

TREĆA REGIONALNA KONFERENCIJA O PROCJENI UTJECAJA NA OKOLIŠ THIRD REGIONAL CONFERENCE ON ENVIRONMENTAL IMPACT ASSESSMENT

POKROVITELJI / PATRONS

predsjednica Republike Hrvatske Kolinda Grabar-Kitarović /
President of the Republic of Croatia Kolinda Grabar-Kitarović

Ministarstvo zaštite okoliša i energetike Republike Hrvatske /
Ministry of Environment and Energy of the Republic of Croatia

Ministarstvo mora, prometa i infrastrukture Republike Hrvatske /
Ministry of the Sea, Transport and Infrastructure of the Republic of Croatia

Ministarstvo regionalnoga razvoja i fondova Europske unije Republike Hrvatske /
Ministry of Regional Development and EU Funds of the Republic of Croatia

Hrvatska agencija za okoliš i prirodu /
Croatian Agency for Environment and Nature

Hrvatska gospodarska komora /
Croatian Business Chamber

ZBORNİK SAŽETAKA RADOVA BOOK OF ABSTRACTS

VODICE
HRVATSKA / CROATIA

13. - 16. rujna 2017. / September 13th - 16th, 2017

Zagreb, rujna 2017. / Zagreb, September 2017

NAKLADNIK / PUBLISHER

Hrvatska udruga stručnjaka zaštite prirode i okoliša, Zagreb, Hrvatska /
Croatian Association of Experts in Nature and Environmental Protection, Zagreb,
Croatia

UREDNICI / EDITORS

Marta Brkić

TEHNIČKI UREDNICI ZBORNIKA / TECHNICAL BOOK EDITORS

Najla Baković
Jelena Fressl

DIZAJN NASLOVNICE / COVER DESIGN

Hrvatska udruga stručnjaka zaštite prirode i okoliša, Zagreb, Hrvatska /
Croatian Association of Experts in Nature and Environmental Protection, Zagreb,
Croatia

NAKLADA / CIRCULATION

350

TISAK / PRINTED BY

Tiskara Zelina d.d., Sveti Ivan Zelina, Hrvatska / Tiskara Zelina d.d., Sveti Ivan
Zelina, Croatia

Autori su odgovorni za sadržaj svojih tekstova, kao i za lekturu te prijevod.
© 2017 autori sažetaka

Authors are responsible for the content of their texts, as well as for
proofreading and translating them.
© 2017 abstract authors

Zagreb, rujan 2017. / Zagreb, September 2017

STRUČNO-ORGANIZACIJSKI ODBOR /
EXPERT- ORGANIZING COMMITTEE

Marta Brkić

Tomislav Ćurko
Maja Jerman Vranić
Željko Koren
Ivan Martinić
Nenad Mikulić
Ilija Šmitran
Domagoj Vranješ

ZNANSTVENI ODBOR /
SCIENTIFIC COMMITTEE

Nenad Mikulić

Aleksandra Anić Vučinić
Vasilije Bušković
Nevenko Herceg
Stjepan Husnjak
Mihone Kerolli Mustafa
Tarik Kupusović
Ivan Martinić
Andjelka Mihajlov
Alan Štimac
Ranko Žugaj

SAVJETODAVNI ODBOR /
ADVISORY COMMITTEE

Tea Aulavuo
Mate Bandur
Brankica Cmiljanović
Jiří Dusík
Ivana Gudelj
Matjaž Harmel
Mihone Kerolli Mustafa
Vesna Kolar Planinšič
Vjera Krstelj
Anamarija Matak
Andjelka Mihajlov
Marla Orenstein
Martin Smutny
Aleksandar Vesić

TEHNIČKI ODBOR /
TECHNICAL COMMITTEE

Najla Baković
Jelena Fressl
Ivan Juratek
Tajana Uzelac Obradović

TAJNIŠTVO /
SECRETARIAT

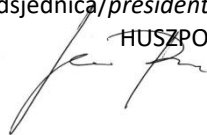
Jelena Fressl
Tajana Uzelac Obradović

Zahvaljujemo pokroviteljima, partneru i partnerskim organizacijama, sponzorima, članovima Stručno-organizacijskog, Znanstvenog i Savjetodavnog odbora, autorima, uvodničarima, panelistima okruglih stolova, moderatorima, sudionicima te svima ostalima na njihovom doprinosu realizaciji konferencije!

We would like to express our gratitude to our patrons, partner and partner organizations, sponsors, members of Expert-Organizing, Scientific and Advisory committees, authors, keynote speakers, panelists of round tables, moderators, participants and everyone else for their contribution to the conference!

Marta Brkić
predsjednica/president

HUSZPO

A handwritten signature in black ink, appearing to be 'Marta Brkić', written over the printed name and title.

SADRŽAJ / TABLE OF CONTENTS

SEKCIJA 1 - STRATEŠKA PROCJENA UTJECAJA NA OKOLIŠ /

SECTION 1 - STRATEGIC ENVIRONMENTAL IMPACT ASSESSMENT

Marina Stenek, Bojana Nardi, Nenad Mikulić <i>Determining the significance of environmental impact: Analysis of practices in Croatia</i>	17
Vesna Kolar Planinšič, Sarah Duff, Ismini Kyriazopoulou <i>Good practice experiences of Training Strategy and Action plan on SEA and EIA as supportive measures for efficient implementation in Slovenia</i>	19
Ekaterina Khmeleva, Yulia Dolinina <i>System of the environmental assessment in Russia: legal aspects and perspectives</i>	20
Klemen Strmšnik, Jelka Habjan, Matjaž Harmel, Sabina Cepuš <i>The appropriateness and quality of Monitoring Indicators – Lessons learned from Monitoring Reports</i>	21
Daniela Klaić Jančijev, Mario Pokrivač <i>Strategic Environmental Assessments of County Development Strategies</i>	22
Matjaž Harmel, Sabina Cepuš, Klemen Strmšnik, Vesna Kolar Planinšič, Mojca Lenardič <i>Effective Strategic Environmental Assessment for municipal spatial plans in Slovenia</i>	24
Elena Perfilyeva, Svetlana Belozerova, Tatiana Voron, Kseniia Stadnikova, Kseniia Stepanenko <i>Strategic environmental assessment in Novokuznetsk municipal district, Kemerovo region, Russia</i>	25
Brankica Cmiljanović, Tamara Brajović, Dina Skarep <i>Strategic environmental assessment for the Program of Exploration and Production of Hydrocarbons Offshore Montenegro</i>	26
Koraljka Vahtar – Jurković, Jelena Čanik, Sonja Šišić <i>Experiences in conducting strategic environmental impact assessments at the local level in Primorje-Gorski Kotar County</i>	27
Jelena Fressl, Daniela Klaić Jančijev <i>Strategic environmental assessment of Small Hydro Power Development Policy in Albania, a Comprehensive, Climate Resilient Approach to Sustainable Hydropower for Albania - methodology and approach</i>	29
Mario Pokrivač, Oksana Sakal <i>Experience of strategic assessment in Ukraine on example of preparation of Strategic Environmental Assessment for the National Transport Strategy</i>	30
Zlatko Pletikapić <i>Applying the system of environmental-economic accounting (SEEA) in strategic planning and strategic environmental impact procedures</i>	32
Boška Matošić, Natalija Pavlus, Nela Sinjkević, Marin Perčić, Smiljana Blažević <i>SEA of IInd Spatial plan changes and amendments of Marina municipality</i>	34
Sabina Cepuš, Matjaž Harmel, Klemen Strmšnik, Matevž Premelč <i>Spatial planning and major industrial accidents involving dangerous chemicals</i>	36
Aleksandar Lazić, Mišo Kucelj <i>Implementation of climate change adaptations into strategic documents for the development of local governments</i>	37

SEKCIJA 1 - STRATEŠKA PROCJENA UTJECAJA NA OKOLIŠ / SECTION 1 - STRATEGIC ENVIRONMENTAL IMPACT ASSESSMENT POSTER PREZENTACIJE / POSTER PRESENTATIONS

Tomi Haramina, Sunčana Bilić <i>Implementation of the Flood Risk Management Plan in the regional spatial plan after the Strategic Environmental Assessment</i>	41
---	----

SEKCIJA 2 PROCJENA UTJECAJA NA OKOLIŠ / SECTION 2 - ENVIRONMENTAL IMPACT ASSESSMENT

Katarina Celič <i>National thresholds for determining the obligation of the environmental impact assessment</i>	45
Petra Šantić <i>The Role of Case Law of the Court of Justice of the European Union in Practice with Reference to the Recent EU Environmental Cases</i>	47
Sandra Golubić <i>Screening in Environmental Impact Assessment– actual issues</i>	49
Mari Kågström <i>Between 'best' and 'good enough': How consultants guide quality in environmental assessment</i> .	51
Katarina Bulešić, Konrad Kiš, Tomislav Ciceli <i>INSPIRE Directive – Current Status, the Efficiency and Effectiveness of its Implementation and Usage in the Preparation of the Environmental Impact Assessment Documents</i>	52
Vjeran Magjarević, Marijana Bakula <i>Evaluation of a need for an impact assessment of the environment on a project - impact of climate changes on projects</i>	54
Marijana Bakula, Gordan Golja, Vjeran Magjarević <i>Impact on climate changes and production of greenhouse gases in sewerage systems and wastewater treatment plants</i>	56
Natalija Pavlus, Mihael Drakšić, Ana Ptiček <i>Wastewater treatment in small settlements on the territory of Republic of Croatia</i>	58
Zlatko Perović, Anita Erdelez <i>A combined approach methodology: effluent discharge from Rab agglomeration into coastal water</i>	60
Valerija Butorac, Goran Lončar, Martina Cvitković, Domagoj Vranješ <i>Geocological evaluation within environment impact assessment studies–Example of: Hydropower plants Kosinj and Senj 2</i>	62
Ivan Vučković, Bojana Nikitović, Jadranka Mustajbegović, Petar Gulin, Iva Vidaković, Andrija Šaban <i>Human health as the Environmental Impact Study component - an example of the Combined-Cycle Cogeneration Gas Power Plant Peruća</i>	64
Andrija Šaban, Ivan Vučković, Koni Čargonja-Reicher <i>Ecological accidents risk assessment - an integral part of the environmental impact study</i>	66
Sanja Bogdanović, Ana Brebrić <i>Problematics in preparation of environmental impact studies for national road projects in Croatia</i>	68

Igor Radović, Dušan Mijuk <i>Problem of traffic noise and protection measures</i>	70
Aleksandra Anić Vučinić, Lana Krišto, Ivana Melnjak, Lucija Radetić <i>The role of environmental impact assessment in rehabilitation and conversion of exploitation fields</i>	72
Nebojša Knežević, Danijela Knežević <i>Environmental Impact Assessment of the Renovation Project of the existing municipal waste landfill, Municipality Sanski Most</i>	74
Matthew Cashmore, Mari Kågström, David Rudolph <i>International experiences with opposition to wind energy siting decisions: Lessons for environmental and social impact assessment</i>	76
Mira Zovko, Ines Katić, Jasna Kufrin, Dunja Pofuk, Ivana Gudelj <i>Synergy of Circular Economy and Environmental Impact Assessment</i>	77
Igor Anić, Imelda Pavelić <i>Considering the possibilities of waste management based on principles of circular economics in the sector of tourism</i>	79
Mihone Kerolli-Mustafa, Letafete Latifi, Lavdim Zeqiri <i>Analysis on Characteristics of Fly Ash from Coal Power Plant in Kosovo</i>	81
Mario Ćosić, Goran Pašalić, Sanja Grabar <i>EAF dust recovery - EIA challenges</i>	82

SEKCIJA 2 - PROCJENA UTJECAJA NA OKOLIŠ /

SECTION 2 - ENVIRONMENTAL IMPACT ASSESSMENT

POSTER PREZENTACIJE / POSTER PRESENTATIONS

Marina Škunca, Luka Škunca, Hrvoje Peternel <i>Contribution of EIA procedures to invasive alien species spread mitigation: troubles in paradise?</i>	87
Tea Strmecky, Davor Barać, Ivan Mališa <i>Landfill leachate – Analysis of leachate pollution parameters based on an example of Diklo landfill, Zadar</i>	88
Fanica Kljaković-Gašpić, Melita Burić, Lav Bavčević, Sanja Grgurić, Ana Jurjević, Tomi Haramina, Jasmina Šargač, Nikolina Bakšić, Oleg Antonić <i>Emission modelling of farming variants for sea bass and sea beam and their use in environmental impact assessment</i>	90
Višnja Šteko, Martina Čipčić- Bragadin, Sunčana Bilić, Matea Lončar <i>EIA as an important instrument for landscape protection: examples of fitting of railway infrastructures into surrounding landscape</i>	92
Goran Gašparac, Sanja Grgurić, Amela Jeričević <i>Application of numerical models in air quality assessment</i>	94
Tanja Radović, Nebojša Pokimica, Ratko Đorđević, Pavle Cvetić, Bojana Lalović <i>Environmental Impact Assessment Procedure for the Ore Deposit Geological Exploration Projects in Serbia</i>	95

SEKCIJA 3 - ZAŠTITA PRIRODE I ODRŽIVO KORIŠTENJE PRIRODNIH RESURSA / SECTION 3 - NATURE CONSERVATION AND SUSTAINABLE USE OF NATURAL RESOURCES

Tina Klemenčič <i>Improving decisions with appropriate assessment</i>	99
Nela Jantol, Ana Ostojić, Davor Korman, Vladimir Kušan, Medeja Pistotnik, Zrinka Mesić <i>Evaluation of Natura 2000 habitats – methods and challenges</i>	101
Mirjana Matešić <i>Will Global Sustainable Development Goals Influence Sustainability of Natural Resource Usage</i>	103
Neven Iveša, Koviljka Aškić <i>Guidelines on integrating environmental and nature protection issues in the local strategic development documents</i>	105
Ivan Martinić <i>Some open issues in obtaining conservation objectives for forest habitats in Natura 2000 areas.</i>	107
Konrad Kiš <i>Unrecognised Conflicts Between the Utilization of Natural Resources and NATURA 2000: Easement of Forests and Forest Land for the Raising of Perennial Crops - Case Study Dubrovnik-Neretva County</i>	109
Tajana Uzelac Obradović, Jelena Fressl, Ines Rožanić, Marta Brkić <i>Use of Ecosystem services in Croatia - current state and possibilities</i>	111
Ana Ostojić, Tena Birov, Zrinka Mesić, Ena Bičanić Marković, Vladimir Kušan <i>The process of evaluating the risk of introducing alien species - review and experience</i>	112
Dragan Kovačević, Dejan Radošević, Goran Panić, Sara Todorović, Darko Jovanić, Svjetlana Radusin, Željka Stojičić <i>Protection Study for Proclamation of Drina National Park</i>	114
Nela Jantol, Ana Ostojić, Tena Birov, Tatjana Vujnović, Silvija Kipson, Sandro Dujmović, Moira Buršić, Zrinka Mesić <i>The habitat map development and the definition of ecological requirements and conservation zones of the natural values of the Brijuni National Park</i>	116
Vesna Kolar Planinšić, Metka Černelc <i>An example of corrective measures of the strategic environmental impact assessment and environmental impacts assessment on the Pokljuka Biathlon Centre in the Triglav National Park</i>	118
Josip Rubinić, Gordana Goreta, Snježana Malić Limari, Najla Baković, Maja Radišić <i>Importance of Hydrological Assessment of Climate Change Impacts in Protected Areas – Examples of Krka NP and Medvednica NP</i>	119
Ines Geci, Tomislav Hriberšek, Igor Anić <i>The Methodology for Pollution Register Preparation for the Sanitary Protection Areas of Wellfields Slapnica and Lipovec in the Town of Samobor</i>	121
Blaženka Banjad Ostojić, Vanja Medić, Vlatka Dumbović Mazal <i>Construction of transverse dyke from the flood relief channel Odra to the Sava river dyke near the Suša village- protection of the target species Corn Crane (Crex crex) in the area of the ecological network HR1000003 Turopolje</i>	123
Goran Lončar, Domagoj Vranješ, Ivana Tomašević, Katarina Čović, Ivana Buj, Goran Dašić, Lovorka Korica	

<i>Possibilities of mitigating water regulation and flood protection structures impact on riparian ecosystems</i>	125
<i>Hrvojka Šunjić, Ivana Ivanković Programme of protection, regulation and utilization of the Sava River and its hinterland from the Slovenian border to Sisak</i>	127
<i>Davor Korman, Ana Ostojić, Nela Jantol, Zrinka Mesić Importance of biospeleological research: HES Kosinj case study</i>	129
<i>Ivančica Somodi, Marija Čulina Rapo, Metod Šolto Flooding Waste Management on Hydropower Plant – Cleaning the River.....</i>	131
<i>Tomislav Lukić, Đuro Tunjić, Andrijana Ostojić-Mihić, Krunoslav Boban, Nevenko Herceg Condition of standardized enviroment control in the southeastern region with a reflection on ecolabeling</i>	133
<i>Iva Lukić¹, Tomislav Lukić² Appliance of environmental standards and eco-labels in sustainable tourism in the region</i>	135
<i>Edin Lugić, Dunja Delić, Tena Birov, Božica Šorgić, Željko Koren, Zrinka Mesić Mitigation measures, protection measures and monitoring status for target species and habitats of Natura 2000 areas in strategic environmental impact assessments</i>	137
<i>Igor Tošić, Davor Korman, Sonja Sviben, Edin Lugić, Zrinka Mesić, Ana Ostojić Mitigation measures and monitoring in the Strategic Environmental Assessment defined by the Water Framework Directive</i>	139
<i>Mate Zec Using sensitivity mapping to prioritise field research.....</i>	141
<i>Boris Božić, Edin Lugić, Dunja Delić Monitoring of wind farms in Croatia</i>	142
<i>Jelena Kurtović, Alen Soldo, Marina Mašanović, Igor Glavičić, Zvezdana Popović-Perković, Josip Boban Protection of ecological network Natura 2000 seabed at anchoring sites of Split-Dalmatia County</i>	144
<i>Anita Erdelez, Martina Furdek, Anamaria Štambuk, Ivan Župan, Melita Peharda Banded murex Hexaplex trunculus as TBT pollution monitoring tool in Croatian ports</i>	146
<i>Alen Berta, Vladimir Kušan, Zrinka Mesić, Dino Križnjak New findings for GHG National Inventory Report- woodstocks of the scrublands and maquies in the Croatian Mediterranean and sub-Mediterranean</i>	148
<i>Marija Zabukovnik, Filip Kokalj Operation experience and outlook of Waste – to – Energy plant Toplarna Celje</i>	149

SEKCIJA 3 - ZAŠTITA PRIRODE I ODRŽIVO KORIŠTENJE PRIRODNIH RESURSA /

SECTION 3 - NATURE CONSERVATION AND SUSTAINABLE USE OF NATURAL RESOURCES

POSTER PREZENTACIJE / POSTER PRESENTATIONS

<i>Maja Taslidžić-Šaćiragić, Erna Alihodžić, Vildana Mahmutović, Vanja Ćurin Constructed wetland system appliance for meat industry waste water treatment</i>	153
<i>Luka Škunca, Marina Škunca, Hrvoje Peternel, Vida Zrnčić, Višnja Šteko, Andrijana Mihulja, Oleg Antonić Identifying High Conservation Value Areas and Ecosystem Services in the County Bilje (Baranja, Croatia)</i>	155

Melita Burić, Ana Jurjević, Sanja Grgurić <i>Hydrodynamic modeling of volume variations and thermal stratification development in reservoir Butoniga</i>	156
Maja Šimunović, Jelena Fressl, Marija Gligora Udovič, Gordana Goreta <i>Applying phytoplankton functional groups in determining the ecological status of lake Visovac</i> .	157
Marina Vidosavljević, Vlatka Gvozdić, Dinko Puntarić, Domagoj Vidosavljević, Matijana Jergović, Miroslav Venus, Ada Puntarić, Dragana Jurić <i>Determinations of arsenic concentrations in hair samples with ICP-MS in area of eastern Croatia</i>	159
Vlatka Gvozdić, Dinko Puntarić, Domagoj Vidosavljević, Matijana Jergović, Stjepan Živković, Filip Samardžić, Lidija Bijelić <i>Determinations of selenium concentrations in plants (Taraxum officinale) and biological samples with ICP-MS (eastern Croatia)</i>	160
Sanja Kozulić, Igor Anić, Imelda Pavelić <i>Possibilities of circular management of construction and demolition waste in Croatia</i>	161
Tomislav Lukić, Stanislava Talić, Iva Lukić, Nermin Alić <i>Intensive development of plantation breeding in Herzegovina (Helichrysum italicum (Roth) G. Don) without developmental planning and strategic documents and environmental impact assessment study</i>	163
Tina Klemenčič, Caroline Pecher, Ulrike Tappeiner, Andreas Haller, Patricia Detry, Jean-Pierre Fosson, Isabella Pasutto, Maria Quarta, Tadej Kogovšek, Suzana Vurunić, Heike Summer, Andreas Pichler ¹ , Stefan Marzelli ¹ <i>AlpES – Alpine Ecosystem Services – mapping, maintenance and management</i>	165

SEKCIJA 4 - SUDJELOVANJE JAVNOSTI /

SECTION 4 - PUBLIC INVOLVEMENT

Daria Mateljak, Darko Alfirev <i>Communication and stakeholder engagement challenges in SEA and EIA processes</i>	169
Andreja Pavlović, Ines Petra Strunje <i>Disinformation in Environmental Impact Assessments - causes, consequences and solutions</i>	170
Merica Pletikosić <i>Investor responsibility in informing the public about a planned project</i>	172
Aslı Gemci, Petra Remeta, Đorđe Stefanović <i>Strengthening CSO participation in environmental decision making</i>	173
Andreja Pavlović <i>Three theses on the need for radical changes in the rational-technical model in environmental decision-making</i>	174
Fanica Kljaković-Gašpić, Tomi Haramina, Višnja Šteko, Sunčana Bilić, Matea Lončar, Jasmina Šargač, Nikolina Bakšić, Sanja Grgurić, Melita Burić, Ana Jurjević, Goran Gašparac, Oleg Antić <i>Participatory process for physical planning in the example of study Resource mapping and sustainable mariculture management in Šibenik- Knin county</i>	176
Remzije Istrefi, Mihone Kerolli-Mustafa <i>The partnership between NGOs and public institutions for environmental protection in Kosovo: The complementarity of purpose</i>	178

SEKCIJA 4 - SUDJELOVANJE JAVNOSTI /

SECTION 4 - PUBLIC INVOLVEMENT

POSTER PREZENTACIJE / POSTER PRESENTATIONS

Ines Pohajda, Iva Pavić, Letizia Antonella Vukorep, Marko Dobrić

Agri-environment-climate education in advisory work: Experiences with farmers 181

SEKCIJA 5 - ZAŠTITA OKOLIŠA I FINANCIRANJE PROJEKATA /

SECTION 5 - ENVIRONMENTAL PROTECTION AND PROJECT FINANCING

Boris Majić

Challenges to meeting the environmental protection requirements and the nature of projects funded from EU funds..... 185

Boris Majić

Pelješac Bridge - Path to EC Approval on Project Financing with a Review on Environmental Issues and Nature Issues..... 187

Marijana Bakula

Agglomeration Rijeka – Cofinancing major environmental protection projects 189

Margareta Šeparović, Ivan Barbić

Environmental Monitoring on Landfills - Financial Challenge for the Municipalities 191

Valentina Habdija Žigman, Željko Varga

Landscape revitalization, the final step at remediating municipal waste landfills within EU funded projects 193

SEKCIJA 1 / SECTION 1

STRATEŠKA PROCJENA UTJECAJA NA OKOLIŠ / STRATEGIC ENVIRONMENTAL IMPACT ASSESSMENT

Determining the significance of environmental impact: Analysis of practices in Croatia

Marina Stenek, Bojana Nardi, Nenad Mikulić

Ekoinvest Ltd., Draškovićeve 50, Zagreb, Croatia
(marina.stenek@ekoinvest.hr, bojana.nardi@ekoinvest.hr,
nenad.mikulic@ekoinvest.hr)

Abstract

SEA Report identifies describes and assesses the likely significant environmental impacts that may arise from implementation of a strategy, plan or program, and its contents are defined by the Croatian Regulation on SEA (OG No. 3/2017). The Regulation also defines the criteria that should be used in determining the likely significant impacts in terms of nature of effects and characteristics of areas affected by implementation of the document, but the decision on the method for the analysis of their significance to be used is placed at the discretion of the person authorized for EA.

Determining the significance of environmental impact is based on setting the scale between the best and worst variants in a given context, based on the established indicators for each component, ie. the definition of assessment criteria, which must be set for each component, regardless of the chosen method of analysis.

The main objective of the paper is to determine which are the methods and tools most commonly used in the Republic of Croatia and to what extent they are used in defining the criteria for determining the significance of impacts.

Results indicate that authorized persons mostly use qualitative methods and base the assessment results on their expert opinion, not specifying the criteria for determining significance of impacts. Such practice bring into question the objectivity, and comparability of assessments, since the results obtained without established indicators are entirely dependent on the interpretation of experts.

Keywords: Impact significance, Criteria/indicators, Environmental Report

Utvrđivanje značaja utjecaja na okoliš: Analiza prakse u Republici Hrvatskoj

Marina Stenek, Bojana Nardi, Nenad Mikulić

Ekoinvest d.o.o., Draškovićeve 50, Zagreb, Hrvatska
(marina.stenek@ekoinvest.hr, bojana.nardi@ekoinvest.hr,
nenad.mikulic@ekoinvest.hr)

Sažetak

Strateškom studijom se određuju, opisuju i procjenjuju vjerojatno značajni utjecaji na okoliš koji mogu nastati provedbom strategije, plana ili programa, a njen sadržaj propisan je Uredbom o strateškoj procjeni utjecaja strategije, plana i programa na okoliš (NN 3/2017). Uredbom su određeni i kriteriji za utvrđivanje vjerojatno značajnog utjecaja na okoliš s obzirom na obilježja utjecaja i obilježja područja na koje provedba dokumenta može utjecati, dok je odluka o odabiru metode analize utjecaja prepuštena ovlaštenicima.

Određivanje značaja utjecaja temelji se na postavljanju skale između najbolje i najgore varijante u datom kontekstu, na temelju utvrđenih indikatora za svaku sastavnicu, tj. definiranju kriterija procjene, koji se moraju postaviti za svaku sastavnicu, bez obzira na odabranu metodu analize.

Glavni cilj rada je utvrditi najčešće korištene metode, odnosno alate, koje ovlaštenici u RH koriste za procjenu utjecaja na okoliš, te u kojoj se mjeri i na koji način kroz spomenute metode utvrđuju kriteriji za određivanje značajnosti utjecaja na obrađivane sastavnice.

Rezultati ukazuju na to da se u većini slučajeva koriste kvalitativne metode kroz koje se rezultati procjene iskazuju na temelju stručne procjene, za koju se u postupku ne utvrđuju ili ne iskazuju kriteriji za određivanje značaja utjecaja. Ovakav postupak dovodi u pitanje objektivnost, ali i usporedivost procjene, budući da rezultati dobiveni bez određenih indikatora u potpunosti ovise o interpretaciji stručnjaka.

Ključne riječi: Značaj utjecaja, Kriteriji/indikatori, Strateška studija

Good practice experiences of Training Strategy and Action plan on SEA and EIA as supportive measures for efficient implementation in Slovenia

Vesna Kolar Planinšič¹, Sarah Duff², Ismini Kyriazopoulou²

¹Ministry of the Environment and Spatial Planning, Republic of Slovenia, Dunajska 48, 1000 Ljubljana, Slovenia (vesna.kolar-planinsic@gov.si)

²JASPERS, Luxemburg and Vienna

Abstract

The transposition and effective implementation of the SEA and EIA directives is one of the ex-ante conditionalities and conditions for ensuring the proper use of European funds. Building and strengthening the administrative capacity of experts involved in the implementation of the SEA and EIA Directives is essential for an adequate understanding of the processes and proper implementation of the SEA and EIA Directives and consequently the proper use of funds. The aim of the paper is presentation of arrangements for the effective application of EU environmental legislation related to EIA and SEA, which represents the general ex-ante conditionality, applicable in principle to all Operation programmes. The paper describes the methods in developing a training strategy, the action plan and related training modules. It shows the method of identifying the main topics and organising the 13 training modules on the following topics: EIA Screening, Climate change in SEA and EIA, SEA and EIA Quality, SEA and EIA and water framework directive, SEA in National Spatial Plans, SEA in municipal land use plans, SEA/EIA and cultural change, SEA and health, new EIA Directive, SEA/EIA and public participation, Tranboundary SEA/EIA and appropriate assessment. The action plan has been implemented in 2015, 2016 and 2017, jointly by ministry and JASPERS as well as the external technical support for some actions and additional trainers from EU. The assessment of each training action was done and the middle evaluation of analyses show the positive result, as the additional knowledge and understanding of topics were reached and good practice experiences broader the view and build good base for efficient SEA and EIA procedures.

Keywords: training strategy, action plan, SEA, EIA, ex-ante conditionality

System of the environmental assessment in Russia: legal aspects and perspectives

Ekaterina Khmeleva, Yulia Dolinina

WWF-Russia, Nikoloyamskaya st. 19, Moscow, Russia (ekhmeleva@wwf.ru)

Abstract

Russia has already started the process of incorporation of European environmental standards into national legislation and regulations.

Though Russia is not a Party of the Espoo Convention, it has implemented the conventional provisions, and conducted an Environmental Impact Assessment (EIA) in accordance with the Convention within the Nord Stream project. As Russia is intended to become a party of the Espoo Convention and Protocol on SEA it was decided to develop appropriate legislation prior to ratification.

In general, the procedure of environmental assessment and taking decisions on environmental matters consists of specific combination of state ecological expertise and impact assessment on the environment (also called OVOS). Thus, there is different procedure Russia from that, which internationally understood as an environmental impact assessment (EIA) procedure.

Russia is only developing SEA in form that is defined by the Protocol on SEA with developing new legal acts and regulatory framework and pilot SEA implementation in individual regions. One of such projects was conducted in Zabaikal Region and in two other regions pilot SEA are also already started. Such projects set important precedents, allow to elaborate a methodological framework and develop the relevant guidelines for applying SEA procedures and finally lay the basis for SEA nationally

Keywords: strategic environmental assessment, legislation, environmental assessment.

The appropriateness and quality of Monitoring Indicators – Lessons learned from Monitoring Reports

Klemen Strmšnik¹, Jelka Habjan², Matjaž Harmel¹, Sabina Cepuš¹

¹ZaVita d.o.o., Tomišškova 40, 1000 Ljubljana, Slovenia (klemen@zavita.si)

²Ministry of the Environment and Spatial Planning - Environment Directorate,
Dunajska c. 47, 1000 Ljubljana, Slovenia (jelka.habjan@gov.si)

Abstract

The year 2014 marked a decade since the implementation of the SEA Directive (2001/42/EC). This triggered SEA effectiveness reviews, search for best practices and preparation of sector specific guidelines in many EU Member States. All with a specific aim – to improve SEA practice. However, as welcome as this retrospective and self-evaluation is, it also raises one important question: *“What about the effectiveness of quality control mechanisms already incorporated into the SEA itself?”*

In this article, we are focusing on one specific implementation-linked control mechanism – Monitoring Indicators. Lessons learned on examples of Municipal Spatial Plans and National Strategies show that:

- A surprisingly high number of monitoring indicators proved to be poorly linked to the actual implementation - and were thus not relevant.
- Often, monitoring indicators were not linked to identified impacts – and were actually not needed.
- Selected monitoring indicators were sometimes based on one-time monitoring of a specific issue or case example – and thus cannot be repeated.

Subsequently, experts preparing the Monitoring Reports were forced to firstly re-evaluate the appropriateness and quality of Monitoring Indicators, to propose substitute monitoring indicators, and only then prepare the Monitoring Report.

In our perspective, many of above stated problems can be linked to:

- in-experience of SEA practitioners and other participants in the SEA processes,
- un-founded fears linked to the quality of the SEA Reports – subsequently demanding non-relevant monitoring indicators,
- in-ability of all participants of the SEA process to envision the actual implementation of the plan.

Keywords: SEA, monitoring indicators, monitoring quality, spatial planning, monitoring report

Strategic Environmental Assessments of County Development Strategies

Daniela Klaić Jančijev, Mario Pokrivač

DVOKUT-ECRO Ltd., Trnjanska 37, Zagreb, Croatia
(daniela.jancijev@dvokut-ecro.hr)

Abstract

Strategic environmental assessments of county development strategies imply a complex consultation process. The development strategy developers are the county development agencies, which also conduct a consultative process of developing the development strategy in parallel. As the development of a strategic environmental study starts at the early stages of developing a development strategy, the strategic assessment process includes a sufficient period for a good approach to develop a strategic study and the contribution to the development strategy document. County development strategies provide a framework for project implementation in the planned period and therefore do not contain individual projects with more detailed project data. Lack of data on individual projects is a difficulty given the need for more detailed analysis when assessing. Strategic environmental studies of county development strategies may include chapters of the appropriate assessment. The most important aspect of the impact is the cumulative impact that can be predicted based on available data and background documents. Also, variant solutions to the planned activities are not envisaged. Analysis within the administrative boundaries of the county carries certain limitations. The parallel development of both documents, which includes a sufficient period for the necessary consultations and harmonization, is a positive characteristic of these procedures.

Keywords: strategic environmental assessment, county development strategy

Strateške procjene utjecaja na okoliš za županijske razvojne strategije

Daniela Klaić Jančijev, Mario Pokrivač

DVOKUT-ECRO d.o.o., Trnjanska 37, Zagreb, Hrvatska
(daniela.jancijev@dvokut-ecro.hr)

Sažetak

Postupci strateških procjena županijskih razvojnih strategija podrazumijevaju kompleksan konzultacijski postupak. Nositelji izrade razvojne strategije su županijska tijela zadužena za razvoj, koja paralelno provode konzultacijski proces izrade razvojne strategije. Kako izrada strateške studije započinje u ranoj fazi izrade razvojne strategije, postupak strateške procjene uključuje dovoljan vremenski period za kvalitetan pristup te u konačnici doprinos dokumentu razvojne strategije. Također, omogućava eventualno potrebne korekcije pojedinih dijelova dokumenta vezano uz poglavlja zaštite okoliša. Razvojne strategije daju okvir za provođenje projekata u razvojnom periodu, te stoga ne sadrže konkretne projekte s detaljnijim projektnim podacima, osim u slučaju projekata koji su predviđeni županijskim ili državnim proračunima. Nedostatak podataka predstavlja poteškoću s obzirom na detaljnije analize prilikom procjene. Strateške studije razvojnih strategija mogu sadržavati poglavlja glavne ocjene prihvatljivosti za ekološku mrežu. Najznačajniji aspekt utjecaja je kumulativni utjecaj koji je moguće predvidjeti na osnovu dostupnih podataka i podloga. Varijantna rješenja predviđenih aktivnosti nisu planirana što predstavlja nedostatak. Sagledavanje unutar administrativnih granica županije nosi ograničenja prilikom analize. Paralelna izrada oba dokumenta koja uključuje dovoljan period konzultacija sudionika i usklađivanje dokumenata, daje pozitivno obilježje ovim postupcima.

Ključne riječi: strateška procjena utjecaja na okoliš, županijska razvojna strategija

Effective Strategic Environmental Assessment for municipal spatial plans in Slovenia

Matjaž Harmel¹, Sabina Cepuš¹, Klemen Strmšnik¹, Vesna Kolar Planinšič², Mojca Lenardič²

¹*ZaVita d.o.o., Tominškova 40, 1000 Ljubljana, Slovenia (matjaz@zavita.si)*

²*Republic of Slovenia, Ministry of Environment and Spatial Planning
(vesna.kolar-planinsic@gov.si)*

Abstract

After more than ten years of experience in SEA for spatial plans, the Ministry of the Environment and Spatial Planning decided to prepare a set of capacity building trainings for the municipalities on the preparation of SEA for spatial plans. The Main reason for such decision was that some municipalities still have many problems in implementation of SEA for their spatial plans and that there are still some municipalities that in the last 13 years didn't adopt new spatial plans, so they do not have experience in SEA.

Besides training, the manual on effective implementation of SEA for the spatial plans was developed. Its aim is to help municipalities with the tips, suggestions and ideas on the implementation and improvement of the processes in different steps of the SEA procedure.

The manual is leading users step by step through the whole process of the SEA. It gives them practical examples, pointing out the most critical phases and suggests them how to implement them smoothly and effectively to get the best possible result. The manual was designed for use in Slovenian municipalities. The biggest advantage of the manual is that it was prepared for the implementation in the Slovenian spatial planning process and is therefore directly applicable. Another advantage is that the manual was prepared by the experienced practitioners in close collaboration with the staff of the Ministry of Environment and Spatial Planning who have significant experiences in implementation of the Strategic Environmental Assessment.

Keywords: SEA, Spatial Plan, ToR, consultation

Strategic environmental assessment in Novokuznetsk municipal district, Kemerovo region, Russia

Elena Perfilyeva, Svetlana Belozerova, Tatiana Voron, Kseniia Stadnikova, Kseniia Stepanenko

*InEca-consulting, LLC, Lazo str.4, Novokuznetsk, Russian Federation
(ineca@ineca.ru)*

Abstract

In 2016-2017 the strategic environmental assessment of «The Integrated programme of social and economical development of Novokuznetsk municipal district» was implemented within the bound the project of Russian Federation Natural Resources and Environmental Protection Ministry, United Nations Development Program and Global Environmental Facility (<http://bd-energy.ru>).

District characteristics: the square is 13057,12 km². Population (including cities) is 700 000 people. 70% of territory is the mountain taiga landscape. On 20% there are located specially protected nature conservation areas. Key economic sectors are coal mining and agriculture.

The ecosystem services and biodiversity economic value assessment was implemented within the bound of the project, including indentifying the average specific indicators of ecosystem value and loss from decreasing the ecosystem square due to coal mining operations; the recommendations for using the recreation, provisioning, cultural, supporting and regulating ecosystem services were given for key stakeholders.

As a result of the SEA there were developed the recommendations for predicted impact, avoidance, minimization or mitigation of impact and increasing the positive influence on the environment condition and population health; for correction of «The Integrated program...» (including another strategic documents) goals, activities and indicators.

Keywords: strategic environmental assessment, ecosystem services and biodiversity economic value assessment

Strategic environmental assessment for the Program of Exploration and Production of Hydrocarbons Offshore Montenegro

Brankica Cmiljanović¹, Tamara Brajović², Dina Skarep³

¹Ministry of Sustainable Development and Tourism , IV proletherske 19, 81000 Podgorica, Montenegro (brankica.cmiljanovic@mrt.gov.me)

²Agency for nature protection and Environment, IV proletherske 19, 81000 Podgorica, Montenegro (tamara.brajovic@epa.org.me)

³Hydrocarbons Administration of Montenegro, Naselje Krusevac bb, 81000 Podgorica, Montenegro (dina.skarep@mha.gov.me)

Abstract

Strategic environmental assessment has been implemented in Montenegro for almost one decade. Even it is a quite long period of implementation the challenges still exist. In order to overcome a possible difficulties and misunderstandings of the implementation of the Law on strategic environmental assessment competent authorities establish an intersectoral working team such as an advisory body. After the Decision on preparations of the Program of Exploration and Production of Hydrocarbons Offshore Montenegro was made by Government of Montenegro, Ministry of Economy as a competent body started to create conditions for the adequate implementation which means to establish a working team and preparation of Decision on SEA need.

In this article, we are focusing on one specific case of implementation showing as a good example of an administrative procedure (lessons learned). Lessons learned on example of SEA for the Program Exploration and Production of Hydrocarbons Offshore Montenegro.

SEA for the Program of Exploration and Production of Hydrocarbons Offshore Montenegro showed that:

- A carefully planned SEA process will not guarantee a time scheduled process;
- Inclusion of outsource experts will improve the quality of SEA report and evaluation;
- The tight cooperation among institutions will speed up the SEA process;
- The transboundary consultations require a more time and more explanations;
- The public hearing was turned into political debate.

Keywords: SEA; SEA report, hydrocarbons, experts, evaluation.

Experiences in conducting strategic environmental impact assessments at the local level in Primorje-Gorski Kotar County

Koraljka Vahtar – Jurković¹, Jelena Čanik¹, Sonja Šišić²

¹*Primorje-Gorski Kotar County, Administrative Department for Physical Planning, Civil Engineering and Environmental Protection, Adamićeva 10, 51000 Rijeka, Croatia, (koraljka.vahtar-jurkovic@pgz.hr)*

²*Public Institution Priroda, Grivica 4, 51000 Rijeka, Croatia (sonja.sisic@ju-priroda.hr)*

Abstract

The July 2014 amendments to the Environmental Protection Act stipulate the obligation to conduct strategic environmental impact assessments not only with regard to documents at the national and regional level but also for strategies, plans and programmes at the local self-government level. In the area of Primorje-Gorski Kotar County, which comprises 36 local self-government units, only one strategic environmental impact assessment regarding a change to a town spatial plan has been conducted so far. Another procedure for a planning document in the field of transport is currently in progress. In addition, the evaluation process regarding the need for a strategic environmental impact assessment has been conducted for 16 further strategies, plans or programmes. Implementation so far has identified a number of problems and resistance to implementing such legislation. For this reason, this paper presents an overview of all strategic environmental impact assessment procedures that have been conducted so far, and evaluates the need for implementation, including the impact on the ecological network, an overview of document types and the areas for which these have been drawn up, problems that have occurred, and the results of these procedures. This has been carried out with the aim of contributing to the analysis of the implementation and effectiveness of environmental protection regulations.

Keywords: strategic environmental impact assessments, local level, Primorje-Gorski Kotar County

Iskustva u provedbi strateške procjene utjecaja na okoliš lokalne razine na području Primorsko-goranske županije

Koraljka Vahtar – Jurković¹, Jelena Čanik¹, Sonja Šišić²

¹Primorsko-goranska županija, Upravni odjel za prostorno uređenje, graditeljstvo i zaštitu okoliša, Adamićeva 10, 51000 Rijeka, Hrvatska, (koraljka.vahtar-jurkovic@pgz.hr)

²Javna ustanova Priroda, Grivica 4, 51000 Rijeka, Hrvatska (sonja.sisic@ju-priroda.hr)

Sažetak

Izmjenama Zakona o zaštiti okoliša, od srpnja 2014. utvrđena je obveza provedbe strateške procjene utjecaja na okoliš, osim za dokumente državne i županijske razine, i za strategije, planove i programe jedinica lokalne samouprave. Na području Primorsko-goranske županije, u sklopu koje je 36 jedinica lokalne samouprave, do sada je provedena samo jedna strateška procjena za izmjenu gradskoga prostornog plana, a u tijeku je još jedan postupak za planski dokument iz područja prometa. Za još 16 strategija, planova ili programa proveden je postupak ocjene o potrebi SPUO. Dosadašnja provedba ukazala je na brojne probleme i otpore primjeni ovakve zakonske odredbe. Stoga se u radu daje pregled do sada provedenih postupaka strateške procjene utjecaja na okoliš i ocjene o potrebi njezine provedbe, uključujući i utjecaje na ekološku mrežu, kao i pregled vrsta dokumenata i područja za koje su izrađeni, problema koji su ih pratili i ishoda tih postupaka, sve radi doprinosa analizi provedbe i učinkovitosti propisa iz područja zaštite okoliša.

Ključne riječi: strateška procjena utjecaja na okoliš, lokalna razina, Primorsko-goranska županija

Strategic environmental assessment of Small Hydro Power Development Policy in Albania, a Comprehensive, Climate Resilient Approach to Sustainable Hydropower for Albania - methodology and approach

Jelena Fressl, Daniela Klaić Jančijev

*DVOKUT-ECRO Ltd., Trnjanska 37, Zagreb, Croatia
(jelena.fressl@dvokut-ecro.hr, daniela.jancijev@dvokut-ecro.hr)*

Abstract

The preparation of the Strategic environmental assessment of Small Hydro Power Development Policy in Albania, a Comprehensive, Climate Resilient Approach to Sustainable Hydropower for Albania was contracted by the UNDP Albania with the aim to assist the Government to make informed decisions. The SEA methodology and approach was outlined in the project Terms of References and the submitted proposal, however it was still further developed during the project course.

This paper will give an overview of the SEA methodology specificities and the manner in which the SEA team addressed them. Firstly, the SEA was prepared for a policy in implementation, no a planning document in preparation. The project included a Field Survey and an EIA Review for a percentage of operational, under construction and planned SHPP locations (SHPP sample). The results of both had to be included in the impact assessment and were therefore instrumental to drafting the SEA conclusions and recommendations.

Keywords: Strategic Environmental Assessment (SEA), Small Hydro Power Plant (SHPP), Albania, Field Survey, EIA Review

Experience of strategic assessment in Ukraine on example of preparation of Strategic Environmental Assessment for the National Transport Strategy

Mario Pokrivač¹, Oksana Sakal²

¹DVOKUT-ECRO Ltd., Trnjanska 37, Zagreb, Croatia
(mario.pokrivac@dvokut-ecro.hr)

²Public Institution „Institute of Environmental Economics and Sustainable Development of the National Academy of Sciences of Ukraine, Taras Shevchenko Boulevard 60, Kiev, Ukraine (o_sakal@ukr.net)

Abstract

Given that the local legislation in Ukraine is still not aligned with the EU directives, Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment (“SEA Directive”) which lays down the principles, methods and fields of application of SEA was used.

SEA Objectives have therefore been developed for each SEA environmental topic: air and climate change, soil and land use change, water and sea, habitats, flora and fauna, protected areas and landscape, cultural heritage and material assets, population, energy, noise, waste and health and safety issues. Scoping consultation helped to inform the development of the SEA Objectives which have subsequently been refined through further stakeholder consultation and a review of baseline characteristics.

The SEA directive foresees the determination of measures to prevent, reduce or offset the adverse impacts on the environment. The proposed measures are based on the impacts assessed in the chapter related to potential impacts and the international experience in similar conditions. However, the measures proposed provide general guidance for addressing the adverse impacts, while detailed measures must be examined case by case during the development of specific projects and incorporated during environmental permitting process.

The monitoring procedure that is proposed in SEA report takes advantage of procedures that already exist in the country in the framework of other policy and legislation requirements. Additionally, the measures for improvement of the data collection in the SEA NTS will facilitate the capability of monitoring the implementation and effects of the NTS.

SEA should ensure that National Transport Strategy and plans take into consideration the environmental effects their causes.

Keywords: strategic assessment, national transport strategy, objectives, measures, monitoring

Iskustva strateške procjene u Ukrajini na primjeru izrade Strateške procjene utjecaja na okoliš za Nacionalnu prometnu strategiju

Mario Pokrivač¹, Oksana Sakal²

¹DVOKUT-ECRO d.o.o., Trnjanska 37, Zagreb, Hrvatska
(mario.pokrivac@dvokut-ecro.hr)

²Javna ustanova "Institut za ekonomiku okoliša i održivi razvoj Nacionalne akademije znanosti Ukrajine, Avenija Tarasa Shevchenka 60, Kijev, Ukrajina
(o_sakal@ukr.net)

Sažetak

S obzirom da lokalno zakonodavstvo u Ukrajini još uvijek nije usklađeno s direktivama Europske unije, Direktiva 2001/42 / EZ o procjeni učinaka pojedinih planova i programa na okoliš ("SEA Directive"), koji propisuje načela i metode je korištena za područje primjene SPUO.

Ciljevi SPUO stoga su razvijeni za svaku temu okoliša u SPUO: zrak i klimatske promjene, promjene tla i korištenja zemljišta, vode i more, staništa, flora i fauna, zaštićena područja i krajolik, kulturna baština i materijalna imovina, broj stanovnika, energija, buka, otpad i zdravstvena i sigurnosna pitanja. Konzultacije vezane uz odlučivanje o sadržaju pomogle su razvoju SPUO ciljeva koji su utvrđeni kroz daljnje konzultacije s dionicima i pregledom osnovnih karakteristika.

SEA Direktiva predviđa određivanje mjera za sprječavanje, smanjivanje ili kompenziranje štetnih utjecaja na okoliš. Predložene mjere temelje se na utjecaju ocijenjenom u poglavlju utjecaja i međunarodnom iskustva u sličnim uvjetima. Međutim, mjere koje su predložene daju osnovne smjernice za adresiranje utjecaja dok će detaljnije mjere biti utvrđene od slučaja do slučaja tijekom razvoja specifičnih projekata i ugraditi će se u proces izdavanje dozvola u zaštiti okoliša.

Postupak praćenja stanja okoliša koji je predložen u SPUO koristi prednosti procedura koji već postoje u zemlji u okviru zahtjeva drugih politika i zakonodavstva. Osim toga, mjere za poboljšanje prikupljanja podataka u SPUO NTS će olakšati praćenja provedbe i učinaka NTS.

SPUO treba osigurati da Nacionalne prometna strategije i planovi uzimaju u obzir okolišne učinke koje uzrokuju.

Ključne riječi: strateška procjena, nacionalna prometna strategija, ciljevi, mjere, program praćenja

Applying the system of environmental-economic accounting (SEEA) in strategic planning and strategic environmental impact procedures

Zlatko Pletikapić

*Elektroprojekt d.d., Alexandera von Humboldta 4, Zagreb, Croatia
(zlatko.pletikapic@elektroprojekt.hr)*

Abstract

Through long-term planning, national economies attempt to avoid rushed and insufficiently deliberate short-term measures when managing their economy and natural resources. At national level, strategic planning is starting to focus towards consideration of different environmental issues arising as a result of significant development plans and programs. These impacts regard social, economic and environmental conditions throughout the entire implementation period.

Strategic planning in the field of impact management between environmental protection, economic and social development has been deliberated in several forms. The concept of a unified, respectively integrated environmental-economic account used by several countries nowadays has been developed separately. This account enables integrated statistics on the most important environmental issues in relationship to the economy as well as development of sectoral policies related to environmental protection and management of natural resources.

The system of environmental-economic accounting is based on the national economic account prepared as an 'input-output' table. In 2013, the Croatian Bureau of Statistics published the first I-O tables for the Croatian economy for the years 2004 and 2005. In 2015, the I-O tables for the year 2013 were issued. With this, the preconditions for establishment of the environmental-economic account for Croatia were created.

Due to the novelty of this system of accounting in Croatia, it has not been applied in strategic planning at national level to date while research studies applying this method are just starting to arise in individual economic sectors.

This paper aims to demonstrate application possibilities of this methods in strategic environmental assessment and justification of its development on national level.

Keywords: Strategic planning, strategic environmental assessment, environmental-economic account

Primjena objedinjenog ekonomsko-ekološkog računa u strateškom planiranju i strateškim procjenama utjecaja na okoliš

Zlatko Pletikapić

*Elektroprojekt d.d., Alexandera von Humboldta 4, Zagreb, Hrvatska
(zlatko.pletikapic@elektroprojekt.hr)*

Sažetak

Nacionalne ekonomije dugoročnim planiranjem nastoje izbjeći nagle promjene i nedovoljno promišljene kratkoročne mjere u upravljanju vlastitim gospodarstvom i prirodnim bogatstvima. Strateško planiranje na nacionalnoj razini počelo se usmjeravati i na sagledavanje različitih okolišnih utjecaja koji su posljedica značajnih razvojnih programa i planova, pri čemu se ti utjecaji odnose na socijalne, gospodarske i okolišne uvjete kroz cijelo razdoblje njihove realizacije. Strateško planiranje u području upravljanja međuutjecajima očuvanja okoliša i gospodarskog i socijalnog razvoja, promišljano je u više oblika. Posebno se razvio koncept objedinjenog odnosno integriranog ekonomsko-ekološkog računa, kojeg danas koriste mnoge države. Ovaj koncept omogućava analizu međuutjecaja najvažnijih okolišnih problema i gospodarstva, te građenje sektorskih politika vezanih uz zaštitu okoliša i upravljanje prirodnim bogatstvima. Objedinjeni ekonomsko-ekološki račun temelji se na nacionalnom ekonomskom računu, pripremljenom u obliku „Input-Output“ tablica. Državni zavod za statistiku RH je 2013. izdao prve prema međunarodnim standardima izrađene I-O tablice za hrvatsko gospodarstvo za 2004. i 2005., a 2015. izdao je i I-O tablice za 2013. godinu. Time su stvoreni preduvjeti za uspostavu objedinjenog ekonomsko-ekološkog računa za RH. S obzirom na novost ovog računa u RH, on do sada nije primjenjivan u izradi različitih strategija na nacionalnoj razini, a tek su se počela javljati istraživanja u pojedinim gospodarskim sektorima s korištenjem ove metode. Ovim radom želi se pokazati mogućnosti njene primjene u strateškim procjenama i opravdanost njenog razvoja na nacionalnoj razini.

Ključne riječi: strateško planiranje, strateške procjene, ekonomsko-ekološki račun

SEA of IInd Spatial plan changes and amendments of Marina municipality

Boška Matošić¹, Natalija Pavlus², Nela Sinjkević¹, Marin Perčić¹,
Smiljana Blažević¹

¹*Zeleni servis d.o.o., Templarska 23, Split, Croatia*
(nela.sinjkevic@zeleniservis.hr)

²*Zeleni servis d.o.o., Ive Robića 2, Zagreb, Croatia,*

Abstract

The Strategic Environmental Assessment was made for the proposition of IInd Spatial plan changes and amendments of Marina municipality. In total 14 activities have been proposed and at request of the Ministry of Environment and Energy the Main assessment of the acceptability for the Ecological Network was also conducted. Assessment of planned activities on individual environmental components found that planned location for the whitefish farm Kobiljak was not favorable because it would be mostly located above the *Posidonia oceanica* meadows. A significant negative impact on *Posidonia* meadows is expected by the activity of fish farming and therefore the activity of the fish farm Kobiljak was removed from IInd Spatial plan changes and amendments of Marina municipality.

Assessment of the other planned activities found that there is no significant impact on individual components of the environment and that the predicted impacts will be diminished, if the activities will be conducted by respecting the applicable Croatian legislation and the implementation of measures recommended by the Strategic Study.

With this example we would like to indicate the importance of Strategic Environmental Assessment implementation during spatial planning, in order to prevent negative impacts on environment.

Keywords: Strategic Environmental Assessment, Spatial plan, fish farm, impact, *Posidonia oceanica*

SPUO II. Izmjena i dopuna Prostornog plana Općine Marina

Boška Matošić¹, Natalija Pavlus², Nela Sinjkević¹, Marin Perčić¹,
Smiljana Blažević¹

¹*Zeleni servis d.o.o., Templarska 23, Split, Hrvatska*
(nela.sinjkevic@zeleniservis.hr)

²*Zeleni servis d.o.o, Ive Robića 2, Zagreb, Hrvatska*

Sažetak

Strateška procjena utjecaja na okoliš izrađena je za prijedlog II. Izmjena i dopuna Prostornog plana Općine Marina. Predloženo je ukupno 14 aktivnosti, a na zahtjev Ministarstva zaštite okoliša i energetike izrađena je i Glavna ocjena prihvatljivosti za ekološku mrežu.

Procjenom utjecaja planiranih aktivnosti na pojedine sastavnice okoliša, ustanovljeno je da predviđena lokacija za postavljanje uzgajališta bijele ribe Kobiljak nije povoljna jer se najvećim dijelom nalazi iznad livada vrste *Posidonia oceanica*. Djelovanjem uzgajališta moguć je značajno negativan utjecaj na naselja posidonije te je aktivnost planiranja uzgajališta Kobiljak, na predviđenoj lokaciji, uklonjena iz II. Izmjena i dopuna PPU Općine Marina.

Procjenom utjecaja ostalih planiranih aktivnosti ustanovljeno je da do značajnijih utjecaja na sastavnice okoliša neće doći ili će se predviđeni utjecaji umanjiti, ukoliko se aktivnosti budu izvodile uz poštivanje važećih zakonskih propisa RH i provedbu mjera preporučenih strateškom studijom.

Navedenim primjerom želimo ukazati na važnost provedbe Strateške procjene utjecaja na okoliš prilikom prostornog planiranja u svrhu sprječavanja negativnih utjecaja na okoliš.

Ključne riječi: strateška procjena, prostorni plan, uzgajalište bijele ribe, utjecaj, *Posidonia oceanica*

Spatial planning and major industrial accidents involving dangerous chemicals

Sabina Cepuš, Matjaž Harmel, Klemen Strmšnik, Matevž Premelč

ZaVita d.o.o., Tominškova 40, 1000 Ljubljana, Slovenia
(sabina.cepus@zavita.si)

Abstract

Major industrial accidents involving dangerous chemicals pose a significant threat to humans and the environment. To minimize the associated risks, measures are necessary to prevent major accidents according to Seveso-III Directive (2012/18/EU). These include spatial planning measures, developed through improved land use plans and SEA/EIA procedures, which are more concretely focusing on issues of major industrial accidents.

The aim of the paper is to present the methodology for considering risks related to major industrial accidents in spatial planning, SEA and EIA procedures in Slovenia. Current practice in Slovenia, including gaps and shortcomings, is compared to three good EU practices (UK, Netherlands and Germany). The core of the paper focuses on the criteria and methodology for the designation of separation distances around SEVESO sites. It also delivers a proposal for spatial planning and SEA/EIA criteria in procedures related to placement of new sites/changes of the site and appropriate spatial planning around existing sites. Special attention is given to the issue of existing SEVESO sites that are often surrounded with sensitive land uses, as well as to the environmental risk assessment.

For the safety of the citizens and the protection of the environment it is important to implement efficient spatial planning measures related to industrial accidents based on SEA/EIA results. To achieve that, the awareness of the public on this issue should be raised and clear procedures for the consideration of this issue in different levels of spatial planning should be established.

Keywords: SEVESO, major industrial accidents, spatial planning, separation distances, dangerous chemicals

Implementation of climate change adaptations into strategic documents for the development of local governments

Aleksandar Lazić, Mišo Kucelj

*Eko-Adria d.o.o., Boškovićev uspon 16, 52100 Pula, Republic of Croatia
(ekoadria@ekoadria.hr)*

Abstract

In the last few years, climate changes have become an issue whose consequences can be felt in various aspects of business and private sector. All the current knowledge about climate changes suggests that existing levels of climate changes are just the beginning stage of major climate oscillations. For this reason, a need has been noted for planning and estimation of impact levels of climate changes on projects.

Strategic Environmental Assessment process determines significant environmental impacts that may arise from the implementation of the strategy, plan and program, but also proposes alternative project solutions to reduce significant negative impacts on the environment. While the reduction of the negative impacts that may arise from the implementation of the strategy, plan and program on climate change is one aspect of alternative solutions, adaptation of certain projects to climate change is another way of defining alternative solutions.

The topic of this paper is a description of how to, in the process of Strategic Environmental Assessment of development documents of local authorities, carry out the adaptation of projects on future climate changes. This way, local governments could not only better plan their projects for distant time periods, but also potentially prevent possible adverse events that could occur due to climate changes.

Keywords: climate change, strategic documents for development of local governments, adaptation to climate changes

Implementacija prilagodbe klimatskim promjenama u strateške dokumente razvoja JLS

Aleksandar Lazić, Mišo Kucelj

*Eko-Adria d.o.o., Boškovićev uspon 16, 52100 Pula, Republika Hrvatska
(ekoadria@ekoadria.hr)*

Sažetak

Klimatske promjene su posljednjih godina postale problematika čije se posljedice mogu osjetiti u raznim područjima poslovnog, ali i privatnog života, dok sva dosadašnja saznanja upućuju na to da su trenutne promjene klimatskih karakteristika tek početak faze značajnijih klimatskih oscilacija. Iz tog razloga uočena je potreba za planiranjem i predviđanjem utjecaja na zahvate u prostoru s obzirom na klimatske promjene.

U postupku strateške procjene predviđaju se značajni utjecaji na okoliš koji mogu proizaći provedbom strategije, plana i programa, ali se predlažu i varijantna rješenja pojedinih projekata u cilju smanjenje značajnog negativnog utjecaja na okoliš. I dok smanjenje negativnih utjecaja provedbe strategije, plana i programa na klimatske promjene predstavlja jedan vid alternativnih rješenja, prilagodba određenih zahvata na klimatske promjene predstavlja drugi način definiranja alternativnih rješenja.

Tema ovog rada je prikaz načina na koji bi, u postupku strateške procjene utjecaja na okoliš razvojnih dokumenata JLS, bilo moguće prilagoditi određene zahvate u prostoru na buduće promjene klimatskih parametara. Na ovaj način omogućilo bi se kvalitetnije planiranje prostornih zahvata u dužem vremenskom periodu, ali i sprječavanje eventualnih izvanrednih, nepovoljnih događaja koji bi se mogli javiti uslijed promjena klimatskih karakteristika.

Ključne riječi: klimatske promjene, strateški dokumenti razvoja JLS, prilagodba klimatskim promjenama

SEKCIJA 1 / SECTION 1

**STRATEŠKA PROCJENA UTJECAJA NA OKOLIŠ /
STRATEGIC ENVIRONMENTAL IMPACT ASSESSMENT**

**POSTER PREZENTACIJE /
POSTER PRESENTATIONS**

Implementation of the Flood Risk Management Plan in the regional spatial plan after the Strategic Environmental Assessment

Tomi Haramina, Sunčana Bilić

*Green infrastructure Ltd., Fallerovo šetalište 22, Zagreb, Croatia
(tharamina@ozins.hr, sbilic@ozins.hr)*

Abstract

The River Basin Management Plan (RBMP) is the basic instrument for water and flood risks management in the Republic of Croatia. The RBMP for the period 2016-2021 (OG 66/16) is currently in force. Prior to its adoption, Strategic Environmental Assessment (SEA) has been carried out; hence environmental protection measures are integrated in the RBMP. After completion of the SEA and adoption of the RBMP, next phase is its implementation in the spatial-planning documentation.

Due to that, the Department for Spatial Planning of the Zagreb County has commissioned the preparation of a professional Study for the implementation of the Flood Risk Management Plan in the Zagreb County Spatial Plan (ZCSP). Completion of the Study was one of the preparatory activities for the preparation of the Amendments to the ZCRP.

The aim of this paper is to outline the Study's guidelines for aligning the ZCSP with one of the components of the RBMP - the Flood Risk Management Plan. The guidelines aim to minimize flood risks by not increasing these risks where they already exist. This was accomplished by (1) proposing criteria for delimiting the County area according to its sensitivity to each flood zone and (2) proposing recommendations for planning of the reserved construction areas in flood zones, depending on their vulnerability to floods. Moreover, conditions for minimizing flood risks were also defined for exceptional cases of constructing objects vulnerable to floods in sensitive flood zones.

Keywords: SEA, planning tools, flood risks

Implementacija Plana upravljanja rizicima od poplava u regionalni prostorni plan nakon provedene strateške procjene utjecaja na okoliš

Tomi Haramina, Sunčana Bilić

*Zelena infrastruktura d.o.o., Fallerovo šetalište 22, Zagreb, Hrvatska
(tharamina@ozins.hr, sbilibic@ozins.hr)*

Sažetak

Osnovni instrument za upravljanje stanjem voda i rizicima od poplava u RH je Plan upravljanja vodnim područjima (PUVP). Trenutno je na snazi Plan upravljanja vodnim područjima za razdoblje 2016.-2021. (NN 66/16) koji sadrži integrirane mjere zaštite okoliša, budući da je za njega proveden postupak strateške procjene utjecaja na okoliš (SPUO). Po završetku postupka SPUO, odnosno nakon donošenja Plana, slijedi faza njegove implementacije u prostorno-plansku dokumentaciju.

S obzirom na to, Zavod za prostorno uređenje Zagrebačke županije je kao jednu od pripremnih aktivnosti za izradu izmjena i dopuna Prostornog plana Zagrebačke županije (PPZŽ) naručio izradu stručne podloge „Implementacija Plana upravljanja rizicima od poplava u Prostorni plan Zagrebačke županije“.

Cilj ovog rada je prikazati smjernice za usklađenje Prostornog plana Zagrebačke županije s jednom od komponenti PUVP-a, tj. Planom upravljanja rizicima od poplava. Svrha smjernica je minimizirati poplavne rizike kroz prostorno planiranje, odnosno izbjeći povećanje tih rizika tamo gdje već postoje. U skladu s tim, kroz Odredbe za provođenje PP dan je prijedlog (1) kriterija razgraničenja osjetljivosti prostora s obzirom na pojedine poplavne zone, kao i (2) preporuka za planiranje građevinskih područja i zahvata u poplavnim zonama ovisno o njihovoj ranjivosti na poplave. Uz to, definirani su i uvjeti za minimiziranje rizika od poplava u iznimnim slučajevima gradnje ranjivih zahvata u osjetljivim poplavnim zonama.

Ključne riječi: SPUO, instrumenti planiranja, rizici od poplava

SEKCIJA 2 / SECTION 2

PROCJENA UTJECAJA NA OKOLIŠ / ENVIRONMENTAL IMPACT ASSESSMENT

National thresholds for determining the obligation of the environmental impact assessment

Katarina Celič

Ministry for the environment and spatial planning, Dunajska 47, Ljubljana, Slovenia (katarina.celic@gov.si)

Abstract

The EU Directive on Environmental Impact Assessment stipulates that for certain categories of projects Member States themselves decide whether an environmental impact assessment is required. In doing so they may set a system of criteria and/or thresholds and take into account selection criteria set by the Directive.

The paper presents examples of how thresholds and criteria for certain categories of project are set up in Germany, France, Lithuania, the UK, Austria, Slovenia and Croatia.

The analysis shows that due to the discretion conferred by the Directive, Member States have different systems and thresholds for determining the obligations of the EIA. The obligation to conduct an environmental impact assessment therefore varies from country to country.

Keywords: EIA, EU, thresholds, criteria

Nacionalni pragovi za določanje obveznosti presoje vplivov na okolje

Katarina Celič

*Ministrstvo za okolje in prostor, Dunajska 47, Ljubljana, Slovenija
(katarina.celic@gov.si)*

Izvleček

Direktiva EU o presoji vplivov na okolje določa, da lahko za nekatere kategorije projektov države same določijo, ali bo zanje obvezna presoja vplivov na okolje. Pri tem lahko postavijo sistem meril in/ali pragov, upoštevati pa morajo z direktivo predpisana izbirna merila.

V prispevku so predstavljeni primeri, kako so pragove in merila za nekatere kategorije projektov postavili v Nemčiji, Franciji, Litvi, Združenem kraljestvu, Avstriji, Sloveniji in Hrvaški.

Analiza pokaže, da imajo države zaradi diskrecijske pravice, ki jo daje direktiva, različne sisteme in različno postavljene pragove za določanje obveznosti presoje vplivov na okolje, in da so zato obveznosti glede izvedbe presoje vplivov na okolje po državah različne.

Ključne besede: presoja vplivov na okolje, EU, pragovi, merila

The Role of Case Law of the Court of Justice of the European Union in Practice with Reference to the Recent EU Environmental Cases

Petra Šantić

Attorney at Law in cooperation with Schoenherr, Ulica kneza Branimira 29/I, Zagreb, Croatia (p.santic@schoenherr.eu)

Abstract

The case law of the Court of Justice of the European Union (CJEU) as one of the sources of EU law plays an important role in the development of the EU legal system. In this context, this paper presents and analyzes a few examples of the recent CJEU environmental rulings.

Particular attention is paid to the legal and practical impacts of the EU environmental case law in the national law system. The CJEU rulings are binding for all EU member states and shall contribute to a uniform interpretation and application of EU law. The national courts are required to apply a legal norm of EU law in accordance with the interpretation given by the CJEU.

It is concluded that follow-up and a broader knowledge of the CJEU case law are of practical importance for the competent public authorities, courts as well as persons involved in the proceedings and activities in the field of environmental protection.

Keywords: case law, Court of Justice of the European Union, environmental impact assessment, the EIA Directive, environmental protection law

Uloga sudske prakse Suda Europske unije u praksi s osvrtnom na novije EU predmete u području zaštite okoliša

Petra Šantić

Odvjetnica Petra Šantić u suradnji sa Schoenherr, Ulica kneza Branimira 29/I, Zagreb, Hrvatska (p.santic@schoenherr.eu)

Sažetak

Sudska praksa Suda Europske unije (Sud EU) kao jedan od izvora prava EU ima važnu ulogu u razvoju pravnog poretka EU. U tom kontekstu, u radu se predstavlja i analizira nekoliko primjera novijih presuda Suda EU iz područja zaštite okoliša.

Posebna pozornost posvećena je pravnim i praktičnim učincima sudske prakse EU o zaštiti okoliša na nacionalni pravni sustav. Presude Suda EU obvezujuće su za sve države članice EU i doprinose ujednačenom tumačenju i primjeni prava EU. Nacionalni sudovi imaju obvezu primijeniti normu EU prava na način kako je tumači Europski sud.

Zaključuje se kako je praćenje i bolje poznavanje sudske prakse Suda EU od praktične važnosti za nadležna javnopravna tijela, sudove, kao i osobe koje su uključene u postupke i poslove iz područja zaštite okoliša.

Ključne riječi: sudska praksa, Sud Europske unije, procjena utjecaja na okoliš, EIA Direktiva, pravo zaštite okoliša

Screening in Environmental Impact Assessment– actual issues

Sandra Golubić

*Međimurje County, Department of Spatial Planning, Construction and Environmental Protection, Ruđera Boškovića 2, Čakovec, Croatia
(sandra.golubic@medjimurska-zupanija.hr)*

Abstract

Screening is a procedure during which the competent authority (Ministry or administrative body in the county or City of Zagreb), based on individual tests in accordance with established standards (List of projects provided in Annex II. And III.) And / or the criteria set out in Annex V of the Regulation on the assessment of environmental impact ("Official Gazette", number 61/14 and 03/17), determines whether the planned project will have significant impact on the environment and decide on the need for assessment.

There is evidence that screening can be an effective tool for reducing the procedures for implementation of environmental impact assessment.

This paper will discuss the problems associated with the procedure for screening that have arisen in the implementation of county-level, with a particular focus on the compliance of the project with spatial planning documents, the size and design of the Project and the cumulative effect of the planned project with existing procedures.

Keywords: environmental impact assessment, significant impact on environment

Screening u procjeni utjecaja na okoliš – aktualni problemi

Sandra Golubić

*Međimurska županija, Upravni odjel za prostorno uređenje, gradnju i zaštitu
okoliša, Rudera Boškovića 2, Čakovec, Hrvatska
(sandra.golubic@medjimurska-zupanija.hr)*

Sažetak

Ocjena o potrebi procjene utjecaja zahvata na okoliš je postupak tijekom kojega nadležno tijelo (Ministarstvo ili upravno tijelo u županiji odnosno u Gradu Zagrebu), na temelju pojedinačnih ispitivanja sukladno utvrđenim mjerilima (Popis zahvata iz Priloga II. i III.) i/ili kriterijima određenim u Prilogu V. Uredbe o procjeni utjecaja zahvata na okoliš („Narodne novine“, broj 61/14 i 3/17), utvrđuje može li planirani zahvat imati značajne utjecaje na okoliš i odlučuje o potrebi procjene.

Dokazano je da ocjena o potrebi procjene utjecaja zahvata na okoliš može biti učinkovito sredstvo za smanjenje postupaka provedbe procjene utjecaja na okoliš.

U ovom radu razmotrit će se problemi povezani s postupkom ocjene o potrebi procjene utjecaja zahvata na okoliš koji su se pojavili u provedbi na razini županije, s posebnim naglaskom na usklađenost zahvata s prostorno planskom dokumentacijom, veličinom i projektnim rješenjem zahvata te kumulativni učinak planiranog zahvata s postojećim zahvatima.

Ključne riječi: procjena utjecaja na okoliš, značajni utjecaji zahvata na okoliš

Between ‘best’ and ‘good enough’: How consultants guide quality in environmental assessment

Mari Kågström

*Department of Urban and Rural Development, Swedish University of Agricultural Sciences, Box 7012, SE-750 07 Uppsala, Sweden
(mari.kagstrom@slu.se)*

Abstract

Strengthening the quality of environmental assessments tends to be connected to control mechanisms and best-practice guidelines in Sweden and many other countries. This paper takes an alternative approach examining quality performance through the lenses of Swedish consultants’ perceptions of appropriate action, primarily in relation to the scoping phase. The study builds on interviews with Swedish consultants. The interviews are analysed by using a recently published theoretical framework focusing on practitioners’ spaces for action. The analysis reveals that quality is highly open for interpretation in Sweden and that consultants are in a strong position to guide quality performance, partly due to the key knowledge they hold. Their action is strongly guided by how the consultants understand their responsibility; requiring a balance between maintaining good relationships with their clients through ‘good enough’ performance and maintaining a good professional reputation by undertaking what they themselves perceive as a ‘best’ practice. These findings indicate a need to reconsider research in this field, and shift scholarly attention away from the dominance of quality enhancement measures and engage with issues of consultants’ and other practitioners’ perceptions of their responsibility in respect to quality.

Keywords: Environmental assessment; practitioners; quality control; Sweden

INSPIRE Directive – Current Status, the Efficiency and Effectiveness of its Implementation and Usage in the Preparation of the Environmental Impact Assessment Documents

Katarina Bulešić¹, Konrad Kiš¹, Tomislav Ciceli²

¹DVOKUT-ECRO Ltd., Trnjanska 37, Zagreb, Croatia
(katarina.bulesic@dvokut-ecro.hr, konrad.kis@dvokut-ecro.hr),

²State Geodetic Administration, Gruška 20, Zagreb, Croatia
(tomislav.ciceli@dqu.hr)

Abstract

Pursuant to the INSPIRE Directive's principles, framework Directive of the European Parliament and the European Council from March 14th, 2007, Croatia defined its National Spatial Data Infrastructure (NSDI) as a set of technologies, measures, norms, rules and services which enable unification, management and maintenance of spatial data sharing. Spatial data encompassed by the NSDI are divided into three groups, most of which are used in every day's work in the field of environmental impact assessment on both, project and strategic levels. Availability, usefulness and accessibility of spatial data provided by the public institutions was analysed in the report presented on the Second Regional Conference on Environmental Impact Assessment from 2015. Two years later, the current status of the INSPIRE Directive implementation and its impact on the environmental impact assessment tasks is analysed again. Several relevant institutions were chosen from the NSDI's Registry of Spatial Data Source from the public sector and the data they provide were analysed from the aspects of availability, usefulness and accessibility. The main purpose of the analysis was to check the availability and quality of spatial data from the chosen providers against the provisions of the Directive. For that purpose, an interview with several data users (licensed practitioners of environmental impact assessment tasks) was conducted and a comparative table of all subjects was created with the purpose of determining the possibility of the utilization of spatial data in the preparation of the environmental impact assessment documents.

Keywords: INSPIRE, NSDI, Registry of Spatial Data, status, environmental impact assessment, spatial data

INSPIRE Direktiva - trenutačno stanje, učinkovitost i djelotvornost primjene i korištenja pri izradi dokumenata procjene utjecaja na okoliš

Katarina Bulešić¹, Konrad Kiš¹, Tomislav Ciceli²

¹DVOKUT-ECRO d.o.o., Trnjanska 37, Zagreb, Hrvatska
(katarina.bulesic@dvokut-ecro.hr, konrad.kis@dvokut-ecro.hr)

²Državna geodetska uprava, Gruška 20, Zagreb, Hrvatska
(tomislav.ciceli@dgu.hr)

Sažetak

Slijedeći principe INSPIRE direktive, okvirne direktive Europskog parlamenta i Vijeća EU od 14. ožujka 2007. godine, u Hrvatskoj je definirana Nacionalna infrastruktura prostornih podataka (NIPP) kao skup tehnologija, mjera, normi, pravila i usluga koji omogućava objedinjavanje, upravljanje i održavanje dijeljenja prostornih podataka. Prostorni podaci koji su obuhvaćeni NIPP-om podijeljeni su u tri skupine, a većina njih koristi se svakodnevno u poslovima izrade razne dokumentacije vezano uz procjenu utjecaja na okoliš kako na projektnoj, tako i na strateškoj razini.

Na Drugoj regionalnoj konferenciji o procjeni utjecaja na okoliš 2015. godine analizirana je i ocijenjena iskoristivost, raspoloživost i dostupnost prostornih podataka relevantnih institucija iz javnog sektora kao imatelja različitih podataka koji se koriste u poslovima zaštite okoliša. Dvije godine kasnije, analizirat će se trenutni status provedbe INSPIRE direktive i njezin utjecaj na učinkovitost provođenja postupaka procjene utjecaja na okoliš. Prema registru subjekata ponovno je odabrano i analizirano nekoliko relevantnih institucija iz javnog sektora kao imatelja različitih podataka koji su analizirani s aspekta dostupnosti, korisnosti i pristupačnosti. Svrha analize je uvid u provedbu obveze, uvid u dostupnost podataka, a ponajviše u kvalitetu podataka (odabranih) institucija. U tu je svrhu provedena i anketa korisnika podataka (izrađivača Studija o utjecaju na okoliš) te je načinjena komparativna tablica kojom su ocijenjene mogućnosti primjene prostornih podataka odabranih institucija pri izradi dokumenata procjene utjecaja na okoliš.

Ključne riječi: INSPIRE, NIPP, registar subjekata, status, prostorni podaci

Evaluation of a need for an impact assessment of the environment on a project - impact of climate changes on projects

Vjeran Magjarević, Marijana Bakula

*DVOKUT-ECRO Ltd., Trnjanska 37, 10000 Zagreb, Croatia
(vjeran.magjarevic@dvokut-ecro.hr, marijana.bakula@dvokut-ecro.hr)*

Abstract

It is scientifically confirmed (e.g. 2007. Nobel Peace Prize), that the climate is changing and that humans are at least partly responsible for it. Since climate change affects a multitude of human activity sectors, climate change adaptation is increasingly becoming one of the greatest challenges of our time. Although the Republic of Croatia has a relatively small contribution to global greenhouse gas emissions, the effects of climate variability, which are already felt around the world, will not bypass it. Under the term “climate change” the most common notion are their negative consequences, i.e. significant risks for the future, but with certain investing and efforts, some climate change effects can be turned into favorable opportunities.

The Decree on Amendments to the Decree on Environmental Impact Assessment (OG 03/17), stipulated the obligation of undertaking an analysis of the susceptibility of the project to climate change within a comprehensive environmental impact assessment. Using “Non-paper Guidelines for Project Managers: Making vulnerable investments climate resilient” (European Commission) when making such an analysis is advised.

In this paper, we will look at the content of these guidelines, the analysis procedure recommended in them, and the general (non) need for an assessment of environment on a project (climate change impact) to be carried out within every environmental impact assessment.

Keywords: climate change, Non-paper Guidelines for Project Managers, EIA screening

Ocjena o potrebi procjene utjecaja okoliša na zahvat - utjecaj klimatskih promjena na zahvat

Vjeran Magjarević, Marijana Bakula

DVOKUT-ECRO d.o.o., Trnjanska 37, 10000 Zagreb, Hrvatska
(vjeran.magjarevic@dvokut-ecro.hr, marijana.bakula@dvokut-ecro.hr)

Sažetak

Znanstveno je potvrđena činjenica, priznata Nobelovom nagradom za mir 2007. godine, da se klima mijenja te da su ljudi barem djelomično odgovorni za to. Budući da promjena klime utječe na mnoštvo sektora ljudskih djelatnosti, klimatske promjene sve više prerastaju u jedan od najvećih izazova našega vremena. Iako Republika Hrvatska ima relativno mali doprinos globalnoj emisiji stakleničkih plinova, učinci klimatske varijabilnosti, koji se već osjećaju diljem svijeta, neće je zaobići. Pod pojmom klimatskih promjena najčešće se misli na negativne posljedice tj. značajne rizike za budućnost koje promjena klime sa sobom donosi, uz ulaganje određenog napora i sredstava neke klimatske promjene moguće je pretvoriti u povoljne prilike.

Hrvatsko zakonodavstvo je 2017. godine, Uredbom o izmjenama i dopunama Uredbe o procjeni utjecaja zahvata na okoliš (NN 03/17), propisalo obavezu analize podložnosti zahvata klimatskim promjenama unutar sveobuhvatne procjene utjecaja zahvata na okoliš. Preporuka je da se pri izradi takve analize koristi neformalni dokument Europske komisije „Smjernice za voditelje projekata: Kako povećati otpornost ranjivih ulaganja na klimatske promjene“.

U ovom radu osvrnut ćemo se na sadržaj navedenih smjernica, postupak analize koja se u njima preporuča i općenito (ne)potrebu procjene utjecaja okoliša (klimatskih promjena) na zahvat unutar baš svake procjene utjecaja zahvata na okoliš.

Ključne riječi: klimatske promjene, smjernice za voditelje projekata, ocjena o potrebi procjene

Impact on climate changes and production of greenhouse gases in sewerage systems and wastewater treatment plants

Marijana Bakula, Gordan Golja, Vjeran Magjarević

*DVOKUT-ECRO Ltd., Trnjanska 37, Zagreb, Croatia
(marijana.bakula@dvokut-ecro.hr)*

Abstract

Emissions of greenhouse gases from anthropogenic sources have become the dominant factor in global warming of the Earth's atmosphere in the past 150 years. Therefore, at the EU level, as well as in the Republic of Croatia as a member state, environmental impact assessment include the assessment of impacts of climate changes to the project and impact of project on the climate changes. The impact of sewerage systems and wastewater treatment plants on climate change can be evaluated based on the greenhouse gases (GHG) production. Sources of greenhouse gases can be direct (produced on the location in treatment process) and indirect (use of energy, chemical consumption, waste and sludge disposal, ...). Production of GHG is given for the common types of the collection of wastewaters and processes of wastewater and sludge treatment for all types according to the emission factor which are specific for the certain process. Total production of GHG is based on specific emission factors. Construction of public drainage systems and WWTP generally reduces greenhouse gas emissions compared to collection of wastewater in septic tanks that are a significant source of greenhouse gas emissions. In addition, additional measures have been presented to reduce greenhouse gas emissions and reduce negative impacts on climate change. The methodology of the GHG calculation is presented on the typical example of sewerage system and WWTP.

Keywords: climate changes, GHG emissions, sewerage system, waste water treatment plant

Utjecaj na klimatske promjene i proizvodnja stakleničkih plinova u sustavima odvodnje i na uređajima za pročišćavanje otpadnih voda

Marijana Bakula, Gordan Golja, Vjeran Magjarević

*DVOKUT-ECRO d.o.o., Trnjanska 37, Zagreb, Hrvatska
(marijana.bakula@dvokut-ecro.hr)*

Sažetak

Emisije stakleničkih plinova od ljudskih aktivnosti su u proteklih 150 godina postale dominantan faktor koji utječe na globalno zagrijavanje Zemljine atmosfere. Stoga je na razini EU, i RH kao države članice, u postupke procjene utjecaja na okoliš uključena i procjena utjecaja klimatskih promjena na zahvat i zahvata na klimatske promjene. Utjecaj sustava odvodnje i uređaja za pročišćavanje otpadnih voda na klimatske promjene određuje se na temelju proizvedenih stakleničkih plinova. Izvori stakleničkih plinova mogu biti direktni (nastaju u tehnološkim postupcima na samoj lokaciji) i indirektni (korištenje el. energije, potrošnja kemikalija, odvoz otpada i mulja,...). U radu su obrađeni uobičajenim postupci prikupljanja i pročišćavanja otpadnih voda i obrade mulja po vrsti stakleničkog plina i emisijskim faktorima na temelju kojih se određuje ukupna količina proizvedenih stakleničkih plinova i utjecaj na klimatske promjene. Izgradnjom javnih sustava odvodnje i UPOV-a se općenito smanjuju staklenički plinovi u odnosu na prikupljanje otpadnih voda u sabirnim/septičkim jamama koji su značajan izvor emisija stakleničkih plinova. Osim izgradnje javnog sustava odvodnje u radu su prezentirane i dodatne mjere za smanjenje emisija stakleničkih plinova i smanjenje negativnog utjecaja na klimatske promjene. U radu je prezentirana metodologija proračuna stakleničkih plinova na tipskom primjeru sustava odvodnje i UPOV-a.

Ključne riječi: klimatske promjene, staklenički plinovi, sustav odvodnja, uređaj za pročišćavanje otpadnih voda

Wastewater treatment in small settlements on the territory of Republic of Croatia

Natalija Pavlus, Mihael Drakšić, Ana Ptiček

Zeleni servis d.o.o. Split- Izdvojena jedinica Zagreb, Ive Robića 2, Zagreb, Croatia (natalija.pavlus@zeleniservis.hr, mihael.draksic@zeleniservis.hr, ana.pticek@zeleniservis.hr)

Abstract

Demographic situation in Republic of Croatia (HR) is characterized by natural depopulation and polarization of the population. Settlements with less than 2000 inhabitants, mostly with rural character, are covering 70% of the HR territory and account for 60% of the total population. Because of the large number of small settlements in HR and natural sensitivity of the area that they occupy, resolving the issue of sustainable sewerage system and wastewater treatment development is an important factor in preserving and protecting the environment.

There are 767 agglomerations planned in HR of which 486 agglomerations are bellow 2000 PE. The environmental pollution by wastewaters disposal in small settlements is not a priority at the state level. In most of the cases, wastewater disposal of small settlements have been solved through mostly permeable septic tanks or direct discharge to the environment.

This paper provides an overview of possible wastewater treatment solution for small settlements, taking into account the terrain and climate characteristics of area, sensitivity of wastewater receiver and direction of demographic development. Examples shows wastewater systems in Gorski Kotar.

Priority in selecting the wastewater treatment plants technology is simplicity, efficiency of work in possible flow and wastewater load variations, effluent parameter achievement in order with demands for discharging in sensitive areas and all in accordance with environmental and nature protection.

Keywords: sewerage system, small settlements, sensitive areas, environmental protection

Pročišćavanje otpadnih voda malih naselja na području RH

Natalija Pavlus, Mihael Drakšić, Ana Pticek

*Zeleni servis d.o.o. Split- Izdvojena jedinica Zagreb, Ive Robića 2, Zagreb,
Hrvatska (natalija.pavlus@zeleniservis.hr, mihael.draksic@zeleniservis.hr,
ana.pticek@zeleniservis.hr)*

Sažetak

Demografsko stanje RH karakterizira prirodna depopulacija te prostorna polarizacija stanovništva. Naselja s manje od 2000 stanovnika, uglavnom ruralnog karaktera, pokrivaju 70% teritorija i čine oko 60% ukupnog stanovništva. Upravo zbog velikog broja malih naselja i prirodne osjetljivosti područja kojeg zauzimaju, rješavanje pitanja održivog razvoja sustava odvodnje i pročišćavanja otpadnih voda predstavlja bitan faktor u očuvanju i zaštiti okoliša.

U RH je određeno 767 aglomeracija od kojih su 486 aglomeracije s manje od 2000 ES. Problem onečišćenja okoliša otpadnim vodama ruralnih naselja nije prioritet na razini države. Zbrinjavanje otpadnih voda malih naselja u većini slučajeva je riješeno putem septičkih ili sabirnih jama, koje su propusne ili direktnim ispuštanjem u okoliš.

U ovom radu daje se pregled mogućih rješenja pročišćavanja otpadnih voda malih naselja, uzevši u obzir reljefne i klimatološke karakteristike prostora, osjetljivost prijemnika otpadnih voda i demografski smjer razvitka naselja. Kao primjeri navode se sustavi odvodnje malih naselja na području Gorskog Kotara. Prioritet u odabiru tehnologije pročišćavanja su uređaji koje karakterizira efikasnost i funkcionalnost rada kod mogućih varijacija protoka i opterećenja otpadnim vodama, jednostavnost tehnologije, uz dostizanje zadanih parametara izlaznog efluenta, koji moraju zadovoljiti uvjete ispuštanja u osjetljive prijamnike, a sve u skladu s ciljevima očuvanja okoliša i zaštite prirodnih vrijednosti RH.

Ključne riječi: pročišćavanje otpadnih voda, mala naselja, osjetljiva područja, zaštita okoliša

A combined approach methodology: effluent discharge from Rab agglomeration into coastal water

Zlatko Perović, Anita Erdelez

Fidon d.o.o., Vukovarska 271/V, Zagreb, Croatia (zlatko.perovic@fidon.hr, anita.erdelez@fidon.hr)

Abstract

The construction of the sewage and treatment system of the Rab agglomeration includes the increase of the treatment level from I to II on the existing wastewater treatment plant (WWTP) with a capacity of 21750 p.e. The treated effluent will be discharged via 1711 m long submarine outfall at a depth of 78 m into the coastal water body part of Kvarnerić and part of Velebit channel (O422-KVV).

In order to assess the environmental impact, the combined approach methodology for the discharge of the effluent into transitional and coastal waters was used. The concentration of total phosphorus in the effluent was used as contaminant of concern. Since the test of significance showed that the discharge is significant (effective volume flux $>5 \text{ m}^3$), the initial dilution (S_1) for the different environment conditions was calculated. The comparison of the ratio of maximum allowable concentration of contaminant of concern (C_{gve}) and S_1 showed that the effluent would meet the environmental quality standard for receiving water.

The combined approach methodology sometimes leads to unsatisfactory discharge results because of the low initial dilution, despite of the great discharge depth and significant secondary dilution. The question, therefore, is whether the methodology should take into account even the secondary dilution in the near field.

Keywords: agglomeration of Rab, effluent, phosphorus, combined approach methodology, coastal waters

Primjena metodologije kombiniranog pristupa: ispuštanje pročišćenih otpadnih voda aglomeracije Rab u priobalno more

Zlatko Perović, Anita Erdelez

Fidon d.o.o., Vukovarska 271/V, Zagreb, Hrvatska (zlatko.perovic@fidon.hr, anita.erdelez@fidon.hr)

Sažetak

U sklopu izgradnje sustava odvodnje i pročišćavanja otpadnih voda aglomeracije Rab predviđeno je povećanje stupnja pročišćavanja na postojećem uređaju za pročišćavanje otpadnih voda (UPOV) planiranog kapaciteta 21.750 ES s I. na II. stupanj pročišćavanja. Ispuštanje efluenta je planirano putem postojećeg podmorskog ispusta duljine 1.711 m, s dubinom ispuštanja od 78 m u vodno tijelo priobalnih voda Dio Kvarnerića i dio Velebitskog kanala (O422-KVV).

Za procjenu utjecaja otpadnih voda na okoliš korištena je metodologija kombiniranog pristupa za ispuštanje efluenta u prijelazne i priobalne vode. Proračun je napravljen na temelju koncentracije ukupnog fosfora u efluentu, kojeg smatramo mjerodavnom onečišćujućom tvari. Budući da je test ispitivanja značajnosti pokazao da je ispušt značajan (efektivni volumen protoka $>5\text{m}^3$), proračunali smo početno hidrauličko razrjeđenje (S_1) za različite prilike u moru. Na temelju omjera C_{gve}/S_1 , gdje je C_{gve} granična vrijednost emisije onečišćujuće tvari, utvrđeno je da će efluent zadovoljavati standard kakvoće vodnog okoliša za recipijent.

Metodologijom kombiniranog pristupa se kod sličnih projekata ponekad dobivaju nezadovoljavajući uvjeti ispuštanja zbog slabijih karakteristika početnog razrjeđenja, usprkos velikoj dubini ispuštanja i značajnom sekundarnom razrjeđenju. Stoga se postavlja pitanje treba li metodologija uvažiti i sekundarno razrjeđenje u području neposredno oko ispusta (*near field*)?

Ključne riječi: aglomeracija Rab, efluent, fosfor, metodologija kombiniranog pristupa, priobalne vode

Geocological evaluation within environment impact assessment studies—Example of: Hydropower plants Kosiinj and Senj 2

Valerija Butorac¹, Goran Lončar¹, Martina Cvitković², Domagoj Vranješ¹

*¹Vita projekt Ltd., Ilica 191 C, Zagreb, Croatia
(valerija.butorac@vitaprojekt.hr, goran.loncar@vitaprojekt.hr,
domagoj.vranjes@vitaprojekt.hr)*

*²Ekotop Ltd., Hektorovićeve ulica 2, Zagreb, Croatia
(cvitkovic@ekotop-zastita-okolisa.hr)*

Abstract

Ingrained geodiversity definition within geosciences is: „Geodiversity is the natural range (diversity) of landscapes, landforms, processes on the Earth's surface and interior which includes their assemblages, relationships, properties, interpretations and systems.“ It is composed of geological, geomorphological and pedological diversity. According to Nature Protection Act geodiversity is defined as diversity of soils, rocks, minerals, fossils, landforms, subterranean features and structures and natural processes that formed them through geological periods. In the current practice of environment impact assessment studies preparation in Republic of Croatia, there is a notable lack of geodiversity analysis as environmental component. This paper demonstrates the importance of geodiversity and the role of geomorphology in geocological evaluation and environment impact assessment.

There is a possibility to quantify the intrinsic value of relief with the selected methods of cabinet and field work, such as geomorphological analysis, geocological evaluation with the application of GIS technology. The results of such analysis are basis for geodiversity interpretation as one of the environmental components. The above mentioned is applied in Geodiversity chapter within Environment impact assessment study of hydropower plants Kosiinj and Senj 2.

With the aim of continuous improvement of environmental impact assessment procedure, it is necessary to regularly include geodiversity as one of the environmental components. Applicability of geodiversity includes the possibility of the integration of biodiversity and landscape diversity in a holistic spatial assessment process and the assessment of the environmental impact.

Keywords: geodiversity, geocological evaluation, geomorphology, GIS

Geokološko vrednovanje unutar studija o utjecaju na okoliš – primjer dosadašnje prakse: HE Kosinj/Senj 2

Valerija Butorac¹, Goran Lončar¹, Martina Cvitković², Domagoj Vranješ¹

¹Vita projekt d.o.o., Ilica 191 C, 10000 Zagreb, Hrvatska
(valerija.butorac@vitaprojekt.hr, goran.loncar@vitaprojekt.hr,
domagoj.vranjes@vitaprojekt.hr)

²Ekotop d.o.o., Hektorovičeva ulica 2, 10000 Zagreb, Hrvatska
(cvitkovic@ekotop-zastita-okolisa.hr)

Sažetak

Definicija georaznolikosti unutar geoznanosti glasi: „Georaznolikost je sveukupna raznolikost krajolika, oblika i procesa na površini Zemlje i u njenoj unutrašnjosti koja uključuje njihove značajke, odnose i sustave“. Čine ju geološka, geomorfološka i pedološka raznolikost. Zakonom o zaštiti prirode, georaznolikost je definirana kao raznolikost tla, stijena, minerala, fosila, reljefnih oblika, podzemnih objekata i struktura te prirodnih procesa koji su ih stvarali kroz geološka razdoblja. U dosadašnjoj praksi izrade studija o utjecaju na okoliš u Republici Hrvatskoj primjetan je izostanak analize georaznolikosti kao sastavnice okoliša. Cilj rada je prikazati važnost georaznolikosti i ulogu geomorfologije u geokološkom vrednovanju i procjeni utjecaja na okoliš.

Kabinetskim i terenskim radom koji uključuju geomorfološku analizu i geokološku analizu uz primjenu GIS alata, moguće je kvantificirati intrinzičnu vrijednost reljefa. Rezultati ovih analiza osnova su za interpretaciju georaznolikosti kao jedne od sastavnica okoliša. Navedeno je primijenjeno u izradi poglavlja „Georaznolikost“ unutar Studija o utjecaju na okoliš hidroelektrana Kosinj i Senj 2.

U cilju kontinuiranog unaprjeđenja postupka procjene utjecaja na okoliš, nužno je redovno uključivanje georaznolikosti kao jedne od temeljnih sastavnica okoliša. Primjena koncepta georaznolikosti omogućuje integraciju bioraznolikosti i krajobrazne raznolikosti u holistički proces vrednovanja prostora i procjene utjecaja na okoliš.

Ključne riječi: georaznolikost, geokološko vrednovanje, geomorfologija, GIS

Human health as the Environmental Impact Study component - an example of the Combined-Cycle Cogeneration Gas Power Plant Peruća

Ivan Vučković¹, Bojana Nikitović², Jadranka Mustajbegović³,
Petar Gulin², Iva Vidaković¹, Andrija Šaban⁴

¹*Elektroprojekt d.d., Civil and Architectural Engineering Department, Water Resources, Nature and Environmental protection, Alexandera von Humboldta 4., Zagreb, Croatia (ivan.vuckovic@elektroprojekt.hr, iva.vidakovic@elektroprojekt.hr)*

²*Public Health Institute of Krapina-Zagorje County, I.G. Kovačića 1, Zlatar, Croatia (bojana.nikitovic@gmail.com)*

³*The World Health Organization's Associated Medical Center, Rockefellerova 4, Zagreb, Croatia (jmustaj@snz.hr)*

⁴*Elektroprojekt d.d., Mechanical and Process Engineering Department, Alexandera von Humboldta 4., Zagreb, Croatia (andrija.saban@elektroprojekt.hr)*

Abstract

The facts about the relation between the short-term and long-term impacts of air pollution generated by fossil fuel combustion and acute problems with respiratory system and worsening of chronic respiratory diseases have been professionally and scientifically established long time ago. The persons already diagnosed with asthma and chronic obstructive pulmonary disease, the elderly and the children are particularly sensitive to these impacts.

AIM of the paper is to present the method and results of the assessment of the Peruća Combined-Cycle Gas Turbine Cogeneration Plant (CCGT) impact on human health as an important component of the Peruća CCGT Environmental Impact Study.

METHOD of assessment was based on a comprehensive in-depth research conducted in EU for more than 20 years through targeted programs and projects proposed and elaborated by the EU Commission (*EnternE*, *NEEDS*) and the World Health Organization (WHO).

MAIN RESULTS indicate that the Peruća CCGT operation will cause increase in total concentrations of NO₂, PM₁₀ and PM_{2.5} in the air. In case of the backup heat sources firing liquid fuel, air emissions of PM₁₀, PM_{2.5}, NO, NO₂, CO and greenhouse gas CO₂ are expected.

CONCLUSION: The expected increase in the concentration of air pollutants due to the thermal power plant emissions is 2.5-4 times less than the allowable limit values laid down by law (Official Gazette 117/2012), and within the strict framework set up by the World Health Organization (WHO).

Keywords: Peruća CCGT, air emission, environmental impact assessment, human health

Zdravlje ljudi kao sastavnica procjene utjecaja Kombi kogeneracijske plinske elektrane Peruća

Ivan Vučković¹, Bojana Nikitović², Jadranka Mustajbegović³,
Petar Gulin², Iva Vidaković¹, Andrija Šaban⁴

¹*Elektroprojekt d.d., Građevinsko-arhitektonski biro, Odjel za zaštitu voda okoliša i prirode, Alexandera von Humboldta 4, Zagreb, Hrvatska
(ivan.vuckovic@elektroprojekt.hr, iva.vidakovic@elektroprojekt.hr)*

²*Zavod za javno zdravstvo Krapinsko-zagorske županije, I.G. Kovačića 1, Zlatar, Hrvatska (bojana.nikitovic@gmail.com)*

³*Suradni centar za medicinu rada Svjetske zdravstvene organizacije, Rockefellerova 4, Zagreb, Hrvatska (jmustaj@snz.hr)*

⁴*Elektroprojekt d.d., Strojarsko-tehnološki biro, Alexandera von Humboldta 4, Zagreb, Hrvatska (andrija.saban@elektroprojekt.hr)*

Sažetak

Spoznaje o odnosu utjecaja kratkotrajnog i dugotrajnog djelovanja onečišćenja zraka koja nastaju izgaranjem fosilnih goriva na nastanak akutnih poteškoća od strane dišnog sustava i pogoršanje kroničnih bolesti dišnog sustava odavno su dobro stručno i znanstveno potvrđene. Posebno su na te učinke osjetljive osobe s već dijagnosticiranom astmom i kroničnom opstruktivnom plućnom bolesti, starije osobe i djeca.

CILJ je ovog rada prikazati način i rezultat procjene utjecaja Kombi kogeneracijske plinske elektrane (KKPE) Peruća na zdravlje ljudi kao značajnu sastavnicu studije o utjecaju KKPE Peruća na okoliš.

METODA procjene temeljila se na sveobuhvatu detaljnih istraživanja koja se provode više od 20 godina u cijeloj EU, ciljanim programima i projektima predlaganim i obrađivanim od strane EU Komisije (*EnterNE*, *NEEDS*) i Svjetske zdravstvene organizacije (SZO).

GLAVNI REZULTATI pokazuju da će prilikom rada KKPE Peruća doći do povećanja ukupne koncentracije NO₂, PM₁₀ i PM_{2.5} u zraku. U slučaju pogona rezervnih izvora toplinske energije tekućim gorivom, očekivane su emisije u zrak onečišćivača PM₁₀, PM_{2.5}, te NO, NO₂, CO i stakleničkog plina CO₂.

ZAKLJUČAK: Očekivano povećanje koncentracije onečišćivača zraka zbog emisija termoelektrane je 2,5 do 4 puta manje od dozvoljenih graničnih vrijednosti propisanih zakonom (NN 117/2012) i unutar dozvoljenih strogih okvira Svjetske zdravstvene organizacije (SZO).

Ključne riječi: KKPE Peruća, emisije u zrak, procjena utjecaja na okoliš zdravlje stanovništva

Ecological accidents risk assessment - an integral part of the environmental impact study

Andrija Šaban, Ivan Vučković, Koni Čargonja-Reicher

Elektroprojekt d.d, A. von Humboldta 4, Zagreb, Croatia
*(andrija.saban@elektroprojekt.hr, ivan.vuckovic@elektroprojekt.hr,
koni.cargonja-reicher@elektroprojekt.hr)*

Abstract

The environment is a natural surrounding for organisms, their communities, including man and his material goods. Major accidents as eco accident is, could threaten more environmental components as environment in the strict sense so a human with its property. Since, one of the EIA procedure goals is taking care of the consequences to the environment, risk assessment in the EIS is to be made in proportion to the importance and complexity of the project. Risk is a value by which is probability of occurrence or realization of unwanted, uncontrollable event is measured together with its potential consequences or damages that it can cause. In a text shall be presented different approaches to risk evaluation. The process of risk assessment is part of a risk management which is "decision making process". Decisions are aimed to risk removing or reducing. The risk management process is circular process with risk re-evaluation. The result is hazard and its consequences acceptance on some acceptable risk level. When the risk is reduced to an acceptable level, risk-reduction measures and related consequences can be further techno-economically evaluated. Finally, the risk perception is not the same by risk assessment expert and a man who lives near the hazard area. During the public hearing in the EIA procedure, the results of the risk assessment are further adjusted to the public demands.

Keywords: risk, hazard, consequence, risk management, environmental impact assessment (EIA)

Ekološka nesreća s procjenom rizika njenog nastanka – sastavni dio studije utjecaja na okoliš

Andrija Šaban, Ivan Vučković, Koni Čargonja-Reicher

*Elektroprojekt d.d, A. von Humboldta 4, Zagreb, Hrvatska
(andrija.saban@elektroprojekt.hr, ivan.vuckovic@elektroprojekt.hr,
koni.cargonja-reicher@elektroprojekt.hr)*

Sažetak

Okoliš je prirodno okruženje organizama, njihovih zajednica, uključujući čovjeka i njegova materijalna dobra. Sasvim je razumljivo da velika nesreća kao što je ekološka nesreća, može ugroziti više čimbenika okoliša uključujući sastavnice okoliša te čovjeka i njegovu imovinu. Budući da je jedan od ciljeva postupka PUO sagledavanje i mogućih posljedica utjecaja planiranog zahvata na okoliš, proporcionalno važnosti i složenosti zahvata potrebno je u SUO uključiti i procjenu rizika. Rizik je veličina koja se mjeri vjerojatnošću pojave ili realizacije nepoželjnog, nekontroliranog događaja i potencijalom posljedice ili štete koji taj događaj može uzrokovati. U radu će biti prikazano više različitih pristupa ocjenjivanja rizika. Postupak procjene rizika predstavlja dio procesa upravljanja rizikom. Upravljanje rizikom je „decision making“ proces koji uključuje donošenje odluka koje mogu biti u pravcu uklanjanja ili smanjivanja rizika. Proces uklanjanja ili smanjivanja rizika je kružni proces koji uključuje faze vrednovanja rizika. Rezultat je prihvaćanje opasnosti na nekoj prihvatljivoj vjerojatnosti pojave nekontroliranog događaja i njezinih posljedica. Kada se rizik svede na prihvatljiv nivo, mjere za smanjivanje rizika se mogu nadalje i tehnno-ekonomski sagledavati. Na koncu, percepcija rizika nije ista od strane stručnjaka koji se bavi procjenom rizika i čovjeka koji živi u blizini opasnosti. Upravo tijekom javne rasprave, kroz postupak PUO se rezultati procjene rizika dodatno usklađuju sa zahtjevima javnosti.

Ključne riječi: rizik, opasnost, posljedica, upravljanje rizikom, procjena utjecaja na okoliš (PUO)

Problematics in preparation of environmental impact studies for national road projects in Croatia

Sanja Bogdanović, Ana Brebrić

Hrvatske ceste d.o.o., Vončinina 3, 10000 Zagreb, Croatia
(sanja.bogdanovic@hrvatske-ceste.hr, ana.brebrić@hrvatske-ceste.hr)

Abstract

Pursuant to Regulation on the environmental impact assessment of projects, Hrvatske ceste d.o.o., is responsible for the environmental impact assessment procedure, or alternatively, the screening to decide whether an environmental assessment is required for a proposed national road project, be it a new road or a road improvement scheme for any section length.

In practice, such provision entails many ambiguities in procedures, especially for minor projects.

Challenges are encountered already at the stage when the application is made to the Competent Ministry to confirm that the proposed project is compliant to regional planning documents, and to issue an Opinion, which is a condition required to initiate an environmental impact assessment procedure.

The case analysed in the paper is the road section Saborsko-Rakovica, where the proposed corridor overlapped with the area of Natura 2000 sites, which posed a new challenge for the preparation of Appropriate Assessment Study within the Environmental Impact Assessment Study.

The objective of the paper is to present three problematics in the preparation of environmental impact studies for national road projects, viz. 1) proposed project definition, 2) regional planning documents, and 3) appropriate assessment.

The conclusion puts forward the Developer's proposals and comments arising from the preparation of environmental impact studies for national roads.

Keywords: national roads, regional planning documents, appropriate assessment, Saborsko-Rakovica Section.

Problematika pri izradi Studija utjecaja na okoliš na dionicama državnih cesta u RH

Sanja Bogdanović, Ana Brebrić

*Hrvatske ceste d.o.o., Vončinina 3, 10000 Zagreb, Republika Hrvatska
(sanja.bogdanovic@hrvatske-ceste.hr, ana.brebrić@hrvatske-ceste.hr)*

Sažetak

Hrvatske ceste d.o.o., sukladno Uredbi o procjeni utjecaja zahvata na okoliš, obvezne su provoditi postupak procjene utjecaja zahvata na okoliš, odnosno postupak ocjene o potrebi procjene utjecaja na okoliš na nivou svih državnih cesta, neovisno o njihovoj duljini kao ni rekonstrukciji odnosno novogradnji. U praksi takva odredba donosi mnoge nejasnoće o postupanju, naročito za manje zahvate.

Na problematiku se nailazi već u fazi ishoda potvrde usklađenja zahvata sa prostorno planskom dokumentacijom u nadležnom Ministarstvu, bez čijeg Mišljenja o usklađenosti se ne može započeti s postupkom procjene utjecaja na okoliš.

Rad daje analizu konkretnog primjera iz prakse dionice Saborsko-Rakovica, gdje se zbog zadiranja ceste u područje Natura 2000 otvara novo poglavlje problematike izrade Glavne ocjene prihvatljivosti zahvata u okviru Studije o utjecaju na okoliš.

Cilj rada je prezentirati tri različite problematike pri izradi studija utjecaja o na okoliš za državne ceste a to su: 1. Definicija zahvata, 2. Prostorno planska dokumentacija i 3. Glavna ocjena utjecaja na ekološku mrežu zahvata.

Zaključak iznosi prijedloge i mišljenja Investitora prilikom postupka procjene utjecaja na okoliš za državne ceste.

Ključne riječi: državne ceste, prostorno planska dokumentacija, Glavna ocjena utjecaja na ekološku mrežu zahvata, dionica Saborsko-Rakovica

Problem of traffic noise and protection measures

Igor Radović¹, Dušan Mijuk²

¹*Public Enterprise Roads of Serbia, Bulevar kralja Aleksandra 282, PO Box 17, 11050 Belgrade 22, Serbia*

²*Koridori Srbije, Kralja Petra 21, 11000 Belgrade, Serbia*

Abstract

The development of motor transport has made a significant step forward in the transportation of people and goods. Growing motorization was followed by the construction of many modern and high quality roads, capable of accommodating ever increasing traffic loads. At this moment, a fast, well-organized motorway regime that fully meets the demands of individuals and the economy is established. However, all the positive effects of such established traffic are significantly reduced by the adverse impacts that the same traffic produces on environment and human population.

The problem of traffic noise is one of the greatest challenges of modern civilization. It can be successfully resolved by administrative, organizational, spatial planning and technical protection measures. The complexity of this issue is such that it requires engagement of experts even at the earliest project stages, in order to ensure that economical solutions are selected to provide the required traffic protection in vulnerable zones.

The purpose of this work is to present the impacts of traffic noise on the population and provide a systematic overview of possible noise protection measures.

Keywords: traffic noise, protection measures, population

Problem saobraćajne buke i mere zaštite

Igor Radović¹, Dušan Mijuk²

¹*Javno preduzeće putevi Srbije, Bulevar kralja Aleksandra 282, Poštanski fah 17, 11050 Beograd 22, Srbija*

²*Koridori Srbije, Kralja Petra 21, 11000 Beograd, Srbija*

Sažetak

Razvojem motornog saobraćaja napravljen je značajan iskorak u transportu ljudi i roba. Narastajući stepen motorizacije praćen je izgradnjom brojnih savremenih i kvalitetnih saobraćajnica, sposobnih da prihvate sve veća saobraćajna opterećenja. Tako se danas uspostavio režim brzog, dobro organizovanog motornog saobraćaja koji u potpunosti odgovara zahtevima pojedinaca i privrede. Ali, sa druge strane, svi pozitivni efekti ovako uspostavljenog saobraćaja su umanjeni određenim štetnim efektima koje taj isti saobraćaj proizvodi po čovekovu okolinu i čoveka samog.

Problem saobraćajne buke jedan je od najvećih izazova moderne civilizacije. Uspešno se rešava administrativnim, organizacionim, prostorno planerskim i tehničkim merama zaštite. Kompleksnost ove problematike je takva da traži angažman inženjera još u najranijim projektnim fazama, kako bi se obezbedilo da se kroz višestruke mehanizme optimizacije odaberu rešenja koja obezbeđuju zahtevanu zaštitu od saobraćajne buke u ugroženim zonama.

Ovaj rad ima za cilj da prezentuje uticaje saobraćajne buke na stanovništvo i daje sistematizovan pregled mogućih mera zaštite od buke.

Ključne riječi: saobraćajna buka, mere zaštite, stanovništvo

The role of environmental impact assessment in rehabilitation and conversion of exploitation fields

Aleksandra Anić Vučinić¹, Lana Krišto², Ivana Melnjak¹, Lucija Radetić¹

¹University of Zagreb, Faculty of Geotechnical Engineering, Hallerova aleja, Varaždin, Croatia

²AAVA consulting Ltd, Ivana Cankara 21, Zagreb, Croatia
(лана@аава-саветовање.хр)

Abstract

According to existing regulations for the exploitation of mineral resources, it is necessary to carry out environmental impact assessment. When opening the exploitation field, the project documentation must, in accordance with the regulations in force, also contain the method of recovery for the closed exploitation field.

However, the practice so far shows that recovery of the exploitation fields approaches exclusively from the technical point of view which implies mining works for the implementation of protection measures of the excavated areas and exclude the possibility of endangerment of people, property, nature and the environment. It often happens that the abandoned exploitation fields are not recovered and rehabilitation of the exploited field is not considered as part of the technical recovery. From the point of view of environmental protection, the exploitation of mineral resources has far the greatest negative impact, both on landscape and biodiversity, mostly due to the devastated space that remains after the exploitation field is closed.

This paper will show the possibilities of rehabilitation and conversion of the abandoned exploitation fields and the obstacles encountered in the preparation of project documentation, including the environmental impact assessment procedure on several examples.

Keywords: exploitation fields, rehabilitation and conversion, devastation, recovery

Uloga procjena utjecaja zahvata na okoliš u prenamjeni eksploatacijskih polja

Aleksandra Anić Vučinić¹, Lana Krišto², Ivana Melnjak¹, Lucija Radetić¹

¹*Sveučilište u Zagrebu, Geotehnički fakultet, Hallerova aleja 7, 42 000 Varaždin, Hrvatska*

²*AAVA savjetovanje d.o.o., Ivana Cankara 21, 10 000 Zagreb, Hrvatska*
(lana@avaa-savjetovanje.hr)

Sažetak

Prema postojećim važećim propisima za eksploataciju mineralnih sirovina potrebna je provedba procjene utjecaja zahvata na okoliš. Pri otvaranju eksploatacijskog polja projektna dokumentacija u sebi prema važećim propisima mora sadržavati i način sanacije zatvaranja.

Međutim, dosadašnja praksa pokazuje da se sanaciji eksploatacijskih polja pristupa isključivo sa tehničke strane koja podrazumijeva rudarske radove radi provedbe mjera osiguranja otkopanih prostora, kojima se isključuje mogućnost nastanka opasnosti za ljude i imovinu, kao i za prirodu i okoliš. Nerijetko se događa da se napuštena eksploatacijska polja ne saniraju, a prenamjena prostora se u sklopu tehničke sanacije niti ne uzima u obzir. Sa stajališta zaštite okoliša, iskorištavanje mineralnih sirovina ima daleko najveći negativni utjecaj, kako na krajobraznu tako i biološku raznolikost, najviše zbog devastiranog prostora koji ostaje nakon zatvaranja eksploatacijskog polja.

U ovom radu prikazat će se mogućnosti provedbe prenamjene napuštenih eksploatacijskih polje te prepreke na koje se nailazi u pripremi projektne dokumentacije uključujući i postupak procjene utjecaja zahvata na okoliš na nekoliko konkretnih primjera.

Ključne riječi: eksploatacijska polja, prenamjena prostora, devastirani prostor, sanacija

Environmental Impact Assessment of the Renovation Project of the existing municipal waste landfill, Municipality Sanski Most

Nebojša Knežević¹, Danijela Knežević²

*¹Civil Engineering Institute "IG" LLC Banja Luka Kralja Petra I
Karadjordjevića 92-98, 78 000 Banja Luka, Bosnia and Herzegovina
(knezneso@gmail.com)*

*²Technical Ecological Department of Banjaluka, Milana Kranovića bb, Bosnia
and Herzegovina*

Abstract

Waste represents one of the priority environmental issues in B&H. Annually, 2 to 3 million tonnes of solid waste of all categories are produced, which is largely disposed of at around 1,100 "wild landfills", due to insufficient number of duly regulated sanitary landfills. Such garbage disposal directly threatens the health of the population, such as the one living near the landfill, and widespread because of the danger of highlighting toxic substances in groundwater.

The underlying problems stem from the current social relationship to waste and management. Waste management is certainly one of the main directions in the field of environmental protection in the Municipality of Sanski Most. Definitely, there are no communities, cities or local communities that have successfully solved this problem.

The municipality of Sanski Most in the forthcoming period must designate a new location for sanitary landfill, then sanitize the temporary city dump as well as all other "wild landfills".

The aim and purpose of this project is to clearly present all possible environmental impacts during the remediation, use and storage of landfills, to anticipate the necessary measures to protect all segments of the environment and to define a system for monitoring the effectiveness of the protection measures envisaged.

By analyzing all these factors of identified impacts on all environmental segments, including the effects on human health, and comparing them to each other, one can conclude that the project has a positive environmental impact. The identified negative impacts can be brought to legally acceptable limits by prescribed measures.

Keywords: landfill, municipal waste, environment, measures, monitoring.

Procjena utjecaja na okoliš projekta sanacije postojeće deponije komunalnog otpada, Općina Sanski Most

Nebojša Knežević¹, Danijela Knežević²

¹*Institut za građevinarstvo IG d.o.o. Banja Luka, Kralja Petra I Karađorđevića 92-98, 78000 Banja Luka, Bosna i Hercegovina (knezesno@gmail.com)*

²*Tehničko ekološki zavod Banjaluka, Milana Kranovića bb, BiH*

Sažetak

Otpad predstavlja jedan od prioritetnih problema zaštite okoliša u BiH. Godišnje se stvara 2 do 3 miliona tona čvrstog otpada svih kategorija, koji se uglavnom odlaže na oko 1.100 “divljih deponija”, usljed nedovoljnog broja propisno uređenih sanitarnih deponija. Ovakvo odlaganje smeća neposredno ugrožava zdravlje stanovništva, kako onog koje živi u neposrednoj blizini deponija, tako i šire zbog opasnosti isticanja otrovnih materija u podzemne vode.

Osnovni problemi proizlaze iz dosadašnjeg društvenog odnosa prema otpadu i načinu upravljanja. Upravljanje otpadom je svakako jedan od glavnih pravaca u oblasti zaštite okoliša i u Općini Sanski Most. Definitivno, nema nijedne sredine, grada ili mjesne zajednice kojem su uspješno riješili ovaj problem.

Općina Sanski Most u narednom periodu mora odrediti novu lokaciju za sanitarnu deponiju, zatim sanirati privremenu gradsku deponiju kao i sve ostale “divlje deponije”.

Zadatak i cilj ovog projekta je da jasno prikaže sve potencijalne utjecaje na okoliš tokom sanacije, korištenja i zatvaranja deponije, predvidi potrebne mjere zaštite svih segmenata okoliša i definiše sistem praćenja efikasnosti predviđenih mjera zaštite.

Analizirajući sve navedene faktore identifikovanih utjecaja na sve segmente okoliša, uključujući i uticaje na zdravlje ljudi, i komparirajući ih međusobno, može se izvesti zaključak da projekat ima pozitivan utjecaj na okoliš. Identifikovani negativni utjecaji se mogu propisanim mjerama dovesti u zakonski prihvatljive granice.

Ključne riječi: deponija, komunalni otpad, životna sredina, mjere, monitoring.

International experiences with opposition to wind energy siting decisions: Lessons for environmental and social impact assessment

Matthew Cashmore¹, Mari Kågström¹, David Rudolph²

¹Department of Urban and Rural Development. Swedish University of Agricultural Sciences, PO BOX Box 7012, SE-750 07, Uppsala, Sweden (matthew.cashmore@slu.se)

²Department of Wind Energy, Technical University of Denmark, Roskilde 4000, Denmark

Abstract

The planning of renewable energy infrastructure has proven highly controversial across many regions of the world. In this article, we critically examine the lessons that can be learned from research investigating the causes of controversy over, and public opposition to, wind turbines. The review focuses on a specific, but often highly controversial component of planning practice: environmental and social impact assessment. The review advances understandings of the reasons for contestation over the social impacts of wind turbines; the basis and legitimacy of plurality and contestation; and, the biases that tend to underpin understandings of the role and functioning of participation in impact assessment. A typology of actor's attitudes to wind energy is employed to elucidate the implications of our review for impact assessment practices. We conclude that a broader understanding of the societal purposes of public participation needs to be integrated into impact assessment theory and practice, including an acceptance of the legitimacy of antagonism and dissent and its value in fostering social learning.

Keywords: appraisal; renewable energy; wind turbines; planning conflict

Synergy of Circular Economy and Environmental Impact Assessment

Mira Zovko, Ines Katić, Jasna Kufrin, Dunja Pofuk, Ivana Gudelj

*Croatian Agency for the Environment and Nature, Radnička cesta 80/VII,
Zagreb, Croatia (mira.zovko@azo.hr)*

Abstract

The circular economy is the one in which value is generated by environmental conservation and efficient use of resources, such as the use of materials from waste. Since 2014, at the EU-28 level, the concept of a circular economy has been carefully integrated into strategic, planning and legislative documents and has been going beyond environmental frameworks, positively changing society and the economy. On the other hand, the environmental impact assessment is one of the most important environmental protection instruments, so its connection with the circular economy requires concretizing the integration proposal as well as the time for implementation. Still, it is certain that this integration has been already taking place. Therefore, this paper provides a brief analysis of link between the circular economy and the environmental impact assessment and an overview of some of their synergistic effects. The expected outcome is twofold. The first is the promotion of the development of the circular economy, and the second is improvement of the environmental impact assessment in a way that ensures the simplicity and ease of its adoption and implementation. The ultimate goal is to improve these environmental protection instruments with a view to more efficient conservation of natural resources.

Keywords: circular economy, environmental impact assessment

Sinergija kruznoga gospodarstva i procjene utjecaja na okoliš

Mira Zovko, Ines Katić, Jasna Kufrin, Dunja Pofuk, Ivana Gudelj

Hrvatska agencija za okoliš i prirodu, Radnička cesta 80/VII, Zagreb, Hrvatska
(mira.zovko@azo.hr)

Sažetak

Kružno gospodarstvo je ono u kojem se vrijednost stvara očuvanjem okoliša i učinkovitim korištenjem resursa, što uključuje primjerice korištenje materijala iz otpada. Od 2014. godine na razini EU – 28, koncept kruznoga gospodarstva pažljivo se integrira u strateško - planske i zakonodavne dokumente te nadilazi okvire okoliša, pozitivno mijenjajući društvo i gospodarstvo. S druge strane, procjena utjecaja planiranih zahvata na okoliš jedan je od najvažnijih instrumenata zaštite okoliša, pa njeno povezivanje s konceptom kruznoga gospodarstva zahtjeva konkretiziranje prijedloga integracije, ali i vrijeme za implementaciju. Ipak, sigurno je da se ta integracija već odvija. Stoga ovaj rad donosi kratku analizu poveznica kruznoga gospodarstva s procjenom utjecaja na okoliš te pregled nekih od mogućnosti njihovog sinergističkog djelovanja. Očekivani ishod je dvojak. Prvi je promocija razvoja kruznoga gospodarstva, a drugi unaprjeđenje procjene utjecaja na okoliš na način da se osigura jednostavnost i lakoća njenog prihvatanja i provođenja. Krajnji cilj je unaprjeđenje ovih instrumenata zaštite okoliša sa svrhom što učinkovitijeg očuvanja prirodnih resursa.

Ključne riječi: kružno gospodarstvo, procjena utjecaja na okoliš

Considering the possibilities of waste management based on principles of circular economics in the sector of tourism

Igor Anić, Imelda Pavelić

*DVOKUT-ECRO Ltd., Trnjanska 37, Zagreb, Croatia
(igor.anic@dvokut-ecro.hr, imelda.pavelic@dvokut-ecro.hr)*

Abstract

In The Republic of Croatia tourism is the most vital economic sector with significant potential for growth and further development. Emphasized seasonality in the number of tourist visits by which is characterized tourism in Croatia is directly reflecting in the increase of generated waste amounts for a limited time duration making additional pressures on the environment.

The gradual introduction of the circular economy in waste management systems as well as in the field of tourism activity is a guideline for sustainable resource management and sustainable waste management.

The aim of this paper is to present the current sectoral approach and implementation of the circular economy in the field of tourism activity.

On the example of Šibensko-kninska county is given a review of the available solutions for sustainable waste management under which were investigated available options and solutions in waste management based on circular economy.

Through reporting and analyzing state of waste management in tourism sector we raise awareness for above mentioned problem, also paper emphasize limits and opportunities for circular economy implementation in existing waste management systems in tourism sector.

Similar considerations are necessary to develop specific innovative strategies for waste management in tourism sector and gradually decrease the pressure of tourism activities on the environment.

Keywords: circular economy, sustainable waste management, tourism

Razmatranje mogućnosti gospodarenja otpadom na načelima cirkularne ekonomije u sektoru turizma

Igor Anić, Imelda Pavelić

DVOKUT-ECRO d.o.o., Trnjanska 37, Zagreb, Hrvatska
(igor.anic@dvokut-ecro.hr, imelda.pavelic@dvokut-ecro.hr)

Sažetak

U Republici Hrvatskoj turizam predstavlja najvitalniju gospodarsku granu sa značajnim potencijalom za rast i razvoj. Jedna od glavnih karakteristika turizma u Hrvatskoj je istaknuta sezonalnost u broju posjeta turista, koja se očituje u značajnom porastu količine proizvedenog otpada. U toku turističke sezone evidentan je pritisak na postojeće sustave gospodarenja otpadom na regionalnim i lokalnim razinama. Postepeno uvođenje cirkularne ekonomije u sustave gospodarenja otpadom kao i u područja turističke djelatnosti, smjernica je održivom upravljanju resursima i održivom gospodarenju otpadom.

Cilj predmetnog rada je prikaz aktualnog sektorskog pristupa uvođenja cirkularne ekonomije u području turističke djelatnosti te izazova koji se pri tome javljaju.

Na primjeru Šibensko-kninske županije dan je pregled mogućnosti održivog gospodarenja otpadom te su istražene dostupne mogućnosti i rješenja u gospodarenju otpadom na načelima cirkularne ekonomije.

Kroz navedeni prikaz stanja i analize situacije podiže se svijest o predmetnoj problematici te se navode ograničenja i mogućnosti u implementaciji cirkularne ekonomije u postojeće sustave gospodarenja otpadom turističkih područja. Slična razmatranja neophodna su kako bi se razvile specifične inovativne strategije gospodarenja otpadom te smanjili pritisci turističke djelatnosti na okoliš.

Ključne riječi: 1. cirkularna ekonomija, 2. održivo gospodarenje otpadom, 3. turizam

Analysis on Characteristics of Fly Ash from Coal Power Plant in Kosovo

Mihone Kerolli-Mustafa¹, Letafete Latifi², Lavdim Zeqiri²

¹*International Business College Mitrovica, Environmental Management, Bsilim Bajgora nn, 40000 Mitrovica, Kosovo (m.kerolli@ibcmitrovica.eu)*

²*PhD Candidates, University of Zagreb, Faculty of Chemical Engineering and Technology, Marulicev Trg 19, 10000 Zagreb, Croatia*

Abstract

Fly ash is one of the residues generated during the coal combustion in thermal power plants (TPPs). The greatest quantities of industrial ashes are stored in the form of waste dumps on the mine sides, which create a serious problem as sources of heavy metals, PAHs, and other pollutants. The paper studied the characteristics of fly ash samples from two power stations, from Kosova A and Kosova B coal power plant in Obiliq, Kosovo. Thermoelectric power plants (TPP) “Kosova A and Kosova B” are the oldest active plants in the system of the electric power distribution of Kosovo commissioned before 40 years. The total installed power capacity of TPP Kosova A and B is 1478 MW. In general the energy generation from both thermal power plants is over 97%. The Kosovo’s energy strategy is still focused towards the operation of thermal power plants. The accumulation of around 27 Mt of unutilized fly ash management poses a serious environmental problem for Kosovo and requires considerable research and development as well as effective measure for environmental protection. The environmental protection measures established during the EIA including the fly-ash characteristics were analyzed.

Keywords: Fly ash, characteristics, Kosova A and Kosova B coal power plant.

EAF dust recovery - EIA challenges

Mario Ćosić¹, Goran Pašalić², Sanja Grabar³

¹ABS SISAK d.o.o., Braće Kavurić 12, Sisak, Croatia

²IPZ Uniprojekt MCF, Babonićeva 32, Zagreb, Croatia

³GSM Link, Grižanska 5, Zagreb, Croatia

Abstract

At the beginning of 2015, company management decided to start up the project for construction and erection of recycle mill for EAF dust (EWC 10 02 07*). Mill is based on modified Waeltz process and after testing on pilot plant, it should become first mill of this kind on the World.

In this case, main question is availability of best available techniques (BAT) in order to achieve legal and other requirements in environmental protection and mitigation of impact.

Therefore, it is decided that during preparation of Environmental Impact Assessment, best available techniques from interconnected BAT Reference Documents are applied immediately. By this approach, selection of process equipment was influenced in early stage of project, during preparation of project documentation.

Procured Resolution for the planned intervention, and assessment of environmental acceptability, confirms the validity of the chosen approach in the development of Study and shows how to access to problem solving when there is no references for the same.

Keywords: recovery, EAF dust, BREF

Oporaba elektropećne prašine - Izazovi Procjene utjecaja na okoliš

Mario Ćosić¹, Goran Pašalić², Sanja Grabar³

¹ABS SISAK d.o.o., Braće Kavurić 12, Sisak, Republika Hrvatska

²IPZ Uniprojekt MCF, Babonićeva 32, Zagreb, Republika Hrvatska

³GSM Link, Grižanska 5, Zagreb, Republika Hrvatska

Sažetak

Početkom 2015. godine, uprava tvrtke donosi odluku o pokretanju procesa izgradnje postrojenja za oporabu elektropećne prašine (EWC 10 02 07*). Postrojenje je bazirano na modificiranom Waeltz postupku i nakon testiranja na pilot postrojenju, trebalo je biti prvo postrojenje takvog tipa na svijetu.

U ovakvom slučaju neizostavno se postavlja pitanje dostupnosti najboljih raspoloživih tehnika (NRT) kako bi novo postrojenje zadovoljilo zakonske i druge zahtjeve po pitanju emisija u okoliš i minimalnog utjecaja na isto.

Stoga je zaključeno da se prilikom izrade Studije o utjecaju na okoliš za navedeni zahvat, u istu odmah ugrade najbolje raspoložive tehnike iz više međusobno povezanih referentnih dokumenata za najbolje raspoložive tehnike (RDNRT) te na taj način uvjetuje izbor procesne opreme i to već tijekom izrade dokumentacije za idejni projekt.

Ishođeno Rješenje za namjeravani zahvat, kao i ocjena o prihvatljivosti za okoliš, potvrđuju valjanost odabranog pristupa u izradi Studije te ukazuje na koji način pristupati rješavanju problema kad za iste ne postoje reference.

Ključne riječi: oporaba, elektropećna prašina, RDNRT

SEKCIJA 2 / SECTION 2

**PROCJENA UTJECAJA NA OKOLIŠ /
ENVIRONMENTAL IMPACT ASSESSMENT**

**POSTER PREZENTACIJE /
POSTER PRESENTATIONS**

Contribution of EIA procedures to invasive alien species spread mitigation: troubles in paradise?

Marina Škunca, Luka Škunca, Hrvoje Peternel

*Geonatura Ltd., Fallerovo šetalište 22, HR-10000 Zagreb, Croatia
(mskunca@geonatura.hr)*

Environmental (EIA) and Nature Impact Assessment (NIA) procedures are often viewed as a perfect tool to mitigate negative impacts of various human interventions in the environment. Unintentional contribution to the spread of invasive alien species (IAS) on local and regional scales is certainly one of them. And if the aforementioned impact is recognized during the procedure, preventive, control and/or eradication measures can be proposed.

At the same time, results of the preliminary analysis of 116 EIA Studies have shown that the level to which IAS are recognized in those documents is very variable, while the relationship between EIA and IAS is rather entangled.

Based on the results of expanded preliminary analysis and using descriptive statistics, this analysis will highlight the problems that should be addressed if the relationship between EIA and IAS is to remain functional (e.g. non-standardized terminology across Studies, lack of available data and unfamiliarity of other sectors with the issue of IAS).

Keywords: human impacts, EIA and NIA procedures, invasive alien species, mitigation measures

Landfill leachate – Analysis of leachate pollution parameters based on an example of Diklo landfill, Zadar

Tea Strmecky¹, Davor Barać², Ivan Mališa²

¹Maxicon Ltd. Kružna 22, Zagreb, Croatia (tea.strmecky@maxicon.hr)

²PANGEO Projekt Ltd., Marijana Haberlea 6, Zagreb, Croatia
(dbarac@pangeoprojekt.hr, imalisa@pangeoprojekt.hr)

Abstract

As part of Environmental Impact Study, detailed analysis of landfill leachate has been carried out to find the best possible solution for the remediation and closure of the Diklo landfill.

Landfill leachate may contain relatively high concentrations of pollutants which have a potential to contaminate the surrounding groundwater and surface water. The amount of precipitation, waste type, composition and age of landfill affect the final composition of the landfill leachate. The composition of these leachate can usually be presented with basic parameters such as chemical oxygen demand (KPK), biochemical oxygen demand (BPK₅), BPK / KPK ratio, total nitrogen (N total), pH, ammonium salts (NH₄), heavy metals, turbidity (NTU), etc. Young landfill leachate contain large amounts of biodegradable organic matter, due to rapid anaerobic degradation, while mature ones contain non-biodegradable compounds.

The results show that concentrations of pollutants in landfill leachate are higher in the active part of the landfill, where the waste disposal is still occurring, while the concentrations are lower in the passive part, where waste is deposited longer.

The aim is to show that by applying the appropriate covering system within the landfill remediation, concentrations of pollutants are reduced to a minimum and no longer represent a risk for groundwater and surface water.

Keywords: Landfill leachate, age of landfill, leachate composition

Procjedne vode odlagališta otpada– analize parametara onečišćenja procjedne vode na primjeru odlagališta Diklo, Zadar

Tea Strmecky¹, Davor Barać², Ivan Mališa²

¹*Maxicon d.o.o., Kružna 22, Zagreb, Hrvatska (tea.strmecky@maxicon.hr)*

²*PANGEO Projekt d.o.o., Marijana Haberlea 6, Zagreb, Hrvatska (dbarac@pangeoprojekt.hr, imalisa@pangeoprojekt.hr)*

Sažetak

Za potrebe izrade Studije utjecaja na okoliš, provedena je detaljna analiza procjednih voda kako bi se pronašlo najbolje moguće rješenje za sanaciju i zatvaranje odlagališta Diklo.

Procjedne vode sadrže relativno velike koncentracije onečišćujućih tvari koje potencijalno onečišćuju okolne podzemne i površinske vode. Na sastav procjedne vode nekog odlagališta utječe količina oborina, vrsta i sastav otpada, te starost odloženog otpada. Sastav procjednih voda odlagališta obično se može prezentirati osnovnim parametrima kao što su kemijska potrošnja kisika (KPK), biokemijska potrošnja kisika (BPK₅), omjer BPK/KPK, ukupni dušik (Nukupni), pH, amonijeve soli (NH₄), teški metali, mutnoća (NTU), itd. Procjedne vode mladih odlagališta sadrže velike količine biorazgradivih tvari koje su posljedica brze anaerobne razgradnje, dok procjedne vode starijih odlagališta karakteriziraju biološki nerazgradive tvari.

Rezultati pokazuju kako na aktivnom dijelu odlagališta, gdje se i dalje odlaže, koncentracije onečišćujućih tvari u procjednim vodama su veće, dok su na pasivnom dijelu, gdje je otpad već duže odložen, koncentracije niže.

Cilj je prikazati da primjenom odgovarajućeg prekrivnog sustava u sklopu sanacije odlagališta, onečišćujuće tvari se svedu na minimum i više ne predstavljaju rizik za podzemne i površinske vode.

Ključne riječi: procjedne vode, starost odloženog otpada, parametri onečišćenja

Emission modelling of farming variants for sea bass and sea beam and their use in environmental impact assessment

Fanica Kljaković-Gašpić¹, Melita Burić², Lav Bavčević³, Sanja Grgurić², Ana Jurjević², Tomi Haramina¹, Jasmina Šargač¹,
Nikolina Bakšić¹, Oleg Antoni¹

¹*Green infrastrukture Ltd., Fallerovo šetalište 22, Zagreb, Croatia*

²*Gekom Ltd, Fallerovo šetalište 22, Zagreb, Croatia*

³*Savjetodavna služba, Savska cesta 41 (PT Zagrepčanka - Anex), Zagreb, Croatia*

Abstract

For environmental impact assessment of farming site between capes Žman and Gubac with a capacity up to 3 000 t / a, four farming variants (I, II, III and IV a and b) were analysed. The variants differed in the spatial distribution of farming generations, in a number of cages and total annual production. Assessment is preformed based on of the dispersion and deposition of organic matter and oxygen concentration at the sea bottom, using a numerical model consisting of two modules (particle dispersion and deposition model and calculation of oxygen and carbon concentrations at the bottom).

The environmental impact assessment included a comparison of the emissions from the fish farm in the week of the most intensive production. When comparing the variants, the following parameters were considered: annual maximum production, number of cages, surfaces under different oxygen concentrations, maximum and mean value of carbon intake.

Results suggest that by minimal reduction of annual production and good distribution of fish stock during farming cycle, it is possible to significantly reduce a level of emissions from farm as well as effected area below the farm and thereby reduce the impact of the farm on the environment.

Keywords: emissions, variants, modelling, impact assessment

Modeliranje emisija različitih uzgojnih varijanti bijele ribe i njihova primjena u procjeni utjecaja na okoliš

Fanica Kljaković-Gašpić¹, Melita Burić², Lav Bavčević³, Sanja Grgurić², Ana Jurjević², Tomi Haramina¹, Jasmina Šargač¹,
Nikolina Bakšić¹, Oleg Antonić¹

¹*Zelena infrastruktura d.o.o., Fallerovo šetalište 22, Zagreb, Hrvatska*

²*Gekom d.o.o., Fallerovo šetalište 22, Zagreb, Hrvatska*

³*Savjetodavna služba, Savska cesta 41 (PT Zagrepčanka - Anex), Zagreb, Hrvatska*

Sažetak

Za potrebe procjene utjecaja na okoliš za uzgajalište bijele ribe do 3 000 t/a, između rtova Žman i Gubac, analizirane su četiri uzgojne varijante (I, II, III. i IV a i b). Varijante su se razlikovale u prostornom rasporedu pojedinih generacija i broju kaveza te ukupnoj godišnjoj proizvodnji. Napravljena je procjena raspršenja i dotoka organske tvari na morsko dno te koncentracije kisika pri dnu, koja je bazirana na osnovi numeričkog modela koji se sastoji od dva modula (modela raspršenja i taloženja čestica na morsko dno i izračuna koncentracije kisika i ugljika pri dnu).

Procjena utjecaja na okoliš uključivala je usporedbu emisija iz uzgajališta u tjednu najintenzivnije proizvodnje. Prilikom usporedbe varijanti razmatrani su sljedeći parametri: godišnja maksimalna proizvodnja, broj kaveza, površina pod različitim koncentracijama kisika, maksimalna i srednja vrijednost dotoka ugljika.

Rezultati ukazuju da je uz minimalno smanjenje godišnje proizvodnje i promišljenom raspodjelom nasada ribe tijekom uzgojnog ciklusa, moguće značajno smanjiti razinu emisija iz uzgajališta kao i utjecane površine ispod uzgajališta, a samim time i smanjiti utjecaj uzgajališta na okoliš.

Ključne riječi: emisije, varijante, modeliranje, procjena utjecaja

EIA as an important instrument for landscape protection: examples of fitting of railway infrastructures into surrounding landscape

Višnja Šteko, Martina Čipčić- Bragadin, Sunčana Bilić, Matea Lončar

Green infrastructure ltd., Fallerovo šetalište 22, Zagreb, Croatia
(vsteko@ozins.hr, mcbragadin@ozins.hr, sbilic@ozins.hr, mloncar@ozins.hr)

Abstract

Unified system of landscape protection, management and planning is not yet established in the Republic of Croatia. However, these activities are being carried out through separate actions of several responsible departments. Nowadays, specific areas of valuable natural and cultural heritage are being protected through normative measures, whereas relevant physical planning documents prescribe landscape protection measures. Besides these, landscape protection is also carried out through environmental protection measures defined in the process of environmental impact assessment (EIA). Investor is obliged to implement prescribed environmental protection measures even prior to construction phase, at preparatory stage, during the conceptual and more so main design development. This phase, among others, includes development of landscape design that incorporates all environmental protection measures which are of significance for the landscape. Paper presents an overview of the landscape design process on the example of project “Upgrade, renewal, construction of second track and construction of new double-track line on sections of the railway line on the section Dugo selo – Novska”. Ultimately, landscape design results in rehabilitation of areas affected by construction works, as well as fitting of railway structures into surrounding landscape, thus representing a positive example of EIA as an efficient instrument for landscape protection.

Keywords: environmental protection measures, landscape conceptual design project, main landscape design project, railway structures

Postupak PUO kao instrument zaštite krajobraza: primjer uklapanja željezničke infrastrukture u okolni prostor

Višnja Šteko, Martina Čipčić- Bragadin, Sunčana Bilić, Matea Lončar

¹*Zelena infrastruktura d.o.o., Fallerovo šetalište 22, Zagreb, Hrvatska*
(vsteko@ozins.hr, mcbragadin@ozins.hr, sbilibic@ozins.hr, mloncar@ozins.hr)

Sažetak

Trenutno u Republici Hrvatskoj ne postoji jedinstveni sustav zaštite, upravljanja i planiranja krajobraza, već se navedene aktivnosti provode kroz odvojeno djelovanje nekoliko nadležnih resora. Uz normativne mjere kojima se pojedina područja vrijedne prirodne ili kulturne baštine proglašuju zaštićenima i mjere zaštite krajobraza propisane dokumentima prostornog uređenja, zaštita krajobraza se provodi i kroz mjere zaštite okoliša utvrđene u postupku procjene utjecaja zahvata na okoliš (PUO). Propisane mjere zaštite okoliša investitor je obavezan implementirati već u fazi pripreme, prije početka izgradnje zahvata, odnosno u fazi izrade idejnog projekta i glavnog projekta. Izradom projekta krajobraznog uređenja (kroz sve faze projektiranja) osigurava se maksimalna implementacija mjera zaštite okoliša značajnih za krajobraz. U radu je dan pregled postupka izrade idejnog projekata krajobraznog uređenja na primjeru projekta „Unaprjeđenje, obnova, izgradnja drugog kolosijeka te izgradnja nove dvokolosiječne pruge na dionicama željezničke pruge na dionici Dugo selo – Novska“. Krajobrazno uređenje ovog zahvata u konačnici će rezultirati sanacijom područja zahvaćenih građevinskim radovima i uklapanjem zahvata u okolni prostor, predstavljajući tako pozitivan primjer efikasnosti postupka PUO kao instrumenta zaštite krajobraza.

Ključne riječi: mjere zaštite okoliša, idejni projekt, glavni projekt krajobrazno uređenje, željeznička infrastruktura

Application of numerical models in air quality assessment

Goran Gašparac¹, Sanja Grgurić¹, Amela Jeričević²

¹*Geophysical and ecological modeling Ltd., Zagreb, Croatia*
(ggasparac@gekom.hr)

²*Croatian Civil Aviation Agency, Zagreb, Croatia*

Abstract

Air quality models play a significant role in the assessment and management of air quality. Nowadays, they are widely used in public health cohort studies as the measurements are expensive and represent usually limited and small areas (e.g., rural areas, mountains), which are often not representative for more broad and detailed studies. The assessment of air quality is conducted by applying various different regional and local models on various time and spatial scales in order to better understand processes in the atmosphere and model performance with attention to stable boundary conditions. Without harmonization of emission input fields and initial and boundary conditions, this work enables an essential scientific baseline on choosing the appropriate model for future needs in terms of resolution, physical parameterization, emission data set, calculation speed in practical applications under current EU air quality legislatives.

Keywords: air quality assessment, numerical modeling, air quality management

Environmental Impact Assessment Procedure for the Ore Deposit Geological Exploration Projects in Serbia

Tanja Radović, Nebojša Pokimica, Ratko Đorđević, Pavle Cvetić,
Bojana Lalović

Dvoper Ltd., Dečanska 5, Belgrade, Serbia
(info@dvoper.rs)

Abstract

Implementation of projects in sector of mining and geological explorations presents a complex procedure defined by the Law on mining and geological explorations.

Mining works are performed based on drafted planning, technical and project documentation, and Opinions, Conditions, Compliances and Permits from competent institutions, according to legislation for waters, environmental protection, environmental protection etc.

Geological explorations are performed for sampling solid mineral resources for further testing and determining composition, reserves on subject area, possibility and cost-effectiveness for technological exploitation.

These types of projects are not subject to environmental impact assessment procedure, according to the Regulation on determining the list of Projects for which impact assessment is obligatory and list of Projects for which the environmental impact assessment can be required. However, in case of performing underground explorations deep in the earth body, it is recommended to submit a request on determining the need for impact assessment. Upon completion of exploration works and eventual exploitation planning, it is necessary to draft an environmental impact assessment in case of surface mines of mineral resources - surface larger than 10 ha (List I item 19), ie. submit the request for determining the need for impact assessment for surface mines with surface up to 10 ha and all underground exploitation of mineral resources projects (List II Item 2).

Keywords: geological exploration, mineral raw materials

Procedura procene uticaja na životnu sredinu za projekte geoloških istraživanja ležišta ruda u Srbiji

**Tanja Radović, Nebojša Pokimica, Ratko Đorđević, Pavle Cvetić,
Bojana Lalović**

*Dvoper d.o.o., Dečanska 5, Beograd, Srbija
(info@dvoper.rs)*

Sažetak

Sprovođenje projekata iz oblasti rudarstva i geoloških istraživanja predstavlja kompleksan postupak definisan Zakonom o rudarstvu i geoloskim istraživanjima.

Rudarski radovi vrše se na osnovu izrađene planske, tehničke i projektne dokumentacije, kao i mišljenja, uslova, saglasnosti i dozvola nadležnih institucija, shodno zakonskoj regulativi iz oblasti voda, zaštite životne sredine, procene uticaja na životnu sredinu i dr.

Geološka istraživanja izvode se u cilju uzimanja uzoraka čvrstih mineralnih sirovina za dalja ispitivanja i utvrđivanje njihovog sastava, rezervi na predmetnom području i mogućnosti i isplativosti njihovog tehnološkog iskorišćenja.

Ova vrsta projekata ne podleže proceduri procene uticaja na životnu sredinu, shodno Uredbi o utvrđivanju liste projekata za koje je obavezna procena uticaja i liste projekata za koje se može zahtevati procena uticaja na životnu sredinu. Ipak, u slučaju da se izvode podzemni istraživački duboko u telu zemlje, preporučuje se podnošenje zahteva za odlučivanje o potrebi procene uticaja. Po završetku istražnih radova i eventualnom planiranju eksploatacije, neophodno je izraditi procenu uticaja na životnu sredinu u slučaju površinskih kopova mineralnih sirovina površine veće od 10 ha (Lista I tačka 19), odnosno podneti zahtev za odlučivanje o potrebi procene uticaja za površinske kopove površine do 10 ha i sve projekte podzemne eksploatacije mineralnih sirovina (Lista II tačka2).

Ključne riječi: geološka istraživanja, mineralne sirovine

SEKCIJA 3 / SECTION 3

ZAŠTITA PRIRODE I ODRŽIVO KORIŠTENJE PRIRODNIH RESURSA / NATURE CONSERVATION AND SUSTAINABLE USE OF NATURAL RESOURCES

Improving decisions with appropriate assessment

Tina Klemenčič

*Institute of Republic of Slovenia for Nature Conservation, Tobačna 5, 1000
Ljubljana, Slovenia (tina.klemencic@zrsvn.si)*

Abstract

Appropriate assessment is an excellent, perfected system for assessing the impacts of a plan or a project to the conservation objectives and the integrity of Natura 2000 site and to the coherence of the ecological network. Taking into account the objectives of the site with all of its diversity, specifics and requirements on one side and the objectives of the plan or the project with all the possible impacts and consequences on the other, it enables economic and social development, protecting the sites at the same time. When such development could significantly damage the site, but is necessary or urgent and there is no other alternative solution to achieve the plan's goals with less damage for the site, it is still possible to bring such plan to effect. However, it is possible only after very careful weighing of overriding public interest has been carried out and the possibility for compensation of the damage has been proved. But even then the overall objective of protecting the wildlife, the integrity and the coherence of Natura 2000 network is binding - if any of the three above stated conditions are not met, the plan cannot be approved. With all of its elements, the appropriate assessment can become an indispensable decision making tool in one's professional and even personal life. The presentation will show how the concept of appropriate assessment can be used for decisions, not related to Natura 2000, and how it can contribute to better understanding of assessing plans and projects on Natura 2000 sites.

Keywords: appropriate assessment, Natura 2000, decision making, conservation objectives, overall objective

Izboljšanje odločitev s pomočjo presoje sprejemljivosti

Tina Klemenčič

Zavod Republike Slovenije za varstvo narave, Tobačna 5, 1000 Ljubljana, Slovenia (tina.klemencic@zrsvn.si)

Povzetek

Presoja sprejemljivosti je dovršen sistem za ocenjevanje vplivov planov ali posegov na varstvene cilje območij Natura 2000, njihovo celovitost in povezanost ekološkega omrežja. Ker na eni strani upošteva varstvene cilje območja z vso raznovrstnostjo, specifikami in zahtevami, na drugi pa cilje plana ali posega z vsemi možnimi vplivi in posledicami, omogoča ekonomski in družbeni razvoj ob hkratnem varovanju območij Natura 2000. Kadar bi lahko tak razvoj pomembno škodljivo vplival na območje in je nujen, pri tem pa za njegovo uresničitev ne obstaja manj škodljiva alternativna rešitev, je tak plan še vedno možno izvesti. Vendar pa je to možno šele po zelo previdnem tehtanju javnega interesa in možnosti za izravnavo škodljivih posledic. Splošni cilj varovanja prostoživečih živali in rastlin ter celovitosti in povezanosti omrežja Natura 2000 pa je tudi v tem primeru zavezujoč – če kateri koli od zgoraj naštetih pogojev ni uresničen, plana s škodljivimi posledicami za območje ni mogoče sprejeti. Z vsemi svojimi elementi lahko presoja sprejemljivosti postane nepogrešljiv pripomoček za sprejemanje odločitev v profesionalnem, pa tudi zasebnem življenju posameznika. Namen predstavitve je pokazati, kako lahko koncept presoje sprejemljivosti uporabimo v odločitvah, ki niso povezane z Naturo 2000, in kako nam to lahko pomaga do boljšega razumevanja presoje planov in posegov na območjih Natura 2000.

Ključne besede: Natura 2000, presoja sprejemljivosti, sprejemanje odločitev, varstveni cilji, splošen cilj

Evaluation of Natura 2000 habitats – methods and challenges

Nela Jantol, Ana Ostojić, Davor Korman, Vladimir Kušan,
Medeja Pistotnik, Zrinka Mesić

*Oikon Ltd. Institute of Applied Ecology, Trg senjskih uskoka 1-2, Zagreb,
Croatia (njantol@oikon.hr)*

Abstract

Evaluation of ecological network habitats is important for assessing the impact on the ecological network as well as for monitoring. Representativity and conservation of almost half of habitat types in all areas of the ecological network of the Republic of Croatia was estimated based on rough estimations while target research is frequently missing. The aim of this paper is to demonstrate methods of research and assessment of some grassland, coastal and forest habitats as well as the challenges arising from it. The methods included field research and remote sensing, creation of GIS database and selection of parameters under which the habitats were evaluated. Challenges encountered in such assessments are reflected in the form of insufficient guidance in assessing the condition, i.e. list of species that are indicators of good or poor condition in specific Croatian habitats, as is the case in some countries. In addition, currently there are no widely available data bases of the latest research used to estimate the impact with greater precision. In the future it will be necessary to establish clear guidelines of evaluation for monitoring purposes of the ecological network with intention to maintain or improve their quality.

Keywords: ecological network, remote sensing, representativity of habitat types, monitoring

Vrednovanje Natura 2000 staništa – metode i izazovi

Nela Jantol, Ana Ostojić, Davor Korman, Vladimir Kušan,
Medeja Pistotnik, Zrinka Mesić

*Oikon d.o.o. Institut za primijenjenu ekologiju, Trg senjskih uskoka 1-2,
Zagreb, Hrvatska (njantol@oikon.hr)*

Sažetak

Vrednovanje staništa ekološke mreže bitno je za procjenu utjecaja kao i za praćenje stanja na područjima ekološke mreže. Reprezentativnost i očuvanost skoro polovice stanišnih tipova u svim područjima ekološke mreže Republike Hrvatske utvrđena je na temelju grube procjene, tj. redovito nedostaju ciljane istraživanja. Cilj ovog rada je prikazati metode istraživanja i procjene stanja nekih travnjačkih, obalnih i šumskih stanišnih tipova kao i izazove koji iz toga proizlaze. Metode su uključivale terenska i daljinska istraživanja, stvaranje GIS baze podataka, a zatim odabir parametara po kojima su staništa vrednovana. Izazovi na koje se nailazi kod ovakvih procjena očituju se u vidu nedostajućih smjernica kod ocjene stanja, npr. popis vrsta koje su indikatori dobrog ili slabijeg stanja u staništima specifičnim za hrvatsku floru, kao što je slučaj u nekim državama. Također, trenutno nema baze široko dostupnih podataka kojima bi se procjena utjecaja mogla odrediti/vrednovati? sa što većom preciznosti. U budućnosti će biti potrebno uspostaviti jasne smjernice procjene za potrebe praćenja stanja područja ekološke mreže u cilju održavanja ili poboljšanja njihove kvalitete.

Ključne riječi: ekološka mreža, daljinska istraživanja, reprezentativnost stanišnih tipova, praćenje stanja

Will Global Sustainable Development Goals Influence Sustainability of Natural Resource Usage

Mirjana Matešić

Croatian Business Council for Sustainable Development, Prilaz Gjure Deželića 30, Zagreb, Croatia (mirjana.matesic@hrpsor.hr)

Abstract

UN Sustainable Development Goals (SDGs) are new Goals to the UN Development Program 2030. Companies of all sizes will have to participate in creation of values according to each goal and change the direction of development, as well as of our own future. When we speak of the responsibility and engagement of companies in implementation of SDGs, it is not only about the responsibility of large multinational companies. Small and medium enterprises and start-ups also have a large role to play in implementation of these Goals.

This paper will try to find out if there is a fair chance that adoption of SDGs and their integration in international and national policies will influence sustainable usage of natural resources and change in the direction of technological development of business towards circular and low-carbon economy. Paper will bring a short analysis of key documents and relevant available researches and offer recommendations on how to support business in making the necessary changes towards sustainable economy. Also, it will give a short overview of the changes that need to be implemented in business systems if we want to see the expected turn. We expect that the research will show that there is a need for stronger engagement of public institutions in creation of the supporting environment as well as closer collaboration and possibility for business and civil sectors to stronger influence public policies.

Keywords: Global Sustainable Development Goals; Circular Economy; Paris Agreement

Mogu li Globalni ciljevi održivog razvoja utjecati na održivost korištenja prirodnih resursa

Mirjana Matešić

Hrvatski poslovni savjet za održivo razvoje, Prilaz Gjura Deželića 30, Zagreb, Hrvatska (mirjana.matesic@hrpsor.hr)

Sažetak

UN-ovi ciljevi održivog razvoja (COR) novi su ciljevi Programa za razvoj do 2030. Poduzeća svih veličina moraju sudjelovati u stvaranju vrijednosti po svakom cilju i mijenjati smjer razvoja, a istovremeno i zajedničke budućnosti. Kada govorimo o angažmanu poduzeća u postizanju COR, ovdje se ne radi samo o odgovornosti velikih međunarodnih kompanija. Malo i srednje poduzetništvo i start-upovi imaju ogromnu ulogu u postizanju ovih Ciljeva.

Ovaj rad će pokušati istražiti kakvi su izgledi da donošenje COR-a i njihova integracija u međudržavne i nacionalne politike, potakne održivo korištenje prirodnih resursa i promjenu smjera tehnološkog razvoja gospodarstva prema kružnoj i niskougljičnoj ekonomiji. Rad će prikazati kratku analizu ključnih dokumenata i relevantnih dostupnih istraživanja te ponuditi preporuke za poticanje gospodarstva na zaokret prema održivom poslovanju. Također će dati kratak osvrt na promjene koje su nužne u poslovnim sustavima kako bi se dogodio očekivani zaokret. Pretpostavljeni nalazi upućivat će na potrebu snažnijeg angažmana javnih institucija u stvaranju poticajnog okruženja kao i veće suradnje i mogućnosti sudjelovanja u kreiranju javnih politika od strane poslovnog, ali jednako tako i civilnog sektora.

Ključne riječi: Globalni ciljevi održivog razvoja, kružno gospodarstvo, Pariški sporazum

Guidelines on integrating environmental and nature protection issues in the local strategic development documents

Neven Iveša, Koviljka Aškić

*Eko-Adria. d.o.o., Boškovićevo uspon 16, 52100 Pula, Republic of Croatia
(ekoadria@gmail.com)*

Abstract

When the Regional Development of the Republic of Croatia Act was passed (Official Gazette, No. 147/2014) a systematic process of planning of development strategies at the county level has been initiated. High quality development strategies at the local level, harmonized with documents of higher ordinance and with the new strategy of development of the Europe Union (EU Agenda 2020), are contributing to the inclusion of local projects in the funding programs at the national and European Union level. Environmental and nature protection has become an important area of human rights, especially in the context of sustainable development, directly associated with the rights to health, life, water and other social and economic rights. According to examination of the local development documents, environmental and nature protection issues are often only declaratively represented by law and/or on inadequate level of expertise. This especially pertains to conservation of biodiversity, strengthening of the interpretative potential of natural values, promoting the purchase of products and services under the principles of "green" public procurement, measures, defining specific measures in order to prevent waste production, water protection etc.

This paper aims to encourage developers to integrate the priorities, measures, activities and goals of environmental and nature protection, while taking into consideration the specificities of individual local governments in existing and / or future development strategies in order to achieve measurability and specific proposals.

Therefore, local development strategies should present a document that synthesizes the key environmental problems and determine measurable activities within an achievable time frame to set goals.

Keywords: development strategy, objectives and measures of environmental and nature protection

Smjernice za integriranje pitanja zaštite okoliša i prirode u lokalne strateške razvojne dokumente

Neven Iveša, Koviljka Aškić

*Eko-Adria. d.o.o., Boškovićev uspon 16, 52100 Pula, Republika Hrvatska
(ekoadria@gmail.com)*

Sažetak

Usvajanjem Zakona o regionalnom razvoju Republike Hrvatske ("NN", br. 147/2014) pokrenut je sustavan proces strateškog planiranja razvoja na područnom (regionalnom) nivou. Na lokalnim razinama kvalitetne strategije razvoja, usklađene s dokumentima višeg reda i novom razvojnom strategijom Europske unije (EU Agenda 2020), doprinose uključivanju lokalnih projekata u programe financiranja na nacionalnoj i EU razini. Zaštita okoliša i prirode sve je značajnije područje ljudskih prava, posebice u kontekstu održivog razvoja koji se dovodi u direktnu vezu s pravom na zdravlje, život, vodu te drugim socijalnim i ekonomskim pravima. Uvidom u lokalne strateške razvojne programe, područja zaštite okoliša i prirode nerijetko su samo deklarativno zastupljena s niskom i/ili nedostatnom razinom stručnosti. To se naročito odnosi na očuvanje bioraznolikosti, jačanje interpretativnog potencijala prirodnih vrijednosti, promicanje nabave proizvoda i usluga po načelima „zelene“ javne nabave, definiranje konkretnih mjera za sprečavanje nastanka otpada, zaštita voda i dr.

Cilj rada je potaknuti izrađivače da u postojeće i/ili buduće strategije razvoja integriraju prioritete, mjere, aktivnosti i ciljeve zaštite okoliša i prirode uzimajući u obzir specifičnosti pojedine lokalne samouprave.

Zaključno, lokalne strategije razvoja trebaju predstavljati dokumente kojima se sintetiziraju ključni okolišni problemi i određuju mjerljive aktivnosti s ostvarivim vremenskim okvirom za dostizanje ciljeva.

Ključne riječi: strategija razvoja, ciljevi i mjere zaštite okoliša i prirode

Some open issues in obtaining conservation objectives for forest habitats in Natura 2000 areas

Ivan Martinić

*University of Zagreb, Faculty of Forestry, Svetošimunska cesta 25, 10000
Zagreb, Croatia*

Abstract

Out of the total land area of the Republic of Croatia covered by the Ecological Network Natura 2000, over 50% is located within forest management area, out of which the most relates to forest habitat types in proposed SCI areas. After the conclusion of biogeographical seminars for Croatia and adoption of the SCI areas by the European Commission, the forestry sector will have to undertake intensive alignment with protection measures for forest habitat types in Natura 2000 areas. It will be crucial to find prudent solutions to many open issues relating to the legal framework, as well as to the organizational-financial feasibility of implementing measures and obtaining conservation objectives, especially for intensive forest management.

Keywords: Natura 2000, Ecological Network, forest habitats, forestry, monitoring

Neka otvorena pitanja postizanja ciljeva očuvanja šumskih stanišnih tipova u Natura 2000 područjima

Ivan Martinić

Šumarski fakultet Sveučilišta u Zagrebu, Svetošimunska cesta 25, 10000 Zagreb, Hrvatska

Sažetak

Od ukupne površine kopnenog područja Republike Hrvatske obuhvaćenog ekološkom mrežom Natura 2000 preko 50% površine nalazi se u šumskogospodarskom području, od čega se veći dio odnosi na šumske stanišne tipove u predloženim POVS područjima. Nakon završetka biogeografskog seminara za Hrvatsku i prihvaćanja POVS (SCI) područja od strane Europske komisije, šumarskom sektoru predstoji intenzivno usuglašavanje mjera očuvanja šumskih stanišnih tipova u Natura 2000 područjima. Pritom je ključno iznaći razborita rješenja na mnoga otvorena pitanja vezano za zakonodavni okvir, ali i za organizacijsko-financijsku održivost u provedbi mjera i postizanju ciljeva očuvanja, posebno pri intenzivnom gospodarenju šumama.

Ključne riječi: Natura 2000, ekološka mreža, šumska staništa, šumarstvo, monitoring

Unrecognised Conflicts Between the Utilization of Natural Resources and NATURA 2000: Easement of Forests and Forest Land for the Raising of Perennial Crops - Case Study Dubrovnik-Neretva County

Konrad Kiš

DVOKUT-ECRO Ltd., Trnjanska 37, Zagreb, Croatia, (konrad.kis@dvokut-ecro.hr)

Abstract

The Government of Croatia, greatly opposed by the forestry professionals, decided to ease forest and forest land in the amount of 21,949.828 ha throughout the country for the raising of perennial crops (vineyards and olive yards). Apart from being professionally unjustified, since the recent study of the Faculty of Agriculture on Pollution of Ground and Surface Waters Caused by Agriculture from 2014 stated that approximately 52% of the agriculture land in the Dubrovnik-Neretva County is not being utilized, these areas are greatly conflictual since they overlap with the ecological network areas: firstly, with the National Ecological Network proclaimed in 2007 and later with NATURA 2000 proclaimed after the admission of Croatia to the EU in July 2013. Conservation goals of the ecological network areas are, in a great number of cases, forest habitat types which will be clear-cut if the Government's decisions are fully executed. However, since most of these decisions have not yet been implemented, there is still a chance to revoke them to preserve vast ecological network areas and thus avoid paying of substantial penalties to the EU due to the loss of habitat types - conservation goals (more than 1%). By the utilization of the GIS and comparison of cadastral lots designated for easement with the ecological network areas from 2007 and 2013, the article analyses significant threats from loss of vast ecological network areas and suggests means for avoiding of such a scenario.

Keywords: Government decisions, easement, perennial crops, National Ecological Network, Dubrovnik-Neretva County.

Neprepoznati konflikti na relaciji korištenja prirodnih resursa i NATURA 2000 područja: osnivanje prava služnosti na šumama i šumskom zemljištu radi podizanja višegodišnjih nasada - analiza slučaja Dubrovačko-neretvanske županije

Konrad Kiš

*DVOKUT-ECRO d.o.o., Trnjanska 37, Zagreb, Hrvatska
(konrad.kis@dvokut-ecro.hr)*

Sažetak

Odlukama Vlade RH u razdoblju 2004. - 2013. godine, čemu se šumarska struka od početka žestoko protivila, ustanovljeno je pravo služnosti na šumi i šumskom zemljištu radi podizanja višegodišnjih nasada (vinograda i maslinika) na ukupnoj površini od 21.940,828 ha diljem države. Osim stručne neopravanosti ovih odluka, budući da Studija o utjecaju poljoprivrede na onečišćenje površinskih i podzemnih voda Agronomskog fakulteta u Zagrebu iz 2014. godine ukazuje na to da je na području DNŽ neiskorišteno oko 52% poljoprivrednog zemljišta, uvelike je konfliktno preklapanje površina namijenjenih za prenamjenu s područjima nacionalne ekološke mreže proglašene 2007. godine te kasnije ekološkom mrežom NATURA 2000 proglašenom nakon pristupa Hrvatske EU u srpnju 2013. godine. Ciljevi očuvanja područja ekološke mreže su u velikom broju slučajeva šumski stanišni tipovi koje se predmetnim odlukama kani iskrčiti radi podizanja višegodišnjih nasada. Međutim, budući da većina ovih odluka nije sprovedena u djelo, još uvijek postoji mogućnost poništenja spornih odluka čime bi se sačuvala velika područja ekološke mreže i spriječilo plaćanje penala Europskoj uniji zbog gubitka stanišnih tipova - ciljeva očuvanja (više od 1%). Uz primjenu GIS alata te usporedbom kastastarskih čestica namijenjenih za prenamjenu s područjima ekološke mreže iz 2007. i 2013. godine, članak analizira značajne moguće opasnosti gubitka velikih područja ekološke mreže te predlaže mjere sprječavanja ovakvog scenarija.

Ključne riječi: Odluke Vlade, osnivanje služnosti, višegodišnji nasadi, nacionalna ekološka mreža, Dubrovačko-neretvanska županija

Use of Ecosystem services in Croatia - current state and possibilities

Tajana Uzelac Obradović, Jelena Fressl, Ines Rožanić, Marta Brkić

*DVOKUT-ECRO Ltd., Trnjanska 37, 10000 Zagreb, Croatia,
(tajana.uzelac@dvokut-ecro.hr)*

Abstract

By ecosystem services we consider all benefits we receive from nature (direct or indirect) that serve to human benefit. They can be financially valued, but mostly they represent non-measurable values that are difficult to evaluate (e.g. importance to nature protection, importance to human health, etc.).

To properly use ecosystem services, a country should have an accurate and updated habitat map, to properly determine habitat types and their condition (including current state, possible impacts, surrounding processes, etc.).

A project has been launched, implemented by the Croatian Environment Agency (today HAOP), with the purpose of maps preparation, evaluation of ecosystems and their possible services in Croatia. Also, proposed draft of the Strategy and Action plan for nature protection, foresees evaluation and mapping of ecosystems to assess their condition and to improve it.

Ecosystem services could be one of the possible economy branches in future economic development in Croatia, but have not yet been entirely recognized.

Some of the preconditions for this have already started: systematical mapping of habitat types and their current state, determination of their potential, and some still need to be implemented: administrative basis for development of projects that will include use of ecosystem services, etc.

Through this paper a brief overview of the current state of ecosystem services use will be presented through analysis of available and prepared official documents, known practices and future possibilities.

Keywords: ecosystem services, habitats

The process of evaluating the risk of introducing alien species - review and experience

Ana Ostojić, Tena Birov, Zrinka Mesić, Ena Bićanić Marković,
Vladimir Kušan

*Oikon Ltd. Institute of Applied Ecology, Trg senjskih uskoka 1-2, Zagreb,
Croatia (aostojic@oikon.hr)*

Abstract

Alien species that does not naturally live in the ecosystem of a particular area is prohibited to place on the market or introduce into nature on Croatian territory (Art. 68 of the Nature Protection Act). In case of the intended introduction to the nature of some alien, particularly invasive alien species, it is necessary to obtain a permit from the Ministry of Environment and Energy. If during course of granting a permit, environmental risk is recognized, it is necessary to prepare a risk assessment study. In preparing the Study, risk is assessed based on available information (previous research, published data and scientific literature). In evaluating the expected impact on nature it is necessary to assess all impacts, and to quantitatively and qualitatively evaluate information on risk assessment using recognized methodology. Expert opinion on the Study is issued by the Croatian Agency for the Environment and Nature within the thirty day deadline. Based on the opinion of the Agency the Ministry will grant or decline a permit for introduction of alien species into nature.

In this work we present the process of evaluating the risk of introducing alien species into nature, various difficulties investors face as well as possible improvements of the procedure including the role of the public.

Keywords: process of risk assessment, alien species, introduction into nature

Postupak procjene rizika uvođenja stranih vrsta - osvrt i iskustva

Ana Ostojić, Tena Birov, Zrinka Mesić, Ena Bićanić Marković,
Vladimir Kušan

*Oikon d.o.o. Institut za primijenjenu ekologiju, Trg senjskih uskoka 1-2,
Zagreb, Hrvatska (aostojic@oikon.hr)*

Sažetak

Stranu vrstu koja prirodno ne obitava u ekosustavu nekoga područja zabranjeno je stavljati na tržište ili uvoditi u prirodu na područje Republike Hrvatske (Čl. 68. Zakona o zaštiti prirode). Iznimno, u slučaju uvođenja u prirodu neke strane, a posebno strane invazivne vrste, potrebno je ishoditi dopuštenje Ministarstva zaštite okoliša i energetike. Ako se tijekom postupka izdavanja dopuštenja utvrdi postojanje ekološkog rizika potrebno je izraditi studiju o procjeni utjecaja strane vrste na prirodu. Pri izradi Studije rizik se procjenjuje na temelju opće poznatih podataka (prethodna istraživanja, znanstveni i stručni objavljeni podaci i publikacije). U ocjeni očekivanih utjecaja na prirodu potrebno je ocijeniti sve utjecaje, a podatke o procjeni rizika potrebno je kvantitativno i kvalitativno izraziti i vrednovati koristeći priznatu metodologiju. Stručno mišljenje o Studiji daje Hrvatska agencija za okoliš i prirodu u predviđenom roku od trideset dana na osnovu kojeg Ministarstvo donosi rješenje o dopuštenju ili o odbijanju dopuštenja za uvođenje strane vrste u prirodu.

U ovom radu predstavljena je temeljna procedura donošenja rješenja o uvođenju strane vrste u prirodu te se temeljem nekoliko primjera iz prakse ukazuje na probleme kojima se susreću investitori kao i na moguća poboljšanja cjelokupne procedure uključujući i ulogu javnosti.

Ključne riječi: postupak procjene rizika, strane vrste, uvođenje u prirodu

Protection Study for Proclamation of Drina National Park

Dragan Kovačević¹, Dejan Radošević¹, Goran Panić¹, Sara Todorović¹, Darko Jovanić¹, Svjetlana Radusin², Željka Stojičić²

¹*Republic Institute for Protection of Cultural – Historical and Natural Heritage of Republic of Srpska, Vuka Karadžića 4/6, Banja Luka, Republic of Srpska/Bosnia and Hercegovina (rzzs@blic.net)*

²*Ministry of Physical Planning, Civil Engineering and Ecology of Republic of Srpska, Trg Republike Srpske 1, Banja Luka, Republic of Srpska/Bosnia and Hercegovina (s.radusin@mqr.vladars.net)*

Abstract

There is no instance anywhere in the world that one bank of the river is under protection by the state whereas the other bank is not. The objective is to establish protected area in the canyon of river Drina. Based on the field research, valorization of natural, cultural and historical heritage of the canyon of river Drina was performed in order to develop the Protection Study. Based on the determined values of the area, the Drina river canyon has been proposed for protection under national parks category.

Keywords: canyon, Drina, protection, national park

Studija zaštite za proglašavanje Nacionalnog parka Drina

Dragan Kovačević¹, Dejan Radošević¹, Goran Panić¹, Sara Todorović¹, Darko Jovanić¹, Svjetlana Radusin², Željka Stojičić²

¹*Republički zavod za zaštitu kulturno-istorijskog i prirodnog nasljeđa, Vuka Karadžića 4/6, Banja Luka, Republika Srpska/Bosna i Hercegovina (rzzzs@blic.net)*

²*Ministarstvo za prostorno uređenje, građevinarstvo i ekologiju, Trg Republike Srpske 1, Banja Luka, Republika Srpska/Bosna i Hercegovina (s.radusin@mqr.vladars.net)*

Sažetak

Nigdje u svijetu ne postoji slučaj da se jedna obala rijeke nalazi pod zaštitom države, a druga ne. Cilj je uspostavljanje zaštićenog područja u kanjonu rijeke Drine. Na osnovu terenskih istraživanja urađena je valorizacija prirodnog i kulturno-istorijskog nasljeđa kanjona rijeke Drine u cilju izrade Studije zaštite. Na osnovu utvrđenih vrijednosti područja, kanjon rijeke Drine je predložen za zaštitu u kategoriji nacionalni park.

Ključne riječi: kanjon, Drina, zaštita, nacionalni park

The habitat map development and the definition of ecological requirements and conservation zones of the natural values of the Brijuni National Park

Nela Jantol¹, Ana Ostojić¹, Tena Birov¹, Tatjana Vujnović²,
Silvija Kipson³, Sandro Dujmović⁴, Moira Buršić⁴, Zrinka Mesić¹

¹*Oikon Ltd. Institute of Applied Ecology, Trg senjskih uskoka 1-2, Zagreb, Croatia (zmesic@oikon.hr)*

²*Drage Ivaniševića 2, Zagreb, Croatia*

³*University of Zagreb, Faculty of Science, Department of Biology, Rooseveltov trg 6, Zagreb, Croatia*

⁴*Public Authority National Park Brijuni, Brionska 10, Fažana, Croatia*

Abstract

The project included the creation of habitat map and defining environmental requirements as well as conservation zones of natural values in Brijuni National Park for the Study of nature conservation for the spatial plan. We analyzed the existing literature data, spatial plans and scientific research (GAP analysis) and future research has been proposed and part of the research has been carried out. Based on data from surveys and favorable habitats, environmental requirements of species were determined and likelihood of species occurrence was estimated with GIS system processing as well as their status and existing influences in the Park. Habitats were valued based on their current state, pressures and on the importance for biodiversity and important sites for biodiversity conservation were identified.

Marine areas were evaluated according to the findings of protected species and on the assessment of importance of the habitats. In addition, the situation and distribution of species and habitat types of ecological network Natura 2000 have been analysed. Survey and evaluation of geological heritage (paleontological findings, speleological objects and geological structures) was carried out. In addition, geomorphological elements of old quarries and their value as a part of the geological heritage and landscape diversity were separately analyzed. The final analysis included the evaluation of biological, landscape and geological diversity upon which zones for conservation of natural values of the NP Brijuni were proposed.

Keywords: Study of nature conservation, protected area, biodiversity, habitat mapping, geodiversity

Izrada karte staništa i definiranje ekoloških zahtjeva i zona očuvanja prirodnih vrijednosti nacionalnog parka Brijuni

Nela Jantol¹, Ana Ostojić¹, Tena Birov¹, Tatjana Vujnović²,
Silvija Kipson³, Sandro Dujmović⁴, Moira Buršić⁴, Zrinka Mesić¹

¹*Oikon d.o.o. Institut za primijenjenu ekologiju, Trg senjskih uskoka 1-2, Zagreb, Hrvatska (zmesic@oikon.hr)*

²*Drage Ivaniševića 2, Zagreb, Hrvatska*

³*Prirodoslovno-matematički fakultet Sveučilišta u Zagrebu, Biološki odsjek, Rooseveltov trg 6, Zagreb, Hrvatska*

⁴*Javna ustanova Nacionalni park Brijuni, Brionska 10, Fažana, Hrvatska*

Sažetak

U sklopu pripreme Stručne podloge zaštite prirode za prostorni plan područja posebnih obilježja NP Brijuni napravljena je karta staništa i definirani su ekološki zahtjevi i zone očuvanja prirodnih vrijednosti. Analizirani su postojeći literaturni podaci, prostorni planovi i znanstvena istraživanja (GAP Analiza) i na temelju njih predložena su buduća istraživanja te je usklupu projekta proveden dio istraživanja. Na temelju podataka iz istraživanja i analize povoljnosti staništa utvrđeni su ekološki zahtjevi vrste i određene zone vjerojatnosti pojave određenih vrsta obradom u GIS-u, procijenjeno je njihovo stanje u NP kao i postojeći utjecaji. Stanišni tipovi su vrednovani prema postojećem stanju, pritiscima i važnosti za bioraznolikost te su identificirana mjesta bitna za očuvanje bioraznolikosti.

Na temelju nalaza zaštićenih vrsta i vrednovanja morskih staništa napravljena je procjena važnosti morskih područja. Analizirano je stanje i rasprostranjenost ciljnih vrsta i stanišnih tipova ekološke mreže Natura 2000.

Također je, provedena inventarizacija i vrednovanje geološke baštine (paleontološki nalazi, speleobjekti i geološke sturkture) u sklopu koje su zasebno analizirani geomorfološki elementi starih kamenoloma i njihove vrijednosti kao dijela geološke baštine, ali i krajobrazne raznolikosti. Završna analiza uključila je vrednovanje biološke, krajobrazne i geološke raznolikosti na temelju kojeg su predložene zone očuvanja prirodnih vrijednosti NP Brijuni.

Ključne riječi: Stručna podloge zaštite prirode, zaštićeno područje, bioraznolikost, kartiranje staništa, georaznolikost

An example of corrective measures of the strategic environmental impact assessment and environmental impacts assessment on the Pokljuka Biathlon Centre in the Triglav National Park

Vesna Kolar Planinšič, Metka Černelč

Ministry of Environment and Spatial Planning, Dunajska 48, 1000 Ljubljana, Slovenia

Abstract

The analysis of the construction of the Pokljuka Biathlon Centre shows that mitigation measures introduced by a subsequent assessment of environmental impacts also have their effects and could reduce environmental impacts. In 2010, the EC lodged Pilot 1308/10/ENVI against the Republic of Slovenia for violating of SEA Directive 2001/42/EC, the EIA (85/337/EEC), and the Habitats Directive in the case of constructing a Biathlon centre at Rudno Polje in Pokljuka; co-funded by EU funds. The construction area of the biathlon centre lies in the heart of the Triglav National park, which is also a Natura 2000 area. Consequently, the Ministry of the Environment and Spatial Planning analysed in detail the history of procedures and found that in the respective case the control of projects was not efficient and adopted a programme of corrective measures to conduct SEA, EIA and Appropriate Assessment for the Pokljuka Biathlon Centre. The active scoping was organised and study, 'Report on Environmental Impacts and Acceptability Assessment for Protected Areas', was commissioned and presented to the public; special attention was paid to nature conservation objectives, protection of water sources, landscape, while in particular the impact on capercaillie was studied. Environmental mitigation measures related to the construction of the Pokljuka Biathlon Centre were stated in the Ordinance on the Spatial Plan of the Municipality of Bohinj, where all the environmental issues were taken into account.

Keywords: Environmental Impact Assessment, Strategic Environmental Assessment, Post-festum assessment, Recreation, Land use plan

Importance of Hydrological Assessment of Climate Change Impacts in Protected Areas – Examples of Krka NP and Medvednica NP

Josip Rubinić¹, Gordana Goreta², Snježana Malić Limari³, Najla Baković⁴, Maja Radišić¹

¹Faculty of Civil Engineering in Rijeka, R. Matejčić 3, Rijeka, Croatia

²Public Institution Krka National Park, Trg Ivana Pavla II 5, Šibenik, Croatia

³Public Institution Medvednica Nature Park, Bliznec 70, Zagreb, Croatia

⁴DVOKUT-ECRO Ltd, Trnjanska 37, Zagreb, Croatia / ADIPA – Society for Research and Conservation of Croatian Natural Diversity, Orehovečki ogranak 37, Zagreb, Croatia (najla.bakovic@dvokut-ecro.hr)

Abstract

A large number of protected areas have been given such status due to the special natural values of their water resources. Their water regime is subject to change. If such change exceeds the scope of common variations and displays marked trends, it can lead to unwanted change in ecosystems as well. It is therefore important to, based on hydrological data, timely recognize potential change, identify its causes and prepare appropriate management response. In that process it does not suffice to analyse and quantify only the hydrological change recorded in the past up to the present day. It is essential to assess the potential change of status in such systems in the future due to the potential climate change impact. The paper presents an example of two protected areas. For the Krka National Park, hydrological conditions in the Krka River (discharge reduction, water level rise, temperature rise) since the 1950s until the present day have been analysed in detail. Based on several climate scenarios, projections of potential change for the period until the year 2100 have been made, as well as assessment of potential implications of such change on the water-dependent ecosystems. For the Medvednica Nature Park, global analyses of risks of the potential climate change impacts have been done so far. Further quantification of potential change is yet to be done, primarily of the already observed trends of a strongly marked decrease of the average annual discharges of the Medvednica streams.

Keywords: hydrological quantification, climate change, negative trends, impacts, ecosystems

Važnost hidroloških procjena utjecaja klimatskih promjena u zaštićenim područjima – primjer NP Krka i PP Medvednica

Josip Rubinić¹, Gordana Goreta², Snježana Malić Limari³, Najla Baković⁴, Maja Radišić¹

¹ Građevinski fakultet u Rijeci, R. Matejčić 3, Rijeka, Hrvatska

² JU „NP Krka“ „Trg Ivana Pavla II 5, Šibenik, Hrvatska

³ JU „PP Medvednica“, Bliznec 70, Zagreb, Hrvatska

⁴ DVOKUT-ECRO d.o.o., Trnjanska 37, Zagreb, Hrvatska / ADIPA – Društvo za istraživanje i očuvanje prirodoslovne raznolikosti Hrvatske, Orehovečki ogranak 37, Zagreb, Hrvatska
(najla.bakovic@dvokut-ecro.hr)

Sažetak

Kod velikog broja zaštićenih područja posebne prirodne vrijednosti vodnih pojava uvjetovali su donošenja statusa zaštićenih područja. Njihov je vodni režim podložan promjenama. Ukoliko te promjene prelaze uobičajenih varijacija i pokazuju izražene trendove, one mogu uvjetovati neželjene promjene i u njihovim ekosustavima. Stoga je važno, na temelju hidroloških podataka, na vrijeme prepoznati moguće promjene, utvrditi uzroke i pripremiti odgovarajuće upravljačke odgovore. Pri tome nije dovoljno analizirati i kvantificirati samo hidrološke promjene zabilježene u prošlosti pa do današnjih dana, već je nužno provesti i procjene mogućih promjena stanja u takvim sustavima u budućnosti uslijed potencijalnog utjecaja klimatskih promjena.

U radu je prikazan primjer provedenih hidroloških analiza za dva zaštićena područja. Kod „NP Krke“ su provedena detaljna sagledavanja hidroloških prilika na rijeci Krki (smanjenja protoka, porasta razine vode, porasta temperatura) od pedesetih godina prošlog stoljeća pa do današnjih dana, a na temelju više klimatskih scenarija dane su i projekcije mogućih promjena i za razdoblje do 2100.g., kao i ocjene mogućih implikacija tih promjena na ekosustave ovisne o vodi. Kod „PP Medvednica“ za sada su provedene globalna sagledavanja rizika od mogućih utjecaja klimatskih promjena, te predstoji daljnja kvantifikacija mogućih promjena, prije svega već sada uočenih trendova iznimno naglašenog smanjivanja srednjih godišnjih protoka Medvedničkih potoka.

Ključne riječi: hidrološka kvantifikacija, klimatske promjene, negativni trendovi, utjecaji, ekosustavi

The Methodology for Pollution Register Preparation for the Sanitary Protection Areas of Wellfields Slapnica and Lipovec in the Town of Samobor

Ines Geci, Tomislav Hriberšek, Igor Anić

*DVOKUT-ECRO Ltd., Trnjanska cesta 37, Zagreb, Croatia
(ines.geci@dvokut-ecro.hr, tomislav.hribersek@dvokut-ecro.hr,
igor.anic@dvokut-ecro.hr)*

Abstract

Within the scope of the Recovery Measures Program of the sanitary protection areas of wellfields Slapnica and Lipovec for existing constructions and activities, the Town of Samobor envisaged the project task for the preparation of the Register of constructions and activities which adversely affect the quality and the amount of water for the period 2017 - 2022. The Register will consist of mapped data and description of wellfields and state of all constructions, traffic routes, agricultural surfaces, infrastructure and all other facilities which should be recovered, removed or supervised pursuant to the Decision on Protection of Wellfields Slapnica and Lipovec (Official Gazette of the Town of Samobor No. 5/15), including the recovery of septic tanks.

Based on the orthophotography images and field survey, 131 constructions situated in the sanitary protection areas were registered (all constructions inside the areas were recorded and digital data extracted). Constructions were categorized in the attribute table regarding their purpose and the activities performed within. For each of the residential constructions, waste water collection system was singled out as well as all other information about the object which were collected during the field survey. Each of the objects was, regarding the area of its location, marked by a specific mark (recover, remove or supervise). Agricultural surfaces were also singled out based on the orthophotography images and field survey, whilst digital data on the same were extracted as a separate spatial information. Agricultural surfaces were marked with a specific ID No., activity, the sanitary protection zone in which they were located and a specific mark (recover, remove or supervise). The locations where point source pollutants were registered (e. g. manure disposal sites) were not singled out as a separate spatial data, but rather emphasized within the attribute table of their respective object, i. e. agricultural surface. Other relevant registered pollutants inside the sanitary protection areas were traffic routes.

Keywords: *pollution register, sanitary protection areas*

Metodologija izrade katastra onečišćivača na području zona sanitarne zaštite izvorišta Slapnica i Lipovec na području Grada Samobora

Ines Geci, Tomislav Hriberšek, Igor Anić

DVOKUT-ECRO d.o.o., Trnjanska cesta 37, Zagreb, Hrvatska
(ines.geci@dvokut-ecro.hr, tomislav.hribersek@dvokut-ecro.hr,
igor.anic@dvokut-ecro.hr)

Sažetak

U sklopu Programa mjera sanacije unutar zona sanitarne zaštite izvorišta Slapnica i Lipovec za postojeće građevine i postojeće djelatnosti, Grad Samobor, za razdoblje 2017. - 2022. god., projektnim zadatkom predviđena je izrada katastra objekata i djelatnosti koji nepovoljno utječu na kakvoću i količinu vode na izvorištima te kartiranje i opis stanja svih građevina, prometnica, poljoprivrednih površina, infrastrukture te ostalih sadržaja koje je potrebno sanirati, ukloniti ili nadzirati u skladu s Odlukom o zaštiti izvorišta Slapnica i Lipovec (Službene vijesti Grada Samobora br. 5/15) uključujući i registraciju sabirnih jama.

Temeljem ortofotografskih snimaka i obilaskom terena registriran je 131 objekt (pokriveni su svi građevinski objekti unutar zona) na području zona sanitarne zaštite koji su izdvojeni u vektorskom obliku. Objekti su kategorizirani u atributnoj tablici prema namjeni objekta te njihovoj aktivnosti. Za svaki građevinski objekt sa stambenom namjenom izdvojen je sustav odvodnje sanitarnih otpadnih voda te ostale informacije o objektu koje su se mogle prikupiti terenskim obilaskom. Za svaki građevinski objekt određeno je u kojoj se zoni nalazi te je određena oznaka (sanirati, ukloniti ili nadzirati). Poljoprivredne površine su također izdvojene temeljem ortofotografskih snimaka i terenskim obilaskom te su vektorizirane kao zasebni prostorni podatak. Poljoprivrednim površinama je dodijeljen zasebni ID broj, aktivnost, oznaka zone sanitarne zaštite u kojoj se nalazi i oznaka (sanirati, ukloniti ili nadzirati). Lokacije na kojima su registrirani točkasti onečišćivači (npr. odlagalište stajskog gnoja) nisu izdvojeni kao zasebni prostorni podatak već su istaknuti u atributnoj tablici kod pripadajućeg građevinskog objekta odnosno poljoprivredne površine. Od ostalih onečišćivača unutar zona sanitarne zaštite izdvojene su prometnice.

Ključne riječi: katastar onečišćivača, zone sanitarne zaštite

Construction of transverse dyke from the flood relief channel Odra to the Sava river dyke near the Suša village- protection of the target species Corn Crane (*Crex crex*) in the area of the ecological network HR1000003 Turopolje

Blaženka Banjad Ostojić¹, Vanja Medić¹, Vlatka Dumbović
Mazal²

¹*Institut IGH d.d., Janka Rakuše 1, Zagreb, Croatia*
(blazenka.banjad@igh.hr)

²*Croatian Agency for the Environment and Nature (CAEN), State institute for Nature Protection, Radnička cesta 80/7, Zagreb, Croatia*
(vlatka.dumbovicmazal@dzzp.hr)

Abstract

The construction of a transverse dyke from the flood relief channel Odra up to the Sava River dyke near the Suša village will contribute to the protection of inhabited areas and agricultural, cultivated surfaces in the hinterland of the right Sava River bank which are influenced by the backwaters of Odransko polje retarding basin. This will ultimately help preserve agriculture, a key factor of biodiversity in the Turopolje and Odransko polje areas.

Harvesting wet meadows prevail in the area of the project, representing an ideal habitat for the target species, the corn crane (*Crex crex*) in the ecological network preservation area significant for birds (POP) HR1000003 Turopolje. Having in mind all above given, potential significant changes in the water regime have been analysed likely to occur during the project use, with respect to the wet meadows as well as possible changes in the ecological conditions of the habitat. Impact on the target species was estimated on the basis of hydrological analysis in the water regime change, and its impact on the surrounding eco-system. This primarily means possible marshification caused by rainwater retention, which would ultimately result in the abandonment of harvesting, neglect of meadows or their drying out, which would mean change in land use as arable land or as surfaces for more frequent harvesting.

During the Environmental Impact Assessment and assessment of the impact on the ecological network, cooperation of the study development team, designers and respective competent body, State Institute for Nature Protection, resulted in the change of design and selection of its best possible alternative in the context of the protection of target species, the corn crane (*Crex crex*).

Keywords: transverse dyke, Corn Crane (*Crex crex*), environmental impact assessment, ecological network

Izgradnja transversalnog nasipa od oteretnog kanala Odra do savskog nasipa kod sela Suša – zaštita ciljne vrste kosca (*Crex crex*) na području ekološke mreže HR1000003 Turopolje

Blaženka Banjad Ostojić¹, Vanja Medić¹, Vlatka Dumbović
Mazal²

¹Institut IGH d.d., Ulica Janka Rakuše 1, Zagreb, Hrvatska
(blazenka.banjad@igh.hr)

²Hrvatska agencija za okoliš i prirodu (HAOP), Državni zavod za zaštitu
prirode (DZZP), Radnička cesta 80/7, Zagreb, Hrvatska
(vlatka.dumbovicmazal@dzzp.hr)

Sažetak

Izgradnjom zahvata transversalnog nasipa od oteretnog kanala Odra do savskog nasipa kod sela Suša, planirana je zaštita naseljenih i poljoprivrednih područja desnog zaobalja rijeke Save koja se nalaze pod utjecajem uspornih voda retencije Odransko polje čime će se očuvati poljoprivreda o kojoj ovisi i biološka raznolikost na području Turopolja i Odranskog polja.

Na području zahvata rasprostranjene su vlažne livade košanice koje predstavljaju idealno stanište za ciljnu vrstu kosca (*Crex crex*) područja očuvanja ekološke mreže značajnog za ptice (POP) HR1000003 Turopolje. Obzirom na navedeno za vrijeme korištenja zahvata analizirane su potencijalne značajne promjene vodnog režima vezano uz vlažne livade, te eventualne promjene ekoloških uvjeta staništa. Utjecaj na ciljnu vrstu je procijenjen kroz hidrološku analizu stanja promjene vodnog režima i utjecaja na okolni ekosustav. Navedeno se odnosilo na moguće zamočvarivanje zbog zadržavanja oborinskih voda, koje bi za posljedicu imalo napuštanje košnje livada i njihovo zaraštavanje ili pak isušivanje koje bi dovelo do prenamjene korištenja zemljišta, odnosno korištenja kao obradivih površina ili do češće košnje.

U okviru procjene utjecaja na okoliš i ekološku mrežu, suradnja izrađivača studijske dokumentacije, projekatanata zahvata i Nadležnog tijela, Državnog zavoda za zaštitu prirode, rezultirala je izmjenom projekta i odabira njegove optimalne varijante u kontekstu zaštite ciljne vrste kosac (*Crex crex*).

Ključne riječi: transversalni nasip, kosac (*Crex crex*), procjena utjecaja na okoliš, ekološka mreža

Possibilities of mitigating water regulation and flood protection structures impact on riparian ecosystems

Goran Lončar¹, Domagoj Vranješ¹, Ivana Tomašević¹, Katarina Čović¹, Ivana Buj², Goran Dašić³, Lovorka Korica³

¹*Vita projekt d.o.o., Ilica 191, Zagreb, Croatia (goran.loncar@vitaprojekt.hr, domagoj.vranjes@vitaprojekt.hr, ivana.tomasevic@vitaprojekt.hr, katarina.covic@vitaprojekt.hr)*

²*Prirodoslovno-matematički fakultet, Biološki odsjek, Rooseveltov trg 6, Zagreb, Croatia (ivana.buj@biol.pmf.hr)*

³*Geokon – Zagreb d.d., Starotrjnanska 16/a, Zagreb, Croatia (goran.dasic@geokon.hr, lovorka.korica@geokon.hr)*

Abstract

In the current practice of design and construction of water regulation and flood protection structures, largest emphasis was given to fulfilling their primary functions. For reasons it is most likely to anticipate a significant negative impact on the nature, environmental and Natura 2000 impact assessments are typically carried out. Due to the fact that a profound impact analysis and thinking about adaptation measures to environmental conditions usually starts in this assessment phase, there is a significant slowdown in the realization of projects that are of great importance for the protection of human lives and property.

This paper presents examples of good practice in the design and construction of water regulation and flood protection structures with included integrated approach which ultimately results with acceptable impact on biodiversity. Possibilities of implementing optimal solutions are presented in the case of the planned construction of flood protection structures on the left bank of the Kupa River from settlement Selce to Rečica. Adopted mitigation measures imply the design of flood protection structures which include green zones and green islands important for local biodiversity.

By incorporating similar guidelines in project assignments for the design of water regulation and flood protection structures, one can significantly affect the environmental acceptability of the project and in this way shorten the time needed for project realization.

Keywords: riparian ecosystems, mitigation measures, water regulation and flood protection design, dikes, revetments

Mogućnosti ublažavanja utjecaja regulacijskih i zaštitnih vodnih građevina na riječne ekosustave

Goran Lončar¹, Domagoj Vranješ¹, Ivana Tomašević¹, Katarina
Čović¹, Ivana Buj², Goran Dašić³, Lovorka Korica³

¹Vita projekt d.o.o., Ilica 191, Zagreb, Hrvatska (goran.loncar@vitaprojekt.hr,
domagoj.vranjes@vitaprojekt.hr, ivana.tomasevic@vitaprojekt.hr,
katarina.covic@vitaprojekt.hr)

²Prirodoslovno-matematički fakultet, Biološki odsjek, Rooseveltov trg 6,
Zagreb, Hrvatska (ivana.buj@biol.pmf.hr)

³Geokon – Zagreb d.d., Starotrtnjanska 16/a, Zagreb, Hrvatska
(goran.dasic@geokon.hr, lovorka.korica@geokon.hr)

Sažetak

U dosadašnjoj praksi projektiranja i gradnje regulacijskih i zaštitnih vodnih građevina, najveći naglasak se davao ispunjavanju njihovih primarnih funkcija - regulacijske i zaštitne. Takav pristup u pravilu rezultira značajnim utjecajem na bioraznolikost područja. Za ove se zahvate provode odgovarajući postupci procjene utjecaja na okoliš, odnosno ekološku mrežu, a kako se s dubljim sagledavanjem utjecaja i razmišljanjem o mjerama ublažavanja negativnih utjecaja najčešće kreće tek u fazi procjene, dolazi do znatnog usporavanja realizacije projekata koji su od velike važnosti za zaštitu života i imovine ljudi. Ovim radom prikazat će se primjeri dobre prakse u projektiranju i gradnji regulacijskih i zaštitnih vodnih građevina s uključenim interdisciplinarnim pristupom. Predstavljene su mogućnosti implementacije optimalnih rješenja na primjeru planirane izgradnje nasipa i obaloutvrda na lijevoj obali Kupe od naselja Selce do Rečice, gdje se kroz postupak glavne ocjene prihvatljivosti za ekološku mrežu, odnosno kroz mjeru ublažavanja negativnih utjecaja predlaže projektiranje obaloutvrda s uključenim zelenim zonama i otocima, važnim za očuvanje bioraznolikosti.

Ugradnja ovakvih mjera u projektne zadatke za projektiranje regulacijskih i zaštitnih vodnih građevina trebala bi postati uobičajena praksa, budući da je na taj način moguće značajno utjecati na prihvatljivost utjecaja ovih zahvata na okoliš i ekološku mrežu i tako skratiti vrijeme potrebno za njihovu realizaciju.

Ključne riječi: riječni ekosustavi, mjere ublažavanja, projektiranje vodnih građevina, nasipi, obaloutvrde

Programme of protection, regulation and utilization of the Sava River and its hinterland from the Slovenian border to Sisak

Hrvojka Šunjić, Ivana Ivanković

*Program Sava d.o.o., Ulica grada Vukovara 37, Zagreb, Croatia
(hrvojka.sunjic@zagrebnasavi.hr)*

Abstract

On the territory of the Republic of Croatia, the Sava River has been characterized by significant water regime changes over the last few decades, especially in the section from the Slovenian border to Sisak. The negative trends are related to the water regime in general, but the emphasis is on the occurrence of continuous deepening of the river bed, which greatly affects the lowering of the level of subterranean waters in the hinterland, and thus the reliability of the water supply, efficiency of the existing flood protection system, quality of surface and subterranean waters and water-dependent ecosystems.

With regard to the problems identified, the Programme of protection, regulation and utilization of the Sava River and its hinterland from the Slovenian border to Sisak (Programme) represents the complete solution to a significant number of negative trends on the Sava River, and a concept that optimizes the possibilities of using the resources of Sava River.

The Program provides for a parallel development of integral water management; spatial planning and use, regulation and protection of waters, aquatic habitats, and water-dependent habitats. The integral management refers to multifunctional systems that are harmonized with all other sections of space, and with the economic, developmental, social and infrastructural policies: water supply, regulation, flood protection, protection and regulation for agricultural purposes, regulation and maintenance of water regimes of surface and subterranean waters, creation of conditions for urban development and urban regeneration, and protection and increase of biodiversity.

Keywords: Sava, Programme, multifunctional system

Program zaštite, uređenja i korištenja rijeke Save i zaobalja od granice s Republikom Slovenijom do Siska

Hrvojka Šunjić, Ivana Ivanković

*Program Sava d.o.o., Ulica grada Vukovara 37, Zagreb, Hrvatska
(hrvojka.sunjic@zagrebnsavi.hr)*

Sažetak

Rijeku Savu na području Republike Hrvatske, a osobito na dionici od granice s Republikom Slovenijom do Siska, kroz proteklih nekoliko desetljeća, karakteriziraju značajne promjene vodnog režima. Negativni trendovi odnose se na vodni režim u cjelini, ali naglasak je na pojavi kontinuiranog produbljivanja riječnog korita, koje u velikoj mjeri utječe na sniženje razine podzemnih voda u zaobalju, a time na pouzdanost vodoopskrbe, efikasnost postojećeg sustava zaštite od poplava, kakvoću površinskih i podzemnih voda te ekosustava koji o vodi ovise.

S obzirom na identificirane probleme, Program zaštite, uređenja i korištenja rijeke Save i zaobalja od granice s Republikom Slovenijom do Siska (Program) predstavlja cjelovito rješenje značajnog dijela negativnih trendova na rijeci Savi te koncept koji optimizira mogućnosti korištenja potencijala rijeke Save.

Programom se predviđa paralelni razvoj integralnog upravljanja vodama; prostornog planiranja te korištenja, uređenja i zaštite voda, vodenih staništa te staništa ovisnih o vodi. Integralno upravljanje odnosi se na višenamjenske sustave koji su usuglašeni sa svim drugim dionicima prostora te ekonomsko-razvojnog, socijalnog i infrastrukturnog politikom: vodoopskrba, uređenje, zaštita od poplava, zaštita i uređenje zemljišta za potrebe poljoprivrede, uređenje i održavanje vodnih režima površinskih i podzemnih voda, stvaranje uvjeta za urbani razvoj i urbanu regeneraciju te zaštita i povećanje biološke raznolikosti.

Ključne riječi: Sava, Program, višenamjenski sustav

Importance of biospeleological research: HES Kosinj case study

Davor Korman, Ana Ostojić, Nela Jantol, Zrinka Mesić

Oikon d.o.o. Institute for applied ecology, Trg senjskih uskoka 1-2, Zagreb, Croatia (aostojic@oikon.hr)

Abstract

So far about 9000 of speleological objects are recorded in Croatia, and presumably as many are still unexplored. Besides the insufficient exploration of underground habitats, an inadequate temporal continuity is often emphasized. Illustrious example of that are recent biospeleological researches in the area of Lipovo polje that have directly influenced the conclusions of the Main Assessment of the impact of project on the Ecological network in the Environmental impact assessment study of HES Kosinj.

During these researches a biodiversity of the wider area of the planned HE Kosinj accumulation lake was determined, and the distribution and state of the goals of protection of the Natura 2000 (*Congerja jalzici*; *Leptodirus hochenwartii*; 8310 Caves not open to public). The biospeleological researches in Lipovo polje have also encompassed Markov ponor, a prominent speleological object in which several speleological, biospeleological and hydrogeological researches were carried out during the 1999.

Analysis of the impact of HES Kosinj on the goals of protection of Natura 2000 was based on the results of the previous studies of the underground water level and temperatures, which were supplemented with additional speleodiving, speleological and biospeleological researches during the 2016. Based on the conclusions of the analysis, measures for the alleviation of the impacts were prescribed. For the implementation of these measures a continuation of research and monitoring of the underground habitats is crucial.

Keywords: Ecological network, Lipovo polje, speleological objects, Kosinj hydroenergetic system, *Congerja jalzici*

Važnost biospeleoloških istraživanja za zahvate - iskustvo sa HES Kosinj

Davor Korman, Ana Ostojić, Nela Jantol, Zrinka Mesić

*Oikon d.o.o. Institut za primijenjenu ekologiju, Trg senjskih uskoka 1-2,
Zagreb, Hrvatska (aostojic@oikon.hr)*

Sažetak

Do sada je u Hrvatskoj zabilježeno i istraženo oko 9.000 speleoloških objekata, a pretpostavlja se da ih je još barem toliko neistraženih. Osim nedovoljne istraženosti podzemnih staništa, često se ističe nedovoljna vremenska kontinuiranost istraživanja. Ilustrativan primjer toga su recentna biospeleološka istraživanja na području Lipovog polja čiji su rezultati izravno utjecali na zaključke Glavne ocjene prihvatljivosti zahvata za ekološku mrežu Studije utjecaja na okoliš HES Kosinj.

Navedenim istraživanjima utvrđena je biološka raznolikost živog svijeta u širem području planirane akumulacije HE Kosinj te rasprostranjenost i stanje ciljeva očuvanja Natura 2000 (*Congerija jalzici*; *Leptodirus hochenwartii*; 8310 Špilje i jama zatvorene za javnost). Istraživanja su obuhvatila i Markov ponor, poznati spelološki objekt u kojem su od 1999. u nekoliko navrata provedena speleološka, biospeleološka i hidrogeološka istraživanja.

Analiza utjecaja korištenja HES Kosinj na ciljeve očuvanja Natura 2000 temeljena je na rezultatima prijašnjih povremenih istraživanja razine vode i temperature u podzemnim staništima, a koji su nadopunjeni dodatnim speleoloronilačkim, speleološkim i biospeleološkim istraživanjima 2016. godine. Sukladno zaključcima analize propisane su mjere ublažavanja za čiju implementaciju je ključan kontinuirani nastavak istraživanja i praćenja stanja uvjeta u podzemnim staništima.

Ključne riječi: Ekološka mreža, Lipovo polje, speleološki objekti, hidroenergetski sustav Kosinj, *Congerija jalzici*

Flooding Waste Management on Hydropower Plant – Cleaning the River

Ivančica Somodi¹, Marija Čulina Rapo², Metod Šolto²

¹HEP-Proizvodnja d.o.o. PP HE Sjever Varaždin, Međimurska 26c Varaždin, Croatia (ivancica.somodi@hep.hr)

²HEP-Proizvodnja d.o.o., PP HE Jug Split, Ivana Gundulića 42, Croatia (marija.culinarapo@hep.hr, metod.solto@hep.hr)

Abstract

River flooding of solid waste represented of all flooding materials organic and an organic origin floated by river, which floated on hydropower plant. The most of flooding waste is naturally produced—it is consist of waterweeds, woods mixed with any human-made solid material that is abundant on river beaches or woods: municipal solid waste, electric, electronic waste, car tires, plastic packaging, polystyrene, metal, and other manufactured materials. As the anthropogenic influence on upstream area is increase, in flooding waste we can find more municipal waste, and amounts of it are also increase. Marine debris is represented in national legislation, but river flooding waste is not represented, although they are notably. Ingredients and quantities flooding waste depend on river flow, seasonal period and geographic-physical conditions of upstream area. With increasing river flow, flooding solid waste is also increase and hydropower plant safety is endangered, so they need to be removed. The most developed system of remove waste is on hydropower plants on river Drava, which removed cca 200-400t/year, the mostly woods and pvc materials. The method of waste management is limited with environmental localization of hydropower plants, such as power plant situated in river canyon.

With presentation of the methods for solve this specific problems we show how hydropower plant management river flooding waste respecting environmental protection, sustainable management of water in a frame of national legislation, using the best applied practice although, they are not communal company.

Keywords: river flooding waste, hydropower plant, waste management

Zbrinjavanje naplavina na hidroelektranama – čišćenje rijeka

Ivančica Somođi¹, Marija Čulina Rapo², Metod Šolto²

¹HEP-Proizvodnja d.o.o. PP HE Sjever Varaždin, Međimurska 26c Varaždin, R Hrvatska (ivancica.somodi@hep.hr)

²HEP-Proizvodnja d.o.o., PP HE Jug Split, Ivana Gundulića 42, R Hrvatska (marija.culinarapo@hep.hr, metod.solto@hep.hr)

Sažetak

Riječne naplavine predstavljaju sav naplavljen materijal organskog i anorganskog podrijetla donesen rijekom na ulazne građevine hidroelektrana. Materijal je većinom organski - sastoji se od naplavljenе drvene mase pomiješane s otpadom antropogenog podrijetla: glomaznim komunalnim otpadom, električnim i elektronskim otpadom, automobilskim gumama, pvc ambalaža, polistiren, i dr. Što je veći antropološki utjecaj na uzvodno slivno područje, u naplavinama prevladavaju veće količine komunalnog i drugog otpada. Morski je otpad prepoznat u Zakonu o održivom gospodarenju otpadom (NN 94/13), ali riječne naplavine nisu specificirane, iako su značajne.

Sastav i količina naplavina ovisi o protocima, godišnjem dobu, ali i karakteristikama uzvodnog slivnog područja. S većim protocima raste i količina naplavljenog materijala na hidroelektrane. Naplavine mogu ugroziti sigurnost HE objekata, stoga ih se svakodnevno uklanja. Najrazvijeniji sustav postupanja s naplavinama uspostavljen je na sve tri hidroelektrane na rijeci Dravi, koje skupe i do 600t naplavina godišnje, što iziskuje znatne troškove. U naplavinama, najveće količine otpadaju na drvenu masu, zatim na pvc ambalažu. Način privremenog zbrinjavanja naplavina ograničen je s nekoliko faktora, no najvažnije su prostorne mogućnosti pojedinih hidroelektrana, a koje su opet posljedica geomorfologijom prostora u kojem se nalazi HE. Primjer takvog ograničavanja prostorom su hidroelektrane koje se nalaze u kanjonima rijeka. Prikazom načina rješavanja problema naplavina pokušati će se prikazati kako hidroenergetski objekti gospodare naplavinama poštujući načela zaštite okoliša, zaštite voda i pravne stečevine EU, koristeći najbolju praksu i pravila struke, iako po svom habitusu nisu komunalna poduzeća i zbrinjavaju otpad koji nije nastao njihovom djelatnošću.

Ključne riječi: naplavine, otpad, hidroelektrane, zbrinjavanje, oporaba

Condition of standardized environment control in the southeastern region with a reflection on ecolabeling

Tomislav Lukić¹, Đuro Tunjić², Andrijana Ostojić-Mihić³,
Krunoslav Boban², Nevenko Herceg³

¹*Federal Ministry of Environment and Tourism, Marka Marulića 2, Sarajevo, Bosnia and Herzegovina (tlukic2@gmail.com)*

²*TÜV Croatia d.o.o. TÜV NORD Group Savska 41, p.p. 23 Ž 10 144 Zagreb Croatia (dtunjic@tuv-croatia.hr)*

³*University of Mostar, Faculty of Science, Mathematics and Education, Matice hrvatske bb, Mostar, Bosnia and Herzegovina*

Low level of implementation of the standardized environment management in organisations is one of the main causes for unsatisfactorily quality of environment in southeastern Europe. Extremely fast encapsulation process, globalization and market development exercise increasing pressure on the environment and impose processes standardization and standardization in almost every serious organization. The application of the ISO 14001 standard is not sufficiently applied in environmental management systems. The aim is to show the extent to which the ISO 14000 standard is applied in the region with special reference to ISO 14024 relating to the award of the environment, with the aim of reducing the negative impact of consumption and production on the environment, health, climate and natural resources.

Standard application of ISO 14001 and systems of marking quality sign for the environment are not sufficiently applied in the region and the need to make significant efforts in order to reach the European level of standardization.

Keywords: Environmental management, ISO 14001, Quality management system, Standardization

Stanje standardiziranog upravljanja okolišem u regiji sa osvrtnom na okolišne oznake

Tomislav Lukić¹, Đuro Tunjić², Andrijana Ostojić-Mihić³,
Krunoslav Boban², Nevenko Herceg³

¹Federalno ministarstvo okoliša i turizma, Marka Marulića 2, Sarajevo, Bosna i Hercegovina (tlukic2@gmail.com)

²TÜV Croatia d.o.o. TÜV NORD Group Savska 41, p.p. 23 Ž 10 144 Zagreb Hrvatska (dtunjic@tuv-croatia.hr)

³Sveučilište u Mostaru, Fakultet prirodoslovno-matematičkih i odgojnih znanosti, Matice hrvatske bb, Mostar, Bosna i Hercegovina

Sažetak

Niska razina implementacije sustava standardiziranog upravljanja okolišem u organizacijama jedan je od glavnih uzroka nezadovoljavajućeg kvalitetnog stanja okoliša u Jugoistočnoj Europi. Iznimno ubrzano ovijanje procesa, globalizacija i razvoj tržišta vrše sve veći pritisak na okoliš te nameću procese standardizacije i normizacije u gotovo svakoj ozbiljnoj organizaciji. Primjena standarda ISO 14001 nije u zadovoljavajućoj mjeri primijenjena u sustavima upravljanja okolišem. Cilj rada je pokazati u kojoj mjeri je standard ISO 14000 primijenjen u zemljama regije sa posebnim osvrtom na ISO 14024 koji se odnosi na dodjelu znaka za okoliš, a sve u cilju smanjenja negativnog utjecaja potrošnje i proizvodnje na okoliš, zdravlje, klimu i prirodne resurse.

Primjena norme ISO 14001 i sustavi označavanja kvaliteta znakom za okoliš nisu dovoljno primijenjeni u regiji te je potrebno uložiti značajne napore kako bi dostigli europsku razinu standardizacije.

Ključne riječi: upravljanje okolišem, ISO 14001, sustav upravljanja kvalitetom, normizacija

Appliance of environmental standards and eco-labels in sustainable tourism in the region

Iva Lukić¹, Tomislav Lukić²

¹*VERN University of Applied Sciences Zagreb*

²*Federal Ministry of Environment and Tourism, Marka Marulića 2, Sarajevo, Bosnia and Herzegovina (tlukic2@gmail.com)*

Abstract

The certificate of environmental standardization is a document approved by a recognized standardization body, which provides rules, instructions and environmental related features.

It is a sophisticated document that the organization proves to have responded to the requirements of one of ISO 14001 or EMAS standards. The introduction of environmental standards of an organization shows that it operates in an environmentally responsible manner, and that the functioning of the system is aligned with the relevant laws of the associated state, which ensures reduced environmental pressure. Standardization of environmental relations in tourism is not a goal in itself but should motivate tourist service providers' services in order to improve their environmental, social and economic efficiency and to be more competitive on the market. The main goal of introducing environmental standards and eco-labels is to encourage environmental awareness and reduce environmental pressure to provide them with reliable environmental information that will affect consumer choice, ie competitiveness. We will demonstrate the state of international standardization systems in tourism in the region with a special focus on Croatia and the application of different eco-labels as a motivating factor for the success of tourism promotion.

Keywords: environmental management, ISO 14001, standardization in tourism, eco labels

Primjena okolišnih standarda i eko oznaka u održivom turizmu u regiji

Iva Lukić¹, Tomislav Lukić²

¹*Veleučilište VERN Zagreb*

²*Federalno ministarstvo okoliša i turizma, Marka Marulića 2, Sarajevo, Bosna i Hercegovina (tlukic2@gmail.com)*

Sažetak

Certifikat o standardizaciji u okolišu je dokument odobren od priznatog tijelo za normizaciju, koji daje pravila, upute i značajke za odnose spram okoliša. To je sofisticirani dokument kojim organizacija dokazuje da je odgovorila na zahtjeve jedne od normi ISO 14001 ili EMAS. Uvođenjem okolišnih standarda organizacija pokazuje kako posluje na okolišno odgovoran način, te da je sustav funkcioniranja usuglašen sa relevantnim zakonima pripadajuće države, koji osigurava smanjeni pritisak na okoliš. Standardizacija odnosa spram okoliša u turizmu nije cilj sam po sebi, već bi trebala motivirati pružatelja turističkih usluga kako bi poboljšali svoju ekološku, društvenu i ekonomsku učinkovitost te biti konkurentniji na tržištu. Glavni cilj uvođenja okolišnih standarda i eko-oznaka su poticanje razvoja okolišne svijesti i smanjenje pritiska na okoliš na način da im pružimo pouzdanu informacije o okolišu koje će utjecati na izbor konzumenta tj. konkurentnost. Radom ćemo pokazati stanje sustava međunarodne standardizacije u turizmu u regiji sa posebnim osvrtom na Hrvatsku, te primjenu različitih eko oznaka kao motivirajućeg faktora uspješnosti turističke promidžbe.

Ključne riječi: upravljanje okolišem, ISO 14001, standardizacija u turizmu, eko oznake

Mitigation measures, protection measures and monitoring status for target species and habitats of Natura 2000 areas in strategic environmental impact assessments

Edin Lugić, Dunja Delić, Tena Birov, Božica Šorgić, Željko Koren, Zrinka Mesić

Oikon Ltd. Institute of Applied Ecology, Trg senjskih uskoka 1-2, 10020 Zagreb, Croatia (zmestic@oikon.hr)

Abstract

Strategic Environmental Impact Assessment procedure is applied to strategies, plans and programmes. Within Strategic Environmental Impact Assessment and Appropriate Assessment it is necessary to review the elements of these documents and analyse the possibility of significant impacts. Strategies, plans and programmes differ significantly in the document's level of detail and spatial definition. Thus strategies often do not have a spatial component, however their interdisciplinary approach defines economic growth of individual sectors which implies future spatial development.

Within this paper an analysis and comparison of different approaches to identifying possible impacts of strategy, plan and programme levels was made. Based on this, the possibilities of prescribing mitigation measures, protection measures and monitoring plan for target species and habitats of Natura 2000 areas at the strategic level are reassessed.

Keywords: mitigation measures, Natura 2000, Strategic Environmental Impact Assessment

Mjere ublažavanja, mjere zaštite i praćenje stanja za ciljeve očuvanja Natura 2000 u Strateškim procjenama utjecaja na okoliš

Edin Lugić, Dunja Delić, Tena Birov, Božica Šorgić, Željko Koren, Zrinka Mesić

Oikon d.o.o. Institut za primijenjenu ekologiju, Trg senjskih uskoka 1-2, 10020 Zagreb, Hrvatska (zmesic@oikon.hr)

Sažetak

Strateška procjena utjecaja na okoliš provodi se za strategije, planove i programe. U sklopu strateške procjene utjecaja na okoliš i glavne ocjene prihvatljivosti zahvata za ekološku mrežu potrebno je sagledati elemente ovih dokumenata i analizirati mogućnost značajnih utjecaja. Strategije, planovi i programi se iznimno razlikuju u razini detaljnosti i prostorne određenosti dokumenta. Tako strategije često nemaju prostornu komponentu, ali svojim interdisciplinarnim pristupom definiraju razvoj pojedinih sektora i na taj način impliciraju budući prostorni razvoj.

U sklopu ovog rada napravljena je analiza i usporedba različitih pristupa prepoznavanju mogućih utjecaja na nivou strategije, plana i programa. Na temelju toga su preispitane mogućnosti propisivanja mjera ublažavanja, mjera zaštite i praćenja stanja za ciljne vrste i staništa Natura 2000 područja na strateškom nivou.

Ključne riječi: mjere ublažavanja, Natura 2000, Strateška procjena utjecaja na okoliš

Mitigation measures and monitoring in the Strategic Environmental Assessment defined by the Water Framework Directive

Igor Tošić, Davor Korman, Sonja Sviben, Edin Lugić, Zrinka Mesić, Ana Ostojčić

Oikon Ltd. Institute of Applied Ecology, Trg senjskih uskoka 1-2, 10000 Zagreb, Croatia (itosic@oikon.hr)

Abstract

Strategic Environmental Assessment (SEA) is an integrated assessment procedure of the impact that different programs, plans and strategies have on the environment. Within SEA it is essential to include into analysis all the aspects of the presented documents of the occurrence of potentially significant impacts according to the Water Framework Directive (WFD, 2000). Plans, programs and strategies differ substantially in their level of detail and spatial definition. For example, strategies often do not imply any spatial component, but they do present an opportunity to prevent potentially significant, and/or cumulative impacts due to their wide approach on the environmental subjects on the strategic level. On the other hand, plans (i.e. spatial plans) are more spatially specific, and sometimes a detailed impact analysis comparable to ones made in the Environmental Impact Assessment studies can be conducted.

Within this paper analysis and comparison of different approaches in identification of possible impacts on the environmental components (surface and ground waters) was made. The analysis was based on the examination of different plans, programs and strategies, with the help of which different mitigation measures and monitoring procedures, regulated by the WFD, were analyzed.

Keywords: negative impacts on water quality, mitigation measures, Strategic Environmental Assessment, Water Framework Directive

Mjere ublažavanja i praćenje stanja u strateškim procjenama utjecaja na okoliš propisanim prema Okvirnoj Direktivi o vodama

Igor Tošić, Davor Korman, Sonja Sviben, Edin Lugić,
Zrinka Mesić, Ana Ostojić

Oikon d.o.o. Institut za primijenjenu ekologiju, Trg senjskih uskoka 1-2, 10000 Zagreb, Hrvatska (itosic@oikon.hr)

Sažetak

Strateške procjene (SPUO) su integrirani postupak procjene utjecaja provedbe različitih programa, planova i strategija na okoliš. U sklopu strateške procjene utjecaja na okoliš neophodno je sagledati elemente predloženih dokumenata te analizirati mogućnost vjerojatnih značajnih utjecaja prema Okvirnoj direktivi o vodama (ODV, 2000). Planovi, programi i strategije se iznimno razlikuju na razini detaljnosti i prostorne određenosti dokumenta. Tako primjerice strategije nerijetko nemaju prostornu komponentu, no svojim širokim pristupom temama te mjerama ublažavanja na razini strategija moguće je spriječiti moguće značajno negativne, a posebice skupne utjecaje. S druge strane planovi su nešto više prostorno određeni dokumenti (osobito prostorni planovi) te je u sklopu njih, u pojedinim slučajevima, moguća analiza utjecaja usporediva razini procjene utjecaja na okoliš.

U sklopu ovog rada provedena je analiza i usporedba različitih pristupa prepoznavanja mogućih utjecaja na određenu sastavnicu okoliša (površinske i podzemne vode) na razini planova, programa i strategija te su analizirane mjere ublažavanja i praćenja stanja okoliša usklađene s propisima Okvirne direktive o vodama.

Ključne riječi: negativni utjecaji na stanje voda, mjere ublažavanja, Strateška procjena utjecaja na okoliš, Okvirna direktiva o vodama

Using sensitivity mapping to prioritise field research

Mate Zec

Association BIOM, Preradovićeve 34, 10000 Zagreb, Croatia
(mate.zec@biom.hr)

Abstract

Studies seeking to adequately and systematically assess the environmental impact of spatially extensive projects, such as large-scale infrastructure, can be prohibitively expensive if they attempt to encompass the entire project area. Reducing the spatial scope of such studies in order to make them feasible is frequently done on a ‘best expert judgement’ basis, which can lead to significant biases in the results. In this paper we aim to present a simple, objective, time-effective and easily applicable method for spatially prioritising field research as well as mitigation projects, based on sensitivity mapping.

Based on our application of the method, we conclude that with sufficient species presence data, the output of the method is clear, repeatable and readily usable. Though our preliminary case study is a combination of species distribution modelling and quantitative risk assessment, the method can also easily be applied, with some caveats, in situations where only qualitative risk analyses are available.

Though it is moderately data-intensive, we believe that this method can be applied to a wide range of environmental assessment procedures that require spatially explicit prioritisation.

Keywords: sensitivity mapping, mitigation, prioritisation, risk assessment

Monitoring of wind farms in Croatia

Boris Božić, Edin Lugić, Dunja Delić

Oikon Ltd. – Institute of Applied Ecology, Trg senjskih uskoka 1-2, Zagreb, Croatia, (bbozic@oikon.hr)

Abstract

Monitoring as part of the Environmental Impact Assessment process is prescribed in the Decision on environmental project acceptability. The key role of monitoring in this process is to assess the effectiveness of environmental protection measures. Moreover, monitoring is often formulated in a way that it can change or add new mitigation measures if the results show that negative impacts on the environment still exist.

The Decision on environmental project acceptability for wind farms in Croatia, according to the European practice, has 2-year monitoring for birds and bats. In the case that wind farm monitoring proves that the existing measures are not effective, additional protection measures are prescribed.

Ten years since the first windfarm was put into operation, the effectiveness of the wind farm monitoring system in Croatia has been brought into question.

For this presentation, we analysed the monitoring results of all active wind farms in Croatia and investigated its effectiveness.

Keywords: monitoring, Decision of environmental project acceptability, Environmental Impact Assessment, Wind farms

Monitoring vjetroelektrana u Hrvatskoj

Boris Božić, Edin Lugić, Dunja Delić

*Oikon d.o.o. – Institut za primijenjenu ekologiju, Trg senjskih uskoka 1-2,
Zagreb, Hrvatska (bbozic@oikon.hr)*

Sažetak

Monitoring, odnosno program praćenja stanja okoliša sastavni je dio rješenja o prihvatljivosti zahvata za okoliš. Osnovna uloga monitoringa jest provjera učinkovitosti propisanih mjera zaštite okoliša. Štoviše, sam program praćenja nerijetko predviđa modifikaciju mjera zaštite okoliša sa ciljem ublažavanja štetnih posljedica na okoliš prepoznatih tijekom praćenja.

Za vjetroelektrane u Hrvatskoj, sukladno europskoj praksi, propisuje se program praćenja za šišmiše i ptice u trajanju od minimalno dvije godine. Dodatno, svako rješenje Ministarstva koje propisuje monitoring naglašava modifikaciju mjera zaštite sukladno rezultatima monitoringa. Nakon više od 10 godina od puštanja u pogon prve vjetroelektrane postavlja se pitanje koliko je takav sustav učinkovit u Hrvatskoj.

U ovom izlaganju napravljen je presjek kroz rezultate monitoringa danas aktivnih vjetroelektrana u Republici Hrvatskoj te je istražena učinkovitost propisanih programa praćenja.

Ključne riječi: praćenje stanja okoliša, rješenje o prihvatljivosti zahvata za okoliš, procjena utjecaja, vjetroelektrane

Protection of ecological network Natura 2000 seabed at anchoring sites of Split-Dalmatia County

Jelena Kurtović¹, Alen Soldo², Marina Mašanović², Igor Glavičić², Zvezdana Popović-Perković², Josip Boban³

¹ Public Institution for the Management of Protected Areas in the Split-Dalmatia County SEA AND KARST, Prilaz braće Kaliterna 10, 21000 Split, Hrvatska (jelena.kurtovic@dalmatian-nature.hr)

² University of Split, University Department of Marine Studies, Ruđera Boškovića 37, P. P. 190, 21000 Split, Hrvatska (mtomas@unist.hr)

³ Natural History Museum and Zoo, Kolombatovićevo šetalište 2, 21000 Split, Hrvatska (josip@prirodoslovni.hr)

Abstract

This expert paper is a result of the Study on protection of ecological network Natura 2000 seabed at anchoring sites of Split-Dalmatia County, which makes Chapter II of the Study on anchoring sites of Split-Dalmatia County. The Study on anchoring sites of Split - Dalmatia County defines standard anchoring solutions and is an integral part of the Split-Dalmatia County Physical Plan. The purpose of this expert paper is the anticipatory protection of ecological network Natura 2000 seabed area on the occasion of amendment of Split-Dalmatia County Physical Plan with the specification of anchoring sites locations in Split- Dalmatia County. In the context of this expert paper the seabed protection refers to protection of the Republic of Croatia submarine area, meaning seabed with living and non-living organisms and their habitats protected by the Nature Protection Act. The main results of this expert paper are habitat maps, strictly protected species found at 29 locations of special-purpose ports (anchorage) on marine public good of Split-Dalmatia County according to the National habitats classification (NKS) and Natura 2000 habitats classification, recommendations formulated for modification/amendment of national habitats map of Natura 2000 ecological network, recommendations formulated for nature protection requirements during assessment of anchoring impact affecting Natura 2000 network sites and, finally, formulation of preservation measures for maintenance of protected marine habitats and species in a favourable conservation status in Natura 2000 ecological network area. Finally, this expert paper shows that the with expert-scientific methodology and field work as well as through multidisciplinary approach to amendment of Split- Dalmatia County Physical Plan with specification of location of special- purpose ports (anchorage), we can anticipatively preserve Natura 2000 network areas

Keywords: anchoring site, ecological anchoring system, Split-Dalmatia County, Physical Plan, ecological network Natura 2000

Zaštita podmorja ekološke mreže Natura 2000 na sidrištima Splitsko-dalmatinske županije

Jelena Kurtović¹, Alen Soldo², Marina Mašanović², Igor
Glavičić², Zvezdana Popović-Perković², Josip Boban³

¹*Javna ustanova za upravljanje zaštićenim dijelovima prirode na području
Splitsko-dalmatinske županije MORE I KRŠ, Prilaz braće Kaliterna 10, 21000
Split, Hrvatska (jelena.kurtovic@dalmatian-nature.hr)*

²*Sveučilište u Splitu, Sveučilišni odjel za studije mora, Ruđera Boškovića 37, P.
P. 190, 21000 Split, Hrvatska (mtomas@unist.hr)*

³*Prirodoslovni muzej i zooološki vrt, Kolombatovićevo šetaliste 2, 21000 Split,
Hrvatska (josip@prirodoslovni.hr)*

Sažetak

Ovaj rad je rezultat Studije zaštite podmorja ekološke mreže Natura 2000 na sidrištima Splitsko-dalmatinske županije koja čini Poglavlja II Studije sidrišta Splitsko-dalmatinske županije. Studija sidrišta definira tipska rješenja sidrišta i sastavni je dio prostornog plana Splitsko-dalmatinske županije. Cilj ovog rada je anticipativno zaštititi podmorje ekološke mreže Natura 2000 prilikom dopune županijskog prostornog plana s lokacijama sidrišta Splitsko-dalmatinske županije. Zaštita podmorja u kontekstu ovog rada podrazumijeva zaštitu podmorskog prostora Republike Hrvatske odnosno morskog dna s pripadajućim živim i neživim organizmima te njihovim staništima koje štiti Zakon o zaštiti prirode. Glavni rezultati ovog stručnog rada su izrađene karte staništa i zabilježene strogo zaštićene vrste za 29 lokacija luka posebne namjene – sidrišta na pomorskom dobru Splitsko-dalmatinske županije sukladno Nacionalnoj klasifikaciji staništa (NKS) i Natura 2000 klasifikaciji staništa, formulirane preporuke za izmjenom/dopunom nacionalne karte staništa ekološke mreže Natura 2000, formulirane preporuke za uvjete zaštite prirode prilikom provedbe postupka prihvatljivosti sidrišta za ekološku mrežu, te u konačnici formulirane preporuke za mjere očuvanja namijenjene održavanju zaštićenih morskih staništa i vrsta u povoljnom stanju očuvanosti unutar područja ekološke mreže Natura 2000. Zaključno se pokazuje kako stručno-znanstvenom metodologijom i terenskim radom, te multidisciplinarnim pristupom prilikom dopune prostornog plana Splitsko-dalmatinske županije s lokacijama luka posebne namjene – sidrišta se mogu anticipativno zaštititi područja ekološke mreže.

Ključne riječi: sidrište, ekološki sidreni sustavi, Splitsko-dalmatinska županija, prostorni plan, ekološka mreža Natura 2000

Banded murex *Hexaplex trunculus* as TBT pollution monitoring tool in Croatian ports

Anita Erdelez¹, Martina Furdek², Anamaria Štambuk³, Ivan Župan⁴, Melita Peharda⁵

¹Institut IGH d.d., Matice hrvatske 15, Split, Croatia (aerdelez@gmail.com),

²Ruđer Bošković Institute, Bijenička cesta 54, Zagreb, Croatia

³University of Zagreb, Faculty of Science, Department of Biology, Rooseveltov trg 6, Zagreb, Croatia

⁴University of Zadar, Department of Ecology, Agronomy and Aquaculture, Trg kneza Višeslava 9, Zadar, Croatia

⁵Institute of Oceanography and Fisheries, Šetalište I. Meštrovića 63, Split, Croatia

Abstract

Tributyltin (TBT), together with other organotins, was widely used in antifouling paints until its toxic effect on gastropods and shellfish was noticed. Even at low TBT concentrations female gastropods develop imposex, which is defined as superimposition of male sex characteristics in females and may cause their sterility. In order to preserve marine environment, organotins have been banned in many countries through conventions, directives and laws. Since imposex represents biological response to TBT, it has been used as biomarker of TBT pollution and this diminished the need for more expensive analytical methods. Our study was performed in the central Adriatic Sea in 2015 and it included imposex investigations on 12 populations of gastropod *Hexaplex trunculus* as well as measurements of butyltins in gastropod tissue and sediment. Investigation sites were categorized as nautical marinas, ports, bays seasonally used, or referent sites. Since the imposex investigations have been performed on the same sites 10 years before, the effectiveness of the TBT ban introduced in year 2006 in Republic of Croatia was evaluated. The results of imposex investigations showed that there has been decrease in TBT in marine environment, but imposex is still evident in all investigated populations, and number of sterile females increased. The TBT pollution is higher in marinas and ports as expected. *Hexaplex trunculus* represents useful bioindicator species in the monitoring of TBT pollution in central Adriatic.

Keywords: bioindicator species, imposex, ports, monitoring of TBT pollution, banded murex *Hexaplex trunculus*

Korištenje volka *Hexaplex trunculus* u praćenju onečišćenja hrvatskih luka TBT-om

Anita Erdelez¹, Martina Furdek², Anamaria Štambuk³, Ivan Župan⁴, Melita Peharda⁵

¹Institut IGH d.d., Matice hrvatske 15, Split, Hrvatska (aerdelez@gmail.com)

²Institut Ruđer Bošković, Bijenička cesta 54, Zagreb, Hrvatska

³Prirodoslovno-matematički fakultet, Biološki odsjek, Rooseveltov trg 6, Zagreb, Hrvatska

⁴Sveučilište u Zadru, Odjel za ekologiju, agronomiju i akvakulturu, Trg kneza Višeslava 9, Zadar, Hrvatska

⁵Institut za oceanografiju i ribarstvo, Šetalište I. Meštrovića 63, Split, Hrvatska

Sažetak

Tributilkositar (TBT) spada u organokositrove spojeve koji su intenzivno korišteni u protuobraštajnim premazima dok nije uočen njihov toksični učinak na puževe i školjkaše. Ženke puževa već pri niskim koncentracijama TBT-a razvijaju imposeks - rast muških spolnih organa što za posljedicu može imati sterilnost. Radi zaštite mora u mnogim je zemljama, kroz konvencije, direktive i zakone, zabranjeno korištenje organokositara u premazima. Imposeks kao biološki odgovor na TBT koristi se kao biomarker u praćenju onečišćenja morskog okoliša TBT-om čime se smanjuje potreba za skupim analitičkim metodama. U svrhu utvrđivanja onečišćenosti područja srednjeg Jadrana TBT-om, 2015. godine provedeno je istraživanje imposeksa i koncentracije butilkositara u tkivu volka *Hexaplex trunculus* i sedimentu na 12 lokacija. Lokacije su razvrstane po kategorijama: nautičke marine, lučice, uvale koje se sezonski koriste i referentne lokacije. Kako je na istim lokacijama provedeno istraživanje imposeksa i 2005. godine, analizirana je učinkovitost zabrane koja je u Republici Hrvatskoj na snazi od 2006. Rezultati istraživanja imposeksa pokazali su da je došlo do smanjenja razine TBT-a u desetogodišnjem razdoblju, ali ne i do oporavka populacija jer je na svim lokacijama zabilježen imposeks kao i povećanje udjela sterilnih ženki. Očekivano, onečišćenje je snažnije izraženo u marinama i lukama. Volak je potvrđen kao korisna bioindikatorska vrsta za praćenje onečišćenja TBT-om za područje srednjeg Jadrana.

Ključne riječi: bioindikatorska vrsta, imposeks, luke, praćenje onečišćenja TBT-om, volak *Hexaplex trunculus*

New findings for GHG National Inventory Report- woodstocks of the scrublands and maquies in the Croatian Mediterranean and sub-Mediterranean

Alen Berta¹, Vladimir Kušan¹, Zrinka Mesić¹, Dino Križnjak²

¹*Oikon Ltd. Institute of Applied Ecology, Trg senjskih uskoka 1-2, Zagreb, Croatia (aberta@oikon.hr)*

²*Croatian Agency for the Environment and Nature, Radnička 80/7, Zagreb, Croatian*

Abstract

As part of the project Upgrade and development of the environmental protection information system and improvement of the monitoring and reporting system on the environment in the Republic of Croatia was planned to assess the wood stock in maquis and scrublands. Major goal was to fill the knowledge gap about present woodstock in these stands since there is no obligation to calculate it during inventarisation of forests for the Forest Management Plan in Croatia. These areas cover half of the forested areas in Croatian Mediterranean and sub-Mediterranean (roughly 400,000 hectares) and it is extremely important to have precise data for the carbon pool, carbon sequestration and carbon release calculations, respectively.

Data collection and processing is carried out according to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories as defined for the Agriculture, Forestry and Other Land Use (AFOLU) sector. The field work included measurement of the DBH and heights of all trees above 1.3 m and 1 cm of DBH (among more than 100 other variables) at 13 m radius plots and was conducted during the 2016. The field investigation encompassed 76 plots in scrublands and 44 plots in maquies. In this paper are presented results of the basic statistics of the woodstock for every individual plots. Due to the great variability of data, the data for this paper were summed according to 2 major Croatian geographical areas (Northern Mediterranean and Dalmatia).

Keywords: GHG NIR, AFOLU, woodstock, maquies, scrublands

Operation experience and outlook of Waste – to – Energy plant Toplarna Celje

Marija Zabukovnik¹, Filip Kokalj²

¹*Energetika Celje, Smrekarjeva ulica 1, Celje, Slovenia*

(marija.zabukovnik@energetika-ce.si)

²*Faculty of Mechanical Engineering, University of Maribor, Smetanova 17,
Maribor, Slovenia (filip.kokalj@um.si)*

Abstract

The utilization of this energy source represents great challenge. Waste – to – energy (W-t-E) plants present an important step towards utilization of available energy sources and reduction of fuel import dependence.

The W-t-E plant in Celje is called “Toplarna Celje” (Celje district heating plant). The plant thermally treats light fraction of municipal solid waste (paper, cardboard, plastic, foils, textile and wood) and sludge from the Celje wastewater treatment plant. The plant represents the final stage of waste treatment, which has previously been processed and prepared at the waste management center.

The main reasons for the decision on the construction of the Celje WtE plant were:

- energy utilization of waste to cover part of the energy needs in the city of Celje,
- meeting the strict requirements regarding the biodegradable carbon content in waste disposed of in the landfill for non-hazardous waste after the year 2008 and
- sewage sludge disposal generated in the Celje waste water treatment plant.

The operation of the plant reduced the negative effects on the environment – in addition to the utilization of energy from previously treated waste, the waste and sludge incineration substantially reduces the volume and utilizes the energy.

The plant operations in recent years has proved the concept and design of the plant and entire waste management process. Some minor modifications enabled operation that is even more successful.

Keywords: incineration, waste – to – energy, municipal solid waste, heating plant, district heating

SEKCIJA 3 / SECTION 3

**ZAŠTITA PRIRODE I ODRŽIVO KORIŠTENJE PRIRODNIH
RESURSA /**

**NATURE CONSERVATION AND SUSTAINABLE USE OF
NATURAL RESOURCES**

**POSTER PREZENTACIJE /
POSTER PRESENTATIONS**

Constructed wetland system appliance for meat industry waste water treatment

Maja Taslidžić-Šaćiragić, Erna Alihodžić, Vildana Mahmutović,
Vanja Ćurin

*Dvokut pro d.o.o. Sarajevo, Avde Hume 11, Sarajevo, Bosnia and Herzegovina
(maja.taslidzic-saciragic@dvokut.ba)*

Abstract

Technological wastewater from the meat industry contain various pollutants that must be kept in the limits established by the legislation, before being discharged into the environment (natural recipient). The aim of this article is to provide optimal technological solution for waste water treatment from the meat industry applying (eco)system of hybrid wetland.

Survey of existing purification technologies, terrain surveying, sampling and analysis of technology waste water preceded to planning and design of constructed wetland system and adapting technology to specific site conditions, based on the natural processes of purification.

The system for waste water purifying, the artificial wetland, is designed to simulate the natural processes under controlled conditions. Physical, chemical and biological processes will occur in shallow pools using the substrate, wetland vegetation and microorganisms.

Before definition of purification technologies, pollution of wastewater, terrain topography (slight decrease), the substrate composition and indigenous wetland vegetation was take into account, after all that survey, it is decided that the plant should be constructed with horizontal and vertical subsurface flow. All phases of execution, commissioning of the artificial wetland and the establishment of functional treatment system will be under the supervision of professional staff in the next two years, after which we will get the results on the effectiveness of the designed plant.

Keywords: wetland, waste water, treatment, meat industry, constructed wetland

Primjena sustava umjetne močvare za pročišćavanje otpadnih voda iz mesne industrije

Maja Taslidžić-Šaćiragić, Erna Alihodžić, Vildana Mahmutović,
Vanja Ćurin

*Dvokut pro d.o.o. Sarajevo, Avde Hume 11, Sarajevo, Bosna i Hercegovina
(maja.taslidzic-saciragic@dvokut.ba)*

Sažetak

Tehnološke otpadne vode iz mesne industrije opterećene su raznim onečišćujućim tvarima koje se moraju svesti u granične vrijednosti utvrđene zakonskom regulativom, prije nego se ispuste u okoliš (prirodni prijemnik). Cilj rada je dati optimalno tehnološko rješenje za pročišćavanje otpadnih voda iz mesne industrije primjenom (eko)sustava hibridne močvare.

Planiranju i projektiranju umjetnog močvarnog sustava, temeljenog na prirodnim procesima pročišćavanja, prethodilo je istraživanje postojećih tehnologija pročišćavanja, snimanje geodetske situacije terena, uzorkovanje i analiza otpadnih tehnoloških voda na temelju kojih je izvršeno adaptiranje tehnologije specifičnim uvjetima na lokaciji.

Sustav za pročišćavanje otpadnih voda, poznat kao sustav umjetne močvare, je projektiran tako da simulira prirodne procese u kontroliranim uvjetima. Fizikalni, kemijski i biološki procesi će se odvijati u plitkim bazenima pomoću supstrata, močvarne vegetacije i mikroorganizama.

Prilikom definiranja tehnologije pročišćavanja, uzimajući u obzir stupanj opterećenosti otpadnih voda, topografiju lokacije (blagi pad), sastav supstrata i autohtone močvarne vegetacije, odabrano je da postrojenje bude projektirano sa horizontalnim i vertikalnim podpovršinskim tokom. Sve faze izvođenja, puštanje u rad postojenja umjetne močvare i uspostava funkcionalnog sustava za pročišćavanje će biti pod nadzorom stručnog osoblja u naredne dvije godine, nakon čega će se dobiti i rezultati o učinkovitosti projektiranog postrojenja.

Ključne riječi: močvara, otpadne vode, pročišćavanje, mesna industrija, biljni uređaj

Identifying High Conservation Value Areas and Ecosystem Services in the County Bilje (Baranja, Croatia)

Luka Škunca¹, Marina Škunca¹, Hrvoje Peternel¹, Vida Zrnčić¹,
Višnja Šteko², Andrijana Mihulja², Oleg Antonić¹

¹*Geonatura LTD, Fallerovo šetalište 22, Zagreb, Croatia*
(lskunca@geonatura.hr)

²*Green Infrastructure LTD, Fallerovo šetalište 22, Zagreb, Croatia*

Abstract

In order to assess the conservation value of the area of County Bilje (Baranja), a valorization of the County's area from the aspect of biodiversity was carried out, as well as the assessment of its ecosystem services. Since most of the County's extent is protected as NP Kopački rit, the concepts of *Rarity* and *Vulnerability* do not adequately assess the area's conservation value for the total biodiversity. Therefore the modelling approach was based on the concepts of *Adequacy*, *Comprehensiveness* and *Representativeness*.

Valorization resulted in a map of the area's conservation value that comprised five classes, where two highest scoring classes represent the High Conservation Value Areas. As expected, High Conservation Value Areas encompass mostly NP Kopački rit, but also wetlands and alluvial forests located outside the NP's borders. Spatially diverse and with a low human presence and low levels of hemeroby, those areas adequately reflect the current and past land use and management practices. In contrast, the lowest scoring areas encompass human settlements and agricultural land since they support only a limited part of the total biodiversity of the County.

The state of the identified ecosystems was assessed using the concept of *Hemeroby*, as an index of the total human impact. Assessment of ecosystem services showed that natural and semi-natural ecosystems provide more services than agricultural land and urban areas, which is consistent with the biodiversity valorization.

Keywords: Nature Conservation, Valorization, Land Use, Biodiversity Mapping, Hemeroby

Hydrodynamic modeling of volume variations and thermal stratification development in reservoir Butoniga

Melita Burić, Ana Jurjević, Sanja Grgurić

*Gekom-geophysical and ecological modeling Ltd., Fallerovo šetalište 22,
Zagreb, Croatia (mburic@gekom.hr, ajurjevic@gekom.hr,
sgrguric@gekom.hr)*

Abstract

Butoniga is artificial lake whose primary purpose is water supply. Reservoir water quality varies depending on season and water levels, while most of the problems occur in the summer when the consumption is largest and reservoir temperature exceeds the critical value. Influence of the water volume on heating and thermal stratification was considered, and consequently reservoir water quality in case of recharge from spring and due to construction of retention basin in extremely dry period during 2012. For that purpose, 3D prognostic model has been applied to simulate impact of atmospheric conditions on hydrodynamic processes in the reservoir. Shallow reservoirs quickly react to atmospheric changes so it's necessary to describe physical processes (heat exchange between air and water, vertical mixing, turbulent energy transport etc.) well by model. To simulate daily and seasonal changes in volume and temperature, the development of thermal stratification and influence of fresh water in the reservoir on: water levels, mixing of water and local temperature change, 3D hydrodynamic model SCHISM (Semi-implicit Cross-scale Hydrosience Integrated System Model, Zhang et al.) is used. The model showed excellent agreement between measured and modeled values of water level and temperature (RMSE, bias). Using this model facilitates understanding of processes in reservoirs and the simulation of various scenarios for the purpose of efficient management of the quantity and quality of water.

Keywords: reservoir, water volume, thermal stratification, water quality, hydrodynamic model

Applying phytoplankton functional groups in determining the ecological status of lake Visovac

Maja Šimunović¹, Jelena Fressl², Marija Gligora Udovič³,
Gordana Goreta⁴

¹Croatian Agency for Environment and Nature, Radnička cesta 80/7, 10 000 Zagreb, Croatia (maja.simunovic@azo.hr)

²DVOKUT-ECRO Ltd, Trnjanska 37, 10 000 Zagreb, Croatia

³University of Zagreb, Faculty of Science, Department of Biology, Rooseveltov trg 6, 10 000 Zagreb, Croatia

⁴Public Institution "National Park Krka", Trg Ivana Pavla II 5, 22 000 Šibenik, Croatia

Abstract

Aim of the paper was to determine the ecological status of lake Visovac using a biological quality element – phytoplankton for the period from April to September 2016. In Croatia, a trophic module, using phytoplankton as a biological quality element for ecological status assessment, is applied taking into account: quantity of chlorophyll *a*, total biomass and share of taxonomic phytoplankton groups according to the valid Methodology for Determining the ratio of Ecological Quality Biological Elements. Pursuant to the provisions of the Regulation on the Water Quality Standards, the ecological quality of Visovac Lake is in the very good ecological status category, which indicates very small or no changes of physical, chemical and hydromorphological elements of the water body quality due to human activity.

According to the Water Framework Directive, composition and biomass are used for evaluation of the ecological status based on phytoplankton, and for this purpose certain indices are applied, e.g. Q index, which demonstrate the share of Reynolds functional groups. Given the cosmopolitan characteristics of phytoplankton species, similar communities are often encountered, therefore it is imperative to take into account not only taxonomic community composition but also specific ecological conditions related to their development.

In Croatia a version of the Q index is applied to determining the ecological status of rivers, but not lakes. According to the research of Croatian natural lakes performed so far, it could be a good index that would clearly describe the ecological status of lakes as well as the ecological potential of accumulations.

Keywords: functional groups, phytoplankton, lake ecological status, Visovac, Q index

Primjena funkcionalnih grupa fitoplanktona u određivanju ekološkog statusa jezera Visovac

Maja Šimunović¹, Jelena Fressl², Marija Gligora Udovič³,
Gordana Goreta⁴

¹Hrvatska agencija za okoliš i prirodu, Radnička cesta 80/7, 10 000 Zagreb, Hrvatska (maja.simunovic@azo.hr)

²DVOKUT-ECRO d.o.o., Trnjanska 37, 10 000 Zagreb, Hrvatska

³Sveučilište u Zagrebu, Prirodoslovno-matematički fakultet, Biološki odsjek, Rooseveltov trg 6, 10 000 Zagreb, Hrvatska

⁴Javna ustanova "Nacionalni park Krka", Trg Ivana Pavla II 5, 22 000 Šibenik, Hrvatska

Sažetak

Cilj rada je bio odrediti ekološki status jezera Visovac koristeći biološki element kakvoće - fitoplankton za promatrano razdoblje od travnja do rujna 2016. godini. U Hrvatskoj se u ocjeni ekološkog stanja jezera koristeći fitoplankton kao biološki element kakvoće primjenjuje modul za trofiju uzimajući u obzir: količinu klorofila *a*, ukupnu biomasu i udio taksonomskih skupina fitoplanktona prema važećoj Metodologiji određivanja omjera ekološke kakvoće bioloških elemenata. Sukladno odredbama Uredbe o standardu kakvoće voda utvrđeno je da je omjer ekološke kakvoće jezera Visovac u kategoriji vrlo dobrog ekološkog stanja što ukazuje na vrlo male ili nikakve promjene zbog ljudske djelatnosti na fizikalno-kemijske i hidromorfološke elemente kakvoće vodnog tijela.

Prema preporuci Okvirne direktive o vodama za ocjenu ekološkog stanja na temelju fitoplanktona koriste se sastav i biomasa te se u tu svrhu koriste određeni indeksi, npr. Q indeks, koji predstavljaju zastupljenost Reynoldsovih funkcionalnih grupa. S obzirom na kozmopolitske značajke fitoplanktonskih vrsta često se nailazi na slične zajednice te je neophodno uz taksonomski sastav zajednice promatrati i specifične ekološke uvjete vezane za njihov razvoj.

Inačica Q indeksa primjenjuje se u Hrvatskoj u određivanju ekološkog stanja rijeka, ali ne i za jezera. Prema dosadašnjim istraživanjima prirodnih jezera u Hrvatskoj potencijalno bi bio dobar indeks koji bi jasno opisivao ekološki status jezera kao i ekološki potencijal akumulacija.

Ključne riječi: funkcionalne grupe, fitoplankton, ekološki status jezera, Visovac, Q indeks

Determinations of arsenic concentrations in hair samples with ICP-MS in area of eastern Croatia

Marina Vidosavljević¹, Vlatka Gvozdić², Dinko Puntarić³,
Domagoj Vidosavljević⁴, Matijana Jergović⁵, Miroslav Venus⁶,
Ada Puntarić⁷, Dragana Jurić⁸

¹Vinkovci, General Hospital, Zvonarska 57, 32100 Vinkovci, Croatia
(vidosavljevic.marina@gmail.com)

²Josip Juraj Strossmayer University Osijek, Department of Chemistry,
Kuhačeva 20, 31000 Osijek, Croatia

³Universitas Studiorum Catholica Croatica. Ilica 242, 10000 Zagreb, Croatia

⁴Vukovar, General Hospital, Bolnička 5, 32000 Vukovar, Croatia

⁵Andrija Štampar, Teaching Institute of Public Health, Mirogojska 16, 10000 Zagreb, Croatia

⁶Institute of Public Health Sv. Rok, Virovitica Podravina County, Ljudevita Gaja 21, 33000 Virovitica, Croatia

⁷Zagreb University, Faculty of Food Technology and Biotechnology,
Pierottijeva 6, 10000 Zagreb, Croatia

⁸Institute of Public Health, Brod-Posavina County, Vladimira Nazora 5, 35000 Slavonski Brod, Croatia

Abstract

The eastern Croatia together with Central Hungary, Serbia and Western Romania (Danube Basin) belongs to the Pannonian Basin where higher groundwater As concentrations have been reported. A recent study of As concentrations in soil shows highest As concentrations in some areas of eastern Croatia. Long term exposure to arsenic may be assessed by analysing the content in hair. Arsenite (As III) reacts readily with sulfhydryl group (-SH) in a variety essential enzymes and proteins. The hair samples were taken in areas: Vladislavci, Čepin, Osijek, Dalj, Vukovar, Vinkovci and Slavonski Brod. Depending the investigated area, the mean concentrations ranged from 0,018 (Vinkovci) to 32 $\mu\text{g g}^{-1}$ (Vladislavci) whereby these last value, significantly exceeded the upper range of reference value (0,31 $\mu\text{g g}^{-1}$). The arsenic concentrations from Našice, Osijek, Slavonski Brod, Vukovar and Vinkovci area were within or slightly above allowed reference range. Maximum As concentrations in hair samples were detected in the Vladislavci (647,60 $\mu\text{g g}^{-1}$) and Čepin (526,78 $\mu\text{g g}^{-1}$) areas.

Keywords: arsenic, hair, Croatia, ICP-MS

Determinations of selenium concentrations in plants (*Taraxum officinale*) and biological samples with ICP-MS (eastern Croatia)

Vlatka Gvozdić¹, Dinko Puntarić², Domagoj Vidosavljević³,
Matijana Jergović⁴, Stjepan Živković¹, Filip Samardžić¹, Lidija
Bijelić⁵

¹Josip Juraj Strossmayer University Osijek, Department of Chemistry,
Kuhačeva 20, HR 31000 Osijek, Croatia (vgvozdic@kemija.unios.hr)

²Universitas Studiorum Catholica Croatia, Ilica 242, 10000 Zagreb, Croatia

³Vukovar General Hospital, Bolnička 5, 32000 Vukovar, Croatia

⁴Andrija Štampar, Teaching Institute of Public Health, Mirogojska 16, 10000
Zagreb, Croatia

⁵Institute of Public Health, Varaždin County, Ivana Meštrovića bb, 42000
Varaždin, Croatia

Abstract

The essential trace element, selenium (Se), has multiple biological activities, which depend on the level of Se intake. Recent studies provide some evidence that adequate selenium status may reduce the risk of some cancers, viral infections, male infertility, cardiovascular disease and mood disorders. Previous research on Se in eastern Croatia revealed the occurrence of selenium deficit disorders in domestic animals and deficient concentrations in soil and grains. The objective of this work was to determine the Se concentration in Dandelion (*Taraxum officinale*) samples and biological materials (urine, serum and hair) from the 500 inhabitants of five towns and three villages in eastern Croatia. No significant difference in concentrations between all samples was observed. Typical levels found in dandelion, urine, serum and hair were $45,8 \mu\text{g kg}^{-1}$, $34,6 \mu\text{g L}^{-1}$, $83,5 \mu\text{g L}^{-1}$ and $1,4 \mu\text{g g}^{-1}$, respectively. The most of values correspond to the lower or higher end of the reference literature data, while for hair a few values are about two orders of magnitude higher than here presented results. Our data may provide some insight into Se concentrations in plant and biological samples and serve as a basis for comparison to other region both in Croatia and worldwide.

Keywords: selenium, dandelion, biological samples, Croatia

Possibilities of circular management of construction and demolition waste in Croatia

Sanja Kozulić, Igor Anić, Imelda Pavelić

DVOKUT-ECRO Ltd., Trnjanska 37, Zagreb, Croatia
(sanja.kozulic@dvokut-ecro.hr, igor.anic@dvokut-ecro.hr,
imelda.pavelic@dvokut-ecro.hr)

Abstract

In project LIFE05 TCY/CRO/000114 CONWAS between 2006-2008 it was estimated that The Republic of Croatia produces 2,5 million tons per year of construction and demolition waste. For projection of amount of construction and demolition waste for period 2015. – 2021, taken from Industrial Strategy of the Republic of Croatia, we reach the total amount of construction and demolition waste from 32.2 million tons in that period, which lead us to increase of 5.37 million per year in average.

The current level of recycling of construction and demolition waste does not exceed 7%, from which secondary raw materials are extracted for 11%.

The Waste Framework Directive requires EU member states to use at least 70% of the total amount of non-hazardous construction and demolition waste generated by 2020 for use, recycling and other types of material recovery.

In some European countries, such as the Netherlands, Belgium, Denmark and Germany (which are world leaders in the recycling of construction waste), the recycling of construction and demolition waste makes more than 80% of the total produced construction and demolition waste.

The aim of this paper is to present the current state of the circular economy in the area of construction and demolition waste management, the improvement of the system, and the challenges and activities that occur.

Keywords: construction and demolition waste, recycling, circular economy

Mogućnosti cirkularnog gospodarenja građevnim otpadom u RH

Sanja Kozulić, Igor Anić, Imelda Pavelić

DVOKUT-ECRO d.o.o., Trnjanska 37, Zagreb, Hrvatska
(sanja.kozulic@dvokut-ecro.hr, igor.anic@dvokut-ecro.hr,
imelda.pavelic@dvokut-ecro.hr)

Sažetak

U okviru projekta LIFE05 TCY/CRO/000114 CONWAS koji je proveden 2006-2008 procijenjeno je da Republika Hrvatska godišnje proizvodi 2,5 mil. tona građevnog otpada. Za projekciju količina građevnog otpada, uzetu iz Industrijske strategije Republike Hrvatske, dolazimo do ukupne količine proizvedenog građevnog otpada u razdoblju 2015. – 2021. od 32,2 milijuna tona, što nam upućuje na povećanje količine građevnog otpada od 5,37 mil. tona godišnje u prosjeku.

Trenutni stupanj reciklaže građevnog otpada u Republici Hrvatskoj ne prelazi 7%, od čega se izdvoji oko 11% sekundarnih sirovina.

Okvirna direktiva o otpadu zahtijeva od zemalja članica EU da se do 2020. godine za ponovno korištenje, recikliranje i druge vrste uporabe materijala koristi najmanje 70% mase ukupnog neopasnog građevinskog otpada koji se generira.

U pojedinim europskim zemljama, primjerice Nizozemskoj, Belgiji, Danskoj i Njemačkoj (koje predstavljaju svjetske lidere u recikliranju građevnog otpada) recikliranje građevnog otpada čini više od 80% ukupno proizvedenog građevnog otpada.

Cilj predmetnog rada je prikaz aktualnog stanje cirkularne ekonomije u području gospodarenja građevnim otpadom, unaprjeđenje sustava, te izazova i aktivnosti koji se pri tome javljaju.

Ključne riječi: građevni otpad, recikliranje, cirkularna ekonomija

Intensive development of plantation breeding in Herzegovina (*Helichrysum italicum* (Roth) G. Don) without developmental planning and strategic documents and environmental impact assessment study

Tomislav Lukić¹, Stanislava Talić², Iva Lukić³, Nermin Alić⁴

¹*Federal Ministry of Environment and Tourism, Marka Marulića 2, Sarajevo, Bosnia and Herzegovina (tlukic2@gmail.com)*

²*The University of Mostar, Faculty of Science, Mathematics and Education, Matica hrvatska bb, Mostar, Bosnia and Herzegovina*

³*VERN University of Applied Science*

⁴*Institut for quality standardization and ecologyTQM l.t.d.Lukavac, Tuzla Bosnia and Herzegovina (nermin.alic@tqm.ba)*

Abstract

The trend of plantation of plantation silage (*Helichrysum italicum* (Roth) G. Don) which reached Hercegovinagot about 1500 ha, while the economic effect of changes is very significant for the overall economic development of Bosnia and Herzegovina. Large areas of the original karst landscape are cultivated, and landscape images have been permanently altered. The consequences of creating monoculture in systems where they have never existed are for ecological systems important. It is clear that compensating methods are necessary to introduce in order to reduce environmental pressure. The current state of uncontrolled waste disposal by distillation with water vapor makes the lawn more complicated and increases the risk of the karst ecosystem. The situation in the region is complex and very unstable market relations that further destabilize each investment climate. We want to point out the various forms of environmental pressures that arise from intensive plantation cultivation, primarily from the perspective of landscapes without planning and strategic documents, as well as studies of environmental impact assessment.

Keywords: Immortelle, plant waste, waste treatment, karst eco system

Intenzivan razvoj plantažnog uzgoja smilja u Hercegovini (*Helichrysum italicum* (Roth) G. Don) bez razvojnih planskih i strateških dokumenta i studija procjene utjecaja na okoliš

Tomislav Lukić¹, Stanislava Talić², Iva Lukić^{3*}, Nermin Alić⁴

¹Federalno ministarstvo okoliša i turizma, Marka Marulića 2, Sarajevo, Bosna i Hercegovina (tlukic2@gmail.com)

²Sveučilište u Mostaru, Fakultet prirodoslovno-matematičkih i odgojnih znanosti, Matice hrvatske bb, Mostar, Bosna i Hercegovina

³Veleučilište VERN Zagreb

⁴Institut za kvalitet, standardizaciju i ekologijuTQM d.o.o.Lukavac, Tuzla Bosna i Hercegovina (nermin.alic@tqm.ba)

Sažetak

Trend plantažnog uzgoja smilja (*Helichrysum italicum* (Roth) G. Don) koji je zahvatio Hercegovinu dosegno je veličino od oko 1500 ha, dok je ekonomski učinak promjena vrlo značajan za ukupna gospodarska kretanja Bosne i Hercegovine. Velike površine izvornog krškog krajolika su kultivirane, a slike krajolika trajno izmijenjene. Posljedice stvaranja monokultura u sustavima gdje one nikada nisu postojale, po ekološke sustave su značajne. Razvidno je kako se kompenzacijske metode moraju nužno uvesti da bi se smanjio pritisak na okoliš. Trenutno stanje nekontroliranog odlaganja otpada nastalog destilacijom vodenom parom smilja dodatno komplicira stanje te povećava rizike po kraške ekosustave. Situaciju u regiji čine kompleksnom vrlo nestabilni tržišni odnosi koji svaku investicijsku klimu dodatno destabiliziraju. Radom želimo ukazati na različite oblike pritiska na okoliš proizvedenih intenzivnim plantažnim uzgojem smilja, prvenstveno sa aspekta izmjene krajolika koji se odvijaju bez planskih i strateških dokumenta, te studija procjene utjecaja na okoliš.

Ključne riječi: smilje, biljni otpad, obrada otpada, kraški eko sustav.

AlpES – Alpine Ecosystem Services – mapping, maintenance and management

Tina Klemenčič¹, Caroline Pecher², Ulrike Tappeiner³, Andreas Haller⁴, Patricia Detry⁵, Jean-Pierre Fosson⁶, Isabella Pasutto⁷, Maria Quarta⁸, Tadej Kogovšek¹, Suzana Vurunić¹, Heike Summer⁹, Andreas Pichler¹⁰, Stefan Marzelli¹¹

¹*Institute of Republic of Slovenia for Nature Conservation, Tobačna 5, 1000 Ljubljana, Slovenia (tina.klemencic@zrsvn.si)*

²EURAC; ³UIBK; ⁴ÖAW/IGF; ⁵Cerema; ⁶FondMS; ⁷VR; ⁸PiemR; ⁹Office of Environment; ¹⁰CIPRA International; ¹¹Ifuplan

Abstract

The AlpES project is co-financed by the European Regional Development Fund through the Interreg Alpine Space program and is being carried out between December 2015 and December 2018. Its overall objective is to introduce ecosystem services (ES) as a regional/transnational environmental governance framework in the Alpine space. The project will support stakeholders in understanding, valuing and managing ES. AlpES will carry out four main tasks: It will (1) develop an Alpine ecosystem services concept, (2) carry out a mapping and assessment of ES for the Alpine Space area including the testing in selected study regions across the Alpine Space, (3) provide stakeholders with the results through an interactive WebGIS an WIKIAlps and (4) ensure a multi-level and cross-sectoral transfer of AlpES results to a maximum number of stakeholders.

The successful implementation of the ES concept needs concrete formal or informal instruments that can be operationalized and used in regional environmental governance as well as in other decision-making processes. In the AlpES project we have identified and collected instruments which are deemed suitable for it. EIA-obligatory projects are carried out in the whole Alpine Space and with the latest amendment to the directive even more projects will be affected. Also, strategic development plans have a specific significance and often need to be supplemented by SEAs. All EU Alpine countries have to apply these instruments. As the methods for implementation of ES are not specified this might be a potential entry point for the ES concept into formal instruments.

Keywords: ecosystem services, Alpine Space, EIA, SEA, implementation

SEKCIJA 4 / SECTION 4

SUDJELOVANJE JAVNOSTI / PUBLIC INVOLVEMENT

Communication and stakeholder engagement challenges in SEA and EIA processes

Daria Mateljak¹, Darko Alfirev²

¹*Hauska&Partner, Ilica 246a, Zagreb, Croatia (daria.mateljak@hauska.com)*

²*HEP d.d., Ulica grada Vukovara 37, Zagreb, Croatia (darko.alfirev@hep.hr)*

Abstract

As SEA and EIA processes grow increasingly more complex, well planned and structured communication becomes more influential. A number of SEA and EIA processes in the past few years encountered difficulties related to communication with stakeholders. In practice, the investors often fail to timely and wholly plan adequate communication strategies aiming at informing and educating stakeholders related to their planned project. Important subjects in these processes are authorized consulting companies who provide services in preparing documentation and studies. The objective of this paper is to research the opinion of authorized consultants on how communication and stakeholder engagement should be organized and conducted in SEA and EIA processes, as well as identify most critical communication challenges they face during these processes. The research is conducted by a quantitative survey among a representative number of consultants in Croatia. The survey uses both closed and open questions addressing practical communication challenges. The conclusions corroborate the main hypothesis that investors should focus more efforts on the structured and planned communication and stakeholder engagement. The findings prove that timely addressing communication and engagement could minimize intangible risks in development projects. The outcomes indicate that both investors and consultants can improve their communication and engagement planning and practices.

Keywords: stakeholder engagement, strategic communication, SEA and EIA processes

Disinformation in Environmental Impact Assessments - causes, consequences and solutions

Andreja Pavlović, Ines Petra Strunje

*Hauska i Partner d.o.o., Ilica 246a, Zagreb, Croatia
(andreja.pavlovic@hauska.com, ines.strunje@hauska.com)*

Abstract

Our reasoning is conducted under strong influence of motivated subconscious, which creates a 'fertile ground' for accepting information with false or misleading content, without actual factual background (disinformation). Informing and participation of the public and other interested public in procedures of environmental impact assessments (EIA) often questions credibility of information provided by the experts engaged in production of EIA studies. In the first part, paper provides theoretical framework for a better understanding of the process of forming and accepting false or misleading information, and related causes and consequences. The second part brings a case study based on the example of Environmental Impact Assessment Study for Combined Cogeneration Gas Power Plant (CCGT) Peruća and penetration of disinformation. By analyzing the context which caused emergence of disinformation, aimed at the public engagement in the project suspension, the authors deal with the process of misinformation production, as well as with their consequences. Authors present the thesis that different public groups participate in decision-making on environmental protection on the basis of pre-designed reference frames, resulting with subconscious motivated reasoning during public debates and decision-making in the environmental protection area. The second thesis is that adequate information aimed at educating the lay public may or may not necessarily lead to better understanding of the matter, or to acceptance of projects which are for any reason marked as 'questionable'. Finally, the paper offers communication solutions which, in this case, proved to be useful, and which can serve in better communication risk management associated with EIA in Croatia.

Keywords: disinformation, environmental impact assessment (EIA) for Combined Cogeneration Gas Power Plant (CCGT) Peruća, motivated reasoning, informing the public, credibility of information

Dezinformacije u postupcima procjene utjecaja zahvata na okoliš – uzroci, posljedice i rješenja

Andreja Pavlović, Ines Petra Strunje

*Hauska i Partner d.o.o., Ilica 246a, Zagreb, Hrvatska
(andreja.pavlovic@hauska.com, ines.strunje@hauska.com)*

Sažetak

Naše rasuđivanje se odvija pod jakim utjecajem motivirane podsvijesti, što stvara 'pogodno tlo' za oblikovanje i prihvaćanje informacija s lažnim ili iskrivljenim sadržajem, bez stvarne činjenične podloge (dezinformacija). Sve češće se tijekom postupaka informiranja i sudjelovanja javnosti i zainteresirane javnosti u postupcima procjene utjecaja zahvata na okoliš (PUO) dovodi u pitanje vjerodostojnost informacija koje pružaju ovlaštenici i stručnjaci angažirani u izradi studija utjecaja na okoliš. Rad u prvom dijelu daje teorijski okvir za bolje razumijevanje procesa oblikovanja i prihvaćanja lažnih ili iskrivljenih informacija, uzroka i posljedica. Zatim se u drugom dijelu donosi studija slučaja koja se temelji na primjeru procjene utjecaja na okoliš za kombi kogeneracijsku plinsku elektranu (KKPE) Peruća i pojave dezinformacija. Analizirajući kontekst koji je uzrokovao nastanak dezinformacija, a koje su za cilj imale angažirati javnost u obustavljanju projekta, autorice tematiziraju proces nastanka dezinformacija, kao i njihove posljedice. Autorice iznose tezu kako različite skupine javnosti sudjeluju u odlučivanju o zaštiti okoliša na temelju prethodno oblikovanih referentnih okvira, koji rezultiraju podsvjesnim motiviranim rasuđivanjem prilikom javnih rasprava i donošenja odluka u području zaštite okoliša. Druga teza je da informiranje s ciljem educiranja laičke javnosti može, ali i ne mora nužno dovesti do boljeg razumijevanja informacija i prihvaćanja projekata koji su iz bilo kojeg razloga označeni kao 'dvojbeni'. Naposljetku, rad nudi komunikacijska rješenja koja su se, u ovom slučaju, pokazala kao korisna, a koja mogu poslužiti u boljem upravljanju komunikacijskim rizicima koji prate PUO u Hrvatskoj.

Ključne riječi: dezinformacije, postupak utjecaja zahvata na okoliš (PUO) za kombi kogeneracijsku plinsku elektranu (KKPE) Peruća, motivirano rasuđivanje, informiranje javnosti, vjerodostojnost informacija

Investor responsibility in informing the public about a planned project

Merica Pletikosić

*Cemex Hrvatska d.d, Cesta dr. Tuđmana 45, Kaštel Sućurac, Croatia
(merica.pletikosic@cemex.com)*

Abstract

The paper presents the results of an empirical study of the awareness and attitudes among the public and interested public on project holder engagement in the legally required informing of the public about a planned project before starting the environmental impact assessment procedure in Croatia. The goal of early involvement, as well as continuous public participation, is to create preconditions that allow the public to affect the outcome of environmental impact assessment. The goal of the study was to analyse the differences among the members of the interested public, defined by belonging to a particular sector or target group, in terms of the level of awareness and opinions on project holder involvement in the legally required informing of the public about a planned project before starting the environmental impact assessment procedure. The qualitative study was conducted using a purposive sample and the methods of in-depth interview and participant observation. Grounded theory was used in analysing the empirical data, while the quantification of the qualitatively processed coded material was performed using the Statistica ver. 11.00 software. The majority of respondents view investor involvement as insufficient, claiming that project holders should be legally required to inform the public about a planned project before starting the environmental impact assessment procedure, as they could change the decision in case of negative reactions, but with no additional study costs.

Keywords: environmental impact study, investor responsibility

Strengthening CSO participation in environmental decision making

Aslı Gemci¹, Petra Remeta², Đorđe Stefanović³

¹ WWF Turkey, *Büyük Postane Cad. No:19 Kat:5 Bahçekapı/Fatih, Istanbul, Turkey* (agemci@wwf.org.tr)

²WWF Adria, *Budmanijeva 5 10000 Zagreb, Croatia*

³*Udruga Dinarica, SPC Rondo, Kralja Krešimira Petra IV, Lam. 2, Mostar, Bosnia and Herzegovina*

Abstract

Civil society organizations (CSOs) play a crucial role for nature protection, in raising awareness on citizens' political, social and environmental rights and ensuring that they are properly used. In Western Balkans and Turkey, Environmental Impact Assessments and Strategic Environmental Assessments are valuable tools where public's access to information, participation in decision making and access to justice can be efficiently utilized, promoting sustainable decisions by recognizing and communicating the needs and interests of the wider public, including decision makers.

Poor flow of information with limited opportunity for the public to raise their voice, insufficient capacity of national and local CSOs in constructive participation to the public consultation processes and lack of public monitoring are the common issues that are faced in the region. It is acknowledged that effective participation results in sustainable environmental decision making, which leads to improvement in regulatory frameworks as well as implementation.

This paper puts forward the need for strengthening CSOs in environmental decision making in the region by outlining common problems of participation, proposing recommendations to strengthen CSO involvement and showcasing best practices from the world to demonstrate particular benefits of public participation.

Keywords: Civil society organizations, public participation, environmental decision making, environmental impact assessment

Three theses on the need for radical changes in the rational-technical model in environmental decision-making

Andreja Pavlović

*Hauska i Partner d.o.o., Ilica 246a, Zagreb, Croatia
(andreja.pavlovic@hauska.com)*

Abstract

Over the twenty-five years public participates in environmental decision-making. The UN Conference on Environment and Development held in Rio de Janeiro in 1992 has prompted many countries to the application of the 10th principle of the Declaration on Environment and Development. A step further was made with the adoption of the Aarhus Convention in 1998. Nevertheless, the practice so far indicates that states are not equally successful in facilitating the participation of citizens in environmental decision-making. Normatively prescribed public participation is often reduced to mere fulfillment of the form, implemented as quickly as possible and with the least possible cost.

Designed under the rational-technical model it deepens conflicts between different groups of the public, paralyzes and / or slows down decision-making and significantly reduces the quality of decisions made. The author would like to underline some limitations of this model and will present three main theses which call for its "radical" change. The first thesis is that the risk society led to a significantly different understanding of risks, which is why they cannot be seen any longer exclusively through their technical features, ignoring the importance of emotions, values, politics and the media. The second is that the public and certain groups of citizens participate in environmental decision-making on the basis of the pre-formed frames that serve them as an interpretative means during public discussions and environmental decision-making. Finally, the third thesis is that activities aiming towards better information and education of lay public do not necessarily lead to better understanding and acceptance of certain 'controversial' technology solutions.

Keywords: Public participation, Rational-technical decision-making model, Radical change

Tri teze o potrebi radikalne promjene racionalno-tehničkog modela odlučivanja o zaštiti okoliša

Andreja Pavlović

*Hauska i Partner d.o.o., Ilica 246a, Zagreb, Hrvatska
(andreja.pavlovic@hauska.com)*

Sažetak

Javnost više od dvadeset pet godina sudjeluje u odlučivanju o zaštiti okoliša. UN-ova konferencija o okolišu i razvoju održana u Rio de Janeiru 1992. potaknula je brojne zemlje na primjenu 10. načela Deklaracije o okolišu i razvoju. Korak dalje učinjen je usvajanjem Aarhuške konvencije 1998. Dosadašnja praksa ipak pokazuje da države nisu podjednako uspješne u omogućavanju sudjelovanja građana u donošenju odluka o zaštiti okoliša. Normativno propisano sudjelovanje javnosti često se svodi na puko ispunjavanje forme, nastoji se provesti što brže i sa što manjim troškovima. Osmišljeno u okviru racionalno-tehničkog modela odlučivanja ono produbljuje sukobe među različitim skupinama javnosti, paralizira i/ili usporava donošenje odluka i bitno smanjuje kvalitetu donesenih odluka. Autorica želi ukazati na neka ograničenja tog modela i iznijeti će tri ključne teze zbog kojih je potrebna njegova „radikalna“ promjena. Prva teza je da je društvo rizika dovelo do bitno drugačijeg shvaćanja rizika, zbog čega ih više nije moguće svoditi samo na njihovu tehničku dimenziju, ignoriranjem važnosti emocija, vrijednosti, politike i medija. Druga je teza da javnost i pojedine skupine građana sudjeluju u odlučivanju o zaštiti okoliša na temelju prethodno oblikovanih okvira koji im služe kao interpretativno sredstvo tijekom sudjelovanja u javnim raspravama i odlučivanja o zaštiti okoliša. Naposljetku, treća je teza da bolje informiranje i educiranje laičke javnosti nužno ne dovodi do boljeg razumijevanja i prihvaćanja pojedinih 'spornih' tehnoloških rješenja.

Ključne riječi: Sudjelovanje javnosti, Racionalno-tehnički model odlučivanja, Radikalna promjena

Participatory process for physical planning in the example of study Resource mapping and sustainable mariculture management in Šibenik- Knin county

Fanica Kljaković-Gašpić¹, Tomi Haramina¹, Višnja Šteko¹,
Sunčana Bilić¹, Matea Lončar¹, Jasmina Šargac¹, Nikolina
Bakšić¹, Sanja Grgurić², Melita Burić², Ana Jurjević², Goran
Gašparac², Oleg Antičić¹

¹*Green infrastrukture Ltd., Fallerovo šetalište 22, Zagreb, Croatia*

²*Gekom Ltd., Fallerovo šetalište 22, Zagreb, Croatia*

Abstract

For preparation of the study Resources mapping and sustainable management of mariculture in Šibenik-Knin county in accordance with the principles of integrated coastal zone management, a participatory process was conducted. All relevant stakeholders were included during workshops held in Šibenik by active participation and giving written comments to the interim results of the study. During workshops, stakeholders analysed current sector status in the county with emphasis on the advantages and disadvantages mariculture development as well as problems which farmers encounter. Also, potential sea bass and sea beam, tuna and shellfish farming sites were presented which are the result of multicriterial spatial analysis (modelling of attractiveness and vulnerability using the GIS system).

As a result of the above mentioned the final proposal of the mariculture farming sites was prepared and will be used in the county's physical plan management that will fulfil the efforts of the Šibenik-Knin county for the development of mariculture, with respect to all spatial restrictions.

Keywords: stakeholders, workshops, multicriterial spatial analysis, physical planning

Participativni proces pri prostornom planiranju na primjeru studije Mapiranje resursa i održivo upravljanje sektorom marikulture u Šibensko-kninskoj županiji

Fanica Kljaković-Gašpić¹, Tomi Haramina¹, Višnja Šteko¹,
Sunčana Bilić¹, Matea Lončar¹, Jasmina Šargač¹, Nikolina Bakšić¹
Sanja Grgurić², Melita Burić², Ana Jurjević², Goran Gašparac²,
Oleg Antonić¹

¹Zelena infrastruktura d.o.o., Fallerovo šetalište 22, Zagreb, Hrvatska

²Gekom d.o.o., Fallerovo šetalište 22, Zagreb, Hrvatska

Sažetak

Za potrebe izrade studije Mapiranje resursa i održivo upravljanje sektorom marikulture u Šibensko-kninskoj županiji u skladu s principima integralnog upravljanja obalnim područjem, proveden je participativni proces. Svi relevantni dionici su prisustvovali na radionicama održanim u Šibeniku, kroz aktivno sudjelovanje na radionicama kao i upućivanjem pismenih komentara na privremene rezultate studije. Na radionicama je kroz sudjelovanje dionika analizirano stanje sektora na području županije s naglascima na prednosti i nedostatke razvoja sektora te probleme s kojima se uzgajivači susreću. Također, predstavljene su potencijalne lokacije uzgoja bijele ribe, tune i školjkaša koje su rezultat višekriterijske, dvojne analize prostora (modeliranjem privlačnosti i ranjivosti prostora pomoću GIS sustava).

Kao rezultat svega navedenog napravljen je konačan prijedlog lokacija za uzgoj marikulture kao stručna podloga koja će pomoći u plansko-upravljačkom procesu kojim se stvaraju pretpostavke za ostvarenje nastojanja Šibensko-kninske županije za razvojem marikulture istovremeno poštujući sva ograničenja u prostoru.

Ključne riječi: dionici, radionice, višekriterijska analiza prostora, prostorno planiranje

The partnership between NGOs and public institutions for environmental protection in Kosovo: The complementarity of purpose

Remzije Istrefi¹, Mihone Kerolli-Mustafa²

¹*University of Prishtina, Faculty of Law, Agim Ramadani nn, Prishtina, 10000, Kosovo*

²*International Business College Mitrovica, Environmental Management, Bsilim Bajgora nn, Mitrovica, 40000, Kosovo (m.kerolli@ibcmmitrovica.eu)*

Abstract

This paper outlines the important role that NGOs play in helping to tackle environmental issues in Kosovo. A myriad NGOs and voluntary organizations act as catalyst in bringing the new initiatives and community participation in developing the social and environmental accountability. Nowadays, the necessity for strengthening the environmental awareness is demanding and urgent than ever before. Despite the existing provisions on the environmental legal framework of Kosovo, the environment degradation continues. The lack of effective enforcement and implementation of various laws affects profoundly the environment protection. The implementation of the Environmental Impact Assessment (EIA) system in Kosovo is to be seen as an important opportunity to create a stable process of assessing the environmental impact and increase the environmental policy integration. The implementation of EIAs, and the role of NGO sector in scrutinizing the public authorities in the process of its implementation are used here as case studies in assessing the level of emerging patterns of environmental protection in Kosovo. The paper suggests new modes of governance to be established in Kosovo with the direct involvement and partnership governance involving interaction between citizen and NGO in enhancing environmental protection.

Keywords: Civil society participation, Environmental Impact Assessment, Kosovo.

SEKCIJA 4 / SECTION 4

**SUDJELOVANJE JAVNOSTI /
PUBLIC INVOLVEMENT**

**POSTER PREZENTACIJE /
POSTER PRESENTATIONS**

Agri-environment-climate education in advisory work: Experiences with farmers

Ines Pohajda¹, Iva Pavić¹, Letizia Antonella Vukorep¹, Marko Dobrić²

¹*Savjetodavna služba, Savska 41, Zagreb, Croatia*
(ines.pohajda@savjetodavna.hr)

²*Savjetodavna služba, podružnica Šibensko-kninske županije, Matije Gupca 66a, Šibenik, Croatia*

Abstract

Agri-environment-climate measure (M10. RDP) is included in Rural Development Programme of Republic of Croatia. Advisory Service conduct education for farmers who are beneficiaries of M10. RDP. Accordingly, educations are addressed to beneficiaries of Operations: Tilling and sowing on the terrain with slope for arable annual plants, Grassing of permanent crops, Preservation of high nature value grasslands, Pilot measure for the protection of corncrake (*Crex crex*), Pilot measure for the protection of butterflies, Establishment of field strips, Maintaining extensive orchards, Maintaining extensive olive groves and Preservation of endangered native and protected breeds of domestic animals. Operations Preservation of high nature value grasslands, Pilot measure for the protection of corncrake (*Crex crex*), Pilot measure for the protection of butterflies include areas within ecological measure Natura 2000. Preservation of birds in areas significant for birds with Pilot measure for the protection of corncrake (*Crex crex*) is in coordinate with order about goals of preservation and basic measures for preserving birds in areas of ecological measure (NN 15/2014).

In Croatia, most common operation is Preservation of endangered native and protected breeds of domestic animals (91,26%), while sub-measure Pilot measure for the protection of corncrake (*Crex crex*) has the lowest number of beneficiaries (0,15%). Advisory Service is obliged to hold compulsory education in duration of 18 hours in 3 blocks (Agri-environment-climate-introduction, Sustainable management of soil, water, fertilizers and pesticides, Agri-environmental principles in practice). Accordingly, in total 1021 beneficiaries attended education. Most of the attendants were present in Sisak-Moslavina County and low was in Zagreb City. In the following years, it is planned 6 hours per year to apply forth with education, demonstrations and conduct individual advisory activities.

Keywords: agri-environment protection, agricultural advising of environment and clima, farmers education

SEKCIJA 5 / SECTION 5

ZAŠTITA OKOLIŠA I FINANCIRANJE PROJEKATA / ENVIRONMENTAL PROTECTION AND PROJECT FINANCING

Challenges to meeting the environmental protection requirements and the nature of projects funded from EU funds

Boris Majić

*Hrvatske ceste d.o.o., Vončinina 3, 10000 Zagreb, Croatia
(boris.majic@hrvatske-cestec.hr)*

Abstract

For all road projects from the Portfolio, the projects for OPP 2007-2013 were prepared by SUO and the EIA carried out before 2011.

Project preparation, as a basis for decision-making on project approval, is considered on the day of submission of the Application Document.

In all projects there is a problem of compliance with Aarhus Convention, Nature 2000, the Water Directive and the Marine Strategy Directive.

The Ordinance on Assessment of Acceptance of the Nature Project was adopted on August 27, 2007. If the EIA started before the Ordinance was adopted, the impact on nature was considered in a special administrative procedure.

In PUOs that started after the rulebook was adopted, procedures were merged.

Climate change appears as a novelty in the regulation and the Jaspers Seminar on Climate Change in Large Projects in the period 2014-2020 gave initial instructions on how to handle this topic.

The first paper on the impact of climate change on the Great Project and adaptation to climate change for the Hc project was completed in May 2016.

The EIA procedures, though complex, clearly defined and in the Programming Period 2014-2020, do not represent a risk for project preparation.

Keywords: Environmental Protection Act, Ordinance on Assessment of Eligibility for Nature Conservation, Environmental Impact, Climate Change, OPKK 2014-2020

Izazovi ispunjavanja uvjeta zaštite okoliša i prirode projekata financiranih iz EU fondova

Boris Majić

*Hrvatske ceste d.o.o. ,Vončinina 3, 10000 Zagreb, Republika Hrvatska
(boris.majic@hrvatske-ceste.hr)*

Sažetak

Za sve cestovne projekte iz Portfelja projekata za OPP 2007-2013 se SUO izradila te PUO proveo prije 2011. g.

Pripremljenost projekta, kao podloga za donošenje odluke o odobrenju projekta, se razmatra na dan dostave Aplikacijskog dokumenta.

Kod svih projekata postoji problem upitnosti usklađenosti s odredbama Aarhuške konvencije, Nature 2000, Direktive o vodama i Direktive o morskoj strategiji.

Pravilnik o ocjeni prihvatljivosti zahvata za prirodu donesen je 27.08.2007. Ukoliko je PUO otpočeo prije donošenja Pravilnika, utjecaj na prirodu se razmatrao u posebnom upravnom postupku.

Kod PUO koji su otpočeli nakon donošenja pravilnika, postupci su objedinjeni. Klimatske promjene se javljaju kao novost u regulativi a Jaspersov Seminar o klimatskim promjenama kod Velikih projekata u periodu 2014-2020 je dao početne naputke o načinu obrade te teme.

Prvi elaborat o utjecaju klimatskih promjena na Veliki projekt i prilagodbi klimatskim promjenama je za projekt Hc-a dovršen u svibnju 2016.

Procedure PUO su , mada složene, jasno definirane te u Programskom periodu 2014-2020 ne predstavljaju rizik za pripremu projekta.

Ključne riječi: Zakon o zaštiti okoliša, Pravilnik o ocjeni prihvatljivosti zahvata za prirodu, Utjecaj na okoliš, Klimatske promjene, OPKK 2014-2020

Pelješac Bridge - Path to EC Approval on Project Financing with a Review on Environmental Issues and Nature Issues

Boris Majić

*Hrvatske ceste d.o.o., Vončinina 3, 10000 Zagreb, Croatia
(boris.majic@hrvatske-ceste.hr)*

Abstract

For the "old" project of the Pelješac bridge EIS was created in 2006, and the EIA was carried out. The site is now in an area that later becomes a protected area under the Nature Protection Act (NN 80/13) and part of the Natura 2000 network.

At that time, RH was not a signatory to the ESPOO Convention, but BiH was involved in the consultation process and was 24.05.2007. In Neum, a presentation of the EIS and a public hearing from which comments on the content of EIS were held (the same were further elaborated).

Feasibility study has been made to analyze all possible options for merging the separated territory of the Republic of Croatia and to propose the best solution for the problem.

The impact of individual options on the environment and nature is one of the key criteria for evaluating options.

In BiH there were no regulations at the time that would be the basis for the establishment of protected areas of nature and options on that issue could not be evaluated.

Options that had been deposited in the territory of the Republic of Croatia all lay within the Natura 2000 area.

Through the multicriteria analysis, each of the options is valued through its impact on: Marine Environment, Land, Protected Areas, Built Environment.

PFS selects the mainland-Peljesac bridge as the best option that can solve the problem of the separated territory of the Republic of Croatia and the EU.

The new EIA is prepared for the 2014-2020 financial period (the new regulation) and the old EIS did not meet the Aarhus Convention, Nature 2000, Water Directive and the Marine Strategy Directive. It was obligate to monitor the impact of the project in accordance with the new Environmental Protection Act and the Decree on Environmental Impact Assessment (NN 61/14).

For all major projects from OPK 2014-2020, it was necessary to analyze the impacts of climate change and adaptation to climate change.

The public hearing of the EIS was held from 07.09.-06.10.2015. and the public insight was given to those interested in Ston and Dubrovnik and on the MZOIP web site. The MZOIP has, in accordance with the provisions of the ESPOO Convention, sent Notifications of BiH but for the duration of EIA, until the issuance of the Eligibility Solvency, no comments were received.

At 07.02.2017. a Peljesac Bridge project application was sent to IQR - on 20 March 2017. IQR has provided a positive response to the project's preparedness and sustainability.

At 07.06.2017., the European Commission decide to accept the co-financing of the construction of the Peljesac Bridge.

Keywords: Peljesac Bridge, Multicriteria Analysis, Environmental Impact, Climate Change, EU Financing

Pelješki most – put do odobrenja EK o financiranju projekta s osvrtnom na problematiku projekta iz područja zaštite okoliša i prirode

Boris Majić

*Hrvatske ceste d.o.o., Vončinina 3, 10000 Zagreb, Republika Hrvatska
(boris.majic@hrvatske-cestes.hr)*

Sažetak

Za „stari” projekt Pelješkog mosta je SUO izrađena 2006., te je proveden PUO. Most se nalazi na području koje kasnije postaje zaštićeno područje prema Zakonu o zaštiti prirode (NN 80/13) te dio mreže Natura 2000.

BiH je bila uključena u konzultacijsku proceduru te je 24.05.2007. u Neumu održana prezentacija SUO i javna rasprava s koje su upućene primjedbe na sadržaj SUO (iste dodatno obrađene).

Izradu Predstudije izvedivosti financira EU, s ciljem analize svih mogućih opcija spajanja razdvojenog teritorija RH te prijedloga najbolje opcije za rješenje problema.

Utjecaj pojedinih opcija na okoliš i prirodu su jedan od ključnih kriterija za vrednovanje opcija.

U BiH tada nije bila na snazi regulativa koja bi bila temelj za uspostavu zaštićenih područja prirode te se opcije po tom pitanju nisu mogle vrednovati.

Opcije koje su bile položene teritorijem RH su sve ležale unutar područja Nature 2000.

Kroz Multikriterijsku analizu je svaka od opcija vrednovana kroz svoj utjecaj na: Morski okoliš, Kopneni okoliš, Zaštićena područja te Izgrađeni okoliš.

Predstudija odabire most kopno-Pelješac kao najbolju opciju koja može riješiti problem razdvojenog teritorija RH i EU.

Nova SUO - projekt je pripreman za financijsko razdoblje 2014-2020 (nova regulativa) te stara SUO nije ispunjavala uvjete iz Aarhuške konvencije, Nature 2000, Direktive o vodama i Direktive o morskoj strategiji. Bilo je potrebno analizirati utjecaje zahvata na okoliš, predložiti mjere zaštite i program praćenja te ocijeniti utjecaj zahvata u skladu s Zakonom o zaštiti okoliša iz 2013. te Uredbom o procjeni utjecaja zahvata na okoliš (NN 61/14).

Za sve Velike projekte iz OPKK 2014-2020 bilo je potrebno analizirati utjecaje klimatskih promjena i prilagodbu klimatskim promjenama.

Javna rasprava o SUO je održana 07.09.-06.10.2015. a javni uvid je bio omogućen u Stonu i Dubrovniku te na web stranicama MZOIP. MZOIP je, shodno odredbama ESPOO konvencije, poslalo notifikaciju BiH ali za vrijeme trajanja PUO, do trenutka izdavanja Rješenja o prihvatljivosti, nisu stigle nikakve primjedbe. Naknadno poslane primjedbe iz 2007.

Dana 07.02.2017. je poslana aplikacija projekta Pelješki most na IQR a 20.03.2017. je IQR dao pozitivno očitovanje o pripremljenosti i održivosti projekta te je 07.06.2017. potpisana Odluka Europske komisije o prihvaćanju sufinanciranja izgradnje Pelješkog mosta.

Ključne riječi: Pelješki most, Multikriterijska analiza, Utjecaj na okoliš, Klimatske promjene, EU financiranje

Agglomeration Rijeka – Cofinancing major environmental protection projects

Marijana Bakula

*DVOKUT-ECRO d.o.o., Trnjanska 37, Zagreb, Croatia
(marijana.bakula@dvokut-ecro.hr)*

Abstract

Project of the agglomeration Rijeka consists of the construction of waste water collection system with waste water treatment plant for the city of Rijeka and the surrounding local self-government units. The total capacity of the agglomeration amounts 200.000 PE which makes it one of the largest environmental protection projects in the Republic of Croatia. Due to the significant financial investment for project construction (around 1,75 billion HRK), part of the financial resources will be provided from the EU funds. The preparation of the project took 5 years, and since it is a major project, the only thing that's left for the realization is to obtain the approval of the European Commission. Numerous options were analysed within the project's framework, and an important role in the selection of the most acceptable option, apart from the financial criteria, had the ecological and highest efficiency criteria which provide for the optimal performance of not only the waste water collection system, but also the waste water treatment plant. Besides the construction, obtaining of maintenance and management equipment for the whole system as well as technical assistance for managing of the construction process and conducting of the construction works is also envisaged by the project, having in mind that projects of such magnitude have never been conducted in the Republic of Croatia and that local experts do not possess sufficient experience in the implementation of such large projects.

Keywords: EU financing, wastewater, wastewater treatment, environmental protection

Aglomeracija Rijeka – Sufinanciranje velikih projekata za zaštitu okoliša

Marijana Bakula

*DVOKUT-ECRO Ltd., Trnjanska 37, Zagreb, Hrvatska
(marijana.bakula@dvokut-ecro.hr)*

Sažetak

Projekt aglomeracije Rijeka uključuje izgradnju sustava odvodnje i pročišćavanja otpadnih voda Grada Rijeke i okolnih jedinica lokalne samouprave. Ukupno opterećenje aglomeracije Rijeka je 200.000 ES i jedan je od najvećih projekata zaštite okoliša u RH. Obzirom na značajna financijska sredstva koja su potrebna za izgradnju projekta (oko 1,75 milijardi HRK), dio sredstava će se osigurati iz EU fondova. Priprema projekta trajala je 5 godina, a obzirom da se radi o velikom projektu preostalo je još jedino odobrenje Europske komisije. U sklopu projekta su provedene brojne opsijske analize, a za odabir najprihvatljivije opcije osim financijskih kriterija važnu ulogu imali su i ekološki kriteriji i kriteriji kojima se postiže visoka učinkovitost i optimalan način rada kako sustava odvodnje tako i uređaja za pročišćavanje otpadnih voda. Osim same izgradnje, projektom je predviđena nabava opreme za održavanje i upravljanje cijelim sustavom, te tehnička pomoć za upravljanje projektom izgradnje i nadzorom nad izvođenjem radova obzirom da u RH nije bilo ovako velikih projekata te domaći stručnjaci nemaju dovoljno iskustva u provođenju ovako velikih projekata.

Ključne riječi: EU financiranje, otpadne vode, pročišćavanje otpadnih voda, zaštita okoliša

Environmental Monitoring on Landfills - Financial Challenge for the Municipalities

Margareta Šeparović, Ivan Barbić

*Maxicon Ltd., Kružna 22, Zagreb, Croatia (margareta.separovic@maxicon.hr,
ivan.barbic@maxicon.hr)*

Abstract

Environmental monitoring on landfills is a legal obligation that takes place during the landfill operation and 30 years after its closure. Municipalities are faced with exceptionally high monitoring costs as defined by Environmental Permit and waste management regulations.

Environmental monitoring on landfill during its operation and after the closure includes: control of meteorological data and gas control, emission control of leachate, surface waters, groundwater and storm water and monitoring of the structure and composition of landfill body with settling behaviour of the landfill body.

Municipalities can receive EU co-financing within the Cohesion Fund through the Operational Programme Competitiveness and Cohesion 2014-2020. The co-financing can only be acquired for the operations related to the closure and remediation of landfills. The installation of infrastructure that is solely in the monitoring function is not an acceptable cost as well as the cost of monitoring and the cost of obtaining an Environmental Permit for an operating landfill.

The legal framework currently does not allow the possibility of reducing the frequency of monitoring in a period of 30 years after its closure if the monitoring results show compliance with the limit values of parameters, which would greatly assist Municipalities in reducing the cost of environmental monitoring on landfill considering the existing deficit in budget funds of many Municipalities in Croatia.

Keywords: Monitoring, Landfills, Municipalities, EU co-financing, Environmental Permit

Praćenje stanja okoliša na odlagalištima otpada – financijski izazov za jedinice lokalne samouprave

Margareta Šeparović, Ivan Barbić

Maxicon d.o.o., Kružna 22, Zagreb, Hrvatska

(margareta.separovic@maxicon.hr, ivan.barbic@maxicon.hr)

Sažetak

Praćenje stanja okoliša na odlagalištima otpada zakonska je obveza koja traje tijekom rada i 30 godina nakon zatvaranja odlagališta. Jedinice lokalne samouprave suočene su s iznimno visokim troškovima monitoringa koji je definiran okolišnom dozvolom i propisima iz gospodarenja otpadom.

Praćenje stanja okoliša na odlagalištu za vrijeme rada i nakon prestanka rada obuhvaća: kontrolu meteoroloških parametara i emisija plinova, kontrolu emisija tvari u procjedne i površinske vode, oborinske i podzemne vode te praćenje strukture, sastava i slijevanja razine tijela odlagališta.

Jedinice lokalne samouprave mogu u okviru Kohezijskog fonda kroz Operativni program Konkurentnost i kohezija 2014.-2020. ostvariti EU sufinanciranje samo za izvedbu građevinskih i drugih radova vezanih za zatvaranje i sanaciju odlagališta otpada čime izgradnja infrastrukture koja je isključivo u funkciji monitoringa nije prihvatljiv trošak kao ni trošak provedbe monitoringa i trošak ishođenja okolišne dozvole za aktivna uređena odlagališta. Zakonski okvir trenutno ne dopušta mogućnost smanjenja učestalosti provedbe monitoringa tijekom 30 g. nakon zatvaranja ukoliko rezultati monitoringa pokazuju zadovoljenje propisanih graničnih vrijednosti parametara čime bi se uvelike pomoglo jedinicama lokalne samouprave u smanjenju troškova provedbe praćenja stanja okoliša na odlagalištu otpada s obzirom na već postojeći deficit u proračunskim sredstvima mnogih jedinica lokalne samouprave u Hrvatskoj.

Ključne riječi: monitoring, odlagališta otpada, jedinice lokalne samouprave, EU sufinanciranje, okolišna dozvola

Landscape revitalization, the final step at remediating municipal waste landfills within EU funded projects

Valentina Habdija Žigman, Željko Varga

*Maxicon d.o.o., Kružna 22, Zagreb, Croatia (valentina.habdija@maxicon.hr,
zeljko.varga@maxicon.hr)*

Abstract

Activity co-financed by the EU within the Operational Programme Competitiveness and Cohesion 2014. - 2020.; Specific Objective 6i1 is remediation/closure/rehabilitation of existing unregulated municipal waste landfills. In that manner, it is possible to contribute to the reduction of negative environmental effects of inadequate waste management practices.

Remediation of existing unregulated municipal waste landfills in the Croatia will have a significant positive impact on the environment and local community, which will be measurable especially in terms of soil, groundwater, surface water and air protection.

The most prominent benefit for the community is the reuse of devastated places and future value of remediated sites. As the most successful tool in that context, landscape revitalization stands out. It involves a careful site and planting design ideas, best by using indigenous plants and efficient embedding of the new landfill structure into the surrounding landscape context giving it a new function, then returned to local community for reuse.

Landscape designs conducted within the rehabilitation projects carried out so far have had an enormous positive feedback from the Municipalities, as is evident from numerous examples of remediated landfill sites co-financed through the previous Program (2007-2013). All new landfill remediation projects planned for co-financing through the new Operational Programme Competitiveness and Cohesion 2014 - 2020. are planned to go in the same direction.

Keywords: OPCC 2014-2020, Municipal waste landfill, EU co-financing, Solution, Landscape revitalization

Krajobrazna revitalizacija, finalni korak sanacije odlagališta komunalnog otpada u okviru EU financiranih projekata

Valentina Habdija Žigman, Željko Varga

Maxicon d.o.o., Kružna 22, Zagreb, Hrvatska (valentina.habdija@maxicon.hr, zeljko.varga@maxicon.hr)

Sažetak

Aktivnost koja se financira EU sredstvima kroz Operativni program Konkurentnost i kohezija 2014.-2020. (OPKK); u okviru prioritetne osi 6; prioritet 6i; specifični cilj 6i1 je sanacija/zatvaranje/rehabilitacija postojećih neusklađenih odlagališta komunalnog otpada, čime se doprinosi smanjenju štetnih utjecaja neadekvatnog gospodarenja otpadom na okoliš.

Sanacije neusklađenih odlagališta na području RH imat će značajan pozitivan utjecaj na okoliš šire lokacije zahvata te lokalnu zajednicu, što će se očitovati kroz zaštitu tla, podzemnih i površinskih voda te zraka.

Najmjerljivija korist za lokalnu zajednicu je prenamjena i nova vrijednost saniranog prostora odlagališta. Kao najkorisniji alat za postizanje uspješne rehabilitacije devastiranog prostora ističe se krajobrazna revitalizacija koja podrazumijeva ozelenjavanje prostora biljnim materijalom, najbolje autohtonim, s uklapanjem u lokalni krajobrazni kontekst. Time se devastiranom prostoru vraćaju doprinske vrijednosti, daje mu se nova namjena te se time isti u novoj funkciji vraća na korištenje lokalnoj zajednici.

Praksa krajobrazne revitalizacije koja se provodi unutar građevinskog projekata sanacije odlagališta naišla je na pozitivan odjek kod jedinica lokalne samouprave što je vidljivo i na brojnim primjerima do sada saniranih odlagališta sufinanciranih kroz prethodni Operativni program Zaštita okoliša 2007.-2013. Istom smjerom kreću buduće sanacije odlagališta koji se planiranju financirati kroz novi OPKK 2014.-2020.

Ključne riječi: OPKK 2014.-2020., odlagalište komunalnog otpada, EU sufinanciranje, paradigma, krajobrazna revitalizacija

Zahvaljujemo našim sponzorima! /
We thank our sponsors!

DVOKUT-ECRO



ENVIRONMENTAL
PROTECTION
AND SUSTAINABLE
DEVELOPMENT

strategic environmental
assessment and
environmental impact
assessment



various reports, analyses,
environmental protection
programs and action plans



nature, water and
sea protection



project design and
environmental supervision



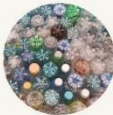
pollution prevention,
control and remediation



environmental monitoring



waste management
documentation



feasibility studies,
financial and economic
analyses



capacity building



training and education



EKONERG – Energy and Environmental Protection Institute
Koranska 5, Zagreb, 10000
Tel: +385 (0)1 6000 111;
Fax: +385 (0)1 6171-560
ekonerger@ekonerger.hr

EKONERG is the leading Croatian consulting company in the fields of energy, industry, environmental protection and climate activities, with a long tradition of successful business on domestic and foreign markets. Multidisciplinary teams of top experts prepare and participate in the implementation of complex projects covering the entire life span of power and utility systems, various industrial plants as well as environmental protection systems. EKONERG is a unique partner in all phases of project development or investment, offering clients a wide range of specialized services. Services in the fields of environmental and nature protection, climate activities and sustainable development are related to the preparation of strategic and planning documents and studies, consultancy services and preparation of environmental and nature protection documents required by law, during the phase of site preparation and construction, use and decommission of the plant.



Sukoišanska 43, HR-21000 Split
PHONE: +385 21 277 100
EMAIL : geoprojekt@geoprojekt.hr
INTERNET: www.geoprojekt.hr

Geoprojekt d.d., Split, is a company with a broad spectrum of activities in the fields of civil engineering, road transportation projecting, geodesy, geoinformatics and urban planning.

The company was founded in 1955 and during more then 60 years has built its reputation as one of the leading companies in Croatia in our field. We keep our acquired position, reputation and competitiveness in the demanding market by constantly implementing new activities, new technologies and by consistent education of our staff in its use.



Bikarac d.o.o
Waste Management Center
Šibenik Knin County
Director: Robert Podrug, dipl.ing.
Address: Stjepana Radića 100, 22000 Šibenik
Telephone: 022 338 363
Fax: 022 662 992
Web: www.bikarac.hr
e-mail: tajnica@bikarac.hr

Waste Management Center Bikarac is a waste management center in Šibenik-Knin County.

Waste Management Center Bikarac consists of two transfer stations (Pirovac and Biskupija) and a Center for mechanical biological treatment of waste.



WITH US DEVELOPMENT IS NATURAL

With over 1,000 completed contracts and almost 20 years of experience, Oikon Ltd. is a leading licensed and accredited environmental consultancy/research institute in Croatia and the region.

Oikon's areas of expertise include nature and environmental protection, industrial ecology, renewable energy, management of natural resources, ecological modelling, landscape analysis and design, geographic information systems, remote sensing and ICT, feasibility studies, as well as programs and projects management.

Oikon is quality certified and has received multiple awards over the years, including the AAA certificate. The company has extensive working experience in Croatia, Bosnia and Herzegovina, Montenegro, Albania, Great Britain, Turkey and Cyprus.

If you would like to work with us or if you just want to learn more about us, please feel free to contact us or visit our web site. We look forward to cooperation and new challenges.

OIKON Ltd.—Institute of Applied Ecology

Trg senjskih uskoka 1-2

10 020 Zagreb, Croatia

T: +385 1 5507 100

W: www.oikon.hr

E: oikon@oikon.hr



↓ save my contact



ZaVita is a reliable partner **ForYou** in environmental and nature protection management, as well as in development planning of rural and protected areas. We do not prepare the documentation, but rather create visible results together with our clients. We are not praising ourselves; our customers are praising our services. We are a socially responsible company with a vision to remain recognizable by innovative and custom-tailored solutions.



ZaVita je pouzdani partner **ZaVas** u upravljanju okolišem i prirodom te u razvojnom planiranju u ruralnim i zaštićenim područjima. Ne pripremamo dokumentaciju, nego zajedno s naručiteljima kreiramo vidljive rezultate. Ne hvalimo se, hvale nas korisnici naših usluga. Društveno smo odgovorno poduzeće s vizijom ostati prepoznatljivi po inovativnim i korisnicima prilagođenim rješenjima.

ZaVita d.o.o., Tominškova 40, Ljubljana, SLOVENIJA, T/+386 41 711 794,
info@zavita.si, www.zavita.si



Dečanska 5
11000 Belgrade
Republika Srbija

Tel: +381(11)3226-451
www.dvoper.rs
info@dvoper.rs



DVOPER LTD, a company from Belgrade, is a recognizable professional factor in the field of *environmental protection consulting and engineering*.

Comprised of experienced professional and expert team, the company has proved itself as a strong and reliable partner of great domestic and foreign companies and organizations, and also as a secure and determined leader of entrusted projects.

DVOPER LTD offers its clients a wide range of services:

- Environmental consulting,
- Project Management,
- Technical Assistance,
- Preparation of Planning and Technical Documentation (EIA, SEA, Waste management plans, Documentation for acquiring integrated permit (IPPC), Documentation for SEVESO facilities, Environmental management plans for construction works contractors (EMP) etc.),
- Providing services to the laboratories in establishing and maintaining SRPC ISO/IEC 17025 systems
- Reports on environmental condition assessment and health and safety (Environmental, Health and Safety Due Diligence),
- Chemical Advisor Services etc.



FIDON

Fidon d.o.o.
za projektiranje i savjetovanje
Fidon Ltd.
for design & consulting

10000 Zagreb
Ulica grada Vukovara 271/V
tel. +385 1 707 9056

www.fidon.hr
fidon@fidon.hr



MUVO - One vehicle for all seasons

Mowing and cleaning the urban infrastructure in the spring, watering and nurturing plants in the summer, snow cleaning and road spreading in the winter, waste collecting and changing public lighting throughout the year – MUVO can do it all.

W www.rasco.hr M rasco@rasco.hr T +385 (48) 883 112 F +385 (48) 280 146
A Kolodvorska 120b, HR-48361 Kalinovac, Croatia / Hrvatska



www.kova.hr

SORTIRNICE OTPADA

Ekologija uvjet
življenja



KOVA

Poduzeće za preradu metala
i plastike, izvoz i uvoz d.o.o.

- Uklanjanje neprikladnih komponenti iz ulaznog neobrađenog otpada
- Povećavanje količine obnovljivih sekundarnih sirovina izdvojenih iz otpada (izdvajanje materijala kao što su staklo, metali, plastika, papir)

KOSI PODIZNI TRANSPORTER



Dužina transportera: 3000
Širina transportera: 1000/1400
Visina transportera: 980/1800 mm
Snaga motora: 380 V / 2,2 kW
Brzina doziranja: 15 m/min
Nagib: 35°
Namjena: Prijenos – transport sortiranog otpada

SORTIRNI TRANSPORTER



Dužina transportera: 5400 mm
Širina transportera: 1000/2460 mm
Visina transportera: 1070 mm
Snaga motora: 380 V / 2,2 kW
Brzina doziranja: 15 m/min
Namjena: Prijenos – transport sortiranog otpada

PODNI (USIPNI) TRANSPORTER



Dužina transportera: 3200 mm
Širina transportera: 1000 (1400) mm
Visina transportera: 440/1500 mm
Snaga motora: 380 V / 2,2 kW
Brzina doziranja: 15 m/min
Namjena: Prijenos – transport sortiranog otpada

10410 Mraclin, Velika Gorica, Braće Radića 122 b, T: 01/6268 254, 01/6268 253 | F: 01/6268 255 | E.: kova@kova.hr



zeleni servis d.o.o.

Studije utjecaja na okoliš • Ekološka mreža • Elaborati zaštite okoliša

ZELENI SERVIS d.o.o.

Split, Velebitska 27, Tel. 021 532 085; 325 196

Zagreb, Ive Robića 2, Tel. 01 614 16 17

www.zeleniservis.hr

Strategic Environmental Assessment

Ecological network

Environmental Impact Assessment Study

Underwater Biological Research

Ekoinvest

Draškovićeva 50, 10000 Zagreb

**ZAŠTITA OKOLIŠA
I PRIRODE**

EU FONDOVI

**PRIJEVODI
I EDUKACIJE**

01 376 91 20
01 376 93 62

ekoinvest@ekoinvest.hr
www.ekoinvest.hr

MAXICON

Maximum Consulting

...environment protection,
waste management and
waste water treatment
consulting services...

Maxicon d.o.o.

Kružna 22, Zagreb

+385 (0)1 7799 533

www.maxicon.hr, info@maxicon.hr



VitaPROJEKT
projektiranje i savjetovanje u zaštiti okoliša
environmental engineering and consulting

PROJEKTI KRAJOBRAZNE
ARHITEKTURE
*LANDSCAPE ARCHITECTURE
DESIGN*



STRUČNI POSLOVI ZAŠTITE
OKOLIŠA
*ENVIRONMENTAL AND
NATURA2000 IMPACT ASSESSMENT*



BIODIVERZITET – GEODIVERZITET
- KRAJOBRAZNA RAZNOLIKOST
*BIODIVERSITY - GEODIVERSITY
- LANDSCAPE DIVERSITY*





ODRŽIVO GOSPODARENJE
OTPADOM I SANACIJA OKOLIŠA
*SUSTAINABLE WASTE
MANAGEMENT SOLUTIONS*

PRILAGODBA KLIMATSKIM
PROMJENAMA
*CLIMATE CHANGE
ADAPTATION*




ZELENI CERTIFIKATI I
EDUKACIJA
*GREEN CERTIFICATES
AND EDUCATION*

VITA PROJEKT d.o.o.
Zagreb, Illica 191C Tel: + 385 (0)1 3774 240
email: info@vitaprojekt.hr www.vitaprojekt.hr



**The Energy and Environmental
Protection Sector
of the Croatian Chamber
of Economy**

organises various activities through
professional associations and interest affiliations.

Its main focus lies on

**energy efficiency,
waste management, climate change,
water management and sustainable management
of natural resources.**

**All businesses are welcome to
join and support
the work of its associations and affiliations.**



HRVATSKA
GOSPODARSKA
KOMORA

Croatian Chamber of Economy, Rooseveltov trg 2, Zagreb; Free Info Phone: 0800 1852; E-mail: okolis@hgk.hr; www.hgk.hr



Fallerovo šetalište 22|10000
Zagreb

Zelena infrastruktura d.o.o. for environmental protection and spatial planning provides consulting services in:

- environmental and nature protection,
- sustainable spatial planning,
- landscape architecture,
- ecosystem services and green infrastructure,
- natural resources management.



**BUREAU
VERITAS**

**Leading company in Management
System Certification and Training**

Certifikacija i edukacija

ISO 9001 - ISO 14001 - OHSAS 18001
ISO 50001 - SA 8000 - ISO 26000
ISO 27001 - ISO 20000-1 - ISO 22301
ISO 22000 - HACCP - IFS - BRC
ISO 17100 - MSC - ISO 20252

IRCA Internal and Lead Auditor training
ISO 9001 & 14001:2015 Transition courses

e-mail: office.croatia@hr.bureauveritas.com
tel: 01-652 93 98
www.bureauveritas.hr

LNG Croatia LLC is the company responsible for the development of LNG import terminal Project on the Island of Krk. The proposed Project will include the building and operating of the infrastructure necessary for receiving, storing, reloading and regasification of liquefied natural gas. The Project has the purpose to secure energy needs and increase security of gas supply through the provision of new gas supply route for the Central and Southeastern European countries.



Co-financed by the European Union
Connecting Europe Facility



**Lider u građevinskoj i komunalnoj
logistici**

**Leader in construction and communal
logistics**

KOMOP d.o.o.

Generalni zastupnik za Faun, Liebherr,
Goldhofer, Putzmeister i Sotkon u
Republici Hrvatskoj

*Authorized representative of Faun,
Liebherr, Goldhofer, Putzmeister and
Sotkon in Croatia*

Kovinska 21
HR-10090 Zagreb-Susedgrad
Phone: +385 (1) 4825 990
Fax: +385 (1) 4825 997
E-mail: info@komop.hr
Web: www.komop.hr