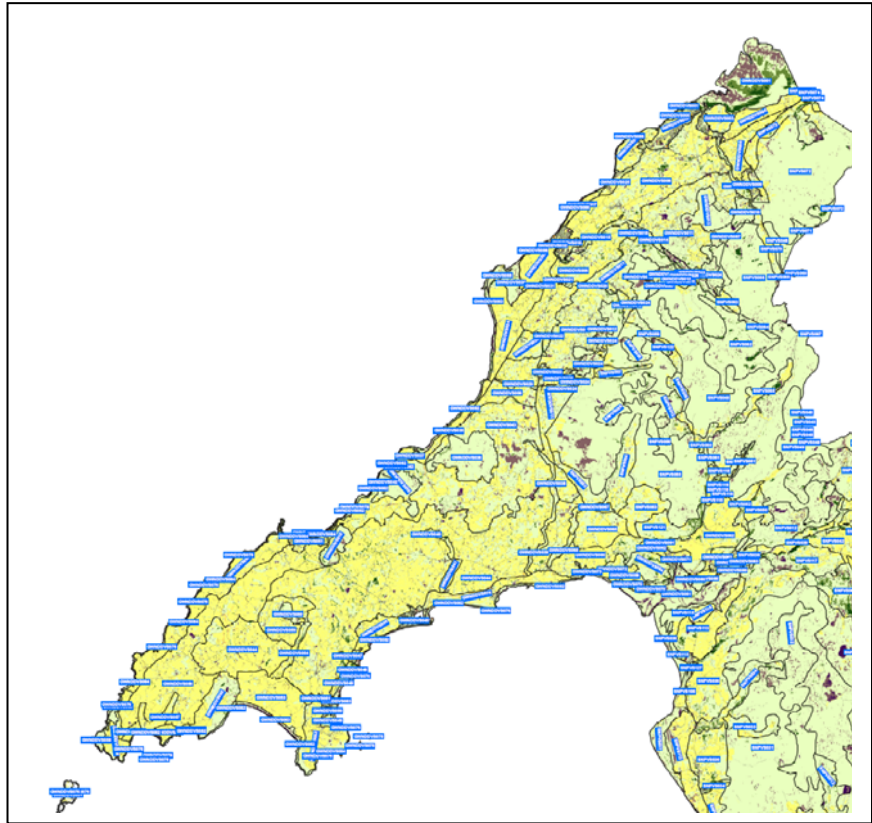


INTERPRETATION OF LANDMAP VISUAL & SENSORY CHANGE DETECTION PACKS: GWYNEDD



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 Gwynedd including the Llyn AONB but excluding the Snowdonia National Park. 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.
- 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)

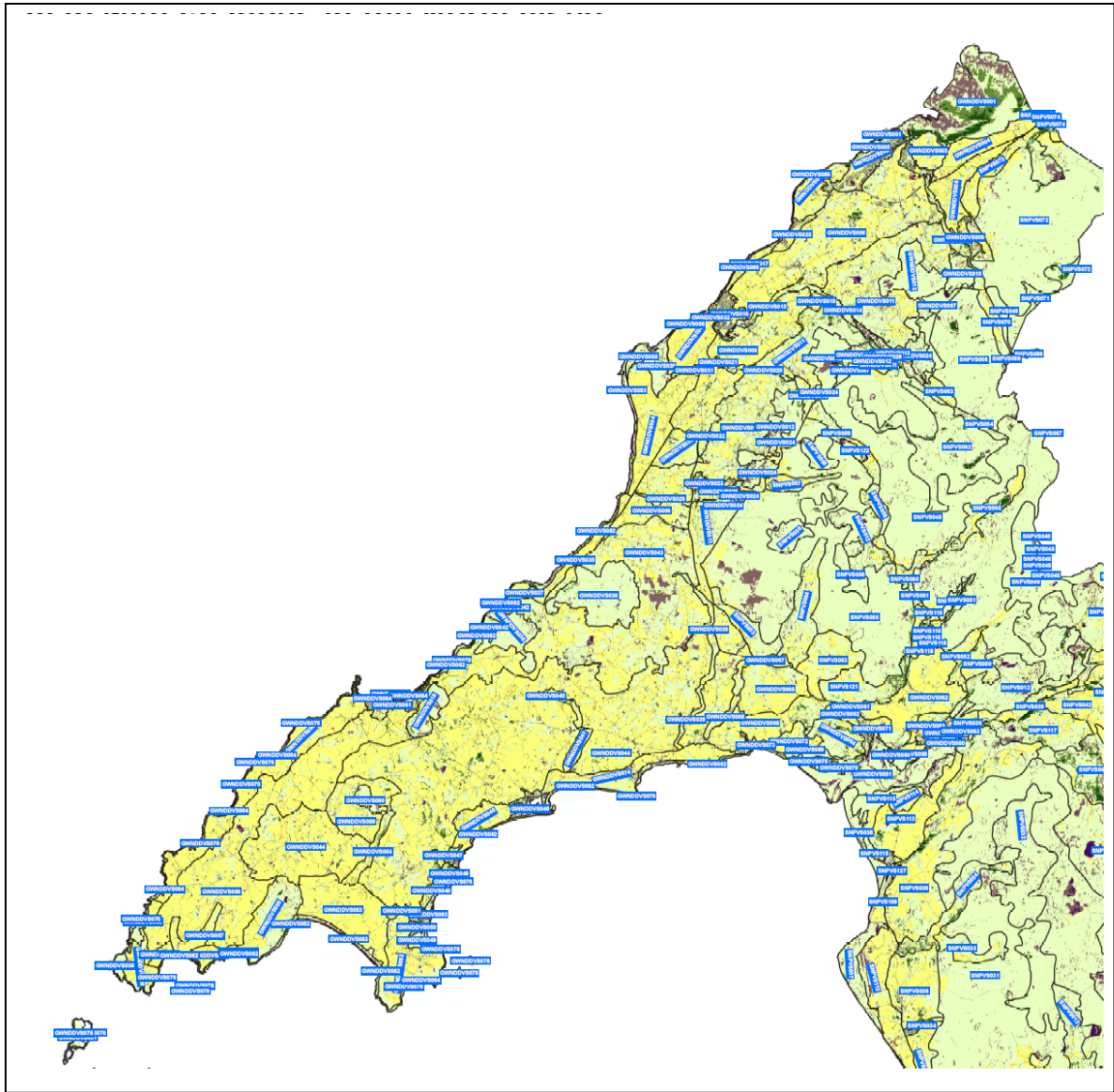
The information is in hard copy form and in GIS.

- 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 Llyn AONB 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, 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 eg the effect of wind farms on nearby aspect areas. Some changes may not be perceptible at the desk study level but are apparent on site. An example could be single wind turbines. 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



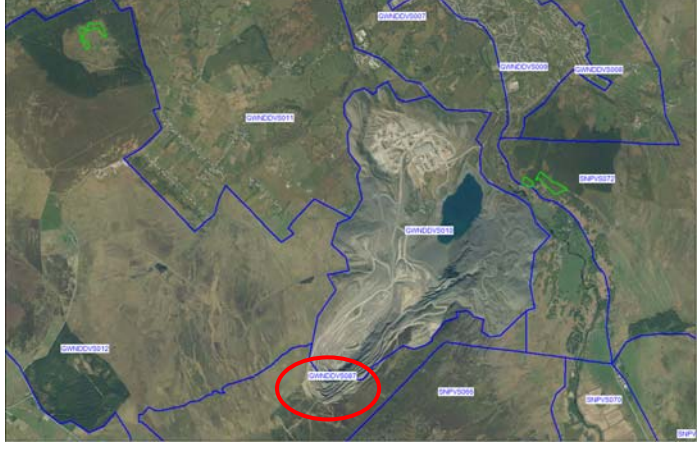
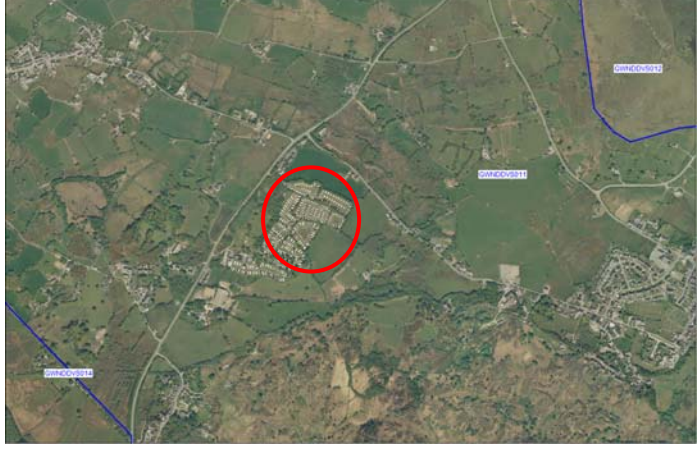
- 2.1. Within the study area the key changes appear to be:
 - Expansion of settlements especially along the coastal strip including Bangor.
 - Expansion of commercial development areas including Bangor.
 - Continued/expanding quarry operation extraction at Penrhyn.
 - Conifer plantation felling which may change the character.
 - Expansion/intensification of caravan parks just back from the coast.
 - Road improvements eg Clynnog Fawr bypass
 - Increase in single/small scale turbines which may change character.
 - Coastal erosion in parts eg near Trefor

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



Mega change map



Aerial view of change	Potential/actual change
	<p>GWNDDVS002 Expansion of Bangor- south</p>
	<p>GWNDDVS002 Expansion of Bangor- south west</p>
	<p>GWNDDVS010 Extension of Penrhyn quarry</p>
	<p>GWNDDVS011 Caravan Park extension/intensification (west of Deimolen)</p>

	<p>GWNDDVS012 Conifer plantation felling</p>
	<p>GWNDDVS019 Caravan park- 2001 (before)</p>
	<p>GWNDDVS019 Caravan park extension and intensification- 2010 (after)</p>
	<p>GWNDDVS035 and GWNDDVS043 Clynnog Fawr bypass</p>

	<p>GWNDDVS043</p> <p>Conifer plantation felling- Bwlch Derwin area</p>
	<p>GWNDDVS061</p> <p>Extension of caravan park- east of Nefyn</p>
	<p>GWNDDVS079</p> <p>Coastal erosion near Trefor- 2001</p>
	<p>GWNDDVS079</p> <p>Coastal erosion near Trefor- 2010</p>

APPENDIX

LANDMAP VISUAL AND SENSORY DATA CHANGE DETECTION SHEETS: GWYNEDD

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
GWNDDVS002	Bangor	Aerial and built form- extension of commercial area south and south west corner of Bangor evident	NDVI- extension of commercial area evident			NRW- Anglesey and Snowdonia seascape assessment- new buildings in/around Bangor		GIS- amend boundary
GWNDDVS005	Vaynol Estate	Aerial and built form- extension of commercial area south west of Bangor evident	NDVI- extension of commercial area infrastructure evident					GIS- amend boundary
GWNDDVS006	Bethel	Aerial and built form- extension of commercial area from Bangor and housing west of Llanrug evident	NDVI- extension of commercial area evident					GIS- amend boundary
GWNDDVS011	Waen Pentir	Aerial- expansion of caravan park to the north			a few single turbines in the Bryncir area			Survey- consider adding caravan park and single turbines to description and consideration in management guidelines if sufficiently apparent
GWNDDVS012	Cefn-du	Aerial- felling evident	NDVI-felling indicated					Survey- possible description character changes to conifer plantation element of area and management recommendation changes
GWNDDVS015	Afon Seiont	Aerial- expansion/	NDVI-					Survey- consider adding

		intensification of caravan park to the south east of Caernarfon	development evident					caravan park to description and consideration in management guidelines	
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	
GWNDDVS018	Llanrug	Aerial- settlement expansion to west						GIS- amend boundary	
GWNDDVS019	Upper Afon Gwynfai	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	
GWNDDVS034	Morfa Dinlle				Anglesey and Snowdonia seascape assessment- continuing development of Caernarfon airport including wind turbines			Survey- consider amending description to incorporate continuing development of Caernarfon airport including wind turbines and also potential management guidelines	
GWNDDVS035	Clynnog Fawr	Aerial and Built form verifies A499 realignment			A499 Aberdesach to Llanaelhaearn improvements			Survey- possibly change description to include A499 improvements and possible new vistas, also possibly change management recommendations; GIS- amend boundary to follow new road alignment as main feature.	
GWNDDVS038	Upper Afon Dwyfach				a few single turbines in the Bryncir area			Survey- consider changing description to include turbines if they are sufficiently apparent, also change management guidelines if	

								necessary.
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
GWNDDVS043	Bwlch Derwin	Aerial- major felling evident especially to east and extension/intensification of caravan park to west adjacent to Nefyn; Built form verifies improvements and slight realignment of A499	NDVI-felling indicated					Survey- possible description character changes to conifer plantation element of area and A499 improvements and management recommendation changes. GIS- amend boundary around caravan park east of Nefyn and refine boundary with GWNDDVS035 to reflect A499 road realignment
GWNDDVS061	Nefyn	Aerial- expansion/intensification of caravan park to the east						GIS- amend boundary
GWNDDVS071	Porthmadog and Tremadog	Aerial- expansion of caravan park to the west						GIS- amend boundary
GWNDDVS076	Bardsey Sound Cliffs	Aerial- does not indicate change but maybe apparent only on site			Coastal erosion around Porth Neigwl/Hells Mouth			Survey- possibly amend description to include erosion of coastal features
GWNDDVS079	Port-y-nant	Aerial- verifies erosion of cliffs in parts			Coastal erosion around Trefor			Survey- amend description to include erosion of coastal features near Trefor