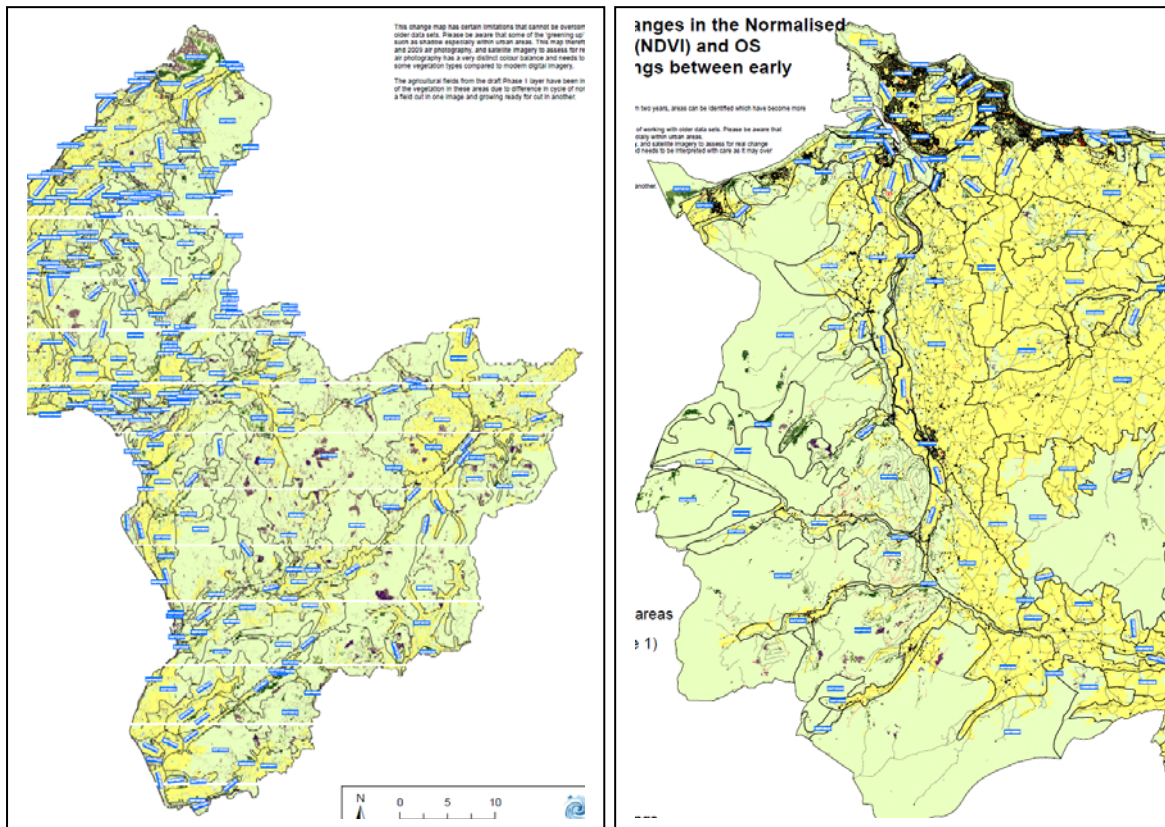


INTERPRETATION OF LANDMAP VISUAL & SENSORY CHANGE DETECTION PACKS: SNOWDONIA NATIONAL PARK



Final Report

for

Natural Resources Wales

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LANDMAP visual and sensory data change detection sheets

1. Introduction

1.1. Natural Resources Wales commissioned White Consultants in August 2013 to undertake the interpretation of LANDMAP Visual & Sensory aspect change detection packs for Powys and North Wales excluding the Isle of Anglesey. This study is for the Snowdonia National Park in Snowdonia National Park and Gwynedd. It is intended to provide the desk study evidence base to understand where changes may have occurred since the original LANDMAP assessments.

1.2. The tasks set out in the brief are as follows:

Stage 1

- Desk study of the Change Detection Pack data using techniques derived from the pilot study and the technical report guidance provided.
- Identification of areas of significant landscape change.
- Preparation of a tabulated excel table filling in columns 1-4 and 8.
- Map extracts to show potential boundary changes if appropriate for clarity

Stage 2a

- Review change questionnaire responses from local authorities provided by NRW.
- Preparation of a tabulated excel table filling in column 5 and amending 8 as necessary.

Stage 2b

- Review changes from other resources provided by NRW.
- Preparation of a tabulated excel table filling in column 6 and amending 8 as necessary.

Stage 2- report and check for Consistency report changes

- Checking if any changes have already been implemented in Consistency report changes on latest LANDMAP dataset
- Prepare a short summary report of key changes and influences for each authority.

1.3. The Change Detection Pack data provided includes the following:

- OS maps
- Existing Visual and Sensory layer
- Aerial photographs dated 2001 and 2010.
- Phase 1 Habitat Survey 2008/9
- Tranquillity Map of Wales
- Normalised Difference Vegetation Index [NDVI]
- Mastermap road and building change maps
- Segment Density/Complexity Maps [SD]
- Seasonal change derived from Phase 1 mapping
- Mega Change Map - incorporating key changes in a single map (based on simplified NDVI and Mastermap)

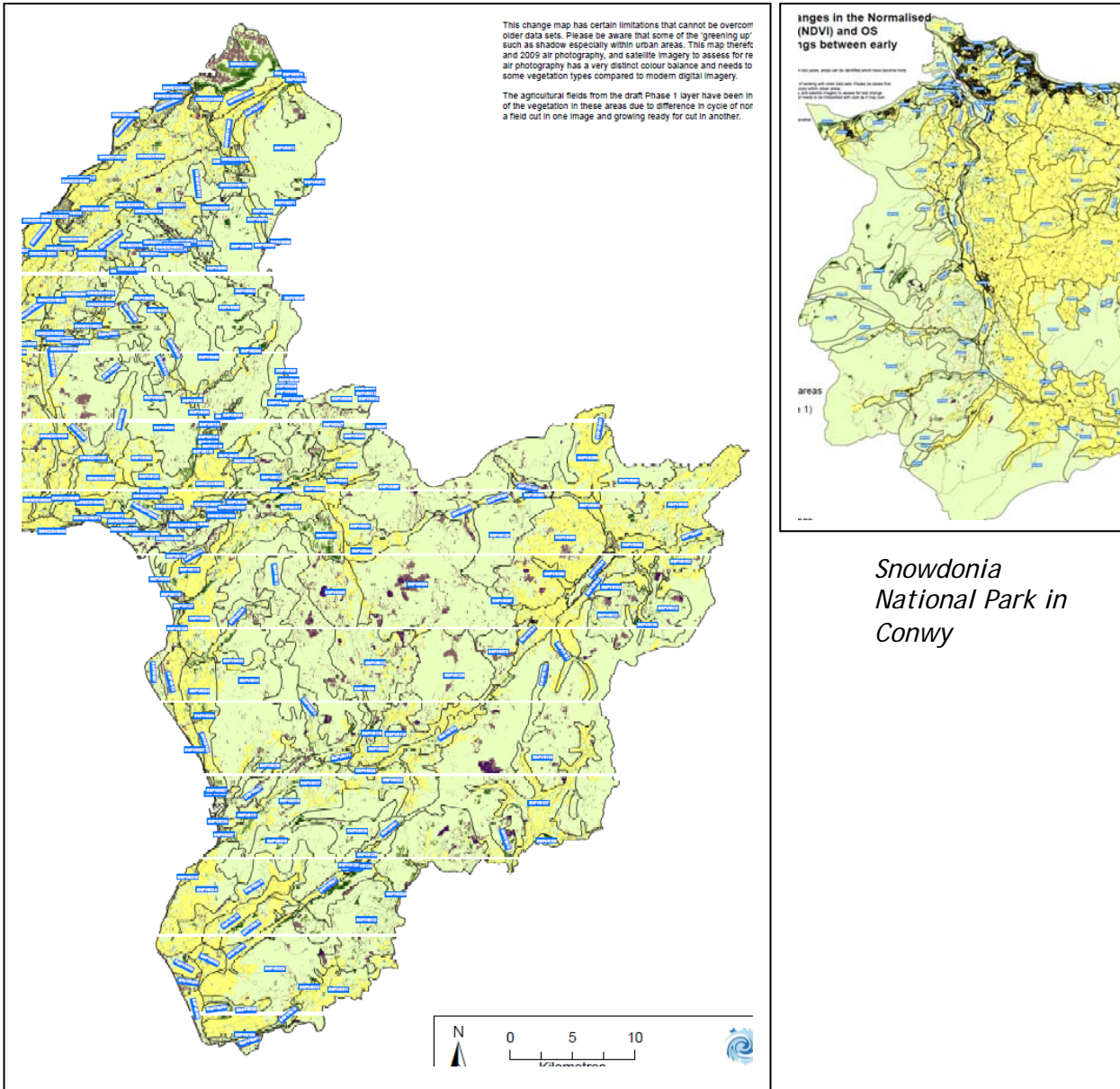
The information is in hard copy form and in GIS.

- 1.4. Other GIS data has been obtained including broadleaf planting from NRW which have proved invaluable in places.
- 1.5. Simon White has liaised with the client and Environment Systems on the data and inputs from various local planning authorities. The method has been derived from the guidance and from previous monitoring experience in South Wales.
- 1.6. The most useful data used in the study have been the Mastermap road and built form change, NDVI, the Mega change map (see Figure) and 2001 and 2009/2010 aerial photographs. This has allowed assessment at a broad and detailed level with small scale changes to be identified in places.
- 1.7. The most detailed data are the aerial photos which have been used to verify indications of change in other data. The 2001 and 2010 photos are the most useful to identify and verify significant change but they have a very different colour balance and degree of contrast, and were flown at different times of year. This makes identification of change more difficult.
- 1.8. The input of Local Authority staff has been found to be very useful, especially to identify changes which would not necessarily be able to be detected remotely.
- 1.9. The purpose of the study is not to refine/improve the current Collector text or aspect area GIS boundaries. It is only to monitor and note potential change. This can then be verified in the field. There are limitations to this desk based stage. It is possible that some noted changes may not be perceptible, eg young broadleaf planting in conifer plantations or rhododendron removal, and some may not be regarded as significant at the Level 3 scale of the assessment/aspect area. Other changes may affect a wider area than noted at the desk study. Some changes may not be perceptible at the desk study level but are apparent on site. An example could be single wind turbines or wireless masts. Therefore, the site survey element of the study is essential, particularly for the visual and sensory aspect, where perception and changes at key points for public access can be very important.
- 1.10. The tabulated list of potential changes drawn from the analysis for each relevant aspect area is set out in the Appendix and is available as a separate excel table.
- 1.11. The issues that have arisen from the study of this specific area are discussed in Section 2.0.

2. Potential changes in the study area

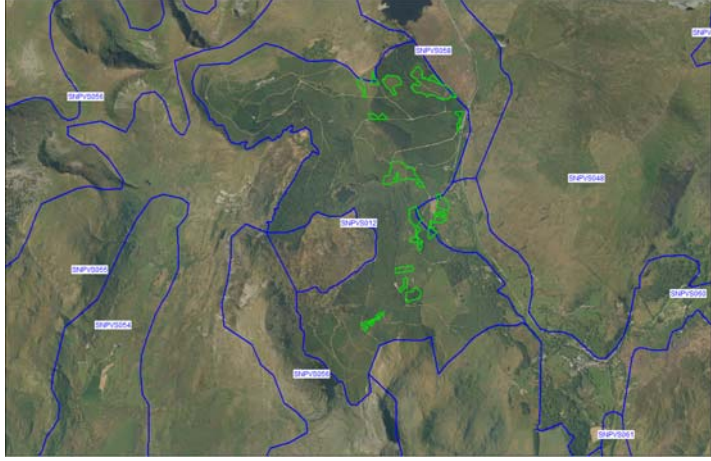
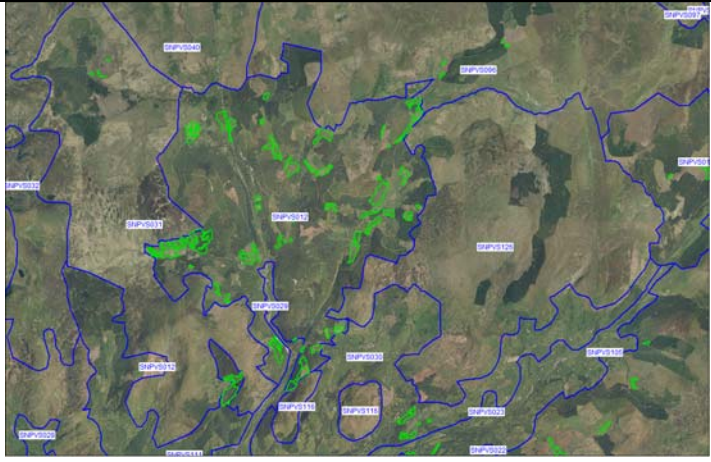
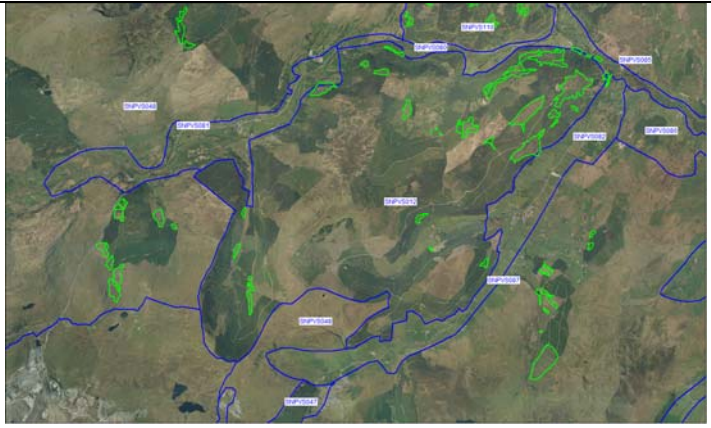
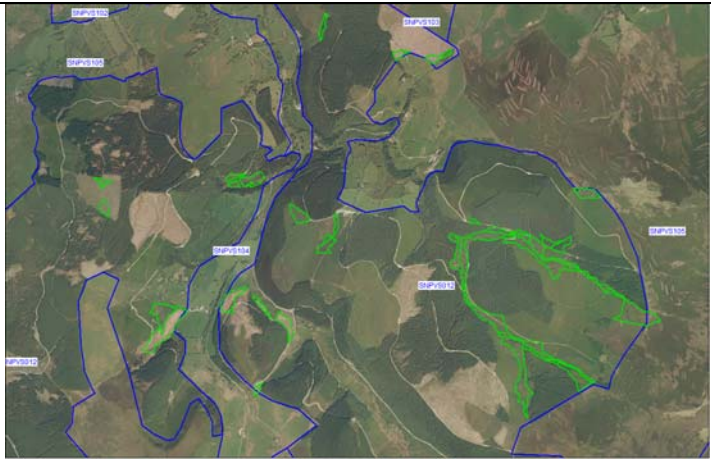
- 2.1. Within the study area the key changes appear to be:
 - Felling and broadleaf plantings which may change the character of the extensive conifer forest plantations.
 - Removal and eradication of rhododendrons around areas such as the Mawddach estuary and Beddgelert/Nant Gwynant
 - Management plan agreements on uplands eg Migneint which may change the character over time
 - Expansion of quarry- Penrhyn.
 - Expansion of caravan parks/leisure facilities in places.
 - Recreational pressure on coastal dunes eg Llandanwg dunes and lagoon

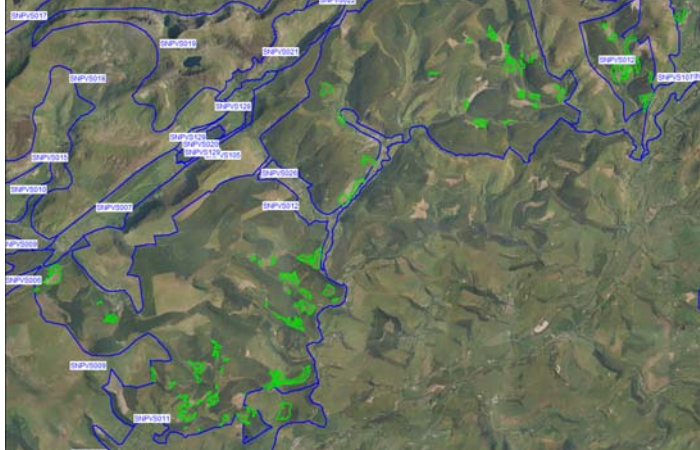
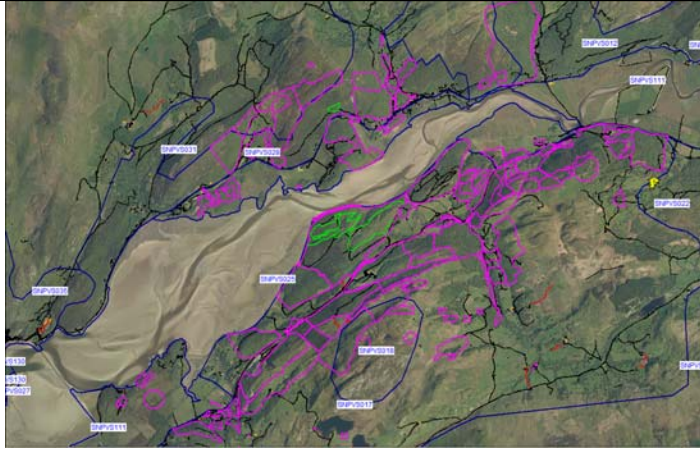


These are illustrated by maps and aerial photos on the following pages.

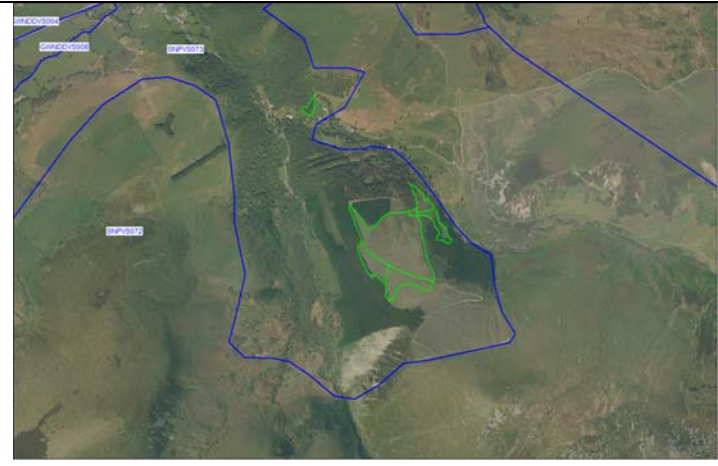
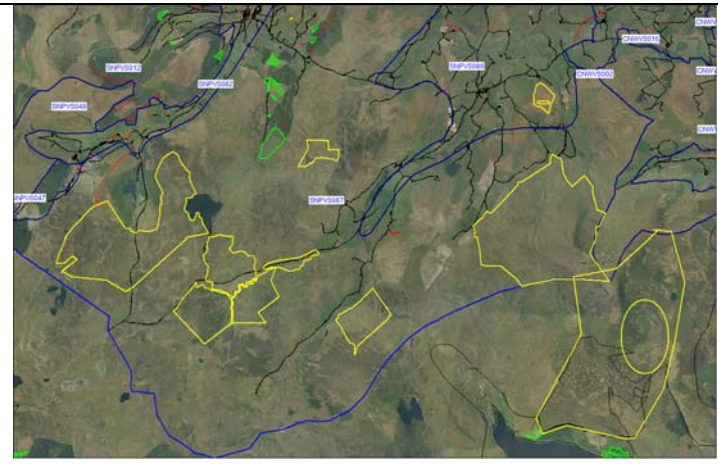
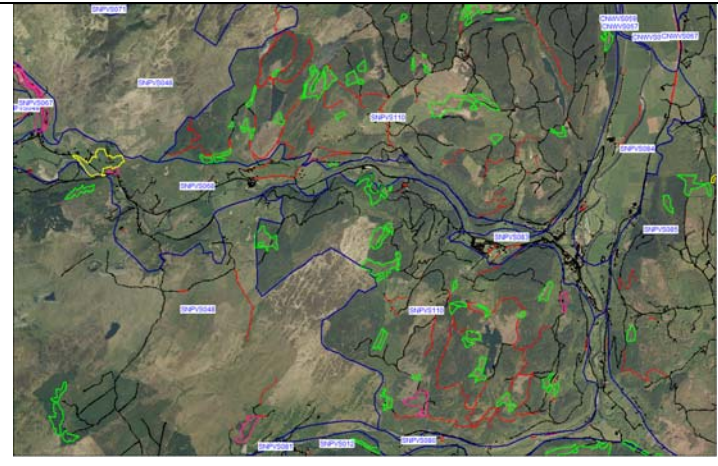


*Snowdonia National Park in Gwynedd
Mega change maps*



| Aerial view of change | Potential/actual change |
|---|--|
|  | <p>SNPVS012</p> <p>Felling and broadleaf planting (green bordered areas) in conifer plantation type- central/north</p> |
|  | <p>SNPVS012</p> <p>Felling and broadleaf planting (green bordered areas) in conifer plantation type- central/south</p> |
|  | <p>SNPVS012</p> <p>Felling and broadleaf planting (green bordered areas) in conifer plantation type- east-Conwy</p> |
|  | <p>SNPVS012</p> <p>Felling and broadleaf planting (green bordered areas) in conifer plantation type- east</p> |

| | |
|---|--|
|  | <p>SNPVS012</p> <p>Felling and broadleaf planting (green bordered areas) in conifer plantation type- south</p> |
|  | <p>SNPVS017</p> <p>Removal and eradication of rhododendrons around the Mawddach estuary (areas of removal programme defined by purple lines)</p> |
|  | <p>SNPVS059</p> <p>Caravan park- 2001 (before)</p> |
|  | <p>SNPVS059</p> <p>Caravan park extension and intensification plus development to south- 2010 (after)</p> |

| | |
|---|--|
|  | <p>SNPVS073</p> <p>Felling and broadleaf planting (green bordered areas) in Abergwyngregyn</p> |
|  | <p>SNPVS087</p> <p>Management scheme underway (RTE- Rhaglen Tir Eryri) in Migneint (yellow bordered areas)</p> |
|  | <p>SNPVS110</p> <p>Felling and broadleaf planting (green bordered areas) in forest plantation type- Conwy</p> |

APPENDIX

LANDMAP VISUAL AND SENSORY DATA CHANGE DETECTION SHEETS: SNOWDONIA NATIONAL PARK

CONWY

| Aspect area | | Change- indicated by: | | | | | Stage 2c | |
|-------------|--------------------|--|---|-----------------------------|---|-------------------------------|------------|--|
| UID | Name | OS data, aerial photos and roads and buildings | Complexity maps (segment density) and NVDI | Phase 1 and seasonal change | LPA workshop/questionnaire | Other resources | Field-work | Recommended LANDMAP amendment- GIS or survey or both |
| SNPVS012 | Conifer plantation | Aerial- felling evident | NVDI-felling indicated | | | NRW- broadleaf planting plans | | Survey- possibly amendments to description to mention felling of compartments and some broadleaf planting |
| SNPVS048 | Snowdon Uplands | Aerial- felling evident | NVDI-felling indicated | | | NRW- broadleaf planting plans | | Survey- possibly minor amendments to description to mention broadleaf planting in conifer blocks |
| SNPVS072 | Carneddau Uplands | | Segment density- significantly less complex | | | | | Survey- site survey to ascertain possible changes to vegetation cover but not apparent from aerial photos- could be seasonal change |
| SNPVS087 | Migneint | Aerial- felling evident | NVDI-felling indicated; Segment density- less complex | | Management scheme underway (RTE- Rhaglen Tir Eryri) | NRW- broadleaf planting plans | | Survey- possibly minor amendments to description to mention broadleaf planting in conifer blocks and management related to RTE management scheme. Site survey to ascertain possible changes to vegetation cover but not apparent from aerial photos- could be seasonal change. |
| SNPVS110 | Forest Plantation | Aerial- felling evident | NVDI-felling indicated | | | NRW- broadleaf planting plans | | Survey- possibly amendments to description to mention felling of compartments and some broadleaf planting |

GWYNEDD

| Aspect area | | Change- indicated by: | | | | | Stage 2c | |
|-------------|--------------------|--|--|-----------------------------|--|--|------------|--|
| UID | Name | OS data, aerial photos and roads and buildings | Complexity maps (segment density) and NVDI | Phase 1 and seasonal change | LPA workshop/ questionnaire | Other resources | Field-work | Recommended LANDMAP amendment- GIS or survey or both |
| SNPVS003 | Tywyn | | | | Anglesey and Snowdonia seascape assessment- tall buildings in Tywyn visible across coastal plain | | | Survey- consider adding taller buildings to description of town and management recommendations |
| SNPVS010 | Penrhyn quarry | Aerial- extension evident | NDVI- extension to south evident | | | | | GIS- amend boundary |
| SNPVS012 | Conifer plantation | | | | Rhododendron present in plantation east of Penrhyn-draeth and north of Mawddach estuary | NRW- broadleaf planting plan indicates some broadleaf planting applies to several areas of the type centrally, south and to the east | | Survey- possible description character change from conifer plantation to mixed woodland (although conifers are still dominant), presence of rhododendron and management recommendation changes |
| SNPVS016 | Llwyngwriil coast | | | | Anglesey and Snowdonia seascape assessment- new sea defences | | | Survey- consider adding sea defences to description and potential management considerations |
| SNPVS017 | Daran | | | | Rhododendron eradication programme in woodland well underway | | | Survey- possible description character changes to include rhododendron in woodland in places and management recommendation changes |

| Aspect area | | Change- indicated by: | | | | | Stage 2c | |
|-------------|-----------------------|--|--|-----------------------------|--|--|------------|--|
| UID | Name | OS data, aerial photos and roads and buildings | Complexity maps (segment density) and NVDI | Phase 1 and seasonal change | LPA workshop/questionnaire | Other resources | Field-work | Recommended LANDMAP amendment- GIS or survey or both |
| SNPVS018 | Cadair Idris uplands | | | | Rhododendron present in northern outlier | | | Survey- possible description character changes to include rhododendron in places and management recommendation changes |
| SNPVS028 | Llechfraith | | | | Rhododendron present in woodland | | | Survey- possible description character changes to include rhododendron in woodland in places and management recommendation changes |
| SNPVS029 | Llanelltyd/ Ganllwydd | | | | Rhododendron present in woodland and along Mawddach river corridor north of Llanelltyd | | | Survey- possible description character changes to include rhododendron in woodland in places and management recommendation changes |
| SNPVS031 | Rhinogs-upland | Aerial- felling evident | NDVI-felling indicated | | | NRW- broadleaf planting plan indicates some broadleaf planting in central part of area replacing some conifers | | Survey- possible description character changes to indicate reduction in conifers and some replanting in the central part of the area and management recommendation changes |
| SNPVS037 | Morfa Mawr | | | | Anglesey and Snowdonia seascape assessment- degradation of dunes through recreational | | | Survey- consider amending description and management guidelines to take account of degradation of dunes through recreational use/pressure eg Llandanwg dunes and lagoon |

| | | | | | use/pressure eg Llandanwg dunes and lagoon | | | |
|-------------|-----------------------|--|--|--------------------------------------|---|--|----------------|---|
| Aspect area | | Change- indicated by: | | | | | Stage 2c | |
| UID | Name | OS data, aerial photos and roads and buildings | Complexity maps (segment density) and NVDI | Phase 1 and seasonal change | LPA workshop/ questionnaire | Other resources | Field- work | Recommended LANDMAP amendment- GIS or survey or both |
| SNPVS040 | Bronaber | Aerial- felling evident | NDVI-felling indicated | | | NRW- broadleaf planting plan indicates some very limited broadleaf planting in western part | | Survey- possible description character changes to indicate reduction in conifers and replanting in the central part of the area and management recommendation changes |
| SNPVS042 | Gelliliydan | | | | Rhododendron present in woodland | | | Survey- possible description character changes to include rhododendron in woodland in places and management recommendation changes |
| SNPVS043 | Afon Cynfal valley | | | | Rhododendron present in woodland | | | Survey- possible description character changes to include rhododendron in woodland in places and management recommendation changes |
| SNPVS046 | Llan Ffestiniog | | | | Rhododendron eradication programme in woodland underway | | | Survey- possible description character changes to include rhododendron in woodland in places and management recommendation changes |
| SNPVS048 | Snowdon Uplands | | | | Rhododendron eradication programme in woodland underway | | | Survey- possible description character changes to include rhododendron in woodland in places and rhododendron eradication underway and management recommendation changes |
| SNPVS051 | Nant Mor | | | | Rhododendron | | | Survey- possible description |

| | | | | | | | | | |
|-------------|-------------------|--|---|-----------------------------|---|---|------------|---|--|
| | | | | | present in woodland | | | character changes to include rhododendron in woodland in places and management recommendation changes | |
| Aspect area | | Change- indicated by: | | | | | | Stage 2c | |
| UID | Name | OS data, aerial photos and roads and buildings | Complexity maps (segment density) and NVDI | Phase 1 and seasonal change | LPA workshop/questionnaire | Other resources | Field-work | Recommended LANDMAP amendment- GIS or survey or both | |
| SNPVS055 | Moel Hebog | | | | Rhododendron present in woodland | | | Survey- possible description character changes to include rhododendron in woodland in places and management recommendation changes | |
| SNPVS059 | Betws Garmon | Aerial- expansion and intensification of caravan park with hardstandings and other development nearby apparent | NDVI- development evident | | | | | Survey- consider adding caravan park to description and consideration in management guidelines | |
| SNPVS065 | Nant Gwynant | | | | Rhododendron present in woodland | | | Survey- possible description character changes to include rhododendron in woodland in places and management recommendation changes | |
| SNPVS072 | Carneddau Uplands | | Segment density- indicates significantly less complex | | | | | Survey- check on site for changes in vegetation cover on uplands possibly due to grazing regimes and amend description and/or management recommendations as necessary | |
| SNPVS073 | Abergwyn-gregyn | Aerial- felling evident | NVDI-felling indicated | | Rhododendron eradication programme in woodland underway | NRW- broadleaf planting plan indicates planting to south east in particular | | Survey- possible description character changes from conifer plantation to mixed woodland, plus rhododendron eradication in broadleaf woodland and management recommendation changes | |
| SNPVS087 | North east | Aerial- extension of | NDVI- extension | | | | | GIS- amend boundary. Note same | |

| | | | | | | | | |
|-------------|------------|--|--|-----------------------------|----------------------------|---|------------|---|
| | Snowdonia | Penrhyn quarry evident | of quarry to south evident | | | | | UID as Migneint -one must be changed |
| Aspect area | | Change- indicated by: | | | | | Stage 2c | |
| UID | Name | OS data, aerial photos and roads and buildings | Complexity maps (segment density) and NVDI | Phase 1 and seasonal change | LPA workshop/questionnaire | Other resources | Field-work | Recommended LANDMAP amendment-GIS or survey or both |
| SNPVS087 | Migneint | | Segment density-indicates less complex | | | NRW-broadleaf planting plan indicates some broadleaf planting | | Survey- possible description character changes to mixed woodland (although conifers are still dominant) and management recommendation changes. Also check on site for changes in vegetation cover on uplands possibly due to grazing regimes and amend description and/or management recommendations as necessary. Note same UID as North East Snowdonia-one must be changed. |
| SNPVS088 | Lley Celyn | | NDVI-felling indicated | | | NRW-broadleaf planting plan indicates some broadleaf planting on northern shore | | Survey- possible description character changes to indicate reduction in conifers and replanting on northern shore of lake and management recommendation changes |
| SNPVS092 | Bethel | Aerial- establishing broadleaf woodland evident on previous conifer plantation | NDVI-growth indicated | | | NRW-broadleaf planting plan indicates some broadleaf planting on felled are on north western boundary | | Survey- possible description character changes to indicate reduction in conifers and replanting in the north western part of the area and management recommendation changes |
| SNPVS095 | Rhyd-uchaf | Aerial- felling evident | NDVI-felling indicated | | | NRW-broadleaf planting plan indicates some | | Survey- possible description character changes to indicate reduction in conifers and replanting in the south western part of the |

| | | | | | | | | | |
|-------------|-----------------------|--|---|-----------------------------|---|--|------------|--|--|
| | | | | | | broadleaf planting in south western part of area replacing some conifers | | area and management recommendation changes | |
| Aspect area | | Change- indicated by: | | | | | | Stage 2c | |
| UID | Name | OS data, aerial photos and roads and buildings | Complexity maps (segment density) and NDVI | Phase 1 and seasonal change | LPA workshop/questionnaire | Other resources | Field-work | Recommended LANDMAP amendment- GIS or survey or both | |
| SNPVS096 | Arenig Uplands | Aerial- felling evident | NDVI-felling indicated; Segment density- indicates significantly less complex | | | NRW- broadleaf planting plan indicates some broadleaf planting in centre of area replacing conifers | | Survey- description character changes to indicate reduction in conifers and replanting in the centre of the area and management recommendation changes in relation to conifer plantations. Also check on site for changes in herb layer vegetation cover on uplands possibly due to grazing regimes and amend description and/or management recommendations as necessary | |
| SNPVS105 | Bwlch-y-Groes uplands | Aerial- felling evident | NDVI-felling indicated. Segment density- indicates significantly less complex | | | NRW- broadleaf planting plan indicates some broadleaf planting in central part of area replacing some conifers | | Survey- possible description character changes to indicate reduction in conifers to the south and limited replanting in the western part of the area and management recommendation changes. check on site for changes in vegetation cover on uplands possibly due to grazing regimes and amend description and/or management recommendations as necessary | |
| SNPVS107 | Dinas Mawddwy | | | | Rhododendron present in woodland around Llanmawddwy | | | Survey- possible description character changes to include rhododendron in woodland in places and management recommendation changes | |

| Aspect area | | Change- indicated by: | | | | | Stage 2c | |
|-------------|-------------------|--|--|-----------------------------|---------------------------------------|-----------------|------------|--|
| UID | Name | OS data, aerial photos and roads and buildings | Complexity maps (segment density) and NVDI | Phase 1 and seasonal change | LPA workshop/questionnaire | Other resources | Field-work | Recommended LANDMAP amendment- GIS or survey or both |
| SNPVS111 | Mawddach valley | | | | Rhododendron present in woodland | | | Survey- possible description character changes to include rhododendron in woodland in places and management recommendation changes |
| SNPVS116 | no name | | | | Rhododendron present ion lower slopes | | | Survey- possible description character changes to include rhododendron in woodland in places and management recommendation changes |
| SNPVS117 | Gelliliydan Hills | | | | Rhododendron present in woodland | | | Survey- possible description character changes to include rhododendron in woodland in places and management recommendation changes |