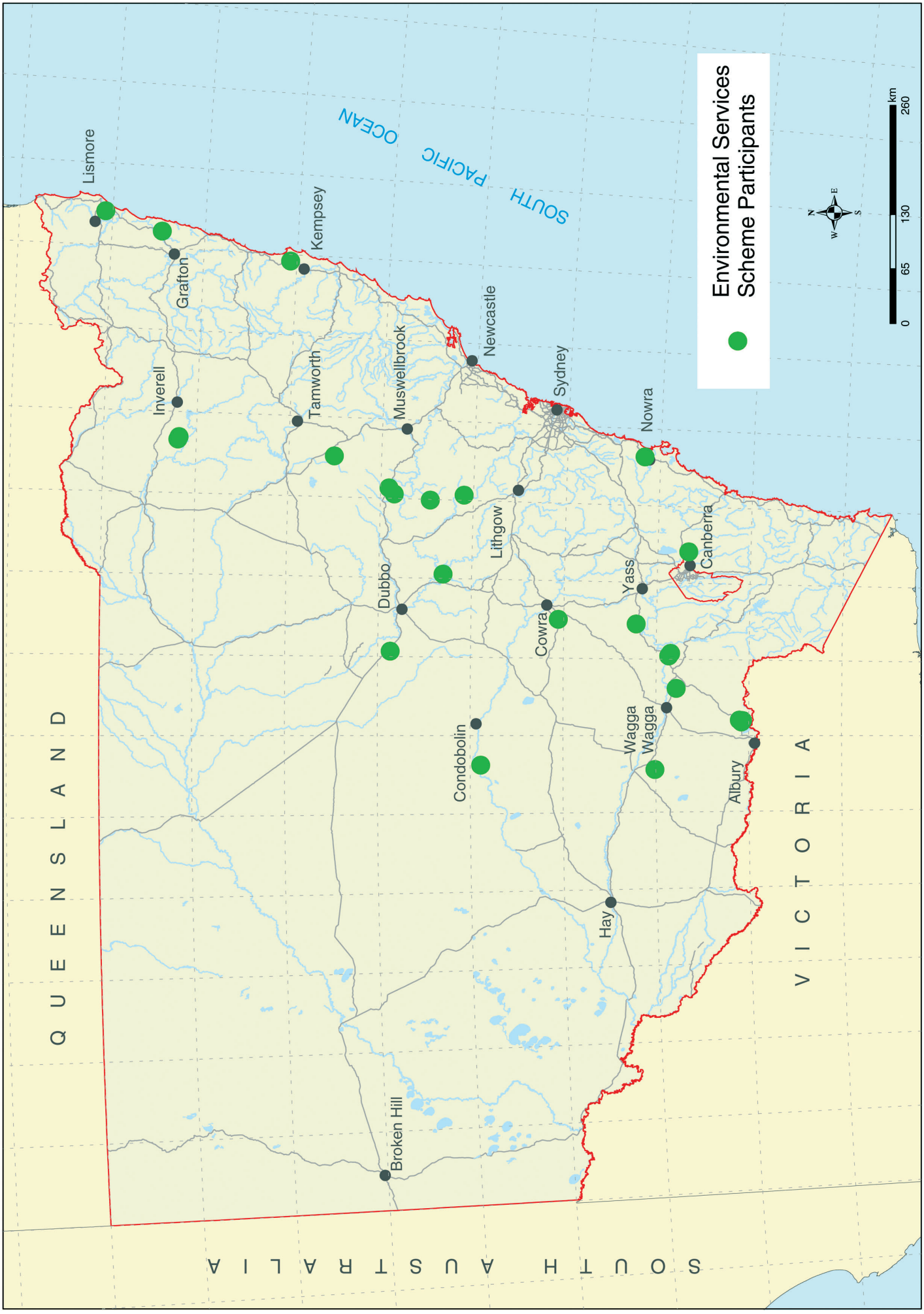
Environmental Services Scheme

DEVELOPING new income streams for farmers

NSW Environmental Services Scheme

Figure 1: Environmental Services Scheme Participants



The NSW Environmental Services Scheme – Progress Report on Outcomes and Experience Developed during its Implementation

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Introduction

One of the key tools of the NSW Salinity Strategy was the endorsement of a market-based approach supported by the community to develop sustainable long term solutions to salinity. The Government allocated $20m to create an Environmental Services Investment Fund (ESIF) which would provide incentives to land managers to manage their properties for specific environmental outcomes. Market-based instruments can help to place a value on 'environmental services' such as reducing salinity, or locking up greenhouse gases in vegetation carbon sinks.

In order to investigate the feasibility of using this market-based approach to incorporating natural resource considerations into economic decision-making at the property level, the Government announced in July 2001 that $2m would be allocated from the ESIF to conduct a trial to establish 20 working examples of properties or (groups of properties) where environmental services would be identified and a value placed on them. The $2m investment would be used to support the activities carried out by the participating landholders. The trial was referred to as the NSW Environmental Services Scheme (ESS).

The ESS project is led by an Environmental Services Investment (Environmental Markets) Team jointly established between the previous Department of Land and Water Conservation (DLWC - now NSW Department of Infrastructure, Planning and Natural Resources, DIPNR) and State Forests of NSW. Additional inputs were provided by NSW Agriculture – as well as inputs from other agencies. The main focus is on the integration of production-based land uses with those which produce environmental services, including salinity benefits, carbon sequestration, biodiversity enhancement, acid sulfate soils mitigation, soil retention and water quality improvement. The properties were to be chosen to represent a range of locations, enterprise types, land use changes and environmental and production benefits. Landholders who participated in the trial will be paid for delivering the environmental services they produce from their new land use activities.

The primary aim of the Environmental Services Scheme is to look at some of the practical issues that will arise in the development of a market to support the environmental services produced on-farm. These include the costs associated with including environmental services within rural production, how to define and create ownership of the services produced, and the types of financial, contractual and incentive arrangements necessary.

The major results expected from the trial include:

- Quantifying the full value of environmental services
- Building knowledge of the most effective ways to manage environmental services at the property and landscape level
- Gaining information to establish markets for environmental services, and
- Developing ways to support property rights and trading systems.

These results could be used as a basis for the ESIF to direct funds for operational scale incentives programs which promote land use changes and management actions offering the best and most cost-effective environmental outcomes. In addition, through developing a better understanding of the factors influencing decision-making by landholders, the project will contribute to our ability to improve the social well-being of our rural communities.

Background

The ESS project commenced in July 2001, with staff seconded from the lead agencies under the direction of the then Director General of DLWC. A project plan (Attachments 1a and 1b) was developed and adopted after endorsement by a reference panel comprising stakeholders from landholder and conservation organisations, others with financial expertise and key agency representatives.

At the outset, a coordinated communication program was developed aimed at fast-tracking the production of the communication packages and resource documents needed to inform people who inquired about the project. These comprised: media information material, a staff kit explaining the concepts and objectives of the project, a list of frequently asked questions and answers and a presentation package for use in public meetings (Attachment 2).

The approach developed by the project team to implement the project involved six main strategies:

1. Identifying the types of environmental services that would be examined
2. Determining the best ways to measure a range of environmental services
3. Developing and implementing a cost-effective process for competitive selection of the trial participants
4. Preparing and executing the necessary contractual arrangements for engaging the successful applicants
5. Establishing systems for monitoring both compliance and the production of environmental services from land use changes
6. Evaluating the benefits and costs to the farm business of land use changes for environmental services.

Report on Progress to October 2003

Strategy 1: Identifying the types of environmental services to be provided

The specific 'services' selected for the project emphasised the provision of public benefits rather than exclusively private benefits. While almost all environmentally beneficial activities undertaken on a property have the potential to generate both public and private benefits, it was agreed that only the public benefit component of a service could legitimately be captured as a 'commodity' suitable for being traded or purchased. For this reason, this partitioning of benefits was an important criterion for including a specific service. As well the service was described in terms which focused on the public benefits.

Six individual environmental services were selected as follows:

i. Carbon sequestration - related to mitigation of the greenhouse effect / climate change
ii. Terrestrial biodiversity benefits - related to improvements in the habitat value of vegetation
iii. Salinity benefits - related to improvements in stream water salinity
iv. Soil benefits - related to the retention of soil on the property and associated benefits to stream water quality through reduced sediment loads
v. Water quality - related to retention of nutrients on the property and resulting benefits to stream water quality
vi. Acid sulfate soil benefits - related to reductions in the production and export of acid or acid products from acid sulfate soil areas and resulting benefits to water quality.

In choosing these environmental services it was important that they were able to be clearly linked with specific land use changes that landholders could readily implement and incorporate into a whole property plan. To simplify the process, the following set of eight approved land use changes or activities was described:

(1) establishing perennial pastures,
(2) improved management of existing perennial pastures,
(3) establishing commercial tree plantings,
(4) establishing environmental plantings of trees or shrubs,
(5) regeneration of native vegetation,
(6) establishment of saltbush,
(7) engineering works (such as earthworks to control runoff or drainage),
(8) reintroduction of natural wetting or drying cycles in former wetlands or estuarine areas.

Each land use category was chosen because it was likely to generate significant (though varying) amounts of the six chosen environmental services. In addition, they were all capable of successful integration into a commercial business plan for each property.

Strategy 2: Determining the best ways to measure a range of environmental services

One of the essential conditions for potential markets for environmental services is a system for measuring the environmental value of changes in land use or management. If it is possible, the impact of these changes should be measured directly, e.g. estimating the quantity of an increased carbon sink created through tree planting using standard carbon accounting techniques. In many instances, however, it is not possible to measure the value of these changes in contributing to additional environmental service levels through direct means. In the case of salinity benefits arising from tree planting throughout the catchment, the impacts on stream water quality are the product of a large number of inputs from specific sites, and the individual contributions will mostly be difficult or impossible to measure directly. In other cases the benefits are not evident until long after the original action is taken as in the case of improving habitat for biodiversity through recreating vegetation systems.

In these cases it is necessary to determine suitable parameters that can be used as a satisfactory indicator of these environmental services (this is sometimes referred to as a surrogate measure). Suitable parameters should have the following features. They should:

- Provide a measure at a property level that can be related to the environmental service at a catchment or regional scale
- Be simple to understand
- Be cheap to measure and reliable to use.

They should also be capable of being combined into a single environmental benefits index (EBI) where more than one environmental service was a priority. This requires that each parameter can be expressed in a form which allows combination with other parameters, i.e. the units must have a similar basis with scores out of a common maximum value such as 100.

With these criteria in mind, a series of six environmental services indices was developed during 2002, together with toolkits to estimate these indices at a property level for each approved land use change. The toolkits were based on existing, or in some cases, newly developed biophysical models and were developed by Technical Working Groups composed of scientific experts in the relevant fields including State and Commonwealth agencies and universities. The indices and toolkits are being published currently in both electronic and hard copy form (see http://www.dlwc.nsw.gov.au/care/es_scheme.html and Ref. 3).

Strategy 3: Developing and implementing a cost-effective process for competitive selection of the trial participants

A two stage process was developed for selecting participants in the project involving (i) Expressions of interest (EOIs); (ii) Full applications from an invited shortlist.

Stage (i) – Expressions of interest

Expressions of interest were called by advertisement in the press, and by direct advice to a list of potential applicants who had registered their interest when the project was originally announced. Altogether over 400 information packages (4) were distributed. A total of 145 expressions of interest was received, which included 5 groups of applicants. A desktop process was used to select a shortlist of 75 applicants including six groups (5).

The selection process used a checklist to assess whether the EOI complied with a range of criteria (location within priority areas, income derived mainly from farming, the extent and suitability of land use changes proposed, integration into a whole farm plan, demonstration value of site), together with an estimate of the potential environmental services to be produced by each proposal. Applications were first scored and assessed by Regional staff, and then independently assessed by a central coordinating panel.

Desktop estimates of the potential environmental services produced by specific land use changes were made using simple ranking systems from 1 to 5 (from low to high value) based on the consensus opinion of the expert Technical Working Groups (6). The relative rankings for the level of environmental benefits produced by each land use change which were used in these systems were ordinal rankings, i.e. the intervals between adjacent scale values were not directly proportional to differences in the quantity of benefits produced by the action. With this qualification, the rankings were used to calculate the quantum of services produced from the given land use change, by adding together the rankings or scores for each environmental service to produce a sum of the values for all services. This sum was then multiplied by the area of change in hectares to give an estimate of the Total Benefits potentially produced by the specific land use change proposed.

Summing the Total Benefits for all land use changes produced a Grand Total of potential environmental services. The Grand Total of environmental benefits was then used to rank the EOIs on the basis of the expected magnitude of benefits produced. An additional ranking was developed based on dividing the Grand Total by the total area of land use changes to give an Average Total Benefits per hectare figure (a type of quality of land use change assessment). The two rankings were used jointly to develop a shortlist.

A close level of agreement was observed between the independent assessment of the EOIs by the central coordinating panel and the assessments made by Regional managers and technical staff familiar with the properties and land use changes in question. Given that the final selection process was independent of this expert local opinion of the relative merits of proposals, the desktop methods used appear to have reasonable substance.

Stage (ii) - Full applications

Shortlisted applicants were invited to submit detailed applications for consideration in the second stage of the process. To assist in this process, Regional DIPNR Investment Services staff were provided with a range of decision support systems to allow them to discuss with landholders, the range of options for land use change on the property and the resulting impacts of these changes on farm economic performance and the production of environmental benefits. The decision support systems included the six toolkits developed to estimate environmental services, together with a spatially based modeling tool termed the land use options simulator (LUOS Version1) which was used to calculate the salinity benefits for various land use change scenarios (7).

Each landholder was also given assistance to prepare a property plan showing the current land use and proposed land use changes. Standard descriptions were provided for each land use as a general guide to the standards of management practice expected (8). A formal application and bid was prepared by the landholder which required the provision of financial information about the business, together with a comprehensive outline of the proposed changes and the bid price (9).

A formalised selection process was developed (10). In brief each application was first assessed by Regional DIPNR staff using the 'toolkits' to estimate the environmental benefits (or disbenefits) of the full suite of land use changes proposed by each applicant. This required a visit to the applicant's property by field staff, and the collection of basic data from the site for subsequent entry into the toolkits. The toolkits were then run and the output indices for each management unit on the property (defined as the total area of each specific land use change) were entered into a spreadsheet, developed for the purpose. The separate indices (five in total for any specific site – since sites occurred either in salinity priority areas or acid sulfate soils areas) were then normalised to a common basis and added together to form a composite Environmental Benefits Index (EBI). This composite EBI was used together with other measures (the demonstration value of the site and cost-effectiveness of the bid), to produce a total score for each application.

All bids were then ranked on the basis of their total score on the three criteria: environmental benefits, cost-effectiveness and demonstration value. Final selection also took account of the need to ensure adequate geographic spread across the State, representation of specific enterprises and inclusion of a full range of land use changes to meet the project objectives. In addition to the 20 selected sites, an eligibility list was created.

The selected applicants were then advised of their success and invited to negotiate a contract for the provision of the agreed services. The first contract was signed in February 2003. By October 2003, a total of 24 contracts had been signed.

Strategy 4: Preparing and executing contractual arrangements

A generic contract was drawn up based on standard DIPNR and SF contracts for the supply of services and joint venture arrangements with landholders (11). The contract contained a background recital that states: "The Landowner and the Department intend to work together to improve understanding of the role of Environmental Services and demonstration of that role to other interested parties. This Contract sets out the basis on which the Department will pay the Landowner for undertaking agreed land use changes, and the framework in which the Landowner will both undertake and maintain the specified land use changes."…so as to.."ensure as far as practicable that the Environmental Services achieved by the Project are sustained in the future." These requirements were intended to ensure that land use changes were of an enduring nature and to avoid perverse outcomes such as the subsequent removal of land use changes intended to be permanent. This was seen as a more desirable approach for a trial than requiring legal attachments to title.

The specifics of the contract were contained in separate Schedules covering the land use changes, a timetable for implementation of works, payments, and provision for monitoring environmental services and reporting for compliance.

Strategy 5: Establishing monitoring systems

One of the primary aims of the ESS project is to develop accurate, cost-effective methods for quantifying the environmental services produced by land use change. Access to the properties in the trial will allow an assessment to be made of the range of tools developed for this purpose. As the ESS is not designed to carry out or fund major research programs, it was not envisaged that these baseline assessments and monitoring would answer all questions. However an opportunity exists to gather sufficient information to improve the predictive power of the toolkits, as well as allowing a good demonstration and reporting of the toolkits in operation. Baseline information is required to test the assumptions about starting conditions in many of the toolkits, and where possible to assess the conditions of each site prior to land use changes in order to build on the initial assessments made by Regional staff. At some sites, implementation of land use changes was undertaken quickly to take advantage of favourable conditions and alternative sampling strategies have been necessary.

Monitoring is also required to build further confidence in the indices; to check the direction and magnitude of environmental benefits following land use changes; and for continued calibration and/or validation of individual toolkits. The toolkits have been developed with the assumption that best management practices are being followed by the landholders. To calibrate the indices and their models, it is essential that the actual management practices achieved by individual landholders are known, so that this underlying assumption can be tested and if necessary, input values to the toolkits adjusted. A general outline of considerations underlying the specific monitoring programs on each site was developed by a workshop of scientific, technical and field staff (12). This outline was then used as a basis to develop specific protocols for each site.

Specific protocols for each site are consistent with the overall objectives of the monitoring but are also tailored to suit site and resourcing constraints. The strategies adopted to carry out this program include:

- Carry out surveys and assessments as appropriate
- Conduct sampling
- Install any necessary monitoring equipment
- Establish on-going data collection program
- Co-ordinate data input and maintenance
- Assess compliance with Best Management Practices as specified in the Contracts – develop a compliance list (e.g. checklist) based on agreed Management Actions.

Monitoring compliance with contractual obligations is also a component of the project to ensure that specific land management changes are carried out and milestones are met. An attempt will be made to amalgamate the compliance monitoring process with the collection of routine management data by landholders (e.g. for improved pasture management). This process is also important as part of developing more efficient, coordinated systems to measure environmental change. Eventually it may be possible for these measurements to be made directly by landholders, as well as by relevant agency or Catchment Authority staff as at present.

Baseline assessment and monitoring programs have been carried out progressively since July 2003. Delays in completing contracts (largely due to the drought) and the complexity of designing robust, yet affordable monitoring methods, have affected this aspect of the project. It is anticipated that all sites will be assessed and monitoring programs put in place by end-December 2003.

Strategy 6: Evaluating the benefits and costs to the farm business of land use changes for environmental services

A key area of interest in the ESS is to measure the returns from existing and proposed land uses and how these changes affect farm profitability. To determine the effect of the ESS on farm profitability, a firm of agricultural and management consultants have been engaged by NSW Agriculture (13). The principal task of the contractors is to establish baseline farm profitability (the without ESS scenario). The following farm performance indicators are required:

- Whole farm gross margin - sum of individual enterprise gross margins (enterprise income less enterprise variable costs) received from farm enterprises;
- Net farm income - whole farm gross margin less overhead costs (overheads include costs like depreciation but exclude finance costs like interest);
- Farm business return - net farm income less imputed cost of operator labour and finance costs (measures overall farm profit);
- Equity per cent - net worth expressed as a percentage of total assets (total assets less total liabilities divided by total assets); and
- Return to equity - business return expressed as a percentage of farm equity (a measure of the return to capital owned by the operator).

The contractors will work with individual landholders to develop a whole farm budget which can be used to determine the above parameters. Because a key focus of the ESS is on the profitability of land uses, the whole farm budget will need to specify individual enterprise gross margins rather than traditional accounting approaches. A major component of the task involves the development of the gross margins:

i) for the whole farm (covering non-land use change areas as well as the unchanged areas of the property); and
ii) based on costs and returns under "average" seasonal and market conditions.

NSW Agriculture will provide a generic set of gross margin budgets for the contractors to adapt to individual property conditions. Revised enterprise budgets will be part of the final product provided by the consultant.

A system for recording benefits and costs of the ESS

To aid future evaluations of the benefits and costs of providing specific environmental services and their contribution to farm profitability, the consultants will develop and implement with each landholder, a financial data collection system. The system will record the impacts of the land use changes funded through the ESS. The consultant will develop a system for each property to capture the necessary data for each year of the ESS trial without imposing high collection costs on the collaborating farmers. These data will be used as just one input into the evaluations of the ESS. NSW Agriculture's Salt Action Team economists will utilise these data as well as interviews with farmers to:

- assess the contribution of the ESS to overall farm profitability; and
- assess the benefits and costs of specific land use changes implemented under the ESS.

Development of business plans and financial data collection systems is planned for completion by end - April 2004.

Because the land use changes implemented under the ESS have differing flows of benefits and costs over time (in many cases extending beyond the trial period of 5 years), final ex-post evaluations will involve development budgeting to compare land uses in present value terms.

Outcomes to Date

The introduction of this new concept in assessing the value of land use change proposals by using objective index-based tools has been received with widespread and enthusiastic support. Apart from the small central coordinating team, a large number of staff within DIPNR and other agencies have contributed to the various stages of the project to date. In addition, the reception from landholders and the rural community, has been very positive. Levels of interest from external groups have also been high, with many inquiries regarding the toolkits and other processes employed. These responses augur well for the expansion of the approach to larger scale incentive-based land use change schemes.

1. Distribution and Number of Contracts

A total of 24 individual landholders have entered into contracts under the project (14). Amongst the successful applicants were three groups which included 7 landholders. Since these groups were treated as though they were a single site during the selection process, there was a total of 20 separate successful bids/sites. The original promotional material for the project indicated that 20 sites would be sought. The distribution of these sites throughout NSW is shown in Figure 1.

Of the 20 sites, 16 were located in salinity priority catchments, and 4 were located in coastal acid sulfate soils priority areas. Another objective of the selection process was to ensure that the sites were representative of the range of soil, climate and vegetation conditions in the State. All of the eight DIPNR Regions were represented.

2. Types of Farming System Selected

The farming systems selected covered a range of types broadly representative of the coast, tablelands and slopes areas included in priority catchments for salinity and acid sulfate soils (Table 1). About half of the sites were predominantly grazing systems, and the balance included a mixture of grazing and cropping. The overall dominance of pasture-based systems was also reflected in the high proportion of land use changes which focused either on the establishment or improved management of perennial pasture (see Table 2).

Table 1: Farming System Types Selected in ESS

Farming System	Number of sites	Percentage of sites
1. Mixed livestock and cropping	13	54
2. Grazing - beef	4	17
3. Grazing – sheep	2	8
4. Grazing – beef and sheep	4	17
5. Grazing – beef and sugarcane	1	4
Sub-total grazing	11	46
TOTAL	24	100

3. Range and Areas of Land Use Changes Selected

Of the total area of land use change (10,983ha) almost three-quarters involved pastures (Table 2).
This preference for perennial pasture systems could be attributable to a number of factors:

- Most of the successful applicants were either grazing enterprises or mixed farms with some grazing and hence have large areas of pastures on their properties
- Improving or establishing pasture is a cost-effective land use change option, and therefore the opportunity to make significant changes to the management of the whole property is feasible
- The potential loss of income from changing existing production systems is minimised
- Changes to pastures involve less alteration to overall property management compared with some other options.

Table 2: Land Use Changes – Relative Composition and Areas on ESS Sites

Land use change	Number of sites	Total area (ha)	Percentage of total area	Average area per site (ha)
1. Establish perennial pasture	19	2879	26	152
2. Improved management of perennial pasture	15	5212	47	347
3. Commercial tree plantings	6	104	1	17
4. Environmental plantings	19	703	6	37
5. Regeneration of native vegetation	14	764	7	55
6. Saltbush plantings	4	68	<1	17
7. Engineering solutions	3	757	7	252
8. Introduce wetting/drying cycles	3	496	5	165
TOTAL	24	10983	100	458

Next in importance for inland sites was the establishment of environmental plantings and regeneration of native vegetation. These two land use changes, although representing smaller areas than pastures, are significant as they were generally located on parts of the sites where the potential for improved habitat, reduced erosion and nutrient export, as well as benefits to salinity and carbon sequestration was greatest. While the cost of implementing these changes is greater than for pasture changes, it still permits reasonably large areas to be tackled within a limited budget.

On coastal acid sulfate soils sites, the dominant land use changes involved changes to drainage systems or alterations to wetting and drying cycles to restore natural groundwater levels, and hence better manage acid exports and generation. The cost of these changes enabled large areas to be tackled.

The smallest areas of land use change, that were also planned on only a small number of sites, were those for commercial tree plantings and saltbush. This result suggests that in considering their options, many applicants gave preference to those changes that required the least alteration to the established management patterns and systems already in place. For example, commercial tree plantings were generally located on sites where maximum impacts on groundwater recharge were needed, rather than as a commercially-driven alternative to other forms of perennial vegetation. The significantly greater cost of establishing plantations presumably would also be a major factor, as well as the extended payback time from this investment. The average area (17 ha) is similar to the typical areas planted on private properties under joint venture agreements managed by State Forests. The importance of this result for programs seeking to effect large scale catchment reforestation is clear. Saltbush, on the other hand, was mainly chosen either in the more westerly sites where it is endemic, or for use where its salt tolerance was desired.

4. Effectiveness of the selection process

An analysis of the effectiveness of the assessment process employed to select the final 20 sites was carried out (15). Particular attention was focused on the effectiveness of the toolkits used to the predict/quantify the various environmental services produced by land use changes on each property. In addition, the effects of using a composite EBI were closely evaluated.

A number of tentative conclusions can be drawn from this assessment of the process used for selecting sites under the ESS project:

- The ability of the individual toolkits to discriminate between land use changes in predicted levels of environmental services estimated was generally good and suggests that the toolkits are soundly based.
- Individual toolkits varied in the ranges of environmental service values which they predicted for different Land Use Changes (LUCs) with some services such as soil and nutrient retention covering a relatively narrow range of values. This could suggest either that the LUCs did not differ greatly in their effects on these services or that the toolkits were not sufficiently sensitive in detecting the small changes involved. Given that the starting point for most LUCs was either annual or perennial pasture, it might be considered that some changes, e.g. to establish environmental plantings where pastures were previously grown, would not necessarily greatly reduce soil erosion or nutrient export, because these problems were already under acceptable control in the current system. It will be necessary to test the toolkits under more extreme situations to decide this point.
- Combining the individual indices into an EBI produced a more nearly normal distribution of values compared to the individual indices alone, suggesting that the behaviour of individual indices may tend to become balanced out when they are included in a combined EBI. This may be an advantage when selecting for a range of services, but it may also conceal the differences between particular bids in specific services. If a particular service such as salinity or biodiversity benefits is considered a high priority, an equally weighted EBI comprising several environmental services may not identify the best bids.
- The combination of other factors such as demonstration value and cost-effectiveness in the selection process resulted in an even wider spread of scores than for environmental values alone. Additional factors would most likely be included in a competitive tender process, with specific weightings being given to factors such as cost-effectiveness. Care should be taken therefore to ensure that the inclusion and weighting of a minor criterion does not obscure the discrimination between bids. Selection based on an EBI alone or EBI-related criteria such as cost-effectiveness is preferable if the best environmental outcomes are to be realised.

5. Property planning standards

The ESS project has provided an opportunity to develop further insights into a standardised system for the preparation of property plans across NSW (16). During the development of final applications, each Region provided assistance to applicants in preparing a plan of their property showing existing and proposed land uses. These plans were prepared using GIS data where available, or alternatively aerial photographs. Considerable variability occurred in the level of detail which was included in the plans, although it was always possible to reconcile areas of change as outlined in the proposal document with the property plan. Ideally a uniform process would exist which used standard information, legends and overlays. The plan would also be accompanied by a written report covering other details of the land capability, vegetation and management options.

In developing a uniform system for property planning, the capability of the LUOS to contribute to this process should be recognised. The LUOS is a GIS-based tool intended for quantifying the environmental and economic impacts of land use change, based on scientific concepts. The LUOS is designed to enable:

- the recording, updating and correcting of spatial data such as land use
- the use of decision rules and models to locate areas for potential land use change
- develop and assess the options available to the landholder for the type, location, area and configuration of activities on the property
- assess the condition of the natural resource base of the property, to more fully understand the potential for delivery of environmental services, and potential risks to their delivery.

6. Cost-effectiveness of Process

Although the project is a trial, in most respects the competitive process for selecting sites followed principles which would be part of a normal tendering or auction system:

- All bids were confidential to the landholders
- Bid preparation did not involve direct participation by agency staff although advice was provided regarding typical costs for implementing land use changes
- Applicants did not know whether there was an upper limit on the cost of a bid (although they were aware that $2 million was available and 20 sites were being sought)
- Qualifying areas were focused on priority zones (for either salinity or acid sulfate soils) so that all applicants were targeting comparable types of services or combinations of services.

In some other aspects such as the requirement that the landholder make available financial records, and the site would be available for detailed studies and for demonstration purposes, the process contained disincentives compared with what might apply under an operational or market-based program.

Despite the potential negative aspects referred to, the cost of procuring enduring land use change under the trial appears to be comparable with other approaches. The average payment to landholders for all sites was $190 per ha over the 5 years of the contract period. In comparison, the costs for land use changes quoted under the Murray Catchment Blueprint ranged from $100 per ha for managing existing native pastures for conservation purpose up to $3000 per ha for restoring conservation areas in riparian zones. Given that the land use changes funded under the ESS covered a range of activities, the figures achieved appear quite encouraging.

Possible Further Developments

1. Monitoring programs

Experience in implementing the monitoring work program to date has indicated that it is essential to specify the level of precision required of the sampling program in order that the cost of the process does not exceed the point of diminishing return. Further research is required into sampling strategies which meet the minimum level of detail and accuracy to verify that the predicted level of environmental service is achieved. If the tools that have been developed are to have wider application, this aspect must be resolved, which will take time. By using information from other related research activities, the process may be speeded up. Effective links should be developed with such projects, some of which are being funded under NAP or NHT programs.

2. Economic assessments

The business planning and related economic analysis will provide over time, better estimates of the impacts on farm productivity of land use changes which produce environmental benefits. To obtain more comprehensive assessments of the economic factors affecting property level decision-making which involves land use change, links with investigations in other agencies and States are needed. There is a high level of interest and activity in this field, and there is value in developing more formal links between the ESS project and other groups with similar interests.

3. Extending the results from the project to operational scale environmental service purchase programs

Resulting from experience to date in implementing the Environmental Services Scheme, and in the implementation of other regionally based pilot programs (Heartlands, TARGET and Liverpool Plains projects), sufficient knowledge has now been developed to design and implement operational scale environmental services purchase programs. In addition, these initial schemes have provided the impetus to develop, and the opportunity to test, a range of decision support tools to enable effective assessments and comparisons of actions proposed at the property level.

Combined, these achievements could now allow for the immediate roll out of targeted, regional schemes providing income streams direct to landholders based on the environmental services they can provide. It is suggested that the funds would be allocated to Catchment Management Authorities (CMAs) specifically for use in running programs for the competitive purchase of environmental services from landholders. The allocations would carry a number of specifications related to program design and implementation (such as the need for competitive purchase, use of objective assessment, use of payment streams and the use of standard contracts of minimum term etc.). Within these constraints, CMAs would tailor the programs to specific geographic areas, the number and types of environmental services, and the timing of implementation - in line with their stated natural resource management objectives and targets.

List of References

1. Project plans
   1a Issue management plan
   1b Project plan and report 2002-03
2. Collection of media information regarding project including
   2a original brochure
   2b staff summary with FAQs
   2c Powerpoint presentation, and
   2d launch invitation
3. Overview of environmental service indices and toolkits
4. Expression of interest information package
5. Outline of process for selecting shortlist
6. EOI desktop system for estimating environmental services
7. Negotiating the proposal
   7a Outline of process
   7b Description of Land Use Options Simulator
8. Activity definitions
9. Guidelines to applicants and application form
10. Final selection process description
11. Contract shell
12. Protocols for baseline assessments and monitoring program
13. Schedule for development of business plans for contractors
14. Final summary of contracts
15. Assessment of the performance of the EBIs during the project
16. ESS pro-forma physical property plan

Figures

1. Map describing ESS showing locations of sites

The Environmental Services Scheme is a collaborative project of the NSW Government including staff from the NSW Department of Infrastructure, Planning and Natural Resources, State Forests of NSW and NSW Agriculture.

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