

MAY 2014

# GLASTIR MONITORING & EVALUATION PROGRAMME FIRST YEAR ANNUAL REPORT

Prepared by CEH on behalf of the Glastir Monitoring & Evaluation Programme Team



**Canolfan  
Ecoleg a Hydroleg**

CYNGOR YMCHWIL YR AMGYLCHEDD NATURIOL



**Centre for  
Ecology & Hydrology**

NATURAL ENVIRONMENT RESEARCH COUNCIL



## How to cite this report:

Full version: Emmett, B.E., Abdalla, M., Anthony, S., Astbury, S., August, T., Barrett, G., Biggs, J., Botham, M., Bradley, D., Brown, M., Carter, H., Chadwick, D., Cigna, F., Cooper, D., Cooper, J., Cosby, B.J., Creer, S Cross, P., Edwards, F., Edwards, M., Evans, C., Ewald, N., Fitton, A., Garbutt, A., Grebby, S., Greene, S., Halfpenney, I., Hall, J., Harrison, S., Harrower, C., Henrys, P., Hobson, R., Hughes, S., Isaac, N., Jackson, B., Jarvis, S., Jones, D., Keith, A., Kelly, M., Korenko, J., Lallias, D., Leaver, D., Lebron, I., Malcolm, H., Maskell, L., McDonald, J., Moxley, J., Norton, L., O'Hare, M., Owen, A., Pereira, M., Peyton, J., Powney, G., Pywell, R., Rawlins, B., Robinson, D.A., Rorke, S., Rowland, C., Roy, D., Scarlett, P., Scholefield, P., Scott, A., Scott, L., Scott, R., Siriwardena, G., Smart, S., Smith, P., Swetnam, R., Taylor, R., Tordoff, G., Van Breda, J., Vincent, H., Wagner, M., Waters, E., Watkins, J., White, J., Williams, B., Wood, C. and Wright, S. (2014) Glastir Monitoring & Evaluation Programme. First Year Annual Report to Welsh Government (Contract reference: C147/2010/11). NERC/Centre for Ecology & Hydrology (CEH Project: NEC04780), pp.442

Short version: Emmett B.E. and the GMEP team (2014) Glastir Monitoring & Evaluation Programme. First Year Annual Report to Welsh Government (Contract reference: C147/2010/11). NERC/Centre for Ecology & Hydrology (CEH Project: NEC04780), pp. 442

**Further copies of this report are available from:** GMEP Office, Centre for Ecology & Hydrology, Environment Centre Wales, Deiniol Road, Bangor, Gwynedd, LL57 2UW.

## Special Thanks to:

*Aspey, N., Bamford, R., Carter, D., Clarke, S., Davies, C., Ellison, M., Everett, C., Everingham, E., Fells, A., Fitos, E., Green, D., Harvey, A., Haycock, A., Haycock, B., Jackson, E., Jones, K., Kelsall, J., Knight, T., Koblizek, E., Meilleur, E., Nuttall, P., Pedashenko, H., Ryan, F., Sazer, D., Seaton, R., Small, J., Smith, A. Tordoff, G. Vasilev, K., Vaughan, D., Wallace, H., Warwick, A. and Winder, J.*



## **Crynodeb i'r Dinesydd**

### **Beth yw pwrpas Rhaglen Monitro a Gwerthuso Glastir?**

Glastir yw'r prif gynllun sydd gan Lywodraeth Cymru ar gyfer talu am nwyddau a gwasanaethau amgylcheddol. Pwrpas Rhaglen Monitro a Gwerthuso Glastir (GMEP) yw gwerthuso llwyddiant y cynllun. Drwy gomisiynu'r rhaglen monitro ochr yn ochr â lansio cynllun Glastir, mae modd cael adborth buan ac addasu taliadau i wneud y cynllun yn fwy effeithiol. Mae cynllun Glastir yn cael ei ariannu ar y cyd gan Lywodraeth Cymru (drwy'r Cynllun Datblygu Gwledig) a'r UE, a fydd yn derbyn adroddiad blynyddol am allbynnau GMEP. Bydd GMEP yn rhoi cymorth hefyd i gyflawni amrywiaeth eang o ofynion cenedlaethol a rhyngwladol am ddarparu cofnodion ar gyfer bioamrywiaeth, allyriadau nwyon tŷ gwydr, pridd ac ansawdd dŵr.

### **Beth yw gwaith y rhaglen?**

Mae'r rhaglen yn casglu tystiolaeth ar gyfer pob un o'r pum canlyniad arfaethedig yng nghynllun Glastir: lleihau effeithiau'r newid yn yr hinsawdd; gwella ansawdd dŵr; atal y dirywiad mewn bioamrywiaeth; rheoli coetiroedd yn well; a mwy o fynediad at dirweddau Cymru a chyflwr nodweddion hanesyddol. Cyflawnir llawer o'r gwaith hwn drwy arolwg maes o 330 o sgwariau 1km ledled Cymru, hanner ohonynt mewn ardaloedd â blaenoriaeth lle y mae taliadau uwch ar gael. Caiff y sgwariau 1km eu dewis ar hap o 26 o ddsbarthiadau tir, fel bod cynrychiolaeth dda o dirweddau Cymru. Archwilir y sgwariau dros gyfnod o bedair blynedd ac ailymwelir â nhw wedyn dros y pedair blynedd dilynol. Drwy wneud hyn, cesglir tystiolaeth o newid a bydd yr effeithiau ar fesuriadau o dywydd eithafol mewn un flwyddyn yn cael eu lleihau. Bydd arwynebedd y 'tir Glastir' ym mhob sgwâr a archwilir yn amrywio a chaiff hyn ei ystyried wrth ddadansoddi data. Byddwn hefyd yn cynnwys data o raglenni monitro arbenigol parhaol yn ein dadansoddiadau lle bynnag y bo modd er mwyn defnyddio'r holl adnoddau sydd ar gael. Defnyddir modelau i amcangyfrif canlyniadau disgwylidig yn y dyfodol fel y gellir addasu'r cynllun yn ôl blaenoriaethau Llywodraeth Cymru (lleihau effeithiau'r newid yn yr hinsawdd ac adnoddau dŵr ym mlynnyddoedd un a dau) a sicrhau'r effaith fwyaf posibl o'r cynllun.

### **Beth yw'r dulliau arloesol?**

Rydym yn defnyddio offer moleciwlaidd newydd i ymchwilio i effeithiau cynllun Glastir ar organeddau mewn pridd a thechnolegau lloeren i fonitro cyflwr mawndiroedd, niferoedd y nodweddion coediog bach ac arwynebedd a chyflwr cynefinoedd yng Nghymru. Datblygir dulliau newydd o asesu ansawdd gweledol tirweddau ac o ddiffinio Tir Ffermio sydd o Werth Mawr i Natur, ac adeilidir systemau mesur symudol sy'n cofnodi fflycsau nwyon tŷ gwydr er mwyn mesur allyriadau carbon deuocsid, ocsid nitrus a methan o laswelltiroedd ledled Cymru.

### **Beth y mae GMEP wedi'i gyflawni yn y flwyddyn gyntaf a beth yw'r prif ganfyddiadau?**

Roedd y gwaith yn y flwyddyn gyntaf yn cynnwys treialu dulliau newydd a chwblhau'r arolwg maes cyntaf. Mae modelwyr wedi ymchwilio i'r effaith bosibl o rai taliadau penodol ar ansawdd a llif dŵr, allyriadau nwyon tŷ gwydr a chysylltedd rhwng coetiroedd. Mae'r canlyniadau'n awgrymu bod yr effaith ddichonol o wahanol ymyriadau'n amrywio rhwng 0.1 a 10% o newid ar y raddfa genedlaethol a bod targedu taliadau'n ofodol yn ymddangos yn fwy effeithiol, ond bod llawer yn dibynnu ar y rhagdybiaeth ynghylch arwynebedd y tir ar bob fferm a newidiadau gwirioneddol sydd wedi'u cyflwyno gan ffermwyr. Bydd arolwg o ffermwyr a gynhelir yn 2016 yn darparu mwy o ddata am hyn. Bydd arolygon pellach o ffermwyr yn ymchwilio i'r manteision ehangach o geir o Grantiau Effeithiolrwydd Glastir, i'r rhwystrau rhag derbyn taliadau Coetir Glastir ac yn asesu ôl traed carbon. Bydd gwefan GMEP yn cael ei lansio yn Ebrill 2015 a bydd canlyniadau arolygon maes a rhediadau modelu yn cael eu cyhoeddi arni.

## **Citizen Summary**

### **What is the purpose of Glastir Monitoring and Evaluation Programme?**

Glastir is the main scheme by which the Welsh Government pays for environmental goods and services whilst the Glastir Monitoring and Evaluation Programme (GMEP) evaluates the scheme's success. Commissioning of the monitoring programme in parallel with the launch of the Glastir scheme provides fast feedback and means payments can be modified to increase effectiveness. The Glastir scheme is jointly funded by the Welsh Government (through the Rural Development Plan) and the EU, to whom outputs from GMEP are reported annually. GMEP will also support a wide range of other national and international reporting requirements for biodiversity, greenhouse gas emissions, soil and water quality.

### **What does it do?**

The programme collects evidence for all five intended outcomes from the Glastir scheme; climate change mitigation, improvement to water quality, a halt in the decline of biodiversity, improved woodland management and greater access to the Welsh landscape and condition of historic features. Much of this is achieved through a field survey of 330 1km squares across Wales, half of which are focussed on areas prioritised for advanced payments. The 1km squares are selected at random from 26 land classes, ensuring good coverage of the Welsh landscape. Squares will be surveyed over a four year period and then revisited over the following four years, meaning evidence of change will be collected and the effects of a single year's weather extremes are reduced. The area of 'Glastir land' within each surveyed square will vary and this is taken into account during analysis. Data from ongoing specialist monitoring programmes is also included in analysis wherever possible to maximise use of all resources. Models are being used to estimate expected future outcomes so that adjustments can be made to match Welsh Government priorities (climate change mitigation and water resources in years one & two) and scheme impact can be maximised.

### **What is innovative?**

We are using new molecular tools to explore the effects of Glastir on soil organisms and satellite technologies to monitor the state of peatlands, numbers of small woody features and areas and condition of habitat in Wales. New approaches to assess visual quality of landscape and defining High Nature Value Farmland are being developed and mobile measurement systems for recording greenhouse gas fluxes are being built to measure carbon dioxide, nitrous oxide and methane emissions from grasslands across Wales.

### **What has GMEP achieved in its first year and what are the main findings?**

Work in the first year included piloting new methods and completion of the first field survey. Modellers explored the potential impact of some selected payments on water quality and flow, greenhouse gas emissions and connectivity of woodlands. Results suggest the potential impact of different interventions range from 0.1 – 10% change at the national scale and spatial targeting of payments appear to be more effective but much depends on the assumption made about land area per farm and actual changes put in place by farmers. A farmer survey being conducted in 2016 will provide further data on this. Additional farmer surveys will explore the wider benefits of the Glastir Efficiency Grants, the barriers to uptake of the Glastir Woodland payments and will assess carbon footprinting. A GMEP website will be launched in April 2015 where the field survey results and model runs will be published.