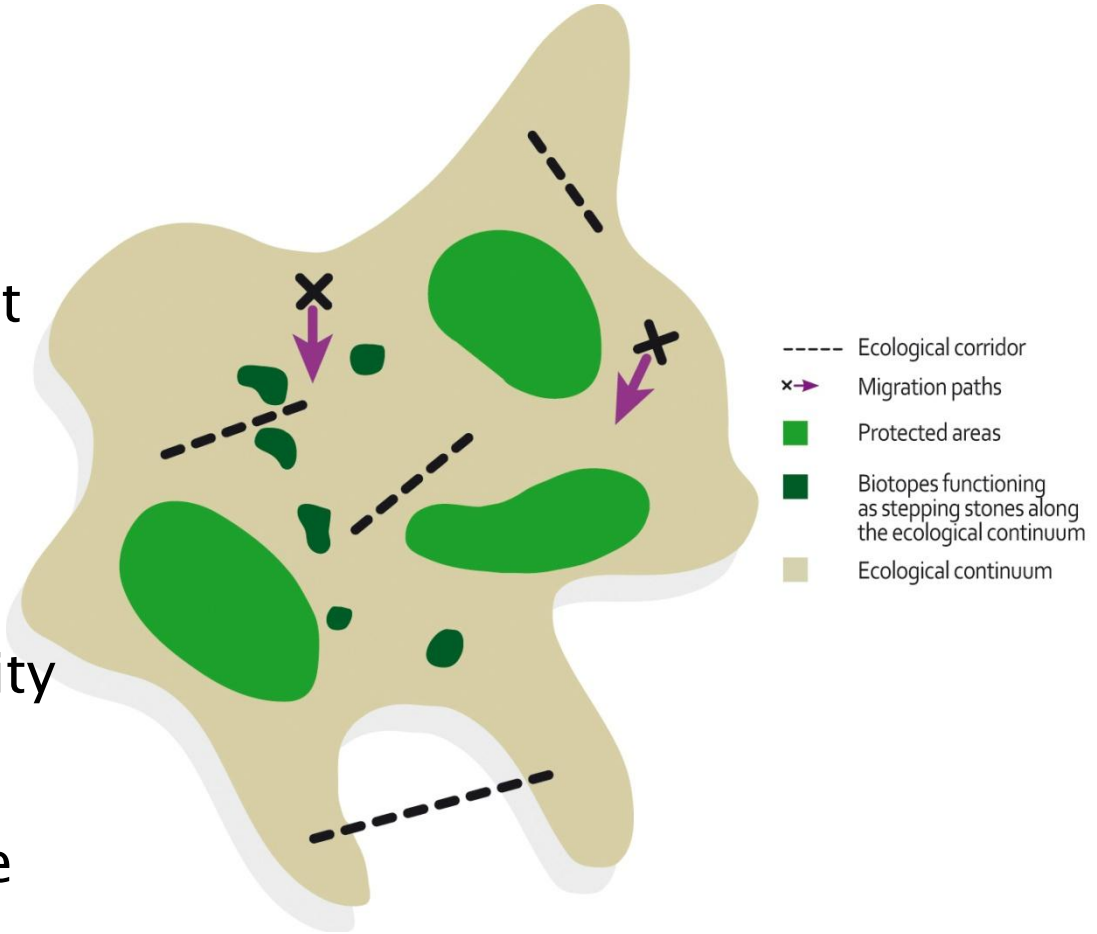
Functional characteristics of riparian vegetation along the Pcinja River in North Macedonia

Cvetanka Cvetkoska
Faculty of Natural Sciences and Mathematics – Skopje

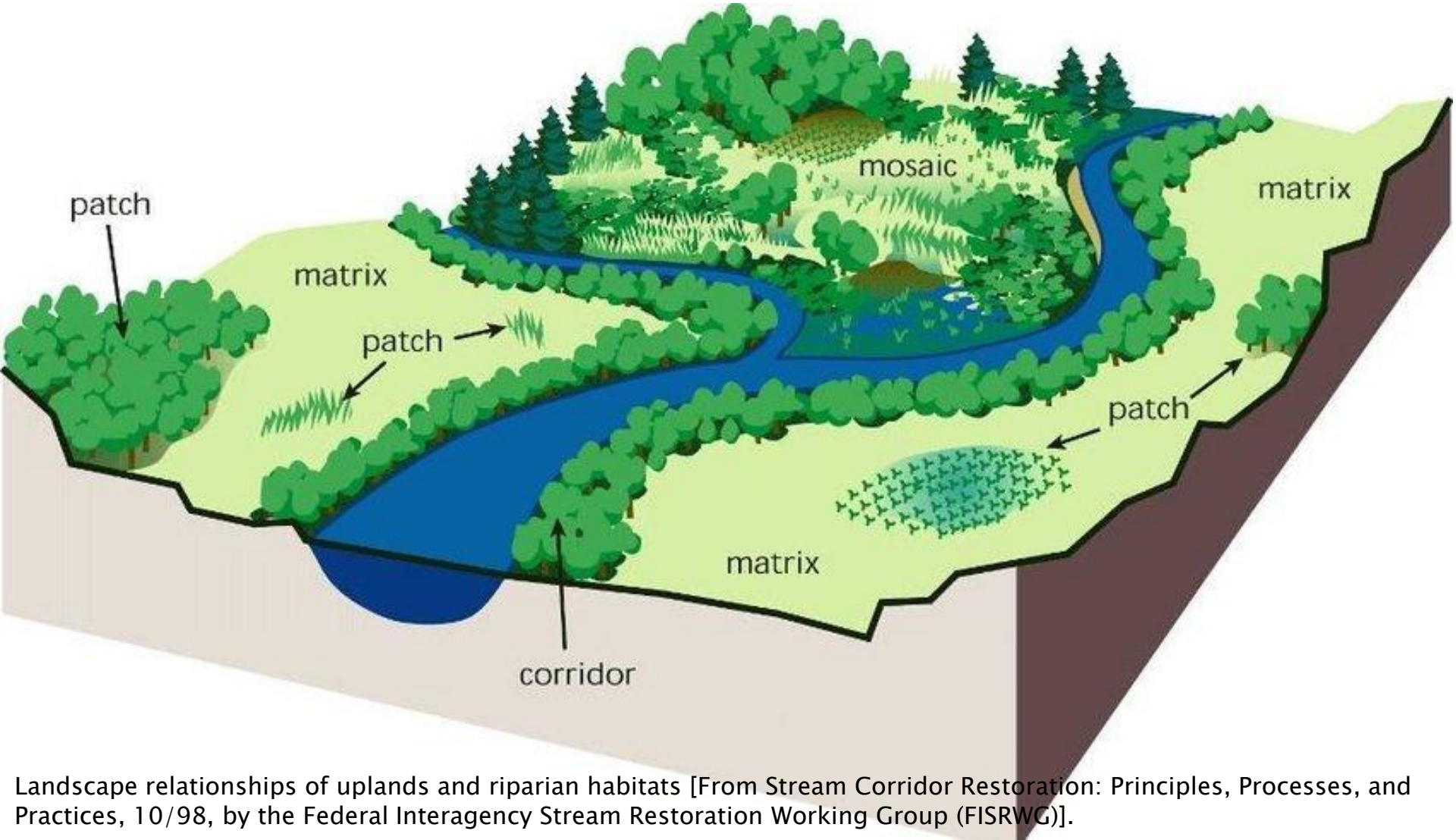
1. Introduction

- **Ecological network**
  - system of sustainably managed core areas of populations of significant species, interconnected with corridors that allow organisms to migrate easily from one core to another
  - genetic linkage and vitality of the population
  - a relatively new model, effective, sustainable use of nature



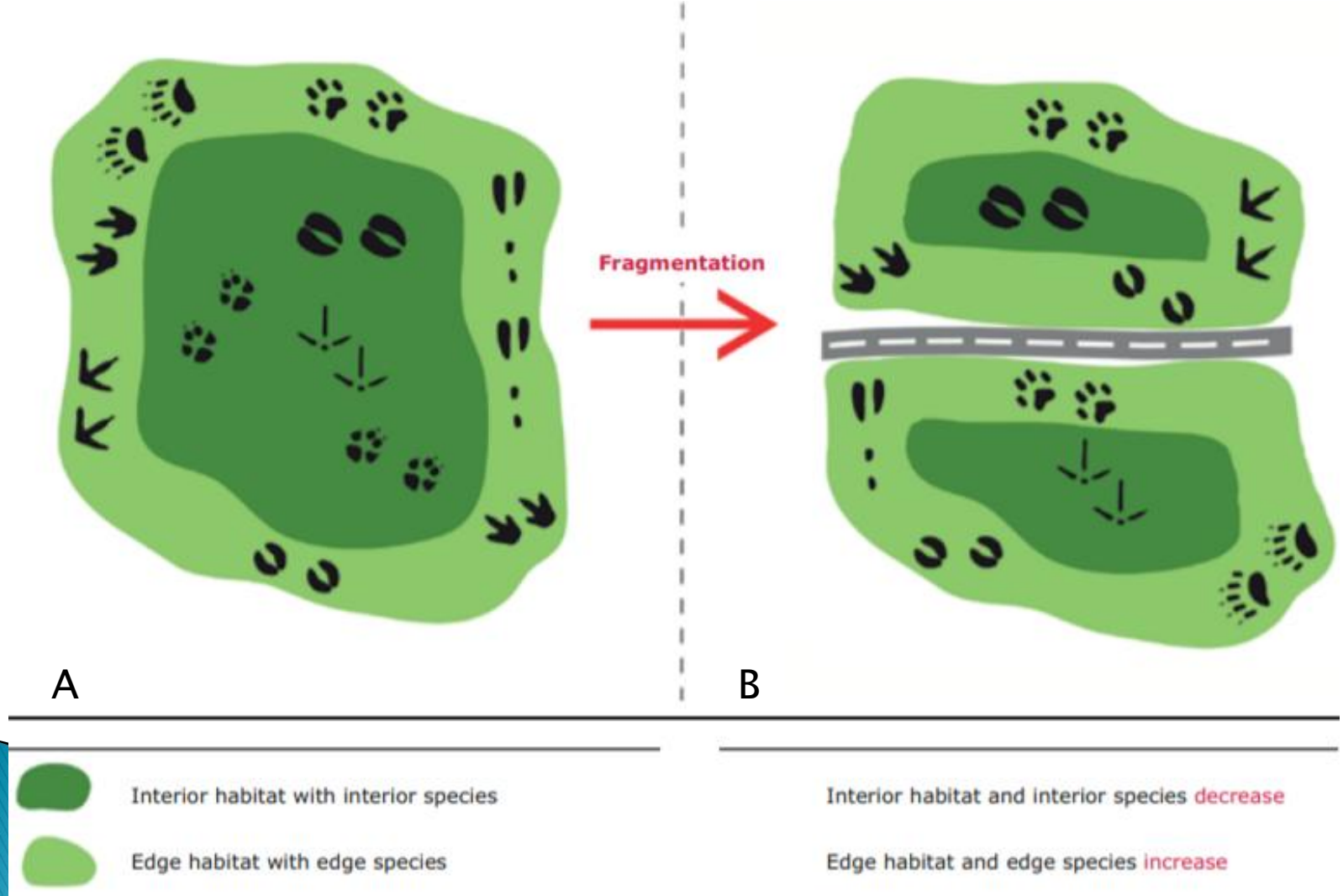
Riparian corridor

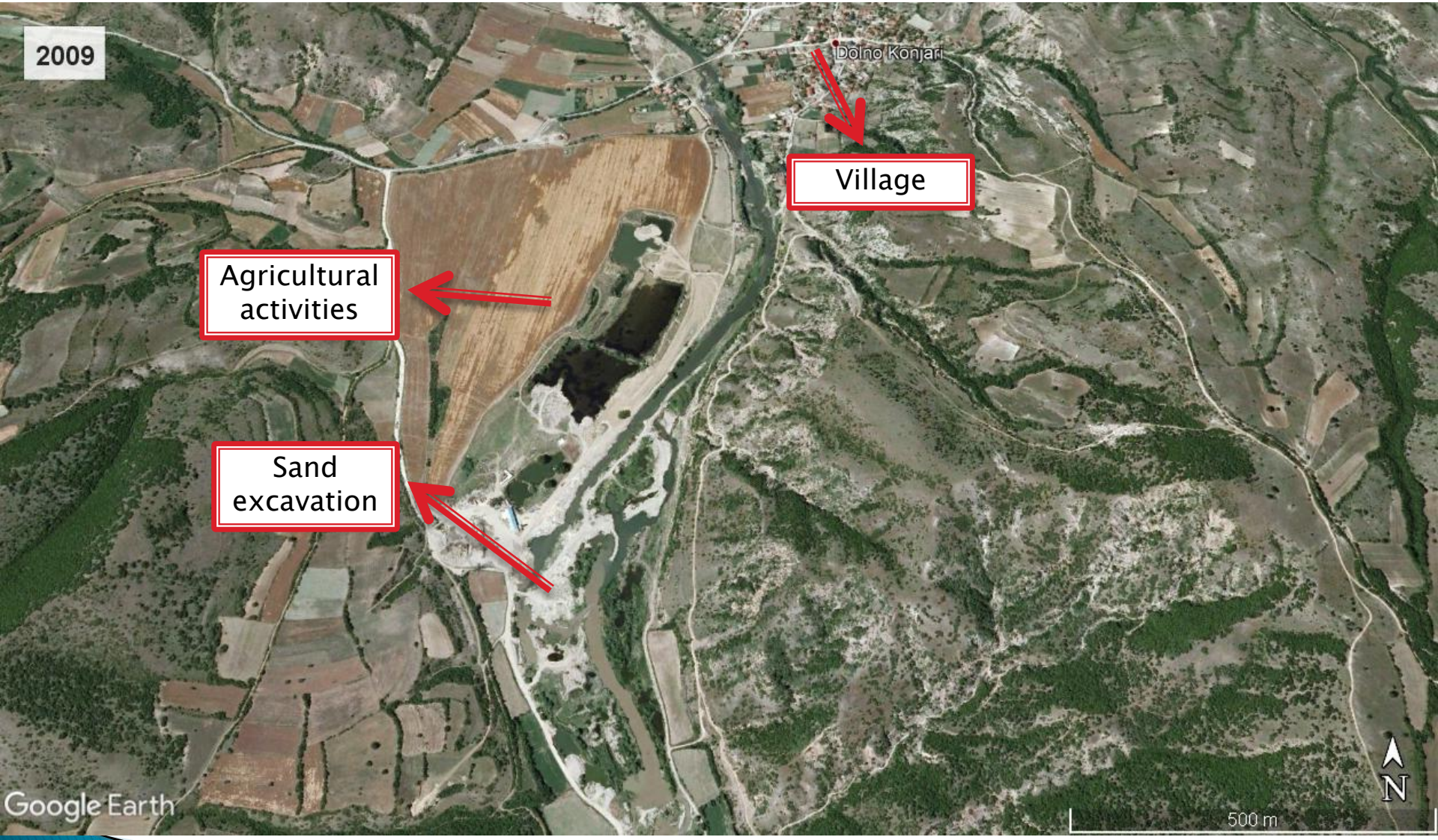
- a very important biological corridor
- an unusually diverse mosaic of landscape forms, communities and environments.



Landscape relationships of uplands and riparian habitats [From Stream Corridor Restoration: Principles, Processes, and Practices, 10/98, by the Federal Interagency Stream Restoration Working Group (FISRWG)].

- **Fragmentation of landscapes**
  - direct human impact – cutting of forests, transformation into agricultural land and/or construction of infrastructure.




2009
Donо Konjari
Village
Agricultural activities
Sand excavation
Google Earth
500 m
N


2020
Dolno Konjari
Google Earth
500 m
N

Connectivity)

- Structural
- Functional

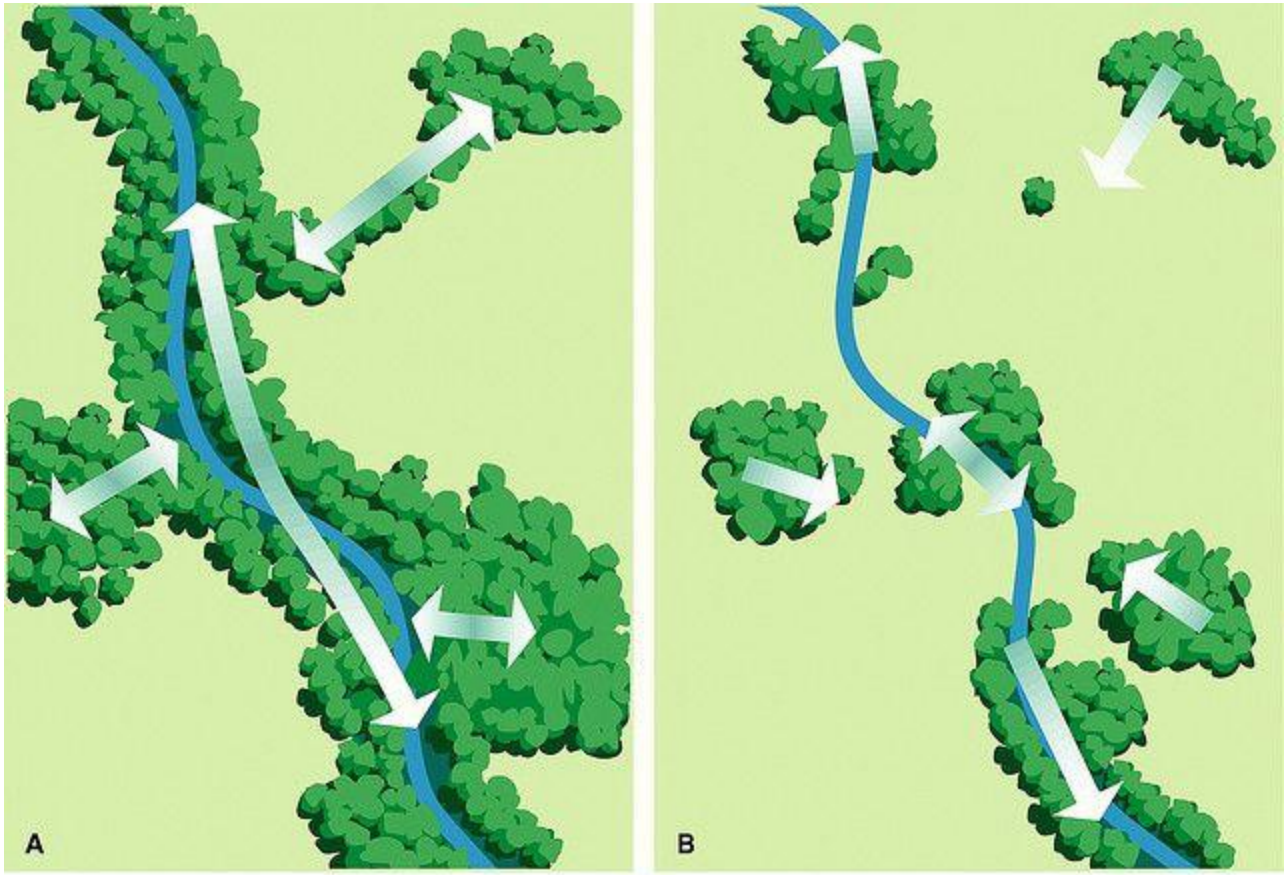
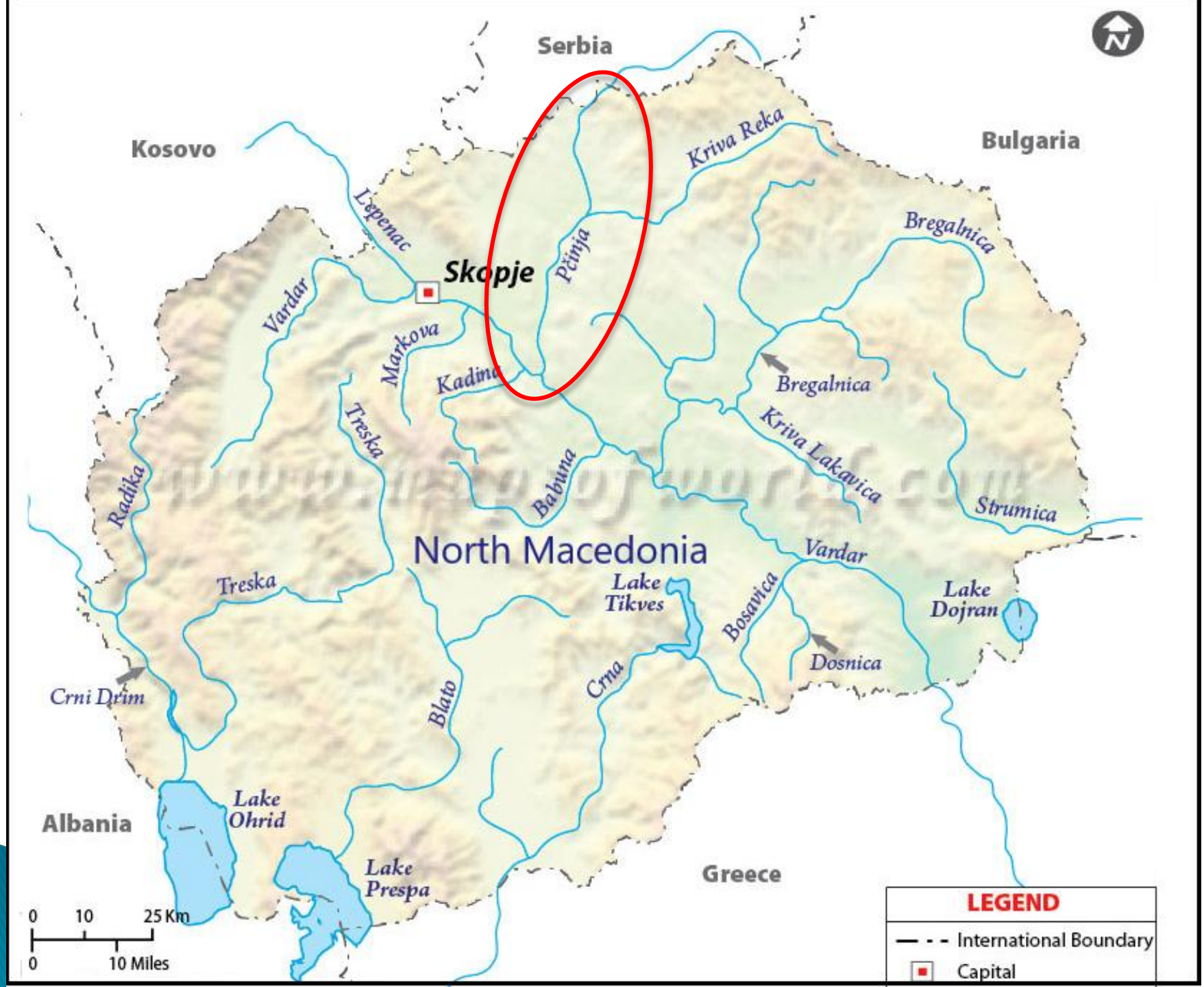


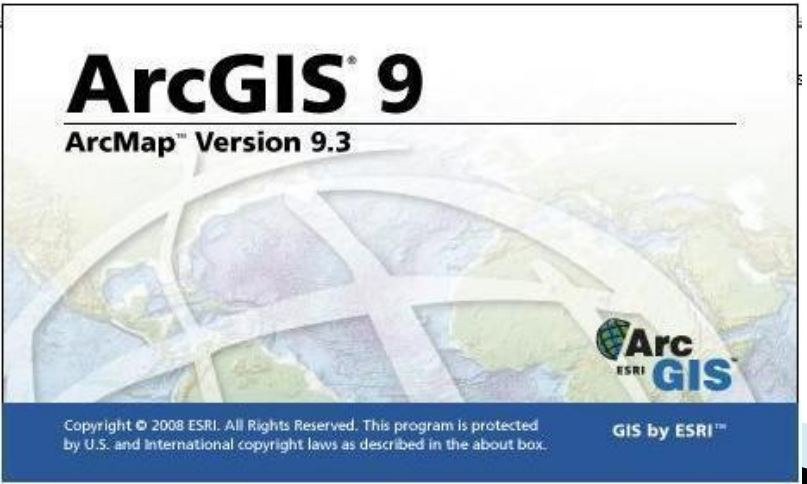
Fig. 2.38 – Landscapes with (A) high and (B) low degrees of connectivity. A connected landscape structure generally has higher levels of functions than a fragmented landscape.
In Stream Corridor Restoration: Principles, Processes, and Practices (10/98)
by the Federal Interagency Stream Restoration Working Group (FISRWG) (15 Federal agencies of the U.S.)

- In the Republic of North Macedonia, riparian habitats are only explored in terms of vegetation composition. There is very little data on the functional properties of riparian vegetation.

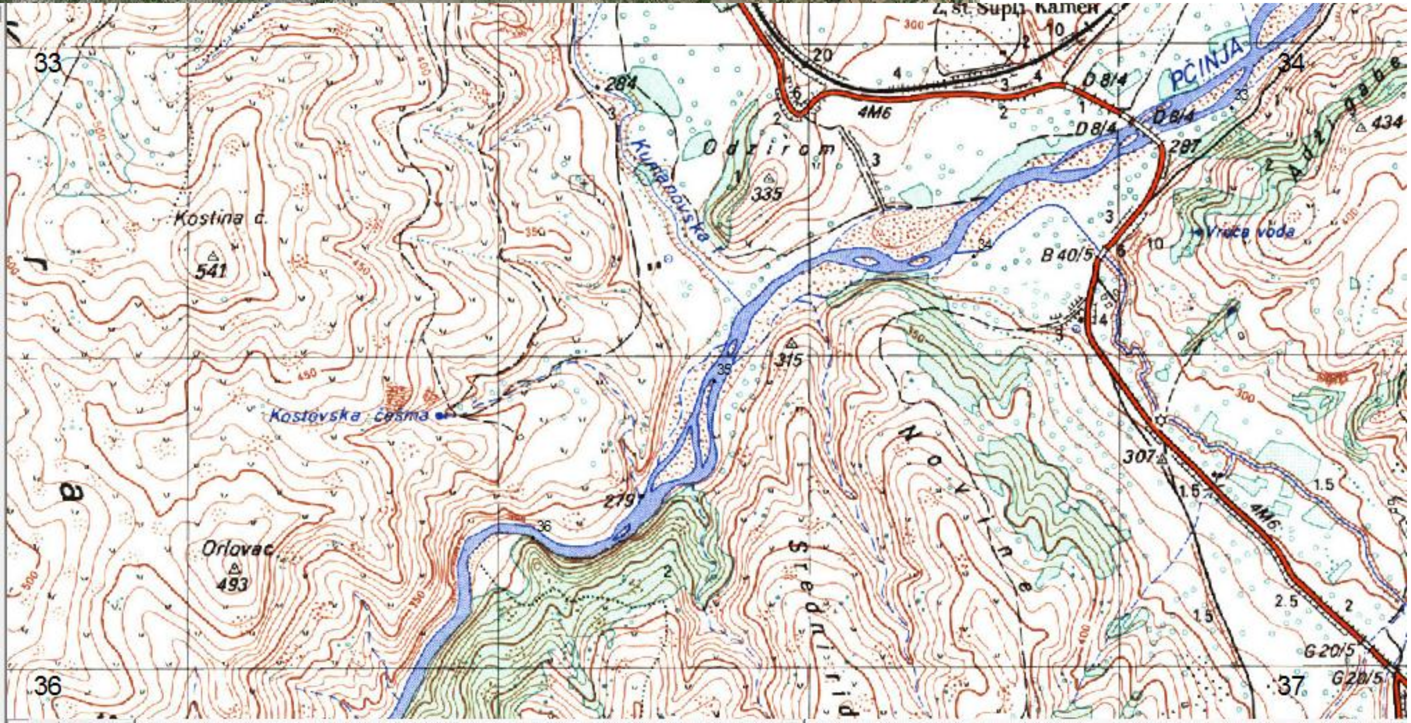

Serbia
Kosovo
Bulgaria
Albania
Greece
North Macedonia
Skopje
Lepenac
Vardar
Markova
Kadina
Treska
Babuna
Radika
Pčinja
Kriva Reka
Bregalnica
Kriva Lakavica
Strumica
Lake Tikves
Bosavica
Lake Dojran
Dosnica
Crni Drim
Blato
Crna
Lake Ohrid
Lake Prespa
0 10 25 Km
0 10 Miles
LEGEND
International Boundary
Capital

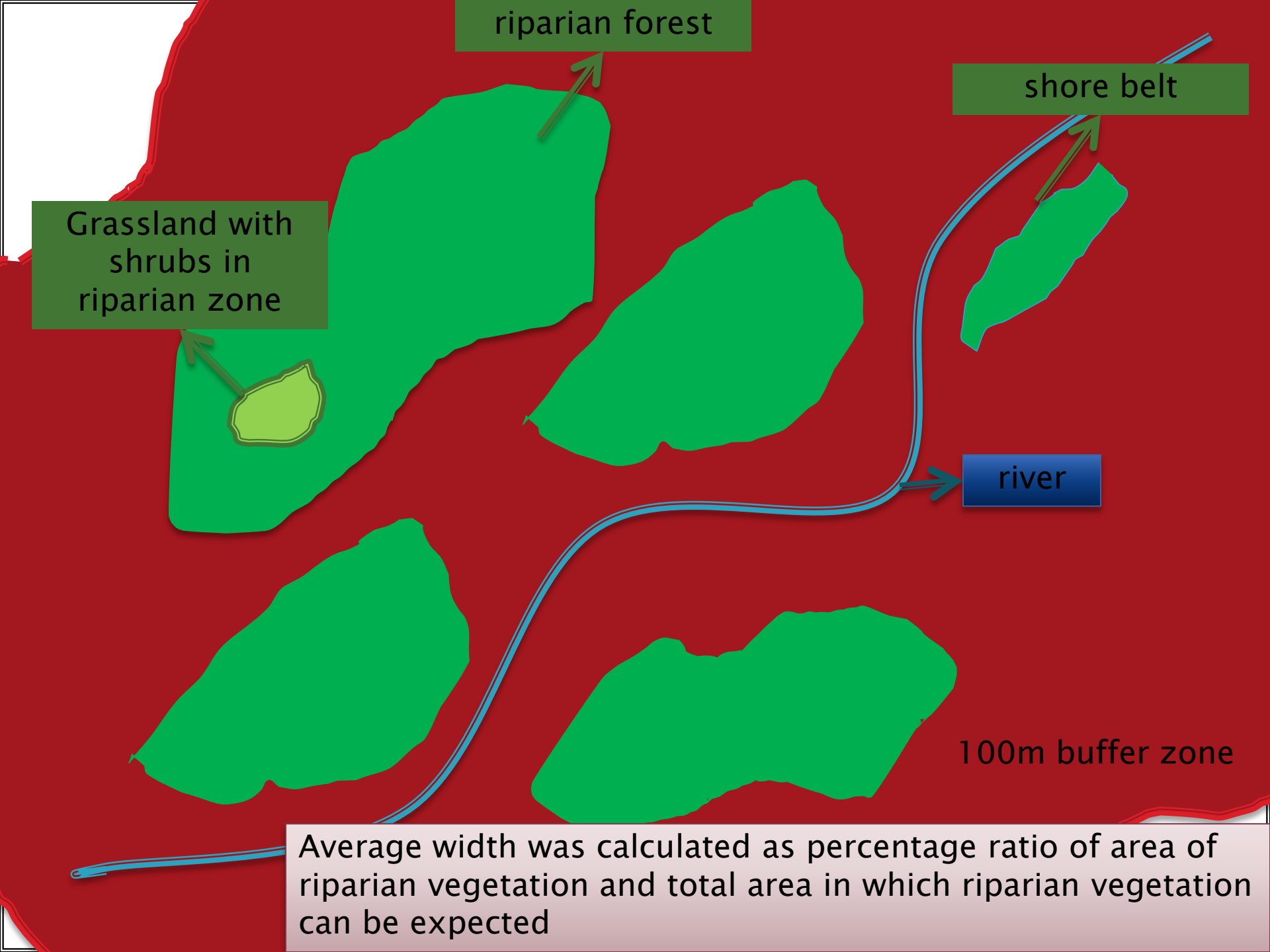
3. Methodology

- Topographic maps (1: 25000)
- Google Earth (2010-2013)
- UTM / WGS 84 zone 34 N
- Arc GIS 9.3
- Field work investigation

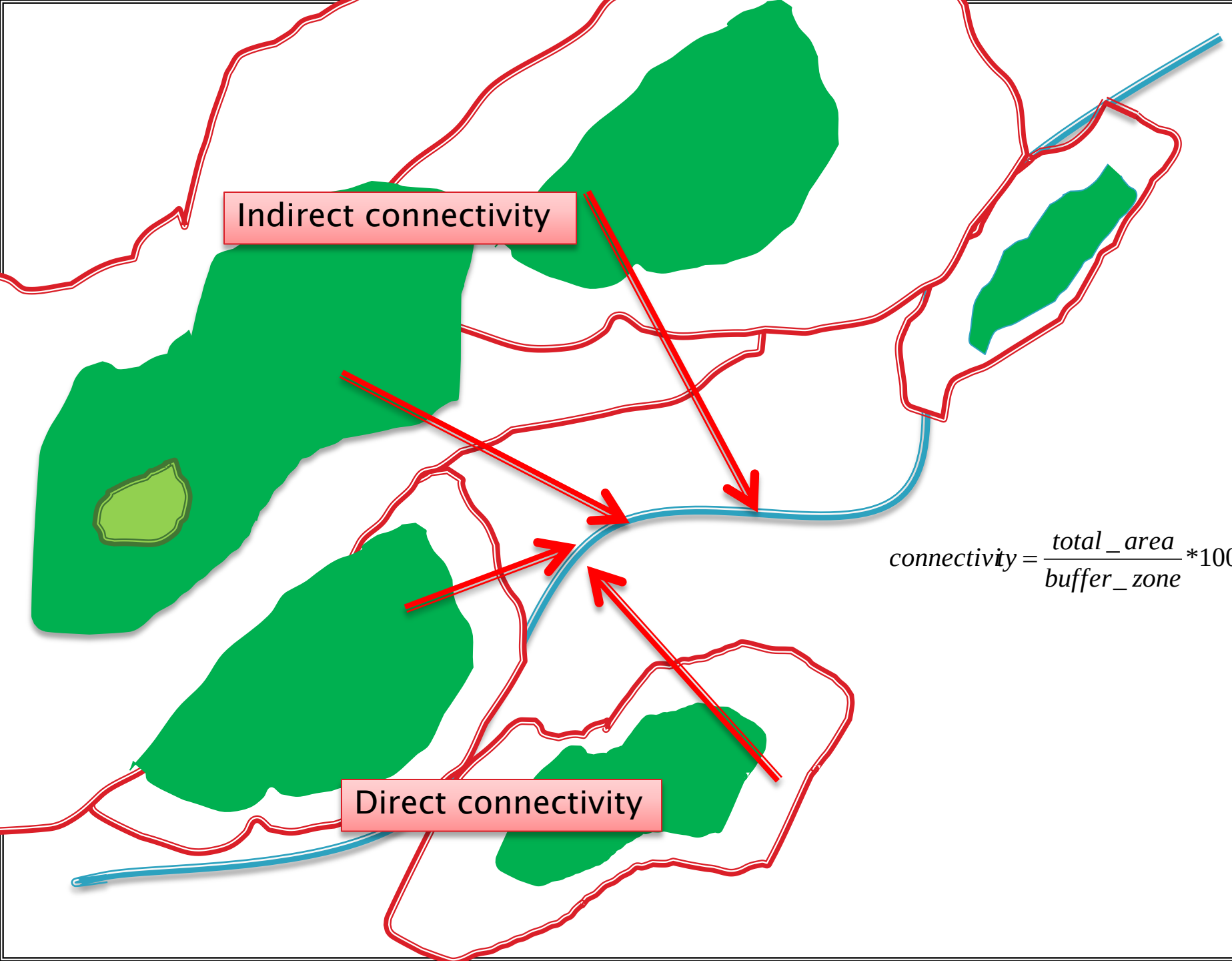



33
34
36
37


33
34
36
37
PČINJA
Kostina c.
541
Orlovac
493
Kostovska česma
Odzirom
335
315
279
284
287
307
434
Vruća voda
4M6
D 8/4
B 40/5
G 20/5
Novine



Average width was calculated as percentage ratio of area of riparian vegetation and total area in which riparian vegetation can be expected

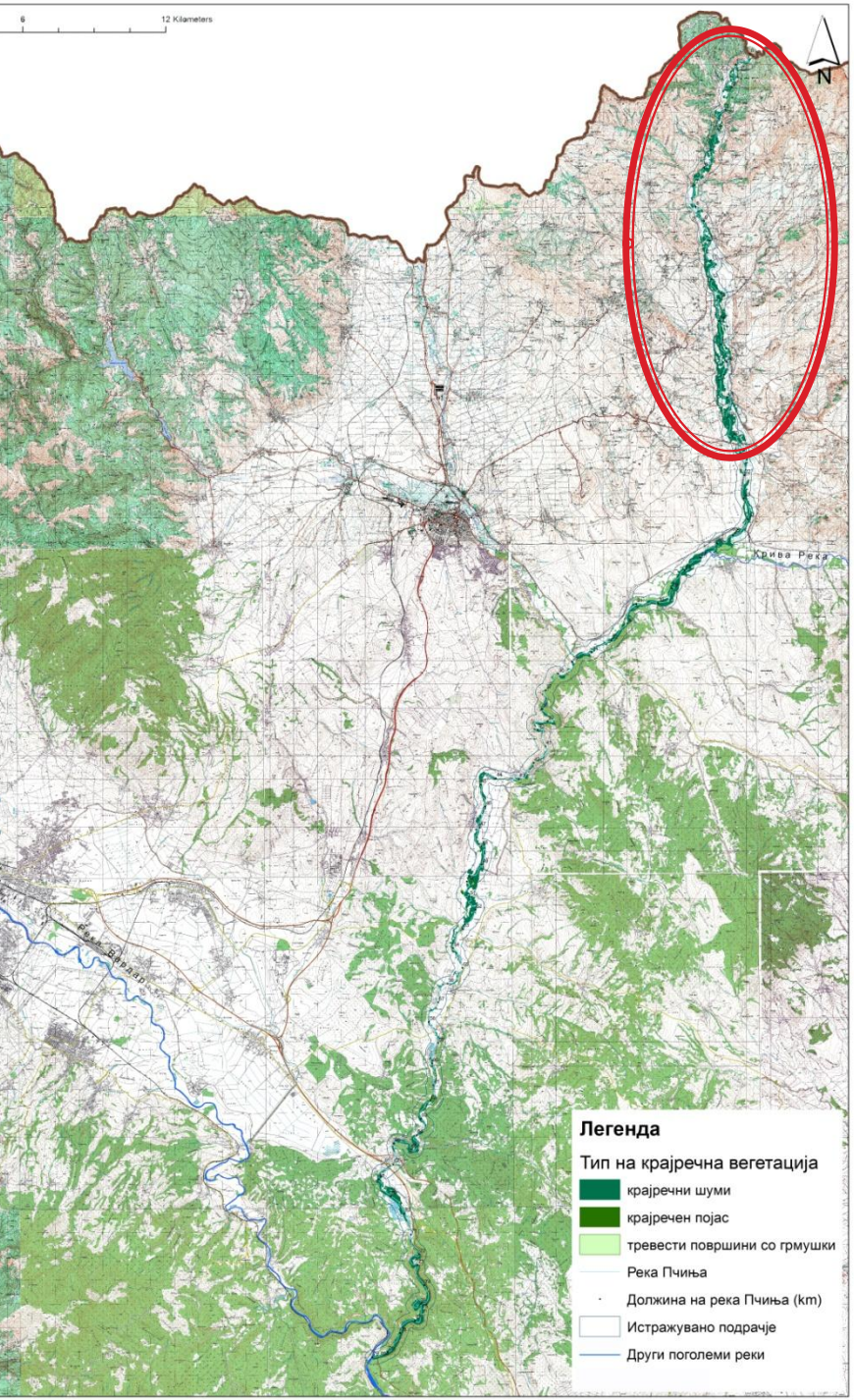


$$connectivity = \frac{total\_area}{buffer\_zone} * 100$$

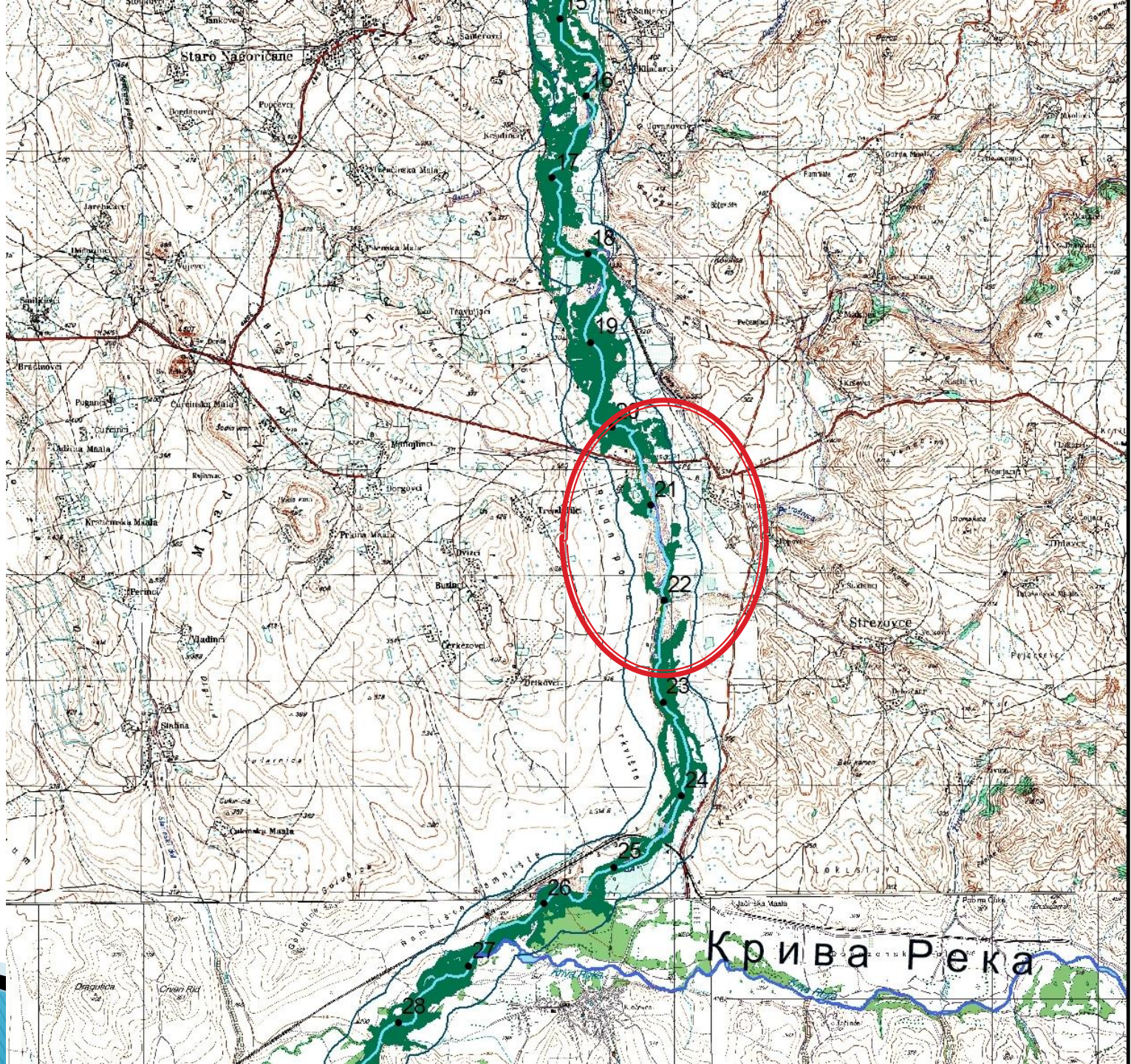
4. Results

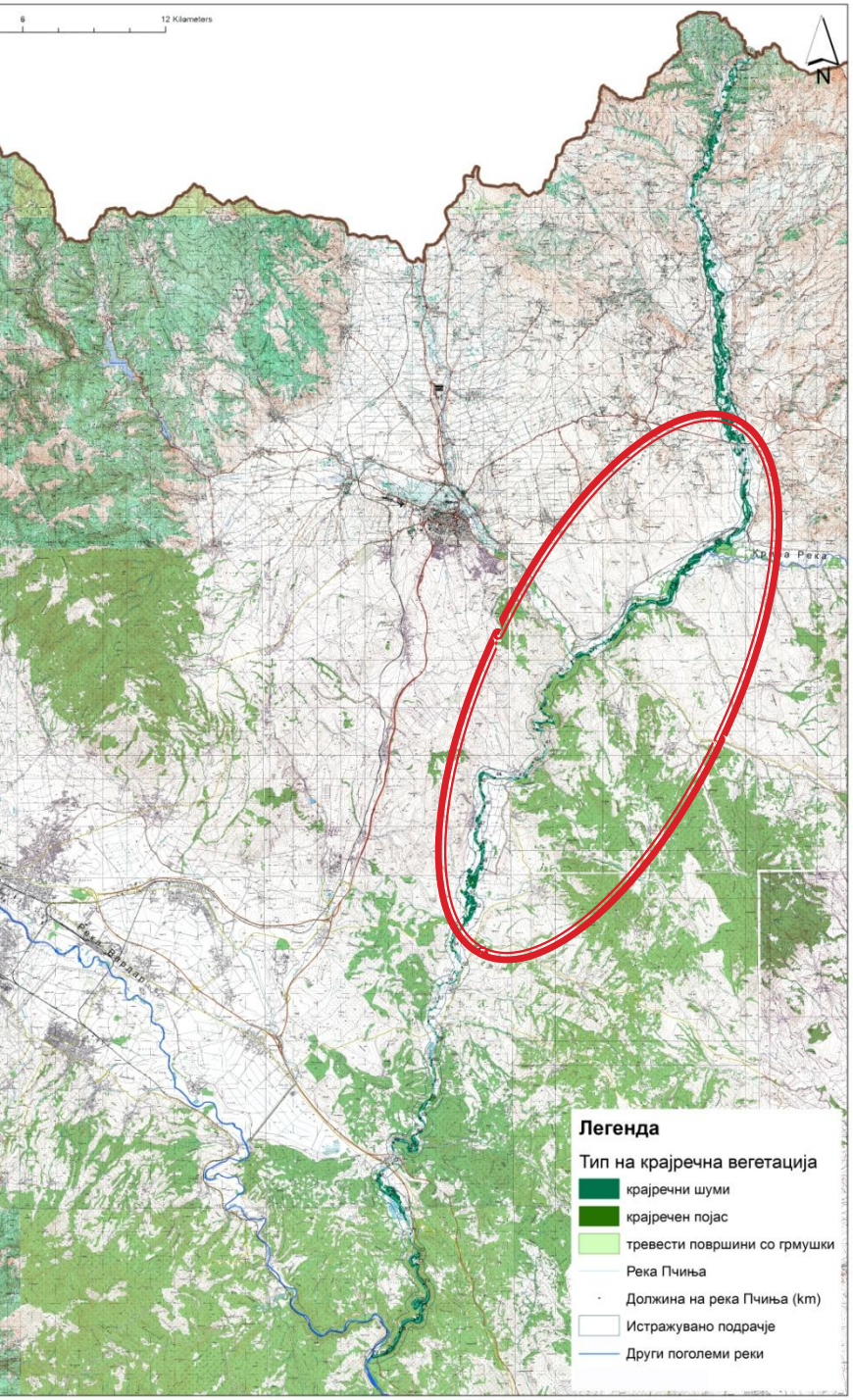
Table no.1: Area and width of riparian vegetation along the Pcinja River

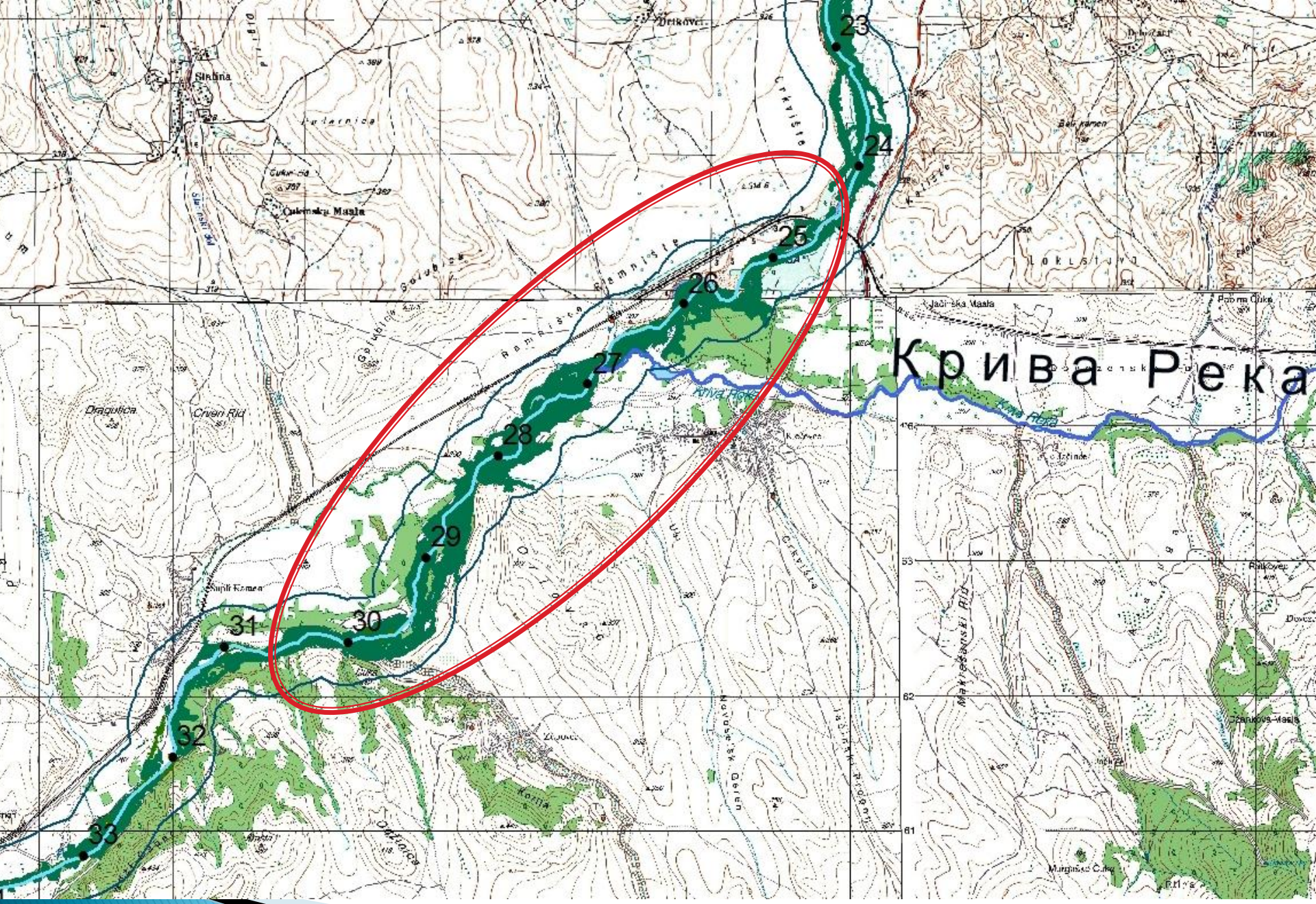
	Total area (m^2)	Average width on both sides (m)
Riparian forest	7928502,1	34,20
Shore belt	604951,07	3,57
Grassland with shrubs in riparian zone	248432,65	0,67
Total	8781885,82	

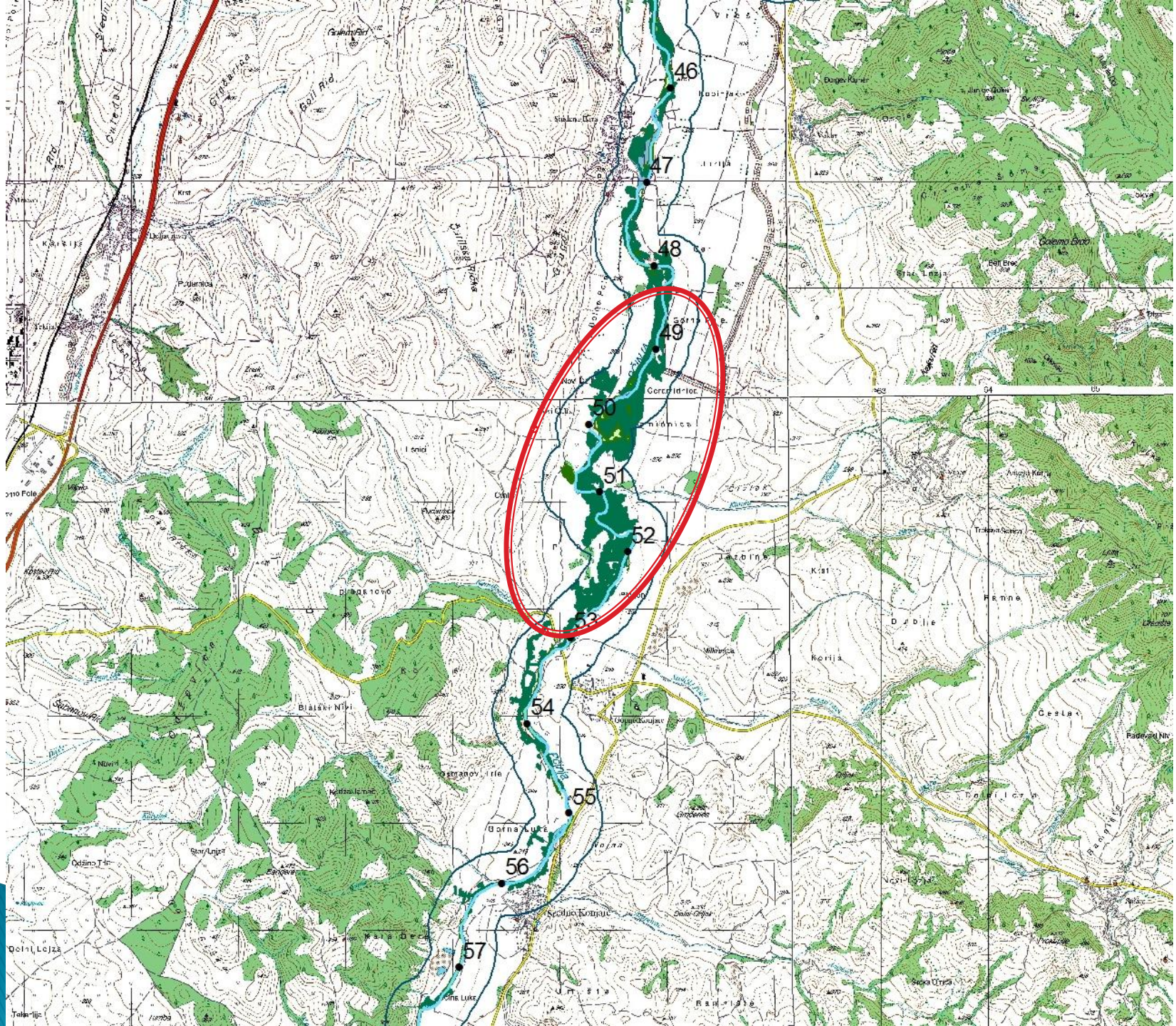

6
12 Kilometers
N
Крива Река
Легенда
Тип на крајречна вегетација
крајречни шуми
крајречен појас
тревести површини со грмушки
Река Пчиња
Должина на река Пчиња (km)
Истражувано подрачје
Други поголеми реки

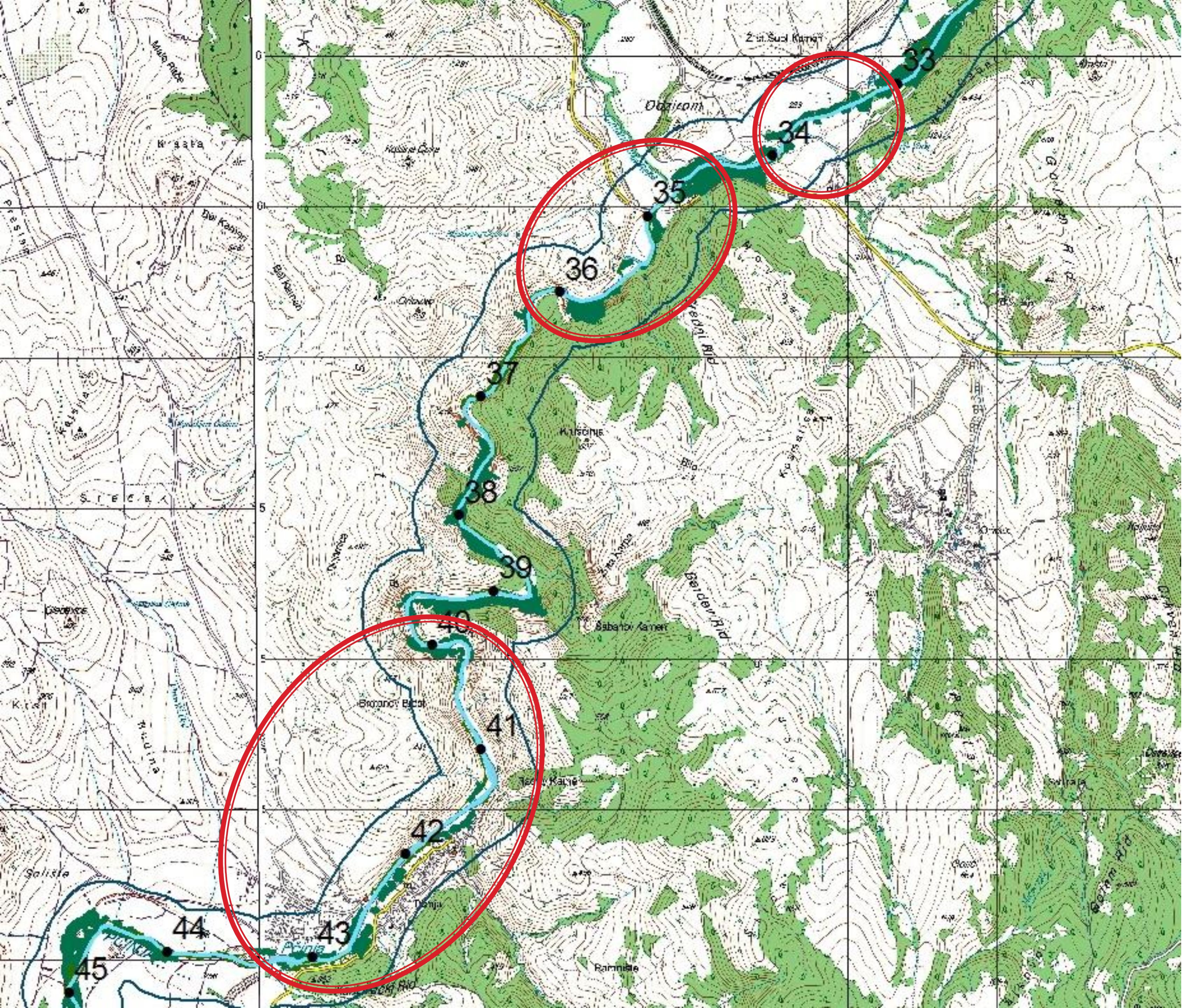

10
11
12
13
14
15
16
17
18
19
20
21
Staro Nagoričane
Nikuljane
Dragomanci
Puzaljka
Dobreša
Belo Gramada

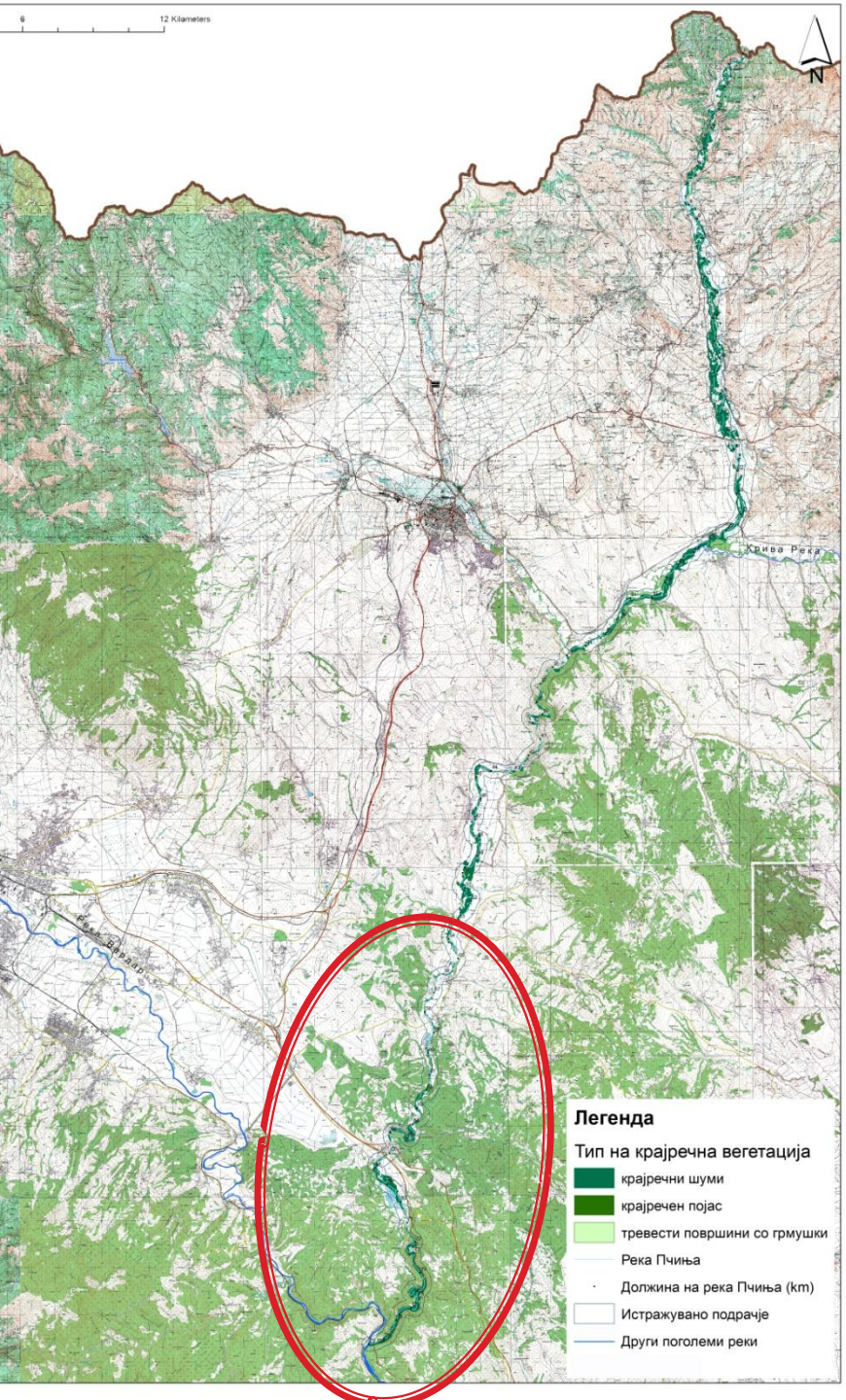

Staro Nagoričane
Kriva Reka

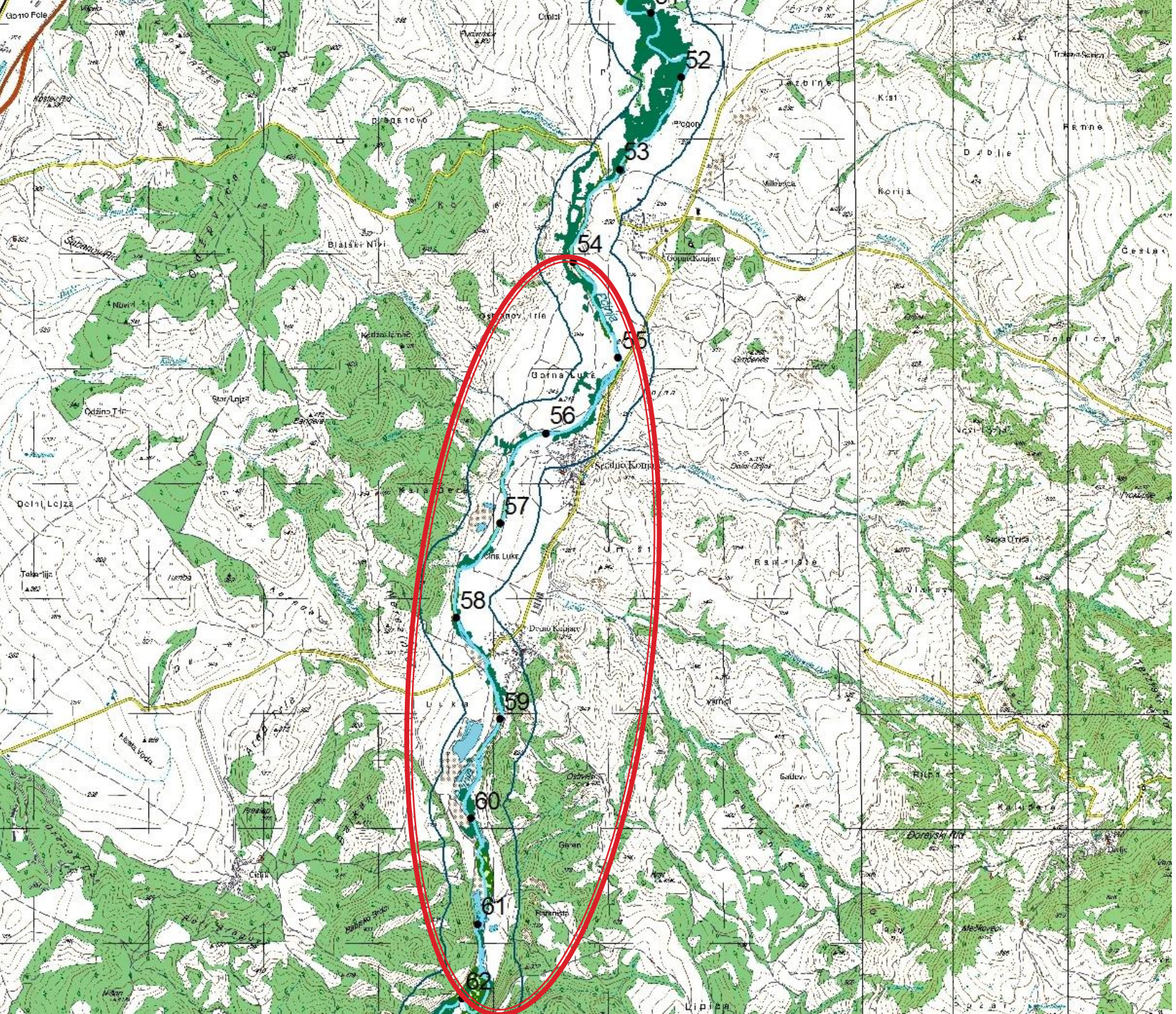

6
12 Kilometers
N
Легенда
Тип на крајречна вегетација
крајречни шуми
крајречен појас
тревести површини со грмушки
Река Пчиња
Должина на река Пчиња (km)
Истражувано подрачје
Други поголеми реки

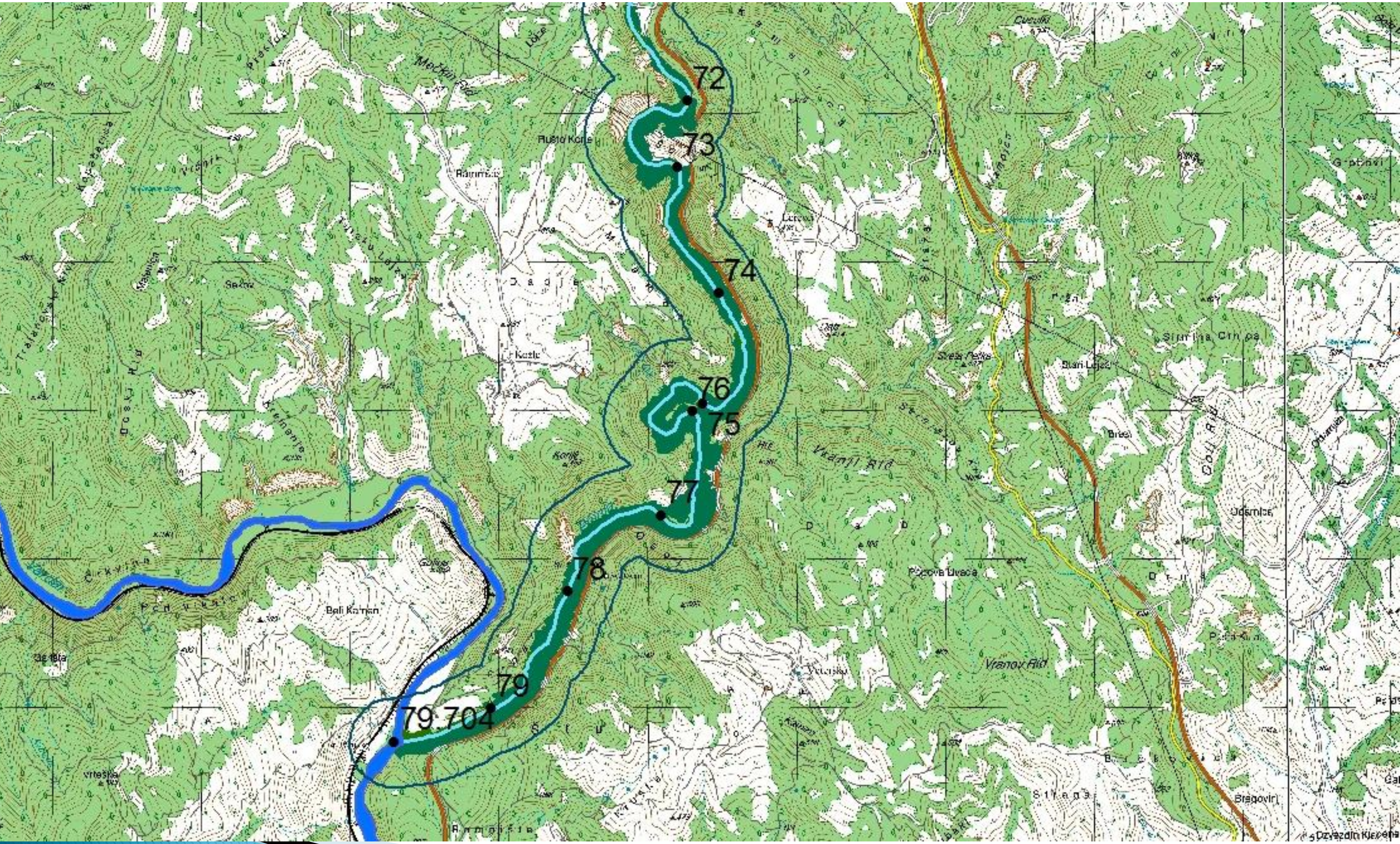

Крива Река
23
24
25
26
27
28
29
30
31
32
33


46
47
48
49
50
51
52
53
54
55
56
57


33
34
35
36
37
38
39
40
41
42
43
44
45
Šabanov Kamen
Berdev Rid


6
12 Kilometers
N
Крива Река
Легенда
Тип на крајречна вегетација
крајречни шуми
крајречен појас
тревести површини со грмушки
Река Пчиња
Должина на река Пчиња (km)
Истражувано подрачје
Други поголеми реки


52
53
54
55
56
57
58
59
60
61
62


72
73
74
76
75
77
78
79
79.704
Beli Kamen
Kozle
Vranov Rid

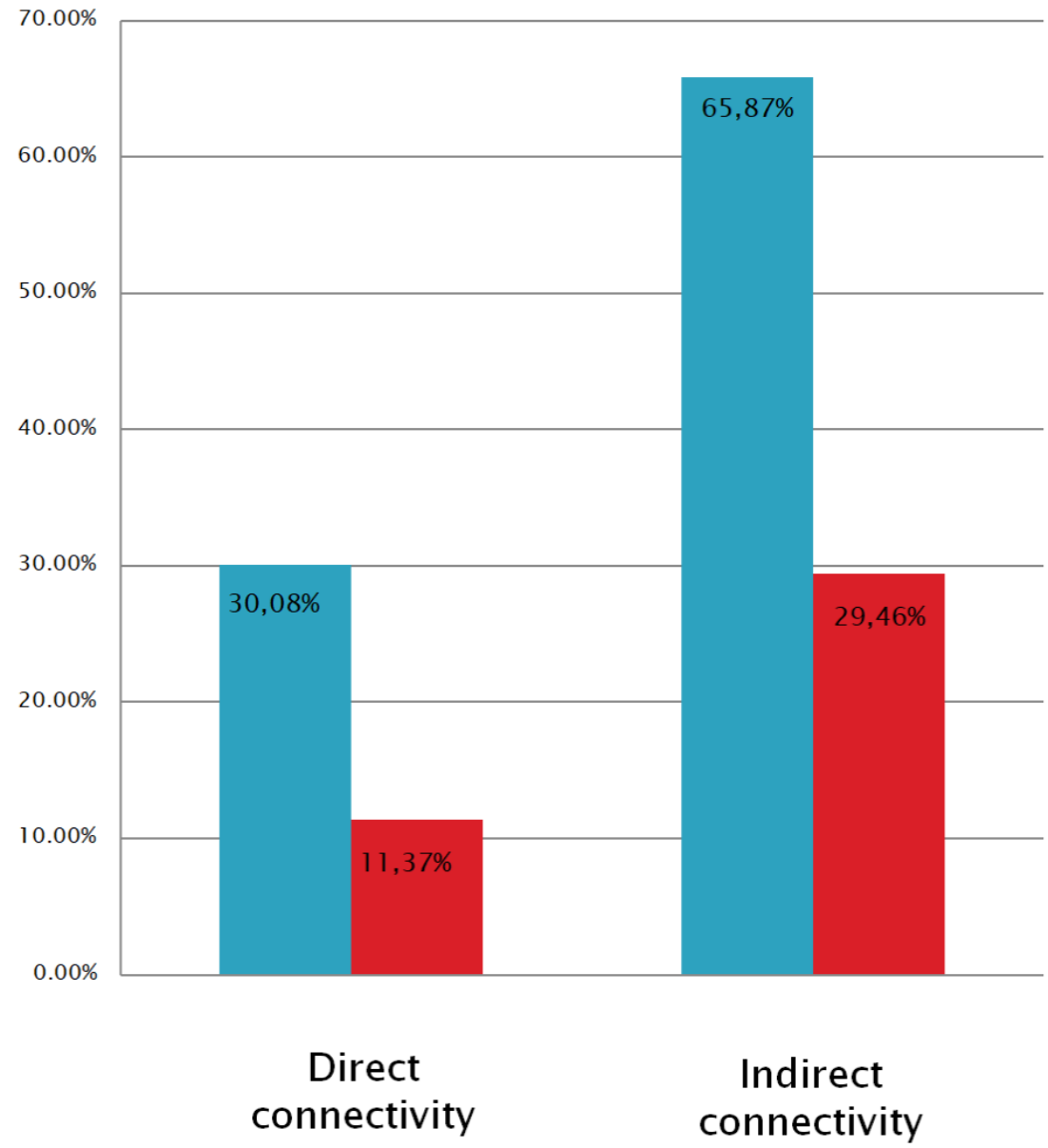


Table no. 2: Rapid Appraisal of Riparian Condition index, the scale of Jansen et al. (2005)

longitudinal conectivity%	value	condition
<50	0	very bad
51-64	1	bad
64-79	2	average
80-94	3	good
>95	4	excellent

- Reasons: Fragmentation and loss of habitats

- Measures: Improve the functionality and connectivity of the corridor
  - Reduce the direct impact
  - Planned expansion of urban settlements
  - Monitoring
  - Revitalization

5. Conclusion

- The discontinuity of vegetation is the result of anthropogenic influence
- The continuity of vegetation in the upper part of the river is in the best condition (very small villages with few inhabitants)
- The greatest impact on riparian vegetation is felt in the lower part (continuity is significantly reduced)
- Direct connectivity is in very bad condition, while indirect connectivity is average
- In the future it is necessary to study the functional, structural and biological characteristics of riparian habitats

Thank you for your attention