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"Assessment of Biodiversity Losses - Monetary Valuation of Biodiversity Losses due to Land Use Changes and Airborne Emissions"

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Abstract

This deliverable presents the development of a new methodology for assessing biodiversity losses due to energy production. For resulting land use changes and airborne emissions we build on the work of Eco-indicator (1999) and Koellner (2002) to derive potentially disappeared fractions (PDF) due to certain land use changes as well as depositions of SO_x, NO_x and NH_3. The resulting PDF changes are then valued by using a restoration cost approach. The resulting external costs per unit of PDF change as well as per kg deposition of SO_x, NO_x and NH_3 are presented for 32 different European countries and validated with results from different WTP studies.

Structure

The present document is organized as follows:

- Summary, Zusammenfassung, Resumée of the report
- Chapter 1 presents an introduction into the topic and puts the document and work package into the context of Stream 1b.
- Chapter 2 deals with the economic valuation of biodiversity losses in general and presents a short overview of different economic valuation instruments.
- Chapter 3 develops a new methodology for assessing biodiversity losses due to energy-related land use changes and airborne emissions and presents the results for different European countries. These results are discussed and validated by comparing them to other results form a wide range of different studies.
- Chapter 4 concludes the document with a short summary of the principal results.
- The Appendix lists the detailed results.

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Summary: Assessment of biodiversity losses due to land use changes and airborne emissions

Land use changes together with acidification and eutrophication caused by the airborne emissions SO_2, NO_x and NH_3 lead to a reduction in species diversity. No studies have yet been undertaken which assess biodiversity losses due to airborne emissions and land use changes.

As part of the integrated project NEEDS (New Energy Externalities Developments for Sustainability) within the EU's sixth framework programme, **eco**ncept has developed an approach for assessing biodiversity losses due to land use changes and deposition of airborne emissions, which is outlined below. The project was supported by the Federal Roads Authority and the Federal Office for the Environment.

Calculation of external costs

The potentially disappeared fraction, PDF (number of disappeared species) compared with reference conditions is used as an indicator for biodiversity losses and related ecosystem damage. The relevant PDFs are known for 40 different land use categories (CORINE-categories).

The external costs of biodiversity losses due to **land use changes** are calculated using a restoration cost approach. The costs of actual projects from various German studies, where ecologically valuable target biotopes were built up from ecologically less valuable habitats (starting biotopes), are evaluated. These can be used to calculate restoration costs for various land use changes. The resulting restoration costs [€/m^2] for 21 target biotopes based on built up land or other suitable starting biotopes are set out for a total of 32 European countries (purchasing power adjusted), giving for example for Switzerland (selected starting and target biotopes):

Starting biotope		Target biotope	Biodiversity change [PDF]	Restoration costs [€/m^2]
Built up land	-->	Integrated farming	- 0.18	0.23
Built up land	-->	Organic farming	- 0.74	0.60
Intensive farming	-->	Organic farming	- 0.47	0.59
Intensive meadows and pasture -->		Extensive meadows and pasture	- 0.86	3.76

Table 1 Biodiversity gains (=PDF reduction) and restoration costs (or increases in value) for selected starting and target biotopes (Switzerland)

The **deposition of airborne emissions SO_x, NO_x and NH_3** damages biodiversity through acidification (SO_x, and NO_x) and eutrophication (NH_3 and NO_x). A Dutch damage model, which determines the resulting change in species diversity for marginal deposition changes of SO_x, NO_x and NH_3, measured as the PDF of biotope-specific target species of vascular plants, is used as the basis for calculating biodiversity losses due to airborne emissions. In this case, PDF is an indicator of the extent to which the typical species[1] originally found in a type of habitat are likely to disappear due to the deposition of airborne emissions.

Table 2 shows the empirically derived dose-response model for the Netherlands.

Emission	Deposition increase [kg / (m^2 x year)] on natural soils	PDF for the Netherlands with current airborne emission load including deposition increase	Damage per kg deposition [PDF x m^2 x year/ kg]
SO_x	0.000064	0.746540	1.73
NO_x	0.000046	0.746867	9.52
NH_3	0.000017	0.746870	25.94

Table 2 Dose-response model used: additional PDF per kg deposition of airborne emission (Eco-indicator 1999). Reference value for biodiversity losses in the NL in 1999 without additional deposition: PDF = 0.746429.

1 Concept of target species: characteristic vascular plants for the habitat type in question.

The reference value gives the biodiversity loss measured as potentially disappeared fraction (PDF) of plants[2] typical for the biotope in question with current depositions of airborne emissions. A PDF of 0.746429 means that, based on present depositions of airborne emissions, 74.6% of the species typical of each biotope in the NL have already disappeared.

Using this empirically-based damage model, the corresponding biodiversity losses can be calculated for small additional deposition changes. For example, the resulting damage per additional kg deposition of SO_x per m^2 equals 1.73 PDF.

Monetarization of biodiversity losses

The restoration costs calculated for land use changes are used to determine the "monetary value" of PDF changes. The restoration costs for specific habitat types with large species diversity, based on a habitat type with low biodiversity (such as e.g. intensive farming), are combined with the resulting PDF changes. This gives restoration costs per PDF change [€/PDF/m^2 or CHF/PDF/m^2]. Those habitat changes with the lowest restoration costs per PDF change are used for the monetary assessment of biodiversity losses due to deposition of airborne emissions: that is the conversion of integrated farming to organic farming with costs of 0.49 €/PDF/m^2 for Germany (2004).[3]

The limits of the approach lie in the fact that the standardization is "blind" with regard to possible differences in the ecological value of single target species typical of a habitat or biotope (i.e. each target species relevant for the biodiversity of a habitat is of equal value).

Results for 32 countries

The external costs of biodiversity losses per kg deposition of SO_x, NO_x and NH_3 for 32 countries are calculated using the German restoration costs of 0.49 €/PDF/m^2 and the Dutch damage model.

2 A species has 'potentially disappeared' when its probability of occurrence on an investigation area in a biotope is less than 5%.

3 When integrated farming (intensive arable) is converted to organic farming (organic arable), the PDF changes by -0.56, i.e. the number of potentially disappeared, habitat-typical plants (target species) falls by 56%. With restoration costs of 0.27 €/m^2 from integrated to organic farming in the FRG, this gives restoration costs of 0.49 €/PDF/m^2 .

Purchasing power (using the purchasing power standard) is used to adjust the German restoration costs for the different countries. The Dutch model is used as the damage model. The different environmental conditions of each of the countries (soil quality, airborne emission load) is taken into consideration in that the dose-response relations between deposition changes and biodiversity changes are weighted using an indicator (acidification/eutrophication pressure index). The acidification/eutrophication pressure index shows the current state of acidification and eutrophication and the soil properties[4] in these countries. The percentage of natural areas in each of the countries is also taken into account, since acidification and eutrophication can only effect the biodiversity on natural areas. As an example the following formula shows calculation of the external costs per kg SO_x deposition in Switzerland:

External costs per 1 kg SO_x deposition $\mathbf{kext_{SO2}}$

$\mathbf{kext_{SO2}}$ = 1.73 PDF x $m^2/kg_{Deposition}$ x 0.96 CHF/PDF x m^2 (PPS-derived value[5] corresponding to 0.49 €/PDF/m^2) x 0.68 (= percentage of natural areas in CH) x 0.613 (= Acidification Pressure Index CH) = **0.69 CHF/kg**

These calculations are carried out in the same way for 31 other European countries and for the three airborne emissions SO_x, NO_x and NH_3.

The following table shows the results per kg/deposition for selected countries:

4 Soil properties which determine susceptibility to acidification/eutrophication, such as for example the buffer capacity of calcareous soils.

5 PPS: Purchasing power standard takes account of the purchasing power in each of the countries. The PPS refers to the Euro as common currency. The PPS is 1.3 for Switzerland and 1 for the FRG i.e. one € in the FRG corresponds to 1.3 € in Switzerland; therefore for the same service 30% more Euros must be paid in Switzerland than in the FRG.

Country	Estimate of external costs of biodiversity losses due to depositions of airborne emissions in [€/$kg_{pollutant\ deposition}$] for 2004 SO_x	NO_x	NH_3
EU25	0.15	0.75	1.88
Austria	0.29	1.51	3.91
France	0.05	0.48	1.87
Germany	0.26	1.41	3.81
Italy	0.05	0.53	2.08
Netherlands	0.21	1.15	3.14
Sweden	0.36	1.10	0.65
United Kingdom	0.16	0.48	0.12
Switzerland	0.46	2.79	8.33

Table 3 External costs of biodiversity losses in selected countries due to depositions of airborne emissions for 2004.

The comparatively high costs in Switzerland can be explained by a combination of the following factors:

- The purchasing power standard for Switzerland is 1.3 (high level of prices and wages), i.e. the purchasing power of one euro is 30 % lower in Switzerland for example than in the FRG, which leads to higher restoration costs
- The percentage of natural land which is actually damaged by the depositions in question is high in Switzerland (68%)
- The acidification pressure and eutrophication pressure are both relatively high in Switzerland
- There is no other country where all three factors mentioned above are relatively high at the same time

When the results are validated using the outcomes of various willingness to pay studies the results obtained are plausible.

Zusammenfassung: Bewertung von Biodiversitätsverlusten durch Landnutzungsänderungen und Luftverschmutzung

Landnutzungsänderungen sowie Versauerung und Überdüngung durch die Luftschadstoffe SO_2, NO_x und NH_3 führen zu einer Reduktion der Artenvielfalt. Bisher liegen noch keine Studien vor, die die Biodiversitätsverluste aufgrund der Luftverschmutzung sowie aufgrund von Landnutzungsänderungen bewerten.

econcept hat im Rahmen des integrierten Projektes NEEDS (New Energy Externalities Developments for Sustainability) des sechsten Rahmenprogrammes der EU einen Ansatz zur Bewertung von Biodiversitätsverlusten aufgrund von Landnutzungsänderungen und von Luftschadstoffdepositionen entwickelt, der im folgenden kurz dargestellt wird. Das Projekt wurde vom Bundesamt für Strassen (ASTRA) und vom Bundesamt für Umwelt (BAFU) unterstützt.

Berechnung der externen Kosten

Als Indikator für Biodiversitätsverluste und den damit verbundenen Ökosystemschaden wird die "Anzahl verschwundener Arten" (potentially disappeared fraction, PDF) im Vergleich mit einem Referenzzustand verwendet. Für 40 verschiedene Landnutzungskategorien (CORINE-Kategorien) sind die zugehörigen PDF bekannt.

Die externen Kosten der Biodiversitätsverluste infolge von **Landnutzungsänderungen** werden mithilfe eines Wiederherstellungskostenansatzes berechnet. Dabei werden die Kosten von realen Projekten aus verschiedenen deutschen Studien ausgewertet, bei denen aus ökologisch wenig wertvollen (Ausgangs-) Habitaten (starting biotopes) ökologisch wertvolle (Ziel-) Habitate (target biotopes) erstellt werden. Damit können Wiederherstellungskosten (restoration costs) für verschiedene Landnutzungsänderungen berechnet werden. Die resultierenden Wiederherstellungskosten [€/m^2] für 21 Zielbiotope, ausgehend von überbautem Land (built up land) bzw. von anderen jeweils geeigneten Ausgangsbiotopen, werden für insgesamt 32 europäische Länder ausgewiesen (kaufkraftbereinigt), so zum Beispiel für die Schweiz (ausgewählte Start- und Zielbiotope):

Startbiotop -->	Zielbiotop	Biodiversitäts-veränderung [PDF]	Wiederherstellung-skosten [€/m²]
Überbautes Land -->	Integrierte Landwirtschaft	- 0.18	0.23
Überbautes Land -->	Organische Landwirtschaft	- 0.74	0.60
Intensivlandwirtschaft -->	Organische Landwirtschaft	- 0.47	0.59
Intensiv-Wiesen&Weiden -->	Extensive Wiesen & Weiden	- 0.86	3.76

Tabelle 4 Biodiversitätsgewinne (= Reduktion PDF) und Wiederherstellungskosten (bzw. Wertsteigerungen) für ausgewählte Start- und Zielbiotope (Schweiz)

Die **Deposition der Luftschadstoffe SO_x, NO_x und NH_3** beeinträchtigt die Biodiversität durch Versauerung (SO_x, und NO_x) und Überdüngung (NH_3 und NO_x). Als Grundlage für die Berechnungen der schadstoffbedingten Biodiversitätsverluste wird ein holländisches Schadensmodell verwendet, welches für marginale Depositionsveränderungen von SO_x, NO_x und NH_3 die resultierende Veränderung der Artenvielfalt ermittelt, welche als PDF von habitattypischen Pflanzen (biotope specific target species of vascular plants) gemessen wird. PDF ist in diesem Fall ein Indikator dafür, wie viele der ursprünglich in einem Habitattyp vorkommenden typischen Arten[6] durch die Deposition von Luftschadstoffen höchstwahrscheinlich verschwinden.

Table 2 zeigt das empirisch ermittelte Dosis-Wirkungsmodell für die Niederlande.

Emission	Depositionszunahme [kg / (m² * Jahr)] auf natürlichen Böden	PDF für die Niederlande bei aktueller Luftschadstoffbelastung inklusive Depositionszunahme	Schaden pro kg Deposition [PDF*m² *Jahr/ kg]
SO_x	0.000064	0.746540	1.73
NO_x	0.000046	0.746867	9.52
NH_3	0.000017	0.746870	25.94

Tabelle 5 Verwendetes Dosis-Wirkungsmodell: Zusätzliche PDF pro kg Luftschadstoff-Deposition (Eco-Indicator 1999). Referenzwert für die Biodiversitätsverluste in den NL im Jahr 1999 ohne zusätzliche Deposition: PDF = 0.746429.

6 Konzept der target species: Für jeweiligen Habitattyp charakteristische vaskuläre Pflanzen.

Der Referenzwert gibt den Biodiversitätsverlust gemessen als potentially disappeared fraction (PDF) von für das jeweilige Biotop typischen Pflanzen[7] bei den aktuellen Luftschadstoffdepositionen an. Ein PDF von 0,746429 bedeutet, dass aufgrund der heutigen Luftschadstoffdepositionen bereits 74,6% der jeweils habitattypischen Arten in den NL verschwunden sind.

Mit dem vorliegenden empirisch begründeten Schadensmodell können für kleine zusätzliche Depositionsänderungen die zugehörigen Biodiversitätsverluste berechnet werden. Der resultierende Schaden pro zusätzliches kg Deposition von SO_x pro m^2 beträgt beispielsweise 1,73 PDF.

Monetarisierung von Biodiversitätsverlusten

Um den "monetären Wert" von PDF-Veränderungen zu bestimmen, werden die bei Landnutzungsänderungen berechneten Wiederherstellungskosten verwendet. Dabei werden die Wiederherstellungskosten für bestimmte Habitattypen mit grosser Artenvielfalt, ausgehend von einem Habitattyp mit geringer Biodiversität (wie bspw. intensiver Landwirtschaft) mit der dabei resultierenden PDF-Veränderung kombiniert. Daraus ergeben sich Wiederherstellungskosten pro PDF-Veränderung [€/PDF/m^2 bzw. CHF/PDF/m^2]. Zur monetären Bewertung von Biodiversitätsverlusten infolge von Luftschadstoffdepositionen werden diejenigen Habitatveränderungen mit den geringsten Wiederherstellungskosten pro PDF-Veränderung verwendet: Das ist der Übergang von integrierter Landwirtschaft zu Biolandwirtschaft mit Kosten von 0,49 €/PDF/m^2 für Deutschland (2004).[8]

Die Grenzen des Ansatzes zeigen sich darin, dass die Standardisierung "blind" ist gegenüber allfälligen Unterschieden beim ökologischen Wert einzelner für ein Habitat bzw. Biotop typischer Zielarten (d.h. jede für die Biodiversität eines Habitates relevante Zielart (target species) ist gleich wertvoll).

7 Eine Art ist 'potentially disappeared' wenn ihre Auftretenswahrscheinlichkeit (probability of occurrence) auf einer Untersuchungsfläche in einem Biotop kleiner als 5% ist.

8 Beim Übergang von integrierter Landwirtschaft (intensive arable) zu Biolandwirtschaft (organic arable) verändern sich die PDF um -0.56, d.h. die Anzahl potenziell verschwundener, habitattypischer Pflanzen (target species) sinkt um 56%. Bei Wiederherstellungskosten von 0.27 €/m^2 von integrierter zu organischer Landwirtschaft in der BRD ergibt das Wiederherstellungskosten von 0.49 €/PDF/m^2 .

Ergebnisse für 32 Länder

Mit den deutschen Wiederherstellungskosten von 0,49 €/PDF/m^2 und dem holländischen Schadensmodell werden die externen Kosten von Biodiversitätsverlusten pro kg Deposition von SO_x, NO_x und NH_3 für 32 Länder berechnet.

Die deutschen Wiederherstellungskosten werden kaufkraftbereinigt (mittels Purchasing Power Standard) auf die verschiedenen Länder umgerechnet. Als Schadensmodell wird das holländische Modell verwendet. Die unterschiedliche Umweltsituation der jeweiligen Länder (Bodenqualität, Luftschadstoffbelastung) wird insofern mitberücksichtigt, als die Dosis-Wirkungsbeziehungen zwischen Depositionsveränderungen und Biodiversitätsveränderungen mittels eines Indikators (Acidification-/Eutrophication- Pressure-Index) gewichtet werden. Der Acidification-/Eutrophication- Pressure-Index, bildet den aktuellen Zustand der Versauerung und Überdüngung sowie der Bodeneigenschaften[9] in diesen Ländern ab. Zusätzlich wird auch der Anteil natürlicher Fläche in den jeweiligen Ländern berücksichtigt, da Versauerung und Überdüngung nur auf natürlichen Flächen die Biodiversität beeinflussen können. Die folgende Formel zeigt beispielhaft die Berechnung der externen Kosten pro kg SO_x - Deposition in der Schweiz:

Externe Kosten pro 1 kg SO_x-Deposition **$kext_{SO2}$**

$kext_{SO2}$ = 1,73 PDF*m^2/$kg_{Deposition}$* 0,96 CHF/PDF*m^2 (entspricht PPS-bereinigt[10] 0,49 €/PDF/m^2)* 0,68 (= Anteil natürliche Fläche in CH) * 0,613 (= Acidification Pressure Index CH) = **0,69 CHF/kg**

Diese Berechnungen werden analog für 31 andere europäische Länder sowie für die drei Schadstoffe SO_x, NO_x und NH_3 durchgeführt.

Die folgende Tabelle zeigt die Ergebnisse pro kg/Deposition für ausgewählte Länder:

9 Bodeneigenschaften, welche die Anfälligkeit gegenüber Versauerung/Überdüngung mitbestimmen, wie beispielsweise die Pufferkapazität von kalkhaltigen Böden.

10 PPS: Purchasing power standard, berücksichtigt die Kaufkraft in den jeweiligen Ländern. Der PPS bezieht sich dabei auf den Euro als gemeinsame Währung. Der PPS für die Schweiz beträgt 1,3 und für die BRD 1, d.h. einem € in der BRD entsprechen 1,3 € in der Schweiz, für dieselbe Leistung müssen daher in der Schweiz 30% mehr Euros ausgegeben werden als in der BRD.

Land	Schätzung der externen Kosten von Biodiversitätsverlusten aufgrund von Luftschadstoffdepositionen in [€/$kg_{Schadstoffdeposition}$] für 2004		
	SO_x	NO_x	NH_3
EU25	0.15	0.75	1.88
Austria	0.29	1.51	3.91
France	0.05	0.48	1.87
Germany	0.26	1.41	3.81
Italy	0.05	0.53	2.08
Netherlands	0.21	1.15	3.14
Sweden	0.36	1.10	0.65
United Kingdom	0.16	0.48	0.12
Switzerland	0.46	2.79	8.33

Tabelle 6 Externe Kosten von Biodiversitätsverlusten in ausgewählten Ländern aufgrund von Luftschadstoffdepositionen für 2004.

Die vergleichsweise hohen Kosten in der Schweiz können als Kombination der folgenden Faktoren erklärt werden:

- Der purchasing power standard für die Schweiz beträgt 1,3 (hohes Preis- und Lohnniveau), d.h. die Kaufkraft eines Euro ist in der Schweiz 30 % tiefer als beispielsweise in der BRD, was zu höheren Wiederherstellungskosten führt
- Der Anteil natürlichen Landes, das durch die jeweiligen Depositionen effektiv beeinträchtigt wird, ist in der Schweiz hoch (68%)
- Sowohl der acidification pressure als auch der eutrophication pressure sind beide in der Schweiz relativ hoch
- In keinem anderen Land sind alle drei oben erwähnten Faktoren gleichzeitig relativ hoch

Die Validierung der Ergebnisse mit den Ergebnissen verschiedener Zahlungsbereitschafts- (willingness to pay)-Studien zeigt, dass die ermittelten Ergebnisse plausibel sind.

Resumée: Évaluation des pertes de biodiversité dues à des changements d'utilisation des sols et à la pollution atmosphérique

Les changements d'utilisation des sols ainsi que leur acidification et leur surfertilisation par certains polluants atmosphériques, le SO_2, les NO_x et le NH_3, entraînent une diminution de la diversité des espèces. Toutefois, on ne dispose jusqu'ici d'aucune étude évaluant les pertes de biodiversité dues à la pollution de l'air ainsi qu'aux changements d'utilisation des sols.

Dans le contexte du projet intégré NEEDS (New Energy Externalities Developments for Sustainability) du sixième Programme-cadre de l'UE, **eco**ncept a développé une méthodologie pour l'évaluation des pertes de biodiversité dues à des changements d'utilisation des sols et à des dépôts de polluants atmosphériques, qui est brièvement présentée ci-après. Le projet a été soutenu par l'Office fédéral des routes et l' Office fédéral de l'environnement.

Calcul des coûts externes

On utilise, en tant qu'indicateur des pertes de biodiversité et des atteintes à l'écosystème qu'elles engendrent, le nombre d'espèces potentiellement disparues par rapport à une situation de référence (potentially disappeared fraction, PDF). On connaît les PDF correspondant à 40 catégories d'utilisations différentes du sol (catégories CORINE).

Les coûts externes des pertes de biodiversité consécutives à des **changements d'utilisation des sols** sont calculés à l'aide d'une évaluation des coûts de restauration. Pour ce faire, on effectue une estimation des coûts de projets réels, présentés dans différentes études allemandes, qui développent, à partir d'habitats (de départ) ayant une faible valeur écologique (starting biotopes), des habitats (cibles) de grande valeur écologique (target biotopes). On peut ainsi calculer les coûts de restauration (restoration costs) pour différents changements d'utilisation des sols. Les coûts de restauration [en €/m^2] qui en résultent pour 21 biotopes cibles, en partant de terrain construit (built up land) ou d'autres biotopes de départ appropriés, sont présentés pour 32 pays européens (coûts corrigés en fonction du pouvoir d'achat), et notamment pour la Suisse (pour des biotopes de départ et biotopes cibles choisis):

Biotope de départ	-->	Biotope cible	Modification de la biodiversité [PDF]	Coûts de restauration [en €/m^2]
Terrain construit	-->	Agriculture intégrée	- 0,18	0,23
Terrain construit	-->	Agriculture organique	- 0,74	0,60
Agriculture intensive	-->	Agriculture organique	- 0,47	0,59
Prairies et pâturages intensifs	-->	Prairies et pâturages extensifs	- 0,86	3,76

Tableau 7 Gains en biodiversité (= réduction du PDF) et coûts de restauration (ou augmentation de la valeur) pour des biotopes de départ et des biotopes cibles choisis (en Suisse)

Les **dépôts de polluants atmosphériques – SO_x, NO_x et NH_3 –** portent atteinte à la biodiversité en acidifiant (SO_x, et NO_x) et en surfertilisant (NH_3 et NO_x) les sols. Comme base pour calculer les pertes de biodiversité dues à des polluants, on utilise un modèle hollandais des dommages, qui détermine la modification de la diversité biologique résultant d'un changement marginal des dépôts de SO_x, de NO_x et de NH_3 en la mesurant sous forme de PDF de plantes typiques de l'habitat (biotope specific target species of vascular plants). Le PDF est ici un indicateur du nombre d'espèces typiques[11] que l'on trouvait à l'origine dans un certain type d'habitat et qui disparaîtront très probablement à cause des dépôts de polluants atmosphériques.

Le Table 2 présente le modèle dose-réponse empirique pour les Pays-Bas.

11 Le concept de « target species » désigne les plantes vasculaires caractéristiques du type d'habitat considéré.

Émission	Augmentation des dépôts [en kg / (m² * an)] sur des sols naturels	PDF pour les Pays-Bas pour la charge polluante actuelle, y compris l'augmentation des dépôts	Dommages par kg de dépôts [en PDF*m² *an/ kg]
SO_x	0,000064	0,746540	1,73
NO_x	0,000046	0,746867	9,52
NH_3	0,000017	0,746870	25,94

Tableau 8 Modèle dose-réponse utilisé: PDF supplémentaires par kg de dépôts de polluants atmosphériques (Eco-Indicator 1999). Valeur de référence pour les pertes de biodiversité aux Pays-Bas en 1999, sans dépôts additionnels: PDF = 0,746429.

La valeur de référence indique la perte de biodiversité mesurée en tant que « potentially disappeared fraction » (PDF) de plantes[12] typiques du biotope correspondant pour les dépôts actuels de polluants atmosphériques. Un PDF de 0,746429 signifie qu'en raison du niveau actuel des dépôts de polluants atmosphériques, 74,6% des espèces typiques de l'habitat considéré ont déjà disparu aux Pays-Bas.

Ce modèle empirique des dommages permet de calculer les pertes de biodiversité découlant de petites modifications additionnelles des dépôts. Par exemple, le dommage induit par kg supplémentaire de dépôts de SO_x par m^2 équivaut à 1,73 PDF.

Monétarisation des pertes de biodiversité

Pour déterminer la « valeur monétaire » des modifications du PDF, on utilise les coûts de restauration calculés pour les changements d'utilisation des sols. Pour ce faire, les coûts de restauration de certains types de biotopes renfermant une grande diversité d'espèces, obtenus en partant d'un type d'habitat à faible diversité biologique (p. ex. l'agriculture intensive), sont combinés avec le changement du PDF qui en résulte. On obtient ainsi des coûts de restauration par modification du PDF [en €/PDF/m^2 ou en CHF/PDF/m^2]. Pour effectuer l'évaluation monétaire des pertes de biodiversité dues à des dépôts de polluants atmosphériques, on utilise les

12 Une espèce a potentiellement disparu (potentially disappeared) lorsque la probabilité qu'elle apparaisse (probability of occurrence) dans un biotope, sur une surface test, est inférieure à 5 %.

modifications d'habitat ayant les coûts de restauration les plus faibles par modification du PDF, à savoir le passage de l'agriculture intégrée à l'agriculture biologique, dont les coûts sont de 0,49 €/PDF/m^2 pour l'Allemagne (2004).[13]

Les limites de cette démarche résident dans le fait que la normalisation est « aveugle » concernant d'éventuelles différences de la valeur écologique de certaines espèces cibles typiques d'un habitat ou d'un biotope (en d'autres termes, toutes les espèces cibles (target species) importantes pour la biodiversité d'un habitat ont la même valeur).

Résultats pour 32 pays

Les coûts externes des pertes de biodiversité par kg de dépôts de SO_x, de NO_x et de NH_3 sont calculés pour 32 pays en utilisant les coûts de restauration allemands de 0,49 €/PDF/m^2 et le modèle hollandais des dommages.

Les coûts de restauration allemands sont convertis dans les monnaies des différents pays et corrigés en fonction du pouvoir d'achat (à l'aide du standard de pouvoir d'achat (SPA), « purchasing power standard (PPS) »). On utilise le modèle hollandais en tant que modèle des dommages. La situation environnementale différente des pays considérés (qualité des sols, pollution atmosphérique) est également prise en compte dans la mesure où les relations dose-réponse entre les modifications des dépôts et les modifications de la biodiversité sont pondérées à l'aide d'un indicateur (acidification/eutrophication pressure index). Cet indice reflète l'état actuel de l'acidification et de la surfertilisation ainsi que des propriétés du sol[14] dans ces pays. On tient en outre aussi compte de la proportion de surfaces naturelles dans les pays considérés, l'acidification et la surfertilisation n'ayant une influence sur la biodiversité que dans des surfaces naturelles. La formule ci-après montre la manière dont se calculent les coûts externes par kg de dépôts de SO_x pour la Suisse:

coûts externes pour 1 kg de dépôts de SO_x $\mathbf{Cext_{SO2}}$

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13 Lors du passage de l'agriculture intégrée (intensive arable) à l'agriculture biologique (organic arable), les PDF se modifient de -0,56; en d'autres termes le nombre de plantes typiques du biotope potentiellement disparues (target species) diminue de 56%. Avec des coûts de restauration de 0,27 €/m^2 en Allemagne pour le passage d'une agriculture intégrée à une agriculture organique, on obtient des coûts de restauration de 0,49 €/PDF/m^2.

14 Caractéristiques du sol qui déterminent la susceptibilité à l'acidification ou à la surfertilisation, telles que le pouvoir tampon de sols calcaires.

Cext$_{SO2}$ = 1,73 PDF*m^2/kg$_{dépôt}$* 0,96 CHF/PDF*m^2 (valeur corrigée à l'aide du SPA[15] correspondant à 0,49 €/PDF/m^2)* 0,68 (= proportion de surfaces naturelles en Suisse) * 0,613 (= acidification pressure index CH) = **0,69 CHF/kg**

Des calculs similaires sont effectués pour 31 autres pays européens et pour les trois polluants (SO_x, NO_x et NH_3).

Le tableau ci-après présente les résultats par kg de dépôts pour quelques pays:

	Estimation des coûts externes des pertes de biodiversité dues à des dépôts de polluants atmosphériques en [€/kg$_{dépôt\ de\ polluant}$] pour 2004		
Pays	SO_x	NO_x	NH_3
UE25	0,15	0,75	1,88
Autriche	0,29	1,51	3,91
France	0,05	0,48	1,87
Allemagne	0,26	1,41	3,81
Italie	0,05	0,53	2,08
Pays-Bas	0,21	1,15	3,14
Suède	0,36	1,10	0,65
Royaume-Uni	0,16	0,48	0,12
Suisse	0,46	2,79	8,33

Tableau 9 Coûts externes des pertes de biodiversité dues à des dépôts de polluants atmosphériques en 2004 pour différents pays

Les coûts comparativement élevés en Suisse peuvent s'expliquer par une combinaison des facteurs suivants:

- le standard de pouvoir d'achat pour la Suisse est de 1,3 (niveaux de prix et de salaires élevés), c'est-à-dire qu'en Suisse, le pouvoir d'achat d'un euro est de 30 % inférieur à celui en Allemagne par exemple, ce qui entraîne des coûts de restauration plus élevés;
- la proportion de surfaces naturelles effectivement atteintes par les dépôts considérés est élevée en Suisse (68 %);
- les indices d'« acidification pressure » et d'« eutrophication pressure » sont tous deux relativement élevés en Suisse;

15 SPA: standard de pouvoir d'achat (purchasing power standard, PPS), tient compte du pouvoir d'achat dans les pays considérés. Le SPA se rapporte à l'euro en tant que monnaie commune. Le SPA est de 1,3 pour la Suisse et de 1 pour l'Allemagne; en d'autres termes 1 € en Allemagne correspond à 1,3 € en Suisse. Aussi pour la même prestation, il faudra dépenser en Suisse 30% d'euros de plus qu'en Allemagne.

- dans aucun autre pays, les trois facteurs mentionnés ci-dessus ne sont relativement élevés en même temps.

La validation des résultats à l'aide des résultats de différentes études sur le consentement à payer (willingness to pay) montre que les résultats obtenus sont plausibles.

1 Introduction

The effects of different fuel cycles and energy infrastructures on biodiversity have not yet been sufficiently assessed. Existing studies applying contingent valuation to value biodiversity have limited transferability and have no bearing on valuing biodiversity losses of energy production (see chapter 2.2 and ExternE, 1999, p. 333).

The objectives of this work package (WP 4, Stream 1b) are as follows:

- Assessment of external costs of biodiversity losses due to energy production and distribution.
  - Biodiversity losses due to land-use changes due to energy production and distribution infrastructures.
  - Biodiversity losses due to energy related airborne emissions (eutrophication and acidification).
- Development of a methodology to assess external costs of biodiversity losses.
- Provision of methodological prerequisites for assessment of external costs for single sites as well as for different fuel cycles or technologies in EU-countries and for energy modelling.

This work package will apply an innovative approach to determine biodiversity damages by habitat losses due to the fuel cycles.

The expected results of this work package are:

- Methods to determine biodiversity damages due to energy production and distribution
- External cost rates per PDF for different European countries. These cost rates, combined with life cycle inventory analyses, can be employed to assess external costs for technologies and for single site evaluations.
- PDF changes per m^2 land use change for different habitat transformations.

- Valuation of a unit change of PDF by a restoration cost approach (minimal cost per unit PDF change).
- Marginal PDF-changes and related (external) damage costs per kilogramme of annual deposition for substances leading to acidification and eutrophication.
- Validation of resulting external costs per PDF change using the results from different WTP studies dealing with land use changes and the impacts of air pollution on ecosystems.

2 Economic Valuation of Biodiversity Losses

A concise methodology for economic valuation of biodiversity losses due to energy production and infrastructure is built on the following steps:

- definition of biodiversity
- quantification of biodiversity losses
- monetary valuation of biodiversity losses

The following chapters try to present the current state-of-the-art in dealing with the economic valuation of biodiversity losses. It includes the presentation of the most important current methodological and empirical results.

2.1 General Definition of Biodiversity

By defining biodiversity, a distinction needs to be made between biological resources and biological diversity. A biological resource is a given example of a gene, species or ecosystem. Biological diversity refers to the variability of biological resources. The Rio 1992 Convention on Biological Diversity, Article 2, defines biodiversity as:

"the variability among all living organisms from all sources, including inter alia, terrestrial, marine and other aquatic ecosystems and ecological complexes of which they are part; this includes diversity within species (genetic diversity), between species (species diversity) and of ecosystems (ecosystem or habitat diversity). (Seidl & Gowdy 1999, p.103., OECD 2002b, p. 24, Greensense 2003, p. 7-2).

Species diversity is a function of the distribution and abundance of species. Both species richness (its number) and species evenness (its relative abundance) are used as measures of diversity (Greensense 2003, p. 7-5). Often, species richness – the number of species within a region or given area – is used almost synonymously with species diversity (Pearce & Moran 1994, p. 7). Alternative measures being developed supplement species richness with measures of the degree of genealogical difference.

2.2 Economic Valuation Instruments

Biodiversity loss has two broad ecological consequences. First, some ecosystem functions may be lost and, second, the resilience of the whole system may be impaired. These two effects are interrelated (OECD 2002b, p. 40f.).

By and large, from a human perspective all ecological functions of ecosystems are also economic functions since humans make use directly or indirectly of all ecosystems. For a great many of these uses there are no markets and resulting market prices. Thus, the economic values attached to ecosystem functions have to be derived from the preferences that individuals have for those functions. These preferences in turn are measured by the notion of willingness to pay (WTP) to secure or retain those functions and services. The economic value can be divided into use and non-use values, i.e. the WTP based on the uses made of ecosystems and the WTP based on people's concerns simply to conserve systems or components of systems. The resulting sum of use and non-use values (total economic value) then describes the economic value of the ecosystems (OECD 2002b, p. 42).

Another link between diversity and ecosystems is the effect of diversity on resilience. Resilience measures the degree of shock or stress that the ecosystem can absorb before moving from one state to another very different one. Diversity stimulates resilience because individual species threatened or affected by change can have their roles taken over by other species in the same system. The smaller the array of species the less there is the chance of this substitution process taking place (OECD 2002b, p. 42).

Overall, the economic value of biodiversity loss comprises two major components:

- the use (consumptive and productive values) and non-use (existence, option and bequest values) values associated with loss of ecosystem functions and
- the values associated with the loss of ecosystem resilience to change.

There are a lot of different methodologies for quantifying these values in economic theory, each with its own specific advantages and disadvantages (see Pearce & Moran 1994, ExternE 1998, and Ott, Baur, Iten & Vettori 2005 for more details), the most important and widely used being:

- Contingent Valuation Method
- Hedonic Price Method
- Travel Cost Method
- Restoration Costs

It should be noted that not all values of biodiversity can be measured in monetary terms, not even made explicit. Thus the monetary estimates should be interpreted as conservative estimations and hence regarded as lower bounds (Greensense 2003, p. 7-10).

2.2.1 Contingent Valuation Method

The underlying principle in monetary valuation is to obtain the willingness to pay (WTP) of the affected individuals to avoid a negative impact, i.e. to prevent biodiversity loss, or the willingness to accept (WTA) payment as compensation if a negative impact takes place. The rationale is that values should be based on individual preferences, which are translated into monetary terms by individual WTP and WTA (ExternE 1998, p. 41f.)

The contingent valuation method (CVM) tries to elicit the WTP or WTA by direct questionnaires. It has been developed into a sophisticated procedure for valuing a number of environmental impacts. A big advantage of CVM is its ability to capture not only use, but also non-use values such as “existence” or “option” values.

If people were able to clearly understand the change in environmental quality being offered, and answered truthfully, this direct approach would be ideal. However, a number of different specific types of biases for CVM-studies can be identified (Pearce & Moran 1994, p. 29f):

- Strategic bias: temptation to understate the true preferences in the hope of a free ride or over-reporting of WTP to ensure provision.
- Hypothetical bias: hypothetical situation can render respondents' answer meaningless if their declared intentions cannot be taken as accurate guides of their actual behaviour.
- Embedding problem: People have problems understanding certain kinds of questions that depend on insights into their own feelings or their memory of events or feelings, i.e. deeply held moral, philosophical and religious beliefs.
- Information bias: The quality of information given in a hypothetical market scenario almost certainly affects the responses received. In the context of unknown or lesser order species, the issue of information provision as the basis of a valuation response is clearly vital. If CVM use is to be extended beyond celebrated species and ecosystems, the effects of information provision must be addressed.

A wide range of contingent valuation studies with regard to biodiversity were undertaken (see Greensense 2003, p. 7-12, Infraconsult 1999, p. 66f., Pearce & Moran 1994, p. 46-58, ExternE 1998, p. 331f., Nunes, van den Bergh, Nijkamp 2001, p. 16f., Nunes & van den Bergh 2001, MacMillan 2001 and ten Brink et al. 2000). These studies either focus on valuing endangered or rare species or biodiversity programmes for specific and local landscapes/habitats.

In general, the results of the studies valuing single species are consistent. They do not represent large proportions of respondent income and habitat appears to be more highly valued than species, which is to be expected since a wider array of benefits is being secured by conservation of habitat than by targeting individual species.

The most recent studies for nature and landscape protection were undertaken in Germany, Austria, Sweden, United Kingdom and Switzerland in the Nineties (Infraconsult 1999, p. 68). Questions contained the protection and promotion of species and habitat diversity and the willingness to pay for the protection of certain habitat types. The resulting WTP estimates for biodiversity range between 2€ and 20€ per person per month (Infraconsult 1999, p. 66f.). The studies in the US focused on the willingness to pay for the protection of specific species. The results presented in Infraconsult (1999, p. 66f.) show that they are plausible.

A range of monetary estimates of biodiversity values basing on 61 different studies from North America and Western Europe analysed by Nunes & van den Bergh (2001) give the following results:

Genetic and Species Diversity	Value Ranges (per Person per Annum)
Single Species	5 – 126US$
Multiple Species	18 - 194US$
Ecosystems and natural habitat diversity	27 - 101US$

Table 1: Value Range for Biodiversity Estimates by CVM (Nunes & van den Bergh 2001)

The loss of biodiversity due to energy production and infrastructure is difficult to determine by these studies. A Norwegian study interviewed people valuing the conservation of rivers against the development of hydroelectric power plants. They found a WTP of US$ 59-107 (1990 prices) per person per annum. This result could be of use in valuing the loss of habitat and ecosystem function from hydropower development. But the transferability of this result is rather limited because it reflects the situation in Norway and only a limited proportion of ecosystem damage due to hydropower production is captured (there are no data for land-use by artificial lakes, destruction of alpine habitats, distribution infrastructure etc.).

In general, the results of studies dealing with WTP values for biodiversity preservation are difficult to validate and are of limited transferability. Comparisons of the results are difficult, because the aims and methodologies of the studies and the questions and target groups are hardly comparable. The values in one country are very much a function of local factors and it is inappropriate to take them out of context. Another problem is that the concept of biodiversity is complicated and one has to assume that it is ill understood among the general population (Nunes, van den Bergh, Nijkamp 2001, p. 16).

Another problem for the use of these values is that they cover the average value of the ecosystem services of biodiversity, and not the marginal value of a change in their characteristics (Greensense 2003, p. 7-10). The results for the willingness to pay for biodiversity per person per annum of a certain amount of € is of no use for the quantification of biodiversity losses due to energy production. If we want to measure the impact of energy-related emissions or land-use on the biodiversity of certain regions, we need costs per m^2 of land use or per kg of deposition and year not per person.

The conclusion is that available contingent valuation studies have no bearing on valuing these losses in the context of energy production (ExternE 1998, p. 333). Therefore, when it comes to the monetary valuation of ecosystem functions, contingent valuation may not be the first method of choice and researchers frequently end up with the use of other valuation methods such as restoration costs or hedonic pricing (Nunes, van den Bergh, Nijkamp 2001, p. 18). Contingent valuation studies can nevertheless be used to validate the results derived from the application of other research methods. Therefore some contingent valuation studies with regard to the valuation of ecosystem damages due to airborne emissions and land-use changes will be presented in more detail in chapter 3.4.

2.2.2 Hedonic Price Method

Hedonic price method tries to find the WTP for environmental goods as expressed in related markets. This technique seeks to elicit preferences from actual, observed market based information. Preferences for the environmental good are revealed indirectly.

For example, environmental effects are often reflected in property values. Thus, an increase in noise will show up in reductions in the value of properties affected by the changes. This approach is widely used for noise and aesthetic effects and the influence of air pollution.

With regard to the valuation of biodiversity losses, hedonic price method is only of limited applicability. The effect of biodiversity should be reflected in the market price of, say, houses or apartments, which is rather unlikely. To date, there exist only a few studies using the hedonic price approach for measuring biodiversity losses, and they usually cover only a small part of biodiversity such as broad-leaved forests, urban parks or freshwater quality (Greensense 2003, p. 7-26 and MacMillan 2001, p. 14ff.).

2.2.3 Travel Cost Method

If individuals undertake expenditures to benefit from a facility such as a park or a fishing area one can determine their WTP through expenditures for the recreational activity, including costs of travel to the park, entrance fees paid etc. By econometric methods, values of changes in environmental facilities can be estimated using such data. This method is known as the travel cost method and is particularly used for valuing recreational impacts. The travel cost approach is based on the central assumption that visit costs can be taken as an indicator of recreational value.

Different studies using the travel cost method were undertaken, dealing especially with recreational values of forests and other landscapes and ecotourism (see Ott & Baur (2005) for Switzerland, and Greensense (2003, p. 7-75f.) and MacMillan (2001, p. 14ff.) for international studies).

The travel cost method is not appropriate to assess biodiversity losses due to energy production and infrastructure since only whole packages of recreational values can be valued by travel expenditures. Biodiversity is an important part of recreation in forests but not the only part. Isolation of the effects of biodiversity changes is hardly possible with this method.

2.2.4 Restoration Costs

The restoration cost approach looks at the cost of replacing or restoring a damaged asset to its original state and uses this cost as a measure of the benefit of restoration. Restoration costs are the investment expenditures required to offset any damage done to the environment by any human activity. The approach assumes that the cost of replacing an ecosystem or its services is an estimate of the value of the ecosystem or its services. The approach is widely used because it is easy to find estimates of such costs. The approach is not really based on individual preferences but on an ecological or expert standard and the cost to re-establish this standard. Since restoration costs are not based on individual preferences, these costs will only provide a valid measure of cost if society is collectively willing to pay for the mitigation, rather than suffer the damage. Otherwise we don't know if the costs are actually higher or lower than the WTP. Another limitation of the approach is that the proposed interventions may not be a perfect substitute for the lost ecosystem service, e.g. existence values of certain ecosystems are not replaceable.

Information of replacement costs can be obtained from direct observation of actual spending on restoring damaged assets or from professional estimates of what it costs to restore the asset. It is assumed that the assets can be fully restored back to its original state. However, some damage may not be fully perceived, or may arise in the long term only, or may not be fully restorable. Benefits will therefore be underestimated as long as the relevant standards for restoration are not beyond individual preferences. Restoration of damaged assets often has secondary benefits as well in addition to the benefits of restoration. In such cases replacement costs will underestimate total benefits (Pearce & Moran 1994, p. 43) but probably overestimate the value of biodiversity.

2.2.5 Conclusion

The valuation of preferences for biodiversity is among the most challenging issues in the context of economic valuation (Pearce & Moran 1994, p. 26).

Direct questioning on biodiversity preferences is largely limited to the preservation of well-known or "charismatic" species and ecosystems. Attempts to elicit preferences for less familiar habitat biodiversity have very often encountered response difficulties because these biodiversity concepts are difficult to explain or unknown to respondents, or where respondents lack experience of making similar transactions (Pearce & Moran 1994, p. 26).

Most studies dealing with the valuation of biodiversity so far have measured the economic value of biological resources rather than their diversity. Valuing diversity is far more complex. In addition, many of the valuations are specific to the areas studied and the transferability of these results is limited.

Current studies have obtained values for biodiversity as such. We are even able to derive average European WTP values for different land types from the studies presented in Greensense (2003, p. 7-24 – 7-29). For estimating biodiversity loss due to energy-related emissions and land-use changes however, these values are only of limited interest because they cover only a small number of different land categories and they present WTP per person per year. Furthermore we are not able to derive marginal values per m^2 which are related to the change in biodiversity. In addition, there are practically no studies assessing the impact of air pollution on biodiversity.

For the sake of lifecycle analysis and the valuation of the impact of different fuel cycles on biodiversity, we need marginal values reflecting the changes in biodiversity due to airborne emissions and land-use changes.

In general, existing economic valuation studies suffer from a lack of suitable indicators for measuring biodiversity loss. Suitable indicators needed for monetary valuation of biodiversity loss would be:

- change in land area by ecosystem classification

- change in number of species connected with land-use change

The next chapter presents a method to derive marginal values for indicators of biodiversity changes.

3 Developing a New Methodology

The new methodology presented here combines elements of the dose-response approach and restoration costs. This chapter is structured as follows:

- first, we define the concept of biodiversity used by the new methodology
- in a second step, biodiversity losses are quantified using the concept developed by Eco-indicator (1999) and Koellner (2001) for measuring changes in biodiversity due to airborne emissions and land use changes for different habitat types
- in a third step, we try to value biodiversity changes using restoration costs for different habitat changes.

The following figure shows the underlying logic applied here to value biodiversity losses for airborne emissions and land use changes due to energy production and infrastructures.

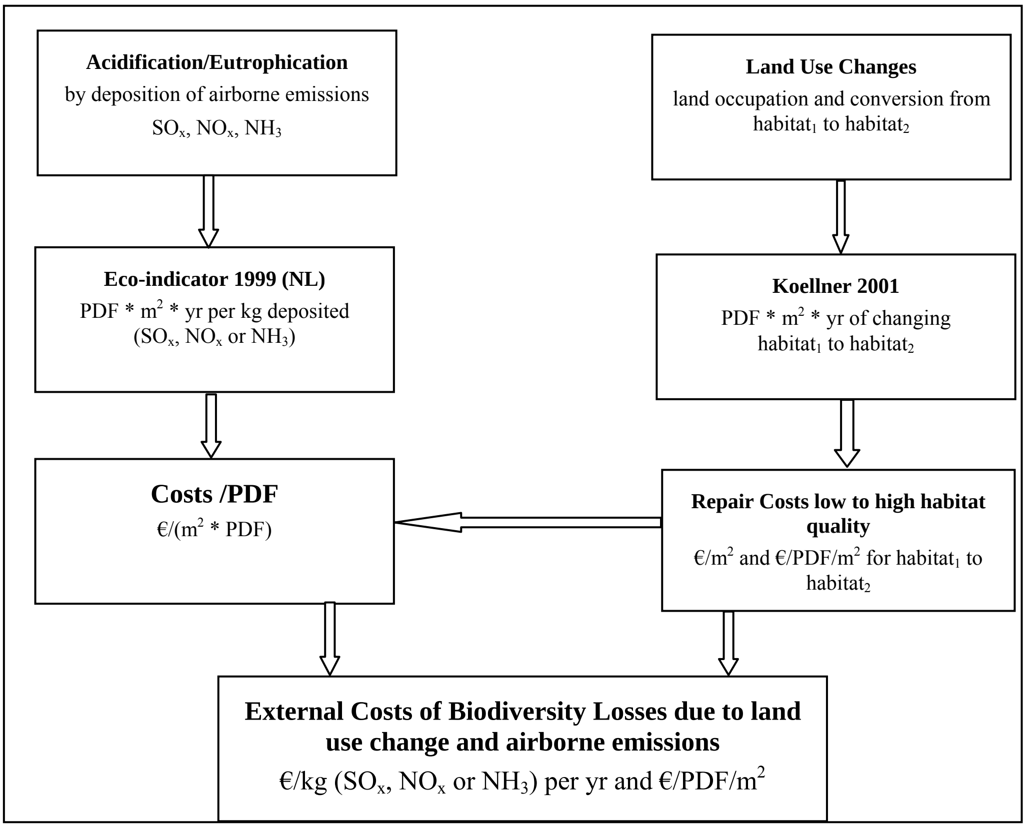

Figure 1: Logic of New Methodology for Valuing Biodiversity Losses

3.1 Applied Definition of Biodiversity

Biodiversity is measured by species richness, i.e. the number of species living in a certain area. Species evenness or genetic diversity is not taken into account.

Damages to ecosystem quality are expressed as the percentage of species that are threatened or that have disappeared in a certain area during a certain time due to the environmental impact.

The damage to Ecosystem Quality can be expressed as:

*The relative decrease of the number of species (fraction) * area * time*

3.2 Biodiversity Loss due to Land Use Changes

3.2.1 Quantification of Biodiversity Losses due to Land Use Changes

The impact of land use changes on ecosystem quality is very significant. Land use conversion is the primary factor explaining biodiversity losses (Pearce & Moran 1994, p. 13).

Land use changes do not only have effects on a specific local area but the surrounding region is also affected. Furthermore, we have to distinguish between land occupation and land transformation.[16]

The effects of land use changes and land transformation are based on empirical data of the occurrence of vascular plants as a function of the land use type and the area size. Both the local damage on the biodiversity of the occupied or transformed land area as well as the regional damage on biodiversity of similar ecosystems in the vicinity is taken into account.

Koellner (2001, p. 55ff.) develops characterisation factors for different types of land use (land occupation and land conversion). These factors allow land use types to be ranked ecologically according to their potential damage to biodiversity. They are based on the number of species occurring on different land categories. Change in the local species richness is used as an indicator for change in the value of ecosystem functioning of different land types. The number of species missing on a certain land use category in comparison to a reference land use category is the indicator for impacts on the local diversity of the species-pool.

For assessing land use activities, Koellner (2001) used CORINE land cover classifications. Here, some CORINE classes were modified and some new classes were added to better distinguish between low and high intensity land use. Land occupation and land transformation were distinguished as basic land use activities. The local effect refers to the change in species numbers occurring on the occupied or

16 Land transformation: Land that is being converted from one state to another.
Land occupation: Land that has been converted earlier and is occupied for a number of years.

converted land itself, while the regional effect refers to the changes on the natural areas outside the occupied or converted area.

Data on species richness for individual land use types were derived from already existing studies for Germany and Switzerland (Koellner 2001, p. 72-75). **P**otentially **D**isappeared **F**raction (PDF) is used as the characterisation factor and measure for the number of species missing relative to a reference state (see Ecoindicator 1999 and Koellner 2001, the latter denotes PDF as EDP "Environmental Damage Potential").

The PDF of vascular plant species is expressed as the relative difference between the number of species S on the reference conditions and the conditions created by the conversion, or maintained by the occupation. Basing on these data, PDF was calculated as follows:

$$PDF = 1 - S_{use} / S_{reference}$$

where $\mathbf{S_{use}}$ is the species (richness) number of an occupied or converted land use type and $\mathbf{S_{reference}}$ is the average species number in the reference area type. The species number of a specific land use type is standardised for 1 m^2. This absolute species number is transformed into a relative number using the regional species richness of the Swiss Lowlands as a reference.[17] The following table presents the species number and potentially disappeared fractions (PDF) for different land use types as derived from different empirical studies for Germany and Switzerland (see Koellner 2001, p. 87f.):

CORINE No. *)	Type	Number of Species per m^2	Potentially Disappeared Fractions (PDF) with Reference to Swiss Lowlands
10	Built up land	1	0.97
2112	Integrated arable	7	0.82
142	Sport facilities	7	0.83
111	Continuous urban	8	0.80
21141	Fibre/energy crops (kenaf)	10	0.75

17 The area of the reference category Swiss Lowlands consists of 8.2% high intensity forest, 17.6% low intensity forest, 52.8% high intensity agriculture, 9.3% low intensity agriculture, 1.3% lakes, 0.3% non use, 5.8% high intensity artificial and 4.8% low intensity artificial (Koellner 2001, p. 100).

CORINE No. *)	Type	Number of Species per m^2	Potentially Disappeared Fractions (PDF) with Reference to Swiss Lowlands
2111	Conventional arable	10	0.74
21142	Fibre/energy crops (hemp)	11	0.73
21143	Fibre/energy crops (chinese reed)	15	0.63
2311	Intensive meadow	17	0.58
322	Heath land	18	0.56
412	Peat bog	19	0.53
2312	Less intensive meadow	19	0.53
112	Discontinuous urban	22	0.45
3112	Semi-natural broad-leafed forest (arid)	23	0.43
2212	Organic orchard	23	0.41
3112	Semi-natural broad-leafed forest (moist)	24	0.41
1225	Rail fallow	24	0.40
1212	Industrial area part, with vegetation	24	0.39
114	Rural settlement	25	0.38
2113	Organic arable	26	0.35
141	Green urban	29	0.27
1224	Rail embankments	32	0.20
134	Mining fallow	38	0.04
321	Natural grassland	39	0.02
125	Industrial fallow	40	-0.01
2115	Agricultural fallow	43	-0.09
325	Hedgerows	44	-0.12
2313	Organic meadow	45	-0.14
314	Forest edge	48	-0.20
245	Agricultural fallow with hedgerows	53	-0.34
	Swiss Lowland	40	0.00

*) CORINE categories with four digit numbers are an extension of the classification introduced by Koellner (2001)

Table 2: Ecosystem Damage Potential for Different Individual Land Use Categories (Koellner 2001, p. 87f)

The PDF values can be interpreted as the relative decline in biodiversity caused by a land use change from Swiss Lowland use to the respective land use category, i.e. through conversion of land from a Swiss Lowland state to conventional arable land, 74% of all species potentially disappear. There are also land changes which can result in an increase of biodiversity (denoted through a negative PDF value), i.e. a conversion of land from a Swiss Lowland state to organic meadows results in a 14% increase of species.

Starting from the different PDF's for different land use types as depicted in Table 2, we can calculate the resulting PDF's for land conversion from one land use category to another using the following formula (see Ecoindicator 1999, p. 70):

$$PDF_{\text{use 1} \rightarrow \text{use 2}} = (b+1) * (PDF_2 - PDF_1)$$

This equation comprises the local and regional effects of land conversion. The local effect refers to the change in species numbers occurring on the converted land itself, while the regional effect refers to the changes on the natural areas outside the converted areas, which decrease in size and thus their species number decreases as well. This regional effect is represented by the introduction of the **species accumulation factor b** for natural areas.[18] Studies found that natural areas have a relatively low species accumulation factor and a high species richness factor. Using the results for different Swiss studies, Eco-indicator (1999, p. 69) proposes to use an average value of b=0.2 for the species accumulation factor b for natural areas.

The damage to ecosystem quality (EQ) can be calculated when the PDF value is multiplied by the appropriate area (**A**) and time span (**t**).

$$EQ = PDF * area * time =$$
$$(\text{species diversity}_{\text{reference}} - \text{species diversity}_{\text{use}}) / \text{species diversity}_{\text{reference}} * A * t.$$

Appendix A-1 shows the resulting PDF values for a range of different land conversion categories. The following table presents some results for the resulting biodiversity change (as expressed by PDF) when converting certain starting biotopes into certain target biotopes (corresponding to the table in Appendix A-1):

18 When a natural area is transformed into an industrial area, the species-area-relationship (number of species depending on area size) dictates that the species number in the remaining natural area will decrease because of its smaller size (Eco-indicator 1999, p. 68). At the same time, there will be a slight increase of species on the industrial area as its size increases. The decrease of species in the natural area is called the regional effect of land conversion and depends on the species accumulation factor b for the respective area. The increase of species in the industrial area is considered to be insignificant and will therefore be neglected (Eco-indicator 1999, p. 68).

Starting Biotope Converted into Target Biotope	Resulting Biodiversity Change (PDF)
Organic Arable --> Built Up Land	0.74
Organic Arable --> Integrated Arable	0.56
Intensive Pasture --> Built Up Land	0.47
Broad-Leafed Forest --> Built Up Land	0.67
Forest Edge --> Organic Arable	0.66

Table 3 Resulting Biodiversity Change of Certain Land Use Conversions (Examples from Appendix A-1)

For example, the conversion of land used for organic agriculture into built up land, e.g. by the construction of a power plant, results in a biodiversity loss of 74%.

These quantified impacts of land use changes on biodiversity will be valued in the next chapter.

3.2.2 Monetary Valuation of Biodiversity Losses due to Land Use Changes

For the monetary valuation of biodiversity losses due to land use changes caused by energy production and infrastructure, we determine the restoration costs of restoring different land use categories.

Each starting habitat can theoretically be changed into a different target habitat. However, we consider only combinations which increase the habitat quality. For instance, the construction of a power plant may destroy intensively used arable land, rural settlement or urban fallow.

Information on replacement or restoration costs for different land use categories is derived from the costs of restoring damaged habitats to more valuable habitats (with less PDF) which were collected by German investigations (Schemel et al. 1993, Bosch & Partner 1993/1998, Froehlich & Sporbeck 1995 and Gühnemann et al. 1999).

a) Valuing Biodiversity Changes with Restoration Costs for Different Habitats

In general, restoration costs for the restoration of a specific habitat from a starting situation which is not natural any more are divided into two cost components:

Restoration costs = restoration costs of target habitats (+ evt. unsealing costs)

For the sake of monetary valuation of biodiversity (measured with PDF-changes by habitat restoration), unsealing costs are not relevant, since unsealing is a technical measure necessary, to prepare a real sealed or built up site for a biodiversity change. Since we use restoration costs not to determine costs of restoring a specific power plant area, but for the sake of valuation of PDF-changes unsealing must not be included, since it does not improve biodiversity. Biodiversity change is effected only by the measures employed after unsealing. Therefore, valuation of biodiversity changes only comprises the costs of the measures necessary to improve biodiversity of a specific area, but not the costs of unsealing. Hereafter, only the costs of these restoration measures will be taken into account for valuing biodiversity changes.[19]

Bosch & Partner (1998) have defined sets of measures which have to be employed to reach a **target biotope** beginning with an appropriate **starting biotope**. For each measure standardized costs were determined (in DM).

Exemplification

Starting biotope: 'arable land'/'meadows'

Target biotope: 'broad-leafed forest'

Package of measures:
deep tilling of the soil (0.2 DM/m²), afforestation (3.7 DM/m²), maintenance (0.6 DM/m²)

Other cost components: planning costs (10%)

Restoration costs ('arable land' → 'broad-leafed forest') =
*(0.2 DM/m²+ 3.7 DM/m² +0.6 DM/m²) *1.1 = 4.95 DM/m² = 2.53 €/m² (1998) --> 2.89 €/m² (2004)*

19 Different studies have estimated unsealing costs (Schemel et al. (1993), Froelich & Sporbeck (1995), Gühnemann et al. (1999) and Infras & IWW (2000)). The most recent data stem from Gühnemann et al. (1999) and Infras & IWW (2000).. **Resulting unsealing costs for Germany are 25.2 €/ m² for 2004** (with the exchange rate from 1998: 1 € = 1.956 DM and taking into account the German inflation rate from 1998 to 2004).

The resulting restoration costs for Germany (2004) are presented in the following table (Appendix 4A-3 contains restoration costs for other European countries).

Restoration Costs in €/m2 (2004)
Country: Germany
PPS 1.00 (Germany = 1)

Biotope Group	starting Biotopes	*Corine ID-No.*	% of sealed area	RESTORATION COSTS (2004) – Target biotopes: Built up land	Continuous urban fabric	Discontinuous urban	Urban/Industrial fallow	Rural settlement	Industrial area	Traffic networks (road and rail networks, airports, port areas	Road/rail embankments and associated land	Green urban areas	Intensive arable	Integrated arable	Organic arable	Organic orchards	Intensive pasture	Less intensive pasture	Organic pasture	Broad-leafed forest	Coniferous forest	Mixed forest	Plantation forest	Forest edge	Country average
artificial_hi	Built up land	*10*	100%		0	0	0	0	0		0	0	0	0.18	0.46	4.41	0.37	0.83	2.06	2.89	2.89	2.89	2.89	9.12	1.17
artificial_hi	Continuous urban fabric	*111*	80%			0	0	0			0	0	0	0.18	0.46	4.41	0.37	0.83	2.06	2.89	2.89	2.89	2.89	9.12	1.17
artificial_hi	Discontinuous urban fabric	*112*	60%				0	0			0	0	0	0.18	0.46	4.41	0.37	0.83	2.06	2.89	2.89	2.89	2.89	9.12	1.17
non-use	Urban/Industrial fallow	*113, 125*	40%										0	0.18	0.46	4.41	0.37	0.83	2.06	2.89	2.89	2.89	2.89	9.12	1.17
artificial_li	Rural settlement	*114*	40%									0	0	0.18	0.46	4.41	0.37	0.83	2.06	2.89	2.89	2.89	2.89	9.12	1.17
artificial_hi	Industrial or commercial area	*121*	80%			0	0	0			0	0	0	0.18	0.46	4.41	0.37	0.83	2.06	2.89	2.89	2.89	2.89	9.12	1.17
artificial_hi	Traffic networks (road and rail networks, airports, port areas	*1221, 1223, 123, 124*	100%		0	0	0	0	0		0	0	0	0.18	0.46	4.41	0.37	0.83	2.06	2.89	2.89	2.89	2.89	9.12	1.17
artificial_li	Road/rail embankments and associated land	*122, 1224*	50%					0				0	0	0.18	0.46	4.41	0.37	0.83	2.06	2.89	2.89	2.89	2.89	9.12	1.17
artificial_li	Green urban areas	*141*	40%					0					0	0.18	0.46	4.41	0.37	0.83	2.06	2.89	2.89	2.89	2.89	9.12	1.17
agri_hi	Conventional/intensive arable	*2111*	0%											0.18	0.46	4.41	0.37	0.83	2.06	2.89	2.89	2.89	2.89	9.12	
agri_hi	Integrated arable	*2112*	0%												0.27	4.41	0.37	0.37	0.83	2.89	2.89	2.89	2.89	9.12	
agri_li	Organic arable	*2113*	0%													4.41			0.37	2.89	2.89	2.89	2.89	9.12	
agri_li	Organic orchards	*2222*	0%																	2.89	2.89	2.89	2.89	9.12	
agri_hi	Intensive pasture and meadows	*2311*	0%											0.18	0.46	4.41		0.84	2.11	2.89	2.89	2.89	2.89	9.12	
agri_li	Less intensive pasture and meadows	*2312*	0%												0.27	4.41			1.26	2.89	2.89	2.89	2.89	9.12	
agri_li	Organic pasture and meadows	*2313*	0%													4.41				2.89	2.89	2.89	2.89	9.12	
forest	Broad-leafed forest	*311*	0%																						
forest	Coniferous forest	*312*	0%																						
forest	Mixed forest	*313*	0%																						
forest_hi	Plantation forest		0%																						
non-use	Forest edge	*314*	0%																						
mix	Country Average		-	0	0	0	0	0	0	0	0	0	0	0.12	0.26	3.01	0.21	0.46	0.90	2.00	2.00	2.00	2.00	6.30	

Table 4 Restoration Costs for Different Land Use Categories for Germany (2004)

These costs represent the present value (for 2004) for the cost per m^2 for theoretically restoring a specific habitat. These costs are an indicator for the biodiversity which is lost by converting the habitat. For example the building of a power plant on a former forest area leads to a biodiversity loss of 67% (PDF change from broad-leafed forest to built up land = 0.67). This is a one-off (not annual) loss of biodiversity, therefore for estimating the value of this biodiversity loss, the whole costs of restoration of the destroyed habitat are considered, i.e. 2.89 €/m^2. These costs correspond to a biodiversity loss of 0.67 PDF and are an indicator for the value of this loss.

Division of these restoration costs by the biodiversity change as expressed by PDF leads to the restoration costs per PDF and m^2 for restoring different starting biotopes into different target biotopes. The resulting restoration costs per PDF and per m^2 for Germany (2004) are presented in Appendix A-4. For example, the restoration costs of a biodiversity increase when restoring built up land into broad-leafed forest are 4.30 € per PDF and m^2. This amount can be interpreted as the costs of the biodiversity decrease when converting broad-leafed forest land into built up land. Later in this report, these costs will be used for valuing biodiversity losses due to air pollution.

For calculating external costs of biodiversity losses due to land use changes restoration costs per m^2 are sufficient. To determine annual external costs of a land use change from broad-leafed forest land to build up land, restoration costs per m^2 have to be annualized by employing an annuity depending on the interest rate and the life-span of the power plant. If, for example, an interest rate of 5% and a life-span for the power plant of 50 years is assumed, annual external costs amount to 0.16 €/m^2 per year.

b) Calculating Costs for Different Countries

The restoration costs/m^2 for Germany are now transferred to other countries by adjusting them to income and price differences of the respective countries (MacMillan 2001, p. 27). Since no specific data to calculate restoration costs for other countries are available, we transfer the German results to other countries by using the concept of purchasing power standard (PPS). PPS is identical to purchasing power parity (PPP) except that the results are in one common currency (Euro in our case) instead of local currencies. PPS Data is available for the 25 EU countries as well as for Iceland, Norway and Switzerland and the accession candidates Bulgaria, Romania and Turkey. Hence, the costs of land conversion can be calculated for 31 European countries. The data source for all countries mentioned except Switzerland is Eurostat (2005). For Switzerland PPS data stems from OECD statistics (2005).

When it comes to life cycle inventories, the type of current land occupation (starting biotope) is normally known, while the type of the natural biotope that was present before land occupation (target biotope) is often unclear. Therefore, the biotope type "country average" is introduced to have an estimation of the restoration costs in the case the target biotope cannot be determined.[20]

To be able to calculate restoration costs that reflect a country average, i.e. the restoration of a starting biotope to a countries average level of land use, detailed CORINE data is needed. CORINE data is not available for every country we are interested in.

For the countries without CORINE data, land use data was taken from a comparative country in the same region. Therefore the country average for these countries has a higher uncertainty and should be treated accordingly.

Country without CORINE Data	Surrogate Country
Sweden	Finland
Norway	Finland
Iceland	Finland
Croatia	Average of Czech Republic, Hungary and Slovakia
Turkey	Average of Bulgaria and Greece

Table 5: Assumption of Surrogate Countries for those Countries without Available CORINE Data.

20 By means of CORINAIR and other geodatasets it is even possible to derive natural biotope types for each administrative unit (from EU over countries to municipalities). Also grid-specific approaches are theoretically feasible.

fcosts per land use type are based on an extended CORINE classification introduced by Köllner (2001). To calculate average costs per country using standard CORINE data, the extensions had to be attributed to a standard CORINE class. It was decided to use the Level 2 classification, since Level 3 would not lead to an improvement in the quality of the results. All subclasses including the extensions are attributed to the respective Level 2 class. Furthermore, some Level 2 categories for which it was not possible to calculate individual restoration costs are assigned to a Level 2 category with restoration costs, if the land use type is very similar (see Table 6).

CORINE Nr / Land Use Type (with Restoration Costs)			CORINE Nr / Land Use Type (without Restoration Costs)	
12	Industrial, commercial and transport units	←	13	Mine, Dump and construction sites
21	Arable land	←	24	Heterogeneous agricultural areas
31	Forests	←	32	Scrub and/or herbaceous vegetation associations

Table 6: Assignment of Land Use Types without Restoration Costs to Land Use Types for which it was Possible to Calculate Restorations Costs.

Some categories were not considered in the calculation of the country average. This is the case for land use types where it was not possible to deduce restoration costs and the land use is too different from the ones that have restoration costs. This concerns mainly the water categories (41 & 42 Wetlands; 51 & 52 Water bodies), but also “open spaces with little or no vegetation” (33). The share of these 5 categories on the total land area varies between 1% for countries without coast and high mountains and 25% for countries with large coastal or mountainous areas.

The resulting tables for all 31 countries, depicting restoration costs/m^2 can be found in Appendix A-3. The following table presents results for the restoration costs of different target biotopes for Germany and the EU 25 in 2004. The land use categories of the target biotopes are defined according to the CORINE land cover classification. Since we want to assess land use changes due to energy production, here **we use built up land as an example for a starting biotope**.

Restoration Costs per m² for Different Target Biotopes - Germany & EU 25 2004 (Starting Biotope: Built Up Land)			
Land Use Category	CORINE Classification Number	Restoration Costs (€ per **m²**)	
		Germany	EU 25
Integrated Arable	2112	0.18	0.17
Organic Arable	2113	0.46	0.42
Organic Orchards	2222	4.41	4.06
Intensive Pasture and Meadows	2311	0.37	0.34
Less intensive Pasture and Meadows	2312	0.83	0.76
Organic Pasture and Meadows	2313	2.06	1.90
Broad-leafed Forest	311	2.89	2.66
Plantation Forest	312	2.89	2.66
Forest Edge	314	9.12	8.39
Country Average		1.17	1.52

Table 7: Restoration Costs per m² for Different Target Biotopes for Germany and EU 25 (year: 2004) with Built Up Land as Starting Biotope

The restoration costs for converting built up land into different target biotopes ranges between **0.18 and 9.12 €/m²** for Germany and between **0.17 and 8.37 €/m²** for the EU 25.

In addition, Appendix A-4 lists the tables for all 31 countries depicting **restoration costs per PDF and per m²**, indicating the "value" of a PDF for different land use categories. The following table presents the restoration costs per PDF and per m² for converting built up land into different target biotopes for Germany and the EU 25.

Mean Restoration Costs per PDF per m² for Different Target Biotopes Germany & EU 25 2004 (Starting Biotope: Built Up Land)			
Land Use Category	CORINE Classification Number	Restoration Costs (€ per [PDF***m²**])	
		Germany	EU 25
Integrated Arable	2112	1.00	0.92
Organic Arable	2113	0.62	0.57
Organic Orchards	2222	6.56	6.04
Intensive Pasture and Meadows	2311	0.79	0.73
Less intensive Pasture and Meadows	2312	1.50	1.38

Mean Restoration Costs per PDF per m² for Different Target Biotopes Germany & EU 25 2004 (Starting Biotope: Built Up Land)			
Land Use Category	CORINE Classification Number	Restoration Costs (€ per [PDF*m^2])	
		Germany	EU 25
Organic Pasture and Meadows	2313	1.55	1.42
Broad-leafed Forest	311	4.30	3.96
Plantation Forest	312	8.03	7.39
Forest Edge	314	6.50	5.98
Country Average		1.00	1.30

Table 8: Average Restoration Costs per PDF per m^2 for Different Target Biotopes for Germany and EU 25 (year: 2004) with Built Up Land as Starting Biotope

Restoration costs for restoring different target biotopes starting from biotopes used for energy infrastructure amount from **0.62 to 8.03 €/PDF/m^2** in Germany and **0.57 - 7.39 €/PDF/m^2** for EU 25. These costs can be considered as technically derived values of the biodiversity of different habitats. Even though these results stem from real projects which were undertaken, it is clear that these costs do not necessarily reflect willingness to pay for these habitats and their biodiversity. In order to reflect on this aspect, a validation of these restoration cost will be conducted in chapter 3.5 by comparing them with results from willingness to pay studies.

3.3 Biodiversity Loss due to Airborne Emissions

3.3.1 Quantification of Biodiversity Losses due to Airborne Emissions

The effects of SO_x, NO_x and NH_3[21] on human health, crops and building materials have been quantified as external costs in the ExternE project (see chapter 3.5.3). Up to now however, ExternE failed to provide external cost estimates for impacts on ecosystems due to acidification and eutrophication. However, attemptes to assess impacts by means of critical load exceedances were undertaken with the help of Ecosense by Krewitt et al. (2001).

Acidification is mainly caused by emissions of sulphur oxide (SO_x), nitrogen oxides (NO_x) and ammonia (NH_3), while eutrophication by airborne pollutants is mainly caused by NO_x and NH_3. For quantifying the effects of acidification and eutrophication by airborne emissions on biodiversity, we use the concept developed by Eco-indicator 99 (1999, p. 58ff.).

Airborne emissions also influence aquatic ecosystems. However, the effects of airborne emissions on rivers, canals and lakes are not taken into account here. In many parts of Europe this is not a serious problem as the direct discharge into water is usually much more important. The exception are the Scandinavian countries where many lakes are reported to be heavily acidified by airborne emissions form central Europe.

Damage from acidification and eutrophication is caused by a complex biochemical mechanism. For assessing the impact we look at observed effects from acidification and eutrophication on plants. The probability that plant species still occur in an area is determined for different levels of acidification and eutrophication and is called the **P**robability **o**f **O**ccurrence (POO). The Potentially Disappeared Fraction (PDF) is defined as **PDF = 1 - POO**. This means the fraction of species that do not occur can also be described as the fraction of the species that have disappeared. The PDF can be interpreted as the fraction of species that has a high prob-

21 Whereas emissions of Nitrogen Oxides and Sulphur Oxides are caused by combustion in energy and transport systems, emissions of NH_3 (Ammonia) are primarily caused by agriculture, which is of less importance in our context.

ability of no occurrence in a region due to unfavourable conditions caused by acidification and eutrophication.

Fate and damage modelling for NO_x, SO_x and NH_3 depositions is undertaken by means of a computer model for the Netherlands. In contrast to the PDF's for land use changes, the PDF's for airborne emissions are derived from models and not from empirical data. Using a Dutch model (Natuurplanner), the changes in depositions are translated into changes in the PDF of plants.

Since acidification and eutrophication not necessarily lead to a reduction in the number of species but can also increase the number of plant species, the concept of **target species** is applied. These are the species that should occur in a specific type of ecosystem if there were no man-made changes in the nutrient level or acidity. The computer model used by Eco-indicator 99 (1999) contains specific information about the types of ecosystems and the associated set of target species. The target species information exists for more than 40 types of ecosystems. Occurrence of these target species represents the natural state of a specific ecosystem. Target species are selected according to typicality and representation for the particular ecosystem.

By means of a damage model (Natuurplanner) increases or decreases of the number of target species are determined due to additional depositions with respect to the background level. A species is considered to meet unfavourable conditions if its probability of occurrence is lower than some threshold value (set to 2.5%). These species suffer from stress caused by the combined effect of acidification and eutrophication. The number of stressed target species is counted and the results were aggregated for the total natural area in the Netherlands, resulting in a percentage of threatened species caused by a specific deposition.

For the Netherlands the following results for the increase of PDF per kg deposition of substance per m^2 and year are determined (see Eco-indicator 99, 1999, p. 62)[22].

22 The transferability of the following Dutch results on other countries is questionable because the largest part of natural area is formed by sandy dune-like landscapes near the coast and

Air Pollutant	Deposition Increase in kg/m² * year on Natural Land (10 mol/ha)	Average PDF of natural land for the Netherlands with/without deposition increase	PDF * m² * year per kg Deposition
Reference Value (Background Level)	--	0.746429	--
SO_x	$6.4 * 10^{-5}$	0.74654	1.73
NO_x	$4.6 * 10^{-5}$	0.746867	9.52
NH_3	$1.7 * 10^{-5}$	0.74687	25.94

Table 9: Biodiversity Damage Caused by the Deposition of Airborne Emissions for the Situation in the Netherlands (Deposition Increase of SO_x, NO_x or NH_3; Eco-indicator 99, 1999, p. 62)

In the Netherlands the reference PDF on natural land for target species without the effects of additional airborne emissions (reference value) is already about three quarters of the full range of target species (74.6%). This means that the damage due to acidification and eutrophication is high in Dutch natural systems. The standard deviation of this figure is 0.32.

Additional depositions of airborne emissions on natural land decline biodiversity measured in PDF by the values of Table 9 for PDF per kg deposition per m^2 and year: 1 kg of SO_x deposited on 1 m^2 of natural land in the Netherlands results in a PDF change of 1.73, 1 kg of NO_x deposited on 1 m^2 leads to a PDF change of 9.52, and 1 kg of NH_3 deposited per m^2 leads to a PDF change of 25.94.

Aquatic ecosystems are missing in the model and the impacts of phosphorous emissions on biodiversity (which are anyway of lesser importance in this context) are not taken into account. Since so far fate and damage modelling only exists for the Netherlands, it is assumed that the Dutch situation is representative for other European countries as well.

there are no rocks or mountains in the NL. Since there are no other data available, we will use Dutch data also for other countries, keeping in mind potential transferability problems.

3.3.2 Monetary Valuation of Biodiversity Losses due to Airborne Emissions

Linking average cost per PDF per m^2 with PDF per kg deposition of airborne emissions per m^2 (see Table 9) yields costs of biodiversity losses due to a certain amount (kg) of airborne emissions deposited per m^2.

In the case of valuing biodiversity losses due to depositions of airborne emissions, the average costs of restoration of more or less natural areas to land use categories with high biodiversity are relevant. It does not make sense to investigate restoring of e.g. built up areas into areas with high biodiversity to valuate the impact of acidification and eutrophication, since only more or less natural areas are affected by acidification and eutrophication. Therefore average cost/PDF/m^2 are calculated by investigating only costs of PDF changes due to land use changes from unsealed natural areas with relatively low biodiversity (like high intensity agriculture, intensive pasture, etc.) into natural areas with high biodiversity (like low intensity agriculture, broad leafed forest, forest edge, etc.). Bearing in mind that these costs should reflect some kind of willingness to pay for biodiversity changes, we do not expect that there is a willingness to pay for only very small and marginal changes of biodiversity. Therefore we consider only perceptible land use changes with a biodiversity increase (ΔPDF) of at least 20% to determine restoration costs per PDF.

Table 10 presents the resulting costs/PDF/m^2 for Germany and 2004.

Land conversion form ..... to	Average Restoration Costs per PDF [€/(m^2*PDF)] (ΔPDF > 20%)
Conventional arable --> organic arable	0.98
Conventional arable --> organic orchards	11.12
Conventional arable --> intensive pasture	1.94
Conventional arable --> less intensive pasture	2.99
Conventional arable --> organic pasture	1.95
Conventional arable --> broad-leafed forest	7.30
Conventional arable --> forest edge	8.08
Integrated arable --> organic arable	0.49
Integrated arable --> organic orchards	8.95

Land conversion form ..... to	Average Restoration Costs per PDF [€/(m²*PDF)] (ΔPDF > 20%)
Integrated arable --> intensive pasture	1.29
Integrated arable --> less intensive pasture	1.00
Integrated arable --> organic pasture	0.72
Integrated arable --> broad-leafed forest	5.87
Integrated arable --> plantation forest	16.06
Integrated arable --> forest edge	7.45
Organic arable --> organic pasture	0.63
Organic arable --> forest edge	13.82
Organic orchards --> forest edge	12.46
Intensive pasture --> organic arable	1.65
Intensive pasture --> organic pasture	2.44
Intensive pasture --> forest edge	9.74
Less intensive pasture --> organic pasture	1.62
Less intensive pasture --> forest edge	10.70

Table 10: Restoration Costs per PDF for Different Land Conversion Types from Low to High Biodiversity (for Starting Habitats which Need no Unsealing) for Germany, 2004.

Restoration costs as employed here are an artificial concept for determining the costs of the cheapest way of replacing the ecosystem services lost. The restoration project does not have to take place at the same site as the damage occurred. For the sake of monetary valuation, we are interested in the least cost changes of habitats which result in an improvement of biodiversity, i.e. the cheapest method to "produce" a certain amount of biodiversity as expressed by a PDF-decrease. Therefore we only consider the cheapest restoration type for a land-use type for improving biodiversity. From all the habitat and corresponding biodiversity changes in Table 10 we select the cheapest habitat restorations resulting in an increase of biodiversity (PDF change) of at least 20%. The habitat restoration with the least cost resulting in a biodiversity change of at least 20% is the **restoration of integrated arable land into organic arable land which costs 0.49 €/PDF/m^2**. Since this is a land conversion common in all of the countries considered, we select 0,49 €/PDF/m^2 as the minimal marginal cost of improving biodiversity per PDF and m^2.

3.3.3 Calculating Costs for the Netherlands

Table 9 shows the biodiversity damage as expressed by PDF change caused by a deposition increase of 1 kg SO_x, NO_x or NH_3 per m^2 of 100% natural land in the Netherlands.

The costs of these PDF changes can now be calculated as follows:

- PDF changes due to the depositions of the 3 air pollutants (column 4) are multiplied by the restoration costs per PDF.
- Restoration costs per PDF for Germany have to be corrected for other countries by using PPS (Purchasing Power Standard): 0.49 €/(PDF*m^2) for Germany is equal to 0.48 €/(PDF*m^2) for the Netherlands.
- Biodiversity loss only occurs through depositions on natural land; therefore the share of natural land in the Netherlands has to be included in the calculation. Calculated from the CORINE data set according to ten Brink et al. (2000) (see Table 12), the resulting share of natural land in the Netherlands amounts to 25%.

Calculation of external costs for the deposition of 1 kg of the 3 air pollutants:

1.73 (PDF * $m^2_{total\ area}$)/1 kg deposition * 0.48 €/(PDF * $m^2_{natural\ area}$) * 0.25 ($m^2_{natural\ area}$ /$m^2_{total\ area}$) = **0.21 €/kg SO_x deposition**

9.52 (PDF * $m^2_{total\ area}$)/1 kg deposition * 0.48 €/(PDF * $m^2_{natural\ area}$) * 0.25 ($m^2_{natural\ area}$ /$m^2_{total\ area}$) = **1.14 €/kg NO_x deposition**

25.94 (PDF * $m^2_{total\ area}$)/1 kg deposition * 0.48 €/(PDF * $m^2_{natural\ area}$) * 0.25 ($m^2_{natural\ area}$ /$m^2_{total\ area}$) = **3.11 €/kg NH_3 deposition**

3.3.4 Calculating Costs for Different Countries

a) Procedure and Assumptions

For the calculation of external costs per kg of air pollutant for different countries, several assumptions have to be made:

1. the PDF change per mass of pollutant (PDF/kg deposition per m^2) as derived for the Netherlands is the same for all European countries.

2. the marginal costs of 0.49 €/(PDF*m^2) calculated for Germany need only be corrected by purchasing power (PPS) to be valid for other countries as well.
3. a degradation (a change in PDF) only takes place on natural land. According to ten Brink et al. (2000) natural land encompasses all CORINE land use classes except the classes 1 (artificial areas) and 2 (agricultural areas) (for a CORINE list, see Koellner 2001, p. 171ff.).
4. The background level of acidification and eutrophication of the respective country influences the impact of additional depositions on biodiversity and hence the resulting external costs.

The procedure to calculate external costs in € per kg deposition due to a PDF change per kg deposition is outlined in Figure 2.

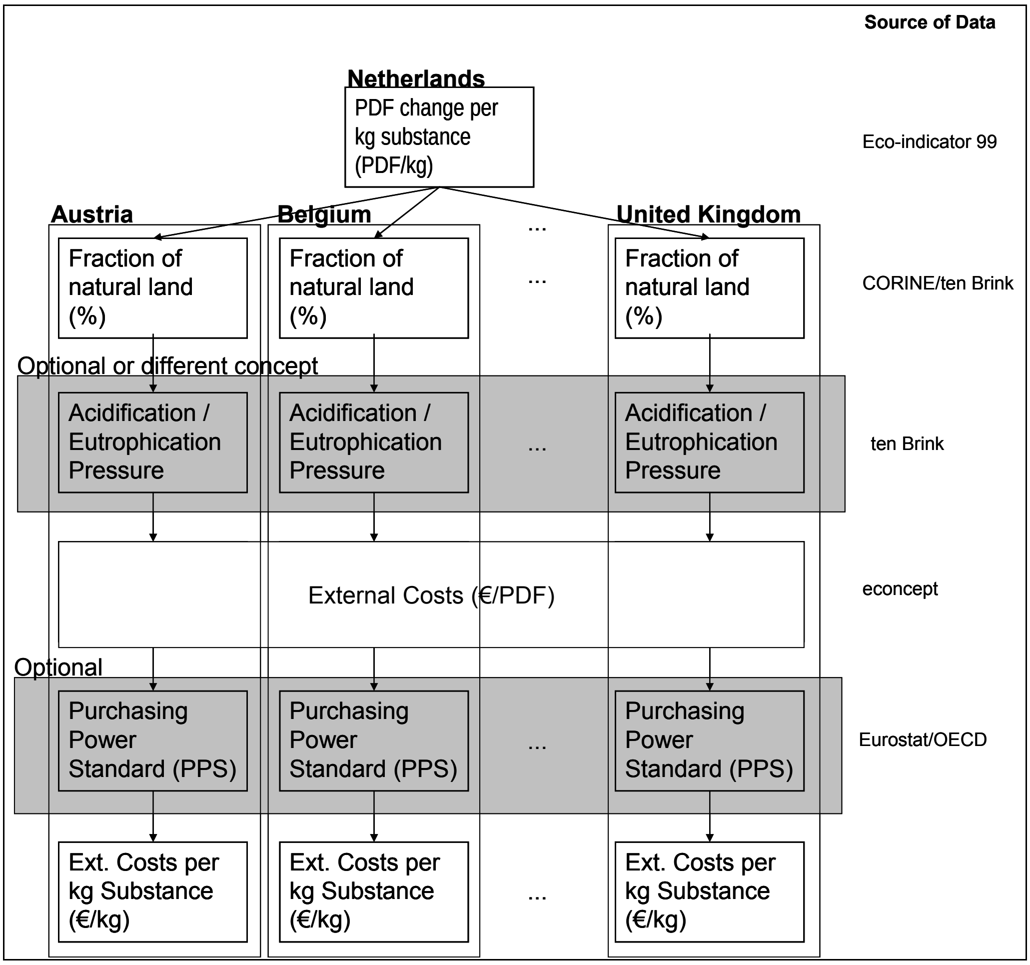

Figure 2: Procedure to Calculate External Costs per kg of Pollutant Deposition for Different Countries

Basically PDF change per kg deposited air pollutant (topmost box) is multiplied by the external costs per PDF. The “fraction of natural land” describes on what fraction of a country's area deposition of pollutants has an effect. For example it can be assumed that a deposition on or near a road does not cause any further PDF changes. The fraction of natural land is calculated for each country according to ten Brink et al. (2000) by using the respective CORINE classification shares.

Furthermore, it is assumed that the restoration costs in a country are related to the existing ecological pressures. The resulting damage costs should be the higher the higher ecological pressure is because further depositions cause relatively more ecological damage since the buffering capacity of the soil is already exhausted. To take into account the existing ecological pressure/background situation we introduce the factor "acidification/eutrophication pressure”. This factor describes how severely a country is already influenced by depositions of respective pollutants. To give an indication of threat to an ecosystem by acidification and eutrophication critical loads are used. A critical load of an ecosystem is essentially a "no-effect" level for a pollutant, i.e. the level of substance (acid deposition) which does not cause long-term damage to an ecosystem (ten Brink et al. 2000, p. 66). Areas, which have a limited natural capacity to absorb or neutralize acid rain, have a low critical load. Ecosystems that are more able to buffer acidity (through e.g. different soil chemistry, biological tolerances, or other factors) have a correspondingly higher critical load. For calculating the acidification/ eutrophication pressure index, the critical load of each grid-cell and the corresponding sulphur and nitrogen depositions were determined. If the sulphur and nitrogen depositions are below the critical loads, no threat to biodiversity is assumed (pressure index = 0), if the depositions are higher than five times the critical load, threat to biodiversity is assumed to be at its maximum level (pressure index = 1000) (ten Brink et al. 2000, p. 66-67). Between these extreme values, a linear relationship between critical load exceedance and pressure index is assumed.

The following table shows the mean single pressures for acidification and eutrophication and the combined pressure index indicating countries with high and low pressure resulting from acidification and eutrophication.

Country	Acidification Pressure	Eutrophication Pressure	Combined Pressure
Norway	305	26	166
Finland	442	105	274
Sweden	528	64	296
Greece	0	15	8
Spain	9	55	32
Portugal	0	67	34
Estonia	111	424	268
Bulgaria	0	158	79
Latvia	4	337	171
Romania	60	243	152
UK	579	28	304
Ireland	95	51	73
Lithuania	213	288	251
Austria	546	495	521
Italy	153	387	270
France	164	410	287
Switzerland	608	731	670
Czech Republic	652	590	621
Denmark	207	224	216
Poland	702	695	699
Hungary	696	496	596
Germany	898	880	889
Slovakia	931	667	799
Netherlands	992	986	989
Belgium	996	900	948

Table 11: Single Pressures and Combined Pressure Index for Natural Areas per Country in 1990 (ten Brink 2000, p. 30, own calculations).

Table 11 shows that acidification is a large pressure in Europe in 1990, especially in Belgium-Luxembourg, Germany, the Netherlands and Slovakia. Acidification causes no or low pressure to biodiversity in Greece, Ireland, Portugal, Bulgaria, Romania and Spain. Countries with very high pressure from eutrophication are Belgium-Luxembourg, Germany and the Netherlands whereas no or limited pressure can be found in Finland, Greece, Ireland, Portugal, Spain, Sweden and the United Kingdom.

For some countries the acidification and eutrophication index and natural land data were estimated from similar countries as described in the following table.

Country without Complete Data	Surrogate Country
Cyprus	Greece
Malta	Italy
Slovenia	Average of Czech Republic, Hungary and Slovak Republic
Croatia	Average of Czech Republic, Hungary and Slovak Republic
Turkey	Average of Greece and Bulgaria
Iceland	Average of Norway, Sweden and Finland

Table 12: Assumptions for Surrogate Countries for those Countries without Available Acidification and Eutrophication Index and Natural Land Data.

It is assumed that the total restoration costs in a country are related to the existing ecological pressures. The resulting damage costs should be the higher the higher ecological pressure is because further depositions cause relatively more ecological damage since the buffering capacity of the soil is already exhausted. In countries with low pressures from acidification/eutrophication, buffering of the soil reduces the impact on biodiversity of the deposition of acidifying pollutants. Therefore, resulting damage costs are expected to be lower. This argument is considered by weighting the ecological impacts of a marginal deposition increase as expressed by PDF (see Table 9 for the Netherlands) by the individual acidification and eutrophication pressures and the combined acidification/eutrophication pressure of the respective country as depicted in Table 13 with the Netherlands serving as the reference (pressure set to 1).[23]

Finally, the external costs are weighted by using the purchasing power standard to account for varying purchasing power in the countries.

23 The weighting factor for acidification/eutrophication pressure in Table 13 is calculated by dividing the corresponding values in Table 11 by the values for the Netherlands in Table 11.

Data used for each country are summarised in the following Table 13.

Country	Area (m2) a)	Natural Land b)	Acidification Pressure c)	Eutrophication Pressure c)	Combined Acidification/ Eutrophication pressure d)	Purchasing Power Standard (PPS) e)
EU25	4.09E+12	49%	0.390	0.329	0.360	0.92
Austria	8.42E+10	63%	0.550	0.502	0.526	0.97
Belgium	3.10E+10	22%	1.004	0.913	0.959	0.96
Cyprus	9.24E+09	*44%*	*0.000*	*0.015*	*0.008*	0.89
Czech Republic	7.94E+10	36%	0.657	0.598	0.628	0.51
Denmark	5.23E+10	31%	0.209	0.227	0.218	1.28
Estonia	4.84E+10	68%	0.112	0.430	0.270	0.58
Finland	3.91E+11	91%	0.446	0.106	0.277	1.16
France	5.61E+11	36%	0.165	0.416	0.290	0.97
Germany	3.66E+11	34%	0.905	0.892	0.899	1.00
Greece	1.32E+11	61%	0.000	0.015	0.008	0.78
Hungary	9.37E+10	26%	0.702	0.503	0.603	0.54
Ireland	7.57E+10	36%	0.096	0.052	0.074	1.16
Italy	3.07E+11	44%	0.154	0.392	0.273	0.94
Latvia	6.39E+10	55%	0.004	0.342	0.172	0.51
Lithuania	6.38E+10	35%	0.215	0.292	0.253	0.51
Luxembourg	2.93E+09	36%	1.004	0.913	0.959	0.97
Malta	1.21E+09	*80%*	*0.154*	*0.392*	*0.273*	0.68
Netherlands	4.12E+10	25%	1.000	1.000	1.000	0.98
Poland	3.13E+11	33%	0.708	0.705	0.706	0.49
Portugal	9.08E+10	50%	0.000	0.068	0.034	0.80
Slovak Republic	4.94E+10	45%	0.939	0.676	0.808	0.46
Slovenia	2.00E+10	*62%*	*0.766*	*0.593*	*0.679*	0.72
Spain	5.16E+11	49%	0.009	0.056	0.032	0.80
Sweden	4.50E+11	69%	0.532	0.065	0.299	1.14
United Kingdom	2.49E+11	36%	0.584	0.028	0.307	0.95
EU Candidates						
Bulgaria	1.12E+11	44%	0.000	0.160	0.080	0.39
Croatia	5.70E+10	*40%*	*0.766*	*0.593*	*0.679*	0.51
Romania	2.39E+11	37%	0.060	0.246	0.153	0.38
Turkey	7.79E+11	*40%*	*0.000*	*0.088*	*0.044*	0.51

Country	Area (m2) a)	Natural Land b)	Acidification Pressure c)	Eutrophication Pressure c)	Combined Acidification/ Eutrophication pressure d)	Purchasing Power Standard (PPS) e)
Other Countries						
Iceland	1.03E+11	*91%*	*0.428*	*0.066*	*0.248*	1.24
Norway	3.24E+11	91%	0.307	0.026	0.167	1.34
Switzerland	4.13E+10	68%	0.613	0.741	0.677	1.30

Table 13: Fraction of Natural Land, Area, Acidification/Eutrophication Indices and PPS Values for the EU25 Countries, the Accession Countries and some Other Countries

data values in *italic* contain estimations from similar countries

a) Calculated from CORINE 2000 data

b) Calculated from CORINE 2000 data according to ten Brink et al. (2000)

c) Source: ten Brink 2000

d) own calculation form data in ten Brink (2000)

e) Source: *EUROSTAT 2005*, Switzerland from OECD (2005). Recalculated with Germany as the reference country

b) Results

External costs can now be calculated by using the average restoration costs of 0.49 €/(m^2 *PDF). The results are presented in Table 14.

The first three columns present the unweighted results, where the background level of acidification and eutrophication is not taken into account. The results range from 0.12 €/kg in Hungary to 1.04 €/kg in Norway for SO_x depositions, from 0.67 €/kg in Hungary to 5.96 €/kg in Norway for NO_x depositions and from 1.82 €/kg in Hungary to 15.50 €/kg in Norway for NH_3 depositions. In general, unweighted results are not plausible because some of the Mediterranean Countries such as Portugal, Spain, Malta, Cyprus and Greece have (much) higher external costs of biodiversity loss due to airborne emissions than the Netherlands or Belgium, which belong to the most heavily acidified and eutrophicated countries in Europe. The high results for the Scandinavian Countries overestimate the external costs of biodiversity losses due to airborne emissions even though acidification is a problem in Scandinavia. The costs without weighting according to the acidification pressure reflect long term costs, because the buffering capacity of soil is limited. However, in the short term – until the capacity is exhausted - buffering reduces the impact of the deposition of acidifying pollutants.

External Costs per kg Deposition (PPS Corrected) [€/kg for 2004]									
	unweighted			weighted with combined average			individually weighted		
Country	SO_x	NO_x	NH_3	SO_x	NO_x	NH_3	SO_x	NO_x	NH_3
EU25	0.38	2.09	5.71	0.14	0.75	2.05	0.15	0.75	1.88
Austria	0.52	2.86	7.79	0.27	1.51	4.10	0.29	1.51	3.91
Belgium	0.18	1.00	2.73	0.17	0.96	2.62	0.18	0.96	2.49
Cyprus	0.34	1.84	5.02	0.00	0.01	0.04	0.00	0.01	0.08
Czech Republic	0.16	0.86	2.35	0.10	0.54	1.48	0.10	0.54	1.41
Denmark	0.33	1.83	4.97	0.07	0.40	1.08	0.07	0.40	1.13
Estonia	0.34	1.84	5.02	0.09	0.50	1.36	0.04	0.50	2.16
Finland	0.90	4.93	13.44	0.25	1.36	3.72	0.40	1.36	1.43
France	0.30	1.65	4.50	0.09	0.48	1.31	0.05	0.48	1.87
Germany	0.29	1.57	4.27	0.26	1.41	3.84	0.26	1.41	3.81
Greece	0.40	2.21	6.03	0.00	0.02	0.05	0.00	0.02	0.09
Hungary	0.12	0.67	1.82	0.07	0.40	1.10	0.09	0.40	0.92
Ireland	0.36	1.96	5.33	0.03	0.14	0.39	0.03	0.14	0.28
Italy	0.36	1.95	5.31	0.10	0.53	1.45	0.05	0.53	2.08
Latvia	0.24	1.31	3.56	0.04	0.23	0.61	0.00	0.23	1.22
Lithuania	0.15	0.83	2.25	0.04	0.21	0.57	0.03	0.21	0.66
Luxembourg	0.30	1.62	4.42	0.28	1.55	4.23	0.30	1.55	4.03
Malta	0.47	2.55	6.96	0.13	0.70	1.90	0.07	0.70	2.73
Netherlands	0.21	1.15	3.14	0.21	1.15	3.14	0.21	1.15	3.14
Poland	0.14	0.75	2.04	0.10	0.53	1.44	0.10	0.53	1.44
Portugal	0.34	1.89	5.15	0.01	0.06	0.17	0.00	0.06	0.35
Slovak Republic	0.18	0.97	2.66	0.14	0.79	2.15	0.17	0.79	1.80
Slovenia	0.38	2.09	5.69	0.26	1.42	3.87	0.29	1.42	3.37
Spain	0.33	1.82	4.96	0.01	0.06	0.16	0.00	0.06	0.28
Sweden	0.67	3.67	10.01	0.20	1.10	2.99	0.36	1.10	0.65
United Kingdom	0.28	1.55	4.22	0.09	0.48	1.30	0.16	0.48	0.12
EU Candidates									
Bulgaria	0.15	0.80	2.17	0.01	0.06	0.17	0.00	0.06	0.35
Croatia	0.17	0.96	2.61	0.12	0.65	1.78	0.13	0.65	1.55
Romania	0.12	0.66	1.81	0.02	0.10	0.28	0.01	0.10	0.45
Turkey	0.18	0.96	2.63	0.01	0.04	0.11	0.00	0.04	0.23
Other Countries									
Iceland	0.96	5.30	14.43	0.24	1.31	3.57	0.41	1.31	0.95
Norway	1.04	5.69	15.50	0.17	0.95	2.59	0.32	0.95	0.41
Switzerland	0.75	4.12	11.23	0.51	2.79	7.60	0.46	2.79	8.33

Table 14 External Costs per kg Deposition for the Pollutants SO_x, NO_x and NH_3 in European Countries for 2004 (Average Restoration Costs = ***0.49 €/PDF/m²****)*

In the following columns we take into account the state of acidification and eutrophication in the respective countries as expressed by the pressure index for acidification and eutrophication. The ecological damage is now weighted according to the buffering capacity of the soil and the existing background level, assuming that the more the buffering capacity of the soils is already exhausted, the more ecological damage is caused by additional depositions.

Columns 4 to 6 present the results using the average of the combined acidification and eutrophication pressure to weight the ecological impact of additional depositions. The range varies considerably between 0 €/kg (Cyprus, Greece, Latvia and Turkey) to 0.51 €/kg (Switzerland) for SO_x depositions, between 0.01 €/kg (Cyprus) and 2.79 €/kg (Switzerland) for NO_x depositions and 0.04 €/kg (Cyprus) and 7.60 €/kg (Switzerland) for NH_3 depositions.

In columns 7 to 9, the impact of SO_x depositions are weighted by the acidification pressure index, the impacts of NO_x are weighted by the combined acidification/eutrophication index (since NO_x contributes to both acidification and eutrophication) and the impacts of NH_3 are weighted by the eutrophication pressure index. The range of external costs varies between 0 €/kg (Cyprus, Greece, Latvia, Portugal, Spain, Bulgaria and Turkey) and 0.46 €/kg (Switzerland) for SO_x depositions, between 0.01 €/kg (Cyprus) and 2.79 €/kg (Switzerland) for NO_x depositions and 0.08 €/kg (Cyprus) and 8.33 €/kg (Switzerland) for NH_3 depositions.

The individual weighting scheme seems to produce more realistic results. For countries where acidification and eutrophication pressure have about the same magnitude (e.g. Greece, Germany, Switzerland), the results do not vary much depending on the weighting scheme. Countries such as Finland or Norway on the other hand, which have a relatively high acidification pressure compared to the eutrophication pressure, using the combined weighting scheme would overestimate the effects of NH_3. The results using the individual weighting scheme are more realistic.

3.3.5 Examples for the Calculation of External Costs

a) Per Country

External costs per kg deposition of SO_x for Switzerland amount to 0.46 €/kg, external costs per kg deposition of NO_x to 2.79 €/kg and the external costs for NH_3 to 8.33 €/kg.

According to EKL (2005, p. 51) the SO_x deposition in Switzerland amounts to 29'800 tonnes per year for 2000, the deposition of NO_x amounts to 29'100 tonnes and the deposition of NH_3 amounts to 48'300 tonnes.

The respective external costs of biodiversity losses due to acidification and eutrophication in Switzerland are determined in the following table:

External Costs of Biodiversity Losses due to Airborne Emissions in Switzerland			
Air Pollutant	Deposition in 2000 (t)	External Costs per kg deposition (€/kg)	External Costs total (€)
SO_x	29'800	0.46	13'708'000
NO_x	29'100	2.79	81'189'000
NH_3	48'300	8.33	402'339'000
Total			497'236'000

Table 15 External Costs of Biodiversity Losses due to Deposition of Airborne Emissions in Switzerland

The external costs of acidification and eutrophication caused by depositions of SO_x, NO_x and NH_3 in Switzerland amount to **497 Mio. €**. The results show that ammonia depositions from agriculture are by far the most important source of biodiversity losses due to acidification and eutrophication in Switzerland.

b) Per Power Plant

The external costs of biodiversity losses due to depositions of airborne emissions by a specific power plant can be determined as follows:

- By means of a deposition model perimeters as well as yearly depositions resulting from the known emissions of the power plant have to be determined.
- Yearly depositions of SO_x, NO_x, and NH_3 on 1 m^2 are calculated.

- Resulting PDF caused by the deposition per m^2 can be determined following the results from the Netherlands depicted in Table 8.
- The share of natural land and the acidification/eutrophication pressure index for the area of interest is determined as follows:
    - share of natural land is defined as all CORINE classifications except classification 1 (built up land) and 2 (arable land).
    - If critical load exceedance is known per grid/ per area of interest, the specific acidification/eutrophication pressure index can be calculated following the description in section 3.3.4a).
- The deposition of the 3 air pollutants, the resulting PDF value, the share of natural land and the acidification/eutrophication pressure allow calculating external costs per kg deposition of the respective air pollutant for the respective power plant.

3.4 External Costs for Biodiversity Losses - Overview of Results

The following table presents the **restoration costs per m²** for biodiversity losses due to land- use changes from built up land into different target biotopes for Germany and EU 25. Detailed results for all 31 countries are found in Appendix 4A-3.

Restoration Costs for Different Target Biotopes - Germany & EU 25 2004 (Starting Biotope: Built Up Land)			
Land Use Category	CORINE Classification Number	Restoration Costs (€ per **m²**)	
		Germany	EU 25
Integrated Arable	2112	0.18	0.17
Organic Arable	2113	0.46	0.42
Organic Orchards	2222	4.41	4.06
Intensive Pasture and Meadows	2311	0.37	0.34
Less intensive Pasture and Meadows	2312	0.83	0.76
Organic Pasture and Meadows	2313	2.06	1.90
Broad-leafed Forest	311	2.89	2.66
Plantation Forest	312	2.89	2.66
Forest Edge	314	9.12	8.39
Country Average		1.17	1.52

Table 16: Restoration Costs per m² for Different Target Biotopes for Germany and EU 25 (year: 2004) with Built Up Land as Starting Biotope

Restoration costs for converting built up land into different target biotopes range between **0.18 and 9.12 €/m²** for Germany and between **0.17 and 8.39 €/m²** for the EU 25.

The **restoration costs per PDF and m²** for converting built up land into different target biotopes for Germany and the EU 25 are presented in the following table:

Mean Restoration Costs for Different Target Biotopes - Germany & EU 25 2004 Starting Biotope: Built Up Land; [€ per PDF per **m²**]			
Land Use Category	CORINE Classification Number	Restoration Costs [€ per PDF per **m²**]	
		Germany	EU 25
Integrated Arable	2112	1.00	0.92
Organic Arable	2113	0.62	0.57
Organic Orchards	2222	6.56	6.04
Intensive Pasture and Meadows	2311	0.79	0.73
Less intensive Pasture and Meadows	2312	1.50	1.38
Organic Pasture and Meadows	2313	1.55	1.42
Broad-leafed Forest	311	4.30	3.96
Plantation Forest	312	8.03	7.39
Forest Edge	314	6.50	5.98
Country Average		1.00	1.30

Table 17: Average Restoration Costs per PDF per m^2 for Different Target Biotopes for Germany and EU 25 (year: 2004) with Built Up Land as Starting Biotope

Restoration costs for restoring different target biotopes starting from biotopes used for energy infrastructure amount from **0.62 to 8.03 €/PDF/m^2** in Germany and **0.57 - 7.39 €/PDF/m^2** for EU 25, depending on the land use type changed.

The following table presents external costs for biodiversity losses due to **the deposition of airborne emissions**. The table contains the most plausible results using the individual weighting scheme.

External Cost Estimates for Biodiversity Losses due to Airborne Emissions (€/kg)			
Country	SO_x	NO_x	NH_3
EU25	0.15	0.75	1.88
Austria	0.29	1.51	3.91
Belgium	0.18	0.96	2.49
Cyprus*	0.00	0.01	0.08
Czech Republic	0.10	0.54	1.41
Denmark	0.07	0.40	1.13
Estonia*	0.04	0.50	2.16
Finland	0.40	1.36	1.43
France	0.05	0.48	1.87
Germany	0.26	1.41	3.81
Greece	0.00	0.02	0.09
Hungary	0.09	0.40	0.92
Ireland	0.03	0.14	0.28
Italy	0.05	0.53	2.08
Latvia*	0.00	0.23	1.22
Lithuania*	0.03	0.21	0.66
Luxembourg*	0.30	1.55	4.03
Malta*	0.07	0.70	2.73
Netherlands	0.21	1.15	3.14
Poland	0.10	0.53	1.44
Portugal	0.00	0.06	0.35
Slovak Republic	0.17	0.79	1.80
Slovenia*	0.29	1.42	3.37
Spain	0.00	0.06	0.28
Sweden	0.36	1.10	0.65
United Kingdom	0.16	0.48	0.12
Bulgaria	0.00	0.06	0.35
Croatia	0.13	0.65	1.55
Romania	0.01	0.10	0.45
Turkey	0.00	0.04	0.23
Iceland	0.41	1.31	0.95
Norway	0.32	0.95	0.41
Switzerland	0.46	2.79	8.33

** only unweighted costs available*

Table 18: Range of External Costs for Biodiversity Losses due to Deposition of Airborne Emissions, all Countries, 2004.

3.5 Validation of External Cost Estimations

In this chapter, external cost estimations of biodiversity losses by land-use changes and airborne emissions are validated. Since our approach is new and other results valuing biodiversity losses as expressed by PDF do not exist yet, our results are compared with the findings from other studies quantifying biodiversity losses due to land-use changes and airborne emissions.

One common criticism of the restoration cost approach applied here is that it is not really based on the preferences of the population and that it does not reflect their willingness to pay. Therefore, in this chapter we try to get information on the willingness to pay (individual and/or political) for restoration costs and to decide whether our results rather under- or overestimate damage costs.

Furthermore, the role of biodiversity losses and the corresponding external costs are assessed within external costs of energy as a whole. We try to assess the significance of biodiversity losses due to energy production with regard to health or building damages by comparing our results with ExternE results for health or building damages due to airborne emissions.

This chapter is organized as follows:

- Chapter 3.5.1 presents studies dealing with the assessment of biodiversity losses in general
- In chapter 3.5.2 information about the individual and political willingness to pay for biodiversity changes due to land use changes and air pollution are derived
- Chapter 3.5.3 gives a short overview of ExternE results for airborne emissions

3.5.1 Assessment of Biodiversity Losses

To validate our results we have reviewed the most relevant and recent studies (as compiled in ten Brink et al. (2000), Greensense (2003), MacMillan (2001)). Some of the results of these studies were already presented in chapter 2.2.1.

The following table presents the results of an extensive literature review of European studies undertaken by ten Brink et al. (2000, p. 31ff.), which again serve as an input to Greensense (2003). Since the vast majority of these studies were carried out in richer EU countries, the results were also adjusted to the average income level in the EU.

Type of Natural Capital	WTP: € per Person per Annum		Countries Covered by the Studies
	Average WTP	WTP adjusted to EU average	
Biodiversity preservation general	31.1	28.66	UK, Norway, Germany
Wildlife	1.9	1.8	UK, Hungary
Woodlands	20.1	18.8	UK, Netherlands, Sweden, Norway
National Parks	9.4	ca. 8.9	UK, Hungary
Wetlands	38	35	UK, Austria, EU
Environmentally sensitive areas	20.6	19	UK, Sweden
Moorland	63	57.8	Scotland
Watercourses	31.2	28.7	UK, Norway
Agricultural landscapes	62.5	57.5	Austria, Sweden, Netherlands, UK
Endangered species	128.6	120.9	Sweden, Norway, UK

Table 19: WTP for Different Aspects of Biodiversity and Different Kinds of Habitat (ten Brink et al. 2000, p. 32).

Most of these economic valuation studies tend to focus on endangered species and habitats at risk of degradation or conversion to some other use. Individuals' WTP to conserve species and habitats appears to be higher the scarcer or the more endangered is the object of value. But it generally remains somehow unclarified if economic valuation studies are valuing diversity as such (ten Brink 2000, p. 29).

In general, these studies show that a wide range of tools is required for a full assessment of the WTP for the improvement of ecosystems and that the results available today are at most partial. Taking into account the differences between the approaches, these findings cannot be used to validate our results.

MacMillan (2001, p. 14ff.) presents different studies form Europe and North America dealing with the valuation of air pollution impacts on ecosystems. The following table summarises some of these studies and presents their main results:

Environmental Benefits	Study/Authors	Context	Valuation Method	Main Results	Country
Recreational fisheries	MacMillan & Ferrier	Acidification and salmon catch	Hedonic Pricing	Changes of market value of fish: - £0.9 Mio. (Status Quo) to + £1,4 Mio. (emission abatement)	Scotland
	Milner & Varallo	Acidification and salmon catch	Market Prices	£1Mio. - £5Mio. per year of fish catch lost per year	Wales
	Navrud (2001)	Acidification and fish status	CV	Ca. 700 NOK per household per year	Norway
	Navrud (1989)	Acidification and fish status	CV	335-387 NOK per household per year for emission abatement and resulting fish population	Norway
	EPA	Acidification and eutrophication and fish population	Travel Costs	$12 - $ 49 Mio. for fish survival and $82-$88 Mio. damage costs for eutrophication	USA
	Mullen & Menz	Acidification and fish catch	Travel Costs	Annual costs of air pollution are $1.6 mio.	USA
	ARA	Acidification and ecological indicators	CV	$260-$300 per household per year to avoid further air pollution damaging freshwaters	Canada
	Johansson & Kristrom	Acidification and freshwater	CV	4500 SEK per household per year for elimination of sulphur emissions	Sweden
Water Quality and Yield	Epp & Al-Ani	Water quality and property prices	Hedonic Pricing	One unit increase in pH increases property value of houses by $1439.	USA
Biodiversity conservation	MacMillan et al.	Acidification and biodiversity	CV	£247 - £351 per household/ year	Scotland
	ECOTEC	Acidification and biodiver-	CV	£26 - £40 per house-	UK

Environmental Benefits	Study/Authors	Context	Valuation Method	Main Results	Country
		sity		hold/year	
Timber	IIASA	Acidification and tree growth	Market Prices	Timber output losses of $1'173 Mio./year for Europe	Europe
	Callaway et al.	Acidification and tree growth	Market Prices	Reductions of forest productivity between 10 and 20%.	USA
	EPA	Air pollution and tree growth	Market Prices	$1.9 billion per year benefits from less air pollution	USA
Forest recreation	Schulze et al.	Scenic quality	CV	Reduced visibility due to air pollution costs $3.5 billion per year	USA

Table 20: Studies Valuing the Impact of Air Pollution on Ecosystems (MacMillan 2001, p. 21-22.)

As shown in Table 20, studies from North America and Scandinavia dominate the international literature on valuing ecosystem effects of air pollution. In part, this reflects the importance attached to air pollution in these regions, but also the stronger policy and academic interest in valuation methods. Many of these studies are concerned with impacts on forest growth and timber and are estimating the cost of acidification on recreational fishing. This emphasis relates less to the overall magnitude of the damage costs than to the ready applicability of appropriate valuation methodologies and to the reliability of the underpinning science (MacMillan 2001, p. 16).

As all of these studies show, the effect of acidification and eutrophication on biodiversity is yet to be explained. Our approach measuring the impact of airborne emissions on biodiversity by the PDF concept and trying to value the resulting ecological damage as defined as PDF * area * time can be regarded as a completely new approach which can not be compared to the studies presented in this chapter since the resulting WTP per person per year/month are to unspecific and cannot directly be associated to a change in biodiversity or ecological damage in general.

3.5.2 WTP for Biodiversity Changes

An often criticised shortcoming of the restoration cost approach concerns the uncertainty regarding the "real" WTP of the population/society for the measures carried out. It is unclarified if society is really willing to pay the full costs for the restoration of affected habitats (therefore restoration costs are often assumed to define an upper boundary of real willingness to pay for these measures). Since the real WTP of the population for biodiversity losses is not known and existing studies give us no clues about the exact amount of WTP we have to find proxies for this unknown WTP for the prevention of biodiversity losses.

In this chapter, we try to assess individual and political willingness to pay for biodiversity by examining existing WTP studies regarding biodiversity loss due to land use changes and air pollution. We try to convert these WTP results, which are often available as WTP per person/ per household per year, into WTP per m^2 of a specific habitat. Combining these values with the respective PDF of the specific habitat leads to WTP/PDF/m^2, which can be compared to our results.

Another possibility consists of assessing the political willingness to pay for biodiversity by examining certain politically derived biodiversity protection programmes and their respective costs. We assume that the costs of these programmes can be considered as the political WTP for the respective biodiversity targets since otherwise a rational political process would not approve these programmes.

To find alternative results based on WTP for valuing biodiversity losses as expressed by PDF changes, we carried out an extensive literature search by examining databases for economic valuation literature (EVRI, EnValue) and different compilation studies such as MacMillan (2001), eftec (2002), Greensense (2003), Entec et al. (2004) and Sundberg & Söderqvist (2004). The studies eventually chosen for validation had to meet the following requirements:

- define a clear starting point/starting situation with respect to biodiversity
- define a clear end point, i.e. a habitat change or a situation before and after the introduction of a biodiversity programme

- explicitly measure WTP (by Contingent Valuation, Discrete Choice Analysis, Travel Costs or Hedonic Pricing) with regard to this habitat change or programme implementation
- allow to assign PDF values to situations 1 and 2
- cover a clearly defined habitat, which allows to assign area size in m^2
- result: €/PDF/m^2 derived from individual WTP and not from restoration costs

The following chapter presents WTP results for land use changes.[24]

a) WTP for Land Use Changes

The following table presents different WTP-studies for different countries and different land use changes which meet the above requirements and can thus are employed for validating our results:

WTP for Land Use Changes

Study	Country	Method/Description	Land use change	Study results (€/PDF/m²)	Our results (€/PDF/m²)
Schmid et al. 2003	Germany	Valuing external costs of forest loss due to Frankfurt Airport by using WTP results from other studies	Built up land ↓ Forest	0.36	4.30
Greensense 2003	Europe	Annual benefits of the current state of biodiversity as derived from different studies	Country Average ↓ Forests	0.02 - 0.16	2.91
			Country Average ↓ Agriculture	0.05	1.78
Pruckner 1994?	Austria	Preservation of agricultural land from transformation into settlements	Rural settlements ↓ Conv. arable	0.01	0.33
Hanley & Craig 1991	UK	WTP for preventing peat bogs converted	Plantation forest	1.00	No comparable results

24 All study results were transformed into € for 2004. The results are compared to our results from the corresponding countries as found in Appendix A-4.

WTP for Land Use Changes

Study	Country	Method/Description	Land use change	Study results (€/PDF/m²)	Our results (€/PDF/m²)
		into plantation forests	↓ Peat bog		
Schmitt et al. 2004	Switzerland	WTP for converting arable land into other land uses	Conv. arable ↓ Org. arable	1.05	1.23
			Conv. arable ↓ Forests	11.17	9.24
			Conv. arable ↓ hedgerows	9.57	10.23 (forest edge)
Dubgaard 1998	Denmark	WTP for increasing biodiversity by converting arable land into forests	Conv. arable ↓ Forests	0.03	9.38
Dubgaard 1994	Denmark	WTP for increasing biodiversity by converting arable land into meadows	Conv. arable ↓ Less intensive meadows	0.04 - 0.07	3.84
Tyrvainen 1999	Finland	WTP for parks in urban areas	Built up ↓ Green urban	1.40	No comparable results
Garrod & Willis 1997	UK	Increase of biodiversity in forests	Forest high int. ↓ Forest low int.	1.75 - 1.89	No comparable results
Dubgaard 1996	Denmark	WTP for increasing biodiversity by converting agricultural land into forests and meadows	Conv. arable ↓ Low. int. meadows Conv. arable ↓ Forests	0.8 - 2.4	3.84 - 9.38
Hanley & Spash 1993	UK	WTP for protecting UK heathlands from being	Conv. arable	0.78	0.97 - 7.23

WTP for Land Use Changes					
Study	Country	Method/Description	Land use change	Study results (€/PDF/m²)	Our results (€/PDF/m²)
		turned into agricultural land	↓ Heathland		
Malmberg 1994	Sweden	WTP for reduction of biocides in Swedish agriculture	Conv. arable ↓ Organic arable	0.08	1.11
Bowker & Diychuck 1994	Canada	WTP for preventing conversion of agricultural land into built up land	Built up land ↓ Conv. agriculture	0.02 - 0.04	0.94 (EU25)
Entec et al. 2004	UK	Calculation of values for different land types from different studies	Conv. arable	0.023	0.99
			Organic arable	0.39	0.48 - 12.66
			Forests	1.05	4.26 - 59.64
			Green Urban	0.52 - 0.77	no comp. results
Veisten & Navrud 2006	Norway	WTP for biodiversity protection in forests	Forest low int. ↓ Forest high int.	2.5 - 2.8	No comparable results

Table 21 Comparison of Restoration Costs with Monetary Valuation by WTP Studies for the sake of Validating Restoration Costs

The following table presents the minimal and maximal values for specific land use categories as derived form the studies from Table 21 and chapter 3.2.2:

Comparison of WTP and Restoration Cost Results for Specific Land Use Categories [€/(PDF*m²)]		
Land Use Category	WTP Results	Restoration Cost Results
Conventional Arable	0.01 - 0.78	0.33 - 7.23
Organic Arable	0.39 - 1.05	0.48 - 12.66
Less Intensive Pasture	0.04 - 2.4	3.84
Forest	0.03 - 11.17	4.26 - 59.64
Forest Edge	9.57	10.23

Table 22 Comparison of WTP and Restoration Cost Results

In contrast to some WTP results, restoration costs are not annual costs. If annualized, the restoration costs would be reduced by a factor 20 or more (depending on life span and interest rate).

b) WTP for Air Pollution

The following table presents WTP studies dealing with the effects of acidification/eutrophication on biodiversity and allowing to derive cost values per kg air pollutant.

WTP for Prevention of Acidification/Eutrophication					
Study	Country	Description	WTP Results	Restoration Cost Results	Ratio (Restoration Costs/WTP)
Barbier et al. 1996	Sweden	WTP for reduction of NO_x in Swedish wetlands	0.19 - 0.36 €/kg NO_x	1.10 €/kg NO_x	3.1 - 5.8
Carlsson 2000	Sweden	WTP for 50% reduction of air pollutants	NO_x: 3.74 €/kg	NO_x: 1.10 €/kg	0.3
			SO_x: 0.83 €/kg	SO_x: 0.36 €/kg	0.4
			NH_3: 0.94 €/kg	NH_3: 0.65 €/kg	0.7
Leksell 1987	Sweden	WTP for reducing forest damage by NO_x	1.65 €/kg NO_x	1.10 €/kg NO_x	0.7
Navrud 2002	Norway	WTP for increasing number of lakes undamaged by acidification	4.0 - 7.7 €/kg SO_x	0.32 €/kg SO_x	0.04 -0.08

Table 23 WTP for Prevention of Acidification and Eutrophication

Resulting external costs from WTP-approaches and the restoration cost approach correspond quite well. However, it has to be kept in mind, that with the restoration cost approach external costs of air pollution are determined per kilogramme **deposition** of airborne pollutants whereas the WTP-results are determined per kilogramme **emission**. Therefore the comparison only holds under the assumption that 1 kg emission equals 1 kg deposition which of course does usually not hold precisely. Nevertheless, the data allow for a qualitative validation and for assessing the plausibility of our restoration cost results. In general, our results can be regarded as a lower boundary of external costs of biodiversity losses due to air pollution.

c) Political WTP for Restoration Measures

In this chapter, we present studies dealing with the "political" WTP for restoration measures. Political WTP can be regarded as a proxy for individual WTP under the assumption, that a rational political process would not pursue these policies were it not somehow based on individual or societal preferences.

Political WTP for Land Use Changes

The following table presents the results from specific government programmes for promoting biodiversity in agriculture and forestry in Switzerland and UK.

WTP for Biodiversity Protection in Agriculture and Forestry					
Study	Country	Method/Description	Land Use Change	Study Results (€/PDF/m^2)	Our Results (€/PDF/m^2)
ten Brink et al. 2000	UK	UK Habitat Scheme (Biodiversity programme in UK agriculture)	Intensive Pasture ↓ Natural Grassland	0.16	2.02 - 2.41 (Proxy, since no costs for natural grassland available)
OECD 2001	UK	WTP for protecting biodiversity in forests	Forest high int. ↓ Forest low int.	0.26 - 0.53	No comparable results
effor2	Switzerland	Protection of biodiversity in Swiss forests	Forest high int. ↓ Forest low int.	1.3	No comparable results
BLW 2004 & OECD 2002a	Switzerland	Contributions for protecting biodiversity in Swiss agriculture	Intensive meadows ↓ Less int./ organic meadows/	0.08 - 0.35	3.08 - 12.69
			Conv. arable ↓ Organic arable	0.19	1.23

Table 24 WTP for Biodiversity Protection in Agriculture and Forestry in Switzerland and UK

Table 24 shows that our results are higher than the political WTP for biodiversity preservation in agriculture and forestry. However, the WTP for biodiversity preservation in Swiss and UK agricultural policy was calculated by using only one specific support programme at a time. There exist many different criteria for support schemes relating to biodiversity protection. Since these support schemes can be cumulated, the resulting payment per m^2 of ecologically cultivated land can be considerably higher than the results derived here from single programmes. These figures therefore represent only a lower bound for the political WTP for biodiversity preservation as derived from Swiss and UK agricultural policy.

Nevertheless the results indicate that our results for land-use conversion compared to political WTP should be considered as an upper boundary for the external costs of biodiversity loss.

Political WTP for Valuation of the Impacts of Acidification and Eutrophication as Based on the Preferences Revealed in Political Negotiations

We only found one study estimating WTP for acidification and eutrophication abatement. Since this study delivers interesting and detailed results for different countries, we present the study in more detail than the other studies in this chapter.

As part of the NewExt project De Nocker, Vermoote and Heck (2004) have tried to value the environmental impacts of acidification and eutrophication based on implicit values of policy makers. To determine the implicit values of policy makers, abatement costs for emission reductions are used as a proxy for the revealed WTP of European society for the improvements in ecosystem health. The standard-price approach calculates the benefits of emission reductions - as perceived by policy makers - based on the abatement costs to reach a well-defined emission reduction target. These costs are a proxy for the benefits that policy makers attribute to these reductions. The estimation of benefits and costs of different emission reduction programmes (UNECE Gothenburg protocol, European Directive 2001/81/EC on National Emission Ceilings of 2001 and the Proposal of the EC to the European Directive 2001/81/EC on National Emission Ceilings of 1999) leads to a marginal WTP of the EU15 per hectare ecosystem protected between 775 and 926 € (0.08 - 0.09 €/m^2).

A corrected and weighted WTP of 100 € per ha ecosystem protected in Europe was then used to calculate external costs for acidification and eutrophication per ton SO_2 and NO_x emitted (Vermoote, De Nocker 2003).

	ExternE based data				*NewExt*		GRAND TOTAL	%**
	Health	Crop losses	Materials	**Total**	Ecosystems	%*		
SO_2								
Austria	5.446	27	295	5.768	199	*3%*	5.967	3%
Belgium	5.942	-9	224	6.157	113	*2%*	6.270	2%
Denmark	2.482	-1	137	2.617	314	*12%*	2.931	11%
Finland	762	-5	45	802	637	*79%*	1.439	44%
France	5.962	-11	185	6.136	155	*3%*	6.291	2%
Germany	4.706	58	220	4.984	430	*9%*	5.414	8%
Greece	3.540	-1	117	3.657	4	*0%*	3.661	0%
Ireland	1.885	1	134	2.020	61	*3%*	2.081	3%
Italy	4.061	3	127	4.191	87	*2%*	4.278	2%
Netherlands	5.062	-6	215	5.271	122	*2%*	5.393	2%
Portugal	2.582	-4	50	2.628	4	*0%*	2.632	0%
Spain	3.195	-4	62	3.253	32	*1%*	3.285	1%
Sweden	1.341	-1	69	1.409	554	*39%*	1.963	28%
UK	3.206	13	337	3.556	168	*5%*	3.724	5%
EU-15 average	**4.028**	**20**	**199**	**4.248**	**174**	***4%***	**4.422**	4%
Switzerland***					88			
NO_x								
Austria	6.240	312	160	6.713	343	*5%*	7.056	5%
Belgium	3.459	-660	73	2.871	176	*6%*	3.047	6%
Denmark	2.607	-22	68	2.654	349	*13%*	3.003	12%
Finland	1.050	144	20	1.214	1.661	*137%*	2.875	58%
France	7.447	528	97	8.072	275	*3%*	8.347	3%
Germany	3.186	-348	84	2.922	361	*12%*	3.283	11%
Greece	4.910	900	91	5.901	207	*4%*	6.108	3%
Ireland	2.605	48	45	2.698	207	*8%*	2.905	7%
Italy	4.719	-213	92	4.599	307	*7%*	4.906	6%
Netherlands	2.608	-716	67	1.960	239	*12%*	2.199	11%
Portugal	3.148	638	29	3.815	345	*9%*	4.160	8%
Spain	4.088	417	38	4.543	301	*7%*	4.844	6%
Sweden	1.705	184	41	1.930	586	*30%*	2.516	23%
UK	1.513	-406	43	1.149	167	*15%*	1.316	13%
EU-15 average	**3.602**	**-79**	**70**	**3.593**	**360**	***10%***	**3.953**	9%
Switzerland***					391			

(*Source* ExternE data : IER, calculations for ExternE 2000, personal communication)

Table 25: External Costs for Impacts of SO_2 and NO_x on Ecosystems Compared to the ExternE Estimates for External Costs for Other Impact Categories (for Emissions from EU15 in 2000, in € per tonne; 1.000 € = 1'000 € = one thousand €; Vermoote, De Nocker 2003, p. 12).

As an impact indicator hectares exceedance of critical loads per ton emitted was used. Table 25 presents the external costs of acidification and eutrophication per ton of SO_2 and NO_x emissions. These estimates are compared to the estimates from ExternE for other impact categories such as human health, crop losses in agriculture and building damages. External costs per ton vary significantly between different countries. In general, impacts and external costs are low for emissions from countries at the edge and South of Europe, whereas the impacts of air pollution are relatively high for emissions in the Scandinavian countries. In general, external costs of NO_x on ecosystems are higher due to the fact that it contributes to both acidification and eutrophication. On average for the EU15, external costs for ecosystem damages are small compared to the costs of other impact categories, but the relative importance of the shadow prices for acidification and eutrophication varies a lot between countries. These results are compared to the external cost estimates derived in chapter 3.3.4.

Comparison of Political WTP and Restoration Cost Results

	Political WTP (€/kg)		Restoration Cost Results (€/kg, weighted)		Ratio (Restoration Costs / WTP)	
Country	SO_2	NO_x	SO_x	NO_x	SOx	NOx
Austria	0.20	0.34	0.29	1.51	1.5	4.4
Belgium	0.11	0.18	0.18	0.96	1.6	5.3
Denmark	0.31	0.35	0.07	0.40	0.2	1.1
Finland	0.64	1.66	0.40	1.36	0.6	0.8
France	0.16	0.28	0.05	0.48	0.3	1.7
Germany	0.43	0.36	0.26	1.41	0.6	3.9
Greece	0.004	0.21	0.00	0.02	1	0.1
Ireland	0.06	0.21	0.03	0.14	0.5	0.7
Italy	0.09	0.31	0.05	0.53	0.6	1.7
Netherlands	0.12	0.24	0.21	1.15	1.8	4.8
Portugal	0.004	0.35	0.00	0.06	1	0.2
Spain	0.03	0.30	0.00	0.06	1	0.2
Sweden	0.55	0.57	0.36	1.10	0.7	1.9
UK	0.17	0.17	0.16	0.48	1	2.8
Switzerland	0.09	0.39	0.46	2.79	5.1	7.2
EU 15 / EU 25	0.17	0.36	0.15	0.75	0.9	2.1

Table 26 Comparison of Political WTP and Restoration Cost Results

The results derived from individually weighted minimal restoration costs from chapter 3.3.4 are in the same range as the results from Vermoote, De Nocker

(2003) for all countries. Even though Vermoote and De Nocker present results per kg emission, their figures can be compared to our results per kg deposition because on a European wide scale, the assumption that 1 kg emission equal 1 kg deposition is quite realistic. The resulting ranking of countries according to external costs as presented by both studies is comparable, with Scandinavian countries having high impacts and high external costs and Mediterranean countries having low impacts and low external costs.

3.5.3 Results for Damage Costs of Air Pollution in Europe

Airborne emissions do not only have impacts on biodiversity but also on human health (especially respiratory diseases and mortality), buildings (building damages) and agriculture (crop losses). Comparing our results for biodiversity losses with external costs incurred by health, building and agricultural impacts of airborne emissions gives a clearer idea about the plausibility of our results.

The most actual damage estimates per kg emission for all EU25 countries stem from the CAFE (Clean Air for Europe) Project (Holland et al. 2005).

The following table presents the damage cost results for the EU25 Member states (without Cyprus). The damage costs include health and agricultural impacts. Impacts on materials (e.g. buildings) and ecosystems are omitted. The range of the results takes account of the variation in the methods used to value mortality (VOLY) and the value of statistical life (VSL) (Holland et al. 2005, p. i).

Damage costs per kg emission/deposition (€/kg)

Country	CAFE 2005 (health and crop losses)			econcept 2006 (ecosystems)			Ratio (Restoration Costs / WTP)		
	SO_2	NO_x	NH_3	SO_x	NO_x	NH_3	SO_x	NO_x	NH_3
EU25	5.6 - 16.0	4.4 - 12.0	11.0 - 31.0	0.15	0.75	1.88	0.014	0.091	0.090
Austria	8.3 - 24.0	8.7 - 24.0	12.0 - 35.0	0.29	1.51	3.91	0.018	0.092	0.166
Belgium	11.0 - 31.0	5.2 - 14.0	30.0 - 87.0	0.18	0.96	2.49	0.009	0.100	0.043
Czech Rep.	8.0 - 23.0	7.3 - 20.0	20.0 - 57.0	0.10	0.54	1.41	0.006	0.040	0.037
Denmark	5.2 - 15.0	4.4 - 12.1	7.9 - 23.0	0.07	0.40	1.13	0.007	0.048	0.073
Estonia	1.8 - 5.2	0.8 - 2.2	2.8 - 8.1	0.04	0.50	2.16	0.011	0.333	0.396
Finland	1.8 - 5.1	0.7 - 2.0	2.2 - 6.3	0.40	1.36	1.43	0.116	1.007	0.336

Damage costs per kg emission/deposition (€/kg)									
Country	CAFE 2005 (health and crop losses)			econcept 2006 (ecosystems)			Ratio (Restoration Costs / WTP)		
	SO_2	NO_x	NH_3	SO_x	NO_x	NH_3	SO_x	NO_x	NH_3
France	8.0 - 23.0	7.7 - 21.0	12.0 - 34.0	0.05	0.48	1.87	0.003	0.033	0.081
Germany	11.0 - 32.0	9.6 - 26.0	18.0 - 51.0	0.26	1.41	3.81	0.012	0.079	0.110
Greece	1.4 - 4.0	0.8 - 1.9	3.2 - 9.1	0.00	0.02	0.09	0.000	0.015	0.015
Hungary	4.8 - 14.0	5.4 - 15.0	11.0 - 32.0	0.09	0.40	0.92	0.010	0.039	0.043
Ireland	4.8 - 14.0	3.8 - 11.0	2.6 - 7.4	0.03	0.14	0.28	0.003	0.019	0.056
Italy	6.1 - 18.0	5.7 - 16.0	11.0 - 32.0	0.05	0.53	2.08	0.004	0.049	0.097
Latvia	2.0 - 5.7	1.4 - 3.7	3.1 - 8.8	0.00	0.23	1.22	0.000	0.090	0.205
Lithuania	2.4 - 6.8	1.8 - 5.0	1.7 - 5.0	0.03	0.21	0.66	0.007	0.062	0.197
Luxembourg	9.8 - 28.0	8.7 - 24.0	25.0 - 72.0	0.30	1.55	4.03	0.016	0.095	0.083
Malta	2.2 - 6.2	0.7 - 1.7	8.2 - 24.0	0.07	0.70	2.73	0.017	0.583	0.170
Netherlands	13.0 - 39.0	6.6 - 18.0	22.0 - 64.0	0.21	1.15	3.14	0.008	0.093	0.073
Poland	5.6 - 16.0	3.9 - 10.0	10.0 - 29.0	0.10	0.53	1.44	0.009	0.076	0.074
Portugal	3.5 - 10.0	1.3 - 3.2	3.7 - 11.0	0.00	0.06	0.35	0.000	0.027	0.048
Slovakia	4.9 - 14.0	5.2 - 14.0	14.0 - 41.0	0.17	0.79	1.80	0.018	0.082	0.065
Slovenia	6.2 - 18.0	6.7 - 18.0	13.0 - 37.0	0.29	1.42	3.37	0.024	0.115	0.135
Spain	4.3 - 12.0	2.6 - 7.2	4.3 - 13.0	0.00	0.06	0.28	0.000	0.012	0.032
Sweden	2.8 - 8.1	2.2 - 5.9	5.9 - 17.0	0.36	1.10	0.65	0.066	0.272	0.057
UK	6.6 - 19.0	3.9 - 10.0	17.0 - 50.0	0.16	0.48	0.12	0.013	0.069	0.004

Table 27 Damage Costs per kg Emission for Health Damages, Crop Losses and Ecosystem Damages (Holland et al. 2005, and own results)

These results per kg pollutant emitted show that our results for the impacts of air pollution on biodiversity (per kg deposition) seem to be plausible.[25] They are a small but significant fraction of total damage costs. SO_x ecosystem damage costs range between less than 1% and 11,6% of health and agricultural damage costs. This is comparable to the share of the typical damage costs of the impacts of SO_2 on building materials which is a small percentage (about 1% - 4%) of the costs of health damages due to SO_2 (Watkiss et al. 2001). It is quite plausible that the damage costs for ecosystem damages and biodiversity losses are somewhat higher than the damage costs for building materials but much smaller than the damage costs for the impacts of air pollution on human health. The highest percentage of

25 Under the assumption that 1 kg emission = 1 kg deposition, which is not too unrealistic for a European wide observation.

ecosystem damage costs compared to health and agricultural damage costs are found in Finland and Sweden, where acidification is a huge problem and health damages due to air pollution are relatively less costly because of the low population density.

Comparing these results to the results of Vermoote & De Nocker (2003, see Table 25) shows that political WTP-results for ecosystem damages have about the same share of overall damage costs (between 1 and 10% of health, building and agricultural damage costs), with Scandinavian countries encountering the highest relative ecosystem damages. These results correspond quite well with our results.

3.5.4 Conclusion - Validation of Results

The validation of the results of our study leads to the following conclusion:

- External cost estimations for the impacts of air pollution seem to be plausible. They generally are in the range of the few results derived from WTP studies. Compared to overall damage cost results, they range between health costs and the costs for building damages which is plausible. When compared to WTP results, they can be regarded as a lower boundary of external costs.
- External costs for land-use and conversion by the restoration cost approach are within the range or on the lower or upper limits of the respective individual and political WTP for restoration measures. Therefore, the results for land use changes by the restoration cost approach have to be considered as a lower or upper boundary for possible estimations of the real WTP, depending on the results of comparison. As long as we don't find a method to derive the WTP for land use changes derived from the preferences of the population we are able to use these external cost estimations as a second best result by keeping in mind that they probably define an upper boundary of "real" costs.

4 Conclusion

The following table again presents the restoration costs per m^2 for biodiversity losses due to **land-use changes** from built up land into different target biotopes for Germany and EU 25. The detailed results for all 31 countries are found in the Appendix A-3.

Restoration Costs for Different Target Biotopes - Germany & EU 25 2004 Starting Biotope: Built Up Land [€ per **m^2**]			
Land Use Category	CORINE Classification Number	Restoration Costs [€ per **m^2**]	
		Germany	EU 25
Integrated Arable	2112	0.18	0.17
Organic Arable	2113	0.46	0.42
Organic Orchards	2222	4.41	4.06
Intensive Pasture and Meadows	2311	0.37	0.34
Less intensive Pasture and Meadows	2312	0.83	0.76
Organic Pasture and Meadows	2313	2.06	1.90
Broad-leafed Forest	311	2.89	2.66
Plantation Forest	312	2.89	2.66
Forest Edge	314	9.12	8.39
Country Average		1.17	1.52

*Table 28: **Valuation of Land Use Change**s by Restoration Costs per m^2 for Different Target Biotopes for Germany and EU 25 (year: 2004) with Built Up Land as Starting Biotope*

Restoration costs for converting built up land into different target biotopes ranges between **0.18 and 9.12 €/m^2** for Germany and between **0.17 and 8.39 €/m^2** for the EU 25.

Restoration **costs per PDF per m^2** for converting built up land into different target biotopes for Germany and the EU 25 are presented in the following table:

Mean Restoration Costs for Different Target Biotopes - Germany & EU 25 2004 (Starting Biotope: Built Up Land)			
Land Use Category	CORINE Classification Number	Restoration Costs [€ per PDF per **m²**]	
		Germany	EU 25
Integrated Arable	2112	1.00	0.92
Organic Arable	2113	0.62	0.57
Organic Orchards	2222	6.56	6.04
Intensive Pasture and Meadows	2311	0.79	0.73
Less intensive Pasture and Meadows	2312	1.50	1.38
Organic Pasture and Meadows	2313	1.55	1.42
Broad-leafed Forest	311	4.30	3.96
Plantation Forest	312	8.03	7.39
Forest Edge	314	6.50	5.98
Country Average		1.00	1.30

Table 29: ***Valuation of Biodiversity Losses*** *(measured by PDF-Changes)* ***by Average Restoration Costs per PDF per m²*** *for Different Target Biotopes for Germany and EU 25 (year: 2004) with Built Up Land as Starting Biotope*

Restoration costs for restoring different target biotopes starting from biotopes used for energy infrastructure amount from **0.62 to 8.03 €/PDF/m²** in Germany and **0.57 - 7.39 €/PDF/m²** for EU 25, depending on the land use type changed.

The following table presents external costs for biodiversity losses due to **the deposition of airborne emissions**. The table contains the most plausible results using the individual weighting scheme.

External Cost Estimates for Biodiversity Losses due to Airborne Emissions (€/kg)			
Country	SO_x	NO_x	NH_3
EU25	0.15	0.75	1.88
Austria	0.29	1.51	3.91
Belgium	0.18	0.96	2.49
Cyprus*	0.00	0.01	0.08
Czech Republic	0.10	0.54	1.41
Denmark	0.07	0.40	1.13
Estonia*	0.04	0.50	2.16
Finland	0.40	1.36	1.43
France	0.05	0.48	1.87
Germany	0.26	1.41	3.81
Greece	0.00	0.02	0.09
Hungary	0.09	0.40	0.92
Ireland	0.03	0.14	0.28
Italy	0.05	0.53	2.08
Latvia*	0.00	0.23	1.22
Lithuania*	0.03	0.21	0.66
Luxembourg*	0.30	1.55	4.03
Malta*	0.07	0.70	2.73
Netherlands	0.21	1.15	3.14
Poland	0.10	0.53	1.44
Portugal	0.00	0.06	0.35
Slovak Republic	0.17	0.79	1.80
Slovenia*	0.29	1.42	3.37
Spain	0.00	0.06	0.28
Sweden	0.36	1.10	0.65
United Kingdom	0.16	0.48	0.12
Bulgaria	0.00	0.06	0.35
Croatia	0.13	0.65	1.55
Romania	0.01	0.10	0.45
Turkey	0.00	0.04	0.23
Iceland	0.41	1.31	0.95
Norway	0.32	0.95	0.41
Switzerland	0.46	2.79	8.33

** only unweighted costs available*

Table 30: Range of External Costs for Biodiversity Losses due to Deposition of Airborne Emissions, all Countries, 2004.

The validation of the results shows that the external cost estimates for biodiversity losses due to the deposition of airborne emissions and land use changes are plausible. Whereas the external costs for land use changes should be regarded as a lower or upper boundary of the WTP for restoration measures, the results for deposition of airborne emissions compares well with WTP results and should generally be regarded as a lower boundary of external costs of biodiversity losses.

Further research in the area should on the one hand concentrate on finding a method to derive individual WTP results for biodiversity losses, e.g. by contingent valuation or discrete choice analysis. Moreover the development of damage models which empirically quantify the relationship between depositions and biodiversity change for countries other than the Netherlands is desirable. As a result, the reliability of the transfer of the approach applied to other European countries could be increased.

Appendix

A-1 PDF Values for Different Land Use Changes

PDF (starting biotope → **target biotope**)

Biotope Group	starting Biotopes	*Corine ID-No.*	*number of species (S)*	*PDF occupation*	*Extensivie-rungsgrad*	% of sealed area	Built up land	Continuous urban fabric	Discontinu-ous urban	Urban/Indus-trial fallow	Rural settlement	Industrial area	Traffic networks	Road/rail embankment	Green urban areas	Intensive arable	Integrated arable	Organic arable	Organic orchards	Intensive pasture	Less intensive	Organic pasture	Broad-leafed forest	Coniferous forest	Mixed forest	Plantation forest	Forest edge	Swiss Lowlands
										Target biotopes			Target biotopes			Target biotopes			Target biotopes			Target biotopes			Target biotopes			
artificial_hi	Built up land	*10*	*1*	*0.97*		100%		0.20	0.62	-1.16	-0.71	-0.70		-0.92	-0.84	-0.28	-0.18	-0.74	-0.67	-0.47	-0.55	-1.33	-0.67	n.a.	n.a.	-0.36	-1.40	-1.16
artificial_hi	Continuous urban fabric	*111*	*8*	*0.8*		80%			-0.42	-0.96	-0.50			-0.72	-0.64	-0.07	0.02	-0.54	-0.47	-0.26	-0.35	-1.13	-0.47	n.a.	n.a.	-0.16	-1.20	-0.96
artificial_hi	Discontinuous urban fabric	*112*	*22*	*0.45*		60%				-0.54	-0.08			-0.30	-0.22	0.35	0.44	-0.12	-0.05	0.16	0.07	-0.71	-0.05	n.a.	n.a.	0.26	-0.78	-0.54
non-use	Urban/Industrial fallow	*113, 125*	*40*	*0*		40%																						
artificial_li	Rural settlement	*114*	*25*	*0.38*		40%									-0.13	0.43	0.53	-0.04	0.04	0.24	0.16	-0.62	0.04	n.a.	n.a.	0.35	-0.70	-0.46
artificial_hi	Industrial or commercial area	*121*	*24*	*0.39*		80%			0.07	-0.47	-0.01			-0.23	-0.14	0.42	0.52	-0.05	0.02	0.23	0.14	-0.64	0.02	n.a.	n.a.	0.34	-0.71	-0.47
artificial_hi	Traffic networks (road and rail networks, airports, port areas	*1221, 1223, 123, 124*				100%		n.a.	n.a.	n.a.	n.a.	n.a.		n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	0.80	n.a.	n.a.
artificial_li	Road/rail embankments and associated land	*122, 1224*	*32*	*0.2*		50%					0.22				0.08	0.65	0.74	0.18	0.25	0.46	0.37	-0.41	0.25	n.a.	n.a.	0.56	-0.48	-0.24
artificial_li	Green urban areas	*141*	*29*	*0.27*		40%					0.13					0.56	0.66	0.10	0.17	0.37	0.29	-0.49	0.17	n.a.	n.a.	0.48	-0.56	-0.32
agri_hi	Conventional/intensive arable	*2111*	*10*	*0.74*	*0%*	0%											0.10	-0.47	-0.40	-0.19	-0.28	-1.06	-0.40	n.a.	n.a.	-0.08	-1.13	-0.89
agri_hi	Integrated arable	*2112*	*7*	*0.82*	*40%*	0%												-0.56	-0.49	-0.29	-0.37	-1.15	-0.49	n.a.	n.a.	-0.18	-1.22	-0.98
agri_li	Organic arable	*2113*	*26*	*0.35*	*100%*	0%													0.07			-0.59	0.07	n.a.	n.a.	0.38	-0.66	-0.42
agri_li	Organic orchards	*2222*	*23*	*0.41*		0%																	0.00	n.a.	n.a.	0.31	-0.73	-0.49
agri_hi	Intensive pasture and meadows	*2311*	*17*	*0.58*	*0%*	0%											0.29	-0.28	-0.20		-0.08	-0.86	-0.20	n.a.	n.a.	0.11	-0.94	-0.70
agri_li	Less intensive pasture and meadows	*2312*	*19*	*0.51*	*40%*	0%												-0.19	-0.12			-0.78	-0.12	n.a.	n.a.	0.19	-0.85	-0.61
agri_li	Organic pasture and meadows	*2313*	*45*	*-0.14*	*100%*	0%													0.66				0.66	n.a.	n.a.	0.97	-0.07	0.17
forest	Broad-leafed forest	*311*	*24*	*0.41*		0%																						-0.49
forest	Coniferous forest	*312*				0%																						n.a.
forest	Mixed forest	*313*				0%																						n.a.
forest_hi	Plantation forest			*0.67*		0%																						
non-use	Forest edge	*314*	*48*	*-0.2*		0%																						0.24
mix	Swiss Lowlands (nature)		*40*	*0*														0.42	0.49		0.61	-0.17	0.49	n.a.	n.a.		-0.24	

A-2 Restoration Costs per m² for Different Land Use Categories - Germany 2004

Restoration Costs for Germany in €/m2 (2004)

Biotope Group	starting Biotopes	Corine ID-No.	number of species (S)	PDF occupation	Extensivierungsgrad	% of sealed area
artificial_hi	Built up land	10	1	0.97		100%
artificial_hi	Continuous urban fabric	111	8	0.8		80%
artificial_hi	Discontinuous urban fabric	112	22	0.45		60%
non-use	Urban/Industrial fallow	113, 125	40	0		40%
artificial_li	Rural settlement	114	25	0.38		40%
artificial_hi	Industrial or commercial area	121	24	0.39		80%
artificial_hi	Traffic networks (road and rail networks, airports, port areas	1221, 1223, 123, 124				100%
artificial_li	Road/rail embankments and associated land	122, 1224	32	0.2		50%
artificial_li	Green urban areas	141	29	0.27		40%
agri_hi	Conventional/intensive arable	2111	10	0.74	0%	0%
agri_hi	Integrated arable	2112	7	0.82	40%	0%
agri_li	Organic arable	2113	26	0.35	100%	0%
agri_li	Organic orchards	2222	23	0.41		0%
agri_hi	Intensive pasture and meadows	2311	17	0.58	0%	0%
agri_li	Less intensive pasture and meadows	2312	19	0.51	40%	0%
agri_li	Organic pasture and meadows	2313	45	-0.14	100%	0%
forest	Broad-leafed forest	311	24	0.41	100%	0%
forest	Coniferous forest	312			100%	0%
forest	Mixed forest	313			0%	0%
forest_hi	Plantation forest			0.67	0%	0%
non-use	Forest edge	314	48	-0.2		0%
mix	Country Average					8%

RESTORATION COSTS (2004) – Target biotopes

starting Biotopes	Built up land	Continuous urban fabric	Discontinu-ous urban	Urban/Indus-trial fallow	Rural settlement	Industrial area	Traffic networks (road and rail networks, airports, port areas	Road/rail embankments and associated land	Green urban areas	Intensive arable
Built up land		0.00 €/m2	0.00 €/m2	0.00 €/m2	0.00 €/m2	0.00 €/m2		0.00 €/m2	0.00 €/m2	0.00 €/m2
Continuous urban fabric			0.00 €/m2	0.00 €/m2	0.00 €/m2			0.00 €/m2	0.00 €/m2	0.00 €/m2
Discontinuous urban fabric				0.00 €/m2	0.00 €/m2			0.00 €/m2	0.00 €/m2	0.00 €/m2
Urban/Industrial fallow										0.00 €/m2
Rural settlement									0.00 €/m2	0.00 €/m2
Industrial or commercial area			0.00 €/m2	0.00 €/m2	0.00 €/m2			0.00 €/m2	0.00 €/m2	0.00 €/m2
Traffic networks (road and rail networks, airports, port areas		0.00 €/m2	0.00 €/m2	0.00 €/m2	0.00 €/m2	0.00 €/m2		0.00 €/m2	0.00 €/m2	0.00 €/m2
Road/rail embankments and associated land					0.00 €/m2				0.00 €/m2	0.00 €/m2
Green urban areas					0.00 €/m2					0.00 €/m2
Conventional/intensive arable										
Integrated arable										
Organic arable										
Organic orchards										
Intensive pasture and meadows										
Less intensive pasture and meadows										
Organic pasture and meadows										
Broad-leafed forest										
Coniferous forest										
Mixed forest										
Plantation forest										
Forest edge										
Country Average										

RESTORATION COSTS (2004) – Target biotopes

starting Biotopes	Integrated arable	Organic arable	Organic orchards	Intensive pasture	Less intensive pasture	Organic pasture	Broad-leafed forest	Coniferous forest	Mixed forest	Plantation forest	Forest edge	Country Average
Built up land	0.18 €/m2	0.46 €/m2	4.41 €/m2	0.37 €/m2	0.83 €/m2	2.06 €/m2	2.89 €/m2	2.89 €/m2	2.89 €/m2	2.89 €/m2	9.12 €/m2	1.17 €/m2
Continuous urban fabric	0.18 €/m2	0.46 €/m2	4.41 €/m2	0.37 €/m2	0.83 €/m2	2.06 €/m2	2.89 €/m2	2.89 €/m2	2.89 €/m2	2.89 €/m2	9.12 €/m2	1.17 €/m2
Discontinuous urban fabric	0.18 €/m2	0.46 €/m2	4.41 €/m2	0.37 €/m2	0.83 €/m2	2.06 €/m2	2.89 €/m2	2.89 €/m2	2.89 €/m2	2.89 €/m2	9.12 €/m2	1.17 €/m2
Urban/Industrial fallow	0.18 €/m2	0.46 €/m2	4.41 €/m2	0.37 €/m2	0.83 €/m2	2.06 €/m2	2.89 €/m2	2.89 €/m2	2.89 €/m2	2.89 €/m2	9.12 €/m2	1.17 €/m2
Rural settlement	0.18 €/m2	0.46 €/m2	4.41 €/m2	0.37 €/m2	0.83 €/m2	2.06 €/m2	2.89 €/m2	2.89 €/m2	2.89 €/m2	2.89 €/m2	9.12 €/m2	1.17 €/m2
Industrial or commercial area	0.18 €/m2	0.46 €/m2	4.41 €/m2	0.37 €/m2	0.83 €/m2	2.06 €/m2	2.89 €/m2	2.89 €/m2	2.89 €/m2	2.89 €/m2	9.12 €/m2	1.17 €/m2
Traffic networks (road and rail networks, airports, port areas	0.18 €/m2	0.46 €/m2	4.41 €/m2	0.37 €/m2	0.83 €/m2	2.06 €/m2	2.89 €/m2	2.89 €/m2	2.89 €/m2	2.89 €/m2	9.12 €/m2	1.17 €/m2
Road/rail embankments and associated land	0.18 €/m2	0.46 €/m2	4.41 €/m2	0.37 €/m2	0.83 €/m2	2.06 €/m2	2.89 €/m2	2.89 €/m2	2.89 €/m2	2.89 €/m2	9.12 €/m2	1.17 €/m2
Green urban areas	0.18 €/m2	0.46 €/m2	4.41 €/m2	0.37 €/m2	0.83 €/m2	2.06 €/m2	2.89 €/m2	2.89 €/m2	2.89 €/m2	2.89 €/m2	9.12 €/m2	1.17 €/m2
Conventional/intensive arable	0.18 €/m2	0.46 €/m2	4.41 €/m2	0.37 €/m2	0.83 €/m2	2.06 €/m2	2.89 €/m2	2.89 €/m2	2.89 €/m2	2.89 €/m2	9.12 €/m2	
Integrated arable		0.27 €/m2	4.41 €/m2	0.37 €/m2	0.37 €/m2	0.83 €/m2	2.89 €/m2	2.89 €/m2	2.89 €/m2	2.89 €/m2	9.12 €/m2	
Organic arable			4.41 €/m2			0.37 €/m2	2.89 €/m2	2.89 €/m2	2.89 €/m2	2.89 €/m2	9.12 €/m2	
Organic orchards							2.89 €/m2	2.89 €/m2	2.89 €/m2	2.89 €/m2	9.12 €/m2	
Intensive pasture and meadows	0.18 €/m2	0.46 €/m2	4.41 €/m2		0.84 €/m2	2.11 €/m2	2.89 €/m2	2.89 €/m2	2.89 €/m2	2.89 €/m2	9.12 €/m2	
Less intensive pasture and meadows		0.27 €/m2	4.41 €/m2			1.26 €/m2	2.89 €/m2	2.89 €/m2	2.89 €/m2	2.89 €/m2	9.12 €/m2	
Organic pasture and meadows			4.41 €/m2				2.89 €/m2	2.89 €/m2	2.89 €/m2	2.89 €/m2	9.12 €/m2	
Broad-leafed forest												
Coniferous forest												
Mixed forest												
Plantation forest												
Forest edge												
Country Average												

Variant types of restoration	Measures, Characteristics	Determination of repair costs (Sources: Gühnemann et al. 1999, Bosch & Partner 1998)
(dark grey)	*no variant (the quality of biotope do not increase)*	no measures
(light grey)	Unsealing	Unsealing costs
(yellow)	Unsealing + extensification	Unsealing costs + costs of measure No. 10 of (Bosch & Partner 1998): starting biotope: intensive arable, target biotope: organic arable
(light blue)	Unsealing + extensification + cultivation of grass species and large fruit trees	Unsealing costs + costs of measures No. 26.1 and 26.2 of (Bosch & Partner 1998): starting biotope: arable land, target biotope: organic orchards
(green)	Unsealing + partially extensification + growing green plants	Unsealing costs + costs of measures No. 13.1 - 13.4 of (Bosch & Partner 1998): starting biotope: intensive arable land, target biotope: organic meadows
(light green)	Unsealing + deep tilling of the soil + afforestation + maintenance	Unsealing costs + costs of measure No. 21 of (Bosch & Partner 1998): starting biotope: arable land/meadows, target biotope: broad leafed forest
(orange)	Unsealing + deep tilling of the soil + cultivation of groves + protective measures against game anim	Unsealing costs + costs of measure No. 20 of (Bosch & Partner 1998): starting biotope: arable land/meadows, target biotope:hedgerows, forest edge
(white)	Mix of measures	mix of measures

Umrechnungskurs	1 Euro =	1.95583 Dm

Cost factors	DM/m2 (199	DM/m2 (1998)	€/m2 (1998)	€/m2 (2004)
	brutto	netto	netto	netto
unsealing costs	50	43.1	22.04	25.17

Source: Gühnemann et al. 1999

Inflation rate	
1999	6
2000	1.4
2001	2
2002	1.4
2003	1.1
2004	1.6
1999-2004	1.142

Source: Statistisches Bundesamt Deutschland

A-3 Restoration Costs per m² for Different Countries

A-3.1 Restoration Costs EU 25

Restoration Costs in €/m2 (2004)
Country: EU25
PPS 0.92 (Germany = 1)

				RESTORATION COSTS (2004)																					
				Target biotopes											Target biotopes										
Biotope Group	starting Biotopes	Corine ID-No.	% of sealed area	Built up land	Continuous urban fabric	Discontinuous urban	Urban/Industrial fallow	Rural settlement	Industrial area	Traffic networks (road and rail networks, airports, port areas	Road/rail embankments and associated land	Green urban areas	Intensive arable	Integrated arable	Organic arable	Organic orchards	Intensive pasture	Less intensive pasture	Organic pasture	Broad-leafed forest	Coniferous forest	Mixed forest	Plantation forest	Forest edge	Country average
artificial_hi	Built up land	*10*	100%		0	0	0	0	0		0	0	0	0.17	0.42	4.06	0.34	0.76	1.90	2.66	2.66	2.66	2.66	8.39	1.52
artificial_hi	Continuous urban fabric	*111*	80%			0	0	0			0	0	0	0.17	0.42	4.06	0.34	0.76	1.90	2.66	2.66	2.66	2.66	8.39	1.52
artificial_hi	Discontinuous urban fabric	*112*	60%				0	0			0	0	0	0.17	0.42	4.06	0.34	0.76	1.90	2.66	2.66	2.66	2.66	8.39	1.52
non-use	Urban/Industrial fallow	*113, 125*	40%										0	0.17	0.42	4.06	0.34	0.76	1.90	2.66	2.66	2.66	2.66	8.39	1.52
artificial_li	Rural settlement	*114*	40%									0	0	0.17	0.42	4.06	0.34	0.76	1.90	2.66	2.66	2.66	2.66	8.39	1.52
artificial_hi	Industrial or commercial area	*121*	80%			0	0	0			0	0	0	0.17	0.42	4.06	0.34	0.76	1.90	2.66	2.66	2.66	2.66	8.39	1.52
artificial_hi	Traffic networks (road and rail networks, airports, port areas	*1221, 1223, 123, 124*	100%		0	0	0	0	0		0	0	0	0.17	0.42	4.06	0.34	0.76	1.90	2.66	2.66	2.66	2.66	8.39	1.52
artificial_li	Road/rail embankments and associated land	*122, 1224*	50%					0				0	0	0.17	0.42	4.06	0.34	0.76	1.90	2.66	2.66	2.66	2.66	8.39	1.52
artificial_li	Green urban areas	*141*	40%					0					0	0.17	0.42	4.06	0.34	0.76	1.90	2.66	2.66	2.66	2.66	8.39	1.52
agri_hi	Conventional/intensive arable	*2111*	0%											0.17	0.42	4.05	0.34	0.76	1.90	2.66	2.66	2.66	2.66	8.39	
agri_hi	Integrated arable	*2112*	0%												0.25	4.05	0.34	0.34	0.76	2.66	2.66	2.66	2.66	8.39	
agri_li	Organic arable	*2113*	0%													4.05			0.34	2.66	2.66	2.66	2.66	8.39	
agri_li	Organic orchards	*2222*	0%																	2.66	2.66	2.66	2.66	8.39	
agri_hi	Intensive pasture and meadows	*2311*	0%											0.17	0.42	4.05		0.77	1.94	2.66	2.66	2.66	2.66	8.39	
agri_li	Less intensive pasture and meadows	*2312*	0%												0.25	4.05			1.16	2.66	2.66	2.66	2.66	8.39	
agri_li	Organic pasture and meadows	*2313*	0%													4.05				2.66	2.66	2.66	2.66	8.39	
forest	Broad-leafed forest	*311*	0%																						
forest	Coniferous forest	*312*	0%																						
forest	Mixed forest	*313*	0%																						
forest_hi	Plantation forest		0%																						
non-use	Forest edge	*314*	0%																						
mix	Country Average		-	0	0	0	0	0	0	0	0	0	0	0.08	0.17	2.04	0.14	0.31	0.59	1.40	1.40	1.40	1.40	4.42	

A-3.2 Restoration Costs Austria

Restoration Costs in €/m2 (2004)
Country: Austria
PPS 0.97 (Germany = 1)

Biotope Group	starting Biotopes	*Corine ID-No.*	% of sealed area	RESTORATION COSTS (2004) Target biotopes: Built up land	Continuous urban fabric	Discontinuous urban	Urban/Industrial fallow	Rural settlement	Industrial area	Traffic networks (road and rail networks, airports, port areas	Road/rail embankments and associated land	Green urban areas	Intensive arable	Integrated arable	Organic arable	Organic orchards	Intensive pasture	Less intensive pasture	Organic pasture	Broad-leafed forest	Coniferous forest	Mixed forest	Plantation forest	Forest edge	Country average
artificial_hi	Built up land	*10*	100%		0	0	0	0	0		0	0	0	0.17	0.45	4.28	0.36	0.81	2.00	2.80	2.80	2.80	2.80	8.85	1.87
artificial_hi	Continuous urban fabric	*111*	80%			0	0	0			0	0	0	0.17	0.45	4.28	0.36	0.81	2.00	2.80	2.80	2.80	2.80	8.85	1.87
artificial_hi	Discontinuous urban fabric	*112*	60%				0	0			0	0	0	0.17	0.45	4.28	0.36	0.81	2.00	2.80	2.80	2.80	2.80	8.85	1.87
non-use	Urban/Industrial fallow	*113, 125*	40%										0	0.17	0.45	4.28	0.36	0.81	2.00	2.80	2.80	2.80	2.80	8.85	1.87
artificial_li	Rural settlement	*114*	40%									0	0	0.17	0.45	4.28	0.36	0.81	2.00	2.80	2.80	2.80	2.80	8.85	1.87
artificial_hi	Industrial or commercial area	*121*	80%			0	0	0			0	0	0	0.17	0.45	4.28	0.36	0.81	2.00	2.80	2.80	2.80	2.80	8.85	1.87
artificial_hi	Traffic networks (road and rail networks, airports, port areas	*1221, 1223, 123, 124*	100%		0	0	0	0	0		0	0	0	0.17	0.45	4.28	0.36	0.81	2.00	2.80	2.80	2.80	2.80	8.85	1.87
artificial_li	Road/rail embankments and associated land	*122, 1224*	50%					0				0	0	0.17	0.45	4.28	0.36	0.81	2.00	2.80	2.80	2.80	2.80	8.85	1.87
artificial_li	Green urban areas	*141*	40%					0					0	0.17	0.45	4.28	0.36	0.81	2.00	2.80	2.80	2.80	2.80	8.85	1.87
agri_hi	Conventional/intensive arable	*2111*	0%											0.18	0.44	4.27	0.36	0.80	2.00	2.80	2.80	2.80	2.80	8.85	
agri_hi	Integrated arable	*2112*	0%												0.27	4.27	0.36	0.36	0.80	2.80	2.80	2.80	2.80	8.85	
agri_li	Organic arable	*2113*	0%													4.27			0.36	2.80	2.80	2.80	2.80	8.85	
agri_li	Organic orchards	*2222*	0%																	2.80	2.80	2.80	2.80	8.85	
agri_hi	Intensive pasture and meadows	*2311*	0%											0.18	0.44	4.27		0.82	2.04	2.80	2.80	2.80	2.80	8.85	
agri_li	Less intensive pasture and meadows	*2312*	0%												0.27	4.27			1.23	2.80	2.80	2.80	2.80	8.85	
agri_li	Organic pasture and meadows	*2313*	0%													4.27				2.80	2.80	2.80	2.80	8.85	
forest	Broad-leafed forest	*311*	0%																						
forest	Coniferous forest	*312*	0%																						
forest	Mixed forest	*313*	0%																						
forest_hi	Plantation forest		0%																						
non-use	Forest edge	*314*	0%																						
mix	Country Average		-	0	0	0	0	0	0	0	0	0	0	0.07	0.14	1.69	0.10	0.26	0.52	1.13	1.13	1.13	1.13	3.57	

A-3.3 Restoration Costs Belgium

Restoration Costs in €/m2 (2004)
Country: Belgium
PPS 0.96 (Germany = 1)

Biotope Group	starting Biotopes	Corine ID-No.	% of sealed area	Built up land	Continuous urban fabric	Discontinuous urban	Urban/Industrial fallow	Rural settlement	Industrial area	Traffic networks (road and rail networks, airports, port areas	Road/rail embankments and associated land	Green urban areas	Intensive arable	Integrated arable	Organic arable	Organic orchards	Intensive pasture	Less intensive pasture	Organic pasture	Broad-leafed forest	Coniferous forest	Mixed forest	Plantation forest	Forest edge	Country average
				RESTORATION COSTS (2004) – Target biotopes																					
artificial_hi	Built up land	*10*	100%		0	0	0	0	0		0	0	0	0.17	0.44	4.23	0.36	0.80	1.98	2.77	2.77	2.77	2.77	8.76	0.82
artificial_hi	Continuous urban fabric	*111*	80%			0	0	0			0	0	0	0.17	0.44	4.23	0.36	0.80	1.98	2.77	2.77	2.77	2.77	8.76	0.82
artificial_hi	Discontinuous urban fabric	*112*	60%				0	0			0	0	0	0.17	0.44	4.23	0.36	0.80	1.98	2.77	2.77	2.77	2.77	8.76	0.82
non-use	Urban/Industrial fallow	*113, 125*	40%										0	0.17	0.44	4.23	0.36	0.80	1.98	2.77	2.77	2.77	2.77	8.76	0.82
artificial_li	Rural settlement	*114*	40%									0	0	0.17	0.44	4.23	0.36	0.80	1.98	2.77	2.77	2.77	2.77	8.76	0.82
artificial_hi	Industrial or commercial area	*121*	80%			0	0	0			0	0	0	0.17	0.44	4.23	0.36	0.80	1.98	2.77	2.77	2.77	2.77	8.76	0.82
artificial_hi	Traffic networks (road and rail networks, airports, port areas	*1221, 1223, 123, 124*	100%		0	0	0	0	0		0	0	0	0.17	0.44	4.23	0.36	0.80	1.98	2.77	2.77	2.77	2.77	8.76	0.82
artificial_li	Road/rail embankments and associated land	*122, 1224*	50%					0				0	0	0.17	0.44	4.23	0.36	0.80	1.98	2.77	2.77	2.77	2.77	8.76	0.82
artificial_li	Green urban areas	*141*	40%					0					0	0.17	0.44	4.23	0.36	0.80	1.98	2.77	2.77	2.77	2.77	8.76	0.82
agri_hi	Conventional/intensive arable	*2111*	0%											0.18	0.44	4.23	0.36	0.79	1.98	2.77	2.77	2.77	2.77	8.76	
agri_hi	Integrated arable	*2112*	0%												0.26	4.23	0.36	0.36	0.79	2.77	2.77	2.77	2.77	8.76	
agri_li	Organic arable	*2113*	0%													4.23			0.36	2.77	2.77	2.77	2.77	8.76	
agri_li	Organic orchards	*2222*	0%																	2.77	2.77	2.77	2.77	8.76	
agri_hi	Intensive pasture and meadows	*2311*	0%											0.18	0.44	4.23		0.81	2.02	2.77	2.77	2.77	2.77	8.76	
agri_li	Less intensive pasture and meadows	*2312*	0%												0.26	4.23			1.21	2.77	2.77	2.77	2.77	8.76	
agri_li	Organic pasture and meadows	*2313*	0%													4.23				2.77	2.77	2.77	2.77	8.76	
forest	Broad-leafed forest	*311*	0%																						
forest	Coniferous forest	*312*	0%																						
forest	Mixed forest	*313*	0%																						
forest_hi	Plantation forest		0%																						
non-use	Forest edge	*314*	0%																						
mix	Country Average		-	0	0	0	0	0	0	0	0	0	0	0.14	0.29	3.32	0.24	0.52	1.08	2.18	2.18	2.18	2.18	6.89	

A-3.4 Restoration Costs Bulgaria

Restoration Costs in €/m2 (2004)
Country: Bulgaria
PPS 0.39 (Germany = 1)

				RESTORATION COSTS (2004)																					
				Target biotopes																					
Biotope Group	starting Biotopes	*Corine ID-No.*	% of sealed area	Built up land	Continuous urban fabric	Discontinuous urban	Urban/Industrial fallow	Rural settlement	Industrial area	Traffic networks (road and rail networks, airports, port areas	Road/rail embankments and associated land	Green urban areas	Intensive arable	Integrated arable	Organic arable	Organic orchards	Intensive pasture	Less intensive pasture	Organic pasture	Broad-leafed forest	Coniferous forest	Mixed forest	Plantation forest	Forest edge	Country average
artificial_hi	Built up land	*10*	100%		0	0	0	0	0		0	0	0	0.07	0.18	1.72	0.14	0.32	0.80	1.13	1.13	1.13	1.13	3.56	0.57
artificial_hi	Continuous urban fabric	*111*	80%			0	0	0			0	0	0	0.07	0.18	1.72	0.14	0.32	0.80	1.13	1.13	1.13	1.13	3.56	0.57
artificial_hi	Discontinuous urban fabric	*112*	60%				0	0			0	0	0	0.07	0.18	1.72	0.14	0.32	0.80	1.13	1.13	1.13	1.13	3.56	0.57
non-use	Urban/Industrial fallow	*113, 125*	40%										0	0.07	0.18	1.72	0.14	0.32	0.80	1.13	1.13	1.13	1.13	3.56	0.57
artificial_li	Rural settlement	*114*	40%									0	0	0.07	0.18	1.72	0.14	0.32	0.80	1.13	1.13	1.13	1.13	3.56	0.57
artificial_hi	Industrial or commercial area	*121*	80%			0	0	0			0	0	0	0.07	0.18	1.72	0.14	0.32	0.80	1.13	1.13	1.13	1.13	3.56	0.57
artificial_hi	Traffic networks (road and rail networks, airports, port areas	*1221, 1223, 123, 124*	100%		0	0	0	0	0		0	0	0	0.07	0.18	1.72	0.14	0.32	0.80	1.13	1.13	1.13	1.13	3.56	0.57
artificial_li	Road/rail embankments and associated land	*122, 1224*	50%					0				0	0	0.07	0.18	1.72	0.14	0.32	0.80	1.13	1.13	1.13	1.13	3.56	0.57
artificial_li	Green urban areas	*141*	40%					0					0	0.07	0.18	1.72	0.14	0.32	0.80	1.13	1.13	1.13	1.13	3.56	0.57
agri_hi	Conventional/intensive arable	*2111*	0%											0.07	0.18	1.72	0.15	0.32	0.80	1.13	1.13	1.13	1.13	3.56	
agri_hi	Integrated arable	*2112*	0%												0.11	1.72	0.15	0.15	0.32	1.13	1.13	1.13	1.13	3.56	
agri_li	Organic arable	*2113*	0%													1.72			0.15	1.13	1.13	1.13	1.13	3.56	
agri_li	Organic orchards	*2222*	0%																	1.13	1.13	1.13	1.13	3.56	
agri_hi	Intensive pasture and meadows	*2311*	0%											0.07	0.18	1.72		0.33	0.82	1.13	1.13	1.13	1.13	3.56	
agri_li	Less intensive pasture and meadows	*2312*	0%												0.11	1.72			0.49	1.13	1.13	1.13	1.13	3.56	
agri_li	Organic pasture and meadows	*2313*	0%													1.72				1.13	1.13	1.13	1.13	3.56	
forest	Broad-leafed forest	*311*	0%																						
forest	Coniferous forest	*312*	0%																						
forest	Mixed forest	*313*	0%																						
forest_hi	Plantation forest		0%																						
non-use	Forest edge	*314*	0%																						
mix	Country Average		-	0	0	0	0	0	0	0	0	0	0	0.04	0.08	0.96	0.08	0.14	0.26	0.65	0.65	0.65	0.65	2.05	

A-3.5 Restoration Costs Cyprus

Restoration Costs in €/m2 (2004)
Country: Cyprus
PPS 0.89 (Germany = 1)

				RESTORATION COSTS (2004)																					
				Target biotopes												Target biotopes									
Biotope Group	starting Biotopes	*Corine ID-No.*	% of sealed area	Built up land	Continuous urban fabric	Discontinuous urban	Urban/Industrial fallow	Rural settlement	Industrial area	Traffic networks (road and rail networks, airports, port areas	Road/rail embankments and associated land	Green urban areas	Intensive arable	Integrated arable	Organic arable	Organic orchards	Intensive pasture	Less intensive pasture	Organic pasture	Broad-leafed forest	Coniferous forest	Mixed forest	Plantation forest	Forest edge	Country average
artificial_hi	Built up land	*10*	100%		0	0	0	0	0		0	0	0	0.16	0.41	3.92	0.33	0.74	1.83	2.57	2.57	2.57	2.57	8.12	1.33
artificial_hi	Continuous urban fabric	*111*	80%			0	0	0			0	0	0	0.16	0.41	3.92	0.33	0.74	1.83	2.57	2.57	2.57	2.57	8.12	1.33
artificial_hi	Discontinuous urban fabric	*112*	60%				0	0			0	0	0	0.16	0.41	3.92	0.33	0.74	1.83	2.57	2.57	2.57	2.57	8.12	1.33
non-use	Urban/Industrial fallow	*113, 125*	40%										0	0.16	0.41	3.92	0.33	0.74	1.83	2.57	2.57	2.57	2.57	8.12	1.33
artificial_li	Rural settlement	*114*	40%									0	0	0.16	0.41	3.92	0.33	0.74	1.83	2.57	2.57	2.57	2.57	8.12	1.33
artificial_hi	Industrial or commercial area	*121*	80%			0	0	0			0	0	0	0.16	0.41	3.92	0.33	0.74	1.83	2.57	2.57	2.57	2.57	8.12	1.33
artificial_hi	Traffic networks (road and rail networks, airports, port areas	*1221, 1223, 123, 124*	100%		0	0	0	0	0		0	0	0	0.16	0.41	3.92	0.33	0.74	1.83	2.57	2.57	2.57	2.57	8.12	1.33
artificial_li	Road/rail embankments and associated land	*122, 1224*	50%					0				0	0	0.16	0.41	3.92	0.33	0.74	1.83	2.57	2.57	2.57	2.57	8.12	1.33
artificial_li	Green urban areas	*141*	40%					0					0	0.16	0.41	3.92	0.33	0.74	1.83	2.57	2.57	2.57	2.57	8.12	1.33
agri_hi	Conventional/intensive arable	*2111*	0%											0.16	0.41	3.92	0.33	0.73	1.83	2.57	2.57	2.57	2.57	8.12	
agri_hi	Integrated arable	*2112*	0%												0.24	3.92	0.33	0.33	0.73	2.57	2.57	2.57	2.57	8.12	
agri_li	Organic arable	*2113*	0%													3.92			0.33	2.57	2.57	2.57	2.57	8.12	
agri_li	Organic orchards	*2222*	0%																	2.57	2.57	2.57	2.57	8.12	
agri_hi	Intensive pasture and meadows	*2311*	0%											0.16	0.41	3.92		0.75	1.87	2.57	2.57	2.57	2.57	8.12	
agri_li	Less intensive pasture and meadows	*2312*	0%												0.24	3.92			1.12	2.57	2.57	2.57	2.57	8.12	
agri_li	Organic pasture and meadows	*2313*	0%													3.92				2.57	2.57	2.57	2.57	8.12	
forest	Broad-leafed forest	*311*	0%																						
forest	Coniferous forest	*312*	0%																						
forest	Mixed forest	*313*	0%																						
forest_hi	Plantation forest		0%																						
non-use	Forest edge	*314*	0%																						
mix	Country Average		-	0	0	0	0	0	0	0	0	0	0	0.09	0.18	2.11	0.18	0.30	0.59	1.49	1.49	1.49	1.49	4.69	

A-3.6 Restoration Costs Czech Republic

Restoration Costs in €/m2 (2004)
Country: Czech Republic
PPS 0.51 (Germany = 1)

Biotope Group	starting Biotopes	Corine ID-No.	% of sealed area	RESTORATION COSTS (2004)																					
				Target biotopes									Target biotopes												
				Built up land	Continuous urban fabric	Discontinuous urban	Urban/Industrial fallow	Rural settlement	Industrial area	Traffic networks (road and rail networks, airports, port areas	Road/rail embankments and associated land	Green urban areas	Intensive arable	Integrated arable	Organic arable	Organic orchards	Intensive pasture	Less intensive pasture	Organic pasture	Broad-leafed forest	Coniferous forest	Mixed forest	Plantation forest	Forest edge	Country average
artificial_hi	Built up land	10	100%		0	0	0	0	0		0	0	0	0.09	0.23	2.25	0.19	0.42	1.05	1.47	1.47	1.47	1.47	4.65	0.63
artificial_hi	Continuous urban fabric	111	80%			0	0	0			0	0	0	0.09	0.23	2.25	0.19	0.42	1.05	1.47	1.47	1.47	1.47	4.65	0.63
artificial_hi	Discontinuous urban fabric	112	60%				0	0			0	0	0	0.09	0.23	2.25	0.19	0.42	1.05	1.47	1.47	1.47	1.47	4.65	0.63
non-use	Urban/Industrial fallow	113, 125	40%										0	0.09	0.23	2.25	0.19	0.42	1.05	1.47	1.47	1.47	1.47	4.65	0.63
artificial_li	Rural settlement	114	40%									0	0	0.09	0.23	2.25	0.19	0.42	1.05	1.47	1.47	1.47	1.47	4.65	0.63
artificial_hi	Industrial or commercial area	121	80%			0	0	0			0	0	0	0.09	0.23	2.25	0.19	0.42	1.05	1.47	1.47	1.47	1.47	4.65	0.63
artificial_hi	Traffic networks (road and rail networks, airports, port areas	1221, 1223, 123, 124	100%		0	0	0	0	0		0	0	0	0.09	0.23	2.25	0.19	0.42	1.05	1.47	1.47	1.47	1.47	4.65	0.63
artificial_li	Road/rail embankments and associated land	122, 1224	50%					0				0	0	0.09	0.23	2.25	0.19	0.42	1.05	1.47	1.47	1.47	1.47	4.65	0.63
artificial_li	Green urban areas	141	40%					0					0	0.09	0.23	2.25	0.19	0.42	1.05	1.47	1.47	1.47	1.47	4.65	0.63
agri_hi	Conventional/intensive arable	2111	0%											0.09	0.23	2.25	0.19	0.42	1.05	1.47	1.47	1.47	1.47	4.65	
agri_hi	Integrated arable	2112	0%												0.14	2.25	0.19	0.19	0.42	1.47	1.47	1.47	1.47	4.65	
agri_li	Organic arable	2113	0%													2.25			0.19	1.47	1.47	1.47	1.47	4.65	
agri_li	Organic orchards	2222	0%																	1.47	1.47	1.47	1.47	4.65	
agri_hi	Intensive pasture and meadows	2311	0%											0.09	0.23	2.25		0.43	1.07	1.47	1.47	1.47	1.47	4.65	
agri_li	Less intensive pasture and meadows	2312	0%												0.14	2.25			0.64	1.47	1.47	1.47	1.47	4.65	
agri_li	Organic pasture and meadows	2313	0%													2.25				1.47	1.47	1.47	1.47	4.65	
forest	Broad-leafed forest	311	0%																						
forest	Coniferous forest	312	0%																						
forest	Mixed forest	313	0%																						
forest_hi	Plantation forest		0%																						
non-use	Forest edge	314	0%																						
mix	Country Average		-	0	0	0	0	0	0	0	0	0	0	0.06	0.12	1.43	0.11	0.21	0.40	0.95	0.95	0.95	0.95	2.99	

A-3.7 Restoration Costs Denmark

Restoration Costs in €/m2 (2004)
Country: Denmark
PPS 1.28 (Germany = 1)

Biotope Group	starting Biotopes	Corine ID-No.	% of sealed area	Built up land	Continuous urban fabric	Discontinuous urban	Urban/Industrial fallow	Rural settlement	Industrial area	Traffic networks (road and rail networks, airports, port areas	Road/rail embankments and associated land	Green urban areas	Intensive arable	Integrated arable	Organic arable	Organic orchards	Intensive pasture	Less intensive pasture	Organic pasture	Broad-leafed forest	Coniferous forest	Mixed forest	Plantation forest	Forest edge	Country average
				RESTORATION COSTS (2004)																					
				Target biotopes									Target biotopes												
artificial_hi	Built up land	*10*	100%		0	0	0	0	0		0	0	0	0.23	0.59	5.64	0.47	1.06	2.64	3.70	3.70	3.70	3.70	11.67	0.71
artificial_hi	Continuous urban fabric	*111*	80%			0	0	0			0	0	0	0.23	0.59	5.64	0.47	1.06	2.64	3.70	3.70	3.70	3.70	11.67	0.71
artificial_hi	Discontinuous urban fabric	*112*	60%				0	0			0	0	0	0.23	0.59	5.64	0.47	1.06	2.64	3.70	3.70	3.70	3.70	11.67	0.71
non-use	Urban/Industrial fallow	*113, 125*	40%										0	0.23	0.59	5.64	0.47	1.06	2.64	3.70	3.70	3.70	3.70	11.67	0.71
artificial_li	Rural settlement	*114*	40%									0	0	0.23	0.59	5.64	0.47	1.06	2.64	3.70	3.70	3.70	3.70	11.67	0.71
artificial_hi	Industrial or commercial area	*121*	80%			0	0	0			0	0	0	0.23	0.59	5.64	0.47	1.06	2.64	3.70	3.70	3.70	3.70	11.67	0.71
artificial_hi	Traffic networks (road and rail networks, airports, port areas	*1221, 1223, 123, 124*	100%		0	0	0	0	0		0	0	0	0.23	0.59	5.64	0.47	1.06	2.64	3.70	3.70	3.70	3.70	11.67	0.71
artificial_li	Road/rail embankments and associated land	*122, 1224*	50%					0				0	0	0.23	0.59	5.64	0.47	1.06	2.64	3.70	3.70	3.70	3.70	11.67	0.71
artificial_li	Green urban areas	*141*	40%					0					0	0.23	0.59	5.64	0.47	1.06	2.64	3.70	3.70	3.70	3.70	11.67	0.71
agri_hi	Conventional/intensive arable	*2111*	0%											0.23	0.58	5.64	0.48	1.06	2.64	3.70	3.70	3.70	3.70	11.67	
agri_hi	Integrated arable	*2112*	0%												0.35	5.64	0.48	0.48	1.06	3.70	3.70	3.70	3.70	11.67	
agri_li	Organic arable	*2113*	0%													5.64			0.48	3.70	3.70	3.70	3.70	11.67	
agri_li	Organic orchards	*2222*	0%																	3.70	3.70	3.70	3.70	11.67	
agri_hi	Intensive pasture and meadows	*2311*	0%											0.23	0.58	5.64		1.08	2.70	3.70	3.70	3.70	3.70	11.67	
agri_li	Less intensive pasture and meadows	*2312*	0%												0.35	5.64			1.62	3.70	3.70	3.70	3.70	11.67	
agri_li	Organic pasture and meadows	*2313*	0%													5.64				3.70	3.70	3.70	3.70	11.67	
forest	Broad-leafed forest	*311*	0%																						
forest	Coniferous forest	*312*	0%																						
forest	Mixed forest	*313*	0%																						
forest_hi	Plantation forest		0%																						
non-use	Forest edge	*314*	0%																						
mix	Country Average		-	0	0	0	0	0	0	0	0	0	0	0.20	0.42	4.91	0.41	0.69	1.31	3.22	3.22	3.22	3.22	10.16	

A-3.8 Restoration Costs Estonia

Restoration Costs in €/m2 (2004)
Country: Estonia
PPS 0.58 (Germany = 1)

Biotope Group	starting Biotopes	Corine ID-No.	% of sealed area	RESTORATION COSTS (2004) – Target biotopes: Built up land	Continuous urban fabric	Discontinuous urban	Urban/Industrial fallow	Rural settlement	Industrial area	Traffic networks (road and rail networks, airports, port areas	Road/rail embankments and associated land	Green urban areas	Target biotopes: Intensive arable	Integrated arable	Organic arable	Organic orchards	Intensive pasture	Less intensive pasture	Organic pasture	Broad-leafed forest	Coniferous forest	Mixed forest	Plantation forest	Forest edge	Country average
artificial_hi	Built up land	*10*	100%		0	0	0	0	0		0	0	0	0.10	0.27	2.56	0.21	0.48	1.19	1.68	1.68	1.68	1.68	5.29	1.12
artificial_hi	Continuous urban fabric	*111*	80%			0	0	0			0	0	0	0.10	0.27	2.56	0.21	0.48	1.19	1.68	1.68	1.68	1.68	5.29	1.12
artificial_hi	Discontinuous urban fabric	*112*	60%				0	0			0	0	0	0.10	0.27	2.56	0.21	0.48	1.19	1.68	1.68	1.68	1.68	5.29	1.12
non-use	Urban/Industrial fallow	*113, 125*	40%										0	0.10	0.27	2.56	0.21	0.48	1.19	1.68	1.68	1.68	1.68	5.29	1.12
artificial_li	Rural settlement	*114*	40%									0	0	0.10	0.27	2.56	0.21	0.48	1.19	1.68	1.68	1.68	1.68	5.29	1.12
artificial_hi	Industrial or commercial area	*121*	80%			0	0	0			0	0	0	0.10	0.27	2.56	0.21	0.48	1.19	1.68	1.68	1.68	1.68	5.29	1.12
artificial_hi	Traffic networks (road and rail networks, airports, port areas	*1221, 1223, 123, 124*	100%		0	0	0	0	0		0	0	0	0.10	0.27	2.56	0.21	0.48	1.19	1.68	1.68	1.68	1.68	5.29	1.12
artificial_li	Road/rail embankments and associated land	*122, 1224*	50%					0				0	0	0.10	0.27	2.56	0.21	0.48	1.19	1.68	1.68	1.68	1.68	5.29	1.12
artificial_li	Green urban areas	*141*	40%					0					0	0.10	0.27	2.56	0.21	0.48	1.19	1.68	1.68	1.68	1.68	5.29	1.12
agri_hi	Conventional/intensive arable	*2111*	0%											0.11	0.26	2.56	0.22	0.48	1.19	1.68	1.68	1.68	1.68	5.29	
agri_hi	Integrated arable	*2112*	0%												0.16	2.56	0.22	0.22	0.48	1.68	1.68	1.68	1.68	5.29	
agri_li	Organic arable	*2113*	0%													2.56			0.22	1.68	1.68	1.68	1.68	5.29	
agri_li	Organic orchards	*2222*	0%																	1.68	1.68	1.68	1.68	5.29	
agri_hi	Intensive pasture and meadows	*2311*	0%											0.11	0.26	2.56		0.49	1.22	1.68	1.68	1.68	1.68	5.29	
agri_li	Less intensive pasture and meadows	*2312*	0%												0.16	2.56			0.73	1.68	1.68	1.68	1.68	5.29	
agri_li	Organic pasture and meadows	*2313*	0%													2.56				1.68	1.68	1.68	1.68	5.29	
forest	Broad-leafed forest	*311*	0%																						
forest	Coniferous forest	*312*	0%																						
forest	Mixed forest	*313*	0%																						
forest_hi	Plantation forest		0%																						
non-use	Forest edge	*314*	0%																						
mix	Country Average		-	0	0	0	0	0	0	0	0	0	0	0.04	0.08	0.97	0.07	0.14	0.27	0.64	0.64	0.64	0.64	2.01	

A-3.9 Restoration Costs Finland

Restoration Costs in €/m2 (2004)
Country: Finland
PPS 1.16 (Germany = 1)

Biotope Group	starting Biotopes	Corine ID-No.	% of sealed area	Built up land	Continuous urban fabric	Discontinuous urban	Urban/Indus-trial fallow	Rural settlement	Industrial area	Traffic networks (road and rail networks, airports, port areas	Road/rail embankments and associated land	Green urban areas	Intensive arable	Integrated arable	Organic arable	Organic orchards	Intensive pasture	Less intensive pasture	Organic pasture	Broad-leafed forest	Coniferous forest	Mixed forest	Plantation forest	Forest edge	Country average
				RESTORATION COSTS (2004)																					
				Target biotopes									Target biotopes												
artificial_hi	Built up land	*10*	100%		0	0	0	0	0		0	0	0	0.21	0.53	5.12	0.43	0.96	2.39	3.35	3.35	3.35	3.35	10.58	2.97
artificial_hi	Continuous urban fabric	*111*	80%			0	0	0			0	0	0	0.21	0.53	5.12	0.43	0.96	2.39	3.35	3.35	3.35	3.35	10.58	2.97
artificial_hi	Discontinuous urban fabric	*112*	60%				0	0			0	0	0	0.21	0.53	5.12	0.43	0.96	2.39	3.35	3.35	3.35	3.35	10.58	2.97
non-use	Urban/Industrial fallow	*113, 125*	40%										0	0.21	0.53	5.12	0.43	0.96	2.39	3.35	3.35	3.35	3.35	10.58	2.97
artificial_li	Rural settlement	*114*	40%									0	0	0.21	0.53	5.12	0.43	0.96	2.39	3.35	3.35	3.35	3.35	10.58	2.97
artificial_hi	Industrial or commercial area	*121*	80%			0	0	0			0	0	0	0.21	0.53	5.12	0.43	0.96	2.39	3.35	3.35	3.35	3.35	10.58	2.97
artificial_hi	Traffic networks (road and rail networks, airports, port areas	*1221, 1223, 123, 124*	100%		0	0	0	0	0		0	0	0	0.21	0.53	5.12	0.43	0.96	2.39	3.35	3.35	3.35	3.35	10.58	2.97
artificial_li	Road/rail embankments and associated land	*122, 1224*	50%					0				0	0	0.21	0.53	5.12	0.43	0.96	2.39	3.35	3.35	3.35	3.35	10.58	2.97
artificial_li	Green urban areas	*141*	40%					0					0	0.21	0.53	5.12	0.43	0.96	2.39	3.35	3.35	3.35	3.35	10.58	2.97
agri_hi	Conventional/intensive arable	*2111*	0%											0.21	0.53	5.11	0.43	0.96	2.39	3.35	3.35	3.35	3.35	10.58	
agri_hi	Integrated arable	*2112*	0%												0.32	5.11	0.43	0.43	0.96	3.35	3.35	3.35	3.35	10.58	
agri_li	Organic arable	*2113*	0%													5.11			0.43	3.35	3.35	3.35	3.35	10.58	
agri_li	Organic orchards	*2222*	0%																	3.35	3.35	3.35	3.35	10.58	
agri_hi	Intensive pasture and meadows	*2311*	0%											0.21	0.53	5.11		0.98	2.44	3.35	3.35	3.35	3.35	10.58	
agri_li	Less intensive pasture and meadows	*2312*	0%												0.32	5.11			1.47	3.35	3.35	3.35	3.35	10.58	
agri_li	Organic pasture and meadows	*2313*	0%													5.11				3.35	3.35	3.35	3.35	10.58	
forest	Broad-leafed forest	*311*	0%																						
forest	Coniferous forest	*312*	0%																						
forest	Mixed forest	*313*	0%																						
forest_hi	Plantation forest		0%																						
non-use	Forest edge	*314*	0%																						
mix	Country Average		-	0	0	0	0	0	0	0	0	0	0	0.03	0.05	0.62	0.05	0.09	0.17	0.40	0.40	0.40	0.40	1.28	

A-3.10 Restoration Costs France

Restoration Costs in €/m2 (2004)
Country: France
PPS 0.97 (Germany = 1)

RESTORATION COSTS (2004) — Target biotopes

Biotope Group	starting Biotopes	Corine ID-No.	% of sealed area	Built up land	Continuous urban fabric	Discontinu-ous urban	Urban/Indu-s-trial fallow	Rural settlement	Industrial area	Traffic networks (road and rail networks, airports, port areas	Road/rail embankments and associated land	Green urban areas	Intensive arable	Integrated arable	Organic arable	Organic orchards	Intensive pasture	Less intensive pasture	Organic pasture	Broad-leafed forest	Coniferous forest	Mixed forest	Plantation forest	Forest edge	Country average
artificial_hi	Built up land	10	100%		0	0	0	0	0		0	0	0	0.17	0.45	4.28	0.36	0.81	2.00	2.80	2.80	2.80	2.80	8.85	1.31
artificial_hi	Continuous urban fabric	111	80%			0	0	0			0	0	0	0.17	0.45	4.28	0.36	0.81	2.00	2.80	2.80	2.80	2.80	8.85	1.31
artificial_hi	Discontinuous urban fabric	112	60%				0	0			0	0	0	0.17	0.45	4.28	0.36	0.81	2.00	2.80	2.80	2.80	2.80	8.85	1.31
non-use	Urban/Industrial fallow	113, 125	40%										0	0.17	0.45	4.28	0.36	0.81	2.00	2.80	2.80	2.80	2.80	8.85	1.31
artificial_li	Rural settlement	114	40%									0	0	0.17	0.45	4.28	0.36	0.81	2.00	2.80	2.80	2.80	2.80	8.85	1.31
artificial_hi	Industrial or commercial area	121	80%			0	0	0			0	0	0	0.17	0.45	4.28	0.36	0.81	2.00	2.80	2.80	2.80	2.80	8.85	1.31
artificial_hi	Traffic networks (road and rail networks, airports, port areas	1221, 1223, 123, 124	100%		0	0	0	0	0		0	0	0	0.17	0.45	4.28	0.36	0.81	2.00	2.80	2.80	2.80	2.80	8.85	1.31
artificial_li	Road/rail embankments and associated land	122, 1224	50%					0				0	0	0.17	0.45	4.28	0.36	0.81	2.00	2.80	2.80	2.80	2.80	8.85	1.31
artificial_li	Green urban areas	141	40%					0					0	0.17	0.45	4.28	0.36	0.81	2.00	2.80	2.80	2.80	2.80	8.85	1.31
agri_hi	Conventional/intensive arable	2111	0%											0.18	0.44	4.27	0.36	0.80	2.00	2.80	2.80	2.80	2.80	8.85	
agri_hi	Integrated arable	2112	0%												0.27	4.27	0.36	0.36	0.80	2.80	2.80	2.80	2.80	8.85	
agri_li	Organic arable	2113	0%													4.27			0.36	2.80	2.80	2.80	2.80	8.85	
agri_li	Organic orchards	2222	0%																	2.80	2.80	2.80	2.80	8.85	
agri_hi	Intensive pasture and meadows	2311	0%											0.18	0.44	4.27		0.82	2.04	2.80	2.80	2.80	2.80	8.85	
agri_li	Less intensive pasture and meadows	2312	0%												0.27	4.27			1.23	2.80	2.80	2.80	2.80	8.85	
agri_li	Organic pasture and meadows	2313	0%													4.27				2.80	2.80	2.80	2.80	8.85	
forest	Broad-leafed forest	311	0%																						
forest	Coniferous forest	312	0%																						
forest	Mixed forest	313	0%																						
forest_hi	Plantation forest		0%																						
non-use	Forest edge	314	0%																						
mix	Country Average		-	0	0	0	0	0	0	0	0	0	0	0.11	0.23	2.73	0.17	0.42	0.82	1.87	1.87	1.87	1.87	5.89	

A-3.11 Restoration Costs Greece

Restoration Costs in €/m2 (2004)
Country: Greece
PPS 0.78 (Germany = 1)

				RESTORATION COSTS (2004)																					
				Target biotopes															Target biotopes						
Biotope Group	starting Biotopes	*Corine ID-No.*	% of sealed area	Built up land	Continuous urban fabric	Discontinuous urban	Urban/Industrial fallow	Rural settlement	Industrial area	Traffic networks (road and rail networks, airports, port areas	Road/rail embankments and associated land	Green urban areas	Intensive arable	Integrated arable	Organic arable	Organic orchards	Intensive pasture	Less intensive pasture	Organic pasture	Broad-leafed forest	Coniferous forest	Mixed forest	Plantation forest	Forest edge	Country average
artificial_hi	Built up land	*10*	100%		0	0	0	0	0		0	0	0	0.14	0.36	3.44	0.29	0.65	1.61	2.25	2.25	2.25	2.25	7.11	1.54
artificial_hi	Continuous urban fabric	*111*	80%			0	0	0			0	0	0	0.14	0.36	3.44	0.29	0.65	1.61	2.25	2.25	2.25	2.25	7.11	1.54
artificial_hi	Discontinuous urban fabric	*112*	60%				0	0			0	0	0	0.14	0.36	3.44	0.29	0.65	1.61	2.25	2.25	2.25	2.25	7.11	1.54
non-use	Urban/Industrial fallow	*113, 125*	40%										0	0.14	0.36	3.44	0.29	0.65	1.61	2.25	2.25	2.25	2.25	7.11	1.54
artificial_li	Rural settlement	*114*	40%									0	0	0.14	0.36	3.44	0.29	0.65	1.61	2.25	2.25	2.25	2.25	7.11	1.54
artificial_li	Industrial or commercial area	*121*	80%			0	0	0			0	0	0	0.14	0.36	3.44	0.29	0.65	1.61	2.25	2.25	2.25	2.25	7.11	1.54
artificial_hi	Traffic networks (road and rail networks, airports, port areas	*1221, 1223, 123, 124*	100%		0	0	0	0	0		0	0	0	0.14	0.36	3.44	0.29	0.65	1.61	2.25	2.25	2.25	2.25	7.11	1.54
artificial_li	Road/rail embankments and associated land	*122, 1224*	50%					0				0	0	0.14	0.36	3.44	0.29	0.65	1.61	2.25	2.25	2.25	2.25	7.11	1.54
artificial_li	Green urban areas	*141*	40%					0					0	0.14	0.36	3.44	0.29	0.65	1.61	2.25	2.25	2.25	2.25	7.11	1.54
agri_hi	Conventional/intensive arable	*2111*	0%											0.14	0.36	3.44	0.29	0.64	1.61	2.25	2.25	2.25	2.25	7.11	
agri_hi	Integrated arable	*2112*	0%												0.21	3.44	0.29	0.29	0.64	2.25	2.25	2.25	2.25	7.11	
agri_li	Organic arable	*2113*	0%													3.44			0.29	2.25	2.25	2.25	2.25	7.11	
agri_li	Organic orchards	*2222*	0%																	2.25	2.25	2.25	2.25	7.11	
agri_hi	Intensive pasture and meadows	*2311*	0%											0.14	0.36	3.44		0.66	1.64	2.25	2.25	2.25	2.25	7.11	
agri_li	Less intensive pasture and meadows	*2312*	0%												0.21	3.44			0.99	2.25	2.25	2.25	2.25	7.11	
agri_li	Organic pasture and meadows	*2313*	0%													3.44				2.25	2.25	2.25	2.25	7.11	
forest	Broad-leafed forest	*311*	0%																						
forest	Coniferous forest	*312*	0%																						
forest	Mixed forest	*313*	0%																						
forest_hi	Plantation forest		0%																						
non-use	Forest edge	*314*	0%																						
mix	Country Average		-	0	0	0	0	0	0	0	0	0	0	0.05	0.11	1.30	0.11	0.18	0.34	1.00	1.00	1.00	1.00	3.16	

A-3.12 Restoration Costs Hungary

Restoration Costs in €/m2 (2004)
Country: Hungary
PPS 0.54 (Germany = 1)

Biotope Group	starting Biotopes	Corine ID-No.	% of sealed area	Built up land	Continuous urban fabric	Discontinuous urban	Urban/Industrial fallow	Rural settlement	Industrial area	Traffic networks (road and rail networks, airports, port areas	Road/rail embankments and associated land	Green urban areas	Intensive arable	Integrated arable	Organic arable	Organic orchards	Intensive pasture	Less intensive pasture	Organic pasture	Broad-leafed forest	Coniferous forest	Mixed forest	Plantation forest	Forest edge	Country average
				RESTORATION COSTS (2004)																					
				Target biotopes									Target biotopes												
artificial_hi	Built up land	*10*	100%		0	0	0	0	0		0	0	0	0.10	0.25	2.38	0.20	0.45	1.11	1.56	1.56	1.56	1.56	4.92	0.54
artificial_hi	Continuous urban fabric	*111*	80%			0	0	0			0	0	0	0.10	0.25	2.38	0.20	0.45	1.11	1.56	1.56	1.56	1.56	4.92	0.54
artificial_hi	Discontinuous urban fabric	*112*	60%				0	0			0	0	0	0.10	0.25	2.38	0.20	0.45	1.11	1.56	1.56	1.56	1.56	4.92	0.54
non-use	Urban/Industrial fallow	*113, 125*	40%										0	0.10	0.25	2.38	0.20	0.45	1.11	1.56	1.56	1.56	1.56	4.92	0.54
artificial_li	Rural settlement	*114*	40%									0	0	0.10	0.25	2.38	0.20	0.45	1.11	1.56	1.56	1.56	1.56	4.92	0.54
artificial_hi	Industrial or commercial area	*121*	80%			0	0	0			0	0	0	0.10	0.25	2.38	0.20	0.45	1.11	1.56	1.56	1.56	1.56	4.92	0.54
artificial_hi	Traffic networks (road and rail networks, airports, port areas	*1221, 1223, 123, 124*	100%		0	0	0	0	0		0	0	0	0.10	0.25	2.38	0.20	0.45	1.11	1.56	1.56	1.56	1.56	4.92	0.54
artificial_li	Road/rail embankments and associated land	*122, 1224*	50%					0				0	0	0.10	0.25	2.38	0.20	0.45	1.11	1.56	1.56	1.56	1.56	4.92	0.54
artificial_li	Green urban areas	*141*	40%					0					0	0.10	0.25	2.38	0.20	0.45	1.11	1.56	1.56	1.56	1.56	4.92	0.54
agri_hi	Conventional/intensive arable	*2111*	0%											0.10	0.25	2.38	0.20	0.45	1.11	1.56	1.56	1.56	1.56	4.92	
agri_hi	Integrated arable	*2112*	0%												0.15	2.38	0.20	0.20	0.45	1.56	1.56	1.56	1.56	4.92	
agri_li	Organic arable	*2113*	0%													2.38			0.20	1.56	1.56	1.56	1.56	4.92	
agri_li	Organic orchards	*2222*	0%																	1.56	1.56	1.56	1.56	4.92	
agri_hi	Intensive pasture and meadows	*2311*	0%											0.10	0.25	2.38		0.45	1.14	1.56	1.56	1.56	1.56	4.92	
agri_li	Less intensive pasture and meadows	*2312*	0%												0.15	2.38			0.68	1.56	1.56	1.56	1.56	4.92	
agri_li	Organic pasture and meadows	*2313*	0%													2.38				1.56	1.56	1.56	1.56	4.92	
forest	Broad-leafed forest	*311*	0%																						
forest	Coniferous forest	*312*	0%																						
forest	Mixed forest	*313*	0%																						
forest_hi	Plantation forest		0%																						
non-use	Forest edge	*314*	0%																						
mix	Country Average		-	0	0	0	0	0	0	0	0	0	0	0.07	0.15	1.75	0.13	0.26	0.49	1.18	1.18	1.18	1.18	3.74	

A-3.13 Restoration Costs Iceland

Restoration Costs in €/m2 (2004)
Country: Iceland
PPS 1.24 (Germany = 1)

Biotope Group	starting Biotopes	Corine ID-No.	% of sealed area	Built up land	Continuous urban fabric	Discontinuous urban	Urban/Industrial fallow	Rural settlement	Industrial area	Traffic networks (road and rail networks, airports, port areas	Road/rail embankments and associated land	Green urban areas	Intensive arable	Integrated arable	Organic arable	Organic orchards	Intensive pasture	Less intensive pasture	Organic pasture	Broad-leafed forest	Coniferous forest	Mixed forest	Plantation forest	Forest edge	Country average
				RESTORATION COSTS (2004)																					
				Target biotopes									Target biotopes												
artificial_hi	Built up land	10	100%		0	0	0	0	0		0	0	0	0.22	0.57	5.47	0.46	1.03	2.55	3.58	3.58	3.58	3.58	11.31	3.18
artificial_hi	Continuous urban fabric	111	80%			0	0	0			0	0	0	0.22	0.57	5.47	0.46	1.03	2.55	3.58	3.58	3.58	3.58	11.31	3.18
artificial_hi	Discontinuous urban fabric	112	60%				0	0			0	0	0	0.22	0.57	5.47	0.46	1.03	2.55	3.58	3.58	3.58	3.58	11.31	3.18
non-use	Urban/Industrial fallow	113, 125	40%										0	0.22	0.57	5.47	0.46	1.03	2.55	3.58	3.58	3.58	3.58	11.31	3.18
artificial_li	Rural settlement	114	40%									0	0	0.22	0.57	5.47	0.46	1.03	2.55	3.58	3.58	3.58	3.58	11.31	3.18
artificial_hi	Industrial or commercial area	121	80%			0	0	0			0	0	0	0.22	0.57	5.47	0.46	1.03	2.55	3.58	3.58	3.58	3.58	11.31	3.18
artificial_hi	Traffic networks (road and rail networks, airports, port areas	1221, 1223, 123, 124	100%		0	0	0	0	0		0	0	0	0.22	0.57	5.47	0.46	1.03	2.55	3.58	3.58	3.58	3.58	11.31	3.18
artificial_li	Road/rail embankments and associated land	122, 1224	50%					0				0	0	0.22	0.57	5.47	0.46	1.03	2.55	3.58	3.58	3.58	3.58	11.31	3.18
artificial_li	Green urban areas	141	40%					0					0	0.22	0.57	5.47	0.46	1.03	2.55	3.58	3.58	3.58	3.58	11.31	3.18
agri_hi	Conventional/intensive arable	2111	0%											0.23	0.57	5.46	0.46	1.02	2.55	3.58	3.58	3.58	3.58	11.31	
agri_hi	Integrated arable	2112	0%												0.34	5.46	0.46	0.46	1.02	3.58	3.58	3.58	3.58	11.31	
agri_li	Organic arable	2113	0%													5.46			0.46	3.58	3.58	3.58	3.58	11.31	
agri_li	Organic orchards	2222	0%																	3.58	3.58	3.58	3.58	11.31	
agri_hi	Intensive pasture and meadows	2311	0%											0.23	0.57	5.46		1.04	2.61	3.58	3.58	3.58	3.58	11.31	
agri_li	Less intensive pasture and meadows	2312	0%												0.34	5.46			1.57	3.58	3.58	3.58	3.58	11.31	
agri_li	Organic pasture and meadows	2313	0%													5.46				3.58	3.58	3.58	3.58	11.31	
forest	Broad-leafed forest	311	0%																						
forest	Coniferous forest	312	0%																						
forest	Mixed forest	313	0%																						
forest_hi	Plantation forest		0%																						
non-use	Forest edge	314	0%																						
mix	Country Average		-	0	0	0	0	0	0	0	0	0	0	0.03	0.06	0.66	0.06	0.09	0.18	0.43	0.43	0.43	0.43	1.37	

A-3.14 Restoration Costs Ireland

Restoration Costs in €/m2 (2004)
Country: Ireland
PPS 1.16 (Germany = 1)

				RESTORATION COSTS (2004)																					
				Target biotopes																					
Biotope Group	starting Biotopes	*Corine ID-No.*	% of sealed area	Built up land	Continuous urban fabric	Discontinuous urban	Urban/Industrial fallow	Rural settlement	Industrial area	Traffic networks (road and rail networks, airports, port areas	Road/rail embankments and associated land	Green urban areas	Intensive arable	Integrated arable	Organic arable	Organic orchards	Intensive pasture	Less intensive pasture	Organic pasture	Broad-leafed forest	Coniferous forest	Mixed forest	Plantation forest	Forest edge	Country average
artificial_hi	Built up land	*10*	100%		0	0	0	0	0		0	0	0	0.21	0.53	5.12	0.43	0.96	2.39	3.35	3.35	3.35	3.35	10.58	1.33
artificial_hi	Continuous urban fabric	*111*	80%			0	0	0			0	0	0	0.21	0.53	5.12	0.43	0.96	2.39	3.35	3.35	3.35	3.35	10.58	1.33
artificial_hi	Discontinuous urban fabric	*112*	60%				0	0			0	0	0	0.21	0.53	5.12	0.43	0.96	2.39	3.35	3.35	3.35	3.35	10.58	1.33
non-use	Urban/Industrial fallow	*113, 125*	40%										0	0.21	0.53	5.12	0.43	0.96	2.39	3.35	3.35	3.35	3.35	10.58	1.33
artificial_li	Rural settlement	*114*	40%									0	0	0.21	0.53	5.12	0.43	0.96	2.39	3.35	3.35	3.35	3.35	10.58	1.33
artificial_hi	Industrial or commercial area	*121*	80%			0	0	0			0	0	0	0.21	0.53	5.12	0.43	0.96	2.39	3.35	3.35	3.35	3.35	10.58	1.33
artificial_hi	Traffic networks (road and rail networks, airports, port areas	*1221, 1223, 123, 124*	100%		0	0	0	0	0		0	0	0	0.21	0.53	5.12	0.43	0.96	2.39	3.35	3.35	3.35	3.35	10.58	1.33
artificial_li	Road/rail embankments and associated land	*122, 1224*	50%					0				0	0	0.21	0.53	5.12	0.43	0.96	2.39	3.35	3.35	3.35	3.35	10.58	1.33
artificial_li	Green urban areas	*141*	40%					0					0	0.21	0.53	5.12	0.43	0.96	2.39	3.35	3.35	3.35	3.35	10.58	1.33
agri_hi	Conventional/intensive arable	*2111*	0%											0.21	0.53	5.11	0.43	0.96	2.39	3.35	3.35	3.35	3.35	10.58	
agri_hi	Integrated arable	*2112*	0%												0.32	5.11	0.43	0.43	0.96	3.35	3.35	3.35	3.35	10.58	
agri_li	Organic arable	*2113*	0%													5.11			0.43	3.35	3.35	3.35	3.35	10.58	
agri_li	Organic orchards	*2222*	0%																	3.35	3.35	3.35	3.35	10.58	
agri_hi	Intensive pasture and meadows	*2311*	0%											0.21	0.53	5.11		0.98	2.44	3.35	3.35	3.35	3.35	10.58	
agri_li	Less intensive pasture and meadows	*2312*	0%												0.32	5.11			1.47	3.35	3.35	3.35	3.35	10.58	
agri_li	Organic pasture and meadows	*2313*	0%													5.11				3.35	3.35	3.35	3.35	10.58	
forest	Broad-leafed forest	*311*	0%																						
forest	Coniferous forest	*312*	0%																						
forest	Mixed forest	*313*	0%																						
forest_hi	Plantation forest		0%																						
non-use	Forest edge	*314*	0%																						
mix	Country Average		-	0	0	0	0	0	0	0	0	0	0	0.18	0.37	4.40	0.09	0.79	1.56	2.89	2.89	2.89	2.89	9.11	

A-3.15 Restoration Costs Italy

Restoration Costs in €/m2 (2004)
Country: Italy
PPS 0.94 (Germany = 1)

RESTORATION COSTS (2004) – Target biotopes

Biotope Group	starting Biotopes	Corine ID-No.	% of sealed area	Built up land	Continuous urban fabric	Discontinuous urban	Urban/Industrial fallow	Rural settlement	Industrial area	Traffic networks (road and rail networks, airports, port areas	Road/rail embankments and associated land	Green urban areas	Intensive arable	Integrated arable	Organic arable	Organic orchards	Intensive pasture	Less intensive pasture	Organic pasture	Broad-leafed forest	Coniferous forest	Mixed forest	Plantation forest	Forest edge	Country average
artificial_hi	Built up land	10	100%		0	0	0	0	0		0	0	0	0.17	0.43	4.15	0.35	0.78	1.94	2.72	2.72	2.72	2.72	8.57	1.52
artificial_hi	Continuous urban fabric	111	80%			0	0	0			0	0	0	0.17	0.43	4.15	0.35	0.78	1.94	2.72	2.72	2.72	2.72	8.57	1.52
artificial_hi	Discontinuous urban fabric	112	60%				0	0			0	0	0	0.17	0.43	4.15	0.35	0.78	1.94	2.72	2.72	2.72	2.72	8.57	1.52
non-use	Urban/Industrial fallow	113, 125	40%										0	0.17	0.43	4.15	0.35	0.78	1.94	2.72	2.72	2.72	2.72	8.57	1.52
artificial_li	Rural settlement	114	40%									0	0	0.17	0.43	4.15	0.35	0.78	1.94	2.72	2.72	2.72	2.72	8.57	1.52
artificial_hi	Industrial or commercial area	121	80%			0	0	0			0	0	0	0.17	0.43	4.15	0.35	0.78	1.94	2.72	2.72	2.72	2.72	8.57	1.52
artificial_hi	Traffic networks (road and rail networks, airports, port areas	1221, 1223, 123, 124	100%		0	0	0	0	0		0	0	0	0.17	0.43	4.15	0.35	0.78	1.94	2.72	2.72	2.72	2.72	8.57	1.52
artificial_li	Road/rail embankments and associated land	122, 1224	50%					0				0	0	0.17	0.43	4.15	0.35	0.78	1.94	2.72	2.72	2.72	2.72	8.57	1.52
artificial_li	Green urban areas	141	40%					0					0	0.17	0.43	4.15	0.35	0.78	1.94	2.72	2.72	2.72	2.72	8.57	1.52
agri_hi	Conventional/intensive arable	2111	0%											0.17	0.43	4.14	0.35	0.78	1.94	2.72	2.72	2.72	2.72	8.57	
agri_hi	Integrated arable	2112	0%												0.26	4.14	0.35	0.35	0.78	2.72	2.72	2.72	2.72	8.57	
agri_li	Organic arable	2113	0%													4.14			0.35	2.72	2.72	2.72	2.72	8.57	
agri_li	Organic orchards	2222	0%																	2.72	2.72	2.72	2.72	8.57	
agri_hi	Intensive pasture and meadows	2311	0%											0.17	0.43	4.14		0.79	1.98	2.72	2.72	2.72	2.72	8.57	
agri_li	Less intensive pasture and meadows	2312	0%												0.26	4.14			1.19	2.72	2.72	2.72	2.72	8.57	
agri_li	Organic pasture and meadows	2313	0%													4.14				2.72	2.72	2.72	2.72	8.57	
forest	Broad-leafed forest	311	0%																						
forest	Coniferous forest	312	0%																						
forest	Mixed forest	313	0%																						
forest_hi	Plantation forest		0%																						
non-use	Forest edge	314	0%																						
mix	Country Average		-	0	0	0	0	0	0	0	0	0	0	0.09	0.18	2.15	0.18	0.31	0.59	1.62	1.62	1.62	1.62	5.11	

A-3.16 Restoration Costs Latvia

Restoration Costs in €/m2 (2004)
Country: Latvia
PPS 0.51 (Germany = 1)

Biotope Group	starting Biotopes	*Corine ID-No.*	% of sealed area	Built up land	Continu-ous urban fabric	Discontinu-ous urban	Urban/In-dustrial fallow	Rural settlement	Industrial area	Traffic networks (road and rail networks, airports, port areas	Road/rail embank-ments and associated land	Green urban areas	Intensive arable	Integrated arable	Organic arable	Organic orchards	Intensive pasture	Less intensive pasture	Organic pasture	Broad-leafed forest	Conife-rous forest	Mixed forest	Plantation forest	Forest edge	Country average
				RESTORATION COSTS (2004) – Target biotopes																					
artificial_hi	Built up land	*10*	100%		0	0	0	0	0		0	0	0	0.09	0.23	2.25	0.19	0.42	1.05	1.47	1.47	1.47	1.47	4.65	0.90
artificial_hi	Continuous urban fabric	*111*	80%			0	0	0			0	0	0	0.09	0.23	2.25	0.19	0.42	1.05	1.47	1.47	1.47	1.47	4.65	0.90
artificial_hi	Discontinuous urban fabric	*112*	60%				0	0			0	0	0	0.09	0.23	2.25	0.19	0.42	1.05	1.47	1.47	1.47	1.47	4.65	0.90
non-use	Urban/Industrial fallow	*113, 125*	40%										0	0.09	0.23	2.25	0.19	0.42	1.05	1.47	1.47	1.47	1.47	4.65	0.90
artificial_li	Rural settlement	*114*	40%									0	0	0.09	0.23	2.25	0.19	0.42	1.05	1.47	1.47	1.47	1.47	4.65	0.90
artificial_hi	Industrial or commercial area	*121*	80%			0	0	0			0	0	0	0.09	0.23	2.25	0.19	0.42	1.05	1.47	1.47	1.47	1.47	4.65	0.90
artificial_hi	Traffic networks (road and rail networks, airports, port areas	*1221, 1223, 123, 124*	100%		0	0	0	0	0		0	0	0	0.09	0.23	2.25	0.19	0.42	1.05	1.47	1.47	1.47	1.47	4.65	0.90
artificial_li	Road/rail embankments and associated land	*122, 1224*	50%					0				0	0	0.09	0.23	2.25	0.19	0.42	1.05	1.47	1.47	1.47	1.47	4.65	0.90
artificial_li	Green urban areas	*141*	40%					0					0	0.09	0.23	2.25	0.19	0.42	1.05	1.47	1.47	1.47	1.47	4.65	0.90
agri_hi	Conventional/intensive arable	*2111*	0%											0.09	0.23	2.25	0.19	0.42	1.05	1.47	1.47	1.47	1.47	4.65	
agri_hi	Integrated arable	*2112*	0%												0.14	2.25	0.19	0.19	0.42	1.47	1.47	1.47	1.47	4.65	
agri_li	Organic arable	*2113*	0%													2.25			0.19	1.47	1.47	1.47	1.47	4.65	
agri_li	Organic orchards	*2222*	0%																	1.47	1.47	1.47	1.47	4.65	
agri_hi	Intensive pasture and meadows	*2311*	0%											0.09	0.23	2.25		0.43	1.07	1.47	1.47	1.47	1.47	4.65	
agri_li	Less intensive pasture and meadows	*2312*	0%												0.14	2.25			0.64	1.47	1.47	1.47	1.47	4.65	
agri_li	Organic pasture and meadows	*2313*	0%													2.25				1.47	1.47	1.47	1.47	4.65	
forest	Broad-leafed forest	*311*	0%																						
forest	Coniferous forest	*312*	0%																						
forest	Mixed forest	*313*	0%																						
forest_hi	Plantation forest		0%																						
non-use	Forest edge	*314*	0%																						
mix	Country Average		-	0	0	0	0	0	0	0	0	0	0	0.04	0.09	1.06	0.06	0.16	0.31	0.70	0.70	0.70	0.70	2.20	

A-3.17 Restoration Costs Lithuania

Restoration Costs in €/m2 (2004)
Country: Lithuania
PPS 0.51 (Germany = 1)

Biotope Group	starting Biotopes	Corine ID-No.	% of sealed area	RESTORATION COSTS (2004) – Target biotopes: Built up land	Continuous urban fabric	Discontinuous urban	Urban/Industrial fallow	Rural settlement	Industrial area	Traffic networks (road and rail networks, airports, port areas	Road/rail embankments and associated land	Green urban areas	Target biotopes: Intensive arable	Integrated arable	Organic arable	Organic orchards	Intensive pasture	Less intensive pasture	Organic pasture	Broad-leafed forest	Coniferous forest	Mixed forest	Plantation forest	Forest edge	Country average
artificial_hi	Built up land	*10*	100%		0	0	0	0	0		0	0	0	0.09	0.23	2.25	0.19	0.42	1.05	1.47	1.47	1.47	1.47	4.65	0.59
artificial_hi	Continuous urban fabric	*111*	80%			0	0	0			0	0	0	0.09	0.23	2.25	0.19	0.42	1.05	1.47	1.47	1.47	1.47	4.65	0.59
artificial_hi	Discontinuous urban fabric	*112*	60%				0	0			0	0	0	0.09	0.23	2.25	0.19	0.42	1.05	1.47	1.47	1.47	1.47	4.65	0.59
non-use	Urban/Industrial fallow	*113, 125*	40%										0	0.09	0.23	2.25	0.19	0.42	1.05	1.47	1.47	1.47	1.47	4.65	0.59
artificial_li	Rural settlement	*114*	40%									0	0	0.09	0.23	2.25	0.19	0.42	1.05	1.47	1.47	1.47	1.47	4.65	0.59
artificial_hi	Industrial or commercial area	*121*	80%			0	0	0			0	0	0	0.09	0.23	2.25	0.19	0.42	1.05	1.47	1.47	1.47	1.47	4.65	0.59
artificial_hi	Traffic networks (road and rail networks, airports, port areas	*1221, 1223, 123, 124*	100%		0	0	0	0	0		0	0	0	0.09	0.23	2.25	0.19	0.42	1.05	1.47	1.47	1.47	1.47	4.65	0.59
artificial_li	Road/rail embankments and associated land	*122, 1224*	50%					0				0	0	0.09	0.23	2.25	0.19	0.42	1.05	1.47	1.47	1.47	1.47	4.65	0.59
artificial_li	Green urban areas	*141*	40%					0					0	0.09	0.23	2.25	0.19	0.42	1.05	1.47	1.47	1.47	1.47	4.65	0.59
agri_hi	Conventional/intensive arable	*2111*	0%											0.09	0.23	2.25	0.19	0.42	1.05	1.47	1.47	1.47	1.47	4.65	
agri_hi	Integrated arable	*2112*	0%												0.14	2.25	0.19	0.19	0.42	1.47	1.47	1.47	1.47	4.65	
agri_li	Organic arable	*2113*	0%													2.25			0.19	1.47	1.47	1.47	1.47	4.65	
agri_li	Organic orchards	*2222*	0%																	1.47	1.47	1.47	1.47	4.65	
agri_hi	Intensive pasture and meadows	*2311*	0%											0.09	0.23	2.25		0.43	1.07	1.47	1.47	1.47	1.47	4.65	
agri_li	Less intensive pasture and meadows	*2312*	0%												0.14	2.25			0.64	1.47	1.47	1.47	1.47	4.65	
agri_li	Organic pasture and meadows	*2313*	0%													2.25				1.47	1.47	1.47	1.47	4.65	
forest	Broad-leafed forest	*311*	0%																						
forest	Coniferous forest	*312*	0%																						
forest	Mixed forest	*313*	0%																						
forest_hi	Plantation forest		0%																						
non-use	Forest edge	*314*	0%																						
mix	Country Average		-	0	0	0	0	0	0	0	0	0	0	0.06	0.13	1.51	0.11	0.22	0.41	0.99	0.99	0.99	0.99	3.12	

A-3.18 Restoration Costs Luxembourg

Restoration Costs in €/m2 (2004)
Country: Luxembourg
PPS 0.97 (Germany = 1)

Biotope Group	starting Biotopes	Corine ID-No.	% of sealed area	RESTORATION COSTS (2004) Target biotopes: Built up land	Continu-ous urban fabric	Discontinu-ous urban	Urban/In-dustrial fallow	Rural settlement	Industrial area	Traffic networks (road and rail networks, airports, port areas	Road/rail embank-ments and associated land	Green urban areas	Target biotopes: Intensive arable	Integrated arable	Organic arable	Organic orchards	Intensive pasture	Less intensive pasture	Organic pasture	Broad-leafed forest	Conife-rous forest	Mixed forest	Plantation forest	Forest edge	Country average
artificial_hi	Built up land	*10*	100%		0	0	0	0	0		0	0	0	0.17	0.45	4.28	0.36	0.81	2.00	2.80	2.80	2.80	2.80	8.85	1.24
artificial_hi	Continuous urban fabric	*111*	80%			0	0	0			0	0	0	0.17	0.45	4.28	0.36	0.81	2.00	2.80	2.80	2.80	2.80	8.85	1.24
artificial_hi	Discontinuous urban fabric	*112*	60%				0	0			0	0	0	0.17	0.45	4.28	0.36	0.81	2.00	2.80	2.80	2.80	2.80	8.85	1.24
non-use	Urban/Industrial fallow	*113, 125*	40%										0	0.17	0.45	4.28	0.36	0.81	2.00	2.80	2.80	2.80	2.80	8.85	1.24
artificial_li	Rural settlement	*114*	40%									0	0	0.17	0.45	4.28	0.36	0.81	2.00	2.80	2.80	2.80	2.80	8.85	1.24
artificial_hi	Industrial or commercial area	*121*	80%			0	0	0			0	0	0	0.17	0.45	4.28	0.36	0.81	2.00	2.80	2.80	2.80	2.80	8.85	1.24
artificial_hi	Traffic networks (road and rail networks, airports, port areas	*1221, 1223, 123, 124*	100%		0	0	0	0	0		0	0	0	0.17	0.45	4.28	0.36	0.81	2.00	2.80	2.80	2.80	2.80	8.85	1.24
artificial_li	Road/rail embankments and associated land	*122, 1224*	50%					0				0	0	0.17	0.45	4.28	0.36	0.81	2.00	2.80	2.80	2.80	2.80	8.85	1.24
artificial_li	Green urban areas	*141*	40%					0					0	0.17	0.45	4.28	0.36	0.81	2.00	2.80	2.80	2.80	2.80	8.85	1.24
agri_hi	Conventional/intensive arable	*2111*	0%											0.18	0.44	4.27	0.36	0.80	2.00	2.80	2.80	2.80	2.80	8.85	
agri_hi	Integrated arable	*2112*	0%												0.27	4.27	0.36	0.36	0.80	2.80	2.80	2.80	2.80	8.85	
agri_li	Organic arable	*2113*	0%													4.27			0.36	2.80	2.80	2.80	2.80	8.85	
agri_li	Organic orchards	*2222*	0%																	2.80	2.80	2.80	2.80	8.85	
agri_hi	Intensive pasture and meadows	*2311*	0%											0.18	0.44	4.27		0.82	2.04	2.80	2.80	2.80	2.80	8.85	
agri_li	Less intensive pasture and meadows	*2312*	0%												0.27	4.27			1.23	2.80	2.80	2.80	2.80	8.85	
agri_li	Organic pasture and meadows	*2313*	0%													4.27				2.80	2.80	2.80	2.80	8.85	
forest	Broad-leafed forest	*311*	0%																						
forest	Coniferous forest	*312*	0%																						
forest	Mixed forest	*313*	0%																						
forest_hi	Plantation forest		0%																						
non-use	Forest edge	*314*	0%																						
mix	Country Average		-	0	0	0	0	0	0	0	0	0	0	0.11	0.23	2.73	0.19	0.42	0.82	1.80	1.80	1.80	1.80	5.69	

A-3.19 Restoration Costs Malta

Restoration Costs in €/m2 (2004)
Country: Malta
PPS 0.68 (Germany = 1)

				RESTORATION COSTS (2004)																					
				Target biotopes										Target biotopes											
Biotope Group	starting Biotopes	*Corine ID-No.*	% of sealed area	Built up land	Continu-ous urban fabric	Discontinu-ous urban	Urban/In-dustrial fallow	Rural settlement	Industrial area	Traffic networks (road and rail networks, airports, port areas	Road/rail embank-ments and associated land	Green urban areas	Intensive arable	Integrated arable	Organic arable	Organic orchards	Intensive pasture	Less intensive pasture	Organic pasture	Broad-leafed forest	Conife-rous forest	Mixed forest	Plantation forest	Forest edge	Country average
artificial_hi	Built up land	*10*	100%		0	0	0	0	0		0	0	0	0.12	0.31	3.00	0.25	0.56	1.40	1.97	1.97	1.97	1.97	6.20	0.48
artificial_hi	Continuous urban fabric	*111*	80%			0	0	0			0	0	0	0.12	0.31	3.00	0.25	0.56	1.40	1.97	1.97	1.97	1.97	6.20	0.48
artificial_hi	Discontinuous urban fabric	*112*	60%				0	0			0	0	0	0.12	0.31	3.00	0.25	0.56	1.40	1.97	1.97	1.97	1.97	6.20	0.48
non-use	Urban/Industrial fallow	*113, 125*	40%										0	0.12	0.31	3.00	0.25	0.56	1.40	1.97	1.97	1.97	1.97	6.20	0.48
artificial_li	Rural settlement	*114*	40%									0	0	0.12	0.31	3.00	0.25	0.56	1.40	1.97	1.97	1.97	1.97	6.20	0.48
artificial_hi	Industrial or commercial area	*121*	80%			0	0	0			0	0	0	0.12	0.31	3.00	0.25	0.56	1.40	1.97	1.97	1.97	1.97	6.20	0.48
artificial_hi	Traffic networks (road and rail networks, airports, port areas	*1221, 1223, 123, 124*	100%		0	0	0	0	0		0	0	0	0.12	0.31	3.00	0.25	0.56	1.40	1.97	1.97	1.97	1.97	6.20	0.48
artificial_li	Road/rail embankments and associated land	*122, 1224*	50%					0				0	0	0.12	0.31	3.00	0.25	0.56	1.40	1.97	1.97	1.97	1.97	6.20	0.48
artificial_li	Green urban areas	*141*	40%					0					0	0.12	0.31	3.00	0.25	0.56	1.40	1.97	1.97	1.97	1.97	6.20	0.48
agri_hi	Conventional/intensive arable	*2111*	0%											0.12	0.31	3.00	0.25	0.56	1.40	1.97	1.97	1.97	1.97	6.20	
agri_hi	Integrated arable	*2112*	0%												0.19	3.00	0.25	0.25	0.56	1.97	1.97	1.97	1.97	6.20	
agri_li	Organic arable	*2113*	0%													3.00			0.25	1.97	1.97	1.97	1.97	6.20	
agri_li	Organic orchards	*2222*	0%																	1.97	1.97	1.97	1.97	6.20	
agri_hi	Intensive pasture and meadows	*2311*	0%											0.12	0.31	3.00		0.57	1.43	1.97	1.97	1.97	1.97	6.20	
agri_li	Less intensive pasture and meadows	*2312*	0%												0.19	3.00			0.86	1.97	1.97	1.97	1.97	6.20	
agri_li	Organic pasture and meadows	*2313*	0%													3.00				1.97	1.97	1.97	1.97	6.20	
forest	Broad-leafed forest	*311*	0%																						
forest	Coniferous forest	*312*	0%																						
forest	Mixed forest	*313*	0%																						
forest_hi	Plantation forest		0%																						
non-use	Forest edge	*314*	0%																						
mix	Country Average		-	0	0	0	0	0	0	0	0	0	0	0.10	0.22	2.38	0.20	0.37	0.78	1.57	1.57	1.57	1.57	4.94	

A-3.20 Restoration Costs Netherlands

Restoration Costs in €/m2 (2004)
Country: Netherlands
PPS 0.98 (Germany = 1)

Biotope Group	starting Biotopes	Corine ID-No.	% of sealed area	Built up land	Continu-ous urban fabric	Discontinu-ous urban	Urban/In-dustrial fallow	Rural settlement	Industrial area	Traffic networks (road and rail networks, airports, port areas	Road/rail embank-ments and associated land	Green urban areas	Intensive arable	Integrated arable	Organic arable	Organic orchards	Intensive pasture	Less intensive pasture	Organic pasture	Broad-leafed forest	Conife-rous forest	Mixed forest	Plantation forest	Forest edge	Country average
				RESTORATION COSTS (2004)																					
				Target biotopes									Target biotopes												
artificial_hi	Built up land	*10*	100%		0	0	0	0	0		0	0	0	0.18	0.45	4.32	0.36	0.81	2.02	2.83	2.83	2.83	2.83	8.94	0.76
artificial_hi	Continuous urban fabric	*111*	80%			0	0	0			0	0	0	0.18	0.45	4.32	0.36	0.81	2.02	2.83	2.83	2.83	2.83	8.94	0.76
artificial_hi	Discontinuous urban fabric	*112*	60%				0	0			0	0	0	0.18	0.45	4.32	0.36	0.81	2.02	2.83	2.83	2.83	2.83	8.94	0.76
non-use	Urban/Industrial fallow	*113, 125*	40%										0	0.18	0.45	4.32	0.36	0.81	2.02	2.83	2.83	2.83	2.83	8.94	0.76
artificial_li	Rural settlement	*114*	40%									0	0	0.18	0.45	4.32	0.36	0.81	2.02	2.83	2.83	2.83	2.83	8.94	0.76
artificial_hi	Industrial or commercial area	*121*	80%			0	0	0			0	0	0	0.18	0.45	4.32	0.36	0.81	2.02	2.83	2.83	2.83	2.83	8.94	0.76
artificial_hi	Traffic networks (road and rail networks, airports, port areas	*1221, 1223, 123, 124*	100%		0	0	0	0	0		0	0	0	0.18	0.45	4.32	0.36	0.81	2.02	2.83	2.83	2.83	2.83	8.94	0.76
artificial_li	Road/rail embankments and associated land	*122, 1224*	50%					0				0	0	0.18	0.45	4.32	0.36	0.81	2.02	2.83	2.83	2.83	2.83	8.94	0.76
artificial_li	Green urban areas	*141*	40%					0					0	0.18	0.45	4.32	0.36	0.81	2.02	2.83	2.83	2.83	2.83	8.94	0.76
agri_hi	Conventional/intensive arable	*2111*	0%											0.18	0.45	4.32	0.37	0.81	2.02	2.83	2.83	2.83	2.83	8.94	
agri_hi	Integrated arable	*2112*	0%												0.27	4.32	0.37	0.37	0.81	2.83	2.83	2.83	2.83	8.94	
agri_li	Organic arable	*2113*	0%													4.32			0.37	2.83	2.83	2.83	2.83	8.94	
agri_li	Organic orchards	*2222*	0%																	2.83	2.83	2.83	2.83	8.94	
agri_hi	Intensive pasture and meadows	*2311*	0%											0.18	0.45	4.32		0.83	2.06	2.83	2.83	2.83	2.83	8.94	
agri_li	Less intensive pasture and meadows	*2312*	0%												0.27	4.32			1.24	2.83	2.83	2.83	2.83	8.94	
agri_li	Organic pasture and meadows	*2313*	0%													4.32				2.83	2.83	2.83	2.83	8.94	
forest	Broad-leafed forest	*311*	0%																						
forest	Coniferous forest	*312*	0%																						
forest	Mixed forest	*313*	0%																						
forest_hi	Plantation forest		0%																						
non-use	Forest edge	*314*	0%																						
mix	Country Average		-	0	0	0	0	0	0	0	0	0	0	0.16	0.33	3.80	0.21	0.62	1.25	2.50	2.50	2.50	2.50	7.90	

A-3.21 Restoration Costs Norway

Restoration Costs in €/m2 (2004)
Country: Norway
PPS 1.34 (Germany = 1)

				RESTORATION COSTS (2004)																					
				Target biotopes									Target biotopes												
Biotope Group	starting Biotopes	*Corine ID-No.*	% of sealed area	Built up land	Continuous urban fabric	Discontinuous urban	Urban/Industrial fallow	Rural settlement	Industrial area	Traffic networks (road and rail networks, airports, port areas	Road/rail embankments and associated land	Green urban areas	Intensive arable	Integrated arable	Organic arable	Organic orchards	Intensive pasture	Less intensive pasture	Organic pasture	Broad-leafed forest	Coniferous forest	Mixed forest	Plantation forest	Forest edge	Country average
artificial_hi	Built up land	*10*	100%		0	0	0	0	0		0	0	0	0.24	0.62	5.91	0.50	1.11	2.76	3.87	3.87	3.87	3.87	12.22	3.44
artificial_hi	Continuous urban fabric	*111*	80%			0	0	0			0	0	0	0.24	0.62	5.91	0.50	1.11	2.76	3.87	3.87	3.87	3.87	12.22	3.44
artificial_hi	Discontinuous urban fabric	*112*	60%				0	0			0	0	0	0.24	0.62	5.91	0.50	1.11	2.76	3.87	3.87	3.87	3.87	12.22	3.44
non-use	Urban/Industrial fallow	*113, 125*	40%										0	0.24	0.62	5.91	0.50	1.11	2.76	3.87	3.87	3.87	3.87	12.22	3.44
artificial_li	Rural settlement	*114*	40%									0	0	0.24	0.62	5.91	0.50	1.11	2.76	3.87	3.87	3.87	3.87	12.22	3.44
artificial_hi	Industrial or commercial area	*121*	80%			0	0	0			0	0	0	0.24	0.62	5.91	0.50	1.11	2.76	3.87	3.87	3.87	3.87	12.22	3.44
artificial_hi	Traffic networks (road and rail networks, airports, port areas	*1221, 1223, 123, 124*	100%		0	0	0	0	0		0	0	0	0.24	0.62	5.91	0.50	1.11	2.76	3.87	3.87	3.87	3.87	12.22	3.44
artificial_li	Road/rail embankments and associated land	*122, 1224*	50%					0				0	0	0.24	0.62	5.91	0.50	1.11	2.76	3.87	3.87	3.87	3.87	12.22	3.44
artificial_li	Green urban areas	*141*	40%					0					0	0.24	0.62	5.91	0.50	1.11	2.76	3.87	3.87	3.87	3.87	12.22	3.44
agri_hi	Conventional/intensive arable	*2111*	0%											0.24	0.61	5.90	0.50	1.11	2.76	3.87	3.87	3.87	3.87	12.22	
agri_hi	Integrated arable	*2112*	0%												0.37	5.90	0.50	0.50	1.11	3.87	3.87	3.87	3.87	12.22	
agri_li	Organic arable	*2113*	0%													5.90			0.50	3.87	3.87	3.87	3.87	12.22	
agri_li	Organic orchards	*2222*	0%																	3.87	3.87	3.87	3.87	12.22	
agri_hi	Intensive pasture and meadows	*2311*	0%											0.24	0.61	5.90		1.13	2.82	3.87	3.87	3.87	3.87	12.22	
agri_li	Less intensive pasture and meadows	*2312*	0%												0.37	5.90			1.69	3.87	3.87	3.87	3.87	12.22	
agri_li	Organic pasture and meadows	*2313*	0%													5.90				3.87	3.87	3.87	3.87	12.22	
forest	Broad-leafed forest	*311*	0%																						
forest	Coniferous forest	*312*	0%																						
forest	Mixed forest	*313*	0%																						
forest_hi	Plantation forest		0%																						
non-use	Forest edge	*314*	0%																						
mix	Country Average		-	0	0	0	0	0	0	0	0	0	0	0.03	0.06	0.71	0.06	0.10	0.20	0.47	0.47	0.47	0.47	1.48	

A-3.22 Restoration Costs Poland

Restoration Costs in €/m2 (2004)
Country: Poland
PPS 0.49 (Germany = 1)

Biotope Group	starting Biotopes	Corine ID-No.	% of sealed area	RESTORATION COSTS (2004) Target biotopes										Target biotopes											
				Built up land	Continuous urban fabric	Discontinuous urban	Urban/Industrial fallow	Rural settlement	Industrial area	Traffic networks (road and rail networks, airports, port areas	Road/rail embankments and associated land	Green urban areas	Intensive arable	Integrated arable	Organic arable	Organic orchards	Intensive pasture	Less intensive pasture	Organic pasture	Broad-leafed forest	Coniferous forest	Mixed forest	Plantation forest	Forest edge	Country average
artificial_hi	Built up land	*10*	100%		0	0	0	0	0		0	0	0	0.09	0.23	2.16	0.18	0.41	1.01	1.42	1.42	1.42	1.42	4.47	0.55
artificial_hi	Continuous urban fabric	*111*	80%			0	0	0			0	0	0	0.09	0.23	2.16	0.18	0.41	1.01	1.42	1.42	1.42	1.42	4.47	0.55
artificial_hi	Discontinuous urban fabric	*112*	60%				0	0			0	0	0	0.09	0.23	2.16	0.18	0.41	1.01	1.42	1.42	1.42	1.42	4.47	0.55
non-use	Urban/Industrial fallow	*113, 125*	40%										0	0.09	0.23	2.16	0.18	0.41	1.01	1.42	1.42	1.42	1.42	4.47	0.55
artificial_li	Rural settlement	*114*	40%									0	0	0.09	0.23	2.16	0.18	0.41	1.01	1.42	1.42	1.42	1.42	4.47	0.55
artificial_hi	Industrial or commercial area	*121*	80%			0	0	0			0	0	0	0.09	0.23	2.16	0.18	0.41	1.01	1.42	1.42	1.42	1.42	4.47	0.55
artificial_hi	Traffic networks (road and rail networks, airports, port areas	*1221, 1223, 123, 124*	100%		0	0	0	0	0		0	0	0	0.09	0.23	2.16	0.18	0.41	1.01	1.42	1.42	1.42	1.42	4.47	0.55
artificial_li	Road/rail embankments and associated land	*122, 1224*	50%					0				0	0	0.09	0.23	2.16	0.18	0.41	1.01	1.42	1.42	1.42	1.42	4.47	0.55
artificial_li	Green urban areas	*141*	40%					0					0	0.09	0.23	2.16	0.18	0.41	1.01	1.42	1.42	1.42	1.42	4.47	0.55
agri_hi	Conventional/intensive arable	*2111*	0%											0.09	0.22	2.16	0.18	0.40	1.01	1.42	1.42	1.42	1.42	4.47	
agri_hi	Integrated arable	*2112*	0%												0.13	2.16	0.18	0.18	0.40	1.42	1.42	1.42	1.42	4.47	
agri_li	Organic arable	*2113*	0%													2.16			0.18	1.42	1.42	1.42	1.42	4.47	
agri_li	Organic orchards	*2222*	0%																	1.42	1.42	1.42	1.42	4.47	
agri_hi	Intensive pasture and meadows	*2311*	0%											0.09	0.22	2.16		0.41	1.03	1.42	1.42	1.42	1.42	4.47	
agri_li	Less intensive pasture and meadows	*2312*	0%												0.13	2.16			0.62	1.42	1.42	1.42	1.42	4.47	
agri_li	Organic pasture and meadows	*2313*	0%													2.16				1.42	1.42	1.42	1.42	4.47	
forest	Broad-leafed forest	*311*	0%																						
forest	Coniferous forest	*312*	0%																						
forest	Mixed forest	*313*	0%																						
forest_hi	Plantation forest		0%																						
non-use	Forest edge	*314*	0%																						
mix	Country Average		-	0	0	0	0	0	0	0	0	0	0	0.06	0.12	1.48	0.11	0.22	0.41	0.98	0.98	0.98	0.98	3.09	

A-3.23 Restoration Costs Portugal

Restoration Costs in €/m2 (2004)
Country: Portugal
PPS 0.80 (Germany = 1)

Biotope Group	starting Biotopes	*Corine ID-No.*	% of sealed area	Built up land	Continu-ous urban fabric	Discontinu-ous urban	Urban/In-dustrial fallow	Rural settlement	Industrial area	Traffic networks (road and rail networks, airports, port areas	Road/rail embank-ments and associated land	Green urban areas	Intensive arable	Integrated arable	Organic arable	Organic orchards	Intensive pasture	Less intensive pasture	Organic pasture	Broad-leafed forest	Conife-rous forest	Mixed forest	Plantation forest	Forest edge	Country average
				RESTORATION COSTS (2004)																					
				Target biotopes										Target biotopes											
artificial_hi	Built up land	*10*	100%		0	0	0	0	0		0	0	0	0.14	0.37	3.53	0.30	0.66	1.65	2.31	2.31	2.31	2.31	7.30	1.43
artificial_hi	Continuous urban fabric	*111*	80%			0	0	0			0	0	0	0.14	0.37	3.53	0.30	0.66	1.65	2.31	2.31	2.31	2.31	7.30	1.43
artificial_hi	Discontinuous urban fabric	*112*	60%				0	0			0	0	0	0.14	0.37	3.53	0.30	0.66	1.65	2.31	2.31	2.31	2.31	7.30	1.43
non-use	Urban/Industrial fallow	*113, 125*	40%										0	0.14	0.37	3.53	0.30	0.66	1.65	2.31	2.31	2.31	2.31	7.30	1.43
artificial_li	Rural settlement	*114*	40%									0	0	0.14	0.37	3.53	0.30	0.66	1.65	2.31	2.31	2.31	2.31	7.30	1.43
artificial_hi	Industrial or commercial area	*121*	80%			0	0	0			0	0	0	0.14	0.37	3.53	0.30	0.66	1.65	2.31	2.31	2.31	2.31	7.30	1.43
artificial_hi	Traffic networks (road and rail networks, airports, port areas	*1221, 1223, 123, 124*	100%		0	0	0	0	0		0	0	0	0.14	0.37	3.53	0.30	0.66	1.65	2.31	2.31	2.31	2.31	7.30	1.43
artificial_li	Road/rail embankments and associated land	*122, 1224*	50%					0				0	0	0.14	0.37	3.53	0.30	0.66	1.65	2.31	2.31	2.31	2.31	7.30	1.43
artificial_li	Green urban areas	*141*	40%					0					0	0.14	0.37	3.53	0.30	0.66	1.65	2.31	2.31	2.31	2.31	7.30	1.43
agri_hi	Conventional/intensive arable	*2111*	0%											0.15	0.37	3.52	0.30	0.66	1.65	2.31	2.31	2.31	2.31	7.30	
agri_hi	Integrated arable	*2112*	0%												0.22	3.52	0.30	0.30	0.66	2.31	2.31	2.31	2.31	7.30	
agri_li	Organic arable	*2113*	0%													3.52			0.30	2.31	2.31	2.31	2.31	7.30	
agri_li	Organic orchards	*2222*	0%																	2.31	2.31	2.31	2.31	7.30	
agri_hi	Intensive pasture and meadows	*2311*	0%											0.15	0.37	3.52		0.67	1.68	2.31	2.31	2.31	2.31	7.30	
agri_li	Less intensive pasture and meadows	*2312*	0%												0.22	3.52			1.01	2.31	2.31	2.31	2.31	7.30	
agri_li	Organic pasture and meadows	*2313*	0%													3.52				2.31	2.31	2.31	2.31	7.30	
forest	Broad-leafed forest	*311*	0%																						
forest	Coniferous forest	*312*	0%																						
forest	Mixed forest	*313*	0%																						
forest_hi	Plantation forest		0%																						
non-use	Forest edge	*314*	0%																						
mix	Country Average		-	0	0	0	0	0	0	0	0	0	0	0.07	0.13	1.59	0.13	0.22	0.42	1.21	1.21	1.21	1.21	3.81	

A-3.24 Restoration Costs Romania

Restoration Costs in €/m2 (2004)
Country: Romania
PPS 0.38 (Germany = 1)

Biotope Group	starting Biotopes	*Corine ID-No.*	% of sealed area	Built up land	Continuous urban fabric	Discontinuous urban	Urban/Industrial fallow	Rural settlement	Industrial area	Traffic networks (road and rail networks, airports, port areas	Road/rail embankments and associated land	Green urban areas	Intensive arable	Integrated arable	Organic arable	Organic orchards	Intensive pasture	Less intensive pasture	Organic pasture	Broad-leafed forest	Coniferous forest	Mixed forest	Plantation forest	Forest edge	Country average
				RESTORATION COSTS (2004)																					
				Target biotopes																					
artificial_hi	Built up land	*10*	100%		0	0	0	0	0		0	0	0	0.07	0.17	1.68	0.14	0.32	0.78	1.10	1.10	1.10	1.10	3.47	0.52
artificial_hi	Continuous urban fabric	*111*	80%			0	0	0			0	0	0	0.07	0.17	1.68	0.14	0.32	0.78	1.10	1.10	1.10	1.10	3.47	0.52
artificial_hi	Discontinuous urban fabric	*112*	60%				0	0			0	0	0	0.07	0.17	1.68	0.14	0.32	0.78	1.10	1.10	1.10	1.10	3.47	0.52
non-use	Urban/Industrial fallow	*113, 125*	40%										0	0.07	0.17	1.68	0.14	0.32	0.78	1.10	1.10	1.10	1.10	3.47	0.52
artificial_li	Rural settlement	*114*	40%									0	0	0.07	0.17	1.68	0.14	0.32	0.78	1.10	1.10	1.10	1.10	3.47	0.52
artificial_hi	Industrial or commercial area	*121*	80%			0	0	0			0	0	0	0.07	0.17	1.68	0.14	0.32	0.78	1.10	1.10	1.10	1.10	3.47	0.52
artificial_hi	Traffic networks (road and rail networks, airports, port areas	*1221, 1223, 123, 124*	100%		0	0	0	0	0		0	0	0	0.07	0.17	1.68	0.14	0.32	0.78	1.10	1.10	1.10	1.10	3.47	0.52
artificial_li	Road/rail embankments and associated land	*122, 1224*	50%					0				0	0	0.07	0.17	1.68	0.14	0.32	0.78	1.10	1.10	1.10	1.10	3.47	0.52
artificial_li	Green urban areas	*141*	40%					0					0	0.07	0.17	1.68	0.14	0.32	0.78	1.10	1.10	1.10	1.10	3.47	0.52
agri_hi	Conventional/intensive arable	*2111*	0%											0.07	0.17	1.67	0.14	0.31	0.78	1.10	1.10	1.10	1.10	3.47	
agri_hi	Integrated arable	*2112*	0%												0.10	1.67	0.14	0.14	0.31	1.10	1.10	1.10	1.10	3.47	
agri_li	Organic arable	*2113*	0%													1.67			0.14	1.10	1.10	1.10	1.10	3.47	
agri_li	Organic orchards	*2222*	0%																	1.10	1.10	1.10	1.10	3.47	
agri_hi	Intensive pasture and meadows	*2311*	0%											0.07	0.17	1.67		0.32	0.80	1.10	1.10	1.10	1.10	3.47	
agri_li	Less intensive pasture and meadows	*2312*	0%												0.10	1.67			0.48	1.10	1.10	1.10	1.10	3.47	
agri_li	Organic pasture and meadows	*2313*	0%													1.67				1.10	1.10	1.10	1.10	3.47	
forest	Broad-leafed forest	*311*	0%																						
forest	Coniferous forest	*312*	0%																						
forest	Mixed forest	*313*	0%																						
forest_hi	Plantation forest		0%																						
non-use	Forest edge	*314*	0%																						
mix	Country Average		-	0	0	0	0	0	0	0	0	0	0	0.04	0.09	1.03	0.07	0.16	0.30	0.72	0.72	0.72	0.72	2.26	

A-3.25 Restoration Costs Slovakia

Restoration Costs in €/m2 (2004)
Country: Slovak Republic
PPS 0.46 (Germany = 1)

				RESTORATION COSTS (2004)																					
				Target biotopes										Target biotopes											
Biotope Group	starting Biotopes	Corine ID-No.	% of sealed area	Built up land	Continu-ous urban fabric	Discontinu-ous urban	Urban/In-dustrial fallow	Rural settlement	Industrial area	Traffic networks (road and rail networks, airports, port areas	Road/rail embank-ments and associated land	Green urban areas	Intensive arable	Integrated arable	Organic arable	Organic orchards	Intensive pasture	Less intensive pasture	Organic pasture	Broad-leafed forest	Conife-rous forest	Mixed forest	Plantation forest	Forest edge	Country average
artificial_hi	Built up land	10	100%		0	0	0	0	0		0	0	0	0.08	0.21	2.03	0.17	0.38	0.95	1.33	1.33	1.33	1.33	4.20	0.68
artificial_hi	Continuous urban fabric	111	80%			0	0	0			0	0	0	0.08	0.21	2.03	0.17	0.38	0.95	1.33	1.33	1.33	1.33	4.20	0.68
artificial_hi	Discontinuous urban fabric	112	60%				0	0			0	0	0	0.08	0.21	2.03	0.17	0.38	0.95	1.33	1.33	1.33	1.33	4.20	0.68
non-use	Urban/Industrial fallow	113, 125	40%										0	0.08	0.21	2.03	0.17	0.38	0.95	1.33	1.33	1.33	1.33	4.20	0.68
artificial_li	Rural settlement	114	40%									0	0	0.08	0.21	2.03	0.17	0.38	0.95	1.33	1.33	1.33	1.33	4.20	0.68
artificial_hi	Industrial or commercial area	121	80%			0	0	0			0	0	0	0.08	0.21	2.03	0.17	0.38	0.95	1.33	1.33	1.33	1.33	4.20	0.68
artificial_hi	Traffic networks (road and rail networks, airports, port areas	1221, 1223, 123, 124	100%		0	0	0	0	0		0	0	0	0.08	0.21	2.03	0.17	0.38	0.95	1.33	1.33	1.33	1.33	4.20	0.68
artificial_li	Road/rail embankments and associated land	122, 1224	50%					0				0	0	0.08	0.21	2.03	0.17	0.38	0.95	1.33	1.33	1.33	1.33	4.20	0.68
artificial_li	Green urban areas	141	40%					0					0	0.08	0.21	2.03	0.17	0.38	0.95	1.33	1.33	1.33	1.33	4.20	0.68
agri_hi	Conventional/intensive arable	2111	0%											0.08	0.21	2.03	0.17	0.38	0.95	1.33	1.33	1.33	1.33	4.20	
agri_hi	Integrated arable	2112	0%												0.13	2.03	0.17	0.17	0.38	1.33	1.33	1.33	1.33	4.20	
agri_li	Organic arable	2113	0%													2.03			0.17	1.33	1.33	1.33	1.33	4.20	
agri_li	Organic orchards	2222	0%																	1.33	1.33	1.33	1.33	4.20	
agri_hi	Intensive pasture and meadows	2311	0%											0.08	0.21	2.03		0.39	0.97	1.33	1.33	1.33	1.33	4.20	
agri_li	Less intensive pasture and meadows	2312	0%												0.13	2.03			0.58	1.33	1.33	1.33	1.33	4.20	
agri_li	Organic pasture and meadows	2313	0%													2.03				1.33	1.33	1.33	1.33	4.20	
forest	Broad-leafed forest	311	0%																						
forest	Coniferous forest	312	0%																						
forest	Mixed forest	313	0%																						
forest_hi	Plantation forest		0%																						
non-use	Forest edge	314	0%																						
mix	Country Average		-	0	0	0	0	0	0	0	0	0	0	0.05	0.09	1.11	0.08	0.16	0.32	0.74	0.74	0.74	0.74	2.33	

A-3.26 Restoration Costs Slovenia

Restoration Costs in €/m2 (2004)
Country: Slovenia
PPS 0.72 (Germany = 1)

Biotope Group	starting Biotopes	Corine ID-No.	% of sealed area	Built up land	Continuous urban fabric	Discontinuous urban	Urban/Industrial fallow	Rural settlement	Industrial area	Traffic networks (road and rail networks, airports, port areas	Road/rail embankments and associated land	Green urban areas	Intensive arable	Integrated arable	Organic arable	Organic orchards	Intensive pasture	Less intensive pasture	Organic pasture	Broad-leafed forest	Coniferous forest	Mixed forest	Plantation forest	Forest edge	Country average
				RESTORATION COSTS (2004)																					
				Target biotopes										Target biotopes											
artificial_hi	Built up land	*10*	100%		0	0	0	0	0		0	0	0	0.13	0.33	3.18	0.27	0.60	1.48	2.08	2.08	2.08	2.08	6.57	1.40
artificial_hi	Continuous urban fabric	*111*	80%			0	0	0			0	0	0	0.13	0.33	3.18	0.27	0.60	1.48	2.08	2.08	2.08	2.08	6.57	1.40
artificial_hi	Discontinuous urban fabric	*112*	60%				0	0			0	0	0	0.13	0.33	3.18	0.27	0.60	1.48	2.08	2.08	2.08	2.08	6.57	1.40
non-use	Urban/Industrial fallow	*113, 125*	40%										0	0.13	0.33	3.18	0.27	0.60	1.48	2.08	2.08	2.08	2.08	6.57	1.40
artificial_li	Rural settlement	*114*	40%									0	0	0.13	0.33	3.18	0.27	0.60	1.48	2.08	2.08	2.08	2.08	6.57	1.40
artificial_hi	Industrial or commercial area	*121*	80%			0	0	0			0	0	0	0.13	0.33	3.18	0.27	0.60	1.48	2.08	2.08	2.08	2.08	6.57	1.40
artificial_hi	Traffic networks (road and rail networks, airports, port areas	*1221, 1223, 123, 124*	100%		0	0	0	0	0		0	0	0	0.13	0.33	3.18	0.27	0.60	1.48	2.08	2.08	2.08	2.08	6.57	1.40
artificial_li	Road/rail embankments and associated land	*122, 1224*	50%					0				0	0	0.13	0.33	3.18	0.27	0.60	1.48	2.08	2.08	2.08	2.08	6.57	1.40
artificial_li	Green urban areas	*141*	40%					0					0	0.13	0.33	3.18	0.27	0.60	1.48	2.08	2.08	2.08	2.08	6.57	1.40
agri_hi	Conventional/intensive arable	*2111*	0%											0.13	0.33	3.17	0.27	0.59	1.48	2.08	2.08	2.08	2.08	6.57	
agri_hi	Integrated arable	*2112*	0%												0.20	3.17	0.27	0.27	0.59	2.08	2.08	2.08	2.08	6.57	
agri_li	Organic arable	*2113*	0%													3.17			0.27	2.08	2.08	2.08	2.08	6.57	
agri_li	Organic orchards	*2222*	0%																	2.08	2.08	2.08	2.08	6.57	
agri_hi	Intensive pasture and meadows	*2311*	0%											0.13	0.33	3.17		0.61	1.52	2.08	2.08	2.08	2.08	6.57	
agri_li	Less intensive pasture and meadows	*2312*	0%												0.20	3.17			0.91	2.08	2.08	2.08	2.08	6.57	
agri_li	Organic pasture and meadows	*2313*	0%													3.17				2.08	2.08	2.08	2.08	6.57	
forest	Broad-leafed forest	*311*	0%																						
forest	Coniferous forest	*312*	0%																						
forest	Mixed forest	*313*	0%																						
forest_hi	Plantation forest		0%																						
non-use	Forest edge	*314*	0%																						
mix	Country Average		-	0	0	0	0	0	0	0	0	0	0	0.05	0.10	1.18	0.08	0.18	0.34	0.80	0.80	0.80	0.80	2.52	

A-3.27 Restoration Costs Spain

Restoration Costs in €/m2 (2004)
Country: Spain
PPS 0.80 (Germany = 1)

Biotope Group	starting Biotopes	*Corine ID-No.*	% of sealed area	RESTORATION COSTS (2004)																					
				Target biotopes																					
				Built up land	Continu-ous urban fabric	Discontinu-ous urban	Urban/In-dustrial fallow	Rural settlement	Industrial area	Traffic networks (road and rail networks, airports, port areas	Road/rail embank-ments and associated land	Green urban areas	Intensive arable	Integrated arable	Organic arable	Organic orchards	Intensive pasture	Less intensive pasture	Organic pasture	Broad-leafed forest	Conife-rous forest	Mixed forest	Plantation forest	Forest edge	Country average
artificial_hi	Built up land	*10*	100%		0	0	0	0	0		0	0	0	0.14	0.37	3.53	0.30	0.66	1.65	2.31	2.31	2.31	2.31	7.30	1.41
artificial_hi	Continuous urban fabric	*111*	80%			0	0	0			0	0	0	0.14	0.37	3.53	0.30	0.66	1.65	2.31	2.31	2.31	2.31	7.30	1.41
artificial_hi	Discontinuous urban fabric	*112*	60%				0	0			0	0	0	0.14	0.37	3.53	0.30	0.66	1.65	2.31	2.31	2.31	2.31	7.30	1.41
non-use	Urban/Industrial fallow	*113, 125*	40%										0	0.14	0.37	3.53	0.30	0.66	1.65	2.31	2.31	2.31	2.31	7.30	1.41
artificial_li	Rural settlement	*114*	40%									0	0	0.14	0.37	3.53	0.30	0.66	1.65	2.31	2.31	2.31	2.31	7.30	1.41
artificial_hi	Industrial or commercial area	*121*	80%			0	0	0			0	0	0	0.14	0.37	3.53	0.30	0.66	1.65	2.31	2.31	2.31	2.31	7.30	1.41
artificial_hi	Traffic networks (road and rail networks, airports, port areas	*1221, 1223, 123, 124*	100%		0	0	0	0	0		0	0	0	0.14	0.37	3.53	0.30	0.66	1.65	2.31	2.31	2.31	2.31	7.30	1.41
artificial_li	Road/rail embankments and associated land	*122, 1224*	50%					0				0	0	0.14	0.37	3.53	0.30	0.66	1.65	2.31	2.31	2.31	2.31	7.30	1.41
artificial_li	Green urban areas	*141*	40%					0					0	0.14	0.37	3.53	0.30	0.66	1.65	2.31	2.31	2.31	2.31	7.30	1.41
agri_hi	Conventional/intensive arable	*2111*	0%											0.15	0.37	3.52	0.30	0.66	1.65	2.31	2.31	2.31	2.31	7.30	
agri_hi	Integrated arable	*2112*	0%												0.22	3.52	0.30	0.30	0.66	2.31	2.31	2.31	2.31	7.30	
agri_li	Organic arable	*2113*	0%													3.52			0.30	2.31	2.31	2.31	2.31	7.30	
agri_li	Organic orchards	*2222*	0%																	2.31	2.31	2.31	2.31	7.30	
agri_hi	Intensive pasture and meadows	*2311*	0%											0.15	0.37	3.52		0.67	1.68	2.31	2.31	2.31	2.31	7.30	
agri_li	Less intensive pasture and meadows	*2312*	0%												0.22	3.52			1.01	2.31	2.31	2.31	2.31	7.30	
agri_li	Organic pasture and meadows	*2313*	0%													3.52				2.31	2.31	2.31	2.31	7.30	
forest	Broad-leafed forest	*311*	0%																						
forest	Coniferous forest	*312*	0%																						
forest	Mixed forest	*313*	0%																						
forest_hi	Plantation forest		0%																						
non-use	Forest edge	*314*	0%																						
mix	Country Average		-	0	0	0	0	0	0	0	0	0	0	0.07	0.14	1.64	0.13	0.23	0.42	1.24	1.24	1.24	1.24	3.92	

A-3.28 Restoration Costs Sweden

Restoration Costs in €/m2 (2004)
Country: Sweden
PPS 1.14 (Germany = 1)

				RESTORATION COSTS (2004)																					
				Target biotopes										Target biotopes											
Biotope Group	starting Biotopes	*Corine ID-No.*	% of sealed area	Built up land	Continu-ous urban fabric	Discontinu-ous urban	Urban/In-dustrial fallow	Rural settlement	Industrial area	Traffic networks (road and rail networks, airports, port areas	Road/rail embank-ments and associated land	Green urban areas	Intensive arable	Integrated arable	Organic arable	Organic orchards	Intensive pasture	Less intensive pasture	Organic pasture	Broad-leafed forest	Conife-rous forest	Mixed forest	Plantation forest	Forest edge	Country average
artificial_hi	Built up land	*10*	100%		0	0	0	0	0		0	0	0	0.21	0.52	5.03	0.42	0.95	2.35	3.29	3.29	3.29	3.29	10.40	2.92
artificial_hi	Continuous urban fabric	*111*	80%			0	0	0			0	0	0	0.21	0.52	5.03	0.42	0.95	2.35	3.29	3.29	3.29	3.29	10.40	2.92
artificial_hi	Discontinuous urban fabric	*112*	60%				0	0			0	0	0	0.21	0.52	5.03	0.42	0.95	2.35	3.29	3.29	3.29	3.29	10.40	2.92
non-use	Urban/Industrial fallow	*113, 125*	40%										0	0.21	0.52	5.03	0.42	0.95	2.35	3.29	3.29	3.29	3.29	10.40	2.92
artificial_li	Rural settlement	*114*	40%									0	0	0.21	0.52	5.03	0.42	0.95	2.35	3.29	3.29	3.29	3.29	10.40	2.92
artificial_hi	Industrial or commercial area	*121*	80%			0	0	0			0	0	0	0.21	0.52	5.03	0.42	0.95	2.35	3.29	3.29	3.29	3.29	10.40	2.92
artificial_hi	Traffic networks (road and rail networks, airports, port areas	*1221, 1223, 123, 124*	100%		0	0	0	0	0		0	0	0	0.21	0.52	5.03	0.42	0.95	2.35	3.29	3.29	3.29	3.29	10.40	2.92
artificial_li	Road/rail embankments and associated land	*122, 1224*	50%					0				0	0	0.21	0.52	5.03	0.42	0.95	2.35	3.29	3.29	3.29	3.29	10.40	2.92
artificial_li	Green urban areas	*141*	40%					0					0	0.21	0.52	5.03	0.42	0.95	2.35	3.29	3.29	3.29	3.29	10.40	2.92
agri_hi	Conventional/intensive arable	*2111*	0%											0.21	0.52	5.02	0.42	0.94	2.35	3.29	3.29	3.29	3.29	10.40	
agri_hi	Integrated arable	*2112*	0%												0.31	5.02	0.42	0.42	0.94	3.29	3.29	3.29	3.29	10.40	
agri_li	Organic arable	*2113*	0%													5.02			0.42	3.29	3.29	3.29	3.29	10.40	
agri_li	Organic orchards	*2222*	0%																	3.29	3.29	3.29	3.29	10.40	
agri_hi	Intensive pasture and meadows	*2311*	0%											0.21	0.52	5.02		0.96	2.40	3.29	3.29	3.29	3.29	10.40	
agri_li	Less intensive pasture and meadows	*2312*	0%												0.31	5.02			1.44	3.29	3.29	3.29	3.29	10.40	
agri_li	Organic pasture and meadows	*2313*	0%													5.02				3.29	3.29	3.29	3.29	10.40	
forest	Broad-leafed forest	*311*	0%																						
forest	Coniferous forest	*312*	0%																						
forest	Mixed forest	*313*	0%																						
forest_hi	Plantation forest		0%																						
non-use	Forest edge	*314*	0%																						
mix	Country Average		-	0	0	0	0	0	0	0	0	0	0	0.03	0.05	0.61	0.05	0.09	0.17	0.40	0.40	0.40	0.40	1.25	

A-3.29 Restoration Costs Switzerland

Restoration Costs in €/m2 (2004)
Country: Switzerland
PPS 1.30 (Germany = 1)

Biotope Group	starting Biotopes	*Corine ID-No.*	% of sealed area	Built up land	Continu-ous urban fabric	Discontinu-ous urban	Urban/In-dustrial fallow	Rural settlement	Industrial area	Traffic networks (road and rail networks, airports, port areas	Road/rail embank-ments and associated land	Green urban areas	Intensive arable	Integrated arable	Organic arable	Organic orchards	Intensive pasture	Less intensive pasture	Organic pasture	Broad-leafed forest	Conife-rous forest	Mixed forest	Plantation forest	Forest edge	Country average
				RESTORATION COSTS (2004)																					
				Target biotopes																					
artificial_hi	Built up land	*10*	100%		0	0	0	0	0		0	0	0	0.23	0.60	5.73	0.48	1.08	2.68	3.76	3.76	3.76	3.76	11.86	2.50
artificial_hi	Continuous urban fabric	*111*	80%			0	0	0			0	0	0	0.23	0.60	5.73	0.48	1.08	2.68	3.76	3.76	3.76	3.76	11.86	2.50
artificial_hi	Discontinuous urban fabric	*112*	60%				0	0			0	0	0	0.23	0.60	5.73	0.48	1.08	2.68	3.76	3.76	3.76	3.76	11.86	2.50
non-use	Urban/Industrial fallow	*113, 125*	40%										0	0.23	0.60	5.73	0.48	1.08	2.68	3.76	3.76	3.76	3.76	11.86	2.50
artificial_li	Rural settlement	*114*	40%									0	0	0.23	0.60	5.73	0.48	1.08	2.68	3.76	3.76	3.76	3.76	11.86	2.50
artificial_hi	Industrial or commercial area	*121*	80%			0	0	0			0	0	0	0.23	0.60	5.73	0.48	1.08	2.68	3.76	3.76	3.76	3.76	11.86	2.50
artificial_hi	Traffic networks (road and rail networks, airports, port areas	*1221, 1223, 123, 124*	100%		0	0	0	0	0		0	0	0	0.23	0.60	5.73	0.48	1.08	2.68	3.76	3.76	3.76	3.76	11.86	2.50
artificial_li	Road/rail embankments and associated land	*122, 1224*	50%					0				0	0	0.23	0.60	5.73	0.48	1.08	2.68	3.76	3.76	3.76	3.76	11.86	2.50
artificial_li	Green urban areas	*141*	40%					0					0	0.23	0.60	5.73	0.48	1.08	2.68	3.76	3.76	3.76	3.76	11.86	2.50
agri_hi	Conventional/intensive arable	*2111*	0%											0.24	0.59	5.73	0.48	1.07	2.68	3.76	3.76	3.76	3.76	11.86	
agri_hi	Integrated arable	*2112*	0%												0.36	5.73	0.48	0.48	1.07	3.76	3.76	3.76	3.76	11.86	
agri_li	Organic arable	*2113*	0%													5.73			0.48	3.76	3.76	3.76	3.76	11.86	
agri_li	Organic orchards	*2222*	0%																	3.76	3.76	3.76	3.76	11.86	
agri_hi	Intensive pasture and meadows	*2311*	0%											0.24	0.59	5.73		1.09	2.74	3.76	3.76	3.76	3.76	11.86	
agri_li	Less intensive pasture and meadows	*2312*	0%												0.36	5.73			1.64	3.76	3.76	3.76	3.76	11.86	
agri_li	Organic pasture and meadows	*2313*	0%													5.73				3.76	3.76	3.76	3.76	11.86	
forest	Broad-leafed forest	*311*	0%																						
forest	Coniferous forest	*312*	0%																						
forest	Mixed forest	*313*	0%																						
forest_hi	Plantation forest		0%																						
non-use	Forest edge	*314*	0%																						
mix	Country Average		-	0	0	0	0	0	0	0	0	0	0	0.10	0.21	2.38	0.12	0.40	0.82	1.59	1.59	1.59	1.59	5.03	

A-3.30 Restoration Costs Turkey

Restoration Costs in €/m2 (2004)
Country: Turkey
PPS 0.51 (Germany = 1)

				RESTORATION COSTS (2004)																					
				Target biotopes																					
Biotope Group	starting Biotopes	*Corine ID-No.*	% of sealed area	Built up land	Continu-ous urban fabric	Discontinu-ous urban	Urban/In-dustrial fallow	Rural settlement	Industrial area	Traffic networks (road and rail networks, airports, port areas	Road/rail embank-ments and associated land	Green urban areas	Intensive arable	Integrated arable	Organic arable	Organic orchards	Intensive pasture	Less intensive pasture	Organic pasture	Broad-leafed forest	Conife-rous forest	Mixed forest	Plantation forest	Forest edge	Country average
artificial_hi	Built up land	*10*	100%		0	0	0	0	0		0	0	0	0.09	0.23	2.25	0.19	0.42	1.05	1.47	1.47	1.47	1.47	4.65	0.87
artificial_hi	Continuous urban fabric	*111*	80%			0	0	0			0	0	0	0.09	0.23	2.25	0.19	0.42	1.05	1.47	1.47	1.47	1.47	4.65	0.87
artificial_hi	Discontinuous urban fabric	*112*	60%				0	0			0	0	0	0.09	0.23	2.25	0.19	0.42	1.05	1.47	1.47	1.47	1.47	4.65	0.87
non-use	Urban/Industrial fallow	*113, 125*	40%										0	0.09	0.23	2.25	0.19	0.42	1.05	1.47	1.47	1.47	1.47	4.65	0.87
artificial_li	Rural settlement	*114*	40%									0	0	0.09	0.23	2.25	0.19	0.42	1.05	1.47	1.47	1.47	1.47	4.65	0.87
artificial_hi	Industrial or commercial area	*121*	80%			0	0	0			0	0	0	0.09	0.23	2.25	0.19	0.42	1.05	1.47	1.47	1.47	1.47	4.65	0.87
artificial_hi	Traffic networks (road and rail networks, airports, port areas	*1221, 1223, 123, 124*	100%		0	0	0	0	0		0	0	0	0.09	0.23	2.25	0.19	0.42	1.05	1.47	1.47	1.47	1.47	4.65	0.87
artificial_li	Road/rail embankments and associated land	*122, 1224*	50%					0				0	0	0.09	0.23	2.25	0.19	0.42	1.05	1.47	1.47	1.47	1.47	4.65	0.87
artificial_li	Green urban areas	*141*	40%					0					0	0.09	0.23	2.25	0.19	0.42	1.05	1.47	1.47	1.47	1.47	4.65	0.87
agri_hi	Conventional/intensive arable	*2111*	0%											0.09	0.23	2.25	0.19	0.42	1.05	1.47	1.47	1.47	1.47	4.65	
agri_hi	Integrated arable	*2112*	0%												0.14	2.25	0.19	0.19	0.42	1.47	1.47	1.47	1.47	4.65	
agri_li	Organic arable	*2113*	0%													2.25			0.19	1.47	1.47	1.47	1.47	4.65	
agri_li	Organic orchards	*2222*	0%																	1.47	1.47	1.47	1.47	4.65	
agri_hi	Intensive pasture and meadows	*2311*	0%											0.09	0.23	2.25		0.43	1.07	1.47	1.47	1.47	1.47	4.65	
agri_li	Less intensive pasture and meadows	*2312*	0%												0.14	2.25			0.64	1.47	1.47	1.47	1.47	4.65	
agri_li	Organic pasture and meadows	*2313*	0%													2.25				1.47	1.47	1.47	1.47	4.65	
forest	Broad-leafed forest	*311*	0%																						
forest	Coniferous forest	*312*	0%																						
forest	Mixed forest	*313*	0%																						
forest_hi	Plantation forest		0%																						
non-use	Forest edge	*314*	0%																						
mix	Country Average		-	0	0	0	0	0	0	0	0	0	0	0.04	0.09	1.05	0.08	0.15	0.28	0.75	0.75	0.75	0.75	2.37	

A-3.31 Restoration Costs United Kingdom

Restoration Costs in €/m2 (2004)
Country: United Kingdom
PPS 0.95 (Germany = 1)

Biotope Group	starting Biotopes	*Corine ID-No.*	% of sealed area	RESTORATION COSTS (2004) Target biotopes: Built up land	Continu-ous urban fabric	Discontinu-ous urban	Urban/In-dustrial fallow	Rural settlement	Industrial area	Traffic networks (road and rail networks, airports, port areas	Road/rail embank-ments and associated land	Green urban areas	Target biotopes: Intensive arable	Integrated arable	Organic arable	Organic orchards	Intensive pasture	Less intensive pasture	Organic pasture	Broad-leafed forest	Conife-rous forest	Mixed forest	Plantation forest	Forest edge	Country average
artificial_hi	Built up land	*10*	100%		0	0	0	0	0		0	0	0	0.17	0.44	4.19	0.35	0.79	1.96	2.75	2.75	2.75	2.75	8.66	1.21
artificial_hi	Continuous urban fabric	*111*	80%			0	0	0			0	0	0	0.17	0.44	4.19	0.35	0.79	1.96	2.75	2.75	2.75	2.75	8.66	1.21
artificial_hi	Discontinuous urban fabric	*112*	60%				0	0			0	0	0	0.17	0.44	4.19	0.35	0.79	1.96	2.75	2.75	2.75	2.75	8.66	1.21
non-use	Urban/Industrial fallow	*113, 125*	40%										0	0.17	0.44	4.19	0.35	0.79	1.96	2.75	2.75	2.75	2.75	8.66	1.21
artificial_li	Rural settlement	*114*	40%									0	0	0.17	0.44	4.19	0.35	0.79	1.96	2.75	2.75	2.75	2.75	8.66	1.21
artificial_hi	Industrial or commercial area	*121*	80%			0	0	0			0	0	0	0.17	0.44	4.19	0.35	0.79	1.96	2.75	2.75	2.75	2.75	8.66	1.21
artificial_hi	Traffic networks (road and rail networks, airports, port areas	*1221, 1223, 123, 124*	100%		0	0	0	0	0		0	0	0	0.17	0.44	4.19	0.35	0.79	1.96	2.75	2.75	2.75	2.75	8.66	1.21
artificial_li	Road/rail embankments and associated land	*122, 1224*	50%					0				0	0	0.17	0.44	4.19	0.35	0.79	1.96	2.75	2.75	2.75	2.75	8.66	1.21
artificial_li	Green urban areas	*141*	40%					0					0	0.17	0.44	4.19	0.35	0.79	1.96	2.75	2.75	2.75	2.75	8.66	1.21
agri_hi	Conventional/intensive arable	*2111*	0%											0.17	0.43	4.19	0.35	0.78	1.96	2.75	2.75	2.75	2.75	8.66	
agri_hi	Integrated arable	*2112*	0%												0.26	4.19	0.35	0.35	0.78	2.75	2.75	2.75	2.75	8.66	
agri_li	Organic arable	*2113*	0%													4.19			0.35	2.75	2.75	2.75	2.75	8.66	
agri_li	Organic orchards	*2222*	0%																	2.75	2.75	2.75	2.75	8.66	
agri_hi	Intensive pasture and meadows	*2311*	0%											0.17	0.43	4.19		0.80	2.00	2.75	2.75	2.75	2.75	8.66	
agri_li	Less intensive pasture and meadows	*2312*	0%												0.26	4.19			1.20	2.75	2.75	2.75	2.75	8.66	
agri_li	Organic pasture and meadows	*2313*	0%													4.19				2.75	2.75	2.75	2.75	8.66	
forest	Broad-leafed forest	*311*	0%																						
forest	Coniferous forest	*312*	0%																						
forest	Mixed forest	*313*	0%																						
forest_hi	Plantation forest		0%																						
non-use	Forest edge	*314*	0%																						
mix	Country Average		-	0	0	0	0	0	0	0	0	0	0	0.12	0.25	2.91	0.14	0.48	0.96	1.91	1.91	1.91	1.91	6.03	

A-4 Restoration Costs per PDF and per m² for Different Land Use Categories

A-4.1 Restoration Costs/(PDF * m²) Germany 2004

Average Restoration Costs per PDF and per m² [€/(m2*PDF)]

Country: Germany

PPS 1.00 (Germany = 1)							Repair Costs per PDF [€/m2/PDF]																					
							Target biotopes										Target biotopes											
Biotope Group	starting Biotopes	Corine ID-No.	number of species (S)	PDF occupation	Extensive-rungsgrad	% of sealed area	Built up land	Continuous urban fabric	Disconti-nuous urban	Urban/ Industrial fallow	Rural settlement	Industrial area	Traffic networks road and rail networks, airports, port areas	Road/rail embank-ments and associated land	Green urban areas	Intensive arable	Integrated arable	Organic arable	Organic orchards	Intensive pasture	Less intensive pasture	Organic pasture	Broad-leafed forest	Coniferous forest	Mixed forest	Plantation forest	Forest edge	Country average
artificial_hi	Built up land	*10*	*1*	*0.97*		100%		0	0	0	0	0		0	0	0	1.00	0.62	6.56	0.79	1.50	1.55	4.30	n.a.	n.a.	8.03	6.50	1.00
artificial_hi	Continuous urban fabric	*111*	*8*	*0.8*		80%			0	0	0			0	0	0	-7.50	0.85	9.42	1.40	2.39	1.83	6.18	n.a.	n.a.	3.01	7.60	1.21
artificial_hi	Discontinuous urban fabric	*112*	*22*	*0.45*		60%				0	0			0	0	0	-0.41	3.83	91.87	-2.37	-11.53	2.91	60.21	n.a.	n.a.	5.35	11.69	2.16
non-use	Urban/Industrial fallow	*113, 125*	*40*	*0*		40%																						
artificial_li	Rural settlement	*114*	*25*	*0.38*		40%									0	0	-0.34	12.78	-122.50	-1.54	-5.32	3.30	-80.28	n.a.	n.a.	6.34	13.10	2.56
artificial_hi	Industrial or commercial area	*121*	*24*	*0.39*		80%			0	0	0			0	0	0	-0.35	9.58	-183.75	-1.62	-5.76	3.24	-120.42	n.a.	n.a.	6.18	12.88	2.49
artificial_hi	Traffic networks (road and rail	*1221,*				100%		n.a.	n.a.	n.a.	n.a.	n.a.		n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
artificial_li	Road/rail embankments and	*122, 1224*	*32*	*0.2*		50%					0				0	0	-0.24	-2.56	-17.50	-0.81	-2.23	5.05	-11.47	n.a.	n.a.	12.04	19.00	4.86
artificial_li	Green urban areas	*141*	*29*	*0.27*		40%					0					0	-0.27	-4.79	-26.25	-0.99	-2.88	4.19	-17.20	n.a.	n.a.	8.92	16.17	3.60
agri_hi	Conventional/intensive arable	*2111*	*10*	*0.74*	*0%*	0%											-1.90	0.98	11.12	1.94	2.99	1.95	7.30	n.a.	n.a.	3.25	8.09	1.37
agri_hi	Integrated arable	*2112*	*7*	*0.82*	*40%*	0%												0.49	8.95	1.29	1.00	0.72	5.87	n.a.	n.a.	2.94	7.45	1.14
agri_li	Organic arable	*2113*	*26*	*0.35*	*100%*	0%													-61.18			0.63	-40.14	n.a.	n.a.	6.88	13.82	2.32
agri_li	Organic orchards	*2222*	*23*	*0.41*		0%																n.a.	n.a.	n.a.	n.a.	5.87	12.46	1.82
agri_hi	Intensive pasture and meadows	*2311*	*17*	*0.58*	*0%*	0%											-0.63	1.65	21.59		10.03	2.44	14.17	n.a.	n.a.	4.15	9.74	1.82
agri_li	Less intensive pasture and	*2312*	*19*	*0.51*	*40%*	0%												1.43	36.71			1.62	24.08	n.a.	n.a.	4.72	10.70	1.99
agri_li	Organic pasture and meadows	*2313*	*45*	*-0.14*	*100%*	0%													-6.67				-4.38	n.a.	n.a.	-17.20	126.67	-5.51
forest	Broad-leafed forest	*311*	*24*	*0.41*		0%																						0
forest	Coniferous forest	*312*				0%																						n.a.
forest	Mixed forest	*313*				0%																						n.a.
forest_hi	Plantation forest			*0.67*		0%																						
non-use	Forest edge	*314*	*48*	*-0.2*		0%																						0
mix	Country average																	-0.61	-6.12	n.a.	-0.75	5.36	-4.06	n.a.	n.a.		26.25	

A-4.2 Restoration Costs/(PDF * m^2) EU 25

Average Restoration Costs per PDF and per m^2 [€/(m2*PDF)]

Country: EU25

PPS 0.92 (Germany = 1)							Repair Costs per PDF [€/m2/PDF]																					
							Target biotopes										Target biotopes											
Biotope Group	starting Biotopes	*Corine ID-No.*	*number of species (S)*	*PDF occupation*	*Extensivie-rungsgrad*	% of sealed area	Built up land	Continuous urban fabric	Disconti-nuous urban	Urban/ Industrial fallow	Rural settlement	Industrial area	Traffic networks road and rail networks, airports, port areas	Road/rail embank-ments and associated land	Green urban areas	Intensive arable	Integrated arable	Organic arable	Organic orchards	Intensive pasture	Less intensive pasture	Organic pasture	Broad-leafed forest	Coniferous forest	Mixed forest	Plantation forest	Forest edge	Country average
artificial_hi	Built up land	*10*	*1*	*0.97*		100%		0	0	0	0	0		0	0	0	0.92	0.57	6.04	0.73	1.38	1.42	3.96	n.a.	n.a.	7.39	5.98	1.30
artificial_hi	Continuous urban fabric	*111*	*8*	*0.8*		80%			0	0	0			0	0	0	-6.90	0.78	8.67	1.29	2.19	1.68	5.68	n.a.	n.a.	2.77	6.99	1.58
artificial_hi	Discontinuous urban fabric	*112*	*22*	*0.45*		60%				0	0			0	0	0	-0.37	3.53	84.52	-2.18	-10.61	2.68	55.39	n.a.	n.a.	4.92	10.76	2.81
non-use	Urban/Industrial fallow	*113, 125*	*40*	*0*		40%																						
artificial_li	Rural settlement	*114*	*25*	*0.38*		40%									0	0	-0.31	11.76	-112.70	-1.42	-4.89	3.04	-73.86	n.a.	n.a.	5.83	12.06	3.33
artificial_hi	Industrial or commercial area	*121*	*24*	*0.39*		80%			0	0	0			0	0	0	-0.32	8.82	-169.05	-1.49	-5.30	2.98	-110.78	n.a.	n.a.	5.68	11.85	3.24
artificial_hi	Traffic networks (road and rail	*1221,*				100%		n.a.	n.a.	n.a.	n.a.	n.a.		n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
artificial_li	Road/rail embankments and	*122, 1224*	*32*	*0.2*		50%					0				0	0	-0.22	-2.35	-16.10	-0.75	-2.05	4.65	-10.55	n.a.	n.a.	11.08	17.48	6.32
artificial_li	Green urban areas	*141*	*29*	*0.27*		40%					0					0	-0.25	-4.41	-24.15	-0.92	-2.65	3.85	-15.83	n.a.	n.a.	8.21	14.88	4.68
agri_hi	Conventional/intensive arable	*2111*	*10*	*0.74*	*0%*	0%											-1.75	0.90	10.23	1.78	2.75	1.79	6.71	n.a.	n.a.	2.99	7.44	1.75
agri_hi	Integrated arable	*2112*	*7*	*0.82*	*40%*	0%												0.45	8.24	1.19	0.92	0.66	5.40	n.a.	n.a.	2.70	6.85	1.52
agri_li	Organic arable	*2113*	*26*	*0.35*	*100%*	0%													-56.29			0.58	-36.93	n.a.	n.a.	6.33	12.71	3.30
agri_li	Organic orchards	*2222*	*23*	*0.41*		0%																n.a.	n.a.	n.a.	n.a.	5.40	11.46	2.55
agri_hi	Intensive pasture and meadows	*2311*	*17*	*0.58*	*0%*	0%											-0.58	1.52	19.87		9.22	2.24	13.03	n.a.	n.a.	3.82	8.96	2.28
agri_li	Less intensive pasture and	*2312*	*19*	*0.51*	*40%*	0%												1.31	33.77			1.49	22.16	n.a.	n.a.	4.34	9.85	2.54
agri_li	Organic pasture and meadows	*2313*	*45*	*-0.14*	*100%*	0%													-6.14				-4.03	n.a.	n.a.	-15.83	116.53	-8.07
forest	Broad-leafed forest	*311*	*24*	*0.41*		0%																						0
forest	Coniferous forest	*312*				0%																						n.a.
forest	Mixed forest	*313*				0%																						n.a.
forest_hi	Plantation forest			*0.67*		0%																						
non-use	Forest edge	*314*	*48*	*-0.2*		0%																						0
mix	Country average																	-0.41	-4.14	n.a.	-0.50	3.51	-2.85	n.a.	n.a.		18.44	

A-4.3 Restoration Costs/(PDF * m^2) Austria

Average Restoration Costs per PDF and per m^2 [€/(m2*PDF)]

Country: Austria

PPS 0.97 (Germany = 1)

Repair Costs per PDF [€/m2/PDF]

							Target biotopes																Target biotopes					
Biotope Group	starting Biotopes	*Corine ID-No.*	*number of species (S)*	*PDF occupation*	*Extensivie-rungsgrad*	% of sealed area	Built up land	Continuous urban fabric	Disconti-nuous urban	Urban/ Industrial fallow	Rural settlement	Industrial area	Traffic networks road and rail networks, airports, port areas	Road/rail embank-ments and associated land	Green urban areas	Intensive arable	Integrated arable	Organic arable	Organic orchards	Intensive pasture	Less intensive pasture	Organic pasture	Broad-leafed forest	Coniferous forest	Mixed forest	Plantation forest	Forest edge	Country average
artificial_hi	Built up land	*10*	*1*	*0.97*		100%		0	0	0	0	0		0	0	0	0.97	0.60	6.37	0.77	1.46	1.50	4.17	n.a.	n.a.	7.79	6.30	1.61
artificial_hi	Continuous urban fabric	*111*	*8*	*0.8*		80%			0	0	0			0	0	0	-7.28	0.83	9.14	1.36	2.31	1.77	5.99	n.a.	n.a.	2.92	7.37	1.95
artificial_hi	Discontinuous urban fabric	*112*	*22*	*0.45*		60%				0	0			0	0	0	-0.39	3.72	89.12	-2.30	-11.18	2.82	58.40	n.a.	n.a.	5.19	11.34	3.47
non-use	Urban/Industrial fallow	*113, 125*	*40*	*0*		40%																						
artificial_li	Rural settlement	*114*	*25*	*0.38*		40%									0	0	-0.33	12.39	-118.83	-1.50	-5.16	3.20	-77.87	n.a.	n.a.	6.15	12.71	4.11
artificial_hi	Industrial or commercial area	*121*	*24*	*0.39*		80%			0	0	0			0	0	0	-0.34	9.30	-178.24	-1.57	-5.59	3.14	-116.80	n.a.	n.a.	5.99	12.49	4.00
artificial_hi	Traffic networks (road and rail	*1221,*				100%		n.a.	n.a.	n.a.	n.a.	n.a.		n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
artificial_li	Road/rail embankments and	*122, 1224*	*32*	*0.2*		50%					0				0	0	-0.23	-2.48	-16.98	-0.79	-2.16	4.90	-11.12	n.a.	n.a.	11.68	18.43	7.81
artificial_li	Green urban areas	*141*	*29*	*0.27*		40%					0					0	-0.26	-4.65	-25.46	-0.96	-2.80	4.06	-16.69	n.a.	n.a.	8.65	15.69	5.78
agri_hi	Conventional/intensive arable	*2111*	*10*	*0.74*	*0%*	0%											-1.85	0.95	10.79	1.88	2.90	1.89	7.08	n.a.	n.a.	3.16	7.84	2.14
agri_hi	Integrated arable	*2112*	*7*	*0.82*	*40%*	0%												0.47	8.69	1.25	0.97	0.70	5.70	n.a.	n.a.	2.85	7.23	1.86
agri_li	Organic arable	*2113*	*26*	*0.35*	*100%*	0%													-59.35			0.61	-38.93	n.a.	n.a.	6.67	13.40	4.16
agri_li	Organic orchards	*2222*	*23*	*0.41*		0%																n.a.	n.a.	n.a.	n.a.	5.70	12.09	3.40
agri_hi	Intensive pasture and meadows	*2311*	*17*	*0.58*	*0%*	0%											-0.62	1.61	20.95		9.73	2.36	13.74	n.a.	n.a.	4.03	9.45	2.79
agri_li	Less intensive pasture and	*2312*	*19*	*0.51*	*40%*	0%												1.38	35.61			1.57	23.36	n.a.	n.a.	4.58	10.38	3.11
agri_li	Organic pasture and meadows	*2313*	*45*	*-0.14*	*100%*	0%													-6.47				-4.25	n.a.	n.a.	-16.69	122.87	-10.18
forest	Broad-leafed forest	*311*	*24*	*0.41*		0%																						0
forest	Coniferous forest	*312*				0%																						n.a.
forest	Mixed forest	*313*				0%																						n.a.
forest_hi	Plantation forest			*0.67*		0%																						
non-use	Forest edge	*314*	*48*	*-0.2*		0%																						0
mix	Country average																	-0.34	-3.43	n.a.	-0.43	3.10	-2.30	n.a.	n.a.		14.88	

A-4.4 Restoration Costs/(PDF * m²) Belgium

Average Restoration Costs per PDF and per m² [€/(m2*PDF)]

Country: Belgium

PPS 0.96 (Germany = 1)

Repair Costs per PDF [€/m2/PDF] — Target biotopes

Biotope Group	starting Biotopes	Corine ID-No.	number of species (S)	PDF occupation	Extensivie-rungsgrad	% of sealed area	Built up land	Continuous urban fabric	Disconti-nuous urban	Urban/ Industrial fallow	Rural settlement	Industrial area	Traffic networks road and rail networks, airports, port areas	Road/rail embank-ments and associated land	Green urban areas	Intensive arable	Integrated arable	Organic arable	Organic orchards	Intensive pasture	Less intensive pasture	Organic pasture	Broad-leafed forest	Coniferous forest	Mixed forest	Plantation forest	Forest edge	Country average
artificial_hi	Built up land	*10*	*1*	*0.97*		100%		0	0	0	0	0		0	0	0	0.96	0.59	6.30	0.76	1.44	1.48	4.13	n.a.	n.a.	7.71	6.24	0.71
artificial_hi	Continuous urban fabric	*111*	*8*	*0.8*		80%			0	0	0			0	0	0	-7.20	0.82	9.05	1.35	2.29	1.75	5.93	n.a.	n.a.	2.89	7.30	0.86
artificial_hi	Discontinuous urban fabric	*112*	*22*	*0.45*		60%				0	0			0	0	0	-0.39	3.68	88.20	-2.28	-11.07	2.79	57.80	n.a.	n.a.	5.14	11.22	1.52
non-use	Urban/Industrial fallow	*113, 125*	*40*	*0*		40%																						
artificial_li	Rural settlement	*114*	*25*	*0.38*		40%									0	0	-0.33	12.27	-117.60	-1.48	-5.11	3.17	-77.07	n.a.	n.a.	6.08	12.58	1.80
artificial_hi	Industrial or commercial area	*121*	*24*	*0.39*		80%			0	0	0			0	0	0	-0.33	9.20	-176.40	-1.56	-5.53	3.11	-115.60	n.a.	n.a.	5.93	12.37	1.75
artificial_hi	Traffic networks (road and rail	*1221,*				100%		n.a.	n.a.	n.a.	n.a.	n.a.		n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
artificial_li	Road/rail embankments and	*122, 1224*	*32*	*0.2*		50%					0				0	0	-0.23	-2.45	-16.80	-0.78	-2.14	4.85	-11.01	n.a.	n.a.	11.56	18.24	3.42
artificial_li	Green urban areas	*141*	*29*	*0.27*		40%					0					0	-0.26	-4.60	-25.20	-0.95	-2.77	4.02	-16.51	n.a.	n.a.	8.56	15.52	2.53
agri_hi	Conventional/intensive arable	*2111*	*10*	*0.74*	*0%*	0%											-1.83	0.94	10.68	1.86	2.87	1.87	7.01	n.a.	n.a.	3.12	7.76	0.98
agri_hi	Integrated arable	*2112*	*7*	*0.82*	*40%*	0%												0.47	8.60	1.24	0.96	0.69	5.64	n.a.	n.a.	2.82	7.15	0.80
agri_li	Organic arable	*2113*	*26*	*0.35*	*100%*	0%													-58.74			0.61	-38.53	n.a.	n.a.	6.61	13.27	1.54
agri_li	Organic orchards	*2222*	*23*	*0.41*		0%																n.a.	n.a.	n.a.	n.a.	5.64	11.96	1.20
agri_hi	Intensive pasture and meadows	*2311*	*17*	*0.58*	*0%*	0%											-0.61	1.59	20.73		9.63	2.34	13.60	n.a.	n.a.	3.99	9.35	1.31
agri_li	Less intensive pasture and	*2312*	*19*	*0.51*	*40%*	0%												1.37	35.24			1.55	23.12	n.a.	n.a.	4.53	10.28	1.42
agri_li	Organic pasture and meadows	*2313*	*45*	*-0.14*	*100%*	0%													-6.41				-4.20	n.a.	n.a.	-16.51	121.60	-3.59
forest	Broad-leafed forest	*311*	*24*	*0.41*		0%																						0
forest	Coniferous forest	*312*				0%																						n.a.
forest	Mixed forest	*313*				0%																						n.a.
forest_hi	Plantation forest			*0.67*		0%																						
non-use	Forest edge	*314*	*48*	*-0.2*		0%																						0
mix	Country average																	-0.70	-6.74	n.a.	-0.86	6.41	-4.44	n.a.	n.a.		28.70	

A-4.5 Restoration Costs/(PDF * m^2) Bulgaria

Average Restoration Costs per PDF and per m^2 [€/(m2*PDF)]

Country: Bulgaria

PPS 0.39 (Germany = 1)							Repair Costs per PDF [€/m2/PDF]																					
							Target biotopes																					
Biotope Group	starting Biotopes	*Corine ID-No.*	*number of species (S)*	*PDF occupation*	*Extensivie-rungsgrad*	% of sealed area	Built up land	Continuous urban fabric	Disconti-nuous urban	Urban/ Industrial fallow	Rural settlement	Industrial area	Traffic networks road and rail networks, airports, port areas	Road/rail embank-ments and associated land	Green urban areas	Intensive arable	Integrated arable	Organic arable	Organic orchards	Intensive pasture	Less intensive pasture	Organic pasture	Broad-leafed forest	Coniferous forest	Mixed forest	Plantation forest	Forest edge	Country average
artificial_hi	Built up land	*10*	*1*	*0.97*		100%		0	0	0	0	0		0	0	0	0.39	0.24	2.56	0.31	0.59	0.60	1.68	n.a.	n.a.	3.13	2.53	0.49
artificial_hi	Continuous urban fabric	*111*	*8*	*0.8*		80%			0	0	0			0	0	0	-2.93	0.33	3.68	0.55	0.93	0.71	2.41	n.a.	n.a.	1.17	2.96	0.59
artificial_hi	Discontinuous urban fabric	*112*	*22*	*0.45*		60%				0	0			0	0	0	-0.16	1.50	35.83	-0.93	-4.50	1.13	23.48	n.a.	n.a.	2.09	4.56	1.05
non-use	Urban/Industrial fallow	*113, 125*	*40*	*0*		40%																						
artificial_li	Rural settlement	*114*	*25*	*0.38*		40%									0	0	-0.13	4.98	-47.78	-0.60	-2.08	1.29	-31.31	n.a.	n.a.	2.47	5.11	1.24
artificial_hi	Industrial or commercial area	*121*	*24*	*0.39*		80%			0	0	0			0	0	0	-0.14	3.74	-71.66	-0.63	-2.25	1.26	-46.96	n.a.	n.a.	2.41	5.02	1.21
artificial_hi	Traffic networks (road and rail	*1221,*				100%		n.a.	n.a.	n.a.	n.a.	n.a.		n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
artificial_li	Road/rail embankments and	*122, 1224*	*32*	*0.2*		50%					0				0	0	-0.09	-1.00	-6.83	-0.32	-0.87	1.97	-4.47	n.a.	n.a.	4.70	7.41	2.36
artificial_li	Green urban areas	*141*	*29*	*0.27*		40%					0					0	-0.11	-1.87	-10.24	-0.39	-1.12	1.63	-6.71	n.a.	n.a.	3.48	6.31	1.75
agri_hi	Conventional/intensive arable	*2111*	*10*	*0.74*	*0%*	0%											-0.74	0.38	4.34	0.76	1.17	0.76	2.85	n.a.	n.a.	1.27	3.15	0.66
agri_hi	Integrated arable	*2112*	*7*	*0.82*	*40%*	0%												0.19	3.49	0.50	0.39	0.28	2.29	n.a.	n.a.	1.15	2.91	0.58
agri_li	Organic arable	*2113*	*26*	*0.35*	*100%*	0%													-23.86			0.25	-15.65	n.a.	n.a.	2.68	5.39	1.23
agri_li	Organic orchards	*2222*	*23*	*0.41*		0%																n.a.	n.a.	n.a.	n.a.	2.29	4.86	0.97
agri_hi	Intensive pasture and meadows	*2311*	*17*	*0.58*	*0%*	0%											-0.25	0.65	8.42		3.91	0.95	5.53	n.a.	n.a.	1.62	3.80	0.85
agri_li	Less intensive pasture and	*2312*	*19*	*0.51*	*40%*	0%												0.56	14.32			0.63	9.39	n.a.	n.a.	1.84	4.17	0.95
agri_li	Organic pasture and meadows	*2313*	*45*	*-0.14*	*100%*	0%													-2.60				-1.71	n.a.	n.a.	-6.71	49.40	-3.05
forest	Broad-leafed forest	*311*	*24*	*0.41*		0%																						0
forest	Coniferous forest	*312*				0%																						n.a.
forest	Mixed forest	*313*				0%																						n.a.
forest_hi	Plantation forest			*0.67*		0%																						
non-use	Forest edge	*314*	*48*	*-0.2*		0%																						0
mix	Country average																	-0.19	-1.94	n.a.	-0.23	1.57	-1.32	n.a.	n.a.		8.53	

A-4.6 Restoration Costs/(PDF * m²) Cyprus

Average Restoration Costs per PDF and per m² [€/(m2*PDF)]

Country: Cyprus

PPS 0.89 (Germany = 1)							Repair Costs per PDF [€/m2/PDF]																					
							Target biotopes														Target biotopes							
Biotope Group	starting Biotopes	*Corine ID-No.*	*number of species (S)*	*PDF occupation*	*Extensivie-rungsgrad*	% of sealed area	Built up land	Continuous urban fabric	Disconti-nuous urban	Urban/ Industrial fallow	Rural settlement	Industrial area	Traffic networks road and rail networks, airports, port areas	Road/rail embank-ments and associated land	Green urban areas	Intensive arable	Integrated arable	Organic arable	Organic orchards	Intensive pasture	Less intensive pasture	Organic pasture	Broad-leafed forest	Coniferous forest	Mixed forest	Plantation forest	Forest edge	Country average
artificial_hi	Built up land	*10*	*1*	*0.97*		100%		0	0	0	0	0		0	0	0	0.89	0.55	5.84	0.70	1.34	1.38	3.83	n.a.	n.a.	7.14	5.78	1.14
artificial_hi	Continuous urban fabric	*111*	*8*	*0.8*		80%			0	0	0			0	0	0	-6.68	0.76	8.39	1.25	2.12	1.63	5.50	n.a.	n.a.	2.68	6.76	1.39
artificial_hi	Discontinuous urban fabric	*112*	*22*	*0.45*		60%				0	0			0	0	0	-0.36	3.41	81.77	-2.11	-10.26	2.59	53.59	n.a.	n.a.	4.76	10.41	2.47
non-use	Urban/Industrial fallow	*113, 125*	*40*	*0*		40%																						
artificial_li	Rural settlement	*114*	*25*	*0.38*		40%									0	0	-0.30	11.37	-109.03	-1.37	-4.74	2.94	-71.45	n.a.	n.a.	5.64	11.66	2.92
artificial_hi	Industrial or commercial area	*121*	*24*	*0.39*		80%			0	0	0			0	0	0	-0.31	8.53	-163.54	-1.44	-5.13	2.88	-107.17	n.a.	n.a.	5.50	11.46	2.85
artificial_hi	Traffic networks (road and rail	*1221,*				100%		n.a.	n.a.	n.a.	n.a.	n.a.		n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
artificial_li	Road/rail embankments and	*122, 1224*	*32*	*0.2*		50%					0				0	0	-0.22	-2.27	-15.58	-0.72	-1.99	4.49	-10.21	n.a.	n.a.	10.72	16.91	5.55
artificial_li	Green urban areas	*141*	*29*	*0.27*		40%					0					0	-0.24	-4.26	-23.36	-0.89	-2.56	3.73	-15.31	n.a.	n.a.	7.94	14.39	4.11
agri_hi	Conventional/intensive arable	*2111*	*10*	*0.74*	*0%*	0%											-1.69	0.87	9.90	1.73	2.66	1.74	6.50	n.a.	n.a.	2.90	7.20	1.55
agri_hi	Integrated arable	*2112*	*7*	*0.82*	*40%*	0%												0.43	7.97	1.15	0.89	0.64	5.23	n.a.	n.a.	2.61	6.63	1.38
agri_li	Organic arable	*2113*	*26*	*0.35*	*100%*	0%													-54.45			0.56	-35.72	n.a.	n.a.	6.12	12.30	2.96
agri_li	Organic orchards	*2222*	*23*	*0.41*		0%																n.a.	n.a.	n.a.	n.a.	5.23	11.09	2.21
agri_hi	Intensive pasture and meadows	*2311*	*17*	*0.58*	*0%*	0%											-0.56	1.47	19.22		8.92	2.17	12.61	n.a.	n.a.	3.70	8.67	1.98
agri_li	Less intensive pasture and	*2312*	*19*	*0.51*	*40%*	0%												1.27	32.67			1.44	21.43	n.a.	n.a.	4.20	9.53	2.22
agri_li	Organic pasture and meadows	*2313*	*45*	*-0.14*	*100%*	0%													-5.94				-3.90	n.a.	n.a.	-15.31	112.73	-7.41
forest	Broad-leafed forest	*311*	*24*	*0.41*		0%																						0
forest	Coniferous forest	*312*				0%																						n.a.
forest	Mixed forest	*313*				0%																						n.a.
forest_hi	Plantation forest			*0.67*		0%																						
non-use	Forest edge	*314*	*48*	*-0.2*		0%																						0
mix	Country average																	-0.43	-4.28	n.a.	-0.49	3.50	-3.02	n.a.	n.a.		19.53	

A-4.7 Restoration Costs/(PDF * m^2) Czech Republic

Average Restoration Costs per PDF and per m^2 [€/(m2*PDF)]

Country: Czech Republic

PPS 0.51 (Germany = 1)							Repair Costs per PDF [€/m2/PDF]																					
							Target biotopes										Target biotopes											
Biotope Group	starting Biotopes	Corine ID-No.	number of species (S)	PDF occupation	Extensivie-rungsgrad	% of sealed area	Built up land	Continuous urban fabric	Disconti-nuous urban	Urban/ Industrial fallow	Rural settlement	Industrial area	Traffic networks road and rail networks, airports, port areas	Road/rail embank-ments and associated land	Green urban areas	Intensive arable	Integrated arable	Organic arable	Organic orchards	Intensive pasture	Less intensive pasture	Organic pasture	Broad-leafed forest	Coniferous forest	Mixed forest	Plantation forest	Forest edge	Country average
artificial_hi	Built up land	10	1	0.97		100%		0	0	0	0	0		0	0	0	0.51	0.32	3.35	0.40	0.77	0.79	2.19	n.a.	n.a.	4.09	3.31	0.54
artificial_hi	Continuous urban fabric	111	8	0.8		80%			0	0	0			0	0	0	-3.83	0.43	4.81	0.71	1.22	0.93	3.15	n.a.	n.a.	1.54	3.88	0.66
artificial_hi	Discontinuous urban fabric	112	22	0.45		60%				0	0			0	0	0	-0.21	1.96	46.86	-1.21	-5.88	1.48	30.71	n.a.	n.a.	2.73	5.96	1.17
non-use	Urban/Industrial fallow	113, 125	40	0		40%																						
artificial_li	Rural settlement	114	25	0.38		40%									0	0	-0.17	6.52	-62.48	-0.79	-2.71	1.68	-40.94	n.a.	n.a.	3.23	6.68	1.39
artificial_hi	Industrial or commercial area	121	24	0.39		80%			0	0	0			0	0	0	-0.18	4.89	-93.71	-0.83	-2.94	1.65	-61.41	n.a.	n.a.	3.15	6.57	1.35
artificial_hi	Traffic networks (road and rail	1221,				100%		n.a.	n.a.	n.a.	n.a.	n.a.		n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
artificial_li	Road/rail embankments and	122, 1224	32	0.2		50%					0				0	0	-0.12	-1.30	-8.93	-0.41	-1.14	2.58	-5.85	n.a.	n.a.	6.14	9.69	2.63
artificial_li	Green urban areas	141	29	0.27		40%					0					0	-0.14	-2.44	-13.39	-0.51	-1.47	2.14	-8.77	n.a.	n.a.	4.55	8.25	1.95
agri_hi	Conventional/intensive arable	2111	10	0.74	0%	0%											-0.97	0.50	5.67	0.99	1.53	0.99	3.72	n.a.	n.a.	1.66	4.12	0.74
agri_hi	Integrated arable	2112	7	0.82	40%	0%												0.25	4.57	0.66	0.51	0.37	3.00	n.a.	n.a.	1.50	3.80	0.64
agri_li	Organic arable	2113	26	0.35	100%	0%													-31.20			0.32	-20.47	n.a.	n.a.	3.51	7.05	1.31
agri_li	Organic orchards	2222	23	0.41		0%																n.a.	n.a.	n.a.	n.a.	3.00	6.35	1.07
agri_hi	Intensive pasture and meadows	2311	17	0.58	0%	0%											-0.32	0.84	11.01		5.11	1.24	7.23	n.a.	n.a.	2.12	4.97	0.97
agri_li	Less intensive pasture and	2312	19	0.51	40%	0%												0.73	18.72			0.83	12.28	n.a.	n.a.	2.41	5.46	1.07
agri_li	Organic pasture and meadows	2313	45	-0.14	100%	0%													-3.40				-2.23	n.a.	n.a.	-8.77	64.60	-3.21
forest	Broad-leafed forest	311	24	0.41		0%																						0
forest	Coniferous forest	312				0%																						n.a.
forest	Mixed forest	313				0%																						n.a.
forest_hi	Plantation forest			0.67		0%																						
non-use	Forest edge	314	48	-0.2		0%																						0
mix	Country average																	-0.29	-2.91	n.a.	-0.34	2.41	-1.93	n.a.	n.a.		12.46	

A-4.8 Restoration Costs/(PDF * m^2) Denmark

Average Restoration Costs per PDF and per m^2 [€/(m2*PDF)]

Country: Denmark

PPS 1.28 (Germany = 1)							Repair Costs per PDF [€/m2/PDF]																					
							Target biotopes															Target biotopes						
Biotope Group	starting Biotopes	*Corine ID-No.*	*number of species (S)*	*PDF occupation*	*Extensivie-rungsgrad*	% of sealed area	Built up land	Continuous urban fabric	Disconti-nuous urban	Urban/ Industrial fallow	Rural settlement	Industrial area	Traffic networks road and rail networks, airports, port areas	Road/rail embank-ments and associated land	Green urban areas	Intensive arable	Integrated arable	Organic arable	Organic orchards	Intensive pasture	Less intensive pasture	Organic pasture	Broad-leafed forest	Coniferous forest	Mixed forest	Plantation forest	Forest edge	Country average
artificial_hi	Built up land	*10*	*1*	*0.97*		100%		0	0	0	0	0		0	0	0	1.28	0.79	8.40	1.01	1.92	1.98	5.50	n.a.	n.a.	10.28	8.31	0.61
artificial_hi	Continuous urban fabric	*111*	*8*	*0.8*		80%			0	0	0			0	0	0	-9.60	1.09	12.06	1.79	3.05	2.34	7.90	n.a.	n.a.	3.85	9.73	0.74
artificial_hi	Discontinuous urban fabric	*112*	*22*	*0.45*		60%				0	0			0	0	0	-0.52	4.91	117.60	-3.04	-14.76	3.72	77.07	n.a.	n.a.	6.85	14.97	1.32
non-use	Urban/Industrial fallow	*113, 125*	*40*	*0*		40%																						
artificial_li	Rural settlement	*114*	*25*	*0.38*		40%									0	0	-0.44	16.36	-156.80	-1.97	-6.81	4.23	-102.76	n.a.	n.a.	8.11	16.77	1.56
artificial_hi	Industrial or commercial area	*121*	*24*	*0.39*		80%			0	0	0			0	0	0	-0.45	12.27	-235.20	-2.08	-7.38	4.15	-154.13	n.a.	n.a.	7.90	16.49	1.52
artificial_hi	Traffic networks (road and rail	*1221,*				100%		n.a.	n.a.	n.a.	n.a.	n.a.		n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
artificial_li	Road/rail embankments and	*122, 1224*	*32*	*0.2*		50%					0				0	0	-0.31	-3.27	-22.40	-1.04	-2.86	6.46	-14.68	n.a.	n.a.	15.41	24.32	2.96
artificial_li	Green urban areas	*141*	*29*	*0.27*		40%					0					0	-0.35	-6.13	-33.60	-1.27	-3.69	5.36	-22.02	n.a.	n.a.	11.42	20.70	2.20
agri_hi	Conventional/intensive arable	*2111*	*10*	*0.74*	*0%*	0%											-2.44	1.25	14.24	2.48	3.83	2.50	9.34	n.a.	n.a.	4.17	10.35	0.92
agri_hi	Integrated arable	*2112*	*7*	*0.82*	*40%*	0%												0.62	11.46	1.66	1.28	0.92	7.52	n.a.	n.a.	3.76	9.54	0.77
agri_li	Organic arable	*2113*	*26*	*0.35*	*100%*	0%													-78.32			0.81	-51.38	n.a.	n.a.	8.81	17.69	1.16
agri_li	Organic orchards	*2222*	*23*	*0.41*		0%																n.a.	n.a.	n.a.	n.a.	7.52	15.95	0.97
agri_hi	Intensive pasture and meadows	*2311*	*17*	*0.58*	*0%*	0%											-0.81	2.12	27.64		12.83	3.12	18.13	n.a.	n.a.	5.31	12.47	1.19
agri_li	Less intensive pasture and	*2312*	*19*	*0.51*	*40%*	0%												1.83	46.99			2.07	30.83	n.a.	n.a.	6.04	13.70	1.27
agri_li	Organic pasture and meadows	*2313*	*45*	*-0.14*	*100%*	0%													-8.54				-5.60	n.a.	n.a.	-22.02	162.13	-2.85
forest	Broad-leafed forest	*311*	*24*	*0.41*		0%																						0
forest	Coniferous forest	*312*				0%																						n.a.
forest	Mixed forest	*313*				0%																						n.a.
forest_hi	Plantation forest			*0.67*		0%																						
non-use	Forest edge	*314*	*48*	*-0.2*		0%																						0
mix	Country average																	-0.99	-9.98	n.a.	-1.13	7.82	-6.55	n.a.	n.a.		42.35	

A-4.9 Restoration Costs/(PDF * m²) Estonia

Average Restoration Costs per PDF and per m² [€/(m2*PDF)]

Country: Estonia

PPS 0.58 (Germany = 1)

Repair Costs per PDF [€/m2/PDF] — Target biotopes

Biotope Group	starting Biotopes	Corine ID-No.	number of species (S)	PDF occupation	Extensivie-rungsgrad	% of sealed area	Built up land	Continuous urban fabric	Disconti-nuous urban	Urban/ Industrial fallow	Rural settlement	Industrial area	Traffic networks road and rail networks, airports, port areas	Road/rail embank-ments and associated land	Green urban areas	Intensive arable	Integrated arable	Organic arable	Organic orchards	Intensive pasture	Less intensive pasture	Organic pasture	Broad-leafed forest	Coniferous forest	Mixed forest	Plantation forest	Forest edge	Country average
artificial_hi	Built up land	10	1	0.97		100%		0	0	0	0	0		0	0	0	0.58	0.36	3.81	0.46	0.87	0.90	2.49	n.a.	n.a.	4.66	3.77	0.96
artificial_hi	Continuous urban fabric	111	8	0.8		80%			0	0	0			0	0	0	-4.35	0.49	5.47	0.81	1.38	1.06	3.58	n.a.	n.a.	1.75	4.41	1.16
artificial_hi	Discontinuous urban fabric	112	22	0.45		60%				0	0			0	0	0	-0.24	2.22	53.29	-1.38	-6.69	1.69	34.92	n.a.	n.a.	3.10	6.78	2.07
non-use	Urban/Industrial fallow	113, 125	40	0		40%																						
artificial_li	Rural settlement	114	25	0.38		40%									0	0	-0.20	7.41	-71.05	-0.89	-3.09	1.91	-46.56	n.a.	n.a.	3.68	7.60	2.45
artificial_hi	Industrial or commercial area	121	24	0.39		80%			0	0	0			0	0	0	-0.20	5.56	-106.58	-0.94	-3.34	1.88	-69.84	n.a.	n.a.	3.58	7.47	2.39
artificial_hi	Traffic networks (road and rail	1221,				100%		n.a.	n.a.	n.a.	n.a.	n.a.		n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
artificial_li	Road/rail embankments and	122, 1224	32	0.2		50%					0				0	0	-0.14	-1.48	-10.15	-0.47	-1.29	2.93	-6.65	n.a.	n.a.	6.98	11.02	4.65
artificial_li	Green urban areas	141	29	0.27		40%					0					0	-0.16	-2.78	-15.23	-0.58	-1.67	2.43	-9.98	n.a.	n.a.	5.17	9.38	3.45
agri_hi	Conventional/intensive arable	2111	10	0.74	0%	0%											-1.10	0.57	6.45	1.13	1.73	1.13	4.23	n.a.	n.a.	1.89	4.69	1.28
agri_hi	Integrated arable	2112	7	0.82	40%	0%												0.28	5.19	0.75	0.58	0.42	3.41	n.a.	n.a.	1.70	4.32	1.12
agri_li	Organic arable	2113	26	0.35	100%	0%													-35.49			0.37	-23.28	n.a.	n.a.	3.99	8.01	2.51
agri_li	Organic orchards	2222	23	0.41		0%																n.a.	n.a.	n.a.	n.a.	3.41	7.23	2.11
agri_hi	Intensive pasture and meadows	2311	17	0.58	0%	0%											-0.37	0.96	12.52		5.82	1.41	8.22	n.a.	n.a.	2.41	5.65	1.65
agri_li	Less intensive pasture and	2312	19	0.51	40%	0%												0.83	21.29			0.94	13.97	n.a.	n.a.	2.74	6.21	1.85
agri_li	Organic pasture and meadows	2313	45	-0.14	100%	0%													-3.87				-2.54	n.a.	n.a.	-9.98	73.47	-6.19
forest	Broad-leafed forest	311	24	0.41		0%																						0
forest	Coniferous forest	312				0%																						n.a.
forest	Mixed forest	313				0%																						n.a.
forest_hi	Plantation forest			0.67		0%																						
non-use	Forest edge	314	48	-0.2		0%																						0
mix	Country average																	-0.19	-1.97	n.a.	-0.23	1.63	-1.30	n.a.	n.a.		8.38	

A-4.10 Restoration Costs/(PDF * m^2) Finland

Average Restoration Costs per PDF and per m^2 [€/(m2*PDF)]

Country: Finland

PPS 1.16 (Germany = 1)

Repair Costs per PDF [€/m2/PDF] — Target biotopes

Biotope Group	starting Biotopes	Corine ID-No.	number of species (S)	PDF occupation	Extensivie-rungsgrad	% of sealed area	Built up land	Continuous urban fabric	Disconti-nuous urban	Urban/ Industrial fallow	Rural settlement	Industrial area	Traffic networks road and rail networks, airports, port areas	Road/rail embank-ments and associated land	Green urban areas	Intensive arable	Integrated arable	Organic arable	Organic orchards	Intensive pasture	Less intensive pasture	Organic pasture	Broad-leafed forest	Coniferous forest	Mixed forest	Plantation forest	Forest edge	Country average
artificial_hi	Built up land	*10*	*1*	*0.97*		100%		0	0	0	0	0		0	0	0	1.16	0.72	7.61	0.92	1.74	1.79	4.99	n.a.	n.a.	9.31	7.54	2.55
artificial_hi	Continuous urban fabric	*111*	*8*	*0.8*		80%			0	0	0			0	0	0	-8.70	0.99	10.93	1.63	2.77	2.12	7.16	n.a.	n.a.	3.49	8.82	3.10
artificial_hi	Discontinuous urban fabric	*112*	*22*	*0.45*		60%				0	0			0	0	0	-0.47	4.45	106.58	-2.75	-13.37	3.38	69.84	n.a.	n.a.	6.21	13.56	5.51
non-use	Urban/Industrial fallow	*113, 125*	*40*	*0*		40%																						
artificial_li	Rural settlement	*114*	*25*	*0.38*		40%									0	0	-0.40	14.82	-142.10	-1.79	-6.17	3.83	-93.12	n.a.	n.a.	7.35	15.20	6.52
artificial_hi	Industrial or commercial area	*121*	*24*	*0.39*		80%			0	0	0			0	0	0	-0.40	11.12	-213.15	-1.88	-6.69	3.76	-139.68	n.a.	n.a.	7.16	14.94	6.35
artificial_hi	Traffic networks (road and rail	*1221,*				100%		n.a.	n.a.	n.a.	n.a.	n.a.		n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
artificial_li	Road/rail embankments and	*122, 1224*	*32*	*0.2*		50%					0				0	0	-0.28	-2.96	-20.30	-0.94	-2.59	5.86	-13.30	n.a.	n.a.	13.97	22.04	12.39
artificial_li	Green urban areas	*141*	*29*	*0.27*		40%					0					0	-0.32	-5.56	-30.45	-1.15	-3.34	4.86	-19.95	n.a.	n.a.	10.35	18.76	9.18
agri_hi	Conventional/intensive arable	*2111*	*10*	*0.74*	*0%*	0%											-2.21	1.13	12.90	2.25	3.47	2.26	8.47	n.a.	n.a.	3.78	9.38	3.36
agri_hi	Integrated arable	*2112*	*7*	*0.82*	*40%*	0%												0.56	10.39	1.50	1.16	0.83	6.81	n.a.	n.a.	3.41	8.64	3.03
agri_li	Organic arable	*2113*	*26*	*0.35*	*100%*	0%													-70.97			0.73	-46.56	n.a.	n.a.	7.98	16.03	7.02
agri_li	Organic orchards	*2222*	*23*	*0.41*		0%																n.a.	n.a.	n.a.	n.a.	6.81	14.45	5.99
agri_hi	Intensive pasture and meadows	*2311*	*17*	*0.58*	*0%*	0%											-0.74	1.92	25.05		11.63	2.83	16.43	n.a.	n.a.	4.82	11.30	4.29
agri_li	Less intensive pasture and	*2312*	*19*	*0.51*	*40%*	0%												1.66	42.58			1.88	27.94	n.a.	n.a.	5.48	12.42	4.87
agri_li	Organic pasture and meadows	*2313*	*45*	*-0.14*	*100%*	0%													-7.74				-5.08	n.a.	n.a.	-19.95	146.93	-17.55
forest	Broad-leafed forest	*311*	*24*	*0.41*		0%																						0
forest	Coniferous forest	*312*				0%																						n.a.
forest	Mixed forest	*313*				0%																						n.a.
forest_hi	Plantation forest			*0.67*		0%																						
non-use	Forest edge	*314*	*48*	*-0.2*		0%																						0
mix	Country average																	-0.13	-1.25	n.a.	-0.14	1.02	-0.82	n.a.	n.a.		5.32	

A-4.11 Restoration Costs/(PDF * m²) France

Average Restoration Costs per PDF and per m² [€/(m2*PDF)]

Country: France

PPS 0.97 (Germany = 1)							Repair Costs per PDF [€/m2/PDF]																					
													Target biotopes									Target biotopes						
Biotope Group	starting Biotopes	*Corine ID-No.*	*number of species (S)*	*PDF occupation*	*Extensivie-rungsgrad*	% of sealed area	Built up land	Continuous urban fabric	Disconti-nuous urban	Urban/ Industrial fallow	Rural settlement	Industrial area	Traffic networks road and rail networks, airports, port areas	Road/rail embank-ments and associated land	Green urban areas	Intensive arable	Integrated arable	Organic arable	Organic orchards	Intensive pasture	Less intensive pasture	Organic pasture	Broad-leafed forest	Coniferous forest	Mixed forest	Plantation forest	Forest edge	Country average
artificial_hi	Built up land	*10*	*1*	*0.97*		100%		0	0	0	0	0		0	0	0	0.97	0.60	6.37	0.77	1.46	1.50	4.17	n.a.	n.a.	7.79	6.30	1.13
artificial_hi	Continuous urban fabric	*111*	*8*	*0.8*		80%			0	0	0			0	0	0	-7.28	0.83	9.14	1.36	2.31	1.77	5.99	n.a.	n.a.	2.92	7.37	1.37
artificial_hi	Discontinuous urban fabric	*112*	*22*	*0.45*		60%				0	0			0	0	0	-0.39	3.72	89.12	-2.30	-11.18	2.82	58.40	n.a.	n.a.	5.19	11.34	2.43
non-use	Urban/Industrial fallow	*113, 125*	*40*	*0*		40%																						
artificial_li	Rural settlement	*114*	*25*	*0.38*		40%									0	0	-0.33	12.39	-118.83	-1.50	-5.16	3.20	-77.87	n.a.	n.a.	6.15	12.71	2.87
artificial_hi	Industrial or commercial area	*121*	*24*	*0.39*		80%			0	0	0			0	0	0	-0.34	9.30	-178.24	-1.57	-5.59	3.14	-116.80	n.a.	n.a.	5.99	12.49	2.80
artificial_hi	Traffic networks (road and rail	*1221,*				100%		n.a.	n.a.	n.a.	n.a.	n.a.		n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
artificial_li	Road/rail embankments and	*122, 1224*	*32*	*0.2*		50%					0				0	0	-0.23	-2.48	-16.98	-0.79	-2.16	4.90	-11.12	n.a.	n.a.	11.68	18.43	5.46
artificial_li	Green urban areas	*141*	*29*	*0.27*		40%					0					0	-0.26	-4.65	-25.46	-0.96	-2.80	4.06	-16.69	n.a.	n.a.	8.65	15.69	4.05
agri_hi	Conventional/intensive arable	*2111*	*10*	*0.74*	*0%*	0%											-1.85	0.95	10.79	1.88	2.90	1.89	7.08	n.a.	n.a.	3.16	7.84	1.53
agri_hi	Integrated arable	*2112*	*7*	*0.82*	*40%*	0%												0.47	8.69	1.25	0.97	0.70	5.70	n.a.	n.a.	2.85	7.23	1.27
agri_li	Organic arable	*2113*	*26*	*0.35*	*100%*	0%													-59.35			0.61	-38.93	n.a.	n.a.	6.67	13.40	2.64
agri_li	Organic orchards	*2222*	*23*	*0.41*		0%																n.a.	n.a.	n.a.	n.a.	5.70	12.09	1.90
agri_hi	Intensive pasture and meadows	*2311*	*17*	*0.58*	*0%*	0%											-0.62	1.61	20.95		9.73	2.36	13.74	n.a.	n.a.	4.03	9.45	2.03
agri_li	Less intensive pasture and	*2312*	*19*	*0.51*	*40%*	0%												1.38	35.61			1.57	23.36	n.a.	n.a.	4.58	10.38	2.23
agri_li	Organic pasture and meadows	*2313*	*45*	*-0.14*	*100%*	0%													-6.47				-4.25	n.a.	n.a.	-16.69	122.87	-6.25
forest	Broad-leafed forest	*311*	*24*	*0.41*		0%																						0
forest	Coniferous forest	*312*				0%																						n.a.
forest	Mixed forest	*313*				0%																						n.a.
forest_hi	Plantation forest			*0.67*		0%																						
non-use	Forest edge	*314*	*48*	*-0.2*		0%																						0
mix	Country average																	-0.55	-5.55	n.a.	-0.69	4.85	-3.79	n.a.	n.a.		24.54	

A-4.12 Restoration Costs/(PDF * m^2) Greece

Average Restoration Costs per PDF and per m^2 [€/(m2*PDF)]

Country: Greece

PPS 0.78 (Germany = 1)

Repair Costs per PDF [€/m2/PDF] — Target biotopes

Biotope Group	starting Biotopes	Corine ID-No.	number of species (S)	PDF occupation	Extensivierungsgrad	% of sealed area	Built up land	Continuous urban fabric	Discontinuous urban	Urban/ Industrial fallow	Rural settlement	Industrial area	Traffic networks road and rail networks, airports, port areas	Road/rail embankments and associated land	Green urban areas	Intensive arable	Integrated arable	Organic arable	Organic orchards	Intensive pasture	Less intensive pasture	Organic pasture	Broad-leafed forest	Coniferous forest	Mixed forest	Plantation forest	Forest edge	Country average
artificial_hi	Built up land	*10*	*1*	*0.97*		100%		0	0	0	0	0		0	0	0	0.78	0.48	5.12	0.62	1.17	1.21	3.35	n.a.	n.a.	6.26	5.07	1.32
artificial_hi	Continuous urban fabric	*111*	*8*	*0.8*		80%			0	0	0			0	0	0	-5.85	0.66	7.35	1.09	1.86	1.42	4.82	n.a.	n.a.	2.35	5.93	1.60
artificial_hi	Discontinuous urban fabric	*112*	*22*	*0.45*		60%				0	0			0	0	0	-0.32	2.99	71.66	-1.85	-8.99	2.27	46.96	n.a.	n.a.	4.17	9.12	2.85
non-use	Urban/Industrial fallow	*113, 125*	*40*	*0*		40%																						
artificial_li	Rural settlement	*114*	*25*	*0.38*		40%									0	0	-0.27	9.97	-95.55	-1.20	-4.15	2.58	-62.62	n.a.	n.a.	4.94	10.22	3.37
artificial_hi	Industrial or commercial area	*121*	*24*	*0.39*		80%			0	0	0			0	0	0	-0.27	7.47	-143.33	-1.27	-4.50	2.53	-93.93	n.a.	n.a.	4.82	10.05	3.29
artificial_hi	Traffic networks (road and rail	*1221,*				100%		n.a.	n.a.	n.a.	n.a.	n.a.		n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
artificial_li	Road/rail embankments and	*122, 1224*	*32*	*0.2*		50%					0				0	0	-0.19	-1.99	-13.65	-0.63	-1.74	3.94	-8.95	n.a.	n.a.	9.39	14.82	6.41
artificial_li	Green urban areas	*141*	*29*	*0.27*		40%					0					0	-0.21	-3.74	-20.48	-0.78	-2.25	3.27	-13.42	n.a.	n.a.	6.96	12.61	4.75
agri_hi	Conventional/intensive arable	*2111*	*10*	*0.74*	*0%*	0%											-1.48	0.76	8.68	1.51	2.33	1.52	5.69	n.a.	n.a.	2.54	6.31	1.77
agri_hi	Integrated arable	*2112*	*7*	*0.82*	*40%*	0%												0.38	6.98	1.01	0.78	0.56	4.58	n.a.	n.a.	2.29	5.81	1.58
agri_li	Organic arable	*2113*	*26*	*0.35*	*100%*	0%													-47.72			0.49	-31.31	n.a.	n.a.	5.37	10.78	3.52
agri_li	Organic orchards	*2222*	*23*	*0.41*		0%																n.a.	n.a.	n.a.	n.a.	4.58	9.72	2.55
agri_hi	Intensive pasture and meadows	*2311*	*17*	*0.58*	*0%*	0%											-0.49	1.29	16.84		7.82	1.90	11.05	n.a.	n.a.	3.24	7.60	2.25
agri_li	Less intensive pasture and	*2312*	*19*	*0.51*	*40%*	0%												1.11	28.63			1.26	18.79	n.a.	n.a.	3.68	8.35	2.54
agri_li	Organic pasture and meadows	*2313*	*45*	*-0.14*	*100%*	0%													-5.21				-3.42	n.a.	n.a.	-13.42	98.80	-8.78
forest	Broad-leafed forest	*311*	*24*	*0.41*		0%																						0
forest	Coniferous forest	*312*				0%																						n.a.
forest	Mixed forest	*313*				0%																						n.a.
forest_hi	Plantation forest			*0.67*		0%																						
non-use	Forest edge	*314*	*48*	*-0.2*		0%																						0
mix	Country average																	-0.26	-2.65	n.a.	-0.30	2.04	-2.04	n.a.	n.a.		13.17	

A-4.13 Restoration Costs/(PDF * m^2) Hungary

Average Restoration Costs per PDF and per m^2 [€/(m2*PDF)]

Country: Hungary

PPS 0.54 (Germany = 1)							Repair Costs per PDF [€/m2/PDF]																					
							Target biotopes														Target biotopes							
Biotope Group	starting Biotopes	*Corine ID-No.*	*number of species (S)*	*PDF occupation*	*Extensivie-rungsgrad*	% of sealed area	Built up land	Continuous urban fabric	Disconti-nuous urban	Urban/ Industrial fallow	Rural settlement	Industrial area	Traffic networks road and rail networks, airports, port areas	Road/rail embank-ments and associated land	Green urban areas	Intensive arable	Integrated arable	Organic arable	Organic orchards	Intensive pasture	Less intensive pasture	Organic pasture	Broad-leafed forest	Coniferous forest	Mixed forest	Plantation forest	Forest edge	Country average
artificial_hi	Built up land	*10*	*1*	*0.97*		100%		0	0	0	0	0		0	0	0	0.54	0.33	3.54	0.43	0.81	0.84	2.32	n.a.	n.a.	4.34	3.51	0.47
artificial_hi	Continuous urban fabric	*111*	*8*	*0.8*		80%			0	0	0			0	0	0	-4.05	0.46	5.09	0.76	1.29	0.99	3.33	n.a.	n.a.	1.63	4.10	0.56
artificial_hi	Discontinuous urban fabric	*112*	*22*	*0.45*		60%				0	0			0	0	0	-0.22	2.07	49.61	-1.28	-6.23	1.57	32.51	n.a.	n.a.	2.89	6.31	1.00
non-use	Urban/Industrial fallow	*113, 125*	*40*	*0*		40%																						
artificial_li	Rural settlement	*114*	*25*	*0.38*		40%									0	0	-0.18	6.90	-66.15	-0.83	-2.87	1.78	-43.35	n.a.	n.a.	3.42	7.08	1.19
artificial_hi	Industrial or commercial area	*121*	*24*	*0.39*		80%			0	0	0			0	0	0	-0.19	5.18	-99.23	-0.88	-3.11	1.75	-65.03	n.a.	n.a.	3.33	6.96	1.16
artificial_hi	Traffic networks (road and rail	*1221,*				100%		n.a.	n.a.	n.a.	n.a.	n.a.		n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
artificial_li	Road/rail embankments and	*122, 1224*	*32*	*0.2*		50%					0				0	0	-0.13	-1.38	-9.45	-0.44	-1.20	2.73	-6.19	n.a.	n.a.	6.50	10.26	2.26
artificial_li	Green urban areas	*141*	*29*	*0.27*		40%					0					0	-0.15	-2.59	-14.18	-0.54	-1.56	2.26	-9.29	n.a.	n.a.	4.82	8.73	1.67
agri_hi	Conventional/intensive arable	*2111*	*10*	*0.74*	*0%*	0%											-1.03	0.53	6.01	1.05	1.62	1.05	3.94	n.a.	n.a.	1.76	4.37	0.65
agri_hi	Integrated arable	*2112*	*7*	*0.82*	*40%*	0%												0.26	4.84	0.70	0.54	0.39	3.17	n.a.	n.a.	1.59	4.02	0.55
agri_li	Organic arable	*2113*	*26*	*0.35*	*100%*	0%													-33.04			0.34	-21.68	n.a.	n.a.	3.72	7.46	1.06
agri_li	Organic orchards	*2222*	*23*	*0.41*		0%																n.a.	n.a.	n.a.	n.a.	3.17	6.73	0.76
agri_hi	Intensive pasture and meadows	*2311*	*17*	*0.58*	*0%*	0%											-0.34	0.89	11.66		5.41	1.32	7.65	n.a.	n.a.	2.24	5.26	0.85
agri_li	Less intensive pasture and	*2312*	*19*	*0.51*	*40%*	0%												0.77	19.82			0.87	13.01	n.a.	n.a.	2.55	5.78	0.93
agri_li	Organic pasture and meadows	*2313*	*45*	*-0.14*	*100%*	0%													-3.60				-2.36	n.a.	n.a.	-9.29	68.40	-2.55
forest	Broad-leafed forest	*311*	*24*	*0.41*		0%																						0
forest	Coniferous forest	*312*				0%																						n.a.
forest	Mixed forest	*313*				0%																						n.a.
forest_hi	Plantation forest			*0.67*		0%																						
non-use	Forest edge	*314*	*48*	*-0.2*		0%																						0
mix	Country average																	-0.35	-3.56	n.a.	-0.42	2.90	-2.41	n.a.	n.a.		15.58	

A-4.14 Restoration Costs/(PDF * m^2) Iceland

Average Restoration Costs per PDF and per m^2 [€/(m2*PDF)]

Country: Iceland

PPS 1.24 (Germany = 1)							Repair Costs per PDF [€/m2/PDF]																					
							Target biotopes																					
Biotope Group	starting Biotopes	*Corine ID-No.*	*number of species (S)*	*PDF occupation*	*Extensivie-rungsgrad*	% of sealed area	Built up land	Continuous urban fabric	Disconti-nuous urban	Urban/ Industrial fallow	Rural settlement	Industrial area	Traffic networks road and rail networks, airports, port areas	Road/rail embank-ments and associated land	Green urban areas	Intensive arable	Integrated arable	Organic arable	Organic orchards	Intensive pasture	Less intensive pasture	Organic pasture	Broad-leafed forest	Coniferous forest	Mixed forest	Plantation forest	Forest edge	Country average
artificial_hi	Built up land	*10*	*1*	*0.97*		100%		0	0	0	0	0		0	0	0	1.24	0.77	8.14	0.98	1.86	1.92	5.33	n.a.	n.a.	9.95	8.05	2.73
artificial_hi	Continuous urban fabric	*111*	*8*	*0.8*		80%			0	0	0			0	0	0	-9.30	1.06	11.68	1.74	2.96	2.26	7.66	n.a.	n.a.	3.73	9.42	3.31
artificial_hi	Discontinuous urban fabric	*112*	*22*	*0.45*		60%				0	0			0	0	0	-0.50	4.75	113.93	-2.94	-14.29	3.61	74.66	n.a.	n.a.	6.64	14.50	5.89
non-use	Urban/Industrial fallow	*113, 125*	*40*	*0*		40%																						
artificial_li	Rural settlement	*114*	*25*	*0.38*		40%									0	0	-0.42	15.84	-151.90	-1.91	-6.60	4.09	-99.54	n.a.	n.a.	7.86	16.25	6.97
artificial_hi	Industrial or commercial area	*121*	*24*	*0.39*		80%			0	0	0			0	0	0	-0.43	11.88	-227.85	-2.01	-7.15	4.02	-149.32	n.a.	n.a.	7.66	15.97	6.79
artificial_hi	Traffic networks (road and rail	*1221,*				100%		n.a.	n.a.	n.a.	n.a.	n.a.		n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
artificial_li	Road/rail embankments and	*122, 1224*	*32*	*0.2*		50%					0				0	0	-0.30	-3.17	-21.70	-1.01	-2.77	6.26	-14.22	n.a.	n.a.	14.93	23.56	13.24
artificial_li	Green urban areas	*141*	*29*	*0.27*		40%					0					0	-0.34	-5.94	-32.55	-1.23	-3.57	5.19	-21.33	n.a.	n.a.	11.06	20.05	9.81
agri_hi	Conventional/intensive arable	*2111*	*10*	*0.74*	*0%*	0%											-2.36	1.21	13.79	2.41	3.71	2.42	9.05	n.a.	n.a.	4.04	10.03	3.60
agri_hi	Integrated arable	*2112*	*7*	*0.82*	*40%*	0%												0.60	11.10	1.60	1.24	0.89	7.28	n.a.	n.a.	3.64	9.24	3.24
agri_li	Organic arable	*2113*	*26*	*0.35*	*100%*	0%													-75.87			0.79	-49.77	n.a.	n.a.	8.53	17.13	7.50
agri_li	Organic orchards	*2222*	*23*	*0.41*		0%																n.a.	n.a.	n.a.	n.a.	7.28	15.45	6.40
agri_hi	Intensive pasture and meadows	*2311*	*17*	*0.58*	*0%*	0%											-0.79	2.05	26.78		12.43	3.02	17.57	n.a.	n.a.	5.15	12.08	4.59
agri_li	Less intensive pasture and	*2312*	*19*	*0.51*	*40%*	0%												1.77	45.52			2.01	29.86	n.a.	n.a.	5.86	13.27	5.21
agri_li	Organic pasture and meadows	*2313*	*45*	*-0.14*	*100%*	0%													-8.28				-5.43	n.a.	n.a.	-21.33	157.07	-18.76
forest	Broad-leafed forest	*311*	*24*	*0.41*		0%																						0
forest	Coniferous forest	*312*				0%																						n.a.
forest	Mixed forest	*313*				0%																						n.a.
forest_hi	Plantation forest			*0.67*		0%																						
non-use	Forest edge	*314*	*48*	*-0.2*		0%																						0
mix	Country average																	-0.13	-1.34	n.a.	-0.15	1.09	-0.88	n.a.	n.a.		5.69	

A-4.15 Restoration Costs/(PDF * m^2) Ireland

Average Restoration Costs per PDF and per m^2 [€/(m2*PDF)]

Country: Ireland

PPS 1.16 (Germany = 1)							Repair Costs per PDF [€/m2/PDF]																					
							Target biotopes											Target biotopes										
Biotope Group	starting Biotopes	*Corine ID-No.*	*number of species (S)*	*PDF occupation*	*Extensivie-rungsgrad*	% of sealed area	Built up land	Continuous urban fabric	Disconti-nuous urban	Urban/ Industrial fallow	Rural settlement	Industrial area	Traffic networks road and rail networks, airports, port areas	Road/rail embank-ments and associated land	Green urban areas	Intensive arable	Integrated arable	Organic arable	Organic orchards	Intensive pasture	Less intensive pasture	Organic pasture	Broad-leafed forest	Coniferous forest	Mixed forest	Plantation forest	Forest edge	Country average
artificial_hi	Built up land	*10*	*1*	*0.97*		100%		0	0	0	0	0		0	0	0	1.16	0.72	7.61	0.92	1.74	1.79	4.99	n.a.	n.a.	9.31	7.54	1.14
artificial_hi	Continuous urban fabric	*111*	*8*	*0.8*		80%			0	0	0			0	0	0	-8.70	0.99	10.93	1.63	2.77	2.12	7.16	n.a.	n.a.	3.49	8.82	1.38
artificial_hi	Discontinuous urban fabric	*112*	*22*	*0.45*		60%				0	0			0	0	0	-0.47	4.45	106.58	-2.75	-13.37	3.38	69.84	n.a.	n.a.	6.21	13.56	2.46
non-use	Urban/Industrial fallow	*113, 125*	*40*	*0*		40%																						
artificial_li	Rural settlement	*114*	*25*	*0.38*		40%									0	0	-0.40	14.82	-142.10	-1.79	-6.17	3.83	-93.12	n.a.	n.a.	7.35	15.20	2.91
artificial_hi	Industrial or commercial area	*121*	*24*	*0.39*		80%			0	0	0			0	0	0	-0.40	11.12	-213.15	-1.88	-6.69	3.76	-139.68	n.a.	n.a.	7.16	14.94	2.83
artificial_hi	Traffic networks (road and rail	*1221,*				100%		n.a.	n.a.	n.a.	n.a.	n.a.		n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
artificial_li	Road/rail embankments and	*122, 1224*	*32*	*0.2*		50%					0				0	0	-0.28	-2.96	-20.30	-0.94	-2.59	5.86	-13.30	n.a.	n.a.	13.97	22.04	5.53
artificial_li	Green urban areas	*141*	*29*	*0.27*		40%					0					0	-0.32	-5.56	-30.45	-1.15	-3.34	4.86	-19.95	n.a.	n.a.	10.35	18.76	4.09
agri_hi	Conventional/intensive arable	*2111*	*10*	*0.74*	*0%*	0%											-2.21	1.13	12.90	2.25	3.47	2.26	8.47	n.a.	n.a.	3.78	9.38	1.52
agri_hi	Integrated arable	*2112*	*7*	*0.82*	*40%*	0%												0.56	10.39	1.50	1.16	0.83	6.81	n.a.	n.a.	3.41	8.64	0.93
agri_li	Organic arable	*2113*	*26*	*0.35*	*100%*	0%													-70.97			0.73	-46.56	n.a.	n.a.	7.98	16.03	1.77
agri_li	Organic orchards	*2222*	*23*	*0.41*		0%																n.a.	n.a.	n.a.	n.a.	6.81	14.45	0.95
agri_hi	Intensive pasture and meadows	*2311*	*17*	*0.58*	*0%*	0%											-0.74	1.92	25.05		11.63	2.83	16.43	n.a.	n.a.	4.82	11.30	2.36
agri_li	Less intensive pasture and	*2312*	*19*	*0.51*	*40%*	0%												1.66	42.58			1.88	27.94	n.a.	n.a.	5.48	12.42	2.41
agri_li	Organic pasture and meadows	*2313*	*45*	*-0.14*	*100%*	0%													-7.74				-5.08	n.a.	n.a.	-19.95	146.93	-2.78
forest	Broad-leafed forest	*311*	*24*	*0.41*		0%																						0
forest	Coniferous forest	*312*				0%																						n.a.
forest	Mixed forest	*313*				0%																						n.a.
forest_hi	Plantation forest			*0.67*		0%																						
non-use	Forest edge	*314*	*48*	*-0.2*		0%																						0
mix	Country average																	-0.87	-8.94	n.a.	-1.28	9.28	-5.86	n.a.	n.a.		37.94	

A-4.16 Restoration Costs/(PDF * m²) Italy

Average Restoration Costs per PDF and per m² [€/(m2*PDF)]

Country: Italy

PPS	0.94 (Germany = 1)						Repair Costs per PDF [€/m2/PDF]																					
							Target biotopes														Target biotopes							
Biotope Group	starting Biotopes	*Corine ID-No.*	*number of species (S)*	*PDF occupation*	*Extensivierungsgrad*	% of sealed area	Built up land	Continuous urban fabric	Discontinuous urban	Urban/ Industrial fallow	Rural settlement	Industrial area	Traffic networks road and rail networks, airports, port areas	Road/rail embankments and associated land	Green urban areas	Intensive arable	Integrated arable	Organic arable	Organic orchards	Intensive pasture	Less intensive pasture	Organic pasture	Broad-leafed forest	Coniferous forest	Mixed forest	Plantation forest	Forest edge	Country average
artificial_hi	Built up land	*10*	*1*	*0.97*		100%		0	0	0	0	0		0	0	0	0.94	0.58	6.17	0.74	1.41	1.45	4.04	n.a.	n.a.	7.55	6.11	1.31
artificial_hi	Continuous urban fabric	*111*	*8*	*0.8*		80%			0	0	0			0	0	0	-7.05	0.80	8.86	1.32	2.24	1.72	5.80	n.a.	n.a.	2.83	7.14	1.58
artificial_hi	Discontinuous urban fabric	*112*	*22*	*0.45*		60%				0	0			0	0	0	-0.38	3.60	86.36	-2.23	-10.84	2.74	56.60	n.a.	n.a.	5.03	10.99	2.81
non-use	Urban/Industrial fallow	*113, 125*	*40*	*0*		40%																						
artificial_li	Rural settlement	*114*	*25*	*0.38*		40%									0	0	-0.32	12.01	-115.15	-1.45	-5.00	3.10	-75.46	n.a.	n.a.	5.96	12.32	3.33
artificial_hi	Industrial or commercial area	*121*	*24*	*0.39*		80%			0	0	0			0	0	0	-0.33	9.01	-172.73	-1.53	-5.42	3.04	-113.19	n.a.	n.a.	5.80	12.11	3.25
artificial_hi	Traffic networks (road and rail	*1221,*				100%		n.a.	n.a.	n.a.	n.a.	n.a.		n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
artificial_li	Road/rail embankments and	*122, 1224*	*32*	*0.2*		50%					0				0	0	-0.23	-2.40	-16.45	-0.76	-2.10	4.75	-10.78	n.a.	n.a.	11.32	17.86	6.33
artificial_li	Green urban areas	*141*	*29*	*0.27*		40%					0					0	-0.26	-4.50	-24.68	-0.93	-2.71	3.94	-16.17	n.a.	n.a.	8.38	15.20	4.69
agri_hi	Conventional/intensive arable	*2111*	*10*	*0.74*	*0%*	0%											-1.79	0.92	10.46	1.82	2.81	1.83	6.86	n.a.	n.a.	3.06	7.60	1.76
agri_hi	Integrated arable	*2112*	*7*	*0.82*	*40%*	0%												0.46	8.42	1.22	0.94	0.67	5.52	n.a.	n.a.	2.76	7.00	1.56
agri_li	Organic arable	*2113*	*26*	*0.35*	*100%*	0%													-57.51			0.60	-37.73	n.a.	n.a.	6.47	12.99	3.37
agri_li	Organic orchards	*2222*	*23*	*0.41*		0%																n.a.	n.a.	n.a.	n.a.	5.52	11.71	2.23
agri_hi	Intensive pasture and meadows	*2311*	*17*	*0.58*	*0%*	0%											-0.60	1.56	20.30		9.43	2.29	13.32	n.a.	n.a.	3.90	9.16	2.26
agri_li	Less intensive pasture and	*2312*	*19*	*0.51*	*40%*	0%												1.34	34.51			1.52	22.64	n.a.	n.a.	4.44	10.06	2.53
agri_li	Organic pasture and meadows	*2313*	*45*	*-0.14*	*100%*	0%													-6.27				-4.12	n.a.	n.a.	-16.17	119.07	-8.40
forest	Broad-leafed forest	*311*	*24*	*0.41*		0%																						0
forest	Coniferous forest	*312*				0%																						n.a.
forest	Mixed forest	*313*				0%																						n.a.
forest_hi	Plantation forest			*0.67*		0%																						
non-use	Forest edge	*314*	*48*	*-0.2*		0%																						0
mix	Country average																	-0.44	-4.38	n.a.	-0.50	3.49	-3.29	n.a.	n.a.		21.30	

A-4.17 Restoration Costs/(PDF * m^2) Latvia

Average Restoration Costs per PDF and per m^2 [€/(m2*PDF)]

Country: Latvia

PPS 0.51 (Germany = 1)

Repair Costs per PDF [€/m2/PDF] – Target biotopes

Biotope Group	starting Biotopes	Corine ID-No.	number of species (S)	PDF occupation	Extensivie-rungsgrad	% of sealed area	Built up land	Continuous urban fabric	Disconti-nuous urban	Urban/ Industrial fallow	Rural settlement	Industrial area	Traffic networks road and rail networks, airports, port areas	Road/rail embank-ments and associated land	Green urban areas	Intensive arable	Integrated arable	Organic arable	Organic orchards	Intensive pasture	Less intensive pasture	Organic pasture	Broad-leafed forest	Coniferous forest	Mixed forest	Plantation forest	Forest edge	Country average
artificial_hi	Built up land	10	1	0.97		100%		0	0	0	0	0		0	0	0	0.51	0.32	3.35	0.40	0.77	0.79	2.19	n.a.	n.a.	4.09	3.31	0.77
artificial_hi	Continuous urban fabric	111	8	0.8		80%			0	0	0			0	0	0	-3.83	0.43	4.81	0.71	1.22	0.93	3.15	n.a.	n.a.	1.54	3.88	0.93
artificial_hi	Discontinuous urban fabric	112	22	0.45		60%				0	0			0	0	0	-0.21	1.96	46.86	-1.21	-5.88	1.48	30.71	n.a.	n.a.	2.73	5.96	1.66
non-use	Urban/Industrial fallow	113, 125	40	0		40%																						
artificial_li	Rural settlement	114	25	0.38		40%									0	0	-0.17	6.52	-62.48	-0.79	-2.71	1.68	-40.94	n.a.	n.a.	3.23	6.68	1.96
artificial_hi	Industrial or commercial area	121	24	0.39		80%			0	0	0			0	0	0	-0.18	4.89	-93.71	-0.83	-2.94	1.65	-61.41	n.a.	n.a.	3.15	6.57	1.91
artificial_hi	Traffic networks (road and rail	1221,				100%		n.a.	n.a.	n.a.	n.a.	n.a.		n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
artificial_li	Road/rail embankments and	122, 1224	32	0.2		50%					0				0	0	-0.12	-1.30	-8.93	-0.41	-1.14	2.58	-5.85	n.a.	n.a.	6.14	9.69	3.73
artificial_li	Green urban areas	141	29	0.27		40%					0					0	-0.14	-2.44	-13.39	-0.51	-1.47	2.14	-8.77	n.a.	n.a.	4.55	8.25	2.76
agri_hi	Conventional/intensive arable	2111	10	0.74	0%	0%											-0.97	0.50	5.67	0.99	1.53	0.99	3.72	n.a.	n.a.	1.66	4.12	1.03
agri_hi	Integrated arable	2112	7	0.82	40%	0%												0.25	4.57	0.66	0.51	0.37	3.00	n.a.	n.a.	1.50	3.80	0.88
agri_li	Organic arable	2113	26	0.35	100%	0%													-31.20			0.32	-20.47	n.a.	n.a.	3.51	7.05	1.92
agri_li	Organic orchards	2222	23	0.41		0%																n.a.	n.a.	n.a.	n.a.	3.00	6.35	1.58
agri_hi	Intensive pasture and meadows	2311	17	0.58	0%	0%											-0.32	0.84	11.01		5.11	1.24	7.23	n.a.	n.a.	2.12	4.97	1.35
agri_li	Less intensive pasture and	2312	19	0.51	40%	0%												0.73	18.72			0.83	12.28	n.a.	n.a.	2.41	5.46	1.50
agri_li	Organic pasture and meadows	2313	45	-0.14	100%	0%													-3.40				-2.23	n.a.	n.a.	-8.77	64.60	-4.64
forest	Broad-leafed forest	311	24	0.41		0%																						0
forest	Coniferous forest	312				0%																						n.a.
forest	Mixed forest	313				0%																						n.a.
forest_hi	Plantation forest			0.67		0%																						
non-use	Forest edge	314	48	-0.2		0%																						0
mix	Country average																	-0.21	-2.15	n.a.	-0.27	1.87	-1.42	n.a.	n.a.		9.15	

A-4.18 Restoration Costs/(PDF * m^2) Lithuania

Average Restoration Costs per PDF and per m^2 [€/(m2*PDF)]

Country: Lithuania

PPS 0.51 (Germany = 1)

Repair Costs per PDF [€/m2/PDF] — Target biotopes

Biotope Group	starting Biotopes	Corine ID-No.	number of species (S)	PDF occupation	Extensivie-rungsgrad	% of sealed area	Built up land	Continuous urban fabric	Disconti-nuous urban	Urban/ Industrial fallow	Rural settlement	Industrial area	Traffic networks road and rail networks, airports, port areas	Road/rail embank-ments and associated land	Green urban areas	Intensive arable	Integrated arable	Organic arable	Organic orchards	Intensive pasture	Less intensive pasture	Organic pasture	Broad-leafed forest	Coniferous forest	Mixed forest	Plantation forest	Forest edge	Country average
artificial_hi	Built up land	*10*	*1*	*0.97*		100%		0	0	0	0	0		0	0	0	0.51	0.32	3.35	0.40	0.77	0.79	2.19	n.a.	n.a.	4.09	3.31	0.50
artificial_hi	Continuous urban fabric	*111*	*8*	*0.8*		80%			0	0	0			0	0	0	-3.83	0.43	4.81	0.71	1.22	0.93	3.15	n.a.	n.a.	1.54	3.88	0.61
artificial_hi	Discontinuous urban fabric	*112*	*22*	*0.45*		60%				0	0			0	0	0	-0.21	1.96	46.86	-1.21	-5.88	1.48	30.71	n.a.	n.a.	2.73	5.96	1.09
non-use	Urban/Industrial fallow	*113, 125*	*40*	*0*		40%																						
artificial_li	Rural settlement	*114*	*25*	*0.38*		40%									0	0	-0.17	6.52	-62.48	-0.79	-2.71	1.68	-40.94	n.a.	n.a.	3.23	6.68	1.29
artificial_hi	Industrial or commercial area	*121*	*24*	*0.39*		80%			0	0	0			0	0	0	-0.18	4.89	-93.71	-0.83	-2.94	1.65	-61.41	n.a.	n.a.	3.15	6.57	1.25
artificial_hi	Traffic networks (road and rail	*1221,*				100%		n.a.	n.a.	n.a.	n.a.	n.a.		n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
artificial_li	Road/rail embankments and	*122, 1224*	*32*	*0.2*		50%					0				0	0	-0.12	-1.30	-8.93	-0.41	-1.14	2.58	-5.85	n.a.	n.a.	6.14	9.69	2.44
artificial_li	Green urban areas	*141*	*29*	*0.27*		40%					0					0	-0.14	-2.44	-13.39	-0.51	-1.47	2.14	-8.77	n.a.	n.a.	4.55	8.25	1.81
agri_hi	Conventional/intensive arable	*2111*	*10*	*0.74*	*0%*	0%											-0.97	0.50	5.67	0.99	1.53	0.99	3.72	n.a.	n.a.	1.66	4.12	0.70
agri_hi	Integrated arable	*2112*	*7*	*0.82*	*40%*	0%												0.25	4.57	0.66	0.51	0.37	3.00	n.a.	n.a.	1.50	3.80	0.59
agri_li	Organic arable	*2113*	*26*	*0.35*	*100%*	0%													-31.20			0.32	-20.47	n.a.	n.a.	3.51	7.05	1.19
agri_li	Organic orchards	*2222*	*23*	*0.41*		0%																n.a.	n.a.	n.a.	n.a.	3.00	6.35	0.98
agri_hi	Intensive pasture and meadows	*2311*	*17*	*0.58*	*0%*	0%											-0.32	0.84	11.01		5.11	1.24	7.23	n.a.	n.a.	2.12	4.97	0.91
agri_li	Less intensive pasture and	*2312*	*19*	*0.51*	*40%*	0%												0.73	18.72			0.83	12.28	n.a.	n.a.	2.41	5.46	1.00
agri_li	Organic pasture and meadows	*2313*	*45*	*-0.14*	*100%*	0%													-3.40				-2.23	n.a.	n.a.	-8.77	64.60	-2.90
forest	Broad-leafed forest	*311*	*24*	*0.41*		0%																						0
forest	Coniferous forest	*312*				0%																						n.a.
forest	Mixed forest	*313*				0%																						n.a.
forest_hi	Plantation forest			*0.67*		0%																						
non-use	Forest edge	*314*	*48*	*-0.2*		0%																						0
mix	Country average																	-0.30	-3.06	n.a.	-0.35	2.43	-2.01	n.a.	n.a.		13.01	

A-4.19 Restoration Costs/(PDF * m^2) Luxembourg

Average Restoration Costs per PDF and per m^2 [€/(m2*PDF)]

Country: Luxembourg

PPS 0.97 (Germany = 1)							Repair Costs per PDF [€/m2/PDF]																					
							Target biotopes										Target biotopes											
Biotope Group	starting Biotopes	*Corine ID-No.*	*number of species (S)*	*PDF occupation*	*Extensivierungsgrad*	% of sealed area	Built up land	Continuous urban fabric	Discontinuous urban	Urban/ Industrial fallow	Rural settlement	Industrial area	Traffic networks road and rail networks, airports, port areas	Road/rail embankments and associated land	Green urban areas	Intensive arable	Integrated arable	Organic arable	Organic orchards	Intensive pasture	Less intensive pasture	Organic pasture	Broad-leafed forest	Coniferous forest	Mixed forest	Plantation forest	Forest edge	Country average
artificial_hi	Built up land	*10*	*1*	*0.97*		100%		0	0	0	0	0		0	0	0	0.97	0.60	6.37	0.77	1.46	1.50	4.17	n.a.	n.a.	7.79	6.30	1.07
artificial_hi	Continuous urban fabric	*111*	*8*	*0.8*		80%			0	0	0			0	0	0	-7.28	0.83	9.14	1.36	2.31	1.77	5.99	n.a.	n.a.	2.92	7.37	1.29
artificial_hi	Discontinuous urban fabric	*112*	*22*	*0.45*		60%				0	0			0	0	0	-0.39	3.72	89.12	-2.30	-11.18	2.82	58.40	n.a.	n.a.	5.19	11.34	2.30
non-use	Urban/Industrial fallow	*113, 125*	*40*	*0*		40%																						
artificial_li	Rural settlement	*114*	*25*	*0.38*		40%									0	0	-0.33	12.39	-118.83	-1.50	-5.16	3.20	-77.87	n.a.	n.a.	6.15	12.71	2.72
artificial_hi	Industrial or commercial area	*121*	*24*	*0.39*		80%			0	0	0			0	0	0	-0.34	9.30	-178.24	-1.57	-5.59	3.14	-116.80	n.a.	n.a.	5.99	12.49	2.65
artificial_hi	Traffic networks (road and rail	*1221,*				100%		n.a.	n.a.	n.a.	n.a.	n.a.		n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
artificial_li	Road/rail embankments and	*122, 1224*	*32*	*0.2*		50%					0				0	0	-0.23	-2.48	-16.98	-0.79	-2.16	4.90	-11.12	n.a.	n.a.	11.68	18.43	5.17
artificial_li	Green urban areas	*141*	*29*	*0.27*		40%					0					0	-0.26	-4.65	-25.46	-0.96	-2.80	4.06	-16.69	n.a.	n.a.	8.65	15.69	3.83
agri_hi	Conventional/intensive arable	*2111*	*10*	*0.74*	*0%*	0%											-1.85	0.95	10.79	1.88	2.90	1.89	7.08	n.a.	n.a.	3.16	7.84	1.45
agri_hi	Integrated arable	*2112*	*7*	*0.82*	*40%*	0%												0.47	8.69	1.25	0.97	0.70	5.70	n.a.	n.a.	2.85	7.23	1.22
agri_li	Organic arable	*2113*	*26*	*0.35*	*100%*	0%													-59.35			0.61	-38.93	n.a.	n.a.	6.67	13.40	2.54
agri_li	Organic orchards	*2222*	*23*	*0.41*		0%																n.a.	n.a.	n.a.	n.a.	5.70	12.09	2.03
agri_hi	Intensive pasture and meadows	*2311*	*17*	*0.58*	*0%*	0%											-0.62	1.61	20.95		9.73	2.36	13.74	n.a.	n.a.	4.03	9.45	1.91
agri_li	Less intensive pasture and	*2312*	*19*	*0.51*	*40%*	0%												1.38	35.61			1.57	23.36	n.a.	n.a.	4.58	10.38	2.10
agri_li	Organic pasture and meadows	*2313*	*45*	*-0.14*	*100%*	0%													-6.47				-4.25	n.a.	n.a.	-16.69	122.87	-6.08
forest	Broad-leafed forest	*311*	*24*	*0.41*		0%																						0
forest	Coniferous forest	*312*				0%																						n.a.
forest	Mixed forest	*313*				0%																						n.a.
forest_hi	Plantation forest			*0.67*		0%																						
non-use	Forest edge	*314*	*48*	*-0.2*		0%																						0
mix	Country average																	-0.56	-5.55	n.a.	-0.68	4.91	-3.67	n.a.	n.a.		23.72	

A-4.20 Restoration Costs/(PDF * m^2) Malta

Average Restoration Costs per PDF and per m^2 [€/(m2*PDF)]

Country: Malta

PPS 0.68 (Germany = 1)							Repair Costs per PDF [€/m2/PDF]																					
							Target biotopes											Target biotopes										
Biotope Group	starting Biotopes	*Corine ID-No.*	*number of species (S)*	*PDF occupation*	*Extensivie-rungsgrad*	% of sealed area	Built up land	Continuous urban fabric	Disconti-nuous urban	Urban/ Industrial fallow	Rural settlement	Industrial area	Traffic networks road and rail networks, airports, port areas	Road/rail embank-ments and associated land	Green urban areas	Intensive arable	Integrated arable	Organic arable	Organic orchards	Intensive pasture	Less intensive pasture	Organic pasture	Broad-leafed forest	Coniferous forest	Mixed forest	Plantation forest	Forest edge	Country average
artificial_hi	Built up land	*10*	*1*	*0.97*		100%		0	0	0	0	0		0	0	0	0.68	0.42	4.46	0.54	1.02	1.05	2.92	n.a.	n.a.	5.46	4.42	0.41
artificial_hi	Continuous urban fabric	*111*	*8*	*0.8*		80%			0	0	0			0	0	0	-5.10	0.58	6.41	0.95	1.62	1.24	4.20	n.a.	n.a.	2.05	5.17	0.50
artificial_hi	Discontinuous urban fabric	*112*	*22*	*0.45*		60%				0	0			0	0	0	-0.28	2.61	62.47	-1.61	-7.84	1.98	40.94	n.a.	n.a.	3.64	7.95	0.89
non-use	Urban/Industrial fallow	*113, 125*	*40*	*0*		40%																						
artificial_li	Rural settlement	*114*	*25*	*0.38*		40%									0	0	-0.23	8.69	-83.30	-1.05	-3.62	2.24	-54.59	n.a.	n.a.	4.31	8.91	1.05
artificial_hi	Industrial or commercial area	*121*	*24*	*0.39*		80%			0	0	0			0	0	0	-0.24	6.52	-124.95	-1.10	-3.92	2.20	-81.88	n.a.	n.a.	4.20	8.76	1.02
artificial_hi	Traffic networks (road and rail	*1221,*				100%		n.a.	n.a.	n.a.	n.a.	n.a.		n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
artificial_li	Road/rail embankments and	*122, 1224*	*32*	*0.2*		50%					0				0	0	-0.16	-1.74	-11.90	-0.55	-1.52	3.43	-7.80	n.a.	n.a.	8.19	12.92	1.99
artificial_li	Green urban areas	*141*	*29*	*0.27*		40%					0					0	-0.19	-3.26	-17.85	-0.68	-1.96	2.85	-11.70	n.a.	n.a.	6.07	11.00	1.48
agri_hi	Conventional/intensive arable	*2111*	*10*	*0.74*	*0%*	0%											-1.29	0.66	7.56	1.32	2.03	1.33	4.96	n.a.	n.a.	2.21	5.50	0.58
agri_hi	Integrated arable	*2112*	*7*	*0.82*	*40%*	0%												0.33	6.09	0.88	0.68	0.49	3.99	n.a.	n.a.	2.00	5.07	0.51
agri_li	Organic arable	*2113*	*26*	*0.35*	*100%*	0%													-41.61			0.43	-27.29	n.a.	n.a.	4.68	9.40	0.97
agri_li	Organic orchards	*2222*	*23*	*0.41*		0%																n.a.	n.a.	n.a.	n.a.	3.99	8.47	0.81
agri_hi	Intensive pasture and meadows	*2311*	*17*	*0.58*	*0%*	0%											-0.43	1.13	14.68		6.82	1.66	9.63	n.a.	n.a.	2.82	6.63	0.74
agri_li	Less intensive pasture and	*2312*	*19*	*0.51*	*40%*	0%												0.97	24.96			1.10	16.38	n.a.	n.a.	3.21	7.28	0.82
agri_li	Organic pasture and meadows	*2313*	*45*	*-0.14*	*100%*	0%													-4.54				-2.98	n.a.	n.a.	-11.70	86.13	-2.41
forest	Broad-leafed forest	*311*	*24*	*0.41*		0%																						0
forest	Coniferous forest	*312*				0%																						n.a.
forest	Mixed forest	*313*				0%																						n.a.
forest_hi	Plantation forest			*0.67*		0%																						
non-use	Forest edge	*314*	*48*	*-0.2*		0%																						0
mix	Country average																	-0.52	-4.84	n.a.	-0.61	4.66	-3.18	n.a.	n.a.		20.58	

A-4.21 Restoration Costs/(PDF * m^2) Netherlands

Average Restoration Costs per PDF and per m^2 [€/(m2*PDF)]

Country: Netherlands

PPS 0.98 (Germany = 1)

							Repair Costs per PDF [€/m2/PDF]																					
							Target biotopes											Target biotopes										
Biotope Group	starting Biotopes	Corine ID-No.	number of species (S)	PDF occupation	Extensivierungsgrad	% of sealed area	Built up land	Continuous urban fabric	Discontinuous urban	Urban/ Industrial fallow	Rural settlement	Industrial area	Traffic networks road and rail networks, airports, port areas	Road/rail embankments and associated land	Green urban areas	Intensive arable	Integrated arable	Organic arable	Organic orchards	Intensive pasture	Less intensive pasture	Organic pasture	Broad-leafed forest	Coniferous forest	Mixed forest	Plantation forest	Forest edge	Country average
artificial_hi	Built up land	10	1	0.97		100%		0	0	0	0	0		0	0	0	0.98	0.61	6.43	0.77	1.47	1.52	4.21	n.a.	n.a.	7.87	6.37	0.65
artificial_hi	Continuous urban fabric	111	8	0.8		80%			0	0	0			0	0	0	-7.35	0.83	9.23	1.37	2.34	1.79	6.05	n.a.	n.a.	2.95	7.45	0.79
artificial_hi	Discontinuous urban fabric	112	22	0.45		60%				0	0			0	0	0	-0.40	3.76	90.04	-2.32	-11.30	2.85	59.00	n.a.	n.a.	5.24	11.46	1.41
non-use	Urban/Industrial fallow	113, 125	40	0		40%																						
artificial_li	Rural settlement	114	25	0.38		40%									0	0	-0.33	12.52	-120.05	-1.51	-5.21	3.24	-78.67	n.a.	n.a.	6.21	12.84	1.67
artificial_hi	Industrial or commercial area	121	24	0.39		80%			0	0	0			0	0	0	-0.34	9.39	-180.08	-1.59	-5.65	3.17	-118.01	n.a.	n.a.	6.05	12.62	1.63
artificial_hi	Traffic networks (road and rail	1221,				100%		n.a.	n.a.	n.a.	n.a.	n.a.		n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
artificial_li	Road/rail embankments and	122, 1224	32	0.2		50%					0				0	0	-0.24	-2.50	-17.15	-0.80	-2.19	4.95	-11.24	n.a.	n.a.	11.80	18.62	3.17
artificial_li	Green urban areas	141	29	0.27		40%					0					0	-0.27	-4.70	-25.73	-0.97	-2.82	4.10	-16.86	n.a.	n.a.	8.74	15.85	2.35
agri_hi	Conventional/intensive arable	2111	10	0.74	0%	0%											-1.86	0.96	10.90	1.90	2.93	1.91	7.15	n.a.	n.a.	3.19	7.92	0.91
agri_hi	Integrated arable	2112	7	0.82	40%	0%												0.48	8.77	1.27	0.98	0.70	5.76	n.a.	n.a.	2.88	7.30	0.63
agri_li	Organic arable	2113	26	0.35	100%	0%													-59.96			0.62	-39.34	n.a.	n.a.	6.74	13.54	1.08
agri_li	Organic orchards	2222	23	0.41		0%																n.a.	n.a.	n.a.	n.a.	5.76	12.21	0.67
agri_hi	Intensive pasture and meadows	2311	17	0.58	0%	0%											-0.62	1.62	21.16		9.83	2.39	13.88	n.a.	n.a.	4.07	9.55	1.33
agri_li	Less intensive pasture and	2312	19	0.51	40%	0%												1.40	35.98			1.59	23.60	n.a.	n.a.	4.63	10.49	1.37
agri_li	Organic pasture and meadows	2313	45	-0.14	100%	0%													-6.54				-4.29	n.a.	n.a.	-16.86	124.13	-2.03
forest	Broad-leafed forest	311	24	0.41		0%																						0
forest	Coniferous forest	312				0%																						n.a.
forest	Mixed forest	313				0%																						n.a.
forest_hi	Plantation forest			0.67		0%																						
non-use	Forest edge	314	48	-0.2		0%																						0
mix	Country average																	-0.78	-7.73	n.a.	-1.02	7.43	-5.09	n.a.	n.a.		32.90	

A-4.22 Restoration Costs/(PDF * m^2) Norway

Average Restoration Costs per PDF and per m^2 [€/(m2*PDF)]

Country: Norway

PPS 1.34 (Germany = 1)

Repair Costs per PDF [€/m2/PDF] — Target biotopes

Biotope Group	starting Biotopes	Corine ID-No.	number of species (S)	PDF occupation	Extensivie-rungsgrad	% of sealed area	Built up land	Continuous urban fabric	Disconti-nuous urban	Urban/ Industrial fallow	Rural settlement	Industrial area	Traffic networks road and rail networks, airports, port areas	Road/rail embank-ments and associated land	Green urban areas	Intensive arable	Integrated arable	Organic arable	Organic orchards	Intensive pasture	Less intensive pasture	Organic pasture	Broad-leafed forest	Coniferous forest	Mixed forest	Plantation forest	Forest edge	Country average
artificial_hi	Built up land	*10*	*1*	*0.97*		100%		0	0	0	0	0		0	0	0	1.34	0.83	8.79	1.06	2.01	2.07	5.76	n.a.	n.a.	10.76	8.70	2.95
artificial_hi	Continuous urban fabric	*111*	*8*	*0.8*		80%			0	0	0			0	0	0	-10.05	1.14	12.63	1.88	3.20	2.45	8.27	n.a.	n.a.	4.03	10.18	3.58
artificial_hi	Discontinuous urban fabric	*112*	*22*	*0.45*		60%				0	0			0	0	0	-0.54	5.14	123.11	-3.18	-15.45	3.90	80.68	n.a.	n.a.	7.17	15.67	6.36
non-use	Urban/Industrial fallow	*113, 125*	*40*	*0*		40%																						
artificial_li	Rural settlement	*114*	*25*	*0.38*		40%									0	0	-0.46	17.12	-164.15	-2.07	-7.13	4.42	-107.57	n.a.	n.a.	8.49	17.56	7.53
artificial_hi	Industrial or commercial area	*121*	*24*	*0.39*		80%			0	0	0			0	0	0	-0.47	12.84	-246.23	-2.17	-7.72	4.34	-161.36	n.a.	n.a.	8.27	17.26	7.34
artificial_hi	Traffic networks (road and rail	*1221,*				100%		n.a.	n.a.	n.a.	n.a.	n.a.		n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
artificial_li	Road/rail embankments and	*122, 1224*	*32*	*0.2*		50%					0				0	0	-0.32	-3.42	-23.45	-1.09	-2.99	6.77	-15.37	n.a.	n.a.	16.14	25.46	14.31
artificial_li	Green urban areas	*141*	*29*	*0.27*		40%					0					0	-0.37	-6.42	-35.18	-1.33	-3.86	5.61	-23.05	n.a.	n.a.	11.95	21.67	10.60
agri_hi	Conventional/intensive arable	*2111*	*10*	*0.74*	*0%*	0%											-2.55	1.31	14.91	2.60	4.01	2.61	9.78	n.a.	n.a.	4.36	10.83	3.89
agri_hi	Integrated arable	*2112*	*7*	*0.82*	*40%*	0%												0.65	12.00	1.73	1.34	0.96	7.87	n.a.	n.a.	3.94	9.98	3.50
agri_li	Organic arable	*2113*	*26*	*0.35*	*100%*	0%													-81.99			0.85	-53.79	n.a.	n.a.	9.22	18.52	8.11
agri_li	Organic orchards	*2222*	*23*	*0.41*		0%																n.a.	n.a.	n.a.	n.a.	7.87	16.70	6.92
agri_hi	Intensive pasture and meadows	*2311*	*17*	*0.58*	*0%*	0%											-0.85	2.22	28.94		13.44	3.27	18.98	n.a.	n.a.	5.56	13.06	4.96
agri_li	Less intensive pasture and	*2312*	*19*	*0.51*	*40%*	0%												1.91	49.19			2.17	32.27	n.a.	n.a.	6.33	14.34	5.63
agri_li	Organic pasture and meadows	*2313*	*45*	*-0.14*	*100%*	0%													-8.94				-5.87	n.a.	n.a.	-23.05	169.73	-20.27
forest	Broad-leafed forest	*311*	*24*	*0.41*		0%																						0
forest	Coniferous forest	*312*				0%																						n.a.
forest	Mixed forest	*313*				0%																						n.a.
forest_hi	Plantation forest			*0.67*		0%																						
non-use	Forest edge	*314*	*48*	*-0.2*		0%																						0
mix	Country average																	-0.15	-1.45	n.a.	-0.17	1.18	-0.95	n.a.	n.a.		6.15	

A-4.23 Restoration Costs/(PDF * m²) Poland

Average Restoration Costs per PDF and per m² [€/(m2*PDF)]

Country: Poland

PPS 0.49 (Germany = 1)							Repair Costs per PDF [€/m2/PDF]																					
							Target biotopes															Target biotopes						
Biotope Group	starting Biotopes	Corine ID-No.	number of species (S)	PDF occupation	Extensivie-rungsgrad	% of sealed area	Built up land	Continuous urban fabric	Disconti-nuous urban	Urban/ Industrial fallow	Rural settlement	Industrial area	Traffic networks road and rail networks, airports, port areas	Road/rail embank-ments and associated land	Green urban areas	Intensive arable	Integrated arable	Organic arable	Organic orchards	Intensive pasture	Less intensive pasture	Organic pasture	Broad-leafed forest	Coniferous forest	Mixed forest	Plantation forest	Forest edge	Country average
artificial_hi	Built up land	*10*	*1*	*0.97*		100%		0	0	0	0	0		0	0	0	0.49	0.30	3.22	0.39	0.74	0.76	2.11	n.a.	n.a.	3.93	3.18	0.47
artificial_hi	Continuous urban fabric	*111*	*8*	*0.8*		80%			0	0	0			0	0	0	-3.68	0.42	4.62	0.69	1.17	0.89	3.03	n.a.	n.a.	1.48	3.72	0.57
artificial_hi	Discontinuous urban fabric	*112*	*22*	*0.45*		60%				0	0			0	0	0	-0.20	1.88	45.02	-1.16	-5.65	1.43	29.50	n.a.	n.a.	2.62	5.73	1.02
non-use	Urban/Industrial fallow	*113, 125*	*40*	*0*		40%																						
artificial_li	Rural settlement	*114*	*25*	*0.38*		40%									0	0	-0.17	6.26	-60.03	-0.76	-2.61	1.62	-39.34	n.a.	n.a.	3.11	6.42	1.21
artificial_hi	Industrial or commercial area	*121*	*24*	*0.39*		80%			0	0	0			0	0	0	-0.17	4.70	-90.04	-0.80	-2.82	1.59	-59.00	n.a.	n.a.	3.03	6.31	1.18
artificial_hi	Traffic networks (road and rail	*1221,*				100%		n.a.	n.a.	n.a.	n.a.	n.a.		n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
artificial_li	Road/rail embankments and	*122, 1224*	*32*	*0.2*		50%					0				0	0	-0.12	-1.25	-8.58	-0.40	-1.09	2.47	-5.62	n.a.	n.a.	5.90	9.31	2.30
artificial_li	Green urban areas	*141*	*29*	*0.27*		40%					0					0	-0.13	-2.35	-12.86	-0.49	-1.41	2.05	-8.43	n.a.	n.a.	4.37	7.92	1.70
agri_hi	Conventional/intensive arable	*2111*	*10*	*0.74*	*0%*	0%											-0.93	0.48	5.45	0.95	1.47	0.96	3.58	n.a.	n.a.	1.59	3.96	0.65
agri_hi	Integrated arable	*2112*	*7*	*0.82*	*40%*	0%												0.24	4.39	0.63	0.49	0.35	2.88	n.a.	n.a.	1.44	3.65	0.55
agri_li	Organic arable	*2113*	*26*	*0.35*	*100%*	0%													-29.98			0.31	-19.67	n.a.	n.a.	3.37	6.77	1.10
agri_li	Organic orchards	*2222*	*23*	*0.41*		0%																n.a.	n.a.	n.a.	n.a.	2.88	6.10	0.89
agri_hi	Intensive pasture and meadows	*2311*	*17*	*0.58*	*0%*	0%											-0.31	0.81	10.58		4.91	1.19	6.94	n.a.	n.a.	2.03	4.77	0.86
agri_li	Less intensive pasture and	*2312*	*19*	*0.51*	*40%*	0%												0.70	17.99			0.79	11.80	n.a.	n.a.	2.31	5.25	0.94
agri_li	Organic pasture and meadows	*2313*	*45*	*-0.14*	*100%*	0%													-3.27				-2.15	n.a.	n.a.	-8.43	62.07	-2.65
forest	Broad-leafed forest	*311*	*24*	*0.41*		0%																						0
forest	Coniferous forest	*312*				0%																						n.a.
forest	Mixed forest	*313*				0%																						n.a.
forest_hi	Plantation forest			*0.67*		0%																						
non-use	Forest edge	*314*	*48*	*-0.2*		0%																						0
mix	Country average																	-0.30	-3.02	n.a.	-0.35	2.43	-1.99	n.a.	n.a.		12.86	

A-4.24 Restoration Costs/(PDF * m^2) Portugal

Average Restoration Costs per PDF and per m^2 [€/(m2*PDF)]

Country: Portugal

PPS 0.80 (Germany = 1)							Repair Costs per PDF [€/m2/PDF]																					
							Target biotopes																					
Biotope Group	starting Biotopes	*Corine ID-No.*	*number of species (S)*	*PDF occupation*	*Extensivie-rungsgrad*	% of sealed area	Built up land	Continuous urban fabric	Disconti-nuous urban	Urban/ Industrial fallow	Rural settlement	Industrial area	Traffic networks road and rail networks, airports, port areas	Road/rail embank-ments and associated land	Green urban areas	Intensive arable	Integrated arable	Organic arable	Organic orchards	Intensive pasture	Less intensive pasture	Organic pasture	Broad-leafed forest	Coniferous forest	Mixed forest	Plantation forest	Forest edge	Country average
artificial_hi	Built up land	*10*	*1*	*0.97*		100%		0	0	0	0	0		0	0	0	0.80	0.49	5.25	0.63	1.20	1.24	3.44	n.a.	n.a.	6.42	5.20	1.23
artificial_hi	Continuous urban fabric	*111*	*8*	*0.8*		80%			0	0	0			0	0	0	-6.00	0.68	7.54	1.12	1.91	1.46	4.94	n.a.	n.a.	2.41	6.08	1.49
artificial_hi	Discontinuous urban fabric	*112*	*22*	*0.45*		60%				0	0			0	0	0	-0.32	3.07	73.50	-1.90	-9.22	2.33	48.17	n.a.	n.a.	4.28	9.35	2.64
non-use	Urban/Industrial fallow	*113, 125*	*40*	*0*		40%																						
artificial_li	Rural settlement	*114*	*25*	*0.38*		40%									0	0	-0.27	10.22	-98.00	-1.23	-4.26	2.64	-64.22	n.a.	n.a.	5.07	10.48	3.13
artificial_hi	Industrial or commercial area	*121*	*24*	*0.39*		80%			0	0	0			0	0	0	-0.28	7.67	-147.00	-1.30	-4.61	2.59	-96.33	n.a.	n.a.	4.94	10.31	3.05
artificial_hi	Traffic networks (road and rail	*1221,*				100%		n.a.	n.a.	n.a.	n.a.	n.a.		n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
artificial_li	Road/rail embankments and	*122, 1224*	*32*	*0.2*		50%					0				0	0	-0.19	-2.04	-14.00	-0.65	-1.78	4.04	-9.17	n.a.	n.a.	9.63	15.20	5.95
artificial_li	Green urban areas	*141*	*29*	*0.27*		40%					0					0	-0.22	-3.83	-21.00	-0.80	-2.31	3.35	-13.76	n.a.	n.a.	7.14	12.94	4.40
agri_hi	Conventional/intensive arable	*2111*	*10*	*0.74*	*0%*	0%											-1.52	0.78	8.90	1.55	2.39	1.56	5.84	n.a.	n.a.	2.60	6.47	1.65
agri_hi	Integrated arable	*2112*	*7*	*0.82*	*40%*	0%												0.39	7.16	1.03	0.80	0.57	4.70	n.a.	n.a.	2.35	5.96	1.47
agri_li	Organic arable	*2113*	*26*	*0.35*	*100%*	0%													-48.95			0.51	-32.11	n.a.	n.a.	5.50	11.05	3.22
agri_li	Organic orchards	*2222*	*23*	*0.41*		0%																n.a.	n.a.	n.a.	n.a.	4.70	9.97	2.25
agri_hi	Intensive pasture and meadows	*2311*	*17*	*0.58*	*0%*	0%											-0.51	1.32	17.28		8.02	1.95	11.33	n.a.	n.a.	3.32	7.79	2.10
agri_li	Less intensive pasture and	*2312*	*19*	*0.51*	*40%*	0%												1.14	29.37			1.30	19.27	n.a.	n.a.	3.78	8.56	2.37
agri_li	Organic pasture and meadows	*2313*	*45*	*-0.14*	*100%*	0%													-5.34				-3.50	n.a.	n.a.	-13.76	101.33	-8.04
forest	Broad-leafed forest	*311*	*24*	*0.41*		0%																						0
forest	Coniferous forest	*312*				0%																						n.a.
forest	Mixed forest	*313*				0%																						n.a.
forest_hi	Plantation forest			*0.67*		0%																						
non-use	Forest edge	*314*	*48*	*-0.2*		0%																						0
mix	Country average																	-0.32	-3.24	n.a.	-0.36	2.48	-2.45	n.a.	n.a.		15.87	

A-4.25 Restoration Costs/(PDF * m²) Romania

Average Restoration Costs per PDF and per m² [€/(m2*PDF)]

Country: Romania

PPS 0.38 (Germany = 1)							Repair Costs per PDF [€/m2/PDF]																					
							Target biotopes																					
Biotope Group	starting Biotopes	Corine ID-No.	number of species (S)	PDF occupation	Extensivie-rungsgrad	% of sealed area	Built up land	Continuous urban fabric	Disconti-nuous urban	Urban/ Industrial fallow	Rural settlement	Industrial area	Traffic networks road and rail networks, airports, port areas	Road/rail embank-ments and associated land	Green urban areas	Intensive arable	Integrated arable	Organic arable	Organic orchards	Intensive pasture	Less intensive pasture	Organic pasture	Broad-leafed forest	Coniferous forest	Mixed forest	Plantation forest	Forest edge	Country average
artificial_hi	Built up land	*10*	*1*	*0.97*		100%		0	0	0	0	0		0	0	0	0.38	0.23	2.49	0.30	0.57	0.59	1.63	n.a.	n.a.	3.05	2.47	0.45
artificial_hi	Continuous urban fabric	*111*	*8*	*0.8*		80%			0	0	0			0	0	0	-2.85	0.32	3.58	0.53	0.91	0.69	2.35	n.a.	n.a.	1.14	2.89	0.54
artificial_hi	Discontinuous urban fabric	*112*	*22*	*0.45*		60%				0	0			0	0	0	-0.15	1.46	34.91	-0.90	-4.38	1.11	22.88	n.a.	n.a.	2.03	4.44	0.96
non-use	Urban/Industrial fallow	*113, 125*	*40*	*0*		40%																						
artificial_li	Rural settlement	*114*	*25*	*0.38*		40%									0	0	-0.13	4.86	-46.55	-0.59	-2.02	1.25	-30.51	n.a.	n.a.	2.41	4.98	1.14
artificial_hi	Industrial or commercial area	*121*	*24*	*0.39*		80%			0	0	0			0	0	0	-0.13	3.64	-69.83	-0.62	-2.19	1.23	-45.76	n.a.	n.a.	2.35	4.89	1.11
artificial_hi	Traffic networks (road and rail	*1221,*				100%		n.a.	n.a.	n.a.	n.a.	n.a.		n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
artificial_li	Road/rail embankments and	*122, 1224*	*32*	*0.2*		50%					0				0	0	-0.09	-0.97	-6.65	-0.31	-0.85	1.92	-4.36	n.a.	n.a.	4.58	7.22	2.17
artificial_li	Green urban areas	*141*	*29*	*0.27*		40%					0					0	-0.10	-1.82	-9.98	-0.38	-1.10	1.59	-6.54	n.a.	n.a.	3.39	6.14	1.61
agri_hi	Conventional/intensive arable	*2111*	*10*	*0.74*	*0%*	0%											-0.72	0.37	4.23	0.74	1.14	0.74	2.77	n.a.	n.a.	1.24	3.07	0.61
agri_hi	Integrated arable	*2112*	*7*	*0.82*	*40%*	0%												0.18	3.40	0.49	0.38	0.27	2.23	n.a.	n.a.	1.12	2.83	0.52
agri_li	Organic arable	*2113*	*26*	*0.35*	*100%*	0%													-23.25			0.24	-15.25	n.a.	n.a.	2.61	5.25	1.08
agri_li	Organic orchards	*2222*	*23*	*0.41*		0%																n.a.	n.a.	n.a.	n.a.	2.23	4.73	0.78
agri_hi	Intensive pasture and meadows	*2311*	*17*	*0.58*	*0%*	0%											-0.24	0.63	8.21		3.81	0.93	5.38	n.a.	n.a.	1.58	3.70	0.80
agri_li	Less intensive pasture and	*2312*	*19*	*0.51*	*40%*	0%												0.54	13.95			0.62	9.15	n.a.	n.a.	1.79	4.07	0.88
agri_li	Organic pasture and meadows	*2313*	*45*	*-0.14*	*100%*	0%													-2.54				-1.66	n.a.	n.a.	-6.54	48.13	-2.61
forest	Broad-leafed forest	*311*	*24*	*0.41*		0%																						0
forest	Coniferous forest	*312*				0%																						n.a.
forest	Mixed forest	*313*				0%																						n.a.
forest_hi	Plantation forest			*0.67*		0%																						
non-use	Forest edge	*314*	*48*	*-0.2*		0%																						0
mix	Country average																	-0.21	-2.10	n.a.	-0.26	1.81	-1.45	n.a.	n.a.		9.41	

A-4.26 Restoration Costs/(PDF * m^2) Slovakia

Average Restoration Costs per PDF and per m^2 [€/(m2*PDF)]

Country: Slovak Republic

PPS 0.46 (Germany = 1)							Repair Costs per PDF [€/m2/PDF]																					
							Target biotopes																Target biotopes					
Biotope Group	starting Biotopes	Corine ID-No.	number of species (S)	PDF occupation	Extensivie-rungsgrad	% of sealed area	Built up land	Continuous urban fabric	Disconti-nuous urban	Urban/ Industrial fallow	Rural settlement	Industrial area	Traffic networks road and rail networks, airports, port areas	Road/rail embank-ments and associated land	Green urban areas	Intensive arable	Integrated arable	Organic arable	Organic orchards	Intensive pasture	Less intensive pasture	Organic pasture	Broad-leafed forest	Coniferous forest	Mixed forest	Plantation forest	Forest edge	Country average
artificial_hi	Built up land	*10*	*1*	*0.97*		100%		0	0	0	0	0		0	0	0	0.46	0.28	3.02	0.36	0.69	0.71	1.98	n.a.	n.a.	3.69	2.99	0.58
artificial_hi	Continuous urban fabric	*111*	*8*	*0.8*		80%			0	0	0			0	0	0	-3.45	0.39	4.33	0.64	1.10	0.84	2.84	n.a.	n.a.	1.38	3.50	0.71
artificial_hi	Discontinuous urban fabric	*112*	*22*	*0.45*		60%				0	0			0	0	0	-0.19	1.76	42.26	-1.09	-5.30	1.34	27.70	n.a.	n.a.	2.46	5.38	1.26
non-use	Urban/Industrial fallow	*113, 125*	*40*	*0*		40%																						
artificial_li	Rural settlement	*114*	*25*	*0.38*		40%									0	0	-0.16	5.88	-56.35	-0.71	-2.45	1.52	-36.93	n.a.	n.a.	2.92	6.03	1.49
artificial_hi	Industrial or commercial area	*121*	*24*	*0.39*		80%			0	0	0			0	0	0	-0.16	4.41	-84.53	-0.75	-2.65	1.49	-55.39	n.a.	n.a.	2.84	5.93	1.45
artificial_hi	Traffic networks (road and rail	*1221,*				100%		n.a.	n.a.	n.a.	n.a.	n.a.		n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
artificial_li	Road/rail embankments and	*122, 1224*	*32*	*0.2*		50%					0				0	0	-0.11	-1.18	-8.05	-0.37	-1.03	2.32	-5.28	n.a.	n.a.	5.54	8.74	2.83
artificial_li	Green urban areas	*141*	*29*	*0.27*		40%					0					0	-0.13	-2.20	-12.08	-0.46	-1.33	1.93	-7.91	n.a.	n.a.	4.10	7.44	2.10
agri_hi	Conventional/intensive arable	*2111*	*10*	*0.74*	*0%*	0%											-0.88	0.45	5.12	0.89	1.38	0.90	3.36	n.a.	n.a.	1.50	3.72	0.79
agri_hi	Integrated arable	*2112*	*7*	*0.82*	*40%*	0%												0.22	4.12	0.59	0.46	0.33	2.70	n.a.	n.a.	1.35	3.43	0.69
agri_li	Organic arable	*2113*	*26*	*0.35*	*100%*	0%													-28.14			0.29	-18.46	n.a.	n.a.	3.17	6.36	1.47
agri_li	Organic orchards	*2222*	*23*	*0.41*		0%																n.a.	n.a.	n.a.	n.a.	2.70	5.73	1.20
agri_hi	Intensive pasture and meadows	*2311*	*17*	*0.58*	*0%*	0%											-0.29	0.76	9.93		4.61	1.12	6.52	n.a.	n.a.	1.91	4.48	1.02
agri_li	Less intensive pasture and	*2312*	*19*	*0.51*	*40%*	0%												0.66	16.89			0.75	11.08	n.a.	n.a.	2.17	4.92	1.14
agri_li	Organic pasture and meadows	*2313*	*45*	*-0.14*	*100%*	0%													-3.07				-2.01	n.a.	n.a.	-7.91	58.27	-3.61
forest	Broad-leafed forest	*311*	*24*	*0.41*		0%																						0
forest	Coniferous forest	*312*				0%																						n.a.
forest	Mixed forest	*313*				0%																						n.a.
forest_hi	Plantation forest			*0.67*		0%																						
non-use	Forest edge	*314*	*48*	*-0.2*		0%																						0
mix	Country average																	-0.23	-2.26	n.a.	-0.27	1.88	-1.50	n.a.	n.a.		9.71	

A-4.27 Restoration Costs/(PDF * m^2) Slovenia

Average Restoration Costs per PDF and per m^2 [€/(m2*PDF)]

Country: Slovenia

PPS 0.72 (Germany = 1)							Repair Costs per PDF [€/m2/PDF]																					
							Target biotopes											Target biotopes										
Biotope Group	starting Biotopes	Corine ID-No.	number of species (S)	PDF occupation	Extensivie-rungsgrad	% of sealed area	Built up land	Continuous urban fabric	Disconti-nuous urban	Urban/ Industrial fallow	Rural settlement	Industrial area	Traffic networks road and rail networks, airports, port areas	Road/rail embank-ments and associated land	Green urban areas	Intensive arable	Integrated arable	Organic arable	Organic orchards	Intensive pasture	Less intensive pasture	Organic pasture	Broad-leafed forest	Coniferous forest	Mixed forest	Plantation forest	Forest edge	Country average
artificial_hi	Built up land	*10*	*1*	*0.97*		100%		0	0	0	0	0		0	0	0	0.72	0.45	4.73	0.57	1.08	1.11	3.10	n.a.	n.a.	5.78	4.68	1.21
artificial_hi	Continuous urban fabric	*111*	*8*	*0.8*		80%			0	0	0			0	0	0	-5.40	0.61	6.78	1.01	1.72	1.31	4.45	n.a.	n.a.	2.17	5.47	1.46
artificial_hi	Discontinuous urban fabric	*112*	*22*	*0.45*		60%				0	0			0	0	0	-0.29	2.76	66.15	-1.71	-8.30	2.09	43.35	n.a.	n.a.	3.85	8.42	2.60
non-use	Urban/Industrial fallow	*113, 125*	*40*	*0*		40%																						
artificial_li	Rural settlement	*114*	*25*	*0.38*		40%									0	0	-0.25	9.20	-88.20	-1.11	-3.83	2.38	-57.80	n.a.	n.a.	4.56	9.43	3.08
artificial_hi	Industrial or commercial area	*121*	*24*	*0.39*		80%			0	0	0			0	0	0	-0.25	6.90	-132.30	-1.17	-4.15	2.33	-86.70	n.a.	n.a.	4.45	9.27	3.00
artificial_hi	Traffic networks (road and rail	*1221,*				100%		n.a.	n.a.	n.a.	n.a.	n.a.		n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
artificial_li	Road/rail embankments and	*122, 1224*	*32*	*0.2*		50%					0				0	0	-0.17	-1.84	-12.60	-0.58	-1.61	3.64	-8.26	n.a.	n.a.	8.67	13.68	5.85
artificial_li	Green urban areas	*141*	*29*	*0.27*		40%					0					0	-0.20	-3.45	-18.90	-0.72	-2.08	3.01	-12.39	n.a.	n.a.	6.42	11.64	4.34
agri_hi	Conventional/intensive arable	*2111*	*10*	*0.74*	*0%*	0%											-1.37	0.70	8.01	1.40	2.15	1.40	5.25	n.a.	n.a.	2.34	5.82	1.61
agri_hi	Integrated arable	*2112*	*7*	*0.82*	*40%*	0%												0.35	6.45	0.93	0.72	0.52	4.23	n.a.	n.a.	2.11	5.36	1.42
agri_li	Organic arable	*2113*	*26*	*0.35*	*100%*	0%													-44.05			0.46	-28.90	n.a.	n.a.	4.95	9.95	3.17
agri_li	Organic orchards	*2222*	*23*	*0.41*		0%																n.a.	n.a.	n.a.	n.a.	4.23	8.97	2.61
agri_hi	Intensive pasture and meadows	*2311*	*17*	*0.58*	*0%*	0%											-0.46	1.19	15.55		7.22	1.75	10.20	n.a.	n.a.	2.99	7.02	2.07
agri_li	Less intensive pasture and	*2312*	*19*	*0.51*	*40%*	0%												1.03	26.43			1.17	17.34	n.a.	n.a.	3.40	7.71	2.33
agri_li	Organic pasture and meadows	*2313*	*45*	*-0.14*	*100%*	0%													-4.81				-3.15	n.a.	n.a.	-12.39	91.20	-7.82
forest	Broad-leafed forest	*311*	*24*	*0.41*		0%																						0
forest	Coniferous forest	*312*				0%																						n.a.
forest	Mixed forest	*313*				0%																						n.a.
forest_hi	Plantation forest			*0.67*		0%																						
non-use	Forest edge	*314*	*48*	*-0.2*		0%																						0
mix	Country average																	-0.24	-2.41	n.a.	-0.29	2.00	-1.62	n.a.	n.a.		10.49	

A-4.28 Restoration Costs/(PDF * m^2) Spain

Average Restoration Costs per PDF and per m^2 [€/(m2*PDF)]

Country: Spain

PPS 0.80 (Germany = 1)

							Repair Costs per PDF [€/m2/PDF]																					
							Target biotopes															Target biotopes						
Biotope Group	starting Biotopes	*Corine ID-No.*	*number of species (S)*	*PDF occupation*	*Extensivie-rungsgrad*	% of sealed area	Built up land	Continuous urban fabric	Disconti-nuous urban	Urban/ Industrial fallow	Rural settlement	Industrial area	Traffic networks road and rail networks, airports, port areas	Road/rail embank-ments and associated land	Green urban areas	Intensive arable	Integrated arable	Organic arable	Organic orchards	Intensive pasture	Less intensive pasture	Organic pasture	Broad-leafed forest	Coniferous forest	Mixed forest	Plantation forest	Forest edge	Country average
artificial_hi	Built up land	*10*	*1*	*0.97*		100%		0	0	0	0	0		0	0	0	0.80	0.49	5.25	0.63	1.20	1.24	3.44	n.a.	n.a.	6.42	5.20	1.21
artificial_hi	Continuous urban fabric	*111*	*8*	*0.8*		80%			0	0	0			0	0	0	-6.00	0.68	7.54	1.12	1.91	1.46	4.94	n.a.	n.a.	2.41	6.08	1.47
artificial_hi	Discontinuous urban fabric	*112*	*22*	*0.45*		60%				0	0			0	0	0	-0.32	3.07	73.50	-1.90	-9.22	2.33	48.17	n.a.	n.a.	4.28	9.35	2.60
non-use	Urban/Industrial fallow	*113, 125*	*40*	*0*		40%																						
artificial_li	Rural settlement	*114*	*25*	*0.38*		40%									0	0	-0.27	10.22	-98.00	-1.23	-4.26	2.64	-64.22	n.a.	n.a.	5.07	10.48	3.08
artificial_hi	Industrial or commercial area	*121*	*24*	*0.39*		80%			0	0	0			0	0	0	-0.28	7.67	-147.00	-1.30	-4.61	2.59	-96.33	n.a.	n.a.	4.94	10.31	3.01
artificial_hi	Traffic networks (road and rail	*1221,*				100%		n.a.	n.a.	n.a.	n.a.	n.a.		n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
artificial_li	Road/rail embankments and	*122, 1224*	*32*	*0.2*		50%					0				0	0	-0.19	-2.04	-14.00	-0.65	-1.78	4.04	-9.17	n.a.	n.a.	9.63	15.20	5.86
artificial_li	Green urban areas	*141*	*29*	*0.27*		40%					0					0	-0.22	-3.83	-21.00	-0.80	-2.31	3.35	-13.76	n.a.	n.a.	7.14	12.94	4.34
agri_hi	Conventional/intensive arable	*2111*	*10*	*0.74*	*0%*	0%											-1.52	0.78	8.90	1.55	2.39	1.56	5.84	n.a.	n.a.	2.60	6.47	1.63
agri_hi	Integrated arable	*2112*	*7*	*0.82*	*40%*	0%												0.39	7.16	1.03	0.80	0.57	4.70	n.a.	n.a.	2.35	5.96	1.44
agri_li	Organic arable	*2113*	*26*	*0.35*	*100%*	0%													-48.95			0.51	-32.11	n.a.	n.a.	5.50	11.05	3.15
agri_li	Organic orchards	*2222*	*23*	*0.41*		0%																n.a.	n.a.	n.a.	n.a.	4.70	9.97	2.18
agri_hi	Intensive pasture and meadows	*2311*	*17*	*0.58*	*0%*	0%											-0.51	1.32	17.28		8.02	1.95	11.33	n.a.	n.a.	3.32	7.79	2.08
agri_li	Less intensive pasture and	*2312*	*19*	*0.51*	*40%*	0%												1.14	29.37			1.30	19.27	n.a.	n.a.	3.78	8.56	2.34
agri_li	Organic pasture and meadows	*2313*	*45*	*-0.14*	*100%*	0%													-5.34				-3.50	n.a.	n.a.	-13.76	101.33	-7.86
forest	Broad-leafed forest	*311*	*24*	*0.41*		0%																						0
forest	Coniferous forest	*312*				0%																						n.a.
forest	Mixed forest	*313*				0%																						n.a.
forest_hi	Plantation forest			*0.67*		0%																						
non-use	Forest edge	*314*	*48*	*-0.2*		0%																						0
mix	Country average																	-0.33	-3.34	n.a.	-0.37	2.53	-2.52	n.a.	n.a.		16.32	

A-4.29 Restoration Costs/(PDF * m^2) Sweden

Average Restoration Costs per PDF and per m^2 [€/(m2*PDF)]

Country: Sweden

PPS 1.14 (Germany = 1)							Repair Costs per PDF [€/m2/PDF]																					
							Target biotopes											Target biotopes										
Biotope Group	starting Biotopes	Corine ID-No.	number of species (S)	PDF occupation	Extensivie-rungsgrad	% of sealed area	Built up land	Continuous urban fabric	Disconti-nuous urban	Urban/ Industrial fallow	Rural settlement	Industrial area	Traffic networks road and rail networks, airports, port areas	Road/rail embank-ments and associated land	Green urban areas	Intensive arable	Integrated arable	Organic arable	Organic orchards	Intensive pasture	Less intensive pasture	Organic pasture	Broad-leafed forest	Coniferous forest	Mixed forest	Plantation forest	Forest edge	Country average
artificial_hi	Built up land	10	1	0.97		100%		0	0	0	0	0		0	0	0	1.14	0.70	7.48	0.90	1.71	1.76	4.90	n.a.	n.a.	9.15	7.41	2.51
artificial_hi	Continuous urban fabric	111	8	0.8		80%			0	0	0			0	0	0	-8.55	0.97	10.74	1.60	2.72	2.08	7.04	n.a.	n.a.	3.43	8.66	3.04
artificial_hi	Discontinuous urban fabric	112	22	0.45		60%				0	0			0	0	0	-0.46	4.37	104.74	-2.70	-13.14	3.32	68.64	n.a.	n.a.	6.10	13.33	5.41
non-use	Urban/Industrial fallow	113, 125	40	0		40%																						
artificial_li	Rural settlement	114	25	0.38		40%									0	0	-0.39	14.57	-139.65	-1.76	-6.07	3.76	-91.52	n.a.	n.a.	7.23	14.94	6.41
artificial_hi	Industrial or commercial area	121	24	0.39		80%			0	0	0			0	0	0	-0.40	10.93	-209.48	-1.85	-6.57	3.69	-137.28	n.a.	n.a.	7.04	14.68	6.24
artificial_hi	Traffic networks (road and rail	1221,				100%		n.a.	n.a.	n.a.	n.a.	n.a.		n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
artificial_li	Road/rail embankments and	122, 1224	32	0.2		50%					0				0	0	-0.28	-2.91	-19.95	-0.93	-2.54	5.76	-13.07	n.a.	n.a.	13.73	21.66	12.18
artificial_li	Green urban areas	141	29	0.27		40%					0					0	-0.31	-5.46	-29.93	-1.13	-3.29	4.77	-19.61	n.a.	n.a.	10.17	18.43	9.02
agri_hi	Conventional/intensive arable	2111	10	0.74	0%	0%											-2.17	1.11	12.68	2.21	3.41	2.22	8.32	n.a.	n.a.	3.71	9.22	3.31
agri_hi	Integrated arable	2112	7	0.82	40%	0%												0.55	10.21	1.47	1.14	0.82	6.70	n.a.	n.a.	3.35	8.49	2.98
agri_li	Organic arable	2113	26	0.35	100%	0%													-69.75			0.72	-45.76	n.a.	n.a.	7.84	15.75	6.90
agri_li	Organic orchards	2222	23	0.41		0%																n.a.	n.a.	n.a.	n.a.	6.70	14.20	5.89
agri_hi	Intensive pasture and meadows	2311	17	0.58	0%	0%											-0.72	1.89	24.62		11.43	2.78	16.15	n.a.	n.a.	4.73	11.11	4.22
agri_li	Less intensive pasture and	2312	19	0.51	40%	0%												1.63	41.85			1.85	27.46	n.a.	n.a.	5.38	12.20	4.79
agri_li	Organic pasture and meadows	2313	45	-0.14	100%	0%													-7.61				-4.99	n.a.	n.a.	-19.61	144.40	-17.24
forest	Broad-leafed forest	311	24	0.41		0%																						0
forest	Coniferous forest	312				0%																						n.a.
forest	Mixed forest	313				0%																						n.a.
forest_hi	Plantation forest			0.67		0%																						
non-use	Forest edge	314	48	-0.2		0%																						0
mix	Country average																	-0.12	-1.23	n.a.	-0.14	1.00	-0.81	n.a.	n.a.		5.23	

A-4.30 Restoration Costs/(PDF * m^2) Switzerland

Average Restoration Costs per PDF and per m^2 [€/(m2*PDF)]

Country: Switzerland

PPS 1.30 (Germany = 1)							Repair Costs per PDF [€/m2/PDF]																					
							Target biotopes											Target biotopes										
Biotope Group	starting Biotopes	Corine ID-No.	number of species (S)	PDF occupation	Extensivie-rungsgrad	% of sealed area	Built up land	Continuous urban fabric	Disconti-nuous urban	Urban/ Industrial fallow	Rural settlement	Industrial area	Traffic networks road and rail networks, airports, port areas	Road/rail embank-ments and associated land	Green urban areas	Intensive arable	Integrated arable	Organic arable	Organic orchards	Intensive pasture	Less intensive pasture	Organic pasture	Broad-leafed forest	Coniferous forest	Mixed forest	Plantation forest	Forest edge	Country average
artificial_hi	Built up land	*10*	*1*	*0.97*		100%		0	0	0	0	0		0	0	0	1.30	0.80	8.53	1.03	1.95	2.01	5.59	n.a.	n.a.	10.44	8.44	2.15
artificial_hi	Continuous urban fabric	*111*	*8*	*0.8*		80%			0	0	0			0	0	0	-9.75	1.11	12.25	1.82	3.10	2.37	8.03	n.a.	n.a.	3.91	9.88	2.61
artificial_hi	Discontinuous urban fabric	*112*	*22*	*0.45*		60%				0	0			0	0	0	-0.53	4.98	119.44	-3.08	-14.99	3.78	78.27	n.a.	n.a.	6.96	15.20	4.64
non-use	Urban/Industrial fallow	*113, 125*	*40*	*0*		40%																						
artificial_li	Rural settlement	*114*	*25*	*0.38*		40%									0	0	-0.44	16.61	-159.25	-2.00	-6.92	4.29	-104.36	n.a.	n.a.	8.24	17.03	5.49
artificial_hi	Industrial or commercial area	*121*	*24*	*0.39*		80%			0	0	0			0	0	0	-0.45	12.46	-238.88	-2.11	-7.49	4.21	-156.54	n.a.	n.a.	8.03	16.75	5.35
artificial_hi	Traffic networks (road and rail	*1221,*				100%		n.a.	n.a.	n.a.	n.a.	n.a.		n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
artificial_li	Road/rail embankments and	*122, 1224*	*32*	*0.2*		50%					0				0	0	-0.31	-3.32	-22.75	-1.05	-2.90	6.56	-14.91	n.a.	n.a.	15.65	24.70	10.43
artificial_li	Green urban areas	*141*	*29*	*0.27*		40%					0					0	-0.35	-6.23	-34.13	-1.29	-3.75	5.44	-22.36	n.a.	n.a.	11.60	21.02	7.73
agri_hi	Conventional/intensive arable	*2111*	*10*	*0.74*	*0%*	0%											-2.47	1.27	14.46	2.52	3.89	2.54	9.49	n.a.	n.a.	4.23	10.51	2.84
agri_hi	Integrated arable	*2112*	*7*	*0.82*	*40%*	0%												0.63	11.64	1.68	1.30	0.93	7.64	n.a.	n.a.	3.82	9.69	2.43
agri_li	Organic arable	*2113*	*26*	*0.35*	*100%*	0%													-79.54			0.82	-52.18	n.a.	n.a.	8.95	17.96	5.47
agri_li	Organic orchards	*2222*	*23*	*0.41*		0%																n.a.	n.a.	n.a.	n.a.	7.64	16.20	4.40
agri_hi	Intensive pasture and meadows	*2311*	*17*	*0.58*	*0%*	0%											-0.82	2.15	28.07		13.04	3.17	18.42	n.a.	n.a.	5.40	12.67	3.75
agri_li	Less intensive pasture and	*2312*	*19*	*0.51*	*40%*	0%												1.86	47.72			2.11	31.31	n.a.	n.a.	6.14	13.92	4.18
agri_li	Organic pasture and meadows	*2313*	*45*	*-0.14*	*100%*	0%													-8.68				-5.69	n.a.	n.a.	-22.36	164.67	-13.20
forest	Broad-leafed forest	*311*	*24*	*0.41*		0%																						0
forest	Coniferous forest	*312*				0%																						n.a.
forest	Mixed forest	*313*				0%																						n.a.
forest_hi	Plantation forest			*0.67*		0%																						
non-use	Forest edge	*314*	*48*	*-0.2*		0%																						0
mix	Country average																	-0.49	-4.83	n.a.	-0.65	4.86	-3.24	n.a.	n.a.		20.95	

A-4.31 Restoration Costs/(PDF * m^2) Turkey

Average Restoration Costs per PDF and per m^2 [€/(m2*PDF)]

Country: Turkey

PPS 0.51 (Germany = 1)

Repair Costs per PDF [€/m2/PDF]

Biotope Group	starting Biotopes	Corine ID-No.	number of species (S)	PDF occupation	Extensivie-rungsgrad	% of sealed area	Built up land	Continuous urban fabric	Disconti-nuous urban	Urban/ Industrial fallow	Rural settlement	Industrial area	Traffic networks road and rail networks, airports, port areas	Road/rail embank-ments and associated land	Green urban areas	Intensive arable	Integrated arable	Organic arable	Organic orchards	Intensive pasture	Less intensive pasture	Organic pasture	Broad-leafed forest	Coniferous forest	Mixed forest	Plantation forest	Forest edge	Country average
artificial_hi	Built up land	10	1	0.97		100%		0	0	0	0	0		0	0	0	0.51	0.32	3.35	0.40	0.77	0.79	2.19	n.a.	n.a.	4.09	3.31	0.75
artificial_hi	Continuous urban fabric	111	8	0.8		80%			0	0	0			0	0	0	-3.83	0.43	4.81	0.71	1.22	0.93	3.15	n.a.	n.a.	1.54	3.88	0.91
artificial_hi	Discontinuous urban fabric	112	22	0.45		60%				0	0			0	0	0	-0.21	1.96	46.86	-1.21	-5.88	1.48	30.71	n.a.	n.a.	2.73	5.96	1.62
non-use	Urban/Industrial fallow	113, 125	40	0		40%																						
artificial_li	Rural settlement	114	25	0.38		40%									0	0	-0.17	6.52	-62.48	-0.79	-2.71	1.68	-40.94	n.a.	n.a.	3.23	6.68	1.92
artificial_hi	Industrial or commercial area	121	24	0.39		80%			0	0	0			0	0	0	-0.18	4.89	-93.71	-0.83	-2.94	1.65	-61.41	n.a.	n.a.	3.15	6.57	1.87
artificial_hi	Traffic networks (road and rail	1221,				100%		n.a.	n.a.	n.a.	n.a.	n.a.		n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
artificial_li	Road/rail embankments and	122, 1224	32	0.2		50%					0				0	0	-0.12	-1.30	-8.93	-0.41	-1.14	2.58	-5.85	n.a.	n.a.	6.14	9.69	3.64
artificial_li	Green urban areas	141	29	0.27		40%					0					0	-0.14	-2.44	-13.39	-0.51	-1.47	2.14	-8.77	n.a.	n.a.	4.55	8.25	2.70
agri_hi	Conventional/intensive arable	2111	10	0.74	0%	0%											-0.97	0.50	5.67	0.99	1.53	0.99	3.72	n.a.	n.a.	1.66	4.12	1.01
agri_hi	Integrated arable	2112	7	0.82	40%	0%												0.25	4.57	0.66	0.51	0.37	3.00	n.a.	n.a.	1.50	3.80	0.89
agri_li	Organic arable	2113	26	0.35	100%	0%													-31.20			0.32	-20.47	n.a.	n.a.	3.51	7.05	1.95
agri_li	Organic orchards	2222	23	0.41		0%																n.a.	n.a.	n.a.	n.a.	3.00	6.35	1.47
agri_hi	Intensive pasture and meadows	2311	17	0.58	0%	0%											-0.32	0.84	11.01		5.11	1.24	7.23	n.a.	n.a.	2.12	4.97	1.29
agri_li	Less intensive pasture and	2312	19	0.51	40%	0%												0.73	18.72			0.83	12.28	n.a.	n.a.	2.41	5.46	1.45
agri_li	Organic pasture and meadows	2313	45	-0.14	100%	0%													-3.40				-2.23	n.a.	n.a.	-8.77	64.60	-4.86
forest	Broad-leafed forest	311	24	0.41		0%																						0
forest	Coniferous forest	312				0%																						n.a.
forest	Mixed forest	313				0%																						n.a.
forest_hi	Plantation forest			0.67		0%																						
non-use	Forest edge	314	48	-0.2		0%																						0
mix	Country average																	-0.21	-2.14	n.a.	-0.25	1.69	-1.53	n.a.	n.a.		9.88	

A-4.32 Restoration Costs/(PDF * m^2) United Kingdom

Average Restoration Costs per PDF and per m^2 [€/(m2*PDF)]

Country: United Kingdom

PPS 0.95 (Germany = 1)							Repair Costs per PDF [€/m2/PDF]																					
							Target biotopes										Target biotopes											
Biotope Group	starting Biotopes	*Corine ID-No.*	*number of species (S)*	*PDF occupation*	*Extensivie-rungsgrad*	% of sealed area	Built up land	Continuous urban fabric	Disconti-nuous urban	Urban/ Industrial fallow	Rural settlement	Industrial area	Traffic networks road and rail networks, airports, port areas	Road/rail embank-ments and associated land	Green urban areas	Intensive arable	Integrated arable	Organic arable	Organic orchards	Intensive pasture	Less intensive pasture	Organic pasture	Broad-leafed forest	Coniferous forest	Mixed forest	Plantation forest	Forest edge	Country average
artificial_hi	Built up land	*10*	*1*	*0.97*		100%		0	0	0	0	0		0	0	0	0.95	0.59	6.23	0.75	1.43	1.47	4.09	n.a.	n.a.	7.63	6.17	1.04
artificial_hi	Continuous urban fabric	*111*	*8*	*0.8*		80%			0	0	0			0	0	0	-7.13	0.81	8.95	1.33	2.27	1.73	5.87	n.a.	n.a.	2.86	7.22	1.26
artificial_hi	Discontinuous urban fabric	*112*	*22*	*0.45*		60%				0	0			0	0	0	-0.39	3.64	87.28	-2.25	-10.95	2.76	57.20	n.a.	n.a.	5.08	11.11	2.23
non-use	Urban/Industrial fallow	*113, 125*	*40*	*0*		40%																						
artificial_li	Rural settlement	*114*	*25*	*0.38*		40%									0	0	-0.32	12.14	-116.38	-1.46	-5.05	3.14	-76.26	n.a.	n.a.	6.02	12.45	2.64
artificial_hi	Industrial or commercial area	*121*	*24*	*0.39*		80%			0	0	0			0	0	0	-0.33	9.10	-174.56	-1.54	-5.48	3.08	-114.40	n.a.	n.a.	5.87	12.24	2.58
artificial_hi	Traffic networks (road and rail	*1221,*				100%		n.a.	n.a.	n.a.	n.a.	n.a.		n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
artificial_li	Road/rail embankments and	*122, 1224*	*32*	*0.2*		50%					0				0	0	-0.23	-2.43	-16.63	-0.77	-2.12	4.80	-10.89	n.a.	n.a.	11.44	18.05	5.02
artificial_li	Green urban areas	*141*	*29*	*0.27*		40%					0					0	-0.26	-4.55	-24.94	-0.94	-2.74	3.98	-16.34	n.a.	n.a.	8.47	15.36	3.72
agri_hi	Conventional/intensive arable	*2111*	*10*	*0.74*	*0%*	0%											-1.81	0.93	10.57	1.84	2.84	1.85	6.93	n.a.	n.a.	3.09	7.68	1.39
agri_hi	Integrated arable	*2112*	*7*	*0.82*	*40%*	0%												0.46	8.51	1.23	0.95	0.68	5.58	n.a.	n.a.	2.79	7.08	1.09
agri_li	Organic arable	*2113*	*26*	*0.35*	*100%*	0%													-58.13			0.60	-38.13	n.a.	n.a.	6.54	13.13	2.24
agri_li	Organic orchards	*2222*	*23*	*0.41*		0%																n.a.	n.a.	n.a.	n.a.	5.58	11.84	1.70
agri_hi	Intensive pasture and meadows	*2311*	*17*	*0.58*	*0%*	0%											-0.60	1.57	20.51		9.53	2.32	13.46	n.a.	n.a.	3.94	9.26	1.93
agri_li	Less intensive pasture and	*2312*	*19*	*0.51*	*40%*	0%												1.36	34.88			1.54	22.88	n.a.	n.a.	4.49	10.17	2.08
agri_li	Organic pasture and meadows	*2313*	*45*	*-0.14*	*100%*	0%													-6.34				-4.16	n.a.	n.a.	-16.34	120.33	-4.99
forest	Broad-leafed forest	*311*	*24*	*0.41*		0%																						0
forest	Coniferous forest	*312*				0%																						n.a.
forest	Mixed forest	*313*				0%																						n.a.
forest_hi	Plantation forest			*0.67*		0%																						
non-use	Forest edge	*314*	*48*	*-0.2*		0%																						0
mix	Country average																	-0.59	-5.91	n.a.	-0.78	5.69	-3.88	n.a.	n.a.		25.12	

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