**The Application of Resilience to Conservation of the Natural Environment**

**Thursday 26th October:  10.30 – 15.30 at Silvan House, Corstorphine, Edinburgh**

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**Attendees**

Duncan Stone (SNH) Ruth Mitchell, Rob Brooker (JHI), Colin Edwards, Helen Sellars, (FC), David Genney (SNH), Katy Hayden (RBGE), Nick Everett (SNH), Chris Leakey (SNH), Chris Quine (FR), Nicola Melville (SEPA), Mary Christie (SNH), Graham Sullivan (SNH), Andrew Coupar (SNH), Chris Reed (Woodland Trust), Paul Woodcock (JNCC), Anna Ferretto (JHI), Paul Sizeland (SNH), Joan Cottrell (FR), Niki Newton (JNCC), Maggie Keegan (SWT), Steve Ewing (RSPB)

**Agenda/Invitation**

Many thanks for replying to our invitation to our discussion on The Application of Resilience to Conservation of the Natural Environment. The background to the meeting is that as part of the RESAS-funded Research Programme we are considering the Resilience of Biodiversity and Ecosystems, and are doing so in parallel with Duncan Stone, who is leading on SNH’s analogous application of Contingency Planning.

During the day we aim to :

1. Consider current frameworks for managing environmental resilience including feasibility, practicalities and prioritisation of actions.
2. Review recent work at SNH on contingency planning, and work in the Scottish Government’s Research Programme on Resilience.
3. Identify knowledge gaps and needs for future research to support any proposed actions

Agenda

10:30 – Arrive + teas and coffees.

10:45 – Welcome and introduction, aims for the day; Rob Brooker (JHI).

10:55 – Presentation of the resilience framework (Fuller and Quine 2016). Chris Quine (Forest Research)

11:15 – Presentation of SNH contingency planning work; Matt Smedley(TBC) (SNH/JNCC)

11:35 – Presentation of resilience work in the SRP; Glenn Iason (JHI)

11:55 – General discussion and clarification of questions for afternoon break outs.

12:30 – Lunch

13:30 – Breakouts

14:30 - Plenary incl. identification of common knowledge gaps and research needs.

We will address the following in the afternoon session:

1. Is it desirable and possible to incorporate building resilience into our management of the natural environment, including designated areas?
2. In which systems might resilience management work or not work and which habitats, designations or other systems would be our priorities to target increased resilience?
3. Do we have the information we need for systems that are considered to be priorities?

15:30 - Depart

**Notes from morning (11:55) open discussion**

General keenness to move away from the issue of defining words to look more at the practicalities of getting resilience thinking into conservation management action.

Are policy drivers helping or hindering resilience work?

* Some policy documents might talk about resilience but might not have more explicit resilience thinking in terms of developing associated action plans.
* Strategic policy documents tend to be conservative – need some examples of action on the ground to promote iterative development of strategies; these can help foster some areas of general agreement which then becomes the mainstream consensus and will be taken up into policies, with the outcome being the actions drive policies rather than *vice versa*

Is contingency planning, e.g. by SNH, being linked to climate change adaptation action?

* Adaptation principles for climate change -> planning for change; can be related to broader resilience principles and help folk to actually start thinking about change.
* Good to keep the discussion of principles of adaptive management for climate change and contingency planning up together.
* SG Climate Change Action Plan has resilience objectives, but reviews of this plan say it is hard to measure effectiveness due to lack of specific outcomes. How can we measure progress?
* Challenge is to roll out thinking from climate change to more drivers of change.

Resilience as a focus varies between targets and designated features; limits to acceptable change exist and we can only undertake newer resilience thinking if we loosen off some of these limits.

* For coastal features, the goal is maintaining the feature over time.
* In the conservation objectives being developed for marine systems, more information on function and processes is being included in the draft objectives.
* Perhaps thinking in coastal and marine systems is more flexible (reflecting the dynamic nature of these systems) – maybe they are further ahead in thinking than terrestrial systems.

In some cases what might appear to be tensions with respect to the aims of building resilience, e.g. the conflict of encouraging resilience vs. providing ecosystems with capacity for change, might be false in that it depends on scale.

* Should we maintain e.g. core areas, and allow some other areas to change?
* Should we try to avoid policies that focus on a single particular approach? – there is no “one size fits all” solution.

Limits of acceptable change seems to be a persistent sticking point/problem.

* Policy side prefers a narrow definition which is difficult to work to.
* At the same time some people don’t like the “slippery” concept of resilience – the alternative way to frame it is to pitch it as approaches to adaptation.
* Limits of acceptable change discussions should also consider social tipping points andthresholds; social scientific approaches might be more accepting of the concept of resilience (often discussed e.g. with respect to communities).
* Can we look at acceptable change at a network level, i.e. it is change of the network that is key – different sites might go in different directions.

Monitoring is a key issue:

* Monitoring timescales and foci – what’s the best for contingency planning?
* Need to monitor both the system and the threats.
* For condition monitoring of e.g. PAs, maybe one of the criteria should simply be “is a resilience plan in place”?

**Notes from break out group A**

**Question 1: Is it desirable and possible to incorporate building resilience into our management of the natural environment, including designated areas?**

Is it desirable?

* Creates risks – might turn out to be undeliverable and/or could it do harm – too cavalier an approach?
* If we’re thinking about actions that improve future-proofing, then it’s underway already in some cases.
* It may be more or less desirable at different levels or for different aspects.
* Need to define what it is we want to make resilient before deciding if it is desirable – different people have different objectives so there may be a risk of generating conflict.

Is it possible?

* Should we be using current value judgements to set long-term management goals?
* Logistical issue when looking at the large number of feature x site combinations – how can these be prioritised? Could we take a risk-based approach to this?
* Should designated sites be handled differently to other locations (e.g. core vs. periphery)?
* Discussion about the future of the protected areas network should use a wider context in terms of time and space.

**Question 2: In which systems might resilience management work or not work and which habitats, designations or other systems would be our priorities to target increased resilience?**

* Should identify refugia/core areas and act more conservatively here.
* At which scales of management would this thinking be appropriate – possibly better at a network scale?
* Is the appropriate scale dependent on the nature of the threat – e.g. deer grazing (local) vs. climate change (national)?
* Depends on the scale or possibility of management intervention.
* It might pragmatically be better to let some folk get on and try stuff – it would take too long to work up a national plan.
* Empower people to do something, for example through time-limited pilots.
* Coastal systems seem a good place to target trials (more acceptance of dynamism) – might other systems be more (e.g. woodlands) or less (e.g. grasslands/uplands) open to change-orientated thinking?

**Question 3: Do we have the information we need for systems that are considered to be priorities?**

* We should extend current climate change risk assessment frameworks.
* Operationalising it is difficult given the complexities of operating across different scales.
* Need to know how things are changing.
* Priorities might be sites with big projected future change; however, where large change is occurring, there’s likely to be more uncertainty in our projection of its outcome.
* Do we know the outcome of possible interventions? Interventions could be via altering levels of resistance, transformation and adaptive capacity, and will influence species/habitats and service delivery.
* For some systems we have good knowledge, for some poor knowledge.

**General additional thoughts**

* When it comes to acting on advice we struggle with a) resource limitations (not enough funds to do what we want), b) policy limitations (e.g. problems of limits to acceptable change thinking), and c) the challenge of delivering cultural change (from static to adaptive conservation).
* Limits of acceptable change – needs more consideration in terms of the complexity of setting these and integrating temporal change and moving baselines.
* You need to know your limits.

**Notes from break out group B**

**Question 1: Is it desirable and possible to incorporate building resilience into our management of the natural environment, including designated areas?**

* If we don’t build resilience then we are automatically accepting change. Therefore quick agreement within the group that we do want to build resilience into our natural environment
* We can build resilience at the national level – or at have plans to do so, less good at doing it at specific sites.
* In some cases we are already building resilience but just don’t call it that, e.g. habitat restoration
* Need to think about where resilience adds to what we are doing already, where it is more than just repacking what we are already doing, - e.g. includes scale much better
* Chris’s 6 point structure gives a good framework for managing at the site level.

Is it possible to implement resilience?

*Tipping points*

* Difficult to use tipping points as the data/models are not there to identify tipping points
* Possible to implement the 6 point framework but need to be pragmatic – identify risks not tipping points as we can achieve that
* Concentrate resources on where we can make a difference (where we can change something)
* There may be lots of different tipping points – which ones should we focus on? Can’t do them all
* Look at degradation rather than tipping points, we need to stop us reaching tipping points and they are hard to identify any way so better to look at degradation

*Foundation species*

* Foundation species better to use than tipping points
* Could think about which features are linked to which foundation species and manage the feature via the foundation species (features within this context referring to features of interest within protected areas).
* Foundation species are not the characteristic species –e.g. in an Atlantic oak wood the foundation species are the oak trees, the characteristic species are the Atlantic bryophytes and lichens. You can have the foundation species without the characteristic species for which the site was designated. The characteristic species may also use species other than the foundation species. So a straight link to foundation species is complicated.
* Can we use a more functional approach in designating sites rather than a species approach?

*Network of sites operating across different scales to build resilience*

* Need to look at networks, build resilience across networks. Populations are moving, sites are changing from what they were originally designated for. Conserve species across a network, rather than within one site, allows for movement of species and change within any one site.
* Government agencies can do some but not all the resilience planning, other agencies also need to be involved
* Need to develop a network approach that starts at a high level but works down to implementing resilience at a local level. Need a multiscale action that goes from national to local
* How do we balance the scale of our work – do we work at the scale the species operates at or the scale the pressure is operating at?
* When do we have enough of X to be resilient?
* One person’s connectivity is another person’s fragmentation of habitats e.g. conflict of connecting some habitats but causing disconnect of others.
* Need a landscape scale approach to fragmentation across habitats

**Question 2: In which systems might resilience management work or not work and which habitats, designations or other systems would be our priorities to target increased resilience?**

When will it not work?

* Depends on the system. Some systems will respond to inputs/management, others won’t
* Depends on the threat/drive of change
* Resilience management will not work in protected sites where there is a high level of management required to maintain the site in favourable condition/to meet the target, ie where no change is allowed
* Where the site is smaller than the processes we are looking at
* Where the system is already degraded
* How far can we reproduce the functionality of a foundation species (e.g. trying to find out best species to replace ash)
* Won’t work if resilience planning of others is driving it in a different direction
* Need to force integrated thinking across different organisations so they operate at least at a catchment scale to achieve the same direction of travel for resilience (but then how do you link this to a network approach described above?)

When will it work?

* Systems we know more about
* Managed systems?
* Where there is a willingness to see change
* When adaptation is better than management to resist change (or more cost effective)
* In systems where there is a more functional approach – e.g. Water Framework Directive
* Marine environment: the pressures are managed rather than the species, not habitat management. A very different starting point from the terrestrial system of protected sites, partly because generally the species are a lot more mobile
* Use environmental characteristics as “foundation species” e.g. marine pH, like Duncan used river temperature

**Question 3: Do we have the information we need for systems that are considered to be priorities?**

* Need time series to identify trends
* Need models to predict future changes
* But should not let the above needs stop us doing something now. Need action now, not more science
* Need a way of identifying priorities without getting stuck with lack of knowledge
* The foundation species approach gives us a focus
* In Wales they use: Connectivity, diversity, condition and extent to identify resilience. Can we use these four categories to help us prioritize?
* Prioritize by dealing with the threats you can do something about e.g. deer and rhododendron but not climate change – this links to question 2 – ie it will work where you can do something about it
* Biosecurity – the arrival of each new non-native invasive pest is a tipping point but probably haven’t got the resources to deal with each new pest on a case by case basis
* Agree shared objectives for priority habitats across stakeholders e.g. what we would like the habitat to look like/deliver. The opposite of these shared objectives to help to define limits of acceptable change (i.e. anything that moved you away from these shared objectives)
* Need to work with others – e.g. local authorities – would they work on resilience for flagship species?
* Switches – if the landscape changes what can we accommodate in terms of “new species” e.g. butterfly species moving north. Without some thinking about the limits of acceptable change the status quo becomes the norm
* If we have migration, which of our species should we allow to “fall off the cliff” –i.e. northern species that can’t move north. – should we prioritize those species for which we have an international responsibility, but we less concerned about those with a healthy population elsewhere on the globe?
* A good example of thinking about limits of acceptable change is what is classed as native/non-native either side of the English/Scottish border. This border is historical but not ecologically meaningful. Should we accept species that are native in England but not currently seen as native in Scotland?
* Should think about what is an acceptable pace of change rather than the level of change (accepting that no change is not possible) – this is current thinking in the Marine environment.

**Notes from afternoon (post-break out) open discussion**

* Resilience would be an ideal topic for discussion by the SBS Species and Habitats group.
* Some kind of ongoing resilience forum across the UK? Forums can be hard to keep on top of.
* An online library of resilience/contingency plans might be an important resource – could encourage folk to do their own and/or provide information as to how they might be done.
* Need to engage new people in the discussion and to communicate issues of change in new and different ways (for example, through art, as per recent Valuing Nature Network activities) to get past inherent resistance to change.

**Post-meeting synthesis – some general thoughts**

* There is a general agreement that we should manage for resilience in our natural systems.
* There is a general desire to move beyond defining concepts towards getting action on the ground.
* Learning by doing is probably a good approach.
* Contingency planning is probably a better framing than discussing resilience.
* The Quine/Fuller approach provides a good structure for management action at a site level.
* We can build upon approaches and traction generated by climate change adaptation, and adaptive management in coastal/marine systems; we should also recognise management action where we’re already building resilience.
* We should stop thinking about tipping points – they are hard to measure and monitor for, and may not happen; thresholds/targets might instead be set by levels of degradation or presence of foundation species.
* As well as trying it out in some case studies, we need to look at bigger-scale challenges to implementing resilience thinking in nature conservation:
1. Limits of policies and concepts (e.g. limits of acceptable change)
2. Scale of planning – should contingency planning be in all NNR plans, or should it be part of larger scale planning and the consideration of networks?

**Research challenges**

* How can we promote the uptake of resilience thinking, and what are the current limitations on its uptake?
* How should we target, and at what scale should we be undertaking, resilience planning and learning-by-doing? We need solutions that can deal with current knowledge gaps.
* What are the risks of contingency planning?

**Next steps**

At the meeting it was generally agreed that keeping up a flow of information on resilience thinking and work would be worthwhile. Here, we suggest **meeting attendees can record their own next steps** for the coming year (2017-2018). If other attendees are interested in an area of work, then one-to-one discussions can take place to follow up.

**James Hutton Institute (Glenn Iason, Rob Brooker)** – Work with Duncan Stone (SNH) to develop a process for resilience assessments, and to then trial this procedure at one or two sites to complement the range of studies being undertaken elsewhere. For example the assessment may be trailed at an oak woodland site which is part of work being undertaken by the PuRpOsE project to assess ecological impacts of oak decline <https://protectouroaks.wordpress.com/> (Ruth Mitchell). However the exact sites and range of studies will be determined in 2018.