

# Road Traffic in Protected Forest Areas – Case Study in Triglav National Park, Slovenia

Igor Potočnik

## *Abstract – Nacrtak*

*The paper deals with traffic management strategy in the preserved forest area of the Pokljuka highland in the centre of the Triglav National Park in Slovenia. The idea of traffic management was raised by an increased number of visitors especially during the high tourist season. The management includes public and forest roads with special emphasis on ownership issues. The strategy foresees two-step management regulation of transport – parking and soft approach – informing. The strategy proposes the regulation of parking lots in the valley and on the plateau of Pokljuka, introducing alternative public transport, fees, providing wider tourist offer on the plateau and providing visitors with information about the natural environment, protected natural and forest areas, national park itself, code of behaviour in the natural environment, etc. The proposed traffic management strategy should be accepted by all sectors concerned in the studied area.*

*Keywords: traffic, forest roads, Pokljuka highland, Triglav National park, Slovenia*

## **1. Introduction and research problem – Uvod i problematika istraživanja**

In recent years the Rousseau's saying »Back to the Nature« has become actual due to the change of lifestyle not only in developed countries. Popularization of free-time activities in nature (mostly in forests) also increased the number of visitors in the regions of protected nature. In the case of Slovenia the only national park, Triglav National Park, is over visited especially during the high summer season. The development of mass winter tourism in the Alps since 1960 has also raised the question in Slovenia: How to involve mountain areas into tourism? It seems that locations between 1,200 m and 1,500 m above the sea level are the most suitable for alpine tourist development where climate conditions make winter and summer season equally attractive (Jeršič 2001).

Beside the above mentioned, several different interests can be met in this picturesque area, such as tradition, intentions, visions of development. Traditionally forestry and agriculture are permanently present in the whole Alpine region and not only in the protected area of Triglav National Park. Inside the National Park a Military Training Centre is located on the plateau of Pokljuka with all facilities for biathlon competitions. Reference should also be made

to the interest of land owners – forest and pasture owners, Association of Mountaineers etc.

The regulation of traffic is absolutely required, as the area of protected nature is obviously overcrowded during the high season. It is not only a problem of parking; it is a problem of noise, disturbance of natural environment. The role of foresters is to propose such traffic regulation that would involve interests of visitors and protected nature.

## **2. Working methods and research object – Metode rada i područje istraživanja**

Such a complex problem as is the case of the area of protected nature requires complex working methods. Studying of References is just a beginning followed by field work using methods of observing and inquiring (Albinini 2003).

The research object is the plateau of Pokljuka which is a part of the Triglav National Park. Areas and roads (public and forest roads) with the most intensive traffic were taken into consideration. The study area of 6,703 ha is mostly covered by mountain forest with Norway spruce as a dominant tree species in associations *Abieti-Fagetum prealpinum* and *Piceetum subalpinum*. The average altitude of Pokljuka



Fig. 1 Location of the Triglav National Park ([www.sigov.si/tnp](http://www.sigov.si/tnp))

Slika 1. Položaj Nacionalnoga parka Triglav ([www.sigov.si/tnp](http://www.sigov.si/tnp))

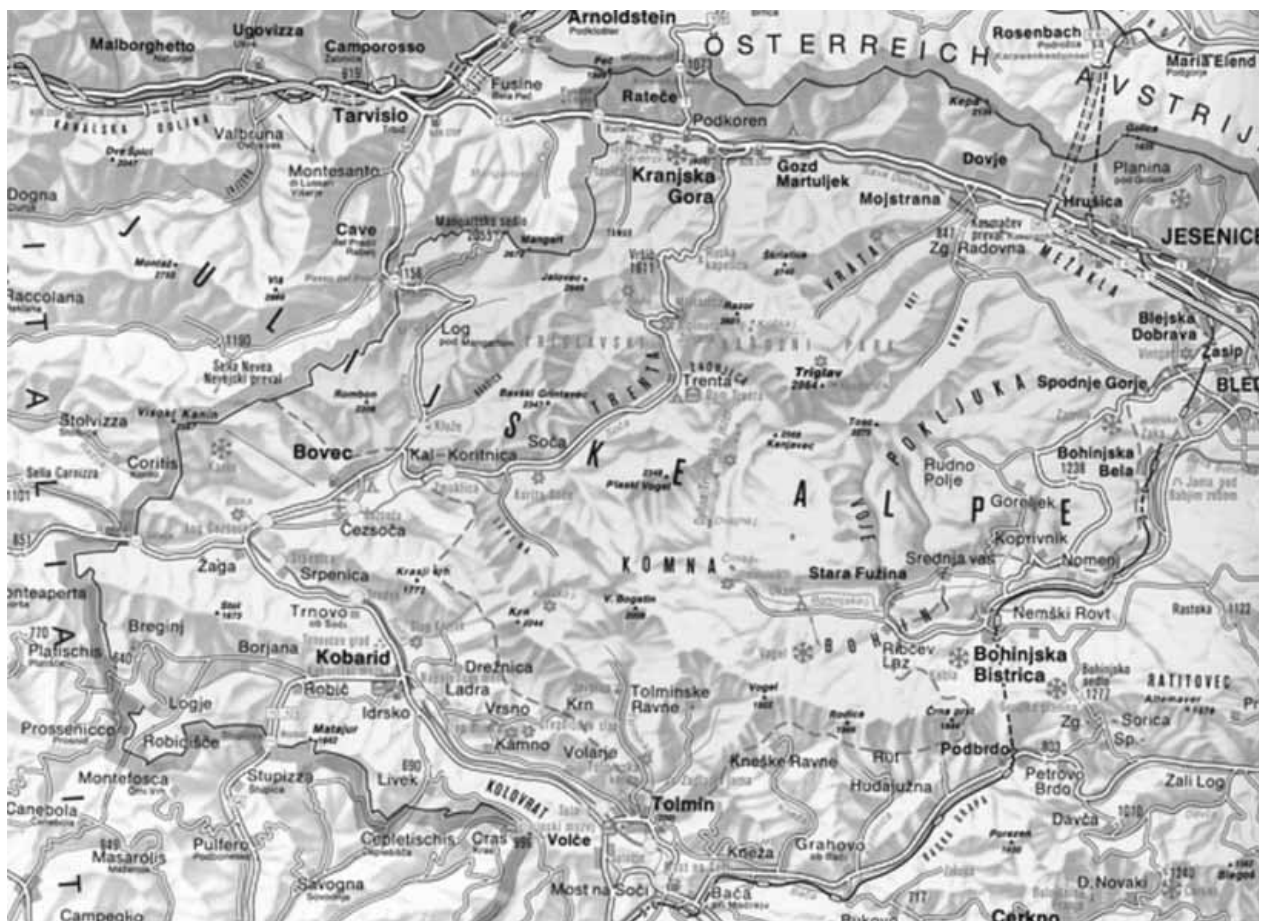


Fig. 2 The plateau of Pokljuka as an area studied within the Triglav National Park ([www.sigov.si/tnp](http://www.sigov.si/tnp))

Slika 2. Visoravan Pokljuka - istraživano područje u Nacionalnom parku Triglav ([www.sigov.si/tnp](http://www.sigov.si/tnp))

ranges between 1,200 and 1,700 m above the sea level.

Firstly we established the capacity of the existing parking spaces on the plateau of Pokljuka and identified the most intensively visited areas. These areas have lately been recognized as suitable or non suitable for visiting. Finally we determined the future development strategy for all suitable locations.

The existing parking spaces had various shapes so it took some time to survey all of them correctly. Several smaller existing parking spaces were later recognized as unsuitable because their location was too close to the trees, places with possible erosion etc. We used Technical Guidelines (Anon. 1991) for projecting of urban traffic areas to establish the real capacity of parking spaces on the plateau of Pokljuka.

### 3. Results – *Rezultati istraživanja*

#### 3.1 State of the Art – *Posljednja dostignuća*

Visitors of Pokljuka are:

- ⇒ Stationary visitors from cottages, inns, hotel on the plateau,
- ⇒ Owners of summer cottages (only on the Gorenjska mountain more than 120 cottages),
- ⇒ Daily visitors: coming from tourist centres like Bled and Bohinj and other parts of Slovenia and neighbouring countries,
- ⇒ Land owners.

The most important and popular activities are:

- ⇒ Hiking and picking up mushrooms, blueberries etc.,
- ⇒ Mountaineering: plateau is an ideal starting point for mountaineering to Triglav group mountains,
- ⇒ Mountain biking: for an average biker the plateau with several roads is suitable because of gentle road slopes and low traffic mainly on forest roads,
- ⇒ Cross country skiing: suitable for winter sports because of the natural shape of plateau, numerous unplugged forest roads and paths,
- ⇒ Free skiing: increasingly popular in recent years.

Here are some data to get an impression of the number of visitors during the summer season: in summer 1997 (Šolar 2002) on an average working day 1,850 persons visited Pokljuka, 3,880 on an average weekend day and more than 182,000 during the season. The problem should be considered thoroughly because we deal with traffic in protected natural environment.

On the basis of answers of 21 different local communities, associations and services concerned about Pokljuka and Triglav National Park it can be concluded that 90% of persons concerned believe that the situation on Pokljuka is problematic. According to their answers the responsibility is to be given to the Triglav National Park Organization (100%), local community (infrastructure – 90%), state (Ministry of Transport and Communications and Ministry of Defence – 60%), Slovenian Forest Service (forest roads – 60%) etc.

One of the questions was also which professions (professionals) should be involved into the working group in order to prepare the proposal of the plateau management. The answers focused on foresters, biologists, lawyers, economists, etc. Therefore foresters are the professionals who are supposed to be the most qualified to prepare the guidelines for traffic regulation.

#### 3.2 Proposal of Traffic Regulation – *Prijedlog regulacije prometa*

Every traffic regulation should comprise:

- ⇒ Determination of preferential directions and traffic management,
- ⇒ Limitations of road usage according to the type of traffic,
- ⇒ Speed limits and measures in order to slow down the traffic,
- ⇒ Regulation of parked vehicles,
- ⇒ Determination of low-speed zones and pedestrian zones,
- ⇒ Determination of other commitments.

There is no transit traffic on Pokljuka so parking places are necessary. Traffic should be directed toward several organized parking lots away of zones of quietness. In the first phase of regulation the existing locations are determined (considering the capacity and proximity of locations with higher level of protection) as suitable or non suitable for parking. If the location is suitable it should be equipped with information tables (maps, current location, free-to-use and closed roads, places of natural heritage, important objects, etc).

In the second phase of traffic regulation on Pokljuka the possibility is considered of larger central parking on the plateau and in the valley as well, along with the implementation of the public transport system from the valley to the plateau. Here there are two possibilities:

- ⇒ To enable access to the plateau until the parking lots are filled and later use the parking spaces in the valley,

⇒ Parking only in the valley and use of public transport system from the valley to the plateau.

The basic purpose of this strategy is to convince visitors as much as possible to leave their cars in the valley.

Another point of view is the time aspect. The traffic limitations could be:

- ⇒ Permanent,
- ⇒ Temporary during the summer and winter season,
- ⇒ Temporary during the sport events.

Introducing of high parking fee on the plateau and free parking in the valley with free public transport (included in the entrance fee) might bring adequate results in high season. Permanent traffic limitations might be non productive because traffic out of the season is very limited and not problematic to the environment.

We should also consider road barriers, meaning that roads are only used for bikes and pedestrians. Positive aspects of barriers are:

- ⇒ Effective protection of nature and zones of quietness,
- ⇒ Efficient utilization of forest functions,
- ⇒ Safe implementation of forest operations.

Beside positive effects, road barriers also bring negative effects. This measure should be introduced thoroughly and only be limited to the high season.

The last step in traffic regulation is the so-called »soft approach«. Traffic regulation strategy foresees soft approach where restrictive measures are not suitable. The purpose is to inform and to advice visitors especially at the locations of private property. Signs of wood or other natural material with symbols of expected behaviour should be used. Soft approach is an alternative for road barriers during the low season when the barriers are not necessary.

#### 4. Discussion – *Rasprava*

The proposed strategy is based on the understanding that investing in the areas of protected nature – in our case traffic regulation – is an investment and not consumption. Natural environment and spending spare time in pure nature will be increasingly demanded. The intensity of growth and locations can hardly be predicted; we expect increased visit to the most popular and attractive locations. Traffic and environmental problems of over-visited locations of the Pokljuka plateau are limited to the high season. In our opinion it is crucial to provide thorough infor-



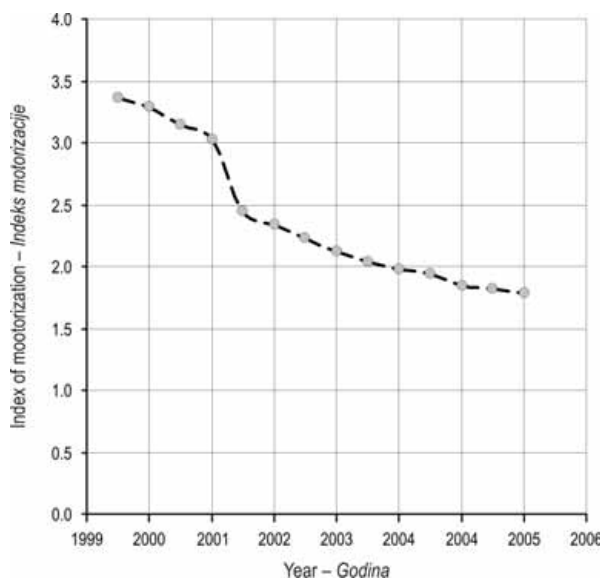
**Fig. 3** Road barriers are an effective means of traffic regulation if implemented thoroughly

**Slika 3.** Rampe su učinkovito sredstvo regulacije prometa ako su propisno postavljene



**Fig. 4** Symbols of expected behaviour in natural environment

**Slika 4.** Znakovi očekivanoga ponašanja u prirodnom okruženju



**Fig. 5** Trend of index of motorization in Slovenia

**Slika 5.** Prikaz indeksa motoriziranosti stanovništva u Sloveniji

mation to visitors and this should be involved in the strategy already at the very beginning. Traffic regulation also brings some other information: distribution of visitors during the season and migration during the working days and weekend days, information on visitors' expectations, social distribution of visitors, etc. Information and data used in this

paper are based on the estimation and traffic counting on rush days. Another problem is related to forest roads: basically forest roads are opened for tourist traffic along with forest traffic. The problem is how to ensure higher standard of transportability (better maintenance, traffic signs, etc.), which is necessary for safe traffic and however not required by the forest management. In future years an increasing number of visitors may be expected as well as disturbance of the natural environment. The index of motorization (relation between population and number of personal cars) shows a trend of intensive decreasing, which means more vehicles and visitors not only in towns but also in regions like Pokljuka.

The funds allocated for the maintenance of forest roads are insufficient although the contribution of the state budget for the maintenance of forest roads is as high as 35%. It seems that the introduction of the toll, entrance ticket, tourist tax, environmental tax, necessary. We should all be aware that pure nature and its protection are simply not free.

## 5. References – Literatura

Anon., 1991: Technical Guidelines for Projecting of Urban Traffic Area. Traffic Technical Institute, Faculty of Civil and geodetic Engineering, University of Ljubljana, p. VII/11–VII/22.

Anon., 2000: Guidelines for Protected Area Management Categories (Interpretation and Application of the Protected Area Management Categories in Europe). Grafenau, IUCN/ Europarc Federation, 46 pp.

Albinini, M. 2003: Traffic Management Strategy for Protected Areas – Case Study Pokljuka. Graduation thesis, University of Ljubljana Biotechnical Faculty Dep. of Forestry and Renewable Forest Resources, 106 pp.

<http://www.sigov.si/tnp/>. Triglav National Park (in English).

<http://www.statsi/engrindex.asp>. Statistical office of the Republic of Slovenia (in English).

<http://www.uradni-list.si/index.jsp>. Official Gazette of Republic of Slovenia (in Slovene).

Jeršič, M., 2001: National Park and Regional Development. In Šolar M. (ed.): Triglav National Park – 20 years later. Bled, 51–58.

McNelly, J. A. et al., 1994: Guidelines: Development of National Parks and Protected Areas for Tourism. Madrid, WTO, UNEP, 53 pp.

Šolar, M., 2002: Principles of Adjustment of Recreational Use in Protected Areas – Case Study Triglav National Park. Master thesis, University of Ljubljana Biotechnical Faculty Dep. of Forestry and Renewable Forest Resources, 160 pp.

---

## Sažetak

---

### Cestovni promet u zaštićenim šumskim područjima – studija za Nacionalni park Triglav

Moderan čovjek velik dio svoga slobodnoga vremena provodi u prirodi baveći se raznim aktivnostima. Zbog toga stalno raste broj posjetitelja u šumskim, a poglavito u zaštićenim šumskim područjima, koja svojom primarnom šumskom prometnom infrastrukturom (javne i šumske ceste s pripadajućim cestovnim objektima) nisu dimenzionirane za takav promet. Tijekom ljeta 1997. godine radnim je danom prosječno 1850 osoba posjetilo Pokljuku, u dane vikenda taj je broj bio 3880. Te je godine zabilježeno ukupno 182 000 posjetitelja.

Osim problema parkirnih mjesta javlja se i problem onečišćenja okoliša, uznemiravanja životinja bukom i dr. Zadaća je šumara da predlože regulaciju prometa koja će s jedne strane usuglasiti interese posjetitelja, a s druge strane osigurati opstojnost zaštićenih šumskih područja.

Istraživanja prikazana u ovom radu provedena su na visoravni Pokljuka, sastavnom dijelu Nacionalnoga parka Triglav u Sloveniji (slika 1 i slika 2). Istraživani se objekt površine 6703 ha nalazi na nadmorskoj visini između 1200 i 1700 m te kao takav predstavlja izuzetno pogodno područje za razvijanje i zimskoga i ljetnoga planinskoga turizma. Najproširenija je obična smreka (*Picea abies* L.), koja raste u šumskim zajednicama *Abieti-Fagetum prealpinum* i *Piceetum subalpinum*.

Sastavljen je kompleksan upitnik koji je ispunio 21 ispitanik (lokalna zajednica, udruge, službe) koji su na različite načine povezani s Pokljukom i Nacionalnim parkom Triglav. Oko 90 % anketiranih smatra kako je situacija na Pokljuki problematična i da zahtjeva određene aktivnosti. Kao stručnjaci koji bi trebali biti uključeni u radnu skupinu za izradu prijedloga gospodarenja visoravni Pokljuka navedeni su na prvom mjestu šumari, zatim biolozi, pravnici, ekonomisti i dr.

Snimljena je postojeća situacija na terenu te određen kapacitet postojećih parkirnih mjesta. Locirana su najčešće posjećivana područja koja su zatim klasificirana u ona pogodna i u ona nepodogodna za posjećivanje. Parkirališta su bila dosta razbacana i različita oblika te je trebalo prilično vremena kako bi se ona valjano prikazala. Mnoga manja parkirališta prepoznata su kao nepovoljna ponajprije zbog blizine stabala (mogućnost oštećivanja), zbog smještaja na erozivnim površinama itd. Korištenjem Tehničkih uvjeta za projektiranje u urbanim prometnim područjima (Anon. 1991) utvrđen je stvarni kapacitet povoljnih parkirnih mjesta na visoravni Pokljuka.

Posjetitelji Pokljuke razdijeljeni su na:

- ⇒ stacionirane posjetitelje koji više dana provode u planinskim kućama, apartmanima i hotelima
- ⇒ jednodnevne posjetitelje koji dolaze iz turističkih središta u blizini (Bled, Bohinj), iz ostalih krajeva Slovenije, ali i iz susjednih zemalja (Austrija, Hrvatska, Italija)
- ⇒ vlasnike ljetnih planinskih kuća
- ⇒ vlasnike šumskih i poljoprivrednih površina.

Najvažnije i najpopularnije aktivnosti kojima se bave posjetitelji Pokljuke jesu: planinarenje, skupljanje šumskih plodova (gljiva, borovnica i dr.), brdski biciklizam, skijaško trčanje, slobodno skijanje (izvan uređenih skijaških staza) i ostalo.

Sukladno prijedlogu regulacije prometa na Pokljuki, u prvoj fazi promet treba usmjeriti prema nekoliko većih parkirališta, smještenih na povoljnim mjestima i udaljenih od područja pod najvećom zaštitom (zones of quietness). Parkirališta treba urediti te opremiti informativnim tablama (zemljovidi, postojeći položaj, provozne i zatvorene ceste, značajna prirodna područja i objekti itd.). U drugoj fazi predvidjeli smo mogućnost velikoga središnjega parkirališta na visoravni, ali i parkirališta u dolini uz uvođenje javnoga transportnoga sustava iz doline na visoravan. Izrađene su dvoje inačice:

- ⇒ parkiranje na visoravni do popunjenosti kapaciteta središnjega parkirališta, a nakon toga slijedi zatvaranje prilazne ceste za visoravan te usmjeravanje vozila na parkiralište u dolini uz uvođenje javnoga prijevoza do visoravni
- ⇒ parkiranje samo u dolini uz javni transportni sustav iz doline na visoravan.

Vremenska sastavnica ograničenja prometovanja također je vrlo bitna. Zabrana prometovanja može biti stalna (tijekom čitave godine), povremena tijekom ljetne i zimske turističke sezone (ili samo u glavnoj sezoni) te povremena samo tijekom većih sportskih događanja. Uvođenje visoke cijene parkiranja na visoravni te slobodnoga parkiranja u dolini uz isto tako slobodan javni prijevoz (cijena kojega je uključena u ulaznicu) moglo bi donijeti dobre rezultate u glavnoj turističkoj sezoni. Stalna zabrana prometovanja nije potrebna jer je promet izvan turističke sezone ograničen i nije štetan za okoliš.

Razmatrana je i uporaba rampi na cestama, čime one postaju upotrebljive samo za bicikliste i pješake. Uz pozitivne strane te mjere, kao što su učinkovita zaštita prirode i područja pod najvećim stupnjem zaštite od prometa, sigurno provođenje šumskih radova i dr., definirane su i negativne strane. Stoga rampe treba primjenjivati mjestimično te samo tijekom glavne turističke sezone.

U kombinaciji s restriktivnim mjerama regulacije prometa, a posebno tamo gdje takve mjere nisu pogodne, treba primijeniti tzv. »mekani pristup« (soft approach). Cilj je tih mjera informirati i obavijestiti posjetitelje odgovarajućim znakovima što u prirodi nije dopušteno činiti (slika 4). Znakovi trebaju biti izrađeni od drva ili kojega drugoga prirodnoga materijala kako bi se što bolje uklopili u prirodno okruženje, a dobra su zamjena za primjerice rampe izvan glavne turističke sezone.

Predložene mjere regulacije prometa u zaštićenom šumskom području visoravni Pokljuka u Nacionalnom parku Triglav predstavljaju investiciju u budućnost očuvanja prirodnosti i ljepota šuma. Problem povećanoga prometa uočen je samo u glavnoj turističkoj sezoni. Neizbježan je daljnji rast broja posjetitelja zaštićenim šumskim područjima. To je s jedne strane uvjetovano željom ljudi za provođenjem slobodnoga vremena u što prirodnijem okruženju daleko od svakodnevnog gužve i buke, a s druge strane stalnim smanjivanjem indeksa motoriziranosti stanovništva (predstavlja odnos između broja stanovnika i broja motornih vozila), čime zaštićena šumska područja postaju dostupna sve većemu broju ljudi (slika 5).

Poseban je problem povezan s javnom uporabom šumskih cesta te time iniciranom potrebom povećanja njihova postojećega standarda (češće i zahtjevnije održavanje, dodatni cestovni objekti, prometni znakovi i dr.) koji je dostatan za potrebe gospodarenja šumom, ali je nedovoljan za siguran javni promet. Iako država sufinancira održavanje šumskih cesta s 35 % potrebnoga godišnjega iznosa, financijska su sredstva potrebna za tekuće i periodično održavanje šumskih cesta nedovoljna. Stoga treba razmisliti o sufinanciranju radova održavanja primarnih šumskih prometnica iz npr. ulaznica u nacionalni park, turističkih taksi, davanja za zaštitu okoliša i drugih izvora. Trebamo biti svjesni kako očuvanje prirodnih bogatstava ne može biti besplatno.

**Ključne riječi:** promet, šumske ceste, visoravan Pokljuka, Nacionalni park Triglav, Slovenija

---

**Author's address – Autorova adresa:**

Assoc. Prof. Igor Potočnik, PhD.  
University of Ljubljana, Biotechnical Faculty  
Department of Forestry and Forest Resources  
Večna pot 83  
1000 Ljubljana  
SLOVENIA  
e-mail: igor.potocnik@bf.uni-lj.si