

## 2. I dati di base

I dati necessari per la compilazione delle mappe di carico critico per l'acidità totale, per lo zolfo, per l'azoto acidificante e nutriente, per i metalli pesanti, sono stati raccolti e organizzati in forma di database georeferenziato. Di seguito vengono presentati sotto forma di tabella o di carta tematica (a seconda della diversa funzionalità) i principali parametri utilizzati per la stima dei carichi critici.

### 2.1 Carta della percentuale di territorio italiano compresa nel reticolato EMEP

Risoluzione: reticolato EMEP 50x50 km<sup>2</sup>

Mappa in cui viene riportata la percentuale di maglia 50x50 occupata da terra ferma appartenente al territorio nazionale, con l'esclusione delle percentuali occupate dalle acque costiere, dalle acque interne e da territorio straniero, in quanto queste zone non sono state oggetto di mappatura

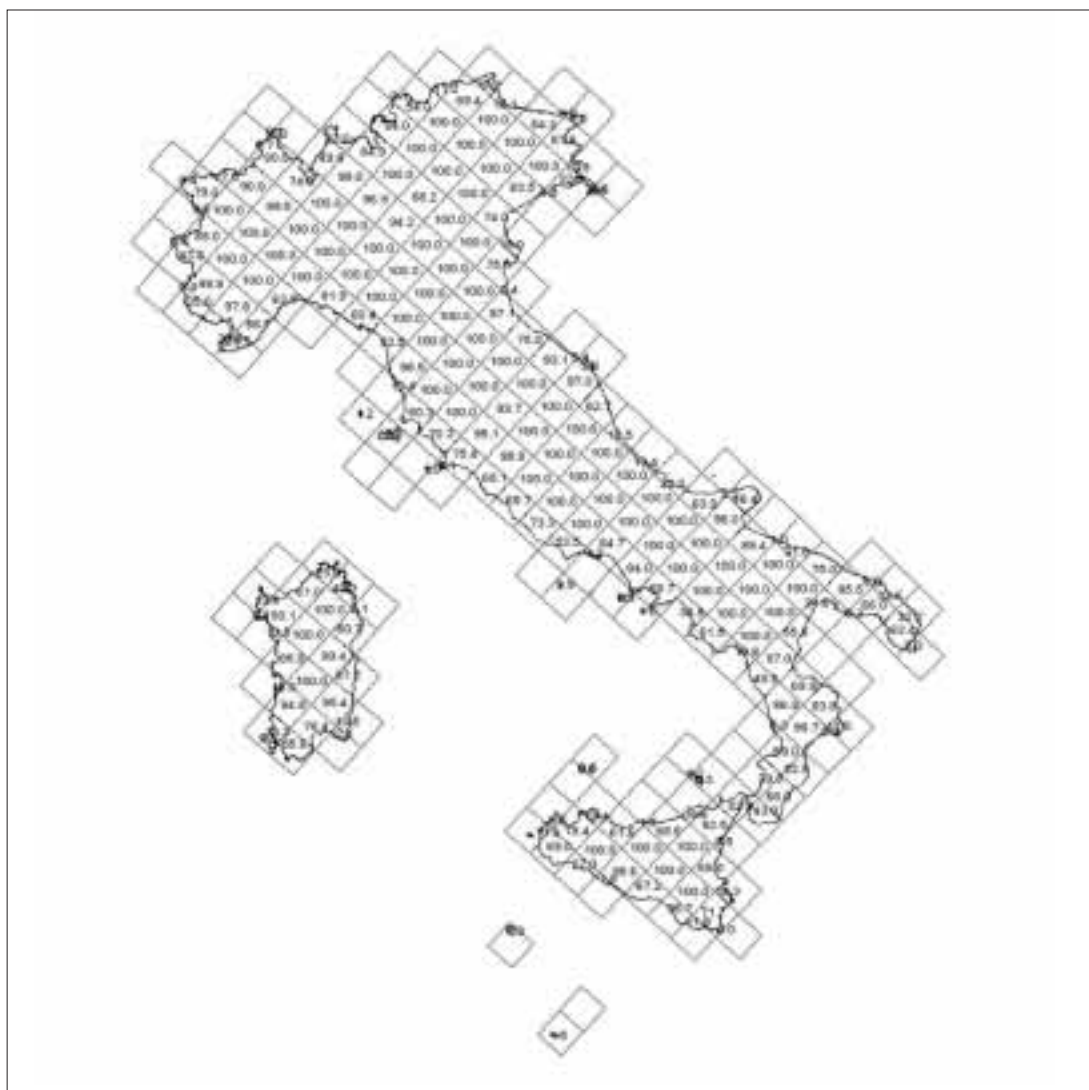


Fig. 2.1.1: Carta della percentuale di territorio italiano compresa nel reticolato EMEP

## 2.2 Carta del territorio italiano coperto da elementi sensibili

Risoluzione: reticolato EMEP 50x50 km<sup>2</sup>

Mappa in cui viene riportata la percentuale di maglia 50x50 occupata da elementi nazionali sensibili ai fenomeni dell'acidificazione e dell'eutrofizzazione, con l'esclusione della percentuale di maglia occupata da acque interne, acque costiere, territorio straniero ed ecosistemi non sensibili all'acidificazione e all'eutrofizzazione quali la terra arabile e le aree urbane.

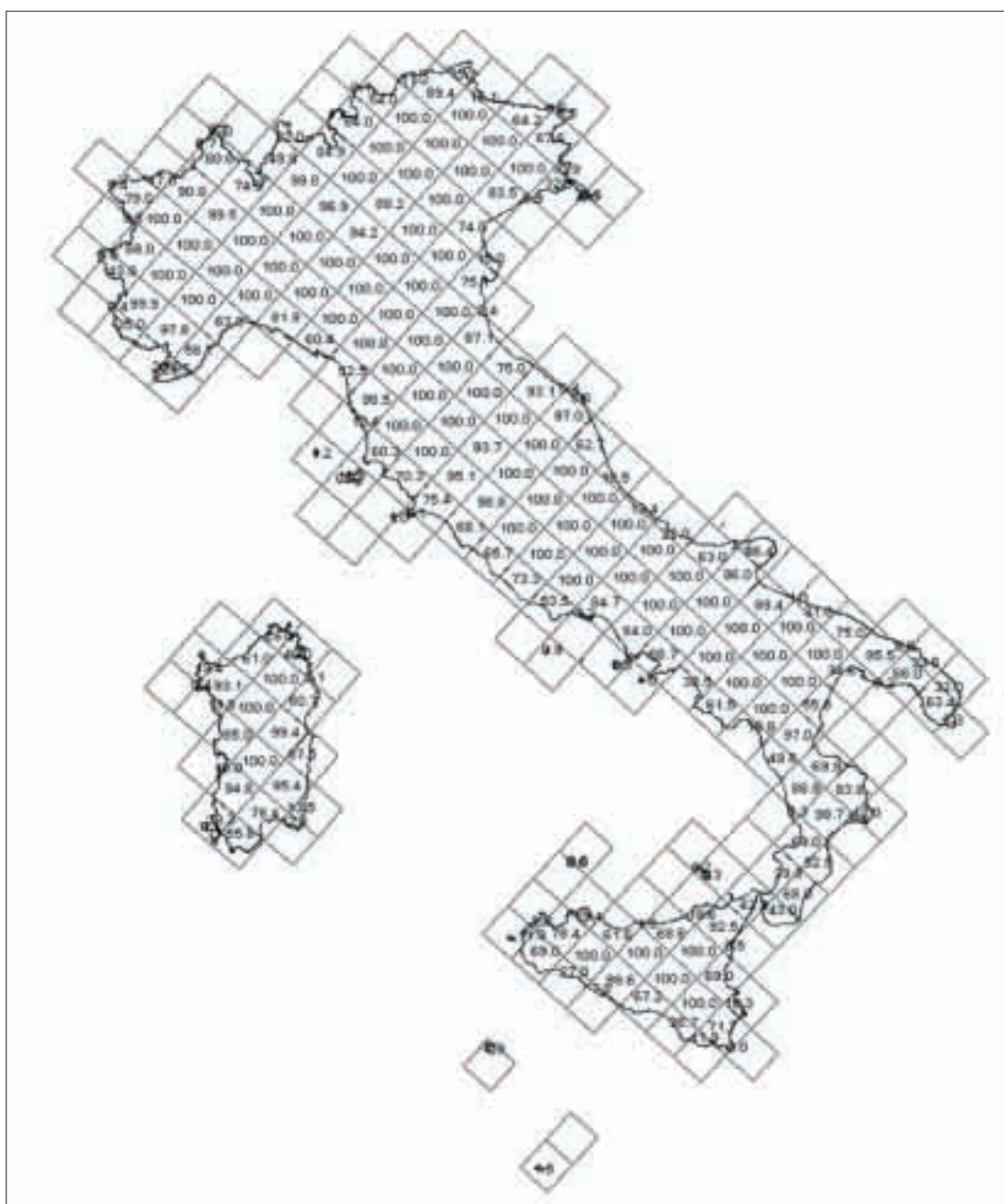


Fig. 2.2.1: Carta del territorio italiano coperto da elementi sensibili

## 2.3 Carta dell'uso del suolo

Risoluzione: reticolato EMEP 1x1 km<sup>2</sup>

Per la determinazione dell'uso del suolo si è utilizzata la "Carta della vegetazione reale d'Italia" in scala 1:1.000.000 (Ministero dell'Ambiente 1992) che suddivide il territorio italiano in due grandi regioni con differenti caratteristiche climatiche e dunque vegetazionali, per un totale di 54 fitotipi riconosciuti: la regione Euro-Siberiana, che corrisponde all'area delle Alpi fino al margine inferiore della pianura Padana, e la regione Mediterranea, che comprende la restante parte del territorio.

Sono state successivamente realizzate due elaborazioni differenti della carta di uso del suolo una utilizzata per la stima del carico critico di acidità totale, per il calcolo del carico critico di zolfo e per il calcolo del carico critico di azoto acidificante e un'altra utilizzata per la stima del carico critico di azoto nutriente con diverse aggregazioni delle classi originarie.

In appendice A è riportata la corrispondenza tra le 54 voci originarie e le 4 previste dalla metodologia per il calcolo del carico critico di acidità totale, di zolfo e di azoto acidificante, mentre in appendice B è riportata la corrispondenza tra le 54 voci originarie e le 7 previste dalla metodologia di stima per il calcolo del carico critico di azoto nutriente

### Legenda di fig. 2.3.1

#### VEGETAZIONE DELLA REGIONE EUROSIBERIANA

##### PIANO COLLINARE

- 1 - Foreste di caducifoglie mesofile (*Fagetalia sylvaticae*, *Carpinion*)
- 2 - Foreste di caducifoglie termofile delle Prealpi (*Quercetalia pubescenti-petraeae*, *Orno-Ostryon*, *Ostryo-Carpinion orientalis*)
- 3 - Foreste di caducifoglie termofile (*Quercetalia pubescenti-petraeae*, *Quercion pubescenti-petraeae*)
- 4 - Foreste di caducifoglie acidofile (*Quercetalia robori-petraeae*)
- 5 - Foreste di caducifoglie acidofile (*Quercetalia robori-petraeae*) con prevalenza di *Castanea sativa*

##### PIANO MONTANO

- 6 - Foreste di caducifoglie mesofile, anche miste ad *Abies alba* (*Fagetalia sylvaticae*, *Eu-Fagion*)
- 7 - Foreste di conifere montane (*Vaccinio-Piceetalia*, *Vaccinio-Abietion*)
- 8 - Foreste di *Pinus sylvestris* delle valli interne delle Alpi (*Erico-Pinetalia*, *Ononido-Pinion*)
- 9 - Foreste di *Pinus sylvestris* delle valli esterne delle Alpi e boscaglie di *Pinus mugo* (*Erico-Pinetalia*, *Erico-Pinion*)

##### PIANO SUBALPINO

- 10 - Foreste di conifere e brughiere subalpine (*Vaccinio-Piceetalia*, *Vaccinio-Piceion*)

##### PIANO ALPINO

- 11 - Praterie neutro-basofile (*Seslerietalia variae*, *Elynetalia*)
- 12 - Praterie acidofile (*Caricetalia curvulae*)
- Praterie secondarie**
- 13 - Praterie acidofile (*Nardetalia*)
- 14 - Praterie xeriche delle valli interne delle Alpi (*Festucetalia valesiacae*)
- 15 - Praterie xeriche delle Prealpi orientali (*Scorzoneretalia villosae*)
- 16 - Praterie falciabili (*Arrhenatheretalia*)

#### VEGETAZIONE DELLA REGIONE MEDITERRANEA

##### PIANO TERMOMEDITERRANEO

- 17 - Macchie di sclerofille sempreverdi (*Pistacio-Rhamnetalia*)

##### PIANO MESOMEDITERRANEO

- 18 - Foreste di sclerofille sempreverdi (*Quercetalia ilicis*)
- 19 - Foreste di *Quercus trojana*
- 20 - Foreste di *Pinus pinaster*

##### PIANO SUPRAMEDITERRANEO

- 21 - Foreste di caducifoglie termofile dell'Appennino a prevalenza di *Quercus pubescens* (*Quercetalia pubescenti-petraeae*, *Quercion pubescenti-petraeae*)
- 22 - Foreste di caducifoglie submesofile (*Quercetalia pubescenti-petraeae*) a prevalenza di *Quercus cerris*

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## Legenda di fig. 2.3.1

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- 23 - Foreste di caducifoglie termofili della Sicilia (*Quercetalia pubescenti-petraeae*)
- 24 - Foreste di Pinus laricio dell'Etna (*Quercetalia pubescenti-petraeae*)
- 25 - Foreste miste di Quercus petraeae e Ilex aquifolium della Sicilia (*Quercetalia pubescenti-petraeae*)
- 26 - Foreste di caducifoglie termofili della Sardegna (*Quercetalia pubescenti-petraeae*), anche con Ilex aquifolium e Taxus baccata
- 27 - Foreste di caducifoglie termofili dell'Appennino a prevalenza di Ostrya carpinifolia e Fraxinus ornus (*Quercetalia pubescenti-petraeae*, *Laburno-Ostryon*)
- 28 - Foreste di caducifoglie meso-igrofile (*Quercetalia robori-petraeae*)
- 29 - Foreste di caducifoglie acidofile (*Quercetalia robori-petraeae*) a prevalenza di Castanea sativa

**PIANO OROMEDITERRANEO**

- 30 - Foreste di caducifoglie mesofile talvolta miste con Abies alba (*Fagetalia sylvaticae*, *Geranio nodosi-Fagion*) dell'Appennino centro-settentrionale
- 31 - Foreste di caducifoglie mesofile (*Fagetalia sylvaticae*, *Geranio striati-Fagion*) dell'Appennino meridionale e Sicilia, talvolta miste con Abies alba nell'Appennino meridionale
- 32 - Foreste di caducifoglie mesofile del Gargano (*Fagetalia sylvaticae*, *Carpinion*)
- 33 - Foreste di Pinus laricio dell'Appennino meridionale (*Fagetalia sylvaticae*, *Hypochaerido-Pinetum laricionis*)
- 34 - Boscaglie di Pinus mugo (*Erico-Pinetalia*)
- 35 - Brughiere ipsofile dell'Appennino centro-settentrionale (*Vaccinio-Piceetalia*)
- 36 - Arbusteti dei monti della Sardegna (*Carici-Genistalia lobelii*)

**PIANO CRIOOROMEDITERRANEO**

- 37 - Praterie neutro basofile (*Seslerietalia apenninae*)
- 38 - Praterie acidofile (*Nardetalia*)
- 39 - Vegetazione ed arbusteti spinosi dell'Etna (*Rumici-Astragaleetalia*)

**Praterie secondarie**

- 40 - Praterie mediterranee (*Thero-Brachypodietalia*, *Helianthemetalia guttati*, limitatamente al sud della Penisola e alla Sicilia anche *Lygeo-Stipetalia*)
- 41 - Praterie Xeriche dell'Appennino (*Brometalia erecti*, *Agropyretalia repentis*)
- 42 - Praterie xeriche della Sicilia (*Erysimo-Jurinetalia*)
- 43 - Praterie e gariche collinari e medio-montane della Sardegna (*Teucrio-Santolinetalia*)
- 44 - Praterie umide dei piani carsici dell'Appennino (*Trifolio-Hordeetalia*)

**VEGETAZIONE PIONIERA E ARBUSTIVA DELLE COLATE LAVICHE DELL'ETNA**

- 45 - Stadi pionieri a Sedum coeruleum, arbusteti a Genista aetnensis, ecc...

**VEGETAZIONE AZONALE****FORESTE RIPARIALI**

- 46 - Foreste e boscaglie ripariali a prevalenza di Salix sp. pl., Alnus glutinosa, A. incana, A. cordata, Populus alba, P. nigra e Tamarix sp. pl. (*Populeetalia albae*, *Salicetalia purpureae*, *Tamaricetalia*)

**FORESTE PALUDOSE**

- 47 - Foreste paludose di Alnus glutinosa (*Alnetalia glutinosae*, *Hydrocotylo-Alnetum glutinosae*, *Carici elongatae-Alnetum glutinosae*, ecc...)

**VEGETAZIONE PALUSTRE**

- 48 - Praterie palustri, canneti, ecc... (*Magnocaricetalia*, *Phragmitetalia*)

**VEGETAZIONE LACUSTRE**

- 49 - Vegetazione natante e sommersa dei laghi (*Potamogetonetalia*)

**VEGETAZIONE DELLE LAGUNE SALMASTRE**

- 50 - Vegetazione sommersa (*Ruppiaetalia*) e vegetazione emersa del bordo (*Thero-Salicornietalia*, *Spartinetalia merittimae*, *Arthrocnemumetalia fruticosi*, *Limonietalia*, *Juncetalia maritimi*)

**VEGETAZIONE DELLE COSTE BASSE**

- 51 - Vegetazione delle dune sabbiose (*Ammophiletalia*, *Malcolmietalia*, *Euphorbietalia peplis*, *Helichryso-Crucianelletalia*)

**VEGETAZIONE DELLE COSTE ALTE**

- 52 - Vegetazione delle coste rocciose (*Crithmo-Limonietalia*)

## Legenda di fig. 2.3.1

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**VEGETAZIONE SINANTROPICA**

53 - Vegetazione ruderale, nitrofila, infestante e degli insediamenti antropici (*Polygono-Chenopodietalia*, *Artemisietalia*, *Aperetalia*, *Secalinetalia*, *Eragrostidetalia*, *Bidentetalia*, *Onopordetalia*, *Plantaginietalia majoris*, ecc...)

54 - Aree con vegetazione scarsa o nulla

Fonte: Ministero dell'Ambiente, 1992.

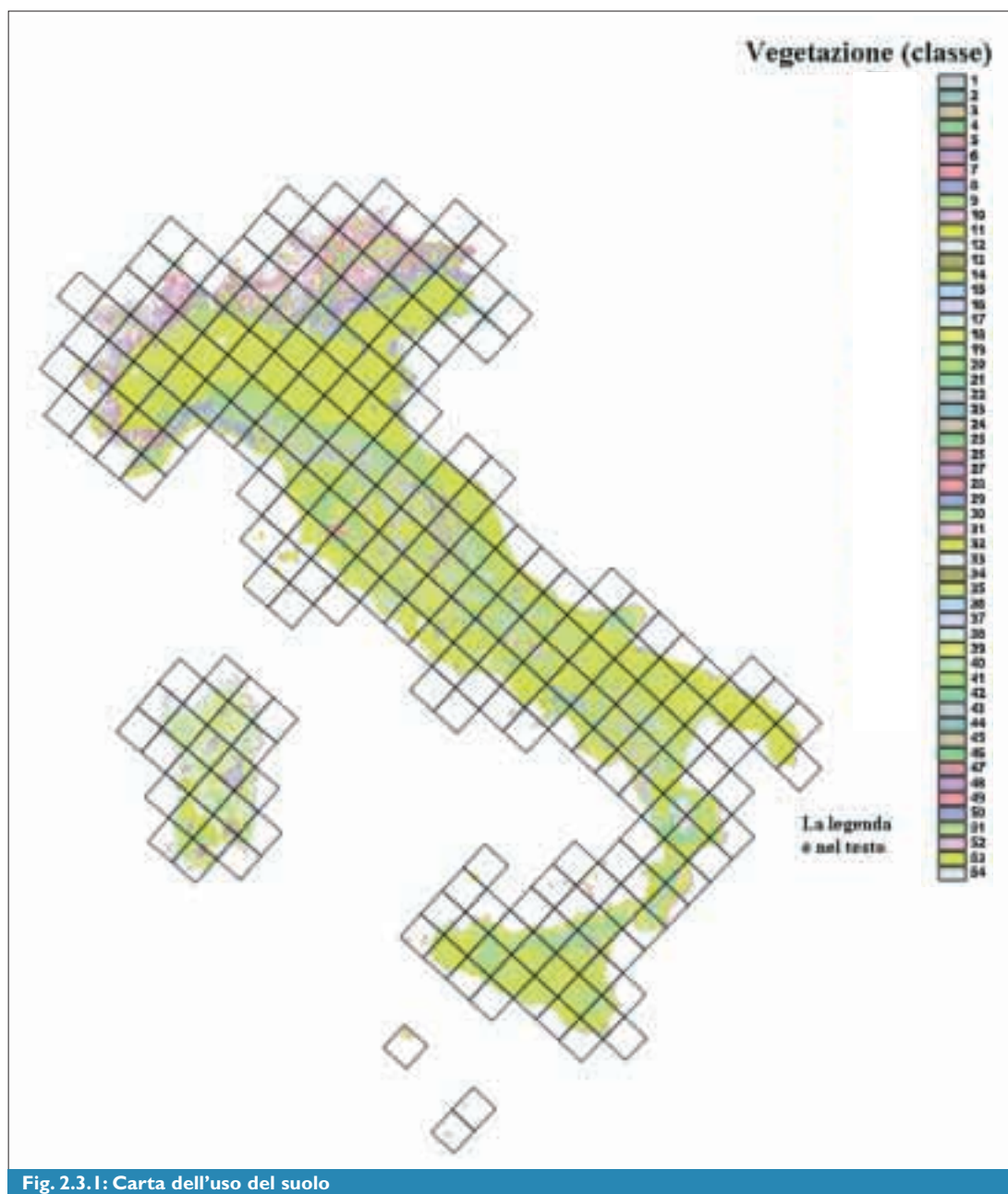


Fig. 2.3.1: Carta dell'uso del suolo

## 2.4 Carta delle precipitazioni

Risoluzione 1x1 km<sup>2</sup>

Carta delle precipitazioni ottenuta digitalizzando la “Carta della precipitazione media annua in Italia per il trentennio 1921-1950” in scala 1:1.000.000 del Consiglio Superiore Servizio Idrografico (Ministero Lavori Pubblici). Ad ogni maglia del grigliato 1x1 è stato assegnato un valore di precipitazione media annua in mm, tale valore di precipitazione corrisponde al valore centrale delle classi previste dalle legenda della carta sopra citata e riportate di seguito:

**Tabella 2.4.1: Codici associati alle maglie della mappa delle precipitazioni**

Codice	Valori di precipitazione media annua in mm	Classi di precipitazione media annua in mm della legenda della “Carta della precipitazione media annua in Italia per il trentennio 1921-1950”
1	250	500
2	625	501 - 750
3	875	751 - 1.000
4	1100	1.001 - 1.250 (*)
8	1350	1.251 - 1.500 (*)
5	1750	1.501 - 2.000
6	2250	2.001 - 2.500
7	2750	> 2.500

Fonte :Vetrella G (1998)

(\*) Nella legenda della “Carta della precipitazione media annua in Italia per il trentennio 1921-1950” [Ministero dei lavori pubblici - a] le classi 1.001-1.250 e 1.251-1.500 sono raggruppate nell'unica classe 1.001-1.500, ma all'interno della carta sono tra loro distinte e sono rappresentate da due differenti isolinee. La distinzione nelle due classi è stata fatta in un secondo momento e questo è il motivo per cui il codice 8 (aggiunto successivamente) non si trova in ordine progressivo (ma si trova tra il 4 e il 5).

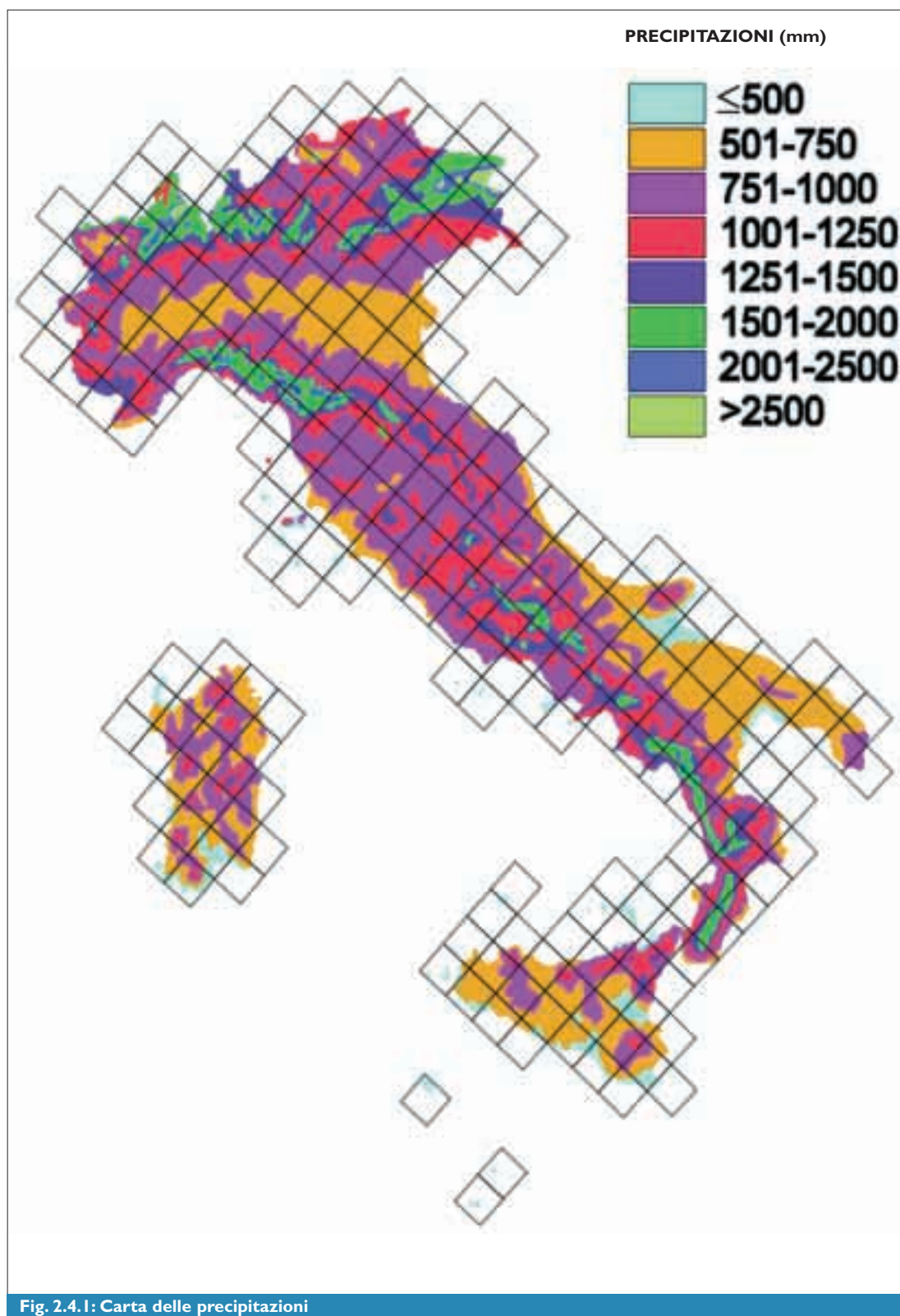


Fig. 2.4.1: Carta delle precipitazioni

## 2.5 Carta dei suoli

Risoluzione 1x1 km<sup>2</sup>

Carta dei suoli ottenuta digitalizzando la parte riguardante l'Italia della "Carta dei suoli della Comunità Europea" in scala 1:1.000.000 con una disaggregazione spaziale di 1x1 km<sup>2</sup> (Tavernier R., Louis A., 1992)

Ad ogni unità territoriale (1x1 km<sup>2</sup>) è stato assegnato un codice denominato Codice CEE a cui è associato un differente tipo di suolo, che classifica il suolo nazionale in 66 tipologie.

**Tabella 2.5.1: Tipi di suoli presenti sul territorio italiano**

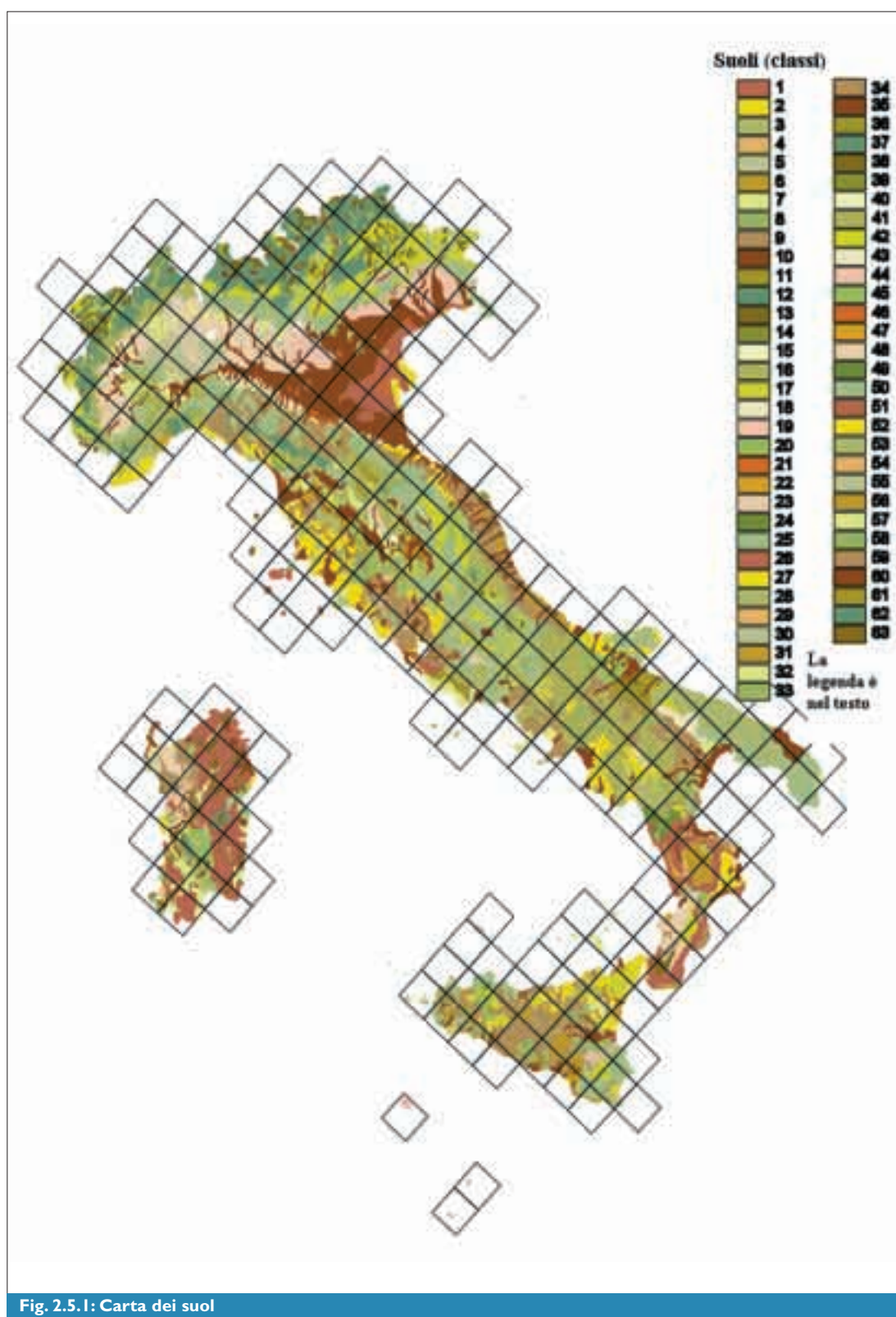
	Codice sulla carta CEE	Tipo di suolo	Tessitura del suolo	Pendenza dei suoli associati	LEGENDE
1	A2	Jeg	1/4	a	
2	A4	Jeg	1/2	a	Tipo di suolo
3	A14	Ge	4	a	Be = Eutric Cambisols
4	A19	Ges	4	a	Bea = Ando-Eutric Cambisols
5	A20	Gef	2/3	a	Bec = Calcaro-Eutric Cambisols
6	A32	Gh	1	a	Bef = Fluvi-Eutric Cambisols
7	A36	Re	1/4	cd	Bgc = Calcaro-Gleyic Cambisols
8	A42	Rc	3/4	cd	Bk = Calcic Cambisols
9	A43	Rc	3/4	bc	Bvc = Calcaro-Vertic Cambisols
10	A45	Rd	1	b	D(d) = (Dystric) Podzoluvisols
11	A48	Ie	2	d	Eo = Orthic Rendzinas
12	A53	Id	1/2	cd	Ge = Eutric Gleysols
13	A54	Id	1/2	cd	Gef = Fluvi-Eutric Gleysols
14	A57	Qc	1	b	Ges = Stagno-Eutric Gleysols
15	A62	Eo	3	b	Gh = Humic Gleysols
16	A63	Eo	3	c	Id = Dystric Lithosols
17	A67	Eo	3	cd	Ie = Eutric Lithosols
18	A72	U	2	cd	Jeg = Gleyo-Eutric Fluvisol
19	A76	Tv	2	bc	Lc = Chromic Luvisols
20	A77	Vp	4/5	ab	Lcr = Rhodo-Chromic Luvisols
21	A84	Vc	5	b	Lf = Ferric Luvisols
22	B8	Be	2	b	Lg = Gleyic Luvisols
23	B10	Be	3	bc	Lgp = Plano-Gleyic Luvisols
24	B11	Be	2	c	Lgs = Stagno-Gleyic Luvisols
25	B14	Be	2/3	ad	Lk = Calcic Luvisols
26	B19	Be	2/3	cd	Lo = Orthic Luvisol
27	B20	Be	2/4	cd	Pl = Leptic Podzols
28	B21	Be	2/4	ad	Po = Orthic Podzols
29	B29	Bec	4	b	Pp = Placid Podzols
30	B30	Bec	4	b	Qc = Cambic Arenosols
31	B31	Bec	1/2	bc	Rc = Calcaric Regosols
32	B32	Bec	2/4	bc	Rd = Dystric Regosols
33	B36	Bec	2	a	Re = Eutric Regosols
34	B38	Bea	1/2	ad	Tv = Vitric Andosols
35	B39	Bef	1/4	a	U = Rankers
36	B45	Bd	3	b	Vcc = Calcaro-Chromic Vertisols

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	Codice sulla carta CEE	Tipo di suolo	Tessitura del suolo	Pendenza dei suoli associati	LEGENDE
37	B46	Bd	1/2	cd	Vp = Pellic Vertisols
38	B50	Bd	2	c	
39	B52	Bd	2	c	Tessitura
40	B54	Bd	2	a	1 = coarse
41	B55	Bd	2	cd	2 = medium
42	B56	Bd	1	cd	3 = medium fine
43	B82	Bgc	4	ab	4 = fine
44	B92	Bk	1/2	b	5 = very fine
45	B110	Bvc	3/4	bc	
46	C1	Lo	3	ab	Pendenza
47	C14	Lo	2	cd	a = level
48	C19	Lo	2/4	ab	b = sloping
49	C21	Lo	2/4	b	c = moderately steep
50	C32	Lc	2/4	d	d = steep
51	C34	Lc	2/4	bc	
52	C43	Lcr	4	cd	
53	C44	Lk	4	b	
54	C50	Lf	2	ab	
55	C53	Lg	3	a	
56	C56	Lgs	3	b	
57	C63	Lgp	2/4	sb	
58	C64	D	3	a	
59	C67	Dd	2	b	
60	C76	Po	1	cd	
61	C77	Po	1	b	
62	C84	Pl	1	cd	
63	C92	Pp	1/2	bc	
64	Ghiacci	Ghiacci			
65	Lago	Lago			
66	Urbanizzato	Urbanizzato			

Fonte: Tavernier R., Louis A., 1992



## 2.6 Carta delle temperature

Risoluzione 1x1 km<sup>2</sup>

Carta delle temperature ottenuta digitalizzando la “Carta delle temperature medie annue vere in Italia per il trentennio 1926-1955” in scala 1:1.000.000 (Ministero dei Lavori Pubblici).

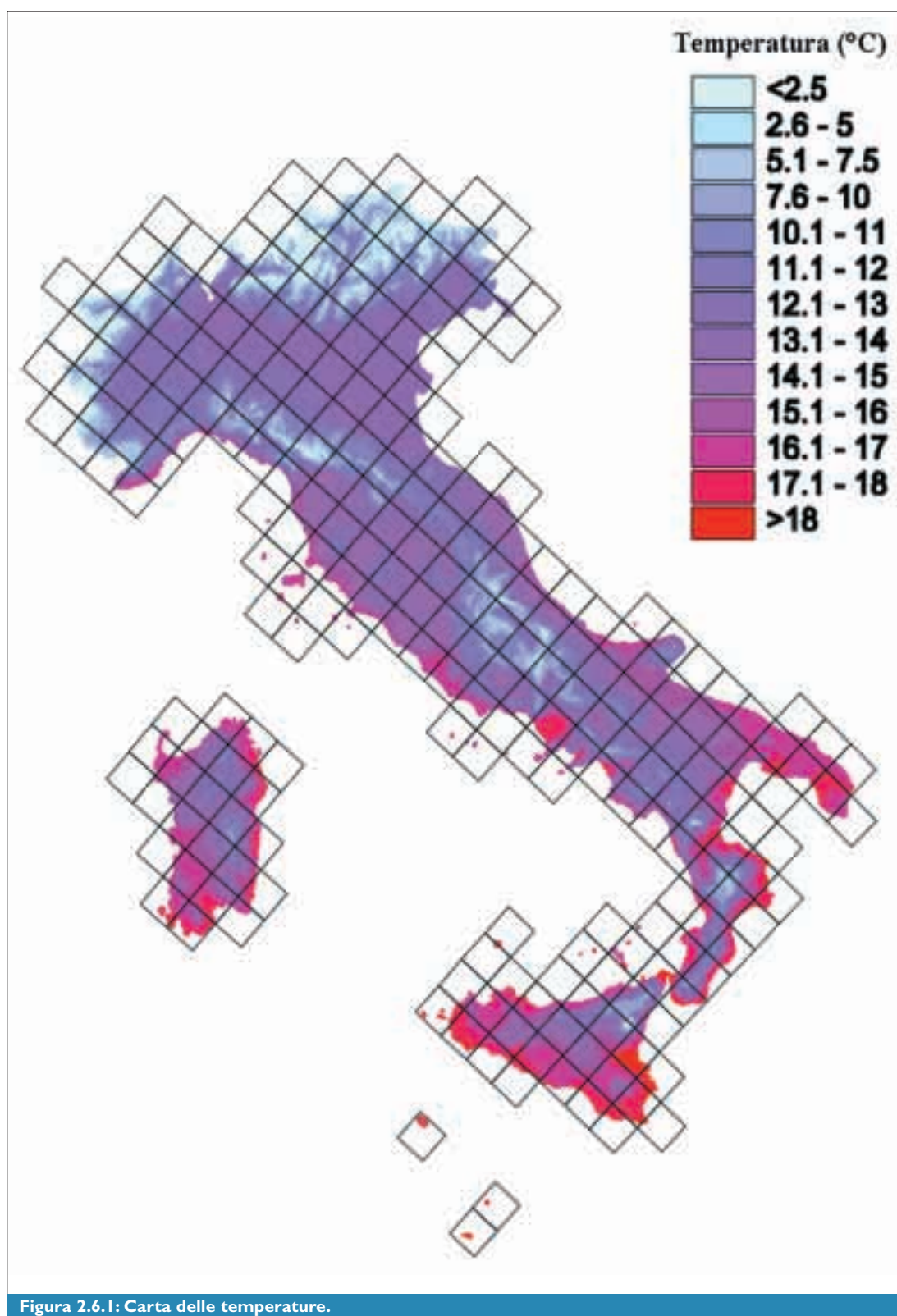
Ad ogni cella della mappa è stato assegnato un codice, a cui è associato un valore di temperatura media annua in °C (valore che corrisponde all'estremo superiore<sup>1</sup> delle tredici classi in cui sono suddivise le temperature del territorio nazionale).

**Tabella 2.6.1: Codici associati alle maglie della carta delle temperature**

Codice	Valori di temperatura media annua in °C	Classi di temperatura media annua in °C della leggenda della “Carta delle temperature medie annue vere in Italia per il trentennio 1926-1955”
1	2,5	£ 2,5
2	5	2,6 - 5
3	7,5	5,1 - 7,5
4	10	7,6 - 10
5	11	10,1 - 11
6	12	11,1 - 12
7	13	12,1 - 13
8	14	13,1 - 14
9	15	14,1 - 15
10	16	15,1 - 16
11	17	16,1 - 17
12	18	17,1 - 18
13	20	>18

Fonte: Vetrella G. (1998)

<sup>1</sup> È stato attribuito il valore superiore e non il valore centrale perché il dato indicato nella leggenda della carta delle temperature identifica il valore relativo al poligono compreso tra le due isolinee e non il valore relativo all'isolinea (come nel caso della carta delle precipitazioni).



## 2.7 Carta delle deposizioni dei cationi basici

Risoluzione 1x1 km<sup>2</sup>

Mappa in cui viene riportato il contenuto di cationi basici (calcio, magnesio e potassio) nelle deposizioni ottenuta a partire dai dati di concentrazione al suolo dei cationi basici e dai dati di precipitazione. Per ogni cella della mappa, la deposizione di cationi basici ( $BC_{dep}$ ) è stata ricavata applicando la seguente formula [Downing R.J. et al., 1993]:

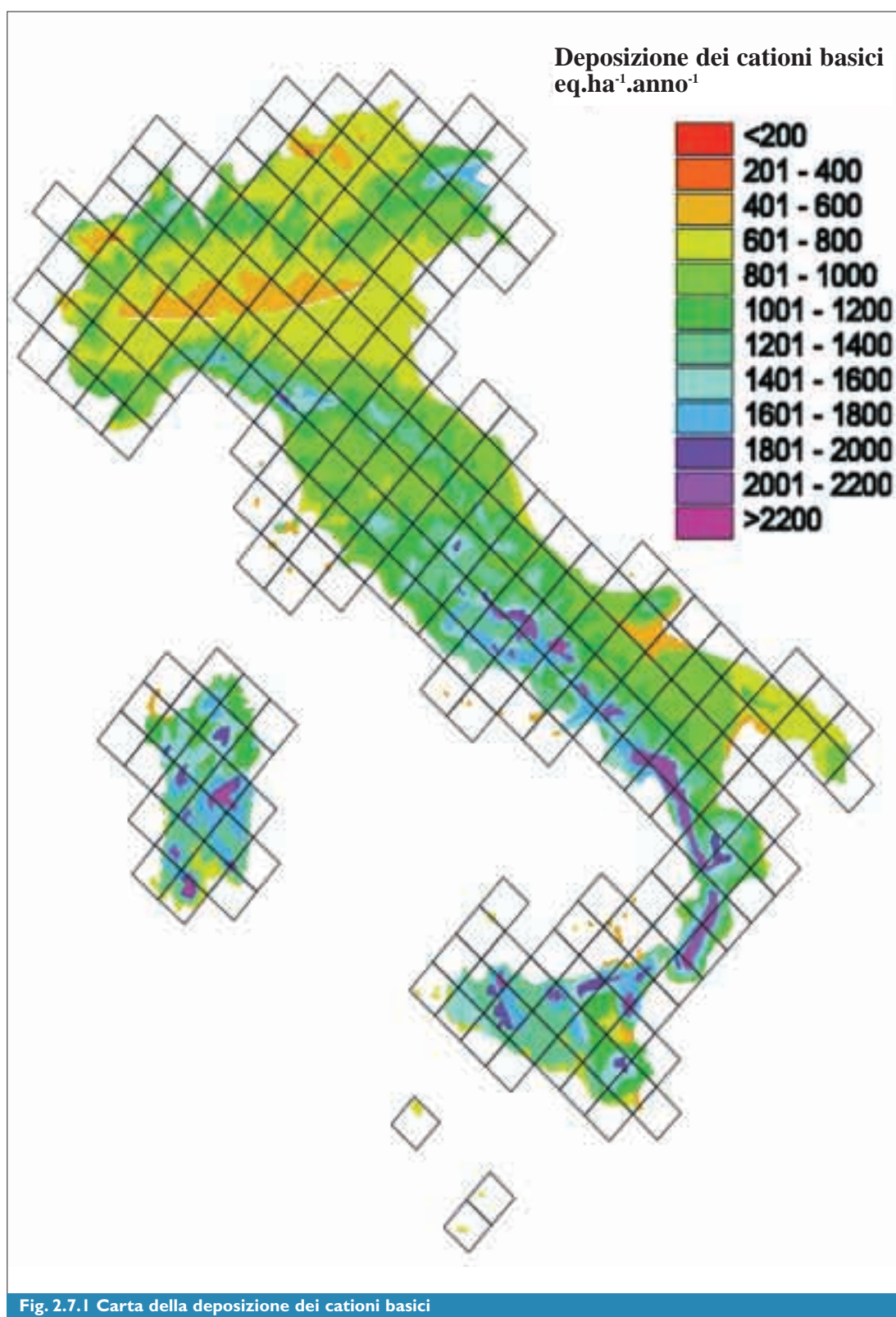
$$BC_{dep} = \begin{cases} Dep * 2 & , \text{ se } Dep \leq 250 \\ Dep + 250 & , \text{ se } Dep > 250 \end{cases} \quad \text{con : } Dep = \frac{BCCON * PRECIPI}{100}$$

dove Dep = deposizione umida

BCCON = concentrazione dei cationi basici al suolo

PRECIPI= entità delle precipitazioni (mm di pioggia)

Le concentrazioni di cationi basici al suolo sono stati precedentemente calcolati, interpolando, con un metodo statistico di media ponderata sul volume per il periodo 1988-1992, i dati di concentrazione rilevati da 39 stazioni di monitoraggio ENEL.



## 2.8 Carta della rimozione dei cationi basici

Risoluzione 1x1 km<sup>2</sup>

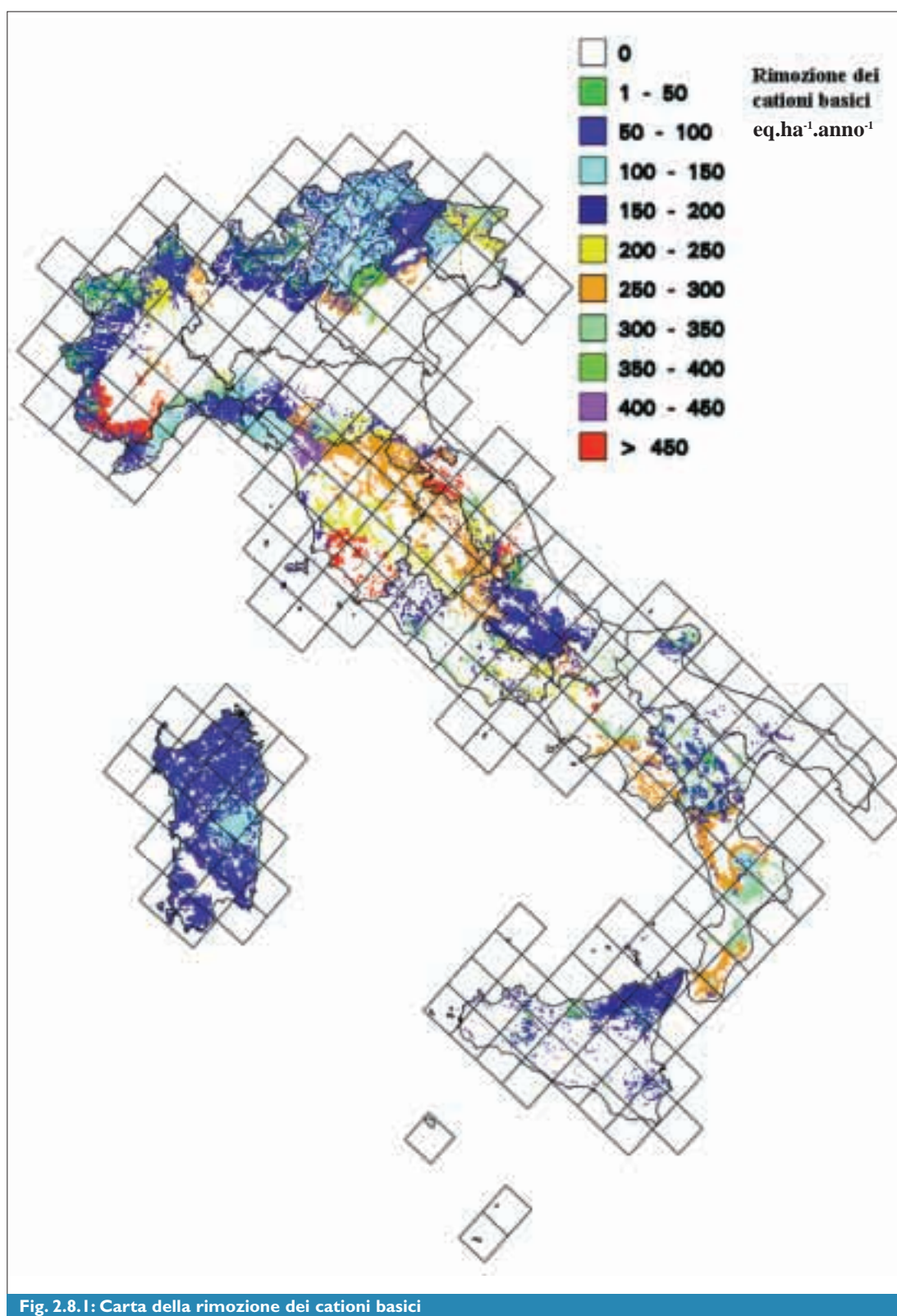
Mappa della rimozione netta di cationi basici (calcio, magnesio e potassio) dal suolo per trasferimento nella biomassa vegetale e animale.

La rimozione netta di cationi basici nella biomassa animale e vegetale può essere determinata sulla base della crescita vegetativa: minore è la crescita e minore sarà la quantità di cationi basici trasferiti nella biomassa, viceversa maggiore è la crescita maggiore sarà la quantità di cationi basici rimossi dal suolo.

Per il calcolo dei valori di biomassa forestale asportata annualmente sono state prese in considerazione le utilizzazioni legnose forestali fornite dall'Istat, sia per le conifere che per le latifoglie, per gli anni 1989-1993 (Istat), tramite le quali si è calcolata, per ogni provincia l'utilizzazione legnosa media annua provinciale (5 anni). Sommando le utilizzazioni medie delle province appartenenti alle stesse regioni, si è ottenuta l'utilizzazione legnosa media annua regionale, separatamente per le conifere e per le latifoglie.

Sulla base dei valori della superficie regionale coperta dai rispettivi tipi di ecosistemi (Inventario Forestale Nazionale, 1985) si è ottenuta l'utilizzazione specifica di ogni ecosistema (in m<sup>3</sup> ha<sup>-1</sup> anno<sup>-1</sup>) all'interno delle singole regioni.

Si è poi corretto questo valore con dei coefficienti moltiplicativi di accrescimento, sia delle conifere che delle latifoglie delle singole province appartenenti alle rispettive regioni, e applicando un ulteriore fattore correttivo sulla base di futuri scenari di utilizzazione.



## 2.9 Carta del rilascio di cationi basici da parte dei suoli

Risoluzione 1x1 km<sup>2</sup>

Il rilascio di cationi basici è il processo con cui i minerali presenti nel suolo forniscono un apporto di cationi basici (calcio, magnesio e potassio) che, oltre a costituire la principale fonte di elementi nutritivi per gli organismi vegetali, esercita un'azione tampone sull'acidità di origine interna all'ecosistema e sugli apporti esterni che si possono registrare con le deposizioni. Il rilascio di cationi basici dipende dalla composizione mineralogica dei suoli, dalla temperatura degli stessi e dalla profondità della zona radicale (Hettenlingh J. P., de Vries W. 1990).

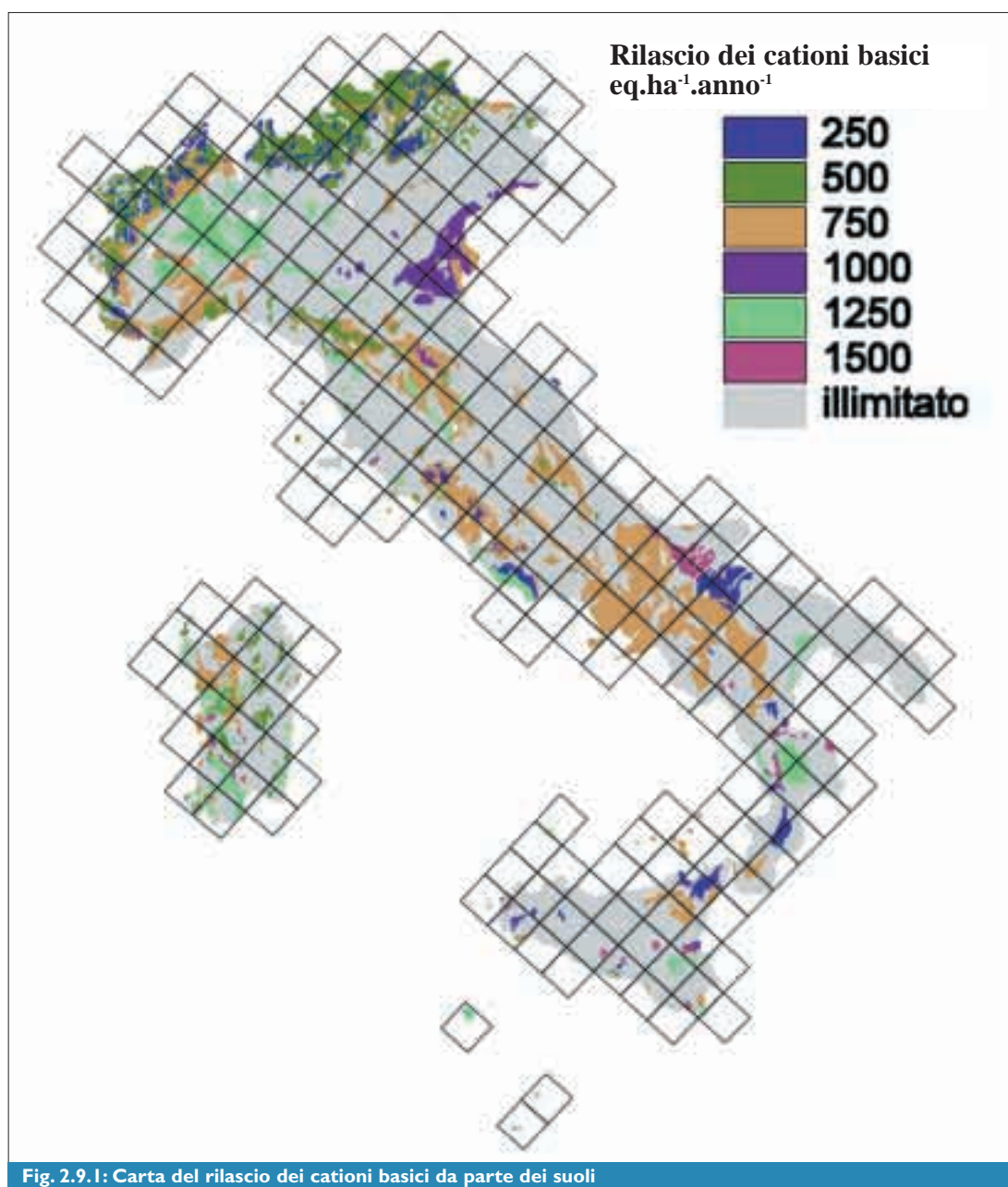


Fig. 2.9.1: Carta del rilascio dei cationi basici da parte dei suoli

## 2.10 I limiti provinciali

Risoluzione 50x50 km<sup>2</sup>

La tabella dei limiti provinciali 2.10.1. riporta la distribuzione del territorio occupato dalle singole province italiane, in termine di percentuale, all'interno delle maglie del reticolato EMEP 50x50.

**Tabella 2.10.1: Limiti provinciali**

PROVINCIA	CELLE	%
Agrigento	I25038	1,074
	I25039	0,27
	I26038	15,04
	I26039	19,267
	I27038	3,898
	I27039	43,216
	I27040	1,103
	I28039	15,263
	I29034	0,716
Alessandria	I29035	0,153
	I06046	5,04
	I07045	5,436
	I07046	39,907
	I07047	1,029
	I08045	7,103
	I08046	40,887
Ancona	I08047	0,598
	I15048	13,976
	I15049	51,418
	I16048	1,448
	I16049	27,823
Aosta	I16050	5,335
	I04045	0,088
	I04046	50,929
	I04047	12,397
	I05046	17,127
Arezzo	I05047	19,094
	I13047	16,902
	I13048	14,462
	I14047	42,737
	I14048	25,145
Ascoli Piceno	I15047	0,754
	I16048	0,896
	I16049	4,876
	I17048	40,222
Asti	I17049	54,006
	I06045	10,629
	I06046	18,587
	I07045	35,527
Avellino	I07046	35,257
	I22046	3,549
	I22047	44,371
	I22048	13,97
	I23047	22,783
Bari	I23048	15,327
	I23049	12,934
	I23050	0,427
	I24048	0,135
	I24049	34,116
	I24050	12,115

continua

segue

PROVINCIA	CELLE	%
	I25049	12,596
	I25050	26,681
	I26050	0,996
Belluno	I09051	0,016
	I09052	17,665
	I09053	37,423
	I09054	4,437
	I10051	0,173
	I10052	23,081
	I10053	14,582
	I10054	2,623
Benevento	I21046	0,165
	I21047	42,633
	I21048	11,312
	I22047	33,411
	I22048	12,479
Bergamo	I07048	4,886
	I07049	51,612
	I07050	10,045
	I08048	9,172
	I08049	22,881
	I08050	1,404
Bologna	I11047	3,408
	I11048	19,019
	I11049	21,199
	I12047	3,186
	I12048	29,813
	I12049	23,375
Bolzano	I07051	8,765
	I07052	15,891
	I07053	3,317
	I08051	1,667
	I08052	25,851
	I08053	26,126
	I08054	4,5
	I09052	1,006
	I09053	10,421
	I09054	2,456
Brescia	I07050	5,865
	I07051	2,886
	I08048	3,38
	I08049	31
	I08050	28,442
	I08051	1,436
	I09048	1,537
	I09049	19,724
	I09050	5,73
Brindisi	I25050	1,484
	I26050	51,669
	I26051	9,081
	I27050	20,825
	I27051	16,941
Cagliari	I15036	0,778
	I16035	10,802
	I16036	23,082
	I16037	4,058
	I17035	15,344
	I17036	22,63

continua

segue		
PROVINCIA	CELLE	%
	I17037	16,413
	I18036	3,17
	I18037	3,723
Caltanissetta	I27039	23,328
	I27040	19,713
	I28039	33,858
	I28040	12,833
	I29039	7,841
	I29040	2,427
Campobasso	I20047	0,636
	I20048	22,72
	I20049	7,586
	I21047	14,787
	I21048	44,879
	I21049	9,392
Caserta	I20046	17,999
	I20047	7,746
	I21046	49,405
	I21047	23,535
	I22046	1,203
	I22047	0,112
Catania	I28040	10,485
	I28041	23,071
	I28042	15,211
	I29039	0,347
	I29040	25,795
	I29041	20,097
	I29042	4,994
Catanzaro	I27045	0,937
	I27046	0,74
	I28044	4,151
	I28045	24
	I28046	30,634
	I28047	22,349
	I29045	9,279
	I29046	1,707
	I29047	6,203
Chieti	I19047	0,277
	I19048	46,818
	I19049	7,746
	I20048	37,632
	I20049	7,527
Como	I06048	16,214
	I06049	40,27
	I07048	21,463
	I07049	22,053
Cosenza	I25046	1,675
	I25047	2,021
	I26046	14,869
	I26047	19,457
	I26048	5,799
	I27045	0,657
	I27046	24,893
	I27047	20,318
	I28046	4,149
	I28047	6,162
Cremona	I07048	0,428
	I08048	47,564

continua

segue

PROVINCIA	CELLE	%
	109048	47,622
	109049	2,1
	110048	2,28
	110049	0,006
Cuneo	105043	0,049
	105044	0,648
	106043	10,335
	106044	28,164
	106045	7,408
	107043	3,875
	107044	28,745
	107045	18,589
	108044	2,187
Enna	127040	9,372
	127041	9,131
	128039	0,765
	128040	47,259
	128041	33,473
Ferrara	111049	27,341
	111050	11,787
	112049	15,719
	112050	45,153
Firenze	112046	5,427
	112047	29,709
	112048	19,41
	113046	3,734
	113047	30,166
	113048	11,554
Foggia	121048	6,07
	121049	14,676
	121050	0,787
	122048	18,465
	122049	25,808
	122050	13,252
	123048	7,428
	123049	13,514
Forlì	112048	0,102
	113048	38,989
	113049	39,327
	114048	2,042
	114049	19,54
Frosinone	118046	10,557
	118047	0,004
	119045	0,006
	119046	49,9
	119047	8,199
	120046	21,226
	120047	10,108
Genova	108045	13,61
	108046	26,933
	109045	0,008
	109046	59,128
	110046	0,321
Gorizia	111054	0,028
	112053	60,59
	112054	39,382
Grosseto	113045	11,73

continua

segue

PROVINCIA	CELLE	%
	I13046	3,593
	I14044	0,443
	I14045	31,644
	I14046	18,118
	I15044	0,988
	I15045	22,447
	I15046	11,037
Imperia	I07043	13,78
	I07044	6,964
	I08043	49,625
	I08044	29,631
Isernia	I20046	0,076
	I20047	75,677
	I20048	21,895
	I21047	2,352
L'Aquila	I17047	6,248
	I17048	1,731
	I18046	3,781
	I18047	33,088
	I18048	10,433
	I19046	1,484
	I19047	34,327
	I19048	3,512
	I20047	5,096
	I20048	0,3
La Spezia	I09046	20,728
	I10046	79,272
Latina	I18045	20,656
	I18046	0,158
	I19044	0,689
	I19045	45,535
	I19046	8,735
	I20044	0,69
	I20045	2,704
	I20046	20,728
	I21045	0,105
Lecce	I27050	18,428
	I27051	11,028
	I28050	45,027
	I28051	21,071
	I29050	4,446
Livorno	I11045	0,356
	I12044	2,646
	I12045	13,873
	I12046	19,036
	I13043	0,454
	I13044	20,2
	I13045	42,117
	I13046	0,355
	I14043	0,963
Lucca	I10047	2,033
	I11046	40,149
	I11047	47,678
	I12046	8,659
	I12047	1,481
Macerata	I15048	0,375
	I15049	0,333
	I16048	46,068

continua

segue

PROVINCIA	CELLE	%
	116049	50,187
	117048	2,29
	117049	0,747
	109048	1,721
	109049	35,768
	110048	5,503
	110049	53,825
	111049	3,183
Massa Carrara	109046	0,041
	110046	44,511
	110047	41,762
	111046	13,656
	111047	0,03
Matera	124048	9,896
	124049	2,668
	125048	42,177
	125049	21,943
	126048	18,621
	126049	4,695
Messina	126042	0,549
	126043	0,293
	127041	23,91
	127042	11,03
	127043	2,861
	127044	0,419
	128041	5,836
	128042	35,475
	128043	19,474
	129042	0,153
Milano	106047	2,083
	106048	0,194
	107047	17,646
	107048	52,351
	108047	0,195
	108048	26,911
	109048	0,62
Modena	110048	4,045
	110049	10,283
	111047	25,237
	111048	45,763
	111049	14,672
Napoli	121045	5,797
	121046	28,393
	122045	1,445
	122046	63,861
	122047	0,504
Novara	104048	0,516
	104049	0,037
	105047	5,656
	105048	48,068
	105049	2,795
	106047	27,673
	106048	9,937
	107047	5,318
Nuoro	114037	1,949
	114038	0,008
	115037	2,919
	115038	10,158

continua

segue

PROVINCIA	CELLE	%
	I15039	5,341
	I15040	1,12
	I16037	13,292
	I16038	27,184
	I16039	17,096
	I16040	0,392
	I17037	10,268
	I17038	10,273
Oristano	I15036	5,341
	I15037	53,934
	I15038	3,6
	I16036	9,461
	I16037	26,945
	I16038	0,719
Padova	I10050	10,875
	I10051	27,928
	I11050	33,526
	I11051	27,671
Palermo	I24040	0,004
	I24041	0,186
	I25039	14,403
	I25040	6,554
	I26038	
	I26039	24,886
	I26040	24,865
	I26041	0,558
	I27039	0,302
	I27040	22,89
	I27041	5,352
Parma	I09046	7,538
	I09047	26,993
	I09048	18,969
	I10046	0,517
	I10047	30,355
	I10048	15,628
Pavia	I06047	0,453
	I07046	3,223
	I07047	45,48
	I07048	0,583
	I08046	3,255
	I08047	46,091
	I08048	0,883
	I09046	0,032
Perugia	I14047	1,567
	I14048	7,36
	I15046	0,237
	I15047	25,519
	I15048	23,237
	I16047	23,423
	I16048	11,186
	I17047	3,608
	I17048	3,863
Pesaro	I13048	0,237
	I13049	0,001
	I14048	24,786
	I14049	33,391
	I15048	10,3
	I15049	31,285

continua

segue

PROVINCIA	CELLE	%
Pescara	I18048	45,418
	I18049	2,699
	I19047	0,049
	I19048	49,453
	I19049	2,381
Piacenza	I08046	1,533
	I08047	26,76
	I08048	3,286
	I09046	6,765
	I09047	43,674
	I09048	17,982
Pisa	I11046	8,834
	I12045	1,341
	I12046	58,801
	I12047	0,055
	I13045	5,336
	I13046	25,633
Pistoia	I11047	17,894
	I12047	82,106
Pordenone	I10052	5,018
	I10053	56,469
	I10054	1,27
	I11052	7,834
	I11053	29,409
Potenza	I23047	3,509
	I23048	15,142
	I23049	1,58
	I24047	12,393
	I24048	24,306
	I24049	1,739
	I25046	1,065
	I25047	24,011
	I25048	7,485
	I26047	7,892
	I26048	0,878
Ragusa	I29039	32,099
	I29040	29,42
	I30039	14,304
	I30040	24,177
Ravenna	I12048	12,043
	I12049	43,235
	I12050	5,051
	I13048	0,833
	I13049	36,176
	I13050	2,662
Reggio Calabria	I28043	4,326
	I28044	15,152
	I28045	0,585
	I29043	25,942
	I29044	38,925
	I29045	15,07
Reggio Emilia	I10047	22,095
	I10048	55,353
	I10049	4,774
	I11047	11,134
	I11048	6,644
Rieti	I16046	0,25
	I17046	28,416

continua

segue

PROVINCIA	CELLE	%
	I17047	47,322
	I17048	8,692
	I18046	2,907
	I18047	12,413
Roma	I16045	9,482
	I17045	25,563
	I17046	17,467
	I18045	18,815
	I18046	25,844
	I19045	0,592
	I19046	2,237
Rovigo	I10049	3,787
	I10050	0,117
	I11049	7,405
	I11050	53,781
	I11051	0,244
	I12050	20
	I12051	14,666
Salerno	I22046	9,219
	I22047	0,615
	I23046	13,254
	I23047	21,919
	I24046	24,654
	I24047	22,737
	I25046	3,283
	I25047	4,319
Sassari	I13037	0,086
	I13038	4,966
	I13039	0,284
	I14037	1,268
	I14038	24,059
	I14039	16,426
	I14040	7,67
	I15037	0,205
	I15038	15,046
	I15039	20,923
	I15040	9,067
Savona	I07044	0,043
	I07045	4,237
	I08044	45,124
	I08045	50,596
Siena	I13046	28,955
	I13047	8,998
	I14046	31,795
	I14047	14,829
	I15046	12,245
	I15047	3,178
Siracusa	I29040	22,075
	I29041	27,705
	I30040	50,22
Sondrio	I06049	11,399
	I06050	14,621
	I06051	0,908
	I07049	7,445
	I07050	39,399
	I07051	26,228
Taranto	I25049	22,897
	I25050	2,492

continua

segue

PROVINCIA	CELLE	%
	I26049	21,105
	I26050	36,682
	I27049	0,179
	I27050	16,645
Teramo	I17048	28,934
	I17049	6,757
	I18048	48,058
	I18049	16,251
Terni	I15046	20,901
	I15047	13,467
	I16046	28,623
	I16047	26,206
	I17046	2,503
	I17047	8,3
Torino	I04044	1,509
	I04045	0,44
	I04046	0,185
	I05044	13,18
	I05045	27,289
	I05046	22,076
	I05047	0,09
	I06044	2,079
	I06045	20,648
	I06046	12,504
Trapani	I24038	9,006
	I24039	7,14
	I25038	48,632
	I25039	30,668
	I26035	3,388
	I26038	0,985
	I26039	0,181
Trento	I07051	2,016
	I08050	11,722
	I08051	31,386
	I08052	3,694
	I09050	6,812
	I09051	21,2
	I09052	22,929
	I09053	0,241
Treviso	I10051	18,835
	I10052	47,94
	I11051	3,955
	I11052	29,27
Trieste	I12053	55,465
	I12054	17,001
	I13053	24,457
	I13054	3,077
Udine	I10053	6,242
	I10054	26,406
	I10055	0,057
	I11053	26,267
	I11054	30,227
	I11055	3,383
	I12053	7,404
	I12054	0,014
Varese	I05048	0,047
	I06047	3,537
	I06048	91,37
	I07048	5,046

continua

segue

PROVINCIA	CELLE	%
Venezia	I I I 050	4,057
	I I I 051	44,714
	I I I 052	42,076
	I I I 053	6,755
	I I 2051	0,8
	I I 2052	0,823
	I I 2053	0,775
Vercelli	I 05046	1,041
	I 05047	37,014
	I 05048	0,271
	I 06046	25,732
	I 06047	33,31
	I 07046	1,104
	I 07047	1,528
Verona	I 09049	9,198
	I 09050	41,321
	I I 0049	12,203
	I I 0050	36,388
	I I I 050	0,89
Vicenza	I 09050	4,845
	I 09051	29,452
	I 09052	0,032
	I I 0050	27,068
	I I 0051	38,557
	I I I 050	0,046
Viterbo	I I 5045	13,688
	I I 5046	16,697
	I I 6045	23,989
	I I 6046	38,973
	I I 7045	0,101
	I I 7046	6,552

Fonte: Vetrella G. (1998)

## 2.11 Perdite di azoto attraverso gli incendi

Risoluzione 50x50 km<sup>2</sup>

Le perdite di azoto attraverso gli incendi sono state determinate sulla base della frequenza di questi ultimi: più bassa è la frequenza e minori saranno le perdite di azoto, viceversa più alta è la frequenza e maggiore saranno le perdite di azoto attraverso gli incendi.

Il Corpo Forestale dello Stato ha fornito, per ogni provincia italiana, i dati relativi alla superficie totale bruciata (boscata e non) complessivamente negli anni 1982-1993 (Ministero delle risorse agricole, alimentari e forestali, 1995), tramite i quali si è calcolata, per ogni provincia, la superficie totale bruciata media annua (per 12 anni).

Poiché all'interno di ogni provincia la superficie totale bruciata non si distribuisce uniformemente sul territorio si sono posti alcuni vincoli quali la quota, il tipo di ecosistema e la ripartizione tra incendi su aree boscate e non boscate, che consentono con un certo livello di approssimazione di attribuire alle singole celle e agli ecosistemi in esse presenti un valore che esprime la quantità di azoto rilasciata verso l'atmosfera a seguito del passaggio degli incendi. I valori di riferimento per il calcolo del rilascio di azoto a seguito di incendio che interessano le diverse tipologie di ecosistema sono riportati nella tabella 2.11.1.

**Tabella 2.11.1: Valori di azoto perso attraverso gli incendi (in kg N ha<sup>-1</sup> anno<sup>-1</sup>) attribuiti agli ecosistemi previsti per il carico critico di azoto nutriente**

Ecosistema bruciato (in ha) per maglia	Superficie di				Ecosistemi		
	Tundra	Foresta boreale	Conifere temperate	Decidue temperate	Foresta mediterranea	Pascoli acidi	Altro (*)
(0 - 1]	0	0	0	0	1	0	9999
(1 - 10]	0	0,2	0,2	0	1,8	0,2	9999
(10 - 100]	0	0,4	0,4	0	2,6	0,4	9999
(100 - 500]	0	0,6	0,6	0	3,4	0,6	9999
(500 - 1.000]	0	0,8	0,8	0	4,2	0,8	9999
> 1.000	0	1	1	0	5	1	9999

Fonte Vetrella G. (1998)

(\*) Il valore 9999 indica che l'ecosistema "Altro" è ritenuto non sensibile all'eutrofizzazione.

In tabella 2.11.2 viene riportato l'azoto rilasciato in atmosfera (in eq N ha<sup>-1</sup> anno<sup>-1</sup>) a seguito di incendio, per ogni ecosistema previsto per la stima del carico critico di azoto nutriente presente all'interno della cella EMEP 50x50

Tabella 2.11.2: Perdite di azoto attraverso gli incendi (eq.ha<sup>-1</sup>yr<sup>-1</sup>)

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	Nfire	% di conifere	Nfire	% di foresta decidua	Nfire	% di foresta medit.	Nfire	% di prateria	Nfire	% di tundra	Nfire
I04044									3,0	0		
I04044	39,0	14,3										
I04044											58,0	0
I04045											4,0	0
I04045									21,0	14,0		
I04046	6,0											0
I04046									21,0	29,0		
I04046	41,0	28,6										
I04047											2,0	0
I04047									18,0	14,0		
I04047	38,0	14,3										
I04048									20	14,0		
I05043											10	0
I05044					13,0	0						
I05044									16,0	29,0		
I05044	24,0	28,6										
I05044											33,0	0
I05045											5,0	0
I05045	10	28,6										
I05045									25,0	43,0		
I05045						47,0						
I05046											3,0	0
I05046	13,0	28,6										
I05046									24,0	29,0		
I05046					32,0	0						
I05047											2,0	0
I05047	18,0	42,9										
I05047					34,0	0			34,0	43,0		
I05048											3,0	0
I05048	19,3	42,9										
I05048									32,5	43,0		
I05048					38,6	0						
I05049									6,0	14,0		
I05049	17,0	14,3										
I05049											32,0	0
I06043	7,0	28,6										
I06043					19,0	0						
I06043											21,0	0
I06043									38,0	29,0		
I06044	10	28,6										
I06044											12,0	0
I06044									15,0	29,0		
I06044					29,0	0						

continua

segue

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	Nfire	% di conifere	Nfire	% di foresta decidua	Nfire	% di foresta medit.	Nfire	% di prateria	Nfire	% di tundra	Nfire
I06045					8,0	0						
I06046					16,0	0						
I06047					31,3	0						
I06048											1,3	0
I06048					61,2	0						
I06049											4,7	0
I06049	8,3	28,6										
I06049									23,7	43,0		
I06049					37,9	0						
I06050											2,0	0
I06050					7,0	0						
I06050	18,0	28,6										
I06050									34,0	29,0		
I06051									12,0	0		
I07043	1,0	14,3										
I07043							2,0	185,7				
I07043											8,0	0
I07043									23,0	43,0		
I07043					32,0	0						
I07044											6,0	0
I07044									8,0	29,0		
I07044					45,0	0						
I07045					22,0	0						
I07046					5,0	0						
I07047	1,0	14,3										
I07047					3,0	0						
I07048					3,0	0						
I07049	8,2	28,6										
I07049									13,3	43,0		
I07049											17,4	0
I07049					26,6	0						
I07050											4,0	0
I07050					14,0	0						
I07050	26,0	28,6										
I07050									28,0	43,0		
I07051											5,0	0
I07051	26,0	28,6										
I07051									30	29,0		
I07052									43,0	0		
I07052	47,0	0										
I07053									37,0	0		
I07053	49,0	0										
I08043			4,0	28,6								

continua

segue

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	Nfire	% di conifere	Nfire	% di foresta decidua	Nfire	% di foresta medit.	Nfire	% di prateria	Nfire	% di tundra	Nfire
I08043							6,0	242,9				
I08043					41,0	0						
I08044											1,0	0
I08044			5,0	42,9								
I08044							6,0	242,9				
I08044					58,0	0						
I08045							3,0	185,7				
I08045			6,0	42,9								
I08045					60	0						
I08046					55,0	0						
I08047					17,0	0						
I08048					2,0	0						
I08049	2,1	28,6										
I08049									3,2	29,0		
I08049											4,3	0
I08049					28,7	0						
I08050											12,0	0
I08050	14,0	28,6										
I08050									18,0	43,0		
I08050					39,0	0						
I08051											3,0	0
I08051									18,0	29,0		
I08051					22,0	0						
I08051	39,0	28,6										
I08052											1,0	0
I08052									10	14,0		
I08052	61,0	28,6			15,0	0						
I08053											7,0	0
I08053									17,0	0		
I08053	74,0	14,3										
I08054									44,0	0		
I08054	50	0										
I09046			4,0	42,9								
I09046					75,0	0						
I09047					53,0	0						
I09048					6,0	0						
I09049					1,1	0						
I09050											12,8	0
I09050									16,7	29,0		
I09050					51,4	0						
I09051											5,0	0
I09051	7,0	28,6										

continua

segue

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	Nfire	% di conifere	Nfire	% di foresta decidua	Nfire	% di foresta mediterranea	Nfire	% di prateria	Nfire	% di tundra	Nfire
I09051									8,0	29,0		
I09051					65,0	0						
I09052											12,0	0
I09052									14,0	29,0		
I09052					23,0	0						
I09052	43,0	28,6										
I09053									6,0	29,0		
I09053					12,0	0						
I09053											21,0	0
I09053	57,0	42,9										
I09054					14,0	0						
I09054									24,0	14,0		
I09054	62,0	28,6										
II0046							3,0	185,7				
II0046			7,0	28,6								
II0046					46,0	0						
II0047					68,0	0						
II0048					12,0	0						
II0049					1,0	0						
II0050					12,0	0						
II0051									1,0	14,0		
II0051					11,0	0						
II0052									2,0	14,0		
II0052					40	0						
II0053									3,0	29,0		
II0053											7,0	0
II0053	19,0	28,6										
II0053					62,0	0						
II0054									2,0	14,0		
II0054											14,0	0
II0054	26,0	28,6										
II0054					54,0	0						
II0055	100	0										
III046	1,0	14,3										
III046							10	185,7				
III046					38,0	0						
III047					72,0	0						
III048			21,0	14,3								
III049			2,0	0								
III050			4,0	14,3								
III052					3,2	0						
III053					9,0	0						
III054									1,0	14,0		

continua

segue

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	Nfire	% di conifere	Nfire	% di foresta decidua	Nfire	% di foresta mediterranea	Nfire	% di prateria	Nfire	% di tundra	Nfire
I11054											7,0	0
I11054	19,0	28,6										
I11054					46,0	0						
I11055									9,0	14,0		0
I11055	34,0	28,6										
I11055					48,0	0						
I12044							18,0	128,6				
I12045							34,0	185,7				
I12046							8,0	185,7				
I12046					21,0	0						
I12047					47,0	0						
I12048			57,0	28,6								
I12050							1,1	71,4				
I12051							7,0	71,4				
I12053									2,6	14,0		
I12053					22,5	0						
I12054									5,0	14,0		
I12054					46,0	0						
I13037							100	185,7				
I13038									35,0	43,0		
I13038							64,0	300				
I13039							100	185,7				
I13043							50	128,6				
I13044					8,0	0						
I13044							41,0	185,7				
I13045					13,0	0						
I13045							43,0	242,9				
I13046							8,0	185,7				
I13046					41,0	0						
I13047							1,0	128,6				
I13047					43,0	0						
I13048			72,0	42,9								
I13049			5,0	14,3								
I13050			40	0								
I13053									26,0	29,0		
I13053					42,0	0						
I13054					35,0	0						
I13054									60	14,0		
I14037									32,0	43,0		
I14037							57,0	242,9				
I14038					3,0	0						
I14038							21,0	300				
I14038									65,0	71,0		

continua

segue

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	Nfire	% di conifere	Nfire	% di foresta decidua	Nfire	% di foresta mediterranea	Nfire	% di prateria	Nfire	% di tundra	Nfire
I14039					1,0	0						
I14039							25,0	300				
I14039									64,0	71,0		
I14040					4,0	0						
I14040							35,0	242,9				
I14040									53,0	57,0		
I14043							100	128,6				
I14044							24,0	71,4				
I14045					15,0	0						
I14045							19,0	185,7				
I14046							2,0	128,6				
I14046					38,0	0						
I14047					37,0	0						
I14048					56,0	0						
I14049					30,3	0						
I15036							15,2	185,7				
I15036									42,7	43,0		
I15037					1,0	0						
I15037							10,2	300				
I15037									54,3	71,0		
I15038					1,0	0						
I15038							27,0	357,1				
I15038									58,0	71,0		
I15039									36,0	71,0		
I15039							55,0	357,1				
I15040							37,0	300				
I15040									48,0	57,0		
I15044							37,0	128,6				
I15045									1,0	14,0		
I15045					14,0	0	14,0	185,7				
I15046					36,5	0						
I15047							2,3	128,6				
I15047					33,0	0						
I15048							1,0	128,6				
I15048					48,0	0						
I15049					16,0	0						
I16035					2,0	0						
I16035									36,0	43,0		
I16035							43,0	242,9				
I16036					2,0	0						
I16036							22,0	300				
I16036									25,0	57,0		
I16037					5,0	0						

continua

segue

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	Nfire	% di conifere	Nfire	% di foresta decidua	Nfire	% di foresta mediterranea	Nfire	% di prateria	Nfire	% di tundra	Nfire
I16037							20	300				
I16037									63,0	71,0		
I16038					1,0	0						
I16038									25,0	57,0		
I16038							51,0	357,1				
I16039					2,0	0						
I16039							23,0	242,9				
I16039									54,0	71,0		
I16040									37,0	29,0		
I16040							63,0	185,7				
I16045							6,0	185,7				
I16045									10	29,0		
I16045					28,0	0						
I16046							8,2	185,7				
I16046					16,4	0						
I16047							8,0	185,7				
I16047					33,0	0						
I16048											1,0	0
I16048							2,0	128,6				
I16048					70	0						
I16049					10	0						
I16050							15,0	128,6				
I17035							25,0	242,9				
I17035									50	57,0		
I17036					3,2	0						
I17036									23,1	43,0		
I17036							24,2	242,9				
I17037					6,0	0						
I17037							28,0	300				
I17037									53,0	71,0		
I17038									28,0	43,0		
I17038							41,0	300				
I17045					6,4	0	6,4	185,7				
I17046							7,0	185,7				
I17046					12,0	0						
I17047									1,0	14,0		
I17047											2,0	0
I17047							5,0	185,7				
I17047					62,0	0						
I17048											4,0	0
I17048					54,0	0						
I17049					6,0	0						
I18036									39,0	43,0		

continua

segue

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	Nfire	% di conifere	Nfire	% di foresta decidua	Nfire	% di foresta medit.	Nfire	% di prateria	Nfire	% di tundra	Nfire
I18036							57,0	242,9				
I18037					1,0	0						
I18037							20	185,7				
I18037									31,0	43,0		
I18045									3,0	29,0		
I18045					7,0	0						
I18045							13,0	185,7				
I18046									1,0	14,0	1,0	0
I18046							2,0	185,7				
I18046					31,0	0						
I18047											6,0	0
I18047					30	0						
I18048							1,0	128,6				
I18048											5,0	0
I18048					12,0	0						
I18049					5,0	0						
I19044							100	185,7				
I19045					5,0	0						
I19045									7,0	29,0		
I19045							13,0	185,7				
I19046											1,0	0
I19046									6,0	29,0		
I19046							11,0	242,9				
I19046					19,0	0						
I19047							1,0	128,6				
I19047											7,0	0
I19047					36,0	0						
I19048	1,0	14,3					1,0	128,6				
I19048											4,0	0
I19048					19,0	0						
I19049					2,0	0						
I19049							8,0	128,6				
I20044							100	185,7				
I20045									3,0	14,0		
I20045							28,0	185,7				
I20046									10	43,0		
I20046					12,0	0						
I20046							13,0	242,9				
I20047											3,0	0
I20047							4,0	185,7				
I20047					33,0	0						
I20048					23,0	0						
I21045					6,0	0						

continua

segue

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	Nfire	% di conifere	Nfire	% di foresta decidua	Nfire	% di foresta medit.	Nfire	% di prateria	Nfire	% di tundra	Nfire
I21045							30	185,7				
I21046							2,0	185,7				
I21046					4,0	0						
I21047											1,0	0
I21047					31,0	0						
I21048					15,0	0						
I21049					2,2	0			2,2	29,0		
I21049							3,3	185,7				
I21050							56,2	185,7				
I22045							100	185,7				
I22046							4,0	185,7				
I22046					27,0	0						
I22047					19,0	0						
I22048					7,0	0						
I22049			1,0	14,3			1,0	128,6				
I22049					3,0	0						
I22049									17,0	43,0		
I22050			11,9	28,6								
I22050					14,1	0						
I22050									18,4	29,0		
I22050							19,5	185,7				
I23046							8,0	185,7				
I23046					13,0	0						
I23047					32,0	0						
I23048					16,0	0						
I23049					1,0	0						
I24038							1,0	71,4				
I24038									10	14,0		
I24039							1,0	71,4				
I24039									44,0	29,0		
I24041									18,0	0		
I24046					12,0	0						
I24046							32,0	242,9				
I24047							2,0	185,7				
I24047					28,0	0						
I24048					19,0	0						
I24049	4,0	28,6			4,0	0						
I25038					2,0	0						
I25038									4,0	29,0		
I25039									10	29,0		
I25040									28,0	29,0		
I25046									14,0	29,0		
I25046					16,0	0						

continua

segue

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	Nfire	% di conifere	Nfire	% di foresta decidua	Nfire	% di foresta medit.	Nfire	% di prateria	Nfire	% di tundra	Nfire
I25046							20	185,7				
I25047							4,0	185,7				
I25047									8,0	29,0		
I25047					35,0	0						
I25048							4,0	185,7				
I25048					17,0	0						
I25048	19,0	42,9										
I25049	1,0	14,3			1,0	0						
I25049							7,0	185,7				
I25050	1,0	14,3			1,0	0						
I25050							8,0	185,7				
I26035									6,0	14,0		
I26035							21,0	128,6				
I26038									5,0	14,0		
I26039					3,0	0			3,0	29,0		
I26040							2,0	185,7				
I26040					3,0	0						
I26040									8,0	29,0		
I26041							12,0	128,6				
I26041					21,0	0						
I26042									71,0	14,0		
I26043									100	14,0		
I26046									8,0	29,0		
I26046					51,0	0						
I26047							1,0	185,7				
I26047									5,0	29,0		
I26047					32,0	0						
I26048							3,0	185,7				
I26048					8,0	0						
I26048									15,0	43,0		
I26049					1,0	0						
I26049							17,0	185,7				
I26050							7,0	185,7				
I27038									5,0	14,0		
I27039					3,0	0						
I27039									6,0	29,0		
I27040							2,0	185,7				
I27040									4,0	29,0		
I27040					7,0	0						
I27041									1,0	14,0		
I27041							11,0	185,7				
I27041					21,0	0						
I27042					1,0	0						

continua

segue

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	Nfire	% di conifere	Nfire	% di foresta decidua	Nfire	% di foresta mediterranea	Nfire	% di prateria	Nfire	% di tundra	Nfire
I27042							8,0	185,7				
I27042									15,0	29,0		
I27043									46,0	29,0		
I27044									50	14,0		
I27045							19,0	185,7				
I27046									5,0	29,0		
I27046			8,0	42,9								
I27046					40	0						
I27047							3,0	185,7	3,0	29,0		
I27047			21,0	42,9								
I27047					25,0	0						
I28039									6,0	29,0		
I28040					1,0	0						
I28040									3,0	14,0		
I28041			1,0	14,3								
I28041									5,0	29,0		
I28041					12,0	0						
I28042			1,0	14,3								
I28042							2,0	185,7				
I28042									7,0	29,0		
I28042					17,0	0						
I28043					4,0	0						
I28043							7,0	185,7				
I28043									8,0	29,0		
I28044					5,0	0						
I28044							8,0	185,7				
I28045					24,0	0						
I28046									1,0	29,0		
I28046			5,0	28,6								
I28046					38,0	0						
I28047							4,0	185,7				
I28047			7,0	28,6								
I28047					21,0	0						
I28050							2,0	128,6				
I28051							4,0	128,6				
I29034									54,0	14,0		
I29035									54,0	0		
I29039							2,0	128,6				
I29040							1,0	128,6				
I29040					6,0	0						
I29040									9,0	29,0		
I29041					4,0	0			4,0	14,0		
I29042					5,0	0						

continua

segue

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	Nfire	% di conifere	Nfire	% di foresta decidua	Nfire	% di foresta mediterranea	Nfire	% di prateria	Nfire	% di tundra	Nfire
I29043			3,0	28,6								
I29043									5,0	29,0		
I29043					13,0	0						
I29043							33,0	242,9				
I29044			5,0	28,6								
I29044							7,0	242,9				
I29044					42,0	0						
I29045							24,0	242,9				
I29045					36,0	0						
I29047					15,0	0						
I30040					7,0	0			7,0	14,0		

## 2.12 Quantità di azoto immobilizzato dal materiale organico del suolo

Risoluzione 50x50 km<sup>2</sup>

La quantità di azoto immobilizzato nel materiale organico del suolo è stato determinato sulla base del clima e in particolare dall'ammontare delle precipitazioni e dalla temperatura, più caldo è il clima minore sarà l'azoto immobilizzato nel suolo, viceversa più freddo è il clima maggiore sarà l'azoto immobilizzato.

Nella tabella 2.12.1 vengono riportati i valori di azoto immobilizzato nel suolo per ogni ecosistema previsto dalla metodologia di stima del carico critico di azoto nutriente

**Tabella 2.12.1: Valori di azoto immobilizzato nel materiale organico del suolo**

Ecosistemi	kg N ha <sup>-1</sup> anno <sup>-1</sup>
Tundra	2,5
Foresta boreale	2,5
Conifere temperate	2
Decidue temperate	2
Foresta mediterranea	0,5
Pascoli acidi	1,25
Altro (*)	9999

Fonte: Vetrella G. (1998)

(\*) Il valore 9999 indica che l'ecosistema "Altro" è ritenuto non sensibile all'eutrofizzazione.

La quantità di azoto immobilizzato dal materiale organico del suolo è dato dall'ammontare di azoto che si accumula annualmente nell'humus del suolo, espresso come Kg N ha<sup>-1</sup> anno<sup>-1</sup> ed è presentato per ogni ecosistema presente nella singola cella 50x50 nella tabella 2.12.2

Tabella 2.12.2: Quantità di azoto immobilizzato dal materiale organico del suolo (eq.ha<sup>-1</sup>yr<sup>-1</sup>)

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	N immob.	% di conifere	N immob.	% di foresta decidua	N immob.	% di foresta medit.	N immob.	% di prateria	N immob.	% di tundra	N immob.
I04044									3,0	89,0		
I04044	39,0	178,6										
I04044											58,0	178,6
I04045											4,0	178,6
I04045									21,0	89,0		
I04046											6,0	178,6
I04046									21,0	89,0		
I04046	41,0	178,6										
I04047											2,0	178,6
I04047									18,0	89,0		
I04047	38,0	178,6										
I04048									20	89,0		
I05043											10	178,6
I05044					13,0	143,0						
I05044									16,0	89,0		
I05044	24,0	178,6										
I05044											33,0	178,6
I05045											5,0	178,6
I05045	10	178,6										
I05045									25,0	89,0		
I05045					47,0	143,0						
I05046											3,0	178,6
I05046	13,0	178,6										
I05046									24,0	89,0		
I05046					32,0	143,0						
I05047											2,0	178,6
I05047	18,0	178,6										
I05047						143,0			34,0	89,0		
I05048											3,0	178,6
I05048	19,3	178,6										
I05048									32,5	89,0		
I05048					38,6	143,0						
I05049									6,0	89,0		
I05049	17,0	178,6										
I05049											32,0	178,6
I06043	7,0	178,6										
I06043					19,0	143,0						
I06043											21,0	178,6
I06043									38,0	89,0		
I06044	10	178,6										
I06044											12,0	178,6
I06044									15,0	89,0		
I06044					29,0	143,0						

continua

segue

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	N immob.	% di conifere	N immob.	% di foresta decidua	N immob.	% di foresta medit.	N immob.	% di prateria	N immob.	% di tundra	N immob.
I06045					8,0	143,0						
I06046					16,0	143,0						
I06047					31,3	143,0						
I06048											1,3	178,6
I06048					61,2	143,0						
I06049											4,7	178,6
I06049	8,3	178,6										
I06049									23,7	89,0		
I06049					37,9	143,0						
I06050											2,0	178,6
I06050					7,0	143,0						
I06050	18,0	178,6										
I06050									34,0	89,0		
I06051									12,0	89,0		
I07043	1,0	178,6										
I07043							2,0	35,7				
I07043											8,0	178,6
I07043									23,0	89,0		
I07043					32,0	143,0						
I07044											6,0	178,6
I07044									8,0	89,0		
I07044					45,0	143,0						
I07045					22,0	143,0						
I07046					5,0	143,0						
I07047	1,0	178,6										
I07047					3,0	143,0						
I07048					3,0	143,0						
I07049	8,2	178,6										
I07049									13,3	89,0		
I07049											17,4	178,6
I07049					26,6	143,0						
I07050											4,0	178,6
I07050					14,0	143,0						
I07050	26,0	178,6										
I07050									28,0	89,0		
I07051											5,0	178,6
I07051	26,0	178,6										
I07051									30	89,0		
I07052									43,0	89,0		
I07052	47,0	178,6										
I07053									37,0	89,0		
I07053	49,0	178,6										
I08043			4,0	142,9								

continua

segue

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	N immob.	% di conifere	N immob.	% di foresta decidua	N immob.	% di foresta medit.	N immob.	% di prateria	N immob.	% di tundra	N immob.
I08043							6,0	35,7				
I08043					41,0	143,0						
I08044											1,0	178,6
I08044			5,0	142,9								
I08044							6,0	35,7				
I08044					58,0	143,0						
I08045							3,0	35,7				
I08045			6,0	142,9								
I08045					60	143,0						
I08046					55,0	143,0						
I08047					17,0	143,0						
I08048					2,0	143,0						
I08049	2,1	178,6										
I08049									3,2	89,0		
I08049											4,3	178,6
I08049					28,7	143,0						
I08050											12,0	178,6
I08050	14,0	178,6										
I08050									18,0	89,0		
I08050					39,0	143,0						
I08051											3,0	178,6
I08051									18,0	89,0		
I08051					22,0	143,0						
I08051	39,0	178,6										
I08052											1,0	178,6
I08052									10	89,0		
I08052					15,0	143,0						
I08052	61,0	178,6										
I08053	7,0											178,6
I08053									17,0	89,0		
I08053	74,0	178,6										
I08054									44,0	89,0		
I08054	50	178,6										
I09046			4,0	142,9								
I09046					75,0	143,0						
I09047					53,0	143,0						
I09048					6,0	143,0						
I09049					1,1	143,0						
I09050											12,8	178,6
I09050									16,7	89,0		
I09050					51,4	143,0						
I09051											5,0	178,6
I09051	7,0	178,6										

continua

segue

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	N immob.	% di conifere	N immob.	% di foresta decidua	N immob.	% di foresta mediterranea	N immob.	% di prateria	N immob.	% di tundra	N immob.
I09051									8,0	89,0		
I09051					65,0	143,0						
I09052											12,0	178,6
I09052									14,0	89,0		
I09052					23,0	143,0						
I09052	43,0	178,6										
I09053									6,0	89,0		
I09053					12,0	143,0						
I09053											21,0	178,6
I09053	57,0	178,6										
I09054					14,0	143,0						
I09054									24,0	89,0		
I09054	62,0	178,6										
I10046							3,0	35,7				
I10046			7,0	142,9								
I10046					46,0	143,0						
I10047					68,0	143,0						
I10048					12,0	143,0						
I10049					1,0	143,0						
I10050					12,0	143,0						
I10051									1,0	89,0		
I10051					11,0	143,0						
I10052									2,0	89,0		
I10052					40	143,0						
I10053									3,0	89,0		
I10053											7,0	178,6
I10053	19,0	178,6										
I10053					62,0	143,0						
I10054									2,0	89,0		
I10054											14,0	178,6
I10054	26,0	178,6										
I10054	54,0				54,0	143,0						
I10055	100	178,6										
I11046	1,0	178,6										
I11046							10	35,7				
I11046					38,0	143,0						
I11047					72,0	143,0						
I11048			21,0	142,9								
I11049			2,0	142,9								
I11050			4,0	142,9								
I11052					3,2	143,0						
I11053					9,0	143,0						
I11054									1,0	89,0		

continua

segue

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	N immob.	% di conifere	N immob.	% di foresta decidua	N immob.	% di foresta mediterranea	N immob.	% di prateria	N immob.	% di tundra	N immob.
I11054											7,0	178,6
I11054	19,0	178,6										
I11054					46,0	143,0						
I11055									9,0	89,0	9,0	178,6
I11055	34,0	178,6										
I11055					48,0	143,0						
I12044							18,0	35,7				
I12045							34,0	35,7				
I12046							8,0	35,7				
I12046					21,0	143,0						
I12047					47,0	143,0						
I12048			57,0	142,9								
I12050							1,1	35,7				
I12051							7,0	35,7				
I12053									2,6	89,0		
I12053					22,5	143,0						
I12054									5,0	89,0		
I12054					46,0	143,0						
I13037							100	35,7				
I13038									35,0	89,0		
I13038							64,0	35,7				
I13039							100	35,7				
I13043							50	35,7				
I13044					8,0	143,0						
I13044							41,0	35,7				
I13045					13,0	143,0						
I13045							43,0	35,7				
I13046							8,0	35,7				
I13046					41,0	143,0						
I13047							1,0	35,7				
I13047					43,0	143,0						
I13048			72,0	142,9								
I13049			5,0	142,9								
I13050			40	142,9								
I13053									26,0	89,0		
I13053					42,0	143,0						
I13054					35,0	143,0						
I13054									60	89,0		
I14037									32,0	89,0		
I14037							57,0	35,7				
I14038					3,0	143,0						
I14038							21,0	35,7				
I14038									65,0	89,0		

continua

segue

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	N immob.	% di conifere	N immob.	% di foresta decidua	N immob.	% di foresta mediterranea	N immob.	% di prateria	N immob.	% di tundra	N immob.
I14039					1,0	143,0						
I14039							25,0	35,7				
I14039									64,0	89,0		
I14040					4,0	143,0						
I14040							35,0	35,7				
I14040									53,0	89,0		
I14043							100	35,7				
I14044							24,0	35,7				
I14045					15,0	143,0						
I14045							19,0	35,7				
I14046							2,0	35,7				
I14046					38,0	143,0						
I14047					37,0	143,0						
I14048					56,0	143,0						
I14049					30,3	143,0						
I15036							15,2	35,7				
I15036									42,7	89,0		
I15037					1,0	143,0						
I15037							10,2	35,7				
I15037									54,3	89,0		
I15038					1,0	143,0						
I15038							27,0	35,7				
I15038									58,0	89,0		
I15039									36,0	89,0		
I15039							55,0	35,7				
I15040							37,0	35,7				
I15040									48,0	89,0		
I15044							37,0	35,7				
I15045									1,0	89,0		
I15045						143,0	14,0	35,7				
I15046					36,5	143,0						
I15047							2,3	35,7				
I15047					33,0	143,0						
I15048							1,0	35,7				
I15048					48,0	143,0						
I15049					16,0	143,0						
I16035					2,0	143,0						
I16035									36,0	89,0		
I16035							43,0	35,7				
I16036					2,0	143,0						
I16036							22,0	35,7				
I16036									25,0	89,0		
I16037					5,0	143,0						

continua

segue

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	N immob.	% di conifere	N immob.	% di foresta decidua	N immob.	% di foresta mediterranea	N immob.	% di prateria	N immob.	% di tundra	N immob.
I16037							20	35,7				
I16037									63,0	89,0		
I16038					1,0	143,0			25,0	89,0		
I16038												
I16038							51,0	35,7				
I16039					2,0	143,0						
I16039							23,0	35,7				
I16039									54,0	89,0		
I16040									37,0	89,0		
I16040							63,0	35,7				
I16045							6,0	35,7				
I16045									10	89,0		
I16045					28,0	143,0						
I16046							8,2	35,7				
I16046					16,4	143,0						
I16047							8,0	35,7				
I16047					33,0	143,0						
I16048											1,0	178,6
I16048							2,0	35,7				
I16048					70	143,0						
I16049					10	143,0						
I16050							15,0	35,7				
I17035							25,0	35,7				
I17035									50	89,0		
I17036					3,2	143,0						
I17036									23,1	89,0		
I17036							24,2	35,7				
I17037					6,0	143,0						
I17037							28,0	35,7				
I17037									53,0	89,0		
I17038									28,0	89,0		
I17038							41,0	35,7				
I17045					6,4	143,0	6,4	35,7				
I17046							7,0	35,7				
I17046					12,0	143,0						
I17047									1,0	89,0		
I17047											2,0	178,6
I17047							5,0	35,7				
I17047					62,0	143,0						
I17048											4,0	178,6
I17048					54,0	143,0						
I17049					6,0	143,0						
I18036									39,0	89,0		

continua

segue

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	N immob.	% di conifere	N immob.	% di foresta decidua	N immob.	% di foresta mediterranea	N immob.	% di prateria	N immob.	% di tundra	N immob.
I18036							57,0	35,7				
I18037					1,0	143,0						
I18037							20	35,7				
I18037									31,0	89,0		
I18045									3,0	89,0		
I18045					7,0	143,0						
I18045							13,0	35,7				
I18046									1,0	89,0	1,0	178,6
I18046							2,0	35,7				
I18046					31,0	143,0						
I18047											6,0	178,6
I18047					30	143,0						
I18048							1,0	35,7				
I18048											5,0	178,6
I18048					12,0	143,0						
I18049					5,0	143,0						
I19044							100	35,7				
I19045					5,0	143,0						
I19045									7,0	89,0		
I19045							13,0	35,7				
I19046											1,0	178,6
I19046									6,0	89,0		
I19046							11,0	35,7				
I19046					19,0	143,0						
I19047							1,0	35,7				
I19047											7,0	178,6
I19047					36,0	143,0						
I19048	1,0	178,6						35,7				
I19048											4,0	178,6
I19048					19,0	143,0						
I19049					2,0	143,0						
I19049							8,0	35,7				
I20044							100	35,7				
I20045									3,0	89,0		
I20045							28,0	35,7				
I20046									10	89,0		
I20046					12,0	143,0						
I20046							13,0	35,7				
I20047											3,0	178,6
I20047							4,0	35,7				
I20047					33,0	143,0						
I20048					23,0	143,0						
I21045					6,0	143,0						

continua

segue

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	N immob.	% di conifere	N immob.	% di foresta decidua	N immob.	% di foresta medit.	N immob.	% di prateria	N immob.	% di tundra	N immob.
I21045							30	35,7				
I21046							2,0	35,7				
I21046					4,0	143,0						
I21047											1,0	178,6
I21047					31,0	143,0						
I21048					15,0	143,0						
I21049					2,2	143,0			2,2	89,0		
I21049							3,3	35,7				
I21050							56,2	35,7				
I22045							100	35,7				
I22046							4,0	35,7				
I22046					27,0	143,0						
I22047					19,0	143,0						
I22048					7,0	143,0						
I22049			1,0	142,9				35,7				
I22049					3,0	143,0						
I22049									17,0	89,0		
I22050			11,9	142,9								
I22050					14,1	143,0						
I22050									18,4	89,0		
I22050							19,5	35,7				
I23046							8,0	35,7				
I23046					13,0	143,0						
I23047					32,0	143,0						
I23048					16,0	143,0						
I23049					1,0	143,0						
I24038							1,0	35,7				
I24038									10	89,0		
I24039							1,0	35,7				
I24039									44,0	89,0		
I24041									18,0	89,0		
I24046					12,0	143,0						
I24046							32,0	35,7				
I24047							2,0	35,7				
I24047					28,0	143,0						
I24048					19,0	143,0						
I24049	4,0	178,6			4,0	143,0						
I25038					2,0	143,0						
I25038									4,0	89,0		
I25039									10	89,0		
I25040									28,0	89,0		
I25046									14,0	89,0		
I25046					16,0	143,0						

continua

segue

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	N immob.	% di conifere	N immob.	% di foresta decidua	N immob.	% di foresta mediterranea	N immob.	% di prateria	N immob.	% di tundra	N immob.
I25046							20	35,7				
I25047							4,0	35,7				
I25047									8,0	89,0		
I25047					35,0	143,0						
I25048							4,0	35,7				
I25048					17,0	143,0						
I25048	19,0	178,6										
I25049	1,0	178,6				143,0						
I25049							7,0	35,7				
I25050	1,0	178,6			1,0	143,0						
I25050							8,0	35,7				
I26035									6,0	89,0		
I26035							21,0	35,7				
I26038									5,0	89,0		
I26039					3,0	143,0			3,0	89,0		
I26040							2,0	35,7				
I26040					3,0	143,0						
I26040									8,0	89,0		
I26041							12,0	35,7				
I26041					21,0	143,0						
I26042									71,0	89,0		
I26043									100	89,0		
I26046									8,0	89,0		
I26046					51,0	143,0						
I26047							1,0	35,7				
I26047									5,0	89,0		
I26047					32,0	143,0						
I26048							3,0	35,7				
I26048					8,0	143,0						
I26048									15,0	89,0		
I26049					1,0	143,0						
I26049							17,0	35,7				
I26050							7,0	35,7				
I27038									5,0	89,0		
I27039					3,0	143,0						
I27039									6,0	89,0		
I27040							2,0	35,7				
I27040									4,0	89,0		
I27040					7,0	143,0						
I27041									1,0	89,0		
I27041							11,0	35,7				
I27041					21,0	143,0						
I27042					1,0	143,0						

continua

segue

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	Nfire	% di conifere	Nfire	% di foresta decidua	Nfire	% di foresta mediterranea	Nfire	% di prateria	Nfire	% di tundra	Nfire
I27042							8,0	35,7				
I27042									15,0	89,0		
I27043									46,0	89,0		
I27044									50	89,0		
I27045							19,0	35,7				
I27046									5,0	89,0		
I27046			8,0	142,9								
I27046					40	143,0						
I27047							3,0	35,7	3,0	89,0		
I27047			21,0	142,9								
I27047					25,0	143,0						
I28039									6,0	89,0		
I28040					1,0	143,0						
I28040									3,0	89,0		
I28041			1,0	142,9								
I28041									5,0	89,0		
I28041					12,0	143,0						
I28042			1,0	142,9								
I28042							2,0	35,7				
I28042									7,0	89,0		
I28042					17,0	143,0						
I28043					4,0	143,0						
I28043							7,0	35,7				
I28043									8,0	89,0		
I28044					5,0	143,0						
I28044							8,0	35,7				
I28045					24,0	143,0						
I28046									1,0	89,0		
I28046			5,0	142,9								
I28046					38,0	143,0						
I28047							4,0	35,7				
I28047			7,0	142,9								
I28047					21,0	143,0						
I28050							2,0	35,7				
I28051							4,0	35,7				
I29034									54,0	89,0		
I29035									54,0	89,0		
I29039							2,0	35,7				
I29040							1,0	35,7				
I29040					6,0	143,0						
I29040									9,0	89,0		
I29041					4,0	143,0				89,0		
I29042					5,0	143,0						

continua

segue

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	Nfire	% di conifere	Nfire	% di foresta decidua	Nfire	% di foresta mediterranea	Nfire	% di prateria	Nfire	% di tundra	Nfire
I29043			3,0	142,9								
I29043									5,0	89,0		
I29043					13,0	143,0						
I29043							33,0	35,7				
I29044			5,0	142,9								
I29044							7,0	35,7				
I29044					42,0	143,0						
I29045							24,0	35,7				
I29045					36,0	143,0						
I29047					15,0	143,0						
I30040					7,0	143,0			7,0	89,0		

### 2.13 Quantità di azoto rimosso dalla biomassa vegetale e animale

Risoluzione 50x50 km<sup>2</sup>

La quantità di azoto rimosso dalla biomassa vegetale e animale ha le dimensioni di kg N ha<sup>-1</sup> anno<sup>-1</sup> ed è stato determinato in prima approssimazione, sulla base della crescita vegetativa: minore è la crescita vegetativa e minore sarà l'azoto rimosso nella biomassa, viceversa maggiore è la crescita e maggiore sarà l'azoto rimosso.

Va tuttavia considerato che fin tanto che la biomassa non viene asportata definitivamente dall'ecosistema (ad esempio con il taglio del bosco) l'azoto in esso presente può essere considerato come temporaneamente indisponibile. Più correttamente l'azoto effettivamente rimosso dall'ecosistema è dato solo dalla frazione effettivamente allontanata dall'ecosistema. Sulla base di queste considerazioni i valori di azoto rimosso con la biomassa animale e vegetale sono stati attribuiti ad ogni ecosistema previsto dalla metodologia di stima del carico critico di azoto nutriente sulla base dei dati ISTAT sulle utilizzazioni forestali e dei dati dell'Inventario Forestale Nazionale del 1985 (Ministero delle politiche agricole e forestali, 1985) per quanto riguarda le superfici forestali.

I valori di azoto rimosso nella biomassa animale e vegetale sono stati attribuiti, ad ogni ecosistema previsto dalla metodologia di stima del carico critico di azoto nutriente vengono riassunti nella tabella 2.13.2.

**Tabella 2.13.1: Rimozione di azoto nella biomassa animale e vegetale (in Kg ha<sup>-1</sup> anno<sup>-1</sup>) per tipo di ecosistema**

Ecosistemi	Crescita vegetativa Valori di riferimento C	Densità del fusto d <sub>f</sub>	Rapporto rami/fusto t	% di N nel fusto N <sub>f</sub>	% di N nei rami N <sub>r</sub>	Rimozione di azoto nella biomassa N <sub>u</sub>
	m <sup>3</sup> ha <sup>-1</sup> anno <sup>-1</sup>	kg/m <sup>3</sup>		%	%	kg N ha <sup>-1</sup> anno <sup>-1</sup>
Tundra = 11	1,97	500	0,15	0,1	0,35	1,5
Tundra = 37	2,62	500	0,15	0,1	0,35	2
Foresta boreale	7,20	490	0,15	0,11	0,40	6
Conifere temperate	6,56	500	0,15	0,10	0,35	5
Decidue temperate	5,95	700	0,20	0,15	0,45	10
Foresta mediterranea	1,23	740	0,38	0,19	0,37	3
Pascoli acidi	0,60	700	0,20	0,15	0,45	1
Altro	0,60	700	0,20	0,15	0,45	9999

Fonte: Downing R.J. et al., 1993.

La quantità di azoto rimosso dalla biomassa vegetale e animale per ogni ecosistema presente all'interno della singola cella 50x50 è riportato nella tabella 2.13.2.

**Tabella 2.13.2: Quantità di azoto rimosso dalla biomassa vegetale ed animale (eq.ha<sup>-1</sup>.yr<sup>-1</sup>)**

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	N immob.	% di conifere	N immob.	% di foresta decidua	N immob.	% di foresta medit.	N immob.	% di prateria	N immob.	% di tundra	N immob.
1104044									3,0	71,0		
104044	39,0	428,6										
104044											58,0	107,1
104045											4,0	107,1
104045									21,0	71,0		
104046											6,0	107,1
104046									21,0	71,0		
104046	41,0	428,6										
104047											2,0	107,1
104047									18,0	71,0		
104047	38,0	428,6										
104048									20	71,0		
105043											10	107,1
105044					13,0	714,0						
105044									16,0	71,0		
105044	24,0	428,6										
105044											33,0	107,1
105045											5,0	107,1
105045	10	428,6										
105045									25,0	71,0		
105045					47,0	714,0						

continua

segue

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	N remov.	% di conifere	N remov.	% di foresta decidua	N remov.	% di foresta medit.	N remov.	% di prateria	N remov.	% di tundra	N remov.
I05046											3,0	107,1
I05046	13,0	428,6										
I05046									24,0	71,0		
I05046					32,0	714,0						
I05047											2,0	107,1
I05047	18,0	428,6										
I05047					34,0	714,0			34,0	71,0		
I05048											3,0	107,1
I05048	19,3	428,6										
I05048									32,5	71,0		
I05048					38,6	714,0						
I05049									6,0	71,0		
I05049	17,0	428,6										
I05049											32,0	107,1
I06043	7,0	428,6										
I06043					19,0	714,0						
I06043											21,0	107,1
I06043									38,0	71,0		
I06044	10	428,6										
I06044											12,0	107,1
I06044									15,0	71,0		
I06044					29,0	714,0						
I06045					8,0	714,0						
I06046					16,0	714,0						
I06047					31,3	714,0						
I06048											1,3	107,1
I06048					61,2	714,0						
I06049											4,7	107,1
I06049	8,3	428,6										
I06049									23,7	71,0		
I06049					37,9	714,0						
I06050											2,0	107,1
I06050					7,0	714,0						
I06050	18,0	428,6										
I06050									34,0	71,0		
I06051									12,0	71,0		
I07043	1,0	428,6										
I07043							2,0	214,3				
I07043	8,0											107,1
I07043									23,0	71,0		
I07043					32,0	714,0						
I07044											6,0	107,1
I07044									8,0	71,0		

continua

segue

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	N remov.	% di conifere	N remov.	% di foresta decidua	N remov.	% di foresta medit.	N remov.	% di prateria	N remov.	% di tundra	N remov.
I07044					45,0	714,0						
I07045					22,0	714,0						
I07046					5,0	714,0						
I07047	1,0	428,6										
I07047					3,0	714,0						
I07048					3,0	714,0						
I07049	8,2	428,6										
I07049									13,3	71,0		
I07049											17,4	107,1
I07049					26,6	714,0						
I07050											4,0	107,1
I07050					14,0	714,0						
I07050	26,0	428,6										
I07050									28,0	71,0		
I07051											5,0	107,1
I07051	26,0	428,6										
I07051									30	71,0		
I07052									43,0	71,0		
I07052	47,0	428,6										
I07053									37,0	71,0		
I07053	49,0	428,6										
I08043			4,0	357,1								
I08043							6,0	214,3				
I08043					41,0	714,0						
I08044											1,0	125,0
I08044			5,0	357,1								
I08044							6,0	214,3				
I08044					58,0	714,0						
I08045							3,0	214,3				
I08045			6,0	357,1								
I08045					60	714,0						
I08046					55,0	714,0						
I08047					17,0	714,0						
I08048					2,0	714,0						
I08049	2,1	428,6										
I08049									3,2	71,0		
I08049											4,3	107,1
I08049					28,7	714,0						
I08050											12,0	107,1
I08050	14,0	428,6										
I08050									18,0	71,0		
I08050					39,0	714,0						
I08051											3,0	107,1

continua

segue

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	N remov.	% di conifere	N remov.	% di foresta decidua	N remov.	% di foresta medit.	N remov.	% di prateria	N remov.	% di tundra	N remov.
I08051									18,0	71,0		
I08051					22,0	714,0						
I08051	39,0	428,6										
I08052											1,0	107,1
I08052									10	71,0		
I08052					15,0	714,0						
I08052	61,0	428,6										
I08053											7,0	107,1
I08053									17,0	71,0		
I08053	74,0	428,6										
I08054									44,0	71,0		
I08054	50	428,6										
I09046			4,0	357,1								
I09046					75,0	714,0						
I09047					53,0	714,0						
I09048					6,0	714,0						
I09049					1,1	714,0						
I09050											12,8	107,1
I09050									16,7	71,0		
I09050					51,4	714,0						
I09051											5,0	107,1
I09051	7,0	428,6										
I09051									8,0	71,0		
I09051					65,0	714,0						
I09052											12,0	107,1
I09052									14,0	71,0		
I09052					23,0	714,0						
I09052	43,0	428,6										
I09053									6,0	71,0		
I09053					12,0	714,0						
I09053											21,0	107,1
I09053	57,0	428,6										
I09054					14,0	714,0						
I09054									24,0	71,0		
I09054	62,0	428,6										
I10046							3,0	214,3				
I10046			7,0	357,1								
I10046					46,0	714,0						
I10047					68,0	714,0						
I10048					12,0	714,0						
I10049					1,0	714,0						
I10050					12,0	714,0						
I10051									1,0	71,0		

continua

segue

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	N remov.	% di conifere	N remov.	% di foresta decidua	N remov.	% di foresta med.	N remov.	% di prateria	N remov.	% di tundra	N remov.
I10051					11,0	714,0						
I10052									2,0	71,0		
I10052					40	714,0						
I10053									3,0	71,0		
I10053											7,0	107,1
I10053	19,0	428,6										
I10053					62,0	714,0						
I10054									2,0	71,0		
I10054											14,0	107,1
I10054	26,0	428,6										
I10054					54,0	714,0						
I10055	100	428,6										
I11046	1,0	428,6										
I11046							10	214,3				
I11046					38,0	714,0						
I11047					72,0	714,0						
I11048			21,0	357,1								
I11049			2,0	357,1								
I11050			4,0	357,1								
I11052					3,2	714,0						
I11053					9,0	714,0						
I11054									1,0	71,0		
I11054											7,0	107,1
I11054	19,0	428,6										
I11054					46,0	714,0						
I11055									9,0	71,0	9,0	107,1
I11055	34,0	428,6										
I11055					48,0	714,0						
I12044							18,0	214,3				
I12045							34,0	214,3				
I12046							8,0	214,3				
I12046					21,0	714,0						
I12047					47,0	714,0						
I12048			57,0	357,1								
I12050							1,1	214,3				
I12051							7,0	214,3				
I12053									2,6	71,0		
I12053					22,5	714,0						
I12054									5,0	71,0		
I12054					46,0	714,0						
I13037							100	214,3				
I13038									35,0	71,0		
I13038							64,0	214,3				

continua

segue

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	N remov.	% di conifere	N remov.	% di foresta decidua	N remov.	% di foresta medit.	N remov.	% di prateria	N remov.	% di tundra	N remov.
I13039							100	214,3				
I13043							50	214,3				
I13044					8,0	714,0						
I13044							41,0	214,3				
I13045					13,0	714,0						
I13045							43,0	214,3				
I13046							8,0	214,3				
I13046					41,0	714,0						
I13047							1,0	214,3				
I13047					43,0	714,0						
I13048			72,0	357,1								
I13049			5,0	357,1								
I13050			40	357,1								
I13053									26,0	71,0		
I13053					42,0	714,0						
I13054					35,0	714,0						
I13054									60	71,0		
I14037									32,0	71,0		
I14037							57,0	214,3				
I14038					3,0	714,0						
I14038							21,0	214,3				
I14038									65,0	71,0		
I14039					1,0	714,0						
I14039							25,0	214,3				
I14039									64,0	71,0		
I14040					4,0	714,0						
I14040							35,0	214,3				
I14040									53,0	71,0		
I14043							100	214,3				
I14044							24,0	214,3				
I14045					15,0	714,0						
I14045							19,0	214,3				
I14046							2,0	214,3				
I14046					38,0	714,0						
I14047					37,0	714,0						
I14048					56,0	714,0						
I14049					30,3	714,0						
I15036							15,2	214,3				
I15036									42,7	71,0		
I15037					1,0	714,0						
I15037							10,2	214,3				
I15037									54,3	71,0		
I15038					1,0	714,0						

continua

segue

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	N remov.	% di conifere	N remov.	% di foresta decidua	N remov.	% di foresta medit.	N remov.	% di prateria	N remov.	% di tundra	N remov.
I15038							27,0	214,3				
I15038									58,0	71,0		
I15039									36,0	71,0		
I15039							55,0	214,3				
I15040							37,0	214,3				
I15040									48,0	71,0		
I15044							37,0	214,3				
I15045									1,0	71,0		
I15045					14,0	714,0	14,0	214,3				
I15046					36,5	714,0						
I15047							2,3	214,3				
I15047					33,0	714,0						
I15048							1,0	214,3				
I15048					48,0	714,0						
I15049					16,0	714,0						
I16035					2,0	714,0						
I16035									36,0	71,0		
I16035							43,0	214,3				
I16036					2,0	714,0						
I16036							22,0	214,3				
I16036									25,0	71,0		
I16037					5,0	714,0						
I16037							20	214,3				
I16037									63,0	71,0		
I16038					1,0	714,0						
I16038									25,0	71,0		
I16038							51,0	214,3				
I16039					2,0	714,0						
I16039							23,0	214,3				
I16039									54,0	71,0		
I16040									37,0	71,0		
I16040							63,0	214,3				
I16045							6,0	214,3				
I16045									10	71,0		
I16045					28,0	714,0						
I16046							8,2	214,3				
I16046					16,4	714,0						
I16047							8,0	214,3				
I16047					33,0	714,0						
I16048											1,0	142,9
I16048							2,0	214,3				
I16048					70	714,0						
I16049					10	714,0						

continua

segue

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	N remov.	% di conifere	N remov.	% di foresta decidua	N remov.	% di foresta medit.	N remov.	% di prateria	N remov.	% di tundra	N remov.
I16050							15,0	214,3				
I17035							25,0	214,3				
I17035									50	71,0		
I17036					3,2	714,0						
I17036									23,1	71,0		
I17036							24,2	214,3				
I17037					6,0	714,0						
I17037							28,0	214,3				
I17037									53,0	71,0		
I17038									28,0	71,0		
I17038							41,0	214,3				
I17045					6,4	714,0	6,4	214,3				
I17046							7,0	214,3				
I17046					12,0	714,0						
I17047									1,0	71,0		
I17047											2,0	142,9
I17047							5,0	214,3				
I17047					62,0	714,0						
I17048											4,0	142,9
I17048					54,0	714,0						
I17049					6,0	714,0						
I18036									39,0	71,0		
I18036							57,0	214,3				
I18037					1,0	714,0						
I18037							20	214,3				
I18037									31,0	71,0		
I18045									3,0	71,0		
I18045					7,0	714,0						
I18045							13,0	214,3				
I18046									1,0	71,0	1,0	142,9
I18046							2,0	214,3				
I18046					31,0	714,0						
I18047											6,0	142,9
I18047					30	714,0						
I18048							1,0	214,3				
I18048											5,0	142,9
I18048					12,0	714,0						
I18049					5,0	714,0						
I19044							100	214,3				
I19045					5,0	714,0						
I19045									7,0	71,0		
I19045							13,0	214,3				
I19046											1,0	142,9

continua

segue

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	N remov.	% di conifere	N remov.	% di foresta decidua	N remov.	% di foresta medit.	N remov.	% di prateria	N remov.	% di tundra	N remov.
I19046									6,0	71,0		
I19046							11,0	214,3				
I19046					19,0	714,0						
I19047							1,0	214,3				
I19047											7,0	142,9
I19047					36,0	714,0						
I19048	1,0	428,6					1,0	214,3				
I19048											4,0	142,9
I19048					19,0	714,0						
I19049					2,0	714,0						
I19049							8,0	214,3				
I20044							100	214,3				
I20045									3,0	71,0		
I20045							28,0	214,3				
I20046									10	71,0		
I20046					12,0	714,0						
I20046							13,0	214,3				
I20047											3,0	142,9
I20047							4,0	214,3				
I20047					33,0	714,0						
I20048					23,0	714,0						
I21045					6,0	714,0						
I21045							30	214,3				
I21046							2,0	214,3				
I21046					4,0	714,0						
I21047											1,0	142,9
I21047					31,0	714,0						
I21048					15,0	714,0						
I21049					2,2	714,0			2,2	71,0		
I21049							3,3	214,3				
I21050							56,2	214,3				
I22045							100	214,3				
I22046							4,0	214,3				
I22046					27,0	714,0						
I22047					19,0	714,0						
I22048					7,0	714,0						
I22049			1,0	357,1			1,0	214,3				
I22049					3,0	714,0						
I22049									17,0	71,0		
I22050			11,9	357,1								
I22050					14,1	714,0						
I22050									18,4	71,0		
I22050							19,5	214,3				

continua

segue

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	N remov.	% di conifere	N remov.	% di foresta decidua	N remov.	% di foresta medit.	N remov.	% di prateria	N remov.	% di tundra	N remov.
I23046							8,0	214,3				
I23046					13,0	714,0						
I23047					32,0	714,0						
I23048					16,0	714,0						
I23049					1,0	714,0						
I24038							1,0	214,3				
I24038									10	71,0		
I24039							1,0	214,3				
I24039									44,0	71,0		
I24041									18,0	71,0		
I24046					12,0	714,0						
I24046							32,0	214,3				
I24047							2,0	214,3				
I24047					28,0	714,0						
I24048					19,0	714,0						
I24049	4,0	428,6			4,0	714,0						
I25038					2,0	714,0						
I25038									4,0	71,0		
I25039									10	71,0		
I25040									28,0	71,0		
I25046									14,0	71,0		
I25046					16,0	714,0						
I25046							20	214,3				
I25047							4,0	214,3				
I25047									8,0	71,0		
I25047					35,0	714,0						
I25048							4,0	214,3				
I25048					17,0	714,0						
I25048	19,0	428,6										
I25049	1,0	428,6			1,0	714,0						
I25049							7,0	214,3				
I25050	1,0	428,6			1,0	714,0						
I25050							8,0	214,3				
I26035									6,0	71,0		
I26035							21,0	214,3				
I26038									5,0	71,0		
I26039					3,0	714,0				71,0		
I26040							2,0	214,3				
I26040					3,0	714,0						
I26040									8,0	71,0		
I26041							12,0	214,3				
I26041					21,0	714,0						
I26042									71,0	71,0		

continua

segue

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	N remov.	% di conifere	N remov.	% di foresta decidua	N remov.	% di foresta med.	N remov.	% di prateria	N remov.	% di tundra	N remov.
I26043									100	71,0		
I26046									8,0	71,0		
I26046					51,0	714,0						
I26047							1,0	214,3				
I26047									5,0	71,0		
I26047					32,0	714,0						
I26048							3,0	214,3				
I26048					8,0	714,0						
I26048									15,0	71,0		
I26049					1,0	714,0						
I26049							17,0	214,3				
I26050							7,0	214,3				
I27038									5,0	71,0		
I27039					3,0	714,0						
I27039									6,0	71,0		
I27040							2,0	214,3				
I27040									4,0	71,0		
I27040					7,0	714,0						
I27041									1,0	71,0		
I27041							11,0	214,3				
I27041					21,0	714,0						
I27042					1,0	714,0						
I27042							8,0	214,3				
I27042									15,0	71,0		
I27043									46,0	71,0		
I27044									50	71,0		
I27045							19,0	214,3				
I27046									5,0	71,0		
I27046			8,0	357,1								
I27046					40	714,0						
I27047							3,0	214,3	3,0	71,0		
I27047			21,0	357,1								
I27047					25,0	714,0						
I28039									6,0	71,0		
I28040					1,0	714,0						
I28040									3,0	71,0		
I28041			1,0	357,1								
I28041									5,0	71,0		
I28041					12,0	714,0						
I28042				1,0								
I28042							2,0	214,3				
I28042									7,0	71,0		
I28042					17,0	714,0						

continua

segue

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	N remov.	% di conifere	N remov.	% di foresta decidua	N remov.	% di foresta mediterranea	N remov.	% di prateria	N remov.	% di tundra	N remov.
I28043					4,0	714,0						
I28043							7,0	214,3				
I28043									8,0	71,0		
I28044					5,0	714,0						
I28044							8,0	214,3				
I28045					24,0	714,0						
I28046									1,0	71,0		
I28046			5,0	357,1								
I28046					38,0	714,0						
I28047							4,0	214,3				
I28047			7,0	357,1								
I28047					21,0	714,0						
I28050							2,0	214,3				
I28051							4,0	214,3				
I29034									54,0	71,0		
I29035									54,0	71,0		
I29039							2,0	214,3				
I29040							1,0	214,3				
I29040					6,0	714,0						
I29040									9,0	71,0		
I29041						714,0			4,0	71,0		
I29042					5,0	714,0						
I29043			3,0	357,1								
I29043									5,0	71,0		
I29043					13,0	714,0						
I29043							33,0	214,3				
I29044			5,0	357,1								
I29044							7,0	214,3				
I29044					42,0	714,0						
I29045							24,0	214,3				
I29045					36,0	714,0						
I29047					15,0	714,0						
I30040					7,0	714,0			7,0	71,0		

## 2.14 Quantità di azoto rilasciato all'atmosfera attraverso i processi di denitrificazione

Risoluzione 50x50 km<sup>2</sup>

Il flusso di azoto rilasciato all'atmosfera mediante denitrificazione, espresso come kg N ha<sup>-1</sup> anno<sup>-1</sup>, è stato determinato sulla base dell'umidità del suolo: più secco è il suolo e minore sarà l'azoto denitrificato, viceversa più umido è il suolo e maggiore sarà l'azoto denitrificato.

I valori di azoto denitrificato sono stati attribuiti, ad ogni ecosistema previsto dalla metodologia di stima del Carico critico di azoto nutriente, mediante la collaborazione di esperti del

Ministero delle risorse agricole, alimentari e forestali. Le attribuzioni elaborate sono riportate nella tabella 2.14.1.

**Tabella 2.14.1: Valori di azoto denitrificato attribuiti agli ecosistemi**

Ecosistemi	Fitotipi (+)	kg N ha <sup>-1</sup> anno <sup>-1</sup>
Tundra	gruppo A: 11 gruppo B: 37 A e B (*)	0,2 0,1 (*)
Foresta boreale	tutti	1
Conifere temperate	tutti	0,5
Decidue temperate	gruppo A: 1-2-3-4-5-6-30-31-32 gruppo B: 21-22-23-27-28-29-46-47 A e B (*)	2 2,5 (*)
Foresta mediterranea	gruppo A: 17-18-19 gruppo B: 25-26 A e B (*)	0 0,2 (*)
Praterie acidofile (Pascoli acidi)	gruppo A: 12-13-14-15-16 gruppo B: 38 A e B (*)	1,5 2 (*)

Fonte: Petriccione B., 1995, comunicazione personale

(+) I numeri indicano quali dei 54 fitotipi sono inclusi nel gruppo A o nel gruppo B

(\*) Maglie del grigliato EMEP 50 x 50 in cui sono presenti contemporaneamente i fitotipi del gruppo A e del gruppo B. In questo caso si assegna un valore di Nde uguale alla media ponderata dei valori di azoto di ciascun gruppo, usando come pesi la superficie di maglia occupata da ciascun gruppo.

Il flusso di azoto all'atmosfera mediante denitrificazione per ogni ecosistema presente all'interno della singola cella EMEP 50x50 è riportato in tabella 2.14.2.

**Tabella 2.14.2: Quantità di azoto rilasciato attraverso il processo di denitrificazione (eq.ha<sup>-1</sup>.yr<sup>-1</sup>)**

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	N denit.	% di conifere	N denit.	% di foresta decidua	N denit.	% di foresta med.	N denit.	% di prateria	N denit.	% di tundra	N denit.
I04044									3,0	107,0		
I04044	39,0	71,4										
I04044											58,0	14,3
I04045											4,0	14,3
I04045									21,0	107,0		
I04046											6,0	14,3
I04046									21,0	107,0		
I04046	41,0	71,4										
I04047											2,0	14,3
I04047									18,0	107,0		
I04047	38,0	71,4										
I04048									20	107,0		
I05043											10	14,3
I05044					13,0	143,0						
I05044									16,0	107,0		
I05044	24,0	71,4										
I05044											33,0	14,3
I05045											5,0	14,3

continua

segue

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	N denit.	% di conifere	N denit.	% di foresta decidua	N denit.	% di foresta medit.	N denit.	% di prateria	N denit.	% di tundra	N denit.
I05045	10	71,4										
I05045									25,0	107,0		
I05045					47,0	143,0						
I05046											3,0	14,3
I05046	13,0	71,4										
I05046									24,0	107,0		
I05046					32,0	143,0						
I05047											2,0	14,3
I05047	18,0	71,4										
I05047					34,0	143,0			34,0	107,0		
I05048											3,0	14,3
I05048	19,3	71,4										
I05048									32,5	107,0		
I05048					38,6	143,0						
I05049									6,0	107,0		
I05049	17,0	71,4										
I05049											32,0	14,3
I06043	7,0	71,4										
I06043					19,0	143,0						
I06043											21,0	14,3
I06043									38,0	107,0		
I06044	10	71,4										
I06044											12,0	14,3
I06044									15,0	107,0		
I06044					29,0	143,0						
I06045					8,0	143,0						
I06046					16,0	143,0						
I06047					31,3	143,0						
I06048											1,3	14,3
I06048					61,2	143,0						
I06049											4,7	14,3
I06049	8,3	71,4										
I06049									23,7	107,0		
I06049					37,9	143,0						
I06050											2,0	14,3
I06050					7,0	143,0						
I06050	18,0	71,4										
I06050									34,0	107,0		
I06051									12,0	107,0		
I07043	1,0	71,4										
I07043							2,0	0				
I07043											8,0	14,3
I07043									23,0	107,0		

continua

segue

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	N denit.	% di conifere	N denit.	% di foresta decidua	N denit.	% di foresta medit.	N denit.	% di prateria	N denit.	% di tundra	N denit.
I07043					32,0	143,0						
I07044											6,0	14,3
I07044									8,0	107,0		
I07044					45,0	143,0						
I07045					22,0	177,0						
I07046					5,0	143,0						
I07047	1,0	71,4										
I07047					3,0	143,0						
I07048					3,0	143,0						
I07049	8,2	71,4										
I07049									13,3	107,0		
I07049											17,4	14,3
I07049					26,6	143,0						
I07050											4,0	14,3
I07050					14,0	143,0						
I07050	26,0	71,4										
I07050									28,0	107,0		
I07051											5,0	14,3
I07051	26,0	71,4										
I07051									30	107,0		
I07052									43,0	107,0		
I07052	47,0	71,4										
I07053									37,0	107,0		
I07053	49,0	71,4										
I08043			4,0	35,7								
I08043							6,0	0				
I08043					41,0	179,0						
I08044											1,0	10,7
I08044			5,0	35,7								
I08044							6,0	0				
I08044					58,0	171,0						
I08045							3,0	0				
I08045			6,0	35,7								
I08045					60	178,0						
I08046					55,0	171,0						
I08047					17,0	177,0						
I08048					2,0	143,0						
I08049	2,1	71,4										
I08049									3,2	107,0		
I08049											4,3	14,3
I08049					28,7	143,0						
I08050											12,0	14,3
I08050	14,0	71,4										

continua

segue

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	N denit.	% di conifere	N denit.	% di foresta decidua	N denit.	% di foresta medit.	N denit.	% di prateria	N denit.	% di tundra	N denit.
I08050									18,0	107,0		
I08050					39,0	143,0						
I08051											3,0	14,3
I08051									18,0	107,0		
I08051					22,0	143,0						
I08051	39,0	71,4										
I08052											1,0	14,3
I08052									10	107,0		
I08052					15,0	143,0						
I08052	61,0	71,4										
I08053											7,0	14,3
I08053									17,0	107,0		
I08053	74,0	71,4										
I08054									44,0	107,0		
I08054	50	71,4										
I09046			4,0	35,7								
I09046					75,0	170						
I09047					53,0	164,0						
I09048					6,0	143,0						
I09049					1,1	143,0						
I09050											12,8	14,3
I09050									16,7	107,0		
I09050					51,4	143,0						
I09051											5,0	14,3
I09051	7,0	71,4										
I09051									8,0	107,0		
I09051					65,0	143,0						
I09052											12,0	14,3
I09052									14,0	107,0		
I09052					23,0	143,0						
I09052	43,0	71,4										
I09053									6,0	107,0		
I09053					12,0	143,0						
I09053											21,0	14,3
I09053	57,0	71,4										
I09054					14,0	143,0						
I09054									24,0	107,0		
I09054	62,0	71,4										
I10046							3,0	0				
I10046			7,0	35,7								
I10046					46,0	178,0						
I10047					68,0	168,0						
I10048					12,0	177,0						

continua

segue

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	N denit.	% di conifere	N denit.	% di foresta decidua	N denit.	% di foresta medit.	N denit.	% di prateria	N denit.	% di tundra	N denit.
I10049					1,0	143,0						
I10050					12,0	143,0						
I10051									1,0	107,0		
I10051					11,0	143,0						
I10052									2,0	107,0		
I10052					40	143,0						
I10053									3,0	107,0		
I10053											7,0	14,3
I10053	19,0	71,4										
I10053					62,0	143,0						
I10054									2,0	107,0		
I10054											14,0	14,3
I10054	26,0	71,4										
I10054					54,0	143,0						
I10055	100	71,4										
I11046	1,0	71,4										
I11046							10	0				
I11046					38,0	178,0						
I11047					72,0	164,0						
I11048			21,0	35,7								
I11049			2,0	35,7								
I11050			4,0	35,7								
I11052					3,2	143,0						
I11053					9,0	143,0						
I11054									1,0	107,0		
I11054											7,0	14,3
I11054	19,0	71,4										
I11054					46,0	143,0						
I11055										107,0	9,0	14,3
I11055	34,0	71,4										
I11055					48,0	143,0						
I12044							18,0	0				
I12045							34,0	0				
I12046							8,0	0				
I12046					21,0	179,0						
I12047					47,0	177,0						
I12048			57,0	35,7								
I12050							1,1	0				
I12051							7,0	0				
I12053									2,6	107,0		
I12053					22,5	143,0						
I12054									5,0	107,0		
I12054					46,0	143,0						

continua

segue

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	N denit.	% di conifere	N denit.	% di foresta decidua	N denit.	% di foresta medit.	N denit.	% di prateria	N denit.	% di tundra	N denit.
I13037							100	0				
I13038									35,0	143,0		
I13038							64,0	0				
I13039							100	0				
I13043							50	0				
I13044					8,0	179,0						
I13044							41,0	0				
I13045					13,0	179,0						
I13045							43,0	0				
I13046							8,0	0				
I13046					41,0	179,0						
I13047							1,0	0				
I13047					43,0	178,0						
I13048			72,0	35,7								
I13049			5,0	35,7								
I13050			40	35,7								
I13053									26,0	107,0		
I13053					42,0	143,0						
I13054					35,0	143,0						
I13054									60	107,0		
I14037									32,0	143,0		
I14037							57,0	0				
I14038					3,0	179,0						
I14038							21,0	0				
I14038									65,0	143,0		
I14039					1,0	179,0						
I14039							25,0	0				
I14039									64,0	143,0		
I14040					4,0	179,0						
I14040							35,0	0				
I14040									53,0	143,0		
I14043							100	0				
I14044							24,0	0				
I14045					15,0	179,0						
I14045							19,0	0				
I14046							2,0	0				
I14046					38,0	178,0						
I14047					37,0	179,0						
I14048					56,0	179,0						
I14049					30,3	179,0						
I15036							15,2	0				
I15036									42,7	143,0		
I15037					1,0	179,0						

continua

segue

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	N denit.	% di conifere	N denit.	% di foresta decidua	N denit.	% di foresta medit.	N denit.	% di prateria	N denit.	% di tundra	N denit.
I15037							10,2	7,1				
I15037									54,3	143,0		
I15038					1,0	179,0						
I15038							27,0	1,4				
I15038									58,0	143,0		
I15039									36,0	143,0		
I15039							55,0	0,7				
I15040							37,0	0				
I15040									48,0	143,0		
I15044							37,0	0				
I15045									1,0	143,0		
I15045					14,0	179,0	14,0	0				
I15046					36,5	178,0						
I15047							2,3	0				
I15047					33,0	179,0						
I15048							1,0	0				
I15048					48,0	176,0						
I15049					16,0	179,0						
I16035					2,0	179,0						
I16035									36,0	143,0		
I16035							43,0	0				
I16036					2,0	179,0						
I16036							22,0	17,9				
I16036									25,0	143,0		
I16037					5,0	179,0						
I16037							20	0				
I16037									63,0	143,0		
I16038					1,0	179,0						
I16038									25,0	143,0		
I16038							51,0	9,3				
I16039					2,0	179,0						
I16039							23,0	0,7				
I16039									54,0	143,0		
I16040									37,0	143,0		
I16040							63,0	0				
I16045							6,0	0				
I16045									10	143,0		
I16045					28,0	179,0						
I16046							8,2	0				
I16046					16,4	179,0						
I16047							8,0	0				
I16047					33,0	178,0						
I16048											1,0	7,1

continua

segue

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	N denit.	% di conifere	N denit.	% di foresta decidua	N denit.	% di foresta mediterranea	N denit.	% di prateria	N denit.	% di tundra	N denit.
I16048							2,0	0				
I16048					70	177,0						
I16049					10	179,0						
I16050							15,0	0				
I17035							25,0	7,1				
I17035									50	143,0		
I17036					3,2	179,0						
I17036									23,1	143,0		
I17036							24,2	7,1				
I17037					6,0	179,0						
I17037							28,0	10,7				
I17037									53,0	143,0		
I17038									28,0	143,0		
I17038							41,0	0				
I17045					6,4	179,0	6,4	0				
I17046							7,0	0				
I17046					12,0	178,0						
I17047									1,0	143,0		
I17047											2,0	7,1
I17047							5,0	0				
I17047					62,0	161,0						
I17048											4,0	7,1
I17048					54,0	161,0						
I17049					6,0	179,0						
I18036									39,0	143,0		
I18036							57,0	0				
I18037					1,0	179,0						
I18037							20	0				
I18037									31,0	143,0		
I18045									3,0	143,0		
I18045					7,0	179,0						
I18045							13,0	0				
I18046									1,0	143,0	1,0	7,1
I18046							2,0	0				
I18046					31,0	155,0						
I18047											6,0	7,1
I18047					30	161,0						
I18048							1,0	0				
I18048											5,0	7,1
I18048					12,0	143,0						
I18049					5,0	179,0						
I19044							100	0				
I19045					5,0	179,0						

continua

segue

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	N denit.	% di conifere	N denit.	% di foresta decidua	N denit.	% di foresta medit.	N denit.	% di prateria	N denit.	% di tundra	N denit.
I19045									7,0	143,0		
I19045							13,0	0				
I19046											1,0	7,1
I19046									6,0	143,0		
I19046							11,0	0				
I19046					19,0	146,0						
I19047							1,0	0				
I19047											7,0	7,1
I19047					36,0	150						
I19048	1,0	71,4						0				
I19048											4,0	7,1
I19048					19,0	154,0						
I19049					2,0	179,0						
I19049							8,0	0				
I20044							100	0				
I20045									3,0	143,0		
I20045							28,0	0				
I20046									10	143,0		
I20046					12,0	179,0						
I20046							13,0	0				
I20047											3,0	7,1
I20047							4,0	0				
I20047					33,0	176,0						
I20048					23,0	179,0						
I21045					6,0	179,0						
I21045							30	0				
I21046							2,0	0				
I21046					4,0	179,0						
I21047											1,0	7,1
I21047					31,0	166,0						
I21048					15,0	179,0						
I21049					2,2	143,0			2,2	143,0		
I21049							3,3	0				
I21050							56,2	0				
I22045							100	0				
I22046							4,0	0				
I22046					27,0	179,0						
I22047					19,0	177,0						
I22048					7,0	179,0						
I22049			1,0	35,7			1,0	0				
I22049					3,0	179,0						
I22049									17,0	143,0		
I22050			11,9	35,7								

continua

segue

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	N denit.	% di conifere	N denit.	% di foresta decidua	N denit.	% di foresta medit.	N denit.	% di prateria	N denit.	% di tundra	N denit.
I22050					14,1	143,0						
I22050									18,4	143,0		
I22050							19,5	0				
I23046							8,0	0				
I23046					13,0	179,0						
I23047					32,0	161,0						
I23048					16,0	177,0						
I23049					1,0	179,0						
I24038							1,0	0				
I24038									10	143,0		
I24039							1,0	0				
I24039									44,0	143,0		
I24041									18,0	143,0		
I24046					12,0	168,0						
I24046							32,0	0				
I24047							2,0	0				
I24047					28,0	161,0						
I24048					19,0	178,0						
I24049		71,4			4,0	179,0						
I25038					2,0	179,0						
I25038									4,0	143,0		
I25039									10	143,0		
I25040									28,0	143,0		
I25046									14,0	143,0		
I25046					16,0	161,0						
I25046							20	0				
I25047							4,0	0				
I25047									8,0	143,0		
I25047					35,0	161,0						
I25048							4,0	0				
I25048					17,0	177,0						
I25048	19,0	71,4										
I25049		71,4			1,0	179,0						
I25049							7,0	0				
I25050	1,0	71,4				179,0						
I25050							8,0	0				
I26035									6,0	143,0		
I26035							21,0	0				
I26038									5,0	143,0		
I26039						179,0			3,0	143,0		
I26040							2,0	7,1				
I26040					3,0	179,0						
I26040									8,0	143,0		

continua

segue

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	N denit.	% di conifere	N denit.	% di foresta decidua	N denit.	% di foresta medit.	N denit.	% di prateria	N denit.	% di tundra	N denit.
I26041							12,0	0				
I26041					21,0	179,0						
I26042									71,0	143,0		
I26043									100	143,0		
I26046									8,0	143,0		
I26046					51,0	168,0						
I26047							1,0	0				
I26047									5,0	143,0		
I26047					32,0	177,0						
I26048							3,0	0				
I26048					8,0	179,0						
I26048									15,0	143,0		
I26049					1,0	179,0						
I26049							17,0	0				
I26050							7,0	0				
I27038									5,0	143,0		
I27039					3,0	179,0						
I27039									6,0	143,0		
I27040							2,0	0				
I27040									4,0	143,0		
I27040					7,0	177,0						
I27041									1,0	143,0		
I27041							11,0	0				
I27041					21,0	161,0						
I27042					1,0	179,0						
I27042							8,0	0				
I27042									15,0	143,0		
I27043									46,0	143,0		
I27044									50	143,0		
I27045							19,0	0				
I27046									5,0	143,0		
I27046			8,0	35,7								
I27046					40	168,0						
I27047							3,0	0	3,0	143,0		
I27047			21,0	35,7								
I27047					25,0	178,0						
I28039									6,0	143,0		
I28040					1,0	179,0						
I28040									3,0	143,0		
I28041			1,0	35,7								
I28041									5,0	143,0		
I28041					12,0	171,0						
I28042			1,0	35,7								

continua

segue

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	N denit.	% di conifere	N denit.	% di foresta decidua	N denit.	% di foresta medit.	N denit.	% di prateria	N denit.	% di tundra	N denit.
I28042							2,0	0				
I28042									7,0	143,0		
I28042					17,0	178,0						
I28043					4,0	179,0						
I28043							7,0	0				
I28043									8,0	143,0		
I28044					5,0	179,0						
I28044							8,0	0				
I28045					24,0	178,0						
I28046									1,0	143,0		
I28046			5,0	35,7								
I28046					38,0	175,0						
I28047							4,0	0				
I28047			7,0	35,7								
I28047					21,0	179,0						
I28050							2,0	0				
I28051							4,0	0				
I29034									54,0	143,0		
I29035									54,0	143,0		
I29039							2,0	0				
I29040							1,0	0				
I29040					6,0	179,0						
I29040									9,0	143,0		
I29041						179,0			4,0	143,0		
I29042					5,0	179,0						
I29043			3,0	35,7								
I29043									5,0	143,0		
I29043					13,0	179,0						
I29043							33,0	0				
I29044			5,0	35,7								
I29044							7,0	0				
I29044					42,0	171,0						
I29045							24,0	0				
I29045					36,0	161,0						
I29047					15,0	179,0						
I30040					7,0	179,0			7,0	143,0		

## 2.15 Quantità di azoto rilasciato all'atmosfera attraverso i processi di volatilizzazione

Risoluzione 50x50 km<sup>2</sup>

Le quantità di azoto che vengono rilasciate all'atmosfera attraverso il fenomeno della volatilizzazione dell'ammoniaca per ogni ecosistema presente all'interno della singola cella EMEP 50x50 sono riportate in tabella 2.15.1.

Le quantità di azoto che vengono rilasciate all'atmosfera attraverso il fenomeno della volatilizzazione dell'ammoniaca, espresse come kg N ha<sup>-1</sup> anno<sup>-1</sup>, sono state considerate nulle per tutti gli ecosistemi previsti dalla metodologia di stima del carico critico di azoto nutriente, tranne che per l'ecosistema che risponde al nome di "conifere temperate", per il quale viene assegnato il valore di 0,25 kg N ha<sup>-1</sup> anno<sup>-1</sup>.

Tabella 2.15.1: Quantità di azoto rilasciato all'atmosfera attraverso il processo di volatilizzazione (eq.ha<sup>-1</sup>.yr<sup>-1</sup>)

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	N volatil	% di conifere	N volatil	% di foresta decidua	N volatil	% di foresta mediterranea	N volatil	% di prateria	N volatil	% di tundra	N volatil
I04044									3,0	0		
I04044	39,0	0										
I04044											58,0	0,0
I04045											4,0	0,0
I04045									21,0	0		
I04046	6,0											0,0
I04046									21,0	0		
I04046	41,0	0										
I04047											2,0	0,0
I04047									18,0	0		
I04047	38,0	0										
I04048									20	0		
I05043											10	0,0
I05044					13,0	0						
I05044									16,0	0		
I05044	24,0	0										
I05044											33,0	0,0
I05045											5,0	0,0
I05045	10	0										
I05045									25,0	0		
I05045					47,0	0						
I05046											3,0	0,0
I05046	13,0	0										
I05046									24,0	0		
I05046					32,0	0						
I05047											2,0	0,0
I05047	18,0	0										
I05047					34,0	0			34,0	0		
I05048											3,0	0,0
I05048	19,3	0										

continua

segue

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	N volatil	% di conifere	N volatil	% di foresta decidua	N volatil	% di foresta mediterranea	N volatil	% di prateria	N volatil	% di tundra	N volatil
I05048									32,5	0		
I05048					38,6	0						
I05049									6,0	0		
I05049	17,0	0										
I05049											32,0	0,0
I06043	7,0	0										
I06043					19,0	0						
I06043											21,0	0,0
I06043									38,0	0		
I06044	10	0										
I06044											12,0	0,0
I06044									15,0	0		
I06044					29,0	0						
I06045					8,0	0						
I06046					16,0	0						
I06047					31,3	0						
I06048											1,3	0,0
I06048					61,2	0						
I06049											4,7	0,0
I06049	8,3	0										
I06049									23,7	0		
I06049					37,9	0						
I06050											2,0	0,0
I06050					7,0	0						
I06050	18,0	0										
I06050									34,0	0		
I06051									12,0	0		
I07043	1,0	0										
I07043							2,0	17,9				
I07043											8,0	0,0
I07043									23,0	0		
I07043					32,0	0						
I07044											6,0	0,0
I07044									8,0	0		
I07044					45,0	0						
I07045					22,0	0						
I07046					5,0	0						
I07047	1,0	0										
I07047					3,0	0						
I07048					3,0	0						
I07049	8,2	0										
I07049									13,3	0		
I07049											17,4	0,0

continua

segue

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	N volatil	% di conifere	N volatil	% di foresta decidua	N volatil	% di foresta mediterr.	N volatil	% di prateria	N volatil	% di tundra	N volatil
I07049					26,6	0						
I07050											4,0	0,0
I07050					14,0	0						
I07050	26,0	0										
I07050									28,0	0		
I07051											5,0	0,0
I07051	26,0	0										
I07051									30	0		
I07052									43,0	0		
I07052	47,0	0										
I07053									37,0	0		
I07053	49,0	0										
I08043			4,0	17,9								
I08043							6,0	17,9				
I08043					41,0	0						
I08044											1,0	0,0
I08044			5,0	17,9								
I08044							6,0	17,9				
I08044					58,0	0						
I08045							3,0	17,9				
I08045			6,0	17,9								
I08045					60	0						
I08046					55,0	0						
I08047					17,0	0						
I08048					2,0	0						
I08049	2,1	0										
I08049									3,2	0		
I08049											4,3	0,0
I08049					28,7	0						
I08050											12,0	0,0
I08050	14,0	0										
I08050									18,0	0		
I08050					39,0	0						
I08051											3,0	0,0
I08051									18,0	0		
I08051					22,0	0						
I08051	39,0	0										
I08052											1,0	0,0
I08052									10	0		
I08052					15,0	0						
I08052	61,0	0										
I08053											7,0	0,0
I08053									17,0	0		

continua

segue

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	N volatil	% di conifere	N volatil	% di foresta decidua	N volatil	% di foresta medit.	N volatil	% di prateria	N volatil	% di tundra	N volatil
I08053	74,0	0										
I08054									44,0	0		
I08054	50	0										
I09046			4,0	17,9								
I09046					75,0	0						
I09047					53,0	0						
I09048					6,0	0						
I09049					1,1	0						
I09050											12,8	0,0
I09050									16,7	0		
I09050					51,4	0						
I09051											5,0	0,0
I09051	7,0	0										
I09051									8,0	0		
I09051					65,0	0						
I09052											12,0	0,0
I09052									14,0	0		
I09052					23,0	0						
I09052	43,0	0										
I09053									6,0	0		
I09053					12,0	0						
I09053											21,0	0,0
I09053	57,0	0										
I09054					14,0	0						
I09054									24,0	0		
I09054	62,0	0										
I10046							3,0	17,9				
I10046			7,0	17,9								
I10046					46,0	0						
I10047					68,0	0						
I10048					12,0	0						
I10049					1,0	0						
I10050					12,0	0						
I10051									1,0	0		
I10051					11,0	0						
I10052									2,0	0		
I10052					40	0						
I10053									3,0	0		
I10053											7,0	0,0
I10053	19,0	0										
I10053					62,0	0						
I10054									2,0	0		
I10054											14,0	0,0

continua

segue

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	N volatil	% di conifere	N volatil	% di foresta decidua	N volatil	% di foresta med.	N volatil	% di prateria	N volatil	% di tundra	N volatil
I10054	26,0	0										
I10054					54,0	0						
I10055	100	0										
I11046	1,0	0										
I11046							10	17,9				
I11046					38,0	0						
I11047					72,0	0						
I11048			21,0	17,9								
I11049			2,0	17,9								
I11050			4,0	17,9								
I11052					3,2	0						
I11053					9,0	0						
I11054									1,0	0		
I11054											7,0	0,0
I11054	19,0	0										
I11054					46,0	0						
I11055									9,0	0		0,0
I11055	34,0	0										
I11055					48,0	0						
I12044							18,0	17,9				
I12045							34,0	17,9				
I12046							8,0	17,9				
I12046					21,0	0						
I12047					47,0	0						
I12048			57,0	17,9								
I12050							1,1	17,9				
I12051							7,0	17,9				
I12053									2,6	0		
I12053					22,5	0						
I12054									5,0	0		
I12054					46,0	0						
I13037							100	17,9				
I13038									35,0	0		
I13038							64,0	17,9				
I13039							100	17,9				
I13043							50	17,9				
I13044					8,0	0						
I13044							41,0	17,9				
I13045					13,0	0						
I13045							43,0	17,9				
I13046							8,0	17,9				
I13046					41,0	0						
I13047							1,0	17,9				

continua

segue

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	N volatil	% di conifere	N volatil	% di foresta decidua	N volatil	% di foresta medit.	N volatil	% di prateria	N volatil	% di tundra	N volatil
I13047					43,0	0						
I13048			72,0	17,9								
I13049			5,0	17,9								
I13050			40	17,9								
I13053									26,0	0		
I13053					42,0	0						
I13054					35,0	0						
I13054									60	0		
I14037									32,0	0		
I14037							57,0	17,9				
I14038					3,0	0						
I14038							21,0	17,9				
I14038									65,0	0		
I14039					1,0	0						
I14039							25,0	17,9				
I14039									64,0	0		
I14040					4,0	0						
I14040							35,0	17,9				
I14040									53,0	0		
I14043							100	17,9				
I14044							24,0	17,9				
I14045					15,0	0						
I14045							19,0	17,9				
I14046							2,0	17,9				
I14046					38,0	0						
I14047					37,0	0						
I14048					56,0	0						
I14049					30,3	0						
I15036							15,2	17,9				
I15036									42,7	0		
I15037					1,0	0						
I15037							10,2	17,9				
I15037									54,3	0		
I15038					1,0	0						
I15038							27,0	17,9				
I15038									58,0	0		
I15039									36,0	0		
I15039							55,0	17,9				
I15040							37,0	17,9				
I15040									48,0	0		
I15044							37,0	17,9				
I15045									1,0	0		
I15045					14,0	0	14,0	17,9				

continua

segue

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	N volatil	% di conifere	N volatil	% di foresta decidua	N volatil	% di foresta medit.	N volatil	% di prateria	N volatil	% di tundra	N volatil
I15046					36,5	0						
I15047							2,3	17,9				
I15047					33,0	0						
I15048							1,0	17,9				
I15048					48,0	0						
I15049					16,0	0						
I16035					2,0	0						
I16035									36,0	0		
I16035							43,0	17,9				
I16036					2,0	0						
I16036							22,0	17,9				
I16036									25,0	0		
I16037					5,0	0						
I16037							20	17,9				
I16037									63,0	0		
I16038					1,0	0						
I16038									25,0	0		
I16038							51,0	17,9				
I16039					2,0	0						
I16039							23,0	17,9				
I16039									54,0	0		
I16040									37,0	0		
I16040							63,0	17,9				
I16045							6,0	17,9				
I16045									10	0		
I16045					28,0	0						
I16046							8,2	17,9				
I16046					16,4	0						
I16047							8,0	17,9				
I16047					33,0	0						
I16048											1,0	0,0
I16048							2,0	17,9				
I16048					70	0						
I16049					10	0						
I16050							15,0	17,9				
I17035							25,0	17,9				
I17035									50	0		
I17036					3,2	0						
I17036									23,1	0		
I17036							24,2	17,9				
I17037					6,0	0						
I17037							28,0	17,9				
I17037									53,0	0		

continua

segue

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	N volatil	% di conifere	N volatil	% di foresta decidua	N volatil	% di foresta medit.	N volatil	% di prateria	N volatil	% di tundra	N volatil
I17038									28,0	0		
I17038							41,0	17,9				
I17045					6,4	0	6,4	17,9				
I17046							7,0	17,9				
I17046					12,0	0						
I17047									1,0	0		
I17047											2,0	0,0
I17047							5,0	17,9				
I17047					62,0	0						
I17048											4,0	0,0
I17048					54,0	0						
I17049					6,0	0						
I18036									39,0	0		
I18036							57,0	17,9				
I18037					1,0	0						
I18037							20	17,9				
I18037									31,0	0		
I18045									3,0	0		
I18045					7,0	0						
I18045							13,0	17,9				
I18046									1,0	0	1,0	0,0
I18046							2,0	17,9				
I18046					31,0	0						
I18047											6,0	0,0
I18047					30	0						
I18048							1,0	17,9				
I18048											5,0	0,0
I18048					12,0	0						
I18049					5,0	0						
I19044							100	17,9				
I19045					5,0	0						
I19045									7,0	0		
I19045							13,0	17,9				
I19046											1,0	0,0
I19046									6,0	0		
I19046							11,0	17,9				
I19046					19,0	0						
I19047							1,0	17,9				
I19047											7,0	0,0
I19047					36,0	0						
I19048	1,0	0					1,0	17,9				
I19048											4,0	0,0
I19048					19,0	0						

continua

segue

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	N volatil	% di conifere	N volatil	% di foresta decidua	N volatil	% di foresta mediterranea	N volatil	% di prateria	N volatil	% di tundra	N volatil
I19049					2,0	0						
I19049							8,0	17,9				
I20044							100	17,9				
I20045									3,0	0		
I20045							28,0	17,9				
I20046									10	0		
I20046					12,0	0						
I20046							13,0	17,9				
I20047											3,0	0,0
I20047							4,0	17,9				
I20047					33,0	0						
I20048					23,0	0						
I21045					6,0	0						
I21045							30	17,9				
I21046							2,0	17,9				
I21046					4,0	0						
I21047											1,0	0,0
I21047					31,0	0						
I21048					15,0	0						
I21049					2,2	0			2,2	0		
I21049							3,3	17,9				
I21050							56,2	17,9				
I22045							100	17,9				
I22046							4,0	17,9				
I22046					27,0	0						
I22047					19,0	0						
I22048					7,0	0						
I22049			1,0	17,9			1,0	17,9				
I22049					3,0	0						
I22049									17,0	0		
I22050			11,9	17,9								
I22050					14,1	0						
I22050									18,4	0		
I22050							19,5	17,9				
I23046							8,0	17,9				
I23046					13,0	0						
I23047					32,0	0						
I23048					16,0	0						
I23049					1,0	0						
I24038							1,0	17,9				
I24038									10	0		
I24039							1,0	17,9				
I24039									44,0	0		

continua

segue

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	N volatil	% di conifere	N volatil	% di foresta decidua	N volatil	% di foresta medit.	N volatil	% di prateria	N volatil	% di tundra	N volatil
I24041									18,0	0		
I24046					12,0	0						
I24046							32,0	17,9				
I24047							2,0	17,9				
I24047					28,0	0						
I24048					19,0	0						
I24049	4,0	0			4,0	0						
I25038					2,0	0						
I25038									4,0	0		
I25039									10	0		
I25040									28,0	0		
I25046									14,0	0		
I25046					16,0	0						
I25046							20	17,9				
I25047							4,0	17,9				
I25047									8,0	0		
I25047					35,0	0						
I25048							4,0	17,9				
I25048					17,0	0						
I25048	19,0	0										
I25049	1,0	0			1,0	0						
I25049							7,0	17,9				
I25050	1,0	0			1,0	0						
I25050							8,0	17,9				
I26035									6,0	0		
I26035							21,0	17,9				
I26038									5,0	0		
I26039					3,0	0			3,0	0		
I26040							2,0	17,9				
I26040					3,0	0						
I26040									8,0	0		
I26041							12,0	17,9				
I26041					21,0	0						
I26042									71,0	0		
I26043									100	0		
I26046									8,0	0		
I26046					51,0	0						
I26047							1,0	17,9				
I26047									5,0	0		
I26047					32,0	0						
I26048							3,0	17,9				
I26048					8,0	0						
I26048									15,0	0		

continua

segue

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	N volatil	% di conifere	N volatil	% di foresta decidua	N volatil	% di foresta medit.	N volatil	% di prateria	N volatil	% di tundra	N volatil
I26049					1,0	0						
I26049							17,0	17,9				
I26050							7,0	17,9				
I27038									5,0	0		
I27039					3,0	0						
I27039									6,0	0		
I27040							2,0	17,9				
I27040									4,0	0		
I27040					7,0	0						
I27041									1,0	0		
I27041							11,0	17,9				
I27041					21,0	0						
I27042					1,0	0						
I27042							8,0	17,9				
I27042									15,0	0		
I27043									46,0	0		
I27044									50	0		
I27045							19,0	17,9				
I27046									5,0	0		
I27046			8,0	17,9								
I27046					40	0						
I27047							3,0	17,9	3,0	0		
I27047			21,0	17,9								
I27047					25,0	0						
I28039									6,0	0		
I28040					1,0	0						
I28040									3,0	0		
I28041			1,0	17,9								
I28041									5,0	0		
I28041					12,0	0						
I28042			1,0	17,9								
I28042							2,0	17,9				
I28042									7,0	0		
I28042					17,0	0						
I28043					4,0	0						
I28043							7,0	17,9				
I28043									8,0	0		
I28044					5,0	0						
I28044							8,0	17,9				
I28045					24,0	0						
I28046									1,0	0		
I28046			5,0	17,9								
I28046					38,0	0						

continua

segue

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	N volatil	% di conifere	N volatil	% di foresta decidua	N volatil	% di foresta medit.	N volatil	% di prateria	N volatil	% di tundra	N volatil
I28047							4,0	17,9				
I28047			7,0	17,9								
I28047					21,0	0						
I28050							2,0	17,9				
I28051							4,0	17,9				
I29034									54,0	0		
I29035									54,0	0		
I29039							2,0	17,9				
I29040							1,0	17,9				
I29040					6,0	0						
I29040									9,0	0		
I29041					4,0	0			4,0	0		
I29042					5,0	0						
I29043			3,0	17,9								
I29043									5,0	0		
I29043					13,0	0						
I29043							33,0	17,9				
I29044			5,0	17,9								
I29044							7,0	17,9				
I29044					42,0	0						
I29045							24,0	17,9				
I29045					36,0	0						
I29047					15,0	0						
I30040					7,0	0			7,0	0		

## 2.16 Quantità di azoto percolato dalla zona radicale

Risoluzione 50x50 km<sup>2</sup>

La quantità di azoto percolato (indicato anche con il termine leaching), sotto forma di azoto organico (N) e di azoto inorganico ( $\text{NO}_3^-$  e  $\text{NH}_4^+$ ), dalla zona radicale, indica la quantità di azoto che viene sottratto al terreno nelle vicinanze delle radici dal fenomeno del “percolamento”. Il fenomeno del percolamento è collegato al surplus di acqua nella zona radicale: più basso è il surplus d’acqua e minore sarà l’azoto percolato, viceversa più alto è il surplus d’acqua e maggiore sarà l’azoto percolato.

Il surplus d’acqua è stato calcolato a partire dall’ammontare annuo delle precipitazioni, a cui sono stati sottratti l’evapotraspirazione reale (che è funzione della temperatura, delle precipitazioni e della copertura del suolo) e il deflusso superficiale (che è funzione della temperatura).

Una volta calcolato, per ogni maglia e per ogni diverso uso del suolo, il surplus d’acqua, i valori di azoto percolato sono stati attribuiti, ad ogni ecosistema previsto dalla metodologia di stima del carico critico di azoto nutriente secondo quanto riportato nella tabella 2.16.1.

Tabella 2.16.1: Valori di azoto percolato dalla zona radicale (in kg N ha<sup>-1</sup> anno<sup>-1</sup>)

Surplus d'acqua (in mm)	Ecosistemi						Altro (*)
	Tundra	Foresta boreale	Conifere temperate	Decidue temperate	Foresta mediterranea	Pascoli acidi	
(0 - 300]	0,1	2	1	1	0,5	1	9999
(300 - 600]	0,75	2,5	1,75	1,75	0,625	1,5	9999
(600 - 900]	1,5	3	2,5	2,5	0,75	2	9999
(900 - 1.200]	2,25	3,5	3,25	3,25	0,875	2,5	9999
> 1.200	3	4	4	4	1	3	9999
Fonte: Vetrella G. (1998)							
(*) Il valore 9999 indica che l'ecosistema "Altro" è ritenuto non sensibile all'eutrofizzazione.							

La quantità di azoto percolato dalla zona radicale per ogni ecosistema presente all'interno della singola cella EMEP 50x50 è riportata nella tabella 2.16.2.

Tabella 2.16.2: Quantità di azoto percolato dalla zona radicale (eq.ha<sup>-1</sup>.yr<sup>-1</sup>)

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	N leach.	% di conifere	N leach.	% di foresta decidua	N leach.	% di foresta medit.	N leach.	% di prateria	N leach.	% di tundra	N leach.
I04044									3,0	71,0		
I04044	39,0	142,9										
I04044											58,0	7,1
I04045											4,0	7,1
I04045									21,0	71,0		
I04046											6,0	7,1
I04046									21,0	71,0		
I04046	41,0	142,9										
I04047											2,0	53,6
I04047									18,0	71,0		
I04047	38,0	142,9										
I04048									20	143,0		
I05043											10	7,1
I05044					13,0	71,0						
I05044									16,0	71,0		
I05044	24,0	142,9										
I05044											33,0	7,1
I05045											5,0	7,1
I05045	10	142,9										
I05045									25,0	71,0		
I05045					47,0	71,0						
I05046											3,0	7,1
I05046	13,0	142,9										
I05046									24,0	107,0		
I05046					32,0	71,0						

continua

segue

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	N leach.	% di conifere	N leach.	% di foresta decidua	N leach.	% di foresta mediterranea	N leach.	% di prateria	N leach.	% di tundra	N leach.
I05047											2,0	7,1
I05047	18,0	142,9										
I05047					34,0	125,0				107,0		
I05048											3,0	7,1
I05048	19,3	178,6										
I05048									32,5	143,0		
I05048					38,6	179,0						
I05049									6,0	179,0		
I05049	17,0	214,3										
I05049											32,0	107,1
I06043	7,0	142,9										
I06043					19,0	71,0						
I06043											21,0	7,1
I06043									38,0	71,0		
I06044	10	142,9										
I06044											12,0	7,1
I06044									15,0	71,0		
I06044					29,0	71,0						
I06045					8,0	71,0						
I06046					16,0	71,0						
I06047					31,3	71,0						
I06048											1,3	107,1
I06048					61,2	125,0						
I06049											4,7	53,6
I06049	8,3	178,6										
I06049									23,7	107,0		
I06049					37,9	125,0						
I06050											2,0	53,6
I06050					7,0	71,0						
I06050	18,0	178,6										
I06050									34,0	107,0		
I06051									12,0	107,0		
I07043	1,0	142,9										
I07043							2,0	35,7				
I07043											8,0	7,1
I07043									23,0	71,0		
I07043					32,0	71,0						
I07044											6,0	7,1
I07044									8,0	71,0		
I07044					45,0	71,0						
I07045					22,0	71,0						
I07046					5,0	71,0						
I07047	1,0	142,9										

continua

segue

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	N leach.	% di conifere	N leach.	% di foresta decidua	N leach.	% di foresta med.	N leach.	% di prateria	N leach.	% di tundra	N leach.
I07047					3,0	71,0						
I07048					3,0	71,0						
I07049	8,2	214,3										
I07049									13,3	107,0		
I07049											17,4	53,6
I07049					26,6	71,0						
I07050											4,0	53,6
I07050					14,0	71,0						
I07050	26,0	142,9										
I07050									28,0	71,0		
I07051											5,0	7,1
I07051	26,0	142,9										
I07051									30	71,0		
I07052									43,0	71,0		
I07052	47,0	142,9										
I07053									37,0	71,0		
I07053	49,0	142,9										
I08043			4,0	71,4								
I08043							6,0	35,7				
I08043					41,0	71,0						
I08044											1,0	7,1
I08044			5,0	71,4								
I08044							6,0	35,7				
I08044					58,0	71,0						
I08045							3,0	35,7				
I08045			6,0	71,4								
I08045					60	71,0						
I08046					55,0	71,0						
I08047					17,0	71,0						
I08048					2,0	71,0						
I08049	2,1	142,9										
I08049									3,2	71,0		
I08049											4,3	7,1
I08049					28,7	71,0						
I08050											12,0	7,1
I08050	14,0	178,6										
I08050									18,0	107,0		
I08050					39,0	71,0						
I08051											3,0	7,1
I08051									18,0	71,0		
I08051					22,0	71,0						
I08051	39,0	142,9										
I08052											1,0	7,1

continua

segue

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	N leach.	% di conifere	N leach.	% di foresta decidua	N leach.	% di foresta mediterranea	N leach.	% di prateria	N leach.	% di tundra	N leach.
I08052									10	71,0		
I08052					15,0	71,0						
I08052	61,0	142,9										
I08053											7,0	7,1
I08053									17,0	71,0		
I08053	74,0	142,9										
I08054									44,0	71,0		
I08054	50	142,9										
I09046			4,0	71,4								
I09046					75,0	125,0						
I09047					53,0	71,0						
I09048					6,0	71,0						
I09049					1,1	71,0						
I09050											12,8	7,1
I09050									16,7	71,0		
I09050					51,4	71,0						
I09051											5,0	7,1
I09051	7,0	142,9										
I09051									8,0	71,0		
I09051					65,0	71,0						
I09052											12,0	7,1
I09052									14,0	107,0		
I09052					23,0	71,0						
I09052	43,0	142,9										
I09053									6,0	71,0		
I09053					12,0	71,0						
I09053											21,0	7,1
I09053	57,0	142,9										
I09054					14,0	71,0						
I09054									24,0	71,0		
I09054	62,0	142,9										
I10046							3,0	35,7				
I10046			7,0	71,4								
I10046					46,0	71,0						
I10047					68,0	71,0						
I10048					12,0	71,0						
I10049					1,0	71,0						
I10050					12,0	71,0						
I10051									1,0	71,0		
I10051					11,0	71,0						
I10052									2,0	107,0		
I10052					40	71,0						
I10053									3,0	107,0		

continua

segue

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	N leach.	% di conifere	N leach.	% di foresta decidua	N leach.	% di foresta medit.	N leach.	% di prateria	N leach.	% di tundra	N leach.
I10053											7,0	53,6
I10053	19,0	178,6										
I10053					62,0	125,0						
I10054									2,0	107,0		
I10054											14,0	53,6
I10054	26,0	214,3										
I10054					54,0	125,0						
I10055	100	178,6										
I11046	1,0	285,7										
I11046							10	35,7				
I11046					38,0	71,0						
I11047					72,0	125,0						
I11048			21,0	71,4								
I11049			2,0	71,4								
I11050			4,0	71,4								
I11052					3,2	71,0						
I11053					9,0	71,0						
I11054									1,0	107,0		
I11054											7,0	107,1
I11054	19,0	250										
I11054					46,0	179,0						
I11055									1,0	107,0	7,0	107,0
I11055	34,0	214,3										
I11055					48,0	125,0						
I12044							18,0	35,7				
I12045							34,0	35,7				
I12046							8,0	35,7				
I12046					21,0	71,0						
I12047					47,0	125,0						
I12048			57,0	178,6								
I12050							1,1	35,7				
I12051							7,0	35,7				
I12053									2,6	71,0		
I12053					22,5	71,0						
I12054									5,0	71,0		
I12054					46,0	71,0						
I13037							100	35,7				
I13038									35,0	71,0		
I13038							64,0	35,7				
I13039							100	35,7				
I13043							50	35,7				
I13044					8,0	71,0						
I13044							41,0	35,7				

continua

segue

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	N leach.	% di conifere	N leach.	% di foresta decidua	N leach.	% di foresta mediterranea	N leach.	% di prateria	N leach.	% di tundra	N leach.
I13045					13,0	71,0						
I13045							43,0	35,7				
I13046							8,0	35,7				
I13046					41,0	71,0						
I13047							1,0	35,7				
I13047					43,0	71,0						
I13048			72,0	125,0								
I13049			5,0	71,4								
I13050			40	71,4								
I13053									26,0	71,0		
I13053					42,0	71,0						
I13054					35,0	71,0						
I13054									60	71,0		
I14037									32,0	71,0		
I14037							57,0	35,7				
I14038					3,0	71,0						
I14038							21,0	35,7				
I14038									65,0	71,0		
I14039					1,0	71,0						
I14039							25,0	35,7				
I14039									64,0	71,0		
I14040					4,0	71,0						
I14040							35,0	35,7				
I14040									53,0	71,0		
I14043							100	35,7				
I14044							24,0	35,7				
I14045					15,0	71,0						
I14045							19,0	35,7				
I14046							2,0	35,7				
I14046					38,0	71,0						
I14047					37,0	71,0						
I14048					56,0	71,0						
I14049					30,3	71,0						
I15036							15,2	35,7				
I15036									42,7	71,0		
I15037					1,0	71,0						
I15037							10,2	35,7				
I15037									54,3	71,0		
I15038					1,0	71,0						
I15038							27,0	35,7				
I15038									58,0	71,0		
I15039									36,0	71,0		
I15039							55,0	35,7				

continua

segue

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	N leach.	% di conifere	N leach.	% di foresta decidua	N leach.	% di foresta mediterranea	N leach.	% di prateria	N leach.	% di tundra	N leach.
I15040							37,0	35,7				
I15040									48,0	71,0		
I15044							37,0	35,7				
I15045									1,0	71,0		
I15045					14,0	71,0	14,0	35,7				
I15046					36,5	71,0						
I15047							2,3	35,7				
I15047					33,0	71,0						
I15048							1,0	35,7				
I15048					48,0	71,0						
I15049					16,0	71,0						
I16035					2,0	71,0						
I16035									36,0	71,0		
I16035							43,0	35,7				
I16036					2,0	71,0						
I16036							22,0	35,7				
I16036									25,0	71,0		
I16037					5,0	71,0						
I16037							20	35,7				
I16037									63,0	71,0		
I16038					1,0	71,0						
I16038									25,0	71,0		
I16038							51,0	35,7				
I16039					2,0	71,0						
I16039							23,0	35,7				
I16039									54,0	71,0		
I16040									37,0	71,0		
I16040							63,0	35,7				
I16045							6,0	35,7				
I16045									10	71,0		
I16045					28,0	71,0						
I16046							8,2	35,7				
I16046					16,4	71,0						
I16047							8,0	35,7				
I16047					33,0	71,0						
I16048											1,0	7,1
I16048							2,0	35,7				
I16048					70	71,0						
I16049					10	71,0						
I16050							15,0	35,7				
I17035							25,0	35,7				
I17035									50	71,0		
I17036					3,2	71,0						

continua

segue

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	N leach.	% di conifere	N leach.	% di foresta decidua	N leach.	% di foresta mediterranea	N leach.	% di prateria	N leach.	% di tundra	N leach.
I17036									23,1	71,0		
I17036							24,2	35,7				
I17037					6,0	71,0						
I17037							28,0	35,7				
I17037									53,0	71,0		
I17038									28,0	71,0		
I17038							41,0	35,7				
I17045					6,4	71,0	6,4	35,7				
I17046							7,0	35,7				
I17046					12,0	71,0						
I17047									1,0	71,0		
I17047											2,0	7,1
I17047							5,0	35,7				
I17047					62,0	71,0						
I17048											4,0	7,1
I17048					54,0	71,0						
I17049					6,0	71,0						
I18036									39,0	71,0		
I18036							57,0	35,7				
I18037					1,0	71,0						
I18037							20	35,7				
I18037									31,0	71,0		
I18045									3,0	71,0		
I18045					7,0	71,0						
I18045							13,0	35,7				
I18046										71,0	1,0	7,1
I18046							2,0	35,7				
I18046					31,0	71,0						
I18047											6,0	7,1
I18047					30	71,0						
I18048							1,0	35,7				
I18048											5,0	7,1
I18048					12,0	71,0						
I18049					5,0	71,0						
I19044							100	35,7				
I19045					5,0	71,0						
I19045									7,0	71,0		
I19045							13,0	35,7				
I19046											1,0	53,6
I19046									6,0	71,0		
I19046							11,0	35,7				
I19046					19,0	71,0						
I19047							1,0	35,7				

continua

segue

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	N leach.	% di conifere	N leach.	% di foresta decidua	N leach.	% di foresta med.	N leach.	% di prateria	N leach.	% di tundra	N leach.
I19047											7,0	7,1
I19047					36,0	71,0						
I19048	1,0	142,9						35,7				
I19048											4,0	7,1
I19048					19,0	71,0						
I19049					2,0	71,0						
I19049							8,0	35,7				
I20044							100	35,7				
I20045									3,0	71,0		
I20045							28,0	35,7				
I20046									10	71,0		
I20046					12,0	71,0						
I20046							13,0	35,7				
I20047											3,0	53,6
I20047							4,0	44,6				
I20047					33,0	71,0						
I20048					23,0	71,0						
I21045					6,0	71,0						
I21045							30	35,7				
I21046							2,0	35,7				
I21046					4,0	71,0						
I21047											1,0	107,1
I21047					31,0	71,0						
I21048					15,0	71,0						
I21049					2,2	71,0			2,2	71,0		
I21049							3,3	35,7				
I21050							56,2	35,7				
I22045							100	35,7				
I22046							4,0	35,7				
I22046					27,0	71,0						
I22047					19,0	71,0						
I22048					7,0	71,0						
I22049				71,4			1,0	35,7				
I22049					3,0	71,0						
I22049									17,0	71,0		
I22050			11,9	71,4								
I22050					14,1	71,0						
I22050									18,4	71,0		
I22050							19,5	35,7				
I23046							8,0	35,7				
I23046					13,0	71,0						
I23047					32,0	71,0						
I23048					16,0	71,0						

continua

segue

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	N leach.	% di conifere	N leach.	% di foresta decidua	N leach.	% di foresta medit.	N leach.	% di prateria	N leach.	% di tundra	N leach.
I23049					1,0	71,0						
I24038							1,0	35,7				
I24038									10	71,0		
I24039							1,0	35,7				
I24039									44,0	71,0		
I24041									18,0	71,0		
I24046					12,0	71,0						
I24046							32,0	35,7				
I24047							2,0	35,7				
I24047					28,0	71,0						
I24048					19,0	71,0						
I24049	4,0	142,9				71,0						
I25038					2,0	71,0						
I25038									4,0	71,0		
I25039									10	71,0		
I25040									28,0	71,0		
I25046									14,0	71,0		
I25046					16,0	71,0						
I25046							20	35,7				
I25047							4,0	44,6				
I25047									8,0	71,0		
I25047					35,0	71,0						
I25048							4,0	35,7				
I25048					17,0	71,0						
I25048	19,0	142,9										
I25049	1,0	142,9				71,0						
I25049							7,0	35,7				
I25050	1,0	142,9			1,0	71,0						
I25050							8,0	35,7				
I26035									6,0	71,0		
I26035							21,0	35,7				
I26038									5,0	71,0		
I26039					3,0	71,0				71,0		
I26040							2,0	35,7				
I26040					3,0	71,0						
I26040									8,0	71,0		
I26041							12,0	35,7				
I26041					21,0	71,0						
I26042									71,0	71,0		
I26043									100	71,0		
I26046									8,0	71,0		
I26046					51,0	71,0						
I26047							1,0	35,7				

continua

segue

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	N leach.	% di conifere	N leach.	% di foresta decidua	N leach.	% di foresta medit.	N leach.	% di prateria	N leach.	% di tundra	N leach.
I26047									5,0	71,0		
I26047					32,0	71,0						
I26048							3,0	35,7				
I26048					8,0	71,0						
I26048									15,0	71,0		
I26049					1,0	71,0						
I26049							17,0	35,7				
I26050							7,0	35,7				
I27038									5,0	71,0		
I27039					3,0	71,0						
I27039									6,0	71,0		
I27040							2,0	35,7				
I27040									4,0	71,0		
I27040					7,0	71,0						
I27041									1,0	71,0		
I27041							11,0	35,7				
I27041					21,0	71,0						
I27042					1,0	71,0						
I27042							8,0	35,7				
I27042									15,0	71,0		
I27043									46,0	71,0		
I27044									50	71,0		
I27045							19,0	35,7				
I27046									5,0	107,0		
I27046			8,0	125,0								
I27046					40	71,0						
I27047							3,0	35,7	3,0	71,0		
I27047			21,0	71,4								
I27047					25,0	71,0						
I28039									6,0	71,0		
I28040					1,0	71,0						
I28040									3,0	71,0		
I28041			1,0	71,4								
I28041									5,0	71,0		
I28041					12,0	71,0						
I28042			1,0	125,0								
I28042							2,0	35,7				
I28042									7,0	71,0		
I28042					17,0	71,0						
I28043					4,0	71,0						
I28043							7,0	35,7				
I28043									8,0	71,0		
I28044					5,0	71,0						

continua

segue

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	N leach.	% di conifere	N leach.	% di foresta decidua	N leach.	% di foresta medit.	N leach.	% di prateria	N leach.	% di tundra	N leach.
I28044							8,0	35,7				
I28045					24,0	125,0						
I28046									1,0	107,0		
I28046			5,0	125,0								
I28046					38,0	71,0						
I28047							4,0	35,7				
I28047			7,0	71,4								
I28047					21,0	71,0						
I28050							2,0	35,7				
I28051							4,0	35,7				
I29034									54,0	71,0		
I29035									54,0	71,0		
I29039							2,0	35,7				
I29040							1,0	35,7				
I29040					6,0	71,0						
I29040									9,0	71,0		
I29041					4,0	71,0			4,0	71,0		
I29042					5,0	71,0						
I29043			3,0	125,0								
I29043									5,0	71,0		
I29043					13,0	71,0						
I29043							33,0	35,7				
I29044			5,0	125,0								
I29044							7,0	35,7				
I29044					42,0	125,0						
I29045							24,0	35,7				
I29045					36,0	125,0						
I29047					15,0	71,0						
I30040					7,0	71,0			7,0	71,0		

## 2.17 Quantità di azoto fissato mediante fissazione biologica

Risoluzione 50x50 km<sup>2</sup>

La quantità di azoto atmosferico fissato è stata determinata sulla base dell'umidità del clima: più secco è il clima minore sarà l'azoto fissato, viceversa più umido è il clima maggiore sarà l'azoto fissato.

Per la determinazione dell'umidità del clima si è utilizzata la "Carta della precipitazione media annua in Italia per il trentennio 1921-1950" in scala 1:1.000.000 [Ministero dei lavori pubblici - a], che individua 8 differenti classi di precipitazione media annua (vedi carta delle precipitazioni §2.4).

Sovrapponendo la "Carta della precipitazione media annua in Italia per il trentennio 1921-1950" alla "Carta della vegetazione reale d'Italia" si è individuata la quantità di precipitazione

caduta in ogni maglia su ognuno degli ecosistemi previsto dalla metodologia di stima del carico critico di azoto nutriente. Gli apporti di azoto derivanti dalla fissazione biologica sono stati attribuiti, ad ogni ecosistema, sulla base dei criteri riassunti nella tabella 2.17.1.

**Tabella 2.17.1 Apporti di azoto derivanti dalla fissazione biologica attribuiti ad ogni ecosistema (kg N ha<sup>-1</sup> anno<sup>-1</sup>)**

Precipitazioni (in mm)	Ecosistemi						
	Tundra	Foresta boreale	Conifere temperate (*)	Decidue temperate	Foresta mediterranea	Pascoli acidi	Altro (**)
(0 - 300]	0,1	2	1	1	0,5	1	9999
500	0	0	0	1	0	0,1	9999
501 - 750	0,1	0,3	0,3	1	0,07	0,15	9999
751 - 1.000	0,2	0,6	0,6	1	0,15	0,3	9999
1.001 - 1.250	0,3	0,9	0,9	1	0,2	0,4	9999
1.251 - 1500	0,4	1,2	1,2	1	0,25	0,5	9999
1.501 - 2.000	0,5	1,5	1,5	1	0,3	0,65	9999
2.001 - 2.500	0,6	1,8	1,8	1	0,4	0,8	9999
> 2.500	0,7	2	2	1	0,48	0,95	9999

Fonte: Vetrella G. (1998)

(\*) Si è stabilito che:

se il sistema è ricco di epifiti, il valore di azoto è 3

se il sistema è mediamente ricco di epifiti, il valore di azoto è 2

(\*\*)

Il valore 9999 indica che l'ecosistema "Altro" è ritenuto non sensibile all'eutrofizzazione

La quantità di azoto atmosferico fissato per ogni ecosistema presente all'interno della singola maglia EMEP 50x50 è riportata in tabella 2.17.2.

**Tabella 2.17.2: Quantità di azoto fissato mediante fissazione biologica (eq.ha<sup>-1</sup>.yr<sup>-1</sup>)**

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	N fix.	% di conifere	N fix.	% di foresta decidua	N fix.	% di foresta med.	N fix.	% di prateria	N fix.	% di tundra	N fix.
104044									3,0	11,0		
104044	39,0	42,9										
104044											58,0	14,3
104045											4,0	14,3
104045									21,0	32,0		
104046											6,0	21,4
104046									21,0	21,0		
104046	41,0	42,9										
104047											2,0	21,4
104047									18,0	29,0		
104047	38,0	64,3										
104048									20	46,0		
105043											10	21,4

continua

segue

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	N fix.	% di conifere	N fix.	% di foresta decidua	N fix.	% di foresta mediterranea	N fix.	% di prateria	N fix.	% di tundra	N fix.
I05044					13,0	71,0						
I05044									16,0	29,0		
I05044	24,0	42,9										
I05044											33,0	14,3
I05045											5,0	14,3
I05045	10	64,3										
I05045									25,0	29,0		
I05045					47,0	71,0						
I05046											3,0	14,3
I05046	13,0	42,9										
I05046									24,0	36,0		
I05046					32,0	71,0						
I05047											2,0	14,3
I05047	18,0	64,3										
I05047					34,0	71,0			34,0	44,0		
I05048											3,0	28,6
I05048	19,3	107,1										
I05048									32,5	46,0		
I05048					38,6	71,0						
I05049									6,0	46,0		
I05049	17,0	107,1										
I05049											32,0	35,7
I06043	7,0	64,3										
I06043					19,0	71,0						
I06043											21,0	21,4
I06043									38,0	29,0		
I06044	10	42,9										
I06044											12,0	21,4
I06044									15,0	29,0		
I06044					29,0	71,0						
I06045					8,0	71,0						
I06046					16,0	71,0						
I06047					31,3	71,0						
I06048											1,3	35,7
I06048					61,2	71,0						
I06049											4,7	35,7
I06049	8,3	85,7										
I06049									23,7	46,0		
I06049					37,9	71,0						
I06050											2,0	28,6
I06050					7,0	71,0						
I06050	18,0	85,7										
I06050									34,0	36,0		

continua

segue

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	N fix.	% di conifere	N fix.	% di foresta decidua	N fix.	% di foresta medit.	N fix.	% di prateria	N fix.	% di tundra	N fix.
I06051									12,0	36,0		
I07043	1,0	85,7										
I07043							2,0	10,7				
I07043											8,0	28,6
I07043									23,0	36,0		
I07043					32,0	71,0						
I07044											6,0	28,6
I07044									8,0	36,0		
I07044					45,0	71,0						
I07045					22,0	71,0						
I07046					5,0	71,0						
I07047	1,0	42,9										
I07047					3,0	71,0						
I07048					3,0	71,0						
I07049	8,2	107,1										
I07049									13,3	46,0		
I07049											17,4	35,7
I07049					26,6	71,0						
I07050											4,0	35,7
I07050					14,0	71,0						
I07050	26,0	64,3										
I07050									28,0	29,0		
I07051											5,0	21,4
I07051	26,0	42,9										
I07051									30	21,0		
I07052									43,0	21,0		
I07052	47,0	42,9										
I07053									37,0	29,0		
I07053	49,0	64,3										
I08043			4,0	42,9								
I08043							6,0	5,0				
I08043					41,0	71,0						
I08044											1,0	21,4
I08044			5,0	64,3								
I08044							6,0	10,7				
I08044					58,0	71,0						
I08045							3,0	14,3				
I08045			6,0	64,3								
I08045					60	71,0						
I08046					55,0	71,0						
I08047					17,0	71,0						
I08048					2,0	71,0						
I08049	2,1	64,3										

continua

segue

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	N fix.	% di conifere	N fix.	% di foresta decidua	N fix.	% di foresta mediterranea	N fix.	% di prateria	N fix.	% di tundra	N fix.
I08049									3,2	36,0		
I08049											4,3	28,6
I08049					28,7	71,0						
I08050											12,0	28,6
I08050	14,0	107,1										
I08050									18,0	36,0		
I08050					39,0	71,0						
I08051											3,0	21,4
I08051									18,0	29,0		
I08051					22,0	71,0						
I08051	39,0	64,3										
I08052											1,0	14,3
I08052									10	21,0		
I08052					15,0	71,0						
I08052	61,0	42,9										
I08053											7,0	14,3
I08053									17,0	21,0		
I08053	74,0	42,9										
I08054									44,0	29,0		
I08054	50	42,9										
I09046			4,0	64,3								
I09046					75,0	71,0						
I09047					53,0	71,0						
I09048					6,0	71,0						
I09049					1,1	71,0						
I09050											12,8	28,6
I09050									16,7	29,0		
I09050					51,4	71,0						
I09051											5,0	28,6
I09051	7,0	64,3										
I09051									8,0	36,0		
I09051					65,0	71,0						
I09052											12,0	21,4
I09052									14,0	29,0		
I09052					23,0	71,0						
I09052	43,0	64,3										
I09053									6,0	21,0		
I09053					12,0	71,0						
I09053											21,0	21,4
I09053	57,0	64,3										
I09054					14,0	71,0						
I09054									24,0	29,0		
I09054	62,0	64,3										

continua

segue

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	N fix.	% di conifere	N fix.	% di foresta decidua	N fix.	% di foresta medit.	N fix.	% di prateria	N fix.	% di tundra	N fix.
I10046							3,0	14,3				
I10046			7,0	85,7								
I10046					46,0	71,0						
I10047					68,0	71,0						
I10048					12,0	71,0						
I10049					1,0	71,0						
I10050					12,0	71,0						
I10051									1,0	36,0		
I10051					11,0	71,0						
I10052									2,0	46,0		
I10052					40	71,0						
I10053									3,0	46,0		
I10053											7,0	35,7
I10053	19,0	107,1										
I10053					62,0	71,0						
I10054									2,0	46,0		
I10054											14,0	35,7
I10054	26,0	107,1										
I10054					54,0	71,0						
I10055	100	85,7										
I11046	1,0	142,9										
I11046							10	14,3				
I11046					38,0	71,0						
I11047					72,0	71,0						
I11048			21,0	42,9								
I11049			2,0	21,4								
I11050			4,0	42,9								
I11052					3,2	71,0						
I11053					9,0	71,0						
I11054									1,0	46,0		
I11054											7,0	50
I11054	19,0	128,6										
I11054					46,0	71,0						
I11055									9,0	46,0	9,0	28,6
I11055	34,0	107,1										
I11055					48,0	71,0						
I12044							18,0	5,0				
I12045							34,0	10,7				
I12046							8,0	10,7				
I12046					21,0	71,0						
I12047					47,0	71,0						
I12048			57,0	64,3								
I12050							1,1	5,0				

continua

segue

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	N fix.	% di conifere	N fix.	% di foresta decidua	N fix.	% di foresta medit.	N fix.	% di prateria	N fix.	% di tundra	N fix.
I12051							7,0	5,0				
I12053									2,6	36,0		
I12053					22,5	71,0						
I12054									5,0	29,0		
I12054					46,0	71,0						
I13037							100	5,0				
I13038									35,0	11,0		
I13038							64,0	0				
I13039							100	0				
I13043							50	0				
I13044					8,0	71,0						
I13044							41,0	10,7				
I13045					13,0	71,0						
I13045							43,0	10,7				
I13046							8,0	10,7				
I13046					41,0	71,0						
I13047							1,0	10,7				
I13047					43,0	71,0						
I13048			72,0	85,7								
I13049			5,0	42,9								
I13050			40	21,4								
I13053									26,0	29,0		
I13053					42,0	71,0						
I13054					35,0	71,0						
I13054									60	29,0		
I14037									32,0	21,0		
I14037							57,0	5,0				
I14038					3,0	71,0						
I14038							21,0	10,7				
I14038									65,0	21,0		
I14039					1,0	71,0						
I14039							25,0	10,7				
I14039									64,0	21,0		
I14040					4,0	71,0						
I14040							35,0	10,7				
I14040									53,0	21,0		
I14043							100	0				
I14044							24,0	5,0				
I14045					15,0	71,0						
I14045							19,0	5,0				
I14046							2,0	14,3				
I14046					38,0	71,0						
I14047					37,0	71,0						

continua

segue

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	N fix.	% di conifere	N fix.	% di foresta decidua	N fix.	% di foresta medit.	N fix.	% di prateria	N fix.	% di tundra	N fix.
I14048					56,0	71,0						
I14049					30,3	71,0						
I15036							15,2	0				
I15036									42,7	0		
I15037					1,0	71,0						
I15037							10,2	10,7				
I15037									54,3	21,0		
I15038					1,0	71,0						
I15038							27,0	10,7				
I15038									58,0	21,0		
I15039									36,0	21,0		
I15039							55,0	10,7				
I15040							37,0	5,0				
I15040									48,0	11,0		
I15044							37,0	5,0				
I15045									1,0	21,0		
I15045					14,0	71,0	14,0	5,0				
I15046					36,5	71,0						
I15047							2,3	10,7				
I15047					33,0	71,0						
I15048							1,0	14,3				
I15048					48,0	71,0						
I15049					16,0	71,0						
I16035					2,0	71,0						
I16035									36,0	11,0		
I16035							43,0	0				
I16036					2,0	71,0						
I16036							22,0	10,7				
I16036									25,0	21,0		
I16037					5,0	71,0						
I16037							20	10,7				
I16037									63,0	11,0		
I16038					1,0	71,0						
I16038									25,0	21,0		
I16038							51,0	10,7				
I16039					2,0	71,0						
I16039							23,0	5,0				
I16039									54,0	11,0		
I16040									37,0	11,0		
I16040							63,0	5,0				
I16045							6,0	10,7				
I16045									10	21,0		
I16045					28,0	71,0						

continua

segue

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	N fix.	% di conifere	N fix.	% di foresta decidua	N fix.	% di foresta medit.	N fix.	% di prateria	N fix.	% di tundra	N fix.
I16046							8,2	14,3				
I16046					16,4	71,0						
I16047							8,0	14,3				
I16047					33,0	71,0						
I16048											1,0	28,6
I16048							2,0	14,3				
I16048					70	71,0						
I16049					10	71,0						
I16050							15,0	10,7				
I17035							25,0	5,0				
I17035									50	11,0		
I17036					3,2	71,0						
I17036									23,1	11,0		
I17036							24,2	5,0				
I17037					6,0	71,0						
I17037							28,0	10,7				
I17037									53,0	21,0		
I17038									28,0	21,0		
I17038							41,0	10,7				
I17045					6,4	71,0	6,4	10,7				
I17046							7,0	10,7				
I17046					12,0	71,0						
I17047									1,0	21,0		
I17047											2,0	28,6
I17047							5,0	17,9				
I17047					62,0	71,0						
I17048											4,0	21,4
I17048					54,0	71,0						
I17049					6,0	71,0						
I18036									39,0	11,0		
I18036							57,0	5,0				
I18037					1,0	71,0						
I18037							20	0				
I18037									31,0	0		
I18045									3,0	36,0		
I18045					7,0	71,0						
I18045							13,0	10,7				
I18046									1,0	29,0	1,0	35,7
I18046							2,0	17,9				
I18046					31,0	71,0						
I18047											6,0	21,4
I18047					30	71,0						
I18048							1,0	10,7				

continua

segue

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	N fix.	% di conifere	N fix.	% di foresta decidua	N fix.	% di foresta medit.	N fix.	% di prateria	N fix.	% di tundra	N fix.
I18048											5,0	21,4
I18048					12,0	71,0						
I18049					5,0	71,0						
I19044							100	0				
I19045					5,0	71,0						
I19045									7,0	21,0		
I19045							13,0	10,7				
I19046											1,0	35,7
I19046									6,0	36,0		
I19046							11,0	17,9				
I19046					19,0	71,0						
I19047							1,0	10,7				
I19047											7,0	21,4
I19047					36,0	71,0						
I19048	1,0	64,3					1,0	10,7				
I19048											4,0	21,4
I19048					19,0	71,0						
I19049					2,0	71,0						
I19049							8,0	5,0				
I20044							100	0				
I20045									3,0	21,0		
I20045							28,0	10,7				
I20046									10	36,0		
I20046					12,0	71,0						
I20046							13,0	17,9				
I20047	3,0											35,7
I20047							4,0	17,9				
I20047					33,0	71,0						
I20048					23,0	71,0						
I21045					6,0	71,0						
I21045							30	0				
I21046							2,0	10,7				
I21046					4,0	71,0						
I21047											1,0	42,9
I21047					31,0	71,0						
I21048					15,0	71,0						
I21049					2,2	71,0			2,2	21,0		
I21049							3,3	5,0				
I21050							56,2	5,0				
I22045							100	0				
I22046							4,0	14,3				
I22046					27,0	71,0						
I22047					19,0	71,0						

continua

segue

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	N fix.	% di conifere	N fix.	% di foresta decidua	N fix.	% di foresta medit.	N fix.	% di prateria	N fix.	% di tundra	N fix.
I22048					7,0	71,0						
I22049			1,0	42,9			1,0	10,7				
I22049					3,0	71,0						
I22049									17,0	21,0		
I22050			11,9	42,9								
I22050					14,1	71,0						
I22050									18,4	21,0		
I22050							19,5	5,0				
I23046							8,0	14,3				
I23046					13,0	71,0						
I23047					32,0	71,0						
I23048					16,0	71,0						
I23049					1,0	71,0						
I24038							1,0	0				
I24038									10	0		
I24039							1,0	5,0				
I24039									44,0	11,0		
I24041									18,0	0		
I24046					12,0	71,0						
I24046							32,0	17,9				
I24047							2,0	17,9				
I24047					28,0	71,0						
I24048					19,0	71,0						
I24049	4,0	21,4			4,0	71,0						
I25038					2,0	71,0						
I25038									4,0	11,0		
I25039									10	21,0		
I25040									28,0	21,0		
I25046									14,0	46,0		
I25046					16,0	71,0						
I25046							20	17,9				
I25047							4,0	21,4				
I25047									8,0	36,0		
I25047					35,0	71,0						
I25048							4,0	5,0				
I25048					17,0	71,0						
I25048	19,0	21,4										
I25049	1,0	21,4			1,0	71,0						
I25049							7,0	5,0				
I25050	1,0	21,4			1,0	71,0						
I25050							8,0	5,0				
I26035									6,0	0		
I26035							21,0	0				

continua

segue

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	N fix.	% di conifere	N fix.	% di foresta decidua	N fix.	% di foresta mediterranea	N fix.	% di prateria	N fix.	% di tundra	N fix.
I26038									5,0	11,0		
I26039					3,0	71,0			3,0	21,0		
I26040							2,0	10,7				
I26040					3,0	71,0						
I26040									8,0	11,0		
I26041							12,0	5,0				
I26041					21,0	71,0						
I26042									71,0	0		
I26043									100	0		
I26046									8,0	36,0		
I26046					51,0	71,0						
I26047							1,0	14,3				
I26047									5,0	46,0		
I26047					32,0	71,0						
I26048							3,0	10,7				
I26048					8,0	71,0						
I26048									15,0	21,0		
I26049					1,0	71,0						
I26049							17,0	0				
I26050							7,0	10,7				
I27038									5,0	11,0		
I27039					3,0	71,0						
I27039									6,0	11,0		
I27040							2,0	14,3				
I27040									4,0	11,0		
I27040					7,0	71,0						
I27041									1,0	21,0		
I27041							11,0	10,7				
I27041					21,0	71,0						
I27042					1,0	71,0						
I27042							8,0	10,7				
I27042									15,0	29,0		
I27043									46,0	0		
I27044									50	0		
I27045							19,0	10,7				
I27046									5,0	46,0		
I27046			8,0	85,7								
I27046					40	71,0						
I27047							3,0	14,3	3,0	36,0		
I27047			21,0	85,7								
I27047					25,0	71,0						
I28039									6,0	0		
I28040					1,0	71,0						

continua

segue

Celle	Foresta boreale		Conifere temperate		Decidue temperate		Foresta mediterranea		Praterie acidofile		Tundra	
	% di foresta boreale	N fix.	% di conifere	N fix.	% di foresta decidua	N fix.	% di foresta medit.	N fix.	% di prateria	N fix.	% di tundra	N fix.
I28040									3,0	11,0		
I28041			1,0	64,3								
I28041									5,0	11,0		
I28041					12,0	71,0						
I28042			1,0	85,7								
I28042							2,0	10,7				
I28042									7,0	29,0		
I28042					17,0	71,0						
I28043					4,0	71,0						
I28043							7,0	14,3				
I28043									8,0	29,0		
I28044					5,0	71,0						
I28044							8,0	10,7				
I28045					24,0	71,0						
I28046									1,0	36,0		
I28046			5,0	107,1								
I28046					38,0	71,0						
I28047							4,0	14,3				
I28047			7,0	85,7								
I28047					21,0	71,0						
I28050							2,0	10,7				
I28051							4,0	5,0				
I29034									54,0	0		
I29035									54,0	0		
I29039							2,0	5,0				
I29040							1,0	5,0				
I29040					6,0	71,0						
I29040									9,0	11,0		
I29041					4,0	71,0			4,0	11,0		
I29042					5,0	71,0						
I29043			3,0	107,1								
I29043									5,0	29,0		
I29043					13,0	71,0						
I29043							33,0	14,3				
I29044			5,0	107,1								
I29044							7,0	17,9				
I29044					42,0	71,0						
I29045							24,0	14,3				
I29045					36,0	71,0						
I29047					15,0	71,0						
I30040					7,0	71,0			7,0	11,0		