SEPA and GCVGN Partnership

Ecological Networks and River Basin Management Planning

Summary report

August 2010










SEPA
Scottish Environment Protection Agency

gcv green network
connecting our quality spaces

Entec

Entec

Creating the environment for business

Copyright and Non-Disclosure Notice

Third-Party Disclaimer

Document Revisions

No.	Details	Date
1	Draft for comment	20/05/10
2	Draft issued for dissemination seminar	24/05/10
3	Draft final for project completion	09/07/10
4	Final, for client checking	20/08/10
5	Final issue	31/8/10

Entec

Creating the environment for business

Report for

Louise Bond,
Senior Biodiversity Ecologist
SEPA Corporate Office
Erskine Court
Castle Business Park
Stirling
FK9 4TR

Main Contributors

Heather Musgrave
Graham Morgan
Richard Stokes

Issued by

.....
Heather Musgrave

Approved by

pp Bmsmith
.....
Andy Brooks

Entec UK Limited

Pacific House
Imperial Way
Reading RG2 0TD
England
Tel: +44 (0) 1183 775600
Fax: +44 (0) 1183 775610

Doc Reg No. 25755C41

h:\projects\hm-255\25755 clyde ecological networks\docs\project report\final\25755c41i2 clyde project report final.doc

SEPA and GCVGN Partnership

Ecological networks and River Basin Management Planning: Clyde Pilot Study

Project report

August 2010

Entec UK Limited

Certificate No. FS 13881

Certificate No. EMS 69090

In accordance with an environmentally responsible approach, this document is printed on recycled paper produced from 100% post-consumer waste, or on ECF (elemental chlorine free) paper

Introduction

This paper summarises the work undertaken by Entec for SEPA and the Glasgow Clyde Valley Green Network Partnership (GCVGNP) on the project "Ecological Networks and RBMP: Clyde Pilot Study", and makes recommendations for how the methodology and ideas from the project could be taken forward both within the Clyde Valley, and more widely across Scotland.

The project was initiated by SEPA and GCVGN to investigate opportunities for achieving multiple benefits through the river basin management planning process. In particular, the project has looked for opportunities to create or enhance areas of habitat and habitat connectivity, whilst also achieving improvements that contribute to meeting the objectives of the Scotland and Solway Tweed River Basin Management Plans (RBMPs). The aim is to recognise the reciprocal benefits: i.e. to deliver river basin planning objectives as part of projects being delivered to meet 'other' drivers, as well as integrating wider biodiversity benefits in to RBMP-led projects. Improvements to habitat connectivity are seen as a key mechanism for reversing the effects of fragmentation on biodiversity, improving landscape resilience, and helping species adapt to climate change. The project was initiated to investigate the recognised areas of overlap in RBMP measures and habitat creation works, and the potential for improved collaboration and funding opportunities that could result from combined opportunities.

The river basin management process focuses on the improvement of the water environment. Implementation of the WFD also provides opportunities to improve wider (i.e. beyond aquatic) areas of habitat, particularly in the riparian zone and floodplains, but potentially also in the wider catchment. A number of RBMP measures will result the creation of new areas of habitat (e.g. during floodplain restoration, installation of buffer strips along rivers, or creation of wetlands for SuDS) and, if suitably located, therefore have the potential to contribute to the enhancement or expansion of ecological networks. In addition to these direct benefits, taking a larger view of the benefits that could be provided to the wider environment and to the community, including habitat creation and improvement, will make projects more widely appealing and beneficial. A combined approach can create new partnerships and open up dialogue between parties who had not previously worked together. This can result in benefits for example of pooled resources, realising multiple benefits, and improving value for money, and has the important effect of ensuring that people working in similar geographical areas are talking to each other and ensuring that individual projects become more joined up. Developing projects with multiple benefits has the potential to open up new areas of funding that may not have been available for projects of more restricted focus.

Examples of the types of schemes that might be relevant are suggested in Table 1. Often these types of measures do not have a clear driver or a responsible party for implementation, particularly where old engineering structures are present. While SEPA's Restoration Fund has been set up to assist with this problem, incorporating the removal of structures in to a wider scope of work including habitat creation and other benefits may make the programmes of work more widely beneficial. (.e.g. incorporating bank reprofiling in to a wider landscape creation and recreational opportunity, or ensuring that the design and implementation of SUDS delivers multiple benefits for biodiversity, water quality, flood storage and recreation). This project has sought to identify suitable areas where such schemes can provide the greatest environmental benefit.

The project derived a methodology for identifying areas with the opportunity to achieve multiple benefits in restoration and/or development, and applied it to the Clyde valley as a pilot study. The area included in the pilot study is shown in Figure 1. The project was designed to start at the broad scale and use GIS datasets and data processing to screen for potentially suitable areas. By combining with other datasets that show areas already identified as being of interest for improvement or development, and increasingly using local knowledge to refine the options, the optimum areas to focus on for improvement can be identified. This is a pioneering area of work, and as might be expected, complications arose in relation to the size of the Clyde pilot study area and the provision and manipulation of data. Nevertheless a suitable process has been derived, with principles that can be applied elsewhere. Taking account of the experiences of the Clyde, recommendations for future application are presented at the end of this report.

Table 1 Examples of ecological network improvements that could be achieved through RBMP

RBMP measure	Benefit to habitats and habitat connectivity	Additional benefits
Improvement of modified riparian habitat to reduce morphological pressures	Enhancement and expansion of areas of riparian habitat; benefits to health and function of aquatic ecosystems	Restoration of natural sediment transport systems; reduced erosion through bank stabilisation, improved species dispersal ability, helps improve water quality
Change from hard flood defences to provision of floodplain storage to reduce morphological pressures	Creation of new wetland habitats; opportunity to reconnect river to floodplain	Flood alleviation and flood storage; improved water quality
Addressing urban diffuse pollution and flood risk through SuDS	Creation of habitat networks within urban areas	Improve urban greenspace, public amenity, access and health, and urban landscape.
Addressing rural diffuse pollution through creation of buffer strips along watercourses	Reduces disturbance of riparian habitats. Potential creation of new wetland, woodland, semi-natural or natural habitat; creation of habitat niches.	Contributes to bank stabilisation; allows species dispersal along riparian corridor

Methodology

The premise of the project is relatively simple, i.e. to identify whether ecological networks can be enhanced through the implementation of measures under the Water Framework Directive. However depending on the size of study area being considered, and the data available, the data processing can involve a few steps, using GIS. This summary report does not describe the steps undertaken for the Clyde in detail, as these are likely to vary for other locations (in fact it is important to allow for local priorities, and the methodology should not be taken as a rigid set of steps, but more as a framework for application elsewhere). Instead the report focuses on conveying an understanding of the principles of the overall process.

The following basic datasets are required (although they can be adapted according to local data availability, brief descriptions are provided of the datasets that were used in the Clyde):

- Spatial data showing the locations of failing baseline waterbodies identified in the RBMP, and their associated catchments. For the Clyde, only rivers and lochs were used;

- Pressures and measures data for individual failing baseline waterbodies. For the Clyde, only morphology and diffuse pollution pressures were considered. For morphology, the focus was on bankside rather than in-river. Other relevant pressures could include Combined Sewer Overflows (CSOs), mining or landfill, which are identified as point source pollution pressures in the RBMP dataset;

- Data representing the extent of habitat networks. In the Clyde wetland and woodland habitats were included, and used the Integrated Habitat Network datasets developed by Forest Research (2008). If there is no existing network dataset, then all available habitat data (e.g. SEPA's wetland inventory; greenspace data; SNH woodland inventory) should be accumulated in to a single file and a standard buffer distance applied around it to represent an assumed extent of connectivity;

- Depending on the scale and purpose, additional data can be included representing "Opportunity Areas", for example local wildlife sites in need of improvement, or regeneration and Community Growth Areas. Additional data being derived or collated as part of the RBMP process may also become useful, particularly in Priority Catchments.

Figure 2 shows a simplified flow chart of the process undertaken to develop screened areas and identify case studies for the Clyde. By processing in GIS, the outputs of the screening process should be:

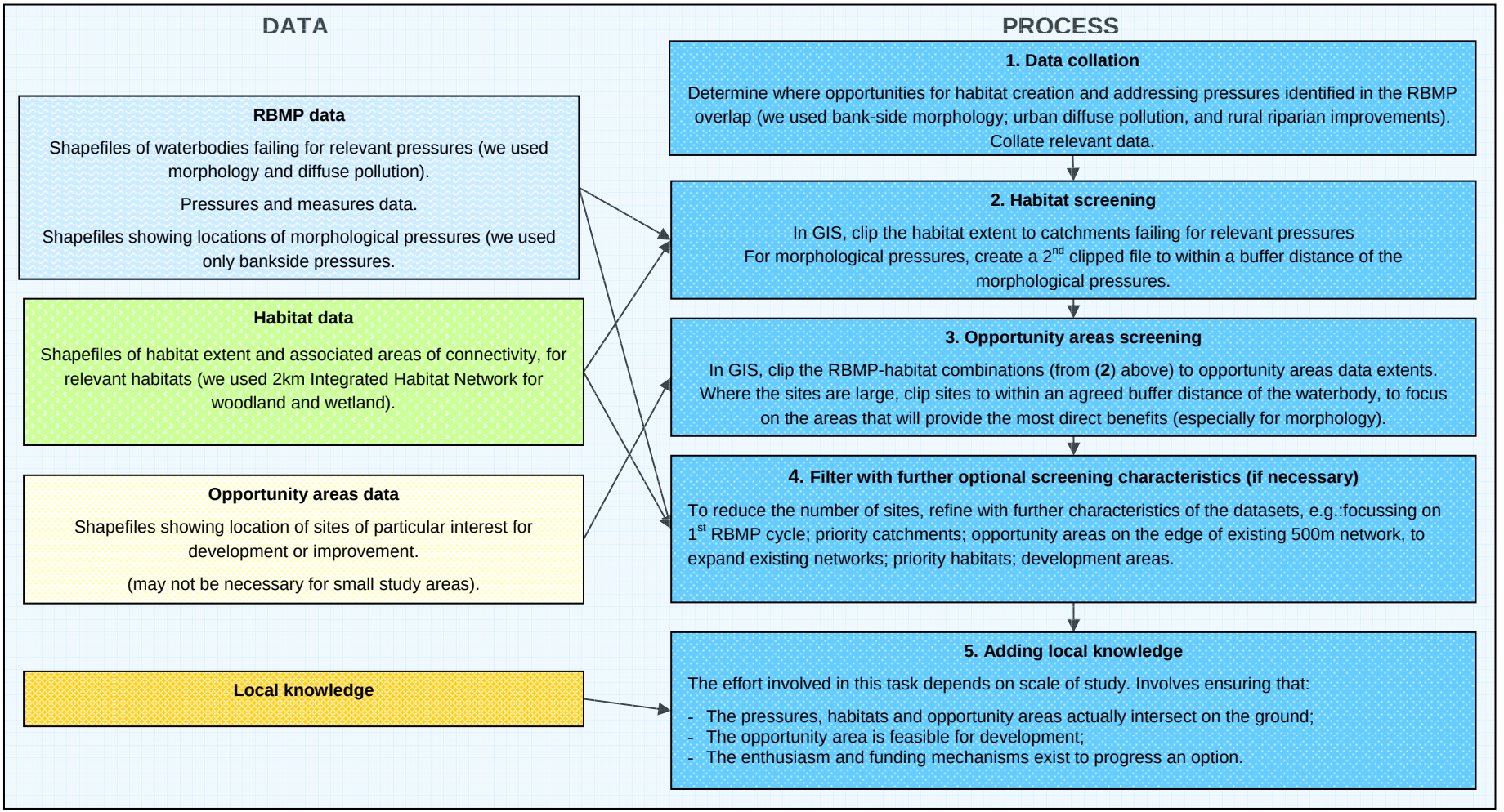
- A shapefile showing areas where pressures affecting waterbody status coincide with ecological networks. This is the output of Step 2, identifying where addressing pressures could enhance or expand habitat networks. Attributes in the shapefile relating to waterbody classification and habitat type enable further filtering of sites where necessary (This is Step 4. For example, allows focus on sites that need to be addressed by 2015). This allows a degree of ranking, to allow prioritisation of projects delivering greater gain, with a higher degree of confidence;

- A shapefile showing where those areas coincide with sites proposed for development or improvement. This is Step 3, which provides a second level of screening to help cut down the number of options where a large area is being considered. If the study area is only small, it may not be necessary to include this second stage.

Figure 3 shows an example of the GIS outputs produced, for East Dunbartonshire in the Clyde Valley. The figure shows the outputs of Steps 3 and 4: firstly with all possible sites from Step 3, which is then overlain by a refined selection showing only sites with an objective to meet Good Status by 2015 (as specified in the RBMP).

Getting from the point of having a completed GIS layer to having a sensible number of sites with the potential to progress may require a significant "reality check". Local knowledge is critical for identifying realistic sites. Depending on the size of area being considered, the party undertaking the screening may have enough knowledge, or it may be beneficial to hold a workshop to allow input from other local experts.

Figure 2 Outline methodology



Case Studies

The screening and filtering process described in Figure 2, when carried out for the Clyde pilot area, resulted in a large number of potential sites being identified, as a result of the size of the area, the amount of data, and the number of failing waterbodies. To refine the process and provide local input to the site selection, a workshop was held in December 2009, at which participants were invited to suggest sites they thought may be of relevance. These sites were compared to the screening results, and a number of the sites were selected for use as case studies, as shown in Box 1. The first three case studies are projects already underway that provide excellent examples of the achievement of multiple benefits, in different types of situations. In contrast, the case studies of Capelrig Road SINC and the Glazert Water describe sites where stakeholders have an interest in improving the site/area, but no work has yet undertaken. For the latter two, the outputs of the screening, and further discussions with interested parties, have been used to suggest a way forward in deriving restoration programmes.

Box 1 A selection of opportunities in the Clyde Valley (identified through the screening process and workshop)

Auchlochan

This land purchase by the Forestry Commission covers a large area between the Nethan Water and the Poniel Water in South Lanarkshire. The area includes some existing forested areas, some previously grazed land (predominantly sheep), Coalburn Moss SSSI, and areas of old mine workings. The plans for the site propose considerable mixed planting, areas of riparian planting on both rivers, improved management of Coalburn Moss, and progressive attempts to restore the mine workings. The proposals will not only create extensive new areas of woodland habitat, but will also play an important role in addressing recognised pressures on both waterbodies: in particular, reducing diffuse pollution from livestock farming in the Nethan Water, and from mining on the Poniel Water.

Capelrig Road SINC

The SINC on Capelrig Road in Newton Mearns has been underused due to the density of planting making it unappealing to local residents. Felling and replanting on the SINC is providing improved woodland habitat, on higher ground above the Auldhouse Burn. There is the potential for wider-scale improvements and contributions to improved waterbody status to be achieved, by restoration and flood management works of the Burn, both within the SINC and in nearby upstream areas.

Glazert Water

The Glazert Water is designated as Heavily Modified and has undergone a significant degree of modification as a result of urbanisation, with associated flood defences. Initial (desk based) consideration of the locations of morphological pressures indicates that it could be feasible to restore some of the more rural stretches that have been subjected to considerable realignment and embankment, and that such improvements could contribute significantly to improving the physical condition of the river as a whole. There are also fisheries interests on the river, with the Glazert considered to be one of the few areas providing suitable salmonid spawning habitat in the Kelvin catchment as a whole. Potential opportunities exist to combine in-river habitat improvements with wider scale river and floodplain restoration works. East Dunbartonshire Council, local angling organisations, and the Clyde River Foundation, have interests in the river that should be combined to bring the maximum coordinated benefit.

Lochwinnoch

The RSPB will be undertaking considerable improvement works at Lochwinnoch reserve, involving restoration works associated with a number of waterbodies as well as improved wetland habitat. The works seek to reconnect three burns to Barr Loch, which were diverted historically and currently flow parallel to the lochshore, rather than in to the loch. Improvements to Aird Meadow, on the banks of Castle Semple Loch, will improve connectivity between waterbodies and create wetland habitat closer to the RSPB's reserve, making them more accessible to visitors. These works will help to improve the morphological condition of the lochs and associated burns.

Pollokshaws

The Pollokshaws SuDS scheme supports the masterplan of Glasgow City Council and Glasgow Housing Association to regenerate an area of 1000 properties, in the vicinity of White Cart Water and Auldhouse Burn. An area-wide SuDS scheme is a crucial component of ensuring that the development will support the major White Cart Flood Prevention Scheme. An integrated approach to SuDS will also help to ensure the greatest benefit for water quality in the area, thereby supporting the improvement of waterbody status for the RBMP, and create new areas of habitat across the development.

Recommendations

This pilot project on the Clyde has highlighted how many areas of overlap exist, where combined improvements could potentially be achieved. Using the project outputs in the Clyde Valley can help to support effective decision-making, inform investment, and achieve maximum environmental, social and economic benefits. Outputs have been produced that can be used within SEPA and GCVGNP, in the Clyde Area Advisory Group, and more widely in the Clyde Valley by dissemination to local authorities. Sharing the opportunity areas created in the project with partners delivering river basin planning is essential to delivering improvements and allowing potential opportunities to be realised. Even where the process is not used formally to identify sites, it is hoped that knowledge of the project will raise awareness of the benefits of partnership working and of the wider benefits that can be achieved through implementing measures under RBMP.

It is recognised that some datasets will become out of date over time, for example as measures are put in place to address pressures identified in the RBMP, and development sites are progressed. As a result consideration will need to be given to keeping the datasets up to date. On the whole it is expected that the outputs of Step 2 (with the attributes used for filtering at Step 4) will remain applicable over a longer time period than the outputs of Step 3. It is recommended that the outputs of Steps 3 and 4 should be used to identify projects over the next one or two years. Subsequently, the outputs of Step 2 can be retained for more 'reactive' use, for example when a new development site is proposed, to see whether it could be adapted or enhanced to provide multiple benefits.

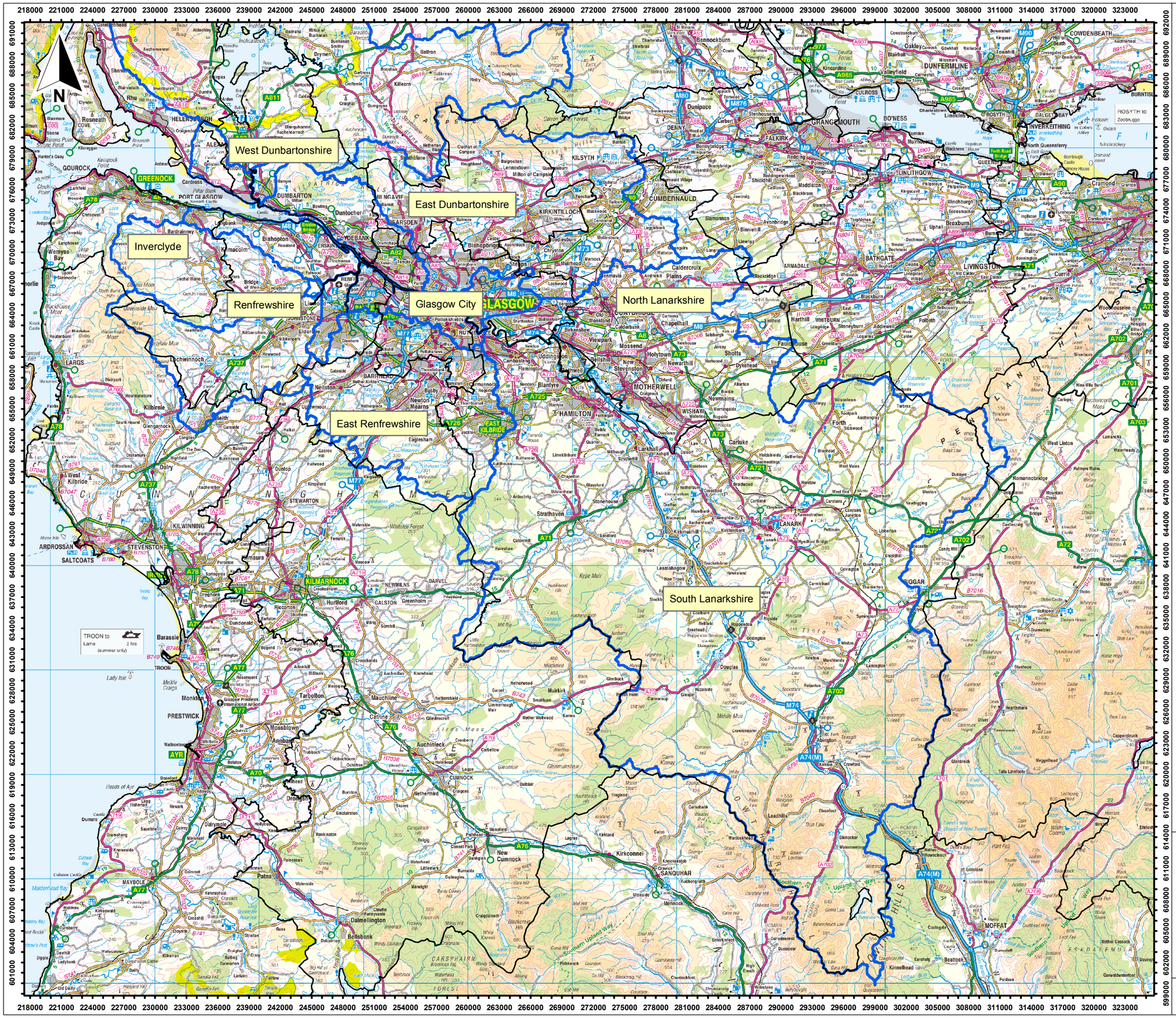
The details of the methodology have not been discussed here, but nevertheless a few general points may be beneficial for future consideration. For example, the methodology was most successful in creating well-defined areas of focus for morphology. For diffuse pollution, the process can assist in prioritising catchments for addressing diffuse pollution, but is more limited in the extent to which it can identify specific locations within catchments for focus, when using RBMP data alone (although additional information on the location of point sources could be used if available). It would also be beneficial in future to further consider the influence of upstream catchments on downstream waterbody status (e.g. in relation to diffuse pollution and flood risk). For the Clyde, this was achieved to some extent for diffuse pollution (by considering the number of downstream waterbodies that would benefit from upstream improvement), however there may be potential to improve this for morphology using the principles of WFD94 (SNIFFER, 2008). The use of information currently being collected for priority catchments is also likely to be of use.

The use of the methodology on the Clyde Valley highlighted where improvements to the methodology could be made when applying it elsewhere, and where other types of data may be useful. In producing the methodology it was recognised that it may not be appropriate to apply exactly the same steps and same data elsewhere. For example, other areas may have particular priority habitats that they wish to focus on, or particular pressures in the RBMP that need to be addressed. It is strongly recommended that the methodology should not be taken as a strict set of steps to be followed precisely, but as a framework that can be adapted according to local preferences. With the considerable amount of work being (and required to be) undertaken for the WFD, it is hoped that the use of this

process, and the ideas contained therein, will contribute to a holistic and streamlined approach to achieving WFD objectives across Scotland, with benefit for the wider environment.

Further information

For further information, refer to the full project report, which is available on the SEPA and GCVGN partnership websites.



Key:

Local Authority boundaries

Waterbody catchment boundaries

0 10,000 20,000 Meters

Scale: 1:350,000 @ A3

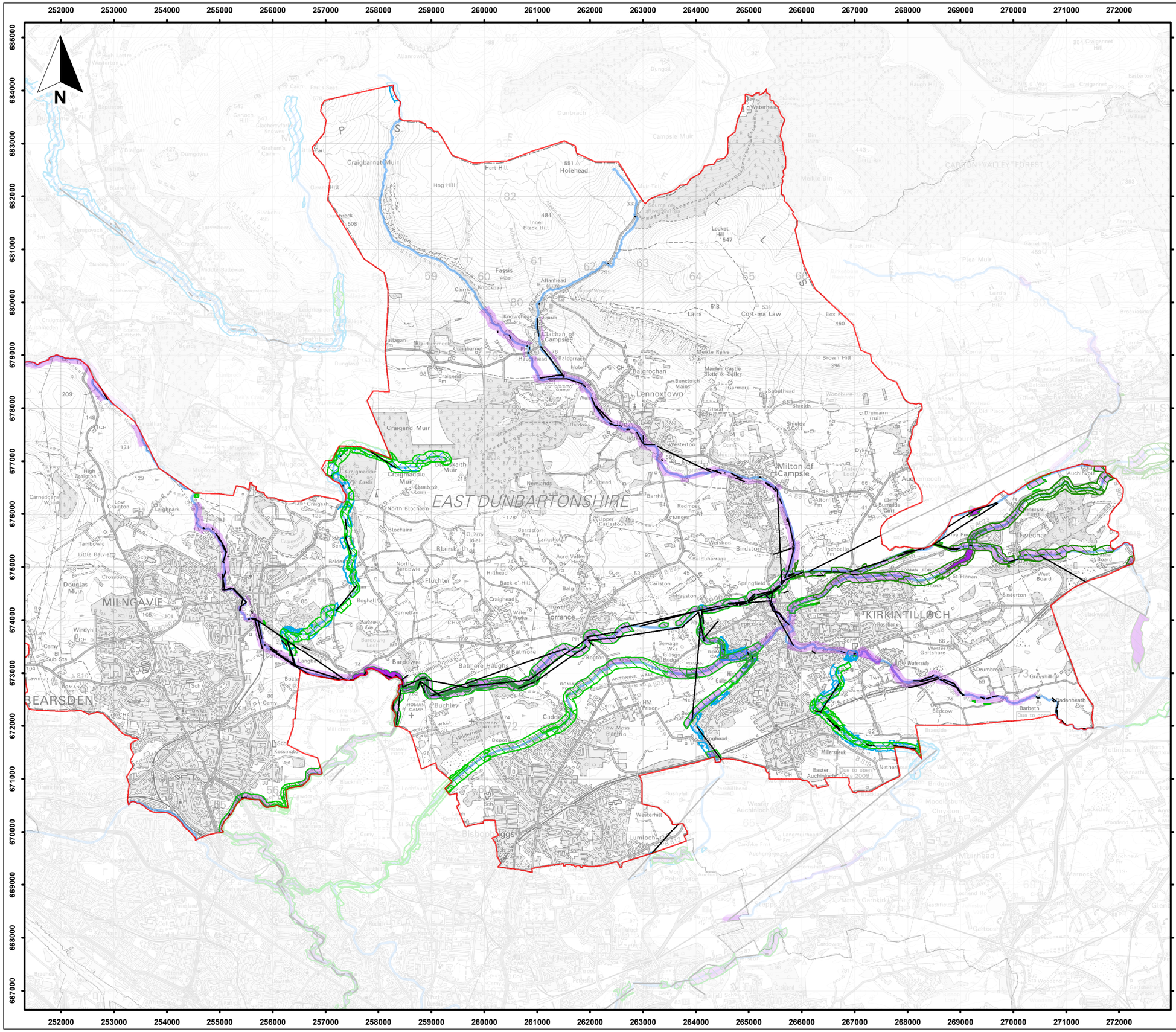
H:\Projects\HM-255\25755 Clyde ecological networks\drawings\25755-B02 study area.mxd

Ecological Networks and River Basin Management Planning: Summary report

Figure 1
Study Area

May 2010
25755-B02 musgh

Entec



Key:

- Bankside engineering structures
- Rivers

Screened areas, where habitat networks coincide with the following pressures:

- Morphology (all)
- Morphology (refined)
- Urban diffuse pollution (all)
- Urban diffuse pollution (refined)
- Riparian pressures (diffuse pollution or morphology) (all)
- Riparian pressures (diffuse pollution or morphology) (refined)

0 500 1,000 1,500 2,000 Meters

Scale: 1:70,000 @ A3

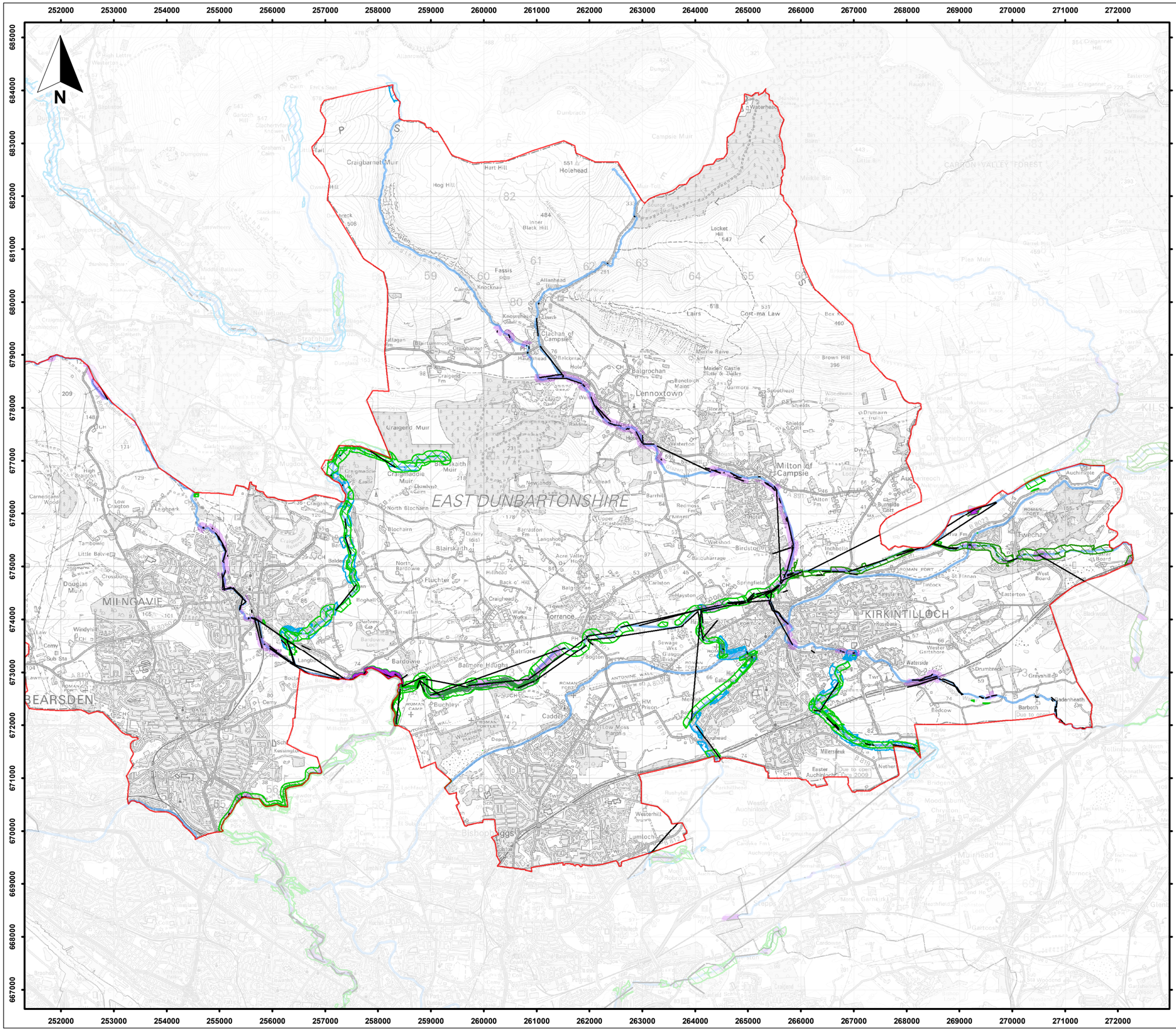
H:\Projects\HM-255\25755 Clyde ecological networks\drawings\scoping report\B35 Fig2 East Dunbartonshire.mxd

Ecological Networks and River Basin Management Planning: Summary Report

Figure 02
Example outputs: East Dunbartonshire screening

May 2010
25755-B35 musgh

Entec



Key:

- Bankside engineering structures
- Rivers

Screened areas, where habitat networks coincide with the following pressures:

- Morphology (Step 3)
- Morphology (Step 4)
- Urban diffuse pollution (Step 3)
- Urban diffuse pollution (Step 4)
- Riparian pressures (diffuse pollution or morphology) (Step 3)
- Riparian pressures (diffuse pollution or morphology) (Step 4)

0 500 1,000 1,500 2,000 Meters

Scale: 1:70,000 @ A3

H:\Projects\HM-255\25755 Clyde ecological networks\drawings\summary report\B57 Fig3 East Dunbartonshire.mxd

Ecological Networks and River Basin Management Planning: Summary Report

Figure 02
Example outputs: East Dunbartonshire screening, Steps 3 and 4

August 2010
25755-B57 musgh

Entec