines talk about how farmers can improve soil quality and keep soils on their land. However, that is not mandatory. We have talked about that for quite a while now. Surely it makes economic sense for farmers not to lose soil. As a gardener, I know that I want to hang on to my soil and to have good quality soil.

Mark Ruskell: What is the right balance between the carrot and stick approaches—offering targeted subsidies and voluntary schemes while putting in place a robust regulatory framework with a mandatory approach that bans certain practices and says that farmers have to test soil? What will shift the situation? At the moment, we seem to have in agriculture a problem with mitigation and adaptation.

Dr Keegan: It might be better to have incentives to promote good practice and then to try to work with farmers who do not maintain their soils or who lose soils into water courses. When that happens, phosphates and other things go into the water, which has a knock-on effect for Scottish Water. Obviously, in the end somebody picks up the bill for cleaning that water—usually the taxpayer. That just does not make sense. We need to find a mechanism through which to promote good agriculture practices. The current voluntary system is not being taken up enough. I am not quite sure why, so we should examine that.

Emily Taylor: I will add to that point—again, with a peatland slant. Education is important. My work involves going out and working with landowners to explain that erosion of peat from the hill can be fixed and that, in effect, they are just losing their soil and their ground. There is a need to get people to understand their soil resource and that it can be fixed and improved. Fundamentally, it makes sense to everybody to manage their soils properly.

Alexander Burnett: I would like to hear the NTS's answer to Mark Ruskell's question. It is the second-largest recipient of CAP payments, which could be gone in four years. What is your policy on that and what work have you done on it so far?

Diarmid Hearn: I do not think that we are quite as high as the second-largest recipient.

The shift that is happening in the CAP is interesting. Our direct payments are declining and we are moving to area-based payments—although I imagine that that will change again. The current scheme will probably continue until 2020 and will probably be replaced. There will probably be less

money overall in the system, regardless of what public benefits are being bought.

From experience, I say that there is an interesting point to make about the structure of the industry. We have been talking about long-term care and maintenance of soils, but for tenancies of one to three years, the person who is leasing the land may have less interest in land-management practices that have a 20 or 25-year horizon. We have seen that with our colleague trust, the National Trust in England, Wales and Northern Ireland—which is a bit of a mouthful. It has been doing work with one of its farms to look at the impacts of tenant farming and land compaction. A tenant farmer who covers a large area of land has to go on the land regardless of whether it is wet or dry—they just have to get it done. Large capital-intensive machinery is compacting land to a high degree, which has all kinds of impacts for biodiversity, flooding and so on. The economic drivers of land management mean that the contractor has to get the work done on large areas of land.

We must think not just about incentives for farmers, but about the structure of the industry as a whole and how it will respond to a change in incentives. That is part of understanding how the industry is shifting. The largest CAP recipient might be Frank Smart, but Frank Smart is not just Mr Smart; Frank A Smart and Son Ltd is a much larger conglomeration of business operations.

The CAP is a good opportunity to look at the scheme again because it has been rolled forward every decade since the 1940s so this is our chance to see what public money is going in and what public benefits are coming back, whether in production or environmental benefits.

Dr Moss: With regard to climate change, because it is projected that other areas of land will become suitable for prime agriculture, we need to consider the potential increase in pressure on soils from their being more intensively farmed. That is a particular worry.

The Convener: Thank you. Let us look at forestry.

Kate Forbes: In the report, the CCC recommended that further action is required to reduce the spread of pests and pathogens and to increase species diversity. What are the witnesses' ideas and recommendations on how we could do that?

Diarmid Hearn: The NTS has been involved. We have a catalogue of various tree diseases on our estate, unfortunately. We work with the Forestry Commission on that and are part of the stakeholder group for the ash dieback outbreak.

The one small silver lining of Brexit could be a change in the regime on importing plant materials. At the moment, we are part of a single area; although it is possible to become a quarantine zone, it is difficult to develop the evidence to show that we ought to be given that status. There is a problem with plant material coming in from the continent.

We are probably guilty ourselves. If you want 100m of hedging quickly, you could go to a Scottish nursery that might give it to you in three years, or you could go to the Netherlands and get it next week. A lot of that kind of plant material is moving around the country. If you look at a map of the outbreaks of ash dieback, you will see that a lot of ash dieback is along radial roads, which is to do with the landscaping of road developments and contractors buying in plant material. The UK could have stricter controls over importing of plant material. That might help to ameliorate the problem. That said, the trends are for globalisation and towards a warmer climate, which are favourable to certain pests and diseases. It is a difficult situation.

Dr Moss: When we looked at the evidence on forestry, the two things that we particularly looked at were dothistroma and Phytophthora ramorum. It is important to bear in mind that organisations such as the Forestry Commission and SNH do not necessarily manage for one specific disease at a time. From their point of view, it is critical to manage in order to increase the general resilience of forestry, which definitely includes increasing the diversity of species nationally and within individual stands. There are other ways of increasing resilience, but once the general resilience is increased, protection against increases in pest species will stand more of a chance.

The Convener: Does anyone else want to come in on forestry?

Dr Keegan: What I have to say is more about native woodlands. The native woodland survey showed that only 17 per cent of our native woodlands are regenerating naturally. If there is no natural regeneration, there is no genetic exchange that might put resilience in the landscape. We do not have diversity within species, never mind of species, within what little woodland we have, which probably makes our natural systems more vulnerable to diseases.

One of the main problems to do with regeneration that came out of the woodlands survey is deer management and getting that under control. I just add that to the mix.

10:30

The Convener: We will move on to the built environment, as a number of members have questions on that area.

David Stewart: Flooding is a major by-product of climate change and, in evidence to this committee, the CCC provided some depressing statistics—for example, that 90 per cent of at-risk properties are not protected by flood defences. Why are we building schools, housing and hospitals on flood plains?

Gary Pender: That goes back to planning regulations. One of the reasons why such building happens is that it is cost effective; flood plains are sensible places to choose to build on because they are flat and easy to develop. Is that necessarily a bad thing and does it increase flood risk? Mitigating steps can be taken to ensure that that does not happen. A balanced approach is required by planning authorities, in giving permission to build while ensuring that facilities are properly protected from future flood risk. It is not an easy thing to do, but it can be achieved.

The Convener: In protecting against future flood risk, to what extent is that risk calculated? When you give permission for a development, do you anticipate what the flood risk will be in 20 or 50 years? What is the general thinking on that?

Gary Pender: That is currently an area of active debate. You cannot give an absolute guarantee that an area will not flood in the future because we live in an uncertain climate and an uncertain world. Society itself has to make a judgment as to what level of protection is acceptable. We currently use the one in 200 years—or 0.005 per cent—flood-event probability, which seems to be a reasonable decision point in making such planning decisions.

David Stewart: What I find depressing about all that is that the Scottish Environment Protection Agency—the responsible body on behalf of the Scottish Government—often advises local authorities that they should not build in certain areas. However, its advice is overturned by elected members or after appeal, which seems to me to be absolutely crazy. Let us look again at the statistics. Only one third of Scottish local authorities have implemented schemes to promote uptake of flood protection measures and there are no data available on actual uptake.

Anyone who has experienced flooding first hand—not just flooding in housing, but flooding in businesses and schools—as I have as an elected member, will testify to its almost tragic effect on people. If you do not believe me, go to the Whitesands in Dumfries and ask the people in businesses there how they feel about flooding day in and day out. We are not coping adequately with flooding in this country and we have not even

touched on changing our building standards and our style of housing in order to be more resilient against future flooding. As climate change gets worse, so will flooding.

The Convener: That really brings us to the local authorities. Angela Heaney will comment, then Martin Ogilvie.

Angela Heaney: I preface my comments by saying that I am not a planning officer or a flooding officer. My understanding is that the one in 200 years flood-event risk is the main plan that folk look at. Certainly, when applications come in, both SEPA and Stirling Council's flooding officers comment. It is very rare for work to go ahead when SEPA has advised against proceeding. We have an awful lot of at-risk properties where there has been historical building—which is not to say that building does not still go ahead in areas of flood risk; of course, that is increasing. Our flooding officers have been looking at a particular area that is prone to flooding and, having done some planning and projections, they are already having to update that work. Things are happening all the time that are beyond historic precedent, and we have surface-water flooding as well.

The Stirling Council area has one of the highest numbers of properties at-risk from low-frequency flooding—that is, the more devastating floods that happen less often. There is a formula for funding building defences, but it is a bit of a numbers game: we do not fit the criteria for getting significant capital for building defences because the number of affected properties in the local authority area is not high, although the proportion of properties is quite high. Furthermore, it has been said that protecting the areas completely would mean building a wall right along the side of the River Forth, which comes back to the point about the level of risk and the level of damage that we are willing to accept. A balance must constantly be struck.

My interest is not just in the flooding as it happens, from the rivers or what have you. My interest is in going further back and reducing flows into the rivers to start with. Action must be taken at every stage. We have already talked about agriculture; although I am no agriculture expert, I think that we need to look at land use in more detail, and that we need a lot more planting in the uplands—where it is appropriate, so not in peat soils or carbon-rich soils—to soak up rainfall. We also need to reduce the amount of grazing that is going on: we have too many sheep and deer. We need our land to absorb as much rain as possible.

We must also take action in urban areas. The bore of drainage pipes is too small—it needs to be wider. We cannot afford to keep digging up those pipes, so we need to plan developments and maintenance such that water can be absorbed or

held back. We need a lot more planting in the urban environment so that there is more greenery that can soak up water.

In Pontbren, in Wales, a group of upland farmers planted more trees and shelter belts. An interesting bit of research that was done on that project showed that the planting reduced compaction from animals, and that absorption of water in the shelter belts was 60 times more than on the neighbouring grassland.

Work needs to be done across the board. Some of the discussion is focusing on particular sectors, but we need to think more about making the links between the sectors so that they add up together in a way that enables a global or holistic approach to be taken to adaptation. It is important that we consider flooding and acknowledge the work that flooding officers are doing on river basin management plans and so on, but we need to go beyond that and recognise that it is critical that we hold back as much water as possible so that it does not get into the river courses in the first place.

Martin Ogilvie: I also preface my comments by saying that I am not a planning officer and am not involved in flood-risk management. I am involved in emergency responses—my area of specialism is business continuity and civil protection.

I have been with Dumfries and Galloway Council for about nine years. The first bad flooding that I experienced was in 2009, down at the Whitesands in Dumfries. At that point, the business owners and homeowners in the area relied on the council to come in with sandbags. However, since then, we have encouraged them through subsidy schemes to partner with us and to buy their own property-level protection, including floodgates, special valves that fit on air bricks and so on. Across the board, but especially at the Whitesands, we have achieved success by going out and engaging with individual property owners and business owners and getting them to partner us on schemes.

We have rolled out various other initiatives, such as the home emergency life-saving plan—HELP. Through schools and communities, we have managed several times to distribute a small template that we encourage homeowners to fill in and which includes advice on what to do when extreme weather—not only flooding but extreme cold weather—is forecast.

You might want to come back later on and ask me about the stuff that we do on community resilience, so I will hold my thoughts on that aspect.

One of the big schemes that we have put in place since 2009 has involved partnership with the local fire brigade—which is now part of the

Scottish Fire and Rescue Service—to buy flood pods, which are demountable containers that fit on the back of lorries. When there is a certain type of weather forecast and the triggers are met, we deploy the pods to flood-prone areas. The pods are filled with equipment that can be distributed to properties that have not invested in their own equipment. We can help people to put special gates in their doorways to stop the flood water coming in. We have used that system a number of times now—it is deployed almost annually, I am afraid.

The Convener: I will allow three or four members to come in with brief supplementaries, and we will continue the debate from there.

Claudia Beamish: I would like to hear the views of panel members on the broader issue of the land use strategy, which has been mentioned, and how that fits with all these issues.

At present, as the witnesses will know, the land use strategy is considered by planning authorities only on an advisory basis in relation to development. I am interested to know how it can help with climate adaptation issues more widely, and what members of the panel think its future status should be. The strategy has been reviewed, but I would like some views on its status.

The Convener: I ask you to hold that thought while we get some further input.

Finlay Carson: My question is on whether we think outside the box enough. Should we always continue to do the traditional things? For example, when a flood bank gets washed away, do we rebuild it?

I declare an interest as a councillor in Dumfries and Galloway Council. At the Whitesands, which was mentioned earlier, there is a potential scheme to build a massive bund along the side of the Nith. There is a debate over whether that is a good or a bad thing; I personally do not think that it is a good thing. We are looking at doing something that has traditionally been tried over hundreds of years, which is to protect a handful of businesses in the Whitesands. Perhaps we should be thinking of another solution, such as ensuring that the businesses that are situated there are ones that would not be affected by flooding. For example, flooding is a disaster for an electrical shop that is full of electrical goods, but other businesses might not be affected so much. Perhaps, rather than always thinking about flood prevention, we should think outside the box and consider whether we allow properties to flood if they would not be greatly affected.

Another solution could involve rerouting rivers. Farmers rebuild flood banks on rivers that traditionally change course fairly regularly. We keep on rebuilding banks where they were, rather

than saying that the long-term solution should be to straighten the river at that point. Perhaps we should be taking out the bends and speeding up the river, or perhaps we should be slowing it down. Do we think outside the box enough?

Mark Ruskell: I, too, declare an interest as a councillor, in Stirling Council.

My question is about whether local authorities have the capacity and capital to address these issues to an acceptable level. It will always be difficult to protect every single property but, from reading the Scottish Government's flood risk management plan, I see that there are only three communities in Scotland where individual property protection measures are subsidised. That is arguably a decision for councils to make, but at £8,000 per property those individual measures are expensive. If councils are not subsidising them, who is?

The other issue relates to major capital projects. Forty-two projects have been approved in Scotland over six years, and funding for one of those years has been accepted. However, are there issues surrounding the deliverability of those projects? They will clearly not address the needs of the 252 communities in Scotland that are in vulnerable areas. Of those 42 projects, which ones have funding in place? Is the capacity in place in councils in terms of engineers and technical expertise to drive through what is being funded, let alone what would have to be funded if we were to meet the needs of many of those communities in Scotland?

The Convener: There is a lot to respond to there. I will let David Stewart in next, and then we will take some responses. A number of other members have questions, so we will take those as one batch afterwards.

10:45

David Stewart: It is crucial that we take a more preventive approach to flooding. Planning authorities in Scotland will be making decisions today about building on flood plains that will result in flooding in 10 years' time. I am particularly concerned that SEPA's advice has been ignored. Either through you on behalf of the committee, convener, or individually, I would like to ask SEPA how many applications throughout Scotland have been turned down where it has recommended that there be no building. That is important.

If there is going to be building on flood plains, there must be a stronger approach to having sustainable urban drainage systems or changes to housing design to ensure that houses are more adaptable for flooding. I will give you an example from America. When there was flooding in a Sacramento village, they rebuilt it one storey

higher. I am not suggesting that we do that; I am merely saying that we must think outside the box, as my colleague Finlay Carson rightly said.

The Convener: I think that in the past few days I have read a statistic that answers your question about SEPA. We will look into that for you.

There is a lot to respond to. Professor Pender can kick off.

Professor Pender: I will try to cover some of those issues. David Stewart is spot on: flooding of any type is both a human and an economic tragedy. Unfortunately, we are not alone in having to adapt to it—"adapt" is the key word, as we are having to adapt to something that is an increasing problem for society. Even worse than that, we do not know what the end point is going to be, and there may not be an end point. Therefore, one of the big issues in academic work just now is the uncertainty associated with our current protections against climate change and what is going to happen in the future. We are trying to make rational decisions now that we can live with for the next 50 years, which is very difficult given the data that we have available to us on which to base those decisions.

It is little comfort, but we are not unique in being in that position. I have the privilege of working in this field internationally, and I know that many countries are wrestling with the same issues. As a nation, we are doing better than many—we are not doing badly, by any stretch of the imagination—but we could do better if our work was more joined up. That is the key. We need to work out our adaptation policy, which could involve a whole portfolio of actions that we could take to protect against flooding. I still believe that appropriate flood plain development will remain part of that mix, because local authorities have competing economic and social demands, and it would probably be impractical to have no flood plain development. However, as David Stewart said, there are other things that we could do to mitigate the effect of flooding. We need to think outside the box about what we can do to protect properties where we feel that it is appropriate to develop on flood plains.

Finlay Carson talked about thinking outside the box in Dumfries and about the shops and businesses there. You only have to go to York to see how some businesses have made a feature of the fact that the River Ouse floods frequently. I do not go to pubs that often, but the King's Arms makes a feature of the fact that it floods regularly—it has a concrete floor, there is a flood warning and, when the floods come, the proprietor moves all his furniture upstairs. When the flood has gone, he sweeps out the ground floor and puts another notch on the wooden post, signifying the level of the flooding on that date. People visit

his establishment to see how frequently it has been flooded and how high the flood waters have been. Across on the other side of the river, all the homes have garages on the lower level, and when there is a flood warning the people move their cars elsewhere and their garages flood. There are lots of things that we can do. It is not just about thinking outside the box but about implementing practices that are found elsewhere.

Flooding is truly a multidisciplinary problem. We have talked about peatland and forestry in the context of the environment, and those things have a role to play in trying to control how water flows off the flood plains. The natural environment and the built environment have to work together in that respect. The difficulty with relying on the natural environment is that it takes a long time to develop. Whereas a concrete wall could be built in a month or so, it takes much longer for a peat bog to become established, for a forest to grow or for agricultural policy to change. We need to get the natural and built environments working in harmony, allowing our natural environment to recover while still implementing hard interventions that deal with today's problems in a relatively short timescale. There is a balance to be struck.

Dr Taylor: I want to pick up on the point about the natural environment and the land use strategy. When we talk about flooding, it is essential that we talk not just about the built environment. Now that people are looking at the catchment in which they live, we have an opportunity to try to understand what the land is doing, where the water is going and what interventions can be made. After all, some natural flood mitigation measures can be put in place fairly quickly; you can break up an extensive drainage network on a hill fairly rapidly, and you will see the difference within a couple of years.

We have a great opportunity to pilot a land use strategy approach in catchments and to look at, for example, whether we want farmland or intensive agriculture in the uplands or whether we want to take out the levees and put in wetland. That sort of really interesting exercise can be done.

On the Whitesands project, I note that the Solway flood risk management plan had £50,000 allocated for peatland restoration in that catchment. The need for that work has been recognised, but funding is needed to deliver it.

The Convener: Before we move on, I think that I can provide the figure that people were looking for—someone got it for us. In 2012, 21 out of 528 planning decisions were granted contrary to SEPA advice. That is just a guideline figure.

Dr Keegan: I know that you want to move on, convener, so I will just very quickly mention the IUCN's river restoration project report, which came

out yesterday. It is a very good example of how flood risk is being managed on Eddleston Water in order to combat the risk of flooding in Eddleston and Peebles. Natural meander channels have been put back, and the people involved have worked with local farmers to plant more trees in the headlands and so on. That demonstration project shows what can be done with nature-based solutions.

Dr Moss: I just wanted to highlight the multiple benefits that come with such projects. For example, the Eddleston project has multiple benefits for water quality and quantity issues, and a holistic approach to tree planting, which has already been mentioned, provides multiple benefits including mitigation and adaptation. Obviously with natural flood risk management, there is the potential to increase habitat corridors, biodiversity and the resilience of the forestry industry, particularly if a coherent approach is taken, if you think about which species you are planting where and if you ensure that you plant species that are going to cope with future climate changes. We very much need a land use strategy approach to be applied in a meaningful way.

Angela Heaney: Just to reiterate what others have said, I think that the land use strategy is crucial for the reasons that have been mentioned, particularly so that land acts as a sponge. Of course, this is not just about rivers, and we should also refer to surface water flooding, which is totally unpredictable. We just do not know where that kind of thing is going to happen. In Stirling, there have been two major landslides as a result of rainfall; the most recent incident, in August 2012, happened only 2 miles from the city centre. In fact, it was not even raining in Stirling. The incident might only have washed out a minor road, but it still presented problems for those who used the road.

As signatories to the European Union mayors adapt initiative, we have been fortunate. We applied to join its twinning programme and, only last week, our senior planner and I visited Rouen in Normandy to learn about some of the urban regeneration work that is being carried out there. I should caveat these comments by pointing out that different legislation and different regulatory and financial frameworks apply, but one of the things that we saw was a harbour-side redevelopment with new flats where blue-green infrastructure had been put in place. That kind of infrastructure is at a lower level than roadways; what for most of the time is a small stream runs through the development, and there is a lot of greenery. Earlier in the summer, though, there was a major rainfall incident and flooding in the neighbouring area, and people were happy that the area in question, which has been in place for only two years, did not flood. There are examples

out there that we can draw on and, indeed, ought to be drawing on.

The Convener: Before I let some of the witnesses back in, two or three members will ask short and sharp questions that will further stimulate the debate.

Emma Harper: My question is on the back of what Dave Stewart and Finlay Carson said about flooding and flood prevention measures, but it will leak into health aspects, too. Last night, I was at a meeting in Newton Stewart. The local people are still saying that we should be dredging rivers, whereas the experts are saying that we should not. There is a common misconception—or is it?—that we should be dredging rivers. I am curious to know what we should be doing about that. Should we dredge in order to satisfy people that something is being done or do we educate people about what the best practice is for dealing with rivers that flood?

The Convener: I call Alexander Burnett, who has had flooding in his constituency.

Alexander Burnett: My question was answered by Professor Pender.

The Convener: Finlay Carson wants to come back in.

Finlay Carson: I appreciate your letting me back in, convener. My question is very much on the back of Emma Harper's comments. We need to make sure that all the organisations around the table look at the matter not just in the long term but in the short term. A lot of the issues that we have with dredging rivers are down to the loss of habitat, potentially over a very short timescale. If rivers are rerouted or moved into new positions, the habitats eventually come back. However, SEPA is very much against any work that would remove the riverbed and so on. I am also aware that protection is in place that allows you to work only within a certain meterage in a river. I am talking about short-term pain for long-term gain where rivers are rerouted and habitats are potentially changed to make them more sustainable.

Diarmid Hearn: In response to the question on legislative strategy, we are now into the second iteration of our work on planning. We have had two pilots. One was based in Aberdeenshire; the other was based around the Tweed Forum. The next stage is to get Scotland-wide coverage. A few weeks back, SNH held a stakeholder event to discuss the next steps. I think that it is fair to say that the general consensus was that water catchment areas made a lot of sense as the sub-regional basis for such planning, which brings in exactly the issues that have been described to do with flooding and housing developments. However, there will probably not be the funding to

set up new partnerships, so the matter is likely to devolve to the local authorities. Therefore, you are back to the issue of local authorities taking decisions at sub-catchment level. I suggest that the future approach should be that local authorities work together on a catchment basis and bring the strategy planning into the local development planning cycle, which currently does not happen. That might start to address questions about the development of flood plains.

It could be that you start to have housing targets for an area that is larger than a local authority region. Perhaps a local authority could give up some housing developments and the neighbouring local authority would take on that work instead, with recognition that that is best for the social, economic, and ecological health of the area as a whole.

Professor Pender: I will reply directly to the question on dredging; my response is also linked to what Finlay Carson said about straightening rivers. Both dredging and straightening allow the water to flow faster down the river channel, which is a good thing if you are interested in reducing the water level, which can reduce flooding. It is a pretty basic hydraulic question. First of all, you have to be reassured that the water has somewhere to go, because things downstream can stop the water going away even if you dredge. For example, if there is a weir, a bridge or the water is flowing into a lake or a high water body if it is tidal, the dredging will not have any impact at all.

As the water flows faster, that can cause erosion, so you need to understand the relationship between the flowing water and the substrate that makes up the river channel, because you could end up with bigger problems with land erosion and the transport of sediment and soils, which are some of the issues that we have talked about.

Dredging and straightening have a role to play. It is not difficult to work out what the impact and consequences will be. It is an obvious thing for people to ask for, but you need to understand what the technical consequences of taking such action would be.

There are alternatives that might be better in some such instances. Someone mentioned ecosystem services. If you were to dredge or straighten a river, you would reduce the ecosystem benefit of it. Again, there is a balance to be struck between the need to protect the ecosystems and the biodiversity and the need to reduce flooding. It would be down to what is considered to be key.

I will digress briefly, convener. I should have mentioned data when I spoke earlier. Data is

going to become much more important in managing such issues. The data will come from satellites and sensing, so we are moving to a situation in which we will be able to monitor our catchments to the same extent as we monitor our motorways and railways or any other system and we will be able to predict what is going to happen much more accurately.

On a more pragmatic level, we do not collect historical data. Older people will often say, "I knew that that would happen, because it happened 60 years ago." People who have moved into an area have limited memories when it comes to what the flood risk is in that area. Memory and historical data might be more valuable to us than all the models that SEPA has for predicting what will happen in the future, so it would be helpful to have a more consistent way of collecting historical data and archiving it.

11:00

The Convener: Could we collect current best practice? Unfortunately, councils such as Dumfries and Galloway Council have had to build up expertise in responding to flooding. Are you contacted by other councils asking for your advice or thoughts on how to tackle certain issues?

Martin Ogilvie: Not regularly but, through professional networks that some of the officers are in, we are often invited along to and asked to speak at annual conferences. We are up for a Convention of Scottish Local Authorities gold award on Thursday night in Crieff, when we hope that one of the big projects that we have put in place over the past few years will be formally recognised as good practice. That project involves a combination of national health service and social work databases that feed in live, real-time information, which means that, when we have flooding or any event that might lead to evacuation of an area, we can capture who the vulnerable people—the people at risk—are. If we have that accurate data, we can go in and offer those people the support that they need.

In 2010, following the flooding in 2009, we employed a member of staff to go and engage formally with the communities. We have more than 100 community councils. The process started slowly but, six or seven years on, we have got to a position in which 75 community council groups have resilience plans. As Professor Pender said, whether a community wants to engage is dependent on its collective memory. The areas that engaged first were the areas that have been flooded within living memory.

We have supported that work with equipment. The Scottish Government has been very good in funding 50 kits for the first 50 communities to

partner with us and to develop their plans and arrangements, but we have also provided some basic templates on how to write an emergency plan and how to exercise that plan. That does not take a huge amount of involvement from local authorities, but we find that we are pushing at an open door. The communities are lapping it up, to the extent that we are having to urge a bit of caution, because they are wanting to go a bit too far. Some of our fire service colleagues are worried that some communities might take rescue into their own hands and start wading into water to get their neighbours.

The communities have a huge amount of ability to respond themselves. We are looking at not just flooding but extreme cold weather. Our winter resilience project is one of the two big initiatives that we have been very successful in deploying. We had two extended extremely cold winter periods in 2010 and 2011, when it was -15° in Dumfries and Galloway for more than three weeks. Many of the water mains pipes froze solid because they had not been buried deep enough in the ground 100 years ago, so we had communities that were living on bottled water for an extended period.

We engaged with those communities and they noted that their grit bins had been put at the extreme ends of the village, which is not much help to the people who want to spread the grit. We told them to redeploy the grit bins and said that we would buy them some more—they cost only a few hundred pounds. They looked at the village maps, and they knew the areas and the layout of the pavements. They decided to redeploy the grit bins in completely different locations that suited the community. With a little bit of extra money, we subsidised grit-spreading machines, which are little devices that people push around. As it happens, I do that for part of my village—there are three or four pavements that I spread salt or grit on. That is an example of how villages have bought into winter resilience.

On flooding, there was a craving for lots of sandbags, but the jury is out on whether sandbags work. The issue is partly psychological. Many of the older properties are several hundred years old, and the water can get in almost anywhere, not just through the front door—in most cases, it goes in straight through the walls. Nevertheless, there was a demand from the communities for us to deploy sandbags, so the council now goes out with flatbed trucks and drops off large pallets' worth of filled sandbags. Before we knew it, a group of volunteers with wheelbarrows had got together. They take out three, four or five sandbags and put them at the front doors of all the homes that they know are in flood risk areas.

There is a lot of good work taking place at a very local level—it just requires a trigger and a bit of support during the first year or so. Communities have really bought into those schemes.

There is one point that the committee might want to consider. The Civil Contingencies Act was designed during the 1990s and came into force in 2004, and the Civil Contingencies Act 2004 (Contingency Planning) (Scotland) Regulations came into force in 2005. The legislation placed six duties on all category 1 responders—fire, police, local authorities and the 14 territorial health boards—but local authorities had one additional duty, which was to promote business continuity. We have a duty to engage with small and medium-sized enterprises and with the charity sector and others to encourage them to prepare business continuity plans for when there is bad weather or any other disruptive event.

However, we do not have a duty to promote community resilience—that is discretionary at present. Nonetheless, Dumfries and Galloway Council has done a huge amount in that respect. We employed a member of staff who is still working with us, and we have had great success in that area. We will continue to do that work, but some local authorities do not do it because it is discretionary. If there is any consideration in future with regard to adding a seventh extra duty that applies to local authorities, that could involve adapting the duty on business promotion to reach into the area of community resilience.

The Convener: We always welcome constructive suggestions.

I want to wrap up the session and move on to something else. Before I do so, does anyone have further points to make?

Mark Ruskell: On the issue of cost, there is an interesting point with regard to the Civil Contingencies Act. The initiatives that Martin Ogilvie's council is putting in place are clearly voluntary. To go back to my point about individual property-level protection, if it costs councils £8,000 a pop to put in the relevant flood gates, self-inflating air bricks and everything else, is that a concern for them? Where do they get the funding if they need to protect 700 or 1,000 properties?

Martin Ogilvie: I cannot speak for other councils, but we certainly do not have a limit of £8,000. Our limit is £1,500, and we expect people in the communities that engage with us to do so on a 50:50 basis.

We provide people who are interested with a catalogue and a drop-down menu of different types of equipment. Rather than a householder or business owner deciding for themselves, a member of the flood risk management team will visit the site and carry out an assessment of the

building, because each building will have particular needs. Because we have the purchasing power, we can buy the stuff through the procurement team and then sell it subsidised with a 50:50 split. The council puts forward half the cost because we expect business owners to see it as their responsibility to make a commitment too.

I must admit that, from the feedback that I have had, I do not think that there is much reluctance from people to acknowledge that the scheme should involve a 50:50 subsidy. No one has not bought the equipment because they have to make a small contribution.

Mark Ruskell: Even people on benefits?

Martin Ogilvie: There are also the flood pods, as I mentioned earlier. If people do not buy the equipment, we will still proactively deploy flood pods to the affected area if there is an amber alert. I also mentioned the sandbags initiative. Property owners who are not buying the proper flood gates can still use improvised equipment such as sandbags and other things.

We have done a lot of work with registered social landlords, who have been good at putting measures in place. Some of our schemes involve not just community councils but tenants and residents associations. People realise that they need to do more to support themselves and to look after their neighbours if they are vulnerable. In fact, some of the best schemes are in areas where tenants and residents are supporting and working with their neighbours.

The Convener: That is useful. I will let Anna Moss and Angela Heaney in briefly.

Angela Heaney: On the point about dredging, I am sure that it has its place, but when there are severe floods and a huge volume of water that is wider than the channel, dredging would take a little bit out of the channel and would not be anywhere near enough to cope with that volume. Dredging is of limited use.

On the straightening angle, a lot of straightening of rivers has caused some of the problems in the first place because it makes the water flow much faster. We have to think more holistically about adaptation. In addition, we will be facing droughts and water shortages, which could be very close to the flooding events in terms of timescale. We need to find ways, looking not only at flooding but at drought, of holding back water and having more meanders but only in the appropriate places.

Dr Moss: I will add a couple of points. With regard to data gaps, we have heard about the gap in historical event data, but there is also a bit of a gap in understanding current impacts. We do not currently have a database that is coherent enough for us to use in the indicator work on current

events, in relation to things such as how long they last, where exactly they are and how many properties are impacted. SEPA is working on improving that, but that is a gap.

There is also an issue around defences. The Scottish flood defence asset database has issues that SEPA is working on. I believe that the intention is to start including structures that are not currently designated specifically as defences. For example, a natural bank could be an important defence mechanism but it might have no protection because it is not seen as a flood defence although, if somebody removed it, that could have important consequences.

On the costs for local authorities, ClimateXChange is about to publish something on the work that it has done closely with Aberdeenshire Council on the costs of flooding. The aim was to get a real understanding of the costs to local authorities of not just the immediate impacts from flooding but the longer-term impacts such as the loss of work hours. With the floods in Aberdeenshire last winter, the council department was working perhaps 75 per cent of the time on flooding issues. Once we can see the significant and real costs to local authorities from flooding, we will start to understand that there is a great cost benefit from being proactive in flood management and not just reactive, which is currently where most of the activity takes place.

The Convener: Thank you—we have had a good kick of the ball on that issue. We move on to the subject of health and social care services.

Emma Harper: Last week, Lord Krebs noted the significance of being able to monitor the arrival of new diseases and suggested that the next Scottish climate change adaptation programme should reflect the need to monitor disease closely. Does anyone have any thoughts on human resilience and pathogens that we could potentially be exposed to?

Dr Moss: We do not currently have any useful information on the risks to humans from vector-borne diseases. That was not brought into the current SCCAP, so we did not look at that. A lot more research is being done on vector-borne diseases in relation to livestock. For example, we have looked at the known climate impacts on liver fluke populations because of the impact on their vector species—the snails that they spend part of their lifetime in. We know that there will be impacts on vector-borne diseases. For Scotland, the issue of species that affect humans is not necessarily critical at the moment but, because the data is not there, we cannot say that categorically. It is therefore important for us to start monitoring species that are travelling up from the south because conditions are getting more advantageous for them.

11:15

Diarmid Hearn: One issue that we are aware of is ticks and Lyme disease. Anecdotally, from my organisation's perspective, it is a risk to staff, volunteers and visitors. We are trying to raise awareness but we do not have any good data to show whether the incidence is increasing, or whether awareness is simply improved. Again, that could feed into land management practice. If there is less agricultural upland and more bracken cover, there are more ticks and more diseases. It might be a second unintended consequence of other changes as a result of other decisions.

The Convener: Stepping back a little to health and social care services, a number of members of the committee visited the national centre for resilience in Dumfries. We were all impressed with the model that has been designed by Dumfries and Galloway Council to identify vulnerable people in communities and where they are, and to keep that information updated so that, if an emergency situation arises, those people can be targeted quickly and moved if that is necessary.

How widespread is that kind of planning around Scotland? Is Dumfries and Galloway Council unique in that?

Martin Ogilvie: The persons at risk database has been around for about nine years. The key step was when it moved from being just a local authority-controlled database with information held by our social work and other departments to being partnered with the NHS. It does not need to be updated, in the sense that it is live information. If a general practitioner goes into someone's records and puts the patient on to dialysis, or there is a change in someone's medical condition, that data is live at any one time.

Declaration of a major incident is the trigger for accessing the database. We have to abide by various data protection legislation, rules and regulations. Once a major incident has been declared, we can ask some of our technical colleagues who have geographic information system mapping to put a polygon or something on to a map, which will tell us exactly where the vulnerable people live within that catchment.

Until this year, the scheme has just been a Dumfries and Galloway scheme. The Scottish Government and the national centre for resilience, quite rightly, have picked it up as one of the leading projects. The first phase has just finished. One of my colleagues retired at the end of last week and his job for the past four months has been to go round Scotland and promote the persons at risk database as a scheme that could be picked up and run with almost off the shelf. That first phase has finished and the report has

been submitted. It is up to the Scottish Government to decide what to do next.

Such schemes arguably do not take an awful lot of money to set up—what is needed is the will to set up the information-sharing protocols and the data protection rights to ensure that there are champions and owners of the information. During the next two years, we will see the scheme being rolled out across Scotland. It is one of those things that we will look back at and ask why it was not in place before; it is so straightforward that it really begs the question.

Finlay Carson: I had a discussion with Martin Ogilvie and I know that he has a fantastic idea about how we can get the information out there and work on good practice across Scotland. I might be stealing his thunder—

The Convener: Prompt him.

Finlay Carson: I should. Martin, would you like to share your idea with the committee?

Martin Ogilvie: I am lucky, in the sense that one of my other jobs is as a reservist in the army and I get to travel abroad a huge amount. Every year, I am in another part of the world looking at community resilience schemes. I have been in Indonesia, I have done about five or six African countries and I am just back from Brazil.

I look at what is happening locally across communities and how we get communities to buy in. I was in Rio in the past month looking at what is done there. There are a lot of communities that aspire to a certain standard and it made me think about what we do in the UK. We put a blue flag on a beach when it reaches a level of cleanliness. We put a green flag on a school when the teachers do some work with the kids on making the school eco-friendly. However, we do not really encourage our communities to have a level of recognition.

Could we have a community resilience award? If we had such an award, it would not just be for the local authorities to say when a trigger has been met. That might happen when a community has an exercised emergency plan. The fire service could say that the trigger has been met when a certain percentage of households have smoke alarms fitted, or the ambulance services could say that it is when a certain number of defibrillators have been deployed in the community.

When I spoke to the chief executive of NHS Dumfries and Galloway on Friday about that idea, he said that under his healthy communities banner, he has an initiative that works with GP practices across Dumfries and Galloway to encourage GPs to make business continuity plans. A number of agencies could work up a trigger that, once met, would mean that the community would achieve resilient community status, just like the

blue flag for beaches or the green flag for schools. There would be recognition that a lot had been done to make the area as secure and safe as possible.

The Convener: That was well prompted, and it is certainly a very interesting idea.

We have covered health and social care, and air pollution and pathogens. We can now look at the issue of businesses.

Kate Forbes: Over the course of the conversation, we have touched on different areas where we need businesses to work together and with their stakeholders. However, the CCC's report identified that there is currently no co-ordinated Government plan to increase the resilience of businesses in Scotland, particularly in relation to severe weather. How can we get a co-ordinated plan, and what should be its purpose and primary objectives?

Dr Keegan: One thing that is emerging from the Scottish forum on natural capital's work with businesses is natural capital accounting, under which a business looks at the risks to it from mining natural capital. For example, the whisky industry not only extracts water, but puts it back into the environment as warm water. An extreme weather event such as drought would affect the industry, and the question is how the whisky industry manages that risk in the future, because it could end up being a problem. In addition, the industry's warm water should be fed into heat networks and not just disposed of and allowed to cool down. The natural capital accounting approach is being used, and one of the first things that it has been used for is to consider how to manage climate risk.

Professor Pender: The University of Sheffield and the University of Durham did some work a few years ago on SMEs' resilience to flooding. We tend to think of flooding in terms of the impact on individual householders or big industries, but a category in the middle—SMEs—is also impacted. SEPA's flood risk maps show which areas are prone to flooding, and we can identify the SMEs that are in those areas. The research by the two universities found that, as with individual households, there is a range of preparedness among SMEs, depending on how aware they are of flooding risk.

Someone—it may have been Anna Moss—made a point about trying to quantify the impact of flooding. We do not really understand the impact of flooding on SMEs in terms of economic output. However, all the tools and data are there, so it is about grasping the nettle and working with SMEs to help them understand how vulnerable their businesses are to flooding. Some SMEs can make themselves more resilient by taking relatively

simple steps, but it is more complicated for other SMEs. We need another level of communication and to focus on that group of businesses.

The Convener: I presume that there are significant and developing challenges in insuring businesses in flood-vulnerable areas. What information do we have on that?

David Stewart: The UK Government has introduced a new national flood protection insurance scheme that means that we all pay to help those at most risk. I know about insurance problems from a business in my constituency that was badly flooded and had real problems in getting hold of an insurance company. The problem is not just the availability of insurance but its cost. Certainly, the new scheme makes some sense because there is a default position whereby there will be a provider of last resort, which is a good thing. The model that has been developed for the scheme is that, like many other benefits, those at who are at no risk pay for those who are at greater risk.

The Convener: Jenny Gilruth wants to touch on education.

Jenny Gilruth: Last week, I quoted this statement from the report:

"Raising awareness about the effects of climate change is likely to be most effective when people are already dealing with the effects of extreme weather."

I think that we would all agree that that sounds a wee bit reactionary rather than preventative. However, later on the report discusses the Education Scotland ready for emergencies resource. I know that Martin Ogilvie has already talked about green flags and the eco-schools programme, but, with regard to education and what happens in the classroom, what do the witnesses think might be the best ways of building resilience in the next generation? Are the local authority witnesses aware of any good practice in teaching about climate change in their council areas?

Martin Ogilvie: One popular scheme that has been running for a number of years in Dumfries and Galloway is operation safety, in which, as you might expect, the police, the fire service and other agencies are involved. The scheme, which runs over a number of weeks, has been tried in different ways; this year, it ran for about three weeks, with primary 7 kids the target audience. The kids were bussed with their teachers into Dumfries for a day to go round a number of scenarios or minor crises that they might face as a young child or young adult and to be given advice by the agencies. Part of the scheme addresses what to do in an evacuation and gets children to think about how to prepare for emergencies.

Other schemes probably exist. I know anecdotally from my children that they have done project work on disasters and so on. They might look at, say, the Titanic, and then go a bit deeper to consider the dynamics of an emergency, how it happens and how it is responded to. A lot of other things get teased out of a project that might run over 10 weeks.

Dr Moss: Obviously, extreme events such as flooding can be a great route in to having conversations and engagement with communities. However, it is really important that we do not lose sight of other issues around adaptation. They are not necessarily headline grabbers, but it will be critical to communicate them through education as they become more and more important for the lives of generations to come. The issues might be more subtle at the moment, but that does not mean that we cannot communicate them in useful ways. I have engaged in primary schools with children as young as six, and I have found that you can engage on issues such as the consequences of adaptation for Scottish farmers in ways that bring issues around adaptation alive, give them meaning in those children's lives and plant the seeds of their awareness of the importance of the issues in future and the need to consider them even though they might not live in a flood risk zone.

Angela Heaney: I am not aware of any specific engagement with regard to adaptation. I know that climate change is certainly dealt with in schools but more often than not, it is about mitigation. In fact, I think that there is a huge piece of work to be done with the whole population, given that mitigation seems to be the default position when climate change is talked about. It is easier to get your head around; it can be reduced to one metric—carbon; and it allows people to think about energy use. Adaptation is such a broad topic that it is difficult for people to get their heads around it, and we face a huge challenge in raising awareness in that respect.

For me, adaptation is the big issue. We definitely have to do mitigation, but the fact is that even if we in the UK were to stop all our emissions tomorrow, that would account for only 2 to 3 per cent of global emissions. I am not saying that we should not be doing that, but emissions are continuing to increase on a global scale. It is coming in our direction, so we have to pay attention to what we can do.

Clearly we have to respond to emergency situations when they happen, but we have to plan to ensure that we do not get to that stage or to reduce the chance of such situations happening. What is really missing is some thinking outside the box about the changes that really need to be made at all levels of society, not just in agriculture,

forestry and everything else that has been discussed this morning but with regard to even broader topics. We have hardly touched on overheating, which we often think is not going to be an issue here because our average temperatures do not sound very high. However, research carried out in Stockholm has shown that temperatures of only about 24°C can cause major heatwave problems, because issues can arise if the temperature does not decrease overnight.

I come back again to the issue of blue and green infrastructure, which we have talked about from a flooding perspective. We need to have more of it in our urban areas for cooling, for absorbing and for improving biodiversity by increasing the habitat networks. Introducing more of it in urban areas, where most people live, will bring about a win-win-win situation, because it will make those environments more pleasant to be in, help economic development, because people will want to spend more time in those places, and help with increased walking and cycling. It will help to improve a range of issues.

Education and awareness raising are definitely important, but the issue is much broader than just schools.

11:30

The Convener: We will wrap up this part of the meeting by looking at what the immediate priorities are for strengthening Scotland's approach to climate adaptation and what work each of the witnesses thinks should be undertaken now to support the development of the next iteration of the Scottish climate change adaptation programme, which is due in 2019. I am looking for bullet-point suggestions from any of the witnesses who feels that they have something to contribute on that question.

Angela Heaney: On strengthening national strategies, last week someone mentioned that the digital strategy did not really take on board adaptation. I know that climate change is mentioned in national planning policy, but the adaptation side is quite weak, because the focus, yet again, is on mitigation. A similar situation applies to infrastructure strategy.

I know that there are pressures on resourcing at all levels of government, but, from a local government perspective, if an obligation is not seen as a legal or mandatory requirement, there is a tendency to focus not on it but on areas that are.

Professor Pender: In these situations, there is always a tendency to move towards more modelling and more sophisticated modelling. There have been recent calls at a UK level for integrated modelling of meteorology, hydrology and flooding, which would give us a short-term

step forward. However, as I said earlier, we should be anticipating the availability of more and cheaper data so that we can understand how the system as a whole is functioning in terms of run-off, response and the monitoring of pipes and systems. It might be too radical to try to manage the system in the way that we would manage a motorway system, but we will be able to take more robust decisions if we base them on data rather than modelling. We should be thinking about what will happen five years from now. Earlier, I made a point about historic data sources. They are really important, and we have to archive them appropriately.

We must make better use of improved statistical methods. One of the issues in the world that I inhabit is that we have discovered that mathematicians and statisticians have been doing a lot of research into improving statistical predictions of uncertainty. However, trying to translate that into practical tools that organisations such as SEPA and the UK Environment Agency can use is a bit of a challenge, and it is important that there is communication between the academic disciplines in order to bring that about.

It is also important that communication is joined up. The sharing of good practice was raised earlier, but there was no time to answer the question fully at that point. Sniffer—the Scotland and Northern Ireland forum for environmental research—runs a three-day mini-conference that enables local authorities to get together and share good practice. That is a good model. Members of the Society of Chief Officers of Transportation in Scotland also get together regularly to talk about flooding issues and share good practice.

We need to look beyond the bounds of Scotland. Lots of stuff is happening in England. I see SEPA and the UK Environment Agency often doing similar things but they do not communicate with each other. I think that the UK Environment Agency is much more connected with the academic community in the UK than the comparable organisations in Scotland are, so encouraging that to take place in Scotland would be useful.

The Convener: That is a constructive suggestion. Thank you.

Dr Keegan: In order to allow nature to adapt to climate change and to get habitats in good ecological condition, we need a national ecological network. There has been a lot of slippage on that in the Scottish biodiversity strategy.

Dr Taylor: In targeting our actions on the ground and looking to set a target for 2027 to 2030 for peatlands, the issue is about getting the data. We need to understand baseline conditions now and where we should be prioritising work and

action. We will then need to have a robust monitoring system—a consistent way of reporting our work on the ground—so that we can show what we are achieving and tie that back into metrics for carbon emissions.

Dr Moss: The issue goes right across the board. Last week, the adaptation sub-committee very clearly raised the need for milestones and timescales to be associated with the adaptation programme, and to do that we need coherent, useful data. That is an issue for peatland although, as I say, it goes right across the board.

The adaptation indicators that we have developed give us a great base to start from and have meant that we can now identify where some of the critical gaps in data are. Those gaps sometimes appear because no data exists, but the problem is often that, although there is data, it is not available in a useful form. We need to be creative in ensuring that data is useable and coherent. We also need to be creative about sharing best practice. For example, at the same time as we do the great things in Dumfries and Galloway that we have heard about, we must think about how we can monitor their effectiveness, collect that information and then share that best practice with other authorities so that databases can be built up that will allow people to know whether what they are doing is effective. That will be critical.

Diarmid Hearn: First, I echo the Committee on Climate Change's point about SNH developing a monitoring system that reports on species and habitats. It is important that that monitoring feeds into the adaptation strategy.

Secondly, it would be good to see the land use strategy rolled out across Scotland. Even if it focused only on habitat fragmentation and water management, which we have spoken about quite a lot, that would be a step forward.

Thirdly, the elephant in the room is that a lot of what has been spoken about depends on CAP funding. I would not wait until 2020 to start thinking about the public benefits that we need to get from any future system. That might happen at a UK level, but Scotland has about 70 per cent of the less favoured areas in UK agriculture and we need to think about the future for the uplands.

The Convener: Does Martin Ogilvie have anything left to add?

Martin Ogilvie: I have one bit of feedback for Professor Pender on emergency planning. In our community, we recognise that we probably have more in common with Northumberland, Cumbria, the Borders and Northern Ireland in respect of our flood risk. Therefore, for over 10 years, we have been meeting representatives from those places

on a six-monthly basis and we have an emergency planning forum in which we share best practice.

My three recommendations or bullet points are: to promote community resilience—the regulations might need a little amendment in that regard; to roll out the persons at risk database, which is a Scotland-wide scheme; and to base all our readiness and plans on what the forecasters say about the levels of risk. At the moment, an emergency is either declared or not declared, but it is not that easy. We align all our readiness levels to the yellow, amber or red warnings that come in, and we have excellent advice from SEPA and the Met Office that is getting better every year as the modelling gets better. We are now able to say with accuracy whether somewhere is going to flood in six or 12 hours' time, which allows us to put in place all sorts of measures.

The Convener: Thank you. David Stewart has asked to have the last word.

David Stewart: That is the story of my life, convener.

This is an observation rather than a question. When we took evidence from the Met Office in session 3, I was concerned to hear that Scotland does not have complete coverage for weather prediction because there is a gap in the high-density radar in Moray, which is in my patch and which, as you will know, has a real problem with flooding. England has complete coverage, and there is a bit of an argument between the Scottish Government and the UK Government about who provides the coverage. My general point is that, because prevention is better than cure, particularly from an emergency planning point of view, surely we should have the same ability to predict severe weather patterns in Scotland as exists in England.

The Convener: I thank the witnesses very much for their time this morning. It has been a very useful evidence session and I am particularly grateful for the constructive suggestions that it has thrown up, which give us a number of action points to take forward and raise with the cabinet secretary in three weeks' time.

We will have a short break while we swap witnesses.

11:39

Meeting suspended.

11:47

On resuming—

Subordinate Legislation

Climate Change (Annual Targets) (Scotland) Order 2016 [Draft]

The Convener: Agenda item 3 is evidence on the draft order. I welcome from the Scottish Government Roseanna Cunningham, the Cabinet Secretary for Environment, Climate Change and Land Reform; John Ireland, deputy director of the low-carbon economy division; and Tom Russon, climate change policy adviser. I ask the cabinet secretary to speak to the instrument.

The Cabinet Secretary for Environment, Climate Change and Land Reform (Roseanna Cunningham): I will briefly give the background to the draft order. It sets annual greenhouse gas emissions reduction targets for 2028 to 2032 in a manner that is evidence based and consistent with the Scottish Government's commitment to a high ambition on climate change.

The proposed annual targets match the more ambitious of the two options that were recommended to the Scottish ministers by the Committee on Climate Change, which provides independent statutory advice. The targets represent a reduction from baseline levels of 64 per cent in 2030, which will keep Scotland on track to meet our 2050 reduction target of 80 per cent.

The committee will be aware of the recent announcement that proposals for a new climate change bill will be outlined in early 2017. Although we expect new legislation, the Scottish Government remains fully committed to discharging the obligations of the Climate Change (Scotland) Act 2009, including the setting of annual targets for 2028 to 2032. The draft order arises out of the 2009 legislation and not from whatever targets the new bill might set.

Setting the targets at the proposed ambitious levels will provide an appropriate stepping stone towards future legislation. It will also reaffirm our long-term commitment to the low-carbon economy, which will send important signals to investors and stakeholders at a time when UK Government policy and the whole Brexit scenario are causing a bit of uncertainty.

The proposed targets are ambitious, but they are achievable, given Scotland's strong progress to date and in the context of the transformative changes that are associated with the transition to a low-carbon economy.

I am happy to answer members' questions but, if you ask very technical questions, the officials will probably need to respond.

The Convener: Thank you. I will kick off the discussion. Was it purely the fact that the chosen option was the more ambitious of the two recommended options that prompted the Scottish Government to go for it or did practical considerations lead to the decision?

Roseanna Cunningham: There were two issues. First, we are setting ourselves ambitious targets. In the long run, it is better to be ambitious and fall slightly short than to achieve unambitious targets but not feel that we have really achieved anything. We wanted to stick to the more ambitious of the two targets, although it is fair to say that the other target would have been a perfectly acceptable way to have gone and that the Committee on Climate Change would have been perfectly content had we chosen that option.

That committee gave us two options. We chose the harder one because it matched the sense that we were being more ambitious. In any case, because we had already signalled a new climate change bill, it seemed to fit that movement. The two approaches came together to make it obvious that we were going to go for the harder option. The softer option would have been acceptable—I do not think that anyone could have criticised us for taking it—but pushing that bit harder is the best way to proceed.

The Convener: The approach is welcome. Do other members have any questions?

Claudia Beamish: Am I allowed to make a one-sentence point or do I have to put a question to the cabinet secretary?

The Convener: You can absolutely make a point.

Claudia Beamish: Thank you, convener—I could not remember the rules. Good morning, cabinet secretary. I simply highlight that I welcome the Scottish Government's decision to go for the more robust option.

The Convener: That is welcome. There are no other questions or points to be made.

We move to agenda item 4, which is consideration of motion S5M-01520. I invite the cabinet secretary to move the motion.

Motion moved,

That the Environment, Climate Change and Land Reform Committee recommends that the Climate Change (Annual Targets) (Scotland) Order 2016 [draft] be approved.—[*Roseanna Cunningham*]

Motion agreed to.

The Convener: Are members content to delegate to me the signing off of the report?

Members indicated agreement.

Climate Change (Limit on Use of Carbon Units) (Scotland) Order 2016 [Draft]

The Convener: Item 5 is evidence on the draft order. The cabinet secretary and her team are still here. I ask the cabinet secretary to speak to the instrument.

Roseanna Cunningham: I will provide a little background to the draft order. It sets a limit on the use of carbon units from 2018 to 2022, so we are talking about a different—and more imminent—period than that for the instrument under the previous agenda item. This instrument concerns a technical matter that relates to the carbon accounting that underpins the 2009 act.

The 2009 act allows emissions reduction targets to be met through two basic mechanisms. The first is through domestic effort to reduce emissions, which includes the operation of the European Union emissions trading system in Scotland, and the second is through the purchase by Scottish ministers of international carbon credits to offset domestic emissions.

The order that we are considering proposes a zero limit on the extent of the latter mechanism—the use of offsetting credits to meet targets—over the period 2018 to 2022. By setting such a limit, the Scottish ministers are committed to meeting emissions reduction targets over the period entirely through domestic effort. The proposed zero limit is consistent with the recommendations of the Committee on Climate Change and with the Scottish Government's on-going commitment to a strong focus on domestic action to tackle climate change.

I am happy to answer questions.

Claudia Beamish: I have a specific question about Brexit—that dreaded word. How does the EU emissions trading system relate to the current negotiations? I am not asking for detail, but I highlight the need to be aware of what will happen if we reach that point, given the commitment that you described.

Roseanna Cunningham: At the moment, the scheme continues to operate, and we have to operate within the current structure. You are correct to flag up the longer-term uncertainty in respect of the EU ETS.

There are—I have to say that it was rather prescient and that the legal draftsmen must have spotted something coming that we did not spot—provisions in section 22 of the 2009 act that allow the amendment of orders such as we are considering, should circumstances regarding the EU ETS change. We do not know how circumstances will change—if they change—and whether there will be a mechanism for signing up as an external party. I cannot answer that

question. There is a legislative mechanism for dealing with the situation but, until we know what we are dealing with, it will be impossible to guess what will happen. There is not an enormous timescale on which to begin to think about the issue; the clock is ticking.

The Convener: If there are no more questions for the cabinet secretary, we move to item 6, which is consideration of motion S5M-01712.

Motion moved,

That the Environment, Climate Change and Land Reform Committee recommends that the Climate Change (Limit on Use of Carbon Units) (Scotland) Order 2016 [draft] be approved.—[Roseanna Cunningham]

Motion agreed to.

The Convener: The committee's report will confirm the outcome of the debate. Are members content to delegate to me the signing off of the report?

Members *indicated agreement.*

The Convener: I thank the cabinet secretary and her officials for their time.

Smoke Control Areas (Exempted Fireplaces) (Scotland) Revocation Order 2016 (SSI 2016/292)

Smoke Control Areas (Authorised Fuels) (Scotland) Revocation Regulations 2016 (SSI 2016/293)

The Convener: Item 7 is consideration of two instruments that are subject to the negative procedure. I refer members to committee paper ECCLR/S5/16/7/4 and I invite comments.

Claudia Beamish: I put on record the concern that has been expressed to me about coal fireplaces outside smokeless zones. It is important that we are aware that that raises an air pollution issue. I simply highlight the issue.

The Convener: If there are no more comments, does the committee agree that it does not want to make any recommendation in relation to the instruments?

Members *indicated agreement.*

The Convener: At our next meeting, on 25 October, following the Scottish Parliament's recess, the committee will take evidence from the cabinet secretary on greenhouse gas emissions targets and climate change adaptation.

As we agreed earlier, we now move into private session. I ask that the public gallery be cleared, as the public part of the meeting is over.

12:00

Meeting continued in private until 12:26.

This is the final edition of the *Official Report* of this meeting. It is part of the Scottish Parliament *Official Report* archive and has been sent for legal deposit.

Published in Edinburgh by the Scottish Parliamentary Corporate Body, the Scottish Parliament, Edinburgh, EH99 1SP

All documents are available on
the Scottish Parliament website at:

www.parliament.scot

Information on non-endorsed print suppliers
is available here:

www.parliament.scot/documents

For information on the Scottish Parliament contact
Public Information on:

Telephone: 0131 348 5000

Textphone: 0800 092 7100

Email: sp.info@parliament.scot



The Scottish Parliament
Pàrlamaid na h-Alba