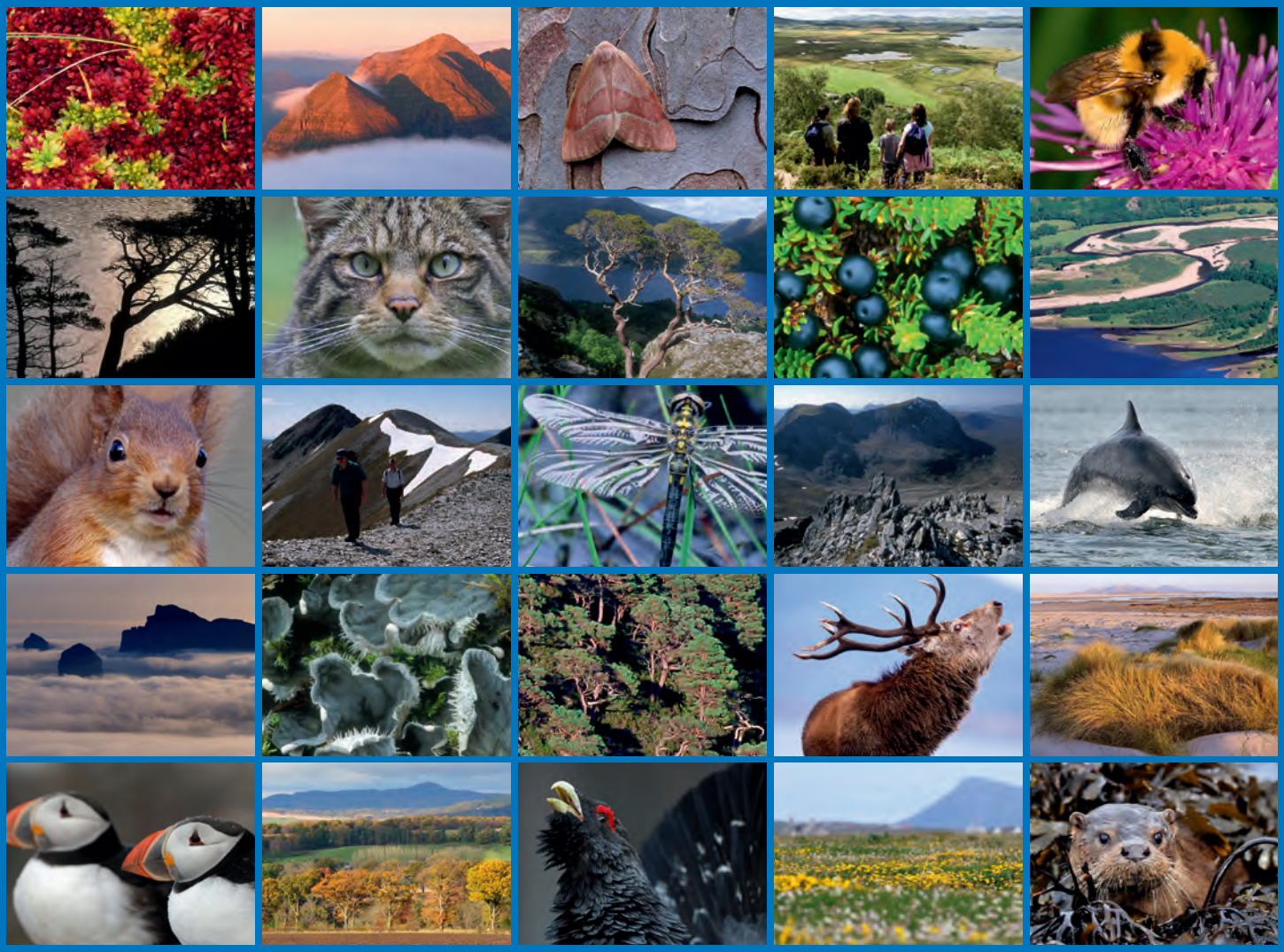
Scottish Natural Heritage
Commissioned Report No. 476

Teaching in nature



Scottish Natural Heritage
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COMMISSIONED REPORT

Commissioned Report No. 476

Teaching in nature

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COMMISSIONED REPORT

Summary

Teaching in nature

Commissioned Report No. 476 (iBids No. 1340)
Contractor: School of Education, University of Stirling, Scotland
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Background

SNH has a remit for people's enjoyment and understanding of the natural heritage as well as the care of it. The potential for the educational use of National Nature Reserves (NNRs) (and similar 'wild' places for nature) is not well understood. This research was designed to enable practicing teachers from primary and secondary schools to collaboratively explore how National Nature Reserves could be used to provide for learning across a range of subject areas. This work was conducted within the context of the new national curriculum initiative in Scotland, *Curriculum for Excellence* (CfE) (LTS, 2010). For further information (including videos of outdoor excursions, lesson plans, and supporting commentaries), visit the project website: http://teachinginnature.stir.ac.uk The research was funded by Scottish Natural Heritage (SNH), and supported by The General Teaching Council of Scotland (GTCS).

Main findings

Teachers' Experiences and Outcomes
All teachers, whether novice or more expert in teaching out of doors, developed their expertise through working collaboratively on planning and executing excursions to natural environments. Key tasks included making advance visits, discussing their ideas with others, making initial and repeat visits, and creating purposeful, meaningful activities with their pupils before, during and after visits. This work affected how teachers viewed themselves as educators as the outdoor context demanded a different role from them. Teachers who perceived themselves to be 'outdoor-novices' faced particular challenges when planning excursions. They found sharing experiences among colleagues and making repeat visits helped to address initial concerns. Handling contingencies (such as weather and terrain) and generally being open to the unexpected (such as encounters with wildlife) were important. Excursions in NNRs helped with meeting formal curricular demands of Curriculum for Excellence and provided opportunities for teaching in both an inter-disciplinary and a single–subject manner. Evidence suggested that educational experiences in natural environments could be very purposeful and meaningful for teachers and pupils.

Pupils' Experiences and Outcomes
In all cases, pupils valued spending time and learning in nature. Excursions and related activities in the classroom helped generate an aesthetic and caring appreciation of the natural environment and new understandings about human-environment relations. A range of teaching strategies were employed which sensitised pupils to the natural place, or took the place as an essential starting point for learning. While on trips, pupils valued having time for engagement in tasks that included investigation, observation, play and exploration. The educational excursions provided multi-sensorial experiences of nature that were very memorable and valued highly. Repeat visits made a particular difference to the quality and

depth of understanding and engagement with natural places. In all cases, pupils and teachers noted that going outdoors for teaching and learning in nature changed and improved relations among pupils and teachers. Educational experiences in natural environments also brought greater enthusiasm, attentiveness and focus in pupils' learning, and the potential for improved health and physical ability, and self-esteem in pupils.

Enhancing Provisions

The research indicates that initial teacher education (ITE) and continuing professional development (CPD) programmes dedicated to enhancing the provision of educational experience in natural environments would be advised to include some key activities and take account of some key factors identified in this report. These include opportunities for staff to develop their own expertise through providing a supportive context for teachers to actively plan, execute and review excursions as well as pre- and post-visits activities. ITE and CPD in this area will also need to take account of the role of the outdoor natural place itself (and how it could be responded to), the teachers' biographies and dispositions, the role of the teacher when outdoors, the teaching strategies chosen, the school context, and the availability of other wider supports such as transport and finance and curricular relevance.

Figure 0.1 SNH Site Manager, Martin Twiss explained about the woodland habitat to this visiting group of pupils. He discussed how the place has become special to him over time and encourages the children to come back and visit with their families at a later date.

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Acknowledgements

Thanks, firstly, to the participating teachers and their pupils who worked on the case studies with us as co-researchers and without whom the project would have been impossible. Their work continues to be developed and archived on-line well beyond the funded life of the project which is an indication of the development of an active and engaged community of practitioner-inquirers. A list of participants is provided in Appendix 1.

Thanks to Brian Spoor, SNH Communications Officer, whose initial ideas gave rise to this project and whose support throughout made it possible. His openness to new ideas brought rewards through opportunity to challenge common sense understandings and sustained critical enquiry. Thanks to the SNH site managers, Martin Twiss (Cleghorn Glen and Falls of Clyde), Catriona Reid (Muir of Dinnet, Burn o'Vat), Neil Mitchell (Loch Leven), and Tom Cunningham (Tentsmuir) for their in-depth introductions to the sites and support thereafter when called upon.

The advisors for the research included Professor Pete Higgins, University of Edinburgh, Dr Ian Matheson, General Teaching Council of Scotland, Ms Alison Motion from the Royal Highland Education Trust, and Ms Juliet Robertson, Creative Star Company. Thanks to these 'critical friends' for their work in supporting the project.

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1 BACKGROUND AND RESEARCH DESIGN

1.1 Background

This research comes at an interesting time in Scottish education. Firstly, the new curriculum, *Curriculum for Excellence* (Scottish Executive, 2004) advocates a more active and engaging pedagogy for pupils and looks to teachers to make more use of outdoor (especially local) areas. Policy makers support the view that outdoor experiences in nature also offer the possibility for addressing many of the aims of *Curriculum for Excellence* through making better connections between subject areas, between academic and practical subjects, and between learning undertaken at different ages (LTS, 2010). Outdoor experiences in nature also potentially offer the opportunity for challenge and personalization, and a broadening of the curriculum through the different sorts of visits and activities that are possible. Some of the skills sought are part of the personal development, citizenship and employability portfolio, the so-called 'soft', transferable or 'life skills'. Other outcomes are knowledge-based or involve our connection with and care of natural places, developed through encounters and transactions between the human and natural worlds[1].

With this policy context in mind, this research on school-based provision continues SNH's on-going commitment to finding ways of getting children and young people out and about in, and caring for, natural heritage, particularly more local natural environments. We also now know that local natural places are not well-visited by class groups in Scotland (Mannion *et al.,* 2007), and that barriers for teachers to going into nature to teach are multi-faceted (Higgins *et al.,* 2006). Our understanding from the outset was that outdoor learning in local National Nature Reserves (SNH, 2003) offers great potential for education in principle. However, how teachers gain support and work to enact excursions in practice is less well understood. This research addresses this gap in knowledge and understanding.

1.2 Aims and Approach

The main purpose of this research was to provide practicing teachers with the opportunity to try out new approaches to 'teaching in nature' through their use of local National Nature Reserve (NNR) sites. For the purposes of this report we take 'teaching in nature' to mean the efforts of teachers to educate through a variety of strategies that happen as a lead up to, while on or after excursions in natural settings, in this case NNRs. For Scottish Natural Heritage, there was the specific aim of understanding how best to encourage teachers to use NNRs for enabling greater understanding of the natural heritage among pupils. Twenty teachers were recruited initially across primary and secondary sectors and diverse subject areas to participate. This number was reduced to around 15 active participants (the target number). We suspect school culture and structures as well as teacher disposition may have played a role in affecting take-up overall (particularly in secondary school contexts). The project was designed to be teacher-led but was supported by consultants and by the Stirling University research team from the School of Education.

The aims of the SNH project overall were:

1. To gain an understanding of the possible uses of NNRs and other special wild places for learning through drawing on teachers' experiences and expertise
2. To inform SNH about its on-going support of outdoor learning in nature through schooling,

[1] We use these terms here but acknowledge the complexity of terminology and ideas here that is possible. For example, the term 'more-than-human' (see Whatmore, 2002) is often used to capture the fact that humans are a species too and that environments can be seen as assemblages of human and nonhuman elements all of which are involved in having some form of agency.

3. To create a working group of teachers to investigate approaches to teaching outdoors in nature.

Our aims as university researchers were:

1. To work alongside teacher-researchers and project stakeholders to conduct a research project to enhance and support the project's aims.
2. To further understand how teachers provide for learning in natural environments and how pupils experience and value this in a fine-grained and qualitative manner.

1.2.1 Research on Outdoor Learning in the Scottish Context

The background to this research is also research-based. There has been a rich seam of empirical work carried out on provision for outdoor learning in natural environments in Scotland over the last few years. Previous research conducted by the University of Stirling (Mannion *et al.,* 2007) highlighted that children's un-supervised access to local outdoor experiences of the natural heritage is likely to be decreasing. Therefore, the roles of adults (both professional and non-professional) will become more critical in enabling children's access to outdoor places from all social backgrounds (though lower socio-economic groups are more likely to face disadvantage). Mannion *et al.*'s (2007) survey provided evidence of the general picture on provision for all kinds of learning outdoors through a survey of schools and early childcare and pre-school centres. That work highlighted that formal outdoor provision needed to be more rounded in terms of its focus, more regular throughout the year and more inclusive of all children. They noted that relatively few outdoor learning events took place in local areas. We also felt that schools and teachers were likely to need assistance and some form of support structures to enhance their outdoor provisions. Lastly, we argued that, with provision levels low overall, if outdoor experience was to be relevant and effective for learning about and 'for' the environment, that schools and teachers generally would need support. Mannion *et al.* (2007) found that time spent in nature, while *necessary* for developing environmental understanding and enhancing a relationship with nature, may *not be sufficient in itself* to achieve this. It was noticeable in that study that young people mentioned care and concern for nature if they had worked closely with adults (teachers or others) on tasks that sought to actively and explicitly engender this as an outcome.

In 2007, further research was recommended as necessary in the Scottish context in order to understand provision better. This project responds to that call and has the potential to bring a more contextualised and practice-focused understanding through the work of teachers as key stakeholders. Higgins *et al.* (2006, p 53) note that teacher disposition is important: "those who were predisposed to taking pupils outdoors would find a way of doing so and those who were not were far less likely to". Beyond this dispositional factor, they found a range of possible 'barriers' to going outdoors which worked together in complex ways for teachers. These *reported* barriers included cost, time, teacher-pupil ratios, safety, weather, transport, disruption to classes and qualifications. In any one context, teachers' dispositions could therefore be moderated by factors such as resource availability, school culture and the rise of curricular relevance and so on. This finding warranted further enquiry and this case study approach could help to take this forward. Case studies also allow for the potential connections identified between outdoor learning and CfE to be further explored. This study presents a valuable opportunity to gain an insight into processes of curriculum change, policy interpretation and enactment within the context of outdoor learning. It also offers scope to explore the impact that such initiatives might have on teachers' sense of their own professional identity and practice.

1.3 Research Questions

The shared research focus for teachers and university researchers alike was on finding out how valued and educational experience in natural environments could be provided by teachers and how it might be experienced by pupils. We also wanted to know more about the planning and design of curricula involving outdoor visits. We wanted to know about the factors affecting the entire planning and enactment cycle, from the inception of ideas for lessons, through to visits outdoors, and post-visit work in the classroom. With these foci in mind, the following research questions were formulated. These questions also reflected the aims (above) and the need to understand teachers' and pupils' experience in practice through the analysis of individual cases in the first instance and, thereafter, through comparison and analysis of these.

1. For selected cases we set out to answer:
    a. How does teaching in nature become possible (from preparation, initiation through execution to conclusion)?
    b. What is valued about these experiences?
    c. What roles are played by teachers in making this possible?
    d. What practical issues are encountered?
    e. What are experienced as barriers?
    f. How are these overcome?
    g. What features of the eco-social context appear to give rise to teaching in nature? What forms of relationship are important here among pupils, teachers, activities and environments?
    h. Does the process of curriculum making in nature have discernable phases or a lifecycle?

2. In what ways does teaching in nature (including preparation, execution and follow-up work) provide opportunities for addressing the expressed values, experiences, outcomes and capacities of Curriculum for Excellence?

3. Can the findings be synthesised to generate generalisable models, approaches or case studies / vignettes that may be of use to a wider audience?

4. What are the implications for initial teacher education (ITE) and the continuous professional development (CPD) of teachers within current curricular reform?

1.4 Research Design

We characterise the general approach as collaborative action enquiry based on exploratory practice (Allwright, 2003). This work would be led by teachers and supported by university and other staff, and the generators of the knowledge would be teachers in practice contexts. This involved SNH and university staff providing minimal support for teachers to try things out and did not involve offering ready-made approaches or pre-ordained strategies or techniques for use in the outdoors. The focus was on generating understanding through addressing teacher-generated 'puzzles'.

1.4.1 Initial Framings

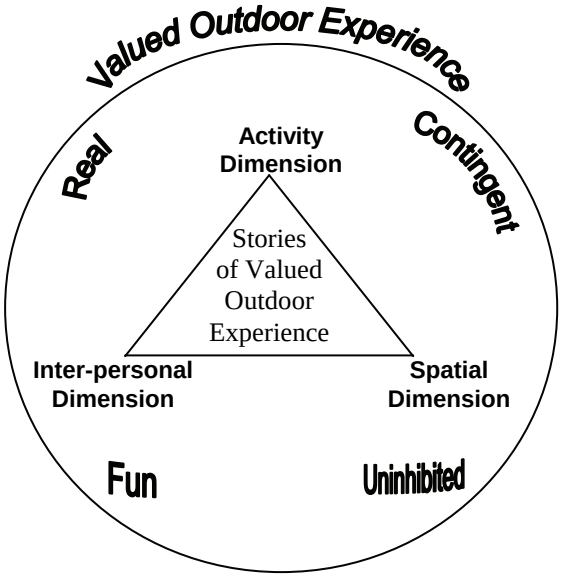
In the initial workshop, the teachers were introduced to some of the earlier findings from Scottish studies and some in-depth discussions followed about how educative processes help people connect to places in meaningful ways. One contribution and starting point for the university research team was that we should seek to understand person-environment-activity as a singular co-joined process. The following schema (from Mannion *et al.,* 2007), which arose from qualitative data from young people about what they valued as outdoor

experiences, was presented and discussed. Young people valued outdoor experience for three main *interlinked* dimensions:

- the social or inter-personal dimension,
- the 'activity' dimension and
- the 'place' dimension.

Being with others (the social dimension), doing things (the activity) and being in certain kinds of places (the spatial dimension) were usually interconnected and inseparable when young people spoke about experiences they valued through stories. These three dimensions, sit alongside the characteristics of valued outdoor experience ('fun, uninhibited, authentic and contingent') (see Mannion *et al.* 2007). We also suggested that there are strong interconnections between the characteristics and the dimensions. Figure 1.1, below, depicts these interrelating dimensions and characteristics.

Figure 1.1 A schema for inter-related dimensions and characteristics of outdoor experience.



Mannion *et al.* (2007) cited some of the regularly mentioned aspects of valued outdoor experience as:

- Fun or Enjoyable Experiences: doing something not commonly engaged in; doing something different or new; being with friends or alone, doing exciting or relaxing things, experiences that involved the senses; having time to think, reflect or talk with others.
- Less Inhibiting Experiences: being free generally as an overall sensation; being free to choose; free to roam, explore; being in open spaces; being in the fresh air; being near wildlife; being in naturalised or remote places; having one's senses exposed to a variety of elements; not being rushed.
- Authentic and Contingent Experiences: being outside rather than inside; encountering natural materials or elements in outdoor contexts (for example, trees, plants, water, rock, sand, snow, ice); encountering problems that arose as part of the flow of events; unexpected or unplanned events; the possibility of seeing wildlife; finding or discovering things; facing problems of challenges (for example, falling in while kayaking); dealing with changes in the environment (for example, the weather, the terrain).

While outwardly simple, the model above suggested a complex and distinctive starting point drawn from the previous empirical work: that for any shared event, valued outdoor

experience will likely contain ALL of these elements.[2] Secondly, evidence strongly suggested that these elements co-specify each other and generate valued outdoor experience in an inter-related way. Put another way by Ingold, organisms and environments are 'coextensive' and there is no boundary between them. Environments and organisms interpenetrate (Ingold, 2003, p 305). 'Persons, in short, come into being […] through growing up in an environment […] personal powers of perception and action are developed through the immediate experience of sensory participation with human and non-human components of the dwelt-in world' (Ingold, 2003, p 310).

1.4.2 Framing the Process as Exploratory Enquiry into Puzzles

As we have seen, this research built upon this earlier evidence through the invitation to teachers to consider in more detail what valued outdoor and *educational* experience might be like within their own contexts. Teachers were invited to decide on a puzzle or challenge that would be meaningful for them and their pupils, in their school and in some chosen subject area or cross-curricular area. This approach drew upon Allwright's (2003) view that teaching itself can be an exploratory practice. Through teaching, teachers can focus on what is going on (both successes and failures), through posing questions and investigating these experiences. Exploratory practice involves action but the main focus is to bring about understanding for the teacher. Doing this collaboratively adds another layer of valuable knowledge sources and support for inquiring teachers.

We asked teachers to initially consider: "*What will be valuable, outdoor, life-enhancing and educational … in <u>your</u> area with <u>your</u> class?"*
We suggested teachers try to address their puzzles by:

- Getting to know their area through planning visits
- Selecting a focus for some interpersonal-place based-activity
- Refining their thinking (discuss with others / research it / think about it).
- Finding / designing / adapting their outdoor activities
- Using these strategies with their class group
- Recording how it goes
- Generating new knowledge & practices
- Potentially, revisiting the site again
- Gathering together in project workshops to collaborate, reflect, and interpret and consider the implications.

This approach meant we needed to be sensitive (in research and in project practice) to the local and situated aspects of the way visits would ensue, and the manner in which teachers and pupils might gain a relationship or connection through learning with some particular site in nature, how they might express this. Taking this more interactional view offered the hope that we would understand the subtleties of the process of curriculum making or 'enactments' in nature.

1.4.3 Teacher Groupings

As planned, four groups of teachers were formed. Two were based in and around urban centres (Fife/Dundee and South Lanarkshire) and one in a more rural area (Aberdeenshire) and one group in a more remote site (Isles of Iona and Mull). These groups needed members that were all relatively local to each other so that they could gather to meet and bring pupils to the same local site. The group in South Lanarkshire gained the additional support from a council officer there, Ms Julie Wilson. A key part of the design of the project was that teachers were invited to voluntarily participate in the project. Teachers who had little or no experience of providing for outdoor learning in natural environments were

[2] We should note that this model reflected children and young people's views (and not teachers') and that it was not a model for what would suffice necessarily as outdoor *educationally* valued experiences.

particularly encouraged to participate. This allowed us to understand how teachers (perhaps with years of indoor teaching expertise) might convert their skills to teach outdoors in nature. All participants were assured of the provision of funding for their release from class duties to explore some local NNR sites in advance of visits (see Section Two on Planning). Teachers accepted onto the project were required to work in teams and to visit selected NNRs (or a local 'wild' area in the case of Mull & Iona).

It was originally envisaged that individual teachers would opt into the project and would convene regularly as groups in order to investigate the possibilities and compare progress and outcomes. In practice, three of the teachers' groups met locally in their designated NNR for the purposes of planning. The majority of participating teachers met at three workshop events (each of which spanned two days in a residential setting). One group of teachers met very regularly outside of these gatherings through the work of a local education authority leader, Ms Julie Wilson, South Lanarkshire Council. This group of primary teachers took the teaching of religious and moral education (RME) outdoors in nature as their focus. Other teachers met in pairs or small groups more informally as they worked in the same school, or worked across a number of schools as peripatetic staff.

1.4.4 Release Time

Funds were also available for staff time for teachers' release so that they could visit the sites with class groups for whole days or parts of days. It was also important that teachers felt they had permission to explore approaches and substantive subject area foci of their own choosing to meet their own requirements for curriculum design and innovation in their own schools, especially during this time of curriculum change. Minimal overarching frameworks were provided to support teachers' thinking on how to approach the work. Some background on the current state of provision in Scottish schools was provided, drawing on previous SNH funded research (Mannion *et al.,* 2007). The university research team's role was to capture evidence of these changes in practice and to provide an account of the puzzles the teachers were addressing. This approach required a degree of trust to be placed in the teachers' own abilities to plan and execute these outdoor educational excursions in natural areas in ways that would be meaningful for themselves and their pupils.

Almost all of the participants who came to the first workshop stayed for the course of the 16-month project (December 2010 – March 2011) and were involved in getting their class groups outdoors in NNRs. Two teachers dropped out of the project mid-way. They did so because of ill-health or because of changes in their job status or school location.

1.5 Methods of Data Collection

Because the experiences of groups in different sites were diverse, the chosen methodology was an ethnographic mixed method approach to multi-site case study (Yin, 1994). We used:

- *Interviews and Focus Groups.* Interviewing pupil and teacher participants and running focus group discussions with the action research group comprise the main source of data. (See below).
- *Fieldnotes and Observations.* We collected fieldnotes and observations of a few in-class and a good number of outdoor events. Using participant observation in selected sites before during and after visits we sought to generate a thick description (Geertz, 1983).
- *Visual Methods.* Visual records have been shown to encourage discussion and debate on the value of outdoor events and person-place-activity relations. Because we sought to examine outdoor learning environments, we collected visual evidence of events which were reviewed later in interviews with respondents. We collected respondent-taken or 'informant-produced' photographs and video footage and used photo- and/or video-prompted interviews / focus groups in the review phase (in workshops 2 and 3).

- *Documentary Analysis.* Other data was made available by teachers in the form of texts (such as student-produced work). Some other web-based interactions between teacher-researchers and university-researchers were collected and analysed too. One group made use of Learning and Teaching Scotland's educational web-site, 'Glow'.

1.6 Constructing and Sampling Cases

A 'case' was taken to mean *any outdoor site visit plus associated planning, preparatory visits, or review processes by teacher-researchers or pupils and related texts / outputs.*

We sampled cases so that we had input from some pre-school pupils and from primary and secondary (see table 1.1, below). We also sought to collect evidence from a spread of subject areas, levels of experience among teaching staff, and utility for comparability. For some site visits, we employed the work of teacher-researchers in proactively collecting data for the project. We set out to collect useful comparable data on approx 25% of site visits and activities, but in the end we collected case data from the vast majority of visits made during the project and had university staff present at most of these.

Table 1.1 Summary of Cases Researched

Summary of Cases Researched by Level and Source of Data						
	Pre-school / Early Years Primary 1-2		**Primary** (upper or whole school)		**Secondary**	
Total Participating Teacher Numbers (Initial) [3]	*10 Primary (including early years)*				*10 Secondary*	
Total Participating Teachers at Completion	*8 Primary*				*3 Secondary*	
Original Plan: Expected Number of Target Cases						
Original plan for no. of cases for which data to be collected by university with teachers' help	*1*		*2*		*2*	
Original plan for no. of subsequent cases for which data to be collected by teacher-researchers	*1*		*2*		*2*	
No. of cases with university researchers present to collect ethnographic data (video, interview, notes)	3	Libberton, Carnwath visit 1 & 2	3	Craigievar, Crawford visit 1, Salen	3	Alford, Banchory, Auchmuty/ Glenrothes
Cases where data were mostly made available by teacher-researchers (eg video, photographs, work)	1	Carnwath visit 3	3	Crawford visit 2, New Lanark, Iona	1	Auchmuty/ Glenrothes
Number of cases fully or part-analysed for report	4		6		4	
Number of cases reported in detail (on website)	6 Primary				3 Secondary	
Total Cases Contributing Data Used Herein	**14**					

Nine cases were researched in a more in-depth manner by university researchers. We have

[3] Not all teachers who joined initially managed to participate in the project to its completion. One dropped out due to ill-health, one moved job, others were working in schools at some distance and did not manage to get to all workshops but did go outdoors with their pupils. The recruitment of secondary school teachers was more difficult. In one case, the teacher found it challenging to gain the curriculum time for an outdoor visit during the life of the project. Otherwise, all participating teachers made at least one visit.

provided a web space as the main site of publication of these case histories. Please visit http://teachinginnature.stir.ac.uk for more details. The on-line content for each case[4] comprises:

(a) a short summary video of each of the (nine) researched outdoor visits with pupils,
(b) materials provided by the teacher-researchers (eg plans and commentaries),
(c) materials from pupils themselves (some audio files, pupils' work examples).

The nine case schools and the location of visits explored on-line are provided below.

Case 1 Carnwath Primary (Primary 1 & 2), Cleghorn Glen NNR, South Lanarkshire.
Case 2 Craigievar Primary (P 4 to 7) in Burn O'Vat, Muir of Dinnet NNR, Aberdeenshire.
Case 3 Salen Primary in Loch Ba, Isle of Mull.
Case 4 Libberton Primary (P 1, 2, 3) in Cleghorn Glen NNR, South Lanarkshire
Case 5 Crawford Primary (Whole school) in Cleghorn Glen NNR, South Lanarkshire.
Case 6 Crawford Primary (whole school trip 2) in Cleghorn Glen NNR, South Lanarkshire.
Case 7 Banchory Academy in Burn O'Vat, Muir of Dinnet NNR, by Ballater, Aberdeenshire.
Case 8 Alford Academy in Burn O'Vat, Muir of Dinnet NNR, by Ballater, Aberdeenshire.
Case 9 Auchmuty High School in Loch Leven NNR, Fife.

1.6.1 Analysis

Data, in the form of video, photographs, fieldnotes, transcripts and workshop discussions, were analysed interpretively and reflexively by university researchers and teacher-researchers. These data, including visual media, were not taken as realist representations of reality; rather, each form of data was considered as offering a context for understanding other data sources (Pink, 2007). Analysis was a collaborative process. Teacher-researchers met at workshops and reviewed and discussed each others' experiences. University researchers employed inter-researcher coding procedures to notice what was salient in the data sets. We used field notes by university researchers who were present at outdoor and classroom events to contextualise video footage and vice versa. Summary videos were made of outdoor trips (see website) and these were used as catalysts for discussion with teachers as a way of sharing their experiences and sharing analysis. These video narratives can be found on the project website alongside teachers' plans and reviews, and pupil work (see http://teachinginnature.stir.ac.uk). All case-related data were analysed by minimum of three university researchers in order to generate further analysis within cases and in order to make useful comparisons between cases. Interview and focus group data from the teachers and pupils meant we could also describe individual cases across the lifecycle of planning, undertaking and reviewing outdoor visits. Longer group and individual interviews were transcribed and analysed using coding mechanisms reflecting the research focus themes. Inter-researcher meetings assured reliability while triangulation across contexts and sources was employed to ensure greater validity and reliability.

1.6.2 Video

Following Lie and Mandler's (2009) schemas, we have used video in three ways. First, we have used it as a way of collecting data alongside other methods (see also Pink, 2007) both with the teacher-researchers and as a university research team. Secondly, we have used video recursively in the research to share experience and knowledge among the teacher-researchers at workshops. Reviewing video in this way meant teachers could share and learn about each others' work and make comparisons: there are many ways of addressing the problems and challenges of teaching in nature. We found that viewing video together also provided a way of remembering unusual details that we often missed while on visits since video captures stories in a more inclusive way (including elements not found in transcripts, such as human-environment relational aspects, for example how people dealt

[4] As one would expect, teachers took different approaches to review and pupil work to suit their own needs and circumstances. See http://teachinginnature.stir.ac.uk

with weather, terrain, but also because video captured more of the social context including elements such as vocal tone).

1.6.3 Types of Findings

We claim three kinds of finding are derivable from case studies. Firstly, in this research we claim that some generalisations about what is predictable in new contexts are available from case studies. Some generalisations are directly and empirically available from the evidence while others are derived from theorisation. In this latter approach, we can in effect theorise about future experience by looking at experience across the cases (Thomas, 2010). Many of the contributions are statements that we felt were indicative of all the cases: for example, that making some form of planning visit without pupils was seen as a key factor for all the teachers. Of course these cannot be read as direct claims about the future for all cases (one might for example imagine that some educators are viably and regularly going outdoors to places where they have never been before). Another contribution is a proposed diagnostic tool for considering outdoor teaching in nature education strategies (see table 3.1).

In addition, the case study stories contain context-dependent findings. Understanding an individual case can generate *exemplary knowledge* (Thomas 2010). This kind of knowing relates to 'how to do something' (or 'phronesis'), is always based in practice, and is tied to specific contexts. For this kind of knowledge to emerge, readers need to be active and make their own appraisal of the case studies. Using the evidence, teachers, policy makers, researchers and others can hopefully better understand their own puzzles and generate new ways of proceeding with their own insights (on challenges such as "what is the point of visiting local sites more than once" or "what we might want to do to get teachers outdoors more with pupils" or "what kinds of issues are faced in the planning of outdoor teaching by those with and without experience). This is perhaps the distinctive contribution of case study research to this area of concern.

2 PLANNING VISITS

2.1 The Project's Planning Model

A key component in this collaborative enquiry project was that teachers would gather together in groups to consider how some local NNRs (or other local wild place)[5] might be used to provide for outdoor learning. Teachers' groups met at planning visits and at project workshops. Three of the groups visited their local NNR without their pupils, but with a member of Scottish Natural Heritage staff on hand to consider possibilities.[6] These 'planning visits' allowed for some interpretation and advice from the local SNH site management staff, and the opportunity for teachers to work closely and meet with others to discuss ideas and challenges. Aspects of these 'planning visits' were recorded on video by university researchers; informal interviews were conducted.[7] Subsequently, the teachers attended a project workshop where they reviewed each other's experiences of the planning visits and shared initial ideas.

2.2 Collaborative Planning

Working collaboratively on planning and executing teaching in nature, rather than alone, had the effect of empowering teachers to try something new. We found that provisions for outdoor learning in natural environments were often made possible or were enhanced through taking a collaborative approach. These collaborators included colleague teachers, the project team, head teachers, other teachers, parents, rangers, SNH site staff, local people (historians, land owners, farmers) and others. Many teachers found the input of specialist staff (in particular, SNH site managers on this project) was useful for their work; these staff tended to be utilised more by teachers who were less in the habit of using outdoor places for learning. One said: "*Doing* this with others [is important] as possibilities will occur to them that you haven't envisaged – *collaboration*".

> Teacher 1: The collaborative approach has really motivated us.
> Teacher 2: And encourages each other. *(Workshop 3 Focus Group)*

Planning for outdoor learning experience is clearly something that can happen on-line, in one's head and through the construction of material resources and by considering desired or officially prescribed curricular purposes, experiences and outcomes. Yet, for outdoor experiences to be educational and valuable, all of these teachers claimed that *making site visits in advance of taking their pupils was a very necessary element*. Doing planning visits together and with specialist staff added further dimensions of added value: teachers benefited from doing a first health and safety check, sharing planning ideas with others, sharing excitement, anxieties and concerns, and learning about the place itself. One said:

> It just opens up…sees all the opportunities….possibilities that are there …. what could you do there … to be able to point out things to them that you've seen as a starting point for them [the pupils] (Primary Teacher, 'novice outdoor'[8]).

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[5] It was a key part of the funded project to consider the use of National Nature Reserves for educative purposes. While there are many natural and greenspace sites near schools that could easily be used for outdoor education, we were concerned in this research to consider the more special places for nature, namely the NNRs; in the case of Mull, visits were made to Loch Ba. These places visited are those that are managed in ways that prioritise nature rather than human use.

[6] Members of the Mull / Iona group of teachers already had informal communications and visited sites on their own islands.

[7] For video footage and supporting documents on teachers' experiences, visit http://teachinginnature.stir.ac.uk , the main project website.

[8] We will use the term 'novice outdoor' to refer to teachers who were new to teaching outdoors in nature but may have had extensive experience teaching in more traditional settings. Similarly, 'experienced outdoor' refers to those teachers who had regular routines of going out with their pupils. There will be degrees of proficiency between 'novice' and 'more experienced' teachers.

Another said:

> We were seeing possibilities together and perhaps talking about some of the problems and maybe thinking of some solutions for instance the health and safety issue … the fact that there weren't toilets and […] well, what we could do is go for shorter visits and you know it just helped us to sort of think through some of the issues. (Primary Teacher, 'novice outdoor').

'Novice outdoor' teachers had more early concerns around logistics. They initially wondered about the level of difficulty of terrain for younger pupils, the availability of toilet facilities and how pupils might have to go 'bush', and other health and safety issues. Discussing these issues with others meant teachers could explore solutions together. The planning visits also allowed staff to begin to generate a personal connection with the NNRs:

> I was thinking 'I don't think I would be comfortable being here with some of the children in my class' and then there were other bits I was thinking 'well this bit could work I can see how we could go you know up the steps how we could use this particular area'. But when I was there I just thought [the place] was so beautiful and natural and I changed my mind … we all fell in love with it. (Primary Teacher, 'novice outdoor').

An early years teacher noted that conversations with teachers from the same level was beneficial with planning visits providing "that bit of reassurance from other people thinking the same things about infants".

2.3 Repeat Visits

Repeat visits to the same place changed teachers' perspectives and allowed for a richer learning experience. In focus groups with teachers (Workshop 2) it was noticeable that teachers had made more than one visit to prepare their class trips. This was the case for both 'novice outdoor' teachers and those with more experience. A number of teachers had quietly returned to consider the site again, both on their own or with family.

> I went back on the Sunday on my own with my dog […] And sometimes being there on your own…I mean if I go somewhere on my own it feels more that this is *my place* […] because that gives you that kind of ownership. (Secondary Teacher)

> I went back the following weekend as well with my husband and my dog and did a full day's big figure of eight walk […] cos I wanted in my head to know as much about the area as I could before I take my children 'cos you'll need to be prepared. (Secondary School Teacher).

One teacher felt that making repeat planning visits was part of the 'responsibility of being a teacher'. All planning visits had the effect of extending how well teachers knew the site, how well they could navigate within it, and how they felt about the place. Personal and emotional connections with place were extended through repeat visits. These visits brought out an "an emotional response to the place you're in that's unquantifiable" for one teacher. One noticed how spending time in a place brought a sense of ownership and that "having a dog has extended….what…what is mine". Another said that the NNR "becomes familiar through the seasons you know you….you know that in a couple of weeks the […] the snowdrops are opening up just now". They also compared their emerging connection with place to that felt by one of the SNH site managers they met. The teacher noticed how proud he had been of the place, how much he knew about it and how glad he was that the teachers had liked it too:

> One of the significant things [the SNH site manager] said was…. "They liked my wood", yet technically that wood does not belong to him … but emotionally it does! (Teacher)

Repeat visits appeared to be important experiences for teachers and pupils (see also Section 4 below), enabling them to understand how places change both with the seasons and with the weather and through the activity of plants and animals; pupil and teacher responses to place also changed as a result of repeat visits, which brought a familiarity with the pedagogical potential of a *particular place* that would change with the seasons and the weather.

> Teacher (case 3): This is the fieldwork part which we can do while the bracken is low and the river is low. The next phase is the [pupils'] research. So they will hand into the museum what information *they* have got and the museum are going to teach them how to access the archives.

2.4 Natural Outdoor Contexts Change Educators

Teachers noticed the outdoor context had effects on how they felt about and how they saw themselves as educators.

> I become more relaxed when I'm outdoors, I become 'more me'…. and the children feed off on that I think […] when you appear in a school you're filling a pretty narrow personality slot there's only certain parts of you that really are going to be acceptable in there but as soon as you take the walls away and go out then you can kind of like a sponge kind of fill up a bit and be a bigger person. (Secondary Teacher)

> If you're in the middle of a wood, there's only us. […] There's no other public kind of watching you in that professional role. (Primary teacher)

It appears that the outdoor place demanded new norms and expectations for teachers; this was apparent as an effect of the planning visits. It was noticeable on these walks that some remembered and discussed their own childhood, and made comparisons between their own experiences and their pupils'. This was the beginning of some teachers making quite deep connections between how they saw themselves as a parent, as child once, and as an educator that might now encourage pupils to explore wild places.

> I think when you're in a place like that, it, …it makes you reflect on your own experience […] you make a relationship between the two things. (Teacher, discussing the connection between themselves and the place)

2.5 Developing Expertise

As we have seen, the collaborative planning visits were a key aspect of the project for many teachers and were particularly important for those who had reservations about going outdoors. Teacher expertise was developed further through repeat visits especially for 'novice outdoor' teachers. There was some occasional tendency for more 'novice outdoor' teachers to plan for outdoor teaching strategies that resembled aspects of indoor class-based activities. They also tended to create more extensive plans for their visits. However, 'novice outdoor' teachers tended to plan for more flexible tasks on subsequent visits and employ more place-focused approaches. A sense of professional growth and development was felt both by teachers who were novice *and* those who were more experienced as outdoor educators. Teachers agreed they faced *different challenges* when approaching trips as 'outdoor-novice' educators than those who are 'outdoor-expert' or had some expertise.

Increased confidence in novices was supported by the planning visits and by simply making the first attempts at taking class groups to a local natural place.

The planning visits appeared to change and challenge teachers' views on what they currently do with their pupils.

> We have dusty old bits of junk in the classroom and what not, and they kind of know that's 'school stuff'. (Art and Design Teacher, Secondary, 'novice outdoor', considering the materials used for still life drawing in the class).

Another said:

> It's a form of incarceration so a day out is a form of …of freedom (Teacher).

The planning visits afforded teachers precious time to focus on their chosen 'puzzles' and to generate ideas about how they would use the NNRs for their teaching. These ideas generated considerable enthusiasm and excitement among the teachers but also, a sense of puzzlement about how they might go about enacting what they had in mind. One looked forward to having her "group being able to be there on their own. I think that's something quite special". This teacher considers what added value the place might bring to his practice:

> Hopefully with this [visit] they're gonna get that added thing that we were all talking about, the sense of kind of ownership and the connection with the place that it's gonna add something else to it. (Secondary, 'novice outdoor')

Other example puzzles were:

> Q: How can religious and moral education be enriched by an experience of nature?
> Q: How can I get the S6 students to consider using nature as inspiration for art portfolio? (You can't just teach them aesthetics!)
> Q: Can teaching in nature help a group to bond?

Workshops and other group communications among teachers also provided valued opportunities to check ideas out with other teachers and time to talk about possible problems and their solutions (for example toileting outdoors away from the built environment, getting the right staff-pupil ratios, deciding on what would be acceptable as a slope for a given age group). Once one visit was made, 'novice outdoor' teachers appeared to become more at ease with outdoor learning events quite quickly and logistical issues move down the agenda on the list of concerns. The more visits teachers made to places, the more likely they were to attend to the specifics of the place in curriculum planning.

2.6 Summary Findings from Planning Phase

1. Working collaboratively on planning and executing teaching in nature, rather than alone, had the effect of empowering teachers to try something new.
2. Repeat visits to the same place changed teachers' perspectives and allowed for a richer learning experience.
3. Teachers noticed the outdoor context had effects on how they felt about and how they saw themselves as educators.
4. Teachers, whether novice or expert in teaching out of doors, found they could develop their expertise through the key activities of
    - making visits to sites in advance of taking their pupils,
    - discussing their ideas with other teachers,
    - making initial visits with their pupils with support (parents or specialist staff),
    - going to visit the same outdoor natural place more than once
    - making connections between the experience of the place and their own past outdoor biographies
    - creating plans for purposeful and meaningful outdoor visits.

Figure 2.1 Planning Visit in Cleghorn Glen.

3 FINDINGS FROM CROSS-CASE ANALYSIS

In this section, we provide a cross-case thematic analysis drawing mainly on data generated from the nine cases researched in more depth. Data were used to generate the themes and findings came from the case studies (field notes, video footage, interviews, photographs and pupil work), discussions and written commentaries. In addition, teachers responded to some end of project questions posed by researchers around what they were finding important overall as the project came to an end. These findings are derived from an analysis of the pupils' experiences, and teachers' own discoveries from having tried things out in practice and reflected upon events.

Readers are invited to visit the project web site, http://teachinginnature.stir.ac.uk to make their own contextualised interpretations of these findings. The findings signpost what would likely be of salience in many other contexts; with this in mind, they are mainly stated as findings *for these cases* (and narrated therefore in the past tense). Readers would have to be their own judge of how these ideas would apply in any new context. We note that it is also the case that these findings probably reflect a distinctively Western view within a Scottish experience.

3.1 Theme 1. What Pupils and Teachers Valued

3.1.1 Valuing the Outdoors

There was lots of evidence that the teachers and the pupils valued the chance to get outside in nature. This was the case even for some pupils living in quite remote places.

> Pupil: I don't get to see much nature, cos I am indoors a lot (Pupil, Mull, case 3)
>
> Teacher: I would like to do this more. I have wanted to for a long time. This is where I would like to be all the time. […] when I did my degree it was because I wanted to work outside with children cos I really like it. (Teacher, Secondary, case 7).
>
> Interviewer: What would you miss most if you could not go outdoors any more?
> Pupil: Nature, scenery, […]
> Pupil: the rivers
> Pupil: the walking […] when I am usually walking or running I am usually happy
> Pupil: the wildlife. The creatures are very interesting.

One pupil, who was a wheelchair user (case 7) said she did not get much chance to see nature "cos I am always inside you see". We had other evidence that some pupils were not in the habit of being outdoors in natural places like these; this was evidenced in the way they walked across terrain at times, the clothing they had for such events, and their comments about the visits.

The exceptional nature of the visits for most participants was quite marked. For teachers, outdoor visits incorporated a chance to spend more time with pupils, to be more 'themselves' and to be responsive to places in ways that are outside the norm for many in the regular timetables. One secondary pupil, who had spent time in a school in Norway, noted that there was a more heightened sense of excitement associated with outdoor visits in Scotland than in Norway. More 'experienced outdoor' teachers tended to have already developed habits and routines around getting outdoors which meant outdoor visits were an embedded feature of the culture of the school or at least the class group. Pupils who went outdoors more often appeared more likely to understand in advance what was expected from them, and how these outdoor experiences would integrate with the preparatory work and with the post-visit

activities in class. That said, both 'experienced outdoor' and 'novice outdoor' educators created viable contexts for their visits and onward project work in their classes.

When asked to consider what the visits afforded, pupils had clear views about the distinctiveness of the outdoor environment for learning. These extracts from case 3 interviews are an example:

> Pupil: You are looking at things and you think about it. Like you think about questions in the classroom and then you come outdoors and there are other questions you think of ..
> Pupil: Cos there are things you can see and talk about
> Interviewer: And if you didn't come outdoors what kinds of questions would you not have been able to ask?
> Pupil: Like what are the houses made of? […]
> Interviewer: How is it different to learning indoors would you say?
> Pupil: Well, it's easier. Cos if you are inside there are not much minibeasts. Like outside there is grass and wood and ..
> Pupil: Yeah, and sticks and trees and little holes.
> Interviewer: How does that make a difference to your learning?
> Pupil 1: Outside there is a lot more …
> Pupil 2: Stuff! […]
> Interviewer: And if you couldn't go outdoors, what would you miss?
> Pupil: You'd miss the nature.

3.1.2 Valuing Place Elements

Teachers and pupils valued the particular places they got to visit. Pupils in all cases reported on these place-elements in their valuations:

(a) some key or 'special' places found in the NNRs / wild places (eg the 'vat', the river, a favourite tree)
(b) the animal and plants found in these wild places, (eg seeing an eagle, finding animal homes, handling live animals eg toads and 'bugs')
(c) what the place afforded for purposeful activity (eg walking in the stream, enacting and filming drama outdoors, mapping the sheilings) (see also below)
(d) an aesthetic appreciation of the places visited.

Words such as 'awesome', 'cool' and 'peaceful' were regularly used to describe particular places they visited or aspects of trips. Here, a pupil takes on the playful role of interviewer to help us garner evidence on a visit.

> Pupil (in interviewing style): [name], what do you like about this place?
> Pupil 1 : I like the view, the rivers.
> Pupil 2: I like the view, taking pictures and the highland cows.

Figure 3.1 Places that might be animals' homes and signs of their presence were a fascination for many pupils.

Pupils easily specified what it was about the trips that they valued. As above, they mentioned specific sites (for example, 'The Vat' cases 2, 7 and 8), plants (the trees) or some animals that lived there (for example, spiders, an adder).

Some valuations were more particularly derived from the teachers' planned activities, while others arose simply from having spent time there.

> Teacher: What did you think of Cleghorn Glen?
> Pupil 1 (girl): It's nice and peaceful.
> Pupil 2 (girl): Fun!
> Teacher: What did you think was fun?
> Pupil 2 (girl): Am, finding all the things.
> Teacher: What did you think, [name]?
> Pupil (boy): All the trees, all the trees, … and the water runnin' by.

3.1.3 Relaxed Approach

Pupils valued the more relaxed approach and the availability of time for engagement in purposeful tasks, enquiry and investigation and observation. In all cases, there were phases of the day when pupils were encouraged to participate in creating their own activities or very much to take their own approach to a given activity (for example, using audio recorders and photography to capture sights and sounds in the place, case 8). Teachers found that there were benefits to building in sufficient time for activities when teaching outdoors; 'novice outdoor' teachers in particular underestimated what might be possible in given timescales. Pupils also appeared to appreciate and enjoy opportunities for group and self-directed investigation and activity.

All teachers found the quality of the educational visits benefited from building in sufficient time for activities. Having plans that were already flexible, or flexibly deviating from plans to allow more time brought benefits: for example teachers and pupils found they interacted differently with each other and got to know each other in a more relaxed and social way. Pupils too reported they found teachers were 'not chasing them' up for things as much as normal. Pupils and teachers alike reported that 'fun' was an important characteristic of events outdoors. Another effect of this more relaxed approach was that incidental and contingent events could be responded to while on visits outdoors (such as the opportunity to look more closely at a frog, or to photograph an object up close, or to appreciate a view). Many of the primary teachers took the view that pupils needed time to 'do their own thing' outdoors and they ensured that pupil choice opportunities were built into phases of the visits. For some cases, pupils actively took part in a lot of the decision-making about the design of the curriculum and the activities undertaken and their location. Allowing time for pupil reflection on visits was considered important by all teachers as this formed the starting point for further useful class-based work.

Pupils valued having time to roam around in places with varying levels of direction from teachers. Younger pupils really valued opportunities like these (for example, for bug collection, case 1, or den building - case 4) while older pupils valued the opportunity to move around in more challenging terrain (for example clambering around on the rocks near a waterfall, or taking time to determine what they might photograph, draw or collect for their projects - case 8).

Interestingly, more 'experienced outdoor' educators appeared to include a mix of *both* teacher-led activities alongside pupil-led time for simply being in the place or for exploring it. However, for some teachers outdoor tasks had already been negotiated with pupils making it less clear or impossible to simply claim that phases of the visits were rigidly 'teacher-led' or 'pupil-led'.

Interviewer: Who comes up with the questions in your class? Is it the pupils or the teacher?
Pupil1: Both.
Pupil 2: Like all of us. (Interview outdoors, case 3).

Pupils who had made regular trips to places were clearly able to explain the purposes of their visits. Pupils could tell us as researchers what they were outdoors to do: 'compass work', 'map reading', 'measuring', 'archaeology', 'orienteering', and 'finding out what the place was like in the past' were examples of this in one instance (case 3). In the main, pupils tended to understand the purposes of visits and valued them for what they offered.

3.1.4 Multi-sensory Experience

Teaching in nature provided pupils with opportunities for distinctive multi-sensorial experiences that were highly valued, often very memorable, and generated a greater degree of enthusiasm, attentiveness and focus.

Interviewer: Is it any different doing this indoors or outdoors?
Pupil 1 (primary boy): [Outdoors], You can see and touch […]
Pupil 2 (boy): [with maps indoors] you can see where different places are but you can't go that way.

Elements found outdoors – anything from leaves, water, slopes, viewing points, bridges, wildlife – could become key to the emergence of activities that were either planned or unplanned. This differs from the more controlled experience of being taught indoors for pupils. The presence of water, for example, afforded many diverse activities: listening to its sound, jumping across burns, climbing trees, investigating riverbanks, walking along the burn bed, splashing each other.

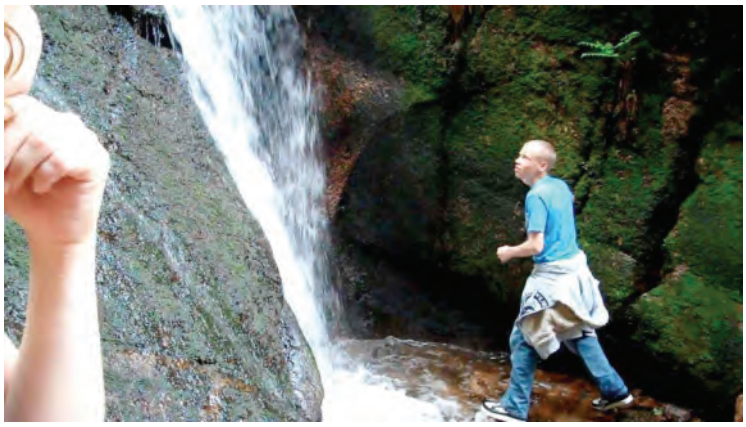
Figure 3.2 Water was an attraction for many pupils on visits. Here, pupils encouraged each other to jump in and enjoy the fun.

Finding bog cotton[9] on the path meant there was an opportunity to caress one's cheek, to feel its softness (Case 3). Seeing a dark area under a holly bush led to den building (Case 4). Crossing a bridge meant they could play 'Pooh Sticks' (Case 1). Finding a dry grassy bank allowed some to roll down it (Case 9). The presence of disused dwelling houses in the glen demanded long all-day walking trips in upland areas and the associated chance encounters with an adder or the sighting of a sea eagle (Case 3). Some pupils almost appeared overwhelmed by the possibilities of what they could do when faced with choices: "there's just so much stuff!" (Secondary art pupil, case 8) which they noted contrasted starkly with the more limited choice set for some activities indoors.

[9] Bog cotton: *Eriophorum angustifolium*, or 'canach' in Gaelic.

Time in nature provided a varied sensory experience. This included experiences that were not possible in indoor contexts such as physical encounters with wildlife, the feel of plants, the sense of openness in mountain landscapes.

Figure 3.3 Teachers reported that there was no difficulty in getting pupils engaged in tasks in the main. Teachers reported pupils could easily remember events that happened on visits.



Teachers mainly reported no difficulty in getting pupils engaged in tasks, and recalling events later. Pupils' art work, expressive writing and other products demonstrated that outdoor visits had created vivid, memorable experiences. This finding meant that in-class teaching (before, between and after visits) benefited from this outdoor experience base as it provided a starting point for many subject areas including literacy and communication work, maths, geography, history, language learning (eg Gaelic) and science as well as environmental education in broader terms.

> Teacher 1: They were more focussed, they concentrated, and we felt they retained the information for a lot longer. You weren't having to jog their memories when you were talking about it back in class.
> Teacher 2: Probably because it *is* multi-sensory. (Workshop 3 transcript).

Figure 3.4 Many events engaged the senses in unusual ways: dipping one's hand in the water while taking a boat trip on Loch Leven (Case 9).

3.1.5 Focal Point for Learning

Teachers particularly valued the way outdoor visits could become focal points for projects of many kinds and provide a platform for learning that met formal curricular demands: for example the experiences and outcomes of Curriculum for Excellence.

The outdoor visits themselves appeared to work as core catalysts for all kinds of teaching and learning indoors both before and after visits: using the school grounds to learn about compass points before going on a visit or writing poetry or stories afterwards. In all cases, the visits were not standalone events but were focal points in wider and more sustained projects. Sometimes the core of these projects were located in subject-related areas such as 'special places in religious and moral education studies', or 'generating a portfolio of art work drawing on nature as inspiration'. Most teachers explicitly spoke about using the visits as foundational experiences that could support wider learning goals (such as school grounds developments, English literacy development, or oral Gaelic language learning).

3.2 Theme 2. Changing Pupil-Pupil and Teacher-Pupil Relations

3.2.1 Improved Relations.

In all cases pupils and teachers noted that going outdoors for teaching and learning in nature changed and improved relations between pupils and between teachers and pupils.

> When we were walking back to the bus I found myself talking to my English teacher she asked me what I wanted to do when I am older and I replied and said that I wanted to be a car or a game designer it was strange speaking to her just as a person and not as a teacher. (Secondary School Pupil)

All teachers commented on the effects on their teaching and learning cultures. Teachers and pupils both valued this aspect. Most noticeable, was the effect on teacher-pupil relations. This finding marries with teachers' sense of changed self (see Section Two). Pupils found visits to be a useful chance to get to know other pupils too.

There were many instances when the normal relations between teachers and pupils were re-ordered through these teaching in nature projects.

Figure 3.5 This photograph was captured at the end of a busy day outdoors. Its creation was part of a set of activities designed to help generate a sense of togetherness for a newly formed class. One boy spoke of the chance to gain confidence speaking to new people.

In some cases, teachers actively focused on aims for learning that were directed to interpersonal dimensions: for example, development of self-esteem, understanding growth in

life in RME, handling the transition from primary to secondary. The exceptional nature of these events (when compared to the normal indoor timetable) was apparent except for classes that regularly went outdoors. In one case, the teachers had brought a cake to share. In the same case, one of the key tasks was to capture the class group in a photograph (above).

3.2.2 Important Potential Benefits

A range of important benefits for pupils were possible from different outdoor educational experiences in natural environments: these included improved health and self-esteem in pupils, improved physical abilities and opportunities for physical challenge, and enriched and more inclusive cultures of learning within groups. Positive effects on self-esteem, and interpersonal, relational effects were especially noticeable for many groups but particularly some individual pupils or groups with additional support needs.

Many of the project teachers reported the sorts of outcomes listed above as accruing from their visits. Self-esteem benefits were noted through the opportunity pupils had to try new things and overcome challenges as individuals and as members of a team. In many class groups, there were cases of children who had little experience in environments like these. Across most visits, some individual pupils' sense of unease and discomfort when outdoors was evident. Teachers felt that repeated and regular visits resulted in improved fitness, confidence, and in many skills needed to navigate varied outdoor terrains (narrow pathways, uneven surfaces, streams to be forded). Some teachers noticed that the outdoor context brought changes in the class culture and a greater appreciation of each other as learners within the classes. Simply being outdoors created opportunities for new social interactions (for example, new ways of older pupils working with younger, or new rules around how to work together to build a den). This led to opportunities for experiences that enhanced social bonds within class groups, between pupils, and between pupils and teachers. Other teachers reported improved tolerance among class members for 'difference' generally. All teachers reported improved behaviour for some pupils who could be more challenging indoors. Across all cases, teachers noted that some pupils with additional support needs were more included in class activities within an outdoor context. We suspect this was because the outdoor visits usually incorporated activities which had a wide variety of challenges (for example, through the need to navigate uneven terrain or cross streams). Some of the challenges included activities that the pupils created for themselves (for example, balancing on rocks or climbing trees). These challenging activities appeared to help create bonds among participants and the development of a more inclusive learning culture.

3.3 Theme 3. Changing Relations with Natural Places

3.3.1 Valued and Memorable Excursions

Pupils and teachers provided evidence, particularly in their class-based activities, that the excursions to NNRs were valuable and memorable. Outdoor visits were evaluated positively by pupils. This was evidenced in pupils' ability to speak about, and produce work that included, smaller and less obvious details. Younger pupils and older revealed in the timbre of their talk, artwork and writing that they had developed a well-observed memory of the place and had made a form of connection with it. The following quotes come from a piece of English writing from secondary school pupils (Case 9) who were reported to often find it challenging to 'put pen to paper'.

> Pupil 1: As we walk back I feel the wind rushing against me and listening to the birds, chirping away to each other.
> Pupil 2: We ran over to the other side of the beach, I could feel the cold wind in my face and it was pushing me back and stopping me run […] I had a really exciting day and I was

glad I went. We were all talking about it on the bus and it seemed that the others were too. When I went in the door my mum asked how it went, and I told her lots of funny stories about my day and she laughed and was happy we all enjoyed ourselves.
Pupil 3: The waves splashed against the side [of the beach], the noise of birds singing and the smell of fresh air was relaxing. […] The day began to end and before I knew it I was tightening the strap of my life jacket the boat began to move, I flew my hand into the water as I felt it sliding through my fingers.

This pupil (case 3) records one of their excursions in her poem in a way that reveals an aesthetic sense of how the place was important to her and was an important habitat for other animals. The acrostic poem is written in Gaelic (with a translation below). The artwork comes from the same case but a different pupil.

Figure 3.6 Pupil's Acrostic Poem. Translation: A loch so beautiful with many lilac-grey mountains./ Above me I saw a sea eagle./ Also I saw a swan as white as the moon. / The little birds singing sweetly. / Caterpillars in every place and / A river as blue as the sky.

Figure 3.7 Pupil's Artwork. An example of a pupil's art work (gille-brighde / oystercatcher); art work was commonly directly inspired from the experiences of having seen these actual animals in the wild. Class work involved working with various media and materials to devise ways of capturing experiences of places. (See web site, case 3, for further examples).

3.3.2 Inter-species Encounters.

Encounters with animals such as slugs, sea eagles, frogs and toads, ants, spiders, proved to be one of the recurring, memorable and valued aspects of events for pupils. These were mostly unplanned events, often with pupils being the ones to come across these animals first. Sometimes, pupils were actively encouraged to look for mini-beasts such as spiders, slugs, and millipedes (see case 7 video). Sometimes, their attention was drawn to animal paths or their signs (see case 1 video). At other times, unexpected animals were encountered such as an adder (see case 3, audio file). In nearly all cases, some animal encounters generated a lot of excitement and were remarked upon in interviews, informal discussion with teachers, and pupils' work.

Pupil (Secondary girl, case 9): I walked over to the little pond and found some black frogs. The class was so excited; it was like they have never seen a frog before.

Figure 3.8 Animals featured a lot in pupils' positive evaluations of visits. Often these were chance encounters… in this case with a rather large black slug.

3.3.4 Repeat visits.

Repeat visits made a particular difference to the quality and depth of engagement with natural places. Pupils and teachers responded to places in ways that showed they had come to know places in multifaceted ways (through their photography, art work, writing, and other class-based activities). Teachers and pupils reported being quite attached to places they visited repeatedly. They came to know and respond to the place in various seasons, which presented different teaching and learning opportunities. Repeat visits to sites over time encouraged a connection with place for many pupils, teachers and community members.

> Teacher: Looking back, […] I am sure that the children got better at the tasks and at appreciating the natural world around them with each successive visit to the same site. There was less chat about TV programmes and advertisements as the visits progressed! More talk about wildlife. Books [were] brought on the trip by the third visit and [there was] more willingness to look for wildlife. ('Experienced outdoor' primary teacher).

3.4 Theme 4. Single-Subject or Multi-disciplinary Approaches

3.4.1 Multi-disciplinary and ingle-subject Approaches

The sheer diversity of what is possible for education in nature (and the complexity of these places themselves) also lends itself to multi-disciplinary work with pupils or single–subject approaches. The cases showed that educational experiences occurred in very varied landscapes and sometimes involved understanding landscape use, conservation and restoration. It was common for visits to help pupils with understanding these special wild places as homes or habitats for other species. They were able to appreciate that these habitats had been affected by human interventions, natural forces and have a history. But some teachers went to these places with specific subject-focused agendas too. It appears these natural places created distinctive opportunities for learning both within single subjects, and in an inter- or multi-disciplinary way. Many teachers (especially primary teachers) reported that they relished the opportunity to work in this way or claimed that the outdoors almost required it: "Outdoor education links with so many area of the curriculum and must not stand alone." Another said: "It's much more meaningful to them if you're looking at all subjects together." However, one secondary school teacher in this project focused not on working outside of their subject area but within it (case 8). Two support-for-learning secondary school teachers took a wider view of the relevance of place and worked across subject departments. Further practice-focused research, especially in secondary schools contexts, would be warranted as this may reveal what is possible both within different subject areas and between them.

3.5 Theme 5. Being Open to Contingencies

3.5.1 Contingencies

Handling contingencies and being open to the unexpected was important when teaching in nature. All teachers reported at the end of the project that the ability to handle and be open to contingencies was important. However, this was more accentuated as a learning point for 'novice outdoor' teachers:

> Teacher A: I think our first [visit] was [about learning] how to […] expect the unexpected.
> Teacher B: Well, you can go out there and do all the site visits in the beginning, but something will always happen that you didn't plan for.
> Teacher C: And then you have to go with the children as well.
> Teacher D: You've got to expect it so that you're not *fazed* by it when you're *faced* by it…
> Teacher E: So that you, you then do have the confidence to drop what you, somebody else is doing and just go with a child or children to take their experience further.

Taking learning into an outdoor place in nature encouraged an openness to the contingent features of visits. Teachers were aware that ideas and challenges would arise that might help define the focus of the learning. These contingent aspects could be related to changes in the weather, encountering wildlife or farm animals, pupils' needs for rest or snack, or opportunities for discussions with pupils about physical elements of the landscape, natural habitats or phenomena. Teachers felt it was important to anticipate and accept that these contingent aspects were an inherent part of outdoor visits and responded through the way they planned visits (for example, making sure pupils had waterproofs and adequate water).

But being aware of contingencies meant more than taking these practical steps. It also meant teachers had an open disposition to how their plans would unfold more generally. One teacher noted that 'knowing a place' and what might be possible there needed to be combined with being open and at times ready to make a spontaneous response: "You have to have prior knowledge of the site and allow for flexibility when you get there as nature has a habit of changing". Another said: "In a small school like ours, where we try to cover all areas outside, planning is essential, but also allowing the project to develop on its own". Another teacher considered flexibility to be important in all teaching but especially so when outdoors: "*flexibility* is important. In an outdoor environment things may happen you haven't planned for. You have to be willing to go with the flow and use the opportunities creatively." Teachers did plan for pupils' purposeful activity, but these were never the *only* activities undertaken, nor were they always completely predictable. Expected and unexpected events would arise from the interactions with the place. How teachers anticipated and reacted to contingent events was a crucial aspect in how teaching occurred. Some teachers went into the outdoor spaces with plans that afforded more open-ended tasks (for example, case 6, where pupils explore a section of woodland). Others had key tasks that had practical outcomes that were more predictable in advance (such as mapping the sheilings, case 3). Either approach allowed for pupil engagement, participation and learning once there was adequate recognition of the effect of contingencies. Further research may be warranted here on this quite subtle aspect of teachers' differentiation in approach and their attendant outcomes. The next theme relates.

3.6 Theme 6. Choosing and Employing Teaching Strategies

3.6.1 Teaching Strategies

For the most part, the teaching strategies we observed led to events that took the natural context into account through being sensitive to it, or taking it as an essential starting point for teaching and learning. We observed many different kinds of teaching strategies across the nine cases. We found we could broadly categorise these strategies into three types: 1. 'Place ambivalent', 2. 'Place-sensitive', and, 3. 'Place-essential'.

3.6.1.1 Place-ambivalent Strategies.

On a few occasions, we noticed that teachers (or their assistants) devised activities that could also, in principle, have been conducted indoors (or in other places) without the activity needing much alteration. We noticed that this type of activity involved reproducing or replicating tasks commonly found indoors in classrooms. For example, children were read a story, given worksheets to complete (but its completion did not necessarily require being outdoors), or, were provided with paper and drawing materials (but not perhaps asked to consider the local environment as the impetus for the work).[10] In practice, these events may not have unfolded as they would outdoors – telling a story outdoors was quite a different experience. Interestingly, what started out as strategies that were on paper 'place-ambivalent' were often impacted upon by being in a given outdoor natural place (with the effects of weather, terrain or context), though teachers might not have considered these factors as being important in advance or noticed these effects necessarily. These strategies often linked to, or followed on from, other events that did take place into account (see below) and they were clearly useful in their own right for enhancing learning. These strategies were mostly employed by 'novice outdoor' educators.

3.6.1.2 Place-sensitive Strategies.

We noticed a lot of teaching events that we categorised as 'place-sensitive'. By this we mean that teachers sought to *take some active account* of the location and its importance for the activity. In these events, the outdoor place was seen as adding value or providing a useful setting for the teaching and learning. An example was case 2 where pupils' improvisations of the stories took the local natural landscape as having relevance to their enactments. Another example (also case 2) was the use of locally available natural materials for the construction of characters from the stories they were considering. (See figure 3.9, below).

3.6.1.3 Place-essential Strategies.

We collected evidence of a number of teaching strategies that resulted in experiences that would be very different had they been conducted in a different place. In these events, the place itself, or the features or elements found there, provide the key basis for the task or activity or enquiry. We categorised these as 'place-essential'. Examples of place-essential tasks included taking photographs of wildflowers to create an inventory of species in a place, sketching an image of a particular rock face, measuring the dimensions of a sheiling, using maps to guide one's way, standing beneath a waterfall to see and hear it up close. (See figure 3.10, below).

[10] Mostly, teaching strategies were not *neatly* categorisable into just one of these broad categories. Our examples here are more illustrative of the categorical type. The examples, are however, based on real events from the project.

Table 3.1 Teaching Strategies in Outdoor Places: a typology

Teaching Strategies	**1. Place-ambivalent**	**2. Place-sensitive**	**3. Place-essential**
Description	The basic strategy is to reproduce or 'export' an indoor teaching strategy into a new venue by attempting to enact it there without necessarily actively taking account of the place as a contributing factor. For example, materials from indoors may be brought outdoors as part of the replication approach.	Place-sensitive teaching strategies are designed by taking *some active account* of the role the place will play in people's learning. In outdoor places, for example, the natural context may be seen as adding value, or be seen as a useful context for the teaching event.	Place-essential teaching strategies could not be enacted if some specific location was not available. The elements found in a specific place provide the very basis of the task or activity or enquiry. These elements are considered as highly important factors in the planning stage.
The Role of Place	Place is thought of as almost inconsequential background.	Place is a semi-consequential context.	Place is an essential starting point.
Effects of Changing the Place	Changing the location of the activity (eg to outdoors) can have a variety of effects but these are not treated as that relevant (at least in the planning). Treating place as inconsequential can run risks and bring surprises. Environmental elements, and their effects, may be ignored or treated as incidental.	Changing the location of a place-sensitive strategy from one place to another might not alter the activity completely. Some elements in the environment will be harnessed to make the activity more interesting or 'add value'. Some aspects of some activities may take account of the place in a pro-active (but in perhaps a non-essential) way.	Because place plays a key role in the design of the strategy, changing the site from one place to another would alter the activity dramatically or completely. The place itself (or features / elements found there) are required for the educational activity. The strategy is designed to enable participants to engage with a particular place.
Contingent Aspects	Contingent aspects are either largely ignored or seen as incidental in practice but may be deemed important after the event. Outdoor contingencies aside (such as weather and terrain which influence teaching and learning), one could imagine the task could perhaps have been achieved indoors.	Contingencies - which in the outdoors could include biodiversity, natural objects, habitats, terrain or weather – are considered up front in the planning and teachers' thinking. Some responsiveness to contingencies that may be thrown up by these elements will be expected.	The strategy or activity requires participants to work actively with the contingencies of the place. As these change, the strategy will be expected to change.
Outcomes	Planned outcomes are likely to be similar to those expected if the activity took place indoors. Desired outcomes will likely not directly affect person-place relations (but may, for example, focus on inter-personal aspects).	Some outcomes may be distinctively possible because of the place while others may not. Outcomes that affect people-place relations are possible but not necessarily the core focus for the learning.	Place-essential strategies will target place-specific outcomes. Some outcomes will be distinctive to the place and may change participants' relations with this particular place (and perhaps other places too).

Figure 3.9 A 'place-sensitive' outdoor learning task.

Of course, these three types of strategy are crude generalisations for what were complex activities enacted by teachers and pupils on the ground in real places. In practice, we found it difficult to place any one strategy into one category.

Figure 3.10 'Place-essential' teaching in nature. This class (foreground) from a primary school have walked for over an hour into the glen to map some local previously inhabited dwellings.

While it was the case that the typology (table 3.1, above) was derived from cross-case comparisons of the researched cases, is likely not a comprehensive description of all possible approaches to teaching in nature. Our intention is to offer it as a tool for further investigation by readers as they seek to understand teaching in nature in their own practice, or in other contexts. The typology does allow us to categorise different approaches in practice (those researched here and those in other contexts) and notice their relationship to contingent aspects of place and place-related outcomes.[11] The typology could be used as a planning tool, as a structure for teacher reflection, or as a component in CPD on outdoor learning.

[11] Place-sensitive or place-essential strategies might not necessarily result in place-related outcomes but they will likely have more of a chance of doing so, one could argue. Further research is warranted here to ascertain the possible links between types and outcomes, especially for example related to the development of an ethic of care for nature.

3.7 Theme 7. Key Factors Affecting Teaching in Nature

Outdoor visits were made possible by a mix of factors, some of which worked as enablers (any one of which could be crucially important in a given context – for example, head teacher support), or could work as inhibitors. Any one of these could completely prevent these events taking place, or interfere with their execution, for example, lack of pupil motivation or understanding of purposes. Teachers reported a range of factors they felt were either very *important* or in some cases actually *necessary* for teaching in nature. The important factors *mentioned by the participating teachers* are explored below under the sub-headings of 'Place', 'Teacher Disposition and Knowledge', 'School Culture', 'Teaching and Learning' and 'Wider Support Factors'.

3.7.1 Place Factors

- *The characteristics of the place* (for example, seasonal, topographical, geological and ecological): These had an effect on what options were available for teaching and learning. Teachers attended to these in their planning. Repeat visits in particular took account of seasonal change.

- *Planning with Place in Mind:* Teachers felt that the planning process needed to *take account of the place*. This meant acknowledging the particularities of the place as a starting point and recognising this as more than a backdrop or 'alternative' location. (See table 3.1).

- *Place-Knowledge:* Teachers' understanding of the place was important and this varied. Some knowledge about the key features of a place (for example, knowing the local plant names) was considered important but not essential by teachers. Having made a preliminary site visit, knowing how one would get to a site and get around it was considered much more important.

3.7.2 Teacher Factors: Dispositions and Knowledge

- *Teacher Dispositions*: According to the participating teachers, some key *dispositions* for anyone wishing to teach in nature included the need for *enthusiasm, spontaneity, flexibility and fun* around curriculum making. At a more basic level, there had to be a desire *to try* teaching outdoors, yet this rested on a degree of *confidence* that appeared to be best gained by experience. This project modelled one way of generating a context for exploring possibilities through practice.

  > "Teacher confidence in working in the outdoors is hard to get, since this can only be gained by experience. You have to be determined to do this type of work, because it's far easier just to stay indoors in the controlled environment." (Secondary school teacher, 'novice outdoor').

  > "I think (the factors that make visits into nature possible) are all relatively easy if you know your class, and consider 'why I am doing this?', 'what do I want to get from it?', 'how is this relevant?', and 'where is most appropriate for this to happen?'. Using nature should not be difficult if you prepare. (Primary teacher, 'experienced outdoor').

- *Teacher Biography*: Teacher's past experiences were influential; if teachers had memories of having benefited from time in nature as children, they tended to also be keen in principle to take pupils out themselves: "I think though my own past experiences […] [they] have made me value natural environments and that helped me feel overcoming my uncertainty was worth it."

- *Knowledge of and Disposition towards Health and Safety:* 'Novice outdoor' teachers felt most under pressure from a sense that '*health and safety issues'* were a barrier. This was less apparent once 'first visits' were undertaken. One teacher noted: "Of course we want to make sure children in our care are safe, but it has been I think over-emphasized in education. It does make you feel concerned when taking children out of school." (Primary Teacher / 'novice outdoor'). Involving the pupils in risk assessment and emphasising the benefits of risk were seen as key by some; in this way they could involve learners in understanding the beneficial aspects of risk and what risks needed attending to. More 'experienced outdoor' educators saw health and safety as an additional thing to consider but not a problem.

3.7.3 School Culture Factors

- *Head teacher / Senior Management support* was identified as a very important factor. One teacher noted that "getting approval, after all, from the senior manager who had been negative at first" was a key influence during the planning phase. Interestingly, where head teachers themselves were involved in the project, there was already a developing or even well-embedded whole-school approach to utilising outdoor contexts for learning across the school (this was apparent in at least two primary schools).

  Teacher: It's about being supported. It's as simple as that. Forget all of this about money and fancy computers and fancy schools.

- *Collegial Support:* Willingness on the part of different subject teachers to participate was a key factor for secondary teachers who led events with teachers from different subject areas. Teachers based in secondary schools generally found getting outdoors much more challenging. One teacher said: "Involvement and support of colleagues is hard to get. Secondary schools are very busy places, subject specific places and workload pressures well-known. Colleagues find difficulty in seeing the relevance of learning outdoors".

- *Generally Supportive School Culture: Norms, Routines and Expectations*
  In schools where outdoor trips were the norm, it was apparent that there were willing pupils and teachers ready to go outside, and support was available. Secondary schools were not always places that supported outdoor learning. Some of the inhibiting factors within secondary school cultures that we think may have been prohibitive included: (i) subject area divisions and the attendant lack of an obvious place for interdisciplinary work in the curriculum, (ii) pressure for an indoor focus especially within more 'academically-focused' schools, and (iii) the inflexibility of some school timetables within secondary schools often driven by assessment regimes (though this was not completely clear from the evidence since non-participating teachers had less input). Some secondary teachers found it difficult to sustain participation in the project, or to find time for excursions because of curricular and timetable pressures. This was the case even when, in principle, they had support from senior management. Further research would be needed to explore these dynamics in more detail and to consider how they might be rendered less inhibiting.

- *Supportive Curricular Structures:* This research was conducted at a time of curriculum change and innovation which was found in the main to be a supportive structure for the project. The new Curriculum for Excellence outcomes and experiences across a range of subject areas were met by the learning achieved through the activities undertaken. Some teachers planned for these in advance of visits more formally than others who tended to look back at experiences to consider what outcomes and experiences had occurred or been met.

- *Finance* was not identified by teachers as essential, perhaps because some funds were available for participants in this project. Yet, the project's financial incentives did not make the same difference to all teachers. All teachers availed of some project funding for their participation.

3.7.4 Teaching and Learning Process Factors

- *Pupil Dispositions: Being Prepared to Be and to Learn Outdoors*: Children, as well as teachers, needed to learn to how 'to be outdoors' and how 'to become outdoor learners'. There was evidence in some class groups that pupils were not at all at ease in outdoor places. One teacher said "young people lack confidence and are surprisingly hard to tempt out of their 'run of the mill' activities. Going somewhere new exposes them to situations which they fear they will not be able to handle." This teacher noted that two pupils were absent on the day of the trip which was likely because they did not want to be outdoors. For 'experienced outdoor' pupils, the disposition that learning outdoors is possible and the norm meant they could also be involved in planning trips more and be more fully engaged in pre-visit and post-visit learning activities.

  There were interesting differences between the reactions and engagement of class groups that had made regular and repeated visits to places and those that had not. Pupils who made regular trips had more:
  (a) understanding of the norms and expectations when outdoors (knowing 'what is permitted to be done here')
  (b) understanding of the possibilities, challenges and effects of contingencies, for example, weather, terrain, seasonal effects (knowing 'what is possible given the opportunities and constraints here in this place') and
  (c) understanding of the purposes of visits.

- *Purposeful, Meaningful, Active Tasks*

Figure 3.11 Den building proved to be a time consuming and very engrossing task (Case 5&6).

Teachers expressed the need for *well-planned, progressive, and purposeful activities*. Some teachers found that having a moderately challenging physically-active task (such as cutting and harvesting willow stems) could make an experience engaging and memorable. One teacher noted that the pupils she took "needed an active focus, and when they didn't have it, their behaviour became a worry". This led to the insight that one of the most important factors was the "preparation of pupils, particularly to answer: *why is this activity relevant to me?"*

3.7.5 *Wider Support Factors*

- *Time for Advance Visits and Collaborative Planning:* Teachers all voiced the view that it was important to have *time to meet with other teachers, to make advance visits* to the site, to get to know it, and to begin designing purposeful activities for target outcomes.

- *Parental support* was seen as a very important factor especially in primary school contexts. More 'experienced outdoor' teachers appeared to take for granted the norms and routines of parental support.

- *Specialist Support Staff:* Working with specialist support staff (for example, SNH staff, Princes Trust or ranger services) was important in some cases. One teacher noted that "input from someone with outdoor experience does give a real educational boost to the experience. The pupils really respond to someone new, specially brought in for them." (Secondary teacher, 'novice outdoor').

- *Travel:* Some schools found it easy to access transport through their local authority, while others found this challenging and costly. In one case, a wheelchair accessible minibus was made available when a local bus was not adequate; this needed to be collected in advance by the teacher, who had gained advance training in use of the chair lift and other hoist systems.

Figure 3.12 Having readily available, appropriate, low cost transport was a factor for many teachers.

4 SUMMARY FINDINGS AND IMPLICATIONS

4.1 Main Findings

4.1.1 Key Activities of Teachers

The collaborative enquiry approach taken proved to be a viable and useful one for teacher development in this area. Primary school and secondary school teachers, whether novice or expert in teaching out of doors, planned, prepared, and enacted their visits through the following 'key activities':

(a) working collaboratively with other teachers in this work,
(b) making advance visits to sites before taking their pupils,
(c) designing opportunities for pupils' purposeful, ethical and material practices and ensuring the natural place was a key element in these practices
(d) making initial and repeat visits with their pupils, often with support from parents or specialist staff,
(e) engaging pupils in the chosen topic before visits and between visits, both in the classroom and sometimes in their communities,
(f) planning for and attending to the multi-sensorial dimensions of pupils' experiences,
(g) striking a balance between planning tasks that were more predictable and allowing for tasks and experiences to be flexible and respond to the place.

4.1.2 Key Valuations

All teachers and the pupils valued:

(a) the opportunity for first hand experience of these special natural places,
(b) encounters with aspects of nature, particularly other species,
(c) distinctive and memorable multi-sensorial aspects of experiences,
(d) the opportunity for a more relaxed or less hurried approach,
(e) the opportunity for participatory engagement in fun, yet purposeful, group- and self-directed tasks outdoors,
(f) opportunities to get to know a natural place better,
(g) opportunities for new challenges that came with taking teaching and learning outdoors into nature.

There were a range of valued benefits and effects of outdoor educational experiences in natural environments. These included *the potential for*:

(a) greater enthusiasm, attentiveness, and focus in pupils' learning,
(b) improved health, physical ability and self-esteem in pupils,
(c) enriched and more inclusive cultures of learning within class groups, brought about through changed and improved relations among pupils, and between teachers and pupils.

Teachers valued the way outdoor visits could:

(a) be focal points for projects and provide a platform for learning and changing pupils relations with nature
(b) help with meeting formal curricular demands, for example the experiences and outcomes of Curriculum for Excellence,
(c) provide the opportunity for either inter- / multi-disciplinary study or single–subject approaches to teaching a variety of topics,
(d) provide opportunities to develop their own expertise through engaging in the key activities (see A above).

4.1.3 Key Factors

Project activities were made possible through the interaction of **key factors**, any one of which could work as an enabler or as an inhibitor. How these factors interacted was particular to local contexts. Factors came together in various ways to affect the aims and objectives, the process of preparing and planning, and the enactment and outcomes. In any one case, multiple factors will interplay.

Place Factors

- The seasonal, topographical, geological and ecological characteristics of the place and their effect on options for teaching and learning
- Planning with Place in mind (see table 3.1)
- Teachers' level of knowledge (about the place, possible strategy, and topic)

Teacher Factors: Dispositions & Knowledge

- Teacher dispositions especially towards teaching outdoors
- Teachers' own personal and professional biography in relation to outdoor experiences in nature
- Teachers' understanding and approach to planning including health and safety

School Factors

- Head teacher and senior management support
- Collegial support
- Supportive school culture
- Supportive curricular structures
- Financial support (as required)

Teaching and Learning Process Factors

- Pupils' dispositions: preparedness to be and learn outdoors
- Teachers' designs for purposeful, meaningful, active tasks

Wider Support Factors

- Advance visits and collaborative planning
- Parental support
- Specialist support staff
- Arrangements and resources for travel to sites

4.2 Implications of the Findings for Enhancing Provision

In this section we seek to draw out some of the possible implications of the findings of the study. Discerning the implications of a small study is a somewhat speculative task. The project involved the provision of much support for teachers which may or may not be replicable in new contexts. However, we have learned about the ways in which we might encourage teachers to try teaching in nature.

We look at the implications of each of the three main findings under the same subheadings: key activities, valuations and factors.

4.2.1 Key Activities

One of the most significant aspects of this research is that it involved more input and action from the participant teachers than from any pre- or in-service provision. There were formal inputs from the university team and project advisers: we gave inputs on exploratory action

inquiry for teachers, the basics of health and safety and some of the ideas developed in previous research. We found in the workshops that teachers valued time for their own professional growth and, through this supportive encouragement from each other, to try things out and address their locally distinctive supports and barriers in innovative ways. Thus, looking back, we can offer some simple ideas relevant for any approach to ITE / CPD:

- Teacher growth and development in this area can be viably based on teachers' own professional desires to try things out in teaching outdoors and to inquire into their practice in an action oriented way.
- Initial perceived barriers are worth looking at but these will only be initial barriers. These could be say, health and safety – for example, form filling, transport, toileting, and other supports. These can often be easily overcome by looking at practice examples and through engaging in collaborative planning (for example collaborative site visits).
- Teachers valued having time to reflect on their own contexts in relative confidence with like-minded people.

The main implication from our findings on 'key activities' is that teachers gain a lot from exposure to and experience of actively teaching in outdoor natural environments. This is really a 'learning by doing' approach to CPD as against a more formal 'input leads to output' design.

4.2.2 Key Valuations

The key valuations of teachers and pupils also provide signposts for what will likely be effective ITE / CPD in this area. Constructing ITE / CPD programmes that mirror the ingredients valued by pupils and teachers is a possible proposal. Thus *the implication is that ITE / CPD would likely be more effective if it includes first-hand experience, includes multi-sensorial encounters with places (especially wildlife), takes a less hurried approach, uses participatory, fun yet purposeful tasks, and provides opportunities for participants to get to know a place better.* It will also be important to help teachers, through this kind of pedagogy, to see links with formal curricular outcomes and experiences within single subject and interdisciplinary project work.

4.2.3 Key Factors

It is of note that the key interventions, events, supports and contexts that made teaching in nature possible were quite varied for each teacher. For one, having training for the use of a minibus and to learn how to use a wheelchair-using pupil's hoist was really important. For another, collegial support was a key ingredient. For many, headteacher support was an important aspect and indeed this was variable. For quite a few teachers, we gained evidence that many or in other cases some of their pupils were either not adequately prepared with clothing to go outdoors, found it very physically challenging, or were not that well disposed to outdoor learning (perhaps given the dearth of experience they had of such practices through schooling and in their own lives). *The implication is that programmes may need to allow teachers to tailor what they require, as each participant's context will be locally distinctive.* This means that generic programmes are unlikely to always target teachers' locally distinctive needs. Understanding which of the key factors are most influential in a given context might be a way of getting teachers to think through their locally situated contexts.

Interestingly, many teachers' needs for support and their sense of what the barriers were changed over time. Initial concerns faded quickly into the background while other concerns emerged as their expertise developed. As we have seen, teachers must work with a range of locally distinctive factors that inhibit and support their development as outdoor educators. Thus*, the implication is that programmes may need to take seriously the changing developmental needs of teachers in a locally relevant way.*

Some participants were experienced teachers, and had high levels of commitment in principle to taking pupils outdoors but were 'novice' when it came to going outdoors. In the case of 'novice outdoor' teachers, it was important to have the time to understand how their personal and professional biographies connected to their emergent understanding of the purposes of teaching in nature. While the number of teachers participating here is small, we suspect there are many who would like to try teaching in nature and would be well-disposed to it. *The implication is that there may be a need to consider teachers' personal and professional biographies as a factor in the design and targeting of ITE / CPD.* There may, for example, be a need to consider different types of programme for different audiences, for example 'novice outdoor' and more experienced teachers, more reluctant teachers whose personal and professional biographies mean they are not that well disposed to it, and those who are already personally and professionally well-disposed.

4.2.4 Summary of Implications for ITE and CPD

Overall, from this research, we infer three main implications for ITE and CPD for teaching in nature.

- *ITE / CPD for teaching in nature needs to provide opportunities for teachers to actively develop their own expertise through engaging in the key teacher activities (see above). Teachers gain a lot from collaborating with colleagues to actively plan, design, enact and review excursions and relevant pre- and post-visit activities.*

- *ITE / CPD for teaching in nature needs to take account of the key valuations (see above). One possible implication is that CPD would likely be more effective if it includes first-hand experience, includes multi-sensorial encounters with places, takes a less hurried approach, uses participatory, purposeful tasks, and provides opportunities for participants to get to know a place well.*

- *ITE / CPD for teaching in nature needs to address the key factors (see above) as these can support or inhibit teaching in nature. Insofar as possible, programmes should be delivered in a locally relevant way and allow teachers to tailor what they require. Programmes need to acknowledge and address the changing developmental needs of teachers, their personal and professional biographies, and their disposition to teaching in nature.*

5 CONCLUSION

In this section, we provide a concluding discussion of selected main findings. (see summary at the beginning of this report for an overview of all findings). We focus on the effects of 'place' on curriculum making - where teachers need to work differently to create meanings in contingent outdoor circumstances.

5.1 Disruptive Intermingling

Teaching in nature appeared to disrupt many of the traditional boundaries of the 'place' of schooling through changes in the location of the teaching, the focus and purpose of the learning, and the types of practices employed. The teachers addressed a wide range of problems or 'puzzles' (Allwright, 2003), but overall, the cases can be seen as inquiries that disrupted yet enhanced educational possibilities and required a departure from very structured 'indoor' timetables. This sense of departure was welcomed by the participating staff and pupils. The teachers' experience was generally that they were working 'outside the norm' especially so in secondary schools, and they were sensitive to the ripple effects (on timetabling, and so on) being felt by their schools before and after visits too.

One of our research questions asked: what forms of relationship have been important here among pupils, teachers, activities and environments? Closer examination has revealed that, in part, it was the combination of non-human and human elements that made the lived experience of the curriculum possible in these cases. Firstly, from the natural world, the participant elements included, other species (plants and animals), non-living things (water, rocks, etc), and natural processes (for example, the weather). These 'place-elements' were rarely found to be completely separate from the effects of humans even within these areas of significant natural beauty; pupils were never far away from effects of humans on these places (for example, SNH signs, fences, loch water levels, uninhabited sheilings, new farming practices or conservation management efforts). These elements contributed to the processes of curriculum making found in this project.

> Interviewer: Is this a place of history or a place of nature or something else?
> Pupils (various): both.
> Interviewer: Give me some examples then.
> Pupil: Well there's old houses and there's hill and creatures and nature.

Considering the old ruined dwellings, the pupils understood that the houses were both part of nature and part of the social world. The adder lived there and the rocks were part of the mountain. "It's nature and someone built it too" (primary pupil). (Listen to audio file, case 3 on website for a more in-depth exploration). There were many other examples where nature and culture met in these 'wild places'. Paths used for access, fences, signage and car parks were examples of human efforts to manage and conserve the places (along with, for example, woodland management schemes and reintroduced species). This is not at all to say that nature was merely a conceptual construction in the minds of pupils. What we are saying is that nature was not found in a set-apart manner, clear of human influence. Indeed, the material dimension of how nature and culture intermingled was of interest to pupils and evidence in NNRs.

Secondly, teaching in nature required some *particular kinds of encounter* between pupils and nature through a range of ways in which they interacted with a particular place. In efforts to understand and respond to place (while being careful not to adversely affect its conservation), pupils and teachers employed buses, boots, hats, wheelchairs, binoculars, cameras, bug boxes, GPS systems, role play materials, sketch pads, and so on.

Figure 5.1 Technologies of many kinds were used to help with observing and understanding and recording experiences of place.

Back in the classroom, further materials were involved in the production of meanings and understandings that brought together carefully selected elements from, or derived from, the natural environment, (eg leaf litter, lichen, water samples, photographs, notes, writings, and drawings). Thus, teaching in nature was an amalgam of the ongoing interactions over time between nature and pedagogical culture through the specific material interactions brought to bear on these places by the actions of pupils and teachers on visits and in the classroom.

5.2 The Consequences for Curriculum Making in Nature

Teaching in nature was a particular kind of pedagogical intervention whose curriculum was made through the way key factors came into play. Teachers' roles in attending to these factors were important especially through the ways in which they:

(a) changed the location of the teaching from indoors to outdoors. This meant non-human and out-of-school elements could intermingle in new ways to make the lived experience of a curriculum in nature possible,

(b) changed the focus and purpose of the learning to make them relevant to specific places, (through using place-sensitive or place-essential strategies – see Table 2),

(c) changed from the norms of what counted as outdoor practices for learning, in particular attending to challenges, problems and inquiries and responding to contingencies that arose in natural places.

There are consequences for taking the points above seriously. A wide range of diverse outdoor experiences can be made possible through the intermingling of elements found in natural landscapes and human environments. The implications for models of curriculum design for teaching in nature have been noted. In the cases researched, throughout the planning process and the teaching and learning activities, we had evidence of how elements from both these spheres interacted. While it may be a commonsense argument to remember that people and place-elements come together (perhaps for all curriculum making whether indoors or out), it is less well-attended to in the commonsense view of curriculum planning where precedence is often given to the aims and objectives, and to the sequencing of content or concepts. Curricula *can* be designed by starting *with objectives and aims or by deciding on content in the first instance*, but this was not the experience of these teachers. In practice, the empirical evidence suggests a wide variety of other contingent interactions that were occurring between the human and non-human material worlds *before and at the same time as* aims and objectives and outcomes were emerging. These interacting and emerging factors needed to be understood, attended to and be explicitly accounted for in the on-going and responsive planning processes required for the enactment of outdoor visits. This seemed to require a change in disposition to curriculum making.

Figure 5.2 Pupils walk into Loch Ba, Isle of Mull (Case 3). Their intention is to use GPS technology to map the sheilings as they consider how others might have lived here in the past. They explain how they have encountered adders living in the walls of the disused houses.

Teaching in nature, as these teachers have defined it in their practices, was always a purposeful, meaningful and material practice that happened in some natural local place. This also implies some outcomes that might be 'for' nature too but these outcomes were not always the explicit or central ones. The strategies teachers enacted could be place-ambiguous, place-sensitive or place-essential (Table 3.1). What we did find was that teaching in nature required some attention to be paid to 'place' right from the start. For all teachers, we recall that making a first site visit in order to plan the teaching strategies was a key task. Only then could aims and objectives come into view. Taking account of place was also an on-going demand that involved, for example, taking account of the weather, the seasons, and time of day or the animals and plants encountered. Taking account of the natural place from planning through to the enactment of visits, through place-sensitive and place-essential strategies also meant teachers needed to be actively open to these mostly welcome contingencies. Interestingly, these were the same often contingent place elements that pupils valued and remembered.

Valued visits invariably involved some shared task or activity by pupils that was designed to engender some skill learning, some understanding and / or some new ways of expressing and applying value through practices. These foci for learning were most engaging for pupils when they were purposeful or problem-focused in ways that generated meanings for the pupils and the teachers. These meanings were often related to nature or were specifically about nature. Overall, we can say that teaching in nature required a willingness on both pupils' and teachers' parts to be responsive to each other, to other species, and to the natural world through taking these open-ended shared purposeful actions. Our analysis suggests that teaching in nature will necessarily be a locally-situated practice because of the need to take account of some particular natural place. Teaching in nature involved the production of unpredictable meanings that arose through contingent inter-species, place-person relations.

Figure 5.3 Case 2. Pupils review a video of their improvised outdoor dramatisation of a legend. They used the features of this wooded place to help them tell the story.

There is support for the view that engaging in teaching in nature involved participating in an place-sensitive or place-essential curriculum design task involving a wide variety of relations between the human and the 'more-than-human' (Whatmore, 2002). 'More-than-human' is used here to capture the fact that pupils and teachers were one species among others and that the natural environments can be seen as assemblages of humans, other species, and nonhuman elements all of which are involved in having some form of agency through growth, change and decay processes. As we have seen the animals encountered, the technologies employed, the weather, and the place itself all had a role in the making of the curriculum for teaching outdoors in nature. The teachers' task appeared to be to intervene in, and change the relations among the human and the 'more than human' through various teaching strategies. Doing this effectively required some teachers to take account of 'place' in their interventions.

Through their work, teachers catalysed new opportunities for learning that were only possible by being outdoors in nature, or facilitated tasks that were enhanced by being there. Teaching in nature disrupted some of the habits ingrained in indoor practices, changing the boundaries and imaginaries of what counted as teaching and learning through schooling. Getting outdoors in nature literally opened the door for a wide range of educative events that we recounted in this report and are explored in the website. Bell (1997) reminds us that it is often small incidents outdoors that awaken and inspire excitement and experiences that change our relations with nature. These incidents can take a little time and space for "digression, interaction, conversation and contemplation" (p 138):

> Such small incidents […] help us attend to the immediate and the particular so that we can (re)acquaint ourselves with our nonhuman neighbours and live out an embodied sense of interdependence with them. We should freely indulge in such moments of relatedness and in the joy, sadness, surprise, uncertainty, wonder, companionship and feelings of sheer aliveness to which they give rise. (Bell, 1997, p 140).

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7 AFTERWORD

Teaching in Nature was a test of one way to get more schools to engage with nature at a time when support from countryside agencies was being cut. We wanted to see what teachers would choose to do with their class given a natural setting and drawing from their own expertise and teaching objectives rather than depending on environmental staff such as a countryside ranger to lead their class. For most teachers this means using nature as a context or venue rather than as the subject of study. Work SNH had previously supported by Joyce Gilbert (Speygrian CPD programme) and Irene Watson (Freeflow - Digital Arts in the Environment) had taken this traditional idea forward so we were hopeful that valid educational results would come from teachers persuaded to try this approach.

However, getting the process started contained a few challenges. Teachers could not be contracted to us in the normal way. Their obligations to their students and their employers would always take priority. Our idea was to fund classroom cover and additional costs but not to pay them. In effect teachers would be volunteering to participate. Although this worked well in the end it did require considerable admin effort to set up and run and did not fit easily into our budget managing conventions. As a result much of my allocated time went into that task, with the remainder split between organising the three project workshops and the rudimentary online communications (using Google groups and Google Sites). I did not witness a class visit although I did attend three of the initial teacher visits at Loch Leven, Dinnet and Cleghorn National Nature Reserves. At those events the SNH site managers covered why we thought the place was special, where they could take their classes and what help - if any - teachers could expect on class visits.

This report by the Stirling University team tells what happened on some of the visits and draws on the teachers' interpretation of their experience as reported in the project workshops. It is not the only product. The website has more detail and most of the teachers involved are keen to continue to develop this approach - a couple have already run site visits for other teachers on a day of CPD. The SNH staff involved are also willing to do the same basic service for other groups of teachers, partly because it requires much less planning time than dealing directly with the pupils but also because they really enjoyed the experience of working with the project teachers and know the value of getting local people interested in their reserve.

Difficulties remain. It became apparent that the chance the workshops gave to discuss educational issues with other teachers and some of the top academics in this field was very highly valued and definitely contributed to motivation. This feature of a research project is not easily repeatable in the same form if the activity is scaled up but using the experienced teachers to run a small CPD group may do a similar job. That will take support from the local authority and the school management to work. Timetable problems in secondary schools remain the problem they have always been (but people can get round them).

Brian Spoor
Former SNH Communications Officer and Nominated Officer for this research

8 APPENDIX 1

List of Participating Teachers and Schools

Dundee & Fife Group

Mr Gerry Dillon	Grove Academy
Ms Jill Darroch	Auchmuty High School
Ms Linsey Rose	Balwearie High School
Ms Joan Brown	Auchmuty High School
Mr Calum McLeod	Balwearie High School

South Lanarkshire Group

Ms Anthea Cameron	Stonelaw Learning Community
Ms Joyce Wood	Crawford Primary School
Ms Debbie Hughes	Biggar Learning Community
Ms Anne Smart	Carnwath Primary School
Ms Eleanor Taylor	New Lanark Primary School
Ms Julie Wilson	Going for Growth Project Leader, South Lanarkshire Council

Aberdeenshire Group

Mr Graham Scott	Alford Academy
Mr Liam Moffat	Alford Academy
Ms Sharon Douglas	Alford Primary School
Ms Claire Gillespie	Banchory Academy
Ms Andrea Drummond	Craigievar Primary School

Argyll and Bute (Isle of Mull) Group

Ms Catriona MacPhail	Salen Primary School
Ms Heather Waller	Ulva Ferry Primary School
Ms Liz Kennedy	Iona Primary School

Figure 6.4 Teachers and pupils on the boardwalk, Muir of Dinnet.

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