Updated NIA M&E indicators: Biodiversity theme

Final versions for use by NIAs, update 28th March 2014

- B01_H: Extent of existing priority habitat managed to maintain and/or improve its condition
- B02_H: Extent of areas managed to restore/create habitat
- B03_H: Proportion of SSSIs in favourable or recovering condition
- B04_H: Total extent of existing priority habitat
- B05_S: Extent of habitat managed to secure species-specific needs
- B06_S: Status of widespread species
- B07_S: Status of focal species
- B08_S: Control of invasive non-native species
- B09_C: Local indicator of habitat connectivity
- B10_C: Comparative indicator of habitat connectivity

Indicator: B01_H: Extent of existing priority habitat managed to maintain and/or improve its condition

Indicator: B01_H	Extent of existing priority habitat managed to maintain and/or improve its condition
Version date	25th February 2014
Theme	Biodiversity
Sub-theme	Habitat
Sub-theme category	Core
Indicator category	Core
Indicates *(what is the indicator intended to indicate)*	This indicates the extent of existing priority habitat being managed by the NIA programme. It comprises existing habitat being maintained in good condition as well as existing habitat being improved. Changes in habitat condition can take many years to become established. While this indicator is a direct measure of the extent of land managed to maintain or improve existing habitat condition it is a proxy measure for biodiversity benefits based on the assumption that habitat being managed to improve its condition will, in time, result in an increase in the area of habitat in good condition
Units	Hectares (ha), Linear Kilometres (km) or Sites depending on the nature of the action type. Ideally, reporting should be as hectares (ha). Habitats for which sites are appropriate include ponds. Linear habitats (e.g. river and hedgerows) can be reported in km
Relevance to Government indicators	England Biodiversity 2020 Indicator 1c. Local sites under positive management
Existing data for establishing baseline	
Relevant dataset(s)	The data required for this indicator relates to habitat management activity. This should be recorded in and sourced from the Biodiversity Action Reporting System (BARS). Relevant records within BARS to include in reporting against this indicator: • Have the *action type* – 'habitat management' • Have a *biodiversity objective* – 'to maintain the extent of habitat in good condition' **and** 'to maintain the extent of habitat and improve its condition…' • Be within the NIA area and undertaken by any partner organisation *as part of the NIA programme*. BARS includes both records added by the NIA partnership / partners themselves, **and** records from nationally imported datasets – e.g. HLS (Higher Level Stewardship), EWGS (English Woodland Grant Scheme), EA (Environment Agency). The NIA will need to establish a collaboration with nationally imported actions in order for them to be included in BARS reports at the NIA programme level.

Source(s) of data *(contact details or hyperlink)*	BARS reports (http://ukbars.defra.gov.uk/), including: 1) Programme delivery entered into BARS by the NIA partners 2) Large datasets imported nationally into BARS (e.g. HLS, EWGS) 3) Delivery information entered by other organisations working in the NIA area *(this information is not included within the NIA reporting).*
Spatial coverage	BARS action maps and reports are available by NIA geographic boundaries. As of December 2013 BARS includes project level reporting as well as geographic which allows both NIA programme level reporting along with geographic.
Temporal coverage	The indicator is focussed on appropriate management in place to maintain or improve the condition of existing priority habitat. Data used to report against this indicator will be sourced from BARS. Data included in reporting should indicate current management, reflecting current protection of the habitat resource. Therefore data from BARS should only be included for actions with an 'action status' of 'planned' or 'underway' at the point of reporting. Actions against each status must be summed as separate amounts (i.e. total planned, total underway). Actions with any other status should not be included. This is to reflect the fact that habitat maintenance activity is an on-going process and the end of the activity does not indicate the achievement of an outcome. NIAs are advised to carry out 'point in time' reporting restricting their report to activity taking place on a specific date (31st March annually is recommended). This is to avoid counting repeated activity of the same type in the same location which would be a risk with a longer reporting period. For example, an action entered as planned may be superseded by an action that is underway on the same site. If the reporting date period bridges the end of the planned action both would be included in the report. The area of habitat on the site would be reported twice.
Planned updates	Continual – there will be on-going and periodic recording of new and changing activity within BARS by both NIA partners and other organisations to reflect changes on the ground. Key national data imports are intended to be updated on at least an annual basis. Updates are primarily structured around financial reporting years (Apr-Mar). As such key updates are likely to be submitted every April / May, and include the latest data up to 31st March. This will also require updates to the setting up of collaborations with these bulk actions. Update will rely on the NIAs contributing actions to BARS and on updating the status of existing actions.

Data collection method *(estimate, survey, monitoring)*	NIAs should record all relevant management actions being undertaken or commissioned as part of the NIA programme. BARS offers a standard method for relating these to objectives (e.g. to maintain or improve), and quantifying these actions. BARS currently allows direct entry/input of individual action records and has a bulk import capability. Some nationally commissioned activity is being input to BARS centrally; this includes Agri-Environment (HLS only) activity, England Woodland Grant Scheme (available by April 14) and nationally collated EA biodiversity projects. NIAs can establish collaborations with actions within these national datasets to reflect where they form part of NIA programme activity.
Accuracy of data	Various
Additional/new data for establishing baseline and monitoring change	

Relevant additional/new data	Changes in the extent of existing priority habitat management recorded on BARS as:
	• Work type = *habitat management*
	• Biodiversity objective =
	  ○ *To maintain the extent of habitat in good condition through appropriate management*
	  OR
	  ○ *To maintain the extent of habitat and improve its condition through appropriate management*
	• Actions which:
	  ○ have been linked under a Parent Project by the NIA within BARS.
	  AND (optionally)
	  ○ coincide with the NIA geographic boundary
	
	As there is currently no established method for assessing habitat condition outside the SSSI series NIAs are advised to record habitat management activity under the *improving condition* BARS objective where there is ambiguity. (Note: Natural England is currently developing a methodology for assessing habitat condition outside SSSIs so it may be possible to separate maintain habitat in good condition and improving condition in the future).
	
	NIAs should update the status of existing records within BARS – i.e. planned to underway, underway to completed.

Responsibility for data collection *(e.g. NIA partnerships or potentially to be taken on by NE or EA)*	**NIA partnerships**: NIA partnerships should be primarily responsible for adding records of NIA activity to BARS beyond that contributed by National Partners detailed below, or by others (which may be identified by viewing records already in the system). **National Partners**: bulk uploads of selected records – e.g. HLS, EWGS, Environment Agency actions within at least annual defined bulk submission schedule. All NIA partnership organisations undertaking actions should be registered as BARS users, to allow for data entry and collaboration on actions. See BARS general guidance for NIAs: https://defra.huddle.net/workspace/16609188/files/#/folder/22

	221241/list In order to report activity carried out by the partnership specifically the NIA will need to establish a top Parent Project beneath which relevant actions are linked, either directly or via Child Projects in BARS. NIA should also establish 'collaborations' on bulk uploaded actions that contribute to their programme delivery
Data collection method	Individual management actions need to be recorded at http://ukbars.defra.gov.uk/ where consistent with the following BARS definition: • "The objective of the action is to ensure an existing area of priority habitat currently in poor condition is improved to good condition. Refers to any practical action that is carried out on an area of priority habitat that is identifiable (i.e. a classification can be determined) but condition is not good prior to commencement of the action". And • The objective of the action is to ensure an existing area of priority habitat currently in good condition is maintained in that status by appropriate management. (Note: as there is currently no readily available methodology or guidance for assessing habitat condition outside SSSIs NIAs are advised to record activity under the 'improving condition' objective where there is ambiguity. Natural England are currently developing a methodology and advice which will become available during 2014) NIA partners need to establish a reporting structure for the NIA programme and NIA partners to enter actions and collaborations for NIA-specific actions. Data entry by NIAs should not include any records included as part of the national 'bulk' upload although the NIAs will need to establish collaborations with any national actions where they form part of programme delivery. NIA specific guidance on BARS Action data entry is given in the NIA BARS FAQ document, available on HUDDLE at: https://defra.huddle.net/workspace/16609188/files/#/folder/22221241/list
Calculating and presenting indicator	
Baseline date for initial 12 NIAs	April 2013
Methods for calculating indicator values	The Action Reporting tools available within BARS (http://ukbars.defra.gov.uk/) can be used to extract data and calculate amounts to report against this indicator. The reporting tools available within the Projects page on BARS should be used to extract data filtered by the NIA project/programme. This is only possible where the NIA has established a 'project' or project hierarchy (Parent & Child projects) within BARS from which to generate these reports. The BARS reporting will be 'per objective' and thus the data for both biodiversity objectives (maintain and improve) need

	to be queried and the results summed or presented separately. (Although NIAs are currently advised to record activity under 'improving condition' reports should also include 'maintaining condition' to capture actions entered by others or national upload datasets). Amounts need to be summed and grouped separately to reflect different action statuses, i.e. the total planned and the total underway. See NIA-specific Guidance for online reporting filters, which allows for new reporting capabilities related to the project. This updates previous guidance and the BARS online tools now allow NIA-specific actions to be reported. See: https://defra.huddle.net/workspace/16609188/files/#/folder/22221241/list There is a need for the initial 12 NIAs to assign past actions (in 2012/2013) and recalculate baselines for effective comparison with subsequent years. All NIAs are required to extract project level reports.
Responsibility for calculating indicator values	NIAs to undertake extraction of figures through the reporting tools within BARS. NIAs have the option of using the figures generated within *Action Summaries* in BARS itself, or extracting a spreadsheet of records from which to filter and calculate alternative figures. The permalink function in BARS allows each NIA to save and return to the report used in either instance.
Reporting	
Online reporting	Baseline and annual fields in the online reporting system will be: • Feature (priority habitat) • Action status (planned, underway) – report these separately rather than as a combined figure • Extent • 'Permalinks' to the report in BARS – if there are multiple objectives record both permalinks • Caveats relating to: ○ Likely gaps in knowledge of the extent of priority habitats managed to maintain and improve their condition (e.g. actions by private landowners). All BARS generated reports offer the ability to generate 'permalinks'. These are direct web-links back to the same report and filters applied to calculate figures from action data within BARS. These offer a simple way to share the link or repeat the same query in the future. Note that the underlying data may change between times causing an associated change in reported figures, this can be used to reflect progress. Note that data entered as "annual figure" in each reporting year should be for that year only, and not cumulative (i.e. not the baseline plus the change). Cumulative figures will be calculated by summing individual year data.
Interpreting	

Interpretation *(inc. linkage to other indicators)*	Use of 'project level' reports replaces 'geographic reports' as this avoids the uncertain completion of action recording by non-NIA agencies. All NIA actions will be within the NIA area. Double-counting of actions may occur in some instances – for example within the HLS national dataset where an HLS agreement is modified and the old agreement is not amended. Please flag to BARS team where you think this may be occurring (http://ukbars.defra.gov.uk/home/contact).

Indicator: B02_H: Extent of areas managed to restore/create habitat

Indicator: B02_H	Extent of areas managed to restore/create habitat
Version date	25th February 2014
Theme	Biodiversity
Sub-theme	Habitat
Sub-theme category	Core
Indicator category	Core
Indicates *(what is the indicator intended to indicate)*	This indicator measures the extent of areas being managed to restore or create priority habitats within the NIA area by any organisation *as part of the NIA programme*. The focus for this indicator is on actions to create or restore habitats rather than those which aim to improve the condition of existing habitats (reported in indicator B01_H). The creation and restoration of habitats can take many years to become established. This indicator is a direct measure of the extent of areas being actively managed to restore / create habitat. It is also a proxy measure for biodiversity benefits based on the assumption that areas managed to restore or create habitat, in time, result in an increase in habitat extent and connectivity. 'Restoration' refers to the development of a habitat where this occurred in the past; 'creation' refers to new habitat created where either this habitat did not exist before or no relic features remain.
Units	Hectares (ha), Linear Kilometres (km) or Sites depending on the nature of the action type. Ideally, reporting should be as hectares (ha). Habitats for which sites are appropriate include ponds. Linear habitats (e.g. river and hedgerows) can be reported in km.
Relevance to Government indicators	The following indicators incorporate the extent of areas managed to restore/create habitats, although it is not differentiated: England Biodiversity 2020 Indicators: • 1c. Local sites under positive management • 2. Extent and condition of priority habitats UK Biodiversity Framework Indicator C3. Status of threatened habitats
Existing data for establishing baseline	
Relevant dataset(s)	BARS actions for priority habitats by any organisation *as part of the NIA programme* recorded as: • Work type – 'habitat management' • Biodiversity objective – 'to increase habitat resource by' either 'restoring features using appropriate management' or 'creating new areas using appropriate management'

	BARS includes both records added by the NIA partnership / partners themselves, **and** records from nationally imported datasets – e.g. HLS (Higher Level Stewardship), EWGS (English Woodland Grant Scheme), EA (Environment Agency). The NIA will need to establish a collaboration with nationally imported actions in order for them to be included in BARS reports at the NIA programme level.
Source(s) of data *(contact details or hyperlink)*	BARS reports (http://ukbars.defra.gov.uk/), including: 1) Programme delivery entered into BARS by the NIA partners 2) Large datasets imported nationally into BARS (e.g. HLS, EWGS) 3) Delivery information entered by other organisations working in the BARS area *(this data is not included as part of the reported data).*
Spatial coverage	BARS action maps and reports are available by NIA geographic boundaries. As of December 2013 BARS includes project level reporting as well as geographic which allows both NIA programme level reporting along with geographic.
Temporal coverage	Data included in any reporting should indicate 'to increase habitat resource by' either 'restoring features using appropriate management' or 'creating new areas using appropriate management'.
Planned updates	Continual – there will be on-going and periodic recording of new and changing activity within BARS by both NIA partners and other organisations reflecting changes on the ground. Key national data imports are intended to be updated on at least an annual basis. Updates are primarily structured around financial reporting years (Apr-Mar). As such key updates are likely to be submitted every April / May, and include the latest data up to 31st March. Update will rely on the NIAs contributing actions to BARS and on updating the status of existing actions. This will also require updates to the setting up of collaborations with these bulk actions.
Data collection method *(estimate, survey, monitoring)*	NIAs should record of all relevant habitat restoration and creation actions being undertaken or commissioned as part of the NIA programme. BARS offers a standard method for relating these to objective and quantifying these actions. BARS currently allows direct entry/input of individual action records and has a bulk import capability. Key nationally commissioned activity is being input to BARS centrally; this includes Agri-Environment (HLS only) activity, England Woodland Grant Scheme (available by April 2014) and nationally collated EA biodiversity projects. NIAs can establish collaborations with actions within these national datasets to reflect where they form part of NIA programme activity.
Accuracy of data	Various

Additional/new data for establishing baseline and monitoring change	

Relevant additional/new data	BARS actions for priority habitats by NIA partners and part of the NIA programme and recorded as:
	
	• Work type – '*habitat management*'
	• Biodiversity objective – 'to increase habitat resource by' either '*restoring features using appropriate management*' or '*creating new areas using appropriate management*'
	• Nationally submitted datasets – (e.g. HLS, EWGS, EA).
	• Actions which:
	  ○ have been linked under a Parent Project by the NIA within BARS
	  AND (optionally)
	  ○ coincide with the NIA geographic boundary
	
	If the actions are linked to the NIA project then only relevant entries will be reported – thereby not requiring the use of geographic filters.
	
	NIAs should update the status of existing records within BARS – i.e. planned to underway, underway to completed.

Responsibility for data collection *(e.g. NIA partnerships or potentially to be taken on by NE or EA)*	**NIA partnerships**: NIA partnerships should be primarily responsible for adding records of NIA activity to BARS beyond that contributed by National Partners detailed below, or by others (which may be identified by viewing records already in the system). **National Partners**: bulk uploads of selected records – e.g. HLS, EWGS, Environment Agency actions within at least annual defined bulk submission schedule. All NIA partnership organisations undertaking actions should be registered as BARS users, to allow for data entry and collaboration on actions. See additional guidance on collaborations available at: https://defra.huddle.net/workspace/16609188/files/#28140579 In order to report activity carried out by the partnership the NIA will need to establish a top Parent Project beneath which relevant actions are linked, either directly or via Child Projects in BARS. NIA should also establish 'collaborations' on bulk uploaded actions that contribute to their programme delivery and link relevant actions to their project.
Data collection method	Individual management actions need to be recorded at http://ukbars.defra.gov.uk/ where consistent with one of the following BARS definitions: • "The objective of the action is to **restore** an area of land to a classified habitat in good condition. Refers to any practical action that is carried out on an area of land that once met a habitat classification, as indicated by historical information and relict features, but cannot be classified as that habitat prior to commencement of the action". • "The objective of the action is to **create** a new area of classified habitat in good condition. Refers to any

	practical action that is carried out on an area of land where the classified habitat is not present and where no significant relicts of the habitat exist prior to commencement of action". NIA partners to establish a reporting structure for the NIA programme and NIA partners to enter actions and collaborations for NIA-specific actions. Activity recorded by NIAs in BARS should not include any records included as part of the national 'bulk' uploads although the NIAs will need to establish collaborations within BARS with any national actions that form part of their programme delivery. NIA specific guidance on BARS Action data entry is given in the NIAs BARS FAQ document, available on HUDDLE at: https://defra.huddle.net/workspace/16609188/files/#/folder/22221241/list
Calculating and presenting indicator	
Baseline date for initial 12 NIAs	April 2013
Methods for calculating indicator values	The action reporting tools within BARS (http://ukbars.defra.gov.uk/) can be used to extract data and calculate amounts to report against this indicator. The reporting tools available within the Projects page on BARS should be used to extract data filtered by the NIA project/programme. This is only possible where the NIA has established a 'project' or project hierarchy (Parent & Child projects) within BARS from which to generate these reports. The BARS reporting will be 'per objective' and thus the data for both biodiversity objective needs to be queried separately and the results summed or presented separately. NIAs are advised to carry out 'point in time' reporting restricting their report to activity taking place on a specific date (31st March annually is recommended). This is to avoid counting repeated activity of the same type in the same location which would be a risk with a longer reporting period Planned, Underway and Completed actions should be reported separately. The report will therefore include any activity planned or underway on the report date and all completed actions. See NIA-specific Guidance for online reporting filters, which allows for new reporting capabilities related to the project. This updates previous guidance and the BARS online tools now allow NIA-specific actions to be reported. See: https://defra.huddle.net/workspace/16609188/files/#/folder/22221241/list There is a need for the initial 12 NIAs to assign / reassign past actions (in 2012/2013) and recalculate baselines for effective comparison with subsequent years. All NIAs are required to extract and report project level reports.

Responsibility for calculating indicator values	NIA undertake extraction of figures through the reporting tools within BARS. NIA's have the option of using the figures generated within Action Summaries in BARS itself, or extracting a spreadsheet of records from which to filter and calculate alternative figures. The permalink function in BARS allows each NIA to save and return to the report used in either instance.
Reporting	
Online reporting	Baseline and annual fields in the online reporting system will be: • Feature (priority habitat) • Action status ('planned', 'underway' and 'complete') – report these separately rather than as a combined figure • 'Permalinks' to the report in BARS – if there are multiple objectives record all permalinks. • Caveats relating to: Likely gaps in knowledge of the extent of priority habitats managed to restore or create priority habitats (e.g. actions by private landowners). Permalinks are records of the filters used within reporting allowing repeated query through a single URL. Note that **data entered as "annual figure" in each reporting year should be for that year only**, and not cumulative (i.e. not the baseline plus the change). Cumulative figures will be calculated by summing individual year data.
Interpreting	
Interpretation *(inc linkage to other indicators)*	Use of 'project level' reports replaces 'geographic reports' as this avoids the uncertain completion of action recording by non-NIA agencies. All NIA actions will be within the NIA area. Double-counting of actions may occur in some instances – for example within the HLS national dataset where an HLS agreement is modified and the old agreement is not amended. Please flag to BARS team where you think this may be occurring (http://ukbars.defra.gov.uk/home/contact). Include explanations of potential interpretation issues within the online tool Caveats section of the online reporting tool.

Indicator: B03_H: Proportion of SSSIs in favourable or recovering condition

Indicator: B03_H	Proportion of SSSIs in favourable or recovering condition
Version date	27th March 2014
Theme	Biodiversity
Sub-theme	Habitat
Sub-theme category	Core
Indicator category	Optional
Indicates *(what is the indicator intended to indicate)*	This is an indicator of the proportion of SSSI area in favourable or recovering condition. There is currently no established methodology for assessing condition of habitat outside SSSIs, so SSSI condition is used here as a proxy for habitat condition, recognising however that condition of SSSI units is based on assessment of features which are not always representative of the underlying habitat. Natural England is currently developing methods for assessing habitat condition outside SSSI so it may be possible to report on habitat condition more widely in the future, and thus expand this indicator to cover habitat condition more generally.
Units	Proportion (%) of SSSI area in favourable or recovering condition
Relevance to Government indicators	England Biodiversity 2020 Indicators: 1b. Condition of SSSIs England Biodiversity 2020 Outcomes: 1A. Better wildlife habitats with 90% of priority habitats in favourable or recovering condition and at least 50% of SSSIs in favourable condition, while maintaining at least 95% in favourable or recovering condition
Existing data for establishing baseline	
Relevant dataset(s)	SSSI unit condition assessment data Data are collected at the management unit level on SSSIs. There is no standard method readily applicable for determining habitat condition outside SSSIs so this measure is limited to SSSI data at this stage.
Source(s) of data *(contact details or hyperlink)*	Natural England: Spatial data for SSSI units with condition attribution available from Natural England: http://www.gis.naturalengland.org.uk/pubs/gis/GIS_register.as Natural England have agreed to provide each of the 12 initial NIAs with analysis of SSSI condition within their NIA, following the national SSSI condition reporting methodology, for each year of the 3 year programme to 2015. This will be

	provided via the NIA Huddle Best Practice Network annually in advance of the reporting deadline (https://defra.huddle.net/huddleworkspace/default.aspx?workspaceid=16609188).
Spatial coverage	Comprehensive across all SSSIs
Temporal coverage	Assessment of the changes in SSSI unit condition is undertaken as part of a rolling programme between 4 and 9 years.
Planned updates	Data is published monthly with updates becoming available by the first of the following month - but note that not all SSSI condition records are updated annually.
Data collection method *(estimate, survey, monitoring)*	Common Standards Monitoring (CSM) See http://jncc.defra.gov.uk/page-2217 for further details of monitoring guidance.
Accuracy of data	See JNCC's guidance: http://jncc.defra.gov.uk/page-2217
Additional/new data for establishing baseline and monitoring change	
Relevant additional/new data	Changes in the extent of SSSIs in favourable or unfavourable recovering condition Note that the resurvey of SSSI sites is typically over longer timeframes (between 4 and 9 years), so monitoring may need to operate the CSM methods within interim survey periods to act as annual or closer period monitoring.
Responsibility for data collection *(e.g. NIA partnerships or potentially to be taken on by NE or EA)*	Natural England SSSI unit condition assessment
Methods for data collection	As above
Calculating and presenting indicator	
Baseline date for 12 initial NIAs	April 2012. Individual SSSI surveys provide the date of the CSM assessment.
Methods for calculating indicator values	Cookie-cut SSSI unit spatial data by NIA boundaries. Condition information is included in the attribution and the total unit areas for each condition category can be calculated. Natural England have agreed to provide each of the 12 initial NIAs with analysis of SSSI condition within their NIA, following the national condition reporting methodology, for each year of the 3 year programme to 2015. This will be provided via the NIA Huddle Best Practice Network annually in advance of the reporting deadline (https://defra.huddle.net/huddleworkspace/default.aspx?workspaceid=16609188).
Responsibility for calculating indicator values	Natural England for 12 initial NIAs to 2015
Reporting	
Online reporting	Baseline and annual fields in the online reporting system will be: • Proportion (%) of SSSI area in '*favourable'* or

	'*unfavourable recovering'* condition
	• Caveats relating to:
	  ○ Proportion of SSSIs reassessed within the reporting period
	  ○ Recognition that SSSI condition may not in all cases be representative of the condition of the underlying habitat
	  ○ Other issues relating to data interpretation / gaps.

Interpreting	
Interpretation *(inc linkage to other indicators)*	Include explanations of potential interpretation issues within the online tool 'Caveats' section. Information on the number of SSSI units assessed during the previous reporting period could be reported as part of the interpretation/caveats.

Indicator: B04_H: Total extent of existing priority habitat

Indicator: B04_H	Total extent of existing priority habitat
Version date	25th February 2014
Theme	Biodiversity
Sub-theme	Habitat
Sub-theme category	Core
Indicator category	Core
Indicates *(what is the indicator intended to indicate)*	The total spatial extent of existing priority habitat(s) within the NIA area, as selected by the NIA partnership (i.e. priority habitat that already meets the Priority Habitat Definition). The best available baseline area for existing priority habitat offers each NIA partnership an amount against which to proportionately compare the amount of priority habitat being actively maintained and created through management.
Units *(required for core and optional indicators, preferred for local indicators)*	Hectares (ha), Linear Kilometres (km).
Relevance to Government indicators	England Biodiversity 2020 Indicator 2. Extent and condition of priority habitats UK Biodiversity Framework Indicator C3. Status of threatened habitats
Existing data for establishing baseline	
Relevant dataset(s)	1. The national Priority Habitats Inventory (PHI), collated by Natural England from a wide variety of national and local data sources, currently provides the best available national datasets for priority habitat distribution and extent. 2. Comprehensive habitat mapping to OS MasterMap standards and Integrated Habitat Survey (IHS) or equivalent standard classification exists for some areas, from which it is possible to extract / translate to Priority Habitat classes. Note that the datasets and the habitat classification need to be consistent across the whole of the NIA area.
Source(s) of data *(contact details or hyperlink)*	1. Priority Habitats Inventory available from Natural England DataShare Environmental Open Data page. (http://www.geostore.com/environment-agency/WebStore?xml=environment-agency/xml/ogcDataDownload.xml), Natural England have agreed to provide each of the 12 initial NIAs with analysis of the area of each priority habitat within their NIA for each year of the 3 year programme to 2015. These can be submitted as the NIA report on habitat extent or NIAs can use local data if they wish 2. Local Record Centres – habitat maps informed by various survey methods to appropriate classifications to

	identify priority habitat types.
Spatial coverage	1. Priority Habitats Inventory: a 'single habitat layer' for England based around OS MasterMap land parcels. 2. Phase 1 maps and local records: normally relate to individual counties.
Temporal coverage	1. Priority Habitats Inventory: a version date for inventory layer further details can be found in files associated with the inventor when downloaded. 2. Local maps – varied dates, some are maintained on an on-going basis. (See note in caveats related to temporal change)
Planned updates	1. Priority Habitats Inventory: NE intends to accept updates to the 'PHI and to re-publish at least annually.. A feedback form is included when the PHI is downloaded. Locally available data can be submitted through this route to offer updated information. This should include data on species constancy and frequency across the site. 2. Local maps are often maintained by local record centres – e.g. Habitat Mapping Framework data.
Data collection method *(estimate, survey, monitoring)*	1. Priority Habitats Inventory is an interpreted product derived from analysis of a range of data sources of varying coverage and confidence in relation to confirming the habitat presence. These include Farm Environment Plan survey data, SSSI survey data, phase 1 and some NVC survey data. Metadata description associated with the PHI contains further detail. Collection methods are described in the Data Description and in 09042013_Single_Habitats_Layer_Final_Report_RDA.pdf included within the data download. 2. Local habitat maps – now typically mapped to OS MasterMap standards and using IHS classification, and some integrate to the National Vegetation Classification.
Accuracy of data	1. Priority Habitats Inventory has inconsistencies and does not always contain the best available local information. The PHI does not contain information on all priority habitats. 2. Other sources depend on the adopted standards.
Additional/new data for establishing baseline and monitoring change	
Relevant additional/new data	Changes to the boundaries of the selected broad or priority habitat(s), which may arise from re-survey, habitat loss/degradation, or restoration/creation. A feedback form is included when the PHI is downloaded from the Data Store. Locally available data can be submitted through this route to offer updated information for the inventories. This should include data on species constancy and frequency across the site.
Responsibility for data collection *(e.g. NIA partnerships or potentially to be taken on by NE or EA)*	Priority Habitats Inventory: NIA partnerships (data may also be collected by others in association with local record centres, national initiatives or on an *ad hoc* basis)
Methods for data collection *(required for core and optional indicators, preferred for local indicators)*	Priority Habitats Inventory: NIA partnerships should send any required updates to the PHI to NE with supporting evidence. A feedback form is included when the PHI is downloaded from the Data Store. Locally available data can be submitted through this route to offer updated information for the inventories. This should include data on species constancy and frequency across the site. Additionally an NE contract

	ending in March 2014 is intending to produce a standard methodology and advice aimed at helping anyone survey to confirm the presence, extent and condition of priority habitat. This will offer a best practice model for gathering and submitting evidence to update the PHI. Actions that restore and create priority habitat may be recorded in BARS2, however this focuses on activity reporting rather than outcomes so cannot be directly used to update the PHI. Activity is indicative of change, but is not a definitive change in land cover. Local habitat maps may be updated by resurvey and mapping changes. The HLU Mapping Tool (HCC/NE) (https://media.readthedocs.org/pdf/hlutool-technicalguide/latest/hlutool-technicalguide.pdf and https://github.com/HabitatFramework/HLUTool) can facilitate updates to the OSMM structured datasets (e.g. Habitat Mapping Framework data). It is important to retain the original versions to allow mapping of change over time.
Calculating and presenting indicator	
Baseline date for 12 initial NIAs	Priority Habitats Inventory: April 2013 – but note that PHI is a combination of past inventory data and the source records do not reflect extents in 2013 in most cases.
Methods for calculating indicator values *(required for core and optional indicators, preferred for local indicators)*	Cookie cut spatial habitat data by NIA boundaries If local habitat maps are used the NIA may need to translate the mapping classification to the equivalent priority habitat classification.
Responsibility for calculating indicator values	Priority Habitats Inventory: Natural England has agreed to provide each of the 12 initial NIAs with analysis of the area of each priority habitat within their NIA for each year of the 3 year programme to 2015. This will be provided via the NIA Huddle Best Practice Network annually in advance of the reporting deadline (https://defra.huddle.net/huddleworkspace/default.aspx?workspaceid=16609188) These can be submitted as the NIA report on habitat extent or NIAs can use local data if they wish. Any local analysis would need to be carried out by the NIA partnership
Reporting	
Online reporting *(required for core and optional indicators, preferred for local indicators)*	The following data can be entered in relevant fields in the online reporting system: • A baseline figure for total extent. The system will allow this figure to be updated annually, if necessary, and will track such changes • A figure for total extent updated annually • Caveats relating to: ○ The PHI only includes 24 priority habitats – out of 40 total terrestrial and freshwater priority habitats. One of these is “Deciduous Woodland” which comprises all BAP woodland which has not been distinguished. In addition to these 24 the PHI includes 3 non-priority

	habitat classifications/attributions. ○ Likely accuracy of the baseline (e.g. what can be deduced locally about potential misattribution of habitats and from information in files associated with each of the inventories when downloaded (e.g. local assessment / expert opinion of the percentage of the NIA area that NIA partners consider is accurately covered by PHI data). ○ Changes in the baseline, e.g. arising from publication of the single habitat layer ○ Likely gaps in knowledge of annual changes in total extent (e.g. arising from an inability to monitor privately landholdings). Note that **data entered as "annual figure" in each reporting year should be for that year only**, and not cumulative. Cumulative figures will be calculated by summing individual year data.
Interpreting	
Interpretation *(inc linkage to other indicators)*	Care is required, as the recorded total extent may not be a fair reflection of reality, due to inconsistencies and incomplete coverage of all the priority habitat types. Refer to the PHI data description for limitations. The originating data is of varied dates and mapping standards. Updates to the PHI (in relation to corrections) are likely to introduce significant change to the areas represented in the inventory. Change in areas represented as a result of actual gains or losses of habitat are likely to be much less significant and hard to deduce. The PHI is currently the only data source available across all 12 NIAs (and across England) and the NIAs should actively engage with its use and update. However, as the development of the PHI is in the early stages the NIAs have the option to submit their own extent calculations as reports against this indicator (these may be more accurate) as an alternative to the PHI if they have the information available. The PHI should be used as a (proxy) fall-back where there is no alternative. Note that the sources of data have minimum mappable units (typically of 0.5 Ha in PHI). Where extent changes due to actions are below these thresholds they will not appear in the record. Changes in extent may reflect changes in knowledge rather than actual changes. This may have wider implications as the indicator has potential links with all indicators within the biodiversity theme and links directly to NIA indicators of: • Area of habitat supporting pollinators • Contribution to water quality • Contribution to carbon storage and sequestration where the extent of habitat is used as a proxy indicator for ecosystems services. This indicator differs from that in B02_H: *Extent of areas managed to restore/create habitat* which maps actions as

	‘being managed to restore or create priority habitats’ whilst this indicator includes existing extent across the NIA.

Indicator: B05_S: Extent of habitat managed to secure species-specific needs

Indicator: B05_S	Extent of habitat managed to secure species-specific needs
Version date	25th February 2014
Theme	Biodiversity
Sub-theme	Habitat
Sub-theme category	Core
Indicator category	Optional
Indicates *(what is the indicator intended to indicate)*	This indicates the extent of specific habitat management as part of the NIA programme to introduce features that meet the niche requirements of individual native species. While this indicator is a direct measure of the extent of habitats being managed to secure species-specific needs it is a proxy measure for biodiversity benefits based on the assumption that habitat being managed to secure species-specific needs will, in time, result in an increase in abundance and resilience of target species.
Units	Hectares (ha), Linear Kilometres (km) or Sites depending on the action type Ideally, reporting should be as hectares (ha). Habitats for which sites are appropriate include ponds, linear habitats (e.g. rivers and hedgerows) can be reported as km.
Relevance to Government indicators	Biodiversity 2020 UK Biodiversity Indicator C4. Status of threatened species.
Existing data for establishing baseline	
Relevant dataset(s)	The data required for this indicator relates to habitat management activity. This should be recorded in and sourced from the Biodiversity Action Reporting System (BARS) Relevant records within BARS to include in reporting against this indicator: • Work type – *'species management'* • Biodiversity objective – '*to introduce certain features that meet the niche requirements of a particular species by undertaking specific management within or across a habitat*' BARS includes both records added by the NIA partnership / partners themselves, **and** records from nationally imported datasets – e.g. HLS (Higher Level Stewardship), EWGS (English Woodland Grant Scheme), EA (Environment Agency). The NIA will need to establish collaboration with nationally imported actions in order for them to be included in BARS reports at the NIA programme level.

	NIAs should update the status of existing records within BARS – i.e. planned to underway, underway to complete.
Source(s) of data *(contact details or hyperlink)*	BARS reports (http://ukbars.defra.gov.uk/), including: • Programme delivery entered into BARS by the NIA • Large datasets imported nationally into BARS e.g. HLS, EWGS) • Delivery information entered by other organisations working in the NIA area
Spatial coverage	BARS action maps and reports are available by NIA geographic boundaries. As of December 2013 BARS includes project level reporting as well as geographic.
Temporal coverage	The indicator is focussed on priority habitat management targeted at meeting the niche requirements of selected species. Data used to report against this indicator should be sourced from BARS. NIAs are advised to carry out 'point in time' reporting restricting their report to activity taking place on a specific date (31st March annually is recommended). This is to avoid counting repeated activity of the same type in the same location which would be a risk with a longer reporting period. Planned, Underway and Completed actions should be reported separately. The report will therefore include any activity planned or underway on the report date and all completed actions.
Planned updates	Continual – on-going and periodic recording of new and changing activity within BARS by both NIA partners and other organisations. Key national data imports are intended to be updated on at least an annual basis. Updates are primarily structured around financial reporting years (Apr- Mar). As such key updates are likely to be submitted every April/May, and include the latest data up to 31st March. Update will rely on the NIAs contributing actions to BARS and on updating the status of existing actions. This will also require updates to the setting up of collaborations with these bulk actions.
Data collection method *(estimate, survey, monitoring)*	NIAs should record of all relevant management actions being undertaken or as part of the NIA programme. BARS offers a standard method for relating these to objective, and quantifying these actions. BARS currently allows direct entry/input of individual action records and has a bulk import capability. Key nationally commissioned activity is being input to BARS centrally; this includes Agri-Environment (HLS only) activity, England Woodland Grant Scheme (available by April 2014) and nationally collated EA biodiversity projects. NIAs can

	establish collaborations with actions within these national datasets to reflect where they form part of NIA programme activity.
Accuracy of data	Various
Additional/new data for establishing baseline and monitoring change	
Relevant additional/new data	Changes in the extent of BARS actions within the NIA recorded as: • Work type = '*species management'* • Biodiversity objective – '*to introduce certain features that meet the niche requirements of a particular species by undertaking specific management within or across a habitat'* • Actions which have been linked under a Parent Project by the NIA within BARS.
Responsibility for data collection	**NIA partnership:** NIA partnerships should be primarily responsible for adding records of NIA activity to BARS beyond that contributed by National Partners detailed below, or by others (which may be identified by viewing records already in the system). **National Partners**: bulk uploads of selected records – e.g. HLS, EWGS, Environment Agency actions within at least annual defined bulk submission schedule. All NIA partnership organisations undertaking actions should be registered as BARS users, to allow for data entry and collaboration on actions. See additional guidance on collaborations available at: https://defra.huddle.net/workspace/16609188/files/#28140579 In order to report activity carried out by the partnership the NIA will need to establish a top Parent Project beneath which relevant actions are linked, either directly or via Child Projects in BARS. NIA should also establish 'collaborations' on bulk uploaded actions that contribute to their programme delivery
Data collection methods	Individual management actions need to be recorded at http://ukbars.defra.gov.uk/ where consistent with the following BARS definition: • "The objective of the action is to introduce certain features that meet the niche requirements of a particular species by undertaking specific management within or across a habitat. This may include preparation of a site to receive individuals as part of a reintroduction / translocation exercise. It is not intended to include more broad management of a particular habitat that generally benefits a wide range of species". NIA partners should establish a reporting structure for the NIA programme and NIA partners to enter actions and collaborations for NIA-specific actions. These should not include any records included as part of the national bulk uploads, although the NIAs will need to establish collaborations with any national actions where they form part of programme delivery.

	NIA specific guidance on BARS Action data entry is given in the NIA BARS FAQ document, available on HUDDLE at: https://defra.huddle.net/workspace/16609188/files/#28140579
Calculating and presenting indicator	
Baseline date for initial 12 NIAs	April 2013
Methods for calculating indicator values	The Action Reporting tools available within BARS (http://ukbars.defra.gov.uk/) can be used to extract data and calculate amounts to report against this indicator. The reporting tools available within the Projects page on BARS should be used to extract data filtered by the NIA project/programme. This is only possible where the NIA has established a 'project' or project hierarchy (Parent & Child projects) within BARS from which to generate these reports. See NIA-specific Guidance for online reporting filters, which allows for new reporting capabilities related to the project. This updates previous guidance and the BARS online tools now allow NIA-specific actions to be reported. See: https://defra.huddle.net/workspace/16609188/files/#/folder/22221241/list There is a need for the initial 12 NIAs to assign past actions (in 2012/2013) and recalculate baselines for effective comparison with subsequent years. All NIAs are required to extract project level reports and can also report at the geographic level as well if they wish.
Responsibility for calculating indicator values	NIA partnership to report, based on appropriate BARS filters. NIA's have the option of using the figures generated within Action Summaries in BARS itself, or by extracting a spreadsheet of records from which to filter and calculate alternative figures. The **permalink** function in BARS allows each NIA to save and return to the report used in either instance.
Reporting	
Online reporting	Baseline and annual fields in the online reporting system will be: • Feature (species) Action status (planned, underway, completed) • Extent of habitat • 'Permalinks' to the queries within BARS • Caveats relating to: ○ Likely gaps in knowledge of the extent of habitat managed to secure species-specific needs (e.g. undertaken by private landowners). The Online reporting system has been updated (December 2013) to allow entry of project level reports, which relate to NIA programme delivery. When extracting BARS reports against the NIA geographic boundary, NIAs should select all actions within the NIA area and select 'overlapping' or 'within' filters. If reporting only BARS actions associated directly with the NIA programme reporting will be at the 'project' level. Permalinks are records of the filters used within reporting

	allowing repeated query through a single URL. Note that **data entered as 'annual figure' in each reporting year should be for that year only**, and not cumulative. Cumulative figures will be calculated by summing individual year data.
Interpreting	
Interpretation *(inc. linkage to other indicators)*	Interpretation will need to be species-specific. Care is required when reporting against all activity within the NIA geographic area as the knowledge of activity may not be a fair reflection of all that is happening. Project level reporting should overcome the limitation. Changes in extent may reflect changes in knowledge or use of BARS rather than changes in activity. This may have wider implications as the indicator has potential links with all indicators within the biodiversity theme. Double-counting of actions may occur in some instances – for example within the HLS national dataset where an HLS agreement is modified and the old agreement is not amended. Please flag to BARS team where you think this may be occurring (http://ukbars.defra.gov.uk/home/contact). Record interpretation issues within the Caveats section of the online reporting tool.

Indicator: B06_S: Status of widespread species

Indicator: B06_S	Status of widespread species
Version date	25th February 2014
Theme	Biodiversity
Sub-theme	Species
Sub-theme category	Core
Indicator category	Optional
Indicates *(what is the indicator intended to indicate)*	This indicator aims to represent the status of individual widespread species used by relevant England Biodiversity 2020 Indicators[1], where NIA partnerships identify that suitable data exists and on-going data collection is feasible. By recording the status of widespread species this indicator seeks to help measure the extent to which species are thriving (or otherwise) in an NIA area. As it is not possible to directly attribute changes in species status across an NIA area to activities of the NIA (as opposed to other activities in the same area) this is considered a proxy indicator of the NIAs' benefit to widespread species.
Units	Trend in species individually categorised according to changes in abundance and/or distribution against a baseline as: • Increasing • Stable • Decreasing • Unknown
Relevance to Government indicators	England Biodiversity 2020 Indicators: • 5. Species in the wider countryside: farmland • 6. Species in the wider countryside: woodland • 7. Species in the wider countryside: wetlands. Biodiversity 2020 Outcomes 3 species Ref: Defra Biodiversity 2020: a strategy for England's wildlife and ecosystem services Indicators 2013 (https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/253546/England_full_FINAL.pdf)
Existing data for establishing baseline	

Relevant dataset(s)	Including:
	• *Ad hoc* records:
	  ○ National Biodiversity Network (NBN)
	  ○ National species recording societies
	  ○ Local records
	• National recording schemes:
	  ○ Breeding Bird Survey (BBS)
	  ○ National Bat Monitoring Programme (NBMP)
	  ○ UK Butterfly Monitoring Scheme (UKBMS)
	  ○ Countryside Survey (CS) – plant species richness

[1] https://www.gov.uk/government/publications/england-biodiversity-indicators

Source(s) of data *(contact details or hyperlink)*	Including:
	• *Ad hoc* records:
	  ○ http://www.nbn.org.uk/
	  ○ Local Records Centres (LRCs)
	• National recording schemes:
	  ○ BBS National Organiser at British Trust for Ornithology http://www.bto.org/volunteersurveys/bbs
	  ○ Bat Conservation Trust (BCT) http://www.bats.org.uk/pages/results_and_reports.html
	  ○ http://www.ukbms.org/
	  ○ http://www.countrysidesurvey.org.uk/

Spatial coverage	National schemes have been designed such that sampling is representative nationally; however, they are likely to include records from within individual NIAs and may be supported by ad hoc records from the NBN, LRC, national species recording societies and local species specialists.
Temporal coverage	National schemes provide systematic time-series data of species distribution and abundance. Other data is mostly recorded ad hoc and simply provides evidence of species presence (not absence) at a specific point in time. Ad hoc data on species abundance is likely to be site-specific and is recorded more rarely.
Planned updates	BBS, BCT and UKBMS national schemes are all ongoing.
Data collection method *(estimate, survey, monitoring)*	Refer to individual national schemes.
Accuracy of data	Records from national schemes, NBN and national species recording societies are verified. Records from LRCs and local species specialists may not have been subject to verification and may therefore need checking. Local species-level recording should seek to match existing recording strategies so that the trends can be reliably indicated.
Additional/new data for establishing baseline and monitoring change	
Relevant additional/new data	Presence and/or population size of widespread species used by the England Biodiversity 2020 Indicators 5-7, where suitable data exists and on-going data collection is feasible.
Responsibility for data collection *(e.g. NIA partnerships or potentially to be taken on by NE or EA)*	NIA partnership in consultation with national recording schemes, national species recording societies and local species specialists.
Methods for data collection	Annual data collection should be in accordance with protocols for national recording schemes to ensure consistency and comparability. Species selection, in relation to all those species used by the England Biodiversity 2020 Indicators 5-7, should be informed by: • An initial review of existing data • On-going data collection • Species specialists willing to record within the NIA. All data collected should be submitted to the LRC and NBN. National monitoring scheme data may not be appropriate to infer changes at a local landscape scale. Consideration should be given to the taxonomic group and the sample

	coverage across the NIA when assessing which species data will be suitable.
Calculating and presenting indicator	
Baseline date for initial 12 NIAs	April 2012, where time-series data exists covering at least 3 years.
Methods for calculating indicator values	Individual species should be categorised based on changes in status over the preceding 3 years (or longer, as necessary). Where populations are fluctuating, they should be assigned to the most likely of the four categories. The issues of bias or rigor are complex and vary between taxa e.g. detectability of species, ease of identification, ease of confusion with other species, recording methods.
Responsibility for calculating indicator values	NIA partnership
Reporting	

Online reporting	The following data can be entered in relevant fields in the online
	reporting system:
	
	• Baseline categorisation by species (features)
	• Annual categorisation by species
	• Caveats relating to:
	  ○ The suite of species selected
	  ○ Likely accuracy of the baseline for each species (e.g. extent to spatial coverage of data is likely to be representative of the NIA)
	  ○ Period over which baseline status was assessed for each species
	  ○ Likely gaps in knowledge (e.g. arising from an inability to monitor privately landholdings).
	
	Note that **data entered as 'annual figure' in each reporting year should be for that year only**, and not cumulative. Cumulative figures will be calculated by summing individual year data.

Interpreting	
Interpretation *(inc. linkage to other indicators)*	Interpretation may need to be specific to broad species groups or individual species. Care is required as changes in the local status of species may reflect changes in knowledge and survey effort rather than real changes or drivers of change that operate at a wider scale (e.g. regionally or nationally). Comparison with trends from national schemes may be informative. This indicator may have wider implications for interpreting all indicators within the biodiversity theme. **Note:** It is necessary to distinguish between real changes in species numbers as opposed to increased survey effort where there is an incomplete historical record. This measure should reflect the survey effort, and repeatability of the survey, methods and areas sampled etc and surveyor bias.

Indicator: B07_S: Status of focal species

Indicator: B07_S	Status of focal species
Version date	25th February 2014
Theme	Biodiversity
Sub-theme	Species
Sub-theme category	Core
Indicator category	Optional
Indicates *(what is the indicator intended to indicate)*	This indicates the trend in species of high conservation status that are the focus of actions or sensitive to drivers of change that are a specific concern within the NIA. By recording the status of focal species this indicator seeks to help measure the extent to which these species are thriving (or otherwise) in an NIA area. As it is not possible to directly attribute changes in species status across an NIA area to activities of the NIA (as opposed to other activities in the same area) this is considered a proxy indicator of the NIAs' benefit to focal species.
Units	Categorised annually according to long-term changes in abundance and/or distribution as: • Increasing • Stable • Decreasing • Unknown
Relevance to Government indicators	England Biodiversity 2020 Indicator 4a. Status of priority species Biodiversity 2020 Outcomes 3 species Ref: Defra Biodiversity 2020: a strategy for England's wildlife and ecosystem services Indicators 2013 (https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/253546/England_full_FINAL.pdf)
Existing data for establishing baseline	

Relevant dataset(s)	Including:
	• *Ad hoc* records:
	  ○ National Biodiversity Network (NBN)
	  ○ National species recording societies
	  ○ Local records
	• National recording schemes, such as:
	  ○ Breeding Bird Survey (BBS)
	  ○ National Bat Monitoring Programme (NBMP)
	  ○ UK Butterfly Monitoring Scheme (UKBMS)
	  ○ Countryside Survey (CS) – plant species richness

Source(s) of data *(contact details or hyperlink)*	Including:
	• *Ad hoc* records:
	  ○ http://www.nbn.org.uk/
	  ○ Local Records Centres (LRCs)
	• National recording schemes, such as:
	  ○ BBS National Organiser at British Trust for Ornithology http://www.bto.org/volunteersurveys/bbs
	  ○ Bat Conservation Trust (BCT) http://www.bats.org.uk/pages/results_and_reports.html
	  ○ http://www.ukbms.org/
	  ○ http://www.countrysidesurvey.org.uk/

Spatial coverage	National schemes have been designed such that sampling is representative nationally; however, they are likely to include records from within individual NIAs and may be supported by ad hoc records from the NBN, LRC, national species recording societies and local species specialists.
Temporal coverage	National schemes provide systematic time-series data of species distribution and abundance. Other data is mostly recorded ad hoc and simply provides evidence of species presence (not absence) at a specific point in time. Ad hoc data on species abundance is likely to be site-specific and is recorded more rarely.
Planned updates	BBS, BCT and UKBMS national schemes are all ongoing.
Data collection method *(estimate, survey, monitoring)*	Refer to individual national schemes
Accuracy of data	Records from national schemes, NBN and national species recording societies are verified. Records from LRCs and local species specialists may not have been subject to verification and may therefore need checking.
Additional/new data for establishing baseline and monitoring change	
Relevant additional/new data	Presence and/or population size of any species that are of relevance to the NIAs objectives because they are: • The focus of species-specific actions; or • Sensitive to drivers of change that are a specific concern. National monitoring scheme data may not be appropriate to infer changes at a local landscape scale. Consideration should be given to the taxonomic group and the sample coverage across the NIA before assuming that the data will be useable.
Responsibility for data collection *(e.g. NIA partnerships or potentially to be taken on by NE or EA)*	NIA partnership in consultation with national recording schemes, national species recording societies and local species specialists, as appropriate.
Data collection method	Annual data collection, in accordance with protocols for national recording schemes and/or best practice promoted by the relevant national species recording society. An initial review of existing data, on-going data collection and species specialists willing to record within the NIA will be informative of species selection based on the NIA's

	objectives. All data collected should be submitted to the LRC and NBN.
Calculating and presenting indicator	
Baseline date for initial 12 NIAs	April 2012, where time-series data exists covering at least 3 years.
Methods for calculating indicator values	Individual species should be categorised based on changes in status over the preceding 3 years (or longer, as necessary). Where populations are fluctuating, they should be assigned to the most likely of the four categories. The issues of bias or rigor are complex and vary between taxa e.g. detectability of species, ease of identification, ease of confusion with other species, recording methods.
Responsibility for calculating indicator values	NIA partnership
Reporting	

Online reporting	The following data can be entered in relevant fields in the online reporting system:
	
	• Baseline categorisation by species
	• Annual categorisation by species
	• Caveats relating to:
	  ○ The species selected
	  ○ Likely accuracy of the baseline (e.g. extent to spatial coverage of data is likely to be representative of the NIA)
	  ○ Period over which baseline status was assessed
	  ○ Likely gaps in knowledge (e.g. arising from an inability to monitor privately landholdings).
	
	Note that **data entered as 'annual figure' in each reporting year should be for that year only**, and not cumulative. Cumulative figures will be calculated by summing individual year data.

Interpreting	
Interpretation *(inc linkage to other indicators)*	Interpretation will need to be specific to individual species. It should explain why the species are a focus for action or sensitive to drivers of change that are a specific concern within the NIA. Care is required, as changes in the local status of species may reflect changes in knowledge and survey effort rather than real changes or drivers of change that operate at a wider scale (e.g. regionally or nationally). Comparison with trends from national schemes may be informative. This indicator may have wider implications for interpreting other indicators within the biodiversity theme and may help inform the 'Extent of habitat managed to secure species-specific needs'. **Note:** It is necessary to distinguish between real changes in

	species numbers as opposed to increased survey effort where there is an incomplete historical record. This should reflect the survey effort, and repeatability of the survey, methods and areas sampled etc and surveyor bias.

Indicator B08_S: Control of invasive non-native species

Indicator B08_S	Control of invasive non-native species
Version date	25th February 2014
Theme	Biodiversity
Sub-theme	Species
Sub-theme category	Core
Indicator category	Optional
Indicates *(what is the indicator intended to indicate)*	This indicator shows the control of significant harm to biodiversity from invasive non-native species. This shows the extent of control of invasive non-native species in the NIA area by any organisation *as part of the NIA programme* by action status (planned, underway or completed).
Units	Hectares (ha), Linear Kilometres (km) or Sites depending on the action type. Ideally, reporting should be as hectares (ha). Habitats for which sites are appropriate include ponds, linear habitats (e.g. rivers and hedgerows) can be reported as km.
Relevance to Government indicators	England Biodiversity 2020 Indicator 20. Trends in pressures on biodiversity – invasive species. UK Biodiversity Framework Indicator B6. Pressure from invasive species: • B6a. Freshwater invasive species • B6c. Terrestrial invasive species.
Existing data for establishing baseline	
Relevant dataset(s)	The data required for this indicator relates to management activity. This should be recorded in and sourced from the Biodiversity Action Reporting System (BARS). BARS actions in the NIA area by any organisation *as part of the NIA programme* recorded as: • Work/action type – '*species management'* • Biodiversity objective – '*to reduce the extent or impact of non-native species by practical activity'* Note that BARS biodiversity objective refers to 'non-native' species. Control of 'invasives' is likely to include native invasives (scrub, bracken control etc.) so a clear distinction is needed to focus on non-natives as other indicators cover management to improve condition that will include invasive *native* species. BARS includes both records added by the NIA partnership / partners themselves, **and** records from nationally imported datasets – e.g. HLS (Higher Level Stewardship), EWGS (English Woodland Grant Scheme), EA (Environment Agency). The NIA will need to establish collaboration with nationally imported actions in order for them to be included in BARS reports at the NIA programme level.

Source(s) of data *(contact details or hyperlink)*	BARS reports (http://ukbars.defra.gov.uk/), including: 1) Programme delivery entered into BARS by the NIA partners 2) Large datasets imported nationally into BARS (e.g. HLS, EWGS) 3) Delivery information entered by other organisations working in the NIA area *(this information is not included within the NIA reporting).*
Spatial coverage	BARS action maps and reports are available by NIA geographic boundary. As of December 2013 BARS includes project level reporting as well as geographic which allows both NIA programme level reporting along with geographic.
Temporal coverage	NIAs are advised to carry out 'point in time' reporting restricting their report to activity taking place on a specific date (31st March annually is recommended). This is to avoid counting repeated activity of the same type in the same location which would be a risk with a longer reporting period Planned, Underway and Completed actions should be reported separately. The report will therefore include any activity planned or underway on the report date and all completed actions.
Planned updates	Continual – on-going and periodic recording of new and changing activity within BARS by both NIA partners and other organisations. Key national data imports are intended to be updated on at least an annual basis. Updates are primarily structured around financial reporting years (Apr-Mar). As such key updates are likely to be submitted every April / May, and include the latest data up to 31st March This will require the NIAs to update to establish collaborations with these bulk actions.
Data collection method *(estimate, survey, monitoring)*	NIAs should record of all relevant management actions being undertaken or commissioned as part of the NIA programme. BARS offers a standard method for relating these to objective, and quantifying these actions. BARS currently allows direct entry/input of individual action records and has a bulk import capability. Key nationally commissioned activity is being input to BARS centrally; this includes Agri-Environment (HLS only) activity, England Woodland Grant Scheme (available by April 14) and nationally collated EA biodiversity projects. NIAs can establish collaborations with actions within these national datasets to reflect where they form part of NIA programme activity.
Accuracy of data	Various
Additional/new data for establishing baseline and monitoring change	
Relevant additional/new data	Changes in the extent of actions recorded on BARS as: • Work/action type – 'species management' • Biodiversity objective – 'to reduce the extent or impact of non-native species by practical activity' • Actions which coincide with the NIA geographic

	boundary OR • Have been linked under a Parent Project by the NIA within BARS.
Responsibility for data collection *(e.g. NIA partnerships or potentially to be taken on by NE or EA)*	**NIA partnerships** should be primarily responsible for adding records of NIA activity to BARS beyond that contributed by National Partners detailed below, or by others (which may be identified by viewing records already in the system). **National Partners**: bulk uploads of selected records – e.g. HLS, EWGS, Environment Agency actions within at least annual defined bulk submission schedule. All NIA partnership organisations undertaking actions should be registered as BARS users, to allow for data entry and collaboration on actions. See additional guidance on collaborations: https://defra.huddle.net/workspace/16609188/files/#28140579 In order to report activity carried out by the partnership specifically the NIA will need to establish a top Parent Project beneath which relevant actions are linked, either directly or via Child Projects in BARS. NIA should also establish 'collaborations' on bulk uploaded actions that contribute to their programme delivery
Data collection methods	Individual management actions need to be recorded at http://ukbars.defra.gov.uk/ where consistent with the following BARS definition: • "The objective of the action is to reduce the extent or impact of non-native species by practical activity. Non-native species are defined as any species now resident in the UK due to human activity, whether accidentally or on purpose. Most actions will relate to invasive non-native species, whose introduction and potential or actual capacity to spread is likely to pose a threat to biological diversity. The action feature should be the non-native species being controlled. Further information on invasive non-native species is available at https://secure.fera.defra.gov.uk/nonnativespecies/index.cfm?sectionid=15" NIA partners need to establish a reporting structure for the NIA programme and NIA partners to enter actions and collaborations for NIA-specific actions. These should not include any records included as part of the national bulk upload although the NIAs will need to establish collaborations with any national actions where they form part of NIA programme delivery. NIA specific guidance on BARS Action data entry is given in the BARS FAQ document, available on HUDDLE at: https://defra.huddle.net/workspace/16609188/files/#28140579
Calculating and presenting indicator	
Baseline date for the 12 initial NIAs	April 2013

Methods for calculating indicator values	The action reporting tools within BARS (http://ukbars.defra.gov.uk/) can be used to extract data and calculate figures to report against this indicator. The reporting tools available within the Projects page on BARS should be used to extract data filtered by the NIA project/programme. This is only possible where the NIA has established a 'project' or project hierarchy (Parent & Child projects) within BARS from which to generate these reports. The BARS reporting will be 'per objective' and thus the data for both biodiversity objective needs to be queried separately and the results summed or presented separately. See NIA-specific Guidance for online reporting filters, which allows for new reporting capabilities related to the project. This updates previous guidance and the BARS online tools now allow NIA-specific actions to be reported. See: https://defra.huddle.net/workspace/16609188/files/#/folder/22221241/list There is a need for the initial 12 NIAs to assign past actions (in 2012/2013) and recalculate baselines for effective comparison with subsequent years. All NIAs are required to extract and report project level reports and can also report at the geographic level as well if they wish
Responsibility for calculating indicator values	NIAs to undertake extraction of figures through the reporting tools within BARS. NIAs have the option of using the figures generated within *Action Summaries* in BARS itself, or extracting a spreadsheet of records from which to filter and calculate alternative figures. The permalink function in BARS allows each NIA to save and return to the report used in either instance.
Reporting	
Online reporting	Baseline and annual fields in the online reporting system will be: • Feature (non-native species) • Action status (planned, underway, completed) • Extent • Permalinks' to the report in BARS • Caveats relating to: ○ Likely gaps in knowledge of the extent of control of invasive or other non-native species (e.g. by private landowners). If reporting only actions associated directly with the NIA programme reporting will be at 'project' level. Note that **data entered as 'annual figure' in each reporting year should be for that year only**, and not cumulative. Cumulative figures will be calculated by summing individual year data.

Interpreting	
Interpretation *(inc. linkage to other indicators)*	Interpretation will need to be species-specific and may relate to other indicators within the biodiversity theme, habitat sub-theme – for example, habitats managed to maintain favourable condition (B03_H), enhance condition (B01_H) or restore/create habitats (B02_H), where non-native species control may form part of the work (e.g. *Rhododendron* clearance). Indicator covers the actions to control the invasive non-native species and does not indicate the species distributions and potential change in extent across the area (i.e. are actions reversing the invasive trend in colonisation and spread).

Indicator: B09_C: Local indicator of habitat connectivity

Indicator: B09_C	Local indicator of habitat connectivity
Version date	25th February 2014
Theme	Biodiversity
Sub-theme	Habitat connectivity
Sub-theme category	Core
Indicator category	Local
Indicates *(what is the indicator intended to indicate)*	This is a measure of progress of the NIA to improve the habitat connectivity. Measures of habitat connectivity can indicate: • The extent and spatial arrangement of habitat patches ("structural connectivity") AND/OR • The 'likelihood that species will be able to move or disperse through the landscape, between or through suitable habitat patches ("functional connectivity") AND/OR • Changes in distribution and/or abundance of particular species or functional group of species As a 'local' indicator, NIAs can define the measures but they should measure, model or create proxy measures of habitat connectivity. The information provided in this protocol should be considered as guidance on choosing and implementing an approach.
Units	Units will be dependent on local definition of the indicator.
Relevance to Government indicators	England Biodiversity 2020 Indicator 3. Habitat connectivity in the wider countryside UK Biodiversity Framework Indicator C2. Habitat connectivity Both currently measure functional connectivity.
Existing data for establishing baseline	
Relevant dataset(s)	Relevant datasets will depend on the approach taken to this indicator. For **modelled and measured connectivity mapping,** use of habitat data at high resolution, appropriate classifications and complete coverage of the NIA is required. This must include a repeat survey or data update cycle to enable for monitoring and evaluation of changes. Data requirements are not always restricted to Priority Habitats, because the intervening habitat matrix is also important in some modelling techniques. Habitat quality/condition may also be required for some modelling approaches. It will be important to decide which habitat type or species is the focus of the connectivity effort. For modelled approaches key datasets may include a range of land cover data options: • Land Cover Map (LCM) • Countryside Survey (2007)

	• Priority Habitats inventory • Phase 1 maps and Bespoke / new habitat surveys • Species records • Green infrastructure (GI) strategies • Biodiversity Opportunity Area (BOA) mapping • Terrain and dispersal barriers datasets • National Climate Change Vulnerability Model)national habitat permeability mapping (NE) NIAs will need to evaluate the suitability of the source data for their particular approach to this indicator. Priority Habitats Inventory data (without intervening habitat matrix) can be used for some structural measures of connectivity, while functional connectivity modelling requires information on the intervening habitat matrix as well as an understanding of how species move. For functional and structural connectivity modelling, there are a wide variety of GIS-based tools available that calculate a range of measures of connectivity, permeability, functional dispersion ability etc. The chosen measures need to be sensitive to change. Tools include: Fragstats (structural), ARCH Connectivity Assessment Tool (ARCH CAT), Conefor and BEETLE (structural and functional). The tool of choice should allow the connectivity metrics to be recalculated based on updated data inputs. In some cases tools (e.g. ARCH CAT) can be used to explore future management scenarios and potential impacts of an intervention at a given location as an aid to prioritisation of actions. Functional connectivity modelling will require identification of relevant species or guilds, their dispersion data or some measure of permeability of the landscape elements. This, information that may not be readily available and it often relies on expert judgement and categorisation of habitat types to reflect available data and dispersal ability of species. Functional connectivity approaches require a complete habitat surface (with no gaps between the habitat patches) as an input to the model. Information about the matrix is as important as information about the target habitat itself being modelled. Structural models can make use of just the Priority Habitat land parcels data. An example of the national modelled approach includes: Natural England National Climate Change Vulnerability Model (NCCVM) (http://www.naturalengland.org.uk/ourwork/climateandenergy/climatechange/vulnerability/nationalvulnerabilityassessment.aspx) – this includes habitat permeability measures and output maps, sensitivity to climate change, adaptive capacity metrics and conservation value. These address elements of structural and functional habitat connectivity, including measures of proximity of same habitat and permeability of surrounding landscape, topographic variety across habitats

	and permeable land and management applications that address current sources of harm for each habitat. This dataset has been calculated for all the NIAs and is available from NE. No update strategy is agreed, but the model and tool is available from NE and can be re-run using updated land cover records.
Source(s) of data *(contact details or hyperlink)*	Two broad approaches are included within the protocol, but the approach adopted will determine dataset choice: • Locally modelled approaches (functional or structural connectivity , depending on NIA selection) • National model runs on permeability – within the National Climate Change Vulnerability Model (NCCVM) Modelled approaches will require a number of datasets, and the NIAs will need to consider the suitability: Land cover: • Countryside Survey, http://www.countrysidesurvey.org.uk/data-access • Priority Habitats Inventory (PHI) available from Natural England DataShare Environmental Open Data page. (http://www.geostore.com/environment-agency/WebStore?xml=environment-agency/xml/ogcDataDownload.xml) • Green infrastructure (GI) strategies provide data on the network of multi-functional green space which is capable of delivering a wide range of environmental, biodiversity and well-being benefits. Many Local authorities have undertaken GI surveys, mapping and strategy development. • Biodiversity Opportunity Area (BOA) mapping approaches have been developed within many counties to identify priorities for conservation actions (e.g. habitat restoration, creation, and enhancement). LRCs and Local Authorities • Terrain and dispersal barriers datasets. National open data (e.g. Open Data Panorama 1:50k data - https://www.ordnancesurvey.co.uk/opendatadownload/products.html) are available, or locally higher resolution data are available (e.g. OS Terrain 5, NextMap - http://www.ordnancesurvey.co.uk/business-and-government/products/os-terrain-5.html). • National Climate Change Vulnerability Model (NCCVM) (http://www.naturalengland.org.uk/ourwork/climateandenergy/climatechange/vulnerability/nationalvulnerabilityassessment.aspx). National habitat permeability mapping (NE) is available from NE data catalogue website (http://www.naturalengland.org.uk/publications/data/default.aspx). • Some Local Records Centres (LRCs) / Wildlife Trusts have specific land cover mapping. Proposals for satellite based land cover classifications at suitable resolution or

	use of OS MasterMap based land parcel data. Species records: • LRCs • National Biodiversity Network (NBN) Information about habitat requirements and dispersal ability data for species or species guilds) is needed for functional connectivity assessments. It is unlikely that the NIA will survey dispersion distances of relevant species – so a meta-analysis of relevant species guilds literature may be an appropriate approach. The habitat datasets for functional connectivity assessments must provide continuous coverage across the entire NIA area. They should also be at a high enough resolution to realistically describe the habitats parcels (e.g. Phase 1 habitat) and intervening matrix effectively including 'barriers' of non-habitat. Priority Habitats Inventory are likely to be useful for the patch based structural connectivity methods but are unlikely to have the detail and consistency required (especially the matrix cover) for functional connectivity analysis.
Spatial coverage	The Priority Habitats Inventory is based around OS MasterMap parcels. Phase 1 maps and local records: usually relate to individual counties, the coverage is variable, but some is comprehensive. Species dispersal records: variable Functional measures of connectivity require a complete coverage. Analysis is likely to be sensitive to the spatial scale of the habitat mapping and the ability to represent the structure of the habitat used by species.
Temporal coverage	Ideally, the NIAs would have an up-to-date complete area habitat map at the start of their programme (2012 for the 12 initial NIAs) against which changes can be monitored. Habitat inventories: The Priority Habitats Inventory is made up of a variety of source habitat inventories. The dates and methodologies used to create these varies and it will be necessary to examine the dataset documentation (metadata) in order to determine the survey dates. Therefore, comparisons should be made with caution. Phase 1 maps and local land cover records: usually produced as a one-off and are generally quite old. Species records: usually *ad hoc* unless relate to a national recording scheme.
Planned updates	To act as an effective basis for monitoring, the input datasets need to reflect the trend in land cover changes associated with the NIA actions. This requires the development of procedures to update the underlying input data layers Priority Habitats inventory: from April 2013, NE intends to accept updates to the PHI and to re-publish it every –year,

	suitability will rely on the contributions of data to NE to update this dataset. Other land cover datasets have varied update strategies.
Data collection method *(estimate, survey, monitoring)*	Data collection for calculating the indicator, will depend on the choice of metric. The approach may be decided locally, based on appropriate land cover resource, technical capacity and resonance with the NIA and selection of structural or functional connectivity metrics. NIAs can draw from projects such as ARCH CAT, which have generated lists of permeability scores for different Phase1 / CORINE habitats and generic species or other searching and meta-analysis can be employed to assign the permeability scores. Habitat inventories: PHI detailed information on each of the inventory is provided in associated files when downloaded.
Accuracy of data	Priority Habitats Inventory: should be considered provisional. It does not always contain the best available local information. The PHI does not contain information on all Priority Habitats. It is intended to be improved through submission of updates Species data: usually only records presence (not absence) of species – but note that the data requirement is likely to a include measures of species dispersal abilities (distances they move, habitats they move through) and impacts of land cover specific barriers
Additional/new data for establishing baseline and monitoring change	
Relevant additional/new data	Annual updates to the habitat connectivity rely on the changes to the land cover and potentially to habitat quality, which may be recorded in relation to NIA M&E framework indicators of: • Extent of habitat managed to improve its condition • Extent of areas managed to restore/create habitat • Extent of habitat in favourable or recovering condition • Total extent of habitat Extent of habitat managed to secure species-specific needs It is important to give an indication of the changes relative to the NIA land area, report on number and size of patches/ average size of patches? For modelling approaches, the underlying land cover map needs to be updated to incorporate changes over time. Many of these actions will be recorded in BARs but the areas of changes will need to be incorporated into the land cover mapping. It may be appropriate to include the actions that are not part of the NIA programme to understand the overall effect within the NIA, but make clear within the caveats that these activities have been included. Changes in habitats extent (and potentially condition) need to be incorporated into the baseline dataset to be used within

	the annual re- analysis of connectivity. Changes in species distribution and abundance, which may be recorded in relation to NIA M&E framework indicators of: • Status of widespread species – birds, butterflies, bats, plants • Status of focal species
Responsibility for data collection *(e.g. NIA partnerships or potentially to be taken on by NE or EA)*	NIA partnerships drawing upon other datasets, as relevant. If NCVVM data is used NE has calculated Year 1 data, subsequent years will need consultation with NE or access to the model / tool.
Data collection method	Consistent with those used for establishing the baseline.
Calculating and presenting indicator	
Baseline date for 12 initial NIAs	Baseline will depend on the metric approaches chosen. For modelled / measured indicator the version date of the contributory land cover data will be the baseline date. For the action proxy, the baseline (pre NIA) is zero (as at April 2012), and the annual figures mark the annual contributions of actions to improve connectivity.
Methods for calculating indicator values	Dependent on local definition of the indicator. Measures of physical/structural and functional connectivity require calculation using a GIS. There are pros and cons associated with each of the three broad types of measures of connectivity: • **Physical/structural connectivity** is simple to measure using land cover data and appropriate tools. It considers land cover as habitat or non-habitat (i.e. in a binary way). An indicator incorporating changes in habitat area, number of patches, patch size and nearest neighbour distance, may be informative. However, care in interpretation may be required, as structural indicators fail to consider the importance of the nature of intervening land between habitat patches, and results may be counterintuitive or ambivalent. • **Functional connectivity** is more complex to measure. The relative ease with which species can move through the landscape between habitat patches is likely to be important in a UK context but little or no empirical data exists, so models rely on expert opinion or published literature meta-analysis. Therefore the dispersal distances and cost surfaces (a model of the ability of a species to move through the landscape across different habitat types) tend to use generic values for groups of species utilising a specific habitat (e.g. woodland specialists). However, the individual requirements and relative ease of movement within this assemblage of species may vary considerably. Tools such as the ARCH CAT model have been developed in GIS and allow both functional connectivity and fragmentation metrics to be created from a detailed GIS habitat map and associated permeability scores for the species modelled. • The National Climate Change Vulnerability Model

	(NCCVM) is based on a modelling tool that can allow for re-runs of the data. Access the tool from NE (http://www.naturalengland.org.uk/ourwork/climateandenergy/climatechange/vulnerability/nationalvulnerabilityassessment.aspx). Updates to the land cover datasets is based on the update to the PHI or land cover data. • **Changes in distribution and/or abundance of multiple species** can in theory provide proxy measures of connectivity but it is necessary to focus on species with intermediate dispersal abilities, as there may be significant time lags in the response of those that are more dispersal-limited. Results may be hard to interpret as changes may reflect trends in many variables not just connectivity. Changes in species distribution and abundance also need to be set in context of habitat availability. • For **proxy measures of actions** contributing to the habitat connectivity extracted through filters of the appropriate records from BARS, it will be important to include within the caveats the permalink and the description of the biodiversity objectives and classes of action that are included within the report.
Responsibility for calculating indicator values	NIA partnership for most measures. NCCVM has been calculated by NE for NIAs, but the modelling could be run by NIAs.
Reporting	

Online reporting	The online tool has currently assumed a modelled structural connectivity approach, however the NIAs may enter their own features to accommodate functional connectivity measures. The following baseline and annual data can be entered in relevant fields in the online reporting system:
	
	• Features to be recorded
	• Figure for the indicators
	• Caveats relating to:
	  ○ Land cover data
	  ○ Species data
	  ○ Methods for calculating indicator values
	  ○ Interpretation of indicator values.
	
	Note that **data entered as 'annual figure' in each reporting year should be for that year only**, and not cumulative. Cumulative figures will be calculated by summing individual year data.

Interpreting	
Interpretation *(inc. linkage to other indicators)*	Care is required not only for reasons identified in the methods for calculating indicator values but also as this indicator may rely upon or be interpreted in the context of any of the other indicators under the biodiversity theme. Changes in their values may reflect changes in knowledge rather than real changes in connectivity. Connectivity and the models are largely theoretical which can lead to difficulties in interpretation of their true ecological meaning. The significance of any changes to the values of

	these indices over time involves comparison of what often appear to users as rather abstract numbers. A useful review of approaches to the assessment of habitat connectivity is provided by: Watts, K., *et al.* 2008. Habitat Connectivity – Developing an indicator for UK and country level reporting. Phase 1 Pilot Study - (Defra Contract WC0704). Forest Research, Farnham, Centre for Ecology and Hydrology, Lancaster (http://sciencesearch.defra.gov.uk/Document.aspx?Document= WC0704_7707_FRP.pdf) and the review of habitat connectivity indicator development by JNCC 2012 (http://jncc.defra.gov.uk/docs/01_BIF_BackgroundPaper_HabitatConnectivity.docx). Links to other indicators such as total extent of habitat, total value of ecosystem services, and other biodiversity indicators within the habitat sub-theme. Actions to improve connectivity and the resulting changes to species distribution and abundance may take some time before effects are detectable. Distribution may not be as important as abundance - if they have access to more habitat, one would expect numbers to increase. The species data would need to be set in context of the habitat connectivity information. Equally, one type of habitat/ connectivity enhancement for some species can be a barrier to others.

Indicator: B10_C: Comparative indicator of habitat connectivity

Indicator: B10_C	Comparative indicator of habitat connectivity
Version date	25th February 2014
Theme	Biodiversity
Sub-theme	Habitat connectivity
Sub-theme category	Core
Indicator category	Core
Indicates *(what is the indicator intended to indicate)*	This is a measure of NIA progress improve habitat connectivity Measures of habitat connectivity can indicate: changes in the distribution / condition / extent of habitats contributing to connectivity (as a proxy)
Units	Hectares (ha), Linear Kilometres (km) or Sites depending on the nature of the action type. Ideally, reporting should be as hectares (ha). Linear habitats (e.g. river and hedgerows) can be reported as km.
Relevance to Government indicators	England Biodiversity 2020 Indicator 3. Habitat connectivity in the wider countryside. UK Biodiversity Framework Indicator C2. Habitat connectivity Both currently measure functional connectivity.
Existing data for establishing baseline	
Relevant dataset(s)	Core indicator would be based on national datasets / collation of conservation actions contributing to connectivity in order to allow national comparison. This is a **proxy measure** of connectivity based on the contribution of actions to improve connectivity. The extent of actions undertaken within the reporting period are needed. Datasets for the proxy measures can be derived from the records (in BARS) of those relevant actions. NIAs can establish a 'Connectivity' sub-NIA ('Child') project within BARS to collate all the relevant actions.
Source(s) of data *(contact details or hyperlink)*	BARS reports (http://ukbars.defra.gov.uk/), or locally held spatial records of actions undertaken by type. BARS data includes: 1) Programme delivery entered into BARS by the NIA partners 2) Large datasets imported nationally into BARS (e.g. HLS, EWGS) 3) Delivery information entered by other organisations working in the NIA area *(this information is not included within the NIA reporting).* If NIAs are managing their action records within a GIS then this can be used as the basis for reporting.

Spatial coverage	For proxy measures of connectivity, include all relevant actions that are within the NIA and have been undertaken within the NIA programme.
Temporal coverage	For proxy measures of connectivity, the actions underway or completed within the period are those that will contribute to the connectivity.
Planned updates	Update will rely on the NIAs contributing actions to BARS or recording the extents of actions and on updating the status of existing actions.
Data collection method *(estimate, survey, monitoring)*	Conservation action records and cross-tabulation between conservation actions and contribution to connectivity derived from literature or expert judgement. Action records may be collated within BARS and these are associated with an area / extent record. The spatial data held in BARS does not form a basis for reporting extents, so NIAs may wish to use local GIS layers of actions. If using BARS the NIAs will need to establish a 'collaboration' (linking between projects within the BARS system) to allow actions from the nationally imported actions or actions entered by other projects to be associated with the NIA 'connectivity project'. Separate indicators may be entered for each habitat type using particular habitats that NIAs are managing for.
Accuracy of data	Spatial accuracy records should be based on the GIS extents of actions. Weighting factors will be subjective, but can be agreed by a stakeholder / expert group.
Additional/new data for establishing baseline and monitoring change	
Relevant additional/new data	Annual updates to the actions will be recorded in BARS in relation to: i) Extent of habitat managed to improve its condition. ii) Extent of areas managed to restore/create habitat. iii) Extent of habitat managed to secure species-specific needs. For this proxy indicator, the changes in land cover do not necessarily need to be integrated back into the local land cover maps as analysis can be run on the actions and records of their extents/condition. Action records of conservation actions (habitat enhancement of condition, creation/restoration) recorded within BARS and selected by the NIAs on the basis of their contribution to connectivity (i.e. not all actions may be undertaken to enhance connectivity). NIAs should update the status of existing records within BARS – i.e. planned to underway, underway to completed.
Responsibility for data collection *(e.g. NIA partnerships or potentially to be taken on by NE or EA)*	NIA partnerships drawing upon other datasets, as relevant.
Data collection method	Consistent with those used for establishing the baseline.

Calculating and presenting indicator	
Baseline date for 12 initial NIAs	For this action based proxy, the baseline (pre-NIA) is zero (as at April 2012), and the annual figures mark the annual contributions of actions to connectivity.
Methods for calculating indicator values	NIAs will need to identify and annually collate the actions which are contributing to connectivity and weight these based on their relative contribution to connectivity. Include both the underway and completed actions. A 'reclassification matrix and some application of weighting factors will be needed to cross-reference the habitat conservation actions to their functional contribution to connectivity. The weightings applied to the extents of actions should be between 0 and 1 based on the NIAs view of the contribution of the habitat objective to connectivity. No standard weightings have been provided. Calculation of areas times the relative contribution to connectivity can be undertaken within a spreadsheet or integrated within a GIS model if local spatial records are used. This weighting may be based on criteria e.g. i) type of actions / objective ii) adjacency to other areas of relevant habitat iii) extent iv) age. For example, the matrix may distinguish actions to create and improve condition and contributing more than actions to maintain habitat. NIAs should report their weighting coefficients as well as quantities (within the Online reporting and caveats). NIAs can calculate and sum the measures for different habitats, but may do that at a coarse level (e.g. woodlands, grasslands, heathlands).
Responsibility for calculating indicator values	NIA partnership.
Reporting	

Online reporting	The following baseline and annual data can be entered in relevant fields in the online reporting system.
	
	• Features – defined for the extent contributing to connectivity for particular habitats
	• Annual figure for the indicator
	• Caveats relating to:
	  ○ Methods for calculating indicator values
	  ○ Interpretation of indicator values.
	
	Note that **data entered as 'annual figure' in each reporting year should be for that year only**, and not cumulative. Cumulative figures will be calculated by summing individual year data.
	
	Include within the caveats the permalink and the description of the biodiversity objectives and classes of action that are included within the report.
	
	The actions for improvement to connectivity should include an area / length value for the works undertaken (e.g. *x* ha deciduous woodland planted or *x* km of hedgerows); a

	location and ideally some narrative information about *why* the action was targeted there specifically. The weighting factors and re-classification matrix used should be included.
Interpreting	
Interpretation *(inc. linkage to other indicators)*	As this is a new protocol (2014) this area needs further research, particularly in terms of the weighting and scoring of the contribution of actions to connectivity, but it is possible to re-run analysis year on year if the conservation actions are recorded. This measure only reports on the actions to improve connectivity developed by the NIA programme. External factors may affect the overall connectivity within the NIA area; narrative reporting on the indicator is encouraged. It may be appropriate to record within the narrative /caveats actions that are not part of the NIA programme to understand the overall effect within the NIA. It is acknowledged that actions to enhance connectivity for some species or habitats may have a negative impact on connectivity for others. In this sense they are not truly additive. This indicator reports on the positive contributions of actions with weightings from 0-1 (in the assumption that there are no actions at '0' and no negative actions. A more sophisticated model might include this but would need to be habitat specific to reflect the positive for one habitat being negative for others. NIAs are encouraged to use the Caveats field to report on these issues. Links to other indicators such as total extent of habitat, total value of ecosystem services, and other biodiversity indicators within the habitat sub-theme offer the opportunity to capture the 'more, bigger, better'.