

EDUCATION AND CONSERVATION ISSUES IN THE SLAPTON LEY NNR

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ABSTRACT

Field experience of areas valued as nature reserves is seen as a fundamental educational experience. Conservation aims to maintain diversity and species richness while also controlling succession and access. Conservation and education are seen to be compatible by making conservation part of the educational agenda and by careful spatial zonation of educational activities so that they are compatible with the robustness and value of the site.

INTRODUCTION

If we have the ideal of improving the quality of life for present and future generations, we can aim to improve the working and living conditions of people and the quality of their environment by “green” research agendas, innovative appropriate technology, targeted cash inputs, idealistic social changes and visionary political agendas. However, any idealism will founder upon the rocks of economic reality unless people’s attitudes are sympathetic to the ideals of conservation and sustainability—and they can afford to encompass them as opposed to goals of short-term economic survival. Fundamental to all these considerations is the question of education and the development of attitudes. The political will of the future comes from the education of today. It is an inescapable conclusion that if people’s attitudes included environmental ethics as a priority, then the barriers to a better environment would diminish (Trudgill, 1990, 1991).

It can be argued that the success of environmental education depends to a very large degree upon first-hand experience or at least a degree of empathy for situations which one cannot experience directly (Trudgill, *et al.*, 1990). Experiences of areas of wilderness and nature are fundamental to the development of attitudes which cherish and wish to conserve such areas.

In 1994, 20,635 student weeks¹ were spent at FSC centres, many students armed with the pragmatic expectation of syllabus fulfilment. The field centre experience is a unique opportunity not only to fulfil this expectation but also to provide an educational experience that will develop the attitudes which will cherish the environment they perceive. The more evidently valuable the environment is, in which they work, the more such a cherishing attitude is enhanced.

In 1994, 3,452 student weeks were spent at Slapton Ley Field Centre where the National Nature Reserve (NNR) and surrounding area provides a prime experience of

¹A student who spends a week (7 nights) at a Field Centre represents one student-week in FSC statistical statements. Ed.

an evidently valuable environment. The diversity of open water, shingle ridge and sea shore, wetlands, woodland and nearby rocky shores, headlands and cliffs, provides ample opportunity for the appreciation of nature.

A potential conflict might arise in that the most valuable areas also tend to be the areas of highest conservation priority. One can learn about species diversity on the school playing field but, in a field of orchids, with butterflies and abundant wild flowers, there is a greater chance of the awakening of an attitude of cherishing what one sees. This diversity and richness is, however, precisely the kind of situation that will be a high priority for conservation, with the attendant conservation management wishing to minimise any damage to such areas. So, if the value of the all-important educational experience increases with the richness of the site, how do we encourage this experience without damaging the very conservation value that is at the heart of that experience?

Conservation and education can be seen as having their own, separate agendas. In this paper we consider them as not, in fact, incompatible. The elements of success involve:

- making conservation part of the educational agenda while also fulfilling customer expectation (e.g. syllabus fulfilment) and
- seeking careful zonation of spatially distributed educational activities so that they are compatible with the robustness and value of the site.

Any conservation agenda tends to include items such as enhancing habitat diversity, the conservation of both representative and rare species and the management of visitors. Such an agenda can readily become part of the education agenda.

Educational priorities in field work tend to include syllabus oriented work (e.g. attainment targets), a promotion of investigative skills, a high quality learning experience, personal development and assessment and also seeing both typical and unusual sites, habitats and species.

An immediately compatible aspect is that much syllabus work can be focused on commonly available situations, habitats and species. For example, infiltration of water into soil, species diversity and sampling techniques can be taught at any number of sites which are not especially valuable or easily damaged (like the playing field mentioned above). It is only where threatened or fragile sites are themselves the subject of investigation that a potential conflict can arise. The most valuable sites are not necessarily the most fragile and so conservation value and fragility have to be evaluated separately and then these considerations must be balanced with education value. Here, the essential decision is either not to use valuable and fragile sites (and thus to prohibit that kind of educational experience) or to use careful spatial planning. 'Core' or pristine sites are identified and protected. Here, rare species, such as birds of prey can nest without disturbance—but can still be seen by visitors in the air. Other sites, perhaps peripheral to, but representative of, the core sites, are visited sparingly and/or in rotation to allow them to recover. Respect for the site can readily be built into the educational experience.

In this way one might learn, say, the principles of quadrat analysis by estimating the percentage cover of daisies in a lawn where everyone can trample round, making estimates and discussing the standardisation of results. Then, going to fragile areas such as a thin vegetation mat over shingle or sand, educationally useful data can be gained while simultaneously using strategies that involve appropriate footwear which will not damage the turf and only one person standing on the site, calling out information to others who are taking notes. Scientific data can be gained on vegetation succession together with making the point about having a respect for the environment.

THE EDUCATIONAL EXPERIENCE

The Field Studies Council (FSC) objective of 'Environmental Understanding for All' has been interpreted in a variety of ways since this phrase—and its predecessor 'Towards a better understanding of our Environment'—was introduced over 30 years ago. The interpretation placed on this mission statement has been necessarily wide, based on the concept that most field-based activities give some opportunity for learning, however subliminal.

More recently, and certainly since the U.N. Conference on Environment and Development held in Rio de Janeiro 1992, thought has been focused on the precise meaning of 'environmental understanding'—and the role which environmental education plays in that. Broadly, the educational emphasis to the teaching and learning programmes based at Slapton have moved between education *in* the environment, to education *about* the environment, and now, increasingly to education *for* the environment. It is this last point, most recently emphasised in the Rio Agenda 21 deliberations, that is beginning to flavour the educational services provided by Slapton Ley Field Centre. Thus *in*, *about* and *for* has developed in an evolutionary way since the inception of Slapton Ley Field Centre in 1959 to mirror the national awareness of environmental issues. Each of the three educational styles can be found in the learning taking place today—much as no doubt happened in 1959—but the emphasis has certainly changed.

Education *in* the environment is, perhaps, a learning style of dictates. The style is safe, without strong challenges for the teaching, or learning process. At one level, this can operate as the guided walk. Information is given and received in an unsophisticated process. The fact that the learning *in* the environment is far more effective is beyond dispute,—being deafened by a Cetti's warbler on the Ley shore is an infinitely more effective and meaningful learning experience than listening to a taped call.

Education *in* the environment can be synonymous with the development of knowledge for its own sake, however, with the 'environment' itself perhaps gaining little from the interaction.

At a higher level, the environment can be used as the vehicle to develop skills not necessarily related to environmental topics. This educational process *in* the environment has been extensively used in skill enhancement course for pupils involved in vocational training, and for management training.

Managing time and people, organising others, and discovering more about one's own character are effectively practised out of doors. Environmental education in this context is unplanned and opportunist but can develop a strong empathy with the natural world. TVEI students involved in group management and night navigation exercises have happened across badgers in Slapton Wood. This produced the strongest experience and image of the entire training event:—quite unplanned, strongly memorable, yet again without positive benefit for the environment above and beyond the empathy.

Education *about* the environment is an educational style far more representative of the teaching and learning opportunities at Slapton—and where current strength lies. This approach has been fundamental since the earliest days of Slapton, and featured strongly in Ian Mercer's First Annual Report for 1959–60. Courses by Professor Dineley, Paul Holmes and Dr Valerie Sankey typified the approach. Dr Sankey's course "added considerably to the body of information we are gradually building up about the Reserve". Similarly, school and university courses since that time have provided the opportunity (of which more could be made) to monitor and develop that body of

information. The educational process inherent in the *about* has evolved with educational philosophy. Courses of 30 years ago were perhaps syllabus-led, with emphasis on identification, taxonomy and recording—all vital ingredients to the process. More recently, and still under the banner of *about* the environment, a move away from a purely knowledge based field course into a more overtly problem solving and personal ‘skills’ oriented event can be recognised.

The Curriculum from 5 to 16 (D.E.S. 1985) emphasised this need for change. In addition to knowledge as a major element of learning, the Curriculum identifies clusters of skills, ranging from communication to personal and social skills, necessary for an effective education. The practical, investigative work, inherent in a field course, combined with the residential role provides, the ideal platform for such an enhanced *about* the environment course.

Some of the skills identified in that document—particularly those study and problem solving skills—provide the bridge between education *about* the environment and *for* the environment. Skills which encourage the selection and extraction of data from a variety of sources, plus the ability to weigh and interpret evidence, and draw conclusions begin to promote the ‘ownership’ of environmental issues by individual students. The development of personal values towards environmental issue is the important step in ensuring action. This sequence was perhaps best exemplified by the introduction of the Schools Council Geography Curriculum Development Project in 1976.

The enquiry route moved students towards challenge and personal response to the environmental issue under investigation. It also emphasised the need for case-studies and investigation into real landscape-management issues. The 16–19 approach (Table 1) typifies this development.

It was at this point that the real strength of earlier monitoring programmes, and higher education research was revealed. That mass of information—perhaps previously peripheral to the day to day teaching at Slapton—suddenly became an indispensable resource.

Land management and water quality, biodiversity, coastal management and sea-level rise, and social consequences of tourism impact suddenly became—and still are—the cornerstones of environmental education at Slapton. Data collected over 30 years (e.g. Burt *et al.*, 1988) provide the temporal insight of events to students spending just one week—or perhaps one day—investigating a topic. This approach has narrowed the gap between *in* and *for* the environment considerably. Indeed investigative project work has frequently empowered students into taking direct action over an environmental issue. This has often taken the form of letters with comment and criticism to those appropriate decision makers—and is hopefully a reflection of an informed and articulate population revealing commitment to ethical and moral values.

The next logical step towards education *for* the environment is to bind more closely investigation and direct, practical activity. Monitoring energy use and waste at the Field Centre, and using this information to elicit a change in lifestyle—at least for the duration of the residential experience—is perhaps one such step. Waste management, in the form of Centre inspired “Community Composting Schemes” is a development now underway, and which will reinforce that need for desirable, practical outcomes inherent in the education *for* the environment banner. More imaginative use of Centre grounds, in which direct practical involvement links with academic endeavour need to occur. The process is already underway to some extent on the Nature Reserve with the

TABLE 1. Geography 16–19 Project: Key questions and guiding concepts of Geography. (Reproduced by permission of the Geography 16–19 Project)

Key questions, enquiry questions and guiding concepts

ENQUIRY ROUTE ↳ generates ↳	KEY QUESTIONS	↳ which break down into	↳ MORE SPECIFIC ENQUIRIES ↳	↳ and leading towards understanding of	↳ GUIDING CONCEPTS
OBSERVATION AND PERCEPTION	WHAT?	What do I observe? What are my perceptions of the situation? What seems to be happening? How do others view it?			Image, Awareness, Perception
DEFINITION AND DESCRIPTION	WHAT? WHERE?	What are the phenomena being studied? What is their appearance and character? How can they be classified and defined?			People, Environments, Ecosystems, Regions, Habitats
ANALYSIS AND EXPLANATION	HOW? WHY?	Where are the phenomena located in space? What patterns of distribution are created? Are phenomena related in space?	How are phenomena structured and organised in space? How are they inter-related in systems? How do people interact with environments and systems?		Location, Distribution, Pattern, Spatial Association
			Why did events and situations occur? What processes are operating to cause and change spatial locations, and patterns? What processes are causing environmental change? How do these processes affect people and environments?		Spatial Organisation, Spatial Interaction, People-Environment, Interaction
PREDICTION AND EVALUATION	WHAT MIGHT? WHAT WILL? WITH WHAT? IMPACT?	What might be the consequences of locational change and environmental change? What influence will these have on the lives of people? What might be alternative ways of organising space and managing the environment?	How can we evaluate the consequences of change? How can we assess the alternatives? How might people react and respond? What will be the environmental impacts of proposed changes?		Process, Time, Behaviour, Interdependence
DECISION-MAKING	WHAT DECISIONS? WITH WHAT? IMPACT?	What decisions are likely to be taken? With what environmental, spatial and human impacts? Who will make the decisions? Who will gain and who will lose?			Environmental Impact, Social Impact, Spatial Justice, Social Justice
PERSONAL EVALUATION JUDGEMENT AND PERSONAL RESPONSE	WHAT DO I THINK? WHY? WHAT NEXT? WHAT SHALL I DO?	Which alternative and which decision would I choose? How would I justify my views? On what criteria do I think decisions such as these should be based? How should I respond? Should I take action?			Quality of Life, Environmental Quality, Welfare, Cost-Benefit
					Decision, Decision-maker, Planning and Management, Power, Inequality
					Environmental Ethic, Commitment, Empathy, Moral Values

Figure 4. Geography 16–19 Project: Key questions and guiding concepts of geography. (Reproduced by permission of the Geography 16–19 Project).

investigation into coppice management incorporating student power at appropriate times of the year.

Evolutionary change in educational style is taking place. More imaginative issues based practical activity does induce ownership of and care about the environment and is perhaps in keeping with the national mood, if not the international intent.

“There is a need to increase people’s sensitivity to, and involvement in, finding solutions for environment and development problems. Education can give people the environmental and ethical awareness, values and attitudes, skills and behaviour needed for sustainable development. To do this, education needs to explain not only the physical and biological environment, but the socio-economic environment and human development” (Keating, 1993).

CONSERVATION PRIORITIES

Conservation Issues

Slapton Ley NNR is leased by FSC from the Whitley Wildlife Conservation Trust, as it has done since 1960. Both landlord and tenant share joint general aims for the site of fostering conservation, education and research. South Hams District Council are the sub-tenants of the Shingle Ridge (so that bye-laws can be implemented) and English Nature have become partners in the running of the Reserve since 1993.

It was the Agreement with English Nature in 1993 which made Slapton Ley an NNR, and secured funding to run it as such, guaranteed for 20 years. But consideration of the issues relevant to the conservation of species and habitats in the long term begs the question of how secure is the future of the Ley system, given the natural forces acting on it? These forces originate principally outside the NNR boundary, in the catchment, or in the sea and include nutrient enrichment, sedimentation and changes in sea level. Management plans for the long term are thus focused upon the NNR area but there is also considerable interest in the relationship of that management with the wider catchment and other surrounding areas.

On a year-to-year basis, the NNR is run according to an approved Management Plan (Riley, 1993). The Conservation (and other) Objectives expanded in the Plan are specified in the Agreed Management Policy document, part of the Agreement with English Nature, an extract of which is given in Table 2 (with the original document paragraph numbering) and illustrated in Figs 1–4 (1, wetland management; 2, shingle ridge and grassland; 3, woodland and 4, access).

Management Policy Areas

Land areas on the NNR are shown according to management policy in a pie chart (Fig. 5). Implementation of the Conservation Objectives involves only 37.2% of the Reserve, in terms of area. The rest (white in Fig. 5) is under a policy of non-intervention, at least for the time being i.e., the current Five Year Plan. Most habitat management is essentially controlling natural succession (black on the pie chart). This amounts to 27.4% of NNR area and involves mainly reed-bed. Other habitat management is defined as habitat enhancement (grey) and involves mainly woodland and grassland, covering 9.8% of the Reserve.

Only a portion of intervention policy areas are likely to be being worked in any particular season, up to about 4% of the Reserve. Visitors and wildlife are thus quite likely to find sanctuary at Slapton, undisturbed even by conservation management.

TABLE 2. *Slapton Ley NNR. Extract from the Management Policy Document.*

5.3 Objectives**Conservation Objectives**

- 5.3.1 To maintain the aquatic habitats of Slapton Ley *particularly with respect to water level and water quality in the Lower Ley and Higher Ley.*
- 5.3.2 To maintain and enhance populations of rare species on the Reserve *particularly those species listed in Annex C as requiring encouragement.*
- 5.3.3 To maintain, enhance and protect the existing types diversity of vegetation and habitats on the Shingle Ridge *in particular the control of scrub.*
- 5.3.4 To maintain, and enhance, the diversity of wetland habitats *particularly reviewing the extent and quality of the reed-beds.*
- 5.3.5 To maintain, and enhance, the diversity of the semi-natural woodland *including woodland of particular value as landscape features. To maintain the coppiced woodlands.*
- 5.3.6 To maintain, and enhance, the grassland communities *including Hartshorn Fields and Southgrounds wet meadow.*
- 5.3.7 To control undesirable or pest species where practicable particularly those species listed in Annex C as requiring control *Herbicides/pesticides will not be used unless approved by English Nature.*
- 5.3.8 Parties should wherever possible seek additional protection on areas adjoining the Reserve by liaison and possible agreement with the landowners.
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Legal and Other Obligations

- 5.3.9 To uphold the terms of the lease with the South Harris District Council.
- 5.3.10 To provide/maintain boundary structures and prevent trespass.
- 5.3.11 To maintain and control Public Rights of Way.
- 5.3.12 To maintain good relations with neighbours, visitors, authorities and other interested parties.
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Provision of Facilities

Subject to 1–12 above provision will be made for the following facilities:

- 5.3.13 site monitoring *to measure the effects of reserve management*
- 5.3.14 scientific research and survey *to include where necessary the erection of temporary structures e.g. hides.*
- 5.3.15 education and interpretation *by means of guided walks, leaflets and signs. The development of a co-ordinated interpretation strategy*
- 5.3.16 angling from boats
- 5.3.17 controlled access for visitors away from areas of open access
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Controlling Succession

Natural succession in the wetlands, from swamp and carr to scrub and woodland (and over which we seek to have some control), has been influenced by changes in water level which are man-made. In 1856 a tunnel outlet was built to reduce dramatic fluctuations in water level (and enable the road along the bar to be made permanent). An overall deepening of the lake resulted (Cannell 1992). Further deepening occurred in the 1920s when the weir lip was raised, and it was this act which caused, it is suspected, the peat

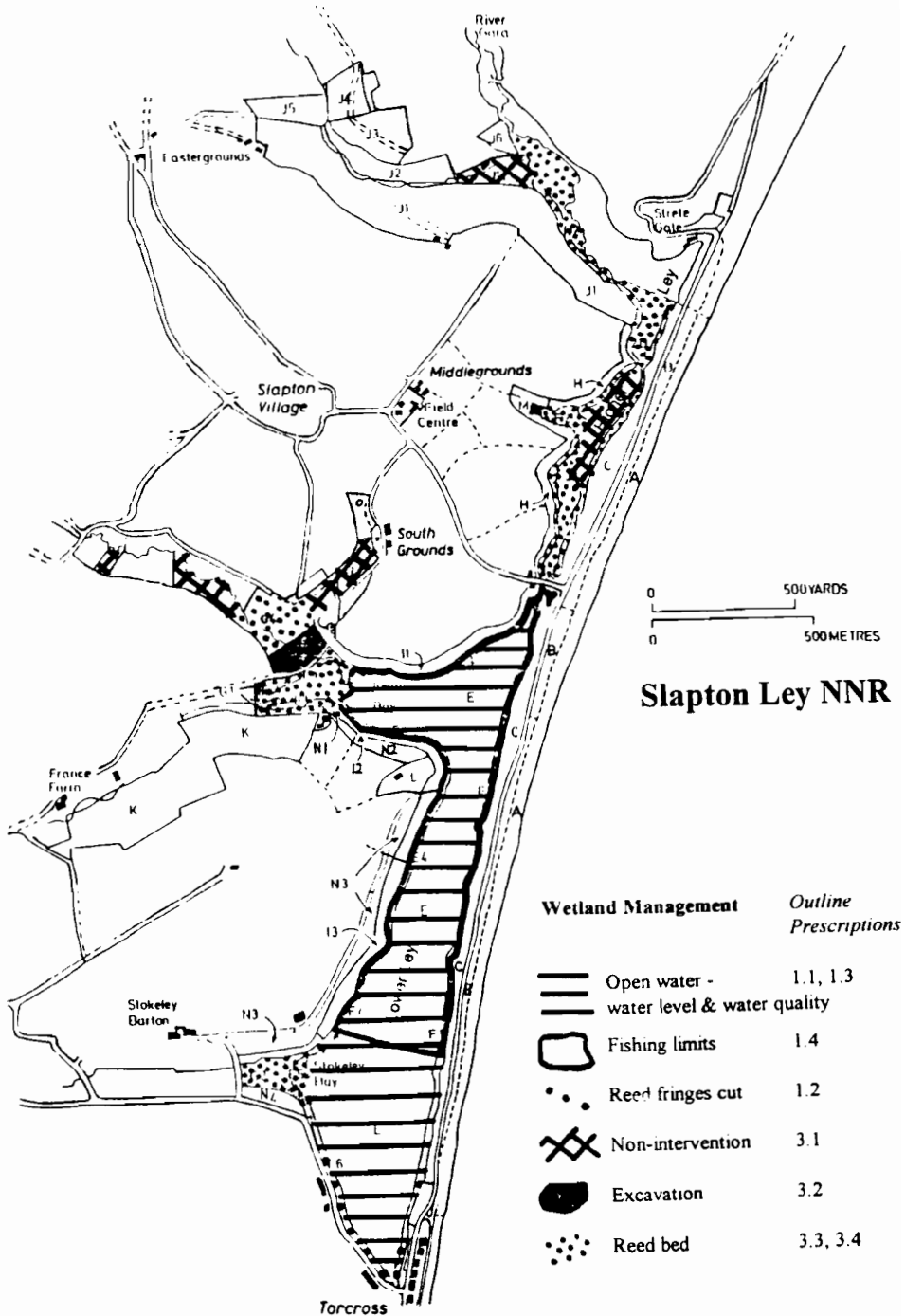


FIG. 1
Slapton Ley National Nature Reserve Management Plan: wetlands

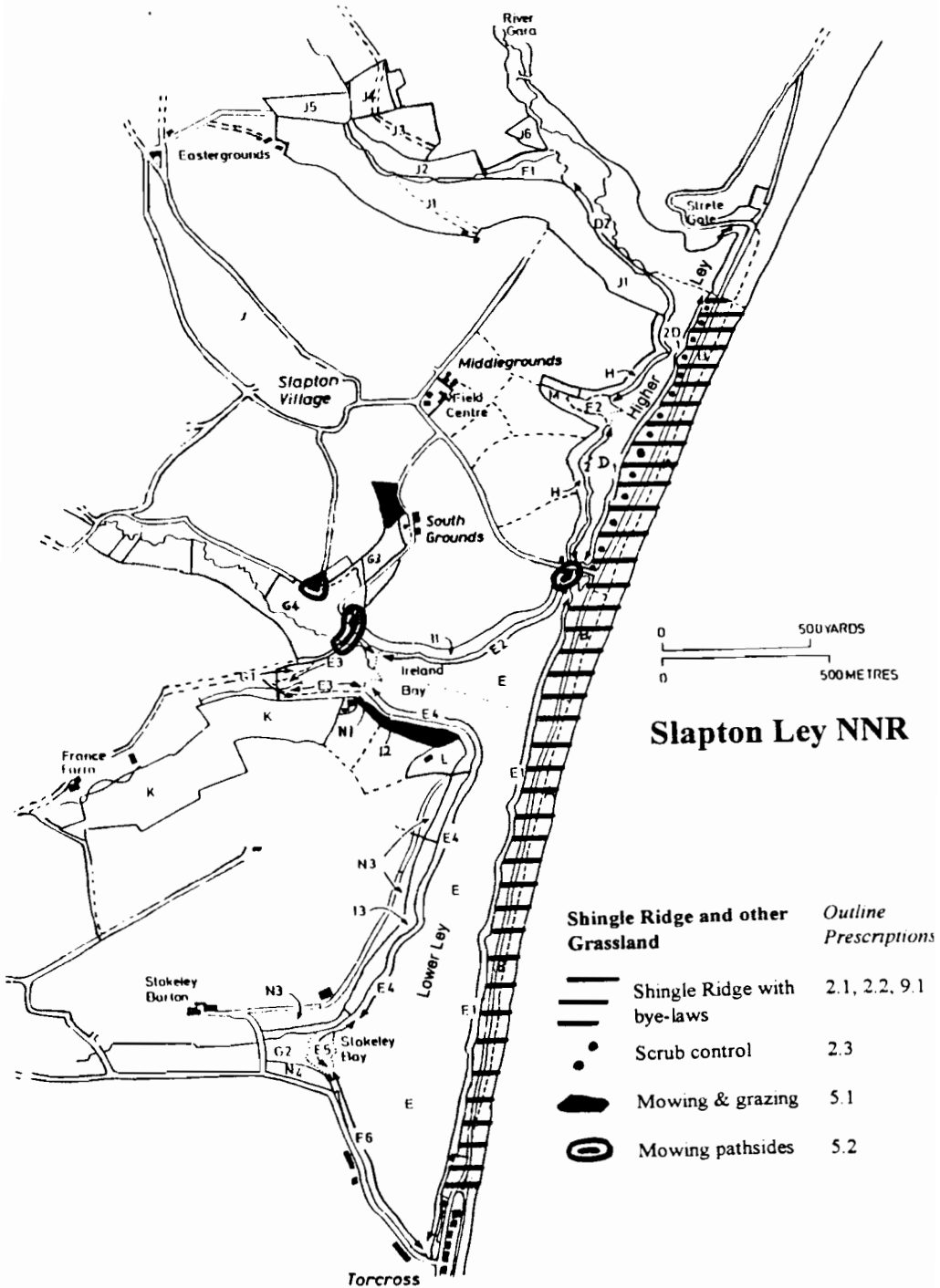


FIG. 2

Slapton Ley National Nature Reserve Management Plan : shingle ridge and grasslands

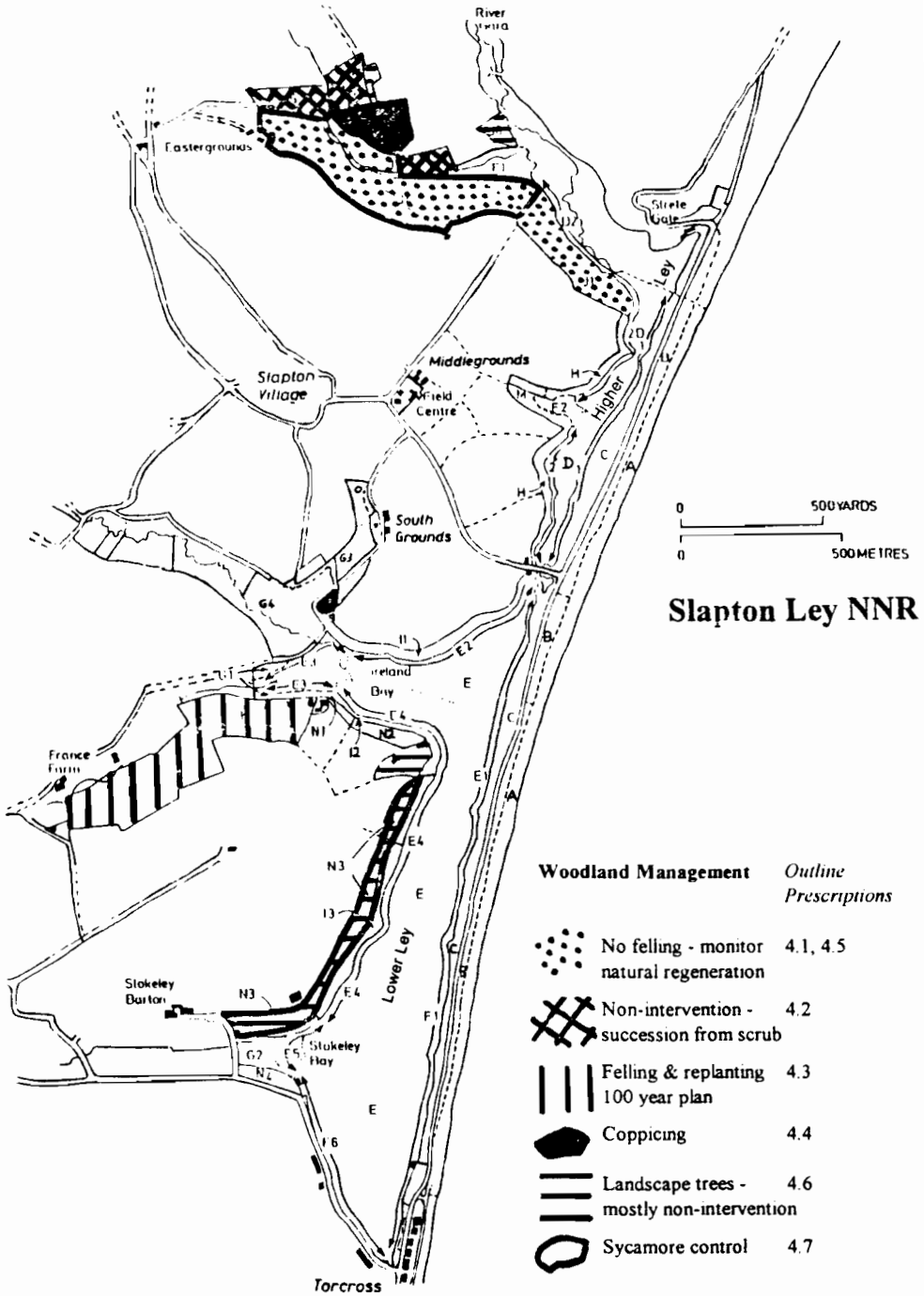


FIG. 3 Slapton Ley National Nature Reserve Management Plan : woodlands

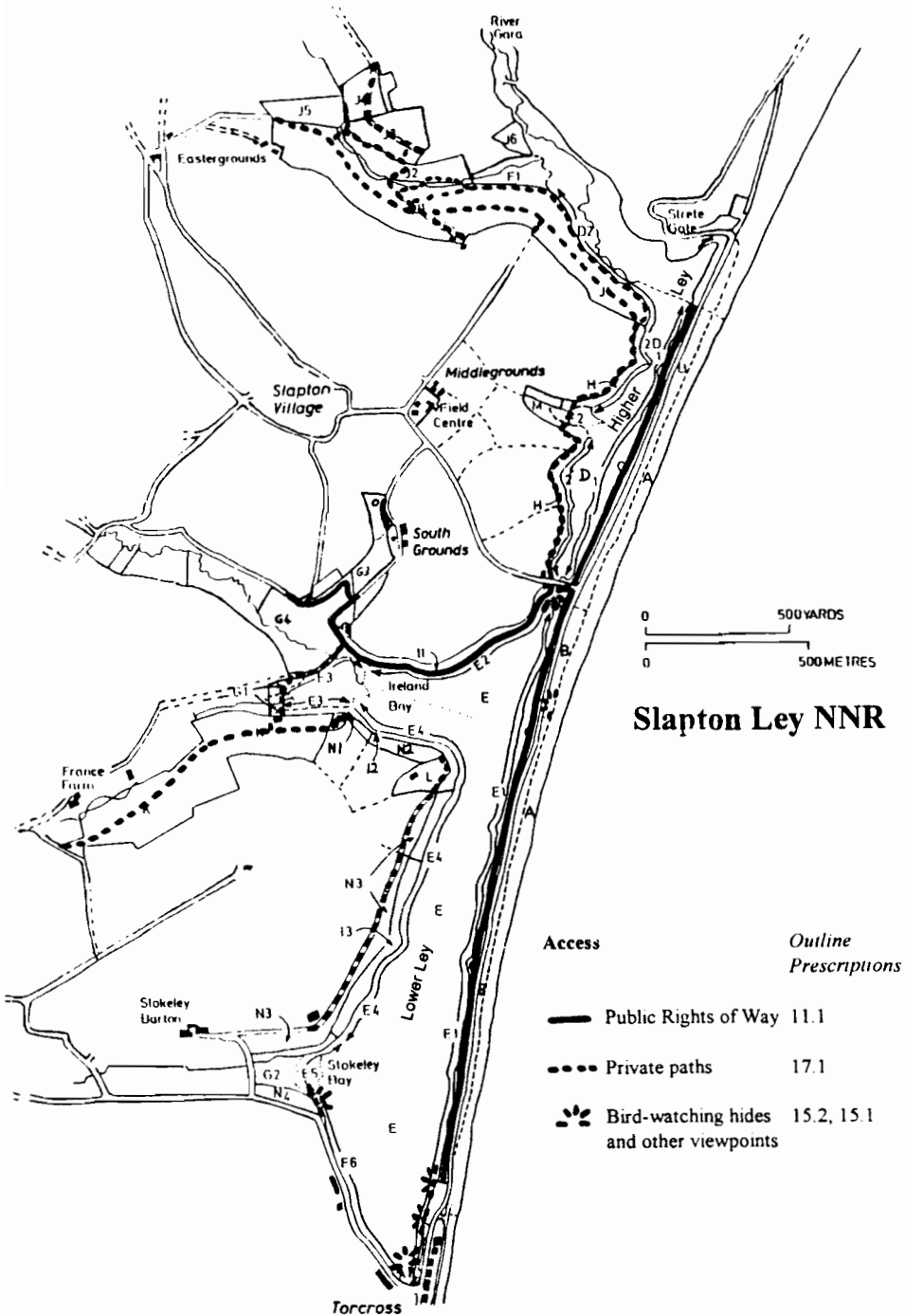


FIG. 4
Slapton Ley National Nature Reserve Management Plan: access

islands in the Higher Ley to float free of the lake bottom. However, sedimentation is rapid, especially in the Higher Ley, and succession is continuing steadily (Cannell, 1992).

Targets have been defined for the reclamation of reed-bed from willow scrub. 0.2 hectares of willow trees are to be removed in the period 1993–98. This target has been set following studies of aerial photographs going back to 1945, since when progressive willow colonisation has occurred. A similarly scientifically-obtained target has yet to be set for harvesting of reeds, but will involve estimation of the rate of biogenic accumulation.

Dramatic disturbance during World War II provided another start point for succession. This was particularly the case on the Shingle Ridge where tanks laid bare great areas of shingle. Grazing of the vegetation here does not seem to have restarted after the evacuation of the area in 1943/44, leading to scrub invasion. The present scrub control programme is a legacy of this past.

The Role of Research in Management

We are fortunate at Slapton that there has been a considerable amount of scientific research which, while not necessarily directed to conservation objectives ('management led'), has often been 'management-relevant'. Such research into the issues and processes affecting the NNR is outside the scope of the present Five-Year Management Plan but continuing research will enable Management Objectives to be updated and put into context.

Truly 'management-led' research is on a fairly small scale, with individual student projects suggested, approved and assisted by the Reserve Officer. English Nature's grant scheme for student projects on SSSIs and NNRs has enabled the availability of grant funds and, more importantly, information disseminated to Universities in the form of a directory of suggested projects.

New research developments are exciting, but the continuous accumulation of more routine background data is an important management requirement. Monitoring by FSC staff occurs weekly, and has been complemented by sampling by the National Rivers Authority. Gaps in the data sets, and lack of simultaneity, barely detract from the fact that Slapton's wealth of accumulated data is one to be proud of and one which will continue to be the basis for analysis well into the next century.

ENSURING COMPATIBILITY BETWEEN EDUCATION AND CONSERVATION Strategies for Use of Sites in Fieldwork

The following strategies are applied on Slapton Ley NNR (Table 3 and Fig. 5):

Robust

can support frequent use by groups of students without significant damage. One site has been particularly studied for possible changes during its life-time as a site for fieldwork. This is the 'Freshwater Community Site' which has seen variations in numbers of particular species or groups of animals, but these are more related to changes in water quality, or local successional changes, than by use by student groups. The general diversity of the site appears stable and confirms the 'robustness' of the site.

TABLE 3.
Fieldwork Site Use and Strategies in Slapton Ley NNR

Summary Table of Fieldwork Site Use and Strategies on Slapton Ley NNR

Site	Type of Use		Site Characteristics		Details of use		Public Use and other factors	Analysis Strategy*	Guidelines
	are. annual no of groups ↓ fieldwork details	Frageility se single visit robust-fragile good-poor reasons	Ability to support frequent use frequent use	Frequency variability Temporal variability	Spatial variability				
1 Shingle Ridge	geog 40 ecol 40	fragile	poor	loose substrate, sensitive to trampling	frequent	confined to transects	disturbance by tourists reduced away from car parks, and mainly on the crest 'path'. Trampling at right level holds back succession-esp. backslope	sacrificial/beneficial	Keep to transects; keep same transect lines from year to year
2 Lower Ley by boats	ecol 12	moderate	good	Trawl nets take very small samples; disturb birds & visual impact but only during visit	infrequent	all over Ley	student use equivalent to <20% of use by anglers	elite/sacrificial	No landing on the Ley shore, apart from in front of Fishing Hut
5 Lower Ley shore Community Site	ecol 40	robust	good	v. small part of large system; but access requires substantial trampling of reeds	frequent	one small site	near PROW but reed fringe otherwise undisturbed	robust (sacrificial access)	Maintain quality of long term data set
6 Lower Ley shore, Pond Dip Site	ecol 50	moderate	moderate	small part of large system, but kick samples disruptive Shore trampled	frequent	40 m shore, all year sometimes extending further along.	20 x as many visitors use paths/shore as students on fieldwork. Trampling maintains reed-free shore.	robust/beneficial	Keep kick samples to a minimum. Identify specimens on site, or return immediately.
8 Slapton Wood Stream	ecol 40	fragile	moderate	stream and bank disturbed & trampled	frequent	spread above & below weir	Private woods Physical factors above weir, inverters below where disturbance minimised.	sacrificial	Keep disturbance as near as possible to V-notch weir. Replace upturned stones
9 Soil Pits (Slap Wood)	geog 15 ecol 10	fragile	poor	removal of soil samples from small sites.	moderate	two sites: gley pit -brown earth	Protection of gley pit may mean management of the course of the stream	permanent	Do not take larger samples than is necessary
10 Infiltration Transects (Slap Wood)	geog 50	fragile	poor	heavy trampling necessary up slope	frequent	confined to transects	Extensive trampling affects infiltration—two sites used in rotation	rotating	Keep to transects; keep same transect lines from year to year
11 Slapton Wood (General)	ecol 20	robust	moderate	Impact only noticeable when same site used repeatedly	infrequent	generally diffuse	Private	robust/rotating	Try to keep near to paths or regularly used areas
12 Coppiced woodland	ecol 10	robust	moderate	sites 'disturbed' by management anyway	infrequent	two sites: -Lowworthy -Southgrounds	Southgrounds next to public path; permanent quadrats installed	robust/rotating	Protect permanent quadrats & growing tree stumps
13 Nitrate sampling sites	geog 50	robust	moderate	bankside erosion at sample points	frequent	18 sites (+6 near the NNR)	Sampling points more sensitive if bank is earth	robust/sacrificial	Keep to paths whilst gaining access

*robust/rotating/sacrificial/elite/permanent/beneficial

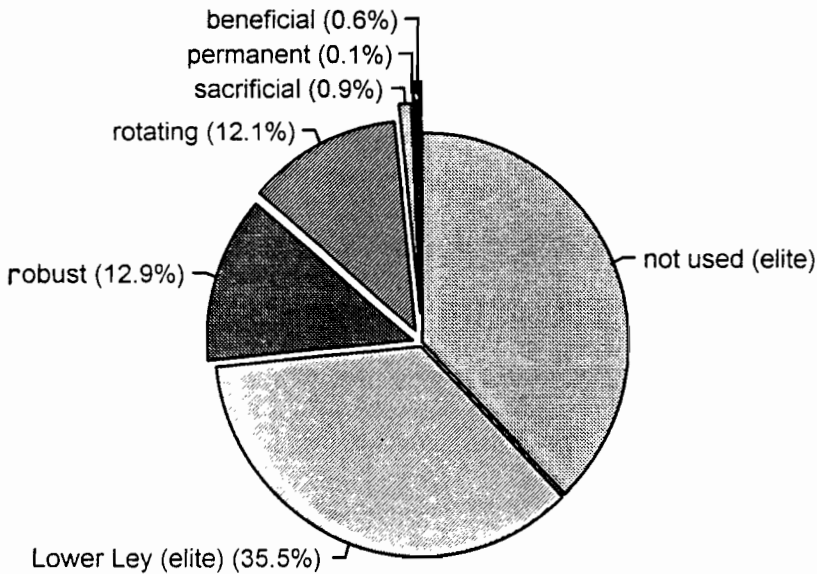


FIG. 5
Management Policy Areas, Slapton Ley NNR

Sacrificial

a certain amount of damage is accepted; the site is sacrificed for the sake of the rest of the ecosystem and for the educational benefits; site will recover soon after usage stops.

Permanent sites

which could takes years to recover and where rotation would only spread the damage, e.g. soil pits.

Rotating

two or more sites used in rotation—frequency should be defined. For example experimental water infiltration plots in woodland.

Beneficial

trampling or disturbance of soil may be seen as beneficial e.g.. keeps scrub down.

Elite

sites preserved 'intact'—specialist groups only; minimal collecting.

Such a zonation of use ensures that both the educational experience and conservation priorities can be met.

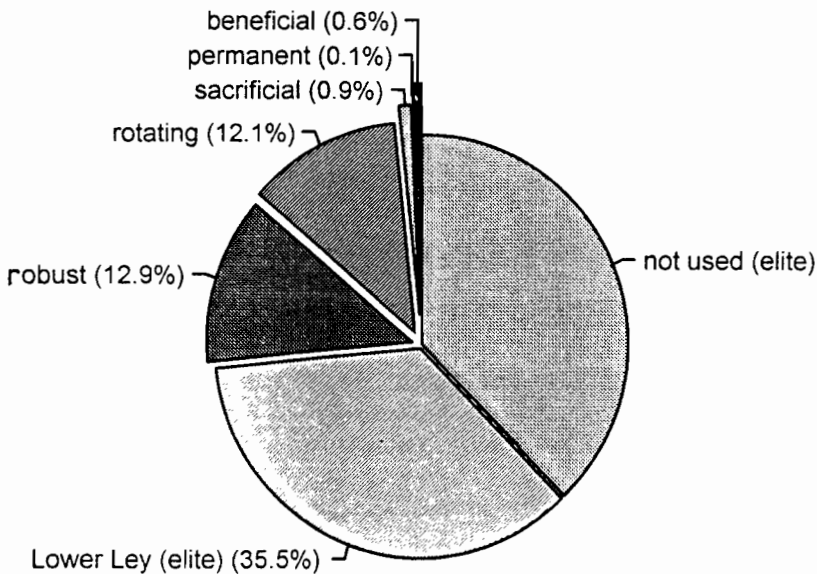


FIG. 6
Use of Slapton Ley NNR

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